INTRODUCTION

How to Use This Manual

The 95 ACCORD COUPE Shop Manual (Maintenance, Repair and Construction) is divided into 23 sections. The first page of each section is marked with a black tab that lines up with its corresponding thumb index tab on this page. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.

Each section includes:

1. A table of contents, or an exploded view index showing:
   - Parts disassembly sequence.
   - Bolt torques and thread sizes.
   - Page references to descriptions in text.
2. Disassembly/assembly procedures and tools.
3. Inspection.
4. Testing/troubleshooting.
5. Repair.
6. Adjustments.

Special Information

⚠ WARNING Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTE: Gives helpful information.

CAUTION: Detailed descriptions of *standard workshop* procedures, safety principles and service operations are not included. Please note that this manual contains warnings and cautions against some specific service methods which could cause PERSONAL INJURY, damage a vehicle or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by HONDA might be done, or of the possible hazardous consequences of every conceivable way, nor could HONDA investigate all such ways. Anyone using service procedures or tools, whether or not recommended by HONDA, *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized.

All information contained in this manual is based on the latest product information available at the time of printing. We reserve the right to make changes at any time without notice. No part of this publication may be reproduced, stored in retrieval system, or transmitted, in any form by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. This includes text, figures and tables.

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Service Publication Office

As sections with * include SRS components; special precautions are required when servicing.

General Info
Special Tools
Specifications
Maintenance
Engine
Cooling
Fuel and Emissions
*Transaxle
*Steering
Suspension
*Brakes (Including ABS)
*Body
*Heater and Air Conditioning
*Electrical (Including SRS)

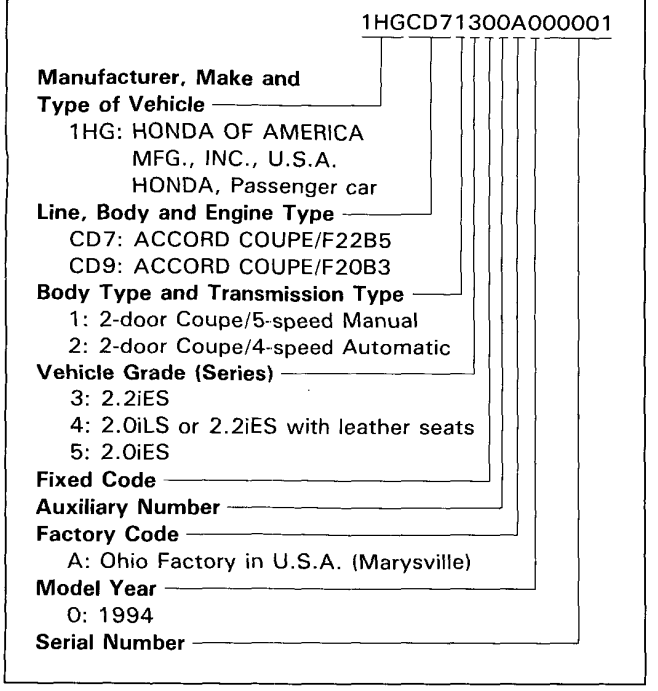
General Information

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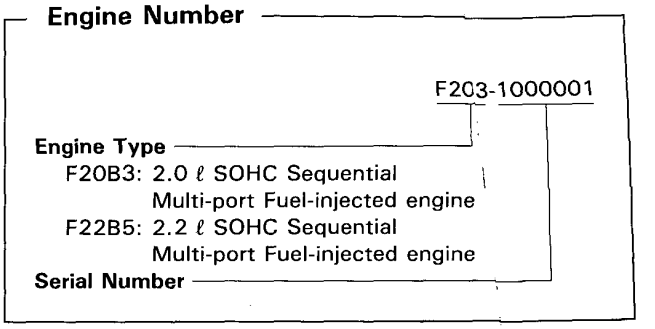
Chassis and Engine Numbers

European Model

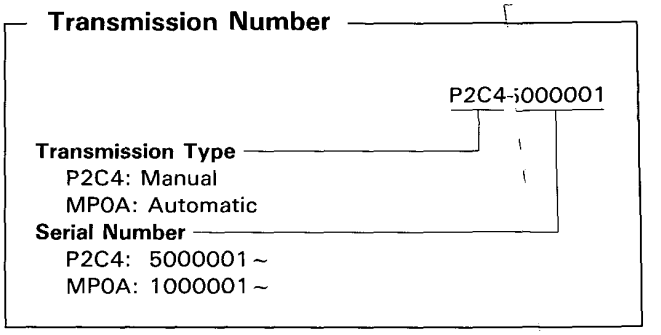
Vehicle Identification Number



Engine Number

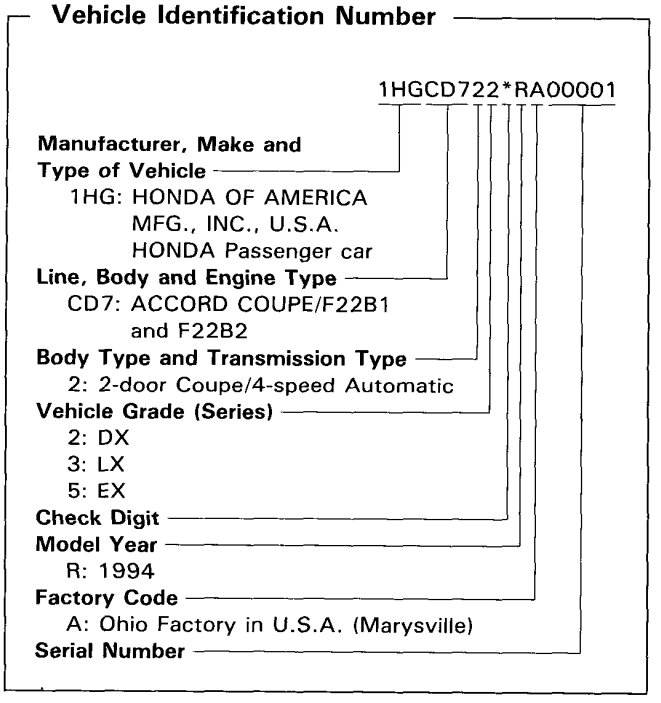


Transmission Number

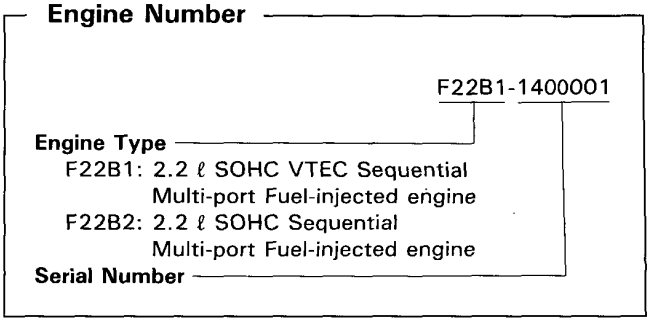


Except European Model

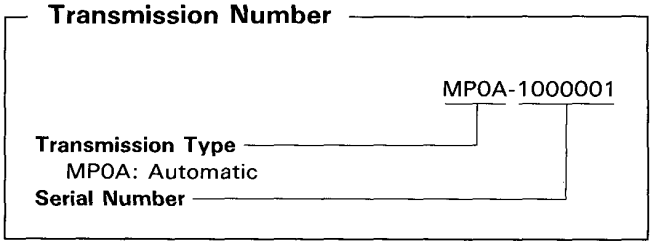
Vehicle Identification Number



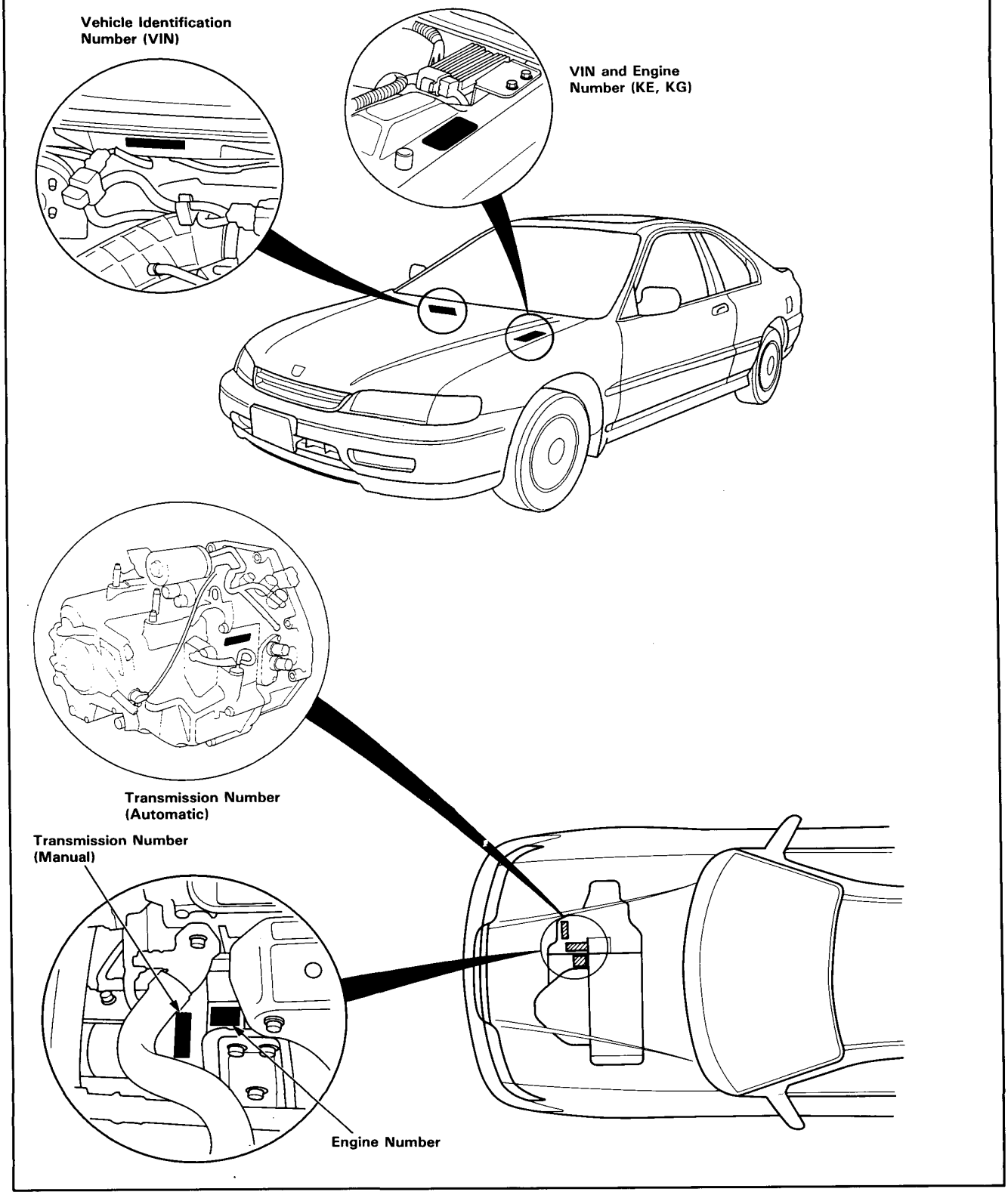
Engine Number



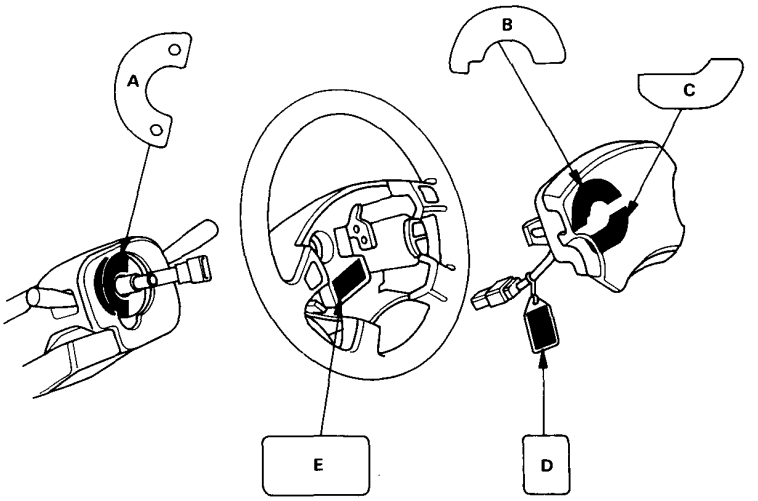
Transmission Number



Identification Number Locations



Warning/Caution Label Locations



A: CABLE REEL CAUTION A

SRS
REFER TO SERVICE (SHOP) MANUAL FOR DETAILED INSTRUCTIONS.

POUR LES INSTRUCTIONS DETAILL'EES, SE REPORTER AU MANUEL DE REPARATIONS.

AUSFÜHRLICHE ANWEISUNGEN SIND DEM WERKSTATTHANBUCH ZU ENTNEMEN.

RAADPLEEG HET WERKPLAATSHANDBOEK VOOR NADERE AANWIJZINGEN.

取扱いはサービスマニュアルを参照願います.

B: DRIVER MODULE DANGER
(KH)

⚠ DANGER
EXPLOSIVE/FLAMMABLE
CONTACT WITH ACID, WATER OR HEAVY METALS SUCH AS COPPER, LEAD OR MERCURY MAY PRODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200°F (100°C). FOR PROPER HANDLING, STORAGE AND DISPOSAL PROCEDURES REFER TO SERVICE MANUAL, SRS SUPPLEMENT.
POISON
CONTAINS POISONOUS SODIUM AZIDE AND POTASSIUM NITRATE.
FIRST AID
IF CONTENTS ARE SWALLOWED, INDUCE VOMITING. FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IF GASES (FROM ACID OR WATER CONTACT) ARE INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION.
KEEP OUT OF REACH OF CHILDREN.

(KG, KE)

- DANGER SRS
  EXPLOSIVE/FLAMMABLE
  POISON
  REFER TO SHOP MANUAL.
- DANGER
  EXPLOSIF ET INFLAMMABLE
  POISON
  SE REPORTER AU MANUEL D'ATELIER.
- GEFAHR
  EXPLOSIV/ENTZUNDBAR
  GIFT
  WERKSTATTHANDBUCH LESEN.
- GEVAAR
  EXPLOSIEGEVAAR/BRANDBAAR
  GIFTIG
  LEES HET WERKPLAATSHANDBOEK.

C: DRIVER MODULE WARNING
(KH)

⚠ WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.
- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES.
  THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.
- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE (SHOP) MANUAL INSTRUCTIONS CAREFULLY.

⚠ ATTENTION
LE GONFLEUR DE COUSSIN D'AIR EST EXPLOSIBLE ET S'LL SE DEPLOIE ACCIDENTELLEMENT, IL RISQUE DE PROVOQUER DES BLESSURES GRAVES OU DE TUER.
- NE PAS UTILISER DE MATERIEL D'ESSAI ELECTRIQUE NI DE SONDE. ILS POURRAIENT PROVOQUER UN DEPLOIMENT ACCIDENTEL DU COUSSIN D'AIR.
- IL N'Y A PAS DE PIECES REPARABLES A L'INTERIEUR. NE PAS DEMONTER.
- QUAND ON RETIRE LE COUSSIN D'AIR, LE TENIR A LA VERTICALE.
- SUIVRE ATTENTIVEMENT LES INSTRUCTIONS DU MANUEL D'ENTRETIEN.

(KG, KE)

WARNING SRS
- REFER TO THE SHOP MANUAL.
- SE REPORTER AU MANUEL D'ATELIER.
- WERKSTATTHANDBUCH LESEN.
- LEES HET WERKPLAATSHANDBOEK.

D: INFLATOR BAM LABEL
(KE, KG only)
ISI manufactured inflator:

AIRBAG GAS GENERATOR GG7-100
ISI
HERSTELLUNGSJAHR: 1993
EINFÜHRER: HONDA DEUTSCHLAND GMBH/OFFENBACH
BAM PT_1-0469

DER GASGENERATOR DART NUR FÜR INSASSENRÜCKHALTESYSTEME MIT LUFTSACK IN KRAFTFAHRZEUGE MONTIERT WERDEN.
DIE MONTAGE UND DEMONTAGE DES GASGENERATORS DARF NUR VON DAFÜR GESCHULTEM PERSONAL VORGENOMMEN WERDEN.

CAUTION CONTAINS FLAMMABLE SOLIDS US DOT-E-9066	THE GAS GENERATOR SHOULD ONLY BE INSTALLED IN VEHICLES EQUIPPED WITH THE AIRBAG SYSTEM. THE GAS GENERATOR IS TO BE INSTALLED AND/OR DISASSEMBLED ONLY BY TRAINED PERSONNEL.
ATTENTION CONTENT DE SOLIDES FLAMMABLES US DOT-E-9066	LE GENERATEUR DE GAZ NE PEUT ETRE INSTALLE QUE SUR DES VEHICULES EQUIPES D'UN SYSTEME AIRBAG LE MONTAGE ET LE DEMONTAGE DU GENERATEUR DE GAZ NE PEUT ETRE EFFECTUE QUE PAR UN PERSONNEL QUALIFIE.

MORTON International manufactured inflator:

AIRBAG GAS GENERATOR UT11600
MORTON INTERNATIONAL INC OGDEN UT. USA
HERSTELLUNGSJAHR: 1992
EINFÜHRER: HONDA DEUTSCHLAND GMBH/OFFENBACH
BAM PT_1-0388

DER GASGENERATOR DARF NUR FÜR INSASSENRÜCKHALTESYSTEME MIT LUFTSACK IN KRAFTFAHRZEUGE MONTIERT WERDEN.
DIE MONTAGE UND DEMONTAGE DES GASGENERATORS DARF NUR VON DAFÜR GESCHULTEM PERSONAL VORGENOMMEN WERDEN.

CAUTION CONTAINS FLAMMABLE SOLIDS US DOT-E-8214	THE GAS GENERATOR SHOULD ONLY BE INSTALLED IN VEHICLES EQUIPPED WITH THE AIRBAG SYSTEM. THE GAS GENERATOR IS TO BE INSTALLED AND/OR DISASSEMBLED ONLY BY TRAINED PERSONNEL.
ATTENTION CONTENT DE SOLIDES FLAMMABLES US DOT-E-8214	LE GENERATEUR DE GAZ NE PEUT ETRE INSTALLE QUE SUR DES VEHICULES EQUIPES D'UN SYSTEME AIRBAG LE MONTAGE ET LE DEMONTAGE DU GENERATEUR DE GAZ NE PEUT ETRE EFFECTUE QUE PAR UN PERSONNEL QUALIFIE.

TRW Safety Systems manufactured inflator:

AIRBAG GAS GENERATOR
TRW SAFETY SYSTEMS/MESA
HERSTELLUNGSJAHR:
EINFÜHRER: HONDA DEUTSCHLAND GMBH/OFFENBACH
BAM PT_1-0538

DER GASGENERATOR DARF NUR FÜR INSASSENRÜCKHALTESYSTEME MIT LUFTSACK IN KRAFTFAHRZEUGE MONTIERT WERDEN.
DIE MONTAGE UND DEMONTAGE DES GASGENERATORS DARF NUR VON DAFÜR GESCHULTEM PERSONAL VORGENOMMEN WERDEN.

CAUTION CONTAINS FLAMMABLE SOLIDS US DOT-E-8236	THE GAS GENERATOR SHOULD ONLY BE INSTALLED IN VEHICLES EQUIPPED WITH THE AIRBAG SYSTEM. THE GAS GENERATOR IS TO BE INSTALLED AND/OR DISASSEMBLED ONLY BY TRAINED PERSONNEL.
ATTENTION CONTENT DE SOLIDES FLAMMABLE US DOT-E-8236	LE GENERATEUR DE GAZ NE PEUT ETRE INSTALLE QUE SUR DES VEHICULES EQUIPES D'UN SYSTEME AIRBAG. LE MONTAGE ET LE DEMONTAGE DU GENERATEUR DE GAZ NE PEUT ETRE EFFECTUE QUE PAR UN PERSONNEL QUALIFIE.

E: STEERING WHEEL WARNING
(KE, KG)

WARNING SRS
- REFER TO THE SHOP MANUAL.
- SE REPORTER AU MANUEL D'ATELIER.
- WERKSTATTHANDBUCH LESSEN.
- LEES HET WERKPLAATSHANDBOEK.

E: STEERING WHEEL NOTICE
(KH)

NOTICE
IMPROPER STEERING WHEEL REMOVAL OR INSTALLATION CAN DAMAGE SRS COMPONENTS.
FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

F: SRS WARNING (HOOD)
(KH)

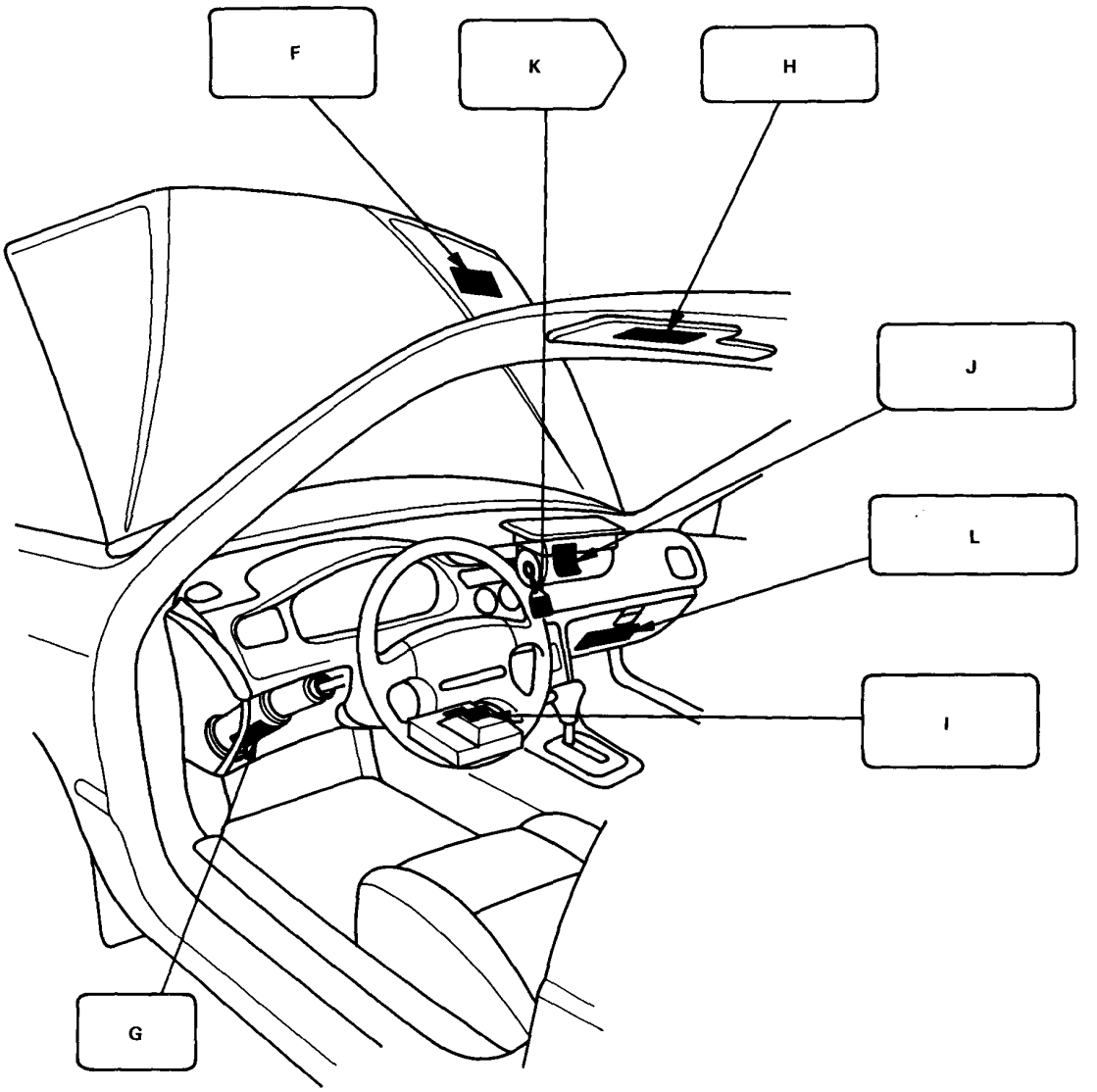
SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
THIS VEHICLE IS EQUIPPED WITH DRIVER AND FRONT SEAT PASSENGER AIRBAGS.
ALL SRS ELECTRICAL WIRING AND CONNECTORS ARE COLORED YELLOW.
TAMPERING WITH, DISCONNECTING OR USING ELECTRICAL TEST EQUIPMENT ON THE SRS WIRING CAN MAKE THE SYSTEM INOPERATIVE OR CAUSE ACCIDENTAL FIRING OF THE INFLATOR.

⚠ WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT YOU. FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

(cont'd)

Warning/Caution Label Locations

(cont'd)



G: STEERING COLUMN NOTICE
(KE, KH)

NOTICE
TO PREVENT DAMAGE, REMOVE STEERING WHEEL BEFORE REMOVING STEERING SHAFT CONNECTING BOLT.

REMARQUE
POUR EVITER TOUT DOMMAGE DU SRS, RETIRER LE VOLANT AVANT DE RETIRER LE BOULON DE RECCORDEMENT DE L'ARBRE DE DIRECTION.

G: STEERING COLUMN CAUTION
(KG)

ACHTUNG SRS
UM BESCHÄDIGUNGEN DER S.R.S.-KABELROLLE ODER DES KABELS. WELCHE DAS S.R.S.-SYSTEM AUBER FUNKTION SETZEN WÜRDEN. ZU VERMEIREN, VOR ARBEITEN AN DER LENKSPINDEL DAS LENKRAD AUSBAUEN.

WAARSCHUWING SRS
OM TE VOORKOMEN DAT DE S.R.S.-KABEL OF- HASPEL BESCHADIGD WORDEN, HETGEEN ERTOE ZOU LEIDEN DAT HET SYSTEEM UITVALT, DIENT U HET STUUR TE VERWIJDEREN VOORDAT U DE STUURSCHACHTCONNECTORBOUT VERWIJDERT.

H: FRONT SEAT PASSENGER AIRBAG MODULE DANGER
(KH)

⚠ DANGER
EXPLOSIVE/FLAMMABLE
CONTACT WITH ACID, WATER OR HEAVY METALS SUCH AS COPPER, LEAD OR MERCURY MAY RPODUCE HARMFUL AND IRRITATING GASES OR EXPLOSIVE COMPOUNDS. STORAGE TEMPERATURES MUST NOT EXCEED 200°F (100°C). FOR PROPER HANDLING, STORAGE AND DISPOSAL PROCEDURES REFER TO SERVICE MANUAL, SRS SUPPLEMENT.
POISON
CONTAINS POISONOUS SODIUM AZIDE AND POTASSIUM NITRATE.
FIRST AID
IF CONTENTS ARE SWALLOWED, INDUCE VOMITING. FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES. IF GASES (FROM ACID OR WATER CONTACT) ARE INHALED, SEEK FRESH AIR. IN EVERY CASE, GET PROMPT MEDICAL ATTENTION.
KEEP OUT OF REACH OF CHILDREN.

⚠ WARNING
THE AIRBAG INFLATOR IS EXPLOSIVE AND, IF ACCIDENTALLY DEPLOYED, CAN SERIOUSLY HURT OR KILL YOU.
- DO NOT USE ELECTRICAL TEST EQUIPMENT OR PROBING DEVICES.
  THEY CAN CAUSE ACCIDENTAL DEPLOYMENT.
- NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE.
- PLACE AIRBAG UPRIGHT WHEN REMOVED.
- FOLLOW SERVICE MANUAL INSTRUCTIONS CAREFULLY.

(KE)

- DANGER
  EXPLOSIVE/FLAMMABLE
  POISON
  REFER TO THE SHOP MANUAL.
- DANGER
  EXPLOSIF ET INFLAMMABLE
  POISON
  SE REPORTER AU MANUEL D'ATELIER.
- GEFAHR
  EXPLOSIV/ENTZÜNDBAR
  GIFT
  WERKSTATTHANDBUCH LESEN.
- GEVAAR
  EXPLOSIEGEVAAR/BRANDBAAR
  GIFTIG
  LEES HET WERKPLAATSHANDBOEK.

I: LABEL AIRBAG

J: INFLATOR BAM LABEL
(KE only)
MORTON INTERNATIONAL manufactured inflator:

AIRBAG GAS GENERATOR UT11873
MORTON INTERNATIONAL, OGDEN, USA
HERSTELLUNGS (JAHR)
EINFÜHRER: HONDA DEUTSCHLAND GMBH/OFFENBACH
BAM PT_1-0437

DER GASGENERATOR DART NUR FÜR INSASSENRÜCKHALTESYSTEME MIT LUFTSACK IN KRAFTFAHRZEUGE MONTIERT WERDEN.
DIE MONTAGE UND DEMONTAGE DES GASGENERATORS DARF NUR VON DAFÜR GESCHULTEM PERSONAL VORGENOMMEN WERDEN.

CAUTION CONTAINS FLAMMABLE SOLIDS	THE GAS GENERATOR SHOULD ONLY BE INSTALLED IN VEHICLES EQUIPPED WITH THE AIRBAG SYSTEM. THE GAS GENERATOR IS TO BE INSTALLED AND/ OR DISASSEMBLED ONLY BY TRAINED PERSONNEL.
ATTENTION CONTENT DE SOLIDES FLAMMABLES	LE GENERATEUR DE GAZ NE PEUT ETRE INSTALLE QUE SUR DES VEHICULES EQUIPES D'UN SYSTEME AIRBAG LE MONTAGE ET LE DEMONTAGE DU GENERATEUR DE GAZ NE PEUT ETRE EFFECTUE QUE PAR UN PERSONNEL QUALIFIE.

(cont'd)

Warning/Caution Label Locations

(cont'd)

K: DRIVER INFORMATION

SRS ALWAYS WEAR YOUR SEAT BELT
- THIS CAR IS EQUIPPED WITH A DRIVER AIRBAG AND A FRONT SEAT PASSENGER AIRBAG AS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS).
- IT IS DESIGNED TO SUPPLEMENT THE SEAT BELT.
- BEFORE DRIVING READ LABEL INSIDE THE GLOVE BOX.

SRS ALWAYS WEAR YOUR SEAT BELT
- THIS CAR IS EQUIPPED WITH A DRIVER AIRBAG AND A FRONT SEAT PASSENGER AIRBAG AS A SUPPLEMENTAL RESTRAINT SYSTEM (S.R.S.).
- IT IS DESIGNED TO SUPPLEMENT THE SEAT BELT.
- IF YOUR SRS INDICATOR LIGHTS WHILE DRIVING SEE YOUR AUTHORIZED HONDA DEALER.

SRS ATTACHEZ TOUJOURS VOTRE CEITURE
- CE VEHICULE EST EQUIPE D'UN COUSSIN D'AIR POUR LE PASSAGER AVANT, QUI CONSTITUENT UN SYSTEME DE RETENUE COMPLEMENTAIRE (S.R.S.).
- CE COUSSIN D'AIR COMPLETE LA FONCTION DE LA CEINTURE DE CECURITE.
- SI LE TEMOIN SRS S'ALLUME PENDANT LA CONDUITE, ADRESSEZ-VOUS A VOTRE CONSSIONNAIRE HONDA OFFICIEL.

SRS SICHERHEITSUGRTE BEI JEDER FAHRT ANLEGEN
- DIESES FAHRZEUG BESITZT JE EINEN AIRBAG FÜR FAHRER UND BEIFAHRER ALS ZUSÄTZLICHES RÜCKHAL TESYSTEM (S.R.S.).
- DAS RÜCKHALTESYSTEM IST EINE ERGÄNZUNG ZUM SICHERHEITSGURT.
- SOLLTE WAHREND DER FAHRT DIE SRS-KONTROLLEUCHTE AUFLEUCHTEN SUCHEN SIE BITTE UNGEHEND EINEN HONDA-HÄNDLER SUF.

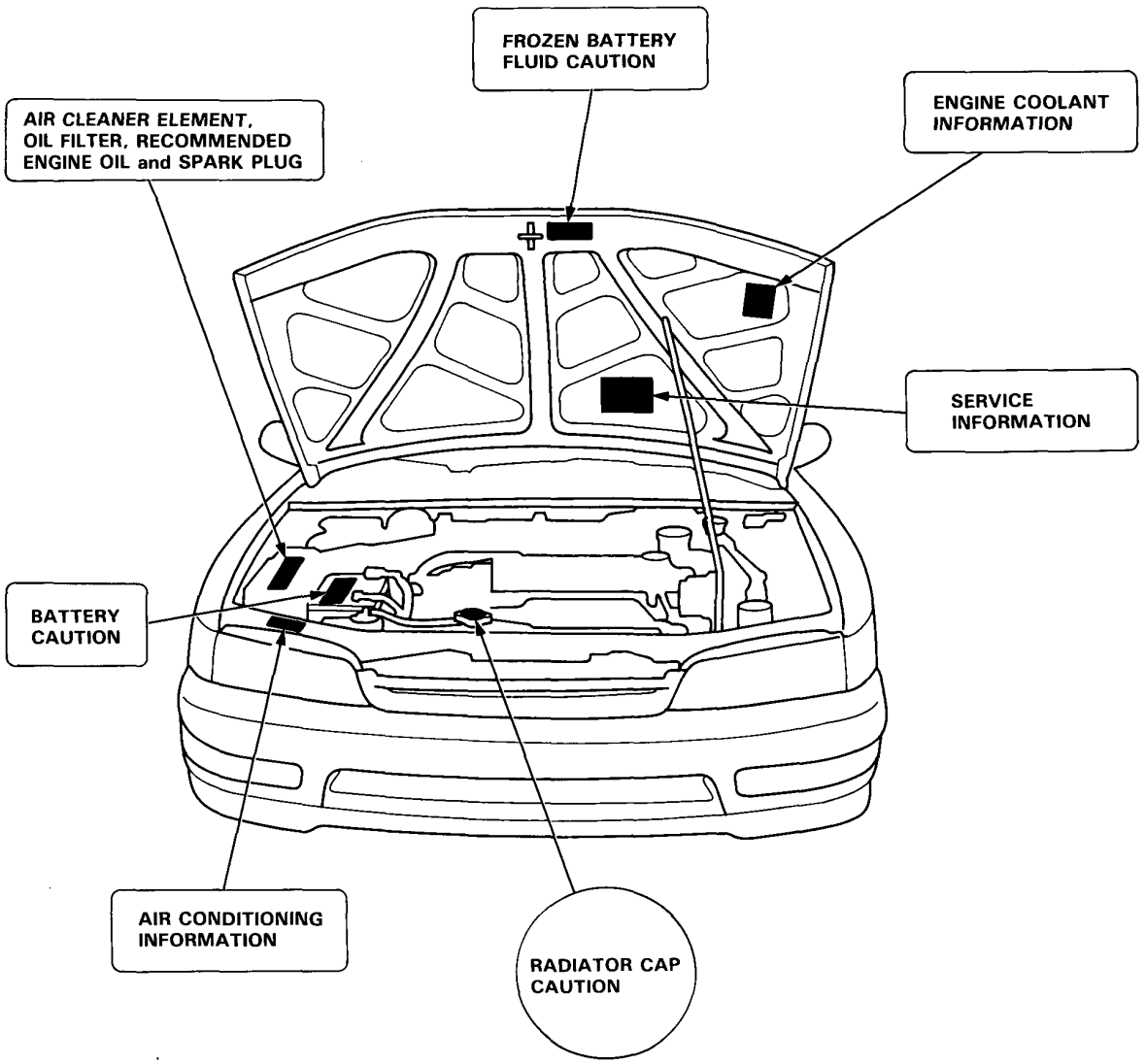
SRS DRAAG ALTIJD UW VEILIGHEIDSGORDEL
- DIT VOERTUIG IS UITGERUST MET AIRBAG (SRS) AAN BESTUURDERSZIJDE EN PASSAGIERSZIJDE VOOR EXTRA VEILIGHEID.
- ONTWORPEN ALS EXTRA BESCHERMING NAAST DE VEILIGHEIDSGORDELS.
- ALS HE SRS-WAARSCHUWINGSLAMPJE GAAT BRANDEN ONDER HET RIJDEN, NEEM DAN KONTAKT OP MET EEN HONDA DEALER.

L: GLOVE BOX INFORMATION
(KH)

AIRBAG INFORMATION
SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
- THE SRS MUST BE INSPECTED TEN YEARS AFTER IT IS INSTALLED. THE DATE OF INSTALLATION IS SHOWN ON THE CERTIFICATION PLATE, LOCATED ON THE DRIVER'S DOOR JAMB.
- DIAGNOSTIC CHECKS AND REPLACEMENT OF SRS COMPONENTS MUST BE DONE BY AN AUTHORIZED DEALER.
- SEE YOUR OWNER'S MANUAL FOR ADDITIONAL SRS INFORMATION.

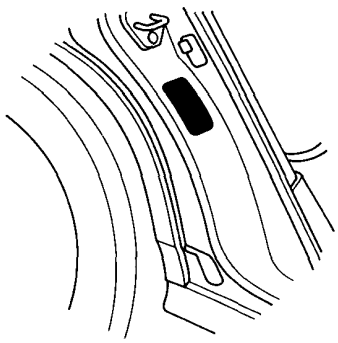
M: MONITOR NOTICE

NOTICE SRS
- NO SERVICEABLE PARTS INSIDE.
- REFER TO SERVICE MANUAL FOR DETAILED INSTRUCTIONS.

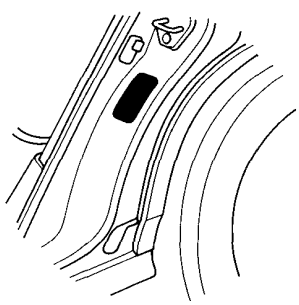


TIRE INFORMATIONS:

RHD:



LHD:



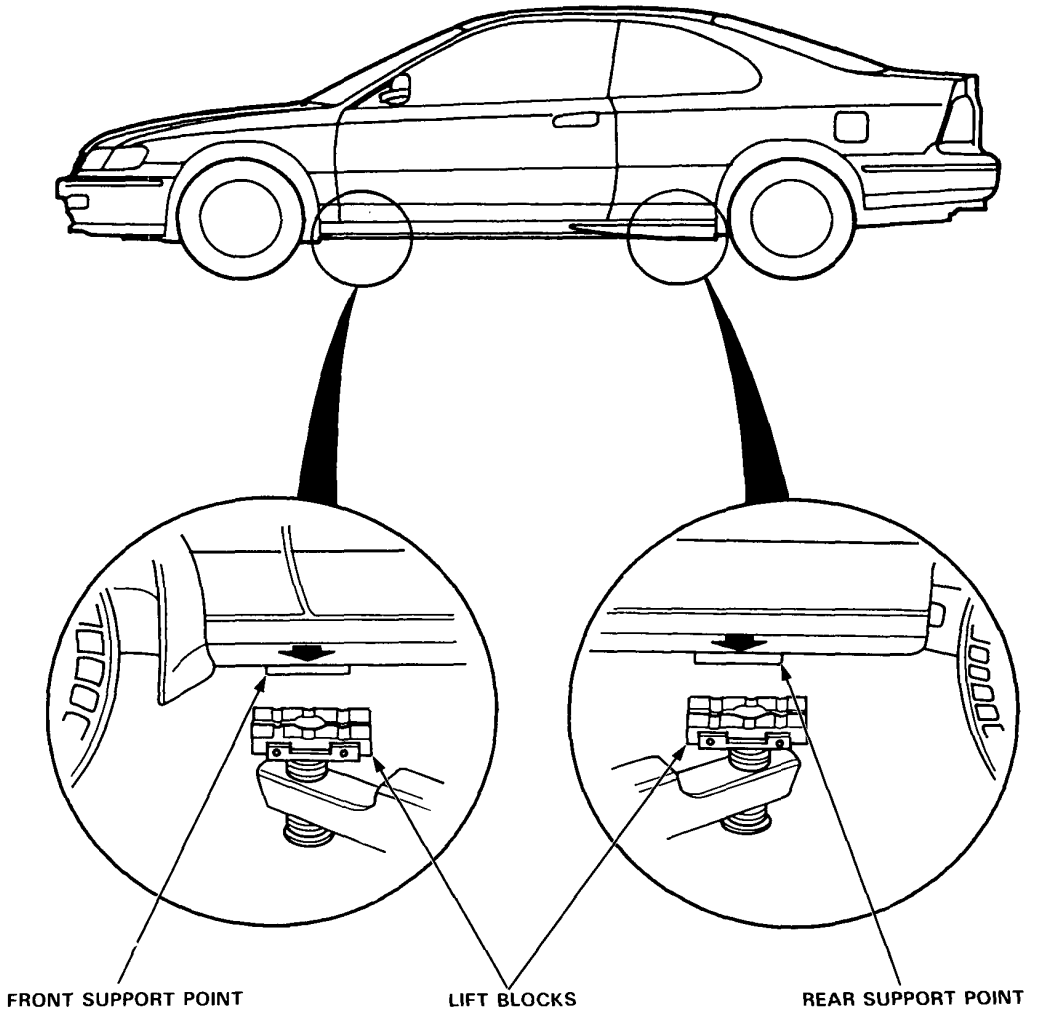
Lift and Support Points

Lift

⚠ WARNING When heavy rear components such as suspension, fuel tank, spare tire and trunk lid are to be removed, place additional weight in the trunk before hoisting. When substantial weight is removed from the rear of the car, the center of gravity may change and can cause the car to tip forward on the hoist.

NOTE: Since each tire/wheel assembly weighs approximately 30 lbs (14 kg), placing the front wheels in the trunk can assist with weight distribution.

1. Place the lift blocks as shown.
2. Raise the hoist a few inches (centimeters) and rock the car to be sure it is firmly supported.
3. Raise the hoist to full height and inspect lift points for solid support.



(cont'd)

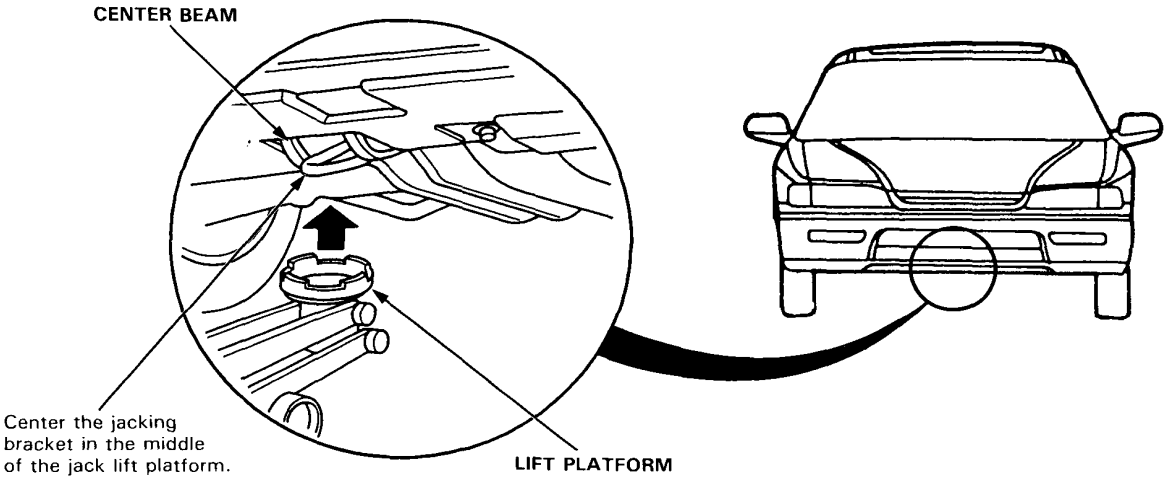
Floor Jack

1. Set the parking brake and block the wheels that are not being lifted.
2. When lifting the rear of the car, put the gearshift lever in reverse (Automatic transmission in [P] position).
3. Raise the car high enough to insert the safety stands.
4. Adjust and place the safety stands as shown on page 1-15 so the car will be approximately level, then lower the car onto them.

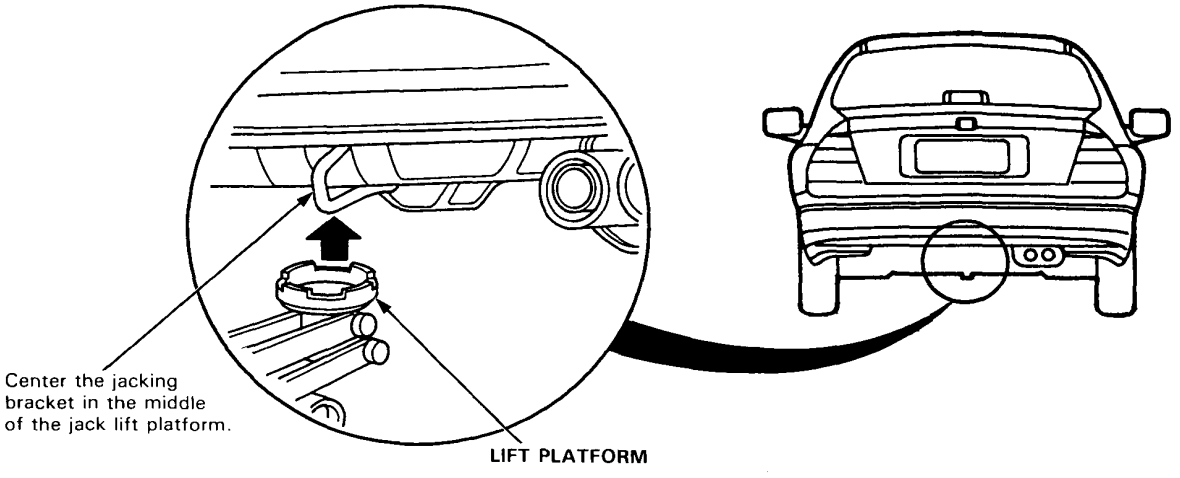
⚠ WARNING

- **Always use safety stands when working on or under any vehicle that is supported only by a jack.**
- **Never attempt to use a bumper jack for lifting or supporting the car.**

Front

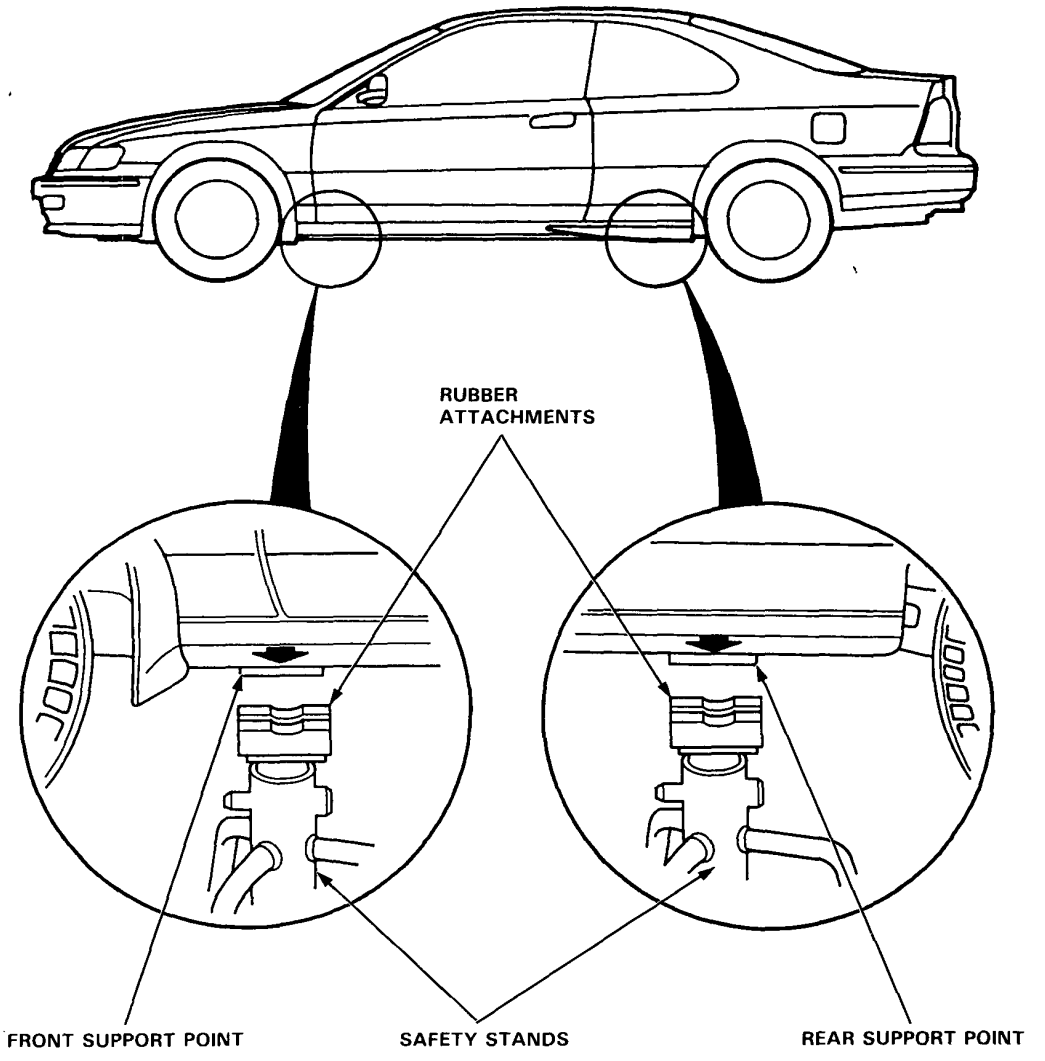


Rear



Lift and Support Points

Safety Stands



Towing

If the car needs to be towed, call a professional towing service. Never tow the car behind another car with just a rope or chain. It is very dangerous.

Emergency Towing
There are three popular methods of towing a car:

Flat-bed Equipment — The operator loads the car on the back of a truck. This is the best way of transporting the car.

Wheel Lift Equipment — The tow truck uses two pivoting arms that go under the tires (front or rear) and lifts them off the ground. The other two wheels remain on the ground.

Sling-type Equipment — The tow truck uses metal cables with hooks on the ends. These hooks go around parts of the frame or suspension, and the cables lift that end of the car off the ground. The car's suspension and body can be seriously damaged if this method of towing is attempted.

If the car cannot be transported by flat-bed, it should be towed with the front wheels off the ground. If due to damage, the car must be towed with the front wheels on the ground, do the following:

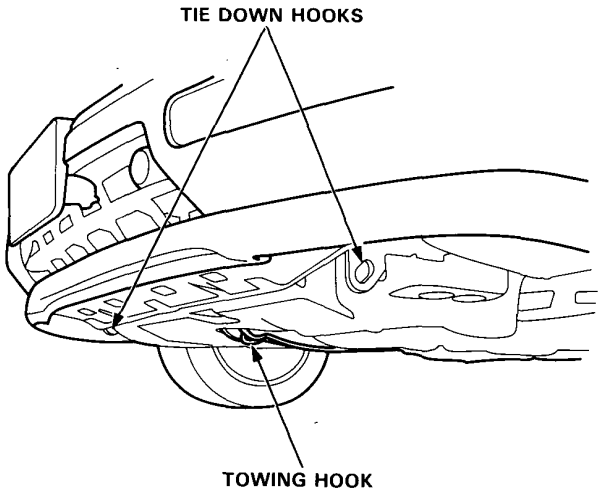
Manual Transmission
- Release the parking brake.
- Shift the transmission to Neutral.

Automatic Transmission
- Release the parking brake.
- Start the engine.
- Shift to [D4] position, then [N] position.
- Turn off the engine.

NOTICE: Improper towing preparation will damage the transmission. Follow the above procedure exactly. If you cannot shift the transmission or start the engine (automatic transmission), your car must be transported on a flat-bed.

- It is best to tow the car no farther than 50 miles (80km), and keep the speed below 35 mph (55 km/h).

NOTICE: Trying to lift or tow the car by the bumpers will cause serious damage. The bumpers are not designed to support the car's weight.



Abbreviations

List of automotive abbreviations which may be used in shop manual.

A/C	Air Conditioning, Air Conditioner
ALT	Alternator
ABS	Anti-lock Brake System
A/T	Automatic Transmission
ATF	Automatic Transmission Fluid
A/F	Air Fuel Ratio
AMP	Ampere (s)
ANT	Antenna
ASSY	Assembly
AUX	Auxiliary
APPROX.	Approximately
ATDC	After Top Dead Center
AUTO	Automatic
ATT	Attachment
ACL	Air Cleaner
API	American Petroleum Institute
BARO	Barometric
BAT	Battery
BTDC	Before Top Dead Center
BDC	Bottom Dead Center
CKP	Crankshaft Position
CYP	Cylinder Position
CAT or CATA	Catalytic Converter
CO	Carbon Monoxide
CYL	Cylinder
CPC	Clutch Pressure Control
CARB	Carburetor
COMP	Complete
CPU	Central Processing Unit
CHG	Charge
DI	Distributor Ignition
DLC	Data Link Connector
DTC	Diagnostic Trouble Code
DIFF	Differential
DOHC	Double Overhead Camshaft
DPI	Dual Point Injection
EVAP	Evaporative
EGR	Exhaust Gas Recirculation
ECM	Engine Control Module
ECT	Engine Coolant Temperature
EX	Exhaust
ELD	Electrical Load Detector
EFI	Electronic Fuel Injection
EPS	Electrical Power Steering
F	Front
FP	Fuel Pump
FWD	Front Wheel Drive
FR	Front Right
FL	Front Left
FSR	Fail Safe Relay
FIA	Fuel Injection Air
GAL	Gallon
GND	Ground
H/B	Hatchback
HO2S	Heated Oxygen Sensor
HC	Hydrocarbons
IAB	Intake Air Bypass
IAC	Idle Air Control
IAR	Intake Air Resonator
ICM	Ignition Control Module
IAT	Intake Air Temperature
IMA	Idle Mixture Adjustment
IN	Intake
IG or IGN	Ignition
ID	Identification
ID or I.D.	Inside Diameter
INJ	Injection
INT	Intermittent
KS	Knock Sensor
L	Left
LH	Left Handle
LHD	Left Handle Drive
L/C	Lock-up Clutch
LSD	Limited Slip Differential
LF	Left Front
LR	Left Rear
L-4	In-line Four Cylinder (engine)
LED	Light Emitting Diode

M/S	Manual Steering
MAP	Manifold Absolute Pressure
MIL	Malfunction Indicator Light
M/T	Manual Transmission
MCK	Motor Check
MAX.	Maximum
MIN.	Minimum
MPI	Multi Point Injection
N	Neutral
NOx	Nitrogen, Oxides of
O2S	Oxygen Sensor
OBD	On-board Diagnostic
OD or O.D.	Outside Diameter
P	Park
PAIR	Pulsed Secondary Air Injection
PSP	Power Steering Pressure
PCV	Positive Crankcase Ventilation
	Proportioning Control Valve
P/S	Power Steering
PGM-FI	Programmed-fuel Injection
PGM-IG	Programmed Ignition
PRI	Primary
P/N	Part Number
PL	Pilot Light
PMR	Pump Motor Relay
PSW	Pressure Switch
PSF	Power Steering Fluid
Qty	Quantity
R	Right
RR	Rear Right
RHD	Right Handle Drive
REF	Reference
RL	Rear Left
RON	Research Octane Number
SAE	Society of Automotive Engineers
SOHC	Single Overhead Camshaft
SOL	Solenoid
SPEC	Specification
S/R	Sun Roof
SRS	Supplemental Restraint System
STD	Standard
SW	Switch
SCS	Service Check Signal
SEC	Second
	Secondary
T	Torque
TCM	Transmission Control Module
TWC	Three Way Catalytic Converter
TDC	Top Dead Center
TB	Throttle Body
TP	Throttle Position
TC	Torque Converter
T/B	Timing Belt
T/N	Tool Number
TCS	Traction Control System
VSS	Vehicle Speed Sensor
VTEC	Viriable Valve Timing & Valve Lift Electronic Control
VC	Viscous Coupling
VIN	Vehicle Identification Number
VVIS	Variable Volume Intake System
W	With
W/O	Without
WOT	Wide Open Throttle
2WD	Two Wheel Drive
4WD	Four Wheel Drive
2WS	Two Wheel Steering
4WS	Four Wheel Steering
4AT	4-speed Automatic Transmission
5MT	5-speed Manual Transmission
[P]	Park
[R]	Reverse
[N]	Neutral
[D4]	Drive (1st through 4th gear)
[D3]	Drive (1st through 3rd gear)
[2]	Second
[1]	First
1ST	Low (gear)
2ND	Second (gear)
3RD	Third (gear)
4TH	Fourth (gear)
5TH	Fifth (gear)

Special Tools

Individual tool lists are located at the front of each section.

Specifications

Standards and Service Limits 3-2
Design Specifications 3-13
Body Specifications 3-17

Standards and Service Limits

Cylinder Head/Valve Train — Section 6

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	200 rpm (min^{-1}) and wide open throttle kPa (kgf/cm^2, psi) Nominal Minimum Maximum variation		 1,230 (12.5, 178) 930 (9.5, 135) 200 (2.0, 28)	
Cylinder head	Warpage Height		—— 99.95 – 100.05 (3.935 – 3.939)	0.05 (0.002) ——
Camshaft	End play Camshaft-to-holder oil clearance Total runout Cam lobe height F22B1 engine F22B2 engine F22B5 engine F20B3 engine	 IN Primary Mid Secondary EX IN EX IN EX IN EX	0.05 – 0.15 (0.002 – 0.006) 0.050 – 0.089 (0.0020 – 0.0035) 0.03 (0.001) max. 37.775 (1.4872) 39.725 (1.5640) 34.481 (1.3575) 38.366 (1.5105) 38.526 (1.5168) 38.778 (1.5267) 39.165 (1.5420) 39.356 (1.5494) 38.741 (1.5252) 38.972 (1.5343)	0.5 (0.02) 0.15 (0.006) 0.04 (0.002) —— —— —— —— —— —— —— —— —— ——
Valve	Valve clearance (Cold) Valve stem O.D. Stem-to-guide clearance 	 	IN EX IN EX IN EX	0.24 – 0.28 (0.009 – 0.011) 0.28 – 0.32 (0.011 – 0.013) 5.485 – 5.495 (0.2159 – 0.2163) 5.450 – 5.460 (0.2146 – 0.2150) 0.020 – 0.045 (0.0008 – 0.0018) 0.055 – 0.080 (0.0022 – 0.0031)	—— —— 5.455 (0.2148) 5.420 (0.2134) 0.08 (0.003) 0.12 (0.005)
Valve seat	Width Stem installed height 	 F22B1 engine Except F22B1 engine 	IN EX IN EX IN EX	1.25 – 1.55 (0.049 – 0.061) 1.25 – 1.55 (0.049 – 0.061) 46.75 – 47.55 (1.841 – 1.872) 46.68 – 47.48 (1.838 – 1.869) 48.08 – 48.88 (1.893 – 1.924) 50.15 – 50.95 (1.974 – 2.006)	2.00 (0.079) 2.00 (0.079) 47.80 (1.882) 47.73 (1.879) 49.13 (1.934) 51.20 (2.016)
Valve spring	Free length 	F22B1 engine Except F22B1, F22B5 engines F22B5 engine 	IN EX IN EX IN EX 	51.08 (2.011) 55.58 (2.188) 53.42 (2.103)*1 54.82 (2.158)*2 54.66 (2.152)*1 56.28 (2.216)*2 53.16 (2.093)*3 53.15 (2.093)*4 55.80 (2.197)*3 55.78 (2.196)*4	—— —— —— —— —— —— —— —— —— ——
Valve guide	I.D. Installed height 	 F22B1 engine Except F22B1 engine 	IN EX IN EX IN EX	5.515 – 5.530 (0.2171 – 0.2177) 5.515 – 5.530 (0.2171 – 0.2177) 21.20 – 22.20 (0.835 – 0.874) 20.63 – 21.63 (0.812 – 0.852) 23.50 – 24.50 (0.925 – 0.965) 14.80 – 15.80 (0.583 – 0.622)	5.55 (0.219) 5.55 (0.219) —— —— —— ——
Rocker arm	Arm-to-shaft clearance 	F22B1 engine Except F22B1 engine 	IN EX IN EX	0.026 – 0.067 (0.0010 – 0.0026) 0.018 – 0.054 (0.0007 – 0.0021) 0.017 – 0.050 (0.0007 – 0.0020) 0.018 – 0.054 (0.0007 – 0.0021)	0.08 (0.003) 0.08 (0.003) 0.08 (0.003) 0.08 (0.003)

*1: Except Associated Spring manufactured valve spring
*2: Associated Spring manufactured valve spring
*3: CHUO HATSUJO manufactured valve spring
*4: NIHON HATSUJO manufactured valve spring

Unit of length: mm (in)

Engine Block — Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.07 (0.003) max.	0.10 (0.004)
	Bore diameter	A or I	85.010 – 85.020 (3.3468 – 3.3472)	85.070 (3.3492)
		B or II	85.000 – 85.010 (3.3465 – 3.3468)	85.070 (3.3492)
	Bore taper		———	0.05 (0.002)
	Reboring limit		———	0.5 (0.02)
Piston	Skirt O.D. [at 21 mm (0.8 in) from bottom of skirt]	No letter	84.980 – 84.990 (3.3457 – 3.3461)	84.970 (3.3453)
		Letter B	84.970 – 84.980 (3.3453 – 3.3457)	84.960 (3.3449)
	Clearance in cylinder		0.020 – 0.040 (0.0008 – 0.0016)	0.05 (0.002)
	Groove width (For ring) Top		1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
	Second		1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
	Oil		2.805 – 2.825 (0.1104 – 0.1112)	2.85 (0.112)
Piston ring	Ring-to-groove clearance	Top	0.035 – 0.060 (0.0014 – 0.0024)	0.13 (0.005)
		Second	0.030 – 0.055 (0.0012 – 0.0022)	0.13 (0.005)
	Ring end gap Top		0.20 – 0.35 (0.008 – 0.014)	0.60 (0.024)
	Second		0.40 – 0.55 (0.016 – 0.022)	0.70 (0.028)
	Oil		0.20 – 0.70 (0.008 – 0.028)	0.80 (0.031)
Piston Pin	O.D.		21.994 – 22.000 (0.8659 – 0.8661)	———
	Pin-to-piston clearance		0.010 – 0.022 (0.0004 – 0.0009)	———
Connecting rod	Pin-to-rod interference		0.013 – 0.032 (0.0005 – 0.0013)	———
	Small end bore diameter		21.968 – 21.981 (0.8649 – 0.8654)	———
	Large end bore diameter			
	Nominal Except F20B3 engine		51.0 (2.01)	———
	F20B3 engine		48.0 (1.89)	
	End play installed on crankshaft		0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
Crankshaft	Main journal diameter	No. 1 and 4 journals	49.984 – 50.008 (1.9679 – 1.9688)	———
		No. 2 journal	49.976 – 50.000 (1.9676 – 1.9685)	———
		No. 3 journal	49.972 – 49.996 (1.9674 – 1.9683)	———
		No. 5 journal	49.988 – 50.012 (1.9680 – 1.9690)	———
	Rod journal diameter			
	Except F20B3 engine		47.976 – 48.000 (1.8888 – 1.8898)	———
	F20B3 engine		44.976 – 45.000 (1.7707 – 1.7717)	———
	Taper		0.005 (0.0002) max.	0.006 (0.0002)
	Out-of-round		0.005 (0.0002) max.	0.006 (0.0002)
	End play		0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)
	Runout		0.03 (0.001) max.	0.04 (0.002)
Bearings	Main bearing-to-journal oil clearance			
		No. 1 and 4 journals	0.013 – 0.037 (0.0005 – 0.0015)	0.050 (0.0020)
		No. 2 journal	0.021 – 0.045 (0.0008 – 0.0018)	0.050 (0.0020)
		No. 3 journal	0.025 – 0.049 (0.0010 – 0.0019)	0.055 (0.0022)
		No. 5 journal	0.009 – 0.033 (0.0004 – 0.0013)	0.040 (0.0016)
	Rod bearing-to-journal oil clearance			
	Except F20B3 engine		0.021 – 0.049 (0.0008 – 0.0019)	0.060 (0.0024)
	F20B3 engine		0.015 – 0.043 (0.0006 – 0.0017)	0.050 (0.0020)
Balancer shaft	Journal diameter	No. 1 front journal	42.722 – 42.734 (1.6820 – 1.6824)	42.71 (1.681)
		No. 1 rear journal	20.938 – 20.950 (0.8243 – 0.8248)	20.92 (0.824)
		No. 2 front and rear journals	38.712 – 38.724 (1.5241 – 1.5246)	38.70 (1.524)
		No. 3 front and rear journals	34.722 – 34.734 (1.3670 – 1.3675)	34.71 (1.367)
	Journal taper		0.005 (0.0002)	———
	End play	Front	0.10 – 0.40 (0.004 – 0.016)	———
		Rear	0.04 – 0.15 (0.002 – 0.006)	———
	Total runout		0.02 (0.001)	0.03 (0.001)
	Shaft-to-bearing oil clearance			
	No. 1 front, No. 3 front and rear journals		0.066 – 0.098 (0.0026 – 0.0039)	0.12 (0.005)
	No. 1 rear journal		0.050 – 0.075 (0.0020 – 0.0030)	0.09 (0.004)
	No. 2 front and rear journals		0.076 – 0.108 (0.0030 – 0.0043)	0.13 (0.005)

Standards and Service Limits

Engine Block — Section 7

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Balancer shaft bearing	I.D.	No. 1 front journal	42.800 – 42.820 (1.6850 – 1.6858)	42.83 (1.686)
		No. 1 rear journal	21.000 – 21.013 (0.8268 – 0.8273)	21.02 (0.828)
		No. 2 front and rear journals	38.800 – 38.820 (1.5276 – 1.5283)	38.83 (1.529)
		No. 3 front and rear journals	34.800 – 34.820 (1.3701 – 1.3709)	34.83 (1.371)

Engine Lubrication — Section 8

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)	F22B1 engine	5.6 (5.9, 4.9) for engine overhaul 4.3 (4.5, 3.8) for oil change, including filter 4.0 (4.2, 3.5) for oil change, without filter	
		Except F22B1 engine	4.9 (5.2, 4.3) for engine overhaul 3.8 (4.0, 3.3) for oil change, including filter 3.5 (3.7, 3.1) for oil change, without filter	
Oil pump	Inner-to-outer rotor clearance		0.02 – 0.16 (0.001 – 0.006)	0.20 (0.008)
	Pump housing-to-outer rotor clearance		0.10 – 0.19 (0.004 – 0.007)	0.21 (0.008)
	Pump housing-to-rotor axial clearance		0.02 – 0.07 (0.001 – 0.003)	0.12 (0.005)
Relief valve	Pressure setting at engine oil temp. 80°C (176°F) kPa (kgf/cm², psi)	at idle	69 (0.7, 10) min.	
		at 3,000 rpm (min^{-1})	340 (3.5, 50) min.	

Cooling — Section 10

	MEASUREMENT	STANDARD (NEW)
Radiator	Coolant capacity ℓ (US qt, Imp qt) [Including engine, heater, cooling line and reservoir] Reservoir capacity: 0.6 ℓ (0.63 US qt, 0.53 Imp qt)	M/T: 6.9 (7.4, 6.1) for overhaul : 5.4 (5.7, 4.8) for coolant change A/T : 6.8 (7.3, 6.0) for overhaul : 5.3 (5.6, 4.7) for coolant change
Radiator cap	Opening pressure kPa (kgf/cm², psi)	93 – 123 (0.95 – 1.25, 14 – 18)
Thermostat	Start to open °C (°F) Fully open °C (°F) Valve lift at fully open	70 – 80 (169 – 176) 90 (194) 8.0 (0.31) min.
Cooling fan	Thermoswitch "ON" temperature °C (°F) Thermoswitch "OFF" temperature °C (°F) Fan timer "ON" temperature °C (°F) Fan timer "OFF" temperature °C (°F)	90 – 96 (194 – 205) Subtract 2 – 7 (4 – 13) from actual "ON" temperature 103 – 109 (217 – 228) Subtract 4 – 9 (7 – 16) from actual "ON" temperature

Unit of length: mm (in)

Fuel and Emissions — Section 11

	MEASUREMENT	STANDARD (NEW)
Pressure regulator	Pressure with regulator vacuum hose disconnected kPa (kgf/cm², psi)	265 – 314 (2.7 – 3.2, 38 – 46)
Fuel tank	Capacity ℓ (US gal, Imp gal)	64.5 (17.1, 14.2)
Engine	Idle speed with headlight and cooling fan off rpm (min⁻¹)	F22B1, F22B2 engines 700 ± 50 (M/T: neutral) 700 ± 50 (A/T: [N] or [P] position) F20B3, F22B5 engines 770 ± 50 (M/T: neutral) 770 ± 50 (A/T: [N] or [P] position)
	Fast idle rpm (min⁻¹)	1,400 ± 200 (M/T: neutral) 1,400 ± 200 (A/T: [N] or [P] position)
	Idle CO %	0.1 max.

Clutch — Section 12

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height to floor Stroke Pedal play Disengagement height to floor	RHD: 209 (8.2), LHD: 184 (7.2) 142.5 – 152.5 (5.6 – 6.0) 9 – 15 (0.4 – 0.6) RHD: 99 (3.9) min. LHD: 74 (2.9) min.	——— ——— ——— ——— ———
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth Thickness	1.3 – 1.9 (0.05 – 0.07) 8.4 – 9.0 (0.33 – 0.35)	0.2 (0.01) 6.0 (0.24)
Pressure plate	Warpage Diaphragm spring finger alignment	0.03 (0.001) max. 0.6 (0.02) max.	0.15 (0.006) 0.8 (0.03)

Manual Transmission — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	1.9 (2.0, 1.7) for oil change 2.0 (2.1, 1.8) for overhaul	
Mainshaft	End play Diameter of ball bearing contact area Diameter of needle bearing contact area Diameter of ball bearing contact area Runout	0.10 – 0.16 (0.004 – 0.006) 27.977 – 27.990 (1.1015 – 1.1020) 37.984 – 38.000 (1.4954 – 1.4961) 27.987 – 28.000 (1.1018 – 1.1024) 0.02 (0.001) max.	Adjust 27.94 (1.100) 37.93 (1.493) 27.94 (1.100) 0.05 (0.002)
Mainshaft 3rd and 4th gears	I.D. End play Thickness 3rd gear 4th gear	43.009 – 43.025 (1.6933 – 1.6939) 0.06 – 0.21 (0.002 – 0.008) 32.42 – 32.47 (1.276 – 1.278) 30.92 – 30.97 (1.217 – 1.219)	43.080 (1.6961) 0.30 (0.012) 32.3 (1.27) 30.8 (1.21)
Mainshaft 5th gear	I.D. End play Thickness	43.009 – 43.025 (1.6933 – 1.6939) 0.06 – 0.21 (0.002 – 0.008) 30.92 – 30.97 (1.217 – 1.219)	43.080 (1.6961) 0.30 (0.012) 30.8 (1.21)
Countershaft	Diameter of needle bearing contact area Diameter of ball bearing and needle bearing contact area Diameter of 1st gear contact area Runout	38.000 – 38.015 (1.4961 – 1.4967) 24.987 – 25.000 (0.9837 – 0.9843) 39.984 – 40.000 (1.5742 – 1.5748) 0.02 (0.001) max.	37.95 (1.494) 24.94 (0.982) 39.93 (1.572) 0.05 (0.002)
Countershaft 1st gear	I.D. End play	46.009 – 46.025 (1.8114 – 1.8120) 0.04 – 0.10 (0.002 – 0.004)	46.08 (1.814) Adjust
Countershaft 2nd gear	I.D. End play Thickness	47.009 – 47.025 (1.8507 – 1.8514) 0.04 – 0.10 (0.002 – 0.004) 28.92 – 28.97 (1.139 – 1.141)	47.08 (1.854) Adjust 28.8 (1.13)

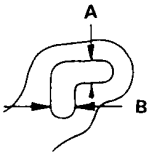
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Standards and Service Limits

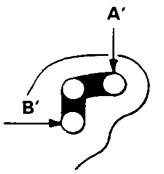
Manual Transmission — Section 13 (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Spacer collar (Countershaft 2nd gear)	I.D.	36.48 – 36.49 (1.4362 – 1.4366)	36.50 (1.437)
	O.D.	41.989 – 42.000 (1.6531 – 1.6535)	41.94 (1.652)
	Length A	29.02 – 29.04 (1.1425 – 1.1433)	———
	Length B	29.07 – 29.09 (1.1445 – 1.1453)	———
Spacer collar (Mainshaft 4th and 5th gears)	I.D.	31.002 – 31.012 (1.2205 – 1.2209)	31.06 (1.223)
	O.D.	37.989 – 38.000 (1.4956 – 1.4961)	37.94 (1.494)
	Length A	56.45 – 56.55 (2.222 – 2.226)	———
	Length B	26.03 – 26.08 (1.025 – 1.027)	26.01 (1.024)
Reverse idler gear	I.D.	20.016 – 20.043 (0.7880 – 0.7891)	20.09 (0.7909)
	Gear-to-reverse gear shaft clearance	0.036 – 0.084 (0.0014 – 0.0033)	0.160 (0.0006)
Syncro ring	Ring-to-gear clearance (ring pushed against gear)	0.85 – 1.10 (0.033 – 0.043)	0.40 (0.016)
Double cone synchro	Clearance (ring pushed against gear)		
	Outer synchro ring-to-gear	0.95 – 1.68 (0.037 – 0.066)	0.6 (0.02)
	Synchro cone-to-gear	0.5 – 1.0 (0.02 – 0.04)	0.3 (0.01)
	Outer synchro ring-to-synchro cone	0.5 – 1.0 (0.02 – 0.04)	0.3 (0.01)
Shift fork	Finger thickness	6.2 – 6.4 (0.24 – 0.25)	———
	Fork-to-synchro sleeve clearance	0.35 – 0.65 (0.014 – 0.026)	1.0 (0.039)
Reverse shift fork	Pawl groove width	13.0 – 13.3 (0.51 – 0.52)	———
	Fork-to-reverse idler gear clearance	0.5 – 1.1 (0.02 – 0.04)	1.8 (0.07)
	Groove width*1 at A	7.05 – 7.25 (0.278 – 0.285)	———
	Groove width*1 at B	7.4 – 7.7 (0.29 – 0.30)	———
	Fork-to-5th/reverse shift shaft clearance*2		
	at A′	0.05 – 0.35 (0.002 – 0.014)	0.5 (0.02)
	at B′	0.4 – 0.8 (0.02 – 0.03)	1.0 (0.04)
Shift arm	I.D.	15.973 – 16.000 (0.6289 – 0.6299)	———
	Shift arm-to-shaft clearance	0.005 – 0.059 (0.0002 – 0.0023)	———
	Shift fork diameter at contact area	12.9 – 13.0 (0.508 – 0.512)	———
	Shift-arm-to-shift fork shaft clearance	0.2 – 0.5 (0.008 – 0.019)	0.6 (0.024)
Select lever	Shaft outer diameter	15.941 – 15.968 (0.6276 – 0.6287)	———
	Shift arm cover clearance	0.032 – 0.102 (0.0013 – 0.0040)	———
Shift lever	O.D.	15.941 – 15.968 (0.6276 – 0.6287)	———
	Transmission housing clearance	0.027 – 0.139 (0.0011 – 0.0055)	———
Interlock	Bore diameter	16.00 – 16.05 (0.630 – 0.632)	———
	Shift arm clearance	0.032 – 0.109 (0.0013 – 0.0043)	———

*1: Measuring points



*2: Measuring points



Automatic Transmission — Section 14

Unit of length mm (in)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)		6.0 (6.3, 5.3) for overhaul 2.4 (2.5, 2.1) for fluid change	
Hydraulic pressure kPa (kgf/cm², psi)	Line pressure at 2,000 rpm (min⁻¹) in [N] or [P] position		830 (8.5, 120) throttle fully-closed | 880 (9.0, 130) throttle more than 2/8 open	780 (8.0, 110) throttle more than 2/8 open
	4th clutch pressure at 2,000 rpm (min⁻¹) in [D4] position		520 (5.3, 75) throttle fully-closed | 880 (9.0, 130) throttle more than 2/8 open	460 (4.7, 67) throttle fully-closed | 780 (8.0, 110) throttle more than 2/8 open
	3rd and 2nd clutch pressure at 2,000 rpm (min⁻¹) in [D4] position		490 (5.0, 71) *throttle fully-closed* | 880 (9.0, 130) throttle more than 2/8 open	440 (4.5, 64) *throttle fully-closed* | 780 (8.0, 110) throttle more than 2/8 open
	2nd clutch pressure at 2,000 rpm (min⁻¹) in [2] position		830 – 880 (8.5 – 9.0, 120 – 130)	780 (8.0, 110)
	1st and 1st-hold clutch pressure at 2,000 rpm in [1] position		830 – 880 (8.5 – 9.0, 120 – 130)	780 (8.0, 110)
	Throttle B pressure	Throttle fully closed	0 (0, 0)	———
		Throttle fully open	830 – 880 (8.5 – 9.0, 120 – 130)	780 (8.0, 110)
Stall speed rpm (min⁻¹) (Check with car on level ground)		F20B3 engine	2,550	2,400 – 2,700
		F22B1, F22B2, F22B5 engines	2,650	2,500 – 2,800
Clutch	Clutch initial clearance	1st-hold	0.80 – 1.00 (0.031 – 0.039)	———
		1st, 2nd	0.65 – 0.85 (0.026 – 0.033)	———
		3rd, 4th	0.4 – 0.6 (0.016 – 0.024)	———
	Clutch return spring free length	1st, 2nd, 3rd, 4th	33.5 (1.32)	31.5 (1.24)
	Clutch disc thickness		1.88 – 2.00 (0.074 – 0.079)	Until grooves worn out.
	Clutch plate thickness	1st, 1st-hold	1.95 – 2.05 (0.077 – 0.081)	Discoloration
		2nd	2.55 – 2.65 (0.100 – 0.104)	Discoloration
		3rd, 4th	2.25 – 2.35 (0.089 – 0.093)	Discoloration
	Clutch end plate thickness	Mark 1	2.05 – 2.10 (0.081 – 0.083)	Discoloration
		Mark 2	2.15 – 2.20 (0.085 – 0.087)	↕
		Mark 3	2.25 – 2.30 (0.089 – 0.091)	↕
		Mark 4	2.35 – 2.40 (0.093 – 0.094)	↕
		Mark 5	2.45 – 2.50 (0.096 – 0.098)	↕
		Mark 6	2.55 – 2.60 (0.100 – 0.102)	↕
		Mark 7	2.65 – 2.70 (0.104 – 0.106)	↕
		Mark 8	2.75 – 2.80 (0.108 – 0.110)	↕
		Mark 9	2.85 – 2.90 (0.112 – 0.114)	Discoloration
Valve body	Stator shaft needle bearing contact I.D.			
	Torque converter side		27.000 – 27.021 (1.0630 – 1.1638)	Wear or damage
	Oil pump side		29.000 – 29.013 (1.1417 – 1.1422)	———
	Oil pump gear thrust clearance		0.03 – 0.05 (0.001 – 0.002)	0.07 (0.003)
	Oil pump gear-to-body clearance	Drive	0.210 – 0.265 (0.0083 – 0.0104)	———
		Driven	0.070 – 0.125 (0.0028 – 0.0049)	———
	Oil pump driven gear I.D.		14.016 – 14.034 (0.5518 – 0.5525)	Wear or damage
	Oil pump shaft O.D.		13.980 – 13.990 (0.5504 – 0.5508)	Wear or damage
Shifting device, parking brake and throttle control system	Reverse shift fork finger thickness		5.90 – 6.00 (0.232 – 0.236)	5.40 (0.213)
	Parking brake pawl		———	Wear or other defect
	Parking brake gear		———	
	Throttle cam stopper heighte		17.0 – 17.1 (0.669 – 0.673)	———

(cont'd)

Standards and Service Limits

Automatic Transmission — Section 14 (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Servo body	Shift fork shaft bore I.D.	14.000 – 14.005 (0.5512 – 0.5514) 14.006 – 14.010 (0.5514 – 0.5516) 14.011 – 14.015 (0.5516 – 0.5518)	——— ——— ———
	Shift fork shaft valve bore I.D.	37.000 – 37.039 (1.4567 – 1.4582)	37.045 (1.4585)
Regulator valve body	Sealing ring contact I.D.	35.000 – 35.025 (1.3780 – 1.3789)	35.05 (1.3799)
Accumulator body	Sealing ring contact I.D.	32.000 – 32.013 (1.2598 – 1.2604)	32.050 (1.2618)
Stator shaft	Sealing ring contact I.D.	29.000 – 29.013 (1.1417 – 1.1422)	29.050 (1.1437)
Transmission	Diameter of needle bearing contact area		
	On mainshaft of stator shaft	22.984 – 23.000 (0.9049 – 0.9055)	Wear or damage
	On mainshaft of 3rd gear collar	45.984 – 46.000 (1.8104 – 1.8110)	
	On mainshaft of 4th gear collar	31.984 – 32.000 (1.2592 – 1.2598)	
	On countershaft of 1st gear collar	40.984 – 41.000 (1.6135 – 1.6142)	
	On countershaft of 4th gear	31.975 – 31.991 (1.2589 – 1.2595)	
	On countershaft of parking gear	39.984 – 40.000 (1.5742 – 1.5748)	
	On countershaft of reverse gear	35.979 – 36.000 (1.4165 – 1.4173)	
	On secondary shaft of 1st gear	31.975 – 31.991 (1.2589 – 1.2595)	
	On secondary shaft of 2nd gear	31.975 – 31.991 (1.2589 – 1.2595)	
	On reverse idler gear shaft	13.99 – 14.00 (0.5508 – 0.5512)	
	Inside diameter		
	Mainshaft 3rd gear	52.000 – 52.019 (2.0472 – 2.0480)	
	Mainshaft 4th gear	38.005 – 38.021 (1.4963 – 1.4969)	
	Countershaft 1st gear	47.000 – 47.016 (1.8504 – 1.8510)	
	Countershaft 4th gear	38.000 – 38.016 (1.4961 – 1.4967)	
	Countershaft reverse gear	42.000 – 42.016 (1.6535 – 1.6542)	
	Countershaft idler gear	48.000 – 48.016 (1.8898 – 1.8904)	
	Secondary shaft 1st gear	36.000 – 36.016 (1.4173 – 1.4179)	
	Secondary shaft 2nd gear	37.000 – 37.016 (1.4567 – 1.4573)	
	Reverse idler gear	20.007 – 20.020 (0.7877 – 0.7881)	
	Reverse idler gear shaft holder	14.800 – 14.824 (0.5827 – 0.5836)	Wear or damage
	Mainshaft 3rd gear collar length	19.50 – 19.55 (0.768 – 0.770)	Wear or damage
	Mainshaft 4th gear collar length	47.50 – 47.55 (1.870 – 1.872)	Wear or damage
	Countershaft 1st gear collar length	27.50 – 27.55 (1.083 – 1.085)	Wear or damage
	Thrust washer thickness		
	Countershaft 1st gear	1.45 – 1.50 (0.057 – 0.059)	Wear or damage
	Countershaft idler gear	3.45 – 3.55 (0.136 – 0.140)	Wear or damage
	Countershaft parking gear length	25.030 – 25.048 (0.9854 – 0.9861)	Wear or damage
	Secondary shaft 1st gear distance collar length	4.95 – 5.00 (0.195 – 0.197)	Wear or damage
	Secondary shaft 2nd gear thrust washer thickness	4.35 – 4.45 (0.1713 – 0.1752)	Wear or damage
	Secondary shaft 2nd gear spline washer thickness	4.02 – 4.05 (0.158 – 0.159) 4.07 – 4.10 (0.160 – 0.161) 4.12 – 4.15 (0.162 – 0.163) 4.17 – 4.20 (0.164 – 0.165) 4.22 – 4.25 (0.166 – 0.167) 4.27 – 4.30 (0.168 – 0.169) 4.32 – 4.35 (0.170 – 0.171) 4.37 – 4.40 (0.172 – 0.173) 4.42 – 4.45 (0.174 – 0.175)	——— ——— ——— ——— ——— ——— ——— ——— ———

Automatic Transmission — Section 14

Unit of length: mm (in)

	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	Free Length	No. of Coils
Spring	Regulator valve spring A	1.8 (0.071)	14.7 (0.579)	88.6 (3.488)	16.5
	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	12.7
	Stator reaction spring	4.5 (0.177)	35.4 (1.394)	30.3 (1.193)	1.92
	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	38.2 (1.504)	14.0
	Relief valve spring	1.0 (0.039)	8.4 (0.331)	39.1 (1.539)	15.1
	Cooler relief valve spring	1.1 (0.043)	8.4 (0.331)	46.8 (1.843)	17.0
	2nd orifice control valve spring	0.6 (0.024)	6.6 (0.260)	66.4 (2.614)	25.0
	Orifice control valve spring	0.7 (0.028)	6.6 (0.260)	52.5 (2.067)	18.4
	Servo control valve spring	1.0 (0.039)	8.1 (0.319)	52.6 (2.071)	22.4
	4th exhaust valve spring	0.8 (0.031)	7.1 (0.280)	48.8 (1.921)	17.2
	Throttle valve B adjusting spring	0.8 (0.031)	6.2 (0.244)	30.0 (1.181)	8.0
	Throttle valve B spring	1.4 (0.055)	8.5 (0.335)	41.5 (1.634)	10.5
		1.4 (0.055)	8.5 (0.335)	41.5 (1.634)	11.2
		1.4 (0.055)	8.5 (0.335)	41.6 (1.638)	12.4
	1-2 shift valve spring	0.9 (0.035)	8.6 (0.339)	40.4 (1.591)	14.5
	2-3/3-4 shift valve spring	0.9 (0.035)	7.6 (0.299)	57.0 (2.244)	26.8
	1st-hold accumulator spring	4.0 (0.157)	25.0 (0.984)	64.7 (2.547)	7.3
	1st accumulator spring A	2.3 (0.091)	16.3 (0.642)	109.6 (4.315)	20.0
	1st accumulator spring B	1.8 (0.071)	6.3 (0.248)	70.5 (2.776)	15.3
	4th accumulator spring	2.9 (0.114)	22.0 (0.866)	90.1 (3.547)	10.9
	2nd accumulator spring	3.5 (0.138)	22.0 (0.866)	91.0 (3.583)	10.8
	3rd accumulator spring	2.9 (0.114)	17.5 (0.689)	99.6 (3.921)	16.1
	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.229)	73.7 (2.902)	32.0
	Lock-up timing valve spring	0.8 (0.031)	6.6 (0.260)	51.1 (2.012)	14.7
	CPC valve spring	1.4 (0.055)	9.4 (0.370)	33.0 (1.299)	10.5
	Modulator valve spring	1.4 (0.055)	9.4 (0.370)	33.0 (1.299)	10.5
	Lock-up control valve spring	0.7 (0.028)	6.6 (0.260)	36.3 (1.429)	14.1
		0.7 (0.028)	6.6 (0.260)	38.1 (1.500)	14.1
	3rd kick-down valve spring	1.0 (0.039)	7.6 (0.299)	48.3 (1.902)	15.6
	Main orifice control valve spring	1.1 (0.043)	7.1 (0.280)	49.1 (1.933)	22.7

Differential (Manual transmission) — Section 15

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Differential	Pinion shaft contact area I.D.		18.000 – 18.018 (0.7087 – 0.7094)	———
	Carrier-to-pinion clearance		0.017 – 0.047 (0.0007 – 0.0019)	0.1 (0.004)
	Driveshaft contact area I.D.		28.005 – 28.025 (1.1026 – 1.1033)	———
	Carrier-to-driveshaft clearance	Right	0.025 – 0.066 (0.0010 – 0.0026)	0.12 (0.005)
		Left	0.055 – 0.091 (0.0022 – 0.0036)	0.15 (0.006)
Differential pinion gear	Backlash		0.05 – 0.15 (0.002 – 0.006)	———
	I.D.		18.042 – 18.066 (0.7103 – 0.7113)	———
	Pinion gear-to-pinion shaft clearance		0.055 – 0.095 (0.0022 – 0.0037)	0.15 (0.006)
Differential taper roller bearing preload Starting torque N·m (kgf·cm, lbf·in)			1.4 – 2.5 (14 – 26, 12 – 23)	Adjust

Differential (Automatic transmission) — Section 15

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Differential carrier	Pinion shaft contact area I.D.		18.000 – 18.018 (0.7087 – 0.7094)	———
	Carrier-to-pinion clearance		0.013 – 0.047 (0.0005 – 0.0019)	0.1 (0.004)
	Driveshaft contact area I.D.		28.005 – 28.025 (1.1026 – 1.1033)	———
	Carrier-to-driveshaft clearance		0.025 – 0.066 (0.0010 – 0.0026)	0.12 (0.005)
Differential pinion gear	Backlash		0.08 – 0.15 (0.003 – 0.006)	———
	I.D.		18.042 – 18.066 (0.7103 – 0.7113)	———
	Pinion gear-to-pinion shaft clearance		0.055 – 0.095 (0.0022 – 0.0037)	0.12 (0.005)
Differential taper roller bearing preload Starting torque N·m (kgf·cm, lbf·in)		*For new bearing* For used bearing	2.7 – 3.9 (28 – 40, 24 – 35) 2.5 – 3.6 (25 – 37, 22 – 32)	Adjust Adjust

Standards and Service Limits

Steering — Section 17

	MEASUREMENT		STANDARD (NEW)
Steering wheel	Rotational play at steering wheel circumference		0 – 10 (0 – 0.39)
	Starting load at steering wheel circumference N (kgf, lbf)	Engine running	29 (3.0, 6.6)
Gear box	Angle of rack-guide-screw loosened from locked position		20° ± 5°
Pump	Pump pressure with shut-off valve closed kPa (kgf/cm², psi)		6,400 – 7,400 (65 – 75, 924 – 1,067)
Power steering fluid	Recommended fluid		Honda power steering fluid-V
	Fluid capacity	For overhaul	1.1 (1.16, 0.97)
	ℓ (US qt, Imp qt)	For fluid change	0.4 (0.42, 0.35)
Power steering belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys		13.0 – 16.0 (0.51 – 0.63) with used belt 11.0 – 12.5 (0.43 – 0.49) with new belt
	Belt tension N (kgf, lbf) Measured with belt tension gauge		390 – 540 (40 – 55, 88 – 121) with used belt 740 – 880 (75 – 90, 165 – 198) with new belt

Suspension — Section 18

	MEASUREMENT			STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Camber		Front	−0°00′ ± 1°	
			Rear	−0°25′ ± 30′	
	Caster		Front	3°00′ ± 1°	
	Total toe		Front	0 ± 3 (0 ± 0.12)	
			Rear	IN 2 ± 2 (0.08 ± 0.08)	
	Front wheel turning angle		Inward wheel	39°00′ ± 2°	
			Outward wheel	30°00′ (Reference)	
Wheel bearing	End play		Front	0 – 0.05 (0 – 0.002)	
			Rear	0 – 0.05 (0 – 0.002)	
				STANDARD (NEW)	SERVICE LIMIT
Wheel	Rim runout	Aluminum wheel	Axial	0 – 0.7 (0 – 0.03)	2.0 (0.08)
			Radial	0 – 0.7 (0 – 0.03)	1.5 (0.06)
		Steel wheel	Axial	0 – 1.0 (0 – 0.04)	2.0 (0.08)
			Radial	0 – 1.0 (0 – 0.04)	1.5 (0.06)

Brakes — Section 19

	MEASUREMENT		STANDARD (NEW)	
Parking brake lever	Play in stroke at 200 N (20 kgf, 44 lbf) lever force		To be locked when pulled Disc: 7 – 11 notches Drum: 4 – 8 notches	
Foot brake pedal	Pedal height (With floor mat removed)	M/T	LHD: 192 (7.56), RHD: 167 (6.57)	
		A/T	LHD: 193 (7.60), RHD: 168 (6.61)	
	Free play		1 – 5 (1/16 – 13/64)	
Master cylinder	Piston-to-pushrod clearance		0 – 0.4 (0 – 0.02)	
			STANDARD (NEW)	SERVICE LIMIT
Disc brake	Disc thickness	Front	22.9 – 23.1 (0.90 – 0.91)	21.0 (0.83)
		Rear	9.9 – 10.1 (0.39 – 0.40)	8.0 (0.31)
	Disc runout	Front	———	0.10 (0.004)
		Rear	———	0.10 (0.004)
	Disc parallelism	Front and rear	———	0.015 (0.0006)
	Pad thickness	Front	12.0 – 13.0 (0.47 – 0.51)	1.6 (0.06)
		Rear	8.5 – 9.5 (0.33 – 0.37)	1.6 (0.06)
Drum brake	Drum I.D.		219.9 – 220.0 (8.657 – 8.661)	221 (8.700)
	Lining thickness		3.9 – 4.5 (0.15 – 0.18)	2.0 (0.08)
Brake booster	Characteristics at 200 N (20 kgf, 44 lbf) pedal force			

Vacuum kPa (mm Hg, in Hg)	Minimum line pressure kPa (kgf/cm², psi)	
	Except 8"+ 9" master power with ABS	8"+ 9" master power with ABS
0 (0, 0)	970 (9.9, 140)	850 (8.7, 120)
40.0 (300, 11.8)	5,530 (56.4, 802)	6,120 (62.4, 887)
66.7 (500, 19.7)	8,580 (87.5, 1,240)	8,980 (91.6, 1,300)

Air Conditioning — Section 22

Unit of length: mm (in)

	MEASUREMENT		STANDARD (NEW)
Air conditioning system	Lubricant type: NIPPONDENSO: ND-OIL8 (P/N 38899 – PR7 – 003) HADSYS: Dn. S10X (P/N 38899 – P0A – 003)		
	Lubricant capacity mℓ (fl oz, Imp oz)	Condenser	25 (5/6, 0.9)
		Evaporator	40 (1 1/3, 1.4)
		Line or hose	10 (1/3, 0.4)
		Receiver	10 (1/3, 0.4)
Compressor (NIPPONDENSO)	Lubricant type: ND-OIL8 (P/N 38899 – PR7 – 003)		
	Lubricant capacity mℓ (fl oz, Imp oz)		160 $^{+15}_{0}$ (5 1/3 $^{+1/2}_{0}$, 5.6 $^{+0.5}_{0}$)
	Stator coil resistance at 20°C (68°F) Ω		3.4 – 3.8
	Pulley-to-pressure plate clearance		0.5 ± 0.15 (0.02 ± 0.006)
Compressor (HADSYS)	Lubricant type: Dn. S10X (P/N 38899 – P0A – 003)		
	Lubricant capacity mℓ (fl oz, Imp oz)		160 $^{+20}_{0}$ (5 1/3 $^{+2/3}_{0}$ 5.6 $^{+0.7}_{0}$)
	Field coil resistance at 20°C (68°F) Ω		2.85 – 3.15
	Pulley-to-pressure plate clearance		0.5 $^{+0.1}_{-0.2}$ (0.02 $^{+0.004}_{-0.008}$)
Compressor belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys		8.0 – 10.5 (0.31 – 0.41) with used belt 5.0 – 7.0 (0.20 – 0.28) with new belt
	Belt tension N (kgf, lbf) Measured with belt tension gauge		440 – 590 (45 – 60, 99 – 132) with used belt 930 – 1,130 (95 – 115, 209 – 254) with new belt

*: When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.

Standards and Service Limits

Electrical — Section 23

	MEASUREMENT	STANDARD (NEW)	
Ignition coil	Rated voltage V	12	
	Primary winding resistance at 20°C (68°F) Ω	F22B1 engine: 0.4 – 0.6 F22B2 engine: 0.6 – 0.8 Except F22B1 and F22B2 engines: 0.6 – 0.8	
	Secondary winding resistance at 20°C (68°F) kΩ	F22B1 engine: 22.4 – 33.6 F22B2 engine: 14.4 – 21.6 Except F22B1 and F22B2 engines: 13 – 19	
Ignition wire	Resistance at 68°F (20°C) kΩ	25 max.	
Spark plug	Type	See Section 23	
	Gap	$1.1\ ^{0}_{-0.1}$ ($0.043\ ^{0}_{-0.004}$)	
Ignition timing	At idling °BTDC (Red) –rpm (min^{-1})	15 ± 2 – 700 ± 50 (M/T: neutral)*1 15 ± 2 – 700 ± 50 (A/T; N or P position)*1 15 ± 2 – 770 ± 50 (M/T: neutral)*2 15 ± 2 – 770 ± 50 (A/T; N or P position)*2	
Alternator belt*3	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	10.5 – 12.5 (0.41 – 0.49) with used belt 8.0 – 10 (0.31 – 0.39) with new belt	
	Belt tension N (kgf, lbf) Measured with belt tension gauge	290 – 440 (30 – 45, 66 – 99) with used belt 540 – 740 (55 – 75, 120 – 170) with new belt	
		STANDARD (NEW)	**SERVICE LIMIT**
Alternator	Output 13.5 V at hot A	80*4, 90*5	
	Coil resistance (rotor) at 20°C (68°F) kΩ	2.8 – 3.0 (0.11 – 0.12)	———
	Slip ring O.D.	14.4 (0.57)	14.0 (0.55)
	Brush length	10.5 (0.41)	1.5 (0.002)
	Brush spring tension N (kgf, lbf)	2.9 – 3.5 (0.30 – 0.36, 0.66 – 0.77)	———
Starter M/T	Output/Manufacturer	1.4 kW/NIPPONDENSO	
	Commutator mica depth	0.5 – 0.8 (0.020 – 0.031)	0.2 (0.008)
	Commutator runout	0 – 0.02 (0 – 0.001)	0.05 (0.002)
	Commutator O.D.	29.9 – 30.0 (1.177 – 1.181)	29.0 (1.14)
	Brush length	15.0 – 15.5 (0.59 – 0.61)	10.0 (0.39)
	Brush spring tension (new) N (kgf, lbf)	18 – 24 (1.8 –2.4, 4.0 – 5.3)	———
A/T	Output/Manufacturer	1.4 kW*6, 1.6 kW*2/MITSUBA	
	Commutator mica depth	0.4 – 0.5 (0.016 – 0.020)	0.15 (0.006)
	Commutator runout	0 – 0.02 (0 – 0.001)	0.05 (0.002)
	Commutator O.D.	28.0 – 28.1 (1.102 – 1.106)	27.5 (1.083)
	Brush length	15.8 – 16.2 (0.62 – 0.64)	10.0 (0.39)
	Brush spring tension (new) N (kgf, lbf)	16 – 18 (1.6 – 1.8, 3.5 – 4.0)	———

*1: F22B1, F22B2 engines
*2: F20B3, F22B5 engines
*3: When using a new belt, adjust deflection or tension to new values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.
*4: F20B3, F22B2, F22B5 engines
*5: F22B1 engine
*6: F22B1 engine

Design Specifications

	ITEM			METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length			4,675 mm	184.1 in	
	Overall Width			1,780 mm	70.1 in	
	Overall Height			1,390 mm	54.7 in	
	Wheelbase			2,715 mm	106.9 in	
	Track Front/Rear			1,515/1,500 mm	59.6/59.1 in	
	Ground Clearance			160 mm	6.3 in	
	Seating Capacity			Five		
WEIGHT	Curb Weight	KE: 2.0i LS	M/T	1320 kg	2910 lbs	*1With SRS airbag system and leather *2With ABS *3With leather
	European Model		A/T	1345 kg	2965 lbs	
	(KE, KG)	2.2i ES	M/T	1335 kg	2943 lbs	
			A/T	1360 kg	2998 lbs	
		KG: 2.0i LS	M/T	1295 kg	2855 lbs	
			A/T	1320 kg	2910 lbs	
		2.0i ES	M/T	1330 kg	2932 lbs	
			A/T	1355 kg	2987 lbs	
		2.2i ES	M/T	1315/1330*1	2899/2932 lbs	
			A/T	1340/1355*1	2954/2987 lbs	
	Except European Model	DX	A/T	1280	2822	
	(KH)	LX	A/T	1310/1325*2	2888/2921*2	
		EX	A/T	1360/1370*3	2999/3020*3	
	Weight Distributions (Front/Rear)					*1With SRS airbag system and leather *2With ABS *3With leather
	European Model	KE: 2.0i LS	M/T	800/520 kg	1764/1146 lbs	
	(KE, KG)		A/T	830/515 kg	1830/1135 lbs	
		2.2i ES	M/T	825/510 kg	1819/1124 lbs	
			A/T	855/505 kg	1885/1113 lbs	
		KG: 2.0i LS	M/T	790/505 kg	1742/1113 lbs	
			A/T	820/500 kg	1808/1102 lbs	
		2.0i ES	M/T	815/515 kg	1797/1135 lbs	
			A/T	845/510 kg	1863/1124 lbs	
		2.2i ES	M/T	810 (820*1)/505 (510*2) kg	1786 (1808*1)/1113 (1124*1) lbs	
			A/T	840 (850*1)/500 (505*1) kg	1852 (1874*1)/1102 (1113*1) lbs	
	Except European Model	DX	A/T	800/480 kg	1764/1058 lbs	
	(KH)	LX	A/T	825 (840*2)/485 kg	1819 (1852*2)/1069 lbs	
		EX	A/T	855 (860*3)/505 (510*3) kg	1885 (1896*3)/1114 (1124*3) lbs	
ENGINE	Type	F22B1 engine		Water-cooled, 4-stroke SOHC VTEC gasoline engine		
		Except F22B1 engine		Water-cooled, 4-stroke SOHC gasoline engine		
	Cylinder Arrangement			Inline 4-cylinder, transverse		
	Bore and Stroke					
	F20B3 engine			85.0 x 88.0 mm	3.35 x 3.46 in	
	F22B1, F22B2, F22B5 engines			85.0 x 95.0 mm	3.35 x 3.74 in	
	Displacement					
	F20B3 engine			1,997 cm^3 (mℓ)	122 cu-in	
	F22B1, F22B2, F22B5 engines			2,156 cm^3 (mℓ)	132 cu-in	

(cont'd)

Design Specifications

(cont'd)

	ITEM	METRIC	ENGLISH	NOTES
ENGINE (cont'd)	Compression Ratio			
	F20B3 engine	9.0 : 1		
	F22B1, F22B2 engines	8.8 : 1		
	F22B5 engine	9.8 : 1		
	Valve Train F22B1 engine	Belt driven, SOHC VTEC 4 valve per cylinder		
	Except F22B1 engine	Belt driven, SOHC 4 valve per cylinder		
	Lubrication System	Forced and wet sump, trochoid pump		
	Oil Pump Displacement at 6,000 engine rpm (min^{-1})	73.5 ℓ (77.7 US qt, 64.7 Imp qt)/minute		
	Water Pump Displacement at 6,000 engine rpm (min^{-1})	160 ℓ (169 US qt, 141 Imp qt)/minute		
	Fuel Required			
	F22B1, F22B2, engines	UNLEADED gasoline with a Research Octane Number (RON) of 91 or higher		
	F20B3, F22B5 engines	Premium UNLEADED gasoline with a Research Octane Number (RON) of 95 or higher		
STARTER	Type	Gear reduction		
	Normal Output M/T	1.4 kW		
	A/T	1.6 kW		
	Normal Voltage	12 V		
	Hour Rating	30 seconds		
	Direction of Rotation	Clockwise as viewed from gear end		
	Weight	3.7 kg	8.2 lbs	
CLUTCH	Type M/T	Single plate dry, diaphragm spring		
	A/T	Torque converter		
	Facing Area M/T	217 cm^2	33.6 sq-in	
TRANSMISSION	Type M/T	Synchronized 5-speed forward, 1 reverse		
	A/T	Electronically controlled 4-speed automatic, 1 reverse		
	Primary Reduction Type/Ratio	Direct/1 : 1		
	Manual Transmission	F20B3, F22B5 engines		
	Gear Ratio 1st	3.307		
	2nd	1.809		
	3rd	1.230		
	4th	0.933		
	5th	0.757		
	Reverse	3.000		
	Final Reduction Gear Ratio	4.266		
	Type	Single helical gear		

	ITEM		METRIC	ENGLISH	NOTES
TRANSMISSION (cont'd)	Automatic Transmission		F20B3, F22B5 engines	F22B1, F22B2 engines	
	Gear Ratio	1st	2.736	2.736	
		2nd	1.333	1.483	
		3rd	1.026	1.026	
		4th	0.731	0.674	
		Reverse	2.047	2.047	
	Final Reduction Gear	Ratio	4.285	4.133	
		Type	Single helical gear		
AIR CONDITIONING	Cooling Capacity		4,130 Kcal/h	16,400 BTU/h	
	Compressor	Type/Manufacturer	Swash-plate/NIPPONDENSO		Except F22B1 engine
		No. of Cylinder	10		
		Capacity	170 mℓ/rev	10.4 cu-in/rev	
		Max. Speed	7,600 rpm (min^{-1})		
		Lubricant Capacity	160mℓ	5 1/3fl oz, 5.6 Imp oz	
		Lubricant Type	ND-OIL8 (P/N 38899 – PR7 – 003)		
	Compressor	Type/Manufacturer	Swash-plate/HADSYS		F22B1 engine
		No. of Cylinder	7		
		Capacity	170 mℓ/rev	10.4 cu-in/rev	
		Max. Speed	7,800 rpm (min^{-1})		
		Lubricant Capacity	160 mℓ	5 1/3fl oz 5.6 Imp oz	
		Lubricant Type	Dn. S10X (P/N 38899 – P0A – 003)		
	Condenser	Type	Corrugated fin		
	Evaporator	Type	Corrugated fin		
	Blower	Type	Sirocco fan		
		Motor Input	200 W/12 V		
		Speed Control	4-speed		
		Max. Capacity	480 m^3/h	16,900 cu-ft/h	
	Temperature Control		Air-mix type		
	Compressor Clutch	Type	Dry, single plate, poly-V-belt drive		
		Power Consumption	40 W max./12 V		At 20°C (68°F)
	Refrigerant	Type	HFC-134a (R-134a)		
		Quantity	650^{0}_{-50}g	$18.4^{0}_{-1.8}$oz	
STEERING SYSTEM	Type		Power assisted, rack and pinion		
	Overall Ratio		16.3		
	Turns, Lock-to-Lock		3.11		
	Steering Wheel Dia.		380 mm	15.0 in	

(cont'd)

Design Specifications

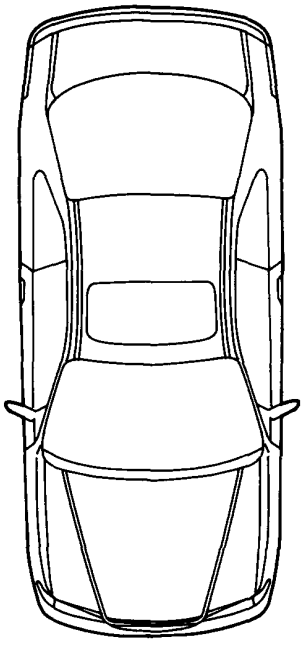
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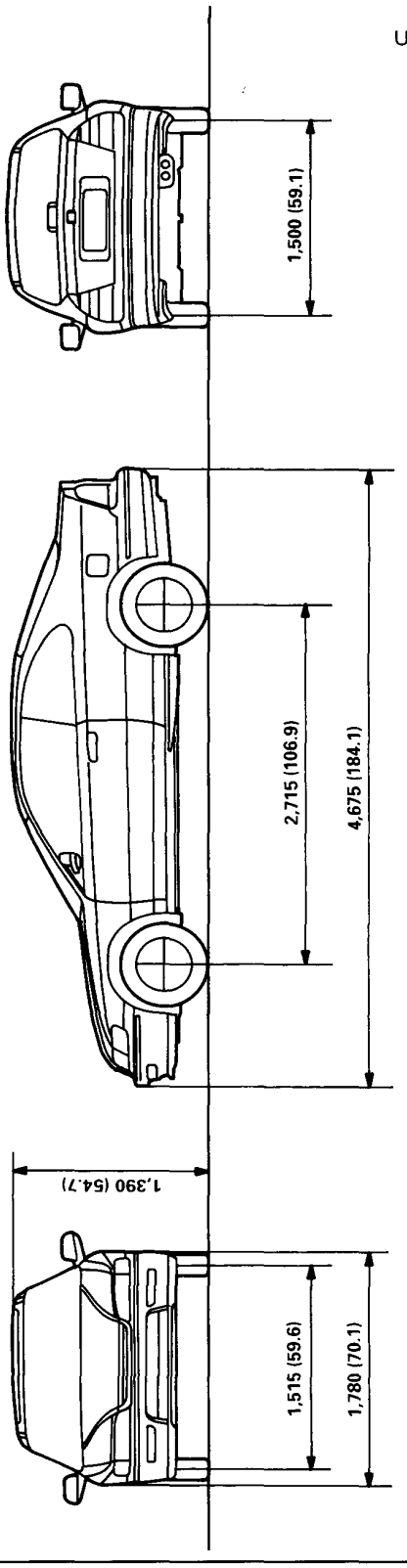
	ITEM		METRIC	ENGLISH	NOTES
SUSPENSION	Type	Front	Independent double wishbone, coil spring with stabilizer		
		Rear	Independent double wishbone, coil spring with stabilizer		
	Shock Absorber	Front and Rear	Telescopic, hydraulic nitrogen gas-filled		
WHEEL ALIGNMENT	Camber	Front	0°		
		Rear	−0°25′		
	Caster	Front	3°00′		
	Total Toe	Front	0 mm	0 in	
		Rear	In 2 mm	In 0.08 in	
BRAKE SYSTEM	Type	Front	Power-assisted self-adjusting ventilated disc		
		Rear	Power-assisted self-adjusting solid disc*1 Power-assisted self-adjusting drum*2		
	Pad Surface Area	Front	49 cm² x 2	7.6 sq-in x 2	
		Rear	28 cm² x 2	4.3 sq-in x 2	Disk brake
	Lining Surface Area	Rear	74 cm² x 2	11.5 sq-in x 2	Drum brake
	Parking Brake	Type	Mechanical actuating, rear two wheel brakes		
TIRE	Size and Pressure		See tire label (see page 1-9)		
ELECTRICAL	Battery		12 V – 55 AH/5 HR		
	Starter		12 V – 1.4 kW/1.6 kW		
	Alternator		12 V – 80 A*1/90 A*2		
	Fuses				
	In Under-dash Fuse/Relay Box		7.5 A, 10 A, 15 A, 30 A		
	In Under-hood Fuse/Relay Box		7.5 A, 10 A, 15 A, 20 A, 30 A, 40 A 50 A, 80 A, 100 A		
	In Under-hood ABS Fuse/Relay Box		10 A, 15 A, 20 A, 40 A		
	Headlights	Inside	12 V – 55 W		
		Outside	12 V – 60/55 W		
	Front Turn Signal Lights		12 V – 21 W		
	Front Side Marker Lights		12 V – 5 W		
	Front Position Lights		12 V – 5 W		
	Side Turn Signal Lights		12 V – 5 W		
	Rear Turn Signal Lights		12 V – 21 W		
	Stop/Taillights		12 V – 21/5 W		
	Rear Side Marker Lights		12 V – 5 W		
	High Mount Brake Light		12 V – 21 W		
	Back-up Lights		12 V – 21 W		
	Interior Lights (Front/Rear)		12 V – 5 W		
	Trunk Lights		12 V – 3.4 W (5.0 W)		
	Door Coutesy Lights		12 V – 3.4 W		
	Vanity Mirror Light		12 V – 1.8 W		
	Gauge Lights		12 V – 1.4 W, 3.0 W		
	Indicator Lights		12 V – 0.84 W, 1.12 W, 1.4 W		
	Illumination and Pilot Lights		12 V – 0.56 W, 0.84 W, 0.91 W, 1.12 W, 1.4 W, LED		
	Heater Illumination Lights		12 V – 1.4 W		

*1: 2.2i ES (KE, KG), 2.0i ES (KE, KG) and EX models
*2: Others

Body Specifications

Unit: mm (in)





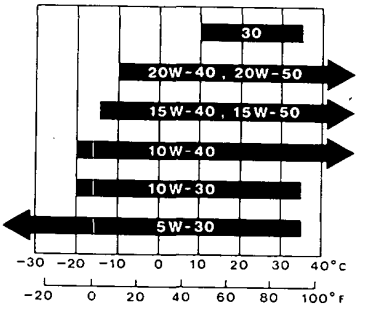
Maintenance

Lubrication Points 4-2
Maintenance Schedule 4-4

Lubrication Points

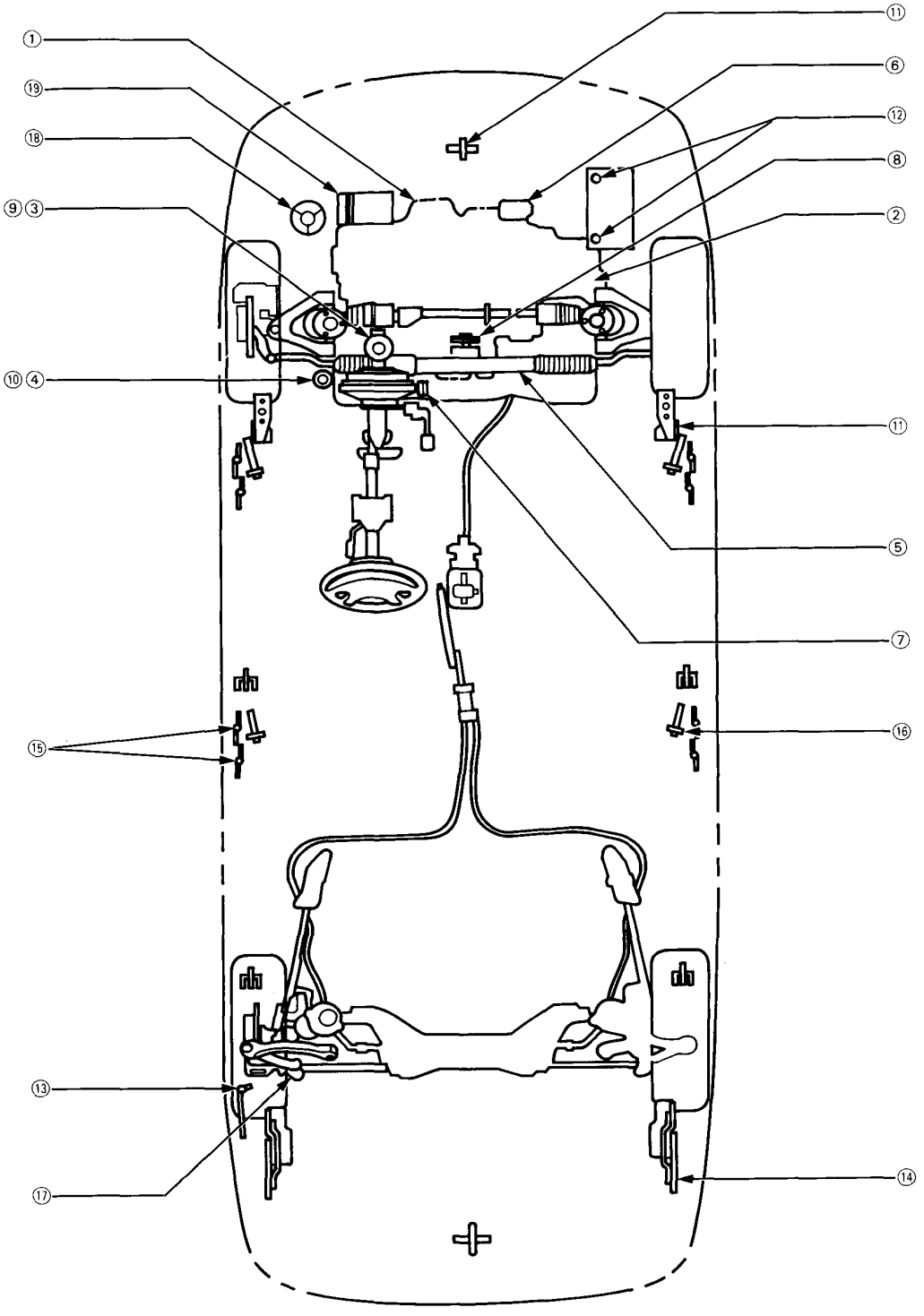
For the details of lubrication points and type of lubricants to be applied, refer to the illustrated index and various work procedure (such as Assembly/Reassembly, Replacement, Overhaul, Installation, etc.) contained in each section.

No.	LUBRICATION POINTS	LUBRICANT
1	Engine	Always use a fuel-efficient oil is that says "API Service SG or SH." SAE Viscosity: See chart below.
2	Transmission — Manual Automatic	API Service Grades: SF or SG SAE Viscosity: 10 W—30 or 10 W—40 Honda Premium Formula or DEXRON® II Automatic transmission fluid
3	Brake line (Includes Anti-lock brake line)	Brake fluid DOT3 or DOT4
4	Clutch line	Brake fluid DOT3 or DOT4
5	Power steering gearbox	Steering grease P/N 08733—B070E
6	Release fork (Manual transmission)	Urea Grease UM264 (P/N 41211—PY5—305)
7	Throttle wire end (Dashboard lower panel hole)	Silicone grease
8 9 10 11 12 13 14 15 16	Throttle cable end (Throttle link) Brake master cylinder pushrod Clutch master cylinder pushrod Hood hinges and hood latch Battery terminals Fuel fill lid Trunk hinges Door hinges, upper and lower Door open detent	Multi-purpose grease
17	Rear brake calipers	Rust-preventive agent
18	Power steering system	Honda power steering fluid-V
19	Air conditioning compressor	Compressor oil: NIPPONDENSO: ND-OIL8 (P/N 38899—PR7—003) HADSYS: Dn. S10X (P/N 38899—P0A—003) (For Refrigerant: HFC-134a (R-134a))



Recommended engine oil
Engine oil viscosity for
ambient temperature ranges

CAUTION: Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.


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R = Replace I = Inspect: After inspection, clean, adjust, fill up, repair or replace if necessary.

Service at the interval listed x 1,000 km (or miles) or after that number of months, whichever comes first.											
		x 1,000 km	20	40	60	80	100	120	140	160	180	200
		x 1,000 miles	12	24	36	48	60	72	84	96	108	120
		months	12	24	36	48	60	72	84	96	108	120
• Engine oil and oil filter	For European models		Replace every 10,000 km (6,000 miles) or 12 months									
	For other than European models		Replace every 10,000 km (6,000 miles) or 6 months									
• Transmission oil	For European models				R			R			R	
	For other than European models			R		R		R		R		R
Valve clearance	For European models			I		I		I		I		I
	For other than European models		I	I	I	I	I	I	I	I	I	I
Belt tension and conditions (Alternator, P/S pump, A/C compressor)				I		I		I		I		I
Timing belt and timing balancer belt							R					R
Water pump							I					I
Cooling system hoses and connections				I		I		I		I		I
• Engine coolant						R		R		R		R
Spark plugs				R		R		R		R		R
Ignition timing (For other than European models)				I		I		I		I		I
Air cleaner element				R		R		R		R		R
Tank, fuel lines and connections				I		I		I		I		I
Fuel filter				R		R		R		R		R
Positive crankcase ventilation valve							I					I
Idle speed and idle CO			I	I	I	I	I	I	I	I	I	I
Evaporative emission control system (For other than European models)							I					I
Distributor cap and rotor (For other than European models)				I		I		I		I		I
Ignition wiring (For other than European models)				I		I		I		I		I

• Day to day care (engine oil, ATF and coolant level) should be done practically according to the owner's manual by the customer.

R = Replace I = Inspect: After inspection, clean, adjust, fill up, repair or replace if necessary.

Service at the interval listed x 1,000 km (or miles) or after that number of months, whichever comes first.											
	x 1,000 km	20	40	60	80	100	120	140	160	180	200
	x 1,000 miles	12	24	36	48	60	72	84	96	108	120
	months	12	24	36	48	60	72	84	96	108	120
Front brake pads		Inspect every 10,000 km (6,000 miles) or 12 months									
Front brake discs and calipers		I	I	I	I	I	I	I	I	I	I
Rear brake discs, calipers and pads			I		I		I		I		I
Rear brake drums, wheel cylinders and linings			I		I		I		I		I
Parking brake operation		I	I		I		I		I		I
Brake fluid (Including ABS)			R		R		R		R		R
Brake hoses and lines		I	I	I	I	I	I	I	I	I	I
Anti-lock brake system operation (For cars with ABS)			I		I		I		I		I
Exhaust system and condition		I	I	I	I	I	I	I	I	I	I
Catalytic converter heat shield						I					I
Suspension components		I	I	I	I	I	I	I	I	I	I
Steering function, tie-rod ends, gearbox and boots		I	I		I		I		I		I
Power steering functions, hoses and connections		I	I	I	I	I	I	I	I	I	I
All fluid levels		Inspect every 10,000 km (6,000 miles) or 12 months									
Battery condition		I	I	I	I	I	I	I	I	I	I
Tires condition, wear and pressure (Including spare)		Inspect every 10,000 km (6,000 miles) or 12 months									
Lights operation and headlight beam		Inspect every 10,000 km (6,000 miles) or 12 months									
Paint damages and body work		I	I	I	I	I	I	I	I	I	I
Test drive (noise, stability, dashboard operations)		I	I	I	I	I	I	I	I	I	I
Cleanliness of controls, door handles etc		Inspect after every Service									
Supplemental Restraint System		Inspect system 10 years first registration									

(cont'd)

Severe Driving Conditions

The following items must be serviced more frequently on cars normally used under severe driving conditions. Refer to the chart below for the appropriate maintenance intervals.

Severe driving conditions include:
- A: Repeated short distance driving.
- B: Driving in dusty conditions.
- C: Driving in severe cold weather.
- D: Driving in areas using road salt or other corrosive materials.
- E: Driving in rough and/or muddy roads.
- F: Towing a trailer.

R = Replace C = Clean I = Inspect: After inspection, clean, adjust, fill up, repair or replace if necessary.

Condition	Maintenance Item		Operation	Interval
A B • • • F	Engine oil and oil filter	For European models	R	Every 5,000 km (3,000 miles) or 6 months
		For other than European models	R	Every 5,000 km (3,000 miles) or 3 months
• • • • • F	Transmission oil		R	Every 20,000 km (12,000 miles) or 12 months
• B • • E •	Air cleaner element		C	Every 20,000 km (12,000 miles) or 12 months
			R	Every 40,000 km (24,000 miles) or 24 months
A B • D E F	Front brake discs and calipers		I	Every 10,000 km (6,000 miles) or 6 months
A B • D E F	Rear brake discs, calipers and pads		I	Every 20,000 km (12,000 miles) or 12 months
A B C • E F	Clutch release arm travel		I	Every 10,000 km (6,000 miles) or 6 months
• B C • E •	Power steering system		I	Every 10,000 km (6,000 miles) or 6 months

Engine

Construction and Function
(F22B1 engine) 5-1
Engine Removal/Installation 5-11
Cylinder Head/Valve Train 6-1
Engine Block 7-1
Engine Lubrication 8-1
Intake Manifold/Exhaust System 9-1
Cooling 10-1



Construction and Function (F22B1 engine)

Outline

Description 5-2

VTEC

Description 5-4

Mechanism 5-6

Control System 5-7

Explanation of Timing Mechanism Operation 5-8

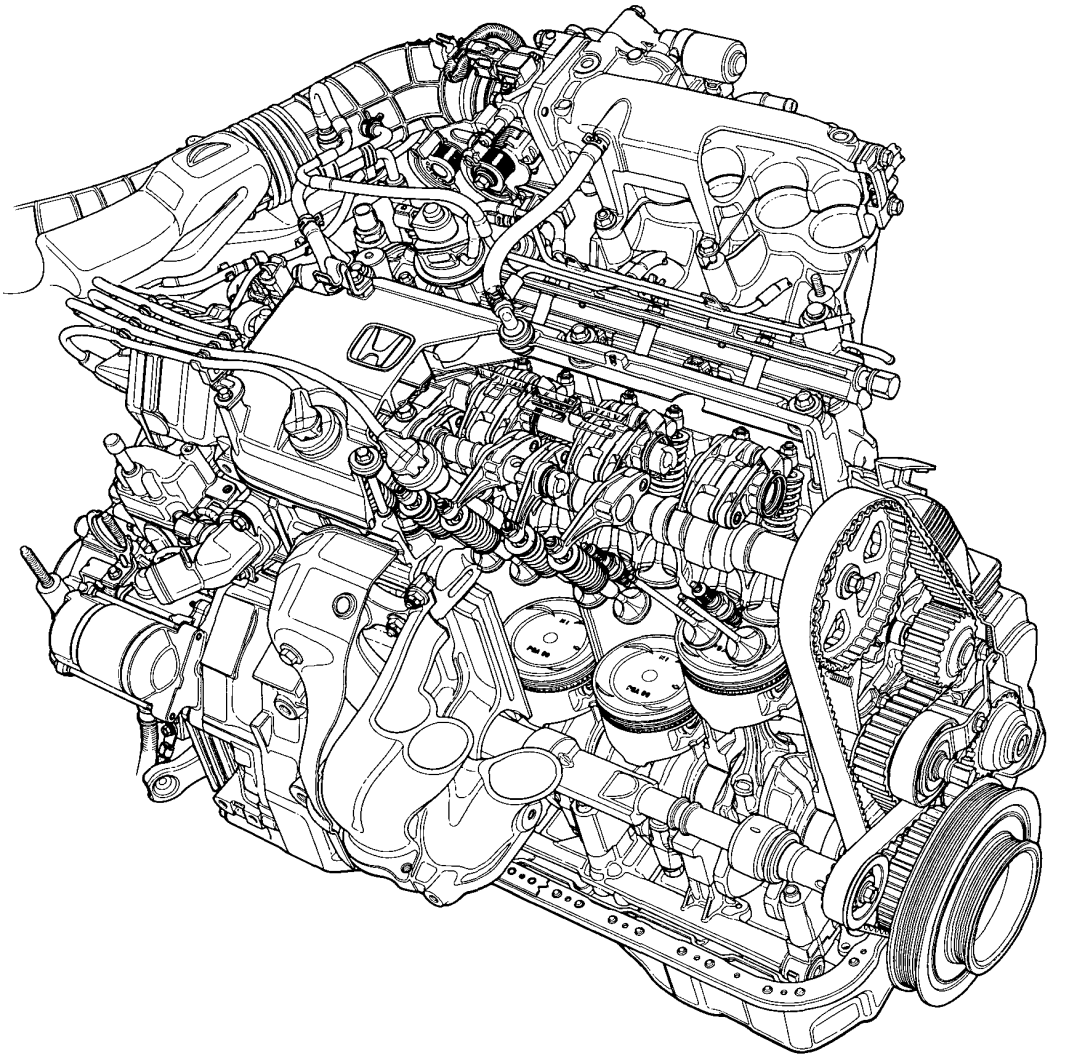


Outline

Description

The new F22B1 engine is an in-line 4-cylinder SOHC design displacing 2,156 cm^3 (131.5 cu-in). It is water cooled and equipped with a center plug type pent-roof combustion chamber. It is specified to use unleaded fuel and uses a PGM-FI (Sequential Multiport Fuel Injection) system. This engine incorporates a mechanism called Honda Variable Valve Timing and Valve Lift Electronic Control (VTEC) System.
The design of other engine models are basically the same as F22B1 engine except the displacements and VTEC system. This system allows the timing and lift of the intake valves to be changed simultaneously.

F22B1 engine:



Major Specifications

Type	Water cooled 4-stroke, In-line 4-cylinder gasoline engine
Displacement	2,156 cm^3 (131.5 cu-in)
Bore x Stroke	85.0 x 95.0 mm (3.35 x 3.74 in)
Compression Ratio	8.8 : 1
Cam, Valve Mechanism	Single over-head camshaft, VTEC
Valve Train	Belt Driven
Fuel Supply System	Sequential Multiport Fuel Injection (SFI)

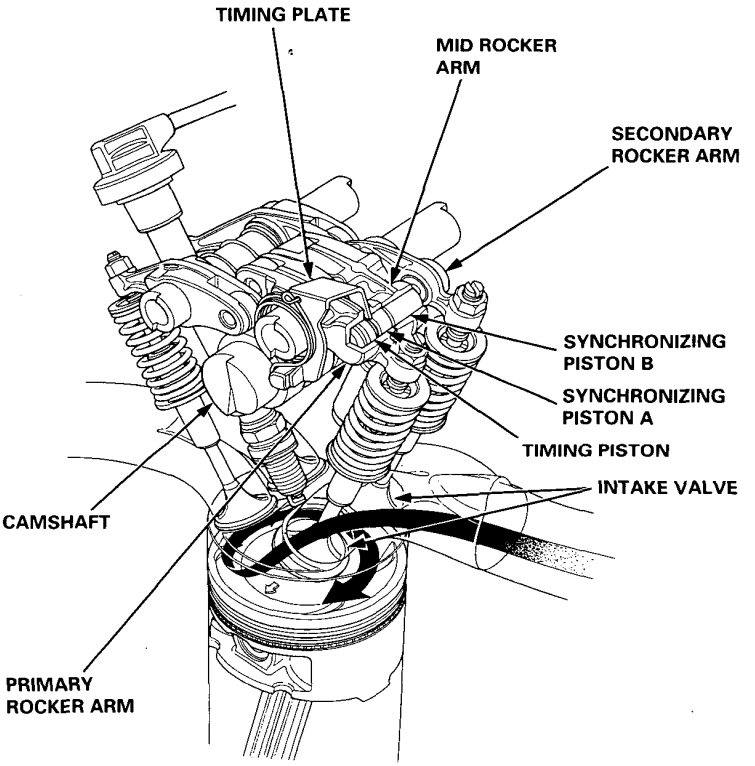
Main Features:

- The cylinder head is made of aluminum alloy, a center plug type, pentroof-shaped combustion chamber is used, and the 4-valve system uses 2 intake valves and 2 exhaust valves.
- The camshaft and the valve train are driven by a timing belt, and the two balancer shafts are driven by a timing balancer belt.
- The cylinder block is made of aluminum alloy using cast iron sleeves.
- The crankshaft is made by forging, is supported at five points and has eight balancer weights.
- The balancer shafts employ a gear-type reverse mechanism to reduce secondary engine vibration.
- The intake manifold is made of aluminum alloy.
- The electronic fuel injection system is a sequential multiport type. It injects fuel into all four cylinders. The throttle body is a one-barrel, side-draft type.
- The ignition system is a fully-transistorized, contactless type. The spark advance is electronic.
- The air cleaner is equipped with a resonator.
- The radiator is a corrugated type, and the cooling fan is electrically powered.

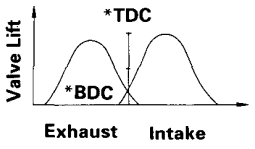
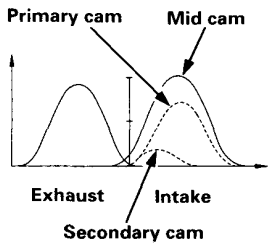
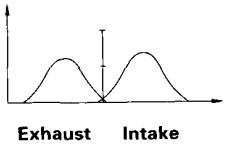
VTEC

Description

This engine has a normal 4 valves per cylinder arrangement. At low engine speed, the primary intake valve operates at normal lift while the secondary intake valve opens only slightly to prevent fuel accumulation in the intake port. At high engine speed the primary and secondary intake rocker arms are connected to the mid intake rocker arm to allow high valve lift. A synchronizing piston connects/disconnects the three intake rocker arms. Hydraulic pressure against a timing piston moves the synchronizing piston A and B one direction, while a stopper piston and return spring moves the synchronizing piston back when hydraulic pressure is reduced.

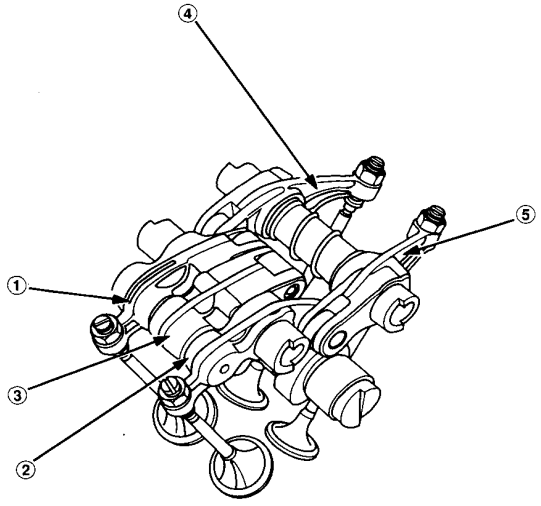


A variable valve timing and lift mechanism is used so the engine achieves both low fuel consumption and high output. This system has achieved high combustion efficiency and low fuel consumption in the low engine speed range while maintaining high output equivalent to that of a conventional 4-valve engine in the high engine speed range. This was made possible by providing a great lift difference between the primary intake valve and secondary intake valve in the low engine speed range to create a swirling fuel/air flow.

	High Power Engine	VTEC Engine	2-valve Engine
Valve Timing (exhaust/intake) Valve Lift			
Max. Power	○	○	×
Low rpm Torque	×	○	○
Idling Stability	×	○	○
Fuel consumption	×	○	○

*TDC = Top Dead Center *BDC = Bottom Dead Center
○ = Optimum Characteristic
× = Worst Characteristic

Rocker arms with roller bearings reduce friction losses.



INTAKE

Rocker Arm	Type
① Primary	Roller
② Secondary	Slider
③ Mid	Roller

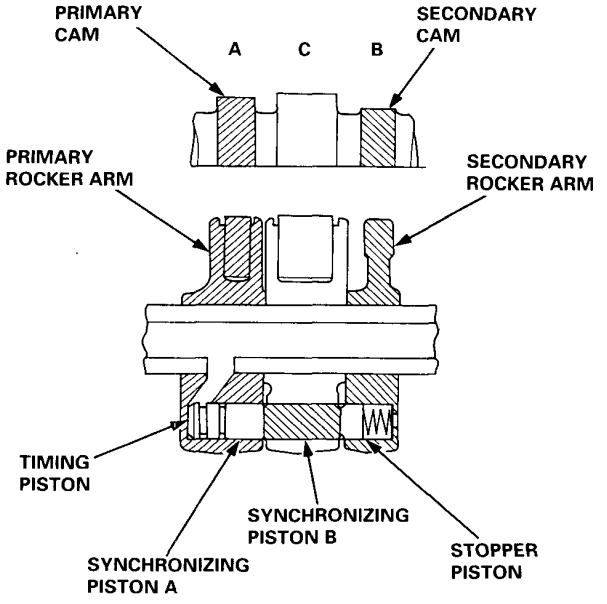
EXHAUST

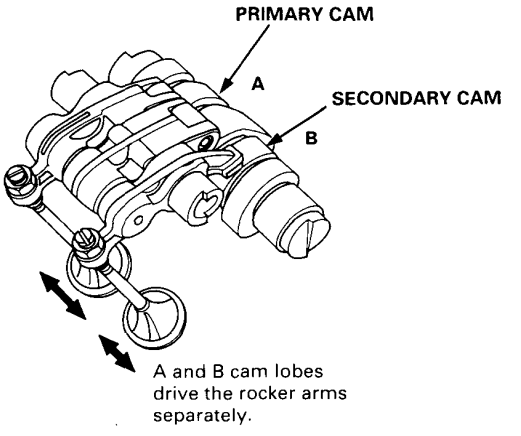
Rocker Arm	Type
④ A	Roller
⑤ B	Roller

Mechanism

At Low Speed:

As shown, the primary and secondary rocker arms are not connected to the mid rocker arm, but are driven separately by cam lobes A and B at different timing and lift. The lift of the secondary cam lobe is small so that one intake valve slightly opens (one-valve control). Although the mid rocker arm is following the center cam lobe with the lost motion assembly, it has no effect on the opening and closing of the valves in the low rpm range.

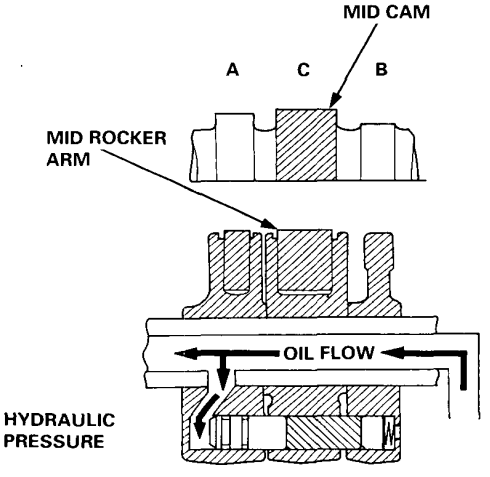


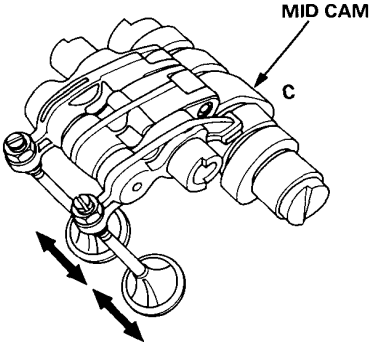


A and B cam lobes drive the rocker arms separately.

At High Speed:

When driving at high speed, the timing piston moves in the direction shown by the arrow in the figure below. As a result, the primary, secondary, and mid rocker arms are linked by 2 synchronizing pistons (like a skewer) and the 3 rocker arms move as a single unit. In this state, all the rocker arms are driven by cam lobe C, opening and closing the valves at the valve timing and valve lift set for high operation.





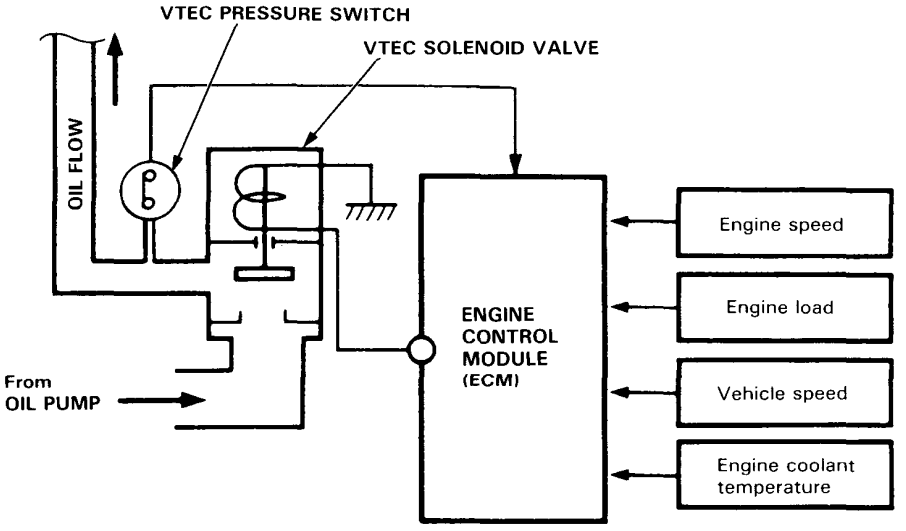
Connected by hydraulic piston, and driven only by the mid cam.

Control System

The control system for this mechanism, as shown below, constantly monitors the changes in engine status such as load, rpm and vehicle speed. This information is transmitted to the Engine Control Module (ECM).

Valve Timing Change Conditions
Engine Speed: 2,300 ~ 3,200 rpm (depending on manifold pressure)
Vehicle Speed: 6.2 mph (10 km/h) or faster
Engine Coolant Temperature: 50°F (10°C) or higher
Engine Load: Judged by intake manifold negative pressure

Control System

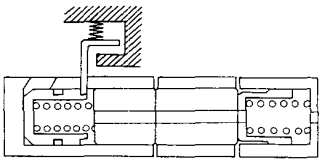


Explanation of Timing Mechanism Operation

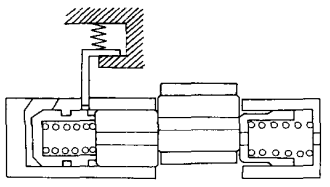
The variable valve timing and lift mechanism switches intake valve operation between single valve operation and two valve operation depending upon engine speed. To help achieve switch-over, a timing plate is installed on the primary rocker arm.

Hydraulic Pressure ON

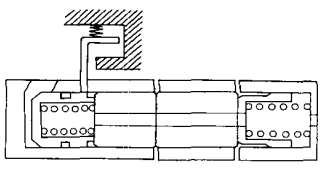
① Lift 0: Switch-over is impossible as the timing Plate is into the timing piston.



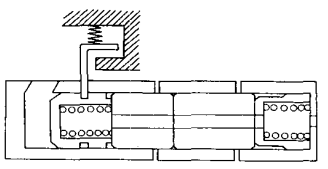
② Lift process begins: The timing plate is desengaged, and the timing piston starts shifting. The synchronizing piston does not move because of the lift.



③ Lift 0: Since the timing plate is pulled out, the valve operating mode starts to change from 1-valve operation to 2-valve operation at the moment the lift becomes zero.

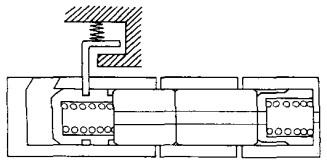


④ Lift 0: Switch-over is complete.

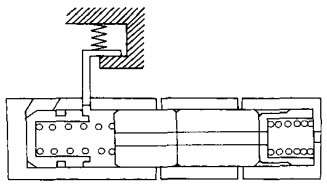


Hydraulic pressure OFF

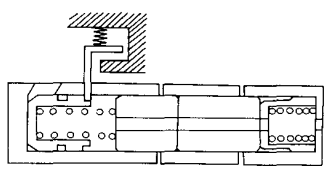
[1] Lift 0: Switch-over is impossible as the timing is inserted into the timing piston.



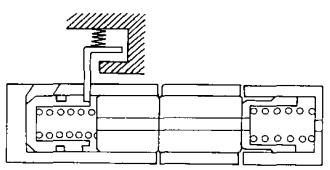
[2] Lift process begins: The timing plate alone starts shifting. The synchronizing piston does not move because of the load imposed.

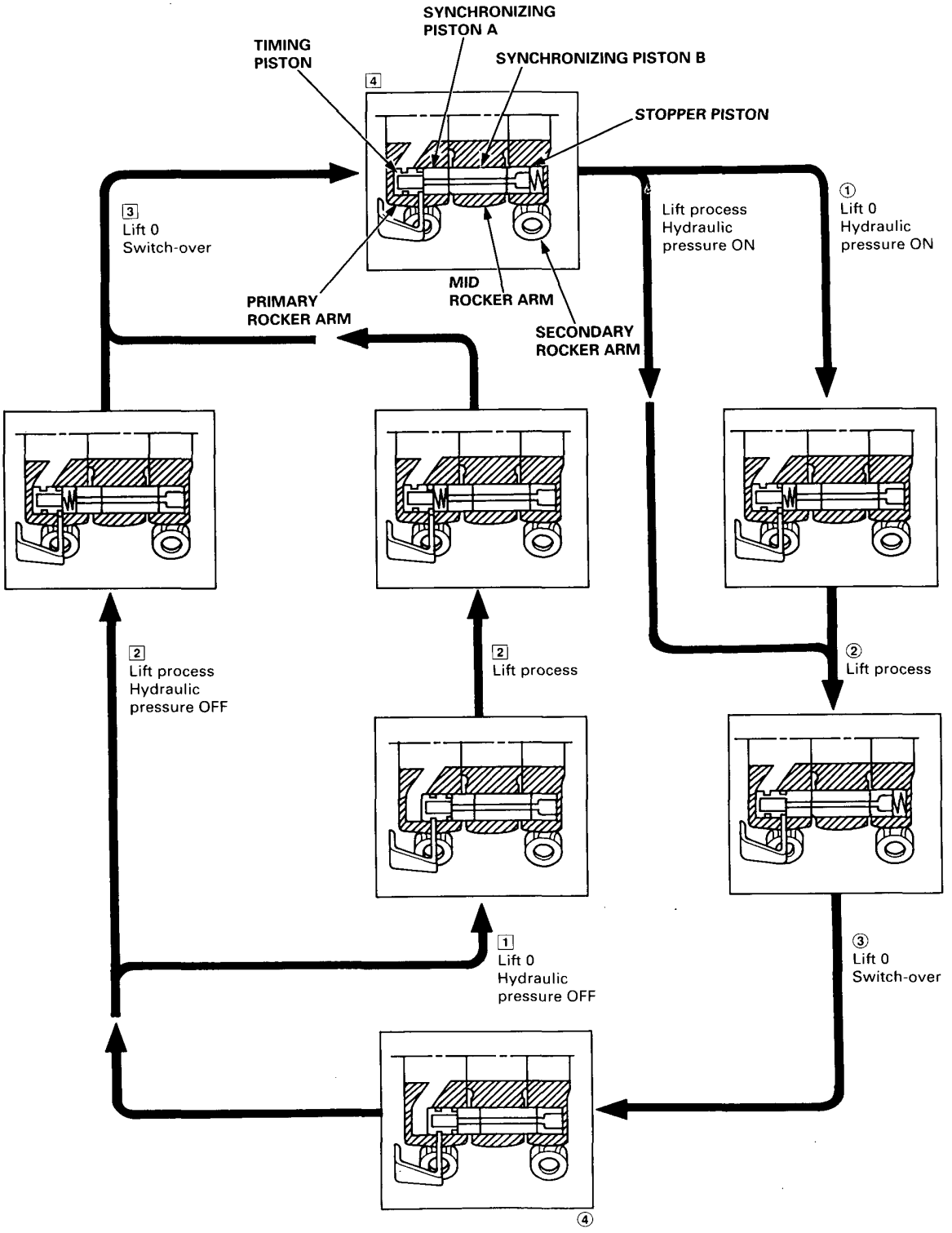


[3] Lift 0: The synchronizing piston is pushed back by the return spring and the valve operation mode starts to change from 2-valve operation to 1-valve operation from the moment when the lift becomes zero.



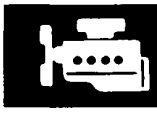
[4] Lift 0: Switch-over is completed.




SYNCHRONIZING PISTON A
TIMING PISTON
SYNCHRONIZING PISTON B
4
STOPPER PISTON
3
Lift 0
Switch-over
Lift process
Hydraulic
pressure ON
①
Lift 0
Hydraulic
pressure ON
PRIMARY ROCKER ARM
MID ROCKER ARM
SECONDARY ROCKER ARM
2
Lift process
Hydraulic
pressure OFF
2
Lift process
②
Lift process
1
Lift 0
Hydraulic
pressure OFF
③
Lift 0
Switch-over
④

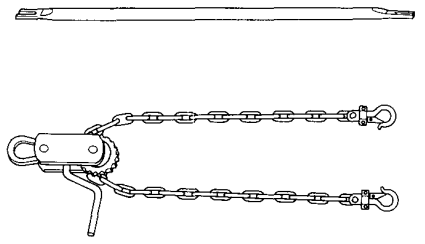
Engine Removal/Installation

Special Tools 5-12
Engine Removal/Installation
  Removal 5-13
  Installation 5-23
Engine Mount Control System (A/T)
  Component Location Index 5-28
  Description 5-29
  Circuit Diagram 5-31
  Troubleshooting 5-32
  Diaphragm Actuator Test 5-35

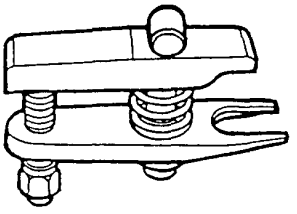


Special Tools

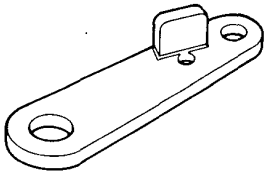
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07KAK – SJ40101	Engine Tilt Hanger Set	1	5-20
②	07MAC – SL00200	Ball Joint Remover, 28 mm	1	5-19
③	07MAK – PY30100	Engine Sub Hanger Stay	1	5-20



①



②



③

Engine Removal/Installation

Removal

⚠ WARNING

- **Make sure jacks and safety stands are placed properly and hoist brackets are attached to the correct positions on the engine.**
- **Make sure the car will not roll off stands and fall while you are working under it.**

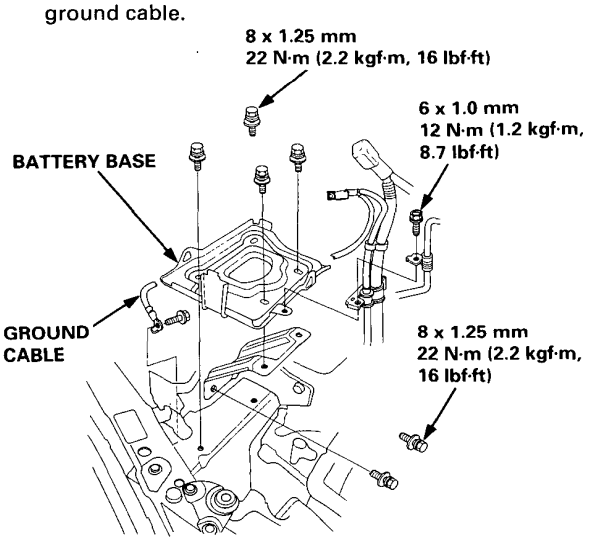
CAUTION:

- **Use fender covers to avoid damaging painted surfaces.**
- **Unspecified items are common.**
- **Unplug the wiring connectors carefully while holding the connector portion to avoid damage.**
- ***Mark all wiring and hoses to avoid misconnection.* Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.**

1. Secure the hood as open as possible.

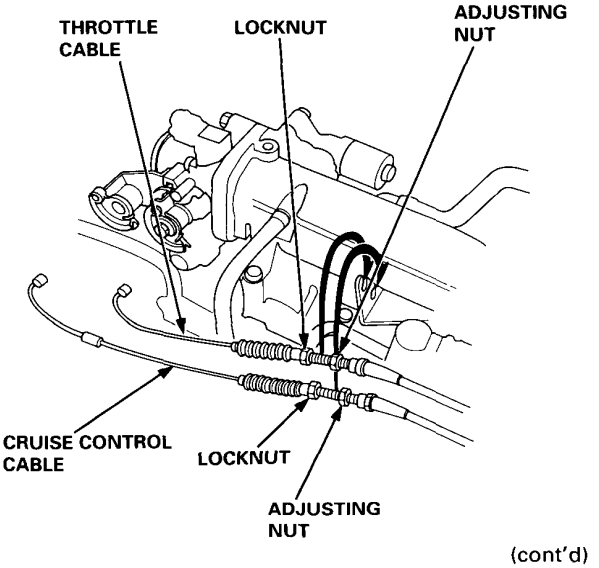
2. Disconnect the battery negative terminal first, then the positive terminal.

3. Remove the battery, battery base and engine ground cable.



4. Remove the throttle cable and cruise control cable by loosening the locknuts, then slip the cable end out of the throttle linkage.

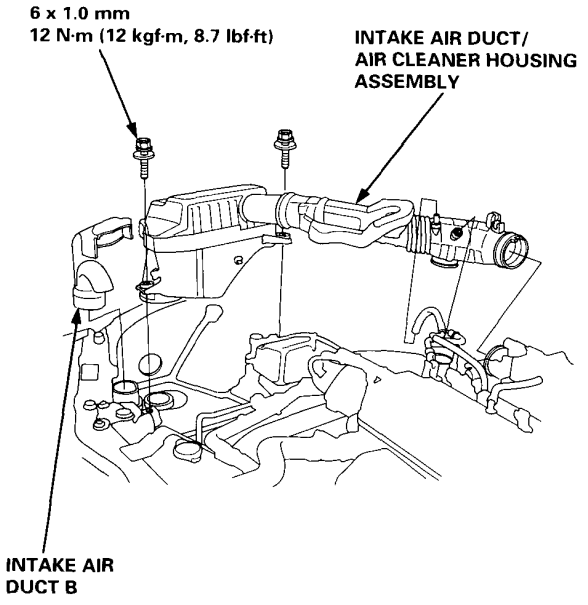
   NOTE:
   - Do not loosen the adjusting nut.
   - Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
   - Adjust the throttle cable and cruise control cable when installing (see section 11 and 23).



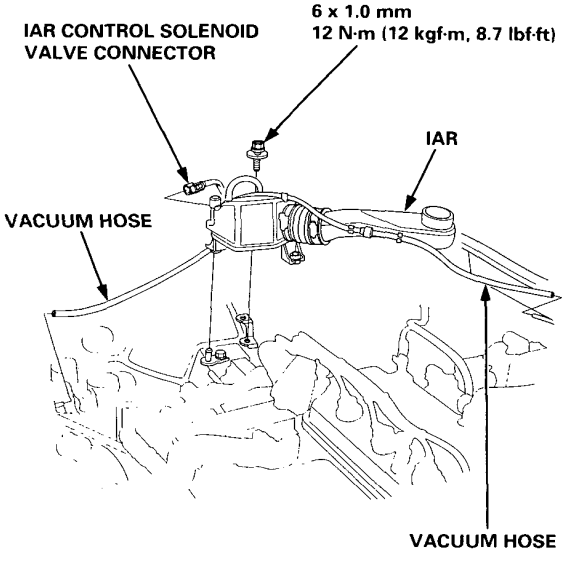
(cont'd)

Removal (cont'd)

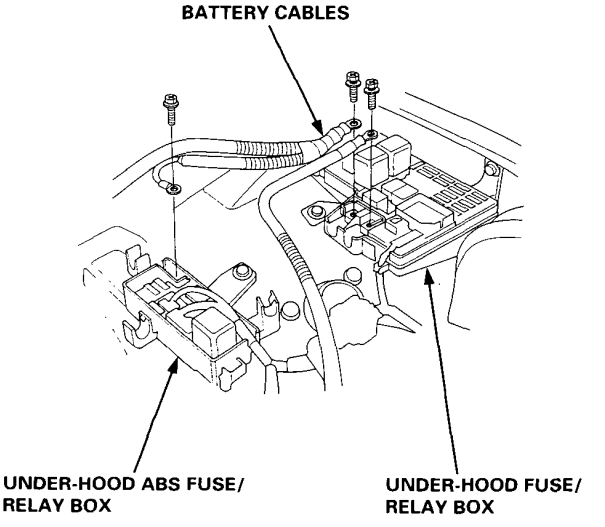
5. Remove the intake air duct B and intake air duct/air cleaner housing assembly.



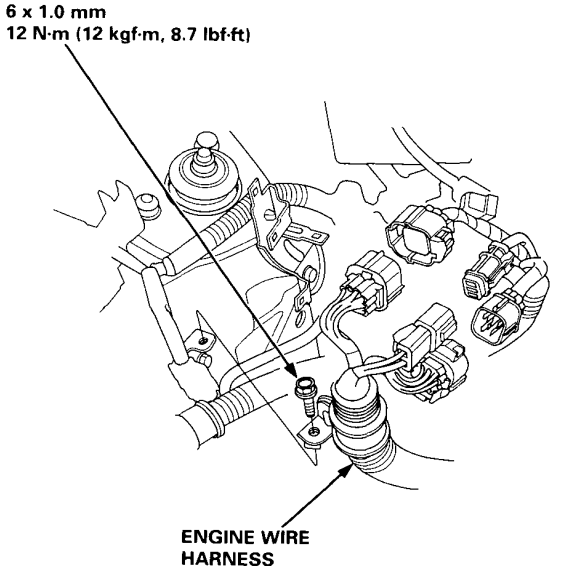
6. Disconnect the intake air resonator (IAR) control solenoid valve connector, then remove the vacuum hose and IAR (F22B1, F22B5 engines).



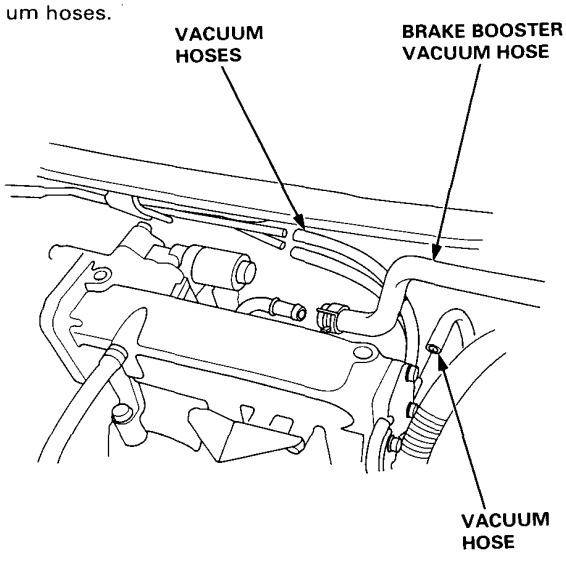
7. Remove the battery cables from the under-hood fuse/relay box and under-hood ABS fuse/relay box.



8. Remove the engine wire harness connectors on the right side of the engine compartment.



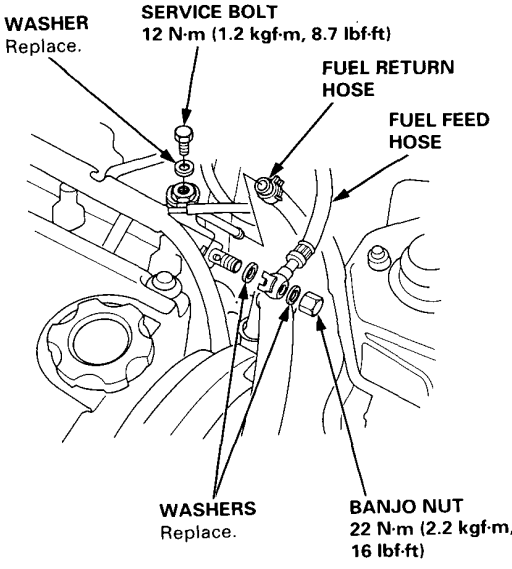
9. Remove the brake booster vacuum hose and vacuum hoses.



10. Relieve fuel pressure by loosening the service bolt on the fuel filter about one turn (see section 11).

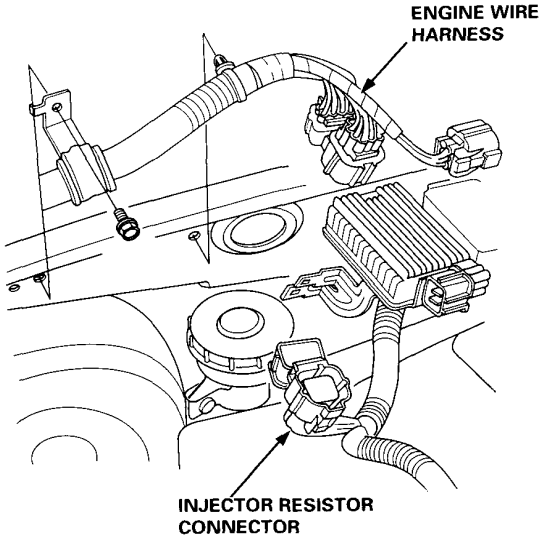
⚠ WARNING Do not smoke while working on fuel system. Keep open flame or spark away from work area. Drain fuel only into an approved container.

11. Remove the fuel feed hose and fuel return hose.

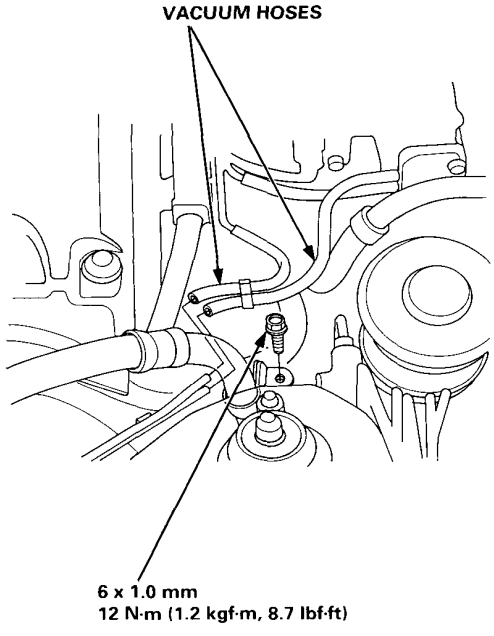


12. Remove the engine wire harness connectors, terminal and clamps on the left side of the engine compartment.

13. Remove the injector resistor connector on the left side of the engine compartment.



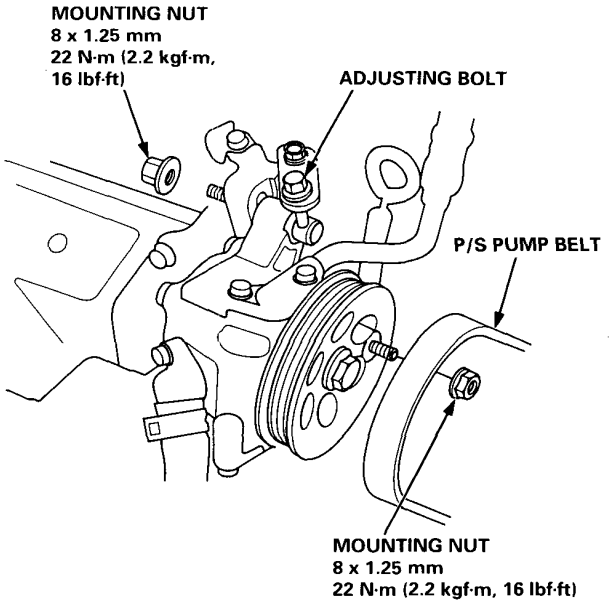
14. Remove the vacuum hoses and power steering (P/S) hose clamp.



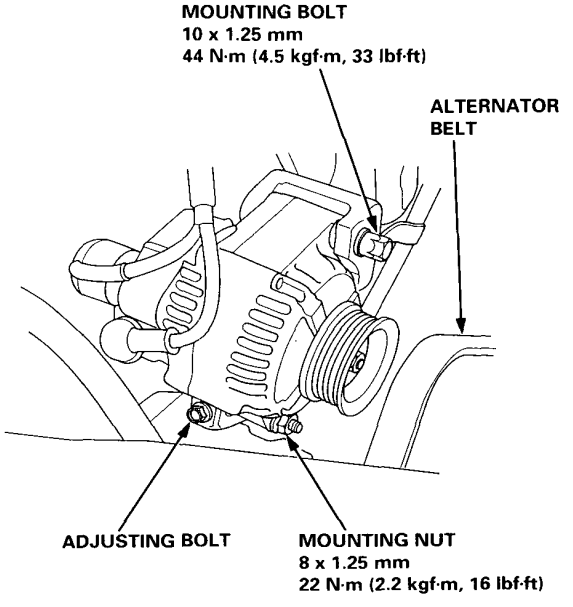
(cont'd)

Removal (cont'd)

15. Remove the mounting nuts and adjusting bolt, then remove the power steering (P/S) pump belt and pump.
    - Do not disconnect the P/S hoses.

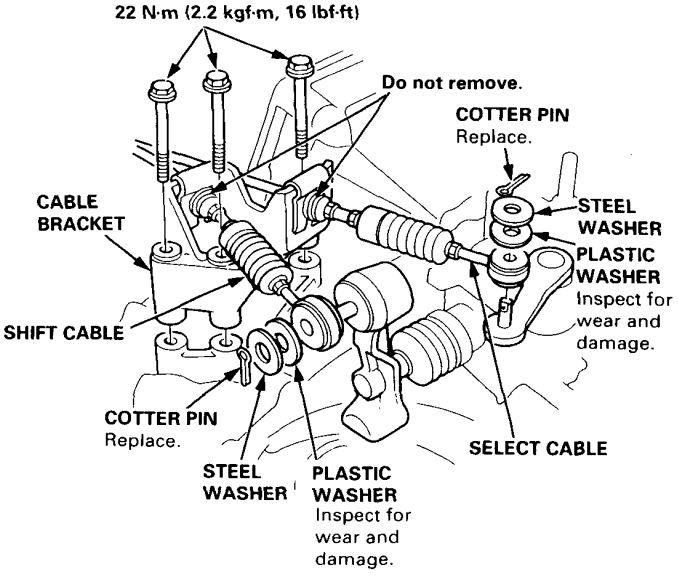


16. Loosen the alternator mounting bolt, nut and adjusting bolt, then remove the alternator belt.

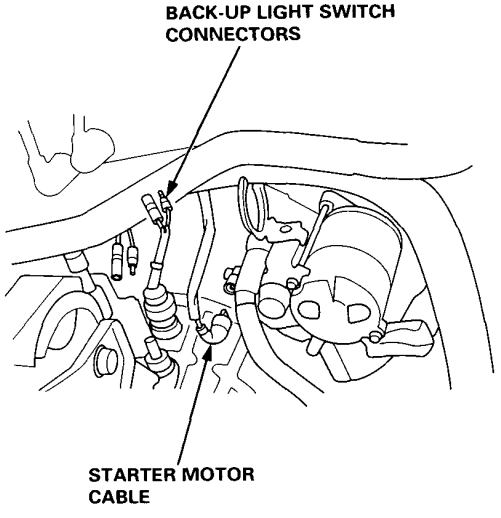


17. (Manual transmission) Remove the shift cable and select cable.

    NOTE: Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.

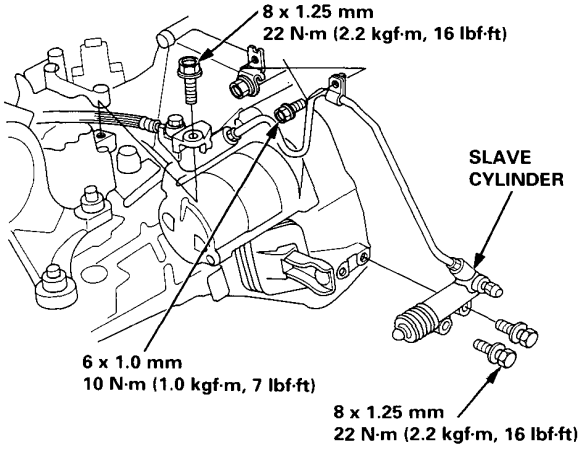


18. Disconnect the back-up light switch connectors and starter motor cable (M/T).



19. Remove the clutch slave cylinder and pipe/hose assembly (M/T).

NOTE:
- Do not disconnect the pipe/hose assembly.
- Do not operate the clutch pedal once the slave cylinder has been removed.
- Take care not to bend the pipe.



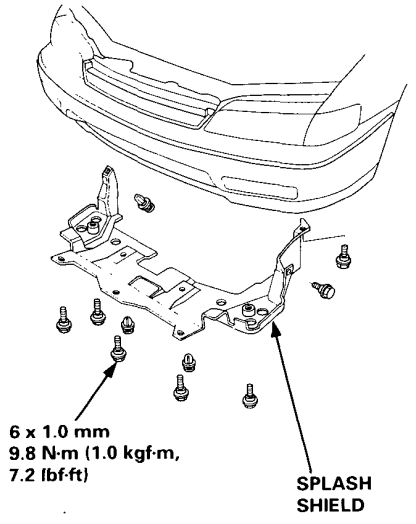
20. Disconnect the vehicle speed sensor (VSS) connector.

21. Remove the radiator cap.

⚠ WARNING ***Use care when removing the radiator cap to avoid scalding by hot coolant or steam.***

22. Raise the hoist to full height.

23. Remove the front tires/wheels and the splash shield.



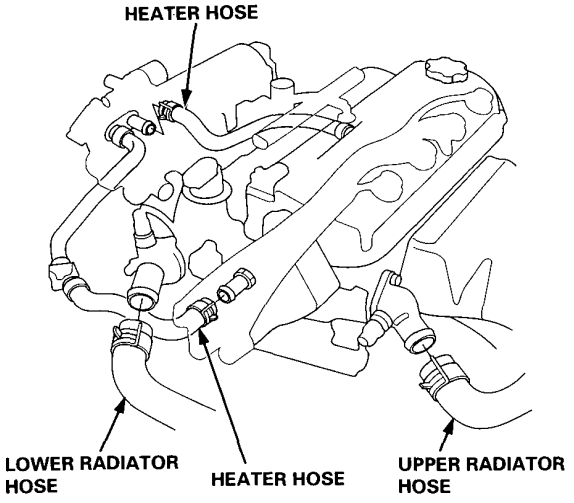
24. Drain the engine coolant (see page 10-5).
- Loosen the drain plug in the radiator.

25. Drain the transmission oil or fluid. Reinstall the drain plug using a new washer (see section 13 or 14).

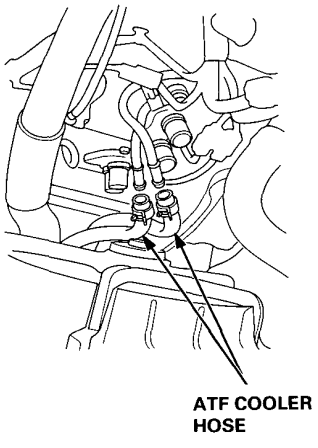
26. Drain the engine oil. Reinstall the drain plug using a new washer (see page 8-4).

CAUTION: Do not overtighten the drain plug.

27. Lower the hoist, then remove the upper and lower radiator hoses and the heater hoses.



28. (Automatic transmission) Remove the ATF cooler hoses.
- Refer to section 14 when installing.

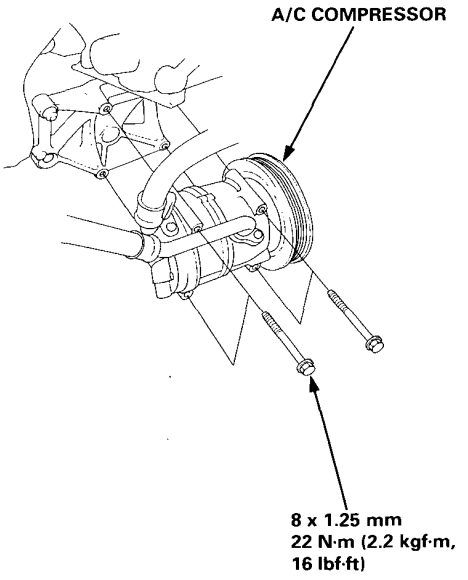


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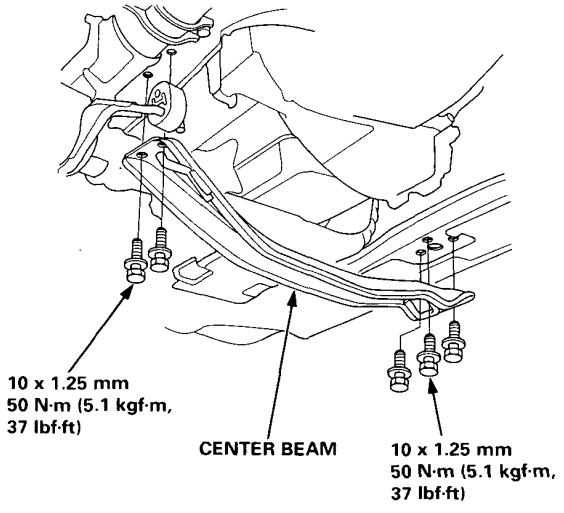
Removal (cont'd)

29. Remove the radiator assembly (see page 10-4).

30. Remove the air conditioning (A/C) compressor.
    - Do not disconnect A/C hoses.



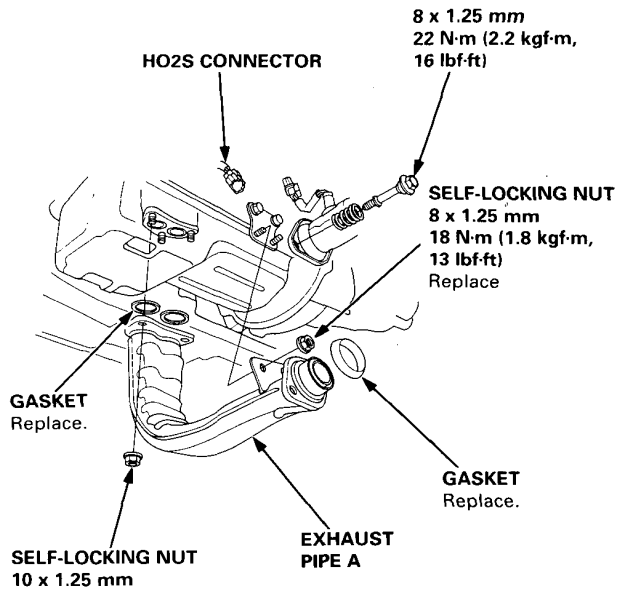
31. Raise the hoist to full height, then remove the center beam.

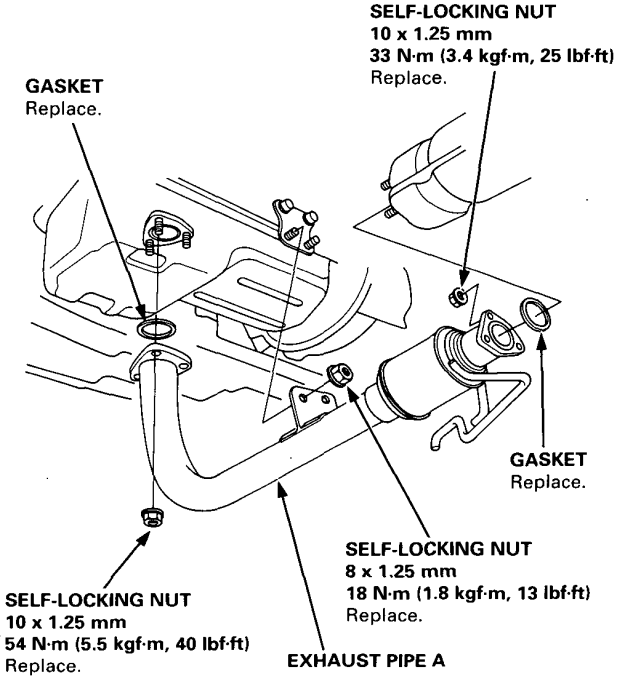


32. Remove the exhaust pipe A.

    NOTE: Refer to pages 9-5 thru 9-7 before installing.

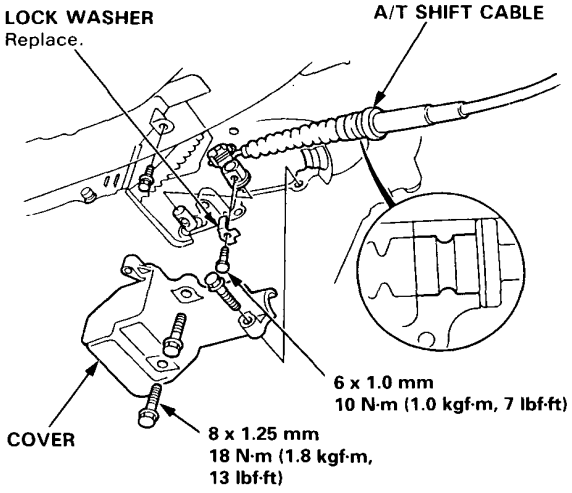
33. Disconnect the heated oxygen sensor (HO2S) connector (F22B1, F22B5, F20B3 engines).
    - Refer to pages 9-5 thru 9-7 when installing.





34. Remove the shift cable (A/T).

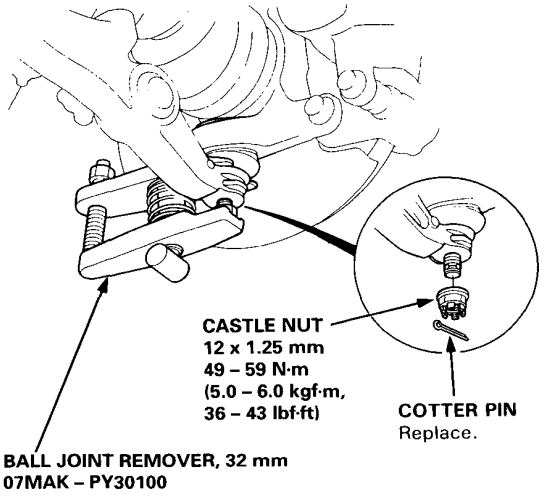
NOTE:
- Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
- Adjust the shift cable when installing (see section 14).



35. Remove the damper fork (see section 18).

36. Disconnect the suspension lower arm ball joints with the special tool. Refer to section 18 for the proper procedure.

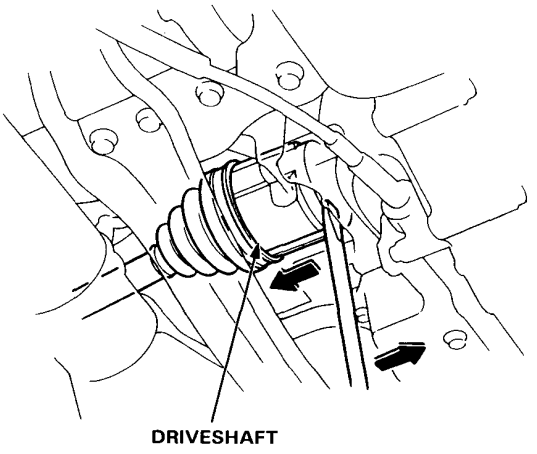
NOTE: Adjust the tool so the jaws are parallel to each other.

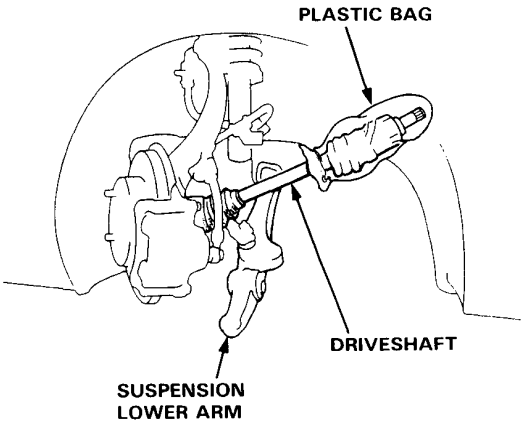


37. Remove the driveshafts.

CAUTION:
- **Do not pull on the driveshaft, the CV joint may come apart.**
- **Use care when prying out the assembly. Pull it straight to avoid damaging the differential oil seal or intermediate shaft dust seal.**

NOTE: Coat all precision-finished surfaces with clean engine oil. Tie plastic bags over the driveshaft ends.



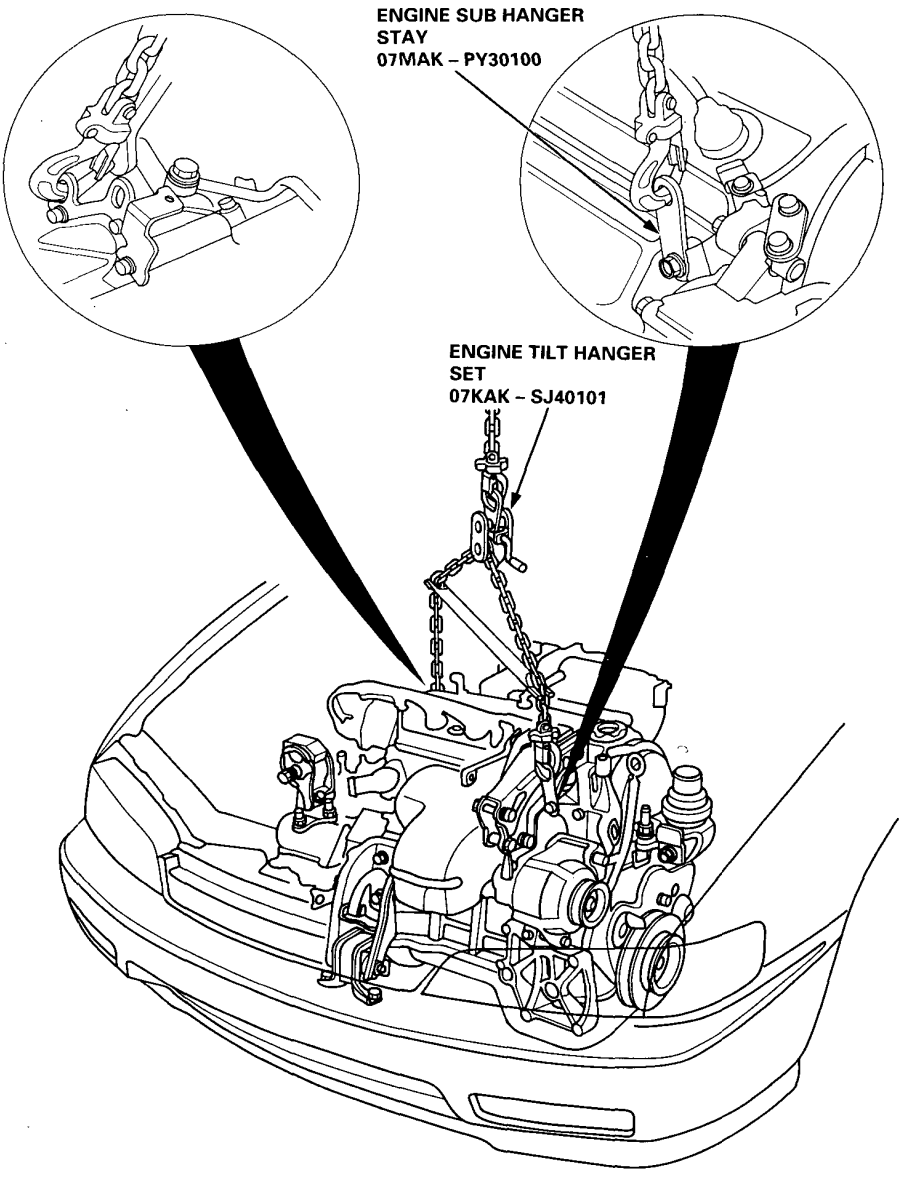


(cont'd)

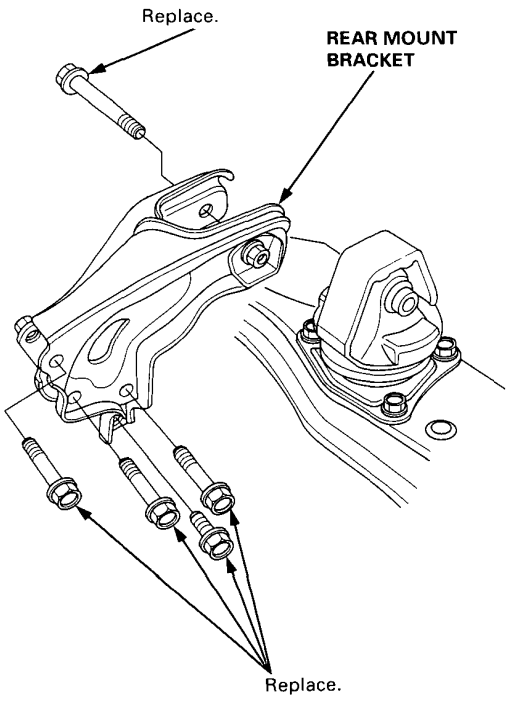
Removal (cont'd)

38. Lower the hoist.

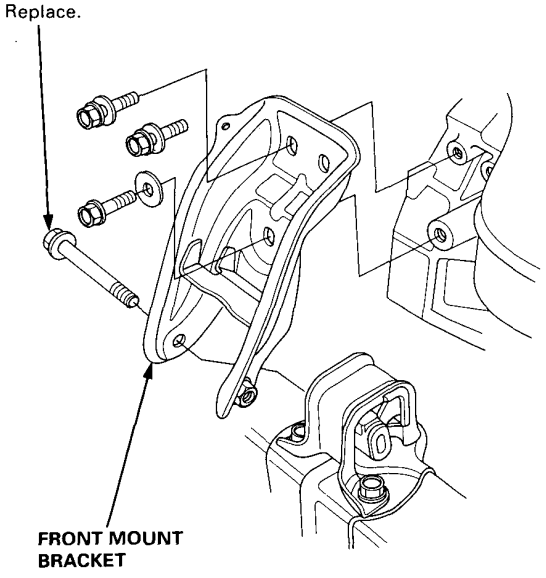
39. Attach the chain hoist to the engine as shown.



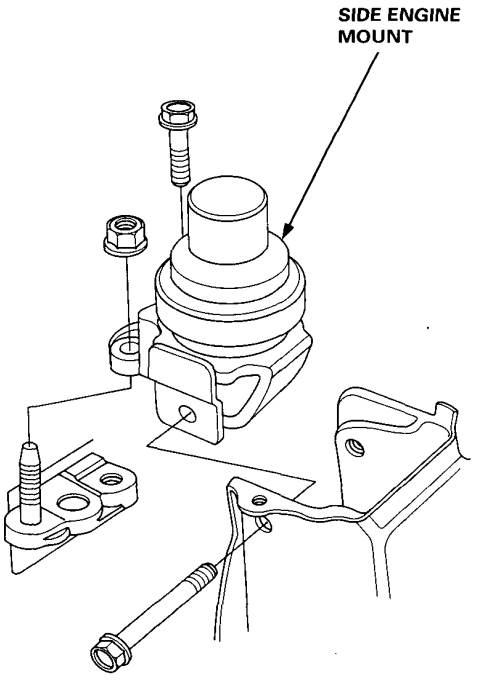
40. Remove the rear mount bracket.



41. Remove the front mount bracket.



42. Remove the side engine mount.

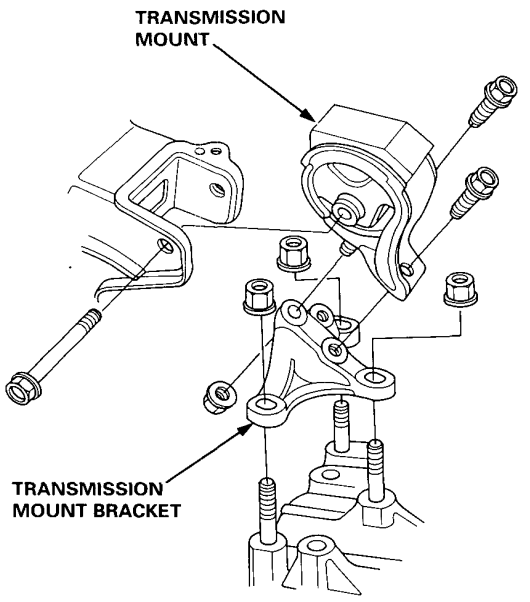


(cont'd)

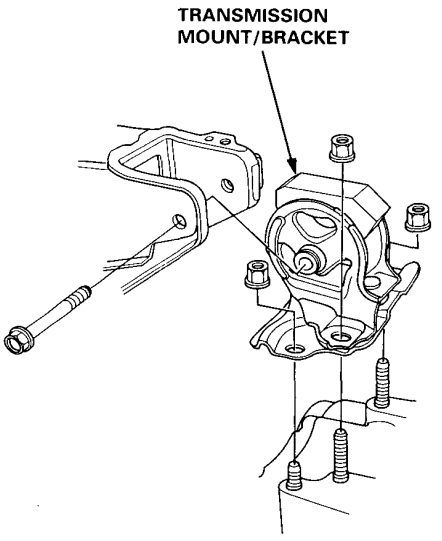
Removal (cont'd)

43. Remove the transmission mount and bracket.

M/T:



A/T:



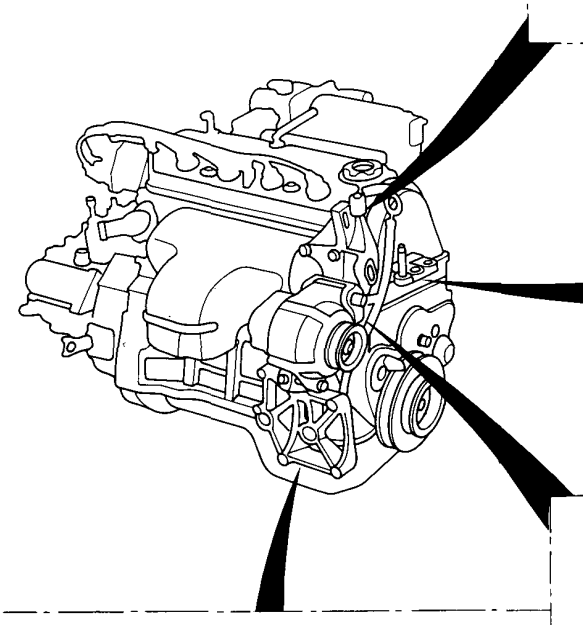
44. Check that the engine is completely free of vacuum hoses, fuel and engine coolant hoses, and electrical wiring.

45. Slowly raise the engine approximately 150 mm (6 in). Check once again that all hoses and wires are disconnected from the engine.

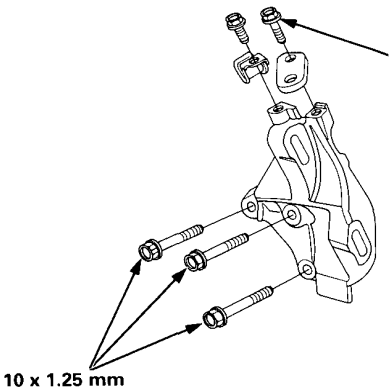
46. Raise the engine all the way and remove it from the car.

Installation

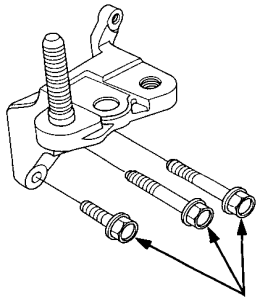
Bracket Bolts/Nuts Torque Specifications:



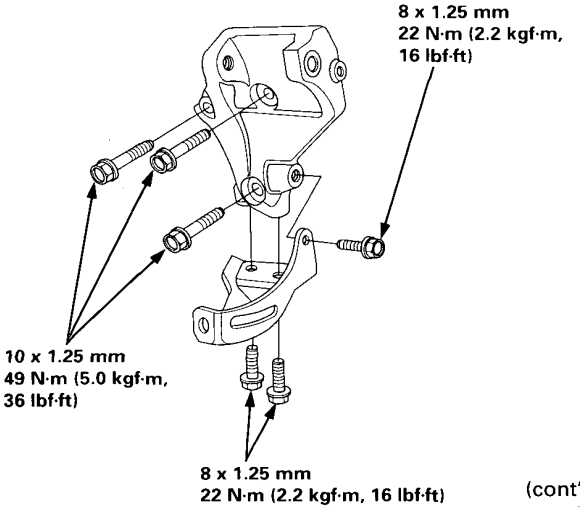
P/S PUMP BRACKET



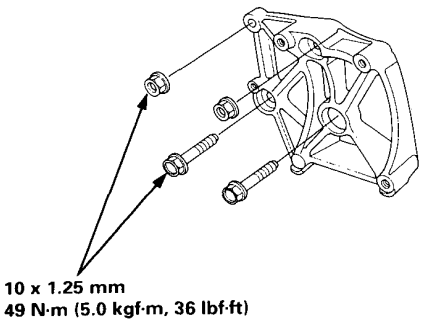
SIDE ENGINE MOUNT BRACKET



ALTERNATOR BRACKET



A/C COMPRESSOR BRACKET



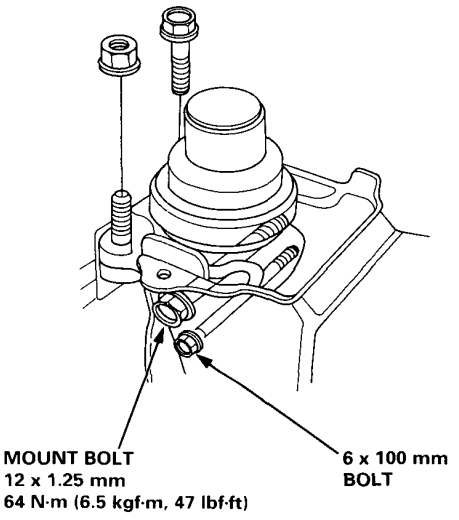
(cont'd)

Installation (cont'd)

Engine Installation
Install the engine in the reverse order of removal. Reinstall the mount bolts/nuts in the following sequence. Failure to follow these procedures may cause excessive noise and vibration, and reduce bushing life.

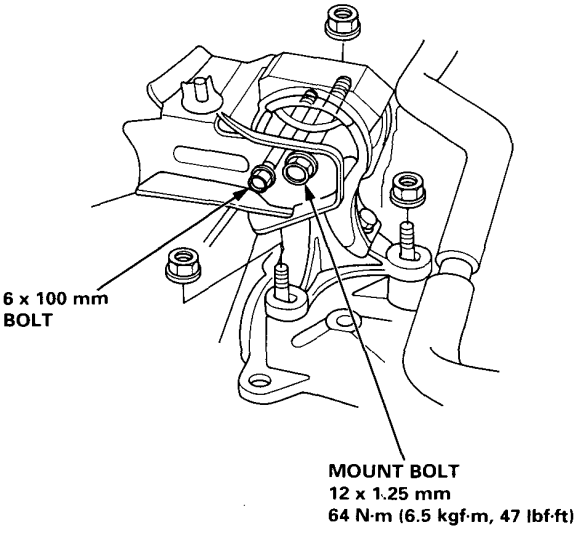
1. Position the side engine mount.
2. Tighten the mount bolt, then remove the 6 x 100 mm bolt.

   NOTE: Do not tighten the bolt/nut on the engine side.

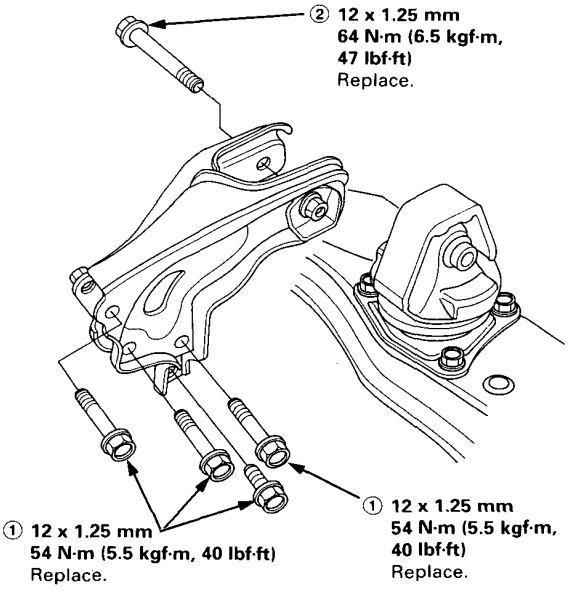


3. Position the transmission mount.
4. Tighten the mount bolt, then remove the 6 x 100 mm bolt.

   NOTE: Do not tighten the nuts on the transmission side.

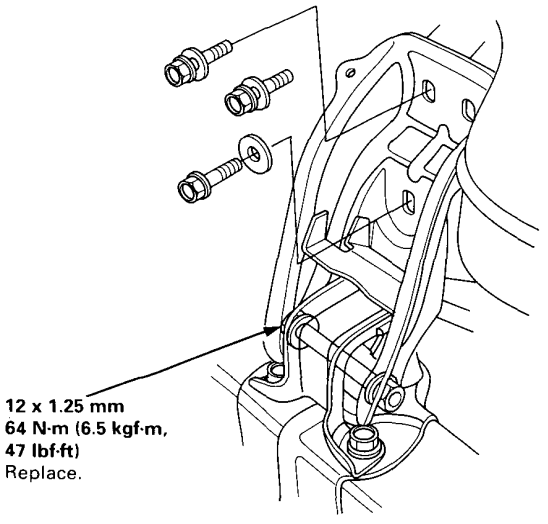


5. Install the rear mount bracket, then tighten the bolts in the numbered sequence as shown (① - ②).

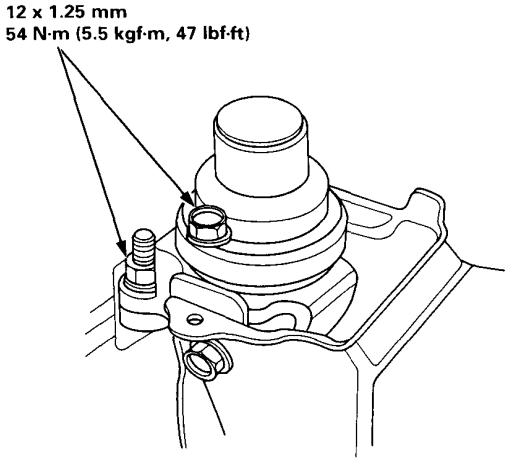


6. Install the front mount bracket, then tighten the mount bolt.

NOTE: Do not tighten the bolts on the engine side.

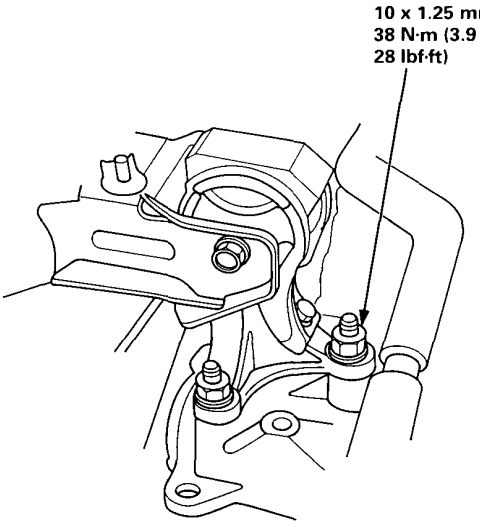


7. Tighten the bolt/nut on the side engine mount.

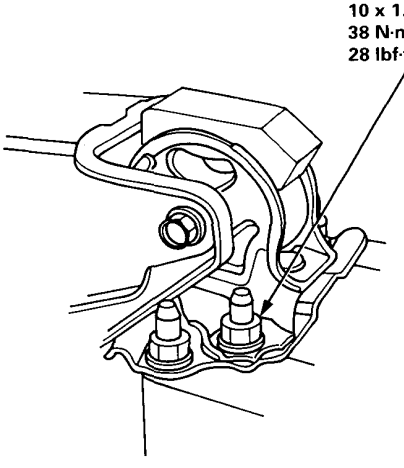


8. Tighten the nuts on the transmission mount.

M/T:



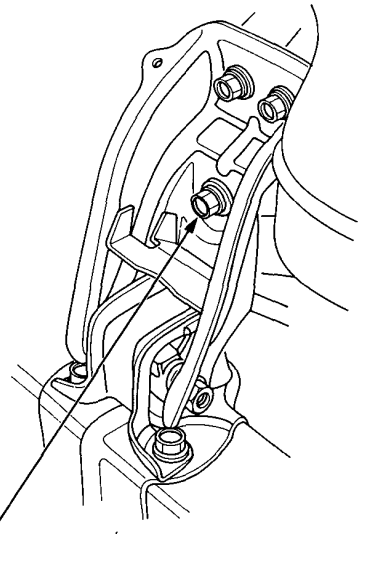
A/T:



(cont'd)

Installation (cont'd)

9. Tighten the bolts on the front mount bracket.



10 x 1.25 mm
38 N·m (3.9 kgf·m, 28 lbf·ft)

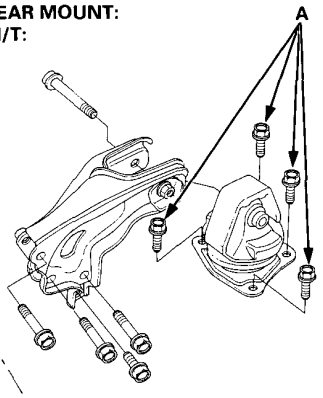
- Check that the spring clip on the end of each driveshaft clicks into place.

CAUTION: Use new spring clips.

- Bleed air from the cooling system at the bleed bolt with the heater valve open (see page 10-5).
- Adjust the throttle cable (see section 11).
- Check the clutch pedal free play (see section 12).
- Check that the transmission shifts into gear smoothly.
- Adjust the tension of the following drive belts.
  Alternator belt (see section 23).
  P/S pump belt (see section 17).
  A/C compressor belt (see section 22).
- Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.
- Inspect for fuel leakage (see section 11).
  - After assembling fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump operates for approximately two seconds and the fuel line pressurizes. Repeat this operation two or three times, and check for fuel leakage at any point in the fuel line.

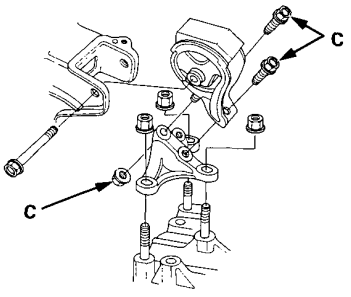
Mount and Bracket Bolts/Nuts Torque Valve Specifications:

REAR MOUNT:
M/T:

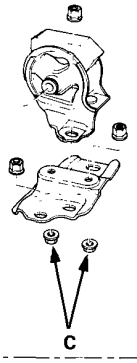


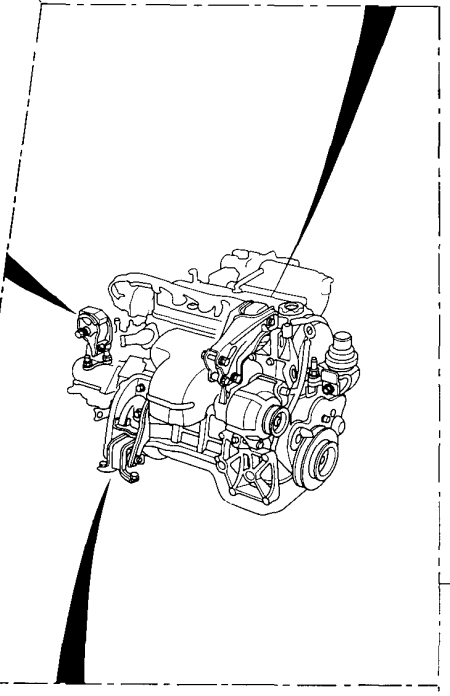
TRANSMISSION MOUNT

M/T:

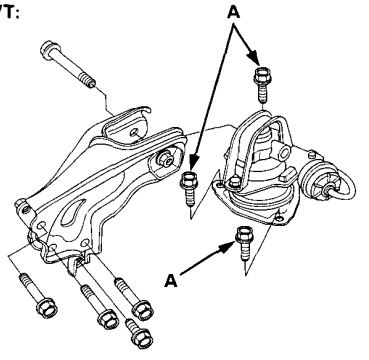


A/T:

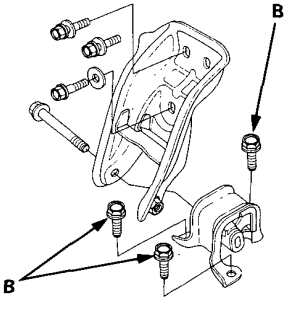




A/T:



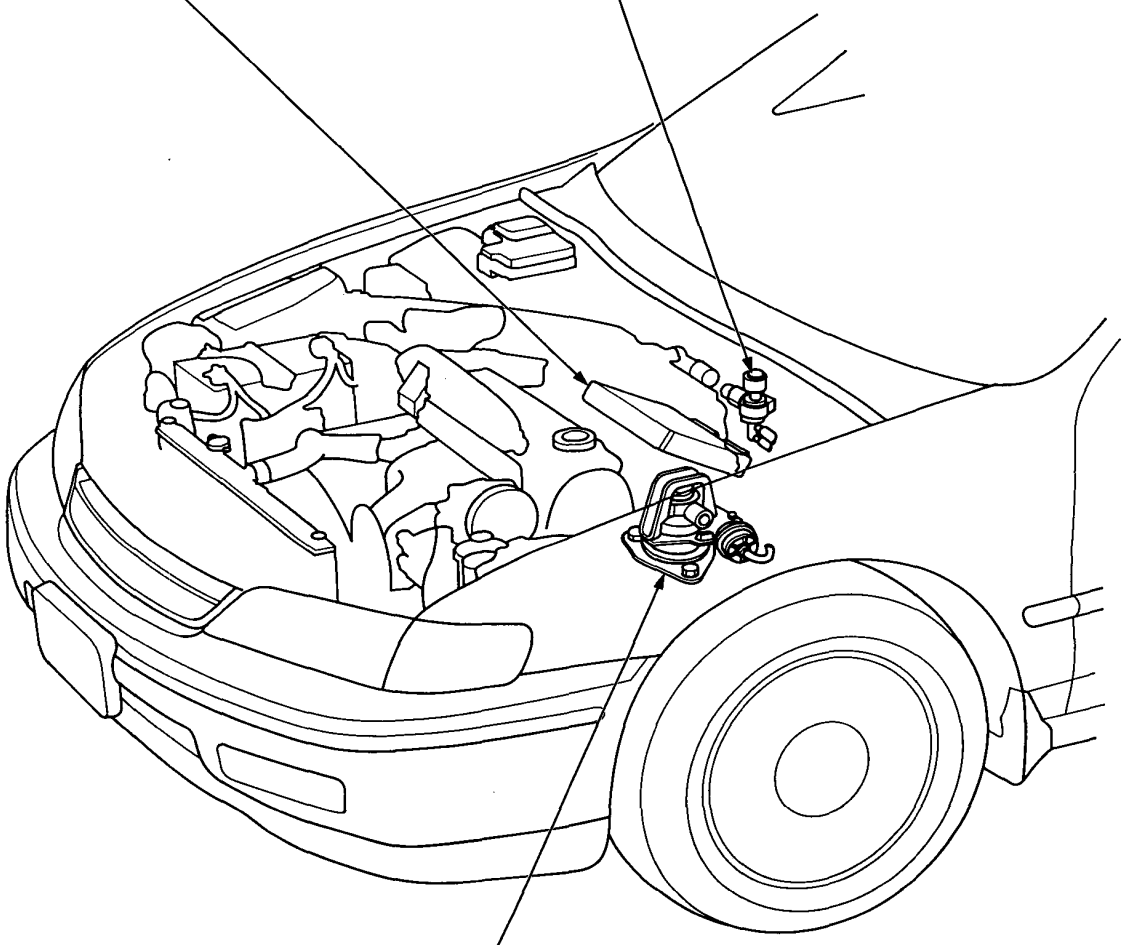
FRONT MOUNT



Torque Specifications:
A: 10 x 1.25 mm
59 N·m (6.0 kgf·m, 43 lbf·ft)
B: 12 x 1.25 mm
93 N·m (9.5 kgf·m, 69 lbf·ft)
C: 10 x 1.25 mm
39 N·m (3.9 kgf·m, 28 lbf·ft)

Engine Mount Control System (A/T)

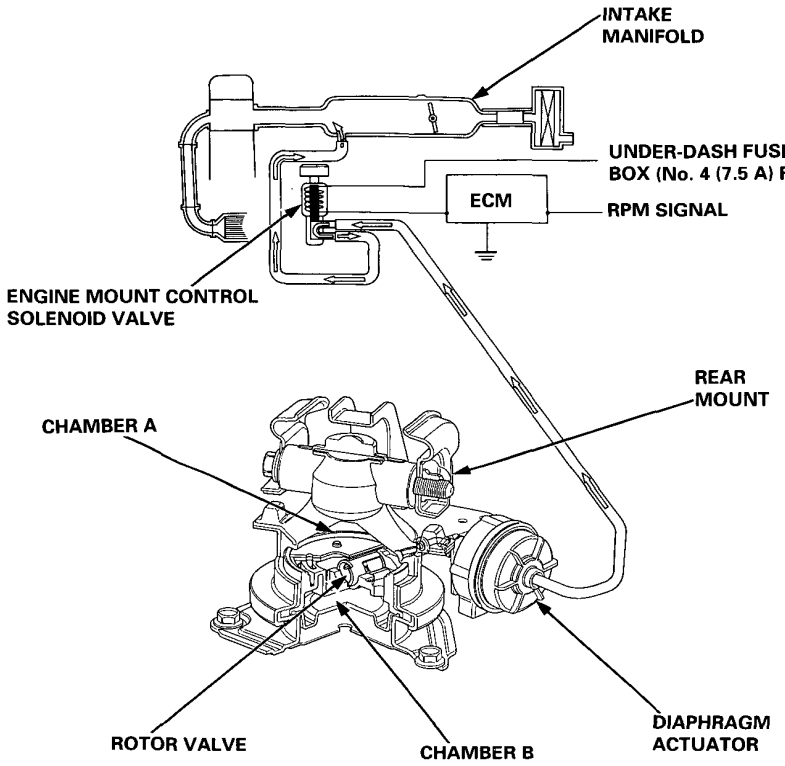
Component Location Index



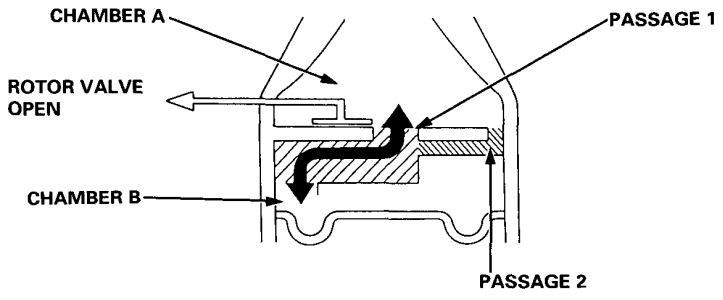
Description

As opposed to previous liquid engine mounts, this engine mount control system remarkably reduces vibration in the idling range without affecting vibration damping in rpm ranges above idling.
The system is comprised of the ECM, the solenoid valve and the rear mount with built-in diaphragm actuator.
The ECM receives the engine rpm signals and sends a signal to the solenoid valve to open only at idling rpm. When the solenoid valve opens, intake manifold vacuum is applied to the diaphragm actuator, and the rotor valve located in the rear mount rotates 80 degrees. The mount has Chamber A on its upper part and Chamber B on the lower part. The rotor valve located between these two chambers controls quantity of liquid that flows between them.

At idling rpm:



At idling rpm, the rotor valve opens, and liquid flows through passages 1 and 2. The quantity of liquid increases, and vibration in the idling range is reduced.

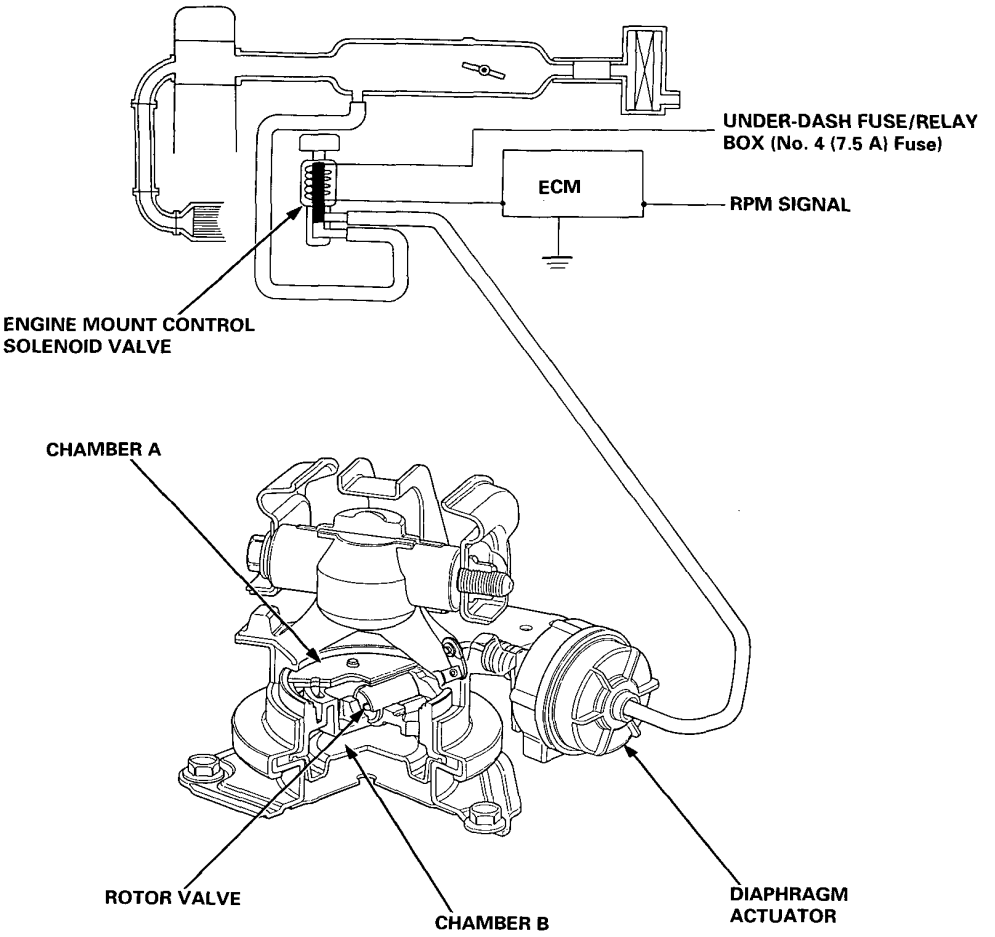


(cont'd)

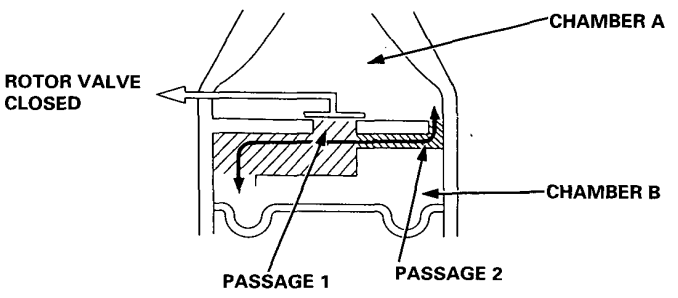
Engine Mount Control System (A/T)

Description (cont'd)

Above idling rpm:

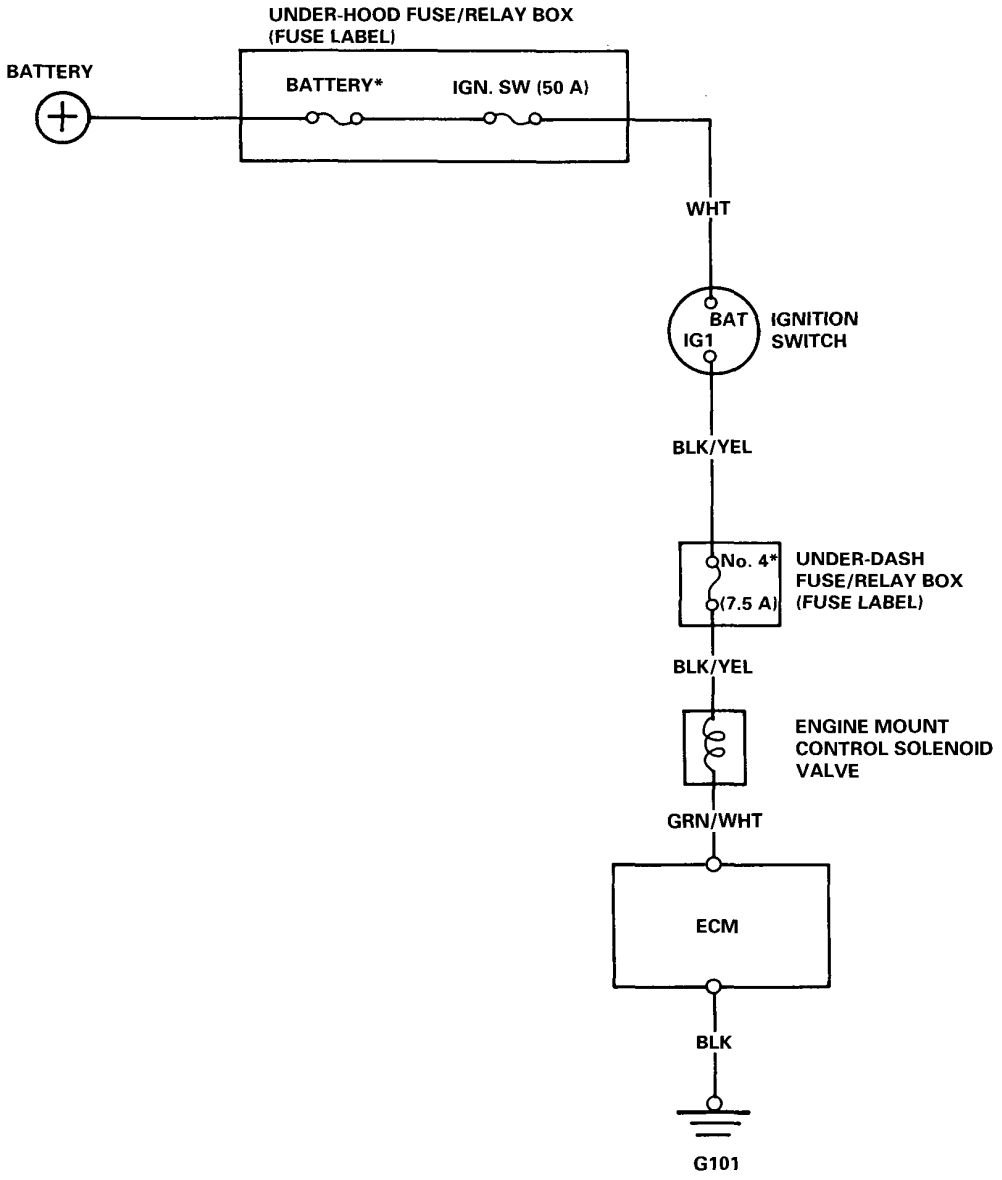


Above idling rpm, passage 1 is closed, and liquid flows only through passage 2. The quantity of liquid decreases, and vibration in ranges above idling is reduced.



Circuit Diagram

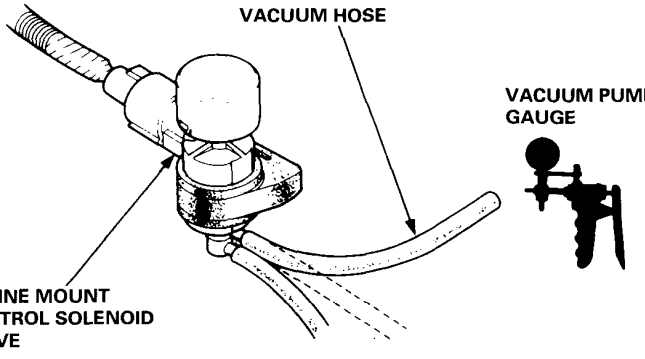
BATTERY* ..... F22B1 engine (100 A)
Except F22B1 engine (80 A)
No. 4* ..... ECU (CRUISE CONTROL)/EAT ECU (TCM)



Engine Mount Control System (A/T)

Troubleshooting

NOTE:
- Check the vacuum hoses and pipes for damage and proper connections.
- Refer to page 11-18 thrn 11-25 before troubleshooting.



Warm up engine to normal operating temperature (the cooling fan comes on).

Disconnect the vacuum hose leading to the rear engine mount from the solenoid valve, and connect a vacuum pump/gauge to the solenoid valve.

Is there intake manifold vacuum with the engine idling (700 rpm)?

NO

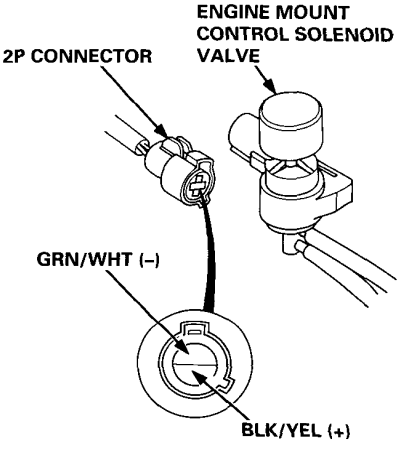
YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the solenoid valve.

Start the engine.

Check for voltage between the BLK/YEL (+) and GRN/WHT (–) terminals of the solenoid valve.



Is there battery voltage with the engine idling?

NO

Replace the solenoid valve.

YES

Check for voltage between the BLK/YEL (+) terminal and body ground.

Ⓐ

(To page 5-33)

Ⓑ

(To page 5-33)

(From page 5-32)

(From page 5-32)

Is there battery voltage?

NO — **Open in the BLK/YEL wire between the No. 4 (7.5 A) fuse and 2P conector.**

YES

Turn the ignition switch OFF, and reconnect the 2P connector to the solenoid valve.

Connect the test harness between the ECM and 2P connector.

Start the engine.

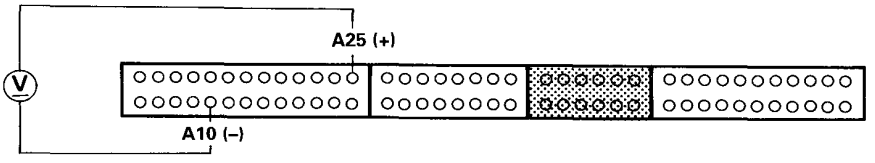
Check for voltage between the A25 (+) and A10 (–) terminals.

Is there battery voltage with the engine idling?

YES — **Open in the GRN/WHT wire the 2P connecter and the ECM (A10).**

NO

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.



Is there vacuum with the engine at 1,000 rpm?

YES

Turn the ignition switch OFF.

NO

(To page 5-34)

(To page 5-34)

(cont'd)

Troubleshooting (cont'd)

(From page 5-34)

A

The solenoid valve is OK; test the diaphragm actuator (see page 5-35).

(From page 5-34)

B

Disconnect the 2P connector from the solenoid valve.

Start the engine.

Is there vacuum?

YES

Replace the solenoid valve.

NO

Turn the ignition switch OFF, and reconnect the 2P connector to the solenoid valve.

Disconnect the 26P connector from the ECM, and connector the test harness only to the body harness.

Turn the ignition switch ON.

Check for voltage between terminal A10 and body ground.

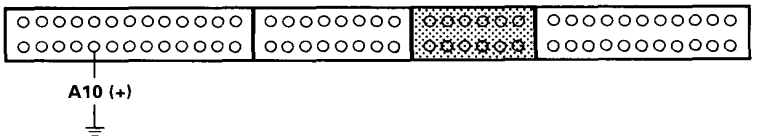
Is there battery voltage?

NO

Short to the GRN/WHT wire the 2P connector and the ECM (A10).

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

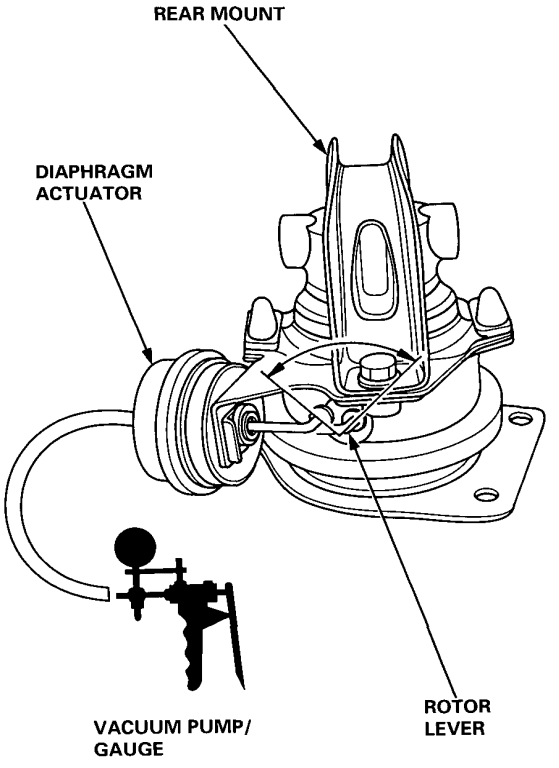


A10 (+)

Diaphragm Actuator Test

1. Disconnect the vacuum hose from the solenoid valve, and remove the rear mount (see page 5-27).
2. Clean and oil the diaphragm actuator rod, rear mount rotor lever, and lever linkage.
3. With a vacuum pump/gauge, apply vacuum of about 230 mmHg, and check if the rotor lever turns 80 degrees.

   — Replace the rear mount if the rotor lever dose not operate.

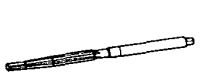


Cylinder Head/Valve Train

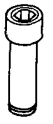
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Special Tools

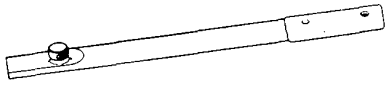
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAH – PJ70100	Valve Guide Reamer, 5.525 mm	1	6-43
②	07JAA – 0010200	Socket Wrench, 19 mm	1	6-15
③	07JAB – 0010200	Handle	1	6-15
④	07LAG – PT20100	Balancer Shaft Lock Pin	1	6-22
⑤	07LAJ – PR30101	Valve Inspection Set	1	6-11
⑥	07LAJ – PR30201	Air Stopper	1	6-10, 11
⑦	07MAB – PY30100	Pulley Holder Attachment, HEX 50 mm	1	6-15
⑧	07NAJ – P070100	Oil Pressure Gauge Attachment	1	6-7, 8
⑨	07PAD – 0010000	Stem Seal Driver	1	6-44
⑩	07406 – 0070001	Low Pressure Gauge	1	6-7, 8
⑪	07742 – 0010100	Valve Guide Driver, 5.5 mm	1	6-43
⑫	07757 – 0010000	Valve Spring Compressor	1	6-39



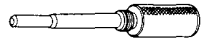
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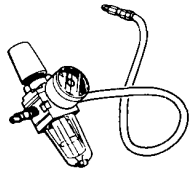
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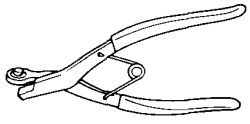
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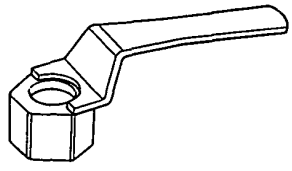
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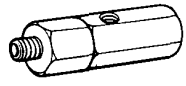
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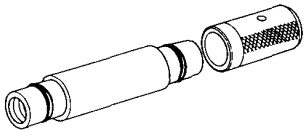
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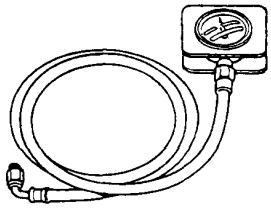
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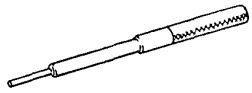
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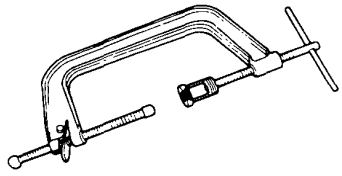
⑨



⑩



⑪

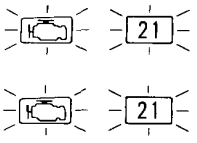


⑫

Variable Valve Timing and Valve Lift Electronic Control (VTEC): F22B1 Engine

Troubleshooting Flowchart — VTEC Solenoid Valve

Refer to page 11-16 thru 11-23 before troubleshooting.



Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 21: A problem in the VTEC Solenoid Valve circuit.

— MIL has been reported on.
— With the SCS short connector connected, code 21 is indicated.

Do the engine control module (ECM) Reset Procedure (see page 11-19).

Start the engine.

Warm up engine to normal operating temperature (the cooling fan comes on).

Do the Road Test.*

*Road Test:
Accelerate in 1st gear to an engine speed over 4,000 rpm.
Hold that engine speed for at least two seconds.
If the MIL does not come on during the first road test, repeat this test two more times.

Is MIL on and does it indicate code 21?

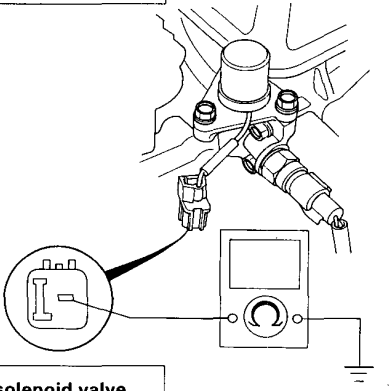
NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at VTEC solenoid valve and ECM.**

YES

Turn the ignition switch OFF.

Disconnect the 1P connector from the VTEC solenoid valve.

Check for continuity between VTEC solenoid valve connector terminal and body ground.



Is there 14 – 30 Ω?

NO → **Replace the VTEC solenoid valve.**

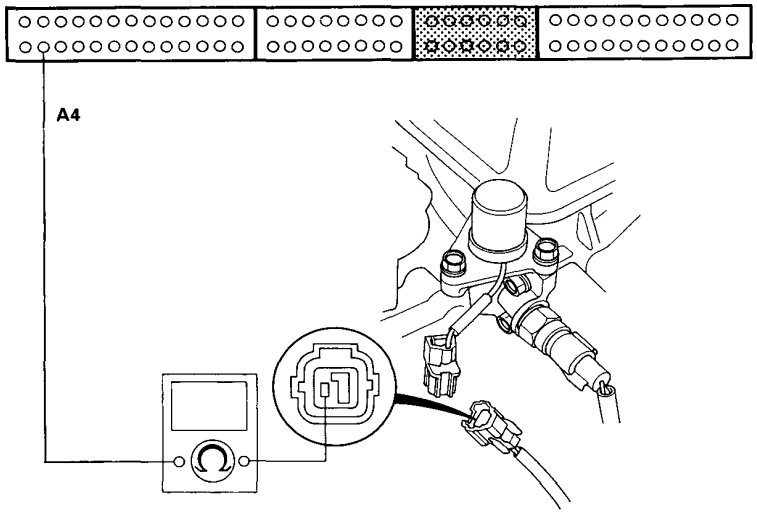
YES

(To page 6-5)

(From page 6-4)

Connect the test harness.

Check for continuity between *VTEC solenoid valve connector* terminal and A4 terminal.



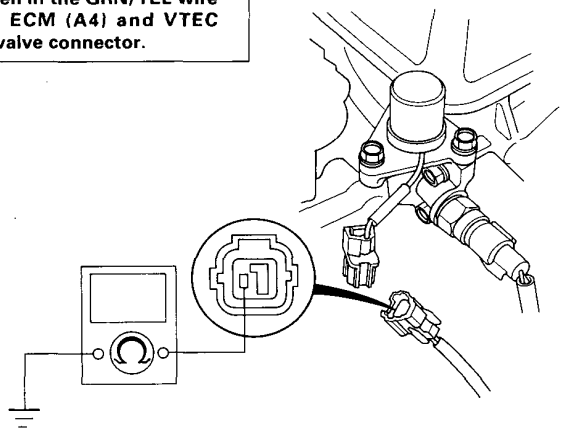
Is there continuity?

NO

Repair open in the GRN/YEL wire between ECM (A4) and VTEC solenoid valve connector.

YES

Check for continuity between *VTEC solenoid valve connector* terminal (harness side) and body ground.



Is there continuity?

YES

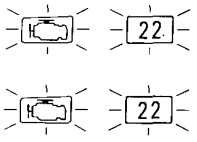
Repair short in the GRN/YEL wire between ECM (A4) and VTEC solenoid valve connector.

NO

Substitute a known-good ECM and recheck. If symptom/indication goes away replace the original ECM.

Troubleshooting Flowchart — VTEC Pressure Switch

Refer to page 11-16 thru 11-23 before troubleshooting.



Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 22: A problem in the VTEC Pressure Switch circuit.

— MIL has been reported on.
— With the SCS short connector connected, code 22 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Start the engine.

Warm up engine to normal operating temperature (cooling fan comes on).

Do the Road Test. *

*Road Test:
Accelerate in 1st gear to an engine speed over 4,000 rpm.
Hold that engine speed for at least two seconds.
If the MIL does not come on during the first road test, repeat this test two more times.

Is MIL on and does it indicate code 22?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires at VTEC pressure switch and ECM.**

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the VTEC pressure switch.

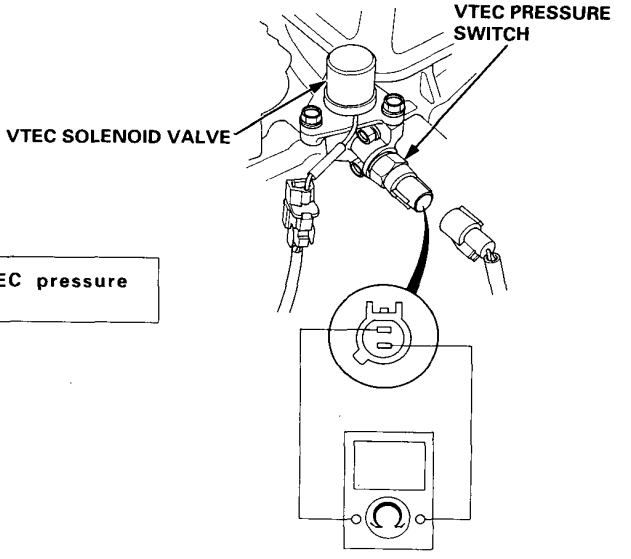
Turn off the engine.
Check for continuity between the 2 terminals on the VTEC pressure switch.

Is there continuity?

NO → **Replace the VTEC pressure switch.**

YES

(To page 6-7)



(From page 6-6)

Check for continuity between the BRN/BLK terminal and body ground.

Is there continuity?

NO → **Repair open in the BRN/BLK wire between 2P connector and body ground.**

YES

Connect the test harness to the main wire harness only, not the ECM.

Check for continuity between the BLU/BLK terminal and D6 terminal.

Is there continuity?

NO → **Repair open in the BLU/BLK wire between ECM (D6) and 2P connector.**

YES

Check for continuity between D6 terminal and body ground.

Is there continuity?

NO → **Repair short in the BLU/BLK wire between ECM (D6) and 2P connector.**

YES

Connect the test harness of the ECM.

Remove the VTEC pressure switch, install the special tools, then reinstall the VTEC pressure switch.

Connect a tachometer (section 11).

Start the engine and warm it up to normal operating temperature.

Check oil pressure at engine speeds of 1,000, 2,000 and 4,000 rpm.

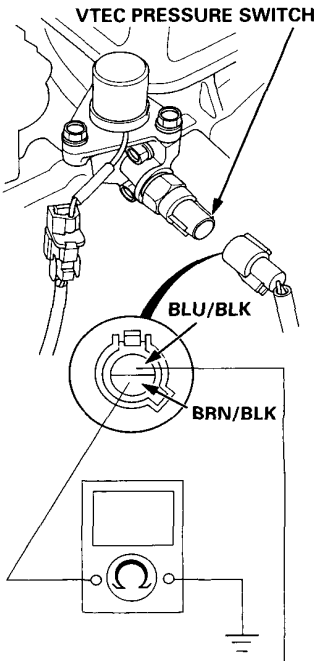
NOTE:
Keep measuring time as short as possible because engine is running with no load (less than one minute).

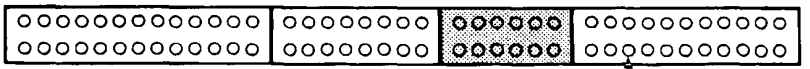
Is pressure below 49 kPa (0.5 kgf/cm², 7 psi)?

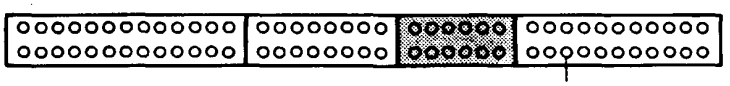
NO → **Inspect the VTEC solenoid valve.**

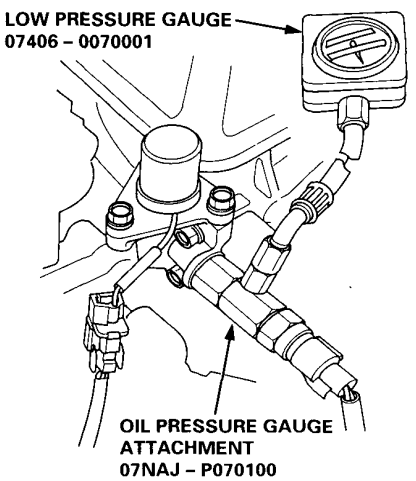
YES

(To page 6-8)









(cont'd)

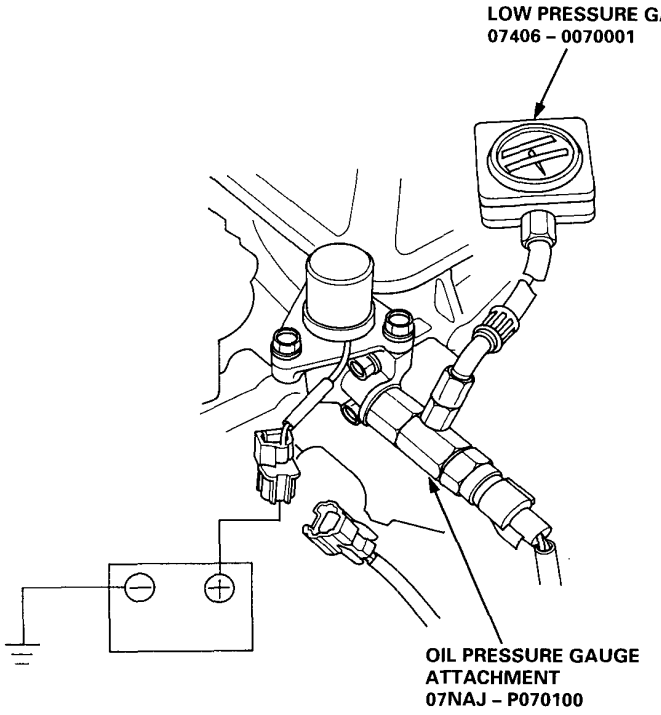
Troubleshooting Flowchart — VTEC Pressure Switch (cont'd)

(From page 6-7)

Disconnect the 2P connector from the VTEC solenoid valve.

Attach the battery positive terminal to the GRN/WHT terminal.

Start the engine and check oil pressure at an engine speed of 3,000 rpm.



NOTE:
Keep measuring time as short as possible because engine is running with no load (less than one minute).

Is pressure above 250 kPa (2.5 kgf/cm², 36 psi).

NO → **Inspect the VTEC solenoid valve.**

YES

Check for continuity between the 2 terminals on the VTEC pressure switch under above condition.

Is there continuity?

YES → **Replace the VTEC pressure switch.**

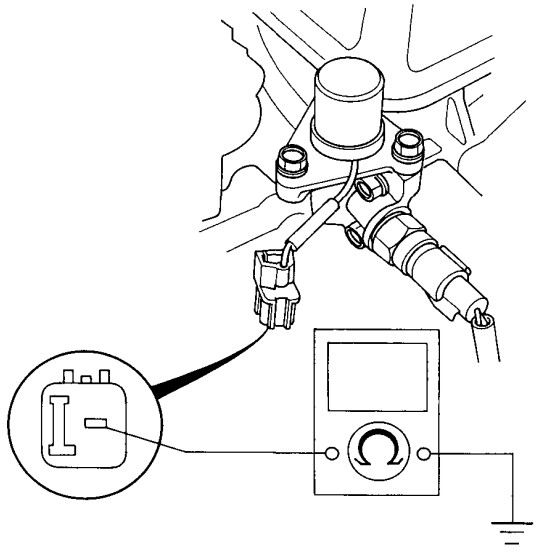
NO

Substitute a known-good ECM and recheck. If symptom/indication goes away replaces the original ECM.

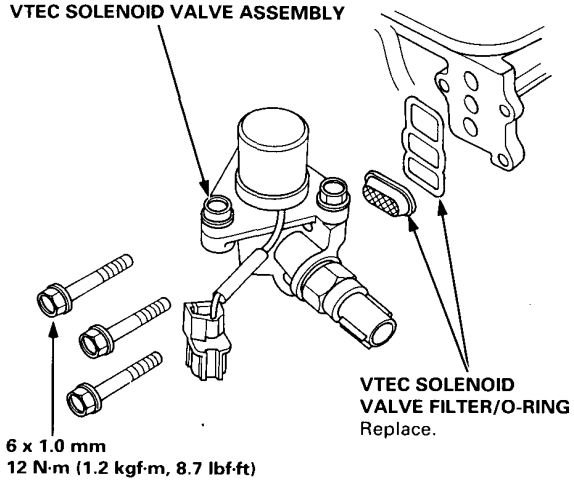
VTEC Solenoid Valve Inspection

1. Disconnect the 1P connector from the VTEC solenoid valve.
2. Measure resistance between the terminal and body ground.

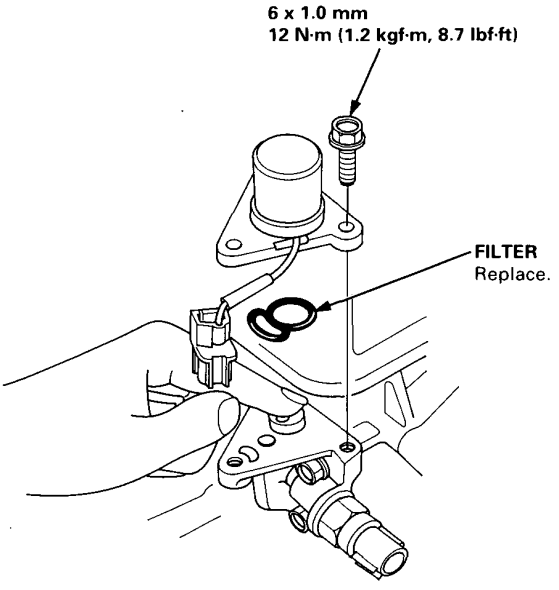
   Resistance: 14 – 30 Ω



3. If the resistance is within specifications, remove the VTEC solenoid valve assembly from the cylinder head, and check the VTEC solenoid valve/O-ring filter for clogging.
   - If there is clogging, replace the engine oil filter and the engine oil.



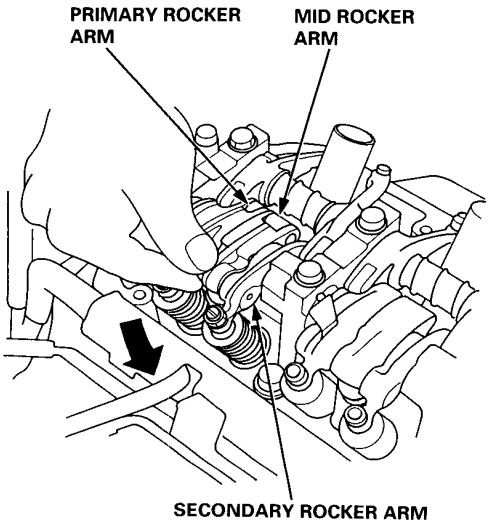
4. If the filter is not clogged, push the VTEC solenoid valve with your finger and check its movement.
   - If the VTEC solenoid valve is normal, check the engine oil pressure.



Rocker Arms — Manual Inspection

1. Set the No. 1 piston at TDC.
2. Remove the cylinder head cover.

   NOTE: Refer to page 6-49 when installing cylinder head cover.
3. Push the intake mid rocker arm on the No. 1 cylinder manually.
4. Check that the intake mid rocker arm moves independently of the primary and secondary intake rocker arms.



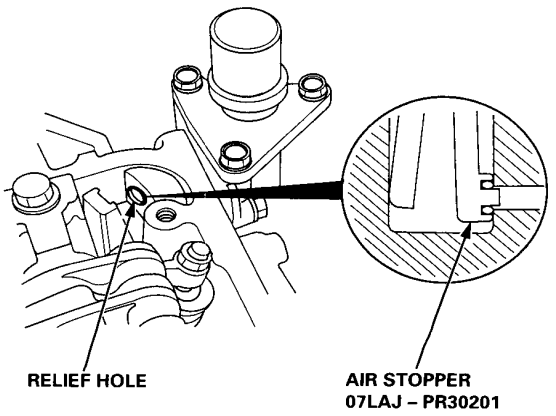
5. Check the intake mid rocker arm of each cylinder at TDC.
   - If the intake mid rocker arm does not move, remove the mid, primary and secondary intake rocker arms as an assembly, and check that the pistons in the mid and primary rocker arms move smoothly.
   - If any rocker arm needs replacing, replace the primary, mid, and secondary rocker arms as an assembly.

Rocker Arms — Inspection Using Special Tools

CAUTION:
- **Before using the Valve Inspection Tool, make sure that the air pressure gauge on the air compressor indicates over 400 kPa (4 kgf/cm², 57 psi).**
- **Inspect the valve clearance before rocker arm inspection.**
- **Cover the timing belt with a shop towel to protect the belt.**
- **Check the intake primary rocker arm of each cylinder at TDC.**

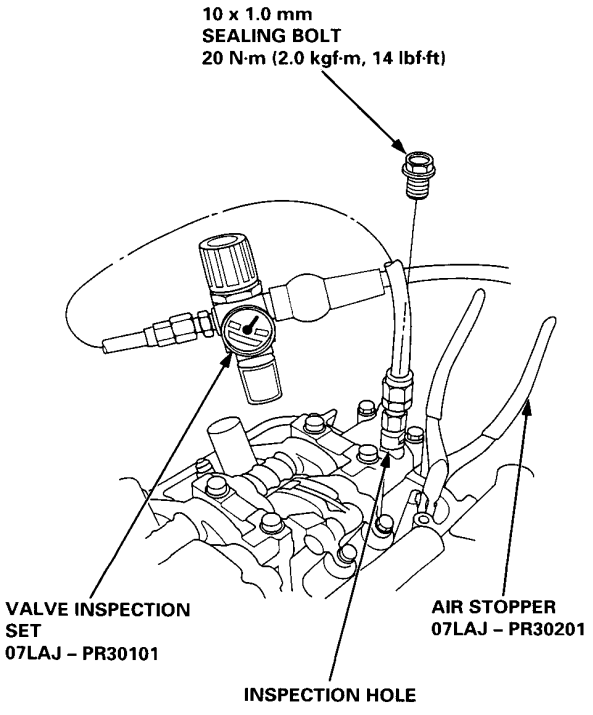
1. Remove the cylinder head cover.

   NOTE: Refer to page 6-49 when installing cylinder head cover.
2. Plug the relief hole with the special tool.



3. Remove the sealing bolt from the inspection hole, and connect the special tool

   NOTE: Remove any oil the bolt threads and camshaft holder threads before retightening the sealing bolt.

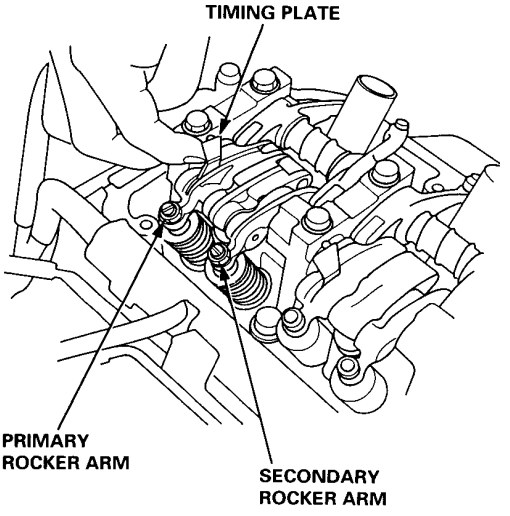


4. Loosen the regulator valve on the valve inspection set and apply the specified air pressure to the rocker arm synchronizing piston A/B.

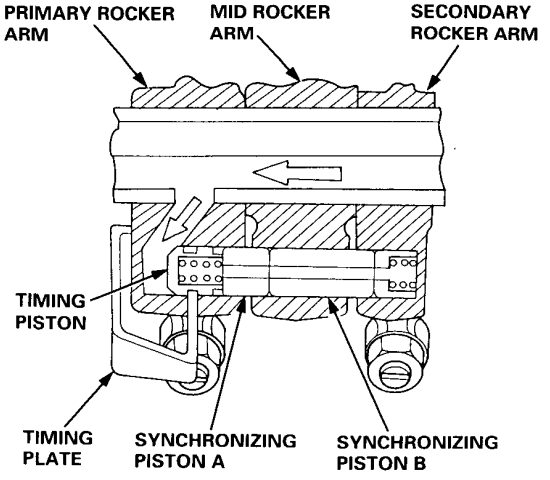
   Specified Air Pressure:
   400 kPa (4 kgf/cm², 57 psi)

5. With the specified air pressure applied, push up the timing plate 2 – 3 mm (0.08 – 0.12 in) at plate end; the synchronizing piston will pop out and engage the intake mid, primary and secondary rocker arms. Visually check the engagement of the synchronizing piston A/B.

   NOTE:
   - The synchronizing piston can be seen in the gap between the mid, secondary and primary rocker arms.
   - With the timing plate engaged in the groove on the timing piston, the piston is locked in the pushed out position.
   - Do not apply too much force when pushing up the timing plate.



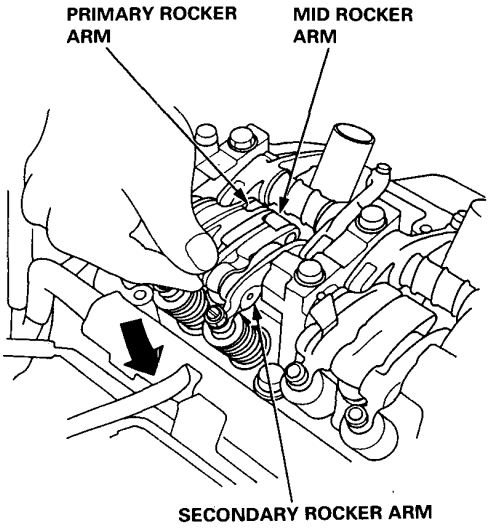
At High PRM:



(cont'd)

Rocker Arms — Inspection Using Special Tools (cont'd)

6. Make sure that the intake primary and secondary rocker arms are mechanically connected by the piston and that the mid rocker arm does not move when pushed manually.

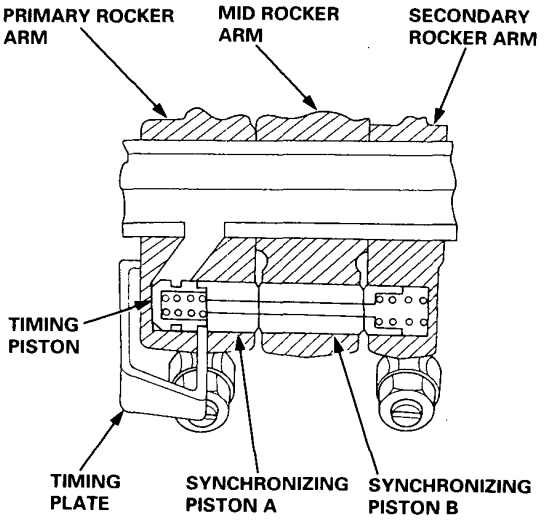


- If any intake mid rocker arm moves independently of the primary and secondary rocker arms, replace the rocker arms as a set.

7. Stop applying air pressure and push up the timing plate; the synchronizing pistons will snap back to its original position.
   Visually check the disengagement of the synchronizing pistons A/B.

   NOTE:
   - When the timing plate is pushed up, it releases the timing piston, letting the return spring move the synchronizing pistons to its original position.
   - Replace the intake rocker arms as an assembly if either does not work correctly.

At Low RPM:



8. Remove the special tools.

9. Check for smooth operation of each lost motion assembly. It is compressed slightly when the intake mid rocker arm is lightly pushed and compressed deeply when the mid rocker arm is strongly pushed.
   - Replace the lost motion assembly if it does not move smoothly.

10. After inspection, check that the MIL does not come on.

Adjustment

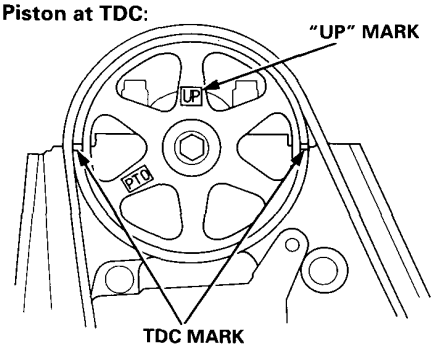
NOTE:
- Valves should be adjusted cold when the cylinder head temperature is less than 38°C (100°F).
- After adjusting, retorque the crankshaft pulley bolt to 245 N·m (25.0 kgf·m, 181 lbf·ft).

1. Remove the cylinder head cover.

   NOTE: Refer to page 6-49 when installing cylinder head cover.

2. Set No. 1 piston at TDC. "UP" mark on the camshaft pulley should be at top, and TDC grooves on the camshaft pulley should align with cylinder head surface (F22B1 engine) or back cover upper surface (Except F22B1 engine).

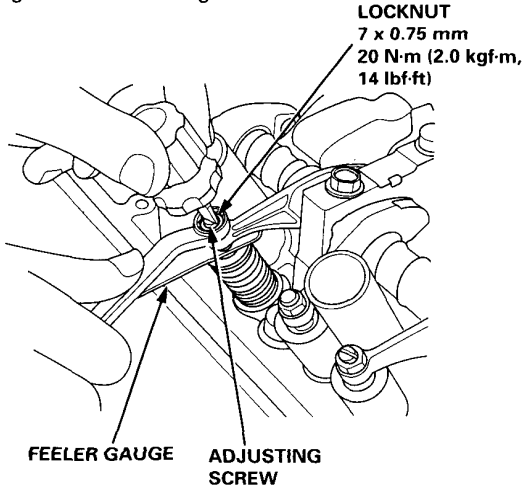
Number 1 Piston at TDC:



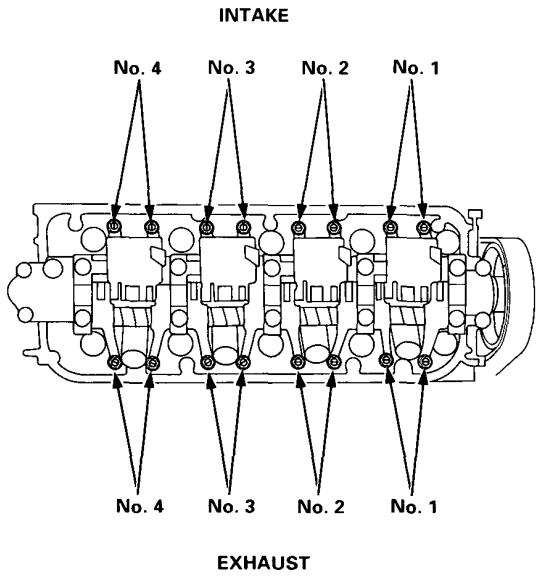
3. Adjust valves on No. 1 cylinder.

   Intake: 0.26 mm (0.010 in) ± 0.02 mm (0.0008 in)
   Exhaust: 0.30 mm (0.012 in) ± 0.02 mm (0.0008 in)

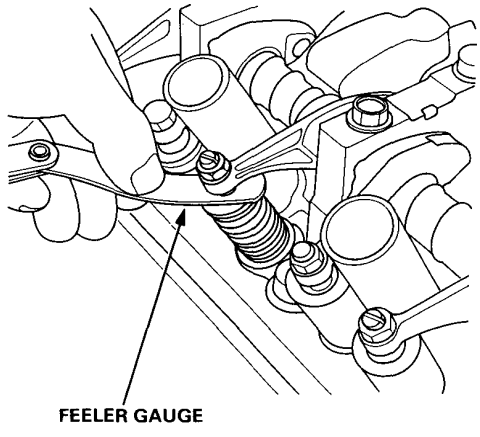
4. Loosen the locknut, and turn the adjusting screw until the feeler gauge slides back and forth with a slight amount of drag.



Adjusting screw location:



5. Tighten the locknut and check clearance again. Repeat adjustment if necessary.

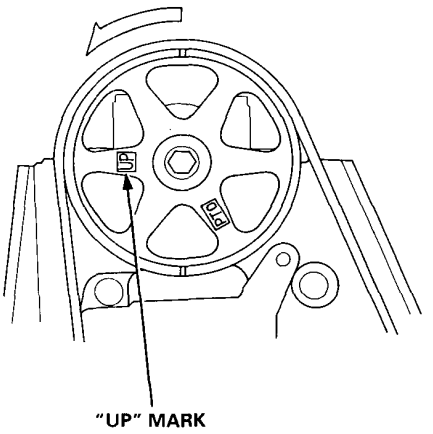


(cont'd)

Adjustment (cont'd)

6. Rotate crankshaft 180° counterclockwise (Camshaft pulley turns 90°). The "UP" mark should be on the exhaust side. Adjust valves on No. 3 cylinder.

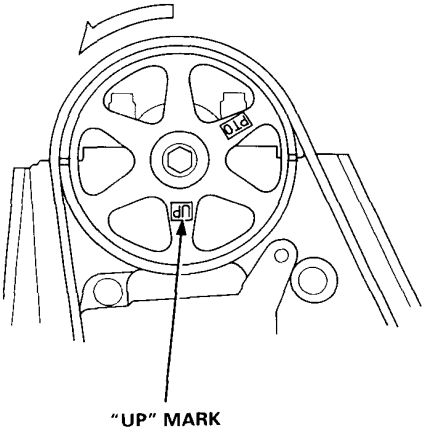
Number 3 Piston at TDC:



"UP" MARK

7. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both TDC grooves are once again visible. Adjust valves on No. 4 cylinder.

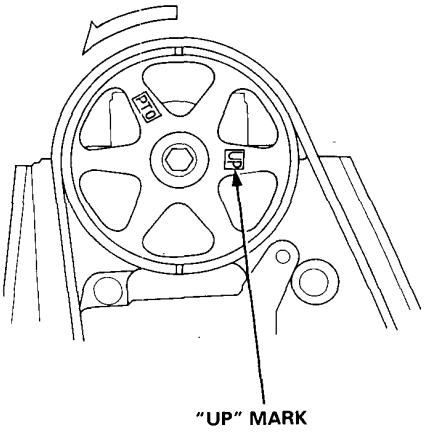
Number 4 Piston at TDC:



"UP" MARK

8. Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. The "UP" mark should be on the intake side. Adjust valves on No. 2 cylinder.

Number 2 Piston at TDC:



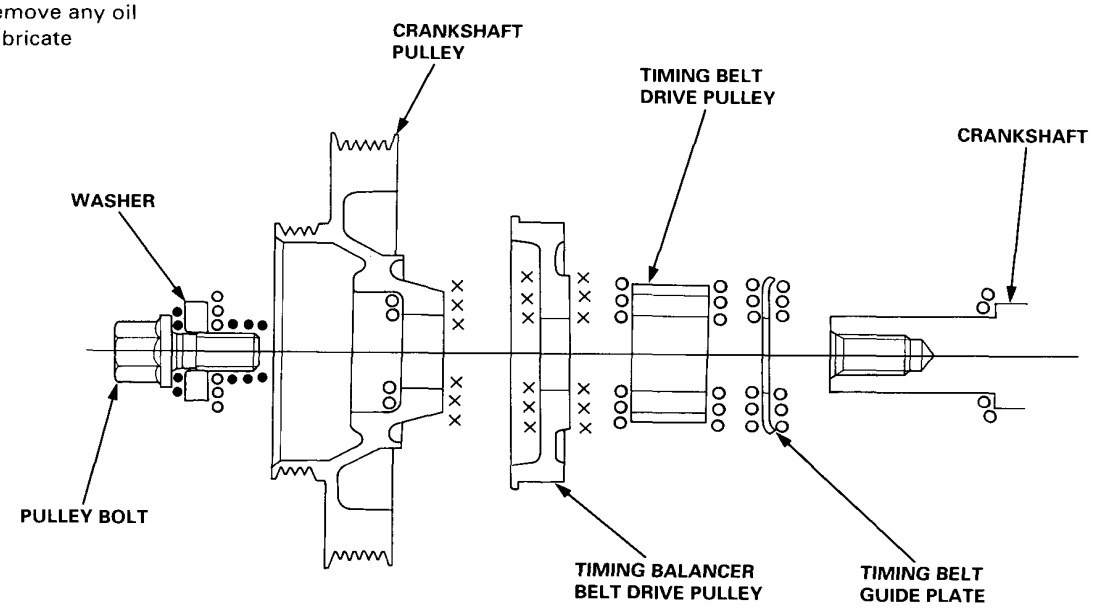
"UP" MARK

Crankshaft Pulley and Pulley Bolt

Replacement

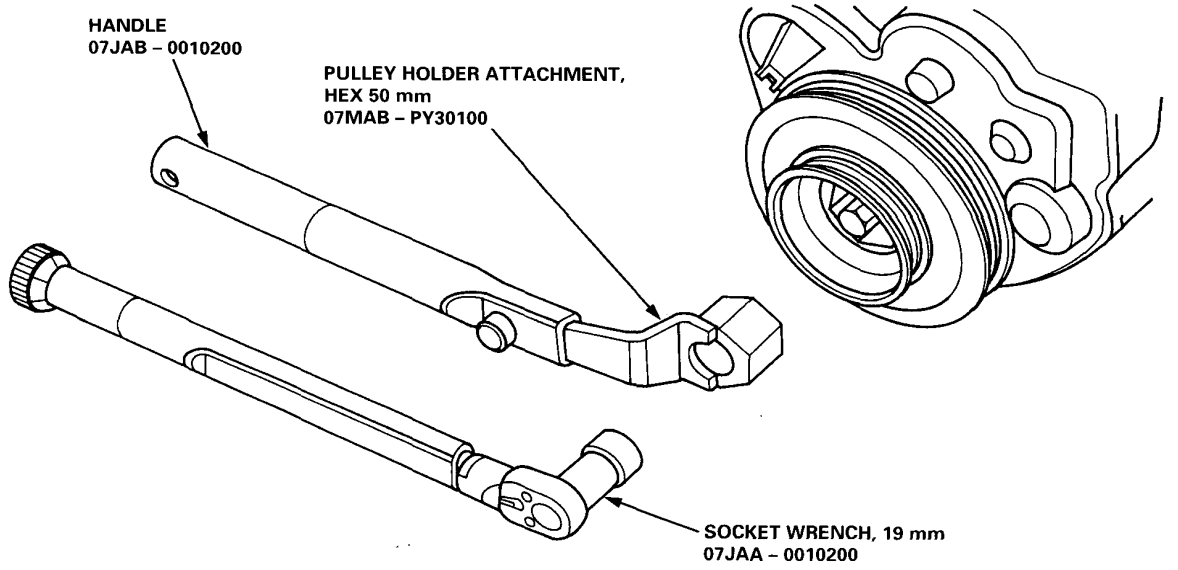
When installing and tightening the pulley, follow the procedure below.

Clean, remove any oil and lubricate points shown below.
○ : Clean
× : Remove any oil
● : Lubricate



Crankshaft pulley bolt size and torque value:
16 x 1.5 mm
245 N·m (25.0 kgf·m, 181 lbf·ft)

NOTE: Do not use the impact wrench when installing.

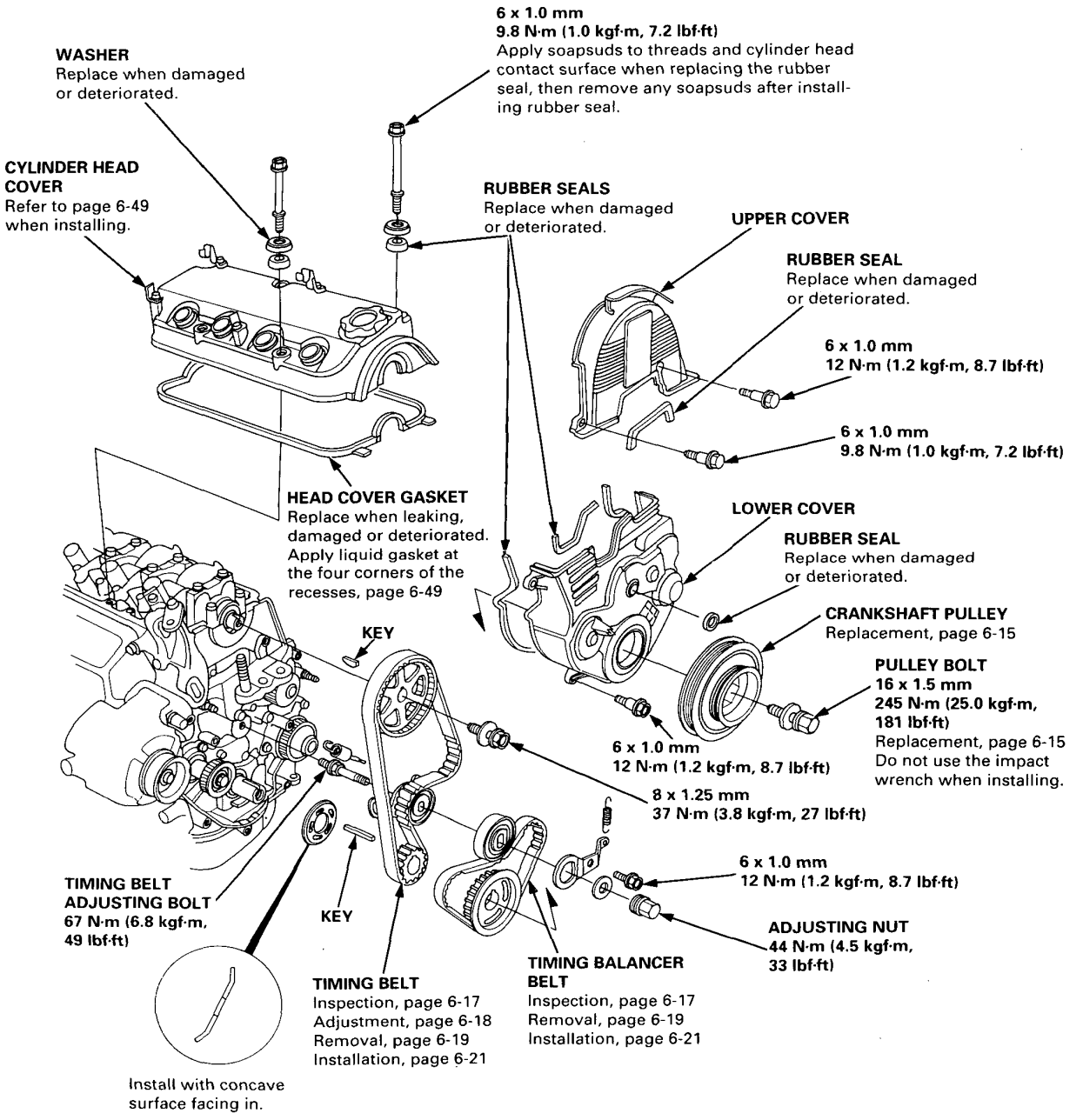


Timing Belt and Timing Balancer Belt

Illustrated Index

NOTE:

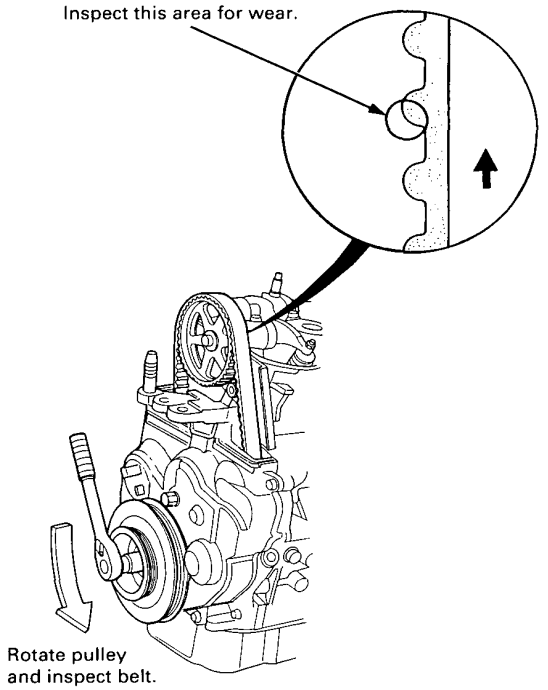
- Refer to page 6-21 for positioning crankshaft and pulley before installing the belt.
- Mark the direction of rotation on the belt before removing.
- Do not use the upper cover and lower cover for storing items disassembled.
- Clean the upper cover and lower cover before installing.
- Replace the camshaft seals and crankshaft seals if there is oil leakage.
- Refer to page 6-15 before installing timing belt and timing balancer belt.



Timing Belt Inspection

1. Disconnect the battery negative terminal first, then the positive terminal.
2. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the cylinder head cover.
3. Remove the cylinder head cover.
   - Refer to page 6-49 when installing.
4. Remove the upper cover.
5. Inspect the timing belt for cracks and oil or coolant soaking.

   NOTE:
   - Replace the belt if oil or coolant soaked.
   - Remove any oil or solvent that gets on the belt.

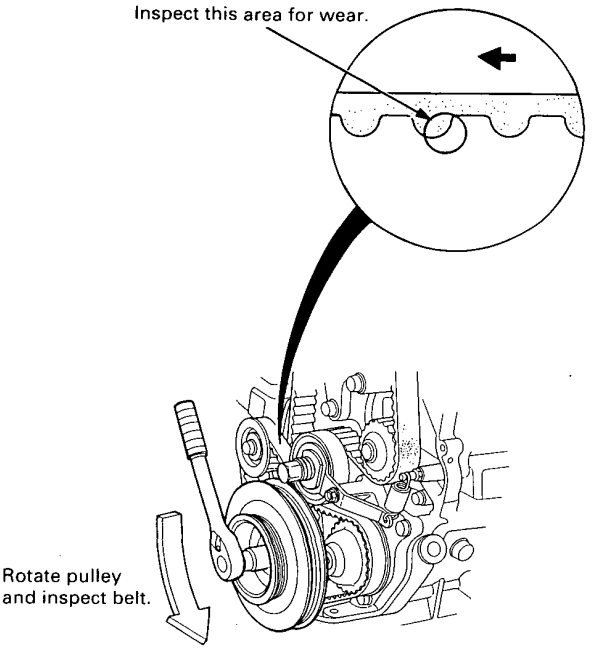


6. After inspecting, retorque the crankshaft pulley bolt to 245 N·m (25.0 kgf·m, 181 lbf·ft).

Timing Balancer Belt Inspection

1. Disconnect the battery negative terminal first, then the positive terminal.
2. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the cylinder head cover.
3. Remove the cylinder head cover.
   - Refer to page 6-49 when installing.
4. Remove the upper cover.
5. Remove the crankshaft pulley.
6. Remove the lower cover.
7. Install the crankshaft pulley.
8. Inspect the timing balancer belt for cracks and oil or coolant soaking.

   NOTE:
   - Replace the belt if oil or coolant soaked.
   - Remove any oil or solvent that gets on the belt.



9. After inspecting, retorque the crankshaft pulley bolt to 245 N·m (25.0 kgf·m, 181 lbf·ft).

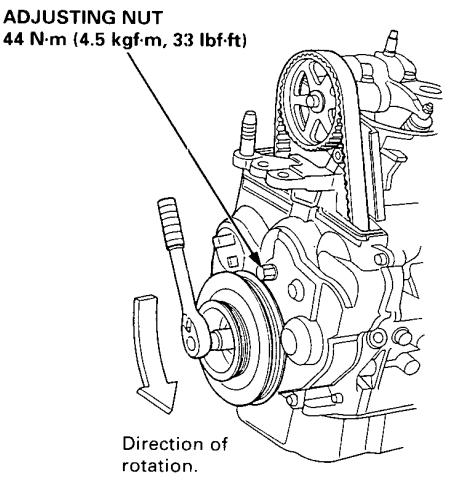
Timing Belt and Timing Balancer Belt

Tension Adjustment

CAUTION: Always adjust timing belt tension with the engine cold.

NOTE:
- The tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment.
- Always rotate the crankshaft counterclockwise when viewed from the pulley side. Rotating it clockwise may result in improper adjustment of the belt tension.
- Inspect the timing balancer belt before adjusting the belt tension.
- Do not loosen the adjusting nut more than one full turn.

1. Disconnect the battery negative terminal first, then the positive terminal.
2. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the cylinder head cover.
3. Remove the cylinder head cover. (Refer to page 6-49 when installing.)
4. Set the No. 1 piston at TDC (see page 6-21).
5. Rotate the crankshaft 5-6 revolutions to set the belt.
6. Set the No. 1 piston at TDC.
7. Loosen the adjusting nut 2/3 – 1 turn.



8. Rotate the crankshaft counterclockwise 3-teeth on the camshaft pulley.
9. Tighten the adjusting nut.
10. After adjusting, retorque the crankshaft pulley bolt to 245 N·m (25.0 kgf·m, 181 lbf·ft).

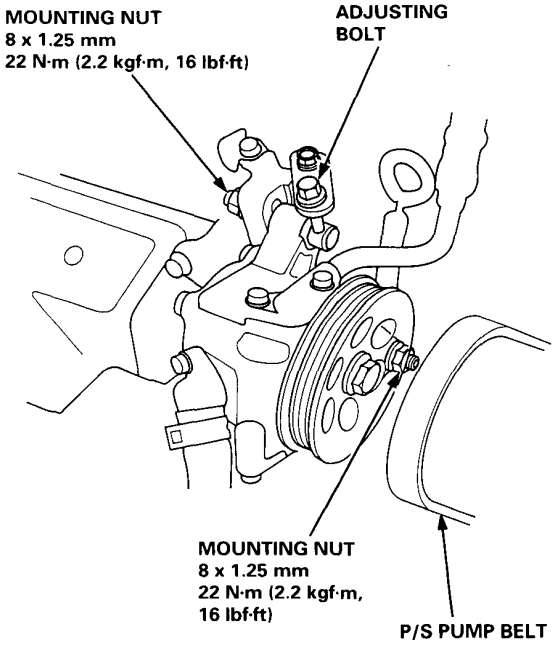
Removal

NOTE:
- Turn the crankshaft pulley so the No. 1 piston is at top dead center (TDC) before removing the belt (see page 6-21).
- Inspect the water pump (see page 10-9).

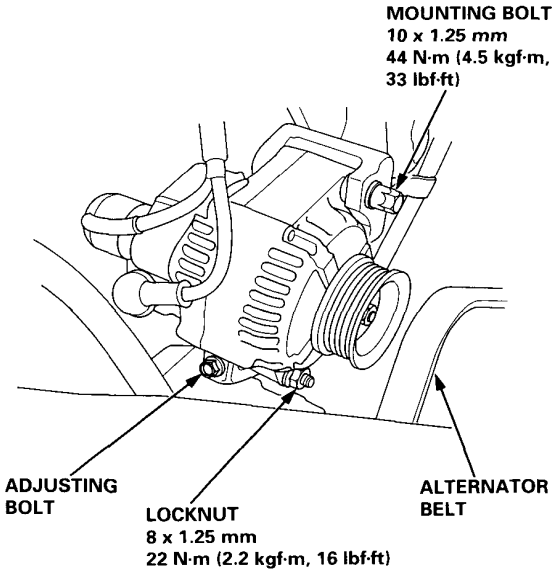
1. Disconnect the battery negative terminal first, then the positive terminal.

2. Remove the wheelwell splash shield (see page 5-17).

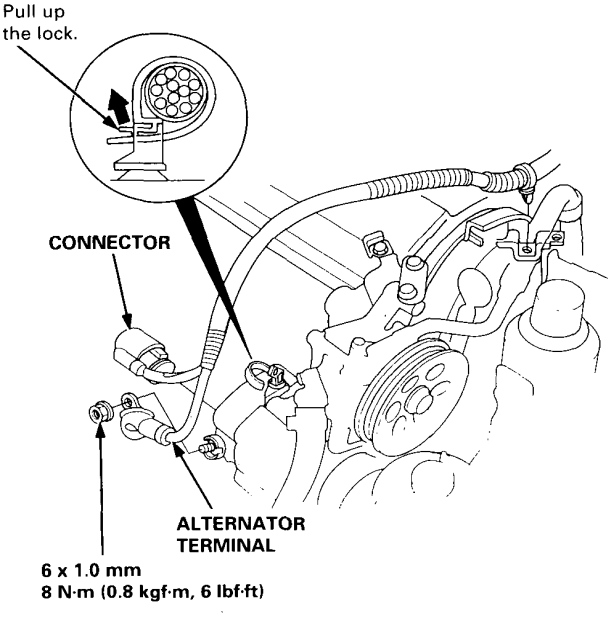
3. Loosen the adjusting bolt and mounting nuts, then remove the power steering (P/S) pump belt.



4. Loosen the adjusting bolt, mounting bolt and locknut, then remove the alternator belt.



5. Remove the alternator terminal and connector.



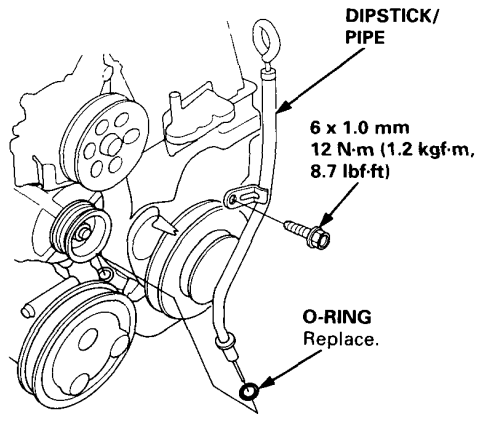
(cont'd)

Removal (cont'd)

6. Remove the side engine mount (see page 5-21).

   NOTE:
   - Use the jack to support the engine before the side engine mount is removed.
   - Make sure to place a cushion between the oil pan and the jack.

7. Remove the dipstick and the pipe.

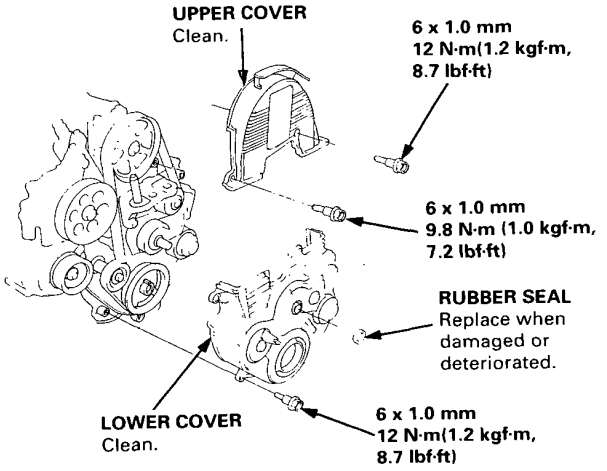


8. Remove the cylinder head cover.
   - Refer to page 6-49 when installing.

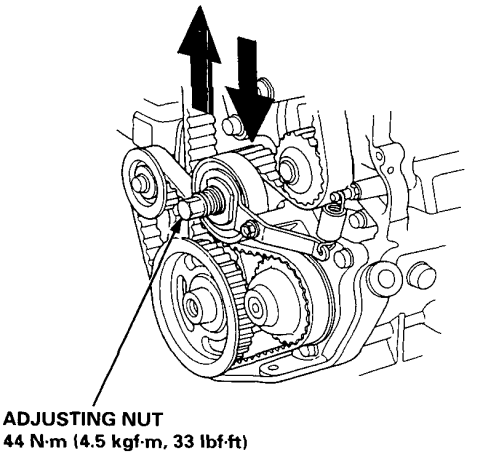
9. Remove the pulley bolt and crankshaft pulley (see page 6-15).

10. Remove the rubber seal from the adjusting nut, then remove the upper and lower covers.

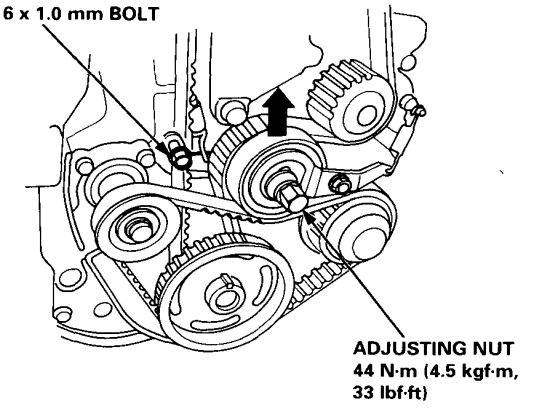
    NOTE: Do not use the upper and lower covers for storing items disassembled.



11. Loosen the adjusting nut 2/3 – 1 turn. Push the tensioner to remove tension from the timing belt and timing balancer belt, then retighten the adjusting nut.



    NOTE: When removing the timing balancer belt only:
    - Lock the timing belt adjuster arm in place by installing one of the 6 x 1.0 mm bolts.
    - Loosen the adjusting nut 2/3 – 1 turn. Push the tensioner to remove tension from the timing balancer belt, then retighten the adjusting nut.



12. Remove the timing balancer belt and timing belt.

Installation

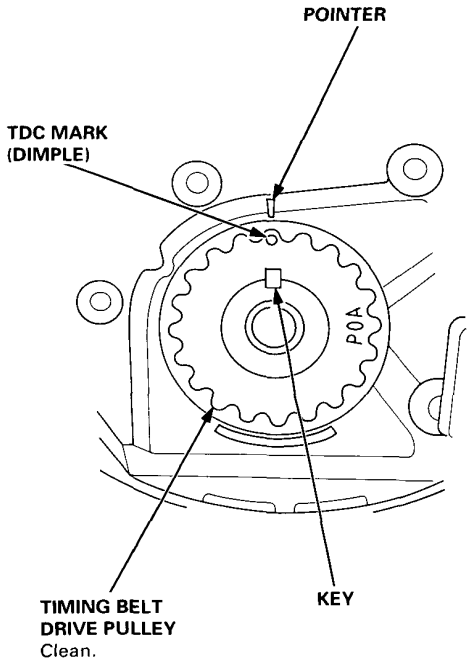
Install the timing belt and timing balancer belt in the reverse order of removal.
Only key points are described here.

- When installing only the timing balancer belt, go to step 13.

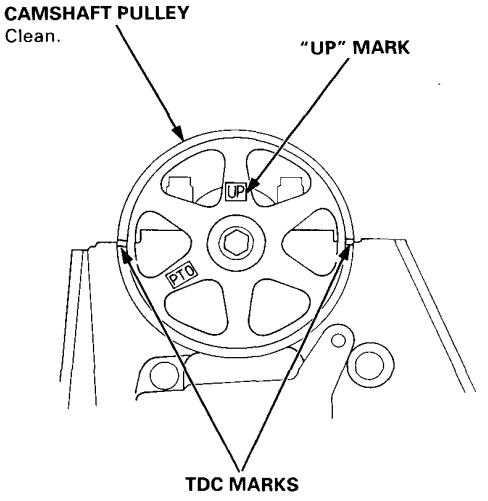
NOTE: Clean the upper and lower covers before installation.

1. Remove the timing balancer belt drive pulley (see page 6-16).

2. Set the timing belt drive pulley so that the No. 1 piston is at top dead center (TDC). Align the dimple on the tooth of the timing belt drive pulley with the ▽ pointer on the oil pump.

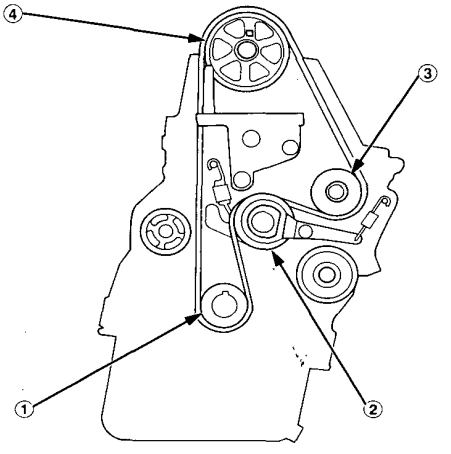


3. Set the camshaft pulley so that the No. 1 piston is at TDC.
Except F22B1 engine: Align the TDC mark on the camshaft pulley with the cylinder head upper surface.
F22B1 engine: Align the TDC mark on the camshaft pulley with the back cover upper surface.



4. Install the timing belt tightly in the sequence shown.
① Timing belt drive pulley (crankshaft) → ② Adjusting pulley → ③ Water pump pulley → ④ Camshaft pulley.

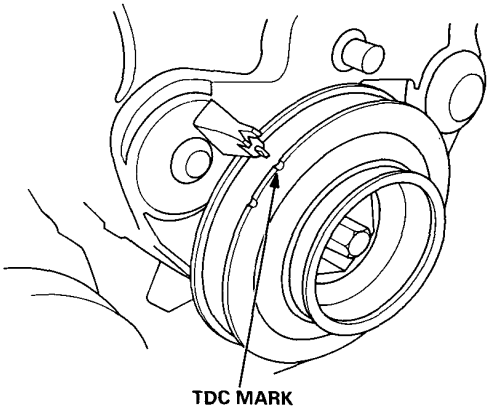
NOTE: Make sure the timing belt drive pulley and camshaft pulley are at TDC.

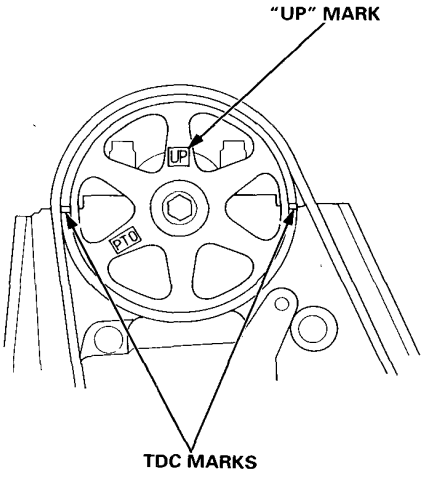


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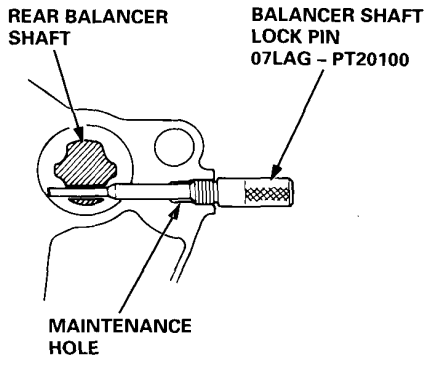
Installation (cont'd)

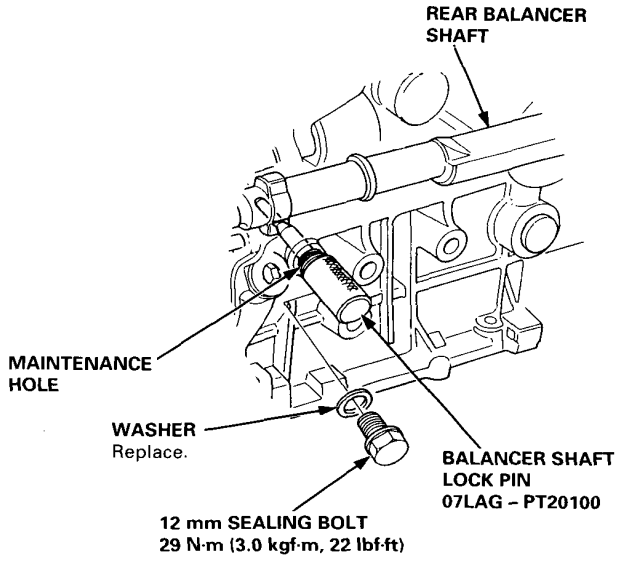
5. Loosen and retighten the adjusting nut to tension the timing belt.
6. Install the timing balancer belt drive pulley and lower cover.
7 Install the crankshaft pulley, then tighten the pulley bolt (see page 6-15).
8. Rotate the crankshaft pulley about 5 or 6 turns counterclockwise so that the timing belt positions on the pulleys.
9. Adjust the timing belt tension (see page 6-18).
10. Make sure the crankshaft pulley and camshaft pulley are at TDC.



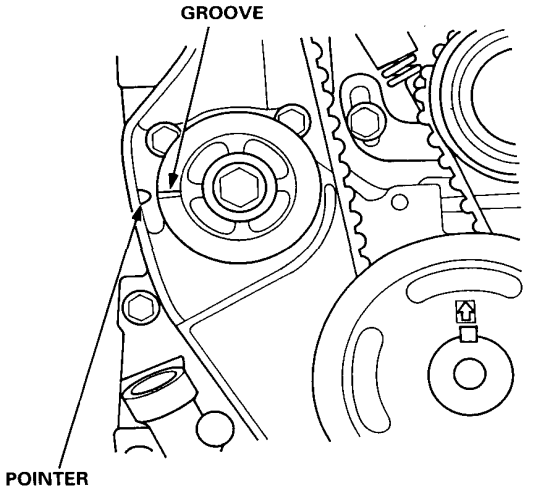


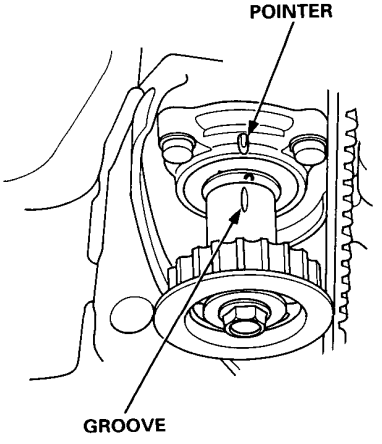
11. If the camshaft or crankshaft pulley is not positioned at TDC, remove the timing belt and adjust the positioning following the procedure on page 6-21, then reinstall the timing belt.
12. Remove the crankshaft pulley and lower cover.
13. Set the timing belt drive pulley so that the No.1 piston at TDC.
14. Lock the timing belt adjuster arm in place by installing one of the 6 x 1.0 mm bolts.
15. Loosen the adjusting nut 2/3 – 1 turn, and verify that the timing balancer belt adjuster moves freely.
16. Push the tensioner to remove tension from the timing balancer belt, then retighten the adjusting nut.
17. Align the rear balancer shaft pulley by using a special tool. Insert the special tool into the maintenance hole to the fix the rear balancer shaft.





18. Align the groove on the front balancer shaft pulley with the pointer on the oil pump housing as shown.





19. Install the timing balancer belt. Loosen the adjusting nut 2/3 – 1 turn to tension the timing balancer belt.

20. Remove the special tool, then install the 12 mm sealing bolt.

21. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-15).

22. Turn the crankshaft pulley about one turn counterclockwise, then tighten the adjusting nut.

23. Remove the 6 x 1.0 mm bolt from the timing belt adjuster arm.

24. Remove the crankshaft pulley, then install the lower cover.

25. Install the rubber seal around the adjusting nut.

    NOTE: Do not loosen the adjusting nut.

26. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-15).

27. After installation, adjust the tension of each belt.

    - See section 23 for alternator belt tension adjustment.
    - See section 22 for air conditioning (A/C) compressor belt tension adjustment.
    - See section 17 for P/S pump belt tension adjustment.

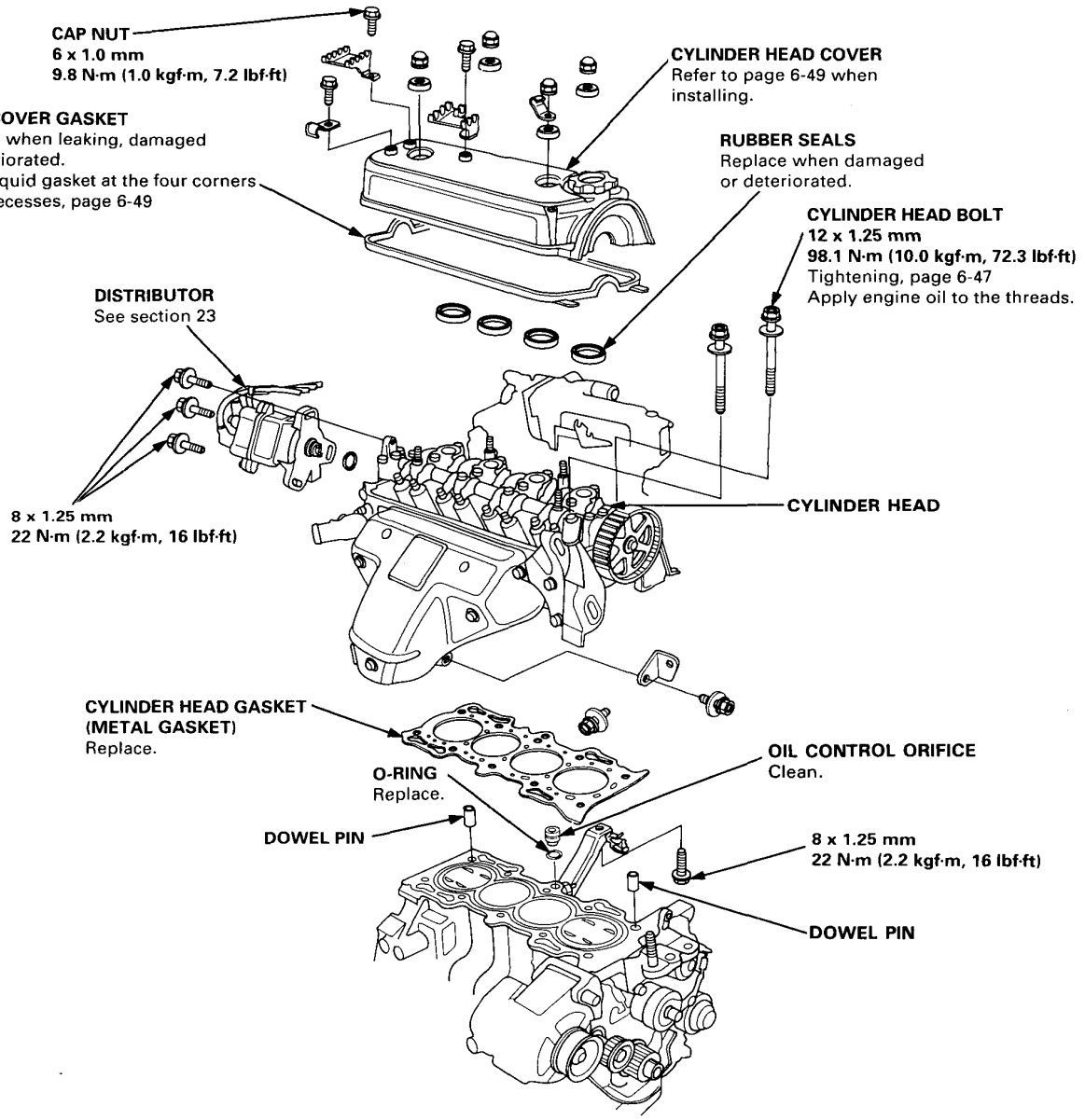
Cylinder Head

Illustrated Index

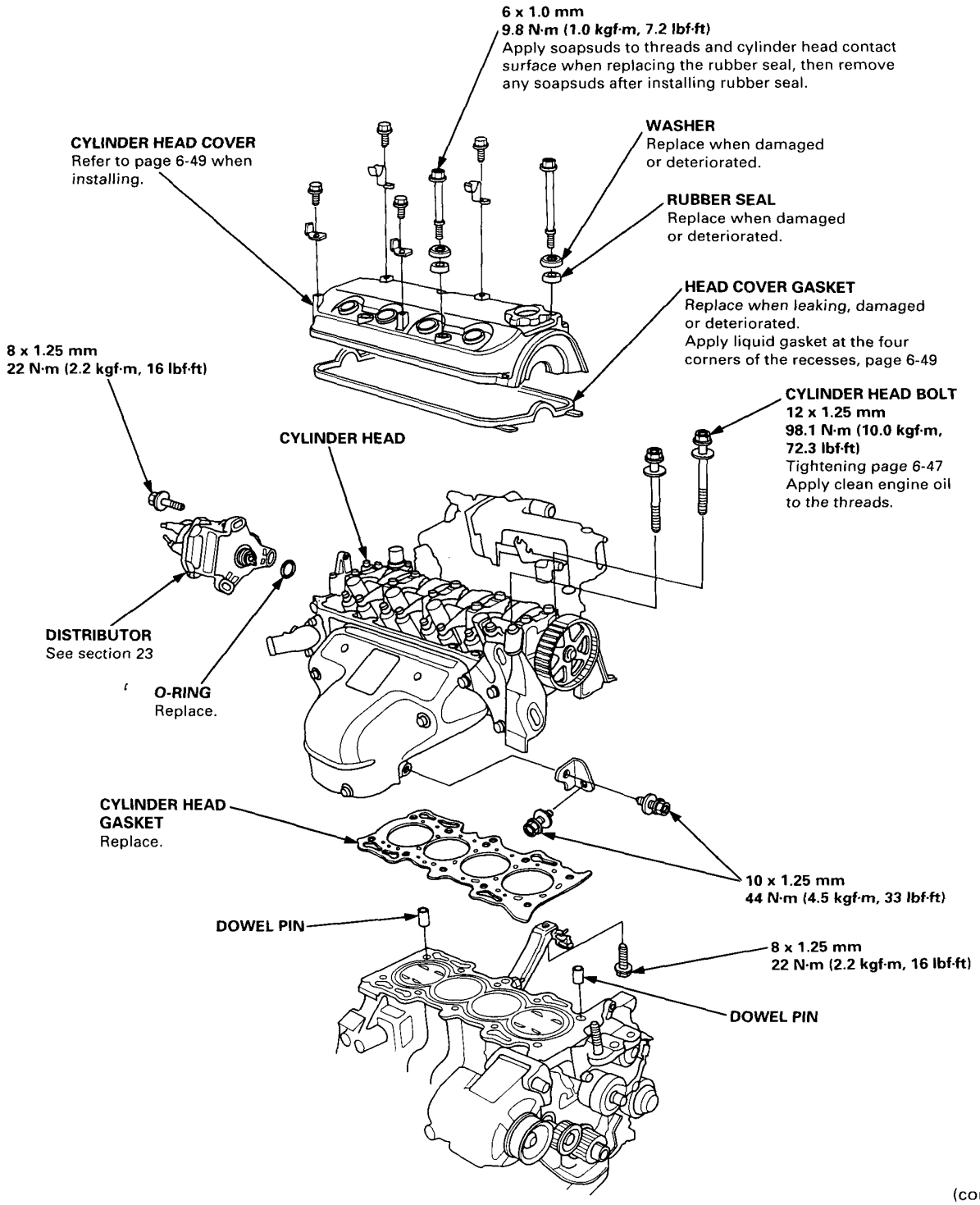
CAUTION:
- **To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 38°C (100°F) before removing it.**
- **In handling a metal gasket, take care not to fold it or damage the contact surface of the gasket.**

NOTE:
- Use new O-rings and gaskets when reassembling.
- Clean the oil control orifice before installing.

Except F22B1 engine:



F22B1 engine:



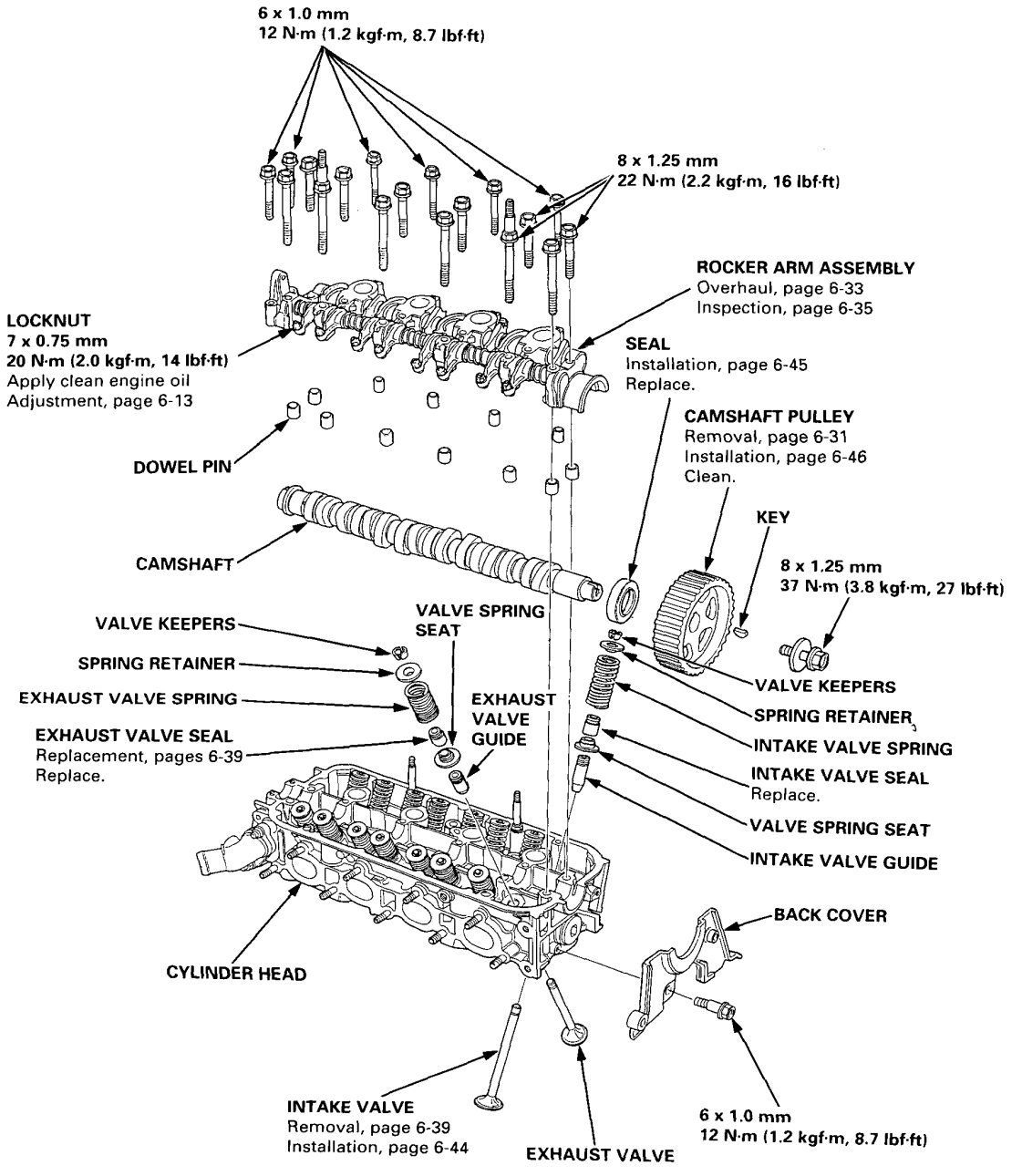
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Cylinder Head

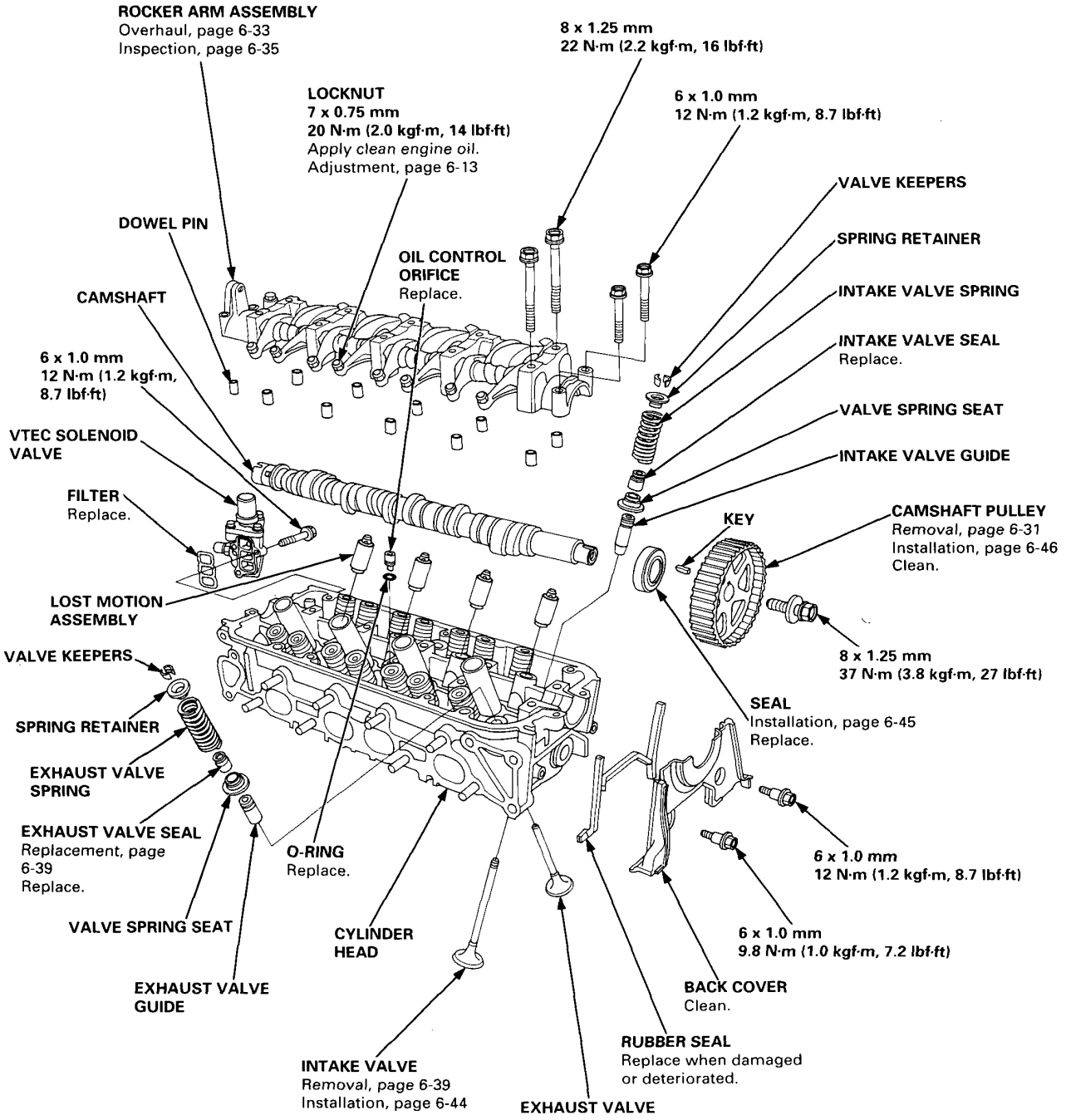
Illustrated Index (cont'd)

OIL Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact parts.

Except F22B1 engine:



F22B1 engine:



Cylinder Head

Removal

Engine removal is not required for this procedure.

⚠ WARNING Make sure jacks and safety stands are placed properly and hoist brackets are attached to correct position on the engine.

CAUTION:
- **Use fender covers to avoid damaging painted surfaces.**
- **Unplug the wiring connectors carefully while holding the connector portion to avoid damage.**
- **To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 38°C (100°F) before loosening the retaining bolts.**

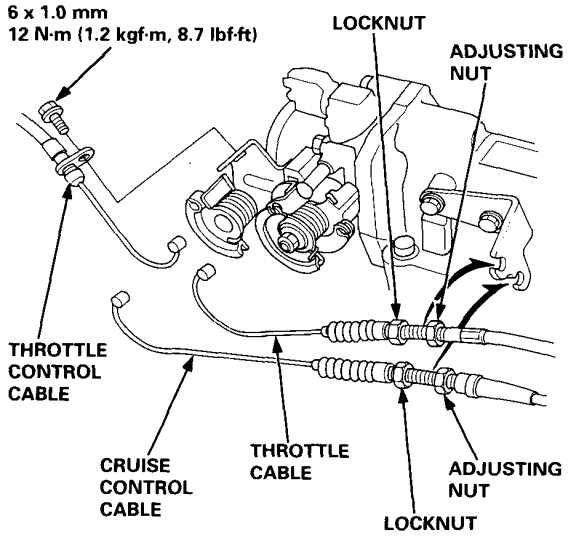
NOTE:
- Unspecified items are common between both engines.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 piston is at top dead center (see page 6-21).

1. Disconnect the battery negative terminal first, then the positive terminal.

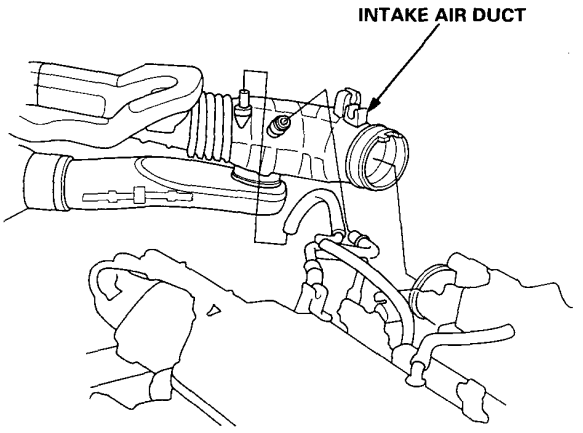
2. Drain the engine coolant (see page 10-5).
   - Remove the radiator cap to speed draining.

3. Remove the throttle cable, throttle control cable (A/T) and cruise control cable.

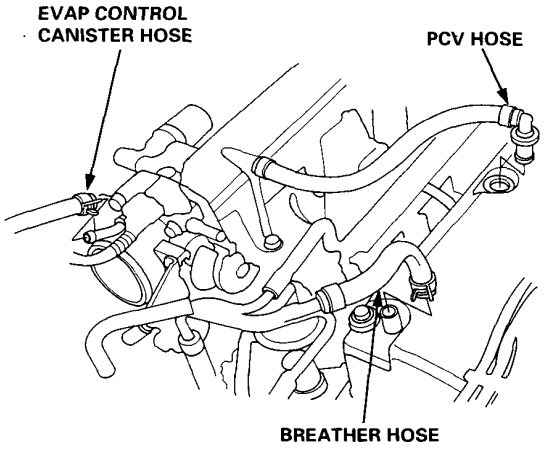
   NOTE:
   - Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
   - Adjust the throttle cable, throttle control cable and cruise control cable when installing (see section 11 and 23).



4. Remove the intake air duct.



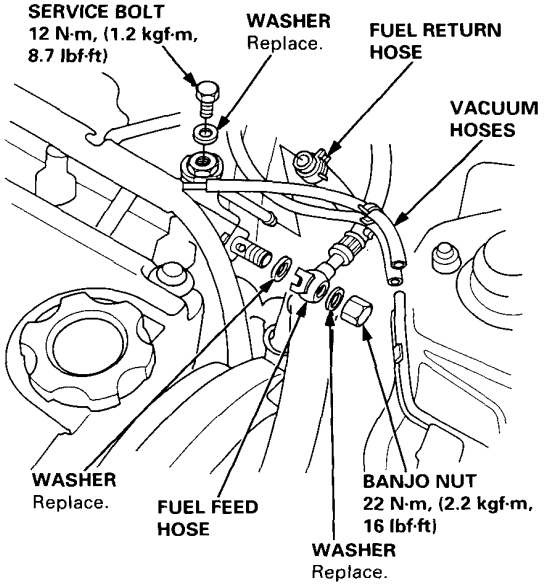
5. Remove the breather hose, positive crankcase ventilation (PCV) hose and evaporative emission (EVAP) control canister hose.



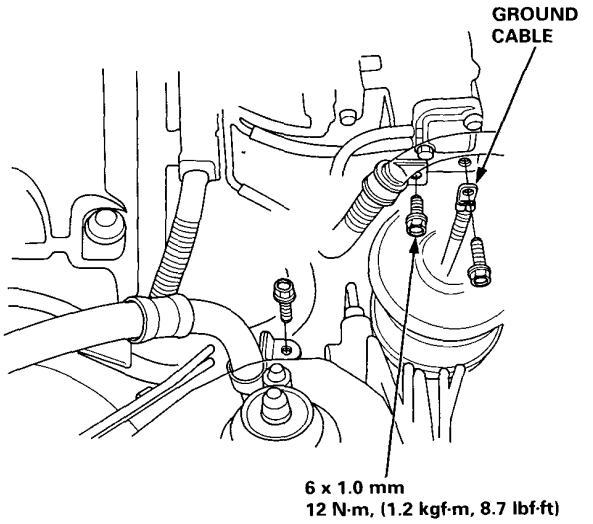
6. Relieve fuel pressure (see section 11).

⚠ WARNING Do not smoke while working on fuel system, keep open flame or spark away from work area. Drain fuel only into an approved container.

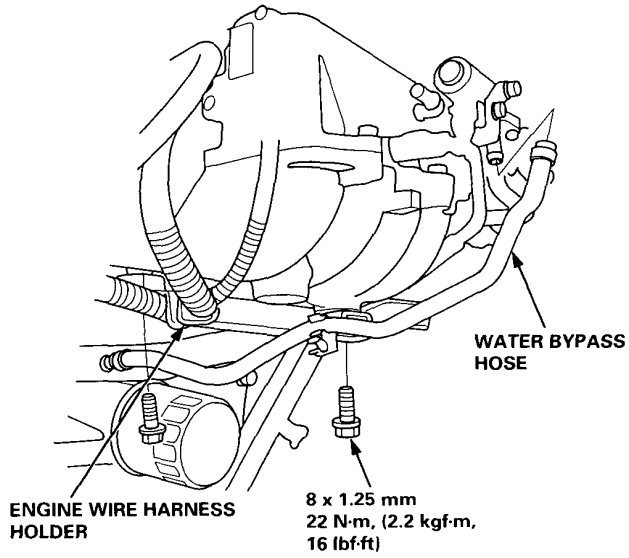
7. Remove the fuel feed hose, fuel return hose and vacuum hoses.



8. Remove the brake booster vacuum hose and vacuum hoses (see page 5-15).
9. Remove the power steering (P/S) hose clamp, wire harness clamp and engine ground cable.



10. Remove the battery cable and alternator connector (see page 6-19).
11. Remove the P/S pump belt and P/S pump (see page 5-16).
12. Remove the alternator belt (see page 6-19).
13. Remove the engine wire harness holder and water bypass hose.



(cont'd)

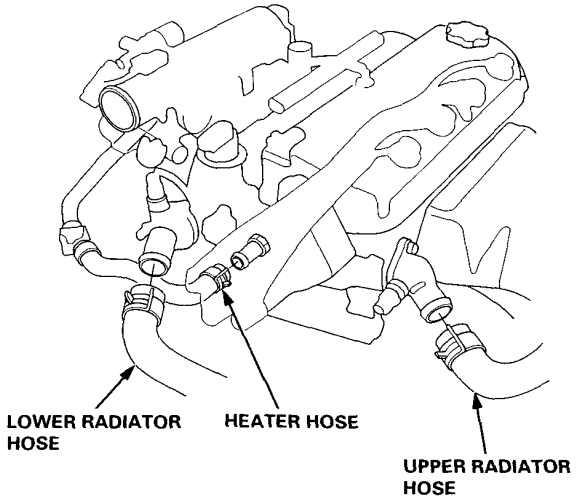
Removal (cont'd)

14. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.

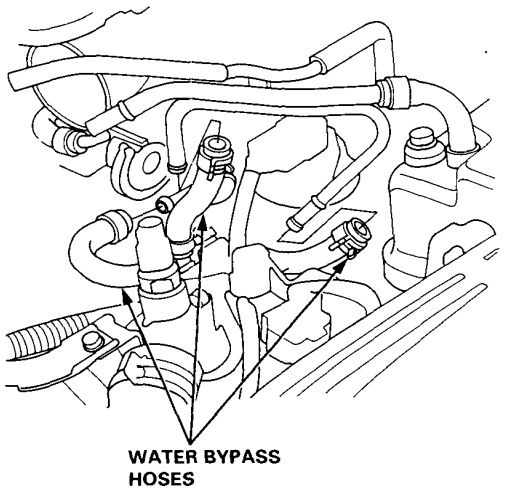
    - Four injector connectors
    - Intake air temperature (IAT) sensor connector
    - Idle air control (IAC) valve connector
    - Throttle position sensor connector
    - Manifold absolute pressure (MAP) sensor connector
    - Heated oxygen sensor (HO2S) connector (F22B2 engine)
    - Engine coolant temperature (ECT) sensor connector
    - ECT switch connector
    - ECT gauge sending unit connector
    - VTEC solenoid valve connector (F22B1 engine)
    - VTEC pressure switch connector (F22B1 engine)
    - Exhaust gas recirculation (EGR) valve lift sensor connector
    - TDC/CKP/CYP sensor connector
    - Ignition coil connector
    - Fuel injection air (FIA) control solenoid valve connector (F22B1 engine)

15. Remove the spark plug caps and distributor from the cylinder head.

16. Remove the upper and lower radiator hoses and heater hose.



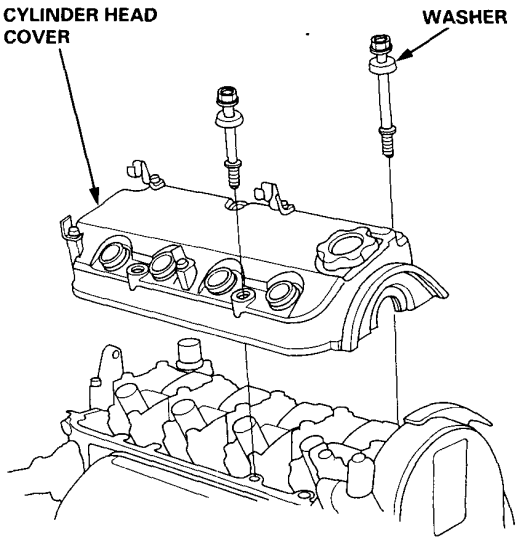
17. Remove the water bypass hoses.



18. Remove the side engine mount (see page 5-21).

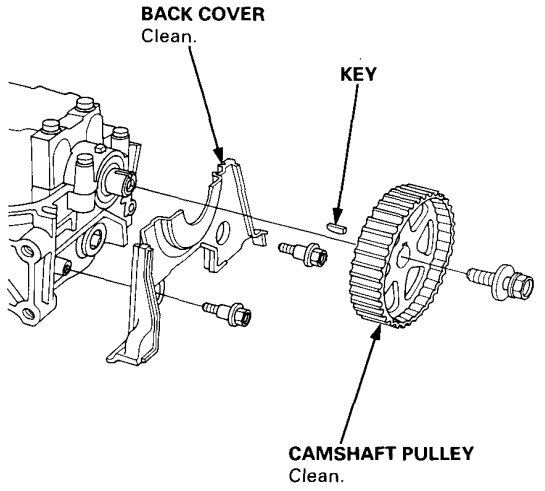
    NOTE:
    - Use the jack to support the engine before the side engine mount is removed.
    - Make sure to place a cushion between the oil pan and the jack.

19. Remove the cylinder head cover.



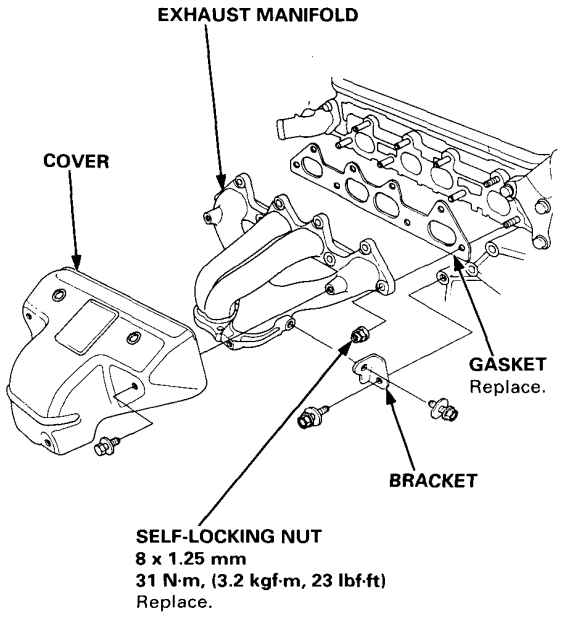
20. Remove the timing belt (see page 6-19).

21. Remove the camshaft pulley and back cover.

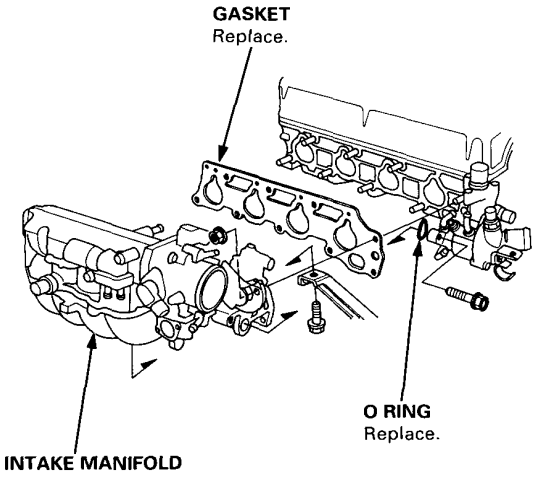


22. Remove the splash shield (see page 5-17).

23. Remove the exhaust manifold.



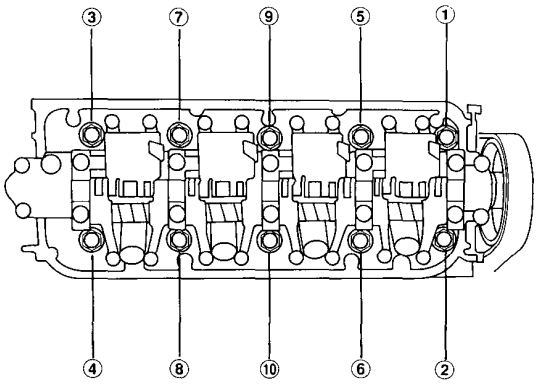
24. Remove the intake manifold.



25. Remove the cylinder head bolts, then remove the cylinder head.

CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

CYLINDER HEAD BOLT LOOSENING SEQUENCE



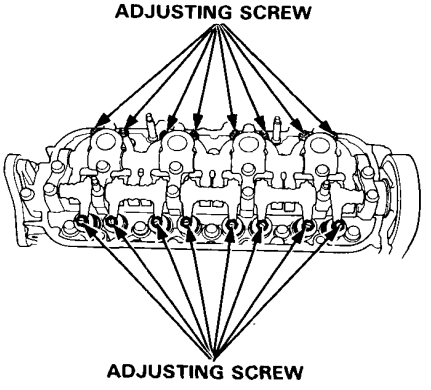
Rocker Arm Assembly

Removal

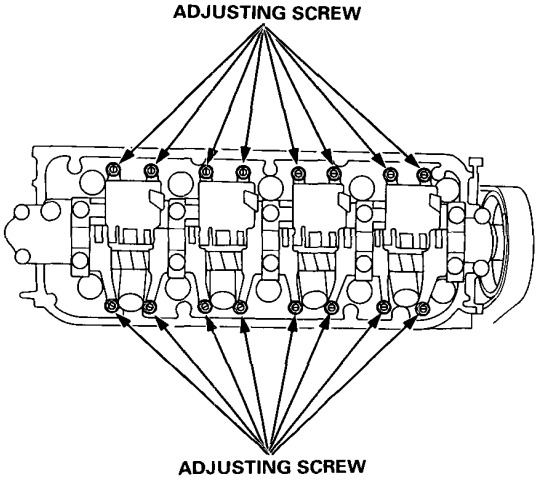
1. Loosen the adjusting screws, then remove the bolts and the rocker arm assembly.

   NOTE:
   - Unscrew the camshaft holder bolts two turns at a time, in a crisscross pattern to prevent damaging the valves or rocker arm assembly.
   - When removing the rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the camshaft holders, the springs and the rocker arms on the shafts.

Except F22B1 engine:

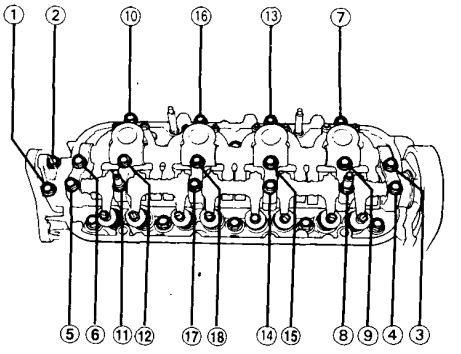


F22B1 engine:

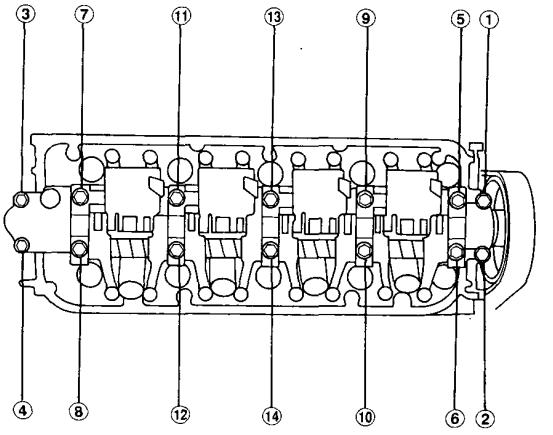


CAMSHAFT HOLDER BOLT LOOSENING SEQUENCE

Except F22B1 engine:



F22B1 engine:



Rocker Arms

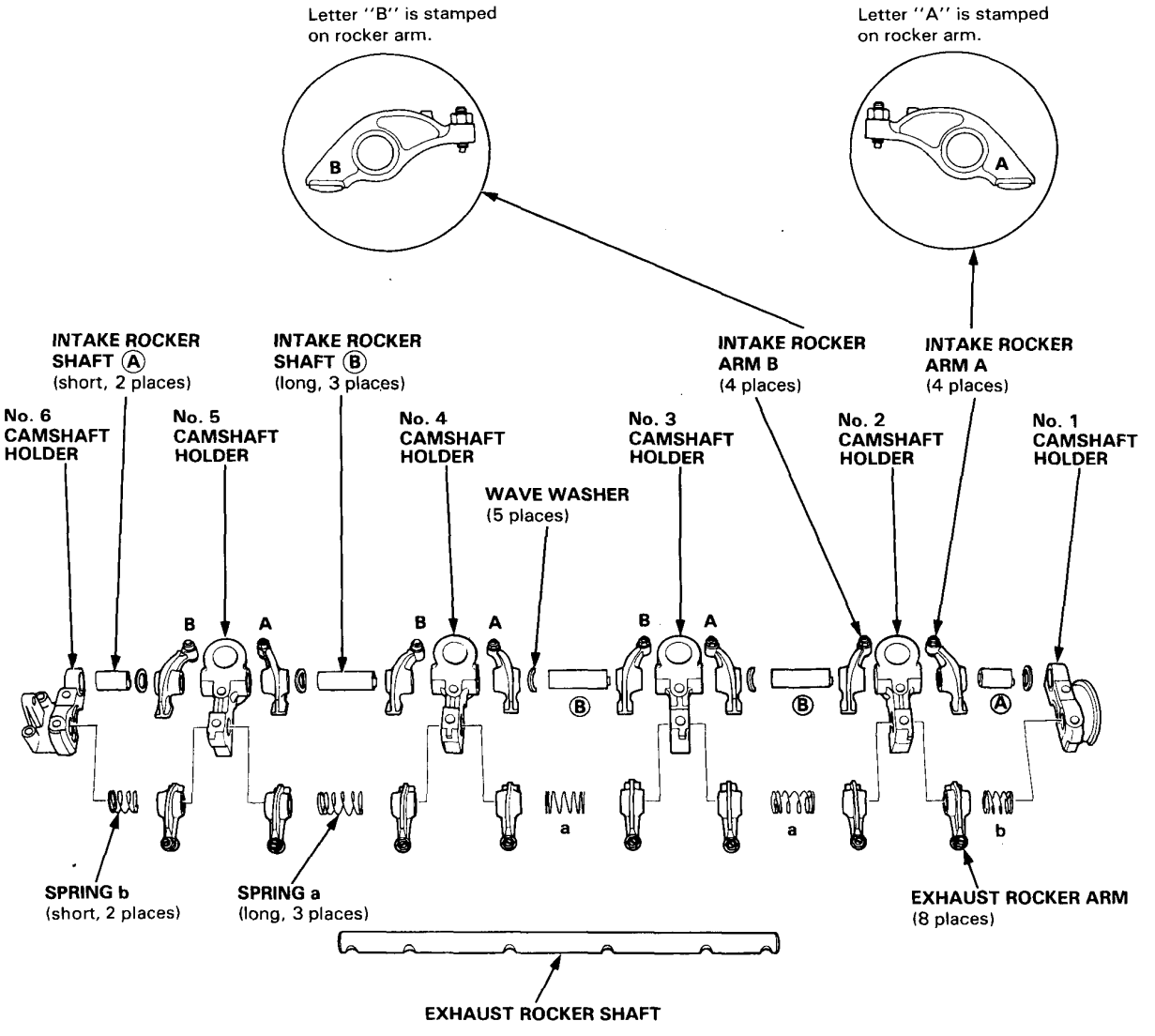
Overhaul

NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (page 6-36).
- Rocker arms must be installed in the same position if reused.
- When removing or installing rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.
- When reassembling, fit the projection on the intake rocker shaft to the notch in the camshaft holder.

OIL Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact parts.

Except F22B1 engine:



(cont'd)

Rocker Arms

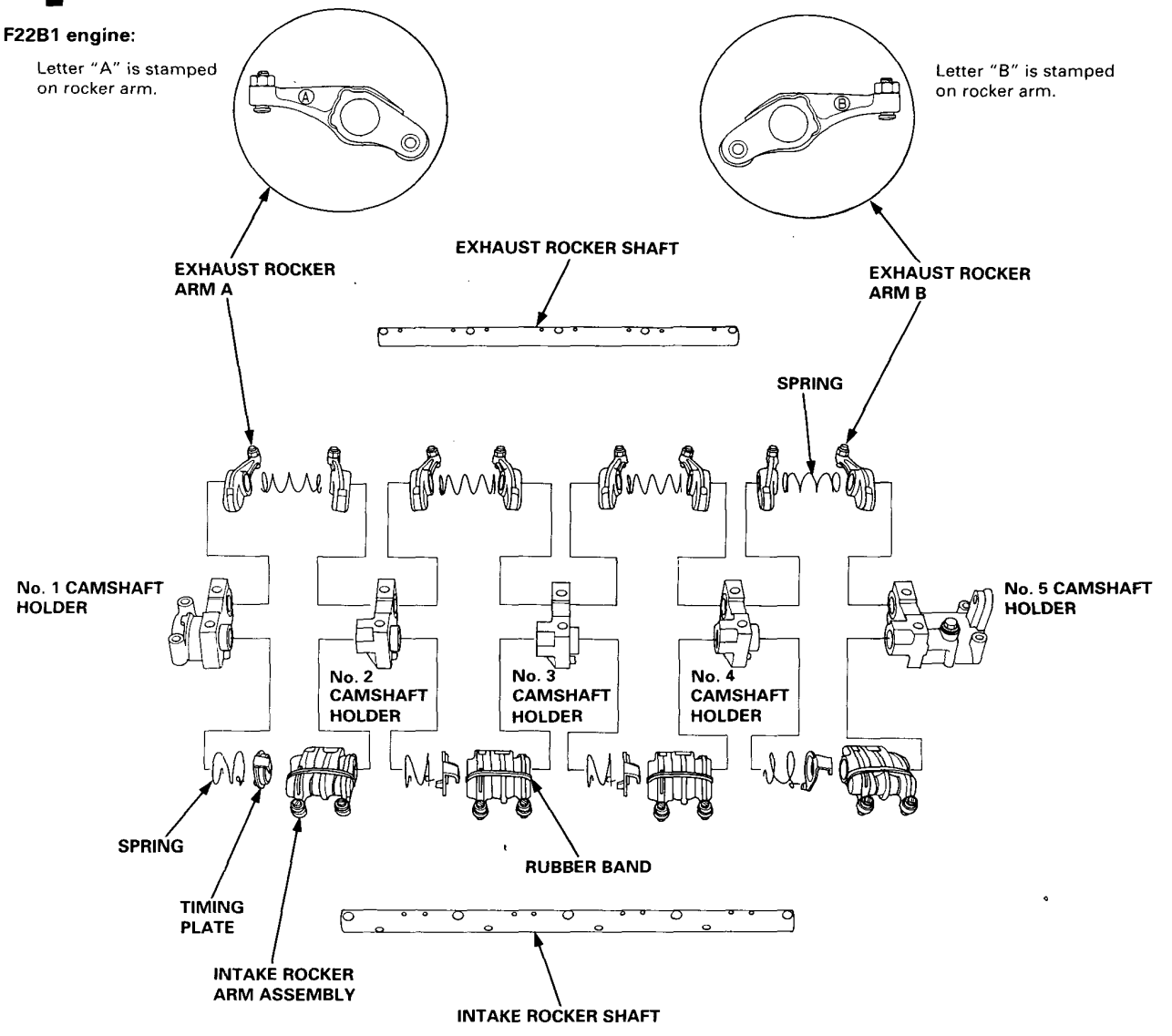
Overhaul (cont'd)

NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (page 6-35 and 36).
- Rocker arms must be installed in the same position if reused.
- When removing or installing rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.
- Bundle the rocker arms with a rubber band to keep them together as a set.

OIL Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.

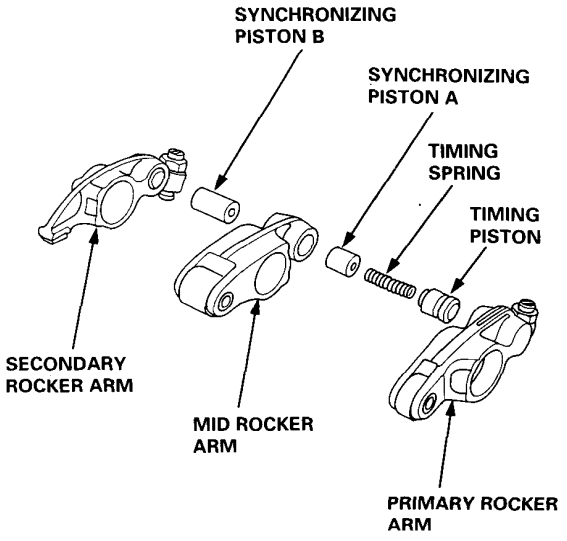
F22B1 engine:



Inspection

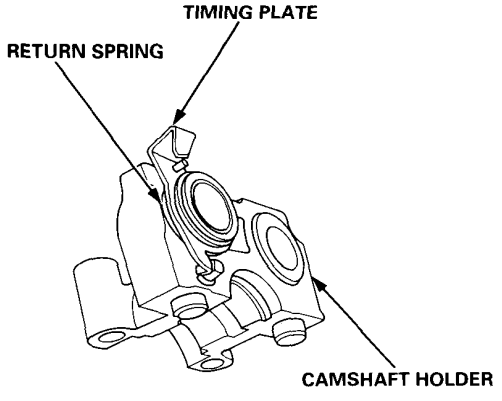
NOTE: When reassembling the primary rocker arm, carefully apply air pressure to the oil passage of the rocker arm.

1. Inspect the rocker arm piston. Push it manually.
   — If it does not move smoothly, replace the rocker arm assembly.



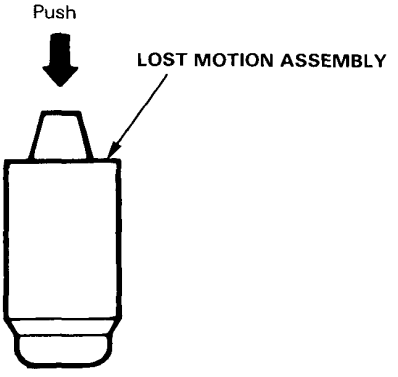
NOTE:
- Apply oil to the pistons when reassembling.
- Bundle the rocker arms with a rubber band to keep them together as a set.

NOTE: Set the timing plate and return spring as shown below.



Inspection

1. Remove the lost motion assembly from the cylinder head and inspect it. Pushing it gently with the finger will cause it to sink slightly. Increasing the force on it will cause it to sink deeper.
   — If the lost motion assembly does not move smoothly, replace it.

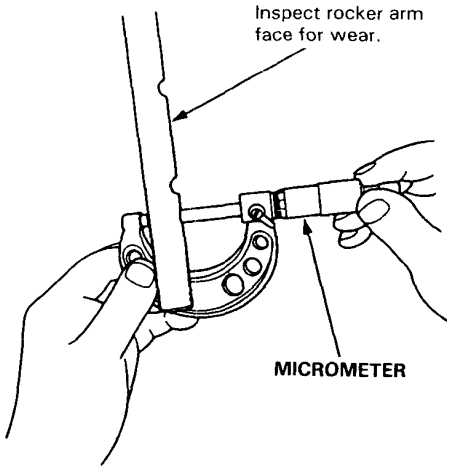


Rocker Arms and Shafts

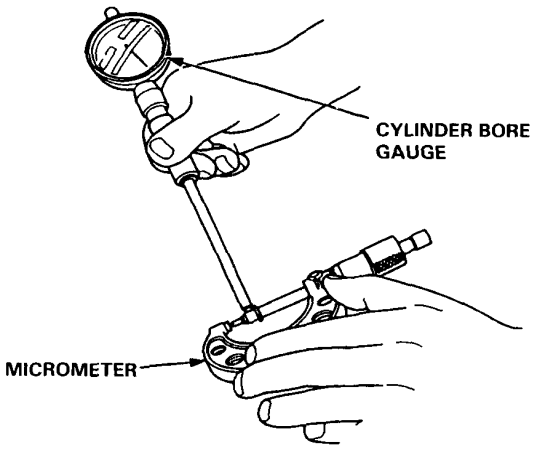
Clearance Inspection

Measure both the intake rocker shaft and exhaust rocker shaft.

1. Measure diameter of shaft at first rocker location.

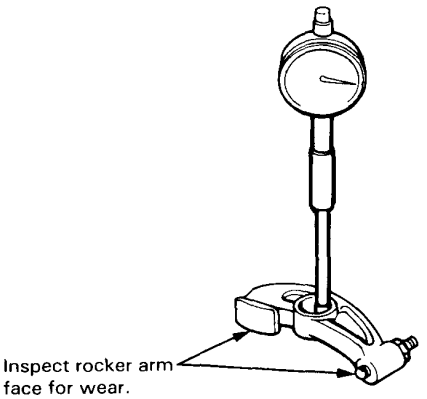


2. Zero gauge to shaft diameter.



3. Measure inside diameter of rocker arm, and check for out-of-round condition.

Rocker Arm-to-Shaft Clearance:
Standard (New):
Except F22B1 engine:
Intake: **0.017 – 0.050 mm (0.0007 – 0.0020 in)**
Exhaust: **0.018 – 0.054 mm (0.0007 – 0.0021 in)**
F22B1 engine:
Intake: **0.026 – 0.067 mm (0.0010 – 0.0026 in)**
Exhaust: **0.018 – 0.054 mm (0.0007 – 0.0021 in)**
Service Limit: 0.08 mm (0.003 in)



Repeat for all rockers.
— If over limit, replace rocker shaft and all overtolerance rocker arms.

NOTE: If any rocker arm needs replacement, replace all three rocker arms in that set (primary, mid, and secondary).

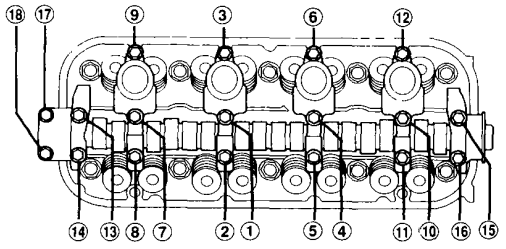
Inspection

NOTE:
- Do not rotate the camshaft during inspection.
- Remove the rocker arms and rocker shafts.

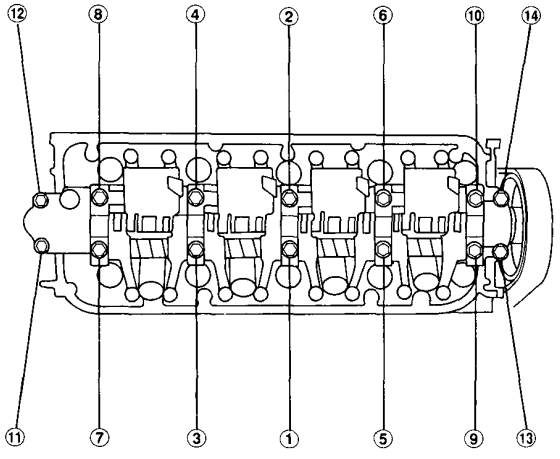
1. Put the camshaft and the camshaft holders on the cylinder head, then tighten the bolts to the specified torque.

   Specified torque:
   8 mm bolts: 22 N·m (2.2 kgf·m, 16 lbf·ft)
   6 mm bolts: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

Except F22B1 engine:
6 mm bolts: ③, ⑥, ⑨, ⑫, ⑰, ⑱



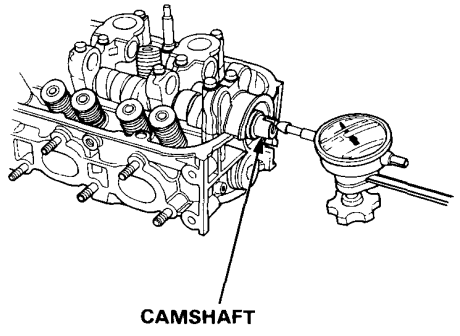
F22B1 engine:
6 mm bolts: ⑪, ⑫, ⑬, ⑭



2. Seat the camshaft by pushing it toward distributor end of cylinder head.

3. Zero the dial indicator against the end of distributor drive, then push the camshaft back and forth and read the end play.

   Camshaft End Play:
   Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)
   Service Limit: 0.5 mm (0.02 in)



4. Remove the bolts, then remove the camshaft holders from the cylinder head.

   — Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace the camshaft if lobes are pitted, scored, or excessively worn.

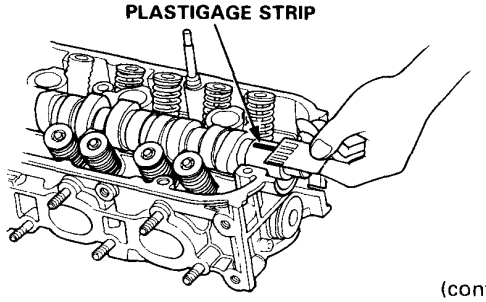
   — Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.

   — Insert plastigage strip across each journal.

5. Install the camshaft holders, then tighten the bolts to the specified torque as shown in the left column of this page.

6. Remove the camshaft holders. Measure widest portion of plastigage on each journal.

   Camshaft-to-Holder Oil Clearance:
   Standard (New): 0.050 – 0.089 mm (0.0020 – 0.0035 in)
   Service Limit: 0.15 mm (0.006 in)



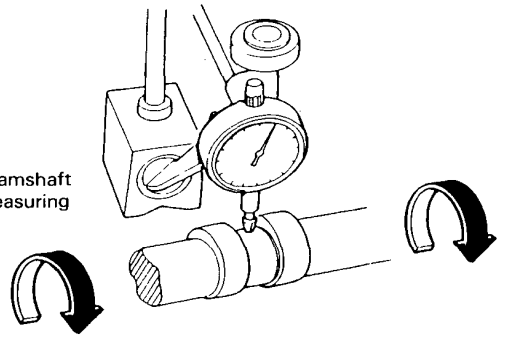
(cont'd)

Inspection (cont'd)

7. If camshaft-to-holder oil clearance is out of tolerance:

   — And the camshaft has already been replaced, you must replace the cylinder head.
   — If camshaft has not been replaced, first check total runout with the camshaft supported on V-blocks.

Camshaft Total Runout:
Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.04 mm (0.002 in)



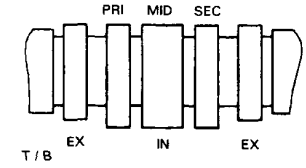
   — If the total runout of the camshaft is within tolerance, replace the cylinder head.
   — If the total runout is out of tolerance, replace the camshaft and recheck, If the oil clearance is still out of tolerance, replace the cylinder head.

8. Measure cam lobe height.

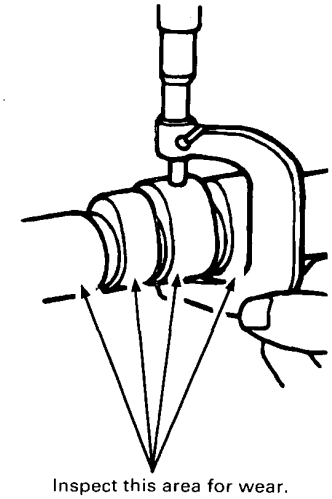
Cam Lobe Height Standard (New):

Unit mm (in)

		INTAKE	EXHAUST
F20B3 engine		38.741 (1.5252)	38.972 (1.5343)
F22B5 engine		39.167 (1.5420)	39.356 (1.5494)
F22B2 engine		38.526 (1.5168)	38.778 (1.5267)
F22B1 engine	PRI	37.775 (1.4872)	38.366 (1.5105)
	MID	39.725 (1.5640)	
	SEC	34.481 (1.3575)	



F22B1 engine:

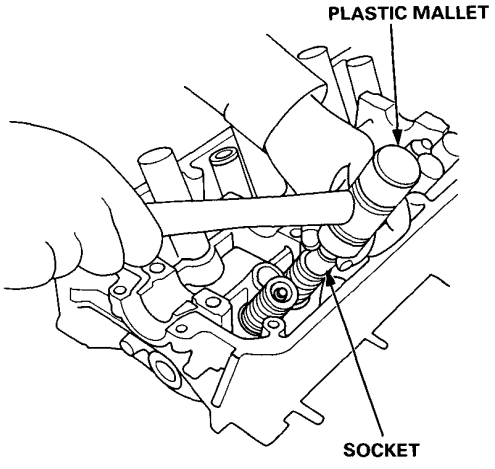


Inspect this area for wear.

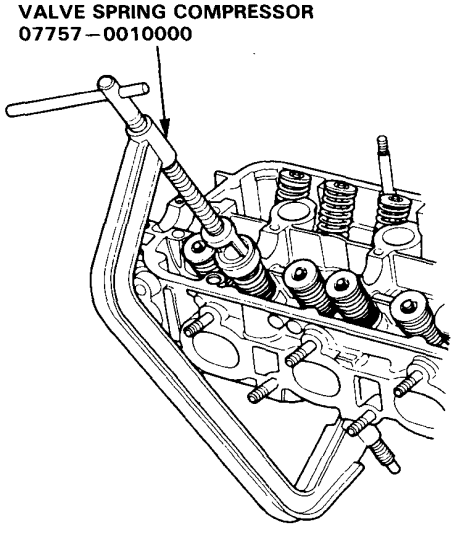
Removal

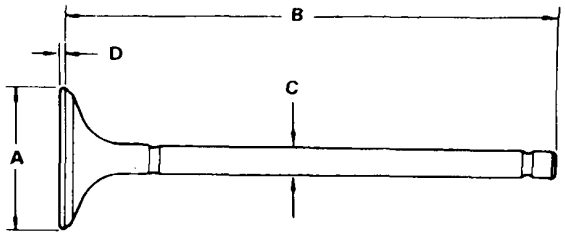
NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

1. Using an appropriate-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.



2. Install the spring compressor. Compress the spring and remove the valve keepers.





Except F22B1 engine:

Intake Valve Dimensions
A Standard (New): 31.90 – 32.10 mm (1.256 – 1.264 in)
B Standard (New): 107.82 – 108.32 mm (4.245 – 4.265 in)
C Standard (New): 5.485 – 5.495 mm (0.2159 – 0.2163 in)
C Service Limit: 5.455 mm (0.2148 in)
D Standard (New): 0.85 – 1.15 mm (0.033 – 0.045 in)
D Service Limit: 0.65 mm (0.026 in)

Exhaust Valve Dimensions
A Standard (New): 28.90 – 29.10 mm (1.138 – 1.146 in)
B Standard (New): 116.95 – 117.45 mm (4.604 – 4.624 in)
C Standard (New): 5.450 – 5.460 mm (0.2146 – 0.2150 in)
C Service Limit: 5.420 mm (0.2134 in)
D Standard (New): 1.05 – 1.35 mm (0.041 – 0.053 in)
D Service Limit: 0.95 mm (0.037 in)

(cont'd)

Removal (cont'd)

F22B1 engine:

Intake Valve Dimensions
A Standard (New): 33.90 – 34.10 mm (1.335 – 1.343 in)
B Standard (New): 110.30 – 110.80 mm (4.343 – 4.362 in)
C Standard (New): 5.485 – 5.495 mm (0.2159 – 0.2163 in)
C Service Limit: 5.445 mm (0.2148 in)
D Standard (New): 0.85 – 1.15 mm (0.033 – 0.045 in)
D Service Limit: 0.65 mm (0.026 in)

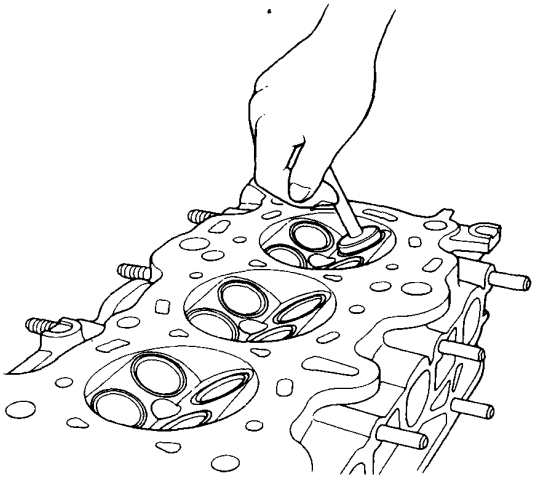
Exhaust Valve Dimensions
A Standard (New): 28.90 – 29.10 mm (1.138 – 1.146 in)
B Standard (New): 108.30 – 108.80 mm (4.264 – 4.283 in)
C Standard (New): 5.450 – 5.460 mm (0.2146 – 0.2150 in)
C Service Limit: 5.420 mm (0.2134 in)
D Standard (New): 1.05 – 1.35 mm (0.041 – 0.053 in)
D Service Limit: 0.95 mm (0.037 in)

Valve Seats

Reconditioning

1. Renew the valve seats in the cylinder head using a valve seat cutter.

   NOTE: If guides are worn (page 6-42), replace them (page 6-43) before cutting the valve seats.

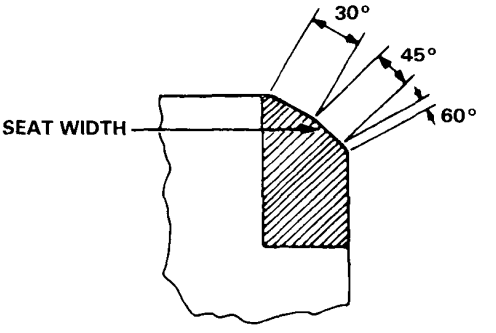


2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.

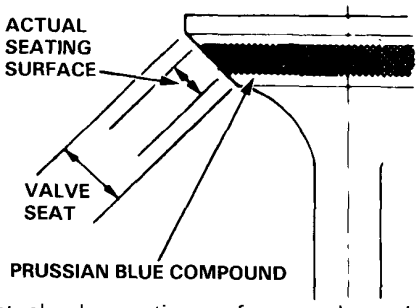
3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check width of seat and adjust accordingly.

4. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutter.

   Valve Seat Width:
   Standard (New): 1.25 – 1.55 mm (0.049 – 0.061 in)
   Service Limit: 2.00 mm (0.079 in)



5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert valve in original location in the head, then lift it and snap it closed against the seat several times.



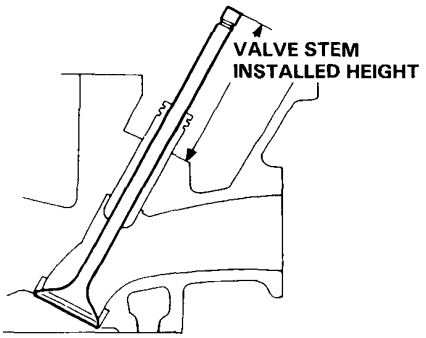
6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
   - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
   - If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

   NOTE: The final cut should always be made with the 45° cutter.

7. Insert intake and exhaust valves in the head and measure valve stem installed height.

   Except F22B1 engine:
   Intake Valve Stem Installed Height:
   Standard (New): 48.08 – 48.88 mm (1.893 – 1.924 in)
   Service Limit: 49.13 mm (1.934 in)
   Exhaust Valve Stem Installed Height:
   Standard (New): 50.15 – 50.95 mm (1.974 – 2.006 in)
   Service Limit: 51.20 mm (2.016 in)

   F22B1 engine:
   Intake Valve Stem Installed Height:
   Standard (New): 46.75 – 47.55 mm (1.841 – 1.872 in)
   Service Limit: 47.80 mm (1.882 in)
   Exhaust Valve Stem Installed Height:
   Standard (New): 46.68 – 47.48 mm (1.838 – 1.869 in)
   Service Limit: 47.73 mm (1.879 in)



8. If valve stem installed height is over the service limit, replace the valve and recheck. If still over the service limit, replace the cylinder head; the valve seat in the head is too deep.

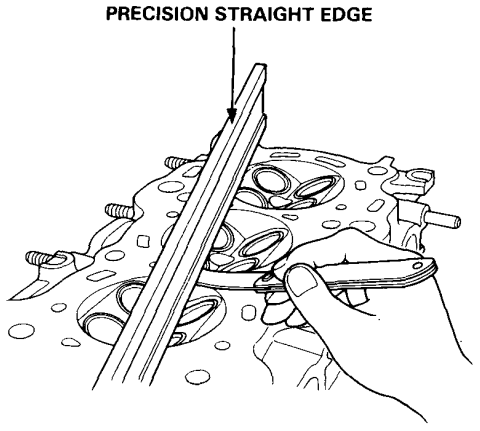
Cylinder Head

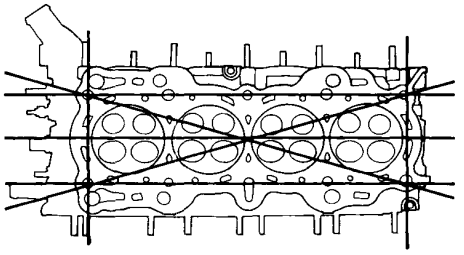
Warpage

NOTE: If camshaft-to-holder oil clearance (page 6-37) is not within specification, the cylinder head cannot be resurfaced.

If camshaft-to-holder oil clearances are within specifications, check the cylinder head for warpage.

- If warpage is less than 0.05 mm (0.002 in) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 100 mm (3.94 in).





Measure along edges, and three ways across center.

Cylinder Head Height:
Standard (New): 99.95 – 100.05 mm (3.935 – 3.939 in)

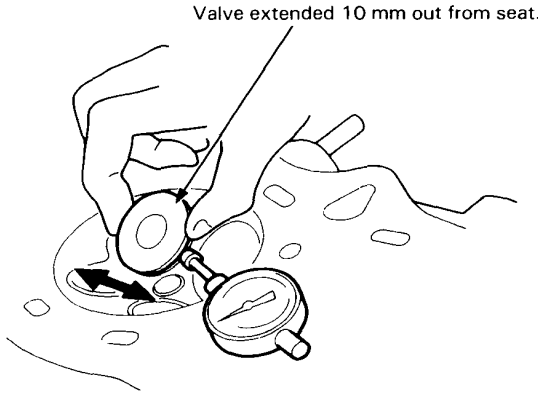
Valve Guides

Valve Movement

Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).

Intake Valve Stem-to-Guide Clearance:
Standard (New): 0.04 – 0.09 mm (0.002 – 0.004 in)
Service Limit: 0.16 mm (0.006 in)

Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.11 – 0.16 mm (0.004 – 0.006 in)
Service Limit: 0.24 mm (0.009 in)



- If measurement exceeds the service limit, recheck using a new valve.
- If measurement is now within service limit, reassemble using a new valve.
- If measurement still exceeds limit, recheck using alternate method below, then replace valve and guide, if necessary.

NOTE: An alternate method of checking guide to stem clearance is to subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge.
Take the measurements in three places along the valve stem and three places inside the valve guide.
The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

Intake Valve Stem-to-Guide Clearance:
Standard (New): 0.020 – 0.045 mm (0.0008 – 0.0018 in)
Service Limit: 0.08 mm (0.003 in)

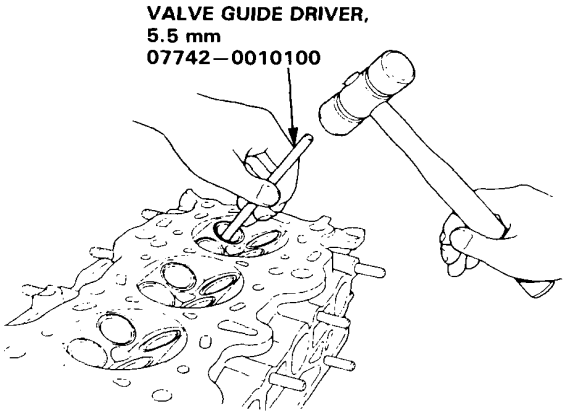
Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.055 – 0.080 mm (0.0022 – 0.0031 in)
Service Limit: 0.12 mm (0.005 in)

Replacement

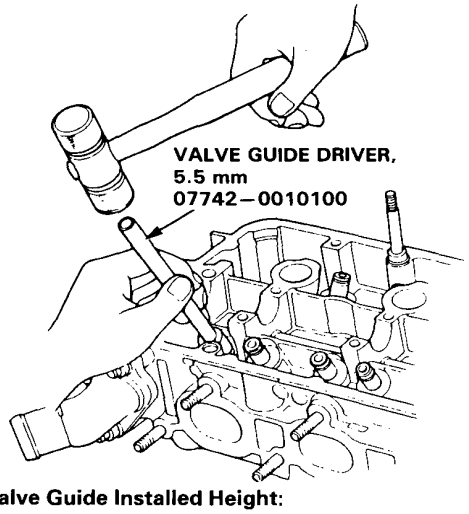
NOTE:
- For best results, heat cylinder head to 150°C (300°F) before removing or installint guides.
- It may be necessary to use an air hammer to remove some valve guides.

CAUTION: *To avoid burns, use heavy gloves when handling heated cylinder head.*

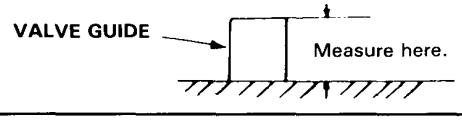
1. Drive the valve guide out from the bottom of the cylinder head.



2. Drive in a new valve guide to the specified depth.



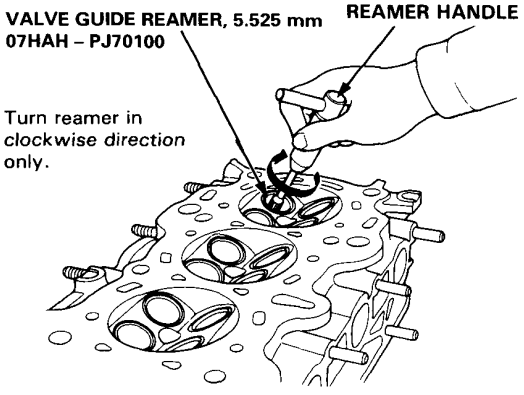
Valve Guide Installed Height:
Except F22B1 engine:
Intake: 23.50 – 24.50 mm (0.925 – 0.965 in)
Exhaust: 14.80 – 15.80 mm (0.583 – 0.622 in)
F22B1 engine:
Intake: 21.20 – 22.20 mm (0.835 – 0.874 in)
Exhaust: 20.63 – 21.63 mm (0.812 – 0.852 in)



Reaming

NOTE: For new valve guides only.

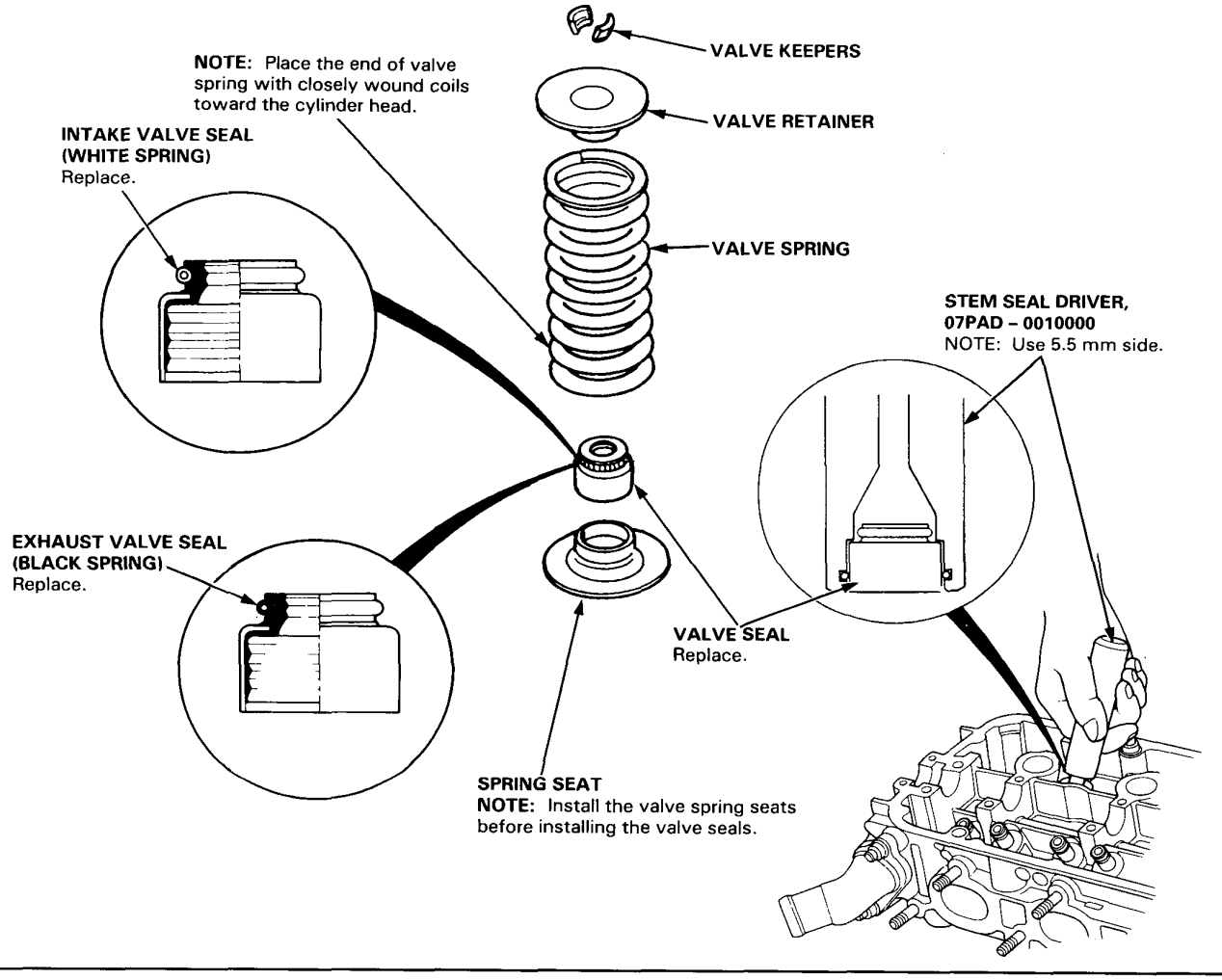
1. Coat both reamer and valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check clearance with a valve (see page 6-13).
   — Verify that the valve slides in the intake and exhaust valve guides without exerting pressure.



Valves, Valve Springs and Valve Seals

Installation Sequence

NOTE: Exhaust and intake valve seals are NOT interchangeable.

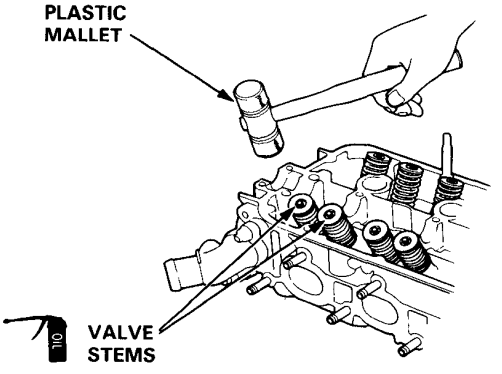


Valve Installation

When installing valves in cylinder head, coat valve stems with oil before inserting into valve guides, and make sure valves move up and down smoothly.

When valves and springs are in place, lightly tap the end of each valve stem two or three times with a plastic mallet to ensure proper seating of valve and valve keepers.

NOTE: Tap the valve stem only along its axis so you do not bend the stem.

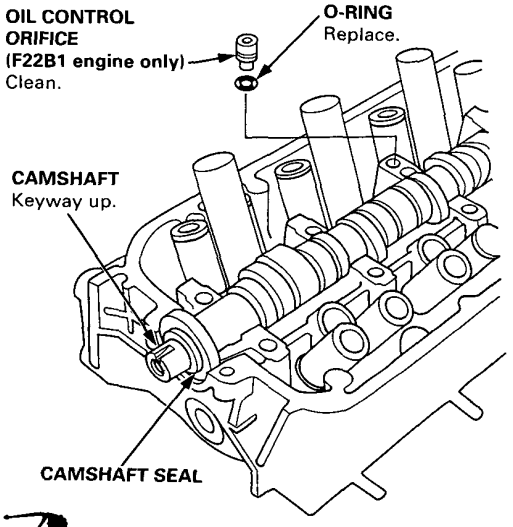


Installation

CAUTION:
- **Make sure that all rockers are in alignment with valves when torquing rocker assembly bolts.**
- **Valve locknuts should be loosened and adjusting screws backed off before installation.**
- **To prevent rocker arm assembly from coming apart, leave camshaft holder bolts in the holes.**

1. After wiping down the camshaft, camshaft seal and journals in the cylinder head, lubricate both surfaces and install the camshaft.

2. Clean and install the oil control orifice with a new O-ring (F22B1 engine only).

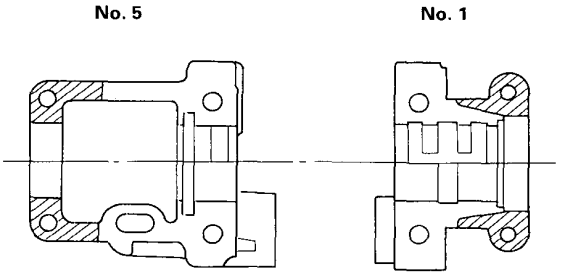


OIL Lubricate cam lobes after reassembly.

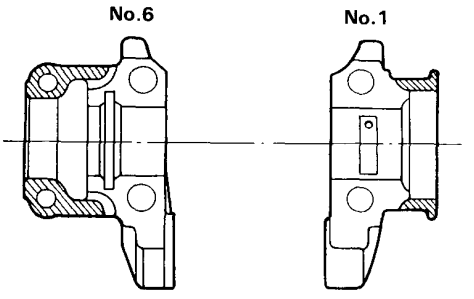
3. Turn the camshaft until its keyway is facing up. (No. 1 piston TDC).

4. Apply liquid gasket to the head mating surfaces of the No. 1 and No. 5 or No. 6 camshaft holders.
   — Apply liquid gasket to the shaded areas.

Except F22B1 engine:



F22B1 engine:



5. Set the rocker arm assembly in place and loosely install the bolts.
   — Make sure that the rocker arms are properly positioned on the valve stems.

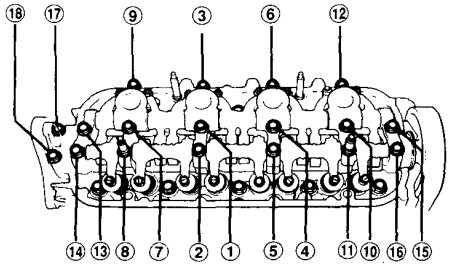
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Installation (cont'd)

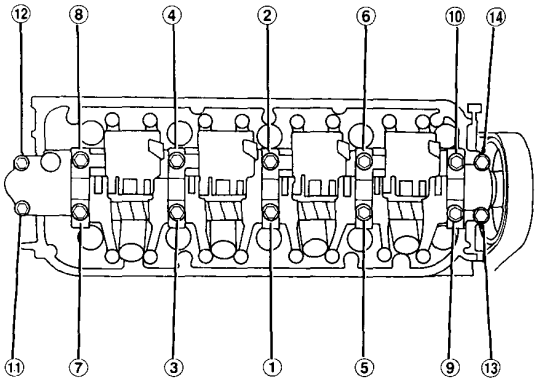
6. Tighten each bolt two turns at a time in the sequence shown below to ensure that the rockers do not bind on the valves.

Specified torque:
8 mm bolts: 22 N·m (2.2 kgf·m, 16 lbf·t)
6 mm bolts: 12 N·m (1.2 kgf·m, 8.7 lbf·t)

Except F22B1 engine:
6 mm bolts: ③, ⑥, ⑨, ⑫, ⑰, ⑱

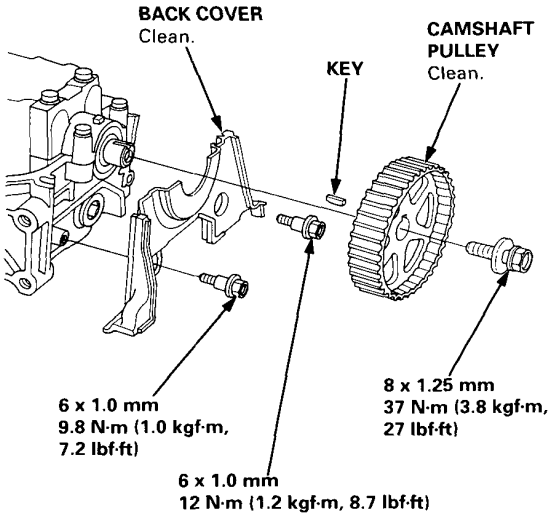


F22B1 engine:
6 mm bolts: ⑪, ⑫, ⑬, ⑭



7. Install the back cover.

8. Install the key and the camshaft pulley onto the camshaft, then tighten the retaining bolt to *the* torque shown.



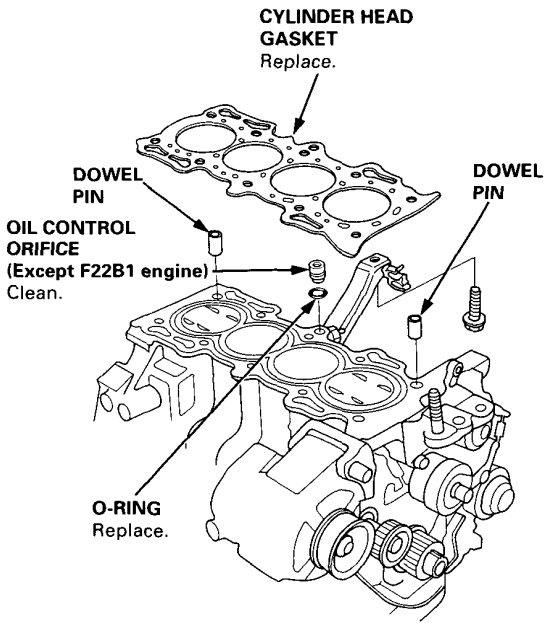
Installation

Install the cylinder head in the reverse order of removal:

NOTE:
- Always use a new head gasket.
- Cylinder head and cylinder block surface must be clean.
- "UP" mark on camshaft pulley should be at the top.
- Turn the crankshaft so the No. 1 piston is at TDC (see page 6-22).
- Clean the oil control orifice before installing.
- Do not use the upper cover and lower cover for storing items disassembled.
- Clean the upper cover and lower cover before installation.

1. Cylinder head dowel pins must be aligned.

2. Install the oil control orifice (Except F22B1 engine).



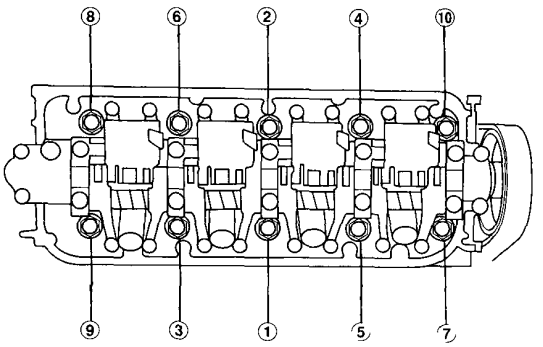
3. Position the camshaft correctly (see page 6-22).

4. Tighten the cylinder head bolts sequentially in three steps.

1st step torque: 39 N·m (4.0 kgf·m, 29 lbf·ft)
2nd step torque: 69 N·m (7.0 kgf·m, 51 lbf·ft)
3rd step torque: 98.1 N·m (10.0 kgf·m, 72.3 lbf·ft)

NOTE:
- We recommend using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten.
- If a bolt makes any noise while you are torquing it, loosen the bolt, and retighten it from the 1st step.

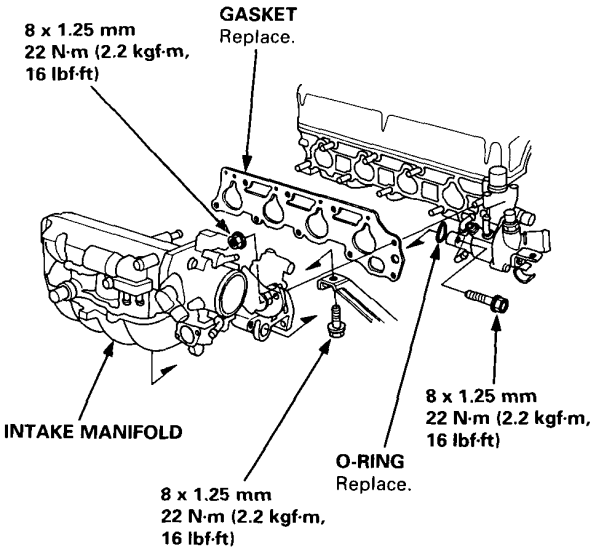
CYLINDER HEAD BOLTS TORQUE SEQUENCE



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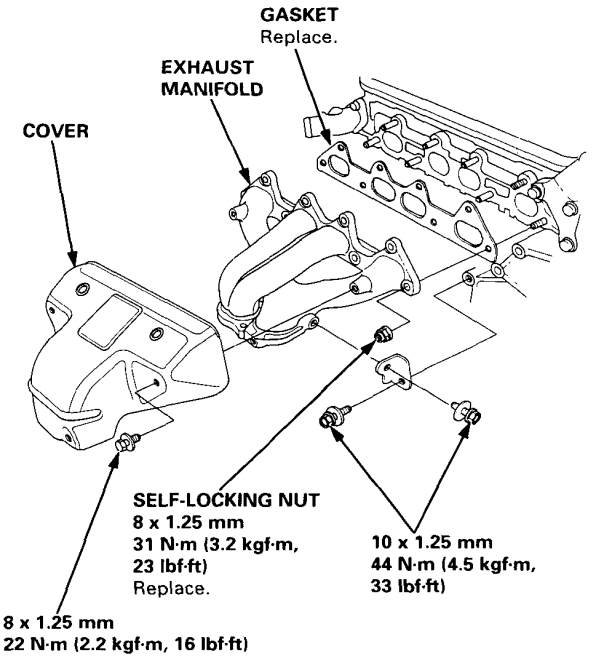
Installation (cont'd)

5. Install the intake manifold and tighten the nuts in a crisscross pattern in 2 or 3 steps, beginning with the inner nuts.
   - Always use a new intake manifold gasket.



6. Install the exhaust manifold and tighten the nuts in a crisscross pattern in 2 or 3 steps, beginning with the inner nut.
   - Always use a new exhaust manifold gasket.

7. Install the exhaust manifold bracket, then install the exhaust pipe A and the bracket, and then install the cover.

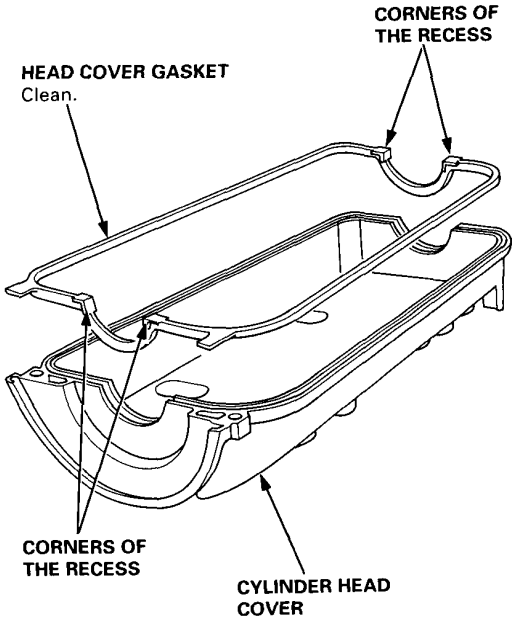


8. Install the timing belt (see page 6-21).

9. Adjust the valve clearance (see page 6-13).

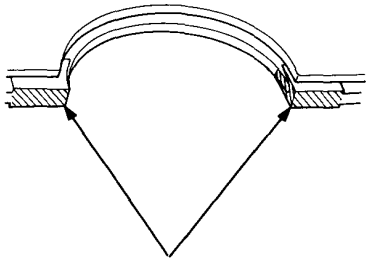
10. Install the head cover gasket in the groove of the cylinder head cover. Seat the recesses for the camshaft first, then work it into the groove around the outside edges.

    NOTE:
    - Before installing the head cover gasket, thoroughly clean the seal and the groove.
    - When installing, make sure the head cover gasket is seated securely in the corners of the recesses with no gap.



11. Apply liquid gasket to the head cover gasket at the four corners of the recesses.

    NOTE:
    - Use liquid gasket, Part No. 0Y740 – 99986.
    - Check that the mating surfaces are clean and dry before applying liquid gasket.
    - Do not install the parts if 5 minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
    - After assembly, wait at least 20 minutes before filling the engine with oil.



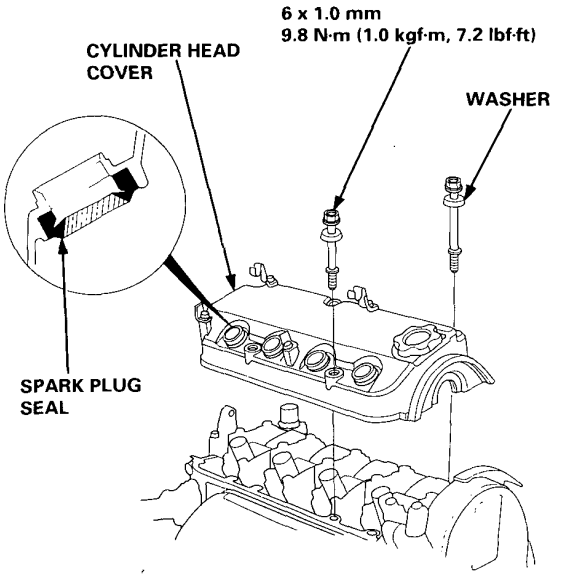
Apply liquid gasket to the shaded areas.

(cont'd)

Installation (cont'd)

12. When installing the cylinder head cover, hold the head cover gasket in the groove by placing your fingers on the camshaft contacting surfaces (top of the semicircles).
    Set the spark plug seal on the spark plug pipe (F22B1 engine only).
    Once the cylinder head cover is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.

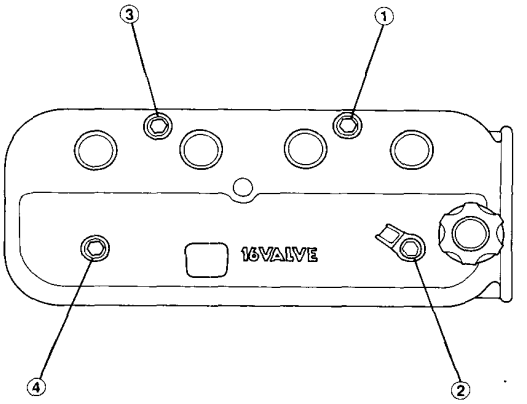
    NOTE:
    - Before installing the cylinder head cover, clean the cylinder head contacting surfaces with a shop towel.
    - Do not touch the parts where liquid gasket was applied.
    - Take care not to damage the spark plug seal when installing the cylinder head cover (F22B1 engine only).
    - Visually check the spark plug seal for damage (F22B1 engine only)
    - Replace the washer when damaged or deteriorated.



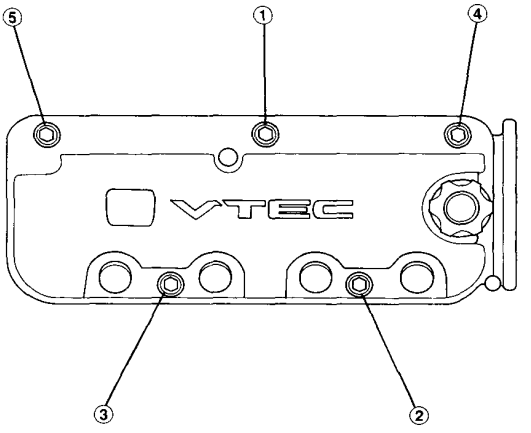
13. Tighten the nuts in 2 or 3 steps. In the final step, tighten all nuts, in sequence, to 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft).

    NOTE: After assembly, wait at least 20 minutes before filling the engine with oil.

Except F22B1 engine:



F22B1 engine:



14. After installation, check that all tubes, hoses and connectors are installed correctly.

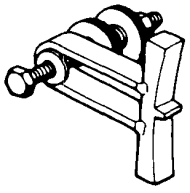
Engine Block

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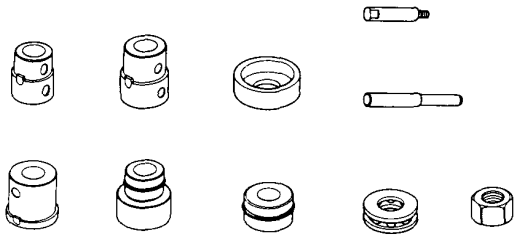
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAB – PV00100	Ring Gear Holder	1	7-7
②	07LAF – PT20100	Bearing Replacement Tool Set	1	7-32
③	07LAG – PT20100	Balancer shaft Lock Pin	1	7-12, 27
④	07PAF – 0010000	Piston Pin Assembly Tool Set	1	7-18, 19
④-1	07PAF – 0010680	Pilot Collar, O.D. 22 mm	1	7-18, 19
⑤	07749 – 0010000	Handle Driver	1	7-24
⑥	07948 – SB00101	Driver Attachment, 96 mm	1	7-24

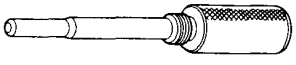




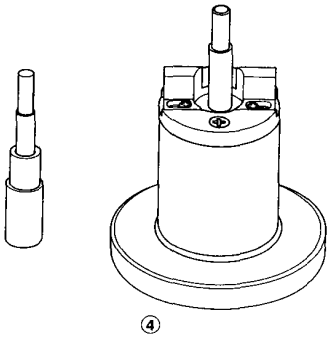
①



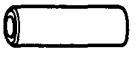
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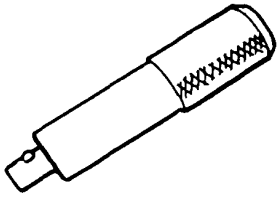
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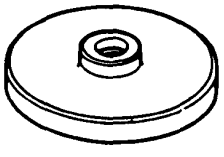
④



④-1



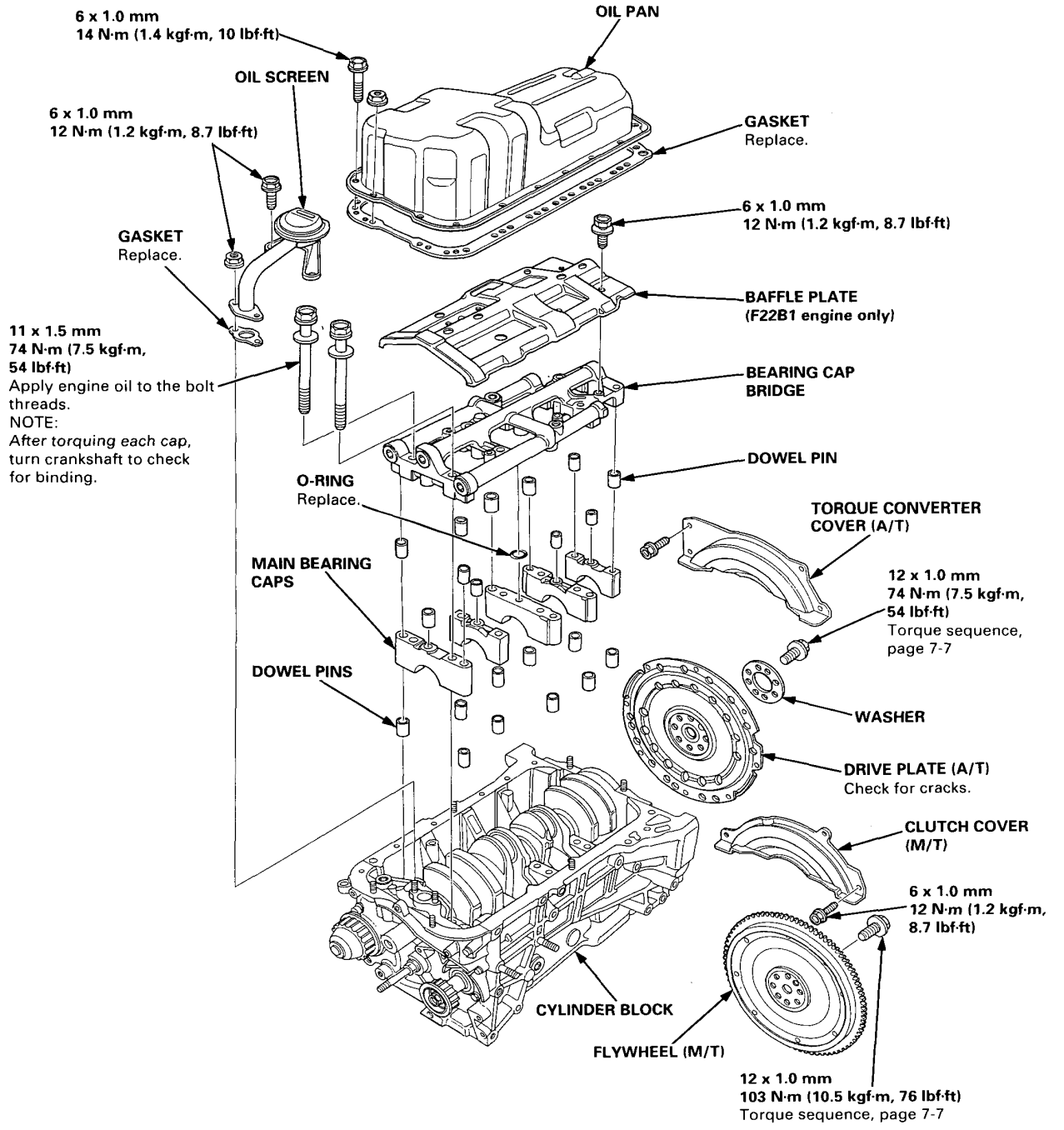
⑤



⑥

Lubricate all internal parts with engine oil during reassembly.

NOTE:
- Clean the oil pan gasket mating surfaces before installing it.
- Apply liquid gasket to the recesses of oil pan gasket (see page 7-28).



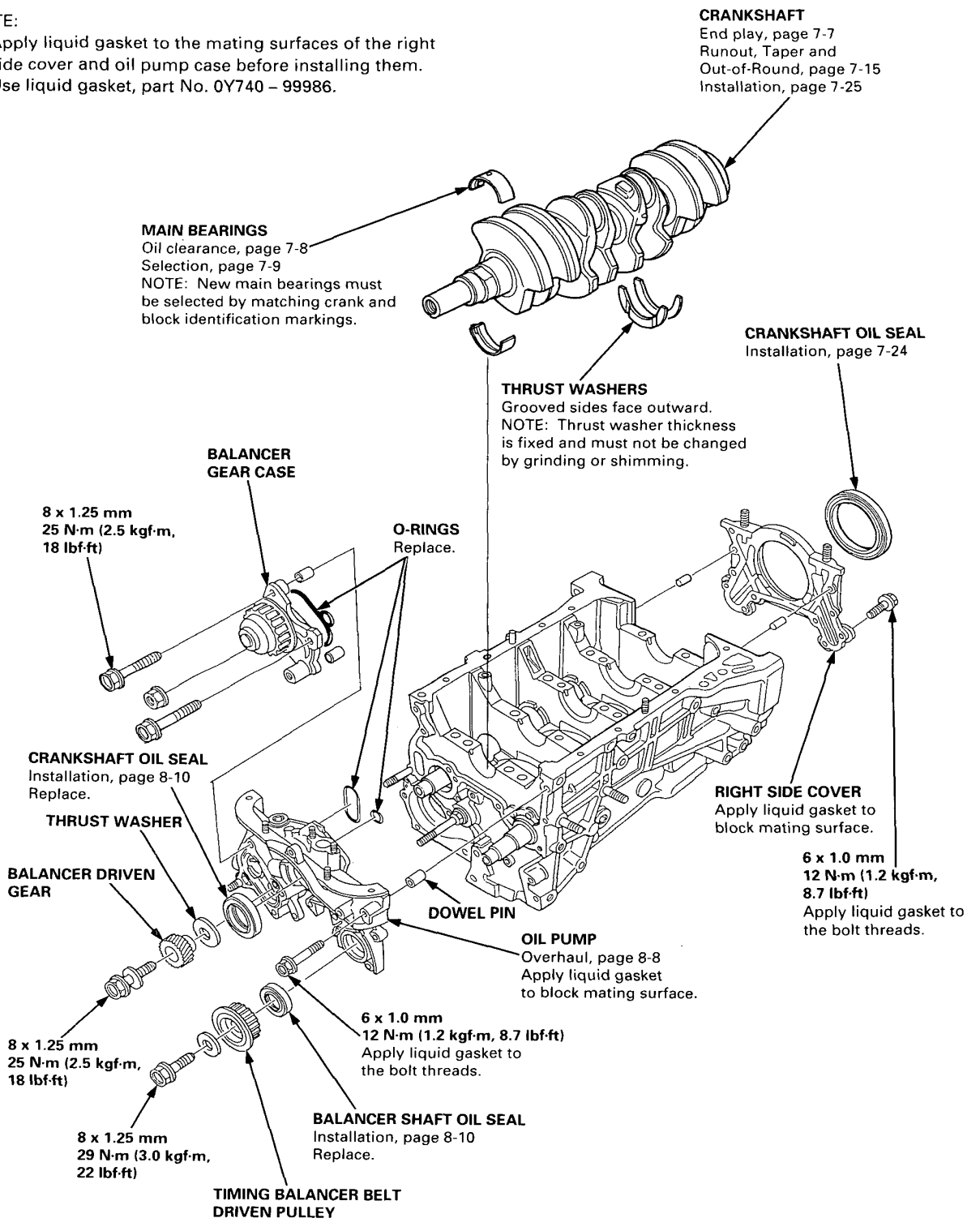
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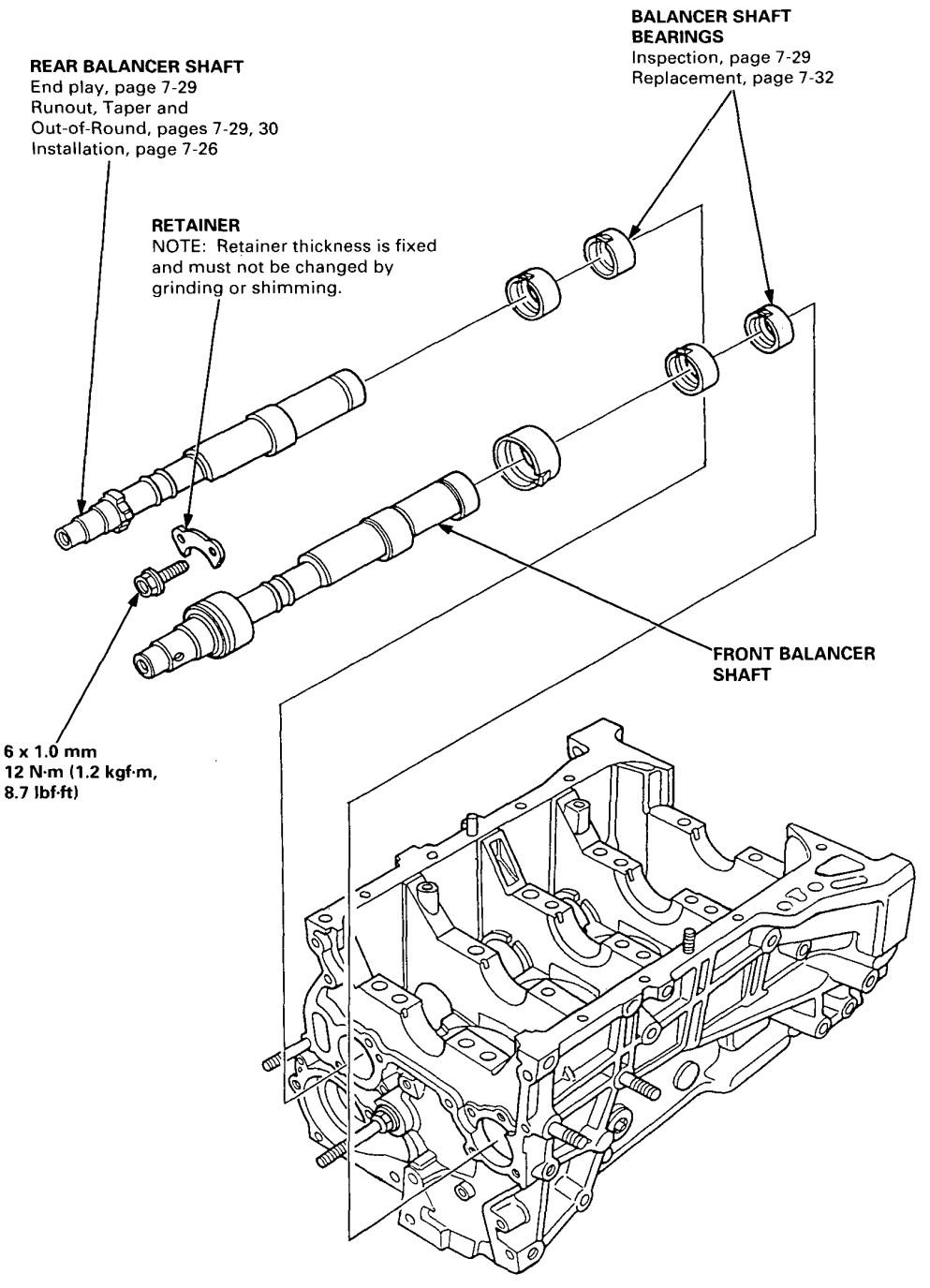
Illustrated Index

(cont'd)

Lubricate all internal parts with engine oil during reassembly.

NOTE:
- Apply liquid gasket to the mating surfaces of the right side cover and oil pump case before installing them.
- Use liquid gasket, part No. 0Y740 – 99986.




BALANCER SHAFT BEARINGS
Inspection, page 7-29
Replacement, page 7-32
REAR BALANCER SHAFT
End play, page 7-29
Runout, Taper and
Out-of-Round, pages 7-29, 30
Installation, page 7-26
RETAINER
NOTE: Retainer thickness is fixed and must not be changed by grinding or shimming.
FRONT BALANCER SHAFT
6 x 1.0 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

(cont'd)

Illustrated Index

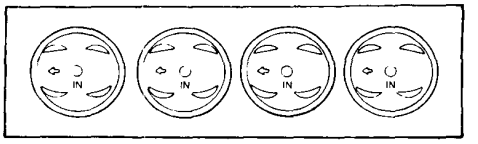
(cont'd)

Lubricate all internal parts with engine oil during reassembly.

NOTE: New rod bearings must be selected by matching connecting rod and crankshaft identification markings (see pages 7-10, 11).

PISTON INSTALLATION DIRECTION

EXHAUST

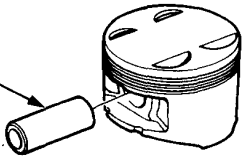


INTAKE

PISTON RINGS
Replacement, page 7-22
Measurement, pages 7-21, 22
Alignment, page 7-23



PISTON PIN
Removal, page 7-18
Installation, page 7-19
Inspection, page 7-20

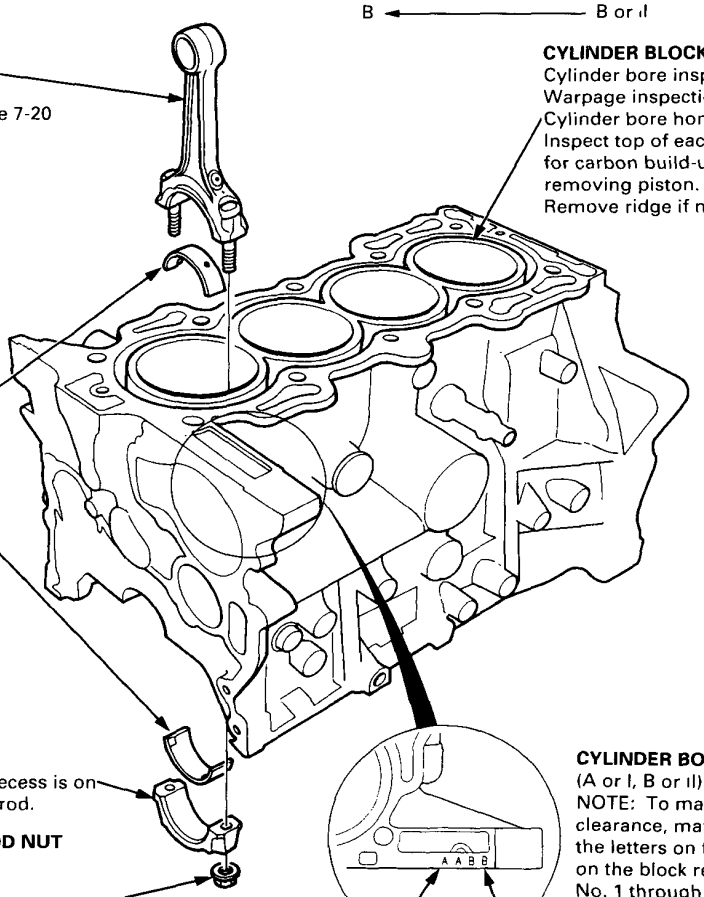


PISTON
Removal, page 7-12
Measurement, page 7-16
NOTE: To maintain proper clearance, match the letter on the piston top with the letter for each cylinder stamped on the block.

On the piston top	On the block
No letter	A or I
B	B or II

CONNECTING ROD
End play, page 7-7
Selection, page 7-19
Small end measurement, page 7-20

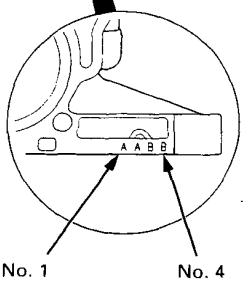
CYLINDER BLOCK
Cylinder bore inspection, page 7-17
Warpage inspection, page 7-17
Cylinder bore honing, page 7-18
Inspect top of each cylinder bore for carbon build-up or ridge before removing piston.
Remove ridge if necessary, page 7-14



CONNECTING ROD BEARINGS
Clearance, page 7-10
Selection, page 7-11

CONNECTING ROD BEARING CAP
Installation, page 7-25
NOTE: Install cap so the bearing recess is on the same side as the recess in the rod.

CONNECTING ROD NUT
F20B3 engine:
8 x 0.75 mm
32 N·m (3.3 kgf·m, 24 lbf·ft)
Except F20B3 engine:
9 x 0.75 mm
46 N·m (4.7 kgf·m, 34 lbf·ft)
After torquing each bearing cap, rotate crankshaft to check for binding.



CYLINDER BORE SIZES
(A or I, B or II)
NOTE: To maintain proper piston clearance, match these letters with the letters on the pistons. The letters on the block read from left to right, No. 1 through No. 4 cylinders.

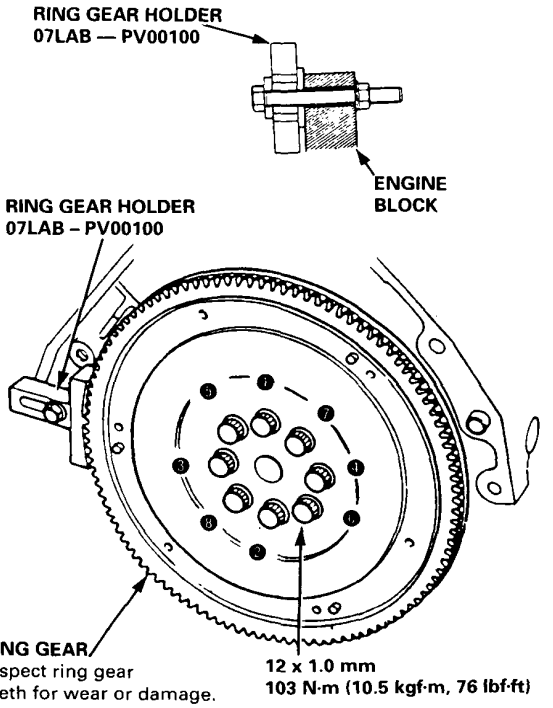
On the block	On the piston top
A or I	No letter
B or II	B

Flywheel and Drive Plate

Replacement

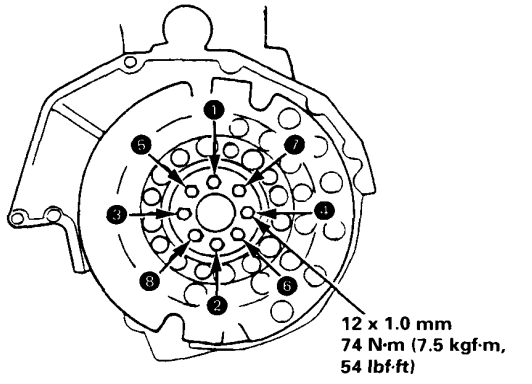
Manual Transmission:

Remove the eight flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Automatic Transmission:

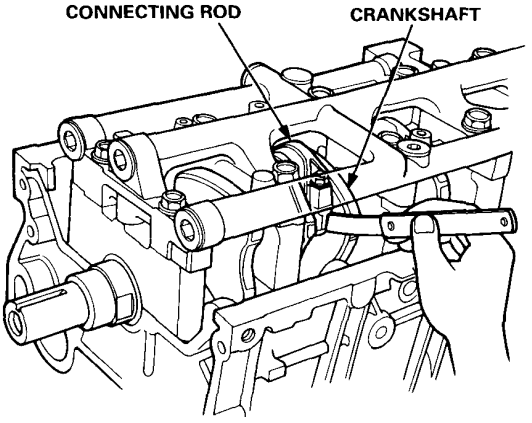
Remove the eight drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Connecting Rod and Crankshaft

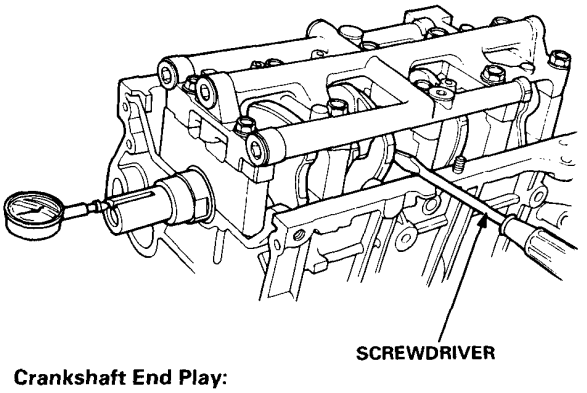
End Play

Connecting Rod End Play:
Standard (New): 0.15 – 0.30 mm (0.006 – 0.012 in)
Service Limit: 0.40 mm (0.016 in)



- *If out-of-tolerance, install a new connecting rod.*
- If still out-of-tolerance, replace the crankshaft (see pages 7-12 and 7-25).

Push the crankshaft firmly away from the dial indicator, and zero the dial against the end of the crankshaft. Then pull the crankshaft firmly back toward the indicator; dial reading should not exceed service limit.



Crankshaft End Play:
Standard (New): 0.10 – 0.35 mm (0.004 – 0.014 in)
Service Limit: 0.45 mm (0.018 in)

- If end play is excessive inspect the thrust washers and thrust surface on the crankshaft. Replace parts as necessary.

NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming.
Thrust washers are installed with grooved sides facing outward.

Main Bearings

Clearance

1. To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.

2. Clean each main journal and bearing half with a clean shop towel.

3. Place one strip of plastigage across each main journal.

   NOTE: If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crankshaft and flywheel will flatten the plastigage further than just the torque on the cap bolt and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights, and check only one bearing at a time.

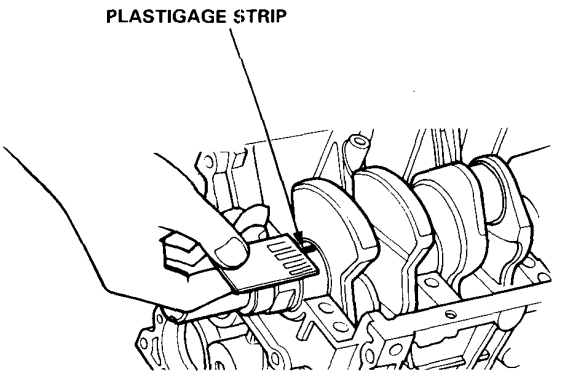
4. Reinstall the bearings and caps, then torque the bolts.

   74 N·m (7.5 kgf·m, 54 lbf·ft)

   NOTE: Do not rotate the crankshaft during inspection.

5. Remove the cap and bearings again, and measure the widest part of the plastigage.

   Main Bearing-to-Journal Oil Clearance:
   Standard (New):
   No. 2 0.021 – 0.045 mm (0.0008 – 0.0018 in)
   Service Limit: 0.050 mm (0.0020 in)
   No. 3 0.025 – 0.049 mm (0.0010 – 0.0019 in)
   Service Limit: 0.055 mm (0.0022 in)
   No. 1 and 4 0.013 – 0.037 mm (0.0005 – 0.0015 in)
   Service Limit: 0.050 mm (0.0020 in)
   No. 5 0.009 – 0.033 mm (0.0004 – 0.0013 in)
   Service Limit: 0.040 mm (0.0016 in)



6. If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.

   CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.

7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again.

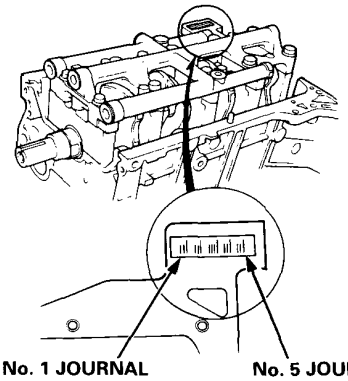
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

Selection

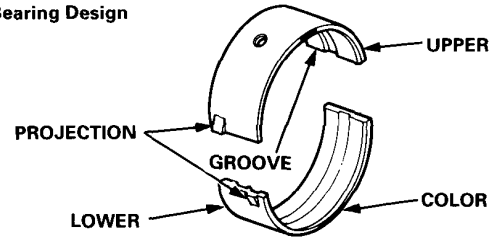
CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Crankshaft Bore Code Location (Numbers, Letters or Bars)

Numbers or Letters or Bars have been stamped on the end of the block as a code for the size of each of the 5 main journal bores.
Use them, and the numbers stamped on the crankshaft (codes for main journal size), to choose the correct bearings.



Bearing Design



Bearing Identification

Color code is on the edge of the bearing.

Smaller main journal	Smaller bearing (Thicker)
1 or I	
2 or II	
3 or III	
4 or IIII	
5 or IIIII	
6 or IIIIII	

→ Larger crank bore

1 or A or I	2 or B or II	3 or C or III	4 or D or IIII
Pink	Pink/ Yellow	Yellow	Yellow/ Green
Pink/ Yellow	Yellow	Yellow/ Green	Green
Yellow	Yellow/ Green	Green	Green/ Brown
Yellow/ Green	Green	Green/ Brown	Brown
Green	Green/ Brown	Brown	Brown/ Black
Green/ Brown	Brown	Brown/ Black	Black

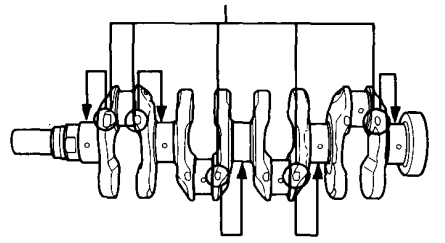
→ Smaller bearing (Thicker)

NOTE: When using bearing halves of *different colors, it does not matter* which color is used in the top or bottom.

Main Journal Code Locations (Numbers or Bars)

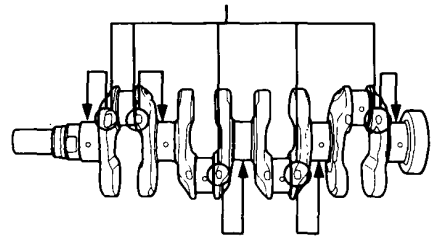
F20B3 engine:

Main Journal Code Locations (Numbers or Bars)

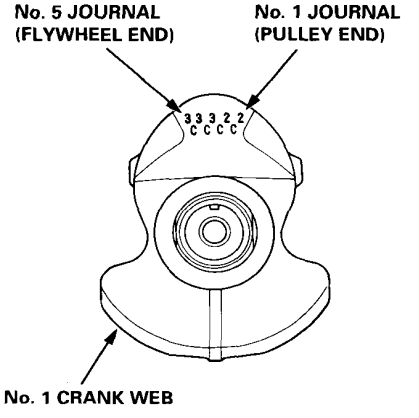


Except F20B3 engine:
The Main Journal Codes are stamped in one of the following locations.

Main Journal Code Locations (Numbers or Bars)



***Main Journal Code Locations* (Numbers or Bars)**



Connecting Rod Bearings

Clearance

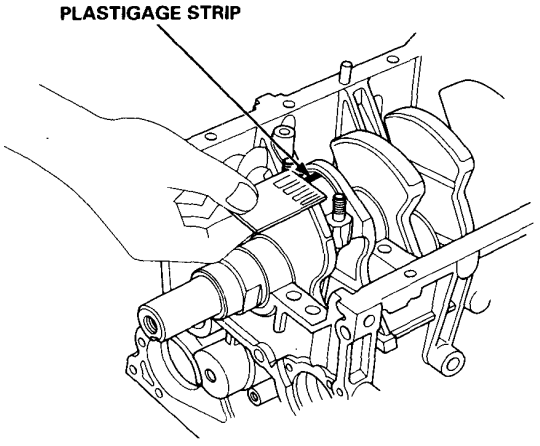
1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts to:

   F20B3 engine:
   32 N·m (3.3 kgf·m, 24 lbf·ft)
   Except F20B3 engine:
   46 N·m (4.7 kgf·m, 34 lbf·ft)

   NOTE: Do not rotate the crankshaft during inspection.

5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

   Connecting Rod Bearing-to-Journal Oil Clearance:
   F20B3 engine:
   Standard (New): 0.015 – 0.043 mm (0.0006 – 0.0017 in)
   Service Limit: 0.050 mm (0.0020 in)
   Except F20B3 engine:
   Standard (New): 0.021 – 0.049 mm (0.0008 – 0.0019 in)
   Service Limit: 0.06 mm (0.002 in)



6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.

   CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.

7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

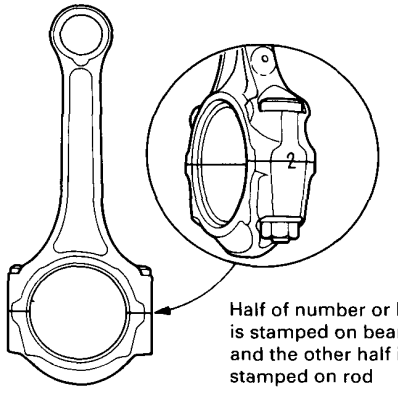
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

Selection

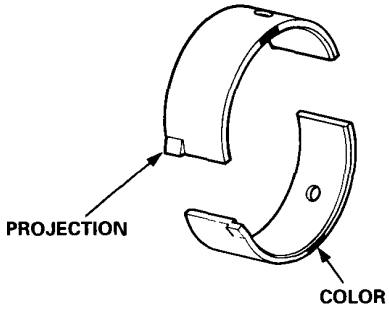
CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Connecting Rod Journal Code Locations (Numbers or Bars)

Numbers or Bars have been stamped on the side of each connecting rod as a code for the size of the big end. Use it, and the letters or bars stamped on the crank (codes for rod journal size), to choose the correct bearings.



Bearing Design



Bearing Identification
Color code is on the edge of the bearing.

Larger big end bore →

1 or I	2 or II	3 or III	4 or IIII

Smaller bearing (Thicker) →

A or I	Red	Pink	Yellow	Green
B or II	Pink	Yellow	Green	Brown
C or III	Yellow	Green	Brown	Black
D or IIII	Green	Brown	Black	Blue

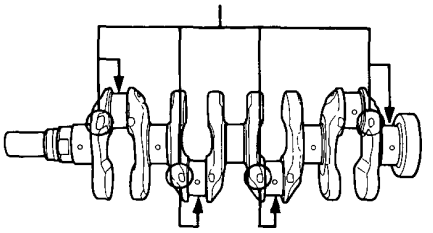
Smaller rod journal ↓

Smaller bearing (Thicker) ↓

Connecting Rod Journal Code Locations (Letters or Bars)

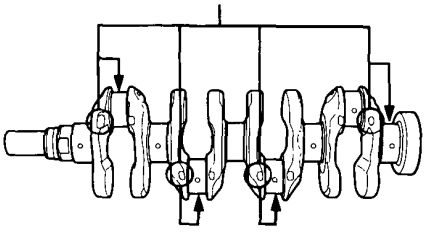
F20B3 engine:

Connecting Rod Journal Code Locations (Letters or Bars)

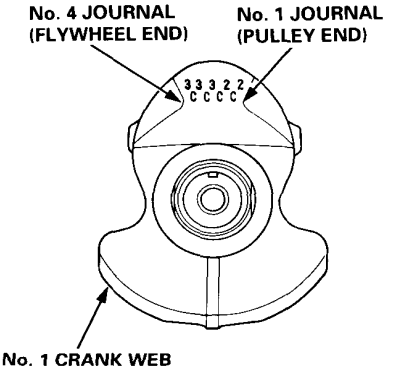


Except F20B3 engine:
The Connecting Rod Journal Codes are stamped in one of the following locations.

Connecting Rod Journal Code Locations (Letters or Bars)

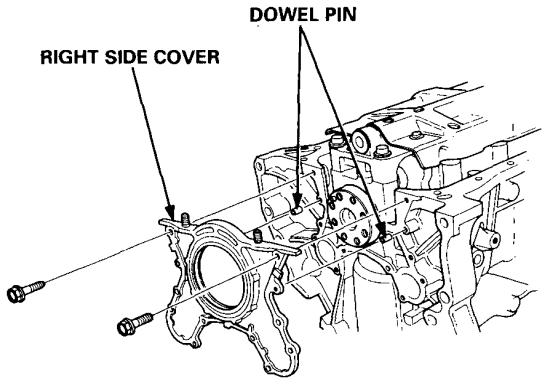


***Connecting* Rod Journal Code Locations (Letters or Bars)**

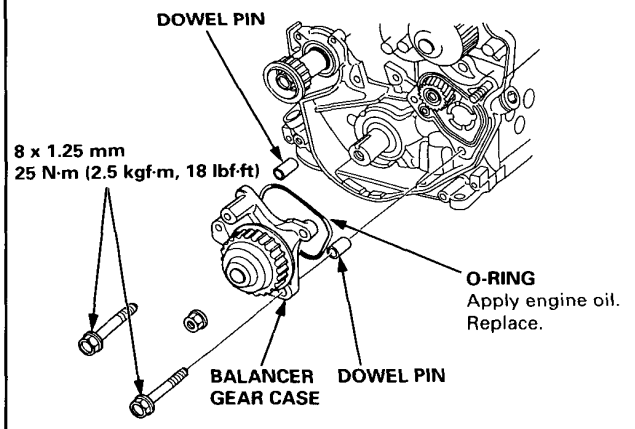


Removal

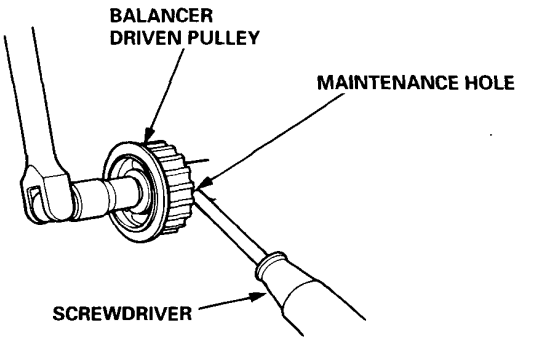
1. Remove the right side cover.



2. Remove the balancer gear case.

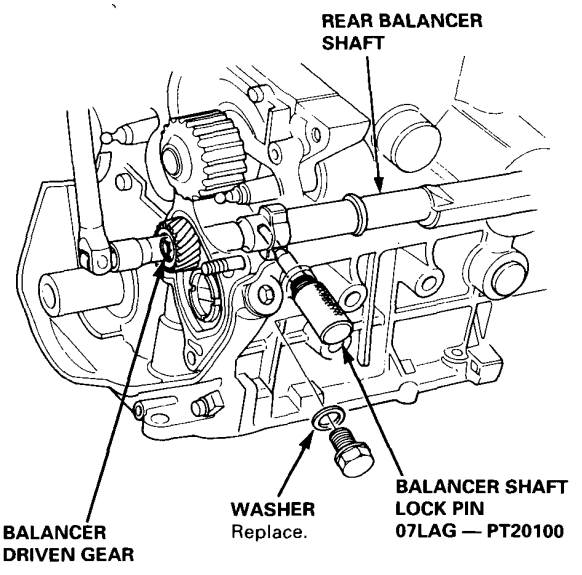


3. Remove the front balancer driven pulley as shown.



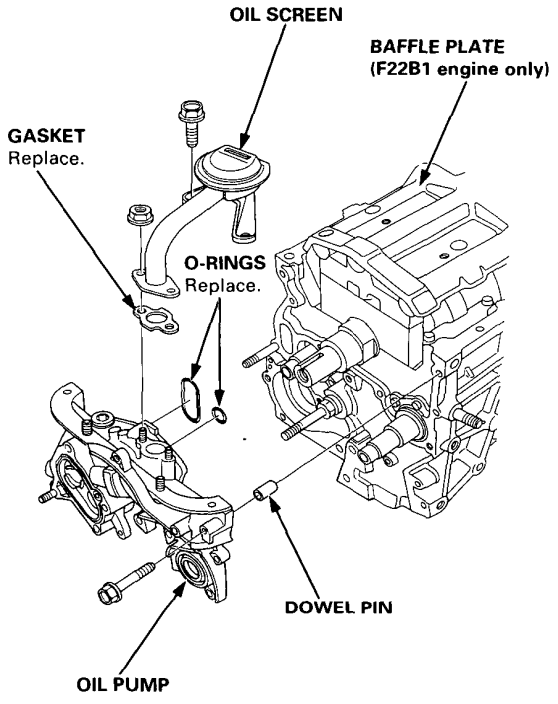
4. Align the bolt hole and the balancer shaft hole, then insert a special tool to hold the rear balancer shaft.

5. Remove the bolt and the balancer driven gear.



6. Remove the oil screen and the oil pump.

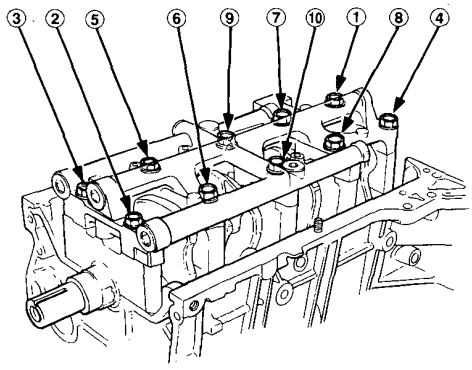
7. Remove the baffle plate (F22B1 engine only).



8. Remove the bolts and the bearing cap bridge, then remove the bearing caps.

CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

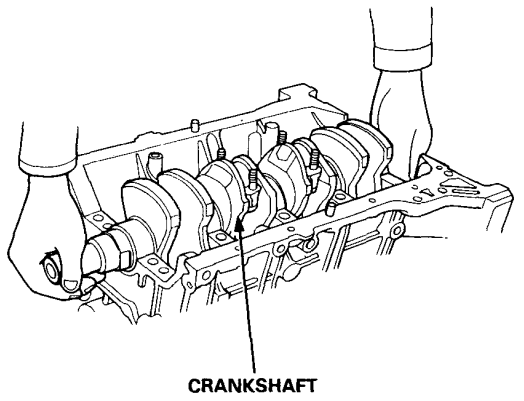
MAIN BEARING CAP BOLTS LOOSENING SEQUENCE



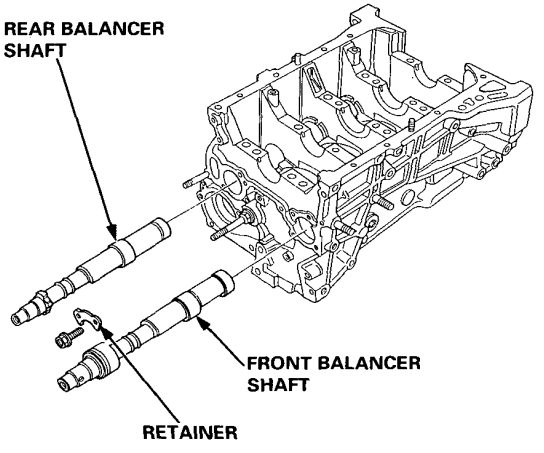
(cont'd)

Removal (cont'd)

9. Turn the crankshaft so No. 2 and 3 crankpins are at the top.
10. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.
11. Lift the crankshaft out of the engine, being careful not to damage journals.

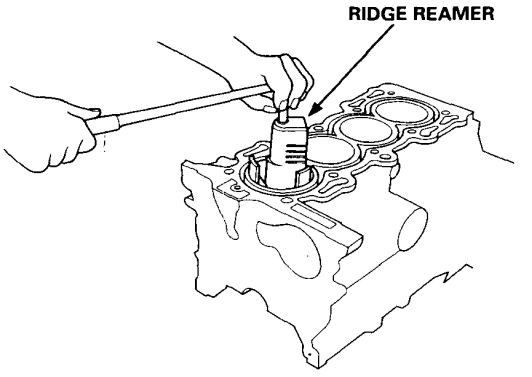


12. Remove the bolts and the retainer, then remove the front balancer shaft and the rear balancer shaft.

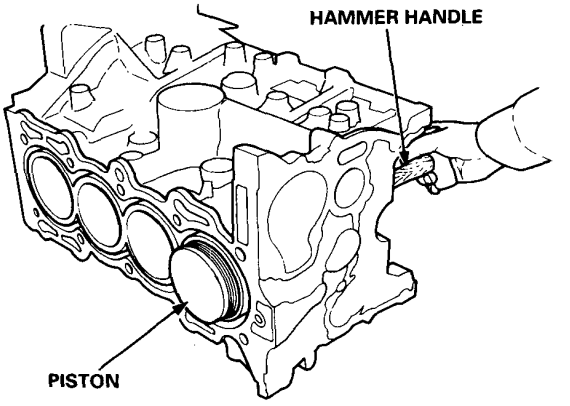


13. Remove the upper bearing halves from the connecting rods and set them aside with their respective caps.
14. Reinstall the main caps and bearings on the engine in proper order.
15. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow the reamer manufacturer's instructions.

CAUTION: If the ridge is not removed, it may damage the pistons as they are pushed out.



16. Use the wooden handle of a hammer to drive the pistons out.



17. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.
18. Mark each piston/connecting rod assembly with its cylinder number to avoid mixup on reassembly.

NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

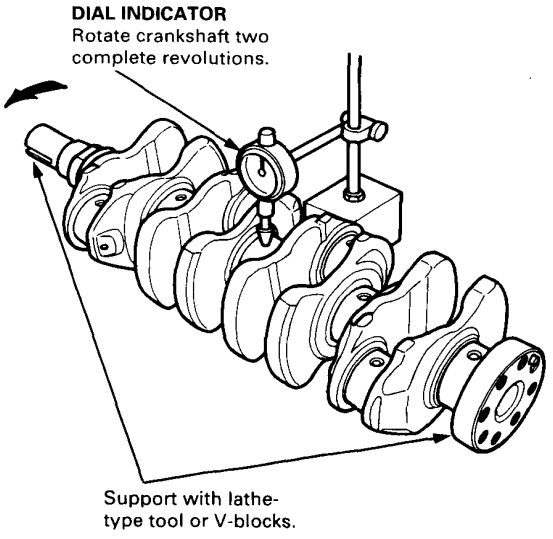
Inspection

- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

Alignment

- Measure runout on all main journals to make sure the crank is not bent.
- The difference between measurements on each journal must not be more than the service limit.

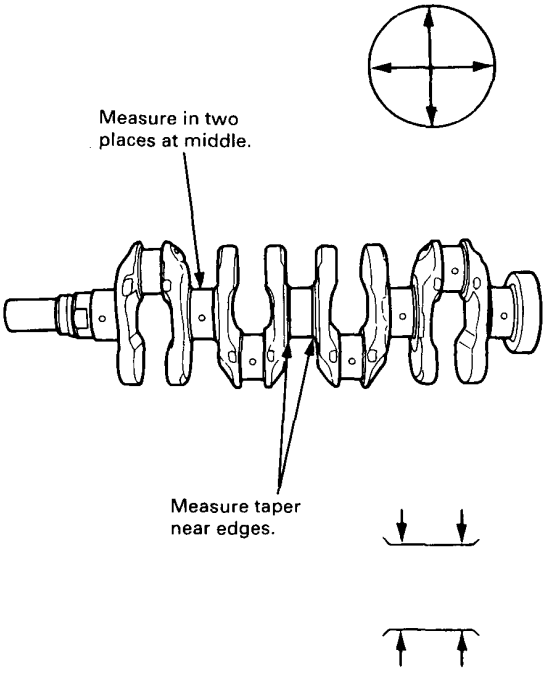
Crankshaft Total Indicated Runout:
Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.04 mm (0.002 in)



Out-of-Round and Taper

- Measure out-of-round at the middle of each rod and main journal in two places.
- The difference between measurements on each journal must not be more than the service limit.

Journal Out-of-Round:
Standard (New): 0.005 mm (0.0002 in) max.
Service Limit: 0.006 mm (0.0002 in)



- Measure taper at the edge of each rod and main journal.
- The difference between measurements on each journal must not be more than the service limit.

Journal Taper:
Standard (New): 0.005 mm (0.0002 in) max.
Service Limit: 0.006 mm (0.0002 in)

Pistons

Inspection

1. Check the piston for distortion or cracks.

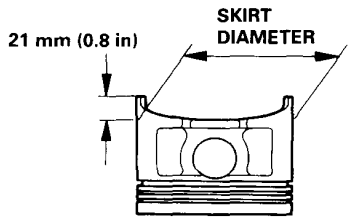
   NOTE: If the cylinder is bored, an oversized piston must be used.

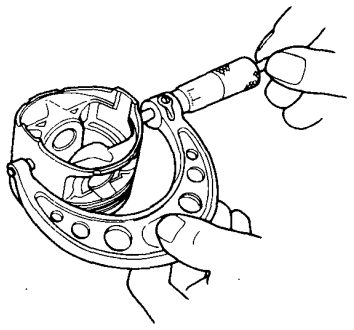
2. Measure the piston diameter at a point 21 mm from the bottom of the skirt.

   NOTE: There are two standard-size pistons (No Letter (A) or B). The letter is stamped on the top of the piston. Letters are also stamped on the block as cylinder bore sizes.

   Piston Diameter:
   Standard (New):
   No Letter (A): 84.980 – 84.990 mm (3.3457 – 3.3461 in)
   B: 84.970 – 84.980 mm (3.3453 – 3.3457 in)

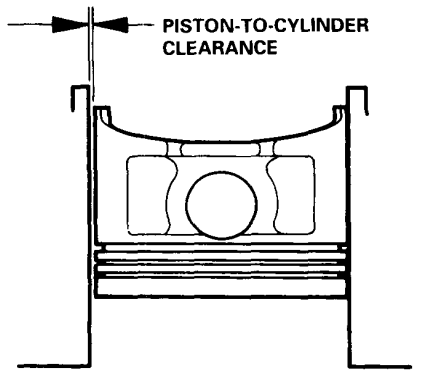
   Service Limit:
   No Letter (A): 84.970 mm (3.3453 in)
   B: 84.960 mm (3.3449 in)





3. Calculate the difference between cylinder bore diameter (see page 7-17) and piston diameter.

   Piston-to-Cylinder Clearance:
   Standard (New): 0.020 – 0.040 mm (0.0008 – 0.0016 in)
   Service Limit: 0.05 mm (0.002 in)

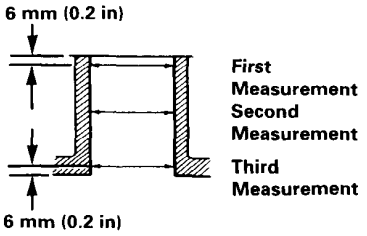


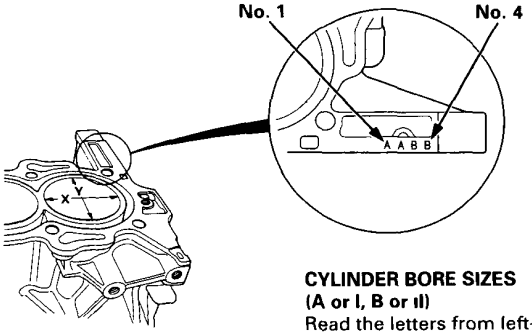
If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.

Oversize Piston Diameter:
0.25: 85.230 – 85.240 mm (3.3555 – 3.3559 in)
0.50: 85.480 – 85.490 mm (3.3653 – 3.3657 in)

Inspection

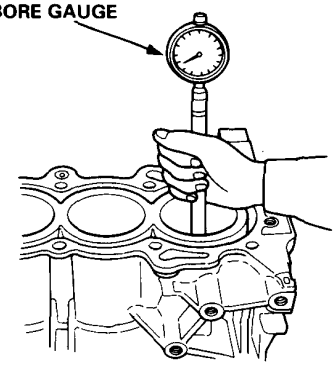
1. Measure wear and taper in direction X and Y at three levels in each cylinder as shown.





CYLINDER BORE SIZES
(A or I, B or II)
Read the letters from left-to-right for No. 1 through No. 4 cylinders.

CYLINDER BORE GAUGE



Cylinder Bore Size:
Standard (New):
A or I: 85.010 – 85.020 mm (3.3468 – 3.3472 in)
B or II: 85.000 – 85.010 mm (3.3465 – 3.3468 in)
Service Limit: 85.070 mm (3.3492 in)

Oversize:
0.25: 85.250 – 85.260 mm (3.3563 – 3.3567 in)
0.50: 85.500 – 85.510 mm (3.3661 – 3.3665 in)

Bore Taper:
Limit: (Difference between first and third measurement) 0.05 mm (0.002 in)

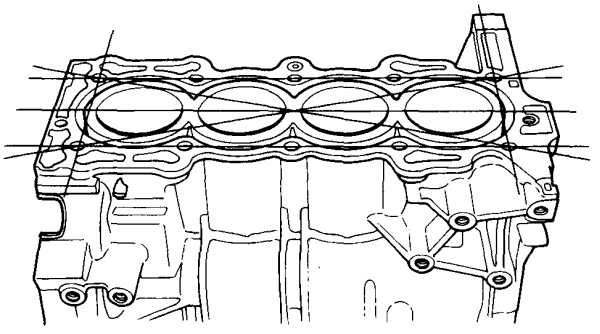
- If measurements in any cylinder are beyond Oversize Bore Service Limit, replace the block.
- If the block is to be rebored, refer to Piston Clearance Inspection (see page 7-16) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit: 0.50 mm (0.020 in) max

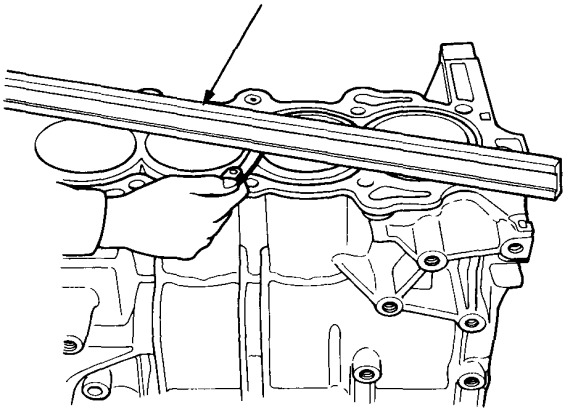
2. Check the top of the block for warpage.
Measure along the edges and across the center as shown.

SURFACES TO BE MEASURED



Engine Block Warpage:
Standard (New): below 0.07 mm (0.003 in) max.
Service Limit: 0.10 mm (0.004 in)

PRECISION STRAIGHT EDGE



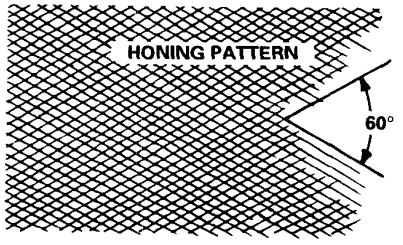
Cylinder Block

Bore Honing

1. Measure cylinder bores as shown on page 7-16. If the block is to be reused, hone the cylinders and remeasure the bores.

2. Hone cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern.

   NOTE:
   - Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent.
   - Do not use stones that are worn or broken.

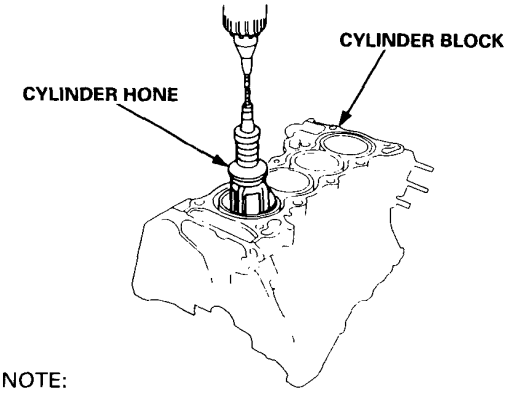


3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

   NOTE: Never use solvent, it will only redistribute the grit on the cylinder walls.

4. If scoring or scratches are still present in cylinder bores after honing to the service limit, rebore the cylinder block.

   NOTE: Some light vertical scoring and scratching is acceptable if it is not deep enough to catch your fingernail and does not run the full length of the bore.



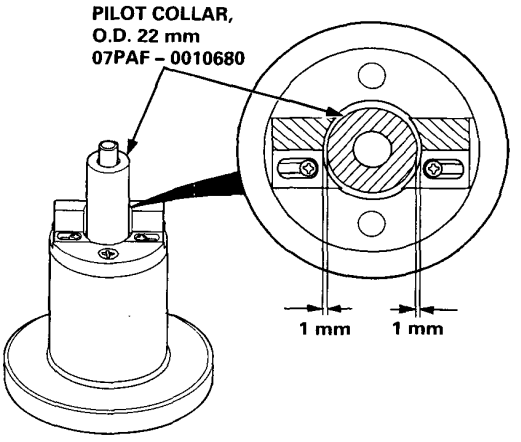
NOTE:
- After honing, clean the cylinder thoroughly with soapy water.
- Only a scored or scratched cylinder bore must be honed.

Piston Pins

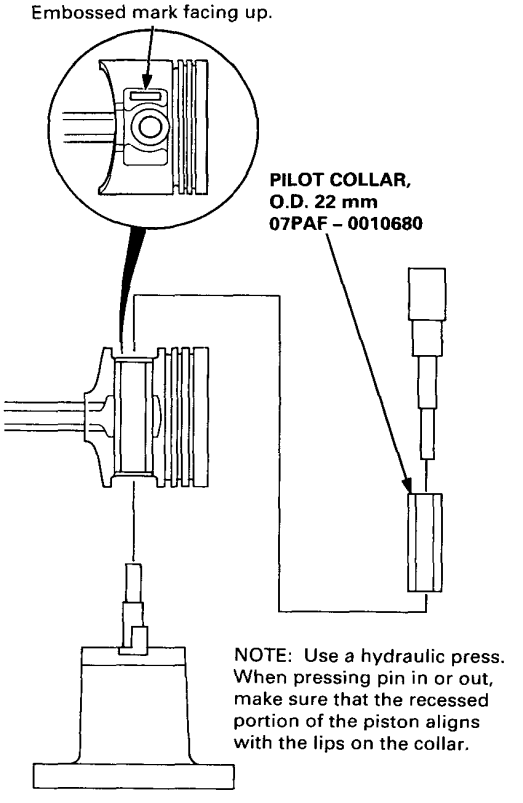
Removal

NOTE:
- Use the piston pin assembly tool set (No. 07PAF – 0010000) for removal of piston pins.
- Be sure to use the pilot collar of correct No. as designated.

1. Set the special tools as shown.



2. Place the piston on the special tools and press the pin out using a hydraulic press.



Connecting Rods

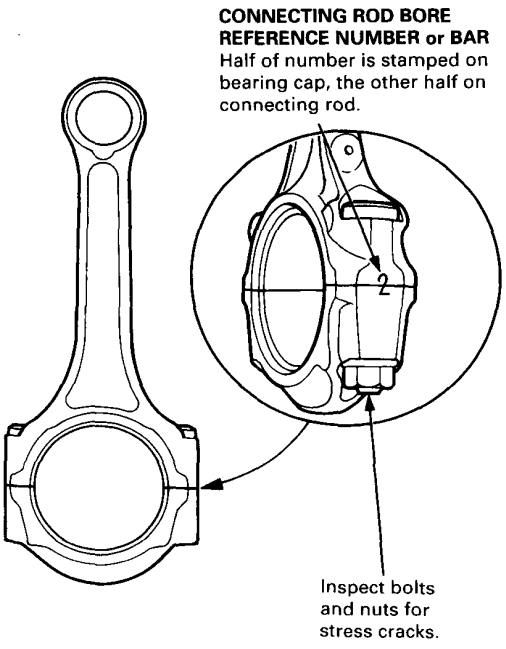
Selection

Each rod falls into one of four tolerance ranges (from 0 to 0.024 mm (0.0009 in), in 0.006 mm (0.0002 in) increments) depending on the size of its big end bore. It's then stamped with a number or bar (1, 2, 3, or 4/I, II, III, or IIII) indicating the range.
You may find any combination of 1, 2, 3, or 4/I, II, III, or IIII in any engine.

Normal Bore Size:

F20B3 engine:	**48.0 (1.89 in)**
Except F20B3 engine:	**51.0 (2.01 in)**

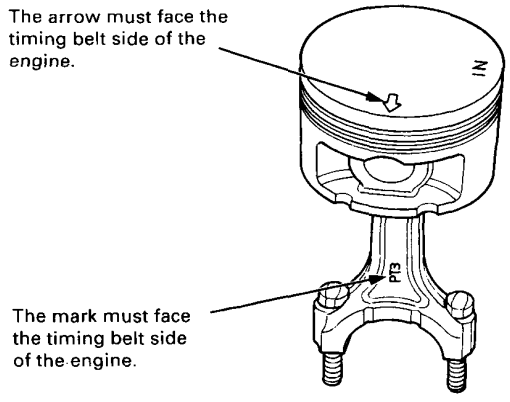
NOTE:
- Reference numbers or bars are for big end bore size and do not indicate the position of the rod in the engine.
- Inspect connecting rod for cracks and heat damage.



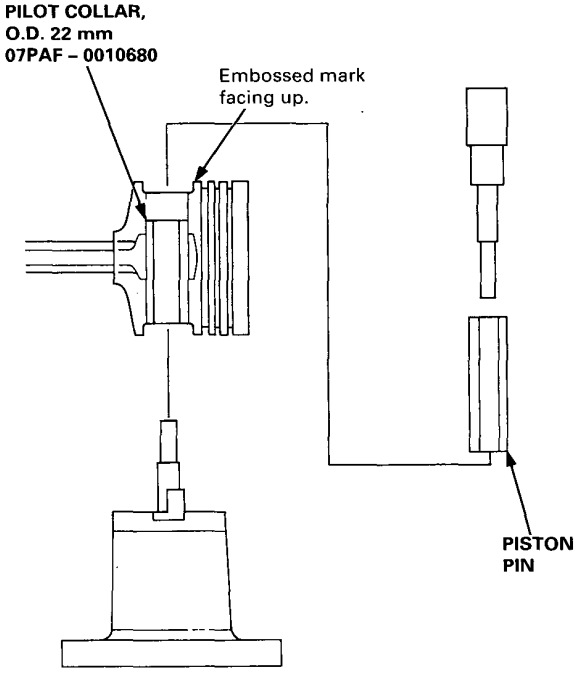
Piston Pins

Installation

NOTE:
- Use the piston pin assembly tool set (No. 07PAF – 0010000) with a hydraulic press.
- Be sure to use the pilot coller of correct No. as designated.



1. Install the piston pin as shown.



NOTE: Install the assembled piston and rod with the oil hole facing the intake manifold.

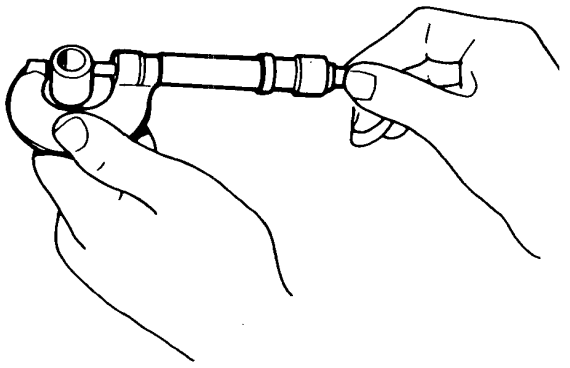
Piston Pins

Inspection

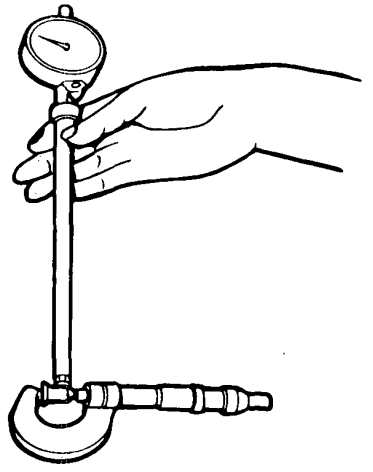
1. Measure the diameter of the piston pin.

Piston Pin Diameter:
Standard (New): 21.994 – 22.000 mm
(0.8659 – 0.8661 in)
Oversize: 21.997 – 22.003 mm
(0.8660 – 0.8663 in)

NOTE: All replacement piston pins are oversize.



2. Zero the dial indicator to the piston pin diameter.

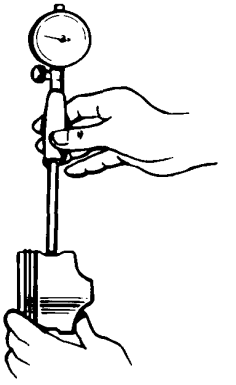


3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

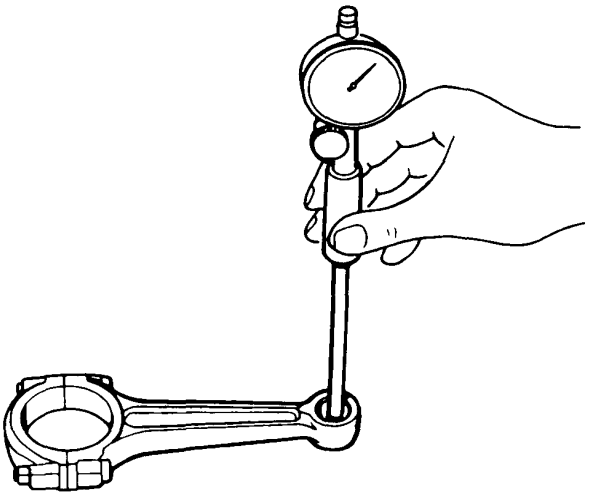
If the piston pin clearance is greater than 0.024 mm (0.0009 in), remeasure using an oversized piston pin.

Piston Pin-to-Piston Clearance:
Standard (New): 0.010 – 0.022
(0.0004 – 0.0009 in)



4. Check the difference between piston pin diameter and connecting rod small end diameter.

Piston pin-to Connecting Rod Interference:
Standard (New): 0.013 – 0.032 mm
(0.0005 – 0.0013 in)



End Gap

1. Using a piston, push a new ring into the cylinder bore 15 – 20 mm (0.6 – 0.8 in) from the bottom.

2. Measure the piston ring end-gap with a feeler gauge:

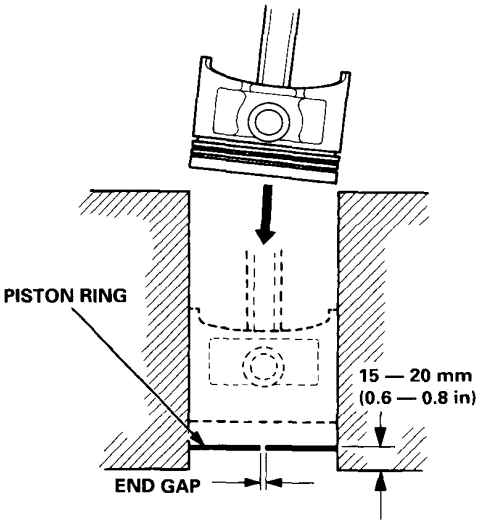
   - If the gap is too small, check to see if you have the proper rings for your engine.

   - If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-17. If the bore is over the service limit, the cylinder block must be rebored.

Piston Ring End-Gap:
Top Ring
Standard (New): 0.20 – 0.35 mm (0.008 – 0.014 in)
Service Limit: 0.60 mm (0.024 in)

Second Ring
Standard (New): 0.40 – 0.55 mm (0.016 – 0.022 in)
Service Limit: 0.70 mm (0.028 in)

Oil Ring
Standard (New): 0.20 – 0.70 mm (0.008 – 0.028 in)
Service Limit: 0.80 mm (0.031 in)



Piston Rings

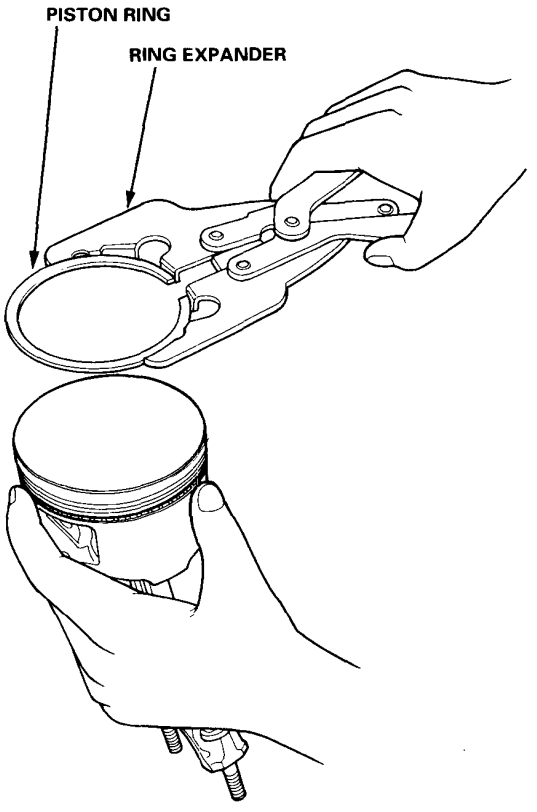
Replacement

1. Using a ring expander, remove the old piston rings.
2. Clean all ring grooves throughly.

   NOTE:
   - Use a squared-off broken ring or ring groove cleaner with blade to fit piston grooves.
   - Top and 2nd ring grooves are 1.2 mm (0.05 in) wide, and the oil ring groove are 2.8 mm (0.11 in) wide.
   - File down blade if necessary.

   CAUTION: Do not use a wire brush to clean the ring grooves, or cut ring grooves deeper with cleaning tools.
   NOTE: If the piston is to be separated from the connecting rod, do not install new rings yet.
3. Install new rings in the proper sequence and position (see page 7-23).

   NOTE: Do not use old piston rings.

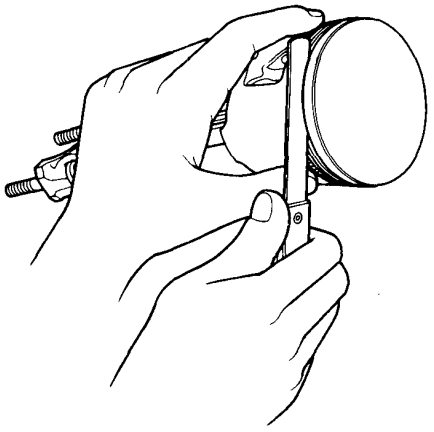


Ring-to-Groove Clearance

After installing a new set of rings, measure the ring-to-groove clearances:

Top Ring Clearance
Standard (New): 0.035 – 0.060 mm (0.0014 – 0.0024 in)
Service Limit: 0.13 mm (0.005 in)

Second Ring Clearance
Standard (New): 0.030 – 0.055 mm (0.0012 – 0.0022 in)
Service Limit: 0.13 mm (0.005 in)

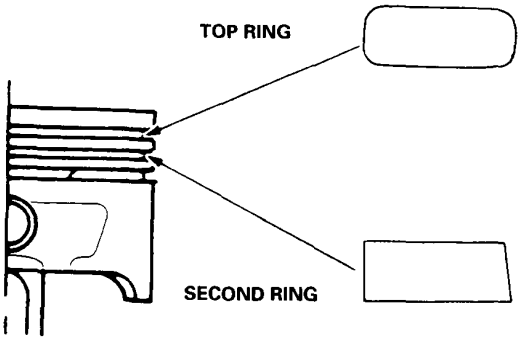


Alignment

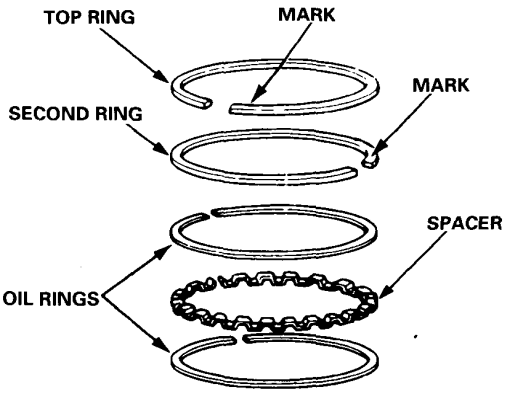
1. Install the rings as shown.

   Identify top and second rings by the chamfer on the edge. Make sure they are in their proper grooves on the piston.

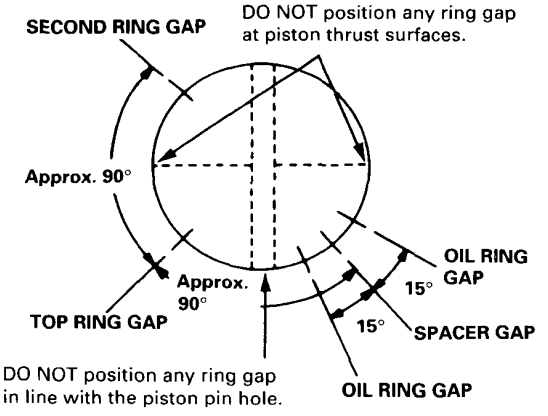
   NOTE: The manufacturing marks must be facing upward.



2. Rotate the rings in their grooves to make sure they do not bind.



3. Position the ring end gaps as shown:



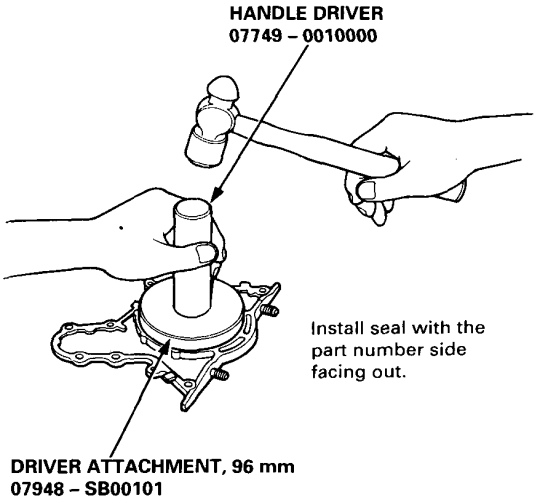
Crankshaft Oil Seal

Installation

The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of the seal.

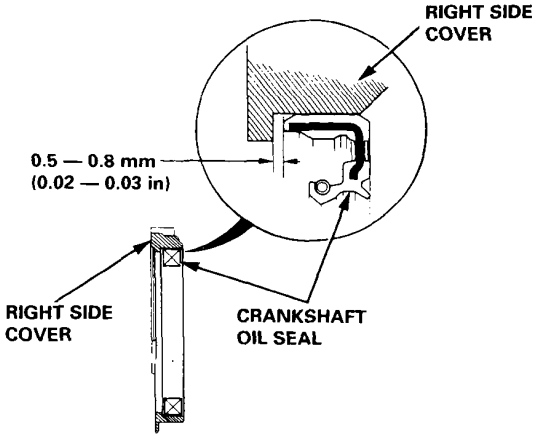
1. Drive in crankshaft oil seal against right side cover.

   NOTE: Drive the crankshaft oil seal in squarely.



2. Confirm that the clearance is equal all the way around with a feeler gauge.

   Clearance: 0.5 – 0.8 mm (0.02 – 0.03 in)



NOTE: Refer to page 8-11 for installation of the oil pump side crankshaft oil seal.

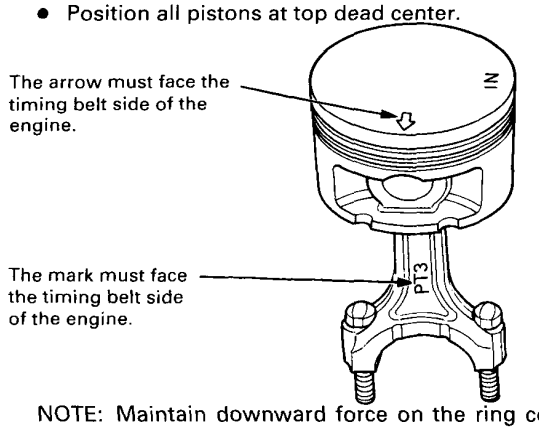
Pistons

Installation

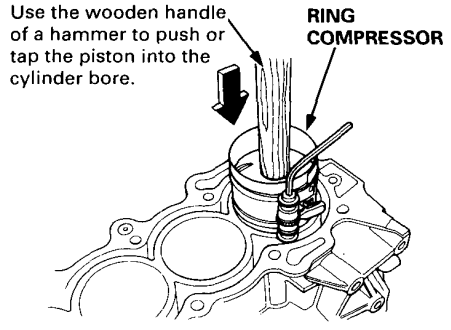
Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

1. If the crankshaft is already installed:
   - Set the crankshaft to BDC for each cylinder.
   - Remove the connecting rod caps, and slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
   - Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder, and tap it in using the wooden handle of a hammer.
   - Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing piston into place.
   - Install the rod caps with bearings, and torque the nuts to:
     F20B3 engine:
     32 N·m (3.3 kgf·m, 24 lbf·ft)
     Except F20B3 engine:
     46 N·m (4.7 kgf·m, 34 lbf·ft)

2. If the crankshaft is not installed:
   - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder, and tap it in using the wooden handle of a hammer.
   - Position all pistons at top dead center.



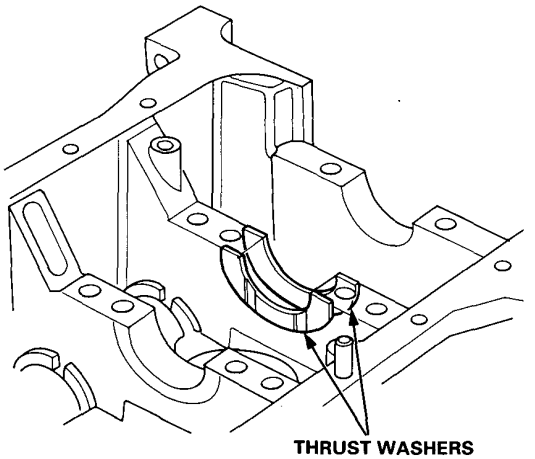
NOTE: Maintain downward force on the ring compressor to prevent rings from expanding before entering the cylinder bore.



Installation

Before installing the crankshaft, apply a coat of engine oil to the main bearings, rod bearings and balancer shaft bearings.

1. Install the thrust washers in the No. 4 journal of the cylinder block.

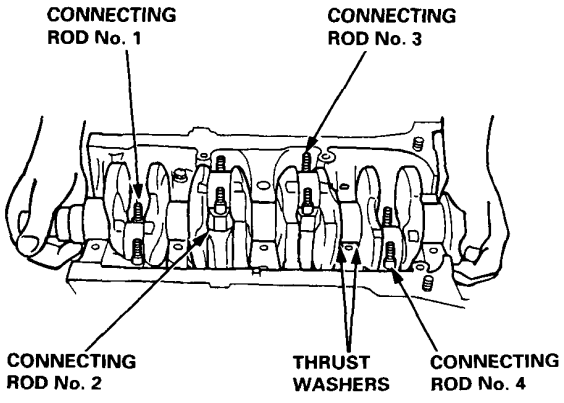


THRUST WASHERS
Grooved side facing outward.

2. Insert bearing halves in the cylinder block and connecting rods.

3. Hold the crankshaft so rod journals for cylinders No. 2 and No. 3 are straight up.

4. Lower the crankshaft into the block, seating the rod journals into connecting rods No. 1 and No. 4. Install the rod caps and nuts finger tight.



5. Rotate the crankshaft clockwise, seat journals into connecting rods No. 2 and No. 3, and install the rod caps and nuts finger tight.

   NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

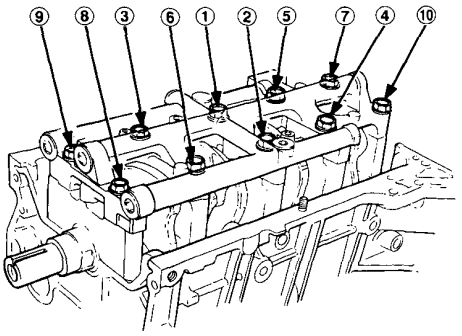
6. Check rod bearing clearance with plastigage (see page 7-10), then torque the capnuts.
   F20B3 engine:
   32 N·m (3.3 kgf·m, 24 lbf·ft)
   Except F20B3 engine:
   46 N·m (4.7 kgf·m, 34 lbf·ft)

   NOTE: Reference numbers on connecting rod are for big-end bore tolerance and do not indicate the position of piston in the engine.

7. Install the main bearing caps and bearing cap bridge.

8. Check clearance with plastigage (see page 7-8), then tighten the bearing cap bolts in 2 steps.
   In the first step tighten, all bolts in sequence, to about 29 N·m (3.0 kgf·m, 22 lbf·ft); in the final step, tighten in same sequence, to 74 N·m (7.5 kgf·m, 54 lbf·ft).

   NOTE: Coat the bolt threads with engine oil.



CAUTION: Whenever any crankshaft bearing or connecting rod bearing is replaced, it is necessary after reassembly to run the engine at idling speed until it reaches normal operating temperature, then continue to run it for approximately 15 minutes.

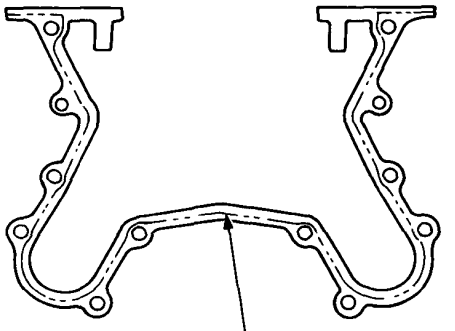
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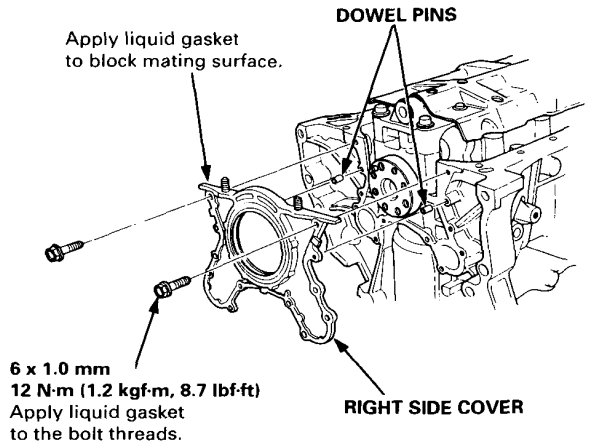
Installation (cont'd)

NOTE:
- Use liquid gasket, part No. 0Y740 - 99986.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, being careful to cover all the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if 5 minutes or more have elapsed since applying the liquid gasket. Instead reapply liquid gasket after removing the old residue.
- After assembly, wait at least 20 minutes before filling the engine with oil.

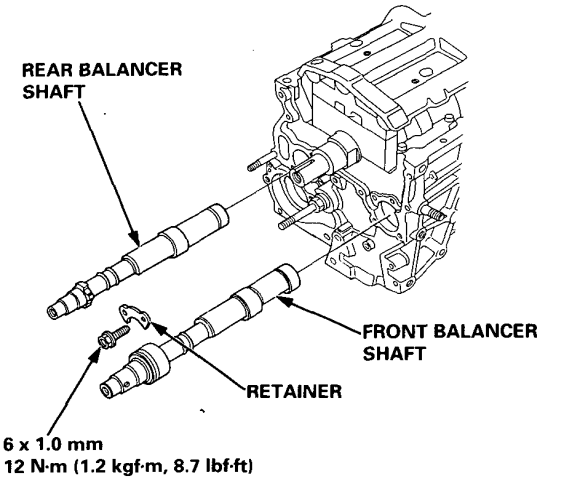
9. Apply liquid gasket to the block mating surface of the right side cover, then install it on the cylinder block.

RIGHT SIDE COVER:





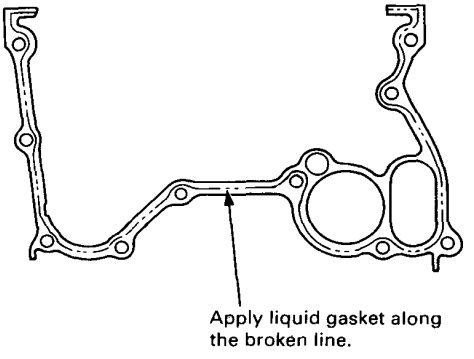
10. Insert the balancer shafts into the block, then install the retainer to the front balancer shaft and block.

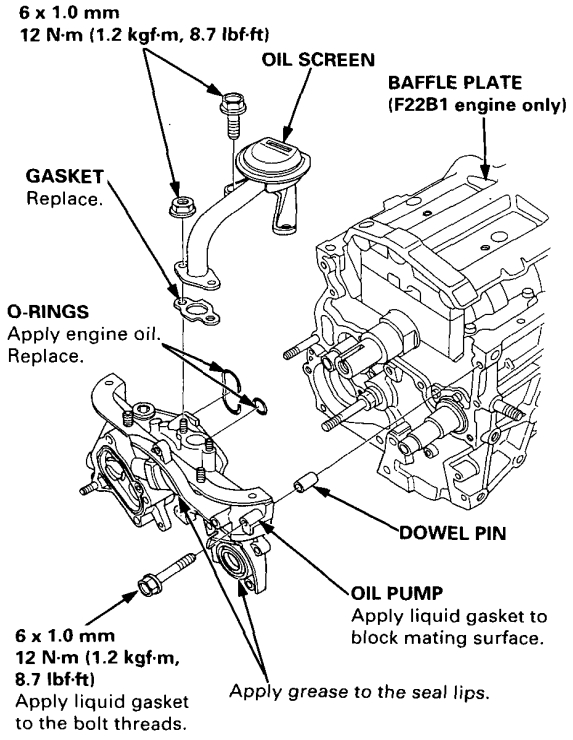


11. Apply liquid gasket to the oil pump mating surface of the block, then install the oil pump on the cylinder block.

- Apply grease to the lips of the oil seals. Then, install the oil pump while aligning the inner rotor with the crankshaft. When the pump is in place, clean any excess grease off the crankshaft and the balancer shaft, then check that the oil seal lips are not distorted.

OIL PUMP:

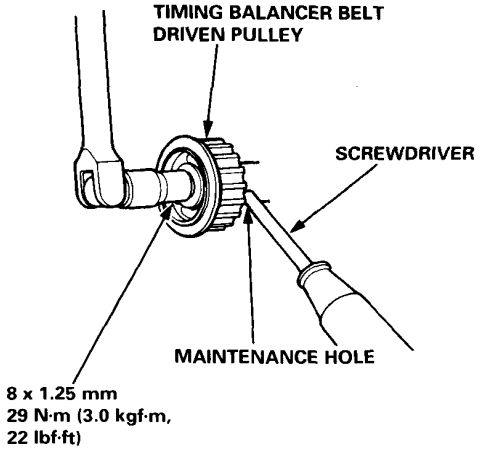




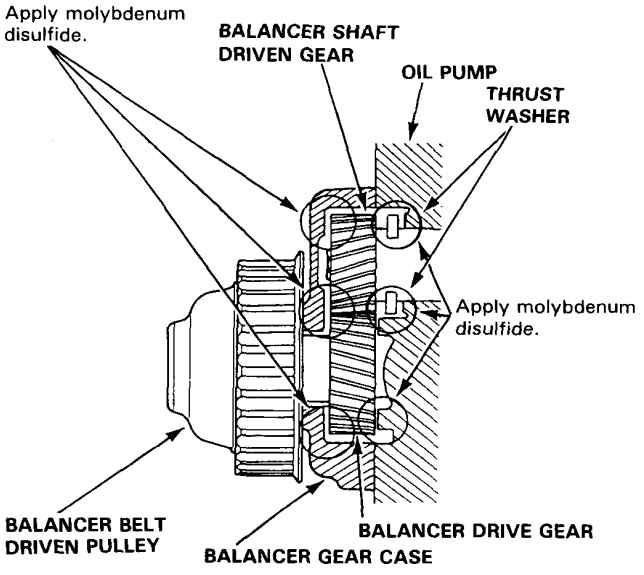
12. Install the baffle plate, then install the oil screen.

13. Hold the front balancer shaft with a screwdriver, then install the timing balancer belt driven pulley.

FRONT BALANCER SHAFT:

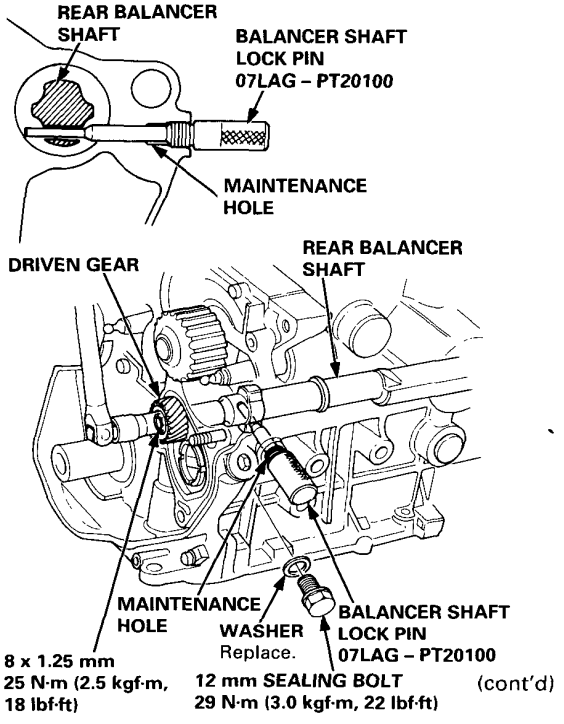


14. Before installing the balancer driven gear and the balancer gear case, apply molybdenum disulfide to the thrust surfaces of the balancer gears as shown.



15. Hold the rear balancer shaft with the special tool, then install the balancer driven gear.

REAR BALANCER SHAFT:

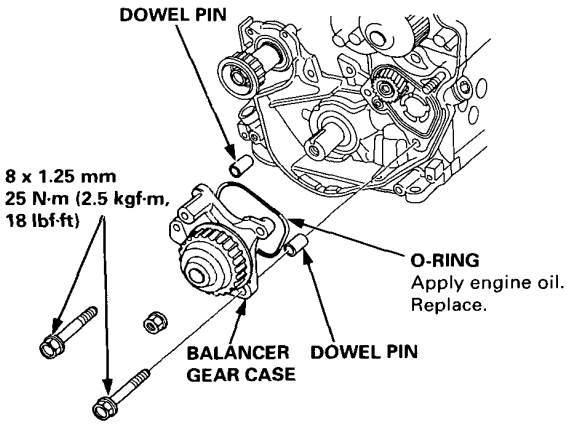


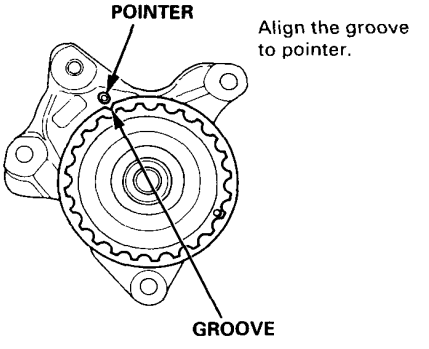
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Installation (cont'd)

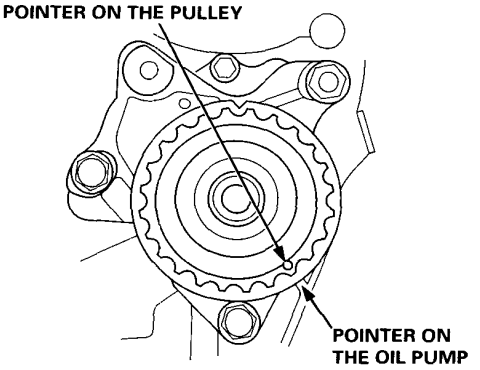
16. Install the balancer gear case to the oil pump.

    NOTE: Align the groove on the pulley edge to the pointer on the gear case while holding the rear balancer with the special tool, then install the gear case.



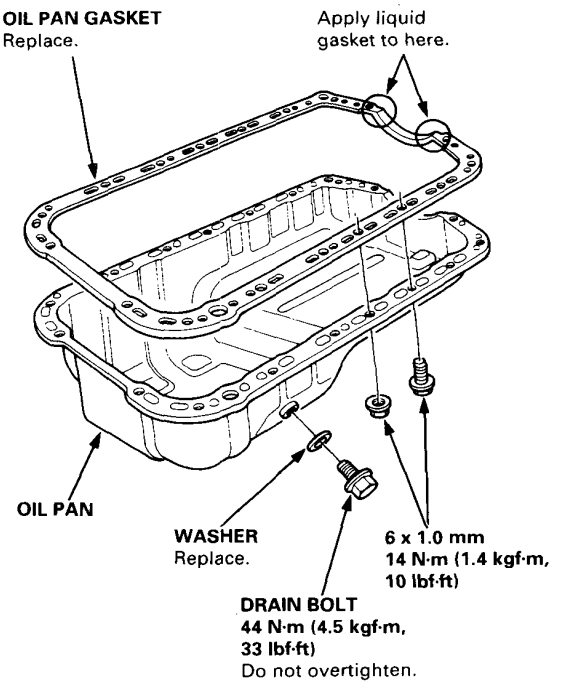


17. Check alignment of pointers after installing the gear case.



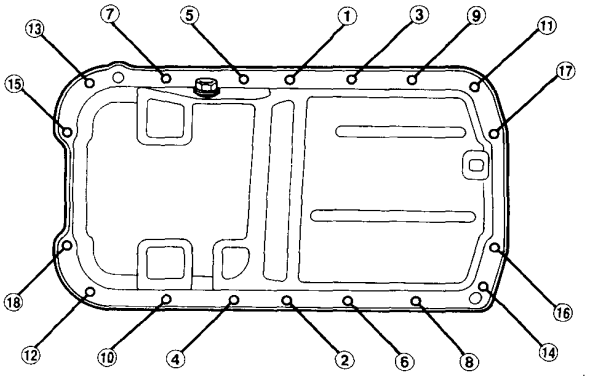
18. Install the oil pan.

    NOTE: Clean the oil pan gasket mating surface.



19. Tighten the bolts and nuts as shown below.

    Torque: 14 N·m (1.4 kgf·m, 10 lbf·ft)



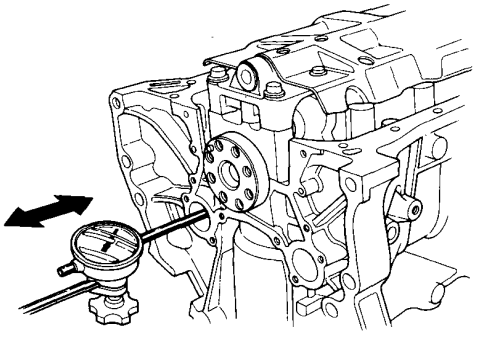
NOTE: Tighten the bolts and nuts in three steps and torque them in a criss-cross pattern.

Inspection

NOTE: Inspect the balancer shaft before removing the right side cover and the balancer gear case (see page 7-12).

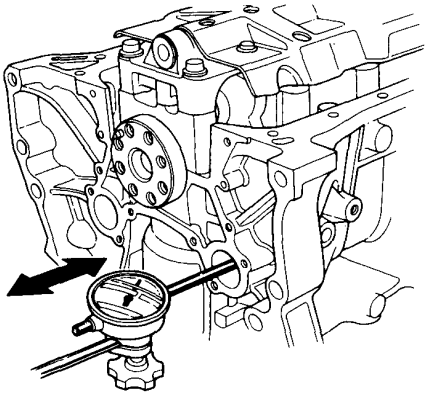
1. Push the balancer shaft firmly away from the dial indicator, and zero the dial against the front end of the balancer shaft, then pull the balancer shaft firmly back toward the indicator.

Front Balancer Shaft End Play
Standard (New): 0.10 – 0.40 mm
(0.004 – 0.016 in)



- If end play is excessive, inspect the retainer and thrust surfaces on the balancer shaft.

Rear Balancer Shaft End Play
Standard (New): 0.04 – 0.15 mm
(0.002 – 0.006 in)



- If end play is excessive, inspect the thrust washer and thrust surfaces on the driven gear and oil pump body.

NOTE: The thickness of the retainer (front) and thrust washer (rear) are fixed and must not be changed either by grinding or shimming.

2. Remove the balancer shafts (see page 7-12).

NOTE: Clean the balancer shafts.

3. Inspect the surface of the balancer shaft journal and balancer bearing.

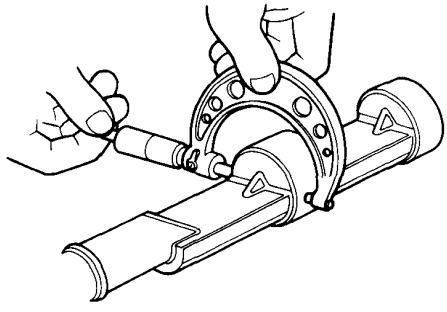
4. Replace the bearing or balancer shaft if there is wear, damage or discoloration on the surface of the bearing or the balancer shaft journal. When replacing the rear No. 1 bearing be sure to replace the oil pump housing with a new one.

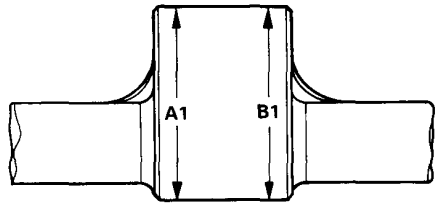
NOTE: A mirror-like surface is normal.

5. Measure taper at the edges of each journal.

- The difference between measurements on each journal must not exceed the standard.

Journal Taper
Standard (New): 0.005 mm (0.0002 in)



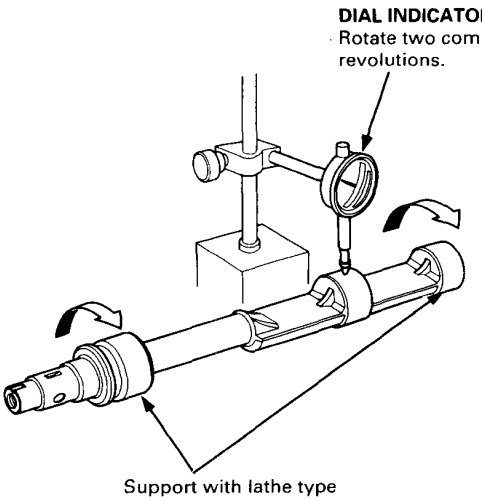


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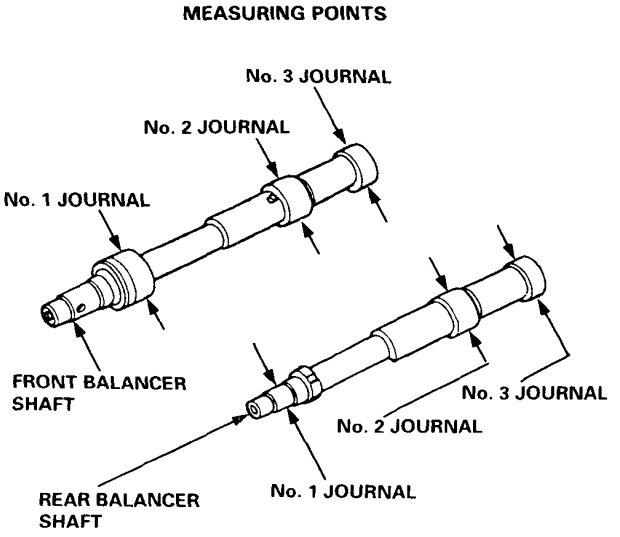
Inspection (cont'd)

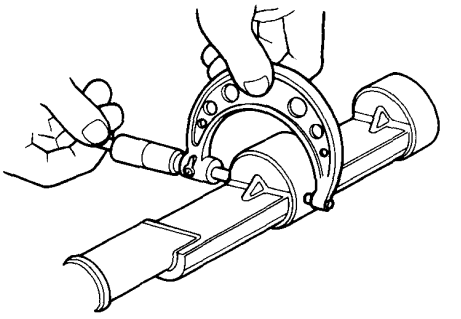
6. Measure runout on the No. 2 journal of each balancer shaft to make sure the balancer shafts are not bent.

Balancer Shaft Total Indicated Runout
Standard (New): 0.02 mm (0.001 in)
Service Limit: 0.03 mm (0.001 in)



7. Measure the diameters of the balancer shaft journals.





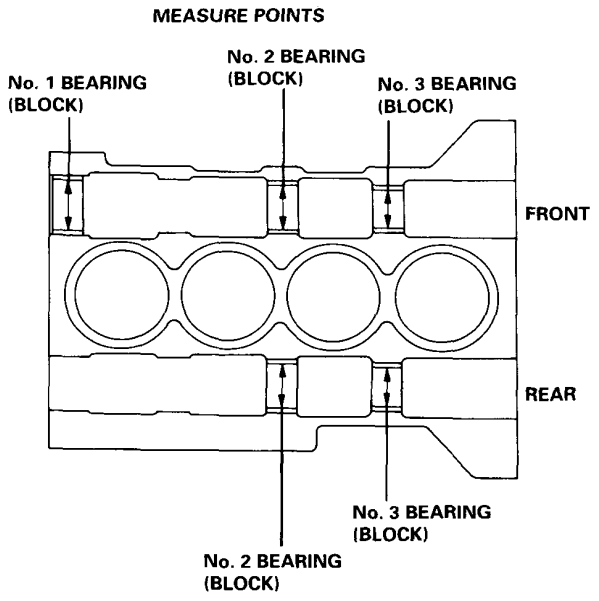
Journal Diameter
Standard (New):
No. 1 journal:
Front: 42.722 – 42.734 mm (1.6820 – 1.6824 in)
Rear: 20.938 – 20.950 mm (0.8243 – 0.8248 in)
No. 2 journals front and rear: 38.712 – 38.724 mm (1.5241 – 1.5246 in)
No. 3 journals front and rear: 34.722 – 34.734 mm (1.3670 – 1.3675 in)

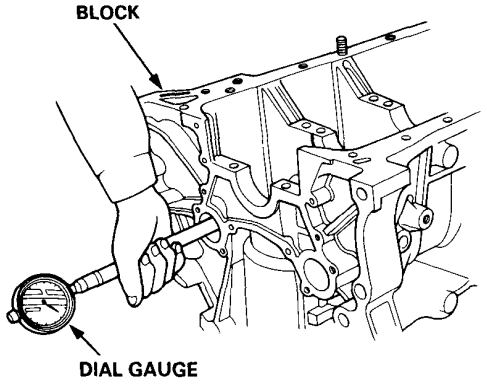
Service Limit:
No. 1 journal:
Front: 42.71 mm (1.681 in)
Rear: 20.92 mm (0.824 in)
No. 2 journals front and rear: 38.70 mm (1.524 in)
No. 3 journals front and rear: 34.71 mm (1.367 in)

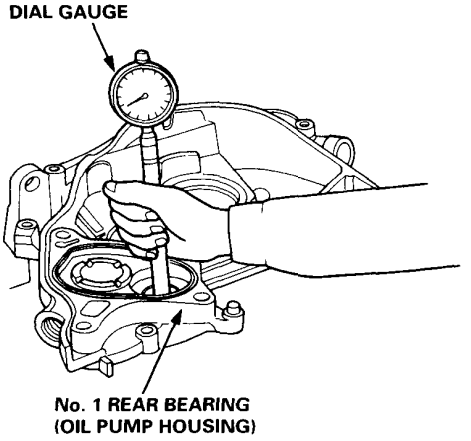
8. Remove the crankshaft, the pistons and the other parts from the block, then clean the balancer shaft journal bearings in the block and the oil pump housing with a clean shop towel.

9. Check the surface of the bearings; if there is wear, damage or discoloration, replace the bearings or the oil pump housing.

10. Measure the inner diameters of the balancer shaft journal bearings.







Bearing Inner Diameter
Standard (New):
No. 1 journals:
Front: 42.800 – 42.820 mm (1.6850 – 1.6858 in)
Rear: 21.000 – 21.013 mm (0.8268 – 0.8273 in)
No. 2 journals front and rear:
38.800 – 38.820 mm (1.5276 – 1.5283 in)
No. 3 journals front and rear:
34.800 – 34.820 mm (1.3701 – 1.3709 in)

Service Limit:
No. 1 journals:
Front: 42.83 mm (1.686 in)
Rear: 21.02 mm (0.828 in)
No. 2 journals front and rear:
38.83 mm (1.529 in)
No. 3 journals front and rear:
34.83 mm (1.371 in)

11. Calculate the shaft-to-bearings oil clearances.

BEARING I.D. – JOURNAL O.D. = OIL CLEARANCE

Bearing-to-shaft Oil Clearance
Standard (New):
No. 1 front journal, No. 3 front and rear journals:
0.066 – 0.098 mm (0.0026 – 0.0039 in)
No. 2 front and rear journals:
0.076 – 0.108 mm (0.0030 – 0.0043 in)
No. 1 rear journal:
0.050 – 0.075 mm (0.0020 – 0.0030 in)

Service Limit:
No. 1 front journal, No. 3 front and rear journals:
0.12 mm (0.005 in)
No. 2 front and rear journals: 0.13 mm (0.005 in)
No. 1 rear journal: 0.09 mm (0.004 in)

Balancer Shaft Bearings

Replacement

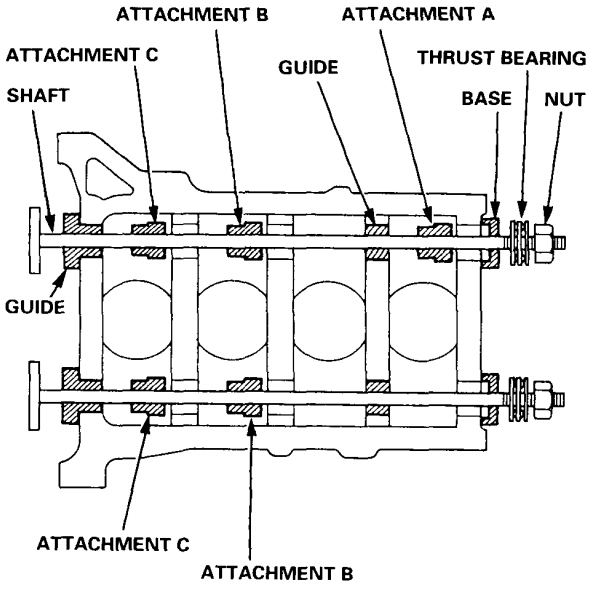
The procedure shown below is used when using the bearing replacement tool set (07LAF — PT20100).

CAUTION:
- **Remove all attachment parts from the cylinder block and lay it with its oil pan side up.**
- **Remove or reinstall bearings one at a time.**
- **Remove bearings from the transmission side to the timing belt side and reinstall them in reverse sequence.**

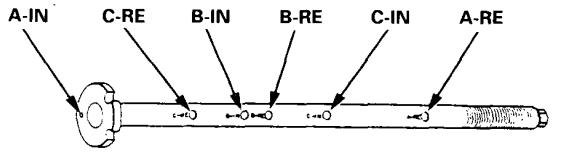
Removal:

NOTE:
- By changing the size and attachment point of the attachment, all balancer bearings can be removed from the cylinder block in the same procedure.
- The illustration shows the attachment points of each special tool.
- When removing bearings successively, put the corersponding attachment through the shaft without fixing them in advance.

SPECIAL TOOL SET LOCATION

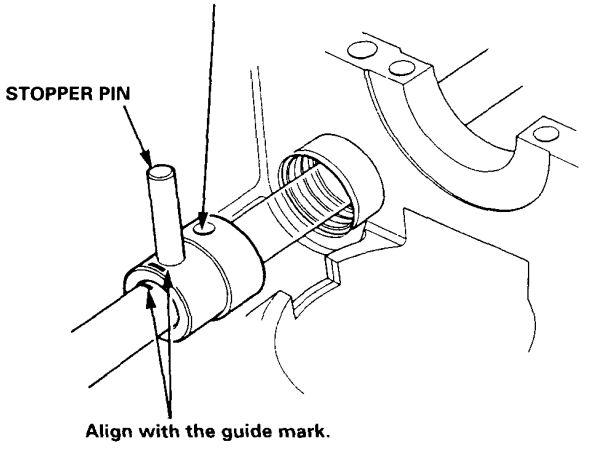


- Position of attachment fixing holes and guide marks on the shaft.

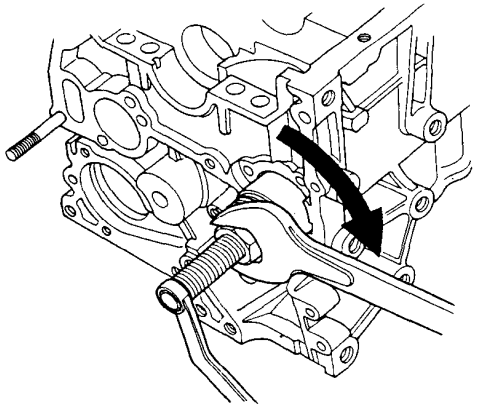


1. Put the attachment with the side having larger diameter facing the bearing. Align the stopper pin holes of the attachment and the shaft.
   Insert the stopper pin to fix the attachment.

FRONT No. 1 BEARING: ATTACHMENT A
No. 2 BEARINGS: ATTACHMENT B
No. 3 BEARINGS: ATTACHMENT C



2. Hold the shaft end with a wrench and turn the nut clockwise until the bearing comes off.
   - Do not rotate the shaft.



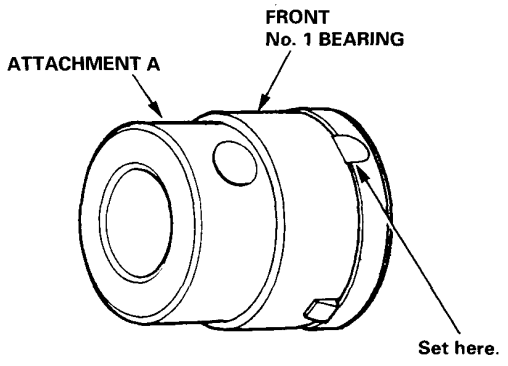
3. When removing bearings in succession, loosen the nut, remove the stopper pin from the pin hole you have finished and repeat above step 1 and 2 on the next bearing.

Installation:

Front No. 1 bearing

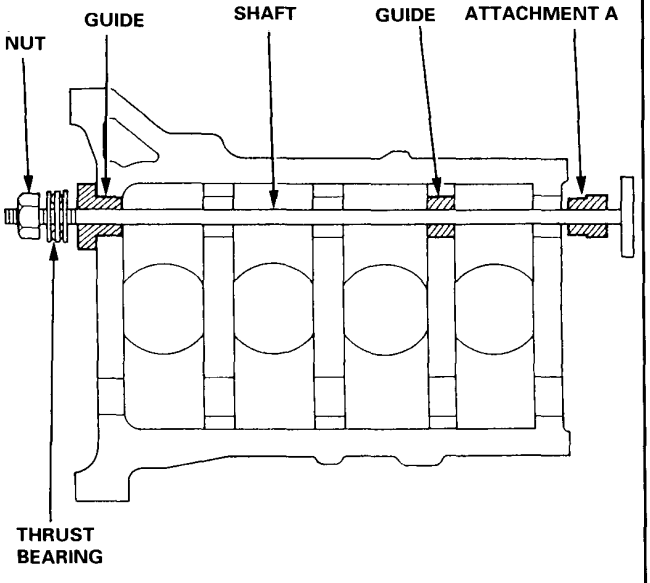
NOTE: Always use new bearings.

1. Set the resess of the bearing to the detent of the attachment.

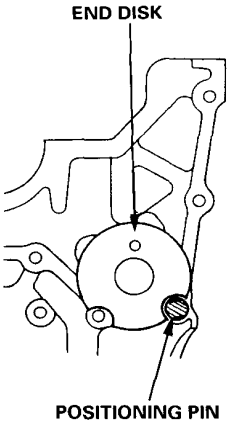


Attachment
Front No. 1 bearing: Attachment A

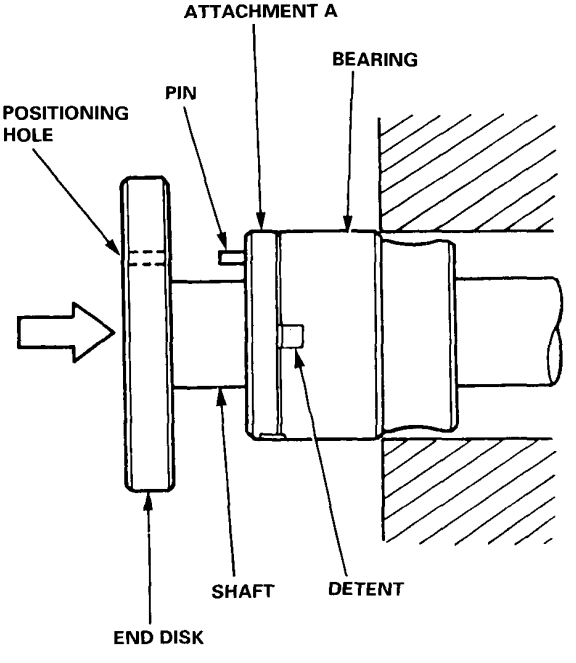
- The illustration shows the attachment points of the special tools.



2. Install the shaft positioning pin.



3. Set the shaft so that the attachment pin is aligned with the positioning hole in the end disc.

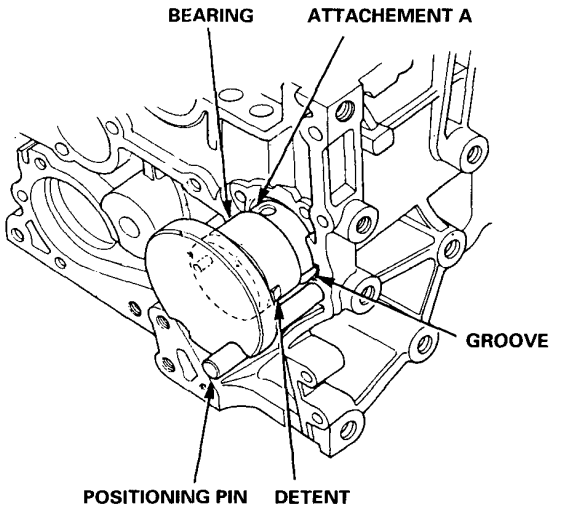


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Balancer Shaft Bearings

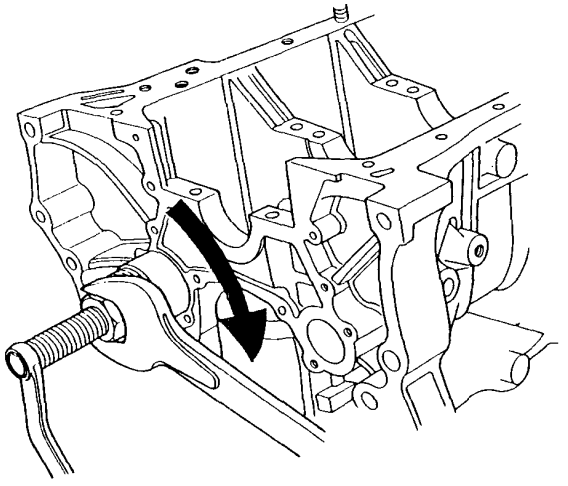
Replacement (cont'd)

4. Set the deten of the bearing to the groove of the cylinder block.



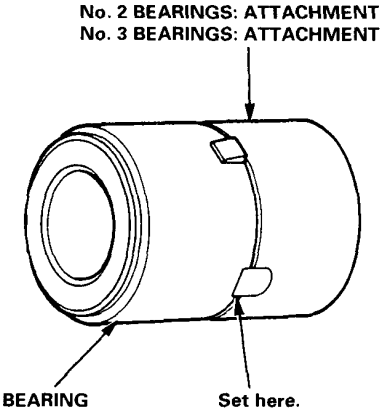
5. Hold the end of the shaft with wrench and install the bearing by turning the nut clockwise.

   - Do not rotate the shaft.

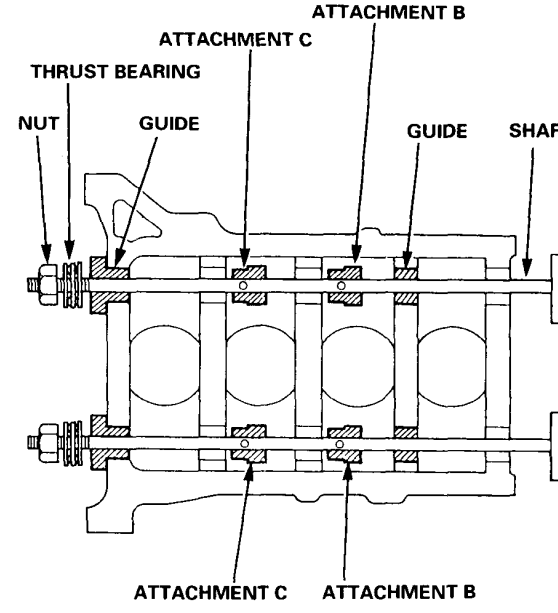


Installation:
No. 2 and No. 3 Bearings

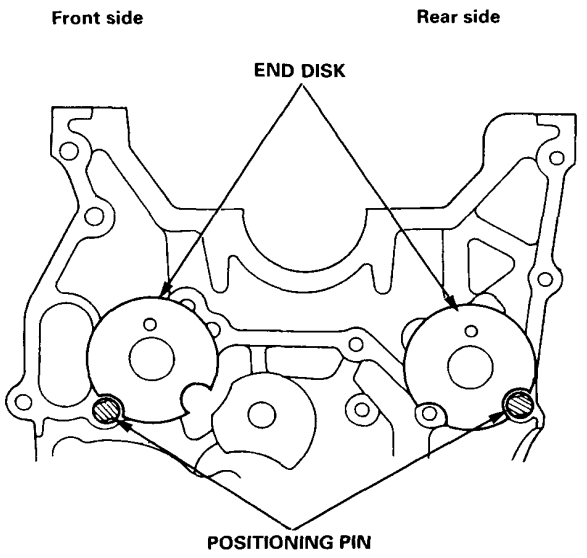
1. Set the resess of the bearing to the detent of the attachment.



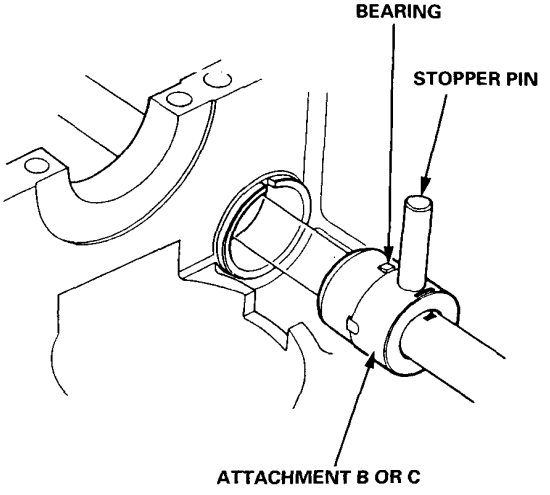
- The illustration shows attachment points of each special tool.
- When installing bearings successively, set the bearings to the attachment and put them through the shaft without fixing them in advance.



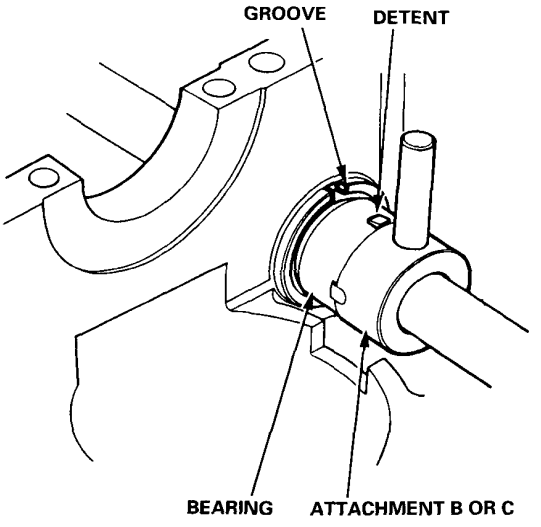
2. Install the shaft positioning pin.



3. Align the attachment with the guide mark. Applicable bearing No. is indicated at the guide mark. Align the pin holes of the attachment and the shaft. Insert the stopper pin to fix the attachment (for No. 2, and No. 3 bearings).

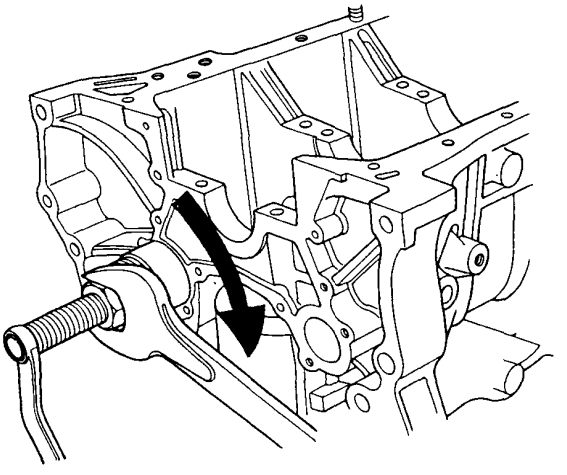


4. Set the detent of the bearing to the groove of the cylinder block.



5. Hold the end of the shaft with wrench and install the bearing by turning the nut clockwise.

- Do not rotate the shaft.



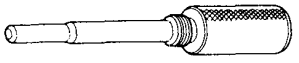
Engine Lubrication

Special Tools 8-2
Illustrated Index 8-3
Engine Oil
  Inspection 8-4
  Replacement 8-4
Oil Filter
  Replacement 8-5
Oil Pressure
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Oil Pump
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Special Tools

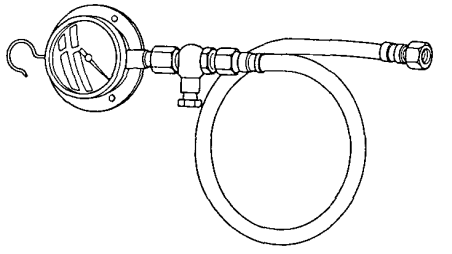
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAG – PT20100	Balancer Shaft Lock Pin	1	8-11
②	07406 – 0030000	Oil Pressure Gauge Attachment	1	8-7
③	07506 – 3000000	Oil Pressure Gauge	1	8-7
④	07746 – 0010300	Driver Attachment, 42 x 47 mm	1	8-10
⑤	07746 – 0010400	Driver Attachment, 52 x 55 mm	1	8-10
⑥	07749 – 0010000	Handle Driver	1	8-10
⑦	07912 – 6110001	Oil Filter Wrench	1	8-6



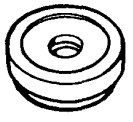
①



②



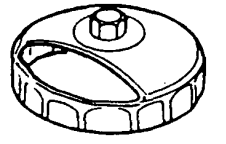
③



④ ⑤



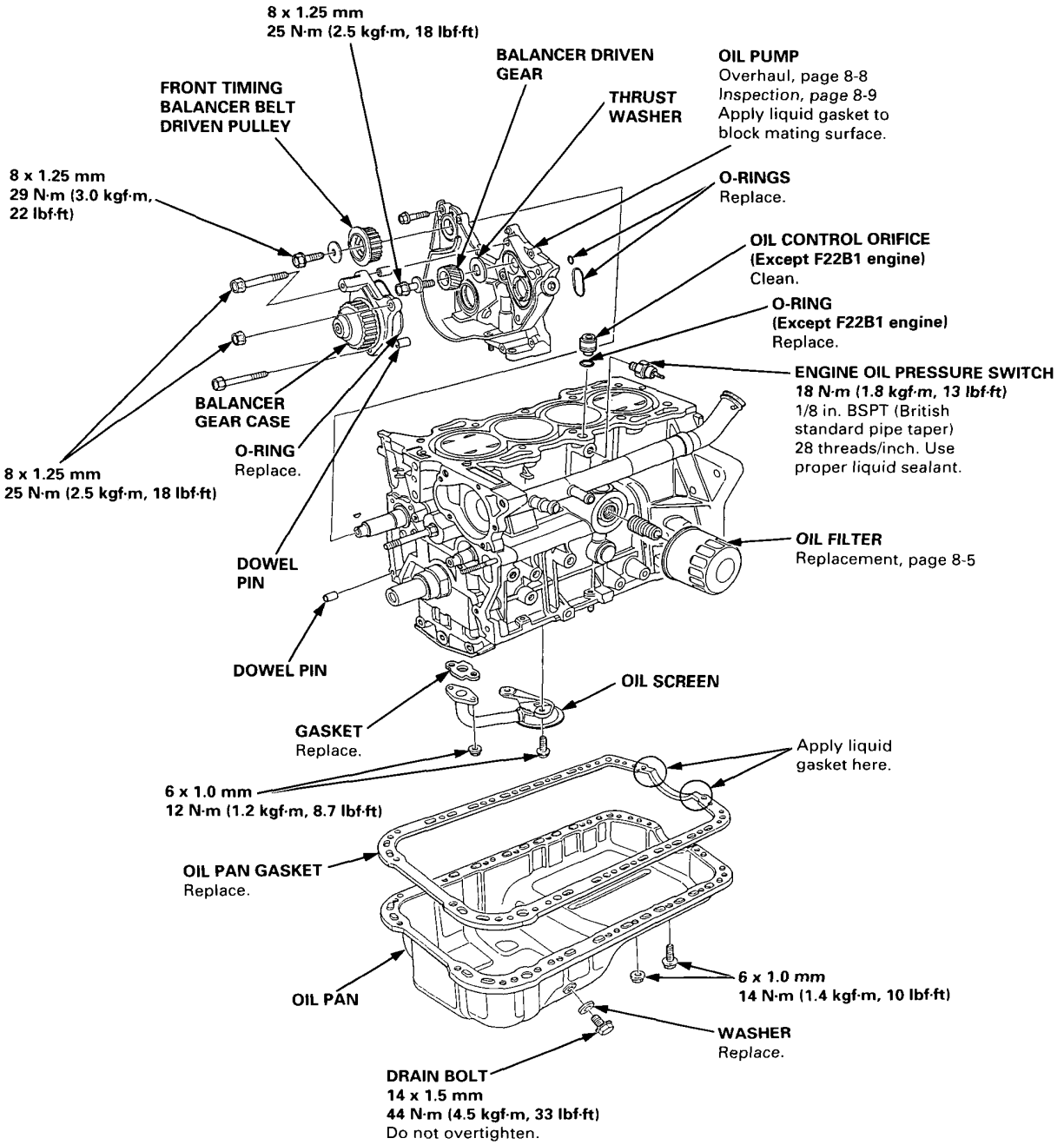
⑥



⑦

NOTE:
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 0Y740 – 99986.
- Clean the oil control orifice before installing.
- Clean the oil pan gasket mating surfaces before installing.
- Apply liquid gasket to the recesses of the oil pan gasket (see page 8-12).

CAUTION: Do not overtighten the drain bolt.

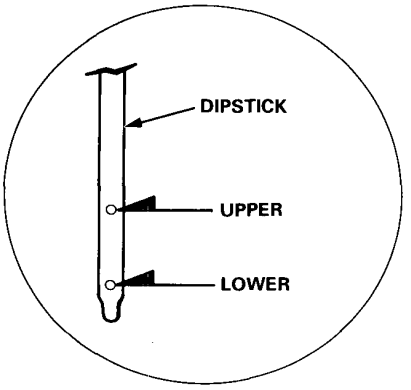


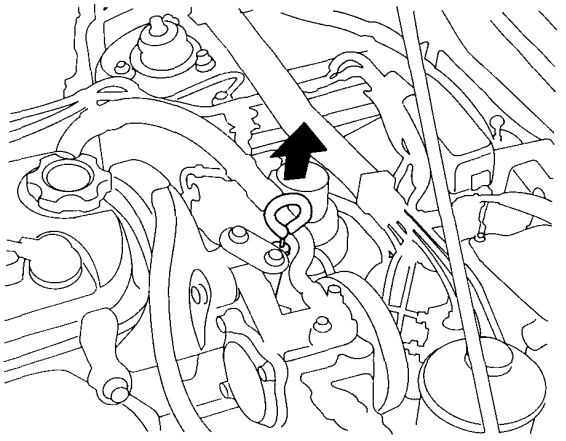
Engine Oil

Inspection

1. Check engine oil with the engine off and the car parked on level ground.
2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks.
3. If the level has dropped close to the lower mark, add oil until it reaches the upper mark.

CAUTION: Insert the dipstick carefully to avoid bending it.

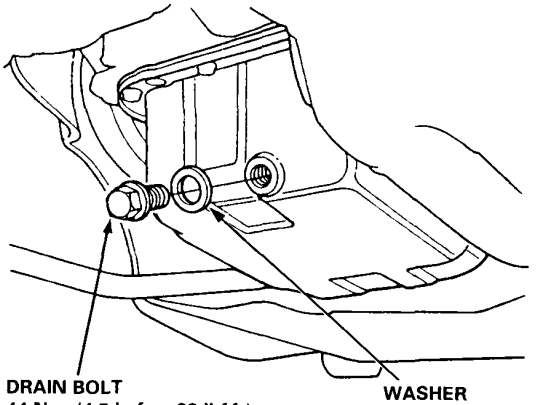




Replacement

CAUTION: Remove the drain bolt carefully while the engine is hot; the hot oil may cause scalding.

1. Warm up the engine.
2. Drain the engine oil.



3. Reinstall the drain bolt with a new washer, and refill with the recommended oil.

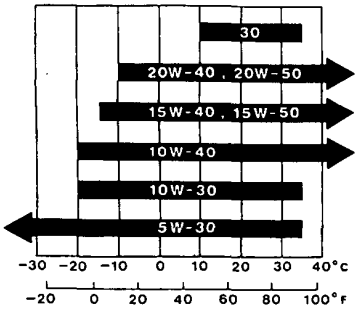
CAUTION: Do not overtighten the drain bolt.

Requirement	Always use a fuel-efficient oil is that says "API Service SG or SH". SAE Viscosity: See chart next page.
Capacity	Except F22B1 engine: 3.5 ℓ (3.7 US qt, 3.1 Imp qt) at oil change. 3.8 ℓ (4.0 US qt, 3.3 Imp qt) at oil change including filter. 4.9 ℓ (5.2 US qt, 4.3 Imp qt) after engine overhaul. F22B1 engine: 4.0 ℓ (4.2 US qt, 3.5 Imp qt) at oil change. 4.3 ℓ (4.5 US qt, 3.8 Imp qt) at oil change including filter. 5.6 ℓ (5.9 US qt, 4.9 Imp qt) after engine overhaul.
Change interval	Every 10,000 km (6,000 miles) or 6 (12*3) months

*3: European models

Oil Filter

Select the oil for the car according to this cart:



Ambient Temperature

4. Fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.

Replacement

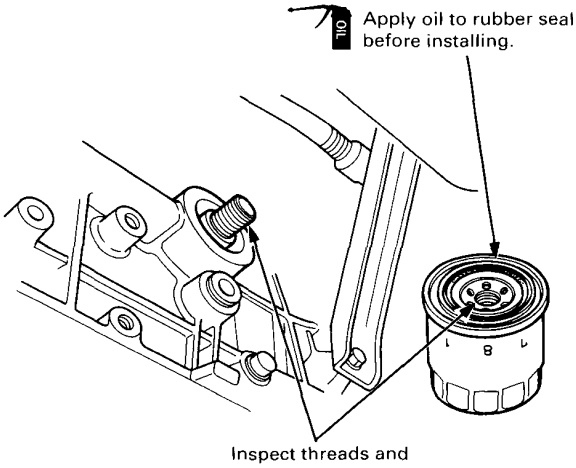
⚠ WARNING

- **After the engine has been run, the exhaust pipe will be hot; be careful when working around the exhaust pipe.**
- **Be careful when loosening the drain bolt while the engine is hot. Burns can result because the oil temperature is very high.**

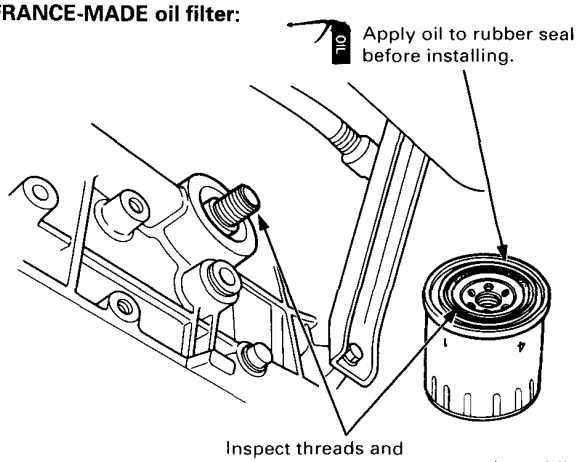
1. Remove the oil filter with the special oil filter wrench.

2. Inspect the threads and rubber seal on the new filter. Wipe off the seat on engine block, then apply a light coat of oil to the filter rubber seal.

   NOTE: Use only filters with a built-in bypass system.



FRANCE-MADE oil filter:



(cont'd)

Oil Filter

Replacement (cont'd)

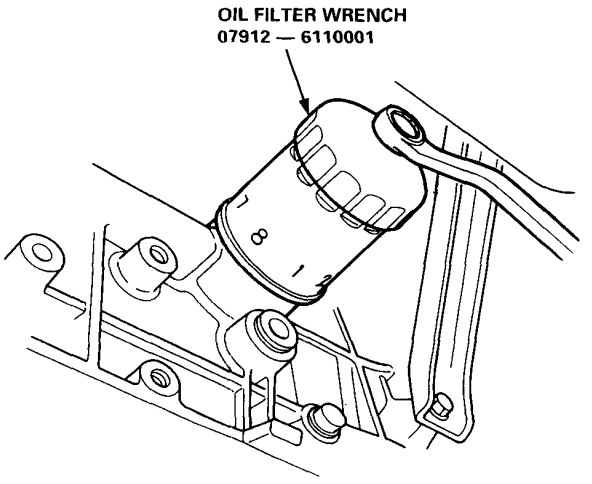
3. Install the oil filter by hand.

4. After the rubber seal seats, tighten the oil filter clockwise with the special tool.

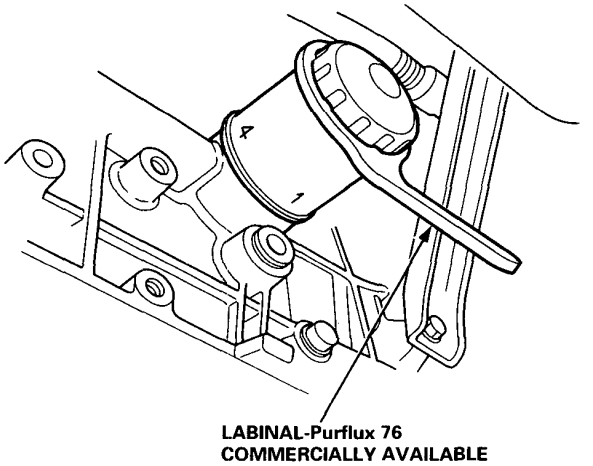
   Tighten: 7/8 turn clockwise.
   Tightening torque: 22 N·m (2.2 kgf·m, 16 lbf·ft)

   FRANCE-MADE oil filter:
   Tighten: three quarter turn clockwise.
   Tightening torque: 22 N·m (2.2 kgf·m, 16 lbf·ft)

   CAUTION: Installation using other than the above procedure could result in serious engine damage due to oil leakage.



FRANCE-MADE oil filter:



Eight numbers (1 to 8) are printed on the surface of the filter.

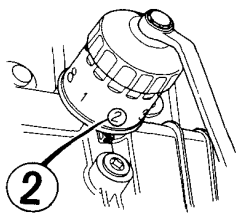
France-made oil filter:
Four numbers (1 to 4) are printed on the surface of the filter.

The following explains the procedure for tightening filters using these numbers.

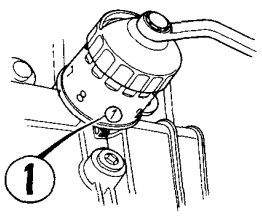
1) Make a mark on the cylinder block under the number that shows at the bottom of the filter when the rubber seal is seated.

2) Tighten the filter by turning it clockwise seven numbers from the marked point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened until the number 1 comes up to the marked point.

   France-made oil filter:
   Tighten the filter by turning it clockwise three numbers from the marked point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened until the number 1 comes up to the marked point.



Number when rubber seal is seated.



Number after tightening.

Number when rubber seal is seated	1	2	3	4	5	6	7	8
Number after tightening	8	1	2	3	4	5	6	7

FRANCE-MADE oil filter:

Number when rubber seal is seated	1	2	3	4
Number after tightening	4	1	2	3

5. After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.

Oil Pressure

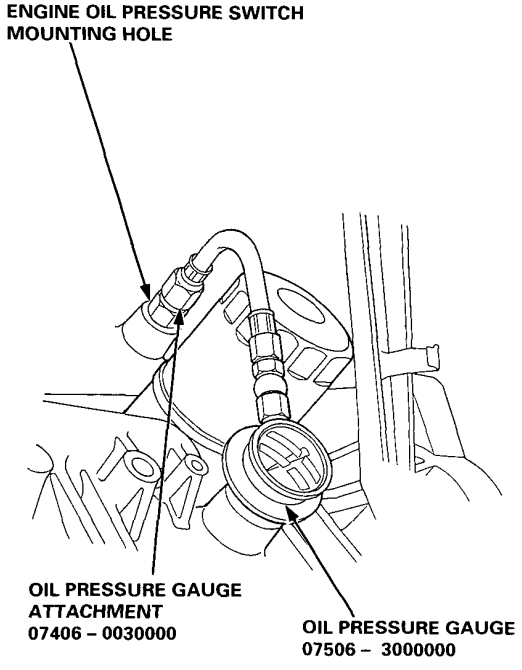
Testing

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

1. Connect a tachometer.
2. Remove the engine oil pressure switch and install an oil pressure gauge.
3. Start the engine. Shut it off immediately if the gauge registers no oil pressure. Repair the problem before continuing.
4. Allow the engine to reach operating temperature (fan comes on at least twice). The pressure should be:

   Engine Oil Temperature: 80°C (176°F)
   Engine Oil Pressure:
   At Idle: 69 kPa (0.7 kgf/cm², 10 psi) minimum
   At 3,000 rpm (min⁻¹): 340 kPa (3.5 kgf/cm², 50 psi) minimum

   - If oil pressure is within specifications, replace the oil pressure switch and recheck.
   - If oil pressure is NOT within specifications, inspect the oil pump (page 8-10).

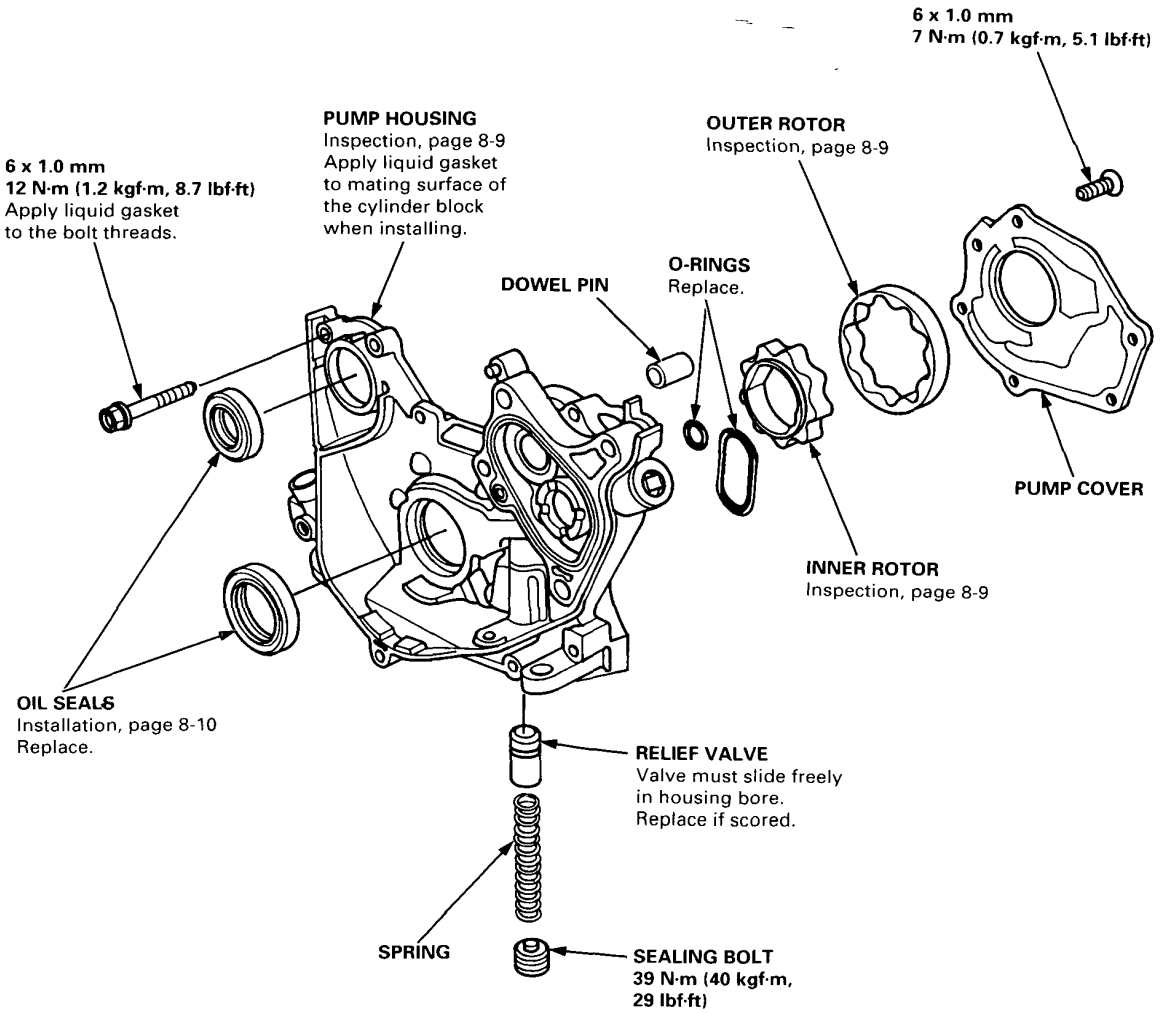


Oil Pump

Overhaul

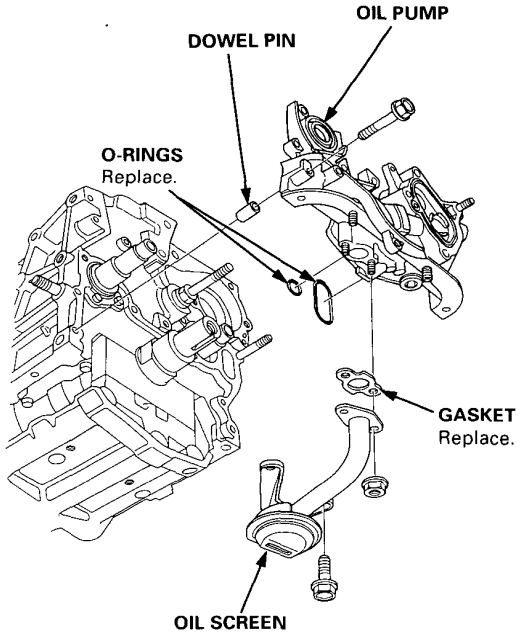
NOTE:

- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 0Y740 – 99986.
- The rotors must be installed to the same direction in order.
- After reassembly, check that the rotors move without binding.



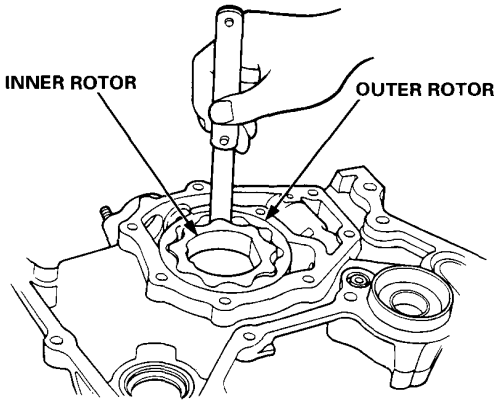
Removal/Inspection/Installation

1. *Drain the engine oil.*
2. Turn the crankshaft so that the No. 1 piston is at top dead center (see page 6-22).
3. Remove the timing belt and the timing balancer belt (see page 6-19).
4. Remove the timing belt tensioner and the timing balancer belt tensioner.
5. Remove the timing belt drive pulley and the timing balancer belt driven pulley (see page 6-16).
6. Remove the balancer gear case and the balancer *driven gear (see page 7-12).*
7. Remove the oil pan and the oil screen.
8. Remove the mounting bolts and the oil pump assembly.



9. *Remove the screws from the pump housing,* then separate the housing and cover.
10. Check the inner-to-outer rotor radial clearance on the pump rotor.

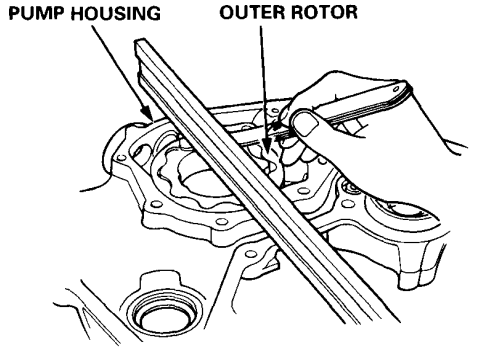
Inner Rotor-to-Outer Rotor Radial Clearance
Standard (New): 0.02 – 0.16 mm (0.001 – 0.006 in)
Service Limit: 0.20 mm (0.008 in)



— If the inner-to-outer rotor clearance exceeds the service limit, replace the inner and outer rotors.

11. *Check the housing-to-rotor axial clearance on the* pump rotor.

Housing-to-Rotor Axial Clearance
Standard (New): 0.02 – 0.07 mm (0.001 – 0.003 in)
Service Limit: 0.12 mm (0.005 in)



— If the housing-to-rotor axial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

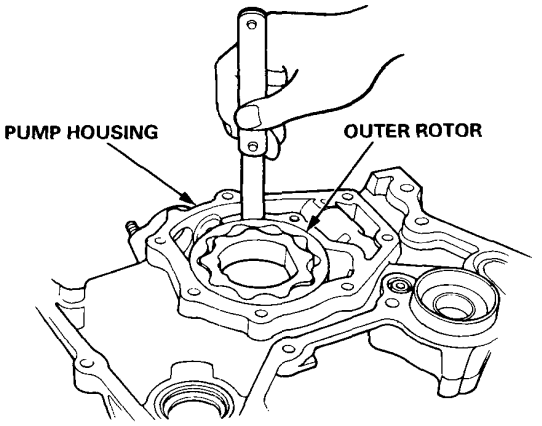
(cont'd)

Oil Pump

Removal/Inspection/Installation (cont'd)

12. Check the housing-to-outer rotor radial clearance.

    Housing-to-Outer Rotor Radial Clearance
    Standard (New): 0.10 — 0.19 mm (0.004 — 0.007 in)
    Service Limit: 0.21 mm (0.008 in)



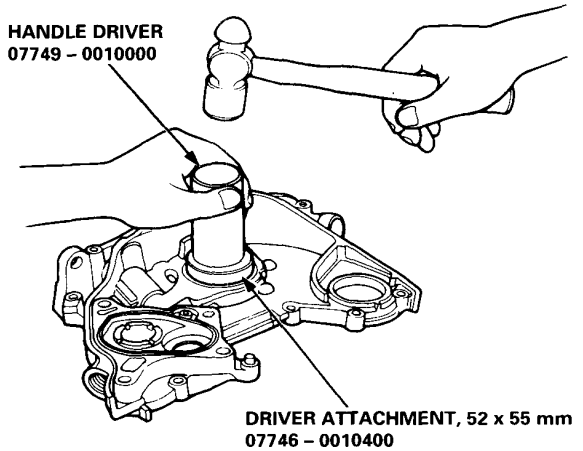
— If the housing-to-outer rotor radial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

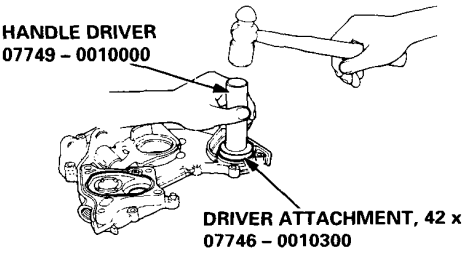
13. Inspect both rotors and the pump housing for scoring or other damage. Replace parts if necessary.

14. Remove the old oil seals from the oil pump.

15. Gently tap in the new oil seals until the special tool bottoms on the pump.

    NOTE: The oil seals alone can be replaced without removing the oil pump by using the special tool.





16. Reassemble the oil pump, applying liquid thread lock to the pump housing screws.

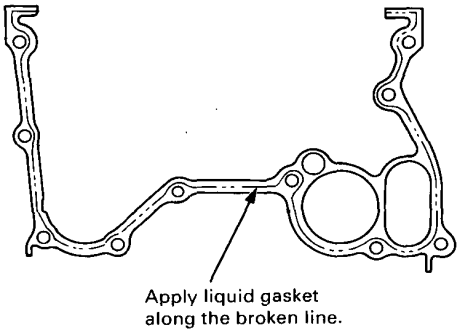
17. Check that the oil pump turns freely.

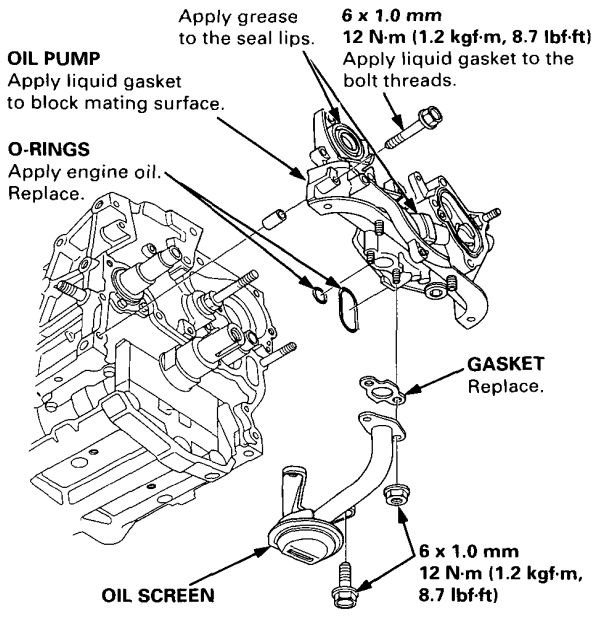
18. Install a dowel pin and the new O-ring on the pump.

    NOTE:
    - Use liquid gasket, Part No. 0Y740 - 99986.
    - Check that the mating surfaces are clean and dry before applying liquid gasket.
    - Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
    - To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
    - Do not install the parts if 5 minutes or more have elapsed since applying liquid gasket. Instead reapply liquid gasket after removing the old residue.
    - After assembly, wait at least 20 minutes before filling the engine with oil.

19. Apply liquid gasket to the oil pump and install it.

    - Apply grease to the lips of the crankshaft oil seal and the balancer shaft seal. Then, install the oil pump inner rotor onto the crankshaft. When the pump is in place, clean any excess grease off the crankshaft and the balancer shaft, then check that the oil seal lips are not distorted.



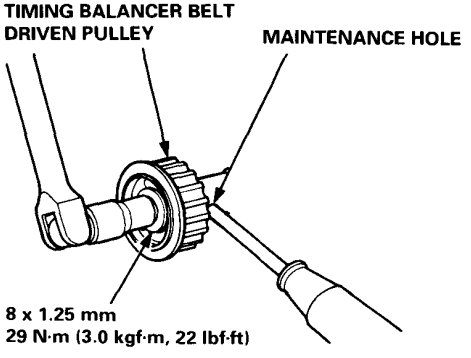


20. Install the baffle plate (F22B1 engine only).

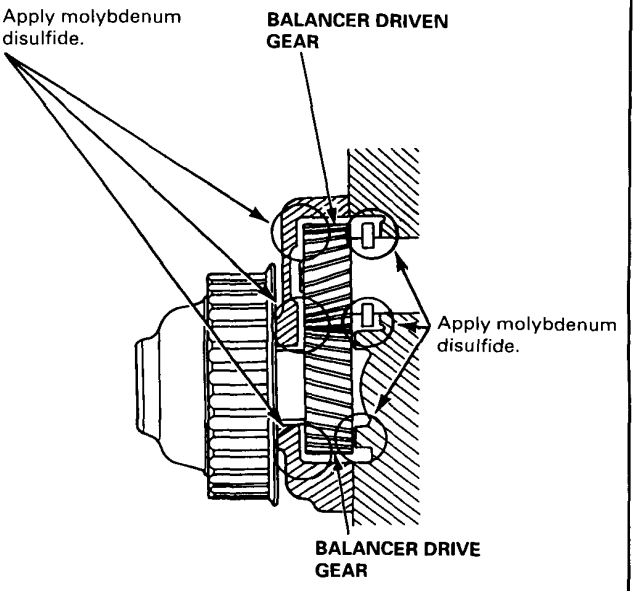
21. Install the oil screen.

22. Hold the front balancer shaft with a screwdriver, then install the timing balancer belt driven pulley.

FRONT BALANCER:

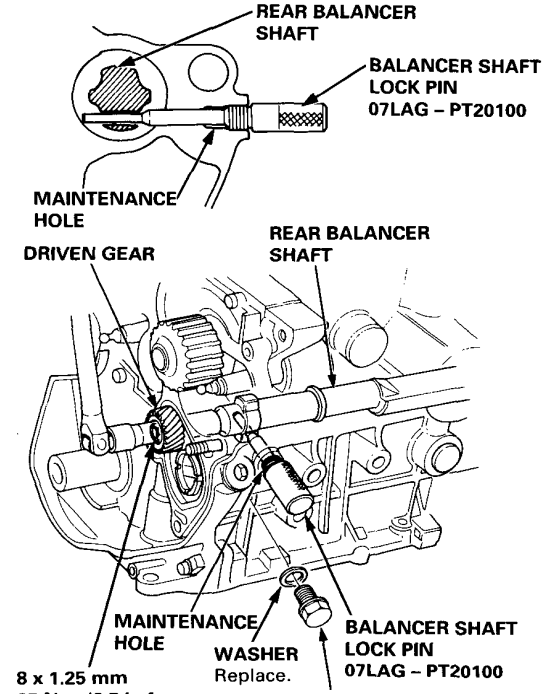


23. Before installing the balancer driven gear and the balancer gear case, apply molybdenum disulfide to the thrust surfaces of the balancer gears, as shown.



24. Hold the rear balancer shaft with the special tool, then install the balancer driven gear.

REAR BALANCER:

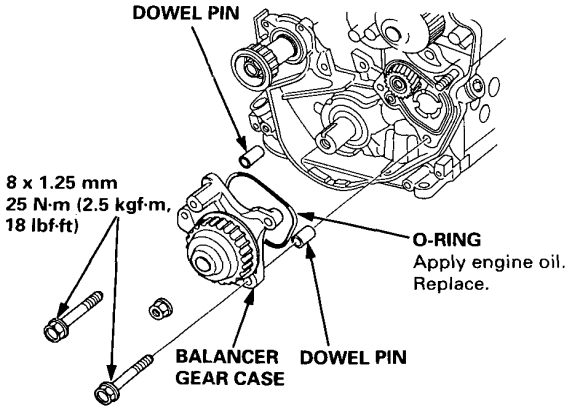


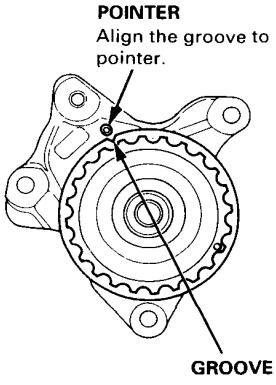
(cont'd)

Removal/Inspection/Installation (cont'd)

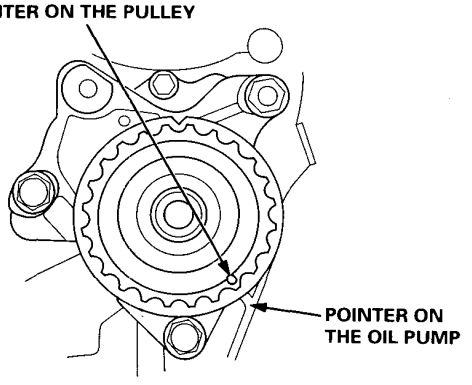
25. Install the balancer gear case on the oil pump.

NOTE: Align the groove on the pulley edge to the pointer on the gear case while holding the rear balancer with the special tool, then install the gear case.



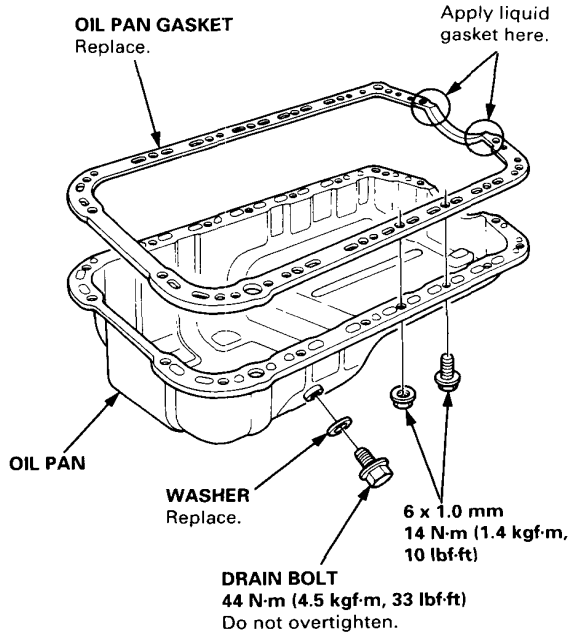


26. Check alignment of pointers after installing the gear case.



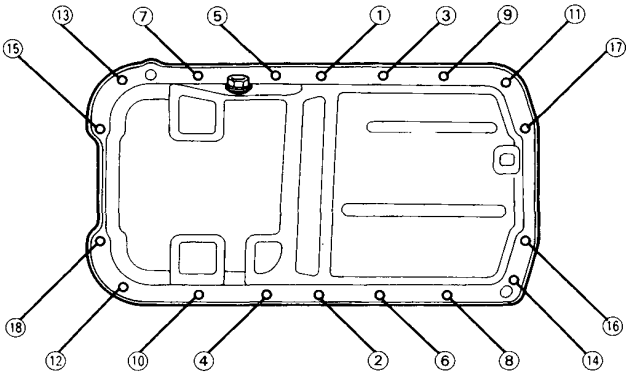
27. Install the oil pan.

NOTE: Clean the oil pan gasket mating surface before installing.



28. Tighten the bolts and nuts as shown below.

Torque: 14 N·m (1.4 kgf·m, 10 lbf·ft)



NOTE: Tighten the bolts and nuts in three steps and torque them in a crisscross pattern.

Intake Manifold/Exhaust System

Intake Manifold
Replacement 9-2
Exhaust Manifold
Replacement 9-3
Exhaust Pipe and Muffler
Replacement 9-5

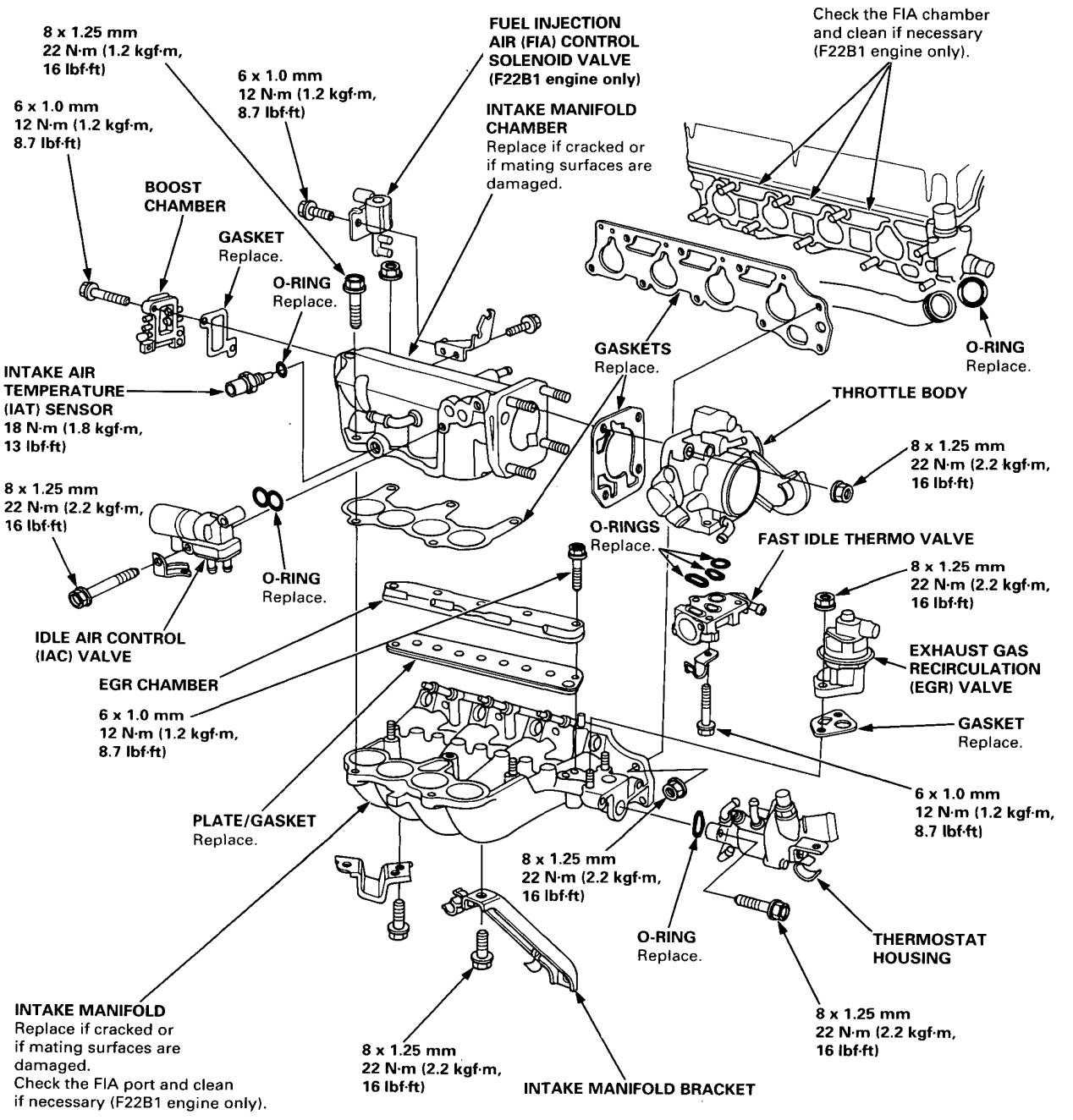


Intake Manifold

Replacement

NOTE: Use new O-rings and gaskets when reassembling.

CAUTION:
- **Check for folds or scratches on the surface of the gasket.**
- **Replace with a new gasket if damaged.**



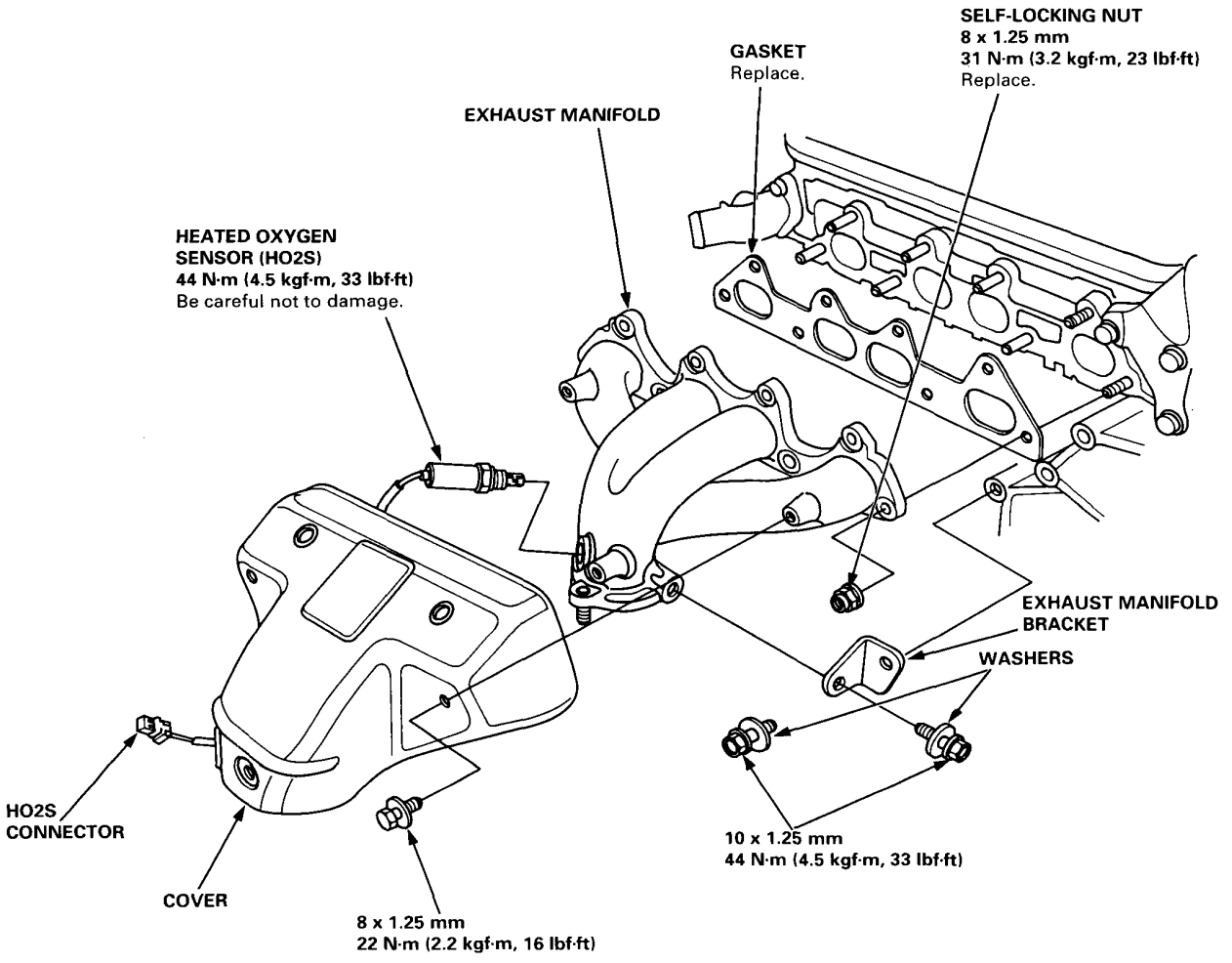
Exhaust Manifold

Replacement

NOTE: Use new gaskets and self-locking nuts when reassembling.

CAUTION:
- **Check for folds or scratches on the surface of the gasket.**
- **Replace with a new gasket if damaged.**

F22B2 engine:



(cont'd)

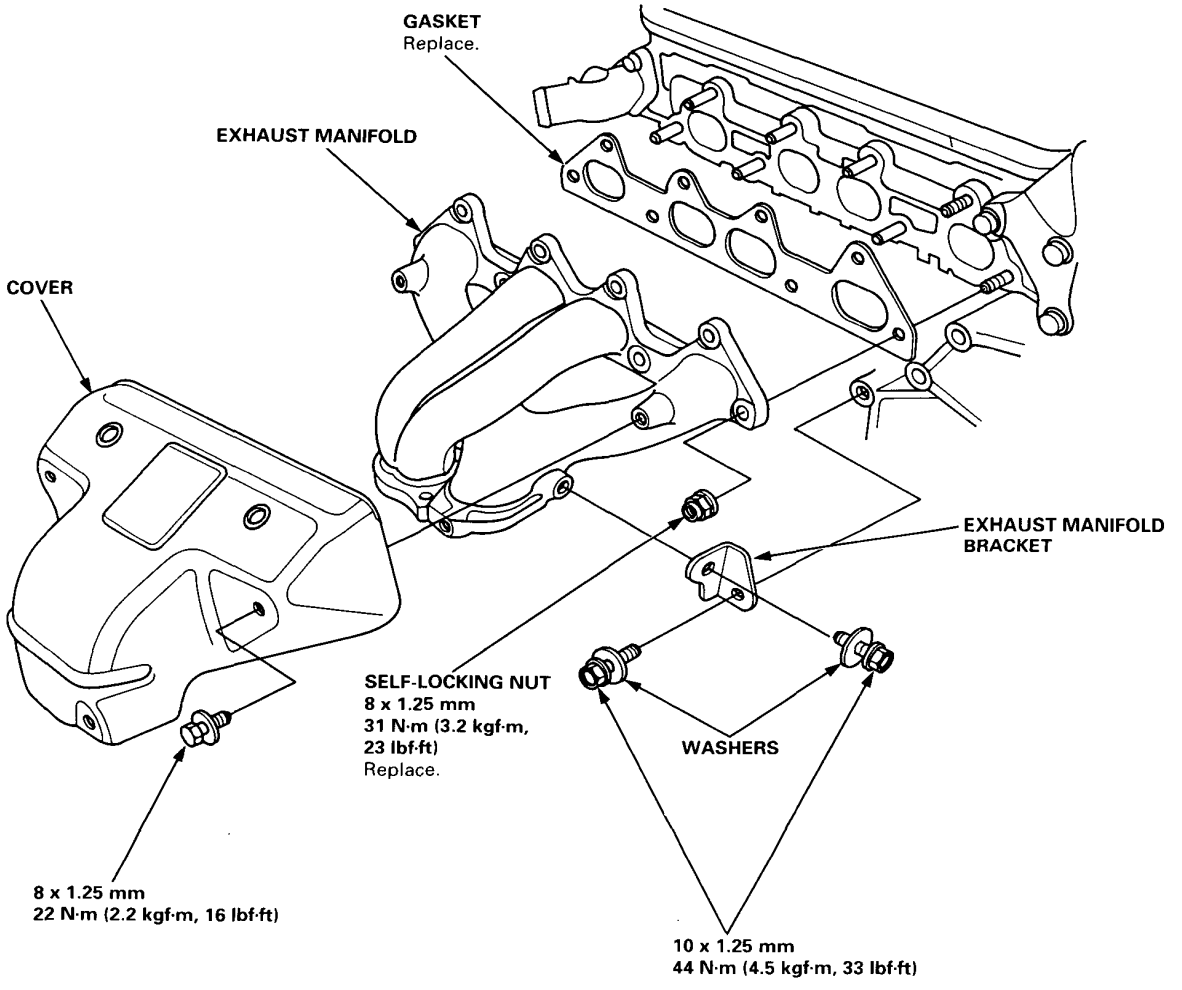
Exhaust Manifold

Replacement (cont'd)

NOTE: Use new gaskets and self-locking nuts when reassembling.

CAUTION:
- **Check for folds or scratches on the surface of the gasket.**
- **Replace with a new gasket if damaged.**

Except F22B2 engine:

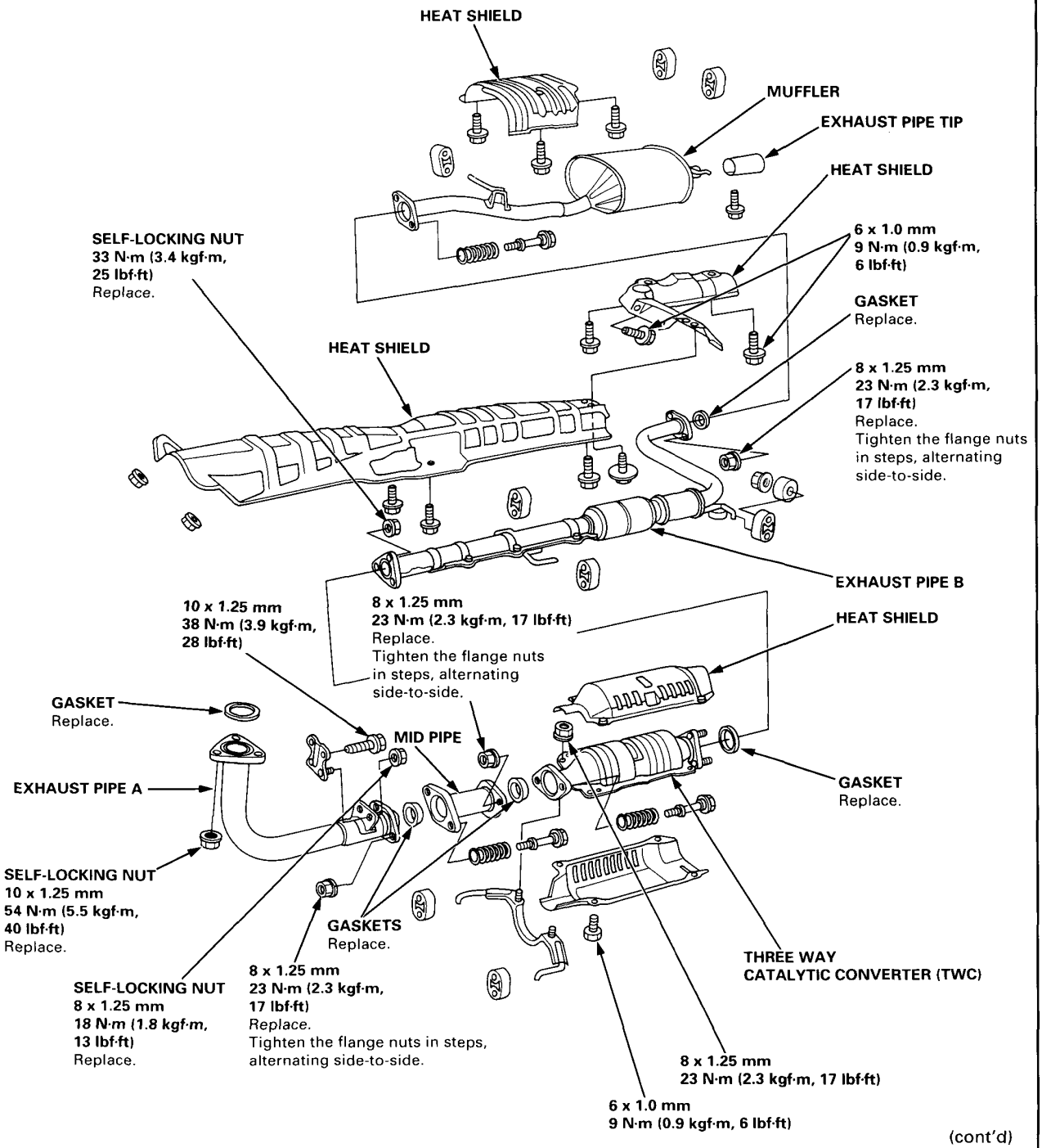


Exhaust Pipe and Muffler

Replacement

NOTE: Use new gaskets and self-locking nuts when reassembling.

F22B2 engine:



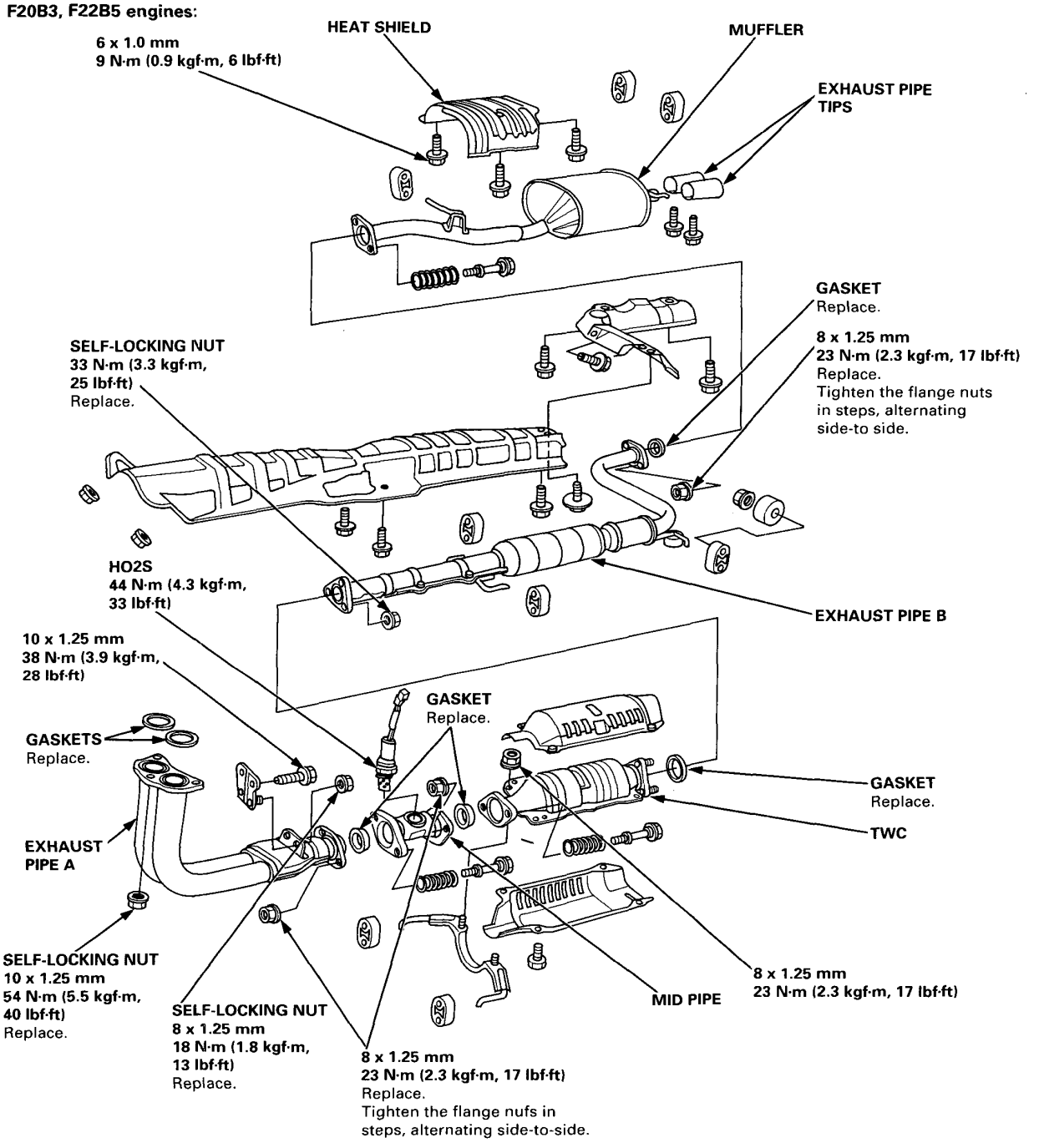
(cont'd)

Exhaust Pipe and Muffler

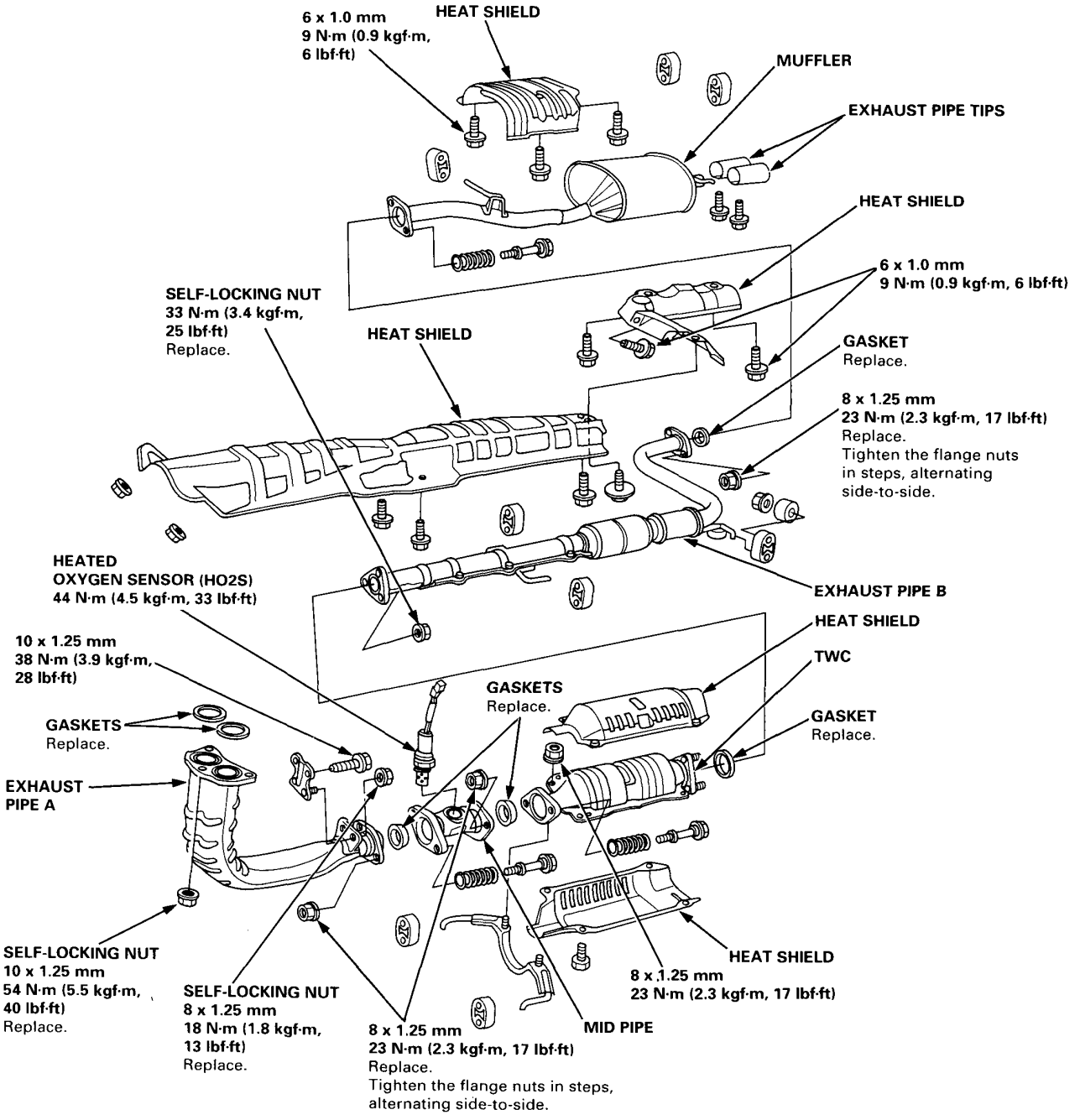
Replacement (cont'd)

NOTE: Use new gaskets and self-locking nuts when reassembling.

F20B3, F22B5 engines:



F22B1 engine:



Cooling

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- Testing 10-6

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Radiator

Illustrated Index

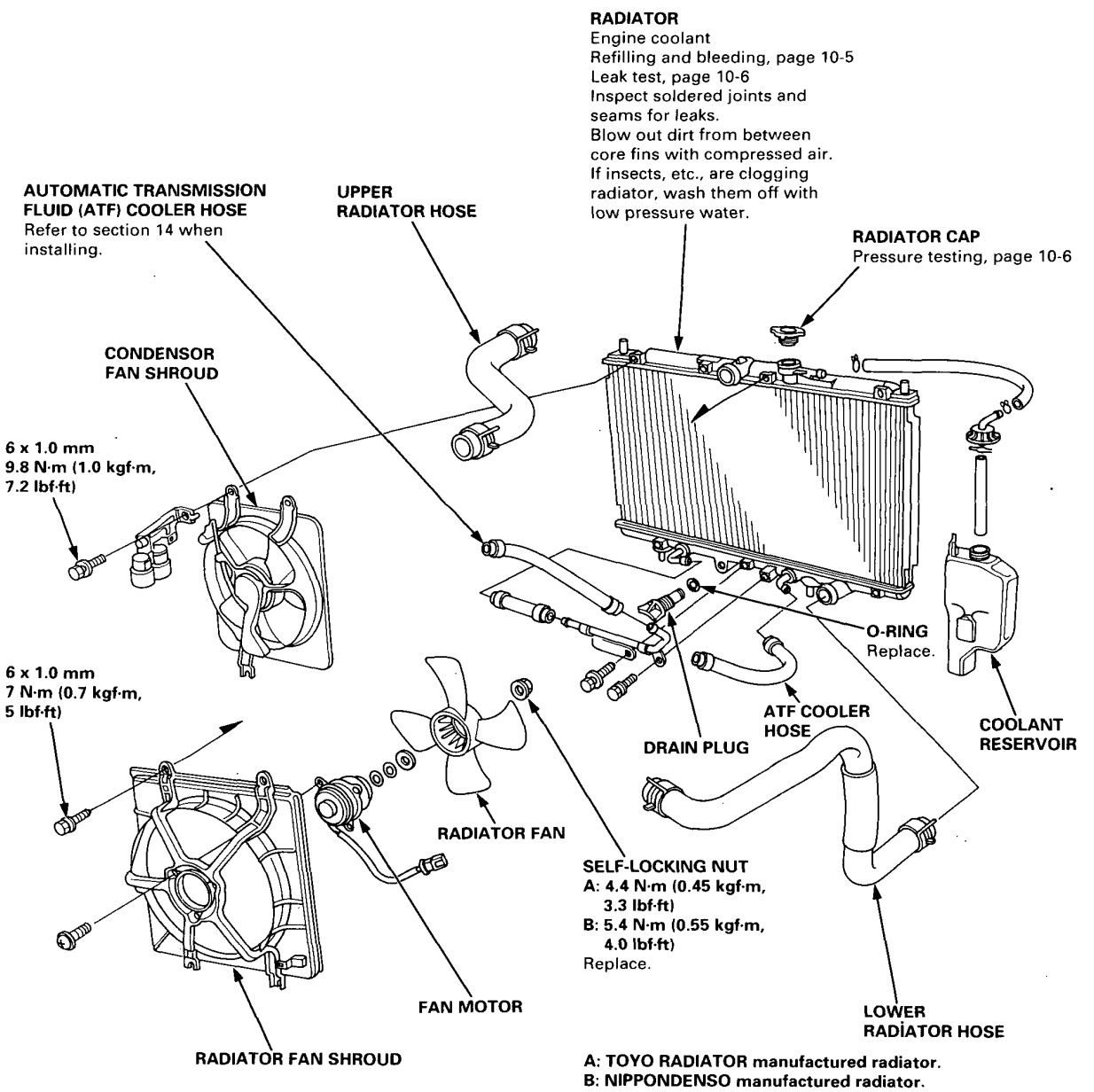
⚠ WARNING **System is under high pressure when engine is hot. To avoid danger of releasing scalding coolant, remove cap only when engine is cool.**

Total Cooling System Capacity (Including heater and reservoir)

M/T: 6.9 ℓ (7.4 US qt, 6.1 Imp qt)
A/T: 6.8 ℓ (7.3 US qt, 6.0 Imp qt)
Reservoir capacity: 0.6 ℓ (0.6 US qt, 0.5 Imp qt)

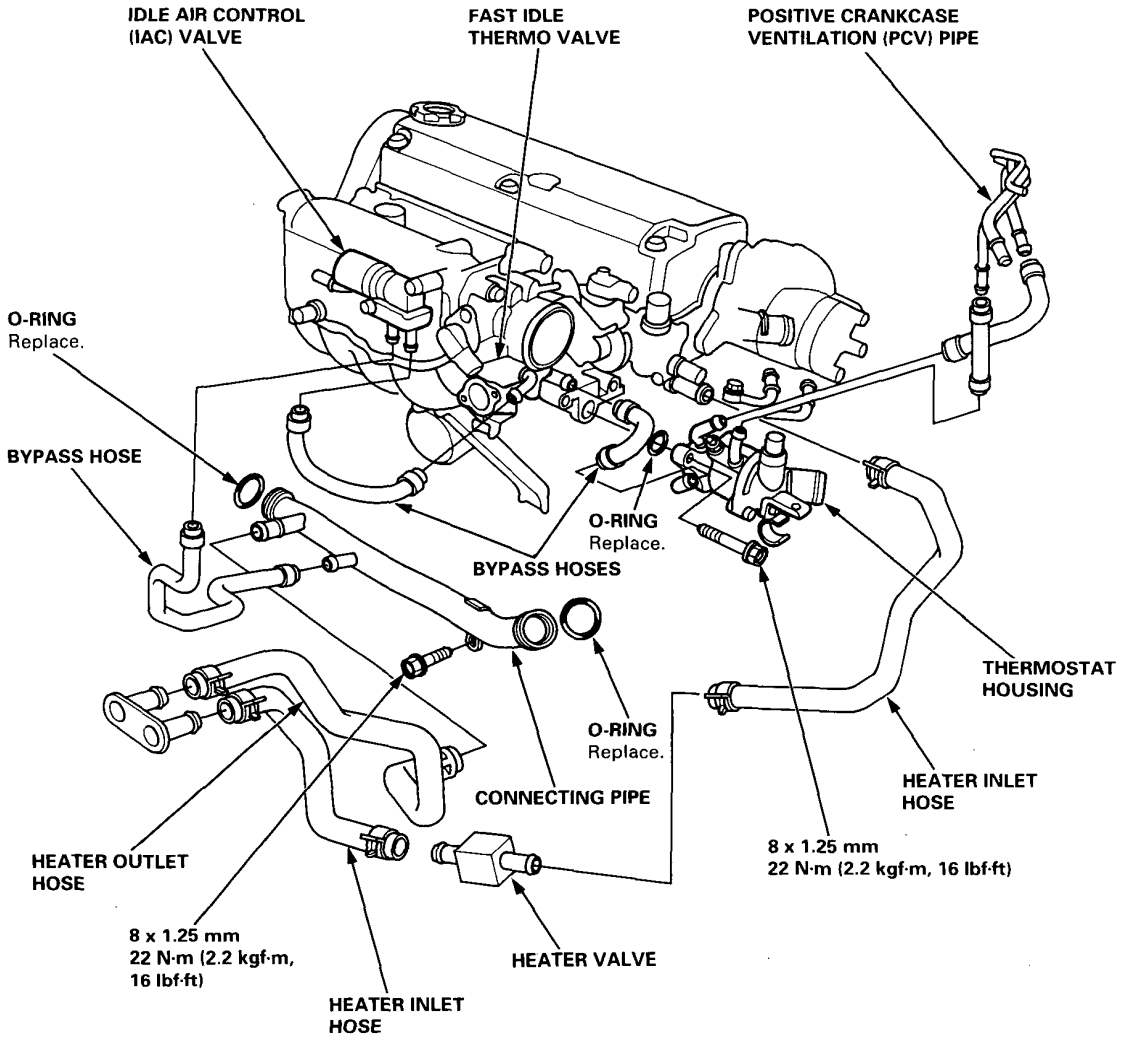
CAUTION: When pouring engine coolant, be sure to shut the relay box lid and not to spill coolant on the electrical parts or the painted portion. If any coolant spills, rinse it off immediately.

NOTE:
- Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
- Check all hose clamps and retighten if necessary.
- Use new O-rings when reassembling.



A: TOYO RADIATOR manufactured radiator.
B: NIPPONDENSO manufactured radiator.

Engine Hose Connections:



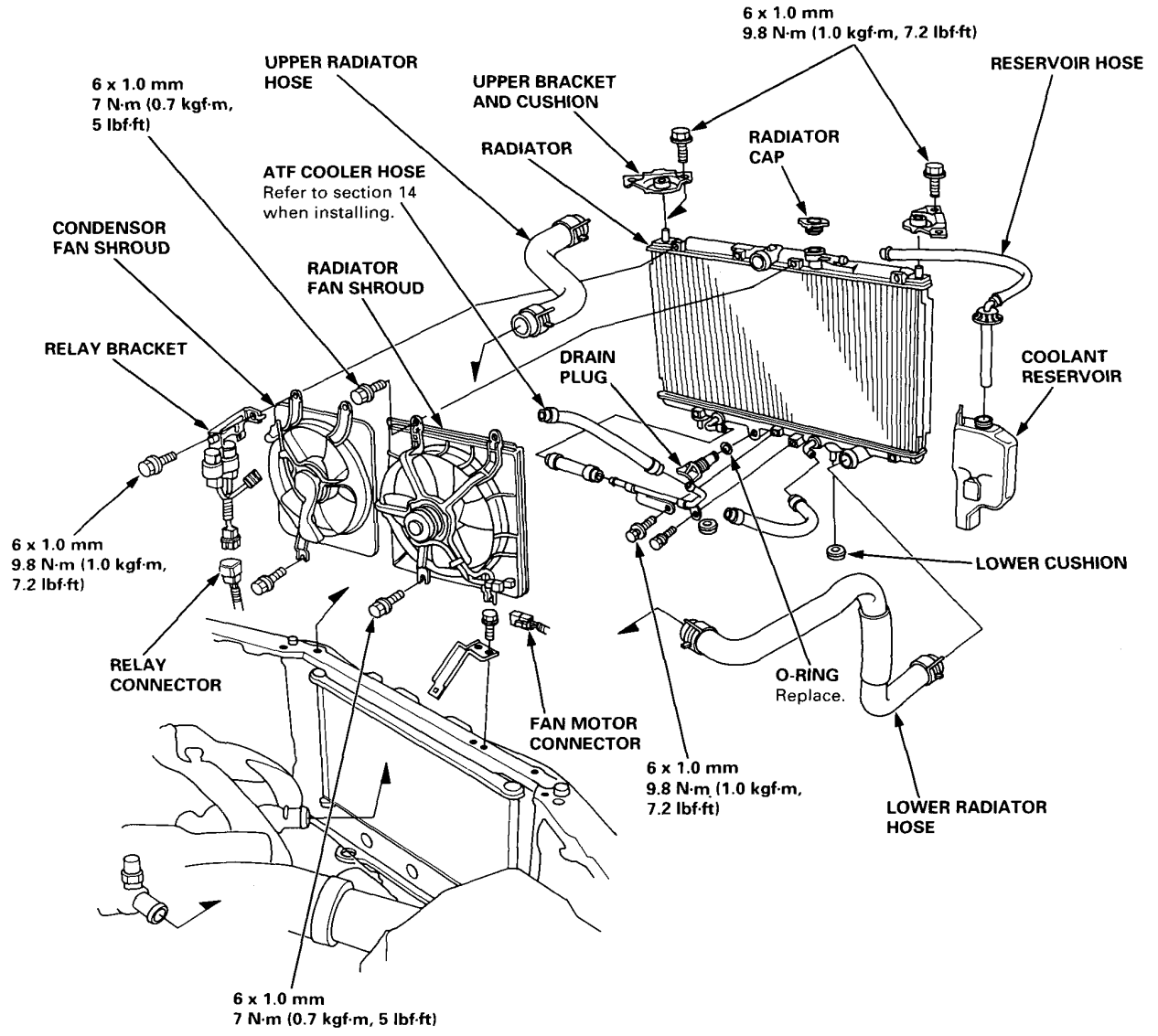
Radiator

Replacement

1. Drain engine coolant.
2. Remove the upper and lower radiator hoses, and ATF cooler hoses.
3. Disconnect the fan motor connectors.
4. Remove the radiator upper brackets, then pull up the radiator.
5. Remove the fan shroud assemblies and other parts from radiator.

Install the radiator in the reverse order of removal:

NOTE:
- Set the upper and lower cushions securely.
- Fill the radiator with engine coolant and bleed the air.



Engine Coolant Refilling and Bleeding

CAUTION: When pouring engine coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the paint. If any coolant spills, rinse it off immediately.

1. Set the heater temperature lever or control dial to maximum heat.
2. When the radiator is cool, remove the radiator cap. Loosen the drain plug, and drain the coolant.
3. Remove the drain bolt from the rear side of the cylinder block to drain the block.
4. Apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer and tighten it securely.
5. Tighten the radiator drain plug securely.
6. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with antifreeze.
7. Mix the recommended antifreeze with an equal amount of water in a clean container.

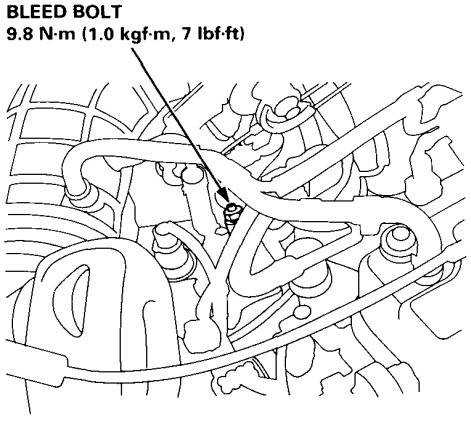
   NOTE:
   - Use only genuine Honda antifreeze/coolant.
   - For best corrosion protection, the coolant concentration must be maintained year-round at 50% minimum. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
   - Coolant concentrations greater than 60 % will impair cooling efficiency and are not recommended.

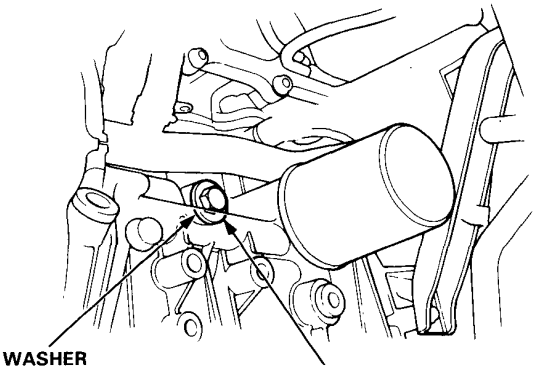
   CAUTION:
   - **Do not mix different brands of antifreeze/coolants.**
   - **Do not use additional rust inhibitors or anti-rust products; they may not be compatible with the genuine coolant.**

   Engine Coolant Refill Capacity: including reservoir (0.6 ℓ (0.6 US qt, 0.5 Imp qt)).

   M/T: 5.4 ℓ (5.7 US qt, 4.8 Imp qt)
   A/T: 5.3 ℓ (5.6 US qt, 4.7 Imp qt)

8. Loosen the air bleed bolt in the thermostat housing, then fill the radiator to the bottom of the filler neck with the coolant mixture. Tighten the bleed bolt as soon as coolant starts to run out in a steady stream without bubbles.



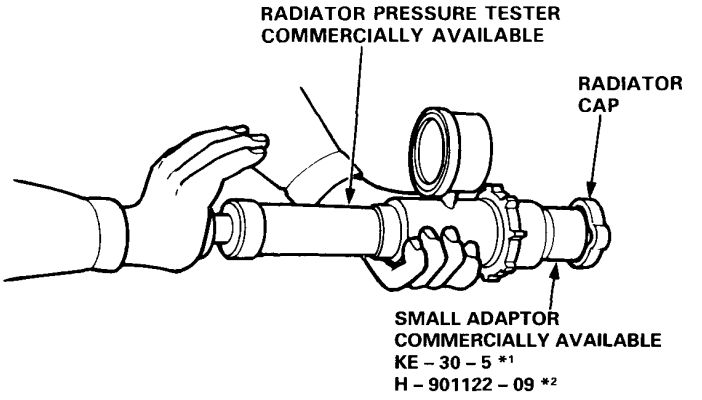


9. With the radiator cap off, start the engine and let it run until warmed up (radiator fan comes on at least twice). Then, if necessary, add more coolant mix to bring the level back up to the bottom of the filler neck.
10. Put the radiator cap on tightly, then run the engine again and check for leaks.

Radiator

Cap Testing

1. Remove the radiator cap, wet its seal with engine coolant, then install it on the pressure tester.
2. Apply a pressure of 93 – 123 kPa (0.95 – 1.25 kgf/cm², 14 – 18 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.

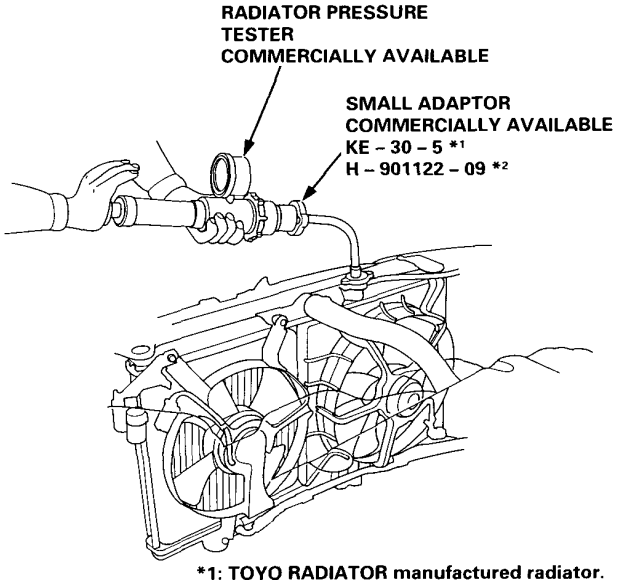


*1: TOYO RADIATOR manufactured radiator.
*2: NIPPONDENSO manufactured radiator.

Testing

1. Wait until the engine is cool, then carefully remove the radiator cap and fill the radiator with engine coolant to the top of the filler neck.
2. Attach the pressure tester to the radiator and apply a pressure of 93 – 123 kPa (0.95 – 1.25 kgf/cm², 14 – 18 psi).
3. Inspect for engine coolant leaks and a drop in pressure.
4. Remove the teater and reinstall the radiator cap.

   NOTE: Check for engine oil in the coolant and/or coolant in engine oil.

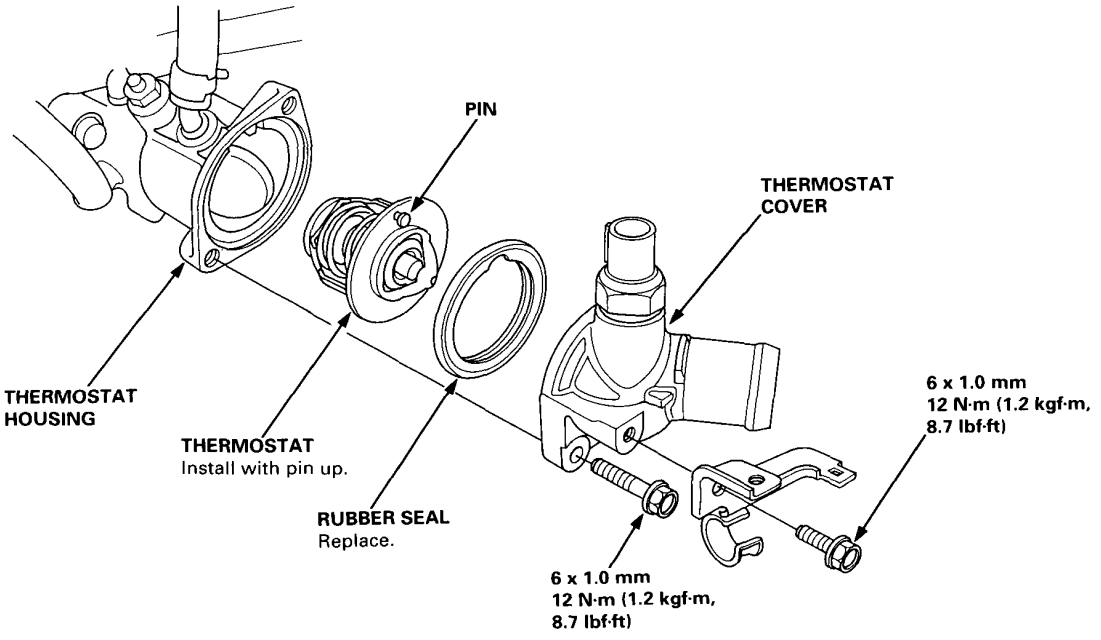


*1: TOYO RADIATOR manufactured radiator.
*2: NIPPONDENSO manufactured radiator.

Thermostat

Replacement

NOTE: Use new O-rings when reassembling.



Testing

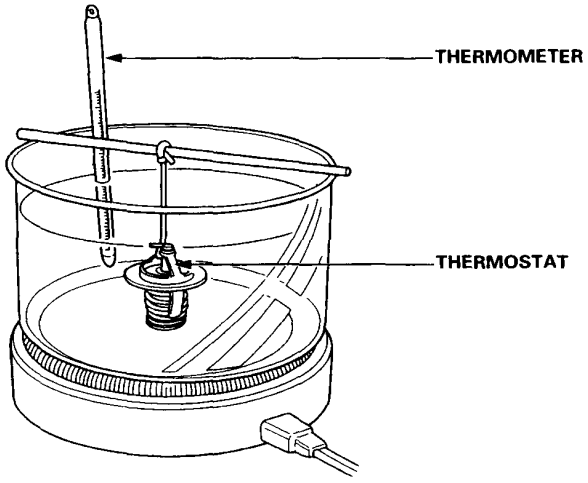
Replace the thermostat if it is open at room temperature.

To test a closed thermostat:

1. Suspend the thermostat in a container of water as shown.
2. Heat the water and check the temperature with a thermometer. Check the temperature at which the thermostat first opens, and at which it is fully open.

   CAUTION: Do not let the thermometer touch the bottom of hot container.
3. Measure lift height of the thermostat when fully open.

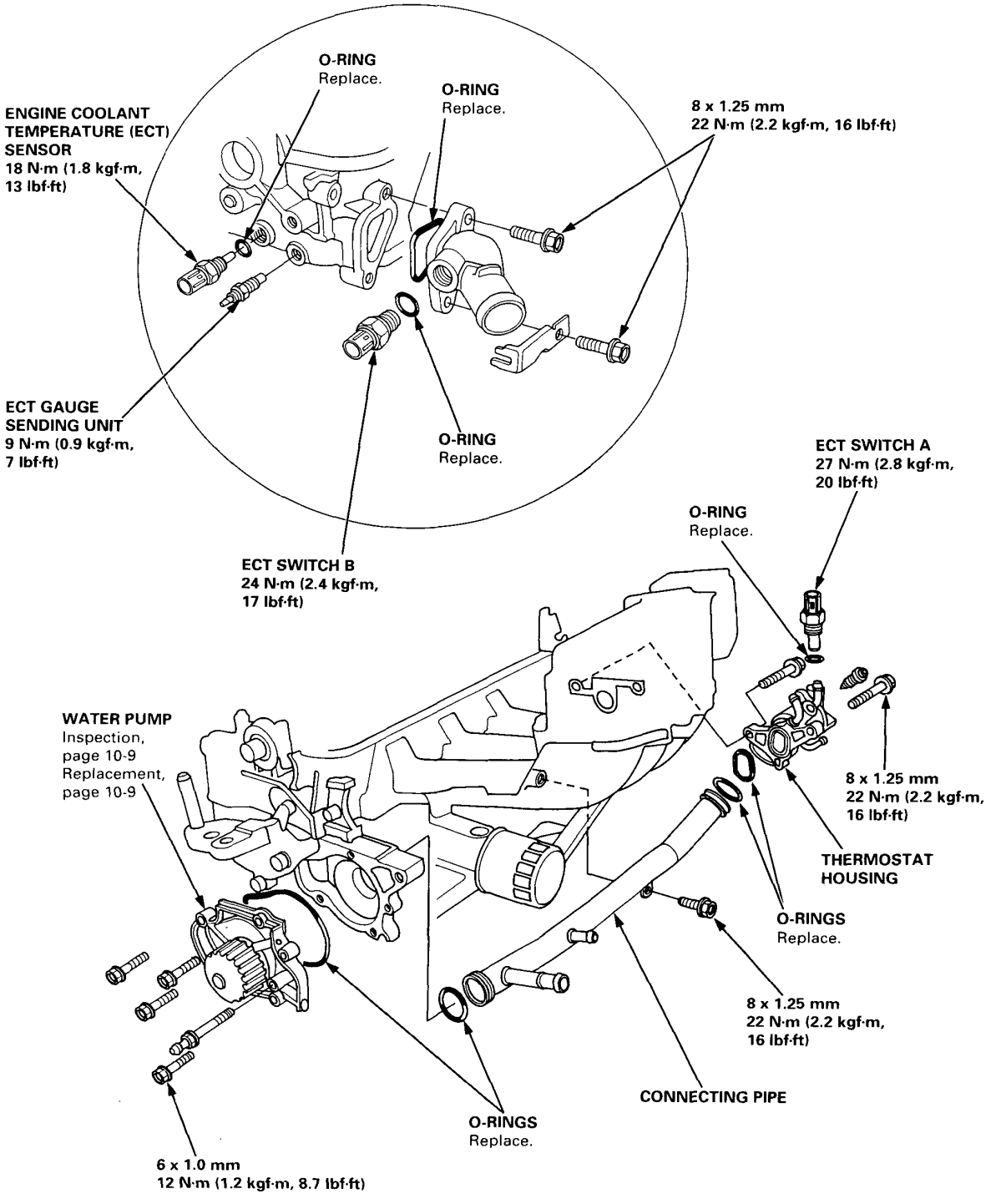
   STANDARD THERMOSTAT
   Lift height: above 8.0 mm (0.31 in.)
   Starts opening: 76 – 80°C (169 – 176°F)
   Fully open: 90°C (194°F)



Water Pump

Illustrated Index

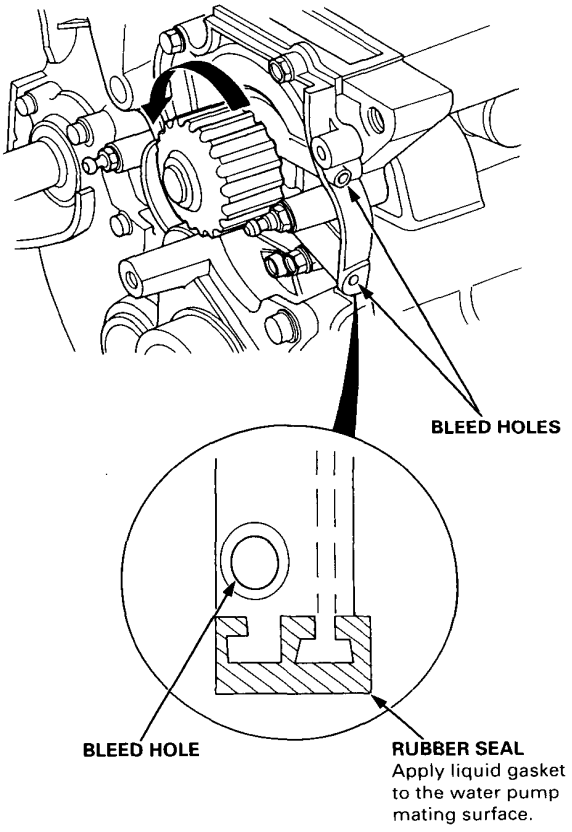
NOTE: Use new O-rings when reassembling.



Inspection

1. Remove the timing belt (see page 6-19).
2. Check that the water pump pulley turns counter-clockwise.
3. Check for signs of seal leakage.

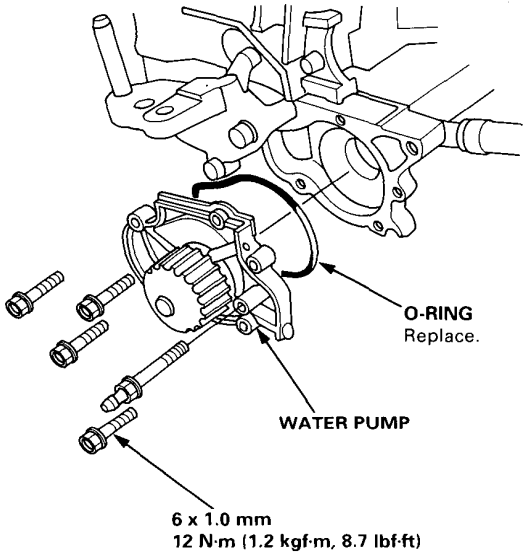
   NOTE: A small amount of "weeping" from the bleed hole is normal.



Replacement

1. Remove the timing belt (see page 6-19).
2. Remove the camshaft pulley and the back cover (see page 6-31).
3. Remove the water pump by removing five bolts.

   NOTE: Inspect, repair and clean the O-ring groove and mating surface with the cylinder block.



4. Install the water pump in the reverse order of removal.

   NOTE:
   - Keep the O-ring in position when installing.
   - Clean the spilled engine coolant.

Fuel and Emissions

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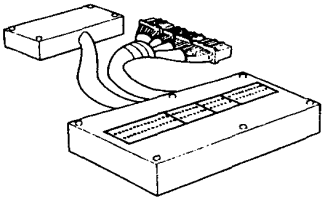


Special Tools

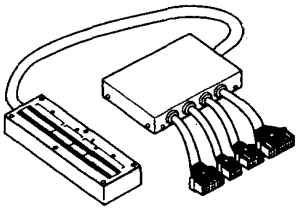
Ref. No	Tool Number	Description	Qty	Remarks
①	07LAA—PT50101	Oxygen Sensor Socket Wrench	1	
②	07LAJ—PT30100	Test Harness	1	
	or			
	07LAJ—PT3010A		1	
③	07PAZ—0010100	SCS Short Connector	1	
④	07406—0040001	Fuel Pressure Gauge Set	1	
④-1	07406—0040100	Pressure Gauge	(1)	Component Tools
④-2	07406—0040201	Hose Assy	(1)	Component Tools



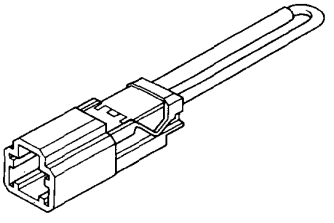
①



②



②



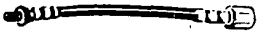
③



④



④-1

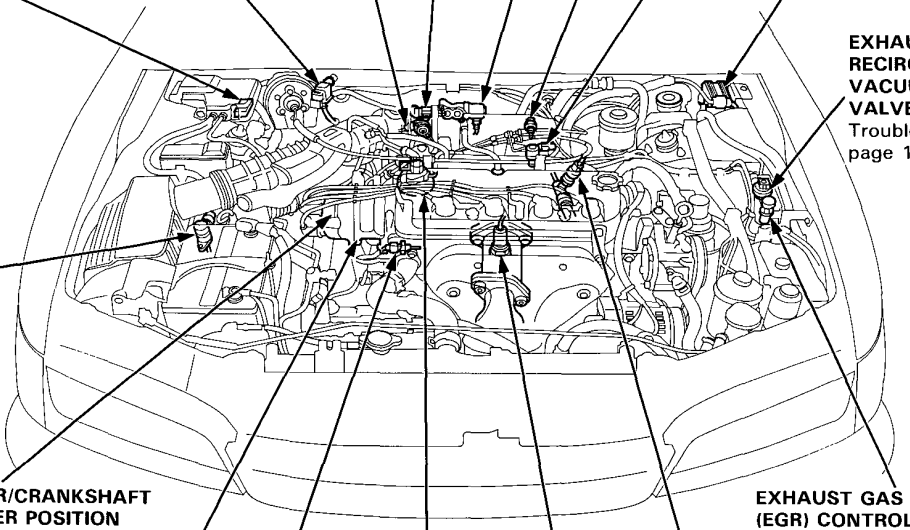


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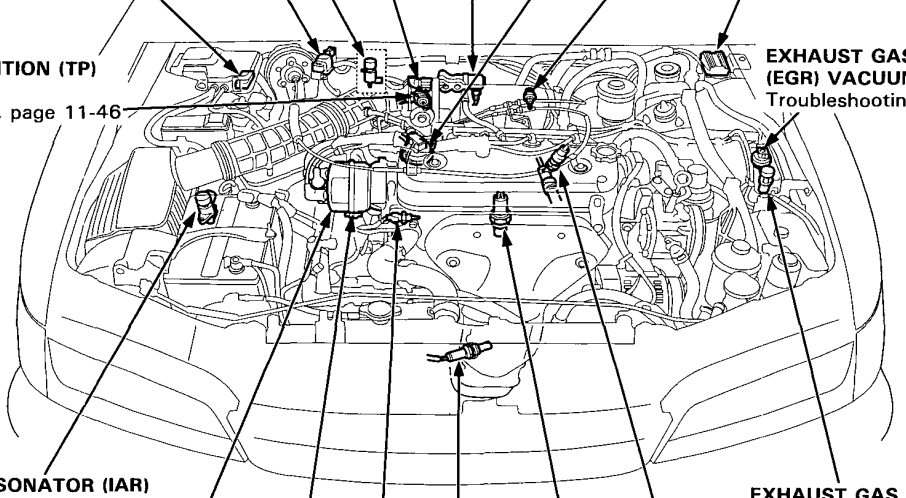
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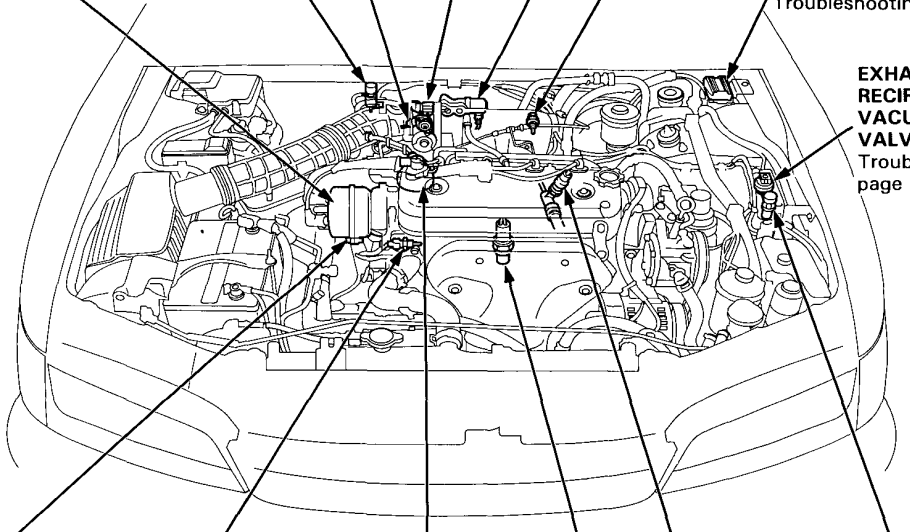
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ENGINE COOLANT TEMPERATURE (ECT) SENSOR
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HEATED OXYGEN SENSOR (HO2S) [F22B2 engine]
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F20B3 engine:



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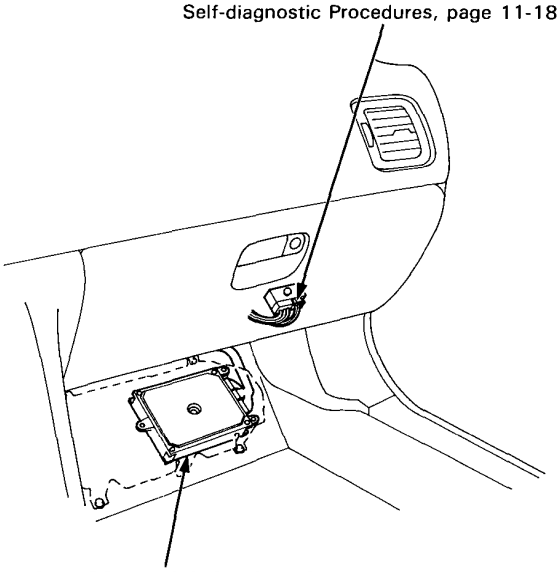
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Component Locations

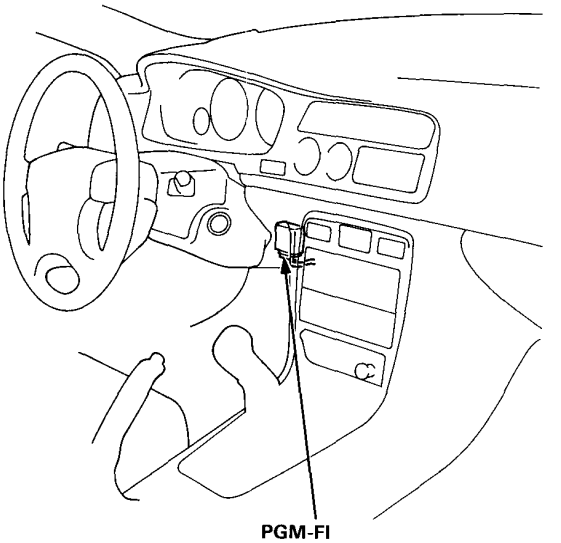
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SERVICE CHECK CONNECTOR (2P)
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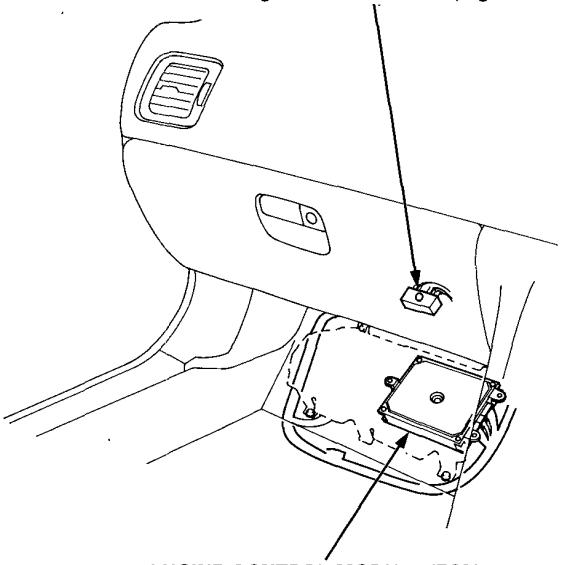
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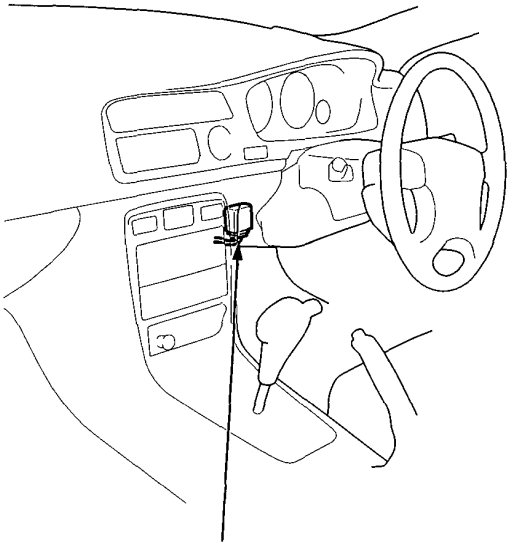
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RHD:

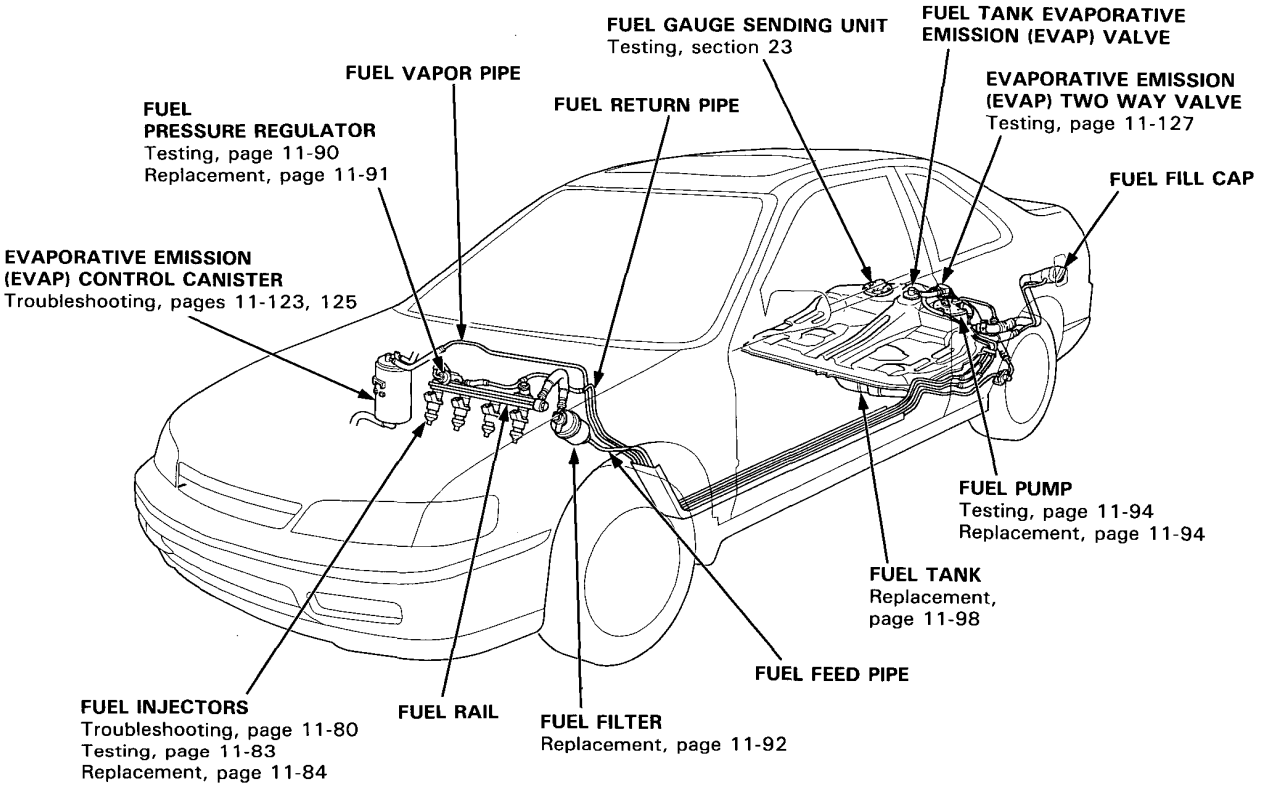
SERVICE CHECK CONNECTOR (2P)
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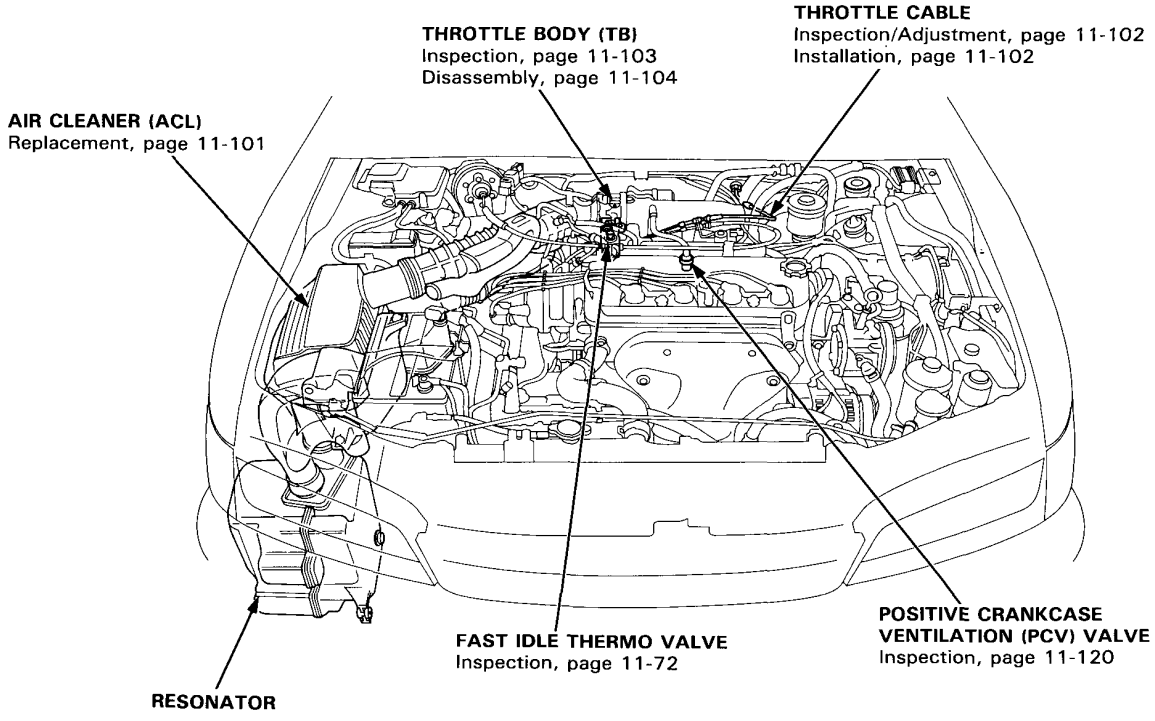


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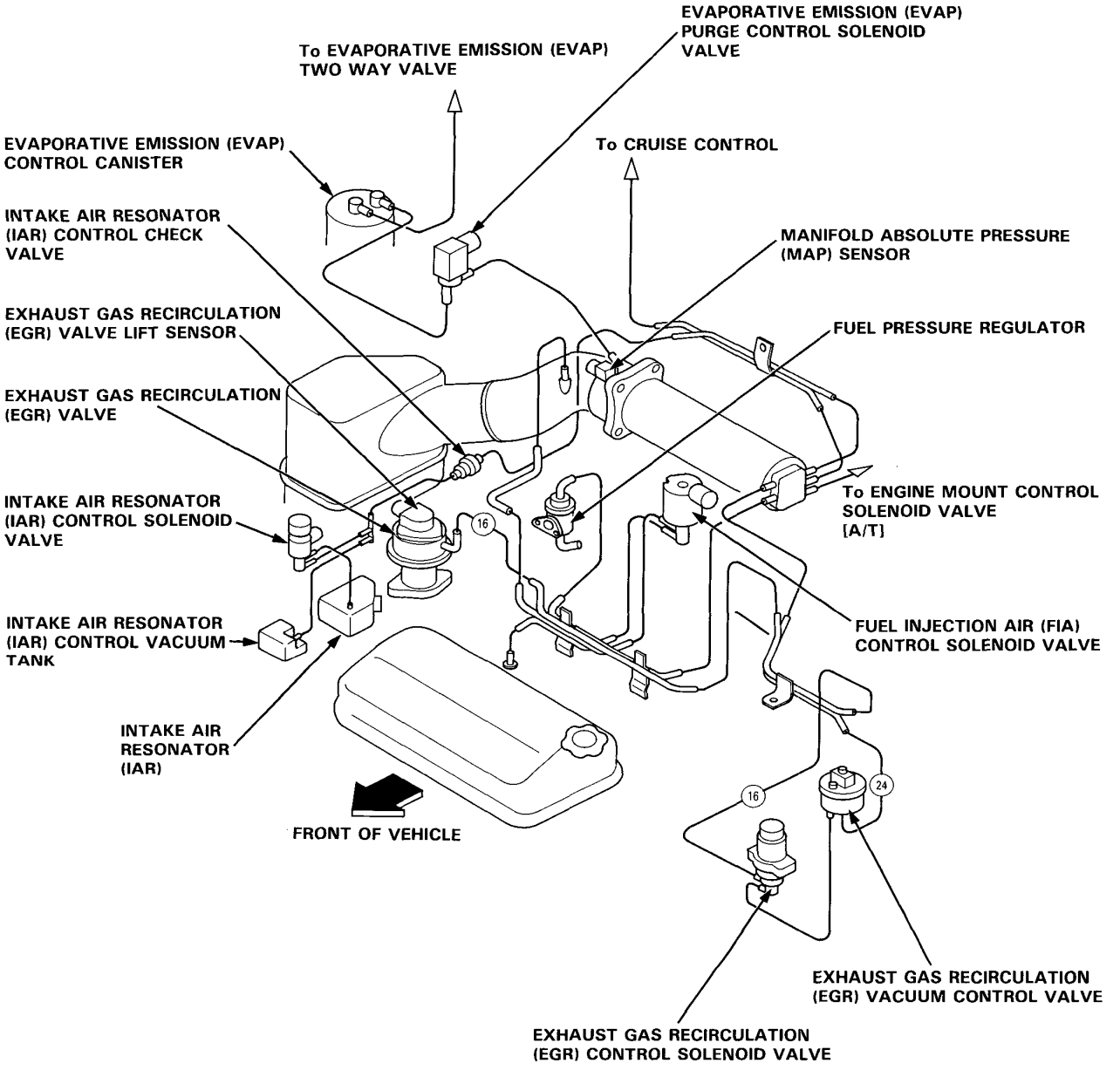

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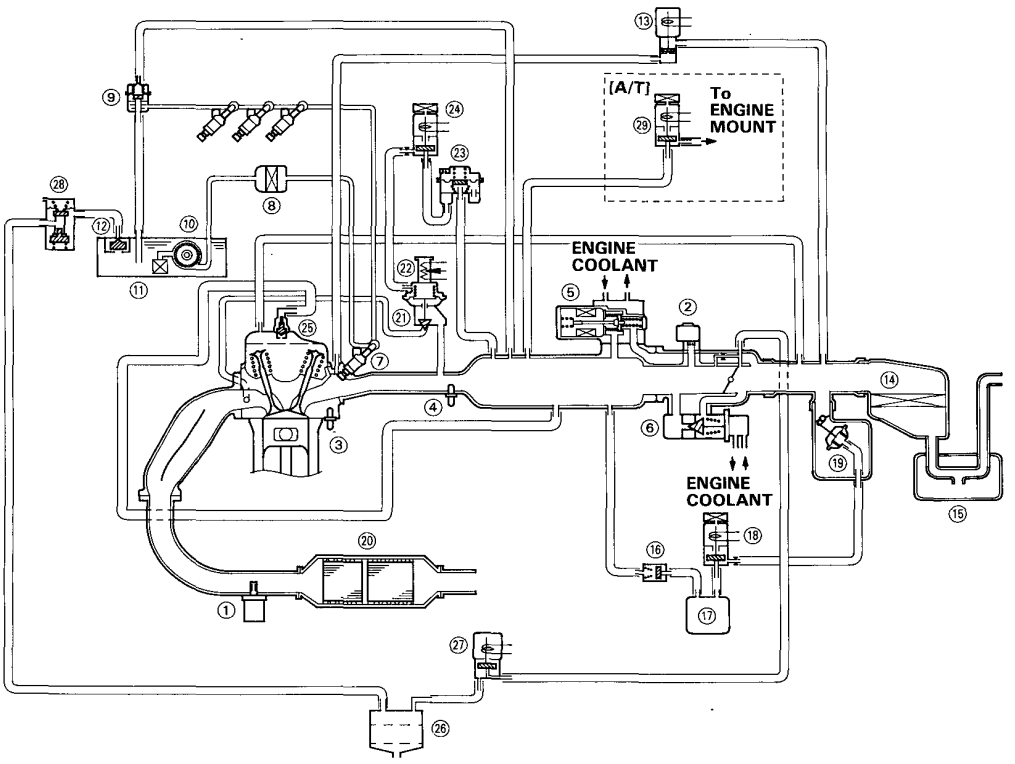

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Inspection, page 11-72
RESONATOR

System Description

Vacuum Connections

F22B1 engine:





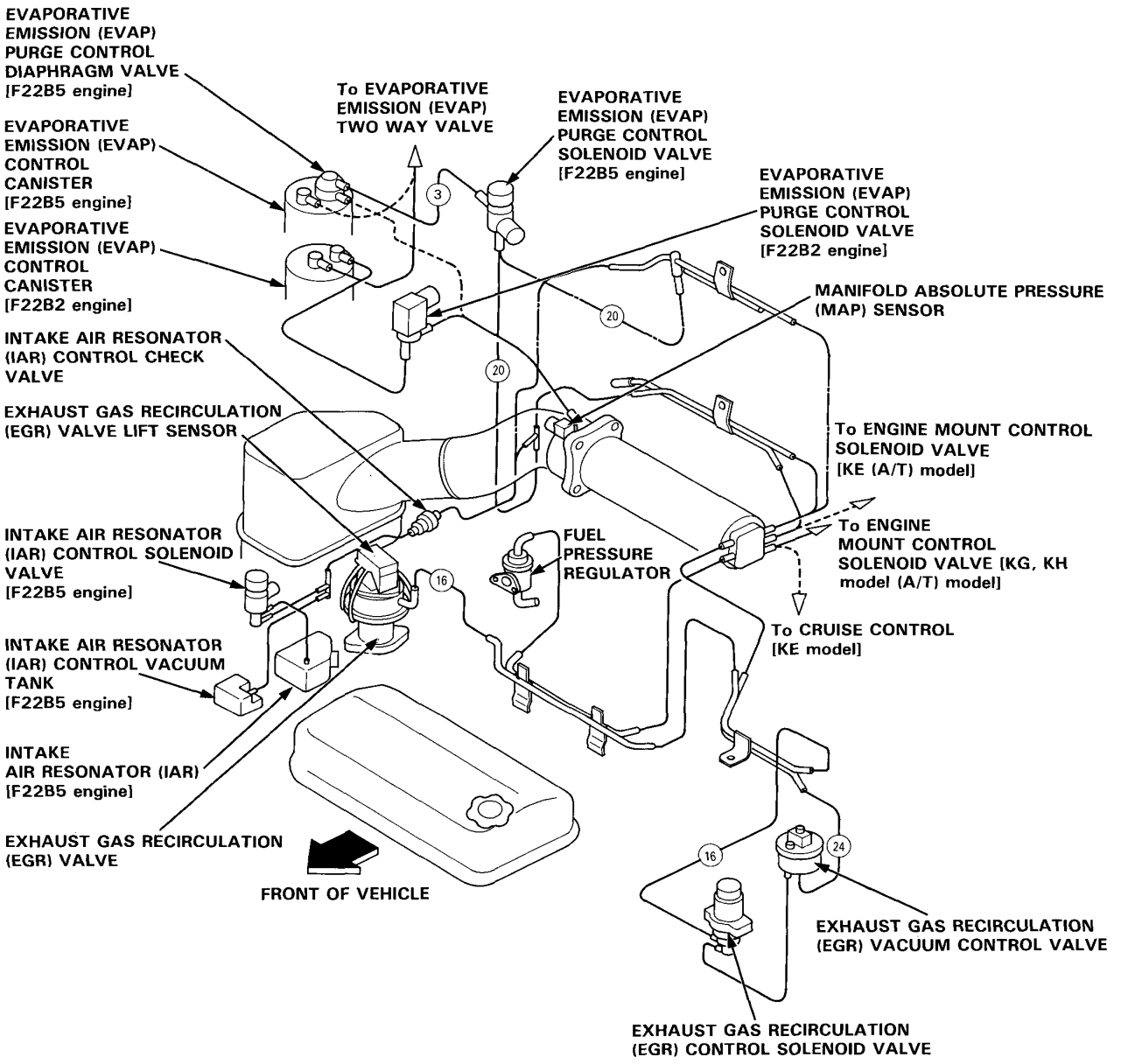
① HEATED OXYGEN SENSOR (HO2S)
② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
④ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑤ IDLE AIR CONTROL (IAC) VALVE
⑥ FAST IDLE THERMO VALVE
⑦ FUEL INJECTOR
⑧ FUEL FILTER
⑨ FUEL PRESSURE REGULATOR
⑩ FUEL PUMP (FP)
⑪ FUEL TANK
⑫ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
⑬ FUEL INJECTION AIR (FIA) CONTROL SOLENOID VALVE
⑭ AIR CLEANER
⑮ RESONATOR
⑯ INTAKE AIR RESONATOR (IAR) CONTROL CHECK VALVE
⑰ INTAKE AIR RESONATOR (IAR) CONTROL VACUUM TANK
⑱ INTAKE AIR RESONATOR (IAR) CONTROL SOLENOID VALVE
⑲ INTAKE AIR RESONATOR (IAR) CONTROL DIAPHRAGM VALVE
⑳ THREE WAY CATALYTIC CONVERTER (TWC)
㉑ EXHAUST GAS RECIRCULATION (EGR) VALVE
㉒ EXHAUST GAS RECIRCULATION (EGR) VALVE LIFT SENSOR
㉓ EXHAUST GAS RECIRCULATION (EGR) VACUUM CONTROL VALVE
㉔ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE
㉕ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
㉖ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉗ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉘ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㉙ ENGINE MOUNT CONTROL SOLENOID VALVE

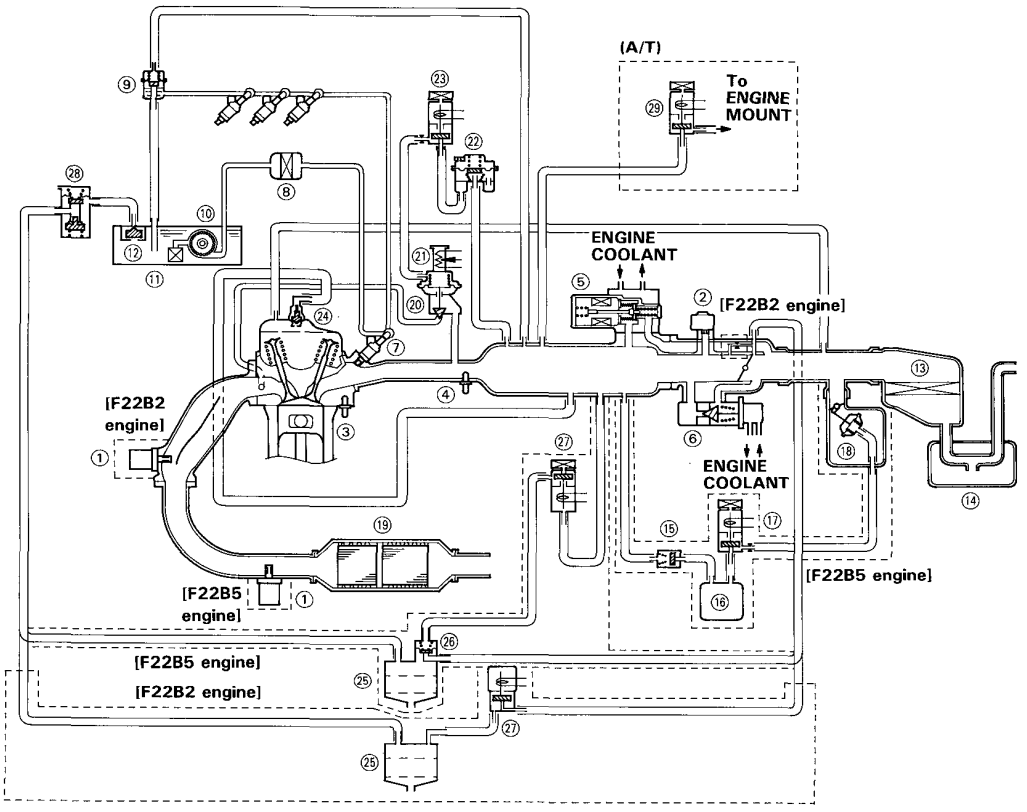
(cont'd)

System Description

Vacuum Connections (cont'd)

F22B2, F22B5 engine:





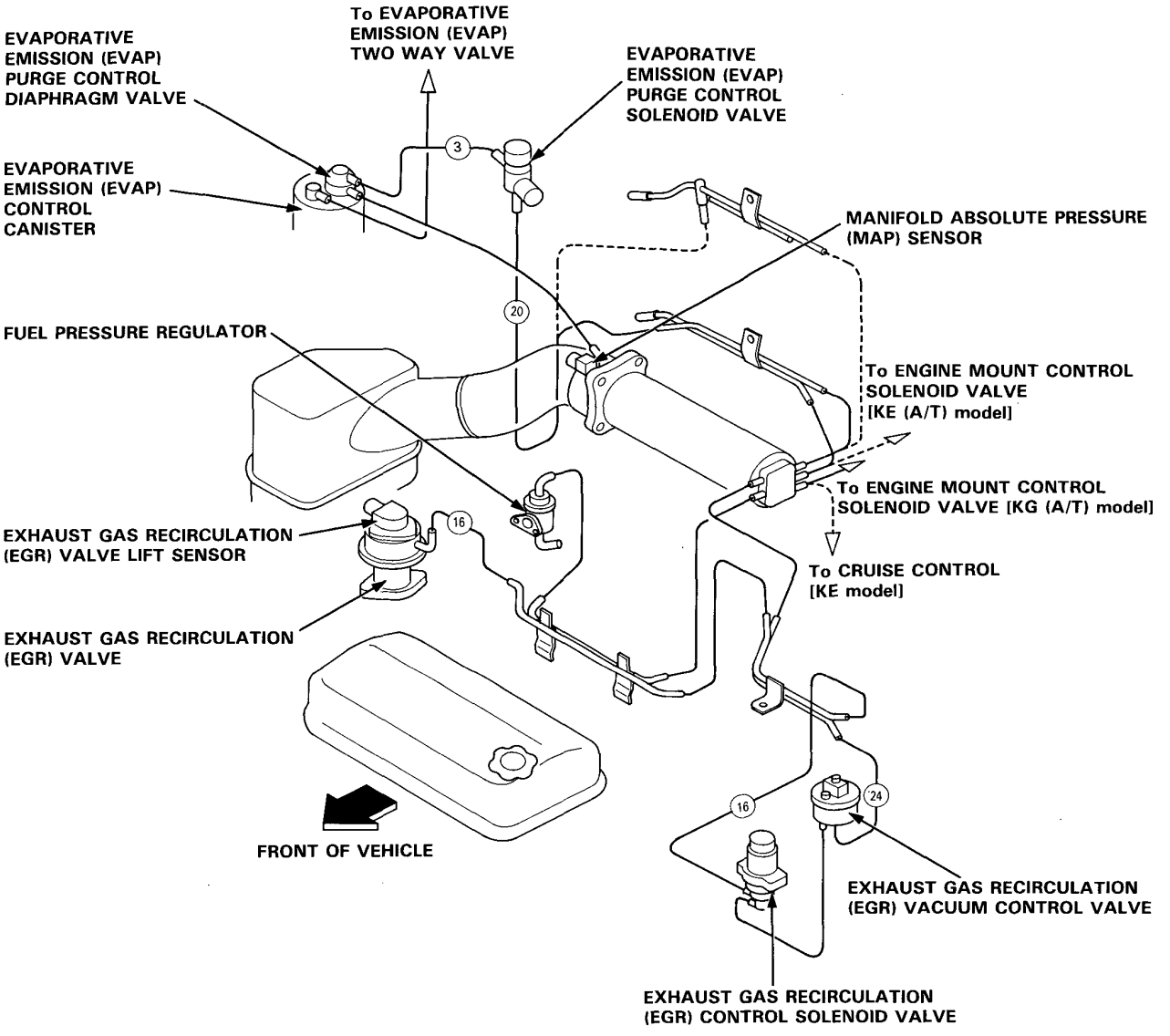
① HEATED OXYGEN SENSOR (HO2S)
② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
④ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑤ IDLE AIR CONTROL (IAC) VALVE
⑥ FAST IDLE THERMO VALVE
⑦ FUEL INJECTOR
⑧ FUEL FILTER
⑨ FUEL PRESSURE REGULATOR
⑩ FUEL PUMP (FP)
⑪ FUEL TANK
⑫ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
⑬ AIR CLEANER
⑭ RESONATOR
⑮ INTAKE AIR RESONATOR (IAR) CONTROL CHECK VALVE
⑯ INTAKE AIR RESONATOR (IAR) CONTROL VACUUM TANK
⑰ INTAKE AIR RESONATOR (IAR) CONTROL SOLENOID VALVE
⑱ INTAKE AIR RESONATOR (IAR) CONTROL DIAPHRAGM VALVE
⑲ THREE WAY CATALYTIC CONVERTER (TWC)
⑳ EXHAUST GAS RECIRCULATION (EGR) VALVE
㉑ EXHAUST GAS RECIRCULATION (EGR) VALVE LIFT SENSOR
㉒ EXHAUST GAS RECIRCULATION (EGR) VACUUM CONTROL VALVE
㉓ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE
㉔ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
㉕ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉖ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL DIAPHRAGM VALVE
㉗ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉘ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㉙ ENGINE MOUNT CONTROL SOLENOID VALVE

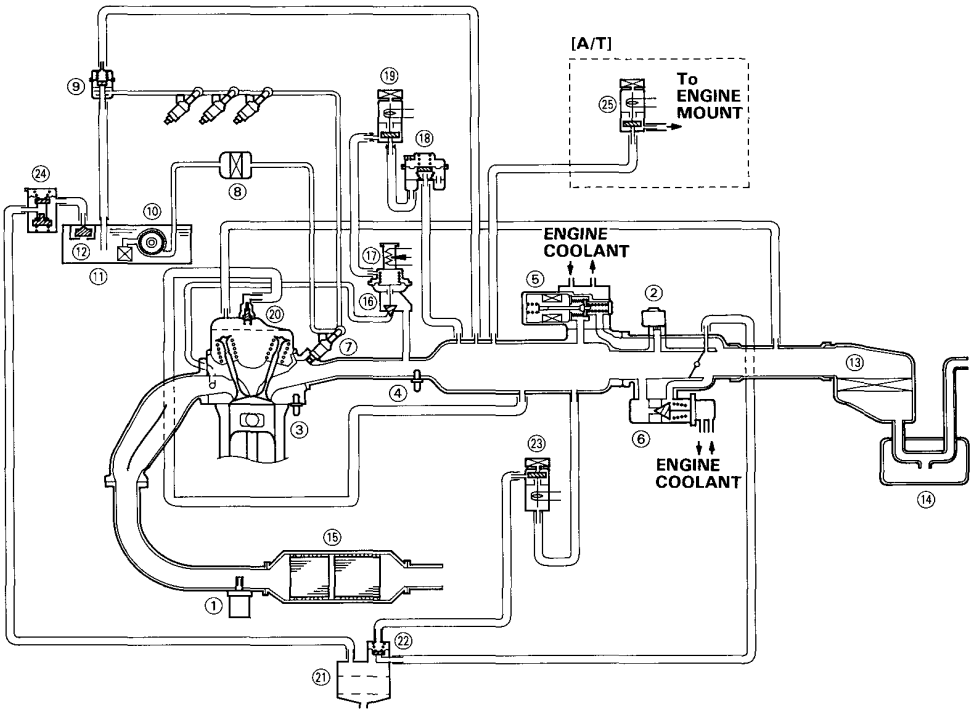
(cont'd)

System Description

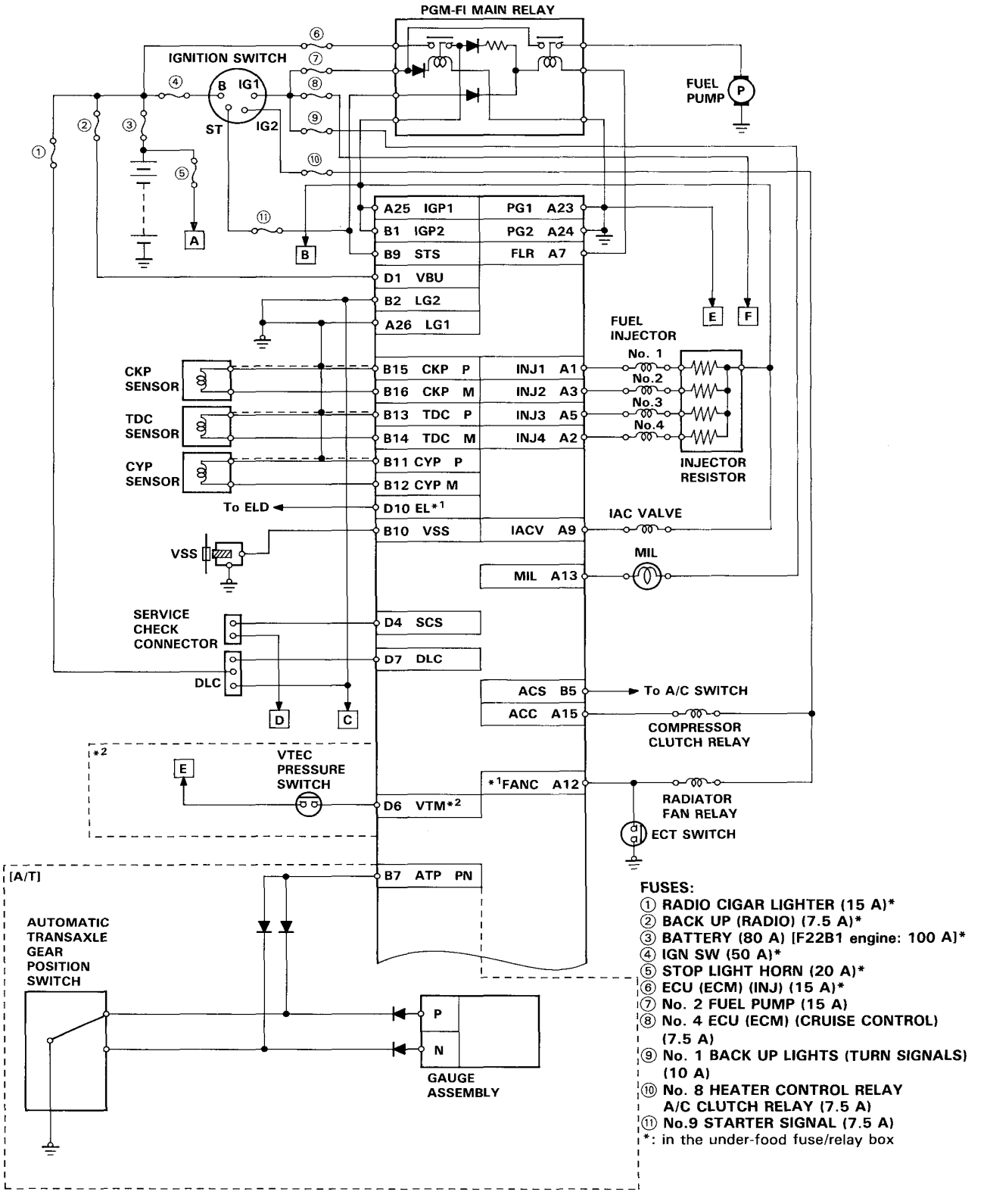
Vacuum Connections (cont'd)

F20B3 engine:



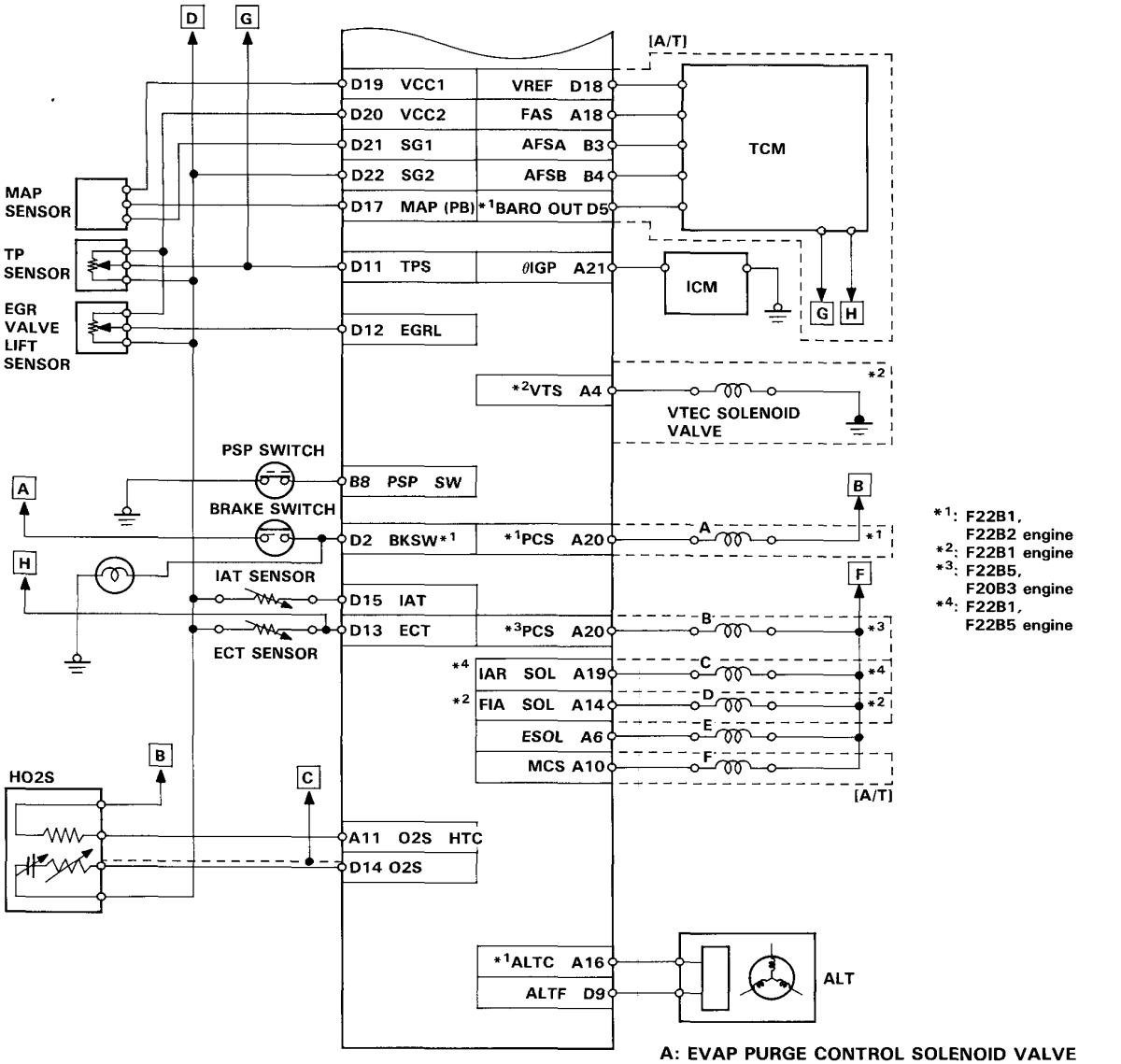


① HEATED OXYGEN SENSOR (HO2S)
② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
④ INTAKE AIR TEMPERATURE (IAT) SENSOR
⑤ IDLE AIR CONTROL (IAC) VALVE
⑥ FAST IDLE THERMO VALVE
⑦ FUEL INJECTOR
⑧ FUEL FILTER
⑨ FUEL PRESSURE REGULATOR
⑩ FUEL PUMP (FP)
⑪ FUEL TANK
⑫ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
⑬ AIR CLEANER
⑭ RESONATOR
⑮ THREE WAY CATALYTIC CONVERTER (TWC)
⑯ EXHAUST GAS RECIRCULATION (EGR) VALVE
⑰ EXHAUST GAS RECIRCULATION (EGR) VALVE LIFT SENSOR
⑱ EXHAUST GAS RECIRCULATION (EGR) VACUUM CONTROL VALVE
⑲ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE
⑳ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
㉑ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
㉒ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL DIAPHRAGM VALVE
㉓ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
㉔ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
㉕ ENGINE MOUNT CONTROL SOLENOID VALVE



FUSES:

① RADIO CIGAR LIGHTER (15 A)*
② BACK UP (RADIO) (7.5 A)*
③ BATTERY (80 A) [F22B1 engine: 100 A]*
④ IGN SW (50 A)*
⑤ STOP LIGHT HORN (20 A)*
⑥ ECU (ECM) (INJ) (15 A)*
⑦ No. 2 FUEL PUMP (15 A)
⑧ No. 4 ECU (ECM) (CRUISE CONTROL) (7.5 A)
⑨ No. 1 BACK UP LIGHTS (TURN SIGNALS) (10 A)
⑩ No. 8 HEATER CONTROL RELAY A/C CLUTCH RELAY (7.5 A)
⑪ No.9 STARTER SIGNAL (7.5 A)
*: in the under-food fuse/relay box



ECM-A

1	3	5	7	9	11	13	15		19	21	23	25
2	4	6		10	12	14	16	18	20		24	26

ECM-B

1	3	5	7	9	11	13	15
2	4		8	10	12	14	16

ECM-D

1		5	7	9	11	13	15	17	19	21
2	4	6		10	12	14		18	20	22

Troubleshooting

Troubleshooting Guide

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE / SYSTEM / SYMPTOM		PGM-FI								
		ENGINE CONTROL MODULE	HEATED OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	TOP DEAD CENTER/ CRANKSHAFT POSITION/ CYLINDER POSITION SENSOR	ENGINE COOLANT TEMPERATURE SENSOR	THROTTLE POSITION SENSOR	INTAKE AIR TEMPERATURE SENSOR	BAROMETRIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL
		11-26	11-30, 34, 37*1	11-39	11-42	11-44	11-46	11-48	11-56	11-50
MALFUNCTION INDICATOR LAMP (MIL) TURNS ON		or								
MALFUNCTION INDICATOR LAMP (MIL) BLINKS		or	or or *1	3	or or	6	7	10	13	15
ENGINE WON'T START		①			③					③
DIFFICULT TO START ENGINE WHEN COLD		(BU)		③	③	①				
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	(BU)				③				
	ROUGH IDLE	(BU)		③						
	WHEN WARM ENGINE SPEED TOO HIGH	(BU)				③				
	WHEN WARM ENGINE SPEED TOO LOW	(BU)								
FREQUENT STALLING	WHILE WARMING UP	(BU)				③				
	AFTER WARMING UP	(BU)								
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	(BU)		②	③					
	FAILS EMISSION TEST	(BU)	③	②						
	LOSS OF POWER	(BU)		③			②			

* If codes other than those listed above are indicated, count the number of blinks again. If the MIL is in fact blinking these codes, replace the ECM.

(BU) If the MIL is on while the engine is running, connect the SCS short connector to the service check connector. If no code is displayed (MIL stays on steady), the back-up system is in operation.
Substitute a known-good ECM and recheck. If the indication goes away, replace the original ECM.

PGM-FI						IDLE CONTROL		FUEL SUPPLY			EMISSION CONTROL	
VEHICLE SPEED SENSOR	ELECTRICAL LOAD DETECTOR *1	VTEC SOLENOID VALVE*2	VTEC PRESSURE SWITCH*2	A/T FI SIGNAL A	A/T FI SIGNAL B	IDLE AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR *1	OTHER FUEL SUPPLY	INTAKE AIR	EXHAUST GAS RECIRCULATION (EGR) CONTROL SYSTEM	OTHER EMISSION CONTROL SYSTEM
11-52	11-54	6-4	6-6	11-57	11-57	11-61	11-58	11-80	11-75	11-99	11-114	11-111
17	20	21	22	30	31	14		16			12	
									②			
									②			
						①	②					
						①	②	②			③	
						①	②					
	③					①	②	②				
						①	②		③			
						③			①		②	
								①			③	
												①
		③	③					③	①	③		③

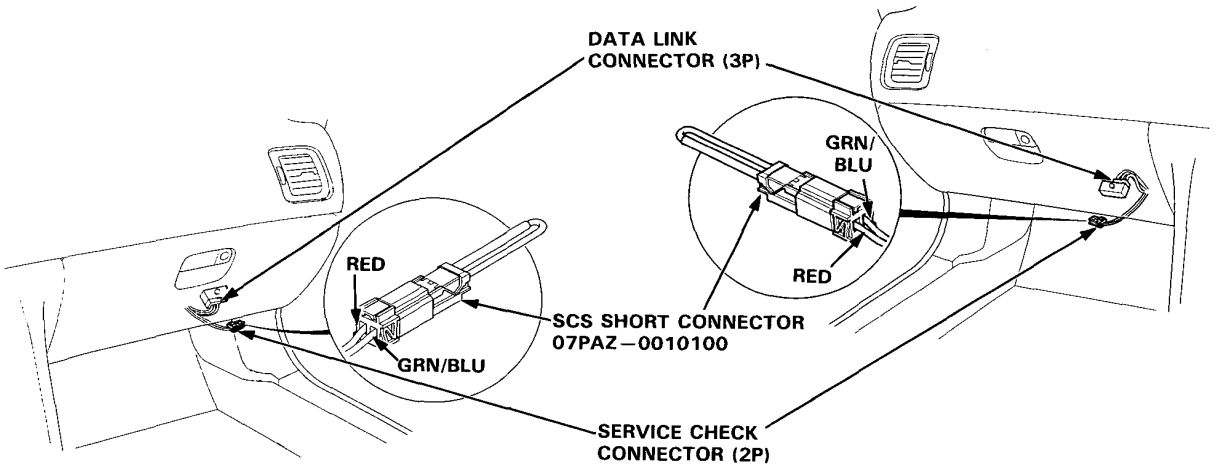
*1: F22B1, F22B2 engine
*2: F22B1 engine

Self-diagnostic Procedures

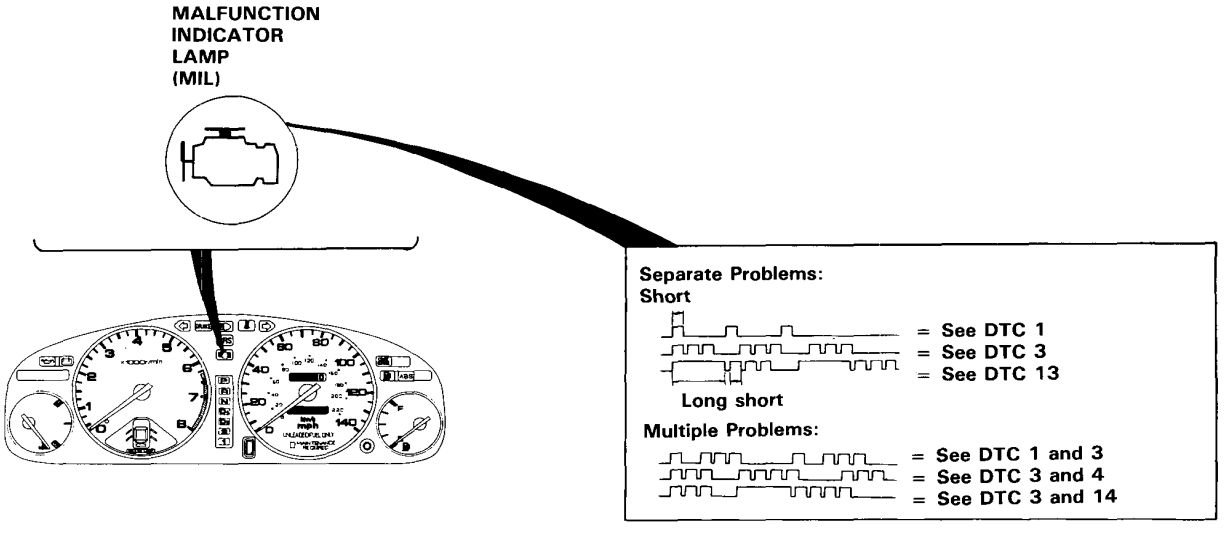
I. When the Malfunction Indicator Lamp (MIL) has been reported on, do the following:

1. Connect the SCS short connector to Service Check Connector as shown. (The 2P Service Check Connector is located under the dash on the passenger side of the car). Turn the ignition switch on.

LHD: **RHD:**

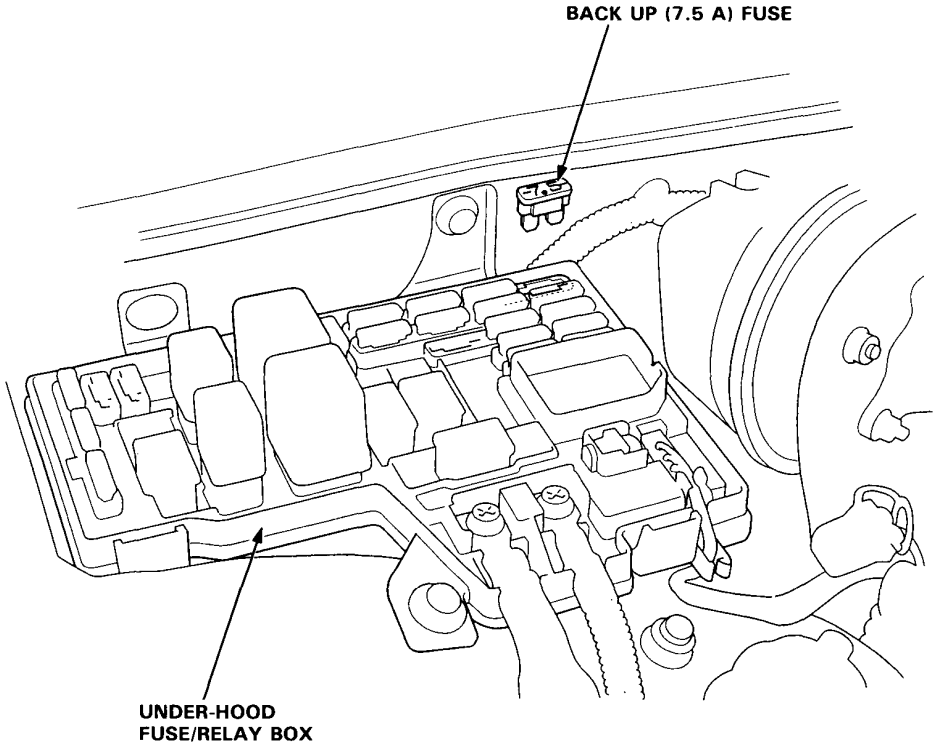


2. Note the Diagnostic Trouble Code (DTC): The MIL indicates a code by the length and number of blinks. The MIL can indicate multiple problems by blinking separate codes, one after another. Codes 1 through 9 are indicated by individual short blinks. Codes 10 through 43 are indicated by a series of long and short blinks. The number of long blinks equals the first digit, the number of short blinks equals the second digit. Sometimes the first blink is difficult to see; always count the blinks at least twice to verify the code.



II. Engine Control Module (ECM) Reset Procedure

1. Turn the ignition switch off.
2. Remove the BACK UP (7.5 A) fuse from the under-hood fuse/relay box for 10 seconds to reset the ECM.



III. Final Procedure (this procedure must be done after any troubleshooting)

1. Remove the SCS Short Connector.

   NOTE: If the SCS Short Connector is connected and there are no DTCs stored in the ECM, the MIL will stay on.

2. Do the ECM Reset Procedure.

(cont'd)

Self-diagnostic Procedures (cont'd)

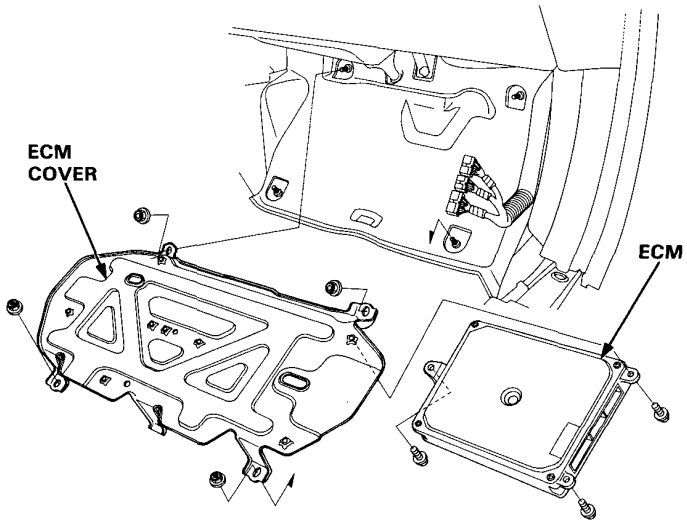
DIAGNOSTIC TROUBLE CODE (DTC)	SYSTEM INDICATED	Page
0	ENGINE CONTROL MODULE (ECM)	11-26
1	HEATED OXYGEN SENSOR (HO2S)	11-30,37*1
3	MANIFOLD ABSOLUTE PRESSURE (MAP SENSOR)	11-39
4	CRANKSHAFT POSITION (CKP SENSOR)	11-42
6	ENGINE COOLANT TEMPERATURE (ECT SENSOR)	11-44
7	THROTTLE POSITION (TP SENSOR)	11-46
8	TOP DEAD CENTER POSITION (TDC SENSOR)	11-42
9	No. 1 CYLINDER POSITION (CYP SENSOR)	11-42
10	INTAKE AIR TEMPERATURE (IAT SENSOR)	11-48
12	EXHAUST GAS RECIRCULATION (EGR VALVE LIFT SENSOR)	11-115
13	BAROMETRIC PRESSURE (BARO SENSOR)	11-56
14	IDLE AIR CONTROL (IAC VALVE)	11-61
15	IGNITION OUTPUT SIGNAL	11-50
16	FUEL INJECTOR*1	11-80
17	VEHICLE SPEED SENSOR (VSS)	11-52
20	ELECTRICAL LOAD DETECTOR (ELD)*1	11-54
21	VARIABLE VALVE TIMING & VALVE LIFT ELECTRONIC CONTROL SOLENOID VALVE (VTEC SOLENOID VALVE)*2	6-4
22	VARIABLE VALVE TIMING & VALVE LIFT ELECTRONIC CONTROL PRESSURE SWITCH (VTEC PRESSURE SWITCH)*2	6-6
30	A/T FI SIGNAL A	11-57
31	A/T FI SIGNAL B	11-57
41	HEATED OXYGEN SENSOR (HO2S) HEATER	11-34
43	FUEL SUPPLY SYSTEM*1	11-37

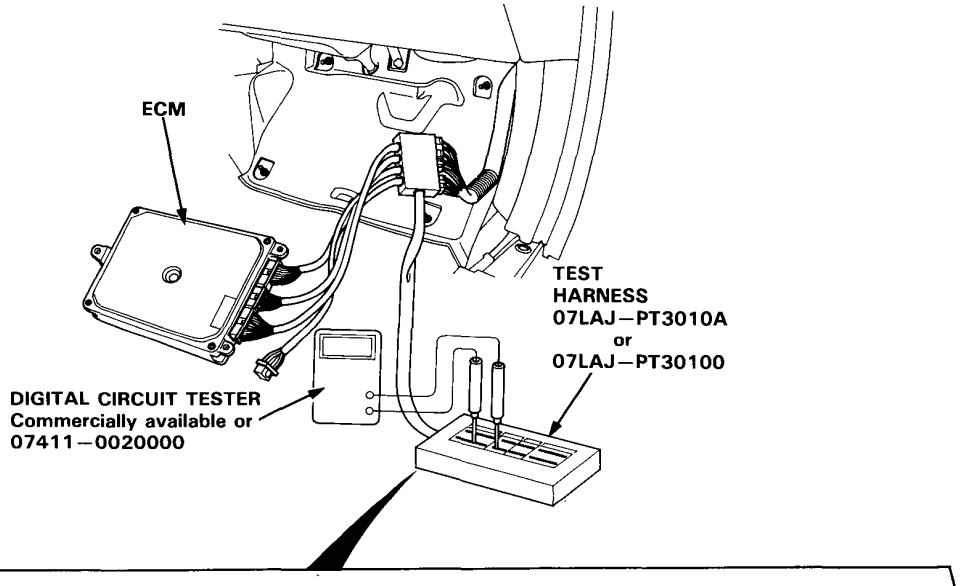
*1: F22B1, F22B2 engine
*2: F22B1 engine

- If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECM.
- The MIL may come on, indicating a system problem when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
- The MIL and D4 indicator light may light simultaneously when the Diagnostic Trouble Code (DTC) is 6, 7 or 17. Check the PGM-FI system according to the PGM-FI system troubleshooting, then recheck the D4 indicator light. If it lights, see page 14-50, 51.
- The MIL does not come on when there is a malfunction in the A/T FI signal or Electrical Load Detector (ELD) circuits. However, it will indicate the codes when the Service Check Connector is shorted.

If the inspection for a particular code requires the test harness, remove the passenger side door sill molding. Pull the carpet back to expose the ECM. Unbolt the ECM cover. Turn the ignition switch off and connect the test harness. Check the system according to the procedure described for the appropriate code(s) listed on the following pages.

LHD:



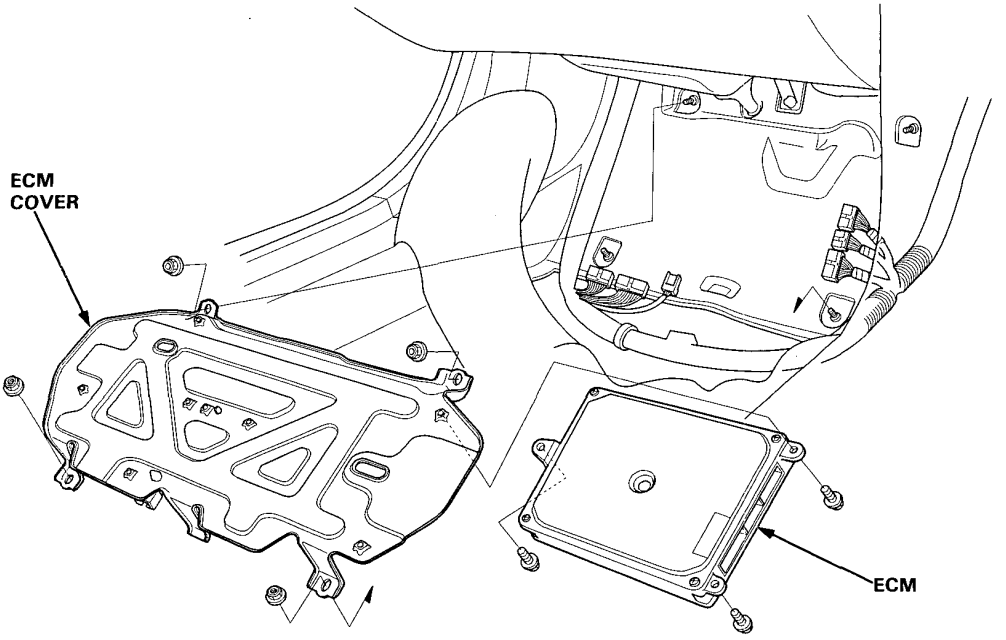


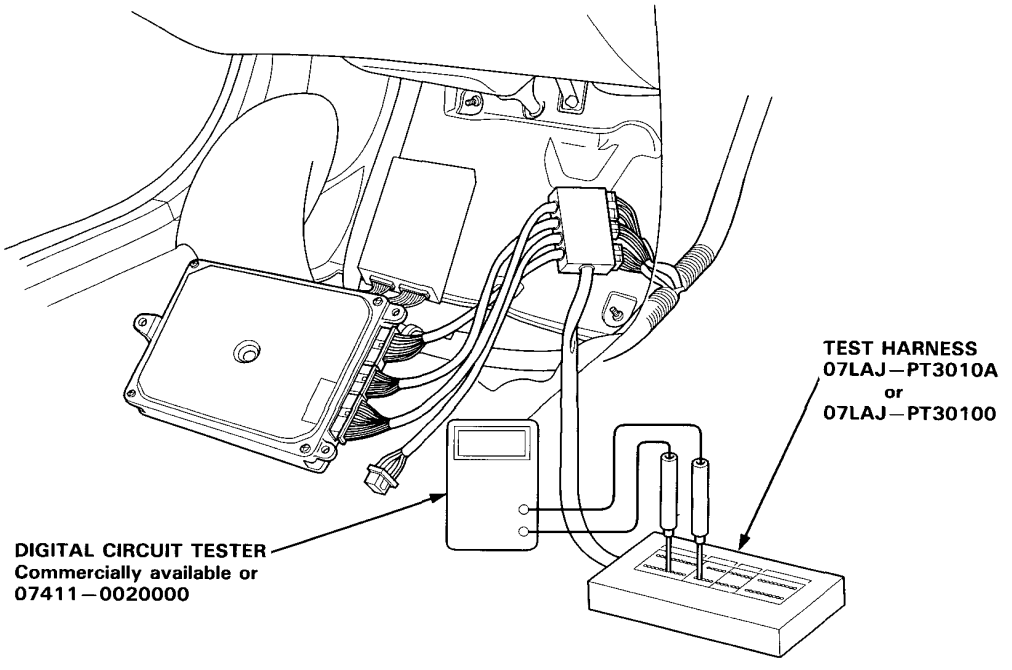
TERMINAL LOCATIONS

(cont'd)

Self-diagnostic Procedures (cont'd)

RHD:

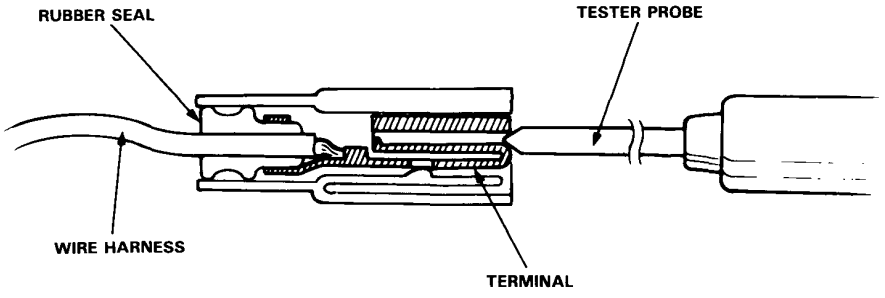




Self-diagnostic Procedures (cont'd)

CAUTION:

- **Puncturing the insulation on a wire can cause poor or intermittent electrical connections.**
- **For testing at connectors other than the test harness, bring the tester probe into contact with the terminal from the connector side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.**



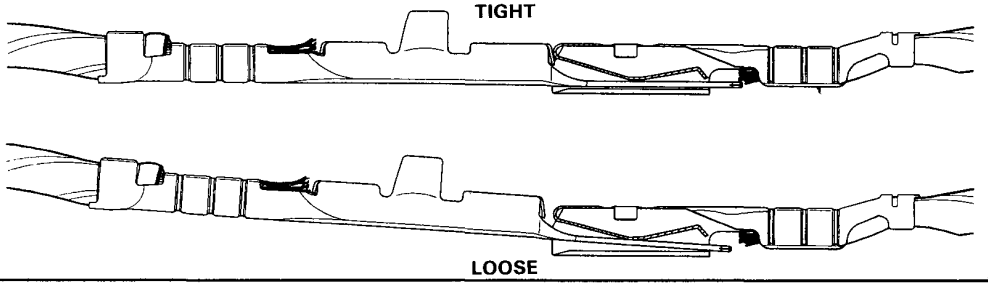
How to Read Flowcharts

A flowchart is designed to be used from start to final repair. It's like a map showing you the shortest distance. But beware: if you go off the "map" anywhere but a "stop" symbol, you can easily get lost.

START (bold type)	Describes the conditions or situation to start a troubleshooting flowchart.
ACTION	Asks you to do something; perform a test, set up a condition etc.
DECISION	Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.
STOP (bold type)	The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flowchart to confirm your repair.

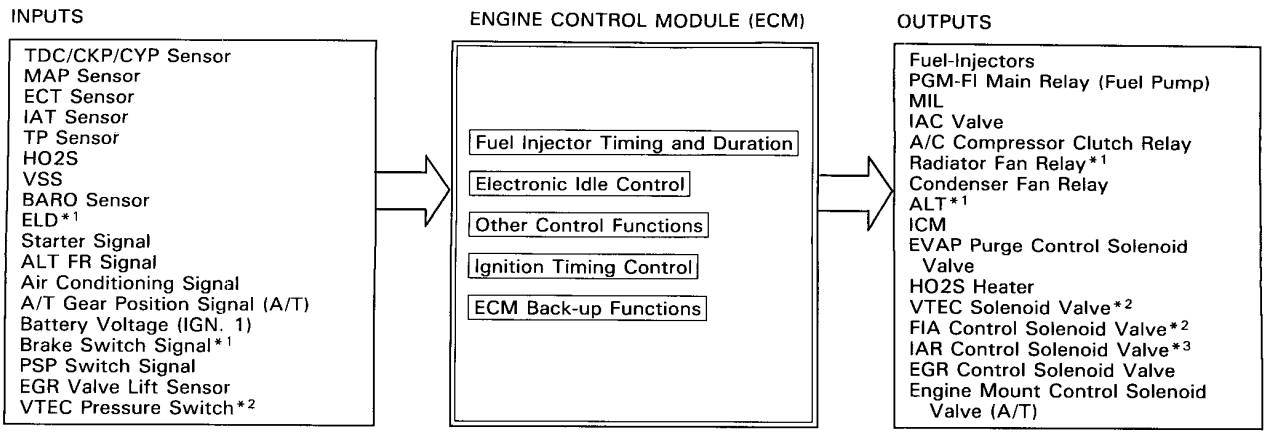
NOTE:

- The term "Intermittent Failure" is used in these charts. It simply means a system may have had a failure, but it checks out OK at this time. If the Malfunction Indicator Lamp (MIL) on the dash does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting (see illustration below).
- Most of the troubleshooting flowcharts have you reset the Engine Control Module (ECM) and try to duplicate the Diagnostic Trouble Code (DTC). If the problem is intermittent and you can't duplicate the code, do not continue through the flowchart. To do so will only result in confusion and, possibly, a needlessly replaced ECM.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something won't work at all. In complex electronics (like ECM's), this can sometimes mean something works, but not the way it's supposed to.
- If the electrical readings are not as specified when using the test harness, check the test harness connections before proceeding.



PGM-FI System

System Description



*1: F22B1, F22B2 engine
*2: F22B1 engine
*3: F22B1, F22B5 engine

PGM-FI System
The PGM-FI system on this model is a sequential multiport fuel injection system.

Fuel Injector Timing and Duration
The ECM contains memories for the basic discharge durations at various engine speeds and manifold pressures. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Idle Air Control
Idle Air Control Valve (IAC Valve)
When the engine is cold, the A/C compressor is on, the transmission is in gear (A/T only), the brake pedal is depressed, the P/S load is high, or the alternator is charging, the ECM controls current to the IAC Valve to maintain the correct idle speed.

Ignition Timing Control
The ECM contains memories for basic ignition timing at various engine speeds and manifold pressures. Ignition timing is also adjusted for engine coolant temperature.

Other Control Functions
1. Starting Control
   When the engine is started, the ECM provides a rich mixture by increasing fuel injector duration.
2. Fuel Pump Control
   - When the ignition switch is initially turned on, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
   - When the engine is running, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump.
   - When the engine is not running and the ignition is on, the ECM cuts ground to the PGM-FI main relay which cuts current to the fuel pump.

3. Fuel Cut-off Control
   - During deceleration with the throttle valve closed, current to the fuel injectors is cut off to improve fuel economy at speeds over 1,100 rpm (min^{-1}) [F22B1, F22B2 engine], 1,200 rpm (min^{-1}) [F22B5, F20B3 engine].
   - Fuel cut-off action also takes place when engine speed exceeds, 6,500 rpm (min^{-1}) [F22B1 engine], 6,600 rpm (min^{-1}) [Except F22B1 engine], regardless of the position of the throttle valve, to protect the engine from over-revving.

4. A/C Compressor Clutch Relay
   When the ECM receives a demand for cooling from the air conditioning system, it delays the compressor from being energized, and enriches the mixture to assure smooth transition to the A/C mode.

5. Evaporative Emission (EVAP) Purge Control Solenoid Valve
   When the engine coolant temperature is below 167°F (75°C), the ECM supplies a ground to the EVAP purge control solenoid valve which cuts vacuum to the EVAP purge control canister.

6. Intake Air Resonator (IAR) Control Solenoid Valve*3
   When the engine speed is below 2,900 rpm (min^{-1}) [F22B5 engine: 3,000 rpm (min^{-1})], IAR control solenoid valve is deactivated by the ECM, and intake air does not flow from the IAR. At engine speeds between 2,900 rpm (min^{-1}) and 3,700 rpm (min^{-1}) [F22B5 engine: 3,000 rpm (min^{-1}) and 3,800 rpm (min^{-1})] (mid-range), the solenoid valve is activated by a signal from the ECM, and intake air flows from the IAR.

7. Fuel Injection Air (FIA) Control Solenoid Valve*2
   When the engine speed is between 1,300 rpm (min^{-1}) and 4,500 rpm (min^{-1}), the ECM supplies ground to the FIA control solenoid valve, sending intake air to the fuel injectors.

8. Exhaust Gas Recirculation (EGR) Control Solenoid Valve
   When the EGR is required for control of oxides of nitrogen (NOx) emissions, the ECM supplies ground to the EGR control solenoid valve which supplies regulated vacuum to EGR valve.

9. Alternator Control*1
   The system controls the voltage generated at the alternator in accordance with the electrical load and drive mode, which reduces the engine load to improve the fuel economy.

ECM fail-safe/back-up Functions

1. Fail-safe Function
   When an abnormality occurs in a signal from a sensor, the ECM ignores that signal and assumes a pre-programmed value for that sensor that allows the engine to continue to run.

2. Back-up Function
   When an abnormality occurs in the ECM itself, the fuel injectors are controlled by a back-up circuit independent of the system in order to permit minimal driving.

3. Self-diagnosis Function [Malfunction Indicator Lamp (MIL)]
   When an abnormality occurs in a signal from a sensor, the ECM supplies ground for the MIL and stores the code in erasable memory. When the ignition is initially turned on, the ECM supplies ground for the MIL for two seconds to check the MIL bulb condition.

4. Two Trip Detection Method
   To prevent false indications, the Two Trip Detection Method is used for the HO2S, fuel metering-related and EGR self-diagnostic functions. When an abnormality occurs, the ECM stores it in its memory. When the same abnormality recurs after the ignition switch is turned OFF and ON again, the ECM informs the driver by lighting the MIL. However, to ease troubleshooting, this function is cancelled when you short the service check connector. The MIL will then blink immediately when an abnormality occurs.

Engine Control Module (ECM)

The Malfunction Indicator Lamp (MIL) never comes on (even for two seconds) after ignition is turned on.

NOTE: If this symptom is intermittent, check for a loose fuse No. 1 (BACK UP LIGHTS, METER LIGHTS, 10A) in the under-dash fuse/relay box, a poor connection at ECM terminal A13, or an intermittent open in the LT GRN/RED wire between the ECM (A13) and the gauge assembly.

Turn the ignition switch ON.

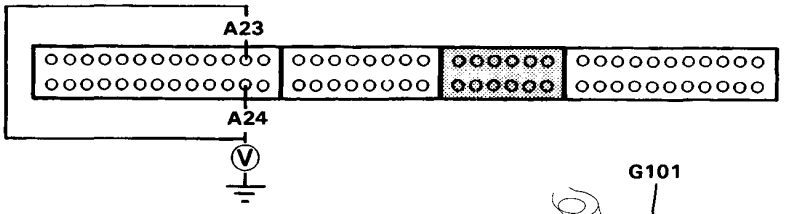
Is the low oil pressure light on?

NO

- **Replace No. 1 (BACK-UP LIGHTS, METER LIGHTS) (10 A) fuse.**
- **Repair short in YEL wire between No. 1 (BACK-UP LIGHTS, METER LIGHTS) (10 A) fuse and gauge assembly.**

YES

Try to start the engine.



Does the engine start?

NO

Turn the ignition switch OFF.

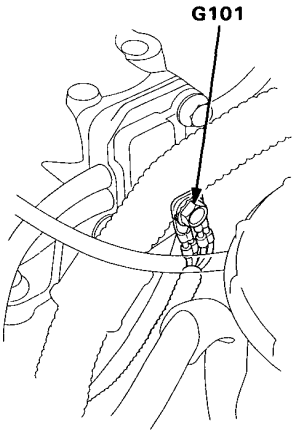
YES

Connect the test harness between the ECM and connectors (see page 11-21).

Turn the ignition switch ON.

Turn the ignition switch OFF.

Measure voltage between body ground and the following terminals individually: A23, A24.



Connect the test harness between the ECM and connectors (see page 11-21).

Is there less than 1.0 V?

NO

Repair open in BLK wire(s) between ECM and G101 (located at intake manifold) that had more than 1.0 V.

YES

Connect A13 terminal to body ground.

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

Turn the ignition switch ON.

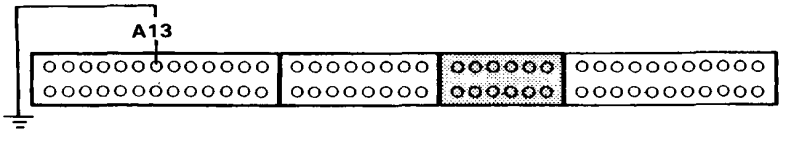
Is the MIL on?

NO

- **Replace the MIL bulb.**
- **Repair open in LT GRN/RED wire between ECM (A13) and gauge assembly.**

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.



NOTE:

- When there is no code stored, the MIL will stay on if the service check connector is shorted.
- If this symptom is intermittent, check for:
  - A loose ECU (ECM) fuse (15 A) in the under-hood fuse/relay box
  - A loose No. 2 FUEL PUMP fuse (15 A) in the under-dash fuse/relay box
  - An intermittent short in the RED wire between the ECM (D4) and the service check connector
  - An intermittent open in the GRN/BLU wire between the service check connector and ECM (D22)
  - An intermittent short in the LT GRN/RED wire between the ECM (A13) and the gauge assembly.
  - An intermittent short in the YEL/WHT wire between the ECM (D19) and the MAP sensor
  - An intermittent short in the YEL/BLU wire between the ECM (D20) and the TP sensor

The Malfunction Indicator Lamp (MIL) stays on or comes on after two seconds.

Connect the SCS short connector to the service check connector (see page 11-18).

Turn the ignition switch ON.

Does the MIL indicate any Diagnostic Trouble Code (DTC)?

YES → **Go to self-diagnostic procedures (see page 11-16).**

NO

Remove the SCS short connector from the service check connector.

Try to start the engine.

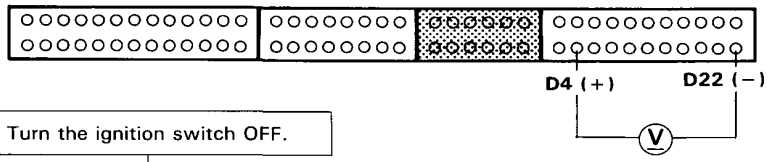
Did the engine start?

YES → Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D4 (+) terminal and D22 (−) terminal.



Is there approx. 5 V?

YES → Connect the SCS short connector to service check connector.

Measure voltage between D4 (+) terminal and D22 (−) terminal.

Is there approx. 5 V?

YES → * **Repair open in RED wire between ECM (D4) and service check connector.**
Repair open in GRN/BLU wire between ECM (D22) and service check connector.

NO

Remove the SCS short connector from the service check connector.

NO → **Repair short to body ground in RED wire between the ECM (D4) and service check connector.**

Inspect ECU (ECM) (15 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

NO → **Repair short in WHT/GRN wire between ECU (ECM) (15 A) fuse and PGM-FI main relay.**
Replace ECU (ECM) (15 A) fuse.

YES

*NOTE: After repair, disconnect the SCS Short Connector, test drive the car, and recheck the MIL for a code.

(To page 11-28)

(To page 11-28)

(cont'd)

Engine Control Module (ECM) (cont'd)

(From page 11-27)

A

Inspect the No. 2 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO

- **Repair short in RED/WHT wire between under-dash fuse/relay box and PGM-FI main relay.**
- **Replace No. 2 FUEL PUMP (15 A) fuse.**

YES

Turn the ignition switch ON.

Disconnect the 3P connector of each sensor one at a time:
- MAP sensor
- TP sensor
- EGR valve lift sensor

Does the MIL remain ON?

NO

Replace the sensor that caused the light to go out.

YES

Turn the ignition switch OFF.

Connect the test harness. Disconnect the "D" connector from the ECM only, not the main wire harness (see page 11-21).

Check for continuity between body ground and D19, D20 terminals.

Is there continuity?

YES

- **Repair short to body ground in YEL/WHT wire between ECM (D19) and MAP sensor.**
- **Repair short to body ground in YEL/BLU wire between ECM (D20) and TP sensor or EGR valve lift sensor.**

NO

Reconnect all the sensor connectors.
Reconnect the "D" connector to the ECM.

Turn the ignition switch ON.

(To page 11-29)

(From page 11-27)

B

Turn the ignition switch OFF.

Disconnect "A" connector from the ECM.

Turn the ignition switch ON.

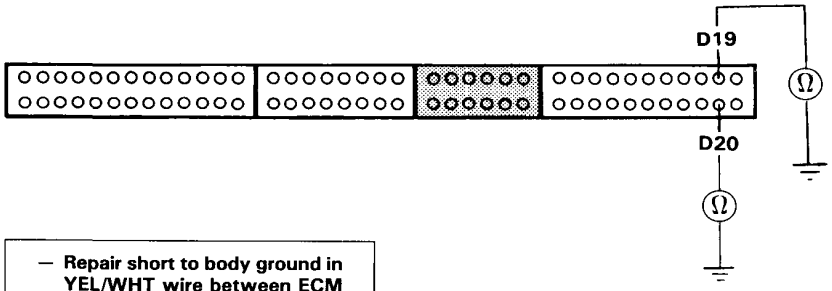
Is the MIL ON?

NO

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

YES

Repair short to body ground in LT GRN/RED wire between the ECM (A13) and MIL.



(From page 11-28)

Measure voltage between body ground and the following terminals individually: A26, B2.

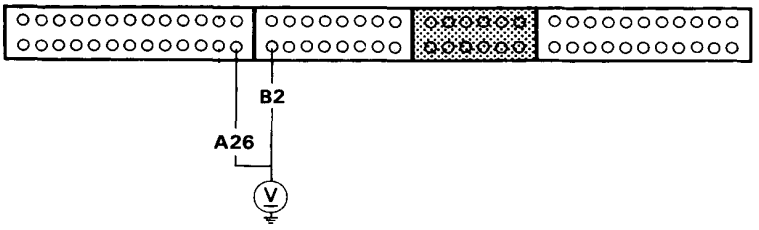
Is there less than 1.0 V?

NO

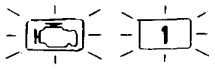
Repair open in BRN/BLK wire between ECM (A26, B2) and G101.

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

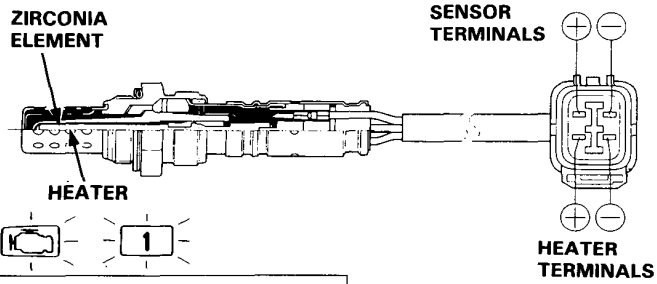


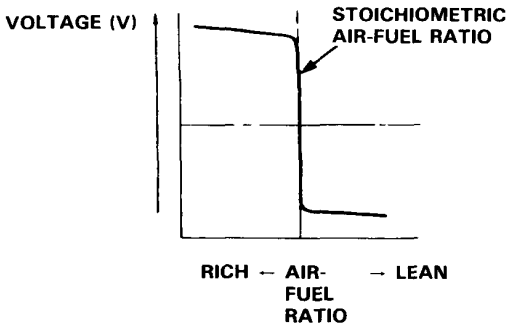
Heated Oxygen Sensor (HO2S) [F22B1, F22B2 engine]



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 1: A problem in the Heated Oxygen Sensor (HO2S) circuit.

The Heated Oxygen Sensor (HO2S) detects the oxygen content in the exhaust gas and signals the ECM. In operation, the ECM receives the signals from the sensor and varies the duration during which fuel is injected. To stabilize the sensor's output, the sensor has an internal heater. The HO2S is installed in exhaust pipe A [F22B2 engine: exhaust manifold].





– The MIL has been reported on.
– With the SCS short connector connected (see page 11-18), code 1 is indicated.

↓

Do the ECM Reset Procedure (see page 11-19).

↓

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in N or P position) until the radiator fan comes on, then let it idle for at least one minute before road testing.

↓

Connect the SCS short connector to the service check connector (see page 11-18).

↓

Road test with the automatic transmission in 2 position. Starting at 1,600 rpm (min^{-1}), accelerate using wide open throttle for at least 5 seconds. Then decelerate for at least 5 seconds with the throttle completely closed.

↓

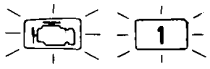
Does the MIL blink and does it indicate code 1?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the HO2S and the ECM.**

YES ↓

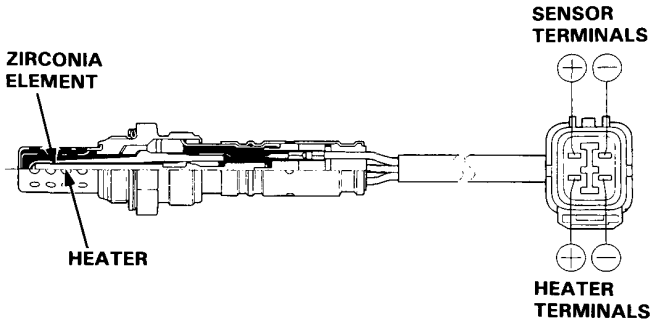
Go to page and perform test for code 43 (see page 11-37).

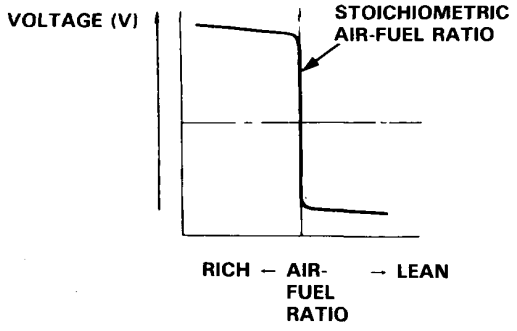
Heated Oxygen Sensor (HO2S) [F22B5, F20B3 engine]

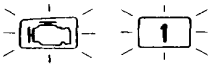


The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 1: A problem in the Heated Oxygen Sensor (HO2S) circuit.

The Heated Oxygen Sensor (HO2S) detects the oxygen content in the exhaust gas and signals the ECM. In operation, the ECM receives the signals from the sensor and varies the duration during which fuel is injected. To stabilize the sensor's output, the sensor has an internal heater. The HO2S is installed in exhaust pipe A.







– The MIL has been reported on.
– With the SCS short connector connected (see page 11-18), code 1 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle for at least one minute before road testing.

Connect the SCS short connector to the service check connector (see page 11-18).

Road test with the automatic transmission in [2] position (M/T: 4th gear).
Starting at 1,600 rpm (min^{-1}), accelerate using wide open throttle for at least 5 seconds. Then decelerate for at least 5 seconds with the throttle completely closed.

Does the MIL blink and does it indicate code 1?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the HO2S and the ECM.**

YES

(To page 11-32)

(cont'd)

Heated Oxygen Sensor (HO2S) [F22B5, F20B3 engine] (cont'd)

(From page 11-31)

Inspect fuel pressure (see page 11-79).

Is it normal?

NO → **Go to page 11-75 Fuel Supply System.**

YES

Turn the ignition switch OFF.

Disconnect the HO2S connector and connect No. 3 (+) terminal to No. 4 (−) terminal with a battery.

Start the engine.

After two minutes, measure voltage between No. 1 (+) terminal and No. 2 (−) terminal.

Is the voltage above 0.6 V at wide open throttle to 4,500 rpm (min^{-1}) and below 0.4 V when the throttle is quickly released from 4,500 rpm (min^{-1})?

NO → **Replace the HO2S.**

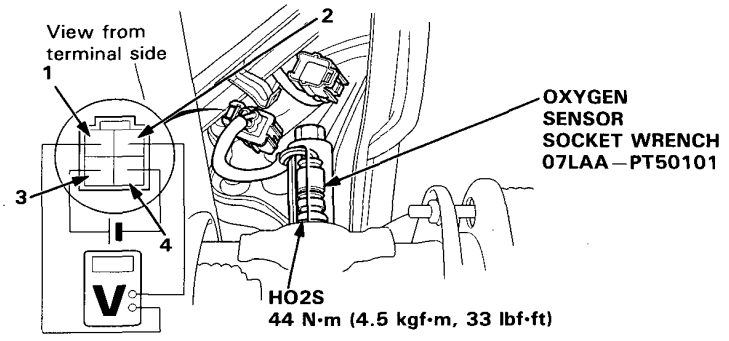
YES

Turn the ignition switch OFF.

Connect the HO2S connector to engine wire harness.

Connect the test harness between the ECM and connector (page 11-21).

(To page 11-33)



(From page 11-32)

Restart the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.

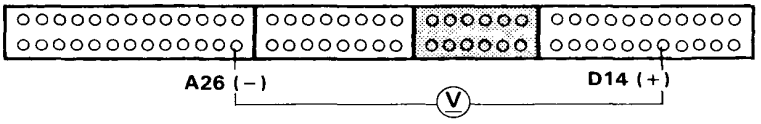
Measure voltage between D14 (+) and A26 (−) terminal.

Is the voltage above 0.6 V at wide open throttle to 4,500 rpm (min^{-1}) and 0.4 V when the throttle is quickly released from 4,500 rpm (min^{-1})?

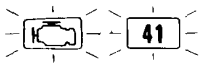
NO → **Repair short or open in WHT/RED wire between ECM (D14) and HO2S.**

YES

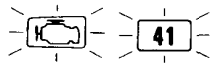
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.



Heated Oxygen Sensor Heater



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 41: A problem in the Heated Oxygen Sensor (HO2S) Heater circuit.



– The MIL has been reported on.
– With the SCS short connector connected (see page 11-18), code 41 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Start the engine.

Is the MIL on and does it indicate code 41?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires between the HO2S and the ECM.

YES

Turn the ignition switch OFF.

Disconnect the 4P connector from the HO2S.

Measure resistance between terminals 3 and 4 on the HO2S.

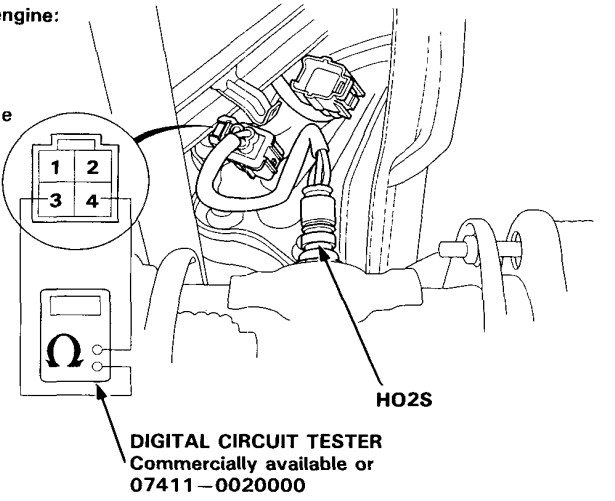
Is there 10–40 Ω?

NO → **Replace the HO2S.**

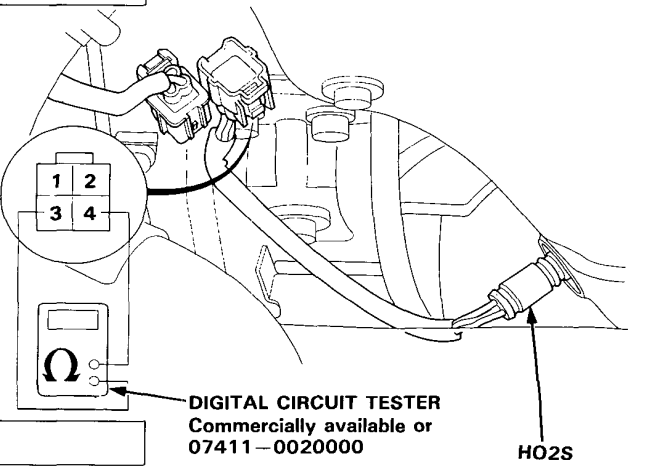
YES

(To page 11-35)

Except F22B2 engine:



F22B2 engine:



(From page 11-34)

Check for continuity to body ground on terminals 3 and 4 of the HO2S.

Is there continuity? YES → **Replace the HO2S.**

NO

Check for continuity between terminal 4 and terminals 1 and 2 individually (F22B1 engine: between terminal 3 and terminals 1 and 2).

Is there continuity? YES → **Replace the HO2S.**

NO

Turn the ignition switch ON.

At the HO2S harness, measure voltage between YEL/BLK (+) terminal and ORN/BLK (−) terminal.

Is there battery voltage? YES → Turn the ignition switch OFF.

NO

Measure voltage between YEL/BLK (+) terminal and body ground.

Is there battery voltage? NO → **Repair open in YEL/BLK wire between HO2S and PGM-FI main relay.**

YES

Turn the ignition switch OFF.

A (To page 11-36)

Disconnect the "A" connector from the ECM.

Turn the ignition switch ON.

At HO2S harness, measure voltage between YEL/BLK (+) terminal and ORN/BLK (−) terminal.

Is there battery voltage? YES → **Repair short in ORN/BLK wire between ECM (A11) and HO2S.**

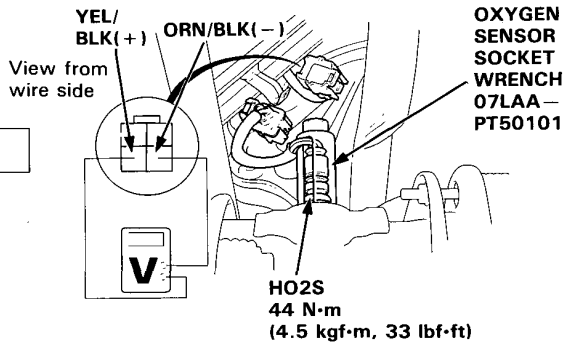
NO

Turn the ignition switch OFF.

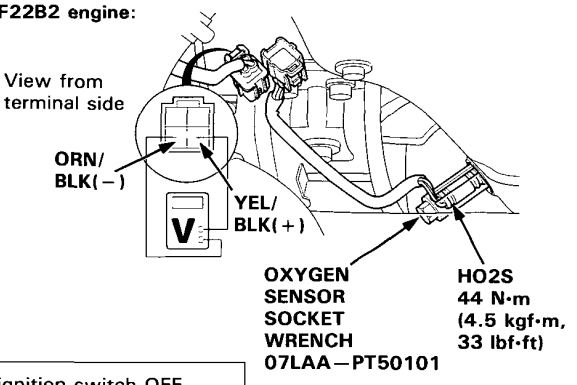
Reconnect the HO2S connector.

B (To page 11-36)

Except F22B2 engine:



F22B2 engine:



(cont'd)

Heated Oxygen Sensor Heater (cont'd)

(From page 11-35)

A

Reconnect the 4P connector to the HO2S.

Connect the test harness "A" connector to the main wire harness only, not the ECM (see page 11-21).

Turn the ignition switch ON.

Measure voltage between A11 (+) terminal and A23 (−) terminal.

Is there battery voltage?

NO → **Repair open in ORN/BLK wire between ECM (A11) and the HO2S.**

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

(From page 11-35)

B

Connect the test harness "A" connector to the main wire harness only, not the ECM (see page 11-21).

Connect an ammeter between terminals A11 (+) and A26 (−)

Turn the ignition switch ON.

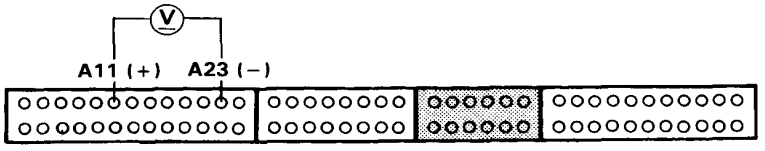
* Monitor over a 5 minute period unless the current drops below 0.1A immediately.

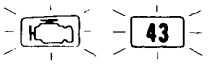
Is the current less than 0.1 A?*

YES → **Replace the HO2S.**

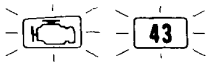
NO

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.





The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 43: A problem in the Heated Oxygen Sensor (HO2S) circuit, or a problem in the Fuel Supply System.



— The MIL has been reported on.
— With the SCS short connector connected (see page 11-18), code 43 is indicated.

Is the code 43 accompanied by the MIL and poor driveability?

YES → **Go to Fuel Supply system (see page 11-75).**

NO

Do the ECM Reset Procedure (see page 11-19).

Connect the SCS short connector to the service check connector (see page 11-18).

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in N or P position, M/T in neutral) until the radiator fan comes on, then let it idle for at least one minute.

Raise the engine speed to 3,000 rpm (min^{-1}) and hold that throttle position for at least one minute. Do not vary the throttle position even if the engine speed drops.

Does the MIL blink and does it indicate code 43?

NO → **Intermittent failure, system is OK at this time.**
Check for poor connections or loose wire between the HO2S and the ECM.

YES

From code 1 troubleshooting (page 11-30).

Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-21).

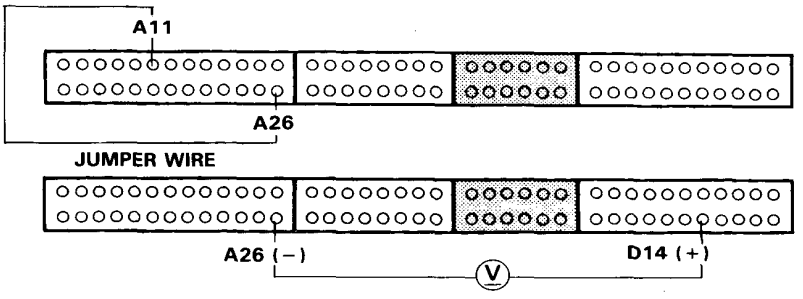
With the ignition switch OFF, wait for at least two minutes.

Install a jumper wire on the test harness between A11 and A26.

Turn the ignition switch ON.

(To page 11-38)

NOTE:
• Use DIGITAL CIRCUIT TESTER (Commercially available or 07411—0020000).
• Use 2 Volt range.



(cont'd)

Fuel Supply System [F22B1, F22B2 engine] (cont'd)

(From page 11-37)

Measure voltage between D14 (+) terminal and A26 (−) terminal as soon as the ignition switch is turned on.

Is there 0.1 V or less when the ignition switch is first turned on?

YES

Disconnect the 4P connector from the HO2S.

Measure voltage between D14 (+) terminal and A26 (−) terminal.

Is there more than 0.1 V?

YES

Replace the HO2S.

NO

Turn the ignition switch OFF.

Disconnect the "D" connector from the main wire harness.

Turn the ignition switch ON.

Measure voltage between D14 (+) terminal and A26 (−) terminal.

Is there more than 0.1 V?

YES

Repair short in WHT/RED wire between ECM (D14) and the HO2S.

NO

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

NO

Disconnect the 4P connector from the HO2S.

Measure voltage at the engine wire harness side of the HO2S connector between WHT/RED (+) and GRN/BLU (−).

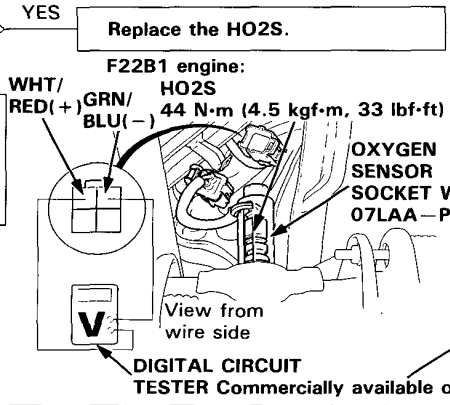
Is there more than 0.1 V?

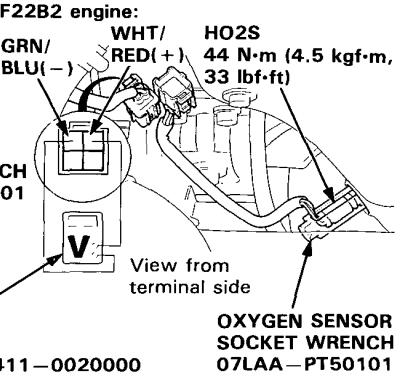
YES

Replace the HO2S.

NO

Check for open in WHT/RED wire between ECM (D14) and the HO2S. If wire is OK, repair open in GRN/BLU wire between ECM (D22) and the HO2S.

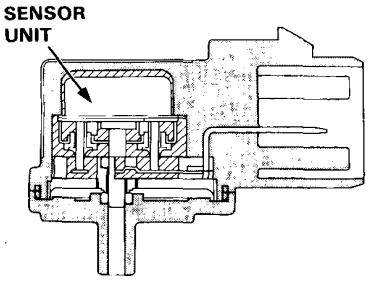


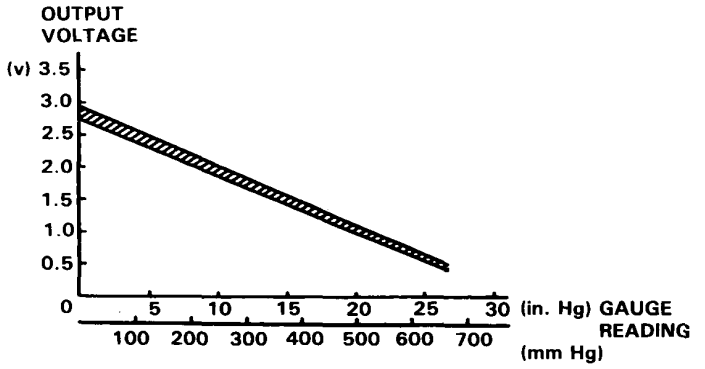


Manifold Absolute Pressure (MAP) Sensor

The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 3: An electrical problem in the Manifold Absolute Pressure (MAP) Sensor circuit.

The MAP sensor converts manifold absolute pressure into electrical signals and inputs the ECM.





3

– The MIL has been reported on.
– With the SCS short connector connected (see page 11-18), code 3 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Start the engine and allow it to idle.

Is the MIL on and does it indicate code 3?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires between the MAP sensor and the ECM.

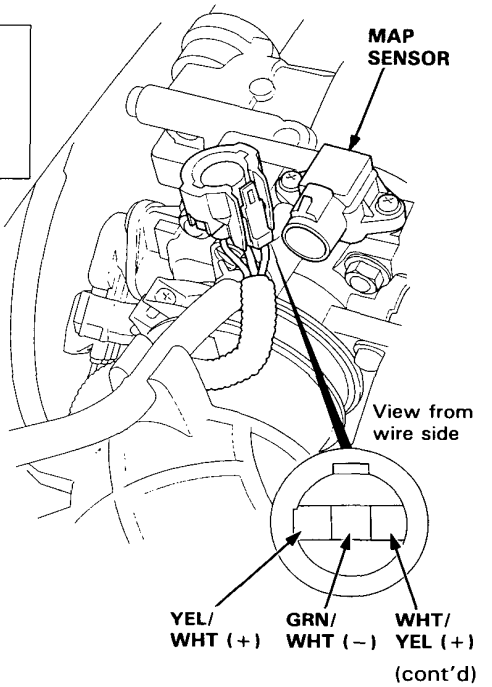
YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the MAP sensor.

Turn the ignition switch ON.

(To page 11-40)



(cont'd)

Manifold Absolute Pressure (MAP) Sensor (cont'd)

(From page 11-39)

Measure voltage between YEL/WHT (+) terminal and body ground.

Is there approx. 5 V?

YES

Measure voltage between YEL/WHT (+) terminal and GRN/WHT (−) terminal.

Is there approx. 5 V?

NO

Repair open in GRN/WHT wire between ECM (D21) and the MAP sensor.

YES

NO

Turn the ignition switch OFF.

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D19 (+) terminal and D21 (−) terminal.

Measure voltage between WHT/YEL (+) terminal and GRN/WHT (−) terminal.

Is there approx. 5 V?

YES

NO

Repair open in YEL/WHT wire between ECM (D19) and the MAP sensor.

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

Is there approx. 5 V?

NO

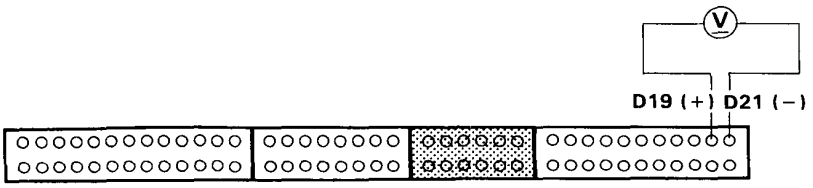
YES

Turn the ignition switch OFF.

Reconnect the 3P connector to the MAP sensor.

Connect the test harness between the ECM and connector (see page 11-21).

Turn the ignition switch ON.



A
(To page 11-41)

B
(To page 11-41)

(From page 11-40)

A

Turn the ignition switch OFF.

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D17 (+) terminal and D21 (–) terminal.

Is there approx. 5 V?

YES → **Repair open or short in WHT/YEL wire between ECM (D17) and the MAP sensor.**

NO → **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**

(From page 11-40)

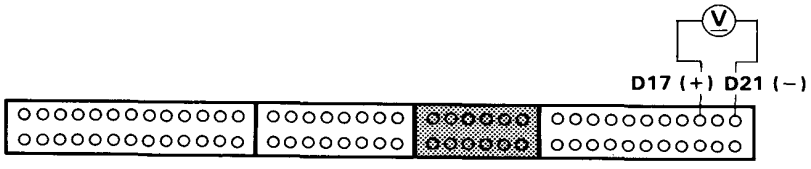
B

Measure voltage between D17 (+) terminal and D21 (–) terminal.

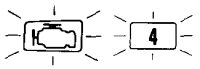
Is there approx. 3 V?

NO → **Replace the MAP sensor.**

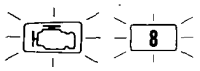
YES → **Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.**



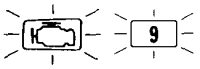
TDC/CKP/CYP Sensor



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 4: A problem in the Crankshaft Position (CKP) Sensor circuit.



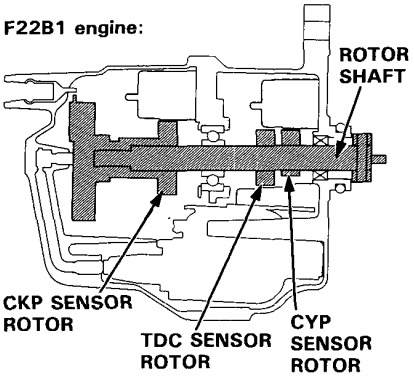
The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 8: A problem in the Top Dead Center (TDC) Sensor circuit.



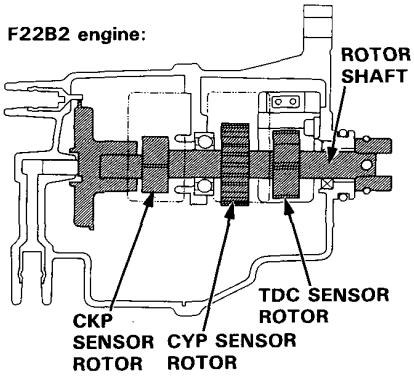
The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 9: A problem in the Cylinder Position (CYP) Sensor circuit.

The CKP Sensor determines timing for fuel injection and ignition of each cylinder and also detects engine speed. The TDC Sensor determines ignition timing at start-up (cranking) and when crank angle is abnormal. The CYP Sensor detects the position of No. 1 cylinder for sequential fuel injection to each cylinder.

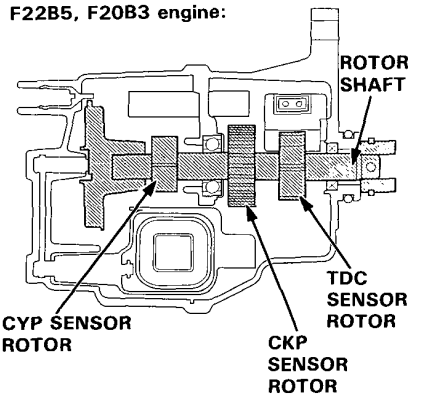
F22B1 engine:

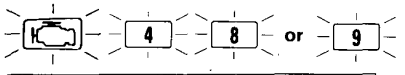


F22B2 engine:



F22B5, F20B3 engine:





— The MIL has been reported on.
— With the SCS short connector connected (see page 11-18), code 4, 8 and/or 9 are indicated.

Do the ECM Reset Procedure (see page 11-19).

Start the engine.

Is the MIL on and does it indicate code 4, 8 and/or 9?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires between the TDC/CKP/CYP sensor and the ECM.

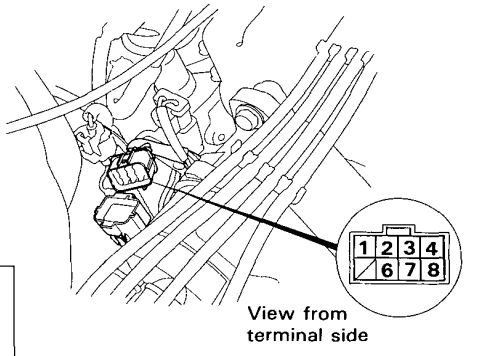
YES

Turn the ignition switch OFF.

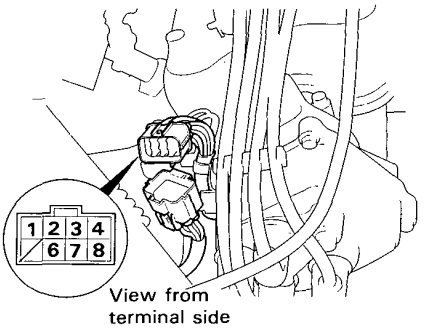
Disconnect the 8P connector from the TDC/CKP/CYP sensor.

(To page 11-43)

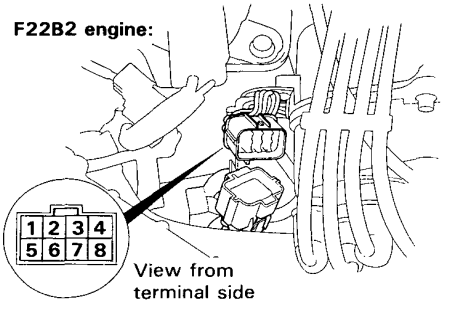
F22B1 engine:



F22B5, F20B3 engine:



F22B2 engine:



(From page 11-42)

Measure resistance between terminals of the indicated sensor.
*see table

Is there 350 – 700 Ω? (F22B1 engine: 700 – 1,300 Ω?)

NO → **Replace the distributor housing. (see section 23)**

YES

Check for continuity to body ground on both terminals of the indicated sensor.

Is there continuity?

YES → **Replace the distributor housing. (see section 23)**

NO

Reconnect the connector.

Connect the test harness to the main wire harness only, not to the ECM (see page 11-21).

Measure resistance between terminals of the indicated sensor on test harness.
*see table

Is there 350 – 700 Ω? (F22B1 engine: 700 – 1,300Ω?)

NO → **Repair open in the indicated sensor wires. *see table**

YES

Check for continuity to body ground on B15, B13 and/or B11 terminals.

Is there continuity?

YES → **Repair short to body ground in the indicated sensor wires. *see table**

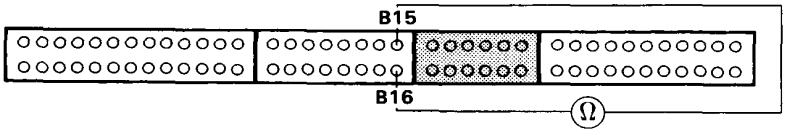
NO

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

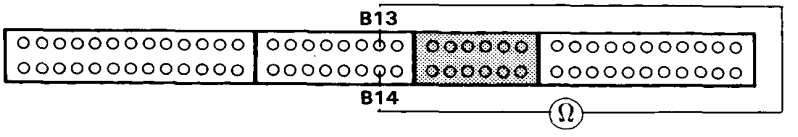
*:

SENSOR	DTC	SENSOR TERMINAL	ECM TERMINAL	WIRE COLOR
CKP	4	2	B15	BLU/GRN
		6	B16	BLU/YEL
TDC	8	3	B13	ORN/BLU
		7	B14	WHT/BLU
CYP	9	4	B11	ORN
		8	B12	WHT

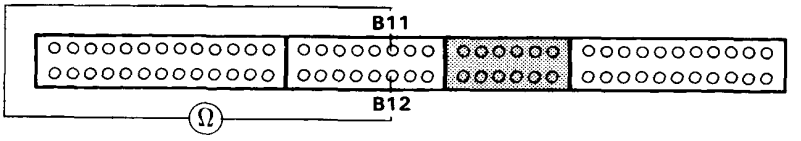
CKP:



TDC:



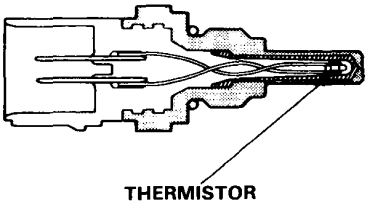
CYP:

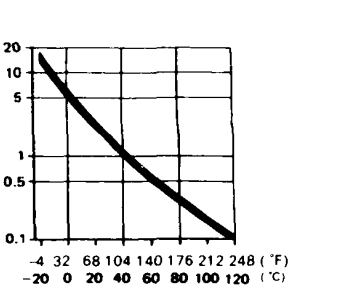


Engine Coolant Temperature (ECT) Sensor

The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 6: A problem in the Engine Coolant Temperature (ECT) Sensor circuit.

The ECT Sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the engine coolant temperature increases as shown below.





— The MIL has been reported on.
— With the SCS short connector connected (see page 11-18), code 6 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Turn the ignition switch ON.

Is the MIL on and does it indicate code 6?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires between the ECT sensor, the ECM and TCM [A/T].

YES

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.

Turn the ignition switch OFF.

Disconnect the 2P connector from the ECT sensor.

Measure resistance between the 2 terminals on the ECT sensor.

Is there 200—400 Ω?

NO → **Replace the ECT sensor.**

YES

(To page 11-45)

(From page 11-44)

Turn the ignition switch ON.

Measure voltage between RED/WHT and body ground.

Is there approx. 5 V? — YES → Measure voltage between RED/WHT (+) terminal and GRN/BLU (−) terminal.

NO

Turn the ignition switch OFF.

Disconnect the 22P connector from the Transmission Control Module (TCM).

Turn the ignition switch ON.

Is there approx. 5 V? — YES → **Replace the TCM.**

NO

Turn the ignition switch OFF and reconnect the connector to the TCM.

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D13 (+) terminal and D22 (−) terminal.

Is there approx. 5 V? — YES →
- **Repair open or short in RED/WHT wire between ECM (D13) and the ECT sensor.**
- **Repair short in RED/WHT wire between ECM (D13) and TCM [A/T].**

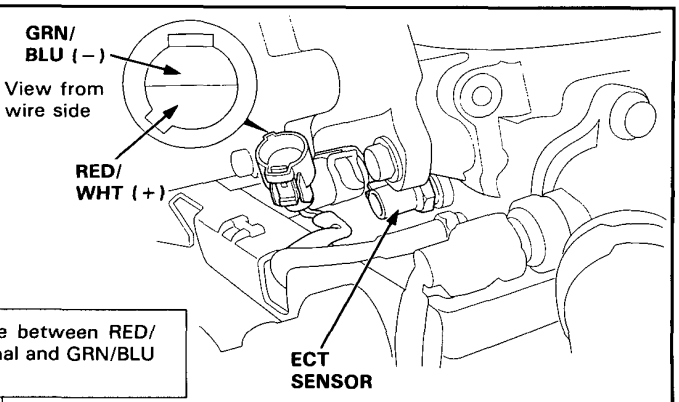
NO

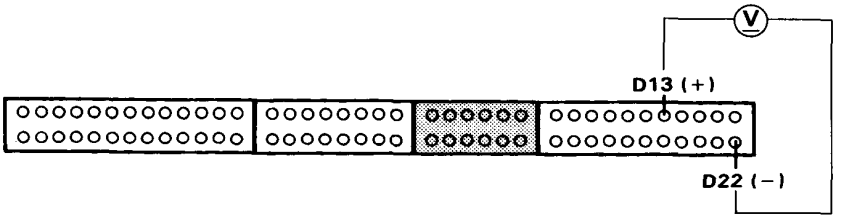
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

Is there approx. 5 V? — NO → **Repair open in GRN/BLU wire between ECM (D22) and the ECT sensor.**

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

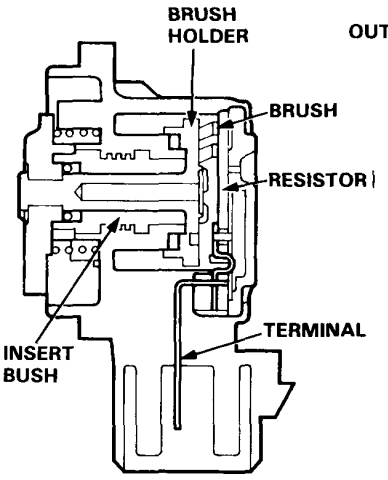


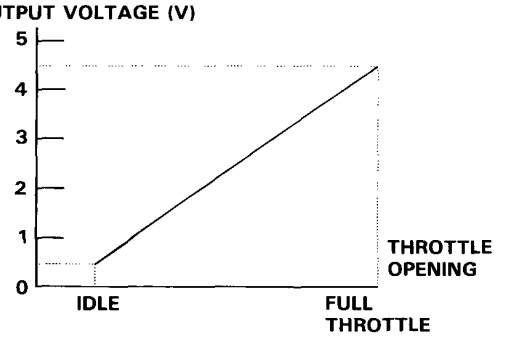


Throttle Position (TP) Sensor

The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 7: A problem in the Throttle Position (TP) Sensor circuit.

The TP Sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle position changes, the throttle position sensor varies the voltage signal to the ECM.





— The MIL has been reported on.
— With the SCS short connector connected (see page 11-18), code 7 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Start the engine.

Is the MIL on and does it indicate code 7?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires between the TP sensor, the ECM and the TCM [A/T].

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the TP sensor.

Turn the ignition switch ON.

Measure voltage between YEL/BLU (+) terminal and GRN/BLU (−) terminal.

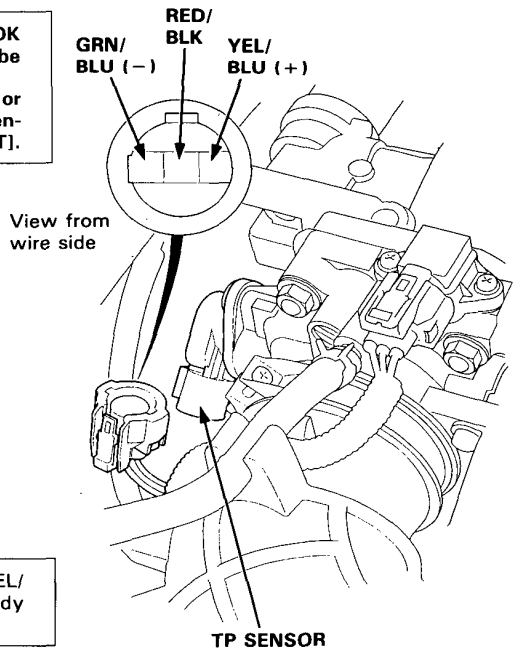
Is there approx. 5 V?

NO → Measure voltage between YEL/BLU (+) terminal and body ground.

YES

A → (To page 11-47)

B → (To page 11-47)



(From page 11-46)

(A)

Turn the ignition switch OFF.

Reconnect the 3P connector.

Connect the test harness between the ECM and connectors (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D11 (+) terminal and D22 (−) terminal.

Is voltage approx. 0.5 V at full close throttle, and approx. 4.5 V at full open throttle?
NOTE: There should be a smooth transition as the throttle is depressed.

NO

Turn the ignition switch OFF.

Disconnect the 22P connector from the Transmission Control Module (TCM).

Turn the ignition switch ON.

Is voltage approx. 0.5 V at full close throttle, and approx. 4.5 V at full open throttle?
NOTE: There should be a smooth transition as the throttle is depressed.

NO

- **Replace the TP sensor.**
- **Repair open or short in RED/BLK wire between ECM (D11), TCM [A/T] and TP sensor.**

YES

Replace the TCM.

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

(From page 11-46)

(B)

Is there approx. 5 V?

YES

Repair open in GRN/BLU wire between ECM (D22) and the TP sensor.

NO

Turn the ignition switch OFF.

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D20 (+) terminal and D22 (−) terminal.

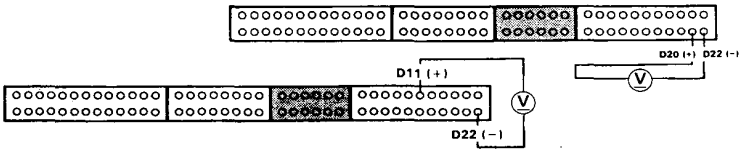
Is there approx. 5 V?

YES

Repair open in YEL/BLU wire between ECM (D20) and the TP sensor.

NO

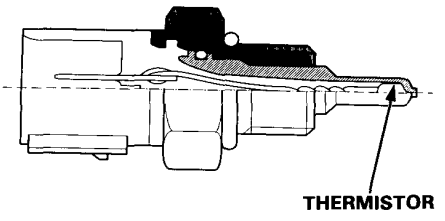
Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.

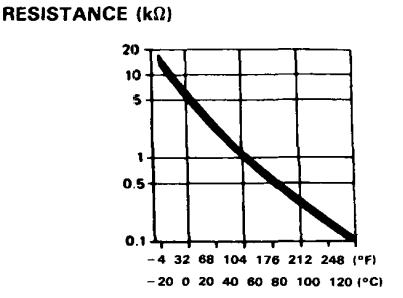


Intake Air Temperature (IAT) Sensor

10 The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 10: A problem in the Intake Air Temperature (IAT) Sensor circuit.

The IAT Sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.





10

- The MIL has been reported on.
- With the SCS short connector connected (see page 11-18), code 10 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Turn the ignition switch ON.

Is the MIL on and does it indicate code 10?

NO → Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires between the IAT sensor and the ECM.

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the IAT sensor.

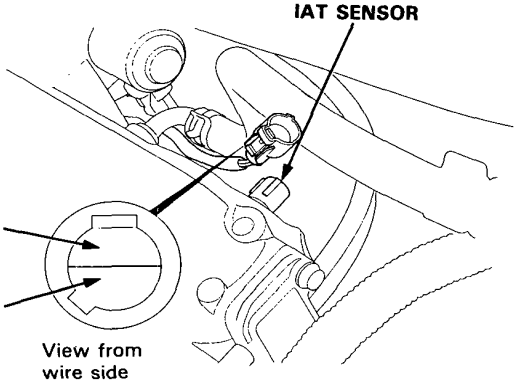
Measure resistance between the 2 terminals on the IAT sensor.

Is there 0.4—4.0 kΩ?

NO → Replace the IAT sensor.

YES

(To page 11-49)



(From page 11-48)

Turn the ignition switch ON.

Measure voltage between RED/YEL (+) terminal and body ground.

Is there approx. 5 V?

YES → Measure voltage between RED/YEL (+) terminal and GRN/BLU (−) terminal.

Is there approx. 5 V?

NO → **Repair open in GRN/BLU wire between ECM (D22) and the IAT sensor.**

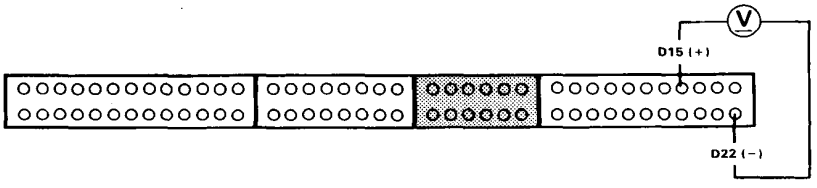
YES → **Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.**

NO → Turn the ignition switch OFF.

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D15 (+) terminal and D22 (−) terminal.

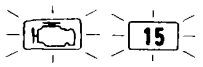


Is there approx. 5 V?

YES → **Repair open or short in RED/YEL wire between ECM (D15) and the IAT sensor.**

NO → **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**

Ignition Output Signal



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 15: A problem in the Ignition Output Signal circuit.

— The MIL has been reported on.
— With the SCS short connector connected (see page 11-18), code 15 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Start the engine.

Is the MIL on and does it indicate code 15?

NO → **Intermittent failure system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires between the distributor and the ECM.

YES

NOTE: If the engine won't start, it may take 20 seconds of cranking to set the code.

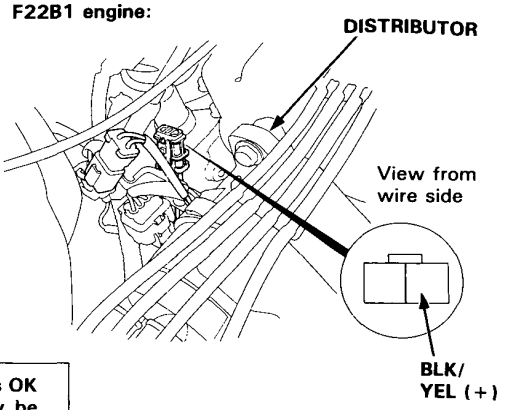
Turn the ignition switch OFF.

Disconnect the 2P connector from the distributor.

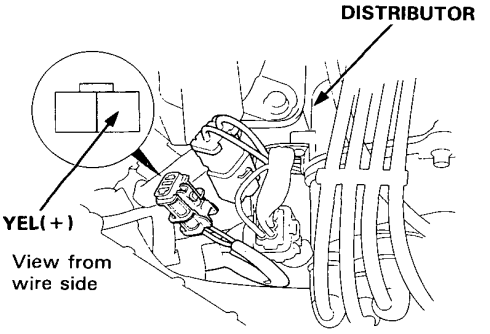
Turn the ignition switch ON.

(To page 11-51)

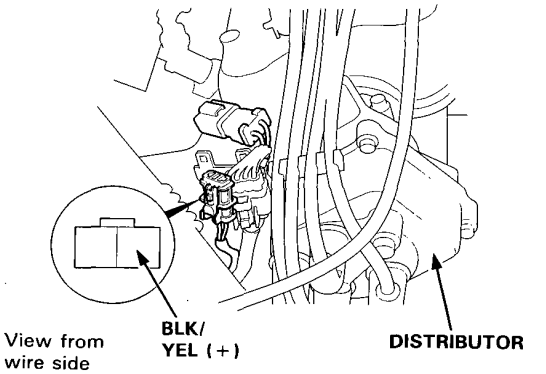
F22B1 engine:



F22B2 engine:



F22B5, F20B3 engine:



(From page 11-50)

Measure voltage between BLK/YEL (+) [F22B2 engine: YEL] terminal and body ground.

Is there battery voltage?

NO

[F22B2 engine]

Test the ignition coil (see section 23).

Is the ignition coil OK?

NO

Replace the ignition coil.

YES

- **Repair open in YEL wire between the 2P connector and ignition coil.**
- **Repair open in BLK/YEL wire between the ignition coil and ignition switch.**

[Except F22B2 engine]

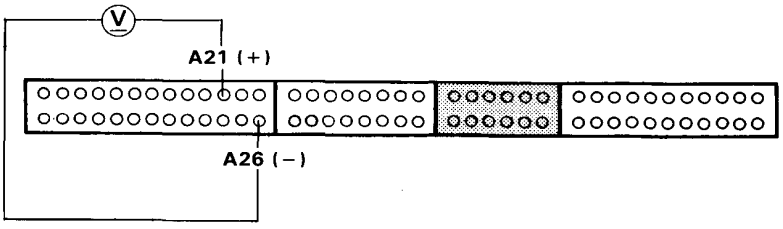
Repair open in BLK/YEL wire between the 2P connector and ignition switch.

YES

Turn the ignition switch OFF.

Reconnect the 2P connector.

Connect the test harness between the ECM and connectors (see page 11-21).



Turn the ignition switch ON.

Measure voltage individually between A21 (+) terminals and A26 (−) terminal.

Is there battery voltage?

NO

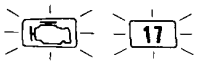
- **Replace the ICM (see section 23).**
- **Repair open or short in YEL/GRN wire between ICM and ECM (A21).**

NOTE: If the YEL/GRN wire was shorted, the ICM may be damaged.

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

Vehicle Speed Sensor (VSS)



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 17: A problem in the Vehicle Speed Sensor (VSS) circuit.

The VSS generates a pulsing signal when the front wheels turn.

— The MIL has been reported on.
— With the SCS short connector connected (see page 11-18), code 17 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Road test with A/T in [2] position (M/T: in 2nd gear), accelerate to 4,000 rpm (min^{-1}), then decelerate to 1,500 rpm (min^{-1}) with throttle fully closed for at least 5 seconds.

Is the MIL on and does it indicate code 17?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the VSS, the ECM, and the TCM [A/T].**

YES

Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

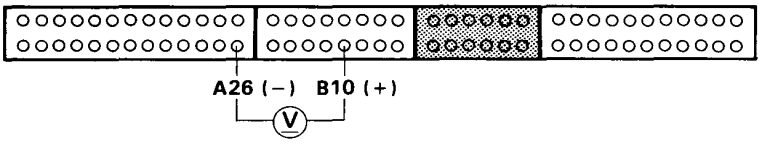
⚠ WARNING Block rear wheels before jacking up front of car.

Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-21).

Turn the ignition switch ON.

Block the right front wheel and slowly rotate left front wheel and measure voltage between B10 (+) terminal and A26 (−) terminal.



NOTE: Transmission in [N] position (A/T).

Does voltage pulse 0 V and approx. 5 V?

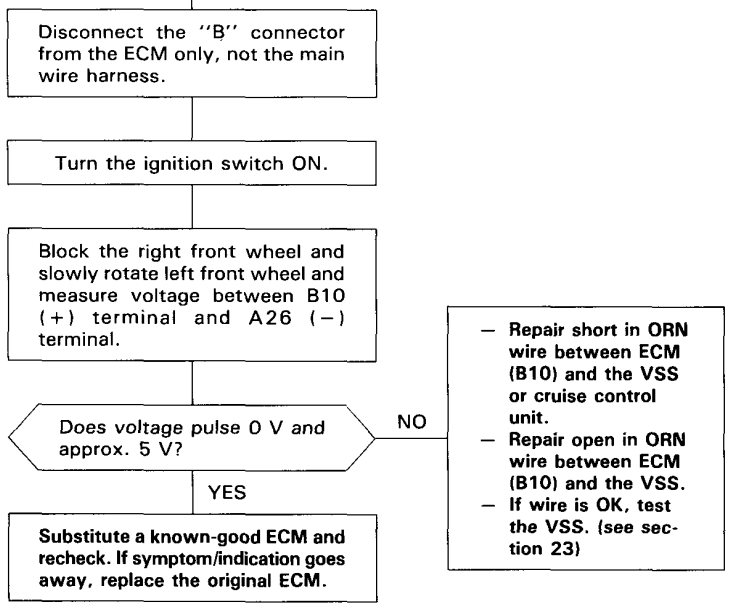
NO → Turn the ignition switch OFF.

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

(To page 11-53)

(From page 11-52)



Electrical Load Detector (ELD) [F22B1, F22B2 engine]

The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 20: A problem in the Electrical Load Detector (ELD) circuit.

With the SCS short connector connected (see page 11-18), code 20 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Start engine and keep engine speed at idle.
Turn on headlights.

Does the MIL indicate code 20?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at the ELD and the ECM.

YES

Turn the ignition switch and headlights OFF.

Disconnect the 3P connector from the ELD.

Turn the ignition switch ON.

Measure voltage between BLK/YEL (+) terminal and BLK (−) terminal.

Is there battery voltage?

NO → Measure voltage between BLK/YEL (+) terminal and body ground.

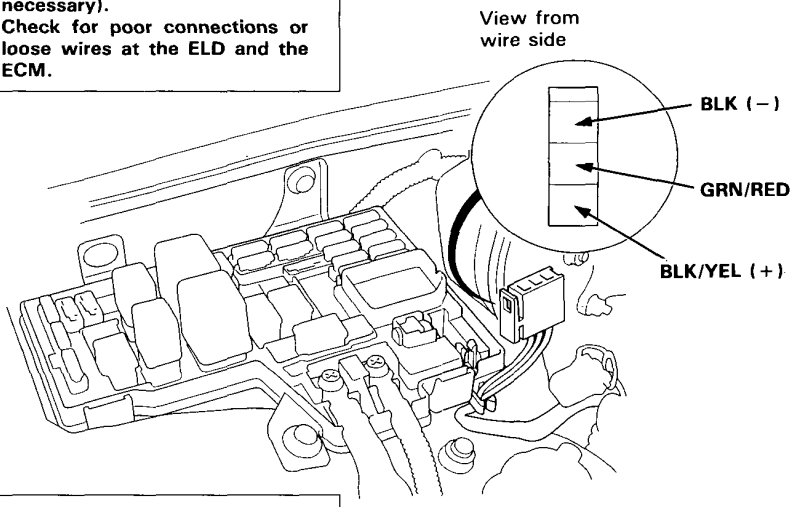
Is there battery voltage?

YES → **Repair open in BLK wire between the 3P connector and G402 (located behind right kick panel).**

NO → **Repair open in BLK/YEL wire between No. 4 ECU (ECM) (7.5 A) fuse in the under-dash fuse/relay box and the 3P connector.**

YES

(To page 11-55)



(From page 11-54)

Measure voltage between GRN/RED terminal and body ground.

Is there approx. 5 V?

NO → **Check for an open or short in GRN/RED wire between ECM (D10) and the 3P connector. If wire is OK, substitute a known-good ECM and recheck.**

YES

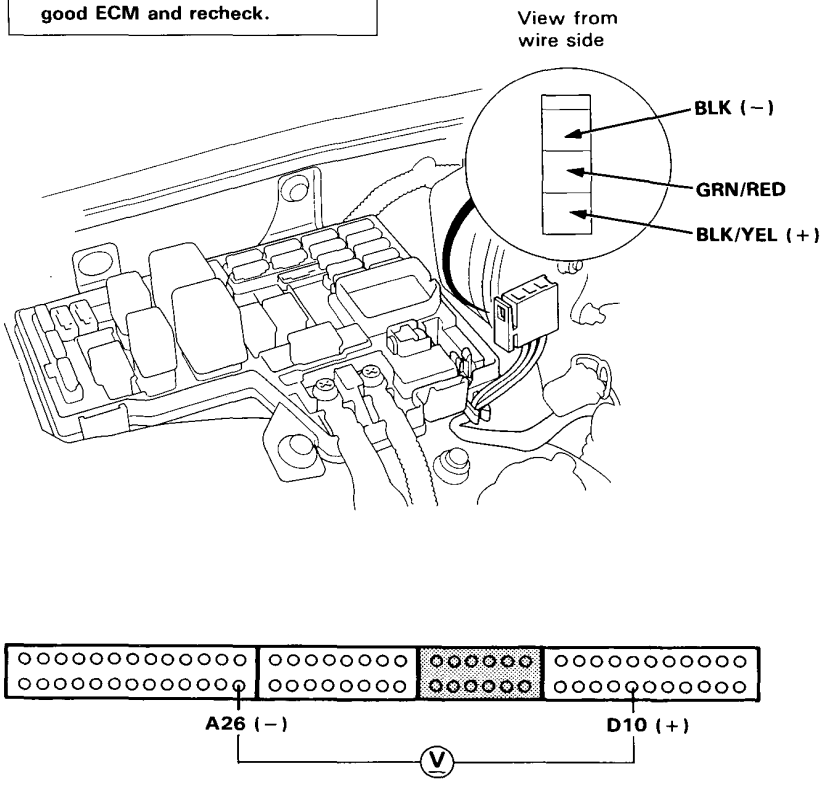
Turn the ignition switch OFF.

Connect the 3P connector to the ELD.

Connect the test harness between the ECM and connectors (see page 11-21).

Start the engine and allow it to idle.

While measuring voltage between D10 (+) terminal and A26 (−) terminal, turn the headlights on (low).



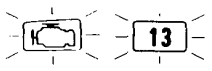
Does the voltage drop when the headlights are turned on?

NO → **Replace the ELD.**

YES

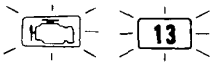
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

Barometric Pressure (BARO) Sensor



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 13: A problem in the Barometric Pressure (BARO) Sensor.

The BARO Sensor is built into the ECM.



— The MIL has been reported on.
— With the SCS short connector connected (see page 11-18), code 13 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Turn the ignition switch ON.

Is the MIL on and does it indicate code 13?

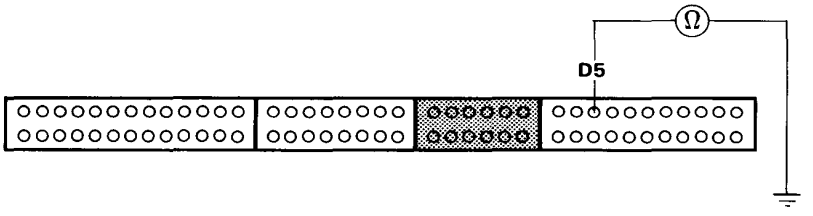
NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
[F22B1, F22B2 engine (A/T)]: Check for poor connections or loose wires at the TCM and the ECM.

YES

[F22B1, F22B2 engine (A/T)]

Turn the ignition switch OFF.

Connect the test harness to the main wire harness only, not the ECM (see page 11-21).



Disconnect the 22P connector from the Transmission Control Module (TCM).

Check for continuity between D5 terminal and body ground.

Is there continuity?

YES → **Repair short in BLU/WHT wire between ECM (D5) and the TCM.**

NO

Substitute known-good TCM and recheck.

Is the MIL on and does it indicate code 13?

NO → **Replace the original TCM.**

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

A/T FI Signal A/B (A/T)

30 The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 30: A problem in the A/T FI Signal A circuit between Transmission Control Module (TCM) and ECM.

31 The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 31: A problem in the A/T FI Signal B circuit between Transmission Control Module (TCM) and ECM.

30 or 31

With the SCS short connector connected (see page 11-18), code 30 and/or 31 are indicated.

Do the ECM Reset Procedure (see page 11-19).

Test drive necessary.
Drive the car for several miles so that the transmission upshifts and downshifts several times.

Does the MIL indicate code 30 and/or 31?

NO → **Intermittent failure, system is OK at this time.**
Check for poor connections or loose wires at the TCM and the ECM.

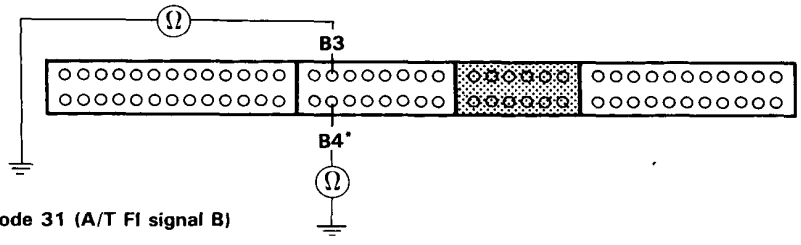
YES

Turn the ignition switch OFF.

Connect the test harness to the main harness only, not to the ECM (see page 11-21).

Disconnect the 22P connector from the TCM.

Check for continuity between B3 and/or B4* terminal and body ground.



***: code 31 (A/T FI signal B)**

Is there continuity?

NO → Check for continuity on WHT/RED or GRN* wire between B3 or B4* and 22P connector of the TCM.

YES

Repair short in WHT/RED or GRN* wire between ECM (B3 or B4*) and the TCM.

Is there continuity?

NO → **Repair open in WHT/RED or GRN* wire between ECM (B3 or B4*) and the TCM.**

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

Idle Control System

System Troubleshooting Guide

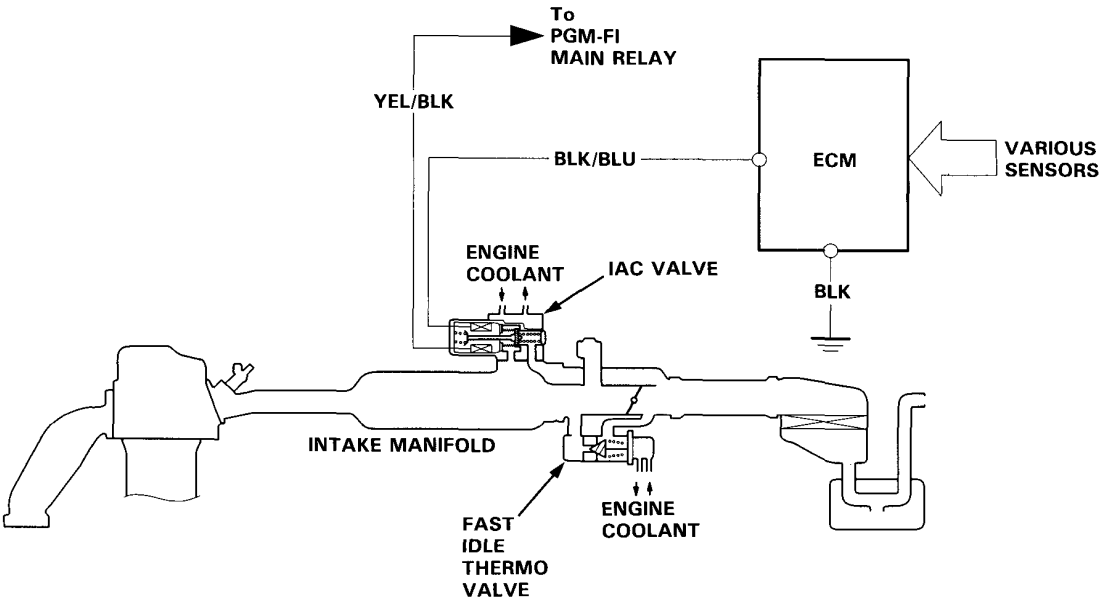
NOTE:

- Across each row in the chart, the sub-systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and the Malfunction Indicator Lamp (MIL) does not blink Diagnostic Trouble Code (DTC) 14, go to inspection described on page 11-60.

PAGE / SUB-SYSTEM / SYMPTOM		IDLE ADJUSTING SCREW	IDLE AIR CONTROL VALVE	STARTER SWITCH SIGNAL	AIR CONDI-TIONING SIGNAL	ALTER-NATOR FR SIGNAL	AUTOMATIC TRANSAXLE GEAR POSITION SIGNAL	BRAKE SWITCH SIGNAL	POWER STEERING PRESSURE SWITCH SIGNAL	FAST IDLE THERMO VALVE	HOSES AND CONNEC-TIONS
SYMPTOM		11-73	11-61	11-63	11-64	11-66	11-68	11-70	11-71	11-72	—
DIFFICULT TO START ENGINE WHEN COLD				②						①	
WHEN COLD FAST IDLE OUT OF SPEC. (1,000–2,000 rpm (min^{-1}))		③	②							①	
ROUGH IDLE			②								①
WHEN WARM ENGINE SPEED TOO HIGH		③	①						③	②	③
WHEN WARM ENGINE SPEED TOO LOW	Idle speed is below specified engine speed (no load)	②	①								
	Idle speed does not increase after initial start up.		①								
	On models with automatic transmission, the idle speed drops in gear		②				①				
	Idle speeds drops when air conditioner in ON		②		①						
	Idle speed drops when steering wheel is turning		②						①		
	Idle speed fluctuates with electrical load		②			③					①
FREQUENT STALLING	WHILE WARMING UP	②	①								
	AFTER WARMING UP	①	②								
FAILS EMISSION TEST											①

System Description

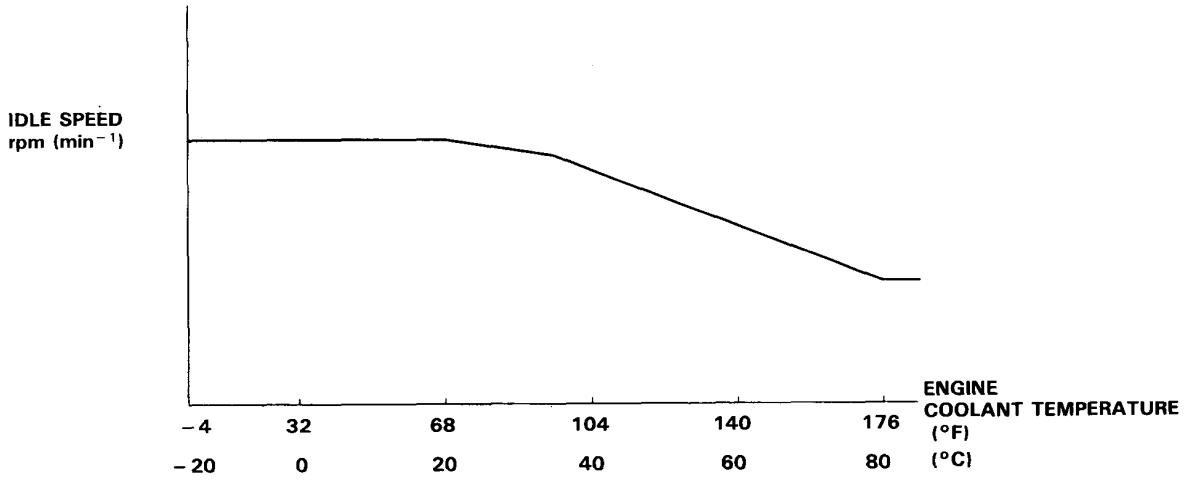
The idle speed of the engine is controlled by the Idle Air Control (IAC) Valve.
The valve changes the amount of air bypassing into the intake manifold in response to electric current controlled by the ECM. When the IAC Valve is activated, the valve opens to maintain the proper idle speed.



(cont'd)

System Description (cont'd)

1. After the engine starts, the IAC valve opens for a certain time. The amount of air is increased to raise the idle speed about 150—300 rpm (min^{-1}).
2. When the coolant temperature is low, the IAC valve is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the engine coolant temperature.

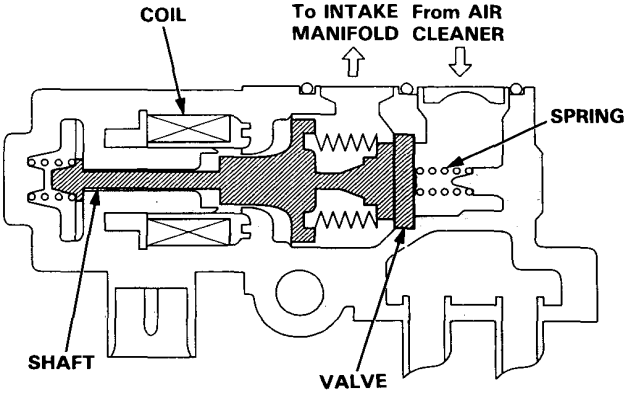


1. When the idle speed is out of specification and the Malfunction Indicator Lamp (MIL) does not blink Diagnostic Trouble Code (DTC) 14, check the following items:
   - Adjust the idle speed (see page 11-73)
   - Starter switch signal (see page 11-63)
   - Air conditioning signal (see page 11-64)
   - ALT FR signal (see page 11-66)
   - A/T gear position signal (see page 11-68)
   - Brake switch signal (see page 11-70)
   - PSP switch signal (see page 11-71)
   - Fast idle thermo valve (see page 11-72)
   - Hoses and connections
   - IAC valve and its mounting O-rings
2. If the above items are normal, substitute a known-good IAC valve and readjust the idle speed (see page 11-73).
   - If the idle speed still cannot be adjusted to specification (and the MIL does not blink code 14) after IAC valve replacement, substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.

Idle Air Control (IAC) Valve

14 The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 14: A problem in the Idle Air Control (IAC) Valve circuit.

The IAC Valve changes the amount of air bypassing the throttle body in response to a current signal from the ECM in order to maintain the proper idle speed.



14

- **The MIL has been reported on.**
- **With the SCS short connector *connected (see page 11-18)*, code 14 is indicated.**

Do the ECM Reset Procedure (see page 11-19).

Start the engine.

Is the MIL on and does it indicate code 14?

NO → Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in N or P position, M/T in neutral) until the radiator fan comes on, then let it idle.

YES

Disconnect the 2P connector from the IAC valve.

With the engine running and the accelerator pedal released, disconnect the 2P connector from the IAC valve.

Is there a reduction in engine speed?

YES → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires between the IAC valve and the ECM.**

NO → **Substitute a known-good IAC valve and retest.**

(To page 11-62)

(cont'd)

Idle Air Control (IAC) Valve (cont'd)

(From page 11-61)

Measure voltage between the YEL/BLK wire and body ground.

Is there battery voltage?

NO → **Repair open in YEL/BLK wire between IAC valve and PGM-FI main relay.**

YES

Turn the ignition switch off and reconnect the 2P connector to the IAC valve.

Connect the test harness "A" connector to the main wire harness only, not the ECM (see page 11-21).

Turn the ignition switch ON.

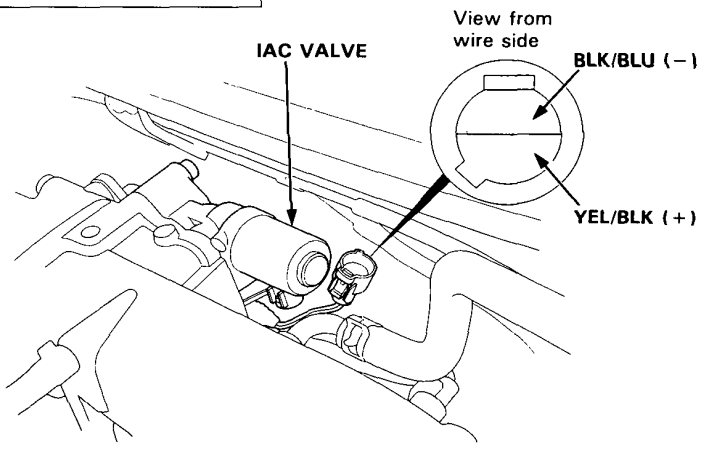
Momentarily connect A9 terminal to A23 terminal several times.

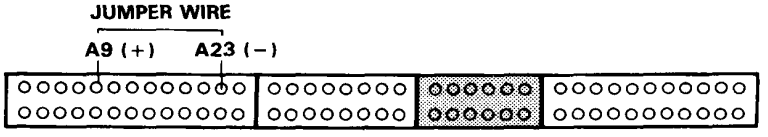
Does the IAC valve click?

YES → **Substitute a known-good ECM and retest. If symptom/indication goes away, replace the original ECM.**

NO

Check for an open or short in BLK/BLU wire between IAC valve and ECM (A9). If the wire is OK, replace the IAC valve.





Starter Switch Signal

This signals the ECM when the engine is cranking.

Inspection of Starter Switch Signal.

Connect the test harness between the ECM and connector (see page 11-21).

Measure voltage between B9 (+) terminal and A26 (−) terminal with the ignition switch in the start position.

Is there battery voltage?

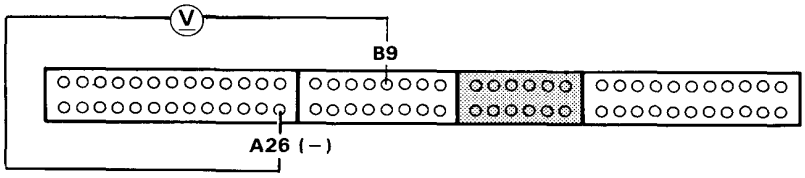
NO → Inspect No. 9 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO → **— Repair short in BLU/RED wire between ECM (B9) and No. 9 STARTER SIGNAL (7.5 A) fuse, PGM-FI main relay.**
— Replace No. 9 STARTER SIGNAL (7.5 A) fuse.

YES → **— Repair open in BLU/RED wire between ECM (B9) and No. 9 STARTER SIGNAL (7.5 A) fuse.**

YES → **Starter switch signal is OK.**



NOTE:
- M/T: Clutch pedal must be depressed.
- A/T: Transmission in [N] or [P] position.

Air Conditioning Signal

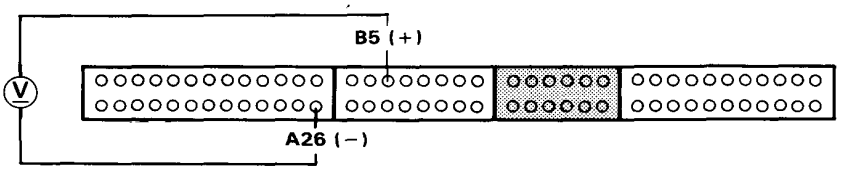
This signals the ECM when there is a demand for cooling from the air conditioning system.

Inspection of Air Conditioning Signal.

Connect the test harness between the ECM and connectors. Disconnect "B" connector from the main wire harness only, not the ECM (see page 11-21).

Turn the ignition switch ON.

Measure voltage between B5 (+) terminal and A26 (−) terminal.



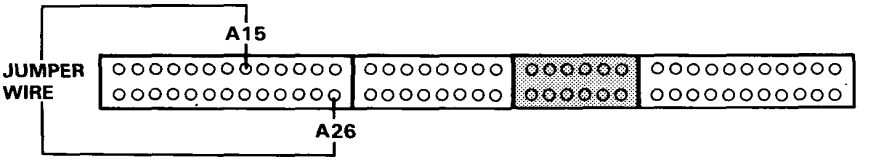
Is there approx. 5 V?

NO → **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**

YES

Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

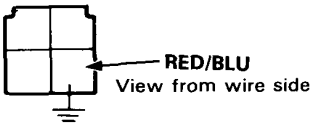


Turn the ignition switch ON.

Momentarily connect A15 terminal to A26 terminal several times.

Is there a clicking noise from the A/C compressor clutch?

NO → Momentarily connect the RED/BLU terminal of the 4P connector on the A/C clutch relay to body ground several times.



YES

Start the engine.

Blower switch ON.

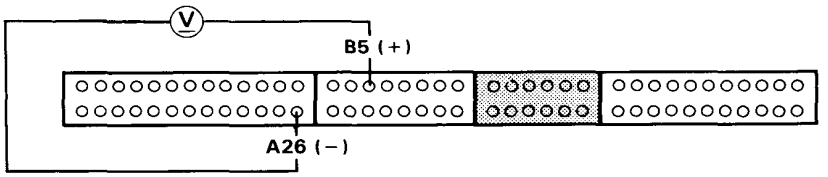
Is there a clicking noise from the A/C compressor clutch?

NO → **See air conditioner inspection (see section 22).**

YES

Repair open in RED/BLU wire between ECM (A15) and A/C clutch relay.

(To page 11-65)



(From page 11-64)

A/C switch ON.

Does A/C operate?

NO

Measure voltage between B5 (+) terminal and A26 (−) terminal.

YES

Air conditioning signal is OK.

Is voltage less than 1.0 V?

NO

Repair open in RED/WHT wire between ECM (B5) and A/C switch.

YES

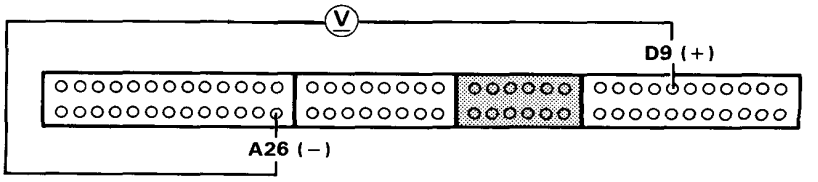
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

Alternator (ALT) FR Signal

This signals the ECM when the Alternator (ALT) is charging.

Inspection of ALT FR Signal.

Connect the test harness between the ECM and connectors. Disconnect "D" connector from the main wire harness only, not the ECM (see page 11-21).



Turn the ignition switch ON.

Measure voltage between D9 (+) terminal and A26 (–) terminal.

Is there approx. 5 V?

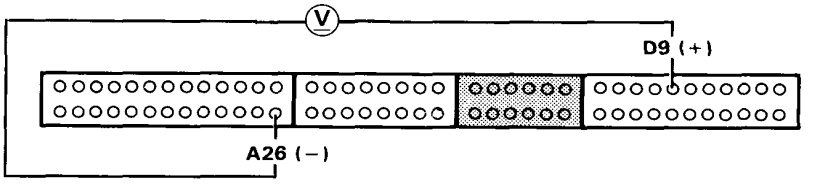
NO → **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**

YES

Turn the ignition switch OFF.

Reconnect "D" connector to the main wire harness.

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.



Measure voltage between D9 (+) terminal and A26 (–) terminal when the radiator fan is off.

Does the voltage decrease when headlights and rear defogger are turned on?

NO → Turn the ignition switch OFF.

YES

ALT FR signal is OK.

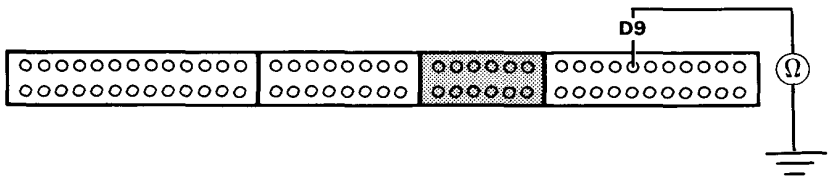
(To page 11-67)

(From page 11-66)

Disconnect "D" connector from ECM only, not the main wire harness.

Disconnect the negative battery cable from the battery.

Check for continuity between D9 terminal and body ground.



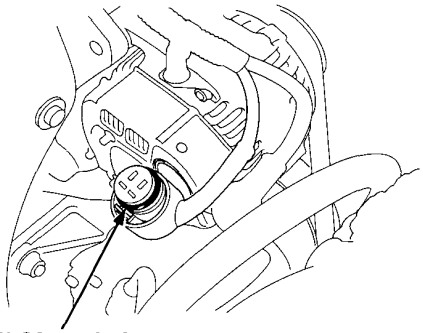
Is there continuity?

YES

Disconnect GRN connector from the alternator.

NO

Disconnect GRN connector from the alternator.



Connect WHT/RED wire to body ground.

Check for continuity between D9 terminal and body ground.

Is there continuity?

YES

NO

Repair open in WHT/RED wire between ECM (D9) and alternator.

See ALT inspection (see section 23).

Check for continuity between D9 terminal and body ground.

Is there continuity?

NO

See ALT inspection (see section 23).

YES

Repair short in WHT/RED wire between ECM (D9) and ALT.

Automatic Transaxle (A/T) Gear Position Signal (A/T only)

This signals the ECM when the transmission is in [N] or [P] position.

Inspection of A/T Gear Position Signal.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

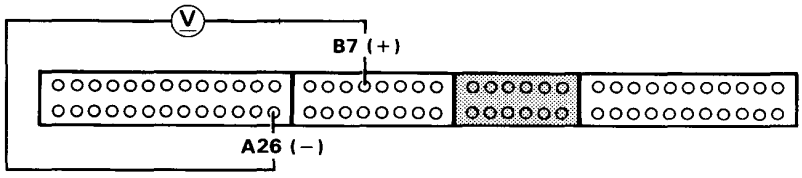
Does the indicator light properly?

NO → **See A/T gear position indicator inspection (see section 14).**

YES

Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors. Disconnect "B" connector from the main wire harness only, not the ECM (see page 11-21).



Turn the ignition switch ON.

Measure voltage between B7 (+) terminal and A26 (−) terminal.

Is there approx. 5 V?

NO → **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**

YES

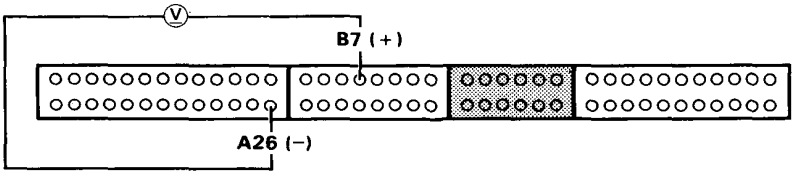
Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

Start the engine.

(To page 11-69)

(From page 11-68)



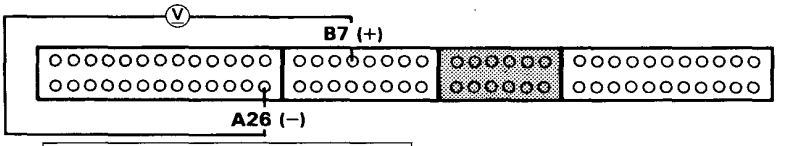
Measure voltage between B7 (+) terminal and A26 (–) terminal with the transmission in N and P position individually.

Is there less than 1.0 V?

NO

Repair open in LT GRN wire between ECM (B7) and gauge assembly.

YES



Measure voltage between B7 (+) terminal and A26 (–) terminal with the transmission in gear.

Is there battery voltage?

NO

Repair short in LT GRN wire between ECM (B7) and gauge assembly.

YES

Automatic Transaxle gear Position Switch signal is OK.

Brake Switch Signal [F22B1, F22B2 engine]

This signals the ECM when the brake pedal is depressed.

Inspection of Brake Switch Signal.

Are the brake lights on without depressing the brake pedal?

YES → **Inspect the brake switch (see section 19).**

NO

Depress the brake pedal.

Do the brake lights come on?

NO → Inspect STOP LIGHT, HORN (20 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

NO → **— Repair short in WHT/YEL wire between brake switch and STOP LIGHT, HORN (20 A) fuse.**
— Replace STOP LIGHT, HORN (20 A) fuse.

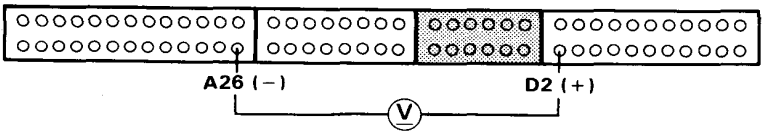
YES

YES

— Repair open in WHT/YEL wire between brake switch and STOP LIGHT, HORN (20 A) fuse.
— Inspect the brake switch (see section 19).

Connect the test harness to the main wire harness only, not to the ECM (see page 11-21).

Depress the brake pedal.



Measure voltage between D2 (+) terminal and A26 (−) terminal with the brake pedal depressed.

Is there battery voltage?

NO → **Repair open in GRN/WHT wire between the brake switch and ECM (D2).**

YES

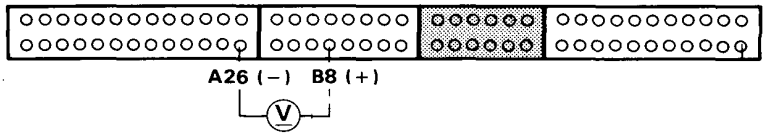
Brake switch signal is OK.

Power Steering Pressure (PSP) Switch Signal

This signals the ECM when the power steering load is high.

Inspection of PSP switch signal.

Connect the test harness between the ECM and connectors (see page 11-21).



Turn the ignition switch ON.

Measure voltage between B8 (+) terminal and A26 (–) terminal.

Is there less than 1.0 V?

NO

Turn the ignition switch OFF.

Disconnect the 2P connector from the PSP switch.

Turn the ignition switch ON.

Connect GRN terminal to BLK terminal.

Is there less than 1.0 V?

YES

Replace the PSP switch.

NO

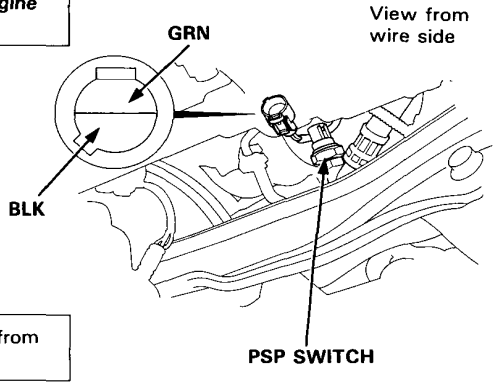
Repair open in GRN wire between ECM (B8) and PSP switch or BLK wire between PSP switch and G402 (*located at left of engine compartment*).

YES

Start the engine.

Turn steering wheel slowly.

Measure voltage between B8 (+) terminal and A26 (–) terminal while steering wheel is turning.



Is there battery voltage?

NO

YES

PSP switch signal is OK.

Disconnect the 2P connector from the PSP switch.

Is there battery voltage?

YES

Replace the PSP switch.

NO

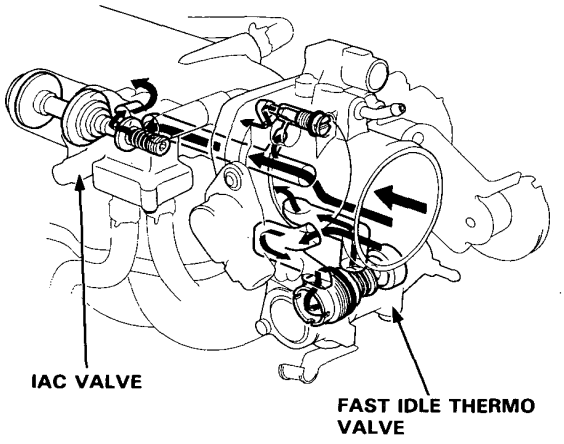
Check for a short in GRN wire between ECM (B8) and PSP switch. If wire is OK, substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.

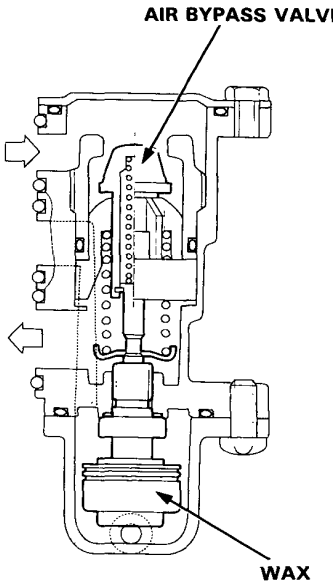
Idle Control System

Fast Idle Thermo Valve

Description

To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle thermo valve is controlled by a thermowax plunger. When the engine is cold, the engine coolant surrounding the thermowax contracts the plunger, allowing additional air to be bypassed into the intake manifold so that the engine idles faster. When the engine reaches operating temperature, the valve closes, reducing the amount of air bypassing into the intake manifold.

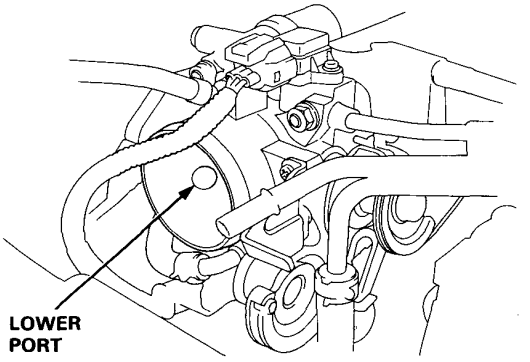




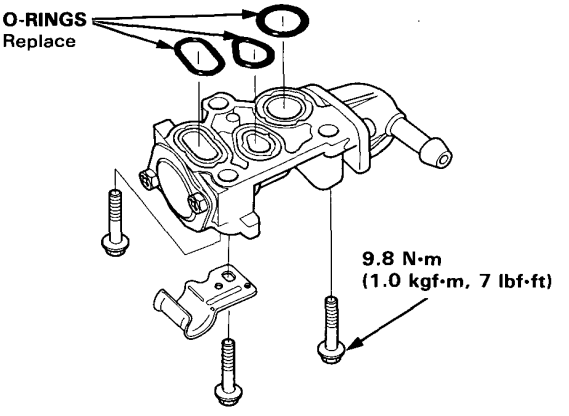
Inspection

NOTE: The fast idle thermo valve is factory adjusted; it should not be disassembled.

1. Remove the intake air duct from the throttle body.
2. Start the engine.
3. Put your finger over the lower port in throttle body and make sure that there is air flow with the engine cold (engine coolant temperature below 86°F, 30°C).



- If not, replace the fast idle thermo valve and retest.



4. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.
5. Check that valve is completely closed. If the valve is leaking, the idle speed will drop when you cover the lower port. Check engine coolant level and for air in the engine cooling system (see section 10). If OK, replace the fast idle thermo valve and recheck.

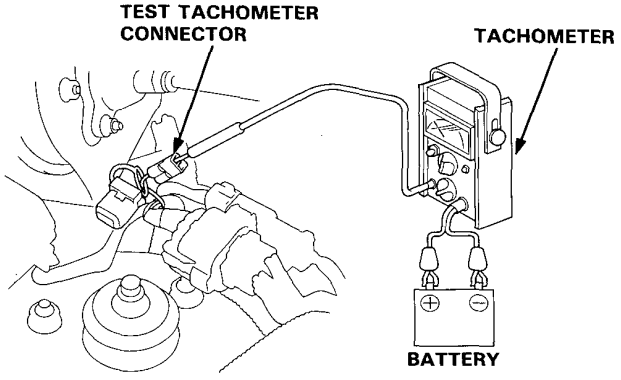
Idle Speed Setting

Inspection/Adjustment

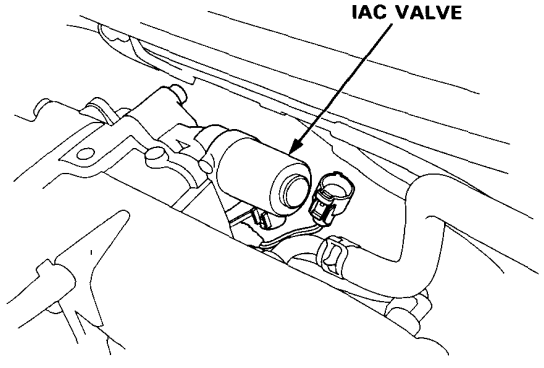
NOTE: Before the idle speed setting, check the following items:
- The MIL has not been reported on.
- Ignition timing
- Spark plugs
- Air cleaner
- PCV system

1. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.

2. Connect a tachometer.



3. Disconnect the 2P connector from the Idle Air Control (IAC) valve.



4. Start the engine with the accelerator pedal slightly depressed. Stabilize the engine speed at 1,000 rpm, then slowly release the pedal until the engine idles.

5. Check idling in no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioner are not operating.

Idle speed should be:
F22B1, F22B2 engine:

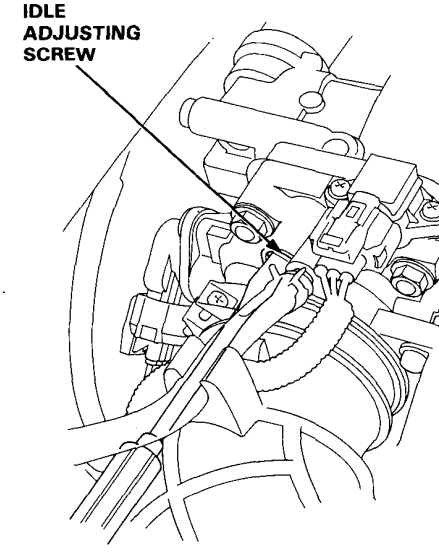
M/T	550 ± 50 rpm (min^{-1})
A/T	550 ± 50 rpm (min^{-1}) (in [N] or [P] position)

F22B5, F20B3 engine:

M/T	620 ± 50 rpm (min^{-1})
A/T	620 ± 50 rpm (min^{-1}) (in [N] or [P] position)

Adjust the idle speed, if necessary, by turning the idle adjusting screw.

NOTE: After adjusting the idle speed in this step, check the ignition timing (see section 23).
If it is out of spec, go back to step 4.



6. Turn the ignition switch OFF.

7. Reconnect the 2P connector on the IAC valve, then remove the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for 10 seconds to reset the ECM.

(cont'd)

Idle Speed Setting (cont'd)

8. Restart and idle the engine with no-load conditions for one minute, then check the idle speed.

Idle speed should be;
F22B1, F22B2 engine

M/T	700 ± 50 rpm (min^{-1})
A/T	700 ± 50 rpm (min^{-1}) (in [N] or [P] position)

F22B5, F20B3 engine

M/T	770 ± 50 rpm (min^{-1})
A/T	770 ± 50 rpm (min^{-1}) (in [N] or [P] position)

9. Idle the engine for one minute with headlights (Low) ON and check the idle speed.

Idle speed should be;

M/T	770 ± 50 rpm (min^{-1})
A/T	770 ± 50 rpm (min^{-1}) (in [N] or [P] position)

10. Turn the headlights off.
Idle the engine for one minute with heater fan switch at HI and air conditioner on, then check the idle speed.

Idle speed should be;

M/T	770 ± 50 rpm (min^{-1})
A/T	770 ± 50 rpm (min^{-1}) (in [N] or [P] position)

NOTE: If the idle speed is not within specification, see System Troubleshooting Guide on page 11-58.

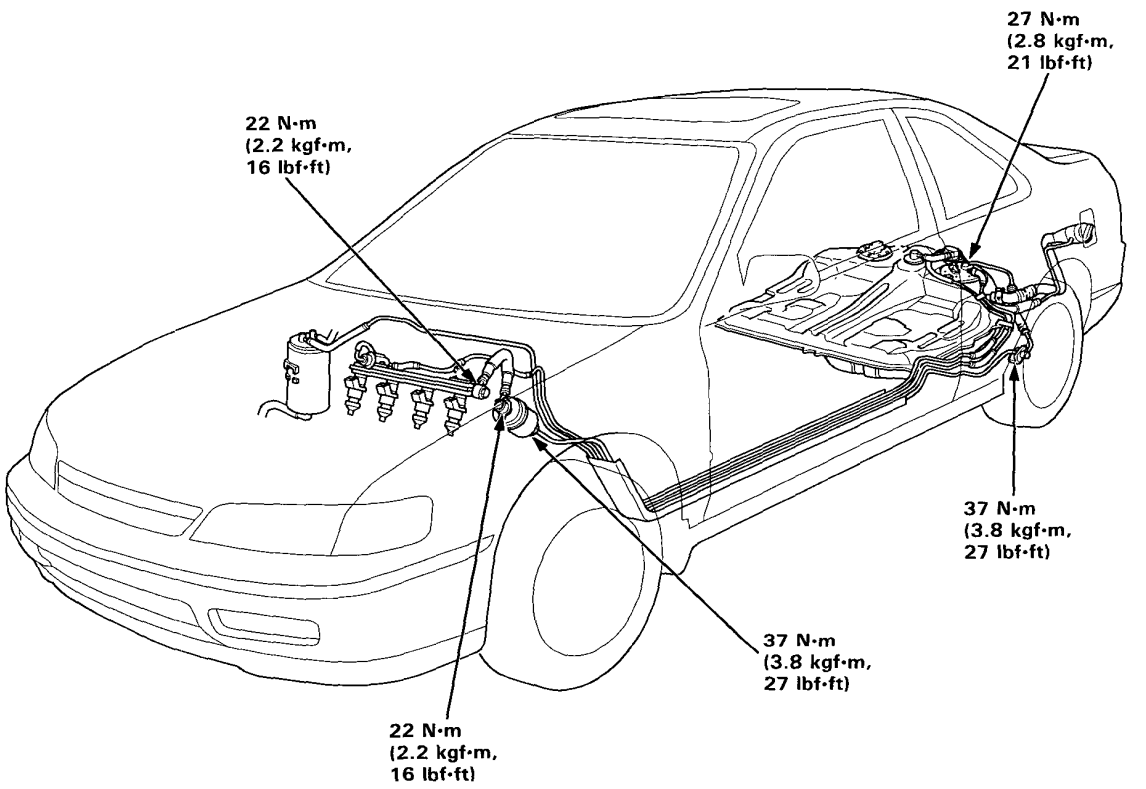
System Troubleshooting Guide

NOTE: Across each row in the chart, the sub-systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

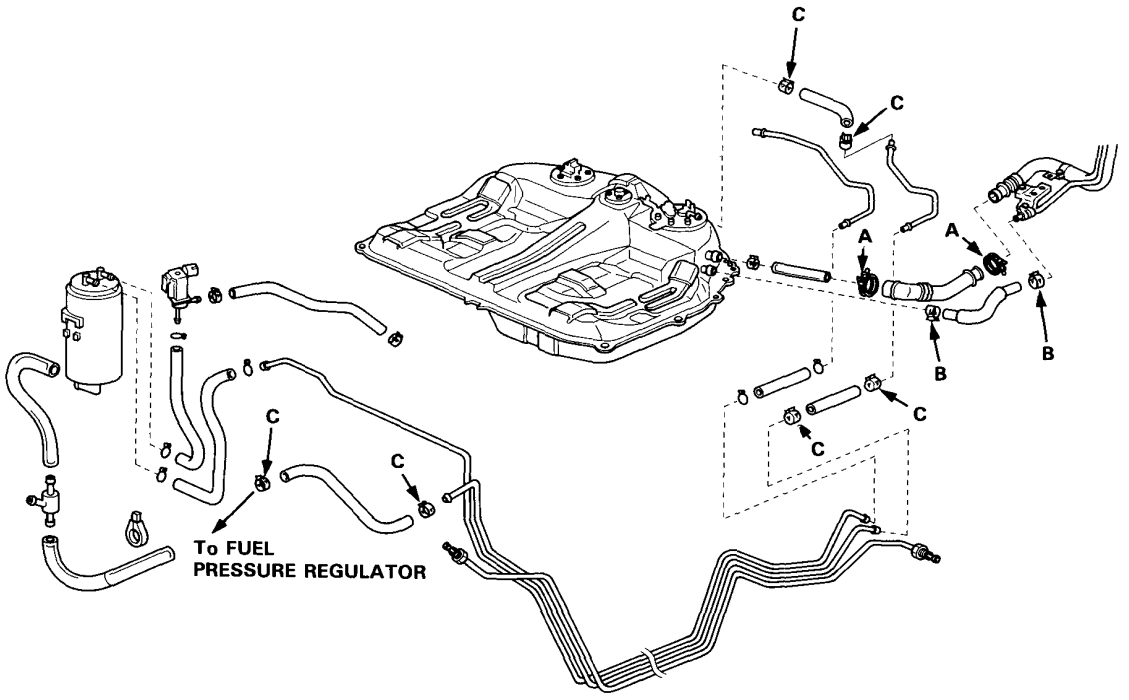
PAGE / SUB-SYSTEM / SYMPTOM		FUEL LINES	FUEL INJECTOR	FIA CONTROL SYSTEM [F22B1 engine]	INJECTOR RESISTOR	FUEL PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	PGM-FI MAIN RELAY	CONTAM-INATED FUEL
		11-76	11-80, 83	11-86	11-89	11-90	11-92	11-93	11-95	–
ENGINE WON'T START					③		③	①	②	
DIFFICULT TO START ENGINE WHEN COLD OR HOT							①	②		
ROUGH IDLE			①		②					③
POOR PER-FORMANCE	MISFIRE OR ROUGH RUNNING		①		②	③				③
	FAILS EMISSION TEST		②	③	③	①				
	LOSS OF POWER		③		③		②	①		
FREQUENT STALLING	WHILE WARMING UP					①				
	AFTER WARMING UP					①				

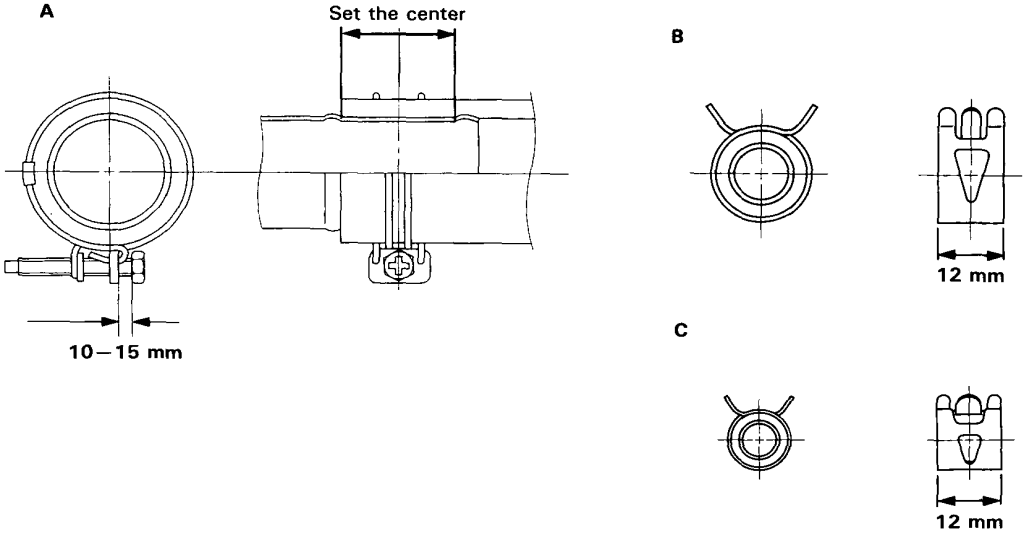
Fuel Lines

NOTE: Check all fuel system lines and hoses for damage, leaks or deterioration, and replace if necessary.



NOTE: Check all hose clamps and retighten if necessary.





Fuel Supply System

System Description

The fuel supply system consists of a fuel tank, in-tank high presssure fuel pump, PGM-FI main relay, fuel filter, fuel pressure regulator, fuel injectors, injector resistor and Fuel Injection Air (FIA) Control System [F22B1 engine] and fuel delivery and return lines. This system delivers pressure-regulatored fuel to the fuel injectors and cuts the fuel delivery when the engine is not running.

Fuel Pressure

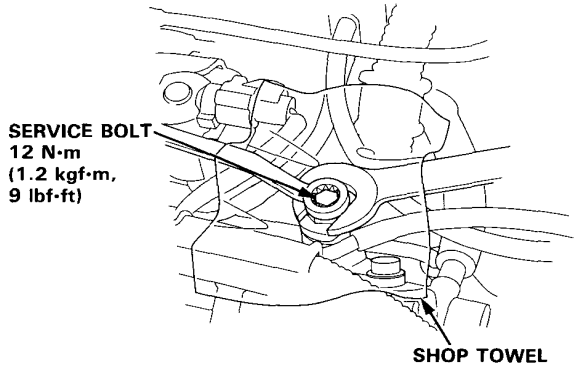
Relieving

Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 6 mm service bolt on top of the fuel rail.

⚠ WARNING

- **Do not smoke while working on the fuel system. Keep open flames or sparks away from your work area.**
- **Be sure to relieve fuel pressure while the ignition switch is off.**

1. Disconnect the battery negative cable from the battery negative terminal.
2. Remove the fuel fill cap.
3. Use a box end wrench on the 6 mm service bolt at the fuel rail, while holding the special banjo bolt with another wrench.
4. Place a rag or shop towel over the 6 mm service bolt.
5. Slowly loosen the 6 mm service bolt one complete turn.



NOTE:

- A fuel pressure gauge can be attached at the 6 mm service bolt hole.
- Always replace the washer between the service bolt and the special banjo bolt whenever the service bolt is loosened.
- Replace all washers whenever the bolts are removed.

Inspection

1. Relieve fuel pressure (see page 11-78).

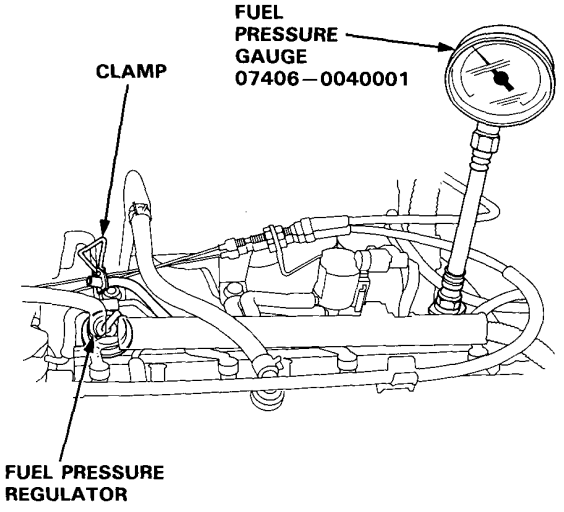
2. Remove the service bolt on the fuel rail while holding the banjo bolt with another wrench. Attach the special tool.

3. Start the engine. * Measure the fuel pressure with the engine idling and the vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched.

   Pressure should be;
   265—314 kPa (2.7—3.2 kgf/cm², 38—46 psi)

4. Reconnect vacuum hose to the fuel pressure regulator.

   Pressure should be;
   206—255 kPa (2.1—2.6 kgf/cm², 30—37 psi)



*: If the engine will not start, turn the ignition switch on, wait for two seconds, turn it off, then back on again and read the fuel pressure.

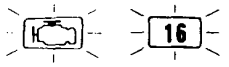
- If the fuel pressure is not as specified, first check the fuel pump (see page 11-94). If the fuel pump is OK, check the following:

— If the fuel pressure is higher than specified, inspect for:
  - Pinched or clogged fuel return hose or line.
  - Faulty fuel pressure regulator (see page 11-90).

— If the fuel pressure is lower than specified, inspect for:
  - Clogged fuel filter.
  - Faulty fuel pressure regulator (see page 11-90).
  - Leakage in the fuel line.

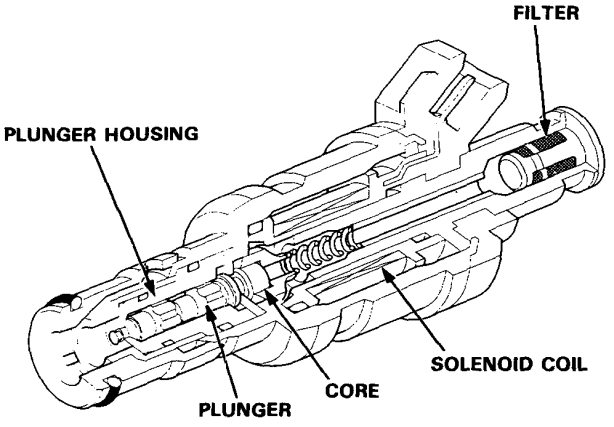
Fuel Injectors

[F22B1, F22B2 engine]
Troubleshooting



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 16: A problem in the Fuel Injector circuit.

The Fuel Injectors are a solenoid-actuated constant-stroke pintle type consisting of a solenoid, plunger needle valve and housing. When current is applied to the solenoid coil, the valve lifts up and pressurized fuel is injected. Because the needle valve lift and the fuel pressure are constant, the injection quantity is determined by the length of time that the valve is open (i.e., the duration the current is supplied to the solenoid coil). The Fuel Injector is sealed by an O-ring and seal ring at the top and bottom. These seals also reduce operating noise.



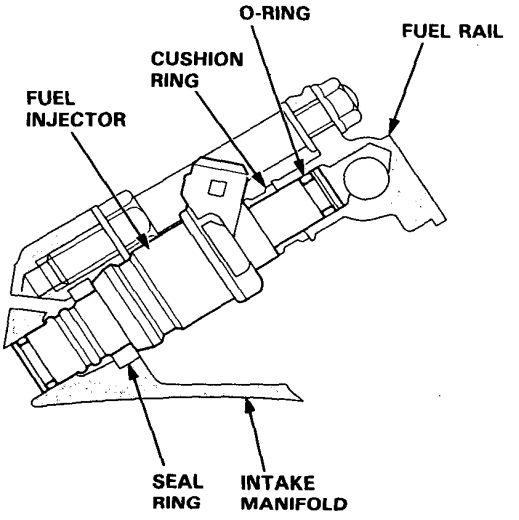
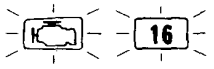


Illustration: F22B1 engine



– The MIL has been reported on.
– With the SCS short connector connected (see page 11-18), code 16 is indicated.

Do the ECM Reset Procedure (see page 11-19).

Start the engine and allow it to idle.

NOTE: If engine will not start, it may take 10 seconds of cranking to set the code.

Is the MIL on and does it indicate code 16?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires between the fuel injector, the injector resistor and the ECM.

YES

(To page 11-81)

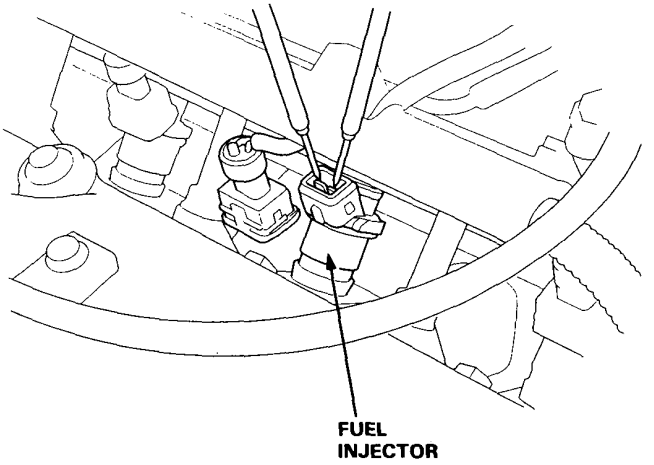
(From page 11-80)

Start the engine and listen at each fuel injector for a clicking sound.

Turn the ignition switch OFF.

Disconnect the 2P connector from the fuel injector that does not click.

Measure resistance between the 2 terminals of fuel injector.



Is there 1.5—2.5 Ω?

NO → **Replace the fuel injector/injectors that are not 1.5—2.5 Ω.**

YES

Turn the ignition switch ON.

Measure voltage between RED/BLK (+) terminal in the 2P connector and body ground.

Is there battery voltage?

NO → Turn the ignition switch OFF.

Disconnect 6P connector from the injector resistor.

Turn the ignition switch ON.

Measure voltage between RED/BLK (+) terminal and body ground.

YES

Ⓐ

(To page 11-82)

Ⓑ

(To page 11-82)

(cont'd)

Fuel Injectors (cont'd)

(From page 11-81)
Ⓐ

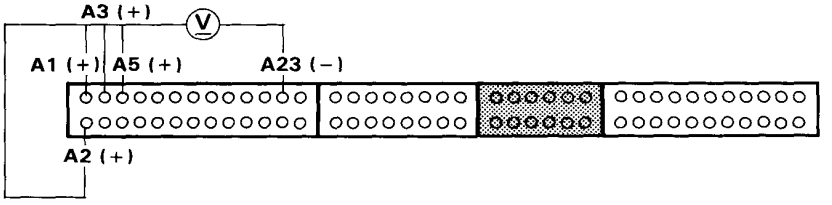
Turn the ignition switch OFF.

Reconnect the 2P connector to the fuel injector.

Connect the test harness between the ECM and connectors (see page 11-21).

Turn the ignition switch ON.

Measure voltage between A23 (−) terminal and following terminal:
- No. 1 fuel injector: A1 (+) terminal.
- No. 2 fuel injector: A3 (+) terminal.
- No. 3 fuel injector: A5 (+) terminal.
- No. 4 fuel injector: A2 (+) terminal.



Is there battery voltage?

NO → **Repair open in the wire between the ECM (A1, A3, A5 or A2) and the fuel injector.**

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

(From page 11-81)
Ⓑ

Is there battery voltage?

NO → **Repair open in the YEL/BLK wire between the injector resistor and the PGM-FI main relay.**

YES

Test the injector resistor (see page 11-89).

Does the injector resistor test OK?

NO → **Replace the injector resistor.**

YES

Repair open RED/BLK wire between 2P connector and injector resistor.

[F22B5, F20B3 engine]

Testing

NOTE: Check the following items before testing: idle speed, ignition timing and idle CO%

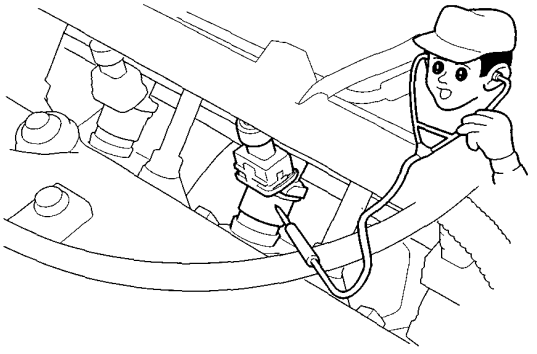
If the engine runs:

1. With the engine idling, disconnect each fuel injector connector individually and inspect the change in the idle speed.

   - If the idle speed drop is almost the same for each cylinder, the fuel injectors are normal.

   - If the idle speed or quality remains the same when you disconnect a particular fuel injector, replace the fuel injector and retest.

2. Check the clicking sound of each fuel injector by means of a stethoscope when the engine is idling.



   - If any fuel injector fails to make the typical clicking sound, check the sound again after replacing the fuel injector.

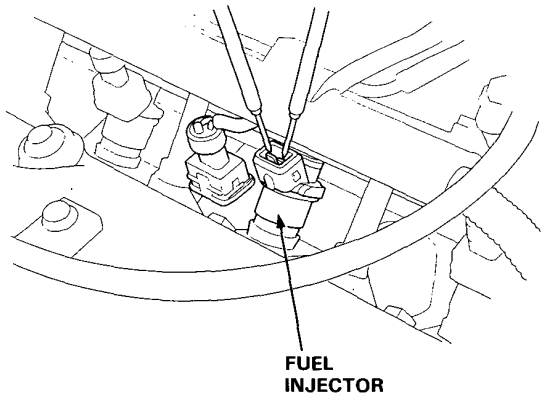
   — If clicking sound is still absent, check the following.
     - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the PGM-FI main relay and the injector resistor.
     - Whether the injector resistor is open or corroded (page 11-89).
     - Whether there is any short-circuiting, wire breakage or poor connection in the RED/BLK wire between the injector resister and the fuel injector.
     - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the fuel injector and the ECM.

     If all is OK, check the ECM (see page 11-26) and PGM-FI main relay (see page 11-95).

If the engine cannot be started:

1. Remove the connector of the fuel injector, and measure the resistance between the 2 terminals of the fuel injector.

   Resistance should be: 1.5—2.5 Ω



   - If the resistance is not as specified, replace the fuel injector.

   - If the resistance is as specified, check the pressure (see page 11-79).

   — If the fuel pressure is as specified, check the following:
     - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the PGM-FI main relay and the injector resistor.
     - Whether the injector resistor is open or corroded (page 11-89).
     - Whether there is any short-circuiting, wire breakage, or poor connection in the RED/BLK wire between the injector resistor and the fuel injector.
     - Whether there is any short-circuiting, wire breakage or poor connection in the wire betwen the fuel injector and the ECM.

     If all is OK, check the ECM (see page 11-26).

(cont'd)

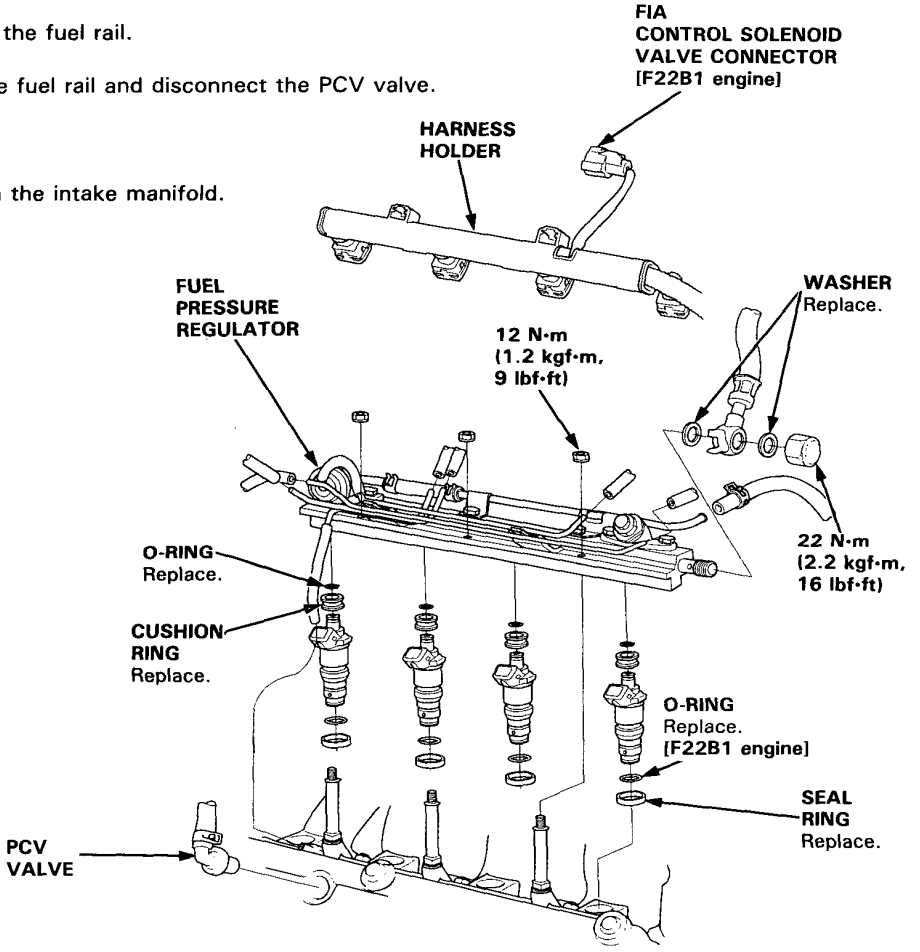
Fuel Injectors (cont'd)

Replacement

⚠ WARNING Do not smoke when working on the fuel system. Keep open flames away from your work area.

1. Relieve the fuel pressure (see page 11-78).
2. Disconnect the connectors from the fuel injectors and the FIA control solenoid valve [F22B1 engine].
3. Disconnect the vacuum hoses and fuel return hose from the fuel pressure regulator.

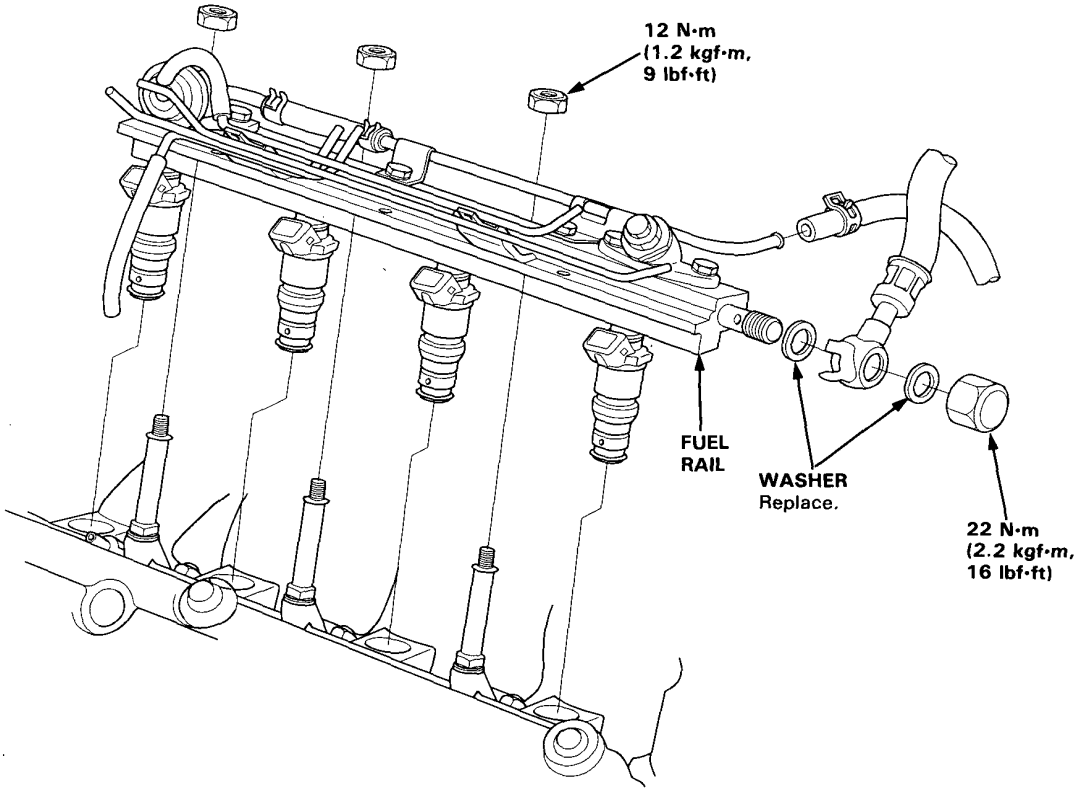
   NOTE: Place a rag or shop towel over the hoses before disconnecting them.
4. Disconnect the fuel hose from the fuel rail.
5. Loosen the retainer nuts on the fuel rail and disconnect the PCV valve.
6. Disconnect the fuel rail.
7. Remove the fuel injectors from the intake manifold.



8. Slide new cushion rings onto the fuel injectors.
9. Coat new O-rings with clean engine oil, and put them on the fuel injectors.
10. Insert the fuel injectors into the fuel rail first.
11. Coat new seal rings with clean engine oil, and press them into the intake manifold.

12. Install the fuel injectors and fuel rail assembly in the intake manifold.

CAUTION: To prevent damage to the O-rings, install the fuel injectors in the fuel rail first, then install them in the intake manifold.



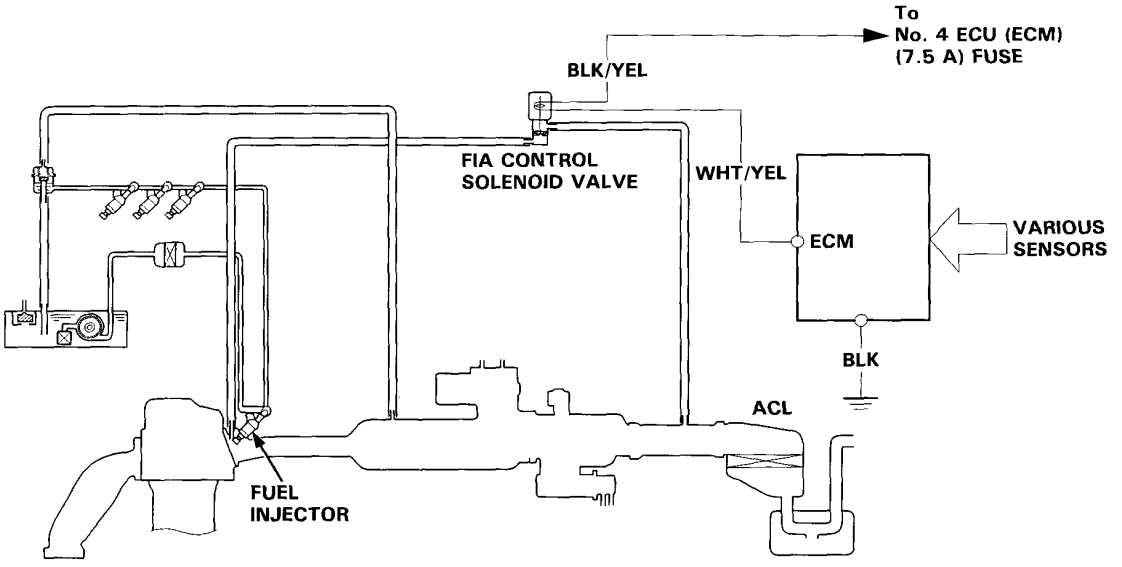
13. Install and tighten the retainer nuts.
14. Connect the fuel hose to the fuel rail with new washers.
15. Connect the vacuum hoses and fuel return hose to the fuel pressure regulator.
16. Install the connectors on the fuel injectors and the FIA control solenoid valve (F22B1 engine).
17. Replace the 6 mm service bolt washer and tighten the bolt.
18. Connect the PCV valve.
19. Turn the ignition switch ON, but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

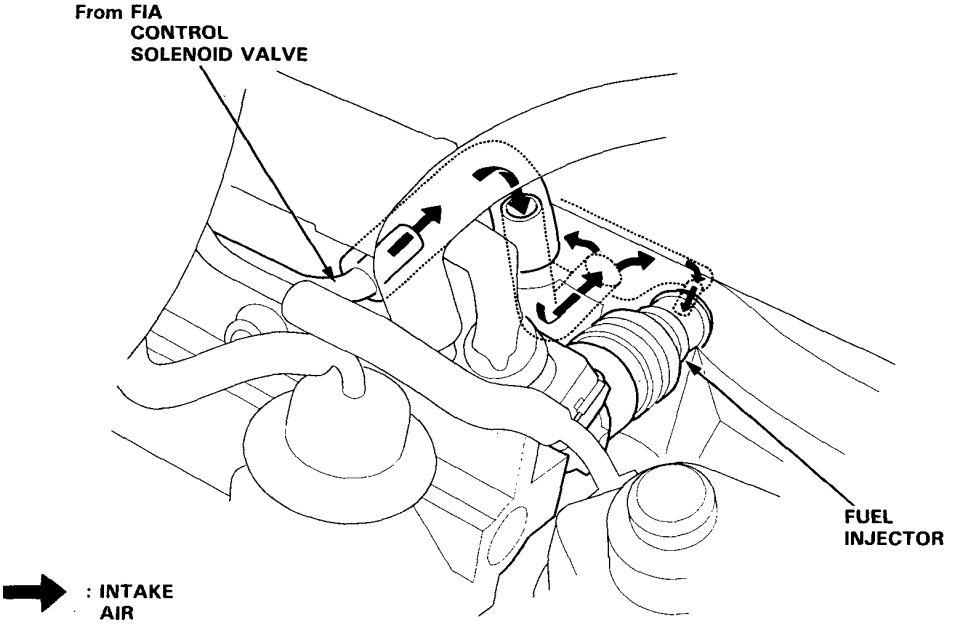
Fuel Supply System

Fuel Injection Air (FIA) Control System [F22B1 engine]

Description

When the engine speed is between 1,300 rpm (min^{-1}) and 4,500 rpm (min^{-1}), the ECM supplies ground to the FIA control solenoid valve sending intake air to the fuel injectors.





Troubleshooting

Inspection of the FIA control system

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position until the radiator fan comes on, then let it idle.

Remove the vacuum hose from the install pipe and connect a vacuum gauge to the hose.

Is there vacuum?

YES → Disconnect the 2P connector from the FIA control solenoid valve.

Is there vacuum?

YES → **Replace the FIA control solenoid valve.**

NO → Turn the ignition switch OFF.

Disconnect "A" connector from ECM.

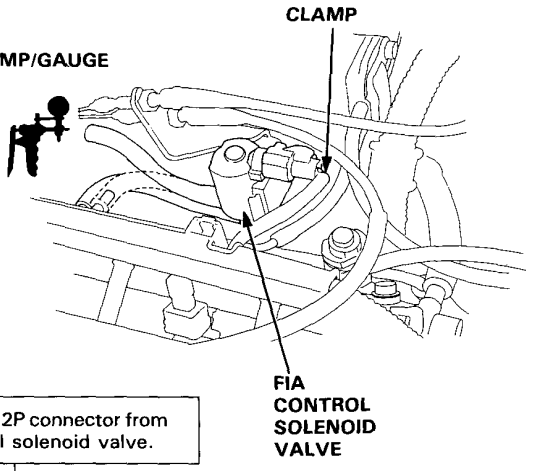
Check for continuity to ground on the WHT/YEL wire.

Is there continuity to ground?

YES → **Repair short to ground in WHT/YEL wire between ECM (A14) and the 2P connector.**

NO → **Substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.**

NO → (To page 11-88)



(cont'd)

Fuel Injection Air (FIA) Control System (cont'd)

(From page 11-87)

Raise engine speed to 1,500 rpm (min^{-1}).

Check for vacuum at vacuum hose.

Is there vacuum?

NO

Disconnect the 2P connector from the FIA control solenoid valve.

Keep engine speed at 1,500 rpm (min^{-1}).

Measure voltage between BLK/YEL (+) terminal and WHT/YEL (−) terminal.

Is there battery voltage?

YES

Replace the FIA control solenoid valve.

NO

Measure voltage between BLK/YEL (+) terminal and body ground.

Is there battery voltage?

NO

Repair open in BLK/YEL wire between 2P connector and No. 4 ECU (ECM) (7.5 A) fuse in the under-dash fuse/relay box.

YES

Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-21).

Turn the ignition switch ON and connect a jumper wire between ECM (A14) terminal and ECM (A26) terminal.

Does the solenoid valve click when the jumper is connected?

NO

Repair open in WHT/YEL wire between ECM (A14) and the 2P connector.

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

YES

Raise engine speed to 5,000 rpm (min^{-1}).

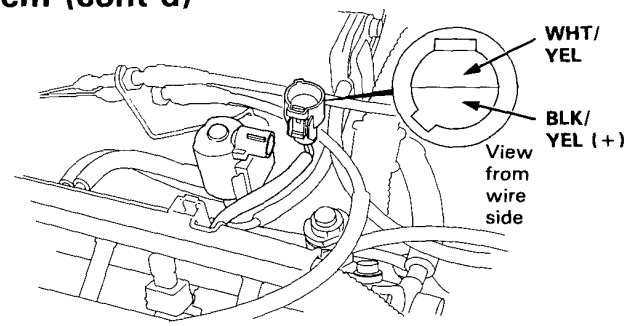
Is there vacuum?

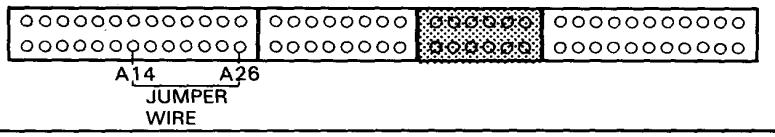
YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

NO

FIA control system is OK.

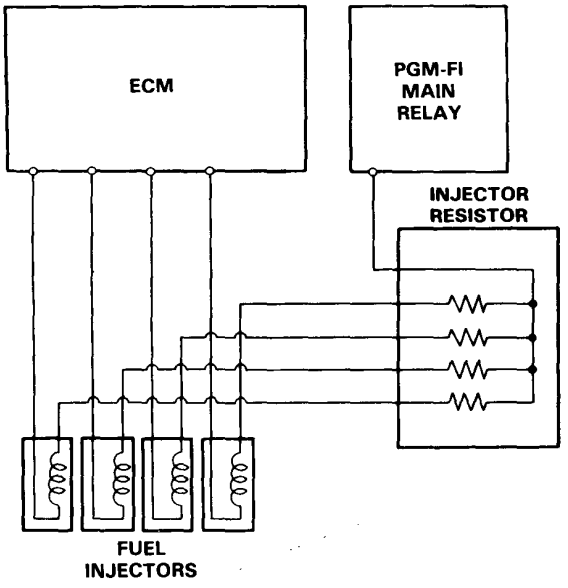




Injector Resistor

Description

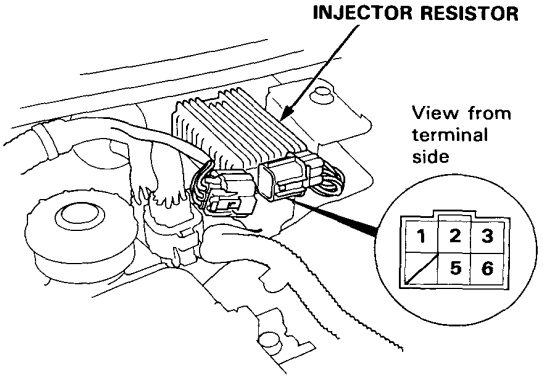
The injector resistor lowers the current supplied to the fuel injectors to prevent damage to the fuel injector coils. This allows a faster response time of the fuel injectors.

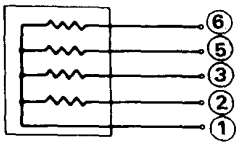


Testing

1. Disconnect the injector resistor connector.
2. Check for resistance between each of the injector resistor terminals (6, 5, 3 and 2) and the power terminal (1).

   Resistance should be: 5—7 Ω





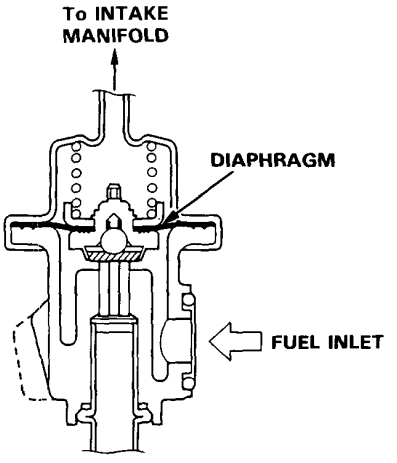
- Replace the injector resistor if any of the resistances are outside of the specification.

Fuel Pressure Regulator

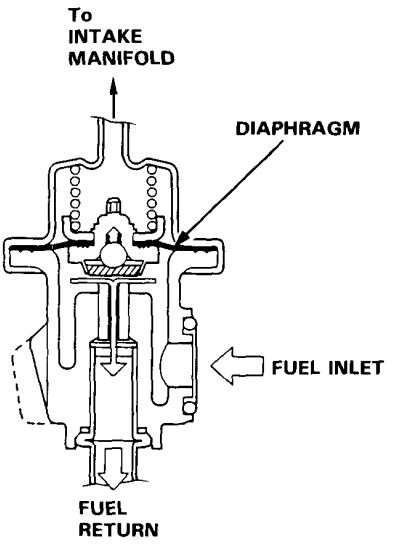
Description

The fuel pressure regulator maintains a constant fuel pressure to the fuel injectors. When the difference between the fuel pressure and manifold pressure exceeds 3.0 kgf/cm² (294 kPa, 43 psi), the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.

CLOSE:



OPEN:

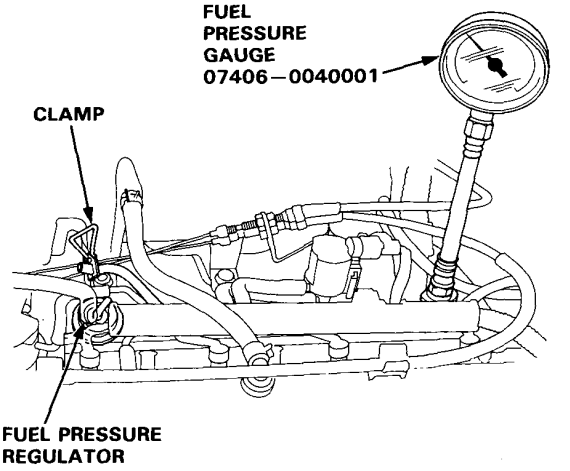


Testing

⚠ WARNING Do not smoke during the test. Keep open flames away from your work area.

1. Attach a fuel pressure gauge to the service port of the fuel filter (see page 11-79).

   Pressure should be;
   265–314 kPa (2.7–3.2 kgf/cm², 38–46 psi)
   (with the fuel pressure regulator vacuum hose disconnected and pinched)



2. Reconnect the vacuum hose to the fuel pressure regulator.

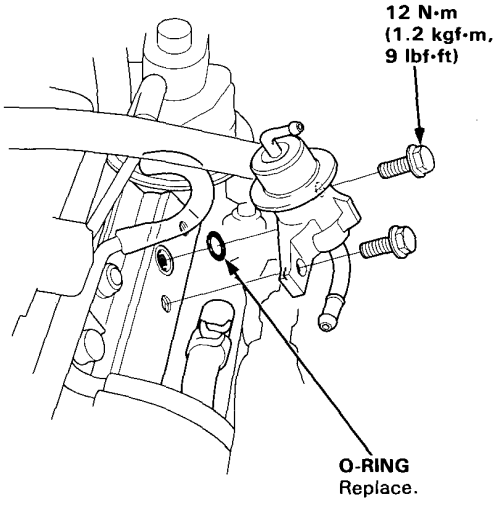
3. Check that the fuel pressure rises when the vacuum hose from the fuel pressure regulator is disconnected again.

   - If the fuel pressure did not rise, replace the fuel pressure regulator.

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from your work area.

1. Place a shop towel under the fuel pressure regulator, then relieve fuel pressure (see page 11-78).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.



NOTE:
- Replace the O-ring.
- When assembling the fuel pressure regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

Fuel Filter

Replacement

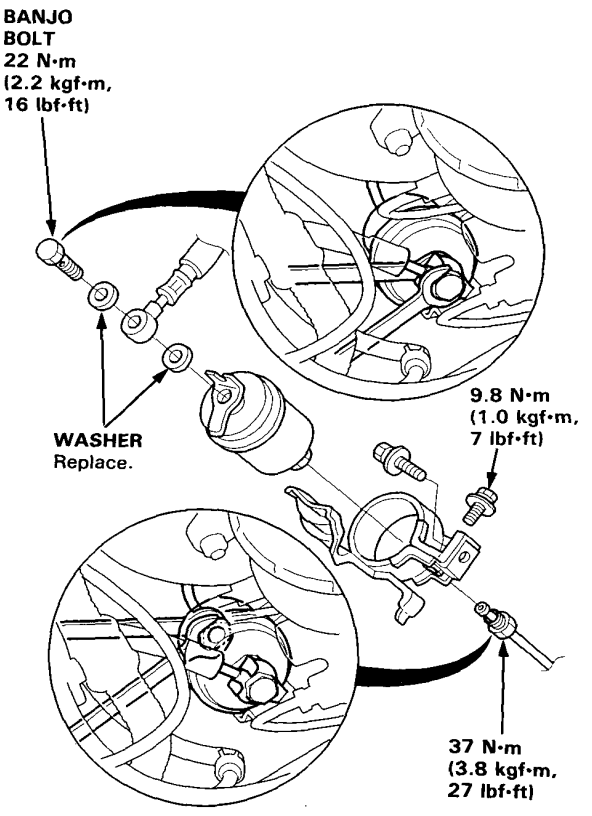
⚠ WARNING

- **Do not smoke while working on fuel system. Keep open flame away from your work area.**
- **While replacing the fuel filter, be careful to keep a safe distance between battery terminals and any tools.**

The fuel filter should be replaced every 2 years or 40,000 km (24,000 miles), whichever comes first, or whenever the fuel pressure drops below the specified value [265-314 kPa, 2.7—3.2 kgf/cm², 38—46 psi with the fuel pressure regulator vacuum hose disconnected and pinched] after making sure that the fuel pump and the fuel pressure regulator are OK.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Place a shop towel under and around the fuel filter.
3. Relieve fuel pressure (see page 11-78).
4. Remove the banjo bolt, and the fuel feed pipe from the fuel filter, then support with the other wrench, as shown.
5. Remove the fuel filter clamp and fuel filter.
6. When assembling, use new washers, as shown.

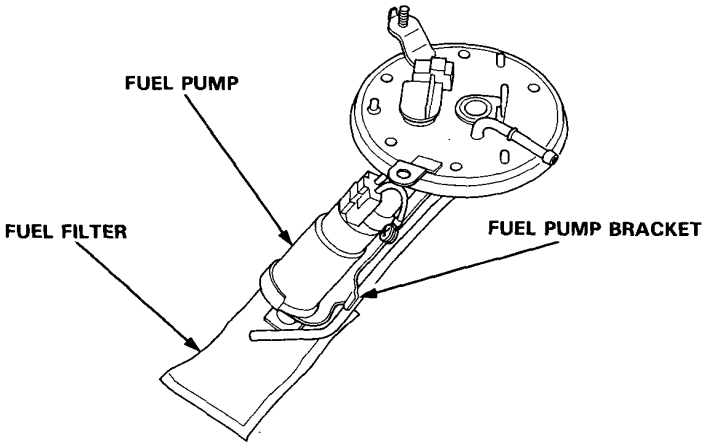
   NOTE: Clean the flared joint of high pressure hoses thoroughly before reconnecting them.



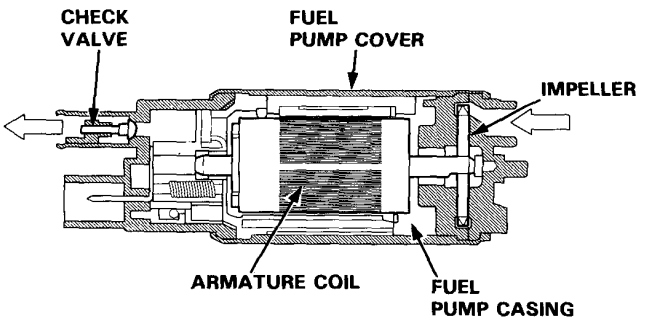
Fuel Pump

Description

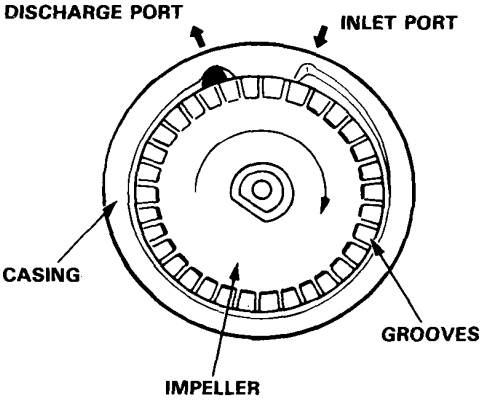
Because of its compact impeller design, the fuel pump is installed inside the fuel tank, thereby saving space and simplifying the fuel line system.



FUEL PUMP CROSS SECTION (Side view)



FUEL PUMP ASSEMBLY CROSS SECTION (Top view)



The fuel pump consists of a DC motor, a circumference flow pump, a relief valve for protecting the fuel line systems, a check valve for retaining residual pressure, an inlet port, and a discharge port. The fuel pump assembly consists of the impeller (driven by the motor), the fuel pump casing (which forms the pumping chamber), and the fuel pump cover.

OPERATION

(1) When the engine is started, the PGM-FI main relay actuates the fuel pump, and the motor turns together with the impeller.
Differential pressure is generated by the numerous grooves around the impeller.

(2) Fuel entering the inlet port flows inside the motor from the pumping chamber and is forced through the discharge port via the check valve.
If fuel flow is obstructed at the discharge side of the fuel line, the relief valve will open to bypass the fuel to the inlet port and prevent excessive fuel pressure.

(3) When the engine stops, the fuel pump stops automatically. However, a check valve closes by gravity to retain the residual pressure in the line, helping the engine to restart more easily.

(cont'd)

Fuel Pump (cont'd)

Testing

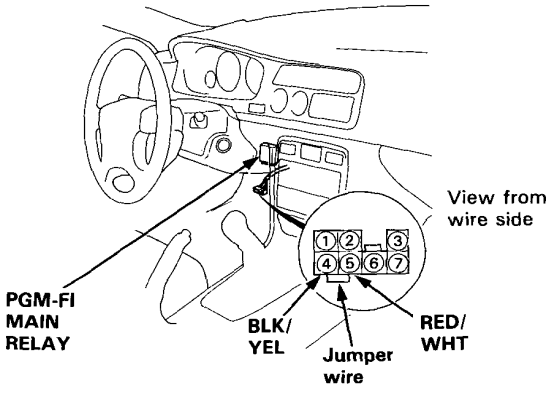
⚠ WARNING Do not smoke during the test. Keep open flame away from your work area.

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON, you will hear some noise if you hold your ear to the fuel fill port with the fuel fill cap removed. The fuel pump should run for two seconds, when ignition switch is first turned on. If the fuel pump does not make noise, check as follows:

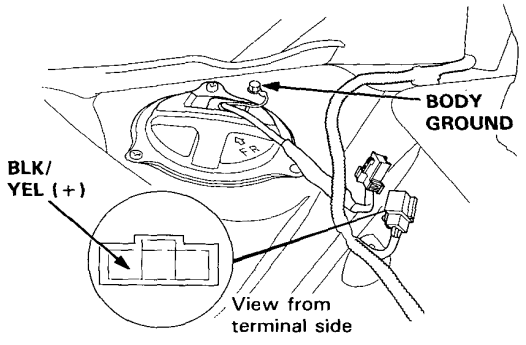
1. Raise the front section of the spare tire lid.
2. Disconnect the 3P connector.

   CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

3. Connect the RED/WHT ⑤ wire and BLK/YEL ④ wire with a jumper wire at the PGM-FI main relay connector.



4. Check that battery voltage is available at the fuel pump connector when the ignition switch is turned ON (positive probe to the BLK/YEL wire, negative probe to the body ground).

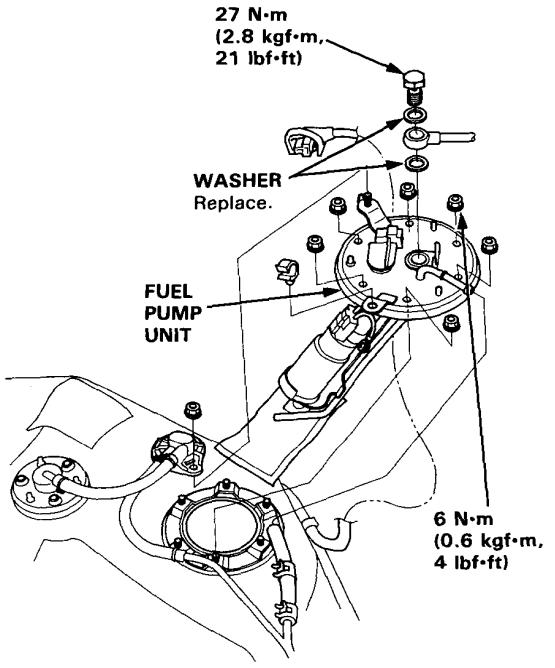


- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the fuel pump ground and wire harness (see page 11-96).

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flames away from your work area.

1. Remove the fuel tank (see page 11-98).
2. Disconnect the 2P connector from the fuel pump.
3. Remove the fuel pump mounting nuts.
4. Remove the fuel pump from the fuel tank.
5. Install a new washer on the banjo bolt, then install parts in the reverse order of removal.



PGM-FI Main Relay

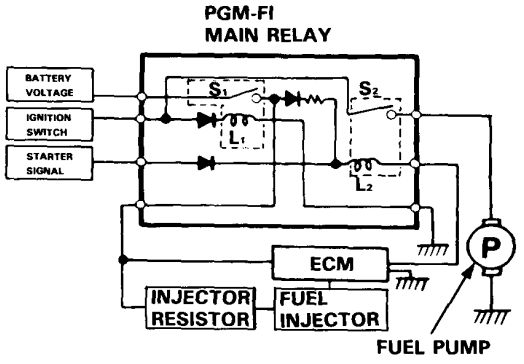
Description

The PGM-FI main relay actually contains two individual relays.

This relay is located at the left side of the cowl.

One relay is energized whenever the ignition is on which supplies the battery voltage to the ECM, power to the fuel injectors, and power for the second relay.

The second relay is energized for two seconds when the ignition is switched on, and when the engine is running, to supply power to the fuel pump.



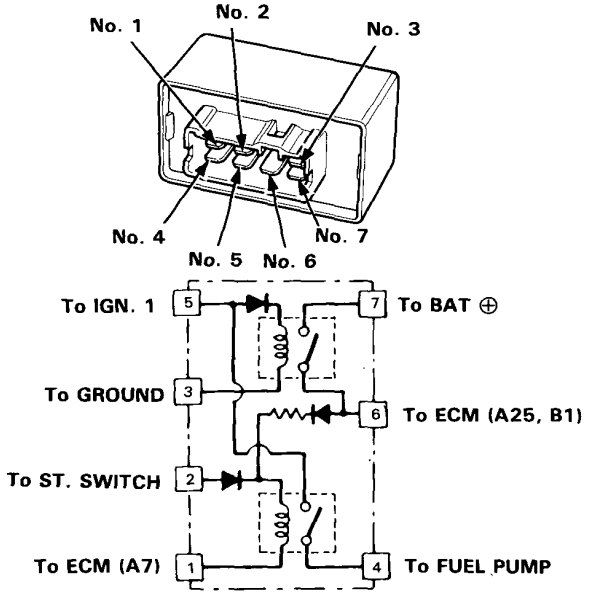
Relay Testing

NOTE: If the car starts and continues to run, the PGM-FI main relay is OK.

1. Remove the PGM-FI main relay.

2. Attach the battery positive terminal to the No. 2 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check for continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.

   - If there is continuity, go on to step 3.
   - If there is no continuity, replace the PGM-FI main relay and retest.



3. Attach the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 3 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 7 terminal and No.6 terminal of the PGM-FI main relay.

   - If there is continuity, go on to step 4.
   - If there is no continuity, replace the PGM-FI main relay and retest.

4. Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.

   - If there is continuity, the PGM-FI main relay is OK.
   - If there is no continuity, replace the PGM-FI main relay and retest.

(cont'd)

PGM-FI Main Relay (cont'd)

Troubleshooting

– Engine will not start.
– Inspection of PGM-FI main relay and relay harness.

Disconnect the PGM-FI main relay connector.

Check for continuity between BLK terminal ③ and body ground.

Is there continuity?

NO → **Repair open in BLK wire between PGM-FI main relay and G101 located at intake manifold.**

YES

Measure the voltage between WHT/GRN terminal ⑦ and body ground.

Is there battery voltage?

NO → **– Replace the ECU (ECM) (15 A) fuse in the under-hood fuse/relay box.**
– Repair open or short in the WHT/GRN wire between the PGM-FI main relay and the ECU (ECM) (15 A) fuse.

YES

Turn the ignition switch ON.

Measure the voltage between RED/WHT terminal ⑤ and body ground.

Is there battery voltage?

NO → **– Replace the No. 2 FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.**
– Repair open or short in the RED/WHT wire between the PGM-FI main relay and the No. 2 FUEL PUMP (15 A) fuse.

YES

Turn the ignition switch to the START position.

NOTE:
- M/T: Clutch pedal must be depressed.
- A/T: Transmission in [N] or [P] position.

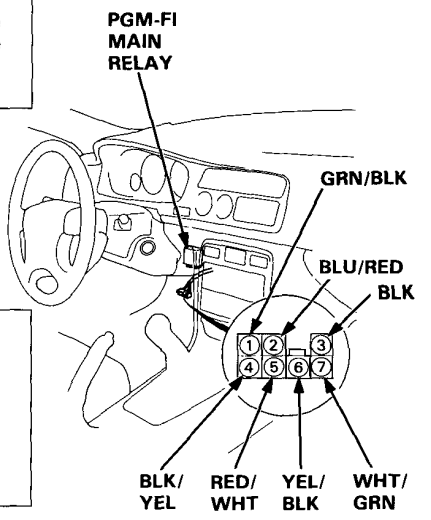
Measure the voltage between BLU/RED terminal ② and body ground.

Is there battery voltage?

NO → **– Replace the No. 9 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.**
– Repair open or short in the BLU/RED wire between the PGM-FI main relay and the No. 9 STARTER SIGNAL (7.5 A) fuse, ECM (B9).

YES

(To page 11-97)

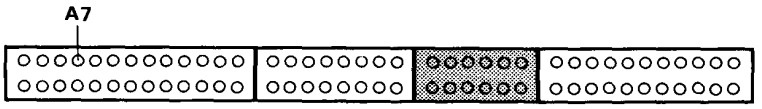


View from wire side

(From page 11-96)

Turn the ignition switch off.

Connect the test harness between the ECM and connectors. Disconnect "A" connector from the ECM only, not the main wire harness (see page 11-21).



Check for continuity between GRN/BLK terminal ① and A7 terminal.

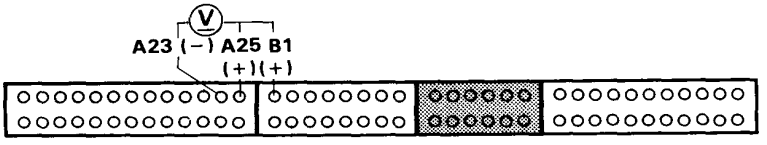
Is there continuity?

NO — **Repair open in GRN/BLK wire between ECM (A7) and PGM-FI main relay.**

YES

Reconnect "A" connector to the ECM.

Connect the PGM-FI main relay connector.



Turn the ignition switch ON.

Measure the voltage between A23 (−) terminal and the following terminals; A25 (+) B1 (+).

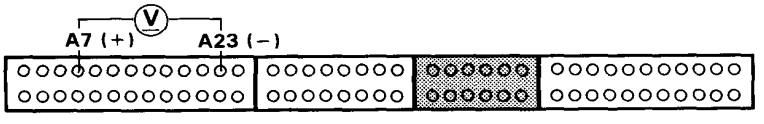
Is there battery voltage?

NO — **— Repair open in the YEL/BLK wire ⑥ between the ECM (A25, B1) and PGM-FI main relay.**
— Replace the PGM-FI main relay.

YES

Turn the ignition switch OFF.

Measure the voltage between A7 (+) terminal and A23 (−) terminal when the ignition switch is first turned ON for two seconds.



Is there 1.0 V or less?

NO — **Substitute a known-good ECM and recheck. If pescribed voltage is now available, replace the original ECM.**

YES

Check the PGM-FI main relay (see page 11-95).

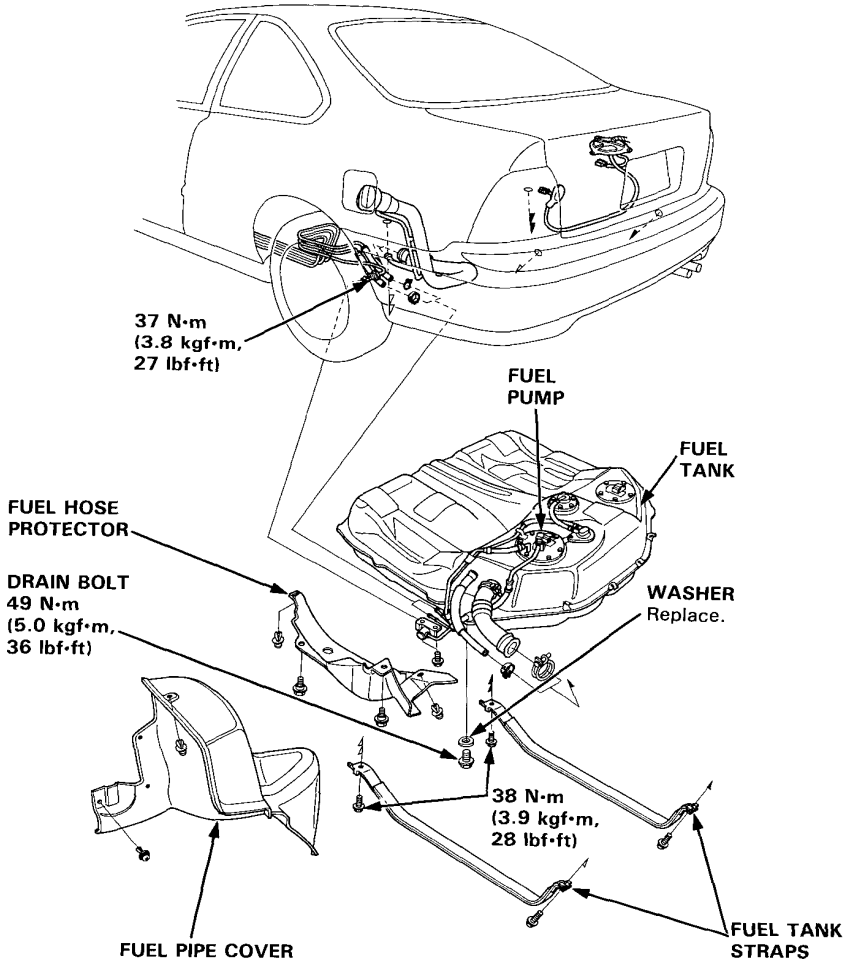
Fuel Supply System

Fuel Tank

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from your work area.

1. Relieve the fuel pressure (see page 11-78).
2. Jack up the car and support with jackstands.
3. Remove the drain bolt, and drain the fuel into an approved container.
4. Remove the fuel pipe cover and fuel hose protector.
5. Disconnect the hoses.
   CAUTION:
   - **When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.**
   - **Clean the flared joint of high pressure hoses thoroughly before reconnecting them.**
6. Place a jack, or other support, under the tank.
7. Remove the strap nuts and let the straps fall free.
8. Disconnect the 2P and 3P connectors.
9. Remove the fuel tank.
   NOTE: The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount.
10. Install a new washer on the drain bolt, then install parts in the reverse order of removal.



System Troubleshooting Guide

NOTE: Across each row in the chart, the sub-systems that could be sources of a symtom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.

[F22B2, F20B3 engine]

PAGE / SUB-SYSTEM / SYMPTOM	THROTTLE CABLE	THROTTLE BODY	AIR CLEANER AND INTAKE AIR DUCT
	11-102	11-103	11-101
WHEN COLD FAST IDLE OUT OF SPEC		①	
WHEN WARM IDLE SPEED TOO HIGH	②	①	
LOSS OF POWER		①	②

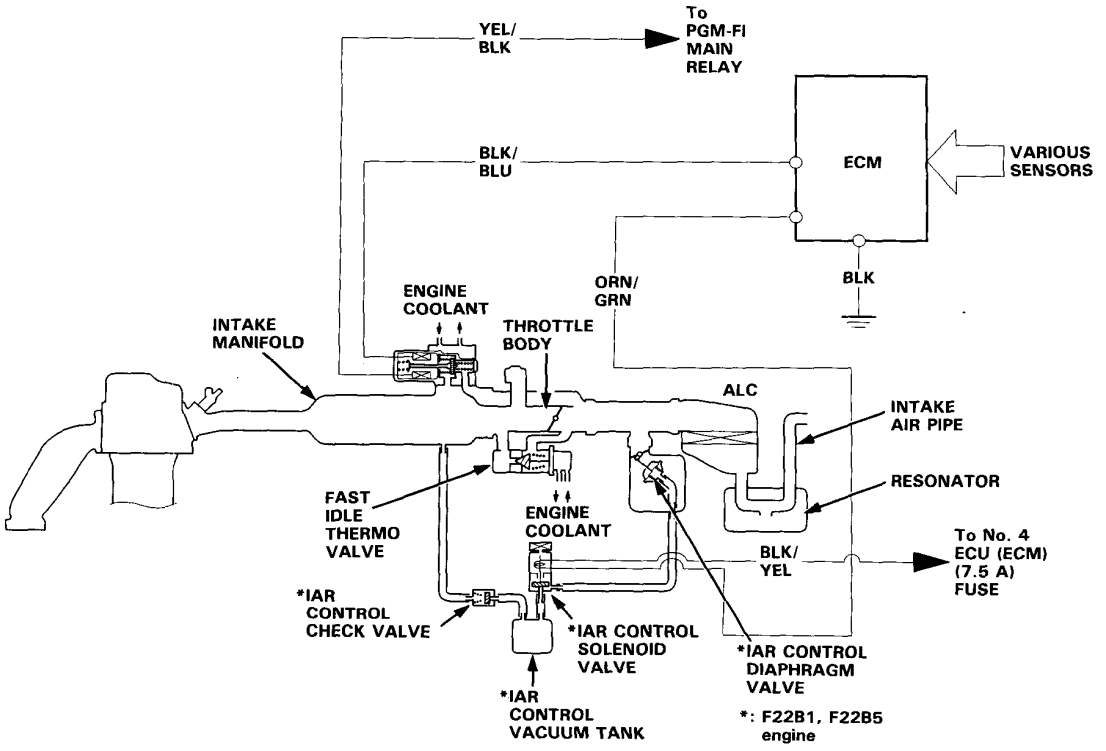
[F22B1, F22B5 engine]

PAGE / SUB-SYSTEM / SYMPTOM	THROTTLE CABLE	THROTTLE BODY	INTAKE AIR RESONATOR (IAR) CONTROL	AIR CLEANER AND INTAKE AIR DUCT
	11-102	11-103	11-106	11-101
WHEN COLD FAST IDLE OUT OF SPEC		①		
WHEN WARM IDLE SPEED TOO HIGH	②	①		
LOSS OF POWER		①	②	③

Intake Air System

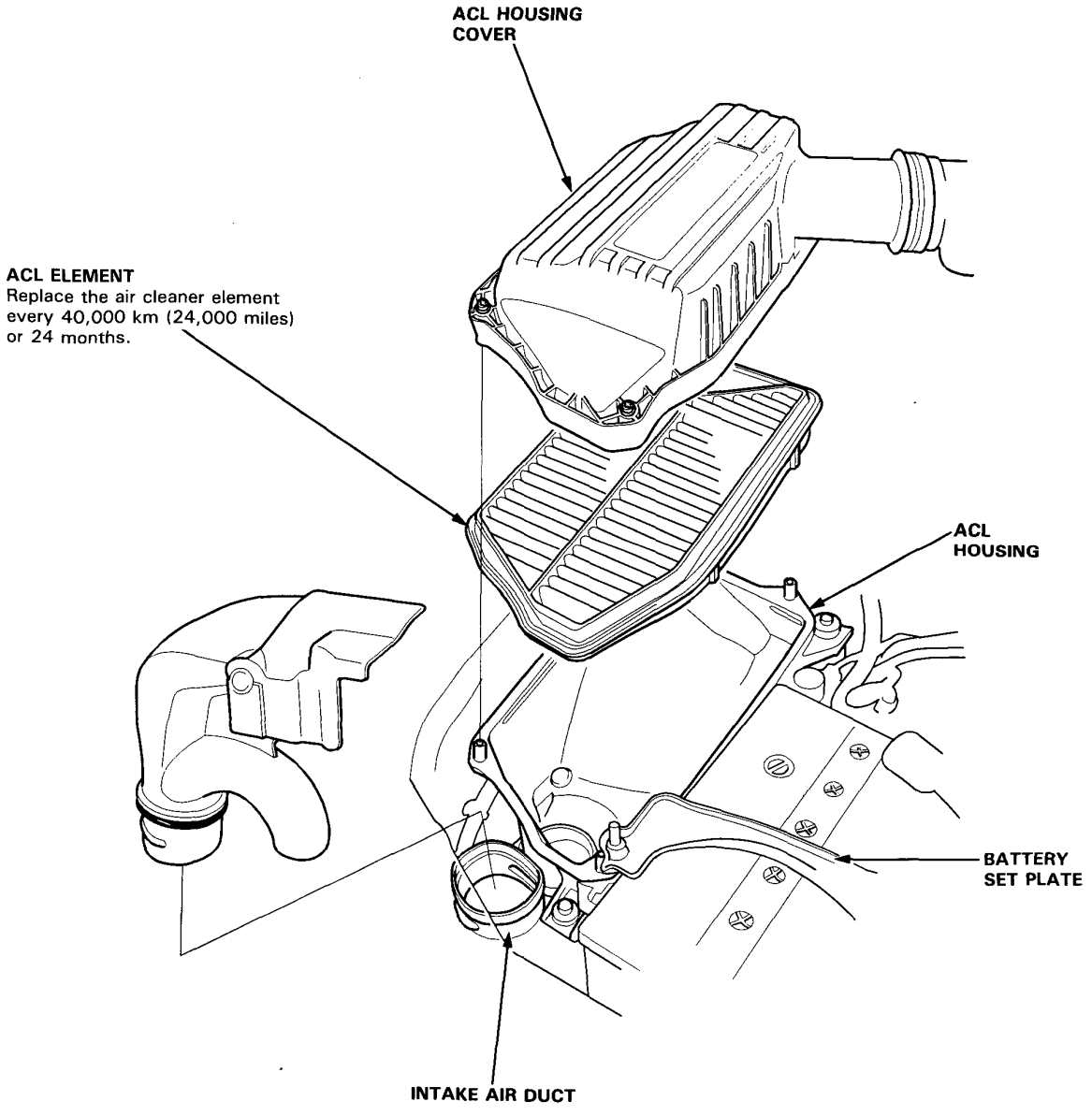
System Description

The system supplies air for all engine needs. It consists of the intake air pipe, Air Cleaner (ACL), intake air duct, Throttle Body (TB), Idle Air Control (IAC) Valve, fast idle thermo valve, Intake Air Resonator (IAR) Control System [F22B1, F22B5 engine] and intake manifold.
A resonator in the intake air pipe provides additional silencing as air is drawn into the system.



ACL Element Replacement

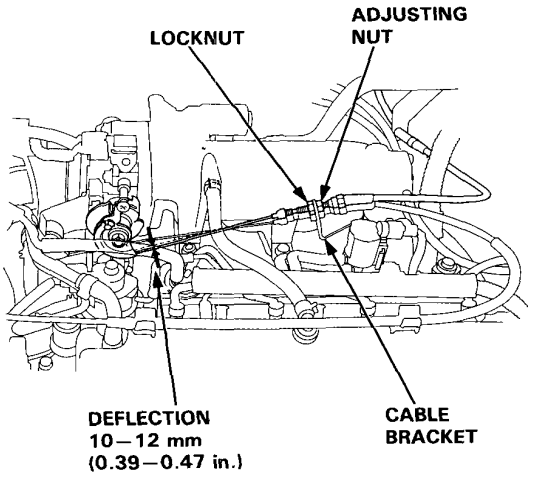
NOTE: Loosen the battery set bolt and move the battery set plate before remove the ACL housing cover.



Throttle Cable

Inspection/Adjustment

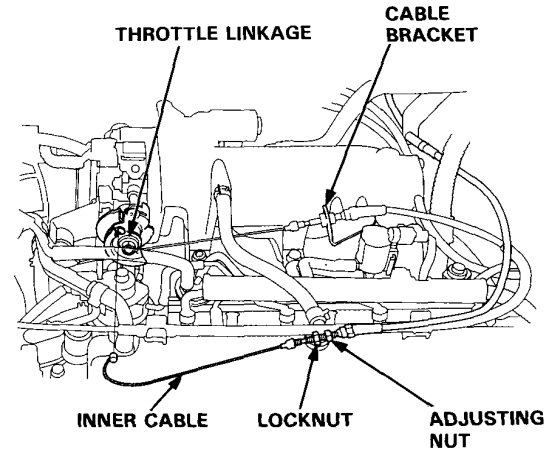
1. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Remove the actuator cable from the throttle linkage.
4. Check cable free play at the throttle linkage. Cable deflection should be 10—12 mm (0.39—0.47 in.)



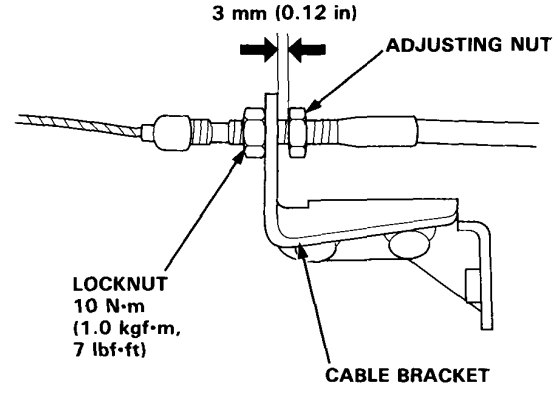
5. If deflection is not within specs, loosen the locknut, and turn the adjusting nut until the deflection is as specifled, then retighten the locknut.
6. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator pedal.
7. Install the actuator cable to the throttle linkage.

Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the cable bracket.
2. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.



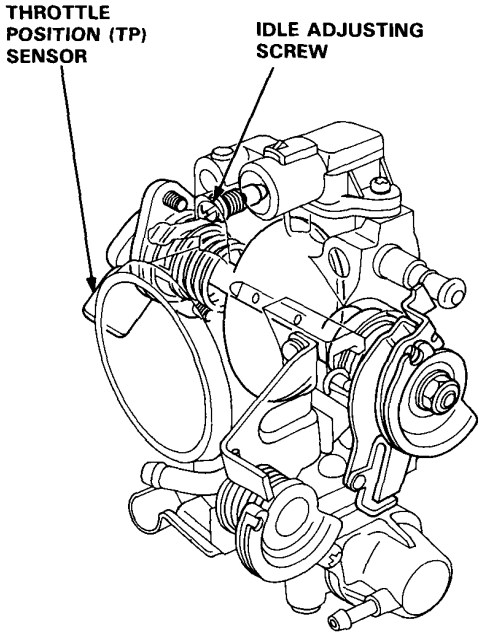
3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm (0.12 in.) away from the cable bracket.
5. Tighten the locknut. The cable deflection should now be 10—12 mm (0.39—0.47 in.). If not, see Inspection/Adjustment.



Throttle Body

Description

The throttle body is of the single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant from the cylinder head. The idle adjusting screw which increases/decreases bypass air and the Evaporative Emission (EVAP) Control Canister port are located on the top of the throttle body.

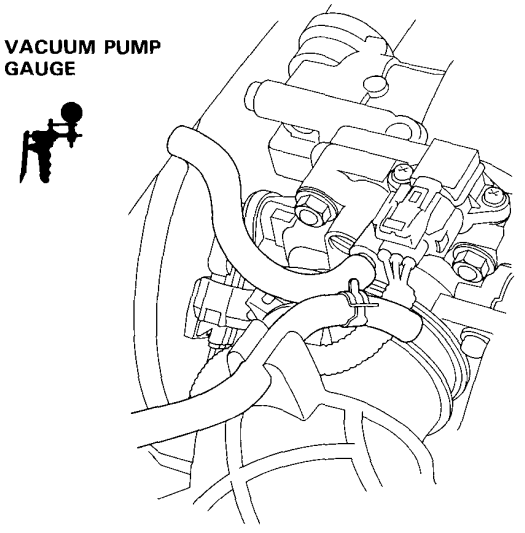


Inspection

CAUTION: Do not adjust the throttle stop screw. It is preset at the factory.

1. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.

2. Disconnect the vacuum hose (to the EVAP control canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.



3. Allow the engine to idle and check that the gauge indicates no vacuum.

   - If there is vacuum, check the throttle cable (see page 11-102).

4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
   - If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.

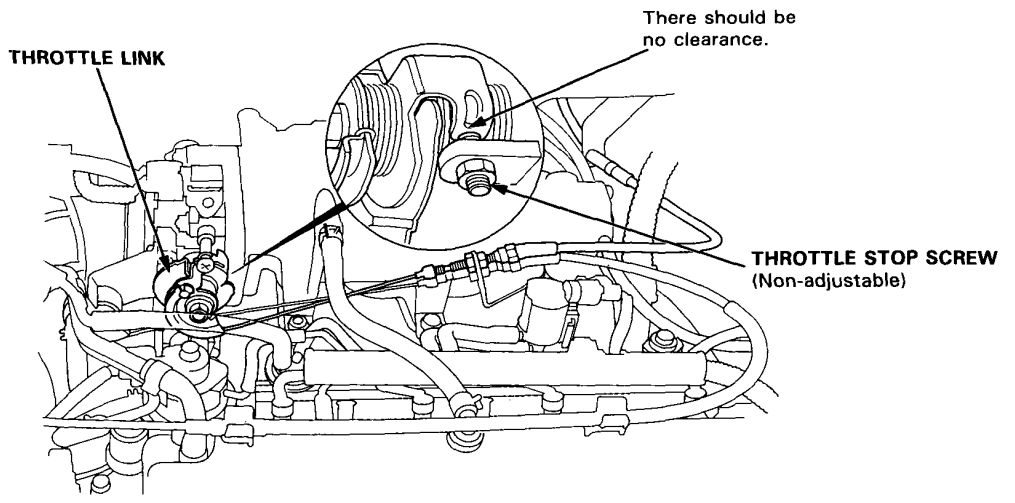
5. Stop the engine, and check that the throttle cable operates smoothly without binding or sticking.

   - If there are any abnormalities in the above steps, check for:

   — Excessive wear or play in the throttle valve shaft.
   — Sticky or binding throttle lever at full close position.
   — Clearance between throttle stop screw and throttle lever at full close position.

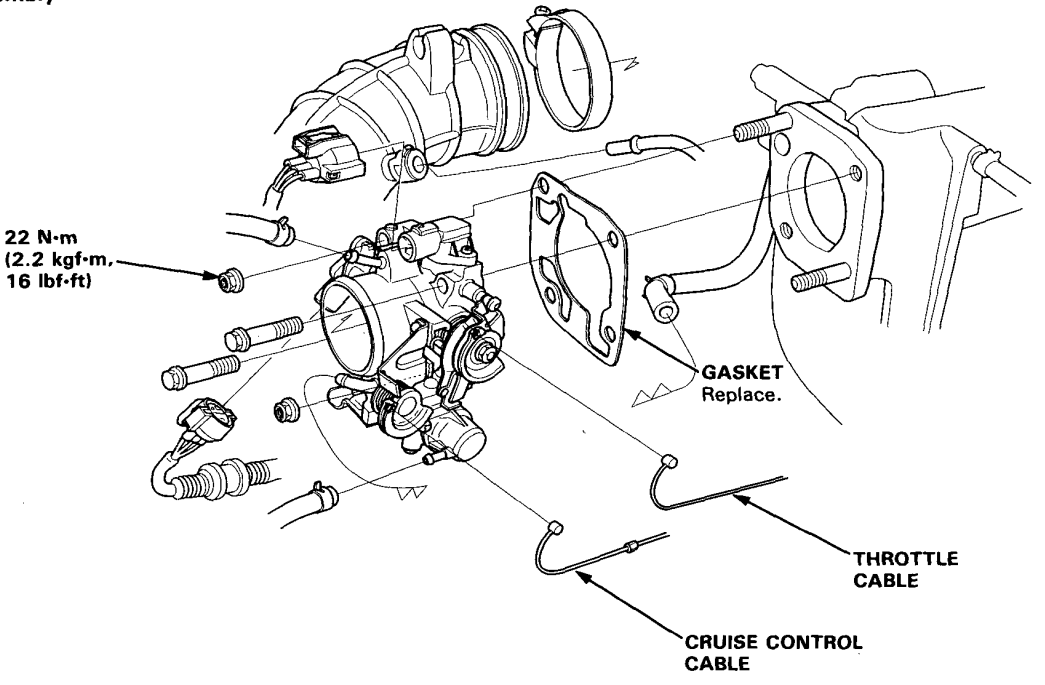
(cont'd)

Throttle Body (cont'd)



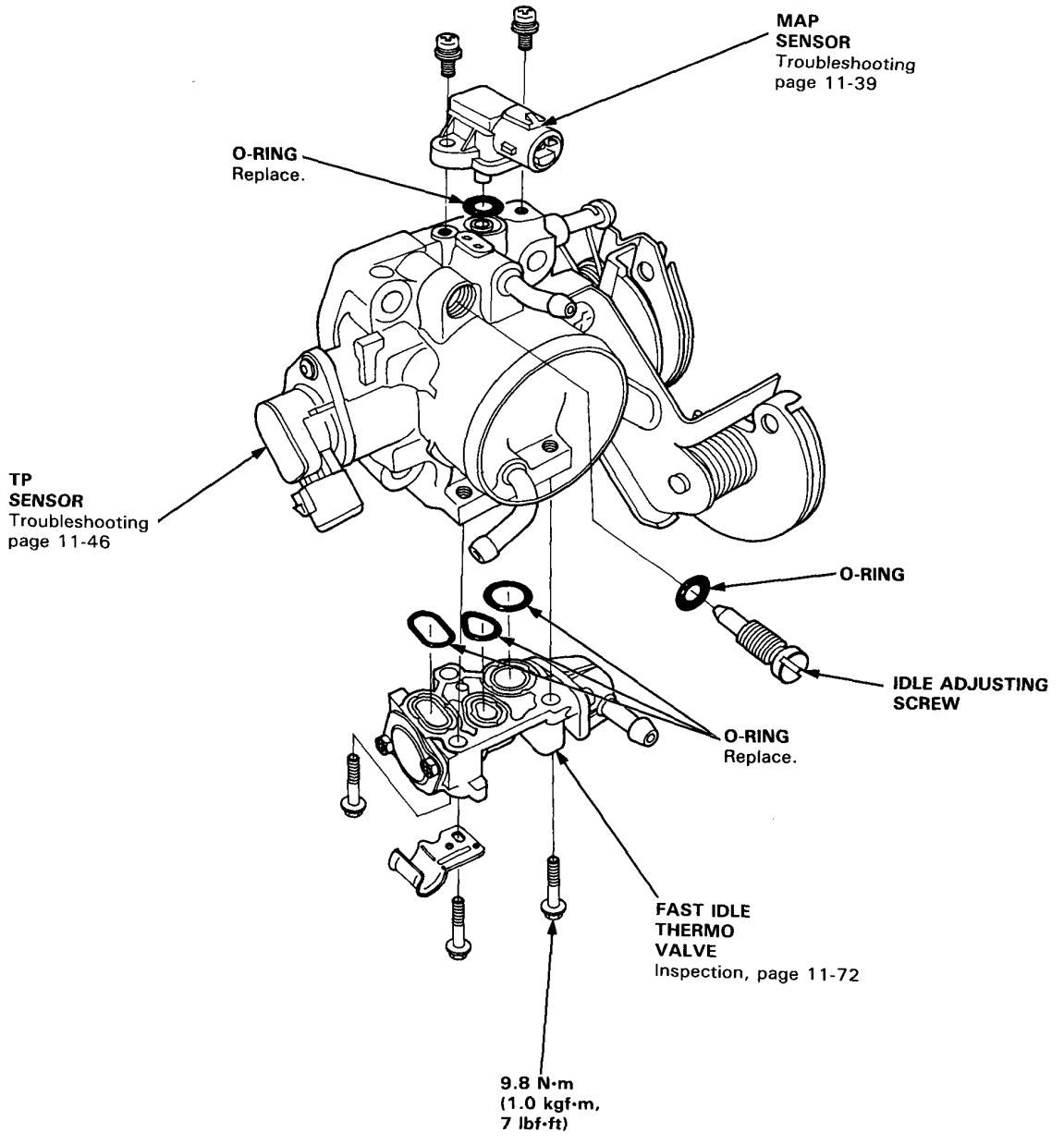
Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

Disassembly



CAUTION:

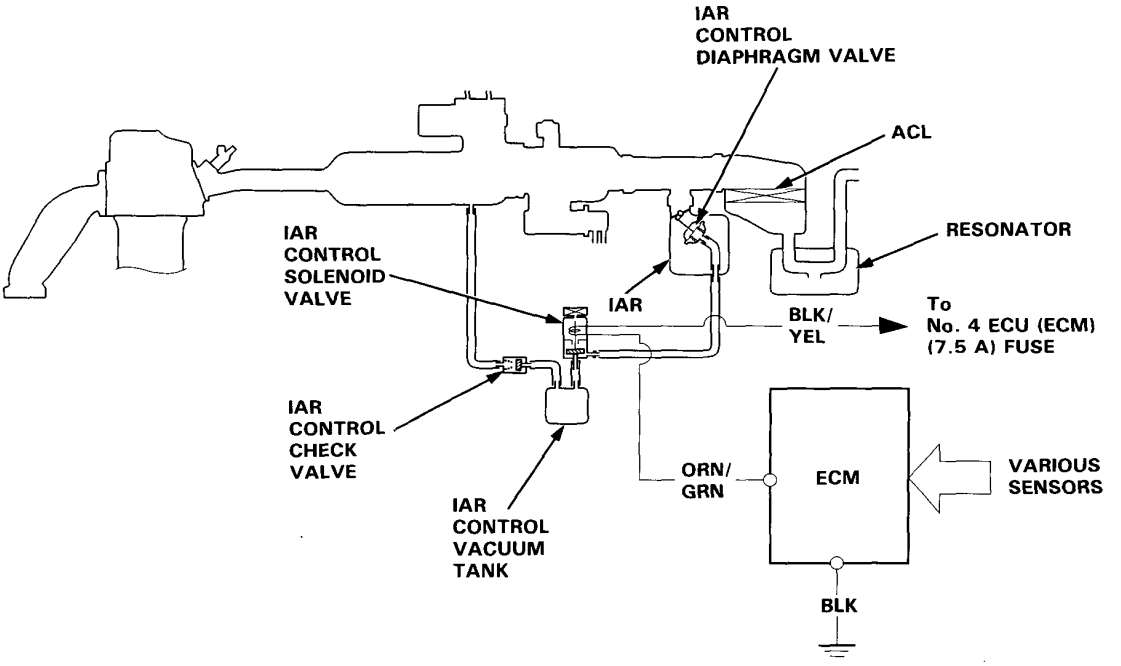
- **The throttle stop screw is non-adjustable.**
- **After reassembly, adjust the throttle cable (page 11-102), and A/T throttle control cable (section 14) for cars with A/T.**
- **The TP sensor is not removable.**


MAP
SENSOR
Troubleshooting
page 11-39
O-RING
Replace.
TP
SENSOR
Troubleshooting
page 11-46
O-RING
IDLE ADJUSTING
SCREW
O-RING
Replace.
FAST IDLE
THERMO
VALVE
Inspection, page 11-72
9.8 N·m
(1.0 kgf·m,
7 lbf·ft)

Intake Air Resonator (IAR) Control System

Intake Air Resonator (IAR) Control System [F22B1, F22B5 engine]

When the engine speed is below 2,900 rpm (min^{-1}) [F22B5 engine: 3,000 rpm (min^{-1})], IAR control solenoid valve is deactivated by the ECM, and intake air does not flow from the IAR. At engine speeds between 2,900 rpm (min^{-1}) and 3,700 rpm (min^{-1}) [F22B5 engine: 3,000 rpm (min^{-1}) and 3,800 rpm (min^{-1})] (mid-range), the solenoid valve is activated by a signal from the ECM, and intake air flows from the IAR.



Troubleshooting

Inspection of the IAR control system

Start engine and allow to idle.

Remove the vacuum hose from the IAR and connect a vacuum gauge to the solenoid valve.

Is there vacuum?

YES → Disconnect the 2P connector from the IAR control solenoid valve.

Is there vacuum?

YES → **Replace the IAR control solenoid valve.**

NO

Turn the ignition switch OFF.

Disconnect "A" connector from ECM.

Check for continuity to ground on ORN/GRN wire.

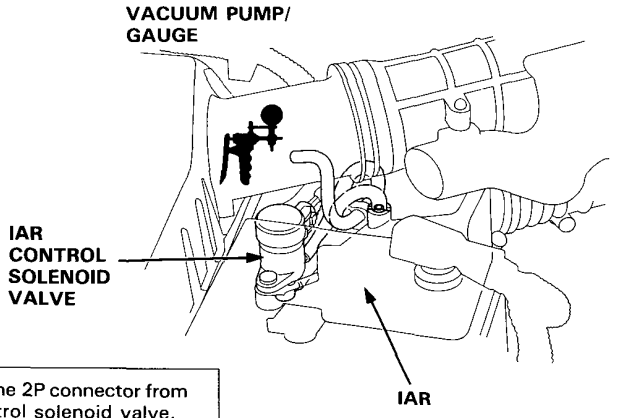
Is there continuity to ground?

YES → **Repair short to ground in ORN/GRN wire between ECM (A19) and 2P connector.**

NO

Substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.

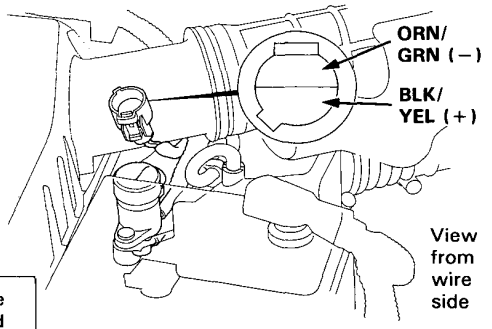
NO



(To page 11-108)

(cont'd)

Intake Air Resonator (IAR) Control System (cont'd)



(From page 11-107)

Raise engine speed to 3,000 rpm (min^{-1}).

Check for at vacuum hose.

Is there vacuum?

NO

Disconnect lower hose from the IAR control solenoid valve and connect vacuum gauge to the hose.

Is there vacuum?

NO

— Check the vacuum line for proper connection, cracks, blockage or disconnected hose.
— Clean manifold port.

YES

Disconnect the 2P connector from the IAR control solenoid valve.

Measure voltage between BLK/YEL (+) terminal and ORN/GRN (−) terminal.

Is there battery voltage?

YES

Replace the IAR control solenoid valve.

NO

Measure voltage between BLK/YEL (+) terminal and body ground.

Is there battery voltage?

NO

Repair open in BLK/YEL wire between 2P connector and No. 4 ECU (ECM) (7.5 A) fuse in the under-dash fuse/relay box.

YES

Turn the ignition switch OFF.

Reconnect the 2P solenoid connector.

Connect the test harness between the ECM and connectors (see page 11-21).

YES

(To page 11-109)

(To page 11-109)

(From page 11-108)

(A)

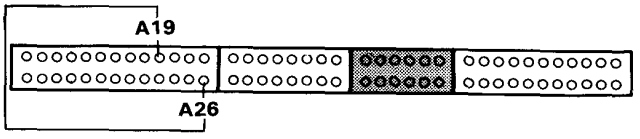
(From page 11-108)

(B)

Turn the ignition switch ON.

Connect a jumper wire between ECM (A19) terminal and ECM (A26) terminal.

JUMPER WIRE



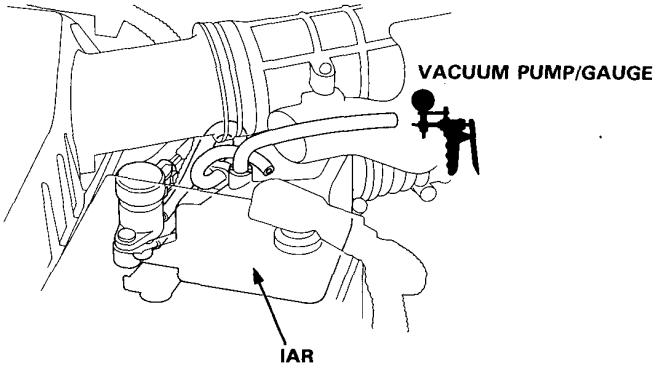
Does solenoid valve click when the jumper wire is connected?

NO

Repair open in ORN/GRN wire between ECM (A19) and the 2P connector.

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, *replace the original ECM.*



Connect a vacuum pump to the vacuum hose.

Apply the vacuum.

Does it hold vacuum?

NO

Check the vacuum line for proper connection or disconnected hose. If OK, replace the IAR.

YES

Raise the engine speed to 4,500 rpm (min^{-1}).

Is there vacuum?

YES

Substitute a known-good ECM and recheck. If symptom goes away, *replace the original ECM.*

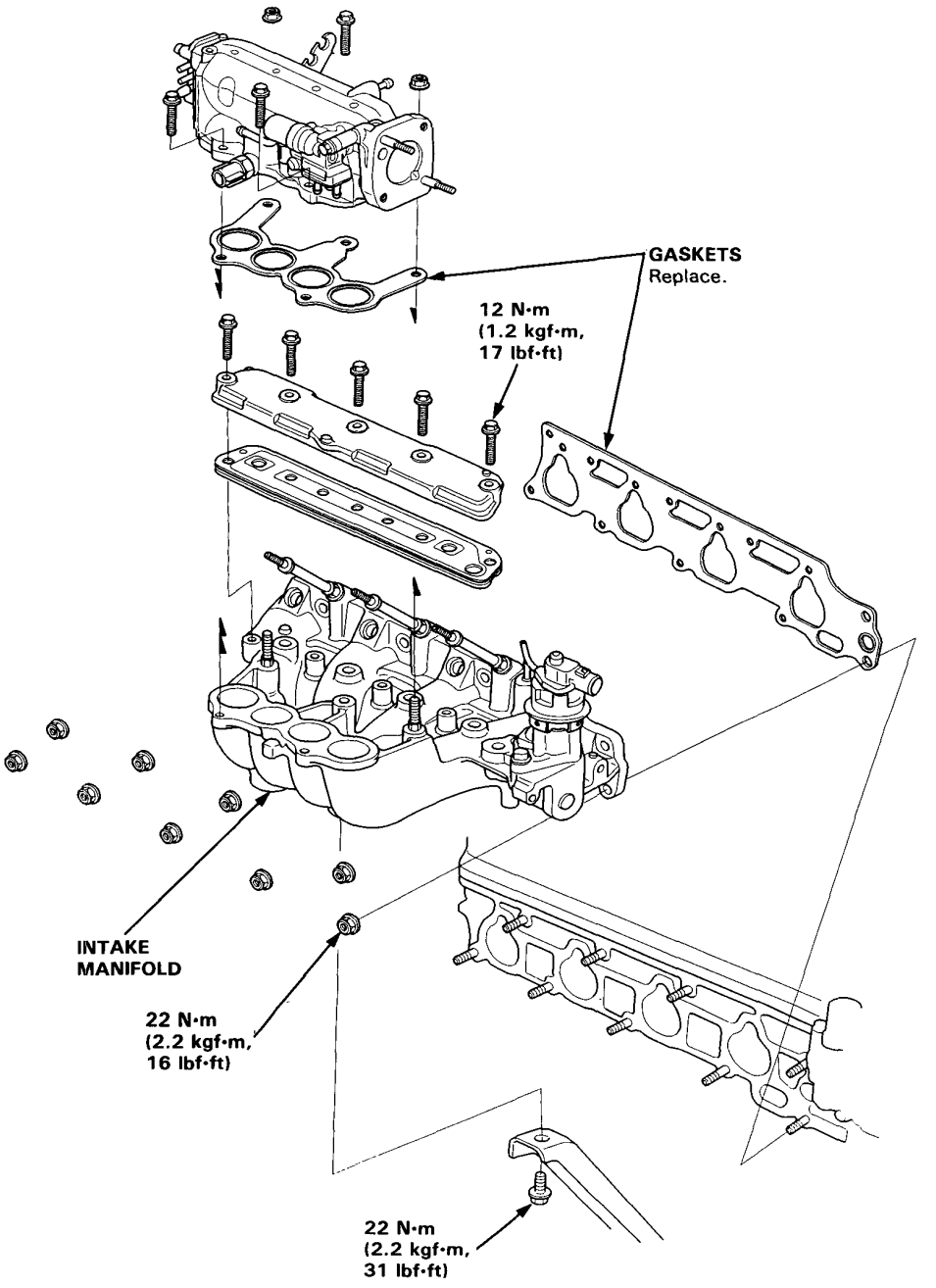
NO

IAR control system is OK.

Intake Air System

Intake Manifold

Disassembly



Emission Control System

System Troubleshooting Guide

NOTE: Across each row in the chart, the sub-systems that could be sources of a symptom are raked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of the column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE / SUB-SYSTEM / SYMPTOM		THREE WAY CATALYTIC CONVERTER	EXHAUST GAS RECIRCULATION SYSTEM	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		11-113	11-114	11-120	11-121
ROUGH IDLE			①	②	
FREQUENT STALLING	AFTER WARM-ING UP		①		
POOR PERFORMANCE	FAILS EMISSION TEST	①			②
	LOSS OF POWER	①			

Emission Control System

System Description

The emission control system includes a Three Way Catalytic Converter (TWC), Exhaust Gas Recirculation (EGR) system, Positive Crankcase Ventilation (PCV) system and Evaporative Emission (EVAP) Control system.

Tailpipe Emission

Inspection

⚠ WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

1. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.
2. Connect a tachometer.
3. Check and adjust the idle speed, if necessary (see page 11-73).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

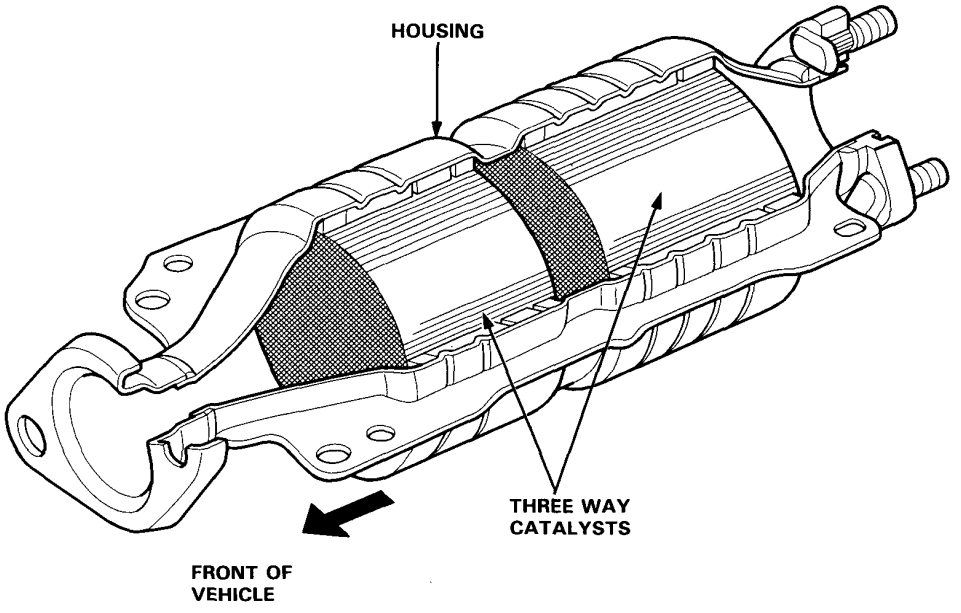
   Specified CO%: 0.1% maximum

   - If unable to obtain this reading:
     See ECM troubleshooting guide (page 11-16).

Three Way Catalytic Converter (TWC)

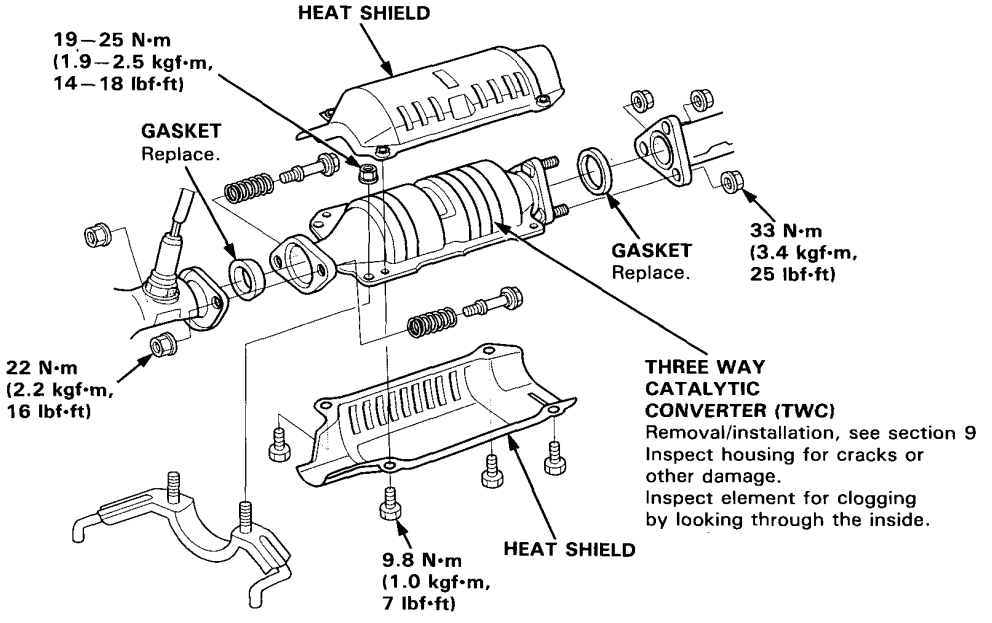
Description

The Three Way Catalytic Converter (TWC) is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas, to carbon dioxide (CO_2), dinitrogen (N_2) and water vapor.



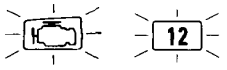
Inspection

If excessive exhaust system back-pressure is suspected, remove the TWC from the car and make a visual check for plugging, melting or cracking of the catalyst. Replace the TWC if any of the visible area is damaged or plugged.



Exhaust Gas Recirculation (EGR) System

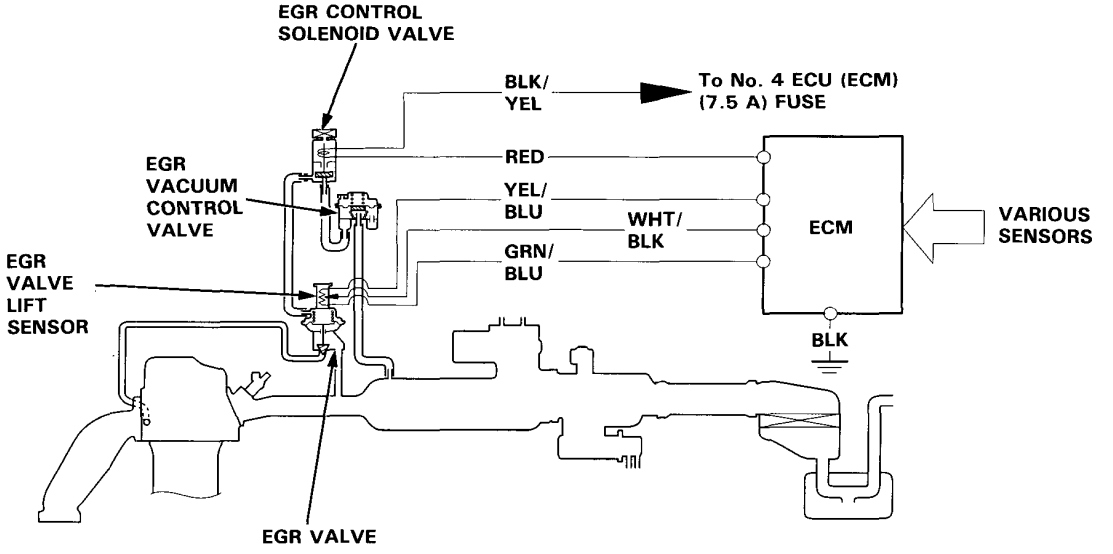
Troubleshooting



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 12: A problem in the Exhaust Gas Recirculation (EGR) system.

The EGR system is designed to reduce oxides of nitrogen emissions (NOx) by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of the EGR valve, EGR vacuum control valve, EGR control solenoid valve, ECM and various sensors.

The ECM contains memories for ideal EGR valve lifts for varying operating conditions. The EGR valve lift sensor detects the amount of EGR valve lift and sends the information to the ECM. The ECM then compares it with the ideal EGR valve lift which is determined by signals sent from the other sensors. If there is any difference between the two, the ECM cuts current to the EGR control solenoid valve to reduce vacuum applied to the EGR valve.



— **The MIL has been reported on.**
— **With the SCS short connector *connected (see page 11-18)*, code 12 is indicated.**

Do the ECM Reset Procedure (see page 11-19).

Connect the SCS short connector to the service check connector (see page 11-18).

Road test necessary: Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in N or P position, M/T in neutral) until the radiator fan comes on, then let it idle.
Drive the car on the road for approx. 10 minutes. Try to keep the *engine speed in the 1,700—2,500* rpm (min^{-1})

Does the MIL blink and does it indicate code 12?

NO → **Intermittent failure, system is OK at this time.**
Check for poor connections or loose wires between the EGR valve lift sensor, the control box and the ECM.

YES

With the engine at idle, disconnect the #16 hose from the EGR valve and connect a vacuum pump/gauge to the hose.

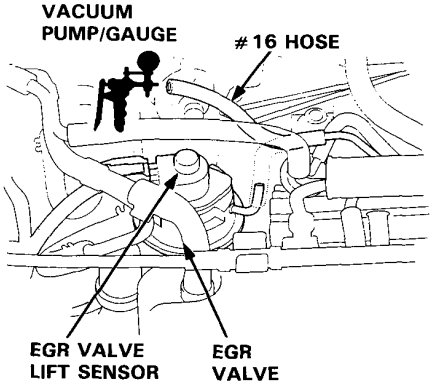
Is there any vacuum?

YES → *Disconnect 2P connector from the control box and check the #16 hose for vacuum again.*

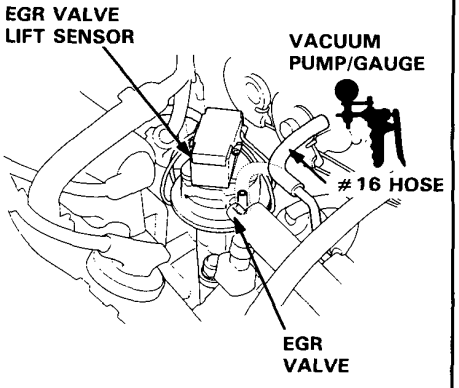
NO

Move the vacuum pump/gauge to the EGR valve.

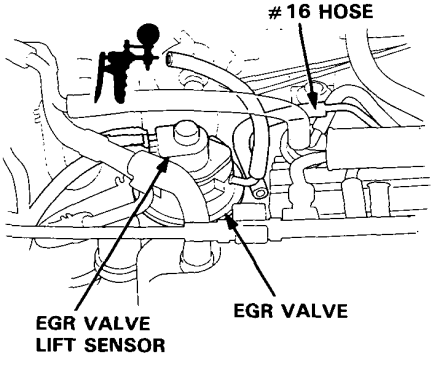
Except F22B2 engine:



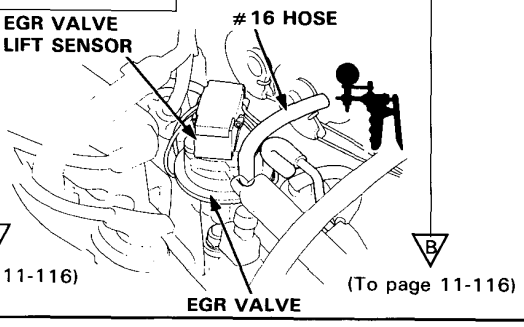
F22B2 engine:

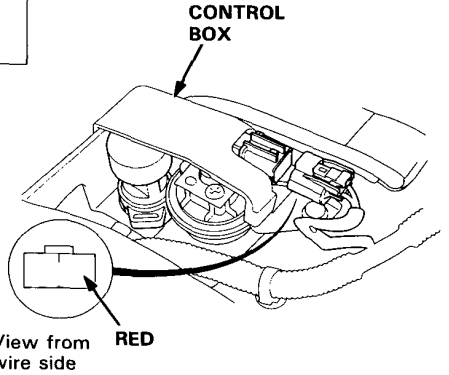


Except F22B2 engine:



F22B2 engine:





(To page 11-116)

(To page 11-116)

(cont'd)

Exhaust Gas Recirculation (EGR) System

(From page 11-115)

(A)

With the engine at idle, apply 200 mm Hg (8 in Hg) of vacuum to the EGR valve.

Does the engine stall or run rough and does the EGR valve hold vacuum?

NO → **Repace the EGR valve.**

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the control box.

Turn the ignition switch ON.

Measure voltage between BLK/YEL (+) terminal on the main wire harness and body ground.

Is there battery voltage?

NO → **Repair open in BLK/YEL wire between the EGR control solenoid valve and No. 4 ECU (ECM) (7.5 A) fuse in the under-dash fuse/relay box.**

YES

Reconnect the vacuum pump/gauge to the #16 hose.

Start the engine and allow it to idle.

(To page 11-117)

(From page 11-115)

(B)

Is there any vacuum?

YES → **Check vacuum hose routing of the entire EGR system. If hose routing is OK, replace EGR control solenoid valve.**

NO

Turn the ignition switch OFF and disconnect the "A" connector from the ECM.

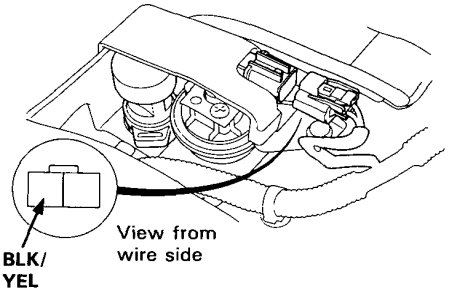
Check for continuity to ground on RED wire of 2P connector.

Is there continuity?

YES → **Repair short in RED wire between EGR control solenoid valve and ECM (A6).**

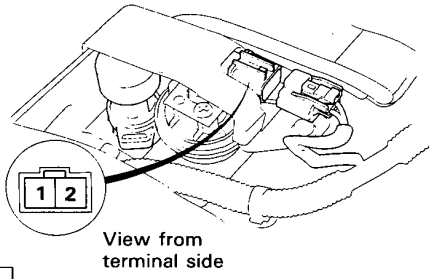
NO

Substitute a known-good ECM and retest. If symptom/indication goes away, replace the original ECM.



(From page 11-116)

Connect the battery positive terminal to the No. 1 terminal of the 2P connector. While watching the vacuum gauge, connect the battery negative terminal to the No. 2 terminal.



View from terminal side

Is there approx. 200 mm Hg (8 in. Hg) within 1 second?

NO → Turn the ignition switch OFF and inspect the #16 and #24 hoses for leaks, restrictions, or misrouting.

YES

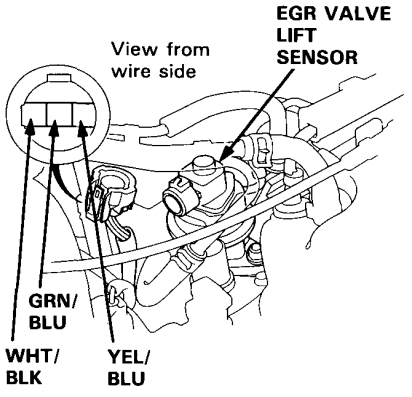
Turn the ignition switch OFF and reconnect the 2P connector.

Are the hoses OK?

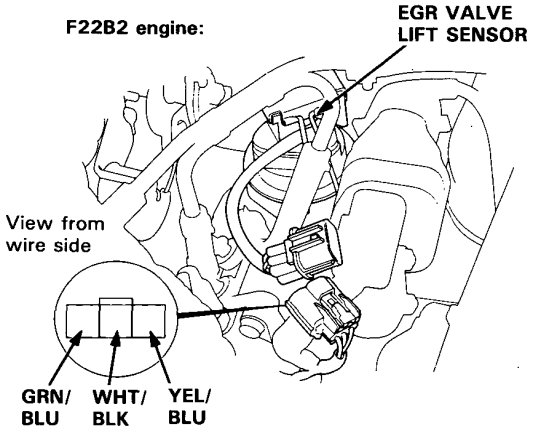
NO → ***Correct as necessary.***

YES

Except F22B2 engine:



F22B2 engine:



Disconnect the lower hose on EGR control solenoid valve and connect a vacuum gauge to the hose.

Start the engine and allow it to idle.

Disconnect 3P connector from the EGR valve lift sensor.

Turn the ignition switch ON.

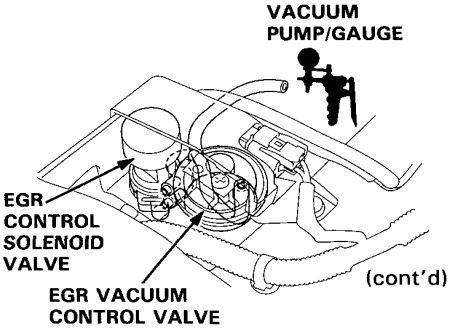
Measure voltage between YEL/BLU (+) terminal and GRN/BLU (−) terminal.

Is there 150−250 mm Hg (6−10 in. Hg) of vacuum?

NO → **Replace the EGR vacuum control valve.**

YES

Replace the EGR control solenoid valve.



Is there approx. 5 V?

NO → Measure voltage between YEL/BLU (+) terminal and body ground.

YES

Ⓐ

(To page 11-118)

Ⓑ

(To page 11-118)

(cont'd)

Exhaust Gas Recirculation (EGR) System

(From page 11-117)

Ⓐ

Turn the ignition switch OFF.

Reconnect the 3P connector to the EGR valve lift sensor.

Connect the test harness between the ECM and connectors (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D12 (+) terminal and D22 (−) terminal.

Is the voltage approx. 1.2 V with no vacuum applied and approx. 4.3 V with 200 mm Hg (8 in. Hg) of vacuum applied to the EGR valve?

NO

- **Check for an open or short in WHT/BLK wire between EGR valve lift sensor and ECM (D12).**
- **If wire is OK, replace the EGR valve.**

YES

(To page 11-119)

(From page 11-117)

Ⓑ

Is there approx. 5 V?

YES

Repair open in GRN/BLU wire between EGR valve lift sensor and ECM (D22).

NO

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-21).

Turn the ignition switch ON.

Measure voltage between D20 (+) terminal and D22 (−) terminal.

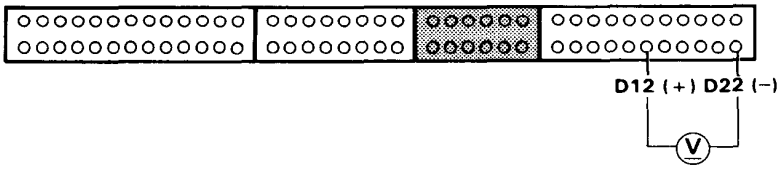
Is there approx. 5 V?

YES

NO

Repair open in YEL/BLU wire between EGR valve lift sensor and ECM (D20).

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.



(From page 11-118)

Does the voltage consistently increase/decrease as the vacuum increases/decreases?

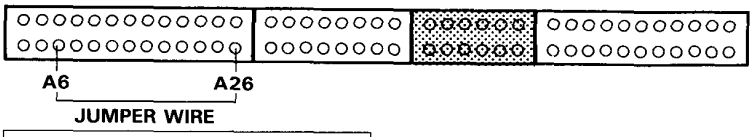
NO → **Replace the EGR valve.**

YES

Reconnect the #16 hose to the EGR valve.

Start the engine and allow it to idle.

Connect A6 terminal to A26 terminal with a jumper wire.



Did the engine stall or run rough?

NO → **Repair open in RED wire between ECM (A6) and EGR control solenoid valve.**

YES

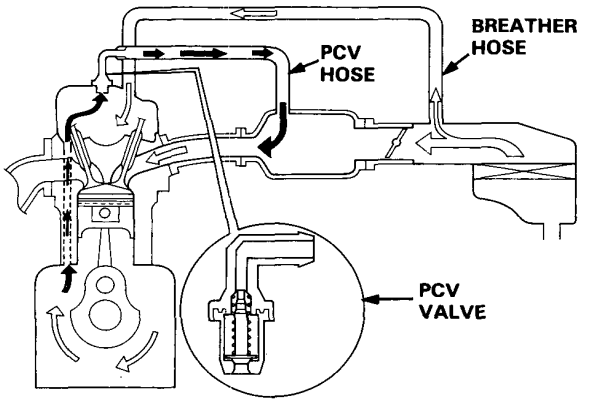
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

Emission Control System

Positive Crankcase Ventilation (PCV) System

Description

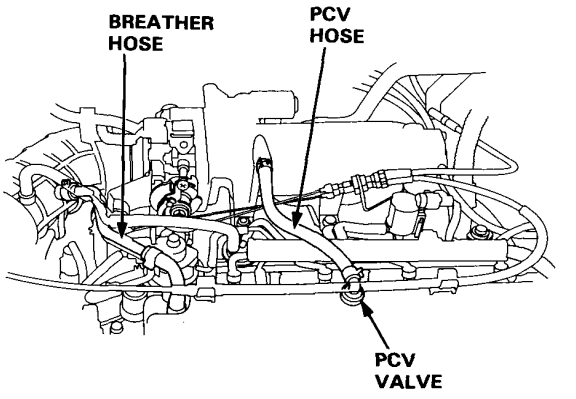
The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.



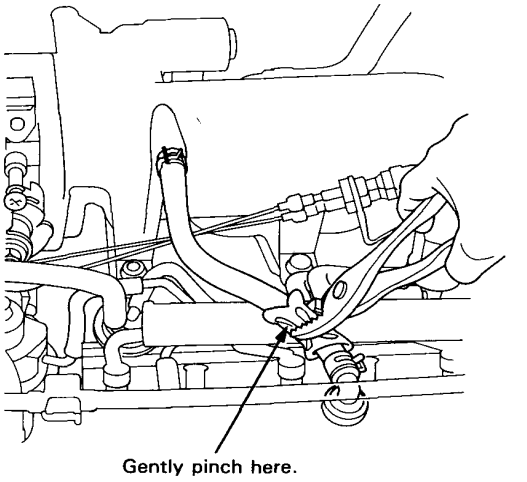
←: BLOW-BY VAPOR
⇦: FRESH AIR

Inspection

1. Check the PCV hoses and connections for leaks and clogging.



2. At idle, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold in lightly pinched with your fingers or pliers.



- If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.

Evaporative Emission (EVAP) Controls

Description

The evaporative emission controls are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

A. Evaporative Emission (EVAP) Control Canister
An EVAP control canister is used for the temporary storage of fuel vapor until the fuel vapor can be purged from the EVAP control canister into the engine and burned.

B. Vapor Purge Control System
EVAP control canister purging is accomplished by drawing fresh air through the EVAP control canister and into a port on the throttle body. The purging vacuum is controlled by the EVAP purge control diaphragm valve [F22B5, F20B3 engine] and the EVAP purge control solenoid valve.

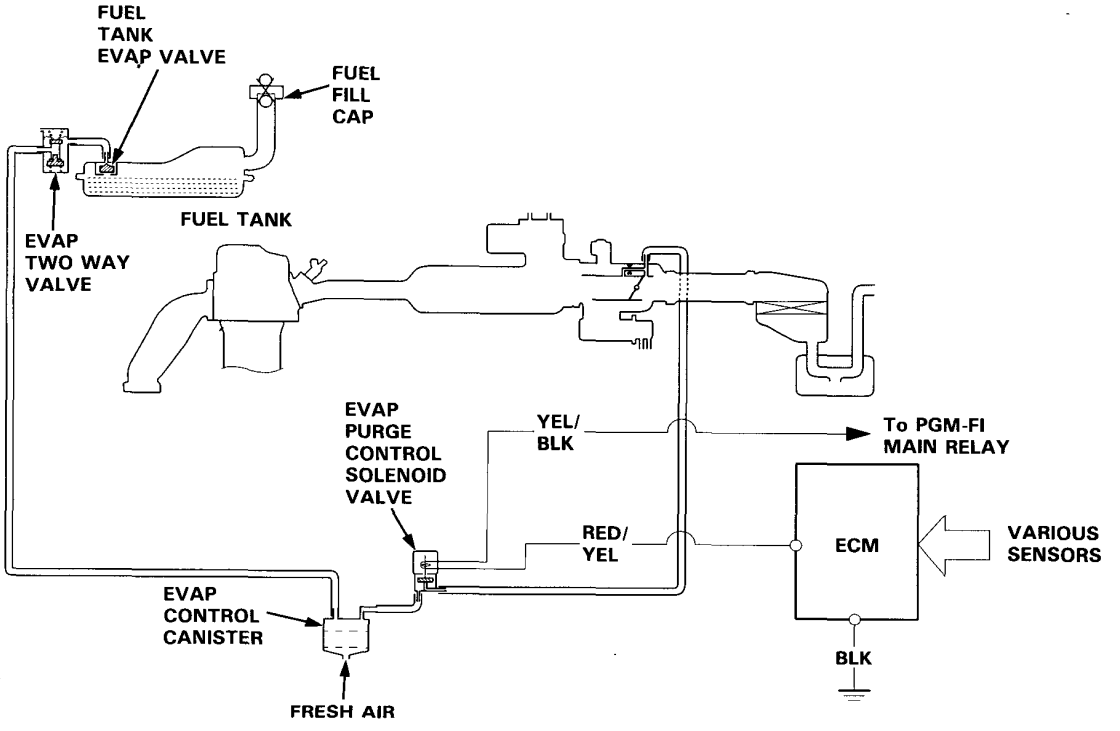
EVAP PURGE CONTROL SOLENOID VALVE ON AFTER STARTING ENGINE [F22B5, F20B3 engine: SOLENOID VALVE OFF]

↑

ENGINE COOLANT TEMPERATURE ABOVE 167°F (75°C)

C. Fuel Tank Vapor Control System
When fuel vapor pressure in the fuel tank is higher than the set value of the EVAP two way valve, the valve opens and regulates the flow of fuel vapor to the EVAP control canister.

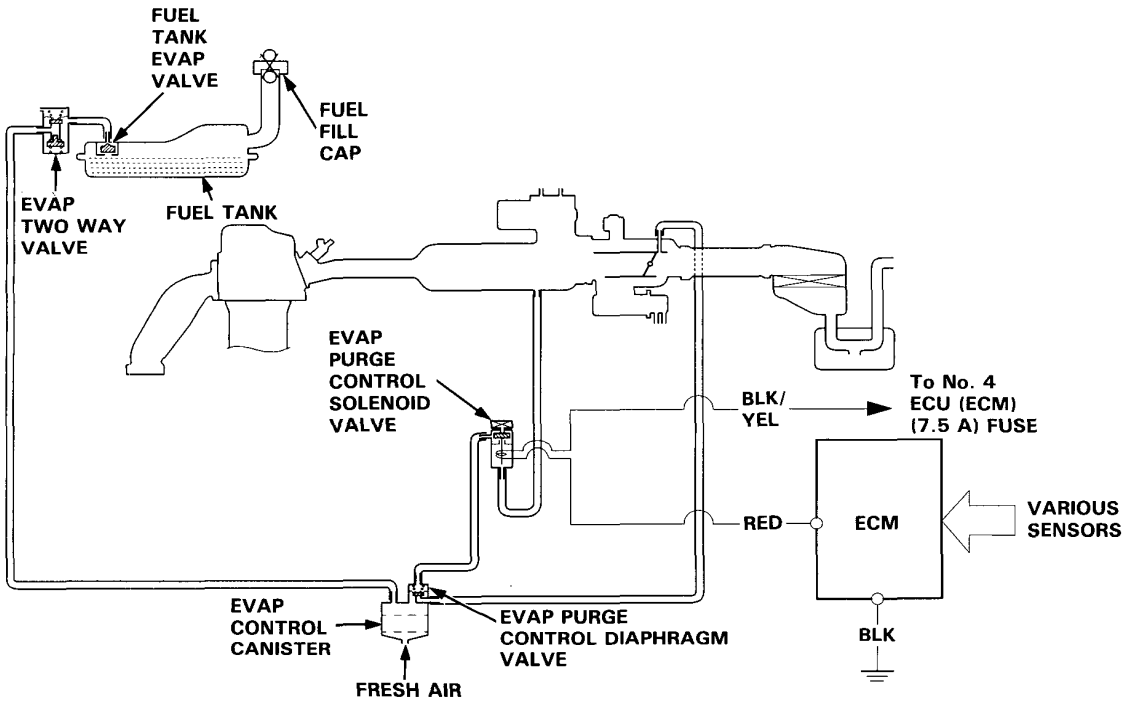
F22B1, F22B2 engine:



(cont'd)

Evaporative Emission (EVAP) Controls (cont'd)

F22B5, F20B3 engine:



F22B1, F22B2 engine:

Troubleshooting

Inspection of Evaporative Emission Controls.

Disconnect the vacuum hose from the EVAP control canister and connect a vacuum gauge to hose.

Start the engine and allow it to idle.
NOTE: Engine coolant temperature must be below 167°F (75°C).

Snap the engine to 3,000 rpm (min^{-1}).

Is there vacuum?

YES → Disconnect the 2P connector from the EVAP purge control solenoid valve.

NO

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position) until the radiator fan comes on, then let it idle.

Check for vacuum at vacuum hose after starting the engine.

Snap the engine to 3,000 rpm (min^{-1}).

Is there manifold vacuum?

NO → Disconnect the 2P connector from the EVAP purge control solenoid valve.

YES

Measure voltage between YEL/BLK (+) terminal and RED/YEL (−) terminal.

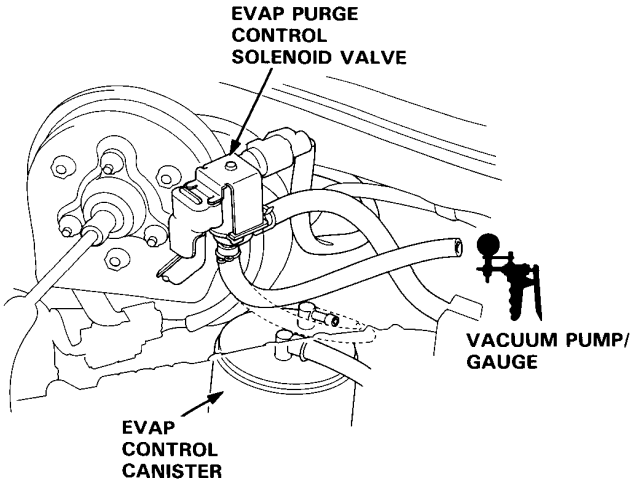
Snap the engine to 3,000 rpm (min^{-1}).

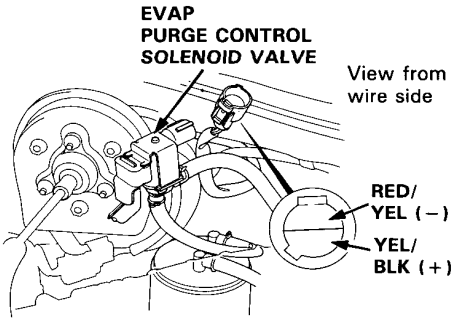
Is there manifold vacuum?

NO → **Inspect vacuum hose routing.**
If OK, replace the EVAP purge control solenoid valve.

YES

Inspect for a short in RED/YEL wire between ECM (A20) and the connector.
If wire is OK, substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.





(A) (To page 11-124)

(B) (To page 11-124)

(cont'd)

Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-123)

A

Reconnect the hose.

Remove fuel fill cap.

Connect a vacuum gauge to canister purge air hose.

Start the engine and raise speed to 3,500 rpm (min^{-1}).

Does vacuum appear on gauge within 1 minute?

NO → **Replace the EVAP control canister.**

YES

See EVAP two way valve test to complete.
Evaporative emission controls are OK.

(From page 11-123)

B

Is there battery voltage?

YES → **Inspect vacuum hose routing.**
If OK, replace EVAP purge control solenoid valve.

NO

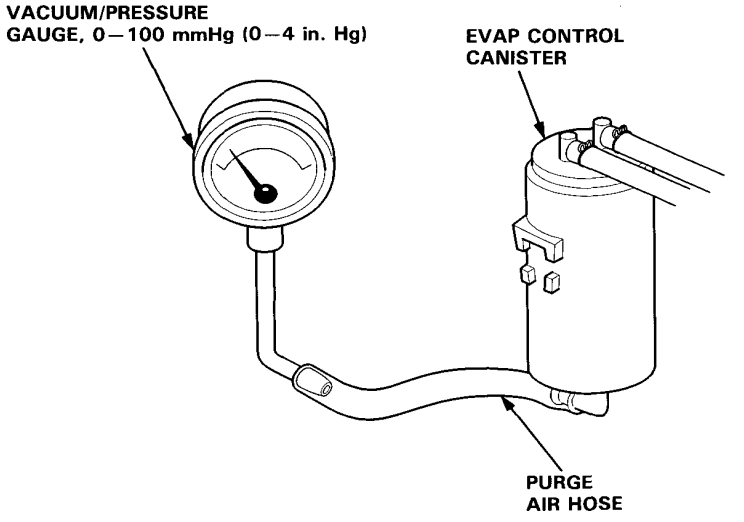
Measure voltage between YEL/BLK (+) terminal and body ground.

Is there battery voltage?

NO → **Repair open in YEL/BLK wire between the 2P connector and the PGM-FI main relay.**

YES

Inspect RED/YEL wire for an open to body ground between ECM (A20) and the connector.
If wire is OK, substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.



F22B5, F20B3 engine:

Troubleshooting

Inspection of Evaporative Emission Controls.

Disconnect vacuum hose from the EVAP purge control diaphram valve (on the EVAP control canister) and connect a vacuum gauge to the hose.

Start the engine and allow it to idle.
NOTE: Engine coolant temperature must be below 167°F (75°C)

Is there vacuum?

YES

Disconnect the 2P connector from the EVAP purge control solenoid valve.

NO

Measure voltage between BLK/YEL (+) terminal and RED (−) terminal.

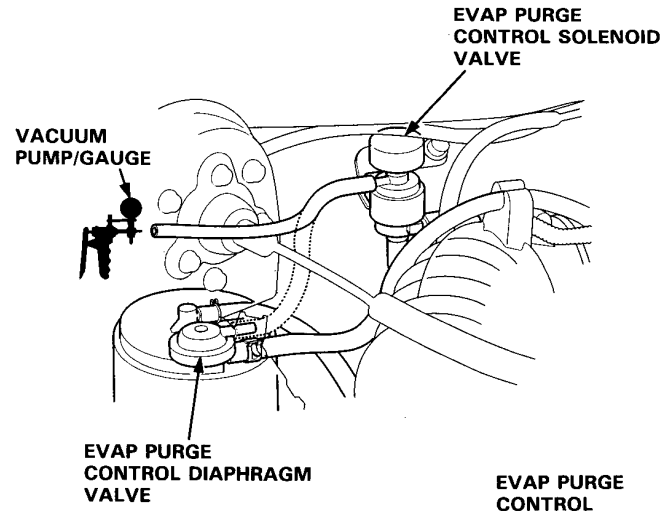
Is there battery voltage?

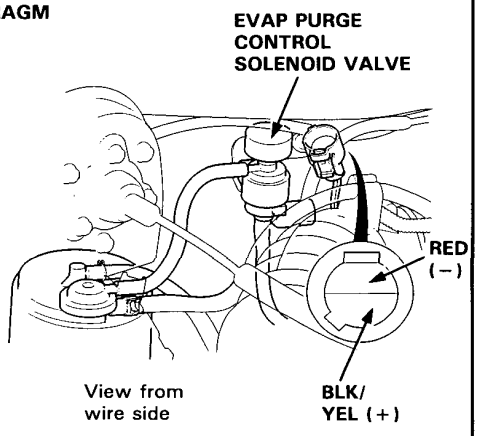
YES

Inspect vacuum hose routing.
If OK, replace EVAP purge control solenoid valve.

NO

Measure voltage between BLK/YEL (+) terminal and body ground.





(To page 11-126)

(To page 11-126)

(cont'd)

Evaporative Emission (EVAP) Controls (cont'd)

(From page 11-125)

A

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in N or P position, M/T in neutral) until the radiator fan comes on, then let it idle.

Check for vacuum at vacuum hose after starting the engine.

Is there manifold vacuum?

NO → Disconnect the 2P connector from the EVAP purge control solenoid valve.

Is there manifold vacuum?

NO → **Inspect vacuum hose routing. If OK, replace the EVAP purge control solenoid valve.**

YES → **Inspect for a short in wire between ECM (A20) and the connector. If wire is OK, substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.**

YES

Reconnect the hose.

Remove fuel fill cap.

Connect a vacuum gauge to canister purge air hose.

Start the engine and raise speed to 3,500 rpm (min^{-1}).

Does vacuum appear on gauge within 1 minute?

NO → **Replace the EVAP control canister.**

YES

See EVAP two way valve test to complete. Evaporative emission controls are OK.

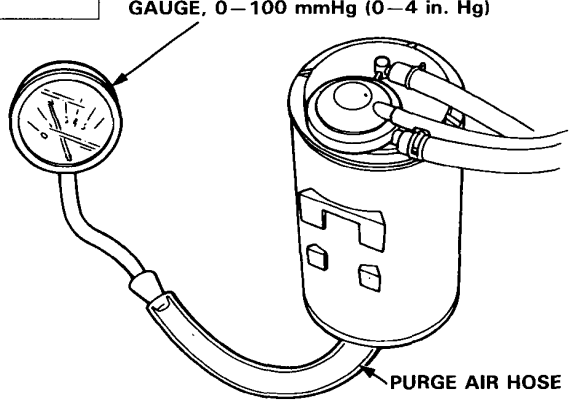
(From page 11-125)

B

Is there battery voltage?

NO → **Repair open in BLK/YEL wire between the 2P connector and No. 4 ECU (ECM) (7.5 A) fuse in the under-dash fuse/relay box.**

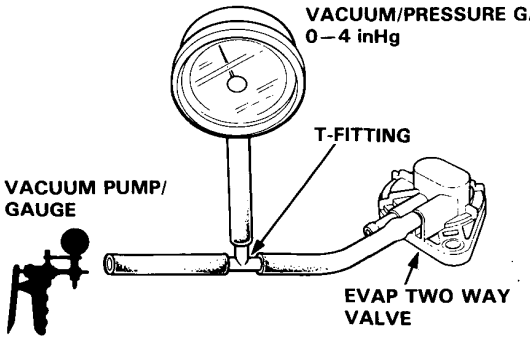
YES → **Inspect RED wire for an open to body ground between ECM (A20) and the connector. If wire is OK, substitute a known-good ECM and recheck, if symptom goes away, replace the original ECM.**



Evaporative Emission Two Way Valve (EVAP Two Way Valve) Testing

1. Remove the filler cap.

2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.

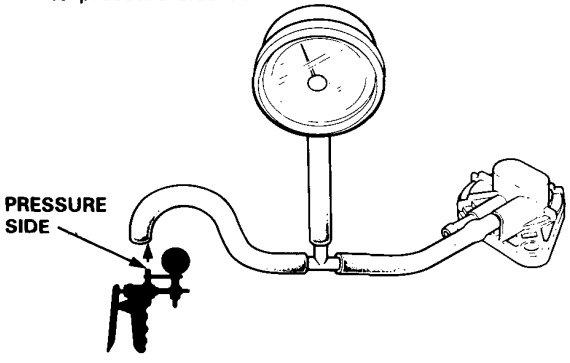


3. Apply vacuum slowly and continuously while watching the gauge.

   Vacuum should stabilize momentarily at 5 to 15 mmHg (0.2 to 0.6 in Hg).

   - If vacuum stabilized (EVAP two way valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install new EVAP two way valve and retest.

4. Move vacuum pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.

   Pressure should stabilize at 10 to 35 mmHg (0.4 to 1.4 in. Hg).

   - If pressure momentarily stabilizes (EVAP two way valve opens) at 10 to 35 mmHg (0.4 to 1.4 in. Hg), the EVAP two way valve is OK.
   - If pressure stabilizes below 10 mmHg (0.4 in. Hg) or above 35 mmHg (1.4 in. Hg), install a new EVAP two way valve and retest.

Transaxle

Clutch 12-1
Manual Transmission 13-1
Automatic Transmission 14-1
Differential
  Manual Transmission 15-1
  Automatic Transmission 15-11
Driveshafts 16-1



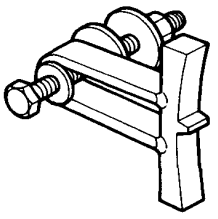
Clutch

Special Tools 12-2
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  Adjustment 12-4
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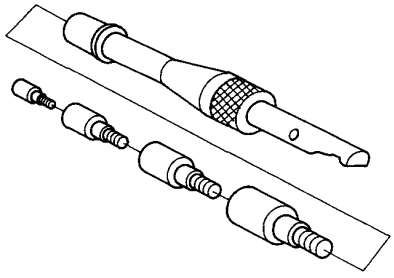


Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAB – PV00100 or 07924 – PD20003	Ring Gear Holder	1	12-10, 11, 13
②	07PAF – 0020000	Clutch Alignment Tool Set	1	12-10, 11, 13



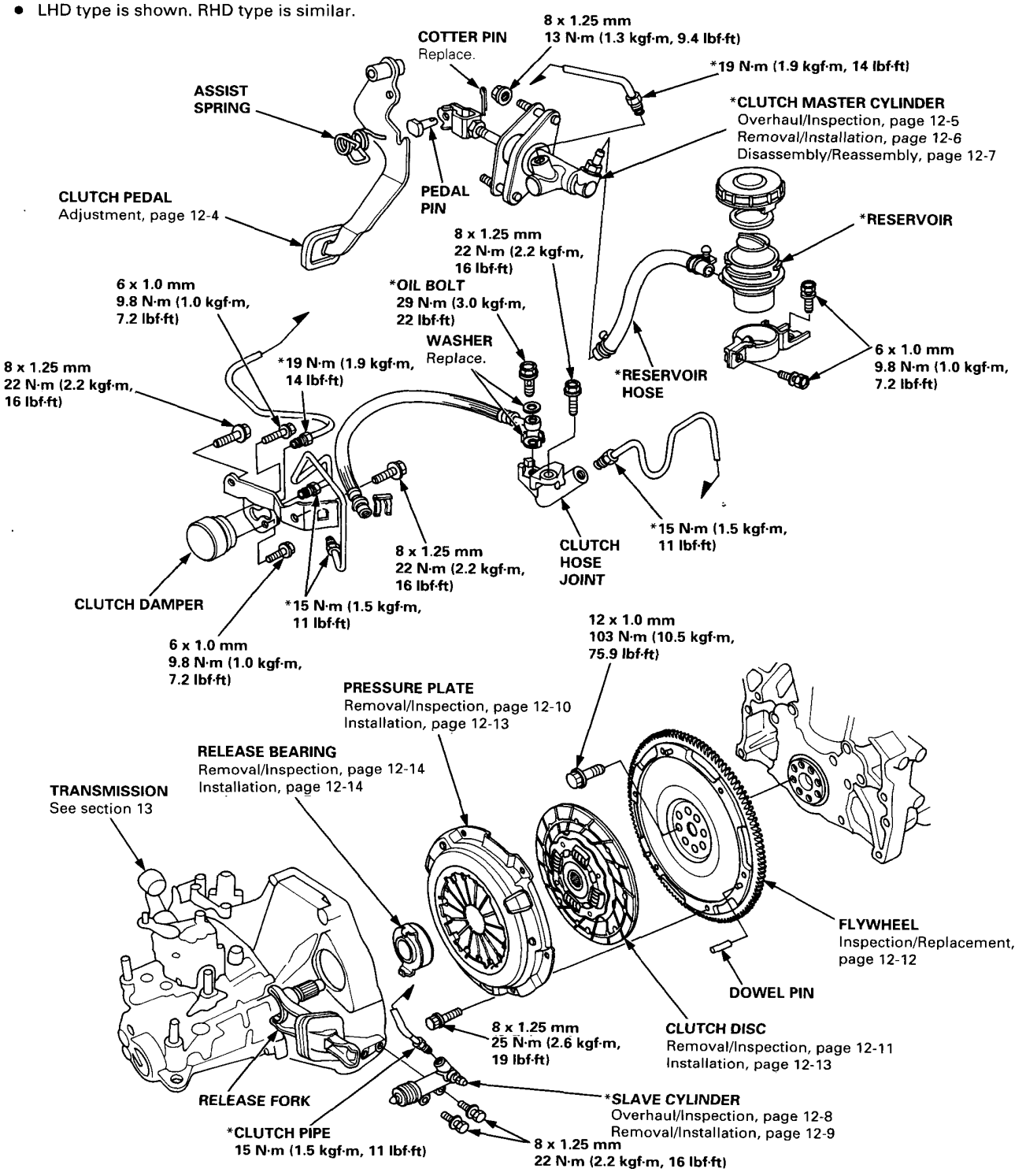
①



②

NOTE:

- Whenever the transmission is removed, clean and grease the release bearing sliding surface.
- If the parts marked * are removed, the clutch hydraulic system must be bled (see page 12-9).
- Inspect the hoses for damage, leaks, interference, and twisting.
- LHD type is shown. RHD type is similar.



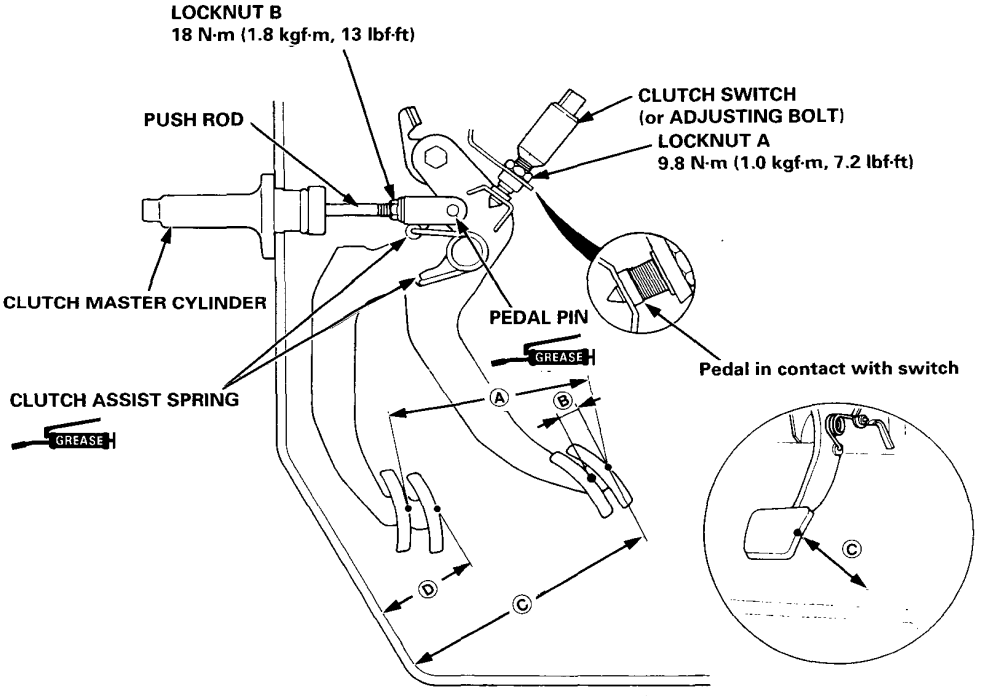
Clutch Pedal

Adjustment

NOTE:
- To check the clutch switch, see section 23.
- The clutch is self-adjusting to compensate for wear.

CAUTION: If there is no clearance between the master cylinder piston and push rod, the release bearing is held against the diaphragm spring, which can result in clutch slippage or other clutch problems.

1. Loosen locknut A, and back off the clutch switch (or adjusting bolt) until it no longer touches the clutch pedal.
2. Loosen locknut B, and turn the push rod in or out to get the specified stroke (Ⓐ) and height (Ⓒ) at the clutch pedal.
3. Tighten locknut B.
4. Turn the clutch switch (or adjusting bolt) in until it contacts the clutch pedal.
5. Turn the clutch switch in an additional 1/4 – 1/2 turn.
6. Tighten locknut A.



Ⓐ (STROKE at PEDAL): 142.5 – 152.5 mm (5.61 – 6.00 in)
Ⓑ (TOTAL CLUTCH PEDAL FREE PLAY): 9.0 – 15.0 mm (0.35 – 0.59 in) includes the pedal play 1 – 7 mm (0.04 – 0.28 in)
Ⓒ (CLUTCH PEDAL HEIGHT): LHD: 184 mm (7.24 in) to the floor
RHD: 209 mm (8.23 in) to the floor
Ⓓ (CLUTCH PEDAL DISENGAGEMENT HEIGHT): LHD: 46 mm (1.81 in) minimum to the carpet
RHD: 76 mm (2.99 in) minimum to the carpet

Clutch Master Cylinder

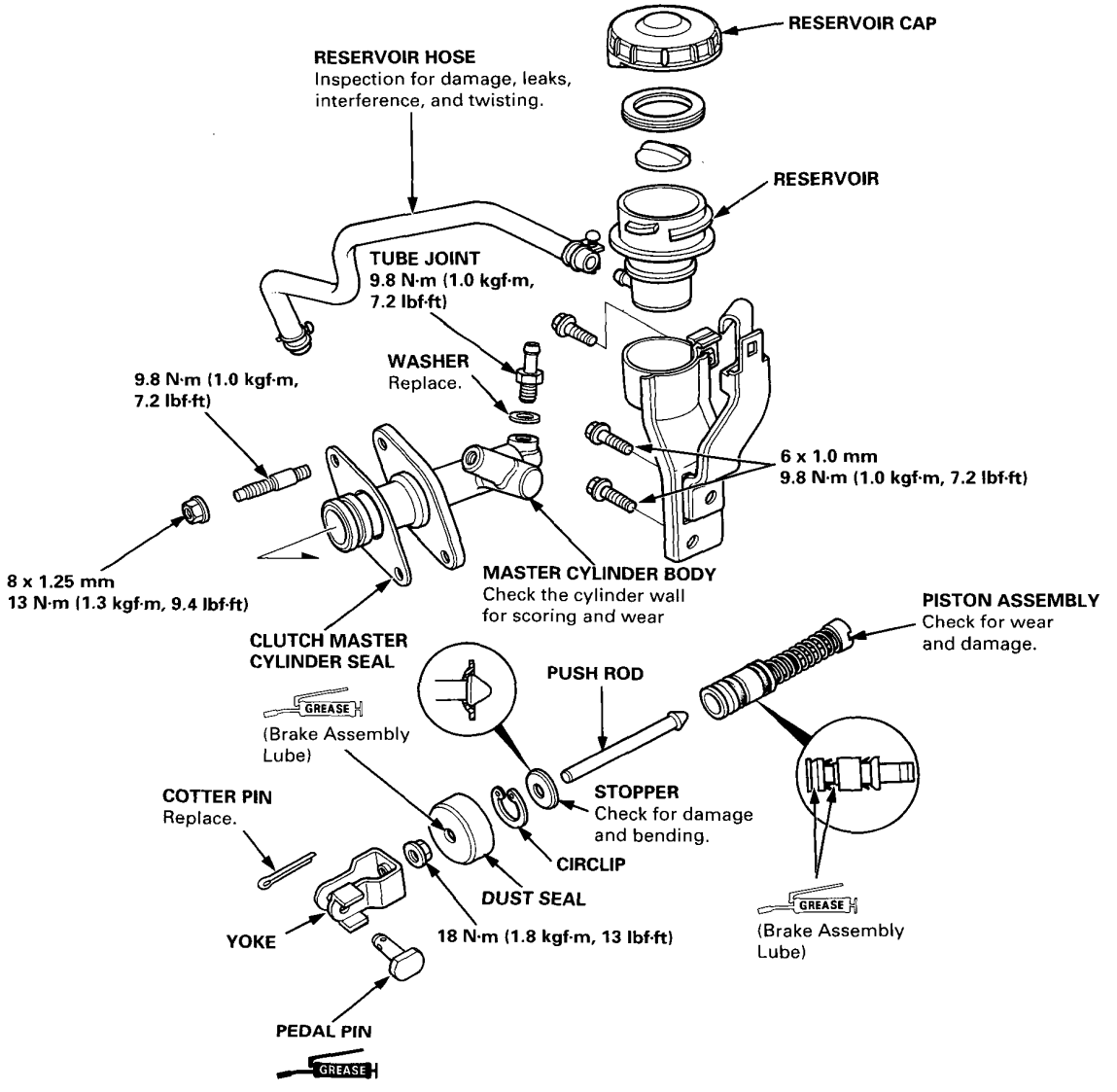
Overhaul/Inspection

CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**

NOTE: LHD type is shown. RHD type is similar.

GREASE: Brake Assembly Lube or equivalent rubber grease.



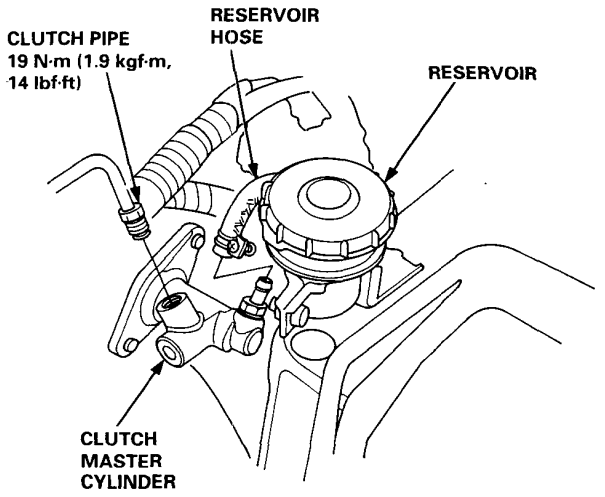
Clutch Master Cylinder

Removal/Installation

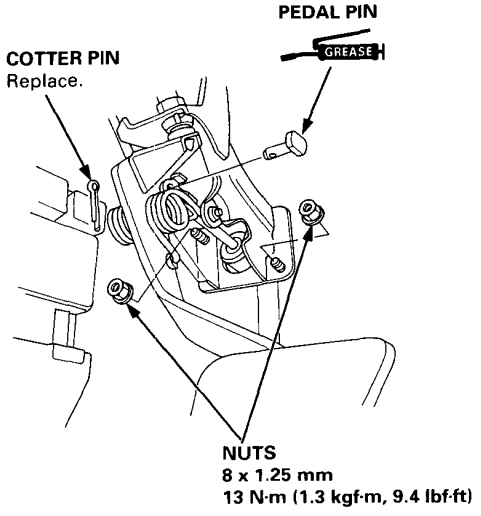
CAUTION:
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Plug the end of the clutch pipe and reservoir hose with a shop towel to prevent brake fluid from coming out.**

1. Remove the brake fluid from the clutch master cylinder reservoir with a syringe.

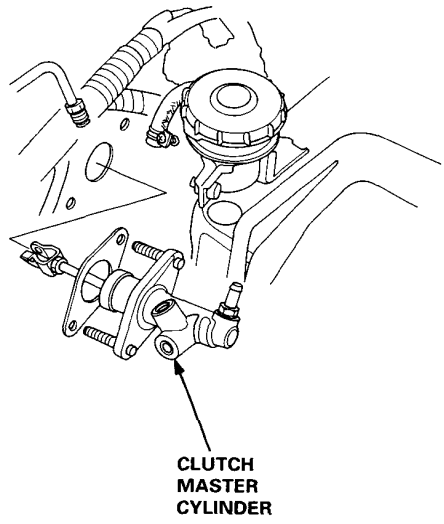
2. Disconnect the clutch pipe and reservoir hose from the clutch master cylinder.



3. Pry out the cotter pin, and pull the pedal pin out of the yoke. Remove the nuts.



4. Remove the clutch master cylinder.



5. Install the clutch master cylinder in the reverse order of removal.

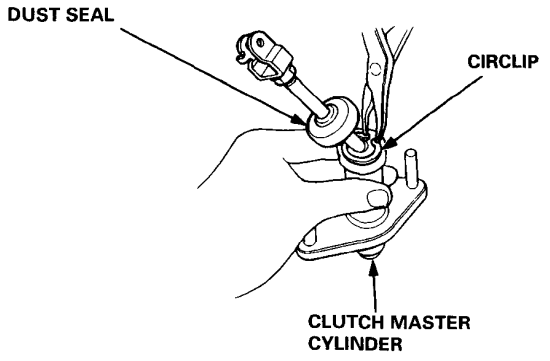
   NOTE: Bleed the clutch hydraulic system (see page 12-9).

Disassembly/Reassembly

CAUTION: Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

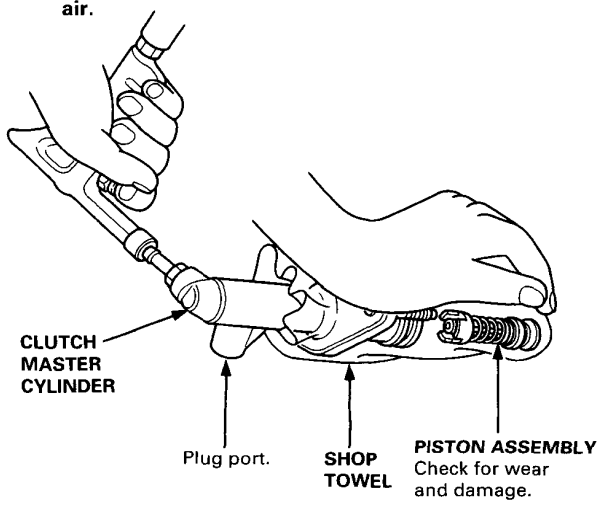
1. Remove the dust seal from the clutch master cylinder.

2. Pry the circlip off the clutch master cylinder.



3. Carefully remove the piston by applying air pressure through the clutch line hole.

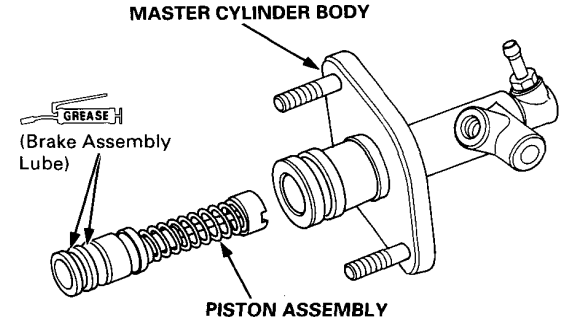
CAUTION:
- **Hold a shop towel over the clutch master cylinder, to stop the piston in case it comes out suddenly.**
- **Plug the end of the clutch hose port with a shop towel to prevent fluid from coming out.**
- **Clean all disassembled parts in solvent and blow through all ports and passages with compressed air.**



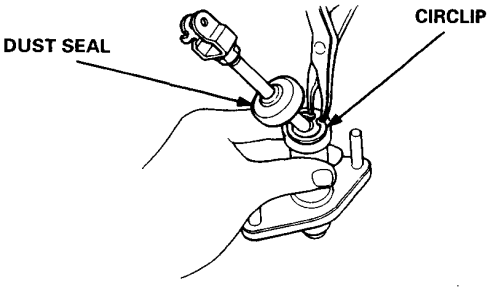
CAUTION:
- ***Before reassembling, check that all parts are free of dust and other foreign particles.***
- **Replace parts with new ones whenever specified to do so.**
- **Make sure not dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**

4. Assemble the piston nothing the proper direction of the parts (see page 12-5).

5. Slide the piston assembly into the clutch master cylinder.



6. Install the circlip in the groove of the clutch master cylinder.



7. Install the dust seal.

Slave Cylinder

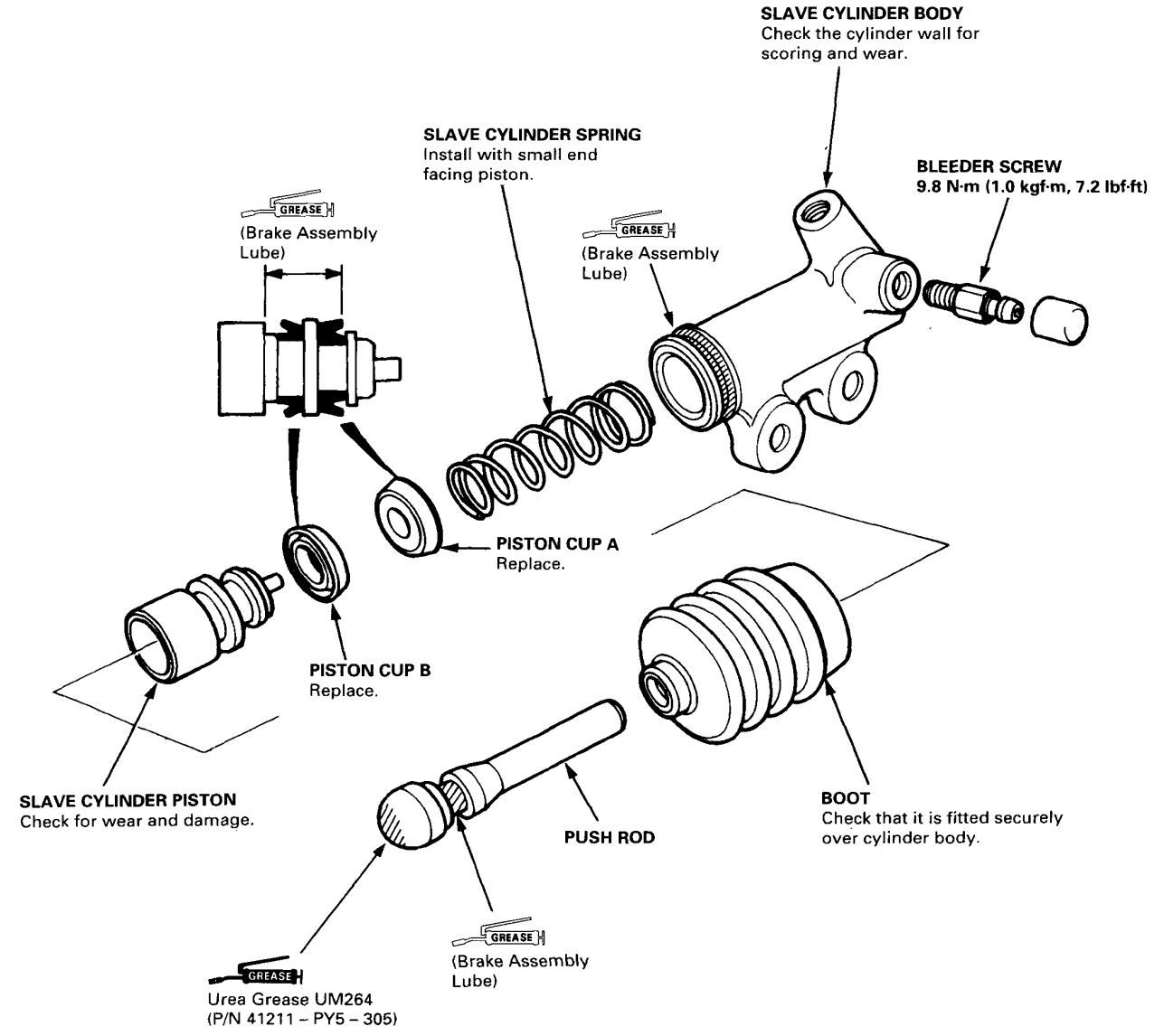
Overhaul/Inspection

CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint ; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**

GREASE: HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).

GREASE: Brake Assembly Lube or equivalent rubber grease.



Removal/Installation

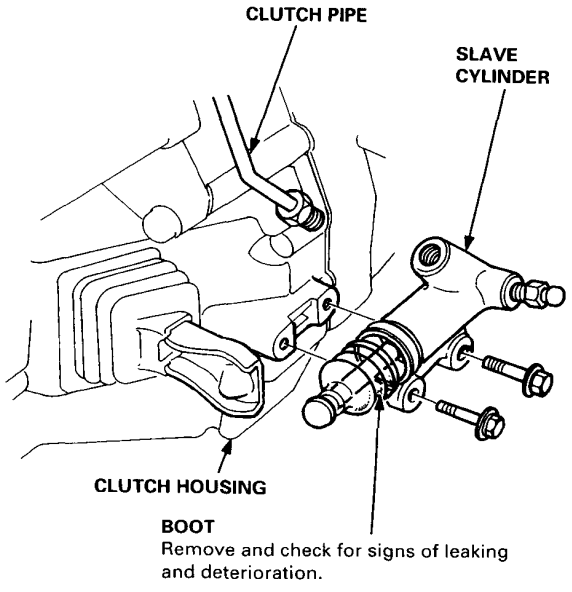
CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Plug the end of the clutch pipe with a shop towel to prevent brake fluid from coming out.**

GREASE: HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).

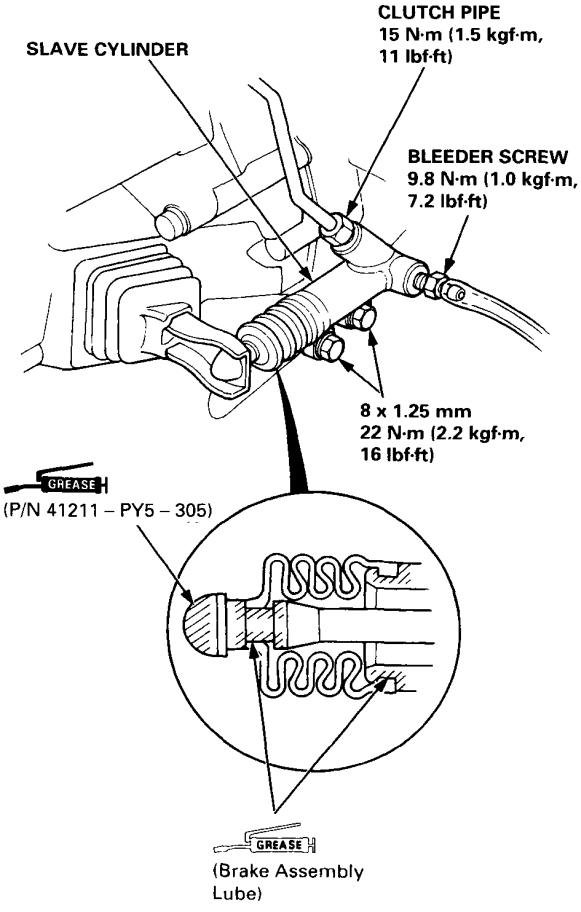
GREASE: Brake Assembly Lube or equivalent rubber grease.

1. Disconnect the clutch pipe from the slave cylinder.
2. Remove the slave cylinder from the clutch housing.



3. Install the slave cylinder in the reverse order of removal.

NOTE: Make sure the boot is installed on the slave cylinder.



4. Bleed the clutch hydraulic system.

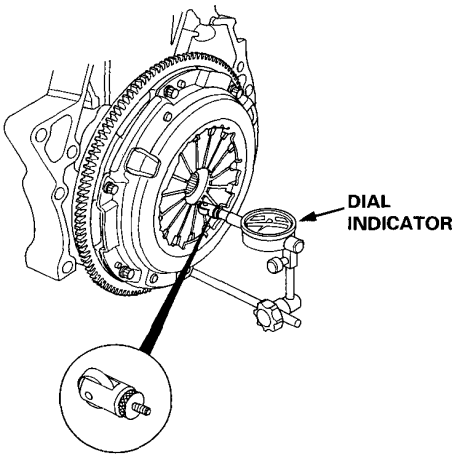
   - Attach a hose to the bleeder screw, and suspend the hose in a container of brake fluid.
   - Make sure there is an adequate supply of fluid at the clutch master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
   - Refill the clutch master cylinder with fluid when done.
   - Use only DOT 3 or 4 brake fluid.

Pressure Plate

Removal/Inspection

1. Check the diaphragm spring fingers for height using the dial indicator.

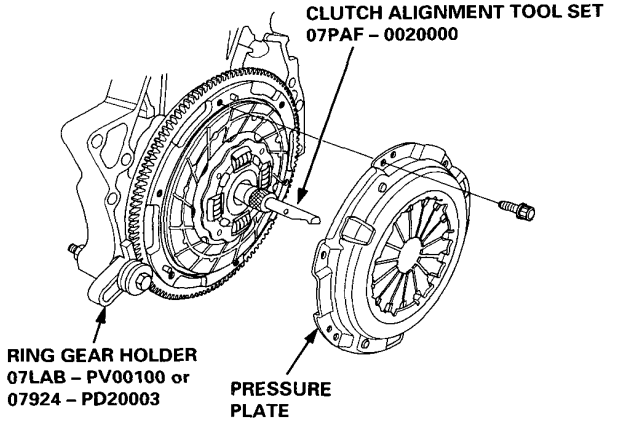
   Standard (New): 0.6 mm (0.02 in) max.
   Service Limit: 0.8 mm (0.03 in)

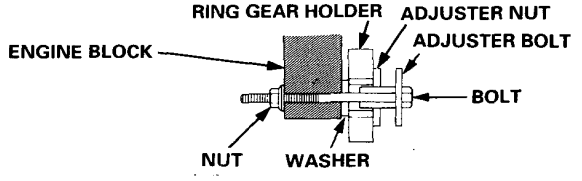


   - If the height is more than the service limit, replace the pressure plate.

2. Install the special tools as shown.

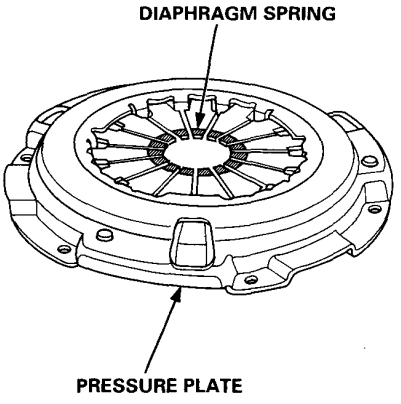
3. To prevent warping, unscrew the pressure plate mounting bolts in a crisscross pattern in several steps, then remove the pressure plate.





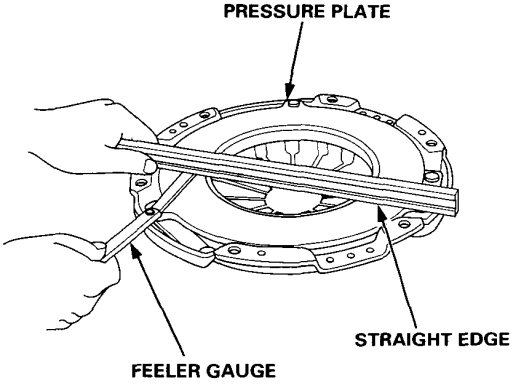
4. Inspect the pressure plate surface for wear, cracks, and burning.

5. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.



6. Inspect for warpage using a straight edge and feeler gauge. Measure across the pressure plate.

   Standard (New): 0.03 mm (0.001 in) max.
   Service Limit: 0.15 mm (0.006 in)

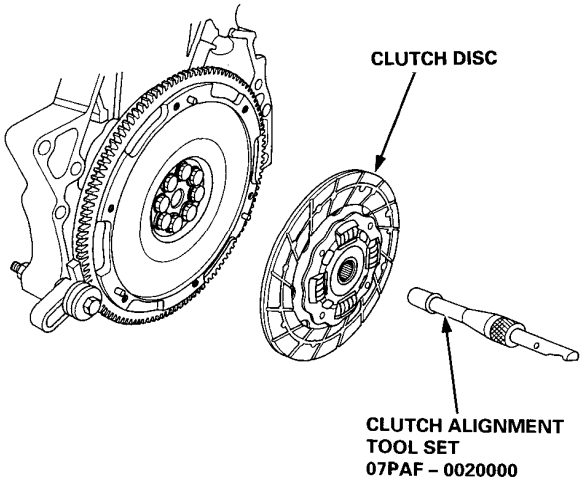


   - If the warpage is more than the service limit, replace the pressure plate.

Clutch Disc

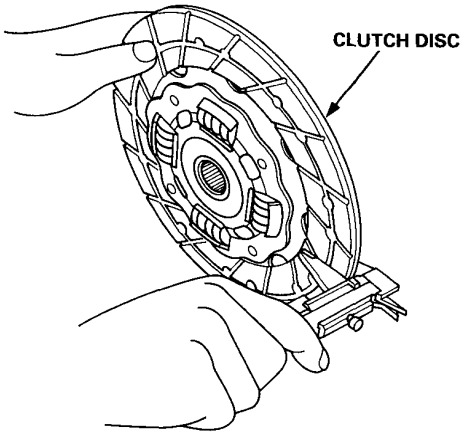
Removal/Inspection

1. Remove the clutch disc and special tools.
2. Inspect the lining of the clutch disc for signs of slipping or oil. If the clutch disc is burned black or oil soaked, replace it.



3. Measure the clutch disc thickness.

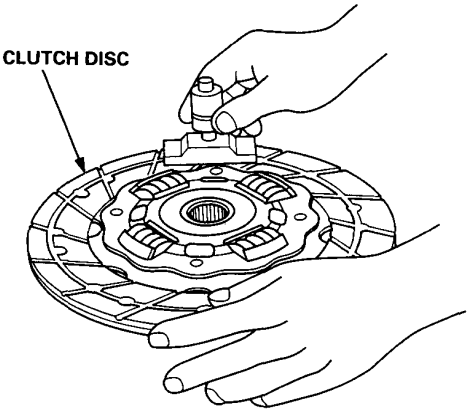
Standard (New): 8.4 – 9.0 mm (0.33 – 0.35 in)
Service Limit: 6.0 mm (0.24 in)

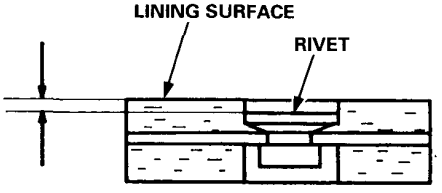


- If the thickness is less than the service limit, replace the clutch disc.

4. Measure the rivet depth from the lining surface to the rivets, on both sides.

Standard (New): 1.3 – 1.9 mm (0.05 – 0.07 in)
Service Limit: 0.2 mm (0.008 in)





- If the rivet depth is less than the service limit, replace the clutch disc.

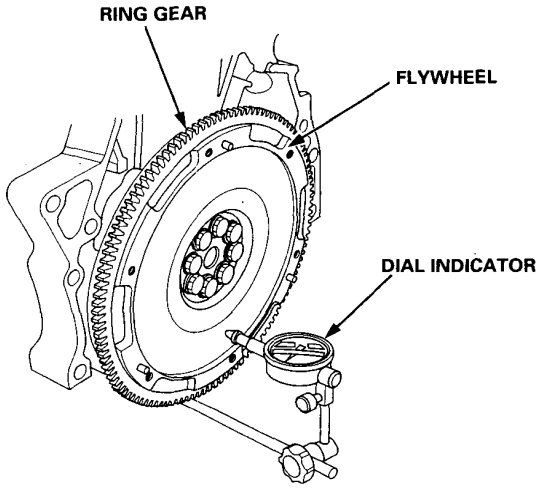
Flywheel

Inspection/Replacement

1. Inspect the ring gear teeth for wear and damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks, and burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the crankshaft thrust washer clearance.

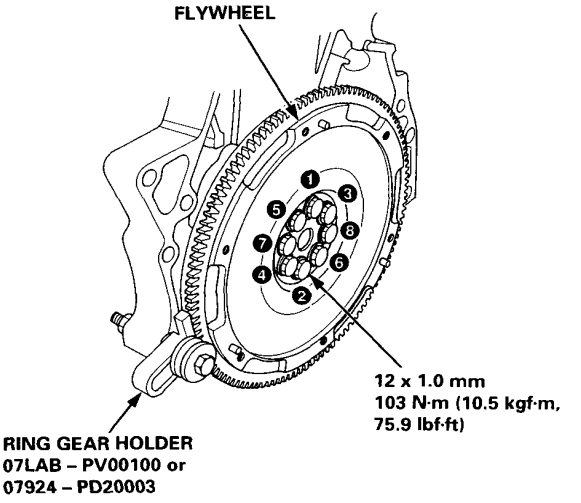
   NOTE: The runout can be measured with the engine installed.

   Standard (New): 0.05 mm (0.002 in) max.
   Service Limit: 0.15 mm (0.006 in)



- If the runout is more than the service limit, replace the flywheel and recheck the runout.

4. Install the special tool as shown.
5. Remove the flywheel mounting bolts in a crisscross pattern in several steps as shown, then remove the flywheel.



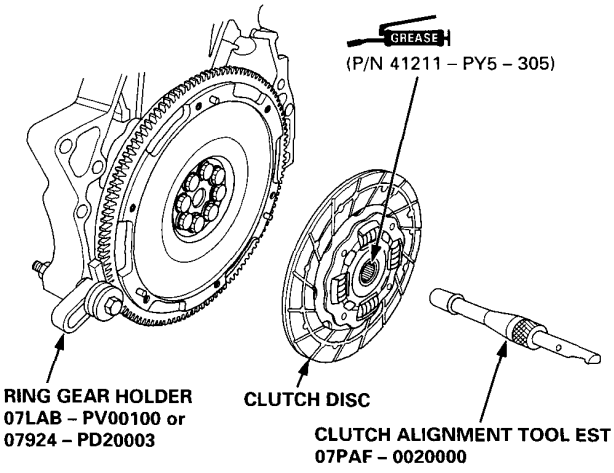
6. Align the hole in the flywheel with the crankshaft dowel pin, and install the flywheel. Install the mounting bolts finger-tight.
7. Install the special tool, then torque the flywheel mounting bolts in a crisscross pattern in several steps.

Installation

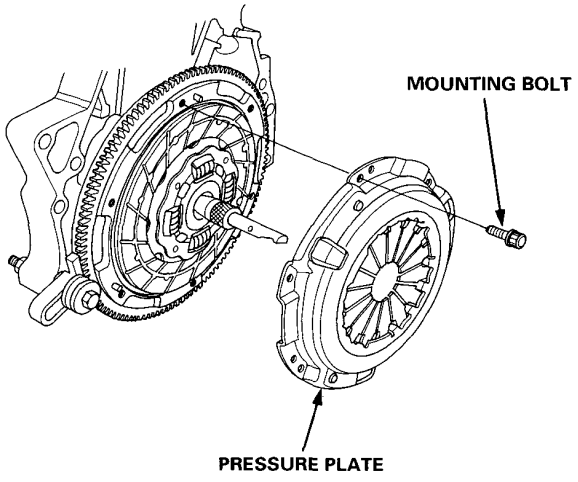
1. Install the ring gear holder.

2. Apply grease to the splines of the clutch disc, then install the clutch disc using the special tools as shown.

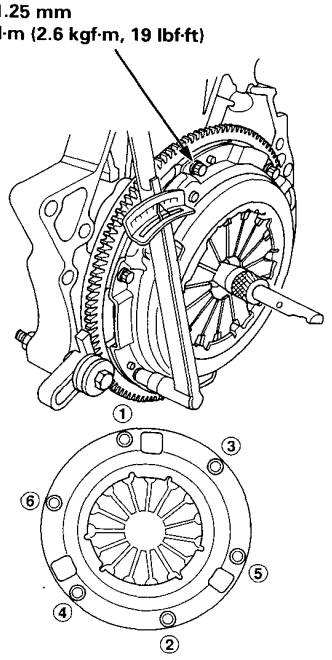
   NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).



3. Install the pressure plate and the mounting bolts finger-tight.



4. Torque the mounting bolts in a crisscross pattern as shown. Tighten the bolts in several steps to prevent warping the diaphragm spring.



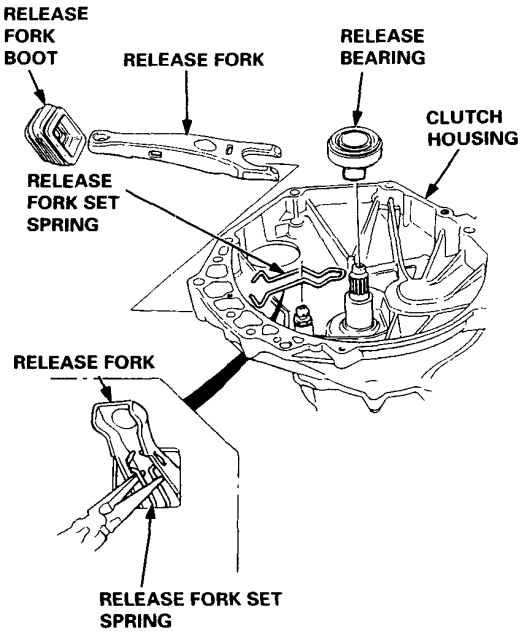
5. Remove the special tools.

6. Check the diaphragm spring fingers for height (see page 12-10).

Release Bearing

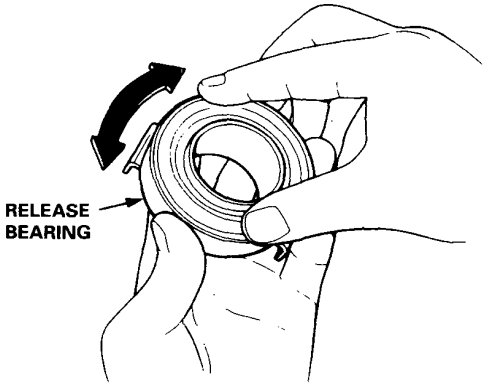
Removal/Inspection

1. Remove the release fork boot from the clutch housing.
2. Remove the release fork from the clutch housing by squeezing the release fork set spring with pliers. Remove the release bearing.



3. Check the release bearing for play by spinning it by hand.

CAUTION: The release bearing is packed with grease. Do not wash it in solvent.

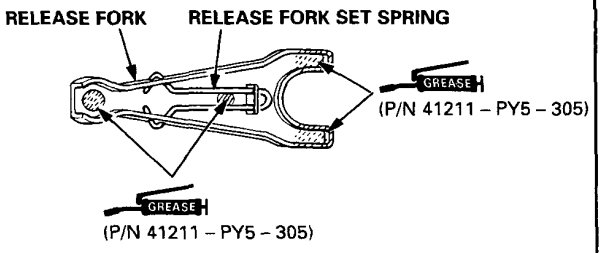


- If there is excessive play, replace the release bearing with a new one.

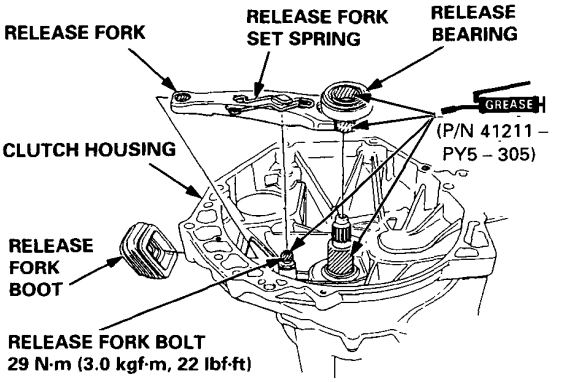
Installation

NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).

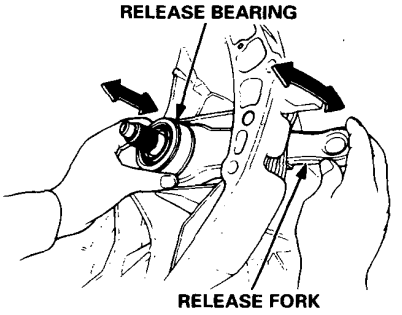
1. Install the release fork set spring on the release fork.



2. With the release fork slid between the release bearing pawls, install the release bearing on the mainshaft while inserting the release fork through the hole in the clutch housing.
3. Align the detent of the release fork with the release fork bolt, then press the release fork over the release fork bolt squarely.



4. Install the release fork boot; make sure the boot seals around the release fork and clutch housing.
5. Move the release fork right and left to make sure that it fits properly against the release bearing, and that the release bearing slides smoothly.



Manual Transmission

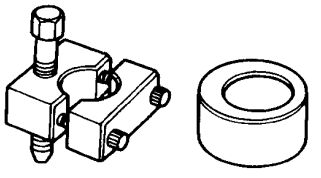
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Special Tools

Ref. No.	Tool Number	Description	Qty.	Page Reference
①	07GAD – PG20100	Pin Driver, 5.0 mm	1	13-28
②	07GAJ – PG20102	Mainshaft Clearance Inspection Tool Set	1	13-36, 37
②-1	07GAJ – PG20110	Mainshaft Holder	(1)	
②-2	07GAJ – PG20130	Mainshaft Base	(1)	
③	07JAC – PH80000	Adjustable Bearing Remover Set	1	13-32, 33
③-1	07JAC – PH80100	Bearing Remover Attachment	(1)	
③-2	07JAC – PH80200	Remover Handle Assembly	(1)	
③-3	07741 – 0010201	Remover Weight	(1)	
④	07LGC – 0010100	Snap Ring Pliers	1	13-15, 39
⑤	07746 – 0010300	Attachment, 42 x 47 mm	1	13-22, 27, 32
⑥	07746 – 0010500	Attachment, 62 x 68 mm	1	13-32, 33
⑦	07746 – 0030100	Driver, 40 mm I.D.	1	13-22
⑧	07746 – 0030400	Attachment, 35 mm I.D.	1	13-22
⑨	07749 – 0010000	Driver	1	13-22, 27, 32, 33
⑩	07947 – 6890100	Oil Seal Driver	1	13-27
⑪	07979 – PJ40001	Magnet Stand Base	1	13-37

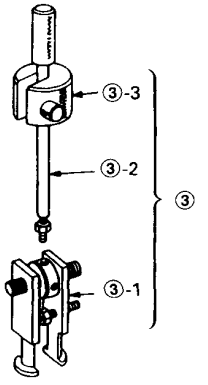


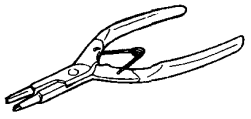
①



②-1 ②-2

②

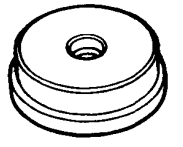




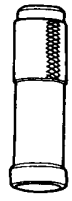
④



⑤



⑥



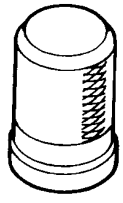
⑦



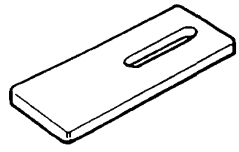
⑧



⑨



⑩



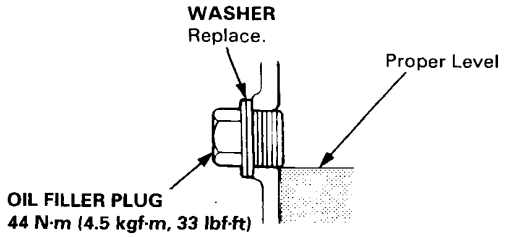
⑪

Maintenance

Transmission Oil

NOTE: Check the oil with engine OFF and car on level ground.

1. Remove the oil filler plug, then check the level and condition of the oil.



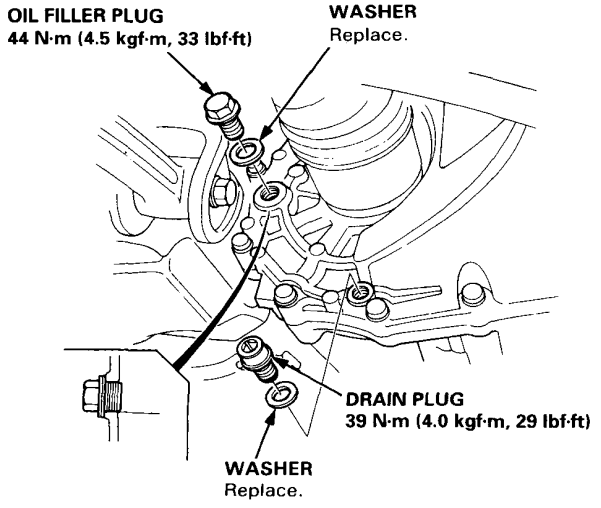
2. The oil level must be up to the filler hole. If it is below the hole, add oil until it runs out, then reinstall the oil filler plug with a new washer.
3. If the transmission oil is dirty, remove the drain plug and drain the oil.
4. Reinstall the drain plug with a new washer, and refill the transmission oil to the proper level.

   NOTE: The drain plug washer should be replaced at every oil change.

5. Reinstall the oil filler plug with a new washer.

   Oil Capacity
   1.9 ℓ (2.0 US qt, 1.7 Imp qt) at oil change
   2.0 ℓ (2.1 US qt, 1.8 Imp qt) at overhaul

   Use only SAE 10 W – 30 or 10 W – 40, API service SF or SG grade.

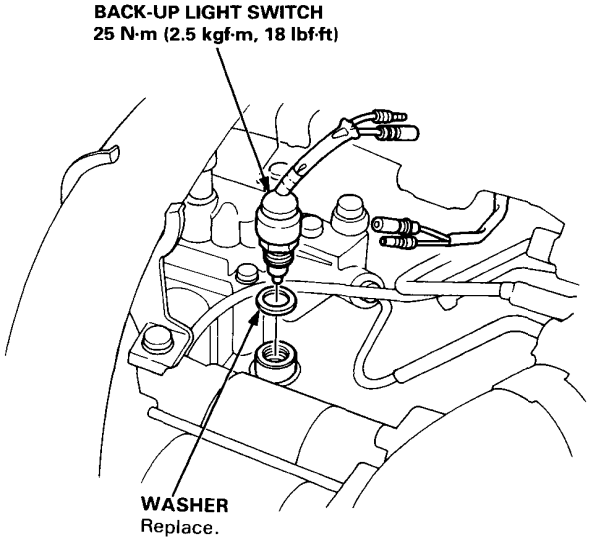


Back-up Light Switch

Replacement

NOTE: To test the back-up light switch see section 23.

1. Disconnect the back-up light switch connectors.
2. Remove the back-up light switch.



3. Install the new washer and back-up light switch.
4. Connect the back-up light switch connectors.

Transmission Assembly

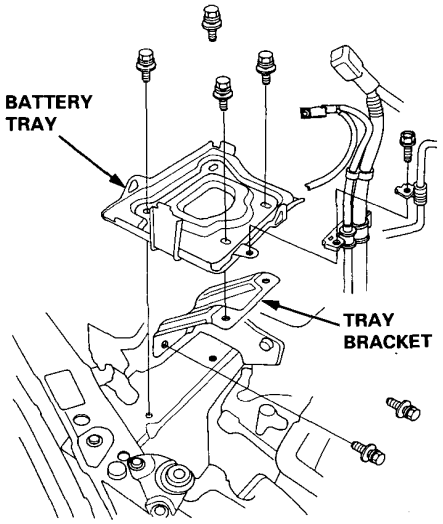
Removal

⚠ WARNING

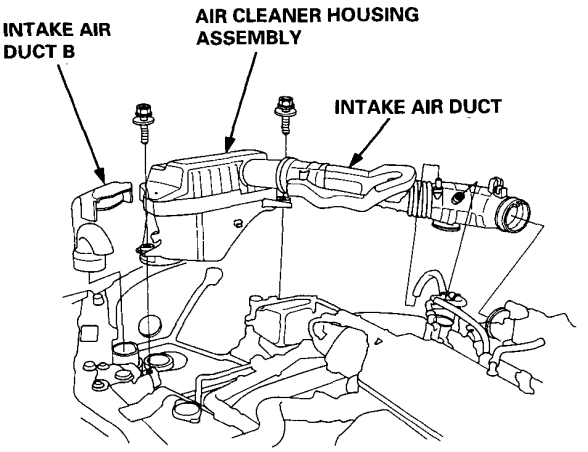
- **Make sure jacks and safety stands are placed properly (see section 1).**
- **Apply parking brake and block rear wheels so car will not roll off stands and fall on you while working under it.**

CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the negative (–) cable first, then the positive (+) cable from the battery. Remove the battery from the battery tray.
2. Drain the transmission oil (see page 13-3).
3. Remove the battery tray and tray bracket.

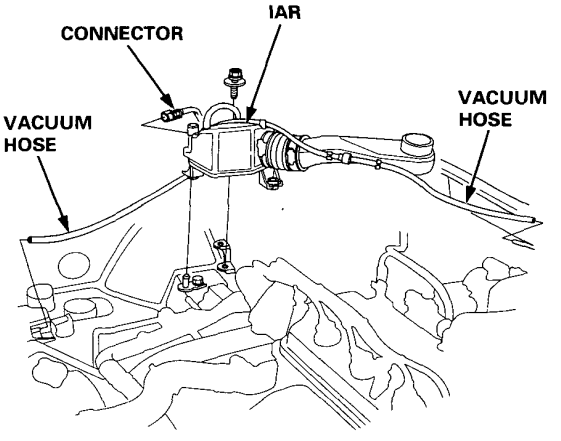


4. Remove the intake air duct and air cleaner housing assembly.

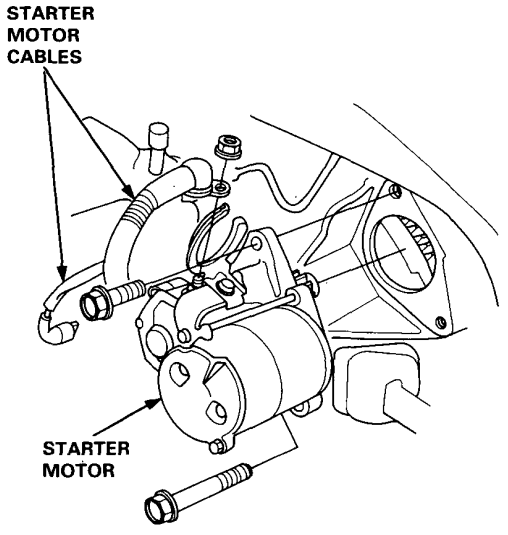


5. Disconnect the connector and vacuum hoses, then remove the intake air resonator (IAR)*1.

   *1: F22B5 Engine only

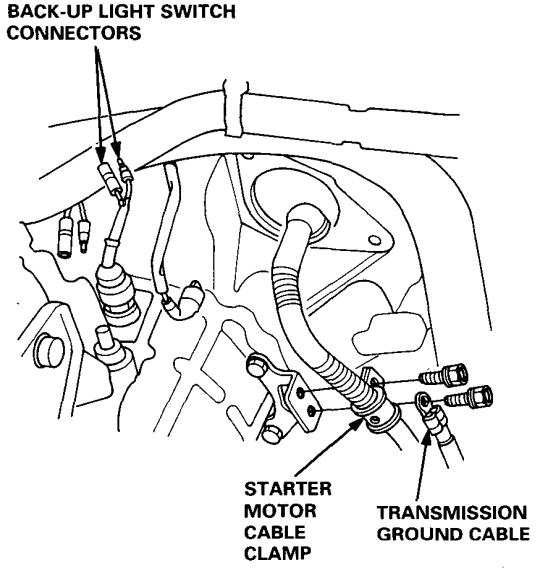


6. Disconnect the starter motor cables, then remove the starter motor.

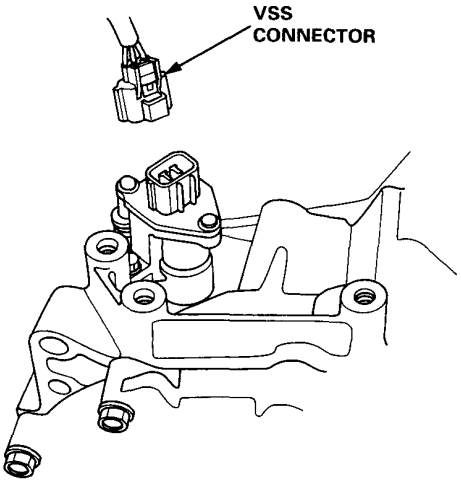


7. Disconnect the back-up light switch connectors.

8. Remove the transmission ground cable and starter motor cable clamp.



9. Disconnect the vehicle speed sensor (VSS) connector.

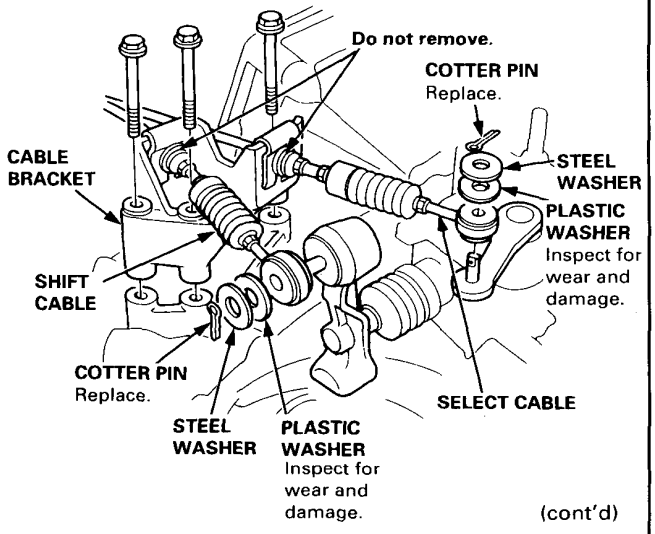


10. Shift the transmission into reverse.

11. First remove the cable bracket, then disconnect the cables from the top of the transmission housing.

    NOTE: Remove both cables and the bracket together.

CAUTION: Take care not to bend the cables.

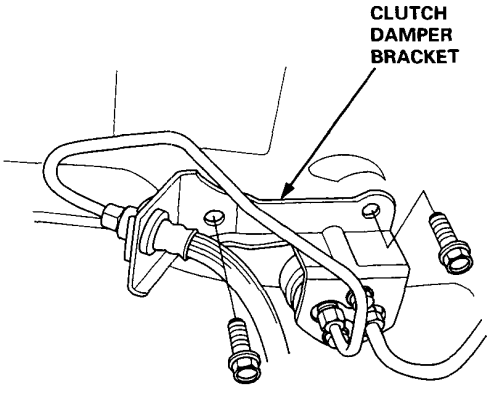


(cont'd)

Removal (cont'd)

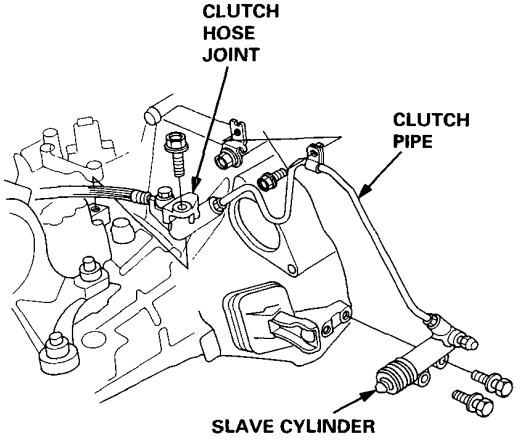
12. Remove the clutch damper bracket mounting bolts, and raise the clutch damper bracket.

    CAUTION: Take care not to bend the clutch pipes.

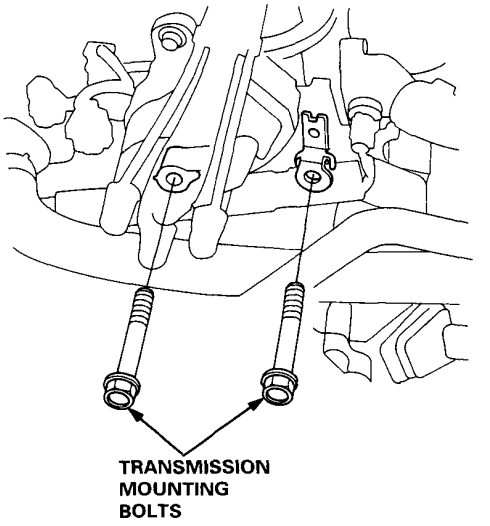


13. Remove the slave cylinder, clutch pipe, and clutch hose joint.

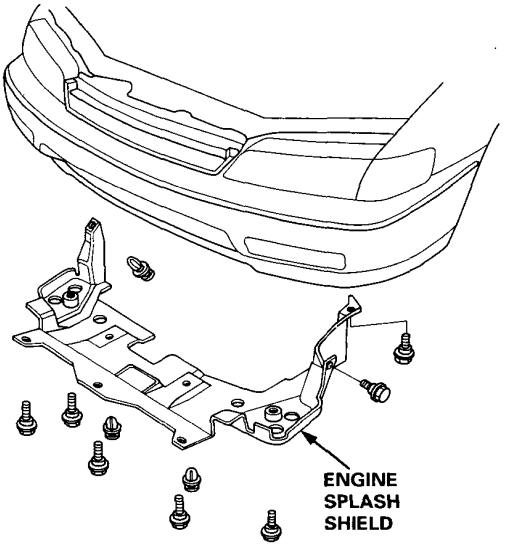
    CAUTION:
    - **Do not operate the clutch pedal once the slave cylinder has been removed.**
    - **Take care not to bend the clutch pipe.**



14. Remove the two upper transmission mounting bolts.

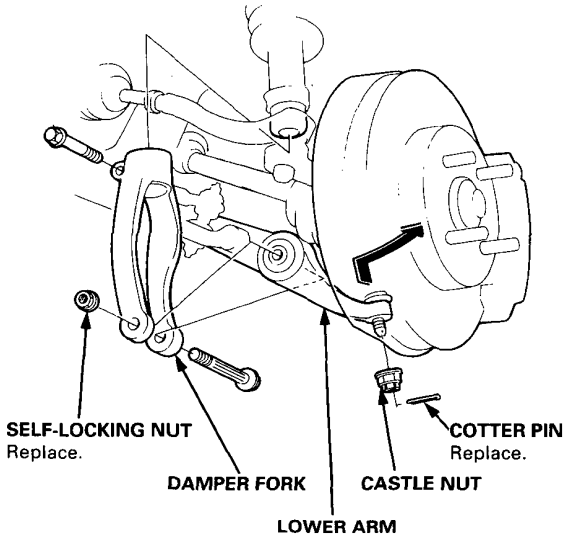


15. Remove the engine splash shield.

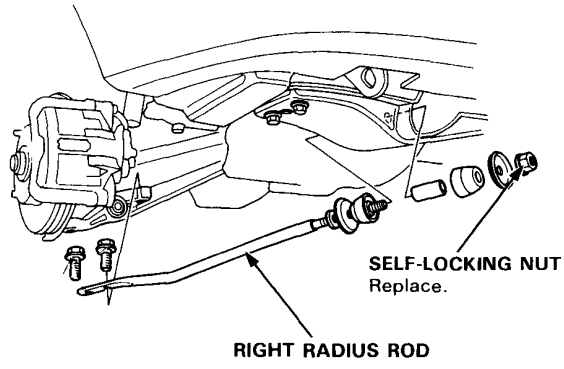


16. Remove the cotter pins and loosen the castle nuts, then separate the ball joints and lower arms on both sides (see section 18).

17. Remove the right damper fork bolt.

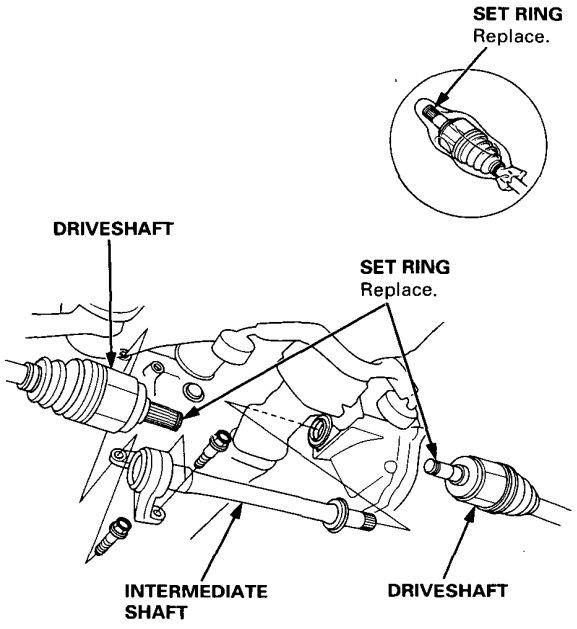


18. Remove the right radius rod.

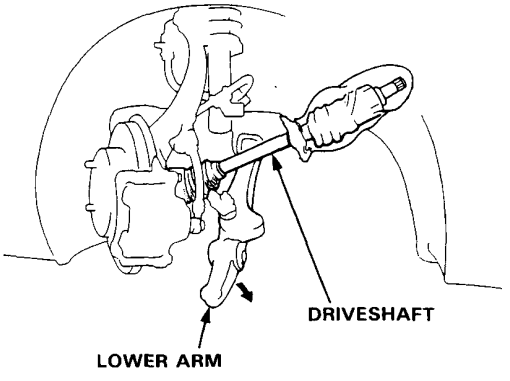


19. Remove the driveshafts and intermediate shaft (see section 16).

NOTE: Coat all precision finished surfaces with clean engine oil or grease. Tie plastic bags over the driveshaft ends.



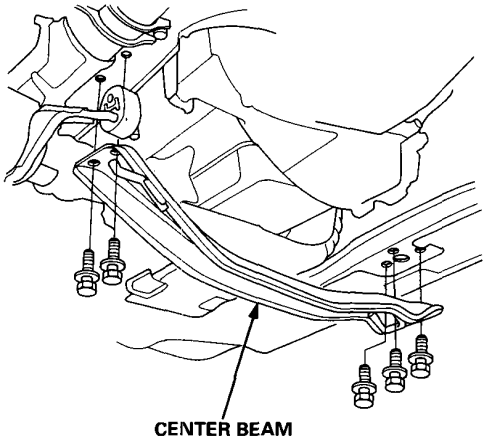
20. Swing the right driveshaft to the inner fender.



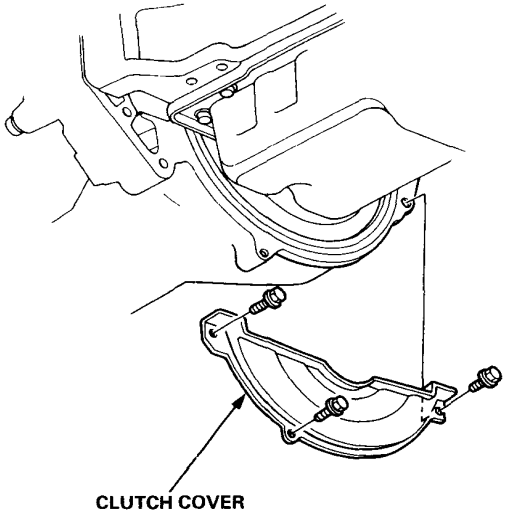
(cont'd)

Removal (cont'd)

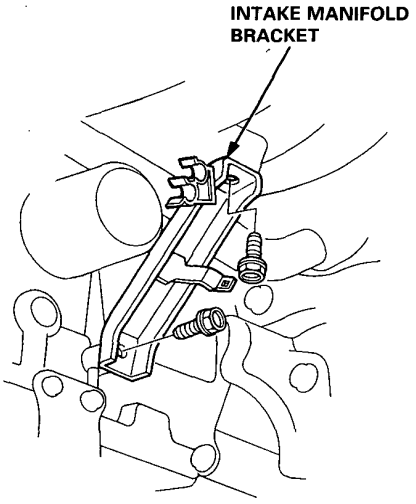
21. Remove the center beam.



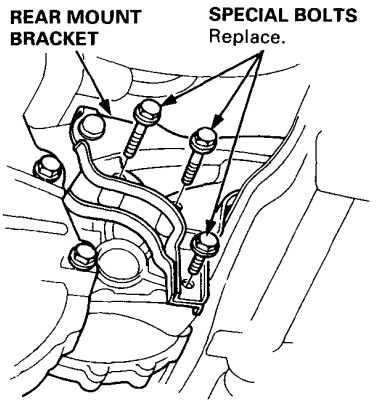
22. Remove the clutch cover.



23. Remove the intake manifold bracket.

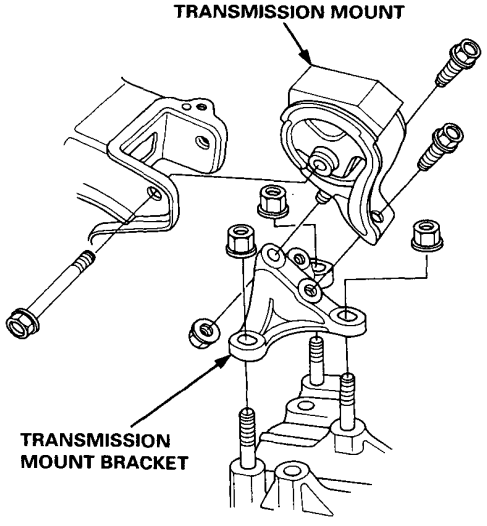


24. Remove the three rear mount bracket mounting bolts.

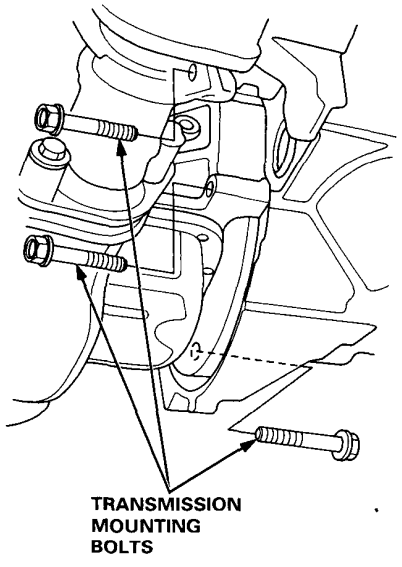


25. Place a floor jack under the transmission, and raise the transmission just enough to take weight off of the mounts.

26. Remove the transmission mount and the transmission mount bracket.



27. Remove the three lower transmission mounting bolts.



28. Pull the transmission away from the engine until it clears the mainshaft.

CAUTION: Take care not to bend the clutch pipes.

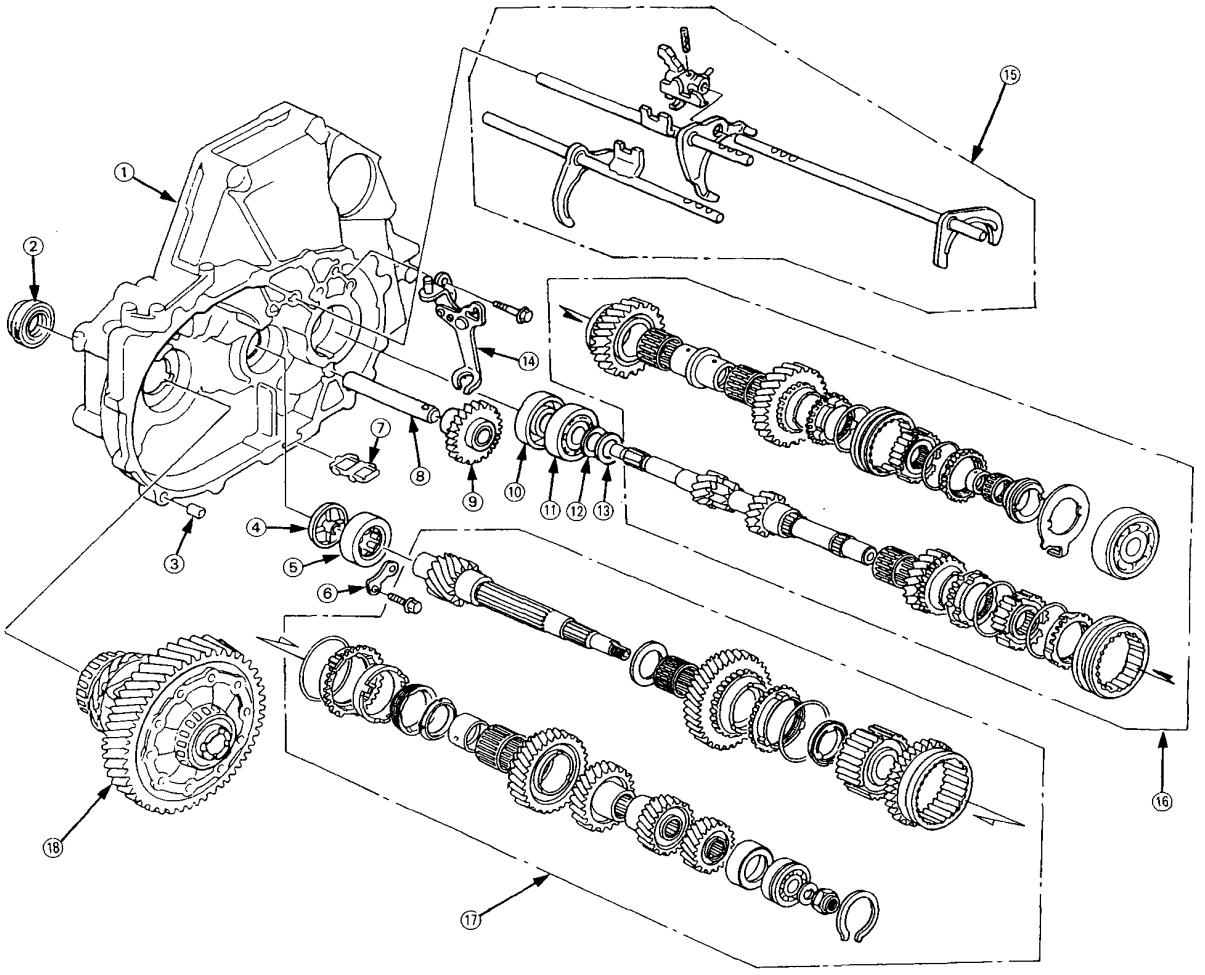
Illustrated Index

Refer to the drawing below for the transmission disassembly/reassembly.
Clean all the parts thoroughly in solvent, and dry with compressed air.

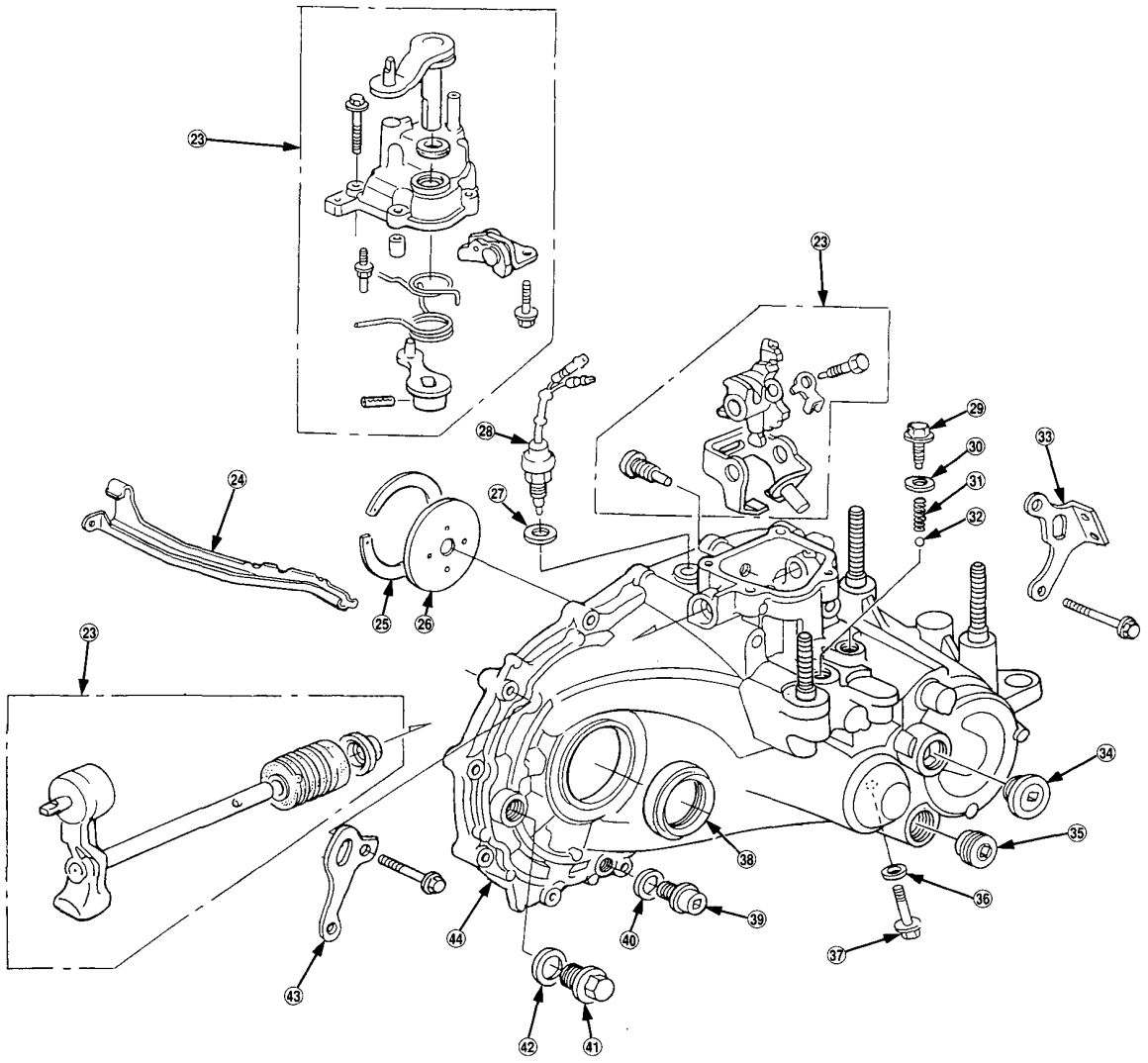
Lubricate all the parts with oil before reassembly.

NOTE:

- This transmission uses no gaskets between the major housings; use liquid gasket (P/N 0Y740 – 99986) (see page 13-14, 39).
- Always clean the magnet ⑦ whenever the transmission housing is disassembled.
- Inspect all the bearings for wear and operation.



① **CLUTCH HOUSING**
② **OIL SEAL** Replace.
• See section 15
③ **14 x 20 mm DOWEL PIN**
④ **OIL GUIDE PLATE**
⑤ **NEEDLE BEARING**
⑥ **RETAINING PLATE**
⑦ **MAGNET**
⑧ **REVERSE IDLER GEAR SHAFT**
⑨ **REVERSE IDLER GEAR**
⑩ **OIL SEAL** Replace.
⑪ **BALL BEARING**
⑫ **SPRING WASHER**
⑬ **WASHER**
⑭ **REVERSE SHIFT FORK**
⑮ **SHIFT FORK ASSEMBLY**
• Index, page 13-28
⑯ **MAINSHAFT ASSEMBLY**
• Index, page 13-18
⑰ **COUNTERSHAFT ASSEMBLY**
• Index, page 13-23
⑱ **DIFFERENTIAL ASSEMBLY**
• See section 15



㉓ ***SHIFT ARM ASSEMBLY***
- Index, page 13-12

㉔ **OIL GUTTER PLATE**
㉕ **78 mm SHIM**
- Selection, page 13-34

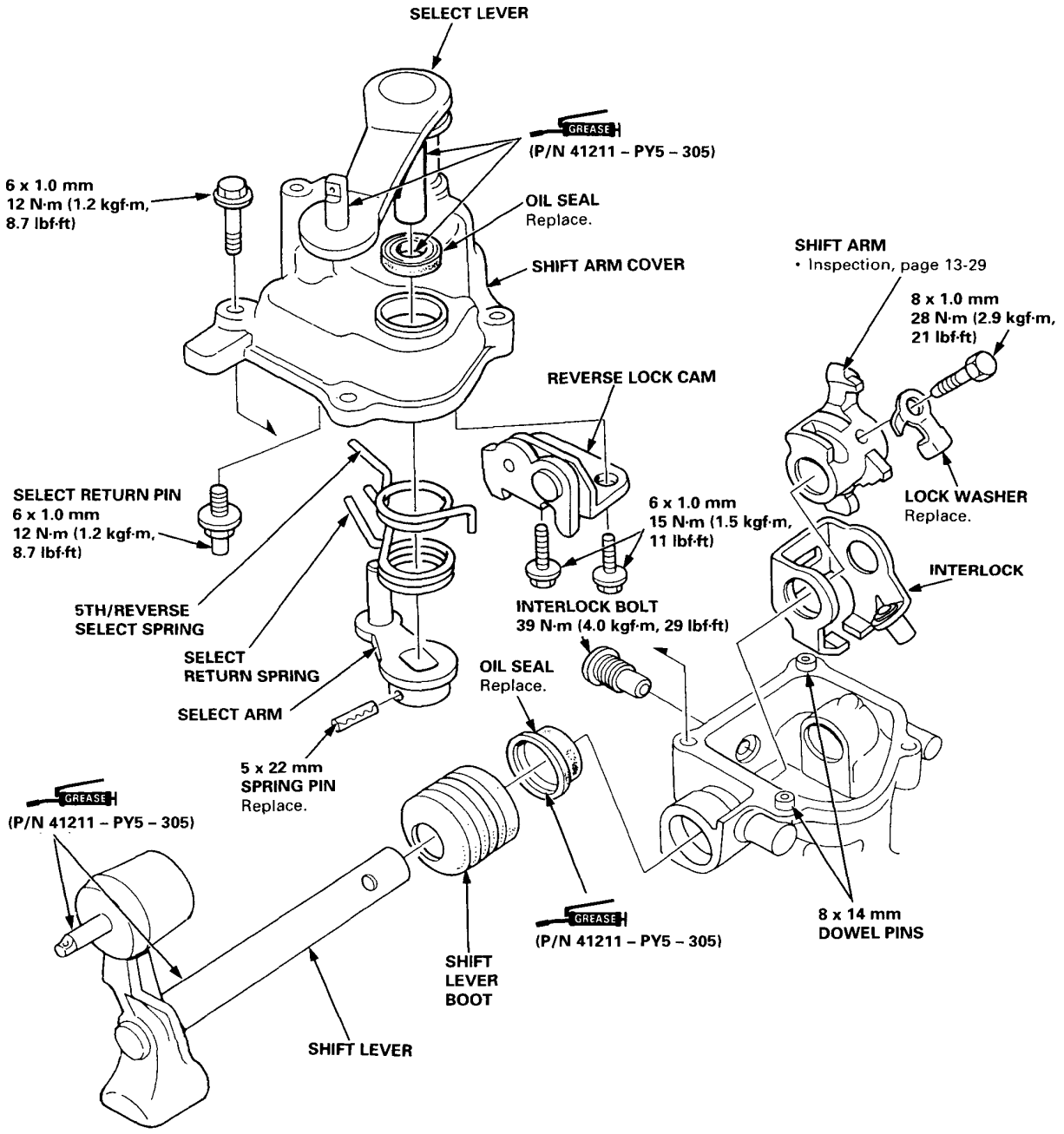
㉖ **OIL GUIDE PLATE**
㉗ **WASHER** Replace.
㉘ **BACK-UP LIGHT SWITCH**
㉙ **SETTING SCREW**
㉚ **WASHER** Replace.
㉛ **SPRING L. 26 mm (1.02 in)**
㉜ **STEEL BALL D. 5/16 in**
㉝ ***TRANSMISSION HANGER A***
㉞ **28 mm SEALING BOLT**
㉟ **32 mm SEALING BOLT**
㊱ **WASHER** Replace.
㊲ **REVERSE IDLER GEAR SHAFT BOLT**
㊳ **OIL SEAL** Replace.
㊴ **DRAIN PLUG**
㊵ **WASHER** Replace.
㊶ ***OIL FILLER PLUG***
㊷ **WASHER** Replace.
㊸ **TRANSMISSION HANGER B**
㊹ **TRANSMISSION HOUSING**

Shift Arm Assembly

Index

NOTE:

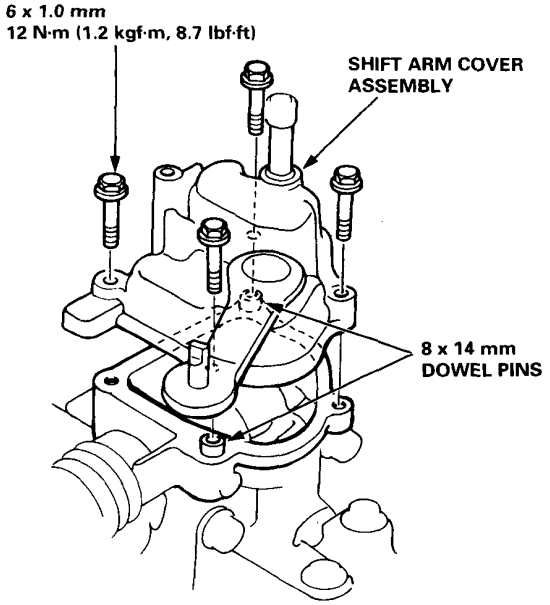
- The shift arm cover can be removed and installed with the transmission in the car.
- Lubricate all moving and sliding surfaces with the specified grease.
- Turn the shift lever boot so the hole is facing down.
- Use only HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).



Disassembly/Reassembly

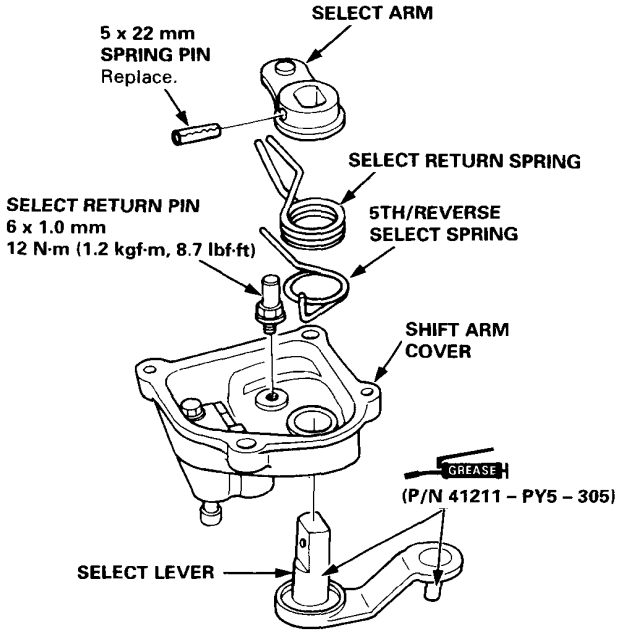
NOTE:
- During reassembly, grease all sliding parts.
- Use only HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).

1. Remove the shift arm cover assembly.

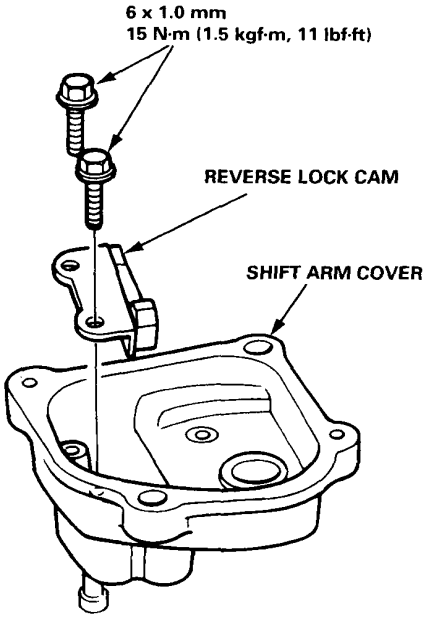


2. Remove the spring pin, then remove the select lever, select arm and springs.

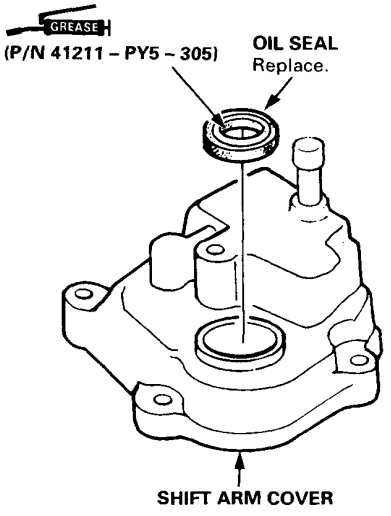
3. Remove the select return pin.



4. Remove the reverse lock cam.



5. Remove the oil seal.



(cont'd)

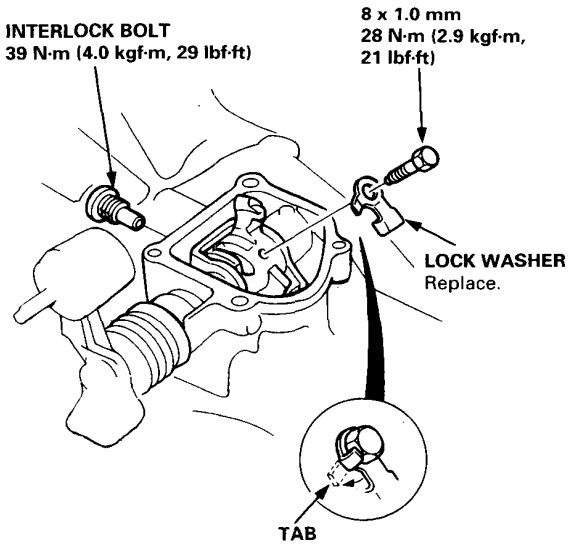
Shift Arm Assembly

Disassembly/Reassembly (cont'd)

6. Bend the tab of the lock washer, then remove the bolt.

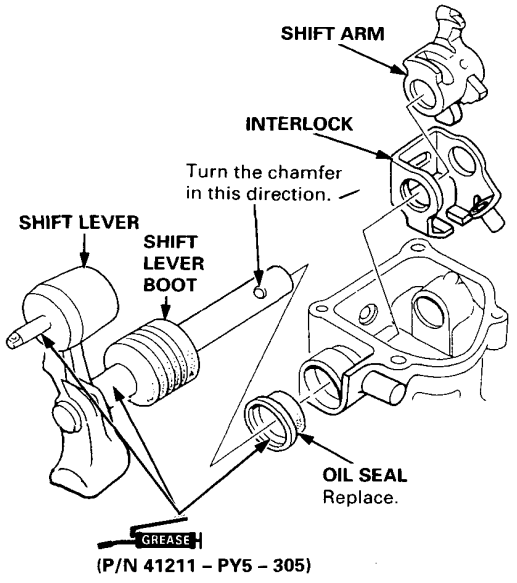
7. Remove the interlock bolt.

   NOTE: Apply liquid gasket (P/N 0Y740 – 99986) to the threads before reassembly.



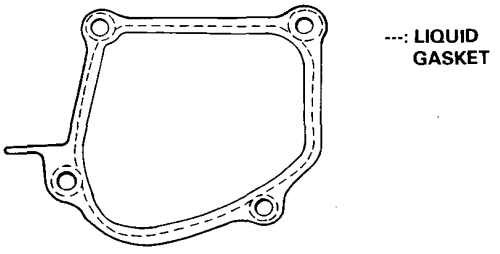
8. Remove the shift lever, shift arm, and interlock.

   NOTE: Turn the shift lever boot so the hole is facing down.



9. Install the shift arm assembly in the reverse order of removal.

   NOTE:
   - Use liquid gasket (P/N 0Y740 – 99986).
   - Remove the dirt and oil from the sealing surface.
   - Seal the entire circumference of the bolt holes to prevent oil leakage.
   - If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings. Allow it to cure at least 20 minutes after assembly before filling the transmission with oil.



Transmission Housing

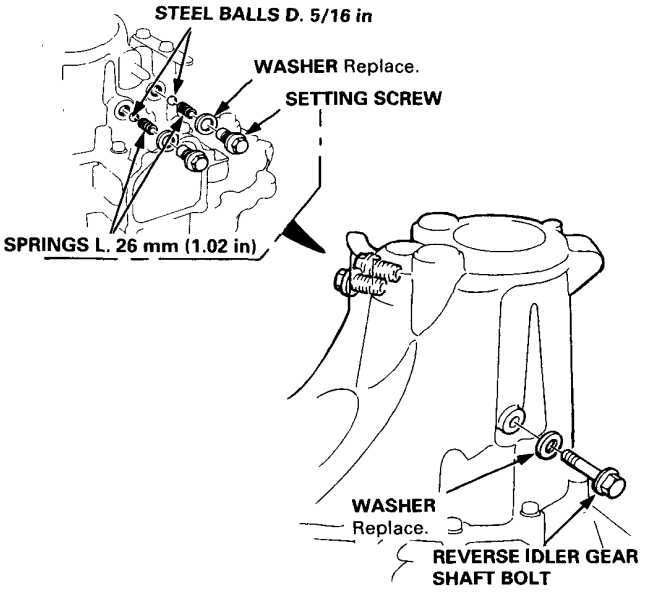
Removal

NOTE:
- If the transmission housing or clutch housing are replaced, the bearing preload must be adjusted.
- Place the clutch housing on two pieces of wood thick enough to keep the mainshaft from hitting the workbench.

1. Remove the shift arm cover assembly (see page 13-13).

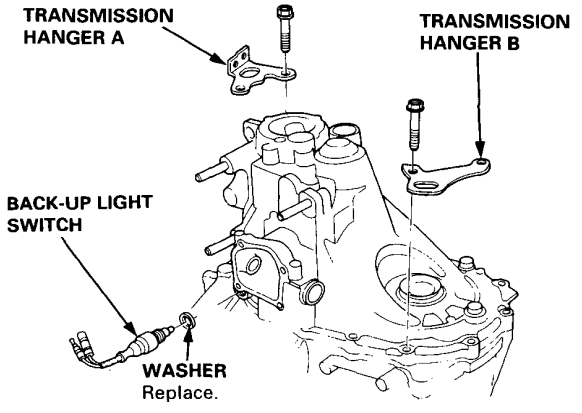
2. Remove the reverse idler gear shaft bolt.

3. Remove the setting screws, then remove the washers, springs, and steel balls.



4. Remove the back-up light switch.

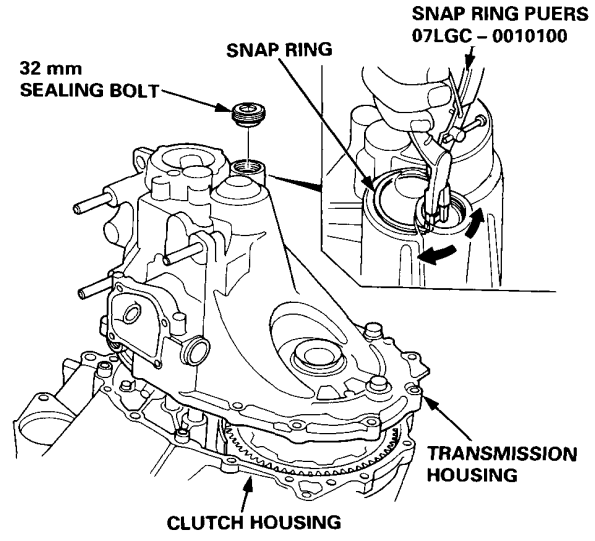
5. Remove the 10 mm bolts and 8 mm bolts in a criss-cross pattern in several steps.



6. Remove the 32 mm sealing bolt.

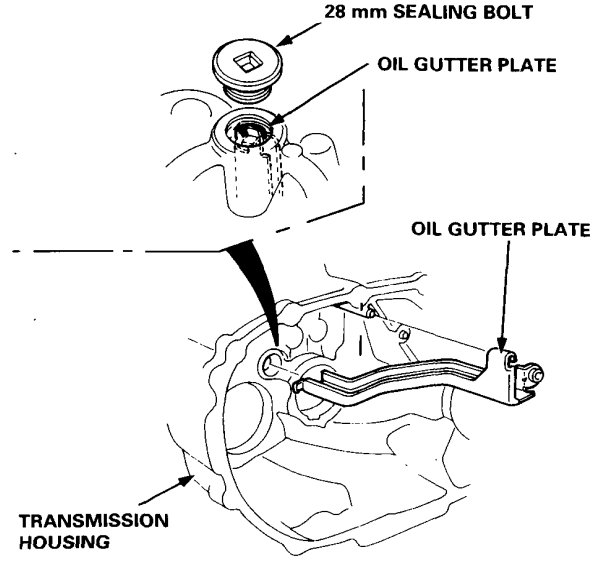
7. Expand the snap ring on the countershaft ball bearing, and remove it from the groove using a pair of snap ring pliers.

8. Separate the transmission housing from the clutch housing, and wipe it clean of the sealant.



9. *Remove the 28 mm sealing bolt, then remove the* oil gutter plate.

NOTE: The transmission housing can be removed with the oil gutter plate in the transmission housing.

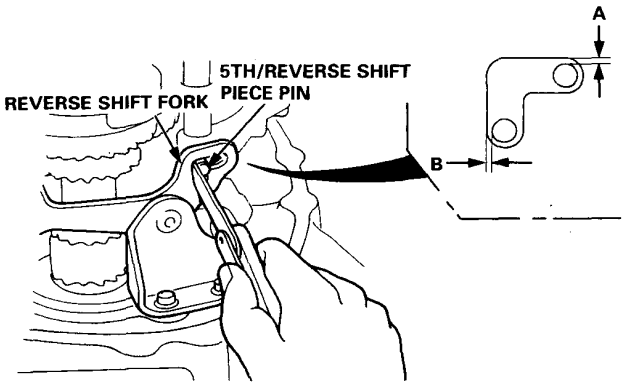


Reverse Shift Fork

Clearance Inspection

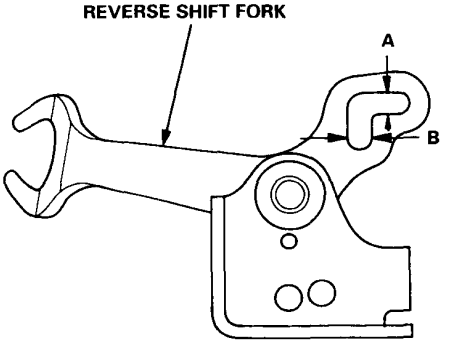
1. Measure the clearances between the reverse shift fork and 5th/reverse shift piece pin.

   Standard: **A: 0.05 – 0.35 mm (0.002 – 0.014 in)**
   B: 0.4 – 0.8 mm (0.02 – 0.03 in)
   Service Limit: A: 0.5 mm (0.02 in)
   B: 1.0 mm (0.04 in)



2. If the clearances are more than the service limit, measure the widths of the groove in the reverse shift fork.

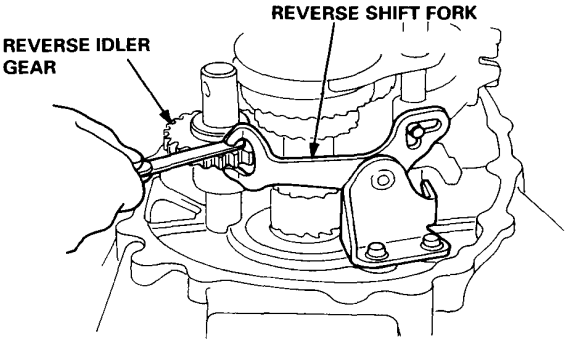
   Standard: A: 7.05 – 7.25 mm (0.278 – 0.285 in)
   B: 7.4 – 7.7 mm (0.29 – 0.30 in)



- If the widths of the grooves are not within the standard, replace the reverse shift fork with a new one.
- If the widths of the grooves are within the standard, replace the 5th/reverse shift piece with a new one.

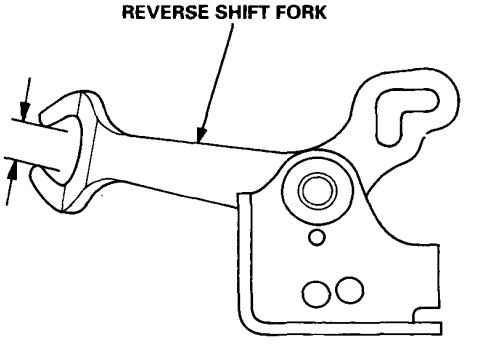
3. Measure the clearance between the reverse idler gear and reverse shift fork.

   Standard: **0.5 – 1.1 mm (0.02 – 0.04 in)**
   Service Limit: 1.8 mm (0.07 in)



4. If the clearance is more than the service limit, measure the width of the reverse shift fork.

   Standard: 13.0 – 13.3 mm (0.512 – 0.524 in)

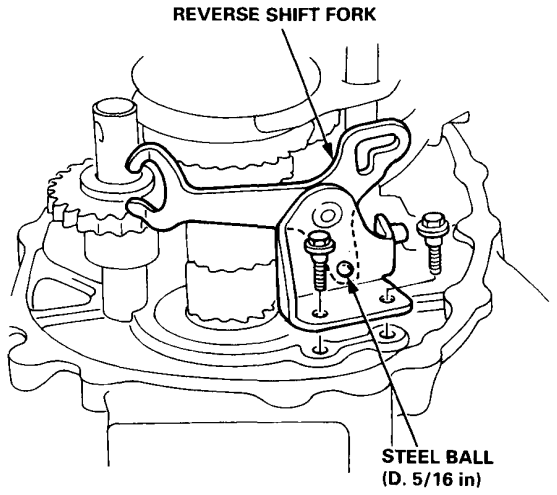


- If the width is not within the standard, replace the reverse shift fork with a new one.
- If the width is within the standard, replace the reverse idler gear with a new one.

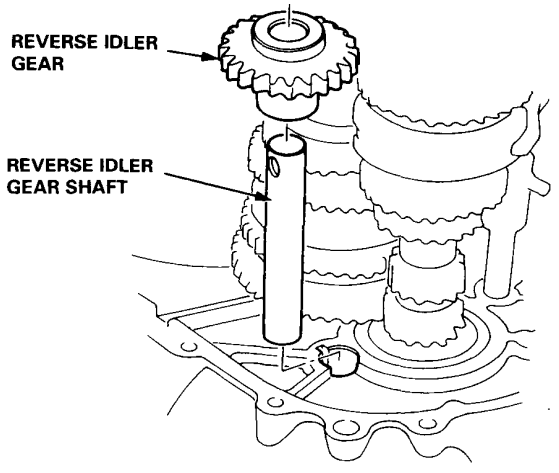
Reverse Idler Gear

Removal

1. Remove the reverse shift fork.



2. Remove the reverse idler gear shaft and the reverse idler gear.

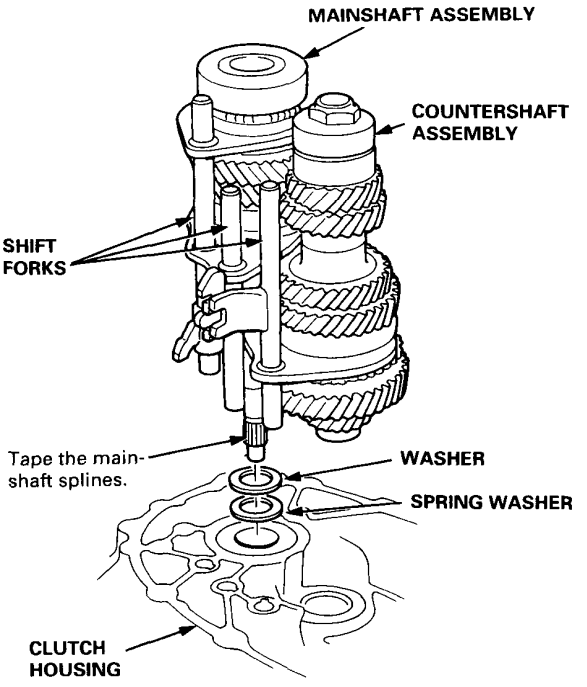


Mainshaft, Countershaft

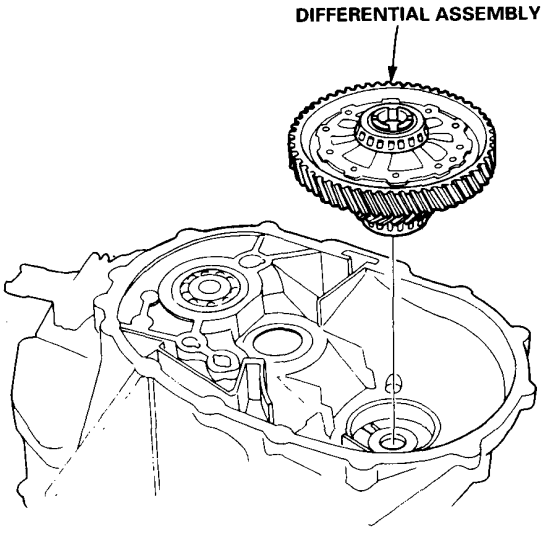
Removal

1. Remove the mainshaft and countershaft assemblies with the shift forks from the clutch housing.

   NOTE: Tape the mainshaft splines before removing the mainshaft and countershaft assemblies.



2. Remove the differential assembly.

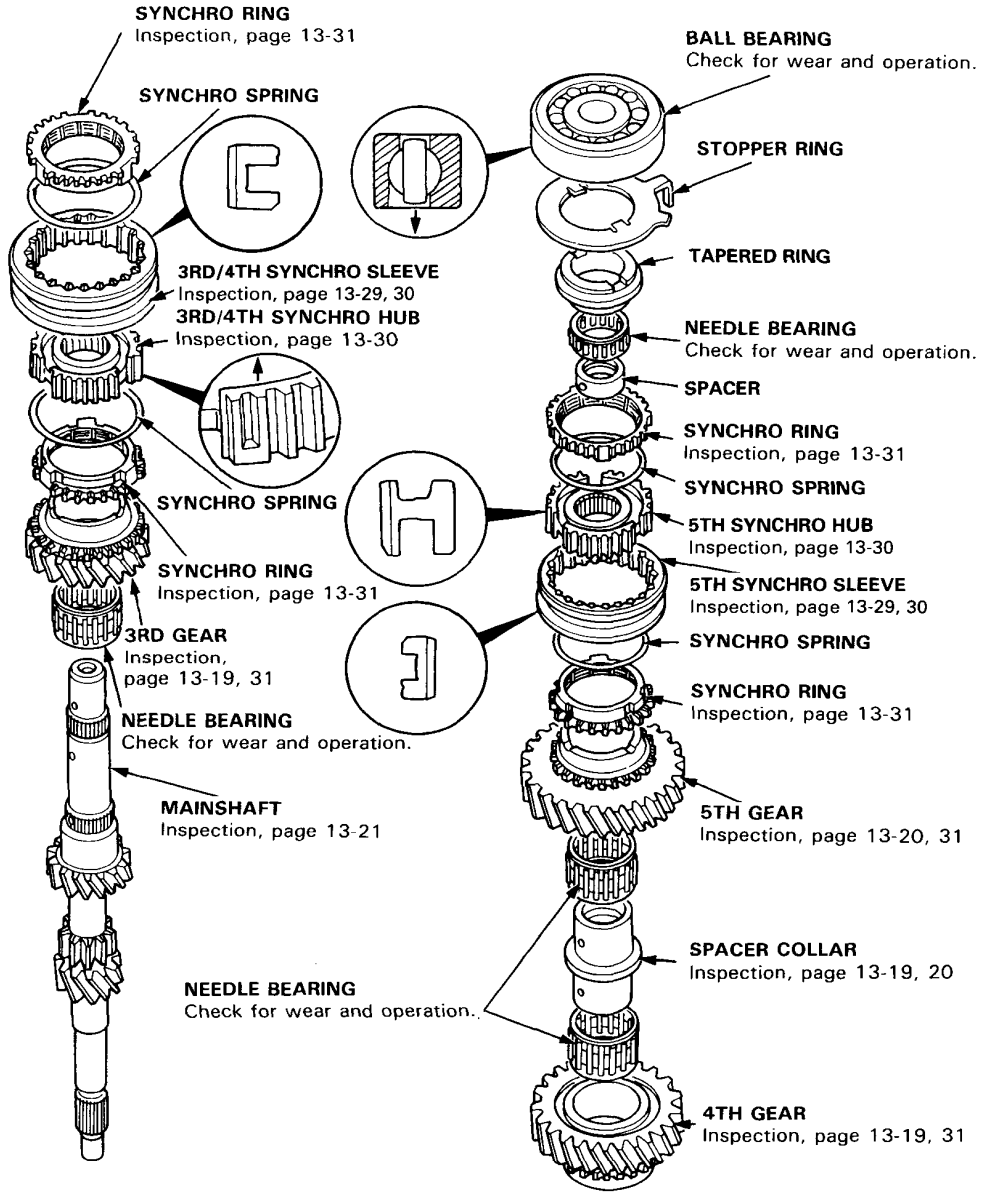


Mainshaft Assembly

Index

NOTE: The 3rd/4th, and 5th synchro hubs, and the ball bearing are installed with a press.

Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces. The 3rd/4th and 5th synchro hubs, however, should be installed with a press before lubricating them.



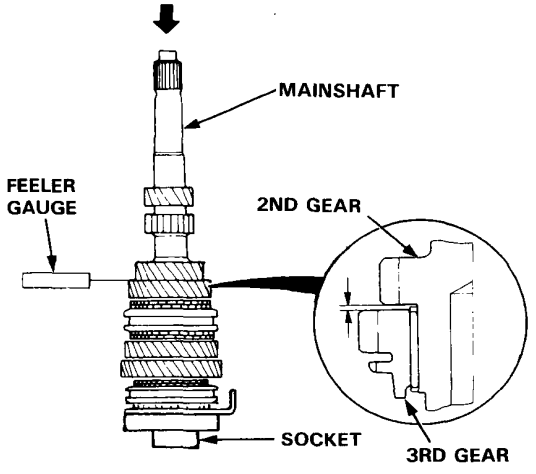
Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

1. Support the bearing inner race with a socket, and push down on the mainshaft.

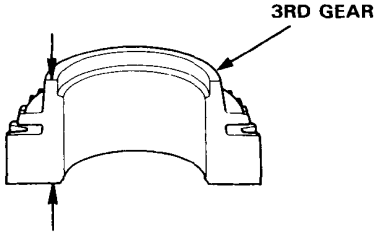
2. Measure the clearance between 2nd and 3rd gears.

   Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
   Service Limit: 0.3 mm (0.01 in)



3. If the clearance is more than the service limit, measure the thickness of 3rd gear.

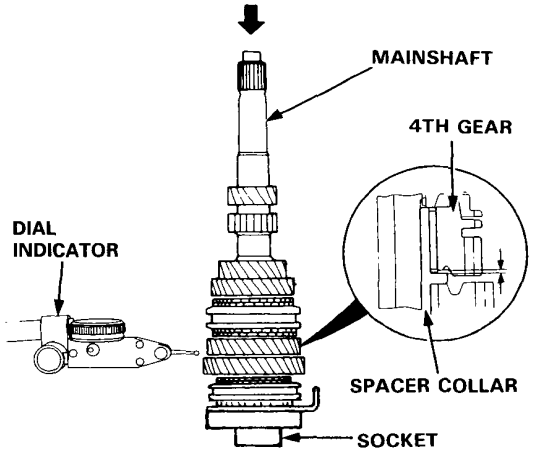
   Standard: 32.42 – 32.47 mm (1.276 – 1.278 in)
   Service Limit: 32.3 mm (1.27 in)



- If the thickness of 3rd gear is less than the service limit, replace 3rd gear with a new one.
- If the thickness of 3rd gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

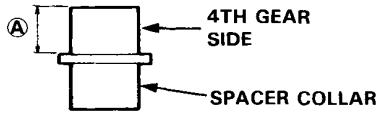
4. Measure the clearance between 4th gear and the spacer collar.

   Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
   Service Limit: 0.3 mm (0.01 in)



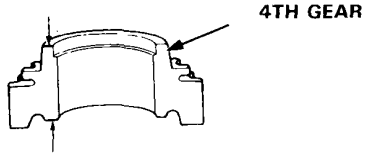
5. If the clearance is more than the service limit, measure distance Ⓐ on the spacer collar.

   Standard: 26.03 – 26.08 mm (1.025 – 1.027 in)
   Service Limit: 26.01 mm (1.024 in)



6. If distance Ⓐ is less than the service limit, replace the spacer collar with a new one.
   If distance Ⓐ is within the service limit, measure the thickness of 4th gear.

   Standard: 30.92 – 30.97 mm (1.217 – 1.219 in)
   Service Limit: 30.8 mm (1.21 in)



- If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one.
- If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

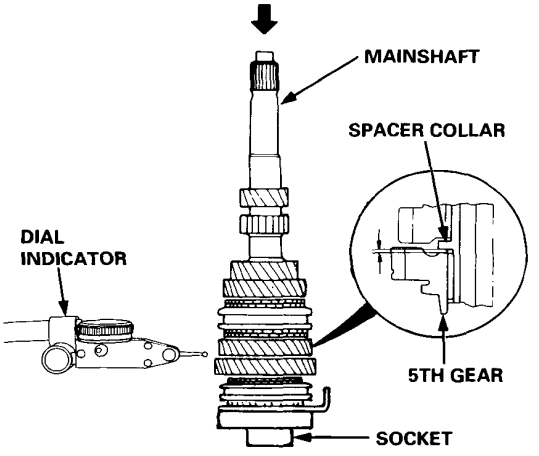
(cont'd)

Mainshaft Assembly

Clearance Inspection (cont'd)

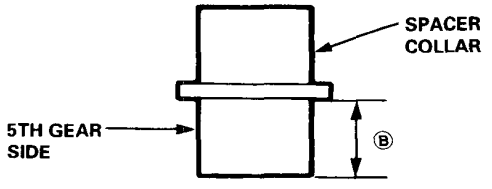
7. Measure the clearance between the spacer collar and 5th gear.

Standard: 0.06 – 0.21 mm (0.002 – 0.008 in)
Service Limit: 0.3 mm (0.01 in)



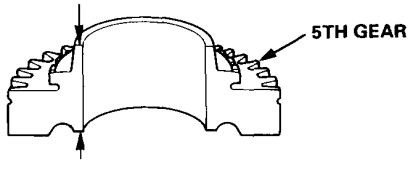
8. If the clearance is more than the service limit, measure distance Ⓑ on the spacer collar.

Standard: 26.03 – 26.08 mm (1.025 – 1.027 in)
Service Limit: 26.01 mm (1.024 in)



9. If distance Ⓑ is less than the service limit, replace the spacer collar with a new one.
If distance Ⓑ is within the service limit, measure the thickness of 5th gear.

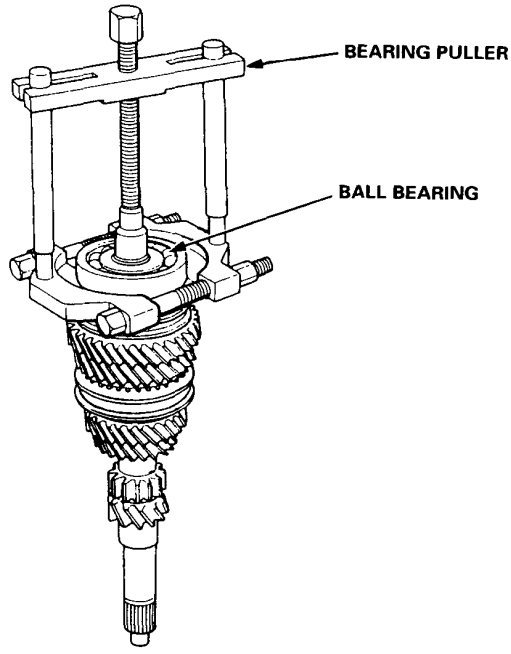
Standard: 30.92 – 30.97 mm (1.217 – 1.219 in)
Service Limit: 30.8 mm (1.21 in)

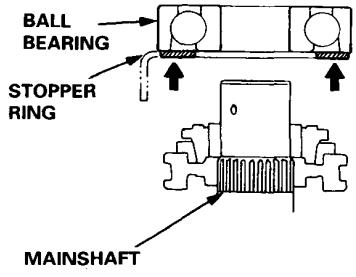


- If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one.
- If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.

Disassembly

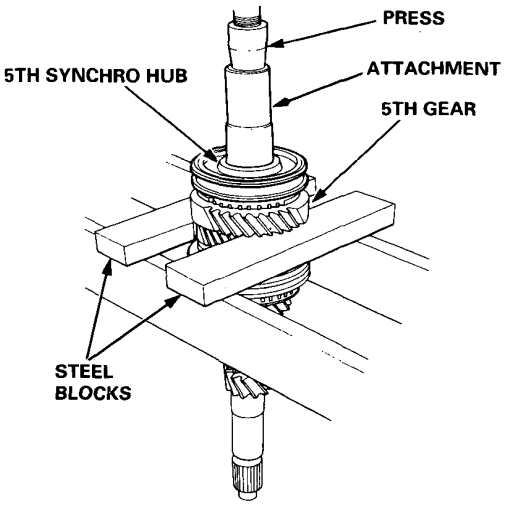
1. Remove the ball bearing using a bearing puller as shown.



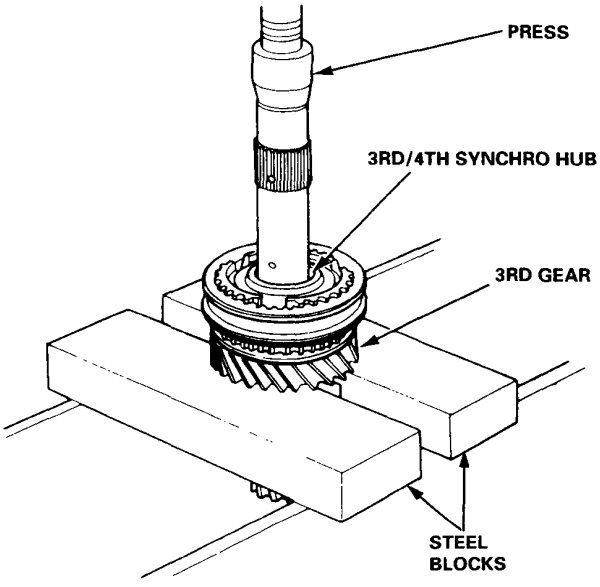


CAUTION: Remove the synchro hubs using a press and steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.

2. Support 5th gear on steel blocks, and press the mainshaft out of the 5th synchro hub, as shown.



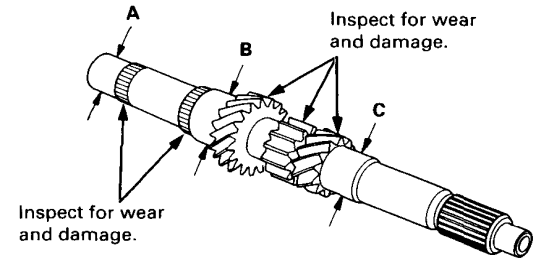
3. In the same manner as above, support the 3rd gear on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub, as shown.



Inspection

1. Inspect the gear surface and bearing surface for wear and damage, then measure the mainshaft at points A, B, and C.

Standard:
A (Ball bearing surface): 27.987 – 28.000 mm (1.1018 – 1.1024 in)
B (Needle bearing surface): 37.984 – 38.000 mm (1.4954 – 1.4961 in)
C (Ball bearing surface): 27.977 – 27.990 mm (1.1015 – 1.1020 in)
Service Limit: A: 27.940 mm (1.1000 in)
B: 37.930 mm (1.4933 in)
C: 27.940 mm (1.1000 in)

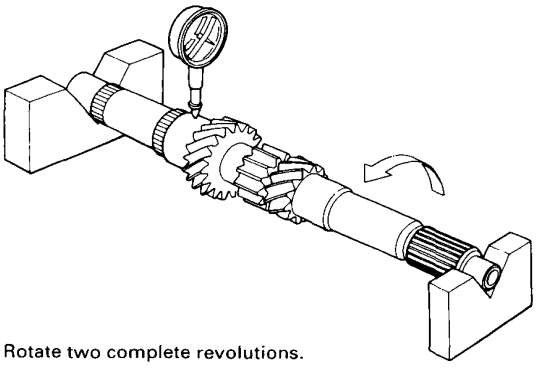


- If any part of the mainshaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

Standard: 0.02 mm (0.0008 in) max.
Service Limit: 0.05 mm (0.002 in)

NOTE: Support the mainshaft at both ends as shown.



- If the runout is more than the service limit, replace the mainshaft with a new one.

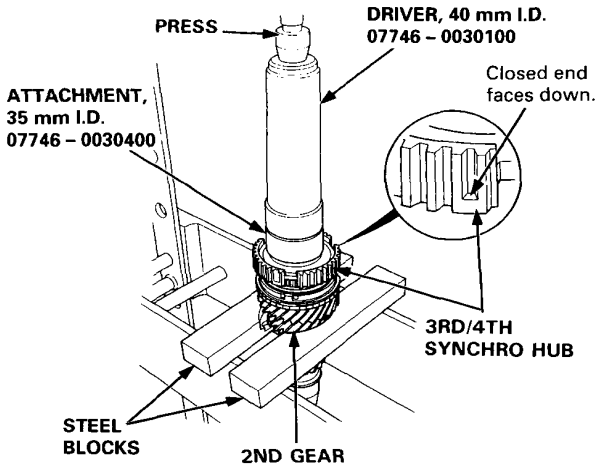
Mainshaft Assembly

Reassembly

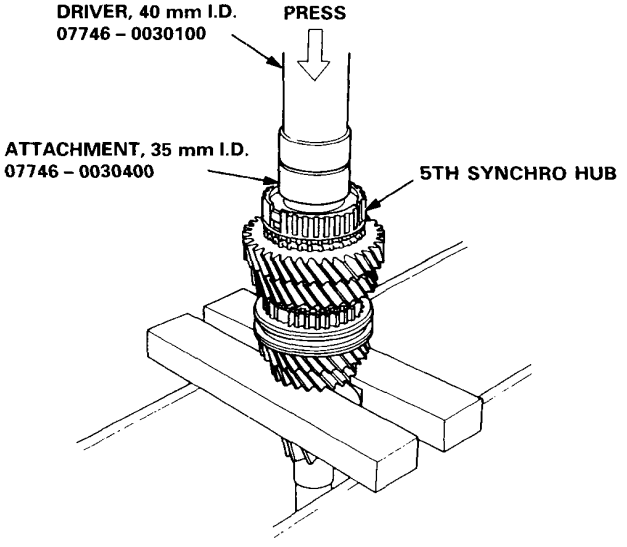
NOTE: Refer to page 13-18 for reassembly sequence.

1. Support 2nd gear on steel blocks, then install the 3rd/4th synchro hub using the special tools and a press, as shown.

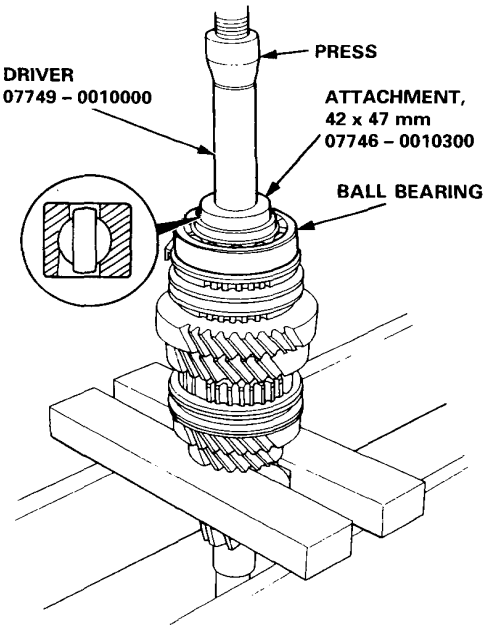
   NOTE: After installing, check the operation of the 3rd/4th synchro hub set.



2. Install the 5th synchro hub using the special tools and a press as shown.



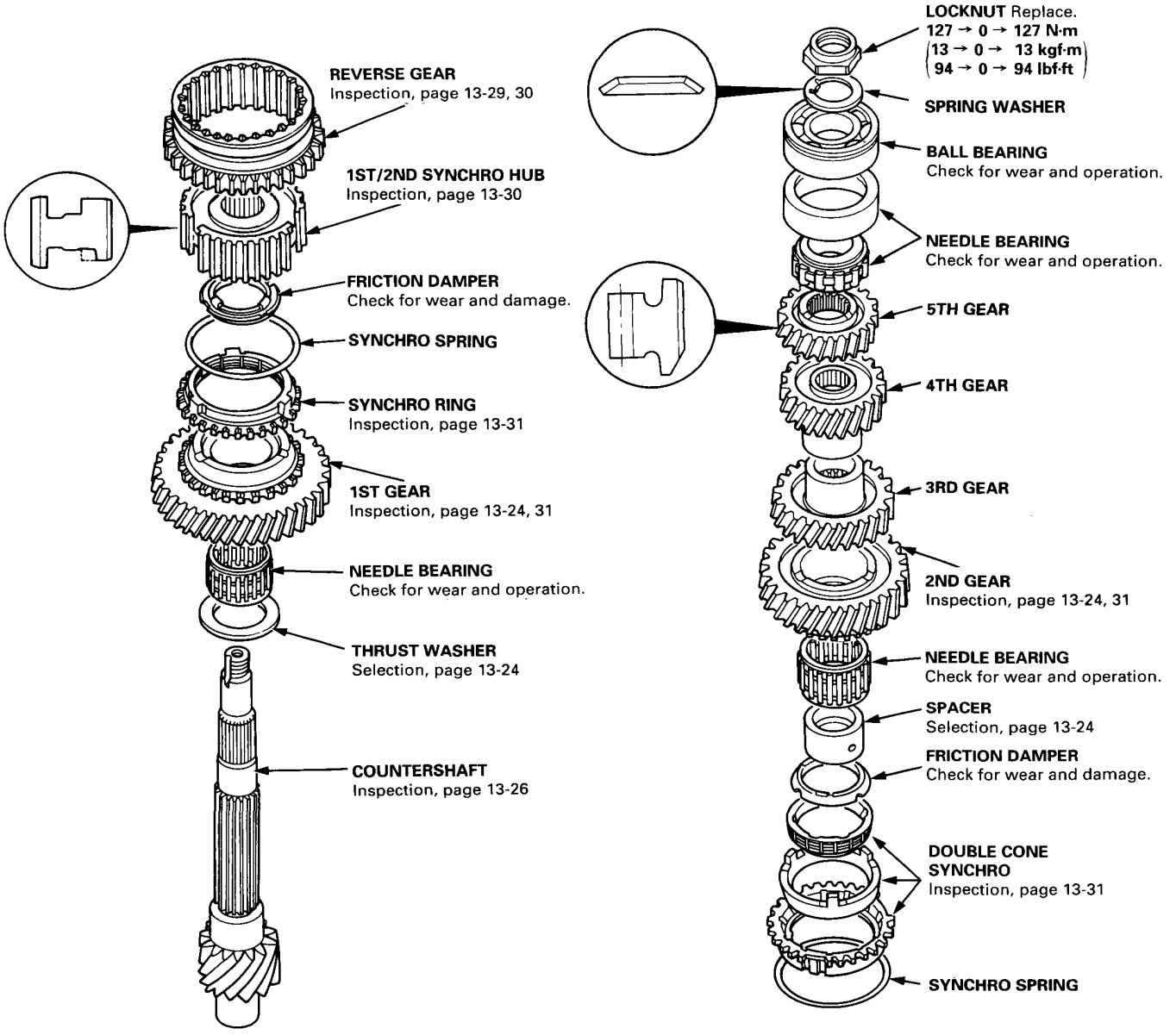
3. Install the ball bearing using the special tools and a press as shown.



Countershaft Assembly

Index

Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces.

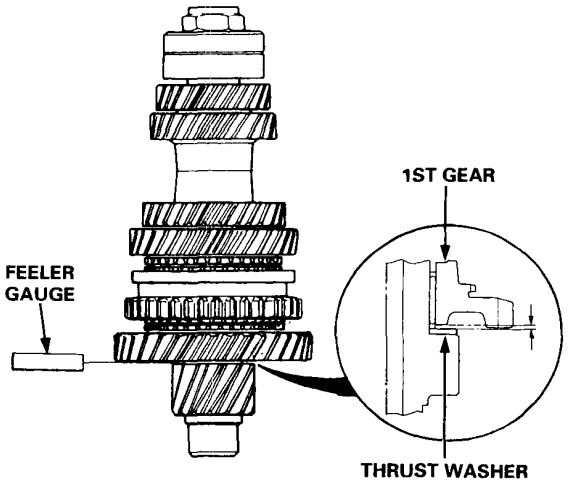


Countershaft Assembly

Clearance Inspection

1. Measure the clearance between the 1st gear and thrust washer.

   Standard: 0.04 – 0.10 mm (0.002 – 0.004 in)
   Service Limit: 0.18 mm (0.007 in)



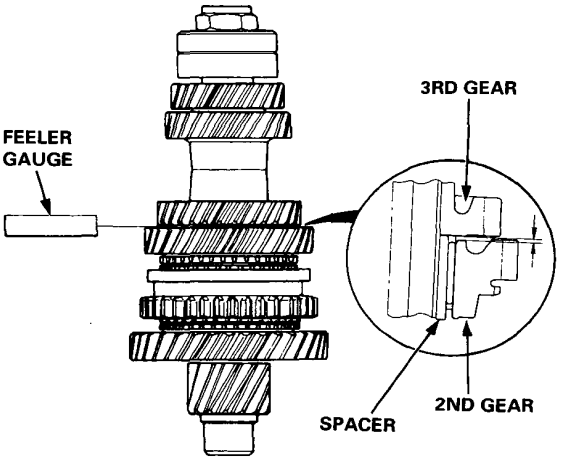
2. If the clearance is more than the service limit, select the appropriate thrust washer for the correct clearance from the chart below, and install it.

THRUST WASHER

	Part Number	Thickness
A	23921 – PG1 – 000	1.96 mm (0.0771 in)
B	23922 – PG1 – 000	1.99 mm (0.0783 in)
C	23923 – PG1 – 000	2.02 mm (0.0795 in)
D	23924 – PG1 – 000	2.05 mm (0.0807 in)
E	23925 – PG1 – 000	2.08 mm (0.0819 in)

3. Measure the clearance between the 2nd gear and 3rd gear.

   Standard: 0.04 – 0.10 mm (0.002 – 0.004 in)
   Service Limit: 0.18 mm (0.007 in)



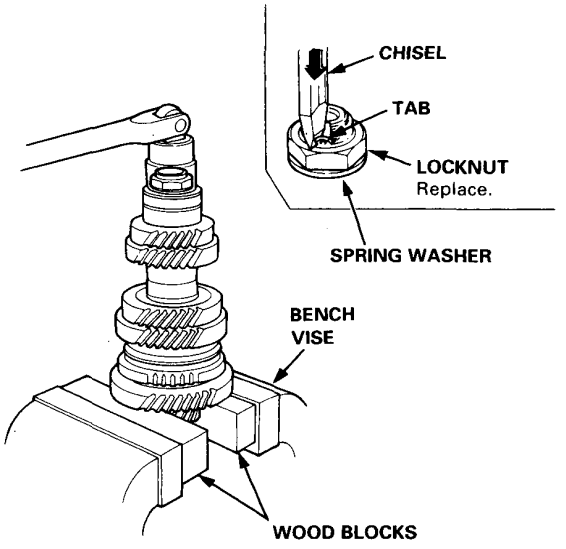
4. If the clearance is more than the service limit, select the appropriate spacer for the correct clearance from the chart below, and install it.

SPACER

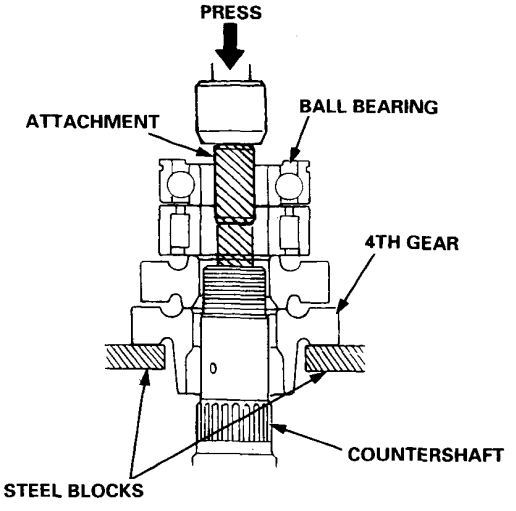
	Part Number	Thickness
A	23917 – P21 – 010	29.02 – 29.04 mm (1.1425 – 1.1433 in)
B	23918 – P21 – 010	29.07 – 29.09 mm (1.1445 – 1.1453 in)

Disassembly

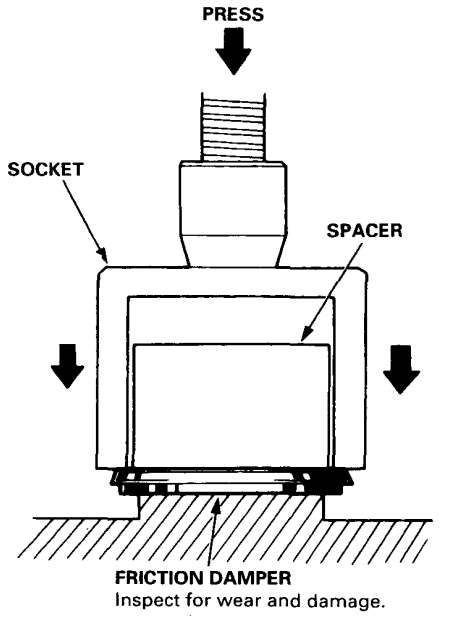
1. Securely clamp the countershaft assembly in a bench vise with wood blocks.
2. Raise the locknut tab from the groove in the countershaft, then remove the locknut and the spring washer.



3. Remove the ball bearing using a press as shown.



4. Remove the friction damper from the spacer using a press and a socket as shown.

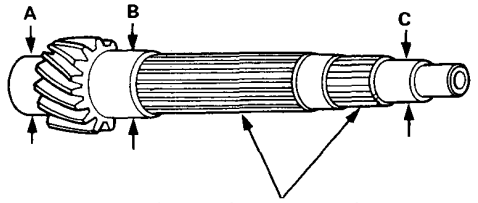


Countershaft Assembly

Inspection

1. Inspect the gear surface and bearing surface for wear and damage, then measure the countershaft at points A, B, and C.

   Standard: **A: 38.000 – 38.015 mm (1.4961 –1.4967 in)**
   B: 39.984 – 40.000 mm (1.5742 –1.5748 in)
   C: 24.987 – 25.000 mm (0.9837 – 0.9843 in)
   Service Limit: A: 37.950 mm (1.4941 in)
   B: 39.930 mm (1.5720 in)
   C: 24.940 mm (0.9819 in)



Inspect for wear and damage.

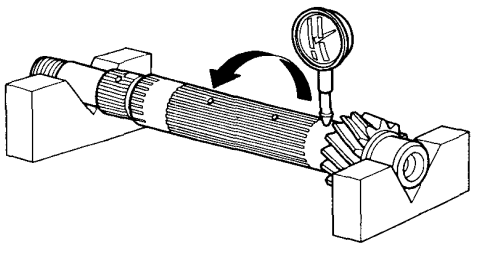
- If any part of the countershaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

   Standard: **0.02 mm (0.0008 in) max.**
   Service Limit: 0.05 mm (0.002 in)

   NOTE: Support the countershaft at both ends as shown.

Rotate two complete revolutions.



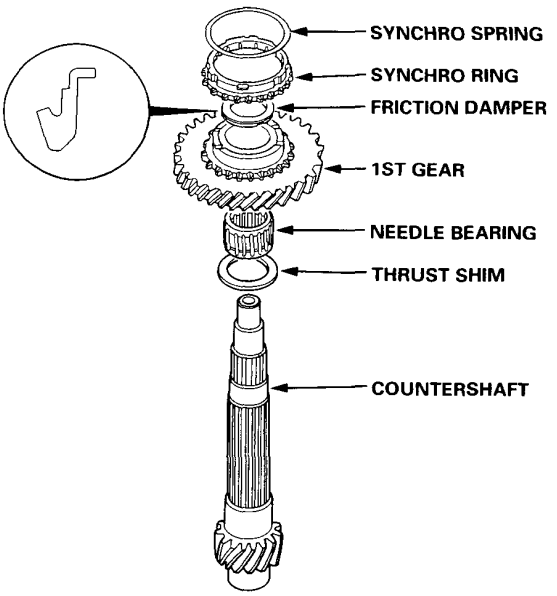
- If the runout exceeds the service limit, replace the countershaft with a new one.

Reassembly

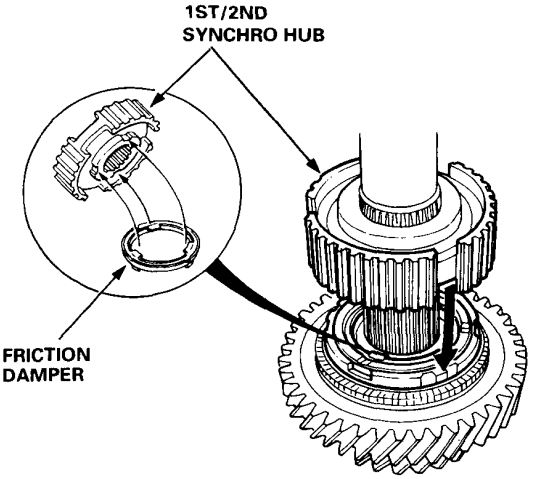
NOTE: Refer to page 13-23 for reassembly sequence.

1. Install the thrust shim, needle bearing, 1st gear, friction damper, synchro ring, and synchro spring.

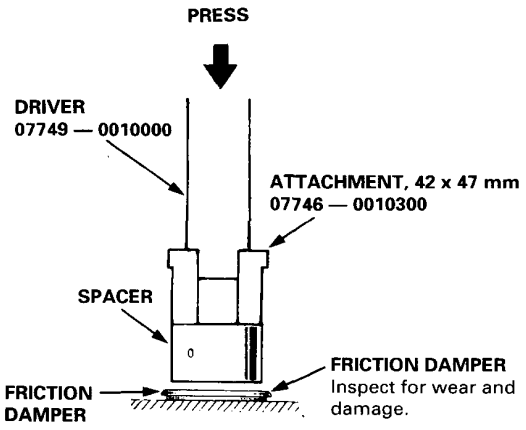
   NOTE: Reassemble the 1st gear and friction damper before installation.



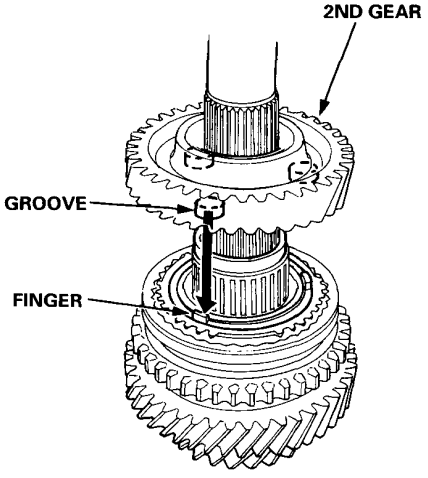
2. Install the 1st/2nd synchro hub by aligning the friction damper fingers with 1st/2nd synchro hub grooves.



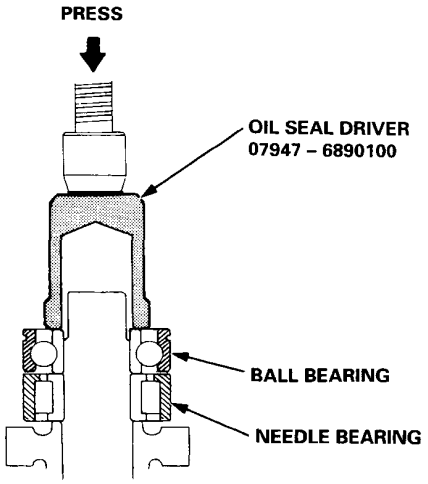
3. Install the friction damper on the spacer using the special tools and a press as shown.



4. Install the 2nd gear by aligning the synchro cone fingers with 2nd gear grooves.



5. Install the needle bearing and the ball bearing using a special tool and a press as shown.

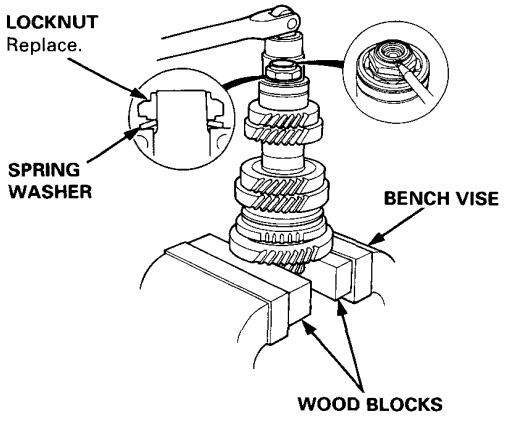


6. Securely clamp the countershaft assembly in a bench vise with wood blocks.

7. Install the spring washer.

8. Tighten the new locknut to the correct torque, then stake the locknut tab into the groove.

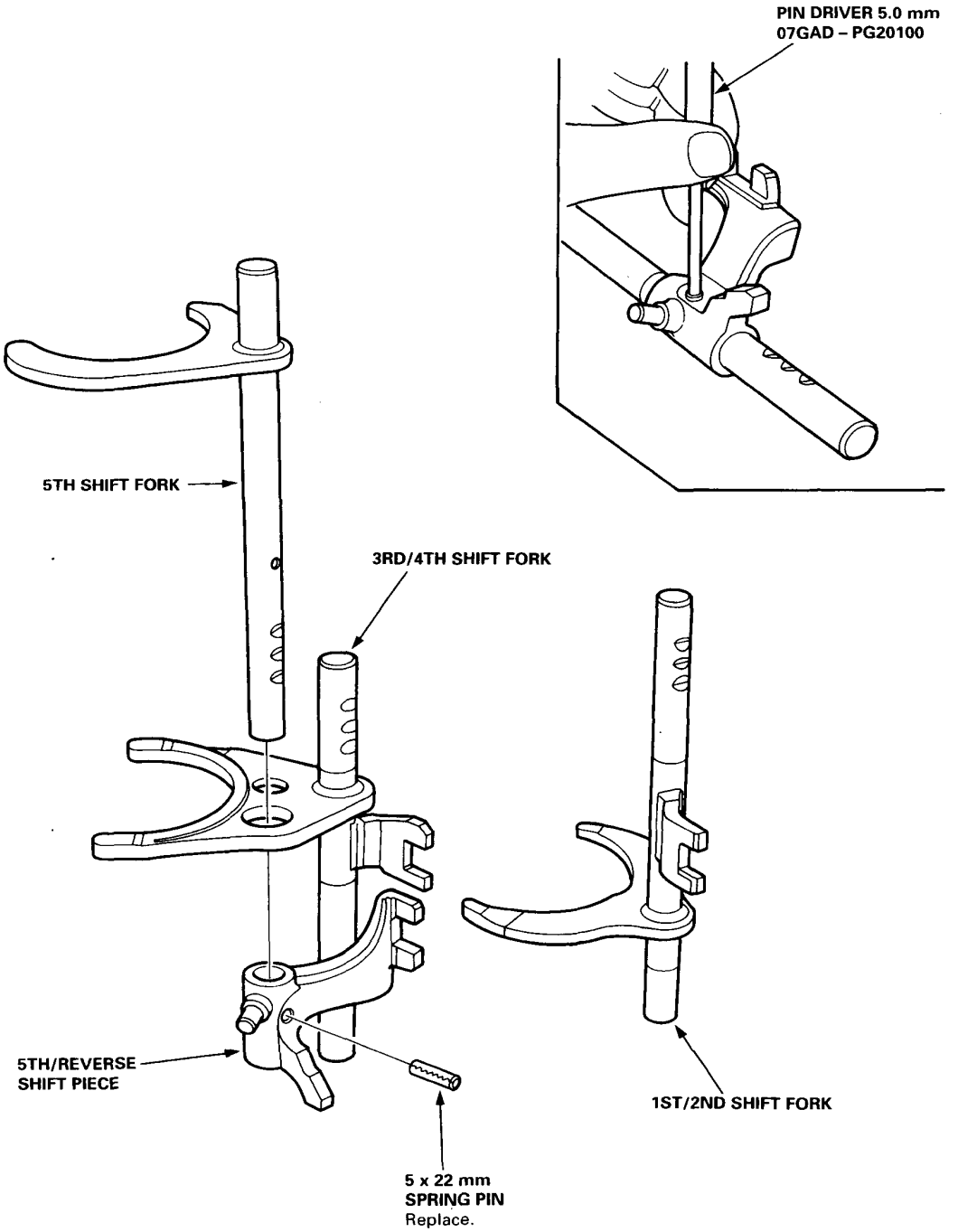
Torque: 127 → 0 → 127 N·m (13 → 0 → 13 kgf·m, 94 → 0 → 94 lbf·ft)



Shift Fork Assembly

Disassembly/Reassembly

Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.

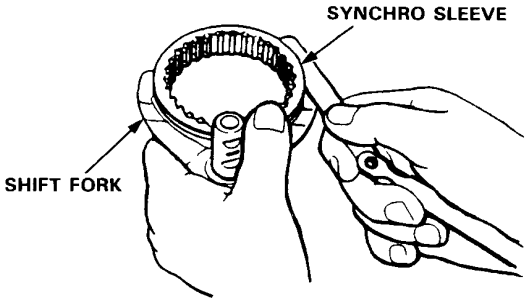


Clearance Inspection

NOTE: The synchro sleeve and synchro hub should be replaced as a set.

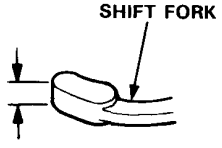
1. Measure the clearance between each shift fork and its matching synchro sleeve.

   Standard: 0.35 – 0.65 mm (0.014 – 0.026 in)
   Service Limit: 1.00 mm (0.039 in)



2. If the clearance is more than the service limit, measure the thickness of the shift fork fingers.

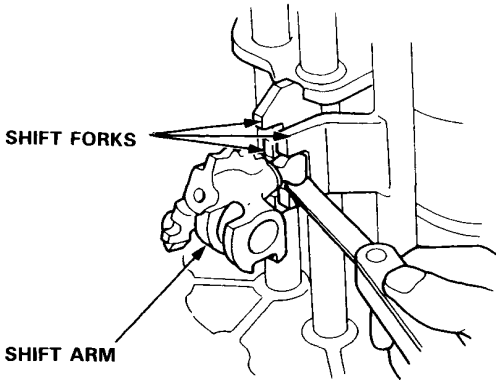
   Standard: 6.2 – 6.4 mm (0.24 – 0.25 in)



- If the thickness of the shift fork finger is not within the standard, replace the shift fork with a new one.
- If the thickness of the shift fork finger is within the standard, replace the synchro sleeve with a new one.

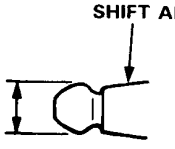
3. Measure the clearance between the shift fork and the shift arm.

   Standard: 0.2 – 0.5 mm (0.008 – 0.019 in)
   Service Limit: 0.6 mm (0.02 in)



4. If the clearance is more than the service limit, measure the width of the shift arm.

   Standard: 12.9 – 13.0 mm (0.508 – 0.512 in)



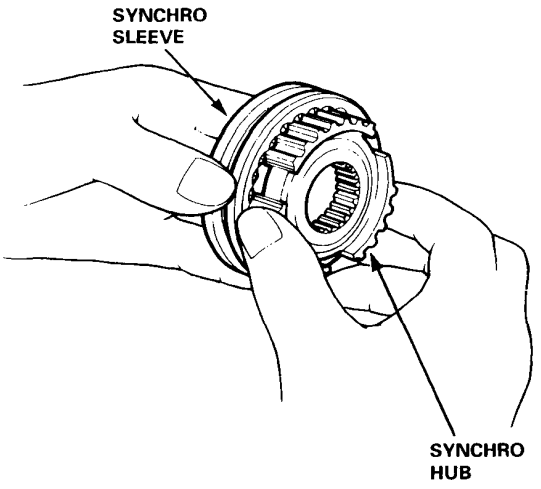
- If the width of the shift arm is not within the standard, replace the shift arm with a new one.
- If the width of the shift arm is within the standard, replace the shift fork or shift piece with a new one.

Synchro Sleeve, Synchro Hub

Inspection

1. Inspect gear teeth on all synchro hubs and synchro sleeves for rounded off corners, which indicate wear.
2. Install each synchro hub in its mating synchro sleeve, and check for freedom of movement.

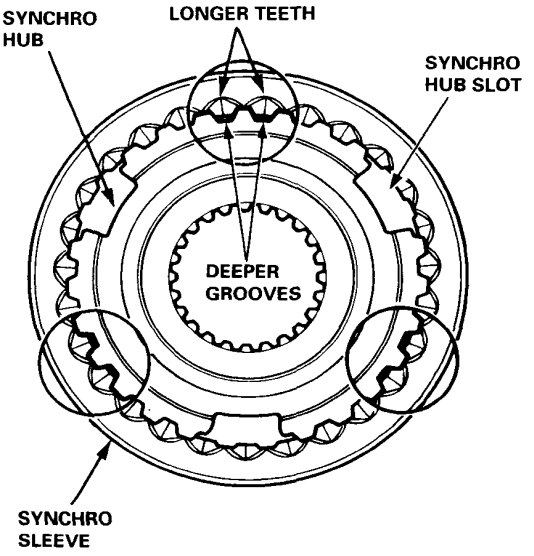
   NOTE: If replacement is required, always replace the synchro sleeve and synchro hub as a set.



Installation

When assembling the synchro sleeve and synchro hub, be sure to match the three sets of longer teeth (120 degrees apart) on the synchro sleeve with the three sets of deeper grooves in the synchro hub.

CAUTION: Do not install the synchro sleeve with its longer teeth in the 1st/2nd synchro hub slots because it will damage the spring ring.



Synchro Ring, Gear

Inspection

1. Inspect the synchro ring and gear.

   A: Inspect the inside of the synchro ring for wear.

   B: Inspect the synchro sleeve teeth and matching teeth on the synchro ring for wear (rounded off).

   C: Inspect the synchro sleeve teeth and matching teeth on the gear for wear (rounded off).

   D: Inspect the gear hub thrust surface for wear.

   E: Inspect the cone surface for wear and roughness.

   F: Inspect the teeth on all gears for uneven wear, scoring, galling, and cracks.

2. Coat the cone surface of the gear with oil, and place the synchro ring on the matching gear. Rotate the synchro ring, making sure that it does not slip.

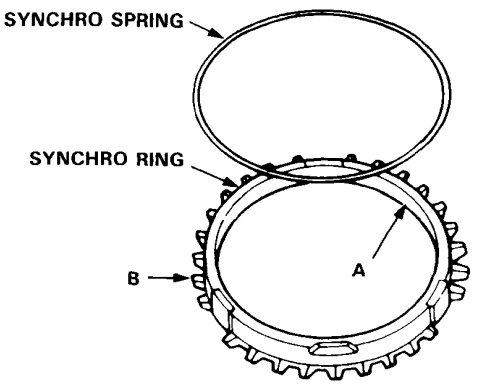
   Measure the clearance between the synchro ring and gear all the way around.

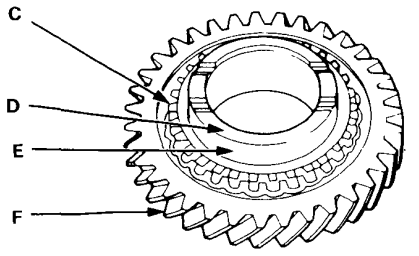
   NOTE: Hold the synchro ring against the gear evenly while measuring the clearance.

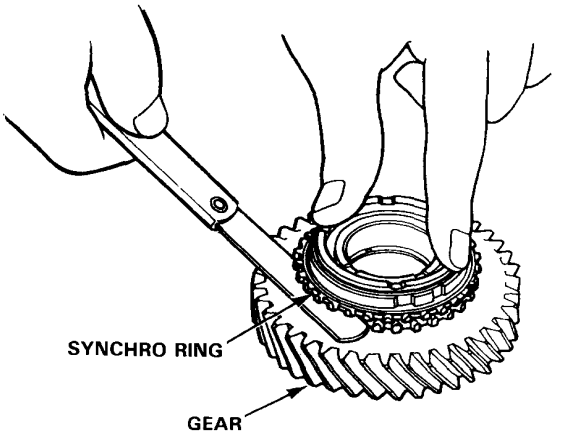
   Synchro Ring-to-Gear Clearance
   Standard: 0.85 – 1.10 mm (0.033 – 0.043 in)
   Service Limit: 0.4 mm (0.02 in)

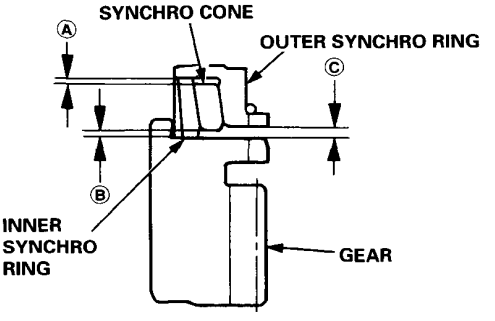
   Double Cone Synchro-to-Gear Clearance
   Standard:
   Ⓐ: (Outer Synchro Ring to Synchro Cone) 0.5 mm (0.02 in) min.
   Ⓑ: (Synchro Cone to Gear) 0.5 mm (0.02 in) min.
   Ⓒ: (Outer Synchro Ring to Gear) 0.95 – 1.68 mm (0.037 – 0.066 in)
   Service Limit:
   Ⓐ: 0.3 mm (0.01 in)
   Ⓑ: 0.3 mm (0.01 in)
   Ⓒ: 0.6 mm (0.02 in)

   If the clearance is less than the service limit, replace the synchro ring and synchro cone.





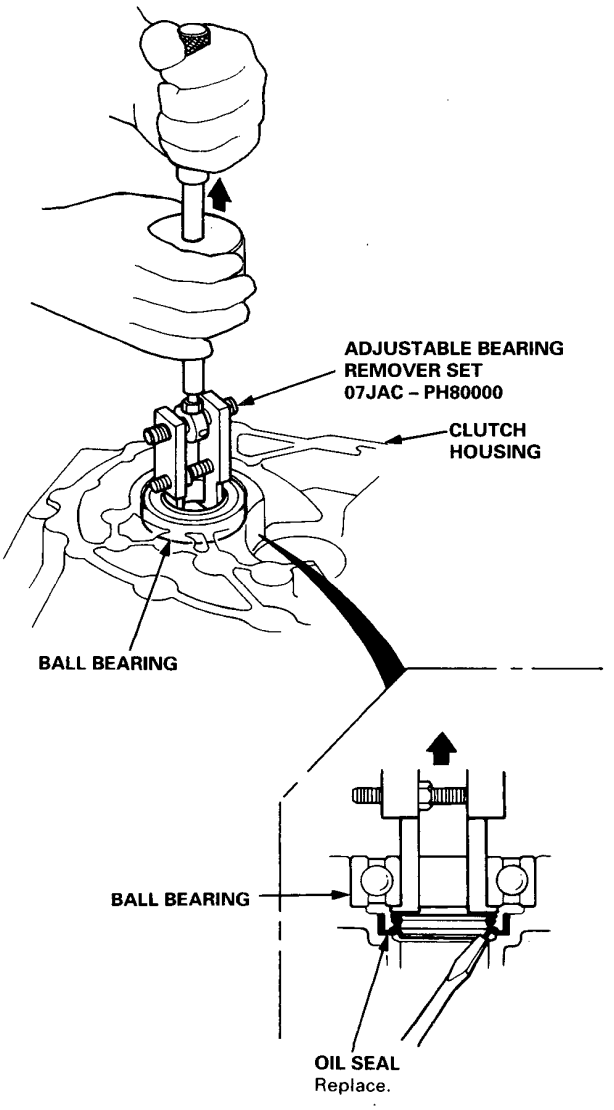




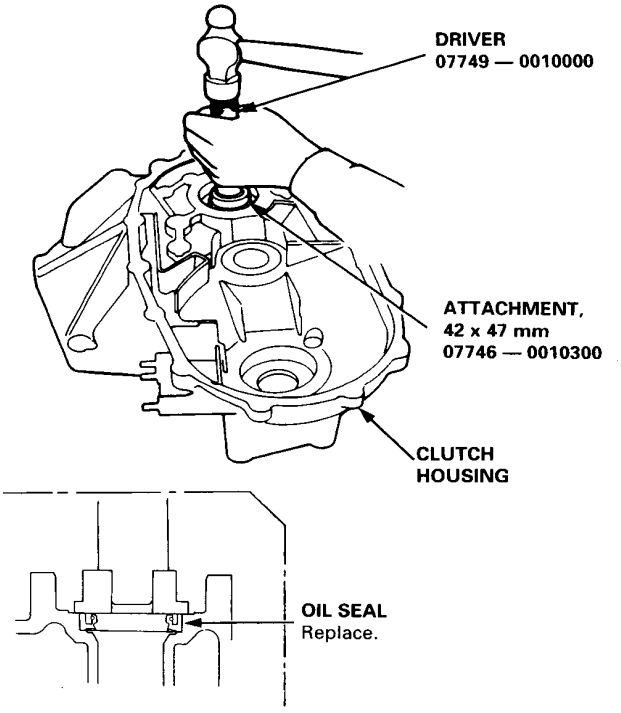
Mainshaft Bearing/Oil Seal

Replacement

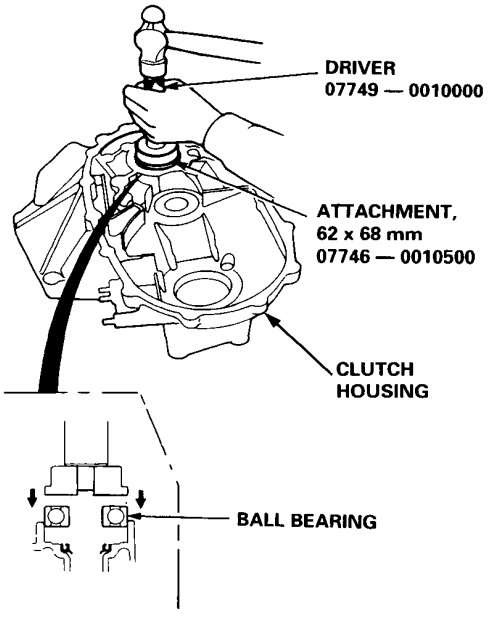
1. Remove the differential assembly.
2. Remove the ball bearing using the special tool as shown.
3. Remove the oil seal from the clutch side.



4. Drive the new oil seal in from the transmission side using the special tools as shown.



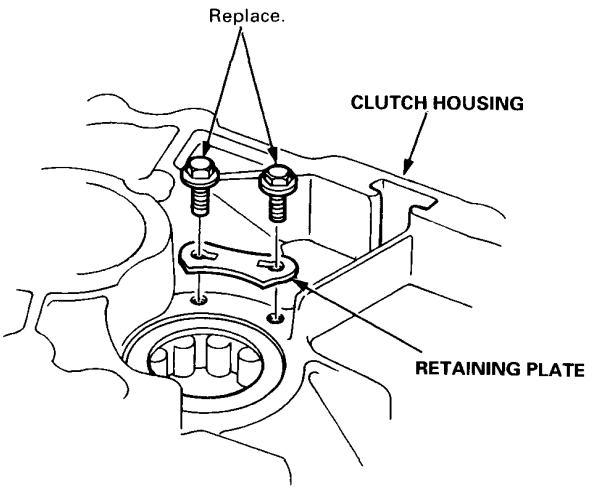
5. Drive the new ball bearing in from the transmission side using the special tools as shown.



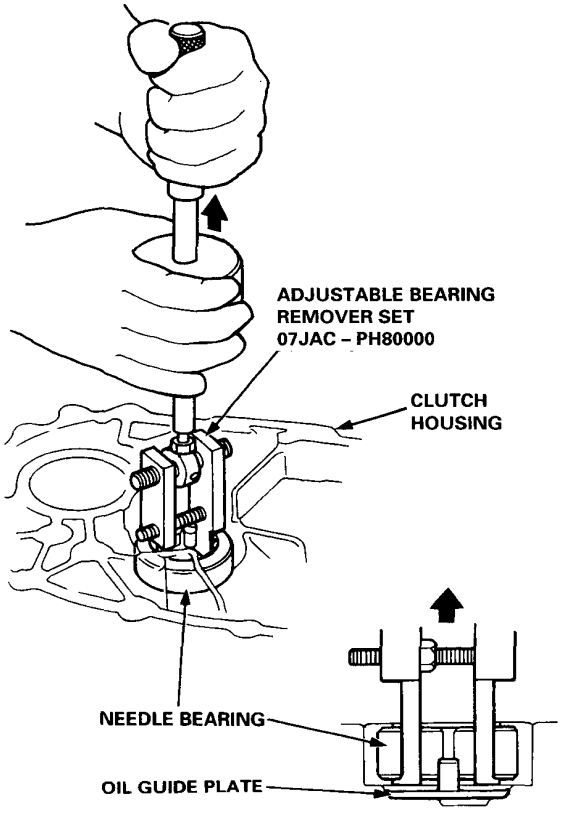
Countershaft Bearing

Replacement

1. Remove the retaining plate from the clutch housing.

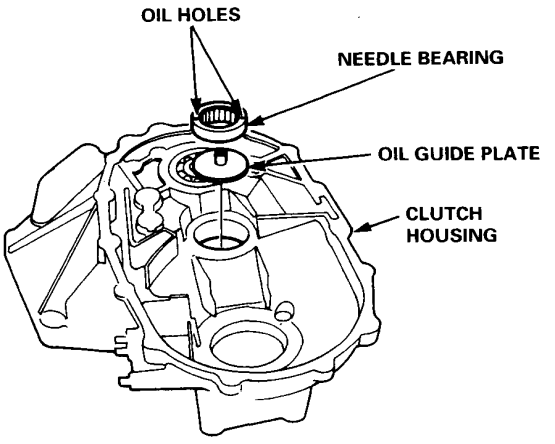


2. Remove the needle bearing using the special tool, then remove the oil guide plate.

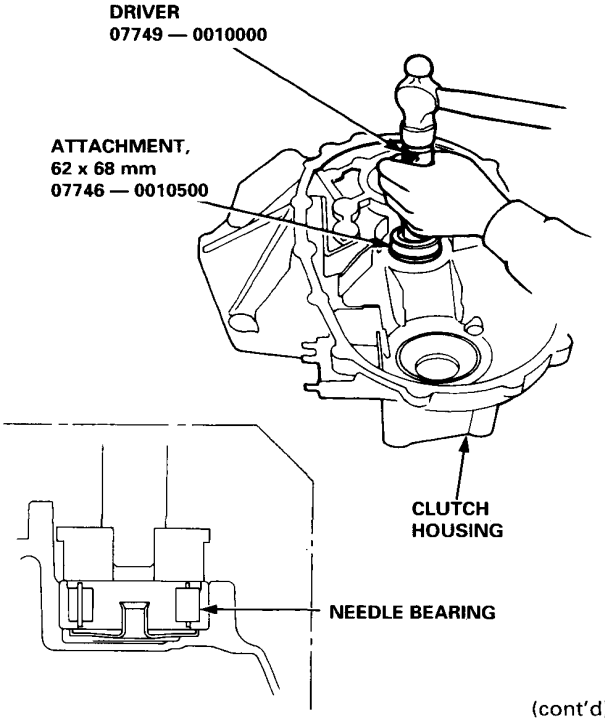


3. Position the oil guide plate and new needle bearing in the bore of the clutch housing.

   NOTE: Position the needle bearing with the oil hole *facing up*.



4. Drive the needle bearing using the special tools as shown.

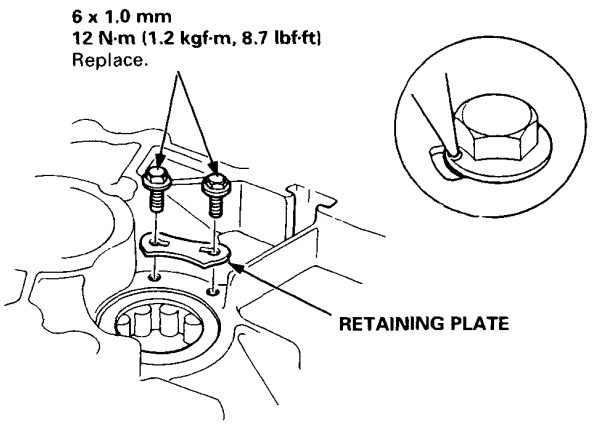


(cont'd)

Countershaft Bearing

Replacement (cont'd)

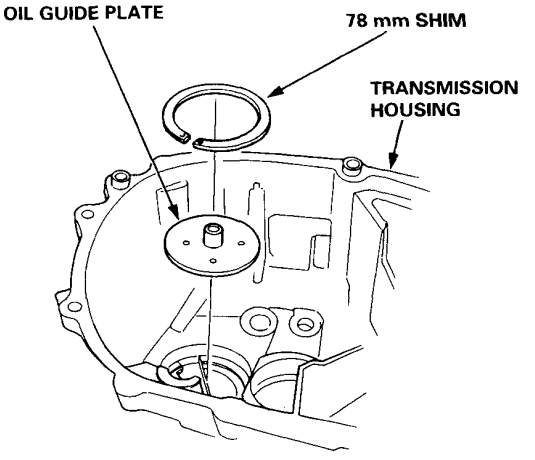
5. Install the retaining plate, and stake the bolt heads into the groove in the retaining plate.



Mainshaft Thrust Clearance

Adjustment

1. Remove the 78 mm shim and oil guide plate from the transmission housing.

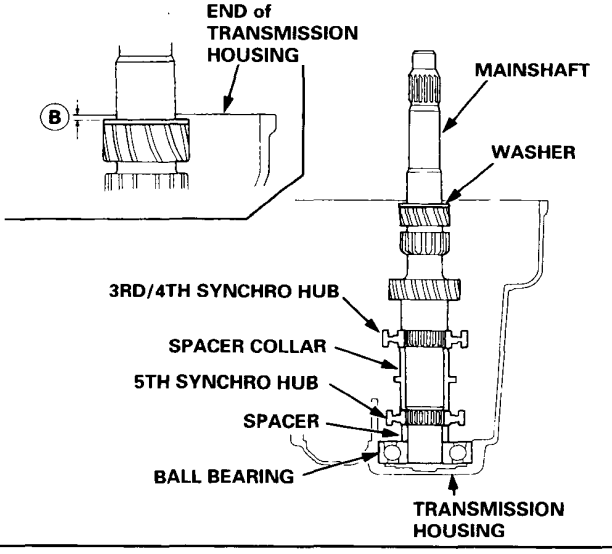


2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, spacer, and ball bearing on the mainshaft, then install the above assembly in the transmission housing.

3. Install the washer on the mainshaft.

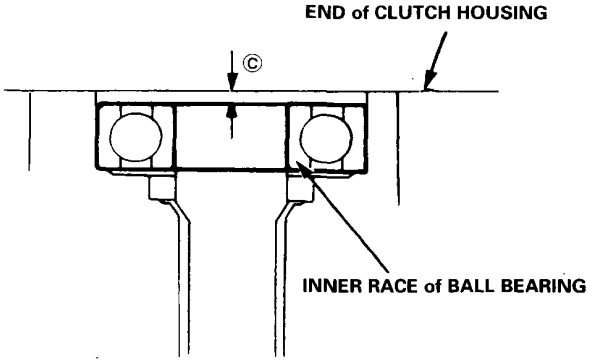
4. Measure distance Ⓑ between the end of the transmission housing and washer.

   NOTE:
   - Use a straight edge and vernier caliper.
   - Measure at three locations and average the reading.



5. Measure distance Ⓒ between the end of the clutch housing and bearing inner race.

NOTE:
- Use a straight edge and depth gauge.
- Measure at three locations and average the readings.



6. Select the proper 78 mm shim from the chart by using the formula below.

Shim Selection Formula:

From the measurements you made in steps 4 and 5:

–1. Add distance Ⓒ (step 5) to distance Ⓑ (step 4).

–2. From this number, subtract 0.93 (which is the midpoint of the flex range of the clutch housing bearing spring washer).

–3. Take this number and compare it to the available shim sizes in the chart.

(For example)

B: 2.39	2.61
+ C: 0.22	– 0.93
= 2.61	= 1.68

- Try the 1.68 mm (0.0661 in) shim.

78 mm SHIM

	Part Number	Thickness
A	23941 – PK5 – 000	1.20 mm (0.0472 in)
B	23942 – PK5 – 000	1.23 mm (0.0484 in)
C	23943 – PK5 – 000	1.26 mm (0.0496 in)
D	23944 – PK5 – 000	1.29 mm (0.0508 in)
E	23945 – PK5 – 000	1.32 mm (0.0520 in)
F	23946 – PK5 – 000	1.35 mm (0.0531 in)
G	23947 – PK5 – 000	1.38 mm (0.0543 in)
H	23948 – PK5 – 000	1.41 mm (0.0555 in)
I	23949 – PK5 – 000	1.44 mm (0.0567 in)
J	23950 – PK5 – 000	1.47 mm (0.0579 in)
K	23951 – PK5 – 000	1.50 mm (0.0591 in)
L	23952 – PK5 – 000	1.53 mm (0.0602 in)
M	23953 – PK5 – 000	1.56 mm (0.0614 in)
N	23954 – PK5 – 000	1.59 mm (0.0626 in)
O	23955 – PK5 – 000	1.62 mm (0.0638 in)
P	23956 – PK5 – 000	1.65 mm (0.0650 in)
Q	23957 – PK5 – 000	1.68 mm (0.0661 in)
R	23958 – PK5 – 000	1.71 mm (0.0673 in)
S	23959 – PK5 – 000	1.74 mm (0.0685 in)
T	23960 – PK5 – 000	1.77 mm (0.0697 in)
U	23961 – PK5 – 000	1.80 mm (0.0709 in)
V	23962 – PK5 – 000	1.83 mm (0.0720 in)
W	23963 – PK5 – 000	1.86 mm (0.0732 in)
X	23964 – PK5 – 000	1.89 mm (0.0744 in)
Y	23965 – PK5 – 000	1.92 mm (0.0756 in)
Z	23966 – PK5 – 000	1.95 mm (0.0768 in)
AA	23967 – PK5 – 000	1.98 mm (0.0780 in)
AB	23968 – PK5 – 000	2.01 mm (0.0791 in)
AC	23969 – PK5 – 000	2.04 mm (0.0803 in)
AD	23970 – PK5 – 000	2.07 mm (0.0815 in)
AE	23971 – PK5 – 000	2.10 mm (0.0827 in)
AF	23972 – PK5 – 000	2.13 mm (0.0839 in)
AG	23973 – PK5 – 000	2.16 mm (0.0850 in)
AH	23974 – PK5 – 000	2.19 mm (0.0862 in)
AI	23975 – PK5 – 000	2.22 mm (0.0874 in)
AJ	23976 – PK5 – 000	2.25 mm (0.0886 in)
AK	23977 – PK5 – 000	2.28 mm (0.0898 in)
AL	23978 – PK5 – 000	2.31 mm (0.0909 in)
AM	23979 – PK5 – 000	2.34 mm (0.0921 in)
AN	23980 – PK5 – 000	2.37 mm (0.0933 in)

(cont'd)

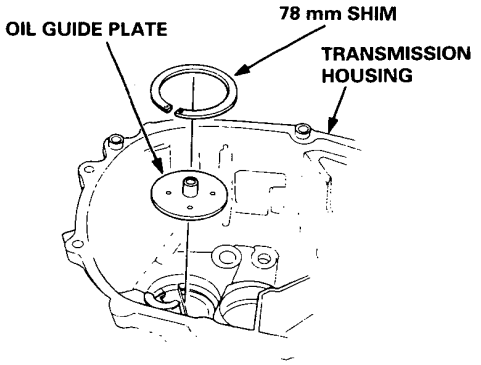
Mainshaft Thrust Clearance

Adjustment (cont'd)

7. Check the thrust clearance in the manner described below.

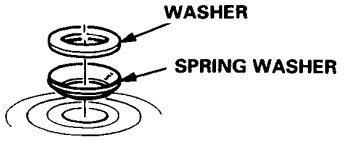
   NOTE: Measurement should be made at normal room temperature.

   -1. Install the 78 mm shim selected and oil guide plate in the transmission housing.



   -2. Install the spring washer and washer on the ball bearing.

   NOTE:
   - Clean the spring washer, washer and thrust shim throughly before installation.
   - Install the spring washer, washer and thrust shim properly.



   -3. Install the mainshaft in the clutch housing.

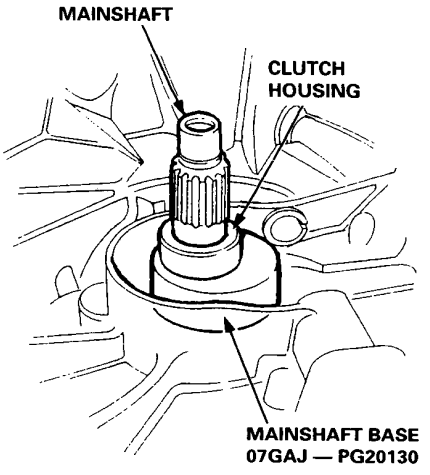
   -4. Place the transmission housing over the mainshaft and onto the clutch housing.

   -5. Tighten the clutch and transmission housings with several 8 mm and 10 mm bolts.

   NOTE: It is not necessary to use sealing agent between the housings.

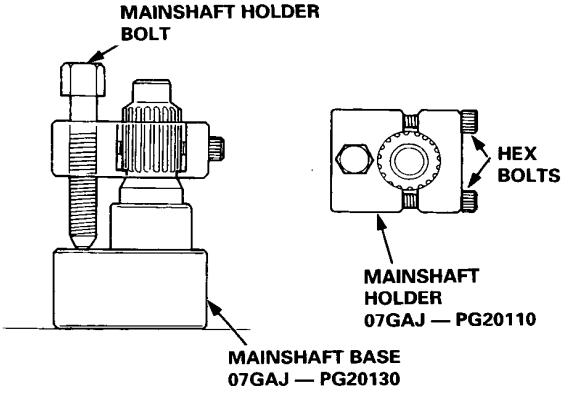
   -6. Tap the mainshaft with a plastic hammer.

   -7. Slide the mainshaft base over the mainshaft.



   -8. Attach the mainshaft holder to the mainshaft as follows:

   NOTE:
   - Back-out the mainshaft holder bolt and loosen the two hex bolts.
   - Fit the holder over the mainshaft so its lip is towards the transmission.
   - Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.



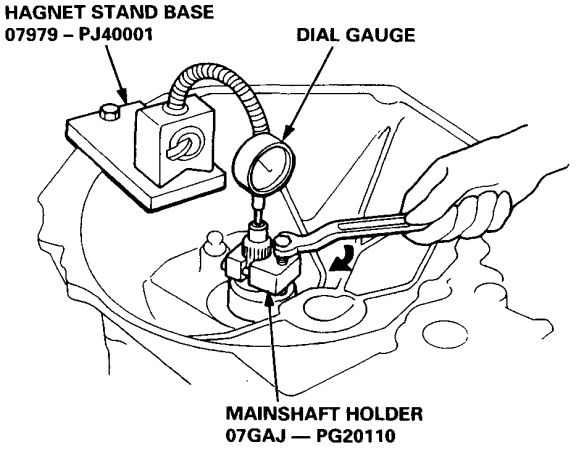
   -9. Seat the mainshaft fully by tapping its end with a plastic hammer.

   -10. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

   -11. Zero a dial gauge on the end of the mainshaft.

-12. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.

CAUTION: Turning the mainshaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.

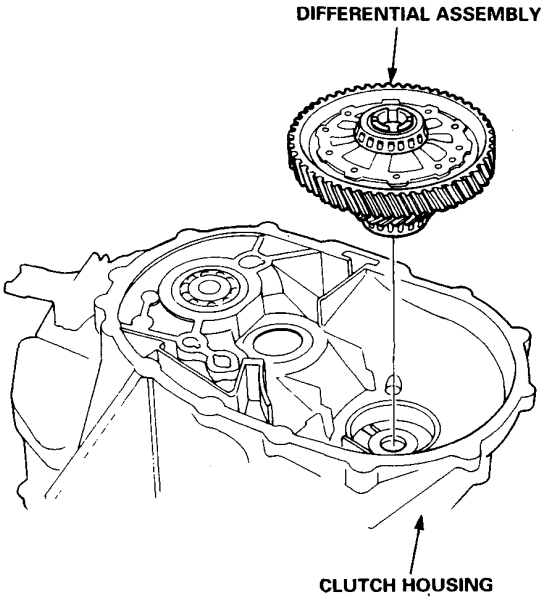


-13. If the reading is within the standard, the clearance is correct.
If the reading is not within the standard, recheck the shim thickness.

Standard: 0.10 – 0.16 mm (0.004 – 0.006 in)

Reassembly

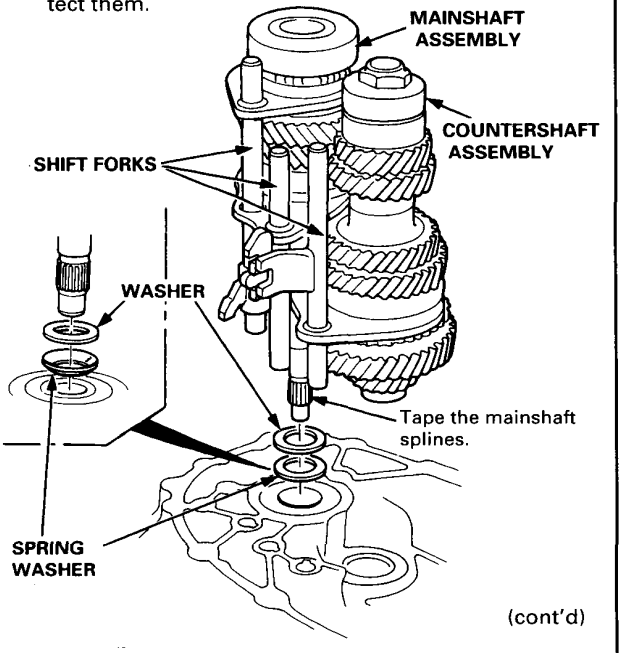
1. Install the differential assembly in the clutch housing.



2. Install the spring washer and washer with the angle against the clutch housing as shown.

3. Insert the mainshaft and countershaft into the shift forks, and install them as an assembly.

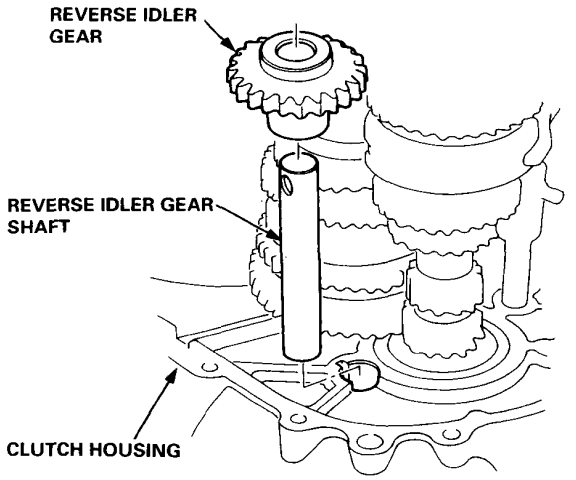
NOTE: Before installing the mainshaft and countershaft assemblies, tape the mainshaft splines to protect them.



(cont'd)

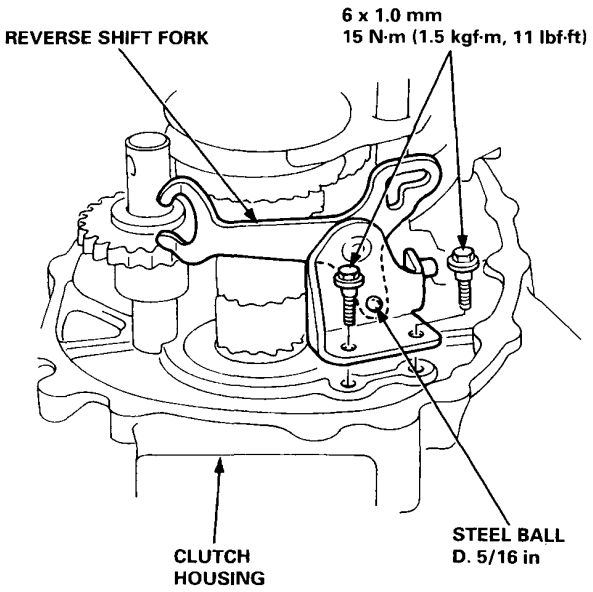
Reassembly (cont'd)

4. Install the reverse idler gear and reverse idler gear shaft in the clutch housing.



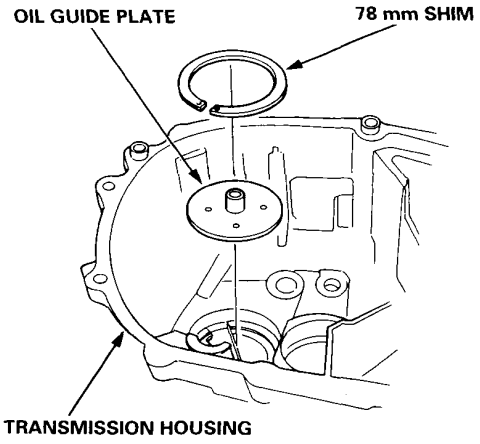
5. Install the reverse shift fork in the clutch housing with the 5th/reverse shift piece pin positioned in the slot of the reverse shift fork.

   NOTE: Check that the steel ball is in the proper position.



   NOTE: Select the 78 mm shim according to the measurements made on page 13-34.

6. Install the oil guide plate and 78 mm shim into the transmission housing.

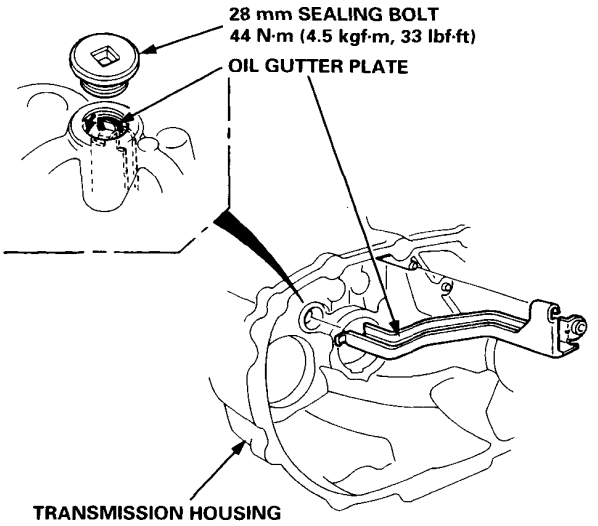


7. Install the oil gutter plate in the transmission housing.

   NOTE: Bend the hook of the oil gutter plate into the hole on the transmission housing.

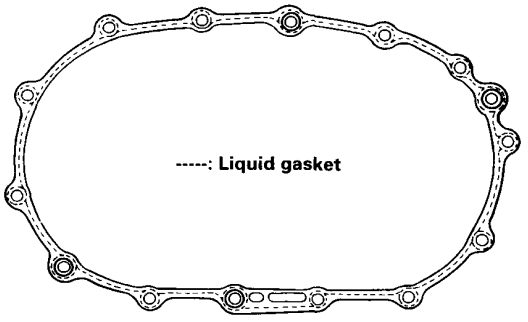
8. Install the 28 mm sealing bolt.

   NOTE: Apply liquid gasket (P/N 0Y740 – 99986) to the threads.



9. Apply liquid gasket to the surface of the transmission housing as shown.

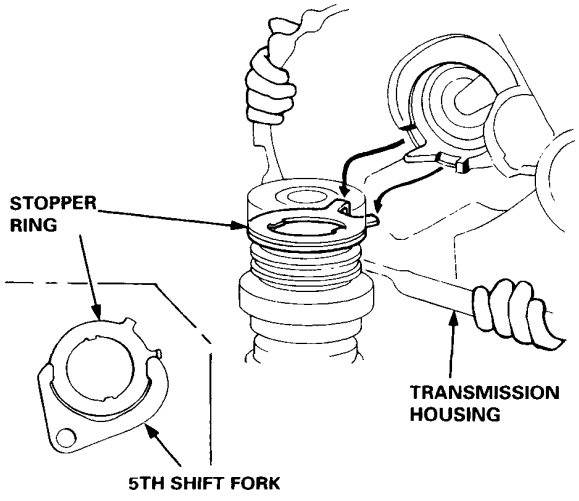
NOTE:
- Use liquid gasket (P/N 0Y740 – 99986).
- Remove the dirty oil from the sealing surface.
- Seal the entire circumference of the bolt holes to prevent oil leakage.
- If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings. Allow it to cure at least 20 minutes after assembly before filling the transmission with oil.



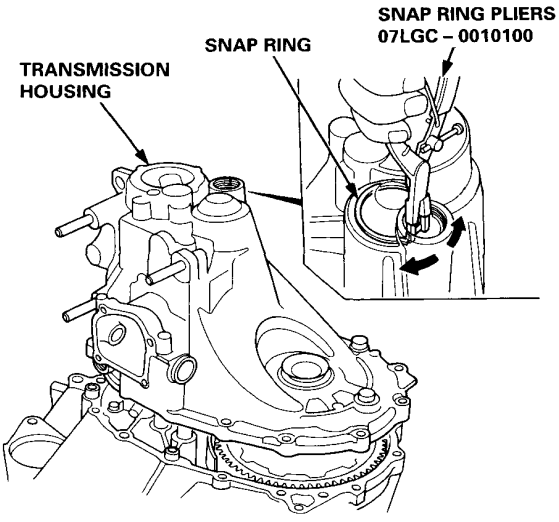
10. Install the 14 x 20 mm dowel pins.

11. Set the stopper ring as shown. Place the transmission housing over the clutch housing, being careful to line up the shafts.

NOTE: Align the long arm of 5th shift fork with the hook on the stopper ring.



12. Lower the transmission housing with the snap ring pliers, and set the snap ring into the groove of the countershaft bearing.

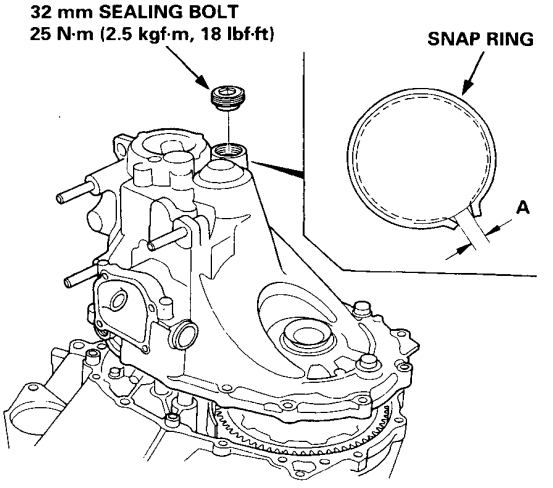


13. Check that the snap ring is securely seated in the groove of the countershaft bearing.

Dimension A as installed: 3.60 – 6.32 mm (0.142 – 0.249 in)

14. Install the 32 mm sealing bolt.

NOTE: Apply liquid gasket (P/N 0Y740 – 99986) to the threads.

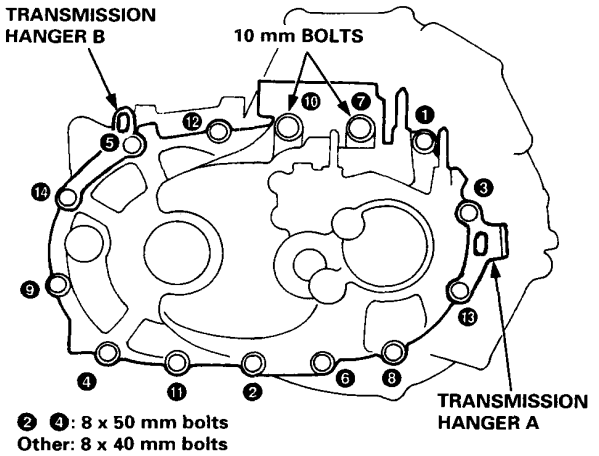


(cont'd)

Reassembly (cont'd)

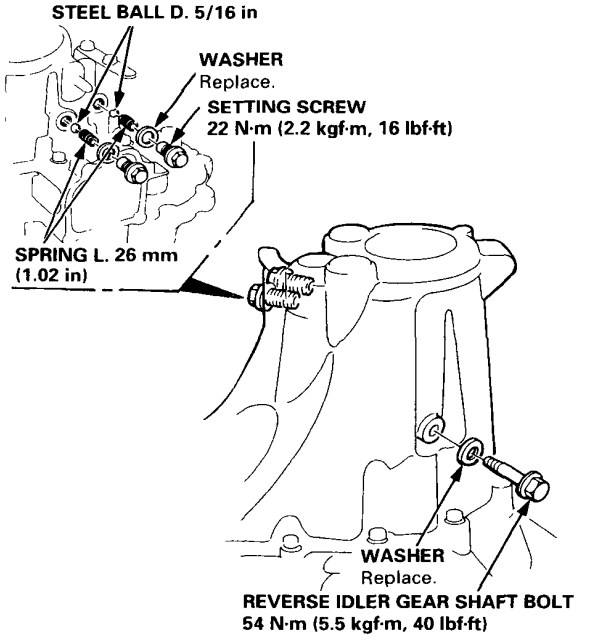
15. Install transmission hangers A and B, then tighten the bolts in a crisscross pattern in several steps as shown.

    8 x 1.25 mm bolts: 27 N·m (2.8 kgf·m, 20 lbf·ft)
    10 x 1.25 mm bolts: 44 N·m (4.5 kgf·m, 33 lbf·ft)



16. Install the reverse idler gear shaft bolt.

17. Install the steel balls, springs, washers and setting screws.

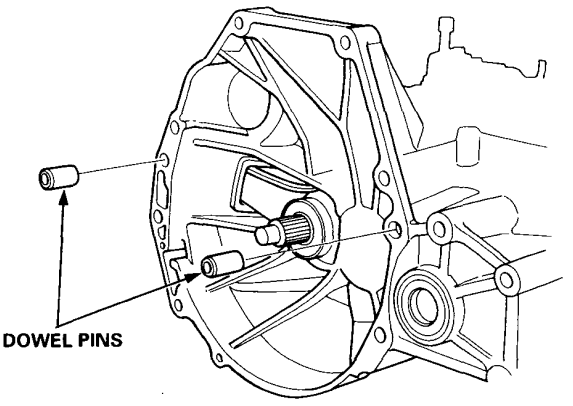


18. Install the shift arm cover assembly (see page 13-13).

19. Shift the transmission through all the gears before installing it.

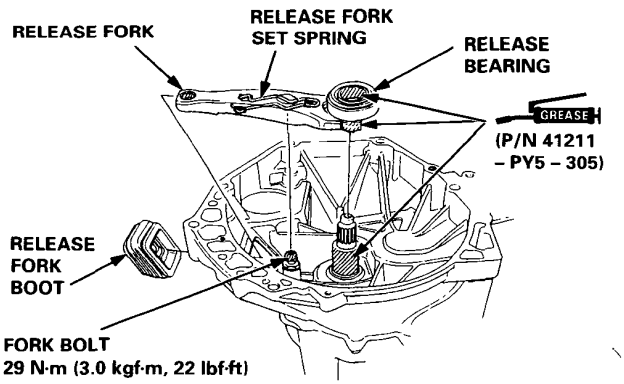
Installation

1. Install the dowel pins.



2. Apply grease to the parts as shown, then install the release bearing and release fork (see section 12).

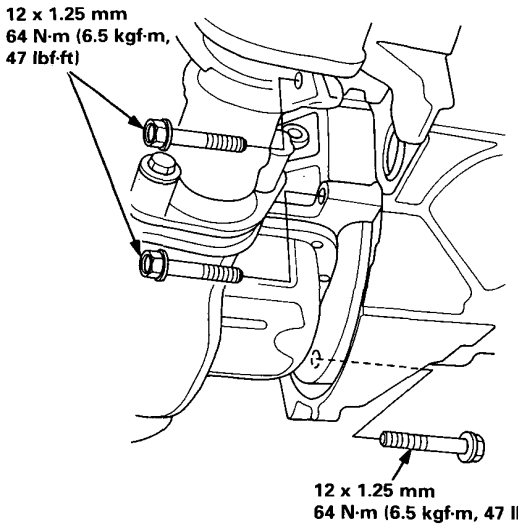
   NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).



3. Install the release fork boot.

4. Place the transmission on the transmission jack, and raise it to the engine level.

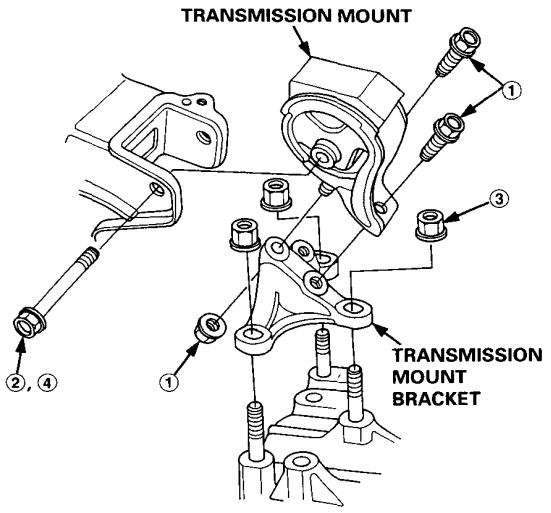
5. Install the three lower transmission mounting bolts.



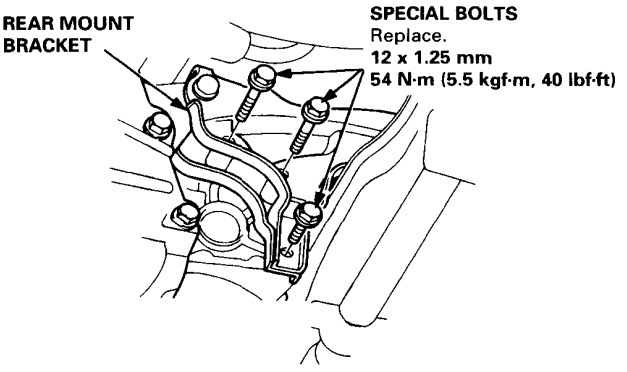
6. Raise the transmission, then install the transmission mount bracket and the transmission mount.

NOTE:
- Torque mounting bolts and nuts in the sequence shown.
- Make sure the bushings are not twisted or offset.

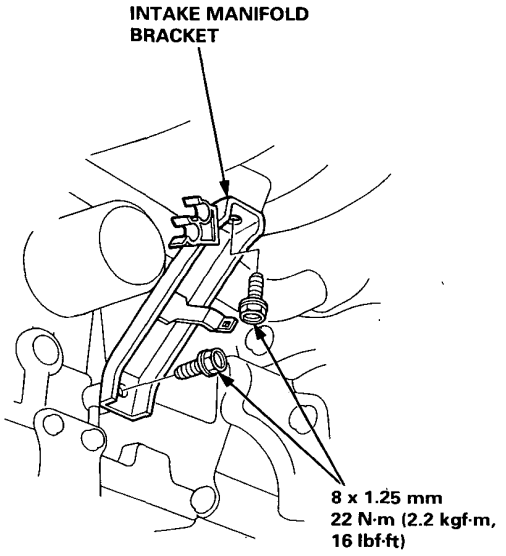
①, ③: **10 x 1.25 mm**
38 N·m (3.9 kgf·m, 28 lbf·ft)
④: **12 x 1.25 mm**
64 N·m (6.5 kgf·m, 47 lbf·ft)
②: **Temporary tightening**



7. Install the three rear mount bracket mounting bolts.



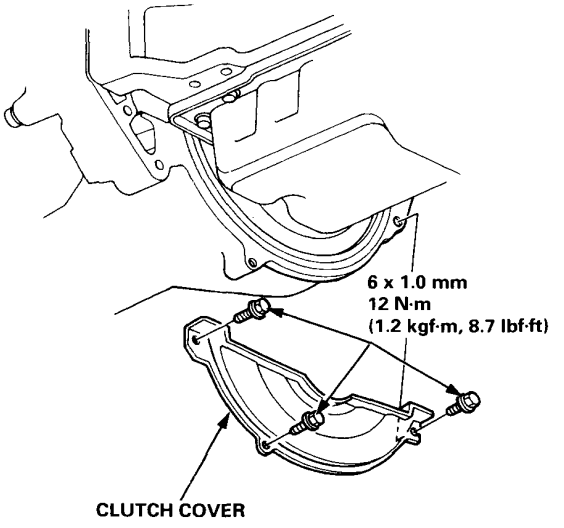
8. Install the intake manifold bracket.



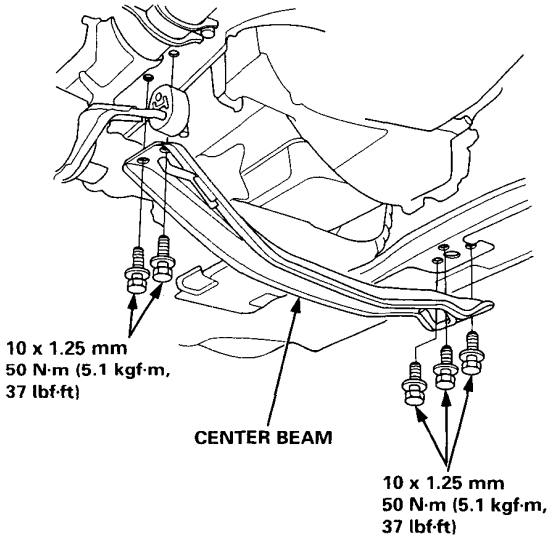
(cont'd)

Installation (cont'd)

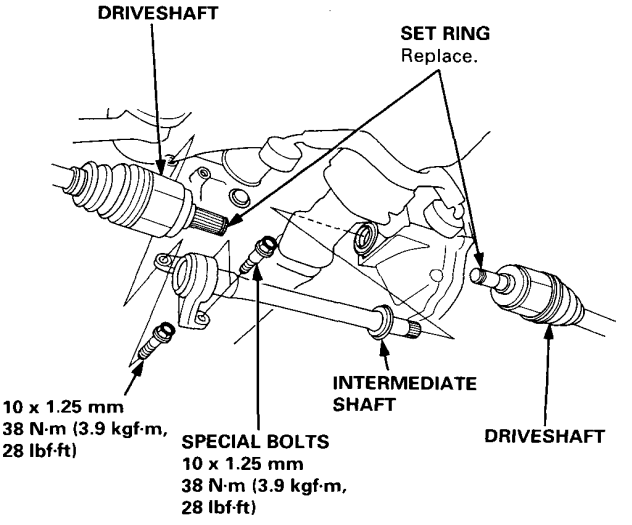
9. Install the clutch cover.



10. Install the center beam.

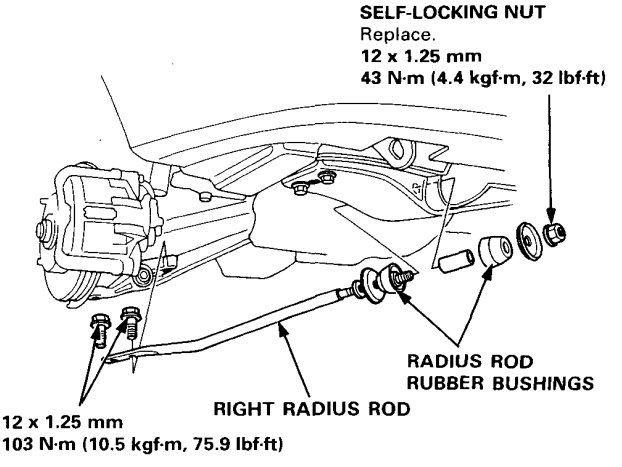


11. Install the intermediate shaft and driveshafts (see section 16).



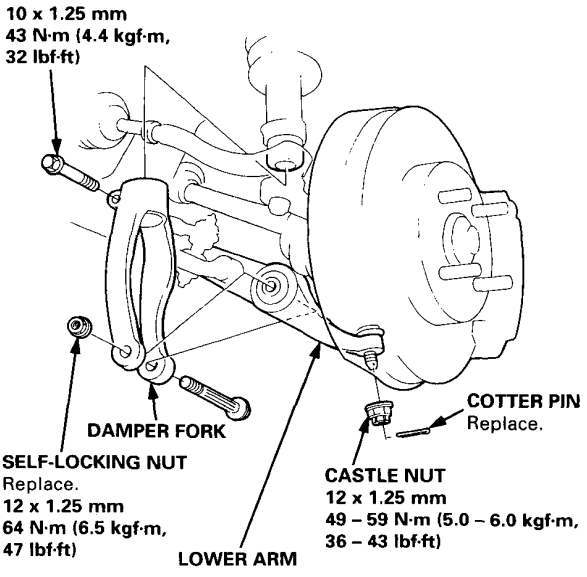
12. Install the right radius rod.

NOTE: Check for deterioration or damage of the radius rod rubber bushings.

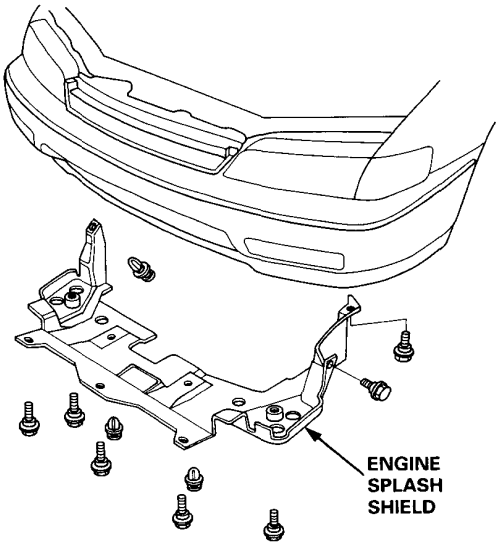


13. Install the ball joints onto the lower arms (see section 18).

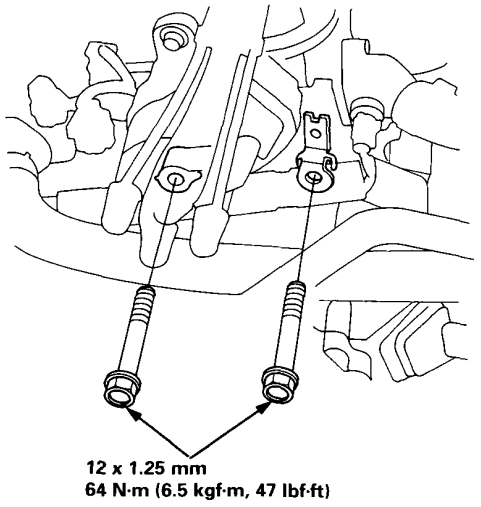
14. Install the right damper fork bolt (see section 18).



15. Install the engine splash shield.



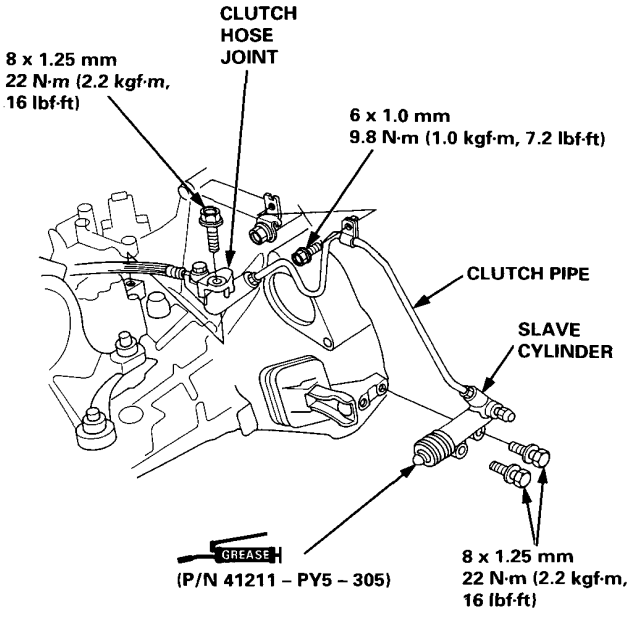
16. Install the two upper transmission mounting bolts.



17. Install the slave cylinder, clutch pipe, and clutch hose joint.

CAUTION: Take care not to bend the clutch pipe.

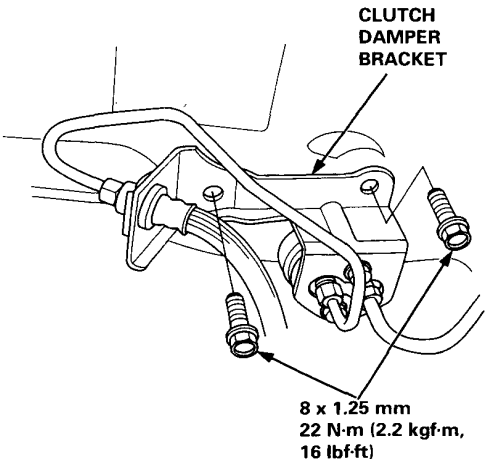
NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).



(cont'd)

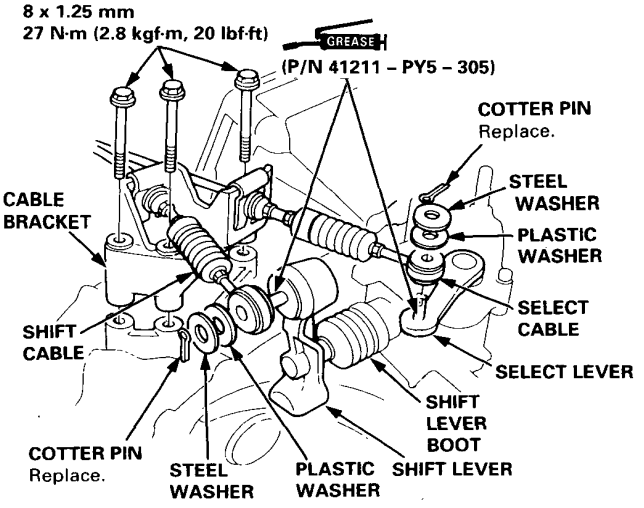
Installation (cont'd)

18. Install the clutch damper bracket.

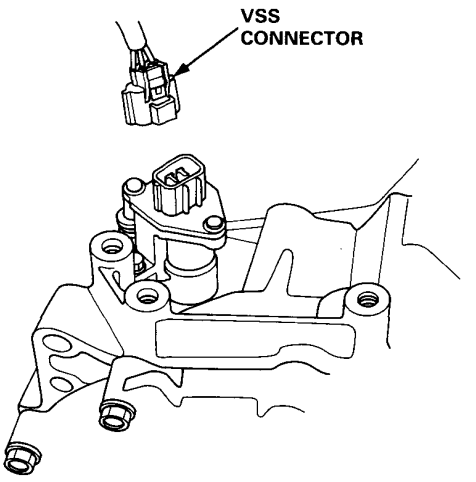


19. Install the shift cable and select cable to the shift lever and to the select lever respectively.

NOTE:
- Check that the new cotter pin is seated firmly.
- Turn the boot of the shift lever so the hole is facing down.
- Inspect the plastic washer for wear and damage.
- Use only HONDA Genuine Urea Grease UM264 (P/N 41211 – PY5 – 305).

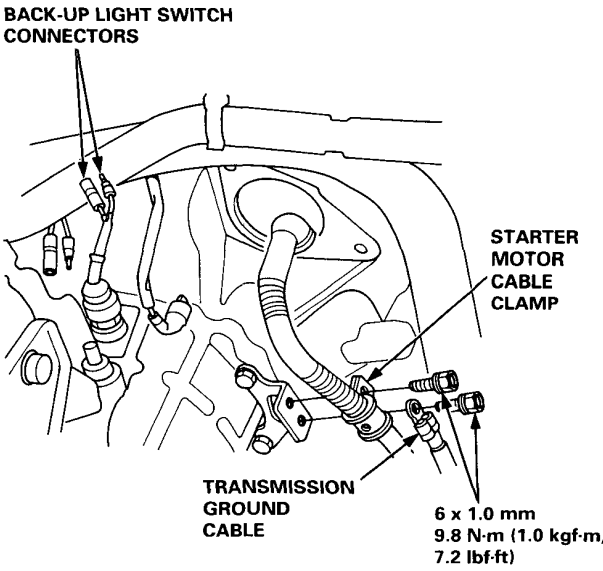


20. Connect the vehicle speed sensor (VSS) connector.



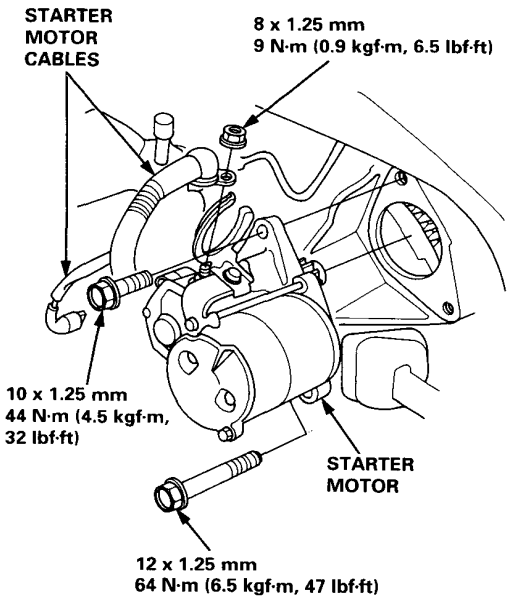
21. Connect the transmission ground cable and starter motor cable clamp.

22. Connect the back-up light switch connectors.



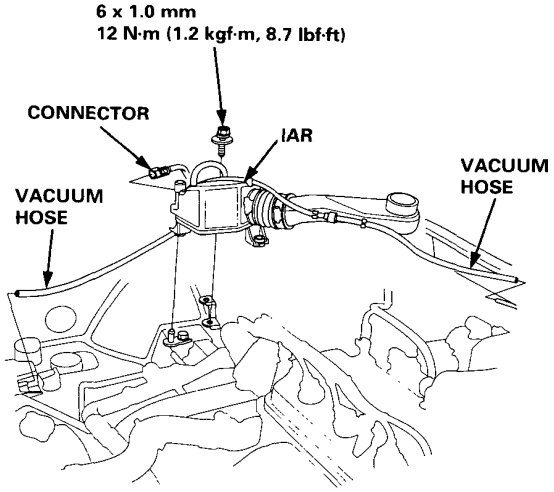
23. Install the starter motor, then connect the starter motor cables.

NOTE: When installing the starter motor cable, make sure that the crimped side of the ring terminal is facing out (see section 23).

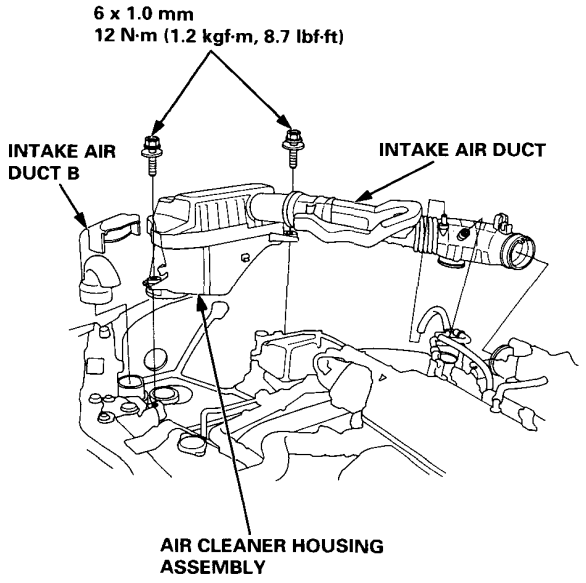


24. Install the intake air resonator (IAR)*1, then connect the connector and vacuum hoses.

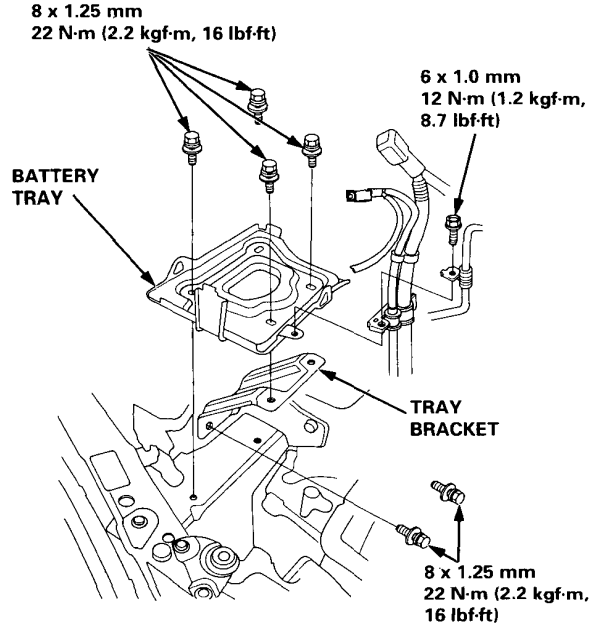
*1: F22B5 Engine only



25. Install the air cleaner housing assembly and intake air duct.



26. Install the tray bracket and the battery tray.

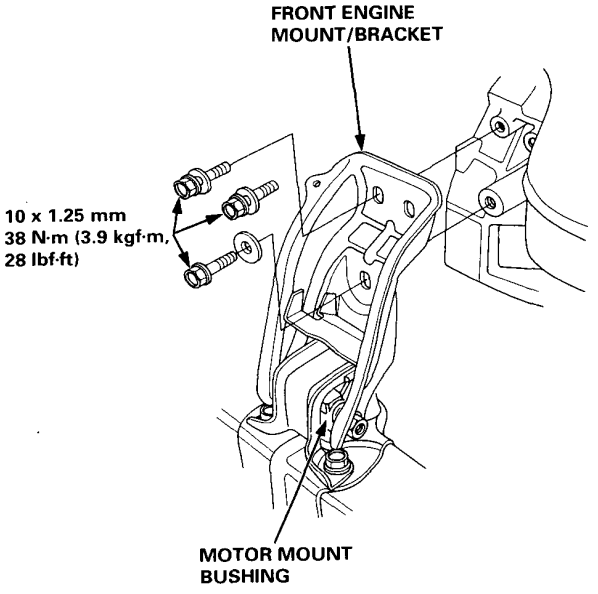


(cont'd)

Installation (cont'd)

27. Install the battery, then connect the positive (+) cable first, then negative (–) cable to the battery.
28. Refill the transmission with oil (see page 13-3).
29. Check the clutch operation.
30. Shift the transmission, and check for smooth operation.
31. Check the front wheel alignment (see section 18).
32. Loosen the three mounting bolts of the front engine mount/bracket, then torque the three mount bolts.

    NOTE:
    - Make sure the motor mount bushing is not twisted or offset.
    - If the motor mount bushing is twisted or offset, loosen all mounts and retorque. Refer to section 5 for engine mount torque sequence.

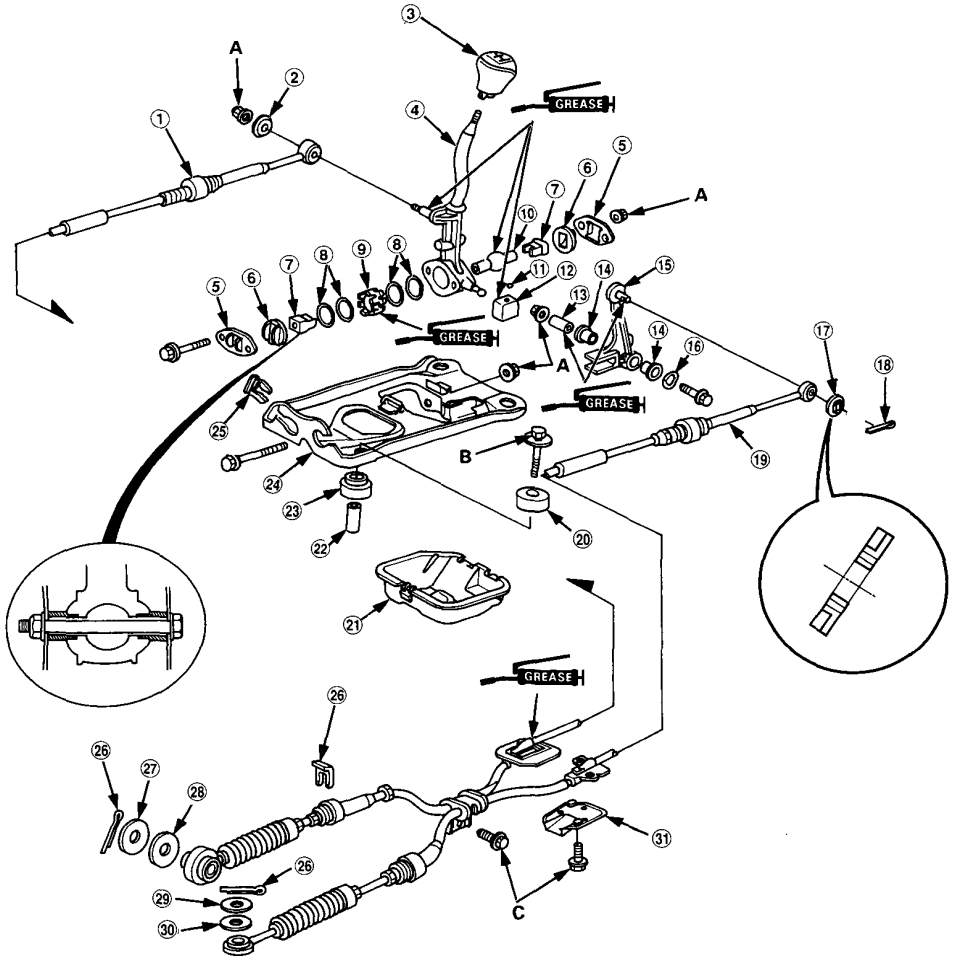


Gearshift Mechanism

Overhaul

NOTE:

- Inspect rubber parts for wear and damage when disassembling; replace any worn or damaged parts.
- Check that the new cotter pin is seated firmly.



① **SHIFT WIRE**
② **SHIFT WIRE WASHER**
③ **SHIFT LEVER KNOB**
8 N·m (0.8 kgf·m, 6 lbf·ft)
④ **SHIFT LEVER**
⑤ **SHIFT BALL HOLDER**
⑥ **SHIFT LEVER PIVOT GUIDE**
⑦ **SHIFT PIVOT BUSHING**
⑧ **O-RINGS** Replace.
⑨ **SHIFT LEVER BALL SEAT**
⑩ **SHIFT LEVER PIVOT**
⑪ **CUSHION BALL**
⑫ **SHIFT LEVER BUSHING C**
⑬ **SELECT LINK COLLAR**
⑭ **SHIFT LEVER BUSHING B**
⑮ **SHIFT LEVER LINKAGE**
⑯ **WAVE WASHER**
⑰ **SELECT WIRE WASHER ASSY.**
⑱ **COTTER PIN** Replace.
⑲ **SELECT WIRE**
⑳ **FLOATING RUBBER A**
㉑ **FLOOR TUNNEL STIFFENER LID**
㉒ **FLOATING COLLAR**
㉓ **FLOATING RUBBER B**
㉔ **SHIFT LEVER BRACKET**
㉕ **SHIFT WIRE PLATE** Replace.
㉖ **COTTER PIN** Replace.
㉗ **SHIFT WIRE WASHER A**
㉘ **SHIFT WIRE WASHER B**
㉙ **SELECT WIRE WASHER A**
㉚ **SELECT WIRE WASHER B**
㉛ **WIRE HOLDER**

A: **SELF-LOCKING NUT** Replace.
6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
B: **8 x 1.25 mm**
22 N·m (2.2 kgf·m, 16 lbf·ft)
C: **6 x 1.0 mm**
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
(If automatic transmission maintenance is required)

Some model versions of the Accord Coupe include a driver's airbag, located in the steering wheel hub, and a front passenger's airbag, located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Shop Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

⚠ WARNING

- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.**
- **All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.**

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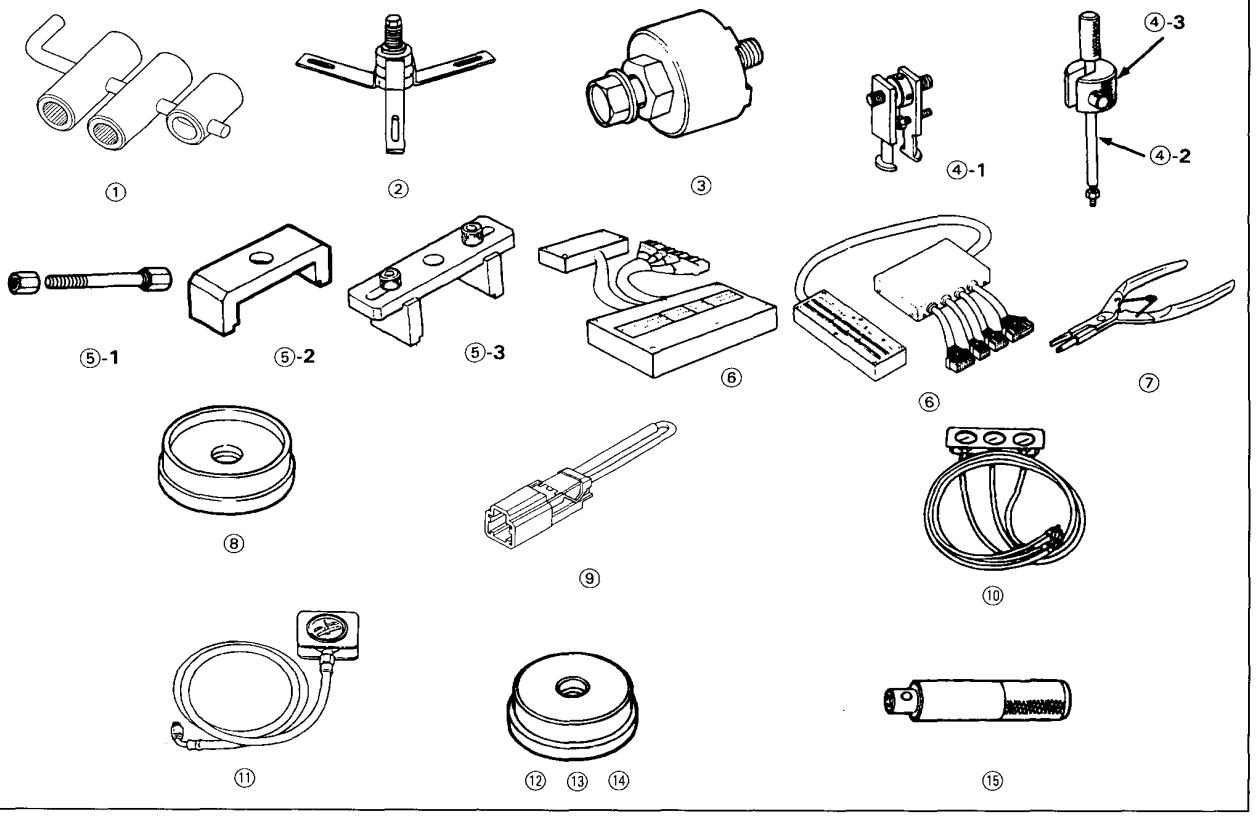
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②	07HAC—PK40100	Housing Puller	1	14-113
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Description

The Automatic Transmission is a combination of a 3-element torque converter and triple-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 speed reverse. The entire unit is positioned in line with the engine.

Torque Converter, Gears and Clutches

The torque converter consists of a pump, turbine and stator assembled in a single unit.
They are connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.
The transmission has three parallel shafts: the mainshaft, the countershaft, and the secondary shaft. The mainshaft is in line with the engine crankshaft.
The mainshaft includes the clutches for 3rd, and 4th, and gears for 3rd, 4th, Reverse and Idler (Reverse gear is integral with 4th gear).
The countershaft includes the 1st-hold clutch and gears for 2nd, 3rd, 4th, Reverse, 1st and Idler.
The secondary shaft includes the 1st and 2nd clutches, and gears for 2nd, 1st and Idler.
The 4th and reverse gears can be locked to the countershaft at its center, providing 4th gear or Reverse, depending on which way the selector is moved.
The gears on the mainshaft are in constant mesh with those on the countershaft and the secondary shaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft to the countershaft to provide [D4], [D3], [2], [1] and [R] positions.

Electronic Control

The electronic control system consists of the Transmission Control Module (TCM), sensors, and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.
The TCM is located below the dashboard, under the front lower panel on the passenger's side.

Hydraulic Control

The valve bodies include the main valve body, secondary valve body, servo body, regulator valve body, throttle valve body and 1st/2nd accumulator body. They are bolted to the torque converter housing as an assembly.
The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, cooler relief valve, lock-up shift valve, lock-up control valve, main orifice control valve, modulator valve, CPC valve and oil pump gears.

The secondary valve body includes the 4th exhaust valve, 3rd kick-down valve, 3-4 shift valve, servo control valve, orifice control valve and the 2nd orifice control valve.

The servo body contains the accumulator pistons and servo valve. The regulator valve body contains the regulator valve, torque converter check valve, and lock-up timing valve. The throttle valve body contains the throttle valve B and relief valve. Fluid from the regulator passes through the manual valve to the various control valves.

The clutches receive oil from their respective feed pipes or internal hydraulic circuit.

Shift Control Mechanism

Input from various sensors located throughout the car determines which shift control solenoid valve the TCM will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging that clutch and its corresponding gear.

Lock-up Mechanism

In [D4] position, in 2nd, 3rd and 4th, and [D3] position in 3rd, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the TCM optimizes the timing of the lock-up mechanism.
The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve B.
When lock-up control solenoid valves A and B activate, modulator pressure changes. Lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the TCM.

(cont'd)

Description

(cont'd)

Gear Selection

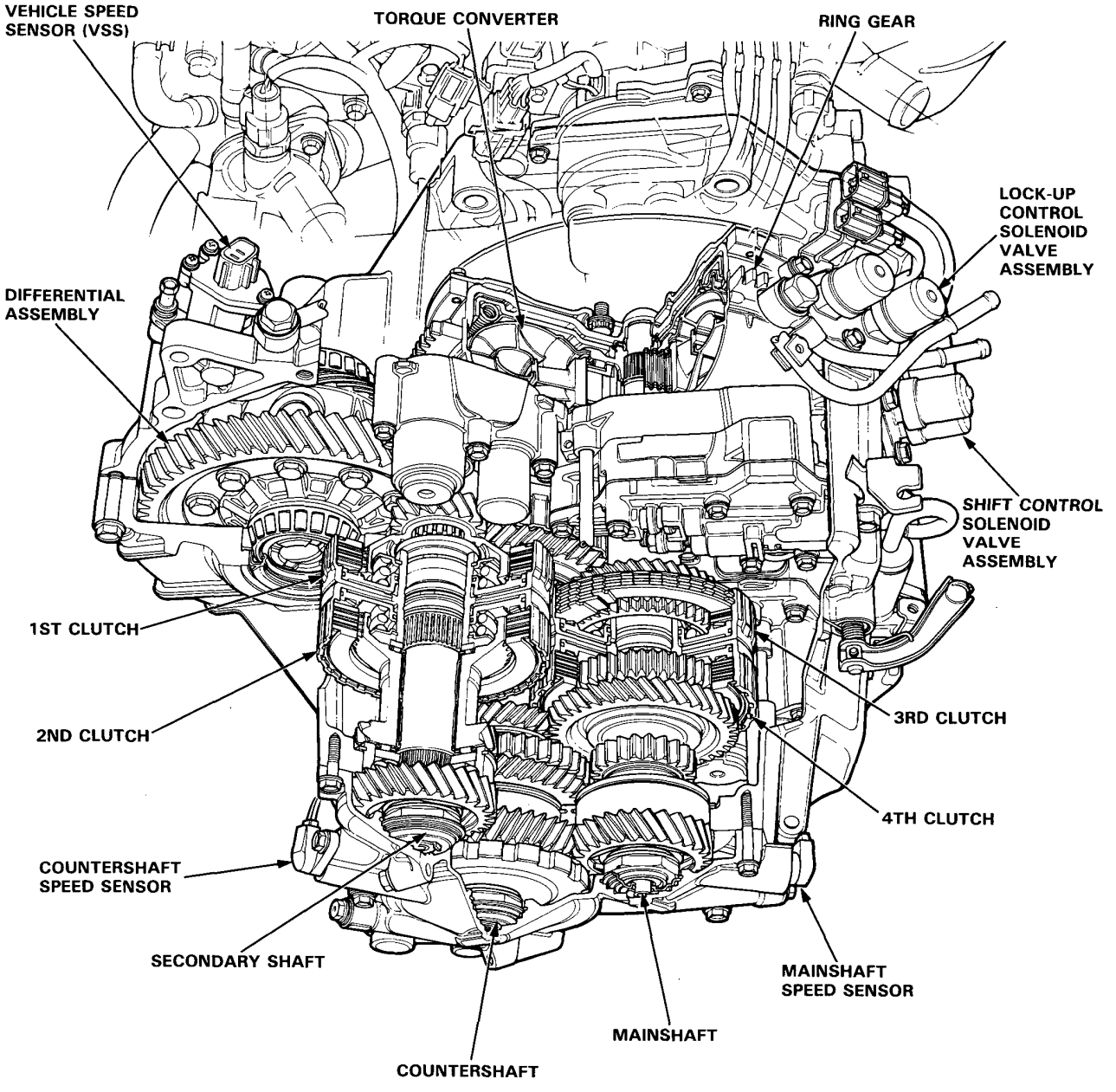
The selector lever has seven positions: [P] PARK, [R] REVERSE, [N] NEUTRAL, [D4] 1st through 4th gear ranges, [D3] 1st through 3rd gear ranges, [2] 2nd gear and [1] 1st gear.

Position	Description
[P] PARK	Front wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.
[R] REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th gear clutch locked.
[N] NEUTRAL	All clutches released.
[D4] DRIVE (1st through 4th)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshift through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in [D4] position in 2nd, 3rd and 4th speed.
[D3] DRIVE (1st through 3rd)	For rapid acceleration at highway speeds and general driving; up-hill and down-hill driving; starts off in 1st, shifts automatically to 2nd, then 3rd, depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to stop. The lock-up mechanism comes into operation in 3rd speed.
[2] SECOND	For engine braking or better traction starting off on loose or slippery surfaces; stays in 2nd gear, does not shift up or down.
[1] FIRST	For engine braking; stays in 1st gear, does not shift up.

Starting is possible only in [P] and [N] positions through the use of a slide-type, neutral-safety switch.

Automatic Transaxle (A/T) Gear Position Indicator

The A/T gear position indicator in the instrument panel shows which gear has been selected without having to look down at the console.


VEHICLE SPEED SENSOR (VSS)
TORQUE CONVERTER
RING GEAR
LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY
DIFFERENTIAL ASSEMBLY
SHIFT CONTROL SOLENOID VALVE ASSEMBLY
1ST CLUTCH
2ND CLUTCH
3RD CLUTCH
4TH CLUTCH
COUNTERSHAFT SPEED SENSOR
SECONDARY SHAFT
MAINSHAFT SPEED SENSOR
MAINSHAFT
COUNTERSHAFT

Description

Clutches

The four-speed automatic transmission uses hydraulically actuated clutches to engage or disengage the transmission gears. When clutch pressure is introduced into the clutch drum, the clutch piston is applied. This presses the friction discs and steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear.
Likewise, when clutch pressure is bled from the clutch pack, the piston releases the friction discs and steel plates, and they are free to slide past each other while disengaged. This allows the gear to spin independently on its shaft, transmitting no power.

1st Clutch
The 1st clutch engages/disengages 1st gear, and is located at the center of the secondary shaft.
The 1st clutch is joined back-to-back to the 2nd clutch.
The 1st clutch is supplied clutch pressure by its oil feed pipe within the secondary shaft.

1st-hold Clutch
The 1st-hold clutch engages/disengages 1st-hold or [1] position, and is located at the end of the countershaft, just behind the torque converter housing. The 1st-hold clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

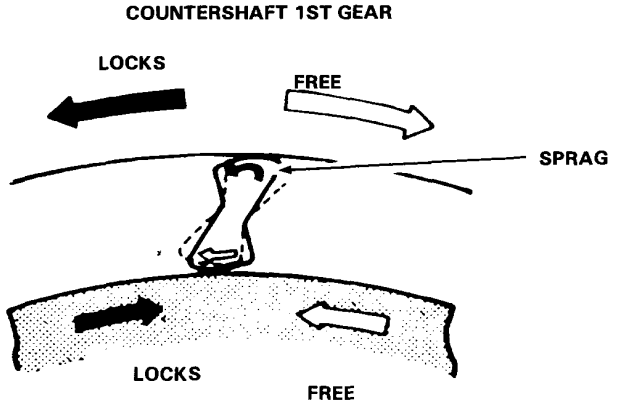
2nd Clutch
The 2nd clutch engages/disengages 2nd gear, and is located at the center of the secondary shaft. The 2nd clutch is joined back-to-back to the 1st clutch. The 2nd clutch is supplied clutch pressure through the secondary shaft by a circuit connected to the internal hydraulic circuit.

3rd Clutch
The 3rd clutch engages/disengages 3rd gear, and is located at the center of the mainshaft.
The 3rd clutch is joined back-to-back to the 4th clutch.
The 3rd clutch is supplied clutch pressure through the mainshaft by a circuit connected to the regulator valve body.

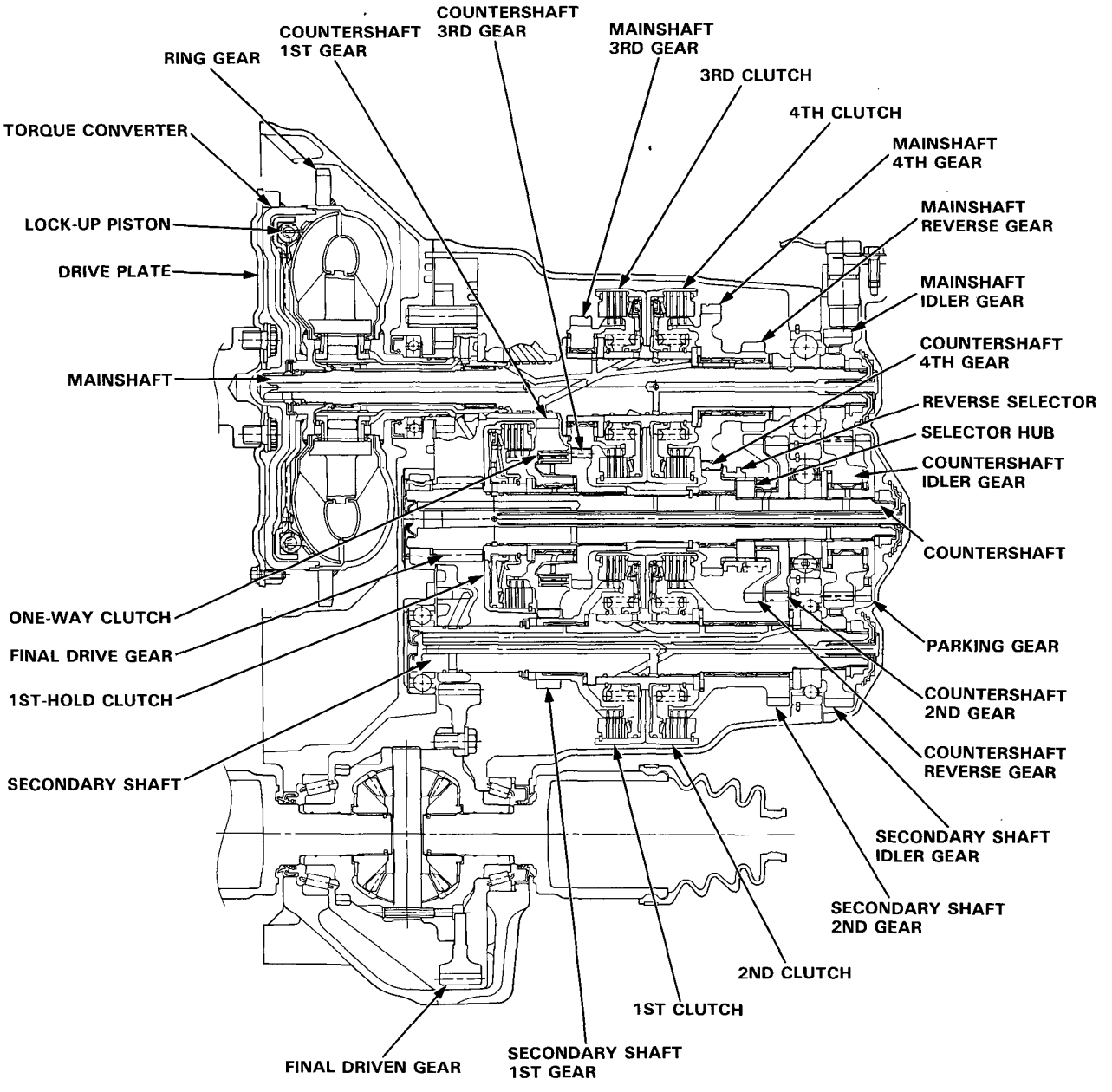
4th Clutch
The 4th clutch engages/disengages 4th gear, as well as reverse gear, and is located at the center of the mainshaft. The 4th clutch is joined back-to-back to the 3rd clutch. The 4th clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

One-way Clutch
The one-way clutch is positioned between the countershaft 1st gear and 3rd gear, with the 3rd gear splined to the countershaft. The 1st gear provides the outer race surface, and the 3rd gear provides the inner race surface. The one-way clutch locks up when power is transmitted from the mainshaft 1st gear to the countershaft 1st gear.
The 1st clutch and gears remain engaged in the 1st, 2nd, 3rd, and 4th gear ranges in the [D4], [D3] or [2] position.

However, the one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the [D4], [D3] or [2] position.
This is because the increased rotational speed of the gears on the countershaft overrides the locking "speed range" of the one-way clutch. Thereafter, the one-way clutch free-wheels with the 1st clutch still engaged.



NOTE:
View from right side cover side.


COUNTERSHAFT 3RD GEAR
COUNTERSHAFT 1ST GEAR
MAINSHAFT 3RD GEAR
RING GEAR
3RD CLUTCH
4TH CLUTCH
TORQUE CONVERTER
MAINSHAFT 4TH GEAR
LOCK-UP PISTON
MAINSHAFT REVERSE GEAR
DRIVE PLATE
MAINSHAFT IDLER GEAR
COUNTERSHAFT 4TH GEAR
MAINSHAFT
REVERSE SELECTOR
SELECTOR HUB
COUNTERSHAFT IDLER GEAR
COUNTERSHAFT
ONE-WAY CLUTCH
PARKING GEAR
FINAL DRIVE GEAR
COUNTERSHAFT 2ND GEAR
1ST-HOLD CLUTCH
COUNTERSHAFT REVERSE GEAR
SECONDARY SHAFT
SECONDARY SHAFT IDLER GEAR
SECONDARY SHAFT 2ND GEAR
2ND CLUTCH
1ST CLUTCH
FINAL DRIVEN GEAR
SECONDARY SHAFT 1ST GEAR

Description

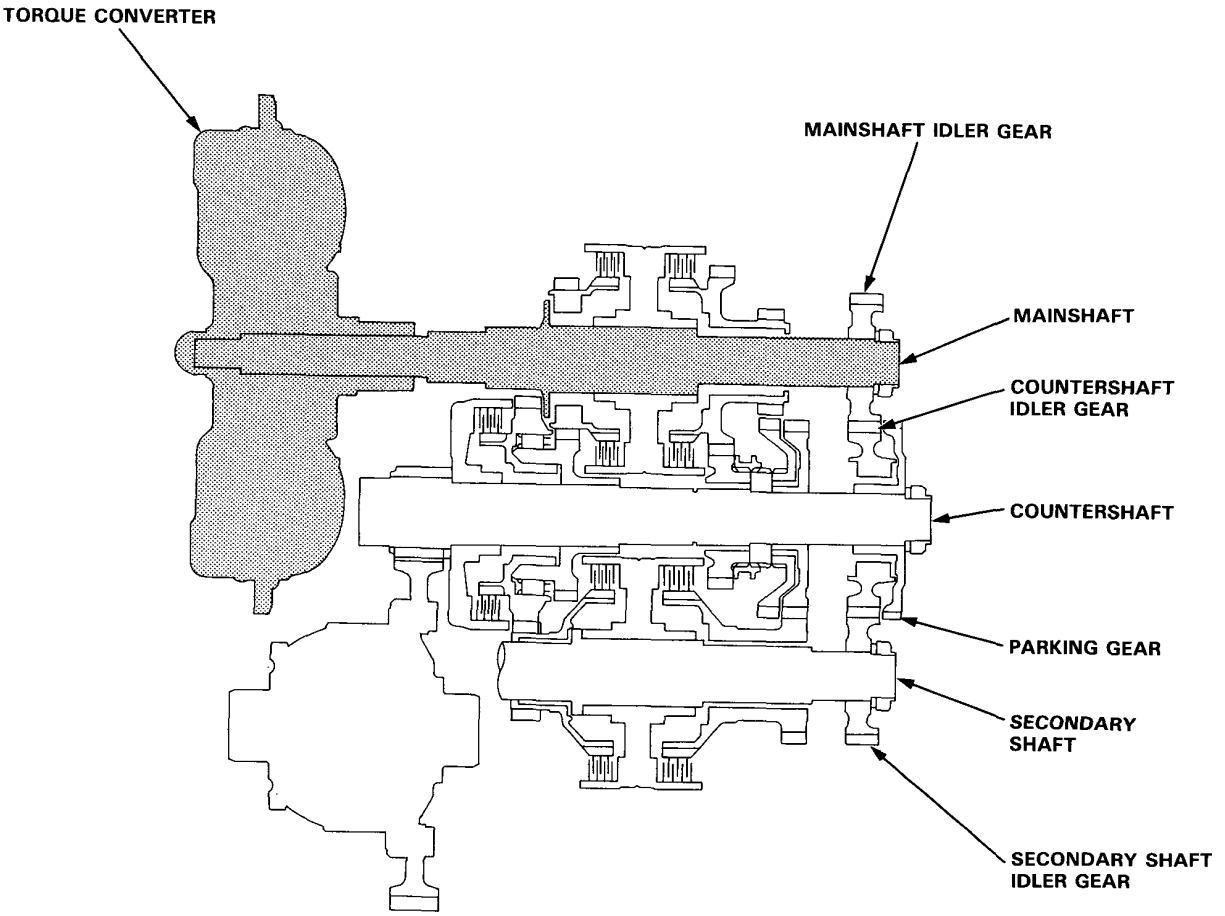
Power Flow

PART / POSITION		TORQUE CON-VERTER	1ST GEAR 1ST-HOLD CLUTCH	1ST GEAR 1ST CLUTCH	1ST GEAR ONE-WAY CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH		REVERSE GEAR	PARKING GEAR
								GEAR	CLUTCH		
P		○	×	×	×	×	×	×	×	×	○
R		○	×	×	×	×	×	×	○	○	×
N		○	×	×	×	×	×	×	×	×	×
D4	1ST	○	×	○	○	×	×	×	×	×	×
	2ND	○	×	*○	×	○	×	×	×	×	×
	3RD	○	×	*○	×	×	○	×	×	×	×
	4TH	○	×	*○	×	×	×	○	○	×	×
D3	1ST	○	×	○	○	×	×	×	×	×	×
	2ND	○	×	*○	×	○	×	×	×	×	×
	3RD	○	×	*○	×	×	○	×	×	×	×
2		○	×	*○	×	○	×	×	×	×	×
1		○	○	○	○	×	×	×	×	×	×

○: Operates, ×: Doesn't operate, *: Although the 1st clutch engages, driving power in not transmitted as the one-way clutch slips.

[N] Position
Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft.

[P] Position
Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. The countershaft is locked by the parking brake pawl interlocking the parking gear.



(cont'd)

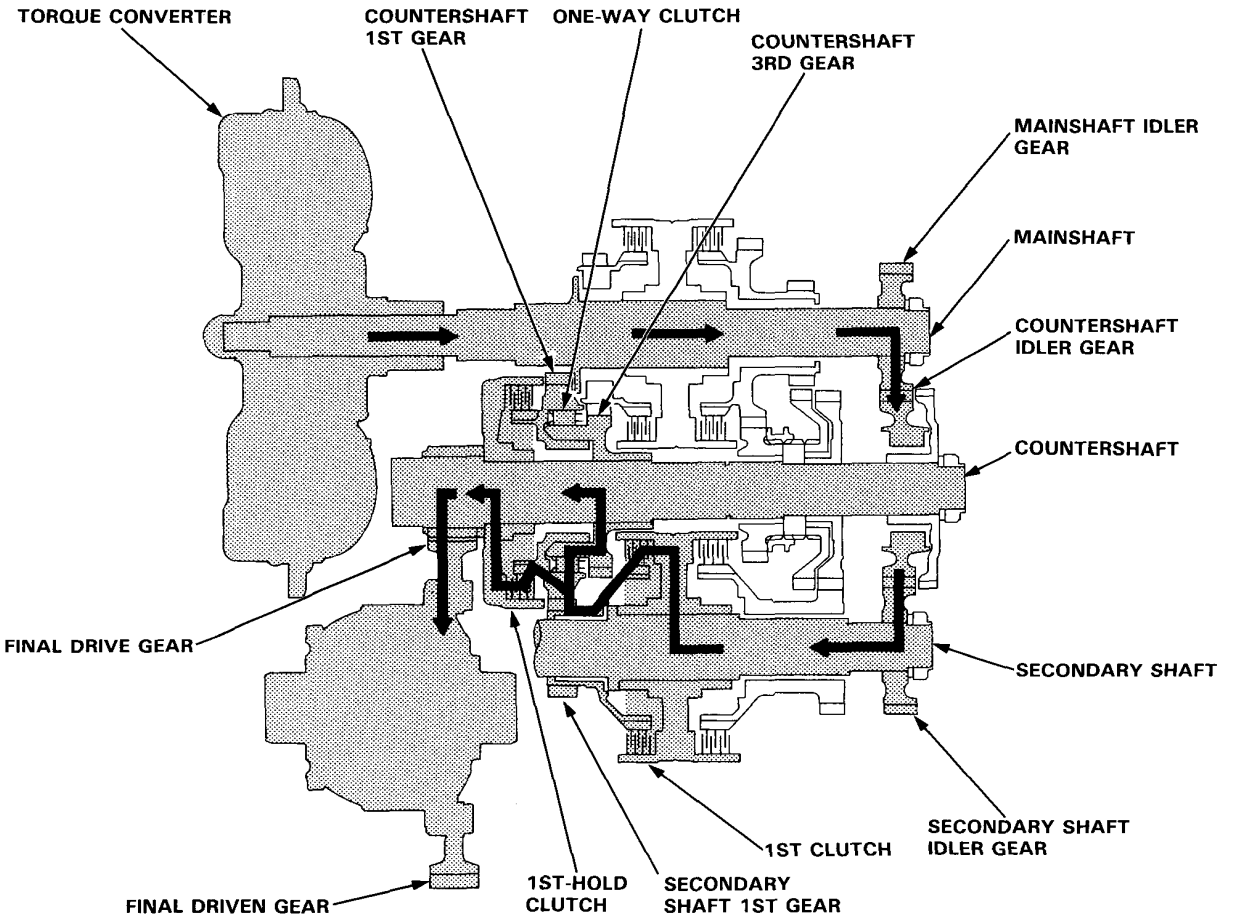
Power Flow (cont'd)

[1] Position

In [1] position, hydraulic pressure is applied to the 1st clutch and 1st-hold clutch.

The power flow when accelerating is as follows;

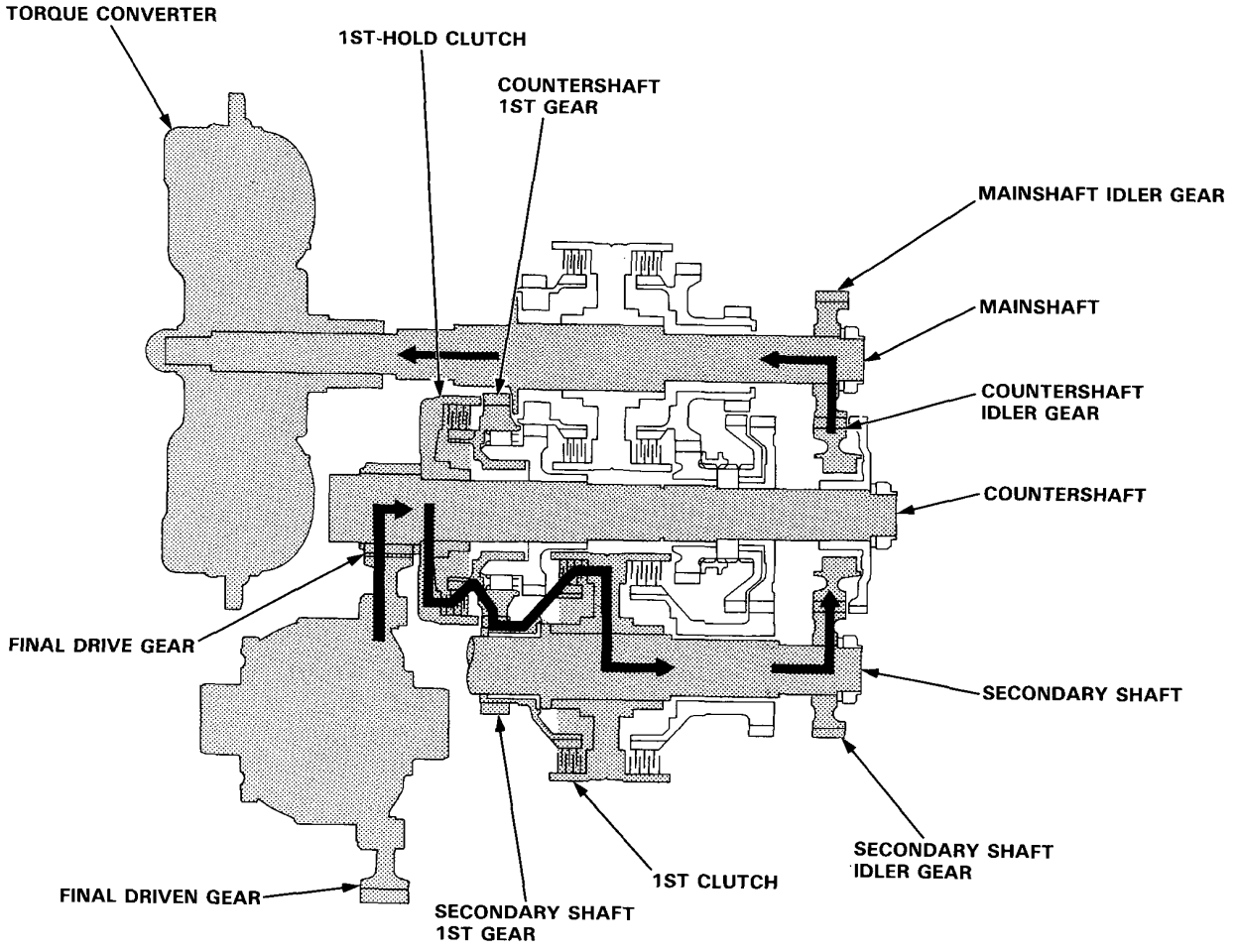
1. Engine power transmitted from the torque converter drives the mainshaft idler gear, countershaft idler gear and secondary shaft idler gear.
2. Hydraulic pressure is applied to the 1st clutch on the secondary shaft, and power is transmitted via the 1st clutch to the countershaft 1st gear.
3. Hydraulic pressure is also applied to the 1st-hold clutch on the countershaft. Power transmitted from the secondary shaft 1st gear is conveyed to the one-way clutch and the 1st-hold clutch. The one-way clutch is used to drive the countershaft via the countershaft 3rd gear, and the 1st-hold clutch drives the countershaft.
4. Power is transmitted to the final drive gear, which in turn drives the final driven gear.



[1] Position

The power flow when decelerating as follows;

1. Hydraulic pressure is applied to the 1st clutch and 1st-hold clutch, and rolling resistance from the road surface goes through the front wheels to the final drive gear, then to the secondary shaft idler gear.
2. The one-way clutch disengages at this time because the application of torque is reverse.
3. The counterforce conveyed to the secondary shaft idler gear turns the mainshaft idler gear via the countershaft idler gear. As a result, engine braking can be obtained with 1st gear.



(cont'd)

Description

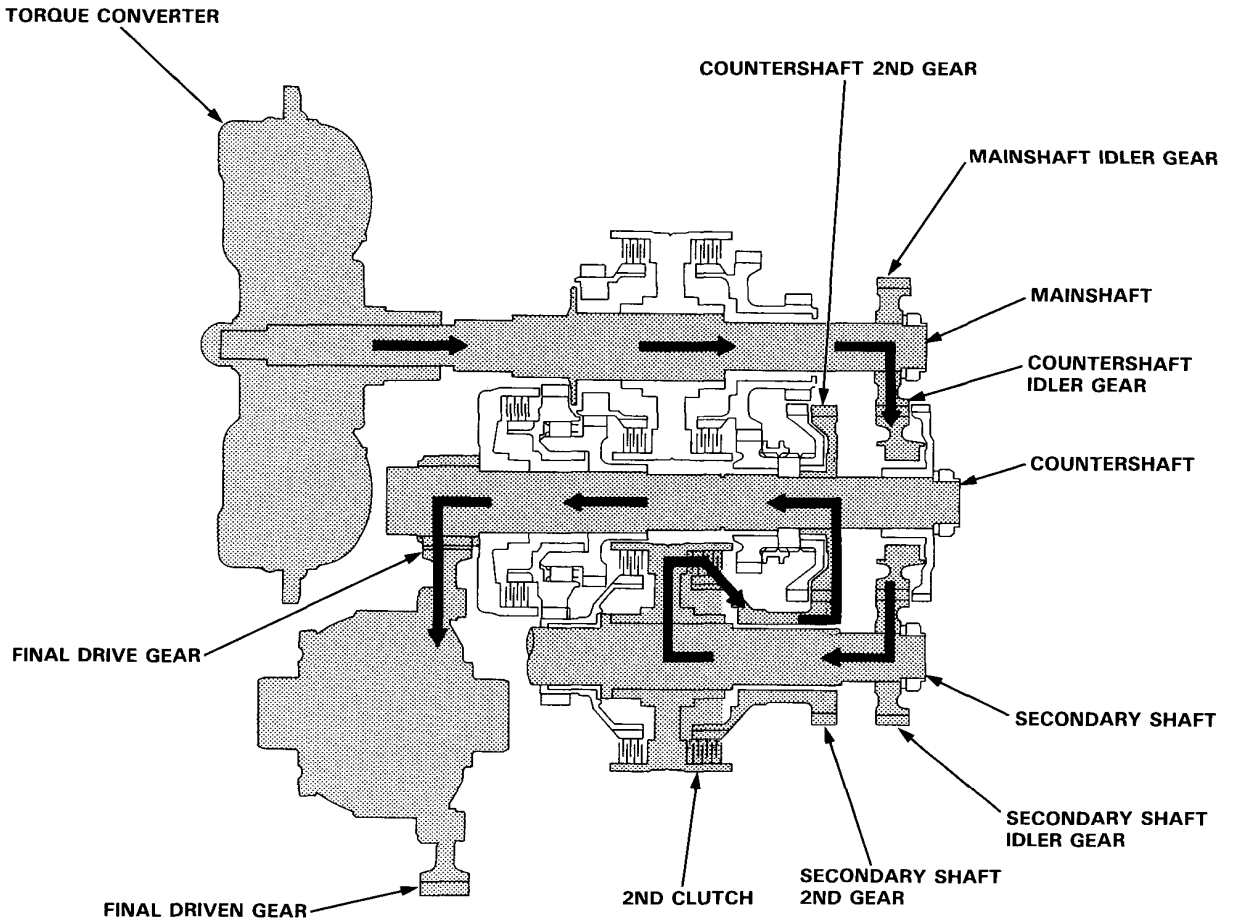
Power Flow (cont'd)

[2] Position

[2] Position is provided to drive 2nd speed only.

1. Hydraulic pressure is applied to the 2nd clutch on the secondary shaft, and power is transmitted via the 2nd clutch to the secondary shaft 2nd gear.
2. Power transmitted from the secondary shaft 2nd gear is conveyed to the countershaft 2nd gear, and drives the countershaft.
3. Power is transmitted to the final drive gear, which in turn drives the final driven gear.

NOTE: Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of the 2nd gear exceeds that of the 1st gear, power from 1st gear is cut off at the one-way clutch.

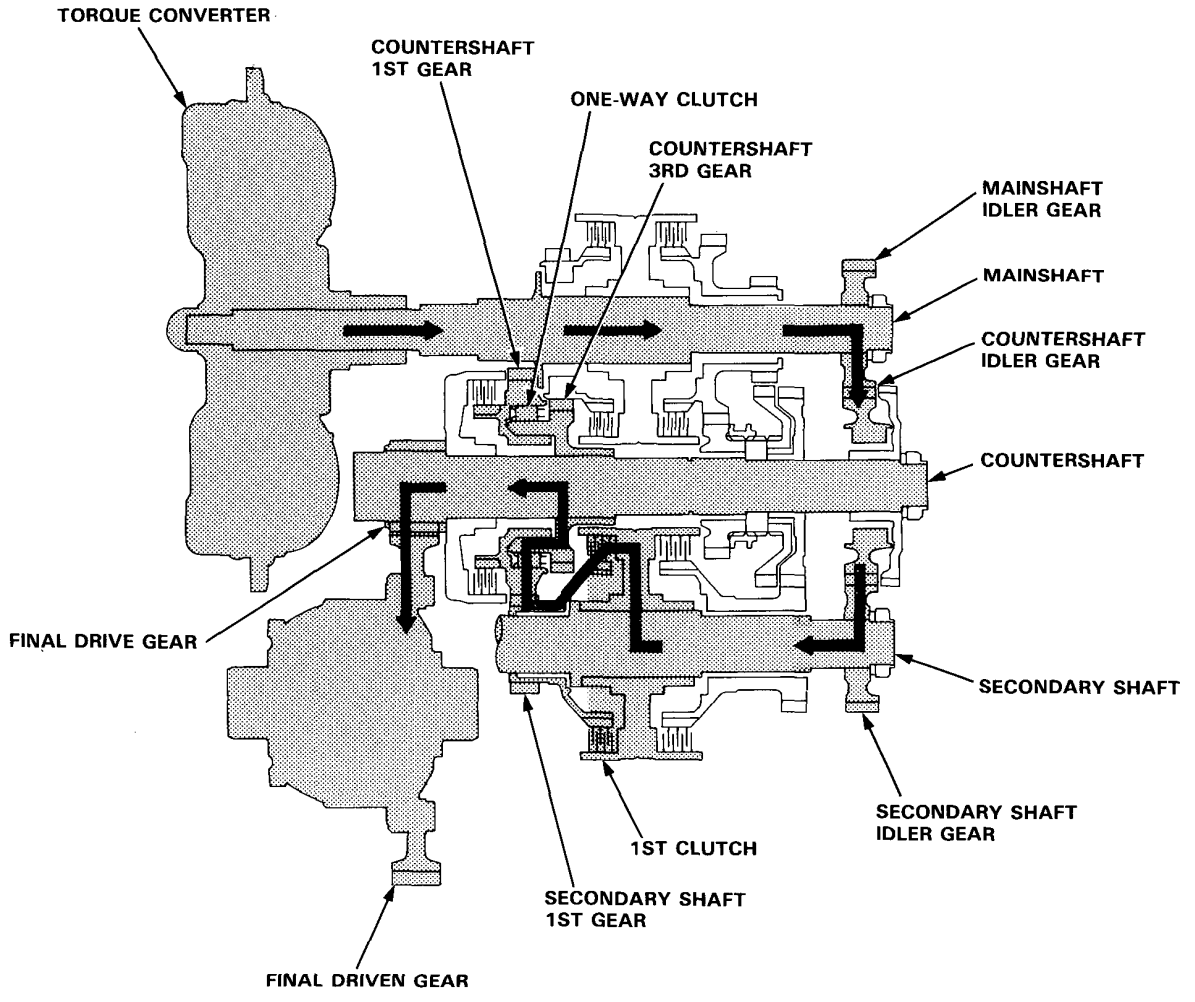


In [D4] or [D3] position, the optimum gear is automatically selected from 1st, 2nd, 3rd, and 4th speeds, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

[D4] or [D3] Position, 1st speed

1. Hydraulic pressure is applied to the 1st clutch, and power is transmitted via the 1st clutch to the secondary shaft 1st gear.
2. Power transmitted to the secondary shaft 1st gear is conveyed via the countershaft 1st gear to the one-way clutch. The one-way clutch is used to drive the countershaft.
3. Power is transmitted to the final drive gear, which in turn drives the final driven gear.

NOTE: In [D4] or [D3] position, hydraulic pressure is not applied to the 1st-hold clutch.



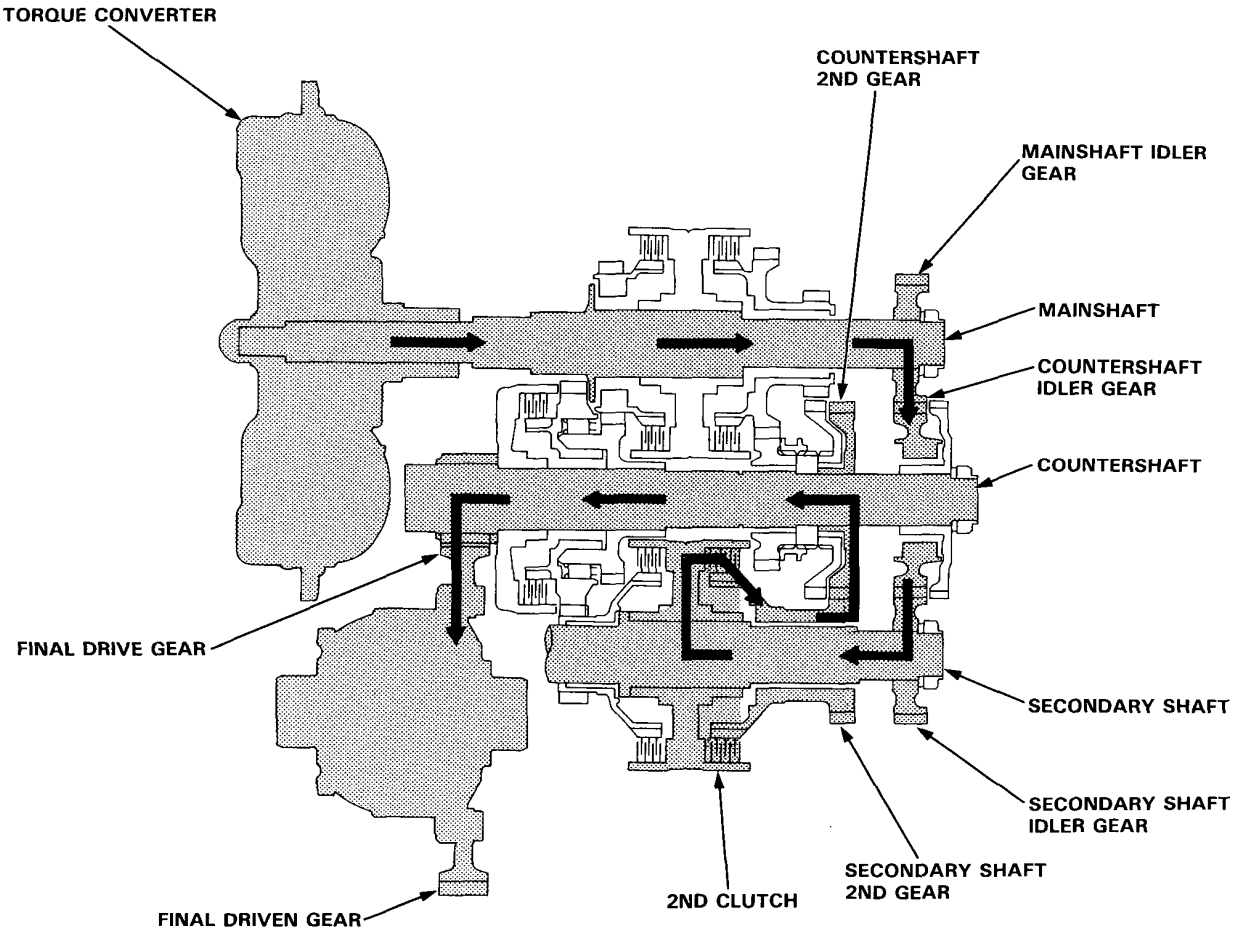
(cont'd)

Power Flow (cont'd)

[D4] or [D3] Position, 2nd speed

1. Hydraulic pressure is applied to the 2nd clutch, and power is transmitted via the 2nd clutch to the secondary shaft 2nd gear.
2. Power transmitted to the secondary shaft 2nd gear is conveyed to the countershaft 2nd gear, and drives the countershaft.
3. Power is transmitted to the final drive gear, which in turn drives the final driven gear.

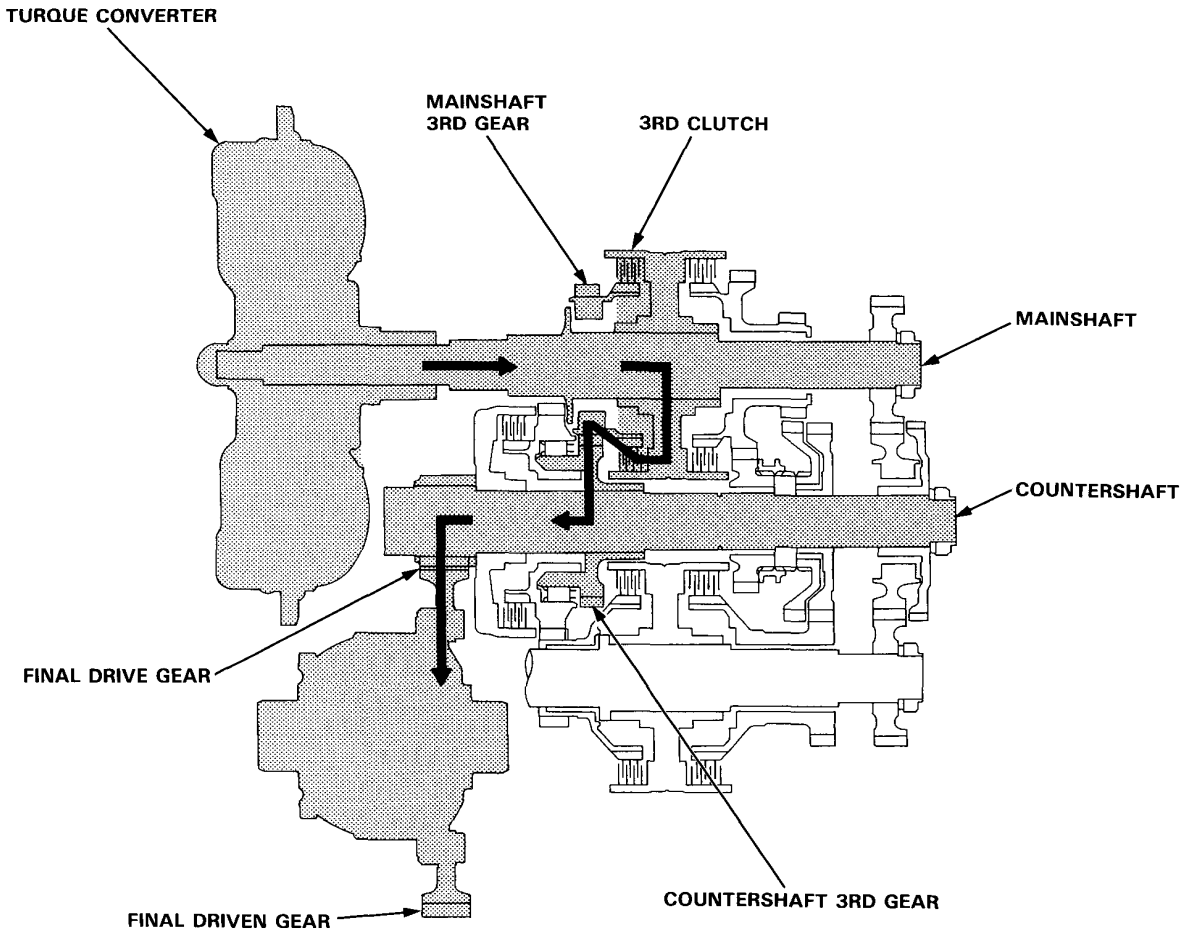
NOTE: In [D4] or [D3] position, 2nd speed, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



[D4] or [D3] Position, 3rd speed

1. Hydraulic pressure is applied to the 3rd clutch, and power is transmitted via the 3rd clutch to the mainshaft 3rd gear.
2. Power transmitted to the mainshaft 3rd gear is conveyed to the countershaft 3rd gear, and drives the countershaft.
3. Power is transmitted to the final drive gear, which in turn drives the final driven gear.

NOTE: In [D4] or [D3] position, 3rd speed, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 3rd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



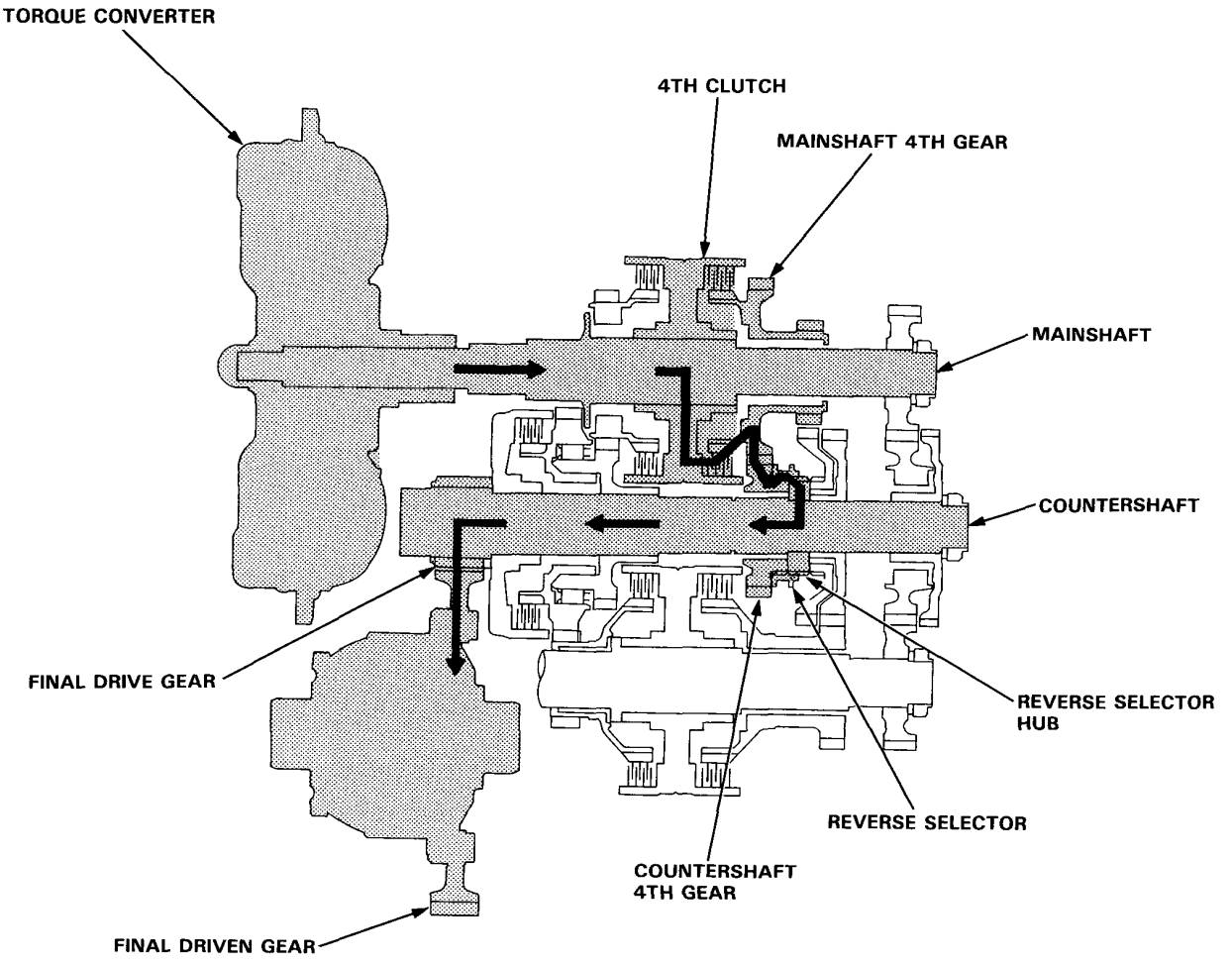
(cont'd)

Power Flow (cont'd)

[D4] Position, 4th speed

1. Hydraulic pressure is applied to the 4th clutch, and power is transmitted via the 4th clutch to the mainshaft 4th gear.
2. Power transmitted to the mainshaft 4th gear is conveyed to the countershaft 4th gear, and drives the countershaft via the reverse selector hub.
3. Power is transmitted to the final drive gear, which in turn drives the final driven gear.

NOTE: In [D4] position, 4th speed, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 4th gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



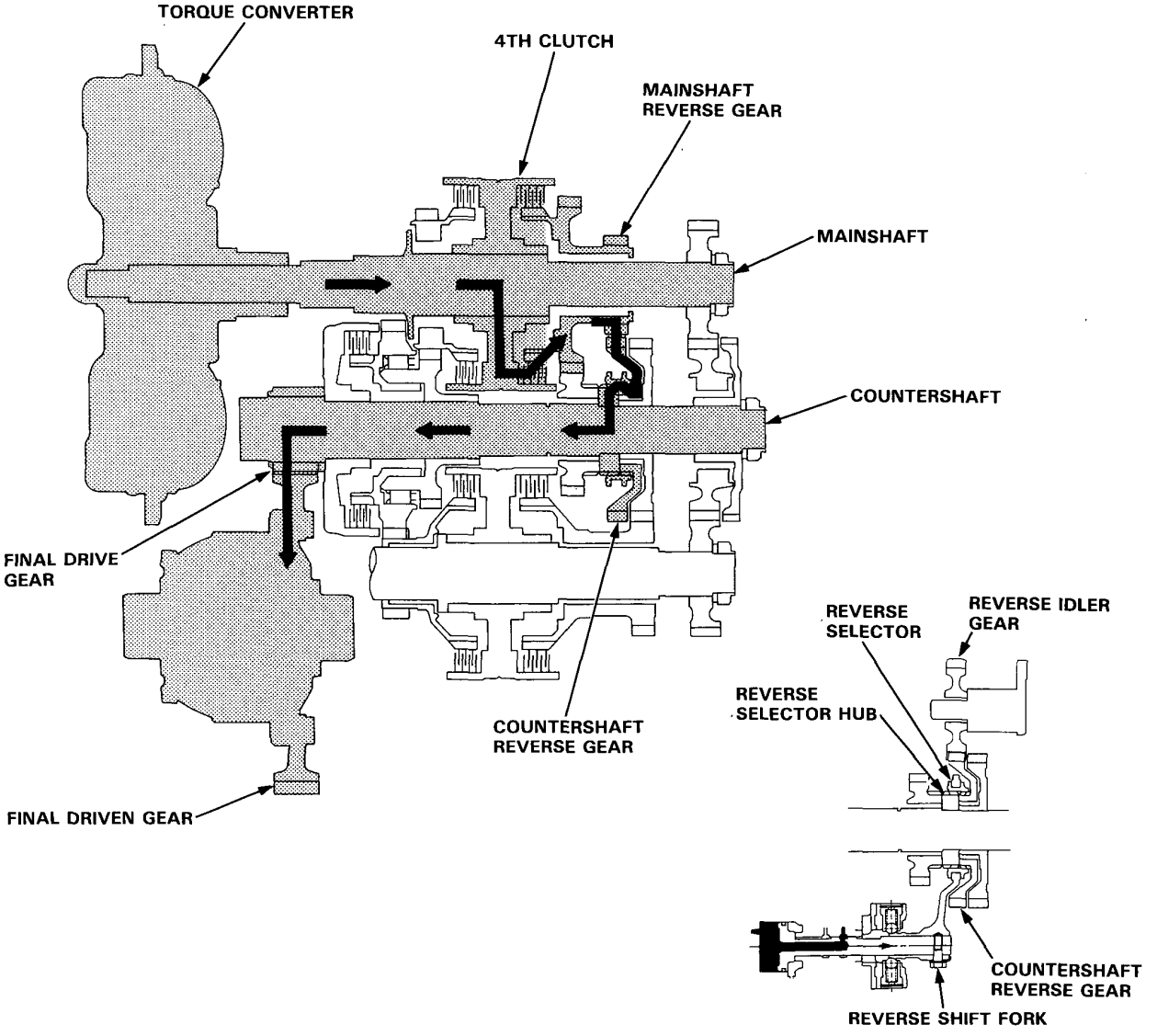
R Position

1. Hydraulic pressure is switched by the manual valve to the servo valve, which moves the reverse shift fork to the reverse position. The reverse shift fork engages with the reverse selector, reverse selector hub and the countershaft reverse gear.

2. Hydraulic pressure is also applied to the 4th clutch. Power is transmitted from the mainshaft reverse gear via the reverse idler gear to the countershaft reverse gear.

3. The rotation direction of the countershaft reverse gear is changed via the reverse idler gear.

4. Power is transmitted to the final drive gear, which in turn drives the final driven gear.



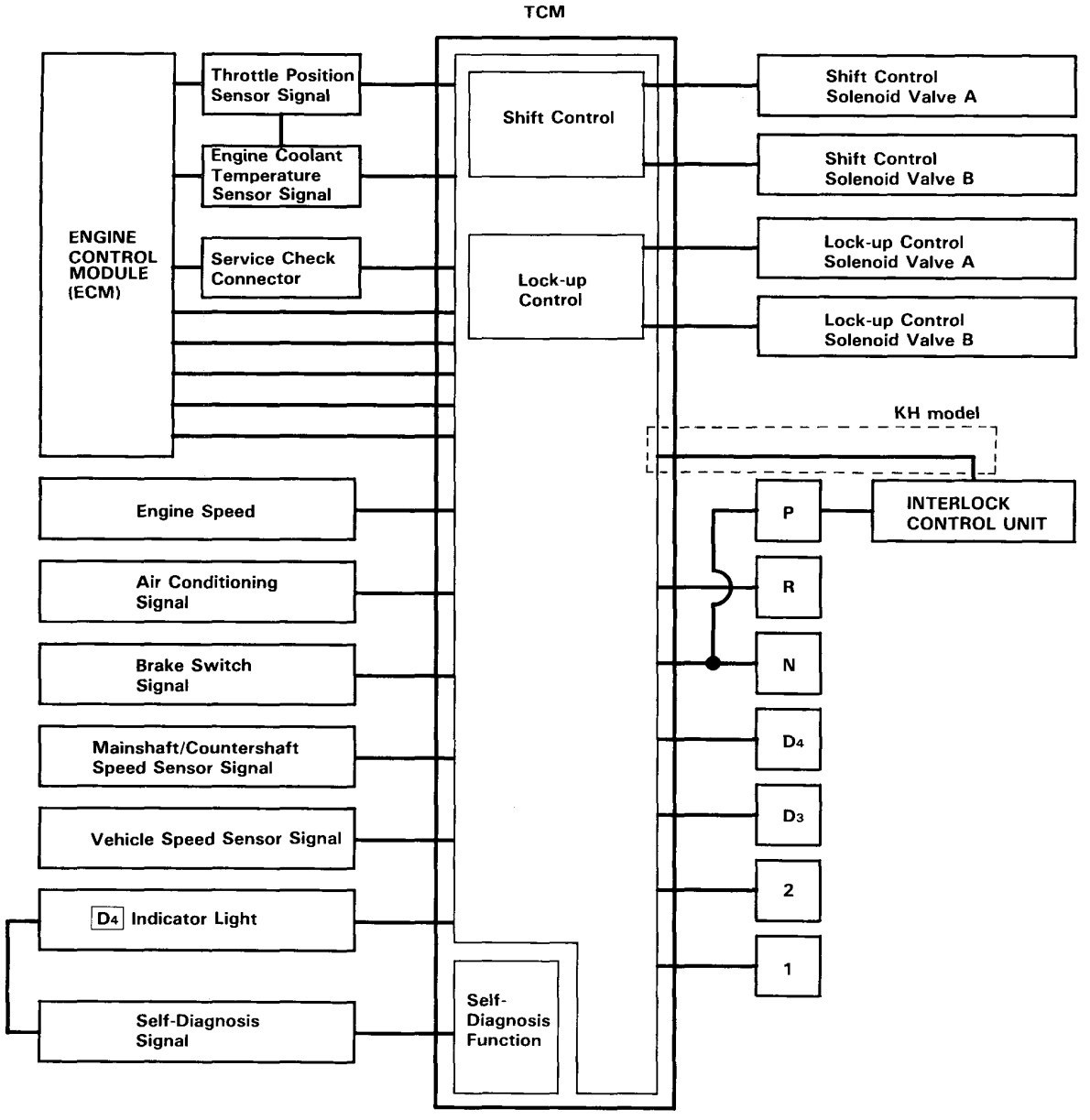
Description

Electronic Control System

Electronic Control System

The electronic control system consists of the Transmission Control Module (TCM), sensors, and four solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.

The TCM is located below the dashboard, under the front lower panel on the passenger's side.



Lock-up Control

From sensor input signals, the TCM determines whether to turn the lock-up ON or OFF and activates lock-up control solenoid valve A and/or B accordingly.

The combination of driving signals to lock-up control solenoid valves A and B is shown in the table below.

Lock-up control Solenoid valve / Lock-up condition	A	B
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	OFF
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up during deceleration	ON	*Duty operation* OFF↔ON

Shift Control

The TCM instantaneously determines which gear should be selected by various signals sent from sensors, and actuates the shift control solenoid valves A and B control shifting. Also, a Grade Logic Control System (KH model) has been adopted to control shifting in [D4] position while the vehicle is ascending or descending a slope, or reducing speed.

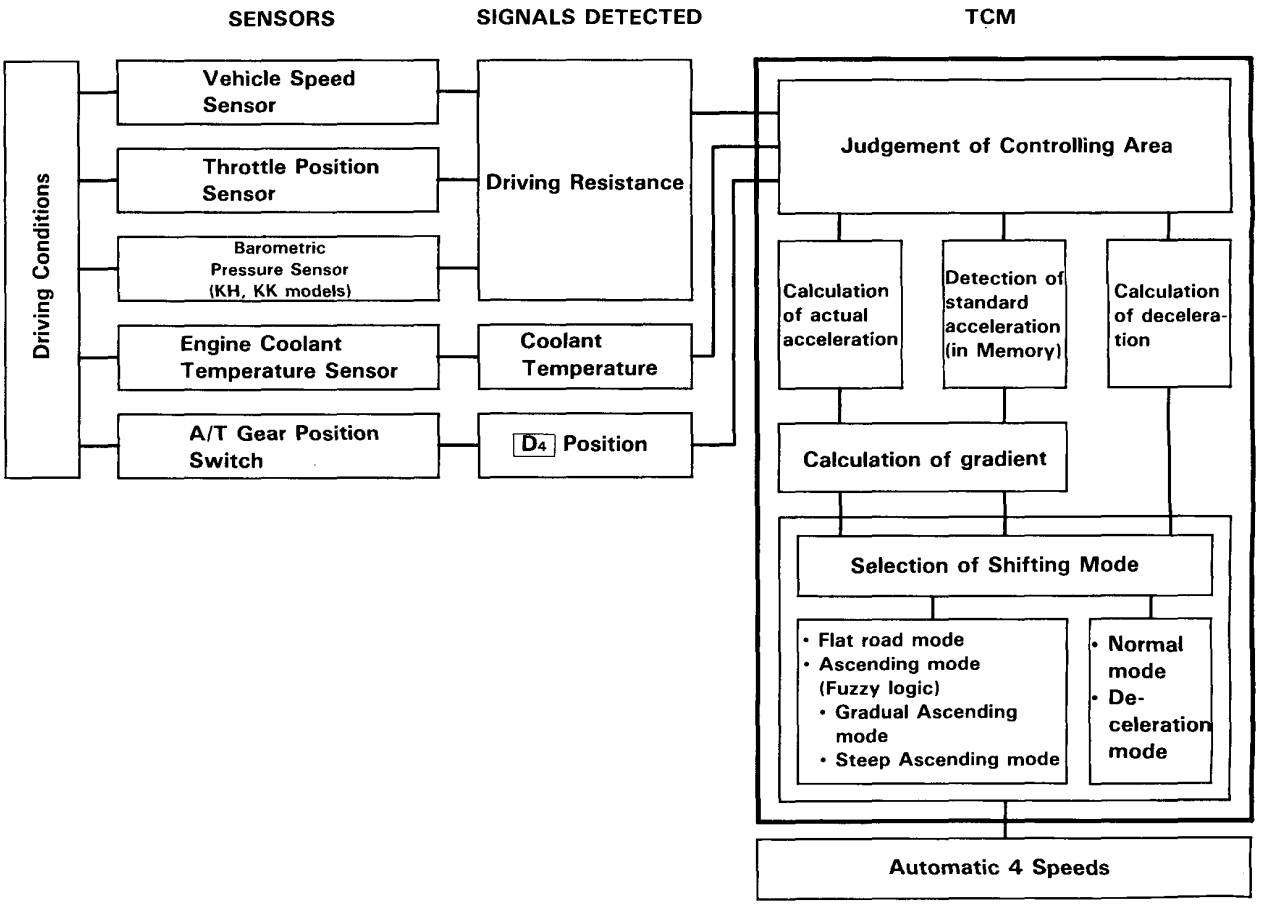
Shift control solenoid valve / Position (gear)		A	B
[D3], [D4]	(1st)	OFF	ON
	(2nd)	ON	ON
	(3rd)	ON	OFF
[D4]	(4th)	OFF	OFF
[2]	(2nd)	ON	ON
[1]	(1st)	ON	OFF
[R]	(Reverse)	ON	OFF

(cont'd)

Electronic Control System (cont'd)

- **GRADE LOGIC CONTROL SYSTEM (KH model)**

How it works:
The TCM compares actual driving conditions with driving conditions memorized in the TCM, based on the input from the vehicle speed sensor, throttle position sensor, engine coolant temperature sensor, barometric pressure sensor, brake switch signal and select lever position signal, to control shifting while a vehicle is ascending or descending a slope, or reducing speed.



• **Ascending Control**

When the TCM determines that the vehicle is climbing a hill in [D4] position, the system extends the engagement area of 3rd gear to prevent the transmission from frequently shifting between 3rd and 4th gears, so the vehicle can run smooth and have more power when needed.

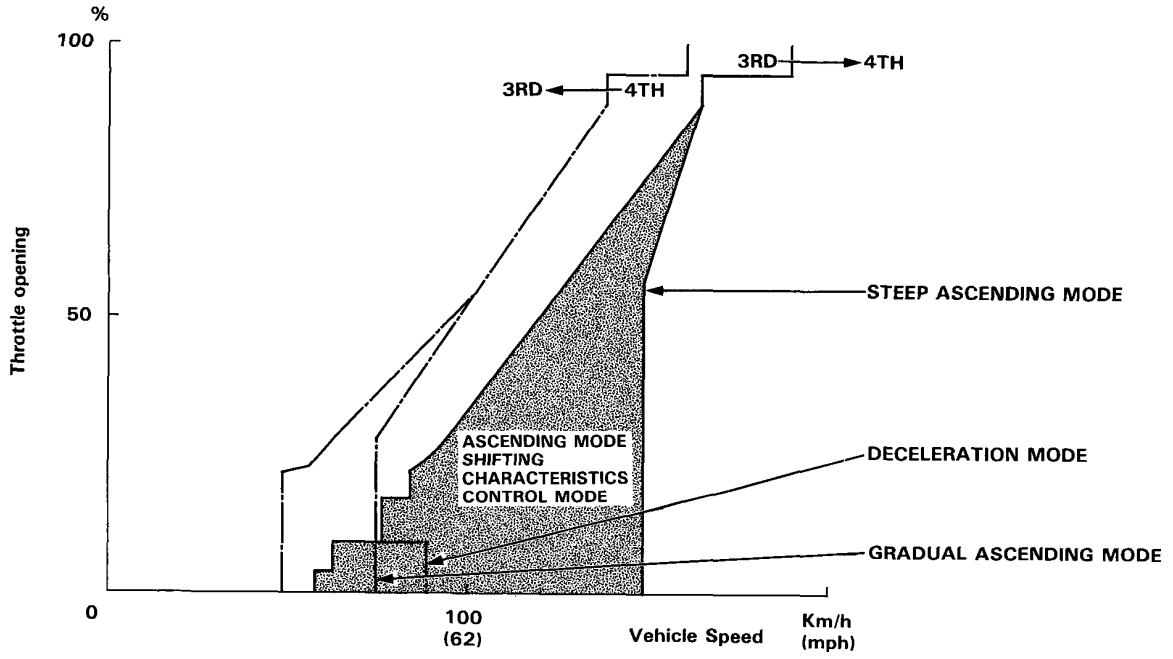
NOTE: Shift schedules between 3rd and 4th gear are stored in the TCM to enable the transmission to automatically select the most suitable gear according to the magnitude of a gradient by Fuzzy Logic.

• **Descending Control**

When the TCM determines that the vehicle is going down a hill in [D4] position, the shift-up speed from 3rd to 4th gear when the throttle is closed becomes faster than the set speed for flat road driving to widen the 3rd gear driving area. This, in combination with engine braking from the deceleration lock-up, achieves smooth driving when the vehicle is descending.

There are two ascending modes with different 3rd gear driving areas according to the magnitude of a gradient stored in the TCM.

When the vehicle is in 4th gear, and you are decelerating on a gradual hill, or when you are applying the brakes on a steep hill, the transmission will downshift to 3rd gear. When you accelerate, the transmission will then return to 4th gear.



• **Deceleration Control**

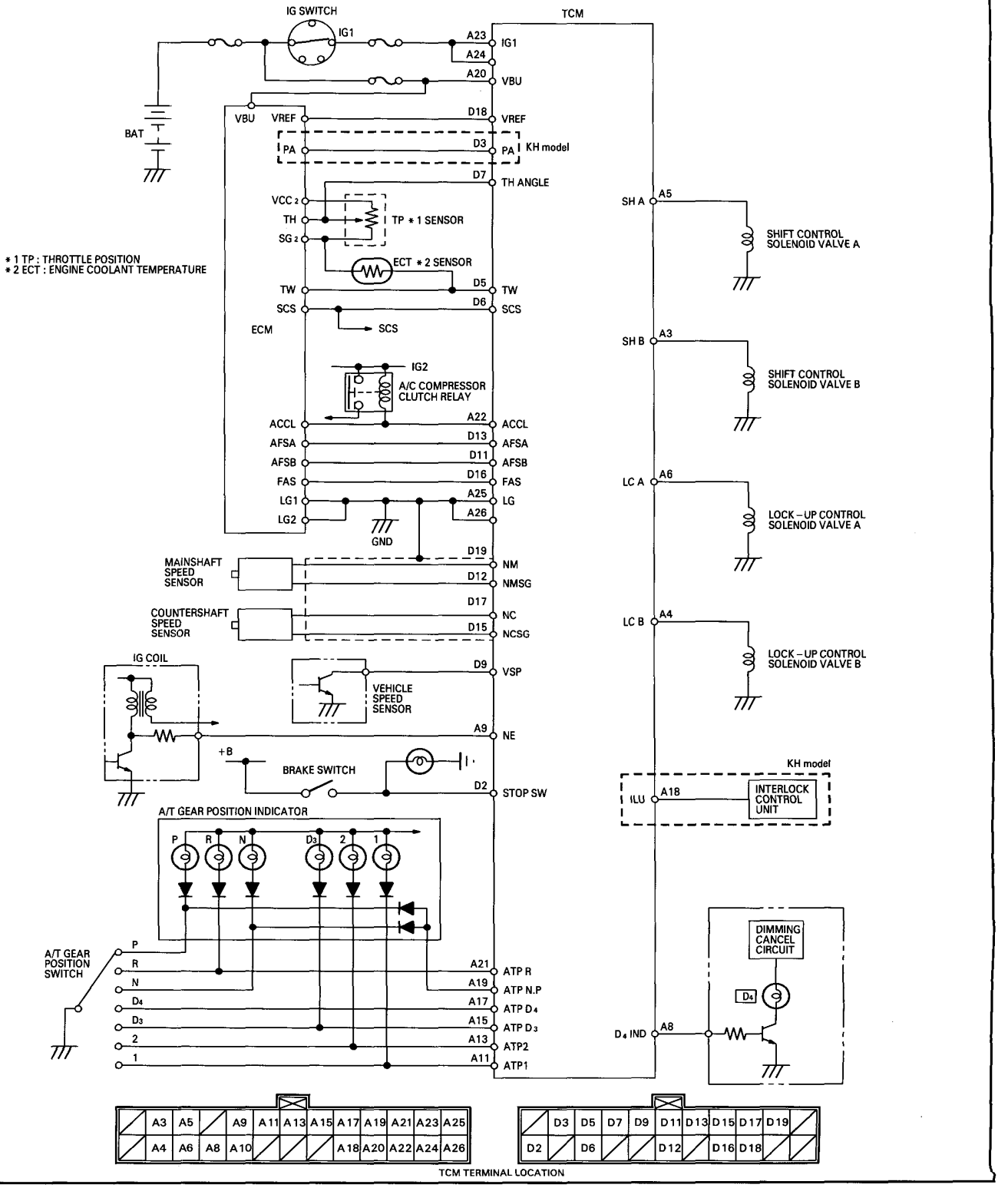
When the vehicle goes around a corner, and needs to decelerate first and then accelerate, the TCM sets the data for deceleration control to reduce the number of times the transmission shifts. When the vehicle is decelerating from speeds above 27 mph (43 km/h), the TCM shifts the transmission from 4th to 2nd earlier than normal to cope with upcoming acceleration.

NOTE:
Fuzzy Logic: Fuzzy logic is a form of artificial intelligence that lets computers respond to changing conditions much like a human mind would.

(cont'd)

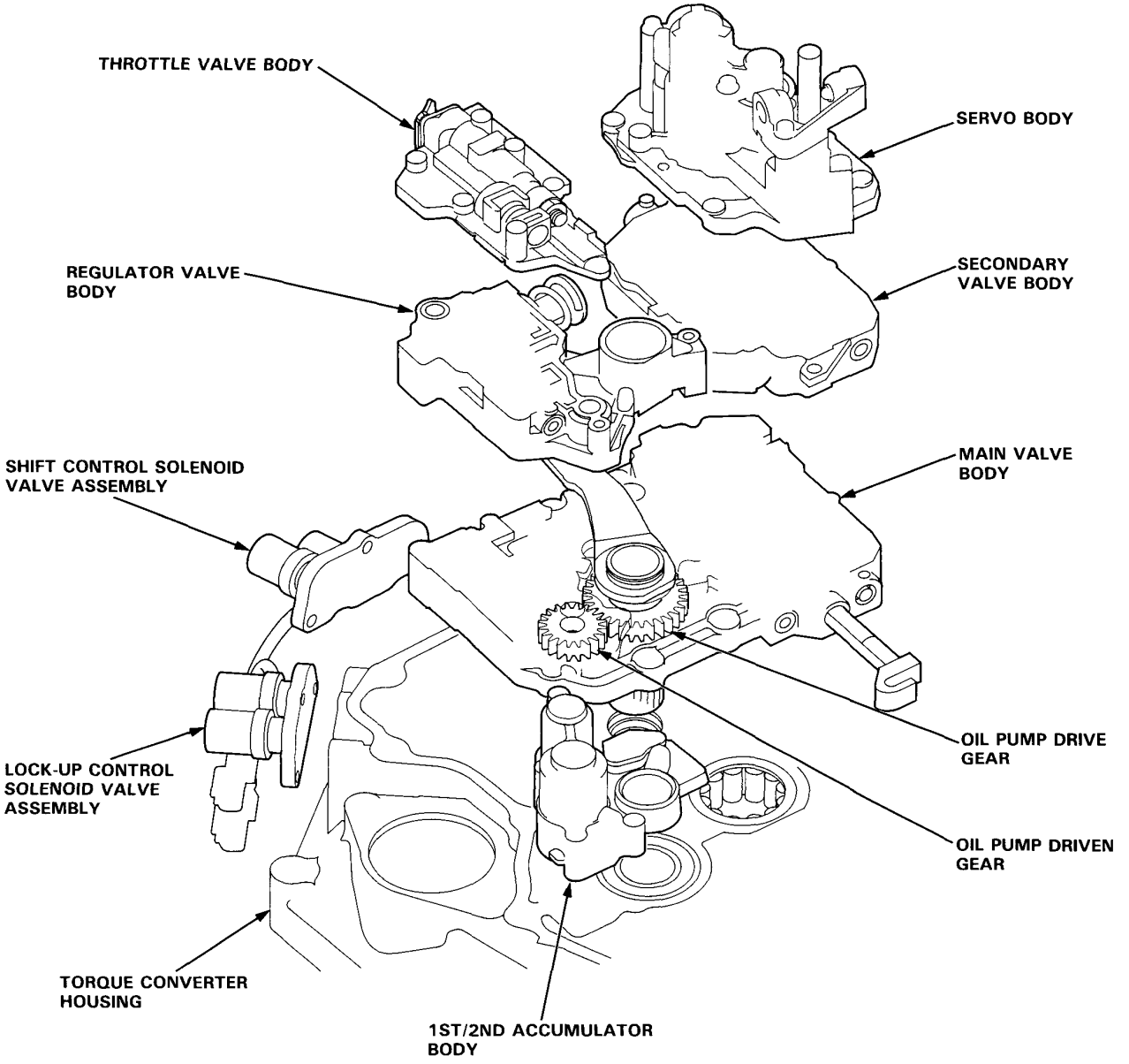
Electronic Control System (cont'd)

Circuit Diagram and Terminal Locations



Hydraulic Control

The valve body includes the main valve body, the regulator valve body, the throttle valve body, the secondary valve body, the servo body and 1st/2nd accumulator body.
The oil pump is driven by splines on the right end of the torque converter which is attached to the engine. Oil flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve and the servo body, directing pressure to each of the clutches.
The shift control solenoid valves A/B and the lock-up control solenoid valves A/B are bolted on the outside of the torque converter housing.

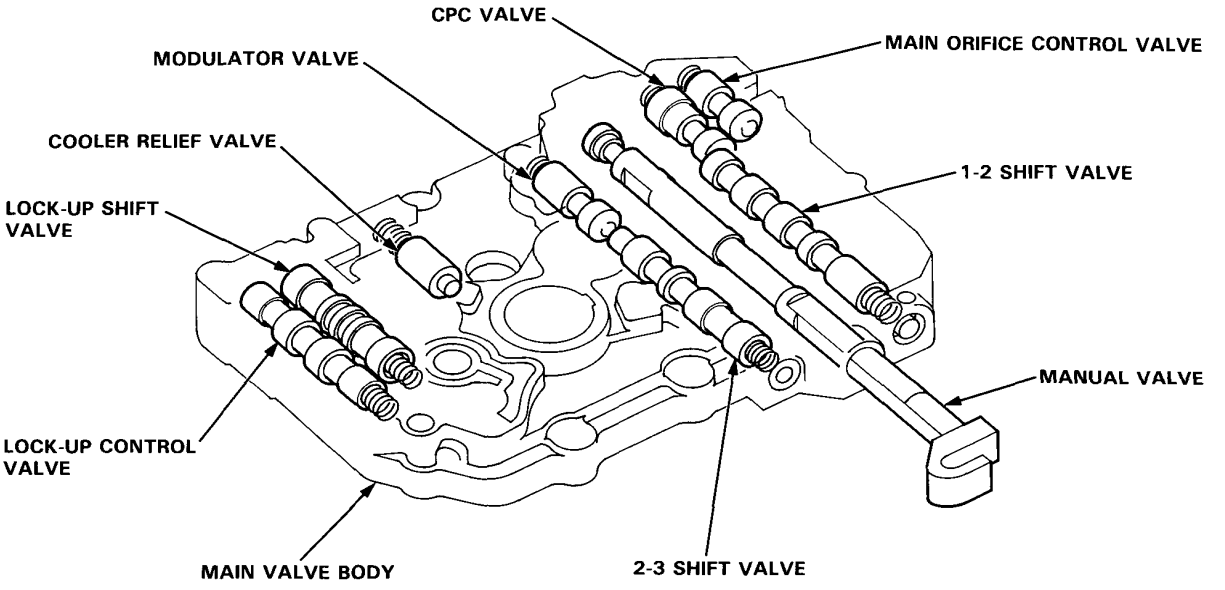


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Hydraulic Control (cont'd)

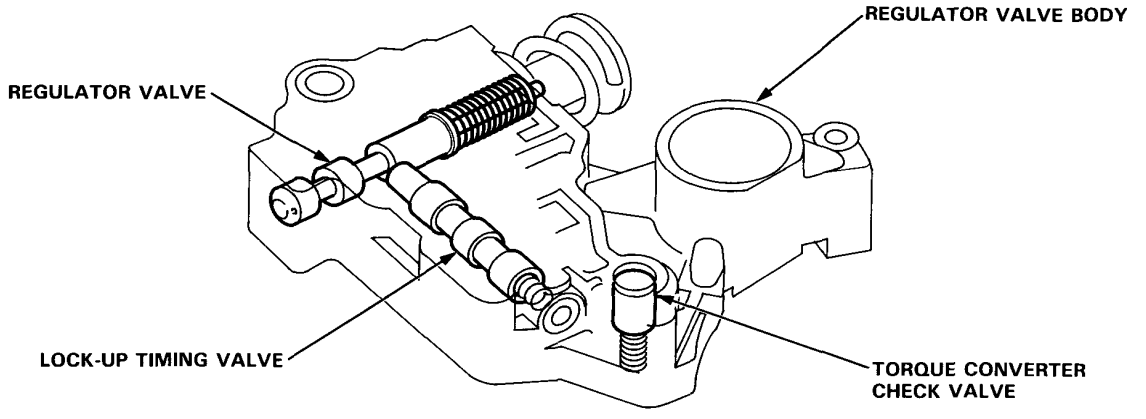
Main Valve Body

The manual valve, 1-2 shift valve, 2-3 shift valve, lock-up control valve, lock-up shift valve, cooler relief valve, modulator valve, clutch pressure control (CPC) valve and main orifice control valve are all assembled in the main valve body. The primary function of this valve body is switching oil pressure on and off and controlling the hydraulic pressure going to the hydraulic control system.



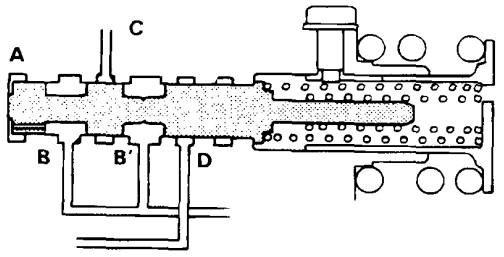
Regulator Valve Body

The regulator valve body is located on the main valve body. The regulator valve body consists of the regulator valve, torque converter check valve and lock-up timing valve.

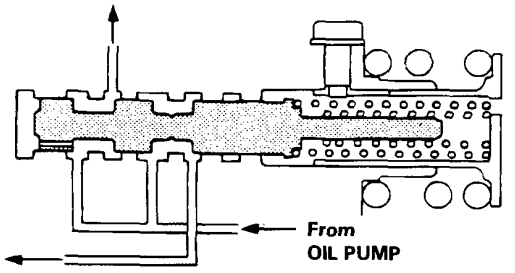


Regulator Valve
The regulator valve maintains a constant hydraulic pressure sent from the oil pump to the hydraulic control system, while also furnishing oil to the lubricating system and torque converter.
Oil flows through B and B'. The oil which enters through B flows through the valve orifice to A, pushing the regulator valve to the right. According to the level of hydraulic pressure through B, the position of the valve changes, and the amount of the oil through B' from D also changes. This operation is continued, maintaining line pressure.

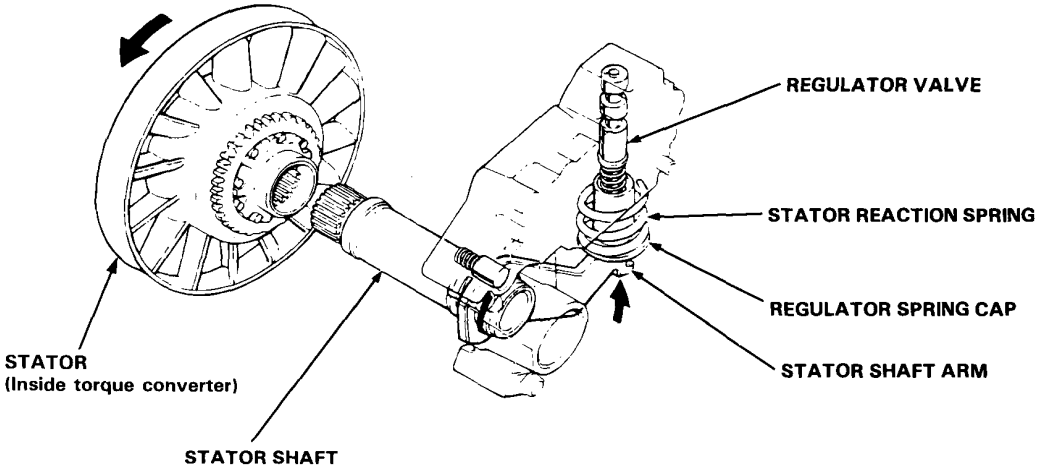
(ENGINE NOT RUNNING)



(ENGINE RUNNING)



Stator Reaction Hydraulic Pressure Control
Hydraulic pressure increase according to torque is performed by the regulator valve using stator torque reaction. The stator shaft is splined in the stator, and its arm end contacts the regulator spring cap. When the car is accelerating or climbing (Torque Converter Range), stator torque reaction acts on the stator shaft, and the stator arm pushes the regulator spring cap in the → direction in proportion to the reaction. The stator reaction spring compresses, and the regulator valve moves to increase the regulated control pressure or line pressure. Line pressure is maximum when the stator reaction is maximum.

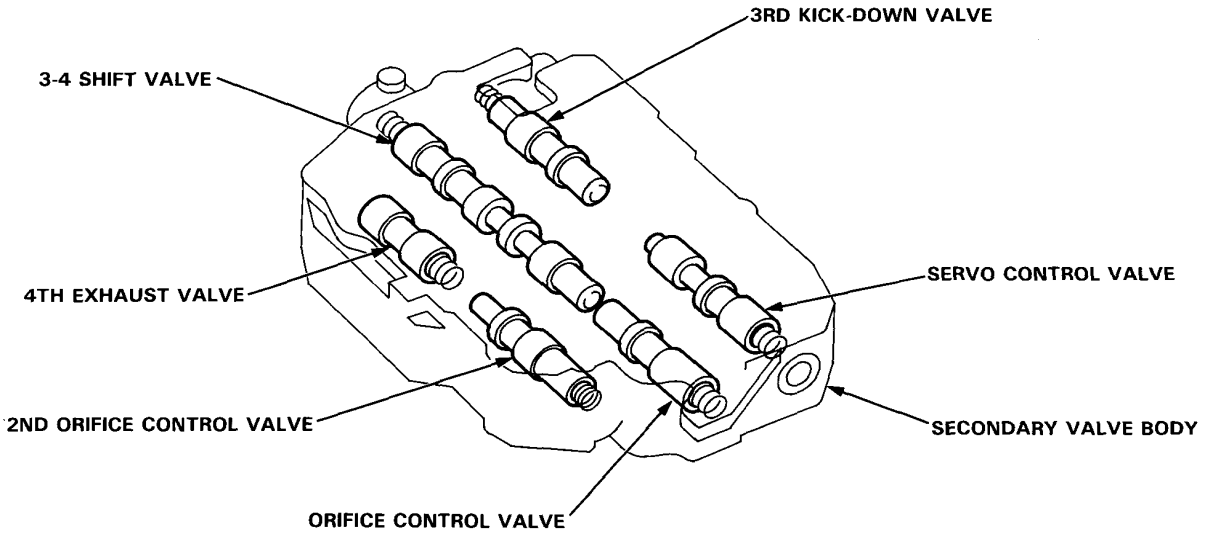


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Hydraulic Control (cont'd)

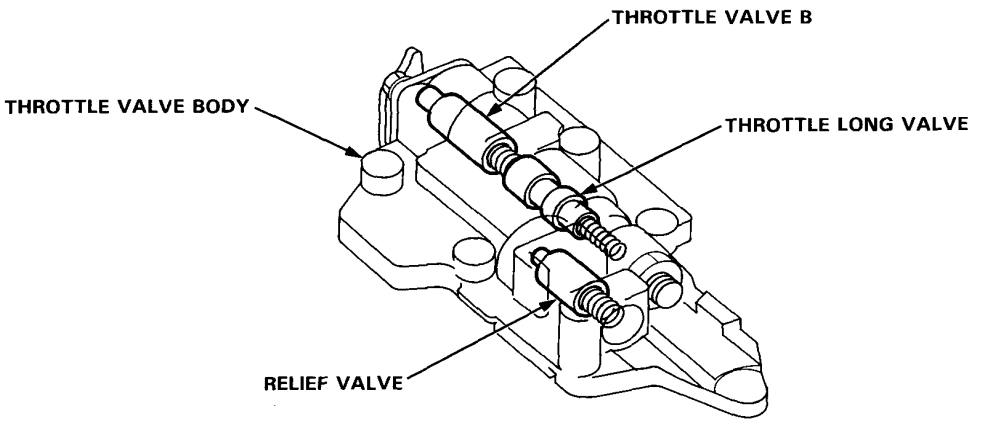
Secondary Valve Body

The secondary valve body is located on the main valve body. The servo control valve, orifice control valve, 2nd orifice control valve, 4th exhaust valve, 3-4 shift valve and 3rd kick-down valve are assembled in the secondary valve body.



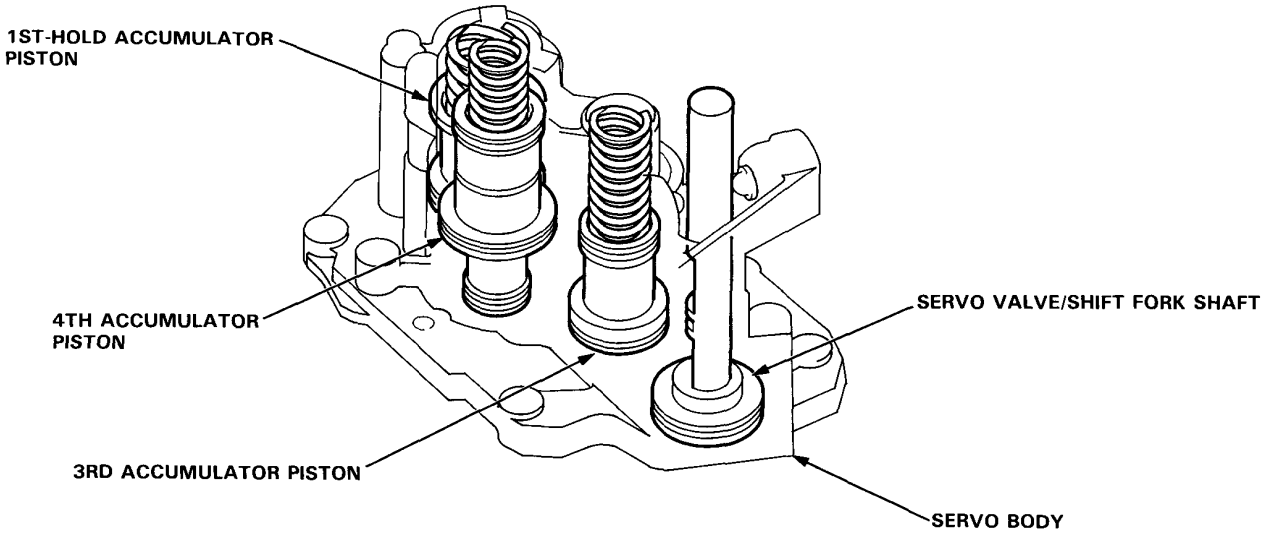
Throttle Valve Body

The throttle valve body is located on the regulator valve body. The throttle valve body contains the throttle valve B, throttle long valve and relief valve.



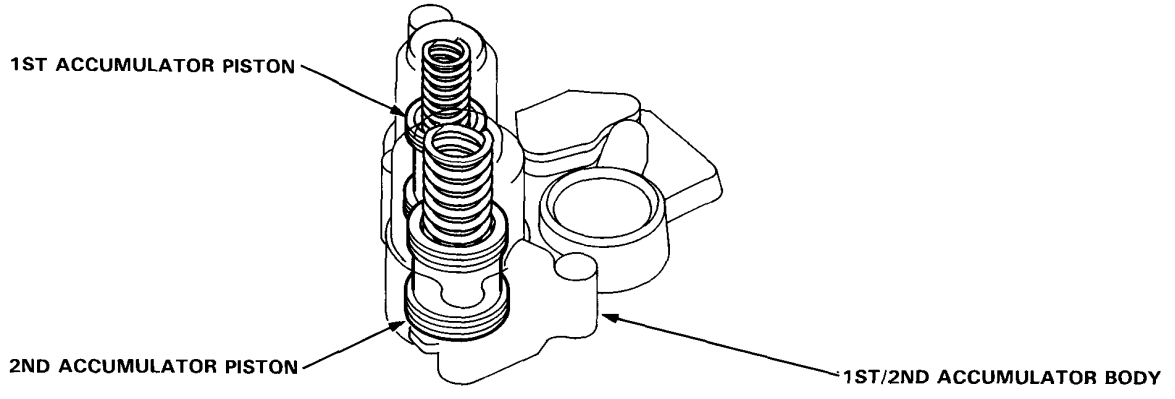
Servo Body

The servo body is located on the secondary valve body. The servo valve is integrated with the shift fork shaft, 3rd accumulator piston, 4th accumulator piston and 1st-hold accumulator piston, which are assembled in the servo body.



1st/2nd Accumulator Body

The 1st/2nd accumulator body is located on the torque converter housing beside the main valve body. This body contains the 1st and 2nd accumulator pistons.



(cont'd)

Description

Hydraulic Flow

General Chart of Hydraulic Pressure

Oil Pump — Regulator Valve — Line Pressure
Regulator Valve — Torque Converter Pressure
Regulator Valve — Lubrication Pressure

Distribution of Hydraulic Pressure

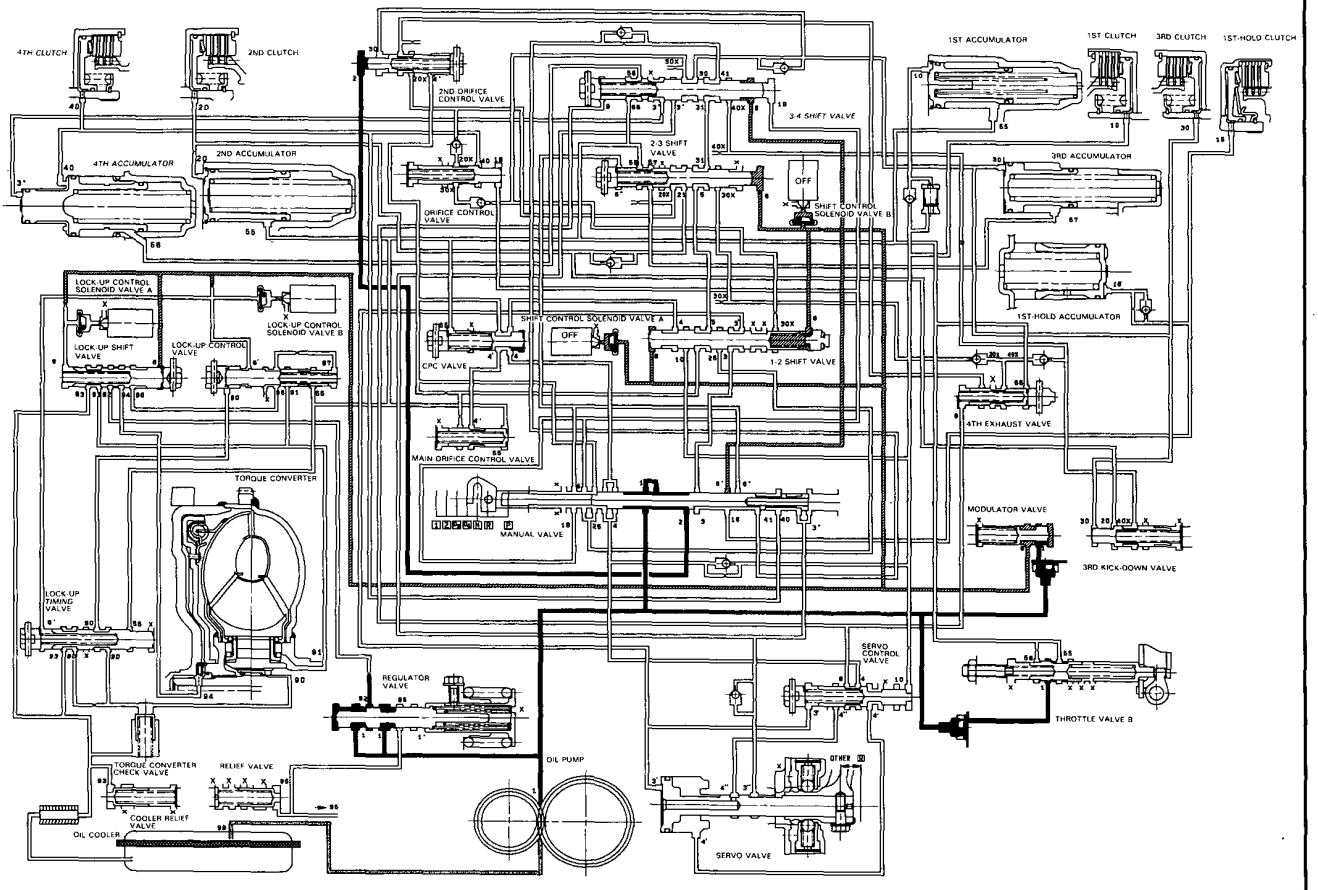
- Regulator Valve — Line Pressure
- Regulator Valve — Torque Converter Pressure
- Regulator Valve — Lubrication Pressure
- Manual Valve — To select Line Pressure
- Modulator Valve — Modulator Pressure
- 1-2 Shift Valve — Clutch Pressure
- 2-3 Shift Valve — Clutch Pressure
- 3-4 Shift Valve — Clutch Pressure
- Throttle Valve B — Throttle B Pressure

NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE
1	LINE	15	1ST-HOLD CLUTCH	58	THROTTLE B
2	LINE	16	1ST-HOLD CLUTCH	90	TORQUE CONVERTER
3	LINE	18	LINE	91	TORQUE CONVERTER
3'	LINE	20	2ND CLUTCH	92	TORQUE CONVERTER
3''	LINE	21	2ND CLUTCH	93	OIL COOLER
4	LINE	25	LINE	94	TORQUE CONVERTER
4'	LINE	30	3RD CLUTCH	95	LUBRICATION
5	LINE	31	3RD CLUTCH	96	TORQUE CONVERTER
6	MODULATE	40	4TH CLUTCH	97	TORQUE CONVERTER
6'	MODULATE (DUTY CONTROL)	41	4TH CLUTCH	99	SUCTION
6''	MODULATE	55	THROTTLE B	×	LEAK
9	LINE	56	THROTTLE B		
10	1ST CLUTCH	57	THROTTLE B		

[N] Position

As the engine turns, the oil pump also starts to operate. Automatic transmission fluid (ATF) is drawn from (99) and discharged into (1). Then, ATF pressure is controlled by the regulator valve and becomes the line pressure (1). The torque converter inlet pressure (92) enters (94) of the torque converter through the orifice and discharges into (90).
The torque converter check valve prevents the torque converter pressure from rising.
Under this condition, the hydraulic pressure is not applied to the clutches as the manual valve stops line pressure (1).

NOTE:
When used, "left" or "right" indicates direction on the flowchart.



(cont'd)

Hydraulic Flow (cont'd)

1 Position

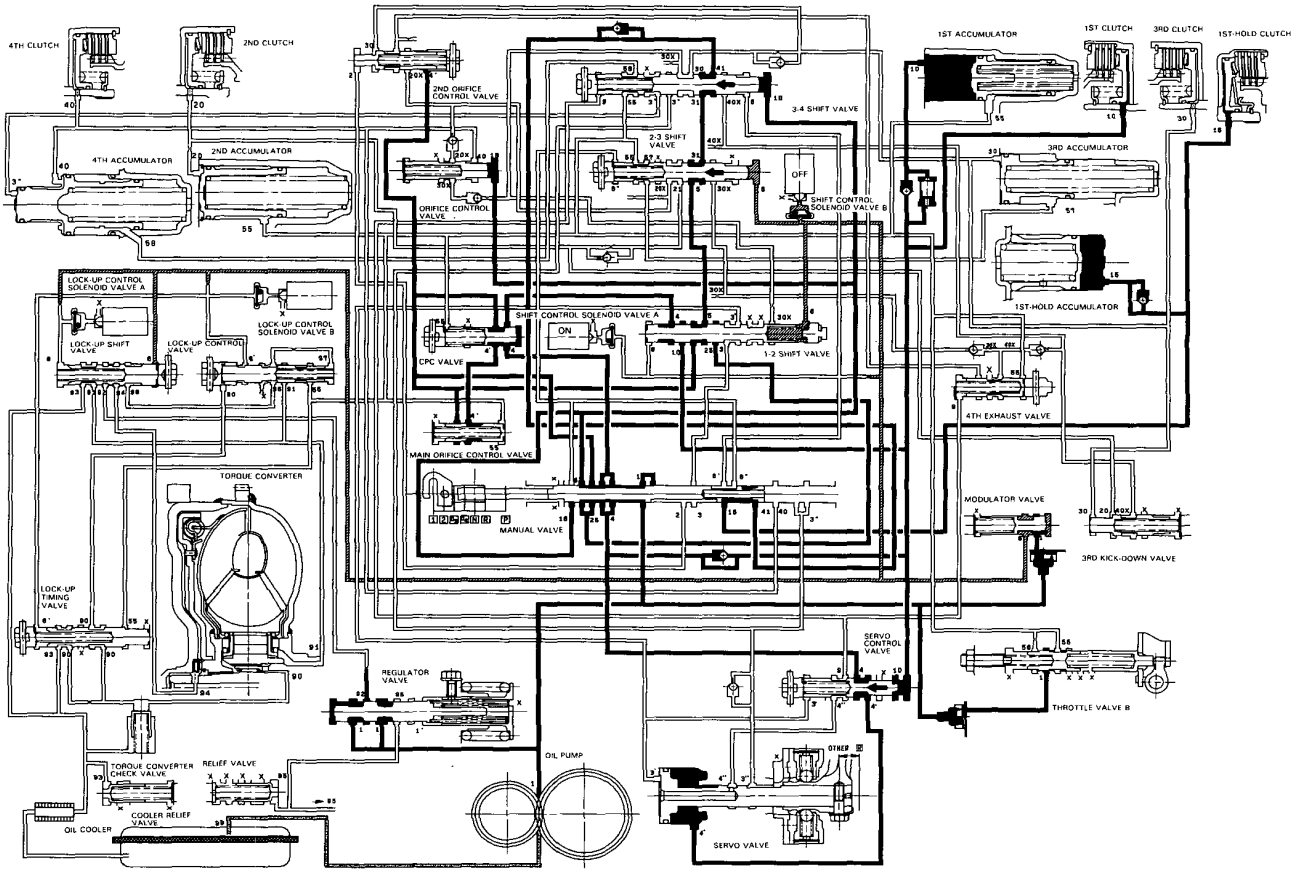
The line pressure (1) becomes line pressure (4) at the manual valve and passes to the 1st clutch and 1st accumulator.
Then line pressure (4) flows through the 1st-hold clutch and 1st-hold accumulator. The power is transmitted only during deceleration through the 1st-hold clutch.

Fluid flows by way of:

—Line Pressure (4)→ 1-2 Shift Valve→ 2-3 Shift Valve—3rd Clutch Pressure (31)→ 3-4 Shift Valve—4th Clutch Pressure (41)→ Manual Valve—1st-hold Clutch Pressure (16)→ 1st-hold Clutch

The modulator pressure (6) is supplied to the 1-2 and 2-3 shift valves.
The line pressure (1) also flows to throttle valve B.

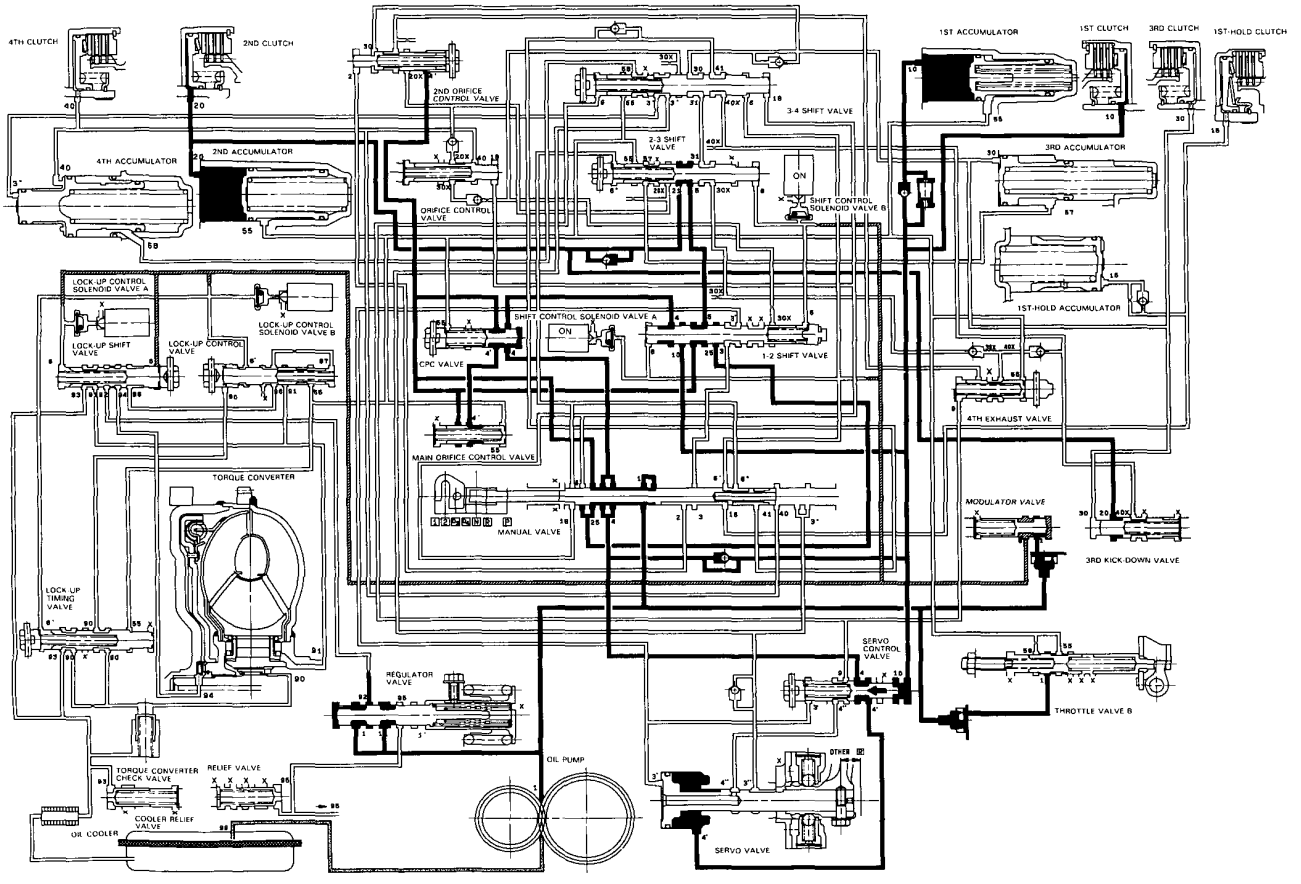
NOTE:
When used, "left" or "right" indicates direction on the flowchart.



2 Position

The line pressure (1) becomes line pressure (4) as it passes through the manual valve. It then goes through line (20) to the 2nd clutch. Also, line pressure (1) goes to the modulator valve through the filter and becomes the modulator pressure (6). Modulator pressure (6) is not supplied to the 1-2, 2-3 and 3-4 shift valves.
Line pressure (1) also flows to throttle valve B.

NOTE:
When used, "left" or "right" indicates direction on the flowchart.



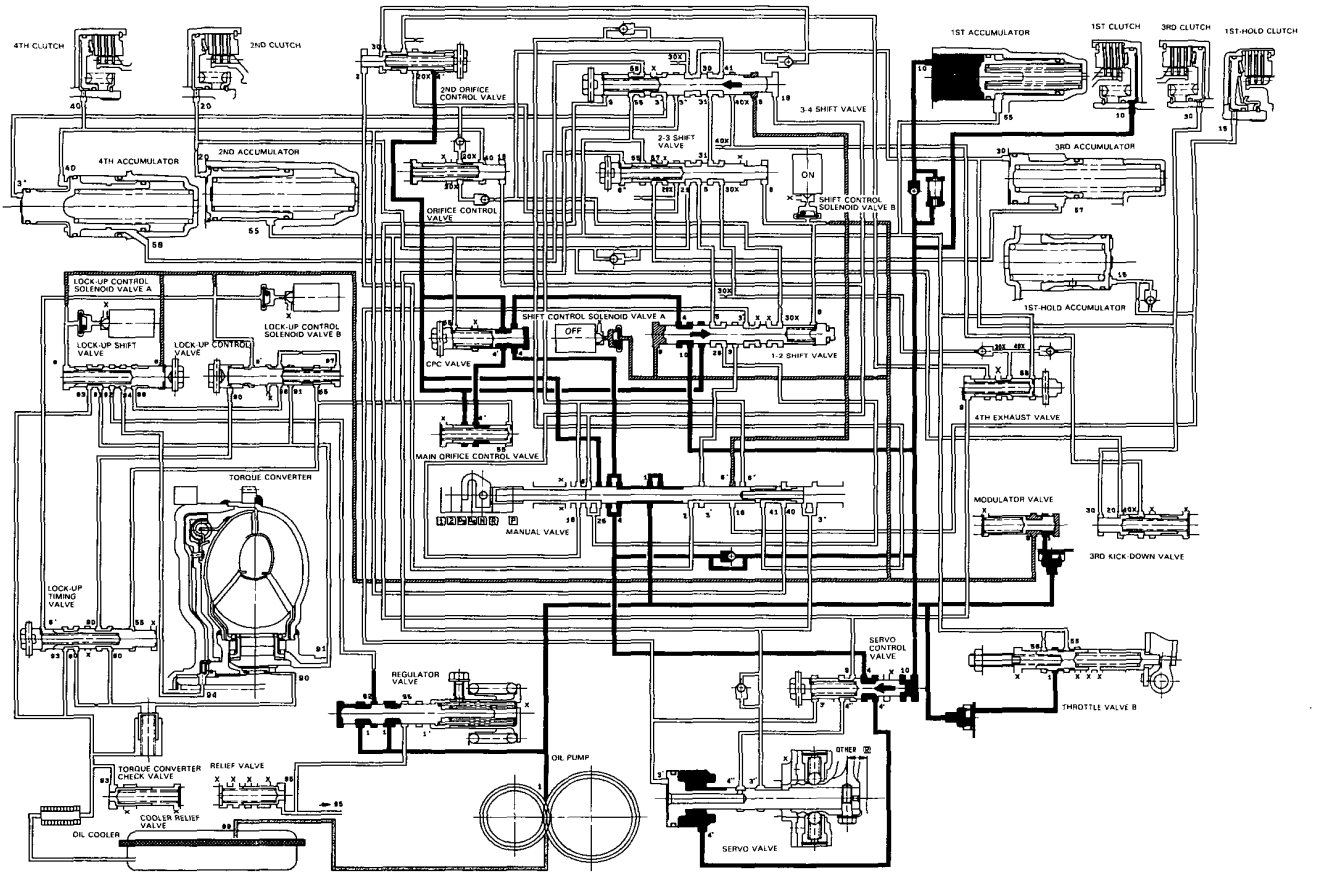
(cont'd)

Hydraulic Flow (cont'd)

[D3] or [D4] Position

1. **1st Speed**
   The flow of fluid throuth the torque converter circuit is the same as in [N] position.
   The line pressure (1) becomes line pressure (4) and 1st clutch pressure (10). The 1st clutch pressure is applied to the 1st clutch and 1st accumulator; consequently, the vehicle will move as the engine power is transmitted.
   The line pressure (1) becomes the modulator pressure (6) by the modulator valve and travels to 1-2 and 3-4 shift valves. The 1-2 shift valve is moved to the right side because the shift control solenoid valve A is turned off and B is turned on by the TCM. This valve stops 2nd clutch pressure and the power is not transmitted to the 2nd clutch.
   Line pressure (4) also flows to the servo valve and line pressure (1) also flows to throttle valve B.

   NOTE:
   When used, "left" or "right" indicates direction on the flowchart.

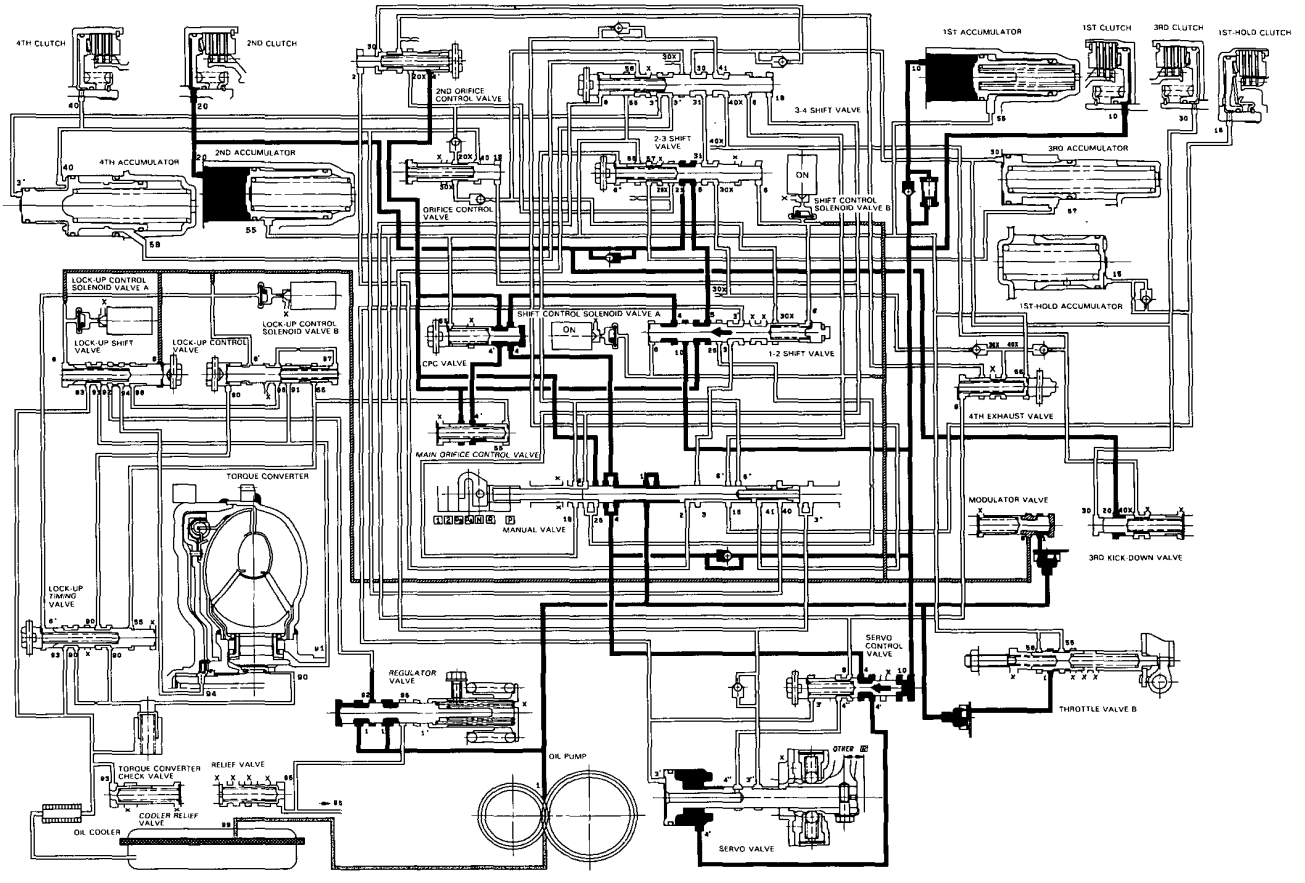


2. **2nd Speed**
The flow of fluid up the 1-2 and 2-3 shift valves is the same as in 1st speed. As the speed of the car reaches the prescribed value, the solenoid valve A is turned on by means of the TCM. As a result, the 1-2 shift valve is moved to the left and uncovers the port leading to the 2nd clutch; the 2nd clutch is engaged.

Fluid flows by way of:
— Line pressure (4) → 1-2 Shift Valve → 2-3 Shift Valve — 2nd Clutch Pressure (21) → 2nd Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch.

NOTE:
When used, "left" or "right" indicates direction on the flowchart.



(cont'd)

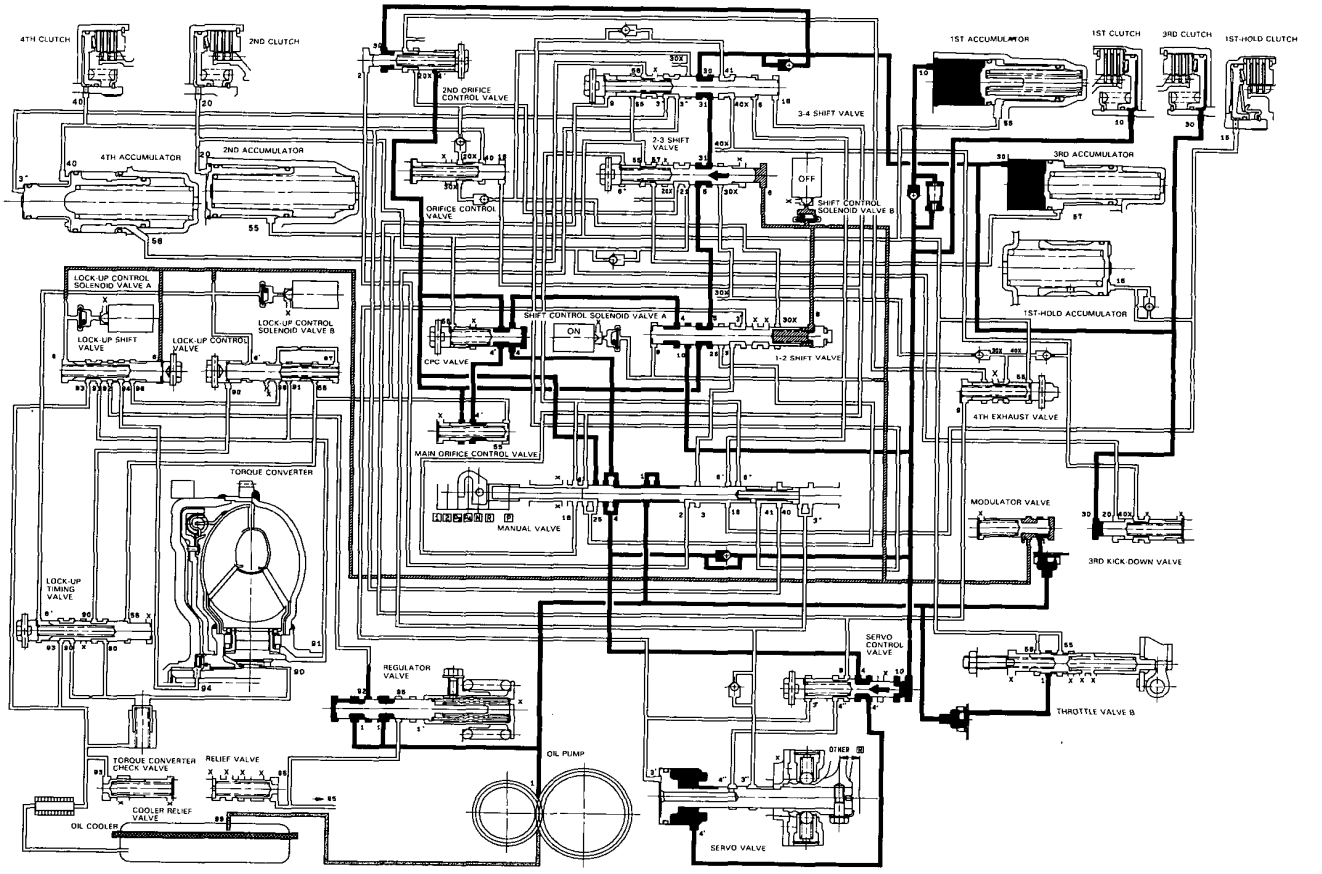
Hydraulic Flow (cont'd)

3. **3rd Speed**
The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as in the 2nd speed. As the speed of the car reaches the prescribed value, the shift control solenoid valve B is turned off (shift control solenoid valve A remains on). The 2-3 shift valve is then moved to the left, uncovering the oil port leading to the 3rd clutch. Since the 3-4 shift valve is moved to the right to cover the oil port to the 4th clutch, the 3rd clutch is turned on.

Fluid flows by way of:
—Line Pressure (4) →1-2 Shift Valve → 2-3 Shift Valve—3rd Clutch Pressure (31) → 3-4 Shift Valve
—3rd Clutch Pressure (30) → 3rd Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch as in the 2nd speed.

NOTE:
When used, "left" or "right" indicates direction on the flowchart.



D4 Position

4th Speed

The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as in the 3rd speed. As the speed of the car reaches the prescribed value, the shift control solenoid valve A is turned off (shift control solenoid valve B remains off).

As this takes place, 3-4 shift valve is moved to the left and uncovers the oil port leading to the 4th clutch. Since the 1-2 and 2-3 shift valves are kept on the left side, the fluid flows through the 4th clutch; the power is transmitted through the 4th clutch.

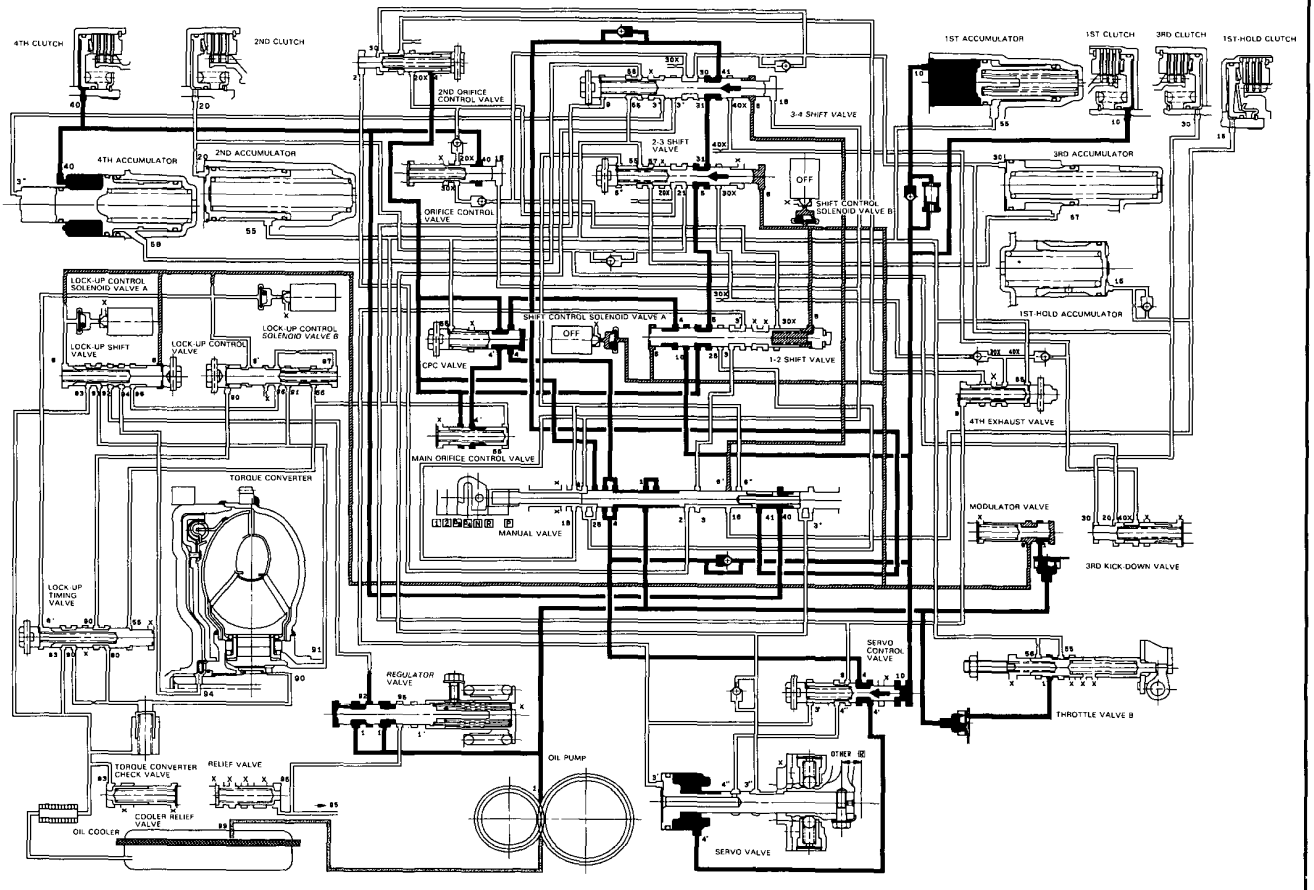
Fluid flows by way of:

—Line Pressure (4) →1-2 Shift Valve → 2-3 Shift Valve—3rd Clutch Pressure (31) → 3-4 Shift Valve—4th Clutch pressure (41) → Manual Valve—4th Clutch Pressure (40) → 4th Clutch

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted because of the one-way clutch as in 2nd and 3rd speed.

NOTE:

When used, "left" or "right" indicates direction on the flowchart.



(cont'd)

Description

Hydraulic Flow (cont'd)

[R] Position

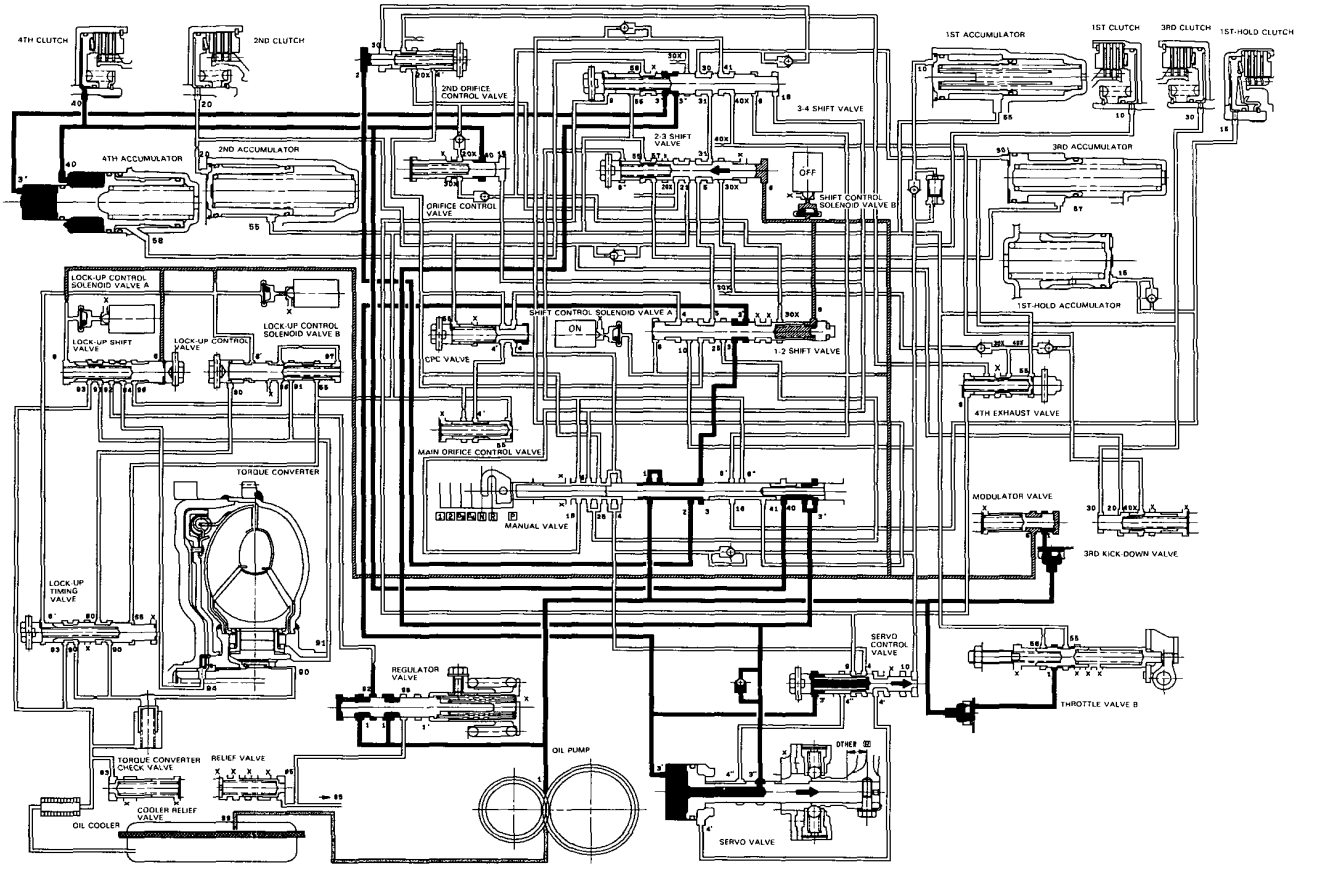
The flow of fluid through the torque converter circuit is the same as in the [N] position. The fluid (1) from the oil pump flows through the manual valve and becomes line pressure (3). It then flows through the 1-2 shift valve to the servo valve (3'), causing the shift fork shaft to be moved in the reverse direction.

Under this condition, the shift control solenoid valve A is turned on whereas the valve B is turned off as in 3rd speed in [D4] or [D3] position. As a result, the 1-2 shift valve is also moved to the left. The fluid (3') will flow through the servo valve and manual valve to the 4th clutch; power is transmitted through the 4th clutch.

Reverse Inhibitor Control

When the [R] position is selected while the vehicle is moving forward at a speed over 6 mph (10 km/h), the TCM outputs1st signal (A: OFF, B: ON), and the 1-2 shift valve is moved to the right side. The line pressure (3) is intercepted by the 1-2 shift valve; consequently, power is not transmitted as the 4th clutch and servo valve are not operated.

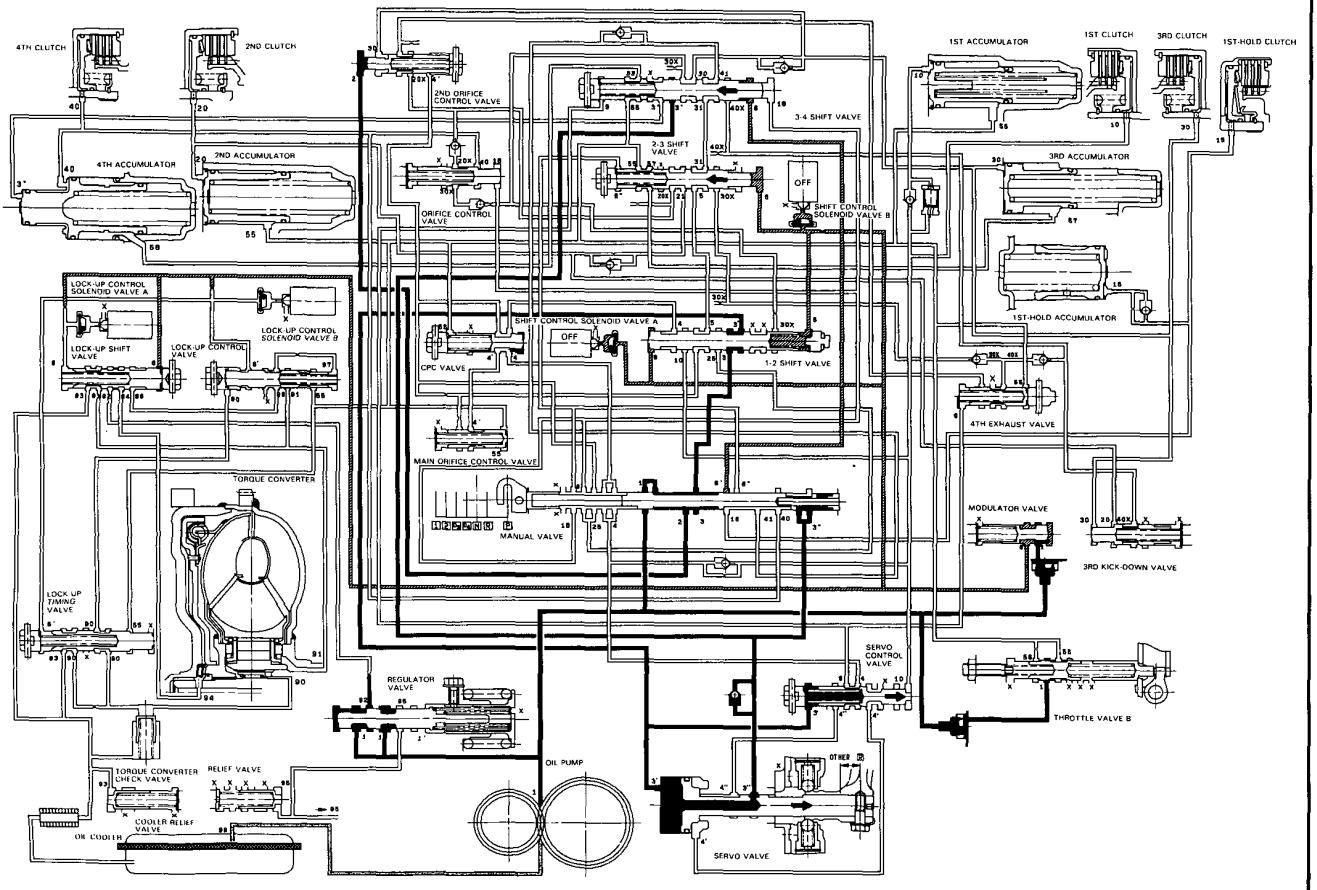
NOTE:
When used, "left" or "right" indicates direction on the flowchart.



P Position

The flow of fluid through the torque converter circuit is the same as in N *position. The line pressure (1) becomes the line* pressure (3) as it passes through the manual valve. Then line pressure (3) flows through the 1-2 shift valve to the servo valve and the servo control valve, causing the shift fork shaft to be moved to the reverse position as in the R position. However, the hydraulic pressure is not supplied to the clutches. The power is not transmitted.

NOTE:
When used, "left" or "right" indicates direction on the flowchart.



Description

Lock-up System

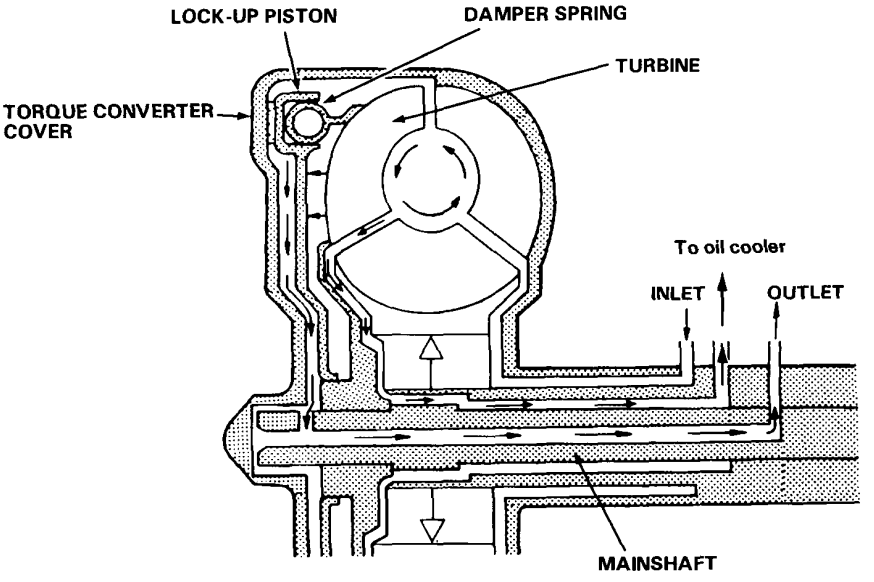
Lock-up Clutch

1. Operation (clutch on)
With the lock-up clutch on, the oil in the chamber between the torque converter cover and lock-up piston is drained off, and the converter oil exerts pressure through the piston against the torque converter cover. As a result, the converter turbine is locked to the converter cover. The effect is to bypass the converter, thereby placing the car in direct drive.

Power flow

The power flows by way of:

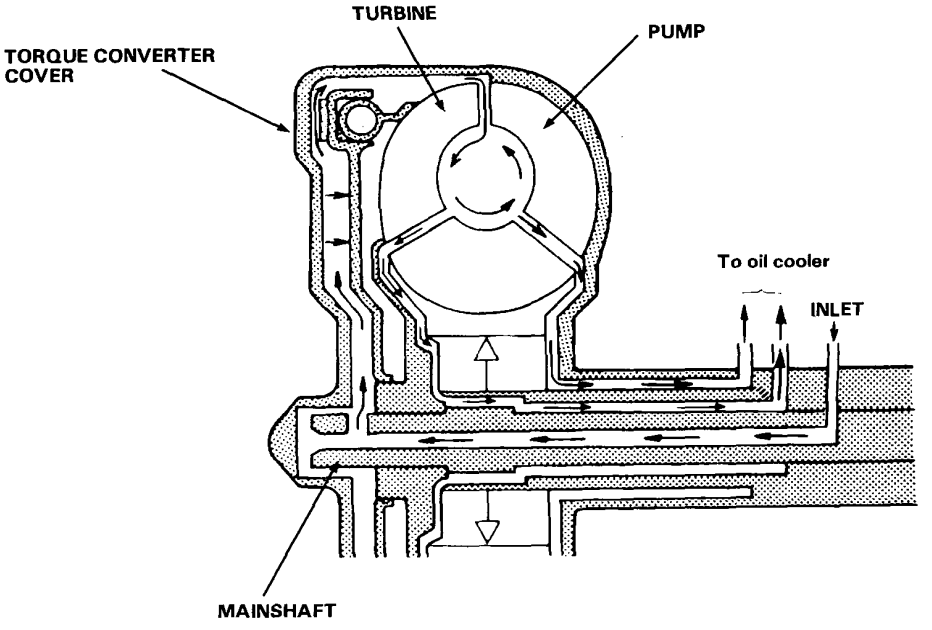
Engine
↓
Drive plate
↓
Torque converter cover
↓
Lock-up piston
↓
Damper spring
↓
Turbine
↓
Mainshaft



2. Operation (clutch off)
With the lock-up clutch off, the oil flows in the reverse of CLUTCH ON. As a result, the lock-up piston moves away from the converter cover, and the torque converter lock-up is released.

Power flow

Engine
↓
Drive plate
↓
Torque converter cover
↓
Pump
↓
Turbine
↓
Mainshaft

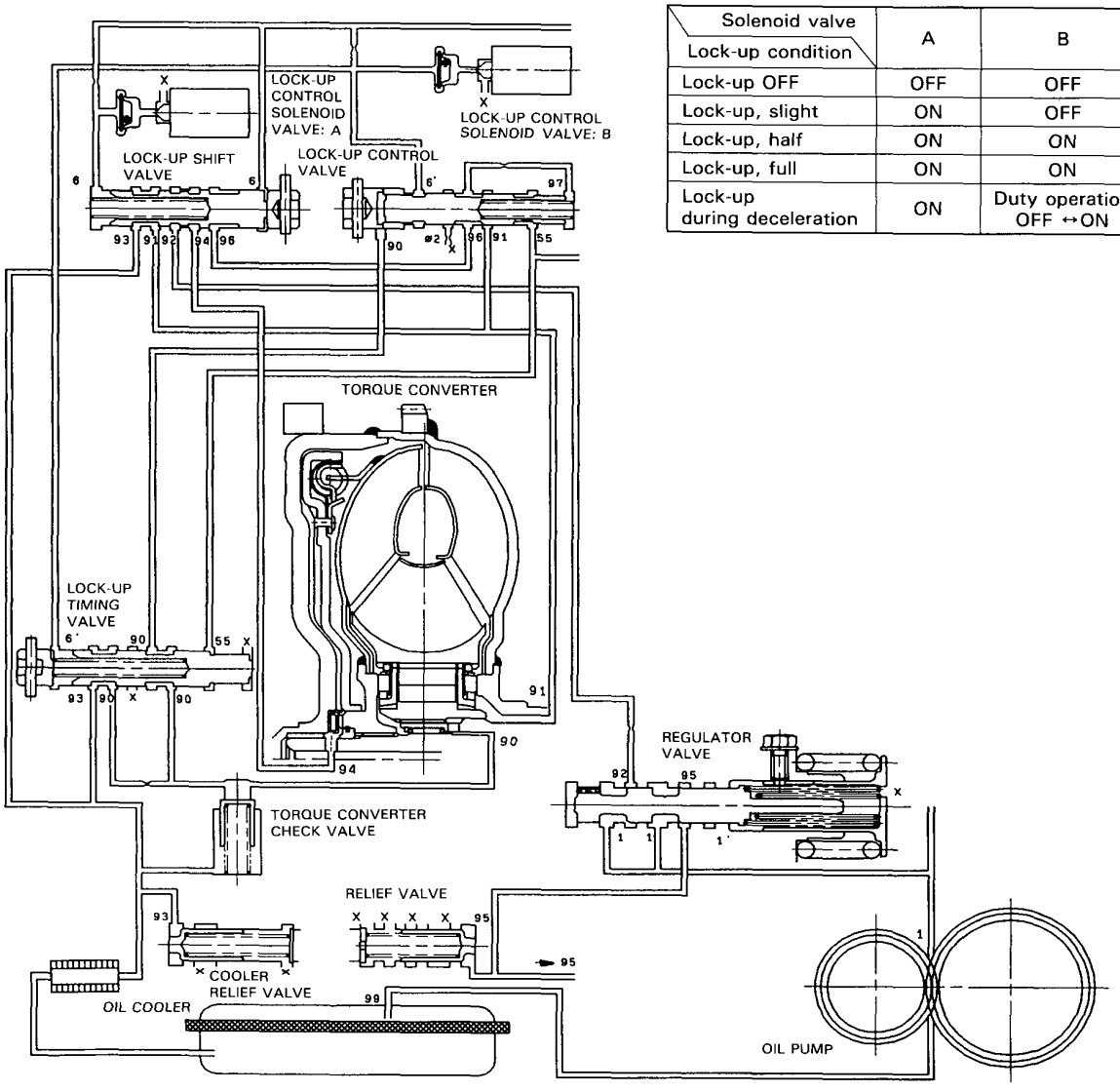


In [D4] position in 2nd, 3rd and 4th, and [D3] position in 3rd, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the TCM optimizes the timing of the lock-up system. Under certain conditions, the lock-up clutch is applied during deceleration, in 3rd and 4th speed.

The lock-up system controls the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve B. When lock-up control solenoid valves A and B activate, modulator pressure changes. Lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the TCM.

NOTE:
When used, "left" or "right" indicates direction on the flowchart.

Solenoid valve / Lock-up condition	A	B
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	OFF
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up during deceleration	ON	Duty operation OFF ↔ON



(cont'd)

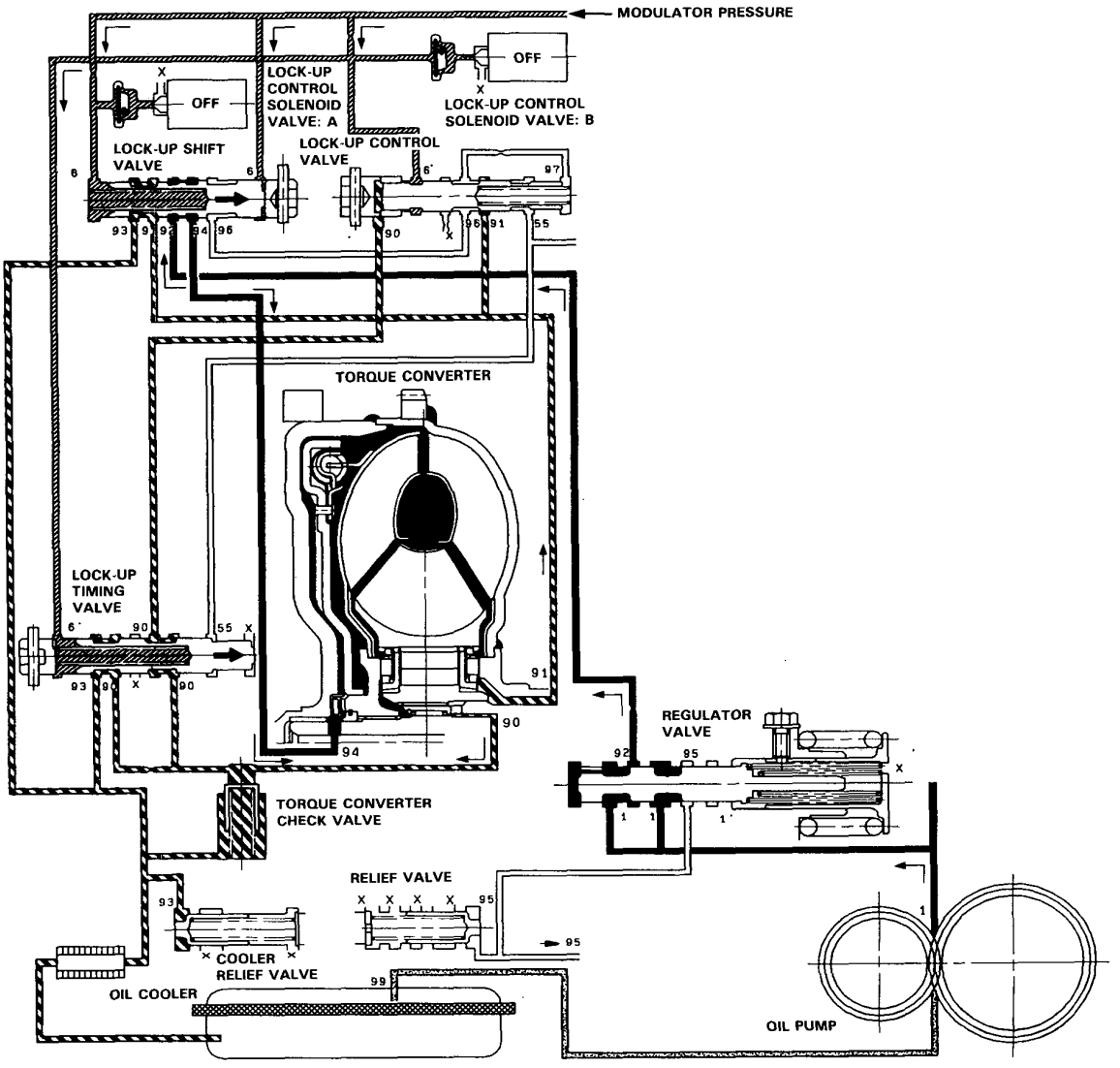
Description

Lock-up System (cont'd)

No Lock-up

The pressurized fluid regulated by the modulator works on both ends of the lock-up shift valve and on the left side of the lock-up control valve. Under this condition, the pressures working on both ends of the lock-up shift valve are equal and the shift valve is moved to the right side by the tension of the valve spring alone. The fluid from the oil pump will flow through the left side of the lock-up clutch to the torque converter; i,e., the lock-up clutch is in OFF condition.

NOTE:
When used, "left" or "right" indicates direction on the flowchart.



Partial Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: OFF

The TCM switches the solenoid valve A on to release the modulator pressure in the left cavity of the lock-up shift valve. The modulator pressure in the right cavity of the lock-up shift valve overcomes the spring force; thus the lock-up shift valve is moved to the left side.

The modulator pressure is separated to the two passages:

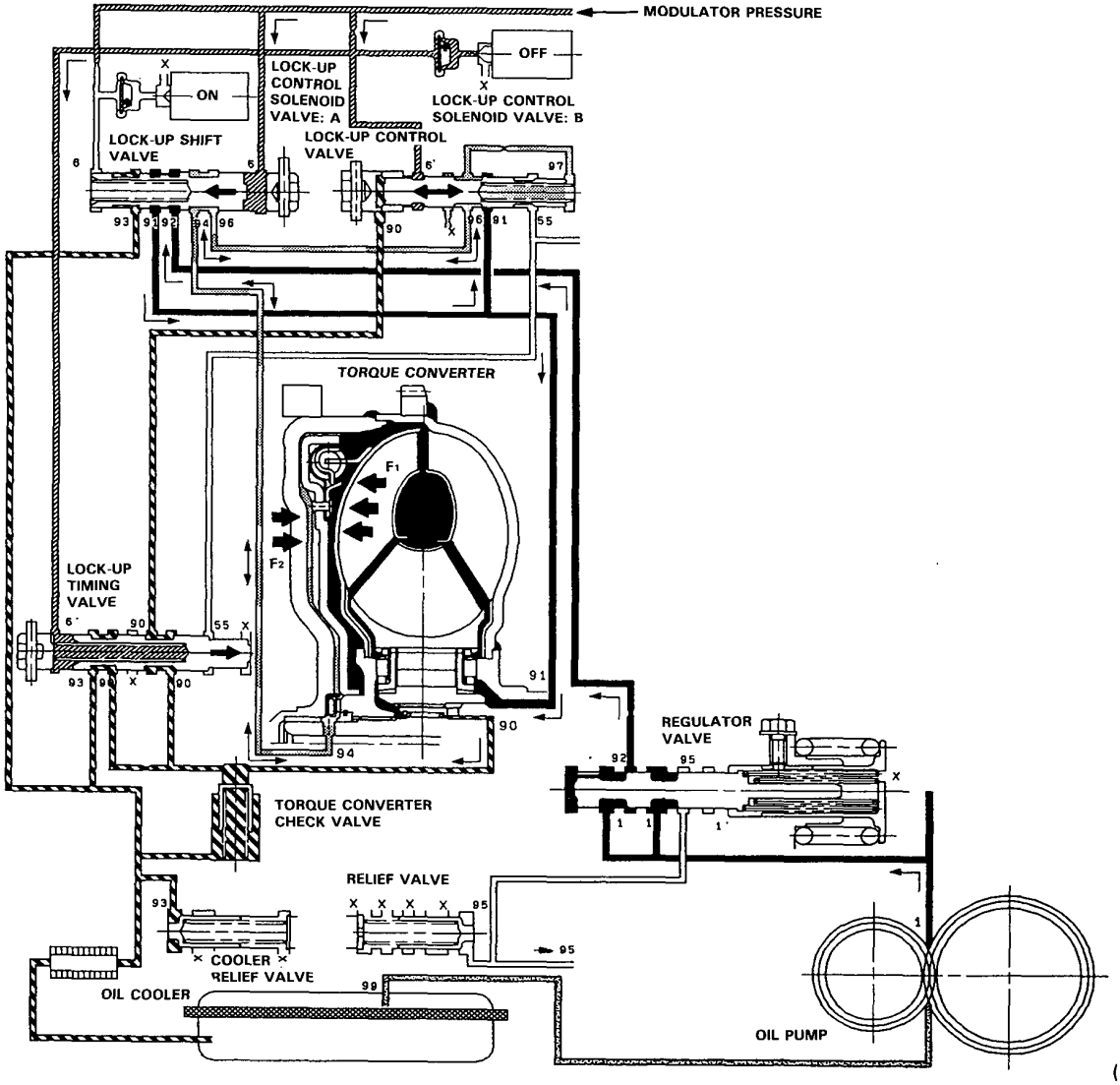
Torque Converter Inner Pressure: enters into right side to engage lock-up clutch

Torque Converter Back Pressure: enters into left side to disengage lock-up clutch

The back pressure (F2) is regulated by the lock-up control valve, whereas the position of the lock-up timing valve is determined by the throttle B pressure, tension of the valve spring, and pressure regulated by the modulator. Also the position of the lock-up control valve is determined by the back pressure of the lock-up control valve and torque converter pressure regulated by the check valve. With the lock-up control solenoid valve B kept off, the modulator pressure is maintained in the left end of the lock-up control valve; in other words, the lock-up control valve is moved slightly to the left side. This slight movement of the lock-up control valve causes the back pressure to be lowered slightly, resulting in partial lock-up.

NOTE:

When used, "left" or "right" indicates direction on the flowchart.



(cont'd)

Description

Lock-up System (cont'd)

Half Lock-up

Lock-up Control Solenoid valve A: ON Lock-up Control Solenoid Valve B: ON

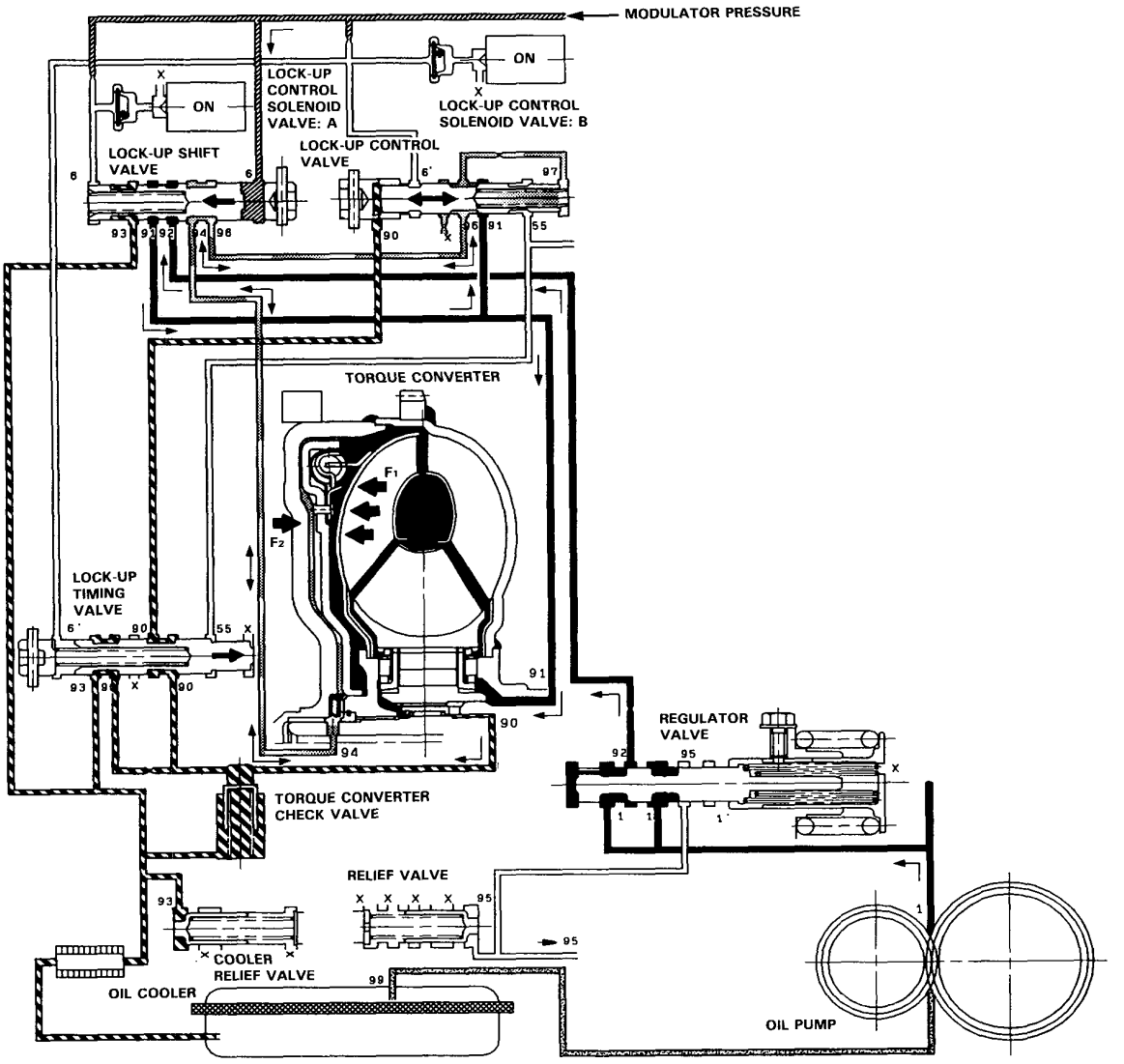
The modulator pressure is released by the solenoid valve B, causing the modulator pressure in the left cavity of the lock-up control valve to lower.

Also the modulator pressure in the left cavity of the lock-up timing valve is low. However, throttle B pressure is still low at this time; consequently, the lock-up timing valve is kept on the right side by the spring force.

With the lock-up control solenoid valve B turned on, the lock-up control valve is moved somewhat to the left side, causing the back pressure (F2) to lower. This allows a greater amount of the fluid (F1) to work on the lock-up clutch so as to engage the clutch. The back pressure (F2) which still exists prevents the clutch from engaging fully.

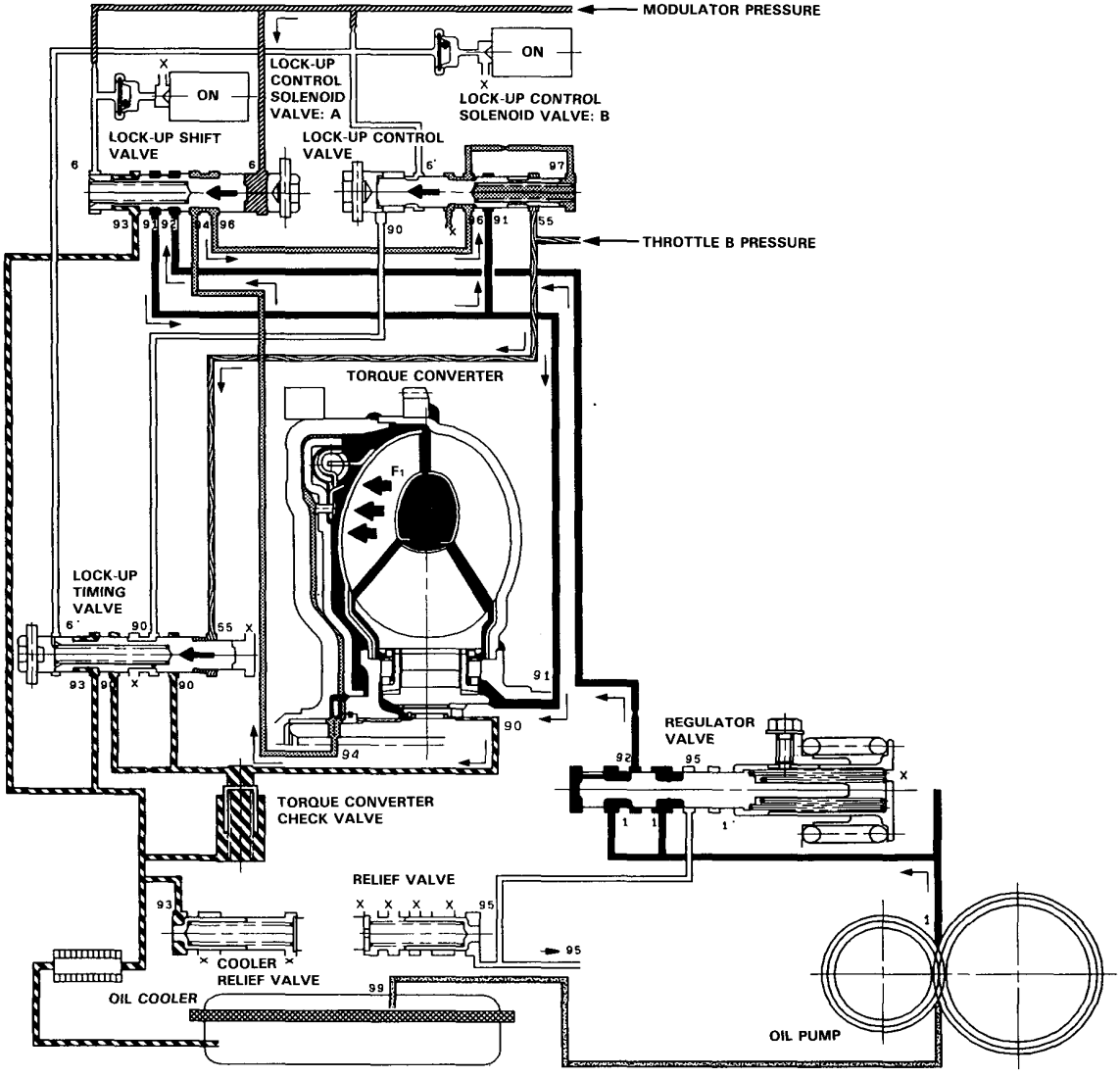
NOTE:

When used, "left" or "right" indicates direction on the flowchart.



Full Lock-up
Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: ON
When the vehicle speed further increases, the throttle B pressure is increased in accordance with the throttle opening.
The lock-up timing valve overcomes the spring force and moves to the left side. Also, this valve closes the oil port leading to the torque converter check valve.
Under this condition, the throttle B pressure working on the right end of the lock-up control valve becomes greater than that on the left end (modulator pressure in the left end has already been released by the solenoid valve B); i.e., the lock-up control valve is moved to the left. As this happens, the torque converter back pressure is released fully, causing the lock-up clutch to be engaged fully.

NOTE:
When used, "left" or "right" indicates direction on the flowchart.



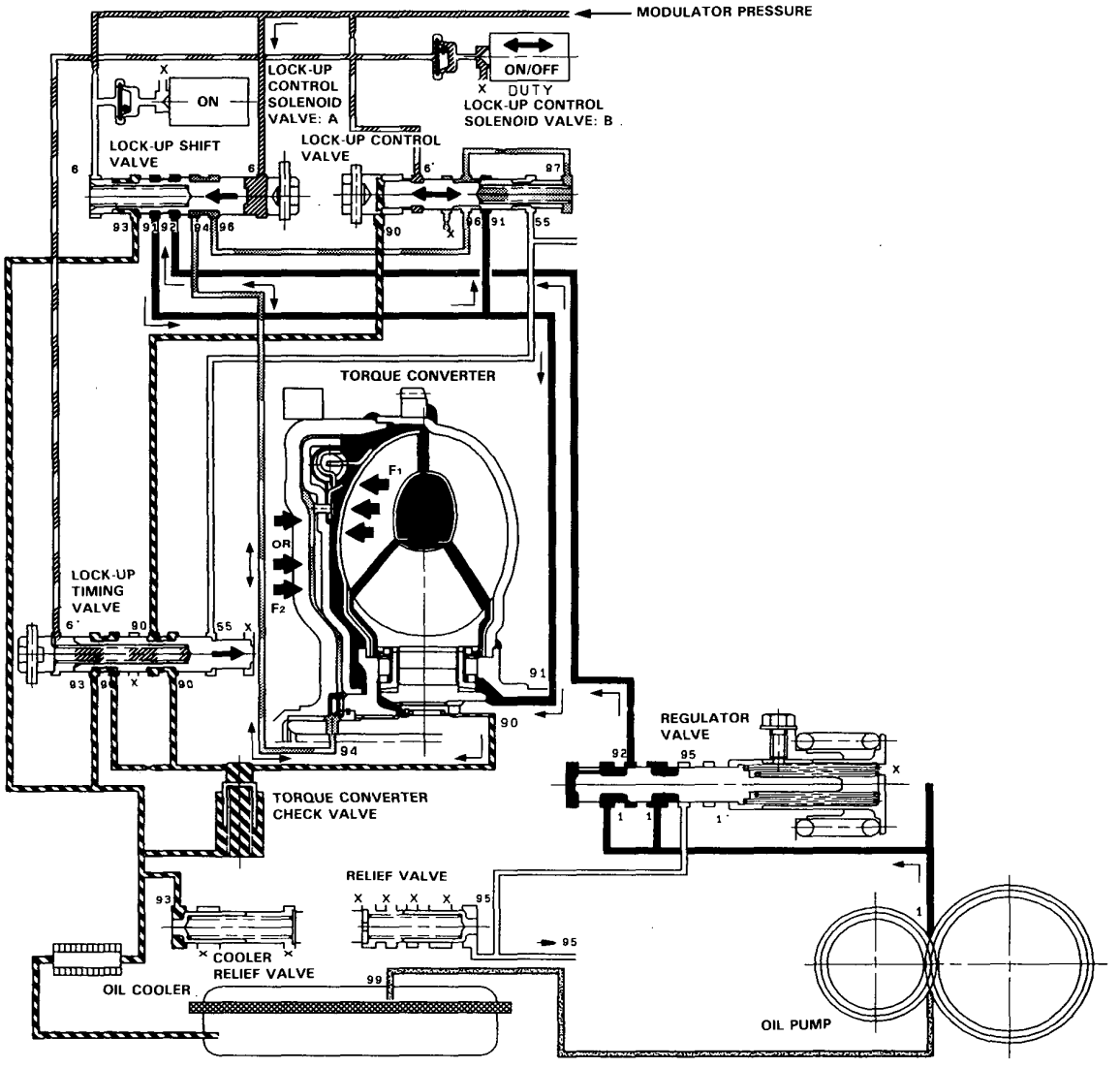
(cont'd)

Description

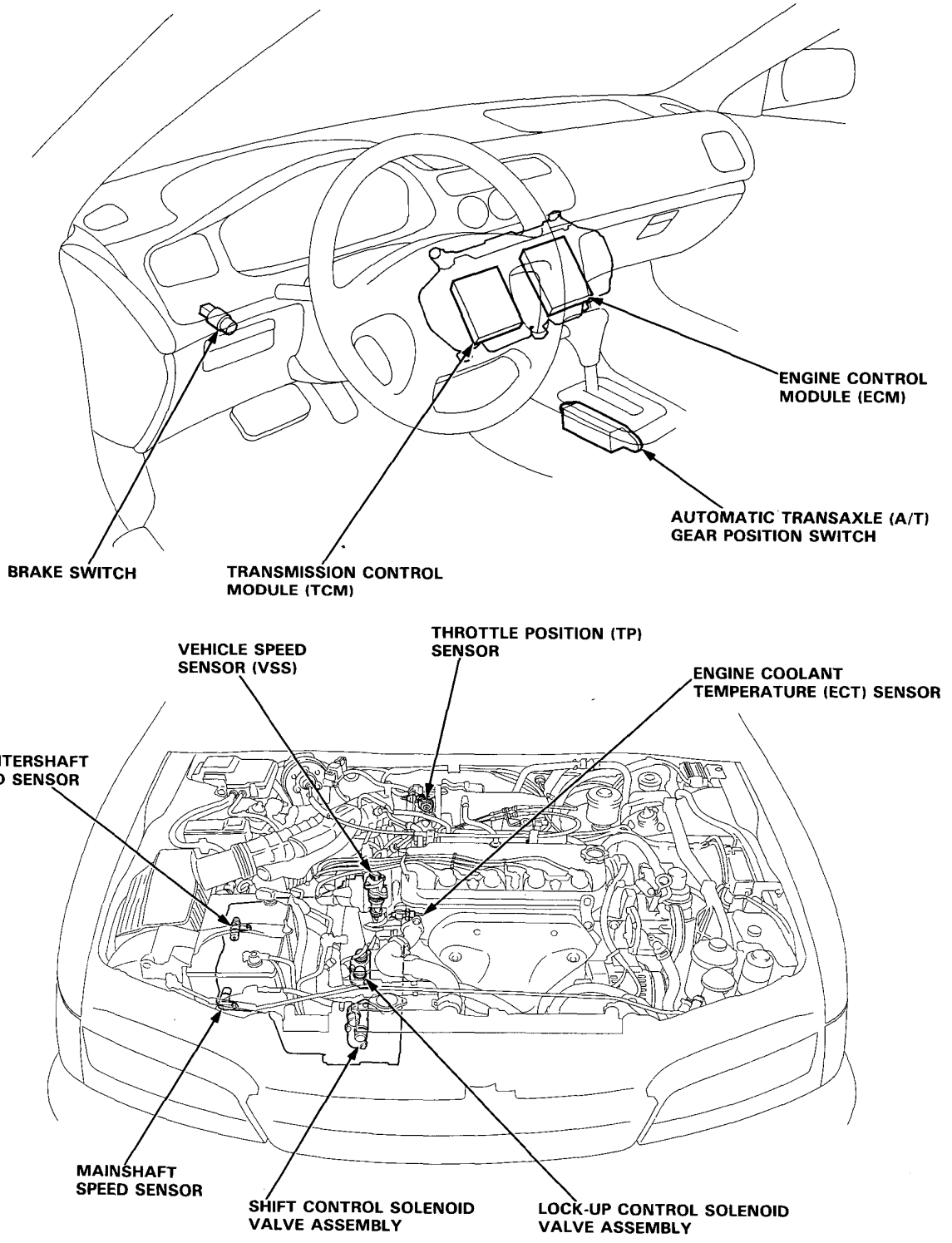
Lock-up System (cont'd)

Deceleration Lock-up
Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: Duty Operation (ON↔OFF)
The TCM switches solenoid valve B on and off rapidly under certain conditions. The slight lock-up and half lock-up regions are maintained so as to lock the torque converter properly.

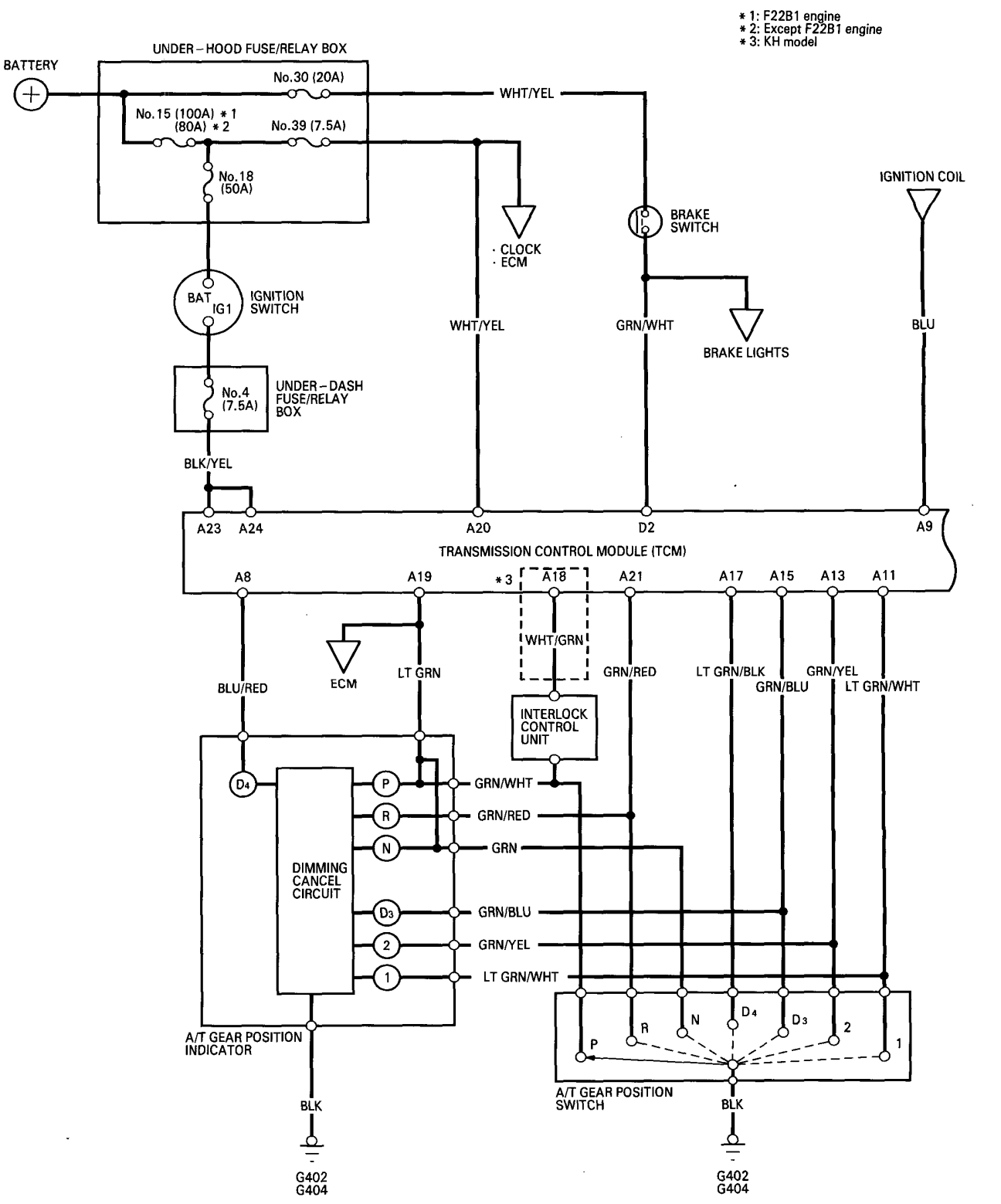
NOTE:
When used, "left" or "right" indicates direction on the flowchart.

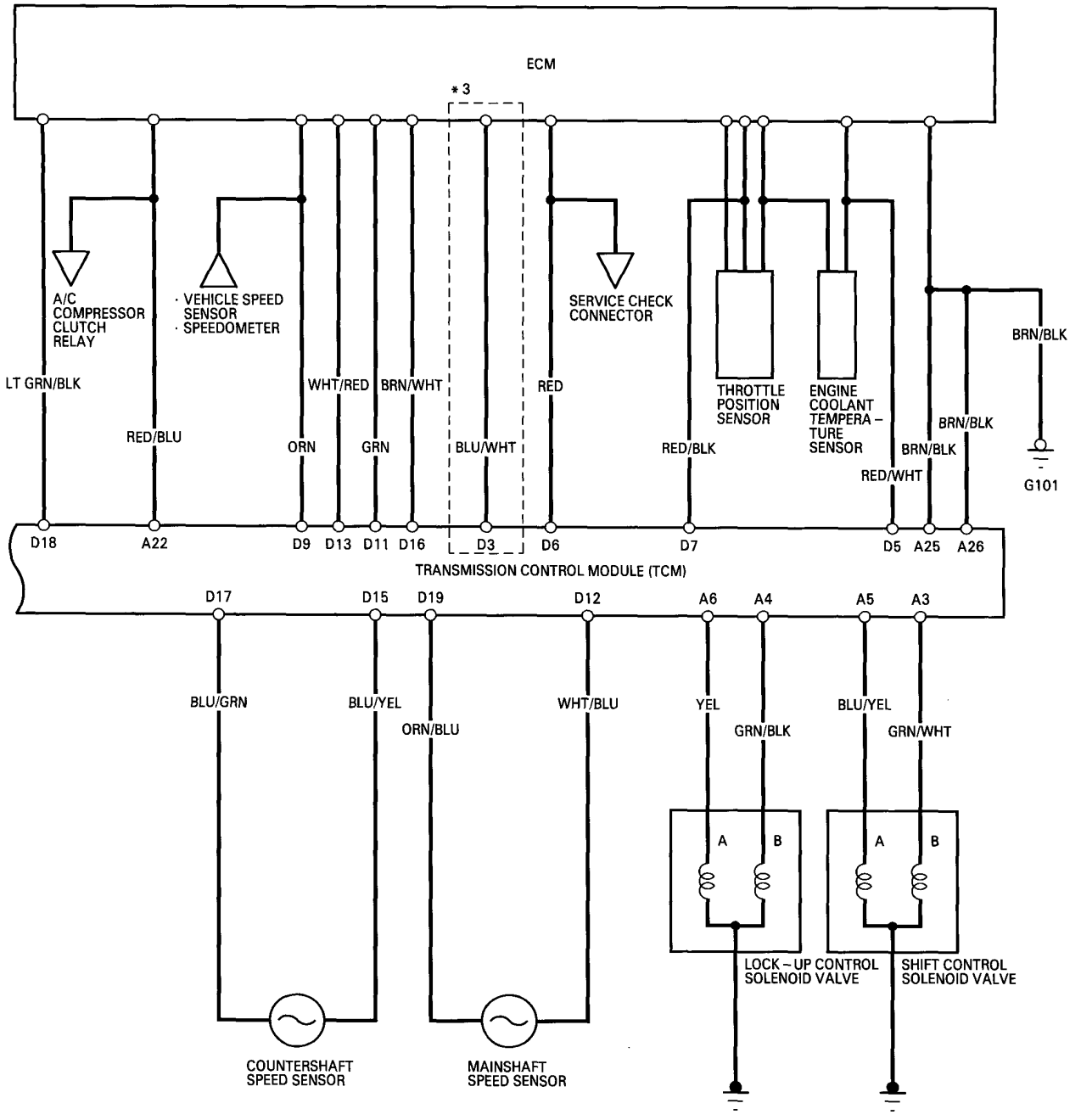


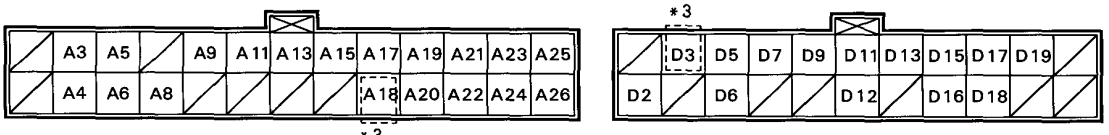
NOTE: LHD type is shown. RHD is similar.



Circuit Diagram



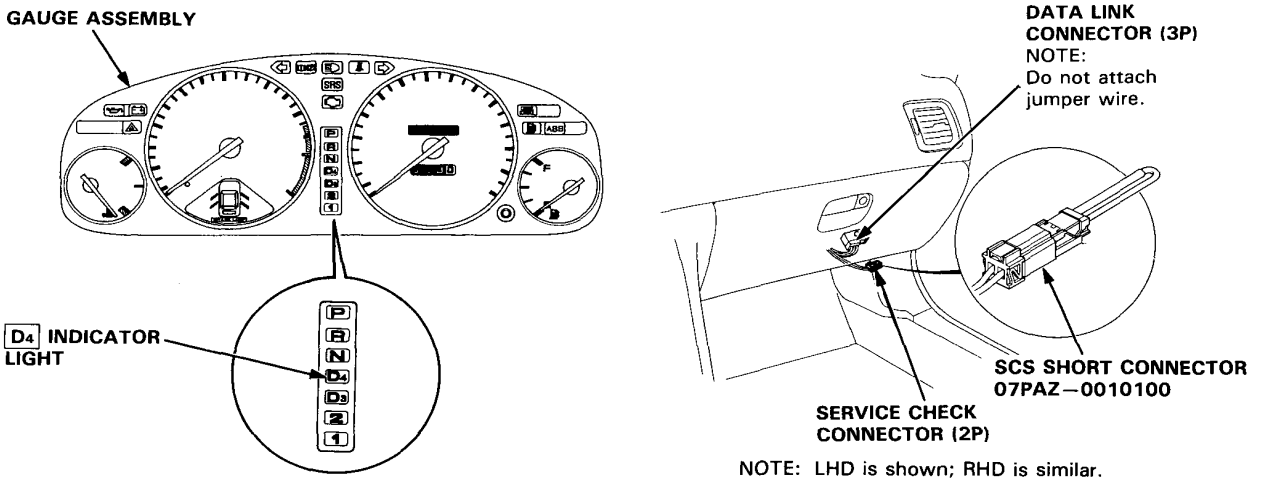




TCM Terminal Locations

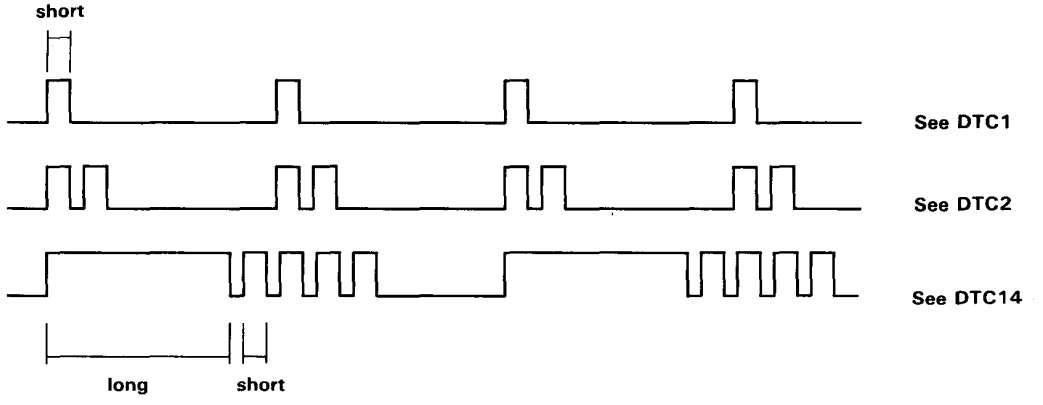
When the TCM senses an abnormality in the input or output systems, the [D4] indicator light in the gauge assembly will blink.
When the Service Check Connector (located under the dash on the passenger side) is connected with the special tool as shown, the [D4] indicator light will blink the Diagnostic Trouble Code (DTC) when the ignition switch is turned on.

When the [D4] indicator light has been reported on, connect the Service Check Connector with the special tool. Then turn on the ignition switch and observe the [D4] indicator light.



NOTE: LHD is shown; RHD is similar.

Codes 1 through 9 are indicated by individual short blinks, codes 10 through 15 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the code. After determining the code, refer to the electrical system Symptom-to-Component Chart on pages 14-50 and 51.



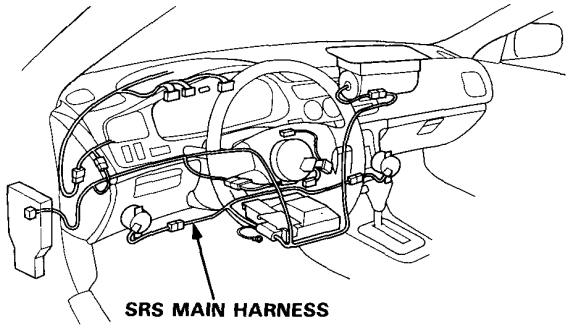
Some PGM-FI problems will also make the [D4] indicator light come on. After repairing the PGM-FI system, disconnect the BACK UP fuse (7.5 A) in the under-hood fuse/relay box for more than 10 seconds to reset the TCM memory.

NOTE: Disconnecting the BACK UP fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.

CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

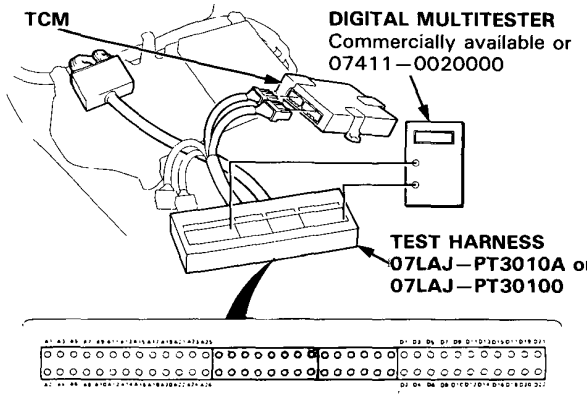


If the inspection for a particular failure code requires the use of Test Harness (07LAJ–PT3010A or 07LAJ–PT30100):

1. Remove the right door sill molding (see section 20).
2. Pull the carpet back to expose the TCM.
3. Remove the ECM cover mounting nuts and turn the TCM over (see page 14-85).
4. Connect the wire harness to the Test Harness, and/or connect the Test Harness to the TCM according to the troubleshooting flowchart.

NOTE:

- Only the A and D terminals of the Test Harness are used for A/T troubleshooting.
- Unless otherwise noted, use only the Digital Multitester, commercially available or 07411–0020000, for testing.

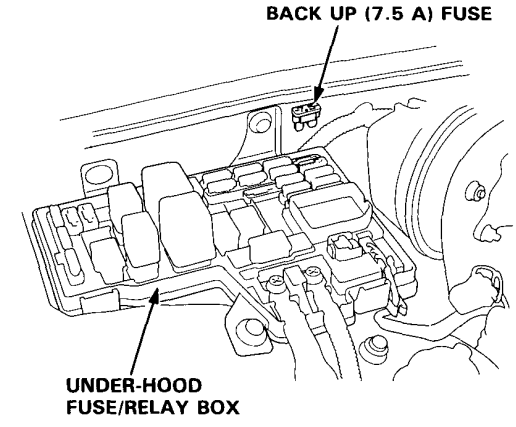


Terminal Locations

- **TCM Reset Procedure**

1. Turn the ignition switch off.
2. Remove the No. 39 BACK UP fuse (7.5 A) from the under-hood fuse/relay box for 10 seconds to reset the TCM.

NOTE: Disconnecting the No. 39 BACK UP fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.



- **Final Procedure**

NOTE: This procedure must be done after any troubleshooting.

1. Remove the special tool from the Service Check Connector.
2. Reset the TCM.
3. Set the radio preset stations and clock setting.

Symptom-to-Component Chart

Electrical System

Number of [D4] indicator light blinks while Service Check Connector is connected with the special tool.	[D4] indicator light	Symptom	Possible Cause	Refer to page
1	Blinks	• Lock-up clutch does not engage. • Lock-up clutch does not disengage. • Unstable idle speed.	• Disconnected lock-up control solenoid valve A connector • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A	14-52
2	Blinks	• Lock-up clutch does not engage.	• Disconnected lock-up control solenoid valve B connector • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B	14-54
3	Blinks or OFF	• Lock-up clutch does not engage.	• Disconnected throttle position (TP) sensor connector • Short or open in TP sensor wire • Faulty TP sensor	14-56
4	Blinks	• Lock-up clutch does not engage.	• Disconnected vehicle speed sensor (VSS) connector • Short or open in VSS wire • Faulty VSS	14-57
5	Blinks	• Fails to shift other than 2nd↔4th gears. • Lock-up clutch does not engage.	• Short in A/T gear position switch wire • Faulty A/T gear position switch	14-58
6	OFF	• Fails to shift other than 2nd↔4th gears. • Lock-up clutch does not engage. • Lock-up clutch engages and disengages alternately.	• Disconnected A/T gear position switch connector • Open in A/T gear position switch wire • Faulty A/T gear position switch	14-60
7	Blinks	• Fails to shift (between 1st↔4th, 2nd↔4th or 2nd↔3rd gears only). • Fails to shift (stuck in 4th gear).	• Disconnected shift control solenoid valve A connector • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A	14-62
8	Blinks	• Fails to shift (stuck in 1st or 4th gears).	• Disconnected shift control solenoid valve B connector • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B	14-64
9	Blinks	• Lock-up clutch does not engage.	• Disconnected countershaft speed sensor connector • Short or open in the countershaft speed sensor wire • Faulty countershaft speed sensor	14-66

Number of [D4] indicator light blinks while Service Check Connector is connected with the special tool.	[D4] indicator light	Symptom	Possible Cause	Refer to page
10	Blinks	• Lock-up clutch does not engage.	• Disconnected engine coolant temperature (ECT) sensor connector • Short or open in ECT sensor wire • Faulty ECT sensor	14-68
11	OFF	• Lock-up clutch does not engage.	• Disconnected ignition coil connector • Short or open in ignition coil wire • Faulty ignition coil	14-70
13 NOTE: A code 13 is applicable to KH model.	Blinks	• No specific symptom appears.	• Short or open in BLU/WHT wire between the D3 terminal and ECM • Faulty barometric pressure (BARO) sensor NOTE: The BARO sensor is built into the ECM	14-71
14	Blinks	• Transmission jerks hard when shifting.	• Short or open in FAS (BRN/WHT) wire between the D16 terminal and ECM • Faulty ECM	14-73
15	OFF	• Transmission jerks hard when shifting.	• Disconnected mainshaft speed sensor connector • Short or open in mainshaft speed sensor wire • Faulty mainshaft speed sensor	14-75

If the self-diagnosis [D4] indicator light does not blink, perform an inspection according to the table below.

Symptom	Inspection	Ref.page
[D4] indicator light is on steady, not blinking whenever the ignition is on.	——	14-77
[D4] indicator light does not come on for 2 seconds after ignition is first turned on.	——	14-78
Lock-up clutch does not have duty operation (ON↔OFF).	Check A/C signal with A/C on.	14-80
Lock-up clutch does not engage.		
Shift lever cannot be moved from [P] position with the brake pedal depressed.	Check brake switch signal.	14-81

- If a customer describes the symptoms for codes 3, (yet the [D4] indicator light is not blinking), 6, 11 or 15, it will be necessary to recreate the symptom by test driving, and then checking the [D4] indicator light with the ignition still ON.
- If the [D4] indicator light displays codes other than those listed above, the TCM is faulty.
- Sometimes the [D4] indicator light and the Malfunction Indicator Lamp (MIL) may come on simultaneously. If so, check the PGM-FI system according to the number of blinks on the MIL, then reset the memory by removing the BACK UP fuse in the under-hood fuse/relay box for more than 10 seconds. Drive the vehicle for several minutes at speed over 30 mph (50 km/h), then recheck the MIL.

  NOTE: Disconnecting the BACK UP fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.

Troubleshooting Flowchart

Self-diagnosis D4 indicator light blinks once.

Turn the ignition switch ON.

Check whether the Malfunction Indicator Lamp (MIL) blinks (see section 11).

Is the MIL blinking? — YES → **Repair the PGM-FI System (see section 11).**

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the TCM.
Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see page 14-49).

Turn the ignition switch ON.

Measure the voltage between the D18 (+) and A25 or A26 (−) terminals.

Is there approx. 5 V? — NO → **Repair open or short in LT GRN/BLK wire between the D18 terminal and the ECM.**

YES

Measure the voltage between the A6 (+) and A25 or A26 (−) terminals.

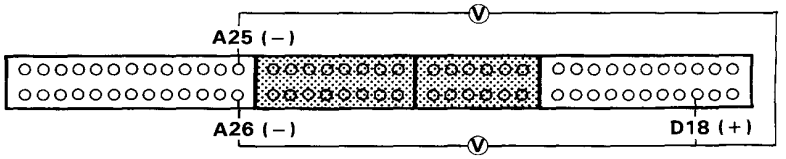
Is there voltage? — YES → **Repair short to power source in YEL wire between the A6 terminal and the lock-up control solenoid valve A.**

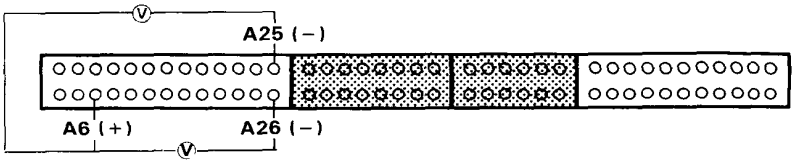
NO

Turn the ignition switch OFF.

To page 14-53

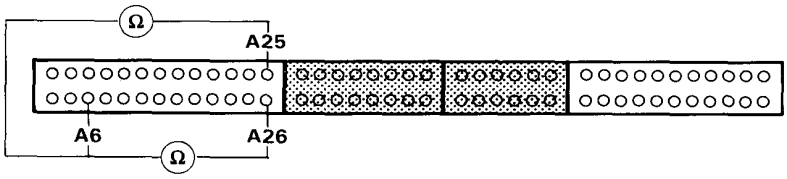
Possible Cause
• Disconnected lock-up control solenoid valve A connector • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A





From page 14-52

Measure the resistance between the A6 and A25 or A26 terminals.



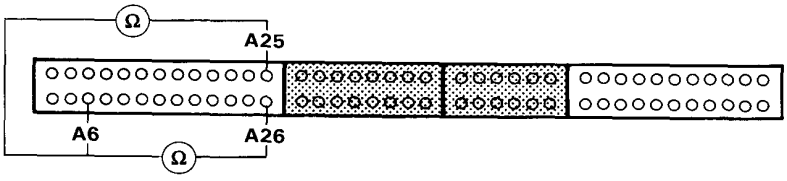
Is the resistance 12—24 Ω?

YES → **Check for loose TCM connectors. If necessary, substitute a known-good solenoid valve assembly or TCM and recheck.**

NO

Disconnect the 2P connector from the lock-up control solenoid valve assembly.

Check for continuity between the A6 and A25 or A26 terminals.



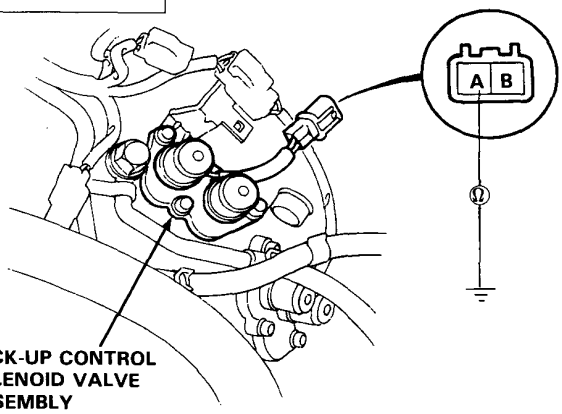
Is there continuity?

YES → **Repair short to ground in YEL wire between the A6 terminal and the lock-up control solenoid valve A.**

NO

Measure the resistance of the solenoid at the 2P connector.

2P CONNECTOR
View from terminal side.



Is the resistance 12—24 Ω?

YES → **Check for open in YEL wire between the A6 terminal and the lock-up control solenoid valve A.**

NO

Replace the lock-up control solenoid valve assembly.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D4 indicator light blinks twice.

Turn the ignition switch ON.

Check whether the Malfunction Indicator Lamp (MIL) blinks (see section 11).

Is the MIL blinking? — YES → **Repair the PGM-FI System (see section 11).**

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the TCM.
Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see page 14-49).

Turn the ignition switch ON.

Measure the voltage between the D18 (+) and A25 or A26 (−) terminals.

Is there approx. 5 V? — NO → **Repair open or short in LT GRN/BLK wire between the D18 terminal and the ECM.**

YES

Measure the voltage between the A4 (+) and A25 or A26 (−) terminals.

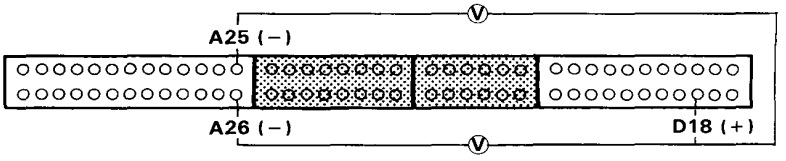
Is there voltage? — YES → **Repair short to power source in GRN/BLK wire between the A4 terminal and the lock-up control solenoid valve B.**

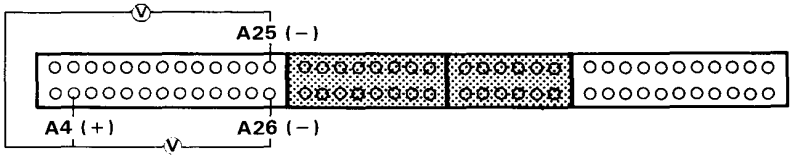
NO

Turn the ignition switch OFF.

To page 14-55

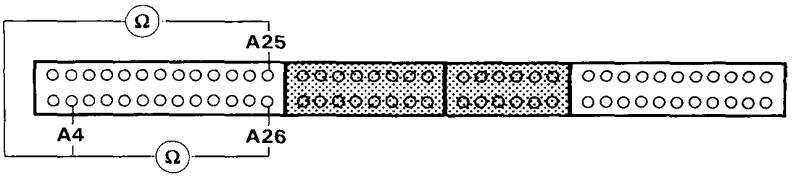
Possible Cause
• Disconnected lock-up control solenoid valve B connector • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B





From page 14-54

Measure the resistance between the A4 and A25 or A26 terminals.

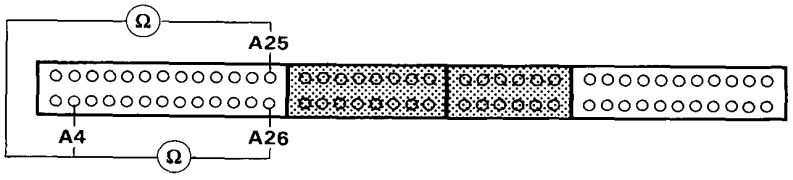


Is the resistance 12–24 Ω?

YES → **Check for loose TCM connectors. If necessary, substitute a known-good solenoid valve assembly or *TCM and recheck*.**

NO

Disconnect the 2P connector from the lock-up control solenoid valve assembly.



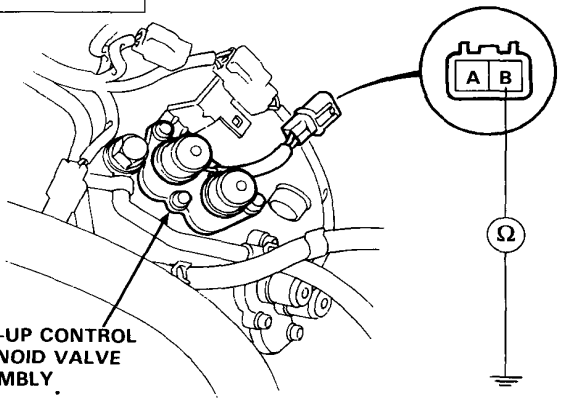
Check for continuity between the A4 and A25 or A26 terminals.

Is there continuity?

YES → **Repair short to ground in GRN/BLK wire between the A4 terminal and the lock-up control solenoid valve B.**

NO

2P CONNECTOR
View from terminal side.



Measure the resistance of the solenoid at the 2P connector.

Is the resistance 12–24 Ω?

YES → **Check for open in GRN/BLK wire between the A4 terminal and the lock-up control solenoid valve B.**

NO

Replace the lock-up control solenoid valve assembly.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D4 indicator light blinks three times.

Possible Cause

- Disconnected throttle position (TP) sensor connector
- Short or open in TP sensor wire
- Faulty TP sensor

Turn the ignition switch ON.

Check whether the Malfunction Indicator Lamp (MIL) blinks (see section 11).

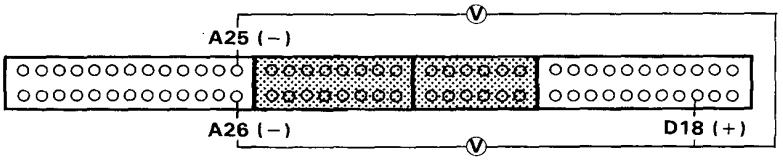
Is the MIL blinking? YES → **Repair the PGM-FI System (see section 11).**

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the TCM. Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see page 14-49).

Turn the ignition switch ON.



Measure the voltage between the D18 (+) and A25 or A26 (−) terminals.

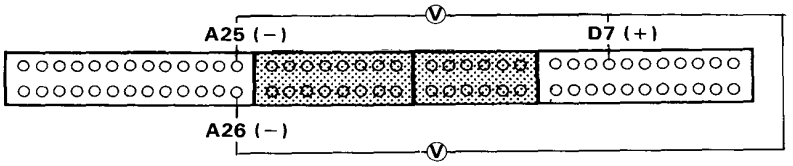
Is there approx. 5 V? NO → **Repair open or short in LT GRN/BLK wire between the D18 terminal and the ECM.**

YES

Turn the ignition switch OFF.

Connect the Test Harness "A" and "D" connectors to the TCM.

Turn the ignition switch ON.



Measure the voltage between the D7 (+) and A25 or A26 (−) terminals.

Is the voltage 0.4–0.6 V? NO → **Repair open or short in RED/BLK wire between the D7 terminal and the TP sensor.**

YES

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

Self-diagnosis D4 indicator light blinks four times.

Possible Cause
• Disconnected vehicle speed sensor (VSS) connector • Short or open in VSS wire • Faulty VSS

Does the speedometer operate?

NO → **Refer to section 23 for vehicle speed sensor (VSS) test.**

YES

Raise the car.

⚠ WARNING

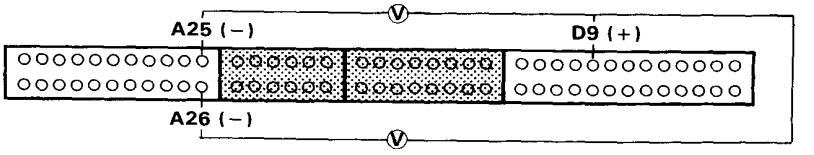
- **Make sure lifts, jacks, and safety stands are placed properly (see section 1).**
- **Set the parking brake securely and block the rear wheels.**
- **Jack up the front of the car and support with safety stands.**

Shift transmission to N position.

Disconnect the 26P and 22P connectors from the TCM.
Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see page 14-49).

Turn the ignition switch ON.

Rotate the front wheel and check for voltage between the D9 (+) and A25 or A26 (−) terminals. Block the other wheel so it does not turn.



Does the voltage 0 V and approx. 5 V appear alternately?

NO → **Check for short or open in ORN wire between the D9 terminal and the VSS. If wire is OK, check the VSS (see section 23).**

YES

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D4 indicator light blinks five times.

Possible Cause

- Short in A/T gear position switch wire
- Faulty A/T gear position switch

Turn the ignition switch ON.

NOTE: Code 5 is caused when the TCM receives two gear position inputs at the same time.

Observe the A/T gear position indicator, and select each position separately.

Do any indicators stay on when the selector lever is not in that position?

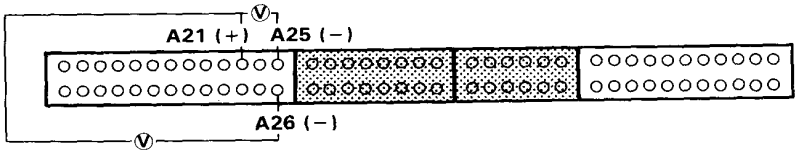
NO → **The system is OK at this time. Check the wire harness for damage.**

YES

Turn the ignition switch OFF.

Connect the Test Harness between the TCM and connectors (see page 14-49).

Turn the ignition switch ON.



Shift to other than R position.

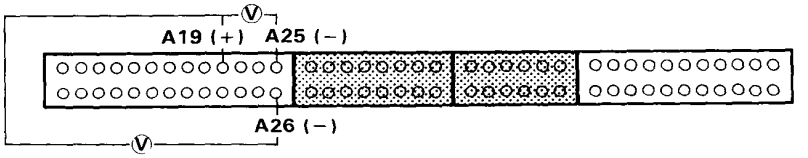
Measure the voltage between the A21 (+) and A25 or A26 (−) terminals.

Is there battery voltage?

NO → **Check for short in GRN/RED wire between the A21 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

YES

Shift to other than N and P position.



Measure the voltage between the A19 (+) and A25 or A26 (−) terminals.

Is there battery voltage?

NO → **Check for short in LT GRN wire between the A19 terminal and the A/T gear position indicator, or a short in GRN/WHT or GRN wires between the A/T gear position indicator and the A/T gear position switch. If wires are OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

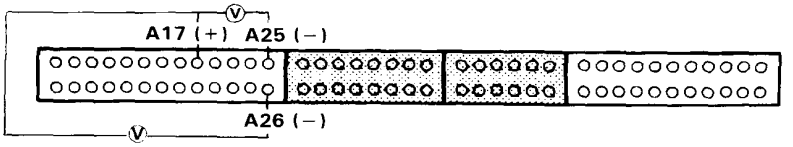
YES

To page 14-59

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Shift to other than [D4] position.

Measure the voltage between the A17 (+) and A25 or A26 (–) terminals.



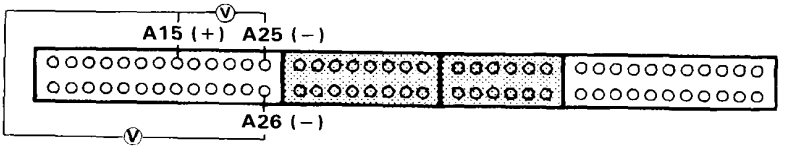
Is there battery voltage?

NO → **Check for short in LT GRN/BLK wire between the A17 terminal and the A/T gear position switch. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

YES

Shift to other than [D3] position.

Measure the voltage between the A15 (+) and A25 or A26 (–) terminals.



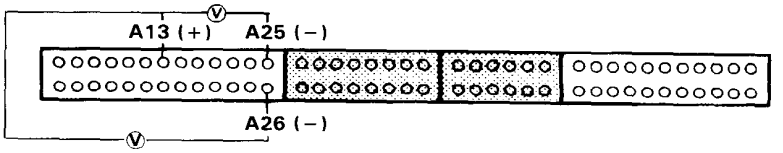
Is there battery voltage?

NO → **Check for short in GRN/BLU wire between the A15 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

YES

Shift to other than [2] position.

Measure the voltage between the A13 (+) and A25 or A26 (–) terminals.



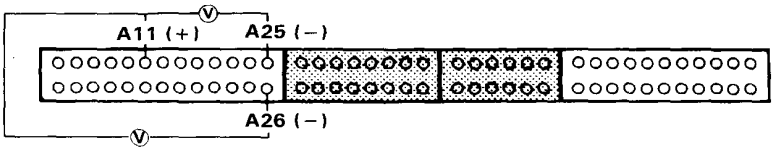
Is there battery voltage?

NO → **Check for short in GRN/YEL wire between the A13 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

YES

Shift to other than [1] position.

Measure the voltage between the A11 (+) and A25 or A26 (–) terminals.



Is there battery voltage?

NO → **Check for short in LT GRN/WHT wire between the A11 terminal and the A/T gear position switch or A/T gear position indicator. If wire is OK, check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

YES

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

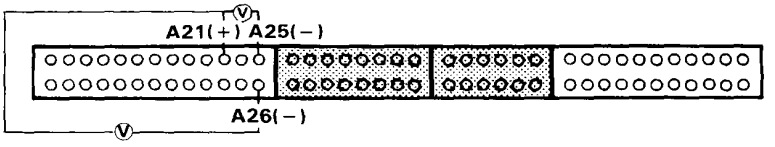
Self-diagnosis D4 indicator light blinks six times.

Possible Cause
- Disconnected A/T gear position switch connector
- Open in A/T gear position switch wire
- Faulty A/T gear position switch

Connect the Test Harness between the TCM and connectors (see page 14-49).

Turn the ignition switch ON.

Shift to R position.



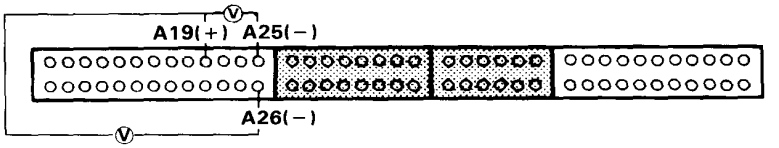
Measure the voltage between the A21 (+) and A25 or A26 (−) terminals.

Is there voltage?

YES → **Repair open in GRN/RED wire between the A21 terminal and the A/T gear position switch.**

NO

Shift to N or P position.



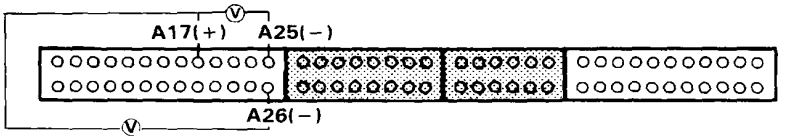
Measure the voltage between the A19 (+) and A25 or A26 (−) terminals.

Is there voltage?

YES → **Repair open in LT GRN wire between the A19 terminal and the A/T gear position indicator.**

NO

Shift to D4 position.



Measure the voltage between the A17 (+) and A25 or A26 (−) terminals.

Is there voltage?

YES → **Repair open in LT GRN/BLK wire between the A17 terminal and the A/T gear position switch.**

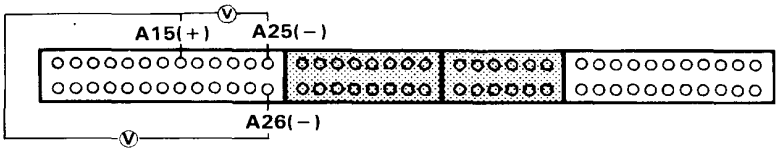
NO

To page 14-61

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Shift to [D3] position.

Measure the voltage between the A15 (+) and A25 or A26 (−) terminals.



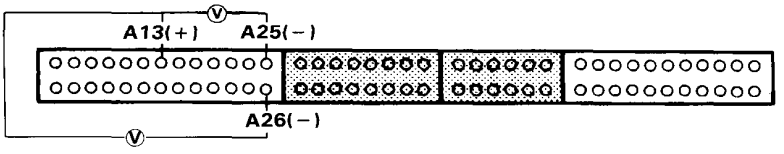
Is there voltage?

YES — **Repair open in GRN/BLU wire between the A15 terminal and the A/T gear position switch.**

NO

Shift to [2] position.

Measure the voltage between the A13 (+) and A25 or A26 (−) terminals.



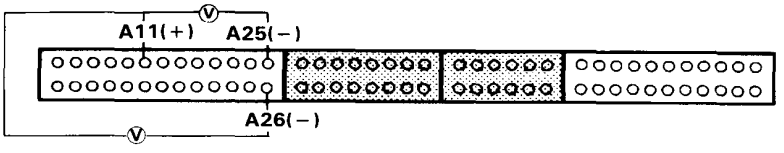
Is there voltage?

YES — **Repair open in GRN/YEL wire between the A13 terminal and the A/T gear position switch.**

NO

Shift to [1] position.

Measure the voltage between the A11 (+) and A25 or A26 (−) terminals.



Is there voltage?

YES — **Repair open in LT GRN/WHT wire between the A11 terminal and the A/T gear position switch.**

NO

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D4 indicator light blinks seven times.

Possible Cause
- Disconnected shift control solenoid valve A connector
- Short or open in shift control solenoid valve A wire
- Faulty shift control solenoid valve A

Turn the ignition switch ON.

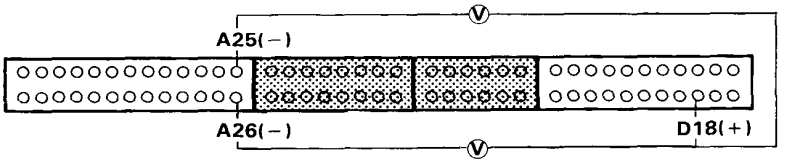
Check whether the Malfunction Indicator Lamp (MIL) blinks (see section 11).

Is the MIL blinking? YES → **Repair the PGM-FI System (see section 11).**

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the TCM.
Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see page 14-49).

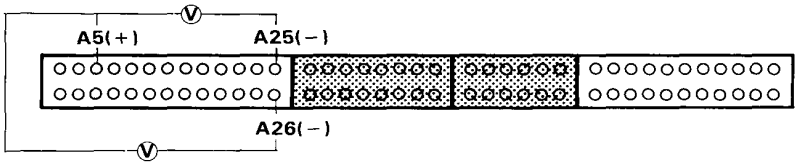


Turn the ignition switch ON.

Measure the voltage between the D18 (+) and A25 or A26 (−) terminals.

Is there approx. 5 V? NO → **Repair open or short in LT GRN/BLK wire between the D18 terminal and the ECM.**

YES



Measure the voltage between the A5 (+) and A25 or A26 (−) terminals.

Is there voltage? YES → **Repair short to power source in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A.**

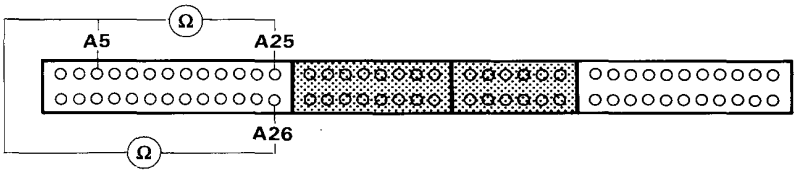
NO

Turn the ignition switch OFF.

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Measure the resistance between the A5 and A25 or A26 terminals.

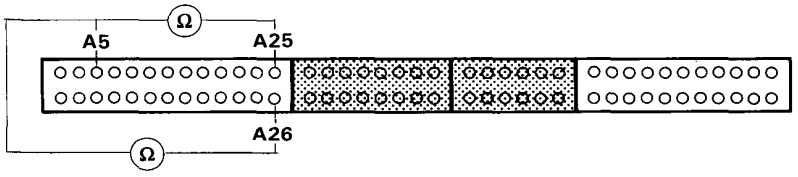


Is the resistance 12—24 Ω?

YES → **Check for loose TCM connectors. If necessary, substitute a known-good solenoid valve assembly or TCM and recheck.**

NO

Disconnect the 3P connector from the shift control solenoid valve assembly.



Check for continuity between the A5 and A25 or A26 terminals.

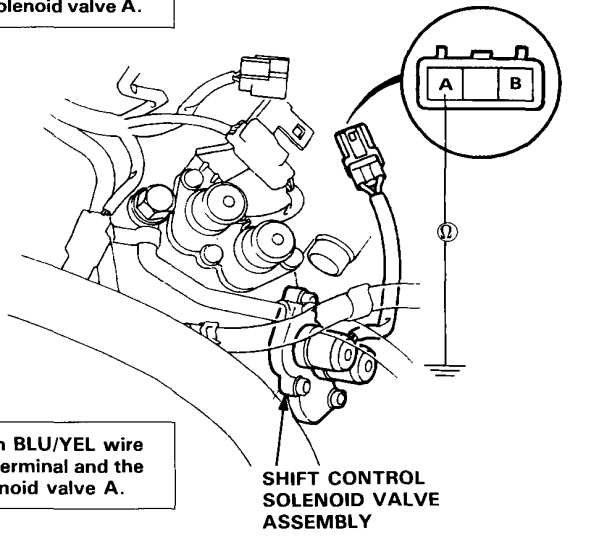
Is there continuity?

YES → **Repair short to ground in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A.**

NO

Measure the resistance of the solenoid at the 3P connector.

3P CONNECTOR
View from terminal side.



Is the resistance 12—24 Ω?

YES → **Check for open in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A.**

NO

Replace the shift control solenoid valve assembly.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D4 Indicator light blinks eight times.

Possible Cause
- Disconnected shift control solenoid valve B connector
- Short or open in shift control solenoid valve B wire
- Faulty shift control solenoid valve B

Turn the ignition switch ON.

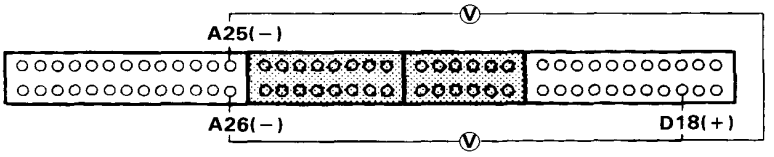
Check whether the Malfunction Indicator Lamp (MIL) blinks (see section 11).

Is the MIL blinking? YES → **Repair the PGM-FI System (see section 11).**

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the TCM. Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see page 14-49).

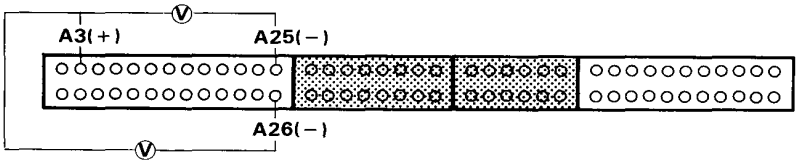


Turn the ignition switch ON.

Measure the voltage between the D18 (+) and A25 or A26 (−) terminals.

Is there approx. 5 V? NO → **Repair open or short in LT GRN/BLK wire between the D18 terminal and the ECM.**

YES



Measure the voltage between the A3 (+) and A25 or A26 (−) terminals.

Is there voltage? YES → **Repair short to power source in GRN/WHT wire between the A3 terminal and shift control solenoid valve B.**

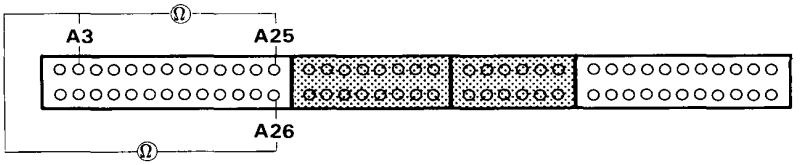
NO

Turn the ignition switch OFF.

To page 14-65

From page 14-64

Measure the resistance between the A3 and A25 or A26 terminals.



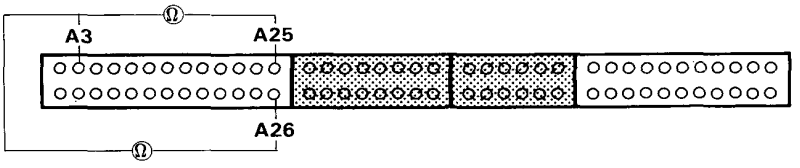
Is the resistance 12—24 Ω?

YES → **Check for loose TCM connectors. If necessary, substitute a known-good solenoid valve assembly or TCM and recheck.**

NO

Disconnect the 3P connector from the shift control solenoid valve assembly.

Check for continuity between the A3 and A25 or A26 terminals.



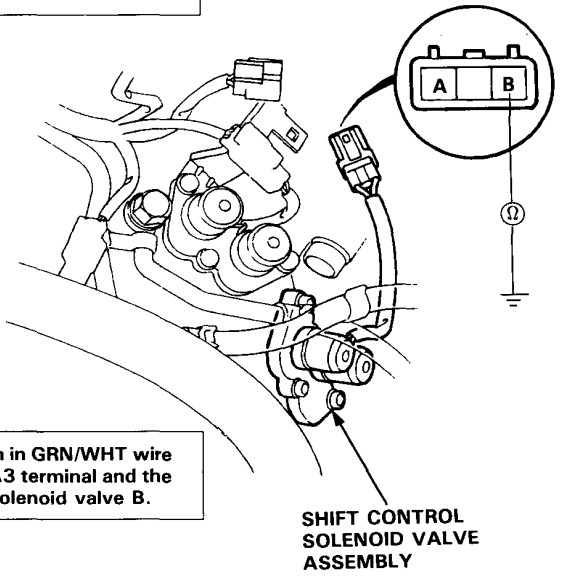
Is there continuity?

YES → **Repair short to ground in GRN/WHT wire between the A3 terminal and the shift control solenoid valve B.**

NO

Measure the resistance of the solenoid at the 3P connector.

3P CONNECTOR
View from terminal side.



Is the resistance 12—24 Ω?

YES → **Check for open in GRN/WHT wire between the A3 terminal and the shift control solenoid valve B.**

NO

Replace the shift control solenoid valve assembly.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D4 indicator light blinks nine times.

Possible Cause
• Loose or faulty connection between the TCM and car harness. • Disconnected countershaft speed sensor connector • Short or open in the countershaft speed sensor wire • Faulty countershaft speed sensor

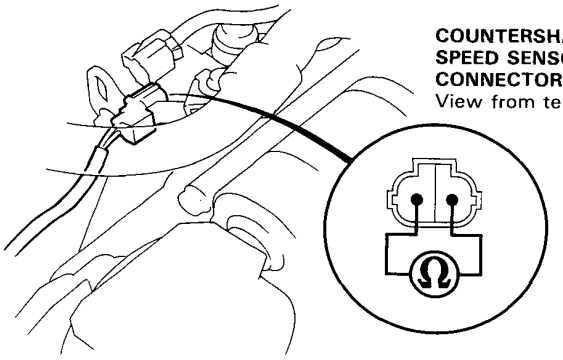
Is the countershaft speed sensor installed properly?

NO → **Reinstall and recheck.**

YES

Disconnect the 2P connector from the countershaft speed sensor connector.

Measure the resistance of the countershaft speed sensor.



COUNTERSHAFT SPEED SENSOR CONNECTOR
View from terminal side.

Is the resistance 400—600 Ω?

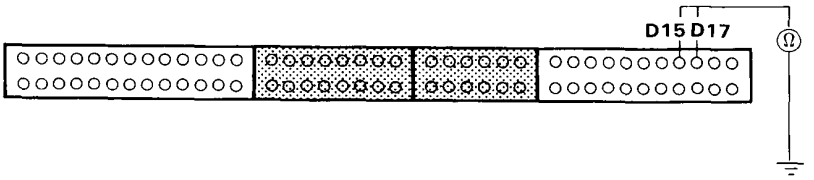
NO → **Replace the countershaft speed sensor.**

YES

To page 14-67

From page 14-66

Disconnect the 22P connector from the TCM. Connect the Test Harness "D" connector to the wire harness only, not to the TCM (see page 14-49).



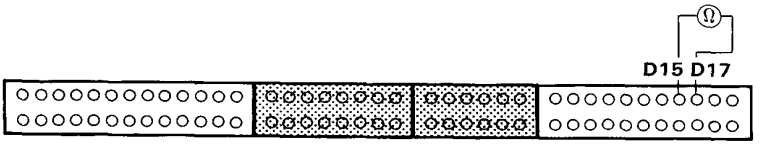
Check for continuity between body ground and D17 terminal and D15 terminal individually.

Is there continuity?

YES → ***Repair short in BLU/GRN or BLU/YEL wire between D17 and D15 terminals and the countershaft speed sensor.***

NO

Reconnect the countershaft speed sensor connector.



Measure the resistance between D17 and D15 terminals.

Is the resistance 400—600 Ω?

NO → ***Repair loose terminal or open in BLU/GRN or BLU/YEL wire between D17 and D15 terminals and the countershaft speed sensor.***

YES

Check for loose TCM connector. If necessary, substitute a known-good TCM and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D4 indicator light blinks ten times.

Turn the ignition switch ON.

Check whether the Malfunction Indicator Lamp (MIL) blinks (see section 11).

Is the MIL blinking?

YES → **Repair the PGM-FI System (see section 11).**

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the TCM.
Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see page 14-49).

Turn the ignition switch ON.

Measure the voltage between the D18 (+) and A25 or A26 (−) terminals.

Is there approx. 5 V?

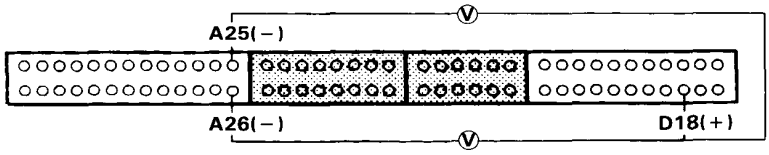
NO → **Repair open or short in LT GRN/BLK wire between the D18 terminal and the ECM.**

YES

Turn the ignition switch OFF.

To page 14-69

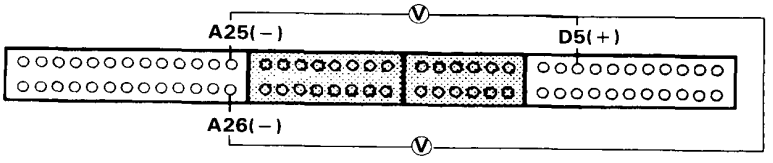
Possible Cause
• Disconnected Engine Coolant Temperature (ECT) sensor connector • Short or open in the ECT sensor wire • Faulty ECT sensor



From page 14-68

Connect the Test Harness "A" and "D" connectors to the TCM.

Start the engine and warm it up to normal operating temperature (the radiator fan comes on).



Measure the voltage between the D5 (+) and A25 or A26 (−) terminals.

Is the voltage less than 1V?

NO → **Repair open or short in RED/WHT wire between the D5 terminal and the ECT sensor.**

YES

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis D4 indicator light blinks eleven times.

Disconnect the 26P connector from the TCM.

Turn the ignition switch ON.

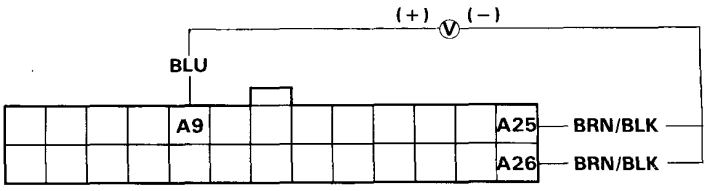
Measure the voltage between the A9 (BLU: +) and A25 (BRN/BLK: −) or A26 (BRN/BLK: −) terminals.

Is there battery voltage?

NO → **Repair open or short in BLU wire between the A9 terminal and the ignition coil.**

YES → **Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

Possible Cause
• Disconnected ignition coil connector • Short or open in ignition coil wire • Faulty ignition coil



NOTE: View from wire side.

Self-diagnosis D4 indicator light blinks thirteen times.

Possible Cause
• Short or open in BLU/WHT wire between the D3 terminal and the ECM. • Faulty barometric pressure (BARO) sensor. NOTE: The BARO sensor is built into the ECM.

NOTE: A code 13 is applicable to KH model.

Is the Malfunction Indicator Lamp (MIL) on and does it indicate code 13?

YES → Do the TCM Reset Procedure (see page 14-49).

NO

Turn the ignition switch ON.

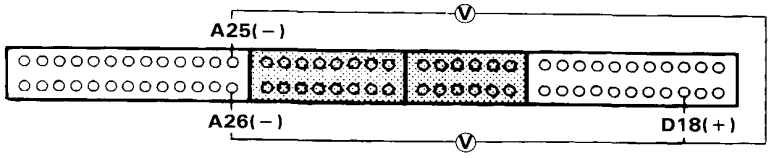
Is the MIL on and does it indicate code 13?

YES → **Substitute a known-good ECM and recheck. If symptom/Indication goes away, replace the original ECM.**

NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the TCM
Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see pare 14-49).



Turn the ignition switch ON.

Measure the voltage between the D18 (+) and A25 or A26 (−) terminals.

Is there approx. 5 V?

NO → **Repair open or short in LT GRN/BLK wire between the D18 terminal and the ECM.**

YES

Turn the ignition switch OFF.

To page 14-72

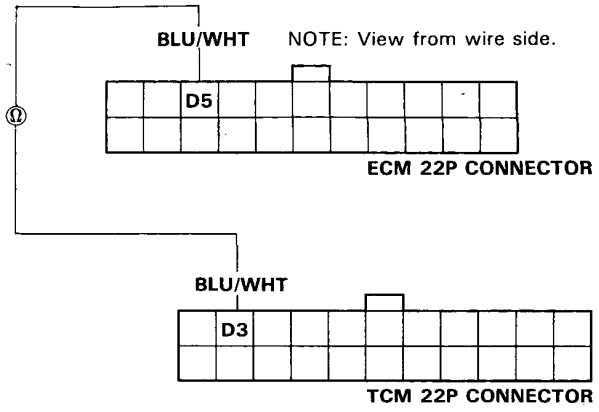
(cont'd)

Troubleshooting Flowchart (cont'd)

From page 14-71

Disconnect the 22P connectors from the TCM and ECM.

Check for continuity between the D3 (BLU/WHT) terminal of the TCM 22P connector and the D5 (BLU/WHT) terminal of the ECM 22P connector.



Is there continuity?

NO → **Repair open in BLU/WHT wire between the TCM and ECM.**

YES

Check for continuity between the BLU/WHT wire and body ground.

Is there continuity?

YES → **Repair short to body ground in BLU/WHT wire.**

NO

Check for loose TCM and ECM connectors. If necessary, substitute a known-good TCM and recheck.

Self-diagnosis D4 indicator light blinks fourteen times.

Possible Cause
• Short or open in FAS (BRN/WHT) wire. • Faulty ECM.

Is the Malfunction Indicator Lamp (MIL) on?

YES → **Repair the PGM-FI System (see section 11).**

NO

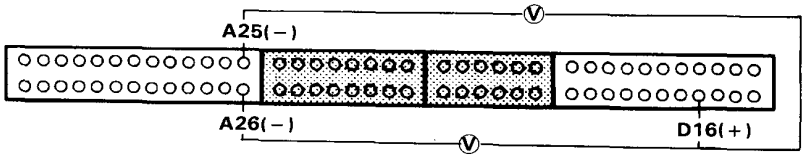
Start the engine and warm it up to normal operating temperature (the radiator fan comes on).

Shift to P position.

Turn the ignition switch OFF.

Connect the Test Harness between the TCM and connectors (see page 14-49).

Turn the ignition switch ON and wait for at least two seconds.



Measure the voltage between the D16(+) and A25 or A26(−) terminals.

Is there approx. 5 V?

YES → **Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

NO

Turn the ignition switch OFF.

Disconnect the Test Harness from the TCM, but leave it connected to the car harness.

Turn the ignition switch ON.

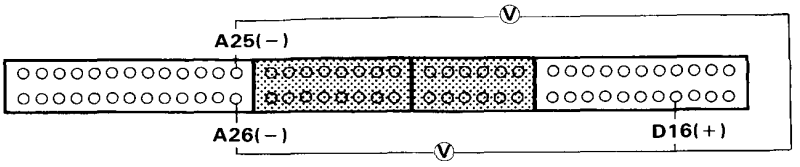
To page 14-74

(cont'd)

Troubleshooting Flowchart (cont'd)

From page 14-73

Measure the voltage between the D16(+) and A25 or A26(−) terminals.



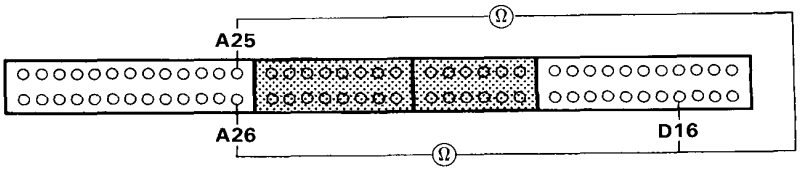
Is there approx. 5 V?

YES → **Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

NO

Disconnect the 26P connector from the ECM.

Check for continuity between the D16 and A25 or A26 terminals of the Test Harness.



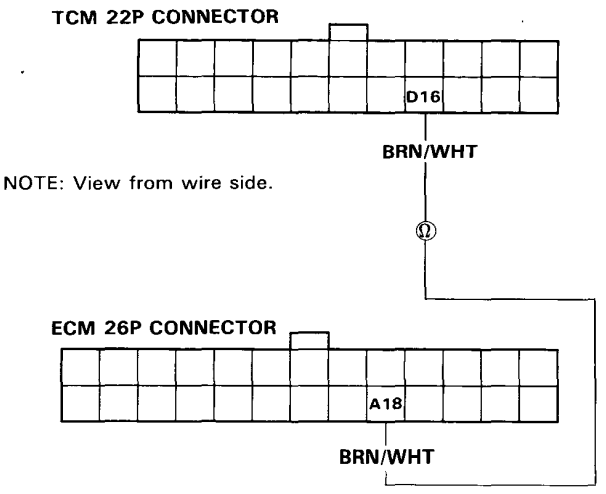
Is there continuity?

YES → **Repair short in BRN/WHT (FAS) wire between TCM and ECM.**

NO

Disconnect the 26P and 22P connectors from the Test Harness.

Check for continuity between the D16 (BRN/WHT) terminal of TCM 22P connector and A18 (BRN/WHT) terminal of ECM 26P connector.



Is there continuity?

YES → **Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

NO

Repair open in BRN/WHT (FAS) wire between TCM and ECM.

Self-diagnosis D4 indicator light blinks fifteen times.

Possible Cause
• Disconnected mainshaft speed sensor connector • Short or open in mainshaft speed sensor wire. • Faulty mainshaft speed sensor.

NOTE:
• A code 15 on the TCM doesn't always mean there's an electrical problem in the mainshaft or countershaft speed sensor circuit; code 15 may also indicate a mechanical problem in the transmission.

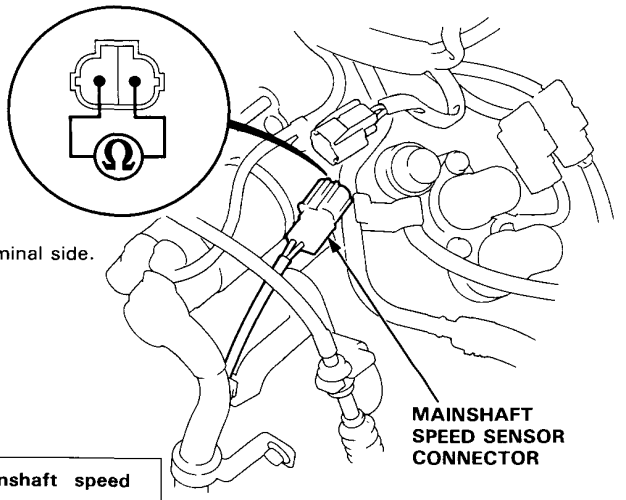
Are the mainshaft and countershaft speed sensors installed properly?

NO → **Reinstall and recheck.**

YES

Disconnect the 2P connector from the mainshaft speed sensor.

Measure the resistance of the mainshaft speed sensor.

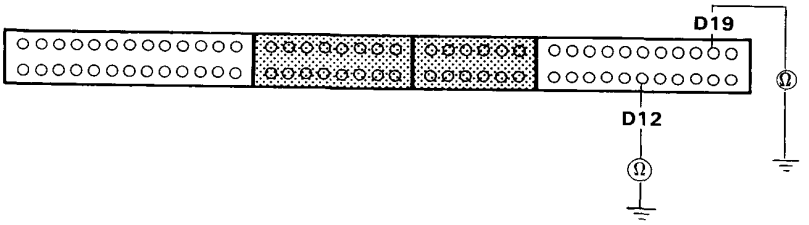


Is the resistance 400–600 Ω?

NO → **Replace the mainshaft speed sensor.**

YES

Disconnect the 22P connector from the TCM.
Connect the Test Harness "D" connector to the wire harness only, not to the TCM (see page 14-49).



Check the continuity between D19 and D12 terminals and body ground.

Is there continuity?

YES → **Repair short in ORN/BLU or WHT/BLU wires between D19 and D12 terminals and the mainshaft speed sensor.**

NO

Reconnect the 2P connector to the mainshaft speed sensor.

To page 14-76

(cont'd)

Troubleshooting Flowchart (cont'd)

From page 14-75

Measure the resistance between D19 and D12 terminals.

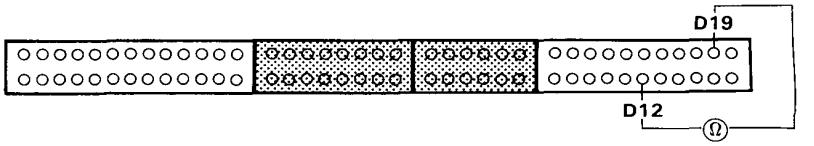
Is the resistance 400—600 Ω?

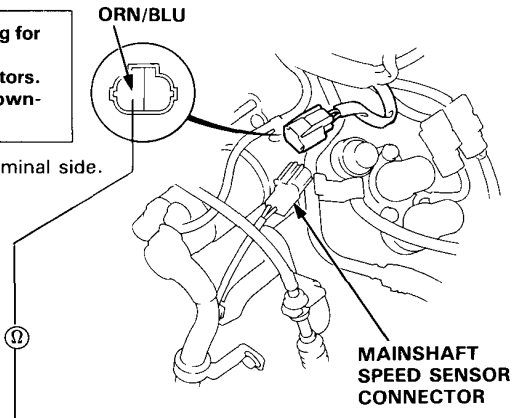
YES → **Run Electrical Troubleshooting for code 9. Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

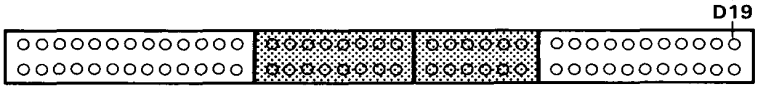
NO

Disconnect the 2P connector from the mainshaft speed sensor.

Check for continuity between D19 terminal and the mainshaft speed sensor connector.





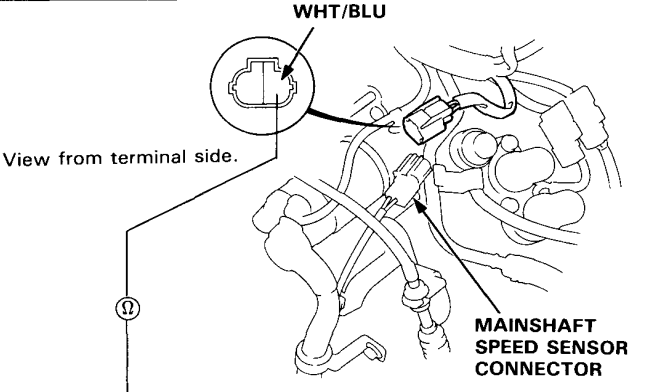


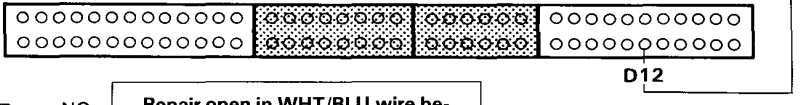
Is there continuity?

NO → **Repair open in ORN/BLU wire between D19 terminal and the mainshaft speed sensor.**

YES

Check for continuity between D12 terminal and the mainshaft speed sensor connector.





Is there continuity?

NO → **Repair open in WHT/BLU wire between D12 terminal and the mainshaft speed sensor.**

YES

Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.

D4 indicator light is on steady (not blinking) whenever the ignition switch is ON.

Turn the ignition switch OFF.

Disconnect the 26P connector from the TCM.
Connect the Test Harness "A" connector to the wire harness only, not to the TCM (see page 14-49).

Turn the ignition switch ON.

Measure the voltage between the A8 (+) terminal and body ground (−).

Is there voltage?

YES → **Repair short to power in BLU/RED wire between A8 terminal and gauge assembly.**

NO

Connect the Test Harness "A" connector to the TCM.

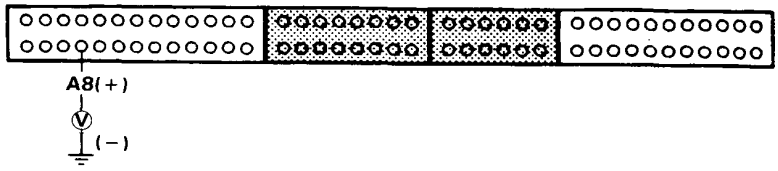
Measure the voltage between the A17 terminal and body ground with the selector lever in any position other than D4 position.

Is there voltage?

NO → **Check for a short to ground on the LT GRN/BLK wire. If the wire is OK, replace the A/T gear position indicator.**

YES

Replace the TCM.



(cont'd)

Troubleshooting Flowchart (cont'd)

D4 indicator light does not come on with the ignition switch ON. (It should come on for about 2 seconds.)

Is the service check connector connected with the special tool (SCS Service Connector)?

YES → **Disconnect the special tool from the service check connector and recheck.**

NO

Shift to D4 position.

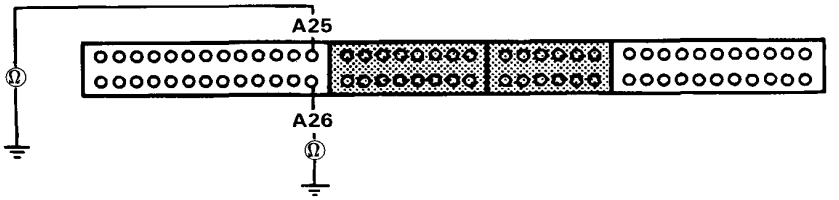
Does the D4 indicator light come on?

YES → **Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**

NO

Turn the ignition switch OFF.

Disconnect the 26P connector from the TCM.
Connect the Test Harness "A" connector to the wire harness only, not to the TCM (see page 14-49).



Check for continuity between the A25 terminal and body ground and A26 and body ground.

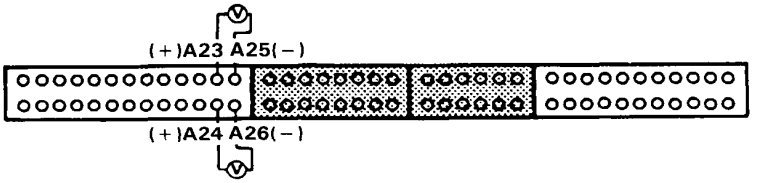
Is there continuity?

NO → **Repair open BRN/BLK wires between A25 or A26 terminals and G101.**

YES

Turn the ignition switch ON.

Measure the voltage between the A23 or A24 (+) and A25 or A26 (−) terminals.



Is there battery voltage?

NO → **Repair open or short in BLK/YEL wire between the A23 and/or A24 terminals and under-hood fuse/relay box.**

YES

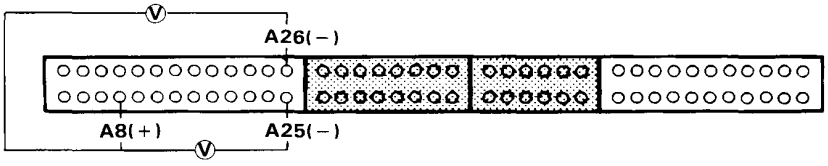
Turn the ignition switch OFF.

To page 14-79

From page 14-78

Connect the Test Harness "A" connector to the TCM.

Turn the ignition switch ON. Be sure that voltage is available for 2 seconds between the A8 (+) terminal and A25 or A26 (−) terminal.



Is there voltage?

YES → **Check for open or short in BLU/RED wire between the A8 terminal and the gauge assembly.**

NO

Turn the ignition switch OFF.

Disconnect the Test Harness "A" connector from the TCM.

Check for continuity between the A8 terminal and the BLU/RED wire at the gauge assembly (see section 23).

Is there continuity ?

NO → **Repair open in BLU/RED wire between the A8 terminal and the gauge assembly.**

YES

Check for loose TCM connectors. Check the A/T gear position switch. If necessary, substitute a known-good TCM and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Inspection of the A/C signal.

Start the engine.

Turn the blower switch ON.

Push the A/C switch ON.

Does A/C compressor clutch engage? — NO → **See Air Conditioning inspection (see section 22).**

YES

Stop the engine.

Disconnect the 26P connector from the TCM.

Start the engine.

Measure the voltage between the A22 (RED/BLU: +) and A25 (BRN/BLK: −) or A26 (BRN/BLK: −) terminals. (A/C compressor OFF)

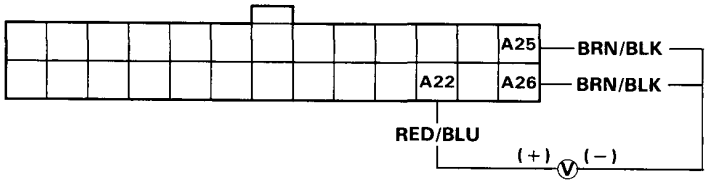
Is there battery voltage? — NO → **Repair open in RED/BLU wire between the A22 terminal and A/C compressor clutch relay.**

YES

- **A/C signal is OK.**
- **Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**
- **Inspect the air conditioning (see section 22).**

Symptom
• Lock-up clutch does not have duty operation (ON↔OFF). • Lock-up clutch does not engage.

NOTE: View from wire side.



Inspection of the brake switch signal.

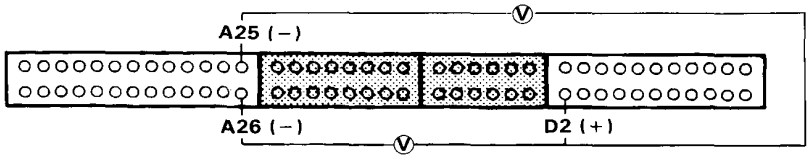
Check that the brake lights come on with the brake pedal depressed.

Are brake lights ON?

NO → **Repair faulty brake switch circuits (see section 23).**

YES

Disconnect the 26P and 22P connectors from the TCM.
Connect the Test Harness "A" and "D" connectors to the wire harness only, not to the TCM (see page 14-49).



Measure the voltage between the D2 (+) and A25 or A26 (−) terminals with the brake pedal depressed.

Is there battery voltage?

NO → **Repair open in GRN/WHT wire between the D2 terminal and brake switch.**

YES

- **Brake switch signal OK.**
- **Check for loose TCM connectors. If necessary, substitute a known-good TCM and recheck.**
- **Inspect the brake switch circuit (see section 23).**

Symptom

Shift lever cannot be moved from P position with the brake pedal depressed.

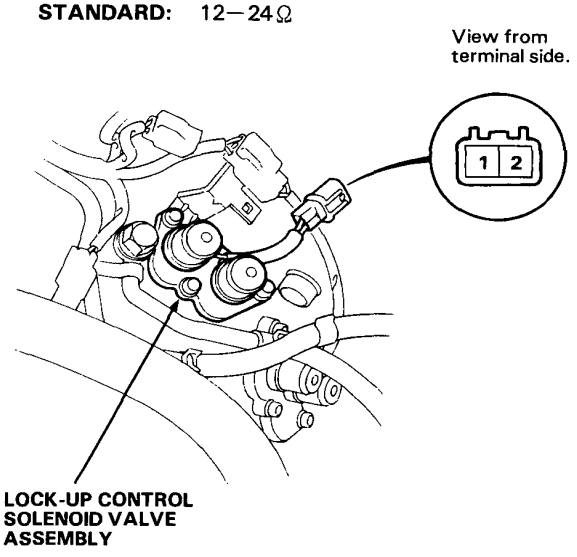
Lock-up Control Solenoid Valve A/B

Test

NOTE:
Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the connector from the lock-up control solenoid valve A/B.
2. Measure the resistance between the No. 1 terminal (solenoid valve A) of the lock-up control solenoid valve connector and body ground, and between the No. 2 terminal (solenoid valve B) and body ground.

STANDARD: 12—24Ω



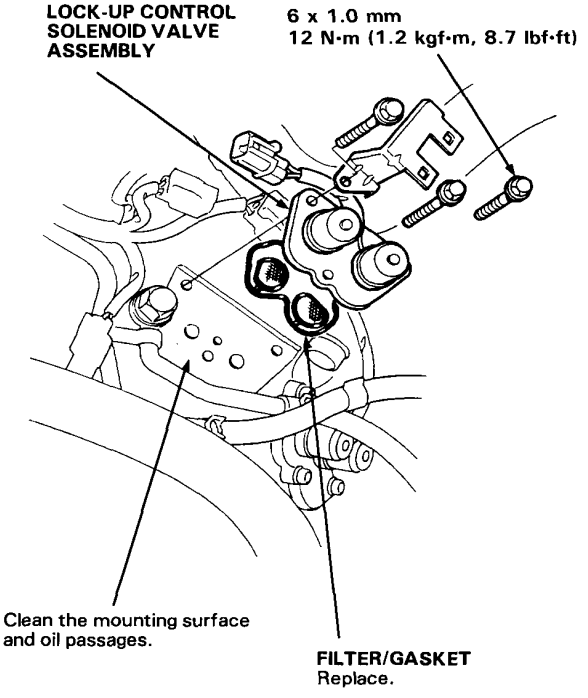
3. Replace the lock-up control solenoid valve assembly if the resistance is out of specification.
4. If the resistance is within the standard, connect the No. 1 terminal of the lock-up control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the lock-up control solenoid valve assembly if no clicking sound is heard.

Replacement

1. Remove the mounting bolts and lock-up control solenoid valve assembly.

   NOTE:
   Be sure to remove or replace the lock-up control solenoid valves A and B as an assembly.

2. Check the lock-up control solenoid valve oil passages for dust or dirt, and replace as an assembly, if necessary.



3. Clean the mounting surface and oil passages of the lock-up control solenoid valve assembly, and install a new filter/gasket.
4. Check the connector for rust, dirt or oil, and reconnect it securely.

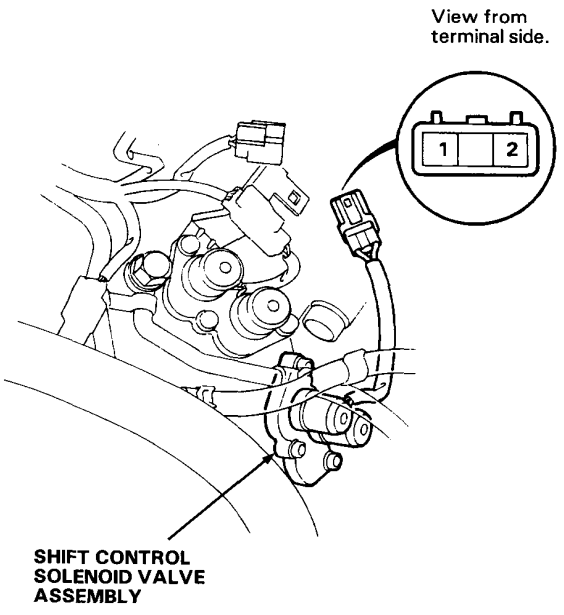
Shift Control Solenoid Valve A/B

Test

NOTE:
Shift control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the connector from the shift control solenoid valve A/B.
2. Measure the resistance between the No. 1 terminal (solenoid valve A) of the shift control solenoid valve connector and body ground, and between the No. 2 terminal (solenoid valve B) and body ground.

STANDARD: 12—24 Ω



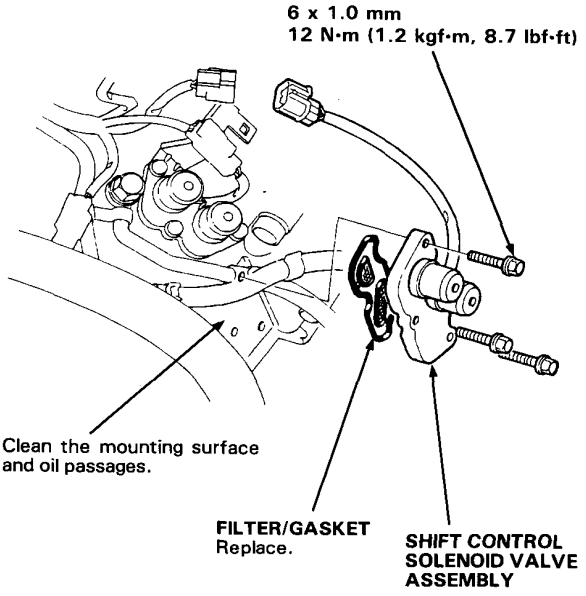
3. Replace the shift control solenoid valve assembly if the resistance is out of specification.
4. If the resistance is within the standard, connect the No. 1 terminal of the shift control solenoid valve connector to the battery positive terminal. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal. A clicking sound should be heard. Replace the shift control solenoid valve assembly if no clicking sound is heard.

Replacement

1. Remove the mounting bolts and shift control solenoid valve assembly.

   NOTE:
   Be sure to remove or replace the shift control solenoid valves A and B as an assembly.

2. Check the shift control solenoid valve oil passages for dust or dirt, and replace as an assembly, if necessary.

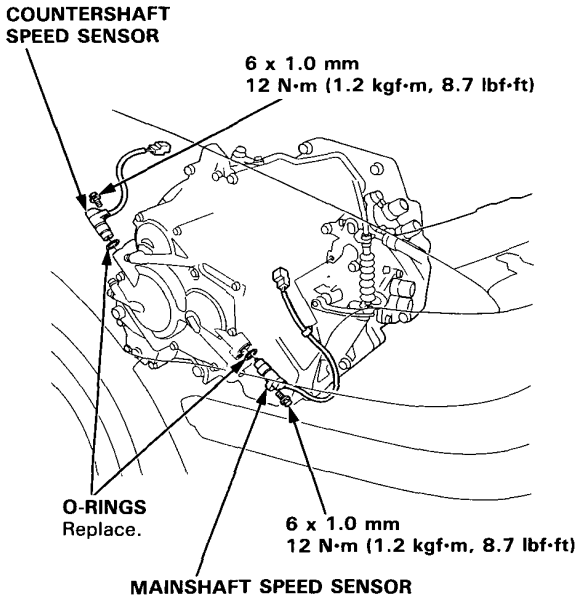


3. Clean the mounting surface and oil passages of the shift control solenoid valve assembly, and install a new filter/gasket.
4. Check the connector for rust, dirt or oil, and reconnect it securely.

Mainshaft/Countershaft Speed Sensors

Replacement

1. Remove the 6 mm bolt from the transmission housing, and remove the mainshaft or countershaft speed sensor.



2. Replace the O-ring with a new one before reinstalling the mainshaft or countershaft speed sensor.

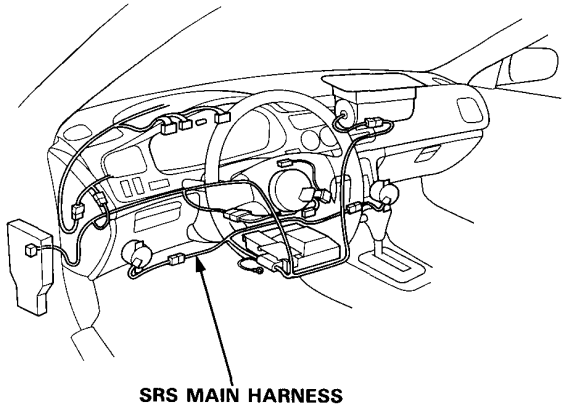
Transmission Control Module (TCM)

Replacement

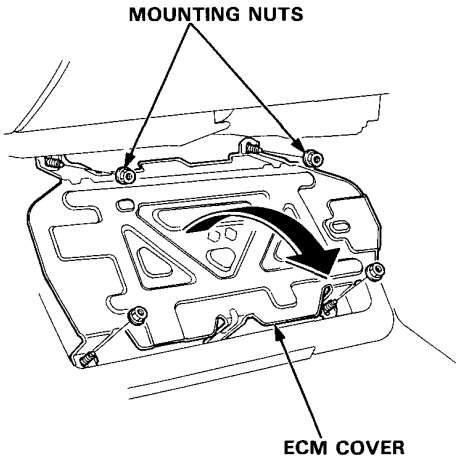
CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

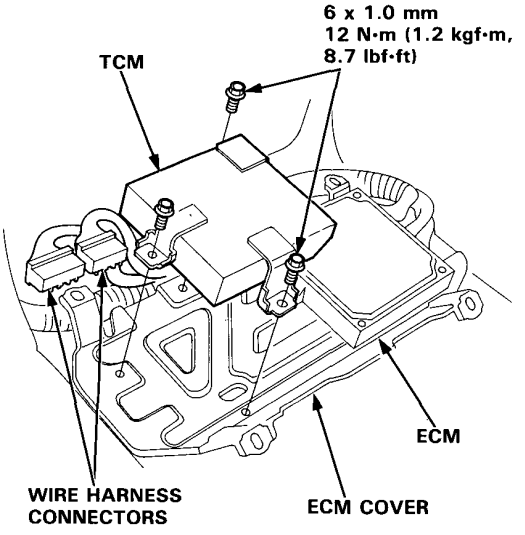
NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



1. Remove the right door sill molding (see section 20).
2. Pull the carpet back to expose the TCM.
3. Remove the ECM cover mounting nuts and turn the TCM over.



4. Remove the TCM and disconnect the wire harness connectors.



Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE List	Check these items on the NOTES List
Engine runs, but car does not move in any gear.	1, 6, 7, 16	K, L, R, S
Car moves in [R] and [2], but not in [D3], [D4] or [1] position.	8, 29, 44, 48	C, M, O
Car moves in [D3], [D4], [1], [R], but not in [2] position.	9, 30, 49	C, L
Car moves in [D3], [D4], [2], [1], but not in [R] position.	1, 11, 22, 34, 38, 39, 40	C, L, Q
Car moves in [N] position.	1, 8, 9, 10, 11, 46, 47	C, D
Excessive idle vibration.	5, 17	B, K, L
Slips in all gears.	6, 7, 16	C, L
No engine braking in [1] position.	12	C, D, L
Slips in 1st gear.	8, 29, 44, 48	C, N, O
Slips in 2nd gear.	9, 20, 23, 30, 49	C, L
Slips in 3rd gear.	10, 21, 23, 31, 49	C, L
Slips in 4th gear.	11, 23, 32, 44	C, L, N
Slips in reverse gear.	11, 32, 34, 44	C, N
Flares on 1—2 upshift.	3, 15, 23	E, L, V
Flares on 2—3 upshift.	3, 15, 23, 24, 49	E, L, V
Flares on 3—4 upshift.	3, 15, 23, 25, 49	E, L, N, V
No upshift; transmission stays in 1st gear.	14, 19, 23	G, L
No downshift to 1st gear.	12, 19	G, L
Late upshift.	14	L, V
Erratic shifting.	2, 14, 26	V
Harsh shift (up and down shifting).	2, 4, 15, 23, 24, 25, 26, 27, 47	A, E, H, I, L, V
Harsh shift (1—2).	2, 9, 15, 23	C, D, E, V
Harsh shift (2—3).	2, 10, 15, 23, 24	C, D, E, H, L, V
Harsh shift (3—4).	2, 11, 15, 23, 25	C, D, E, I, L, V
Harsh kick-down shifts.	2, 15, 23, 26, 27, 28	E, L, Q, V
Harsh kick-down shift (2—1).	48	O
Harsh downshift at closed throttle.	2, 15, 23	E, T
Harsh shift when manually shifting to [1] position.	33	L
Axle(s) slips out of transmission on turns.	43, 50	L, P, Q
Axle(s) stuck in transmission.	43	L, Q
Ratcheting noise when shifting into [R] position.	6, 7, 38, 39, 40	K, L, Q
Loud popping noise when taking off in [R] position.	38, 39, 40	L, Q
Ratcheting noise when shifting from [R] to [P] position or from [R] to [N] position.	38, 39, 40, 45	L, Q
Noise from transmission in all selector lever positions.	6, 17	K, L, Q
Noise from transmission only when wheels are rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	8, 13, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	38, 42	L, Q
Transmission will not shift into 4th gear in [D4] position	1, 21, 28, 32	L
Lock-up clutch does not lock-up smoothly.	17, 36, 37	L
Lock-up clutch does not operate properly.	2, 3, 14, 15, 18, 35, 36, 37	E, L, V
Transmission has multitude of problems shifting. At disassembly, large particles of metal are found on magnet.	43	L, Q

	PROBABLE CAUSE
1.	Shift cable broken/out of adjustment.
2.	Throttle cable too short.
3.	Throttle cable too long.
4.	Wrong type ATF.
5.	Idle rpm too low/high.
6.	Oil pump worn or binding.
7.	Pressure regulator stuck.
8.	1st clutch defective.
9.	2nd clutch defective.
10.	3rd clutch defective.
11.	4th clutch defective.
12.	1st-hold clutch defective.
13.	Mainshaft, countershaft, and secondary shaft idler gears worn/damaged.
14.	Modulator valve stuck.
15.	Throttle valve B stuck.
16.	ATF strainer clogged.
17.	Torque converter defective.
18.	Torque converter check valve stuck.
19.	1—2 shift valve stuck.
20.	2—3 shift valve stuck.
21.	3—4 shift valve stuck.
22.	Servo control valve stuck.
23.	Clutch pressure control (CPC) valve stuck.
24.	2nd orifice control valve stuck.
25.	Orifice control valve stuck.
26.	Main orifice control valve stuck.
27.	3rd kick-down valve stuck.
28.	4th exhaust valve stuck.
29.	1st accumulator defective.
30.	2nd accumulator defective.
31.	3rd accumulator defective.
32.	4th accumulator defective.
33.	1st-hold accumulator defective.
34.	Servo valve stuck.
35.	Lock-up timing valve stuck.
36.	Lock-up shift valve stuck.
37.	Lock-up control valve stuck.
38.	Shift fork bent.
39.	Reverse gears worn/damaged (3 gears).
40.	Reverse selector worn.
41.	3rd gears worn/damaged (2 gears).
42.	Final gears worn/damaged (2 gears).
43.	Differential pinion shaft worn.
44.	Feed pipe O-ring broken.
45.	4th gears worn/damaged (2 gears).
46.	Gear clearance incorrect.
47.	Clutch clearance incorrect.
48.	One-way (sprag) clutch defective.
49.	Sealing rings/guide worn.
50.	Axle-inboard joint clip missing.

(cont'd)

Symptom-to-Component Chart

Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR List	Items on the NOTES List
Car creeps in [N] position.	R1, R2	
Car does not move in [D3] or [D4] position.	R4	
Transmission locks up in [R] position.	R3, R12	
Excessive drag in transmission.	R6	K, R
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R5	
Main seal pops out.	R8	S
Various shifting problems.	R9, R10	
Harsh upshifts.	R11	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1.	Improper clutch clearance.
R2.	Improper gear clearance.
R3.	Parking brake lever installed upside down.
R4.	One-way (sprag) clutch installed upside down.
R5.	Reverse selector hub installed upside down.
R6.	Oil pump binding.
R7.	Torque converter not fully seated in oil pump.
R8.	Main seal improperly installed.
R9.	Springs improperly installed.
R10.	Valves improperly installed.
R11.	Check valve balls not installed.
R12.	Shift fork bolt not installed.

NOTES	
B.	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of service manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear, and check the orifice control valves and throttle valves for free movement.
E.	If throttle valve B is stuck, inspect the clutches for wear.
G.	If the 1—2 shift valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no 1st gear.
H.	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment or main valve body and torque converter housing may cause oil pump seizure. The symptoms are mostly an rpm-related ticking noise or a high-pitched squeak.
L.	If the ATF strainer is clogged with particles of steel or aluminum, inspect the oil pump and differential pinion shaft. If both are OK and no cause for the contamination is found, replace the torque converter.
M.	If the 1st clutch feed pipe guide in the right side cover is scored by the secondary shaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the right side cover as it is dented. The O-ring under the guide is probably worn.
N.	• Replace the mainshaft if the bushing for the 4th feed pipe is loose or damaged. If the 4th feed pipe is damaged or out of round, replace it. • Replace the countershaft if the bushing for the 1st-hold feed pipe is loose or damaged. If the 1st-hold feed pipe is damaged or out of round, replace it. • Replace the secondary shaft if the bushing for the 1st feed pipe is loose or damaged. If the 1st feed pipe is damaged or out of round, replace it.
O.	A worn or damaged sprag clutch is mostly a result of shifting the transmission in [D3] or [D4] position while the wheels rotate in reverse, such as rocking the car in snow.
P.	Inspect the frame for collision damage.
Q.	Inspect for damage or wear: 1. Reverse selector gear teeth chamfers. 2. Engagement teeth chamfers of countershaft 4th and reverse gear. 3. Shift fork for scuff marks in center. 4. Differential pinion shaft for wear under pinion gears. 5. Bottom of 1st-hold clutch for swirl marks. Replace items 1, 2, 3 and 4 if worn or damaged. If transmission makes clicking, grinding or whirring noise, also replace mainshaft 4th gear and reverse idler gear and countershaft 4th gear in addition to 1, 2, 3 or 4. If differential pinion shaft is worn, overhaul differential assembly, and replace ATF strainer, and thoroughly clean transmission, flush torque converter, cooler and lines. If bottom of 1st-hold clutch is swirled and transmission makes gear noise, replace the countershaft and final driven gear.
R.	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the oil pump when you torque down the main valve body. This will result in oil pump seizure if not detected. Use proper tools.
S.	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the oil return passage and result in damage.
T.	Harsh downshifts when coasting to a stop with zero throttle may be caused by a bent-in throttle valve retainer/cam stopper. Throttle cable adjustment may clear this problem.
V.	Throttle cable adjustment is essential for proper operation of the transmission. Not only does it affect the shift points if misadjusted, but also the shift quality and lock-up clutch operation. A cable adjusted too long will result in throttle pressure being too low for the amount of engine torque input into the transmission and may cause clutch slippage. A cable adjusted too short will result in too high throttle pressure which may cause harsh shifts, erratic shifts and torque converter hunting.

NOTE: Warm up the engine to normal operating temperature (the radiator fan comes on).

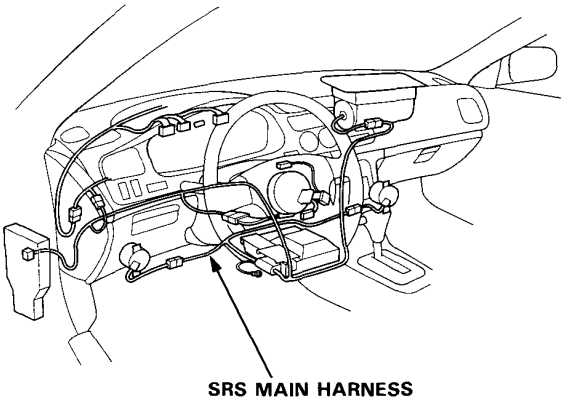
1 Apply parking brake and block the wheels. Start the engine, then move the selector lever to [D4] position while depressing the brake pedal. Depress the accelerator pedal and release it suddenly. The engine should not stall.
2. Repeat same test in [D3] position.
3. Shift the selector lever to [D4] position, and check that the shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.

NOTE:
Throttle position sensor voltage represents the throttle opening.

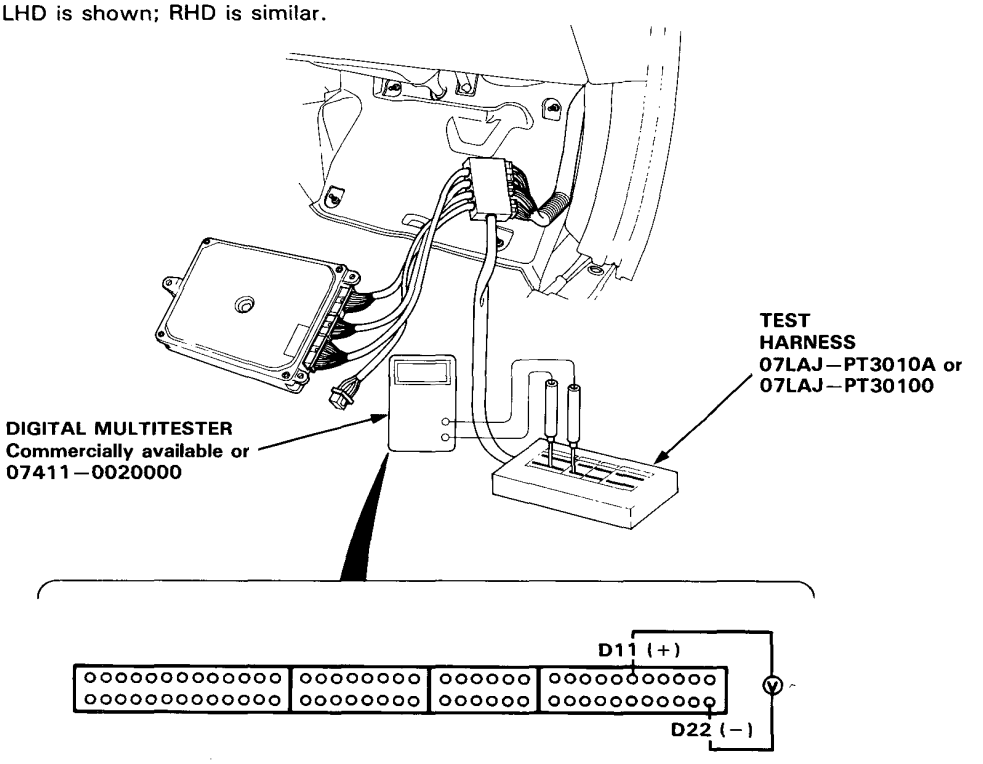
—1. Connect the Test Harness between the ECM and connector (see section 11).
—2. Set the digital multimeter to check voltage between D11 (+) terminal and D22 (—) terminal for the throttle position sensor.

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



NOTE: LHD is shown; RHD is similar.



F20B3/F22B5 Engine: KG, KE models
D4 Position

● Upshift

		1st→2nd	2nd→3rd	3rd→4th	Lock-up Clutch ON
Throttle position sensor voltage: 0.8 V	mph	11—13	19—21	29—33	——
	km/h	18—21	33—37	47—53	——
***Throttle position sensor voltage:* 2.25 V**	mph	18—21	38—41	54—59	63—67
	km/h	29—34	61—66	87—95	101—108
Full throttle Throttle position sensor voltage: 4.5 V	mph	31—35	68—73	93—98	84—88
	km/h	50—56	109—117	150—158	135—142

● Downshift

		Lock-up Clutch OFF	4th→3rd	3rd→2nd	2nd→1st
Throttle position sensor voltage: 0.8 V	mph	13—16	——	17—19 (4th→2nd)	7—9
	km/h	21—26	——	27—31 (4th→2nd)	11—14
Throttle position sensor voltage: 2.25 V	mph	49—54	42—45	26—30	7—9
	km/h	79—87	68—72	42—48	11—14
Full throttle Throttle position sensor voltage: 4.5 V	mph	80—85	78—84	54—61	26—30
	km/h	129—137	126—135	87—98	42—48

F22B1/F22B2 Engine: KH model
D4 Position

● Upshift

		1st→2nd	2nd→3rd	3rd→4th	Lock-up Clutch ON
Throttle position sensor voltage: 0.8 V	mph	11—13	21—23	29—33	——
	km/h	18—21	33—37	47—53	——
Throttle position sensor voltage: 2.25 V	mph	18—21	38—41	54—59	63—67
	km/h	29—34	61—66	87—95	101—108
Full throttle Throttle position sensor voltage: 4.5 V	mph	31—35	63—68	93—98	84—88
	km/h	50—56	101—109	150—158	135—142

● Downshift

		Lock-up Clutch OFF	4th→3rd	3rd→2nd	2nd→1st
Throttle position sensor voltage: 0.8 V	mph	13—16	——	19—21 (4th→2nd)	7—9
	km/h	21—26	——	31—34 (4th→2nd)	11—14
Throttle position sensor voltage: 2.25 V	mph	49—54	42—45	26—30	7—9
	km/h	79—87	68—72	42—48	11—14
Full throttle Throttle position sensor voltage: 4.5 V	mph	80—85	78—84	54—61	26—30
	km/h	129—137	126—135	87—98	42—48

(cont'd)

(cont'd)

4. Accelerate to about 35 mph(57 km/h) so the transmission is in 4th, then shift from [D4] position to [2] position. The car should immediately begin slowing down from engine braking.

   CAUTION:
   Do not shift from [D4] or [D3] position to [2] or [1] position at speeds over 63 mph (100 km/h); you may damage the transmission.

5. Check for abnormal noise and clutch slippage in the following positions.

   [1] (1st Gear) Position
   - 1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
   - 2. Upshifts should not occur with the selector in this position.

   [2] (2nd Gear) Position
   - 1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
   - 2. Upshifts and downshifts should not occur with the selector in this position.

   [R] (Reverse) Position
   Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

6. Test in [P] (Parking) Position
   Park car on slope (approx. 16°), apply the parking brake, and shift into [P] position. Release the brake; the car should not move.

Stall Speed

Test

CAUTION:
- **To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.**
- **Do not shift the lever while raising the engine speed.**
- **Be sure to remove the pressure gauge before testing stall speed.**

1. Engage parking brake and block the front wheels.
2. Connect tachometer, and start the engine.
3. Make sure the A/C switch is OFF.
4. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift into [2] position.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow 2 minutes for cooling, then repeat the test in [D4], [1], and [R] positions.

NOTE:
- Stall speed tests should be used for diagnostic purposes only.
- Stall speed should be the same in [D4], [2], [1] and [R] positions.

Stall Speed RPM:
F20B3 Engine
Specification: 2,550 rpm (min^{-1})
Service Limit: 2,400—2,700 rpm (min^{-1})
F22B1,F22B2 and F22B5 Engines
Specification: 2,650 rpm (min^{-1})
Service Limit: 2,500—2,800 rpm (min^{-1})

TROUBLE	PROBABLE CAUSE
Stall rpm high in [D4], [2], [1] and [R] positions	· Low fluid level or oil pump output · Clogged ATF strainer · Pressure regulator valve stuck closed · Slipping clutch
Stall rpm high in [R] position	· Slippage of 4th clutch
Stall rpm high in [2] and [D4] positions	· Slippage of 2nd clutch
Stall rpm high in [1] position	· Slippage of 1st clutch or 1st gear one-way clutch
Stall rpm low in [D4], [2], [1] and [R] positions	· Engine output low · Torque converter one-way clutch slipping

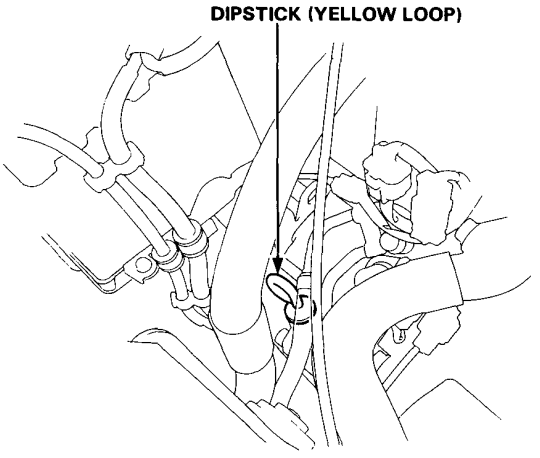
Fluid Level

Checking/Changing

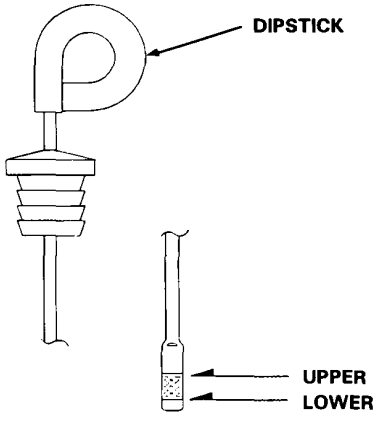
Checking

NOTE:
Check the fluid level with the engine at normal operating temperature (the radiator fan comes on).

1. Park the car on level ground. Turn off the engine.
2. Remove the dipstick (yellow loop) from the transmission, and wipe it with a clean cloth.
3. Insert the dipstick into the transmission.



4. Remove the dipstick and check the fluid level. It should be between the upper and lower marks.

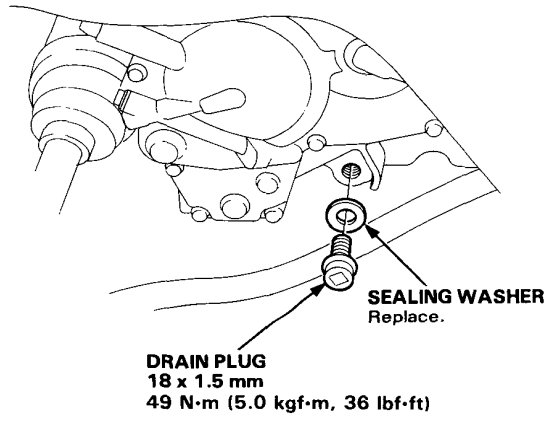


5. If the level is below the lower mark, add fluid into the tube to bring it to the upper mark. Use Honda Premium Formula Automatic Transmission Fluid or an equivalent DEXRON® II Automatic Transmission Fluid (ATF) only.
6. Insert the dipstick back into the transmission.

Changing

1. Bring the transmission up to normal operating temperature (the radiator fan comes on) by driving the car. Park the car on level ground, turn the engine off, and then remove the drain plug.
2. Reinstall the drain plug with a new sealing washer, then refill the transmission to the upper mark on the dipstick.

Automatic Transmission Fluid Capacity:
2.4 ℓ (2.5 US qt , 2.1 Imp qt) at changing
6.0 ℓ (6.3 US qt , 5.3 Imp qt) at overhaul



Pressure Testing

⚠ WARNING

- **While testing, be careful of the rotating front wheels.**
- **Make sure lifts, jacks, and safety stands are placed properly (see section 1).**

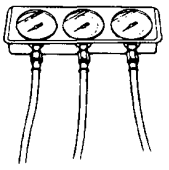
CAUTION:

- **Before testing, be sure the transmission fluid is filled to the proper level.**
- **Warm up the engine before testing.**

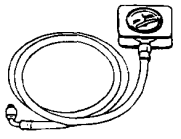
1. Raise the car (see section 1).
2. Warm up the engine, then stop the engine and connect a tachometer.
3. Connect the oil pressure gauge to each inspection hole.

   TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

   CAUTION: Connect the oil pressure gauge securely; be sure not to allow dust and other foreign particles to enter the inspection hole.



A/T OIL PRESSURE GAUGE SET 07406–0020004



A/T LOW PRESSURE GAUGE 07406–0070001

4. Start the engine, and measure the respective pressure as follows.
   - Line Pressure
   - Clutch Pressure
   - Throttle B Pressure
5. Install a new washer and the sealing bolt in the inspection hole, and tighten to the specified torque.

   TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

   NOTE: Do not reuse old aluminum washers.

● Line Pressure Measurement

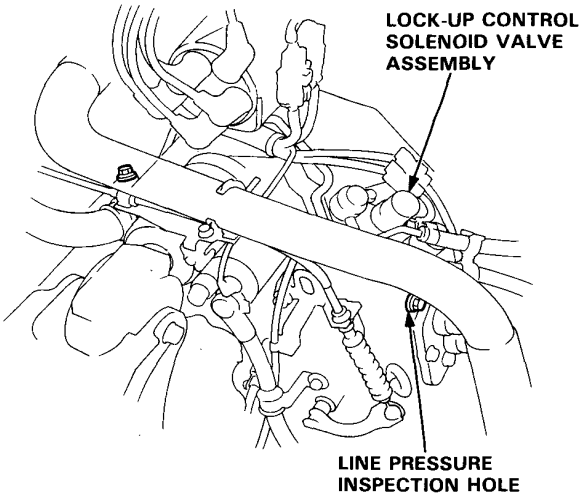
–1. Set the parking brake and block both rear wheels securely.

–2. Run the engine at 2,000 rpm (min^{-1}).

–3. Shift the select lever to [N] or [P] position.

   NOTE: Higher pressures may be indicated if measurements are made in selector positions other than [N] or [P] position.

–4. Measure line pressure.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	[N] or [P]	No (or low) line pressure	Torque converter, oil pump, pressure regulator, torque converter check valve	830–880 kPa (8.5–9.0 kgf/cm², 120–130 psi)	780 kPa (8.0 kgf/cm², 110 psi)

- **Clutch Pressure Measurement**

⚠ WARNING While testing, be careful of the rotating front wheels.

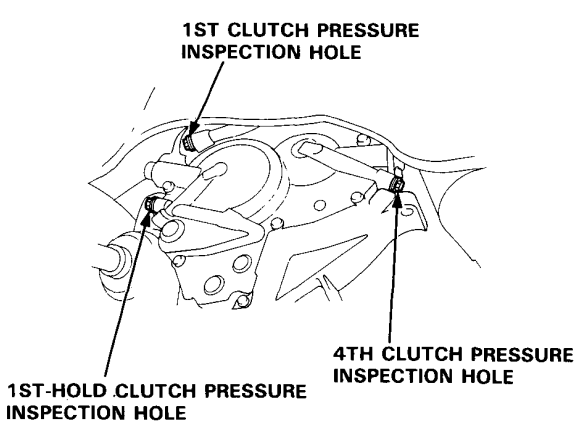
—1. Set the parking brake and block both rear wheels securely.

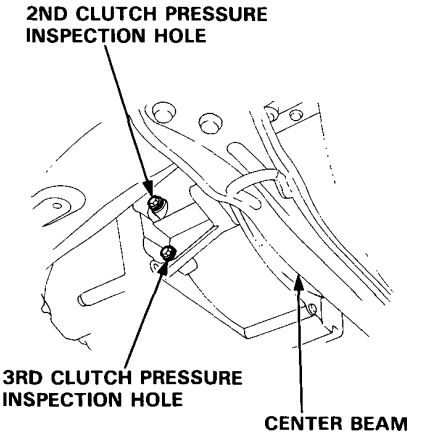
—2. Raise the front of the car and support it with safety stands.

—3. Allow the front wheels to rotate freely.

—4. Run the engine at 2,000 rpm (min^{-1}).

—5. Measure each clutch pressure.





PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st Clutch	1 or D4	No or low 1st pressure	1st Clutch	830—880 kPa (8.5—9.0 kgf/cm², 120—130 psi)	780 kPa (8.0 kgf/cm², 110 psi)
1st-hold Clutch	1	No or low 1st-hold pressure	1st-hold Clutch		
2nd Clutch	2	No or low 2nd pressure	2nd Clutch		
2nd Clutch	D4	No or low 2nd pressure	2nd Clutch	490 kPa (5.0 kgf/cm², 71 psi) (Throttle control lever fully closed) 880 kPa (9.0 kgf/cm², 130 psi) (Throttle control lever more than 2/8 opened)	440 kPa (4.5 kgf/cm², 64 psi) (Throttle control lever fully closed) 780 kPa (8.0 kgf/cm², 110 psi) (Throttle control lever more than 2/8 opened)
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch	520 kPa (5.3 kgf/cm², 75 psi) (Throttle control lever fully closed) 880 kPa (9.0 kgf/cm², 130 psi) (Throttle control lever more than 2/8 opened)	460 kPa (4.7 kgf/cm², 67 psi) (Throttle control lever fully closed) 780 kPa (8.0 kgf/cm², 110 psi) (Throttle control lever more than 2/8 opened)
	R		Servo Valve or 4th Clutch	830—880 kPa (8.5—9.0 kgf/cm², 120—130 psi)	780 kPa (8.0 kgf/cm², 110 psi)

(cont'd)

(cont'd)

● **Throttle B Pressure Measurement**

—1. Set the parking brake securely and block the wheels.

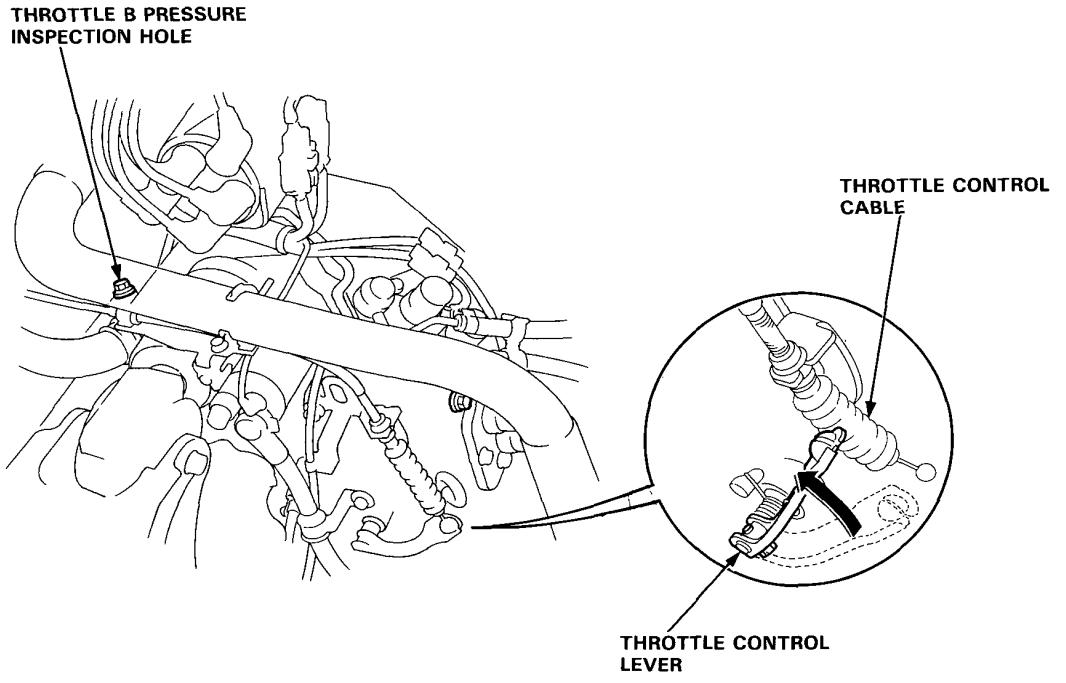
—2. Run the engine at 1,000 rpm (min^{-1}).

—3. Disconnect the throttle control cable from the throttle control lever.

—4. Measure full-closed throttle B pressure.

—5. Move the throttle control lever to full-opened throttle position.

—6. Measure full-opened throttle B pressure.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Throttle B	D4	Pressure too high	Throttle Valve B	0 kPa (0 kgf/cm², 0.0 psi) throttle control lever fully closed	—
		No or low pressure		830—880 kPa (8.5—9.0 kgf/cm², 120—130 psi) throttle control lever fully opened	780 kPa (8.0 kgf/cm², 110 psi) throttle control lever fully opened

Removal

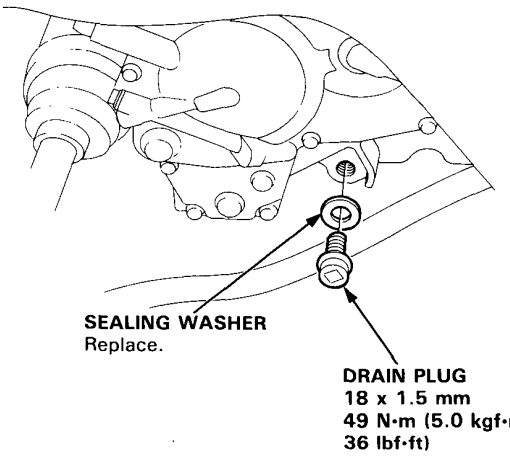
⚠ WARNING

- **Make sure lifts, jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).**
- **Apply parking brake and block rear wheels so car will not roll off stands and fall on you while working under it.**

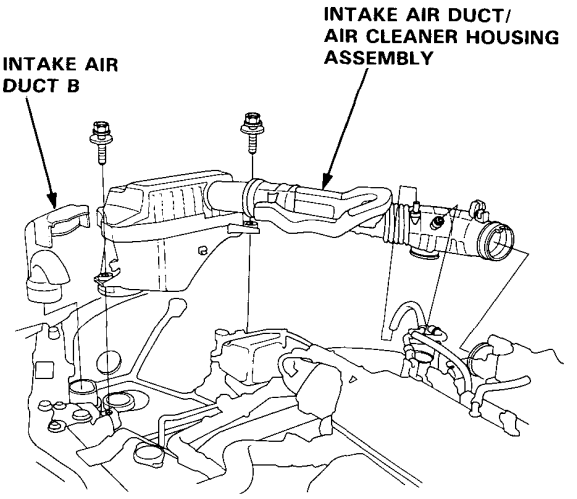
CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative (−) and positive (+) cables from the battery.
2. Remove the battery set plate, then remove the battery.
3. Remove the drain plug, and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.

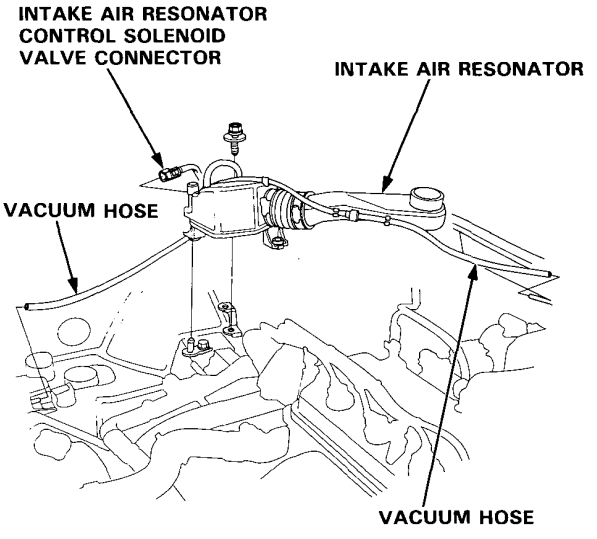
   TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)



4. Remove the intake air duct B and intake air duct/air cleaner housing assembly.



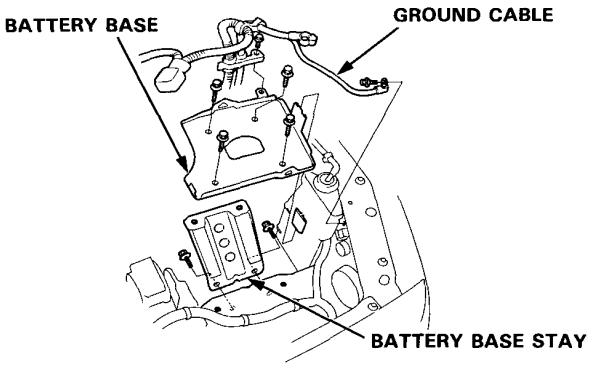
5. Disconnect the intake air resonator control solenoid valve connector, then remove the vacuum hoses and intake air resonator (F22B1 and F22B5 engines).



(cont'd)

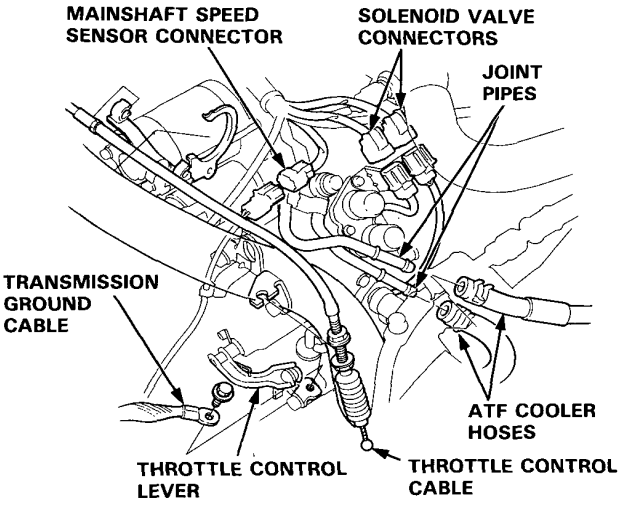
Removal (cont'd)

6. Remove the battery cable and ground cable stay from the battery base.
7. Remove the battery base.
8. Remove the battery base stay.

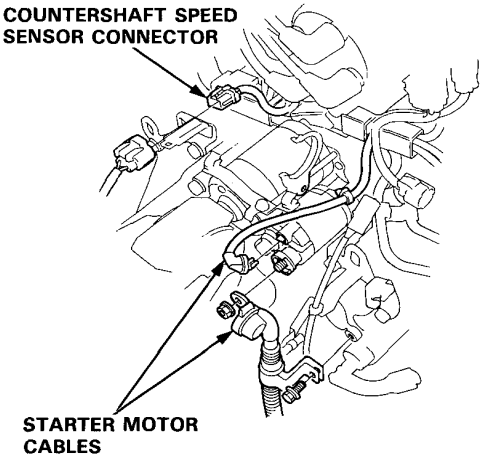


9 Disconnect the transmission ground cable from the transmission.
10. Disconnect the lock-up control solenoid valve and shift control solenoid valve connectors.
11. Disconnect the throttle control cable from the throttle control lever.
12. Disconnect the mainshaft speed sensor connector.
13. Remove the ATF cooler hoses at the joint pipes. Turn the ends of the ATF cooler hoses up to prevent ATF from flowing out, then plug the joint pipes.

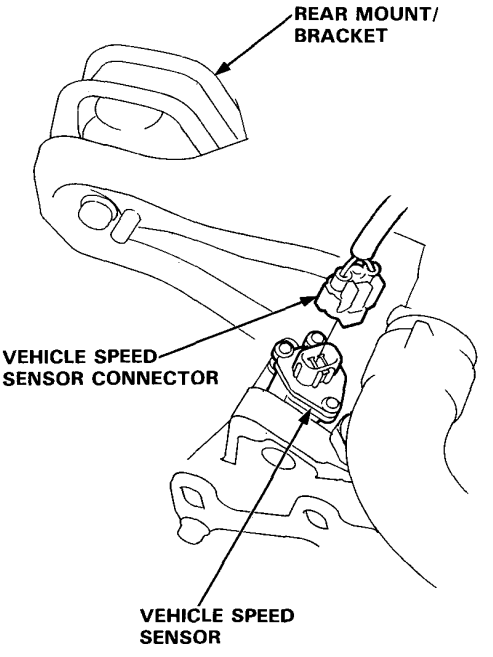
NOTE:
Check for any signs of leakage at the hose joints.



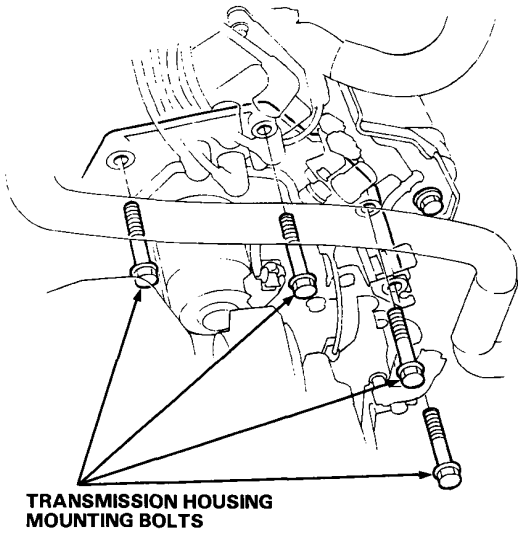
14. Remove the starter motor cables.
15. Disconnect the countershaft speed sensor connector.



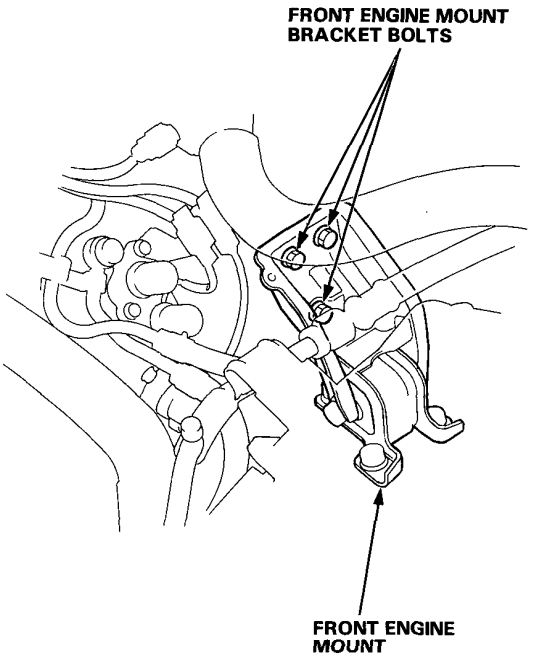
16. Disconnect the vehicle speed sensor connecter.



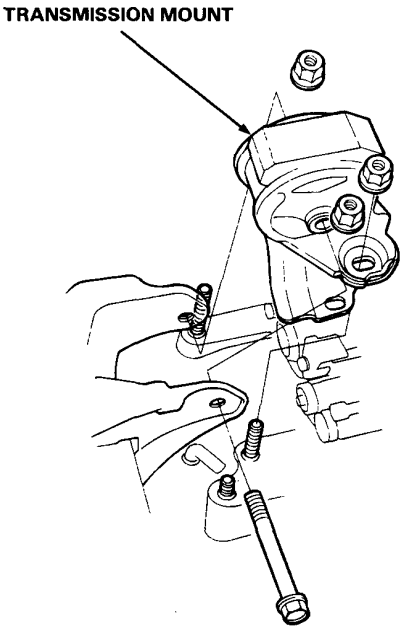
17. Remove the transmission housing mounting bolts.



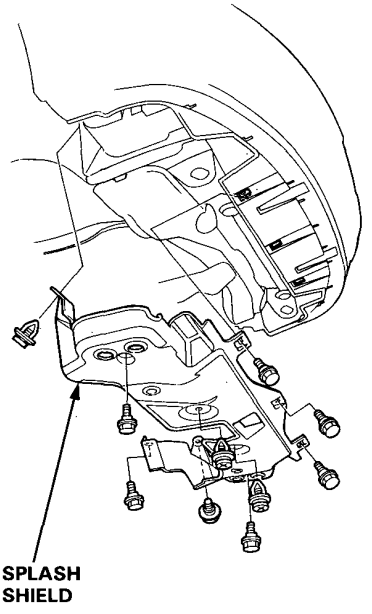
18. Loosen the front engine mount bracket bolts.



19. Remove the transmission mount.



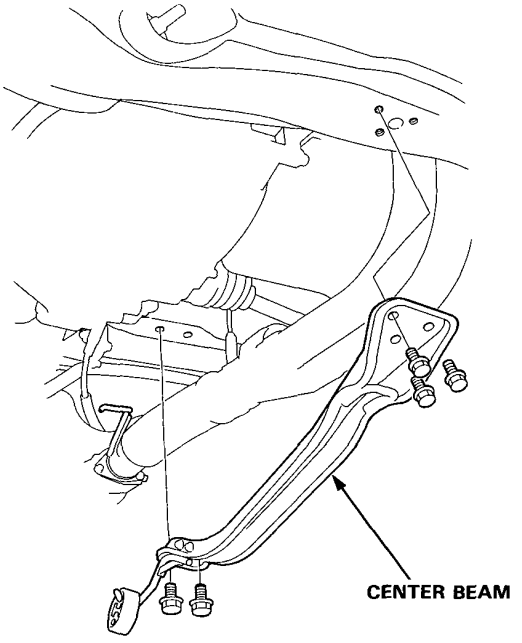
20. Remove the splash shield.



(cont'd)

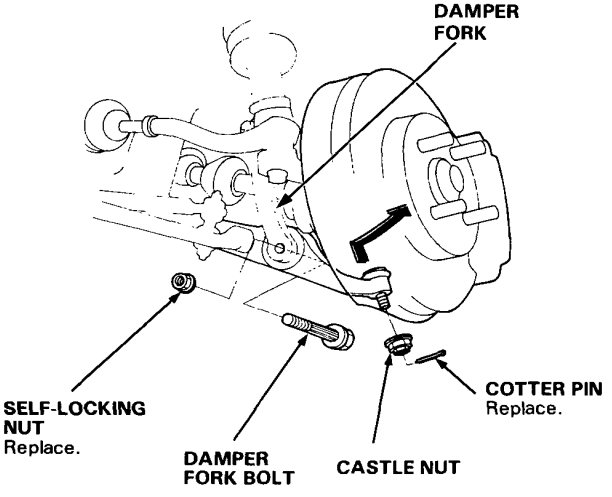
Removal (cont'd)

21. Remove the center beam.



22. Remove the cotter pins and castle nuts, then separate the ball joints from the lower arm (see section 18).

23. Remove the damper fork bolts, then separate the damper fork and lower arm.

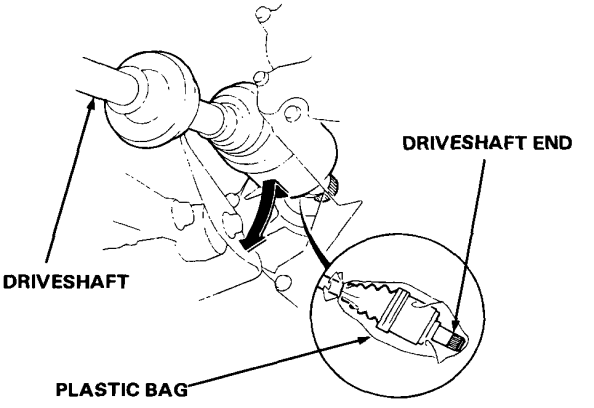


24. Pry the driveshafts out of the differential.

25. Pull on the inboard joint, and remove the right and left driveshafts (see section 16).

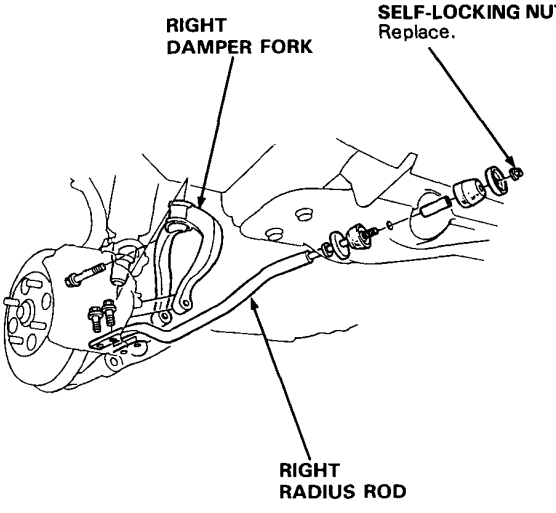
26. Tie plastic bags over the driveshaft ends.

NOTE:
Coat all precision finished surfaces with clean engine oil or grease.



27. Remove the right damper pinch bolt, then separate the damper fork and damper.

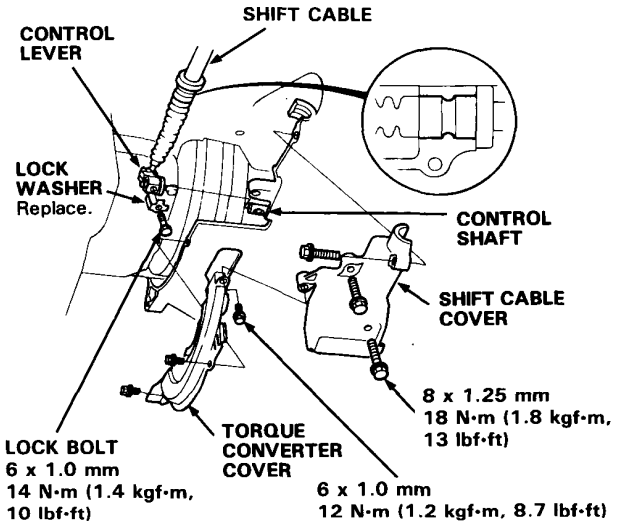
28. Remove the self-locking bolts and self-locking nut, then remove the right radius rod.



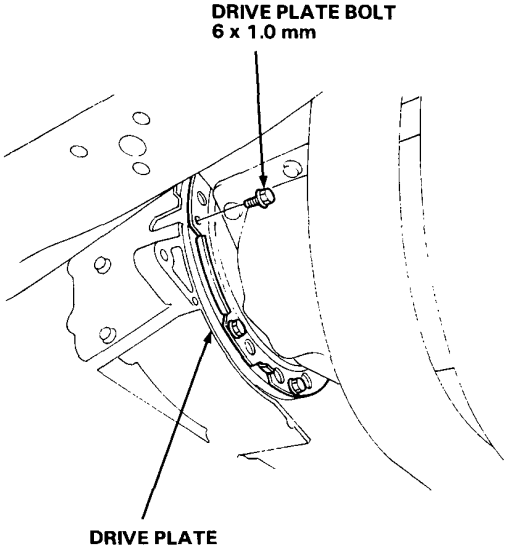
29. Remove the torque converter cover and shift cable cover.

30. Remove the lock bolt securing the control lever, then remove the shift cable with the control lever.

CAUTION:
Take care not to bend the shift cable while removing it.



31. Remove the eight drive plate bolts one at a time while rotating the crankshaft pulley.

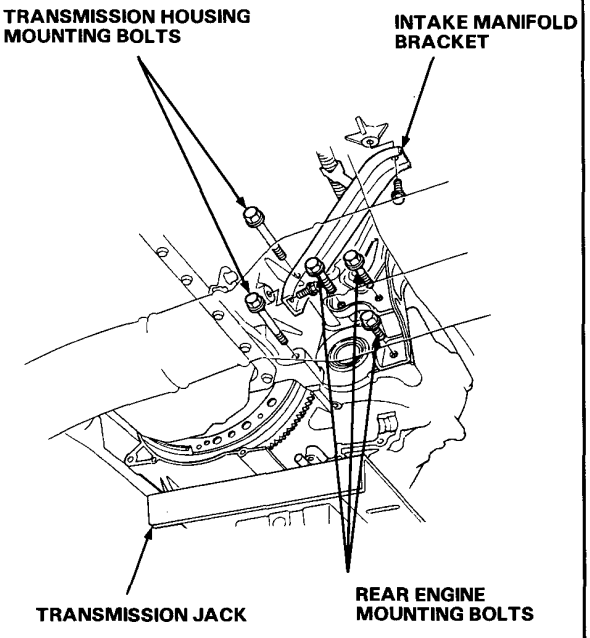


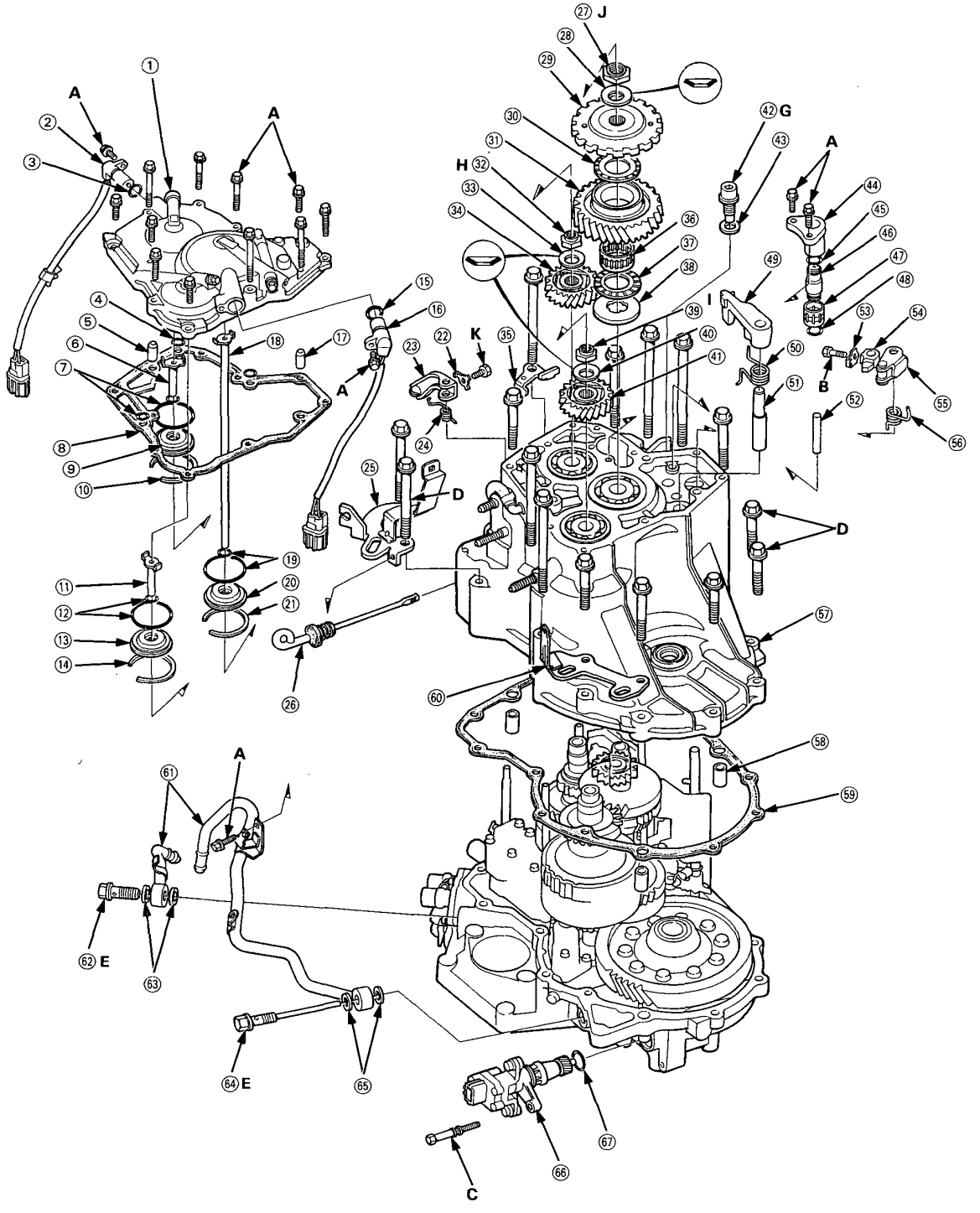
32. Place a jack under the transmission, and raise the transmission just enough to take weight off of the mount.

33. Remove the intake manifold bracket.

34. Remove the transmission housing mounting bolts and rear engine mounting bolts.

35. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.

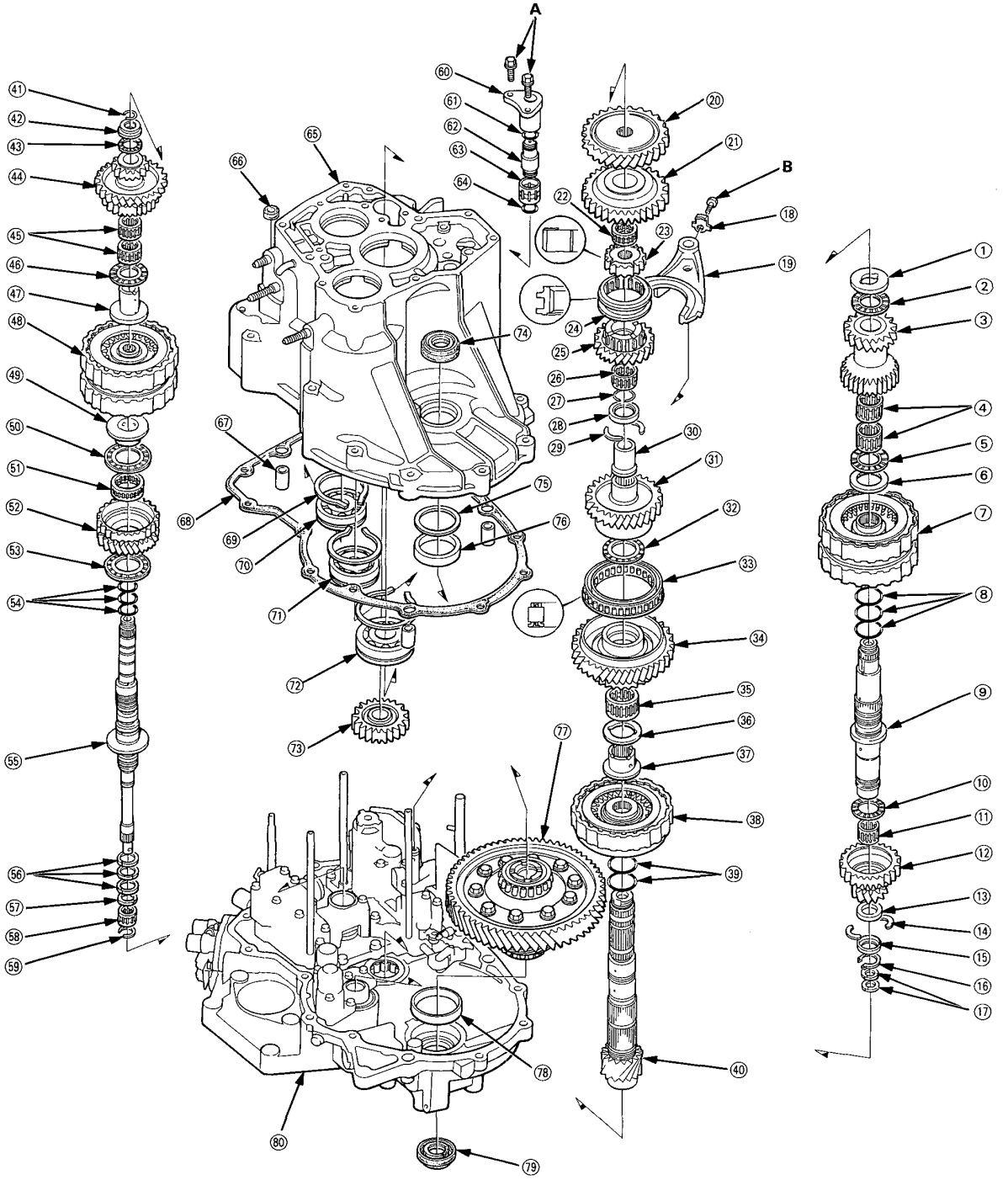



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① **RIGHT SIDE COVER**
② **MAINSHAFT SPEED SENSOR**
③ **O-RING** Replace.
④ **O-RING** Replace.
⑤ **DOWEL PIN**
⑥ **4TH CLUTCH FEED PIPE**
⑦ **O-RINGS** Replace.
⑧ **RIGHT SIDE COVER GASKET** Replace.
⑨ **FEED PIPE GUIDE**
⑩ **SNAP RING**
⑪ **1ST CLUTCH FEED PIPE**
⑫ **O-RINGS** Replace.
⑬ **FEED PIPE GUIDE**
⑭ **SNAP RING**
⑮ **O-RING** Replace.
⑯ **COUNTERSHAFT SPEED SENSOR**
⑰ **DOWEL PIN**
⑱ **1ST-HOLD CLUTCH FEED PIPE**
⑲ **O-RINGS** Replace.
⑳ **FEED PIPE GUIDE**
㉑ **SNAP RING**
㉒ **LOCK WASHER** Replace.
㉓ **THROTTLE CONTROL LEVER**
㉔ **THROTTLE CONTROL LEVER SPRING**
㉕ **THROTTLE CONTROL CABLE STAY/ TRANSMISSION HANGER**
㉖ **ATF LEVEL GAUGE**
㉗ **COUNTERSHAFT LOCKNUT, 24 x 1.25 mm** (Flange nut) Replace.
㉘ **CONICAL SPRING WASHER** Replace.
㉙ **PARKING GEAR**
㉚ **THRUST NEEDLE BEARING**
㉛ **COUNTERSHAFT IDLER GEAR**
㉜ **MAINSHAFT LOCKNUT, 24 x 1.25 mm** (Flange nut) Replace.
㉝ **CONICAL SPRING WASHER** Replace.
㉞ **MAINSHAFT IDLER GEAR**
㉟ **HARNESS STAY**
㊱ **NEEDLE BEARING**
㊲ **THRUST NEEDLE BEARING**
㊳ **THRUST WASHER**
㊴ **SECONDARY SHAFT LOCKNUT, 24 x 1.25 mm** (Flange nut) Replace.
㊵ **CONICAL SPRING WASHER** Replace.
㊶ **SECONDARY SHAFT IDLER GEAR**
㊷ **DRAIN PLUG**
㊸ **SEALING WASHER** Replace.
㊹ **REVERSE IDLER GEAR SHAFT HOLDER**
㊺ **O-RING** Replace.
㊻ **REVERSE IDLER GEAR SHAFT**
㊼ **NEEDLE BEARING**
㊽ **O-RING** Replace.
㊾ **PARKING BRAKE PAWL**
㊿ **PARKING BRAKE PAWL SPRING**
(51) **PARKING BRAKE PAWL SHAFT**
(52) **PARKING BRAKE PAWL STOPPER**
(53) **LOCK WASHER** Replace.
(54) **PARKING BRAKE STOPPER**
(55) **PARKING BRAKE LEVER**
(56) **PARKING BRAKE LEVER SPRING**
(57) **TRANSMISSION HOUSING**
(58) **DOWEL PIN**
(59) **TRANSMISSION HOUSING GASKET** Replace.
(60) **TRANSMISSION HANGER**
(61) **ATF COOLER PIPES**
(62) **JOINT BOLT**
(63) **SEALING WASHERS** Replace.
(64) **JOINT BOLT**
(65) **SEALING WASHERS** Replace.
(66) **VEHICLE SPEED SENSOR**
(67) **O-RING** Replace.

TORQUE SPECIFICATIONS

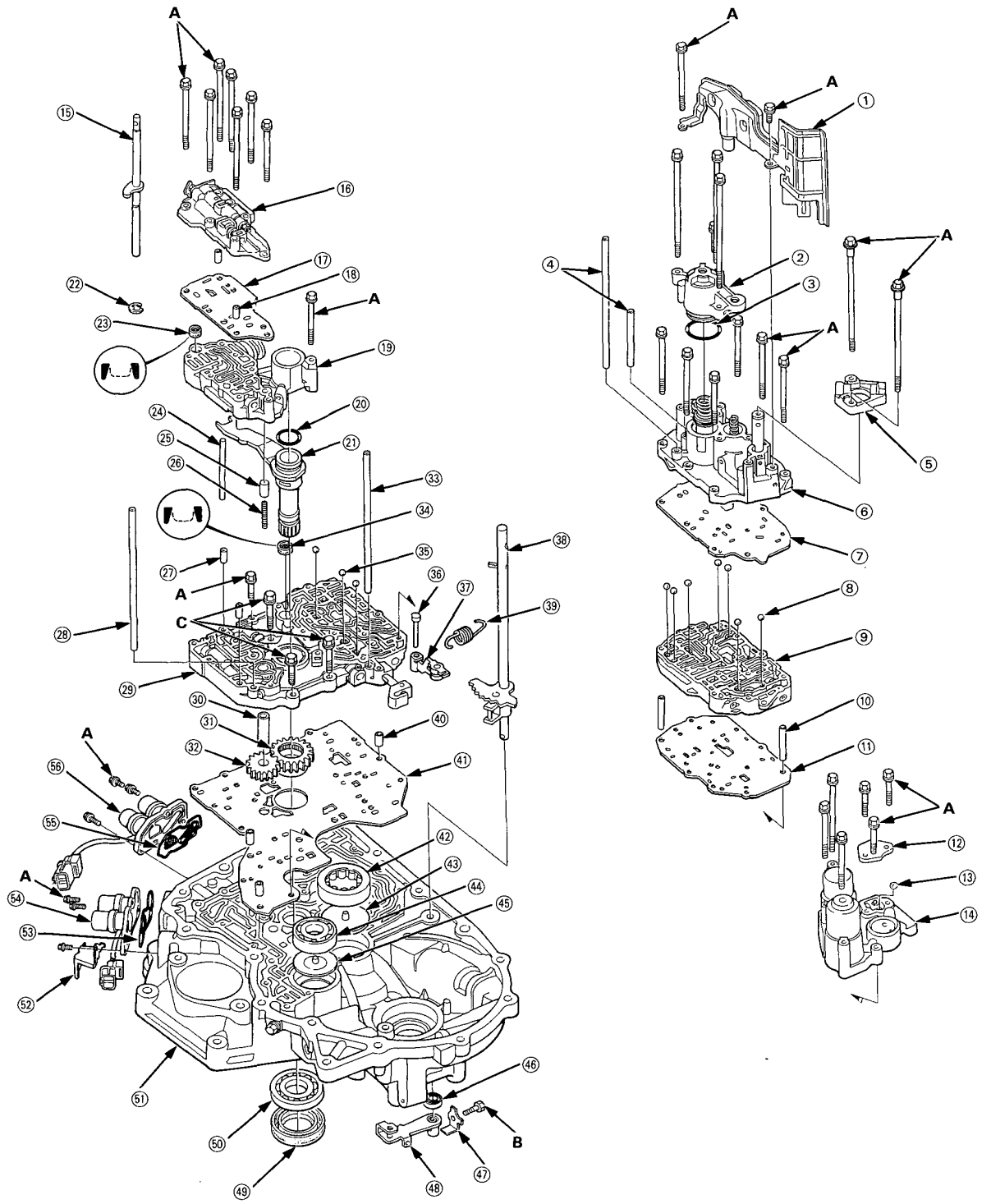
Ref No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
C	18 N·m (1.8 kgf·m, 13 lbf·ft)	8 x 1.25 mm	
D	54 N·m (5.5 kgf·m, 40 lbf·ft)	10 x 1.25 mm	
E	28 N·m (2.9 kgf·m, 21 lbf·ft)	12 x 1.25 mm	Joint bolt
G	49 N·m (5.0 kgf·m, 36 lbf·ft)	18 x 1.5 mm	Drain plug
H	226 N·m (23.0 kgf·m, 166 lbf·ft)→0→ 167 N·m (17.0 kgf·m, 123 lbf·ft)	24 x 1.25 mm	Mainshaft locknut Left-hand threads
I	226 N·m (23.0 kgf·m, 166 lbf·ft)→0→ 167 N·m (17.0 kgf·m, 123 lbf·ft)	24 x 1.25 mm	Secondary shaft locknut
J	226 N·m (23.0 kgf·m, 166 lbf·ft)→0→ 167 N·m (17.0 kgf·m, 123 lbf·ft)	24 x 1.25 mm	Countershaft locknut
K	8 N·m (0.8 kgf·m, 6 lbf·ft)	5 x 0.8 mm	


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① THRUST WASHER
② THRUST NEEDLE BEARING
③ SECONDARY SHAFT 2ND GEAR
④ NEEDLE BEARINGS
⑤ THRUST NEEDLE BEARING
⑥ SPLINED WASHER Selective part
⑦ 1ST/2ND CLUTCH ASSEMBLY
⑧ O-RINGS Replace.
⑨ SECONDARY SHAFT
⑩ THRUST NEEDLE BEARING
⑪ NEEDLE BEARING
⑫ SECONDARY SHAFT 1ST GEAR
⑬ DISTANCE COLLAR, 5.0 mm
⑭ COTTERS, 29 mm
⑮ COTTER RETAINER
⑯ SNAP RING
⑰ SEALING RINGS, 32 mm
⑱ LOCK WASHER Replace.
⑲ SHIFT FORK
⑳ COUNTERSHAFT 2ND GEAR
㉑ COUNTERSHAFT REVERSE GEAR
㉒ NEEDLE BEARING
㉓ REVERSE SELECTOR HUB
㉔ REVERSE SELECTOR
㉕ COUNTERSHAFT 4TH GEAR
㉖ NEEDLE BEARING
㉗ SNAP RING
㉘ COLLAR, 32 mm
㉙ COTTERS, 29 mm
㉚ DISTANCE COLLAR
㉛ COUNTERSHAFT 3RD GEAR
㉜ THRUST NEEDLE BEARING
㉝ ONE-WAY CLUTCH
㉞ COUNTERSHAFT 1ST GEAR
㉟ NEEDLE BEARING
㊱ THRUST WASHER
㊲ COUNTERSHAFT 1ST GEAR COLLAR
㊳ 1ST-HOLD CLUTCH ASSEMBLY
㊴ O-RINGS Replace.
㊵ COUNTERSHAFT
㊶ SNAP RING
㊷ COLLAR
㊸ THRUST NEEDLE BEARING
㊹ MAINSHAFT 4TH/REVERSE GEAR
㊺ NEEDLE BEARINGS
㊻ THRUST NEEDLE BEARING
㊼ MAINSHAFT 4TH GEAR COLLAR
㊽ 3RD/4TH CLUTCH ASSEMBLY
㊾ MAINSHAFT 3RD GEAR COLLAR
㊿ THRUST NEEDLE BEARING
(51) NEEDLE BEARING
(52) MAINSHAFT 3RD GEAR
(53) THRUST NEEDLE BEARING
(54) O-RINGS Replace.
(55) MAINSHAFT
(56) SEALING RINGS, 35 mm
(57) SEALING RING, 29 mm
(58) NEEDLE BEARING
(59) SET RING
(60) REVERSE IDLER GEAR SHAFT HOLDER
(61) O-RING Replace.
(62) REVERSE IDLER GEAR SHAFT
(63) NEEDLE BEARING
(64) O-RING Replace.
(65) TRANSMISSION HOUSING
(66) OIL SEAL Replace.
(67) DOWEL PIN
(68) TRANSMISSION HOUSING GASKET Replace.
(69) SNAP RING
(70) TRANSMISSION HOUSING MAINSHAFT BEARING
(71) TRANSMISSION HOUSING SECONDARY SHAFT BEARING
(72) TRANSMISSION HOUSING COUNTERSHAFT BEARING
(73) REVERSE IDLER GEAR
(74) TRANSMISSION HOUSING OIL SEAL Replace.
(75) THRUST SHIM Selective part
(76) TAPERED ROLLER BEARING OUTER RACE
(77) DIFFERENTIAL ASSEMBLY
(78) TAPERED ROLLER BEARING OUTER RACE
(79) TORQUE CONVERTER HOUSING OIL SEAL Replace.
(80) TORQUE CONVERTER HOUSING

TORQUE SPECIFICATIONS

Ref. No.	Torque Value	Bolt Size	Remarks
A	12 N•m (1.2 kgf•m, 8.7 lbf•ft)	6 x 1.0 mm	
B	14 N•m (1.4 kgf•m, 10 lbf•ft)	6 x 1.0 mm	


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① ATF STRAINER
② 4TH ACCUMULATOR COVER
③ O-RING Replace.
④ OIL FEED PIPES
⑤ SERVO DETENT BASE
⑥ SERVO BODY
⑦ SERVO SEPARATOR PLATE
⑧ CHECK BALLS
⑨ SECONDARY VALVE BODY
⑩ DOWEL PINS
⑪ SECONDARY SEPARATOR PLATE
⑫ ACCUMULATOR BODY COVER
⑬ CHECK BALL
⑭ 1ST/2ND ACCUMULATOR BODY
⑮ THROTTLE CONTROL SHAFT
⑯ THROTTLE VALVE BODY
⑰ THROTTLE SEPARATOR PLATE
⑱ DOWEL PINS
⑲ REGULATOR VALVE BODY
⑳ O-RING Replace.
㉑ STATOR SHAFT
㉒ E-RING
㉓ FILTER Replace.
㉔ STOPPER SHAFT
㉕ TORQUE CONVERTER CHECK VALVE
㉖ TORQUE CONVERTER CHECK VALVE SPRING
㉗ DOWEL PINS
㉘ OIL FEED PIPE
㉙ MAIN VALVE BODY
㉚ OIL PUMP DRIVEN GEAR SHAFT
㉛ OIL PUMP DRIVE GEAR
㉜ OIL PUMP DRIVEN GEAR
㉝ OIL FEED PIPE
㉞ FILTER Replace.
㉟ CHECK BALLS
㊱ DETENT ARM SHAFT
㊲ DETENT ARM
㊳ CONTROL SHAFT
㊴ DETENT ARM SPRING
㊵ DOWEL PINS
㊶ MAIN SEPARATOR PLATE
㊷ TORQUE CONVERTER HOUSING COUNTERSHAFT NEEDLE BEARING
㊸ OIL GUIDE PLATE
㊹ TORQUE CONVERTER HOUSING SECONDARY SHAFT BALL BEARING
㊺ OIL GUIDE PLATE
㊻ OIL SEAL Replace.
㊼ LOCK WASHER Replace.
㊽ CONTROL LEVER
㊾ MAINSHAFT OIL SEAL Replace.
㊿ TORQUE CONVERTER HOUSING MAINSHAFT BALL BEARING
(51) TORQUE CONVERTER HOUSING
(52) SOLENOID VALVE CONNECTOR STAY
(53) SHIFT CONTROL SOLENOID VALVE FILTER/GASKET Replace.
(54) SHIFT CONTROL SOLENOID VALVE ASSEMBLY
(55) LOCK-UP CONTROL SOLENOID VALVE FILTER/GASKET Replace.
(56) LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY

TORQUE SPECIFICATIONS

Ref. No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 10 mm	
C	18 N·m (1.8 kgf·m, 13 lbf·ft)	8 x 1.25 mm	

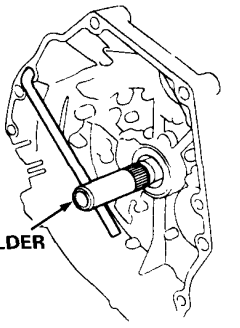
Right Side Cover

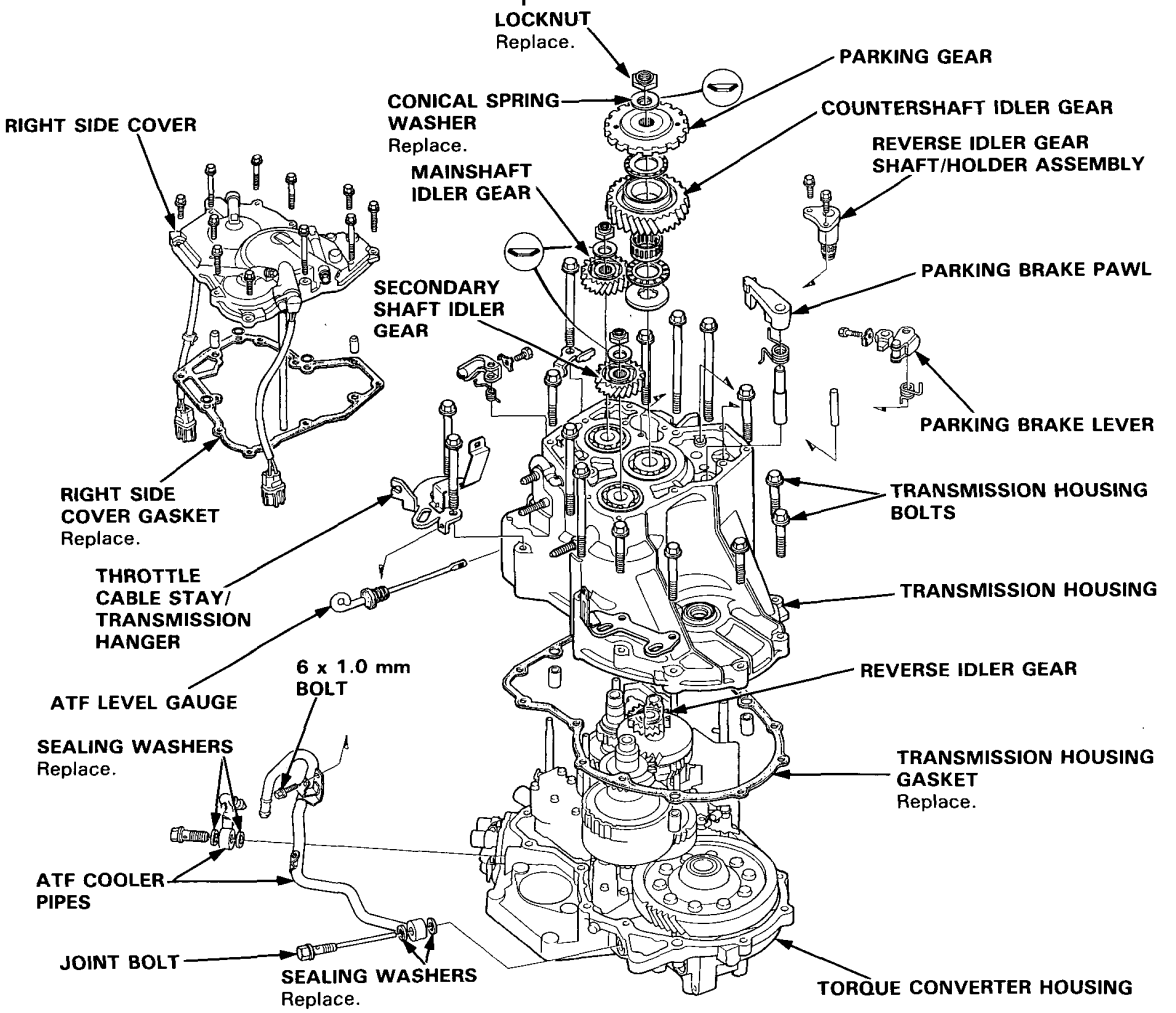
Removal

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the transmission right side cover, replace the following:
  - Right side cover gasket
  - Lock washers
  - Transmission housing gasket
  - O-rings
  - Each shaft locknut and conical spring washer
  - Sealing washers

1. Remove the eleven bolts securing the right side cover, then remove the right side cover.

2. Slip the special tool onto the mainshaft.



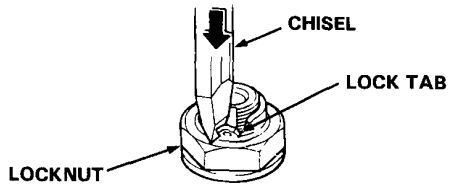


3. Engage the parking brake pawl with the parking gear.

4. Cut the lock tabs of each shaft locknut using a chisel as shown. Then remove the locknuts and conical spring washers from each shaft.

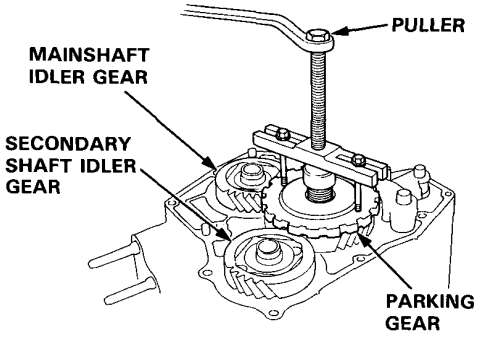
   NOTE:
   - Mainshaft locknut has left-hand threads.
   - Clean the old locknuts; they are used to install the press fit idler gears on the mainshaft and secondary shaft and the parking gear on the countershaft.
   - Always wear safety glasses.

   CAUTION:
   Keep all of the chiseled particles out of the transmission.



5. Remove the special tool from the mainshaft after removing the locknuts.

6. Remove the parking gear using a puller from the countershaft as shown. Then remove the idler gears from the mainshaft and secondary shaft using a puller.



7. Remove the countershaft idler gear, needle bearing, thrust needle bearing, and thrust washer from the countershaft.

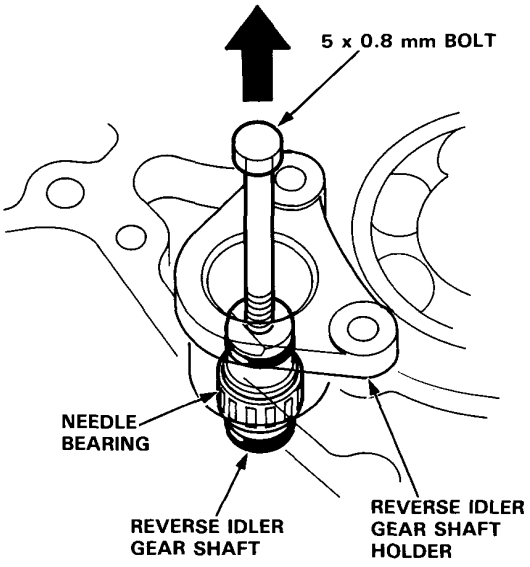
8. Remove the parking brake pawl, spring, shaft, and stopper from the housing.

9. Remove the throttle control lever and spring from the throttle control shaft.

10. Remove the ATF cooler pipe mounting bolt from the transmission hanger.

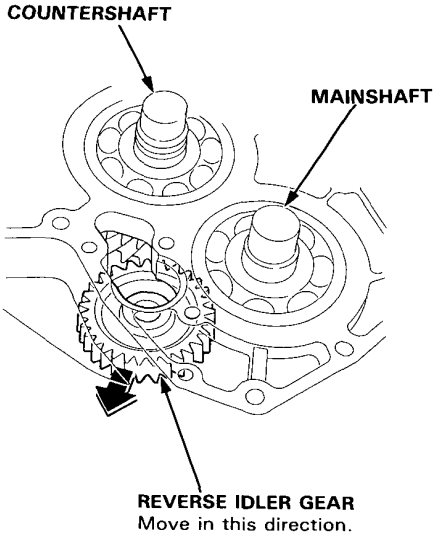
11. Remove the transmission housing mounting bolts.

12. Remove the reverse idler gear shaft and reverse idler gear shaft holder using a 5 x 0.8 mm bolt as shown.



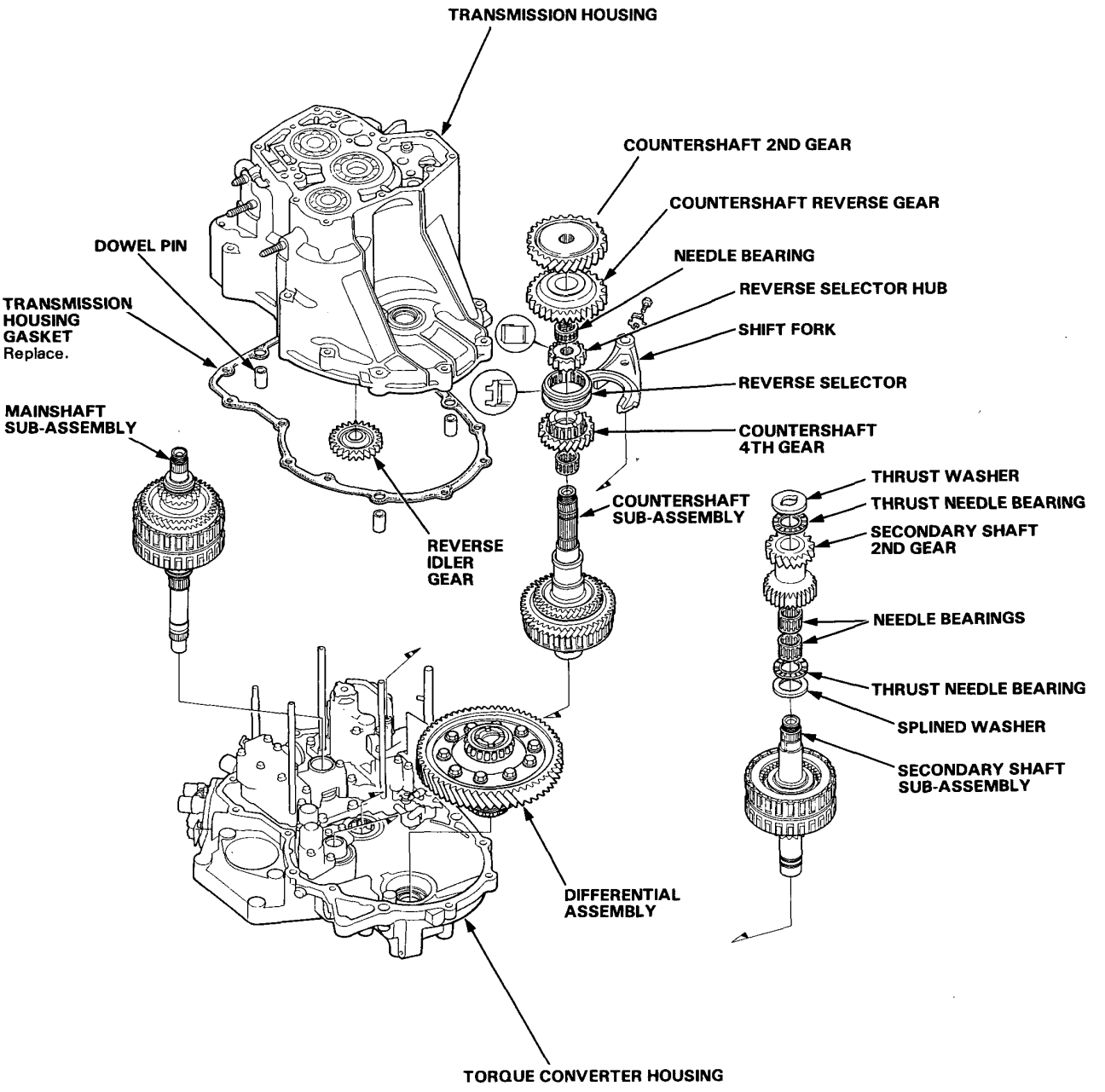
13. Move the reverse idler gear to disengage it from the countershaft and mainshaft reverse gears as shown.

    NOTE:
    The transmission housing will not separate from the torque converter housing if the reverse idler gear is not removed.



Transmission Housing

Removal



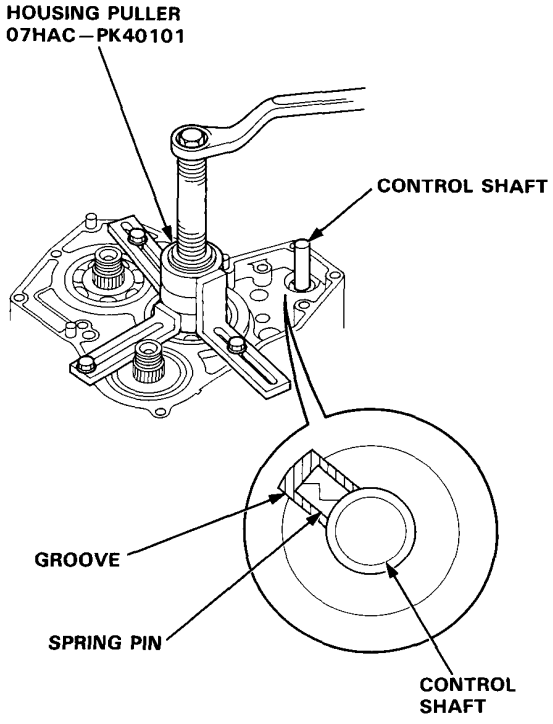
NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the transmission housing, replace the following:
  - Transmission housing gasket
  - Lock washer

1. Remove the transmission housing mounting bolts and hangers.

2. Align the spring pin of the control shaft with the transmission housing groove by turning the control shaft.

3. Install the special tool on the transmission housing, then remove the housing as shown.



4. Remove the reverse idler gear from the transmission housing.

5. Remove the countershaft 2nd gear, reverse gear, secondary shaft 2nd gear, thrust washer, and thrust needle bearing together from the countershaft and secondary shaft.

6. Remove the lock bolt securing the shift fork, then remove the fork with the reverse selector from the countershaft.

7. Remove the needle bearings, thrust needle bearing, and splined washer from the secondary shaft.

8. Remove the secondary shaft sub-assembly.

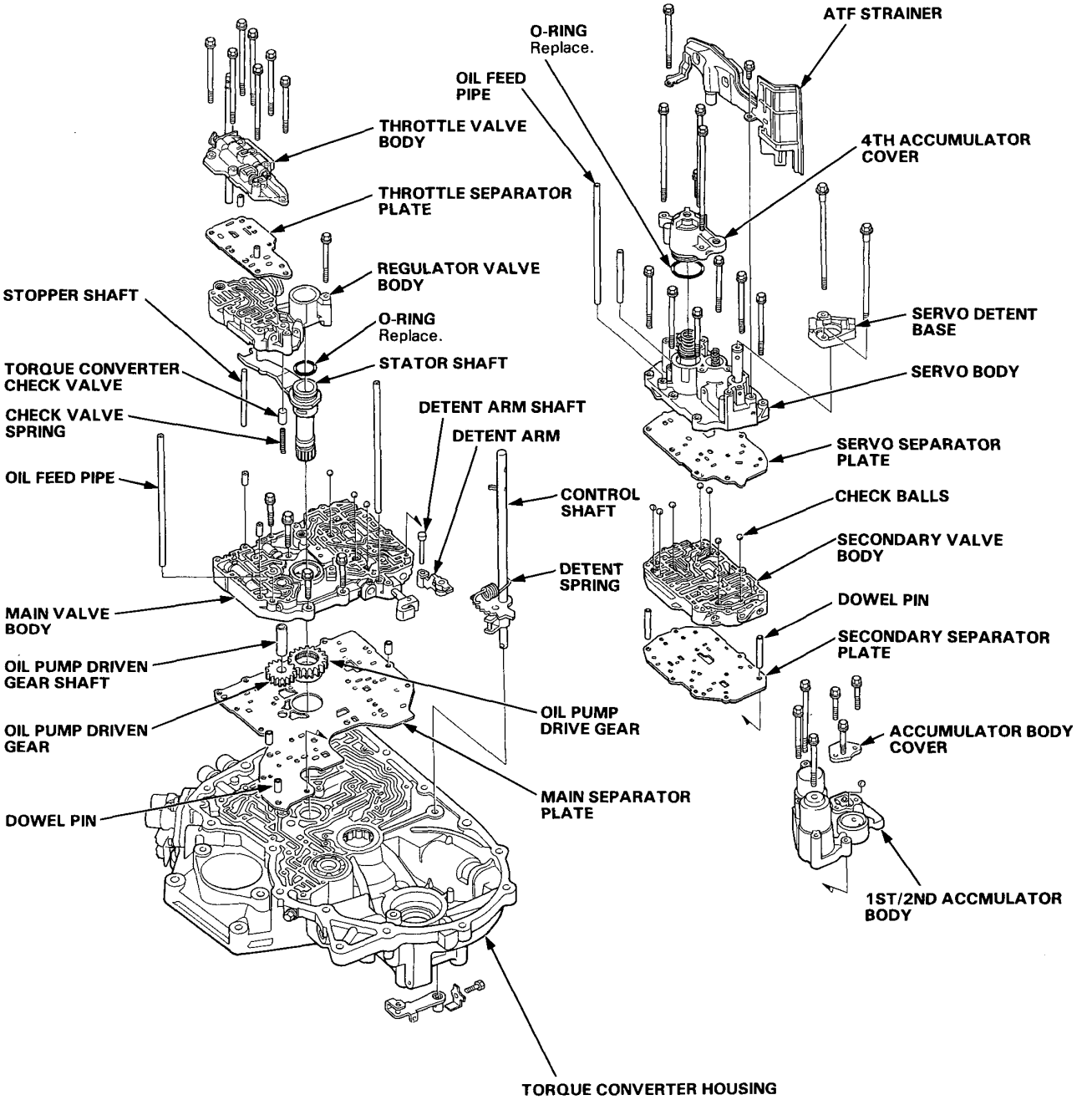
9. Remove the mainshaft sub-assembly.

10. Remove the countershaft sub-assembly.

11. Remove the differential assembly.

Torque Converter Housing/Valve Body

Removal



NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- When removing the valve body, replace the following:
  - O-rings
  - Lock washer

1. Remove the servo detent base (two bolts).
2. Remove the ATF strainer (two bolts).
3. Remove the oil feed pipes from the servo body and main valve body.
4. Remove the 4th accumulator cover (three bolts).

   NOTE: The 4th accumulator cover is spring loaded. To prevent stripping the threads in the servo body, press down on the accumulator cover while unscrewing the bolts in a crisscross pattern.

5. Remove the seven bolts securing the servo body, then remove the servo body and separator plate.
6. Remove the secondary valve body and separator plate.
7. Remove the seven bolts securing the throttle valve body, then remove the throttle valve body and separator plate.
8. Remove the regulator valve body (one bolt).
9. Remove the stator shaft and stopper shaft.
10. Remove the detent spring from the detent arm, then remove the control shaft from the torque converter housing.
11. Remove the detent arm and detent arm shaft from the main valve body.
12. Remove the main valve body (four bolts).
13. Remove the 1st/2nd accumulator body (six bolts).
14. Remove the oil pump driven gear shaft, then remove the oil pump gears.
15. Remove the main separator plate with three dowel pins.

Repair

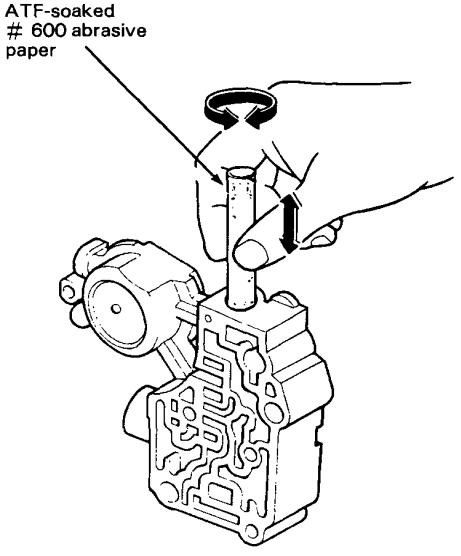
NOTE:
This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the valve bodies.

1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore.

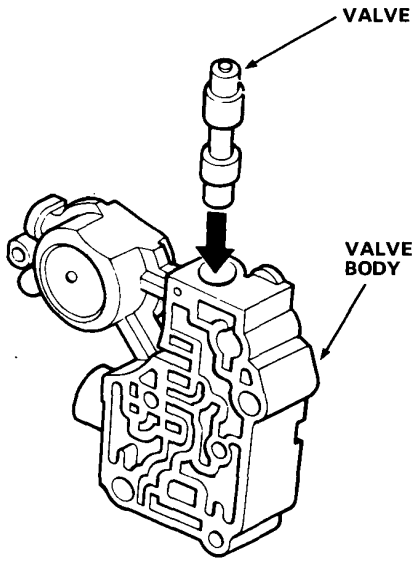
CAUTION:
It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked #600 paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

CAUTION:
The valve body is aluminum and doesn't require much polishing to remove any burrs.



5. Remove the #600 paper. Thoroughly wash the entire valve body in solvent, then dry with compressed air.
6. Coat the valve with ATF, then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest.

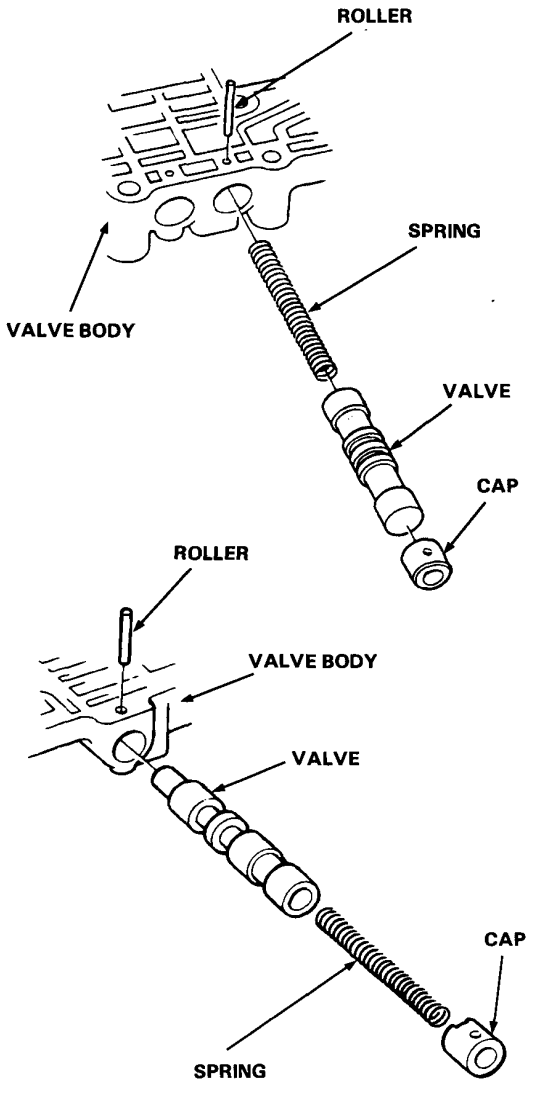


7. Remove the valve and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

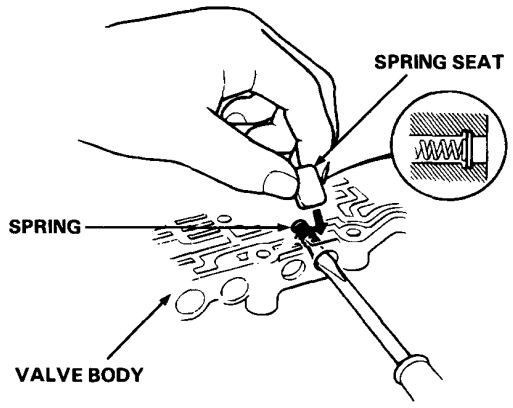
Assembly

NOTE:
Coat all parts with ATF before assembly.

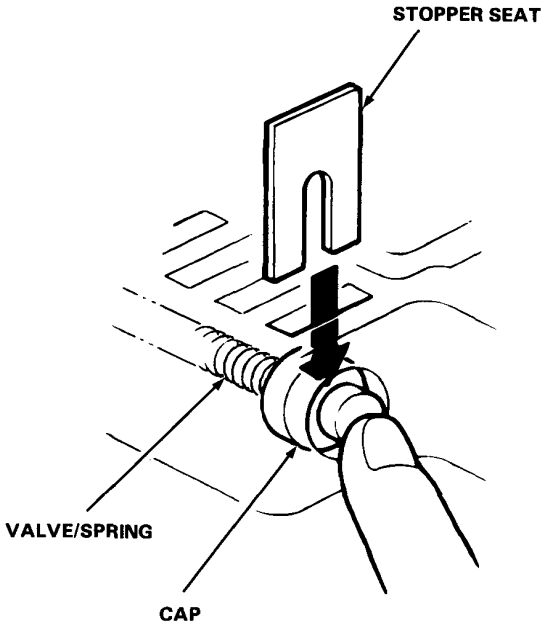
- Install the valve, valve spring and cap in the valve body, and secure with the roller.



- Set the spring in the valve and install them in the valve body. Push the spring in with a screwdriver, then install the spring seat.



- Install the valve, spring and cap in the valve body. Push the cap, then install the valve cap stopper.



Valve Caps

Description

- Caps with one projected tip and one flat end are installed with the flat end toward the inside of the valve body.
- Caps with a projected tip on each end are installed with the smaller tip toward the inside of the valve body. The small tip is a spring guide.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with one projected tip and hollow end are installed with the tip toward the inside of the valve body. The tip is a spring guide.

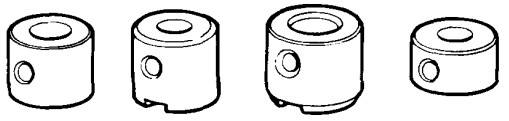
TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with hollow ends are installed with the hollow end away from the inside of the valve body.
- Caps with notched ends are installed with the notch toward the inside of the valve body.
- Caps with flat ends and a hole through the center are installed with the smaller hole toward the inside of the valve body.

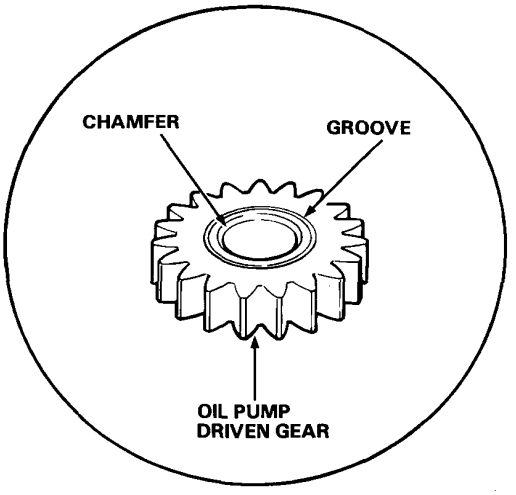
TOWARD OUTSIDE OF VALVE BODY

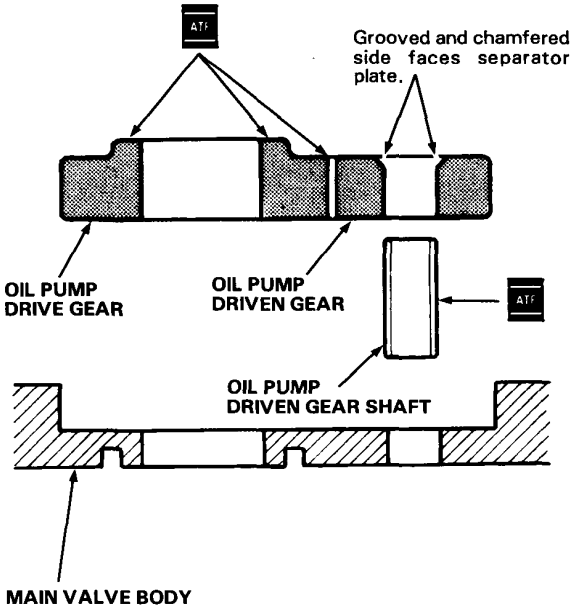


TOWARD INSIDE OF VALVE BODY

Inspection

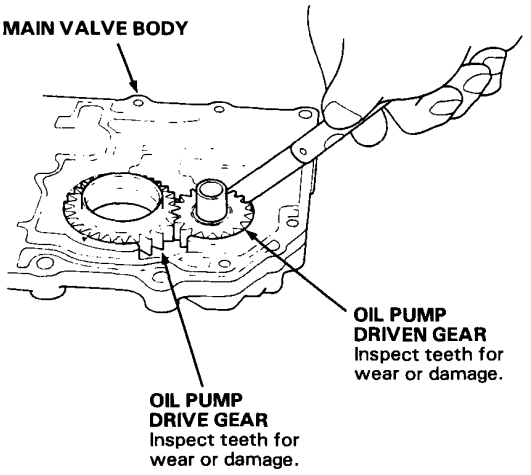
1. Install the oil pump gears and oil pump driven gear shaft in the main valve body.





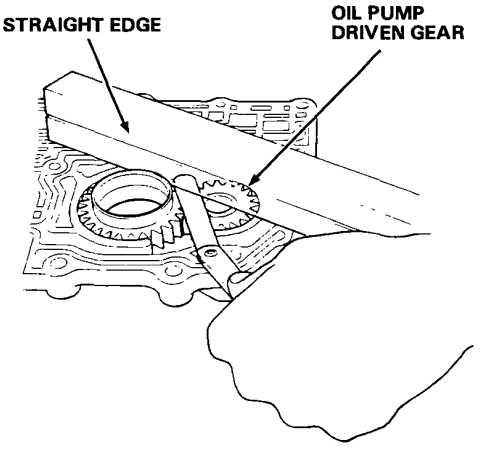
2. Measure the side clearance of the oil pump drive and driven gears.

Oil Pump Gears Side (Radial) Clearance:
Standard (New):
Oil Pump Drive Gear
0.210—0.265 mm (0.0083—0.0104 in)
Oil Pump Driven Gear
0.070—0.125 mm (0.0028—0.0049 in)



3. Remove the oil pump driven gear shaft. Measure the thrust clearance of the oil pump driven gear-to-valve body.

Oil Pump Drive/Driven Gear Thrust (Axial) Clearance:
Standard (New): 0.03—0.05 mm (0.001—0.002 in)
Service Limit: 0.07 mm (0.003 in)



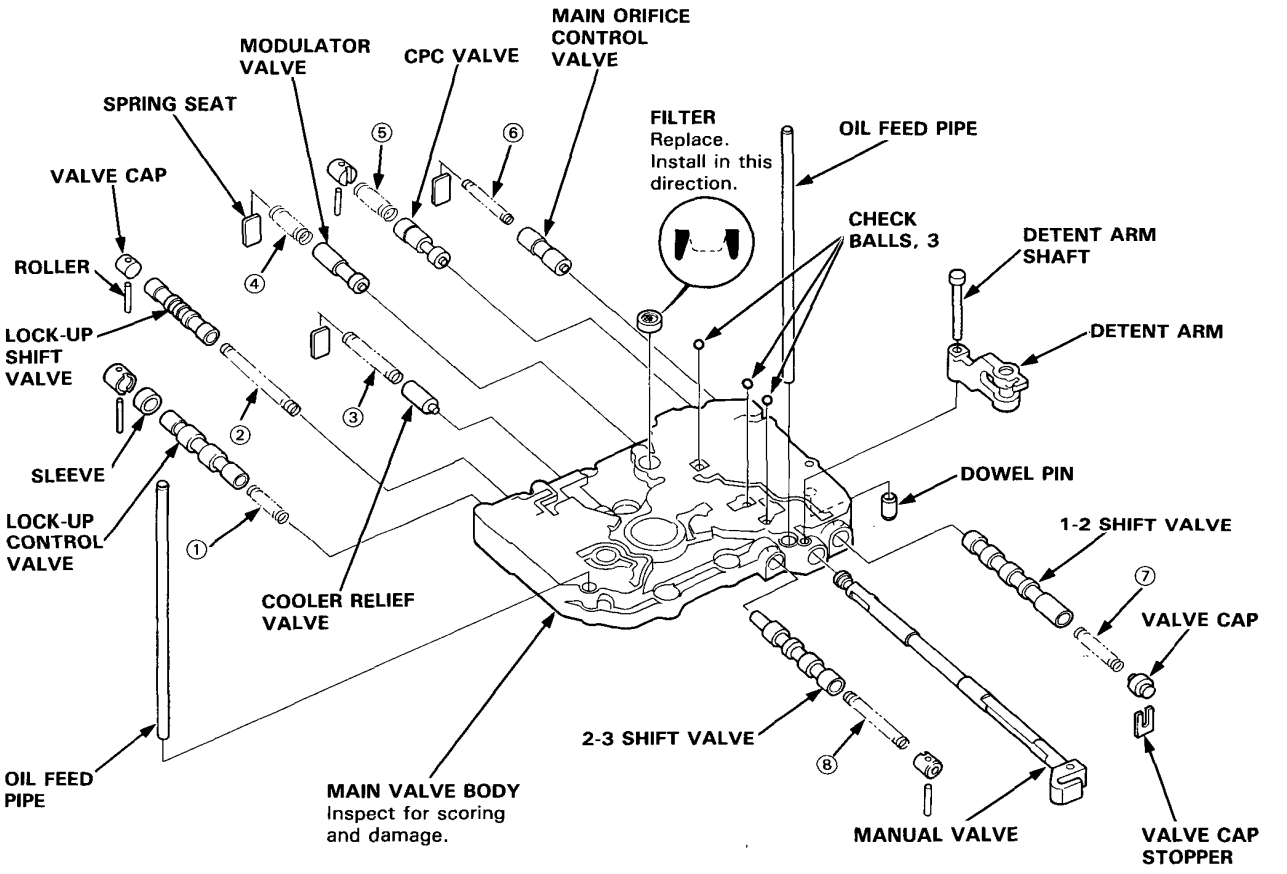
Main Valve Body

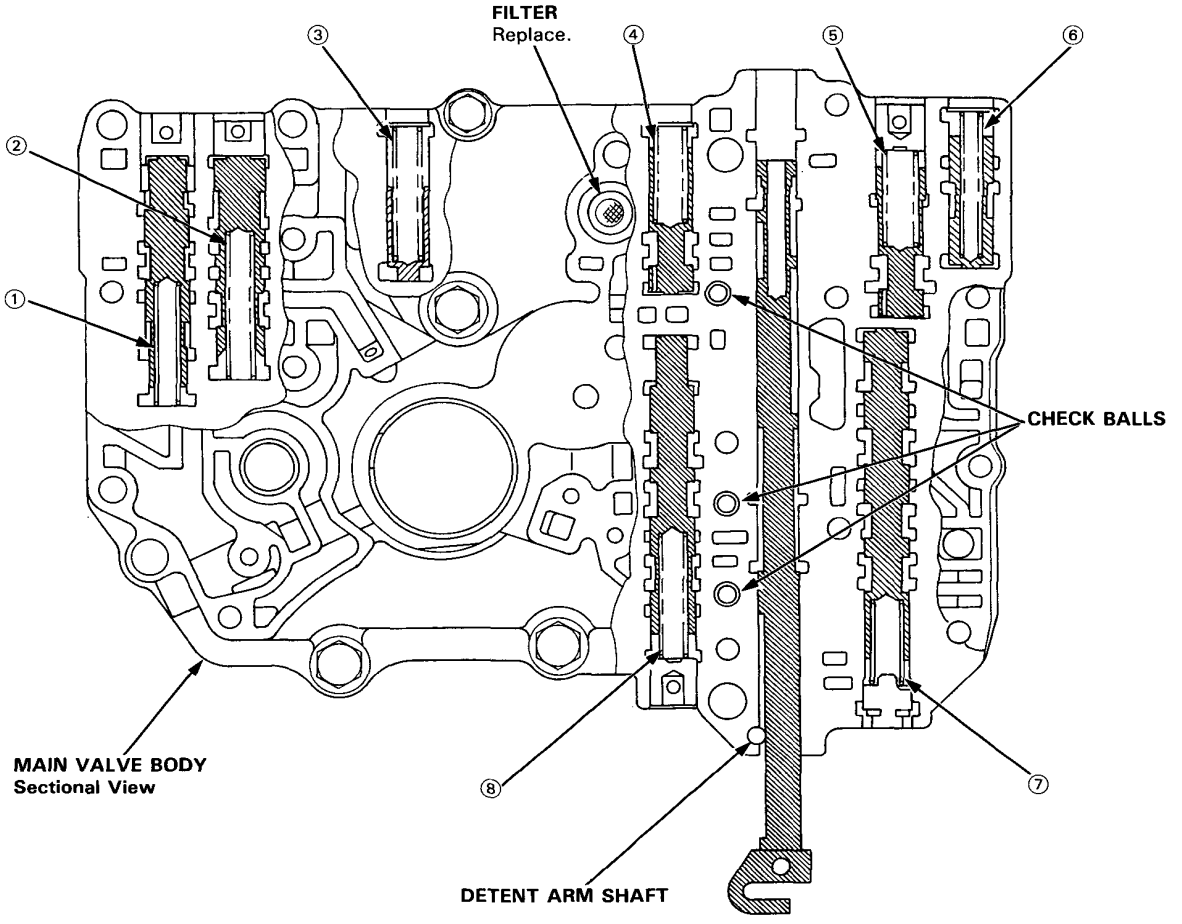
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-116.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.





SPRING SPECIFICATIONS

Unit: mm(in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up control valve spring	0.7(0.028)	6.6(0.260)	36.3(1.429)	14.1
②	Lock-up shift valve spring	0.9(0.035)	7.6(0.299)	73.7(2.902)	32.0
③	Cooler relief valve spring	1.1(0.043)	8.4(0.331)	46.8(1.843)	17.0
④	Modulator valve spring	1.4(0.055)	9.4(0.370)	33.0(1.299)	10.5
⑤	CPC valve spring	1.4(0.055)	9.4(0.370)	33.0(1.299)	10.5
⑥	Main orifice control valve spring	1.1(0.043)	7.1(0.280)	49.1(1.933)	22.7
⑦	1-2 shift valve spring	0.9(0.035)	8.6(0.339)	40.4(1.591)	14.5
⑧	2-3 shift valve spring	0.9(0.035)	7.6(0.299)	57.0(2.244)	26.8

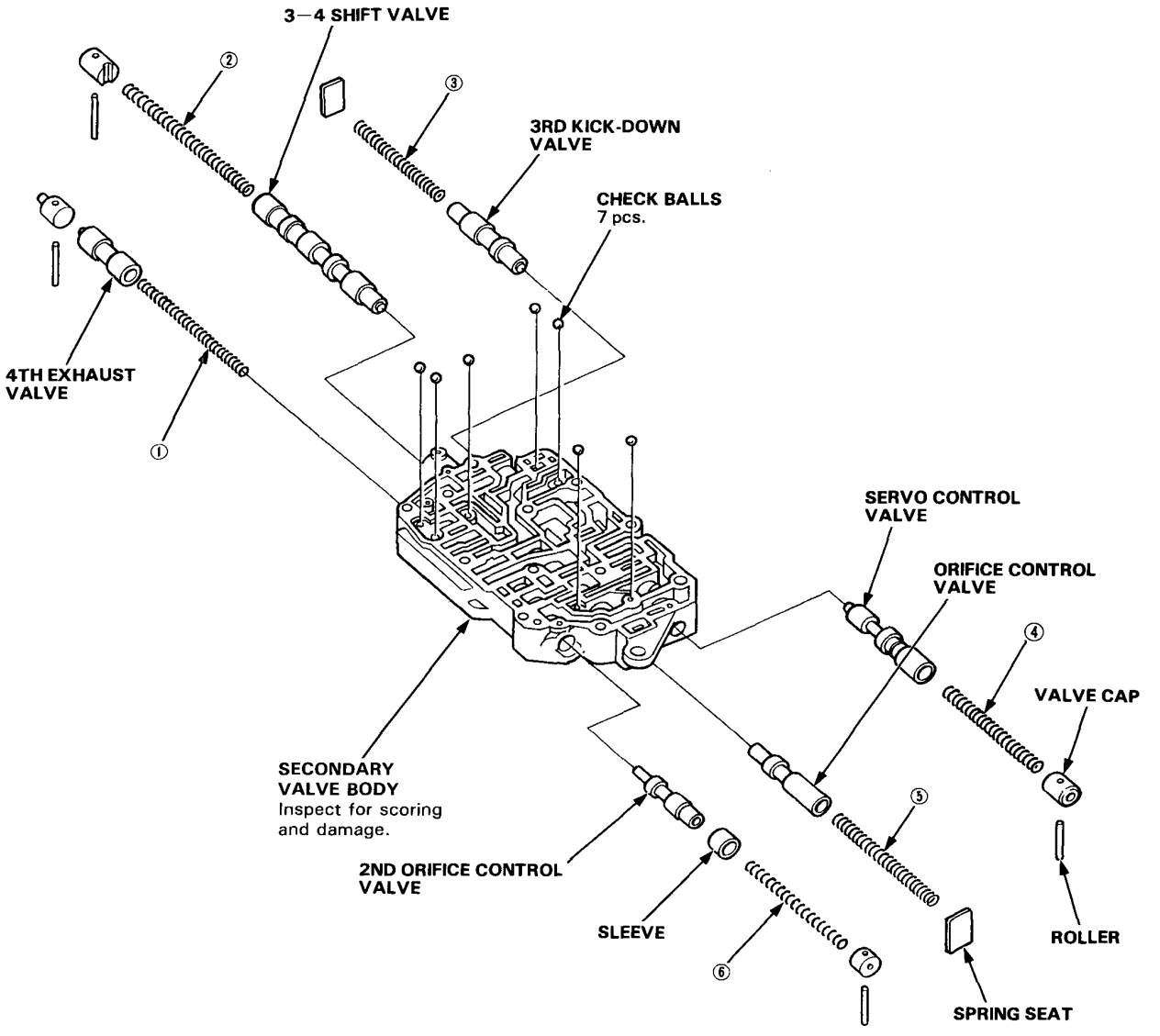
Secondary Valve Body

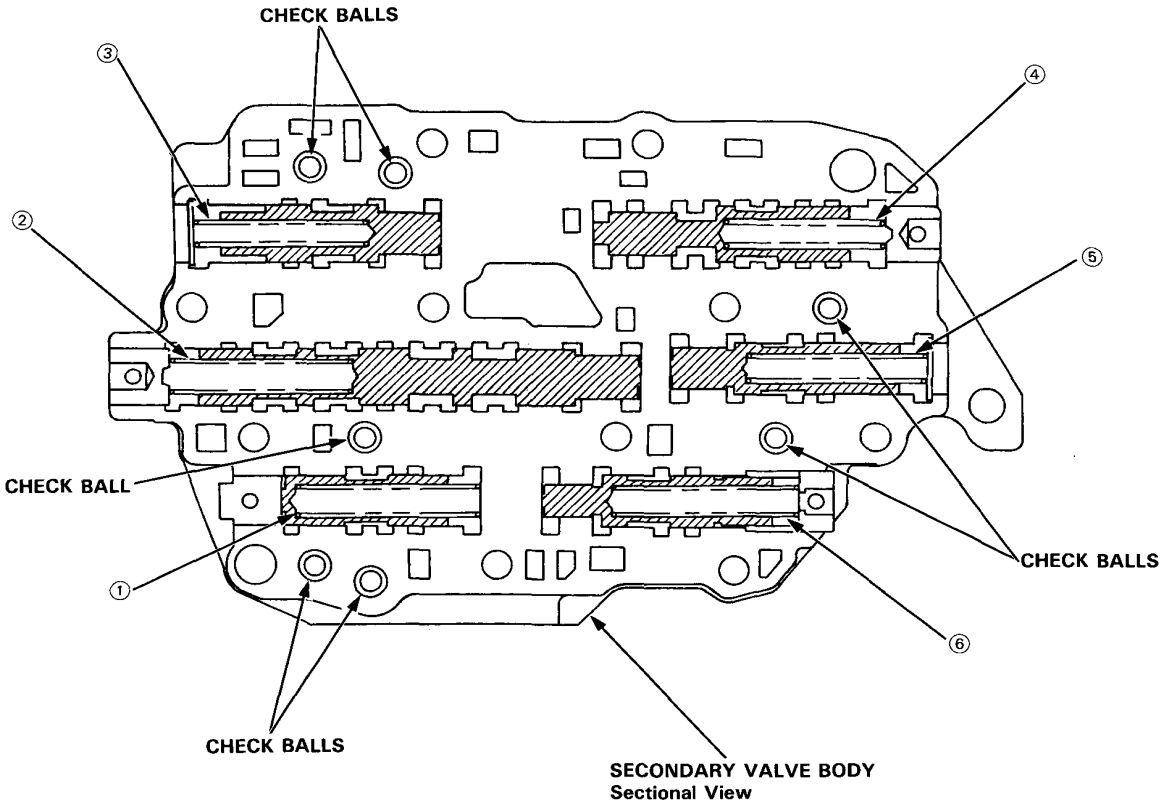
Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-116.
- Coat all parts with ATF before assembling.
- Replace the valve body as an assembly if any parts are worn or damaged.

CAUTION:
Do not use a magnet to remove the check balls; it may magnetize the balls.





SECONDARY VALVE BODY
Sectional View

SPRING SPECIFICATIONS

Unit: mm(in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	4th exhaust valve spring	0.8(0.031)	7.1(0.280)	48.8(1.921)	17.2
②	3-4 shift valve spring	0.9(0.035)	7.6(0.299)	57.0(2.244)	26.8
③	3rd kick-down valve spring	1.0(0.039)	7.6(0.299)	48.3(1.902)	15.6
④	Servo control valve spring	1.0(0.039)	8.1(0.319)	52.6(2.071)	22.4
⑤	Orifice control valve spring	0.7(0.028)	6.6(0.260)	52.5(2.067)	18.4
⑥	2nd orifice control valve spring	0.6(0.024)	6.6(0.260)	66.4(2.614)	25.0

Regulator Valve Body

Disassembly/Inspection/Reassembly

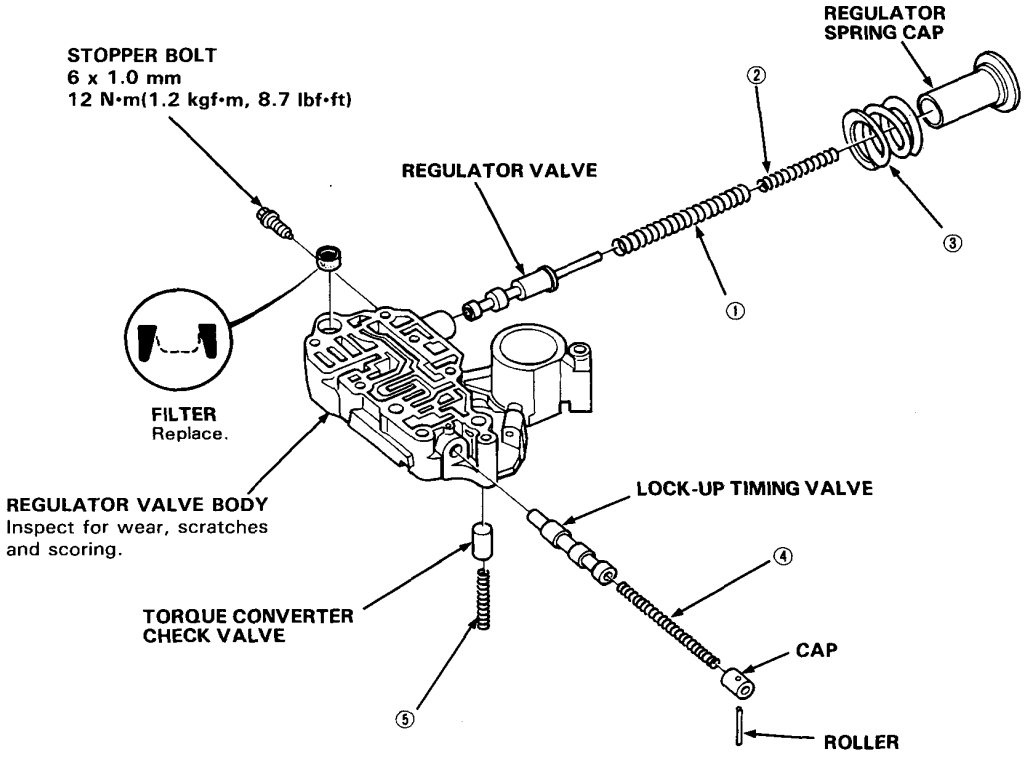
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Replace the valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-116.

1. Hold the regulator spring cap in place while removing the stopper bolt. Once the stopper bolt is removed, release the spring cap slowly.

   CAUTION:
   The regulator spring cap can pop out when the lock bolt is removed.

2. Reassembly is the reverse order of disassembly.

   NOTE:
   - Coat all parts with ATF.
   - Align the hole in the regulator spring cap with the hole in the valve body, then press the spring cap into the valve body, and tighten the stopper bolt.



SPRING SPECIFICATIONS Unit: mm(in)

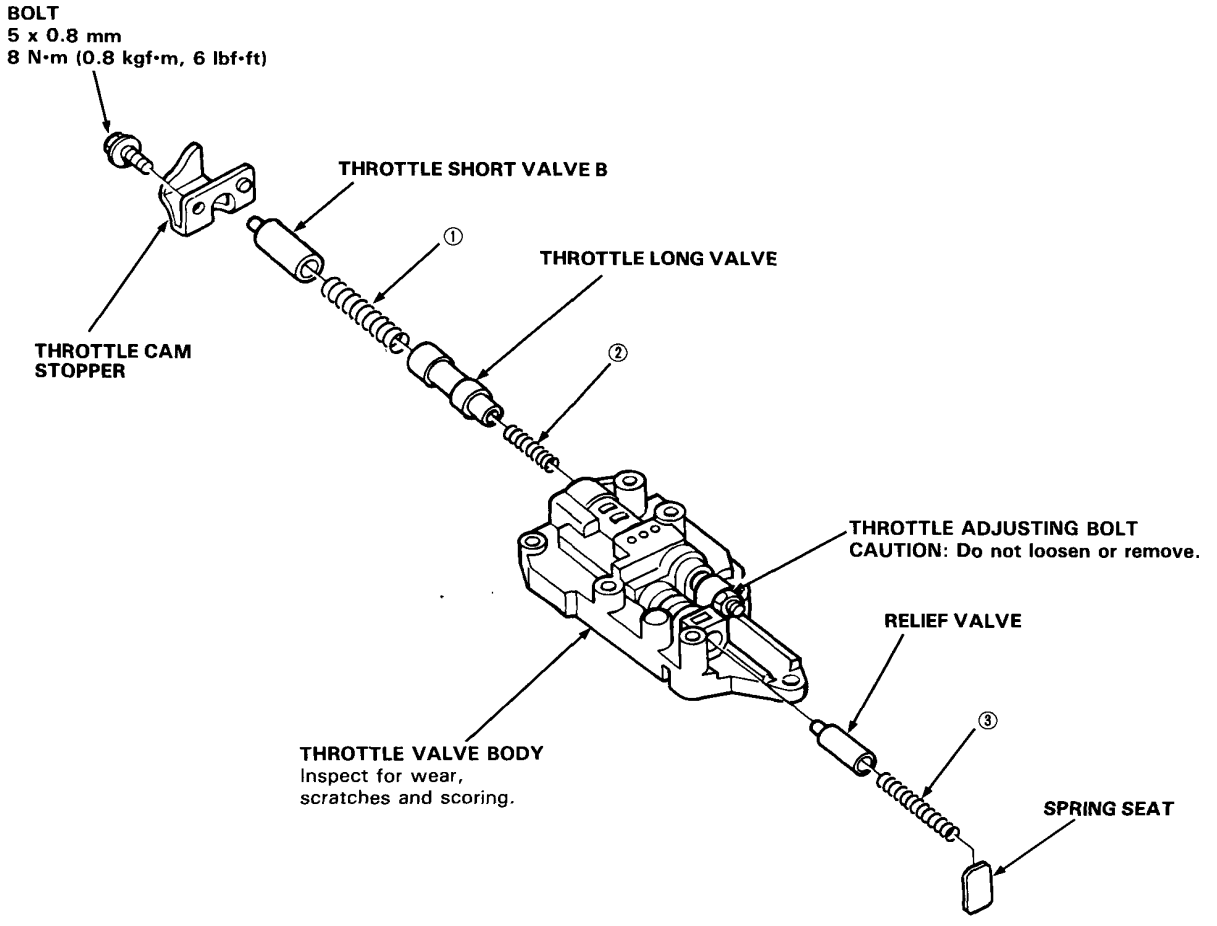
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Regulator valve spring A	1.8(0.071)	14.7(0.579)	88.6(3.488)	16.5
②	Regulator valve spring B	1.8(0.071)	9.6(0.378)	44.0(1.732)	12.7
③	Stator reaction spring	4.5(0.177)	35.4(1.394)	30.3(1.193)	1.92
④	Lock-up timing valve spring	0.8(0.031)	6.6(0.260)	51.1(2.012)	14.7
⑤	Torque converter check valve spring	1.1(0.043)	8.4(0.331)	38.2(1.504)	14.0

Throttle Valve Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-116.
- Coat all parts with ATF before assembling.
- Replace the valve body as an assembly if any parts are worn or damaged.



SPRING SPECIFICATIONS

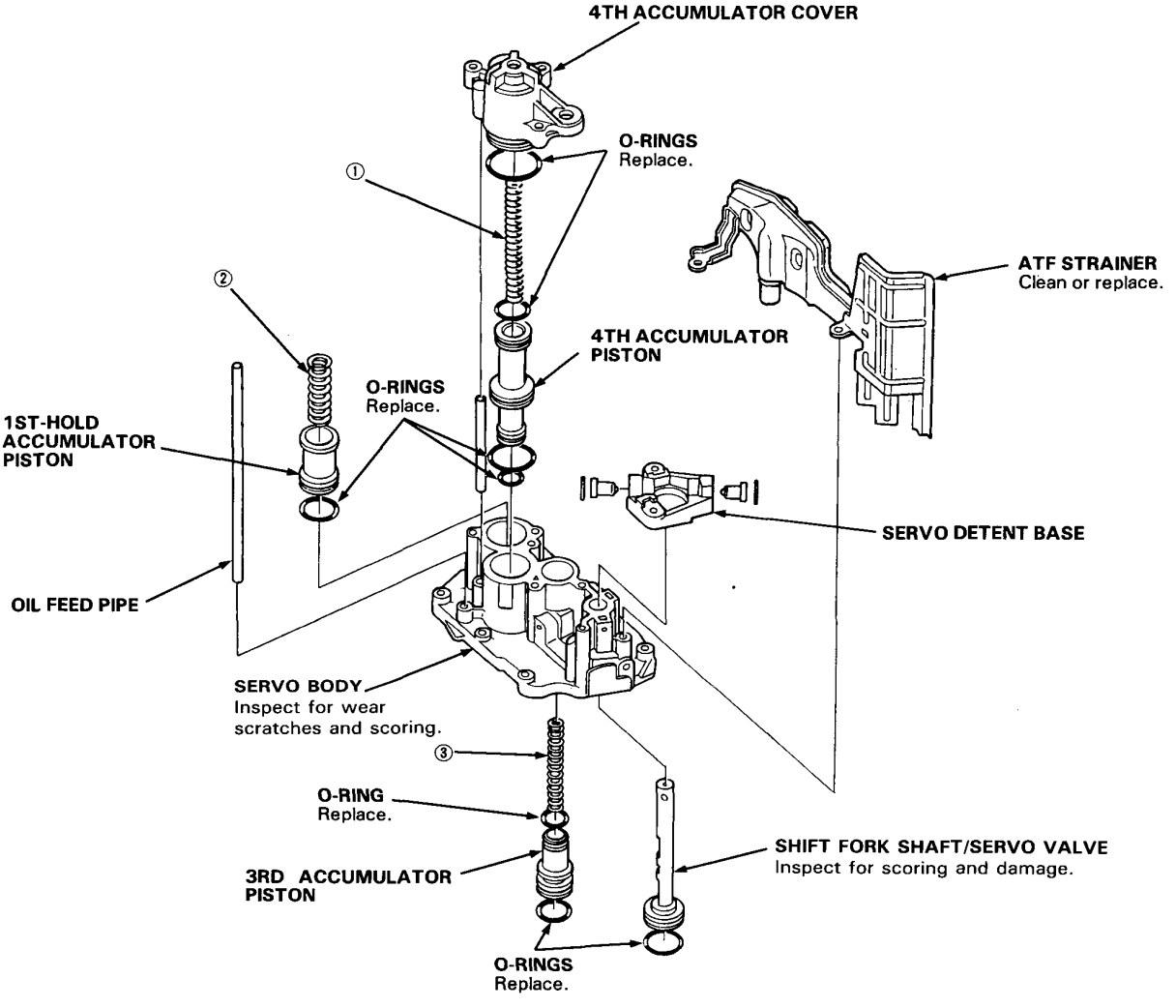
Unit: mm(in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Throttle valve B spring	1.4(0.055)	8.5(0.335)	41.5(1.634)	10.5
		1.4(0.055)	8.5(0.335)	41.5(1.634)	11.2
		1.4(0.055)	8.5(0.335)	41.6(1.638)	12.4
②	Throttle valve B adjusting spring	0.8(0.031)	6.2(0.244)	30.0(1.181)	8.0
③	Relief valve spring	1.0(0.039)	8.4(0.331)	39.1(1.539)	15.1

Servo Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Replace the servo body as an assembly if any parts are worn or damaged.
- Replace ATF strainer if its inlet opening is clogged.
- Coat all parts with ATF before assembly.



SPRING SPECIFICATIONS

Unit: mm(in)

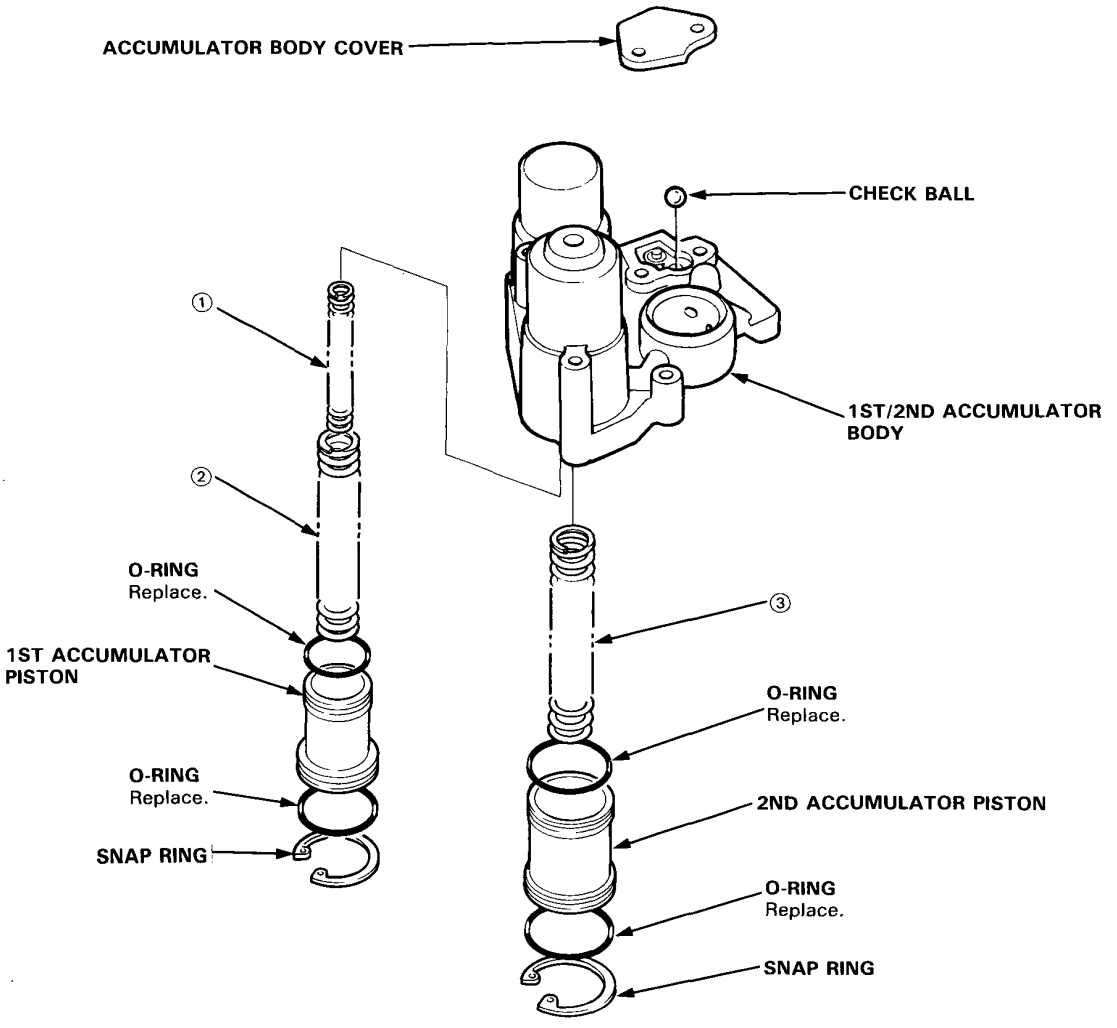
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	4th accumulator spring	2.9(0.114)	22.0(0.866)	90.1(3.547)	10.9
②	1st-hold accumulator spring	4.0(0.157)	25.0(0.984)	64.7(2.547)	7.3
③	3rd accumulator spring	2.9(0.114)	17.5(0.689)	99.6(3.921)	16.1

1st/2nd Accumulator Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all part thoroughly in solvent or carburetor cleaner, and dry them with compressed air. Blow out all passages.
- Coat all parts with ATF before assembly.

CAUTION: Do not use a magnet to remove the check ball; it may magnetize the ball.



SPRING SPECIFICATIONS

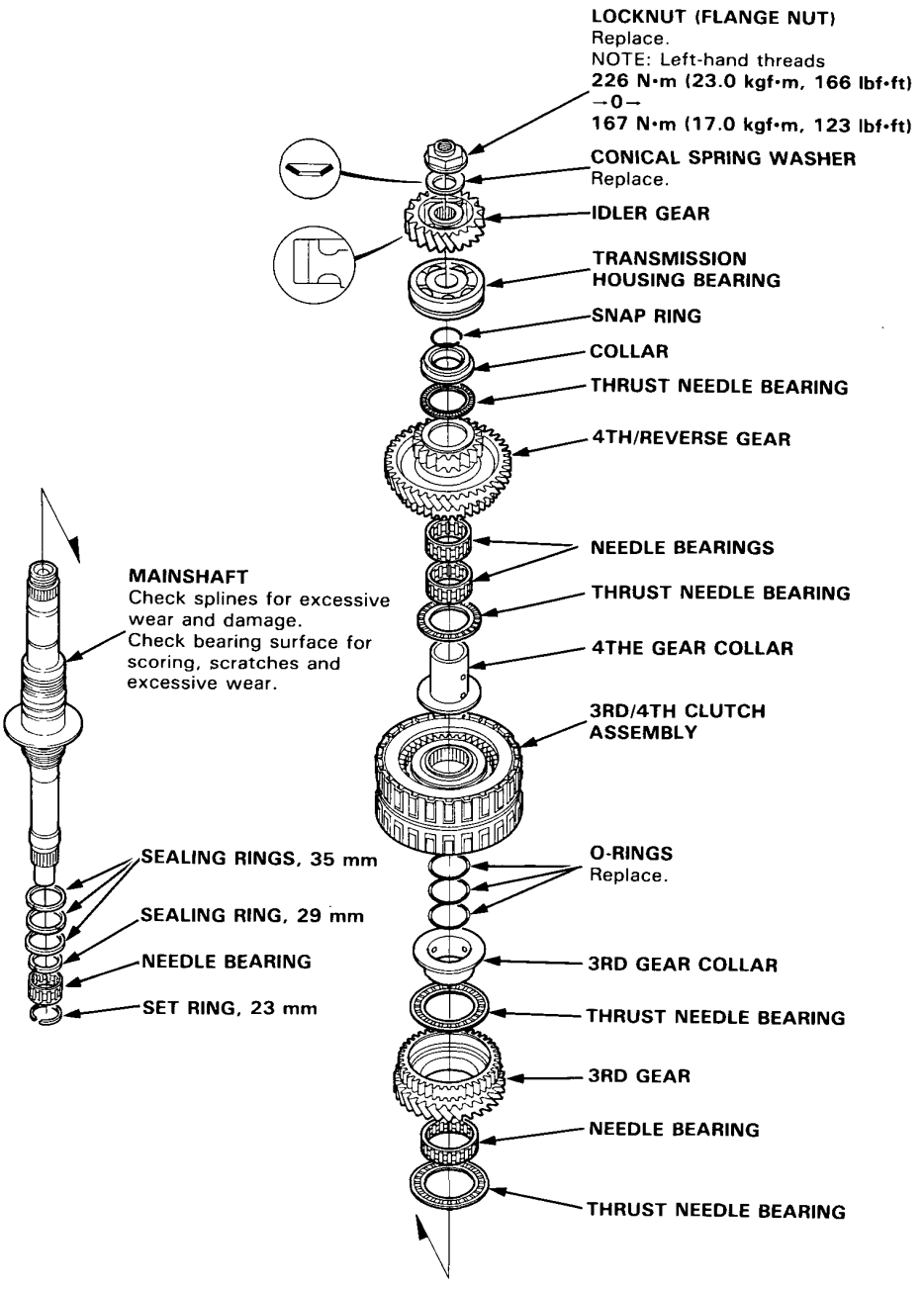
Unit: mm(in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st accumulator spring B	1.8(0.071)	6.3(0.248)	70.5(2.776)	15.3
②	1st accumulator spring A	2.3(0.091)	16.3(0.642)	109.6(4.315)	20.0
③	2nd accumulator spring	3.5(0.138)	22.0(0.866)	91.0(3.583)	10.8

Mainshaft

Disassembly/Inspection/Reassembly

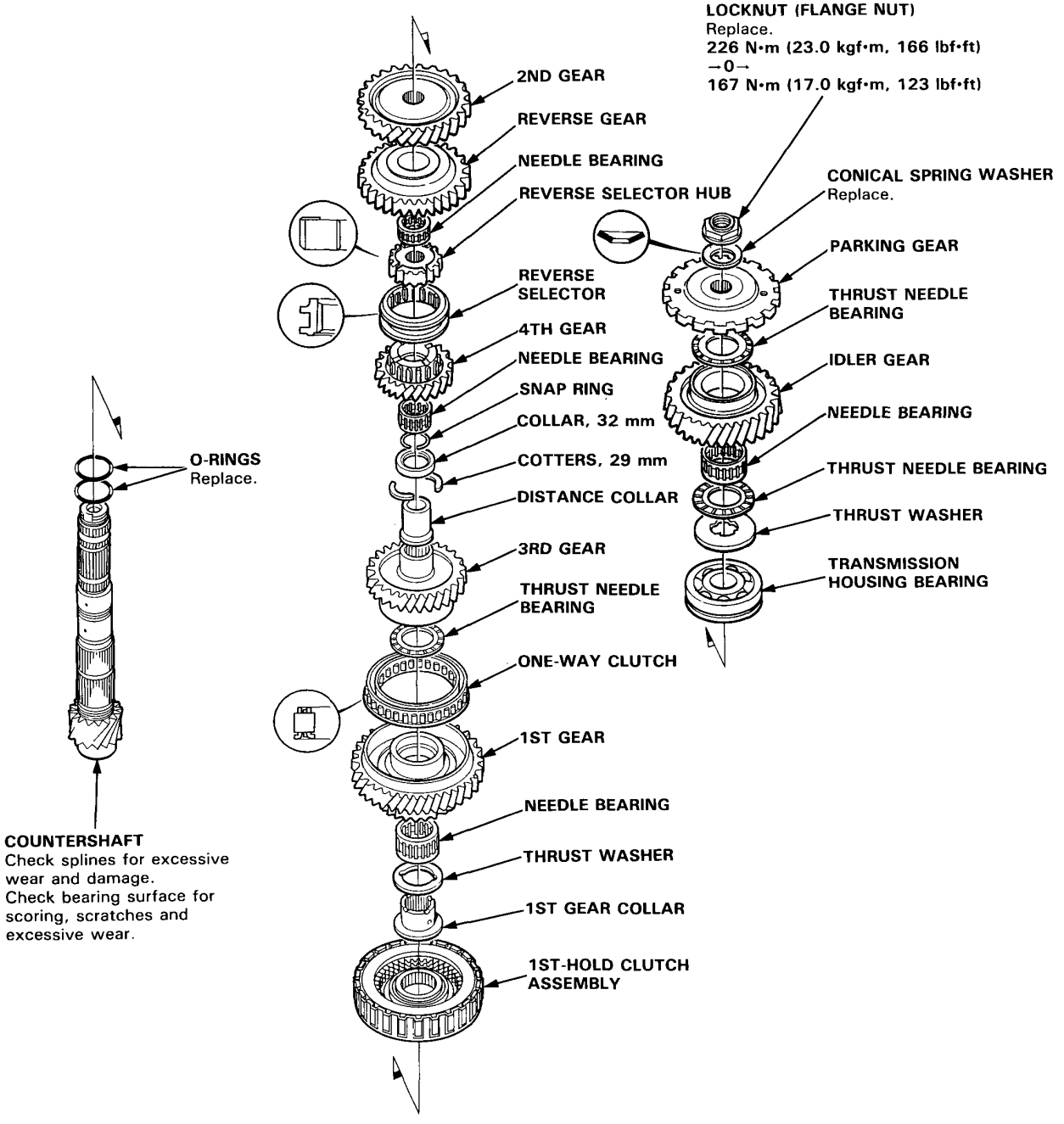
NOTE:
- Lubricate all parts with ATF during reassembly.
- Install the thrust needle bearings with unrolled edge of bearing retainer facing the washer.
- Inspect the thrust needle bearing and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.



Countershaft

Disassembly/Inspection/Reassembly

NOTE:
- Lubricate all parts with ATF during reassembly.
- Install the thrust needle bearings with unrolled edge of bearing retainer facing the washer.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, warp the shaft splines with tape to prevent damage to the O-rings.

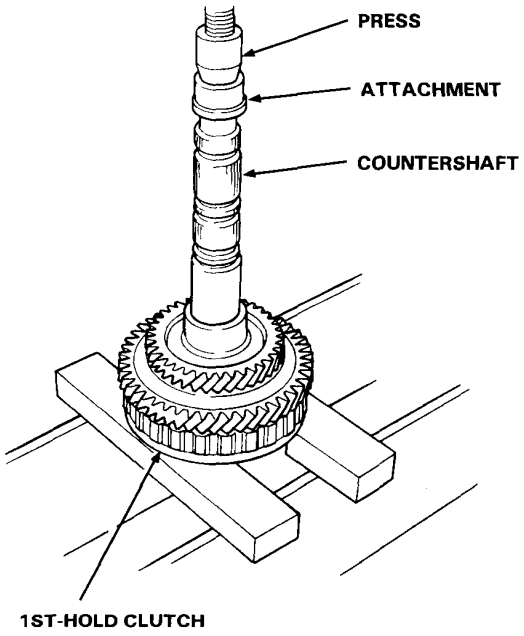


Countershaft

Removal

1. Using a press, press out the countershaft while supporting the 1st-hold clutch.

   NOTE:
   Place an attachment between the press and countershaft to prevent damage to the shaft.



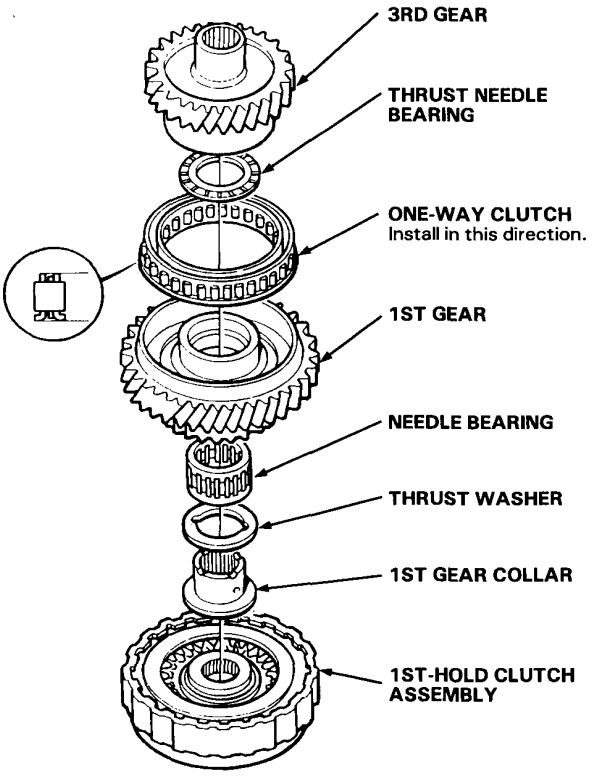
Installation

NOTE:
Lubricate all parts with ATF during assembly.

1. Install two new O-rings on the countershaft.

   NOTE:
   Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.

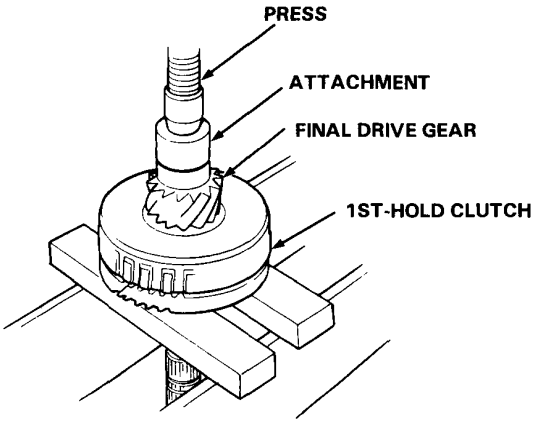
2. Assemble the 1st-hold clutch assembly, 1st gear collar, thrust washer, needle bearing, 1st gear, one-way clutch, thrust needle bearing and 3rd gear.



3. Install the above assembly on the countershaft.

4. Align the shaft splines with those of 3rd gear, then press the countershaft into 3rd gear with a press.

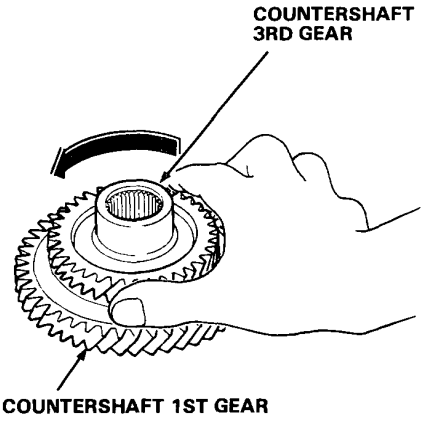
   NOTE:
   - Also align the shaft splines with those of the 1st-hold clutch when pressing the countershaft into the 3rd gear.
   - Use an attachment between the shaft and a press to prevent damage to the countershaft.
   - Stop pressing the countershaft when the 1st-hold clutch contacts the final drive gear.



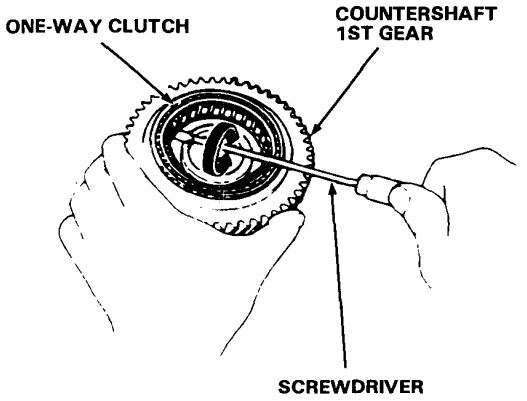
One-way Clutch

Disassembly/Inspection/Reassembly

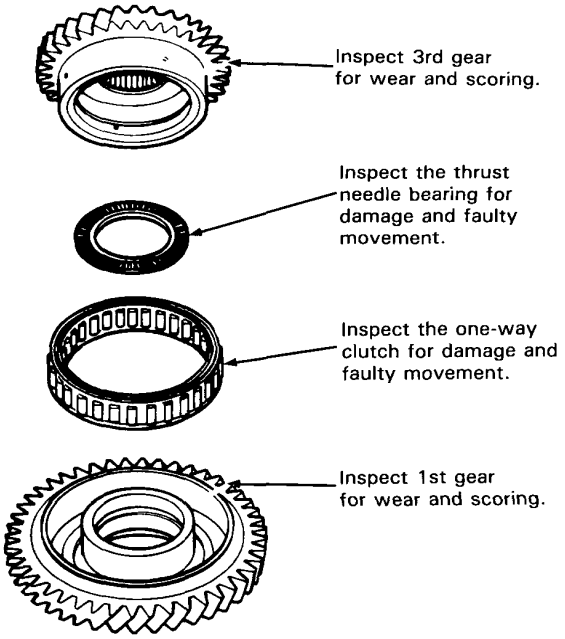
1. Separate countershaft 3rd gear from countershaft 1st gear by turning 3rd gear in the direction shown.



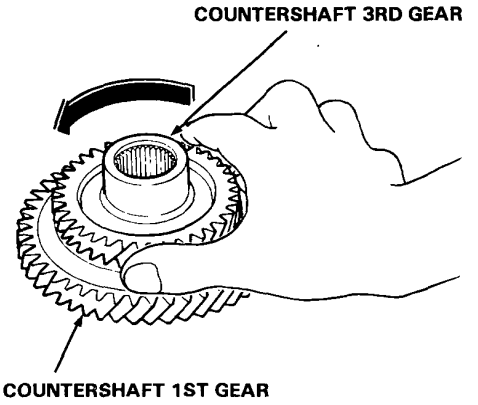
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



3. Inspect the parts as follows:



4. After the parts are assembled, hold countershaft 1st gear and turn countershaft 3rd gear in the direction shown to be sure it turns freely.

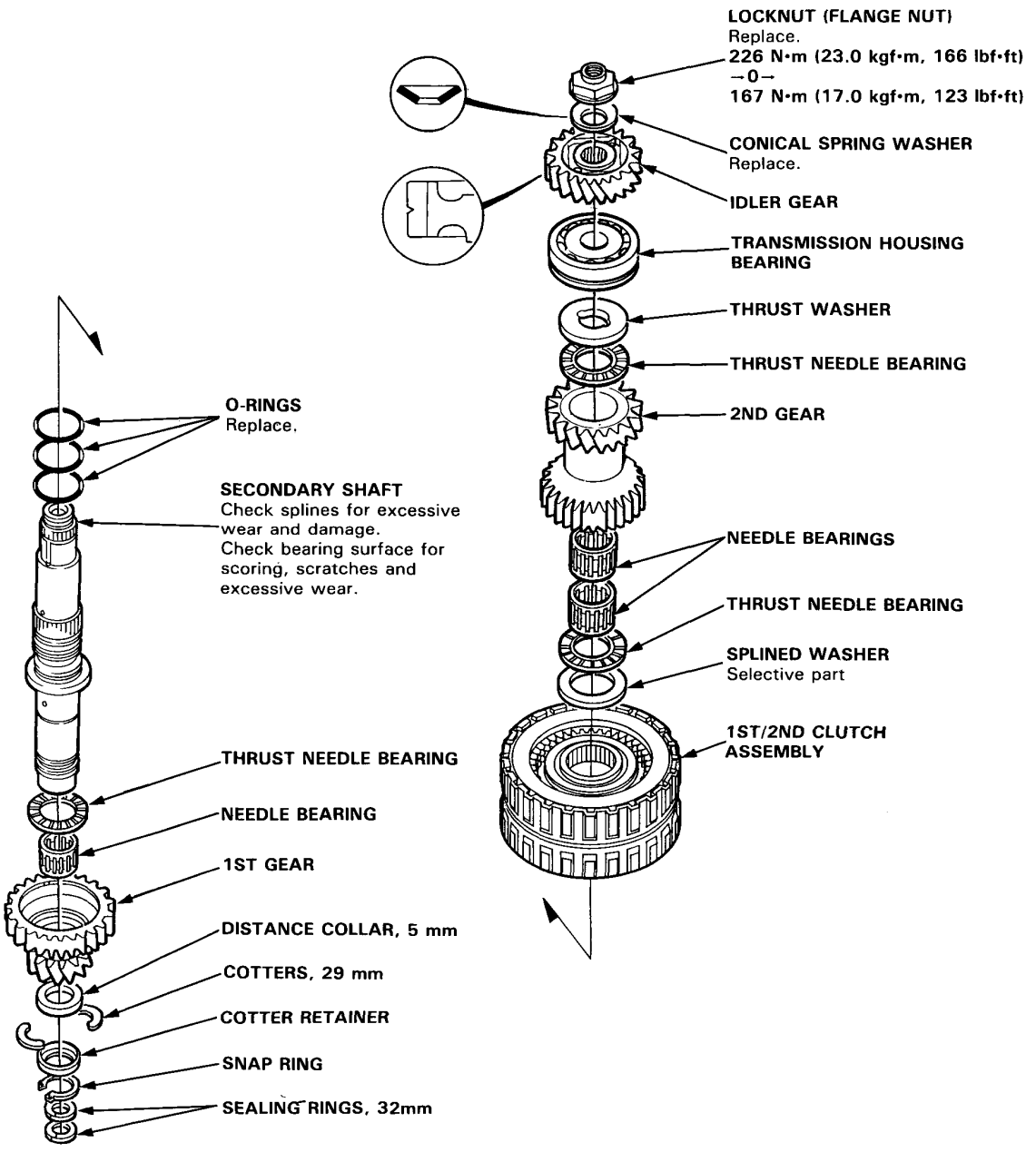


Secondary Shaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF during reassembly.
- Install the thrust needle bearings with unrolled edge of bearing retainer facing the washer.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damage to the O-rings.



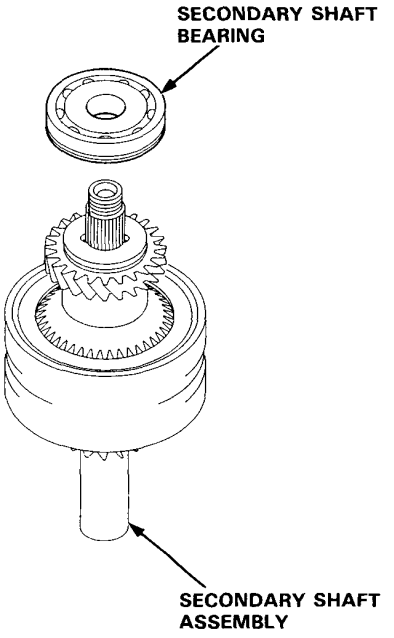
Secondary Shaft

Inspection

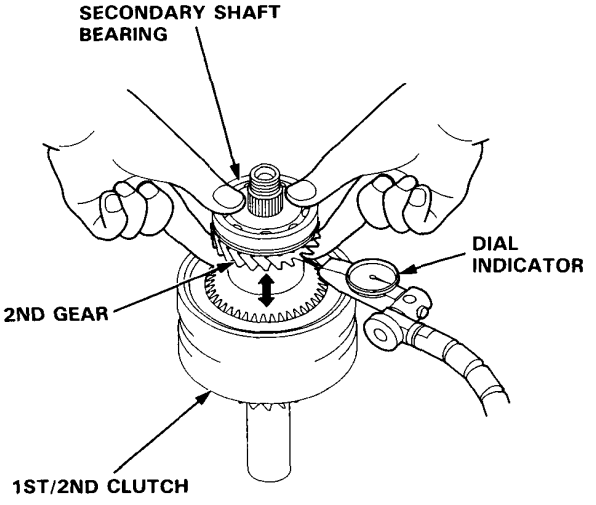
- Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

1. Remove the secondary shaft bearing from the transmission housing.
2. Assemble the secondary shaft assembly without O-rings.
3. Install the secondary shaft bearing on the secondary shaft.



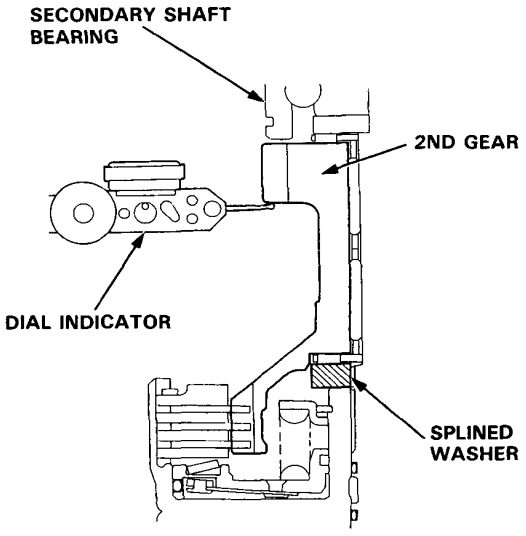
4. Set the dial indicator to the 2nd gear as shown.



5. Hold the secondary shaft bearing against the 1st/2nd clutch assembly. Measure the 2nd gear axial clearance while moving the 2nd gear.

STANDARD: 0.07–0.15 mm (0.003–0.006 in)

NOTE: Take measurements in at least three places, and use the average as the actual clearance.



6. If the clearance is out of tolerance, remove the splined washer and measure its thickness.
7. Select and install a new splined washer then recheck.

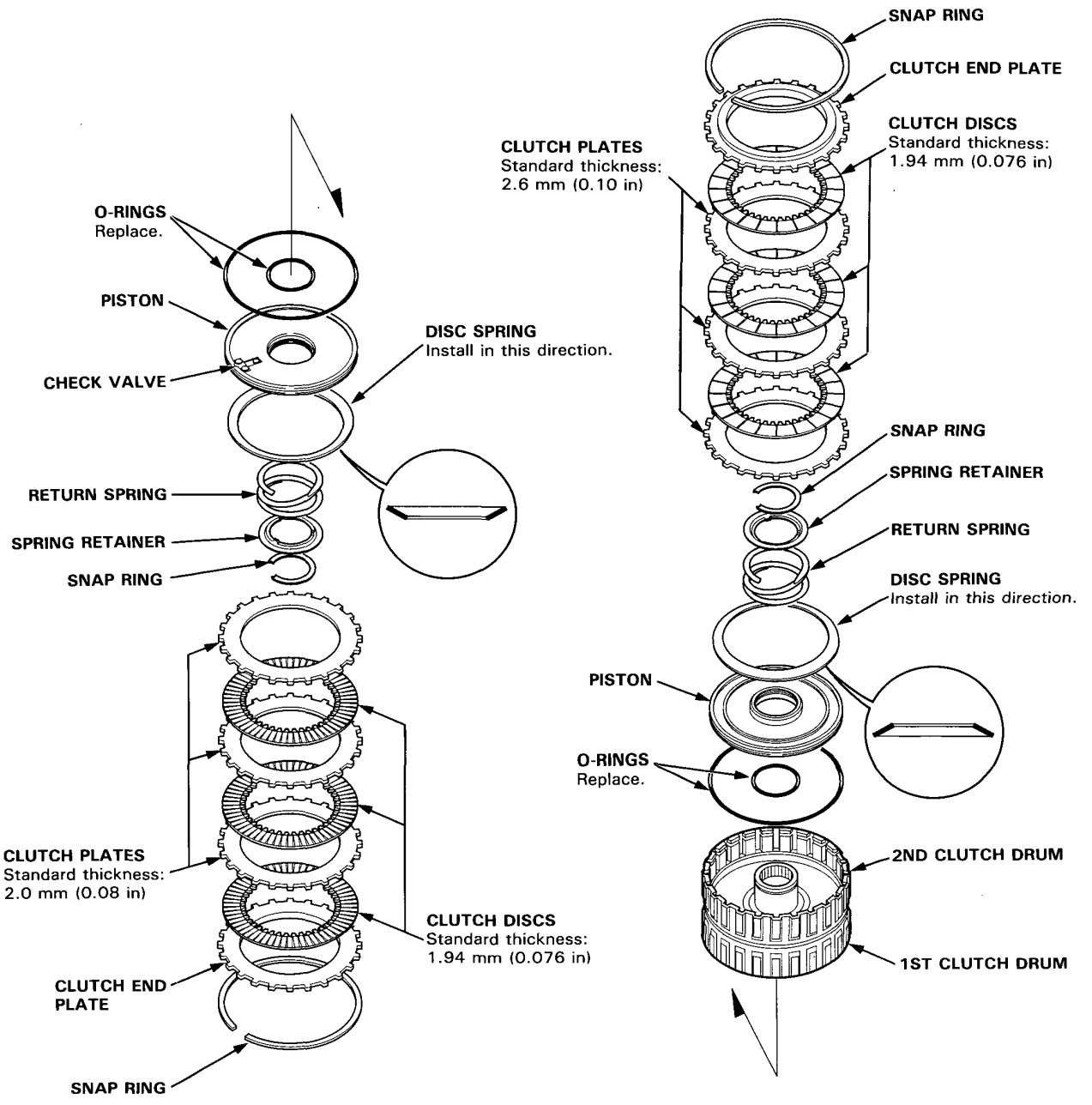
SPLINED WASHER

No.	Part Number	Thickness
1	90406–PX4–700	4.05 mm (0.159 in)
2	90407–PX4–700	4.10 mm (0.161 in)
3	90408–PX4–700	4.15 mm (0.163 in)
4	90409–PX4–700	4.20 mm (0.165 in)
5	90410–PX4–700	4.25 mm (0.167 in)
6	90411–PX4–700	4.30 mm (0.169 in)
7	90412–PX4–700	4.35 mm (0.171 in)
8	90413–PX4–700	4.40 mm (0.173 in)
9	90414–PX4–700	4.45 mm (0.175 in)

8. After replacing the splined washer, make sure that the clearance is within tolerance.

Illustrated Index

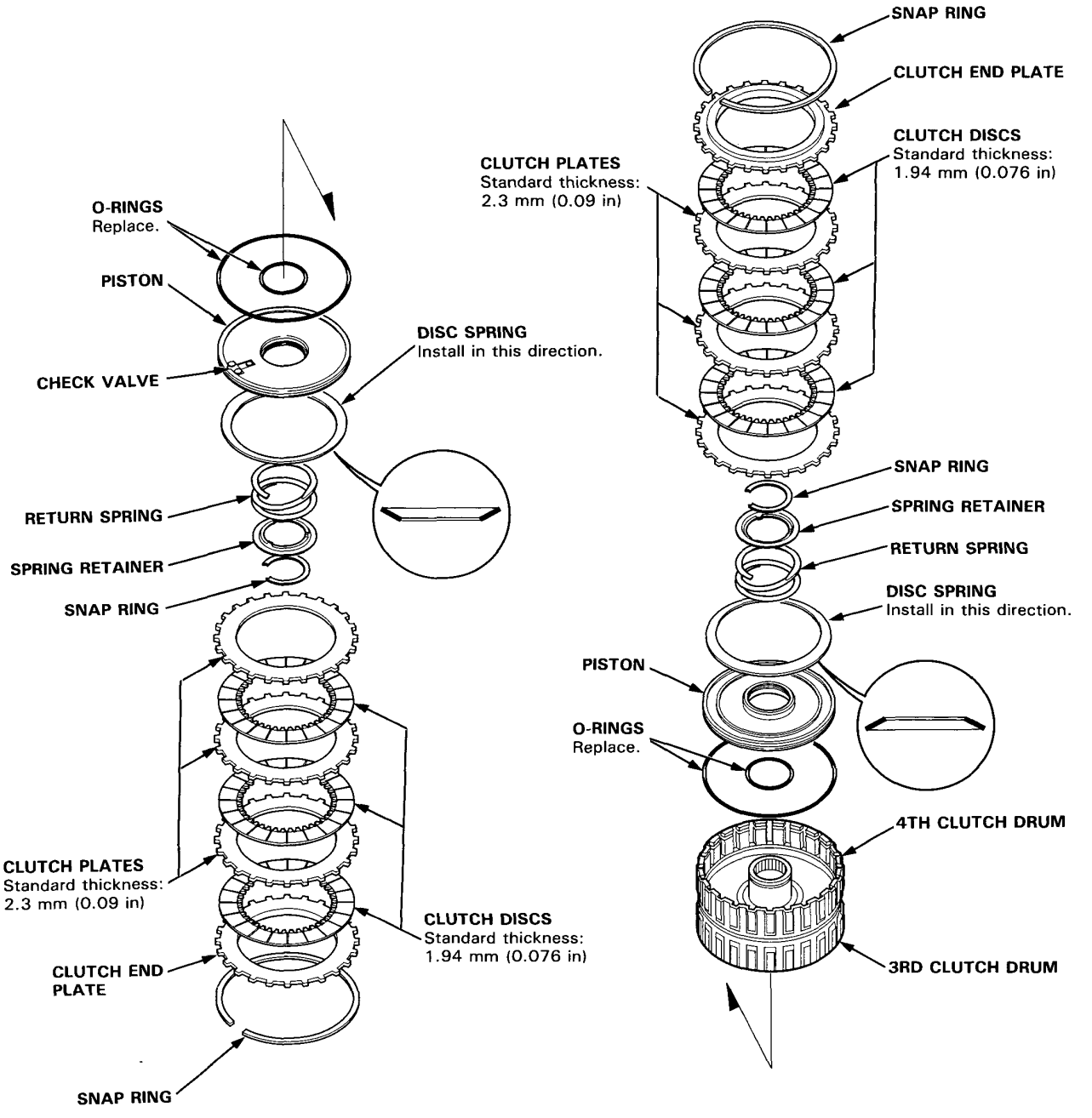
1ST/2ND CLUTCH ASSEMBLY



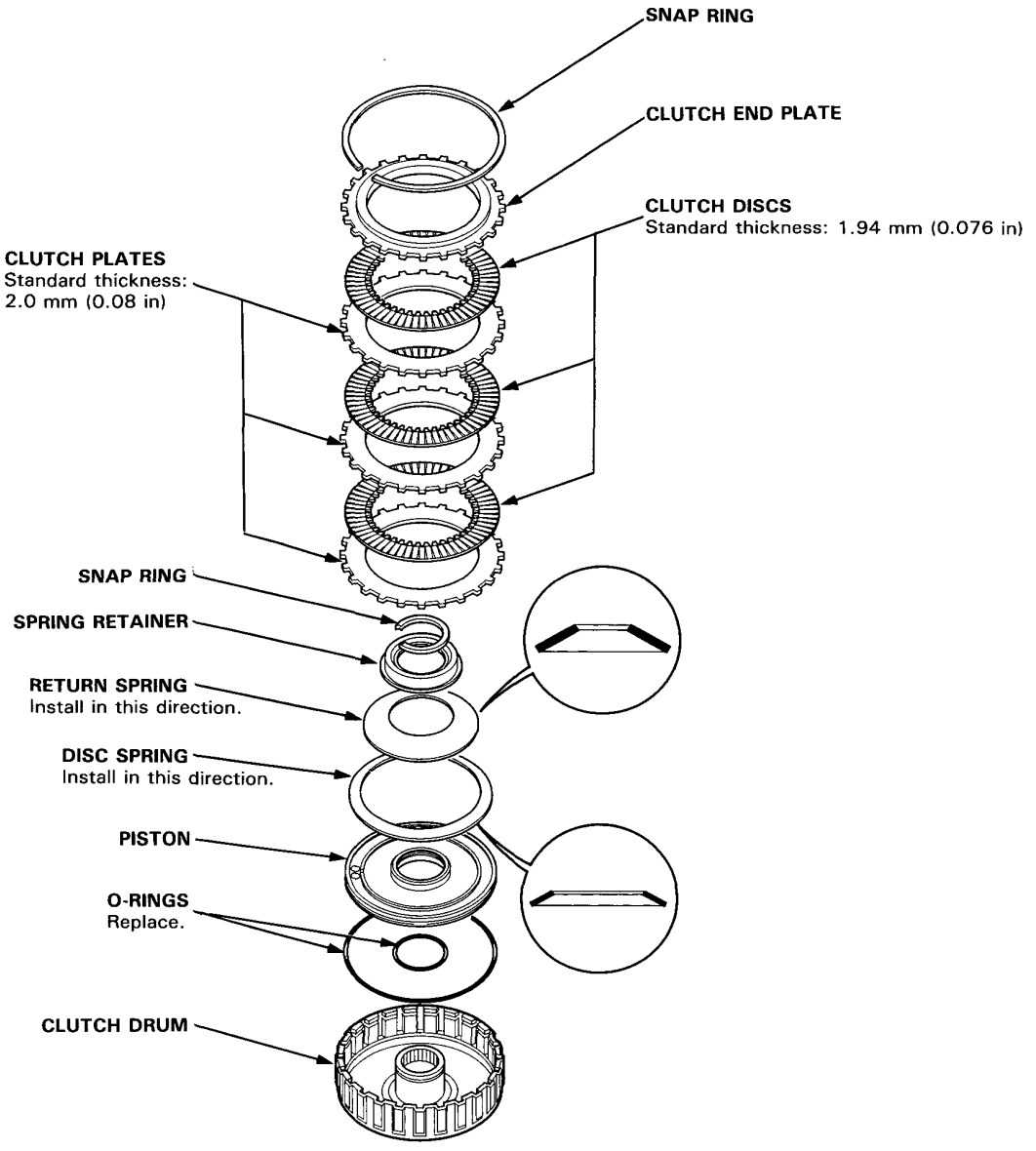
(cont'd)

Illustrated Index (cont'd)

3RD/4TH CLUTCH ASSEMBLY

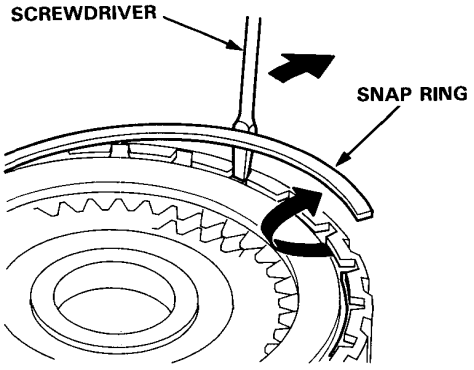


1ST-HOLD CLUTCH ASSEMBLY

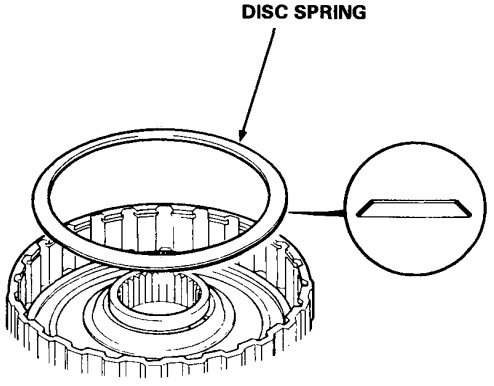


Disassembly

1. Remove the snap ring, then remove the clutch end plate, clutch discs and plates.

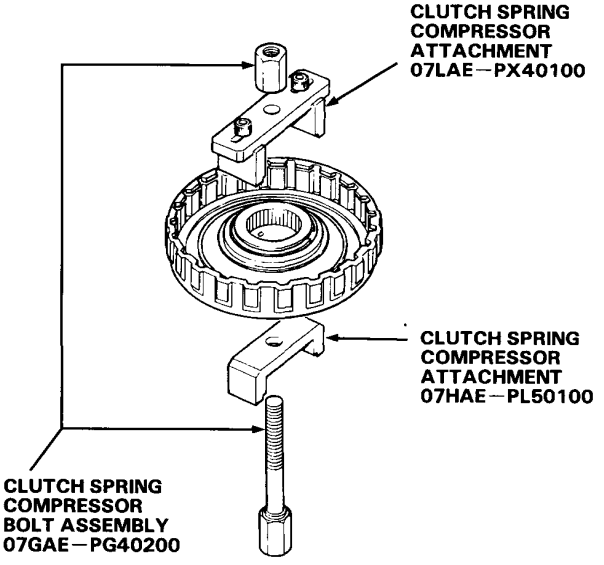


2. Remove the disc spring.

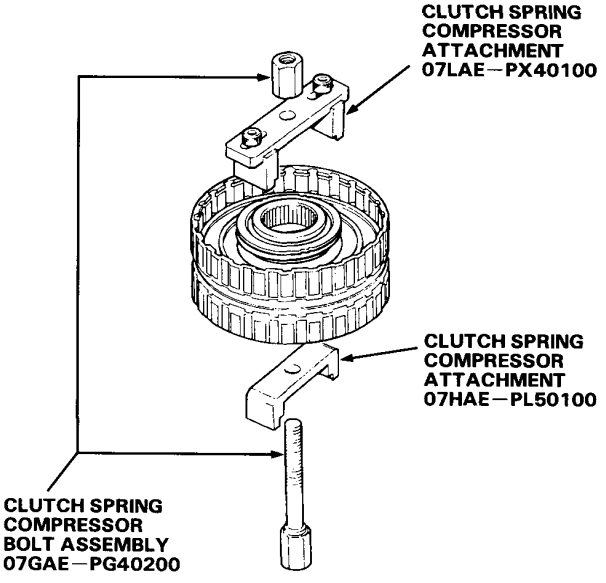


3. Install the special tools as shown.

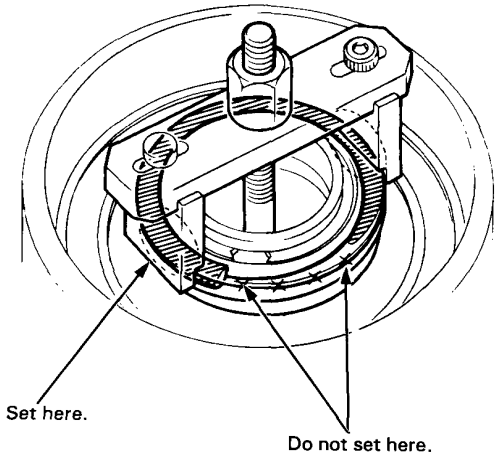
NOTE: For 1st-hold clutch



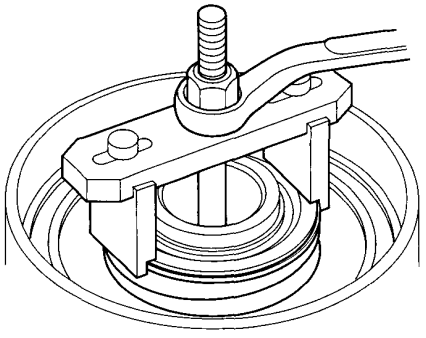
NOTE: For 1st, 2nd, 3rd and 4th clutches.



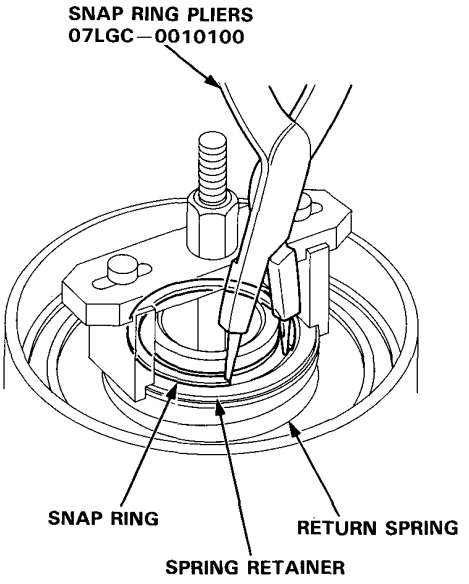
CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



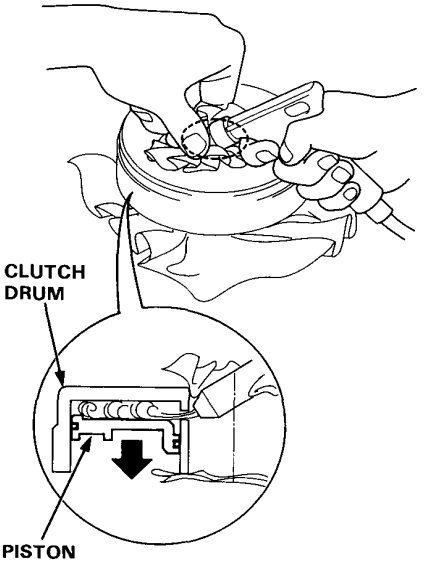
4. Compress the return spring.



5. Remove the snap ring. Then remove the special tools, spring retainer and return spring.



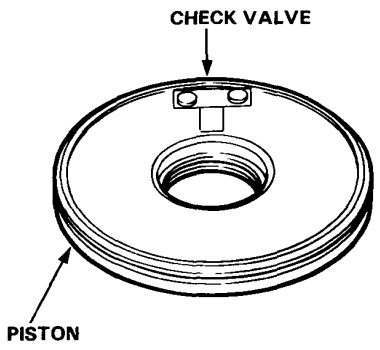
6. Wrap a shop rag around the clutch drum, and apply air pressure to the oil passage to remove the piston. Place a finger tip on the other end while applying air pressure.



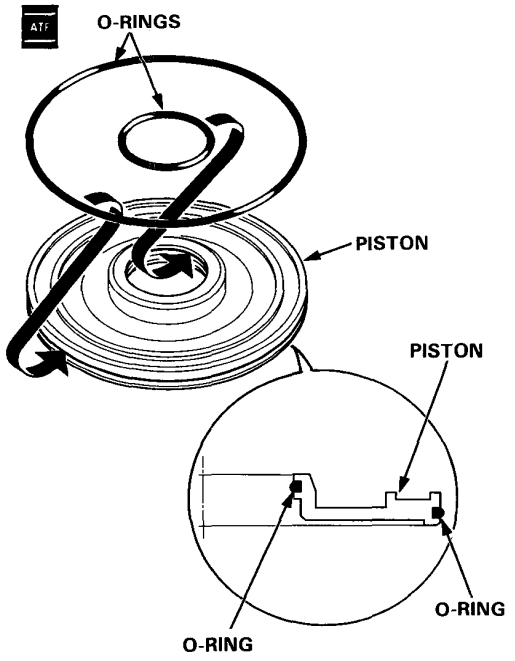
Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before assembly.

1. Inspect the check valve; if it's loose, replace the piston.



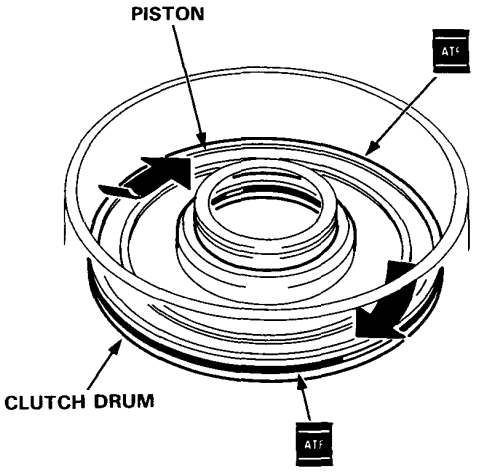
2. Install new O-rings on the piston.



3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

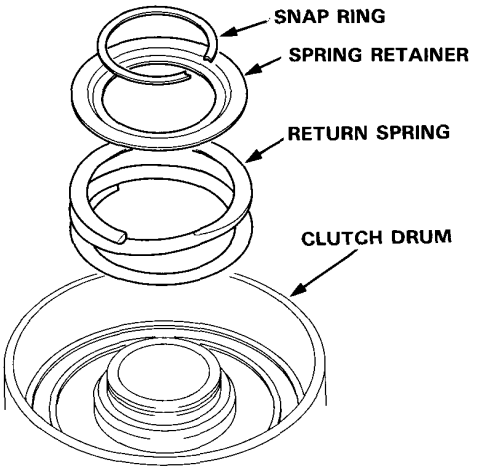
   NOTE: Lubricate the piston O-ring with ATF before installing.

   CAUTION: Do not pinch the O-ring by installing the piston with too much force.



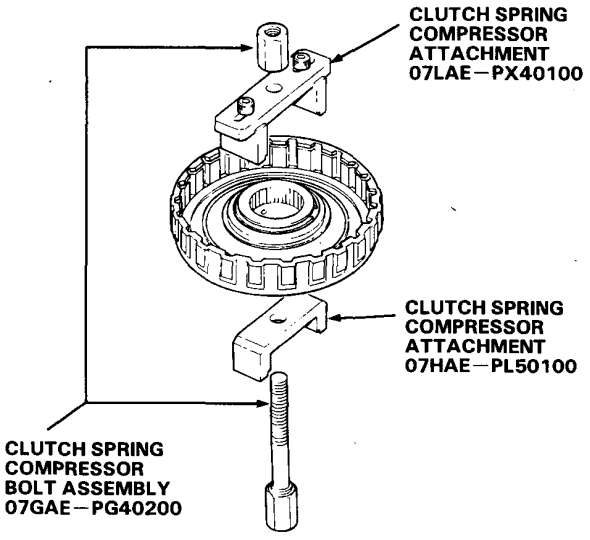
4. Install the return spring and spring retainer, and position the snap ring on the retainer.

   NOTE: In this figure, the return spring is for 1st, 2nd, 3rd and 4th clutches. The 1st-hold clutch return spring is a disc spring, see page 14-137 to install it.

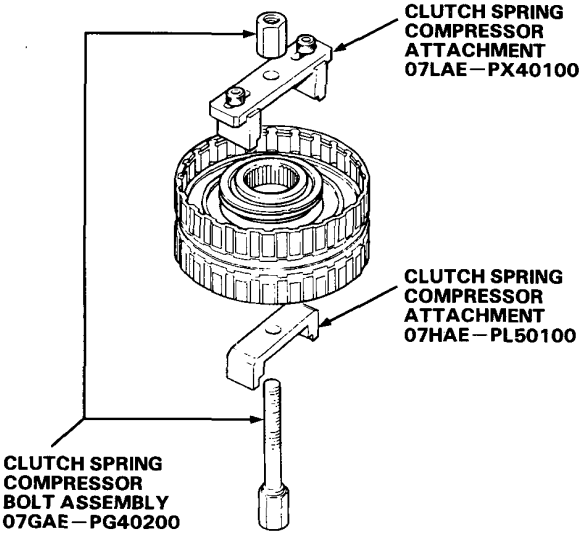


5. Install the special tools as shown.

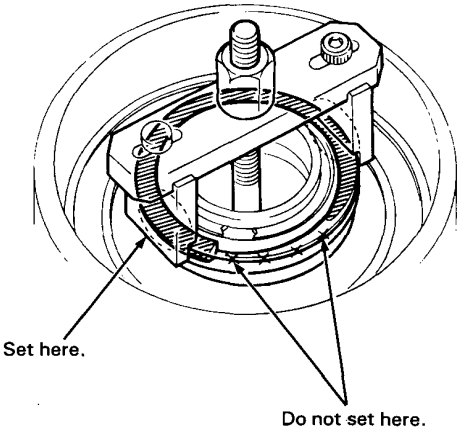
NOTE: For 1st-hold clutch



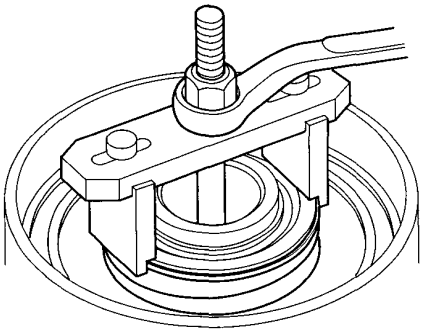
NOTE: For 1st, 2nd, 3rd and 4th clutches



CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



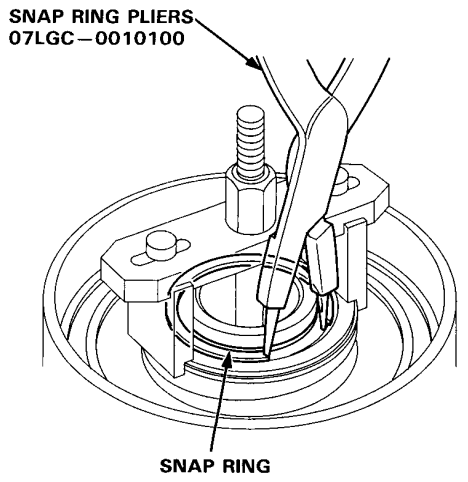
6. Compress the return spring.



(cont'd)

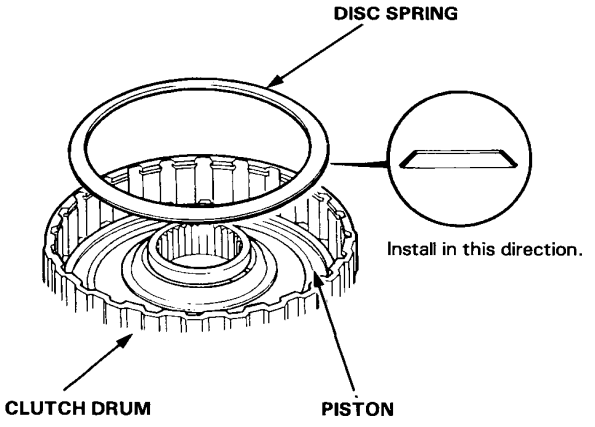
Reassembly (cont'd)

7. Install the snap ring.



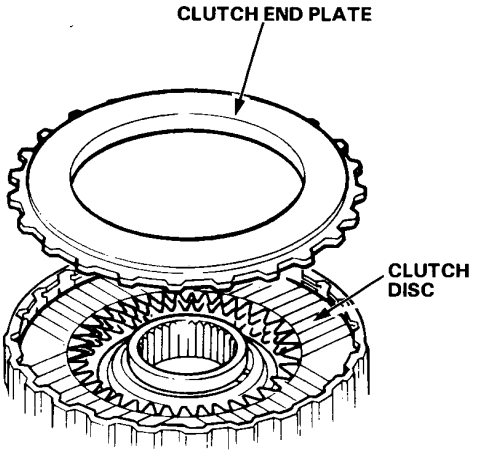
8. Remove the special tools.
9. Install the disc spring.

   NOTE: Install the disc spring in the direction shown.

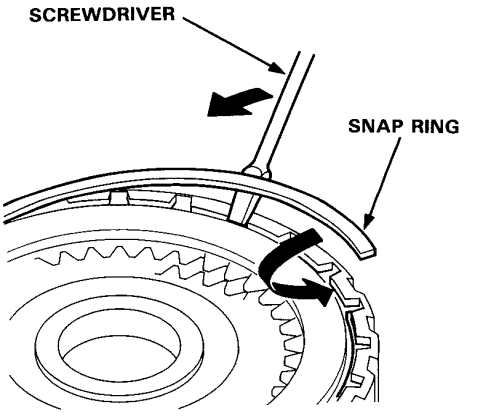


10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.
11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with flat side toward the disc.

    NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt or other foreign matter.



12. Install the snap ring.

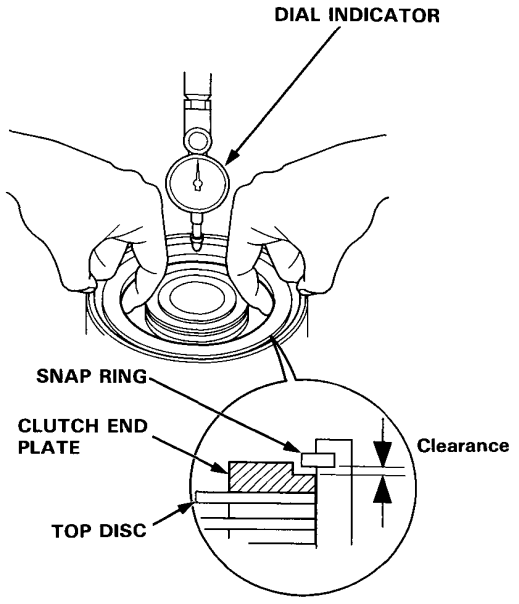


13. Measure the clearance between the clutch end plate and top disc with a dial indicator.
Zero the dial indicator with the clutch end plate lowered, and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

NOTE: Measure at three locations.

Clutch End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65—0.85 mm (0.026—0.033 in)
2nd	0.65—0.85 mm (0.026—0.033 in)
3rd	0.40—0.60 mm (0.016—0.024 in)
4th	0.40—0.60 mm (0.016—0.024 in)
1st-Hold	0.80—1.00 mm (0.031—0.039 in)

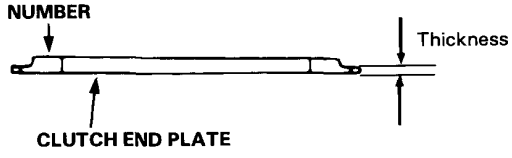


14. If the clearance is not within the service limits, select a new clutch end plate from the following table.

NOTE: If the thickest clutch end plate is installed, but the clearance is still over the standard, replace the clutch discs and clutch plates.

CLUTCH END PLATE

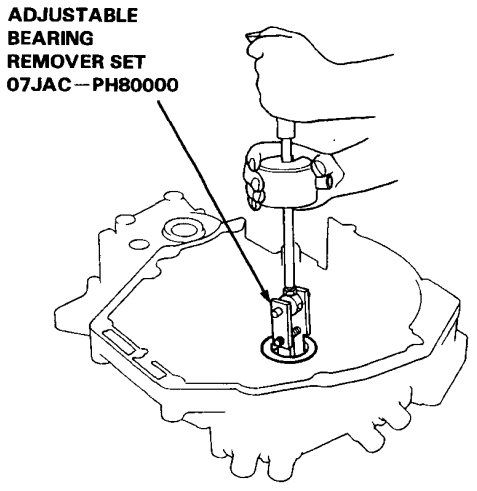
Plate No.	Part Number	Thickness mm (in)
1	22551—PX4—003	2.10 (0.083)
2	22552—PX4—003	2.20 (0.087)
3	22553—PX4—003	2.30 (0.091)
4	22554—PX4—003	2.40 (0.094)
5	22555—PX4—003	2.50 (0.098)
6	22556—PX4—003	2.60 (0.102)
7	22557—PX4—003	2.70 (0.106)
8	22558—PX4—003	2.80 (0.110)
9	22559—PX4—003	2.90 (0.114)



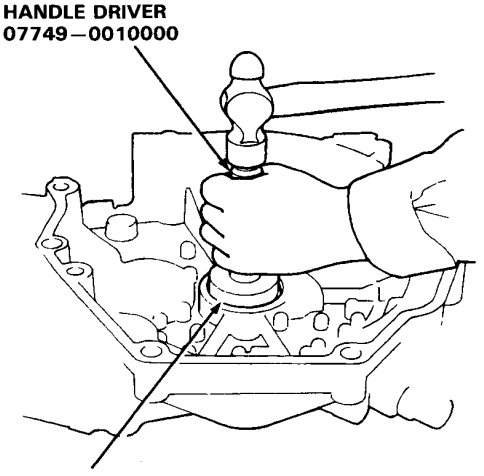
Torque Converter Housing Bearings

Mainshaft Bearing/Oil Seal Replacement

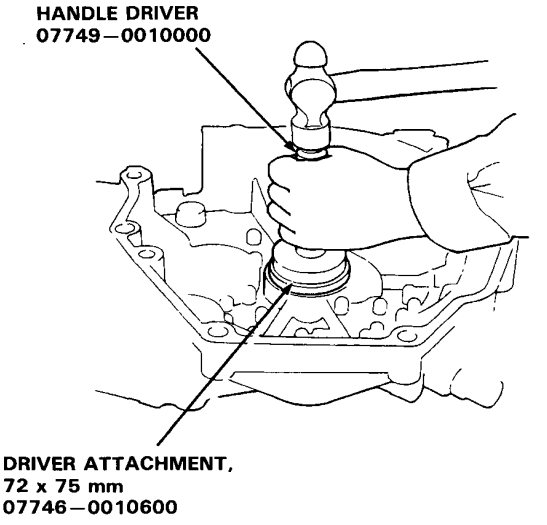
1. Remove the mainshaft bearing and oil seal using the special tools as shown.



2. Drive in the new mainshaft bearing until it bottoms in the housing using the special tools as shown.

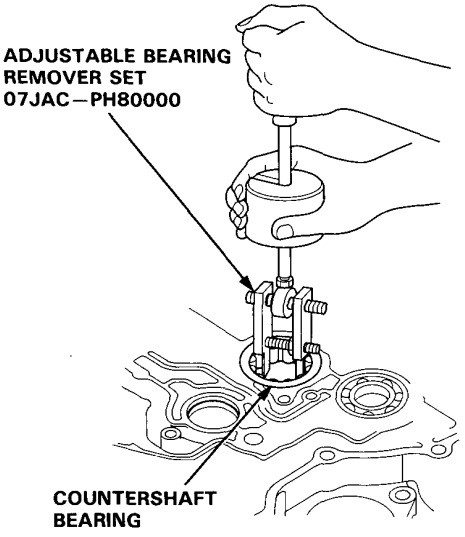


3. Install the new oil seal flush with the housing using the special tools as shown.

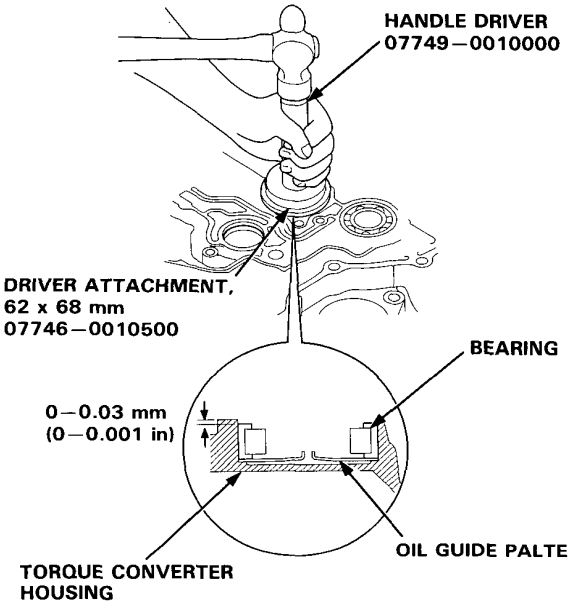


Countershaft Bearing Replacement

1. Remove the countershaft bearing using the special tool as shown.

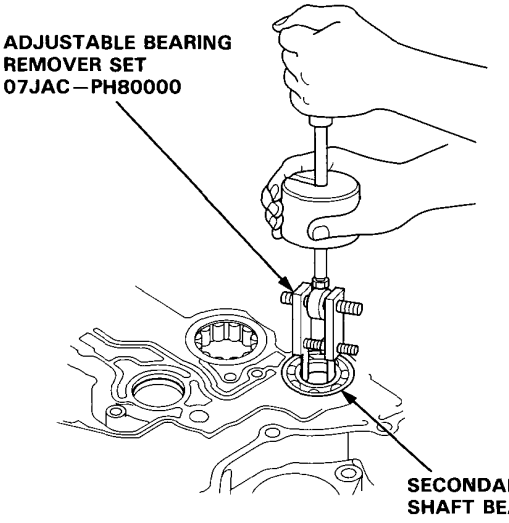


2. Install the oil guide plate.
3. Install the new bearing into the housing using the special tools as shown.

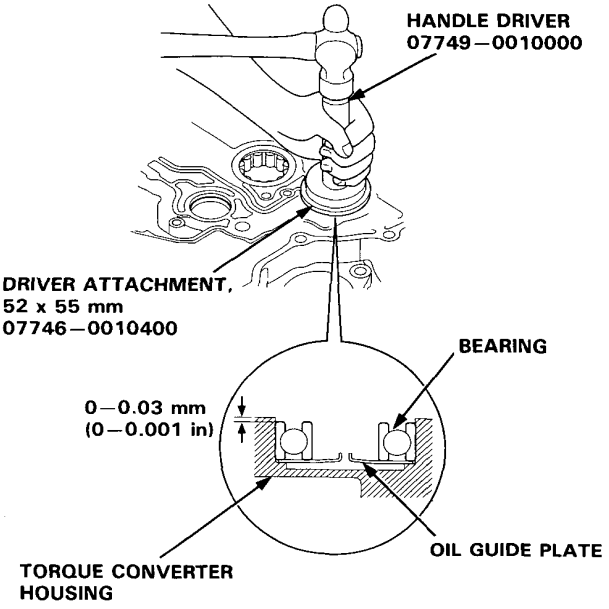


Secondary Sahft Bearing Replacement

1. Remove the secondary shaft bearing using the special tool as shown.



2. Install the oil guide plate.
3. Install the new bearing into the housing using the special tools as shown.



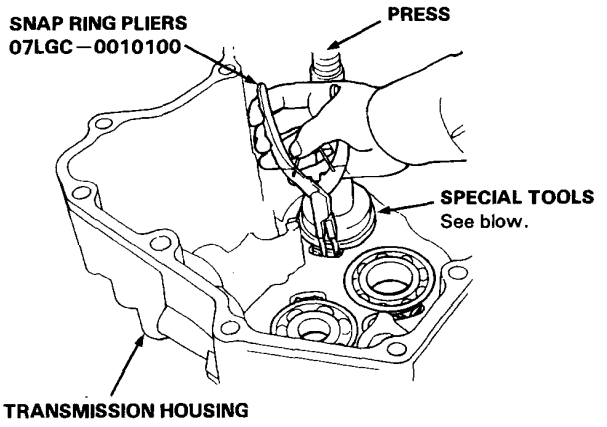
Transmission Housing Bearings

Removal/Installation

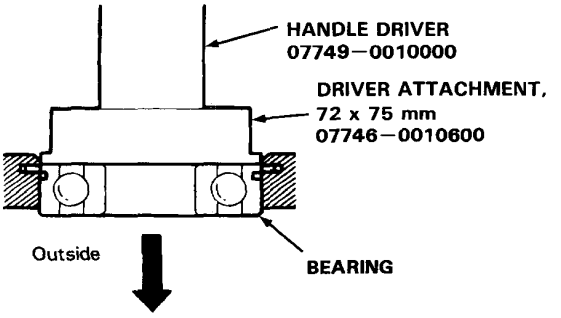
NOTE:
Lubricate all parts with ATF before assembly.

1. To remove the mainshaft, countershaft and secondary shaft bearings from the transmission housing, expand each snap ring with snap ring pliers, then push the bearing out using the special tool and a press as shown.

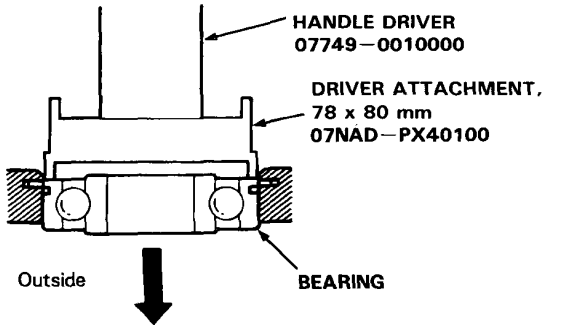
   NOTE:
   Do not remove the snap rings unless it's necessary to clean the grooves in the housing.



- **Mainshaft and Secondary Shaft Removal Use:**



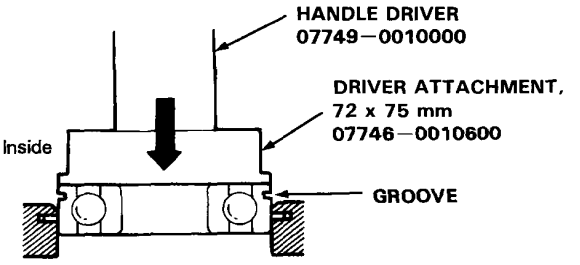
- **Countershaft Removal Use:**



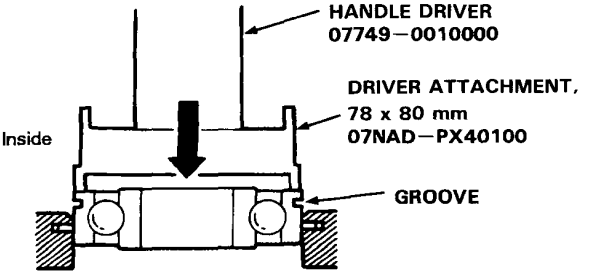
2. Expand each snap ring with snap ring pliers,and insert the new bearing part-way into the housing, using the special tool and a press as shown. Install with groove side of the bearing facing inside the housing.

3. Release the pliers, then push the bearing down into the housing until the snap ring snaps in place around it.

- **Mainshaft and Secondary Shaft Installation Use:**

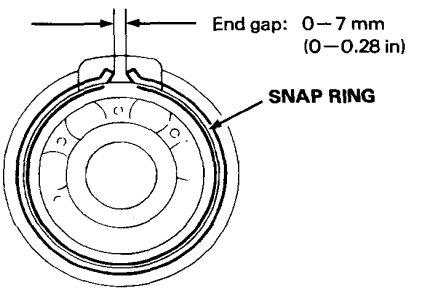


- **Countershaft Installation Use:**



4. After installing the ball bearing verify the following:

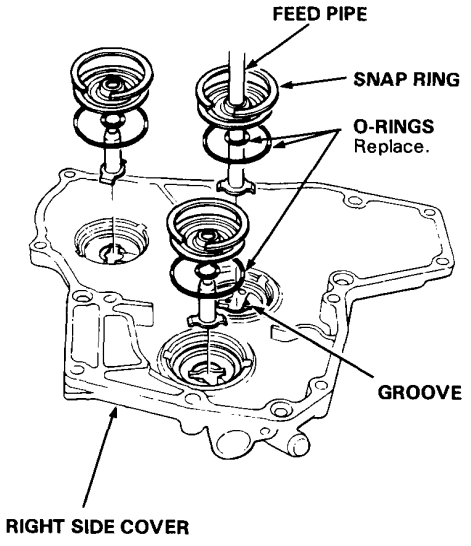
   - The snap ring is seated in the bearing and housing grooves.
   - The snap ring operates properly.
   - The ring end gap is correct.



Right Side Cover

Feed Pipe Installation

1. Install the feed pipes in the right side cover with new O-rings, aligning the lugs with the grooves in the right side over.
2. Install the snap rings.

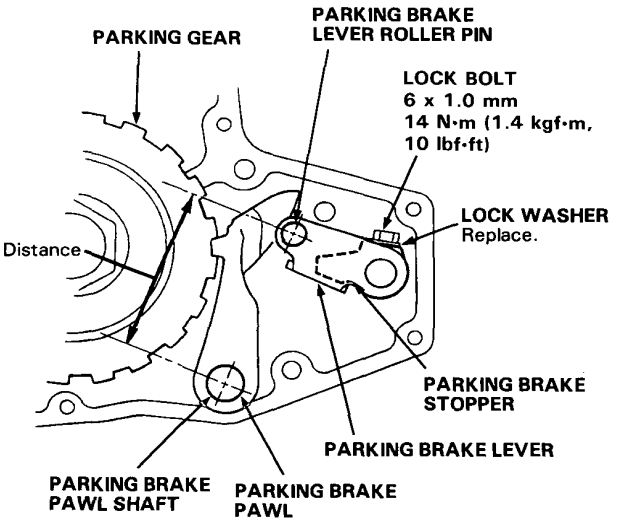


Parking Brake Stopper

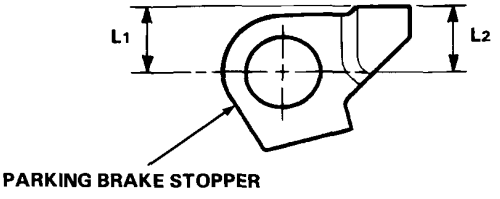
Inspection/Adjustment

1. Set the parking brake lever in the [P] position.
2. Measure the distance between the parking brake pawl shaft and the parking brake lever roller pin as shown.

   STANDARD: 64.5—65.5 mm (2.54—2.58 in)



3. If the measurement is out of tolerance, select and install the appropriate parking brake stopper from the table below.



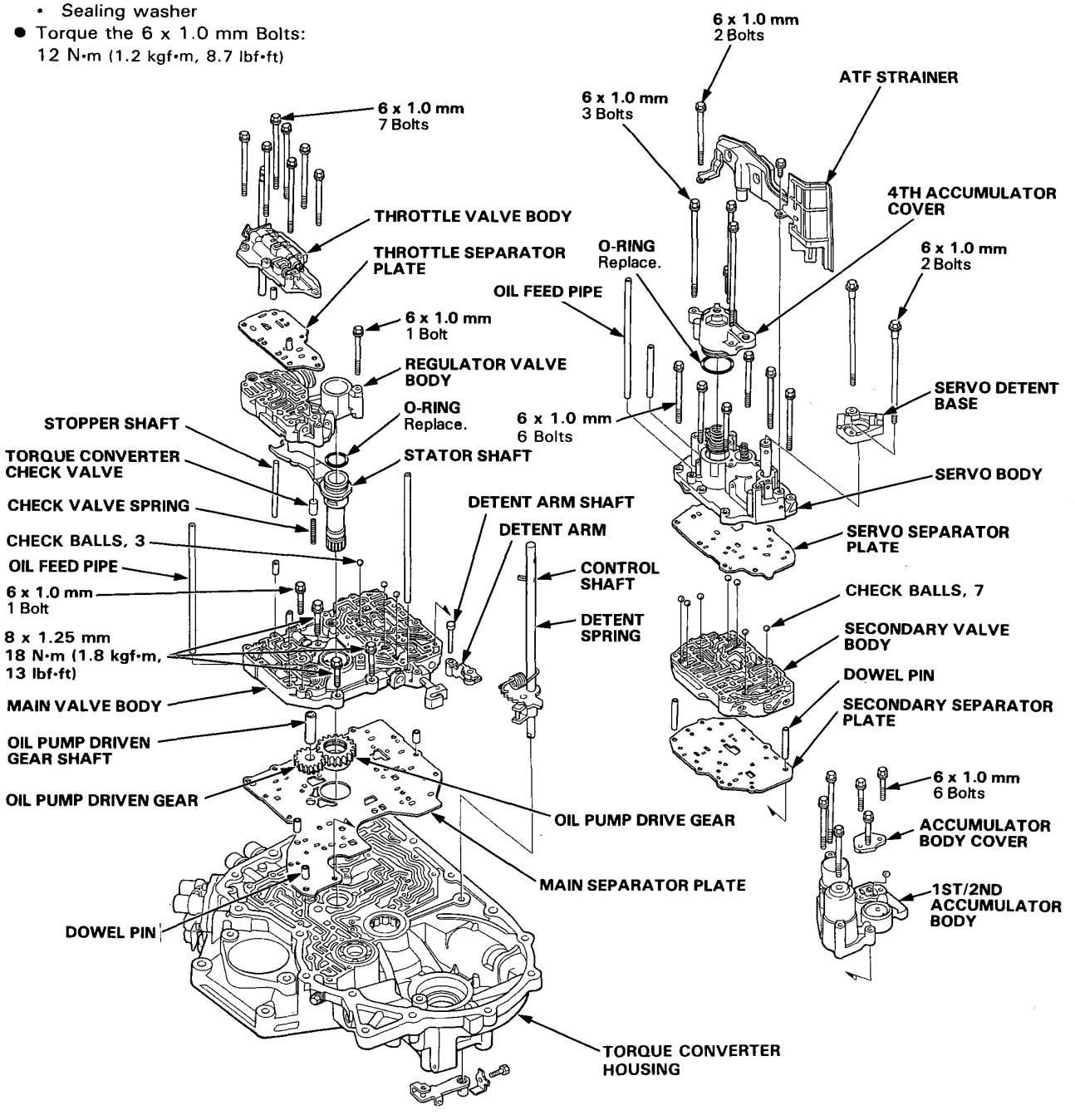
PARKING BRAKE STOPPER

Mark	Part Number	L_1	L_2
1	24537—PA9—003	11.00 mm (0.433 in)	11.00 mm (0.433 in)
2	24538—PA9—003	10.80 mm (0.425 in)	10.65 mm (0.419 in)
3	24539—PA9—003	10.60 mm (0.417 in)	10.30 mm (0.406 in)

4. After replacing the parking brake stopper, make sure the distance is within tolerance.

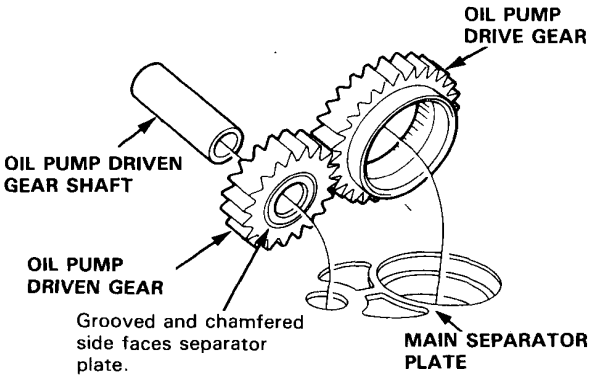
Reassembly

NOTE:
- Coat all parts with ATF.
- Replace the following parts:
  - O-rings
  - Lock washers
  - Gaskets
  - Locknuts and conical spring washers
  - Sealing washer
- Torque the 6 x 1.0 mm Bolts:
  12 N·m (1.2 kgf·m, 8.7 lbf·ft)



1. Install the main separator plate and the three dowel pins on the torque converter housing. Then install the oil pump gears and oil pump driven gear shaft.

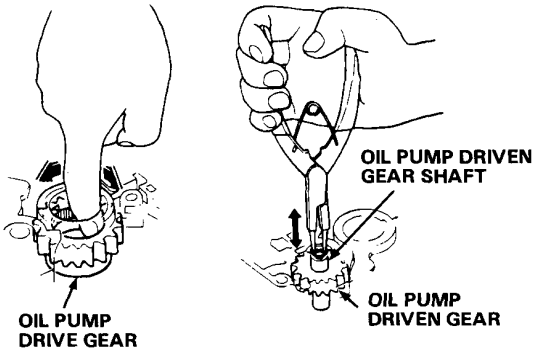
   NOTE: Install the oil pump driven gear with its grooved and chamfered side facing down.



2. Install the main valve body with four bolts. Make sure the oil pump drive gear rotates smoothly in the normal operating direction, and the oil pump driven gear shaft moves smoothly in the axial and normal operating directions.

3. If the oil pump drive gear and oil pump driven gear shaft do not move freely, loosen the main valve body bolts; realign the oil pump driven gear shaft, and then retighten to the specified torque.

   CAUTION: *Failure to align the oil pump driven gear* shaft correctly will result in a seized oil pump drive gear or oil pump driven gear shaft.



4. Install the stator shaft and stopper shaft.

5. Install the two dowel pins, torque converter check valve and torque converter check valve spring in the main valve body.

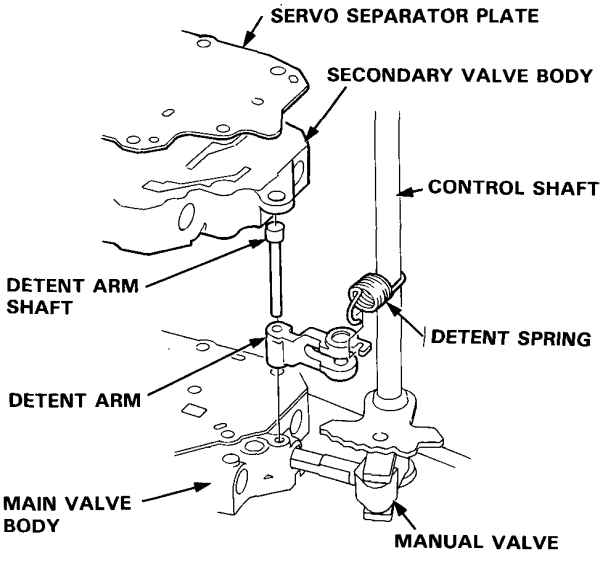
6. Install the regulator valve body with the bolt on the main valve body.

7. Install the two dowel pins and separator plate on the regulator valve body, then install the throttle valve body (seven bolts).

8. Install the secondary separator plate with two dowel pins on the main valve body.

9. Install the control shaft in the housing with the control shaft and manual valve together.

10. Install the detent arm and arm shaft in the main valve body, then hook the detent spring to the detent arm.



11. Install the secondary valve body, servo separator plate and servo body (six bolts).

12. Install the oil feed pipe in the servo body, then install the 4th accumulator cover (three bolts).

13. Install the ATF strainer (two bolts).

14. Install the servo detent base (two bolts).

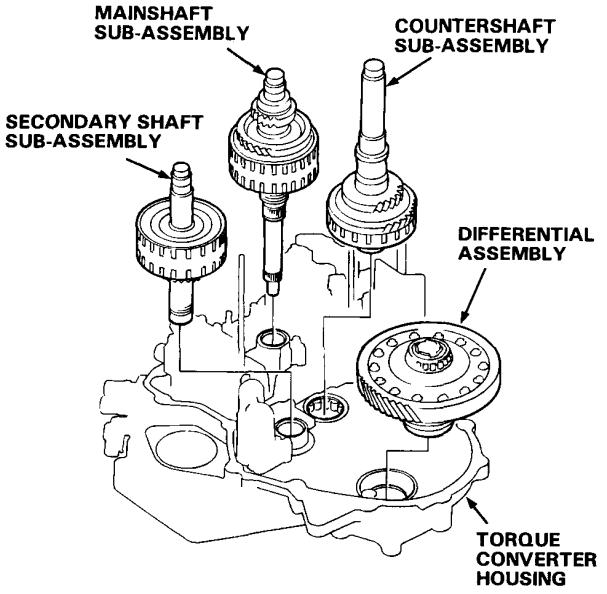
15. Install the 1st/2nd accumulator body (six bolts).

16. Install two oil feed pipes in the main valve body and the oil feed pipe in the servo body.

(cont'd)

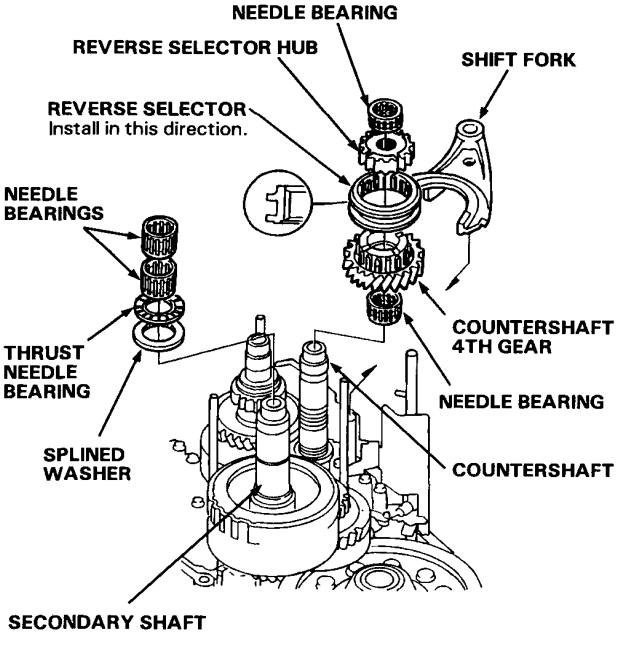
Reassembly (cont'd)

17. Install the differential assembly, countershaft sub-assembly, mainshaft sub-assembly, and secondary shaft sub-assembly in the torque converter housing.

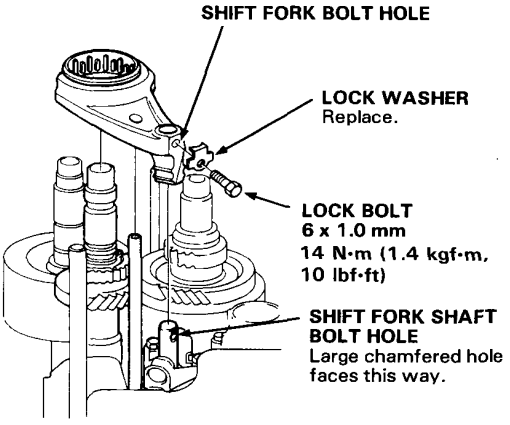


18. Install the splined washer, thrust needle bearing and needle bearings on the secondary shaft.

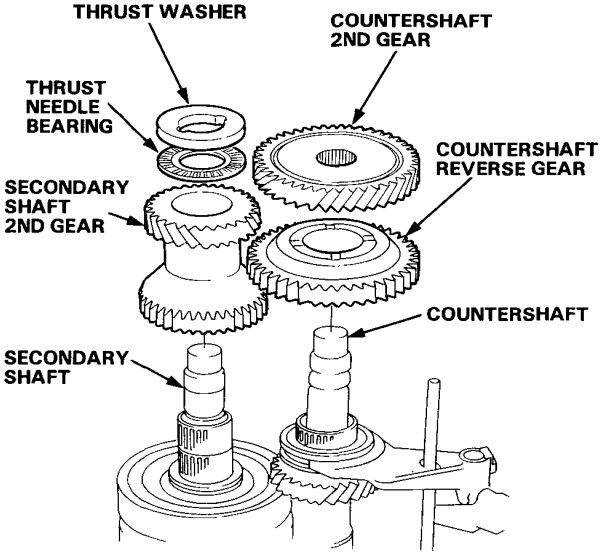
19. Install the needle bearings, countershaft 4th gear, reverse selector hub, and reverse selector with the shift fork on the countershaft.



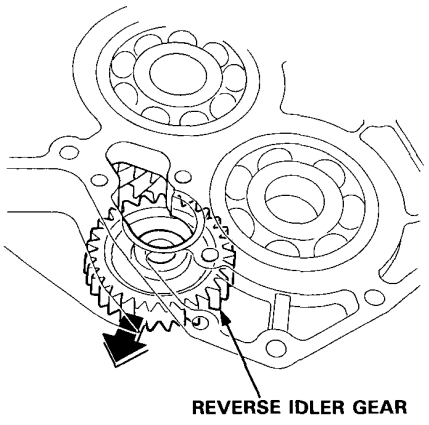
20. Turn the shift fork shaft so the large chamfered hole is facing the fork bolt hole. Then install the shift fork and the lock bolt with a new lock washer, and torque. Bend the lock tab against the bolt head.



21. Install the secondary shaft 2nd gear, thrust needle bearing and thrust washer on the secondary shaft. Install the countershaft reverse gear and 2nd gear on the countershaft as shown.



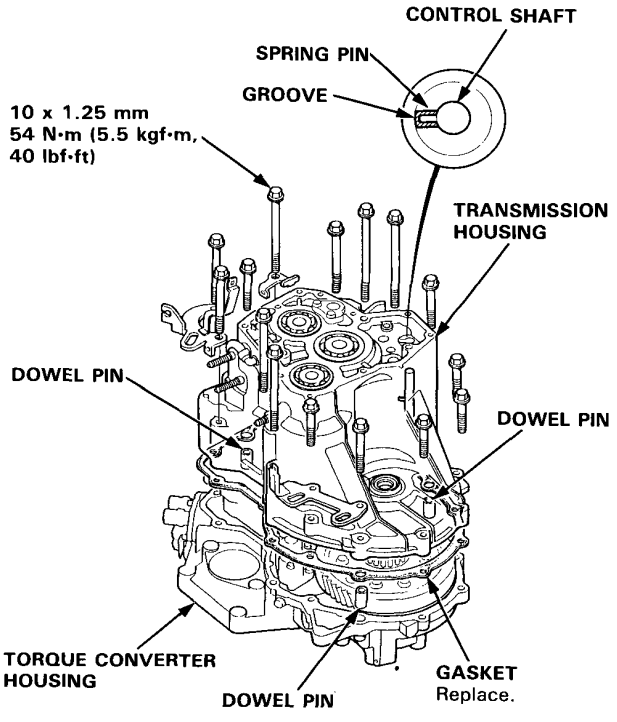
22. Install the reverse idler gear into the transmission housing, then slip it the direction as shown.



23. Align the spring pin of the control shaft with the transmission housing groove by turning the control shaft.

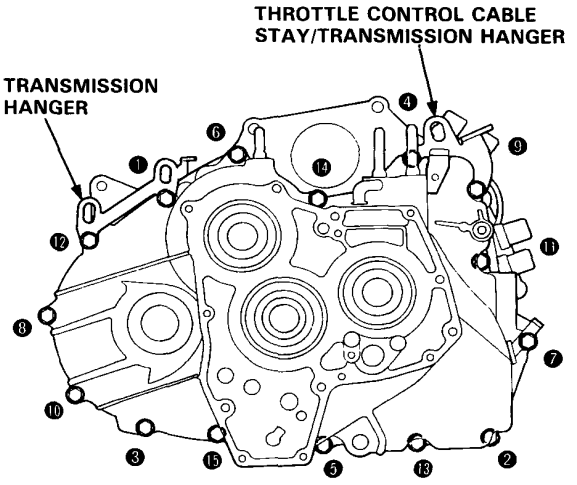
24. Install three dowel pins and a new gasket on the torque converter housing.

25. Place the transmission housing on the torque converter housing.

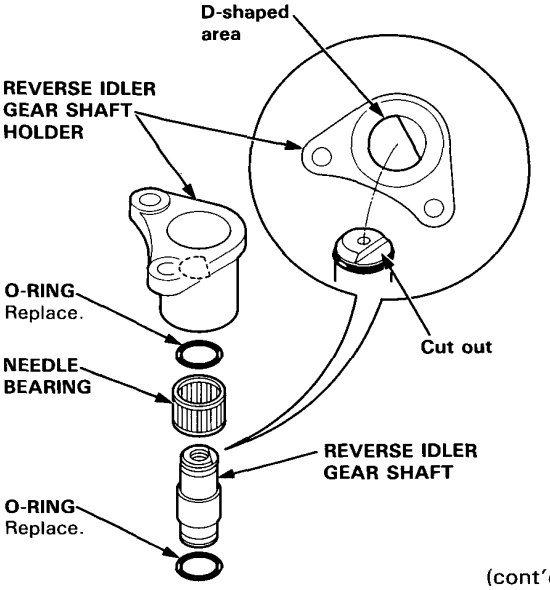


26. Install the transmission housing bolts along with the transmission hanger, throttle control cable stay/ transmission hanger and harness stay. Torque the bolts in two or more steps in the sequence shown.

TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)



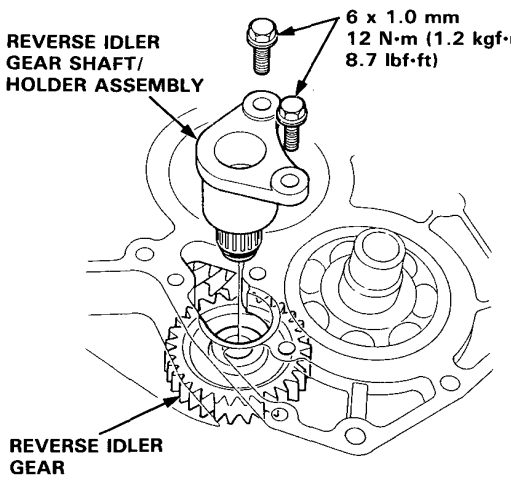
27. Coat the reverse idler gear shaft, needle bearing and new O-rings with lithium grease lightly.
Assemble new O-rings and needle bearing on the reverse idler gear shaft, then install the reverse idler gear shaft in the reverse idler gear shaft holder, aligning the D-shaped cut out of the shaft with the D-shaped area of the holder.



(cont'd)

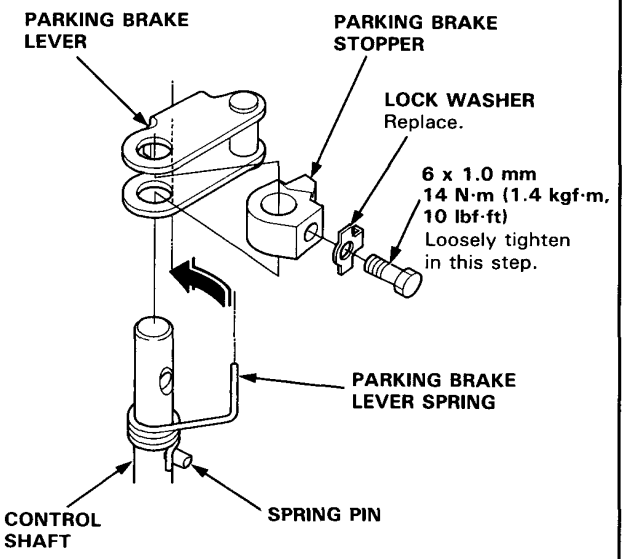
Reassembly (cont'd)

28. Engage the reverse idler gear to the countershaft and mainshaft reverse gears, then install the reverse idler gear shaft/holder assembly on the transmission housing.

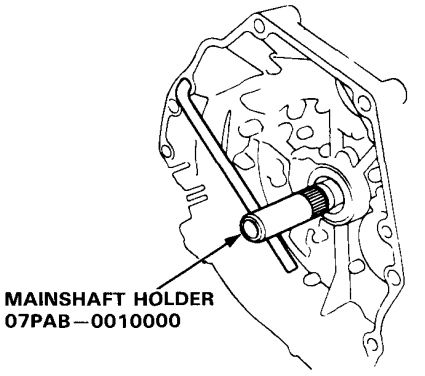


29. Install the parking brake lever on the control shaft, then install the lock bolt loosely with a new lock washer.

NOTE: Do not tighten the lock bolt to the specified torque and bend the lock tab in this step.



30. Slip the special tool onto the mainshaft.



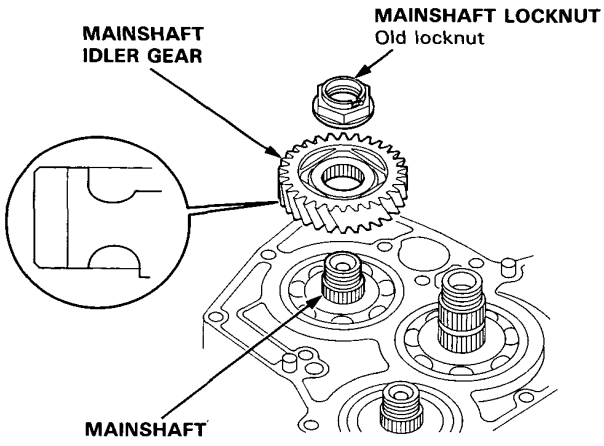
31. Lubricate the following parts with ATF:
    - Splines and threads of each shaft.
    - Threads of the old locknuts.
    - Splines of the mainshaft and countershaft idler gears.
    - Splines of the parking gear.

32. Install the mainshaft idler gear.

33. Install the old locknut on the mainshaft to seat the idler gear.

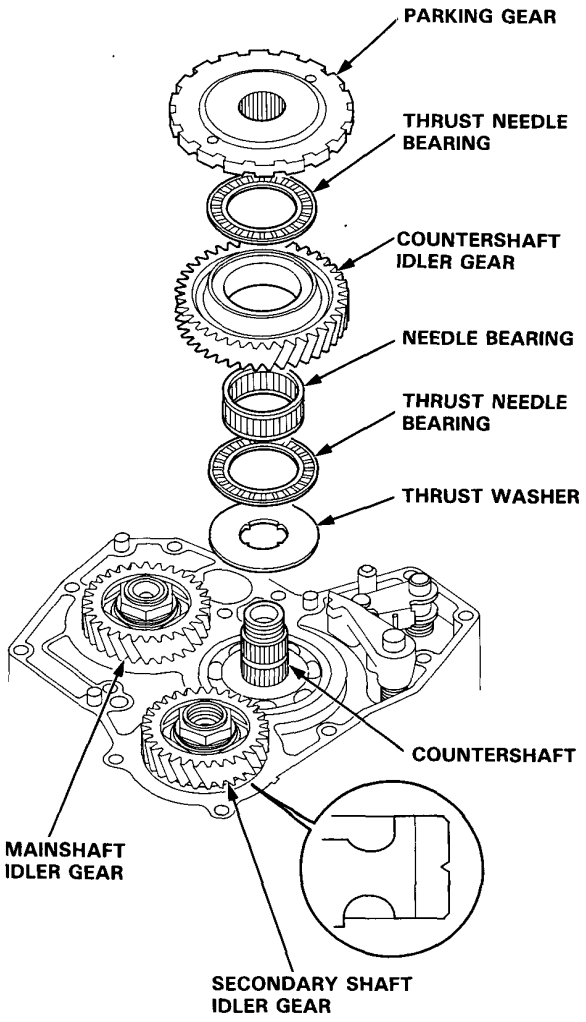
NOTE:
- The mainshaft locknut has left-hand threads.
- Do not drive the idler gear on with a hammer.
- Do not use a impact wrench, always use a torque wrench to tighten the locknut.

TORQUE: 226 N·m (23.0 kgf·m, 166 lbf·ft)



34. Install the secondary shaft idler gear on the secondary shaft.

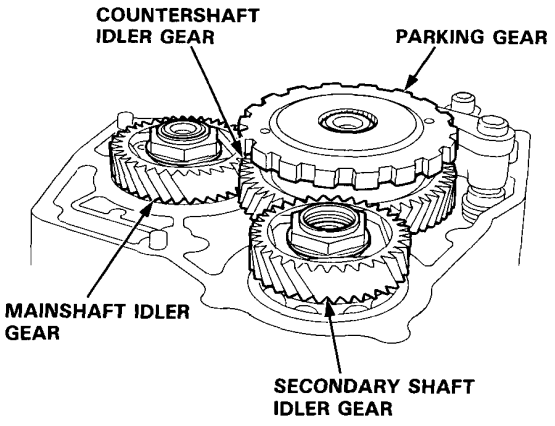
35. Install the thrust washer, thrust needle bearing, needle bearing, countershaft idler gear and parking gear on the countershaft.



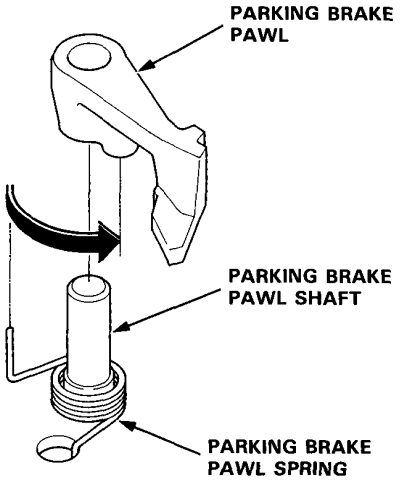
36. Install the old locknut on the secondary shaft. Tighten the old locknut to seat the secondary shaft idler gear while holding the countershaft idler gear.

NOTE:
- Do not drive the idler gear on with a hammer.
- Do not use a impact wrench, always use a torque wrench to tighten the locknut.

TORQUE: 226 N·m (23.0 kgf·m, 166 lbf·ft)



37. Install the parking brake pawl shaft and spring in the transmission housing, then install the parking brake pawl.



(cont'd)

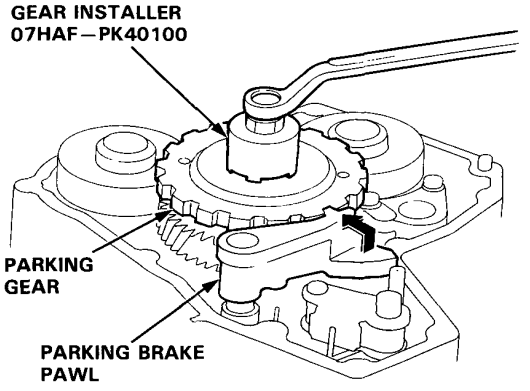
Reassembly (cont'd)

38. Install the special tool on the parking gear, and engage the parking brake pawl with the parking gear by moving up the parking brake pawl.

    CAUTION: Keep all of the particles of the transmission when installing the special tool.

39. Tighten the special tool and lightly seat the parking gear.

    NOTE: Do not drive the parking gear on with a hammer.



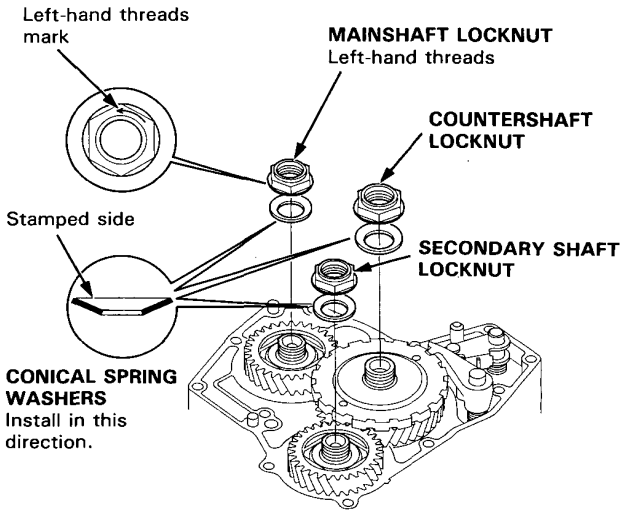
40. Remove the special tool.
41. Use the old locknut to tighten the press fit parking gear to the specified torque, then loosen it.

    NOTE: Do not use a impact wrench, always use a torque wrench to tighten the locknut.

    TORQUE: 226 N·m (23.0 kgf·m, 166 lbf·ft)

42. Remove the old locknut, then install new conical spring washers and new locknuts on each shaft.

    CAUTION: Install the conical spring washers in the direction shown.

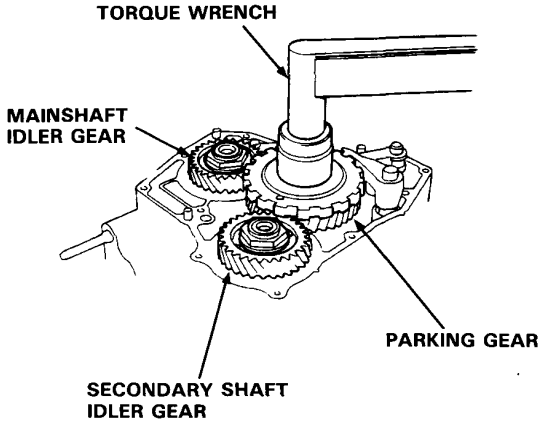


43. Tighten the locknuts to specified torque using a torque wrench.

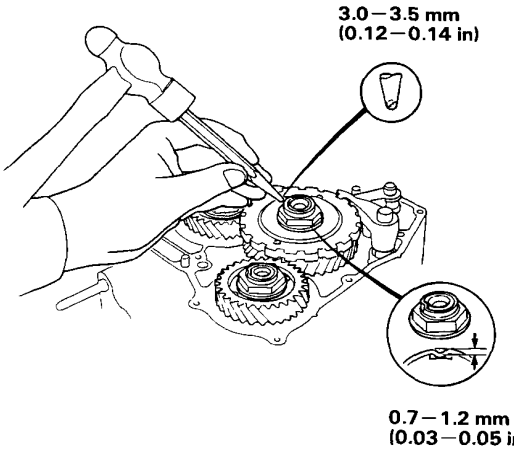
    NOTE: Do not use a impact wrench, always use a torque wrench to tighten the locknuts.

    TORQUE: 167 N·m (17. 0 kgf·m, 123 lbf·ft)

    NOTE: The mainshaft locknut has left-hand threads.



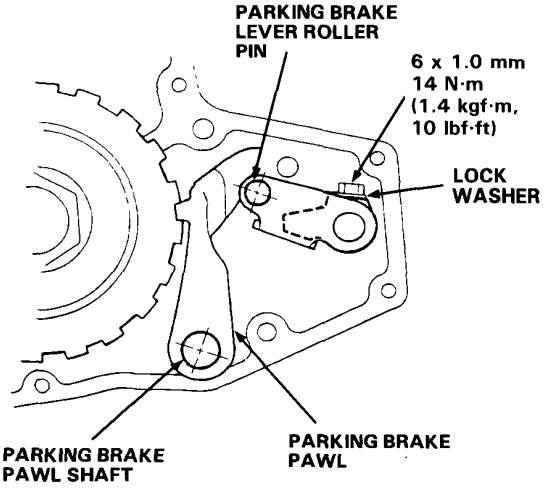
44. Stake each locknut into its shaft using a 3.5 mm punch.



45. Set the parking brake lever in the [P] position, then verify that the parking brake pawl engages the parking gear.

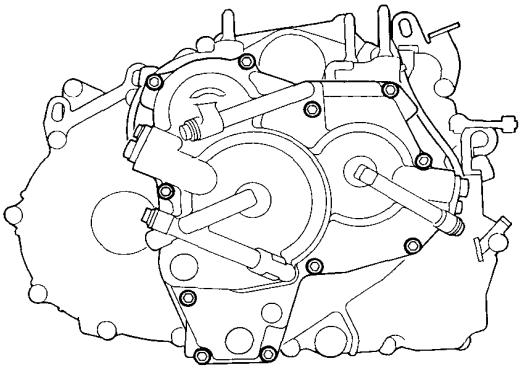
46. If the pawl does not engage fully, check the parking brake pawl stopper clearance as described on page 14-147.

47. Tighten the bolt, and bend the lock tab against the bolt head.

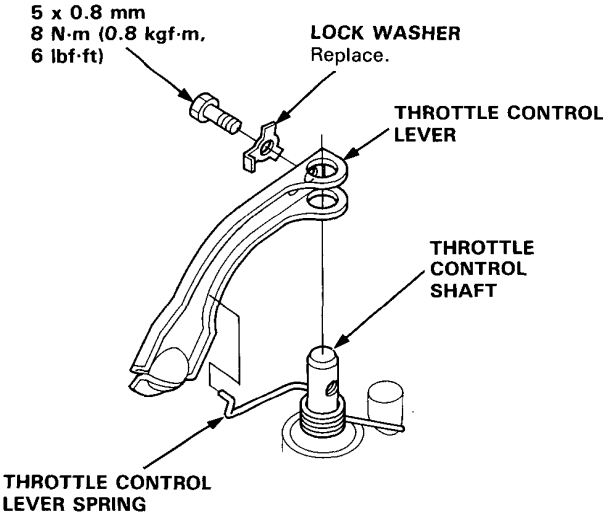


48. Install the right side cover.

TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)



49. Install the throttle control lever and spring on the throttle control shaft.



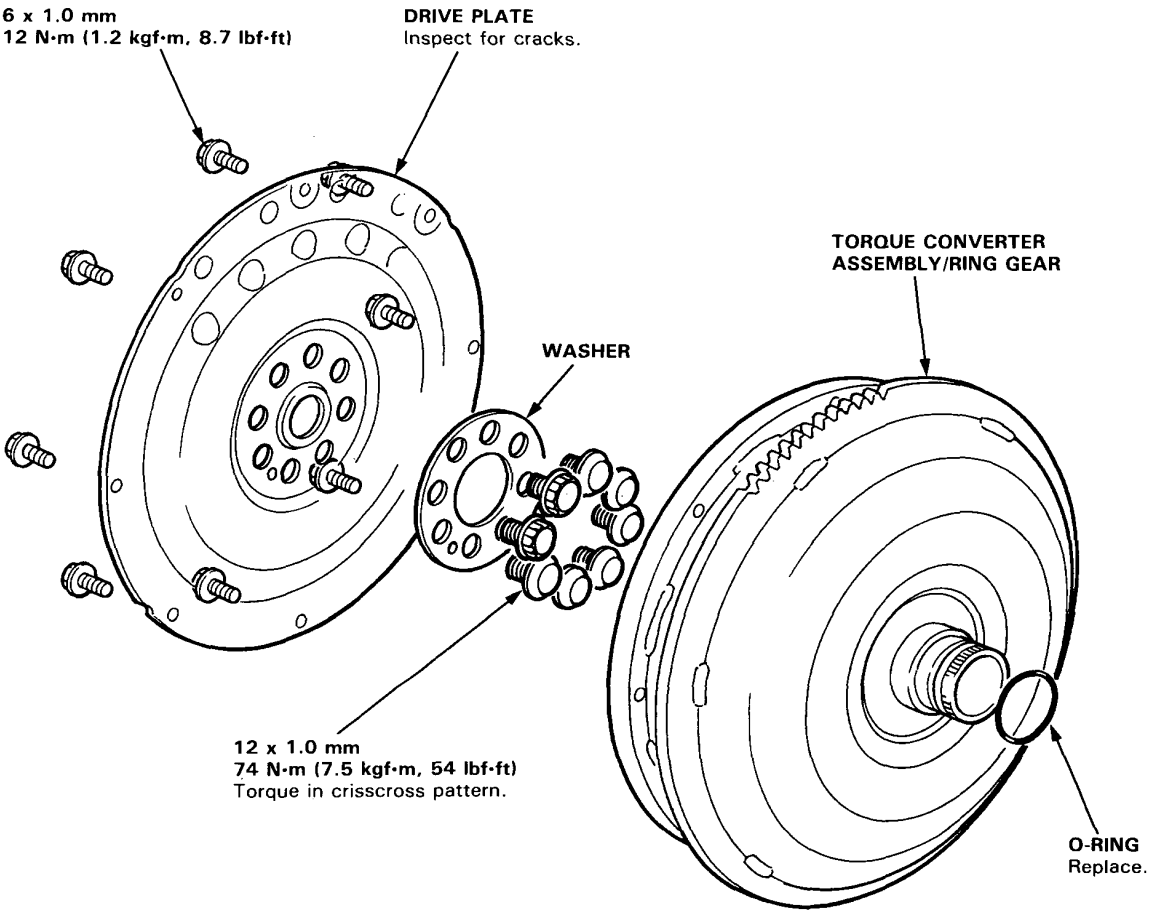
50. Install the ATF cooler pipes with new sealing washers.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

51. Install the ATF level gauge.

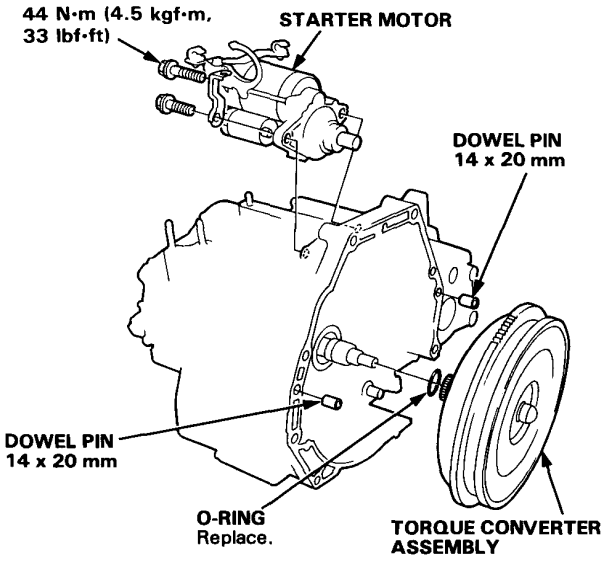
Torque Converter

Disassembly



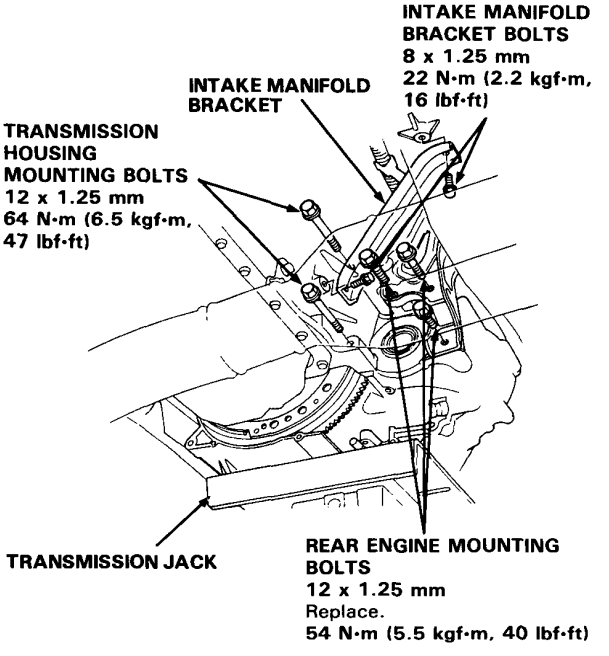
Installation

1. Install the starter motor on the torque converter housing, and install the two 14 x 20 mm dowel pins in the torque converter housing.

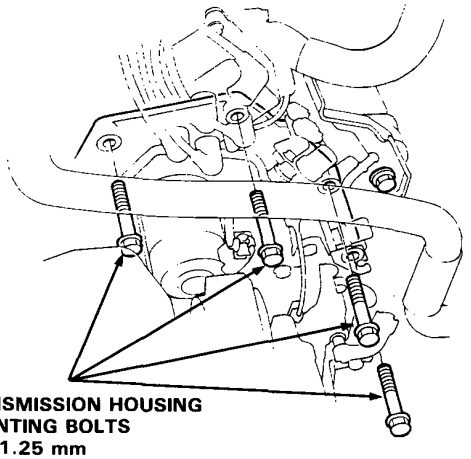


2. Place the transmission on a jack, and raise to the engine assembly level.

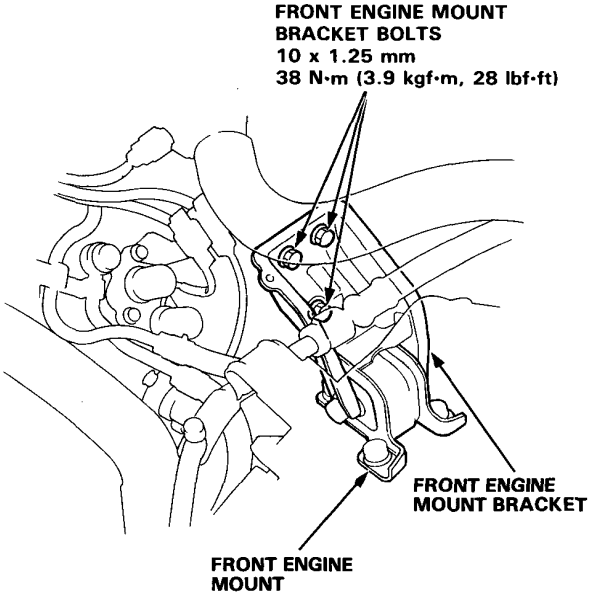
3. Attach the transmission on the engine, then install the transmission housing mounting bolts, rear engine mounting bolts and intake manifold bracket bolts.



4. Install the transmission housing mounting bolts.



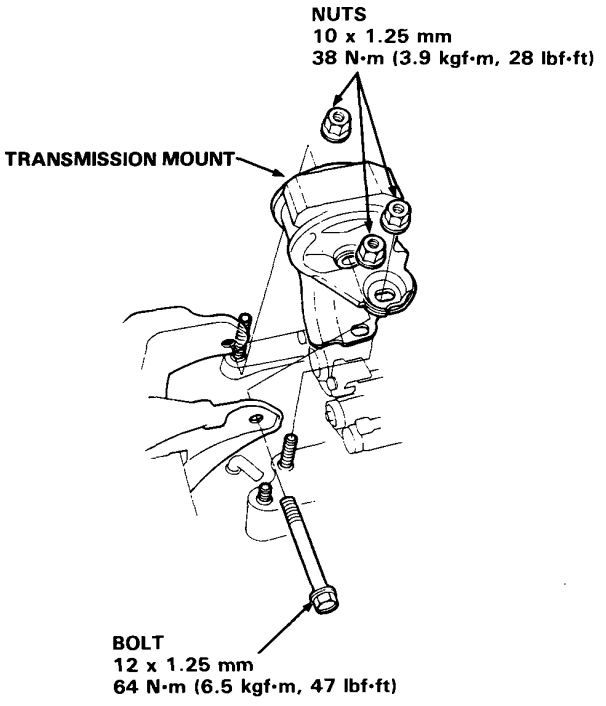
5. Tighten the front engine mount bracket bolts to specified torque.



(cont'd)

Installation (cont'd)

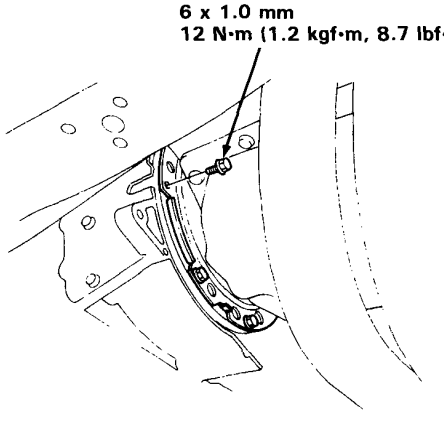
6. Install the transmission mount. Tighten the bolt, then tighten the nuts to specified torque, and retighten the bolt to specified torque.



7. Remove the transmission jack.

8. Attach the torque converter to the drive plate with eight bolts and torque:
   Rotate the crankshaft as necessary to tighten the bolts to 1/2 of the specified torque, then to the final torque, in a crisscross pattern.
   After tightening the last bolt, check that the crankshaft rotates freely.

   TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

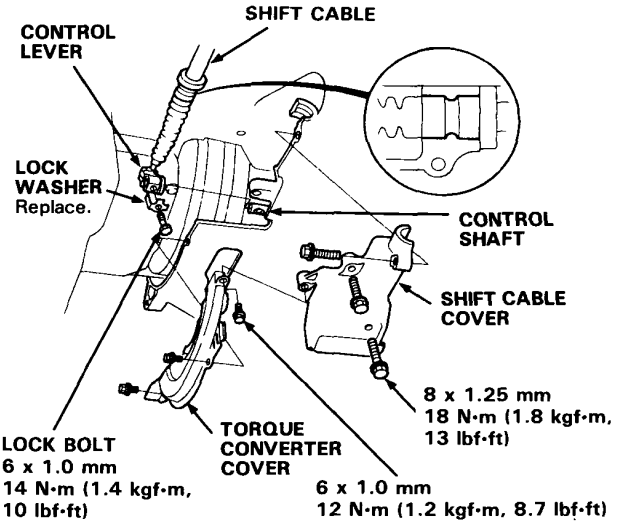


9. Install the control lever with the shift cable on the control shaft.

   CAUTION: Take care not to bend the shift cable.

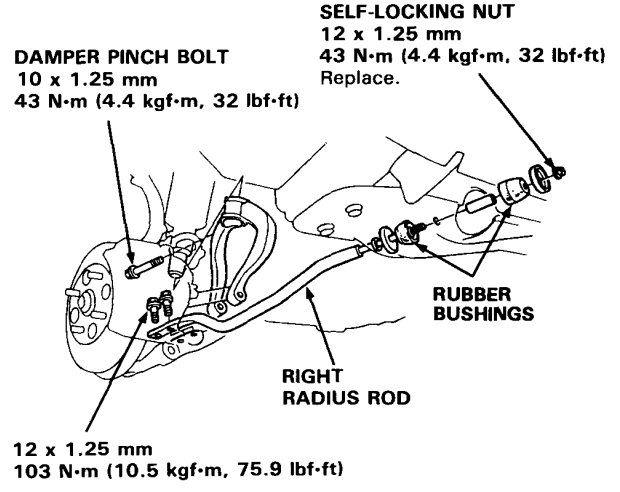
10. Install the lock bolt with a new lock washer, then bend the lock tab.

11. Install the torque converter cover and shift cable cover.



12. Install the right radius rod and damper fork.

    NOTE: Check radius rod rubber bushings for deterioration and damage.

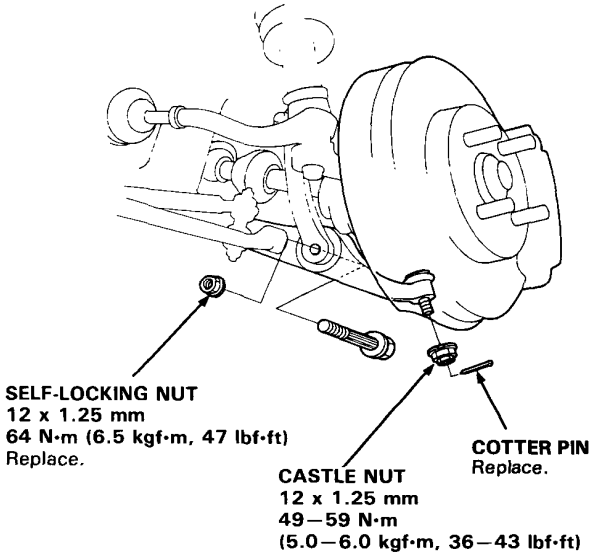


13. Install new set rings on the end of the driveshafts.

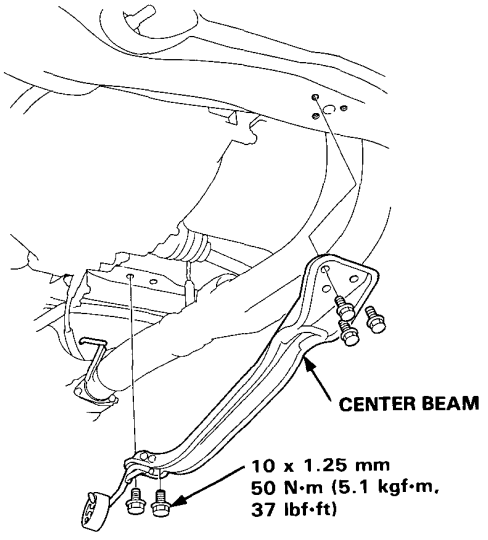
14. Install the right and left driveshafts.

    NOTE: Turn the right and left steering knuckles fully outward, and slide the inner CV joints into the differential until you feel the set ring engage the side gear.

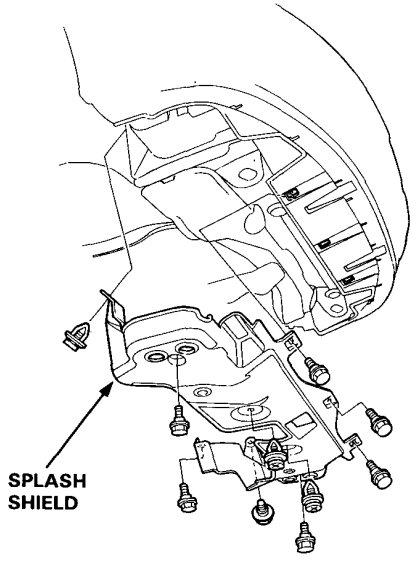
15. Install the damper fork to the lower arm. Then install the ball joint to the lower arm. Use the castle nuts with new cotter pins.



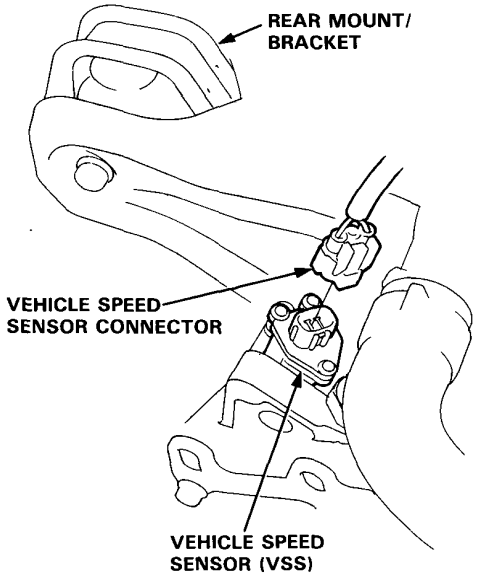
16. Install the center beam.



17. Install the splash shield.



18. Connect the vehicle speed sensor connector.



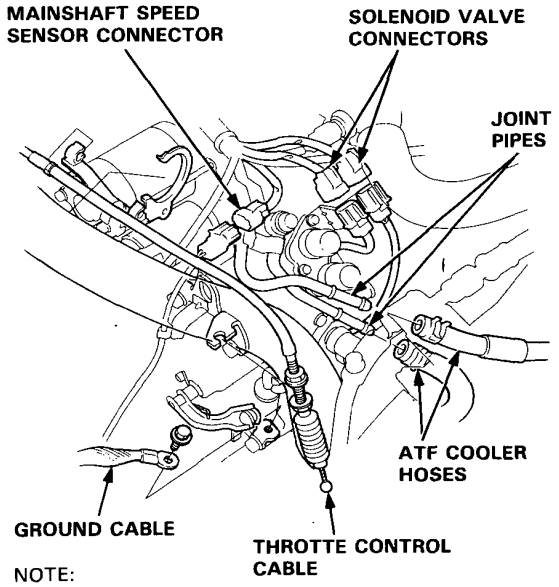
(cont'd)

Installation (cont'd)

19. Connect the ATF cooler hoses to the joint pipes (see page 14-165).

20. Connect the lock-up control solenoid and shift control solenoid valve connectors, and the throttle control cable.

21. Connect the mainshaft speed sensor connector.

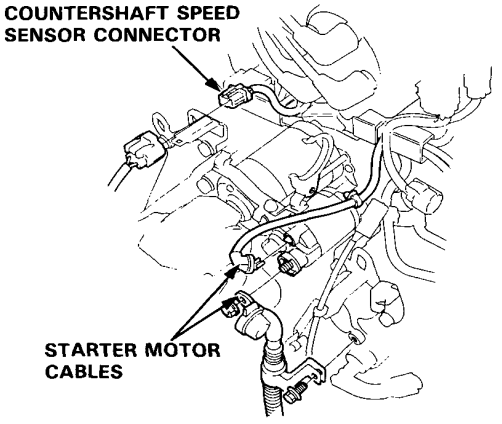


NOTE:
Install the ground cable in step 25.

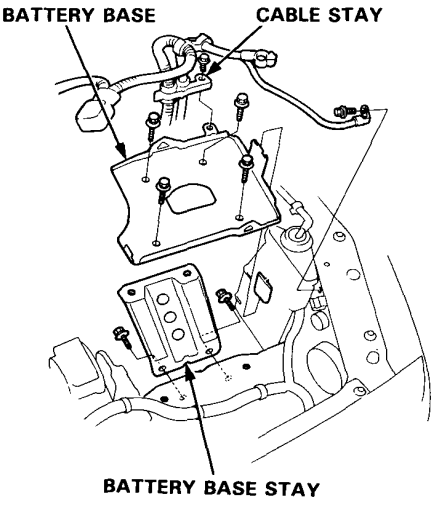
22. Connect the countershaft speed sensor connector.

23. Connect the starter motor cables.

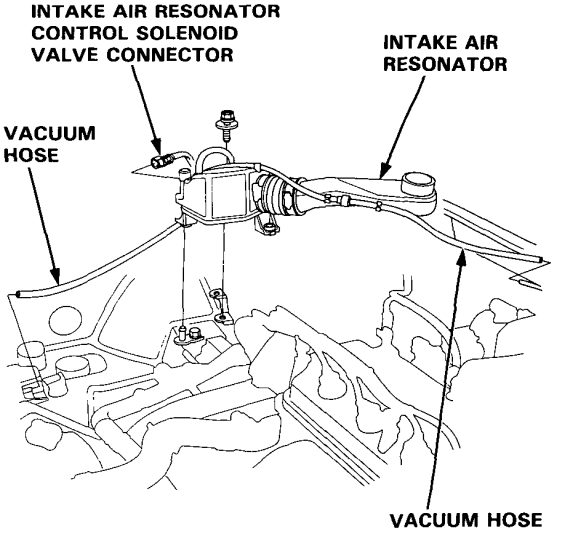
NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out (see section 23).



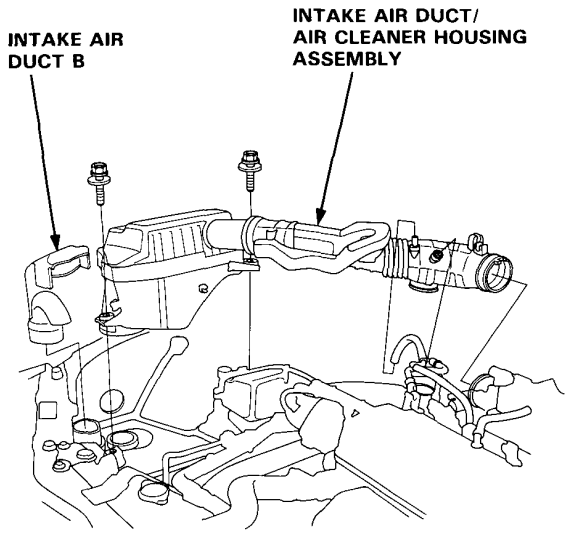
24. Install the battery base and base stay, then install the cable stay on the battery base.



25. Install the intake air resonator, then connect the vacuum hoses and the intake air resonator control solenoid valve connector (F22B1 and F22B5 engines).



26. Install the intake air duct/air cleaner housing assembly and intake air duct B.



27. Refill the transmission with ATF (see page 14-95).

28. Connect the battery positive (+) and negative (−) cables to the battery.

29. Start the engine. Set the parking brake, and shift the transmission through all gears three times.

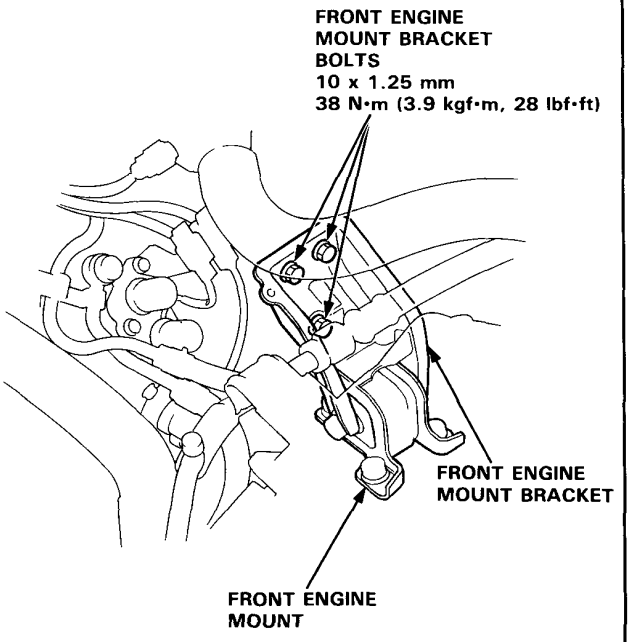
30. Check the throttle control cable adjustment as described on page 14-164.

31. Check and adjust the front wheel alignment (see section 18).

32. Let the engine reach operating temperature (the radiator fan comes on) with the transmission in [N] or [P] position, then turn it off and check fluid level.

33. Road test as described on pages 14-90 thru 14-92.

34. Loosen the front engine mount bracket bolts after the road test, and retighten them to specified torque.



Shift Cable

Removal/Installation

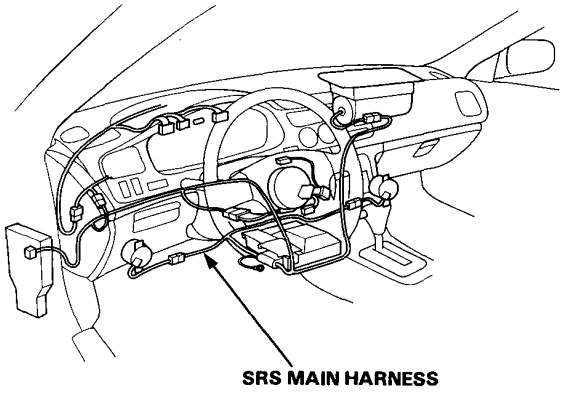
⚠ WARNING

- **Make sure lifts, jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).**
- **Apply parking brake and block rear wheels so car will not roll off stands and fall on you while working under it.**

CAUTION:

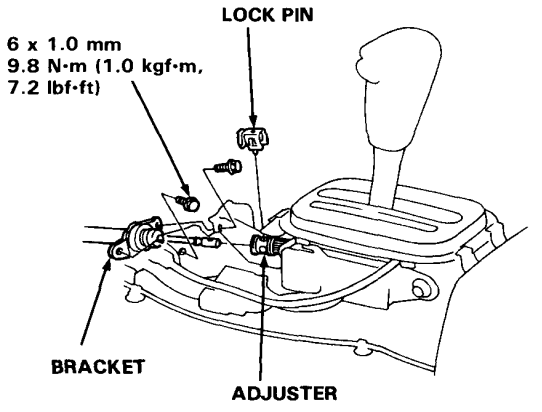
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

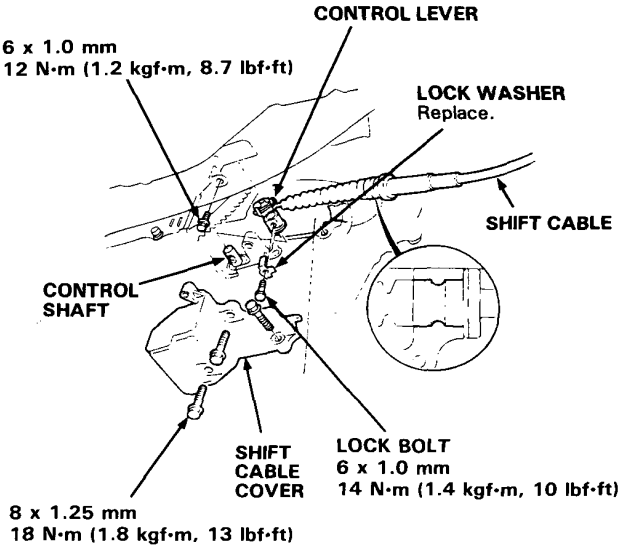


1. Remove the front console (see section 20).
2. Shift to [N] position, then remove the lock pin from the cable adjuster.
3. Remove the bolts securing the bracket.

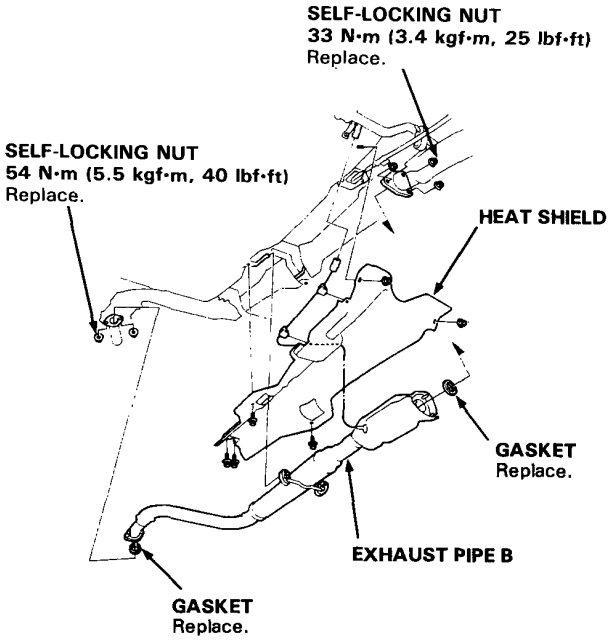
   NOTE: LHD is shown; RHD is similar.



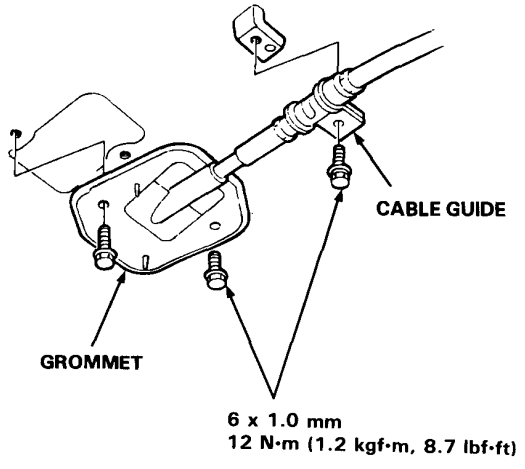
4. Remove the shift cable cover.
5. Remove the lock bolt securing the control lever, then remove the control lever with the shift cable.



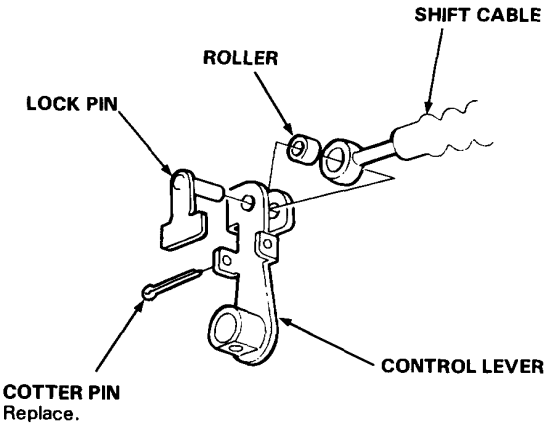
6. Remove the exhaust pipe B and heat shield.



7. Remove the cable guide and grommet.



8. Remove the cotter pin and lock pin, then separate the control lever from the shift cable.



9. Install the shift cable in the reverse order of removal.

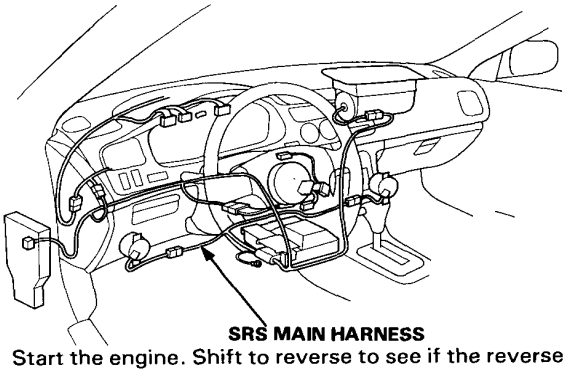
10. Check the cable adjustment after installing the shift cable (see page 14-164).

Shift Cable

Adjustment

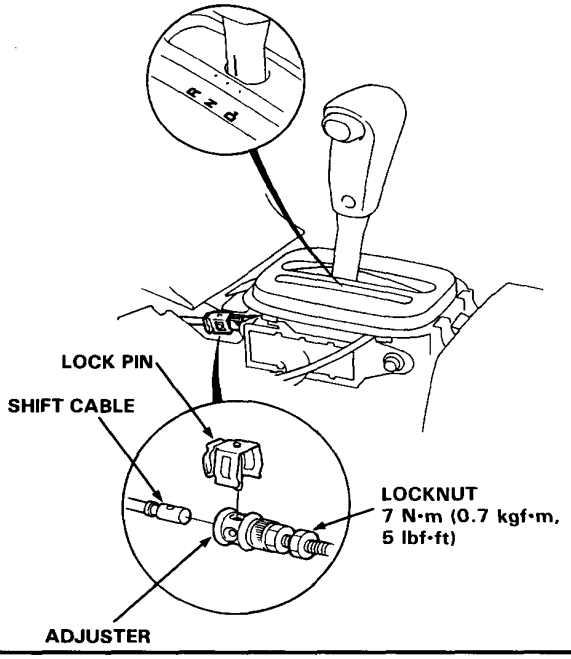
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

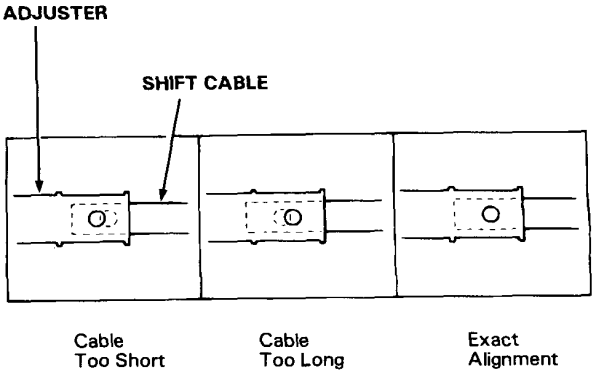


1. Start the engine. Shift to reverse to see if the reverse gear engages. If not, refer to Troubleshooting on page 14-86 thru 89.
2. With the engine off, remove the front console (see section 20).
3. Shift to [N] position, then remove the lock pin from the cable adjuster.

   NOTE: LHD is shown; RHD is similar.



4. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable.



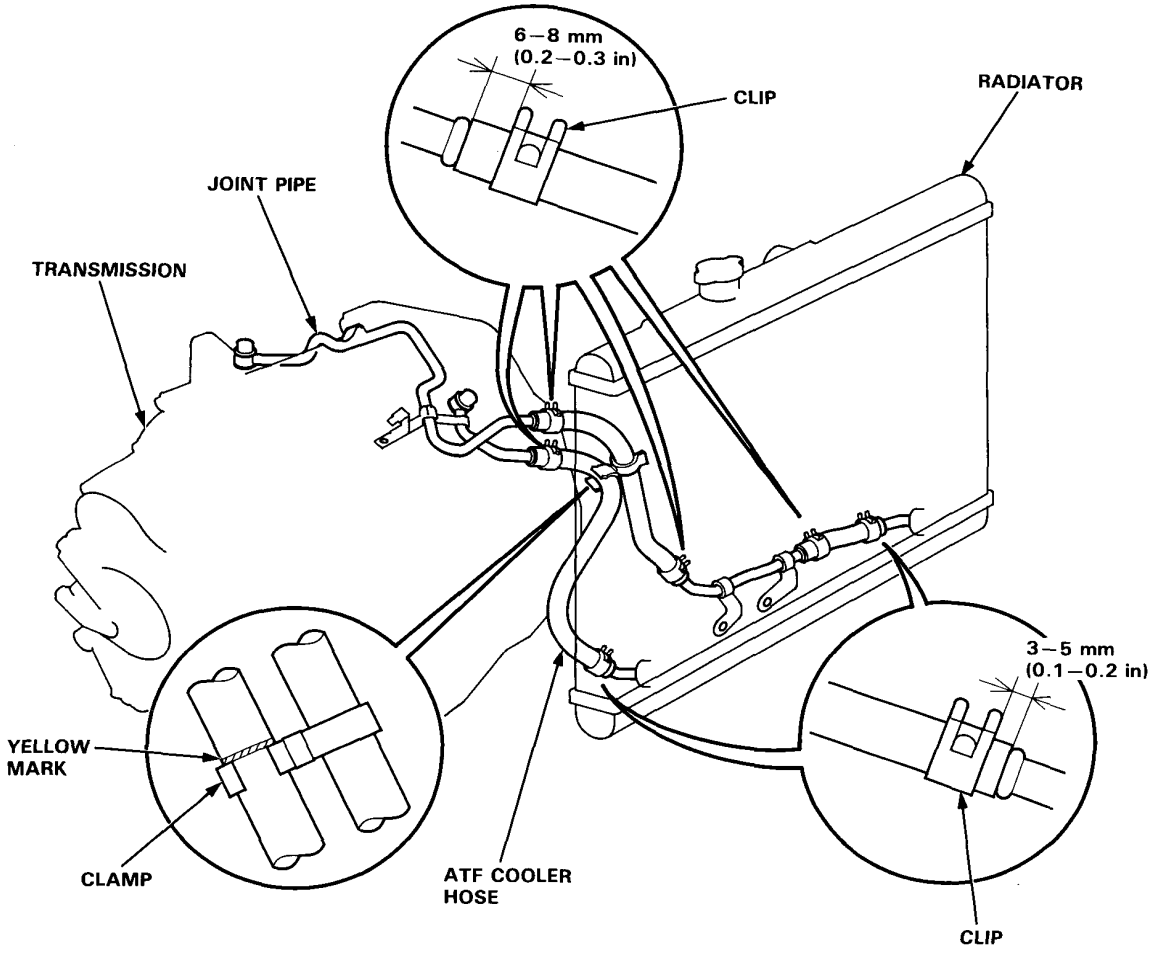
NOTE:
There are two holes in the end of the shift cable. They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.

5. If not perfectly aligned, loosen the locknut on the shift cable, and adjust as required.
6. Tighten the locknut.
7. Install the lock pin on the adjuster. If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.
8. Move the shift lever to each gear, and verify that the A/T gear position indicator follows the A/T gear position switch.
9. Start the engine and check the select lever in all gears. If any gear does not work properly, refer to troubleshooting on page 14-86 thru 89.
10. Insert the ignition key into the key cylinder on the A/T gear position indicator panel, and verify that the shift lock lever is released.

ATF Cooler Hoses

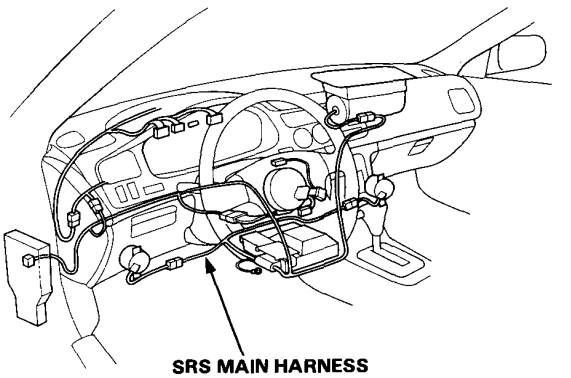
Connection

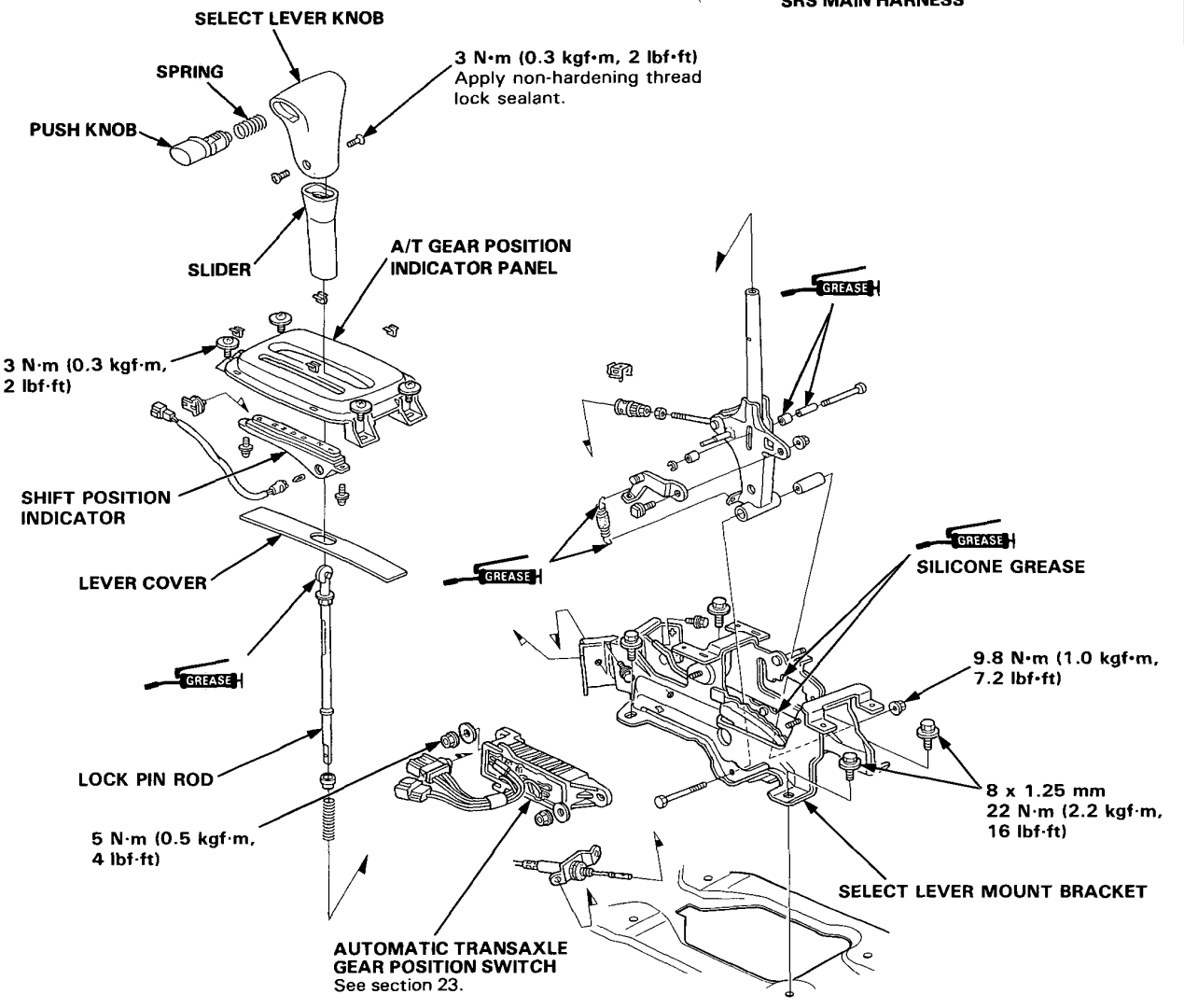
1. Connect the ATF cooler hoses to the joint pipes and ATF cooler, and secure them with the clips as shown.
2. Install the clamp on the yellow mark on the ATF cooler hose, then clamp the other hose as shown.



Gearshift Selector (KG model)

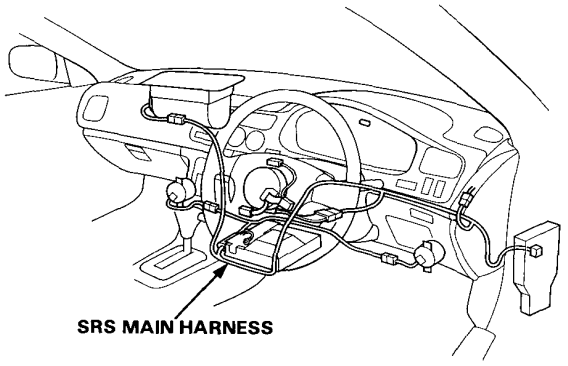
CAUTION:
- All SRS electrical wiring harnesses are covered with yellow insulation.
- Before disconnecting any part of the SRS wire harness, connect the short connectors.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.

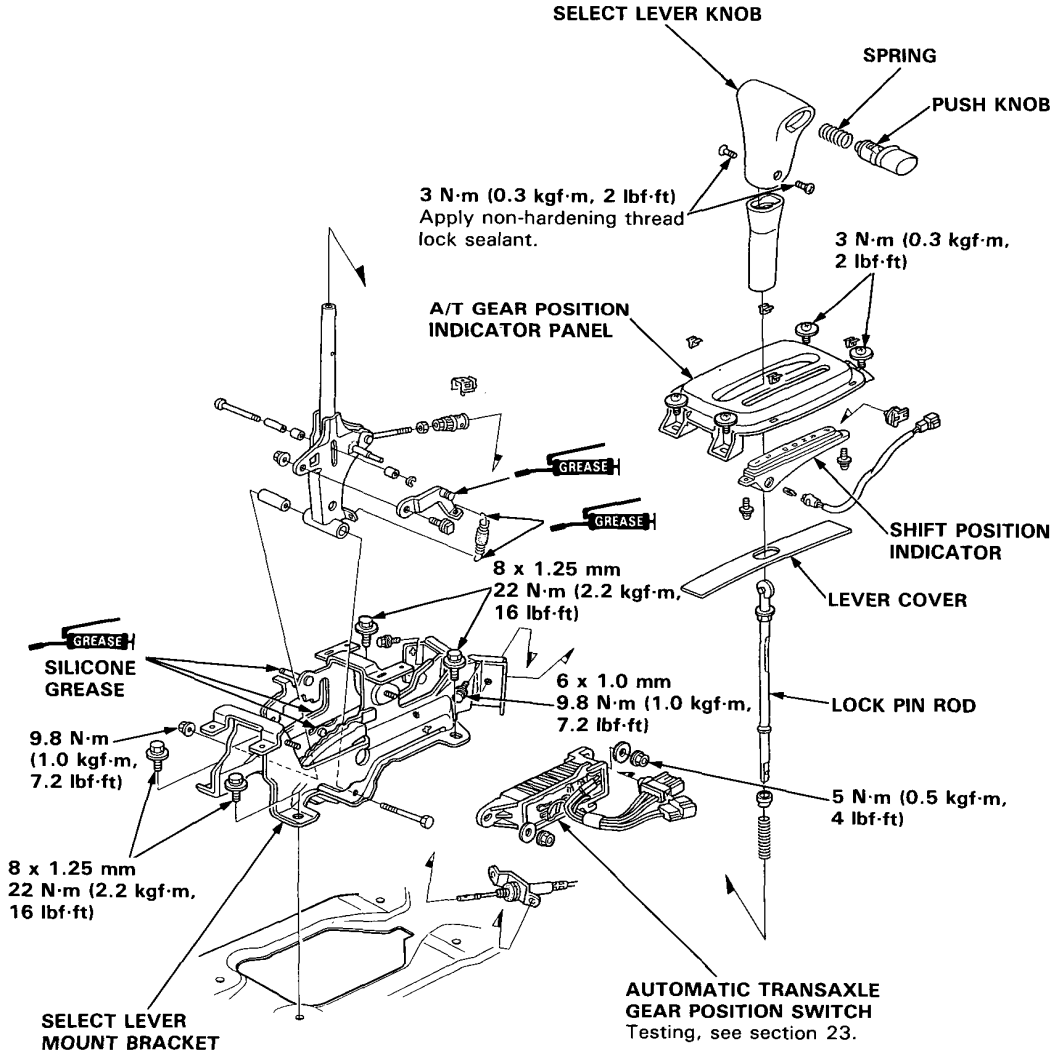




Gearshift Selector (KE model)

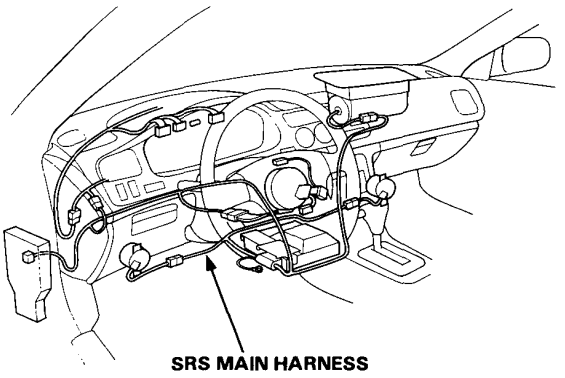
CAUTION:
- All SRS electrical wiring harnesses are covered with yellow insulation.
- Before disconnecting any part of the SRS wire harness, connect the short connectors.
- Replace the entire affected SRS harness assesmbly if it has an open circuit or damaged wiring.

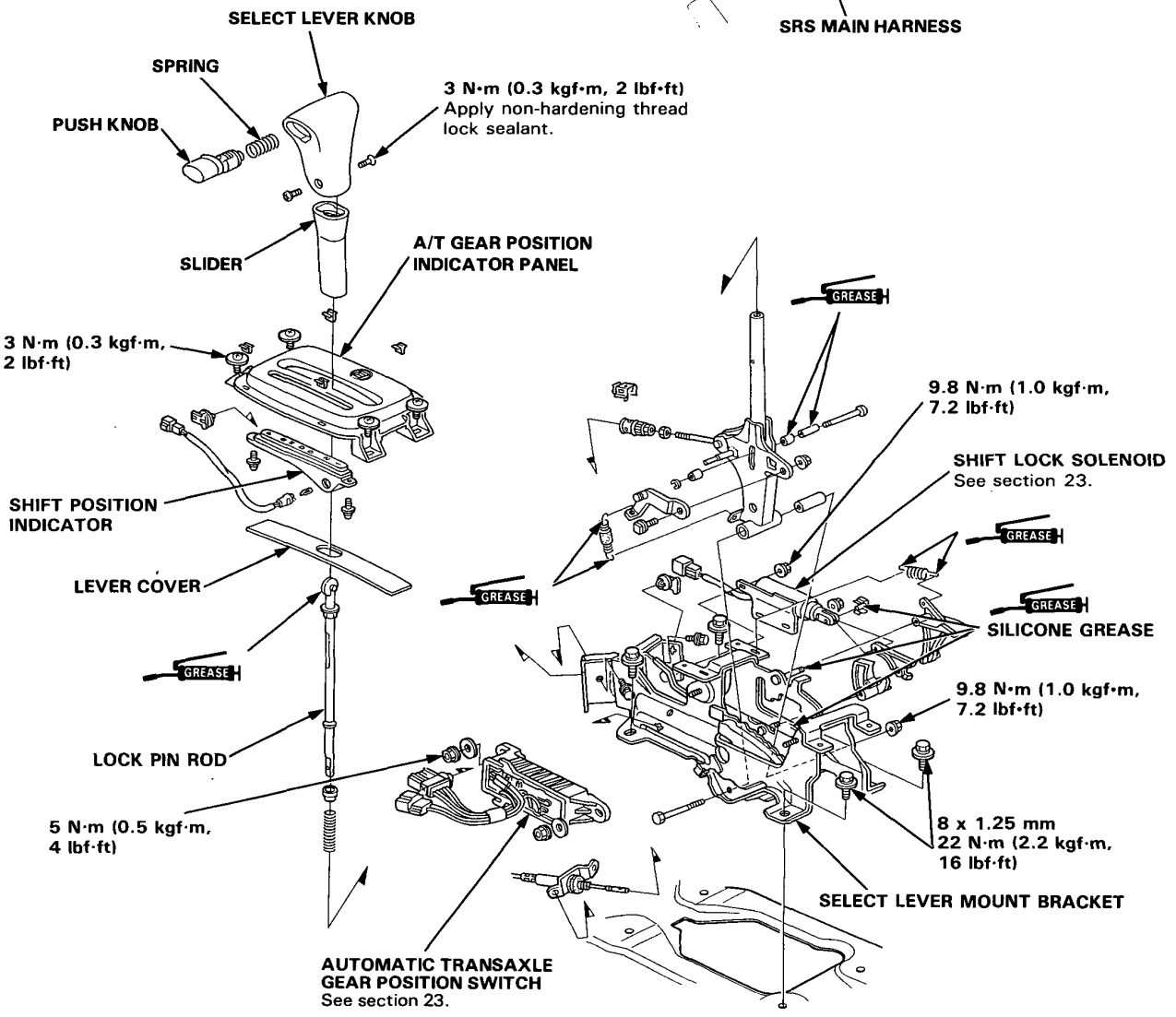




Gearshift Selector (KH model)

CAUTION:
- All SRS electrical wiring harnesses are covered with yellow insulation.
- Before disconnecting any part of the SRS wire harness, connect the short connectors.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.



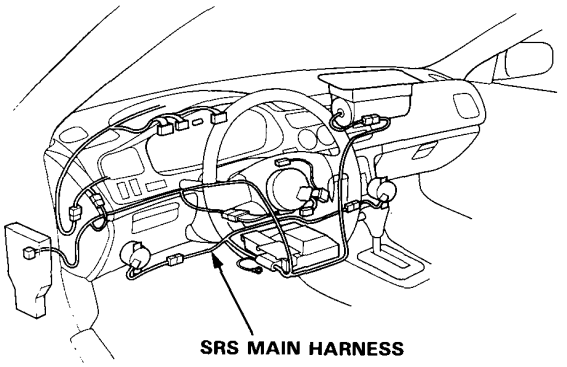


A/T Gear Position Indicator Panel

Adjustment

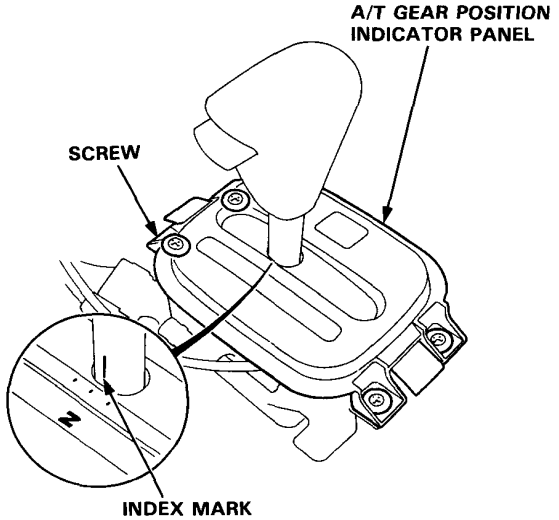
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



1. With the transmission in [N] position, check that the index mark on the indicator aligns with the N mark on the A/T gear position indicator panel when the transmission is in [N] position.
2. If not aligned, remove the front console (see section 20).
3. Remove the A/T gear position indicator panel mounting screws, and adjust by moving the panel.

   NOTE: Whenever the A/T gear position indicator panel is removed, check the panel adjustment as described above.



NOTE: LHD is shown; RHD is similar.

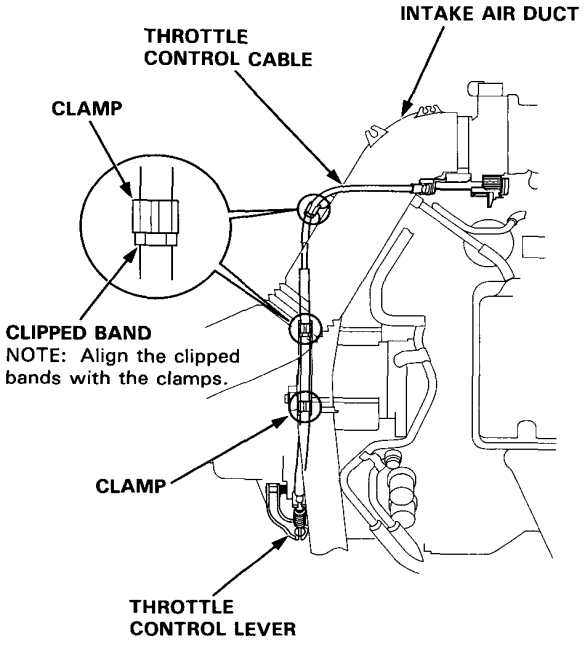
Throttle Control Cable

Inspection

NOTE: Before inspecting the throttle control cable, make sure that:

- Throttle cable free play is correct (see section 11).
- Idle speed is correct (see section 11).
- You warm up the engine to normal operating temperature (the radiator fan comes on).

1. Verify that the throttle control cable is clamped correctly in three positions.



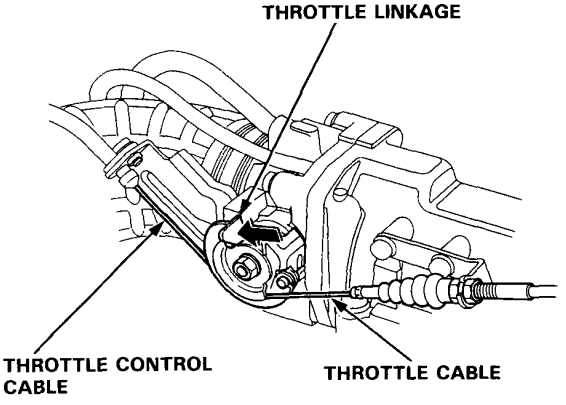
(cont'd)

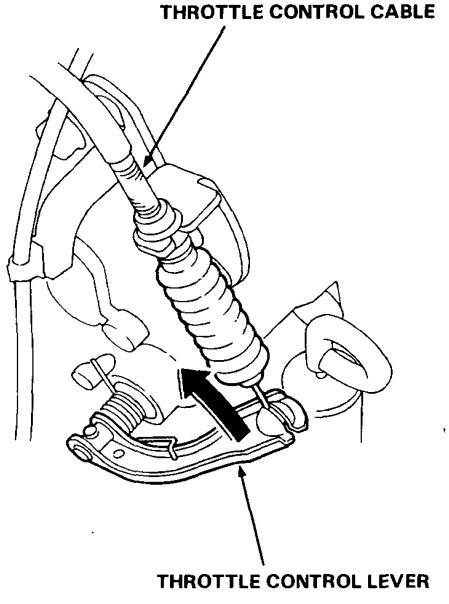
Throttle Control Cable

Inspection (cont'd)

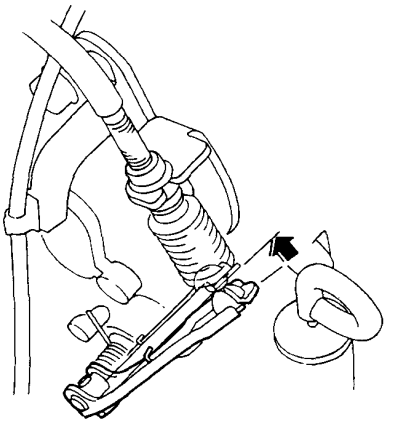
2. Verify that the throttle control lever is synchronized with the throttle linkage while depressing and releasing the accelerator pedal.

3. If the throttle control lever is not synchronized with the throttle linkage, adjust the throttle control cable.



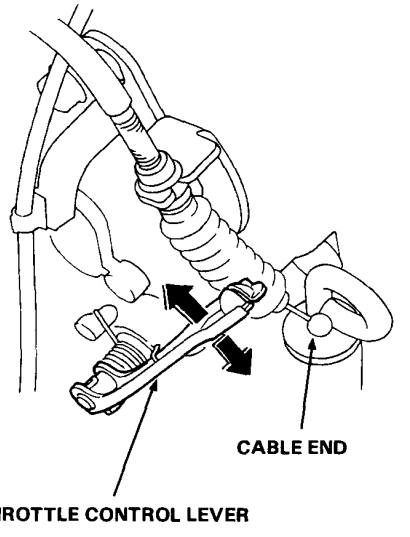


4. Check that there is play in the throttle control lever while depressing the accelerator pedal to the full-throttle position.



5. Remove the cable end of the throttle control cable from the throttle control lever.

6. Check that the throttle control lever moves smoothly.

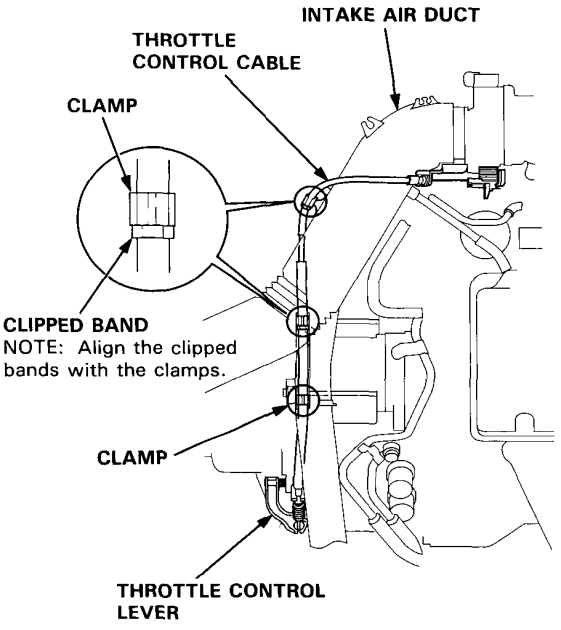


Adjustment

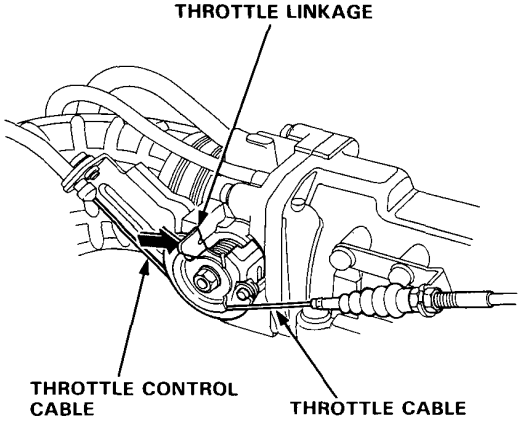
NOTE: Before adjusting the throttle control cable, make sure that:

- Throttle cable free play is correct (see section 11).
- Idle speed is correct (see section 11).
- You warm up the engine to normal operating temperature (the radiator fan comes on).

1. Verify that the throttle control cable is clamped correctly in three positions.

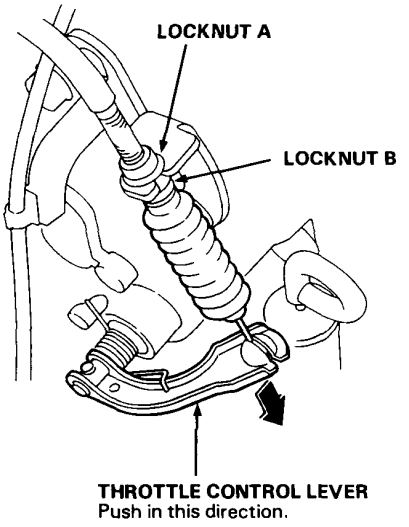


2. Verify that the throttle linkage is in the fully-closed position.

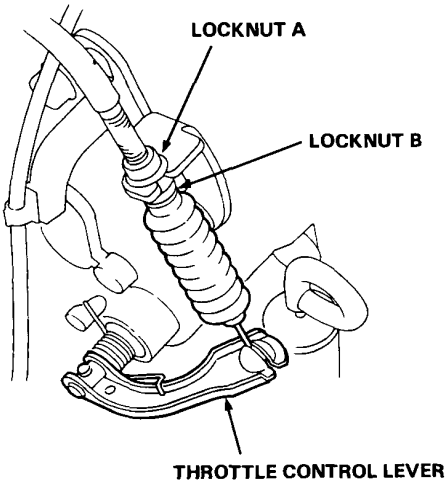


3. Loosen the locknut on the throttle control cable at the throttle control lever.

4. Remove the free play in the throttle control cable with the locknut, while pushing the throttle control lever to the fully-closed position as shown.



5. Tighten the locknuts.



6. After tightening the locknuts, inspect the synchronization and throttle control lever movement.

NOTE: To tailor the shift/lock-up characteristics to a particular customer's driving expectations, you can adjust the throttle control cable up to 2 mm (0.078 in) shorter than the "synchronized" point.

Differential

Manual Transmission 15-1
Automatic Transmission 15-11

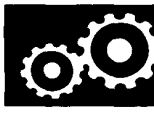


Differential (Manual Transmission)

Special Tools 15-2

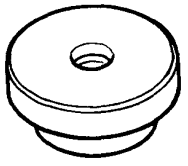
Differential

- Illustrated Index 15-3
- Backlash Inspection 15-4
- Final Driven Gear Replacement 15-4
- Tapered Roller Bearing Replacement 15-5
- Oil Seal Removal 15-5
- Bearing Outer Race Replacement 15-6
- Tapered Roller Bearing Preload Adjustment 15-7
- Oil Seal Installation 15-9

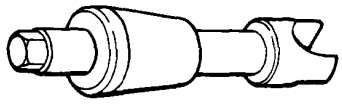


Special Tools

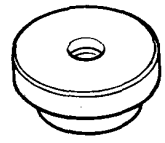
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAD – PG40100	Driver Attachment	1	15-9
②	07HAJ – PK40201	Preload Inspection Tool	1	15-7
③	07JAD – PH80101	Driver Attachment	1	15-9
④	07JAD – PH80400	Pilot, 28 x 30 mm	1	15-9
⑤	07746 – 0010400	Attachment, 52 x 55 mm	1	15-6
⑥	07746 – 0010500	Attachment, 62 x 68 mm	1	15-6
⑦	07746 – 0010600	Attachment, 72 x 75 mm	1	15-6
⑧	07746 – 0030100	Driver, 40 mm I.D.	1	15-5
⑨	07749 – 0010000	Driver	1	15-6, 9



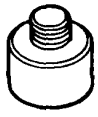
①



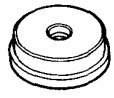
②



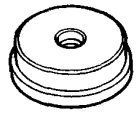
③



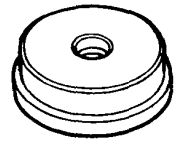
④



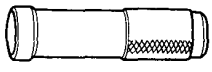
⑤



⑥



⑦



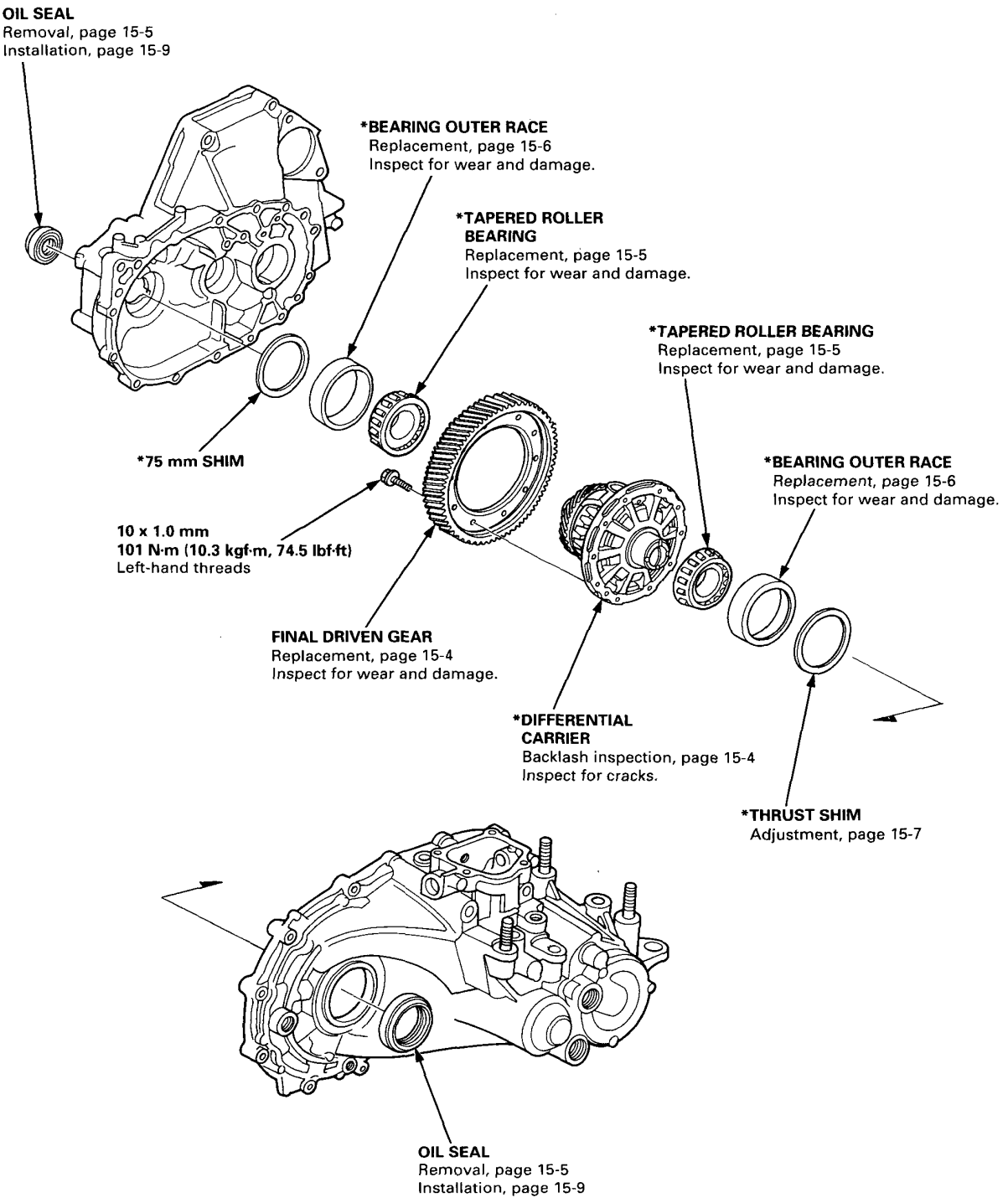
⑧



⑨

Illustrated Index

NOTE: If the * mark parts were replaced, the tapered roller bearing preload must be adjusted (see page 15-7).

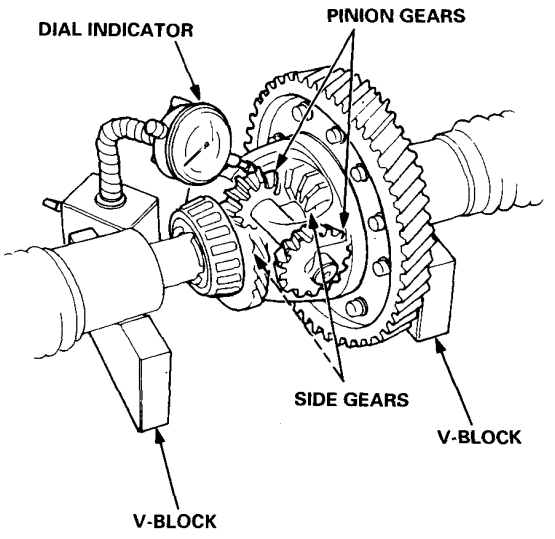


Differential (Manual Transmission)

Backlash Inspection

1. Place the differential assembly on V-blocks and install both axles.
2. Measure the backlash of both pinion gears.

Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)

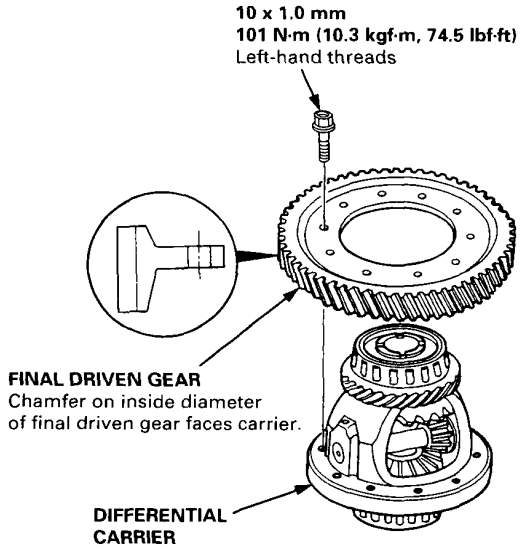


- If the backlash is not within the standard, replace the differential carrier.

Final Driven Gear Replacement

1. Remove the bolts in a crisscross pattern in several steps, and remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have left-hand threads.

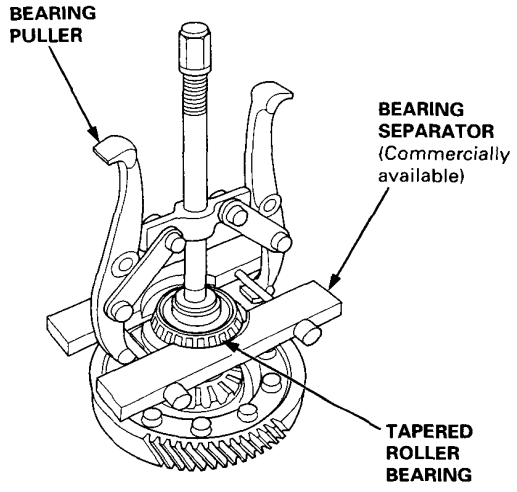


2. Install the final driven gear by tightening the bolts in a crisscross pattern in several steps.

Tapered Roller Bearing Replacement

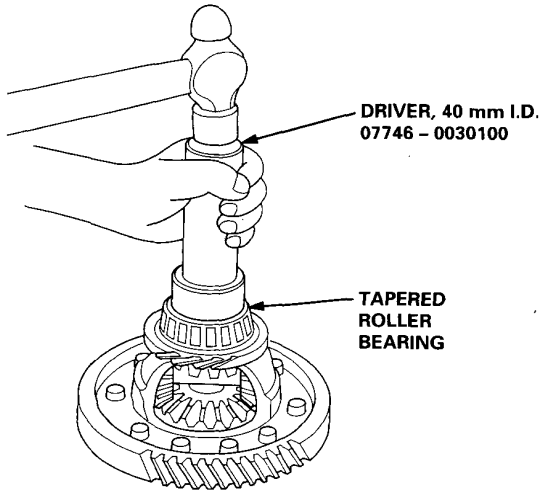
NOTE:
- The tapered roller bearing and bearing outer race should be replaced as a set.
- Inspect and adjust the tapered roller bearing preload whenever the tapered roller bearing is replaced.
- Check the tapered roller bearings for wear and rough rotation. If the tapered roller bearings are OK, removal is not necessary.

1. Remove the tapered roller bearings using a bearing puller and a bearing separator as shown.



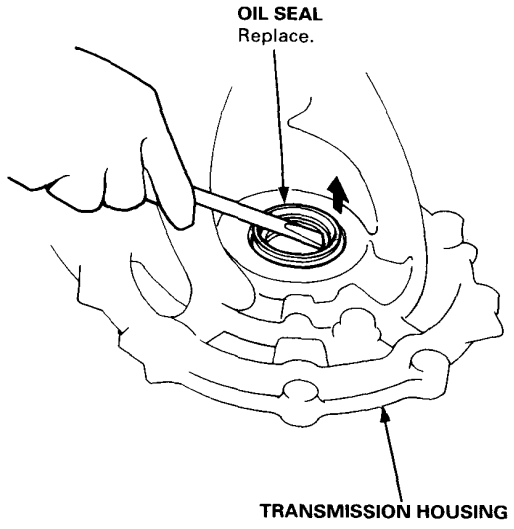
2. Install new tapered roller bearings using the special tool as shown.

   NOTE: Drive the tapered roller bearings on until they bottom against the differential carrier.

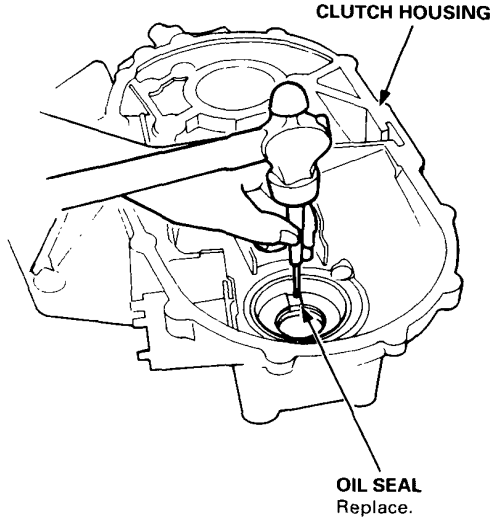


Oil Seal Removal

1. Remove the differential assembly.
2. Remove the oil seal from the transmission housing.



3. Remove the oil seal from the clutch housing.



Bearing Outer Race Replacement

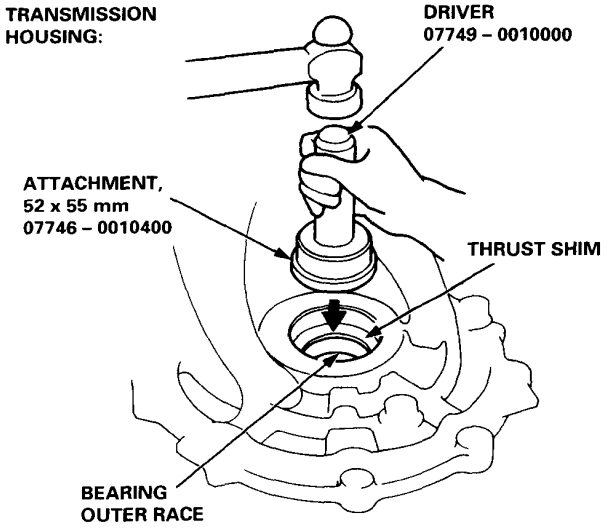
NOTE:
- The bearing outer race and tapered roller bearing should be replaced as a set.
- Inspect and adjust the tapered roller bearing preload whenever the tapered roller bearing is replaced.

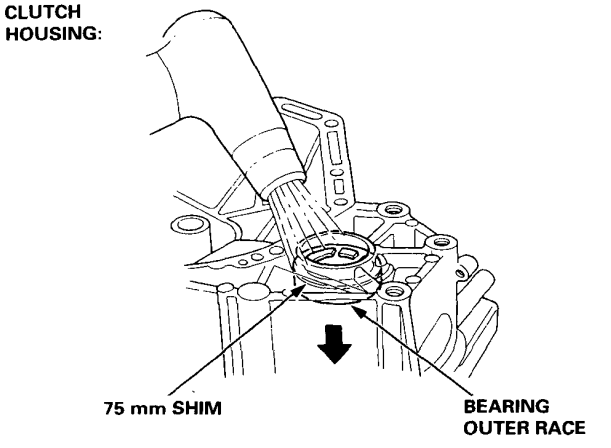
1. Remove the oil seals from the transmission housing and clutch housing (see page 15-5).

2. Drive the bearing outer race and thrust shim out of the transmission housing, or remove the bearing outer race and 75 mm shim from the clutch housing by heating the clutch housing to about 212°F (100°C) with a heat gun.

   CAUTION: Do not reuse the thrust shim if the outer race was driven out.

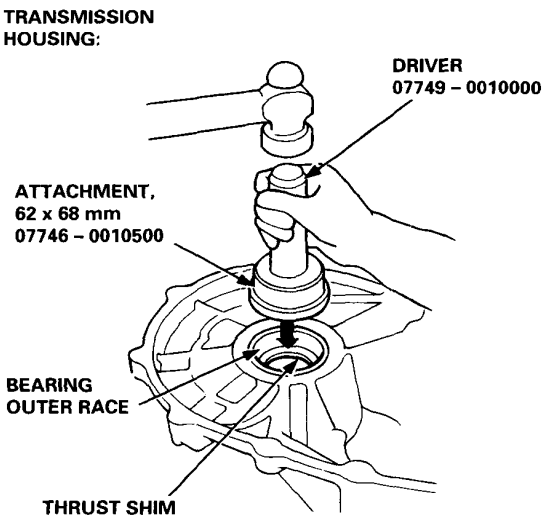
   NOTE: Do not heat the clutch housing in excess of 212°F (100°C).

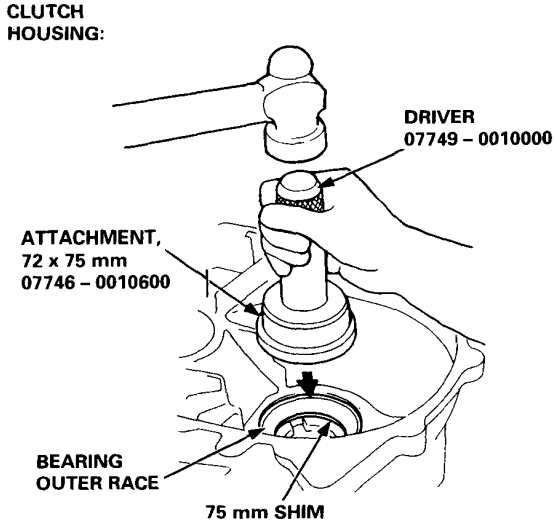




3. Install the thrust shim or 75 mm shim and the bearing outer race in the transmission housing and clutch housing using the special tools as shown.

   NOTE:
   - Install the bearing outer race squarely.
   - Check that there is no clearance between the bearing outer race, thrust shim or 75 mm shim, and housing.





4. Install the oil seal (see page 15-9).

Tapered Roller Bearing Preload Adjustment

NOTE: If any of the items listed below were replaced, the tapered roller bearing preload must be adjusted.

- Transmission housing
- Clutch housing
- Differential carrier
- Tapered roller bearing and bearing outer race
- Thrust shim
- 75 mm shim

1. Remove the bearing outer race and thrust shim from the transmission housing (see page 15-6).

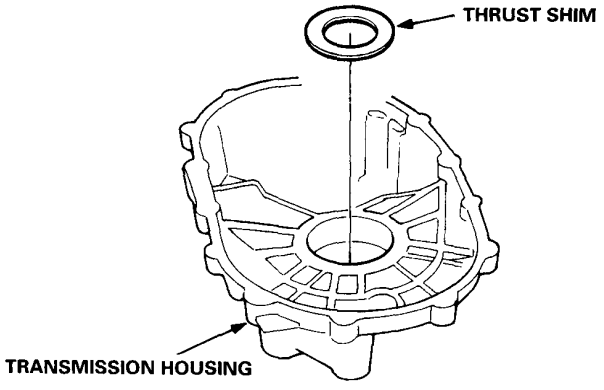
   NOTE: Install the thrust shim only on the transmission housing side.

   CAUTION: Do not reuse the thrust shim if the bearing outer race was driven out.

   NOTE: Before adjusting the tapered roller bearing preload, let the transmission cool to room temperature if the bearing outer race was removed by heating the clutch housing.

2. First try the same size thrust shim that was removed.

   CAUTION: Use only one thrust shim.



3. After installing the thrust shim, install the bearing outer race in the transmission housing (see page 15-6).

   NOTE:
   - Install the bearing outer race squarely.
   - Check that there is no clearance between the bearing outer race, thrust shim and transmission housing.

4. With the mainshaft and countershaft removed, install the differential assembly, and torque the clutch housing and transmission housing.

   NOTE: It is not necessary to use sealing agent between the housings.

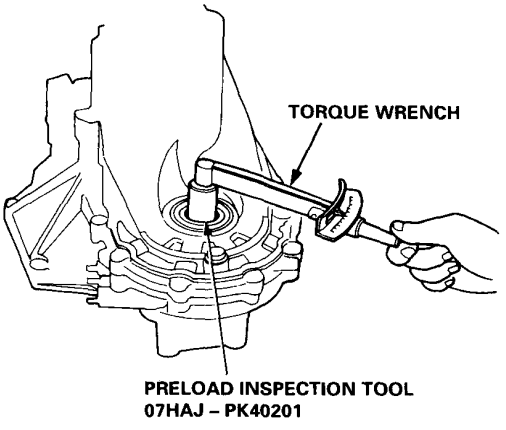
   TORQUE: 10 x 1.25 mm: 44 N·m (4.5 kgf·m, 33 lbf·ft)
   8 x 1.25 mm: 27 N·m (2.8 kgf·m, 20 lbf·ft)

5. Rotate the differential assembly in both directions to seat the tapered roller bearings.

6. Measure the starting torque of the differential assembly with the special tool and a torque wrench.

   STANDARD: 1.4 – 2.5 N·m (14 – 26 kgf·cm, 12 – 23 lbf·in)

   NOTE:
   - Measure the tapered roller bearing preload at normal room temperature.
   - Measure the tapered roller bearing preload in both directions.



(cont'd)

Differential (Manual Transmission)

Tapered Roller Bearing Preload Adjustment (cont'd)

7. If the tapered roller bearing preload is not within the standard, select the thrust shim which will give the correct tapered roller bearing preload from the following table.

   NOTE: Changing the thrust shim to the next size will increase or decrease tapered roller bearing preload about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 lbf·in).

THRUST SHIM

	Part Number	Thickness
A	41381 – PX5 – 000	1.90 mm (0.0748 in)
B	41382 – PX5 – 000	1.93 mm (0.0760 in)
C	41383 – PX5 – 000	1.96 mm (0.0772 in)
D	41384 – PX5 – 000	1.99 mm (0.0783 in)
E	41385 – PX5 – 000	2.02 mm (0.0795 in)
F	41386 – PX5 – 000	2.05 mm (0.0807 in)
G	41387 – PX5 – 000	2.08 mm (0.0819 in)
H	41388 – PX5 – 000	2.11 mm (0.0831 in)
I	41389 – PX5 – 000	2.14 mm (0.0843 in)
J	41390 – PX5 – 000	2.17 mm (0.0854 in)
K	41391 – PX5 – 000	2.20 mm (0.0866 in)
L	41392 – PX5 – 000	2.23 mm (0.0878 in)
M	41393 – PX5 – 000	2.26 mm (0.0890 in)
N	41394 – PX5 – 000	2.29 mm (0.0902 in)
O	41395 – PX5 – 000	2.32 mm (0.0913 in)
P	41396 – PX5 – 000	2.35 mm (0.0925 in)
Q	41397 – PX5 – 000	2.38 mm (0.0937 in)
R	41398 – PX5 – 000	2.41 mm (0.0949 in)
S	41399 – PX5 – 000	2.44 mm (0.0961 in)
T	41400 – PX5 – 000	2.47 mm (0.0972 in)

8. Recheck the tapered roller bearing preload.

9. How to select the correct thrust shim:
   -1) Compare the tapered roller bearing preload you get with the thrust shim that was removed, with the specified preload of 1.4 – 2.5 N·m (14 – 26 kgf·cm, 12 – 23 lbf·in).
   -2) If your measured tapered roller bearing preload is less than specified, subtract yours from the specified.
   If yours is more than specified, subtract the specified from your measurement.

   For example with a 2.17 mm (0.0854 in) thrust shim:

   Ⓐ specified 2.5 N·m (26 kgf·cm, 23 lbf·in)
   – you measure 0.6 N·m (6 kgf·cm, 5 lbf·in)
   1.9 N·m (20 kgf·cm, 18 lbf·in) less

   Ⓑ you measure 3.3 N·m (34 kgf·cm, 30 lbf·in)
   – specified 2.5 N·m (26 kgf·cm, 23 lbf·in)
   0.8 N·m (8 kgf·cm, 7 lbf·in) more

   -3) Each shim size up or down from standard makes about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 lbf·in) difference in tapered roller bearing preload.

   In example Ⓐ, your measured tapered roller bearing preload was 1.9 N·m (20 kgf·cm, 18 lbf·in) less than standard so you need a thrust shim five sizes thicker than standard (try the 2.32 mm (0.0913 in) thrust shim, and recheck).
   In example Ⓑ, your measurement was 0.8 N·m (8 kgf·cm, 7 lbf·in) more than standard, so you need a thrust shim two sizes thinner (try the 2.11 mm (0.0831 in) thrust shim, and recheck).

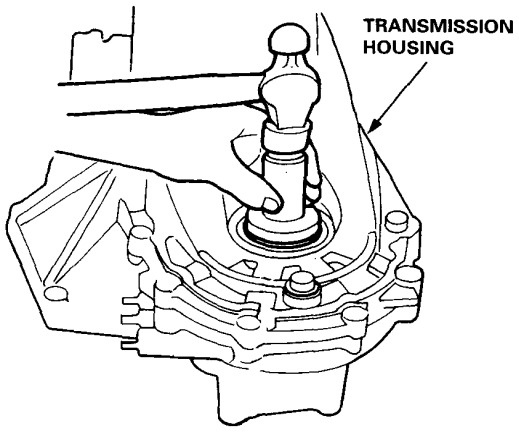
10. After adjusting the tapered roller bearing preload, assemble the transmission and install the transmission housing (see section 13).

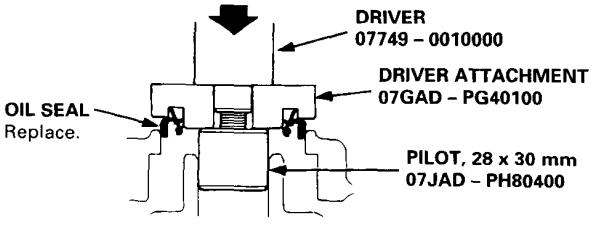
    TORQUE:
    10 x 1.25 mm: 44 N·m (4.5 kgf·m, 33 lbf·ft)
    8 x 1.25 mm: 27 N·m (2.8 kgf·m, 20 lbf·ft)

11. Rotate the differential assembly in both directions to seat the tapered roller bearings.

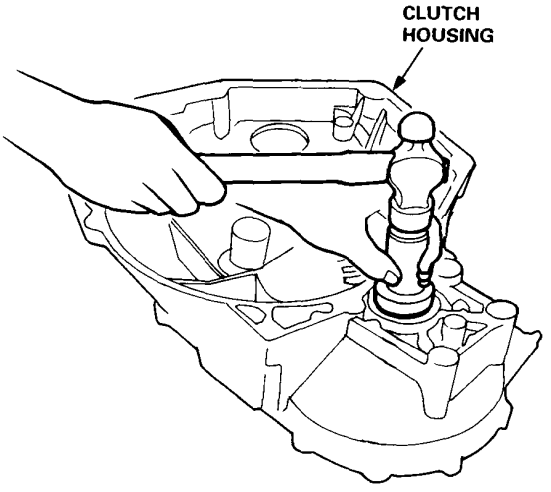
Oil Seal Installation

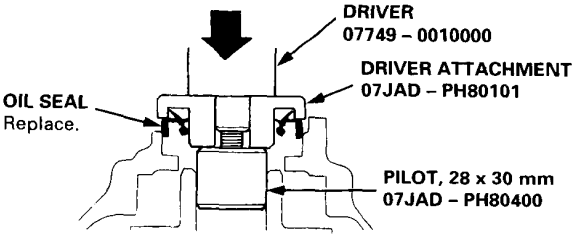
1. Install the new oil seal into the transmission housing using the special tools as shown.





2. Install the new oil seal into the clutch housing using the special tools as shown.





Differential (Automatic Transmission)

Special Tools 15-12

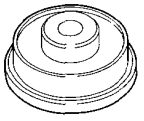
Differential (Automatic Transmission)

- Illustrated Index 15-13
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- Bearing Replacement 15-14
- Differential Carrier Replacement 15-15
- Oil Seal Removal 15-15
- Tapered Roller Bearing Preload Adjustment 15-16
- Bearing Outer Race Replacement 15-18
- Oil Seal Installation 15-18

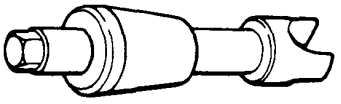


Special Tools

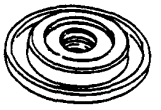
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAD – SF10100	Driver Attachment	1	15-18
②	07HAJ – PK40201	Preload Inspection Tool	1	15-17
③	07JAD – PH80101	Driver Attachment	1	15-18
④	07JAD – PH80400	Pilot, 28 x 30 mm	1	15-18
⑤	07LAD – PW50601	Attachment, 40 x 50 mm	1	15-14
⑥	07746 – 0010600	Attachment, 72 x 75 mm	1	15-17
⑦	07749 – 0010000	Driver	1	15-17, 18
⑧	07947 – SD90200	Driver Attachment	1	15-18



①



②



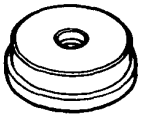
③



④



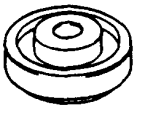
⑤



⑥

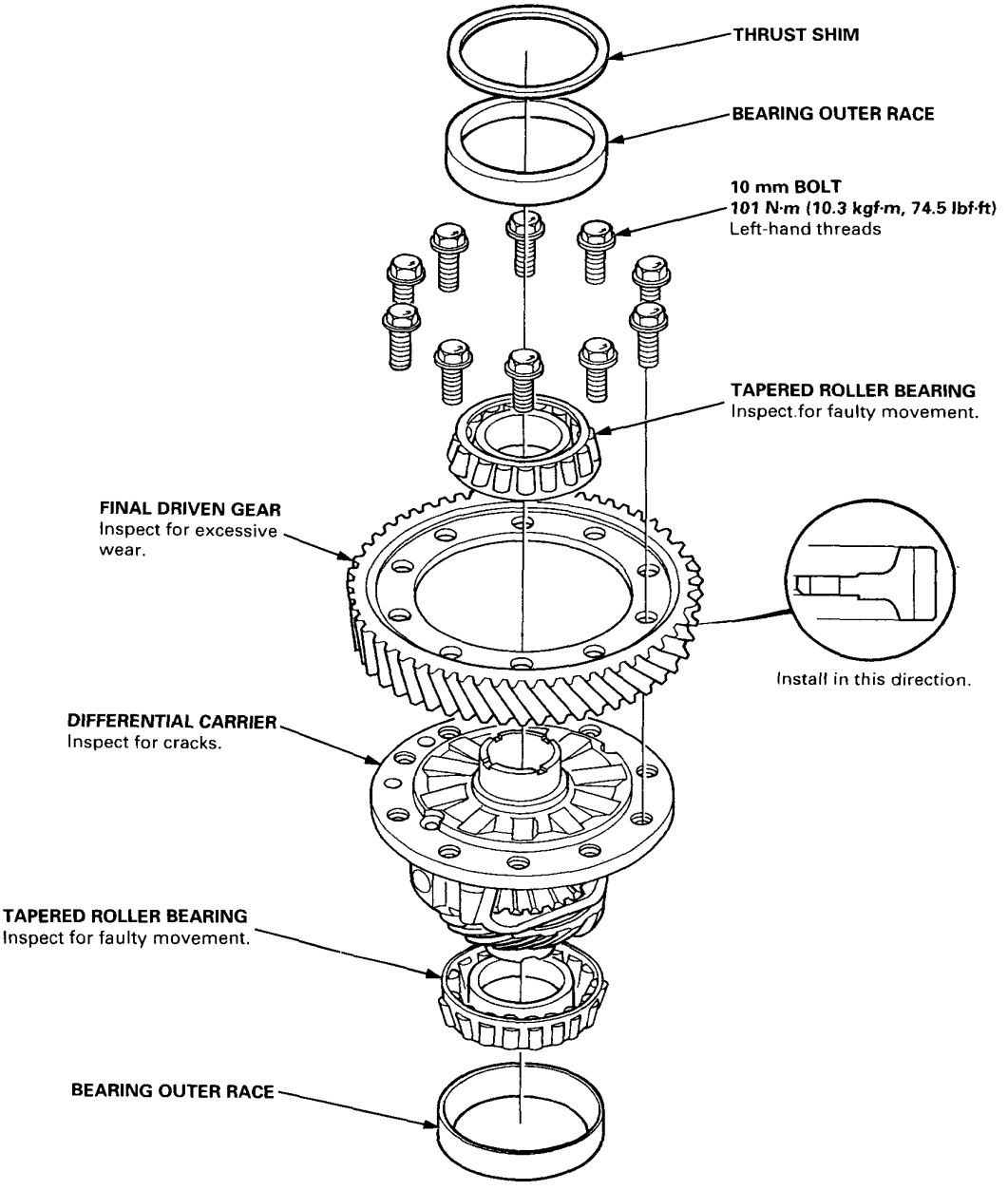


⑦



⑧

Illustrated Index

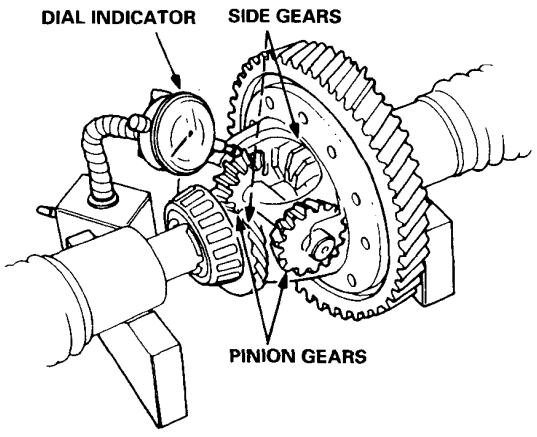


Differential (Automatic Transmission)

Backlash Inspection

1. Place the differential assembly on V-blocks and install both axles.
2. Check backlash of both side gears.

   Standard (New): 0.08 – 0.15 mm (0.003 – 0.006 in.)

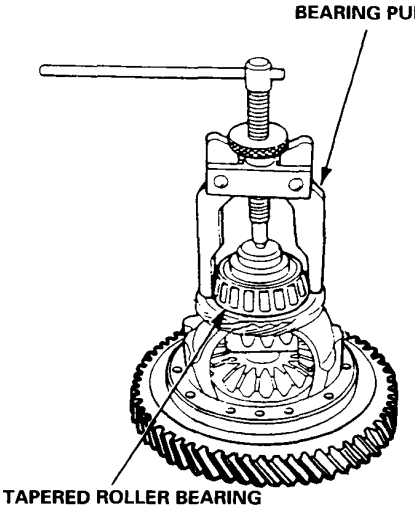


3. If backlash is out of tolerance, replace the differential carrier.

Bearing Replacement

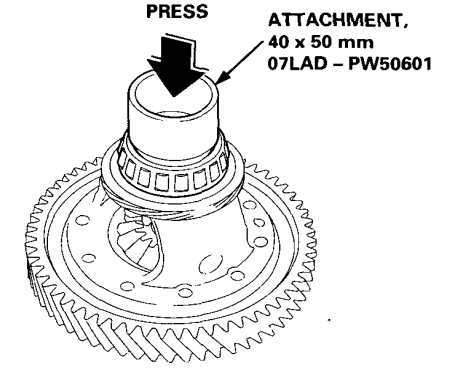
NOTE: Check the bearings for wear and rough rotation. If the bearings are OK, removal is not necessary.

1. Remove the tapered roller bearings using a bearing puller.



2. Install the new tapered roller bearings, using the special tool and a press as shown.

   NOTE:
   - Press the bearings on until they bottom.
   - Use the large end of the special tool for torque converter housing side bearing.
   - Use the small end of the special tool for transmission housing side bearing.



   NOTE:
   - The bearing and outer race should be replaced as a set.
   - Inspect and adjust the bearing preload whenever a bearing is replaced.
   - Drive in the bearings securely so that there is no clearance between the bearings and differential carrier.

Differential Carrier Replacement

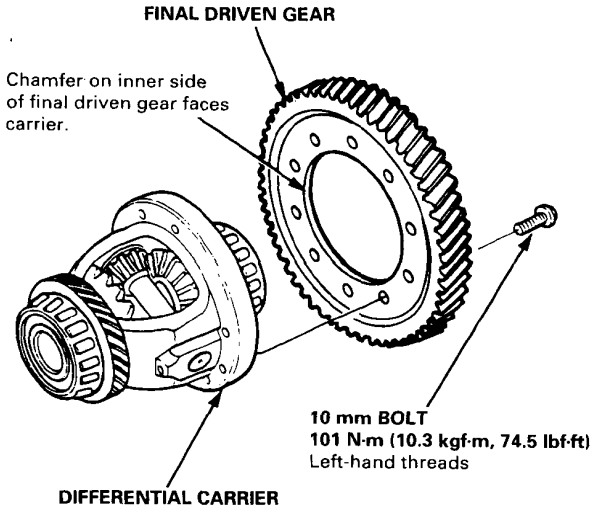
1. Remove the final driven gear from the differential carrier.

   NOTE: The final driven gear bolts have left-hand threads.

2. Install the final driven gear with its chamfered side on inner bore facing the differential carrier.

3. Torque the bolts to the specified torque in a criss-cross pattern.

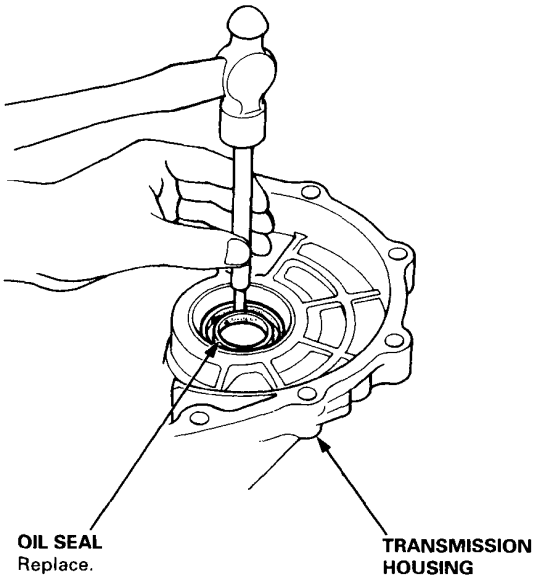
   TORQUE: 101 N·m (10.3 kgf·m, 74.5 lbf·ft)



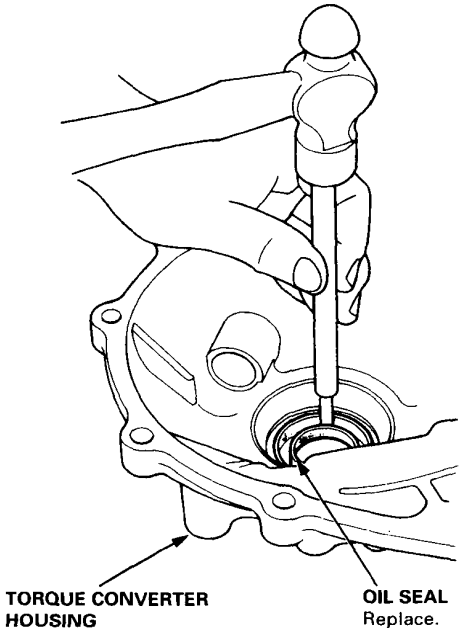
Oil Seal Removal

1. Remove the differential assembly.

2. Remove the oil seal from the transmission housing.



3. Remove the oil seal from the torque converter housing.



Differential (Automatic Transmission)

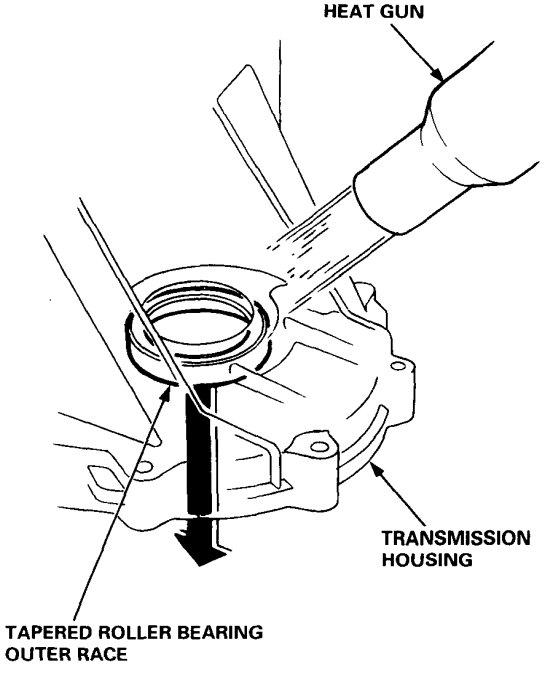
Tapered Roller Bearing Preload Adjustment

NOTE: If the transmission housing, torque converter housing, differential carrier, tapered roller bearing, outer race or thrust shim were replaced, the bearing preload must be adjusted.

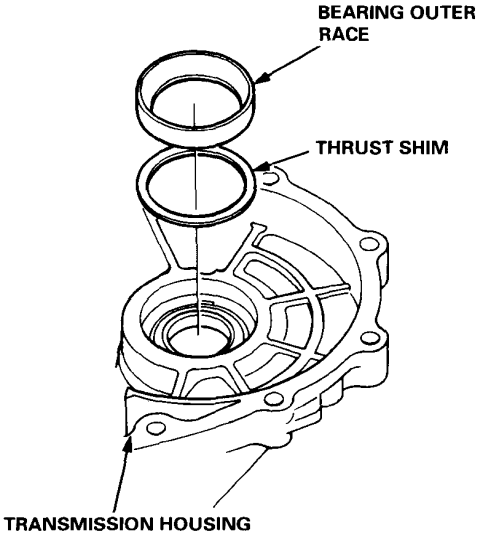
1. Remove the bearing outer race and thrust shim from the transmission housing by heating the housing to about 212°F (100°C) with a heat gun.

CAUTION:
- **Do not heat the housing in excess of 212°F (100°C).**
- **Replace the tapered roller bearing when the outer race is to be replaced.**
- **Do not use a shim on the torque converter housing side.**

NOTE: Let the transmission housing cool to the room temperature before adjusting the bearing preload.



2. Select the 2.60 mm (0.102 in) thrust shim from the middle of the table below.



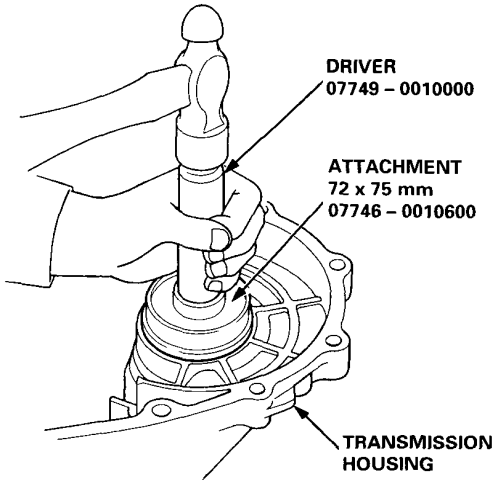
THRUST SHIM

No.	Part Number	Thickness
A	41441 – PK4 – 000	2.20 mm (0.087 in)
B	41442 – PK4 – 000	2.25 mm (0.089 in)
C	41443 – PK4 – 000	2.30 mm (0.091 in)
D	41444 – PK4 – 000	2.35 mm (0.093 in)
E	41445 – PK4 – 000	2.40 mm (0.094 in)
F	41446 – PK4 – 000	2.45 mm (0.096 in)
G	41447 – PK4 – 000	2.50 mm (0.098 in)
H	41448 – PK4 – 000	2.55 mm (0.100 in)
*I	41449 – PK4 – 000	2.60 mm (0.102 in)
J	41450 – PK4 – 000	2.65 mm (0.104 in)
K	41451 – PK4 – 000	2.70 mm (0.106 in)
L	41452 – PK4 – 000	2.75 mm (0.108 in)
M	41453 – PK4 – 000	2.80 mm (0.110 in)
N	41454 – PK4 – 000	2.85 mm (0.112 in)
O	41455 – PK4 – 000	2.90 mm (0.114 in)
P	41456 – PK4 – 000	2.95 mm (0.116 in)
Q	41457 – PK4 – 000	3.00 mm (0.118 in)
R	41458 – PK4 – 000	3.05 mm (0.120 in)

* Standard shim

3. After installing the thrust shim, install the outer race in the transmission housing, using the special tools as shown.

   NOTE:
   - Install the outer race squarely in the transmission housing.
   - Check that there is no clearance between the outer race, shim and transmission housing.



4. With the mainshaft, countershaft and secondary shaft removed, install the differential assembly and torque the transmission housing.

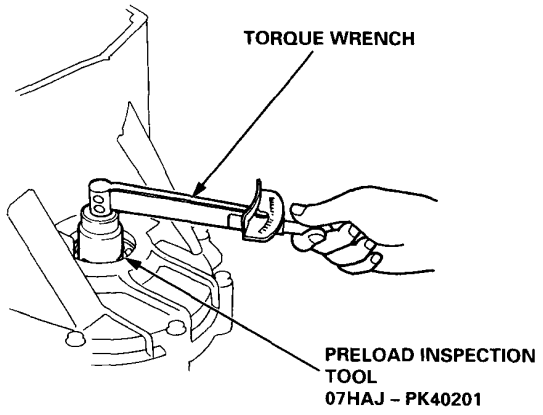
   NOTE: Install the gasket when checking starting torque.

   TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

5. Rotate the differential assembly in both directions to seat the bearings.

6. Measure the starting torque of the differential assembly with the special tool and a torque wrench.

   STANDARD:
   New bearings: **2.7 – 3.9 N·m (28 – 40 kgf·cm, 24 – 35 lbf·in)**
   Reused bearings: **2.5 – 3.6 N·m (25 – 37 kgf·cm, 22 – 32 lbf·in)**



   NOTE:
   - Measure the starting torque at normal room temperature in both directions.
   - Changing one of the shims to the next size will increase or decrease starting torque about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 3 – 3 lbf·in).
   - To increase the starting torque, increase the thickness of shims. To decrease the starting torque, decrease the thickness of shims.

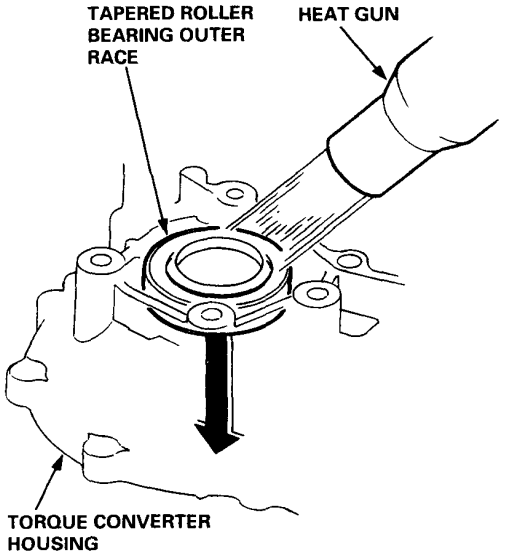
Differential (Automatic Transmission)

Bearing Outer Race Replacement

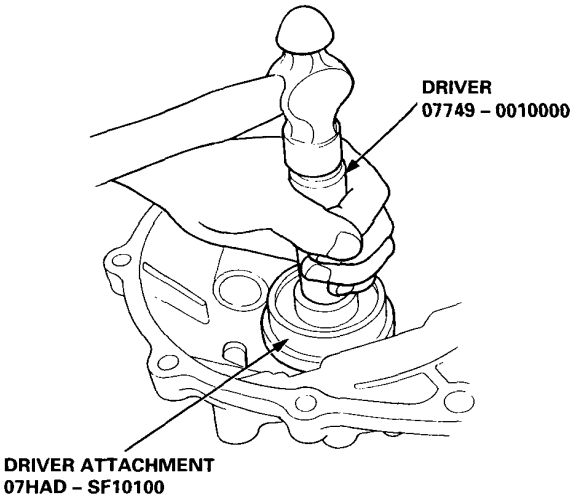
1. Remove the bearing outer race from the torque converter housing by heating the housing to about 212°F (100°C) with a heat gun.

   CAUTION: Do not heat the housing in excess of 212°F (100°C).

   NOTE:
   - Replace the bearing with a new one whenever the outer race is to be replaced.
   - Do not use shims on the torque converter housing side.
   - Adjust preload after replacing the bearing outer race and bearing.

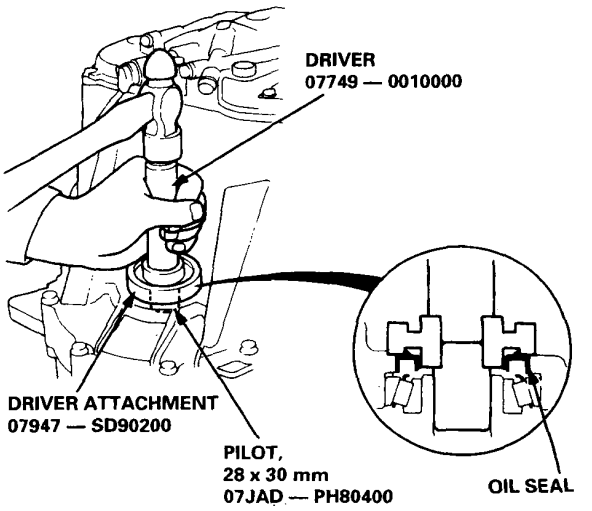


2. Install the new bearing outer race flush with the housing using the special tools.

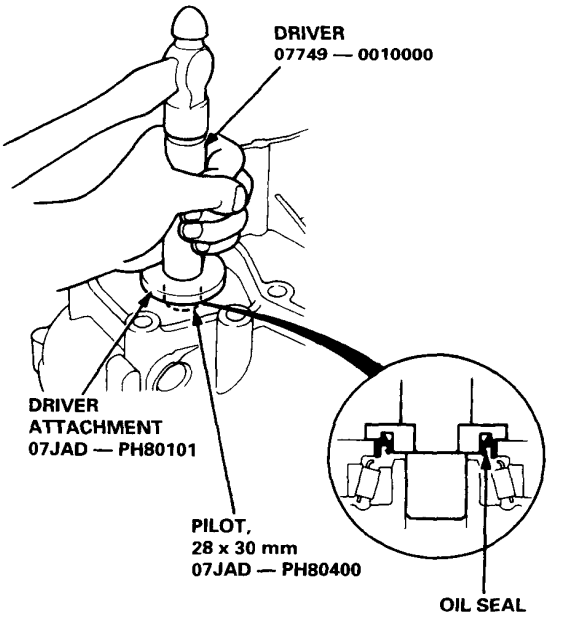


Oil Seal Installation

1. Install the oil seal in the transmission housing, using the special tools as shown.



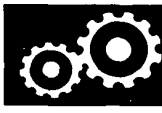
2. Drive the oil seal into the torque converter housing, using the special tools as shown.



Driveshafts

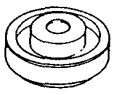
Special Tools 16-2
Driveshafts
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- Removal 16-3
- Disassembly 16-5
- Reassembly 16-7
- Installation 16-10

Intermediate Shaft
- Removal 16-12
- Disassembly 16-12
- Reassembly 16-14
- Installation 16-16

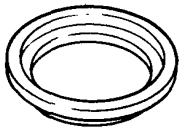


Special Tools

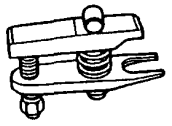
Number	Tool Number	Description	Qty	Page Reference
①	07GAD – PG40100	Oil Seal Driver	1	16-15
②	07LAF – SM40300	Support Base Attachment	1	16-13, 15
③	07MAC – SL00100	Ball Joint Remover, 32 mm	1	16-4
④	07746 – 0010300	Attachment, 42 x 47 mm	1	16-13
⑤	07746 – 0030100	Driver, 40 mm I.D.	1	16-15
⑥	07749 – 0010000	Driver	1	16-13, 15
⑦	07947 – SD90101	Seal Driver Attachment	1	16-15
⑧	07947 – 6110501	Driver Attachment	1	16-15
⑨	07965 – SD90100	Support Base	1	16-13, 15



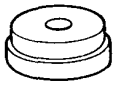
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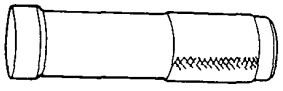
②



③



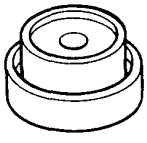
④



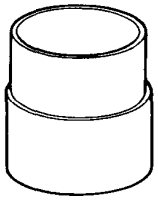
⑤



⑥



⑦ ⑧



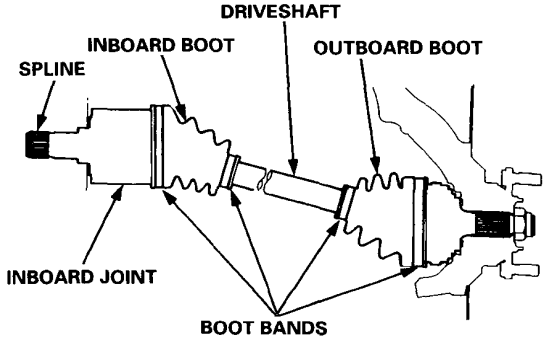
⑨

Inspection

Driveshaft Boot
Check the boots on the driveshaft for cracks, damage, leaking grease or loose boot bands.
If any damage is found, replace the boot and boot bands.

Loose Splines
Turn the driveshaft by hand, and make sure the splines and joint are not excessively loose.
If damage is found, replace the inboard joint.

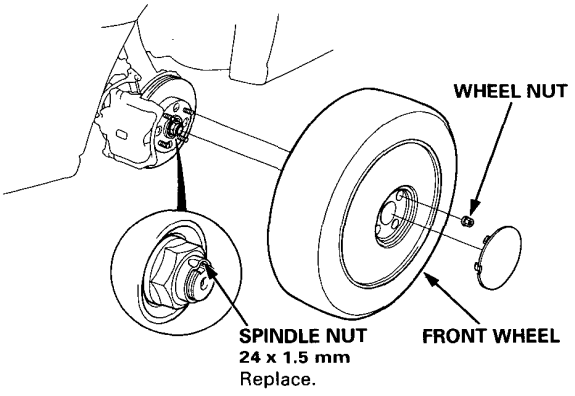
Twisted or Cracked
Make sure the driveshaft is not twisted or cracked.
Replace it if necessary.



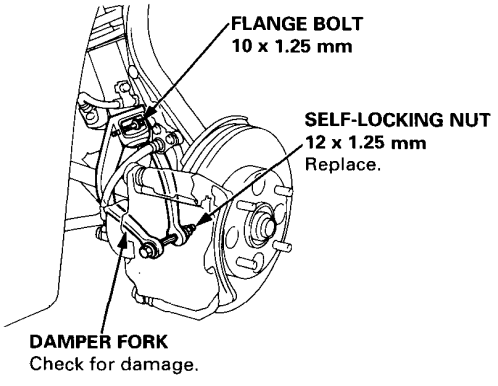
Removal

1. Loosen the wheel nuts slightly.
2. Raise the front of car, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheels.
4. Drain the transmission oil or fluid (see section 13 or 14).

   NOTE: It is not necessary to drain the differential oil when the left driveshaft is removed.
5. Raise the locking tab on the spindle nut, then remove the nut.



6. Remove the self-locking nut and FLANGE bolt.
7. Remove the damper fork.



(cont'd)

Removal (cont'd)

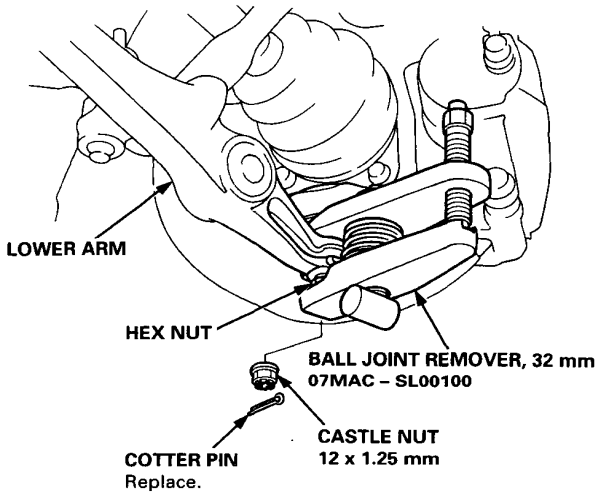
8. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

9. Install a 12 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

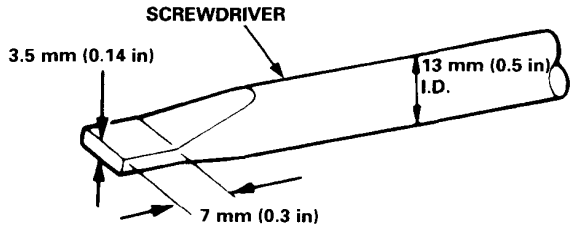
10. Use the ball joint remover, 32 mm, as shown on page 18-10, to separate the ball joint and lower arm.

    CAUTION: Be careful not to damage the ball joint boot.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

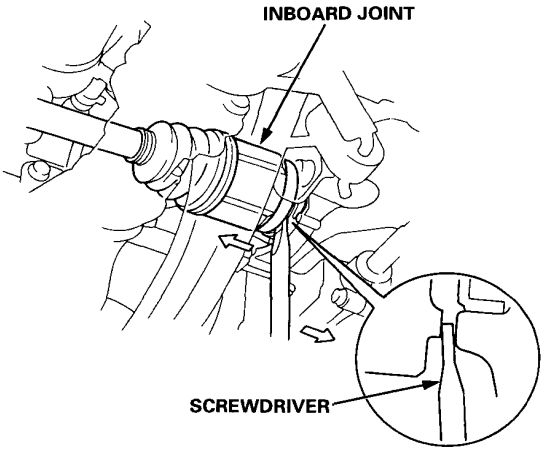


11. Pry the driveshaft assembly with a screwdriver, as shown, to force the set ring at the driveshaft end past the groove.

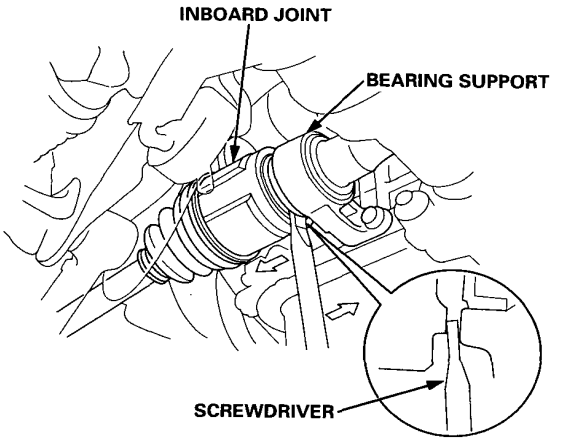


12. Pull on the inboard joint, and remove the driveshaft from the differential case or bearing support as an assembly.

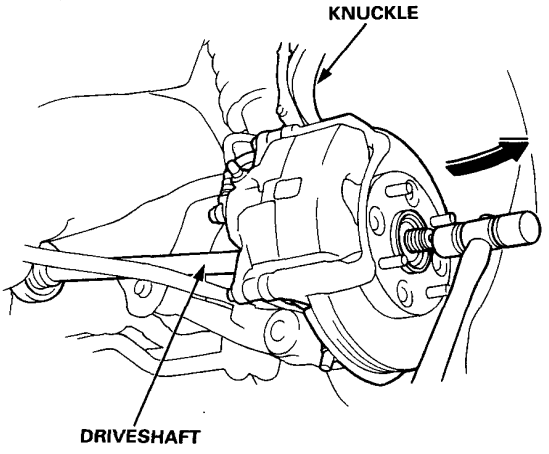
    CAUTION:
    - **Do not pull on the driveshaft, as the inboard joint may come apart.**
    - **Use care when prying out the assembly, and pull it straight to avoid damaging the differential oil seal or the intermediate shaft outer seal.**



〈 Left driveshaft with intermediate shaft: 〉



13. Pull the knuckle outward, and remove the driveshaft outboard joint from the front wheel hub using a plastic hammer.



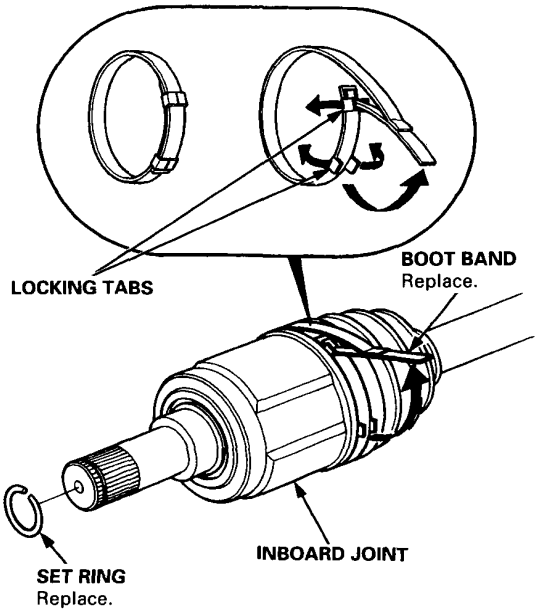
Disassembly

1. Remove the set ring from the inboard joint.

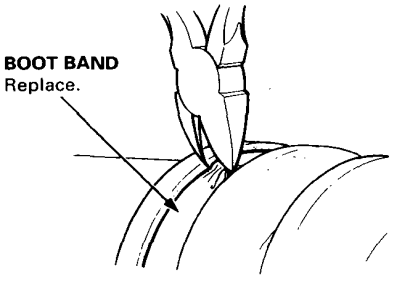
2. To remove the boot band, pry up the locking tabs with a screwdriver and raise the end of the band.

   CAUTION: Take care not to damage the boot.

   NOTE: Carefully clamp the driveshaft in a vise with soft jaws.



— If the boot band is the welded type, cut it off as shown.

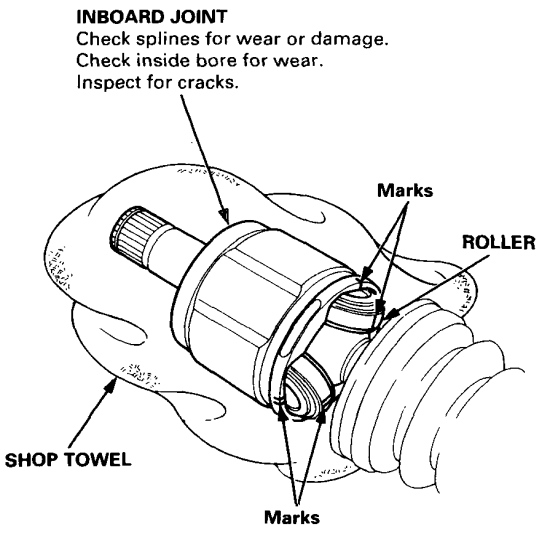


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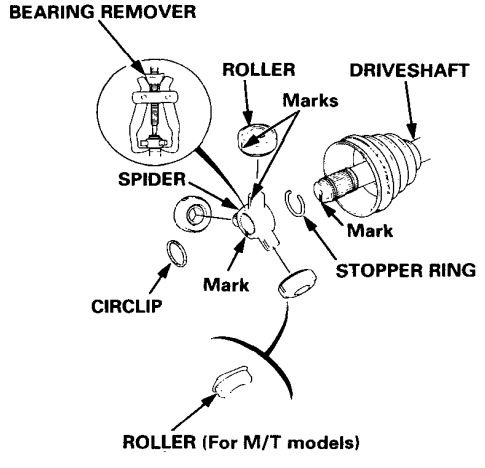
Disassembly (cont'd)

3. Mark each roller and inboard joint to identify the locations of rollers and grooves in the inboard joint. Then remove the inboard joint on the shop towel.

   NOTE: Be careful not to drop the rollers when separating them from the inboard joint.



4. Mark the rollers and spider to identify the locations of rollers on the spider. Then remove the rollers.
5. Remove the circlip.
6. Mark the spider and driveshaft to identify the position of the spider on the shaft.
7. Remove the spider using a commercially available bearing remover.
8. Remove the stopper ring.



9. Wrap the splines on the driveshaft with vinyl tape to prevent damage to the boots and dynamic damper.
10. Remove the boot band and inboad boot.

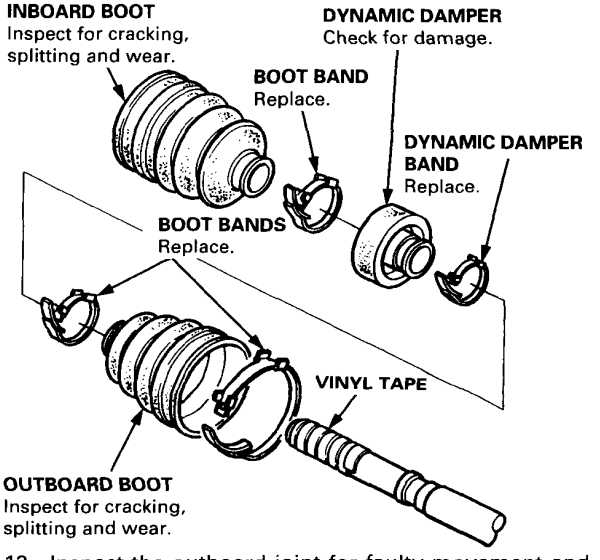
    CAUTION: Take care not to damage the boot.

11. Remove the dynamic damper band and dynamic damper if equipped.

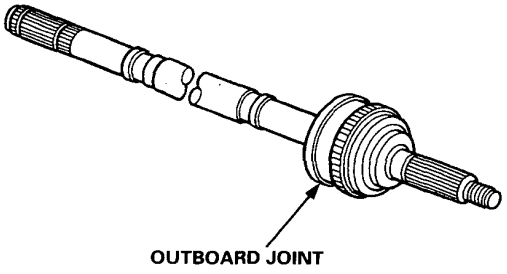
    CAUTION: Take care not to damage the dynamic damper.

12. Remove the boot bands and outboard boot, then remove the vinyl tape.

    CAUTION: Take care not to damage the boot.



13. Inspect the outboard joint for faulty movement and wear. If any roughness or excess play is felt, replace the outboard joint.



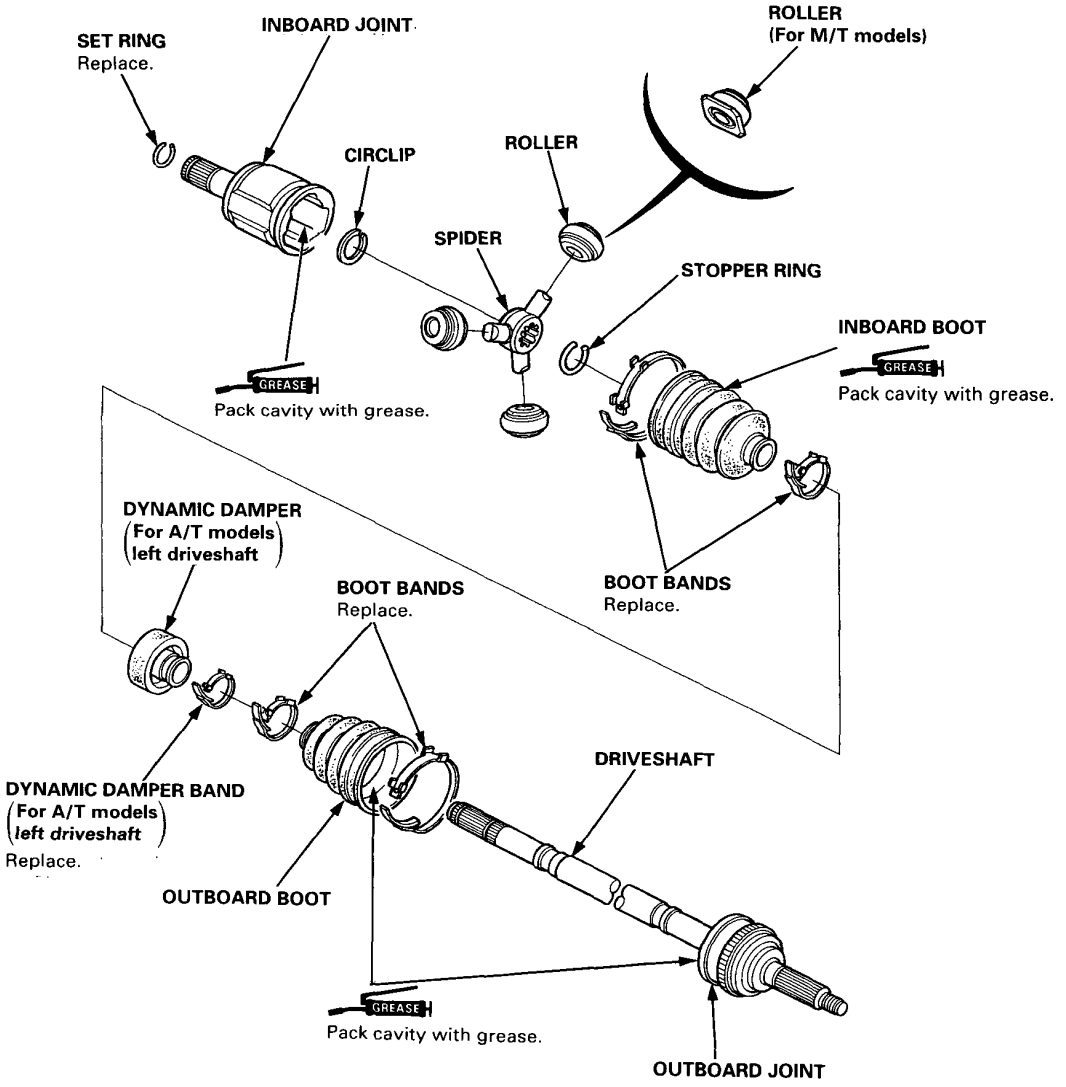
Reassembly

NOTE:

- Clean the disassembled parts with solvent, and dry them throughly with compressed air. Do not wash the rubber parts with solvent.
- GREASE : Thoroughly pack the inboard joint and both joint boots with the joint grease included in the new driveshaft set.

Grease quantity:

Inboard Joint	120 – 130 g (4.2 – 4.6 oz)
Outboard Joint	130 – 140 g (4.6 – 4.9 oz)

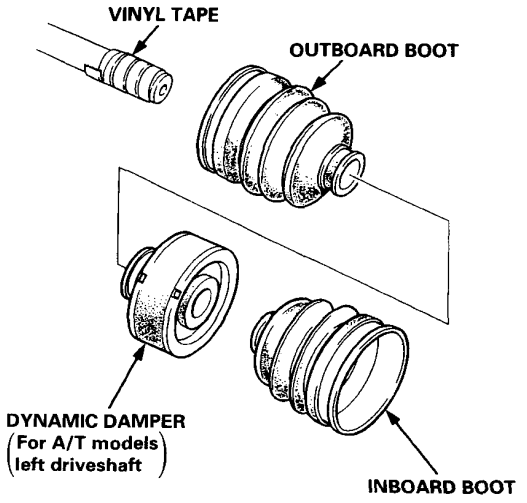


(cont'd)

Reassembly (cont'd)

1. Wrap the splines with vinyl tape to prevent damage to the boots and dynamic damper.
2. Install the outboard boot, dynamic damper and inboard boot to the driveshaft, then remove the vinyl tape.

   CAUTION: Take care not to damage the boots and dynamic damper.

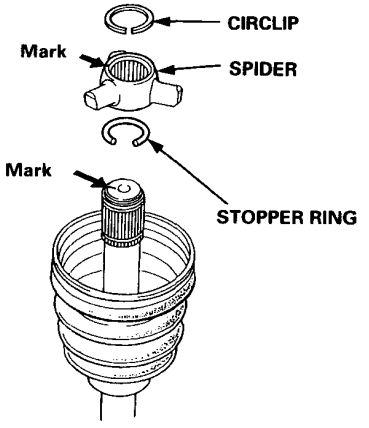


3. Install the stopper ring into the driveshaft groove.

   NOTE: Always rotate the stopper ring in its groove to be sure it is fully seated.

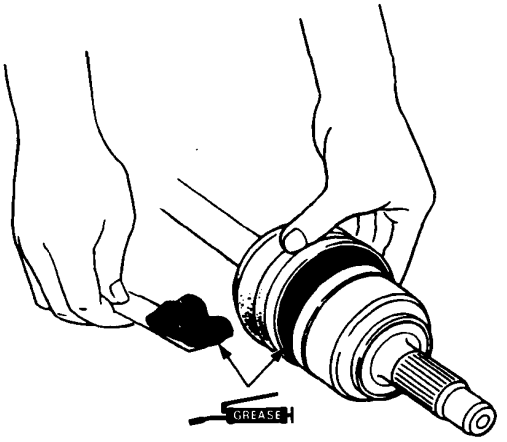
4. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
5. Fit the circlip into the driveshaft groove.

   NOTE: Always rotate the circlip in its groove to be sure it is fully seated.



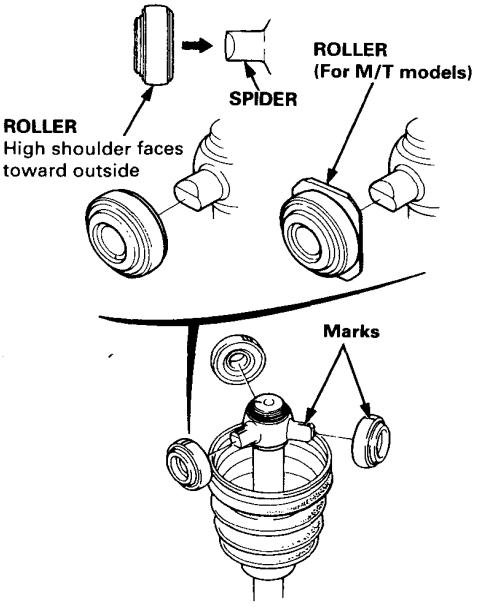
6. Pack the outboard joint with the joint grease included in the new driveshaft set.

   Grease quantity: 130 – 140 g (4.6 – 4.9 oz)



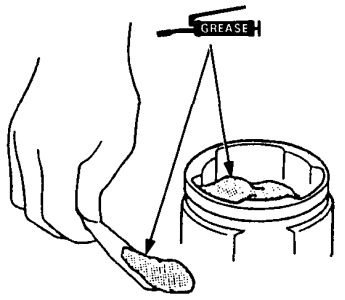
7. Fit the rollers to the spider with their high shoulders facing outward.

   NOTE:
   - Reinstall the rollers in their original positions on the spider by aligning the marks.
   - Hold the driveshaft pointed up to prevent the rollers from falling off.



8. Pack the inboard joint with the joint grease included in the new driveshaft set.

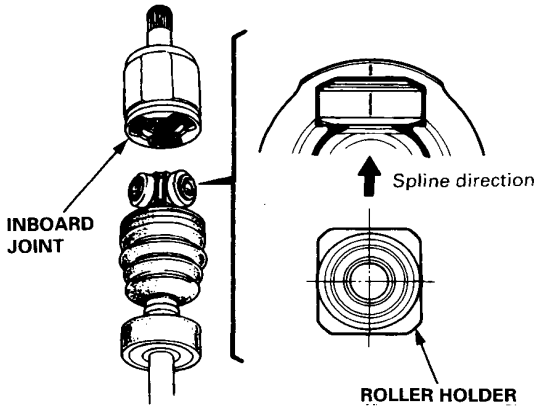
Grease quantity: 120 – 130 g (4.2 – 4.6 oz)



9. Fit the inboard joint onto the driveshaft.

NOTE:
- Reinstall the inboard joint onto the driveshaft by aligning the marks on the inboard joint and the rollers.
- Hold the driveshaft so the inboard joint points up to prevent it from falling off.

M/T models:
Align the roller holders with the inboard joint as shown below.

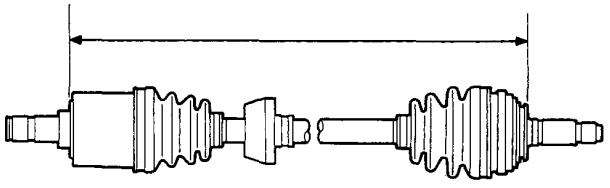


10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and full extension.

NOTE: The ends of boots seat in the groove of the driveshaft and joint.

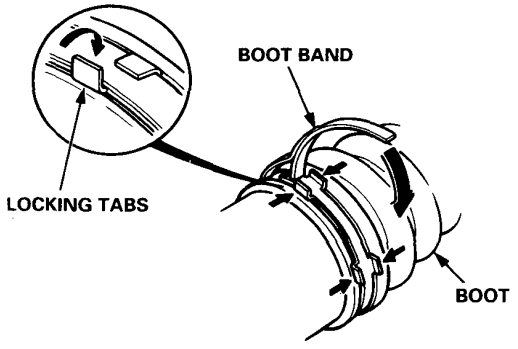
M/T model:
Left/Right: 486 – 491 mm (19.1 – 19.3 in)

A/T model:
Left: 845 – 850 mm (33.3 – 33.5 in)
Right: 486 – 491 mm (19.1 – 19.3 in)



11. Install new boot bands on the boots, and bend both sets of locking tabs.

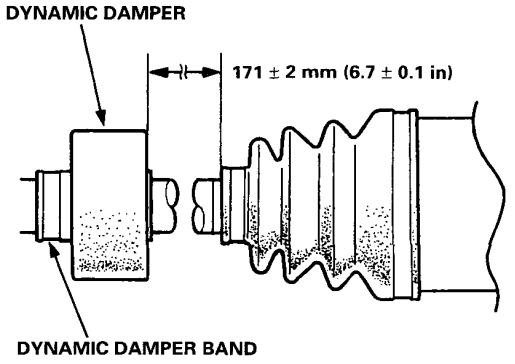
12. Lightly tap on the doubled-over portions to reduce their height.



(cont'd)

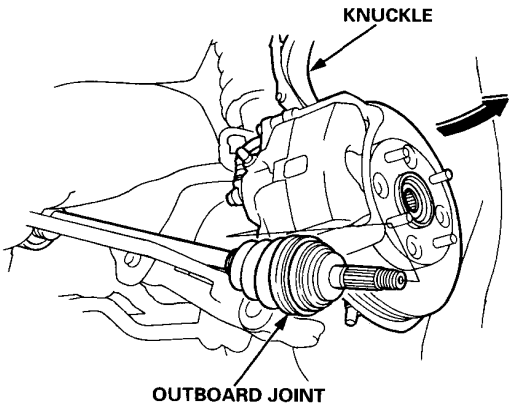
Reassembly (cont'd)

13. Position the dynamic damper as shown below.
    - Install a new dynamic damper band, and bend down both sets of locking tabs.
    - Lightly tap on the doubled-over portion of the band to reduce its height.



Installation

1. Install the outboard joint into the knuckle.

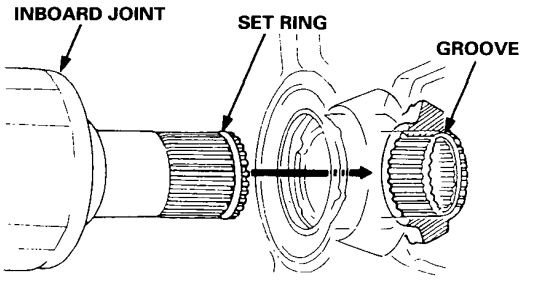


2. Apply 0.3 – 1.0 g (0.01 – 0.04 oz) of specified grease to the whole splined surface of the left driveshaft (for cars with intermediate shaft).

3. Install the new set ring onto the driveshaft groove.

   CAUTION: Always use a new set ring whenever the driveshaft is being installed.

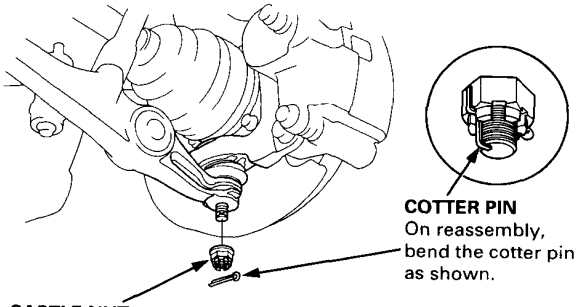
4. Insert the inboard end of the driveshaft into the differential or intermediate shaft until the set ring locks in the groove.



5. Install the knuckle on the lower arm, then tighten the castle nut and install a new cotter pin.

   NOTE: Wipe off the grease before tightening the nut at the ball joint.

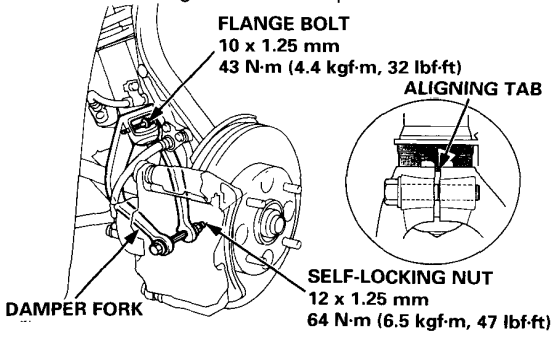
   CAUTION:
   - **Be careful not to damage the ball joint boot.**
   - **Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.**



6. Install the damper fork over the driveshaft and onto the lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.

7. Loosely install the FLANGE bolt and the new self-locking nut.

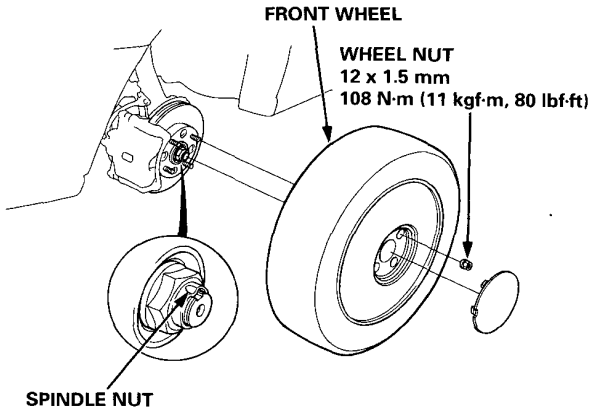
   NOTE: The bolts and nut should be tightened with the vehicle's weight on the damper.



8. Install a new spindle nut, then tighten and stake the nut.

9. Install the front wheel with the wheel nuts.

   NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and wheel.



10. Tighten the FLANGE bolt and the new self-locking nut with the vehicle's weight on the damper.

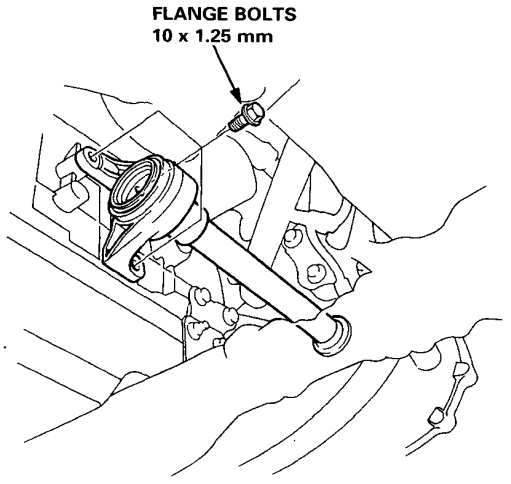
11. Refill the transmission with recommended oil or fluid (see section 13 or 14).

12. Check the front wheel alignment, and adjust if necessary (see page 18-4).

Intermediate shaft

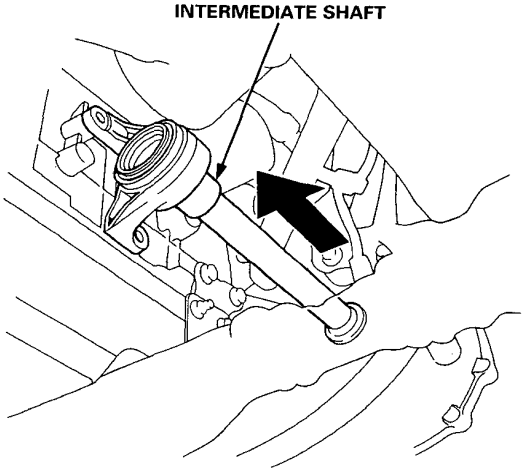
Removal

1. Drain the transmission oil or fluid (see section 13 or 14).
2. Remove the left driveshaft (see page 16-3).
3. Remove the three flange bolts.



4. Remove the intermediate shaft from the differential.

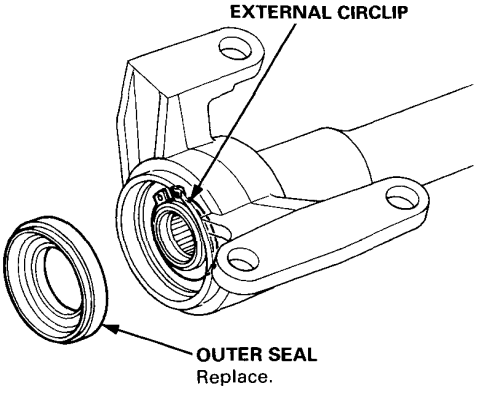
CAUTION: Hold the intermediate shaft horizontal until it is clear of the differential to prevent damage to the differential oil seal.



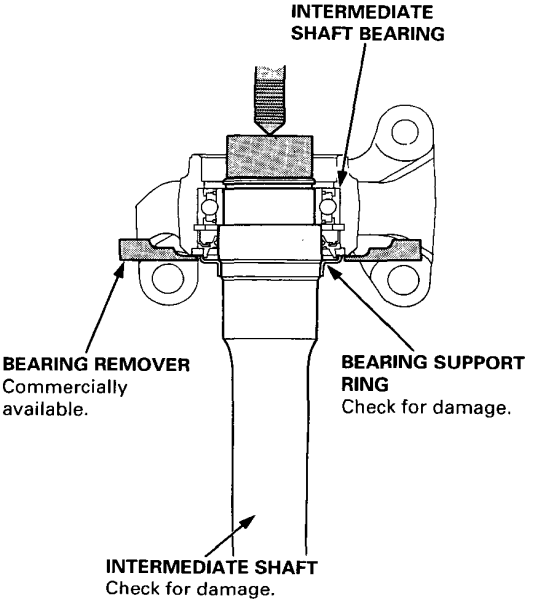
Disassembly

NOTE: Be careful not to damage the metal rings on the intermediate shaft during disassembly.

1. Remove the intermediate shaft outer seal from the bearing support.
2. Remove the extenal circlip.

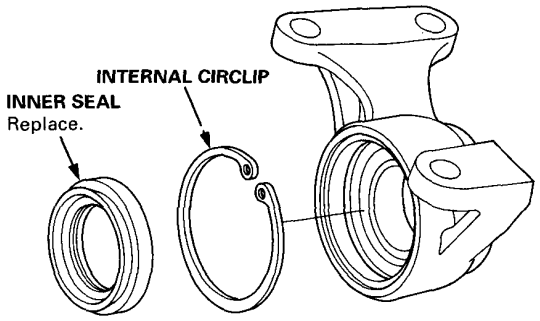


3. Press the intermediate shaft out of the intermediate shaft bearing using a commercially available bearing remover as shown.

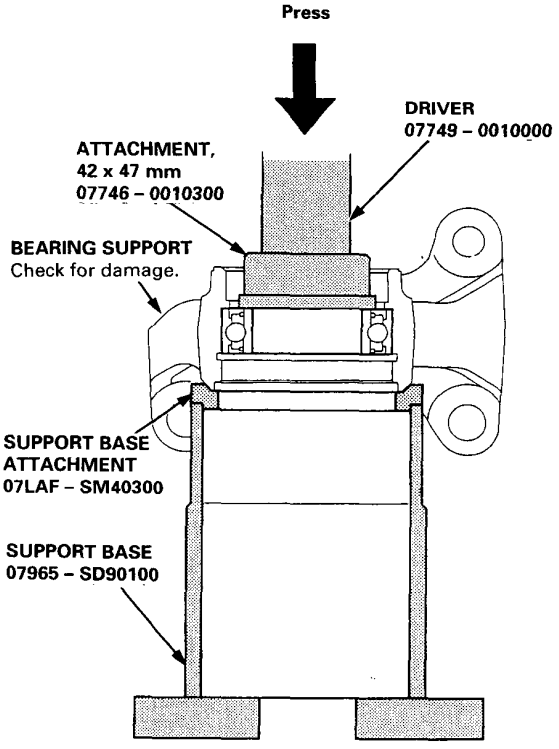


4. Remove the intermediate shaft inner seal.

5. Remove the internal circlip.



6. Press the intermediate shaft bearing out of the bearing support using the special tools and a press as shown.

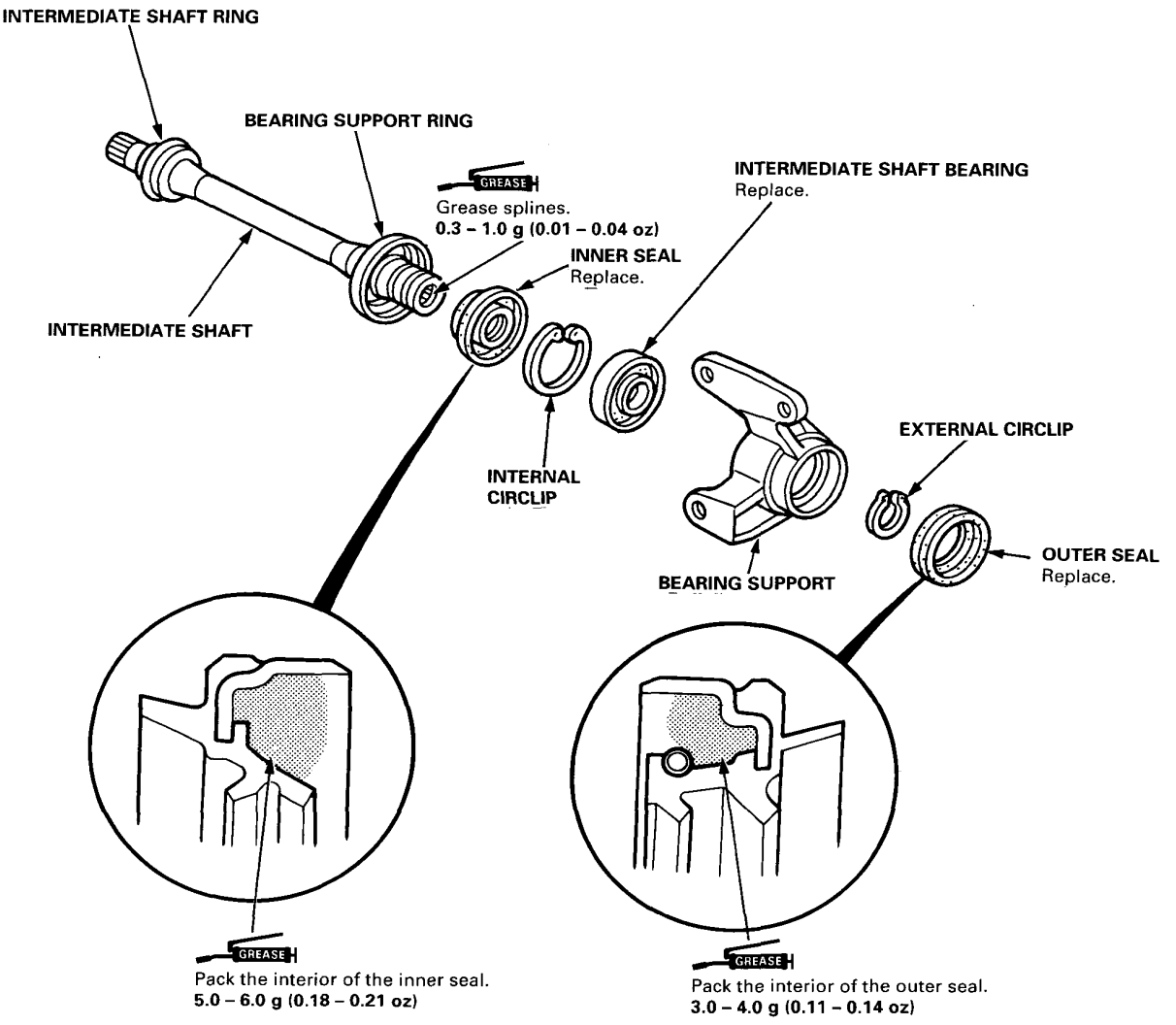


Intermediate Shaft

Reassembly

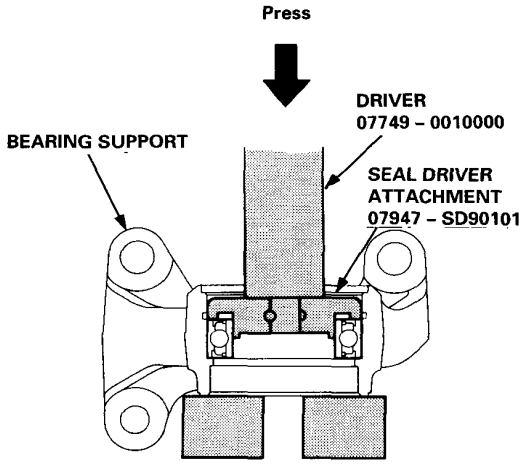
NOTE:

- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.
- Be careful not to damage the metal rings on the intermediate shaft during reassembly.



Reassembly

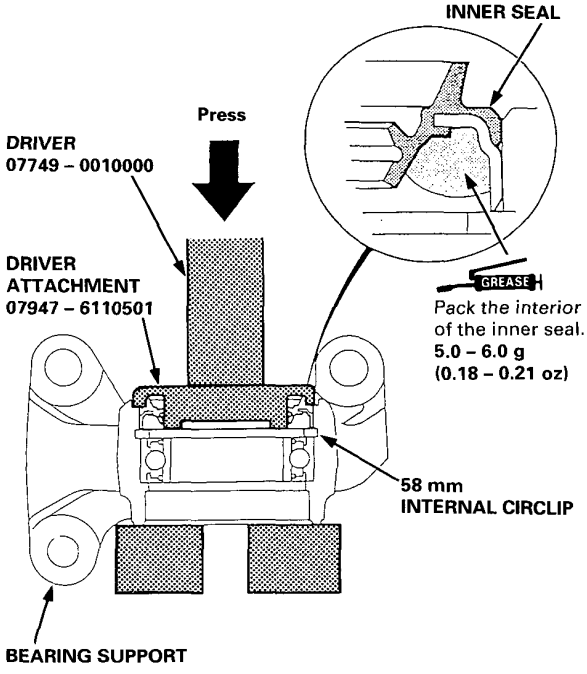
1. Press the intermediate shaft bearing into the bearing support using the special tools and a press as shown.



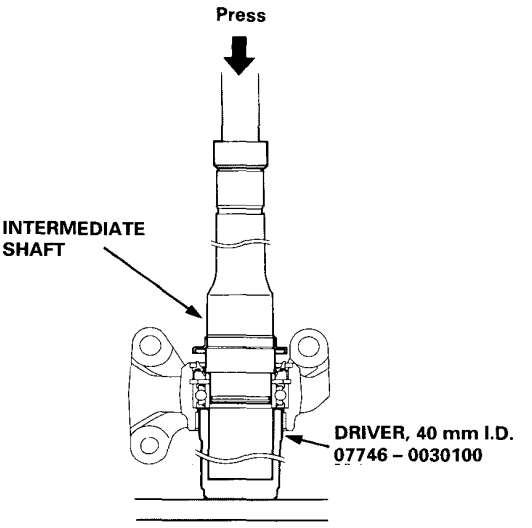
2. Seat the 58 mm internal circlip in the groove of the bearing support.

CAUTION: Install the circlip with the tapered end facing out.

3. Press the intermediate shaft inner seal into the bearing support using the special tools and a press as shown.



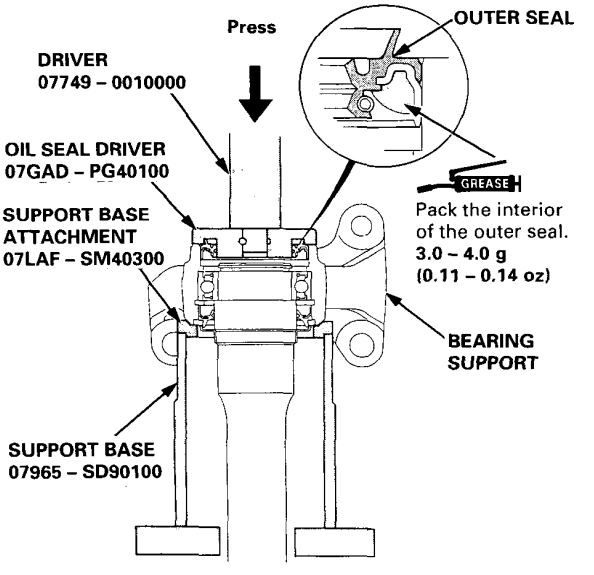
4. Press the intermediate shaft into the shaft bearing using the special tool and a press as shown.



5. Seat the 38 mm external circlip in the groove of the intermediate shaft.

CAUTION: Install the circlip with the tapered end facing out.

6. Press the outer seal into the bearing support using the special tools and a press as shown.

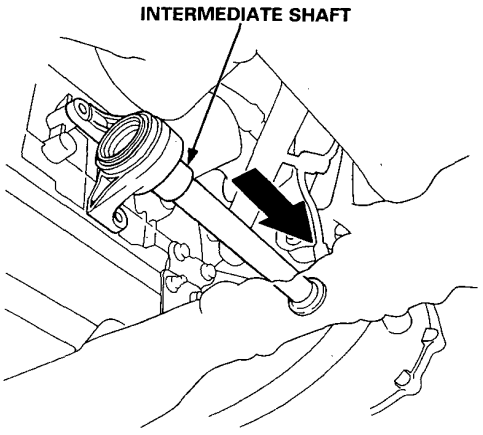


Intermediate Shaft

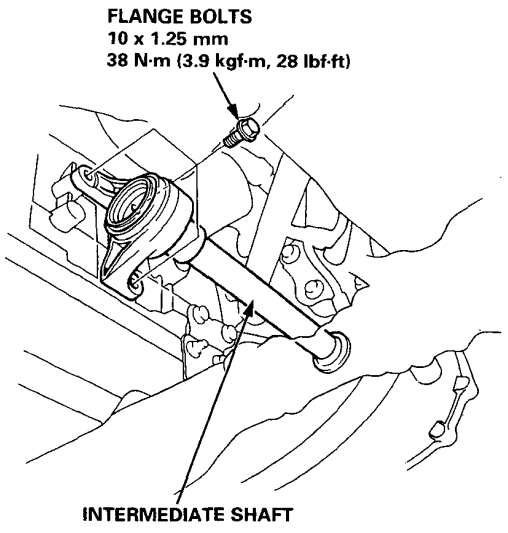
Installation

1. Insert the intermediate shaft assembly into the differential.

   CAUTION: Hold the intermediate shaft horizontal to prevent damage to the differential oil seal.



2. Install the three flange bolts, then tighten them.



Steering

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

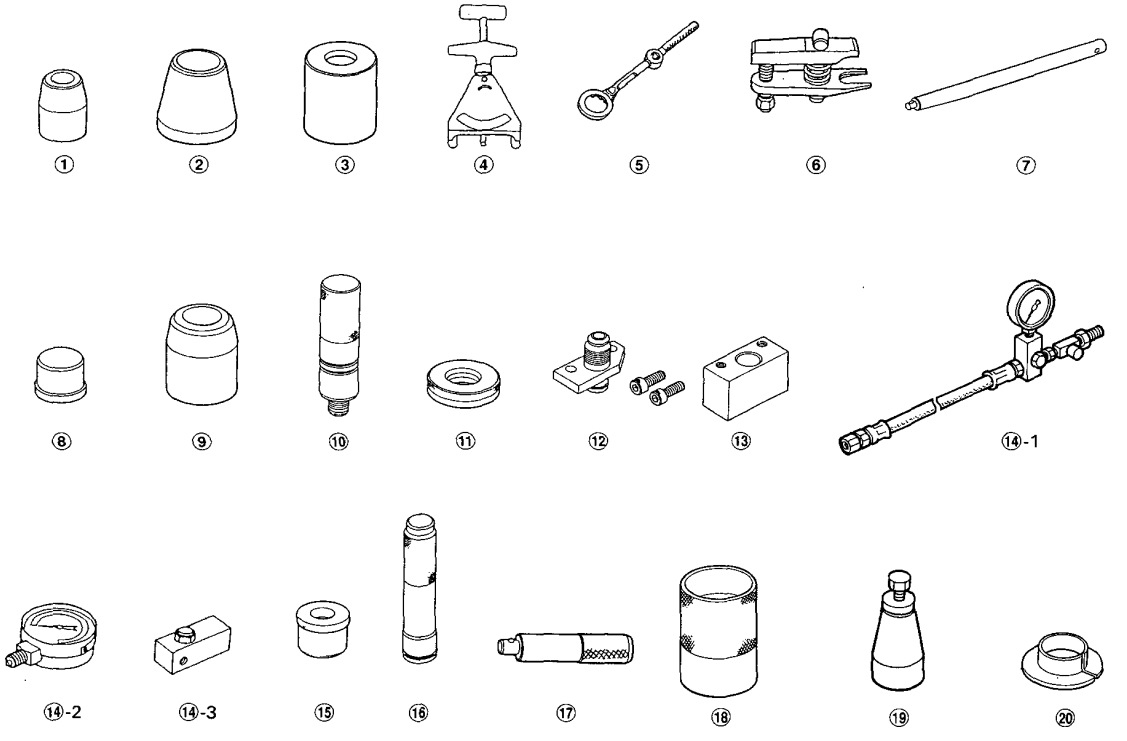
Some model versions of the Accord Coupe include a driver's airbag, located in the steering wheel hub, and a front passenger's airbag, located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Shop Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

⚠ WARNING

- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.**
- **All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.**

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAG – SD40400	Cylinder End Seal Guide	1	17-59
②	07HAG – SF10100	Piston Seal Ring Guide	1	17-58
③	07HAG – SF10200	Piston Seal Ring Sizing Guide	1	17-58
④	07JGG – 0010100	Belt Tension Gauge	1	17-20
⑤	07MAA – SL00100	Locknut wrench, 40 mm	1	17-21
⑥	07MAC – SL00200	Ball Joint Remover, 28 mm	1	17-46
⑦	07NAD – SR30101	Driver Handle	1	17-50
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⑪	07NAG – SR30900	Valve Seal Ring Sizing Remover	1	17-55
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⑲	07974 – SA50800	Ball Joint Boot Clip Guide	1	17-66
⑳	07974 – 6890801	Cylinder End Packing Slider	1	17-58, 59



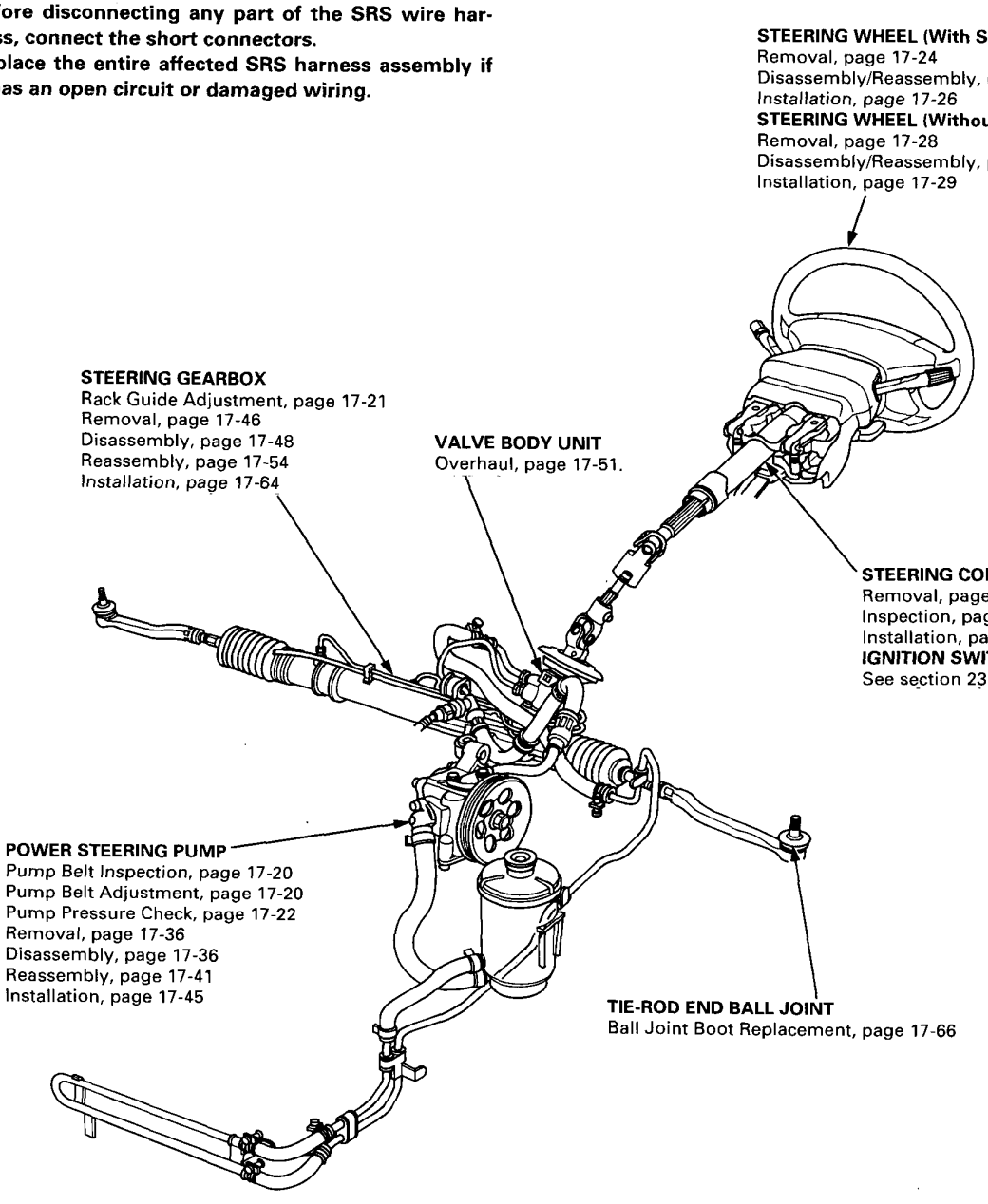
Component Location

Index

Power Steering:

NOTE:
- If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed (see section 23).
- Before removing the gearbox, remove the ignition key to keep the steering shaft from turning.
- After installing the gearbox, check the wheel alignment and adjust if necessary.
- LHD type is shown, RHD type is symmetrical.

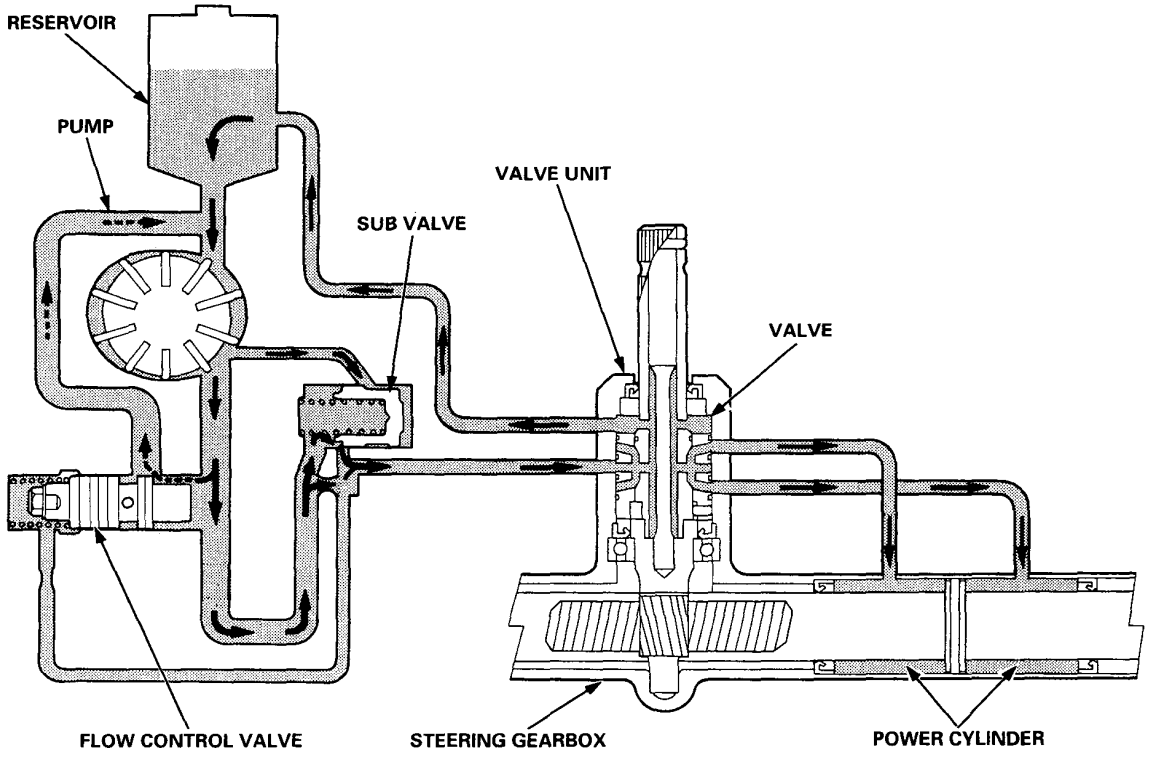
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**



System Description

Fluid Flow Diagram

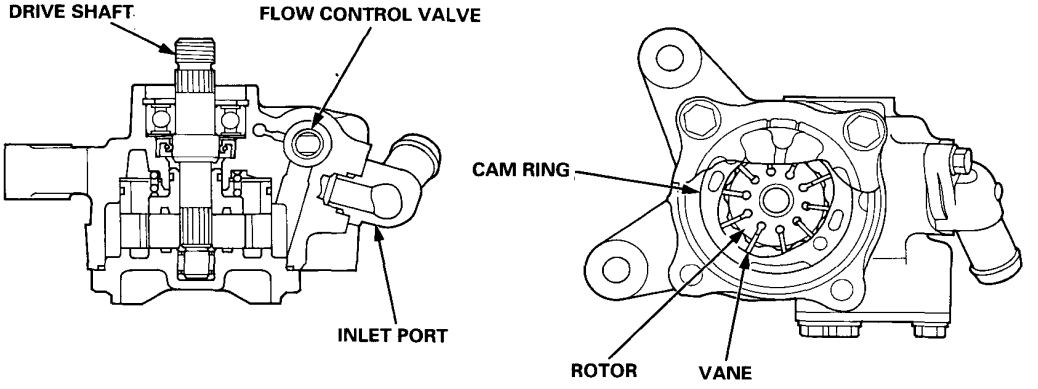
The system is a compact rotary-valve-type power steering, connected to the steering gearbox. The fluid pressure is provided by a vane-type pump which is driven by the engine crank pulley. The amount of fluid and pressure is regulated by the flow control valve built into the pump. The fluid pressure from the pump is delivered to the valve unit around the pinion of the steering gearbox. The valve inside the valve unit controls the hydraulic pressure and changes the direction of the flow. The fluid then flows to the power cylinder, where rack thrust is generated. Fluid returning from the power cylinder flows back to the reservoir, where the fluid is "filtered" and supplied to the pump again.



Steering Pump

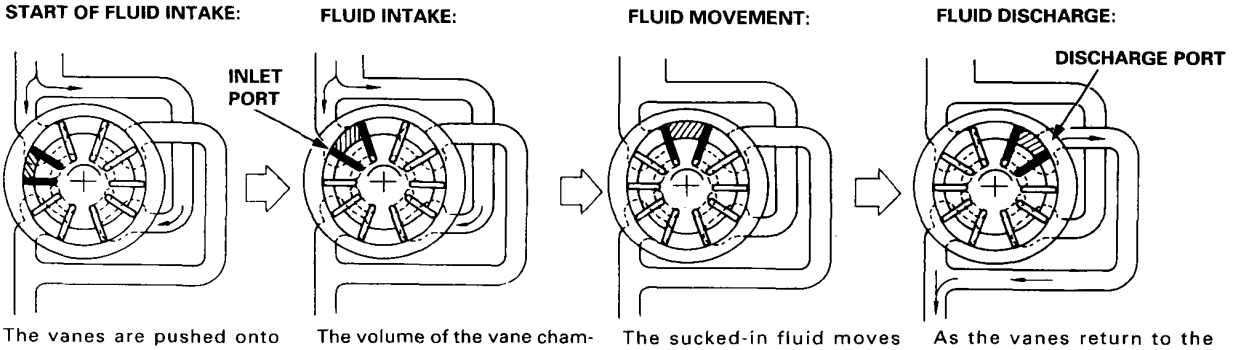
Construction

The pump is a vane-type incorporating a flow control valve (with an integrated relief valve) and is driven by a V-belt from the crank pulley. The pump features 10 vanes. Each vane performs two intake/discharge operations for every rotation of the rotor. This means that the hydraulic fluid pressure pulse becomes extremely small during discharge.



Operation

The belt-driven pulley rotates the rotor through the drive shaft. As the rotor rotates, the hydraulic pressure is applied to the vane chamber of the rotor and the vanes will rotate while being pushed onto the inner circumference of the cam ring. The inner circumference of the cam ring has an extended portion with respect to the center of the shaft, so the rollers move downward in the axial direction as the carrier rotates. As a result of this roller movement, the internal volume of the vane chamber will change, resulting in fluid intake and discharge.



The vanes are pushed onto the inner circumference of the cam ring.

The volume of the vane chamber increases so that fluid is sucked in.

The sucked-in fluid moves toward the discharge port.

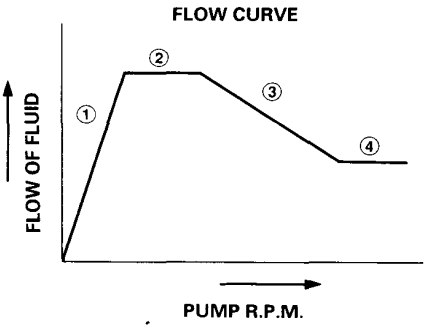
As the vanes return to the their original position on the inner side, the volume of the vane chamber decreases so the fluid is discharged from the discharge port.

(cont'd)

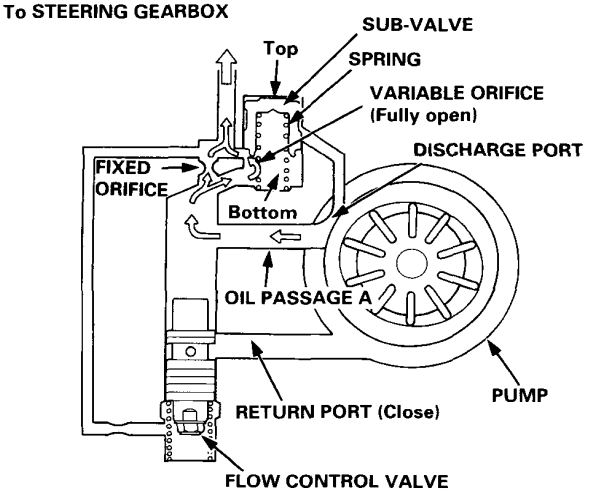
System Description

Steering Pump (cont'd)

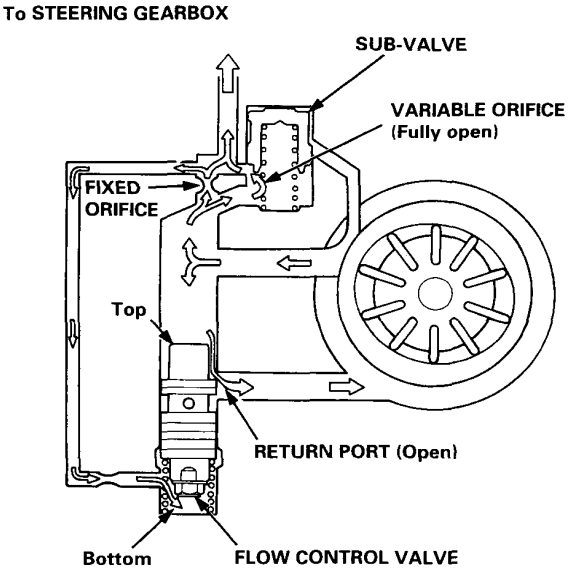
The flow control valve and sub-valve in the pump performs the following steps ① through ④ to control the flow of fluid, that is to increase the discharge volume when engine speed is low and to decrease it when the engine speed increases. The assistance thrust of the steering gearbox changes in compliance with the change in the discharge volume.



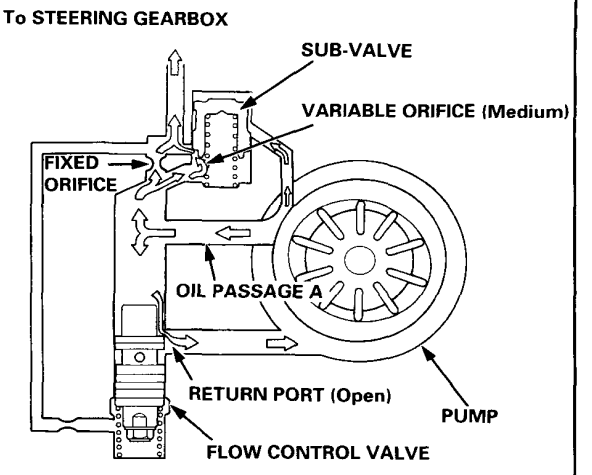
① When the engine starts, fluid discharged from the discharge port starts to flow through oil passage A, the fixed orifice and the variable orifice to the steering gearbox.
When the engine speed is extremely low, the return port is closed by the flow control valve.
Fluid pressure discharged from the discharge port is applied to the top of the sub-valve, and the fluid pressure that passed through oil passage A is applied to the bottom of the sub-valve. Therefore, the pressure difference between the ends of oil passage A, which is caused by the resistance oil passage A when the fluid flows through the passage, is applied to the sub-valve. However, the pressure difference applied to the sub-valve, that is, the force that pushes the sub-valve down, is too small to overcome the spring force, and the variable orifice is fully open when the engine speed is extremely low.



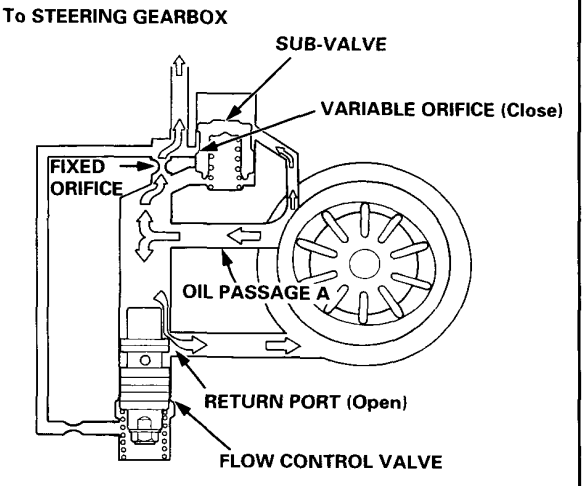
② Because the fluid volume flowing through the fixed orifice and variable orifice increases, a pressure difference is created between the ends of these orifices, and it increases in proportion to the engine speed.
As the fluid pressure that passed the fixed orifice and variable orifice is directed to the bottom of the flow control valve, a pressure difference is created between the top and bottom of the valve, which pushes down the flow control valve and opens the return port. As a result, part of the fluid discharged from the discharge port returns to the pump suction port, keeping the discharge volume constant.
In this condition, the sub-valve does not move, and the variable orifice stays fully open.



③ The fluid volume that flows through oil passage A and the pressure difference applied to the sub-valve increase in proportion to the engine speed. The sub-valve lowers overcoming the spring force, and it starts to close the variable orifice to regulate the discharge volume. Therefore, the fluid volume flowing to the steering gearbox decreases as the engine speed increases.
At the same time, the flow control valve continues to control the fluid volume to the return port.

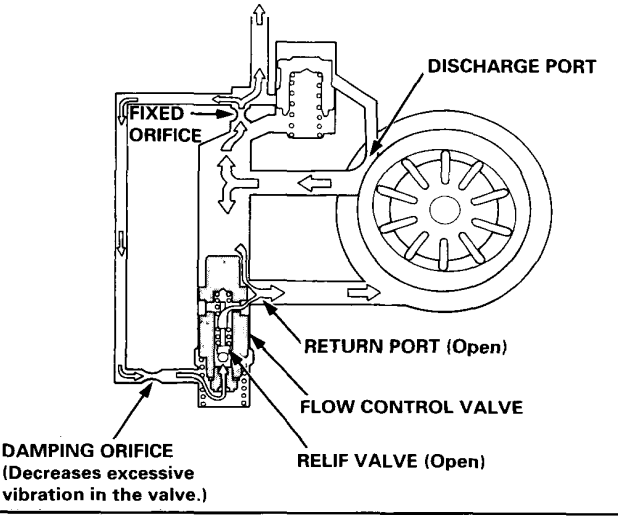


④ As the engine speed increases further, the pressure difference at the sub-valve increases further, too. The sub-valve then closes the variable orifice completely, regulating the discharge volume further. Therefore, the fluid volume discharged from the pump to the steering gearbox is regulated and maintained at a given level until the engine speed reaches the high speed range.
The flow control valve functions continues to control the fluid volume to the return port.



Pressure Relief

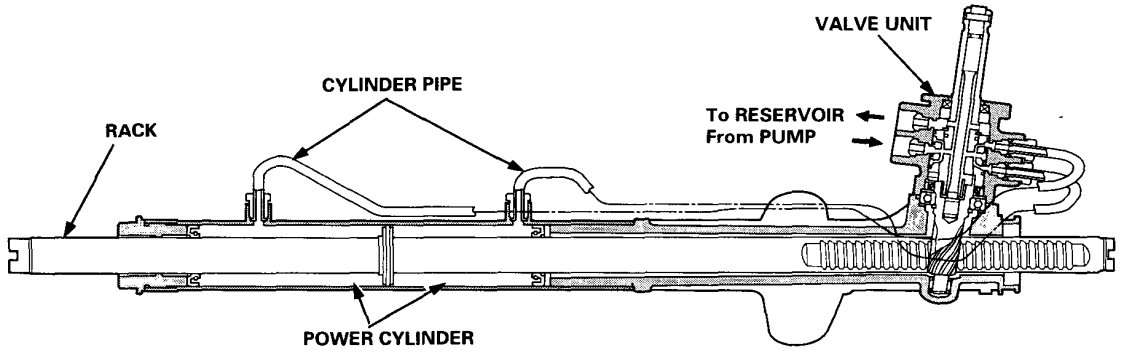
Pressure at the discharge side of the fixed orifice is directed to the bottom of the flow control valve. When the pressure builds up, the relief valve in the flow control valve opens to release the pressure at the bottom of the valve. This allows the flow control valve to be pushed back by the pressure difference, and the fluid volume to the pump return port increases.
As explained above, the system keeps the pump discharge pressure (relief pressure) from exceeding the given level by controlling the volume of the fluid to the pump return port.



System Description

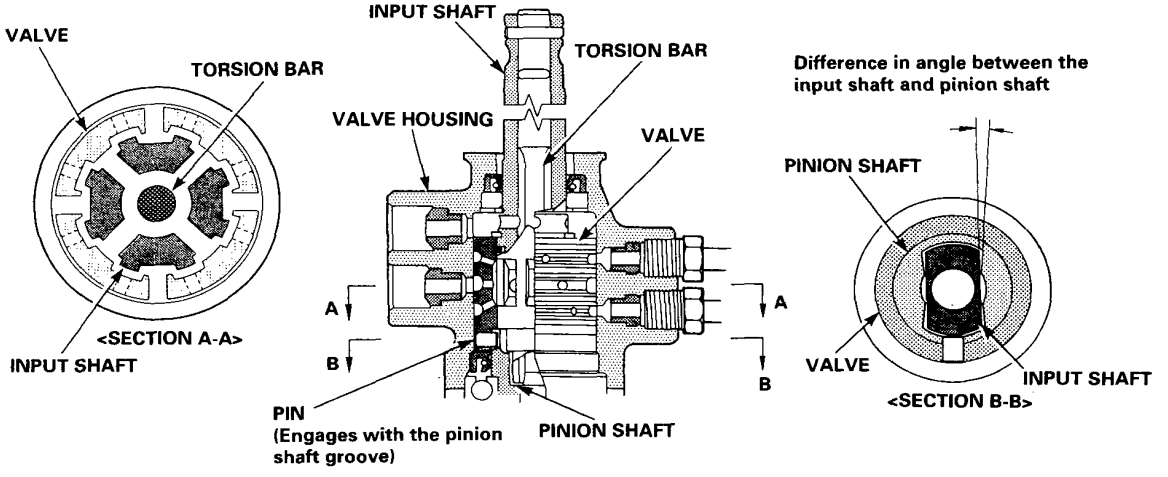
Steering Gearbox

The rack-and-pinion type steering gearbox has a valve unit incorporated with the pinion to control the steering fluid pressure. Steering fluid from the pump is regulated by a rotary valve in the valve unit and is sent through the cylinder pipe to the power cylinder, where hydraulic pressure is applied. The steering fluid in the other side of the power cylinder returns through the cylinder pipe and valve unit to the reservoir.



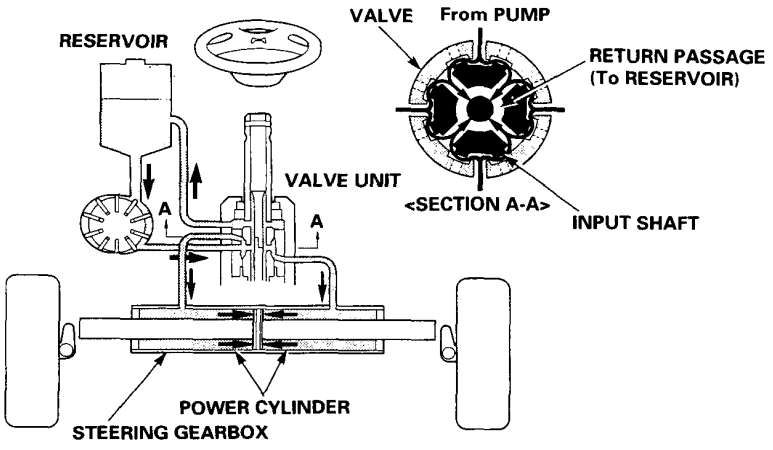
Valve Unit

Inside the valve unit is the valve, which is coaxial with the pinion shaft, and controls the steering fluid pressure. The valve housing is connected with the fluid pipe from the pump, the return pipe to the pump, and the two cylinder pipes from the respective power cylinder.
The pinion shaft is double – structured with the input shaft connected to the pinion gear, both of which are interconnected with the torsion bar.
The pin inserted in the valve and the pinion shaft groove engage; this allows the pinion shaft to rotate together with the valve.
Because of this construction, the difference in angle in the circumferential direction between the input shaft and the valve becomes larger according to the torsional strength of the pinion or steering resistance. However, maximum torsion between the shafts is regulated by the engaged splines of the shafts at the pin engagement section to hold the torsion bar within the set value.
This allows the steering system to function as an ordinary rack-and-pinion type steering if the steering fluid is not pressurized because of a faulty pump.

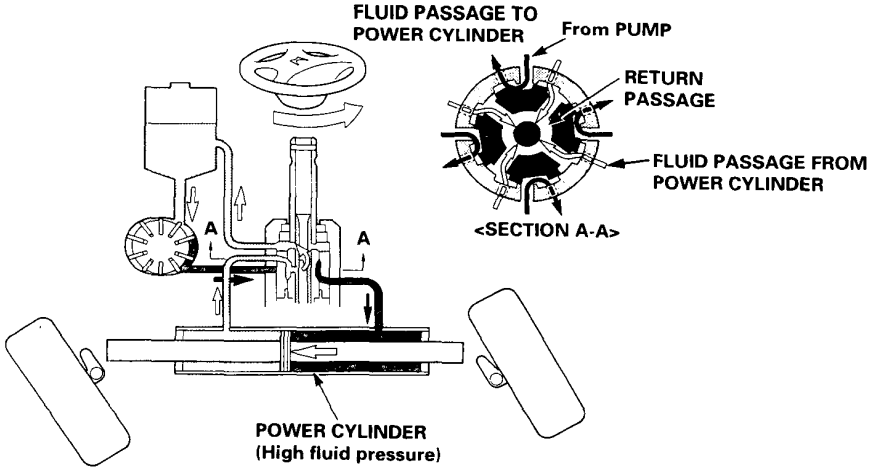


Pressure Control

Low assist at higher speeds:
When steering resistance is low, such as when driving at high speeds, or when driving straight ahead, the input shaft is near or in the neutral position, so there is little or no flow to any of the power cylinder orifices. Most of the feed pressure from the pump is bypassed to the reservoir. Because of this, the pressure stays the same in both sides of the power cylinder, resulting in low or no assist.



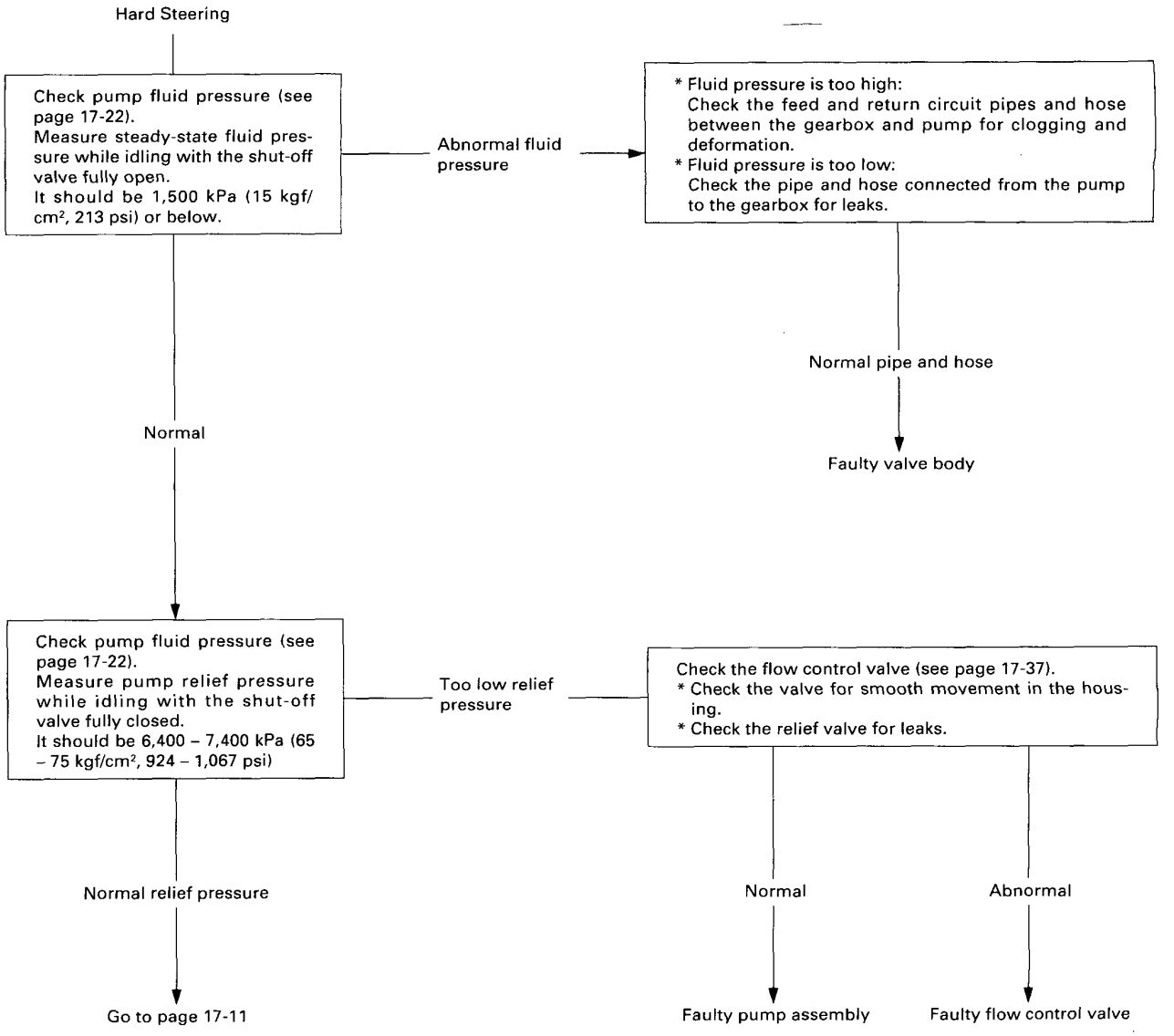
High assist at lower speeds:
When steering resistance is high, such as when driving at low speeds, or when turning the wheel with the car stopped, the difference in angle created between the input shaft and the valve opens the fluid passage on one side, and closes the fluid passage on the other side, at each pair of orifices. The fluid pressure increases in the side of the power cylinder fed by the larger fluid passage. This increased pressure pushes on the rack piston, allowing the steering wheel to be turned with light effort. On the other side of the power cylinder, the return passage opens allowing the steering fluid to return through the input shaft to the reservoir. The fluid passages to the power cylinder automatically change in size, increasing as the steering resistance increases. In other words, the passages become larger and power assist increases when the steering effort would normally be high, (for example, when parking or making low speed turns), and the passages become smaller and power assist decreases when the steering effort would normally be low, (for example, when driving at high speeds or straight ahead).

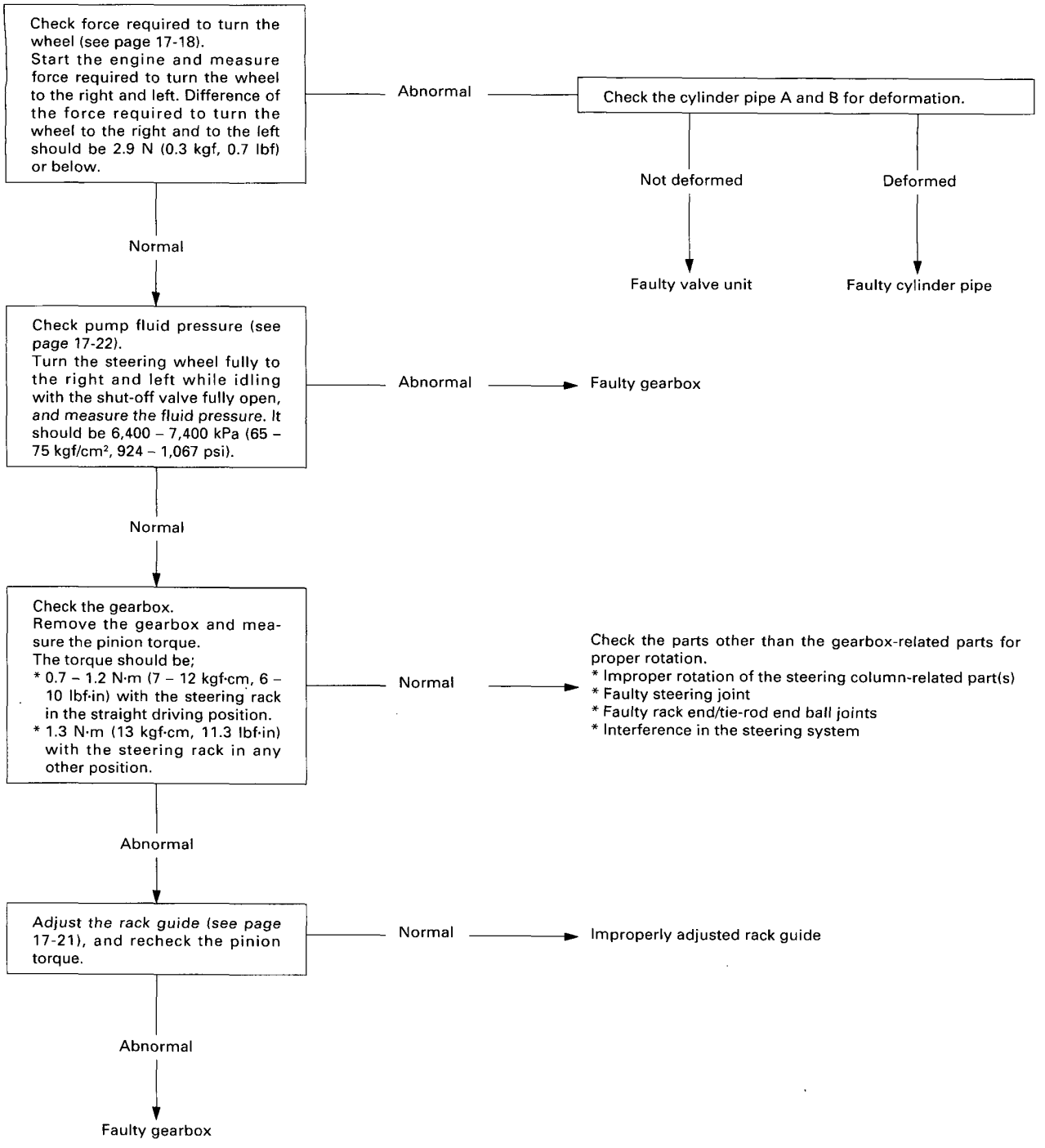


General Troubleshooting

Check the following before you begin:

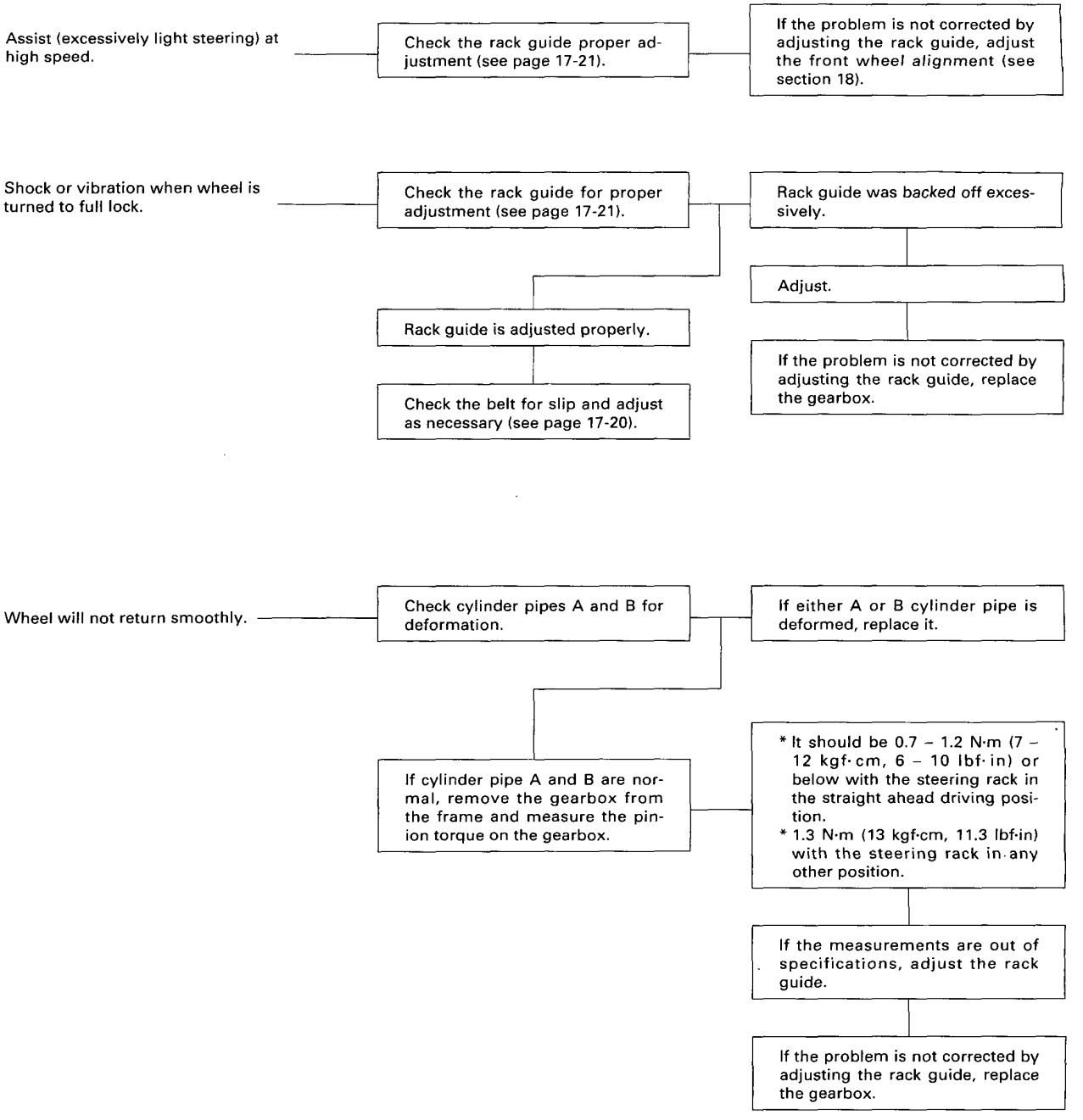
- Has the suspension been modified in a way that would affect steering?
- Are tire sizes, tire variety and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?




Check force required to turn the wheel (see page 17-18).
Start the engine and measure force required to turn the wheel to the right and left. Difference of the force required to turn the wheel to the right and to the left should be 2.9 N (0.3 kgf, 0.7 lbf) or below.
Abnormal
Check the cylinder pipe A and B for deformation.
Not deformed
Deformed
Faulty valve unit
Faulty cylinder pipe
Normal
Check pump fluid pressure (see page 17-22).
Turn the steering wheel fully to the right and left while idling with the shut-off valve fully open, and measure the fluid pressure. It should be 6,400 – 7,400 kPa (65 – 75 kgf/cm², 924 – 1,067 psi).
Abnormal
Faulty gearbox
Normal
Check the gearbox.
Remove the gearbox and measure the pinion torque.
The torque should be;
* 0.7 – 1.2 N·m (7 – 12 kgf·cm, 6 – 10 lbf·in) with the steering rack in the straight driving position.
* 1.3 N·m (13 kgf·cm, 11.3 lbf·in) with the steering rack in any other position.
Normal
Check the parts other than the gearbox-related parts for proper rotation.
* Improper rotation of the steering column-related part(s)
* Faulty steering joint
* Faulty rack end/tie-rod end ball joints
* Interference in the steering system
Abnormal
Adjust the rack guide (see page 17-21), and recheck the pinion torque.
Normal
Improperly adjusted rack guide
Abnormal
Faulty gearbox

(cont'd)

General Troubleshooting (cont'd)





Uneven or rough steering.	Improperly adjusted rack guide.	Adjust rack guide (see page 17-21).
		If the problem is not corrected by adjusting the rack guide, replace the gearbox.
	Belt slipping on pulley.	Adjust belt tension. Replace belt, if necessary (see page 17-20).
	Idle speed low or erratic.	If the engine stalls when wheel is turned while car is stopped or moving at low speed, adjust idle speed (see section 11).
	Air in reservoir, or check power steering fluid level.	Check power steering fluid level. If level is excessively low, check for leaks in the system. Add fluid to the specified level.
		If fluid level is OK, check O-rings and seals on both ends of the pump inlet hose, and the oil pump housing mating surfaces for suction leaks. Replace parts as necessary.
Steering kicks back during wide turns.	Pump belt slipping on pulley (pump stops momentarily).	Adjust belt tension (see page 17-20) or replace belt.
	Set the power steering pressure gauge. Close the shut-off valve fully and measure the pump pressure (see page 17-22).	Check if pump pressure is within the range 6,400 – 7,400 kPa (65 – 75 kgf/cm², 924 – 1,067 psi) and the gauge needle travel is 500 kPa (5 kgf/cm², 71 psi) or less. Check the flow control valve if the needle travel exceeds 500 kPa (5 kgf/cm², 71 psi). If the flow control valve is normal, replace the pump as an assembly.

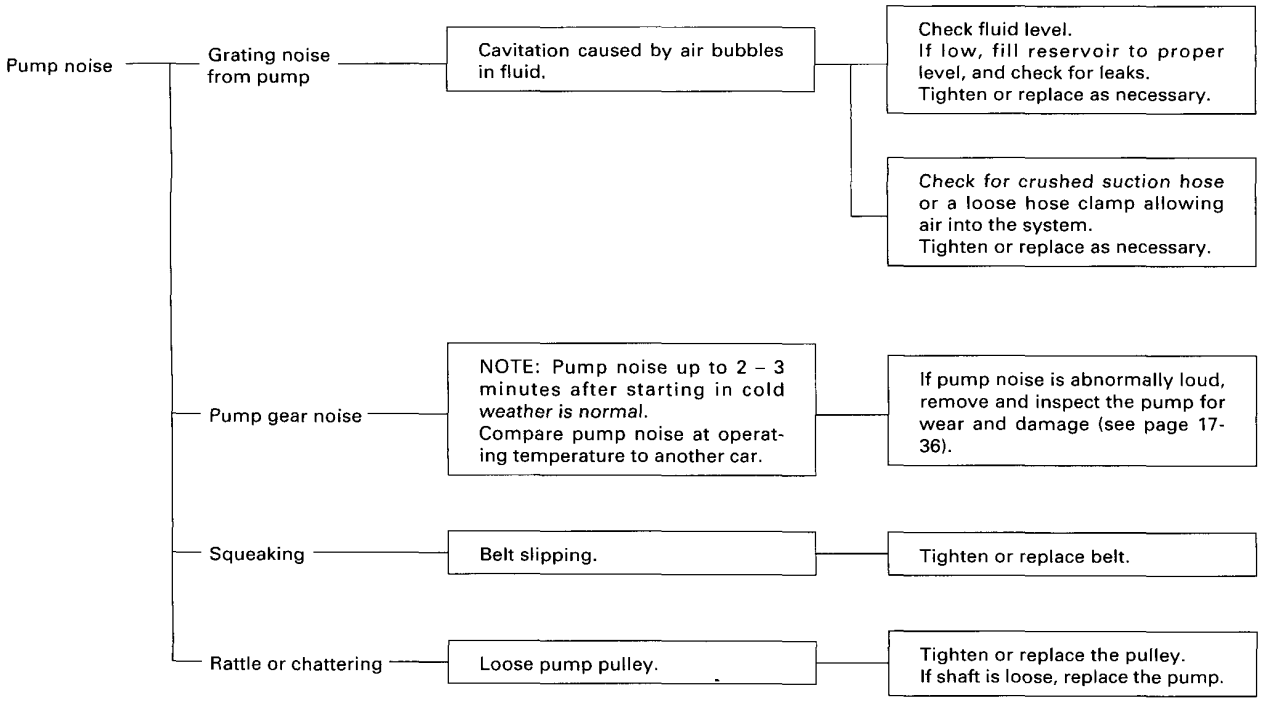
Troubleshooting

Noise and Vibration

NOTE: Pump noise in first 2 – 3 minutes after starting in cold weather is normal.

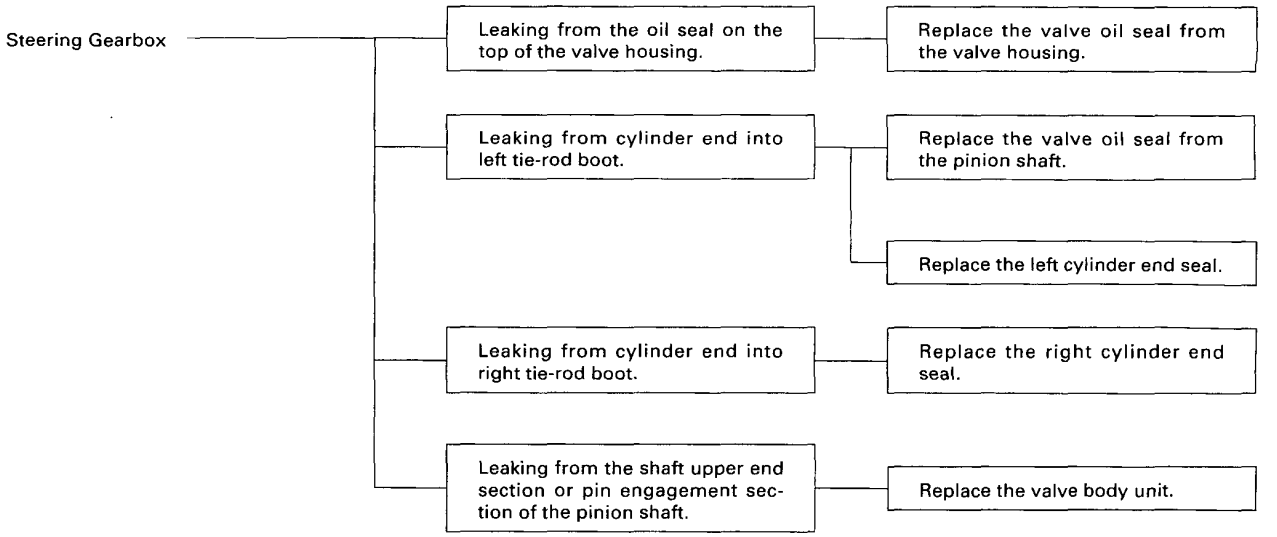
Humming	Humming due to pulsation of fluid is normal, particularly when wheel is turned with car stopped.	
	If equipped with automatic transmission, the hum could be torque converter or pump noise.	Confirm by temporarily removing pump belt.
	High pressure line touching the frame.	Reposition the line.
Rattle or chattering	Loose steering shaft connector, tie-rod, or ball joint.	Check and tighten, or replace parts as necessary.
	Column shaft wobbling.	Replace column assembly.
	Check the rack guide for proper adjustment (see page 17-21).	Adjust, if necessary.
	Rattling sound and feeling when turning the steering wheel right and left with the engine OFF is a sound when the valve unit contacts the stopper. This is normal.	
	Striking sound when turning the steering wheel fully right or left is a sound when the stopper washer contacts the stopper. This is normal.	
Hissing	Pump noise, though not loud, from the valve body unit can be heard when turning the steering wheel right or left. This is normal.	

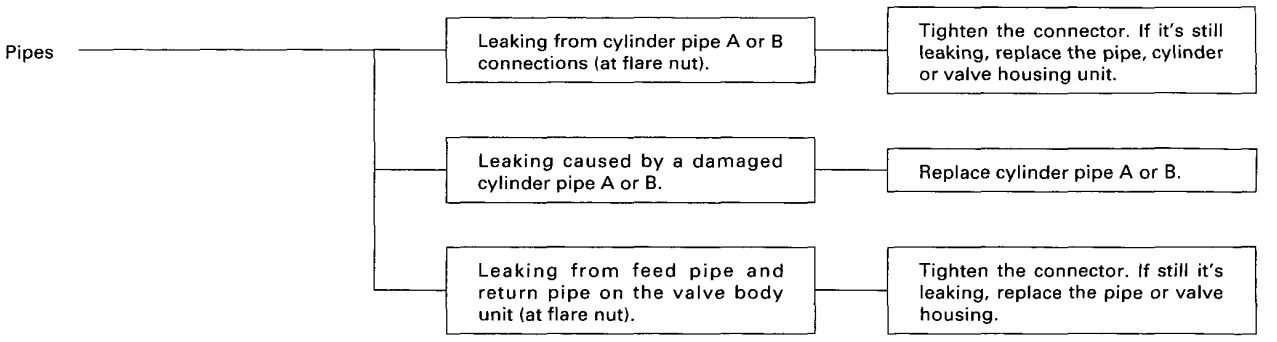
CAUTION: When inspecting, do not holding the steering wheel all the way to right or left.

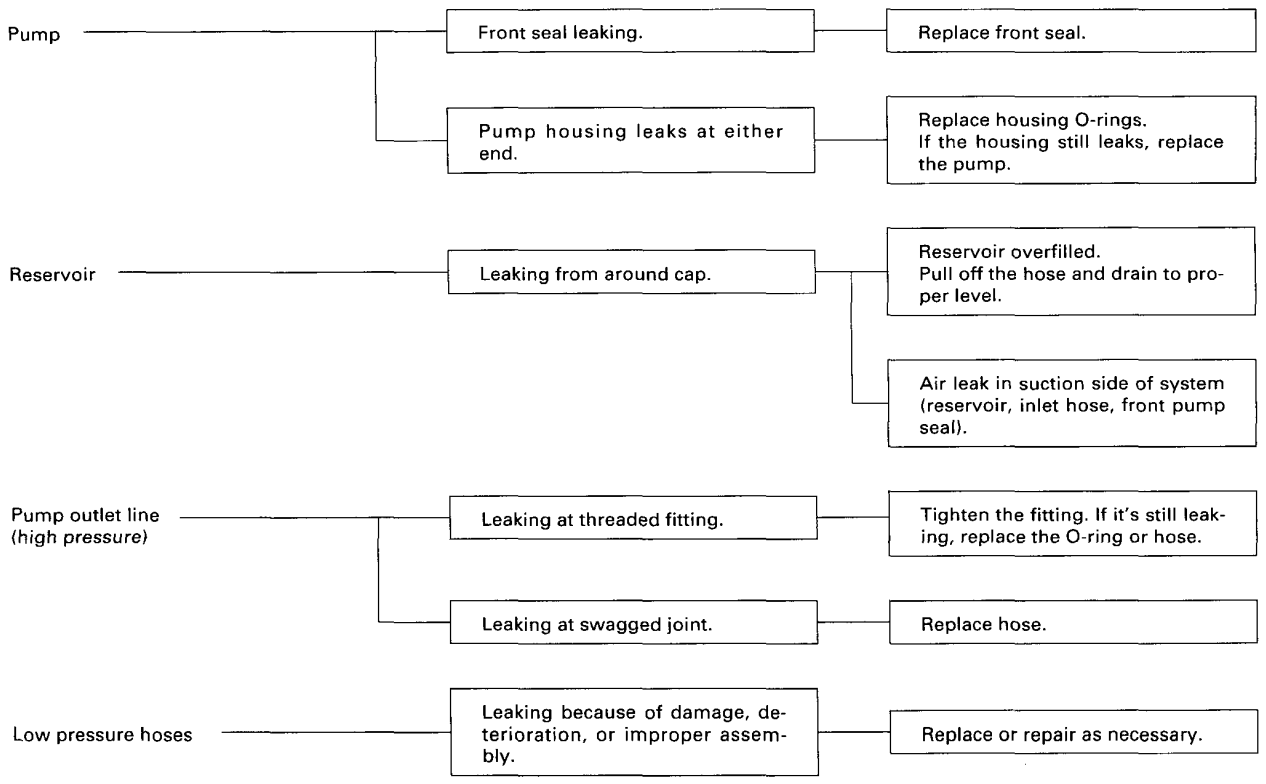

Pump noise
Grating noise from pump
Cavitation caused by air bubbles in fluid.
Check fluid level.
If low, fill reservoir to proper level, and check for leaks.
Tighten or replace as necessary.
Check for crushed suction hose or a loose hose clamp allowing air into the system.
Tighten or replace as necessary.
Pump gear noise
NOTE: Pump noise up to 2 – 3 minutes after starting in cold weather is normal.
Compare pump noise at operating temperature to another car.
If pump noise is abnormally loud, remove and inspect the pump for wear and damage (see page 17-36).
Squeaking
Belt slipping.
Tighten or replace belt.
Rattle or chattering
Loose pump pulley.
Tighten or replace the pulley.
If shaft is loose, replace the pump.

Fluid Leaks

- Check the gearbox assembly for oil leaks carefully. Oil can leak out of various points, depending on location of the faulty oil seals/seal rings. Check the following before removing the gearbox from the frame.






Pump
Front seal leaking.
Replace front seal.
Pump housing leaks at either end.
Replace housing O-rings. If the housing still leaks, replace the pump.
Reservoir
Leaking from around cap.
Reservoir overfilled. Pull off the hose and drain to proper level.
Air leak in suction side of system (reservoir, inlet hose, front pump seal).
Pump outlet line (high pressure)
Leaking at threaded fitting.
Tighten the fitting. If it's still leaking, replace the O-ring or hose.
Leaking at swagged joint.
Replace hose.
Low pressure hoses
Leaking because of damage, deterioration, or improper assembly.
Replace or repair as necessary.

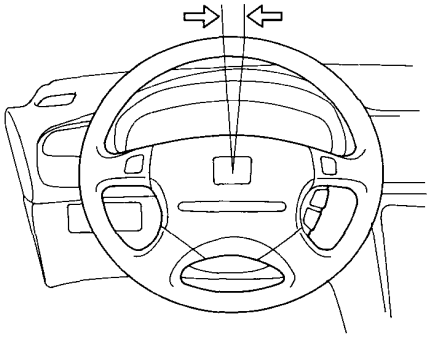
Steering Operation

Place the front wheels in the straight ahead position, and measure the distance the steering wheel can be turned without moving the front wheels.

ROTATIONAL PLAY: 0 – 10 mm (0 – 0.39 in)

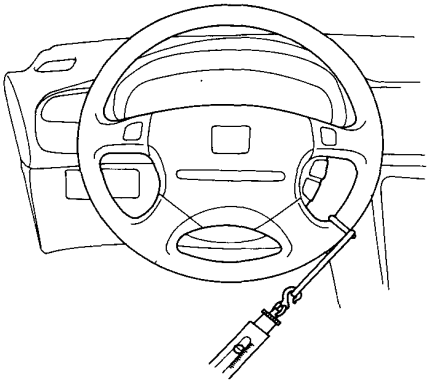
If the play exceeds the service limit, perform rack guide adjustment (see page 17-21).
If the play is still excessive after rack guide adjustment, inspect the steering linkage and gearbox as described on the next page.

ROTATIONAL PLAY



Power Assist Check with Car Parked

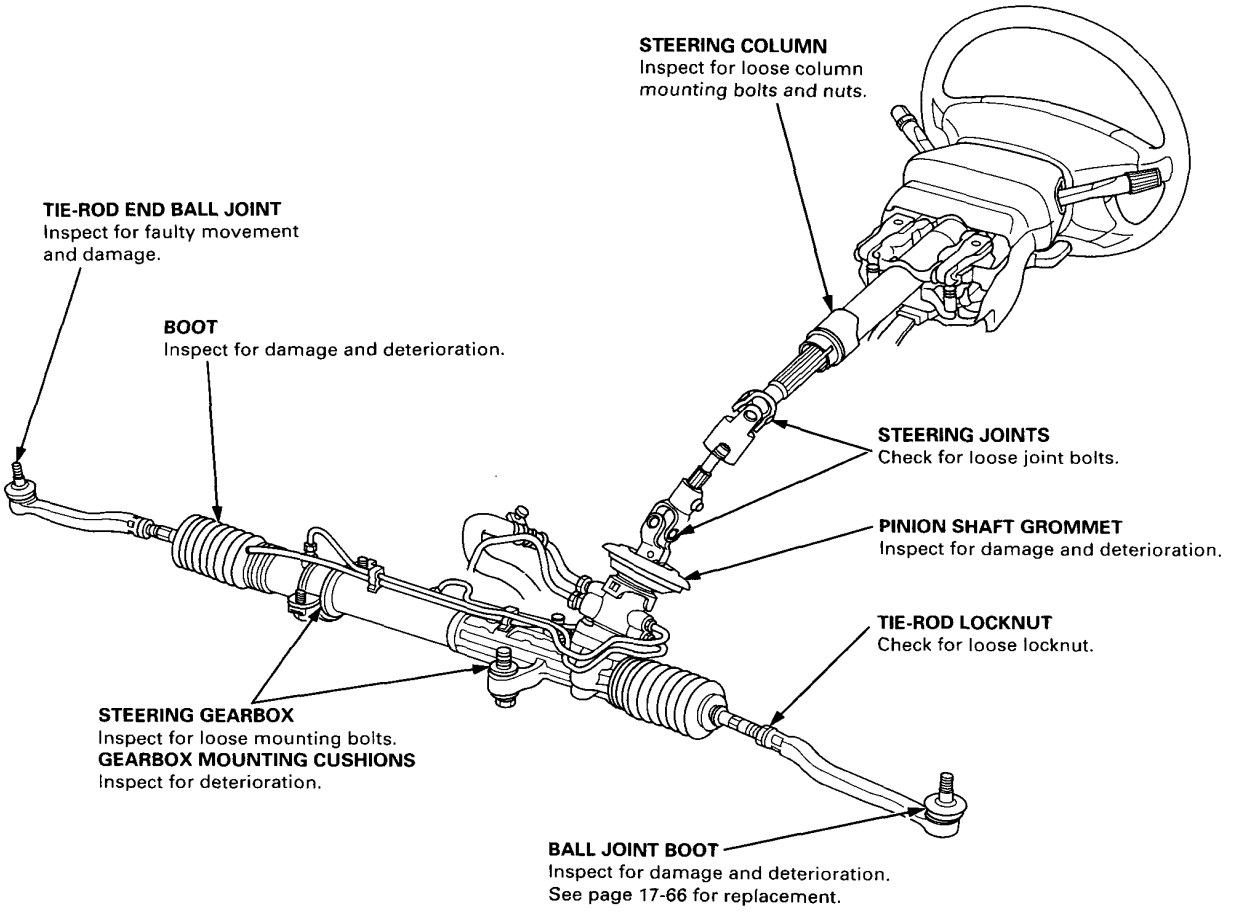
1. Check the power steering fluid level (see page 17-21) and pump belt tension (see page 17-20).
2. Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.
3. Attach a spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.



4. The scale should read no more than 29 N (3.0 kgf, 6.6 lbf). If it reads more, check the gearbox and pump.

Steering Linkage and Gearbox

NOTE: LHD type is shown, RHD type is symmetrical.



Pump Belt

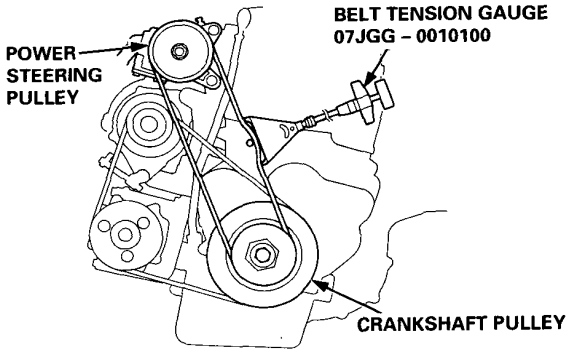
NOTE: When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

Inspection

Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension:
Used Belt: 390 – 540 N (40 – 55 kgf, 88 – 120 lbf)
New Belt: 740 – 880 N (75 – 90 kgf, 170 – 200 lbf)

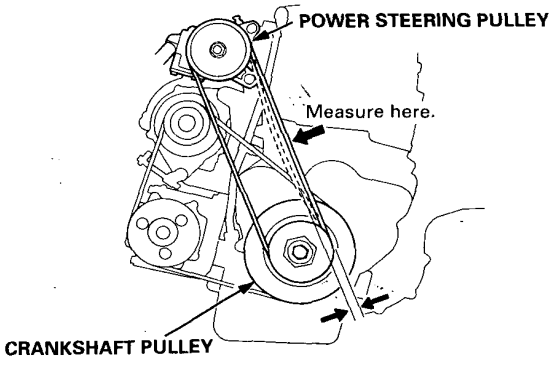
NOTE:
- If there are cracks or any damage evident on the belt, replace it with a new one.
- Follow the manufacturer's instructions for the tension gauge.



Inspect the pump belt for cracks or any damage. Replace the belt with a new one if necessary.

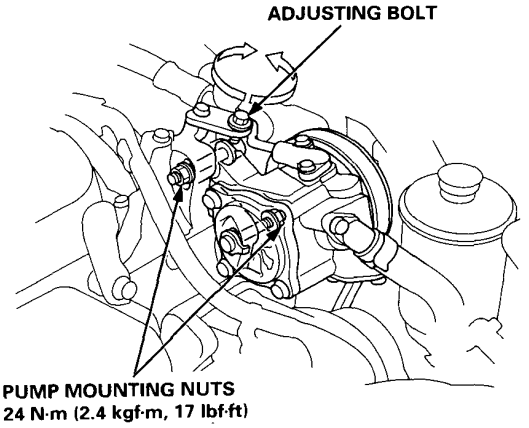
Measurement without Belt Tension Gauge:
Apply a force of 98 N (10 kgf, 22 lbf) and measure the deflection between the power steering pump and the crankshaft pulleys.

Deflection:
Used Belt: 13.0 – 16.0 mm (0.51 – 0.63 in)
New Belt: 11.0 – 12.5 mm (0.43 – 0.49 in)



Adjustment

1. Loosen the power steering pump mounting nuts.
2. Turn the adjusting bolt to get the proper belt tension, then retighten the nuts.
3. Start the engine and turn the steering wheel from lock-to-lock several times, then stop the engine and recheck the deflection of the belt.



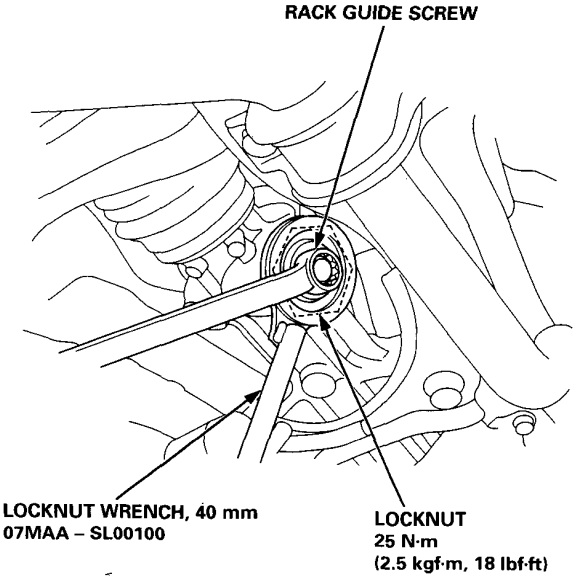
Rack Guide Adjustment

NOTE: Perform rack guide adjustment with the wheels in the straight ahead position.

1. Loosen the rack guide screw locknut with the special tool, then loosen the rack guide screw.
2. Tighten the rack guide screw to 25 N·m (2.5 kgf·m, 18 lbf·ft), then loosen it.
3. Retighten the rack guide screw to 3.9 N·m (0.4 kgf·m, 2.9 lbf·ft), then back it off to specified angle.

   Specified Return Angle: 20 ± 5°
4. Tighten the locknut while holding the rack guide screw.

   NOTE: LHD type is shown, RHD type is symmetrical.



5. Check for tight or loose steering through the complete turning travel.
6. Perform following inspections:
   - Steering operation (see page 17-18).
   - Power assist with car parked.

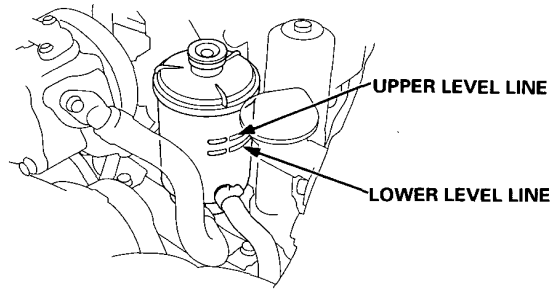
Fluid Replacement

Check the reservoir at regular intervals, and add fluid as necessary.

CAUTION: Use only Genuine Honda Power Steering Fluid-V. Using other fluids such as ATF or other manufacturer's power steering fluid will damage the system.

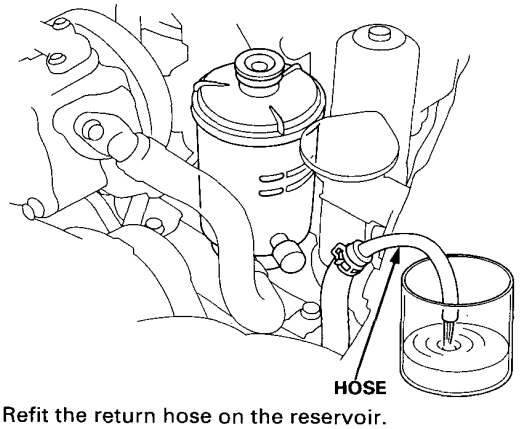
SYSTEM CAPACITY:
1.1 liter (1.16 US. qt, 0.97 Imp.qt)
at disassembly

RESERVOIR CAPACITY:
0.4 liter (0.42 US. qt, 0.35 Imp.qt)



1. Raise the reservoir, then disconnect the return hose that goes to the oil cooler.
2. Connect a hose of suitable diameter to the disconnected return hose, and put the hose end in a suitable container.

   CAUTION: Take care not to spill the fluid on the body and parts. Wipe off the spilled fluid at once.
3. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.



4. Refit the return hose on the reservoir.
5. Fill the reservoir to the upper level line.
6. Start the engine and run it at fast idle, then turn the steering from lock-to-lock several times to bleed air from the system.
7. Recheck the fluid level and add some if necessary.

   CAUTION: Do not fill the reservoir beyond the upper level line.

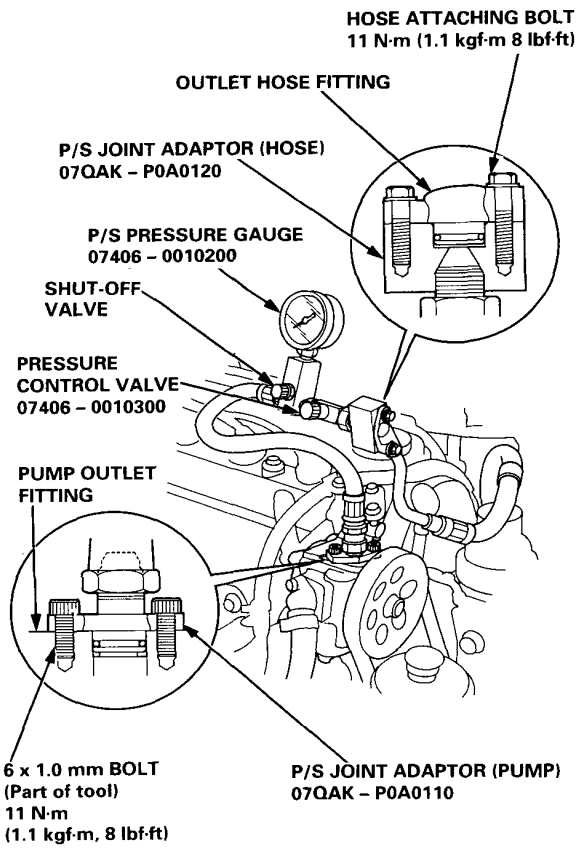
Pump Pressure Check

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

NOTE: First check the power steering fluid level and pump belt tension.

CAUTION: Disconnect the high pressure hose with care so as not to spill the power steering fluid on the frame and other parts.

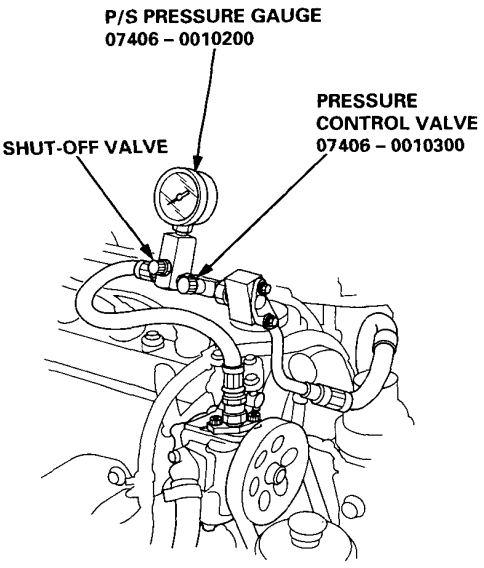
1. Disconnect the outlet hose from the pump outlet fitting, and install the pump joint adapter on the pump outlet.
2. Connect the hose joint adapter to the power steering pressure gauge, then connect the outlet hose to the adaptor.
3. Install the power steering pressure gauge to the pump joint adaptor as shown.



4. Open the shut-off valve fully.
5. Open the pressure control valve fully.
6. Start the engine and let it idle.
7. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.
8. Measure steady-state fluid pressure while idling with the shut-off valve fully open. If the pump is in good condition, the gauge should read less than 1500 kpa (15 kgf/cm², 213 psi).
   If it reads high, check the feed line or valve body unit (see General Troubleshooting 17-10).
9. Close the shut-off valve, then close the pressure control valve gradually until the pressure gauge needle is stable. Read the pressure.
10. Immediately open the shut-off valve fully.

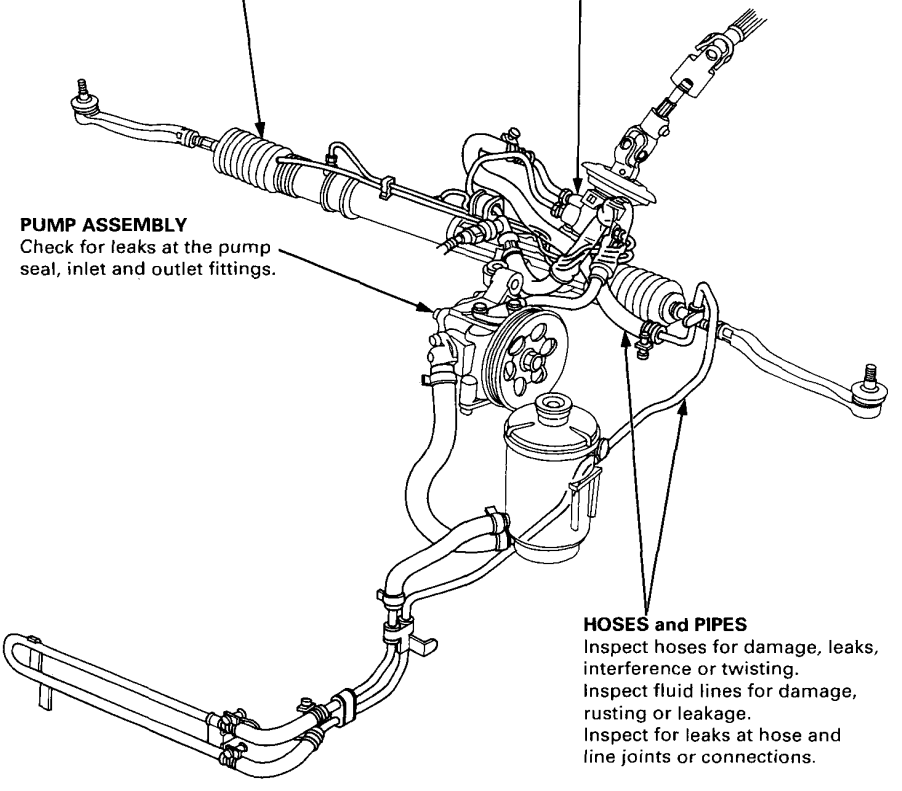
    CAUTION: Do not keep the shut-off valve closed more then 5 seconds or the pump could be damaged by over-heating.

    If the pump is in good condition, the gauge should read at least 6,400 – 7,400 kpa (65 – 75 kgf/cm², 924 – 1,067 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.



Fluid Leakage Inspection

NOTE: LHD type is shown, RHD type is symmetrical.



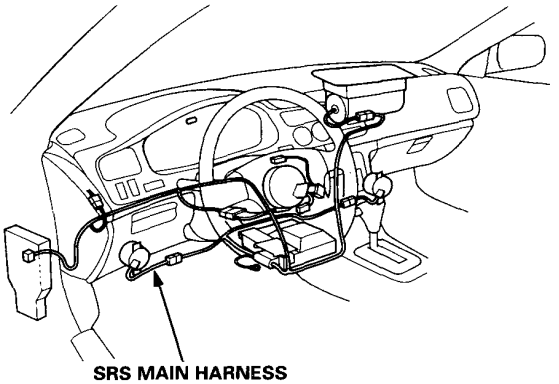
Steering Wheel (With SRS)

Removal

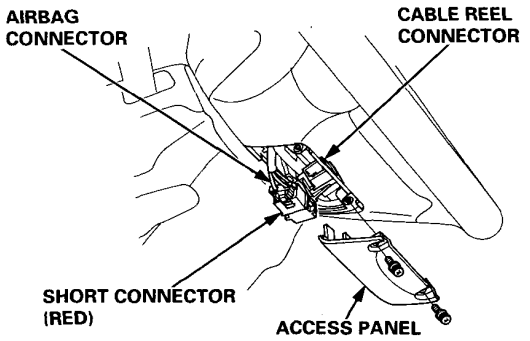
Airbag Removal

NOTE: LHD type is shown, RHD type is symmetrical.

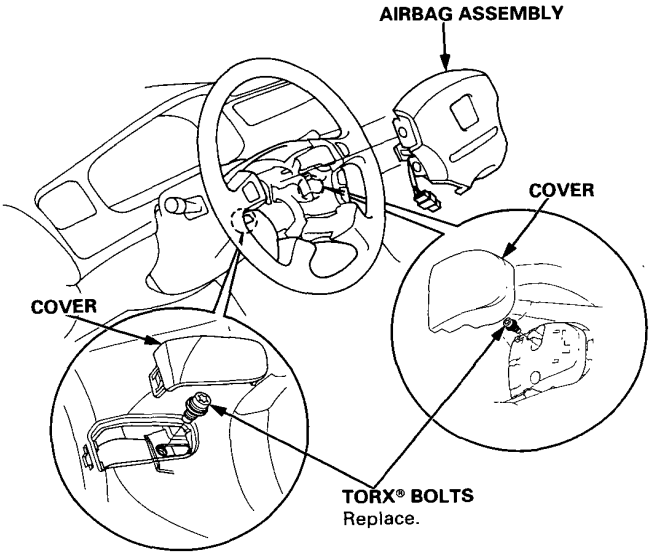
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**



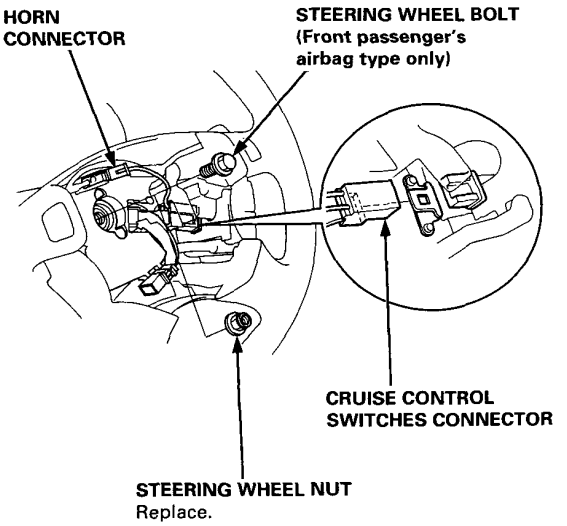
1. Disconnect the negative cable first, then positive cable from the battery.
2. Remove the access panel from the steering wheel lower cover, then remove the short connector.
3. Disconnect the connector between the airbag and cable reel.
4. Connect the short connector to the airbag side of the connector.



5. Remove the covers.
6. Remove the TORX® T30 bit bolts, then remove the airbag assembly.



7. Disconnect the connectors from the horn and cruise control switches.
8. Remove the steering wheel nut or bolt.

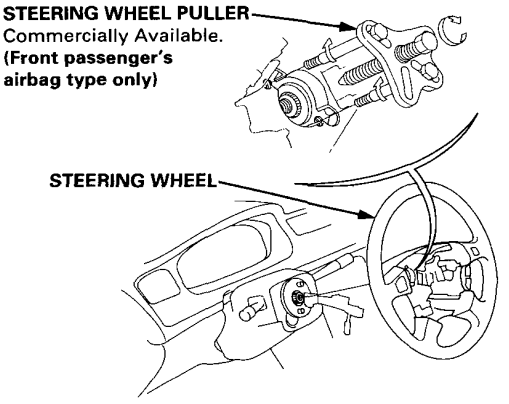


— Removal

9. Remove the steering wheel.

   NOTE: If equipped with the front passenger's airbag, install a commercially available steering wheel puller to the steering wheel to remove it.

CAUTION: Do not tap on the steering wheel or the steering column shaft when removing the steering wheel.

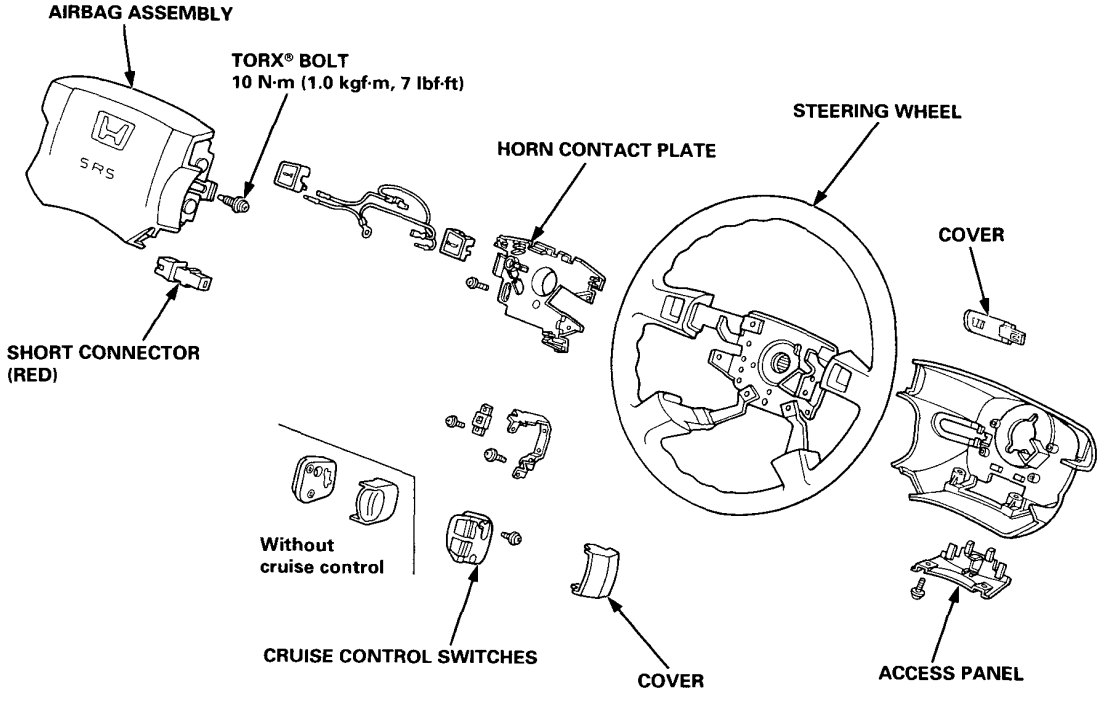


— Disassembly/Reassembly

⚠ WARNING Store a removed airbag assembly with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

NOTE: If an intact airbag assembly has been removed from a scrapped car, or has been found defective or damaged during transit, storage or service, it should be deployed (see section 23).

CAUTION:
- **Carefully inspect the airbag assembly before installing. Do not install an airbag assembly that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.**
- **Always keep the short connector on the airbag connector when the harness is disconnected.**
- **Do not disassemble or tamper with the airbag assembly.**



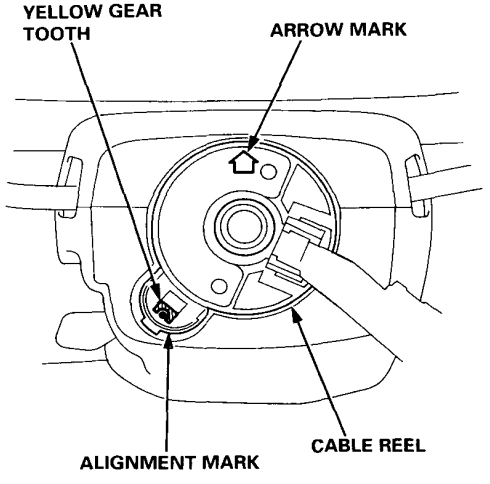
Installation

Airbag installation

CAUTION:
- **Before installing the steering wheel, align the front wheels straight ahead.**
- **Be sure to install the harness wires so that they are not pinched or interfering with other car parts.**
- **Do not replace the original steering wheel with any other design, since it will make it impossible to properly install the airbag. (Only use genuine Honda replacement parts)**
- **After reassembly, confirm that the wheels are still straight ahead and that steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjustment of the tie-rods, not by removing and repositioning the steering wheel.**

⚠ WARNING Confirm that the airbag assembly is securely attached to the steering wheel; otherwise, severe personal injury could result during airbag deployment.

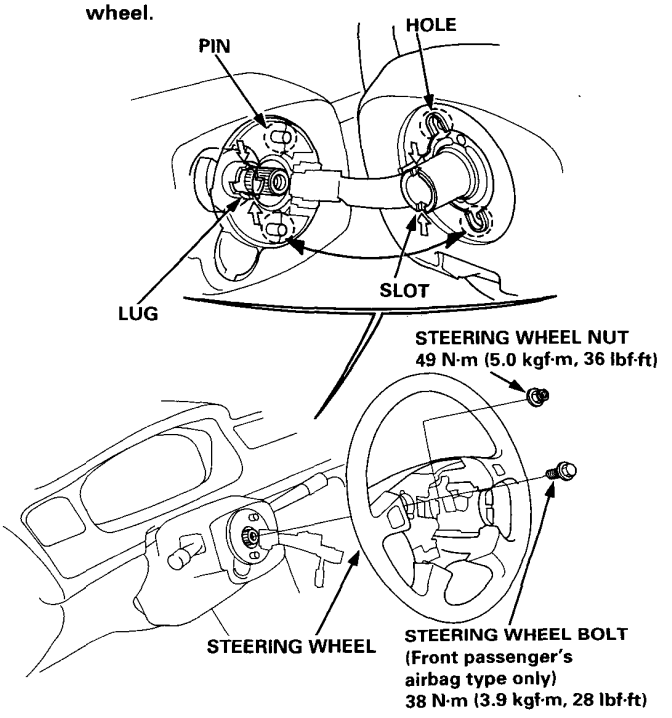
1. Before installing the steering wheel, center the cable reel.
   Do this by first rotating the cable reel clockwise until it stops.
   Then rotate it counterclockwise (approximately two turns) until:
   — The yellow gear tooth lines up with the mark on the cover.
   — The arrow on the cable reel label points straight up.



2. Install the steering wheel with the steering wheel nut or bolt.

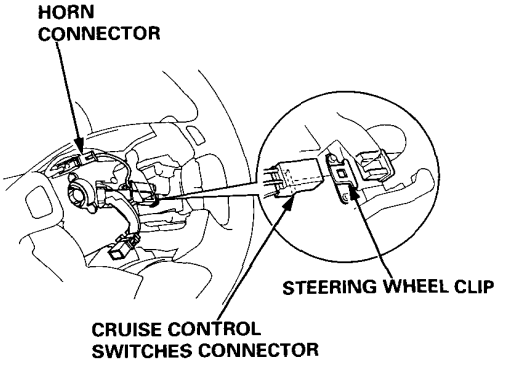
   NOTE: Be sure the steering wheel shaft engages the cable reel and canceling sleeve.

   CAUTION: Do not tap on the steering wheel or steering column shaft when installing the steering wheel.

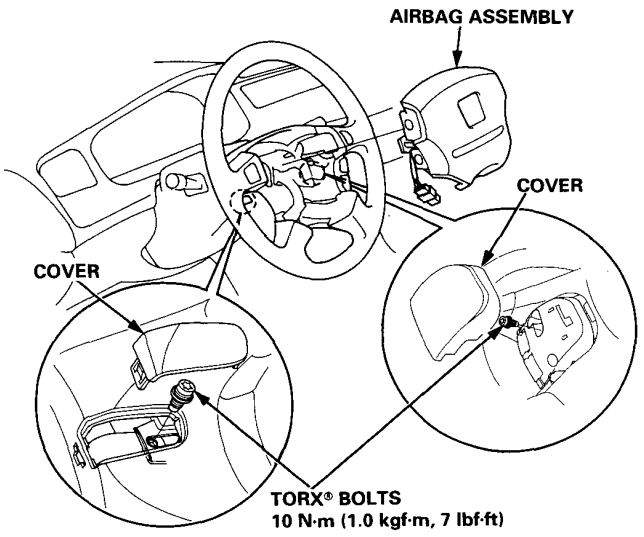


3. Attach the cruise control switches connector to the steering wheel clip.

4. Connect the horn connector.



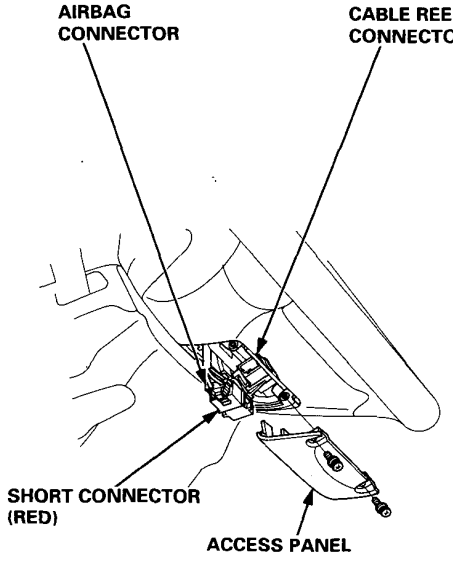
5. Install the airbag assembly with new TORX® bolts.



6. Disconnect the short connector from the airbag connector.

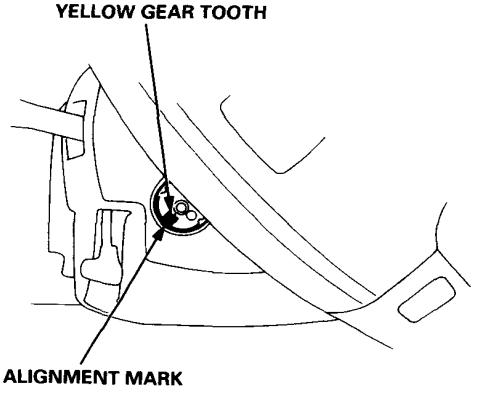
7. Connect the airbag 3-P connector and cable reel 3-P connector.

8. Attach the short connector on the access panel, and install the access panel on the steering lower cover.



9. Connect the positive cable first, then the negative cable to the battery.

10. After installing the airbag assembly, confirm proper system operation:
    - Turn the ignition to II: the instrument panel SRS indicator light should come on for about 6 seconds and then go off.
    - Confirm operation of horn buttons.
    - Confirm operation of cruise control set/resume switches.
    - Turn the steering wheel counterclockwise and make sure the yellow gear tooth still lines up with the alignment mark.



Steering Wheel (Without SRS)

Removal

NOTE: LHD type is shown, RHD type is symmetrical.

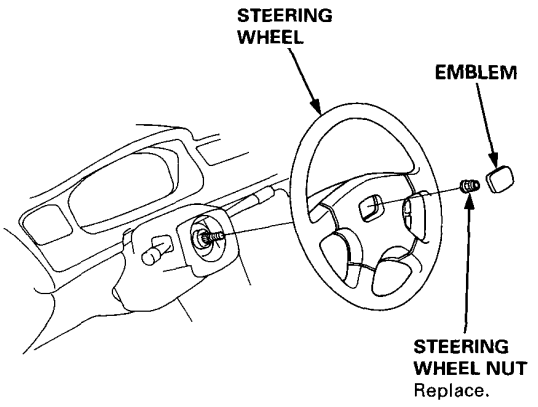
1. Remove the emblem with small screw driver.

   NOTE: Be careful not to damage the emblem and steering wheel.

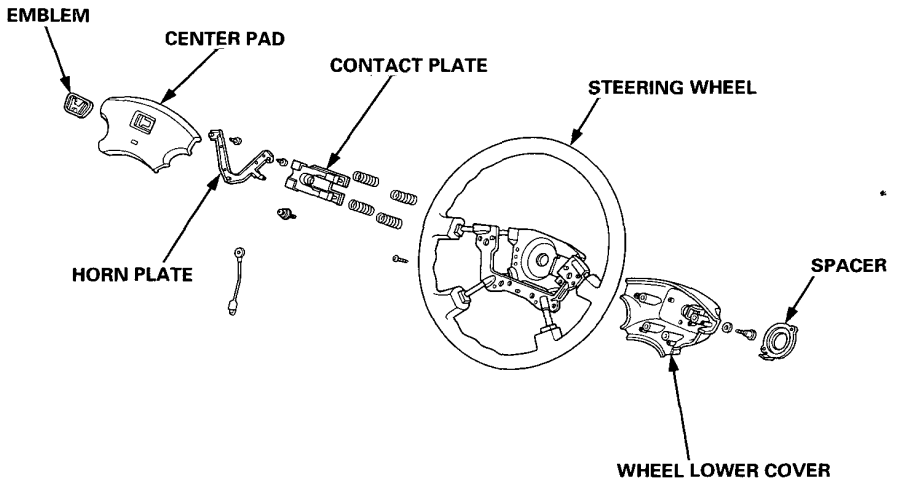
2. Remove the steering wheel nut.

3. Remove the steering wheel by rocking it slightly from side-to-side as you pull steadily with both hands.

   NOTE: Remove the steering wheel with the front wheels in the straight ahead position.



Disassembly/Reassembly

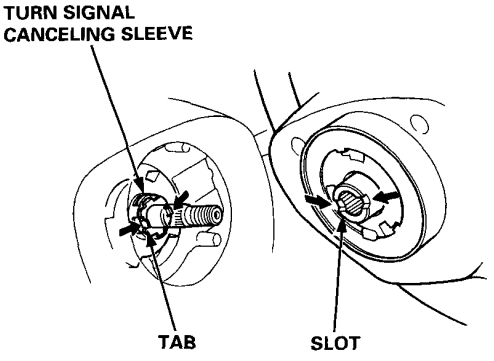


Installation

1. Install the steering wheel with the front wheels straight in the ahead position.

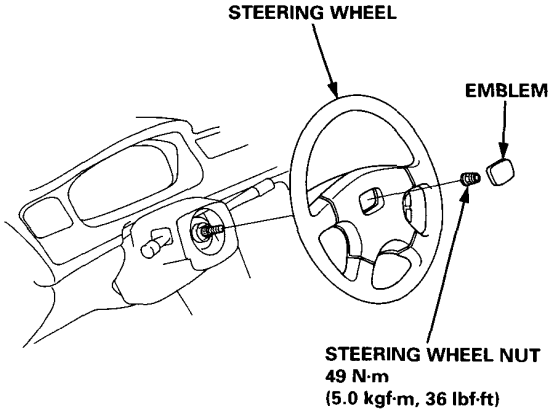
   NOTE: Align the slots on steering wheel and tabs on the turn signal canceling sleeve.

2. Make sure that steering wheel is positioned correctly. Reposition the steering wheel if necessary.



   NOTE: If you can not obtained straight ahead position completely, turn the tie-rods equally to adjust the front wheel direction with the steering wheel straight ahead position. Refer to page 18-6 for front toe adjustment.

3. Tighten the new steering wheel nut and install the emblem.

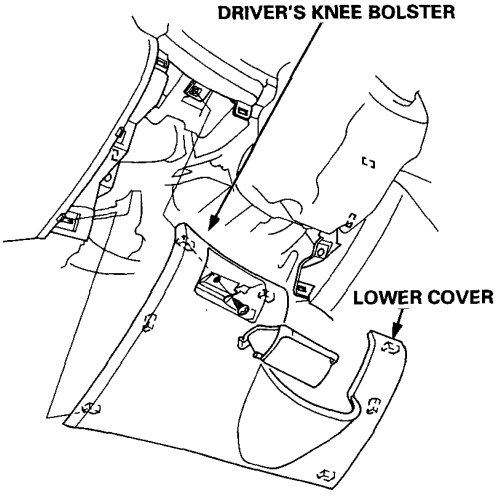


4. After installing the steering wheel, check the horn buttons for proper operation.

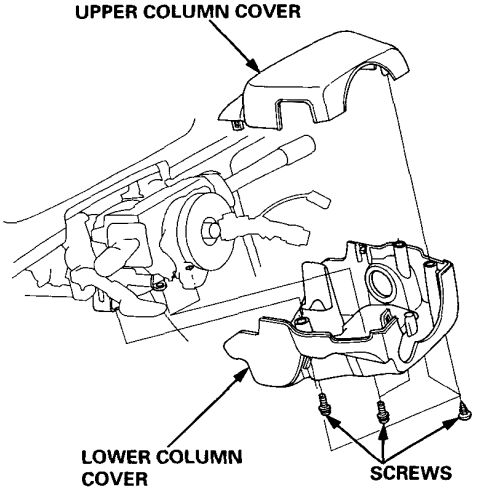
Removal

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

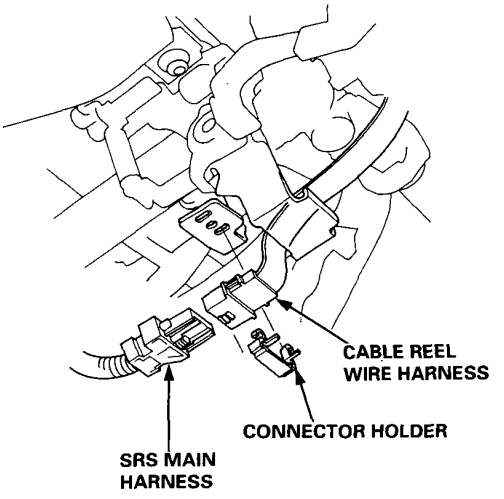
1. Remove the airbag assembly and steering wheel (see page 17-24).
2. Remove the lower cover.
3. Remove the driver's knee bolster.



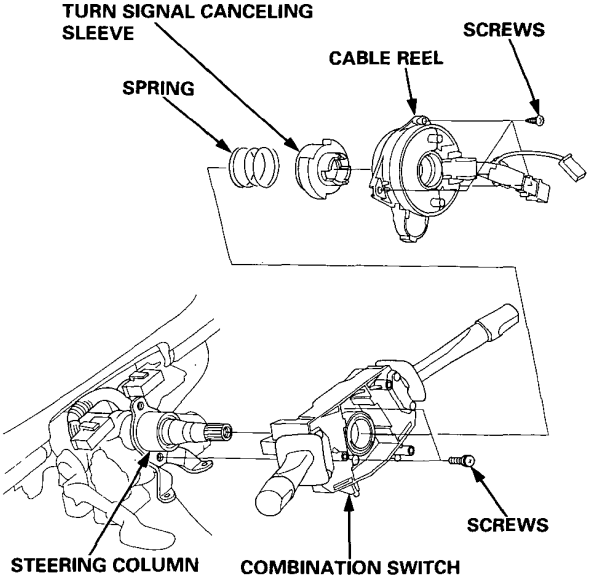
4. Remove the column covers by removing the screws.



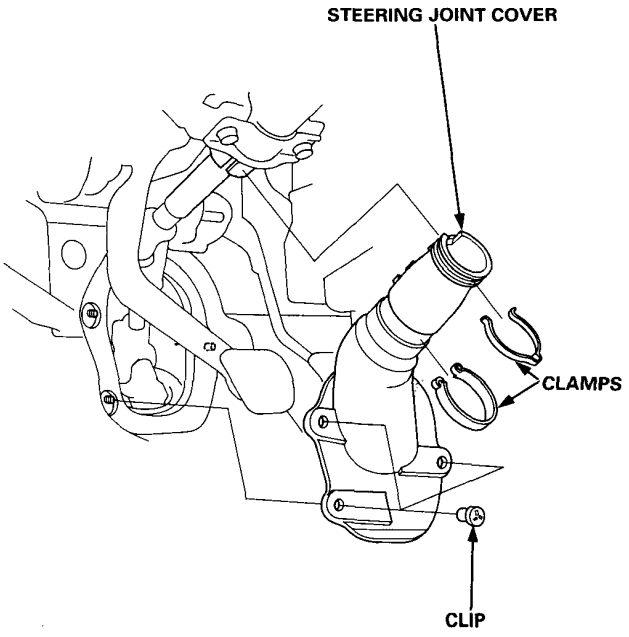
5. Remove the connector holder, then disconnect the SRS main harness from the cable reel wire harness at the under side of the column bracket.



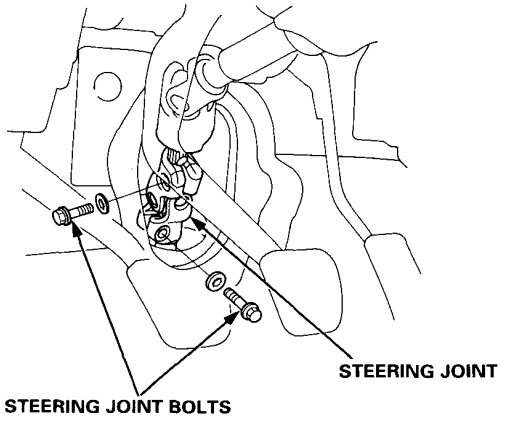
6. Remove the cable reel and turn signal canceling sleeve.
7. Remove the combination switch from the steering column by disconnecting the connectors.



8. Remove the steering joint cover.

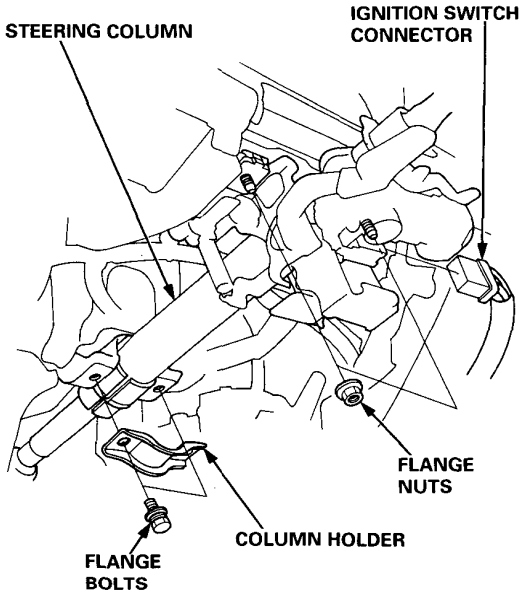


9. Remove the steering joint bolts, then disconnect the steering joint by moving the joint toward the column.



10. Disconnect the ignition switch connectors.

11. Remove the steering column by removing the attaching nuts and bolts.



Steering Column

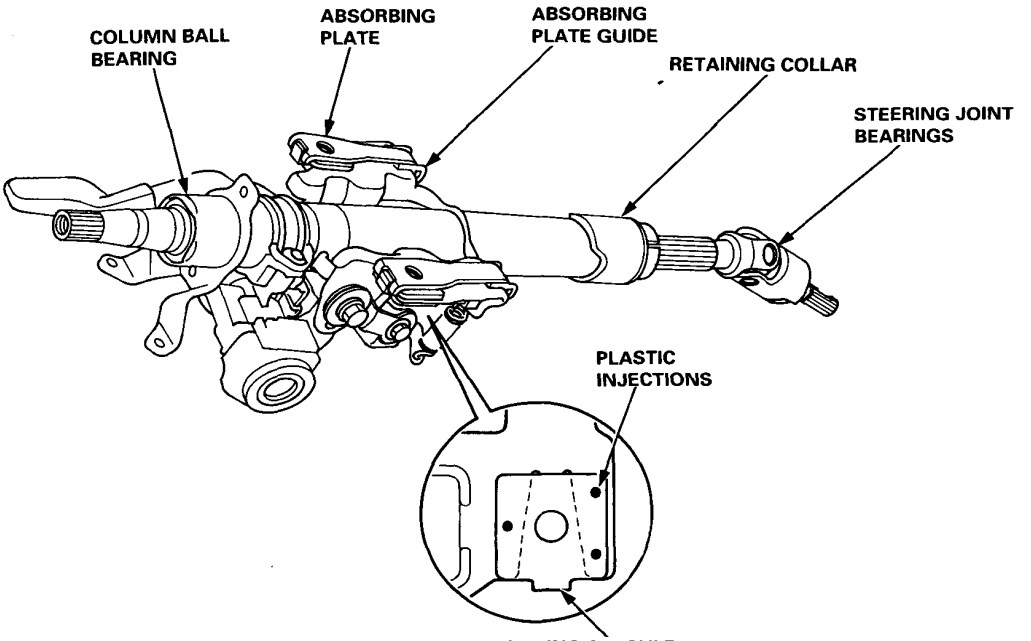
Inspection

- Check the steering column ball bearing and steering joint bearings for play and proper movement.
  If there is noise or excessive play, replace the joint or column assembly.

- Check the retaining collar for damage.
  If it is damaged, replace the retaining collar.

- Check the absorbing plates, absorbing plate guides and sliding capsules (cars with SRS) for distortion or breakage.
  Replace them as an assembly if they are distorted or broken.

CAUTION: Do not apply an impact load to the column shaft in the axial direction.



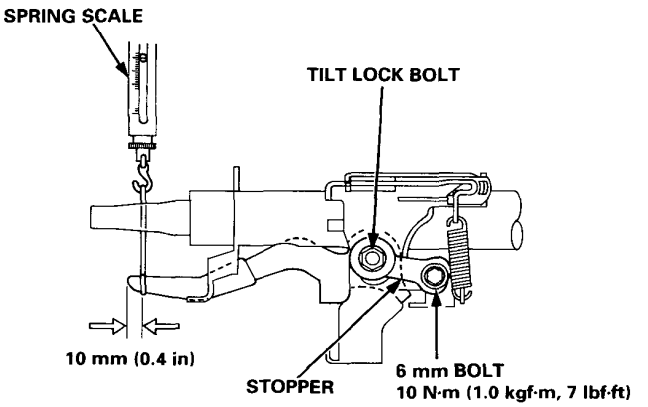
- Check the tilt mechanism for proper movement and damage.

  — Attach a spring scale to the knob of the tilt lever. Measure the preload required to move the lever.

  Preload: 70 – 90 N (7 – 9 kgf, 15 – 20 lbf)

  — If the preload measured is not within the specification, remove the 6 mm bolt and stopper. Adjust the preload by retightening the tilt lock bolt until the correct force can be obtained.
  — Reinstall the stopper and 6 mm bolt, and recheck the preload.

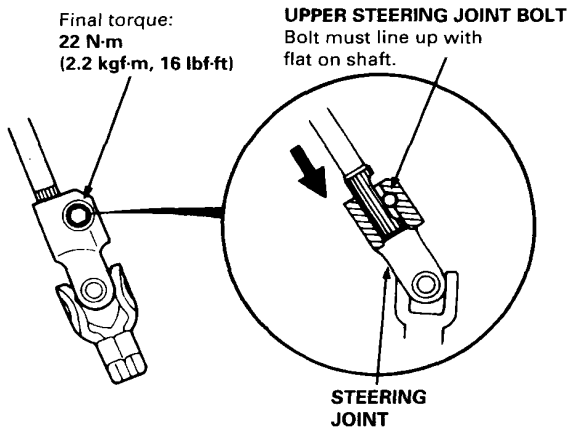
CAUTION: Do not loosen the tilt lever when setting the stopper and when tightening the 6 mm bolt.



Installation

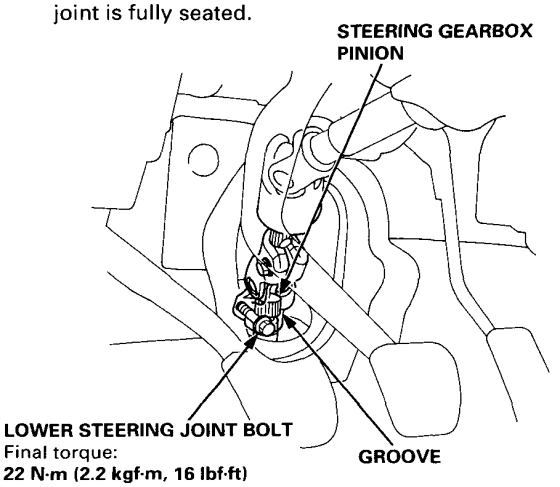
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damage wiring.**

1. Slip the upper end of the steering joint onto the column shaft (line up the bolt hole with the flat on the shaft), and loosely install the upper steering joint bolt.



2. Slip the lower end of the steering joint onto the pinion shaft. Line up the bolt hole with the groove around the shaft, and loosely install the lower bolt.

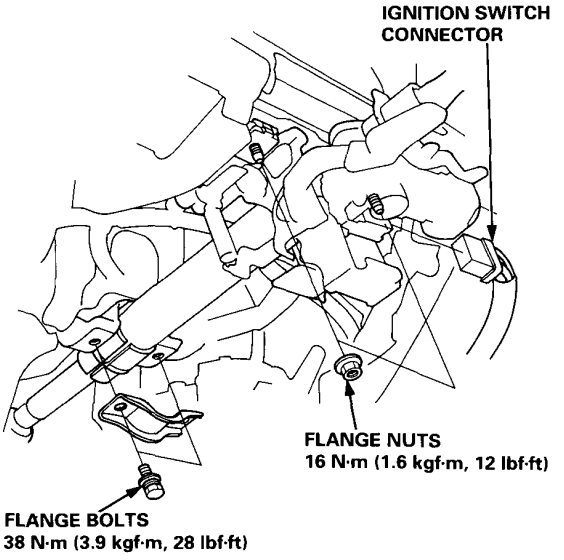
NOTE:
- Do not forget the toothed lock washers.
- Be sure that the lower steering joint bolt is securely in the groove in the steering gearbox pinion.
- Before tightening the steering joint bolts, pull on the steering joint to make sure that the steering joint is fully seated.



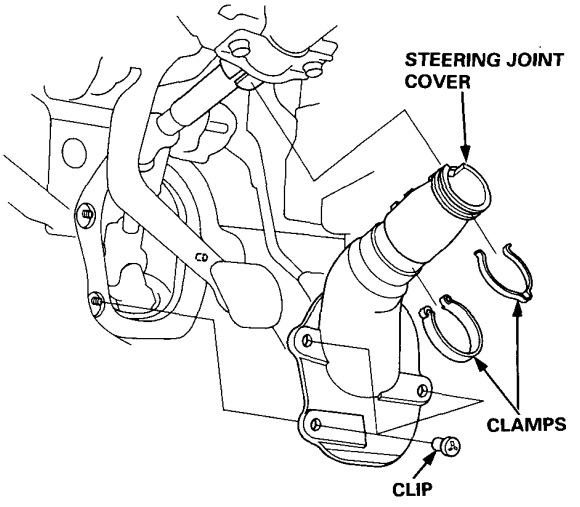
3. Install the steering column with the flange nuts, then install the column holder and flange bolts.

4. Connect the ignition switch connector.

5. Tighten the upper and lower steering joint bolts loosely installed in step 2.



6. Install the steering joint cover with the clamps and clips.



(cont'd)

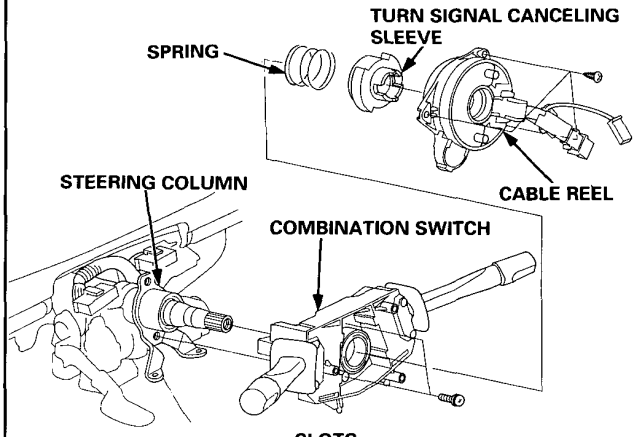
Installation (cont'd)

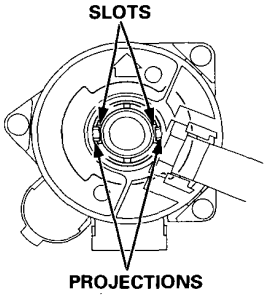
7. Install the combination switch and turn signal canceling sleeve onto the steering column.

   NOTE: Be sure the wires are not caught or pinched by any parts when installing the combination switch.

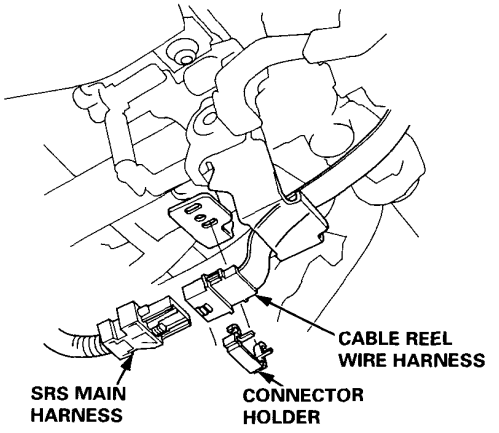
8. Install the cable reel on the combination switch.

   NOTE: Align the slot in the cable reel with the projection on the canceling sleeve.

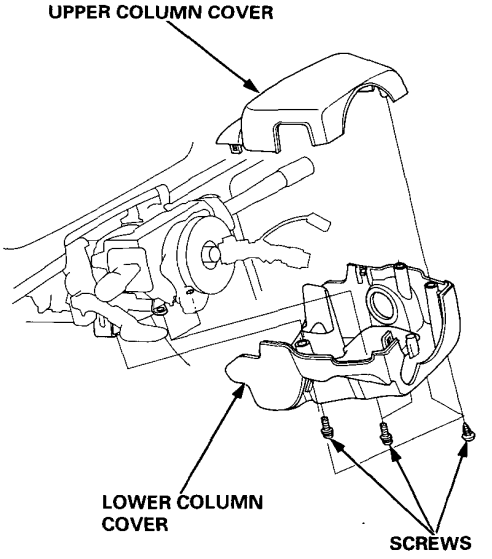




9. Connect the SRS main harness and cable reel wire harness and install the connector holder.



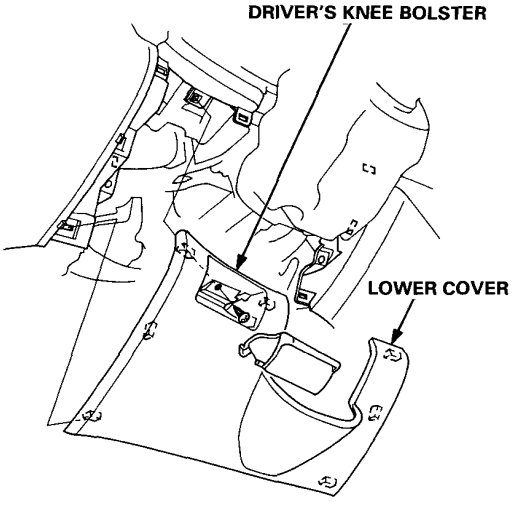
10. Install the column covers.



11. Install the driver's knee bolster.

12. Install the lower cover.

13. Install the steering wheel (see page 17-26).



Power Steering Hoses, Pipes

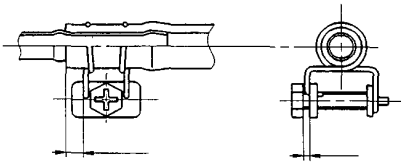
Replacement

NOTE:
- LHD type is shown, RHD type is symmetrical.
- Connect each hose to the corresponding pipe securely until it stops at the stopper on the pipe. Install the clamp or adjustable clamp at the specified distance from the hose end as shown in the drawing.
- Add the power steering fluid to the specified level on the reservoir and check for leaks (see page 17-23).

CAUTION: Check all clamps for deterioration and deformation; replace with new ones if necessary.

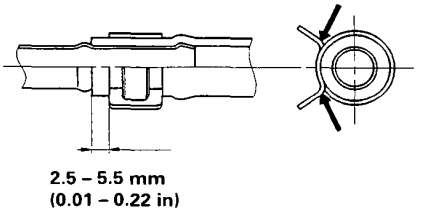
〈ADJUSTABLE HOSE CLAMP:〉

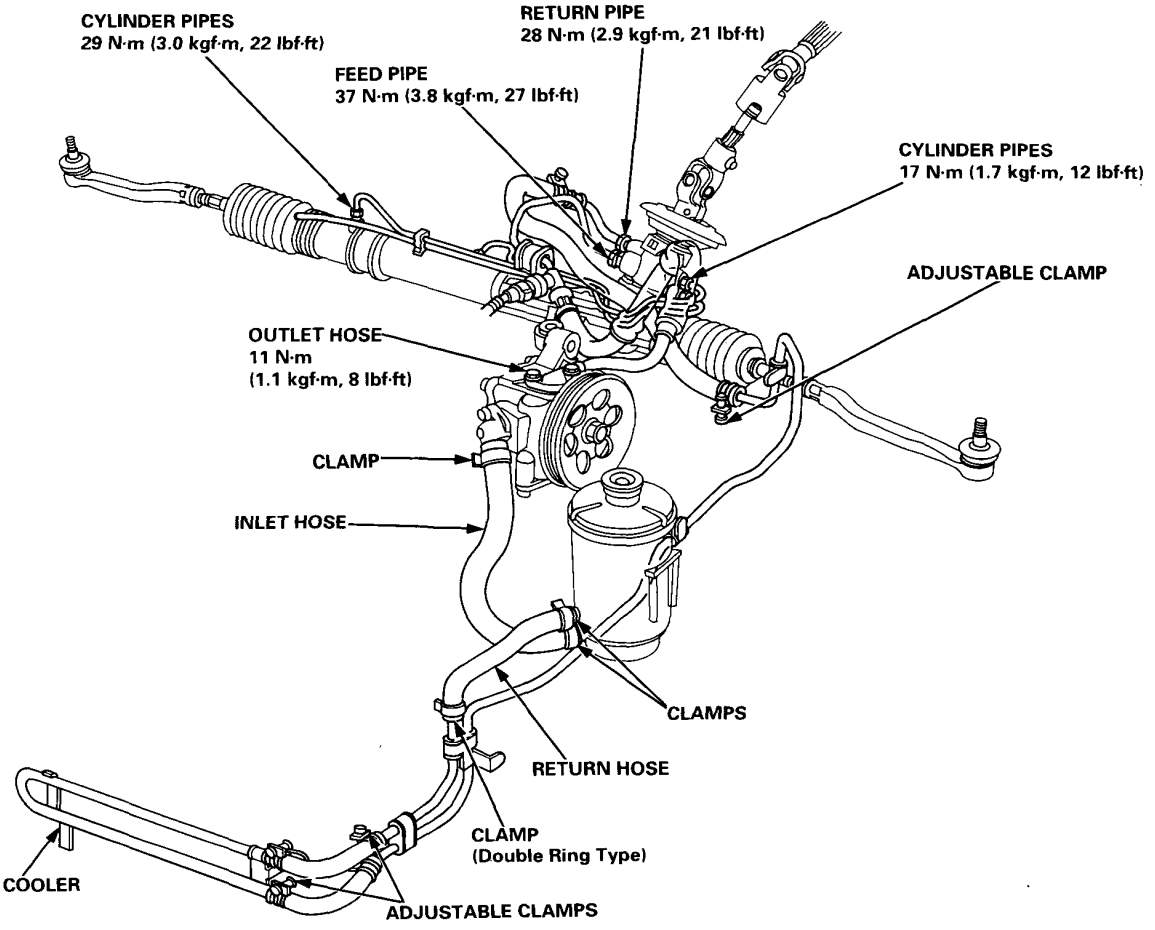
Put over the pipe until the hose stops at the stopper.



〈HOSE CLAMP:〉

Put over the pipe until the hose stops at the stopper.





Power Steering Pump

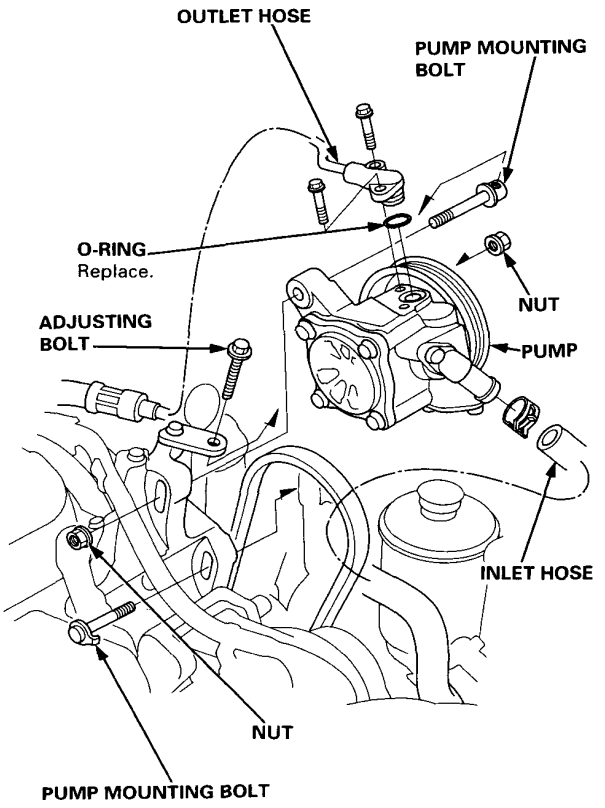
Removal

NOTE: Before disconnecting the hoses from the pump, place a suitable container under the car.

1. Drain the power steering fluid from the reservoir.
2. Remove the belt by loosening the pump adjusting bolt and mounting bolts and nuts.
3. Disconnect the inlet and outlet hoses from the pump and plug the hoses.

   NOTE: Take care not to spill the fluid on the body or parts. Wipe off spilled fluid at once.
4. Remove the pump mounting bolt, then remove the pump.

   NOTE: Do not turn the steering wheel with the pump removed
5. Wrap the opening of the pump with a piece of tape to prevent foreign material from entering the pump. See page 17-45 for pump installation.



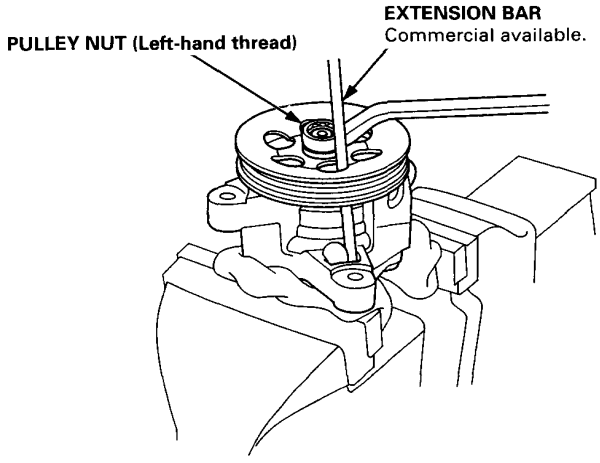
Disassembly

Pulley Removal

1. Drain the fluid from the pump.
2. Hold the steering pump in a vise with soft jaws.

   CAUTION: Be careful not to damage the pump housing with the jaws of the vise.
3. Hold the steering pump pulley with a extension bar and remove the pulley nut.
4. Remove the pulley.

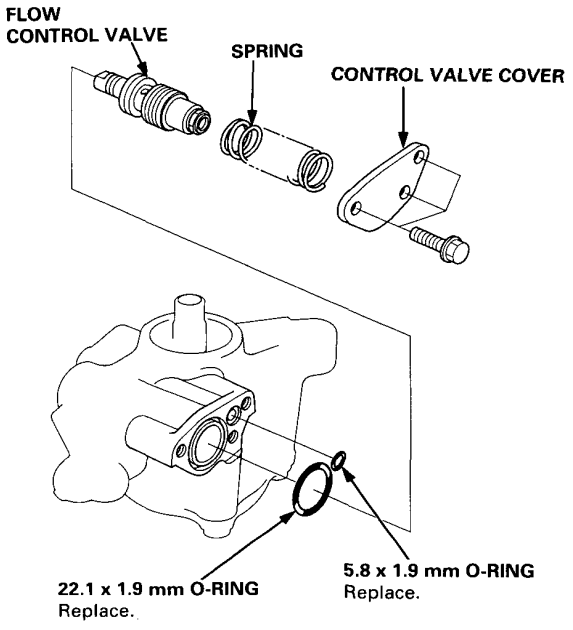
   NOTE: Pulley nut has left hand thread.



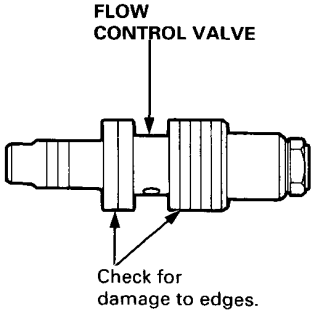
Flow Control Valve Removal/Inspection

1. Remove the control valve cover by removing the three flange bolts.

2. Remove the spring, flow control valve and O-rings.

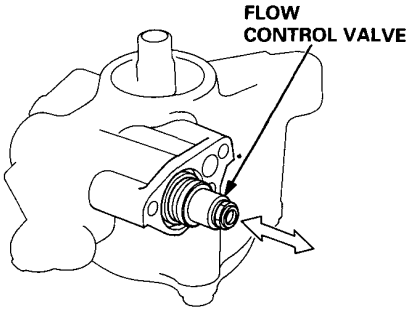


3. Check the flow control valve for wear, burrs, and other damage to the edges of the grooves in the valve.



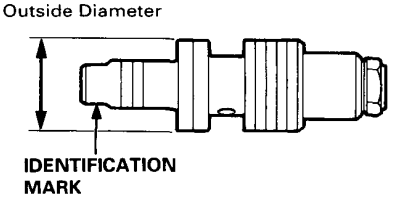
4. Inspect the bore for the flow control valve for scratches or wear.

5. Slip the valve back in the pump and check that it moves in and out smoothly.



— If OK, go on step 6; if not, replace the valve and recheck the valve movement.

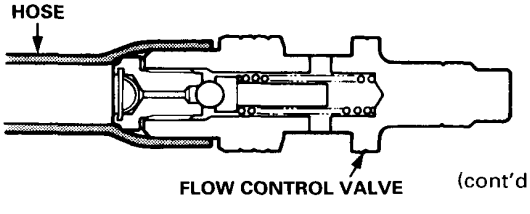
NOTE: The original valve was selected for a precise fit in the pump housing bore, so make sure the new one has the same identification mark.



Mark	Part Name	Outside Diameter mm (in)
A	FLOW CONTROL VALVE A	17.991 – 17.996 (0.7083 – 0.7085)
B	FLOW CONTROL VALVE B	17.996 – 18.001 (0.7085 – 0.7087)

— If the valve movement still incorrect, replace the pump as an assembly.

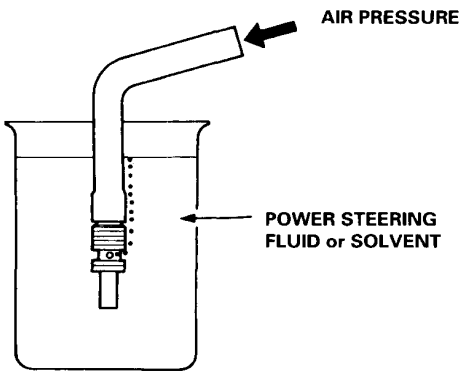
6. Attach a hose to the end of the valve as shown.



(cont'd)

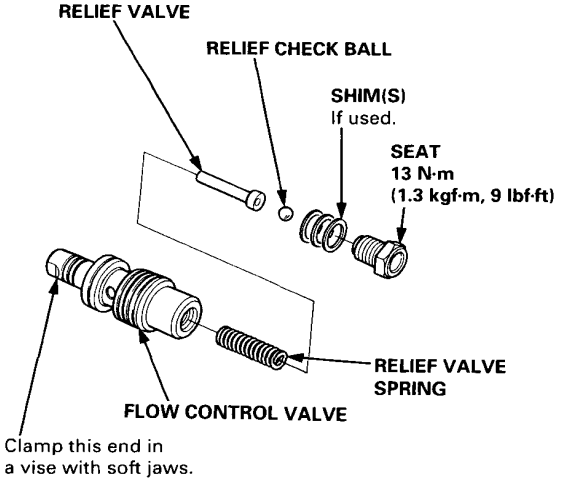
Disassembly (cont'd)

7. Submerge the valve in a container of power steering fluid or solvent, and blow in the hose. If air bubbles leak through the valve at less than 100 kPa (1.0 kgf/cm², 14.2 psi), replace or repair it as follows.



8. Hold the bottom end of the valve with a open end wrench.

9. Unscrew the seat in the top end of the valve, and remove any shims, the relief check ball, relief valve and relief valve spring.



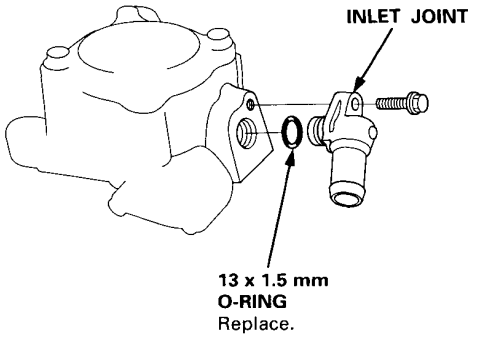
10. Clean all the parts in solvent, dry them off, then reassemble and retest the valve. See page 17-44 for flow control valve installation.

    NOTE: If necessary, relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

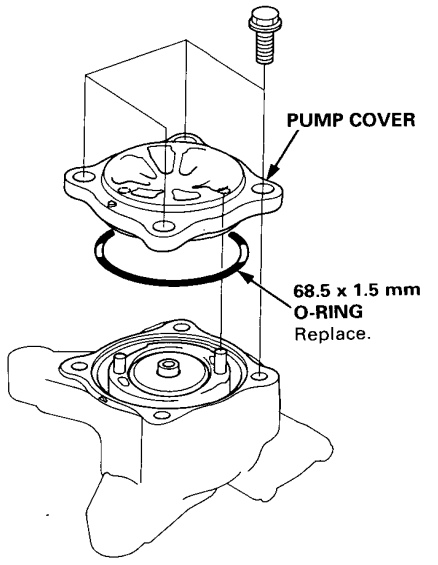
Pump Rotor Removal

CAUTION: The pump components are made of aluminum. Be careful not to damage them when servicing.

1. Remove the inlet joint and O-ring.

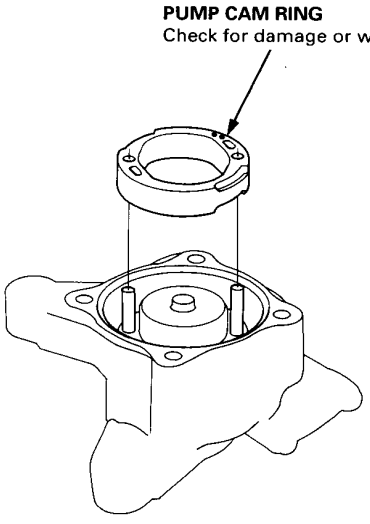


2. Remove the pump cover and O-ring.



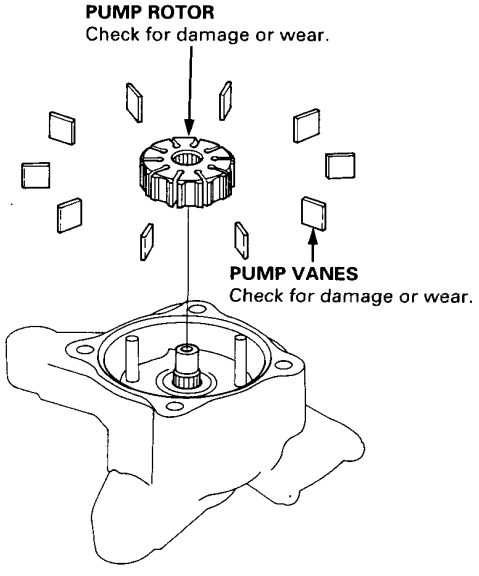
3. Remove the pump cam ring from the pump housing.

   NOTE: Replace the pump as an assembly if the cam ring must be replaced.



4. Remove the pump rotor and vanes.

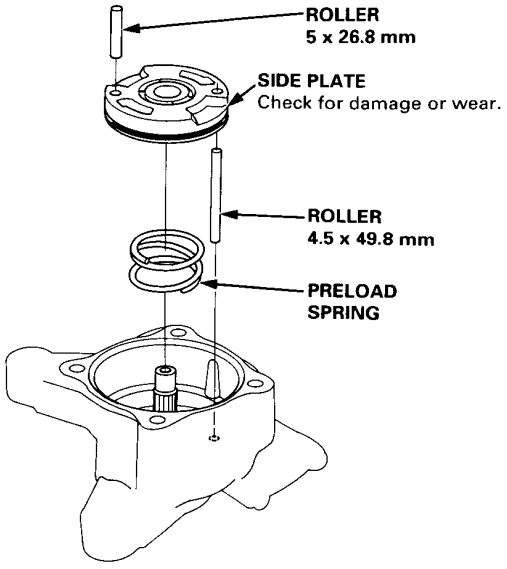
   NOTE: Replace the pump as an assembly if the pump rotor or vanes must be replaced.



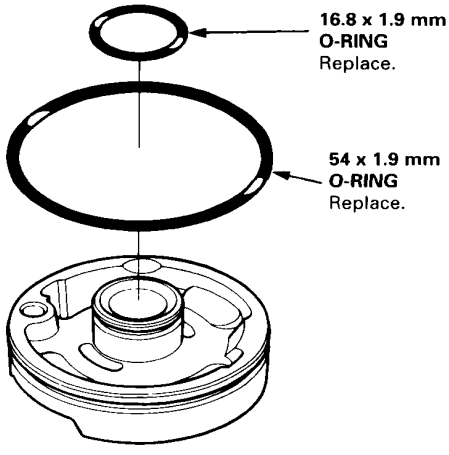
5. Remove the two rollers from the side plate.

6. Remove the side plate and preload spring.

   NOTE: Replace the pump as an assembly if the side plate must be replaced.



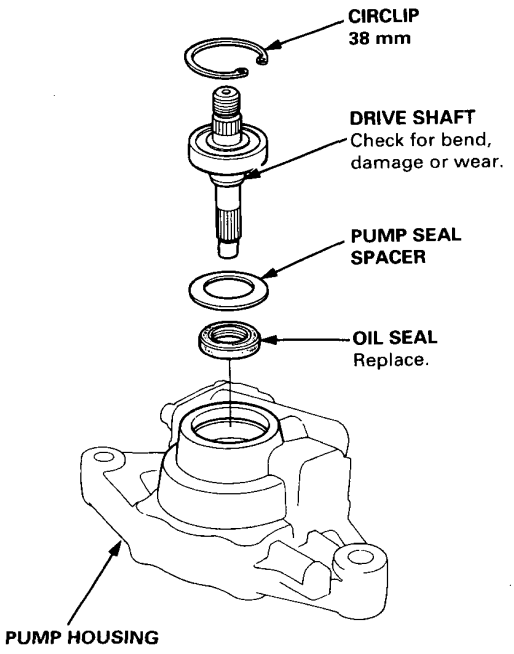
7. Remove the O-rings from the side plate.



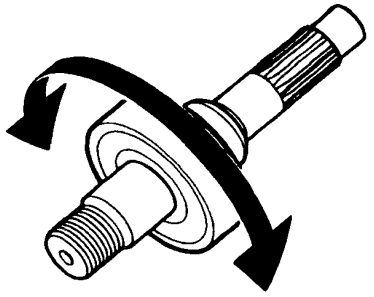
(cont'd)

Disassembly (cont'd)

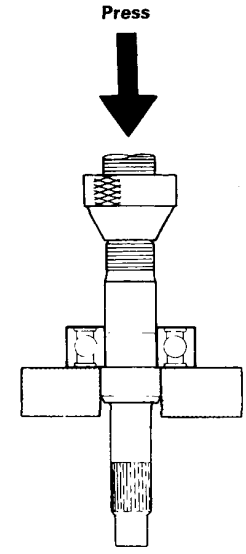
8. Remove the circlip, then remove the drive shaft assembly from the pump housing using a plastic hammer.
9. Remove the seal spacer and oil seal.
10. Inspect the pump housing for damage on the sealing surfaces.



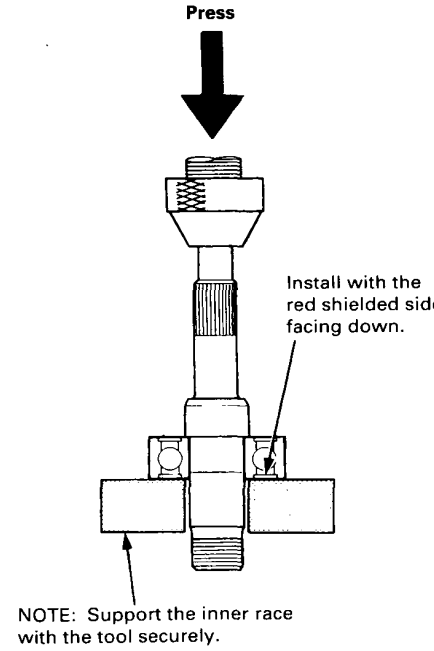
11. Inspect the bearing by rotating the outer race slowly. If any play or roughness is felt, replace the bearing.



12. Remove and discard the bearing using the special tool and a press.



13. Install the new bearing using the special tool and a press.

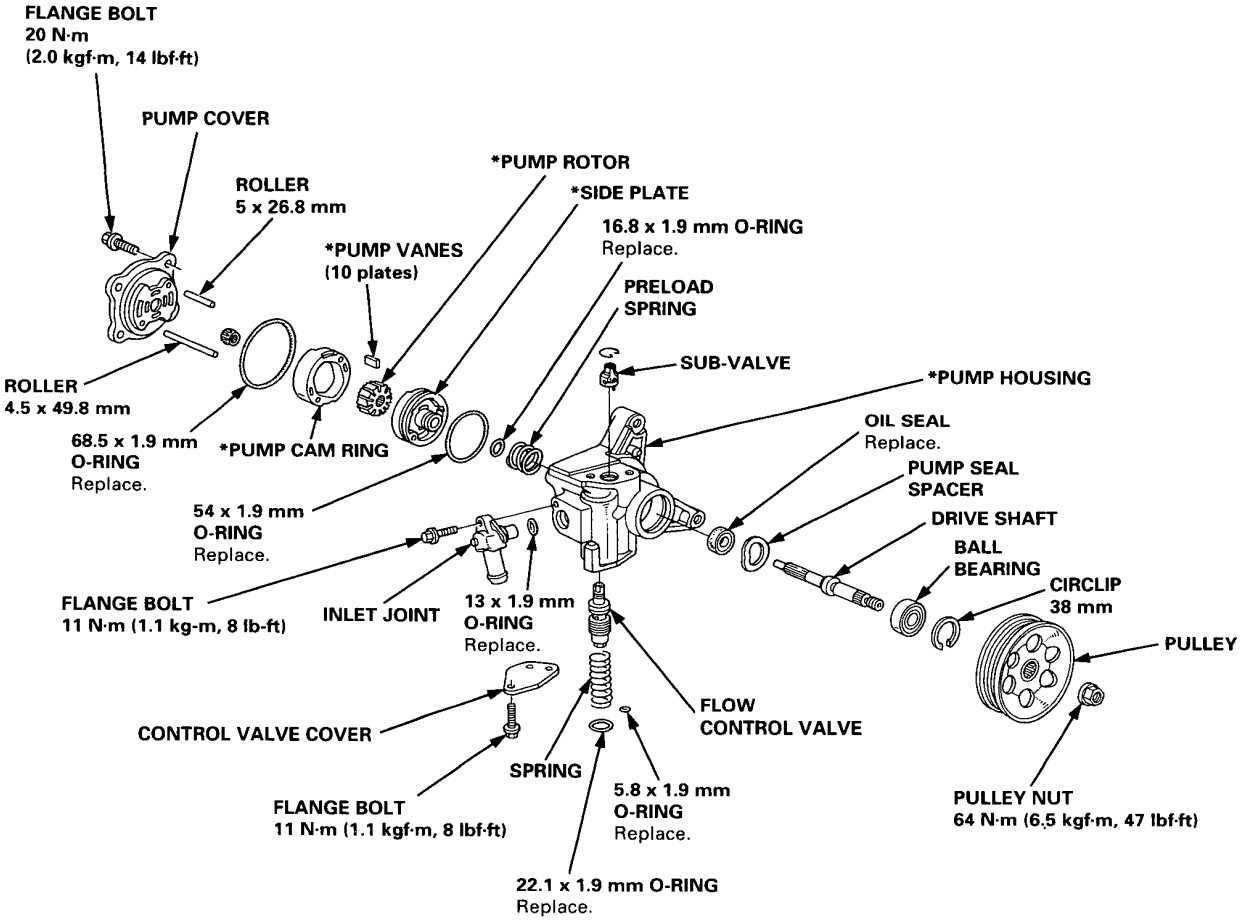


Reassembly

CAUTION: The power steering components are made of aluminum. Avoid damaging the components during assembly.

NOTE:

- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply recommended power steering fluid or steering grease (Honda P/N: 08733 – B070E) to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Replace the pump as an assembly if the parts indicated with asterisk (*) are worn or damaged.



(cont'd)

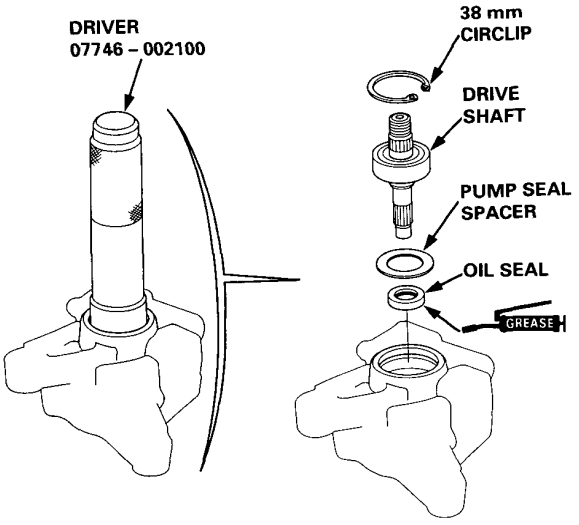
Power Steering Pump

Reassembly (cont'd)

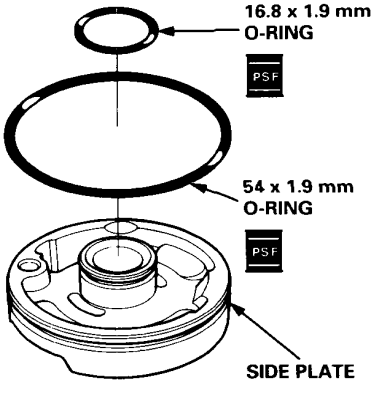
Pump Rotor Installation

1. Coat the lip of the new oil seal with steering grease (Honda P/N 08733 – B070E).
2. Install the new oil seal in the pump housing by hand, then install the pump seal spacer.

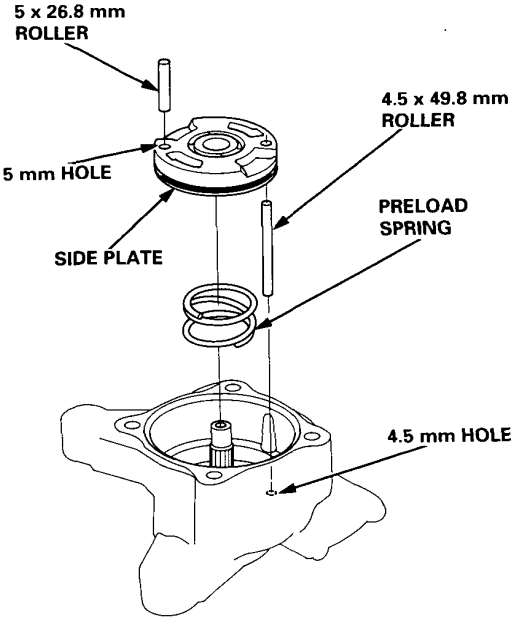
   NOTE: Insert the oil seal with its grooved side facing in.
3. Install the pump drive shaft assembly with the special tool.
4. Install the 38 mm circlip with its tapered side facing out.



5. Coat the side plate grooves with the recommended power steering fluid, then position the 16.8 x 1.9 mm and 54 x 1.9 mm O-rings on the side plate.

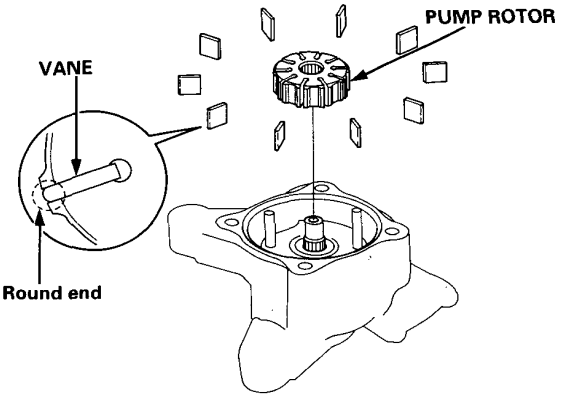


6. Install the preload spring in the pump housing.
7. Set the 4.5 x 49.8 mm roller in the 4.5 mm hole in the pump housing.
8. Set the side plate over the roller and install it on the pump housing.
9. Set the 5 x 26.8 mm roller in the 5 mm hole in the side plate.



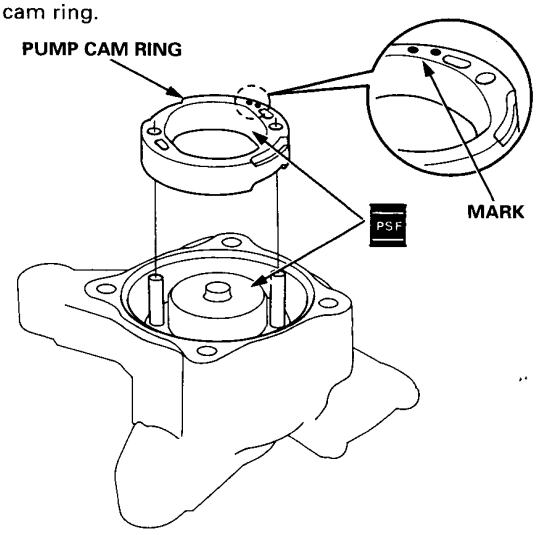
10. Assemble pump rotor to the drive shaft with the "o" mark on the rotor facing upward.
11. Set the 10 vanes in the grooves in the rotor.

    NOTE: Be sure that the round ends of the vanes are in contact with the sliding surface of the cam ring.



12. Set the pump cam ring over the two rollers with the "●" mark on the cam ring upward.

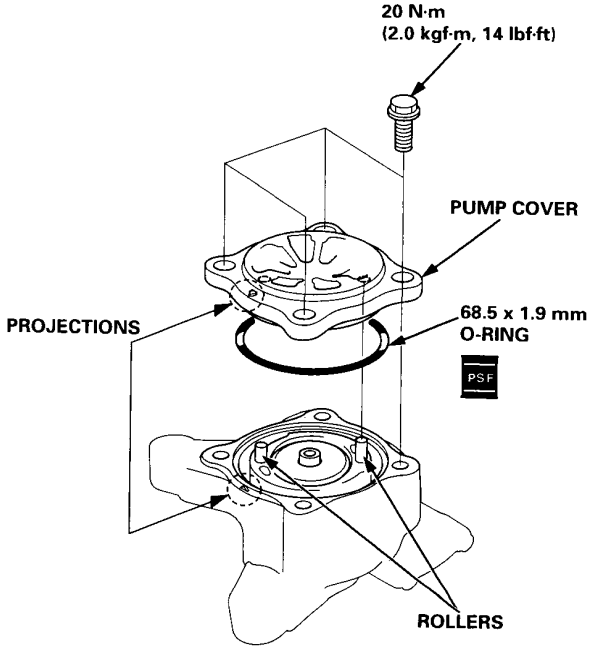
13. Apply clean power steering fluid to the vanes and cam ring.



14. Install the 68.5 x 1.9 mm O-ring on the pump cover.

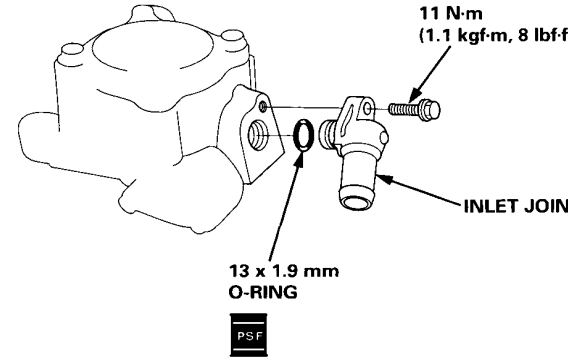
15. Align the roller set holes in the pump cover with the rollers.

16. Align the projection on the pump housing and the projection on the pump cover, and tighten the four bolts.



17. Set the 13 x 1.9 mm O-ring on the inlet joint.

18. Install the inlet joint on the pump housing.

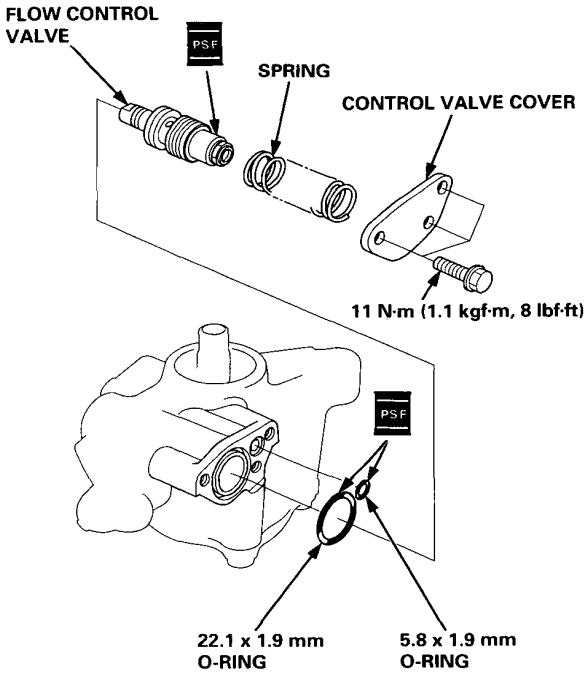


Power Steering Pump

Reassembly (cont'd)

Flow Control Valve Installation

1. Coat the new O-rings with clean power steering fluid, and install them in the housing grooves.
2. Coat the flow control valve with clean power steering fluid.
3. Install the flow control valve, spring and control valve cover on the pump housing.
4. Tighten the three control cover bolts.

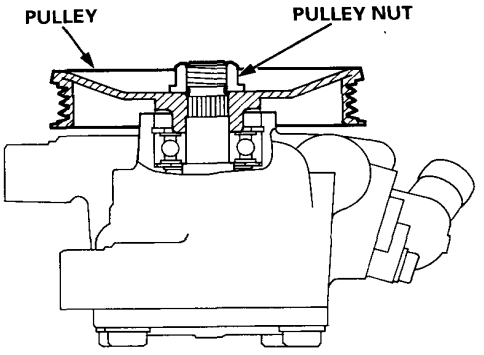


Pulley Installation

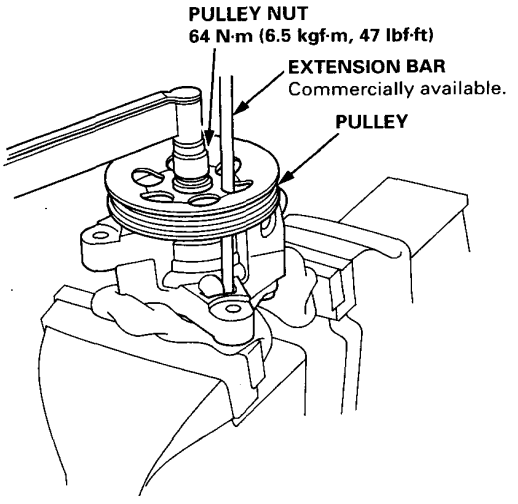
1. Hold the steering pump in a vise with soft jaws.

   CAUTION: Be careful not to damage the pump housing with the jaws of the vise.

2. Install the pump pulley as shown. Then install the pulley nut.



3. Hold the pulley with a extension bar and tighten the pulley nut.

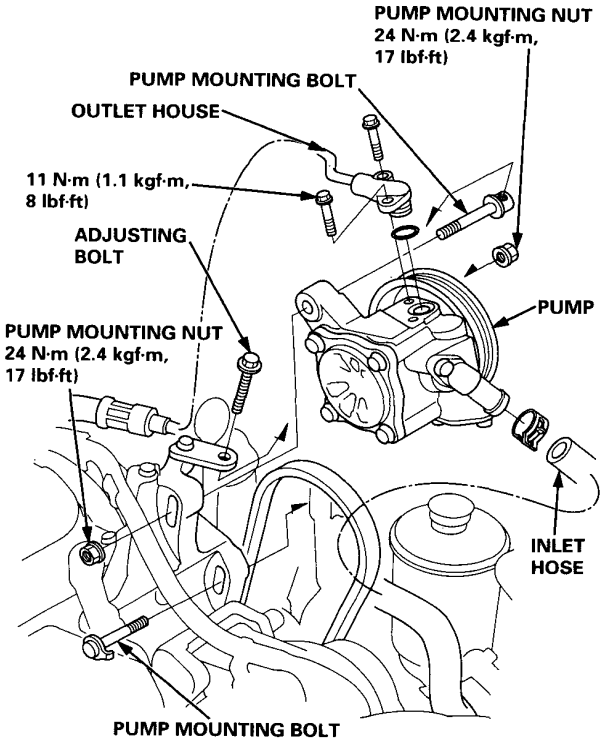


4. Check that the pump turns smoothly by turning the pulley.

Installation

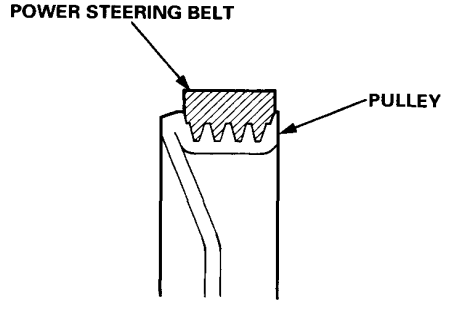
1. Connect the inlet and outlet hoses. Tighten the pump fittings securely.

2. Loosely install the pump in the pump bracket with mounting bolts.



3. Install the pump belt.

CAUTION:
- **Make sure that the power steering belt is securely on the grooves of the pulleys.**
- **Do not get power steering fluid or grease in the power steering belt or pulley faces. Clean off any fluid or grease before installation.**



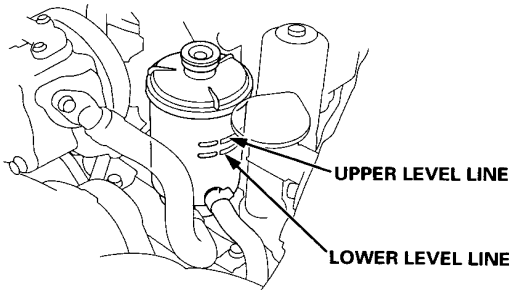
4. Adjust the pump belt (see page 17-20).

5. Fill the reservoir to the upper level line.

NOTE: Take care not to spill the fluid on the body and parts. Wipe off the spilled fluid at once.

CAUTION: Use only Genuine Honda Power Steering Fluid-V. Using other fluids such as ATF or other manufacturer's power steering fluid will damage the system.

SYSTEM CAPACITY:
1.1 liter (1.16 US.qt, 0.97 Imp.qt)
RESERVOIR CAPACITY:
0.4 liter (0.42 US.qt, 0.35 Imp.qt)



— Start the engine, let it run at idle, then turn the steering wheel lock-to-lock several times to bleed air from the system.

— Recheck the fluid level and add some if necessary.

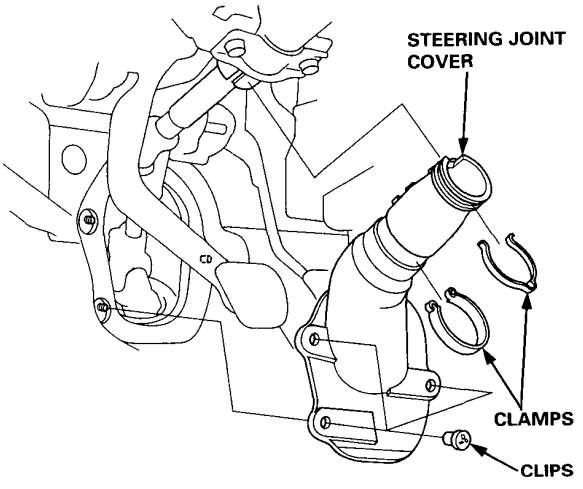
CAUTION: Do not fill the reservoir beyond the upper level line.

Steering Gearbox

Removal

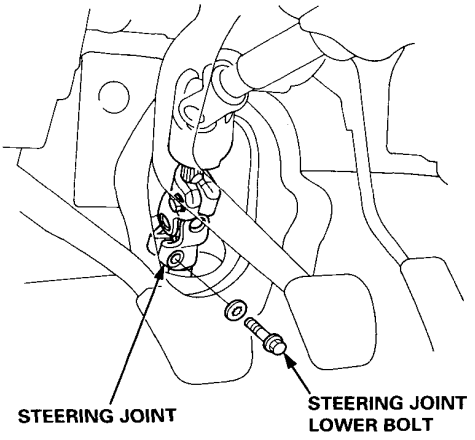
NOTE: Using solvent and a brush, wash any oil and dirt off the valve body unit, its lines, and the end if the gearbox. Blow dry with compressed air.

1. Drain the power steering fluid as described on page 17-21.
2. Raise the front of car, and support on safety stands in the proper locations (see section 1).
3. Remove the front wheels.
4. Remove the steering joint cover.



5. Remove the steering joint lower bolt, and disconnect the steering joint by moving the joint toward the column.

   NOTE: Lock the steering shaft with the ignition key to retain the steering shaft position.

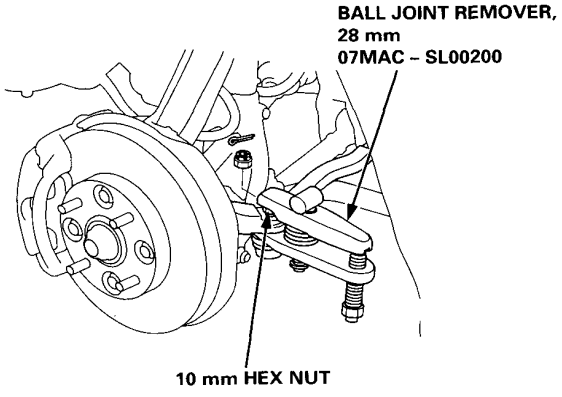


6. Remove the cotter pin from the castle nut and remove the nut.
7. Install the 10 mm hex nut on the ball joint.
   Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

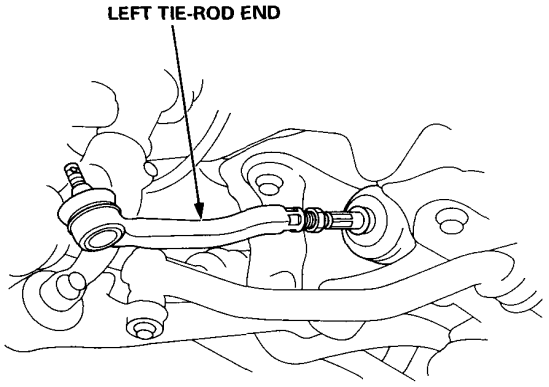
   NOTE: Remove the ball joint using the Ball Joint Remover, 28 mm (07MAC – SL00200). Refer to page 18-11 for how to use the ball joint remover.

8. Separate the tie-rod ball joint and knuckle using the special tool.

   CAUTION: Avoid damaging the ball joint boot.



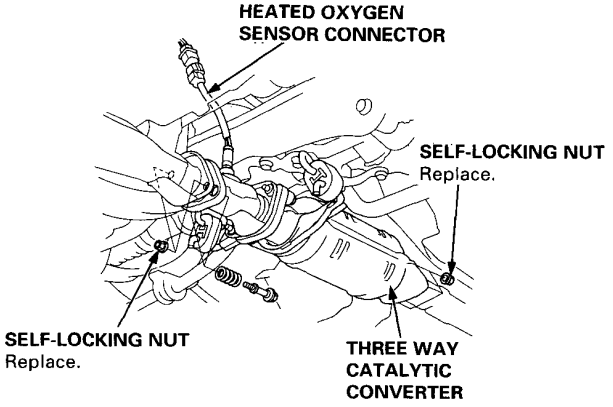
9. Remove the left tie-rod end, then slide the rack all the way to the right.



10. Disconnect the heated oxygen sensor (H02S) connector.

11. Separate the three way catalytic converter by removing the self-locking nuts.

    NOTE: Always replace the gaskets with new ones.

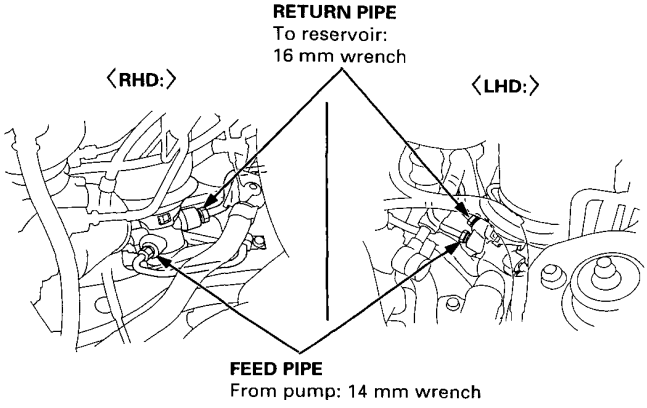


12. Disconnect the shift linkage (M/T model: see section 13, A/T model: see section 14).

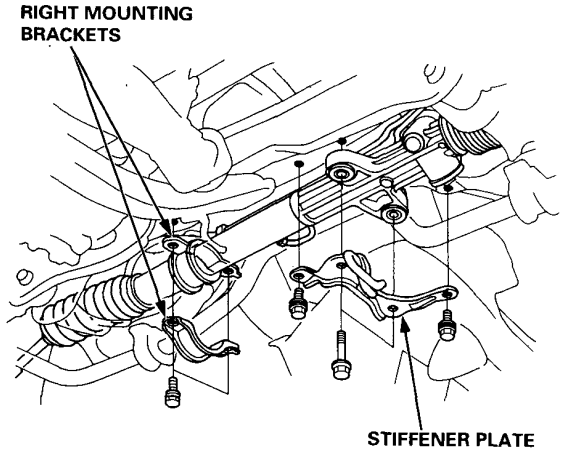
13. Disconnect the two lines from the valve body unit on the steering gearbox.

    CAUTION: After disconnecting the pipes, plug or seal the pipes with a piece of tape or equivalent to prevent foreign materials from entering the valve body unit.

    NOTE:
    - Place the pipes disconnected in the previous step at the rear side of the gearbox so that they do not hinder in the gearbox removal.
    - Do not loosen the cylinder pipes A and B between the valve body unit and cylinder.



14. Remove the stiffener plate first, then remove the right mounting brackets.



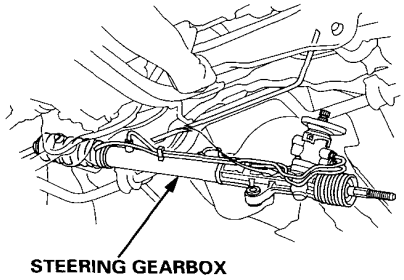
15. Pull the steering gearbox all the way down to clear the pinion shaft from the bulkhead.

16. Move the steering gearbox to the right so the left rack end clears the rear beam.

17. Hold the steering gearbox and slide the rack all the way to the left, then place the left rack end below the rear beam.

18. Move the steering gearbox to the left, and tilt the left side down to remove it from the car.

    CAUTION: Be careful not to bend or damage the two power steering lines and cylinder pipes when removing the gearbox.



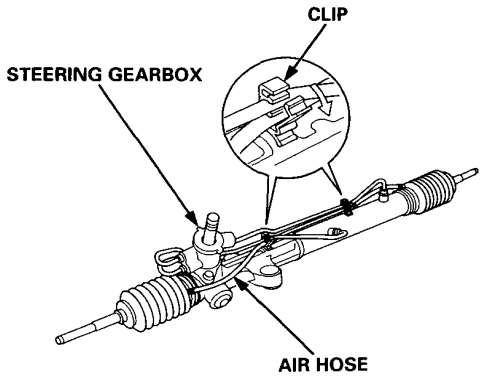
Steering Gearbox

Disassembly

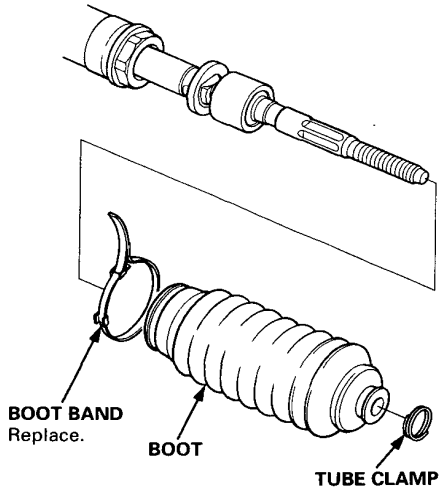
Steering Rack Disassembly

NOTE:
- Before disassembling the gearbox, wash it off with solvent and a brush.
- Do not dip seals and O-rings in solvent.

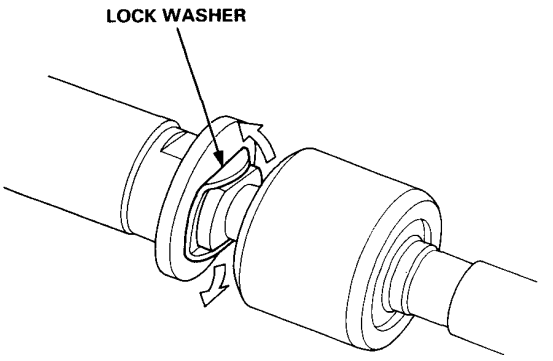
1. Remove the steering gearbox (see page 17-46).
2. Remove the air hose and clips.
3. Remove the tie-rod end and locknut.



4. Remove the boot bands and tube clamps. Pull the boots away from the ends of the gearbox.

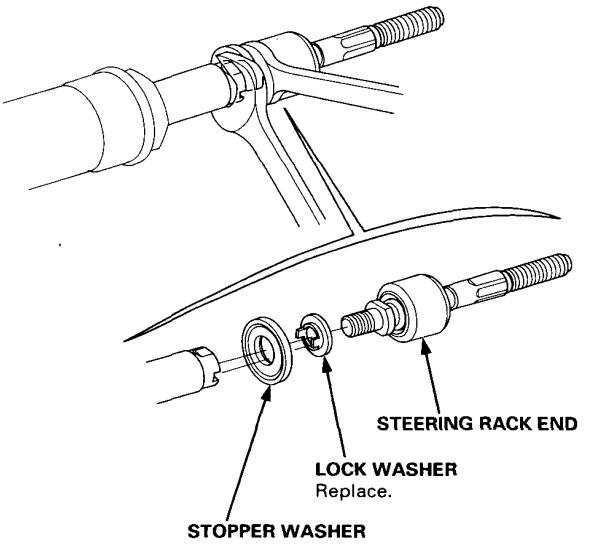


5. Unbend the lock washer.



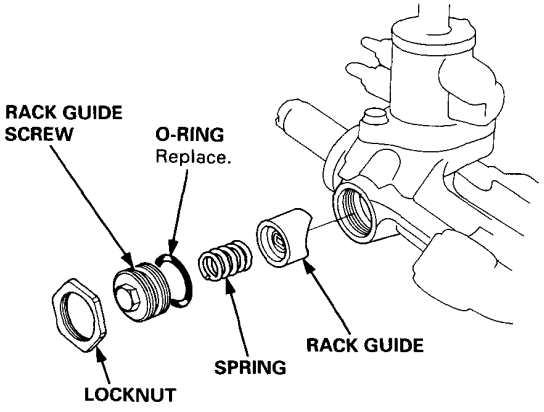
6. Hold the steering rack with a wrench, and unscrew the rack end with a wrench.

CAUTION: Be careful not to damage the rack surface with the wrench.



7. Loosen the locknut and remove the rack guide screw.

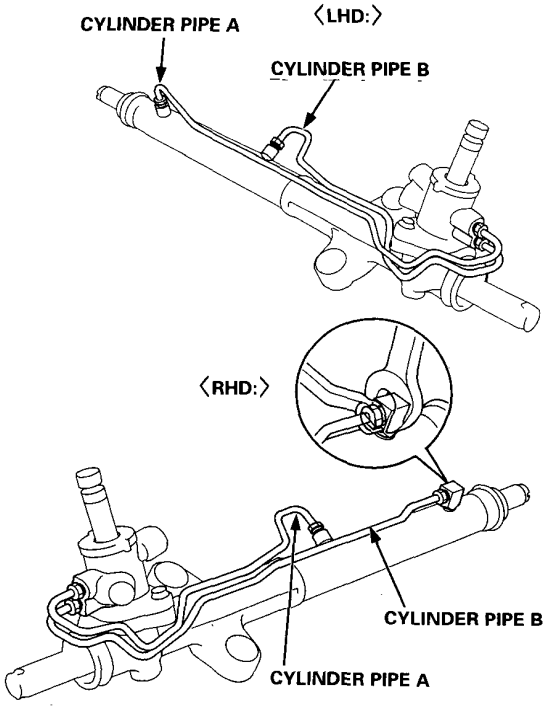
8. Remove the spring and rack guide from the gear housing.



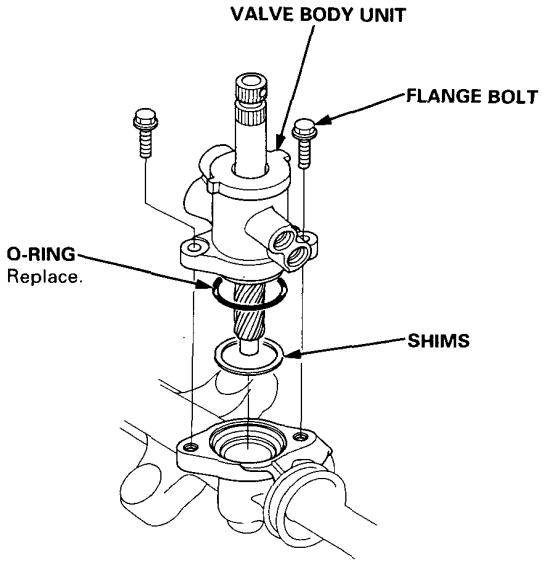
9. Remove the cylinder pipes A and B from the gearbox.

10. Drain the fluid from the cylinder fittings by slowly moving the steering rack back and forth.

NOTE: RHD only: When disconnecting the cylinder pipe B, loosen the flare nut by holding the joint fitting with a 17 mm wrench as shown.

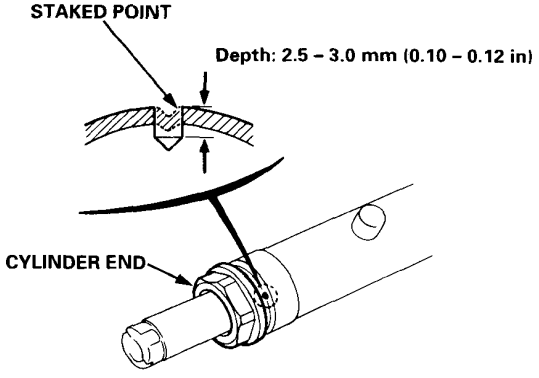


11. Remove the two flange bolts, then remove the valve body unit from the gearbox. (See page 17-51 for valve body unit disassembly.)



12. Drill a 3 mm (0.12 in) diameter hole approximately 2.5 – 3.0 mm (0.10 – 0.12 in) in depth in the staked-point on the cylinder.

NOTE:
- Do not allow metal shavings to enter the cylinder housing.
- After removing the cylinder end, remove burrs at the staked point.

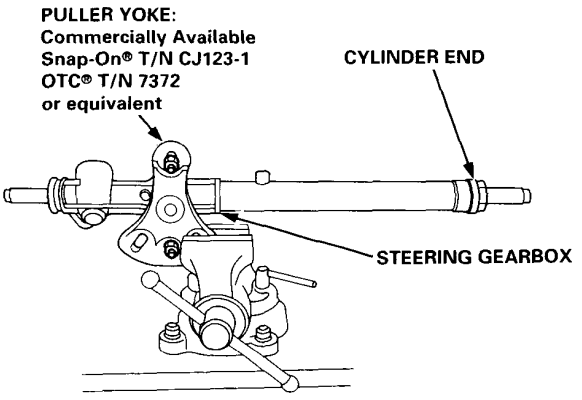


(cont'd)

Disassembly (cont'd)

13. Install a puller yoke to the steering gearbox. Clamp the puller yoke in a vise with soft jaws as shown, then loosen and remove the cylinder end.

CAUTION: Do not clamp the cylinder housing.



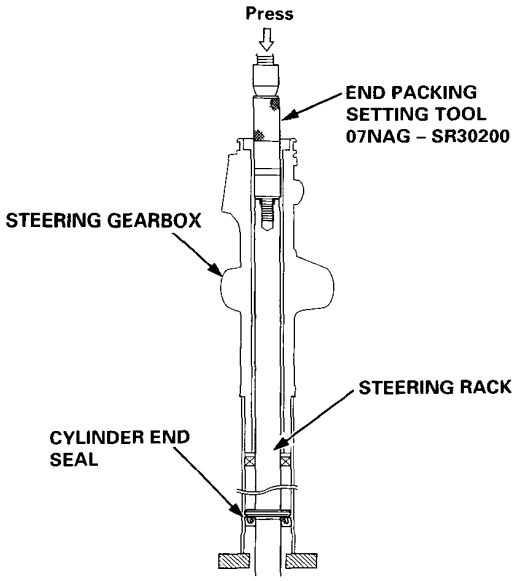
14. Set the gearbox in a press so the gear housing points upward.

15. Install the special tool into the end of the steering rack.

16. Drive out the cylinder end seal and steering rack using a press.

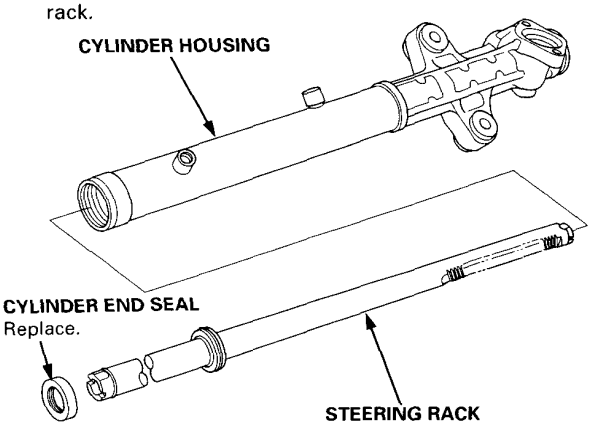
NOTE: Hold onto the steering rack to keep it from falling when pressed clear.

CAUTION: Be careful not to damage to inner surface of the cylinder housing with special tool.



17. Remove the special tool from the steering rack.

18. Remove the cylinder end seal from the steering rack.



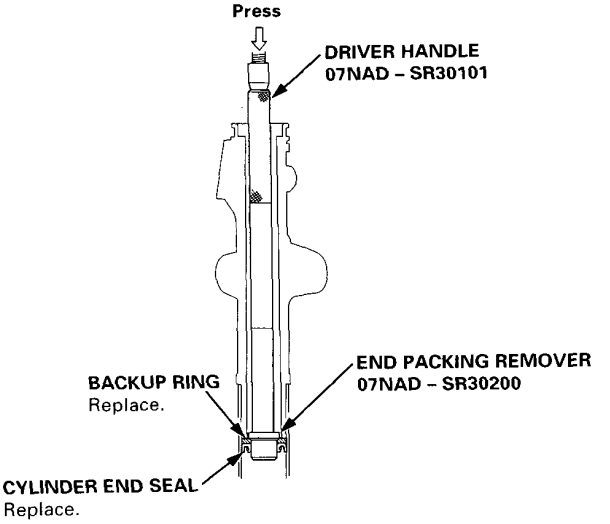
19. Insert the special tools into the cylinder from the gear housing side.

CAUTION: Be careful not to damage the inside surface of the housing with the special tool.

20. Set the gearbox in a press, then drive out the cylinder end seal and backup ring using the special tools and a press as shown.

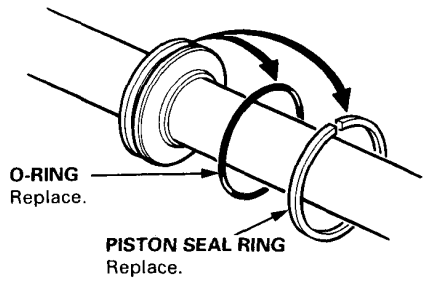
CAUTION:

- **Keep the special tool straight to avoid damage the cylinder wall. Check the special tool angle, and correct it, if necessary, while removing the cylinder end seal.**
- **Use a press to remove the cylinder end seal. Do not try to remove the seal by striking the special tool. It will break the backup ring, and the cylinder end seal will remain in the gearbox.**



21. Carefully pry the piston seal ring and O-ring off the piston of the rack.

CAUTION: Be careful not to damage the inside of seal ring groove and piston edges when removing the seal ring.

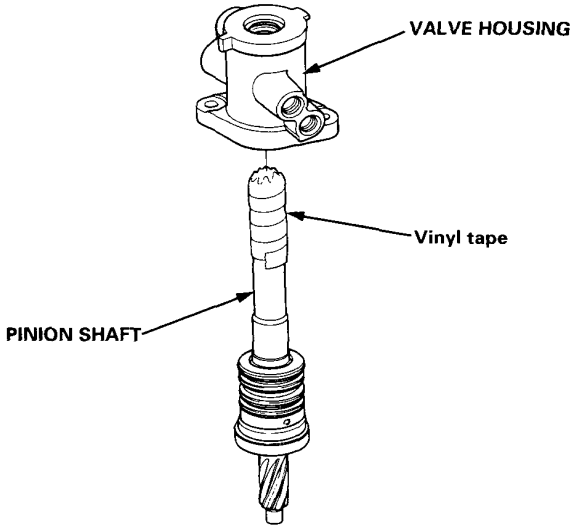


Valve Body Unit Disassembly

22. Before removing the valve housing, apply vinyl tape to splines of the pinion shaft.

23. Separate the valve housing from the pinion shaft/ valve using a press.

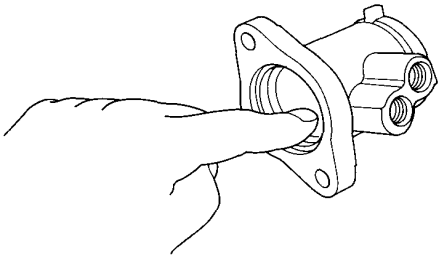
24. Remove the vinyl tape.



25. Check the inner wall of the valve housing where the seal ring slides with your finger. If there is a step in the wall, the valve housing is worn. Replace the valve housing.

NOTE:

- There may be the sliding marks from the seal ring on the wall of the valve housing. Replace the valve housing only the wall is stepped.
- When the valve housing is replaced, install new 32 mm shim(s) on the bearing surface of the housing to adjust the thickness.

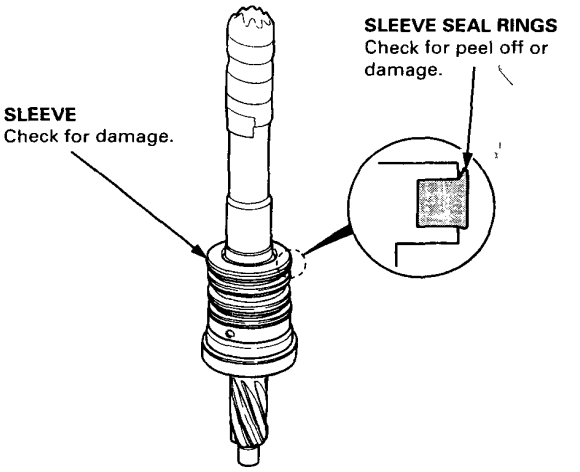


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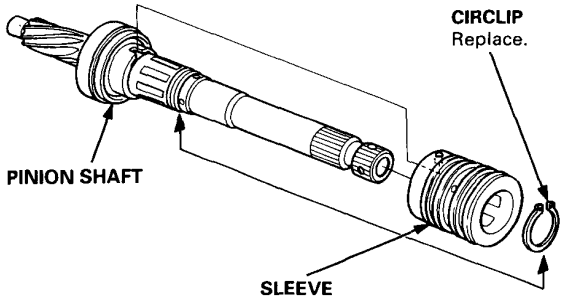
Disassembly (cont'd)

26. Check for wear, burrs and other damage to the edges of the grooves in the sleeve.

    NOTE: The pinion shaft and sleeve are a precision matched set. If either the pinion shaft or sleeve must be replaced, replace both parts as a set.

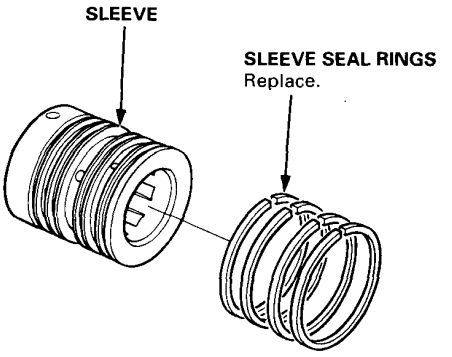


27. Remove the circlip and pinion shaft sleeve from the pinion shaft.



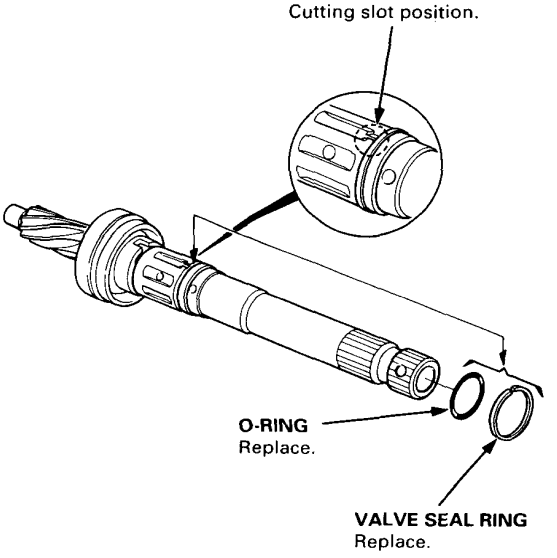
28. Using a cutter or an equivalent tool, cut and remove the four seal rings from the sleeve.

    CAUTION: Be careful not to damage the edges of the sleeve grooves and outer surface when removing the seal rings.



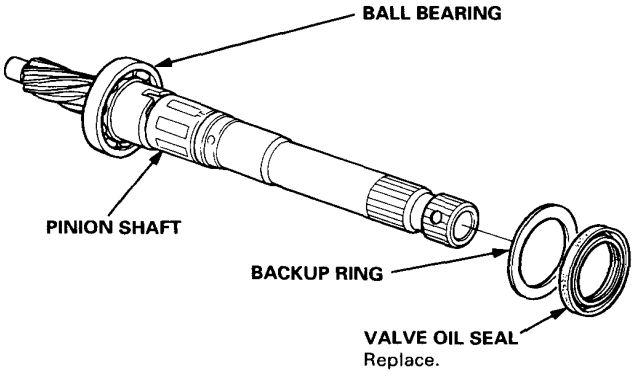
29. Using a cutter or an equivalent tool, cut the valve seal ring and O-ring at the groove the pinion shaft. Remove the valve seal ring and O-ring.

    CAUTION: Be careful not to damage the edges of the pinion shaft groove and outer surface when removing the valve seal ring and O-ring.

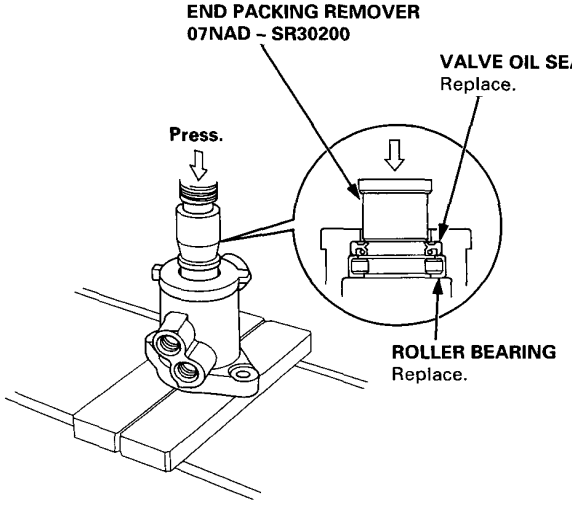


30. Remove the valve oil seal and backup ring from the pinion shaft.

NOTE:
- Inspect the ball bearing by rotating the outer race slowly. If there is any excessive play, replace the pinion shaft and sleeve as an assembly.
- The pinion shaft and sleeve are a precise fit; do not intermix old and new pinion shafts and sleeves.



31. Press the valve oil seal and roller bearing out of the valve housing using a hydraulic press and special tool shown below.

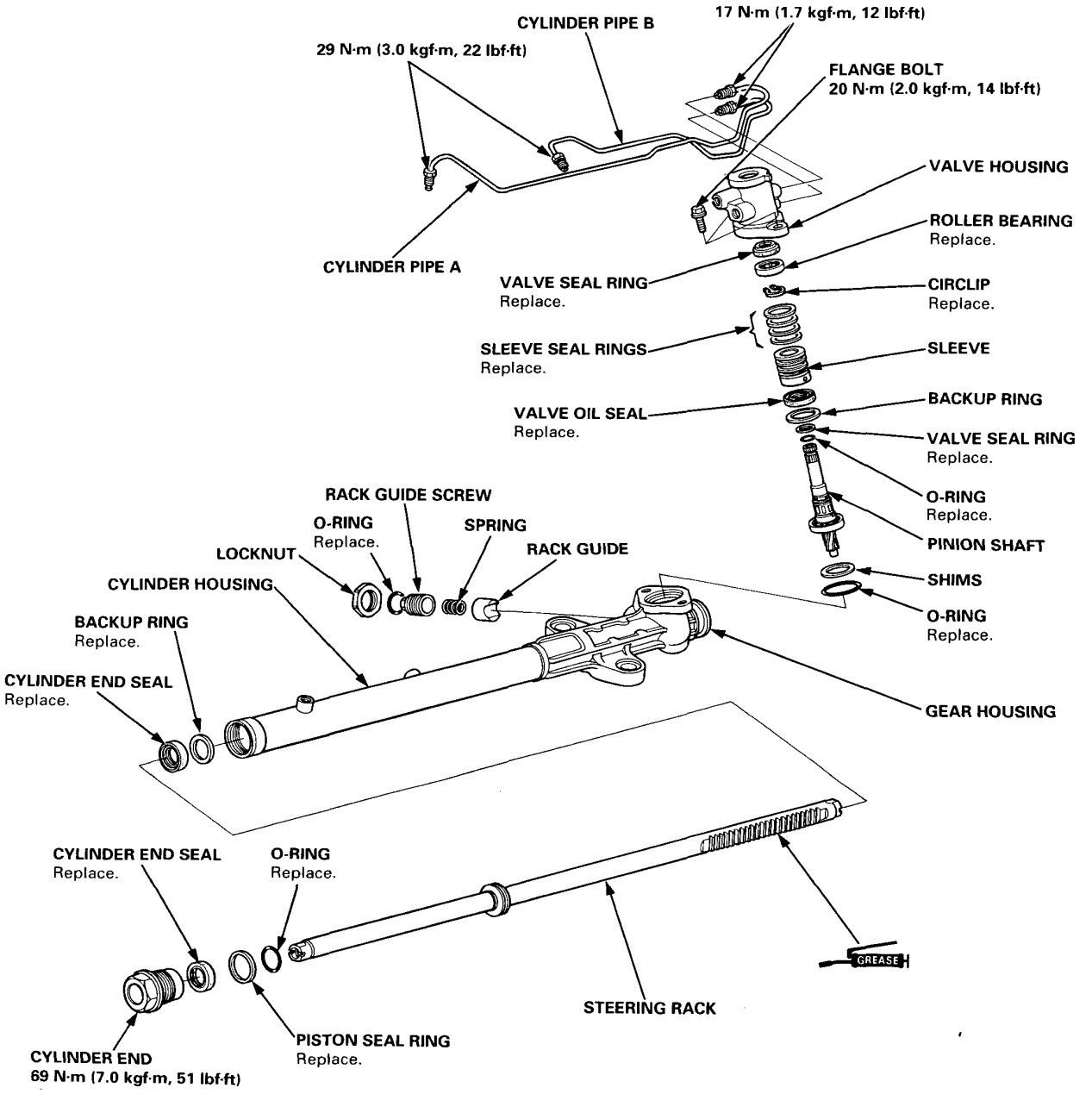


Steering Gearbox

Reassembly

NOTE:

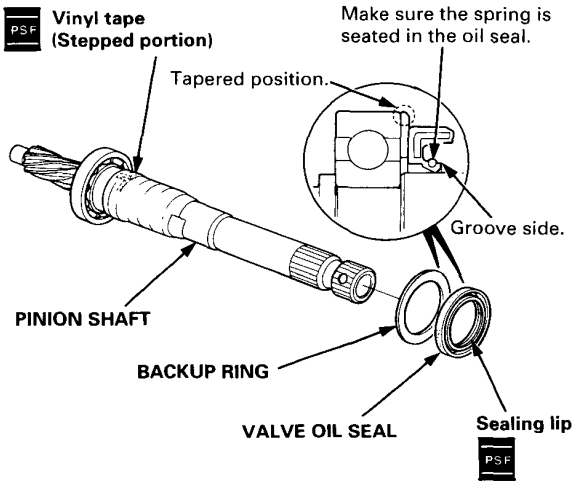
- LHD type is shown, RHD type is symmetrical.
- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply power steering fluid or steering grease (HONDA P/N: 08733 – B070E) to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Use the appropriate special tools where necessary.



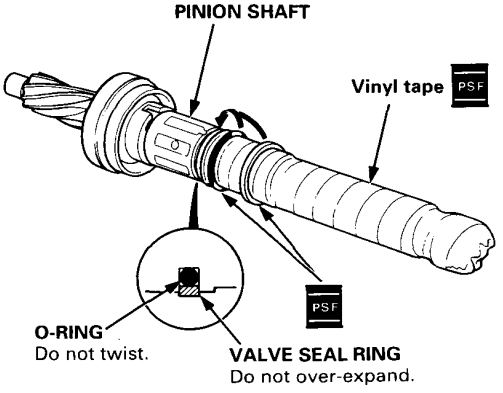
Valve Body Unit Reassembly

1. Apply vinyl tape to the stepped portion of the pinion shaft, and coat the surface of the vinyl tape with the power steering fluid.
2. Install the backup ring with its tapered side as shown below.
3. Coat the inside surface of the new valve oil seal with power steering fluid.
4. Slide the valve oil seal over the pinion shaft, being careful not to damage the sealing lip.

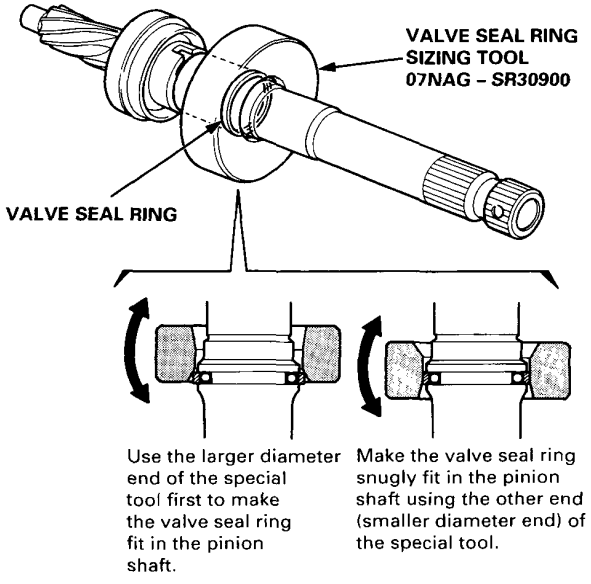
CAUTION: Install the valve oil seal with its grooved side facing opposite the bearing.



5. Apply vinyl tape to the splines and stepped portion of the shaft, and coat the surface of the vinyl tape with the power steering fluid.
6. Fit the new O-ring in the groove of the pinion shaft. Then slide the new valve seal ring over the shaft and the groove in on the pinion shaft.
7. Remove the vinyl tape from the pinion shaft.



8. Apply power steering fluid to the surface of the valve seal ring that was installed on the pinion shaft.
9. Apply power steering fluid to the inside of the special tool. Set the larger diameter end of the special tool over the valve seal ring.
10. Move the special tool up and down several times to make the valve seal ring fit in the pinion shaft.
11. Remove the special tool.
12. Turn the special tool over, and set the smaller diameter end of the special tool over the valve seal ring. Move the special tool up and down several times to make the valve seal ring fit snugly in the pinion shaft.



(cont'd)

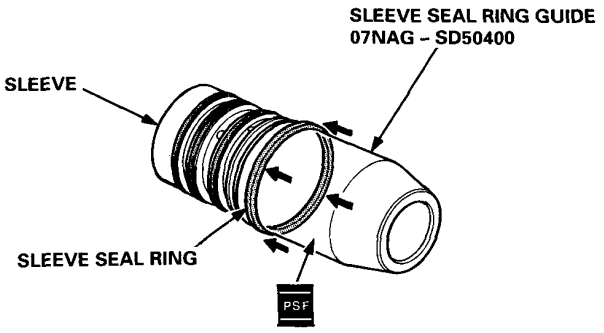
Reassembly (cont'd)

13. Apply power steering fluid to the surface of the special tool. Set the new seal rings over the special tool from the smaller diameter end of the tool, and expand the seal rings. Do two rings at a time from each end of the sleeve.

    NOTE:
    - Do not over-expand the seal ring. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal rings using the special tool (sizing tool).
    - There are two types of sleeve seal rings: black and brown. Do not mix the different types of sleeve seal rings as they are not compatible.

14. Set the special tool in the grooves in the sleeve, and set each ring in each groove securely.

    NOTE: After installation, compress the seal rings with your fingers temporarily.

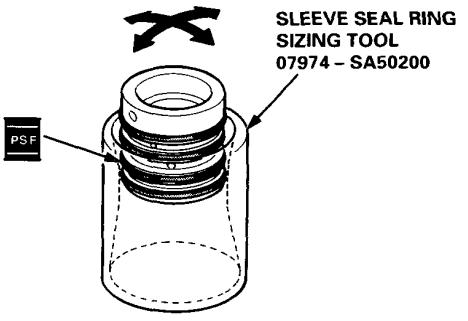


15. Apply power steering fluid to the seal rings on the sleeve, and to the entire inside surface of the special tool.

16. Insert the sleeve into the special tool slowly.

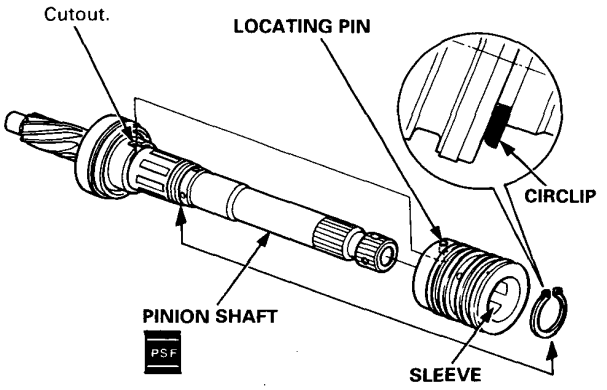
17. Move the sleeve each direction several times to make the seal rings snugly fit in the sleeve.

    NOTE: Be sure that the seal rings are not turned up.



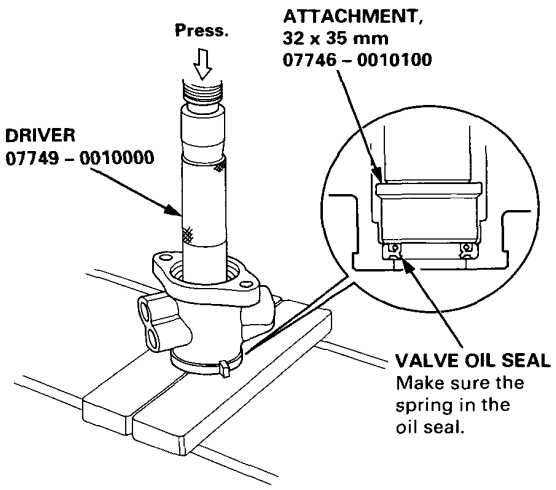
18. Apply power steering fluid to the surface of the pinion shaft. Assemble the sleeve over the pinion shaft by aligning the locating pin on the inside of the sleeve with the cutout in the shaft. Then install the new circlip securely in the pinion shaft groove.

    NOTE:
    - Be careful not to damage the valve seal ring when inserting the sleeve.
    - Install the circlip with its tapered side facing out.



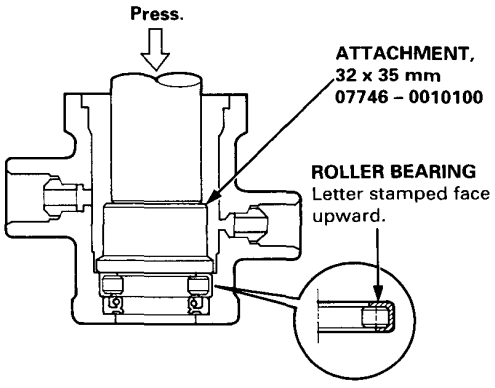
19. Apply power steering fluid to the seal ring lip of the valve oil seal, then install the seal in the valve housing using a hydraulic press and special tools as shown.

    CAUTION: Install the valve oil seal with its grooved side facing the tool.



20. Press the new roller bearing into the valve housing using a hydraulic press and special tool as shown.

    NOTE: Place the roller bearing on the valve housing with the stamped letter facing up towards the valve side.

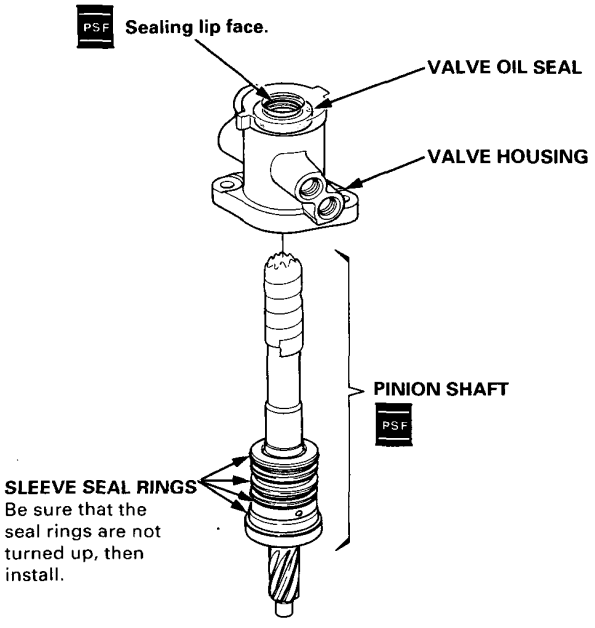


21. Apply vinyl tape to the pinion shaft, then coat the vinyl tape with power steering fluid.

22. Insert the pinion shaft into the valve housing.

    CAUTION: Be careful not to damage the valve seal rings.

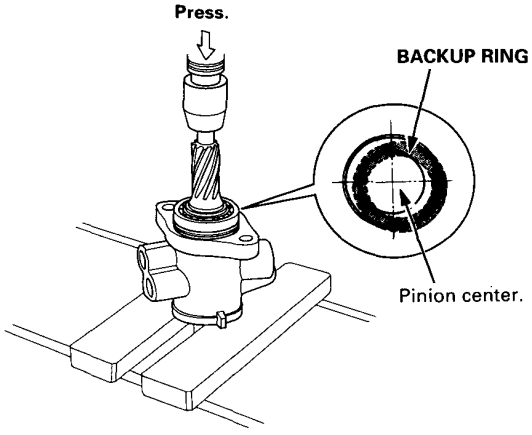
23. Remove the vinyl tape from the pinion shaft.



24. Press the pinion shaft/sleeve using a hydraulic press as shown.

    CAUTION: Before inserting the pinion shaft, be *sure that the backup ring is centered with the pinion shaft bearing.*

    NOTE: Check that the pinion shaft/sleeve turns smoothly by turning the pinion shaft.



(cont'd)

Reassembly (cont'd)

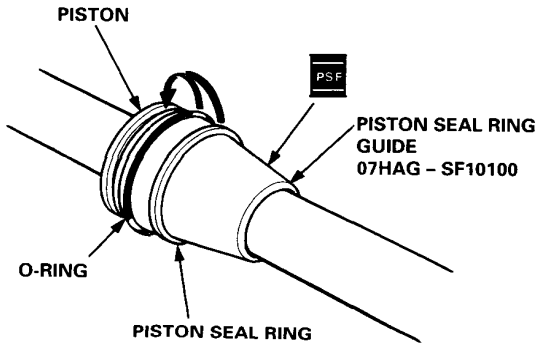
Steering Rack Reassembly

25. Coat the piston seal ring guide with power steering fluid, and slide it onto the rack, big end first.

26. Position the new O-ring and new piston seal ring on the special tool, then slide them down toward the big end of the tool.

    NOTE:
    - Do not over expand the resin seal rings. Install the resin seal rings with care so as not to damage them. After installation, be sure to contract the seal ring using the special tool (sizing tool).
    - Replace piston's O-ring and seal ring as a set.

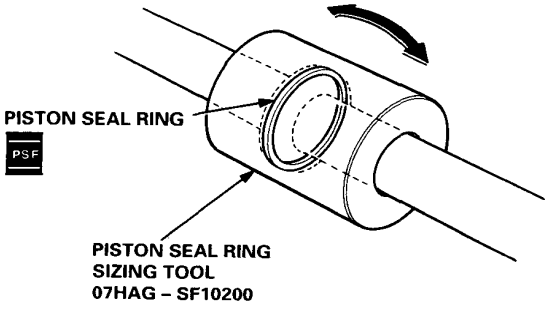
27. Pull the O-ring off into the piston groove, then pull the piston seal ring off into the piston groove on top of the O-ring.



28. Coat the piston seal ring and the inside of the special tool with power steering fluid.

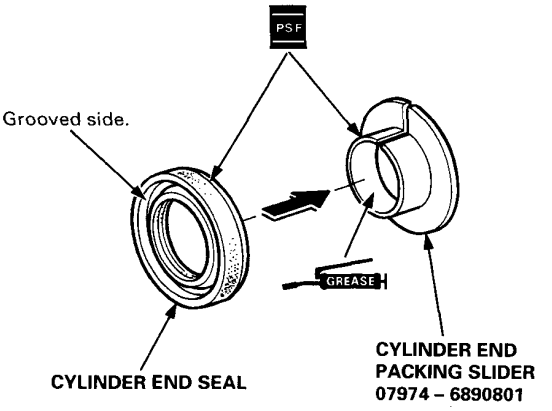
29. Carefully slide the tool onto the rack and over the piston seal ring.

30. Move the special tool back and forth several times to make the piston seal ring fit snugly in the piston.

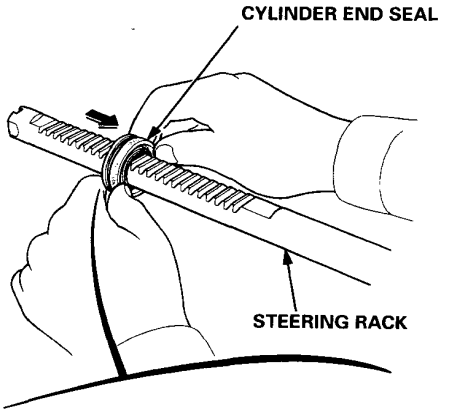


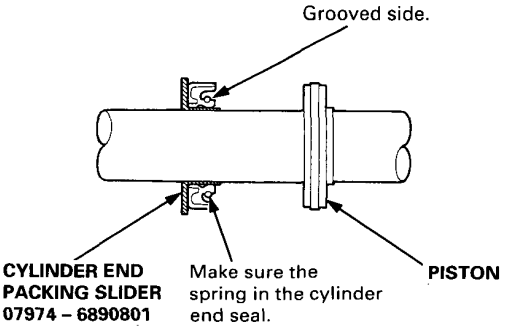
31. Coat the sliding surface of the special tool and new cylinder end seal with power steering fluid.

32. Place the seal on the special tool with its grooved side facing opposite the special tool.

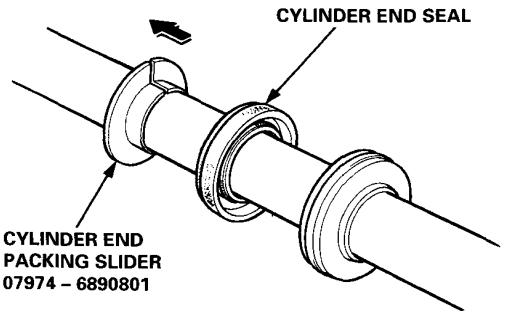


33. Apply a thin coat of grease to the inside of the special tool, and install it on the steering rack.

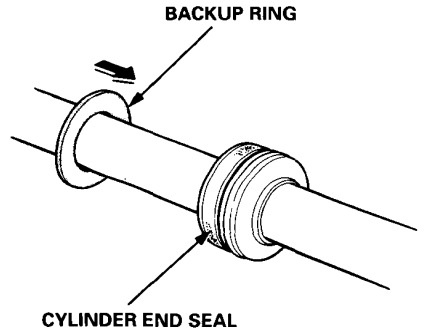




34. Separate the cylinder end seal from the special tool, then remove the tool from the steering rack.

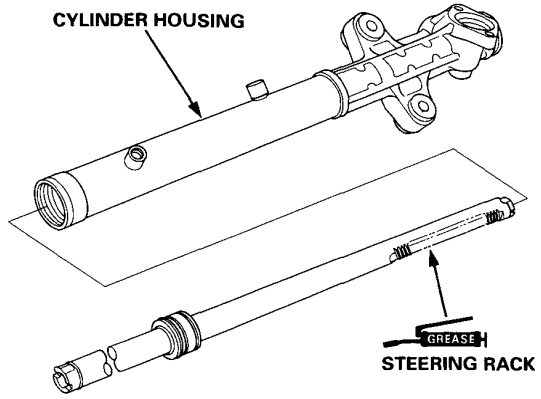


35. Install the new backup ring on the steering rack, then place the cylinder end seal to piston.

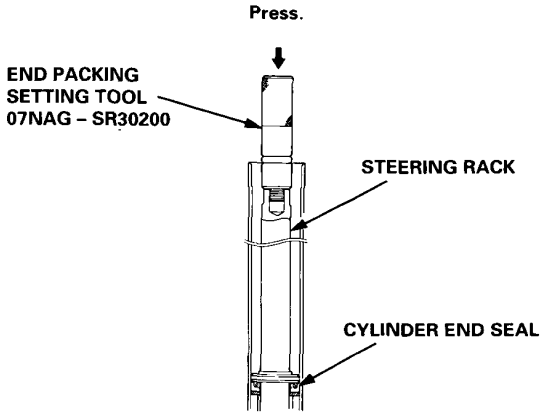


36. Grease the steering rack teeth, then insert the steering rack into the gear housing.

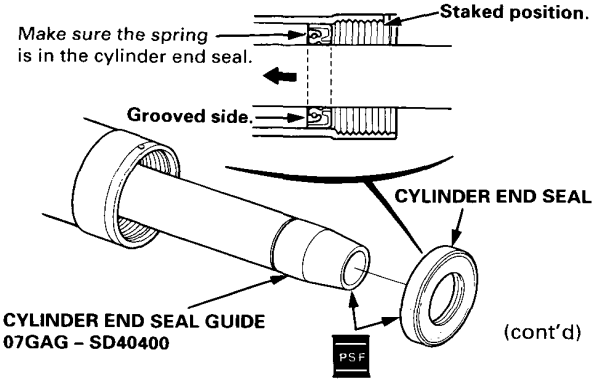
CAUTION: Be careful not to damage to inner surface of the cylinder housing with the rack edges.



37. Then set the gearbox in a press with the tool side upward.
    Install the special tool it into the end of the steering rack.
38. Install the cylinder end seal into the bottom of the cylinder by pressing on the special tool with the hydraulic press as shown.
    CAUTION: Do not push on the special tool with excessive force as it may damage the cylinder end seal.



39. Remove the flange bolt, and center the steering rack.
40. Install the special tool onto the end of the steering rack, then coat the special tool with power steering fluid.
41. Coat the inside surface of the new cylinder end seal with power steering fluid.
42. Install the cylinder end seal onto the steering rack with its grooved side toward the piston.
43. Remove the special tool. Push in the cylinder end seal with your finger.
    NOTE: Take care not to damage the cylinder end seal with the threads and burrs at the staked position of the gearbox.

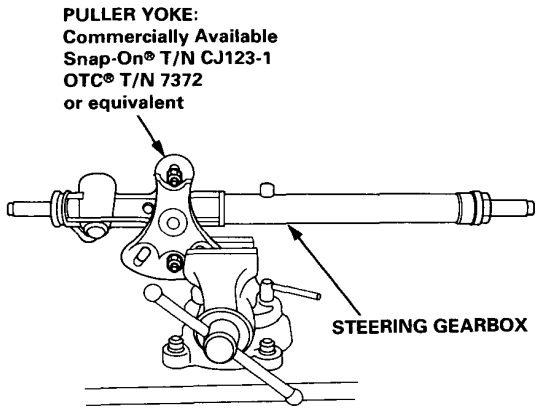


(cont'd)

Reassembly (cont'd)

44. Install a puller yoke to the steering gearbox, then clamp the puller yoke in a vise with soft jaws as shown.

    CAUTION: Do not clamp the cylinder housing.

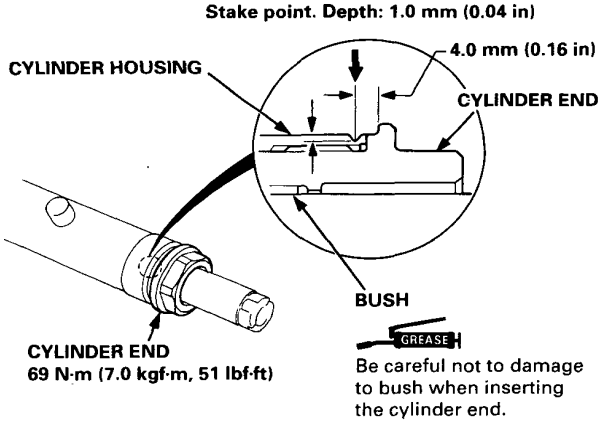


45. Grease the inside surface of the cylinder end, then install the cylinder end by screwing it into the cylinder housing.

46. Remove the puller yoke from the steering gearbox.

47. After tightening the cylinder end, stake the point of the cylinder housing shown below.

    NOTE: Stake the cylinder in the position opposite from where the stake was removed during disassembly.



48. Select the 32 mm shim(s).

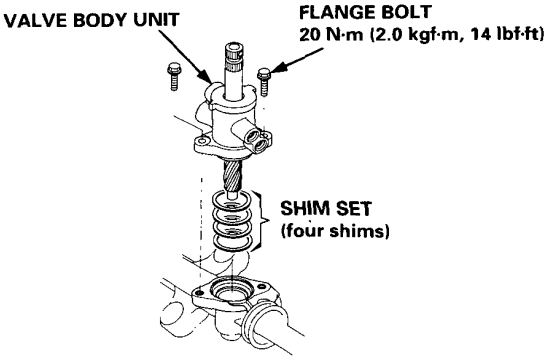
    NOTE: Only reinstall the original 32 mm shim(s) when the steering gearbox is reassembled without replacing the pinion shaft, valve housing, and gearbox housing with new ones.
    If the pinion shaft, valve housing, and gearbox housing are replaced, select the new shim(s) as follows.

Shim selection:

-1. Set the four 32 mm shims on the bearing surface of the gearbox housing. Total thickness of the four shims should equal no more than 0.70 mm.
    Shim set: four 32 mm shims (Thickness: 0.10 mm, 0.15 mm, 0.20 mm, 0.25 mm respectively)

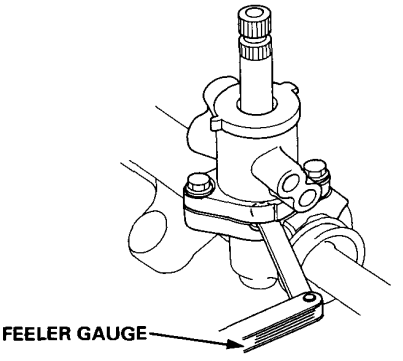
    CAUTION: The four 32 mm shims do not have thickness identification marks. Measure the thickness of each shim using a micrometer, and mark the shim for identification.

-2. Install the valve body unit on the gearbox, and tighten the flange bolts to the specified torque.



-3. Measure the clearance between the gearbox and valve body unit using a feeler gauge as shown.

    NOTE: Measure the clearance at the point midway between the two mounting bolts.



–4. Determine the required thickness of the 32 mm shims by subtracting the clearance obtained in the *step –3 from the total thickness of the four shims.* (Total thickness of the 4 shims) – (Clearance) = Required thickness of the shims

NOTE: Select the shims so that the total thickness is close to, but less than the required thickness.

Example:
Measurement is 0.28 mm (0.011 in):
0.70 – 0.28 = 0.42 mm (0.028 – 0.011 = 0.017 in)

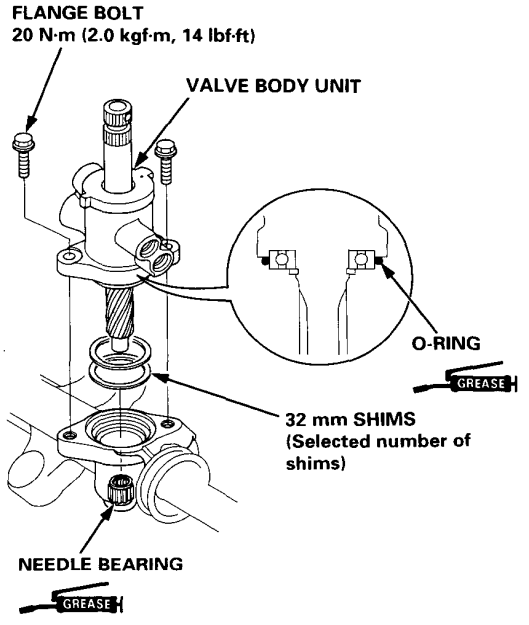
The selected shims should be 0.25 mm (0.010 in) and 0.15 mm (0.006 in) in thickness.

If the required shim thickness is 0.10 mm or less, no shims are necessary.

49. Set the selected 32 mm shims on the bearing surface of the gearbox housing.
50. Coat the new O-ring with grease, and carefully fit it on the valve housing.
51. Apply grease to the needle bearing in the gearbox housing.
52. Install the valve body unit on the gearbox housing by engaging the gears.

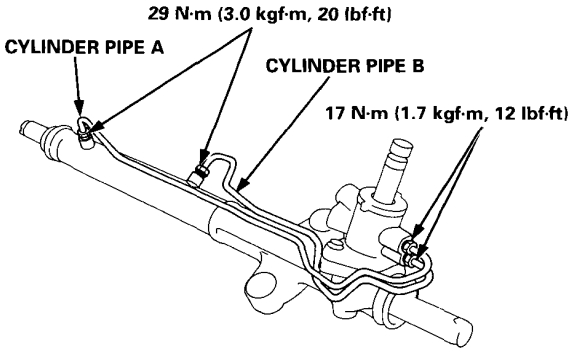
NOTE: Note the valve body unit installation position (direction of pipe connection).

53. Tighten the flange bolts to the specified torque.



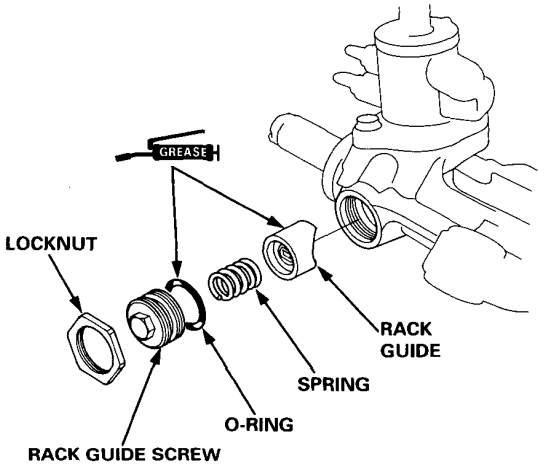
54. Install the cylinder pipes A and B.

NOTE:
- Clean the joints of the cylinder pipes A and B thoroughly. The joints must be free of foreign material.
- Install the cylinder pipes A and B by tighting the flare nuts by hand first, then tighten the flare nuts to the specified torque starting with the cylinder side nuts.



55. Grease the sliding surface of the rack guide, and install it onto the gear housing.
56. Apply a thin coat of grease to the new O-ring, and install it on the rack guide screw.
57. Install the spring, rack guide screw and locknut on the gear housing.
58. Adjust the rack guide screw (see page 17-21).

NOTE: After adjusting, check that the rack moves smoothly by sliding the rack right and left.



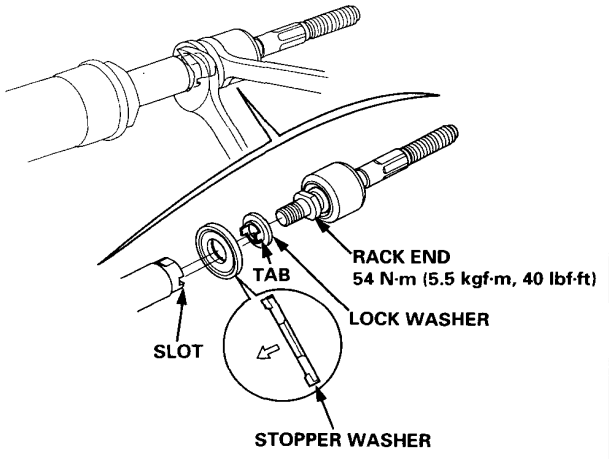
(cont'd)

Reassembly (cont'd)

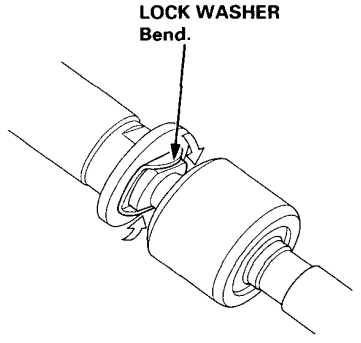
59. Install the stopper washer with the chamfered side facing out.

60. Screw each rack end into the rack while holding the new lock washer so its tabs are in the slots in the end of the rack.

61. Tighten the rack end securely.

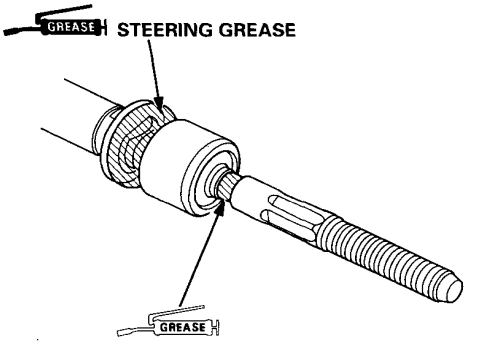


62. Bend the lock washer back against the flat stops on the flange as shown.



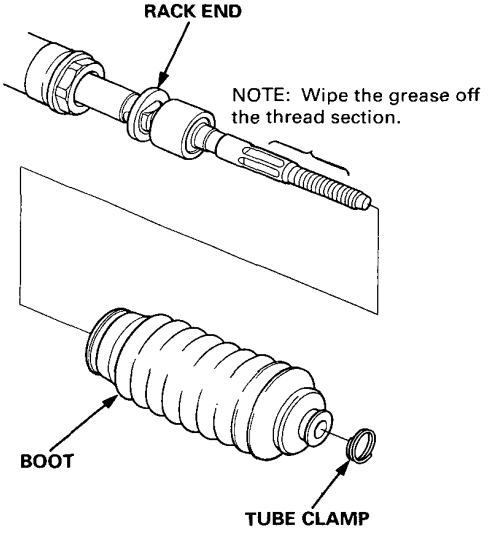
63. Apply steering grease in to the rack end joint housing.

64. Coat the rack end groove and inside of the boot with silicone grease.

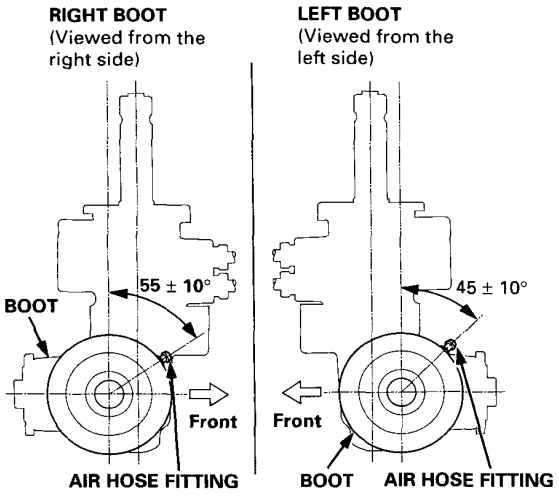


65. Install the boots in the rack end with the tube clamps.

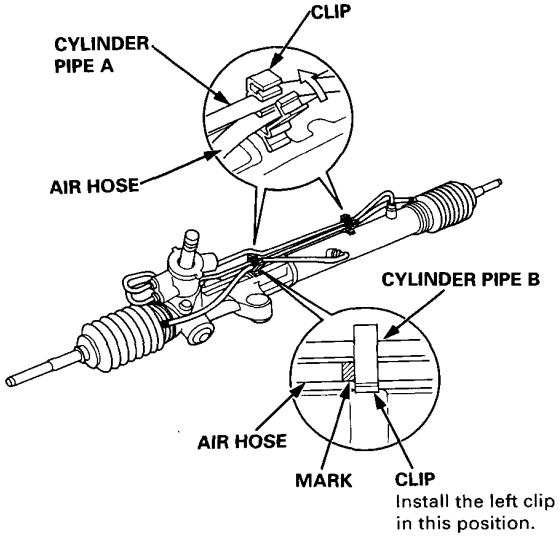
NOTE: Install the boots with the rack in the straight ahead position (i.e., right and left tie-rods are equal in length).



66. Adjust the air hose fitting position of the boots by turning it as shown below.



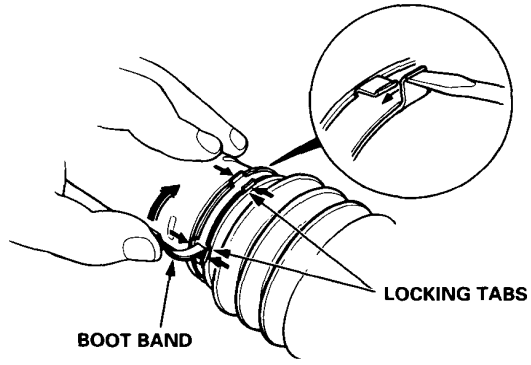
67. *Connect the air hose between the right and left* boot, then install the clips on the cylinder pipe B as shown.



68. Install new boot bands on the boot and bend both sets of locking tabs.

69. Lightly tap on the doubled-over portions to reduce their height.

CAUTION: Stake the band locking tabs firmly.



70. Slide the rack right and left to be certain that the boots are not deformed or twisted.

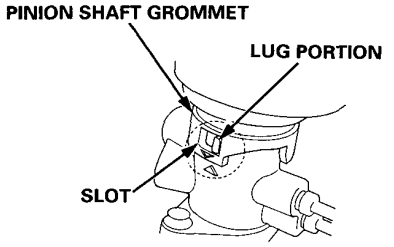
Steering Gearbox

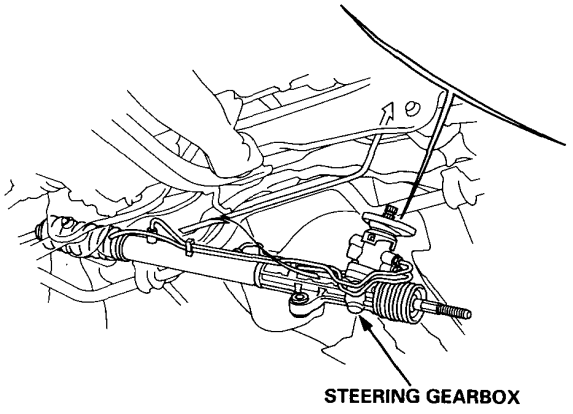
Installation

CAUTION: Be careful not to bend or damage the piping when installing the gearbox.

1. Before installing the gearbox, slide the rack all the way to right.
2. Install the pinion shaft grommet.

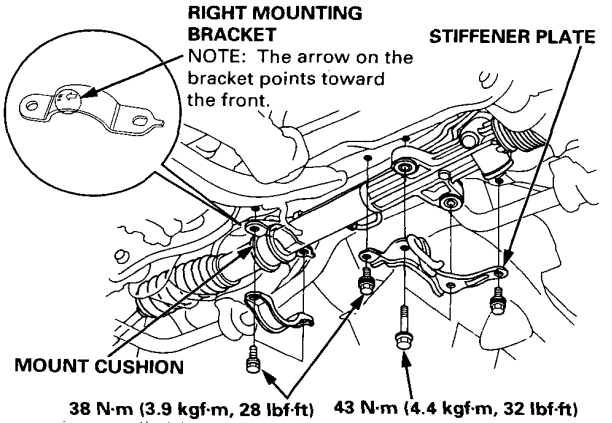
   NOTE: Align the lug portion on the pinion shaft grommet with the slot in the valve body.
3. Pass the right side of the steering gearbox above and through the right side of the rear beam.
4. Raise the left side of the steering gearbox above and through the left side of the rear beam.
5. Install the pinion shaft grommet and insert the pinion shaft up through the bulkhead.





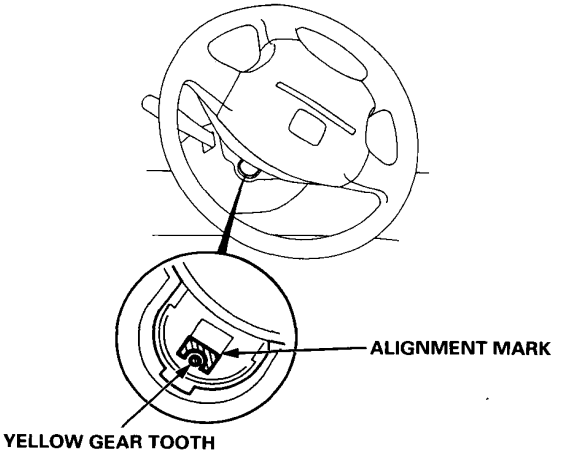
6. Loosely install the mount cushion and right mounting brackets.
7. Tighten the four mounting bolts on the stiffener plate first, then tighten the two mounting bolts on the right mounting brackets.

   NOTE: After installing the steering gearbox, make sure that there is no interference between the cylinder pipes and rearbeam.



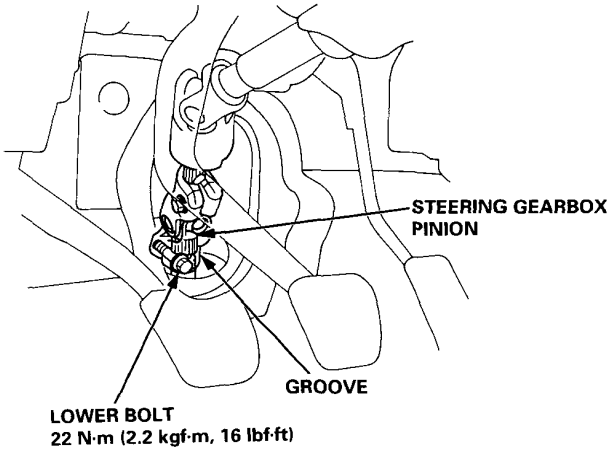
8. Center the steering rack within its stroke.
9. Make sure that the cable reel of the SRS is centered as follows:

   - Turn the steering wheel left approx. 150 degrees, to check the cable reel position with indicator.
   - If the cable reel is centered, the yellow gear tooth lines up with the alignment mark on the cover.
   - Return the steering wheel right approx. 150 degrees to position the steering wheel in the straight ahead position.

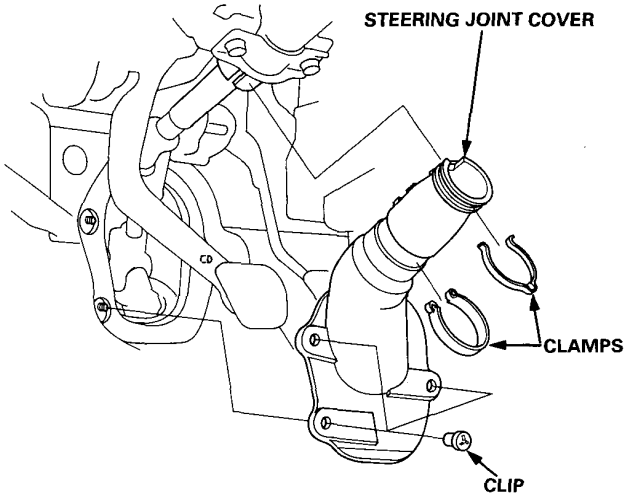


10. Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove around the shaft), and tighten the lower bolt.

    NOTE:
    - Do not forget the toothed lock washer of the lower bolt.
    - Connect the steering shaft and pinion with the cable reel and steering rack centered.
    - Be sure that the lower steering joint bolt is securely in the groove in the steering gearbox pinion.
    - If the steering wheel and rack are not centered, reposition the serrations at lower end of the steering joint.

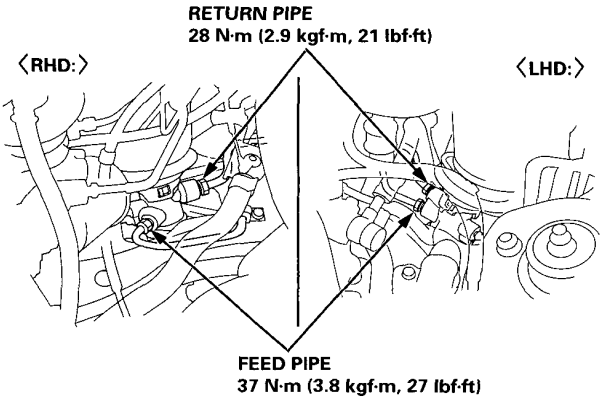


11. Install the steering joint cover with the clamps and clips.



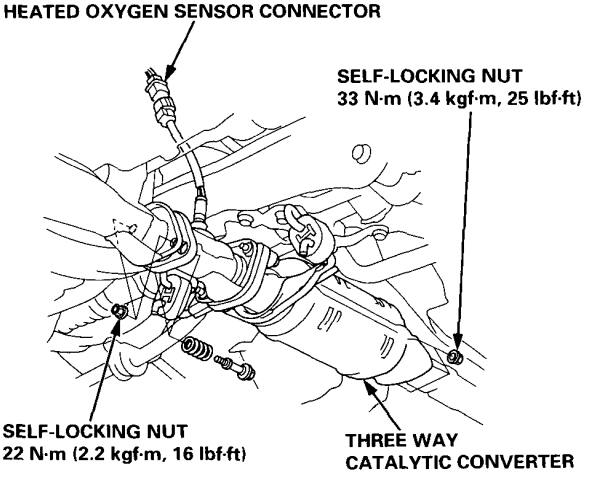
12. Connect the fluid lines to the valve body unit.

    NOTE: After connecting the fluid lines, make sure that there is no interference between the pipes and other parts.



13. Connect the shift linkage (M/T model: see section 13, A/T model: see section 14).

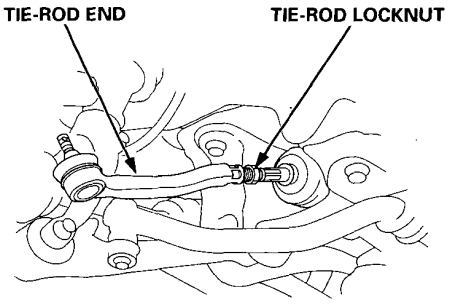
14. Install the three way catalytic converter with the new gaskets and new self-locking nuts, and connect the heated oxygen sensor (HO2S) connector.



(cont'd)

Installation (cont'd)

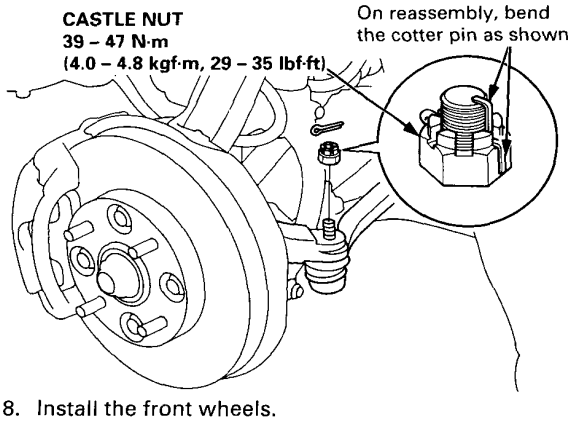
16. Thread the right and left tie-rod ends onto the rack an equal number of turns.



NOTE: Before connecting the tie-rod ends, check the ball joint pin tapered section and threads section for grease contamination, and wipe it if necessary.

17. Reconnect the tie-rod ends to the steering knuckles, tighten the castle nut to the specified torque, and install new cotter pins.

CAUTION: Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.



18. Install the front wheels.
19. Fill the system with power steering fluid and bleed air from the system (see page 17-21).
20. After installation, perform the following checks.

- Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid. Check the gearbox for leaks (see page 17-23).
- Adjust the front toe (see section 18).
- Check the steering wheel spoke angle. Adjust by turning the right and left tie-rods, if necessary.

NOTE: Turn the right and left tie-rods equally.

Ball Joint Boot Replacement

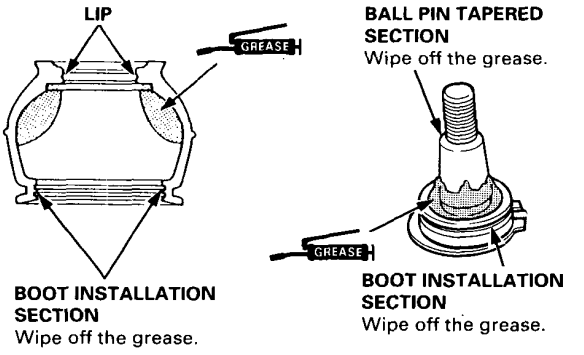
1. Remove the boot set ring and the boot.

CAUTION: Do not contaminate the boot installation section with grease.

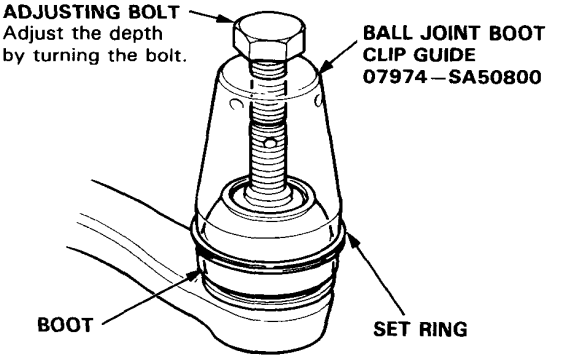
2. Pack the interior of the boot and lip with grease.

3. Wipe the grease off the sliding surface of the ball pin, then pack the lower area with fresh grease.

CAUTION:
- **Keep grease off the boot installation section and the tapered section of the ball pin.**
- **Do not allow dust, dirt, or other foreign materials to enter the boot.**



4. Install the boot in the groove of the boot installation section securely, then bleed air.



5. Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.

CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

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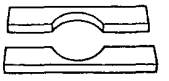


Special Tools

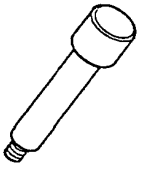
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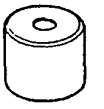
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②



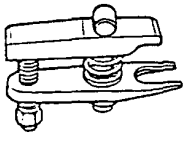
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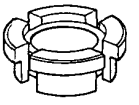
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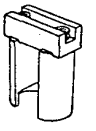
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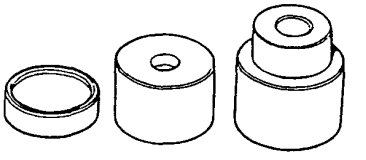
⑥ ⑦



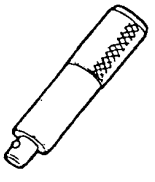
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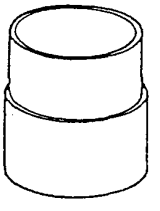
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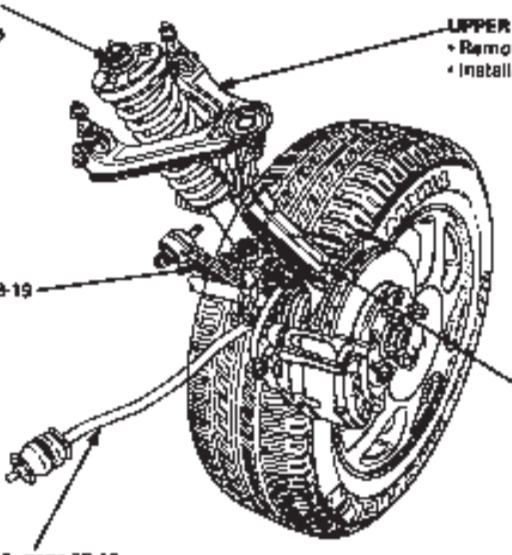
⑫

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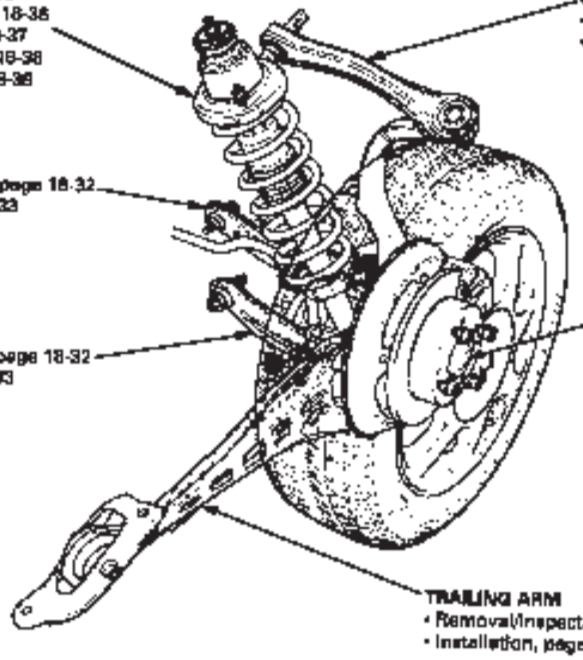
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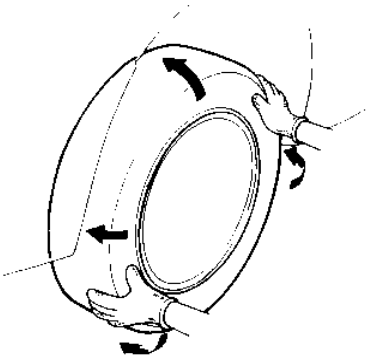
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Wheel Alignment

Service Information

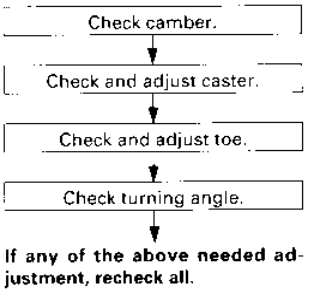
NOTE: For proper inspection/adjustment of the wheel alignment, check and adjust the following before checking the alignment.

- Check that the suspension is not modified.
- Check the tire size and tire pressure.
- Check the runout of the wheels and tires.
- Check the suspension ball joints. (Hold a wheel with your hands and move it up and down and right and left to check for wobbling.)



Wheel alignment adjustment procedure

Each of the wheel alignment elements relates to the other. Therefore, the total adjustment of the front/rear wheel alignment is required whenever either one of elements (that is, camber caster, toe, and/or turning angle) is adjusted.

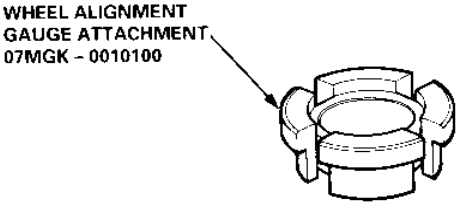


Special Tool Information

Wheel alignment gauge attachment:

NOTE:

- As the wheel alignment gauge attachment can be installed by magnetic force of camber/caster gauge, make sure the wheel hubs are clean and rust-free before installing the wheel alignment gauge attachment.
- When installing the special tool, align the special tool groove and mating surface groove of the camber/caster gauge, to make the most of the magnetic force of the camber/caster gauge.
- For accurate readings, measure the wheel alignment at the car must be level.



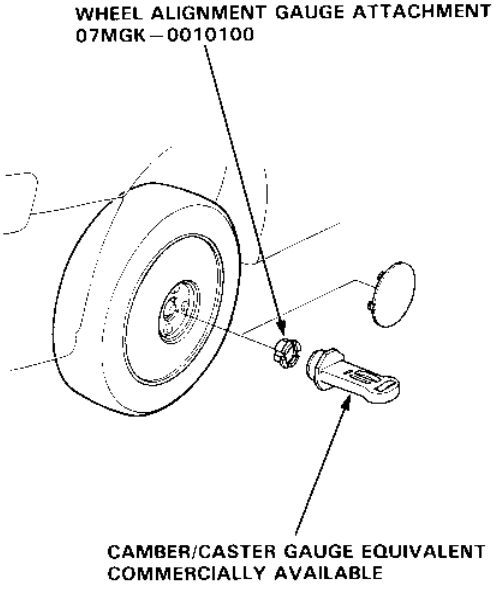
Camber

Inspection

1. Remove the wheel cap.
2. Remove the hub cap from the rear wheel hub (see page 18-29).
3. Install the wheel alignment gauge attachment and camber/caster gauge on the wheel hub.
4. Turn the front wheels to the straight ahead position.
5. Read the camber on the gauge with the bubble at the center of the gauge.

   Camber angle:
   Front: 0°00′ ± 1°
   Rear: −0°25′ ± 30′

6. If out of specification, check for bent or damaed suspension components.



Caster

Inspection

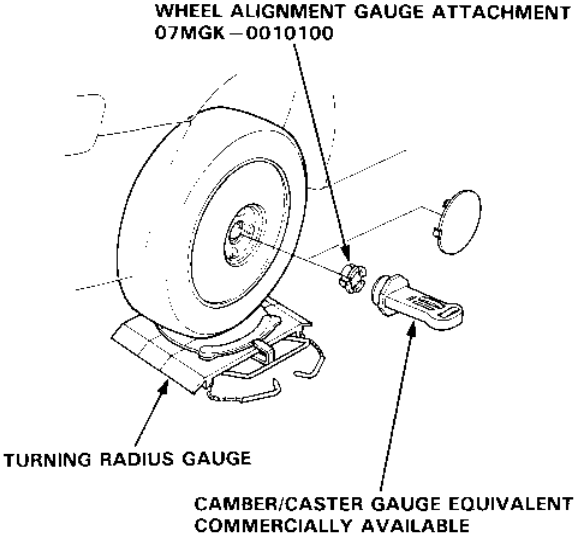
1. Remove the wheel cap.
2. Raise the car and set the turning radius gauges beneath the front wheels, and place boads under the rear wheels the same thickness as one of the turning radius gauges, then lower the car.

   NOTE: Be sure that the car is parallel to the ground with the wheels on the turning radius gauges and boards.

3. Install the wheel alignment gauge attachment and camber/caster gauge on the wheel hub, and apply the front brake.
4. Turn the front wheel 20° outward, then turn the adjust screw so that the bubble in the camber/caster gauge is at 0°.
5. Turn the wheel 20° inward and read the caster on the gauge with the bubble at the center of the gauge.

   Caster angle: 3°00′ ± 1°

6. If out of specification, record the caster reading, then adjust the caster.



(cont'd)

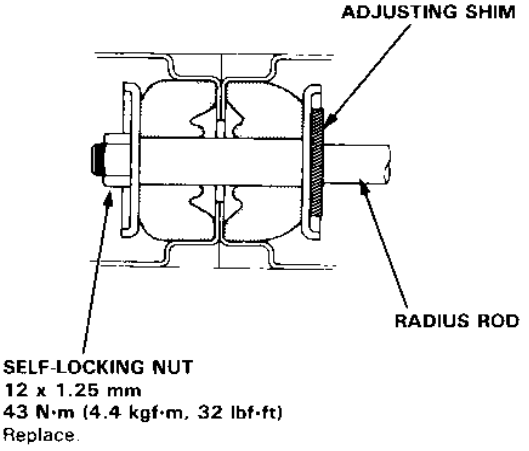
Caster (cont'd)

Adjustment

NOTE: Caster angle can be adjusted by increasing/decreasing the number of the adjusting shims. Remove and install the radius rod each time the caster angle is adjusted.

1. Raise the front of the car, and support it with safety stands in the proper locations (see section 1).
2. Remove the self-locking nut on the end of the radius rod.
3. Remove the FLANGE bolts at the radius rod on the lower arm, and remove the radius rod (see page 18-19).
4. Adjust the caster angle by increasing/decreasing the adjusting shims.

   NOTE:
   - Do not use more than two adjusting shims.
   - One adjusting shim changes the caster angly by 35′ and the caster angle can be adjusted by 1°10′ maximum.
   - One adjusting shim is 3.2 mm (0.13 in) in thickness.



5. After the adjustment, install the radius rod onto the lower arm, and tighten the FLANGE bolts (see page 18-20).
6. Tighten the new self-locking nut to specified torque.

Front Toe Inspection/Adjustment

Inspection

1. Center steering wheel spokes.

   NOTE: Measure difference in toe measurements with the wheels pointed straight ahead.

2. Check the front toe.

   Front toe: 0 ± 3 mm (0 ± 0.12 in)

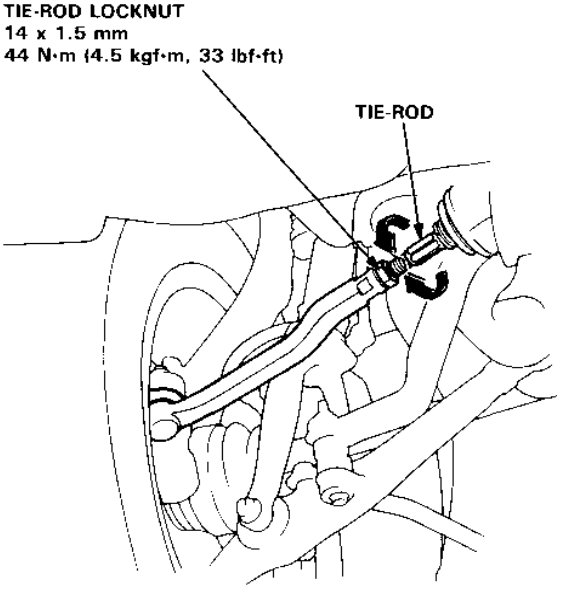
   — If adjustment is required, go on to step 3.

   — If no adjustment is required, remove alignment equipment.

Adjustment

3. Loosen the tie-rod locknuts and turn both tie-rods in the same direction until the front wheels are in straight ahead position.
4. Turn both tie-rods equally until the toe reading on the turning radius gauge is correct.
5. After adjusting, tighten the tie-rod locknuts.

   NOTE: Reposition the tie-rod boot if it is twisted or displaced.



Rear Toe Inspection/Adjustment

Inspection

1. Release parking brake.

   NOTE: If the parking brake is engaged, you may get an incorrect reading.

2. Check the rear toe.

   Rear toe-in: 2 ± 2 mm (0.08 ± 0.08 in)

   — If adjustment is required, go on to step 3.

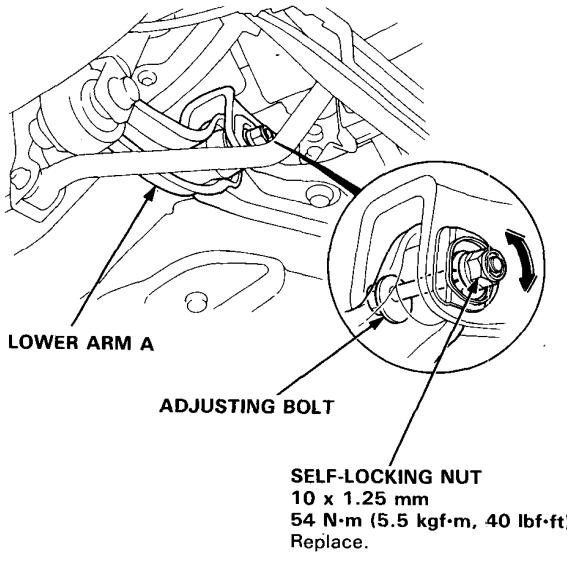
   — If no adjustment is required, remove alignment equipment.

Adjustment

3. Hold the adjusting bolt on the rear lower arm A and loosen the flange nut.

4. Adjust the rear toe by turning the adjusting bolt until toe is correct.

5. Install the flange nut and tighten while holding the adjusting bolt.



Turning Angle Inspection

1. Jack up the front of the car. Set the turning radius gauges beneath the front wheels, then lower the car.

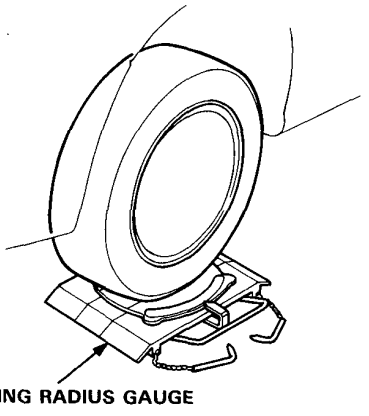
2. Jack up the rear of the car. Place boards that are the same thickness as the turning radius gauges under the rear wheels, then lower the car.

   NOTE: For accurate readings, the car must be level.

3. Turn the wheel right and left while applying the brake, and measure the turning angle of both wheels.

   Turning angle:
   Inward wheel: 39°00′ ± 2°
   Outward wheel: 30°00′ (reference)

4. If the turning angle is not within the specifications, check for bent or damaged suspension components.



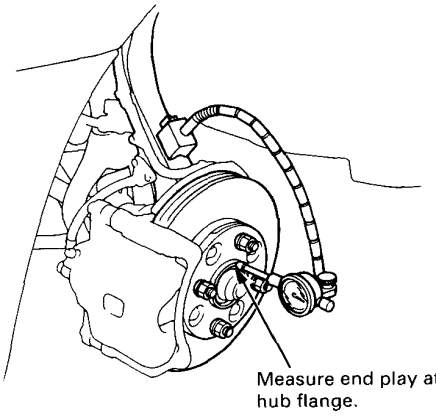
Wheel/Hub Inspection

Bearing End Play

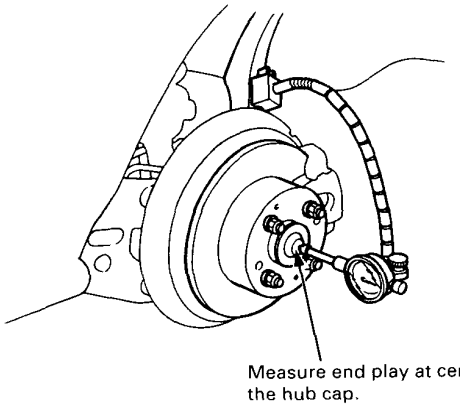
1. Raise the car off the ground, and support it with safety stands in the proper locations (see section 1).
2. Remove the wheels, then reinstall the wheel nuts.
3. Attach the dial gauge as shown.
4. Measure the bearing end play by moving the disc in or outward.

Front/Rear:
Standard: 0 – 0.05 mm (0 – 0.002 in)

〈Front:〉



〈Rear:〉

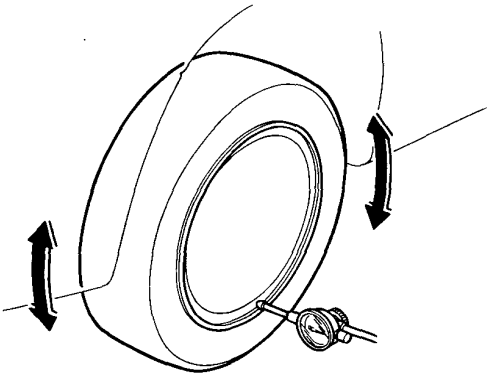


5. If the bearing end play measurement is more than the standard, replace the wheel bearing.

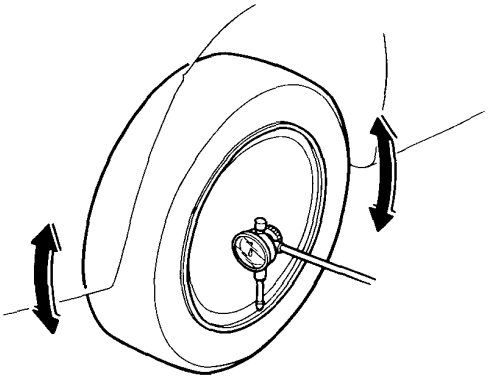
Wheel Runout

1. Raise the car off the ground, and support it with safety stands in the proper locations (see section 1).
2. Check for bent or deformed wheels.
3. Attach the dial gauge as shown.
4. Measure the wheel runout by turning the wheel.

Front and Rear Wheel Axial Runout:
Standard:
Steel Wheel: 0 – 1.0 mm (0 – 0.04 in)
Aluminum Wheel: 0 – 0.7 mm (0 – 0.03 in)
Service Limit: 2.0 mm (0.08 in)



Front and Rear Wheel Radial Runout:
Standard:
Steel Wheel: 0 – 1.0 mm (0 – 0.04 in)
Aluminum Wheel: 0 – 0.7 mm (0 – 0.03 in)
Service Limit: 1.5 mm (0.06 in)



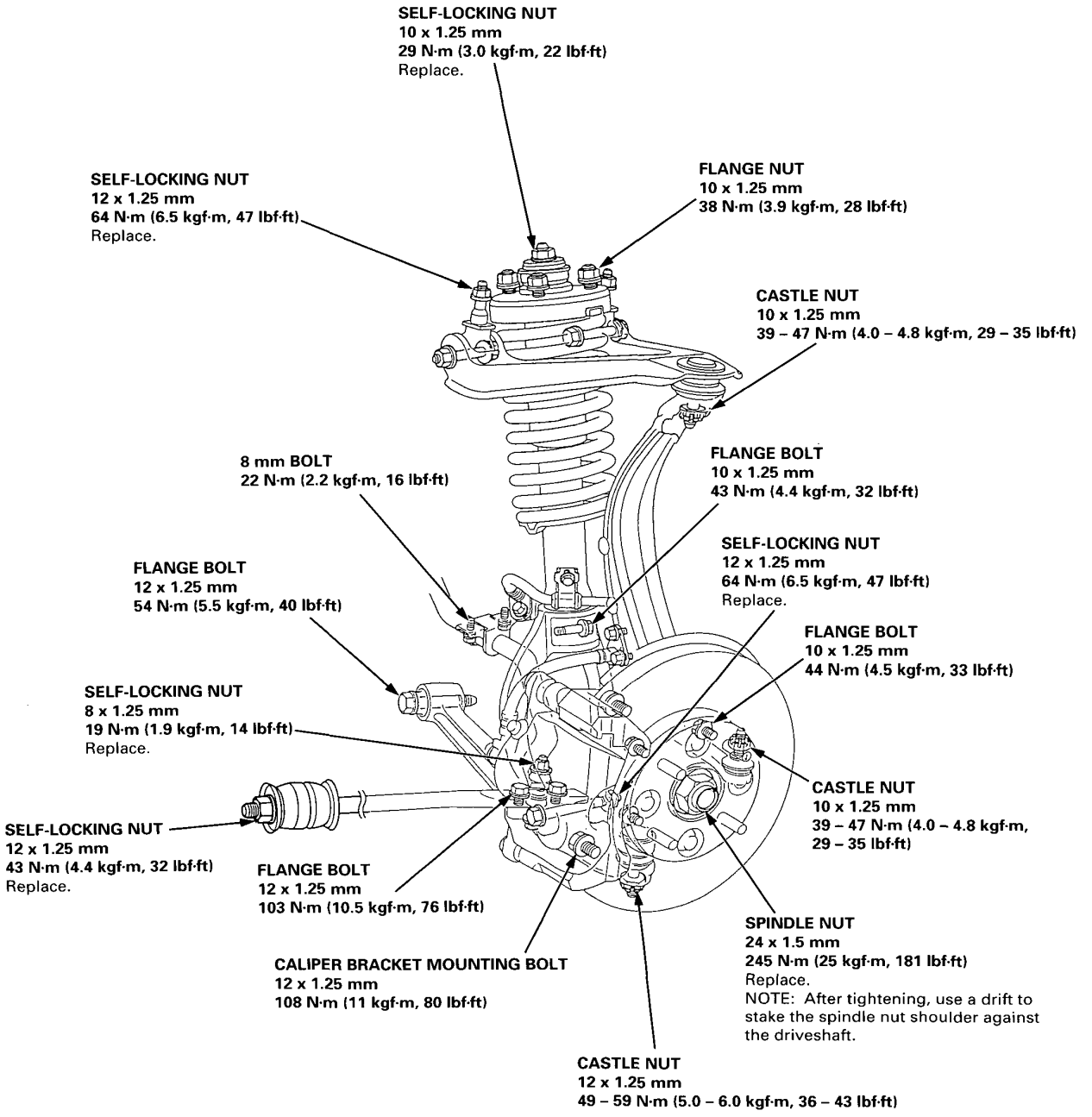
5. If the wheel runout is more than the service limit, replace the wheel.

Torque Specifications

CAUTION:

- **Replace the self-locking nuts after removal.**
- **The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.**
- **Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.**

NOTE: Wipe off the grease before tightening the nut at the ball joint.



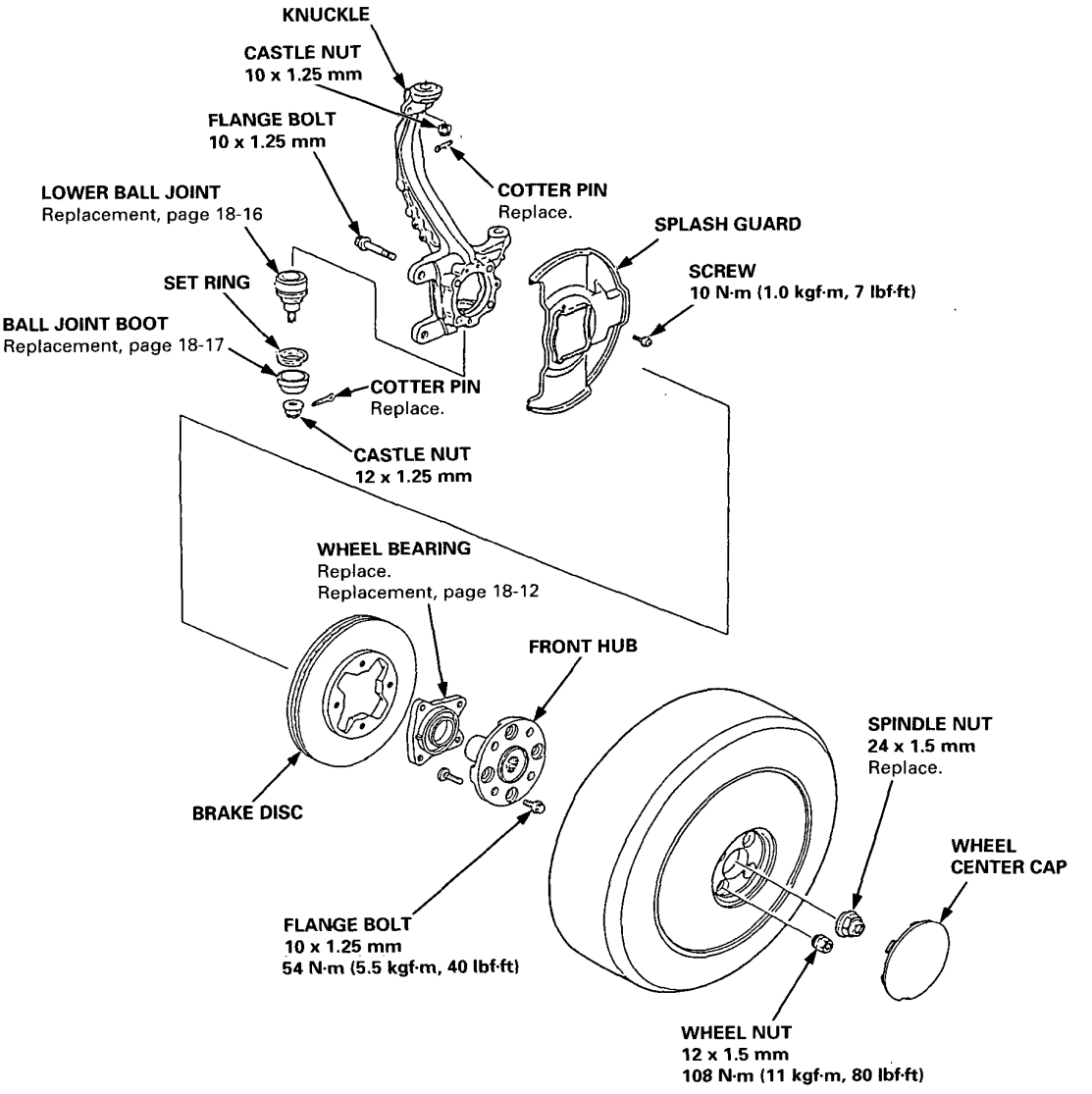
Front Suspension

Knuckle/Hub

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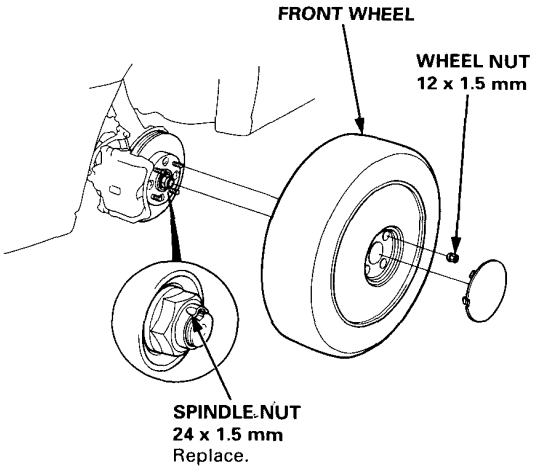
NOTE:

- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- For aluminum wheels, remove the center cap by prying it out with a flat screwdriver. Use a rag at the point you are going to pry because aluminum alloy wheels can be easily damaged. Avoid damage to the cap by not allowing it to fall during removal.
- Before installing the brake disc, clean the mating surfaces of the front hub and brake disc.
- Before installing the wheel, clean the mating surfaces of the brake disc and wheel.



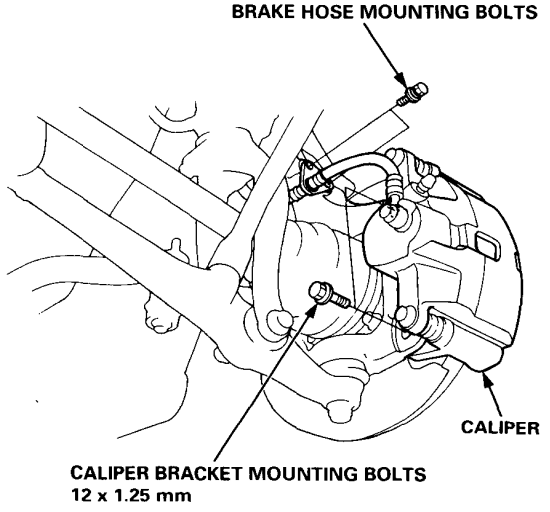
Knuckle Removal

1. Loosen the wheel nuts slightly.
2. Raise the front of car, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheel.
4. Raise the locking tab on the spindle nut, then remove the nut.



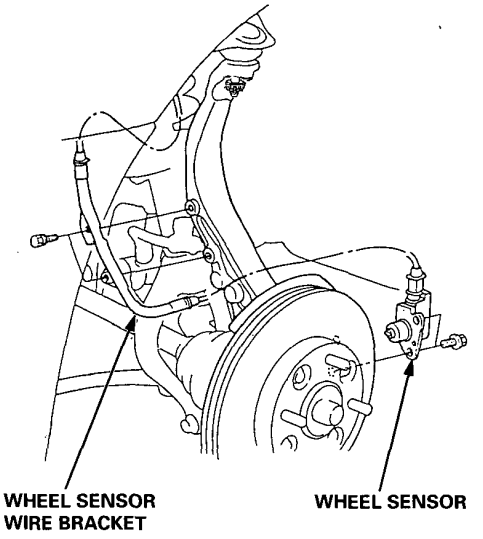
5. Remove the brake hose mounting bolts.
6. Remove the caliper bracket mounting bolts, and hang the caliper to one side.

CAUTION: To prevent accidental damage to the caliper or brake hose, use a short piece of wire to hang the caliper from the undercarriage.



7. Remove the wheel sensor wire bracket, then remove the wheel sensor from the knuckle (for cars with ABS).

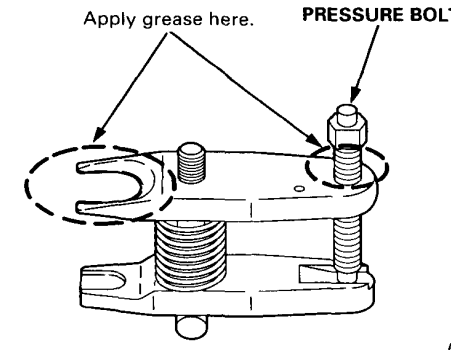
NOTE: Do not disconnect the wheel sensor connector.



NOTE: Use ball joint removers to separate the ball joints from the suspension or tie-rod end.

CAUTION: Be careful not to damage the ball joint boot.

8. Clean any dirt or grease off the ball joint.
9. Remove the cotter pin from the tie-rod end ball joint castle nut, and remove the nut.
10. Apply grease to the special tool on the areas shown. This will ease installation of the tool and prevent damage to the pressure bolt threads.



(cont'd)

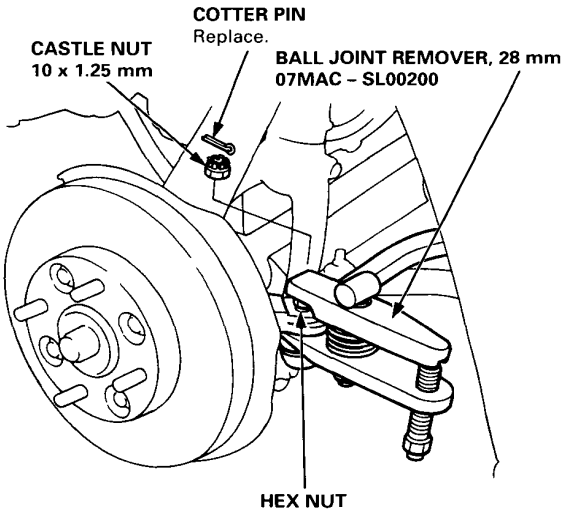
Knuckle/Hub (cont'd)

11. Install a 10 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end to prevent damage to the threaded end of the ball joint.

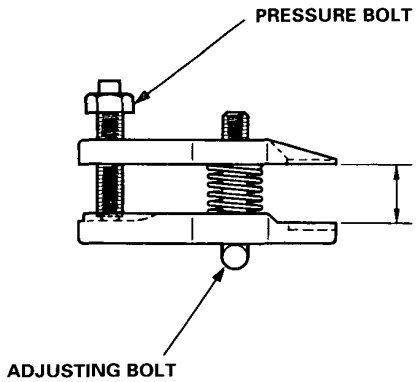
12. Use the ball joint remover, 28 mm, as shown. Insert the jaws carefully, making sure you do not damage the ball joint boot.

13. Adjust the jaw spacing by turning the pressure bolt.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



14. Once the tool is in place, turn the adjusting bolt as necessary to make the jaws parallel. Then hand-tighten the pressure bolt, and recheck the jaws to make sure they are still parallel.



15. With a wrench, tighten the pressure bolt until the ball joint shaft pops loose from the steering arm.

    ⚠WARNING Wear eye protection. The ball joint can break loose suddenly and scatter dirt or other debris in your eyes.

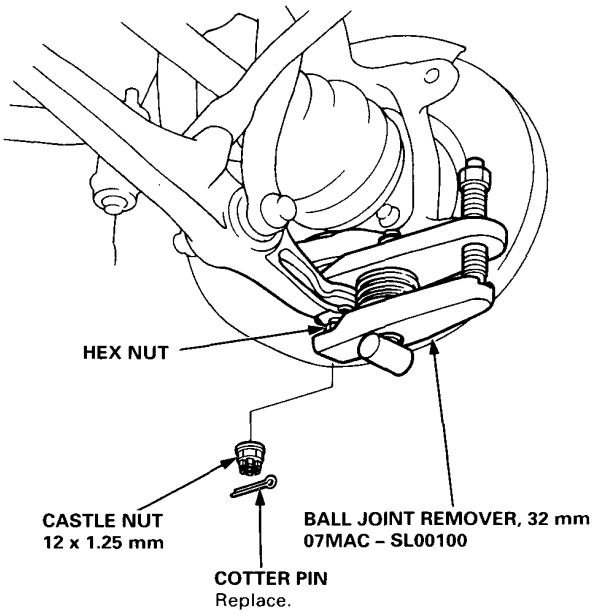
16. Remove the tool, then remove the nut from the end of the ball joint and pull the ball joint out of the steering/suspension arm. Inspect the ball joint boot and replace it if damaged.

17. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

18. Install a 12 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

19. Use the ball joint remover, 32 mm, as shown on step 10 to separate the lower ball joint and lower arm.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

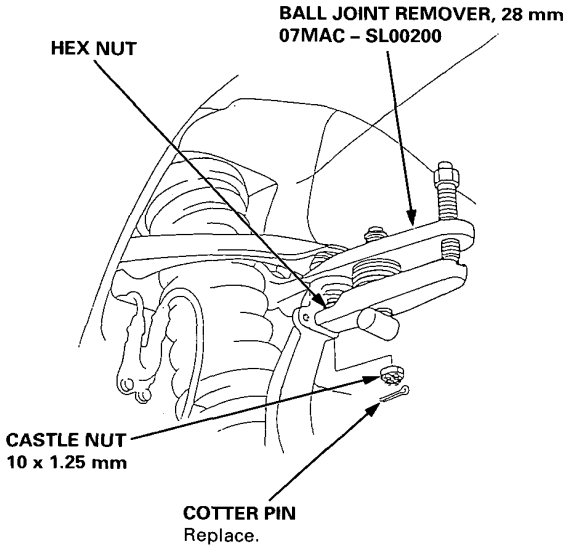


20. Remove the cotter pin from the upper ball joint castle nut, and remove the nut.

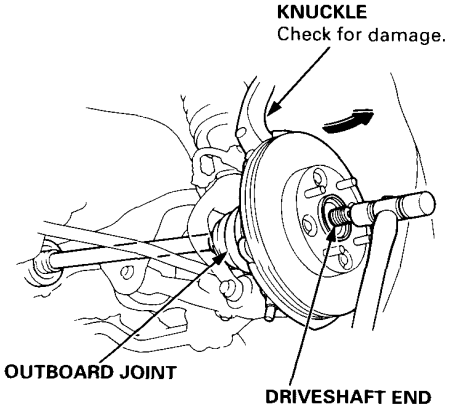
21. Install a 10 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

22. Use the ball joint remover as shown on step 10 to separate the upper ball joint and knuckle.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

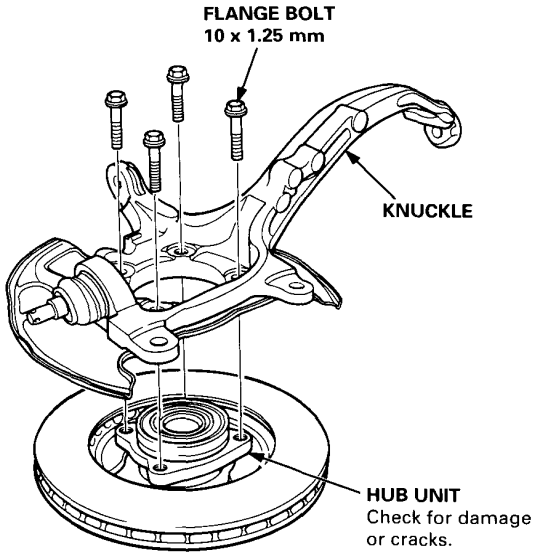


23. Pull the knuckle outward and remove the driveshaft outboard joint from the knuckle by tapping the driveshaft end using a plastic hammer, then remove the knuckle.

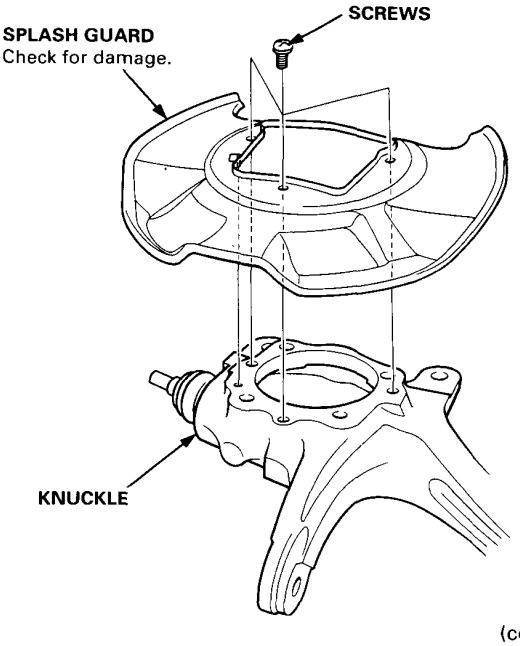


Hub Unit Removal and Wheel Bearing Replacement

1. Remove the knuckle from the hub unit.



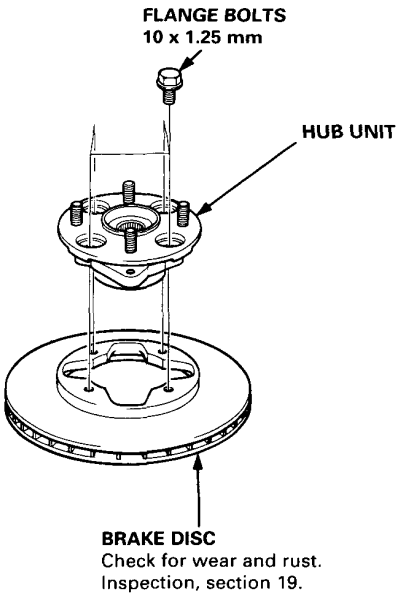
2. Remove the splash guard from the knuckle.



(cont'd)

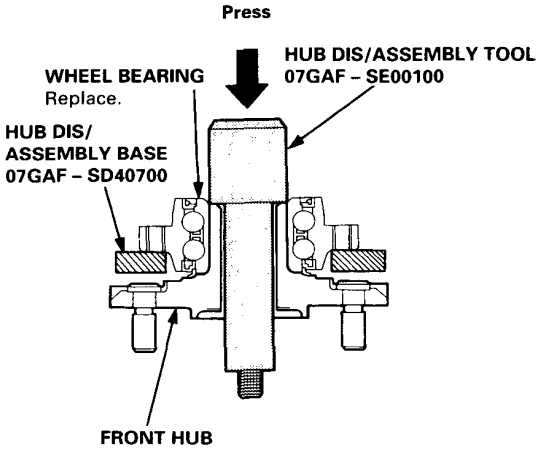
Knuckle/Hub (cont'd)

3. Remove the four flange bolts, then separate the hub unit from the brake disc.

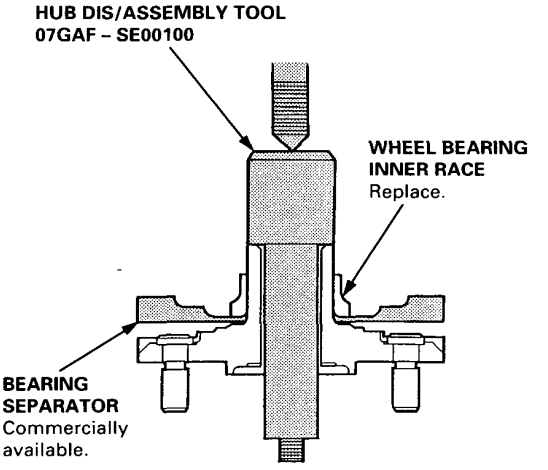


4. Separate the wheel bearing from the front hub using the special tools and a press as shown.

CAUTION: Hold onto the hub to keep it from falling when pressed clear.



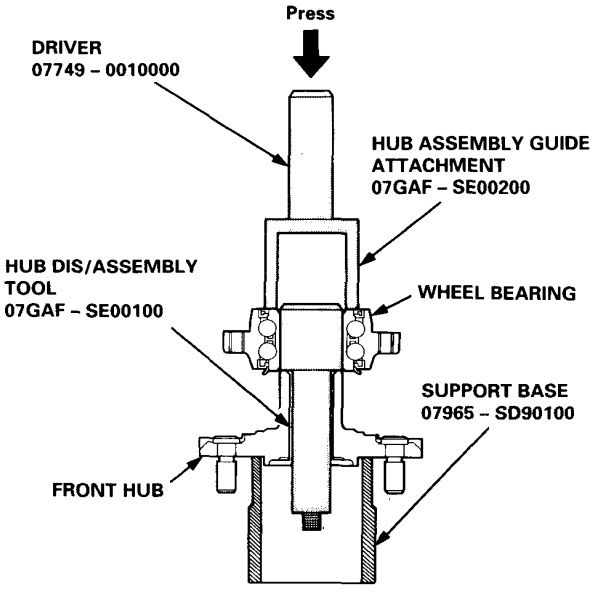
5. Press the wheel bearing inner race from the hub using the special tools and a commercially available bearing separator as shown.



6. Replace the bearing with a new one after removal.

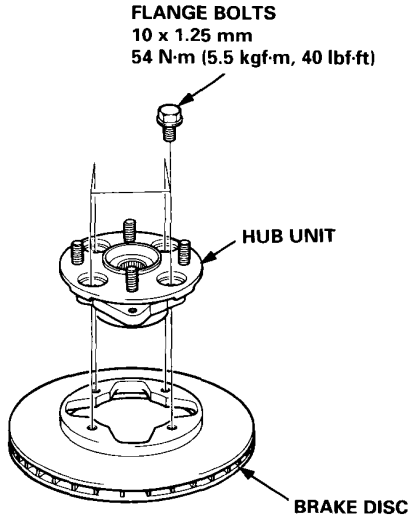
NOTE: Wash the knuckle and hub thoroughly in high flash point solvent before reassembly.

7. Press a new wheel bearing into the hub using the special tools and a press as shown.



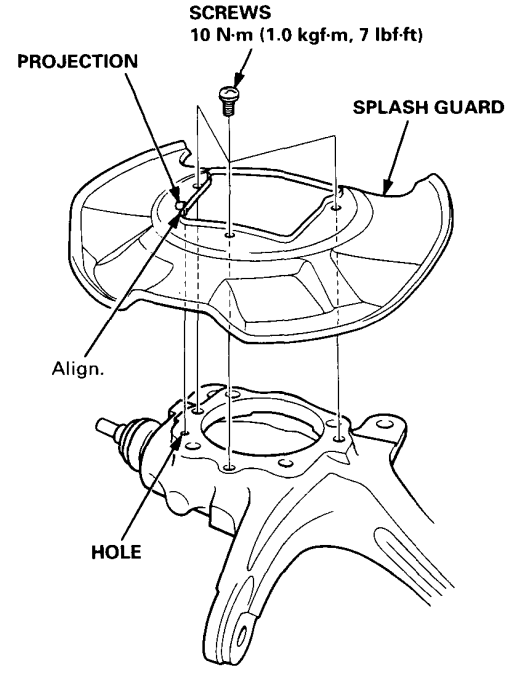
8. Install the hub unit on the brake disc and tighten the flange bolts.

NOTE: Before installing the hub unit, clean the mating surfaces of the hub unit and brake disc.

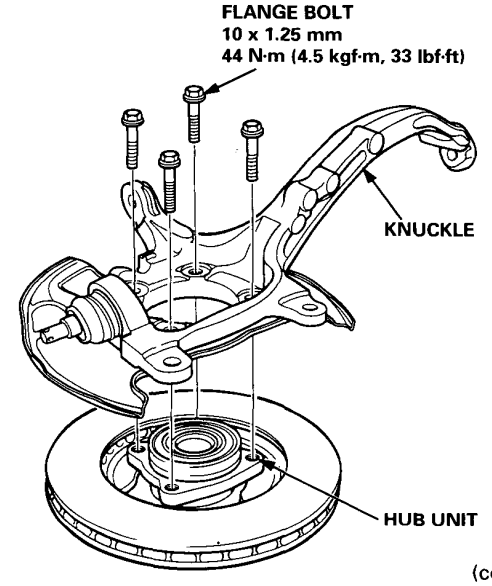


9. Install the splash guard and tighten the screws.

NOTE: Align the projection in the splash guard with the hole on the knuckle.



10. Install the knuckle on the hub unit and tighten the FLANGE bolts.



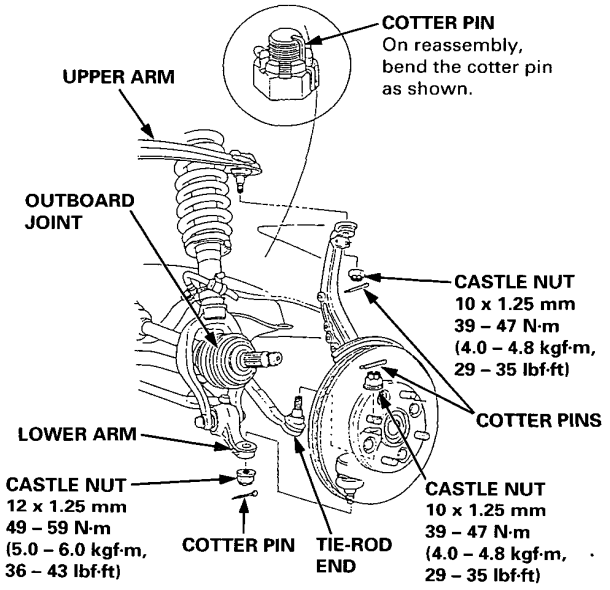
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Knuckle/Hub (cont'd)

Knuckle Installation

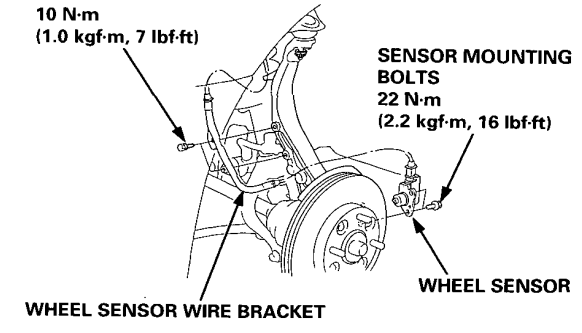
1. Install the knuckle on the driveshaft outboard joint.
2. Install the knuckle on the tie-rod end, upper arm and lower arm, then tighten the castle nuts and install the new cotter pins.

   CAUTION: Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.



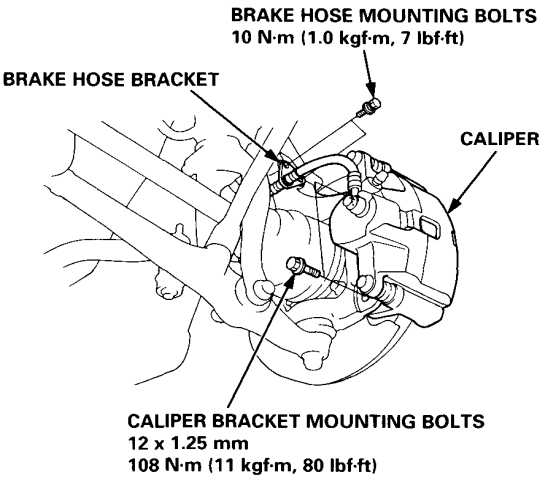
3. Install the wheel sensor with the sensor mounting bolts (for cars with ABS).
4. Install the wheel sensor wire bracket with the two flange bolts (for cars with ABS).

   NOTE: Be careful when installing the sensors to avoid twisting wires.



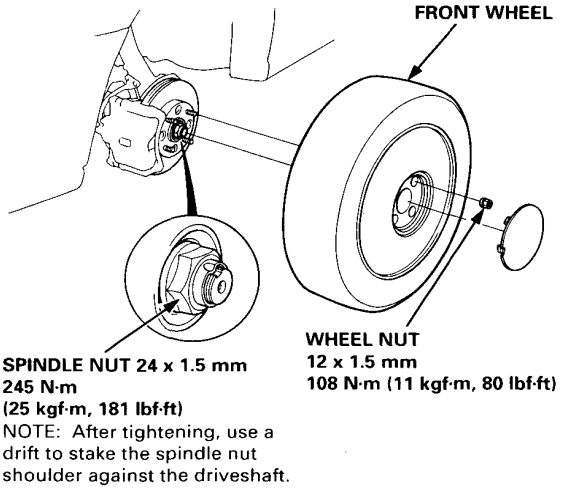
5. Install the caliper with the caliper bracket mounting bolts.
6. Install the brake hose bracket with the brake hose mounting bolts.

   CAUTION: Be careful not to twist the hose more than necessary.



7. Install the new spindle nut, then tighten and stake the nut.
8. Install the front wheel with the wheel nuts.

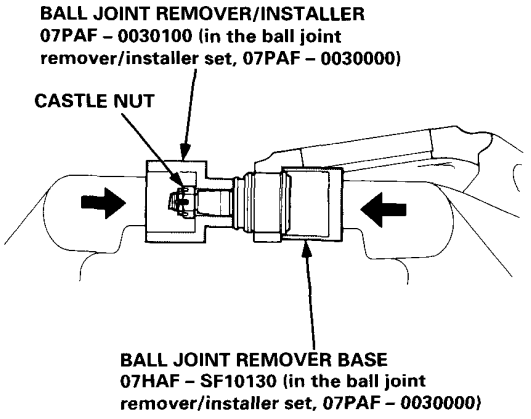
   NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and wheel.



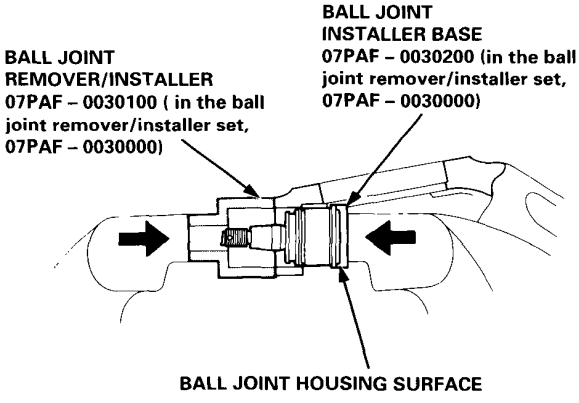
9. Check the front wheel alignment, and adjust if necessary (see page 18-4).

Lower Ball Joint Replacement

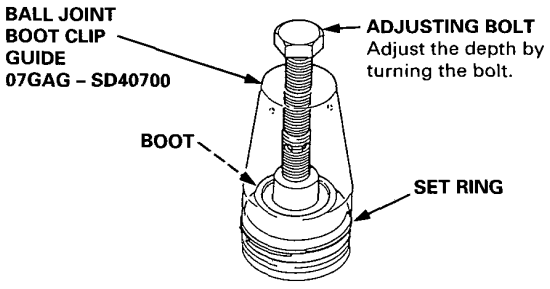
1. Remove the knuckle (see page 18-11), then remove the hub unit from the knuckle (see page 18-13).
2. Remove the boot by prying the set ring off.
3. Check the boot for deterioration and damage, and replace it if necessary.
4. Install the special tools on the ball joint, and tighten the castle nut.
5. Position the special tools over the ball joint as shown, then set the assembly in a vise. Press the ball joint out of the knuckle.



6. Place the ball joint in position by hand.
7. Install the special tools over the ball joint as shown, then press the ball joint in.



8. Install the ball joint boot and set ring using the special tool (see page 18-18).



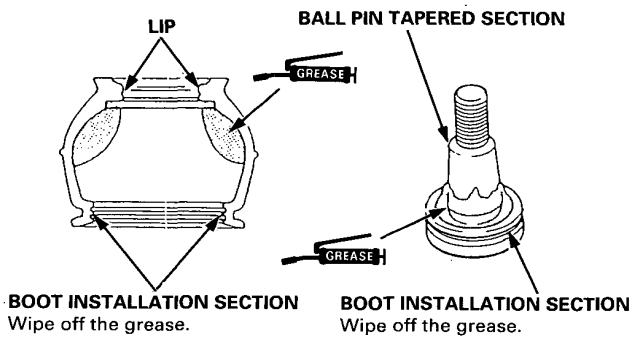
9. Install the hub unit onto the knuckle (see page 18-15).
10. Install the knuckle (see page 18-16).
11. Check the front wheel alignment, and adjust if necessary (see page 18-4).

Ball Joint Boot Replacement

1. Remove the set ring and the boot.

   CAUTION: Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.



3. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.

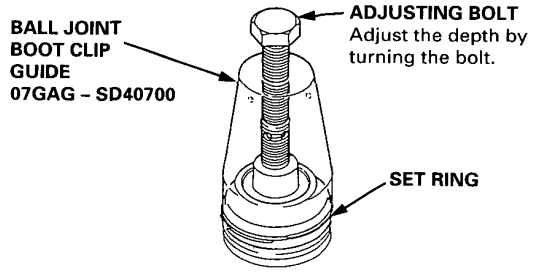
   CAUTION:
   - **Keep grease off the boot installation section and the tapered section of the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**

4. Install the boot in the groove of the boot installation section securely, then bleed air.

5. Install the upper and lower ball joint boot set rings using the special tools as follows:

   Lower ball joint: Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.

   Upper ball joint: Hold the tool over the ball joint, then slide the set ring over the tool and into position.

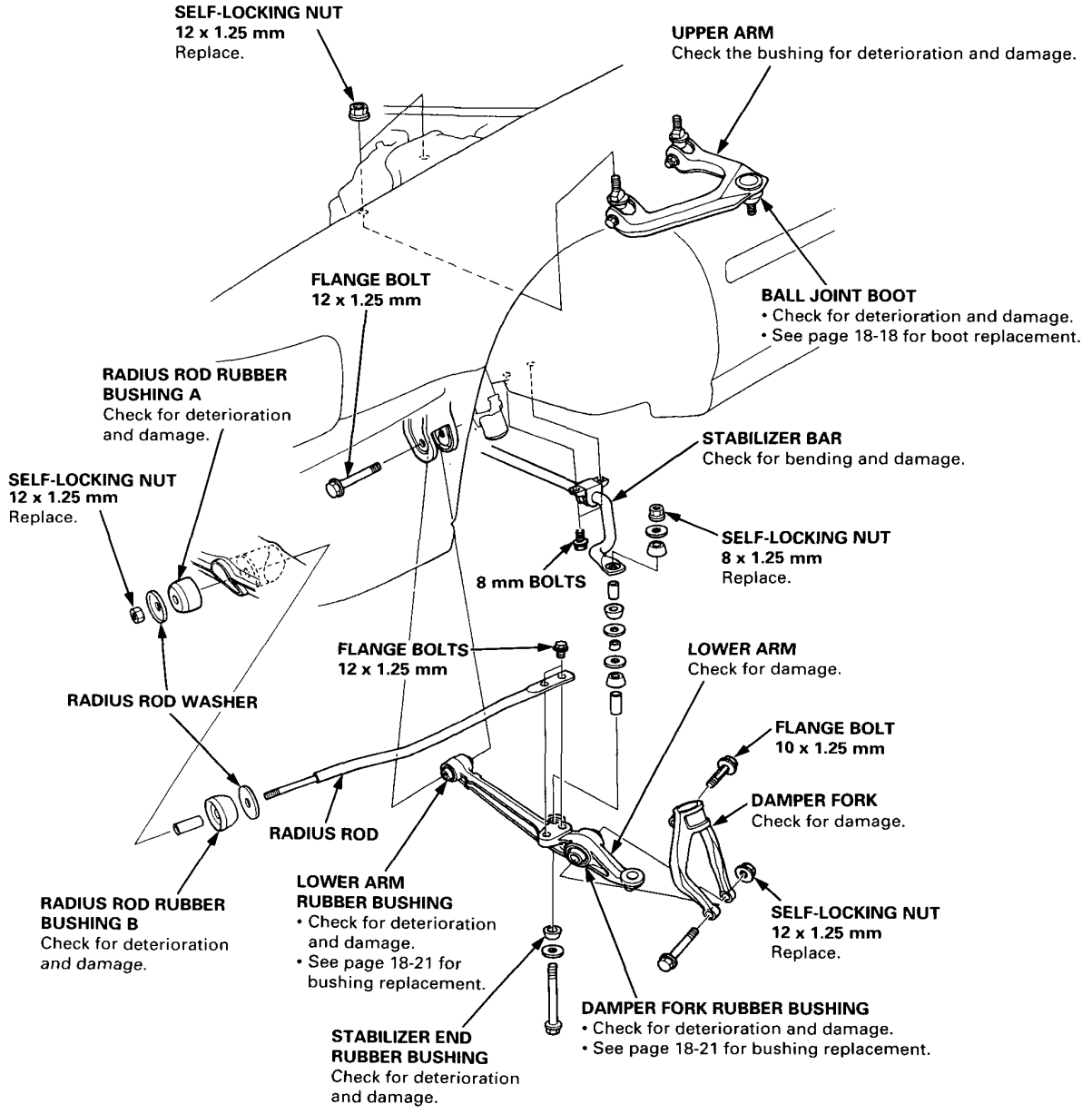


CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

Suspension Arms

Removal/Inspection

CAUTION: Replace the self-locking nuts after removal.



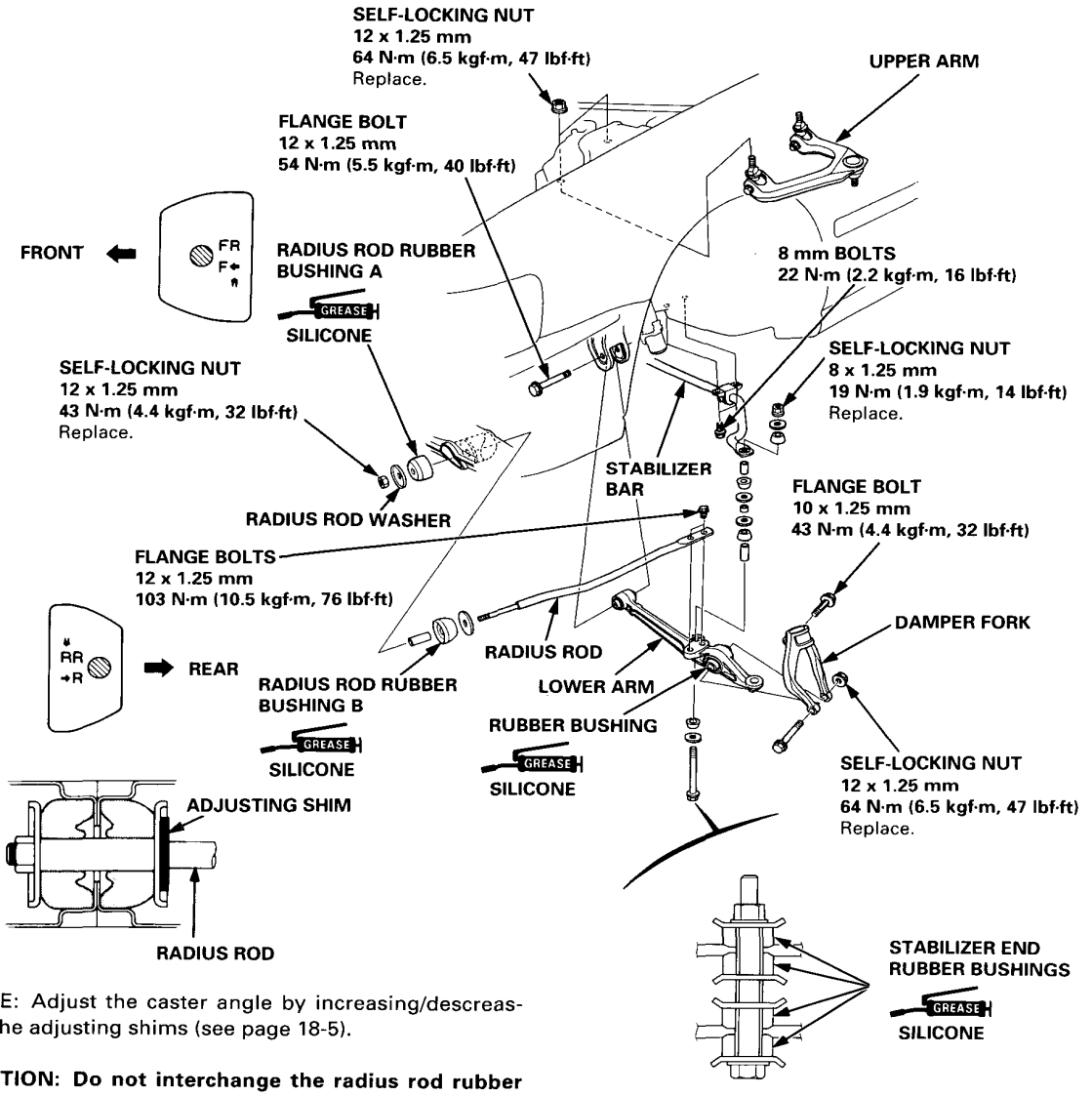
(cont'd)

Installation

CAUTION: The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE:

- Wipe off the dirt, oil or grease on the threads before tightening the fasteners.
- The right and left damper forks are not interchangeable. The left damper fork is marked with "V4L" while the right damper fork is marked with "V4R".
- The right and left upper arms are not interchangeable. The left upper arm is marked with "VL" or "VLG" while the right arm is marked with "VR" or "VRG".
- The stabilizer bar is symmetrical. Install with the paint mark facing rear of the car.
- After installing the suspension arm, check the front wheel alignment, and adjust if necessary (see page 18-4).



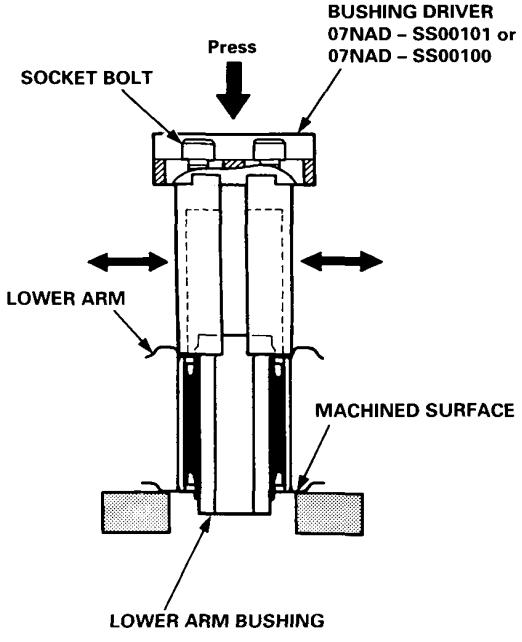
NOTE: Adjust the caster angle by increasing/descreasing the adjusting shims (see page 18-5).

CAUTION: Do not interchange the radius rod rubber bushings.

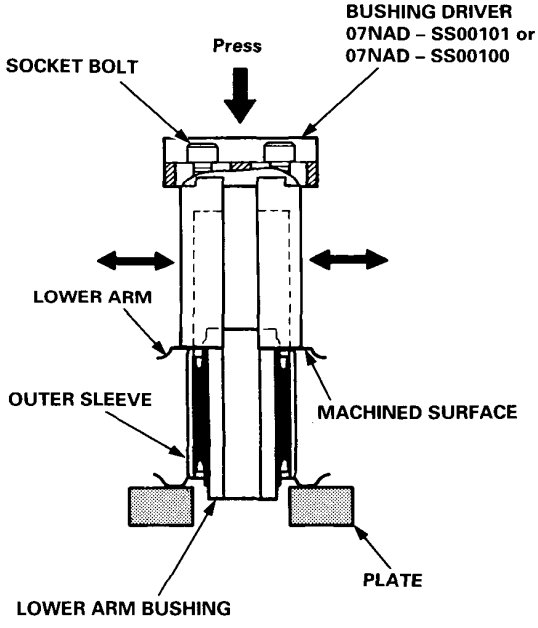
Lower Arm Bushing Replacement

1. Position the lower arm on the press with the machined surface facing down.
2. Adjust the bushing driver so that it matches the inner diameter of the bushing hole, then tighten the socket bolt securely.
3. Position the bushing driver on the bushing.
4. Remove the bushing by pressing on the bushing driver with a press as shown.

   CAUTION:
   - **Support the lower arm at machined surface as shown.**
   - **Be careful not to damage the inside of the bushing hole while pressing on the bushing.**



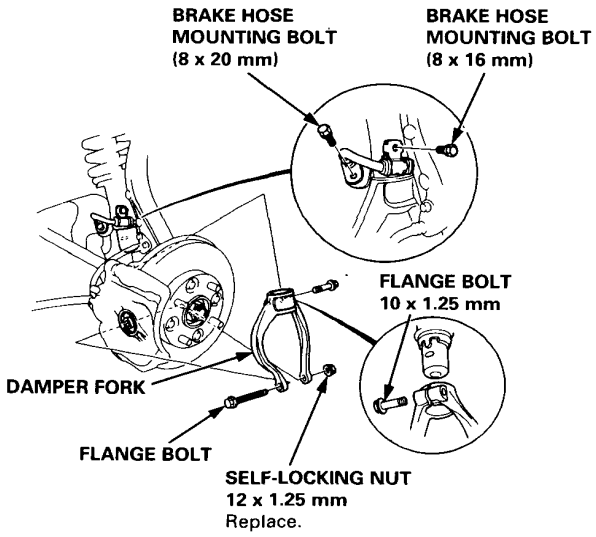
5. Position the lower arm on the press with the machined surface facing up.
6. Adjust the bushing driver so that it matches with the outer diameter of the bushing.
7. Position the bushing driver on the outer sleeve of the bushing.
8. Press the bushing into the lower arm using the bushing driver and a press until the edge of the bushing aligns with machined surface on the lower arm as shown.



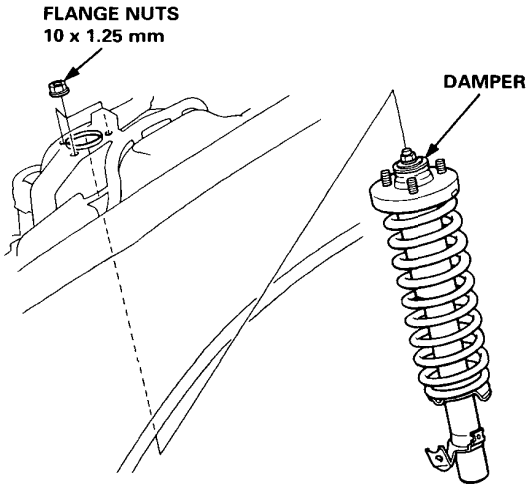
Front Damper

Removal

1. Remove the front wheels (see page 18-11).
2. Remove the brake hose mounting bolts from the damper.
3. Remove the FLANGE bolt.
4. Remove the flange bolt and self-locking nut, then remove the damper fork.



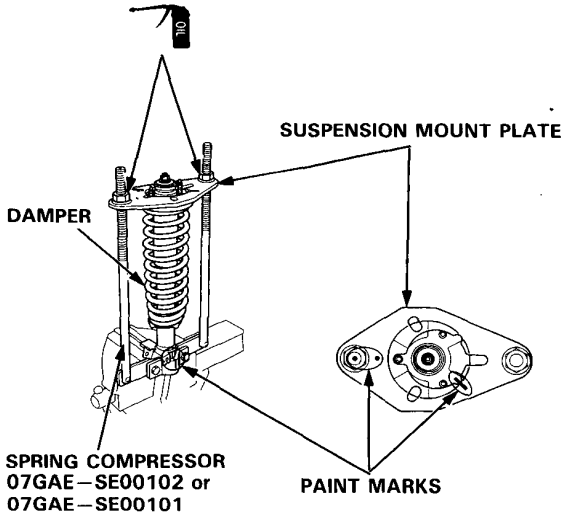
5. Remove the damper by removing the three flange nuts.



Disassembly

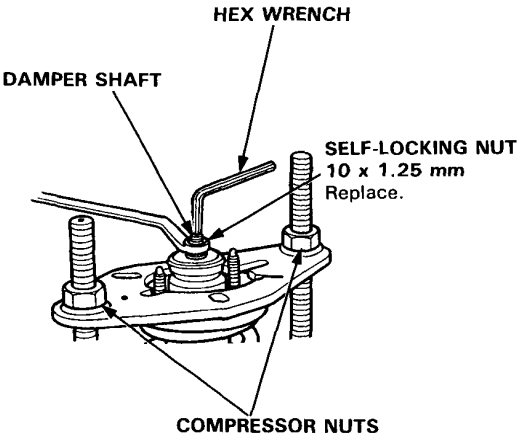
1. Install the damper on the spring compressor by holding the bottom of the damper, and loosely install the holder and bolts.
2. Install the suspension mount plate on the spring compressor.
3. Support the spring compressor with damper on the vise, then tighten the damper holder bolts securely.

   CAUTION: Do not over tighten the bolts.
4. Mark the damper case and the spring compressor holder with paint as shown.
5. Mark the mount plate and the spring compressor, and mount plate and damper mounting base with paint as shown.



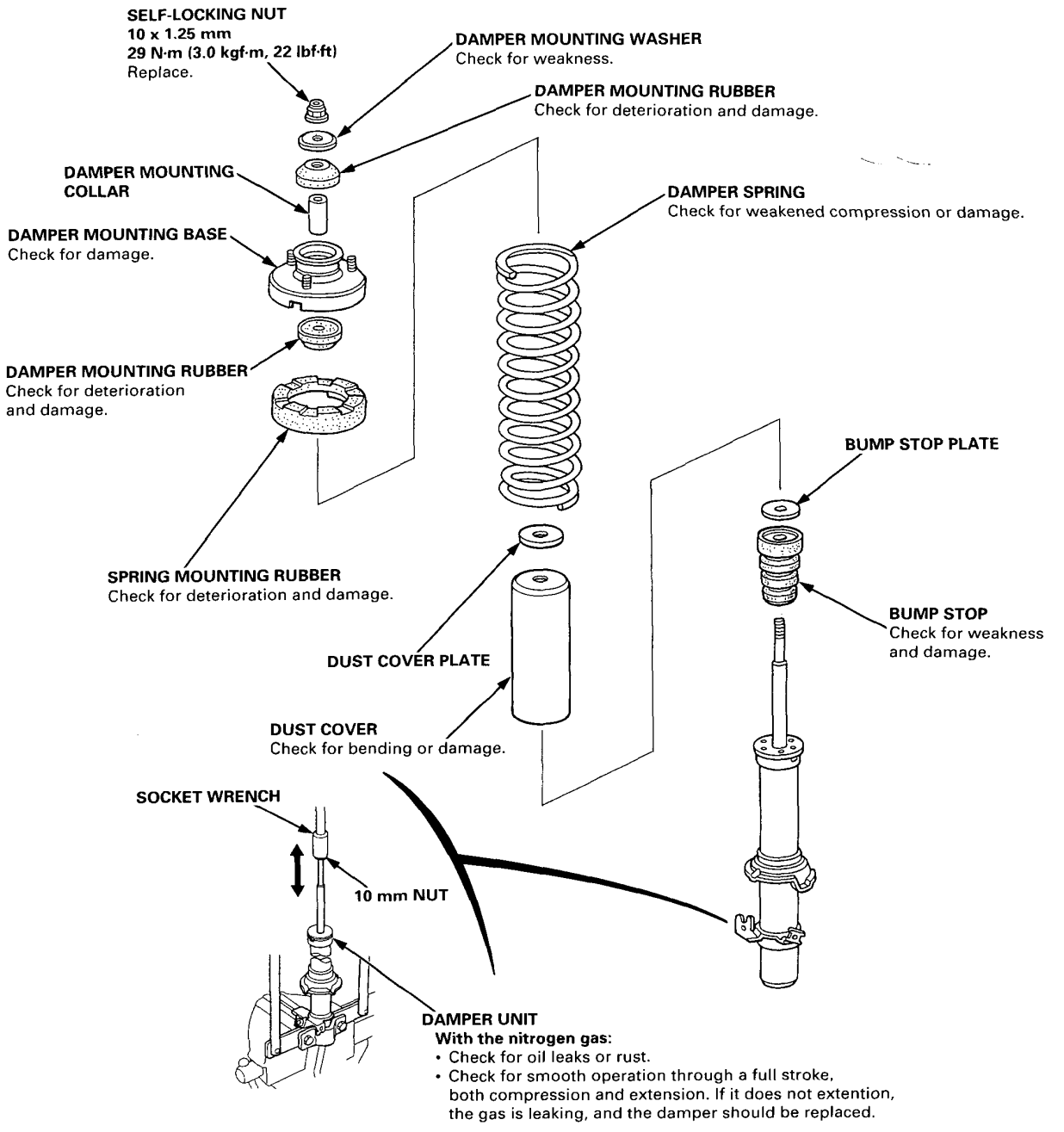
6. Compress the damper to 2—3 cm (0.8—1.2 in) by tightening the compressor nuts.

   NOTE: Turn each compressor nut gradually and equally.
7. Hold the damper shaft with a hex wrench and remove the self-locking nut.
8. Loosen the compressor nuts, then remove the suspension mount plate.
9. Disassemble the damper on the next page.



Front Damper

Inspection



Reassembly

1. Install the damper unit on the spring compressor by aligning the marks on the damper case and the spring compressor holder.

   NOTE: If a new damper is to be installed, mark it on the same position as on the old damper.

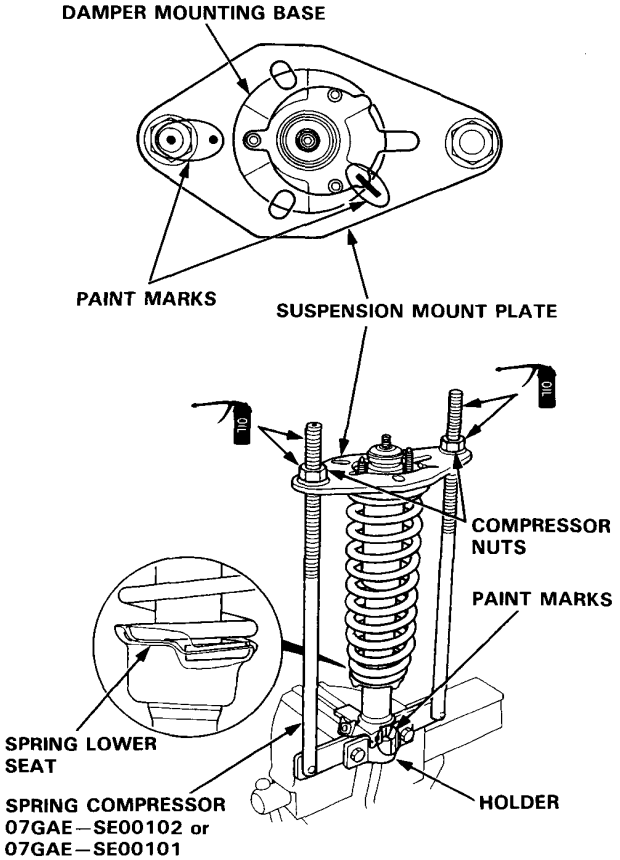
2. Reassemble the damper in reverse order of disassembly except the damper mounting washer and self-locking nut.

   NOTE: Align the bottom of damper spring and spring lower seat as shown.

3. Install the suspension mount plate on the damper with the mark on the plate facing painted threads.

4. Position the damper mounting base by aligning the marks on the damper mounting base and mount plate.

5. Apply oil to the seating surfaces of the compressor nuts and threads of the spring compressor, then loosely install the nuts.

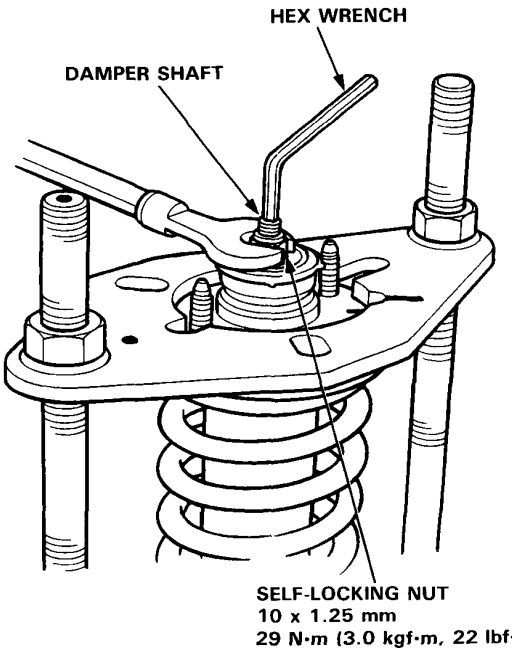


6. Compress the damper spring by turning the compressor nuts.

   NOTE: Turn each compressor nut gradually and equally.

7. Install the damper mounting washer, then loosely install the new self-locking nut.

8. Hold the damper shaft with a hex wrench and tighten the self-locking nut.

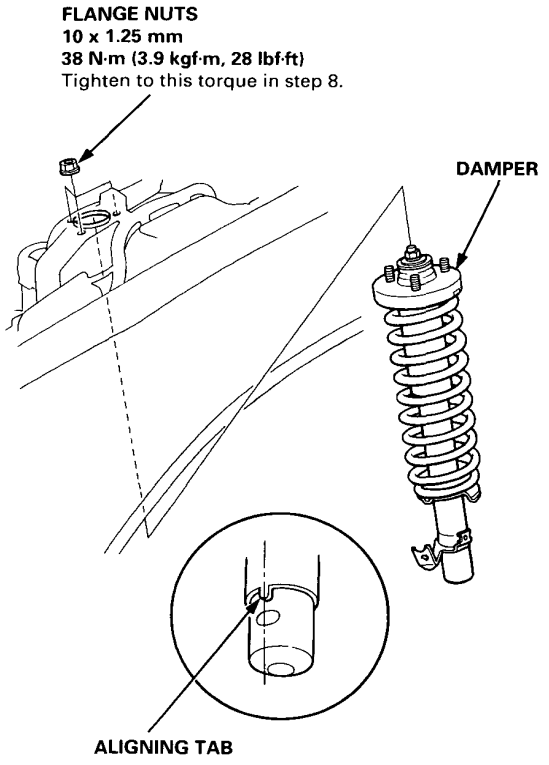


9. Remove the damper from the spring compressor.

Front Damper

Installation

1. Loosely install the damper on the frame with the aligning tab facing inside, then loosely install the two flange nuts.



2. Install the damper fork over the driveshaft and onto the lower arm. Install the front damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.

3. Loosely install the FLANGE bolt into the damper fork.

4. Loosely install a new self-locking nut with the flange bolt.

5. Raise the knuckle with a floor jack until the car just lifts off the safety stand.

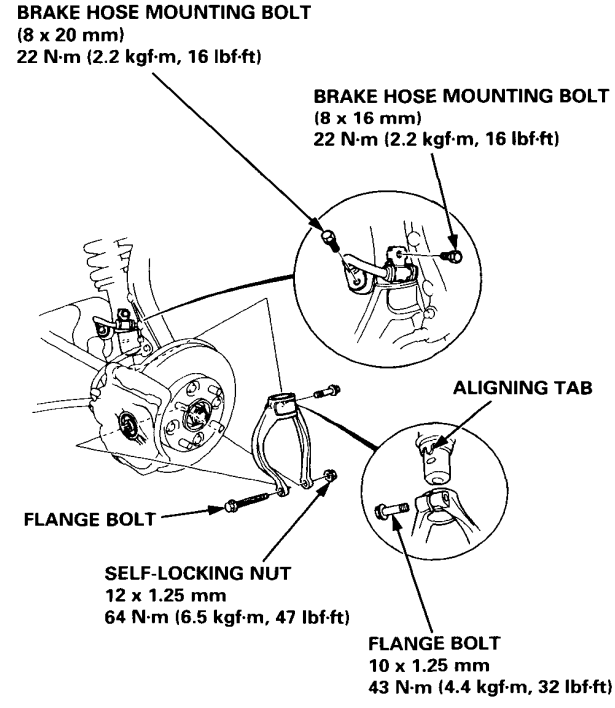
   ⚠ WARNING The floor jack must be securely positioned or personal injury may result.

6. Tighten the FLANGE bolt.

7. Tighten the self-locking nut.

8. Tighten the flange nuts on the top of the damper to the specified torque.

9. Install the brake hose mounts with the brake hose mounting bolts.



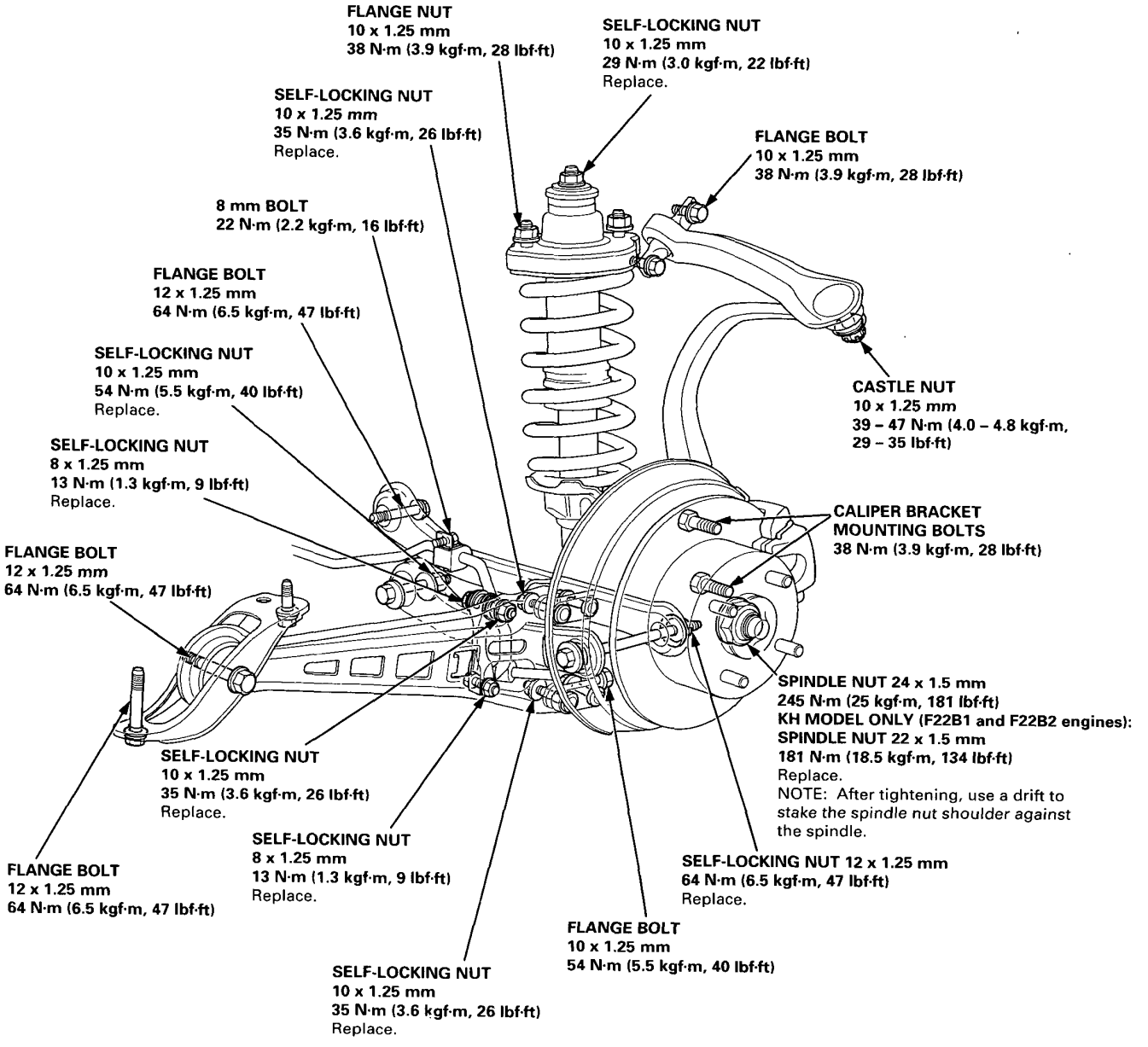
10. Install the front wheel (see page 18-16).

Torque Specifications

CAUTION:

- **Replace the self-locking nuts after removal.**
- **The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.**
- **Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.**

NOTE: Wipe off the grease before tightening the nut at the ball joint.



Rear Suspension

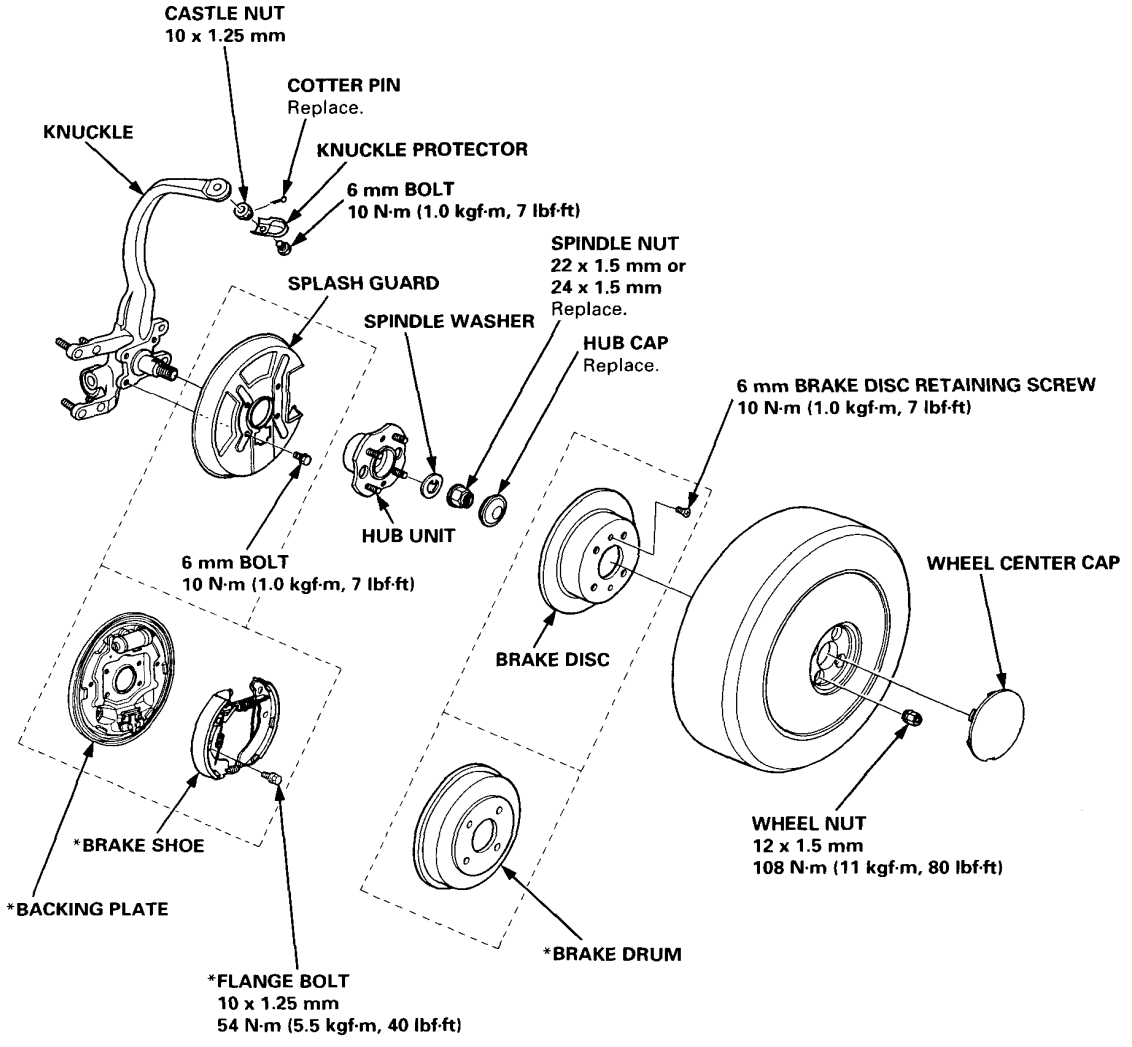
Hub Bearing Unit

Illustrated Index

NOTE:

- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- For aluminum wheels, remove the center cap by prying it out with a flat screwdriver. Use a rag at the point you are going to pry because aluminum alloy wheels can be easily damaged. Avoid damage to the cap by not allowing it to fall during removal.
- Before installing the brake disc, clean the mating surfaces of the rear hub and brake disc.
- Before installing the wheel, clean the mating surfaces of the brake disc and wheel.

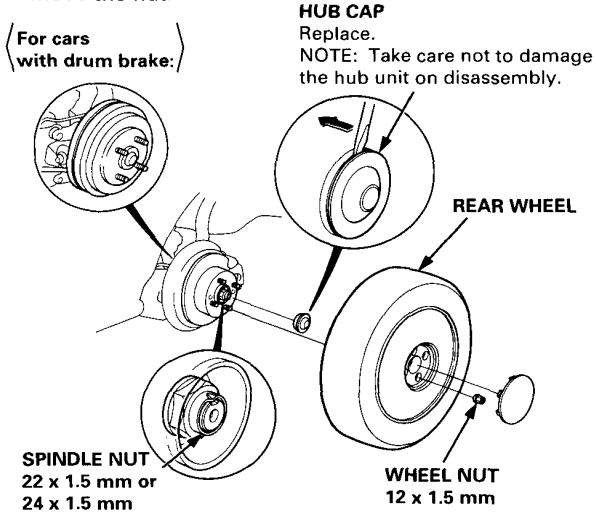
*: For cars with drum brake



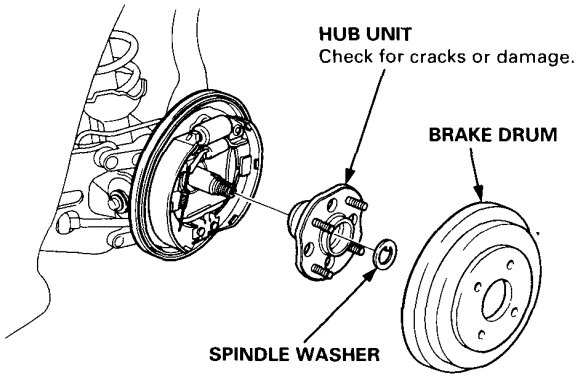
Hub Bearing Unit

Removal

1. Loosen the wheel nuts slightly.
2. Raise the rear of car, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and rear wheel.
4. Pull the parking brake lever up.
5. Remove the hub cap.
6. Raise the locking tab on the spindle nut, then remove the nut.

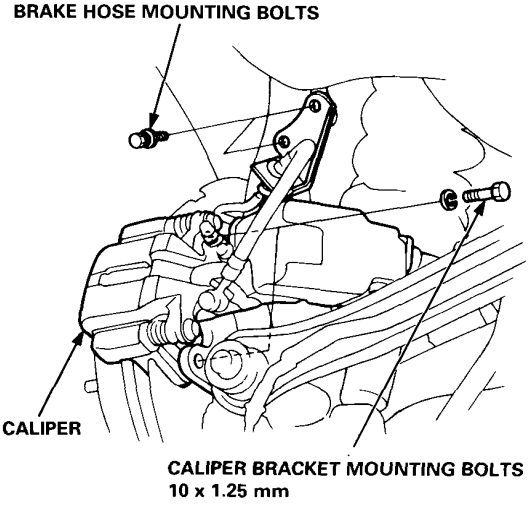


7. Release the parking brake lever.
8. Remove the brake drum, hub unit and spindle washer (for cars with drum brake).



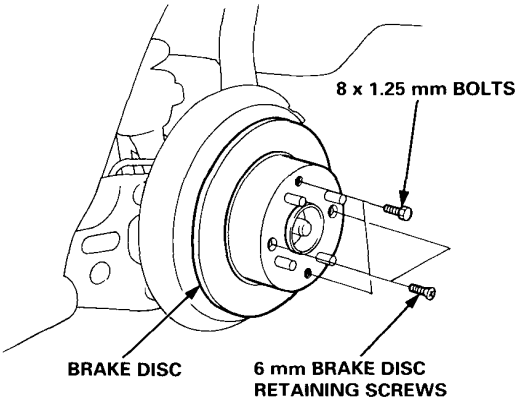
9. Remove the brake hose mounting bolts.
10. Remove the caliper bracket mounting bolts and hang the caliper to one side.

CAUTION: To prevent accidental damage to the caliper or brake hose, use a short piece of wire to hang the caliper from the undercarriage.



11. Remove the 6 mm brake disc retaining screws.
12. Screw two 8 x 1.25 mm bolts into the disc to push it away from the hub.

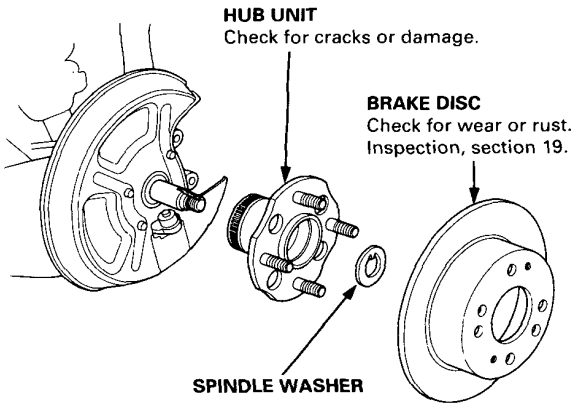
NOTE: Turn each bolt two turns at a time to prevent cocking the disc excessively.



(cont'd)

Hub Bearing Unit (cont'd)

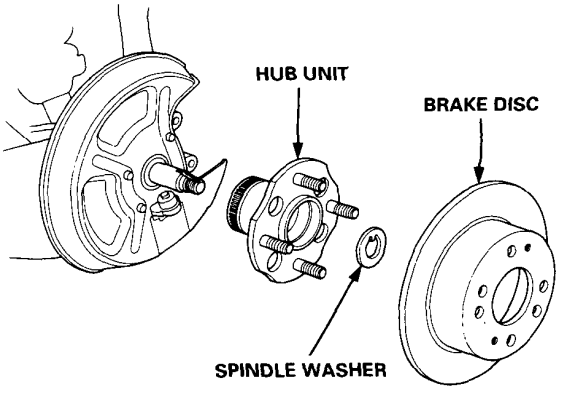
13. Remove the brake disc.
14. Remove the hub unit from the knuckle.



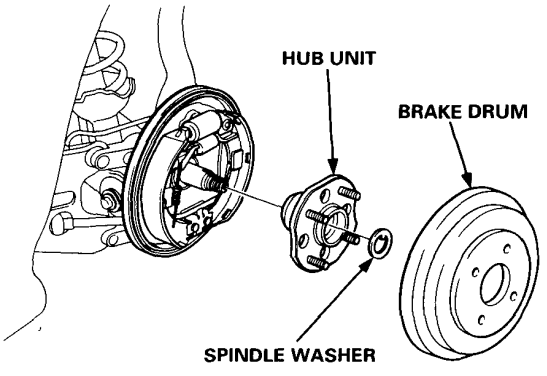
Installation

1. Install the hub unit, spindle washer and brake disc (or brake drum).

NOTE:
- Wash the bearing and spindle thoroughly in high flash point solvent before reassembly.
- Before installing the brake disc (or brake drum), clean the mating surfaces of the rear hub and brake disc (or brake drum).



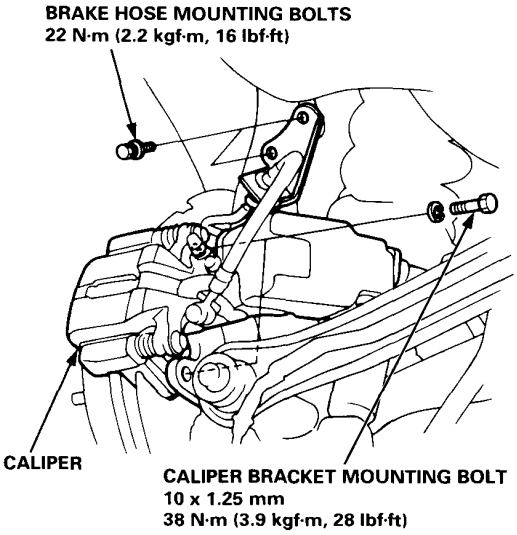
〈For cars with drum brake:〉



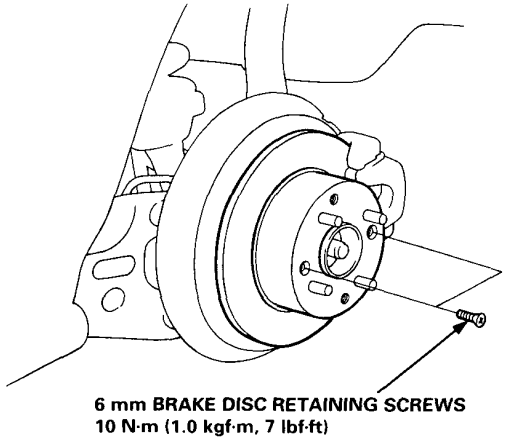
2. Install the brake caliper with the caliper bracket mounting bolts.

3. Install the brake hose with the brake hose mounting bolts.

   CAUTION: Be careful not to twist the hose more than necessary.



4. Tighten the 6 mm brake disc retaining screws.

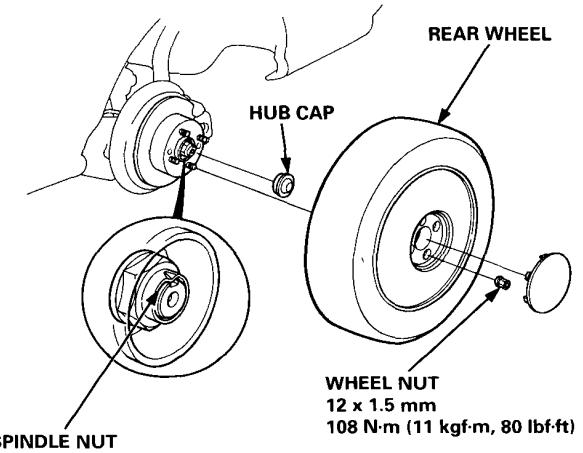


5. Install a new spindle nut, then tighten and stake the nut.

6. Install a new hub cap.

7. Install the rear wheel with the wheel nuts.

   NOTE: Before installing the wheel, clean the mating surfaces of the brake disc (or brake drum) and wheel.

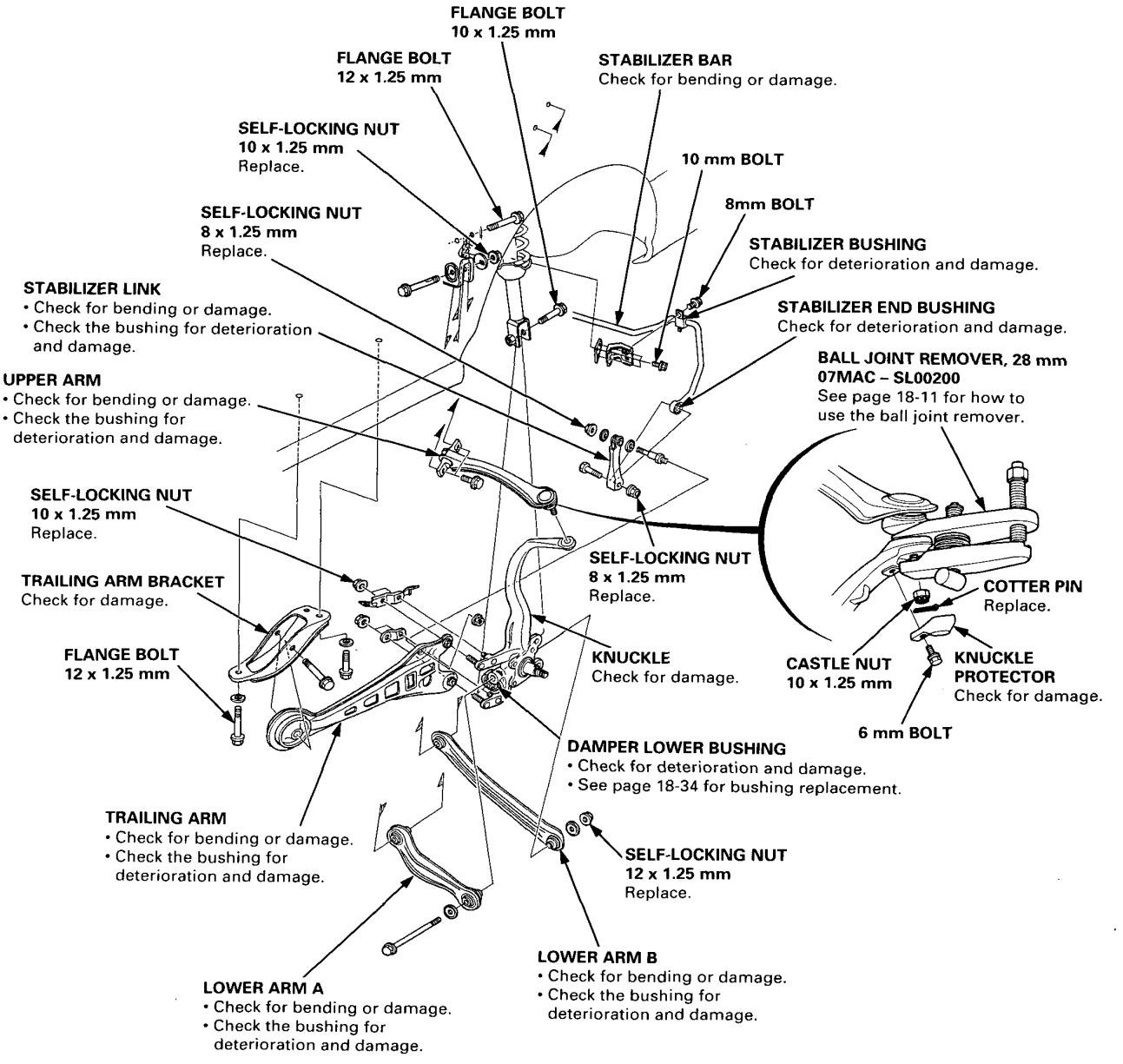


Rear Suspension

Suspension Arms

Removal/Inspection

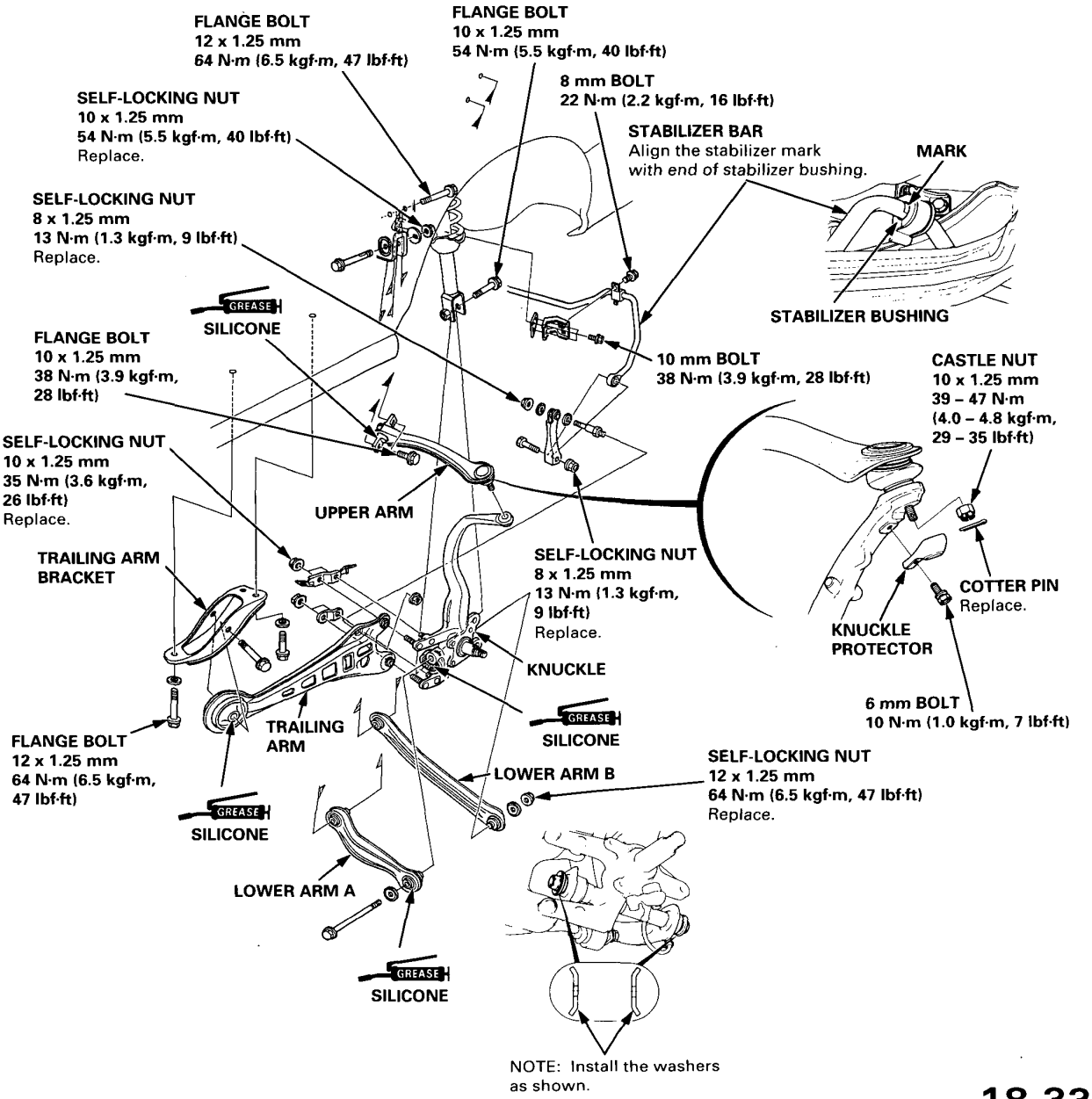
CAUTION:
- **Replace the self-locking nuts after removal.**
- **Be careful not to damage the ball joint boot.**



Installation

CAUTION: The vehicle should on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

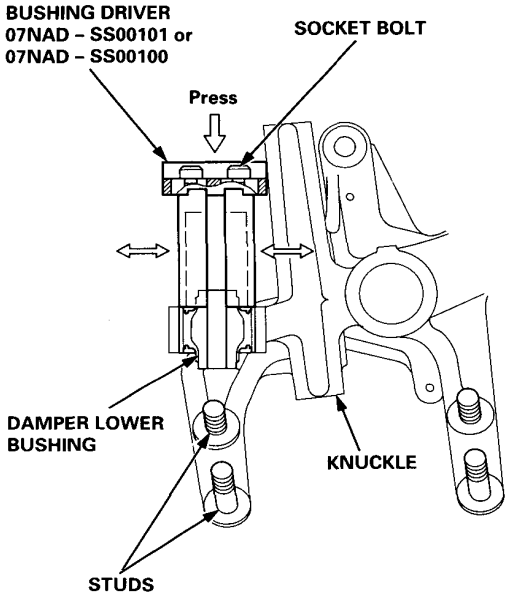
NOTE:
- Wipe off the oil, dirt or grease on the threads before tightening the fasteners.
- Make sure the toe adjuster cams on lower arm A are installed in the same direction.
- The right and left lower arm A are symmetrical. Install so the paint mark of "SV4↑R UP↑" and "SV4↑L UP↑" point to the front.
- "SV4↑L UP↑" is stamped on the left lower arm B and "SV4↑R UP↑" on the right lower arm B.
- The left upper arm is stamped with "AL" while the right upper arm is stamped with "AR".
- After installing the suspension arm, check the rear wheel alignment, and adjust if necessary (see page 18-4).



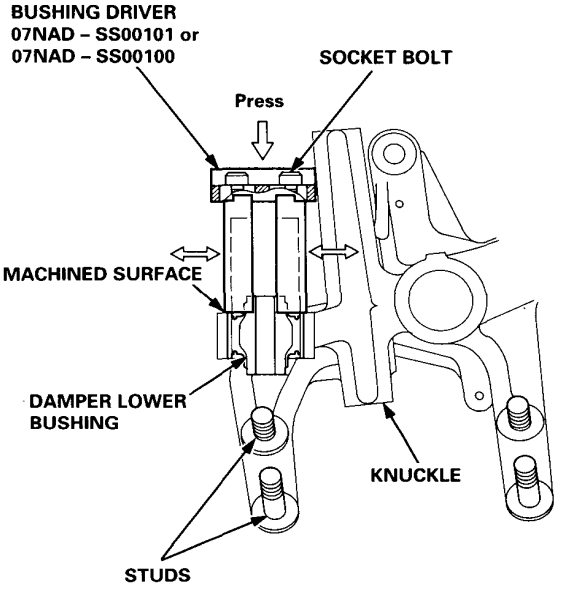
Damper Lower Bushing Replacement

1. Remove the two studs from the knuckle.
2. Position the knuckle on the press.
3. Adjust the bushing driver so that it matches the inner diameter of the bushing hole, then tighten the socket bolt securely.
4. Position the bushing driver on the bushing.
5. Remove the bushing by pressing on the bushing driver with a press as shown.

   CAUTION: Be careful not to damage the inside of the bushing hole while pressing on the bushing.



6. Position the knuckle on the press.
7. Adjust the bushing driver so that it matches with the outer diameter of the bushing.
8. Position the bushing driver on the outer sleeve of the bushing.
9. Press the bushing into the knuckle using the bushing driver and a press as shown. The edge of the bushing should align with machined surface on the knuckle as shown.

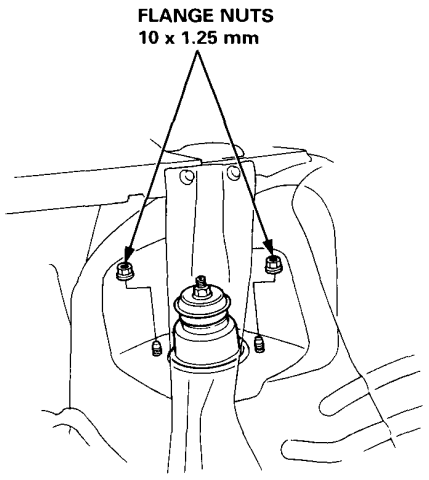


10. Install the two studs to the knuckle.

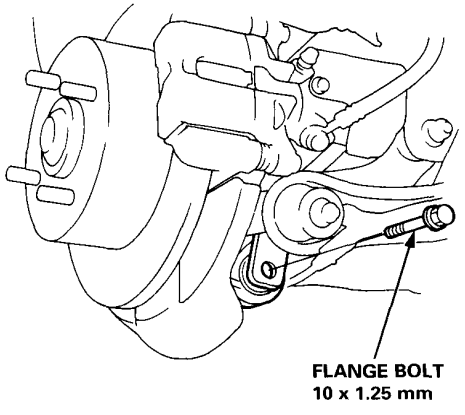
Rear Damper

Removal

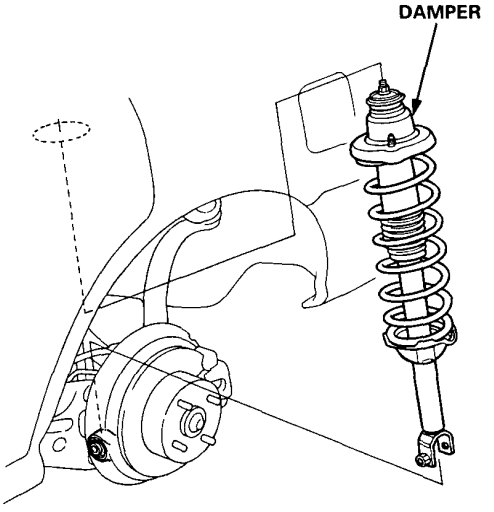
1. Remove the rear wheels (see page 18-29).
2. Remove the rear seat cushion and the rear bulkhead cover and right gusset cover.
3. Pull back the from of the quarter trim panel, and remove the two flange nuts.



4. Remove the FLANGE bolt.



5. Lower the rear suspension and remove the damper.

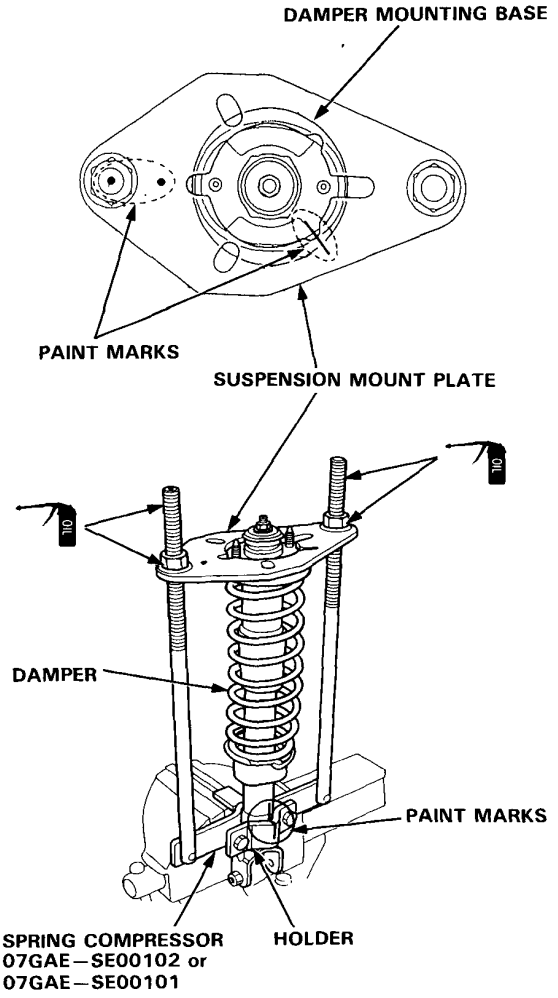


Rear Damper

Disassembly

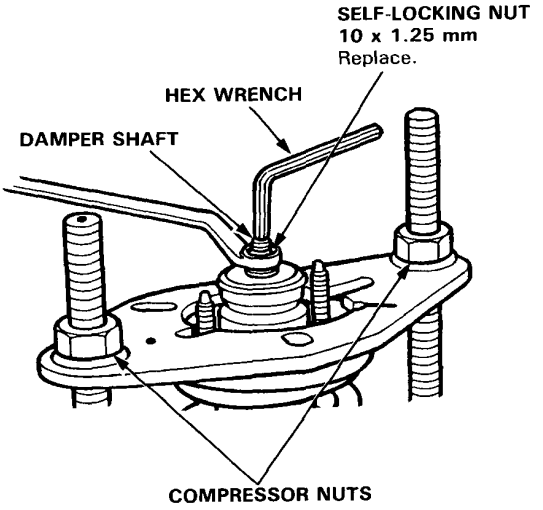
1. Install the damper on the spring compressor by holding the bottom of the damper, and loosely install the holder and bolts.
2. Install the suspension mount plate on the spring compressor.
3. Support the spring compressor with damper on the vise, then tighten the damper holder bolts securely.

   CAUTION: Do not over tighten the bolts.
4. Mark the damper case and the spring compressor holder with paint as shown.
5. Mark the mount plate and the spring compressor, and mount plate and damper mounting base with paint as shown.

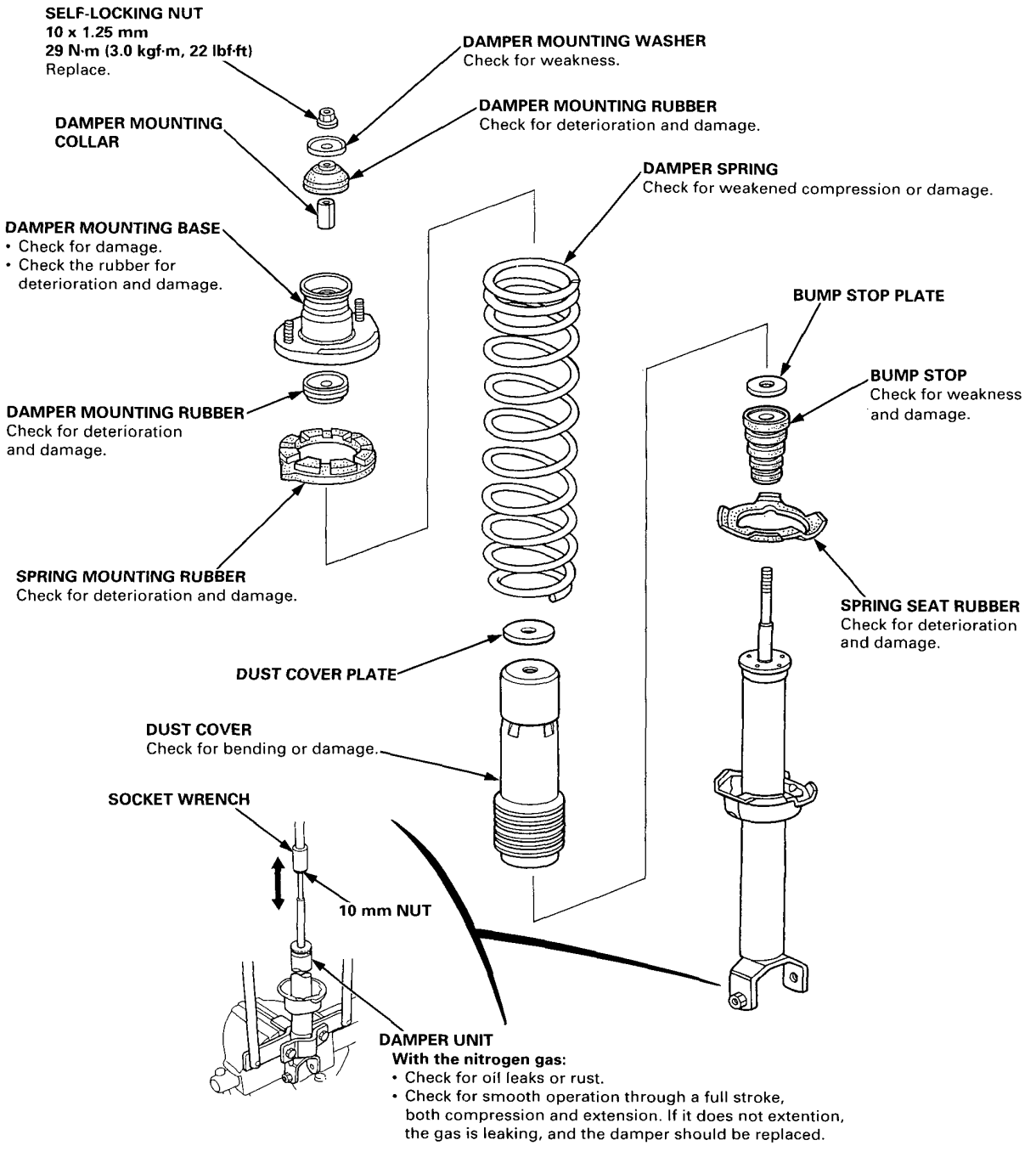


6. Compress the damper to 2—3 cm (0.8—1.2 in) by tightening the compressor nuts.

   NOTE: Turn each compressor nut gradually and equally.
7. Hold the damper shaft with a hex wrench and remove the self-locking nut.
8. Loosen the compressor nuts, then remove the suspension mount plate.
9. Disassemble the damper on the next page.



Inspection


SELF-LOCKING NUT
10 x 1.25 mm
29 N·m (3.0 kgf·m, 22 lbf·ft)
Replace.
DAMPER MOUNTING WASHER
Check for weakness.
DAMPER MOUNTING RUBBER
Check for deterioration and damage.
DAMPER MOUNTING COLLAR
DAMPER SPRING
Check for weakened compression or damage.
DAMPER MOUNTING BASE
• Check for damage.
• Check the rubber for deterioration and damage.
BUMP STOP PLATE
BUMP STOP
Check for weakness and damage.
DAMPER MOUNTING RUBBER
Check for deterioration and damage.
SPRING MOUNTING RUBBER
Check for deterioration and damage.
SPRING SEAT RUBBER
Check for deterioration and damage.
DUST COVER PLATE
DUST COVER
Check for bending or damage.
SOCKET WRENCH
10 mm NUT
DAMPER UNIT
With the nitrogen gas:
• Check for oil leaks or rust.
• Check for smooth operation through a full stroke, both compression and extension. If it does not extention, the gas is leaking, and the damper should be replaced.

Rear Damper

Reassembly

1. Install the damper unit on the spring compressor by aligning the marks on the damper case and the spring compressor holder.

   NOTE: If a new damper is to be installed, mark it on the same position as on the old damper.

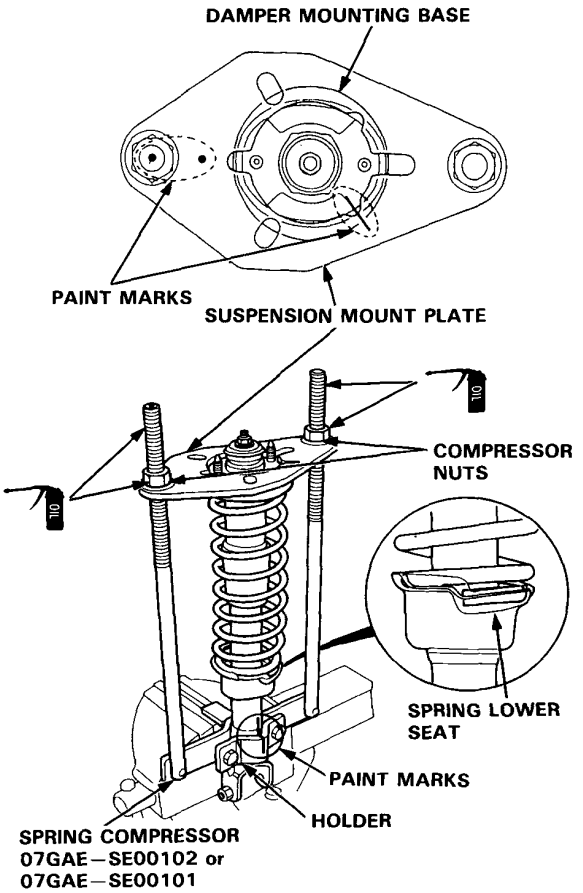
2. Reassemble the damper in reverse order of disassembly except the damper mounting washer and self-locking nut.

   NOTE: Align the bottom of damper spring and spring lower seat as shown.

3. Install the mount plate on the damper with the mark on the plate facing painted threads.

4. Position the damper mounting base by aligning the marks on the damper mounting base and mount plate.

5. Apply oil to the seating surfaces of the compressor nuts and threads of the spring compressor, then loosely install the nuts.

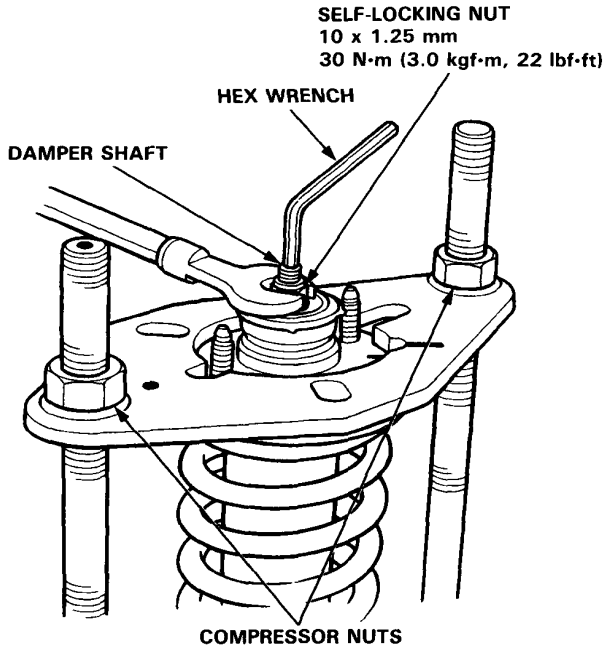


6. Compress the damper spring by turning the compressor nuts.

   NOTE: Turn each compressor nut gradually and equally.

7. Install the damper mounting washer, then loosely install the new self-locking nut.

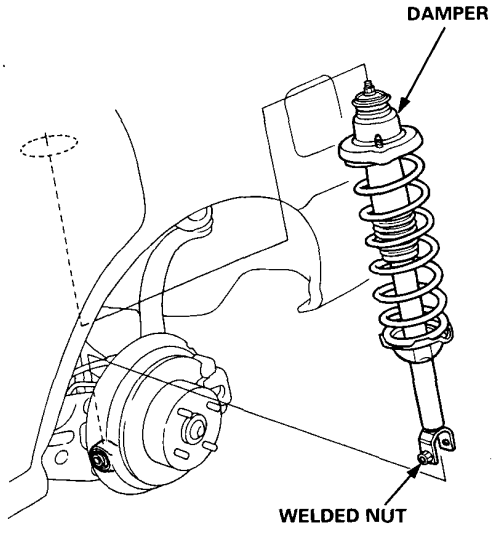
8. Hold the damper shaft with a hex wrench and tighten the self-locking nut.



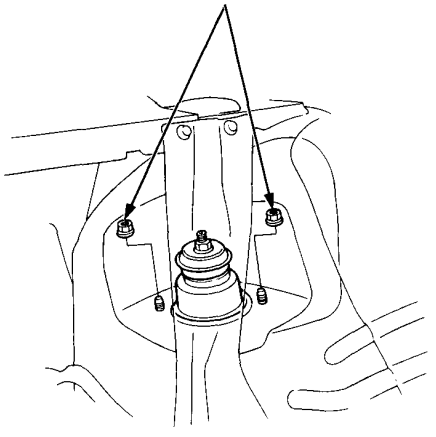
9. Remove the damper from the spring compressor.

Installation

1. Lower the rear suspension, and position the damper with the welded nut pointed toward the front of the car.



2. Loosely install the two flange nuts.



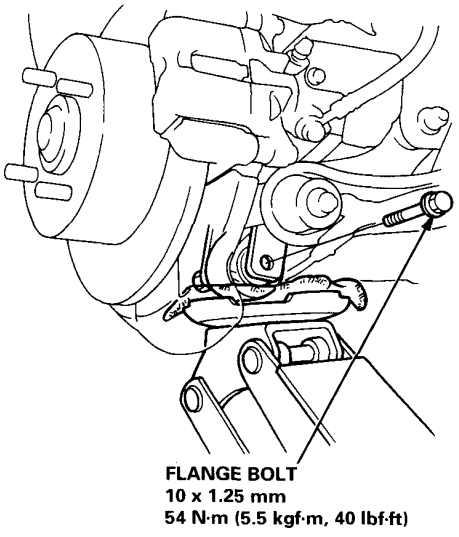
3. Loosely install the FLANGE bolt.

4. Raise the rear suspension with a floor jack until the car just lifts off the safety stand.

⚠ WARNING The floor jack must be securely positioned or personal injury may result.

5. Tighten the FLANGE bolt.

6. Tighten the two flange nuts on top of the damper to the specified torque.



7. Install the rear seat bolsters and the rear bulkhead cover and right gusset cover.

8. Install the rear wheels (see page 18-31).

Brakes

Conventional Brakes 19-1
Anti-lock Brake System (ABS) 19-43



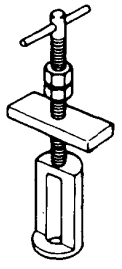
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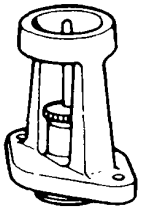


Special Tools

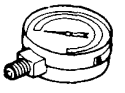
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAE – SG00100	Brake Spring Compressor	1	19-26, 31
②	07JAG – SD40100	Pushrod Adjustment Gauge	1	19-18
③	07504 – 6340100	Brake master power kit		
③-1	07404 – 5790300	Vacuum Gauge	1	19-19
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③-3	07410 – 5790100	Pressure Gauge Attachment C	2	19-20
③-4	07410 – 5790500	Tube Joint Adapter	1	19-20
③-5	07510 – 6340101	Pressure Gauge Joint Pipe	2	19-20
④	07HAK – SG00110	Pressure Gauge Joint Pipe (Cars with ABS)	1	19-20
⑤	07914 – SA50000	Snap Ring Pliers	1	19-27, 31
⑥	07916 – 6390001	Locknut Wrench	1	19-26, 31



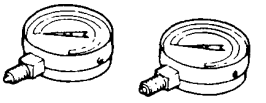
①



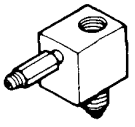
②



③-1



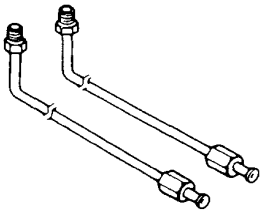
③-2



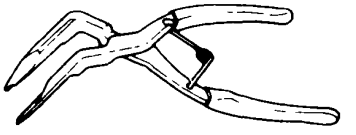
③-3



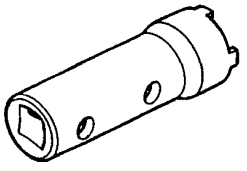
③-4



③-5.④



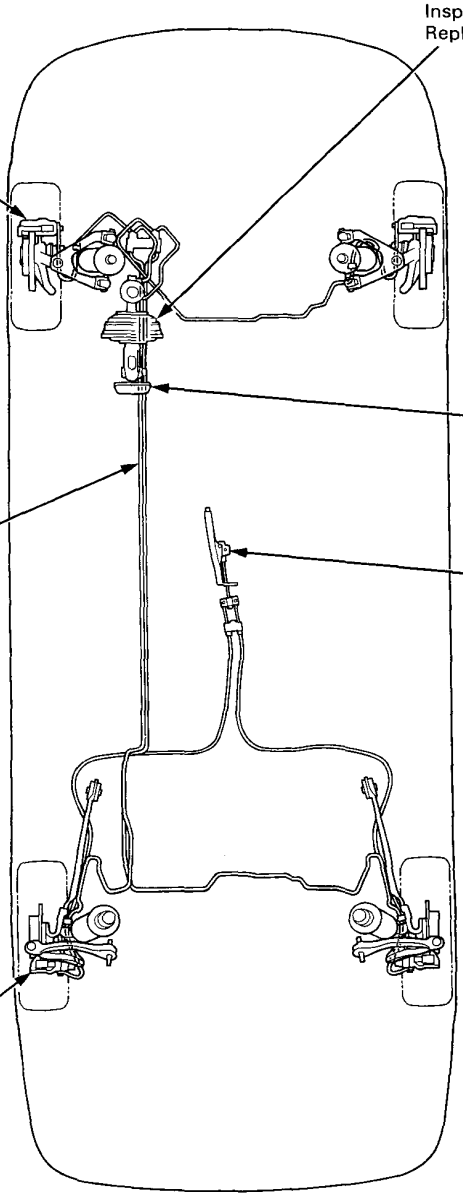
⑤



⑥

Component Location

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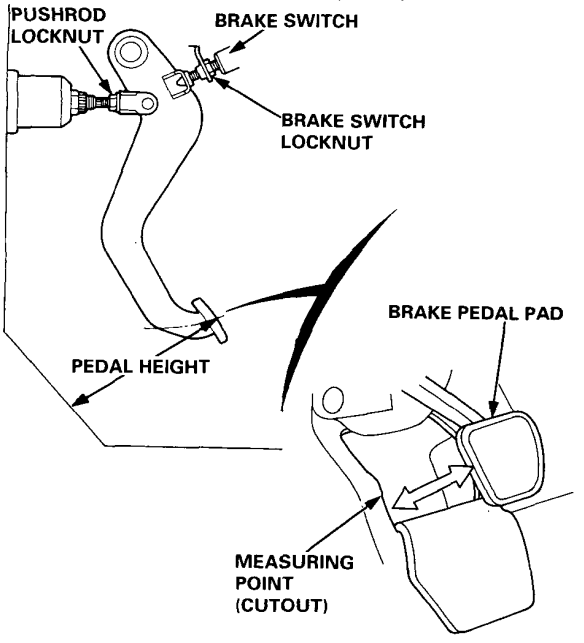
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Brake Pedal

Pedal Height

1. Disconnect the brake switch connector, loosen the brake switch locknut, and back off the brake switch until it is no longer touching the brake pedal.

2. Turn up the floor mat, and measure the pedal height from the left side center of the pedal pad.

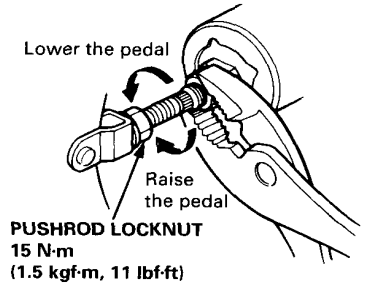


Standard Pedal Height (with floor mat removed):

LHD:
M/T: 192 mm (7.56 in)
A/T: 193 mm (7.60 in)
RHD:
M/T: 167 mm (6.57 in)
A/T: 168 mm (6.61 in)

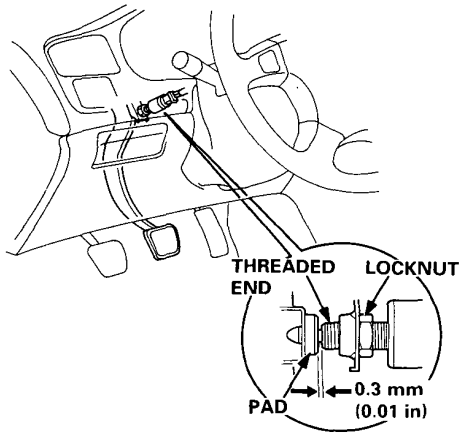
3. Loosen the pushrod locknut, and screw the pushrod in or out with pliers until the standard pedal height from the floor is reached. After adjustment, tighten the locknut firmly.

   NOTE: Do not adjust the pedal height with the pushrod depressed.



4. Screw in the brake switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/4 turn to make 0.3 mm (0.01 in) of clearance between the threaded end and pad. Tighten the locknut firmly. Connect the brake switch connector.

   CAUTION: Make sure that the brake lights go off when the pedal is released.



5. Check the brake pedal free play as described below.

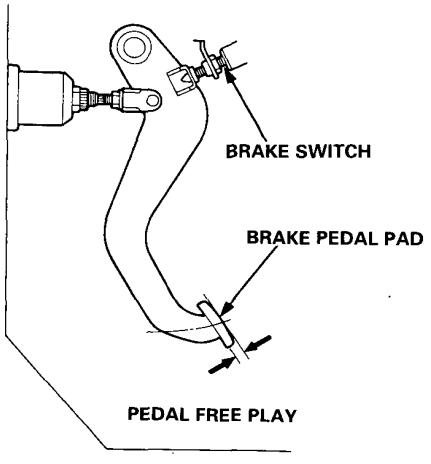
Pedal Free Play

1. With the engine off, inspect the play on the pedal pad by pushing the pedal by hand.

   Free Play: 1 – 5 mm (1/16 – 13/64 in)

2. If the pedal free play is out of specification, adjust the brake switch.

   CAUTION: If the pedal free play is insufficient, it may result in brake drag.

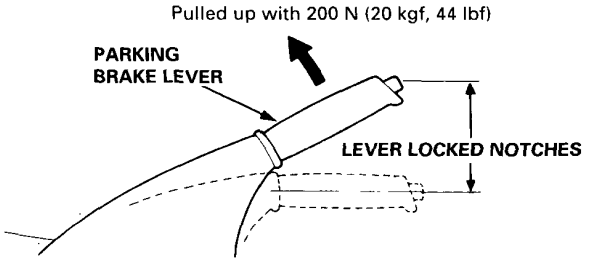


Parking Brake

Inspection

1. Pull the parking brake lever with 200 N (20 kgf, 44 lbf) force to fully apply the parking brake. The parking brake lever should be locked within the specified notches.

   Lever Locked Notches:
   Cars With Rear Disc Brake: 7 – 11
   Cars With Rear Drum Brake: 4 – 8



2. Adjust the parking brake if the lever notches are out of specification.

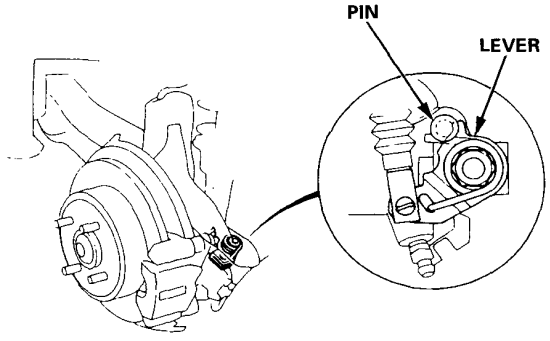
Adjustment

NOTE: After rear brake caliper servicing, loosen the parking brake adjusting nut, start the engine and depress the brake pedal several times to set the self-adjusting brake before adjusting the parking brake.

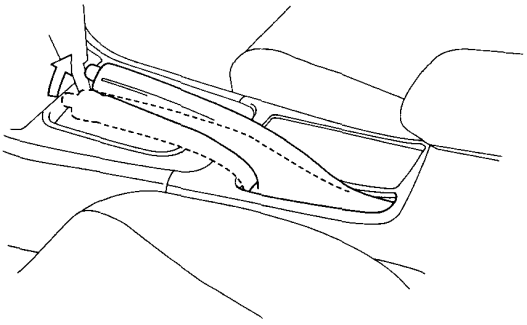
1. Raise the rear wheels off the ground and support on safety stands.

   ⚠ WARNING Block the front wheels before jacking up the rear of the car.

2. Make sure the parking brake arm on the rear brake caliper contacts the brake caliper pin.

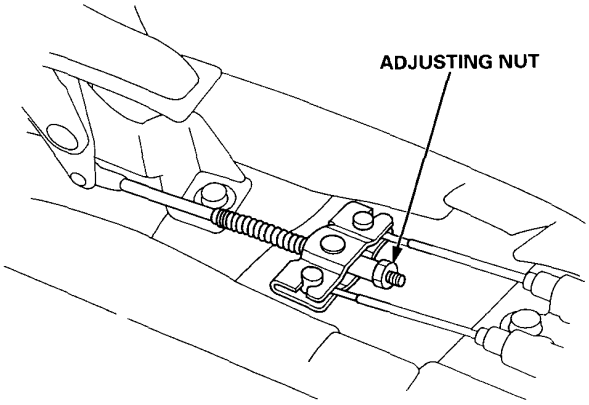


3. Pull the parking brake lever up one notch.



4. Remove the rear console (see section 20).

5. Tighten the adjusting nut until the rear wheels drag slightly when turned.



6. Release the parking brake lever fully, and check that the rear wheels do not drag when turned. Readjust if necessary.

7. Make sure that the parking brakes are fully applied with the parking brake lever is pulled up fully.

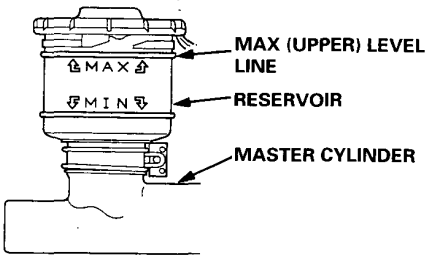
8. Install the cap onto the parking brake cable end, and reinstall the rear console.

Bleeding

CAUTION:
- **Use only clean DOT 3 or 4 brake fluid.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not spill brake fluid on the car, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**

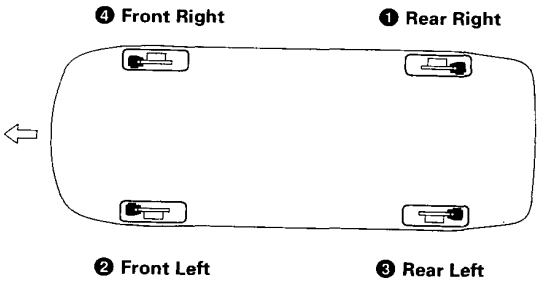
NOTE: The reservoir on the master cylinder must be at the MAX (upper) level mark at the start of bleeding procedure, and checked after bleeding each brake caliper. Add fluid as required. Use only clean DOT 3 or 4 brake fluid.

1. Make sure the brake fluid level in the reservoir is at the MAX (upper) level line.

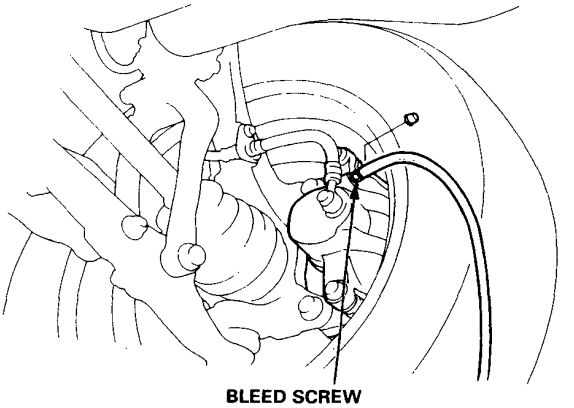


2. Have someone slowly pump the brake pedal several times, then apply steady pressure.
3. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
4. Repeat the procedure for each wheel in the sequence shown below, until air bubbles no longer appear in the fluid.
5. Refill the reservoir of master cylinder to the MAX (upper) level line.

〈BLEEDING SEQUENCE:〉

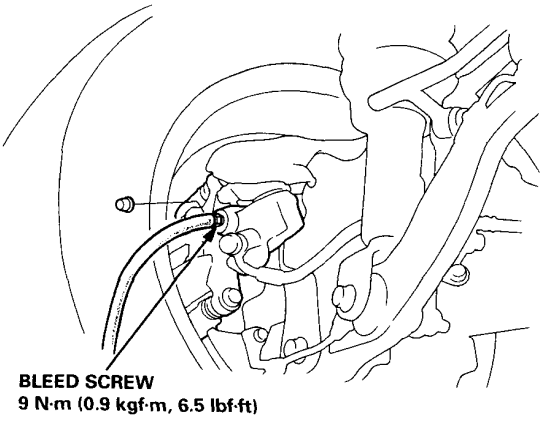


〈FRONT:〉

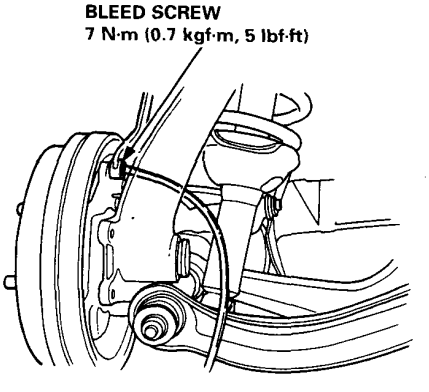


〈REAR:〉

DISC BRAKE



DRUM BRAKE



Front Brake Pads

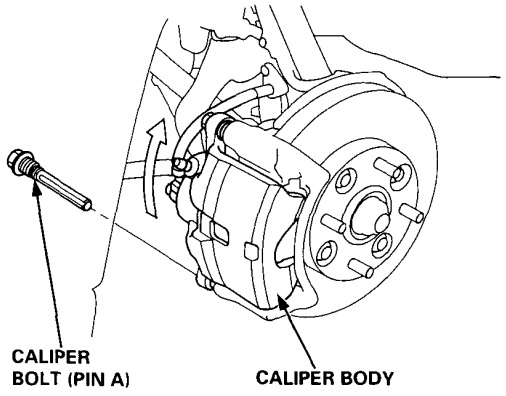
Inspection and Replacement

⚠ WARNING

- **Never use and air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**

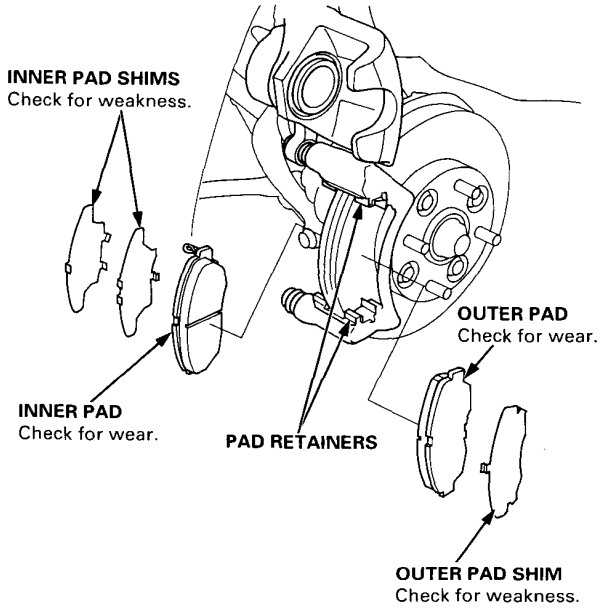
1. Loosen the front wheel nuts slightly, then raise the car and support on safety stands.

2. Remove the caliper bolt (pin A), and pivot the caliper up out of the way.



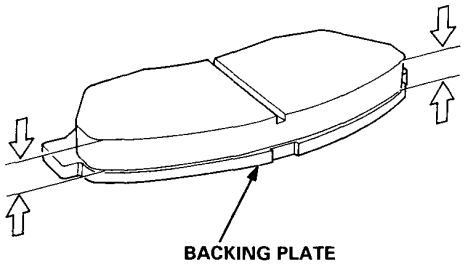
NOTE: Check the hoses and pin boots for damage and deterioration.

3. Remove the pad shims, pad retainers and pads.



4. Using vernier calipers, measure the thickness of each brake pad lining.

Brake Pad Thickness:
Standard:
10.5 – 11.5 mm (0.41 – 0.45 in)
KH model only (F22B1 and F22B2 engines):
12.0 – 13.0 mm (0.47 – 0.51 in)
Service Limit: 1.6 mm (0.06 in)



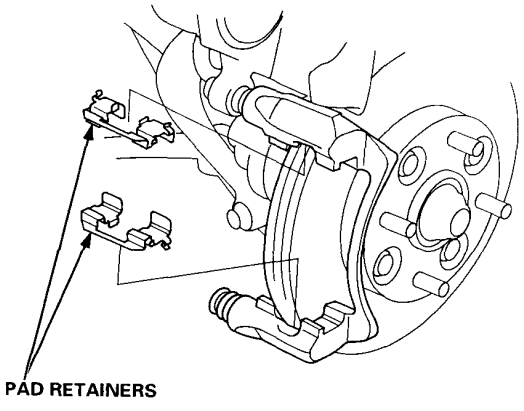
NOTE: Measurement does not include pad backing plate thickness.

5. If the brake pad thickness is less than service limit, replace the front pads as a set.

6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.

7. Check the brake disc for damage or cracks.

8. Install the pad retainers.



Front Brake Pads

Inspection and Replacement (cont'd)

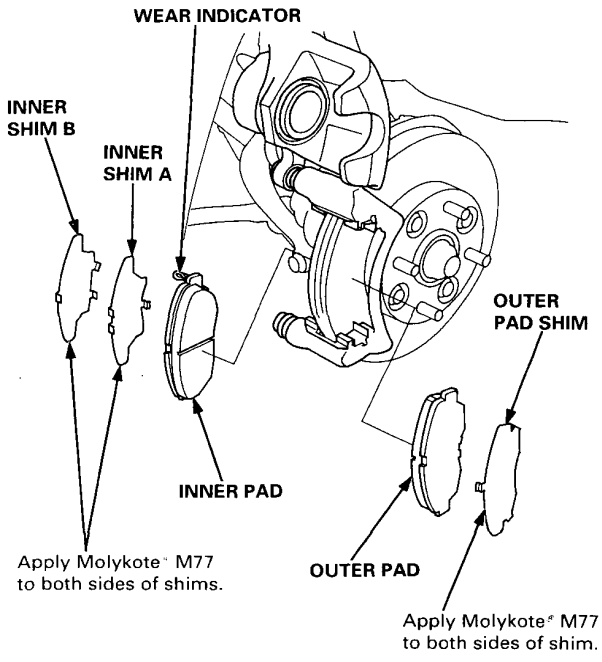
9. Apply Molykote® M77 grease to the inner side of the pad shims and the back of the pads. Wipe excess grease off the shim.

10. Install the brake pads and pad shims correctly.

⚠ WARNING

- **When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.**
- **Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.**

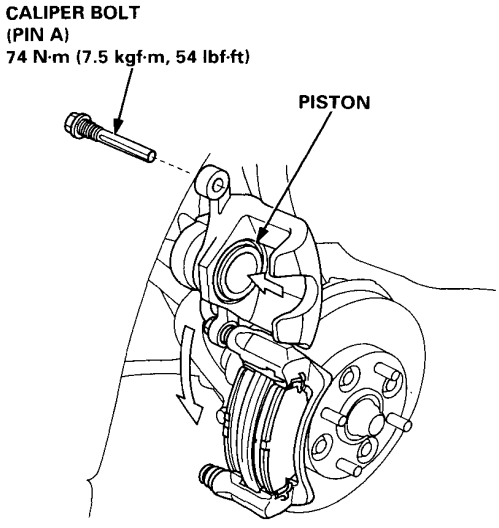
NOTE: Install the pad with the wear indicator on the inside.



11. Push in the piston so that the caliper will fit over the pads. Make sure that the piston boot is in position to prevent damaging it when pivoting the caliper down.

12. Pivot the caliper down into position, then install caliper bolt (pin A) and tighten it.

CAUTION: Be careful not damage the pin boot when pivoting the caliper down.



13. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

14. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.

Front Brake Disc

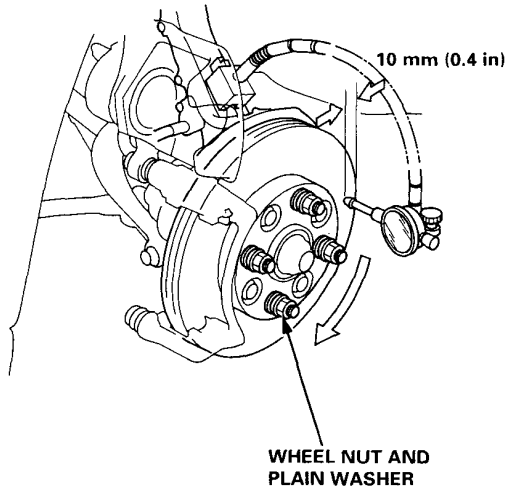
Disc Runout Inspection

1. Loosen the front wheel nuts slightly, then raise the car and support on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-7).
3. Inspect the disc surface for damage or cracks. Clean the disc thoroughly and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

   Brake Disc Runout:
   Service Limit: 0.10 mm (0.004 in)

5. If the disc is beyond the service limit, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-way manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

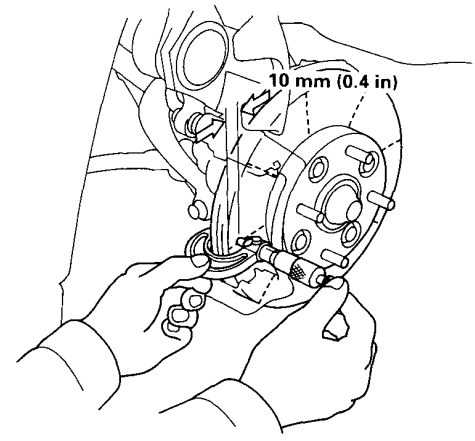
   Max. Refinish Limit:
   25.0 mm (0.98 in)
   KH model only (F22B1 and F22B2 engines):
   21.0 mm (0.83 in)



NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in)

Disc Thickness and Parallelism Inspection

1. Loosen the front wheel nuts slightly, then raise the car and support on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-7).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc.



Brake Disc Thickness:
Standard:
24.9 – 25.1 mm (0.98 – 0.99 in)
Max. Refinishing Limit: 23.0 mm (0.91 in)
KH model only (F22B1 and F22B2 engines:
Standard:
22.9 – 23.1 mm (0.90 – 0.91 in)
Max. Refinishing Limit: 21.0 mm (0.83 in)

NOTE: Replace the brake disc if the smallest measurement is less than the max. refinishing limit.

Brake Disc Parallelism: 0.015 mm (0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

   NOTE: See page 18-11 for brake disc replacement.

Front Brake Caliper

Disassembly

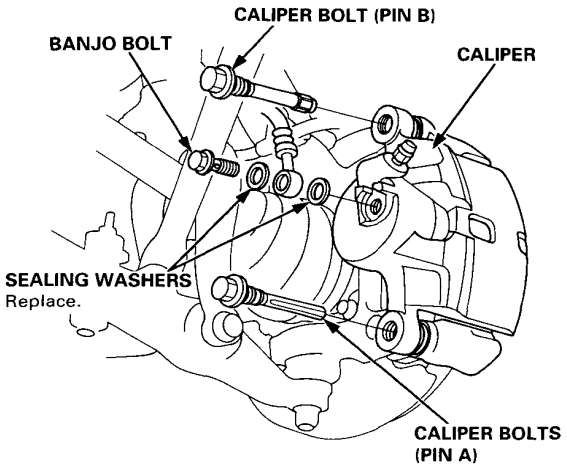
⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**

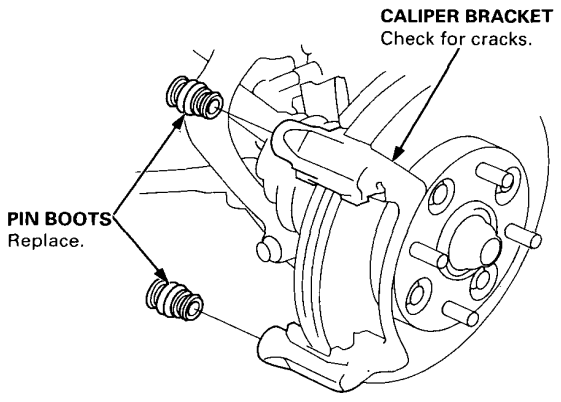
CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**

1. Remove the banjo bolt, and disconnect the brake hose from the caliper.
2. Remove the caliper bolts (pin A and pin B), then remove the caliper from the bracket.



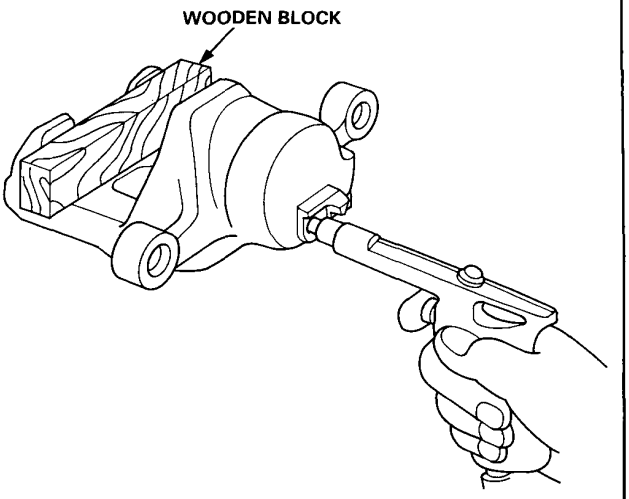
3. Remove the pin boots from the caliper bracket.



4. If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag or wooden block as shown to cushion the piston when it is expelled. Use low pressure air in short spurts.

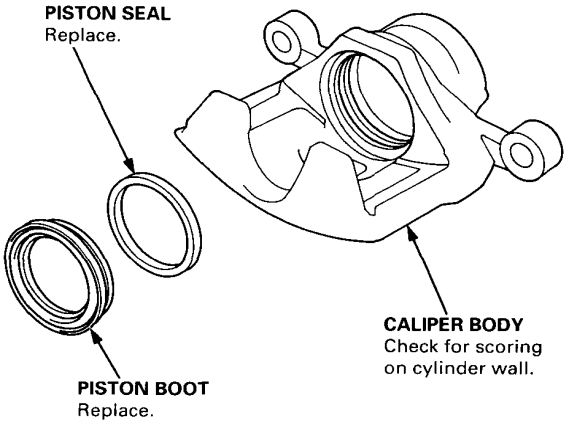
⚠ WARNING

- **Do not place your fingers in front of the piston.**
- **Do not use high air pressure.**



5. Remove the piston from the caliper, and check the piston for scoring on surface.
6. Remove the piston boot and piston seal.

CAUTION: Take care not to damage the cylinder bore.



Reassembly

⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake discs or pads reduce stopping ability.**
- **When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.**

CAUTION:

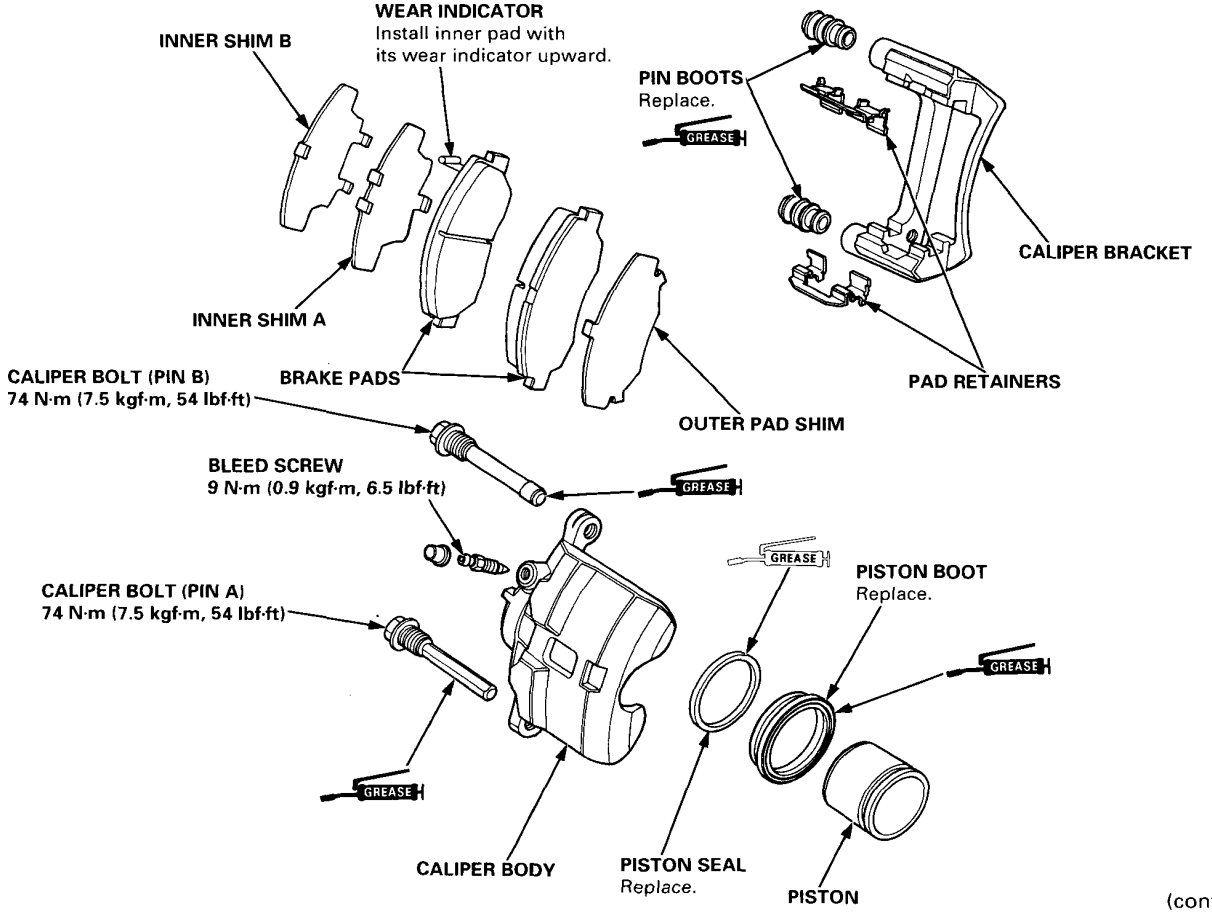
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**

NOTE:

- Coat piston, piston seal, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

GREASE: Use recommended rubber grease in the caliper seal set.

GREASE: Use recommended seal grease in the caliper seal set.



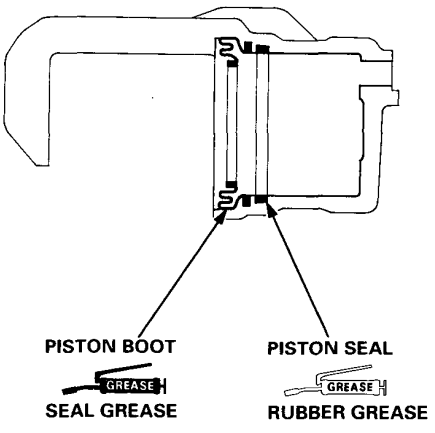
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Front Brake Caliper

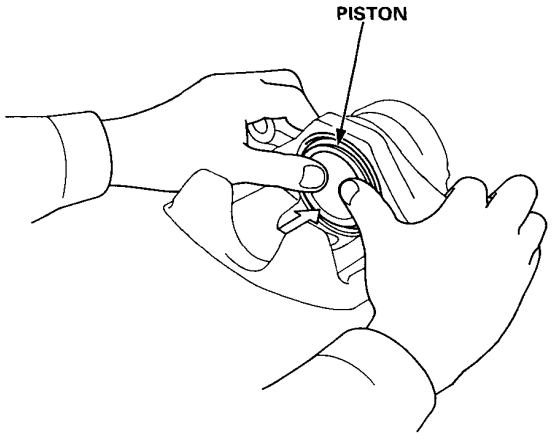
Reassembly (cont'd)

1. Clean the piston and caliper bore with brake fluid and inspect for wear or damage.
2. Coat a new piston seal with the recommended rubber grease in the caliper seal set, and install the seal in the cylinder groove.
3. Apply the recommended seal grease in the caliper seal set to the sealing lips and inside of a new piston boot, and install it in the caliper.

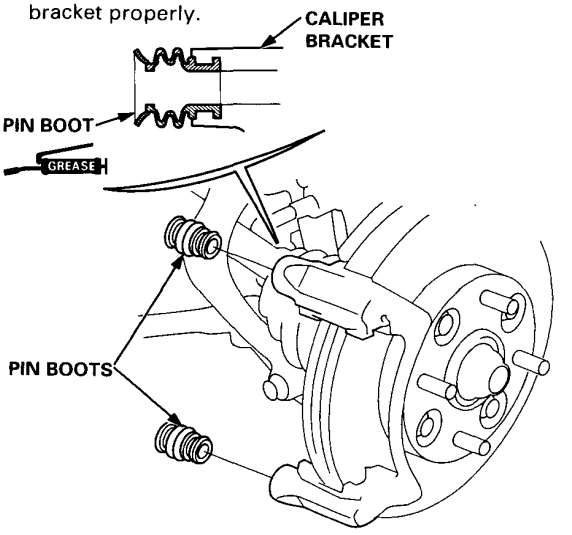
   CAUTION: Be careful not to damage the caliper cylinder wall.



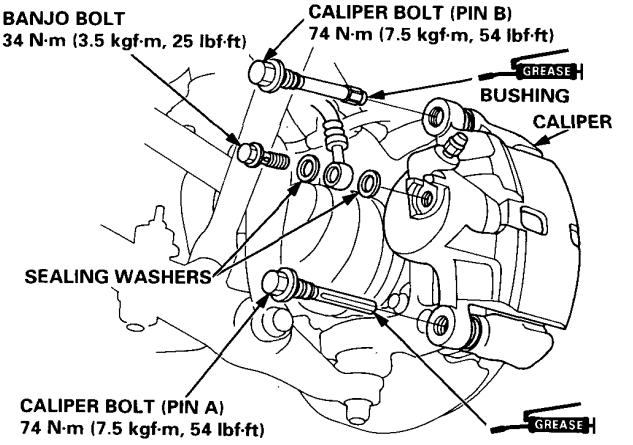
4. Lubricate the caliper cylinder and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.



5. Apply the recommended seal grease in the caliper seal set to sliding surface of the pins and inside of the new pin boots.
6. Install the pin boots into the groove in the caliper bracket properly.



7. Install the brake pads in their original positions (see page 19-8).
8. Push in the piston so that the caliper will fit over the pads, and install the caliper.
   CAUTION: Be careful not to damage the pin boots when installing the caliper.
9. Coat the caliper bolts (pin A and pin B) with the recommended seal grease in the caliper seal set, and insert them into the caliper.
10. Tighten the caliper bolts (pin A and B).
11. Connect the brake hose to the caliper with new sealing washers, and tighten the banjo bolt.



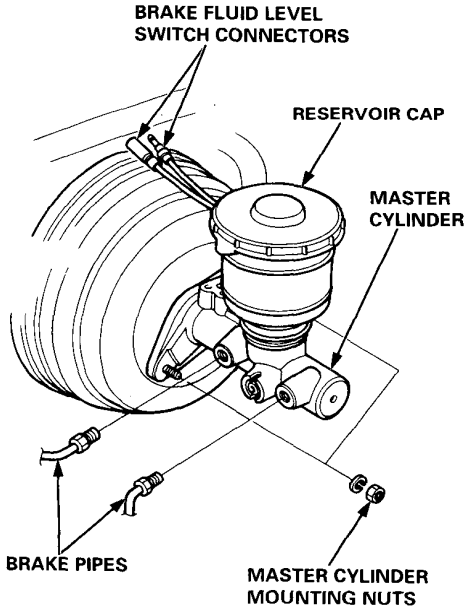
12. Fill the brake reservoir and bleed the brake system (see page 19-6).
13. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.

Master Cylinder

Removal

CAUTION:
- **Be careful not to bend or damage the brake pipes when removing the master cylinder.**
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**

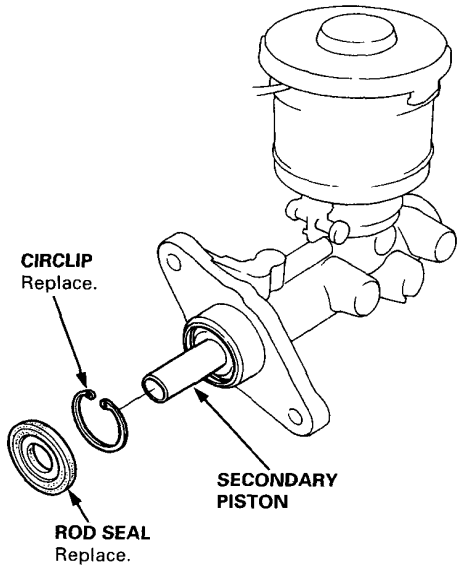
1. Disconnect the brake fluid level switch connectors.
2. Remove the reservoir cap from the master cylinder.
3. The brake fluid may be sucked out through the top of the master cylinder reservoir with a syringe.
4. Disconnect the brake pipes from the master cylinder.
5. Remove the master cylinder mounting nuts and the master cylinder from the brake booster.



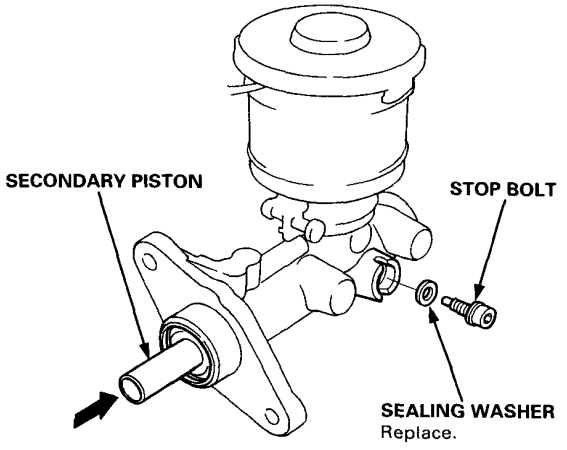
Disassembly

CAUTION:
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**

1. Remove the master cylinder.
2. Remove the rod seal.
3. Remove the circlip while pushing in the secondary piston.



4. Remove the stop bolt while pushing in the secondary piston.



(cont'd)

Master Cylinder

Disassembly (cont'd)

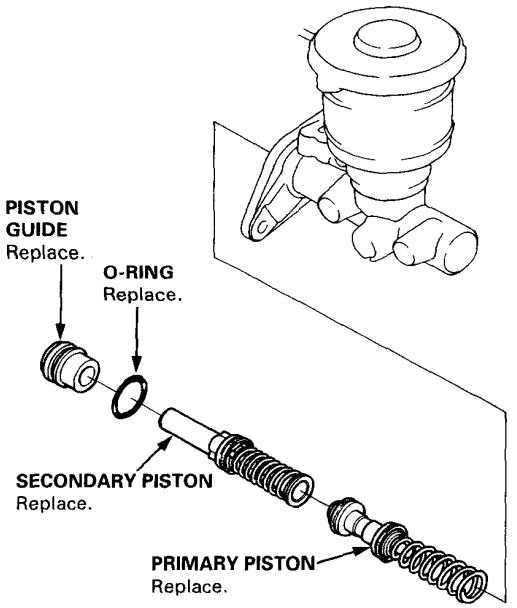
5. Remove the piston guide, secondary cup and O-ring.

6. Remove the secondary piston and primary piston from master cylinder.

   NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side port.

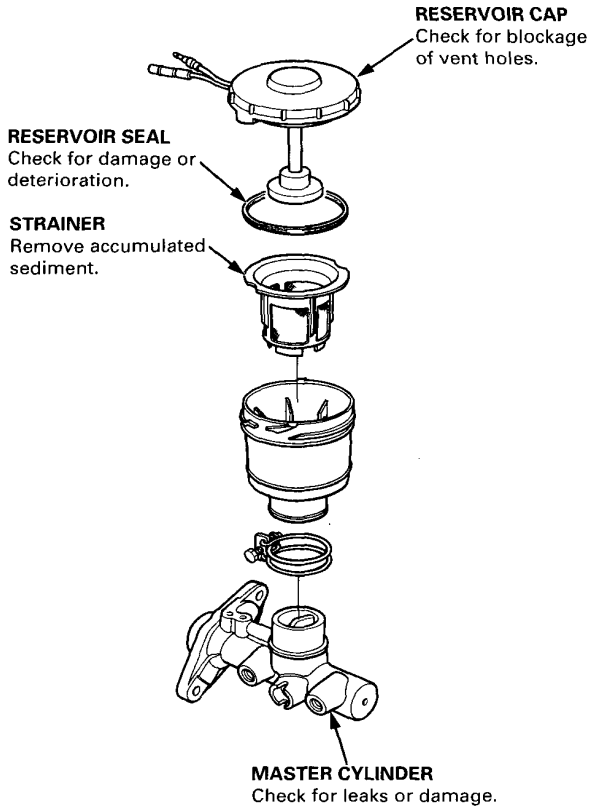
   CAUTION:
   - **Do not use high pressure air or bring the nozzle too close to the port.**
   - **Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.**

7. Disassembly the secondary piston and primary piston (see next page).



8. Remove the reservoir cap, strainer and reservoir from the master cylinder.

9. Remove the reservoir seal from the reservoir cap.



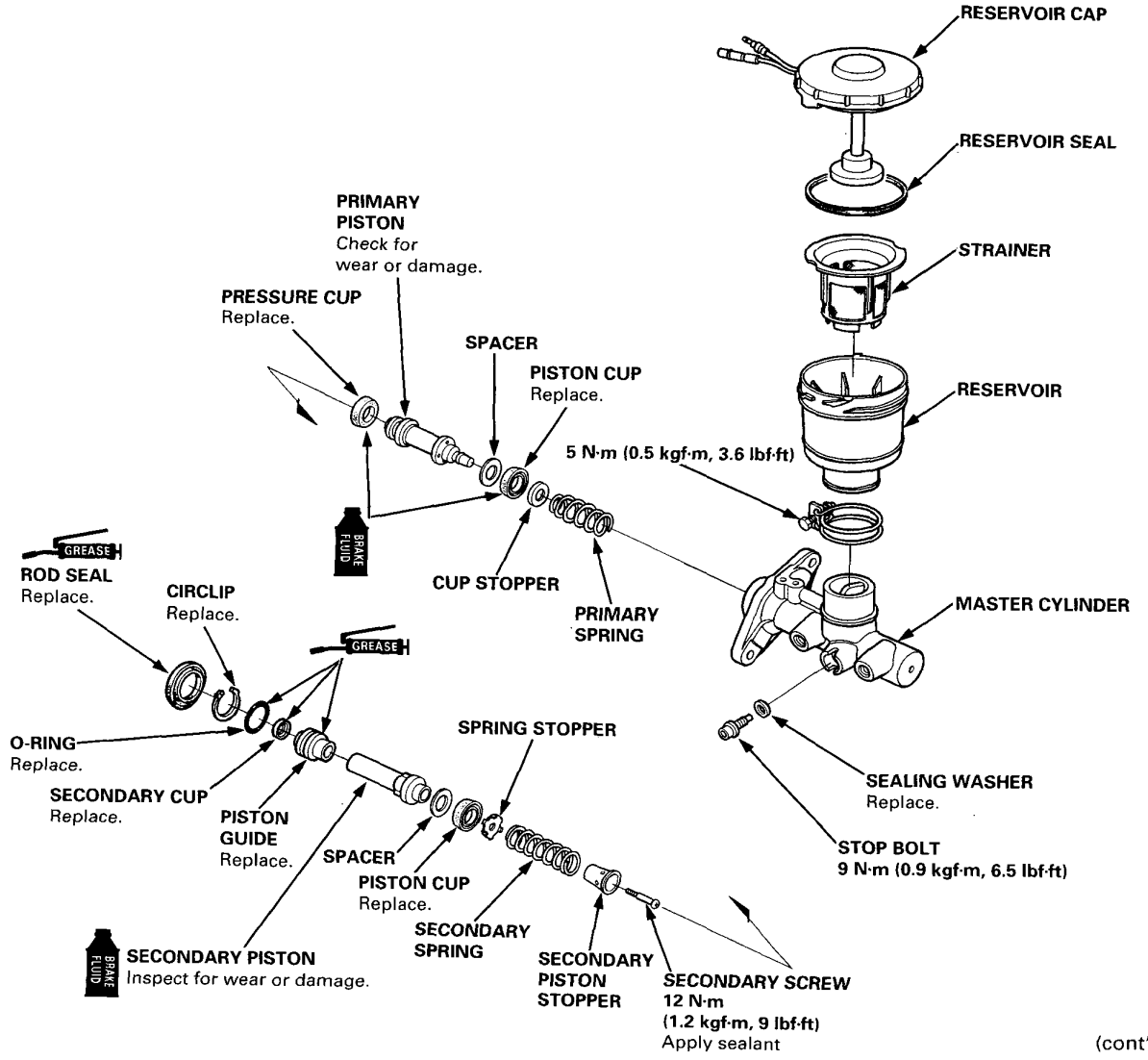
Reassembly

CAUTION:

- **If replacing the primary piston, secondary piston or master cylinder body. Check and adjust the pushrod clearance before installing the master cylinder (see page 19-18).**
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**
- **Replace the master cylinder if the bore is damaged or worn. Do not hone or attempt to refinish the bore.**

NOTE:

- *Coat piston cups, pressure cup and master cylinder bore with clean brake fluid.*
- Use recommended greases in the master cylinder seal set.



(cont'd)

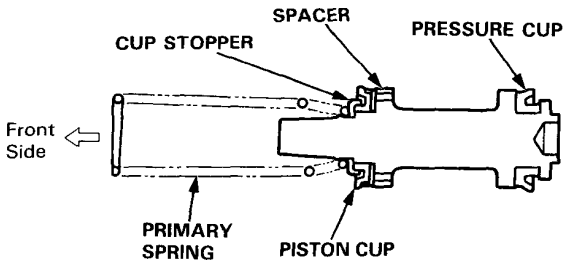
Master Cylinder

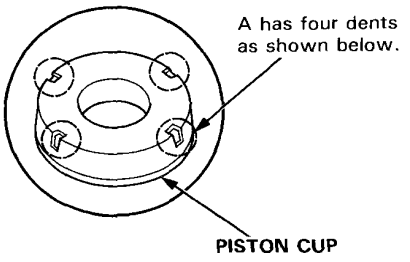
Reassembly (cont'd)

1. Assembly the primary piston and secondary piston.

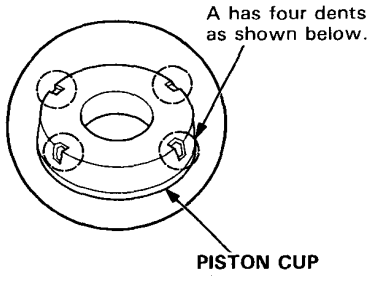
   NOTE: To prevent damage, liberally apply clean brake fluid to the piston cups before installation.

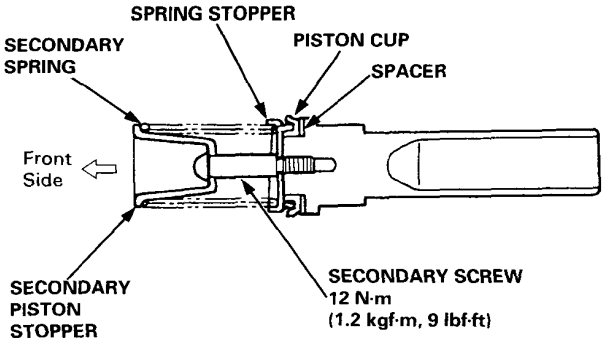
<PRIMARY PISTON:>



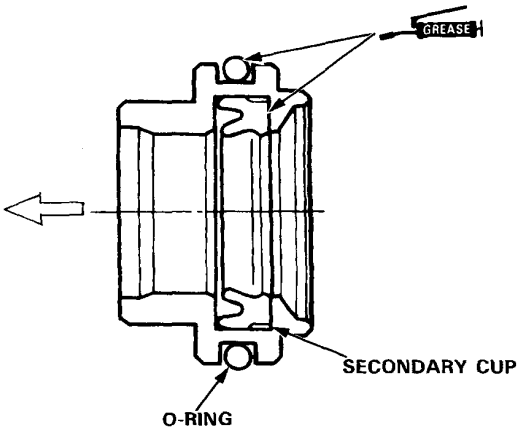


<SECONDARY PISTON:>



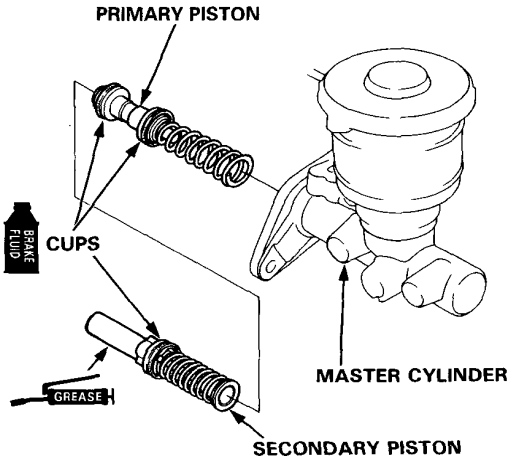


2. Apply recommended grease in the master cylinder seal set to a new O-ring and the secondary cup in a new piston guide and install the O-ring onto the piston guide.

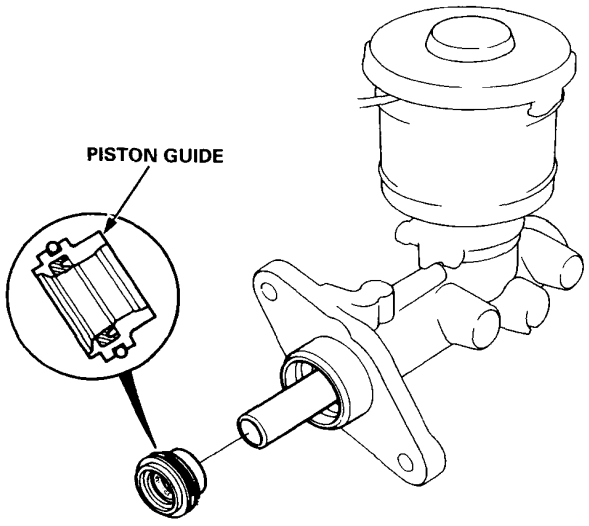


3. Apply recommended grease in the master cylinder seal set to a secondary piston.

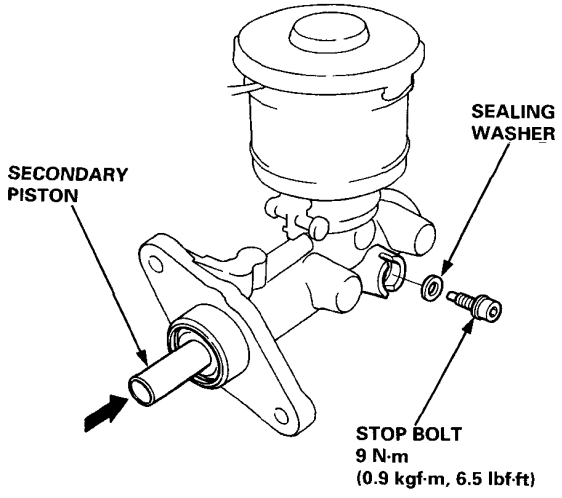
4. Lubricate the cups of primary and secondary pistons with clean brake fluid, and install them into the master cylinder.



5. Install the piston guide assembly into the master cylinder.

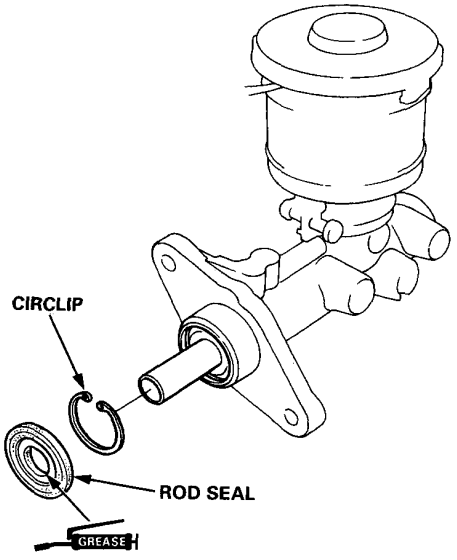


6. Install the stop bolt with a new sealing washer while pushing in the secondary piston, and tighten the stop bolt.



7. Install a new circlip while pushing in the secondary piston.

8. Apply recommended grease in the master cylinder seal set to a new rod seal and install the seal onto the master cylinder.

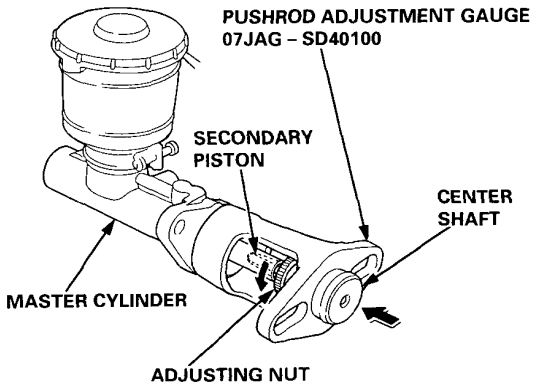


Master Cylinder

Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

1. Set the special tool on the master cylinder body; push in the center shaft until the top of it contacts the end of the secondary piston by turning the adjusting nut.



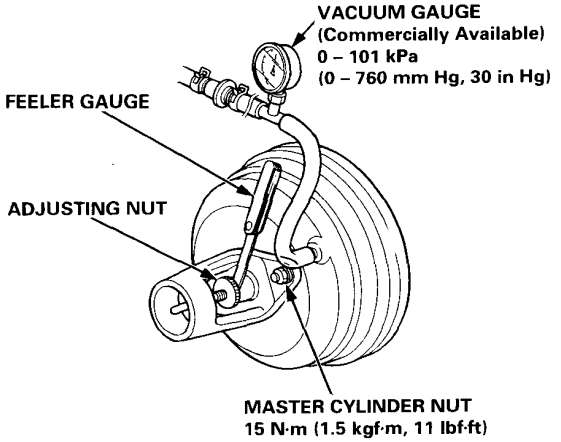
2. Without disturbing the center shaft's position, install the special tool upside down on the booster.

3. Install the master cylinder nuts and tighten to the specified torque.

4. Connect the booster in-line with a vacuum gauge 0 – 101 kPa (0 – 760 mmHg, 30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 66 kPa (500 mmHg, 20 in Hg) vacuum.

5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

   Clearance: 0 – 0.4 mm (0 – 0.02 in)



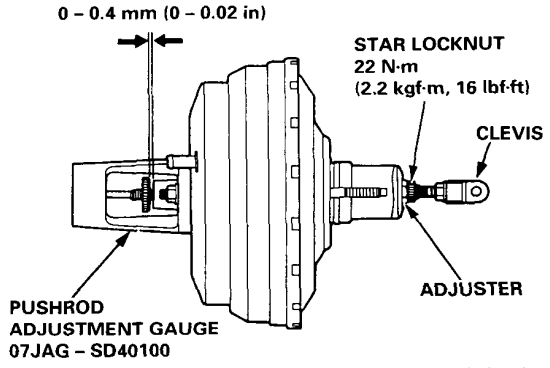
NOTE: If the clearance between the gauge body and adjusting nut is 0.4 mm (0.02 in), the pushrod-to-piston clearance is 0 mm. However, if the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm (0.02 in) or more. Therefore, it must be adjusted and rechecked.

6. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust.

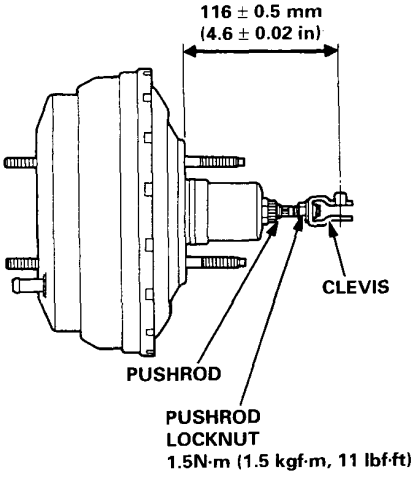
   NOTE:
   - Adjust the clearance while the specified vacuum is applied to the booster.
   - Hold the clevis while adjusting.

7. Tighten the star locknut securely.

8. Remove the special tool.



9. Adjust the pushrod length as shown if the booster is removed.



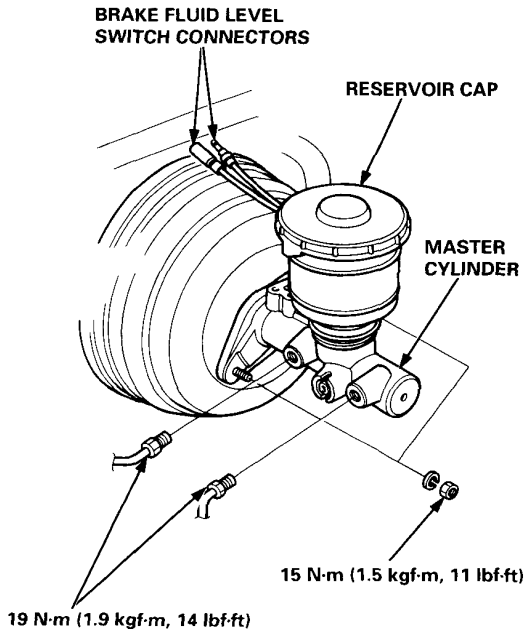
10. Install the master cylinder (see page 19-19).

Installation

CAUTION:
- **When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts.**
- **Be careful not to bend or damage the brake pipes when installing the master cylinder.**

NOTE: If replacing the master cylinder or brake booster, check and adjust the pushrod clearance before installing the master cylinder (see page 19-18).

1. Install the master cylinder on the brake booster with the mounting nuts.
2. Connect the brake pipes to the master cylinder.
3. Fill the master cylinder reservoir and bleed the brake system (see page 19-6).
4. Install the reservoir cap, and connect the brake fluid level switch connectors.

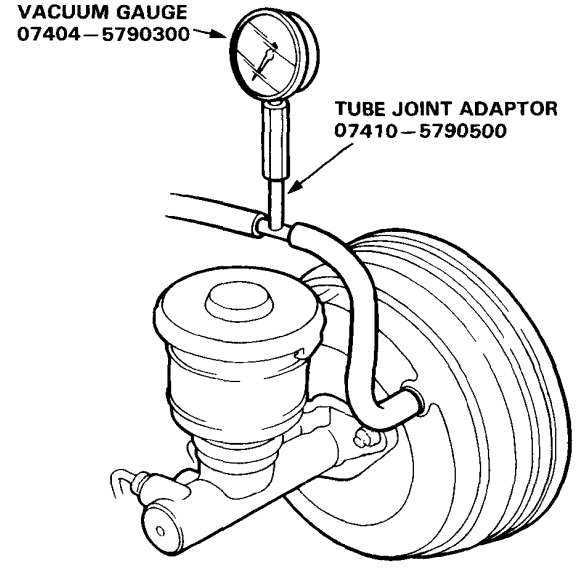


5. After installation, perform the following inspections and adjust if necessary.
   - Brake pedal height (see page 19-4)
   - Brake pedal free play (see page 19-4)

Inspection

Leak Test

1. Install the vacuum gauge between the brake booster and check valve.



2. Start the engine, adjust the engine speed with the accelerator pedal so that the vacuum gauge readings show 40.0 – 66.7 kPa (300 – 500 mmHg, 11.8 – 19.7 in-Hg), then stop the engine.
3. Read the vacuum gauge.

   If the vacuum reading decreases 2.7 kPa (20 mmHg, 0.8 in-Hg) or more after 30 seconds, check following parts for leaks.
   - Check valve
   - Vacuum hose, pipe
   - Seals
   - Brake booster
   - Master cylinder

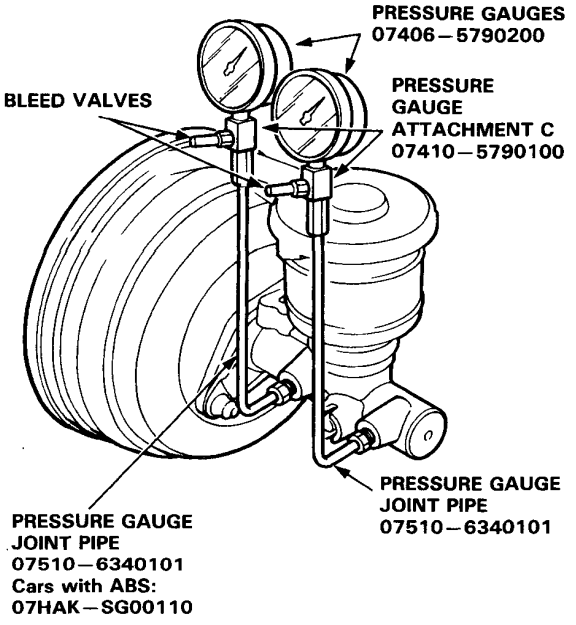
   CAUTION: Do not try to disassemble the brake booster. Replace the brake booster as an assembly with new one.

(cont'd)

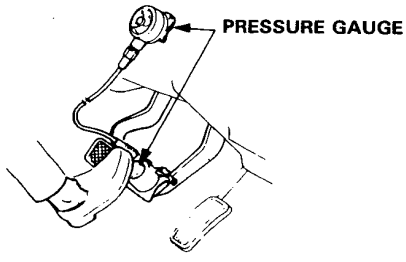
Inspection (cont'd)

Function Test

1. Install the vacuum gauge as same the leak test.
2. Connect the oil pressure gauges to the master cylinder using the attachments as shown.
3. Bleed air through the valves.



4. Start the engine.
5. Depress the brake pedal with a 200 N (20 kgf, 44 lbf) of pressure. The following pressures should be observed at the pressure gauges in each vacuum.



Cars Without ABS

Vacuum mm (in) Hg	Min. Line Pressure kPa (kgf/cm², psi)
0 (0)	970 (9.9, 140)
300 (11.8)	5,530 (56.4, 802)
500 (19.7)	8,580 (87.5, 1,240)

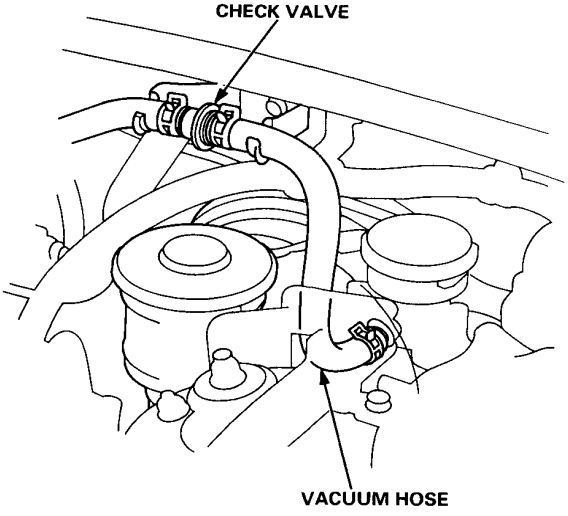
Cars With ABS

Vacuum mm (in) Hg	Min. Line Pressure kPa (kgf/cm², psi)
0 (0)	850 (8.7, 120)
300 (11.8)	6,120 (62.4, 887)
500 (19.7)	8,980 (91.6, 1,300)

6. Inspect the master cylinder for leaks if the readings do not fall within the limits shown above.

Check Valve Test

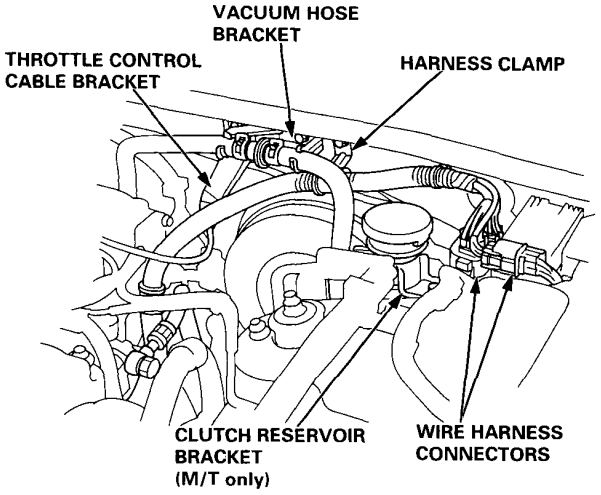
1. Disconnect the brake booster vacuum hose at the booster.
2. Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working correctly.
   Replace the check valve and retest.



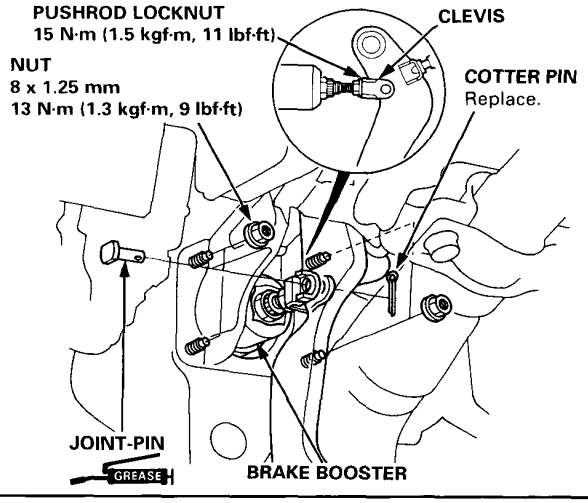
Replacement

1. Remove the master cylinder (see page 19-13).
2. Disconnect the vacuum hose from the brake booster, then remove the vacuum hose bracket.

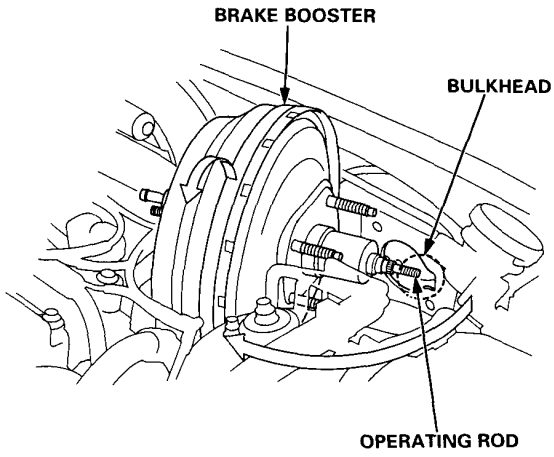
   LHD only:
   - 1. Remove the throttle control cable bracket.
   - 2. Disconnect the engine wire harness connectors, then remove the harness clamp.
   - 3. M/T only: Remove the clutch reservoir and reservoir bracket. Do not disconnect the clutch hose from the reservoir.



3. Loosen the pushrod locknut, then remove the cotter pin and joint-pin.
4. Remove the clevis from the operating rod of the brake booster.
5. Remove the four booster mounting nuts.



6. Pull the brake booster forward, then turn it to the right until the operating rod is clear of the bulkhead.
7. Remove the brake booster from the engine compartment.



8. Install the brake booster in the reverse order of removal.

   NOTE: Adjust the pushrod length before installing the brake booster (see page 19-18).

9. Install the master cylinder (see page 19-19).
10. After installation, perform the following inspections and adjust if necessary.
    - Brake pedal height (see page 19-4).
    - Brake pedal free play (see page 19-4).

Rear Brake Pads

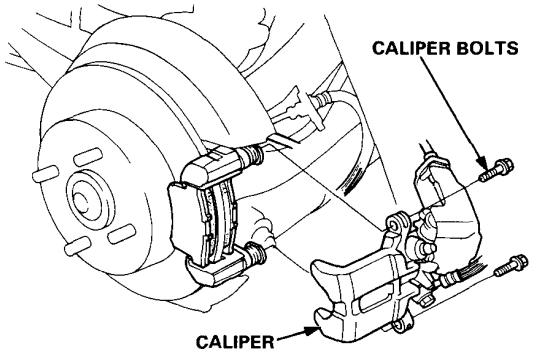
Inspection and Replacement

⚠ WARNING

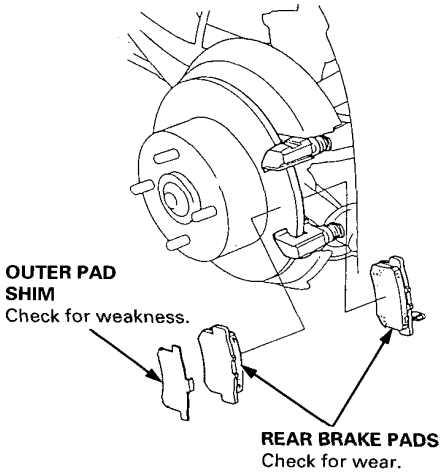
- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**

1. Block the front wheels, loosen the rear wheel nuts slightly, support the rear of car on safety stands, then remove the rear wheels.
2. Release the parking brake.
3. Remove the two caliper bolts and the caliper from the bracket.

   CAUTION:
   - **Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.**
   - **Support the caliper with a piece of wire so that it does not hang from the brake hose.**

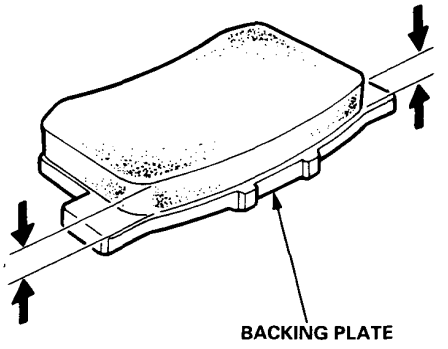


4. Remove the pad shims and brake pads.



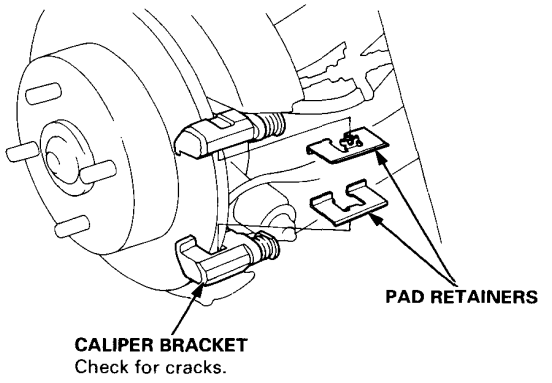
5. Using vernier calipers, measure the thickness of each brake pad lining.

   Brake Pad Thickness:
   Standard: 8.5 – 9.5 mm (0.33 – 0.37 in)
   Service Limit: 1.6 mm (0.06 in)



   NOTE: Measurement does not include pad backing plate thickness.

6. Remove the pad retainers.
7. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
8. Check the brake disc for damage or cracks.
9. Make sure that the pad retainers are installed in the correct positions.



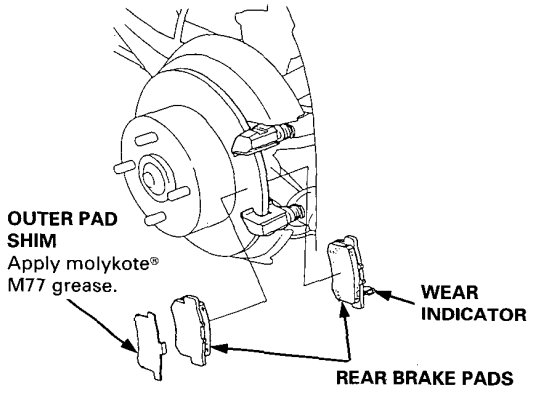
10. Apply Molykote® M77 grease to the pad side of the shims. Wipe excess grease off the shims.

11. Install the brake pads and pad shims on caliper bracket.

⚠ WARNING

- **When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.**
- **Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.**

NOTE: Install the inner pad with its wear indicator facing downward.

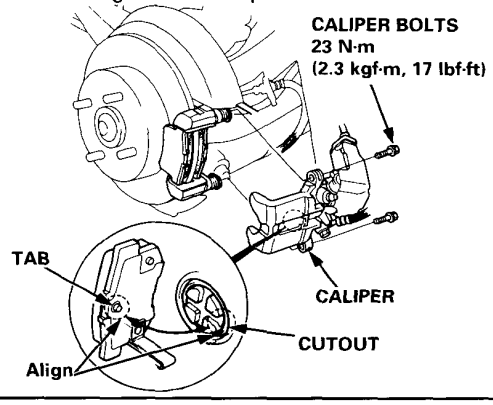


12. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning the piston back.

CAUTION: Lubricate the boot with rubber grease to avoid twisting the piston boot. If piston boot is twisted, back it out so it sits properly.

13. Install the brake caliper.

14. Install and tighten the caliper bolts.



15. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.

16. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

Rear Brake Disc

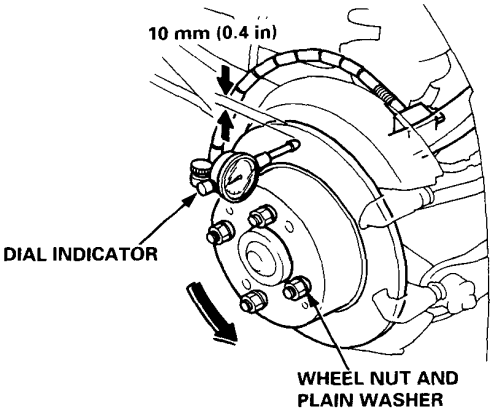
Disc Runout Inspection

1. Loosen the rear wheel nuts slightly, then raise the car and support on safety stands. Remove the rear wheels.
2. Remove the brake pads (see page 19-22).
3. Inspect the disc surface for damage or cracks. Clean the disc thoroughly and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

   Brake Disc Runout:
   Service Limit: 0.10 mm (0.004 in)

5. If the disc is beyond the service limit, refinish the brake disc.

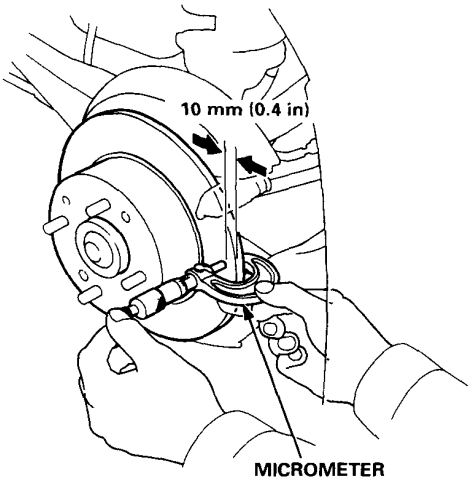
   Max. Refinishing Limit: 8.0 mm (0.31 in)



NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

Disc Thickness and Parallelism Inspection

1. Loosen the rear wheel nuts slightly, then raise the car and support on safety stands. Remove the rear wheels.
2. Remove the brake pads (see page 19-22).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc.



Brake Disc Thickness:
Standard: 9.9 – 10.1 mm (0.39 – 0.40 in)
Max. Refinishing Limit: 8.0 mm (0.31 in)

NOTE: Replace the brake disc if the smallest measurement is less than the max. refinishing limit.

Brake Disc Parallelism: 0.015 mm (0.0006 in) max.

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc.

   NOTE: See page 18-29 for brake disc replacement.

Rear Brake Caliper

Disassembly

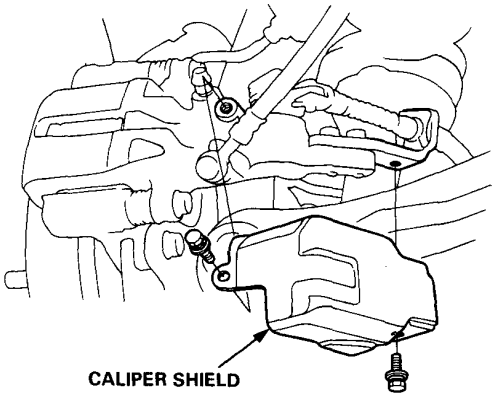
⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake discs or pads reduce stopping ability.**

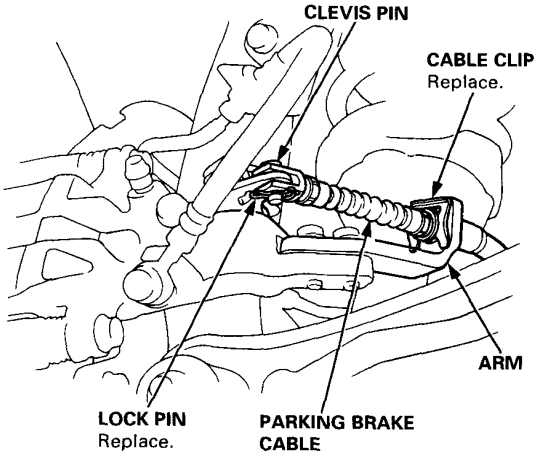
CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**

1. Remove the caliper shield.

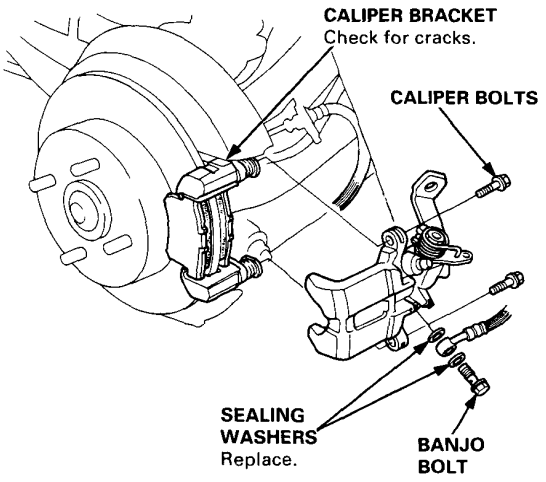


2. Remove the lock pin and clevis pin.
   Remove the cable clip, and disconnect the cable from the arm.

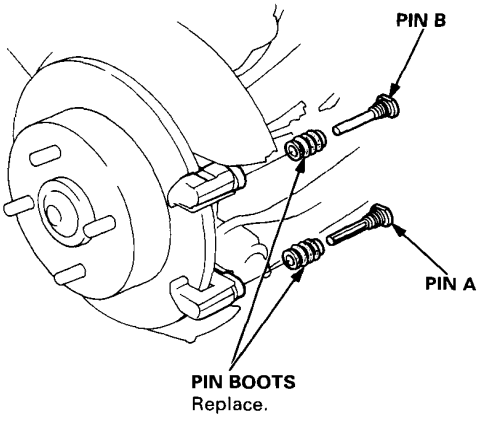


3. Remove the banjo bolt and two sealing washers.

4. Remove the two caliper bolts and caliper body from the bracket.



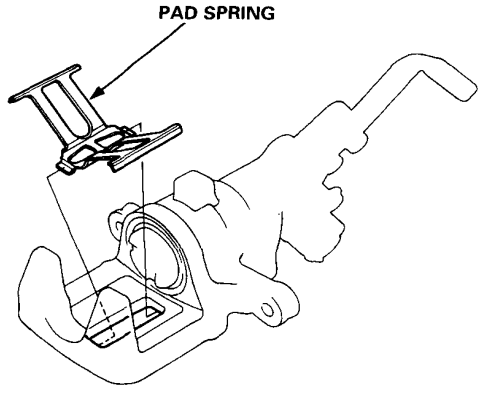
5. Remove the pins and pin boots from the caliper bracket.



(cont'd)

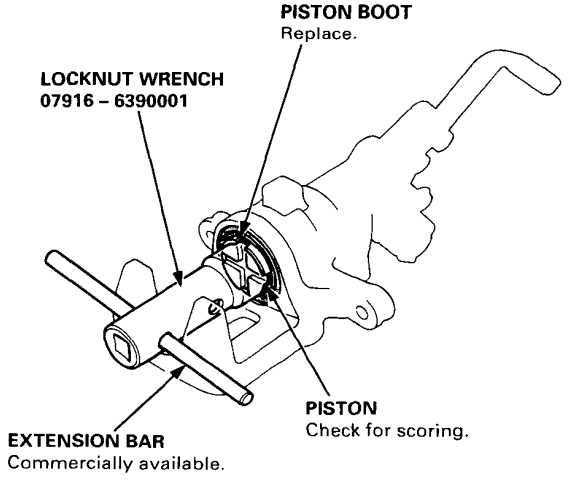
Disassembly (cont'd)

6. Remove the pad spring from the caliper body.



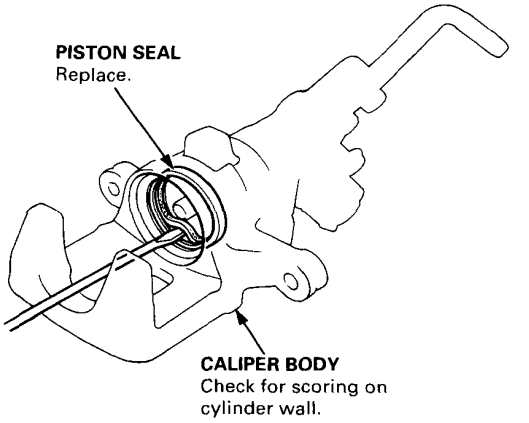
7. Remove the piston by rotating the piston counterclockwise with the special tool, and remove the piston boot.

CAUTION: Avoid damaging the piston.



8. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.

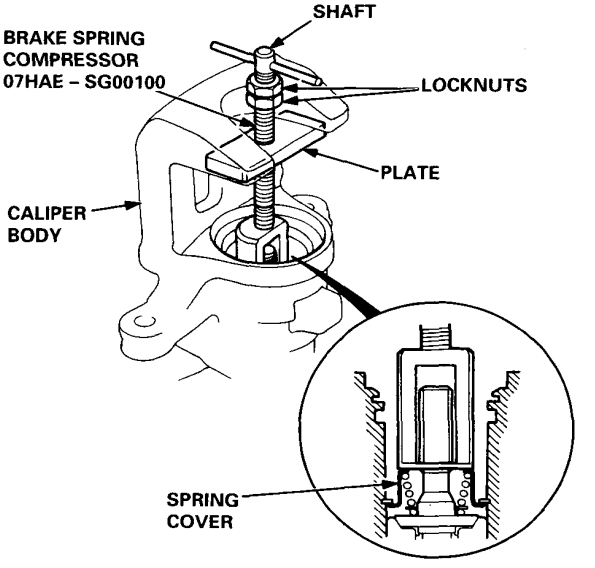


9. Install the special tool between the caliper body and spring cover.

CAUTION: Be careful not to damage the inside of the caliper cylinder during caliper disassembly.

10. Position the locknuts as shown, then turn the shaft until the plate just contacts the caliper body.

NOTE: Do not compress the spring under the spring cover.

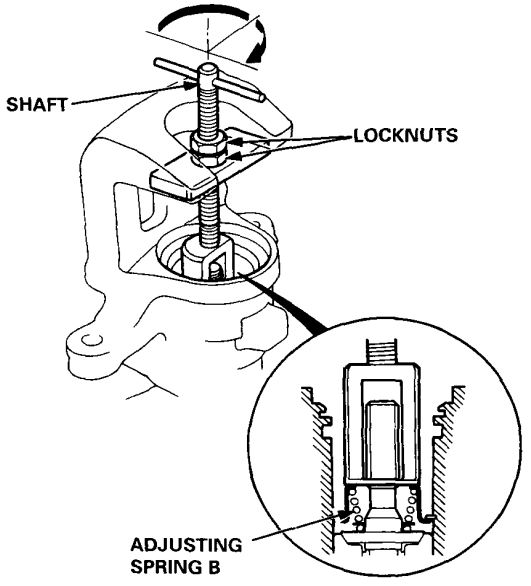


11. Turn the shaft clockwise 1/4 – 1/2 turn to compress adjusting spring B in the caliper body.

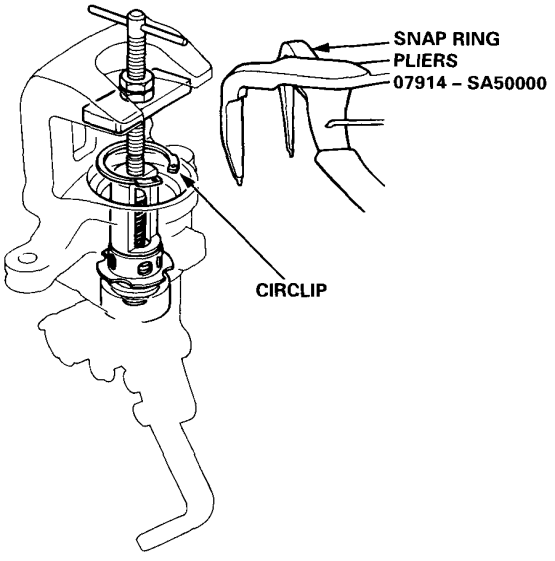
CAUTION: To prevent damage to the inner components, do not turn the shaft more than 1/2 turn.

12. Lower the locknuts fully and tighten them securely.

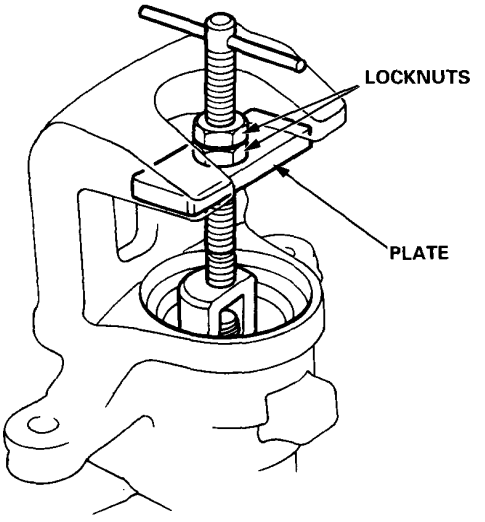
NOTE: Keep the locknuts in this position until you reinstall the circlip.



13. Remove the circlip with snap ring pliers.

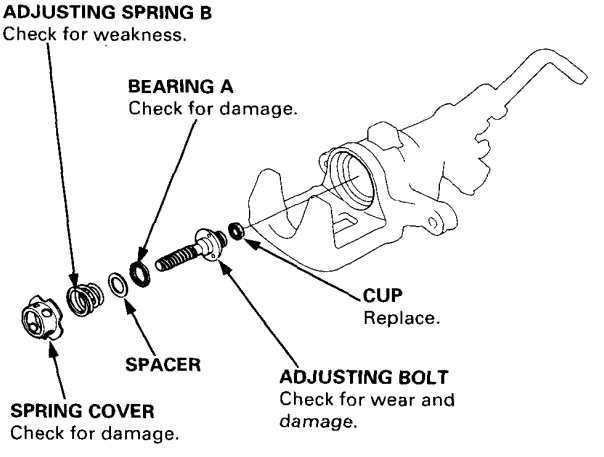


14. Hold the plate with your fingers and turn the shaft counterclockwise. Remove the special tool from the caliper.



15. Remove the adjusting bolt.

16. Remove the spring cover, adjusting spring B, spacer, bearing A and cup from the adjusting bolt.

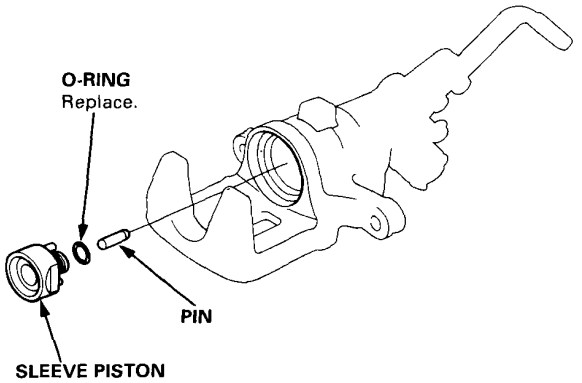


(cont'd)

Rear Brake Caliper

Disassembly (cont'd)

17. Remove the sleeve piston, and remove the pin from the cam in the caliper body.

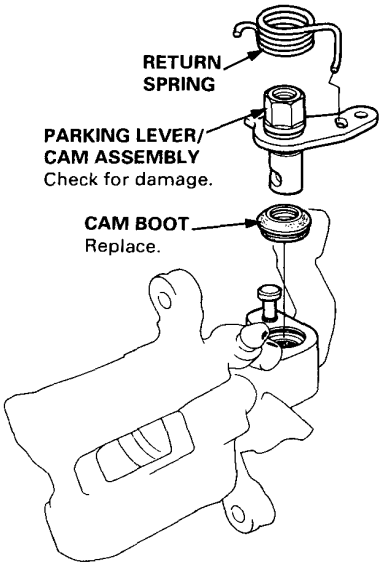


18. Remove the return spring.

19. Remove the parking lever and cam as an assembly from the caliper body.

    CAUTION: Do not loosen the parking nut with the cam installed in the caliper body. If the lever and shaft must be separated, hold the lever in a vise and loosen the parking nut.

20. Remove the cam boot.



Rear Brake Caliper

Reassembly

⚠ WARNING

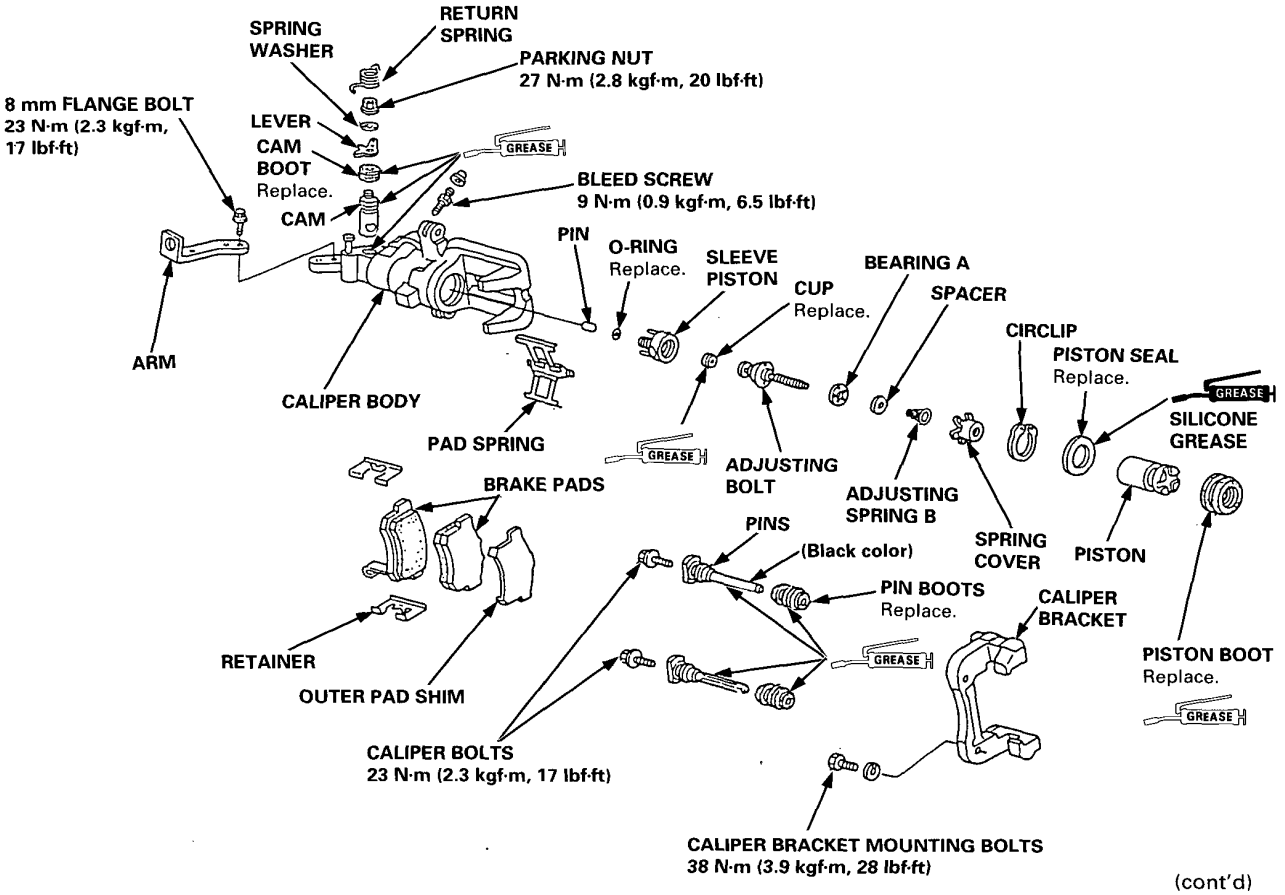
- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake discs or pads reduce stopping ability.**
- **When reusing the pads, install them in their original positions to prevent loss of braking efficiency.**

CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passage with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**

NOTE:

- Coat piston, piston seal groove, and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.
- GREASE: Use recommended seal greases in the caliper seal set.
- GREASE: Use recommended rubber grease in the caliper seal set.



(cont'd)

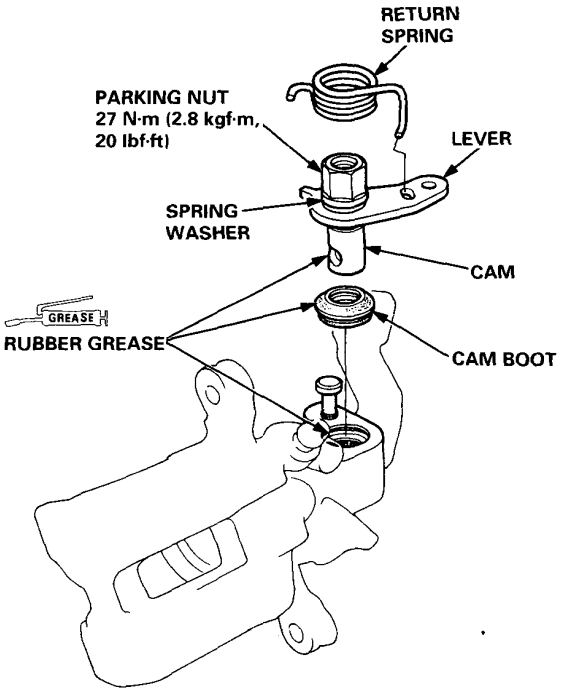
Rear Brake Caliper

Reassembly (cont'd)

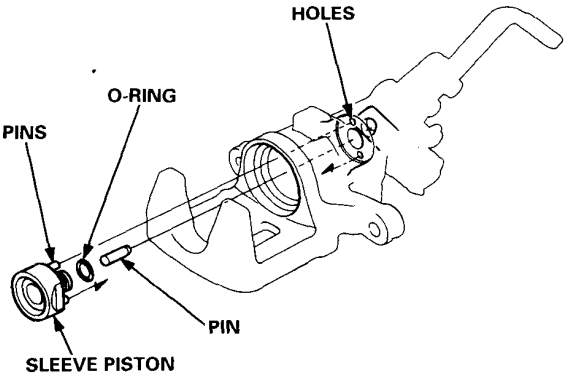
1. Pack all cavities of the needle bearing with the recommended rubber grease in the caliper seal set.
2. Coat a new cam boot with recommended rubber grease in the caliper seal set, and install it in the caliper body.
3. Apply recommended rubber grease in the caliper seal set to the pin contacting area of the cam, and install the cam and lever assembly into the caliper body.
4. Install the return spring.

CAUTION:

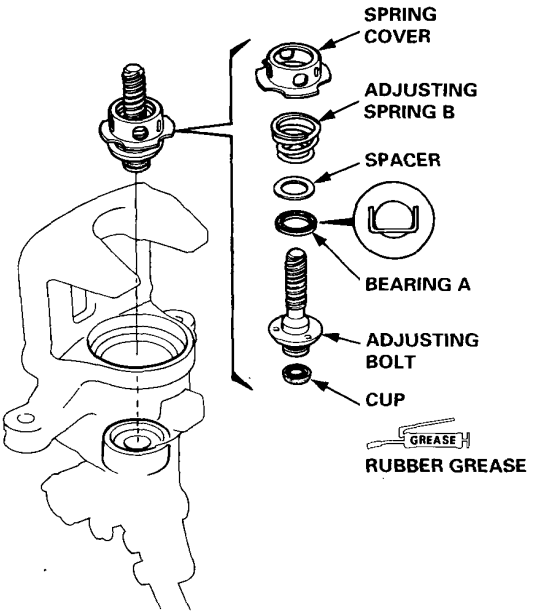
- **When the cam and lever were separated, be sure to assemble them before installing the cam in the caliper body. Install the lever and spring washer, apply locking agent to the threads, and tighten the parking nut while holding the lever with a vise.**
- **Avoid damaging the cam boot since it must be installed before the cam.**
- **When installing the cam, do not allow the cam boot lips to turn outside in.**



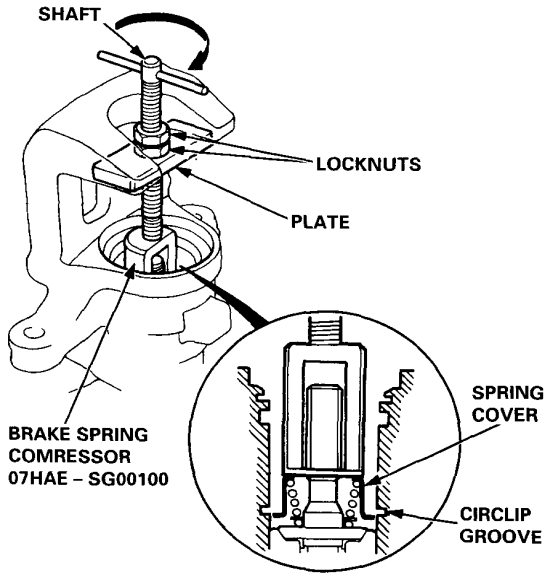
5. Install the pin in the cam.
6. Install a new O-ring on the sleeve piston.
7. Install the sleeve piston so the hole in the bottom of the piston is aligned with the pin in the cam, and two pins on the piston are aligned with the holes in the caliper.



8. Coat a new cup with recommended rubber grease in the caliper seal set, and install it with its groove facing the bearing A side of the adjusting bolt.
9. Fit the bearing A, spacer, adjusting spring B and spring cover on the adjusting bolt, and install them in the caliper cylinder.



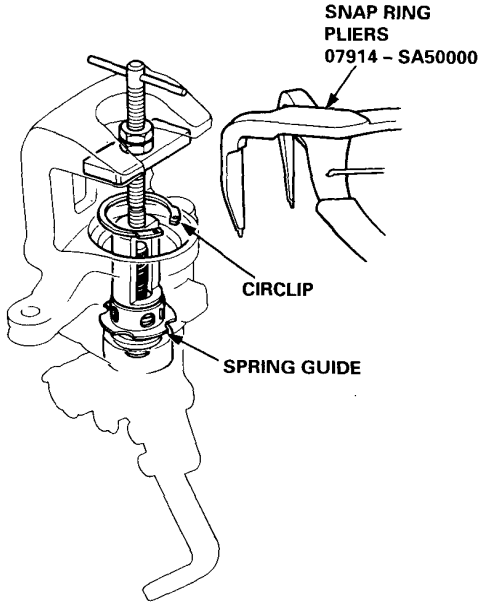
10. Install the special tool on the spring cover, and turn the shaft until the locknut contacts the plate.



11. Check that the flared end of the spring cover is below the circlip groove.

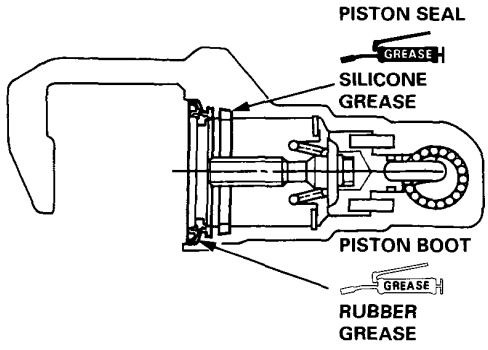
12. Install the circlip in the groove, then remove the special tool.

    NOTE: Check that the circlip is seated in the groove properly.



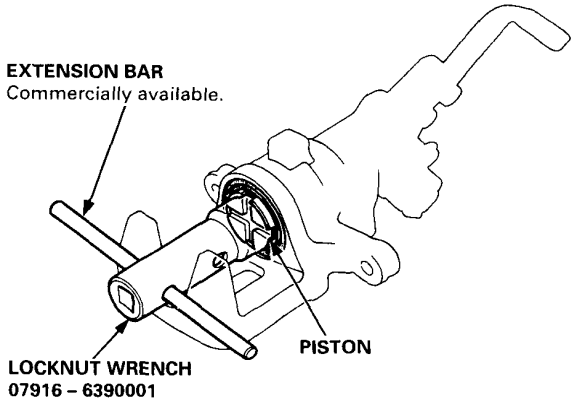
13. Coat a new piston seal with recommended silicone grease in the caliper seal set, and install it in the caliper.

14. Apply recommended rubber grease in the caliper seal set to the sealing lips and inside of a new piston boot, and install it in the caliper.

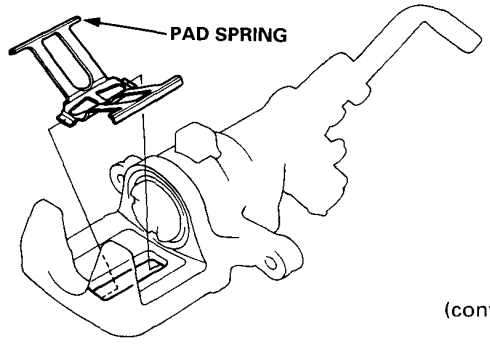


15. Coat the outside of the piston with brake fluid, and install it on the adjusting bolt while rotating it clockwise with the special tool.

    CAUTION: Avoid damaging the piston and piston boot.



16. Install the pad spring on the caliper.



(cont'd)

Rear Brake Caliper

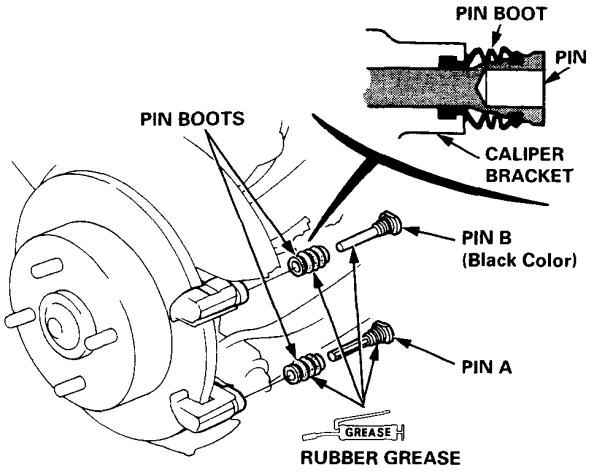
Reassembly (cont'd)

17. Apply the recommended rubber grease in the caliper seal set to the sliding surface of the pins and inside of the new pin boots.

18. Install the pin boots into the groove in the caliper bracket properly.

19. Insert the pin A and pin B into the caliper bracket.

20. Install the pin boots into the groove in the pins properly.

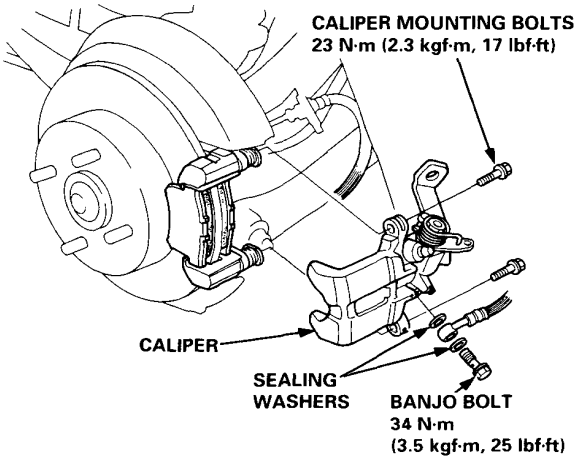


21. Install the brake pad retainers and brake pads (see page 19-22).

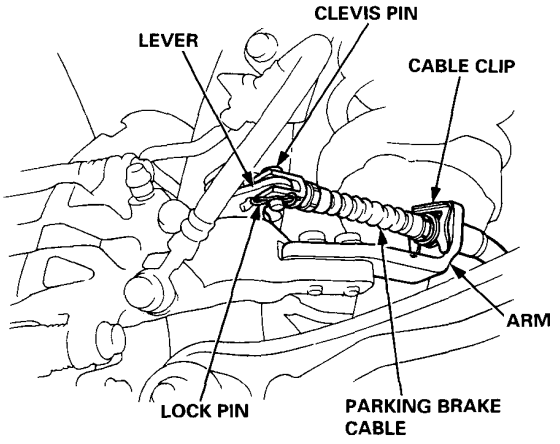
22. Align the cutout in the piston with the tab on the inner pad (see page 19-23).

23. Install the caliper on the caliper bracket, and tighten the caliper mounting bolts.

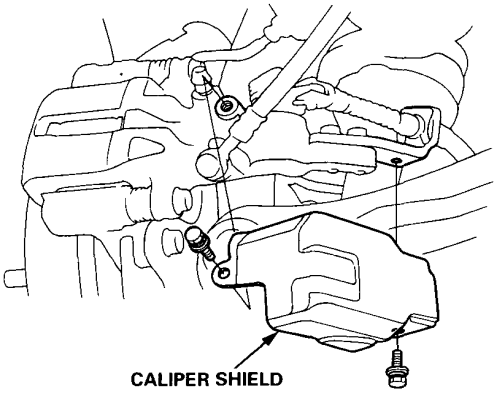
24. Connect the brake hose to the caliper with new sealing washers, and tighten the banjo bolt.



25. Insert the cable through the arm, and connect the cable to the lever with the clevis pin and lock pin. Install the cable clip securely.



26. Install the caliper shield.



27. Fill the brake reservoir up and bleed the brake system (see page 19-6).

28. Operate the brake pedal several times, then adjust the parking brake (see page 19-5).

29. After installation, perform the following checks.

- Check for leaks at hose and line joints or connections, and retighten if necessary.
- Check the parking brake lever for operation, and adjust it if necessary.

Rear Drum Brakes

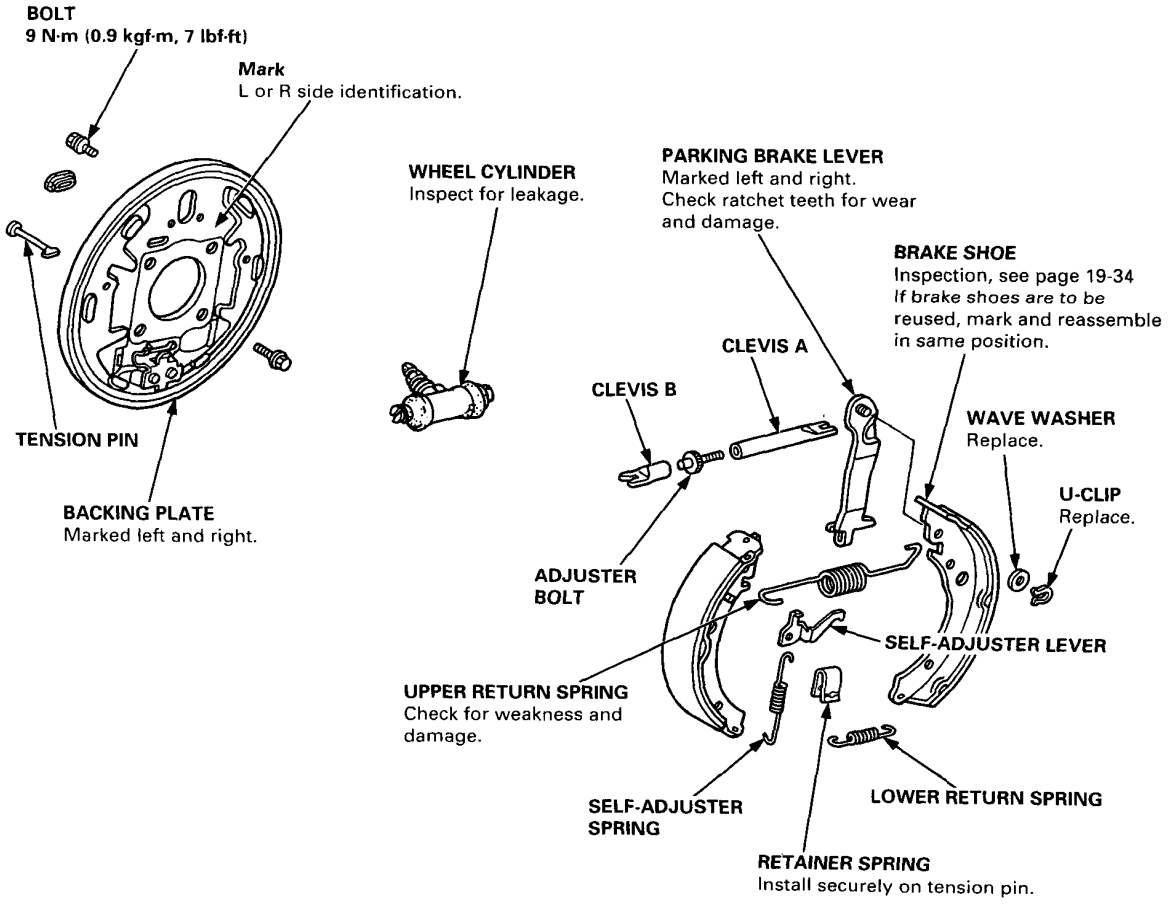
Index/Inspection

⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**
- **Contaminated brake linings or drum reduce stopping ability.**

1. Block the front wheels, loosen the rear wheel nuts slightly, support the rear of car on safety stands, then remove the rear wheels.

2. Loosen the parking brake and remove the rear brake drum.

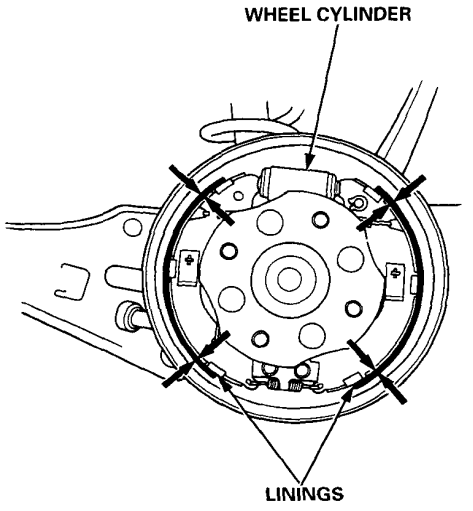


Rear Brake Shoes

Inspection

1. Check the wheel cylinder for leakage.
2. Check the brake linings for cracking, glazing, wear or contamination.
3. Measure the brake lining thickness.

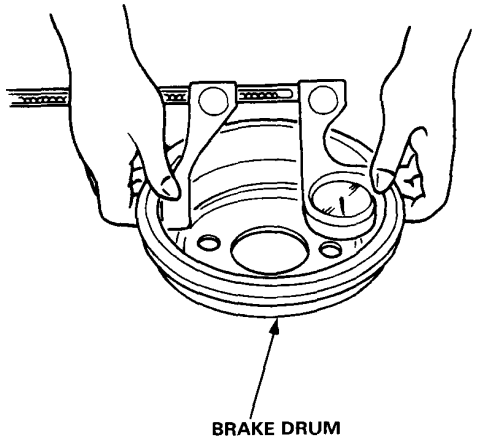
   Brake Lining Thickness:
   Standard: 3.9 – 4.5 mm (0.15 – 0.18 in)
   Service Limit: 2.0 mm (0.08 in)



   NOTE: Measurement does not include brake shoe thickness.

4. Check the bearings in the hub unit for smooth operation. If defective, refer to section 18.
5. Measure the inside diameter of the brake drum.

   Drum Inside Diameter:
   Standard: 219.9 – 220.0 mm (8.657 – 8.661 in)
   Service Limit: 221.0 mm (8.700 in)

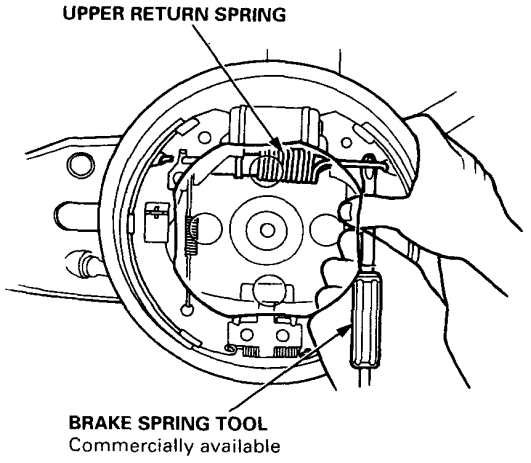


6. Check the brake drum for scoring, grooving and cracks.

Disassembly

1. Remove the upper return spring from the brake shoe as shown.

⚠ WARNING Wear eye protection when using the brake spring tool.



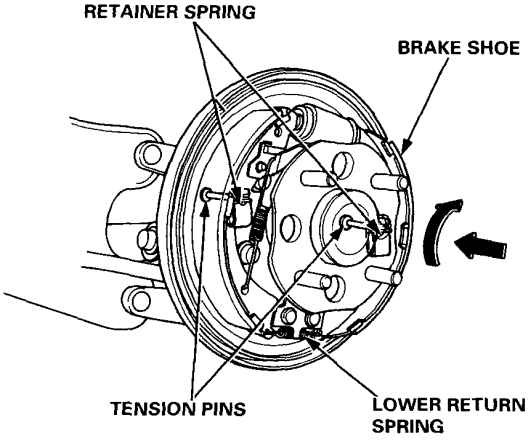
2. Remove the tension pins by pushing the retainer spring and turning them.

3. Lower the brake shoe assembly and remove the lower return spring.

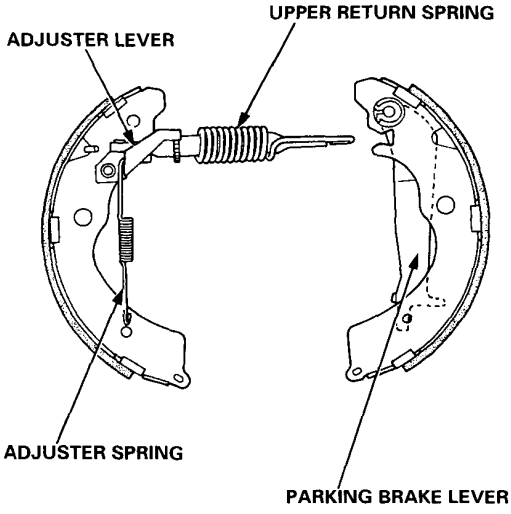
NOTE: Make sure not to damage the dust cover on the wheel cylinder.

4. Disconnect the parking brake cable from the parking brake lever.

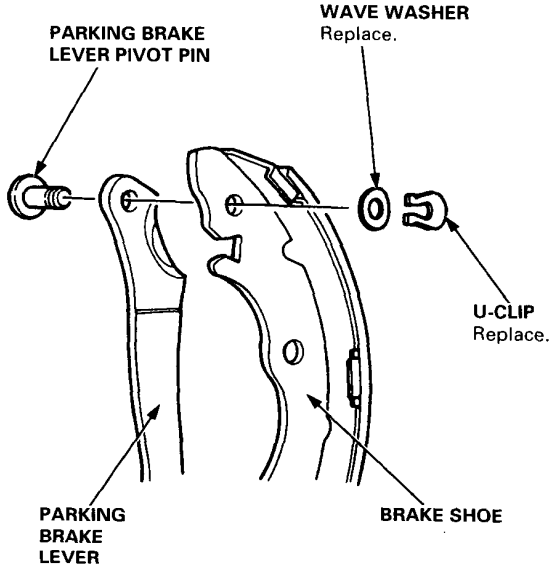
5. Remove the brake shoe assembly.



6. Remove the upper return spring, adjuster lever and adjuster spring, and separate the brake shoes.



7. Remove the wave washer, parking brake lever and pivot pin from the brake shoe by removing the U-clip.



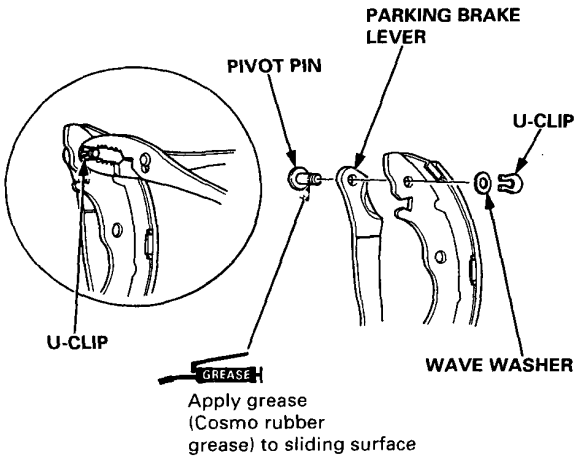
Rear Brake Shoes

Reassembly

1. Apply brake cylinder grease (P/N: 08733 – B020E) or equivalent rubber grease to the sliding surface of the pivot pin, and insert the pin into the brake shoe.

2. Install the parking brake lever and wave washer on the pivot pin, and secure with the U-clip.

   NOTE: Pinch the new U-clip securely to prevent the pivot pin from coming out of the brake shoe.



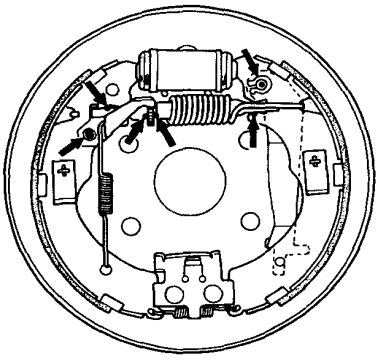
3. Connect the parking brake cable to the parking brake lever.

4. Apply grease on each sliding surface.

   CAUTION: Contaminated brake linings or drum reduce stopping ability. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.

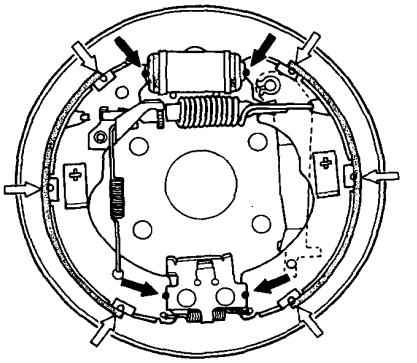
   - Apply brake cylinder grease (P/N: 08733 – B020E) or equivalent rubber grease to the sliding surfaces as shown.

→ ● Sliding surface



- Apply Molykote 44 MA to the brake shoe ends and opposite edges of the shoes as shown.

→ ● Opposite edge of the shoe
⇨ ○ Brake shoe ends

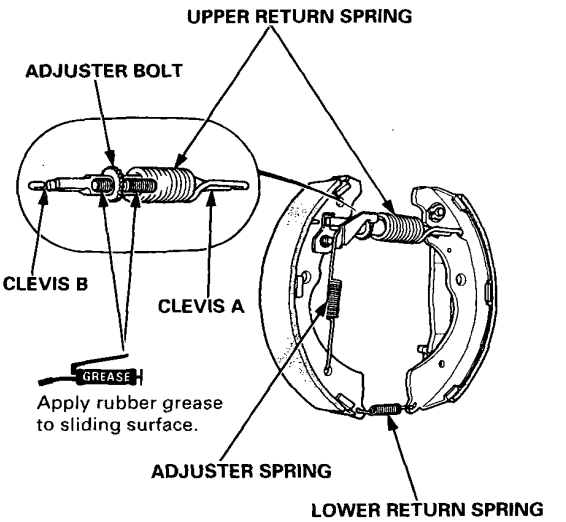


5. Clean the threaded portions of clevises A and B. Coat the threads of the clevises with grease. To shorten the clevises, turn the adjuster bolt.

6. Hook the adjuster spring to the adjuster lever first, then to the brake shoe.

7. Install the clevises and upper return spring noting the installation direction.

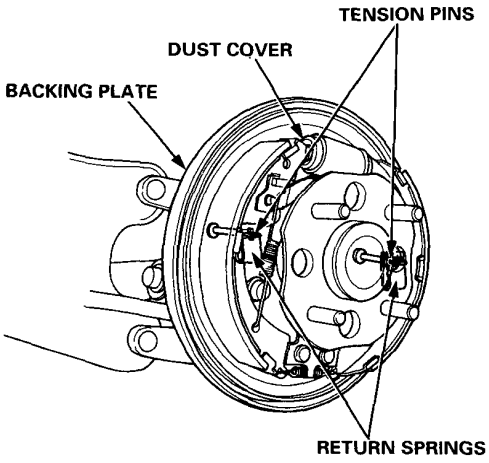
8. Install the lower return spring.



9. Install the brake shoes onto the backing plate.

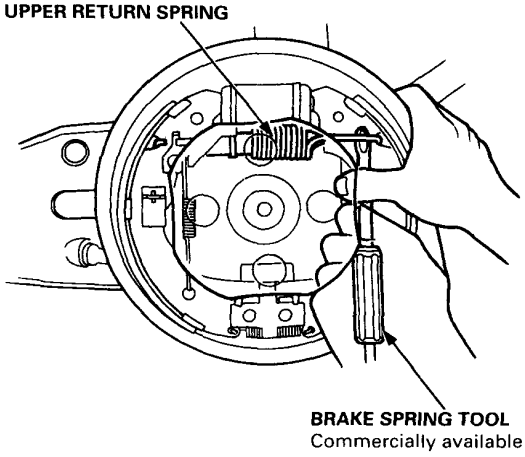
   NOTE: Make sure not to damage the wheel cylinder dust covers.

10. Install the tension pins and the return springs.



11. Install the upper spring as shown.

   ⚠ WARNING Wear eye protection when using the brake spring tool.



12. Install the brake drum.

13. If the wheel cylinder has been removed, bleed the brake system (see page 19-6).

14. Depress the brake pedal several times to set the self-adjusting brake.

15. Adjust the parking brake (see page 19-5).

Wheel Cylinder

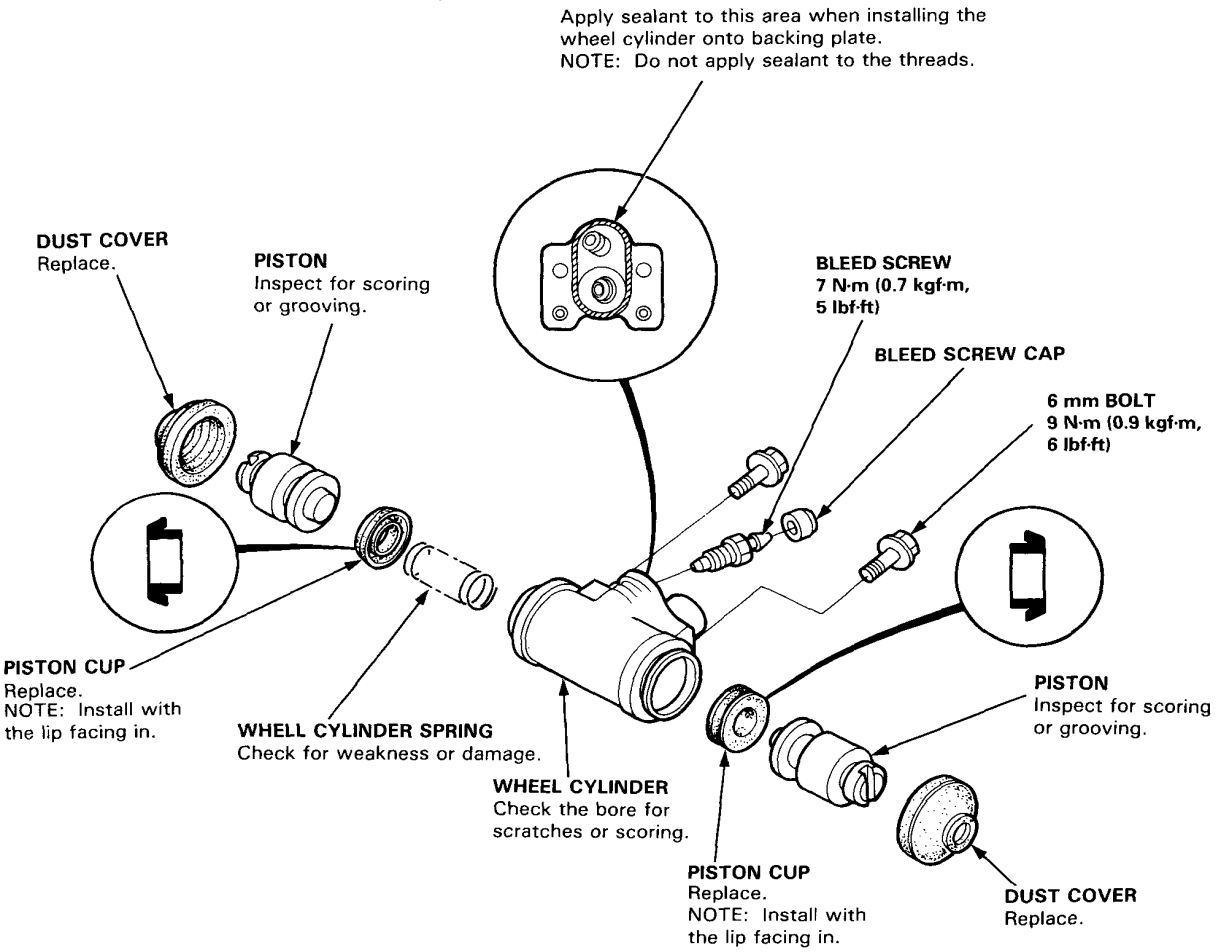
Disassembly/Inspection

CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**

NOTE:

- Coat piston, piston cup, and wheel cylinder bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

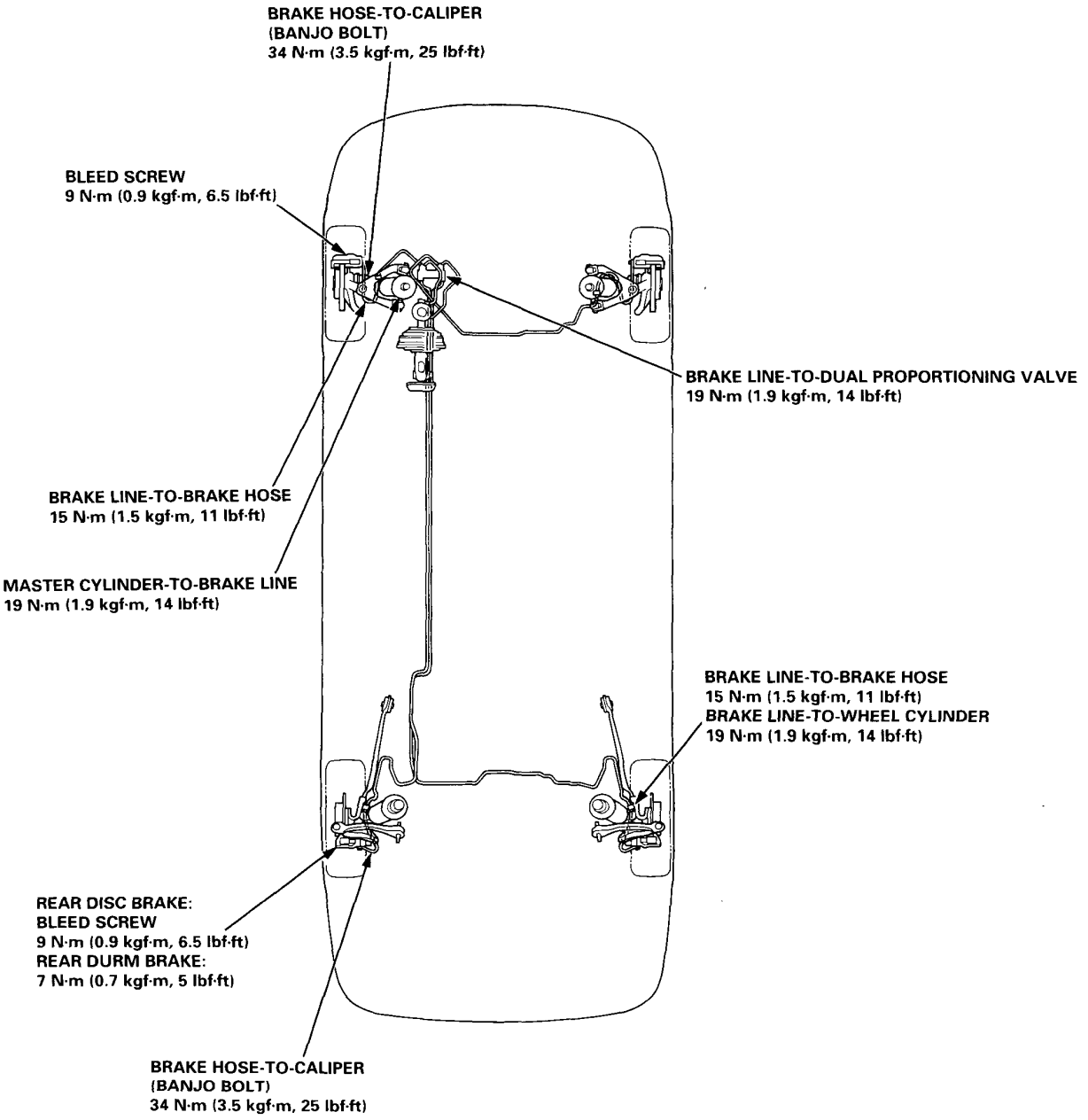


Brake Hoses/Pipes

Inspection

1. Inspect the brake hoses for damage, deterioration, leaks, interference or twisting.
2. Check the brake lines for damage, rusting or leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary.

CAUTION: Replace the brake hose clip whenever the brake hose is serviced.



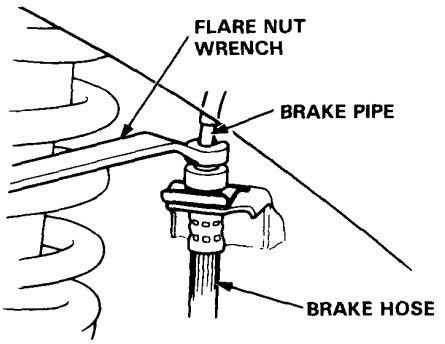
Brake Hoses/Pipes

Hose Replacement

CAUTION:
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**

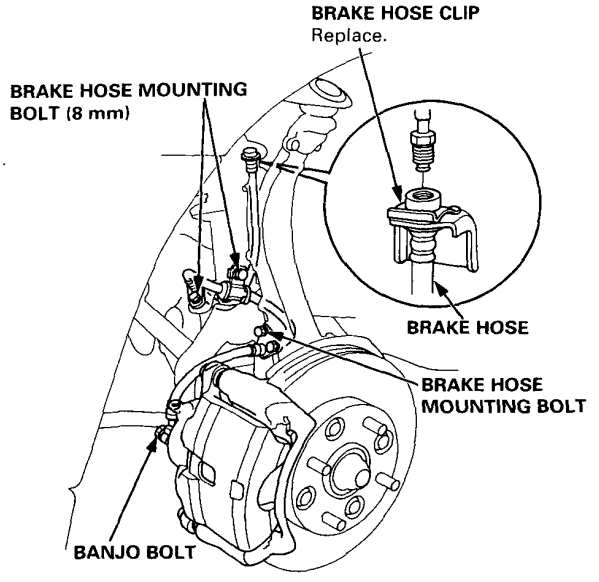
1. Replace the brake hose if the hose is twisted, cracked, or if it leaks.

2. Disconnect the brake hose from the brake pipe using a 10 mm flare nut wrench.

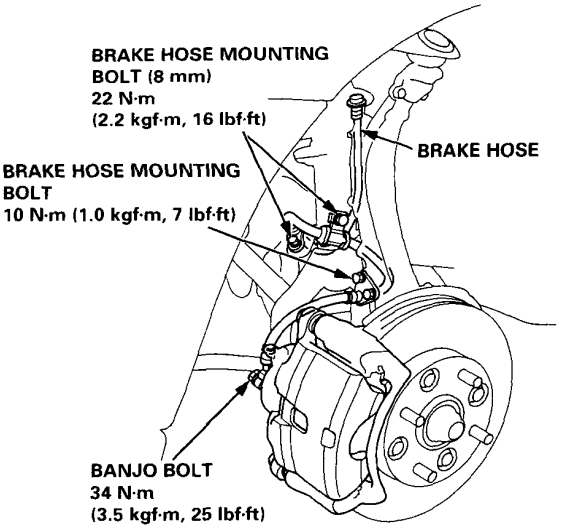


3. Remove and discard the brake hose clip from the brake hose.

4. Remove the banjo bolt, and disconnect the brake hose from the caliper.

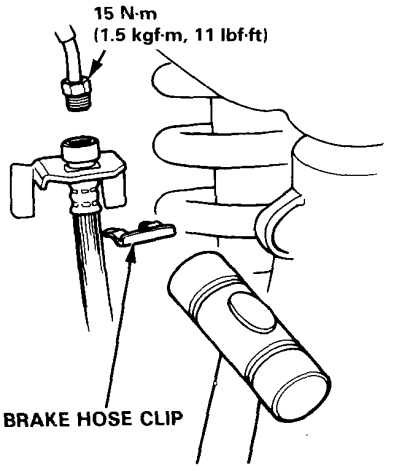


5. Install the brake hose on the knuckle and damper first, then connect the brake hose to the caliper with the banjo bolt and new sealing washers.



6. Install a new brake hose clip on the brake hose.

7. Connect the brake pipe to the brake hose.



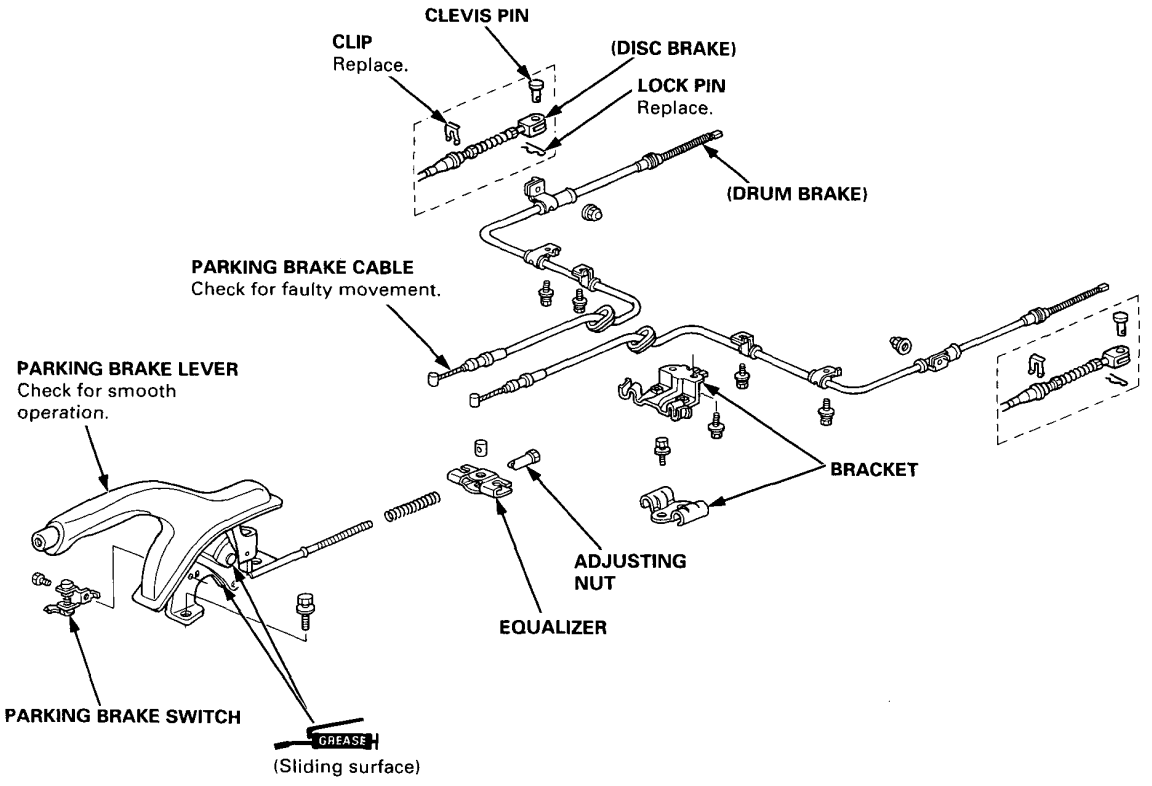
8. After installing the brake hose, bleed the brake system (see page 19-6).

9. Perform the following checks.
   - Check the brake hose and line joint for leaks, and tighten if necessary.
   - Check the brake hoses for interference or twisting.

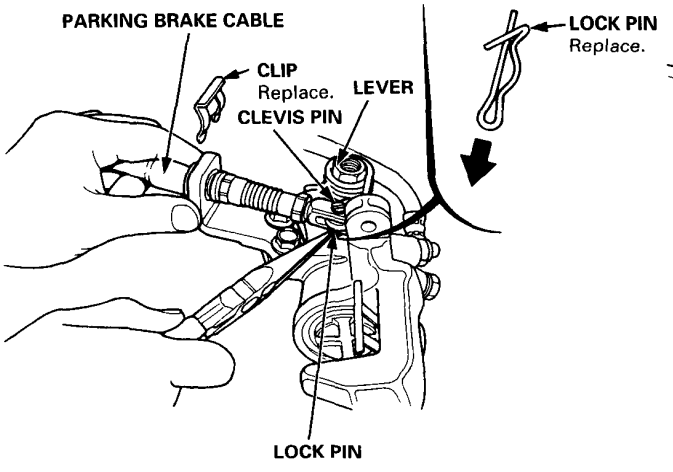
Parking Brake Cable

Inspection and Replacement

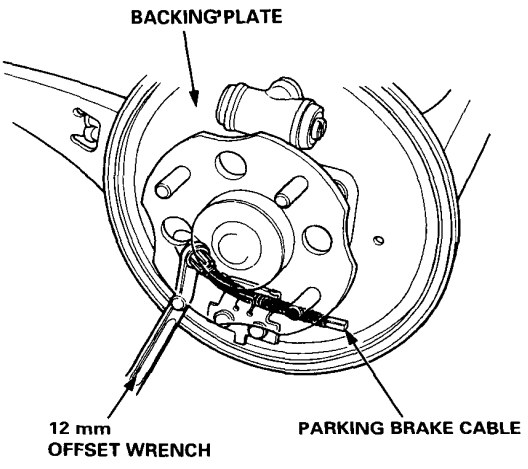
CAUTION: The parking brake cables must not be bent or distorted. This will lead to stiff operation and premature cable failure.



Disconnect the parking brake cable from the lever on the caliper by removing the lock pin and clevis pin, and remove the cable from the arm by removing the clip.



Remove the parking brake cable from the backing plate using a 12 mm offset wrench as shown.



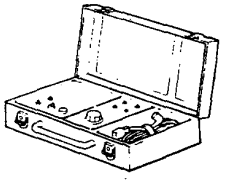
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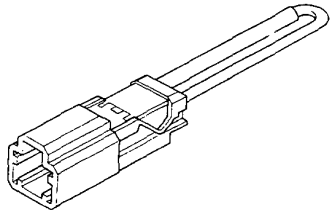


Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAJ – SG00602	ALB Checker	1	19-131
②	07PAZ – 0010100	SCS Short Connector	1	19-62

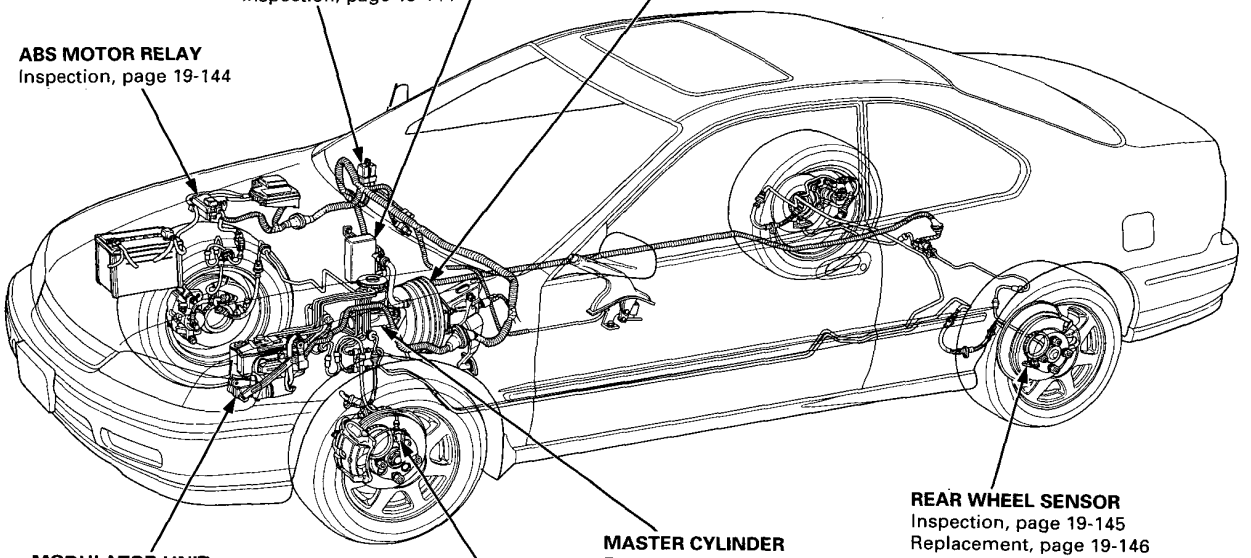


①



②

⚠ WARNING **The accumulator contains high pressure nitrogen gas; do not puncture, expose to flame, or attempt to disassemble the accumulator or it may explode; severe personal injury may result.**



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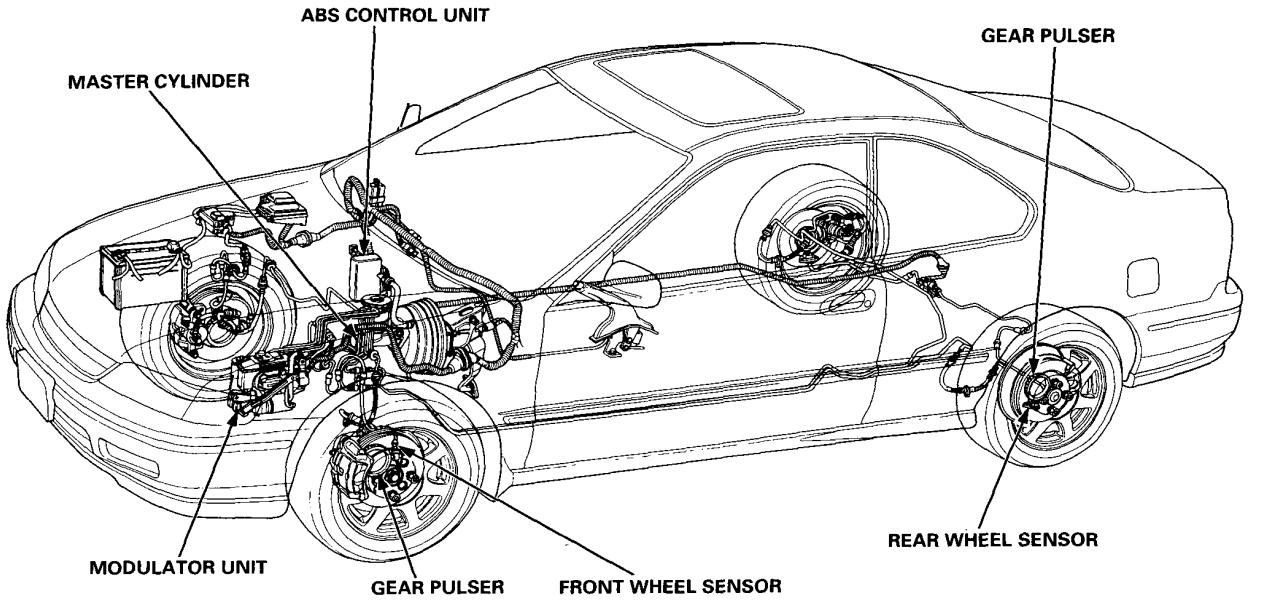
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Anti-lock Brake System (ABS)

Features/Construction

In a conventional brake system, if the brake pedal is depressed very hard, the wheels can lock before the vehicle comes to a stop. In such a case, the stability of the vehicle is reduced if the rear wheels are locked, and maneuverability of the vehicle is reduced if the front wheels are locked, creating an extremely unstable condition.
The Anti-lock Brake System (ABS) modulates the pressure of the brake fluid applied to each front caliper or both rear calipers, thereby preventing the locking of the wheels, whenever the wheels are likely to be locked due to hard braking. It then restores normal hydraulic pressure when there is no longer any possibility of wheel locking.
The ABS equipped on this car is compact, with its hydraulic control system incorporated into one modulator unit. It is a 3-channel anti-lock brake system that has individual control of the front wheels and common control ("select Low") for the rear wheels. "Select Low" means that the rear wheel that would lock first (the one with the lowest resistance to lock-up) determines anti-lock brake system activation for both rear wheels.

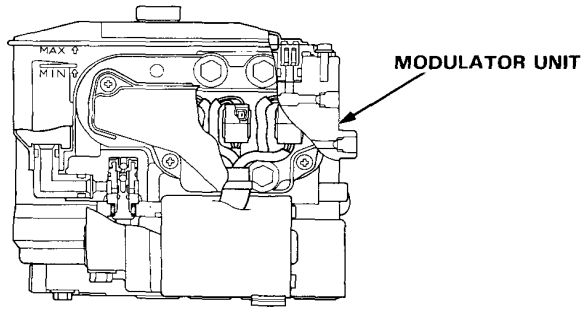


PART NAME	MAJOR FUNCTION
Gear pulser	Attached to the rotating part of the wheel and detects the wheel speed together with the wheel sensor.
Wheel sensor	Generates pulse signal corresponding to the revolution of the gear pulser.
ABS control unit	Controls the working of the anti-lock brake system by performing calculations based on the signals from the individual wheel sensors and the individual switches.
Modulator unit	* Adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the ABS control unit. * Pump, accumulator, solenoid valves, pressure switch and pistons are integrated in the modulator unit.
Motor Relay	Controls the ABS pump motor's power supply according to the signal from the ABS control unit.
Fail-safe relay	Cuts off the solenoid valve ground circuit when the fail-safe device is at work.

Modulator Unit:

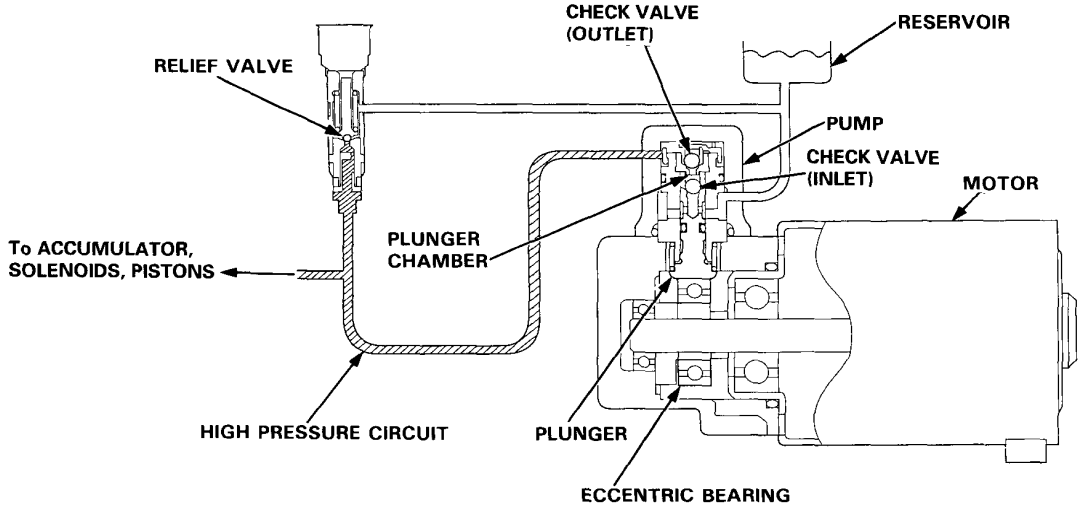
The modulator unit consists of the following sub-units. It adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the ABS control unit.

- ABS pump and motor: Supplies high-pressure brake fluid to control the ABS operation.
- Accumulator: Stores high-pressure brake fluid in it.
- Pressure switch: Detects the pressure in the accumulator and transmits signals to the ABS control unit.
- Solenoid valves: Switches the ABS high-pressure passage according to the signals from the ABS control unit.
- Pistons and related parts: Receives the high-pressure brake fluid, and controls pressure to the calipers accordingly.



Motor and pump:

As the motor rotates, it drives the plunger-type ABS pump and raises the brake fluid pressure to approximately 25 MPa (250 kgf/cm², 3,600 psi). The eccentric bearing is attached to the motor shaft end; it contacts the plunger of the pump plunger. The motor shaft's rotational motion is transmitted to the reciprocating motion of the pump plunger.
When the plunger is pushed, the brake fluid in the plunger chamber is pressurized and fed to the accumulator, solenoid, and piston, via the check valve. When the pressure in the accumulator exceeds 34 MPa (350 kgf/cm², 5,000 psi), the relief valve opens to release the excess brake fluid pressure to the reservoir, thereby protecting the system.

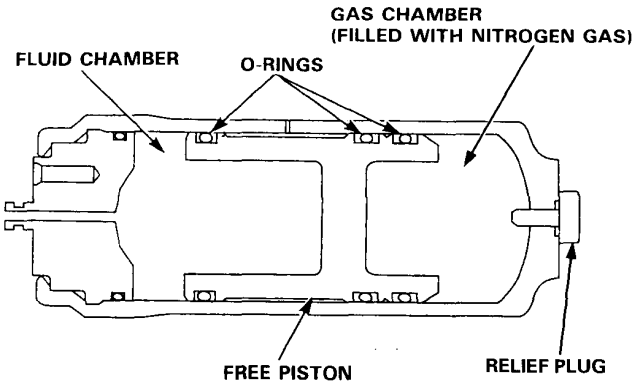


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Features/Construction (cont'd)

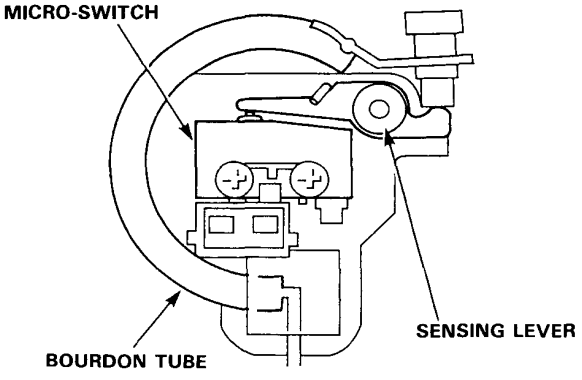
Accumulator:

The high-pressure brake fluid discharged from the pump is fed to the solenoids and pistons, but the passages to the solenoids and pistons are normally closed. Consequently, the high-pressure brake fluid accumulates in the accumulator.
The accumulator consists of two chambers separated by a free piston; that is, the fluid chamber where the brake fluid is accumulated, and the chamber filled with high-pressure nitrogen gas to maintain the fluid at a given pressure.
When the ABS operates, the constant high-pressure brake fluid in the accumulator is supplied to the piston.



Pressure switch:

The pressure switch monitors the pressure accumulation in the accumulator. When the pressure in the accumulator rises, the Bourdon tube in the pressure switch deforms outward, which in turn activates the micro-switch by the force of the spring attached to the sensing lever. When the pressure in the accumulator drops due to ABS operation, the Bourdon tube moves in the opposite direction, and the micro-switch is eventually turned off.
The ABS control unit detects the fluid pressure in the accumulator by the ON/OFF signals from the pressure switch.

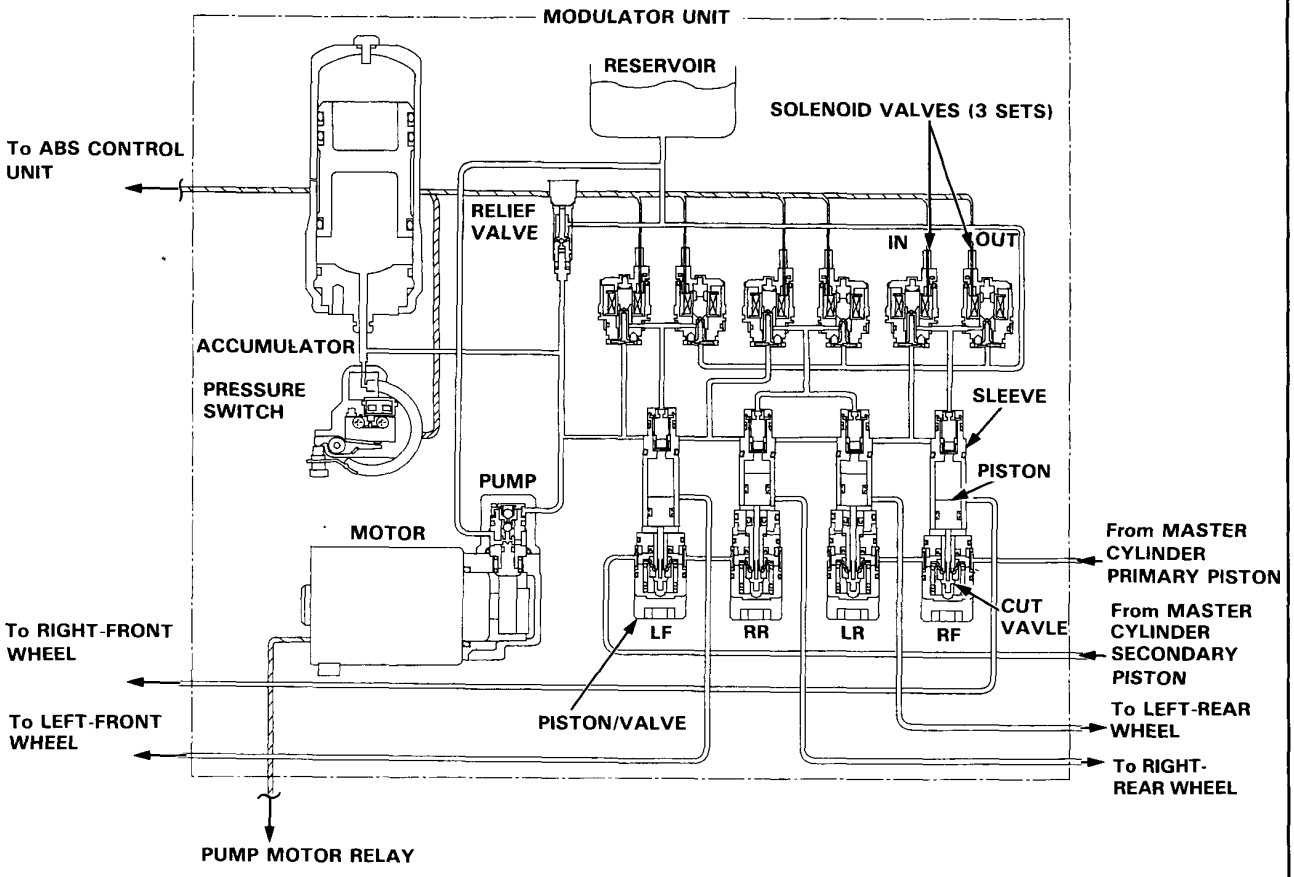


Piston/valve:

The piston/valve assembly consists of the piston, cut valve, and sleeve. There are four piston/valve assemblies in the modulator unit to control the brake fluid pressure to each caliper. The piston/valve assemblies for the rear brakes also serve as proportioning control valves to prevent the rear wheels from locking if the ABS malfunctions or when the ABS is not activated.

Solenoid valves:

The modulator unit opens and closes the inlet and outlet solenoid valves, and shifts the ABS high-pressure passage according to the signals from the ABS control unit. There are three solenoid valve assemblies, each containing an inlet and outlet valve, in the modulator unit; one for each front wheel, and one for both rear wheels. The inlet valves are normally open (open when to the coil is not energized), while the outlet valves are normally closed.

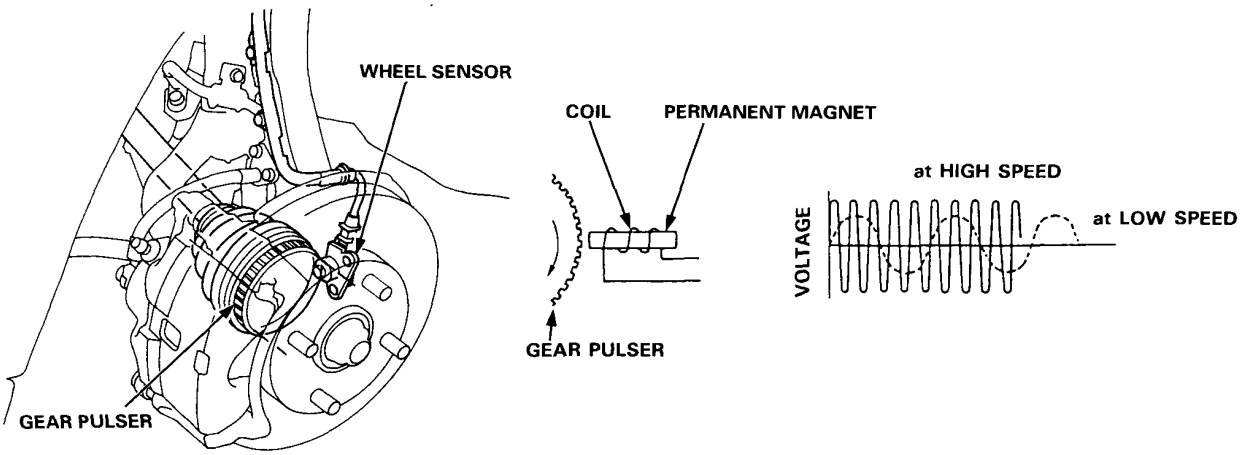


(cont'd)

Features/Construction (cont'd)

Wheel sensor:

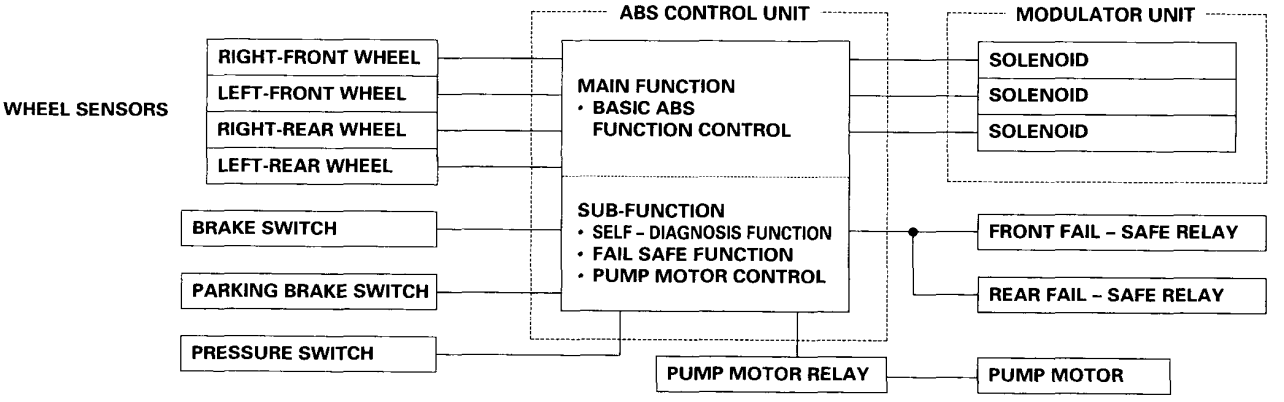
The wheel sensor is a contactless type that detects the rotating speed of a wheel. It consists of a permanent magnet and coil. When the gear pulsers attached to the rotating parts of each wheel turn, the magnetic flux around the coil in the wheel sensor alternates, generating voltages with frequency in proportion to wheel rotating speed. These pulses are sent to the ABS control unit, and the ABS control unit identifies the wheel speed.



ABS control unit:

The ABS control unit consists of a main function, which controls the operation of the anti-lock brake system, and sub-function, which controls the pump motor and "self-diagnosis".
For safety, the main function consists of two systems, and the ABS control unit activates the solenoid valve only when the outputs of the two systems agree with each other.

- The main function section of the ABS control unit performs calculations on the basis of the signals from each wheel sensor, and controls the operation of the anti-lock brake system by activating the solenoid valves in the modulator unit for each front brake and for the two rear brakes. The ABS has individual control of the front wheels and common control ("Select Low") for the rear wheels. "Select Low" means that the rear wheel that would lock first (the one with the lowest resistance to lock-up) determines the ABS activation for both rear wheels.
- The sub-function section has the fail-safe function that monitors the system operation by inputting the brake switch, parking brake switch and pressure switch signals, and stops the anti-lock brake system when it detects an abnormality in the system. It also has a self-diagnosis function and the pump motor control function.



Pump motor control:

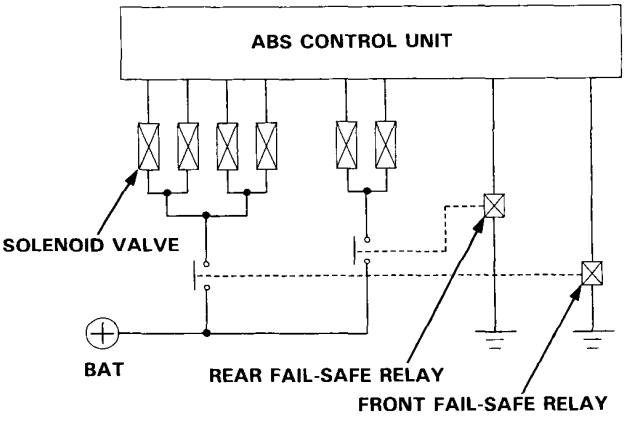
The ABS control unit monitors the brake fluid pressure in the accumulator by the pressure switch ON/OFF signals. The ABS control unit turns the pump on when the pressure in the accumulator drops, and stops the pump when the pressure rises to the specified value.
If the pressure does not reach the specified value after the motor has operated continuously for a specified period, the ABS control unit stops the motor and activates the ABS indicator light.

Self-diagnosis function:

The self-diagnosis function, provided in the sub-function of the ABS control unit, monitors the main system functions by constantly transmitting the data between the two Central Processing Units (CPUs). When an abnormality is detected, the ABS control unit turns the ABS indicator light on and stops the ABS, although the basic brake system continues to operate normally.
When the ABS control unit detects an abnormality with the ABS and turns the ABS indicator light on, the diagnostic trouble code (DTC), which shows the problem part or unit, is recorded in the control unit. The DTC can be read by the blinking frequency of the ABS indicator light.

Fail-safe function:

When an abnormality is detected in the ABS control system self-diagnosis, the solenoid operations are suspended by turning off the two fail-safe relays. This disconnects the ground circuits of all the solenoid valves to prevent ABS operation.
Under these conditions, the braking system functions just as an ordinary one.



Fail-safe relay:

The fail-safe relay's terminal side contact is normally open. When there is continuity at the relay coil, the fail-safe relay is closed, thereby connecting the ground circuit to the solenoid valve.

ABS indicator light:

The ABS control unit turns the ABS indicator light on when one or more of the following abnormalities are detected. This is only a partial list.

- When the operating time of the motor in the power unit exceeds the specified period.
- When vehicle running time exceeds 30 seconds without releasing the parking brake.
- When absence of speed signals from any of the four wheel sensors is detected.
- When the activation time of all solenoids exceeds a given time, or an open circuit is detected in the solenoid system.
- When solenoid output is not detected in the simulated ABS operation when the engine is started or the vehicle is driven.

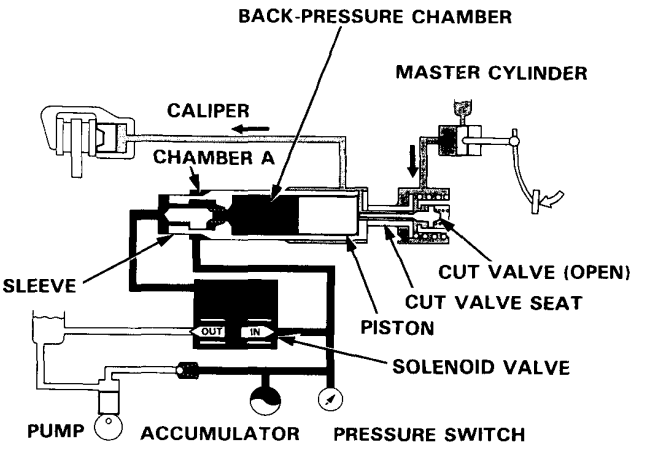
To check the indicator light bulb, the light is activated when the ignition switch is first turned on. The light goes off after the engine is started if there is no abnormality in the system.

Operation

The following description of ABS operation is for one of the front wheels. The ABS operation for the remaining wheels is the same.

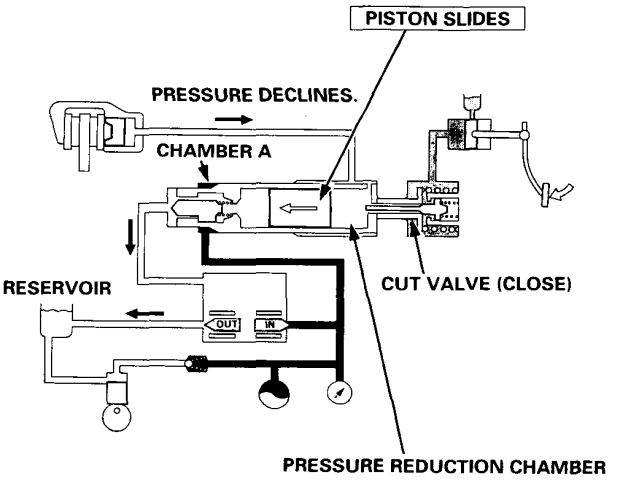
Ordinary braking function:

In ordinary brake operations when the ABS is not functioning, the solenoid outlet valve is closed and the inlet valve is open, the brake fluid pressure is transmitted to the back-pressure chamber between the sleeve and piston, and the cut valve is pushed by the piston. As the high-pressure is also transmitted to chamber A between the sleeve and cylinder, the sleeve pushes the cut valve seat toward the cut valve, too.
Under there conditions, the cut valve is kept open, and the hydraulic pressure from the master cylinder is transmitted to the caliper just like an ordinary brake system.

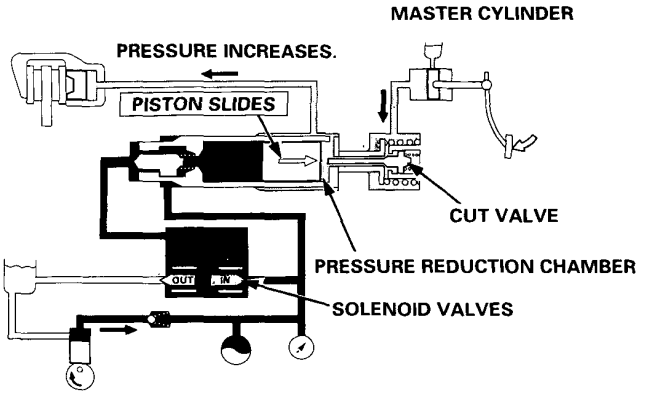


When ABS is functioning:

- Control by reducing caliper fluid pressure:
  When brake inputs (force exerted on brake pedal) are excessively large, and a possibility of wheel locking occurs, the control unit operates the solenoid valve, closing the inlet valve and opening the outlet valve.
  As a result, high pressure in the back-pressure chamber is released to the reservoir, and the piston is pushed by the caliper fluid pressure toward the back-pressure chamber. However, the cut valve seat is kept in the pushed position because high pressure is transmitted to chamber A. As the piston moves, the cut valve moves and shuts the flow from the master cylinder to the caliper, the volume of the pressure reduction chamber connected to the caliper increases, and the fluid pressure in the caliper declines, relieving the braking force. The wheel speed is therefore restored, preventing the wheel from locking.

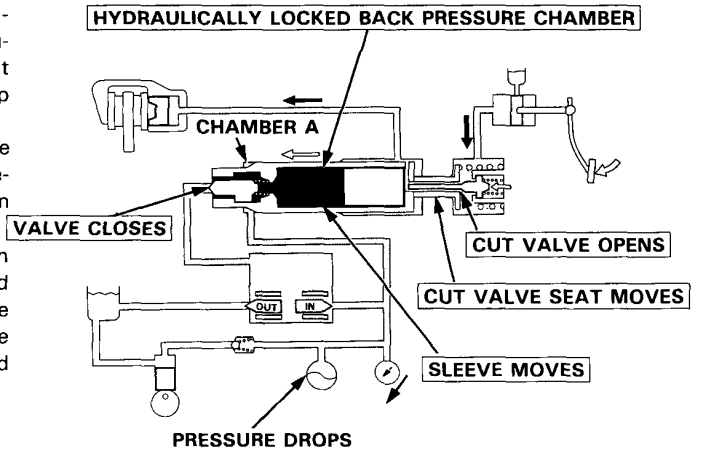


- Control by increasing caliper fluid pressure:
  When the ABS control unit senses that the caliper fluid pressure declined, and the wheel speed is restored, it signals the solenoid inlet valve to open and the solenoid outlet valve to close.
  As a result, the high pressure brake fluid is transmitted to the back-pressure chamber, and the piston is pushed toward the pressure reduction chamber, increasing the caliper fluid pressure, and thereby the braking force again.
  When the master cylinder side's fluid pressure is low, the cut valve is slightly opened as the piston moves, and the caliper fluid pressure is transmitted to the master cylinder. The kickback is felt on the brake pedal this time. When the force depressing the brake pedal is relieved while the ABS is functioning, the cut valve is opened and the pressure in the pressure reduction chamber is returned to the master cylinder side. As a result, the caliper fluid pressure is relieved.



When high-pressure declines:

The ABS control unit monitors the pressure in the high-pressure passage by means of the pressure switch signals. The ABS control unit turns the ABS indicator light on, and stops the ABS when it detects an excessive drop in pressure in the high-pressure passage.
When the pressure declined due to leakage from the passage, for example, the pressure in chamber A declines, too, and the cut valve seat and sleeve return toward chamber A.
As a result, the valve at the sleeve end closes, which hydraulically locks the back-pressure chamber and blocks the piston movement. Because the cut valve opens as the cut valve seat moves, this connects the brake fluid passage between the master cylinder and caliper for ordinary brake operation.

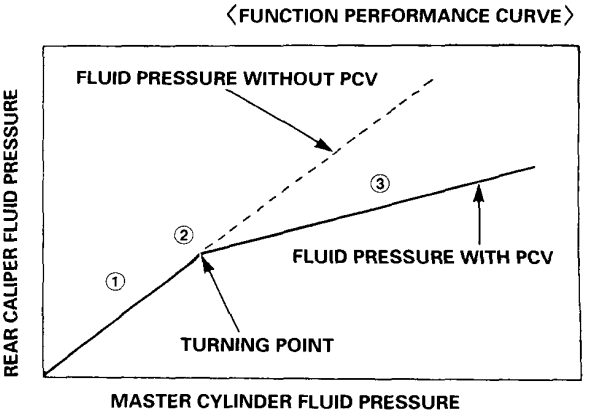


(cont'd)

Operation (cont'd)

Proportioning Control Valve Function:

The modulators for the rear brakes serve as proportioning control valves to prevent the rear wheels from locking if the ABS malfunctions or when the ABS is not activated. When this function is not provided, the hydraulic pressure from the master cylinder and the hydraulic pressure to the rear brake system are equal.
If the fluid pressure is transmitted to the rear brakes at the same rate as the front brakes, the rear wheels will lock first because the rear axle load becomes lighter when the brakes are applied.
To prevent the rear wheels from locking, the proportioning control valve function changes the distribution rate of the fluid pressure to the rear wheels when the pressure in the rear brake system exceeds the given value of the fluid pressure from the master cylinder. The fluid pressure point where the distribution rate changes is called the turning point.

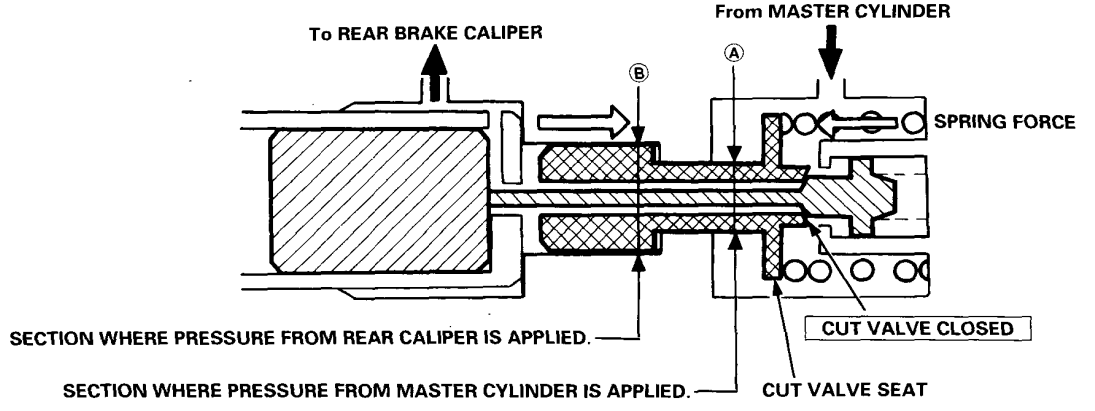


The cut valve seat in the rear brake system has a shoulder between sections A and B. Section A, where pressure from the master cylinder is applied, has a smaller diameter than section B, where pressure from the rear brake caliper is applied. This design provides the proportioning control valve function as follows.

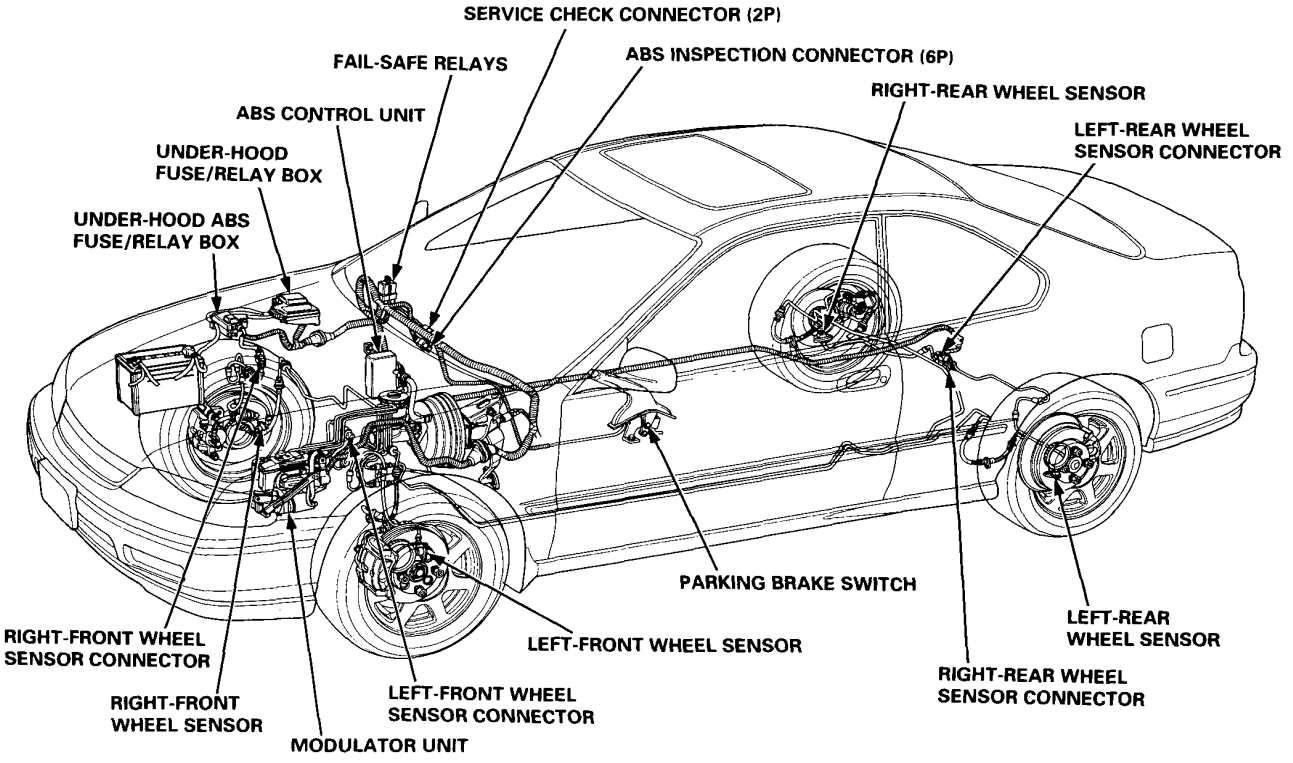
1. When the fluid pressure from the master cylinder is below the turning point, the cut valve seat is pushed by the spring force and the cut valve is open. Therefore, the fluid pressure from the master cylinder is transmitted to the rear brake caliper side. Under these conditions, fluid pressure from the master cylinder is equal to the pressure to the rear brake caliper, but because of the diameter difference between sections A and B, the force on the cut valve overcomes the spring force, moving the cut valve seat toward the cut valve slowly.

2. When the fluid pressure to the rear brake caliper reaches the turning point, the cut valve is closed by the cut valve seat, blocking the fluid passage between the master cylinder side and rear wheel cylinder side.

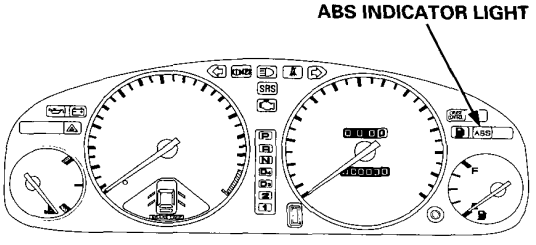
3. When the fluid from the master cylinder exceeds the turning point, the fluid pressure from the master cylinder rises, while the pressure to the rear brake caliper remains at the turning point value. As a result, the cut valve seat moves away from the cut valve and the cut valve opens. The passage between the master cylinder and caliper opens momentarily, but it is blocked again because the fluid pressure to the brake caliper rises, and the cut valve seat moves to close the cut valve. As described above, when the pressure in the master cylinder is above the turning point, the cut valve seat reduces the pressure in the rear brake caliper to the prescribed amount by repeating this process.



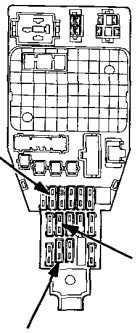
Component Locations



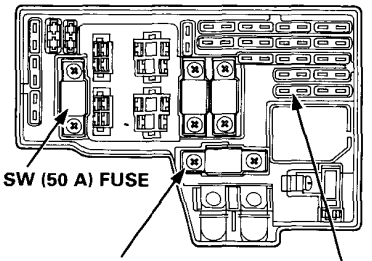
GAUGE ASSEMBLY



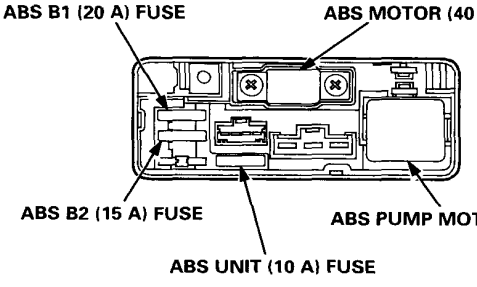
UNDER-DASH FUSE/RELAY BOX



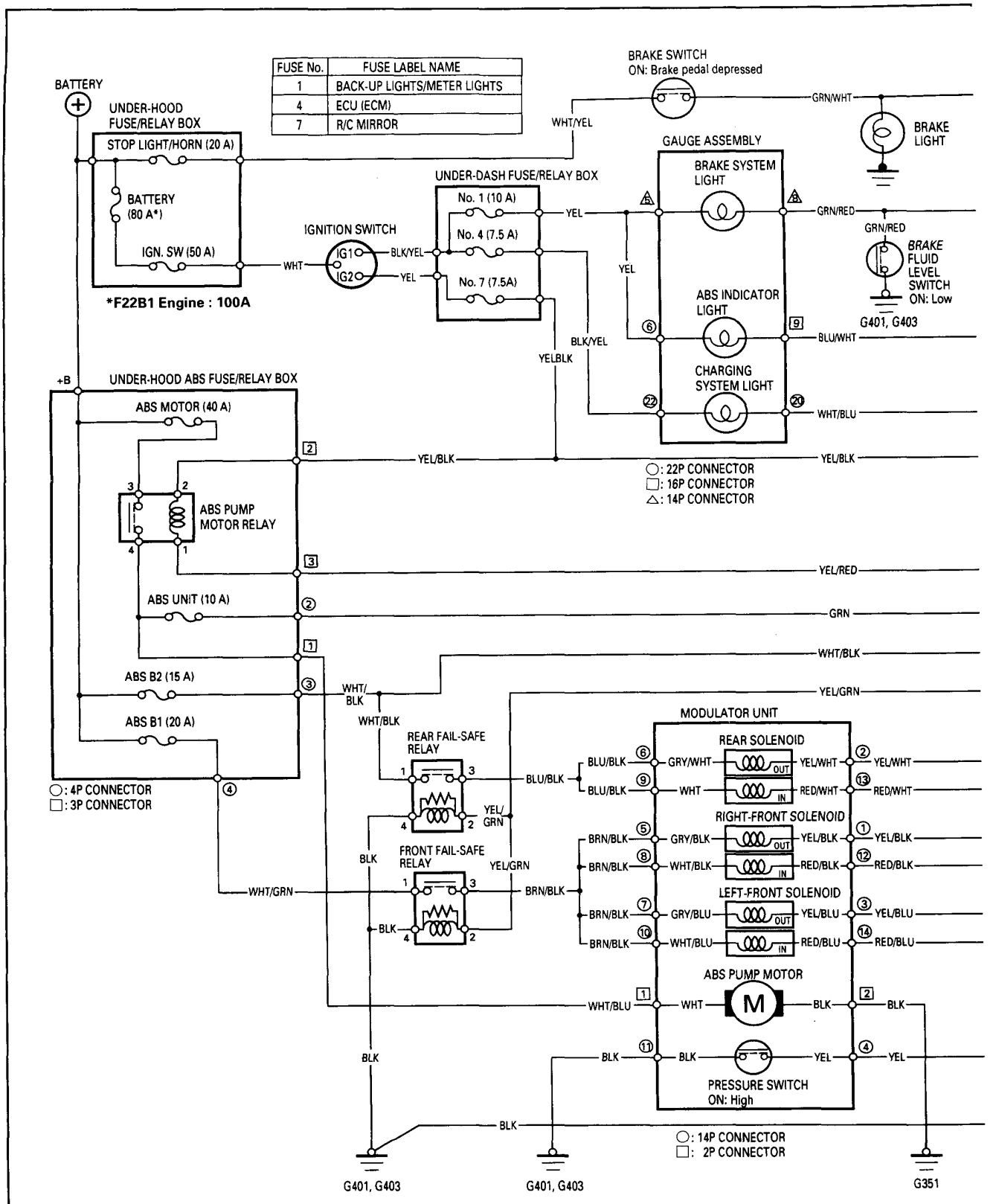
UNDER-HOOD FUSE/RELAY BOX

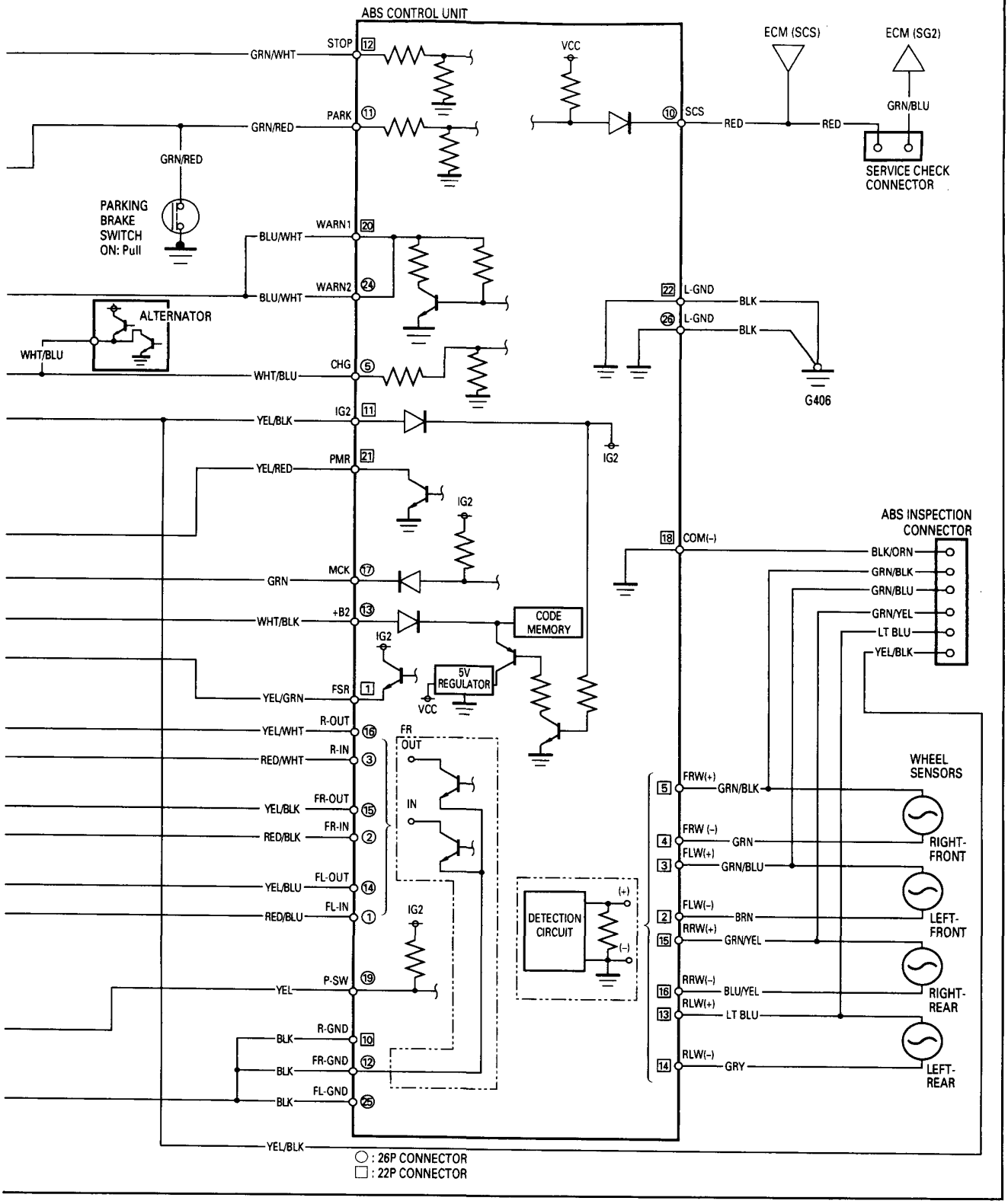


UNDER-HOOD ABS FUSE/RELAY BOX



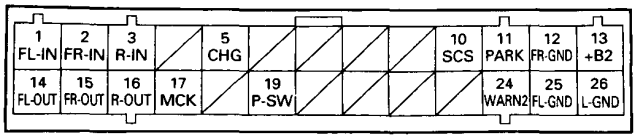
Circuit Diagram




ABS CONTROL UNIT
STOP 12
GRN/WHT
PARK 11
GRN/RED
GRN/RED
PARKING BRAKE SWITCH ON: Pull
WARN1 20
BLU/WHT
WARN2 24
BLU/WHT
ALTERNATOR
WHT/BLU
CHG 5
WHT/BLU
IG2 11
YEL/BLK
PMR 21
YEL/RED
IG2
MCK 17
GRN
+B2 13
WHT/BLK
CODE MEMORY
IG2
5V REGULATOR
VCC
FSR 1
YEL/GRN
R-OUT 16
YEL/WHT
R-IN 3
RED/WHT
FR-OUT 15
YEL/BLK
FR-IN 2
RED/BLK
FL-OUT 14
YEL/BLU
FL-IN 1
RED/BLU
FR OUT
IN
IG2
P-SW 19
YEL
R-GND 10
BLK
FR-GND 12
BLK
FL-GND 25
BLK
YEL/BLK
VCC
10 SCS
RED
RED
ECM (SCS)
ECM (SG2)
GRN/BLU
SERVICE CHECK CONNECTOR
22 L-GND
BLK
26 L-GND
BLK
G406
18 COM(-)
ABS INSPECTION CONNECTOR
BLK/ORN
GRN/BLK
GRN/BLU
GRN/YEL
LT BLU
YEL/BLK
WHEEL SENSORS
5 FRW(+)
GRN/BLK
4 FRW(-)
GRN
3 FLW(+)
GRN/BLU
2 FLW(-)
BRN
15 RRW(+)
GRN/YEL
16 RRW(-)
BLU/YEL
13 RLW(+)
LT BLU
14 RLW(-)
GRY
RIGHT-FRONT
LEFT-FRONT
RIGHT-REAR
LEFT-REAR
DETECTION CIRCUIT
(+)
(-)
○ : 26P CONNECTOR
□ : 22P CONNECTOR

ABS Control Unit Terminal Arrangement

26P CONNECTOR

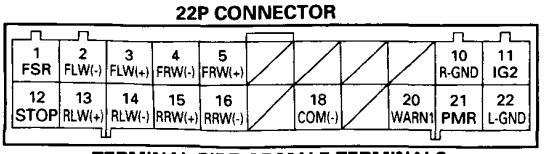


26P CONNECTOR — **TERMINAL SIDE OF MALE TERMINALS**

NOTE: Standard voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	RED/BLU	FL-IN (Front-left inlet solenoid valve)	Drives left-front inlet solenoid valve.	Engine: ON — Solenoid: ON 0 V / OFF 12 V; Engine: OFF (Ignition Switch ON) — 0 V
2	RED/BLK	FR-IN (Front-right inlet solenoid valve)	Drives right-front inlet solenoid valve.	
3	RED/WHT	R-IN (Rear inlet solenoid valve)	Drives rear inlet solenoid valve.	
5	WHT/BLU	CHG (Charge)	Detects engine operation. (Activates ABS control unit with engine ON.)	Engine running: 12 V Engine stopped: 0 V
10	RED	SCS (Service check signal)	Detects service check connector signal (diagnostic trouble code indication).	Connected: 0 V Disconnected: 5 V
11	GRN/RED	PARK (Parking brake)	Detects parking brake switch signal. (ABS indicator light is turned on when driving with signal ON.)	ON: 0 V OFF: 12 V
12	BLK	FR-GND (Front-right solenoid valve ground)	Ground for the right-front inlet and outlet solenoid valves.	
13	WHT/BLK	+B2 (+B2 power source)	• Power source for ABS control unit control circuit. • Power source for diagnostic trouble code memory.	12 V at all times
14	YEL/BLU	FL-OUT (Front-left outlet solenoid)	Drives left-front outlet solenoid valve.	Engine: ON — Solenoid: ON 0 V / OFF 12 V; Engine: OFF (Ignition Switch ON) — 0 V
15	YEL/BLK	FR-OUT (Front-right outlet solenoid valve)	Drives right-front outlet solenoid valve.	
16	YEL/WHT	R-OUT (Rear outlet solenoid valve)	Drives rear outlet solenoid valve.	
17	GRN	MCK (Motor check)	Detects pump motor drive signal. (ABS indicator light is turned on if there is open or short circuit.)	Motor: ON: 12 V OFF: 0 V (Open): 12 V
19	YEL	P-SW (Pressure switch)	Detects pressure switch signal. (Switch turns ON at approx. 22,000 kPa, 220 kgf/cm², 3,100 psi and pump motor is stopped.)	ON: 0 V OFF: 12 V
24	BLU/WHT	WARN 2 (Warning lamp)	Drives ABS indicator light. (Shuts off the indicator light ground circuit inside the ABS control unit to turn off the light when the system is normal.)	Light ON: 0 V Light OFF: 12 V
25	BLK	FL-GND (Front-left solenoid valve ground)	Ground for the left-front inlet and outlet solenoid valves.	
26	BLK	L-GND (Logic ground)	Ground for the ABS control unit control circuits.	

22P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS

22P CONNECTOR

NOTE: Standard voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal	
1	YEL/GRN	FSR (Fail-safe relay)	Drives fail-safe relay. (Fail-safe relay is turned OFF to shut off the power source to the solenoid when problem occurs.)	ON: 12 V OFF: 0 V	
2	BRN	FLW (–) (Front-left wheel sensor, negative)	Detects left-front wheel speed. (Ground level)	No. 2 – 3 terminals	When the wheel is turned at 1 turn/second: 70 mV or above on digital tester (AC range) (Reference) 200 mVP-P or above on oscilloscope
3	GRN/BLU	FLW (+) (Front-left wheel sensor, positive)	Detects left-front wheel speed.		
4	GRN	FRW (–) (Front-right wheel sensor, negative)	Detects right-front wheel speed. (Ground level)	No. 4 – 5 terminals	
5	GRN/BLK	FRW (+) (Front-right wheel sensor, positive)	Detects right-front wheel speed.		
10	BLK	R-GND (Rear solenoid valve ground)	Ground for rear inlet and outlet solenoid valves.		
11	YEL/BLK	IG2 (IG2 power source)	Detects ignition switch IG2 signal. (When IG2 is input, +B2 power source is switched to the power source for the ABS control unit (Vcc). Also IG2 monitors P-SW and MCK lines, and drives fail-safe relay.)	ON: 12 V OFF: 0 V	
12	GRN/WHT	STOP (Foot brake)	Detects brake switch signal. (Prevents unnecessary ABS operation when the brake pedal is not depressed)	ON: 12 V OFF: 0 V	
13	LT BLU	RLW (+) (Rear-left wheel sensor, positive)	Detects left-rear wheel speed. (Ground level)	No. 13 – 14 terminals	When the wheel is turned at 1 turn/second: 70 mV or above on digital tester (AC range) (Reference) 200 mVP-P or above on oscilloscope
14	GRY	RLW (–) (Rear-left wheel sensor, negative)	Detects left-rear wheel speed. (Ground level)		
15	GRN/YEL	RRW (+) (Rear-right wheel sensor, positive)	Detects right-rear wheel speed.	No. 15 – 16 terminals	
16	BLU/YEL	RRW (–) (Rear-right wheel sensor, negative)	Detects right-rear wheel speed. (Ground level)		
18	BLK/ORN	COM (–) (Common negative)	Ground for ALB checker when it is connected.		
20	BLU/WHT	WARN 1 (Warning lamp)	Drives ABS indicator light. (Shuts off the indicator light ground circuit inside the ABS control unit to turn off the light when the system is normal.)	Light ON: 0 V Light OFF: 12 V	
21	YEL/RED	PMR (Pump motor relay)	Drives pump motor relay. (Pump motor relay is turned ON to drive the pump motor when P-SW OFF signal is detected.)	ON: 0 V OFF: 12 V	
22	BLK	L-GND (Logic ground)	Ground for the ABS control unit control circuits.		

Troubleshooting Precautions

ABS Indicator Light:

The ABS indicator light comes on for three seconds and then goes off when the control unit detects no problem during the initial diagnosis right after the engine starts.
However, the ABS indicator light can stay on for up to 40 seconds when the control unit starts to check for pump overrun, etc. during the initial diagnosis.
The ABS indicator light comes on, and the ABS control unit memorizes the diagnostic trouble code (DTC) under certain conditions.

- The parking brake is applied for more than 30 seconds while the vehicle is being driven. (DTC 2-1)
- The transmission downshifted excessively. (DTC 4-1, 4-2)
- The vehicle loses traction, and the front wheels spin for more than one minute when starting from a stuck condition on a muddy, snowly, or sandy road. (DTC 4-8)
- The tires adhesion is lost due to excessive cornering speed. (DTC 5, 5-4, 5-8)
- The vehicle is driven on an extremely rough road. (DTC 8-1)
- The vehicle is interfered by strong radio waves (noise), for example, illegal radio, etc. (DTC 8-2)

NOTE: If there is any trouble in the system, the ABS indicator light turns on during driving.

Diagnostic Trouble Code (DTC):

- When the control unit detects a problem and the ABS indicator light comes on, the control unit memorizes the DTC.
- The control unit has three memory registers. When a problem occurs, the control unit stores the DTC in the first memory register. If another problem occurs, or the same problem occurs again, the control unit moves the first DTC to the next memory register, and stores the second DTC in the first register. If there's a third problem occurrence, the two existing DTCs are moved up one register, and the third DTC is stored in the first register. If problems continue to occur, the oldest problem is moved out of the last register and lost, and the most recent problem is stored in the first register. When the same problem occurs three times, the same DTC is stored in all memory registers.
- The most recent DTC is indicated first, and the oldest DTC is indicated last.
- The DTCs are erased from the control unit when the ABS control unit +B2 power supply or connector is disconnected.
- The control unit's memory can be erased by disconnecting the ABS B2 fuse for more than three seconds.

Self-diagnosis:

- There are three self-diagnosises described below.
  ① Initial diagnosis: Performed right after the engine starts until the ABS indicator light goes off.
  ② Regular diagnosis: Continuously performed (under some conditions) after the ABS indicator light goes off until the engine stops.
  ③ Individual part/system diagnosis: Diagnosis about a specific part/system under its operating conditions.
- The CPU (central processing unit) controls the following when it detects a problem during self-diagnosis:
  ① Turns the ABS indicator light ON.
  ② Turns the front and rear fail-safe relays off.
  ③ Stops the ABS control.
  ④ Stops the ABS pump. (The pump may work under some conditions.)

Kickback and Pump Operation:

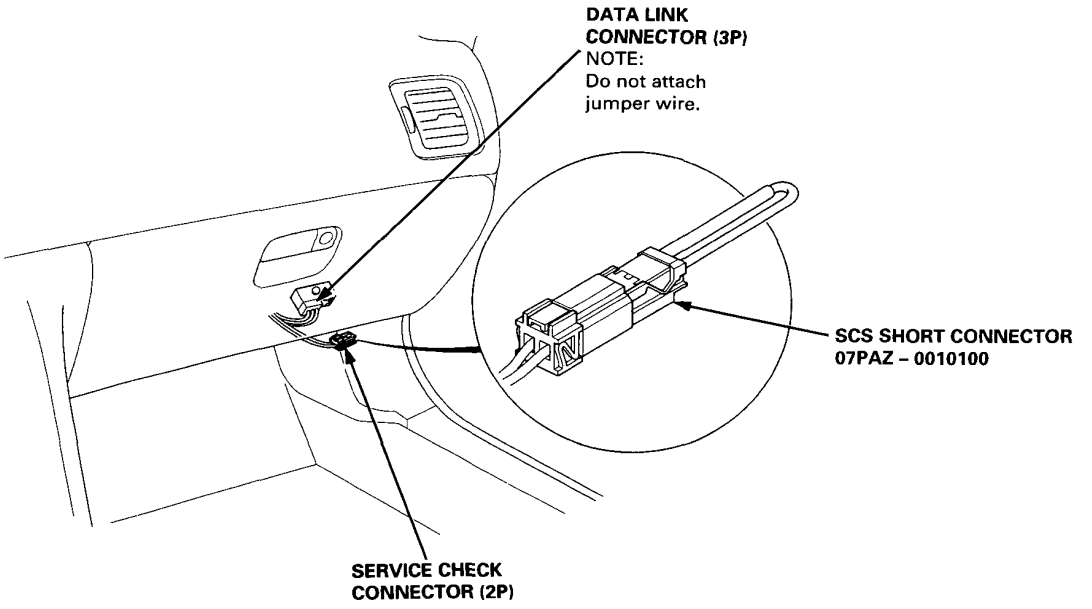
- When the engine is started, the ABS control unit begins the initial diagnosis and operates the solenoid valve one time. The kickback may be felt when the brake pedal is depressed.
- When the ABS control unit detects the pressure switch OFF signal during the initial diagnosis, it operates the pump motor, and performs the pump motor over-run diagnosis and pump motor diagnosis. Therefore, there are two cases where the pump motor operates or does not operate after the engine is started.
- Normally, after the initial diagnosis, the pump motor operates based on the pressure switch signal, regardless of the vehicle speed.

Troubleshooting:

- When two or three DTCs are stored in the control unit, perform troubleshooting for the DTC that appears first.
- When a customer's reported problem cannot be verified on the car, ask the customer about the conditions when the ABS indicator light came ON, and test drive the car under those conditions, if possible. When the ABS indicator light does not come ON during the test, check for loose terminals and check by shaking the harnesses and connectors while following the flowchart.
- The connector terminal numbers are viewed from the wire side for the female terminals, and from the terminal side for the male terminals.

Diagnostic Trouble Code (DTC) Indication

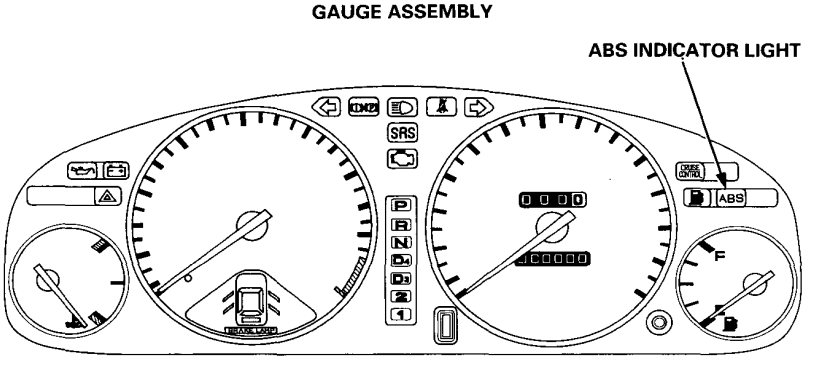
1. Connect the SCS short connector to the service check connector under the glove box.



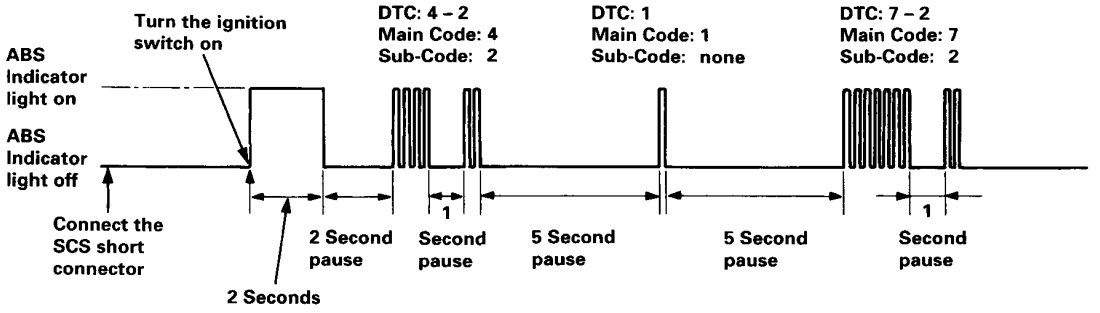
2. Turn the ignition switch ON, but do not start the engine.

3. Record the blinking frequency of the ABS indicator light. The blinking frequency indicates the diagnostic trouble code (DTC).

   NOTE: Check the DTC carefully and record it. The memory of the DTC is erased if the connector is disconnected from the ABS control unit.



DTC Indication Pattern:



- Turn the ignition switch ON. The ABS indicator light comes on for two seconds to check the bulb.
- The ABS control unit can memorize three DTCs (one, two or three problems).
- If you miscount the blinking frequency or if you recheck the blinking frequency, turn the ignition switch OFF then turn it ON to cycle the ABS indicator light again.

4. Remove the SCS short connector.

   NOTE: The Malfunction Indicator Lamp (MIL) will stay on after the engine is started if the SCS short connector is connected.

5. Remove the ABS B2 (15 A) fuse in the under-hood ABS fuse/relay box for at least three seconds to erase the ABS control unit's memory.

Diagnostic Troubleshooting Code (DTC)

Symptom-to-System Chart

DIAGNOSTIC TROUBLE CODE (DTC)		DIAGNOSIS/ SYMPTOM	DIAGNOSTIC PERIOD			PROBLEM LOCATION	PROBABLE CAUSE
MAIN CODE	SUB-CODE		INITIAL DIAGNOSIS	INDIVIDUAL DIAGNOSIS	REGULAR DIAGNOSIS		
—		ABS indicator light does not come on when ignition switch is turned ON					• Blown BACK-UP LIGHTS/METER LIGHTS (10 A) fuse • Open circuit between the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse and ABS indicator light • Blown ABS indicator light bulb • Open circuit between the ABS indicator light and ABS control unit • Open circuit between the ABS control unit and body ground • Poor body ground • Faulty ABS control unit
		ABS indicator light does not go off after engine is started					• Blown R/C MIRROR (7.5 A) fuse • Open circuit between the under-dash fuse/relay box and ABS control unit. • Open circuit between the battery and under-hood ABS fuse/relay box • Blown ABS B2 (15 A) fuse • Open circuit inside the under-hood ABS fuse/relay box • Open circuit between the under-hood ABS fuse/relay box and ABS control unit • Faulty alternator • Open circuit between the alternator and ABS control unit • Short to body ground in the WARN circuit between the ABS indicator light and ABS control unit • Faulty ABS control unit
	—	ABS pump motor over-run	○	○			• Pressure switch stuck OFF • Open circuit between the pressure switch and ABS control unit • Open circuit in the P-SW circuit between the pressure switch and body ground, or a poor ground • Drop in pump discharge volume • Leaking outlet valve • Leaking relief valve • ABS brake fluid leakage • Faulty ABS control unit
①	②	Pump motor	○		○		• Open circuit or short to body ground between the R/C MIRROR (7.5 A) fuse and under-hood ABS fuse/relay box • Open circuit or short to body ground in the PMR circuit inside the under-hood ABS fuse/relay box • Faulty pump motor relay • Open circuit or short to body ground in the PMR circuit between the under-hood ABS fuse/relay box and ABS control unit • Open circuit between the battery and under-hood ABS fuse/relay box • Blown ABS MOTOR (40 A) fuse • Blown ABS UNIT (10 A) fuse • Open circuit or short to body ground in the motor drive circuit and MCK circuit inside the under-hood ABS fuse/relay box • Open circuit or short to body ground in the MCK circuit between the under-hood ABS fuse/relay box and ABS control unit • Open circuit or short to body ground between the under-hood ABS fuse/relay box and pump motor • Faulty pump motor • Open circuit between the pump motor and body ground or poor ground • Faulty ABS control unit
	③	High pressure leakage			○		• Leaking outlet valve • Leaking relief valve • Poor contact in pressure switch circuit
	④	Pressure switch	○				• Short to body ground between the ABS control unit and pressure switch • Pressure switch stuck ON • Faulty ABS control unit
	⑧	High pressure system	○				• Accumulator gas leakage • Changed relief valve set pressure • Rear outlet solenoid valve late to close • Changed pressure switch set pressure
②	①	Parking brake			○		• Low fluid level in the master cylinder reservoir • Open circuit between the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse and brake system light • Blown brake system light bulb • Open circuit or short to body ground between the brake system light and ABS control unit • Parking brake switch stuck ON • Short to body ground between the brake system light and parking brake switch • Brake fluid level switch stuck ON • Short to body ground between the brake system light and brake fluid level switch • Faulty ABS control unit

PROBABLE CAUSE WHEN SYMPTOM DOES NOT REAPPEAR	DESCRIPTION OF DIAGNOSIS	REFER TO PAGE
		19-68
		19-70
	• The ABS indicator light is turned ON when the pump motor relay ON signal is detected for more than 40 seconds while the ABS is not functioning.	19-73
• Intermittent interruption in the MCK circuit • Intermittent interruption in the pump motor relay drive circuit • Intermittent interruption in the pump motor drive circuit	• The ABS indicator light is turned on when battery voltage is detected at the MCK terminal while the pump motor relay OFF signal is detected. • The ABS indicator light is turned on when the 0 V is detected at the MCK terminal while the pump motor relay ON signal is detected.	19-75
• Intermittent interruption in the pressure switch • Intermittent interruption in the pressure switch circuit	• The ABS indicator light is turned on when the frequent ON/OFF cycle of the pressure switch signal after the engine is started, until it is stopped. The count is erased when the ABS functions.	19-81
	• The ABS indicator light is turned on when the pressure switch ON signal is always detected at every initial diagnosis. The count is erased when the ABS control unit detects the pressure switch OFF signal.	19-83
• The ABS indicator light may not come on in normal climate when it comes on in very cold climate.	• This diagnosis is performed when the pressure switch is OFF at the initial diagnosis. The pump motor is operated to turn the pressure swtch ON, then the solenoid valve is momentarily activated. The ABS indicator light is turned on if the pressure switch signal changes from ON to OFF.	19-84
• Driving with the parking brake applied—(No problem)	• The ABS indicator light is turned on when the parking brake ON signal is detected for more than 30 seconds while driving.	19-85

(cont'd)

Diagnostic Troubleshooting Code (DTC)

Symptom-to-System Chart (cont'd)

DIAGNOSTIC TROUBLE CODE (DTC) MAIN CODE	DIAGNOSTIC TROUBLE CODE (DTC) SUB-CODE	DIAGNOSIS/ SYMPTOM	DIAGNOSTIC PERIOD: INITIAL DIAGNOSIS	DIAGNOSTIC PERIOD: INDIVIDUAL DIAGNOSIS	DIAGNOSTIC PERIOD: REGULAR DIAGNOSIS	PROBLEM LOCATION	PROBABLE CAUSE
③	①	Pulser			○	Right-front	• Chipped pulser gear • Improperly installed wheel sensor
	②					Left-front	
	④					Right-rear	
	⑧					Left-rear	
	⑫	Different diameter tire			○		• Different diameter tire installed
④	①	Wheel sensor		○	○	Right-front	• Open circuit, internal short or short to body ground in the wheel sensor • Open circuit or short to body ground in the positive (+) wire between the wheel sensor and ABS control unit • Open circuit or short to body ground in the negative (−) wire between the wheel sensor and ABS control unit • Positive (+) wire shorted to the negative (−) wire between the wheel sensor and ABS control unit • Loose connector or poor contact of terminals • Improper wheel sensor air gap • Faulty ABS control unit • Missing pulser • Modulator does not decrease pressure properly
	②					Left-front	
	④					Right-rear	
	⑧					Left-rear	
⑤	—	Rear wheel lock			○	Right/ Left	• Open circuit, internal short or short to body ground in the wheel sensor system • Rear brake drag • Modulator does not decrease pressure properly • Faulty ABS control unit
	④					Right	
	⑧					Left	
⑥	—	Fail-safe relay	○			Front/ rear	• Short to power in the relay drive circuit between the fail-safe relay and ABS control unit • Faulty relay drive transistor (ON) in the ABS control unit • Fail-safe relay stuck ON • Short to power in the solenoid drive circuits between the fail-safe relay and ABS control unit
	①					Front	
	④					Rear	
⑦	①	Solenoid	○		○	Right-front	• Fail-safe relay stuck OFF • Open circuit in the solenoid drive circuit between the under-hood ABS fuse/relay box and ABS control unit • Short to body ground in the solenoid drive circuit between the solenoid and ABS control unit • Faulty solenoid drive transistor (ON) in the ABS control unit • Short to power in the solenoid drive circuit between the solenoid and ABS control unit • Faulty solenoid drive transistor (OFF) in the ABS control unit • Short to power in the drive circuit inside the solenoid • Short to the outlet circuit in the inlet circuit between the solenoid and ABS control unit
	②					Left-front	
	④					Rear	
⑧	①	ABS function			○		• Wheel sensor signal disappears at speeds of 6 mph (10 km/h) or less • Faulty ABS control unit
	②	CPU comparison	○		○		• Faulty ABS control unit
	④	IC [Integrated Circuit]	○		○		• Faulty ABS control unit

PROBABLE CAUSE WHEN SYMPTOM DOES NOT REAPPEAR	DESCRIPTION OF DIAGNOSIS	REFER TO PAGE
• Intermittent interruption in the wheel sensor	• The ABS indicator light is turned on when the wheel sensor signal is periodically missing during driving.	19-89
(•No problem)	• The ABS indicator light may be turned on while driving when one, two or three different diameter tires are installed. This diagnosis is not performed when the parking brake switch is ON.	19-89
• Intermittent interruption in the wheel sensor • Wheel spin of both front wheels (only for DTC 4-8)—(No problem) • The transmission downshifted excessively (only for DTC 4-1 and 4-2)—(No problem)	• The ABS indicator light is turned on when the wheel sensor signal is missing at speeds of 6 mph (10 km/h) or more. This diagnosis is not performed when the parking brake switch is ON.	19-90 19-93 19-96 19-99
• Intermittent interruption in the wheel sensor • Wheel spin by operating the parking brake while the parking brake switch is stuck OFF • Car spun-out—(No problem)	• The ABS indicator light is turned on when either or both rear wheels lock and the wheel sensor signal is missing during driving. This diagnosis is not performed when the parking brake switch is ON.	19-102
	• The ABS indicator light is turned on when battery voltage is detected at the solenoid terminal before the fail-safe relays are turned on at the initial diagnosis.	19-104 19-106 19-109
• Intermittent interruption in the solenoid valve drive circuit • Intermittent interruption in the solenoid valve ground circuit • Intermittent interruption in the fail-safe relay circuit	• Each solenoid valve is momentarily activated at the initial diagnosis and when the car starts off. The ABS indicator light is turned on when battery voltage is detected at the solenoid terminal. • The ABS indicator light is turned on when 0V is detected at the solenoid terminal while the solenoid OFF signal is detected at the regular diagnosis.	19-111 19-115 19-122
• Intermittent interruption in the wheel sensor • Rough road driving—(No problem)	• The ABS indicator light is turned on when the ABS functions continuously.	19-129
(•No problem)	• The ABS indicator light is turned on when there is a difference between the CPU data.	19-130
(•No problem)	• The ABS indicator light is turned on when there is a abnormality in the IC at the regular diagnosis.	19-130

ABS Indicator Light Does Not Come On

The ABS indicator light does not come on when the ignition switch is turned ON.

When the ignition switch is turned ON, the ABS indicator light drive transistor in the ABS control unit is activated by self-bias and turns the ABS indicator light on.
Possible causes for an ABS indicator light that does not come on:

- Blown BACK-UP LIGHTS/METER LIGHTS (10 A) fuse
- Open circuit between the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse and ABS indicator light.
- Blown ABS indicator light bulb
- Open circuit between the ABS indicator light and ABS control unit
- Open circuit between the ABS control unit and body ground
- Poor body ground
- Faulty ABS control unit

The ABS indicator light does not come on when the ignition switch is turned ON.

Check the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse in the under-dash fuse/relay box.

NOTE: All indicator lights except the charging system indicator light will not come on when the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse is blown.

Is the fuse OK?

NO → **Replace the fuse and recheck.**

YES

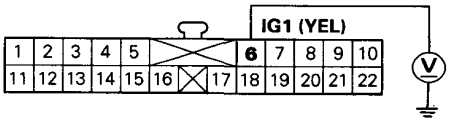
NOTE: Reinstall the fuse if it is OK.

Disconnect the gauge assembly 22P connector.

Turn the ignition switch ON.

Measure the voltage between the gauge assembly 22P connector No. 6 (YEL) terminal and body ground.

GAUGE ASSEMBLY 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Is there battery voltage?

NO → **• Repair open in the YEL wire between the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse and gauge assembly.**
• Replace the under-dash fuse/relay box. (Open circuit inside the fuse/relay box)

YES

Check the ABS indicator light bulb in the gauge assembly.

Is the bulb OK?

NO → **Replace the ABS indicator light bulb.**

YES

(To page 19-69)

(From page 19-68)

Connect the gauge assembly 22P connector.

Connect the gauge assembly 16P connector No. 9 (BLU/WHT) terminal to body ground.

Does the ABS indicator light come on?

NO → **Replace the printed circuit board in the gauge assembly.**

YES

Turn the ignition switch OFF.

Disconnect the ABS control unit 22P and 26P connectors.

Turn the ignition switch ON.

Connect the ABS control unit 22P connector No. 20 (BLU/WHT) terminal or 26P connector No. 24 (BLU/WHT) terminal to body ground.

Does the ABS indicator light come on?

NO → **Repair open in the BLU/WHT wire between the gauge assembly and ABS control unit.**

YES

Connect the ABS control unit 22P and 26P connectors.

Connect the ABS control unit 22P connector No. 22 (BLK) terminal or 26P connector No. 26 (BLK) terminal to body ground.

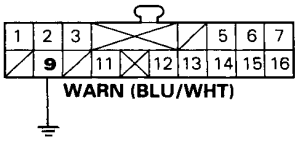
Does the ABS indicator light come on?

YES → **• Repair open in the two BLK wires between the ABS control unit and body ground.**
• Repair poor ground (G406)

NO

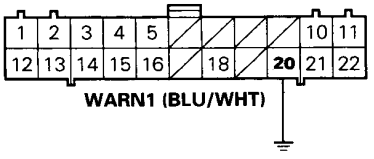
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

GAUGE ASSEMBLY 16P CONNECTOR

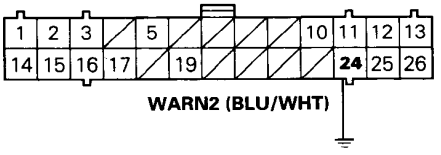


WIRE SIDE OF FEMALE TERMINALS

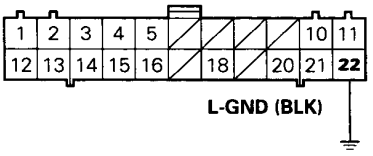
ABS CONTROL UNIT 22P CONNECTOR

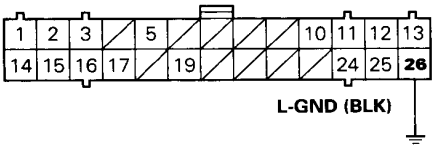


ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS





ABS Indicator Light Does Not Go Off

The ABS indicator light does not go off after the engine is started

When no problem is found during the initial diagnosis, the ABS control unit turns the ABS indicator light drive transistor off to turn the ABS indicator light off.
Possible causes for an ABS indicator light that does not go off, but no Diagnostic Trouble Code (DTC) is indicated:

- Blown R/C MIRROR (7.5 A) fuse
- Open circuit between the under-dash fuse/relay box and ABS control unit
- Open circuit between the battery and under-hood ABS fuse/relay box
- Blown ABS B2 (15 A) fuse
- Open circuit inside the under-hood ABS fuse/relay box
- Open circuit between the under-hood ABS fuse/relay box and ABS control unit
- Faulty alternator
- Open circuit between the alternator and ABS control unit
- Short to body ground in the WARN circuit between the ABS indicator light and ABS control unit
- Faulty ABS control unit

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), no DTC is indicated.

↓

Start the engine and check the charging system indicator light.

↓

Does it go off? — NO → **Check the charging system (see section 23).**

YES ↓

Turn the ignition switch OFF.

↓

Check the R/C MIRROR (7.5 A) fuse in the under-dash fuse/relay box.

NOTE: The IG2 power source is checked in this step.

↓

Is the fuse OK? — NO → **Replace the fuse and recheck.**

YES ↓

Check the ABS B2 (15 A) fuse in the under-hood ABS fuse/relay box.

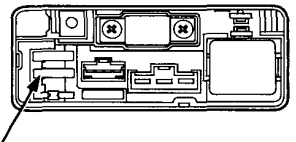
↓

Is the fuse OK? — NO → **Replace the fuse and recheck.**

YES ↓

(To page 19-71) NOTE: Reinstall the fuse if it is OK.

UNDER-HOOD ABS FUSE/RELAY BOX



ABS B2 (15 A) FUSE

(From page 19-70)

Measure the voltage between the under-hood ABS fuse/relay box +B terminal and body ground.

NOTE: The +B2 line is checked from this step.

Is there battery voltage?

NO → **Repair open in the BLK wire between the battery and under-hood ABS fuse/relay box.**

YES

Measure the voltage between the under-hood ABS fuse/relay box 4P connector No. 3 (WHT/BLK) terminal and body ground.

Is there battery voltage?

NO → **Replace the under-hood ABS fuse/relay box.**

YES

Disconnect the ABS control unit 22P and 26P connectors.

Measure the voltage between the ABS control unit 26P connector No. 13 (WHT/BLK) terminal and body ground.

Is there battery voltage?

NO → **Repair open in the WHT/BLK wire between the under-hood ABS fuse/relay box and ABS control unit.**

YES

Turn the ignition switch ON.

NOTE: The WARN line is checked in this step with the ABS control unit connectors disconnected.

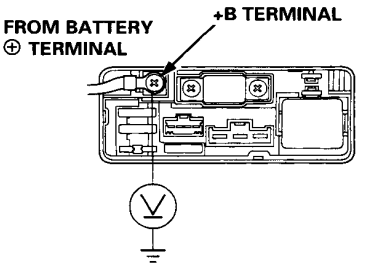
Does the ABS indicator light come on?

YES → **Repair short to body ground in the BLU/WHT wire between the ABS indicator light and ABS control unit.**

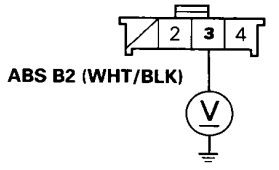
NO

(To page 19-72)

UNDER-HOOD ABS FUSE/RELAY BOX

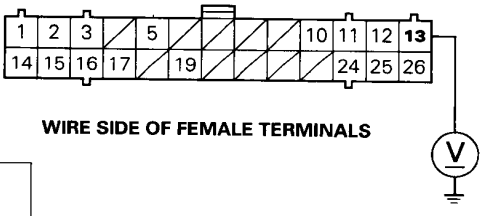


UNDER-HOOD ABS FUSE/RELAY BOX 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

ABS Indicator Light Does Not Go Off (cont'd)

(From page 19-71)

Measure the voltage between the ABS control unit 22P connector No. 11 (YEL/BLK) terminal and body ground.

NOTE: The IG2 line is checked in this step.

Is there battery voltage?

NO → **Repair open in the YEL/BLK wire between the R/C MIRROR (7.5 A) fuse in the under-dash fuse/relay box and ABS control unit.**

YES

Start the engine.

Measure the voltage between the ABS control unit 26P connector No. 5 (WHT/BLU) terminal and body ground.

NOTE: The CHG line is checked in this step.

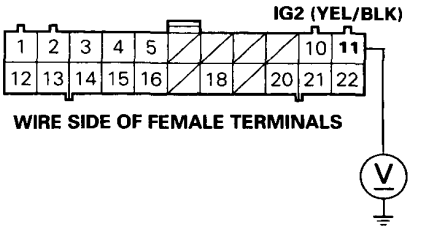
Is there battery voltage?

NO → **Repair open in the WHT/BLU wire between the alternator and ABS control unit.**

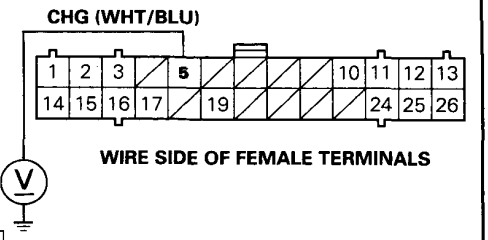
YES

Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

ABS CONTROL UNIT 22P CONNECTOR



ABS CONTROL UNIT 26P CONNECTOR



ABS Pump Motor Over-run

Diagnostic Trouble Code (DTC) 1: ABS Pump Motor Over-run

NOTE: The ABS indicator light comes on twice; once for two seconds during the bulb check, then again, indicating DTC 1.

The ABS control unit monitors the pump motor relay drive signal during the initial diagnosis and individual diagnosis when the ABS is not functioning.
When the ABS control unit detects the drive signal for 40 seconds, it turns the pump motor relay off and keeps the ABS indicator light on. When the ABS control unit detects the drive signal for 40 seconds after the ABS indicator light went off, the control unit turns the ABS indicator light on again.
Possible causes:

- Pressure switch stuck OFF
- Open circuit between the pressure switch and ABS control unit
- Open circuit in the P-SW circuit between the pressure switch and body ground, or a poor ground
- Drop in pump discharge volume
- Leaking outlet valve
- Leaking relief valve
- Brake fluid leakage on the ABS operation system
- Faulty ABS control unit

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), DTC 1 is indicated.

Start the engine and let it run for 1 minute.

Does the pump motor run for 40 seconds and does the ABS indicator light come on?

NO → **The vehicle is OK at this time.**

YES

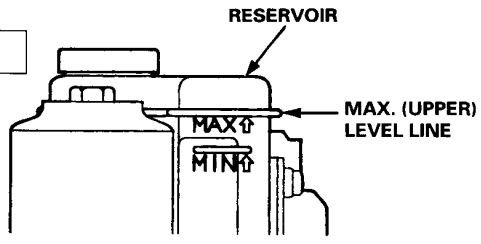
Check the reservoir fluid level.

Is the level OK?

NO → **Replace the modulator nuit. (Brake fluid leakage)**

YES

(To page 19-74)



(cont'd)

ABS Pump Motor Over-run (cont'd)

(From page 19-73)

Turn the ignition switch OFF.

Disconnect the modulator unit 14P connector.

Check for continuity between the modulator unit 14P connector No. 4 (YEL) and No. 11 (BLK) terminals.

Is there continuity?

NO

Replace the modulator unit.
- **Pressure switch stuck OFF**
- **Drop in pump discharge volume**
- **Leaking outlet valve**
- **Leaking releif valve**

YES

Turn the ignition switch ON.

Measure the voltage between the modulator unit 14P connector No. 4 (YEL) terminal and body ground.

Is there battery voltage?

YES

Repair open in the BLK wire between the pressure switch and body ground, or poor ground.

NO

Measure the voltage between the ABS control unit 26P connector No. 19 (YEL) terminal and body ground.

Is there battery voltage?

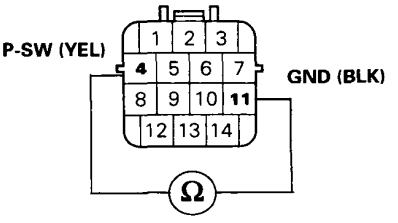
YES

Repair open in YEL wire between the pressure switch and ABS control unit.

NO

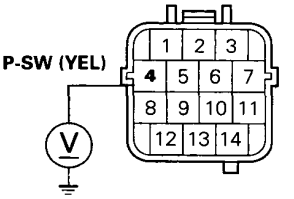
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

MODULATOR UNIT 14P CONNECTOR



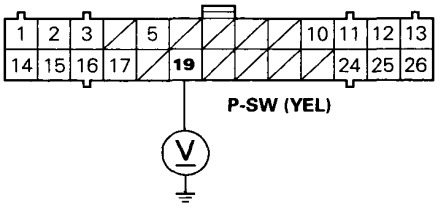
WIRE SIDE OF FEMALE TERMINALS

MODULATOR UNIT 14P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

ABS Pump Motor

Diagnostic Trouble Code (DTC) 1-2: ABS Pump Motor Diagnosis

The ABS control unit checks the conditions at the pump motor relay drive (PMR) terminal and motor check (MCK) terminal during the initial diagnosis and regular diagnosis.
When the ABS control unit detects the following conditions during the diagnosis, it keeps the ABS indicator light on.
When the following conditions are detected after the ABS indicator light goes off, the ABS control unit turns the ABS indicator light on again.

- Battery voltage at the MCK terminal with an OFF signal at the PMR terminal
- 0 V at the MCK terminal with an ON signal at the PMR terminal

Possible causes:

- Open circuit or short to body ground between the R/C MIRROR (7.5 A) fuse and under-hood ABS fuse/relay box
- Open circuit or short to body ground in the PMR circuit inside the under-hood ABS fuse/relay box
- Faulty pump motor relay
- Open circuit or short to body ground in the PMR circuit between the under-hood ABS fuse/relay box and ABS control unit
- Open circuit between the battery and under-hood ABS fuse/relay box
- Blown ABS MOTOR (40 A) fuse
- Blown ABS UNIT (10 A) fuse
- Open circuit or short to body ground in the motor drive circuit and MCK circuit inside the under-hood ABS fuse/relay box
- Open circuit or short to body ground in the MCK circuit between the under-hood ABS fuse/relay box and ABS control unit
- Open circuit or short to body ground between the under-hood ABS fuse/relay box and pump motor
- Faulty pump motor
- Open circuit between the pump motor and body ground or poor ground
- Faulty ABS control unit

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), DTC 1-2 is indicated.

↓

Check the ABS MOTOR (40 A) fuse in the under-hood ABS fuse/relay box.

↓

Is the fuse OK? — NO → **Replace the fuse and recheck.**

YES ↓

Check the ABS UNIT (10 A) fuse in the under-hood ABS fuse/relay box.

↓

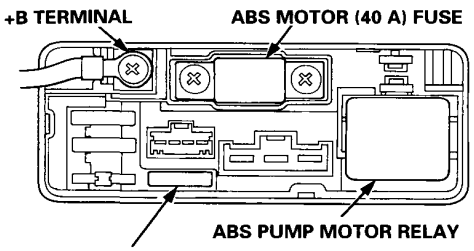
Is the fuse OK? — NO → **Replace the fuse and recheck.**

YES ↓

NOTE: Reinstall the fuse if it is OK.

(To page 19-76)

UNDER-HOOD ABS FUSE/RELAY BOX



(cont'd)

ABS Pump Motor (cont'd)

(From page 19-75)

Remove the ABS pump motor relay and check it (see page 19-144)

Is the relay OK?

NO → **Replace the ABS pump motor relay.**

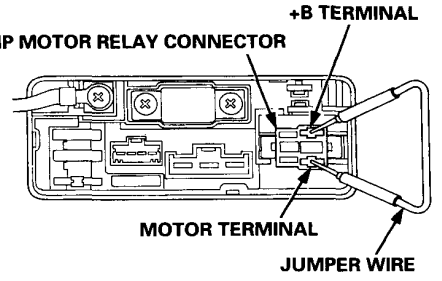
NOTE: If the relay is stuck ON, the motor may be damaged.
Check the pump motor operation.

YES

Bleed high pressure fluid from the modulator unit bleed screw (see page 19-134).

Connect the ABS pump motor relay connector +B and MOTOR terminals with a jumper wire for 1 second.

NOTE: Use a jumper wire with a diameter larger than 2 mm (0.08 in).



Does the pump motor run?

NO → (To page 19-78)
To pump motor drive circuit check

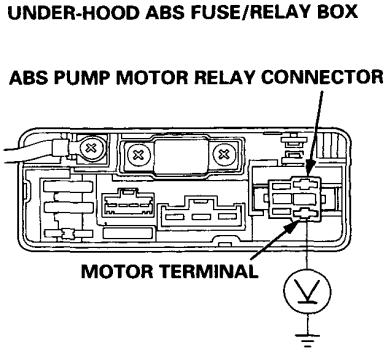
YES

Remove the jumper wire.

Disconnect the under-hood ABS fuse/relay box 3P connector.

Turn the ignition switch ON.

Measure the voltage between the ABS pump motor relay connector MOTOR terminal and body ground.



Is there battery voltage?

NO → (To page 19-79)
To motor check (MCK) circuit check

YES

(To page 19-77)

(From page 19-76)

Measure the voltage between the under-hood ABS fuse/relay box 3P connector No. 2 (YEL/BLK) terminal and body ground.

NOTE: The ABS pump motor relay coil circuit is checked beginning with this step.

Is there battery voltage?

NO → **Repair open in the YEL/BLK wire between the R/C MIRROR (7.5 A) fuse in the under-dash fuse/relay box and the under-hood ABS fuse/relay box.**

YES

Connect the under-hood ABS fuse/relay box 3P connector.

Install the ABS pump motor relay.

Does the ABS pump motor relay operate

YES → (To page 19-80) To short to body ground check of the ABS pump motor relay coil circuit

NO

Measure the voltage between the under-hood ABS fuse/relay box 3P connector No. 3 (YEL/RED) terminal and body ground.

NOTE: Open circuit in the ABS pump motor relay coil circuit is checked beginning with this step.

Is there battery voltage?

NO → **Replace the under-hood ABS fuse/relay box. (Open circuit inside the box)**

YES

Measure the voltage between the ABS control unit 22P connector No. 21 (YEL/RED) terminal and body ground.

Is there battery voltage?

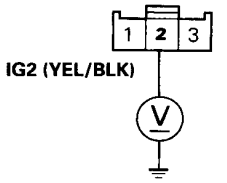
NO → **Repair open in the YEL/RED wire between the under-hood ABS fuse/relay box and ABS control unit.**

YES

Reconnect the connectors properly, bleed high pressure fluid and start the engine. If DTC 1-2 is stored again, replace the ABS control unit.

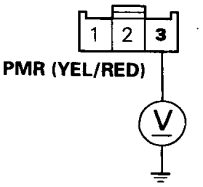
NOTE: Add the brake fluid if the fluid level is lower than the MIN line.

UNDER-HOOD ABS FUSE/RELAY BOX 3P CONNECTOR



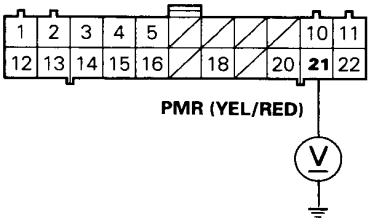
WIRE SIDE OF FEMALE TERMINALS

UNDER-HOOD ABS FUSE/RELAY BOX 3P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

ABS Pump Motor (cont'd)

(From page 19-76)

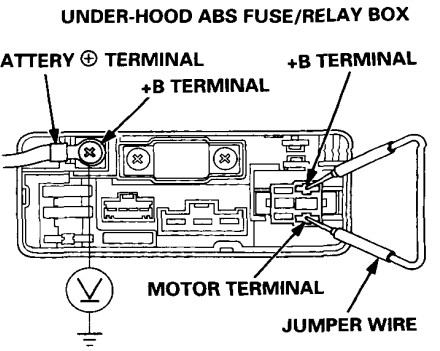
Measure the voltage between the under-hood ABS fuse/relay box battery +B terminal and body ground.

NOTE: The ABS pump motor drive circuit is checked beginning with this step.

Is there battery voltage?

NO → **Repair open in the BLK wire between the battery and under-hood ABS fuse/relay box.**

YES



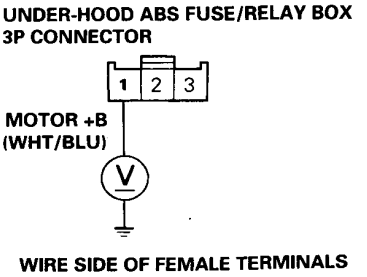
Measure the voltage between the under-hood ABS fuse/relay box 3P connector No. 1 (WHT/BLU) terminal and body ground.

NOTE: Connect the ABS pump motor relay connector +B and MOTOR terminals with a jumper wire.

Is there battery voltage?

NO → **Replace the under-hood ABS fuse/relay box.**

YES



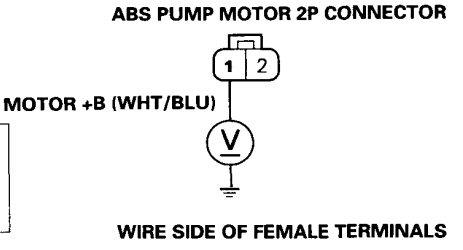
Disconnect the ABS pump motor 2P connector.

Measure the voltage between the ABS pump motor 2P connector No. 1 (WHT/BLU) terminal and body ground.

Is there battery voltage?

NO → **Repair open in the WHT/BLU wire between the under-hood ABS fuse/relay box and ABS pump motor.**

YES

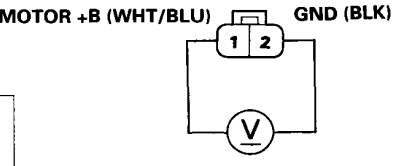


Measure the voltage between the ABS pump motor 2P connector No. 1 (WHT/BLU) and No. 2 (BLK) terminal.

Is there battery voltage?

NO → **• Repair open in the BLK wire between the ABS pump motor and body ground.**
• Repair poor ground (G351).

YES



Replace the ABS pump motor.

(From page 19-76)

Disconnect the under-hood ABS fuse/relay box 4P connector.

NOTE: The motor check (MCK) circuit is checked beginning with this step.

Measure the voltage between the under-hood ABS fuse/relay box 4P connector No. 2 (GRN) terminal and body ground.

Is there battery voltage?

YES → **Replace the under-hood ABS fuse/relay box. (Open circuit inside the box)**

NO

Measure the voltage between the ABS control unit 26P connector No. 17 (GRN) terminal and body ground.

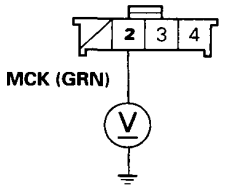
Is there battery voltage?

YES → **Repair open in the GRN wire between the under-hood ABS fuse/relay box and ABS control unit.**

NO

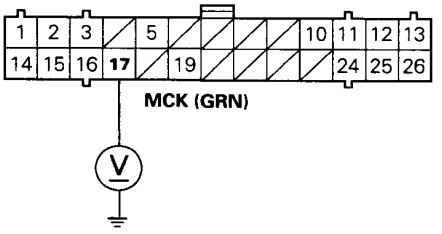
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

UNDER-HOOD ABS FUSE/RELAY BOX 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

ABS Pump Motor (cont'd)

(From page 19-77)

Remove the ABS pump motor relay.

Disconnect the under-hood ABS fuse/relay box 3P connector.

Check for continuity between the ABS pump motor relay connector PMR terminal and body ground.

Is there continuity?

YES → **Replace the under-hood ABS fuse/relay box. (Short circuit inside the box)**

NO

Disconnect the ABS control unit 22P connector.

Check for continuity between the ABS control unit 22P connector No. 21 (YEL/RED) terminal and body ground.

Is there continuity?

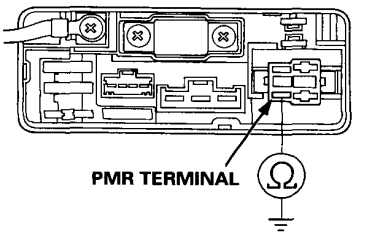
YES → **Repair short to body ground in the YEL/RED wire between the under-hood ABS fuse/relay box and ABS control unit.**

NO

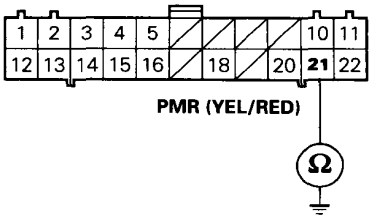
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

NOTE:
- Short to body ground in the ABS pump motor relay coil circuit is checked beginning with this step.
- If the motor relay coil is shorted to body ground, the motor may be damaged. Check the pump motor operation.

UNDER-HOOD ABS FUSE/RELAY BOX



ABS CONTROL UNIT 22P CONNECTOR



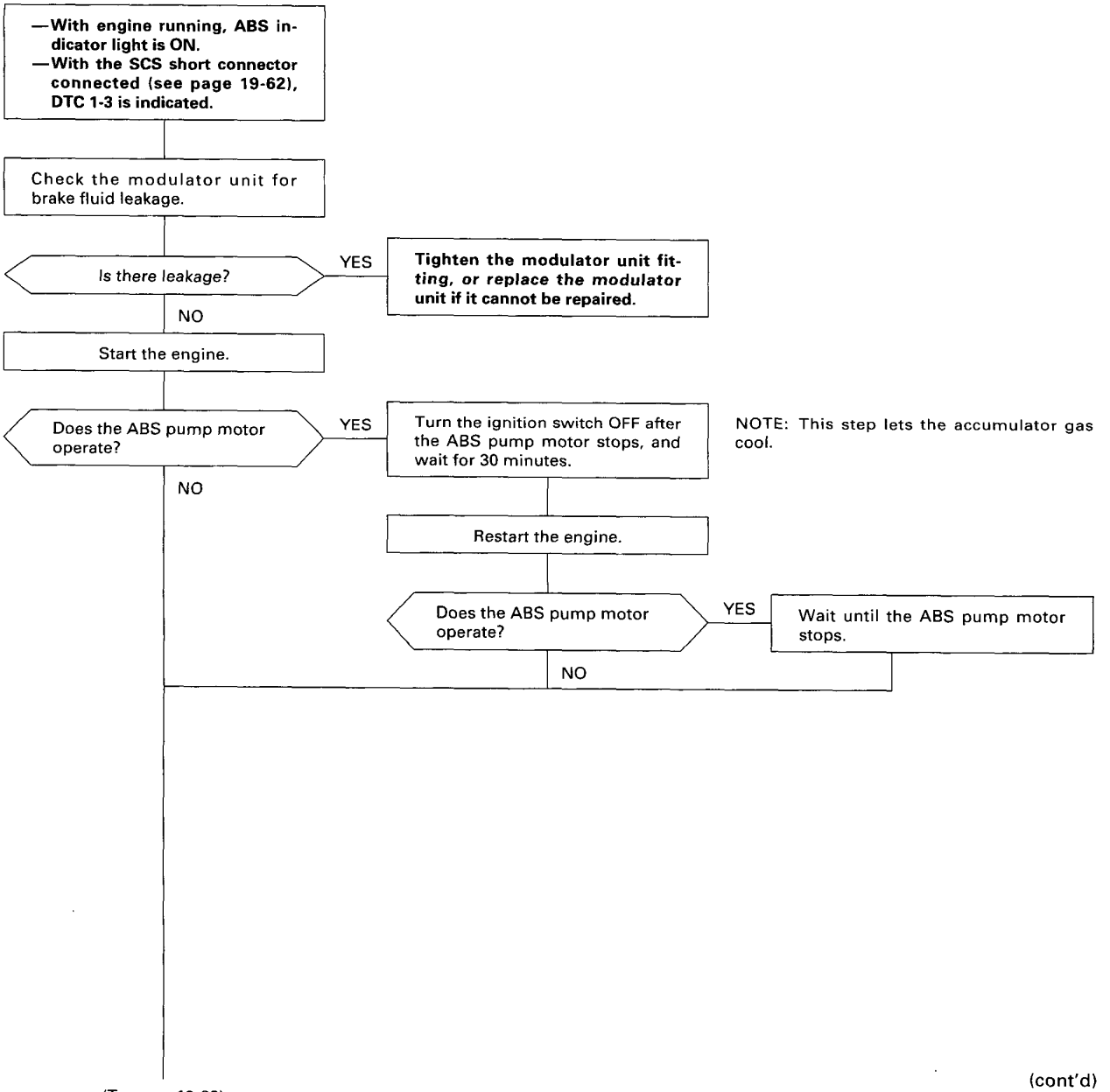
WIRE SIDE OF FEMALE TERMINALS

High Pressure Leakage

Diagnostic Trouble Code (DTC) 1-3: High Pressure Leakage Diagnosis

The ABS control unit counts the number of times that the ABS pump motor operates and stops during regular diagnosis. When the ABS pump motor repeatedly operates and stops, the ABS control unit determines that the high pressure system is leaking and turns the ABS indicator light on.
This count is reset when the ABS functions.
Possible causes:

- Leaking outlet valve
- Leaking relief valve
- Poor contact in pressure switch circuit



(cont'd)

High Pressure Leakage (cont'd)

(From page 19-81)

Turn the ignition switch OFF.

Disconnect the modulator unit 14P connector.

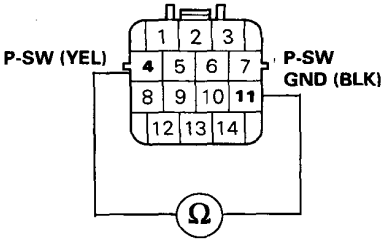
After 30 minutes, check for continuity between the modulator unit 14P connector No. 4 (YEL) and No. 11 (BLK) terminals.

Is there continuity?

NO → **Replace the modulator unit.**
- **Leaking outlet valve**
- **Leaking relief valve**

YES → **Intermittent failure, system is OK at this time.**
Check for loose connectors and terminals in the pressure switch circuit.

MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Pressure Switch

Diagnostic Trouble Code (DTC) 1-4: Pressure Switch Diagnosis

The ABS control unit momentarily activates the outlet solenoid valve and counts the number of times that the pressure switch signal is ON during the initial diagnosis.
When the ABS control unit does not detect the pressure switch OFF signal at all when the engine is started and stopped repeatedly, it keeps the ABS indicator light on. The count of the pressure switch ON signals is reset when the ABS control unit detects the pressure switch OFF signal.
Possible causes:

- Short to body ground between the ABS control unit and pressure switch
- Pressure switch stuck ON
- Faulty ABS control unit

—With engine running, ABS indicator light is ON.
—With the SCS short connector connected (see page 19-62), DTC 1-4 is indicated.

↓

Bleed the high pressure brake fluid from the modulator unit (see page 19-134).

↓

Disconnect the modulator unit 14P connector.

↓

Check for continuity between the modulator unit 14P connector No. 4 (YEL) and No. 11 (BLK) terminals.

↓

Is there continuity? — YES → **Visually inspect the modulator wire harness. If the harness is OK, replace the modulator unit. (Pressure switch stuck ON)**

NO ↓

Disconnect the ABS control unit 26P connector.

↓

Check for continuity between the ABS control unit 26P connector No. 19 (YEL) terminal and body ground.

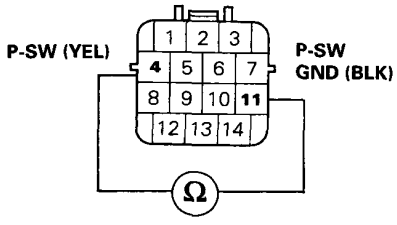
↓

Is there continuity? — YES → **Repair short to body ground in the YEL wire between the ABS control unit and modulator unit.**

NO ↓

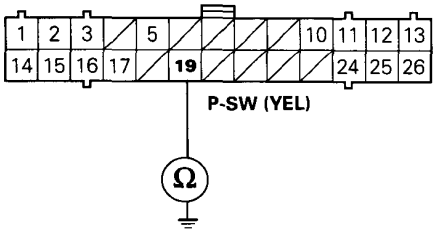
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

High Pressure System

Diagnostic Trouble Code (DTC) 1-8: High Pressure System Diagnosis

When the ABS control unit detects the pressure switch OFF signal during the initial diagnosis, it drives the ABS pump motor until the pressure switch turns ON. Then, it momentarily activates the outlet solenoid valve and monitors the pressure switch signal.
The ABS control unit keeps the ABS indicator light on if it detects the pressure switch OFF signal at this time.
Possible causes:

- Accumulator gas leakage
- Changed relief valve set pressure
- Rear outlet solenoid valve late to close
- Changed pressure switch set pressure

—With engine running, ABS indicator light is ON.
—With the SCS short connector connected (see page 19-62), DTC 1-8 is indicated.

↓

Check the accumulator relief plug.

↓

Is the plug OK? — NO → **Replace the modulator unit. (Accumulator gas leakage)**

↓ YES

Start the engine and allow it to run until the ABS indicator light goes off, then stop the engine. Repeat this procedure 10 times.

NOTE: If there is a problem, the ABS pump motor should operate the second or third time you start the engine.
The ABS pump motor operates for a short time.

↓

Does the ABS indicator light go off each time the engine is started? — YES → **• Intermittent failure, the system is OK at this time.**
• Replace the modulator unit if the symptom appears again.

↓ NO

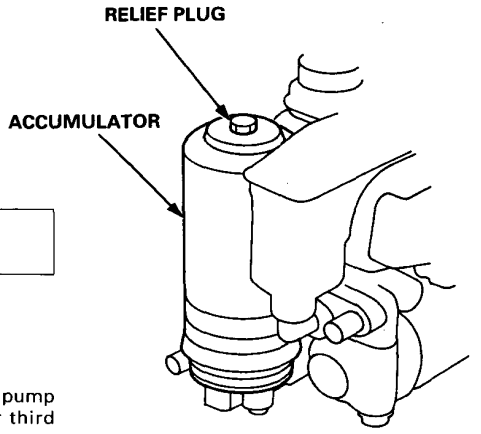
Confirm the ABS code (see page 19-62).

↓

Is code 1-8 indicated? — NO → **Perform the appropriate trouble-shooting flowchart for the code.**

↓ YES

Replace the modulator unit.
• Accumulator gas leakage
• Relief valve set pressure out of spec
• Rear outlet solenoid valve late to close
• Pressure switch set pressure out of spec



Parking Brake

Diagnostic Trouble Code (DTC) 2-1: Parking Brake Diagnosis

The ABS control unit monitors the parking brake signal during the regular diagnosis (during driving). It turns the ABS indicator light on if it detects the parking brake ON signal for 30 seconds.
Possible causes:

- Driving with the parking brake applied
- Low fluid level in the master cylinder reservoir
- Open circuit between the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse and brake system light
- Blown brake system light bulb
- Open circuit or short to body ground between the brake system light and ABS control unit
- Parking brake switch stuck ON
- Short to body ground between the brake system light and parking brake switch
- Brake fluid level switch stuck ON
- Short to body ground between the brake system light and brake fluid level switch
- Faulty ABS control unit

—With engine running, ABS indicator light is ON.
—With the SCS short connector connected (see page 19-62), DTC 2-1 is indicated.

Turn the ignition switch ON.

Pull up the parking brake lever.

Does the brake system light come on? — YES — (To page 19-87)

NO

Remove the gauge assembly (see section 23), then disconnect the gauge assembly 14P connector.

Measure the voltage between the gauge assembly 14P connector No. 5 (YEL) terminal and body ground.

Is there battery voltage? — NO — **Repair open in the YEL wire between the BACK-UP LIGHTS/METER LIGHTS (10 A) fuse and gauge assembly.**

YES

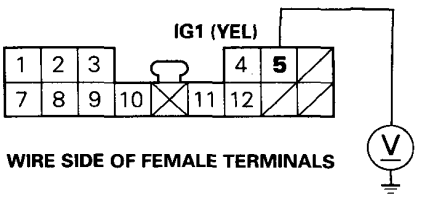
Check the brake system light bulb.

Is the bulb OK? — NO — **Replace the brake system light bulb.**

YES

(To page 19-86)

GAUGE ASSEMBLY 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Parking Brake (cont'd)

(From page 19-85)

Connect the gauge assembly 14P connector.

Connect the gauge assembly 14P connector No. 8 (GRN/RED) terminal to body ground.

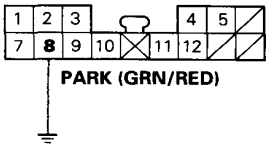
Does the brake system light come on?

NO → **Replace the printed circuit board in the gauge assembly.**

YES

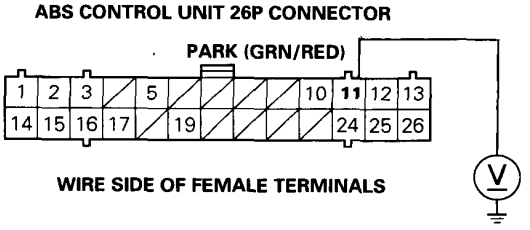
Repair open in the GRN/RED wire between the gauge assembly and parking brake switch.

GAUGE ASSEMBLY 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(From page 19-85)



Release the parking brake lever.

Does the brake system light go off?

YES → Test drive the car at speeds of 6 mph (10 km/h) or more for more than 30 seconds.

NO

Does the ABS indicator light come on?

NO → **The probable cause was driving with the parking brake applied for more than 30 seconds.**

YES

Measure the voltage between the ABS control unit 26P connector No. 11 (GRN/RED) terminal and body ground.

Is there battery voltage?

NO → **Repair open in the GRN/RED wire between the gauge assembly and ABS control unit.**

YES

Replace the ABS control unit. (Open circuit inside the unit)

Check the brake fluid level in the master cylinder reservoir.

Is the level is correct?

NO → **Check the front brake pad thickness and brake system for leaks. If there are no problems, refill the master cylinder reservoir to the correct level.**

YES

Disconnect the brake fluid level switch connectors.

Does the brake system light go off?

YES → **Replace the brake fluid level switch. (Switch stuck ON)**

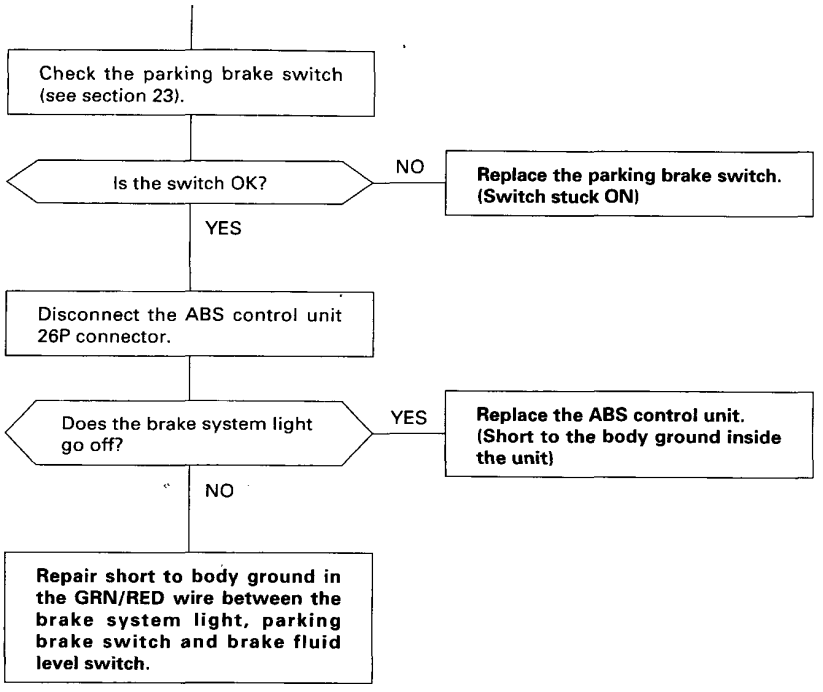
NO

(To page 19-88)

(cont'd)

Parking Brake (cont'd)

(From page 19-87)



Pulser/Different Diameter Tire

Diagnostic Trouble Code (DTC) 3-1 to 3-8: Pulser Diagnosis

The ABS control unit monitors the wheel sensor signals during the regular diagnosis (during driving).
It turns the ABS indicator light on if it detects a periodic change in the wheel sensor signal of each wheel caused by a chipped pulser gear, etc.
Possible causes:

- Chipped pulser gear
- Improperly installed wheel sensor

DTC		Pulser			
		Right-front	Left-front	Right-rear	Left-rear
3	1	○			
	2		○		
	4			○	
	8				○

Diagnostic Trouble Code (DTC) 3-12: Different Diameter Tire Diagnosis

The ABS control unit detects the wheel sensor signal speed during the regular diagnosis (during driving).
This diagnosis is not performed when the parking brake switch signal is ON.
The ABS control unit may turn the ABS indicator light on when one or more different diameter tires are installed.

Right-front Wheel Sensor

Diagnostic Trouble Code (DTC) 4-1: Right-front Wheel Sensor Diagnosis

The ABS control unit monitors the wheel sensor signal during the regular diagnosis (at speeds of 6 mph (10 km/h) or more). This diagnosis is not performed when the parking brake signal is ON.
The ABS control unit turns the ABS indicator light on if it detects that there is no wheel sensor signal from the right-front wheel.
Possible causes:

- Open circuit, internal short or short to body ground in the right-front wheel sensor
- Open circuit or short to body ground in the positive (+) wire between the right-front wheel sensor and ABS control unit
- Open circuit or short to body ground in the negative (–) wire between the right-front wheel sensor and ABS control unit
- Positive (+) wire shorted to the negative (–) wire between the right-front wheel sensor and ABS control unit
- Loose connector or poor contact of terminals
- Improper right-front wheel sensor air gap
- Faulty ABS control unit
- Missing right-front pulser
- Modulator does not decrease pressure properly
- Wheel lock by downshift

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), DTC 4-1 is indicated.

Disconnect the right-front wheel sensor 2P connector.

Measure the resistance between the wheel sensor 2P connector No. 1 and No. 2 terminals.

Is there 700 – 1,100 Ω? NO → **Replace the right-front wheel sensor.**

YES

Check for continuity between the wheel sensor 2P connector No. 2 terminal and body ground.

Is there continuity? YES → **Replace the right-front wheel sensor.**

NO

Disconnect the ABS control unit 22P connector.

Check for continuity between the ABS control unit 22P connector No. 5 (GRN/BLK) terminal and body ground.

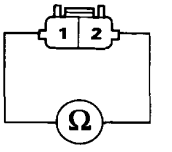
NOTE: Check with the wheel sensor 2P connector disconnected.

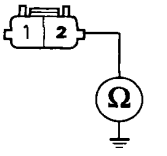
Is there continuity? YES → **Repair short to body ground in the GRN/BLK wire between the ABS control unit and right-front wheel sensor.**

NO

(To page 19-91)

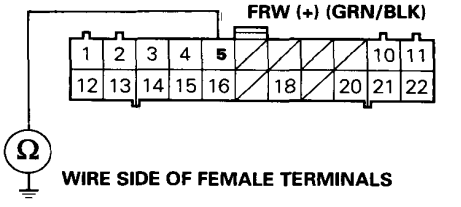
RIGHT-FRONT WHEEL SENSOR 2P CONNECTOR





WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(From page 19-90)

Check for continuity between the ABS control unit 22P connector No. 4 (GRN) terminal and body ground.

Is there continuity?

YES

Repair short to body ground in the GRN wire between the ABS control unit and right-front wheel sensor.

NO

Connect the right-front wheel sensor 2P connector.

Measure the resistance between the ABS control unit 22P connector No. 4 (GRN) and No. 5 (GRN/BLK) terminals.

Is there 700 – 1,100 Ω?

NO

Connect the ABS control unit 22P connector No. 5 (GRN/BLK) terminal to body ground.

YES

Disconnect the right-front wheel sensor 2P connector.

Check for continuity between the wheel sensor 2P connector No. 2 (GRN/BLK) terminal and body ground.

Is there continuity?

NO

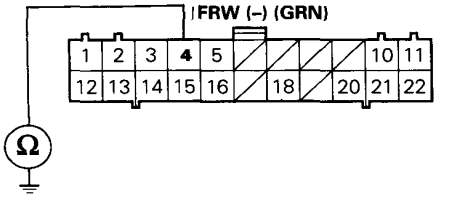
Repair open in the GRN/BLK wire between the ABS control unit and right-front wheel sensor.

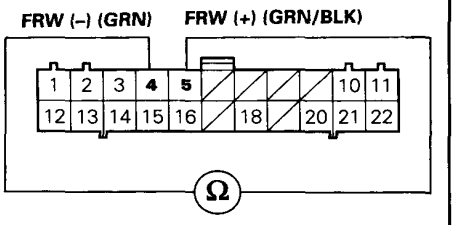
YES

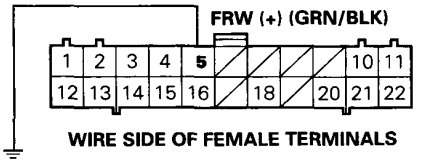
Repair open in the GRN wire between the ABS control unit and right-front wheel sensor.

(To page 19-92)

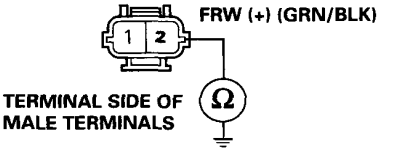
ABS CONTROL UNIT 22P CONNECTOR







RIGHT-FRONT WHEEL SENSOR 2P CONNECTOR



NOTE: Check with the ABS control unit 22P connector disconnected.

(cont'd)

Right-front Wheel Sensor (cont'd)

(From page 19-91)

Measure the right-front wheel sensor air gap (see page 19-145).

Is the air gap OK?

NO → **Correct the right-front wheel sensor air gap (see page 19-145).**

YES

Connect the ALB checker to the ABS inspection connector (see page 19-131).

Start the engine.

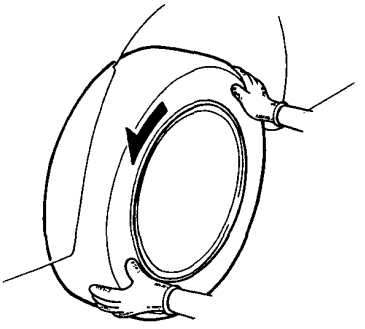
Turn the Mode Selector switch to "5".

Depress the brake pedal firmly and hold it.

Push the Start Test switch.

Confirm that the right-front wheel can be rotated by hand while the ABS is functioning.

NOTE: This step requires an assistant.



Can the wheel be rotated?

NO → **Replace the modulator unit.**

YES

- **Intermittent failure, the system is OK at this time.**
- **Wheel lock by downshift.**
- **Test drive the car. If the symptom reappears, replace the ABS control unit.**

Left-front Wheel Sensor

Diagnostic Trouble Code (DTC) 4-2: Left-front Wheel Sensor Diagnosis

The ABS control unit monitors the wheel sensor signal during the regular diagnosis (at speeds of 6 mph (10 km/h) or more). This diagnosis is not performed when the parking brake signal is ON.
The ABS control unit turns the ABS indicator light on if it detects that there is no wheel sensor signal from the left-front wheel.
Possible causes:

- Open circuit, internal short or short to body ground in the left-front wheel sensor
- Open circuit or short to body ground in the positive (+) wire between the left-front wheel sensor and ABS control unit
- Open circuit or short to body ground in the negative (–) wire between the left-front wheel sensor and ABS control unit
- Positive (+) wire shorted to the negative (–) wire between the left-front wheel sensor and ABS control unit
- Loose connector or poor contact of terminals
- Improper left-front wheel sensor air gap
- Faulty ABS control unit
- Missing left-front pulser
- Modulator does not decrease pressure properly
- Wheel lock by downshift

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), DTC 4-2 is indicated.

Disconnect the left-front wheel sensor 2P connector.

Measure the resistance between the wheel sensor 2P connector No. 1 and No. 2 terminals.

Is there 700 – 1,100 Ω? — NO → **Replace the left-front wheel sensor.**

YES

Check for continuity between the wheel sensor 2P connector No. 2 terminal and body ground.

Is there continuity? — YES → **Replace the left-front wheel sensor.**

NO

Disconnect the ABS control unit 22P connector.

Check for continuity between the ABS control unit 22P connector No. 3 (GRN/BLU) terminal and body ground.

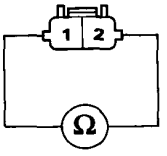
NOTE: Check with the wheel sensor 2P connector disconnected.

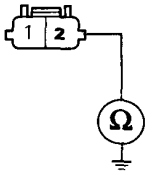
Is there continuity? — YES → **Repair short to body ground in the GRN/BLU wire between the ABS control unit and left-front wheel sensor.**

NO

(To page 19-94)

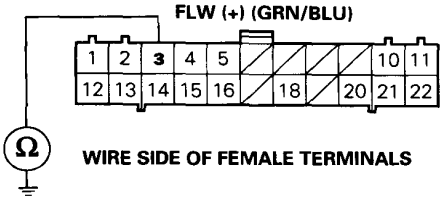
LEFT-FRONT WHEEL SENSOR 2P CONNECTOR





WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Left-front Wheel Sensor (cont'd)

(From page 19-93)

Check for continuity between the ABS control unit 22P connector No. 2 (BRN) terminal and body ground.

Is there continuity?

YES → **Repair short to body ground in the BRN wire between the ABS control unit and left-front wheel sensor.**

NO

Connect the left-front wheel sensor 2P connector.

Measure the resistance between the ABS control unit 22P connector No. 2 (BRN) and No. 3 (GRN/BLU) terminals.

Is there 700 – 1,100 Ω?

NO → Connect the ABS control unit 22P connector No. 3 (GRN/BLU) terminal to body ground.

YES

Disconnect the left-front wheel sensor 2P connector.

Check for continuity between the wheel sensor 2P connector No. 2 (GRN/BLU) terminal and body.

Is there continuity?

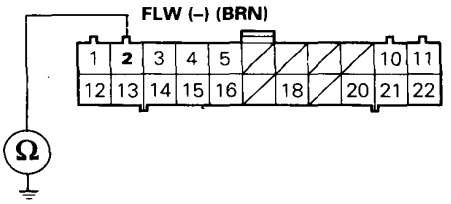
NO → **Repair open in the GRN/BLU wire between the ABS control unit and left-front wheel sensor.**

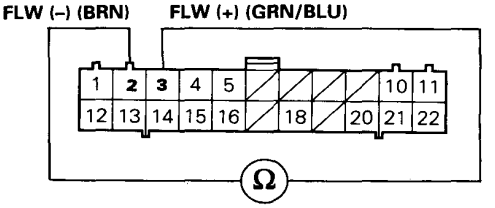
YES

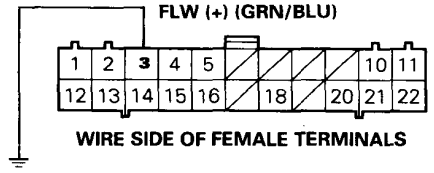
Repair open in the BRN wires between the ABS control unit and left-front wheel sensor.

(To page 19-95)

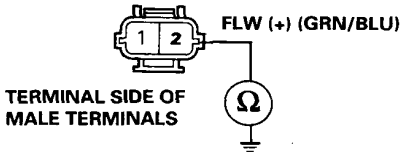
ABS CONTROL UNIT 22P CONNECTOR







LEFT-FRONT WHEEL SENSOR 2P CONNECTOR



NOTE: Check with the ABS control unit 22P connector disconnected.

(From page 19-94)

Measure the left-front wheel sensor air gap (see page 19-145).

Is the air gap OK?

NO → **Correct the left-front wheel sensor air gap (see page 19-145).**

YES

Connect the ALB checker to the ABS inspection connector (see page 19-131).

Start the engine.

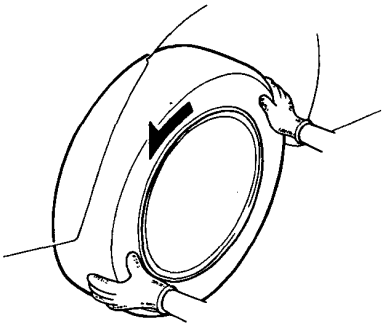
Turn the Mode Selector switch to "4".

Depress the brake pedal firmly and hold it.

Push the Start Test switch.

Confirm that the left-front wheel can be rotated by hand while the ABS is functioning.

NOTE: This step requires an assistant.



Can the wheel be rotated?

NO → **Replace the modulator unit.**

YES

- **Intermittent failure, the system is OK at this time.**
- ***Wheel lock by downshift.***
- **Test drive the car. If the symptom reappears, replace the ABS control unit.**

Right-rear Wheel Sensor

Diagnostic Trouble Code (DTC) 4-4: Right-rear Wheel Sensor Diagnosis

The ABS control unit monitors the wheel sensor signal during the regular diagnosis (at speeds of 6 mph (10 km/h) or more). This diagnosis is not performed when the parking brake signal is ON.
The ABS control unit turns the ABS indicator light on if it detects that there is no wheel sensor signal from the right-rear wheel.
Possible causes:

- Open circuit, internal short or short to body ground in the right-rear wheel sensor
- Open circuit or short to body ground in the positive (+) wire between the right-rear wheel sensor and ABS control unit
- Open circuit or short to body ground in the negative (–) wire between the right-rear wheel sensor and ABS control unit
- Positive (+) wire shorted to the negative (–) wire between the right-rear wheel sensor and ABS control unit
- Loose connector or poor contact of terminals
- Improper right-rear wheel sensor air gap
- Faulty ABS control unit
- Missing right-rear pulser
- Modulator does not decrease pressure properly

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), DTC 4-4 is indicated.

↓

Disconnect the right-rear wheel sensor 2P connector.

↓

Measure the resistance between the wheel sensor 2P connector No. 1 and No. 2 terminals.

↓

Is there 600 – 900 Ω? — NO → **Replace the right-rear wheel sensor.**

↓ YES

Check for continuity between the wheel sensor 2P connector No. 2 terminal and body ground.

↓

Is there continuity? — YES → **Replace the right-rear wheel sensor.**

↓ NO

Disconnect the ABS control unit 22P connector.

↓

Check for continuity between the ABS control unit 22P connector No. 15 (GRN/YEL) terminal and body ground.

NOTE: Check with the wheel sensor 2P connector disconnected.

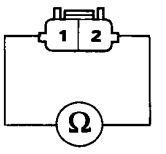
↓

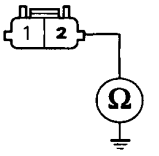
Is there continuity? — YES → **Repair short to body ground in the GRN/YEL wire between the ABS control unit and right-rear wheel sensor.**

↓ NO

(To page 19-97)

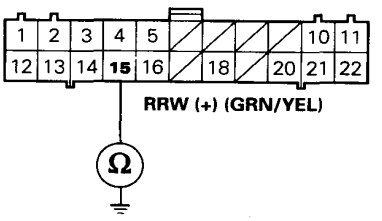
RIGHT-REAR WHEEL SENSOR 2P CONNECTOR





WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(From page 19-96)

Check for continuity between the ABS control unit 22P connector No. 16 (BLU/YEL) terminal and body ground.

Is there continuity?

YES → **Repair short to body ground in the BLU/YEL wire between the ABS control unit and right-rear wheel sensor.**

NO

Connect the right-rear wheel sensor 2P connector.

Measure the resistance between the ABS control unit 22P connector No. 15 (GRN/YEL) and No. 16 (BLU/YEL) terminals.

Is there 600 – 900 Ω?

NO → Connect the ABS control unit 22P connector No. 15 (GRN/YEL) terminal to body ground.

YES

Disconnect the right-rear wheel sensor 2P connector.

Check for continuity between the wheel sensor 2P connector No. 2 (GRN/YEL) terminal and body ground.

Is there continuity?

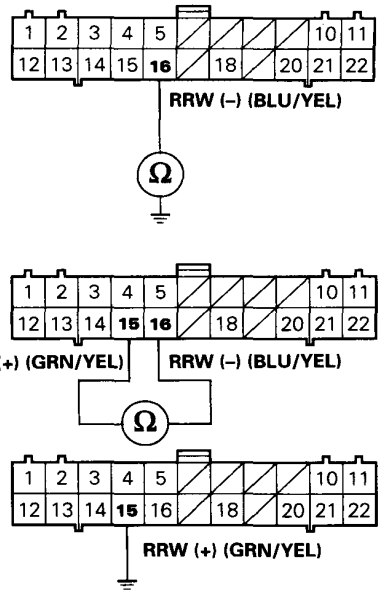
NO → **Repair open in the GRN/YEL wire between the ABS control unit and right-rear wheel sensor.**

YES

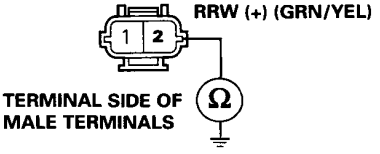
Repair open in the BLU/YEL wire between the ABS control unit and right-rear wheel sensor.

(To page 19-98)

ABS CONTROL UNIT 22P CONNECTOR



RIGHT-REAR WHEEL SENSOR 2P CONNECTOR



NOTE: Check with the ABS control unit 22P connector disconnected.

(cont'd)

Right-rear Wheel Sensor (cont'd)

(From page 19-97)

Measure the right-rear wheel sensor air gap (see page 19-145).

Is the air gap OK?

NO → **Correct the right-rear wheel sensor air gap (see page 19-145).**

YES

Connect the ALB checker to the ABS inspection connector (see page 19-131).

Start the engine.

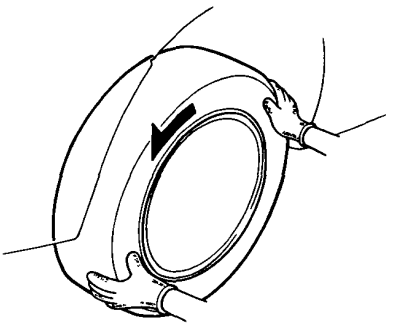
Turn the Mode Selector switch to "3".

Depress the brake pedal firmly and hold it.

Push the Start Test switch.

Confirm that the right-rear wheel can be rotated by hand while the ABS is functioning.

NOTE: This step requires an assistant.



Can the wheel be rotated?

NO → **Replace the modulator unit.**

YES

- **Intermittent failure, the system is OK at this time.**
- **Test drive the car. If the symptom reappears, replace the ABS control unit.**

Left-rear Wheel Sensor

Diagnostic Trouble Code (DTC) 4-8: Left-rear Wheel Sensor Diagnosis

The ABS control unit monitors the wheel sensor signal during the regular diagnosis (at speeds of 6 mph (10 km/h) or more). This diagnosis is not performed when the parking brake signal is ON.
The ABS control unit turns the ABS indicator light on if it detects that there is no wheel sensor signal from the left-rear wheel.
Possible causes:

- Open circuit, internal short or short to body ground in the left-rear wheel sensor
- Open circuit or short to body ground in the positive (+) wire between the left-rear wheel sensor and ABS control unit
- Open circuit or short to body ground in the negative (–) wire between the left-rear wheel sensor and ABS control unit
- Positive (+) wire shorted to the negative (–) wire between the left-rear wheel sensor and ABS control unit
- Loose connector or poor contact of terminals
- Improper left-rear wheel sensor air gap
- Faulty ABS control unit
- Missing left-rear pulser
- Modulator does not decrease pressure properly
- Both front wheels spin (for example, when wheels are stuck)

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), DTC 4-8 is indicated.

↓

Disconnect the left-rear wheel sensor 2P connector.

↓

Measure the resistance between the wheel sensor 2P connector No. 1 and No. 2 terminals.

↓

Is there 600 – 900 Ω? — NO → **Replace the left-rear wheel sensor.**

YES ↓

Check for continuity between the wheel sensor 2P connector No. 2 terminal and body ground.

↓

Is there continuity? — YES → **Replace the left-rear wheel sensor.**

NO ↓

Disconnect the ABS control unit 22P connector.

↓

Check for continuity between the ABS control unit 22P connector No. 13 (LT BLU) terminal and body ground.

NOTE: Check with the wheel sensor 2P connector disconnected.

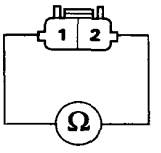
↓

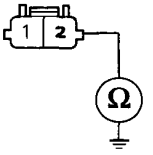
Is there continuity? — YES → **Repair short to body ground in the LT BLU wire between the ABS control unit and left-rear wheel sensor.**

NO ↓

(To page 19-100)

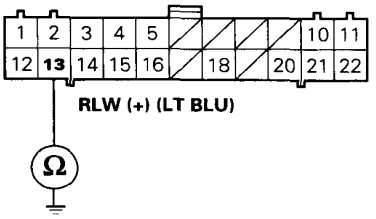
LEFT-REAR WHEEL SENSOR 2P CONNECTOR





WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Left-rear Wheel Sensor (cont'd)

(From page 19-99)

Check for continuity between the ABS control unit 22P connector No. 16 (GRY) terminal and body ground.

Is there continuity?

YES → **Repair short to body ground in the GRY wire between the ABS control unit and left-rear wheel sensor.**

NO

Connect the left-rear wheel sensor 2P connector.

Measure the resistance between the ABS control unit 22P connector No. 13 (LT BLU) and No. 14 (GRY) terminals.

Is there 600 – 900 Ω?

NO → Connect the ABS control unit 22P connector No. 13 (LT BLU) terminal to the body ground.

YES

Disconnect the left-rear wheel sensor 2P connector.

Check for continuity between the wheel sensor 2P connector No. 2 (LT BLU) terminal and body ground.

Is there continuity?

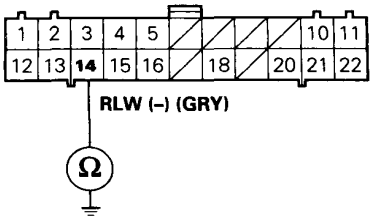
NO → **Repair open in the LT BLU wire between the ABS control unit and left-rear wheel sensor.**

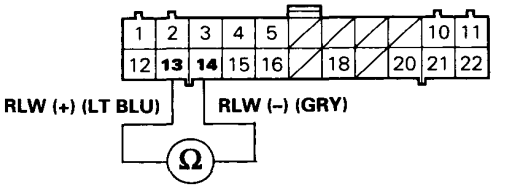
YES

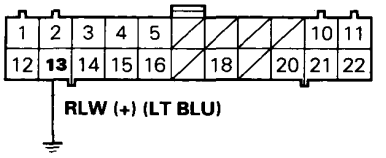
Repair open in the GRY wire between the ABS control unit and left-rear wheel sensor.

(To page 19-101)

ABS CONTROL UNIT 22P CONNECTOR

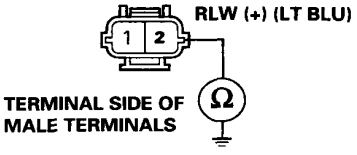






WIRE SIDE OF FEMALE TERMINALS

LEFT-REAR WHEEL SENSOR 2P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS

NOTE: Check with the ABS control unit 22P connector disconnected.

(From page 19-100)

Measure the left-rear wheel sensor air gap (see page 19-145).

Is the air gap OK?

NO → **Correct the left-rear wheel sensor air gap (see page 19-145).**

YES

Connect the ALB checker to the ABS inspection connector (see page 19-131).

Start the engine.

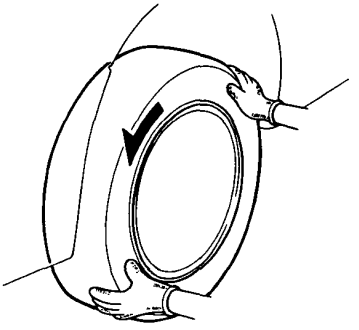
Turn the Mode Selector switch to "2".

Depress the brake pedal firmly and hold it.

Push the Start Test switch.

Confirm that the left-rear wheel can be rotated by hand while the ABS is functioning.

NOTE: This step requires an assistant.



Can the wheel be rotated?

NO → **Replace the modulator unit.**

YES

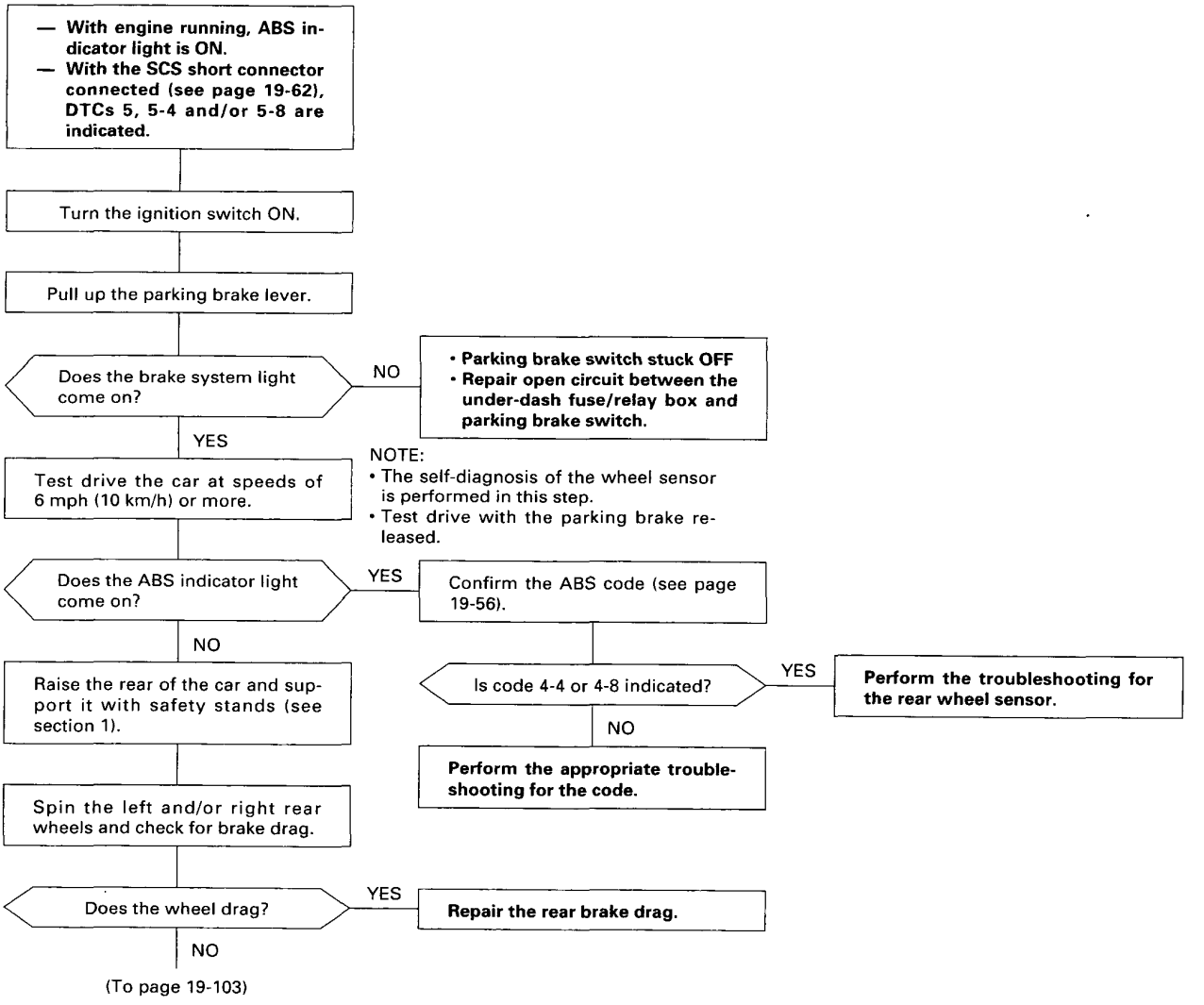
- **Intermittent failure, the system is OK at this time.**
- **Test drive the car. If the symptom reappears, replace the ABS control unit.**

Rear Wheel Lock

Diagnostic Trouble Code (DTC) 5 to 5-8: Rear Wheel Lock Diagnosis

The ABS control unit monitors the rear wheel sensor signals during the regular diagnosis (during driving).
This diagnosis is not performed when the parking brake signal is ON.
The ABS control unit turns the ABS indicator light on if it detects no signal(s) from the rear wheel sensor(s) due to, for example, rear wheel lock.
Possible causes:

- Wheel spin during cornering
- Open circuit, internal short or short to the body ground in the wheel sensor system
- Rear brake drag
- Modulator does not decrease pressure properly
- Faulty ABS control unit



(From page 19-102)

Connect the ALB checker to the ABS inspection connector (see page 19-131).

Start the engine.

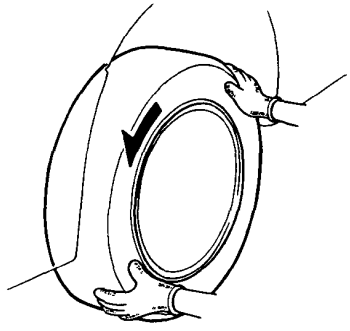
Turn the Mode Selector switch to "2".

Depress the brake pedal firmly and hold it.

Push the Start Test switch.

Confirm that the rear wheels can be rotated by hand while the ABS is functioning.

NOTE: *This step requires an assistant.*



Can the wheels be rotated?

NO → **Replace the modulator unit.**

YES

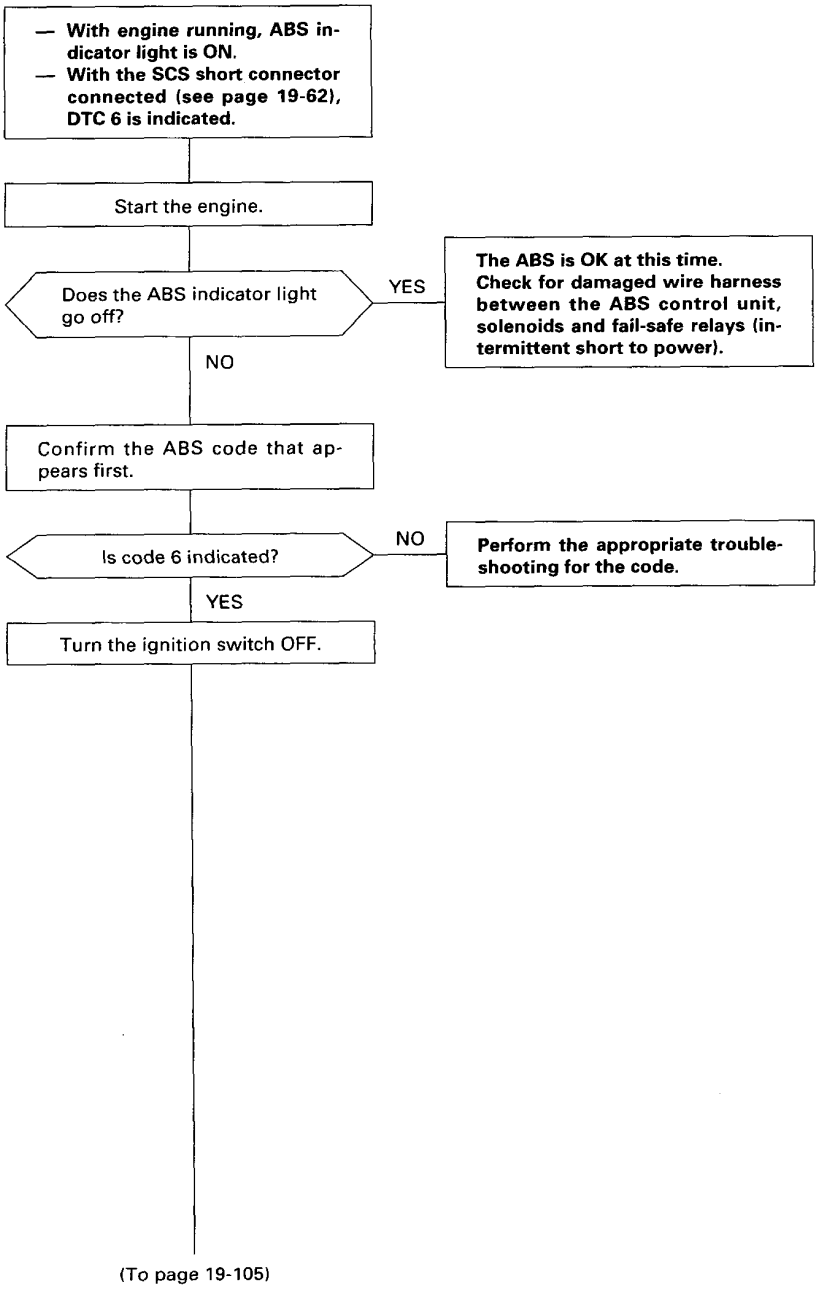
- **Intermittent failure, the system is OK at this time.**
- **The probable cause was that the traction was lost due to excessive cornering speed, etc.**
- **Replace the ABS control unit if the symptom reappears.**

Front and Rear Fail-safe Relays

Diagnostic Trouble Code (DTC) 6: Front and Rear Fail-safe Relays Diagnosis

The ABS control unit monitors the voltage from the battery for the six solenoids during the initial diagnosis when the fail-safe relays are OFF.
The ABS control unit keeps the ABS indicator light on if it detects battery voltage at the front and rear solenoid circuits.
Possible causes:

- Short to power in the relay drive circuits between the fail-safe relays and ABS control unit
- Faulty relay drive transistor (ON) in the ABS control unit



(To page 19-105)

(From page 19-104)

Disconnect the ABS control unit 22P connector.

Start the engine.

Measure the voltage between the ABS control unit 22P connector No. 1 (YEL/GRN) terminal and *body ground.*

Is there battery voltage?

YES → **Repair short to power in the YEL/GRN *wire between ABS control* unit, and front and rear fail-safe relays.**

NO

Turn the ignition switch OFF.

Connect the ABS control unit 22P connector.

Turn the ignition switch ON.

Measure the voltage between the ABS control unit 22P connector No. 1 (YEL/GRN) terminal and body ground.

Is there battery voltage?

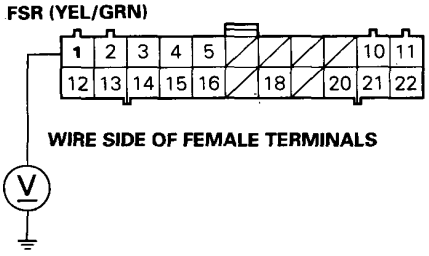
YES → **Replace the ABS control unit. (Faulty fail-safe relay drive transistor)**

NO

Perform the troubleshooting for DTC 6-1 (see page 19-106) and DTC 6-4 (see page 19-109).

ABS CONTROL UNIT 22P CONNECTOR

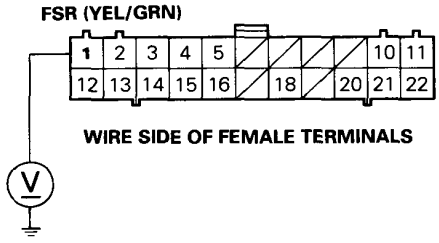
FSR (YEL/GRN)



WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 22P CONNECTOR

FSR (YEL/GRN)



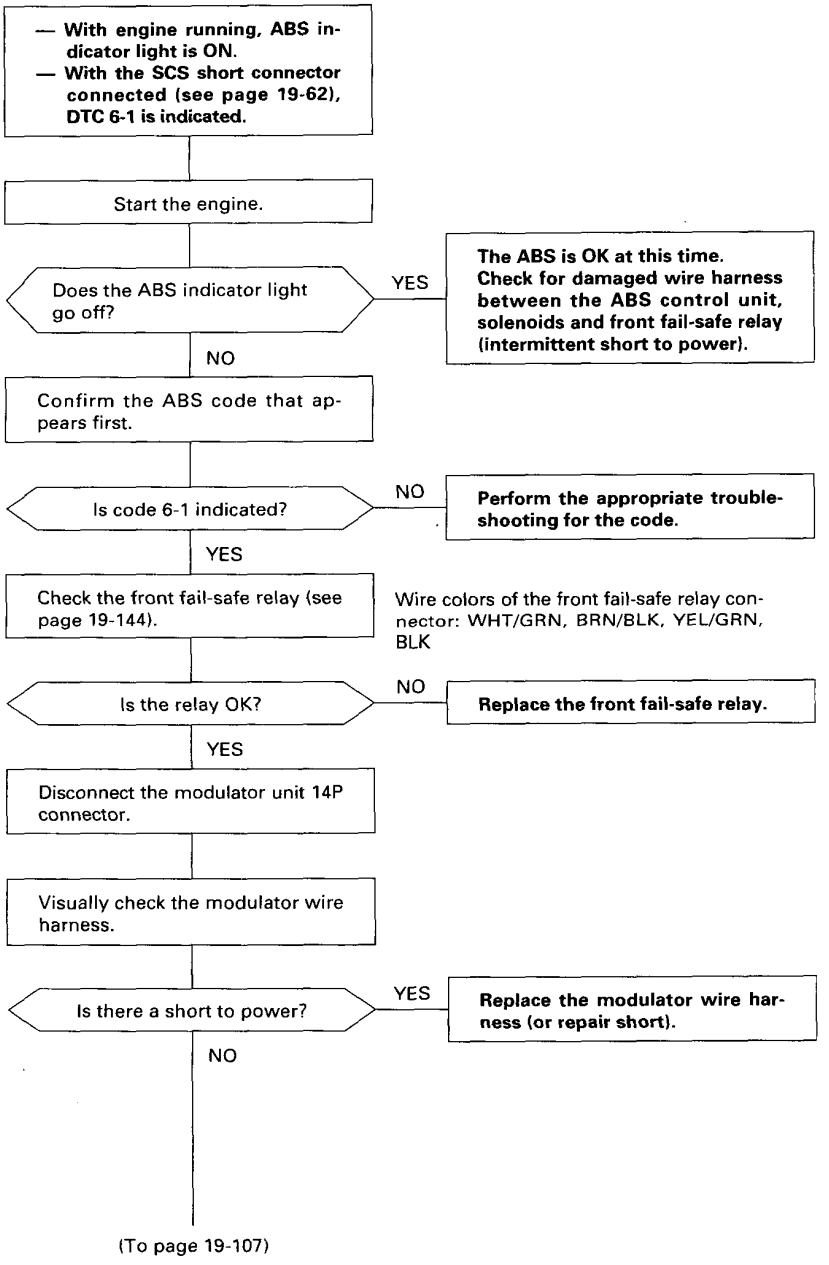
WIRE SIDE OF FEMALE TERMINALS

Front Fail-safe Relay

Diagnostic Trouble Code (DTC) 6-1: Front Fail-safe Relay Diagnosis

The ABS control unit monitors the voltage from the battery for the six solenoids during the initial diagnosis when the fail-safe relays are OFF.
The ABS control unit keeps the ABS indicator light on if it detects battery voltage at the front solenoid circuits.
Possible causes:

- Front fail-safe relay stuck ON
- Short to power in the solenoid drive circuits between the front fail-safe relay and ABS control unit



(From page 19-106)

Start the engine.

Measure the voltage between the front fail-safe relay connector No. 3 (BRN/BLK) terminal and body ground.

NOTE: The fail-safe relays are OFF when the ABS indicator light is kept on.

Is there battery voltage?

YES → **Repair short to power in the BRN/BLK wire between the front fail-safe relay and modulator unit.**

NO

Turn the ignition switch OFF.

Disconnect the ABS control unit 26P connector.

Start the engine.

Measure the voltage between the ABS control unit 26P connector No. 2 (RED/BLK) terminal and body ground.

NOTE: Check with the modulator unit 14P connector disconnected.

Is there battery voltage?

YES → **Repair short to power in the RED/BLK wire between the ABS control unit and modulator unit.**

NO

Measure the voltage between the ABS control unit 26P connector No. 1 (RED/BLU) terminal and body ground.

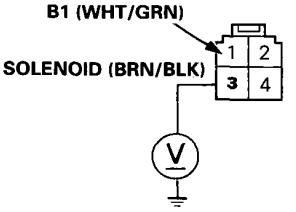
Is there battery voltage?

YES → **Repair short to power in the RED/BLU wire between the ABS control unit and modulator unit.**

NO

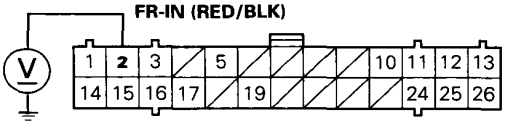
(To page 19-108)

FRONT FAIL-SAFE RELAY CONNECTOR

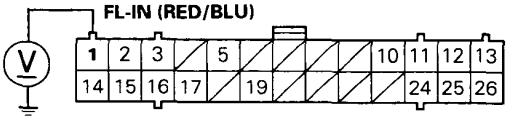


WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



(cont'd)

Front Fail-safe Relay (cont'd)

(From page 19-107)

Measure the voltage between the ABS control unit 26P connector No. 15 (YEL/BLK) terminal and body ground.

Is there battery voltage?

YES → **Repair short to power in the YEL/BLK wire between the ABS control unit and modulator unit.**

NO

Measure the voltage between the ABS control unit 26P connector No. 14 (YEL/BLU) terminal and body ground.

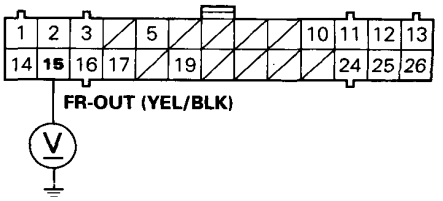
Is there battery voltage?

YES → **Repair short to power in the YEL/BLU wire between the ABS control unit and modulator unit.**

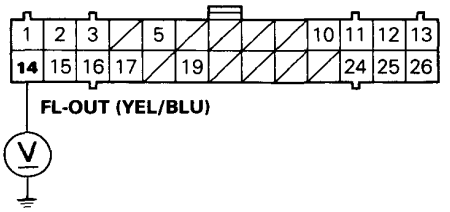
NO

Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

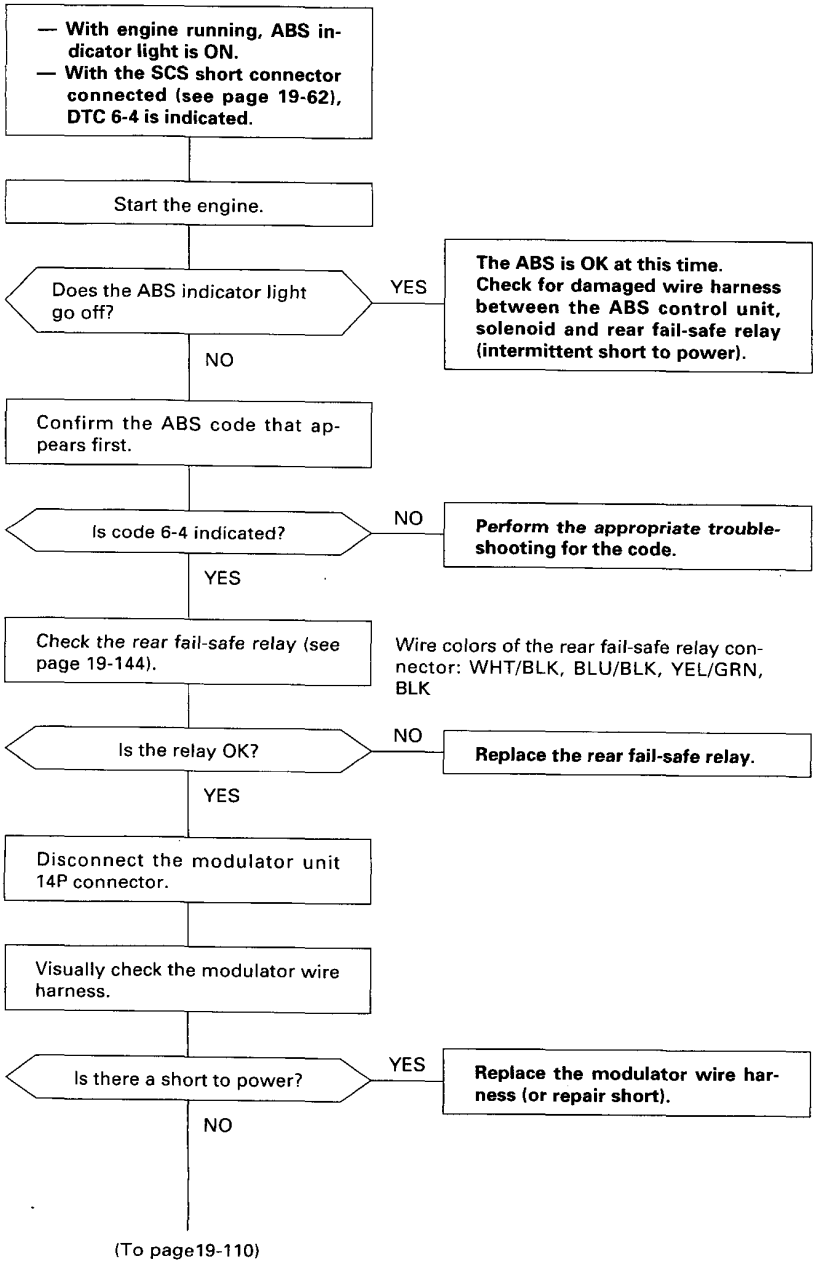


Rear Fail-safe Relay

Diagnostic Trouble Code (DTC) 6-4: Rear Fail-safe Relay Diagnosis

The ABS control unit monitors the voltage from the battery for the six solenoids during the initial diagnosis when the fail-safe relays are OFF.
The ABS control unit keeps the ABS indicator light on if it detects the battery voltage at the two rear solenoid circuits.
Possible causes:

- Rear fail-safe relay stuck ON
- Short to power in the solenoid drive circuits between the rear fail-safe relay and ABS control unit



(cont'd)

Rear Fail-safe Relay (cont'd)

(From page 19-109)

Start the engine.

Measure the voltage between the rear fail-safe relay connector No. 3 (BLU/BLK) terminal and body ground.

NOTE: The fail-safe relays are OFF when the ABS indicator light is kept on.

Is there battery voltage?

YES → **Repair short to power in the BLU/BLK wire between the rear fail-safe relay and modulator unit.**

NO

Turn the ignition switch OFF.

Disconnect the ABS control unit 26P connector.

Start the engine.

Measure the voltage between the ABS control unit 26P connector No. 3 (RED/WHT) terminal and body ground.

NOTE: Check with the modulator unit 14P connector disconnected.

Is there battery voltage?

YES → **Repair short to power in the RED/WHT wire between the ABS control unit and modulator unit.**

NO

Measure the voltage between the ABS control unit 26P connector No. 16 (YEL/WHT) terminal and body ground.

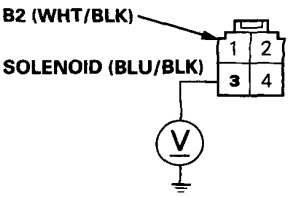
Is there battery voltage?

YES → **Repair short to power in the YEL/WHT wire between the ABS control unit and modulator unit.**

NO

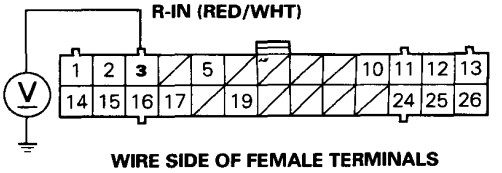
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

REAR FAIL-SAFE RELAY CONNECTOR

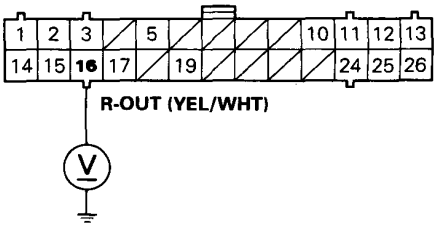


WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



Right-front Solenoid

Diagnostic Trouble Code (DTC) 7-1: Right-front Solenoid Diagnosis

During the initial diagnosis, after the fail-safe relays are turned on, and during the regular diagnosis, the ABS control unit monitors the voltage from the battery for the six solenoids (when the ABS is not functioning).
If the detection circuit for the right-front solenoid detects 0 V, the ABS control unit keeps the ABS indicator light on after the engine is started. It turns the ABS indicator light on again if it detects 0 V after the light goes off.
Possible causes:

- Open circuit in the right-front solenoid drive circuits between the front fail-safe relay and ABS control unit
- Short circuit to body ground in the right-front solenoid drive circuits between the solenoids and ABS control unit
- Faulty right-front solenoid drive transistor (ON) in the ABS control unit

The ABS control unit momentarily outputs the ON signal to each solenoid (too momentary to turn the solenoid on) during the initial diagnosis, and each time the car is started, to check the voltage from the battery with the detection circuit.
If the detection circuit for the right-front solenoids detects battery voltage at this time, the ABS control unit keeps the ABS indicator light on. It turns the ABS indicator light on again if it detects battery voltage when the car is started.
Possible causes:

- Short circuit to power in the right-front solenoid drive circuits between the solenoids and ABS control unit
- Faulty right-front solenoid drive transistor (OFF) in the ABS control unit
- Short circuit to power in the right-front solenoid drive circuits in the modulator wire harness or solenoids
- Short circuit to the right-front solenoid outlet circuit in the inlet circuit between the solenoid and ABS control unit

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), *DTC 7-1 is indicated.*

Start the engine.

Does the ABS indicator light go off?

YES → **The system is OK at this time. Check the wire harness and connectors between the ABS control unit, fail-safe relay and modulator unit (intermittent open or short circuit).**

NO

Confirm the ABS code that appears first.

Is code 7-1 indicated?

NO → **Perform the appropriate troubleshooting for the code.**

YES

Disconnect the modulator unit 14P connector.

Remove the front fail-safe relay.

Wire colors of the front fail-safe relay connector: WHT/GRN, BRN/BLK, YEL/GRN, BLK

Connect the front fail-safe relay connector No. 1 (WHT/GRN) and No. 3 (BRN/BLK) terminals using a jumper wire.

(To page 19-112)

FRONT FAIL-SAFE RELAY CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Right-front Solenoid (cont'd)

(From page 19-111)

Measure the voltage between the modulator unit 14P connector No. 5 (BRN/BLK) and No. 8 (BRN/BLK) terminals and body ground.

Is there battery voltage?

NO → **Repair open in the BRN/BLK wire(s) between the front fail-safe relay and modulator unit.**

YES

Measure the resistance between the modulator unit 14P connector terminals to determine the solenoid standard resistance (A type or B type).
Inlet:
— No. 9 (WHT) and No. 13 (RED/WHT)
— No. 10 (WHT/BLU) and No. 14 (RED/BLU)
Outlet:
— No. 2 (YEL/WHT) and No. 6 (GRY/WHT)
— No. 3 (YEL/BLU) and No. 7 (GRY/BLU)

NOTE:

	STANDARD RESISTANCE	
	A TYPE	B TYPE
Inlet Solenoid	2.5 – 2.9 Ω	6.5 – 7.5 Ω
Outlet Solenoid	2.5 – 2.9 Ω	3.3 – 3.9 Ω

Measure the resistance between the modulator unit 14P connector No. 1 (YEL/BLK) and No. 5 (GRY/BLK) terminals, and the No. 8 (WHT/BLK) and No. 12 (RED/BLK) terminals.

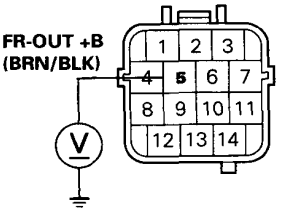
Is the resistance as specified?
Inlet: 2.5 – 2.9 Ω or 6.5 – 7.5 Ω
Outlet: 2.5 – 2.9 Ω or 3.3 – 3.9 Ω

NO → **Visually inspect the modulator wire harness. If the harness is OK, replace the modulator unit. (Open or short in the right-front inlet or outlet solenoid)**

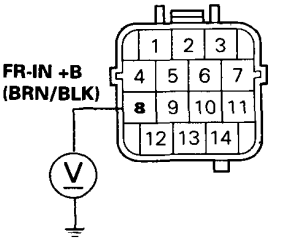
YES

(To page 19-113)

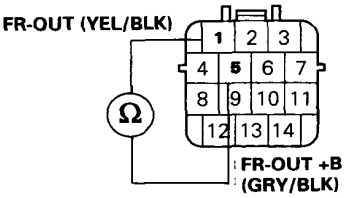
MODULATOR UNIT 14P CONNECTOR



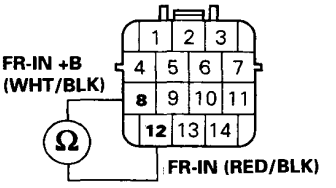
TERMINAL SIDE OF MALE TERMINALS



MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



(From page 19-112)

Check for continuity between the modulator unit 14P connector No. 1 (YEL/BLK) and No. 12 (RED/BLK) terminals and body ground.

Is there continuity?

YES → **Visually inspect the modulator wire harness. If the harness is OK, replace the modulator unit. (Short to body ground in the right-front inlet or outlet solenoid)**

NO

Check for continuity between the modulator unit 14P connector No. 1 (YEL/BLK) and No. 12 (RED/BLK) terminals.

Is there continuity?

YES → **Replace the modulator wire harness. (Short to the RED/BLK wire in the YEL/BLK wire.)**

NO

Disconnect the ABS control unit 26P connector.

Check for continuity between the ABS control unit 26P connector No. 15 (YEL/BLK) and No. 2 (RED/BLK) terminals and body ground.

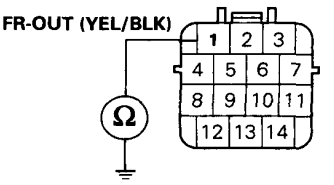
Is there continuity?

YES → **Repair short to body ground in the YEL/BLK or RED/BLK wire between the ABS control unit and modulator unit.**

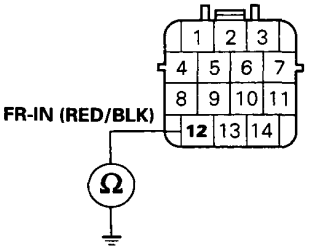
NO

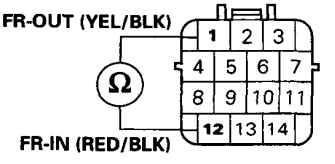
(To page 19-114)

MODULATOR UNIT 14P CONNECTOR

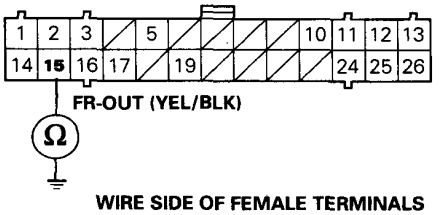


WIRE SIDE OF FEMALE TERMINALS

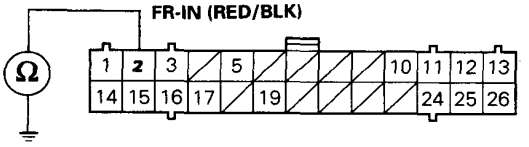




ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



(cont'd)

Right-front Solenoid (cont'd)

(From page 19-113)

Check for continuity between the ABS control unit 26P connector No. 2 (RED/BLK) and No. 15 (YEL/BLK) terminals.

Is there continuity?

YES → **Repair short to the YEL/BLK wire in the RED/BLK wire between the ABS control unit and modulator unit.**

NO

Connect the modulator unit 14P connector.

Measure the voltage between the ABS control unit 26P connector No. 15 (YEL/BLK) and No. 2 (RED/BLK) terminals and body ground.

Is there battery voltage?

NO → **Repair open in the YEL/BLK or RED/BLK wire between the ABS control unit and modulator unit.**

YES

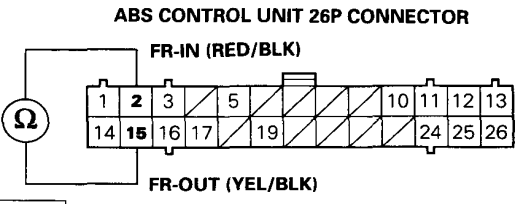
Check for continuity between the ABS control unit 26P connector No. 12 (BLK) terminal and body ground.

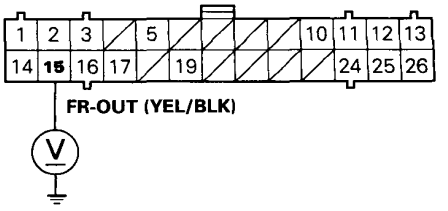
Is there continuity?

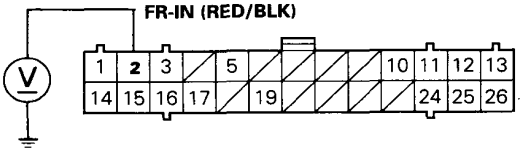
NO → **Repair open in the BLK wire between the ABS control unit and body ground, or a poor ground.**

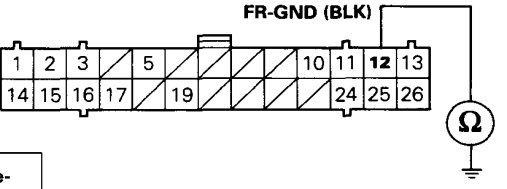
YES

Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.









Left-front Solenoid

Diagnostic Trouble Code (DTC) 7-2: Left-front Solenoid Diagnosis

During the initial diagnosis, after the fail-safe relays are turned on, and during the regular diagnosis, the ABS control unit monitors the voltage from the battery for the six solenoids (when the ABS is not functioning).
If the detection circuit for the left-front solenoid detects 0 V, the ABS control unit keeps the ABS indicator light on after the engine is started. It turns the ABS indicator light on again if it detects 0 V after the light goes off.
Possible causes:

- Front fail-safe relay stuck OFF
- Open circuit in the left-front solenoid drive circuits between the under-hood ABS fuse/relay box and ABS control unit
- Short circuit to body ground in the left-front solenoid drive circuits between the solenoids and ABS control unit
- Faulty left-front solenoid drive transistor (ON) in the ABS control unit

The ABS control unit momentarily outputs the ON signal to each solenoid (too momentary to turn the solenoid on) during the initial diagnosis, and each time the car is started, to check the voltage from the battery with the detection circuit.
If the detection circuit for the left-front solenoids detects battery voltage at this time, the ABS control unit keeps the ABS indicator light on. It turns the ABS indicator light on again if it detects the battery voltage when the car is started.
Possible causes:

- Short circuit to power in the left-front solenoid drive circuits between the solenoids and ABS control unit
- Faulty left-front solenoid drive transistor (OFF) in the ABS control unit
- Short circuit to power in the left-front solenoid drive circuits in the modulator wire harness or solenoids
- Short circuit to the left-front solenoid outlet circuit in the inlet circuit between the solenoids and ABS control unit
- Short circuit to the right-front solenoid inlet or outlet circuit in the left-front solenoid inlet or outlet circuit between the solenoids and ABS control unit

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-62), DTC 7-2 is indicated.

↓

Start the engine.

↓

Does the ABS indicator light go off?

YES → **The system is OK at this time. Check the wire harness and connectors between the ABS control unit, fail-safe relay and modulator unit (intermittent open or short circuit).**

NO ↓

Confirm the ABS code that appears first.

↓

Is code 7-2 indicated?

NO → **Perform the appropriate trouble-shooting for the code.**

YES ↓

Check the ABS B1 (20 A) fuse in the under-hood ABS fuse/relay box.

↓

Is the fuse OK?

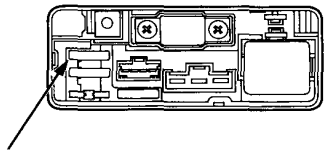
NO → **Replace the fuse, and recheck.**

YES ↓

NOTE: Reinstall the fuse if it is OK.

(To page 19-116)

UNDER-HOOD ABS FUSE/RELAY BOX



ABS B1 (20 A) FUSE

(cont'd)

Left-front Solenoid (cont'd)

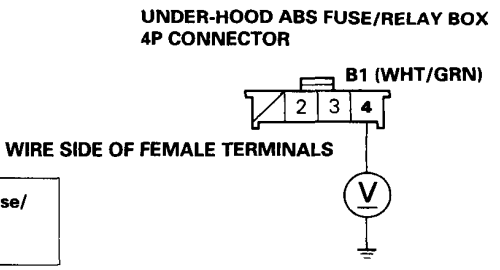
(From page 19-115)

Measure the voltage between the under-hood ABS fuse/relay box 4P connector No. 4 (WHT/GRN) terminal and body ground.

Is there battery voltage?

NO → **Replace the under-hood ABS fuse/relay box. (Internal open)**

YES



Remove the front fail-safe relay.

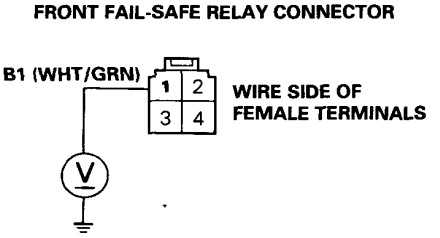
Wire colors of the front fail-safe relay connector: WHT/GRN, BRN/BLK, YEL/GRN, BLK

Measure the voltage between the front fail-safe relay connector No. 1 (WHT/GRN) terminal and body ground.

Is there battery voltage?

NO → **Repair open in the WHT/GRN wire between the under-hood ABS fuse/relay box and front fail-safe relay.**

YES



Check the front fail-safe relay (see page 19-144).

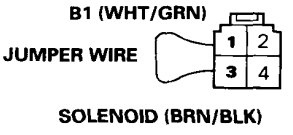
Is the relay OK?

NO → **Replace the front fail-safe relay.**

YES

Disconnect the modulator unit 14P connector.

Connect the front fail-safe relay connector No. 1 (WHT/GRN) and No. 3 (BRN/BLK) terminals using a jumper wire.



(To page 19-117)

(From page 19-116)

Measure the voltage between the modulator unit 14P connector No. 7 (BRN/BLK) and No. 10 (BRN/BLK) terminals and body ground.

Is there battery voltage?

NO → **Repair open in the BRN/BLK wire(s) between the front fail-safe relay and modulator unit.**

YES

Measure the resistance between the modulator unit 14P connector *terminals to determine the* solenoid standard resistance (A type or B type).
Inlet:
— No. 8 (WHT/BLK) and No. 12 (RED/BLK)
— No. 9 (WHT) and No. 13 (RED/WHT)
Outlet:
— No. 1 (YEL/BLK) and No. 5 (GRY/BLK)
— No. 2 (YEL/WHT) and No. 6 (GRY/WHT)

NOTE:

	STANDARD RESISTANCE	
	A TYPE	B TYPE
Inlet Solenoid	2.5 – 2.9 Ω	6.5 – 7.5 Ω
Outlet Solenoid	2.5 – 2.9 Ω	3.3 – 3.9 Ω

Measure the resistance between the modulator unit 14P connector No. 3 (YEL/BLU) and No. 7 (GRY/BLU) terminals, and the No. 10 (WHT/BLU) and No. 14 (RED/BLU) terminals.

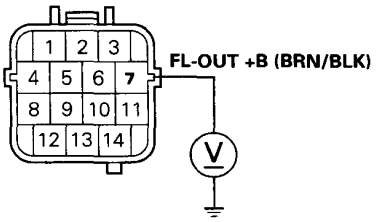
Is the resistance as specified?
Inlet: 2.5 – 2.9 Ω or 6.5 – 7.5 Ω
Outlet: 2.5 – 2.9 Ω or 3.3 – 3.9 Ω

NO → **Visually inspect the modulator wire harness. If the wire harness is OK, replace the modulator unit. (Open or short in the left-front inlet or outlet solenoid)**

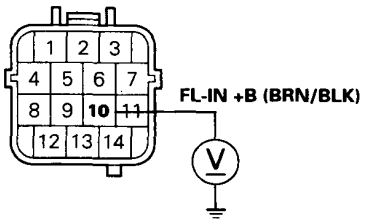
YES

(To page 19-118)

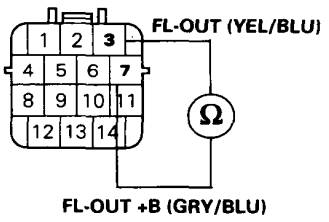
MODULATOR UNIT 14P CONNECTOR



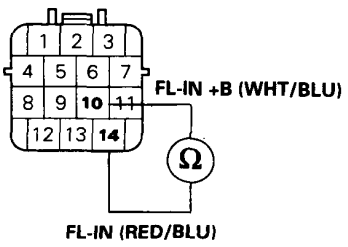
TERMINAL SIDE OF MALE TERMINALS



MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



(cont'd)

Left-front Solenoid (cont'd)

(From page 19-117)

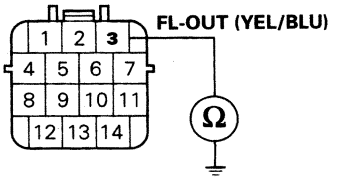
Check for continuity between the modulator unit 14P connector No. 3 (YEL/BLU) and No. 14 (RED/BLU) terminals and body ground.

Is there continuity?

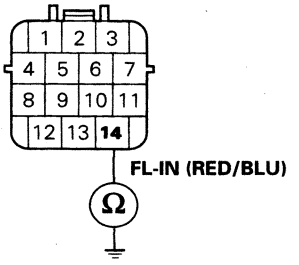
YES → **Visually inspect the modulator wire harness. If the wire harness is OK, replace the modulator unit. (Short to body ground in the left-front inlet or outlet solenoid)**

NO

MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

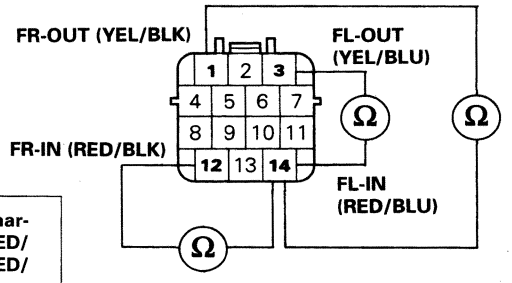


Check for continuity between the modulator unit 14P connector No. 14 (RED/BLU) terminal and following terminals:
- No. 3 (YEL/BLU): Left-front outlet
- No. 12 (RED/BLK): Right-front inlet
- No. 1 (YEL/BLK): Left-front outlet

Is there continuity?

YES → **Replace the modulator wire harness. (Short to the YEL/BLU, RED/BLK or YEL/BLK wire in the RED/BLU wire)**

NO

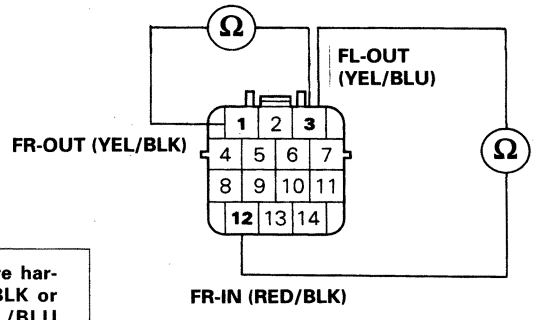


Check for continuity between the modulator unit 14P connector No. 3 (YEL/BLU) terminal and following terminals:
- No. 12 (RED/BLK): Right-front inlet
- No. 1 (YEL/BLK): Left-front outlet

Is there continuity?

YES → **Replace the modulator wire harness. (Short to the RED/BLK or YEL/BLK wire in the YEL/BLU wire)**

NO



(To page 19-119)

(From page 19-118)

Disconnect the ABS control unit 26P connector.

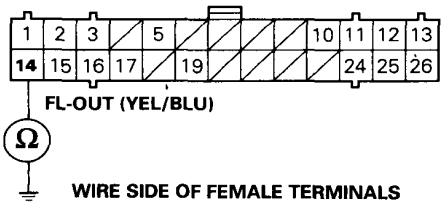
Check for continuity between the ABS control unit 26P connector No. 14 (YEL/BLU) and No. 1 (RED/BLU) terminals and body ground.

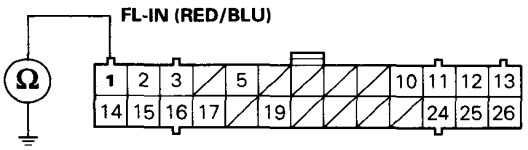
Is there continuity?

YES — **Repair short to body ground in the YEL/BLU or RED/BLU wire between the ABS control unit and modulator unit.**

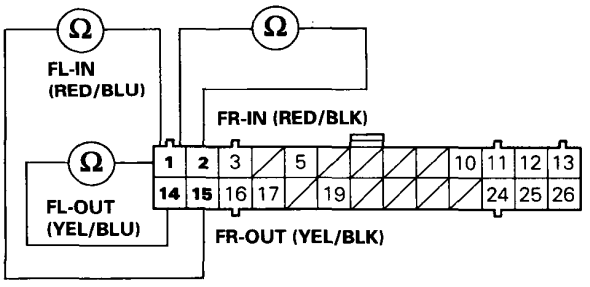
NO

ABS CONTROL UNIT 26P CONNECTOR





Check for continuity between the ABS control unit 26P connector No. 1 (RED/BLU) and following terminals.
— No. 14 (YEL/BLU): Left-front outlet
— No. 2 (RED/BLK): Right-front inlet
— No. 15 (YEL/BLK): Left-front outlet

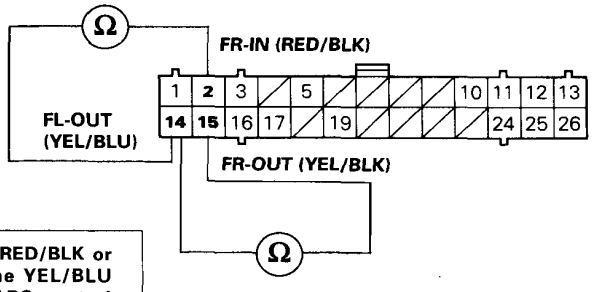


Is there continuity?

YES — **Repair short to the YEL/BLU, RED/BLK or YEL/BLK wire in the RED/BLU wire between the ABS control unit and modulator unit.**

NO

Check for continuity between the ABS control unit 26P connector No. 14 (YEL/BLU) and following terminals.
— No. 2 (RED/BLK): Right-front inlet
— No. 15 (YEL/BLK): Left-front outlet



Is there continuity?

YES — **Repair short to the RED/BLK or YEL/BLK wire in the YEL/BLU wire between the ABS control unit and modulator unit.**

NO

(To page 19-120)

(cont'd)

Left-front Solenoid (cont'd)

(From page 19-119)

Connect the modulator unit 14P connector.

Measure the voltage between the ABS control unit 26P connector No. 14 (YEL/BLU) and No. 1 (RED/BLU) terminals and body ground.

Is there battery voltage?

NO → **Repair open in the YEL/BLU or RED/BLU wire between the ABS control unit and modulator unit.**

YES

Disconnect the ABS control unit 22P connector.

Check for continuity between the ABS control unit 26P connector No. 25 (BLK) terminal and body ground.

Is there continuity?

NO → **Repair open in the BLK wire between the ABS control unit and body ground, or a poor ground.**

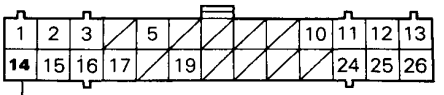
YES

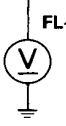
Remove the rear fail-safe relay.

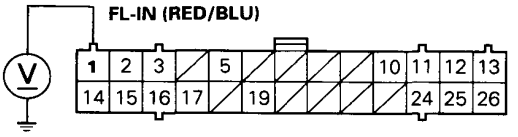
Remove the jumper wire from the front fail-safe relay connector.

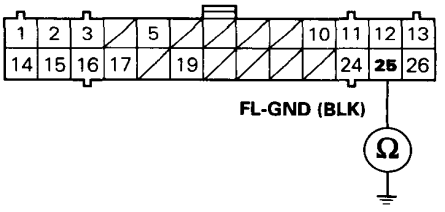
(To page 19-121)

ABS CONTROL UNIT 26P CONNECTOR









(From page 19-120)

Check for continuity between the ABS control unit 22P connector No. 1 (YEL/GRN) terminal and body ground.

Is there continuity?

NO → **Repair short to body ground in the YEL/GRN wire between the ABS control unit and front fail-safe relay.**

YES

Connect the front fail-safe relay No. 2 (YEL/GRN) terminal to body ground with a jumper wire.

Check for continuity between the ABS control unit 22P connector No. 1 (YEL/GRN) terminal and body ground.

Is there continuity?

NO → **Repair open in the YEL/GRN wire between the ABS control unit and front fail-safe relay.**

YES

Check for continuity between the front fail-safe relay connector No. 4 (BLK) terminal and body ground.

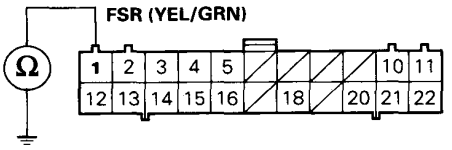
Is there continuity?

NO → **Repair open in the BLK wire between the front fail-safe relay and body ground, or poor ground.**

YES

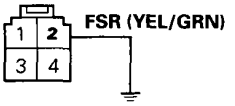
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

ABS CONTROL UNIT 22P CONNECTOR



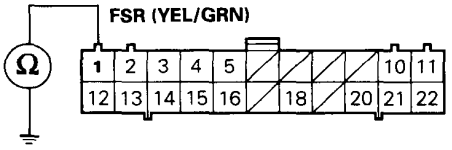
WIRE SIDE OF FEMALE TERMINALS

FRONT FAIL-SAFE RELAY CONNECTOR



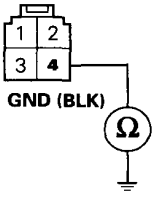
WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

FRONT FAIL-SAFE RELAY CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Rear Solenoid

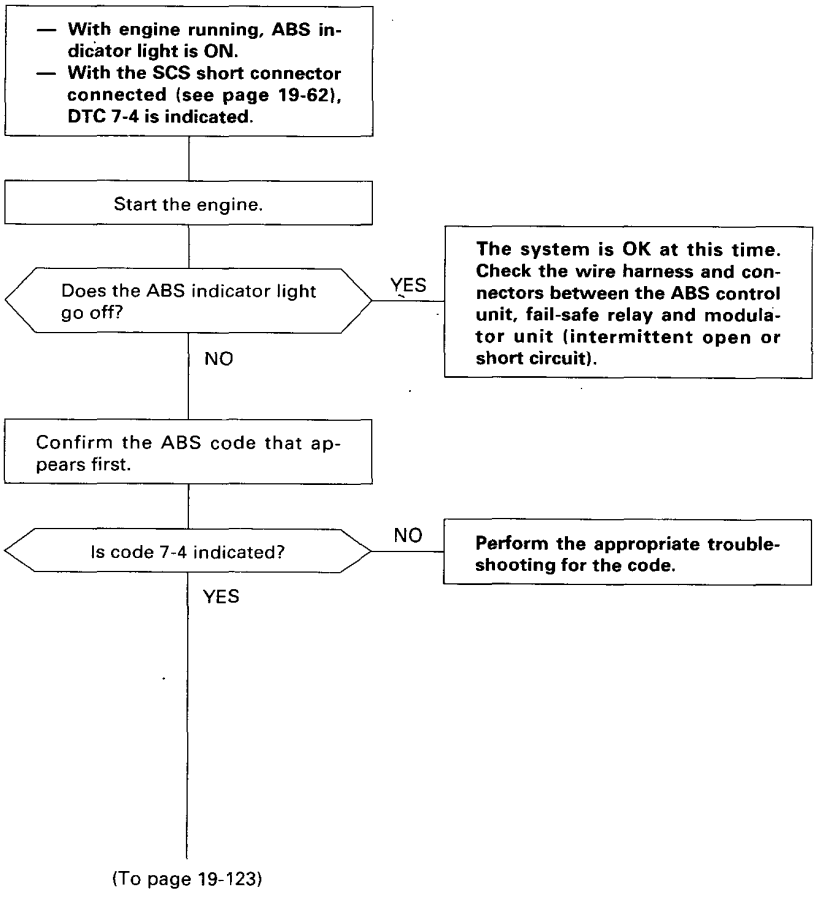
Diagnostic Trouble Code (DTC) 7-4: Rear Solenoid Diagnosis

During the initial diagnosis, after the fail-safe relays are turned on, and during the regular diagnosis, the ABS control unit monitors the voltage from the battery for the six solenoids (when the ABS is not functioning).
If the detection circuit for the rear solenoids detects 0 V, the ABS control unit keeps the ABS indicator light on after the engine is started. It turns the ABS indicator light on again if it detects 0 V after the light goes off.
Possible causes:

- Rear fail-safe relay stuck OFF
- Open circuit in the rear solenoid drive circuits between the under-hood ABS fuse/relay box and ABS control unit
- Short circuit to body ground in the rear solenoid drive circuits between the solenoids and ABS control unit
- Faulty rear solenoid drive transistor (ON) in the ABS control unit

The ABS control unit momentarily outputs the ON signal to each solenoid (too momentary to turn the solenoid on) during the initial diagnosis, and each time the car is started, to check the voltage from the battery with the detection circuit. If the detection circuit for the rear solenoids detects battery voltage at this time, the ABS control unit keeps the ABS indicator light on. It turns the ABS indicator light on again if it detects the battery voltage when the car is started.
Possible causes:

- Short circuit to power in the rear solenoid drive circuits between the solenoids and ABS control unit
- Faulty rear solenoid drive transistor (OFF) in the ABS control unit
- Short circuit to power in the rear solenoid drive circuits in the modulator wire harness or solenoids
- Short circuit to the rear solenoid outlet circuit in the inlet circuit between the solenoids and ABS control unit
- Short circuit to the right-front or left-front solenoid inlet or outlet circuit in the rear solenoid inlet or outlet circuit between the solenoids and ABS control unit.



(To page 19-123)

(From page 19-122)

Remove the rear fail-safe relay.

Wire colors of the rear fail-safe relay connector: WHT/BLK, BLU/BLK, YEL/GRN, BLK

Measure the voltage between the rear fail-safe relay connector No. 1 (WHT/BLK) terminal and body ground.

Is there battery voltage?

NO → **Repair open in the WHT/BLK wire between the under-hood ABS fuse/relay box and rear fail-safe relay.**

YES

Check the rear fail-safe relay (see *page* 19-144).

Is the relay OK?

NO → **Replace the rear fail-safe relay.**

YES

Disconnect the modulator unit 14P connector.

Connect the rear fail-safe relay connector No. 1 (WHT/BLK) and No. 3 (BLU/BLK) terminals using a jumper wire.

Measure the voltage between the modulator unit 14P connector No. 6 (BLU/BLK) and No. 9 (BLU/BLK) terminals and body ground.

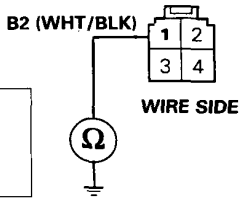
Is there battery voltage?

NO → **Repair open in the BLU/BLK wire(s) between the rear fail-safe relay and modulator unit.**

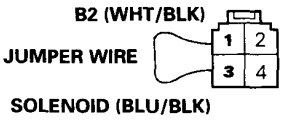
YES

(To page 19-124)

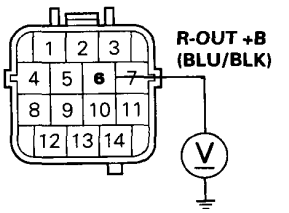
REAR FAIL-SAFE RELAY CONNECTOR



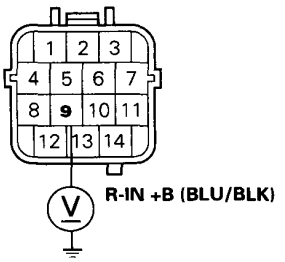
WIRE SIDE OF FEMALE TERMINALS



MODULATOR UNIT 14P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS



(cont'd)

Rear Solenoid (cont'd)

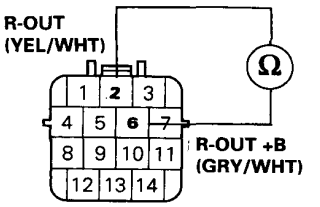
(From page 19-123)

Measure the resistance between the modulator unit 14P connector terminals to determine the solenoid standard resistance (A type or B type).
Inlet:
— No. 8 (WHT/BLK) and No. 12 (RED/BLK)
— No. 10 (WHT/BLU) and No. 14 (RED/BLU)
Outlet:
— No. 1 (YEL/BLK) and No. 5 (GRY/BLK)
— No. 3 (YEL/BLU) and No. 7 (GRY/BLU)

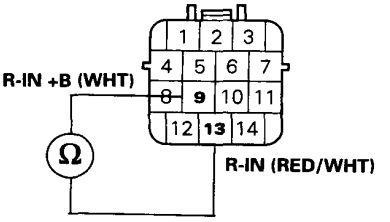
NOTE:

	STANDARD RESISTANCE	
	A TYPE	B TYPE
Inlet Solenoid	2.5 – 2.9 Ω	6.5 – 7.5 Ω
Outlet Solenoid	2.5 – 2.9 Ω	3.3 – 3.9 Ω

MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



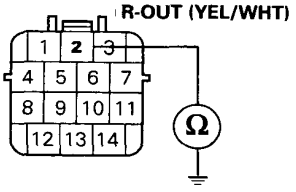
Measure the resistance between the modulator unit 14P connector No. 2 (YEL/WHT) and No. 6 (GRY/WHT) terminals, and the No. 9 (WHT) and No. 13 (RED/WHT) terminals.

Is the resistance as specified?
Inlet: 2.5 – 2.9 Ω or 6.5 – 7.5 Ω
Outlet: 2.5 – 2.9 Ω or 3.3 – 3.9 Ω

NO → **Visually inspect the modulator wire harness. If the harness is OK, replace the modulator unit. (Open or short in the rear inlet or outlet solenoid)**

YES

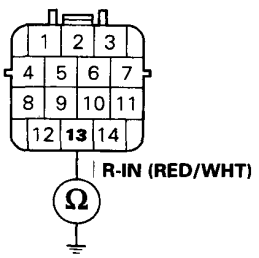
Check for continuity between the modulator unit 14P connector No. 2 (YEL/WHT) and No. 13 (RED/WHT) terminals and body ground.



Is there continuity?

YES → **Visually inspect the modulator wire harness. If the harness is OK, replace the modulator unit. (Short to body ground in the rear inlet or outlet solenoid)**

NO



(To page 19-125)

(From page 19-124)

Check for continuity between the modulator unit 14P connector No. 2 (YEL/WHT) and No. 13 (RED/WHT) terminals.

Is there continuity?

YES → **Replace the modulator wire harness. (Short to the RED/WHT wire in the YEL/WHT wire)**

NO

Check for continuity between the modulator unit 14P connector No. 13 (RED/WHT) terminal and following terminals:
- No. 12 (RED/BLK): Right-front inlet
- No. 1 (YEL/BLK): Right-front outlet
- No. 14 (RED/BLU): Left-front inlet
- No. 3 (YEL/BLU): Left-front outlet

Is there continuity?

YES → **Replace the modulator wire harness. (Short to the RED/BLK, YEL/BLK, RED/BLU or YEL/BLU wire in the RED/WHT wire)**

NO

Check for continuity between the modulator unit 14P connector No. 2 (YEL/WHT) terminal and following terminals:
- No. 12 (RED/BLK): Right-front inlet
- No. 1 (YEL/BLK): Right-front outlet
- No. 14 (RED/BLU): Left-front inlet
- No. 3 (YEL/BLU): Front-left outlet

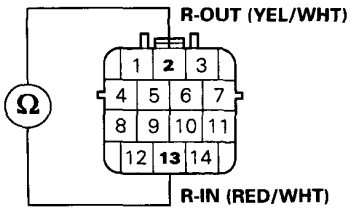
Is there continuity?

YES → **Replace the modulator wire harness. (Short to the RED/BLK, YEL/BLK, RED/BLU or YEL/BLU wire in the YEL/WHT wire)**

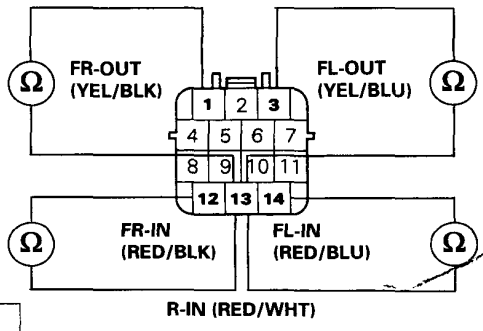
NO

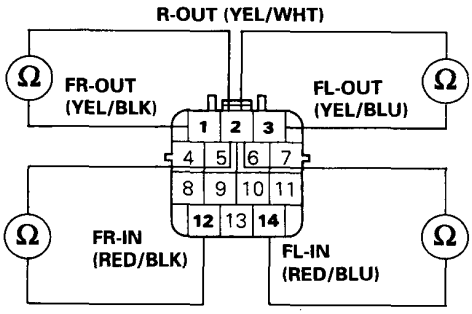
(To page 19-126)

MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS





(cont'd)

Rear Solenoid (cont'd)

(From page 19-125)

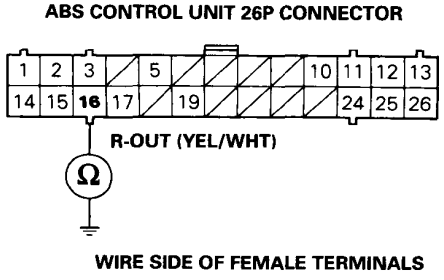
Disconnect the ABS control unit 26P connector.

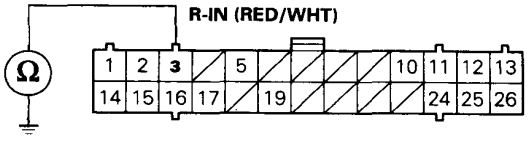
Check for continuity between the ABS control unit 26P connector No. 16 (YEL/WHT) and No. 3 (RED/WHT) terminals and body ground.

Is there continuity?

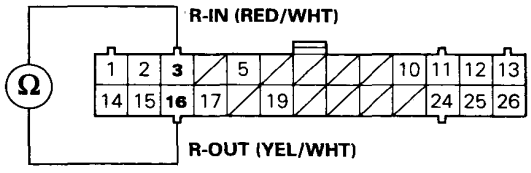
YES → **Repair short to body ground in the YEL/WHT or RED/WHT wire between the ABS control unit and modulator unit.**

NO





Check for continuity between the ABS control unit 26P connector No. 3 (RED/WHT) and No. 16 (YEL/WHT) terminals.



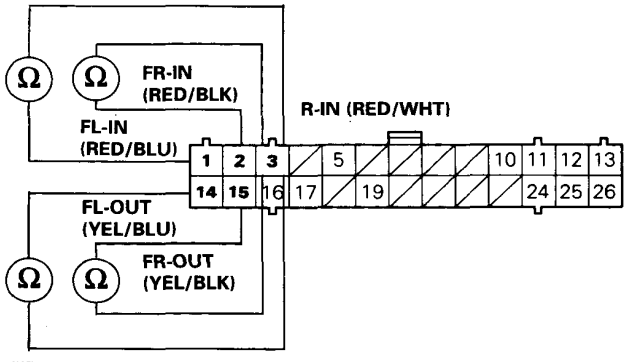
Is there continuity?

YES → **Repair short to the YEL/WHT wire in the RED/WHT wire between the ABS control unit and modulator unit.**

NO

Check for continuity between the ABS control unit 26P connector No. 3 (RED/WHT) and following terminals:

- No. 2 (RED/BLK): Right-front inlet
- No. 15 (YEL/BLK): Right-front outlet
- No. 1 (RED/BLU): Left-front inlet
- No. 14 (YEL/BLU): Left-front outlet



Is there continuity?

YES → **Repair short to the RED/BLK, YEL/BLK, RED/BLU or YEL/BLU wire in the RED/WHT wire between the ABS control unit and modulator unit.**

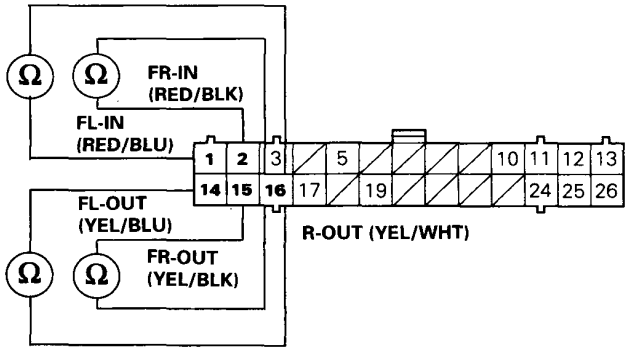
NO

(To page 19-127)

(From page 19-126)

Check for continuity between the ABS control unit 26P connector No. 16 (YEL/WHT) and following terminals:
- — No. 2 (RED/BLK): Right-front inlet
- — No. 15 (YEL/BLK): Right-front outlet
- — No. 1 (RED/BLU): Left-front inlet
- — No. 14 (YEL/BLU): Left-front outlet

ABS CONTROL UNIT 26P CONNECTOR

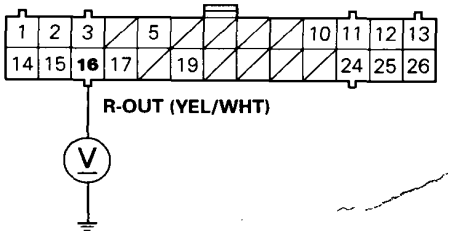


Is there continuity?

YES → **Repair short to the RED/BLK, YEL/BLK, RED/BLU or YEL/BLU wire in the YEL/WHT wire between the ABS control unit and modulator unit.**

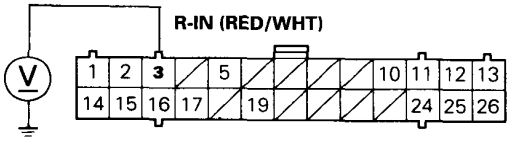
NO

WIRE SIDE OF FEMALE TERMINALS



Connect the modulator unit 14P connector.

Measure the voltage between the ABS control unit 26P connector No. 16 (YEL/WHT) and No. 3 (RED/WHT) terminals and body ground.



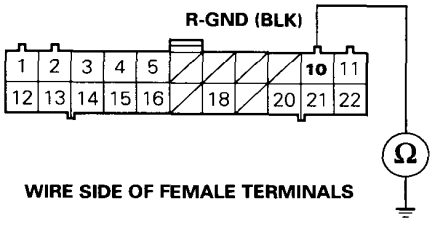
Is there battery voltage?

NO → **Repair open in the YEL/WHT or RED/WHT wire between the ABS control unit and modulator unit.**

YES

Disconnect the ABS control unit 22P connector.

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Check for continuity between the ABS control unit 22P connector No. 10 (BLK) terminal and body ground.

Is there continuity?

NO → **Repair open in the BLK wire between the ABS control unit and body ground, or a poor ground.**

YES

(To page 19-128)

(cont'd)

Rear Solenoid (cont'd)

(From page 19-127)

Remove the jumper wire from the rear fail-safe relay connector.

Remove the front fail-safe relay.

Check for continuity between the ABS control unit 22P connector No. 1 (YEL/GRN) terminal and body ground.

Is there continuity?

YES → **Repair short to body ground in the YEL/GRN wire between the ABS control unit and rear fail-safe relay.**

NO

Connect the rear fail-safe relay connector No. 2 terminal to body ground with a jumper wire.

Check for continuity between the ABS control unit 22P connector No. 1 (YEL/GRN) terminal and body ground.

Is there continuity?

NO → **Repair open in the YEL/GRN wire between the ABS control unit and rear fail-safe relay.**

YES

Remove the jumper wire from the rear fail-safe relay connector.

Check for continuity between the rear fail-safe relay connector No. 4 (BLK) terminal and body ground.

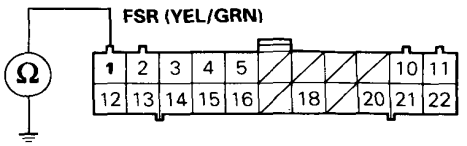
Is there continuity?

NO → **Repair open in the BLK wire between the rear fail-safe relay and body ground, or poor ground.**

YES

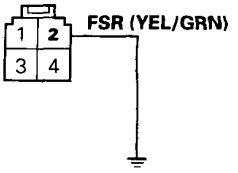
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

ABS CONTROL UNIT 22P CONNECTOR



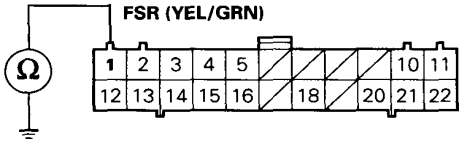
WIRE SIDE OF FEMALE TERMINALS

REAR FAIL-SAFE RELAY CONNECTOR



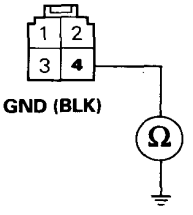
WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

REAR FAIL-SAFE RELAY CONNECTOR



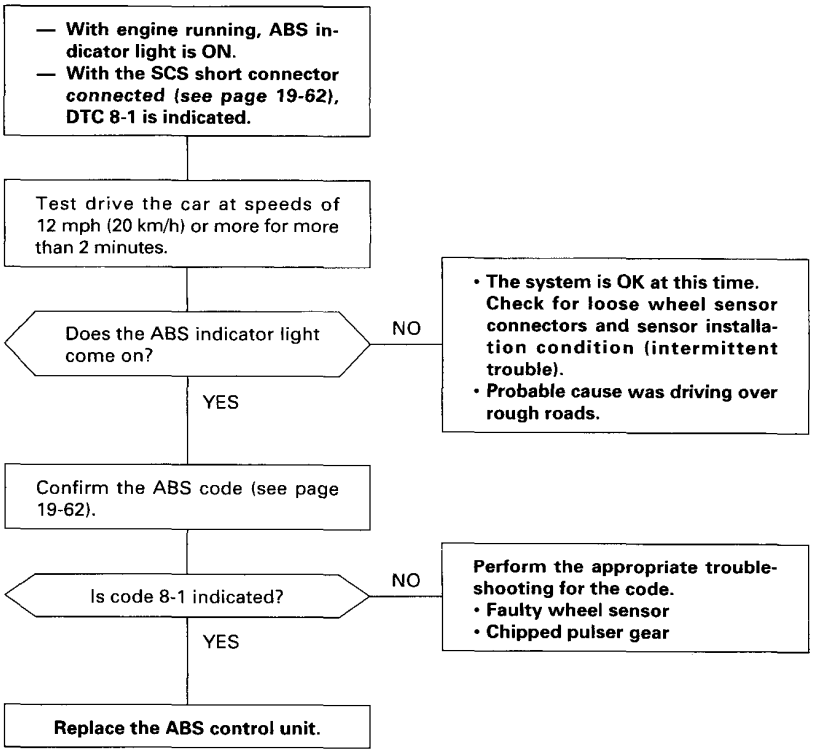
WIRE SIDE OF FEMALE TERMINALS

ABS Function

Diagnostic Trouble Code (DTC) 8-1: ABS Function Diagnosis

The ABS control unit monitors the ABS functioning time during regular diagnosis, and it turns the ABS indicator light on if the ABS is functioning for a prolonged time.
Possible causes:

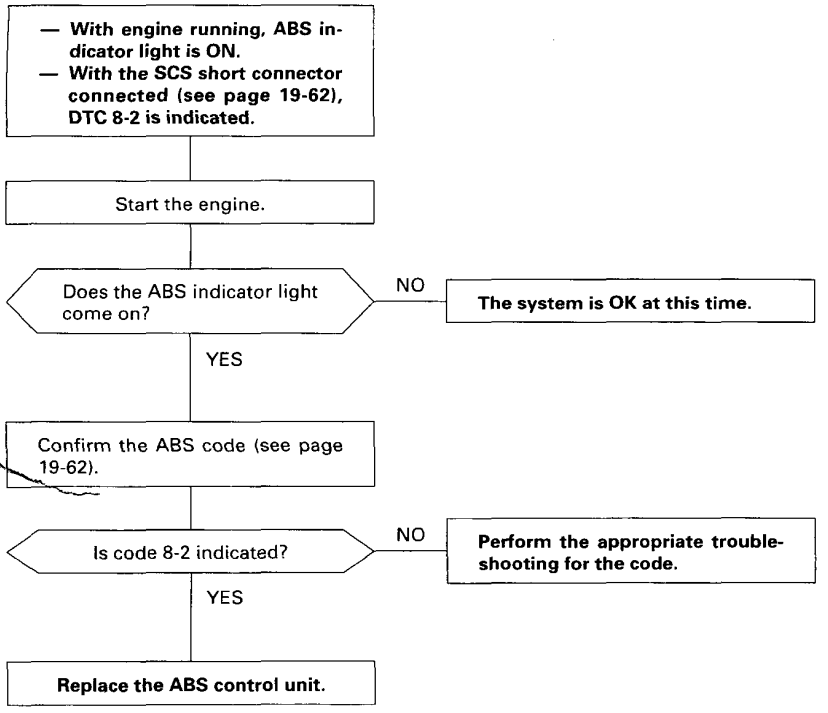
- Wheel sensor signal disappears at speeds of 6 mph (10 km/h) or less
- Faulty ABS control unit



ABS Control Unit

Diagnostic Trouble Code (DTC) 8-2: CPU Comparison Diagnosis

The ABS control unit checks the data of the two CPUs by comparison, and it keeps the ABS indicator light on if there are any differences in the data between the CPUs. It turns the ABS indicator light on again if it detects any difference after the light goes off.



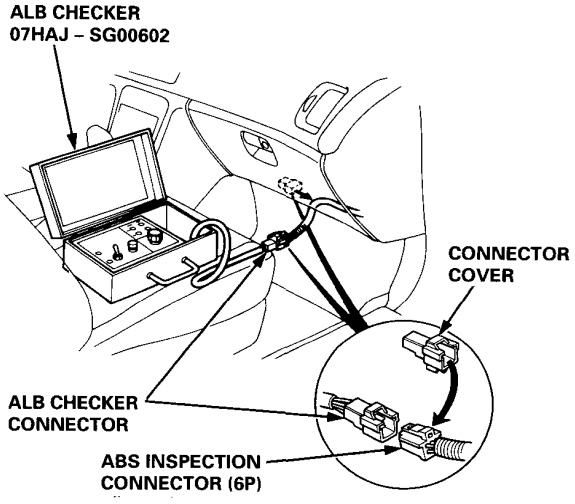
Diagnostic Trouble Code (DTC) 8-4: IC (Intergrated Circuit) Diagnosis

The ABS control unit checks the internal ICs during the initial diagnosis and regular diagnosis, and it keeps the ABS indicator light on if it detects any abnormality. It turns the ABS indicator light on again if it detects any abnormality after the light goes off.

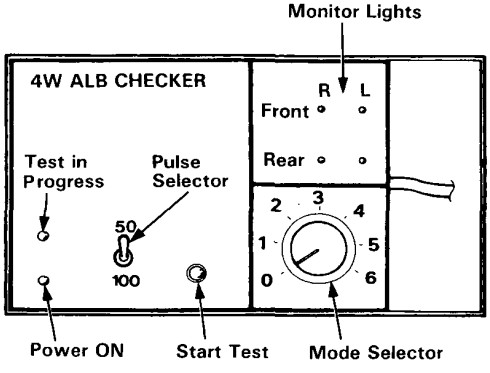
Replace the ABS control unit if DTC 8-4 is indicated with the SCS service connector connected (see page 19-62).

ABS Function Test

1. Raise the car off the ground and support it with safety stands (see section 1).
2. Check that there is no brake drag.
3. Turn the ignition switch ON and confirm that the ABS indicator light comes on.
   - If the ABS indicator light does not come on, follow the troubleshooting on page 19-68.
4. With the ignition switch OFF, disconnect the ABS inspection connector (6P) from the connector cover located under the glove box, and connect it to the ALB checker.



5. Shift the transmission to neutral for manual transmission models, or to [P] position for automatic transmission models.
6. Start the engine and release the parking brake.
7. Set the pulse selector switch to "50".
8. Turn the Mode Selector switch to "1".



9. Push the Start Test switch.
   The ABS indicator light should not come on while the Test in Progress light is on.
   - If the ABS indicator light comes on, confirm the ABS code and perform the appropriate troubleshooting for the code.

   NOTE: Do not turn the Mode Selector switch when the Test in Progress light is on. Damage to the ALB checker can result.
10. Turn the Mode Selector switch to "2".
11. Depress the brake pedal firmly and push the Start Test switch.
    The ABS indicator light should not come on while the Test in Progress light is on. There should be kickback on the brake pedal.

    Have the assistant check that the wheel controlled by the ABS can be rotated by hand when there is kickback on the brake pedal.
    - If the ABS indicator light comes on, confirm the ABS code and perform the appropriate troubleshooting for the code.
    - If the ABS indicator light does not come on and the wheel controlled by the ABS cannot be rotated, check the connection of the modulator wire harness connectors. If the connections are OK, replace the modulator unit.

    NOTE: The kickback should occur approximately 20 seconds after the Start Test switch is pushed.
    The ABS can be checked with a brake tester, too, by checking the brake torque fluctuation of the wheel controlled by the ABS.
12. Turn the Mode Selector switch to "3", "4" and "5". Perform step 10 for each of the test mode positions.

(cont'd)

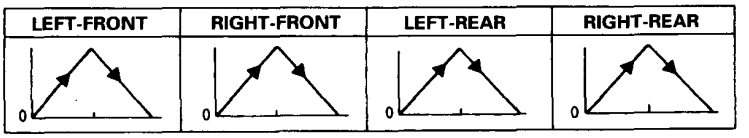
ABS Function Test (cont'd)

Operation Sequence Simulated by Modes of ALB Checker

NOTE: The wheel sensors and sensor wire harnesses are not checked by the ALB checker.

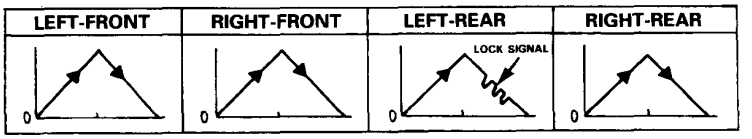
Mode 1: Sends the simulated driving signal 0 mph (0 km/h) → 113 mph (180 km/h) → 0 mph (0 km/h) of each wheel to the ABS control unit to check the system under the normal driving. There should be no kickback.

SIMULATED DRIVING SIGNAL



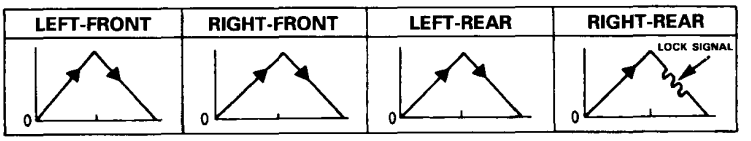
Mode 2: Sends the driving signal of each wheel, then sends the lock signal of the left-rear wheel to the ABS control unit to check the system under left-rear wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



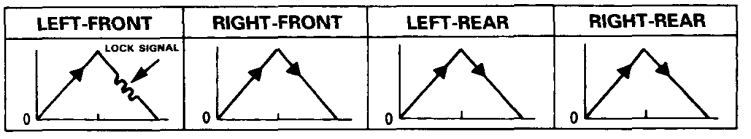
Mode 3: Sends the driving signal of each wheel, then sends the lock signal of the right-rear wheel to the ABS control unit to check the system under right-rear wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



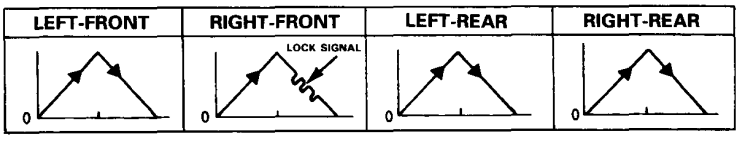
Mode 4: Sends the driving signal of each wheel, then sends the lock signal of the left-front wheel to the ABS control unit to check the system under left-front wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



Mode 5: Sends the driving signal of each wheel, then sends the lock signal of the right-front wheel to the ABS control unit to check the system under right-front wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



Inspection Points

If the ABS indicator light comes on and the system stops during the inspection, confirm the ABS code and perform the appropriate troubleshooting for the code.

If there is no kickback in modes 2 through 5, and the ABS indicator light does not come on, the following items are probable causes:

- Pressure switch stuck ON
- Clogged or stuck solenoid outlet valve
- Modulator wire harness connectors improperly connected

Modulator Function Check

NOTE: This inspection determines whether the basic brake system continues to operate normally when the modulator unit fluid pressure is low.

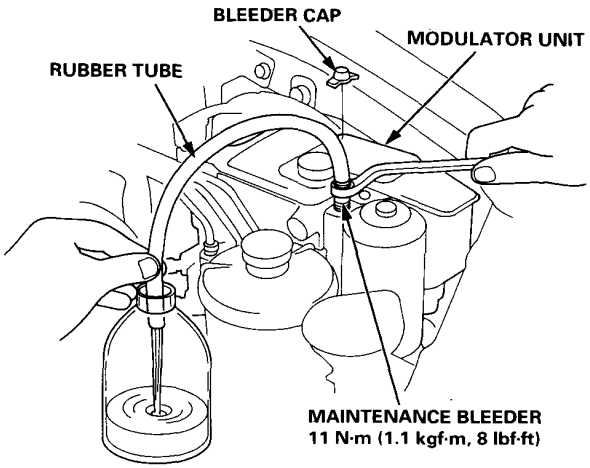
CAUTION:

- **This inspection is made by relieving the high-pressure fluid in the modulator unit and checking for brake operation. After inspection, be sure to add fresh brake fluid to the specified level of the reservoir, and start the engine to restore the ABS to its normal operating condition.**
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Do not reuse the drained brake fluid.**
- **Do not loosen the relief plug on the accumulator.**

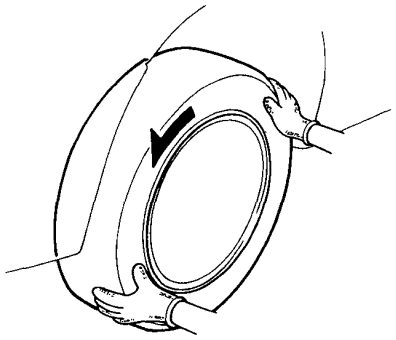
1. Remove the bleeder cap from the maintenance bleeder on the modulator unit.
2. Attach the wrench to the maintenance bleeder.
3. Connect a rubber tube of the appropriate diameter to the maintenance bleeder, and set the other end of the rubber tube in a suitable container.
4. While holding the rubber tube with your hand, slowly loosen the maintenance bleeder 1/8 to 1/4 turn to collect the brake fluid in the container.

   CAUTION: Do not loosen the maintenance bleeder too much. The high-pressure brake fluid can burst out.

5. After the brake fluid stops flowing out, loosen the maintenance bleeder more to release the pressure completely.
6. Tighten the maintenance bleeder to the specified torque.



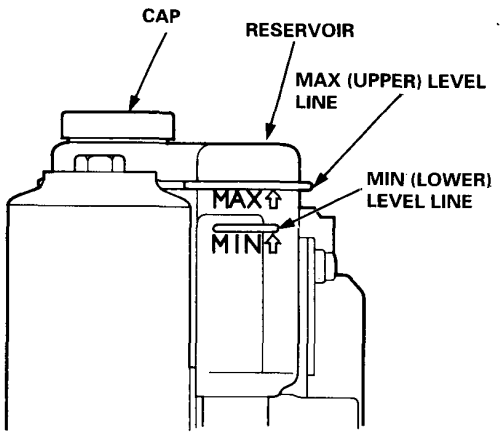
7. Raise the car off the ground and support with safety stands (see section 1).
8. Have an assistant depress the brake pedal firmly, and check that the wheels do not rotate.



9. Remove the cap and refill the reservoir to the MAX (upper) level with fresh brake fluid.

   NOTE: Pour the brake fluid slowly so that it does not foam, and wait for a few minutes.

10. Start the engine and let it idle for a minute. Stop the engine.
11. Check the brake fluid level in the reservoir. It should be below the MAX (upper) level line. Refill the reservoir with fresh brake fluid to the MAX level line again.



12. After inspection, start the engine and make sure that the ABS indicator light goes off.

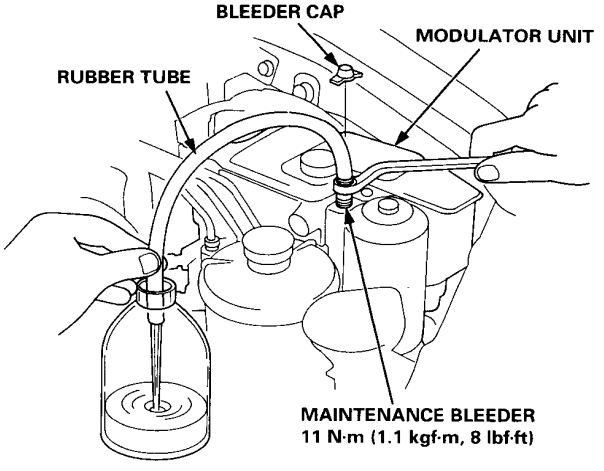
Modulator Unit

Relieving System Pressure

CAUTION:
- **Be sure to drain the high-pressure brake fluid completely before performing the modulator function check, disposing the modulator unit, and ABS pump motor replacement.**
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Do not reuse the drained brake fluid.**
- **Do not loosen the relief plug on the accumulator.**

1. Remove the bleeder cap from the maintenance bleeder on the modulator unit.
2. Attach the wrench to the maintenance bleeder.
3. Connect a rubber tube of the appropriate diameter to the maintenance bleeder, and set the other end of the rubber tube in a suitable container.
4. While holding the rubber tube with your hand, slowly loosen the maintenance bleeder 1/8 to 1/4 turn to collect the brake fluid in the container.

   CAUTION: Do not loosen the maintenance bleeder too much. The high-pressure brake fluid can burst out.
5. Tighten the maintenance bleeder to the specified torque.



Brake Fluid Replacement

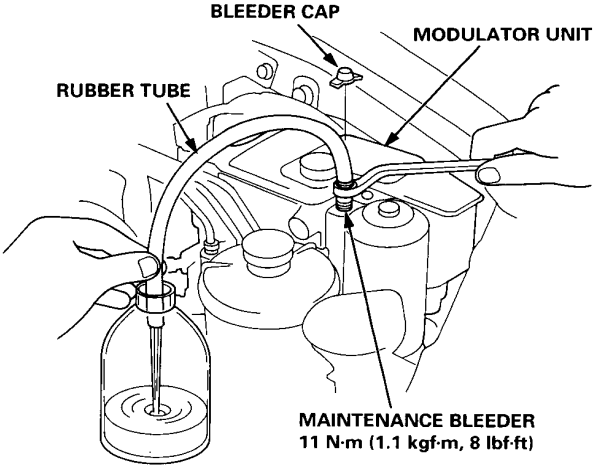
CAUTION:
- **Do not loosen the relief plug on the accumulator.**

NOTE: Brake fluid replacement procedure explained in this section is for the brake fluid in the modulator unit (that is, the brake fluid in the high-pressure passage and in the reservoir). See page 19-6 for the brake fluid replacement procedures for the rest of the brake system.

1. Remove the bleeder cap from the maintenance bleeder on the modulator unit.
2. Attach the wrench to the maintenance bleeder.
3. Connect a rubber tube of the appropriate diameter to the maintenance bleeder, and set the other end of the rubber tube in a suitable container.
4. While holding the rubber tube with your hand, slowly loosen the maintenance bleeder 1/8 to 1/4 to collect the brake fluid in the container.

   CAUTION: Do not loosen the maintenance bleeder too much. The high-pressure brake fluid can burst out.
5. Tighten the maintenance bleeder.

   NOTE: Do not remove the rubber tube and wrench yet.



6. Start the engine and let it idle for a minute. Stop the engine.

7. Check the brake fluid level in the reservoir. It should be below the MAX (upper) level line.

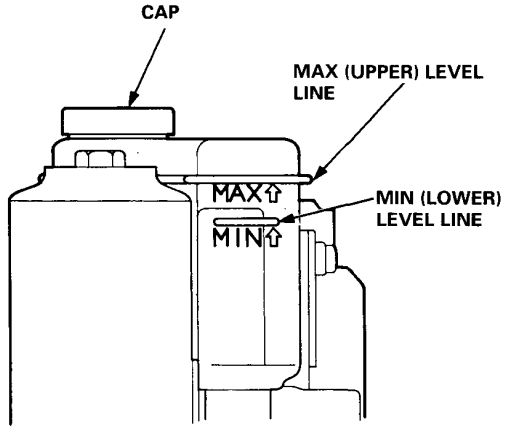
8. Repeat the steps 4 through 7 to drain the rest of the brake fluid from the modulator unit.

   NOTE: The modulator has a capacity of approximately 150 mℓ (150 cc, 5 fl·oz). Approximately 40 – 45 mℓ (40 – 45 cc, 1.3 – 1.5 fl·oz) of the fluid is drained at each try.

9. Remove the cap, and refill the reservoir to the MAX (upper) level with fresh brake fluid.

   NOTE: Pour the brake fluid slowly so that it does not foam, and wait for a few minutes.

10. Repeat steps 4 through 7 twice, and refill the reservoir to the MAX (upper) level with fresh brake fluid.



11. Tighten the maintenance bleeder to the specified torque.

12. After replacement, start the engine and make sure that the ABS indicator light goes off.

Bleeding:

When the brake fluid is completely drained from the reservoir (air enters in the modulator unit) during brake fluid replacement, bleed the air from the modulator unit as follows.

–1. Fill the reservoir to the MAX (upper) level with fresh brake fluid.

–2. Connect the rubber tube to the bleeder on the modulator unit, and set the other end of the rubber tube in a container (see the previous page).

–3. Loosen the bleeder, and start the engine to activate the pump motor.

   NOTE: Take care not to spill the brake fluid from the container.

–4. Tighten the bleeder when the fluid starts to flow out of the bleeder.

–5. Stop the engine after the pump motor stops

   NOTE: If the ABS indicator light comes on and the pump motor stops, repeat steps 3 through 5 above.

Modulator Unit

Removal/Installation

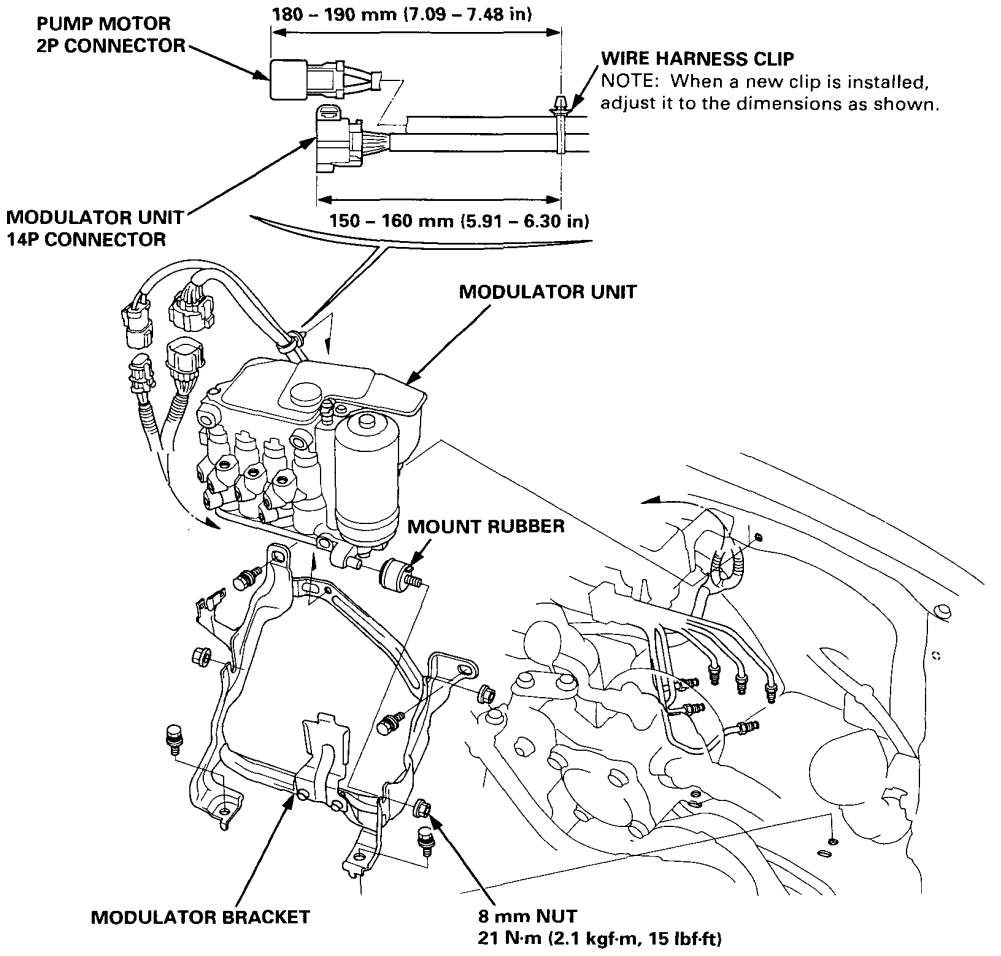
CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Take care not to damage or deform the brake pipes during removal and installation.**
- **To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.**
- **Do not loosen the relief plug on the accumulator.**

1. Disconnect the modulator unit 14P connector and pump motor 2P connector.
2. Remove the wire harness clip from the modulator bracket.

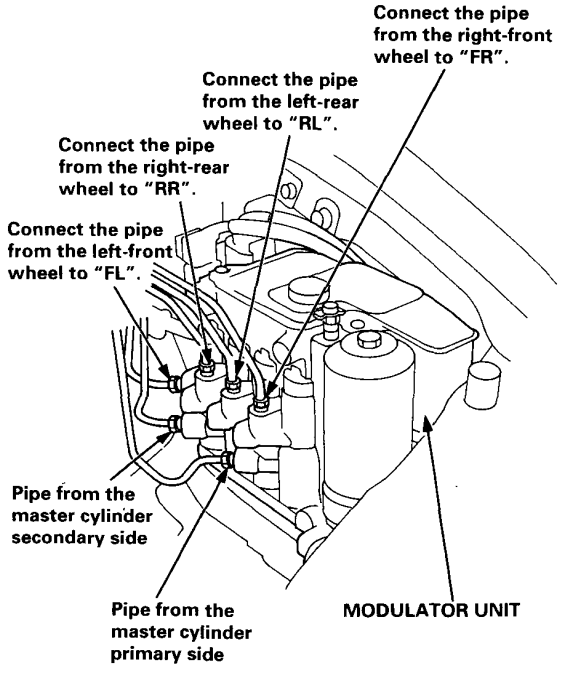
   NOTE: When a new harness clip is installed after a wire harness or modulator unit replacement, adjust the harness clip to the dimensions shown below.
3. Remove the three 8 mm nuts, and remove the modulator unit from the bracket.

   NOTE: When the pump motor or the modulator unit is replaced, bleed the high-pressure brake fluid first (see page 19-134).



4. Install the modulator unit in the reverse order of removal.

   NOTE: Check the letters stamped on the modulator body, and connect the brake pipes properly.
   Tighten the flare nuts to 19 N·m (1.9 kgf·m, 14 lbf·ft).



5. Start the engine and let it idle for a minute.
   Check that:
   - ABS indicator light is off.
   - Brake fluid is not leaking from the brake pipe joints.

6. Stop the engine.

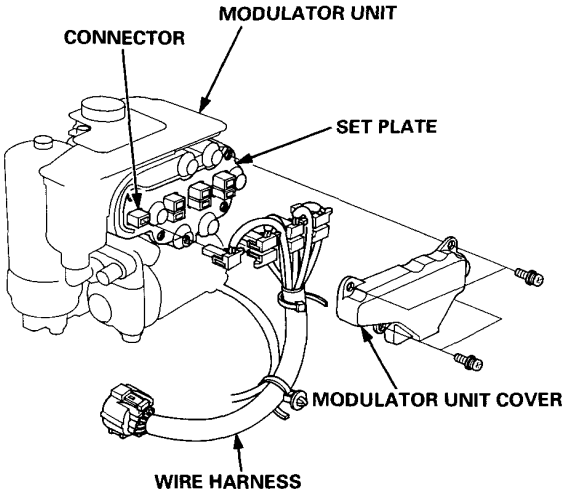
7. Check whether the brake fluid level in the reservoir is at the MAX (upper) level.
   If level is low, add fresh fluid until the reservoir is refilled to the MAX (upper) level.

8. Bleed air from the brake system (see page 19-6).

Wire Harness Replacement

1. Remove the modulator unit from the car (see page 19-136).

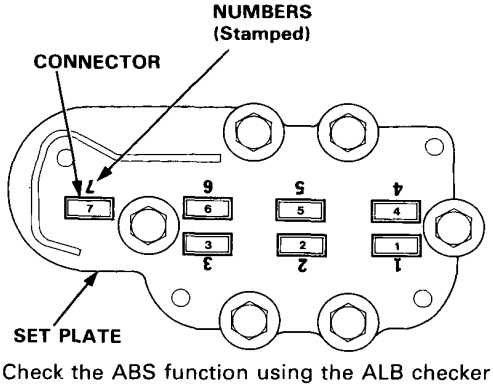
2. Remove the modulator unit cover, and remove the wire harness.



3. Check the numbers stamped on the set plate, and connect each connector of the new wire harness to the set plate of the corresponding number.

   NOTE: Be sure that each connector is locked securely with the two locking tabs.

4. Install the modulator unit cover and modulator unit (see the left column of this page).



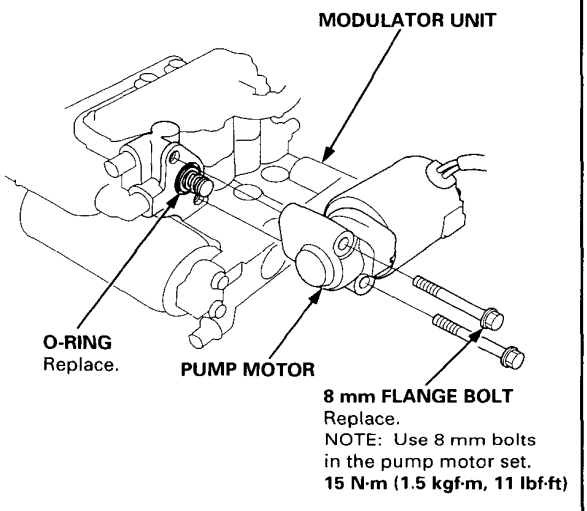
5. Check the ABS function using the ALB checker (see page 19-131).

Modulator Unit

Pump Motor Replacement

⚠ WARNING The modulator unit contains high-pressure brake fluid. Be sure to bleed the high-pressure fluid from the modulator unit before removing the pump motor.

1. Bleed the high-pressure brake fluid from the modulator unit (see page 19-134).
2. Remove the modulator unit from the car (see page 19-136).
3. Remove the 8 mm flange bolts from the modulator unit, and remove the pump motor.



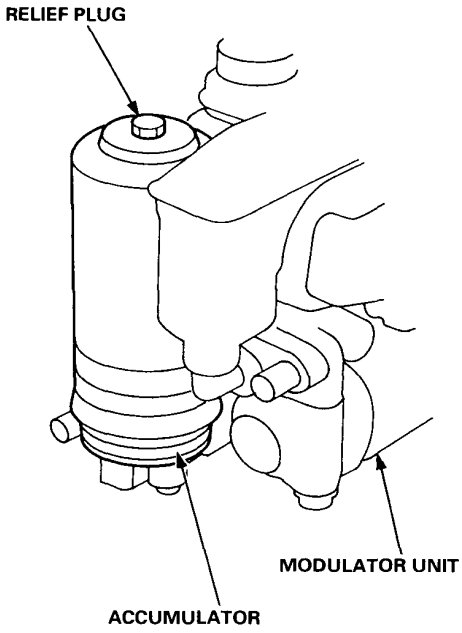
4. Install the pump motor in the reverse order of removal.

NOTE:
- After installing the modulator unit, add fresh brake fluid until the reservoir is refilled to the specified level, and bleed air from the system (see page 19-134).
- Turn the ignition switch on, and check for the ABS indicator light operation.

Disposal

⚠ WARNING The accumulator contains high pressure nitrogen gas. Do not puncture, expose to flame, weld, drop or apply impact to the accumulator, or attempt to remove the accumulator from the modulator unit. The modulator unit may explode and severe personal injury may result.

1. Drain the high-pressure brake fluid from the modulator unit (see page 19-134).
2. Secure the modulator unit in a vise so that the relief plug points straight up.
3. Loosen the relief plug three and a half turns *slowly*, and wait for three minutes for all pressure to escape.
4. Remove the accumulator from the modulator unit.
5. Remove the relief plug completely and dispose of the accumulator.

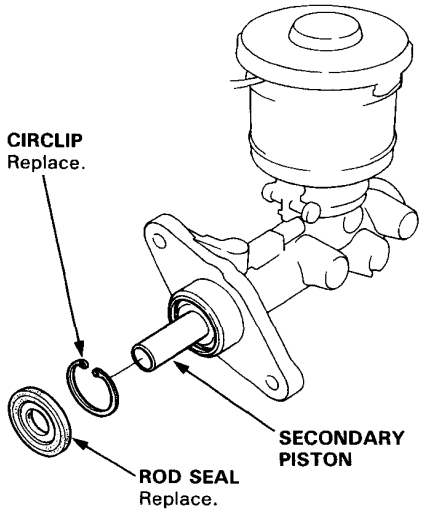


Master Cylinder

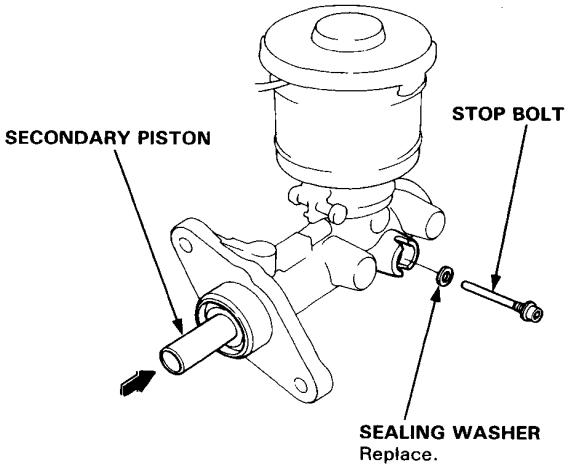
Disassembly

CAUTION:
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**

1. Remove the master cylinder (see page 19-13).
2. Remove the rod seal.
3. Remove the circlip while pushing in the secondary piston.



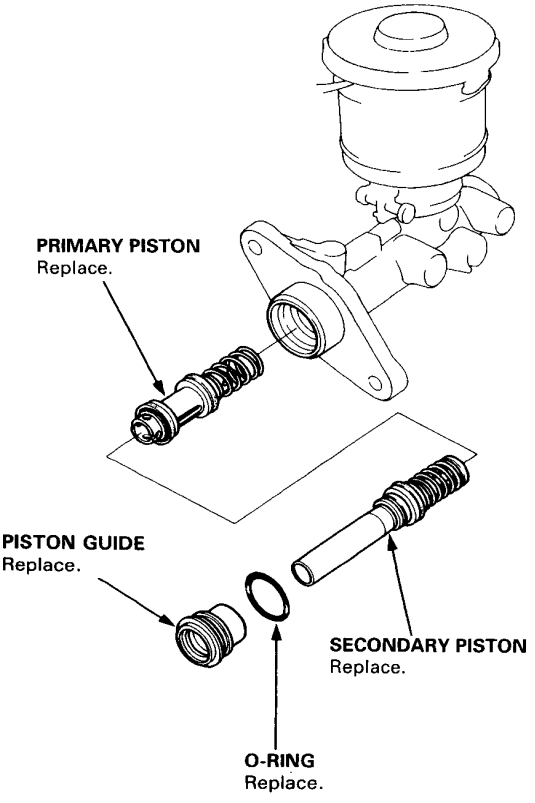
4. Remove the stop bolt while pushing in the secondary piston.



5. Remove the piston guide, secondary piston and primary piston.

NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side port.

CAUTION:
- **Do not use high pressure air or bring the nozzle too close to the port.**
- **Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.**



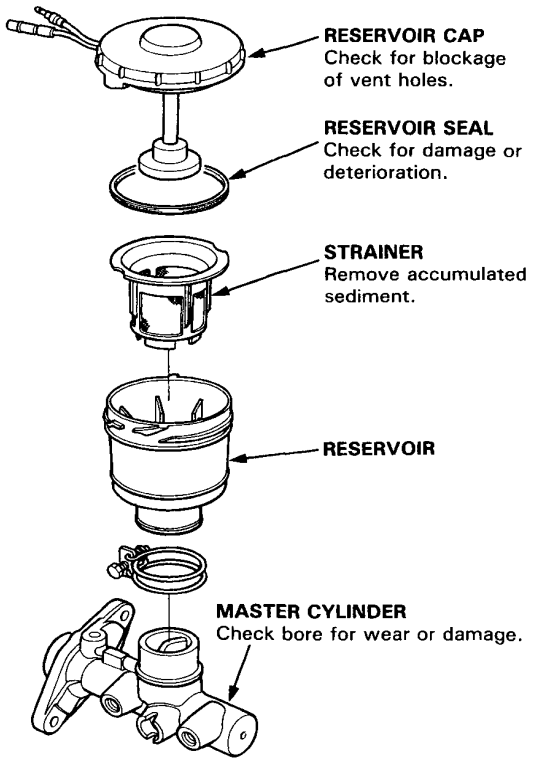
(cont'd)

Master Cylinder

Disassembly (cont'd)

6. Remove the reservoir cap, strainer and reservoir from the master cylinder.

7. Remove the reservoir seal from the reservoir cap.



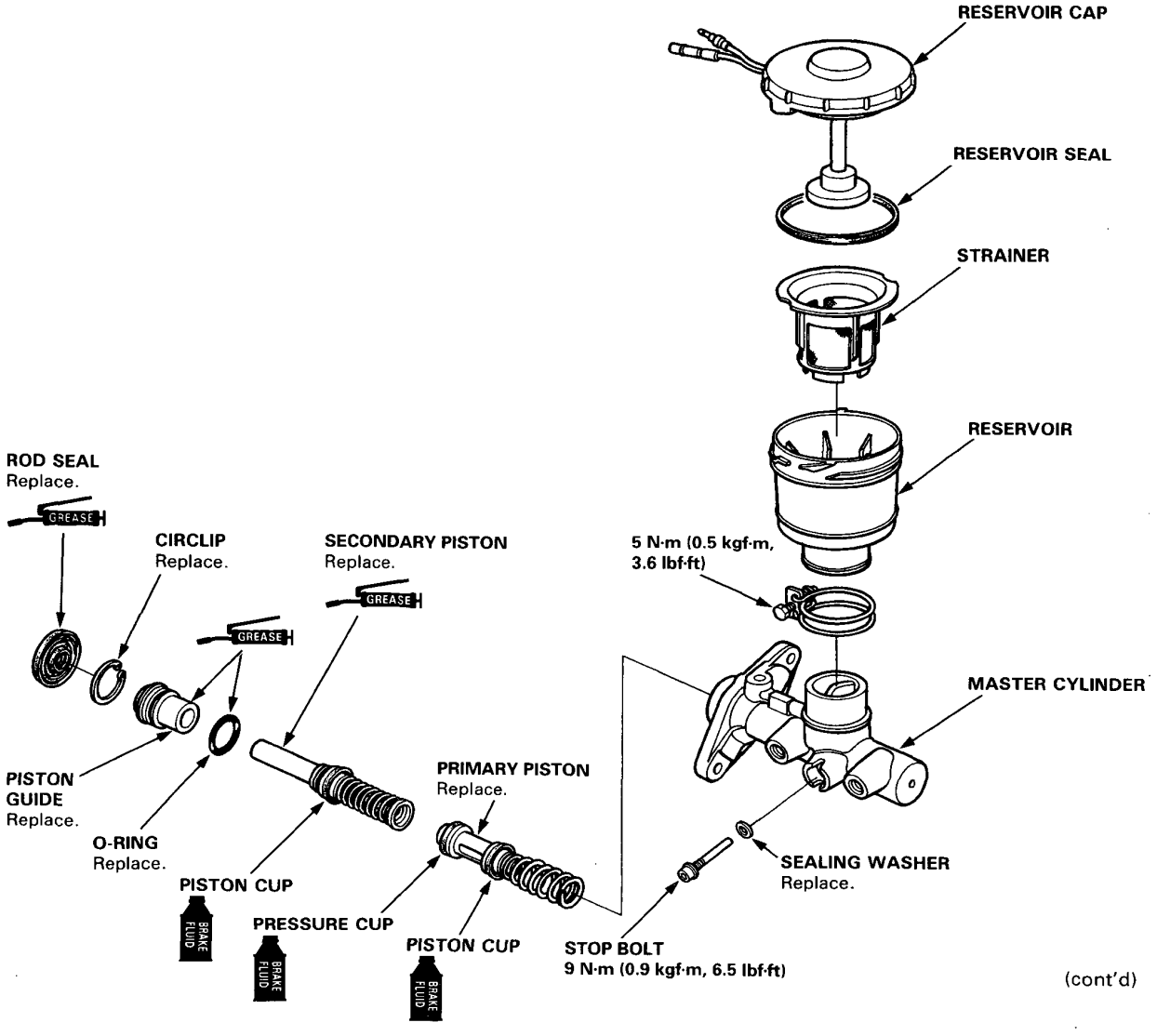
Reassembly

CAUTION:

- **If replacing the primary piston, secondary piston or master cylinder body, check and adjust the pushrod clearance before installing the master cylinder (see page 19-18).**
- **Do not spill brake fluid on the car; it may damage the paint; if brake does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**
- **Replace the master cylinder if the bore is damaged or worn. Do not hone or attempt to refinish the bore.**

NOTE:

- Coat piston cups, pressure cup and master cylinder bore with clean brake fluid.
- *Use recommended greases in the master cylinder seal set.*

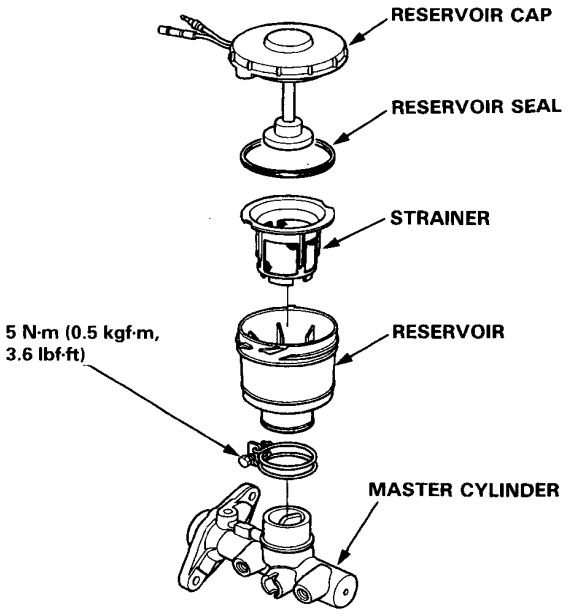


(cont'd)

Master Cylinder

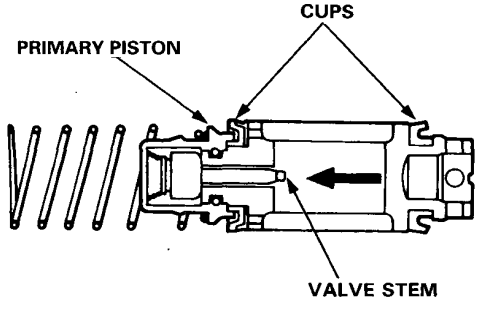
Reassembly (cont'd)

1. Install the reservoir on the master cylinder with a clamp as shown.
2. Install the reservoir seal in the groove of the reservoir cap.
3. Install the strainer and reservoir cap on the reservoir.



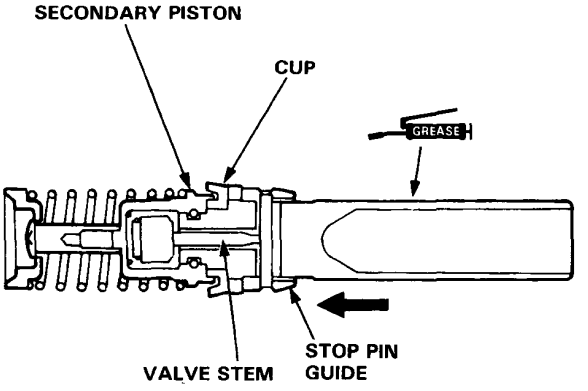
4. Coat the cups of a new primary piston with clean brake fluid, then install the primary piston into the master cylinder.

   NOTE:
   - Before installation, check that the valve stem moves smoothly by lightly pushing it through the slot in the piston.
   - Install the piston so that the slot in the piston aligns with the stop bolt hole in the master cylinder.

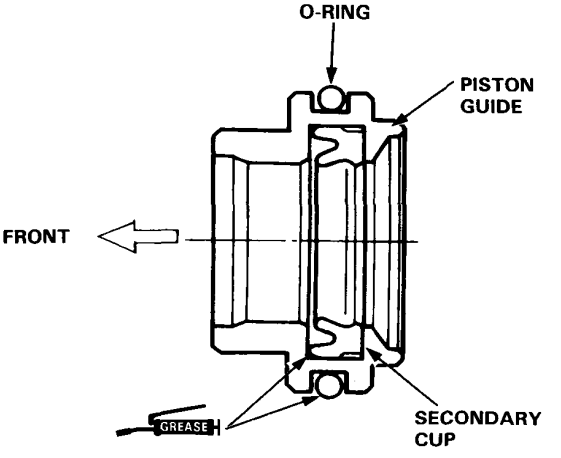


5. Coat the cup of a new secondary piston *with clean* brake fluid.
6. Apply recommended grease in the master cylinder seal set to the piston, and install the piston into the master cylinder.

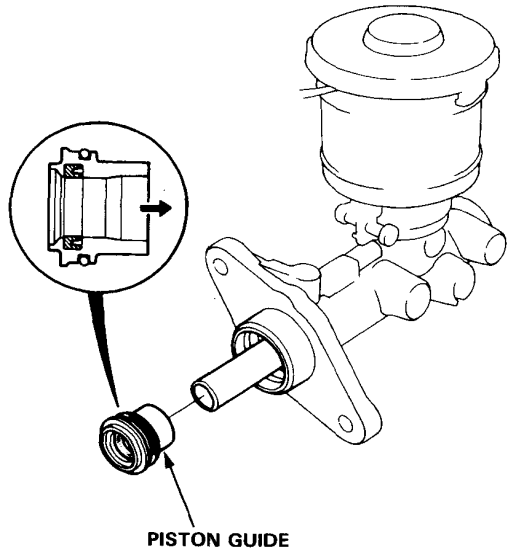
   NOTE: Check that the valve stem moves smoothly by pushing the stop pin guide.



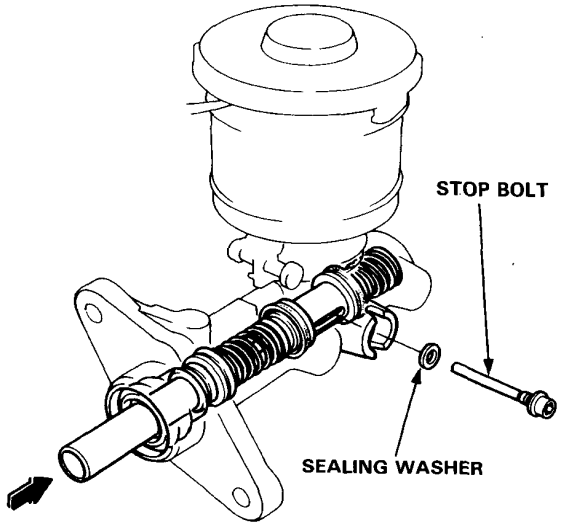
7. Apply recommended grease in the master cylinder seal set to a new O-ring and the secondary cup in a new piston guide, and install the O-ring onto the piston guide.



8. Install the piston guide into the master cylinder.

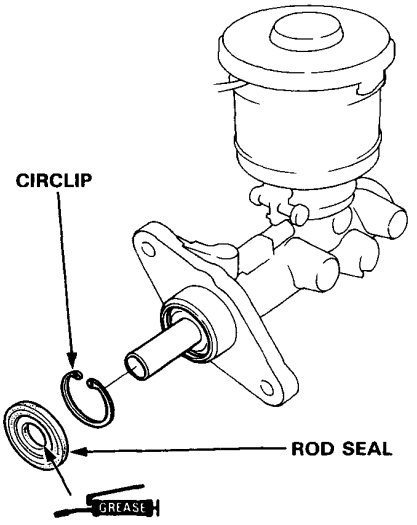


9. Align the slot in the primary piston with the stop bolt hole by pushing the secondary piston in, and install the stop bolt with a new sealing washer.



10. Install a new circlip while pushing in the secondary piston.

11. Apply recommended grease in the master cylinder set to a new rod seal, and install the seal onto the master cyliner.

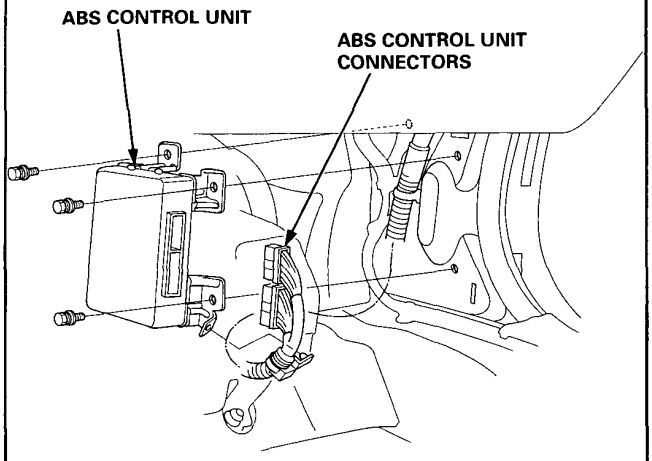


12. Adjust the pushrod clearance (see page 19-18).

13. Install the master cylinster (see page 19-19).

ABS Control Unit Replacement

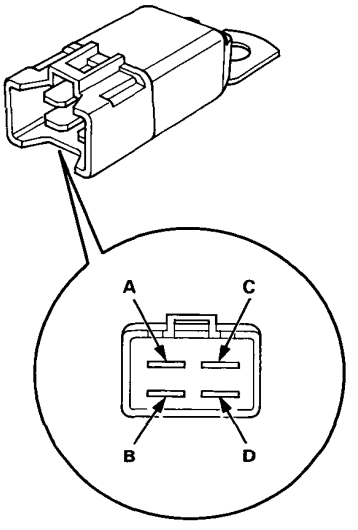
1. Remove the passenger's side kick panel.
2. Disconnect the ABS control unit connectors.
3. Remove the ABS control unit mounting bolts, then remove the control unit.



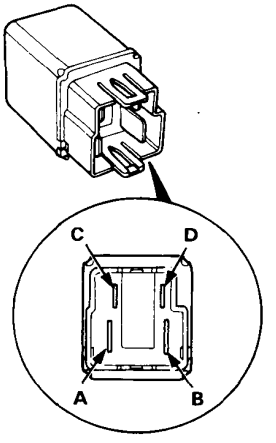
4. Install the ABS control unit in the reverse order of removal.

Relay Inspection

1. Remove the fail-safe relays and motor relay (location: see page 19-45).
2. Check for continuity between the terminals C and D. There should be continuity.
3. Check for continuity between the terminals A and B. There should be continuity when the battery is connected between the terminals C and D.
   There should be no continuity when the battery is disconnected.



<Motor Relay:>

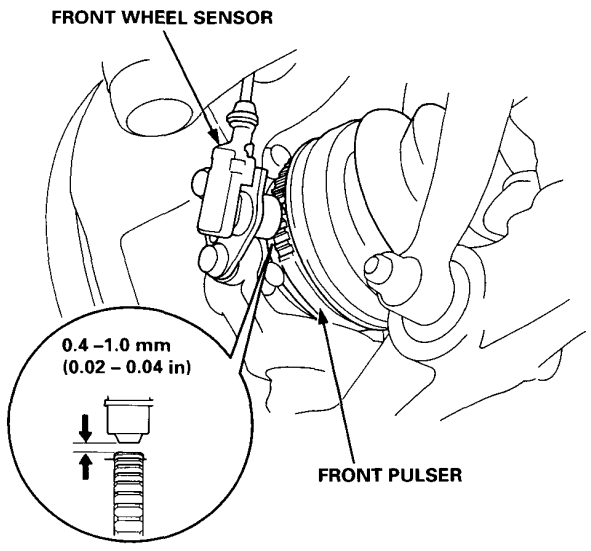


Pulsers/Wheel Sensors

Inspection

Front:

1. Check the front pulser for chipped or damaged teeth.



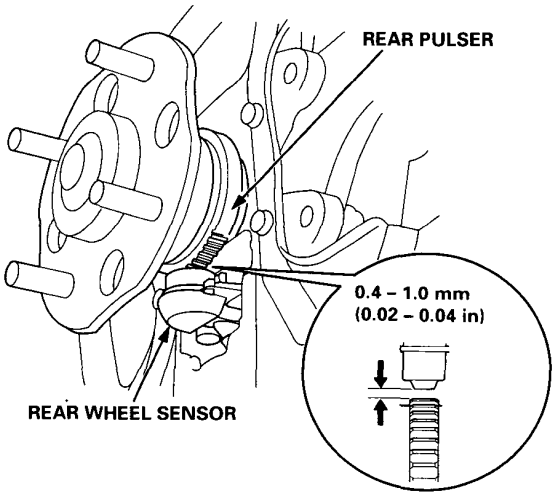
2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the driveshaft by hand.

   Standard: 0.4 – 1.0 mm (0.02 – 0.04 in)

   NOTE: If the gap exceeds 1.0 mm (0.04 in), the probability is a distorted knuckle which should be replaced.

Rear:

1. Check the rear pulser for chipped or damaged teeth.



2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the hub bearing unit by hand.

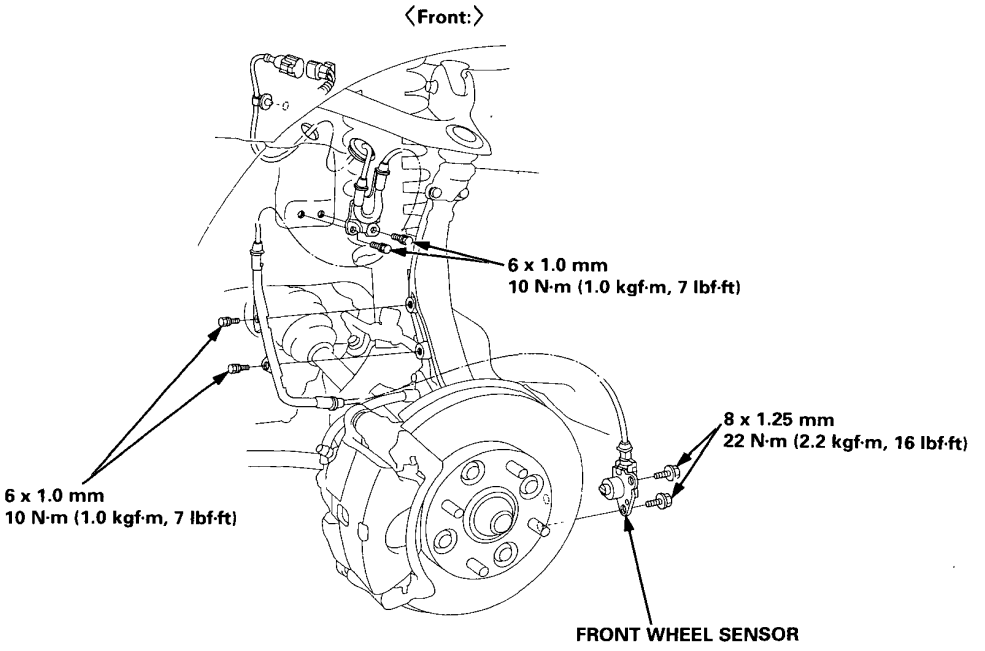
   Standard: 0.4 – 1.0 mm (0.02 – 0.04 in)

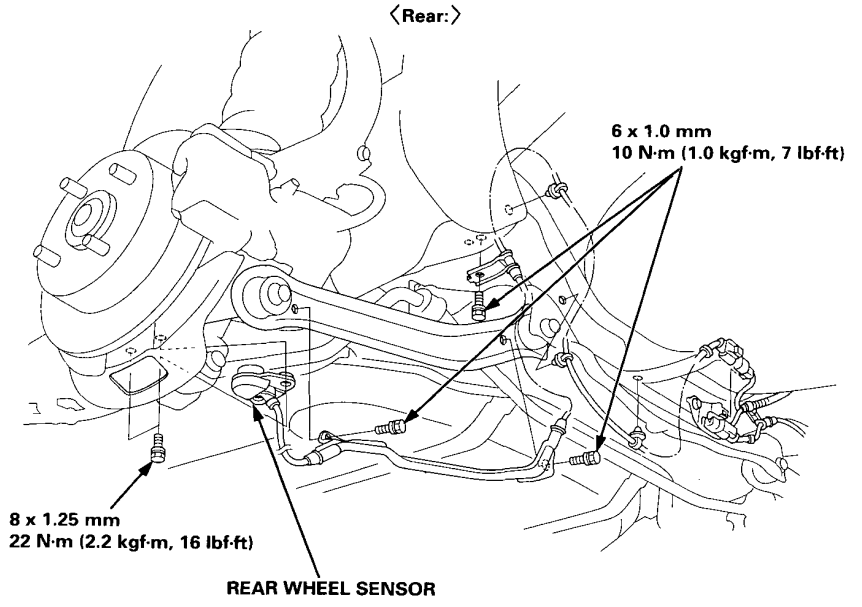
   NOTE: If the gap exceeds 1.0 mm (0.04 in), the probability is a distorted knuckle which should be replaced.

Pulsers/Wheel Sensors

Wheel Sensor Replacement

NOTE:
- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement, confirm proper operation (see page 19-131).





SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (If body maintenance is required)

Some model versions of the Accord Coupe include a driver's airbag, located in the steering wheel hub, and a front passenger's airbag, located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Shop Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

⚠ WARNING

- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.**
- **All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.**

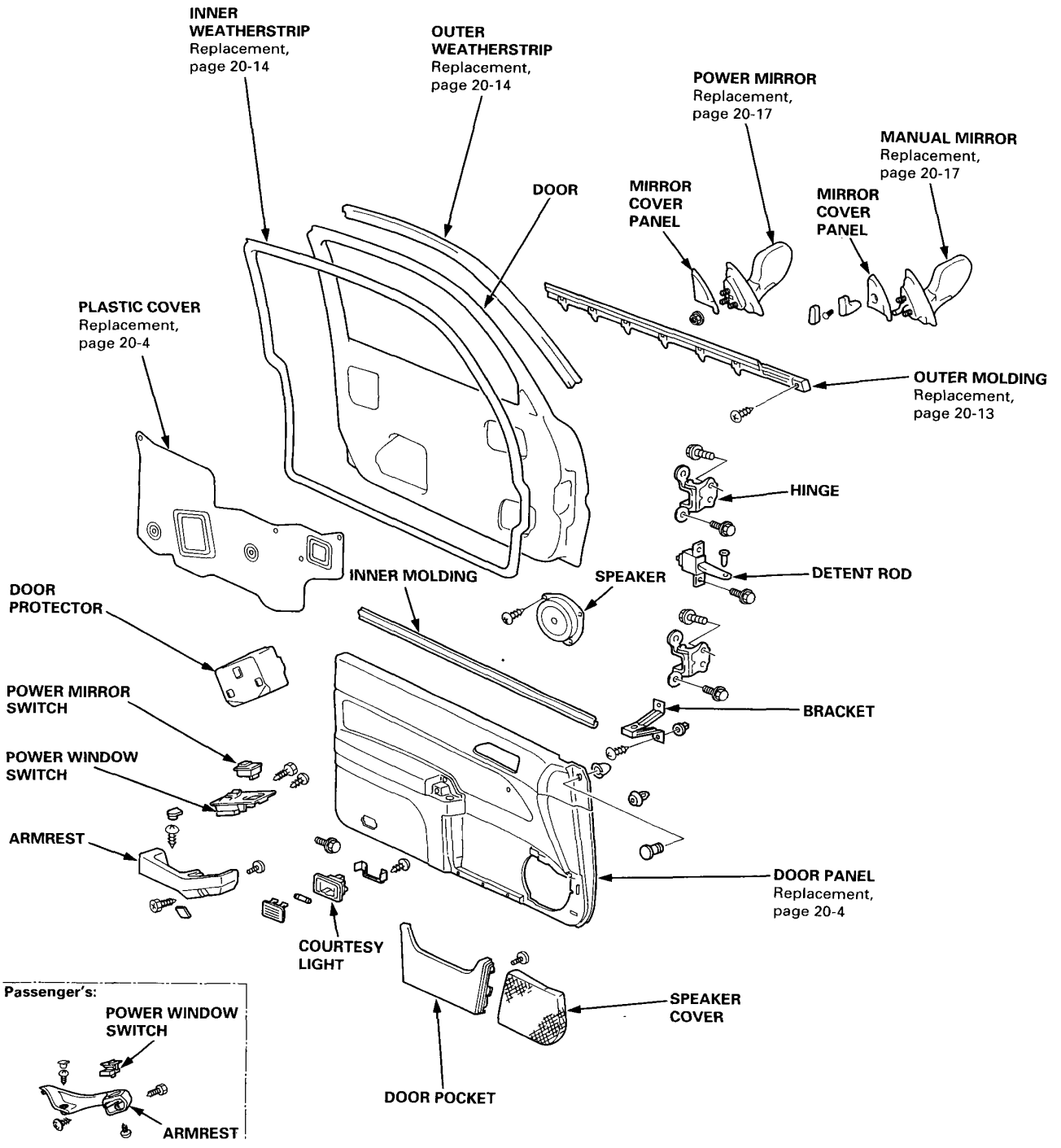
Body

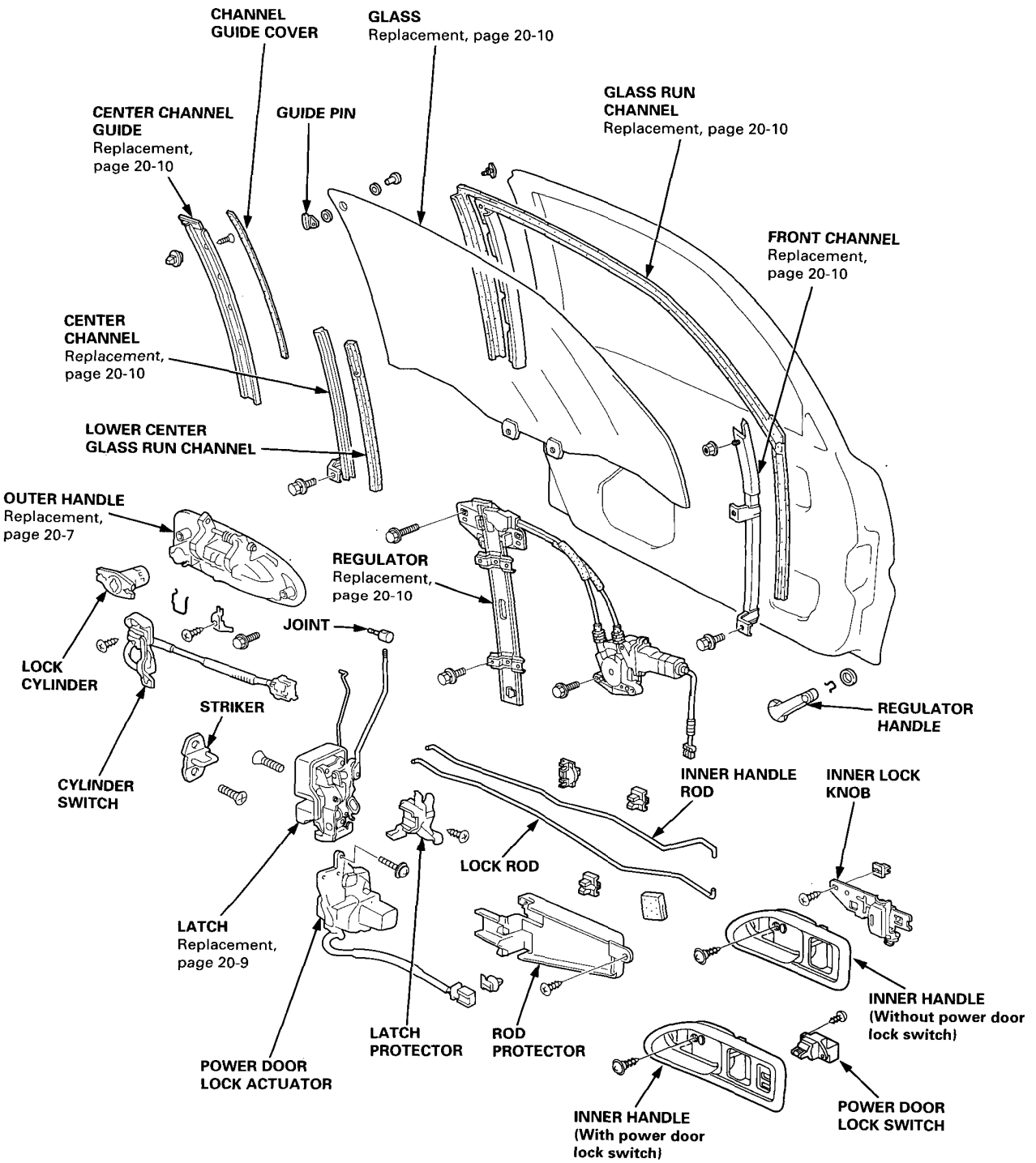
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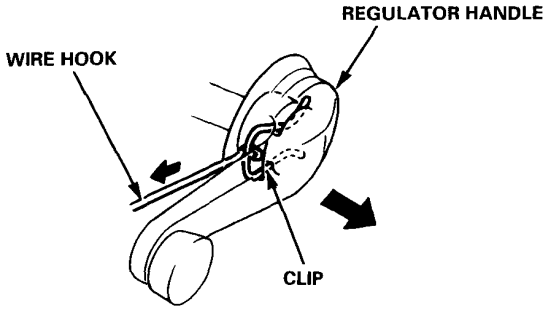

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POWER DOOR LOCK ACTUATOR
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POWER DOOR LOCK SWITCH

Door Panel/Plastic Cover Replacement

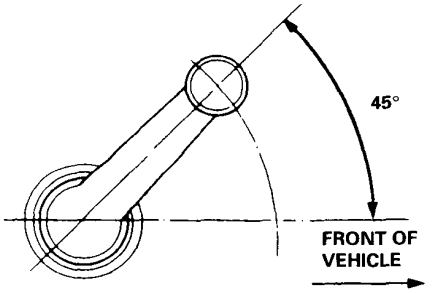
1. Remove the mirror cover panel (see page 20-17).

   NOTE: Take care not to scratch the door panel and other parts.

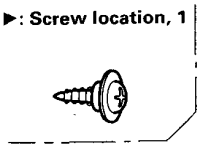
2. If applicable, remove the regulator handle by pulling the clip out a wire hook.

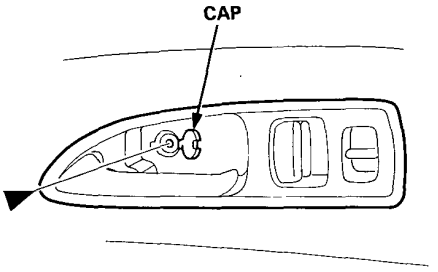


   NOTE: Install the regulator handle so it points forward and up at a 45 degree angle with the glass closed.

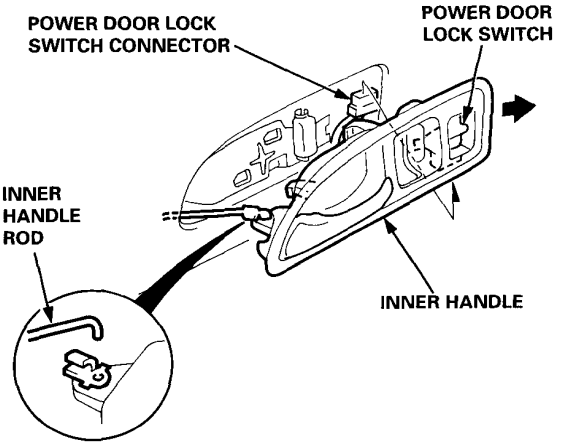


3. Pry the cap and remove the screw.

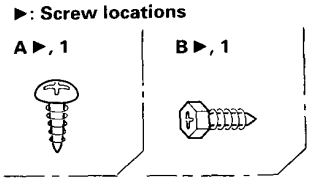




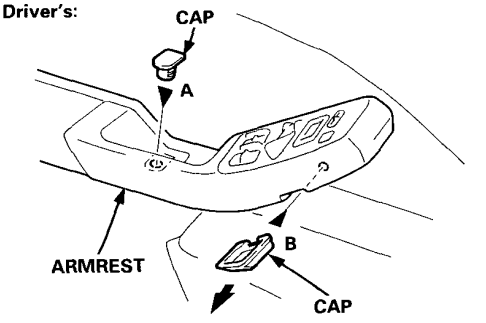
4. Pull the inner handle forward and out half-way, and disconnect the inner handle rod. If so equipped, disconnect the power door lock switch connector.



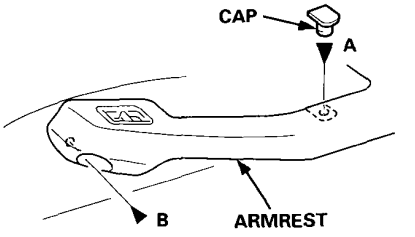
5. Remove the armrest screw.



Driver's:

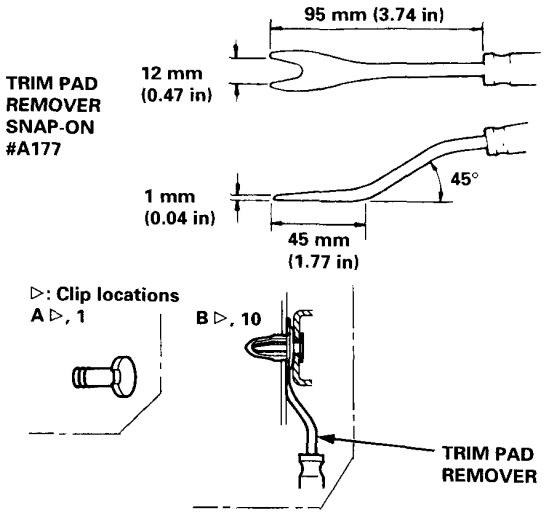


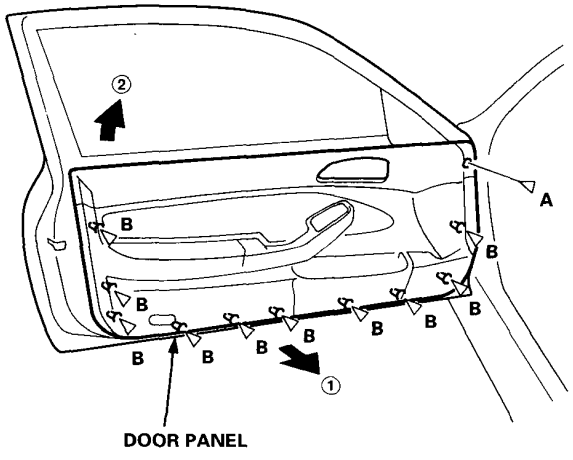
Passenger's:



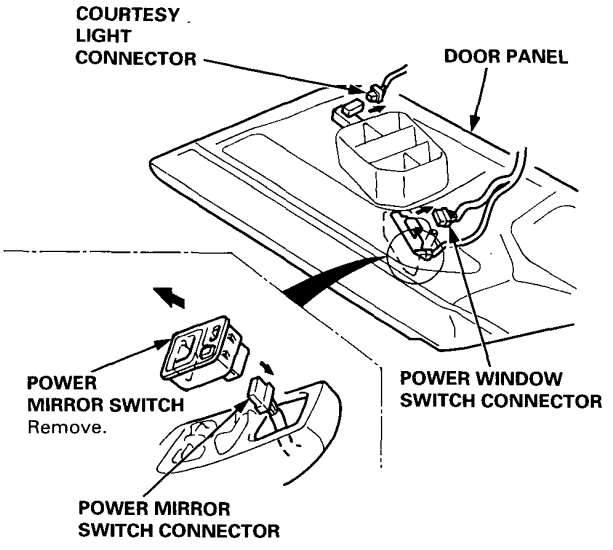
6. Release the clips that hold the door panel. Remove the door panel by pulling it upward.

NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.

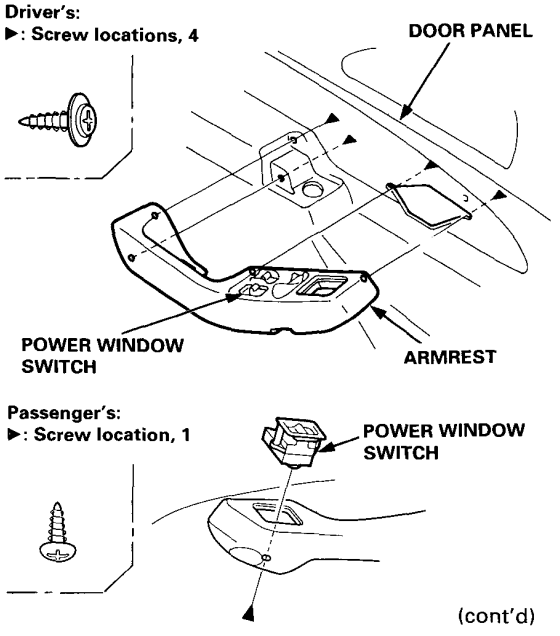




7. Disconnect the following:
   - Power window switch connector
   - Power mirror switch connector (driver's, for some types)
   - Courtesy light connector



NOTE: If necessary, remove the armrest (driver's) or power window switch (passenger's) to move the glass.

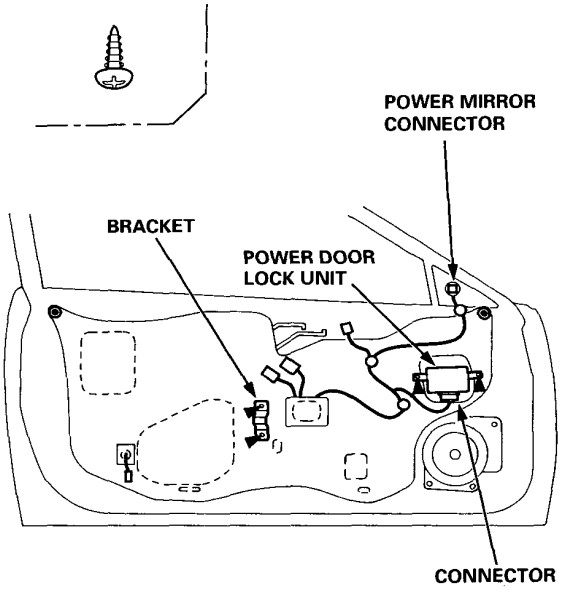


(cont'd)

Door Panel/Plastic Cover Replacement (cont'd)

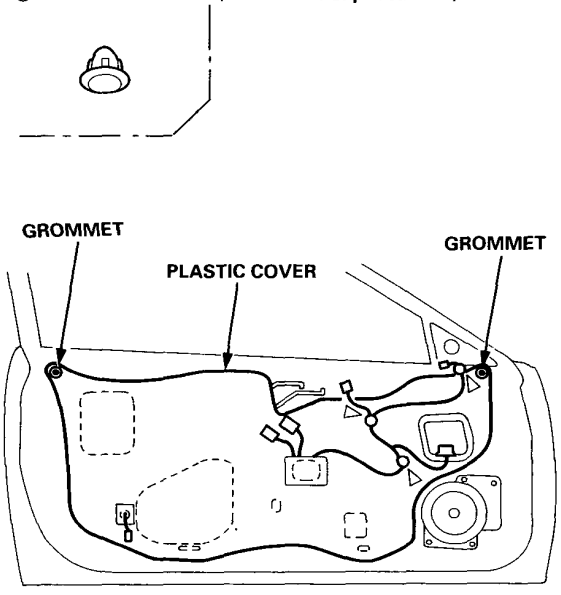
8. Remove the bracket and power door lock unit, and disconnect the connectors.

►: Screw locations, 4



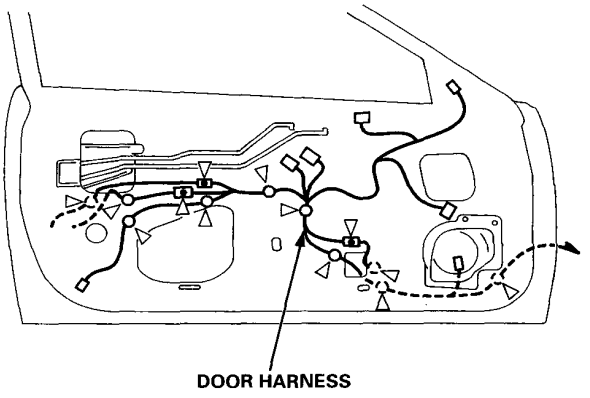
9. Detach the grommets and harness clips, then carefully remove the plastic cover.

◉: Grommet locations, 2 ▷: Clip locations, 3



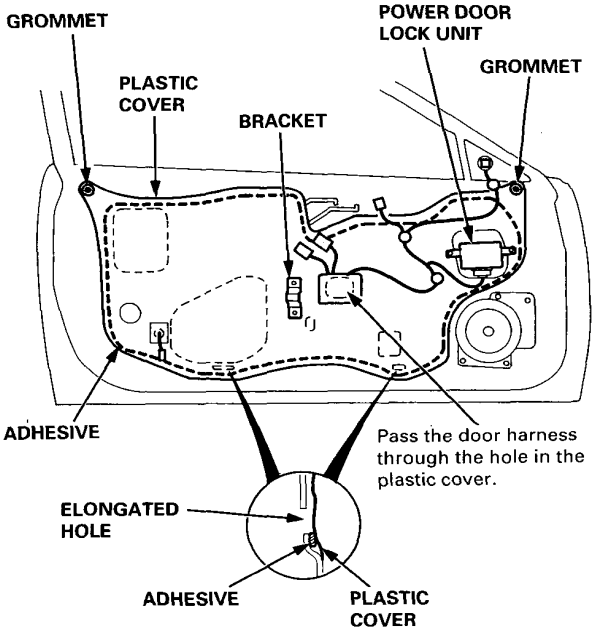
10. Before installing the plastic cover, make sure the door harness and connectors are fastened correctly on the door.

▷: Clip locations, 13



11. Install the plastic cover and all removed parts.

NOTE:
- Apply adhesive along the edge where necessary to maintain a continuous seal and prevent water leaks.
- Do not plug the elongated hole.



12. Install the door panel (see page 20-5).

    NOTE:
    - Make sure the door harness is not pinched.
    - If necessary, replace any damaged clips.
    - Make sure the connectors are connected properly.

13. Install the inner handle (see page 20-4).

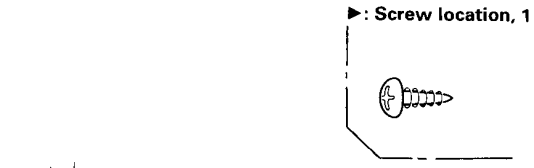
    NOTE: Make sure the connector is connected properly.

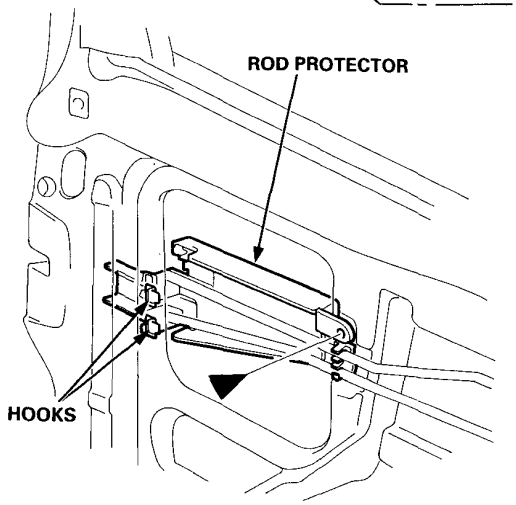
Outer Handle Replacement

NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-4)

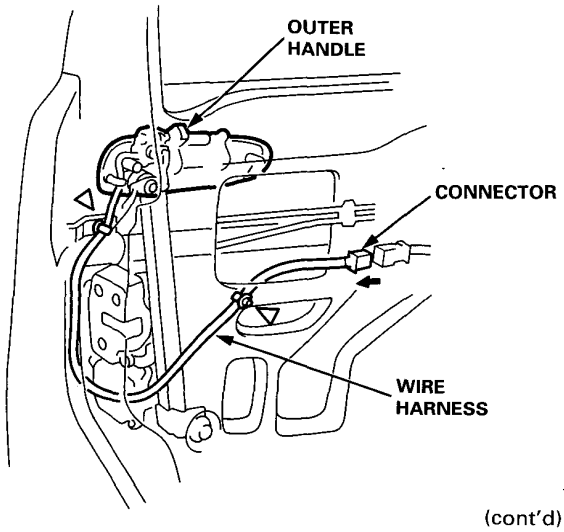
2. Remove the rod protector.





3. If so equipped, disconnect the connector, and remove the harness clips.

   ▷: Clip locations, 2



(cont'd)

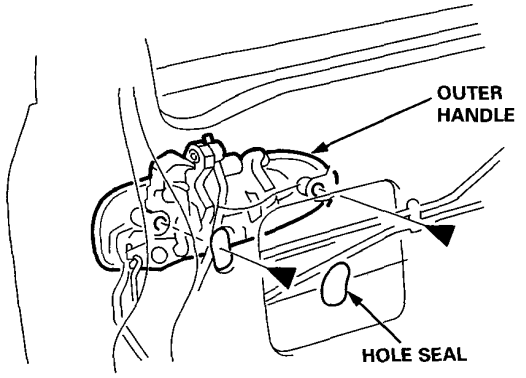
Outer Handle Replacement (cont'd)

4. Remove the bolts.

►: Bolt locations, 2

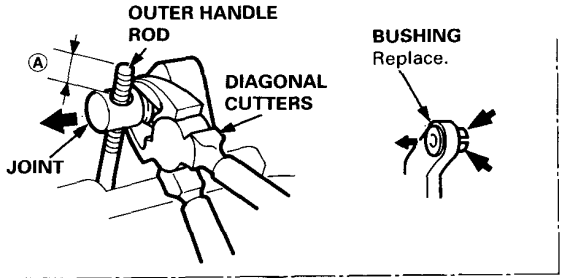


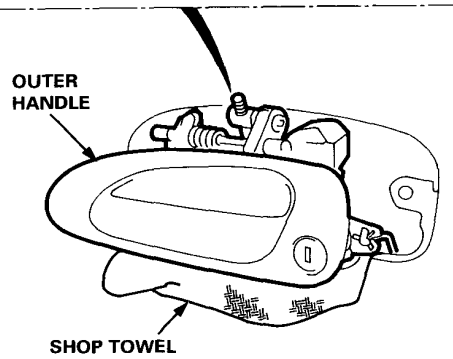
6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



5. Pull out the outer handle.
Pry the outer handle rod out of its joint using diagonal cutters.

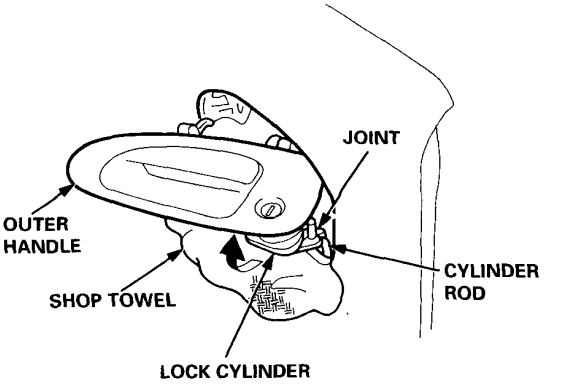
NOTE:
- To ease reassembly, note the location Ⓐ of the outer handle rod on the joint before disconnecting it.
- Take care not to bend the outer handle rod.
- Use a shop towel to protect the opening in the door.



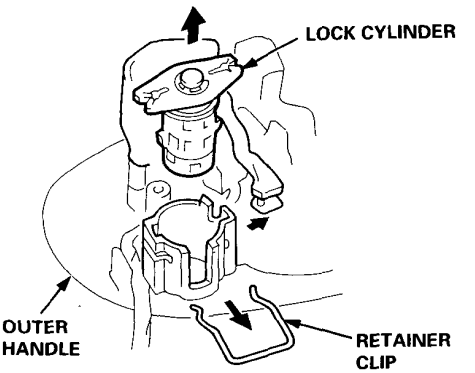


6. Disconnect the cylinder rod as shown.

NOTE: Take care not to damage the lock cylinder joint.



7. Pull out the retainer clip, then remove the lock cylinder.



8. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the outer handle rod and connector are connected securely.
- Make sure the wire harness is routed properly.
- Make sure the door locks and opens properly.

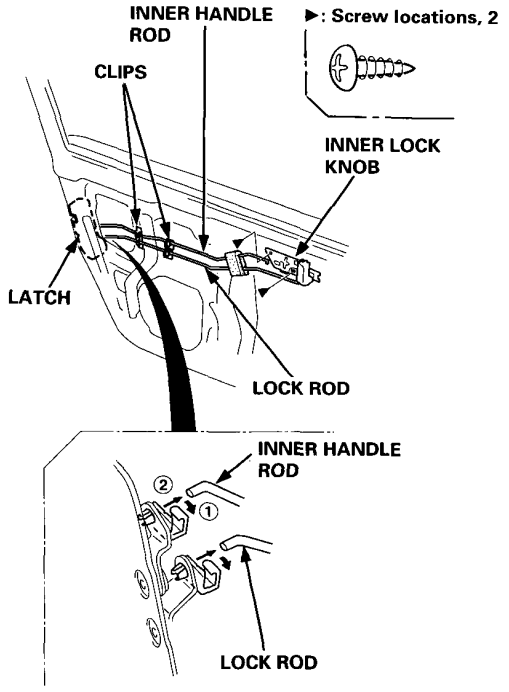
Latch Replacement

NOTE: Raise the glass fully.

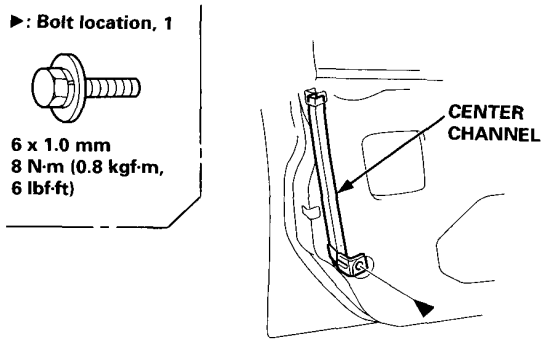
1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-4)
   - Outer handle (see page 20-7)

2. Disconnect the inner handle rod and lock rod from the latch.
   Detach the inner handle rod and lock rod, then remove the inner lock knob.

   NOTE: Take care not to bend the rods.

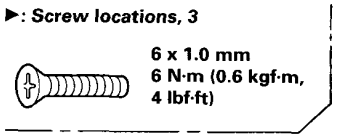


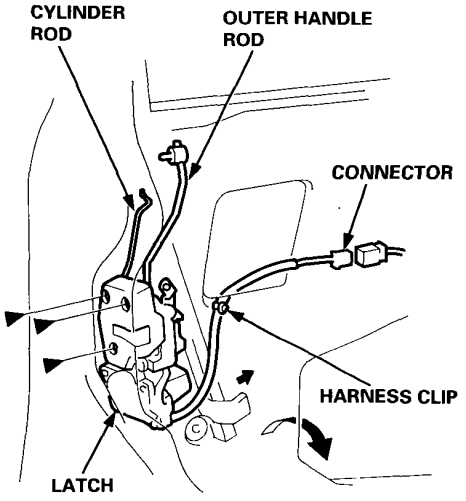
3. Remove the bolt, then move the center channel forward.



4. Disconnect the connector, and detach the harness clip from the door.
   Remove the latch through the hole in the door.

   NOTE: Take care not to bend the outer handle rod and cylinder rod.





5. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure the inner handle rod, lock rod and connector are connected properly.
   - Make sure the door locks and opens properly.

Glass/Regulator/Glass Run Channel Replacement

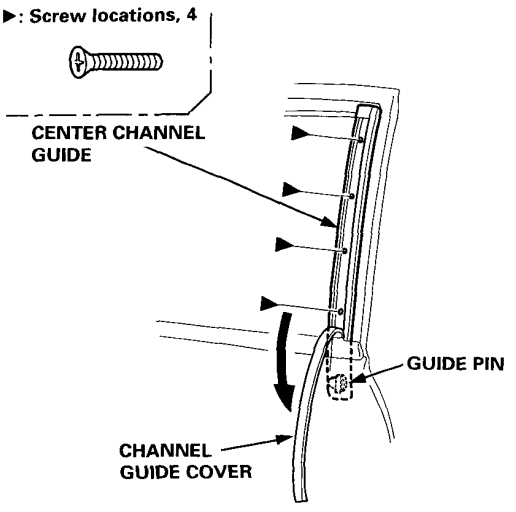
1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-4)

2. Driver's: Remove the armrest from the door panel (see page 20-5).
   Passenger's: Remove the power window switch from the door panel (see page 20-5).
   Connect the power window switch to the door harness.

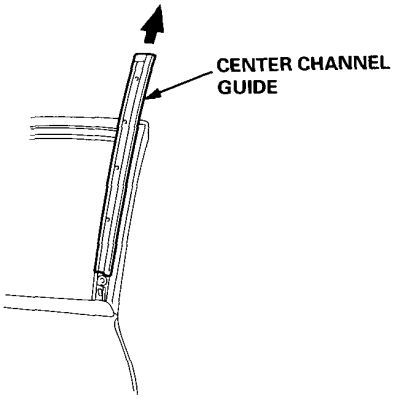
3. Lower the glass fully.

4. Peel off the channel guide cover, then remove the screws.

   NOTE: When installing the channel guide cover, apply the double-faced adhesive tape to it.

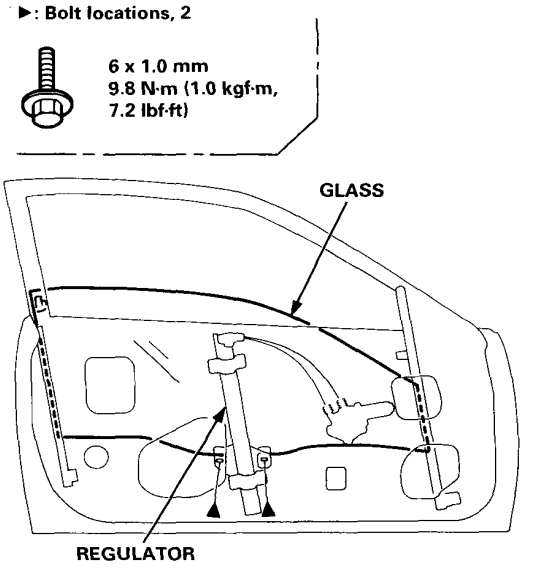


5. Remove the center channel guide by pulling it upward.



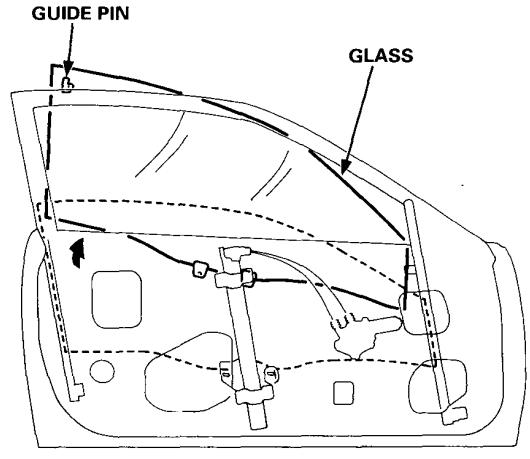
6. Carefully move the glass until you can see the bolts, then remove them.

   NOTE: Take care not to drop the glass inside the door.

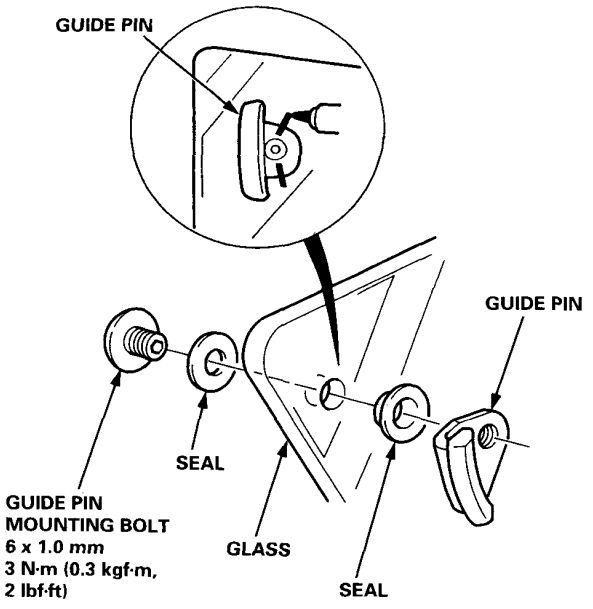


7. Carefully pull the glass out through the window slot.

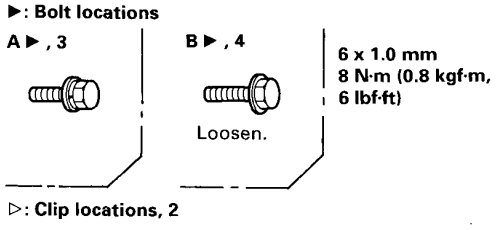
   NOTE:
   - Take care not to drop the glass inside the door.
   - Check the guide pin for damage, and replace if necessary.

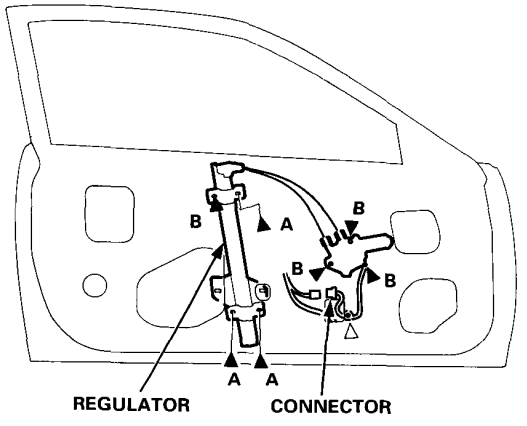


NOTE: Scribe a line around the guide pin to show the original location.

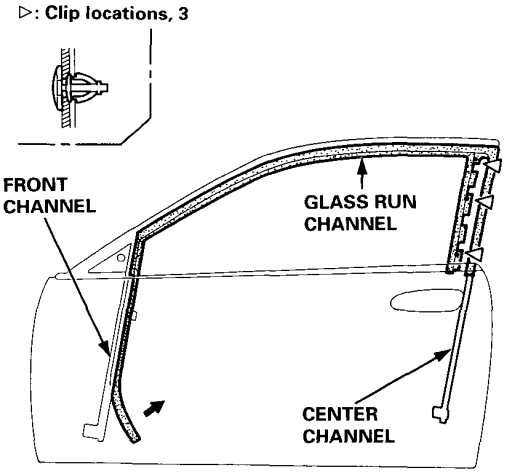


8. Disconnect the connector, then remove the regulator through the center hole in the door.



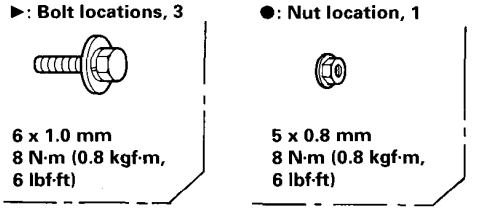


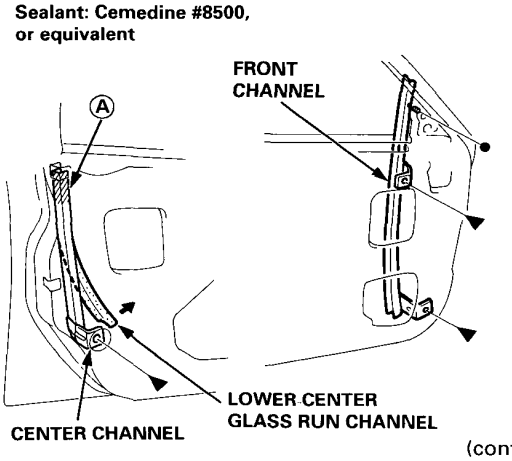
9. Remove the glass run channel.



10. Remove the front and center channels.

NOTE:
- If necessary, remove the lower center glass run channel from the center channel.
- When installing the lower center glass run channel, apply clear sealant to the location Ⓐ of the center channel.

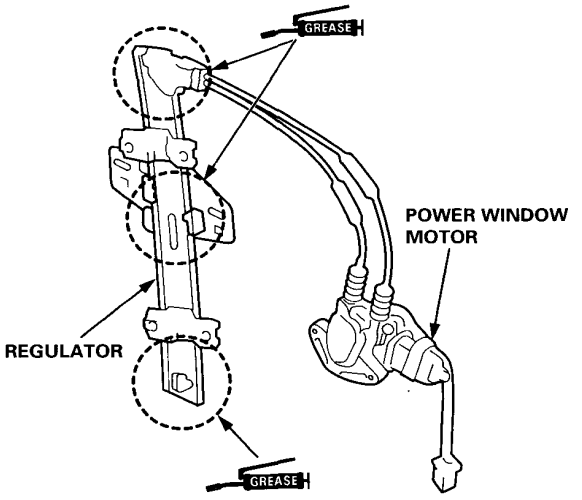




(cont'd)

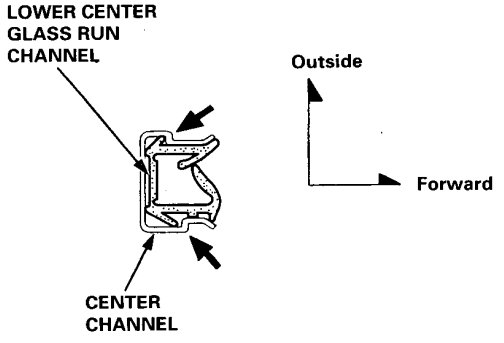
Glass/Regulator/Glass Run Channel Replacement (cont'd)

11. Grease all the sliding surfaces of the regulator where shown.
    Check that the regulator moves smoothly by connecting a 12 V battery to the power window motor (see section 23).



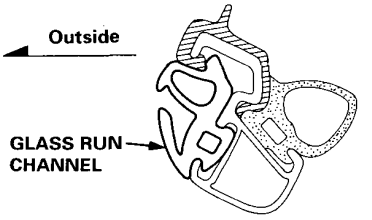
12. Install the front and center channels.

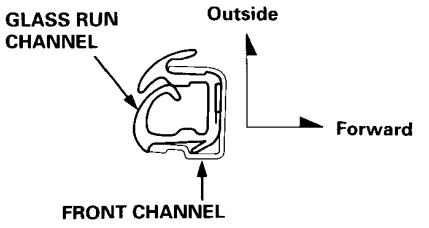
    NOTE: Make sure the lower center glass run channel is fitted into the center channel.



13. Install the glass run channel.

    NOTE: Fit the glass run channel into the front channel and on the door as shown.





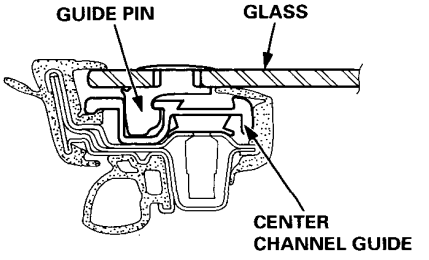
14. Install the regulator (see page 20-11).

    NOTE: Make sure the connector is connected properly.

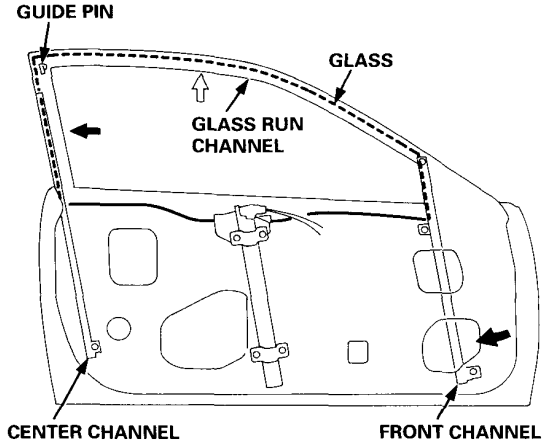
15. Install the glass (see page 20-10).

16. Install the center channel guide and channel guide cover.

    NOTE: Make sure the guide pin is installed in the center channel guide properly.



17. Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and glass run channel when the glass is closed. Adjust the position of the glass as necessary.



18. Attach the door harness to the door correctly (see page 20-6).

19. Disconnect the power window switch from the door harness, then install the armrest and power window switch on the door panel (see page 20-5).

20. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent water leaks (see page 20-6).

21. Install the door panel (see page 20-4).

Outer Molding Replacement

CAUTION: Wear gloves to remove the outer molding.

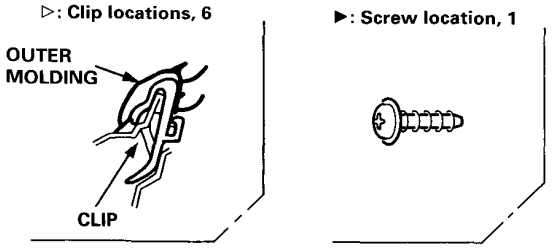
1. Remove the power or manual mirror (see page 20-17).

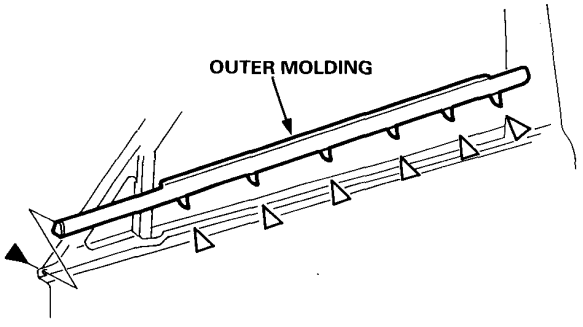
2. Lower the glass.

3. Remove the screw.

4. Starting at the rear, pry the outer molding up and detach the clips, then remove the outer molding.

   NOTE: Take care not to twist or scratch the outer molding.





5. Installation is the reverse of the removal procedure.

   NOTE:
   - If necessary, replace any damaged clips.
   - When installing, align the rear edge of the outer molding with the rear edge of the door.

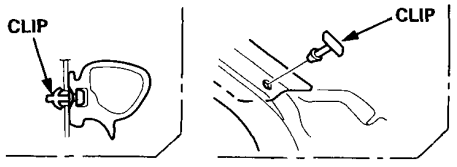
Weatherstrip Replacement

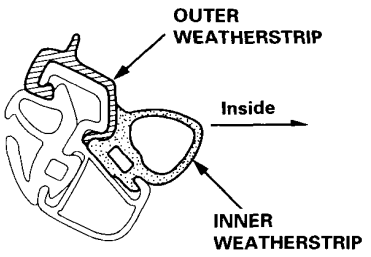
NOTE:
- Before installing the inner weatherstrip, apply clear sealant to locations Ⓐ on the door as shown.
- If necessary, replace any damaged clips.

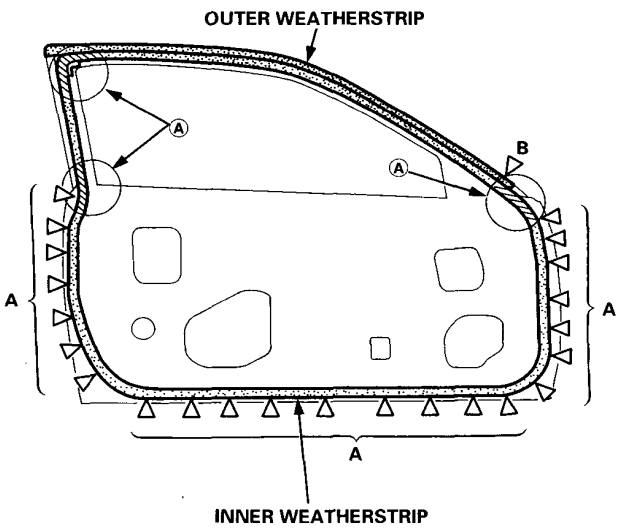
Sealant: Cemedine #8500, or equivalent

▷: Clip locations

A ▷, 23 **B ▷, 1**



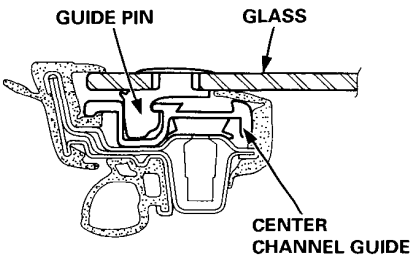




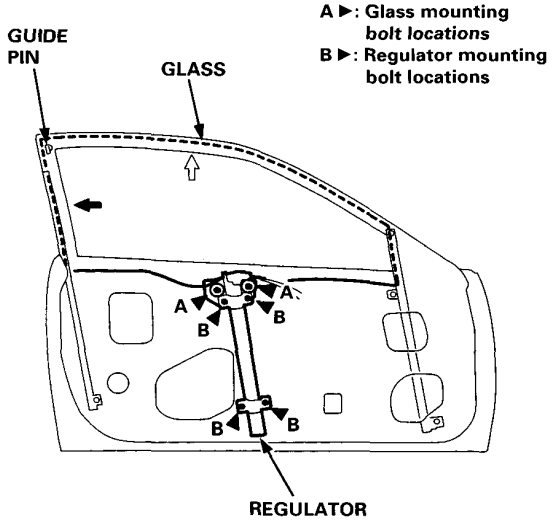
Glass Adjustment

NOTE:
- Place the vehicle on a firm, level surface when adjusting the glass.
- Check the weatherstrips and glass run channel for damage or deterioration, and replace them if necessary.

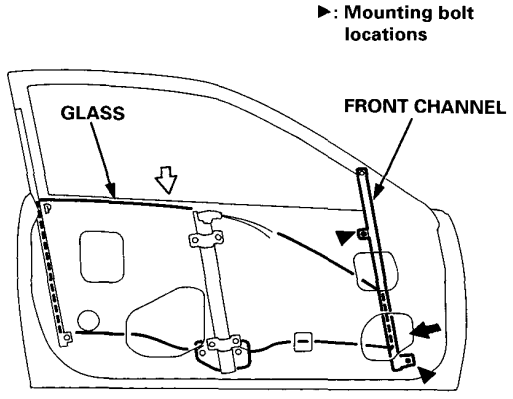
1. Remove the door panel and peel off the plastic cover (see page 20-4).
2. Driver's: Remove the armrest (see page 20-5). Passenger's: Remove the power window switch (see page 20-5).
3. Connect the power window switch to the power window motor connector (power window model). Install the regulator handle on the door regulator (manual window model).
4. Make sure the guide pin is installed in the center channel guide properly.



5. Raise the glass.
6. Loosen the glass mounting bolts and regulator mounting bolts.
7. Adjust the glass so it is contact with the glass run channel evenly.
8. Tighten the glass mounting bolts and regulator mounting bolts.

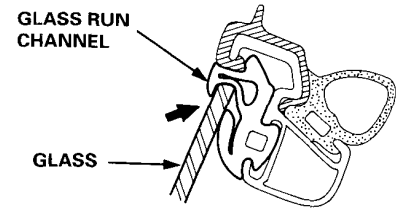


9. Loosen the front channel mounting bolts.
10. Lower the glass.
11. Push the front channel against the glass, then tighten the mounting bolts.



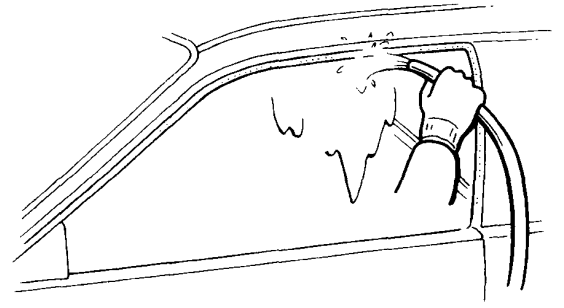
12. Check that the glass moves smoothly.
13. Raise the glass fully and check for gap.
14. Check the glass operation.

    NOTE: Check that the glass contacts the glass run channel evenly.



15. Check for water leaks.

    NOTE: Do not use high pressure water.



16. Route the door harness and connectors, and fasten them to the door (see page 20-6).
17. Disconnect the power window switch from the door harness, then install the armrest (driver's) and power window switch (passenger's) on the door panel (see page 20-5).
18. Attach the plastic cover, then install the door panel (see page 20-4).

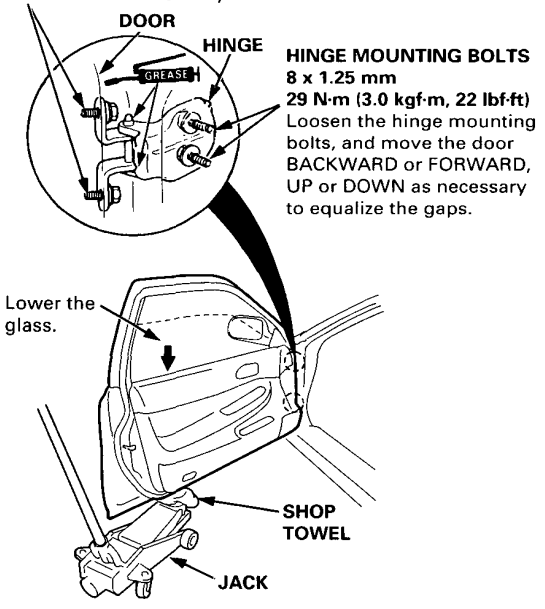
Position Adjustment

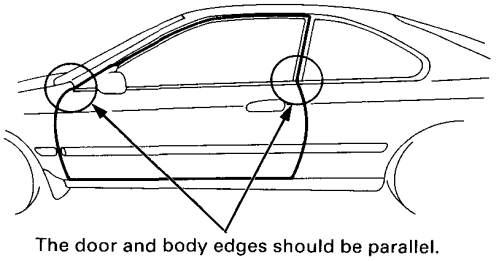
NOTE: Place the vehicle on a firm, level surface when adjusting the doors.

After installing the door, check for a flush fit with the body, then check for equal gaps between the front, rear, and bottom door edges and the body.
The door and body edges should also be parallel. Adjust at the hinges as shown.

CAUTION: Place a shop towel on the jack to prevent damage to the door when loosening the door and hinge mounting bolts for adjustment.

DOOR MOUNTING BOLTS
8 x 1.25 mm 29 N·m (3.0 kgf·m, 22 lbf·ft)
Loosen the door mounting bolts slightly to move the door IN or OUT until it's flush with the body. If necessary, you can install a shim behind one hinge to make the door edges PARALLEL with the body.





The door and body edges should be parallel.

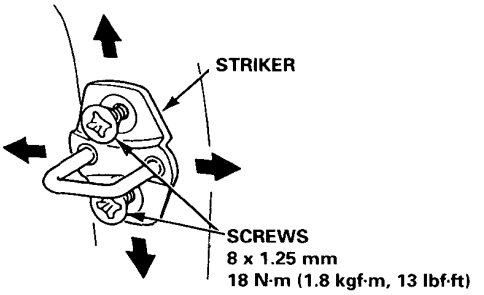
NOTE: Check for water leaks.

Striker Adjustment

Make sure the door latches securely without slamming. If it needs adjustment:

1. Draw a line around the striker for reference.
2. Loosen the screws, and move the striker IN or OUT to make the latch fit tighter or looser. Move the striker UP or DOWN to align it with the latch opening. Then lightly tighten the screws and recheck.

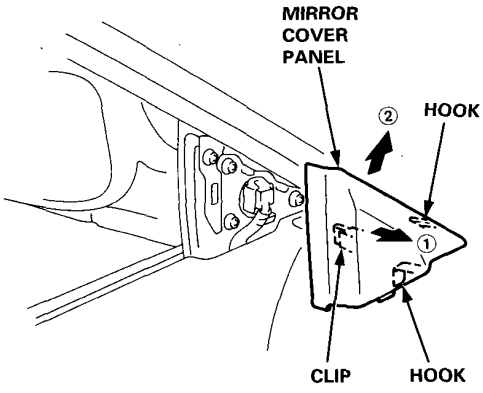
   NOTE: Hold the outer handle out, and push the door against the body to be sure the striker allows a flush fit.
3. If the door latches properly, tighten the screws and recheck.



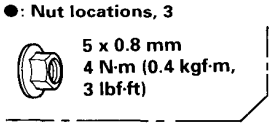
Power Mirror Replacement

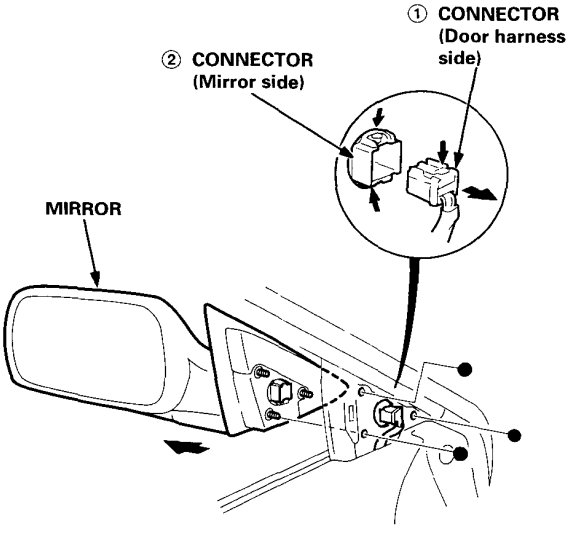
1. Pry out the mirror cover panel with a flat tip screwdriver, then remove it.

   CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.



2. Disconnect the connector. Remove the nuts, then remove the mirror while holding it.





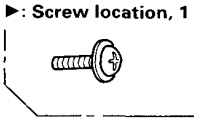
3. Installation is the reverse of the removal procedure.

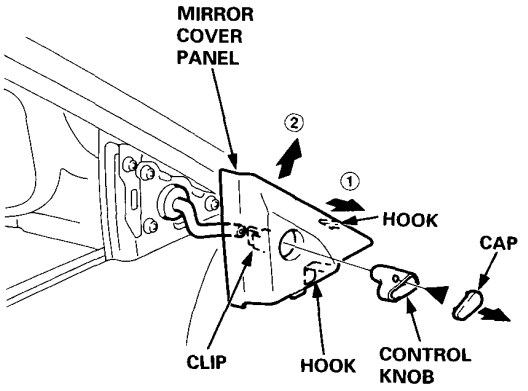
Manual Mirror Replacement

1. Remove the cap and screw, then remove the control knob.

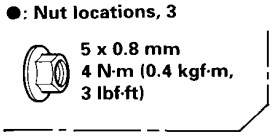
2. Pry out the mirror cover panel with a flat tip screwdriver, then remove it.

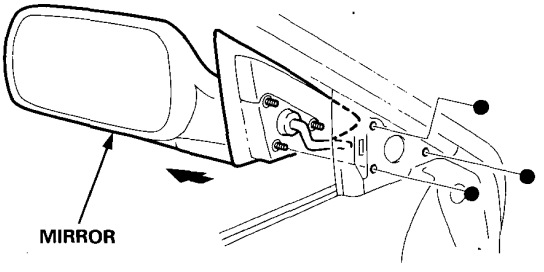
   CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.





3. Remove the nuts, then remove the mirror while holding it.



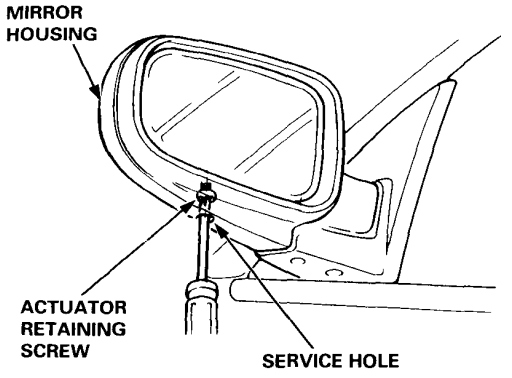


4. Installation is the reverse of the removal procedure.

Mirror Holder Replacement

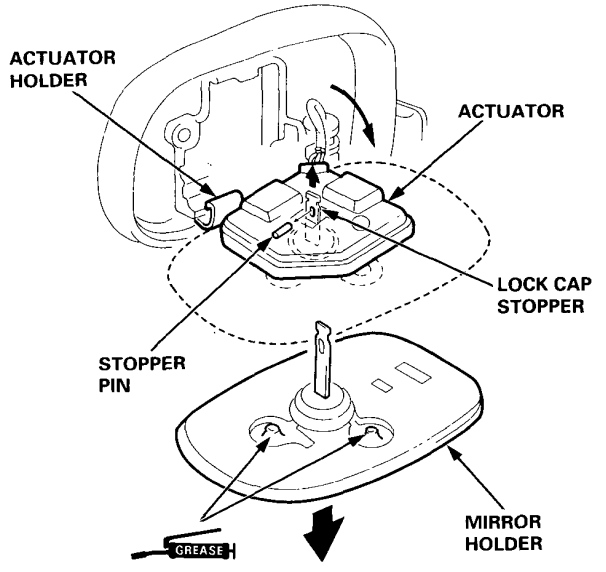
Power mirror:

1. Insert a screwdriver in the mirror housing through the service hole, and loosen the actuator retaining screw.



2. Pull out the mirror holder from the mirror housing.
3. Pull the lock cap stopper and remove the stopper pin, then separate the actuator and mirror holder.

   NOTE: The power mirror with defogger can not separate the actuator and mirror holder.



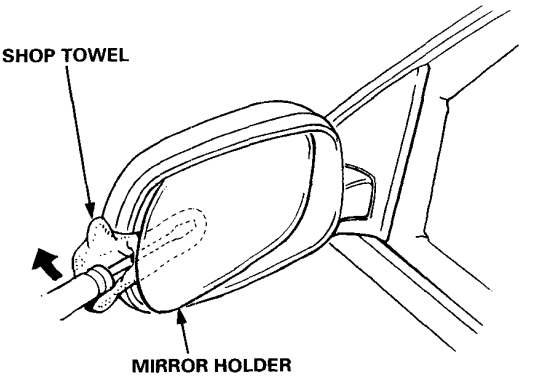
4. Installation is the reverse of the removal procedure.

   NOTE: Apply grease to the locations indicated by the arrows.

Manual mirror:

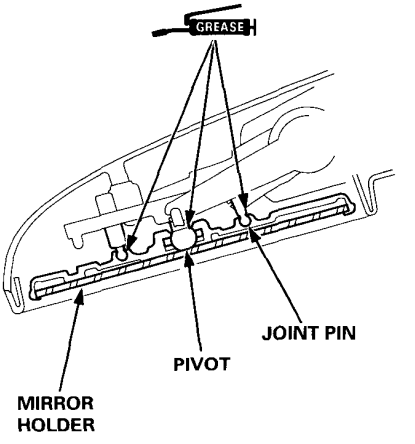
1. Carefully pry out the mirror holder with a flat tip screwdriver as shown.

   CAUTION: To prevent damage to the mirror, wrap the end of a flat tip screwdriver with a shop towel.



2. Installation is the reverse of the removal procedure.

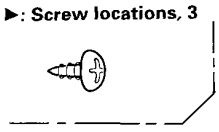
   NOTE: Apply grease to the locations indicated by the arrows.

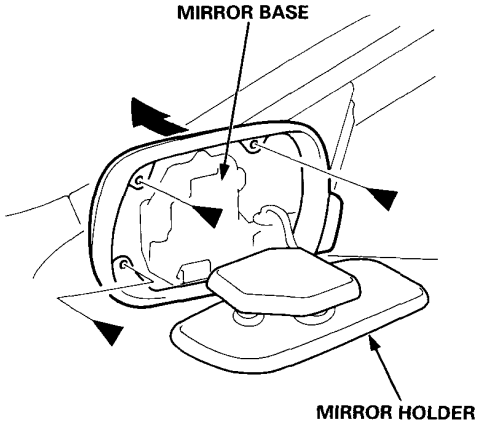


Mirror Visor and Mirror Cover Replacement

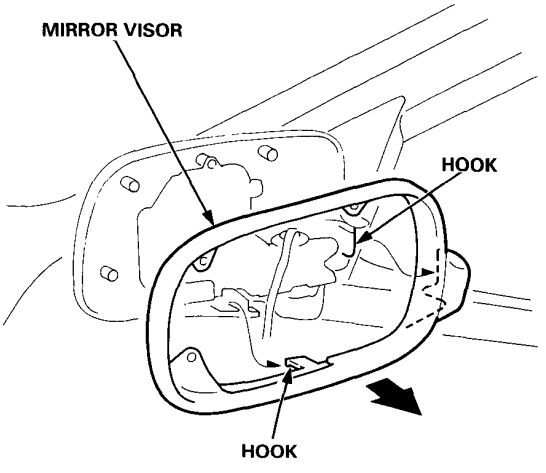
NOTE: The mirror visor and mirror cover replacement procedures shown are for the power mirror. The manual mirror visor and cover can be replaced in the same manner.

1. Remove the mirror holder (see page 20-18).
2. Turn the mirror base forward, then remove the screws.

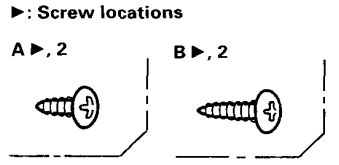


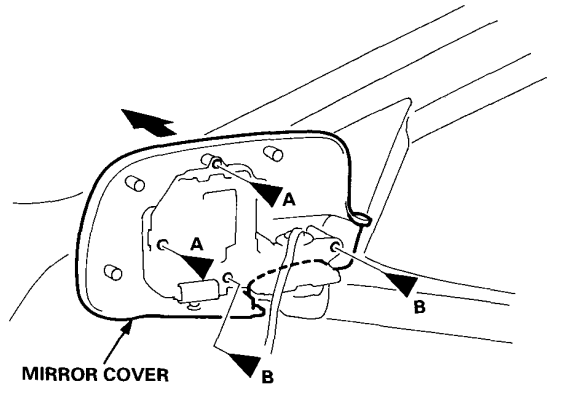


3. Detach the hooks, then remove the mirror visor.



4. Remove the screws, then remove the mirror cover.





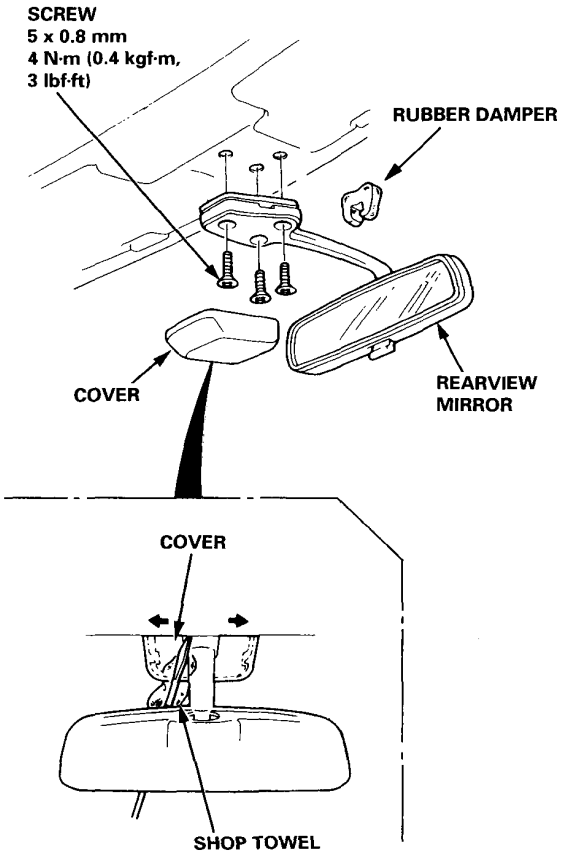
5. Installation is the reverse of the removal procedure.

Mirrors

Rearview Mirror Replacement

1. Remove the rubber damper.
2. Pry the cover off using the end of a flat tip screwdriver.

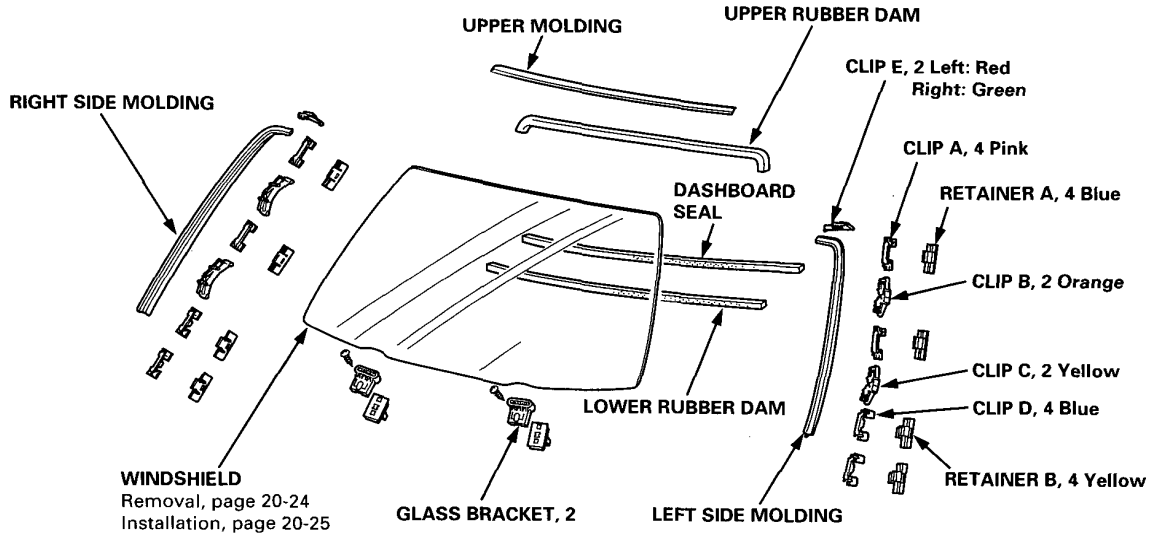
   CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.
3. Remove the screws, then remove the rearview mirror.
4. Installation is the reverse of the removal procedure.

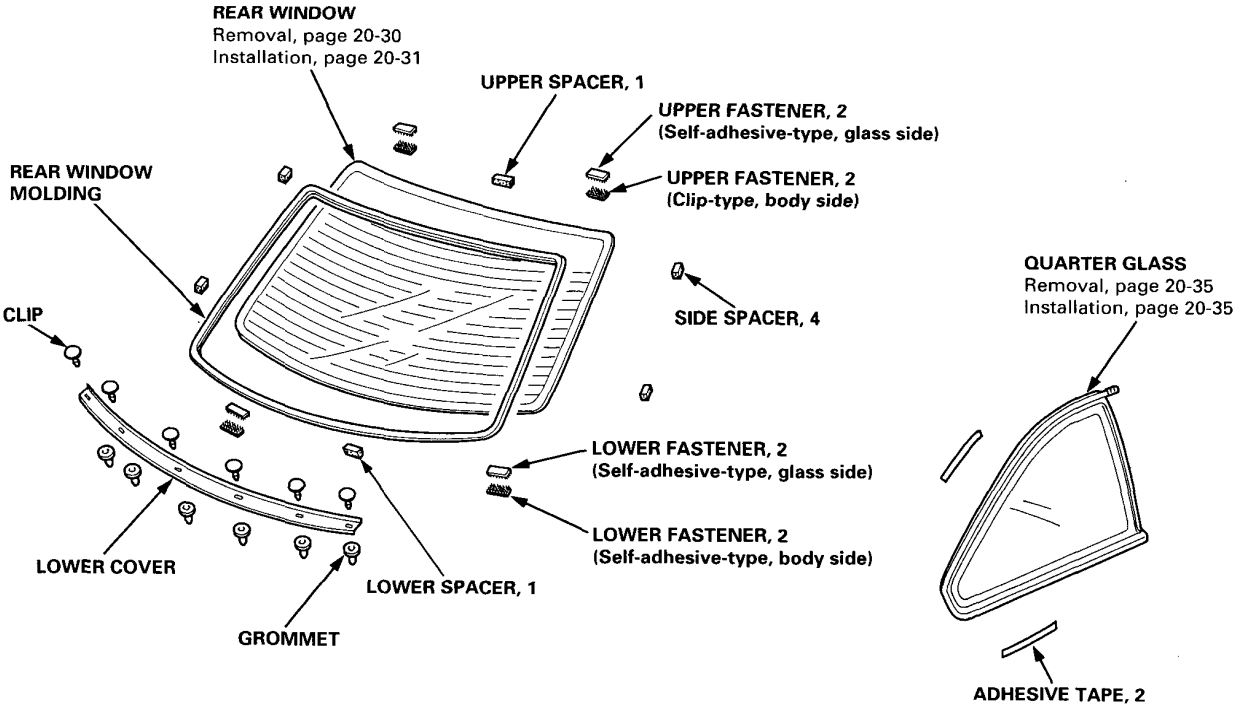


Windshield, Rear Window, Quarter Glass

Index

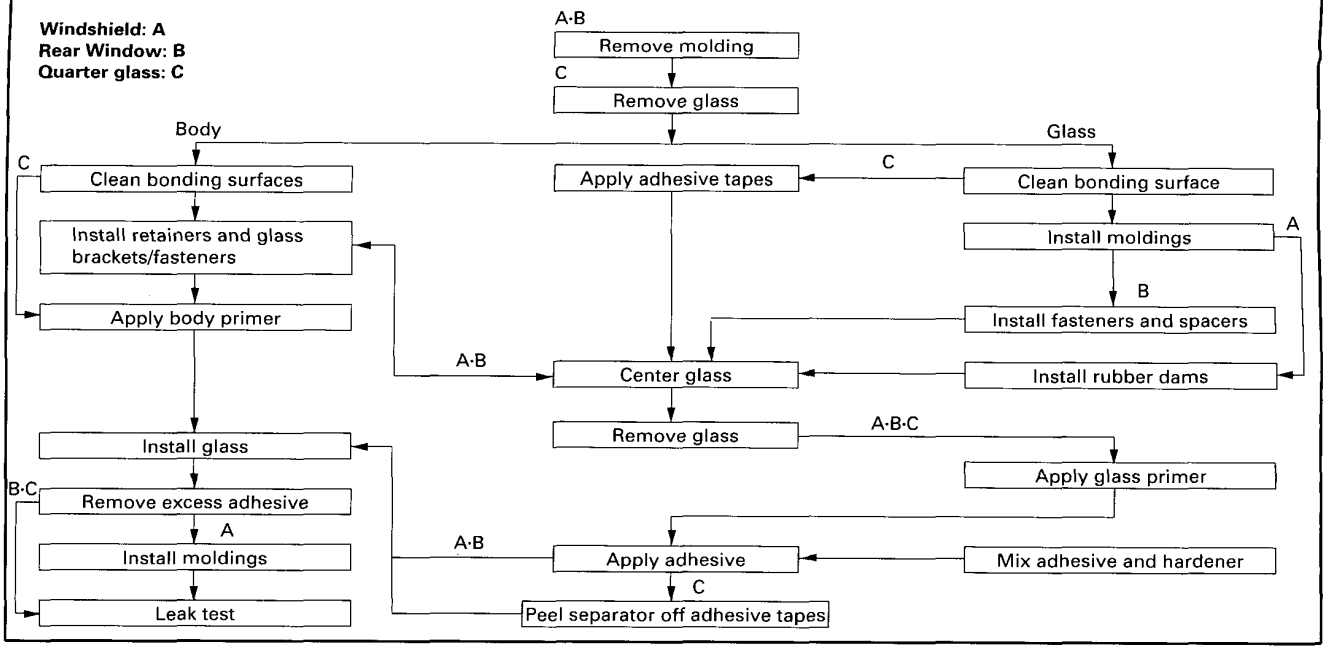
NOTE: The numbers after the part names show the quantities of the parts used.





Windshield, Rear Window, Quarter Glass

Removal/Installation Procedures Flow



Parts

Part Number		Contents	Comment
Adhesive kit —	Low temperature 08718 – 99960 High temperature 08718 – 99961	Adhesive sealant 500 g (17.6 oz) Hardener 75 g (2.6 oz) Glass primer 20 g (0.7 oz) Body primer 20 g (0.7 oz) Piano wire Length: 1 m (3 ft), Diameter: 0.6 mm (0.02 in) Gauze Cartridge Sponge	 For adhesive For applying primers

NOTE:

- Both kits have two types of adhesive primer: one for the body (metal), and one for glass.
- Always use new genuine Honda adhesive, or equivalent.
- Do not use the adhesive if six months have elapsed since date of manufacture.
- Store adhesive in a cool, dry place.
- Open only immediately before you are going to use it.

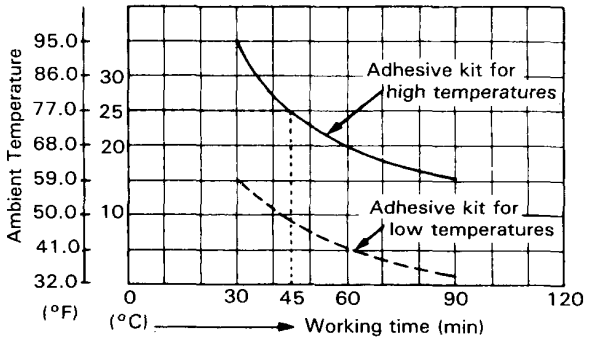
Tools

Tool/Material	Remarks
Glass or steel plate	To mix adhesive and hardener on
Putty knife	To mix adhesive and remove excess
Caulking gun	To apply adhesive to windshield
Suction cups	To install windshield
Knife	To scrape bonding surface around window opening
Awl	To make hole through existing adhesive for piano wire
Two wood sticks	To hold piano wire
Toluene or alcohol	To clean bonding surfaces

Workable Time

Adhesive workable time varies widely according to temperature, so choose the correct adhesive kit for the temperature range you will be working in.
After mixing and applying adhesive, you should install the windshield within the time shown on the chart.

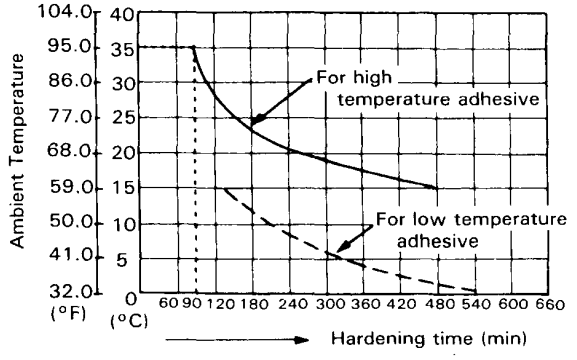
For example, when the ambient temperature is 25°C (77°F), the glass should be installed within 45 minutes using the high temperatue type adhesive.
Kit part numbers and contents are listed on the page before.



Hardening Time

Hardening time can be shortened by heating with infrared light.

For example, the adhesive will start to harden within 270 minutes mixing at 20°C (63°F). If however, it is heated to 35°C (95°F), it will start to harden within 90 minutes.

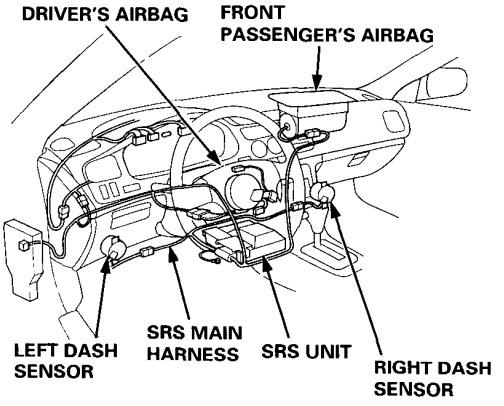


Broken Windshield Removal

For some types:
SRS wire harnesses are routed near the dashboard and steering column.

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly *if it has an open circuit or damaged wiring.***

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



Remove as much broken windshield as possible with a vacuum cleaner.
Blow out the glass in the heater and behind the dashboard with low pressure compressed air.

⚠ WARNING Wear eye protection while using the air gun.

1. Set the temperature control dial to COOL.
2. Select the ↘ to the mode control button.
3. Make sure the recirculation button is OFF.
4. Blow compressed air throught the defroster center vent outlet.
5. Remove the blower duct, and remove any glass from the air mix chamber.
6. Remove any glass from the top of the vent/defrost door.
7. Remove any glass from top and bottom of carpet and seats with a vacuum cleaner.

   NOTE: It is recommended to remove the front seats to shake off any glass (see page 20-51).

Windshield

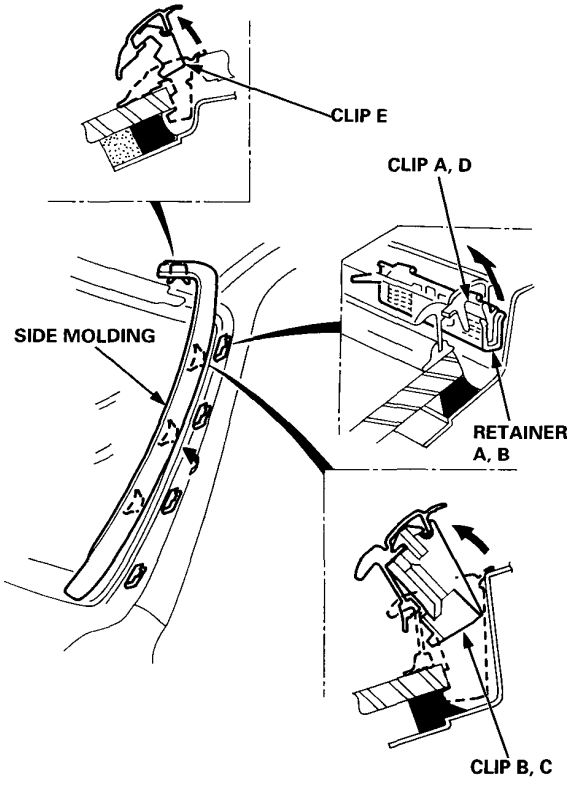
Removal

CAUTION:
- **Wear gloves to remove and install the windshield.**
- **Use seat covers to avoid damaging any surfaces.**

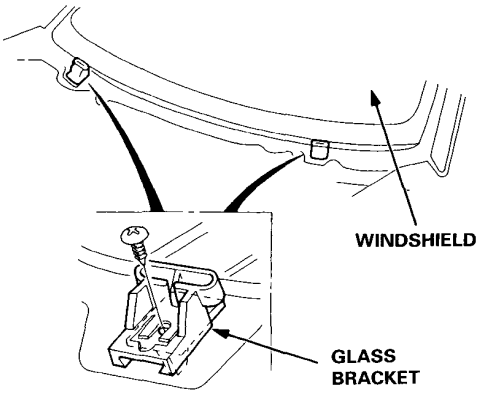
1. To remove the windshield, first remove the:
   - Front pillar trim (see page 20-48)
   - Headliner (see page 20-50)
   - Front wipers and air scoop (see section 23)

2. Detach the clips from the retainers, then remove both side moldings as shown.

   NOTE: If necessary, replace any damaged clips.

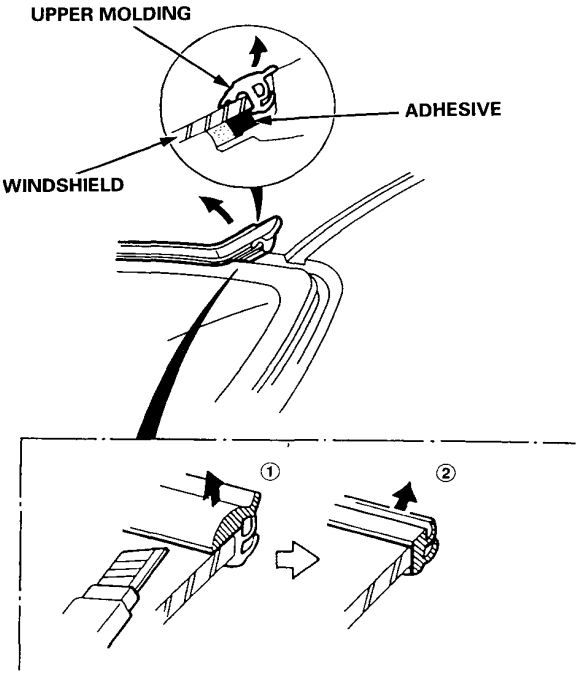


3. Remove the right and left glass brackets.



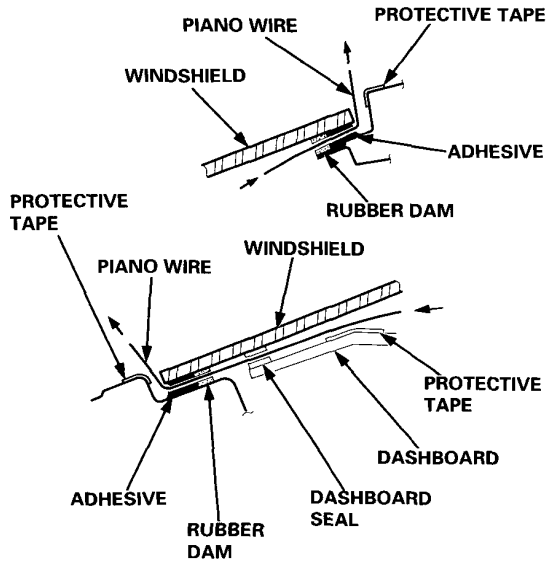
4. Peel off the upper molding.

   NOTE: When the upper molding removal is difficult, cut the upper rubber portion ① off, then cut the side rubber portion ②.



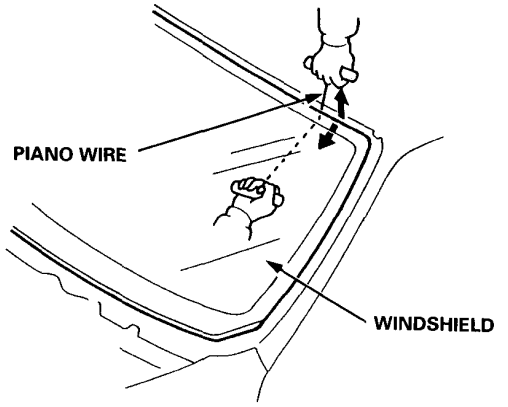
5. Remove the other retainers from the body.

6. Apply protective tape to along the edge of the dashboard and body as shown.
Using an awl, make a hole through the rubber dam and adhesive from inside the car. Push the piano wire throught the hole, and wrap each end around a piece of wood.



7. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the rubber dam and adhesive around the entire windshield.

CAUTION: Hold the piano wire as close to the windshield as possible to prevent damage to the body and dashboard.



8. Carefully remove the windshield.

Installation

1. Scrape the old adhesive smooth with a knife to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire windshield opening flange.

NOTE:
- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Remove the rubber dam from the body.
- Mask off surrounding surfaces before painting.

2. Clean the body bonding surface with a sponge dampened in alcohol.

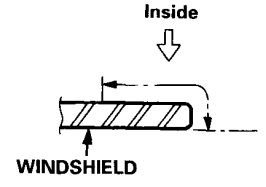
NOTE: After cleaning, keep oil, grease and water from getting on the surface.

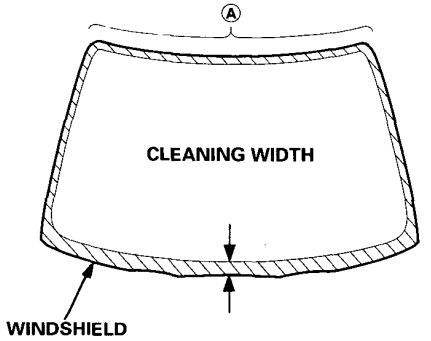
3. If the old windshield is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the windshield surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

CAUTION: Avoid setting the windshield on its edges; small chips may later develop into cracks.

NOTE:
- Clean the shadowed area.
- Clean the area Ⓐ as shown.

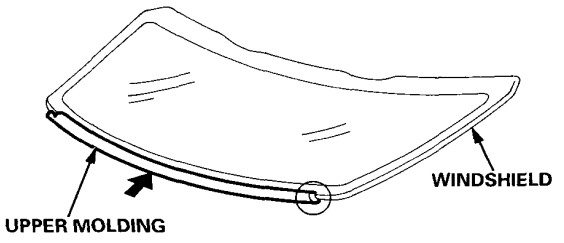


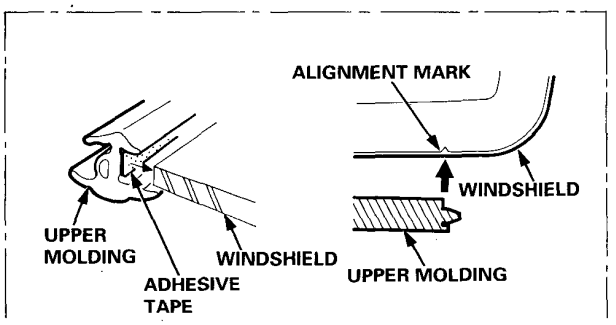


(cont'd)

Installation (cont'd)

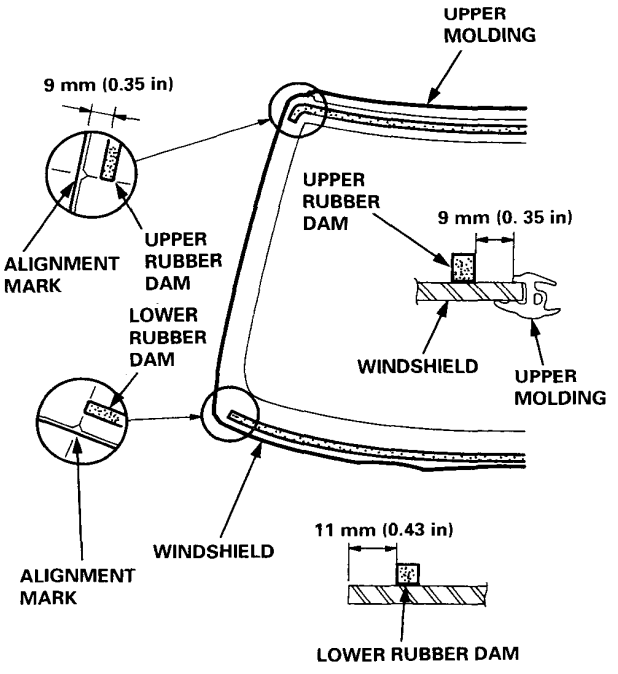
4. Center and glue the upper molding to the upper edge of the windshield.





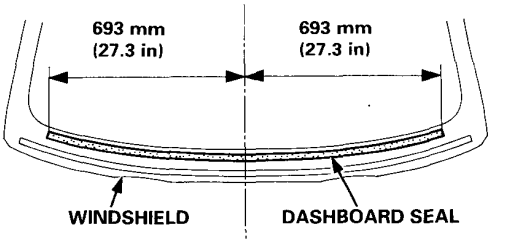
5. Glue the rubber dams to the inside face of the windshield as shown, to contain the adhesive during installation.

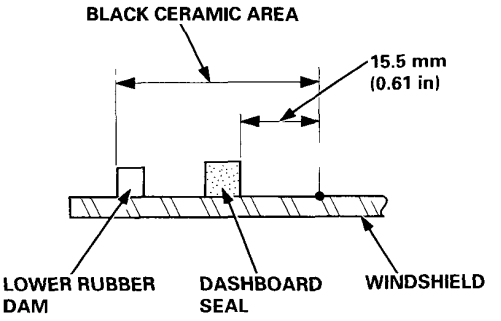
   NOTE: Be careful not to touch the windshield where adhesive will be applied.



6. Glue the dashboard seal to the inside face of the windshield as shown.

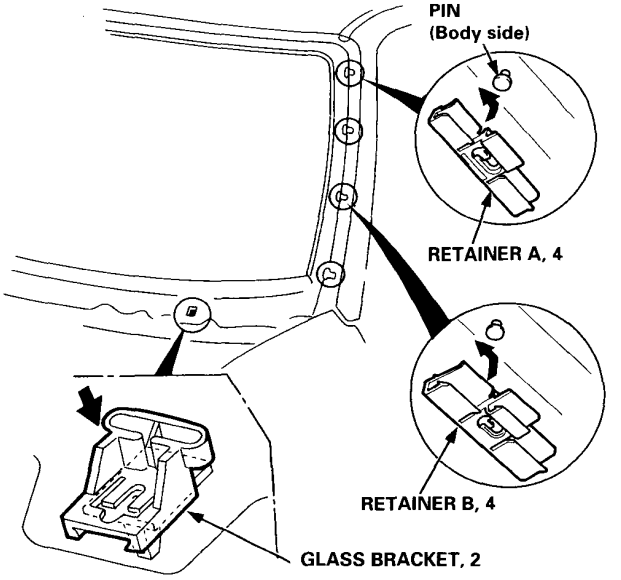
   NOTE: Be careful not to touch the windshield where adhesive will be applied.



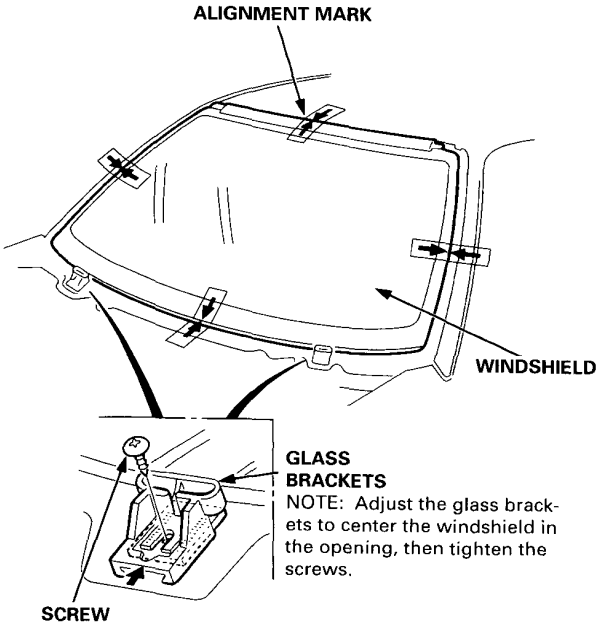


7. Install the glass brackets and retainers as shown.

   NOTE: The numbers after the part names show the quantities of the parts used.



8. Set the windshield on the glass brackets, then center it in the opening. Make alignment marks across the windshield and body with a grease pencil at the four points shown.

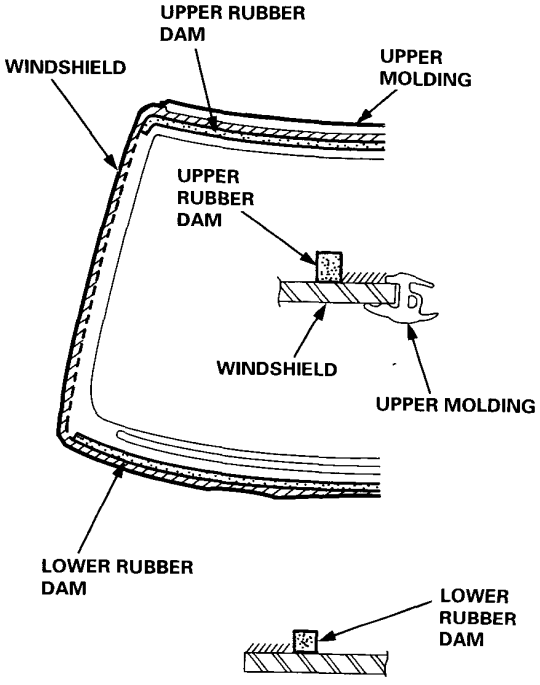


9. Remove the windshield.

10. With a sponge, apply a light coat of glass primer around the edge of the windshield as shown, then lightly wipe it off with gauze or cheesecloth.

    NOTE:
    - Do not apply body primer to the windshield, and do not get body and glass primer sponges mixed up.
    - Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the windshield properly, causing a leak after the windshield is installed.
    - Keep water, dust, and abrasive materials away from the primed surface.

▨ : **Apply glass primer here.**



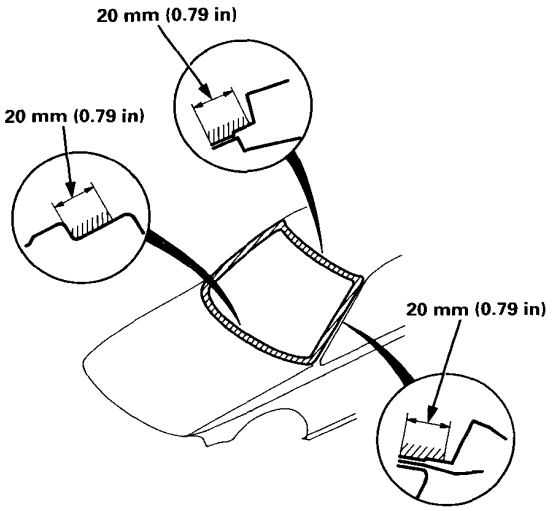
(cont'd)

Installation (cont'd)

11. With a sponge, apply a light coat of body primer to the original adhesive remaining around the windshield opening flange. Let the body primer dry for at least 10 minutes.

    NOTE:
    - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
    - Never touch the primed surfaces with your hands.
    - Mask off the dashboard before painting the flange.

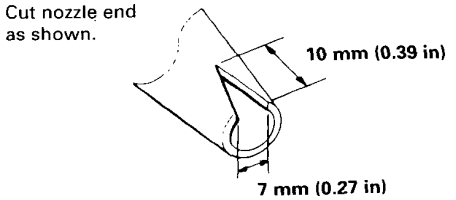
▨ : Apply body primer here.



12. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

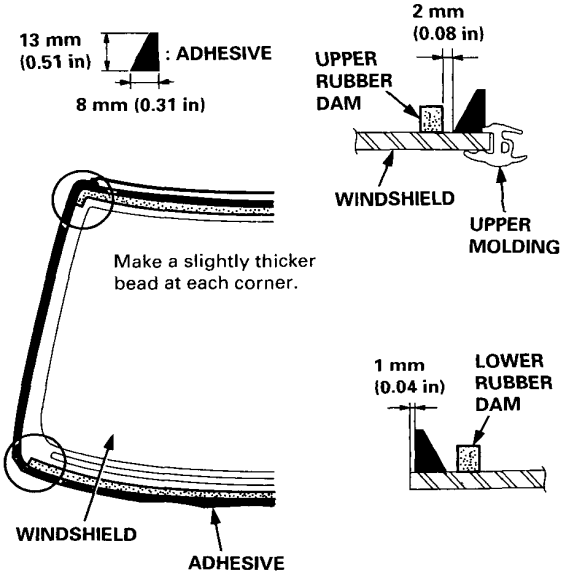
    NOTE:
    - Clean the plate with a sponge and alcohol before mixing.
    - Follow the instructions that come with the adhesive.

13. Before filling a cartridge, cut the end of the nozzle as shown.



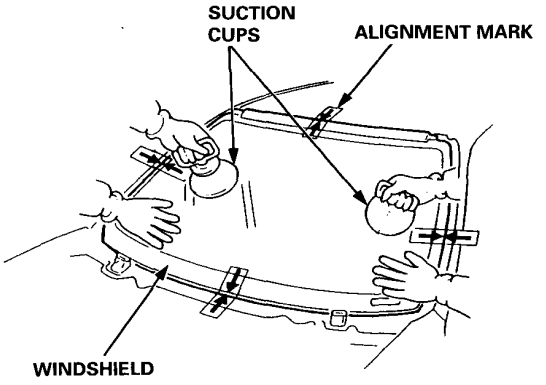
14. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the windshield as shown.

    NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



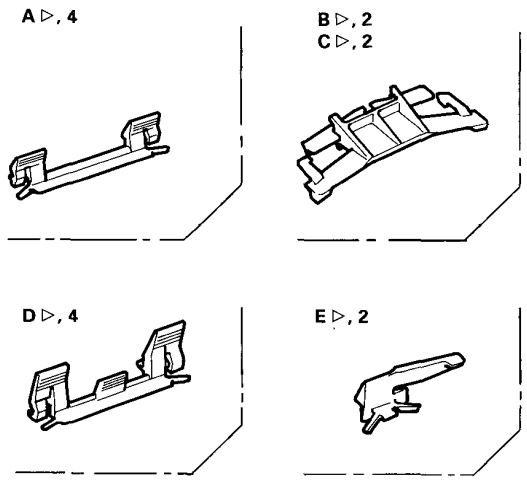
15. Use suction cups to hold the windshield over the opening, align it with the alignment marks made in step 8, and set it down on the adhesive. Lightly push on the windshield until its edge is fully seated on the adhesive all the way around.

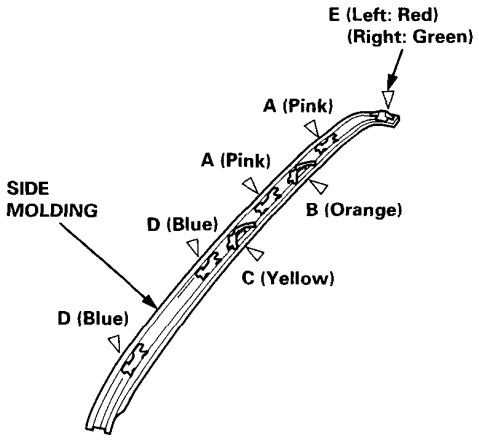
    NOTE: Do not close or open the doors until the adhesive is dry.



16. Install the clips on both side moldings.

▷: **Clip locations**

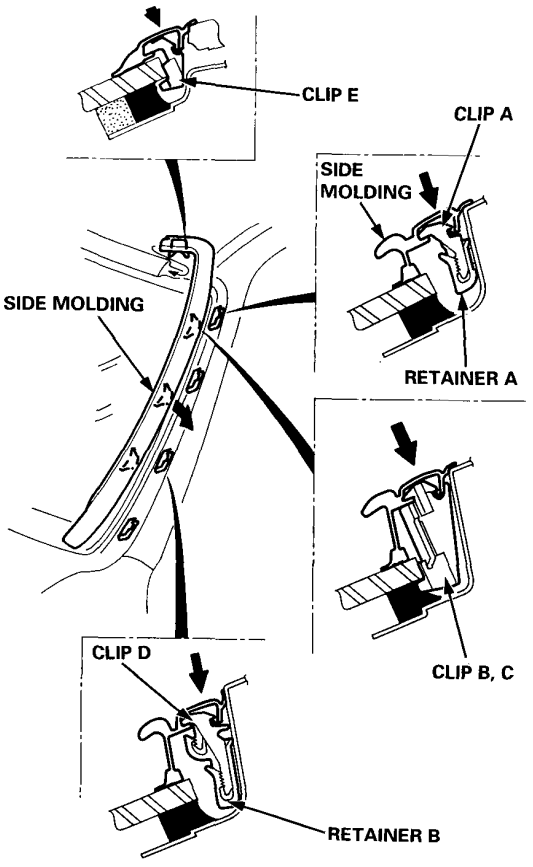




17. Scrape or wipe the excess adhesive off with a putty knife or towel.

NOTE: To remove adhesive from a painted surface or the windshield, wipe with a soft shop towel dampened with alcohol.

18. Install both side moldings.



19. Let the adhesive dry for at least one hour, then spray water over the windshield and check for leaks. Mark leaking areas, and let the windshield dry, then seal with sealant.

NOTE:

- Let the car stand for at least four hours after windshield installation. If the car has to be used within the first four hours, it must be driven slowly.
- Keep the windshield dry for the first hour after installation.
- Check that the ends of the side molding are set under the air scoop.

20. Reassemble all removed parts.

NOTE:

- Install the rearview mirror rubber damper after the adhesive has dryed thoroughly.
- When you return the car, inform the customer to avoid strong vibrations on the car for about three days.

Rear Window

Removal

CAUTION:
- **Wear gloves to remove and install the rear window.**
- **Do not damage the defroster grid lines.**

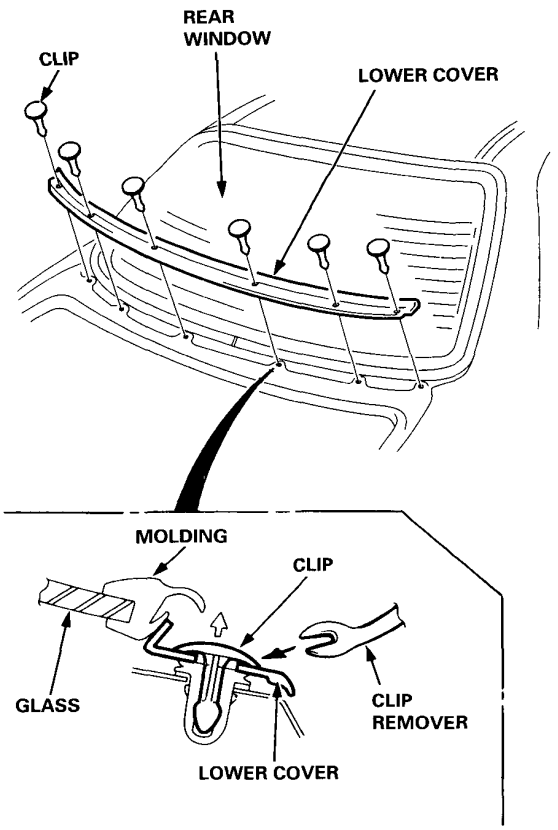
1. To remove the rear window, first remove:
   - Trunk lid (see page 20-90)
   - Rear seat cushion (see page 20-63)
   - Rear shelf trim panel (see page 20-48)
   - Gusset cover (see page 20-48)
   - Side trim panel (see page 20-48)
   - Quarter trim panel (see page 20-48)
   - Rear shelf (see page 20-48)

2. Disconnect the defroster leads, and remove their holders.

   NOTE: Avoid scratching the rear window with the cutter blade.

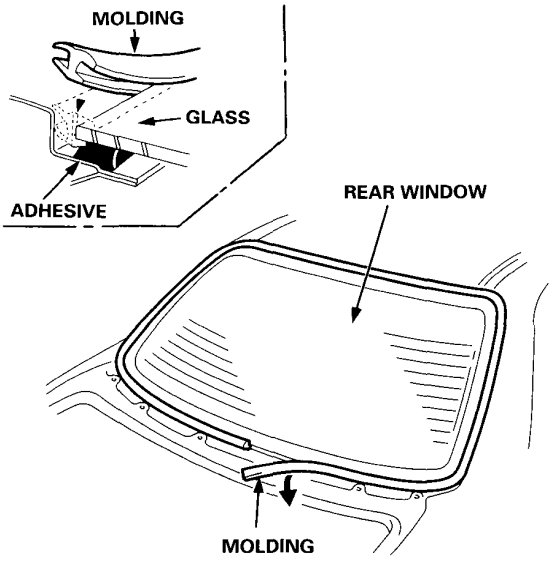
3. Remove the clips, then remove the lower cover.

   NOTE: Use a clip remover to remove the clips.



4. Peel off the molding.

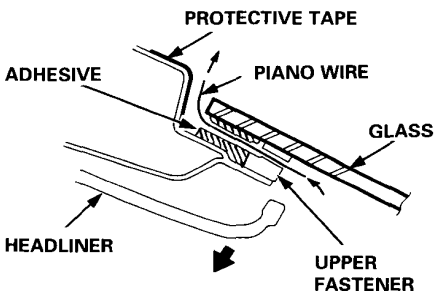
   NOTE: When molding removal is difficult, cut the molding with a knife.

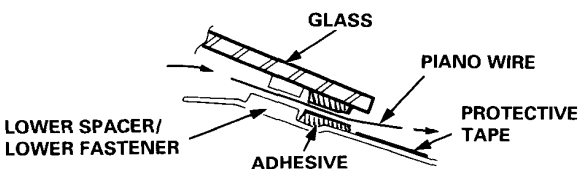


5. Pull down the rear of the headliner (see page 20-50).

   CAUTION: Take care not to bend the headliner excessively.

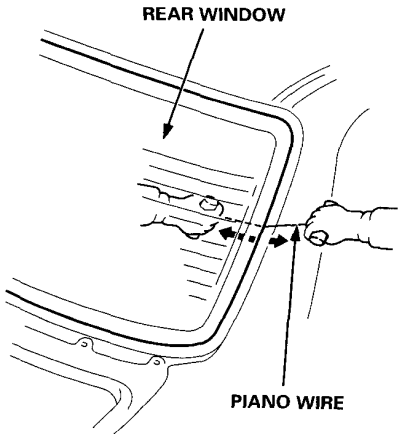
6. Apply protective tape to the edge of the body as shown.
   Using an awl, make a hole through the adhesive from inside the car. Push the piano wire through the hole and wrap each end around a piece of wood.





7. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the adhesive around the entire rear window.

CAUTION: *Hold the piano wire as close to the rear window as possible to prevent damage to the body.*



8. Carefully remove the rear window.

Installation

1. Scrape the old adhesive smooth with a knife to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire rear window opening flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding
   - Remove the upper and lower fasteners from the body.
   - Mask off surrounding surfaces before applying primer.

2. Clean the body bonding surface with a sponge dampened in alcohol.

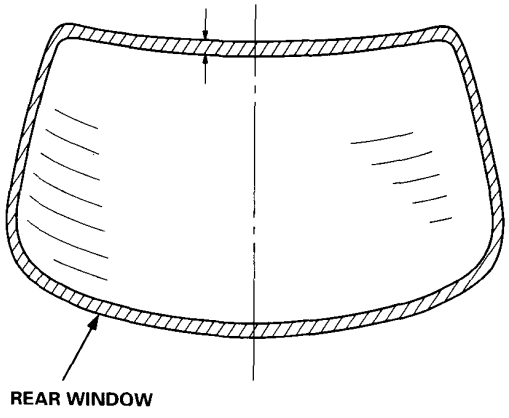
   NOTE: After cleaning, keep oil, grease and water from getting on the surface.

3. If the old rear window is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the rear window surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

   CAUTION: Avoid setting the rear window on its edges; small chips may later develop into cracks.

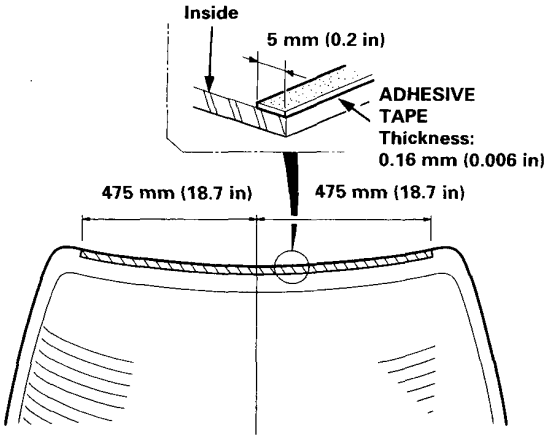
   NOTE: Clean the shadowed area.



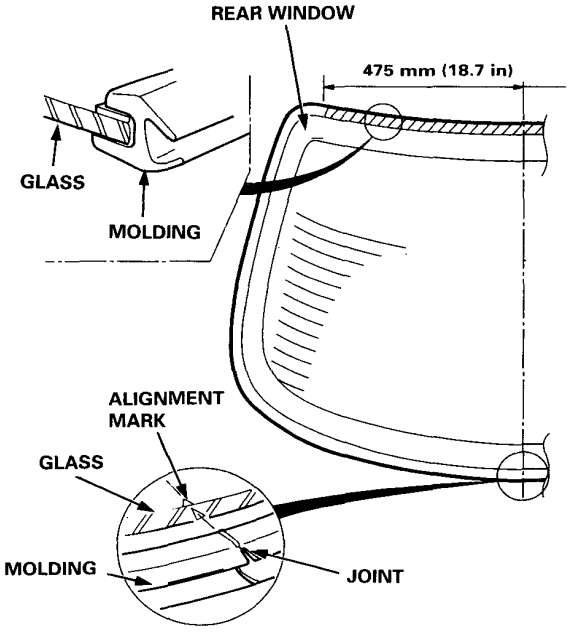
(cont'd)

Installation (cont'd)

4. Apply the double-faced adhesive tape to the inside of the rear window as shown.

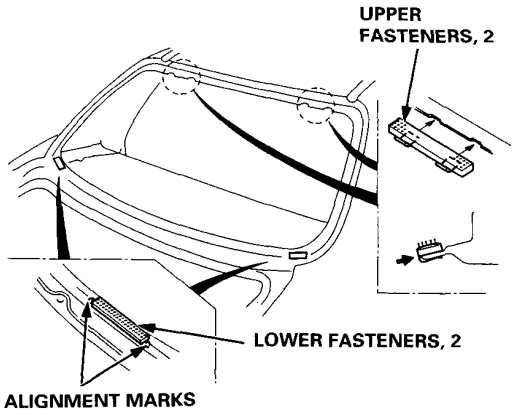


5. Glue the molding around the edge of the rear window as shown.



6. Install the upper fasteners, and glue the lower fasteners to the body as shown.

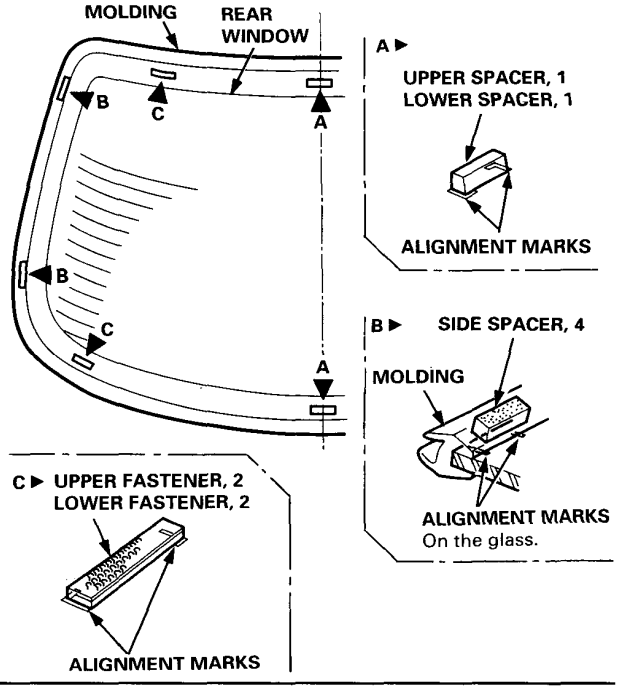
NOTE: The numbers after the part names show the quantities of the parts used.



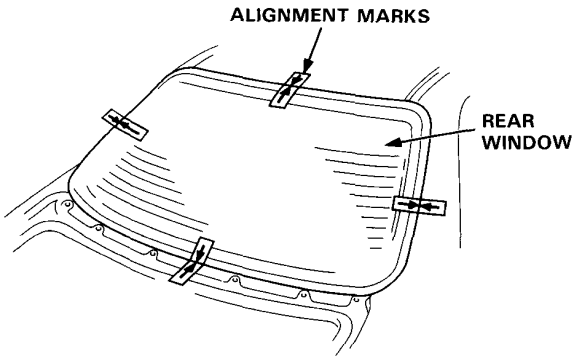
7. Glue the side upper and lower spacers and fasteners to the inside face of the rear window and molding as shown.

NOTE: The numbers after the part names show the quantities of the parts used.

►: Spacer, fastener locations



8. Set the rear window, then center it in the opening. Make alignment marks across the rear window and body with a grease pencil at the four points shown.



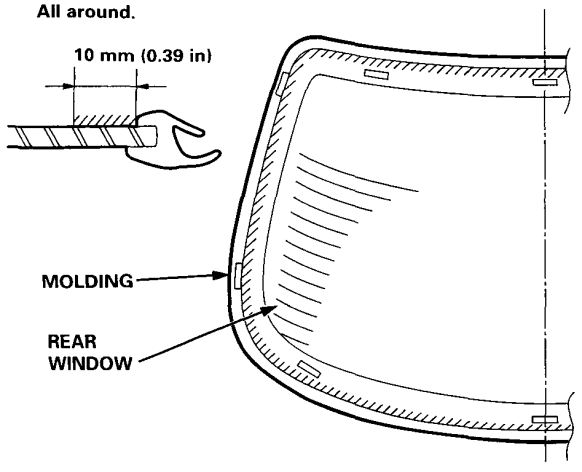
9. Remove the rear window.

10. With a sponge, apply a light coat of glass primer around the edge of the rear window as shown, then lightly wipe it off with gauze or cheesecloth.

    NOTE:
    - Do not apply body primer to the rear window, and do not get body and glass primer sponges mixed up.
    - Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the rear window properly, causing a leak after the rear window is installed.
    - Keep water, dust, and abrasive materials away from the primed surface.

▨ : **Apply glass primer here.**

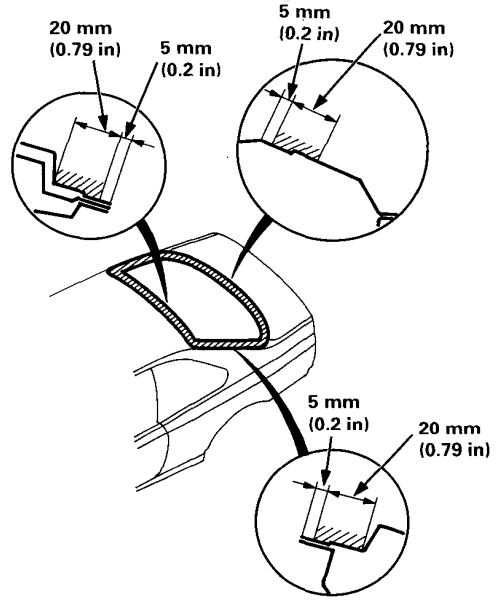
All around.



11. With a sponge, apply a light coat of body primer to the original adhesive remaining around the rear window opening flange. Let the body primer dry for at least 10 minutes.

    NOTE:
    - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
    - Never touch the primed surfaces with your hands.

▨ : **Apply body primer here.**

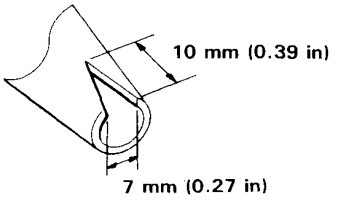


12. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife. Follow the instructions that came with the adhesive.

    NOTE: Clean the plate with a sponge and alcohol before mixing.

13. Before filling a cartridge, cut the end of the nozzle as shown.

Cut nozzle end as shown.



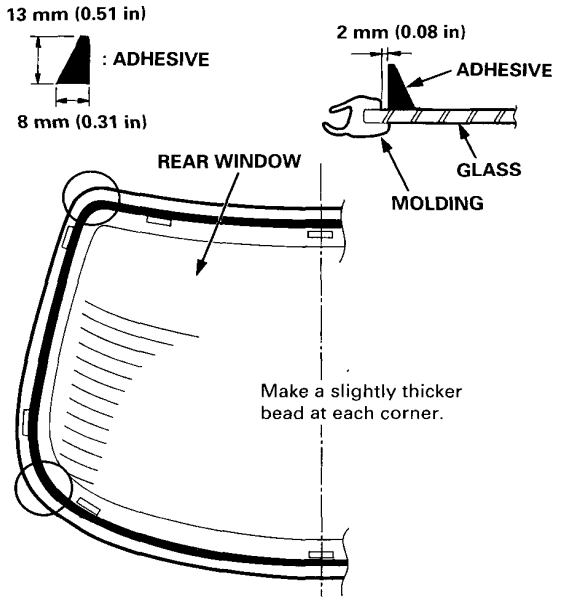
(cont'd)

Rear Window

Installation (cont'd)

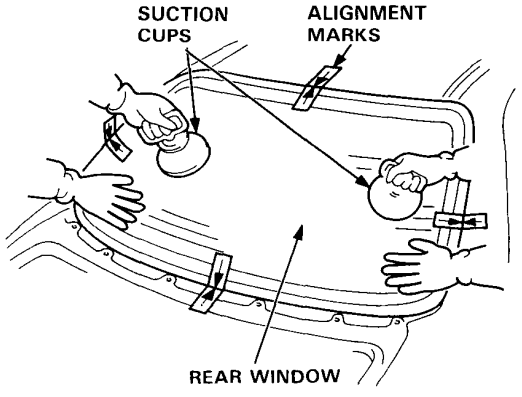
14. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the rear window as shown.

    NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



15. Use suction cups to hold the rear window over the opening, align it with the alignment marks made in step 8 and set it down on the adhesive. Lightly push on the rear window until its edges are fully seated on the adhesive all the way around.

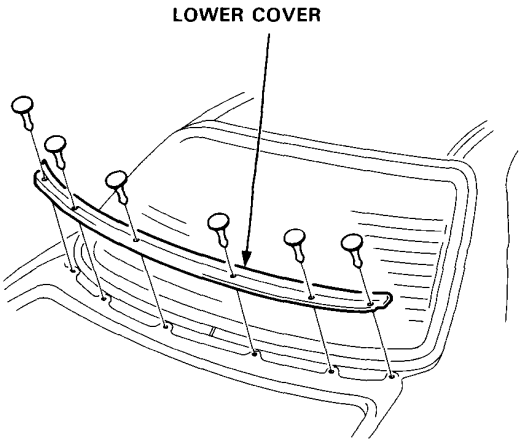
    NOTE: Do not close or open the doors until the adhesive is dry.



16. Scrape or wipe the excess adhesive off with a putty knife or towel.

    NOTE: To remove adhesive from a painted surface or the rear window, use a soft shop towel dampened with alcohol.

17. Install the lower cover.



18. Let the adhesive dry for at least one hour, then spray water over the rear window and check for leaks. Mark leaking areas, let the rear window dry, then seal with sealant.

    NOTE: Let the car stand for at least four hours after rear window installation. If the car has to be used within the first four hours, it must be driven slowly.

19. Raise the headliner back up into position, then install:
    - Rear pillar trim panel
    - Rear shelf
    - Rear seat side bolsters

    NOTE: When you return the car, inform the customer to avoid strong vibrations on the car for three days.

Quarter Glass

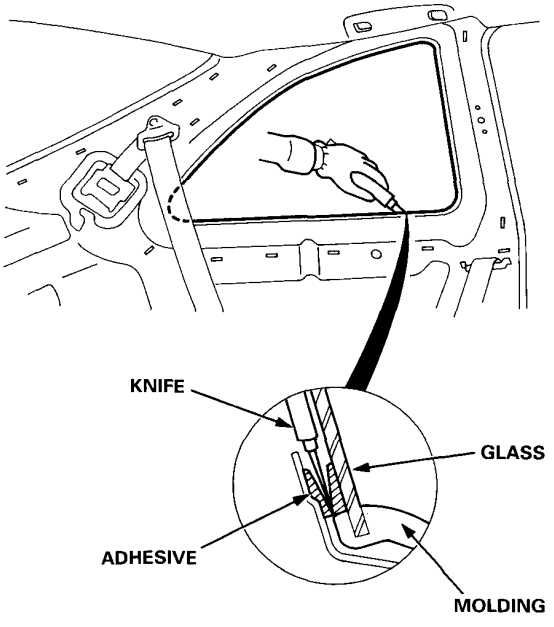
Removal

CAUTION:
- **Wear gloves to remove and install the quarter glass.**
- **Use seat covers to avoid damaging any surfaces.**

1. To remove the quarter glass, first remove the:
   - Rear seat cushion (see page 20-63)
   - Rear shelf trim panel (see page 20-48)
   - Gusset cover (see page 20-48)
   - Side trim panel (see page 20-48)
   - Quarter window trim (see page 20-48)
   - Quarter trim panel (see page 20-48)
   - Side window molding (see page 20-99)

2. From inside the car, use a knife to cut through the quarter glass adhesive all the way around, then remove the quarter glass.

   NOTE: If there is damage on the molding, replace the quarter glass, molding and clips as an assembly.



3. Remove any broken clips from the body.

Installation

1. Scrape the old adhesive smooth with a knife to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire quarter glass opening flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Mask off surrounding surfaces before applying primer.

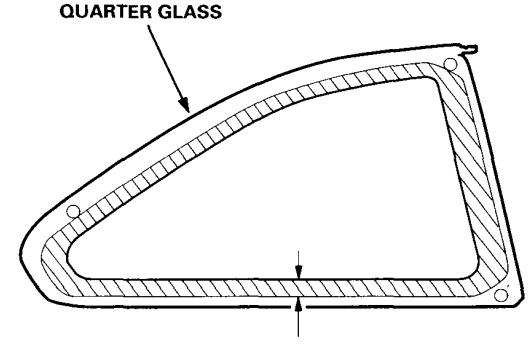
2. Clean the body bonding surface with a sponge dampened in alcohol.

   NOTE: After cleaning, keep oil, grease and water from getting on the surface.

3. If the quarter glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the quarter glass surface with alcohol where adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

   CAUTION: Avoid setting the quarter glass on its edges; small chips may later develop into cracks.

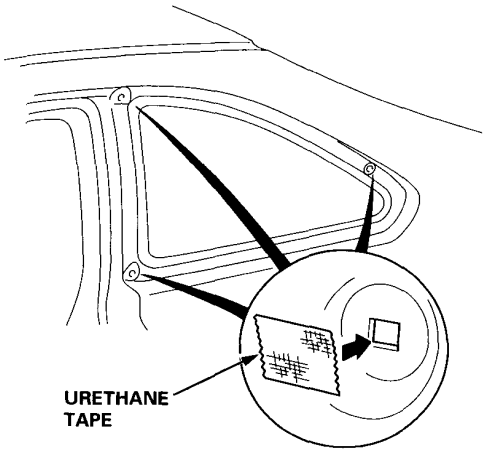


Clean the shadowed area all the way around.

(cont'd)

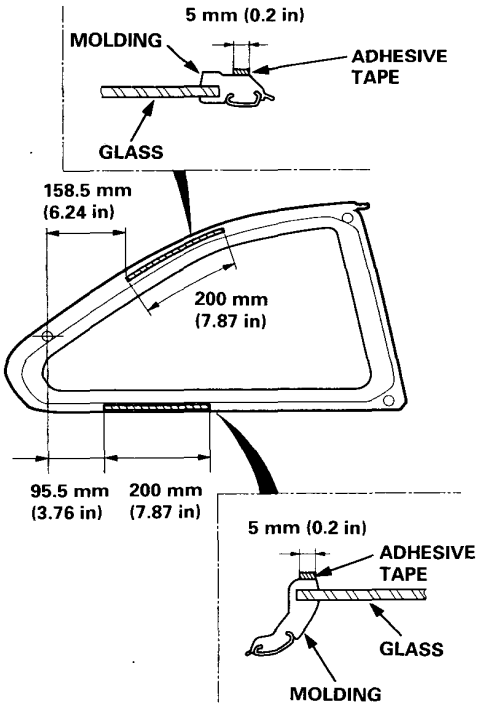
Installation (cont'd)

4. If any of the clips are broken on the quarter glass you are installing, seal their body holes with pieces of urethane tape.

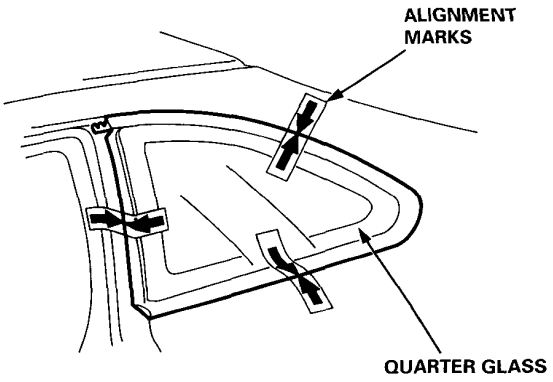


5. Apply the double-faced adhesive tapes to the molding as shown.

NOTE:
- Be careful not to touch the quarter glass where adhesive will be applied.
- Do not peel the separator off the double-faced adhesive tapes.



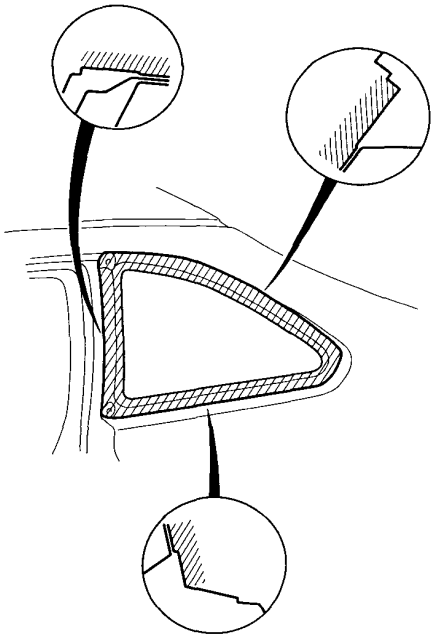
6. If the quarter glass you are installing has had the clips cut off, set it upright on the quarter glass opening. Make alignment marks across the quarter glass and the body with a grease pencil at the three points shown.



7. With a sponge, apply a light coat of body primer to the original adhesive remaining around the quarter glass opening flange.
Let the body primer dry for at least 10 minutes.

NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.

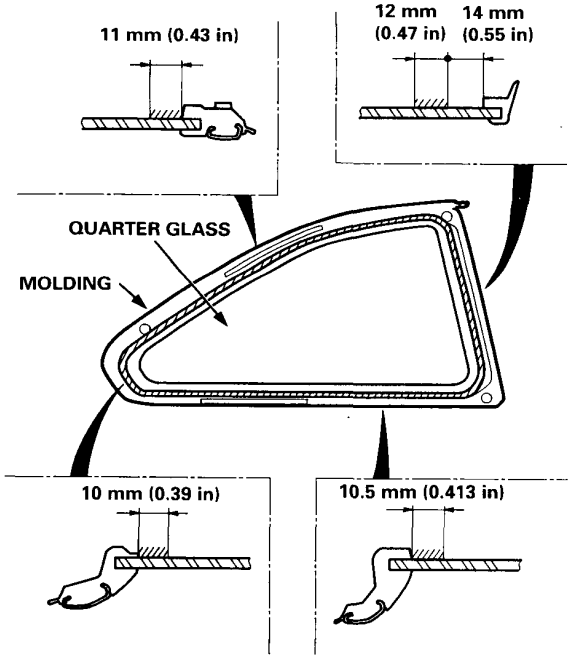
: **Apply body primer here.**



8. With a sponge, apply a light coat of glass primer to the inside face of the quarter glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the quarter glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands.
  If you do, the adhesive may not bond to the quarter glass properly, causing a leak after the quarter glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

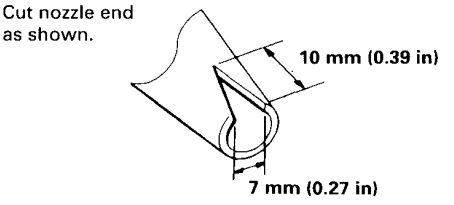
////// : **Apply glass primer here.**



9. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

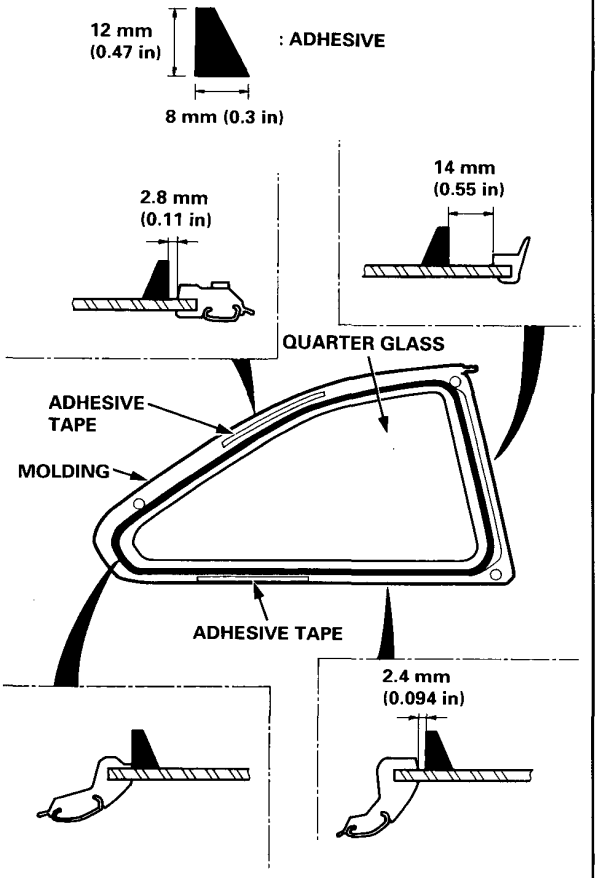
NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.

10. Before filling cartridge, cut the end of the nozzle as shown.



11. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartrige in a caulking gun, and run a bead of adhesive around the edge of the quarter glass as shown.

NOTE:
- After applying the adhesive, peel the separator off the double-faced adhesive tapes.
- Apply the adhesive within 30 minutes after applying the glass primer.



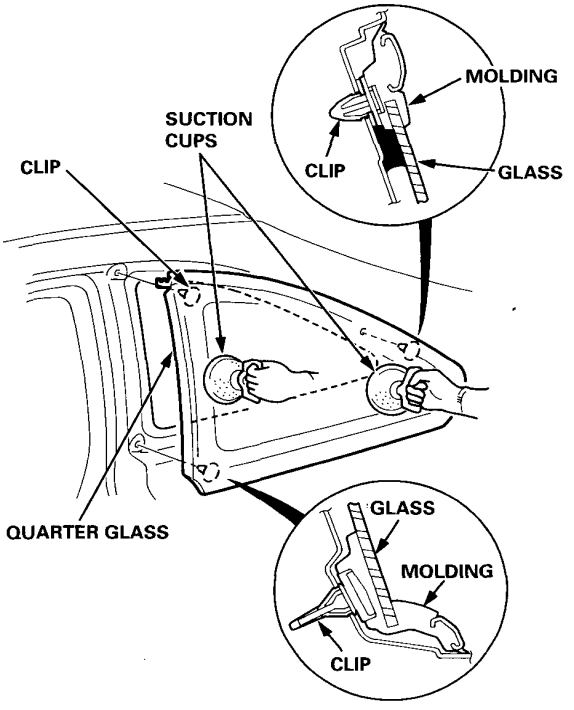
(cont'd)

Quarter Glass

Installation (cont'd)

12. Use suction cups to hold the quarter glass over the opening, align the clips or the marks made in step 6, and set it down on the adhesive. Lightly push on the quarter glass until its edges are fully seated on the adhesive all the way around.

    NOTE: Do not close or open the doors until the adhesive is dry.



13. Scrape or wipe the excess adhesive off with a putty knife or towel.

    NOTE: Use a soft shop towel dampened with alcohol to remove adhesive from a painted surface or the quarter glass.

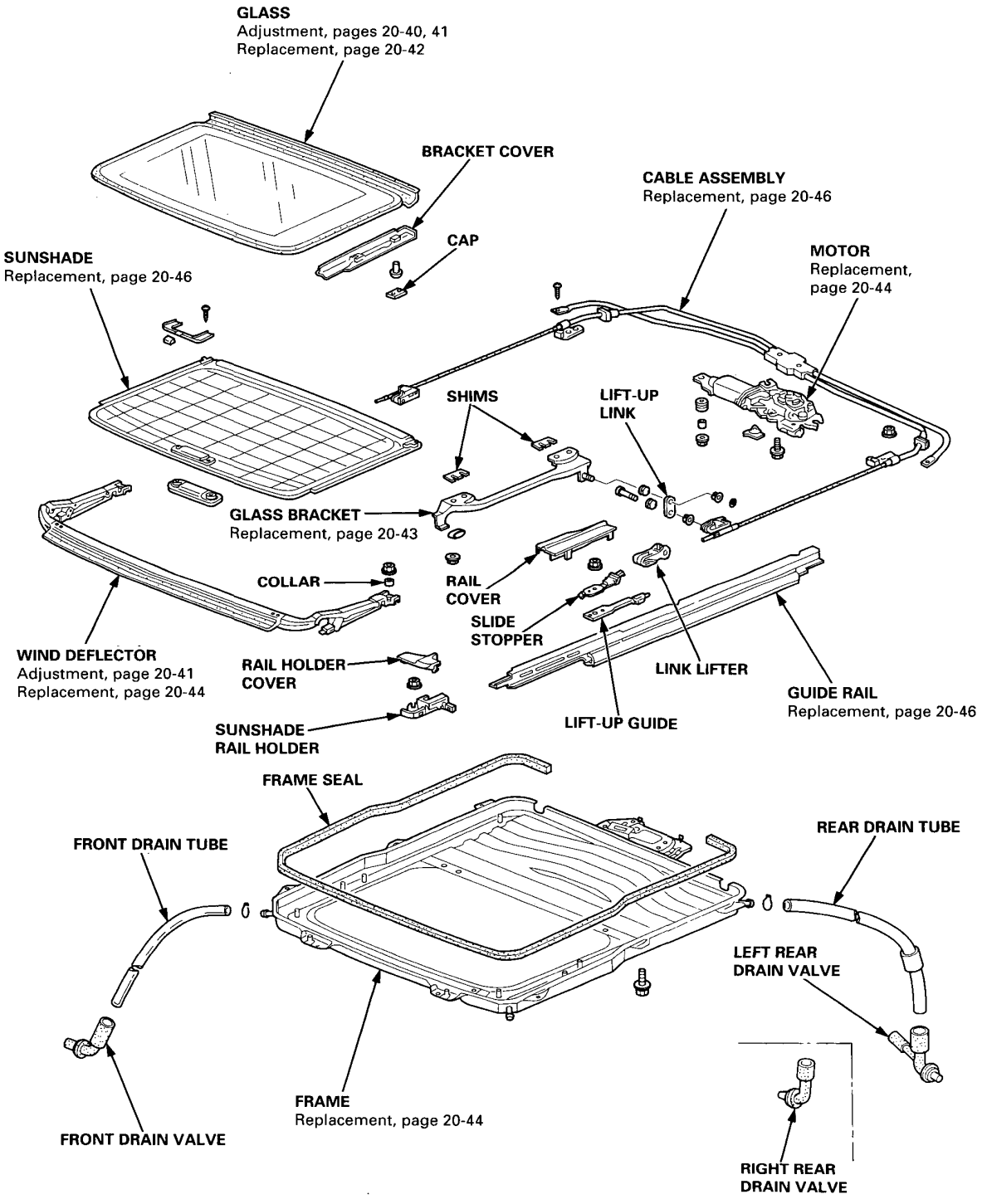
14. Let the adhesive dry for at least one hour, then spray water over the quarter glass and check for leaks.
    Mark leaking areas and let the quarter glass dry, then seal with sealant.

    NOTE: Let the car stand for at least four hours after quarter glass installation. If the car has to be used within the first four hours, it must be driven slowly.

15. Reinstall all remaning removed parts.

    NOTE: When you return the car, inform the customer to avoid strong vibrations on the car for about three days.

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Sunroof

Troubleshooting

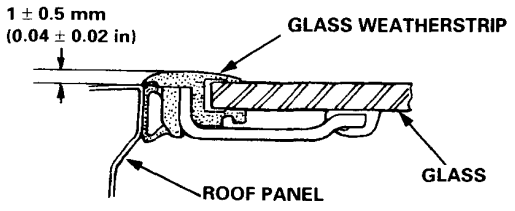
Symptom	Probable Cause
Water leaks	1. Clogged drain tube. 2. Gap between glass weatherstrip and roof panel. 3. Defective or improperly installed glass weatherstrip. 4. Gap between drain seal and roof panel.
Wind noise	1. Excessive clearance between glass weatherstrip and roof panel.
Deflector noise	1. Improper clearance between deflector seal and frame seal. 2. Insufficient deflector extension. 3. Deformed deflector.
Motor noise	1. Loose motor. 2. Worn gear or bearing. 3. Cable assembly deformed.
Glass does not move, but motor turns	1. Clutch out of adjustment. 2. Foreign matter stuck between guide rail and slider. 3. Inner cable loose. 4. Cable assembly not attached properly.
Glass does not move and motor does not turn (glass can be moved with sunroof wrench)	1. Blown fuse. 2. Faulty switch. 3. Battery run down. 4. Defective motor. 5. Faulty relay.

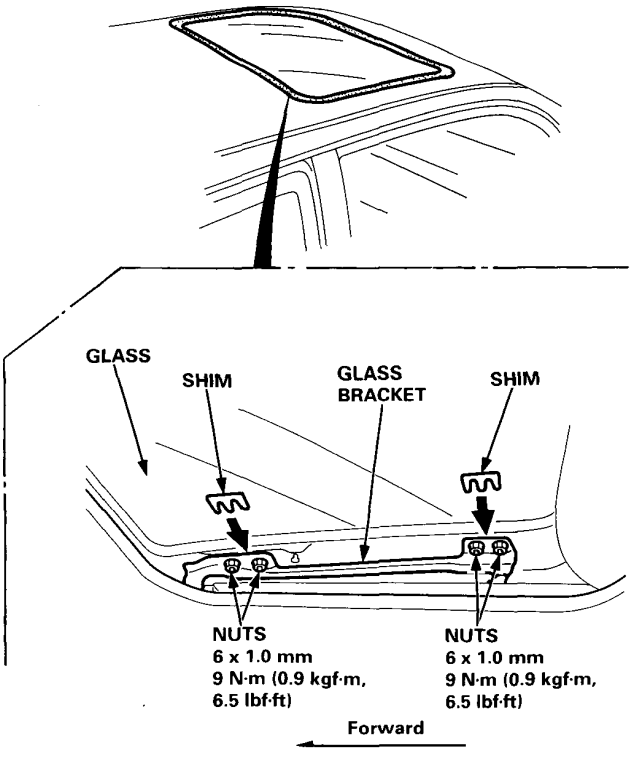
Glass Height Adjustment

The roof panel should be even with the glass weatherstrip, to within 1 ± 0.5 mm (0.04 ± 0.02 in) all the way around. If not, slide the sunshade back, and:

1. Remove the bracket cover (see page 20-42).
2. Loosen the nuts, and install the shims between the glass and glass bracket as shown.

   Shim thickness: Max. 2 mm (0.08 in)
3. Repeat on opposite side if necessary.



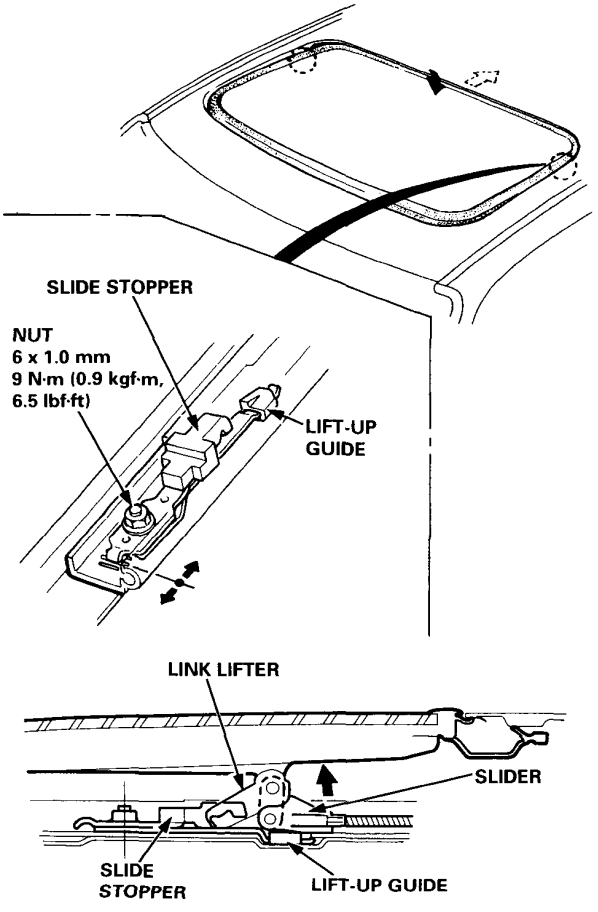


Rear Edge Closing Adjustment

Open the glass about a foot, then close it to check where rear edge begins to rise. If it rises too soon and seats too tightly against the roof panel, or too late and does not seat tightly enough, adjust it.

1. Open the glass fully.
2. Remove the rail covers from both sides, and loosen the nuts.
3. Move the lift-up guides and slide stopper forward or backward, then tighten the nuts, and recheck roof closing.

   The lift-up guides have pitches of 1 mm (0.04 in) each and can be adjusted 2 pitches forward or backward.
4. If necessary, lower the rear of the headliner, remove the motor, then adjust the inner cables (location of sliders) until they are parallel.

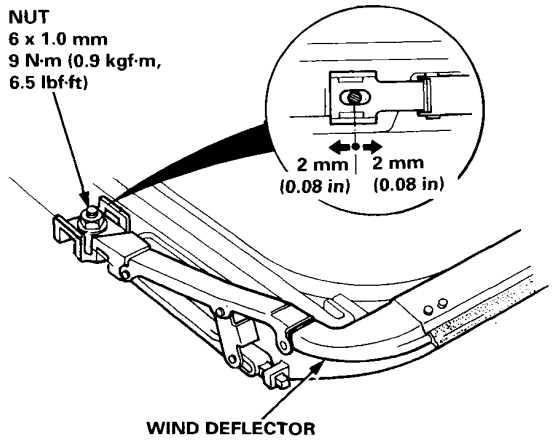


Wind Deflector Adjustment

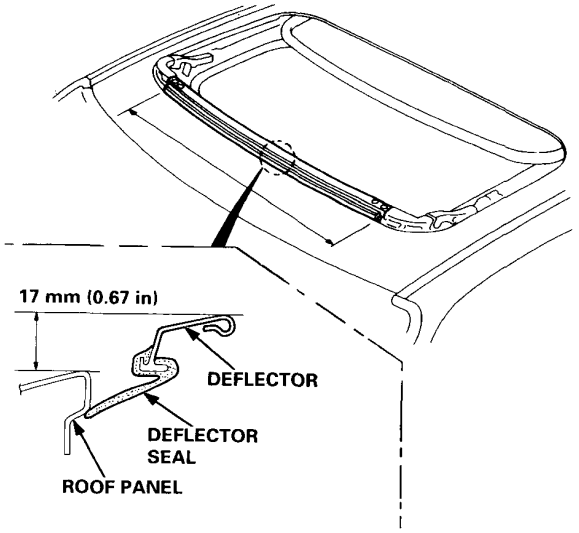
NOTE: A gap between deflector seal and roof panel will cause wind noise when driving at high speed with the sunroof open.

1. Open the sunroof and pry the rail covers off both sides (see page 20-43).
2. Loosen the nuts.

   NOTE: The wind deflector can be adjusted 2 mm (0.08 in) forward or backward.



3. Adjust the wind deflector forward or backward so the edge of its seal touches the roof panel evenly. The deflector seal should touch the roof panel across entire front edge.

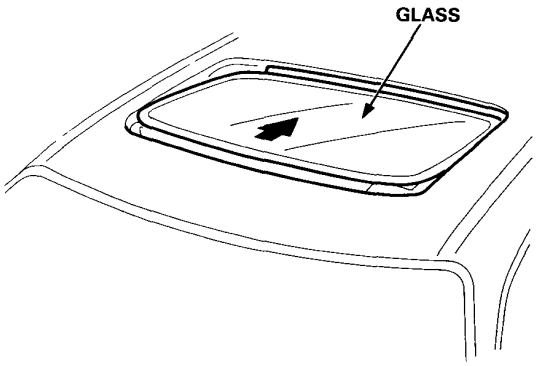


NOTE: The height of the deflector arm when open cannot be adjusted. If damaged or deformed, replace it (page 20-44).

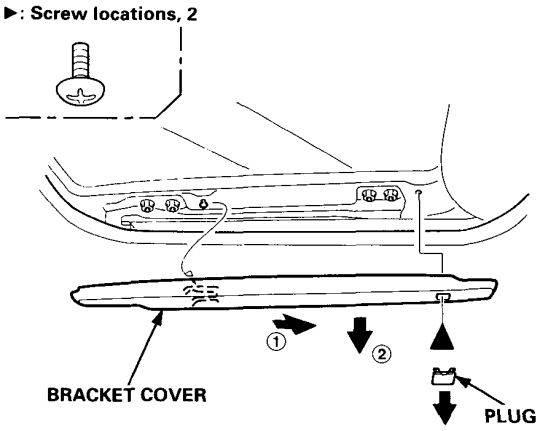
Sunroof

Glass Replacement

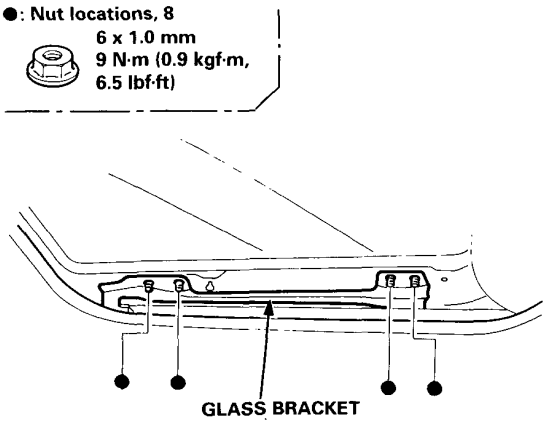
1. Slide the sunshade all the way back.
2. Open the glass as shown.



3. Pry out the plug from each bracket cover, remove the screw, and slide the bracket cover off to the rear.

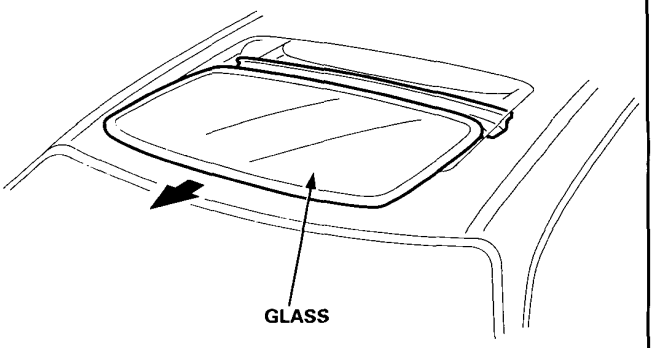


4. Remove the nuts from the glass brackets on both sides.



5. Remove the glass by lifting up and pulling forward as shown.

   NOTE: Do not damage the roof panel.

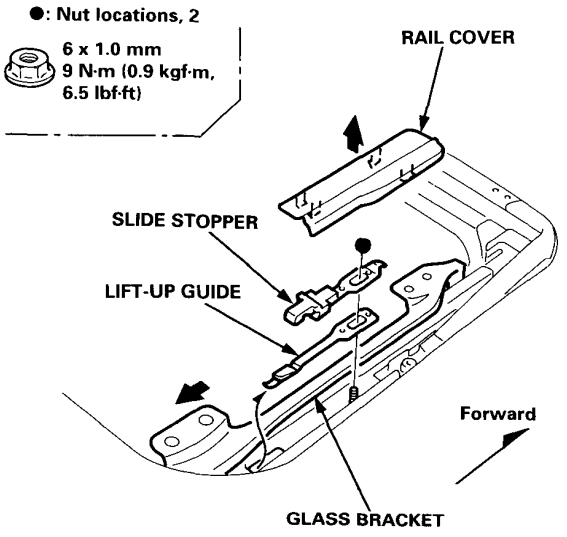


6. Installation is the reverse of the removal procedure.
7. Check for water leaks.

   NOTE: Do not use high pressure water.

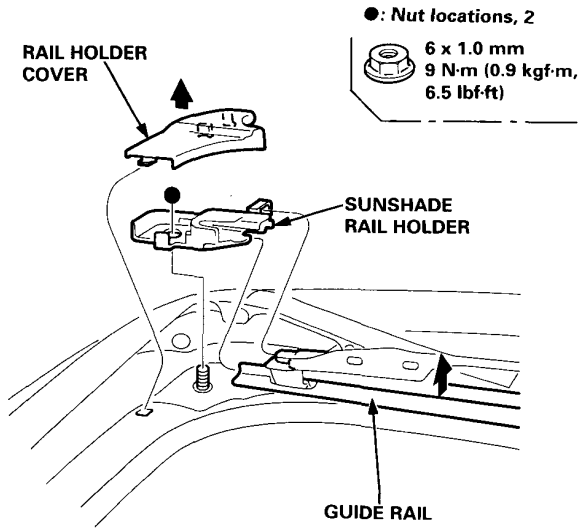
Slide Stopper, Lift-up Guide and Glass Bracket Replacement

1. Remove the glass (see page 20-42).
2. Remove the motor (see page 20-44).
3. Slide the glass bracket to the rear.
4. Remove the rail cover, then remove the slide stopper and lift-up guide.



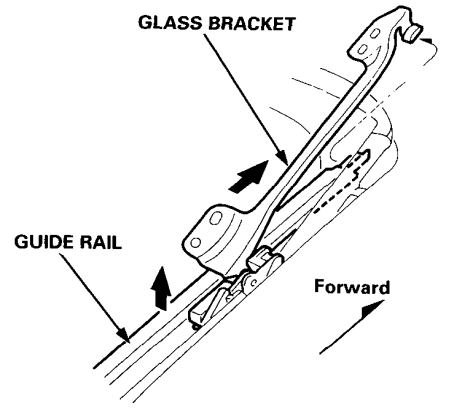
5. Remove the rail holder cover and sunshade rail holder while lifting the guide rail up.

   NOTE: Take care not to bend the guide rail.



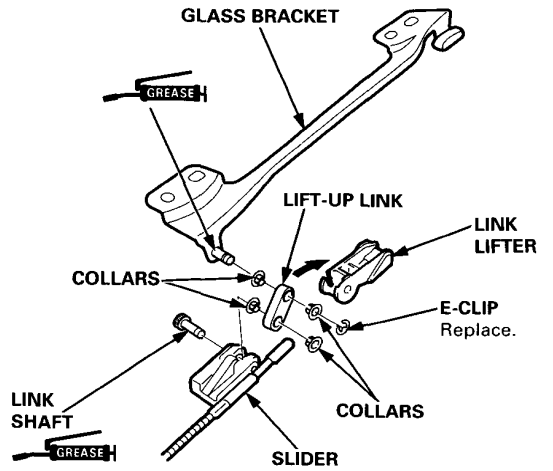
6. Slide the glass bracket forward while lifting the guide rail up.

   NOTE: Take care not to bend the guide rail.



7. Remove the link lifter, then separate the glass bracket and lift-up link.

   NOTE: When installing, apply grease to the sliding portion.



8. Installation is the reverse of the removal procedure.

   NOTE:
   - Before installing the motor, make sure both sliders are parallel.
   - After installing the glass, adjust the lift-up guide and slide stopper on each side (see page 20-41).

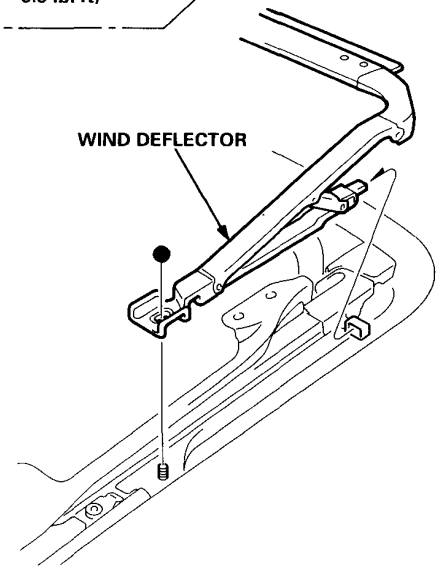
Sunroof

Wind Deflector Replacement

1. Open the glass fully.
2. Remove the rail cover (see page 20-43).
3. Remove the wind deflector.

●: Nut locations, 2

6 x 1.0 mm
9 N·m (0.9 kgf·m, 6.5 lbf·ft)



4. Installation is the reverse of the removal procedure.

   NOTE: Adjust the wind deflector alignment (see page 20-41).

Motor, Drain Tube and Frame Replacement

CAUTION: Be careful not to damage the seats, dashboard and other interior trim.

1. Remove the glass (see page 20-42) and headliner (see page 20-50).
2. Disconnect the connector, then remove the motor, if necessary.

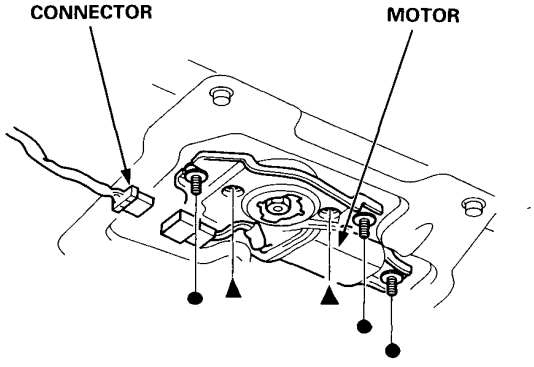
   NOTE: Make sure both sliders are parallel when installing the motor.

►: Bolt locations, 2

6 x 1.0 mm
9.8 N·m
(1.0 kgf·m, 7.2 lbf·ft)

●: Nut locations, 3

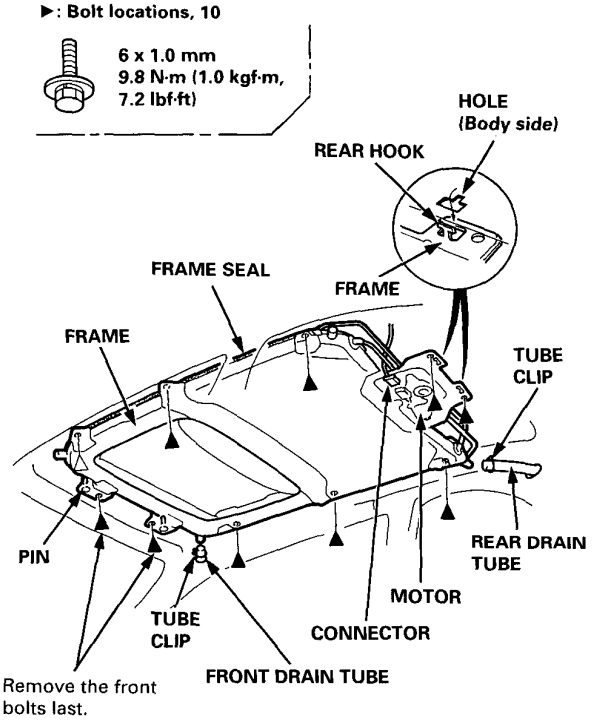
6 x 1.0 mm
9.8 N·m
(1.0 kgf·m, 7.2 lbf·ft)



3. Disconnect the drain tubes.

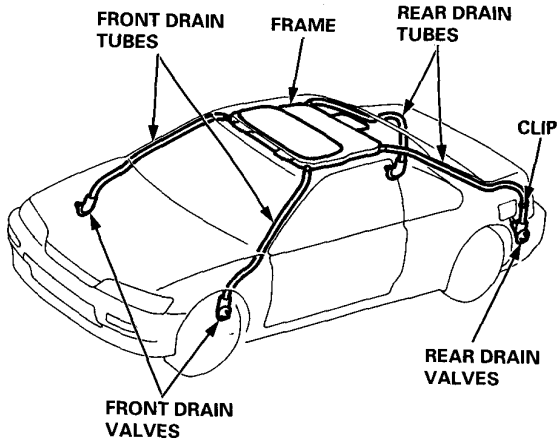
4. Disconnect the connector, then remove the frame from the car.

   NOTE: You may require assistance when removing the frame.



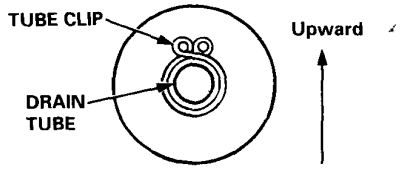
5. Pull the drain tubes out the front and rear pillars.

   NOTE: Before pulling out the drain tube, tie a string to the end of it so it can be reinstalled.



6. Installation is the reverse of the removal procedure.

   NOTE:
   - When installing the frame, first attach the rear hooks, then align the frame with the pins on the body.
   - When connecting the drain tube, slide it over the frame nozzle at least 10 mm (0.4 in).
   - Install the tube clip as shown.

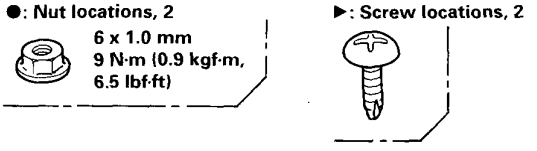


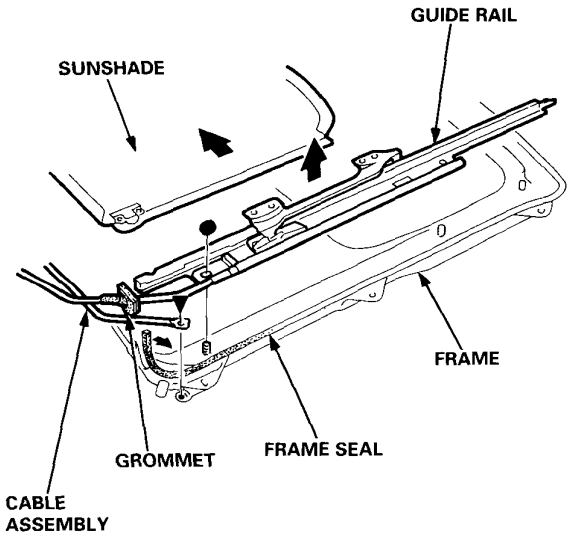
   - Clean the surface of the frame.
   - Check the frame seal.
   - Check for water leaks.

Guide Rails, Sunshade and Cable Assembly Replacement

1. Remove the frame from the car (see page 20-44).
2. Remove the motor (see page 20-44).
3. Remove the wind deflector (see page 20-44).
4. Remove the rail cover, slide stopper and lift-up guide on each side (see page 20-43).
5. Lift and remove both guide rails and the cable assembly from the frame.
   Remove the sunshade.

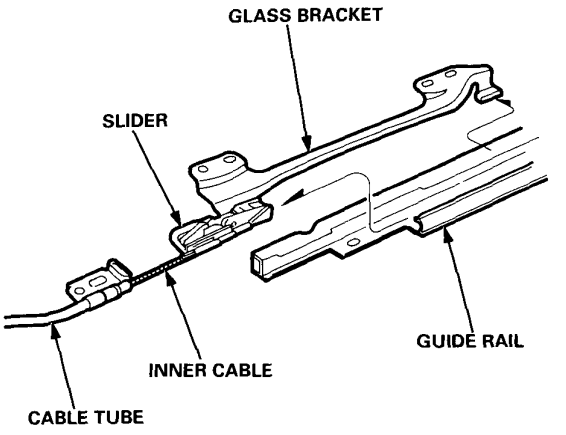
   NOTE: Take care not to bend the cable tubes.





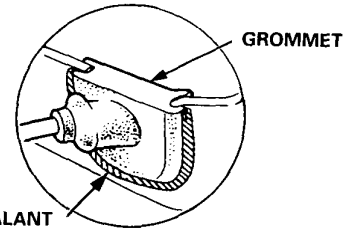
6. Slide the guide rail forward, then remove it.

   NOTE: Take care not to bend the inner cable.



7. Remove the link lifter, glass bracket and lift-up link from the slider (see page 20-43).
8. Installation is the reverse of the removal procedure.

   NOTE:
   - Damaged parts should be replaced.
   - Apply grease to the sliding portion.
   - Fill the groove in each grommet with sealant.



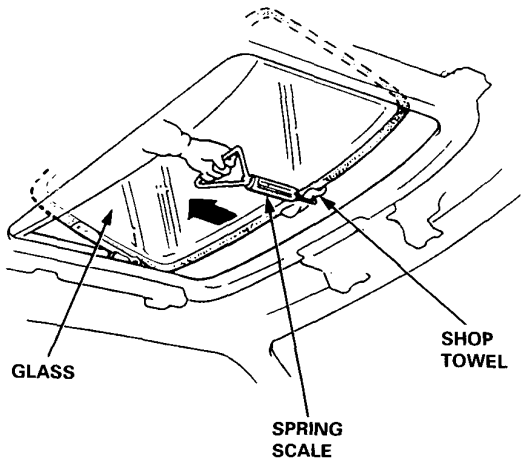
   - Glue the frame seal securely.

Opening Drag Check (Motor Removed)

Before installing the motor, measure the effort required to open the glass using a spring scale as shown.

CAUTION: When using a spring scale, protect the leading edge of the glass with a shop towel.

If load is over 40 N (4 kgf, 9 lbf), check side clearance and glass height adjustment (see page 20-40).

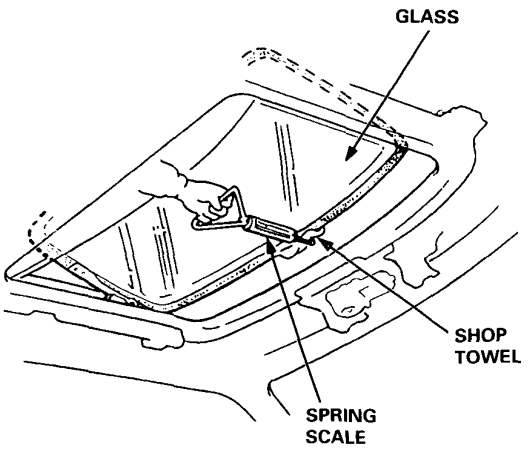


Closing Force Check (Motor Installed)

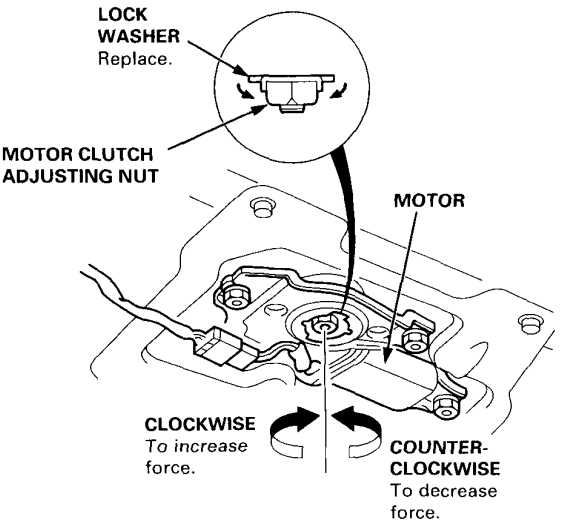
1. After installing all removed parts, have a helper hold the switch to close the glass while you measure force required to stop it. Attach a spring scale as shown. Read the force as soon as the glass stops moving, then immediately release the switch and spring scale.

   CAUTION: When using a spring scale, protect the leading edge of the glass with a shop towel.

   ***Closing Force*: 200 – 290 N**
   (20 – 30 kgf, 44 – 66 lbf)



2. If the force is not within specification, install a new lock washer, adjust the tension by turning the motor clutch adjusting nut, and bend the lock washer against the motor clutch adjusting nut.



Interior Trim

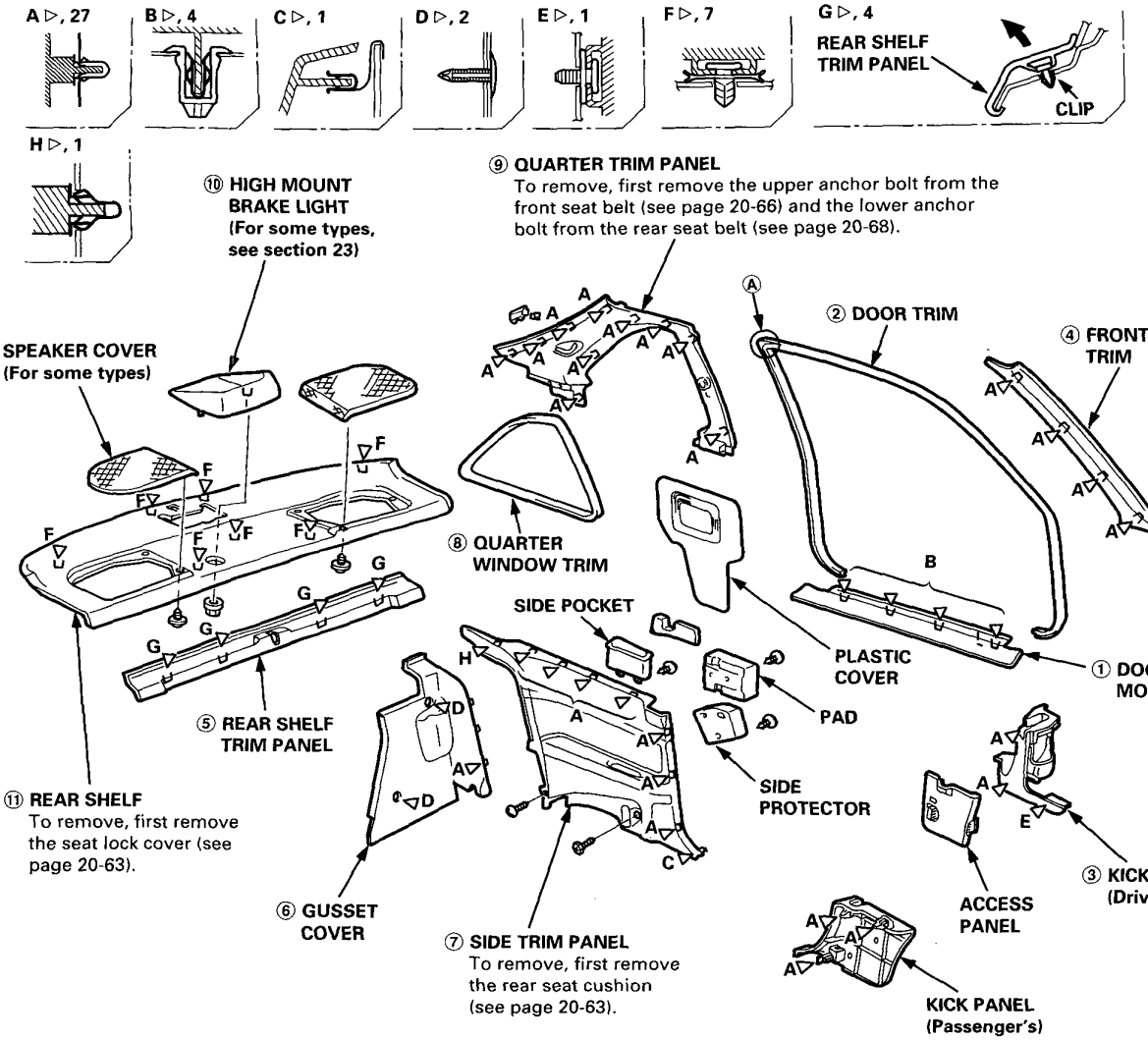
Replacement

CAUTION:
- **Wear gloves to remove and install the trim and panels.**
- **When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.**

NOTE: Take care not to scratch the trim and panels.

Disassemble in numbered sequence.

▷: Clip locations



Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- Before attaching the side trim panel and quarter trim panel, make sure there are no twists or kinks in the front and rear seat belt.
- Make sure the door and quarter window trims are installed securely.
- Apply clear sealant (cemedine #8500, or equivalent) to location Ⓐ on the body.

Trunk Trim

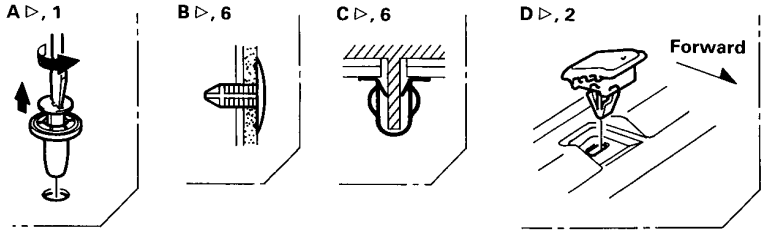
Replacement

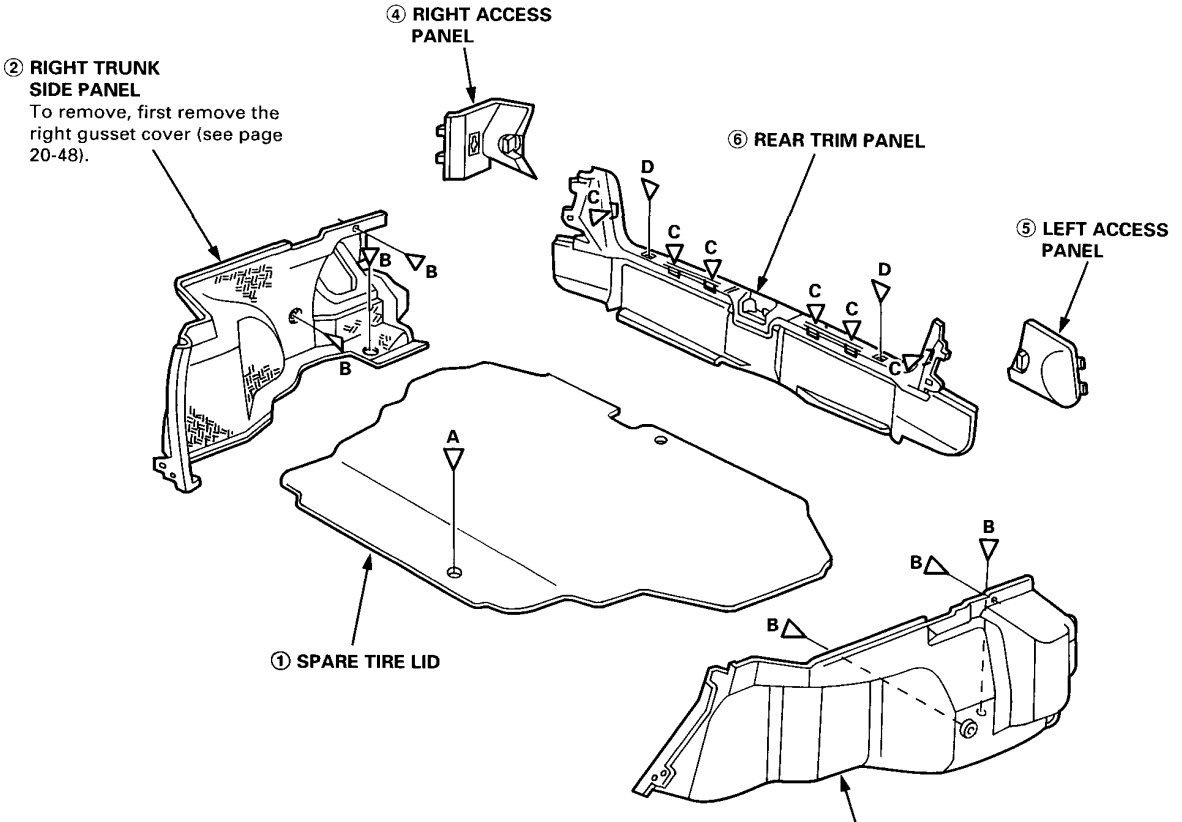
CAUTION:
- **Wear gloves to remove and install the panels.**
- **When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.**

NOTE: Take care not to scratch the panels.

Disassemble in numbered sequence.

▷: Clip locations





Installation is the reverse of the removal procedure.

NOTE: If necessary, replace any damaged clips.

Headliner

Replacement

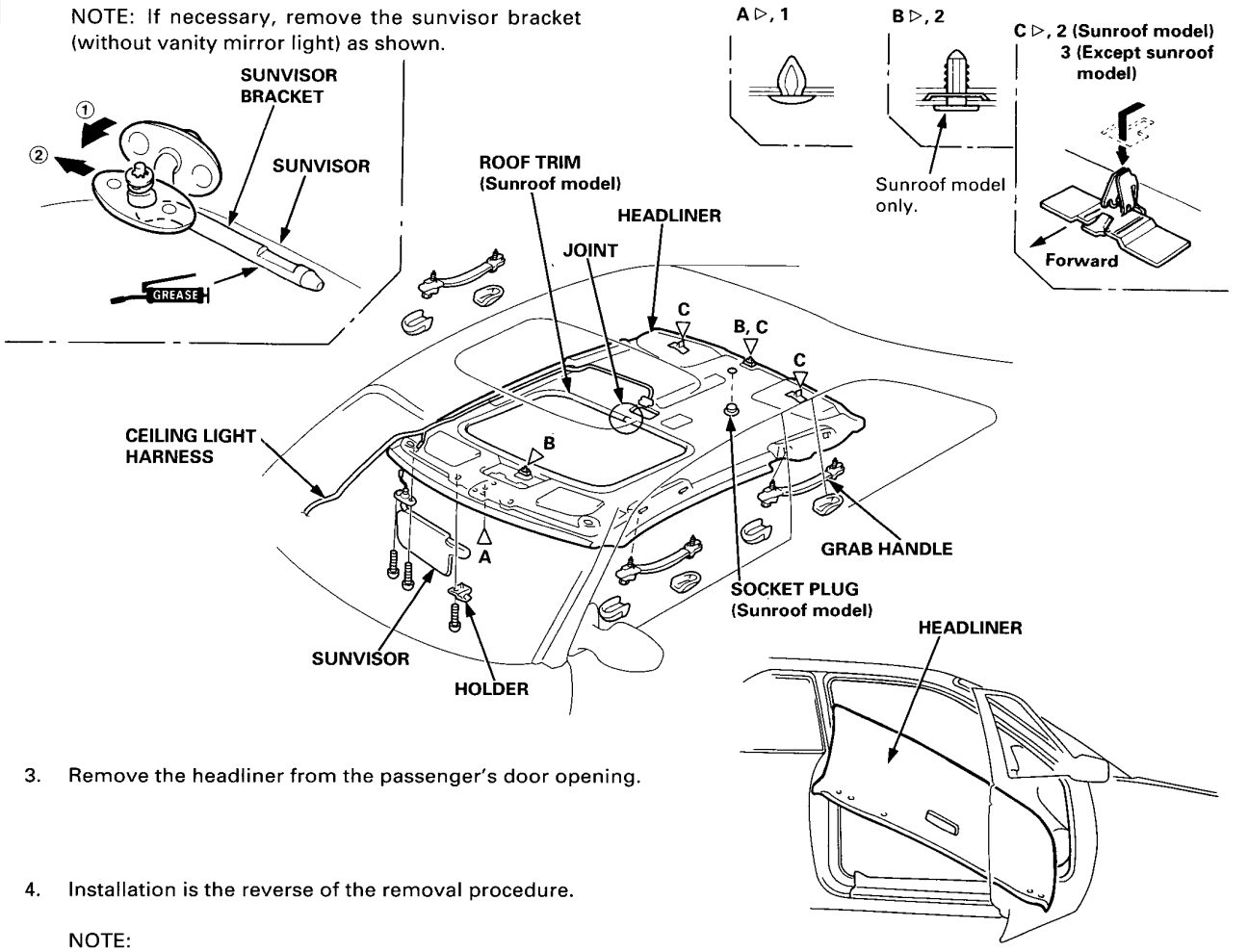
CAUTION: ***When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.***

NOTE:
- Take care not to bend and scratch the headliner.
- Be careful not to damage the dashboard and other interior trim.
- Fold the front seat-back backward.

1. Remove:
   - Door sill molding (see page 20-48)
   - Door trim (see page 20-48)
   - Front pillar trim (see page 20-48)
   - Rearview mirror (see page 20-20)
   - Sunvisors and holders
   - Ceiling light (see section 23)
   - Grab handles
   - Upper portion of the quarter trim panel (see page 20-48)
   - Roof trim (sunroof model)

2. Detach the clips, then remove the headliner.

   NOTE: If necessary, remove the sunvisor bracket (without vanity mirror light) as shown.



3. Remove the headliner from the passenger's door opening.

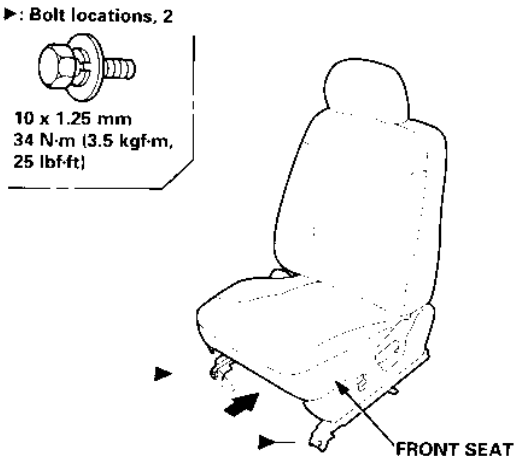
4. Installation is the reverse of the removal procedure.

   NOTE:
   - When installing the headliner, be careful not to fold or bend it. Also, be careful not to scratch the body.
   - Install the ceiling light harness to the headliner securely with a tape.
   - Check that both sides of the headliner are securely attached to the trim and panels.
   - When installing the roof trim, install the joint toward the rear.

Front Seat Removal

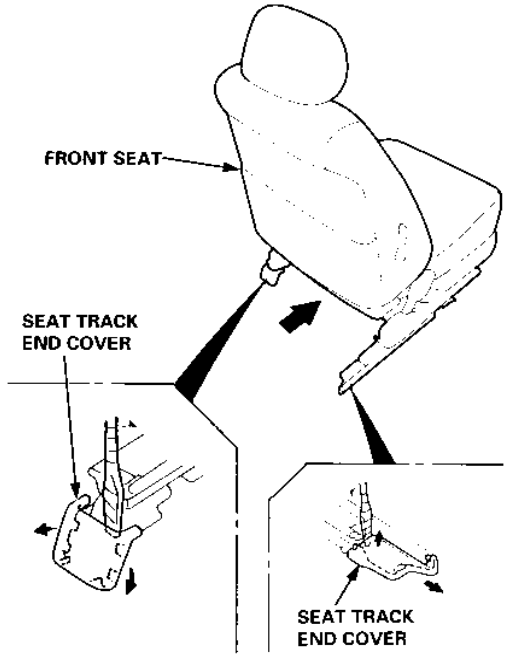
NOTE: Take care not to scratch the seat covers and body.

1. Slide the front seat backward, then remove the bolts.

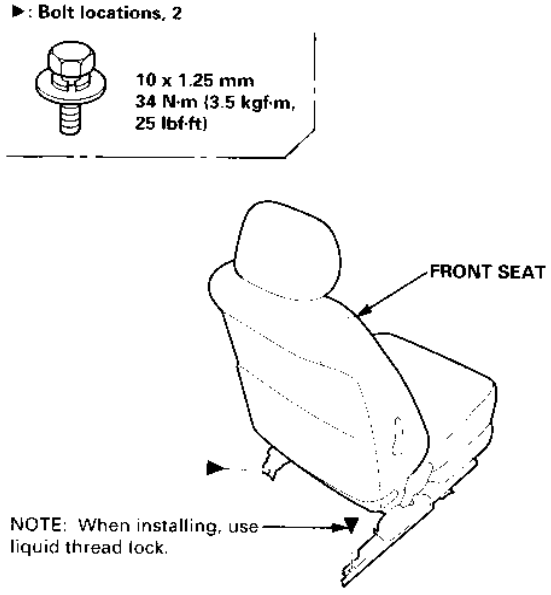


2. Slide the front seat forward, then remove the seat track end covers.

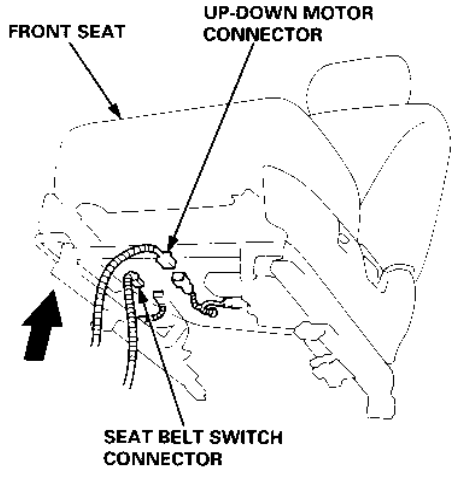
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.



3. Remove the bolts.



4. Lift the front seat, then disconnect the up-down motor connector (driver's, for some types).
If so equipped, disconnect the seat belt switch connector (driver's).



5. Carefully remove the front seat through the door opening.

6. Installation is the reverse of the removal procedure.

Front Seat Replacement

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE:
- Take care not to scratch the seat covers and body.
- Before removing the front seat, raise the seat cushion to its maximum height.

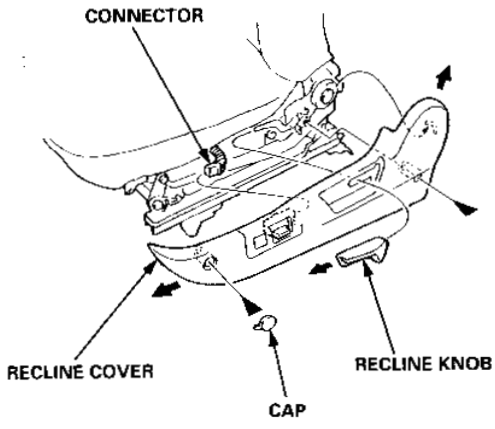
1. Remove the front seat through the door opening (see page 20-51).
2. Remove the recline cover.

►: Screw locations, 2

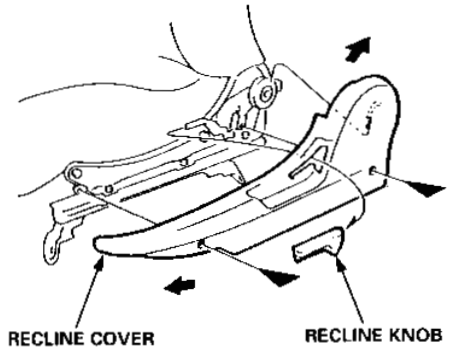


Power height adjustable:

Disconnect the connector.

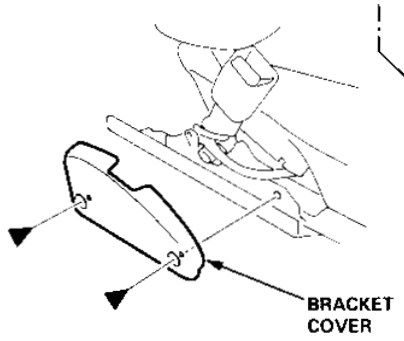


Manually adjustable:



3. Remove the bracket cover (power height adjustable).

►: Screw locations, 2

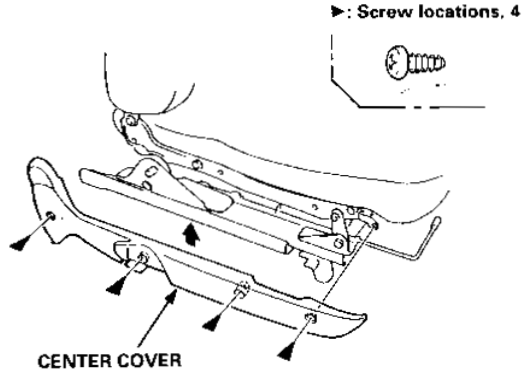


4. Remove the center cover.

Power height adjustable:

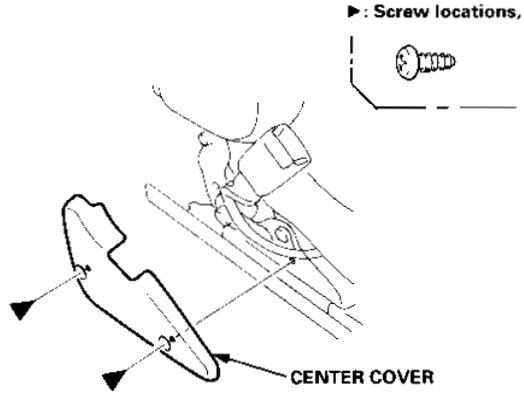
NOTE: Remove the seat belt buckle (see page 20-67).

►: Screw locations, 4



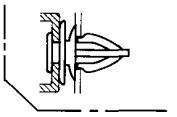
Manually adjustable:

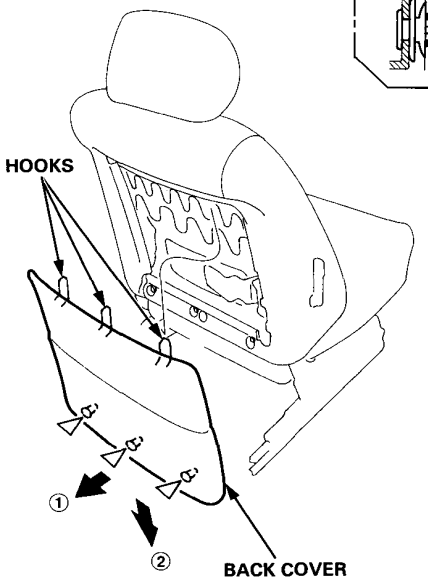
►: Screw locations, 2



5. Remove the back cover.

▷: Clip locations, 3



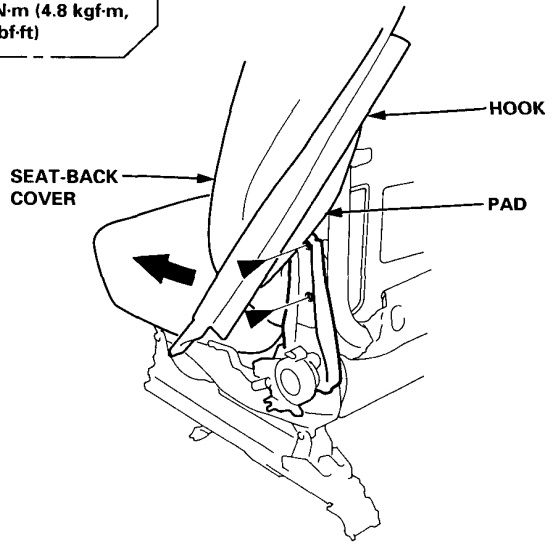


6. Release the hook, and fold the seat-back cover and pad, then remove the bolts.

►: Bolt locations, 2



10 x 1.25 mm
47 N·m (4.8 kgf·m, 35 lbf·ft)

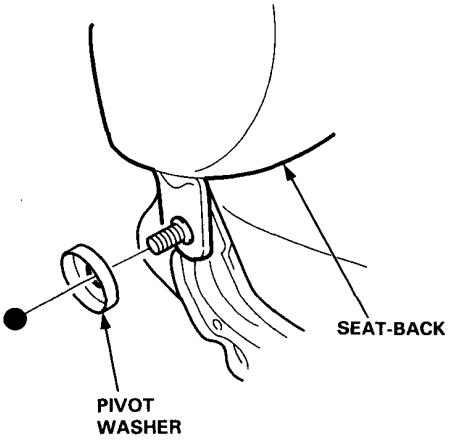


7. Remove the pivot nut.

●: Pivot nut location, 1

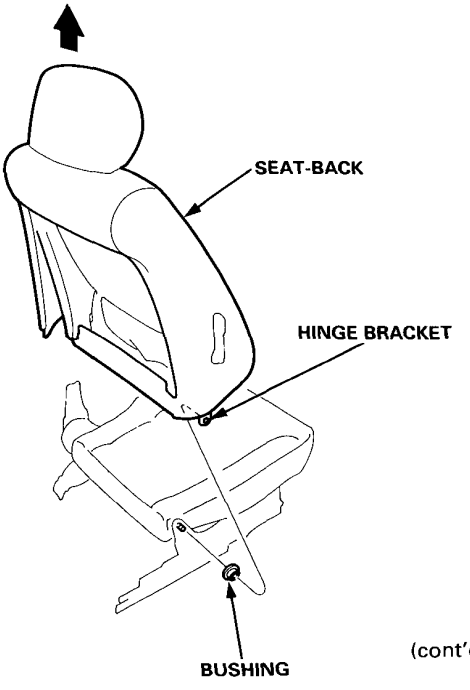


8 x 1.25 mm
22 N·m (2.2 kgf·m, 16 lbf·ft)



8. Remove the seat-back.

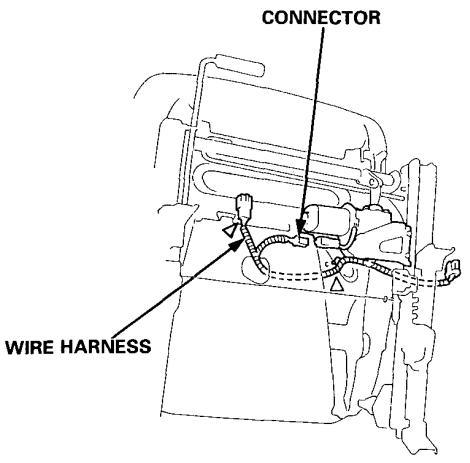
NOTE:
- Take care not to bend the hinge bracket.
- If so equipped, disconnect the rear seat access cable from the seat-back (see page 20-59).



(cont'd)

Front Seat Replacement (cont'd)

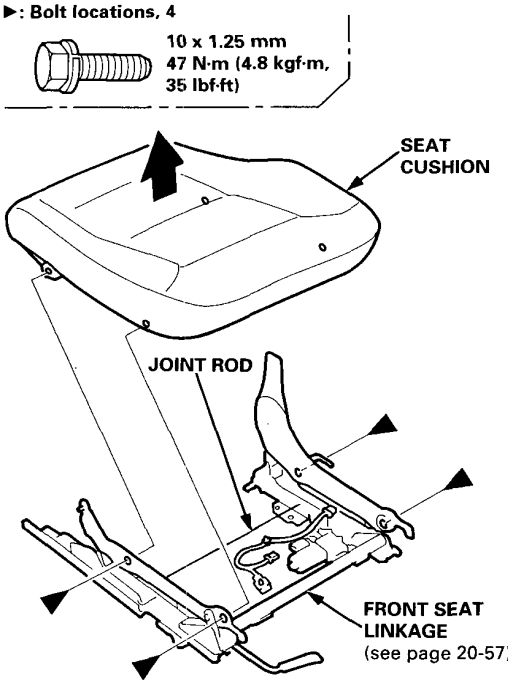
9. Disconnect the connector, then remove the wire harness from the seat cushion (power height adjustable).



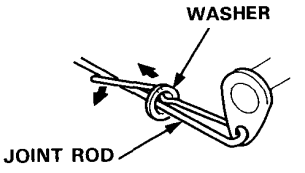
10. If so equipped, remove the recline cable and rear seat access cable from the seat cushion by releasing the clips (see page 20-59).

11. Remove the seat cushion.

NOTE: Take care not to bend the joint rod.



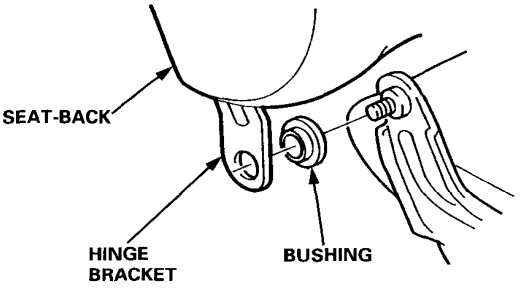
12. If necessary, remove the washer as shown, then remove the joint rod.



13. Installation is the reverse of the removal procedure.

NOTE:

- When installing the seat-back, make sure the bushing is installed to the hinge bracket properly.



- Make sure the wire harness is fastened securely.

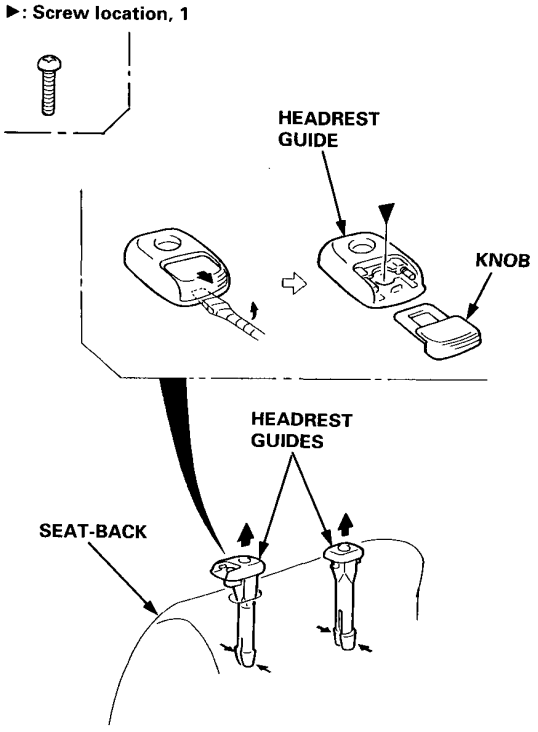
Front Seat Cover Replacement

CAUTION: Wear gloves to remove and install the seat covers.

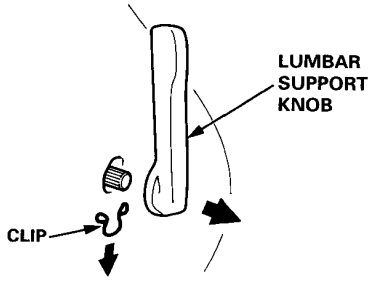
NOTE: Take care not to tear the seams or damage the seat covers.

Seat-back cover removal:

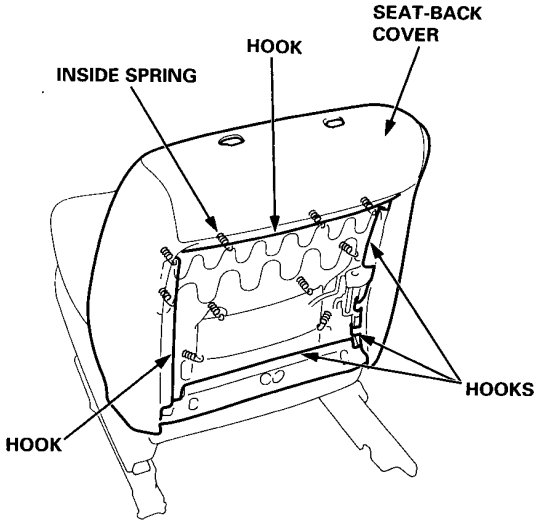
1. Slide the front seat forward and fold the seat-back forward.
2. Remove the back cover (see page 20-53).
3. Remove the headrest and headrest guides.



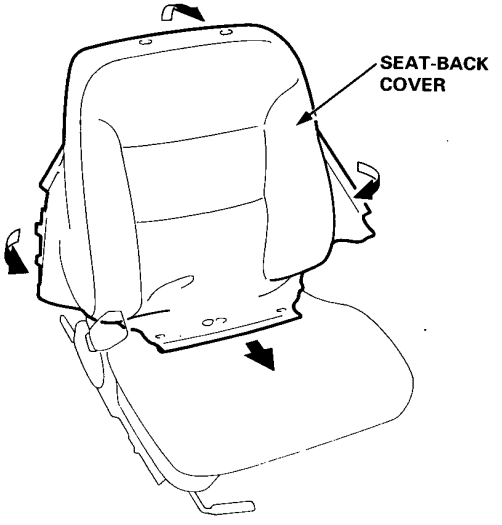
4. If so equipped, remove the lumbar support knob, and remove the trim plate (see page 20-59).



5. Loosen the seat-back cover by releasing all the hooks and inside springs.



6. Pull back the edge of the seat-back cover all the way around, then remove the seat-back cover.



7. Installation is the reverse of the removal procedure.

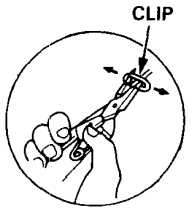
   NOTE: To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the inside springs and hooks.

(cont'd)

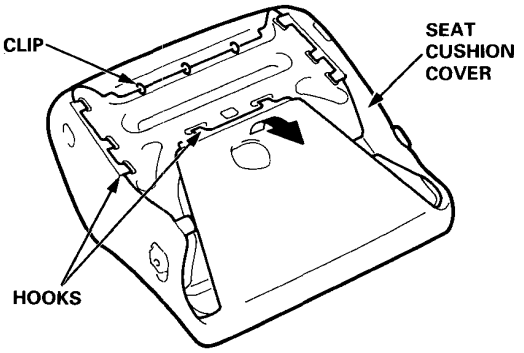
Front Seat Cover Replacement (cont'd)

Seat cushion cover removal:

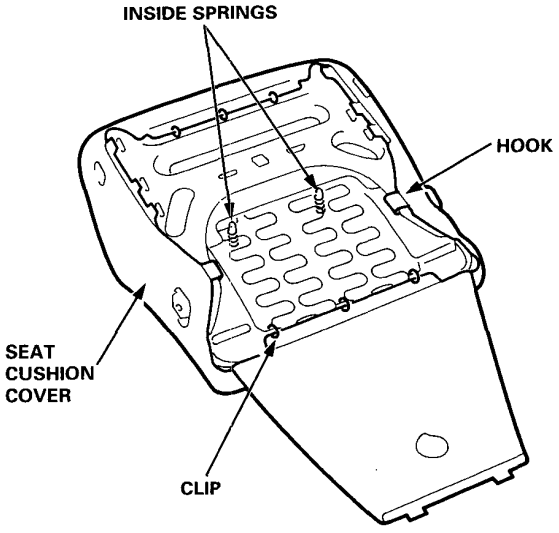
NOTE: Remove the clips as shown.



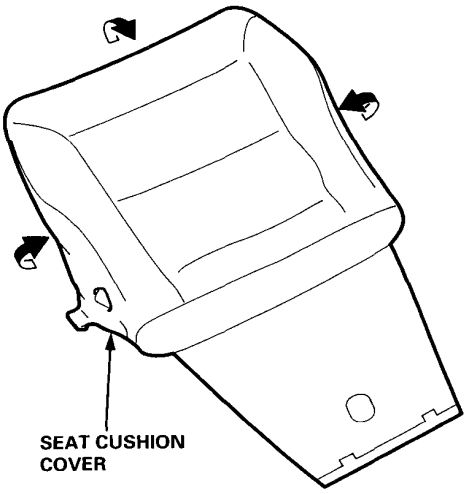
1. Remove the seat cushion (see page 20-52).
2. Remove the clips and hooks from under the seat cushion, then loosen the seat cushion cover.



3. Remove the clips, hooks and inside springs.



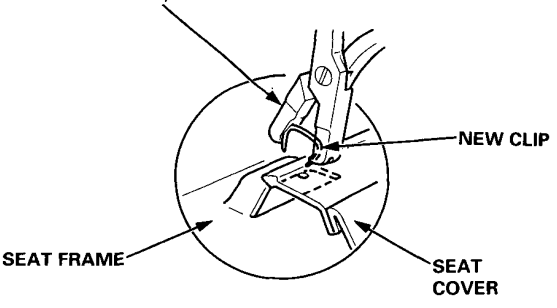
4. Pull back the edge of the seat cushion cover all the way around, then remove the seat cushion cover.



5. Installation is the reverse of the removal procedure.

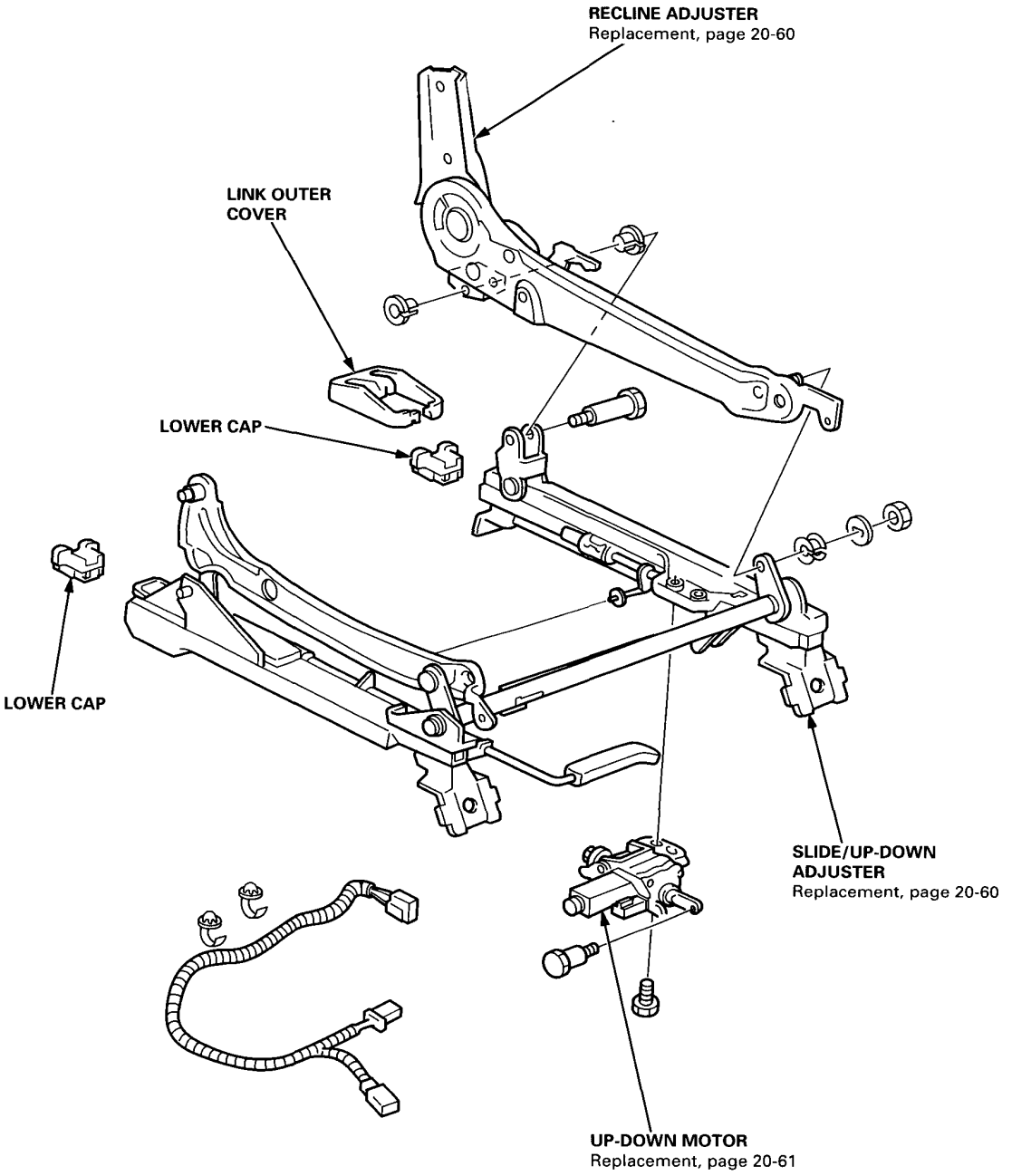
NOTE:
- To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the clips, hooks and inside springs.
- Replace the released clips with new ones.

UPHOLSTERY RING PLIERS
Commercially available.



Front Seat Linkage Index

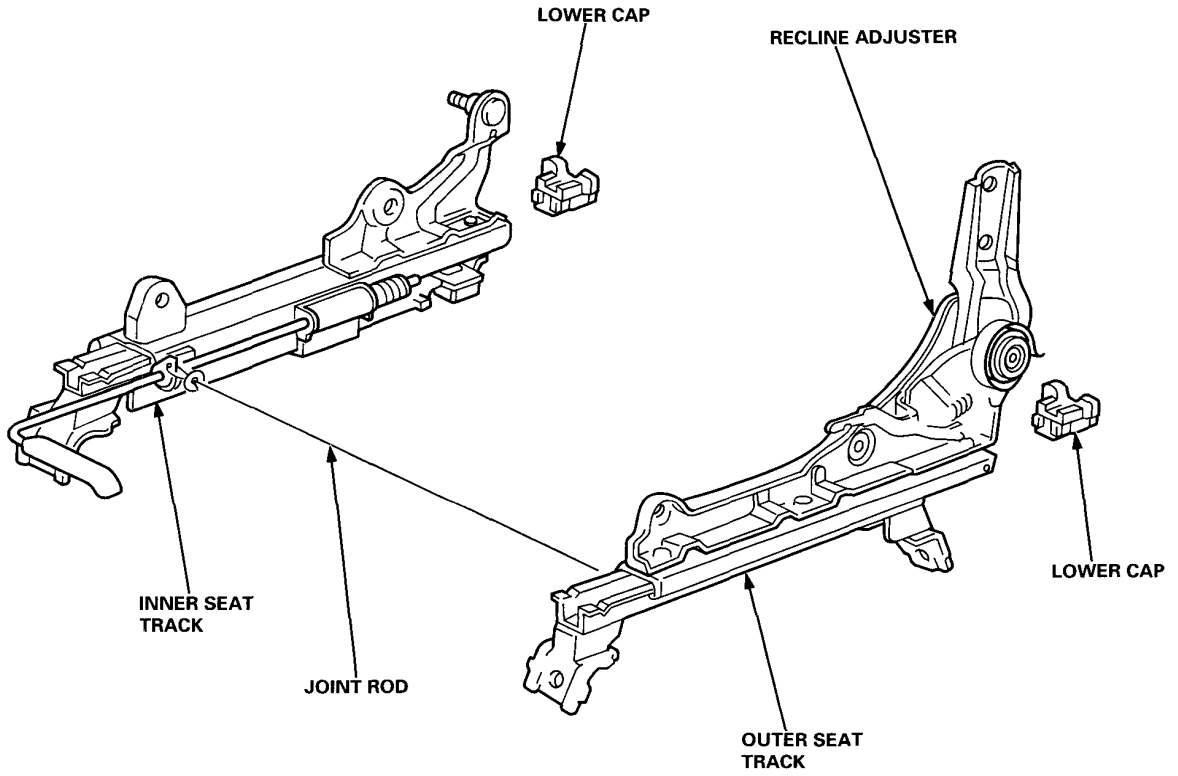
Power height adjustable:



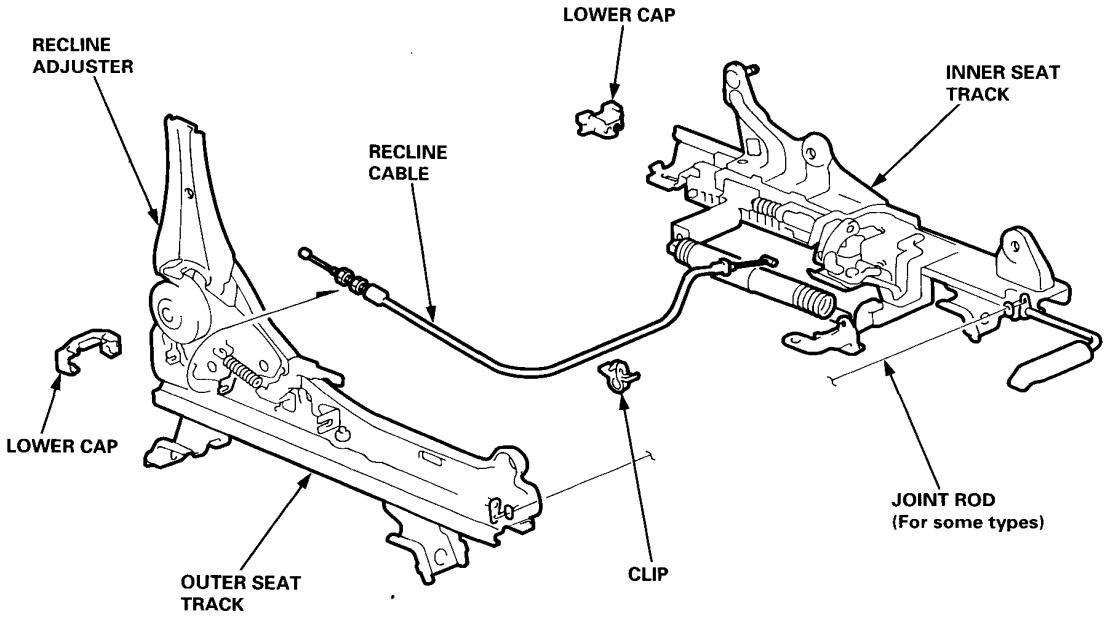
(cont'd)

Front Seat Linkage Index (cont'd)

Manually adjustable (driver's):



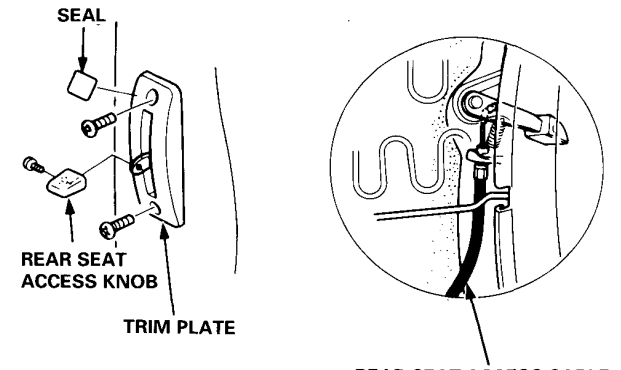
Manually adjustable (passenger's):



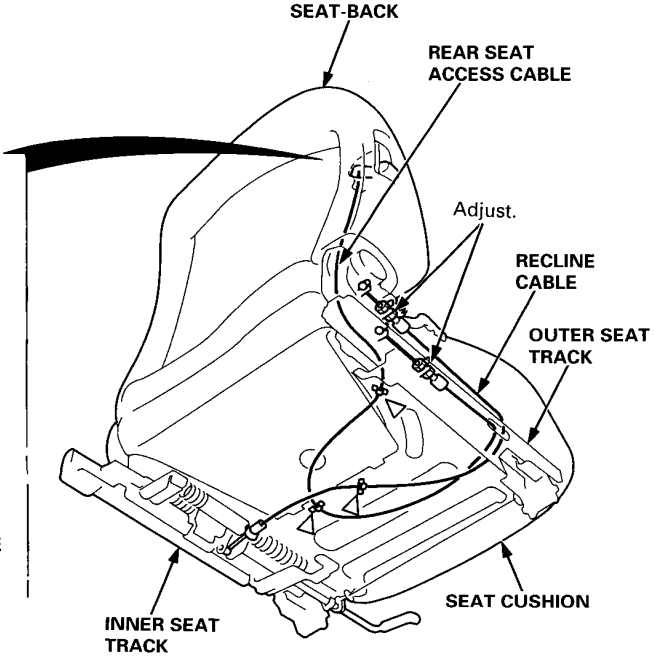
NOTE:

- Take care not to bend the recline cable and rear seat access cable.
- After installing the seat tracks, adjust the recline cable and rear seat access cable.

▷: **Clip locations, 3**



REAR SEAT ACCESS CABLE
To remove the cable, first remove the back cover.



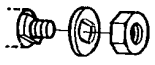
Recline Adjuster, Slide/Up-down Adjuster Replacement

CAUTION: Wear gloves to remove and install the recline adjuster and slide/up-down adjuster.

NOTE:
- Take care not to scratch the seat covers.
- Before removing the front seat, raise the seat cushion to its maximum height.

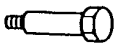
1. Remove the front seat through the door opening (see page 20-51).
2. Remove the seat-back and seat cushion (see page 20-52).
   Remove the wire harness from the front seat linkage (see page 20-54).
3. Separate the recline adjuster and slide/up-down adjuster.

●: Nut location, 1

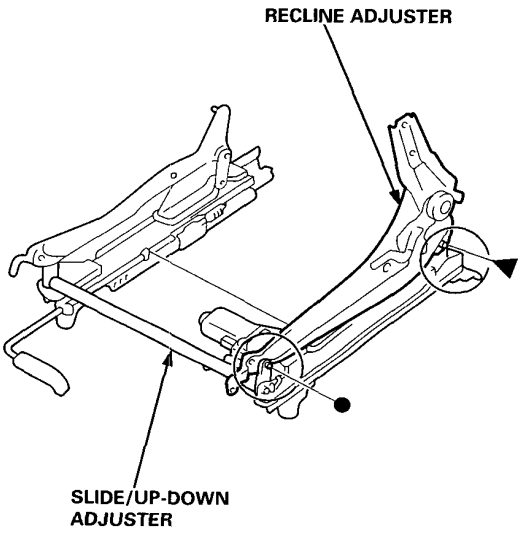


6 x 1.0 mm
4.9 N·m (0.5 kgf·m, 3.6 lbf·ft)

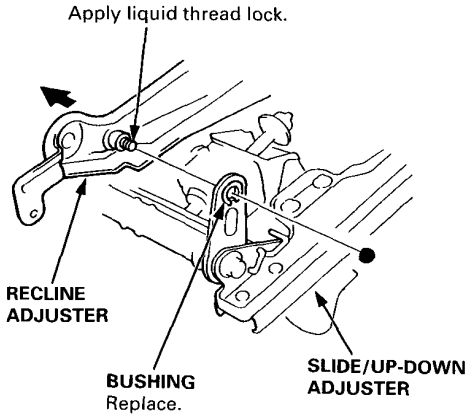
►: Bolt location, 1



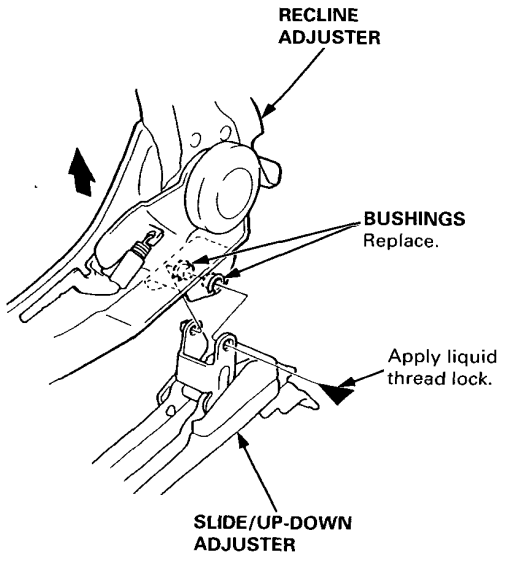
8 x 1.25 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)



NOTE:
- Replace the front bushing with a new one as described on page 20-61.



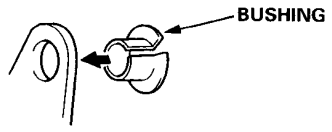
- When replacing the rear bushings do not flatten them.



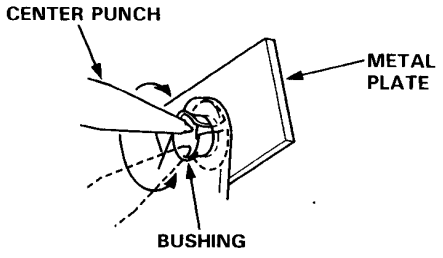
4. Installation is the reverse of the removal procedure.

NOTE:
- Replace the bushings with new ones as follows

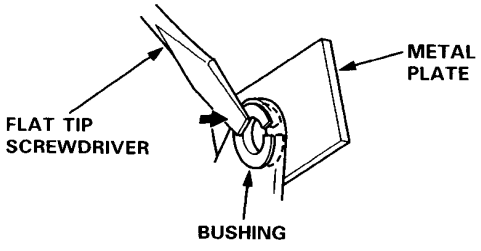
– 1) Install the bushing.



–2) Hold the bushing down against a metal plate, then flare the edge of the bushing using a center punch as shown.



–3) Flatten the bushing using a flat tip screwdriver as shown.



- Check the recline adjuster and slide/up-down adjuster operations.

Up-down Motor Replacement

CAUTION: Wear gloves to remove and install the up-down motor.

NOTE:
- Take care not to scratch the seat covers.
- Before removing the front seat, raise the seat cushion to its maximum height.

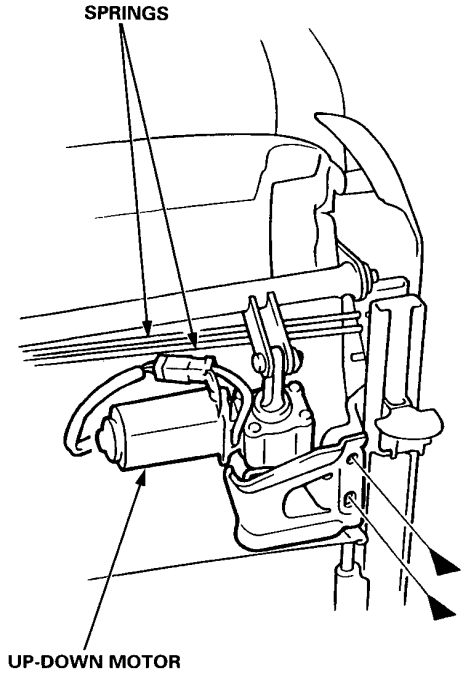
1. Remove the front seat through the door opening (see page 20-51).

2. Remove the bolts while holding the up-down motor.

►: Bolt locations, 2



8 x 1.25 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

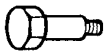


(cont'd)

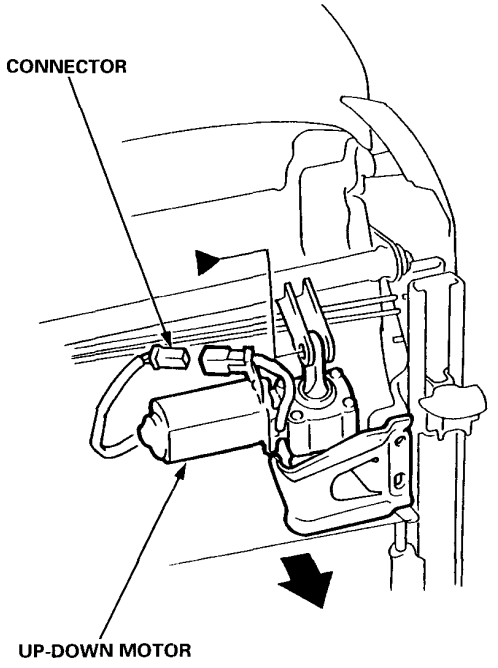
Up-down Motor Replacement (cont'd)

3. Disconnect the connector, then remove the up-down motor.

►: Bolt location, 1

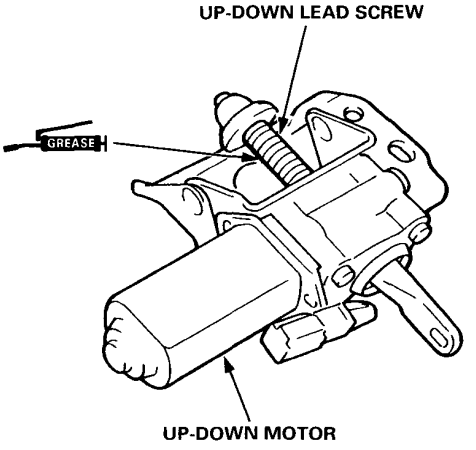


8 x 1.25 mm
12 N·m (1.2 kgf·m, 8.7 lbf·ft)



4. Installation is the reverse of the removal procedure.

NOTE:
- Before installing the up-down motor, apply grease to the up-down lead screw.

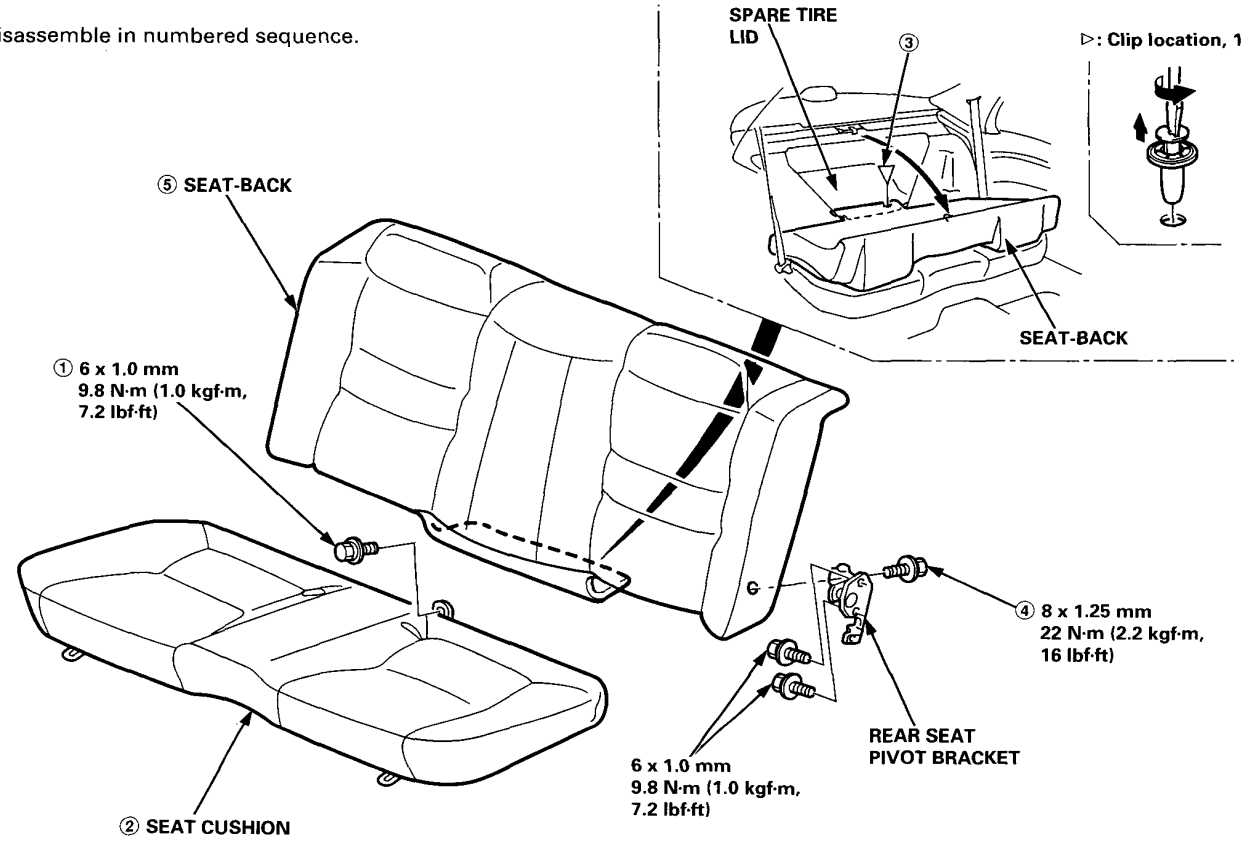


- Apply liquid thread lock to the bolts.
- Make sure the connector is connected properly.
- Check the up-down motor operation.

Rear Seat Replacement

NOTE: Take care not to scratch the seat covers and body.

Disassemble in numbered sequence.



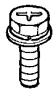
If necessary, remove the rear seat latch and lock cylinder.

NOTE:

- Pry the rear shelf up after removing the rear shelf trim panel (see page 20-48) and seat lock cover.
- Take care not to bend the lock rod.

►: Bolt, screw locations

A ►: Bolt, 2



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)

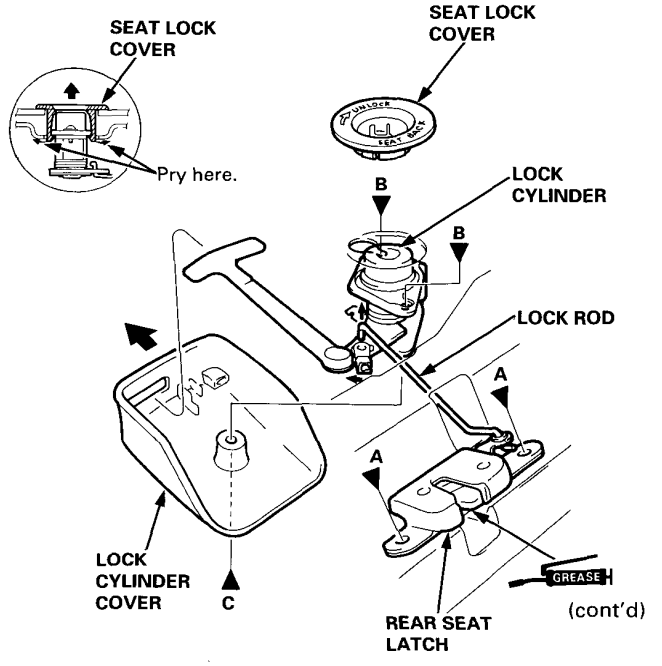
B ►: Bolt, 2



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)

C ►: Screw, 1



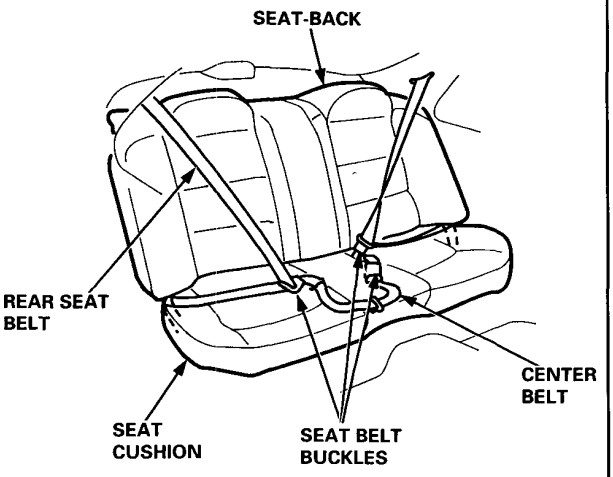


(cont'd)

Rear Seat Replacement (cont'd)

Installation is the reverse of the removal procedure.

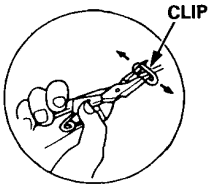
NOTE:
- Make sure the seat-back locks securely.
- In necessary, adjust the rear seat latch and seat-back.
- Before attaching the seat-back and seat cushion, make sure there are no twists or kinks in the rear seat belts and center belt.



Rear Seat Cover Replacement

CAUTION: Wear gloves to remove and install the seat covers.

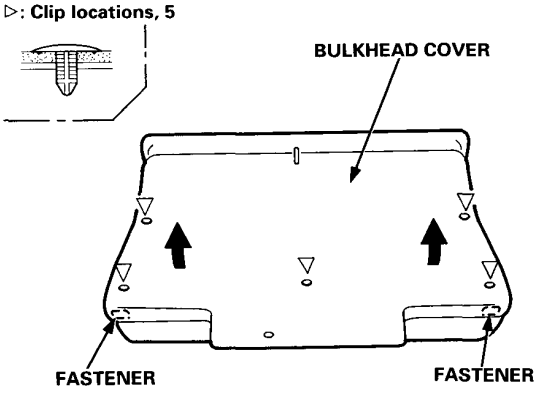
NOTE:
- Take care not to tear the seams or damage the seat covers.
- Remove the clips as shown.



Seat-back cover removal:

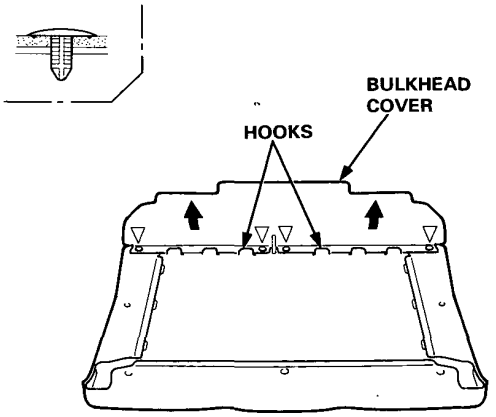
1. Remove the seat-back (see page 20-63).
2. Pull back the bulkhead cover by releasing the clips and fasteners.

▷: **Clip locations, 5**

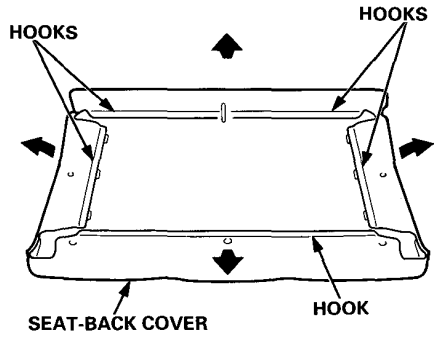


3. Release the clips and hooks, then remove the bulkhead cover.

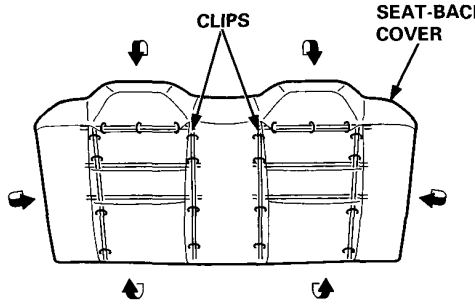
▷: **Clip locations, 4**



4. Release all hooks, then loosen the seat-back cover.



5. Pull buck the edge of the seat-back cover all the way around, then release the clips.



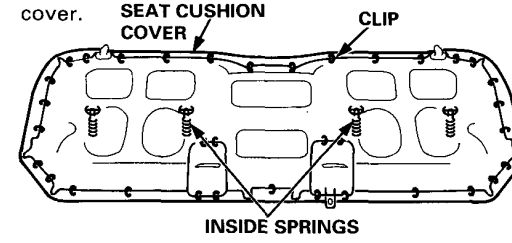
6. Installation is the reverse of the removal procedure.

NOTE:
- To prevent wrinkles when installing a seat cover, make sure the material is stretched evenly over the pad before securing the hooks and clips.
- Replace the released clips with new ones.

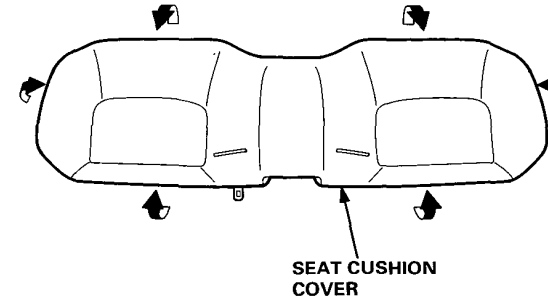
Seat cushion cover removal:

1. Remove the seat cushion (see page 20-63).

2. Remove all the clips and inside springs from under the seat cushion, then loosen the seat cushion cover.



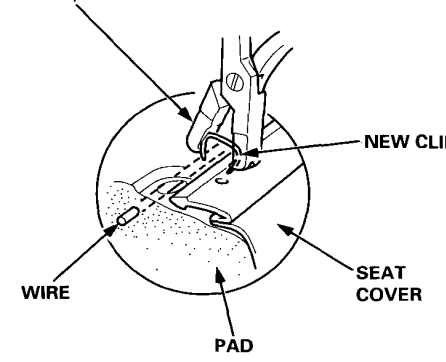
3. Pull back the edge of the seat cushion cover all the way around, then remove the seat cushion cover.



4. Installation is the reverse of the removal procedure.

NOTE:
- To prevent wrinkles when installing a seat cover, make sure the material is stretched evenly over the pad before securing the hooks and clips.
- Replace the released clips with new ones.

UPHOLSTERY RING PLIERS
Commercially available.



Seat Belts

Front Seat Belt Replacement

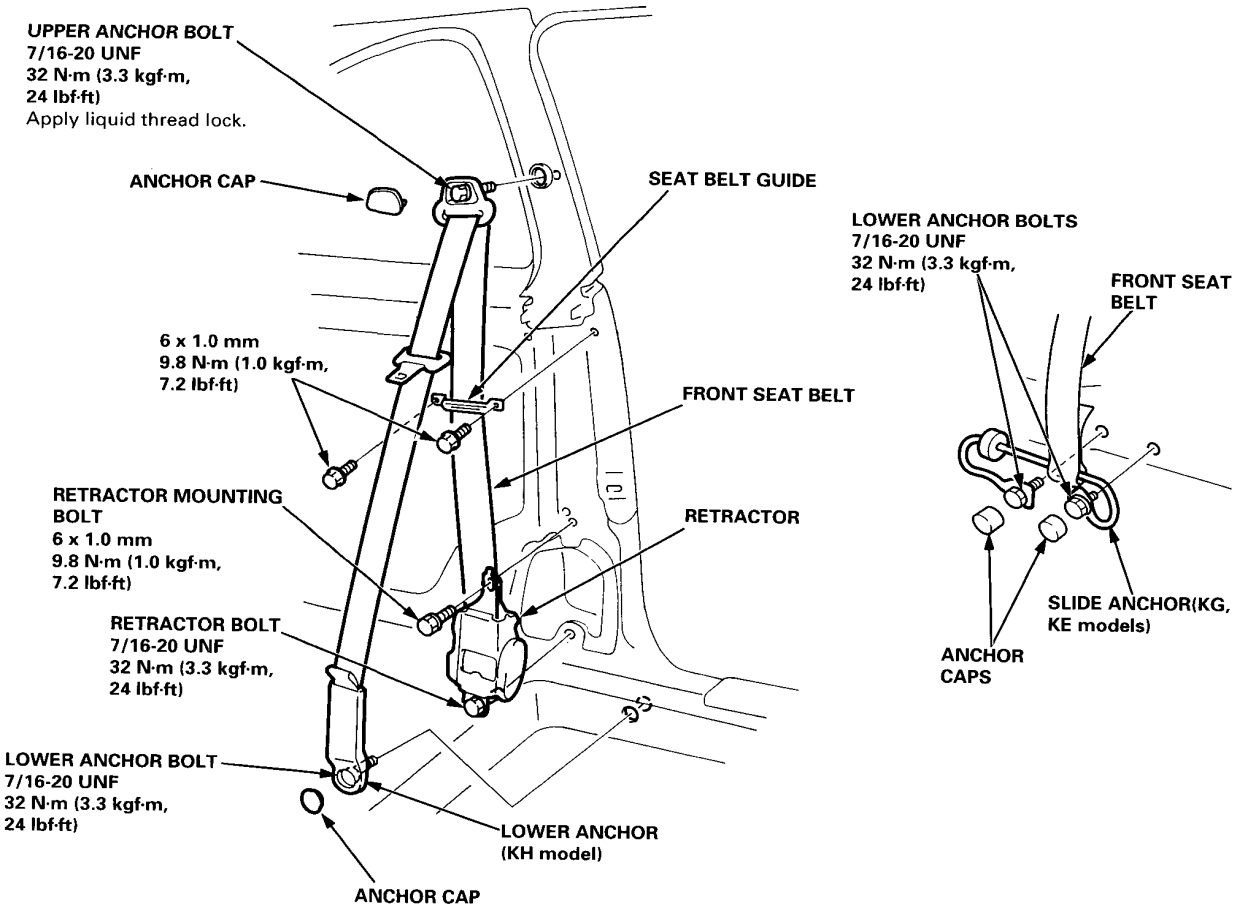
CAUTION: Check the front seat belts for damage and replace them if necessary. Be careful not to damage them during removal and installation.

Front seat belt removal:

1. Remove the following parts, and slide the front seat forward fully.
   - Door sill molding (see page 20-48)
   - Rear seat cushion (see page 20-63)
   - Rear shelf trim panel and gusset cover (see page 20-48)
   - Side trim panel (see page 20-48)
2. Remove all the anchor bolts, the retractor bolt and the retractor mounting bolt, then remove the front seat belt.

   NOTE: When removing the anchor bolts and the retractor bolt, use a 17 mm socket or box-end wrench.
3. Check that the retractor locking mechanism functions as described on page 20-70.
4. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure you assemble the washers and collars on the upper and lower bolts.
   - Before attaching the center pillar lower trim, make sure there are no twists or kinks in the front seat belt.



Seat belt buckle removal:

1. Remove the front seat (see page 20-51).

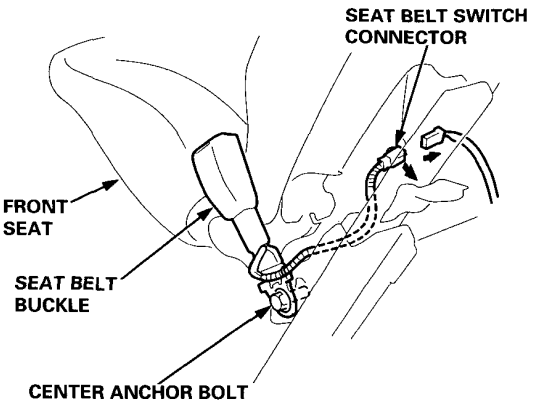
   NOTE: Before removing the front seat, raise the seat cushion to its maximum height.

2. Remove the following covers (see page 20-52).
   - Bracket cover (power height adjustable)
   - Center cover (manually adjustable)

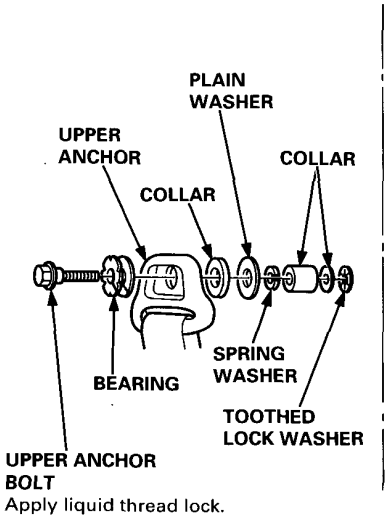
3. Disconnect the seat belt switch connector (driver's, for some types), remove the center anchor bolt, then remove the seat belt buckle.

4. Installation is the reverse of the removal procedure.

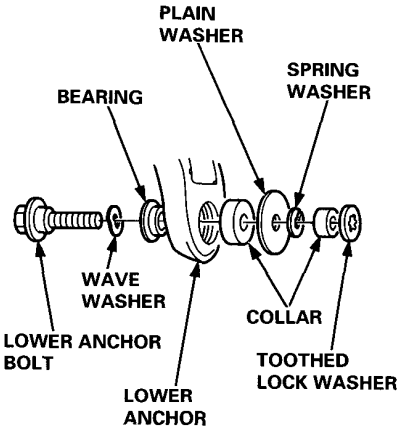
   NOTE: Make sure you assemble the washers and bearing on the center anchor bolt as shown.



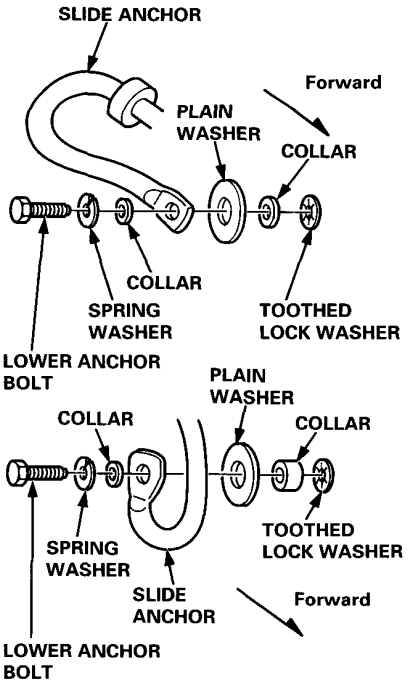
Upper and lower anchor bolt construction:



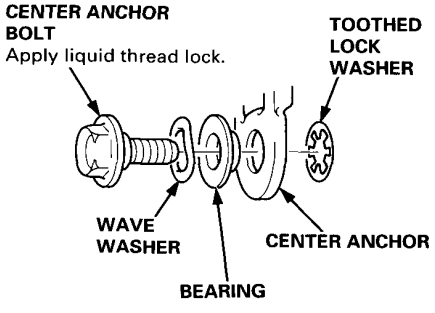
KH model:



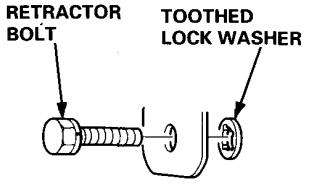
KG, KE models:



Center anchor bolt construction:



Retractor bolt construction:



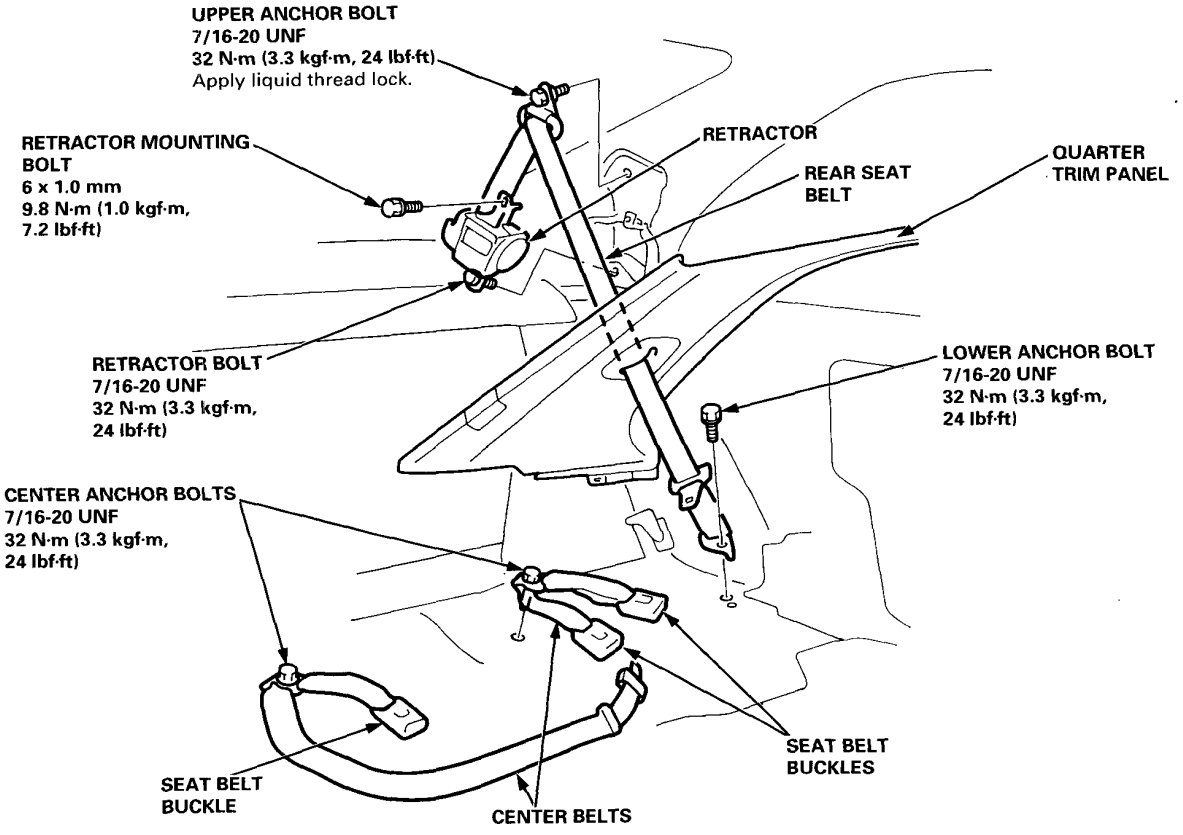
Rear Seat Belt Replacement

CAUTION: Check the rear seat belts for damage and replace them if necessary. Be careful not to damage them during removal and installation.

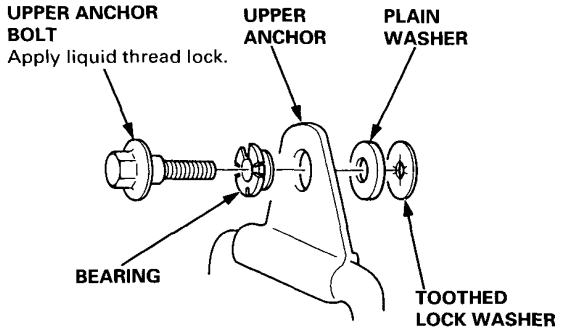
1. Remove:
   - Rear seat cushion (see page 20-63)
   - Door sill molding (see page 20-48)
   - Rear shelf trim panel and gusset cover (see page 20-48)
   - Side trim panel (see page 20-48)
   - Quarter trim panel (see page 20-48)
2. Remove all the anchor bolts, the retractor bolt and the retractor mounting bolts, then remove the rear seat belts and center belts.

   NOTE: When removing the anchor bolts and the retractor bolt, use a 17 mm socket or box-end wrench.
3. Check that the retractor locking mechanism functions as described on page 20-70.
4. Installation is the reverse of the removal procedure.

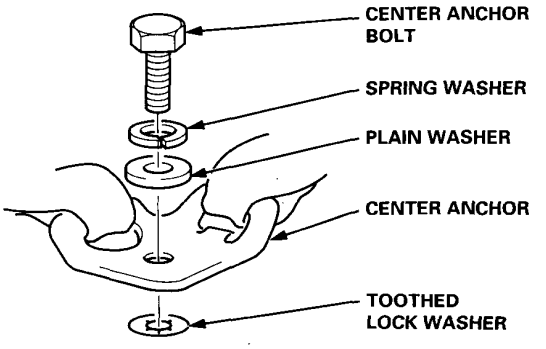
   NOTE:
   - Make sure you assemble the washers on the upper and center anchor bolt (see page 20-39).
   - Before attaching the quarter trim panel, make sure there are no twists or kinks in the rear seat belt.
   - Before attaching the seat-back and seat cushion, make sure there are no twists or kinks in the rear seat belts and center belts.



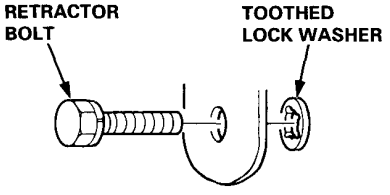
Upper anchor bolt construction:



Center anchor bolt construction:



Retractor bolt construction:



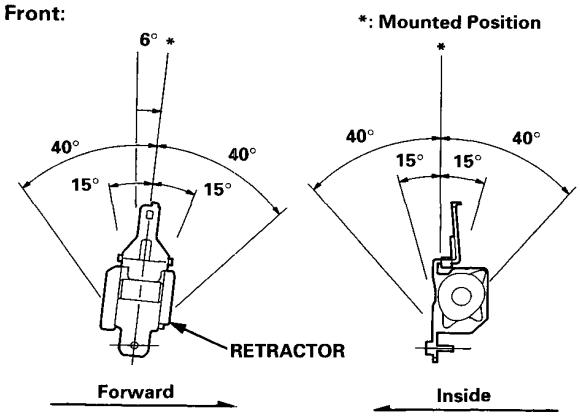
Inspection

Retractor Inspection

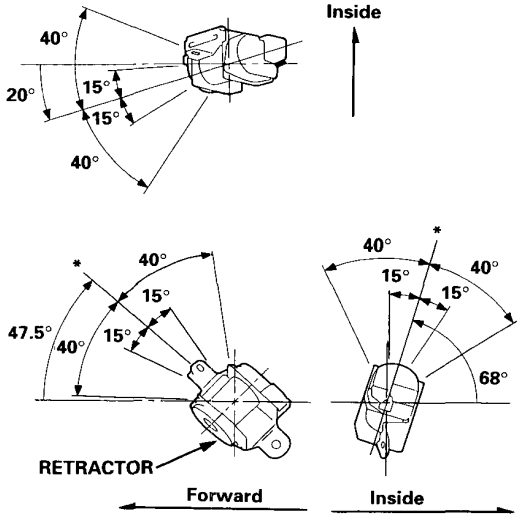
1. Before installing the retractor, check that the seat belt can be pulled out freely.
2. Make sure that the seat belt does not lock when the retractor is leaned slowly up to 15° from the mounted position. The seat belt should lock when the retractor is leaned over 40°.

   CAUTION: Do not attempt to disassemble the retractor.
3. Replace the seat belt with a new one if there is any abnormality.

Front:



Rear:



On-the-Car Seat Belt Inspection

1. Check that the seat belt is not twisted or caught on anything.
2. After installing the anchors, check for free movement on the anchor bolts. If necessary, remove the anchor bolts and check that the washers and other parts are not damaged or improperly installed.
3. Check the seat belts for damage or discoloration. Clean with a shop towel if necessary.

   CAUTION: Use only soap and water to clean.

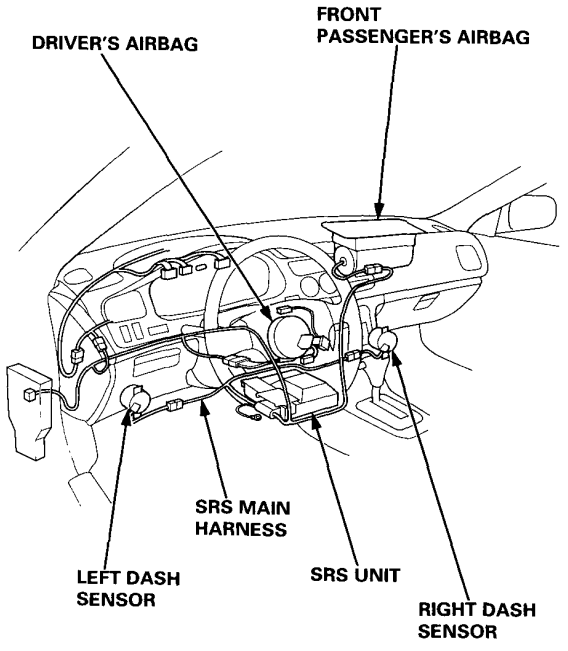
   NOTE: Dirt build-up in the metal loops of the upper anchors can cause the seat belts to retract slowly. Wipe the inside of the loops with a clean cloth dampened in isopropyl alcohol.
4. Check that the seat belt does not lock when pulled out slowly. The seat belt is designed to lock only during a sudden stop or impact.
5. Make sure that the seat belt will retract automatically when released.
6. Replace the seat belt with a new one if there is any abnormality.

Replacement

SRS wire harnesses are routed near the carpet.

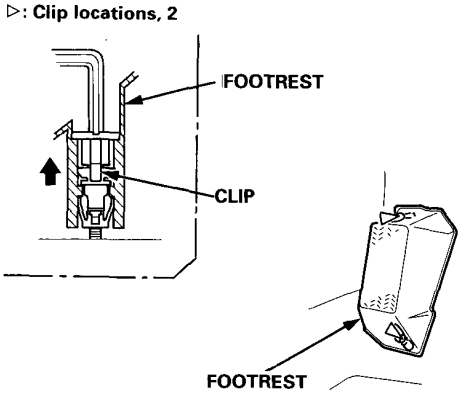
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.

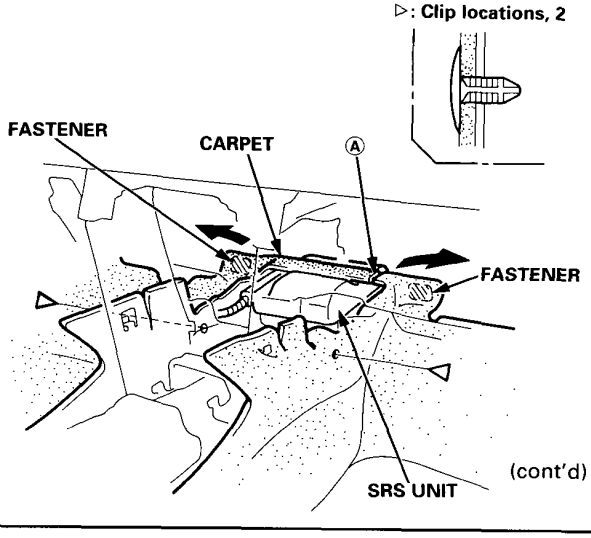


1. *Remove:*
   - Front seat (see page 20-51)
   - Rear seat cushion (see page 20-63)
   - Door sill molding (see page 20-48)
   - Rear shelf trim panel and gusset covers (see page 20-48)
   - Side trim panel (see page 20-48)
   - Front seat belt lower anchor or slide anchor (see page 20-66)
   - Front and rear consoles (see page 20-73)
   - Kick panel (see page 20-48)
   - Opener cover (see page 20-95)
2. Remove the footrest.

   NOTE: Loosen the clips using a hex wrench by turning them counterclockwise.



3. Cut the Ⓐ area in the carpet, then pull it back as shown.



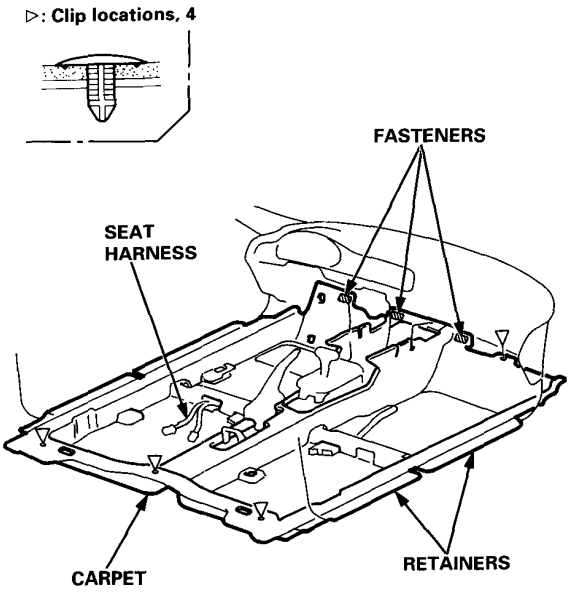
(cont'd)

Carpet

Replacement (cont'd)

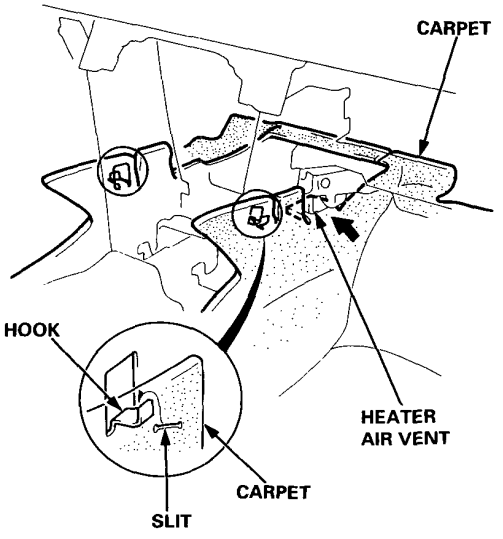
4. Remove the carpet by sliding it rearward.

   NOTE: LHD is shown, RHD is symmetrical.

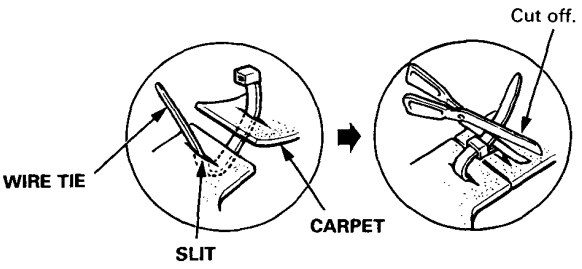


5. Installation is the reverse of the removal procedure.

   NOTE:
   - Take care not to damage, wrinkle or twist the carpet.
   - Make sure the seat harness is routed correctly.
   - Slip the slits in the carpet over the hooks.
   - Slip the carpet under the heater air vent.



- Reattach the Ⓐ cut area of the carpet (see page 20-71) with a wire tie as shown.



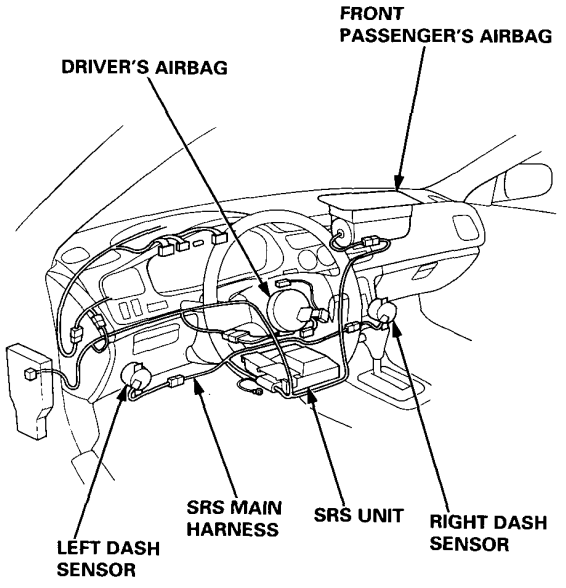
- If necessary, replace any damaged clips.

Replacement

SRS wire harnesses are routed near the front console.

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

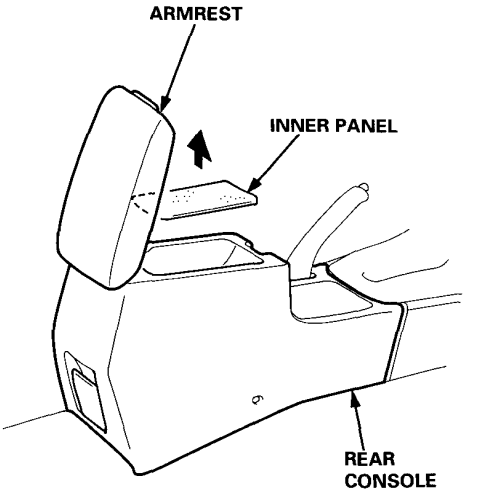
NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.



NOTE:
- Take care not to scratch the front and rear consoles, front seats and dashboard.
- LHD is shown, RHD is symmetrical.

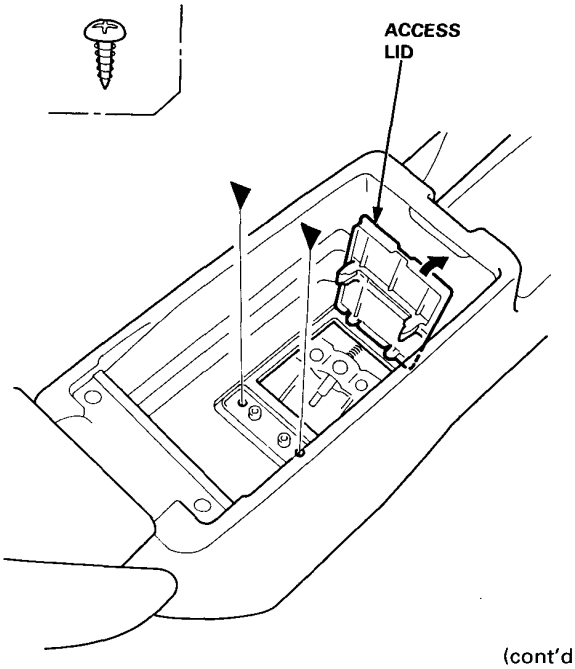
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

1. Open the armrest and remove the inner panel.



2. Remove the access lid and screws.

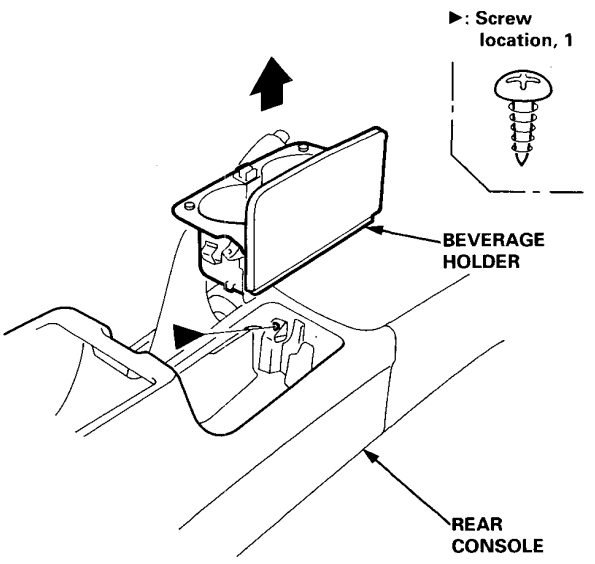
►: Screw locations, 2



(cont'd)

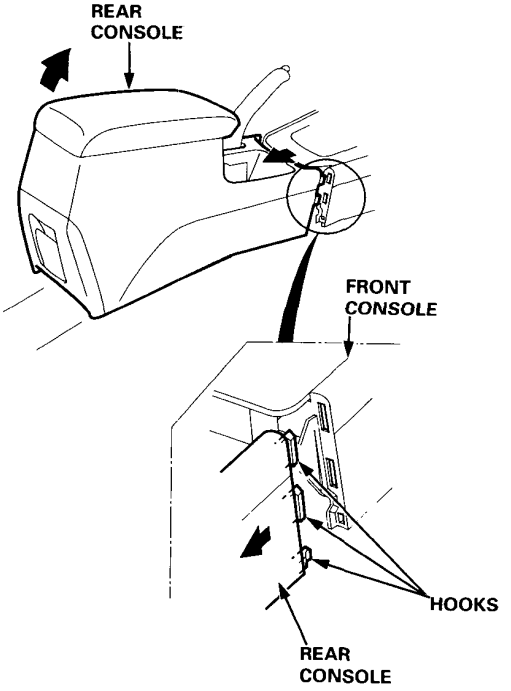
Replacement (cont'd)

3. Remove the beverage holder and screw.

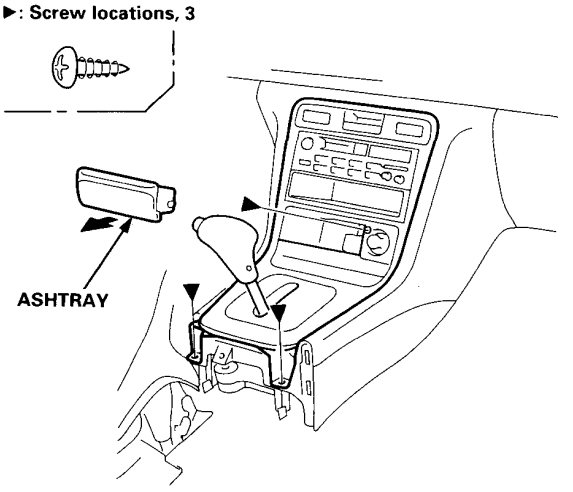


4. Remove the rear console.

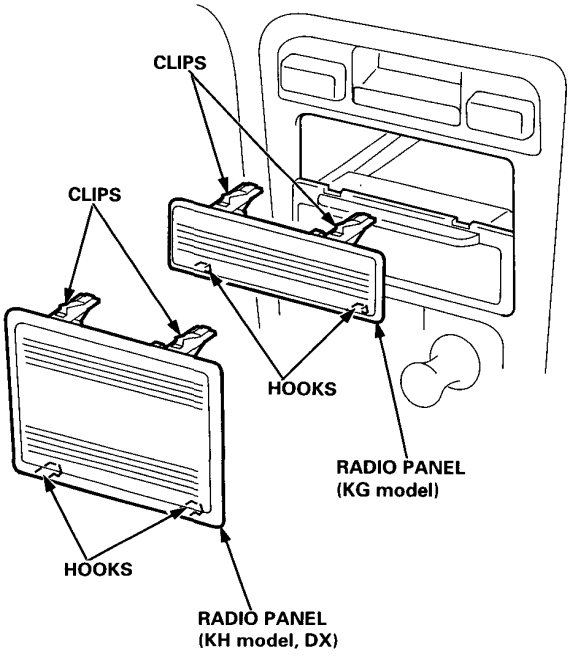
NOTE:
- Lift up the parking brake lever.
- Detach the hooks by lifting the front of the rear console and sliding it rearward.



5. Remove the ashtray and screws.

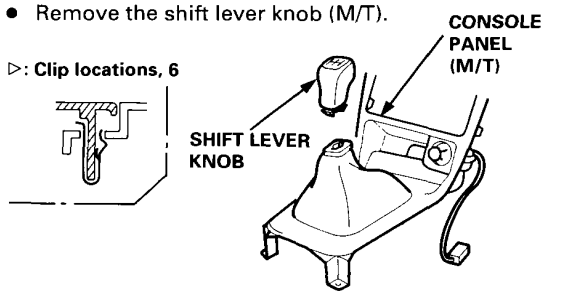


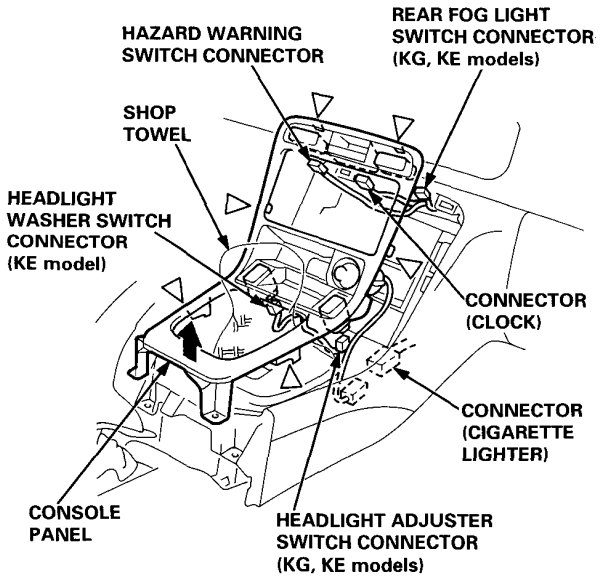
6. Remove the radio panel for some types.



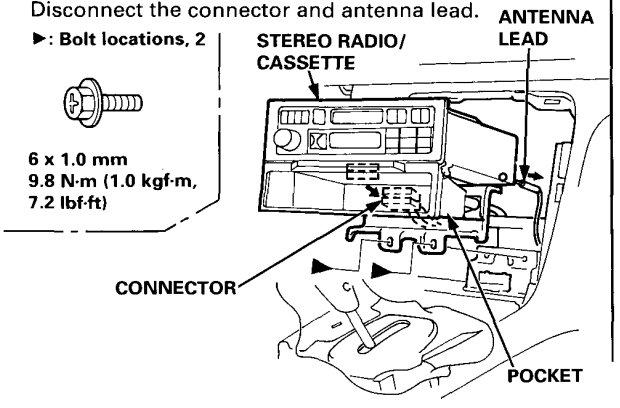
7. Detach the clips by lifting the console panel, and disconnect the connectors (LHD is shown, RHD is symmetrical).

NOTE:
- Take care not to scratch the selecter lever and A/T gear position indicator panel.
- Remove the shift lever knob (M/T).



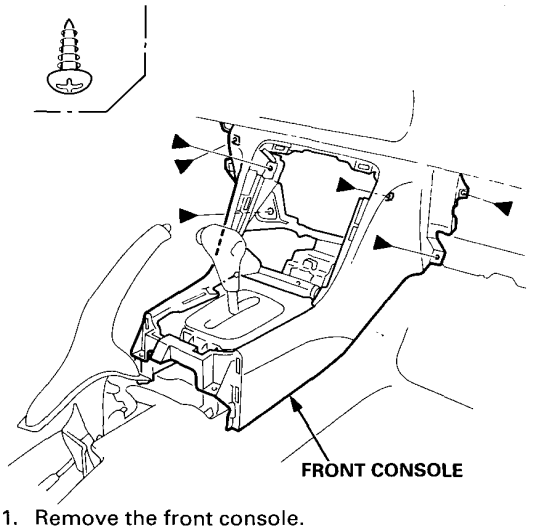


8. KE model: Remove the bolts, then remove the stereo radio/cassette and pocket by pulling it out. Disconnect the connector and antenna lead.



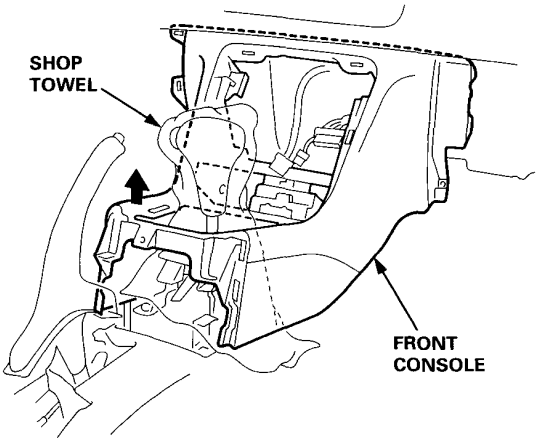
9. Remove:
   - Dashboard lower cover (see page 20-78).
   - Glove box (see page 20-79).

10. Remove the screws.



11. Remove the front console.

NOTE: Wrap the selector lever and A/T gear position indicator panel with a shop towel to prevent damage.



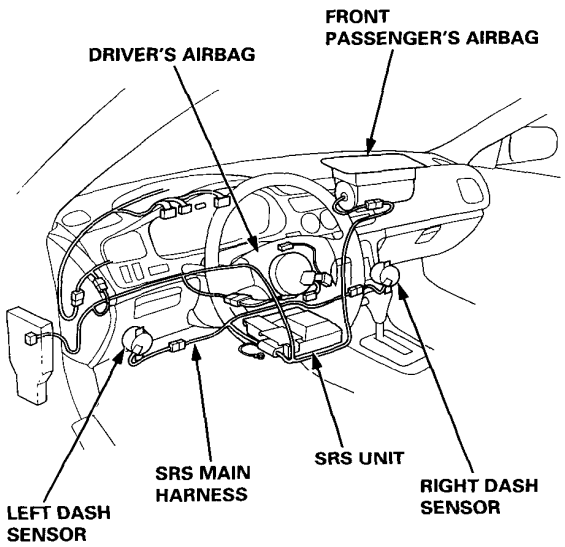
12. Installation is the reverse of the removal procedure.

Component Removal/Installation

SRS wire harnesses are routed near the dashboard and steering column.

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.



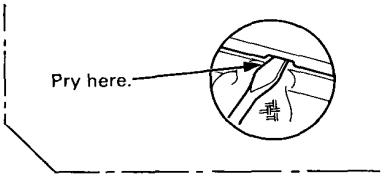
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.

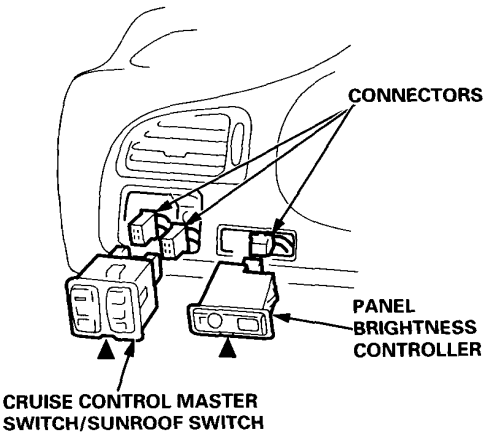
Instrument panel removal:

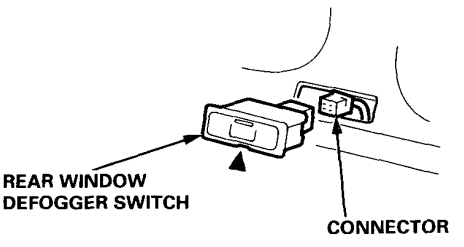
NOTE: LHD is shown, RHD is symmetrical.

1. Remove:
   - Console panel (see page 20-73)
   - Stereo radio/cassette (see page 20-73)
   - Glove box (see page 20-79)
2. Remove the switches and disconnect the connectors.
   - Cruise control master switch (KE, KH models)/ sunroof switch
   - Panel brightness controller
   - Rear window defogger switch

▶locations:

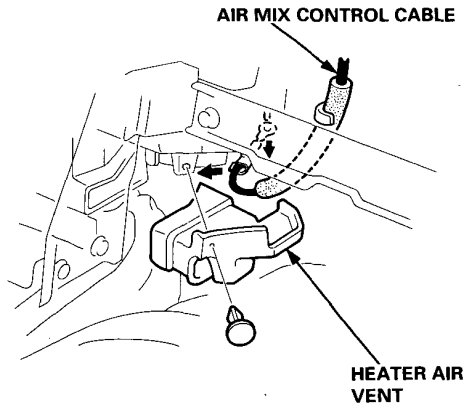






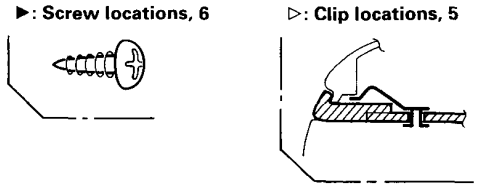
3. Remove the heater air vent and disconnect the air mix control cable.

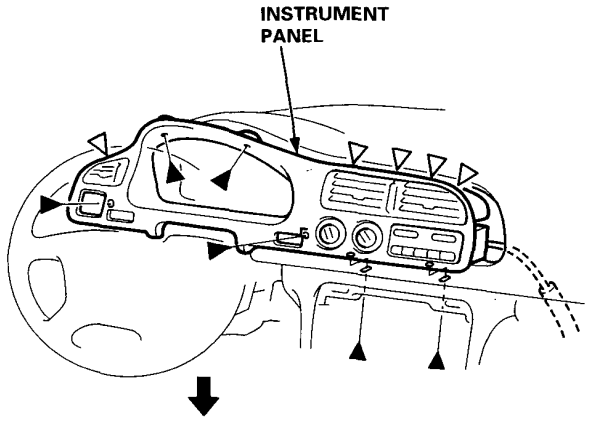
   NOTE: Adjust the air mix control cable (see section 21).



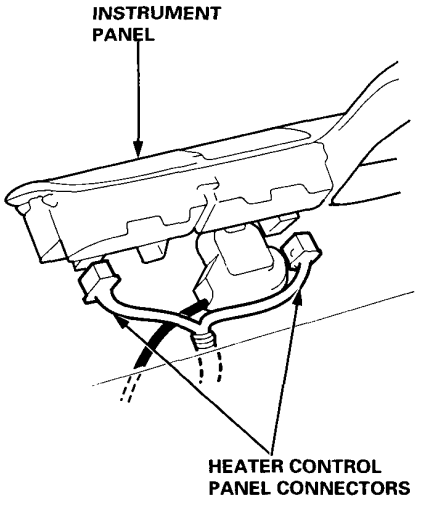
4. Lower the steering column and remove the screws.

   Carefully pull out the instrument panel.

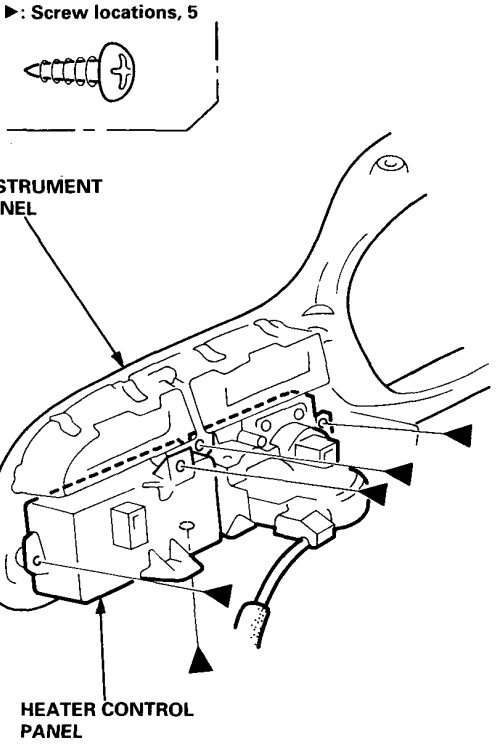




5. Disconnect the heater control panel connectors.



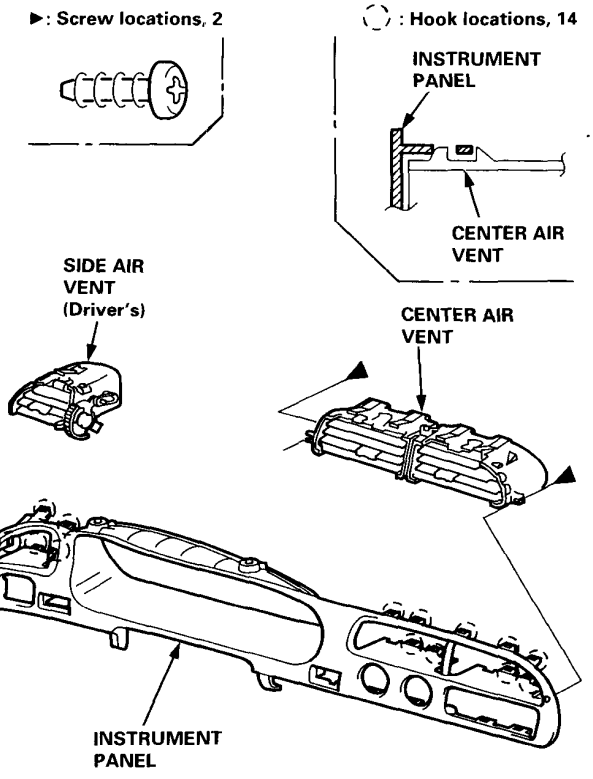
6. Remove the heater control panel.



(cont'd)

Component Removal/Installation (cont'd)

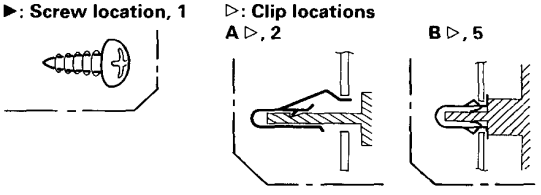
7. If necessary, disassemble the center air vent and side air vent (driver's).



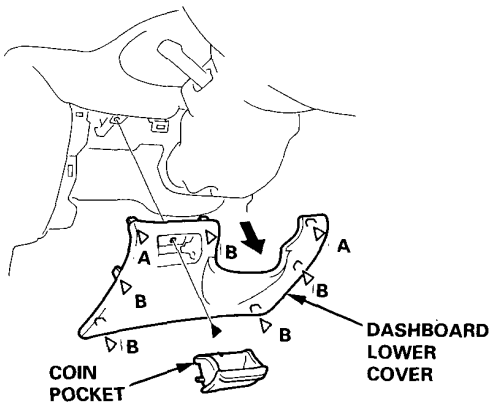
8. Installation is the reverse of the removal procedure.

Dashboard lower cover and knee bolster removal:

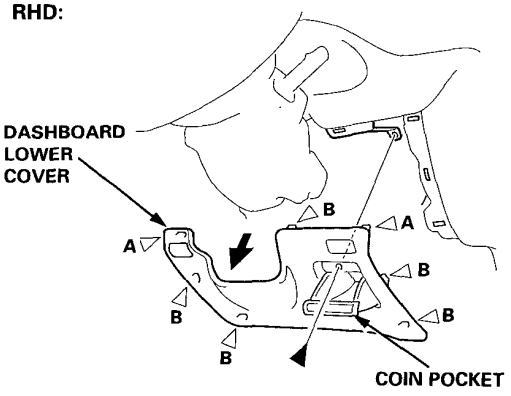
1. Remove the coin pocket (LHD).
2. Remove the screw and detach the clips, then remove the dashboard lower cover.



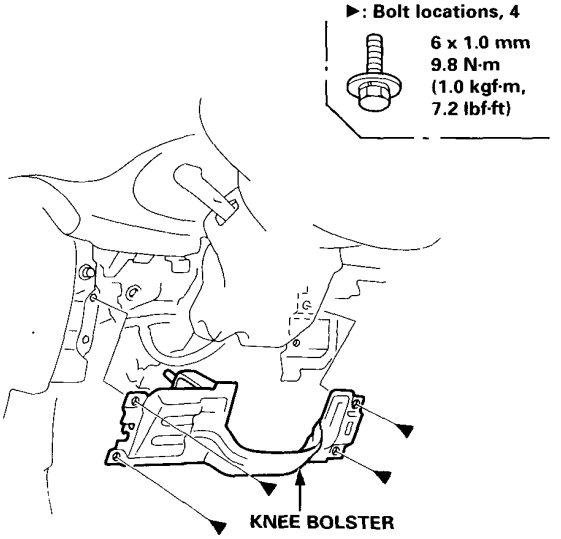
LHD:



RHD:



3. Remove the knee bolster (KH model).



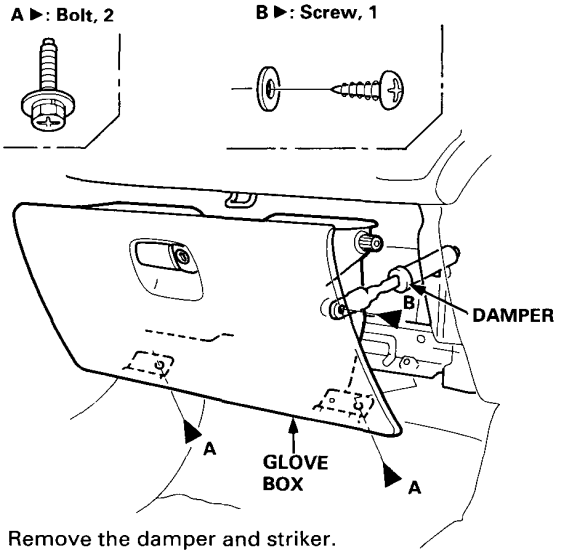
4. Installation is the reverse of the removal procedure.

Glove box removal:

NOTE: LHD is shown, RHD is symmetrical.

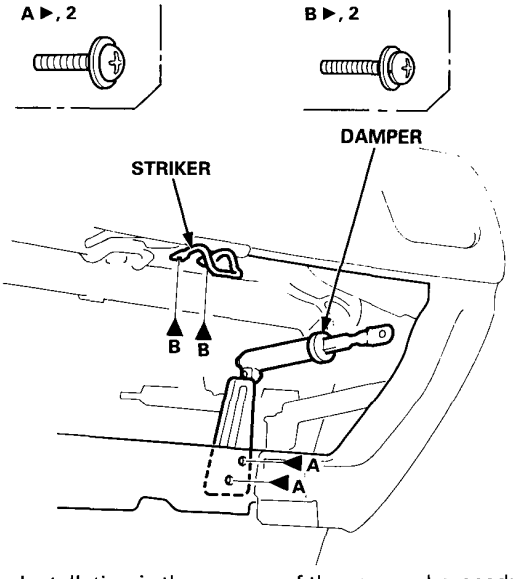
1. Open the glove box.
2. Remove the screw, then remove the damper from the glove box.
3. Remove the screw and bolts, then remove the glove box.

▶: Bolt, screw locations



4. Remove the damper and striker.

▶: Screw locations



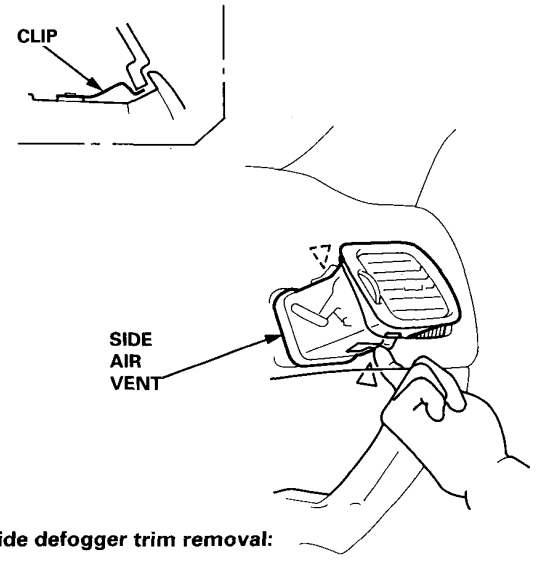
5. Installation is the reverse of the removal procedure.

Side air vent (Front passenger's) removal:

NOTE: LHD is shown, RHD is symmetrical.

1. Remove the glove box.
2. Carefully pry the side air vent at the lower edge, then pull it out.

▷: Clip locations, 2

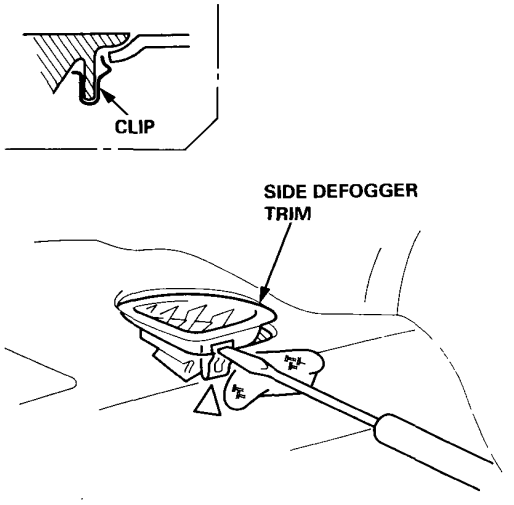


Side defogger trim removal:

NOTE: LHD is shown, RHD is symmetrical.

Carefully pry the side defogger trim at the rear edge, then remove it.

▷: Clip location, 1

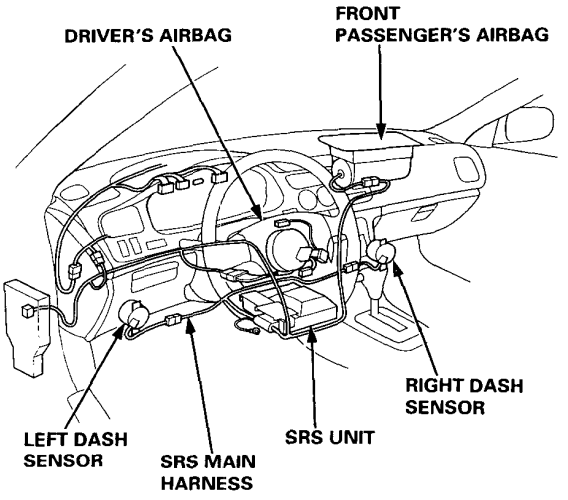


Replacement Precautions

SRS wire harnesses are routed near the dashboard and steering column.

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.



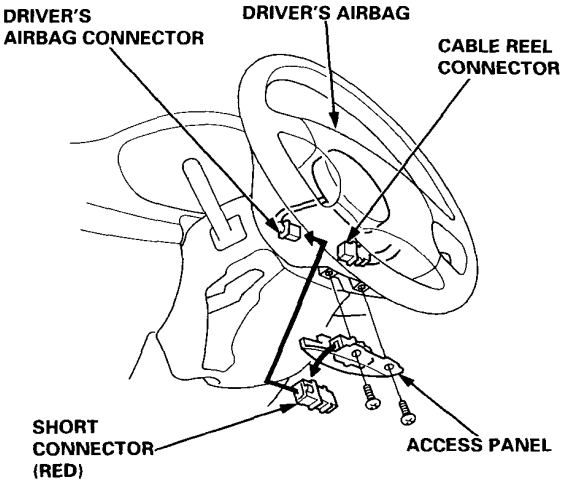
Before removing the dashboard:

⚠ WARNING To avoid accidental deployment and possible injury, always install the protective short connectors on the driver's and front passenger's airbag connectors before working near any SRS wiring.

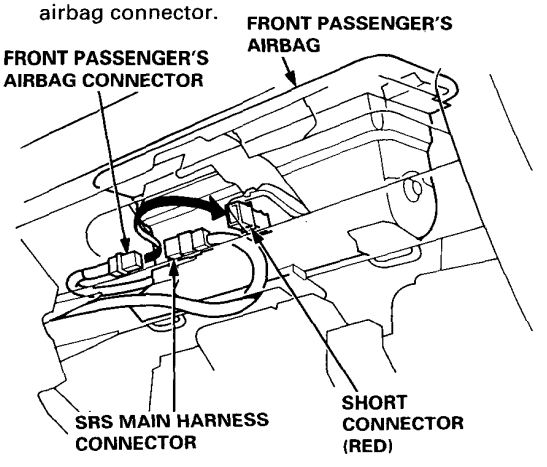
1. Disconnect the battery negative cable, then disconnect the positive cable.

2. Install the short connectors (RED).

   Driver's:
   Remove the access panel, then disconnect the connector between the cable reel and driver's airbag. Connect the short connector (RED) to the driver's airbag connector.



   Front passenger's:
   Remove the glove box (see page 20-79), then disconnect the connector between the front passenger's airbag and SRS main harness. Connect the short connector (RED) to the front passenger's airbag connector.



Replacement

NOTE: LHD is shown, RHD is symmetrical.

1. To remove the dashboard, first remove the:

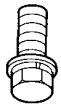
   - Front and rear consoles (see page 20-73)
   - Dashboard lower cover (see page 20-78)
   - Knee bolster (KH model, see page 20-78)
   - Glove box (see page 20-79)

2. Lower the steering column (see section 17).

   ⚠ WARNING To avoid accidental deployment and possible injury, always install the protective short connector on the driver's airbag connector before lowering the steering column (see page 20-80).

   NOTE: To prevent damage to the steering column, wrap it with a shop towel.

►: Bolt locations, 2

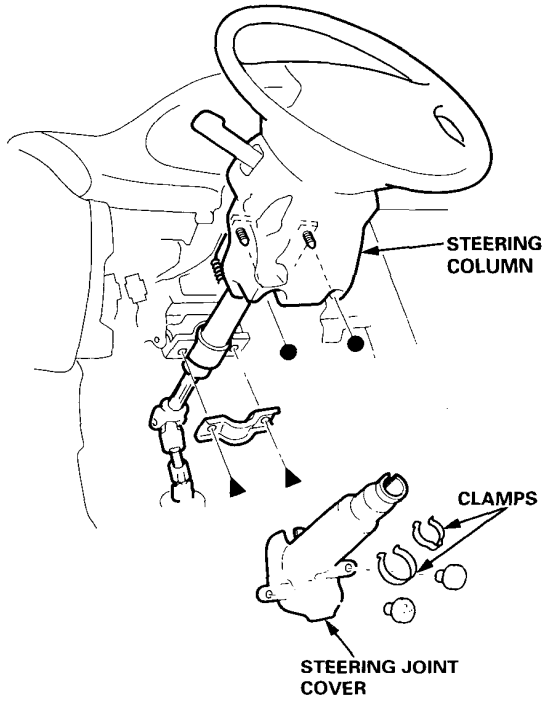


10 x 1.25 mm
38 N·m (3.9 kgf·m, 28 lbf·ft)

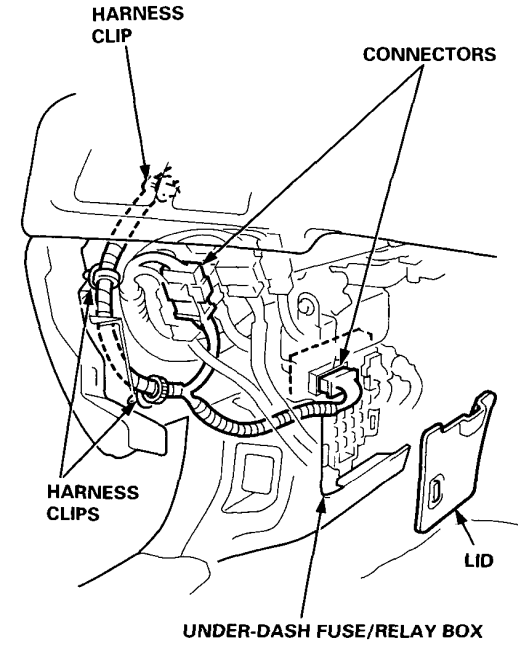
●: Nut locations, 2

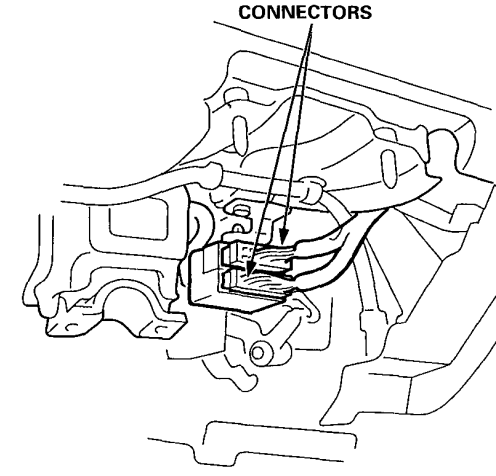


8 x 1.25 mm
16 N·m (1.6 kgf·m, 12 lbf·ft)
Replace.



3. *Disconnect the dashboard wire harness connectors.* Detach the harness clips.



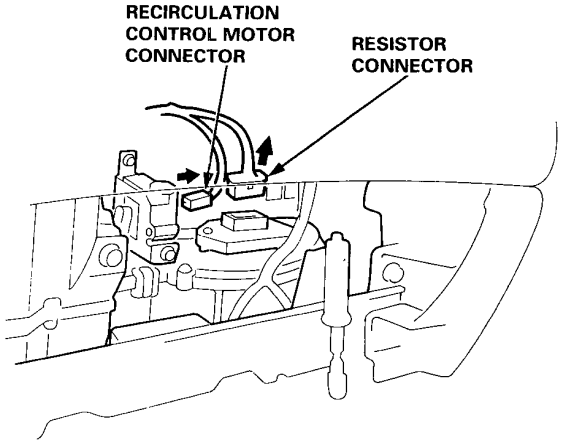


(cont'd)

Replacement (cont'd)

4. Disconnect the air mix control cable (see page 20-77).

5. Disconnect the recirculation control motor connector and resistor connector.



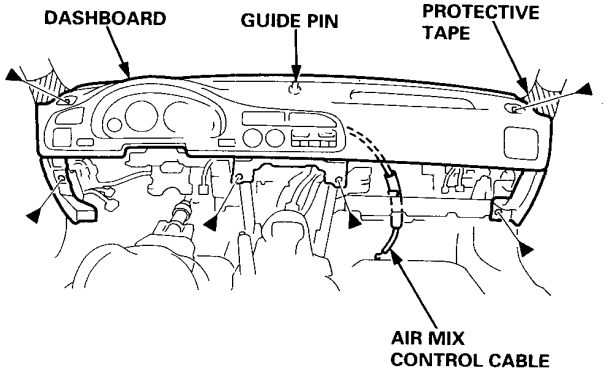
6. Remove the side defogger trim on each side (see page 20-79).

7. Remove the bolts.

►: Bolt locations, 6



6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



CAUTION: Use protective tape on the bottom of the front pillar trim.

- To prevent damage to the shift lever (M/T) or selecter lever and A/T gear position indicator panel (A/T), wrap them with a shop towel.

8. If so equipped, remove the front passenger's airbag.
Lift and remove the dashboard.

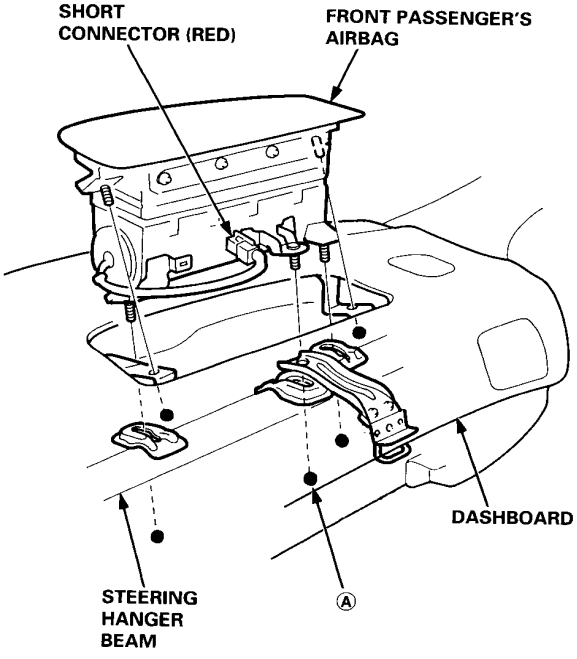
NOTE: Remove the Ⓐ nut for without front passenger's airbag.

⚠ WARNING To avoid accidental deployment and possible injury, always install the protective short connector on the front passenger's airbag connector when the SRS main harness is disconnected (see page 20-80).

●: Nut locations, 5



6 x 1.0 mm
9.8 N·m
(1.0 kgf·m, 7.2 lbf·ft)



9. Installation is the reverse of the removal procedure.

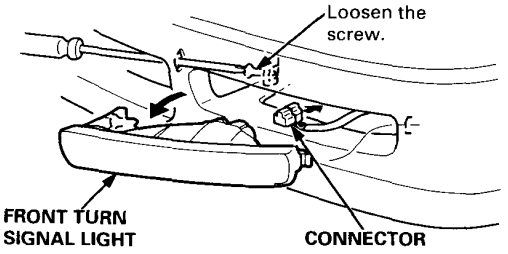
NOTE:
- Make sure the dashboard fits onto the guide pin correctly.
- Before tightening the bolts, make sure the dashboard wire harnesses are not pinched, and that the dashboard is not interfering with the air mix control cable.

Front Bumper Replacement

CAUTION: Wear gloves to remove and install the front bumper.

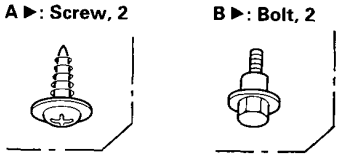
NOTE:
- An assistant is helpful when removing the front bumper.
- Take care not to scratch the front bumper.

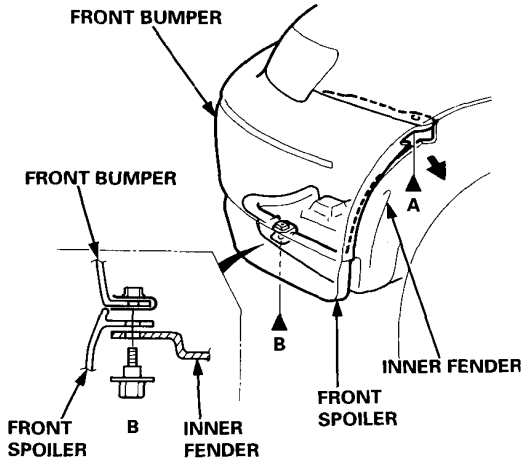
1. Remove the front turn signal light, then disconnect the connectors on each side.



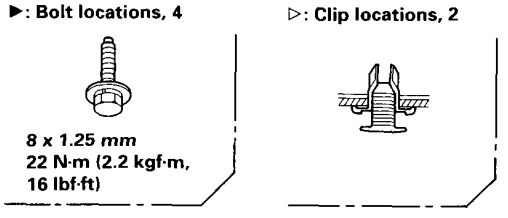
2. Remove the bolt and screw on each side.

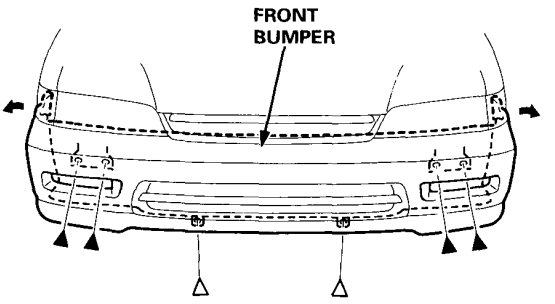
▶: Bolt, screw locations





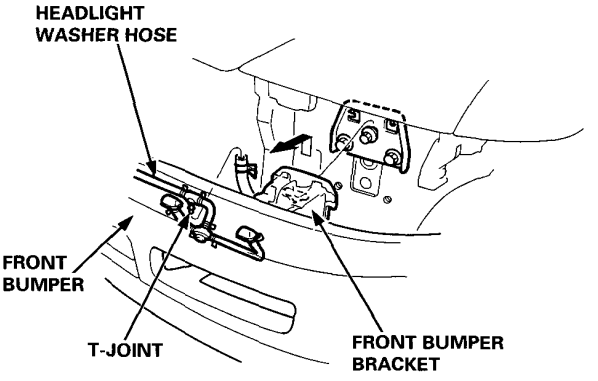
3. Remove the bolts and clips.





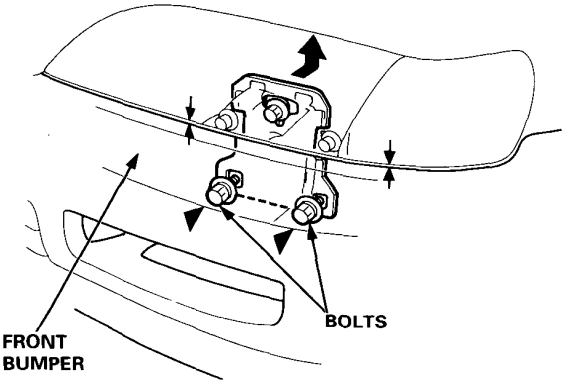
4. Lift and remove the front bumper.

NOTE:
- Disconnect the headlight washer hose (KE model).
- If necessary, disassemble the front bumper (see pages 20-84, 85).



5. Installation is the reverse of the removal procedure.

NOTE: Align the front bumper with the front fender and headlight properly, then tighten the bolts.



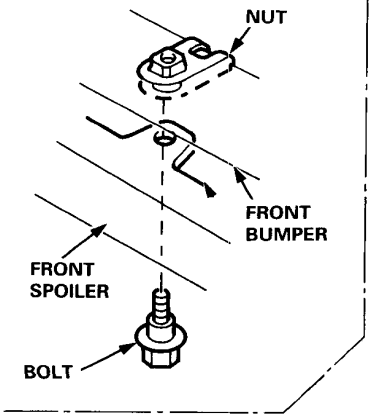
Bumpers

Front Bumper Disassembly

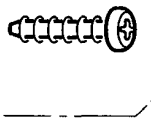
KG, KH models:

▶ : Bolt, screw locations

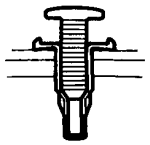
A ▶: Bolt, 9

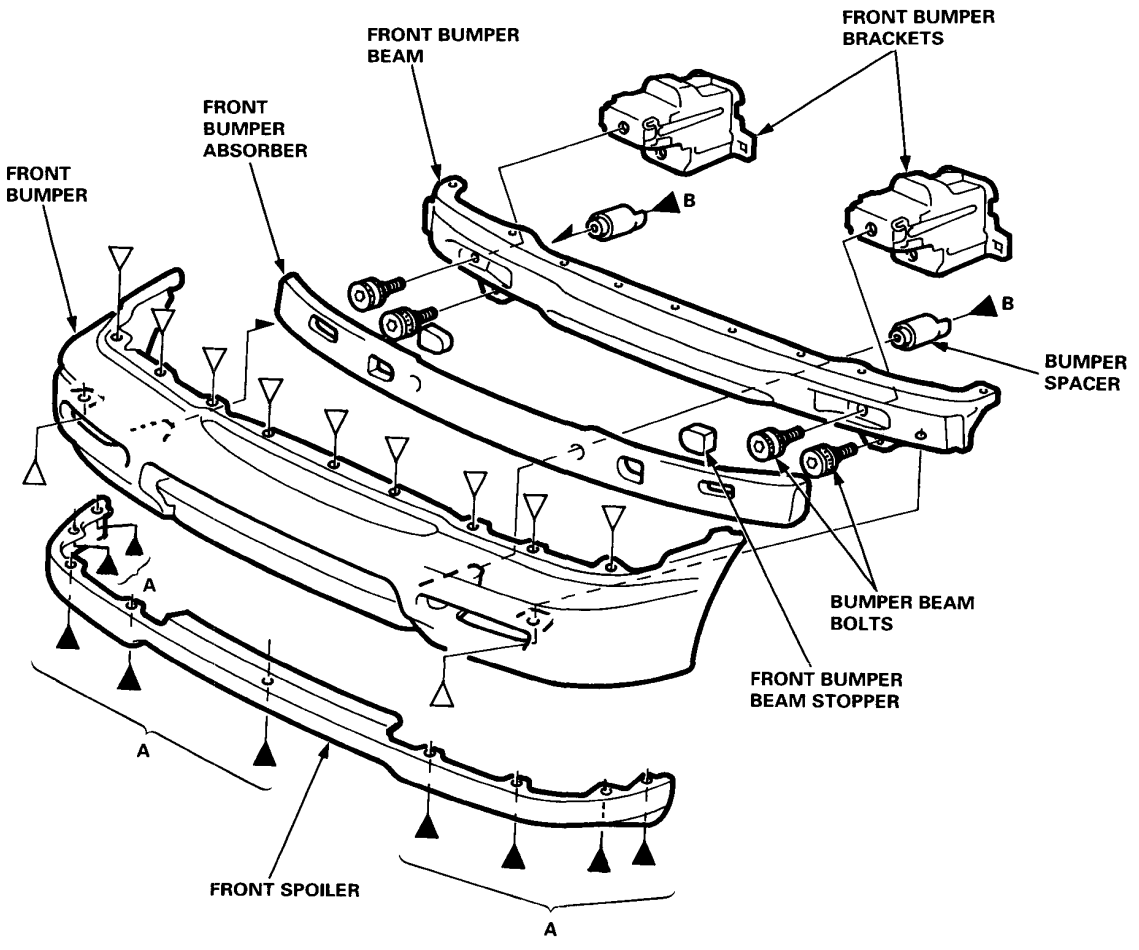


B ▶: Screw, 2

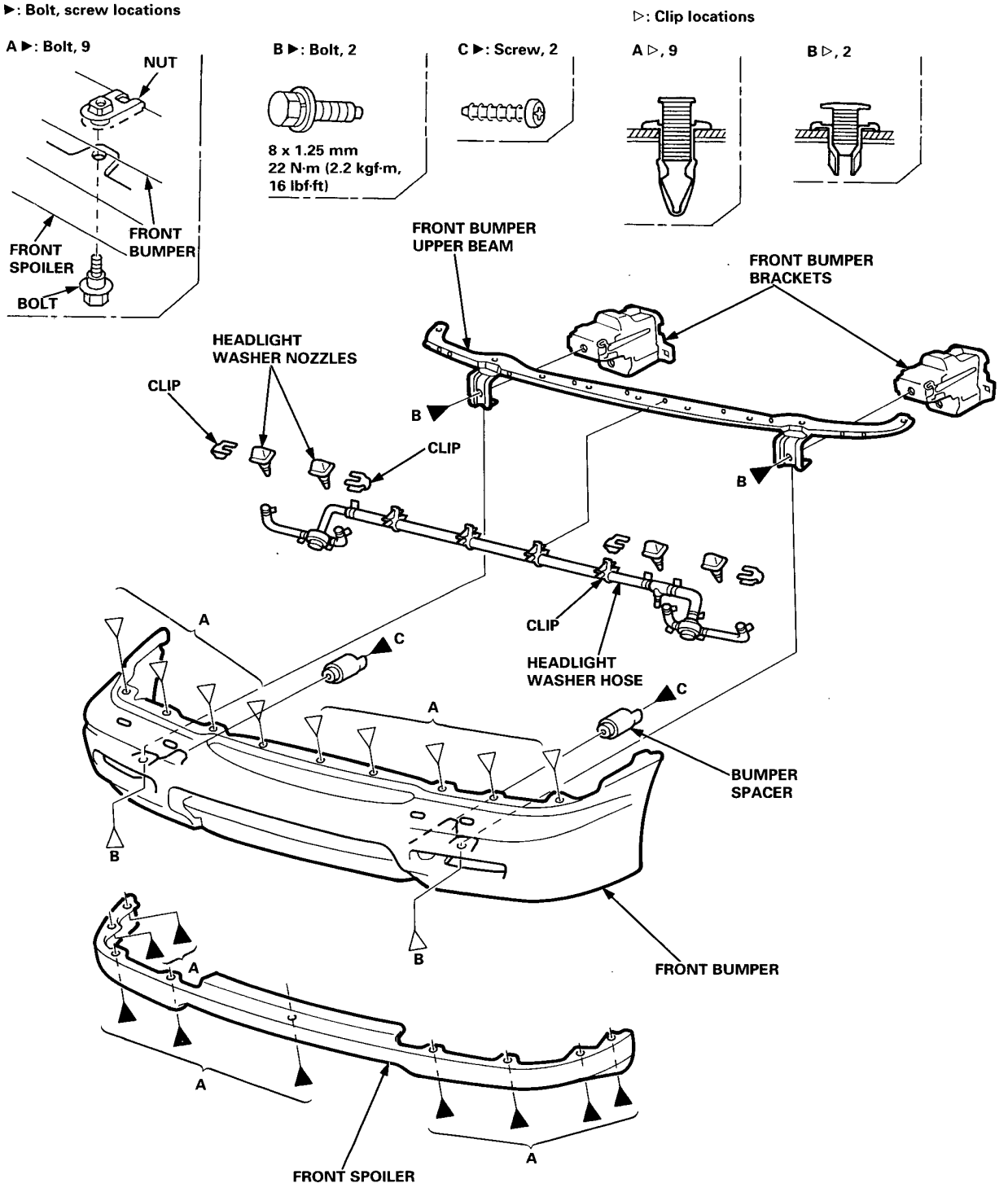


▷: Clip locations, 11





KE model:


►: Bolt, screw locations
▷: Clip locations
A ►: Bolt, 9
NUT
FRONT BUMPER
FRONT SPOILER
BOLT
B ►: Bolt, 2
8 x 1.25 mm
22 N·m (2.2 kgf·m, 16 lbf·ft)
C ►: Screw, 2
A ▷, 9
B ▷, 2
FRONT BUMPER UPPER BEAM
FRONT BUMPER BRACKETS
HEADLIGHT WASHER NOZZLES
CLIP
B
CLIP
B
CLIP
HEADLIGHT WASHER HOSE
A
C
A
C
BUMPER SPACER
B
B
FRONT BUMPER
A
A
A
FRONT SPOILER

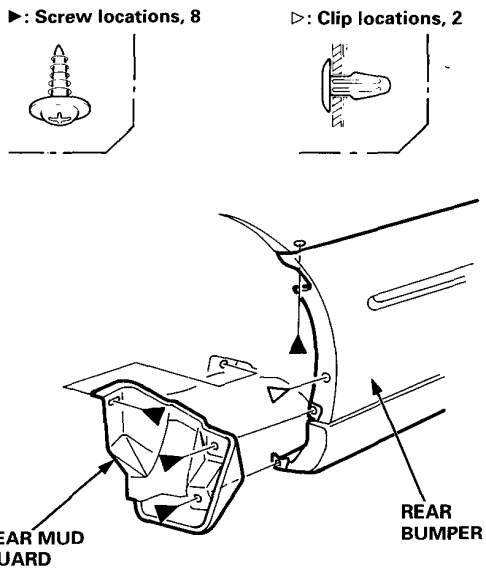
Rear Bumper Replacement

CAUTION: Wear gloves to remove and install the rear bumper.

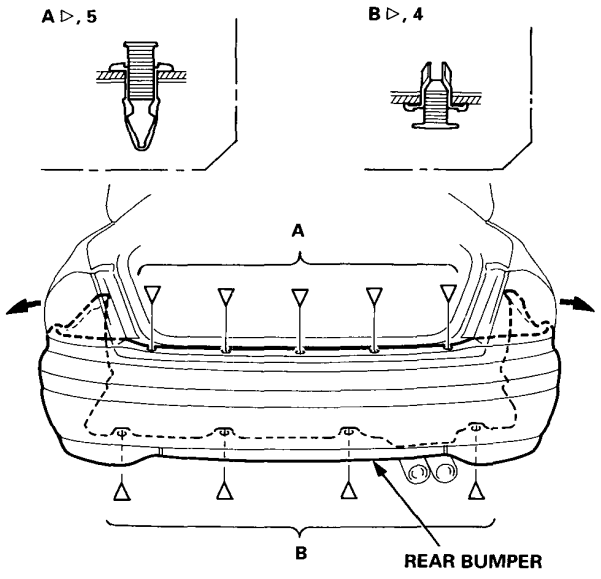
NOTE:
- An assistant is helpful when removing the rear bumper and rear bumper beam.
- Take care not to scratch the rear bumper.

1. Remove the screws and clip from each side.

   NOTE: If so equipped, remove the rear mud guard.

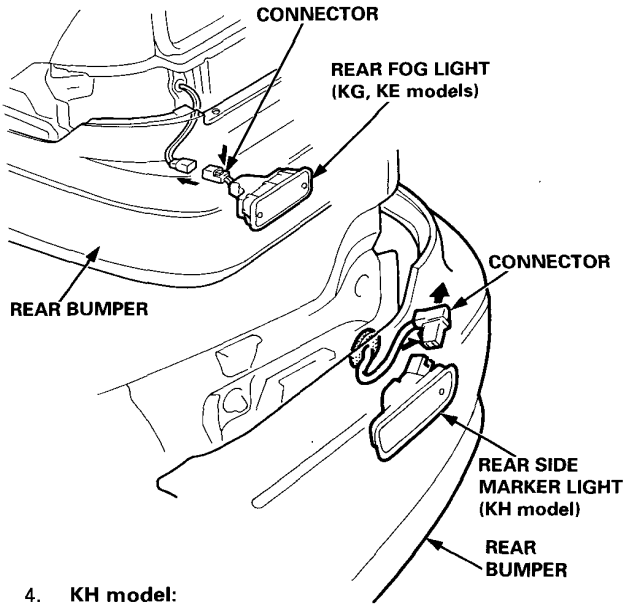


2. Remove the clips.

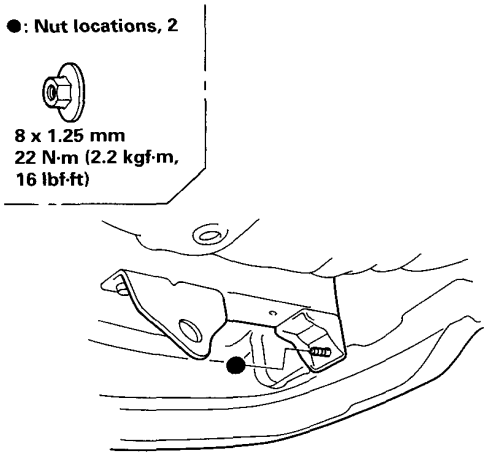


3. If so equipped, disconnect the rear side marker light connector on each side and rear fog light connector, then remove the rear bumper.

   NOTE:
   - Rear fog light: KG model is shown, KE model is symmetrical.
   - If necessary, disassemble the rear bumper (see page 20-87).



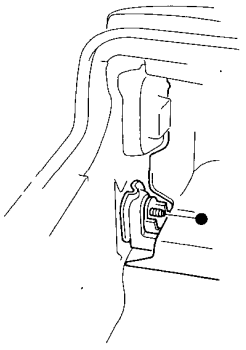
4. **KH model:**
   Remove the nut on each side from under the trunk floor.



5. Open the trunk lid, then remove the rear trim panel (see page 20-49).
Remove the nut on each side.

●: Nut locations, 2

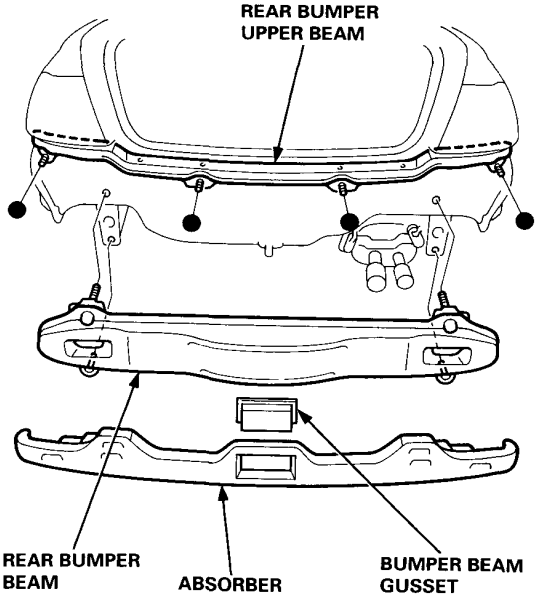
8 x 1.25 mm
22 N·m (2.2 kgf·m, 16 lbf·ft)



6. Remove the absorber, bumper beam gusset, rear bumper beam and rear bumper upper beam.

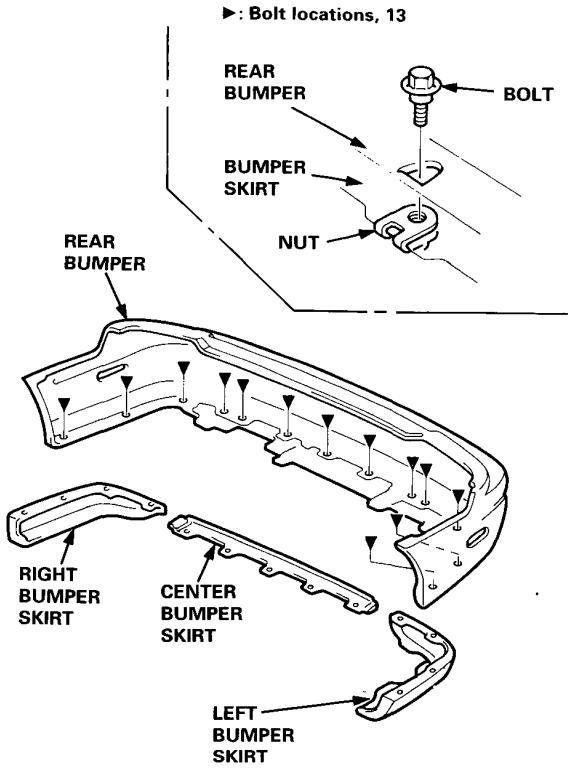
●: Nut locations, 4

6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

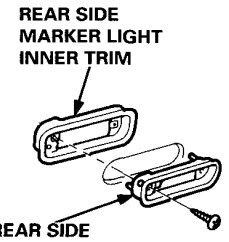


7. Installation is the reverse of the removal procedure.

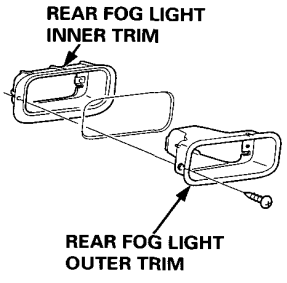
Rear Bumper Disassembly



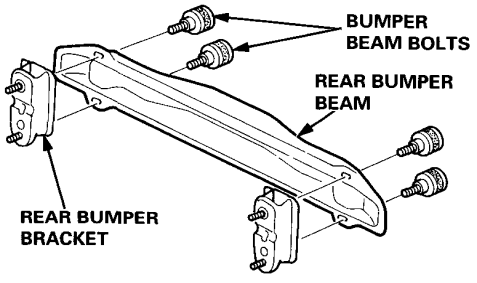
KH model:



KG, KE models:



KH model:



Hood

Replacement

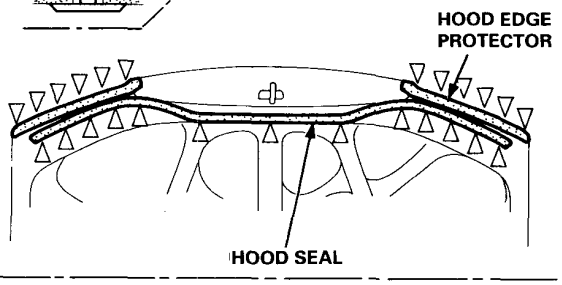
NOTE:
- An assistant is helpful when removing the hood.
- Take care not to damage the hood and body.
- When removing the clips, use a clip remover.
- Open the hood.

1. If necessary, remove the hood edge protector, hood seal and hood insulator.

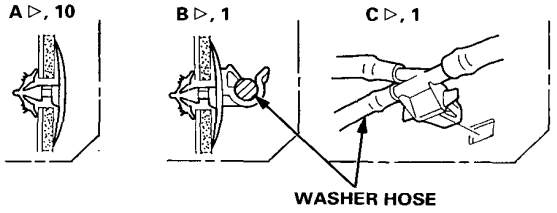
▷: Clip locations

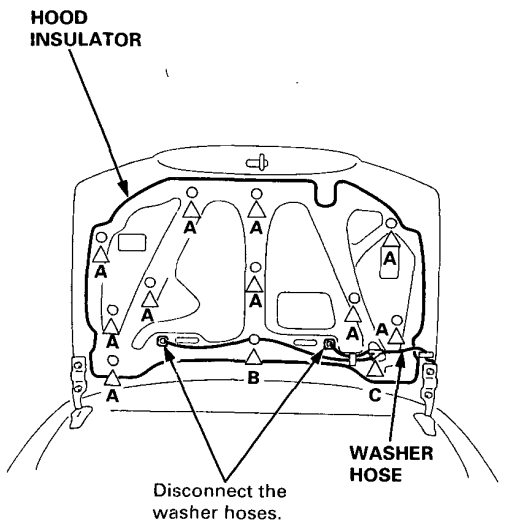


Hood edge protector, 12
Hood seal,13



▷: Clip locations



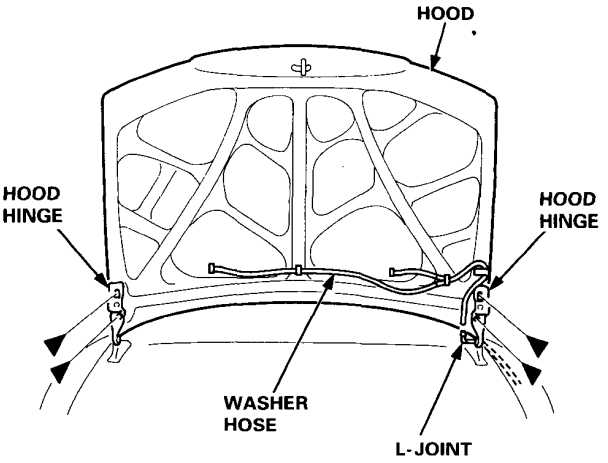


2. Disconnect the washer hose, then remove the hood.

►: Bolt locations, 4

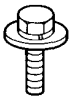


6 x 1.0 mm
9.8 N·m
(1.0 kgf·m,
7.2 lbf·ft)

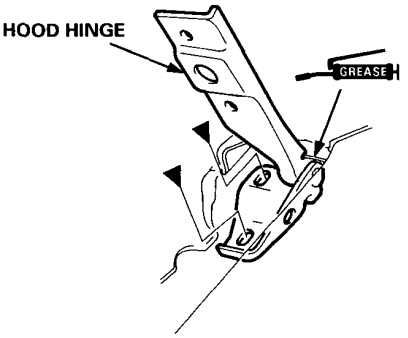


NOTE: If necessary, remove the hood hinge.

►: Bolt locations, 4



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)



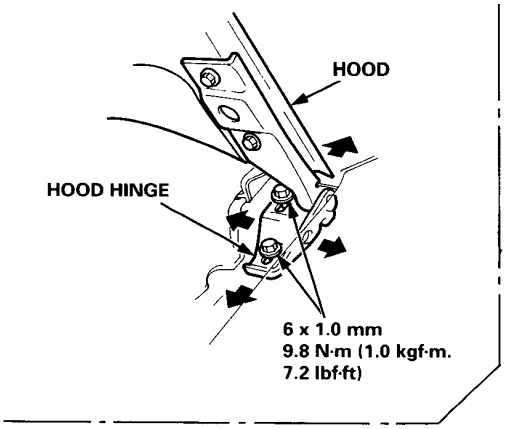
3. Installation is the reverse of the removal procedure.

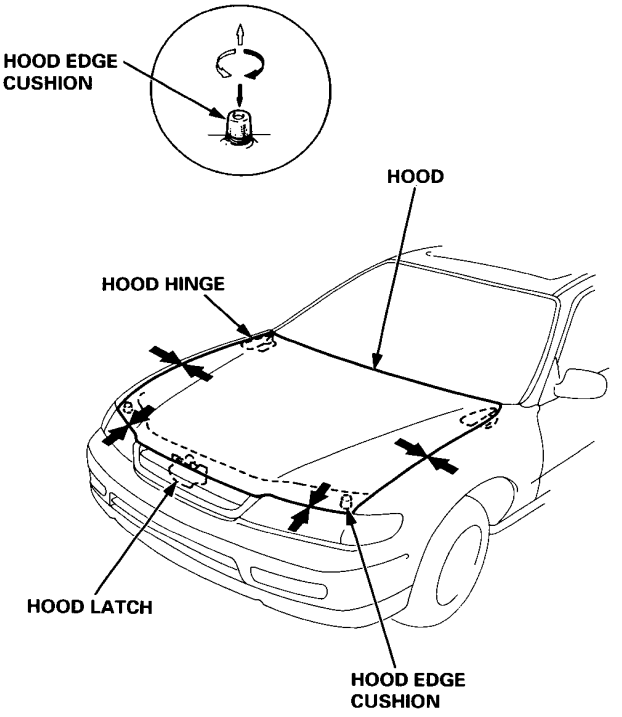
NOTE:
- If necessary, replace any damaged clips.
- Make sure the hood locks securely.
- Make sure the hood opens properly.
- Adjust the hood alignment (see page 20-89).

Adjustment

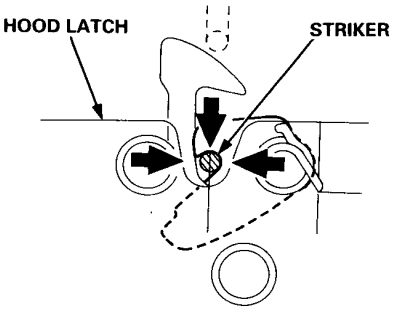
NOTE: Before adjusting the hood, loosen each bolt slightly.

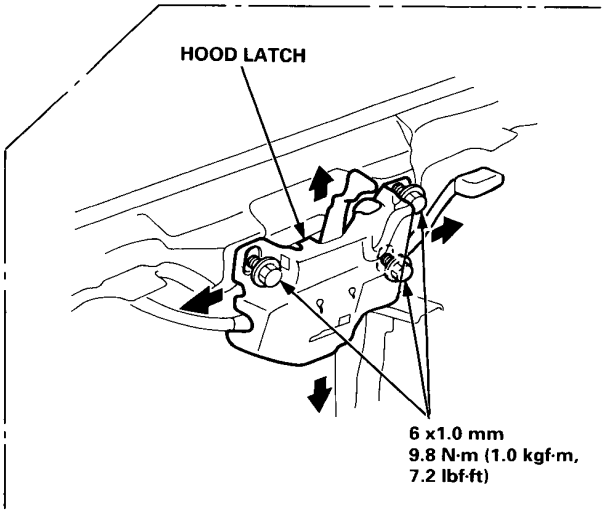
1. Adjust the hood hinges right and left, as well as fore and aft, by using the elongated holes.
2. Turn the hood edge cushions, as necessary, to make the hood fit flush with the body at front and side edges.
3. Adjust the hood latch to obtain the proper height at the forward edge.
4. After adjustment, tighten each bolt securely.





NOTE: Move the hood latch right or left until the striker is centered in the hood latch as shown.



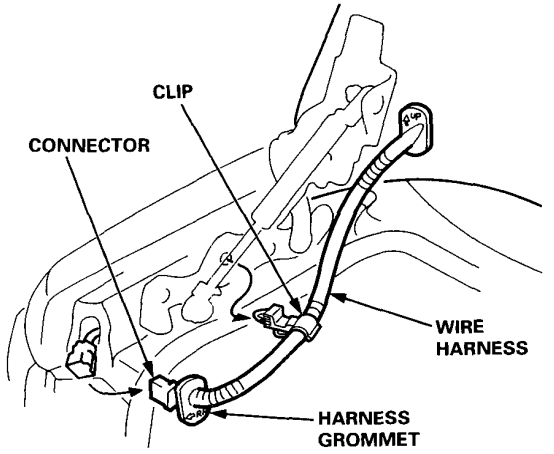


Trunk Lid

Replacement

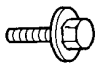
NOTE:
- An assistant is helpful when removing the trunk lid.
- Take care not to damage the trunk lid and body.
- Open the trunk lid.

1. Remove the harness grommet, clip and disconnect the connector.

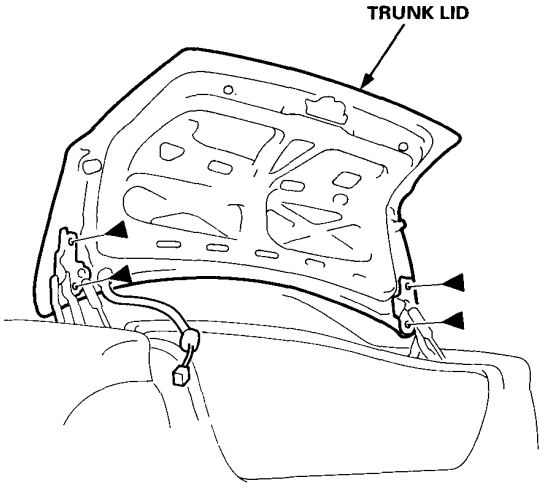


2. Remove the trunk lid.

▶: Bolt locations, 4



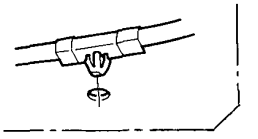
6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



3. Remove the wire harness from the trunk lid.

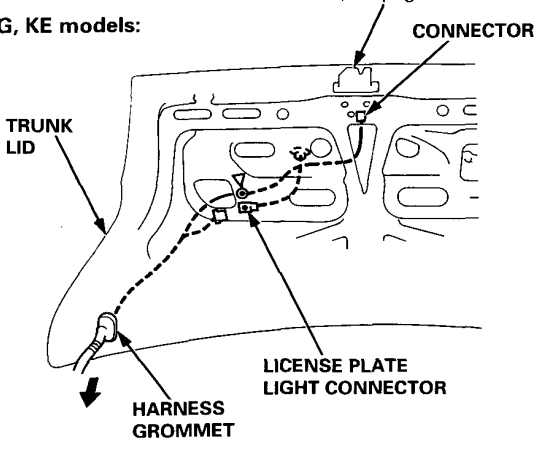
NOTE: Before pulling out the wire harness, tie a string to the end of it so you can pull it back in when the trunk lid is reinstalled.

▷: Harness clip locations
KG, KE models, 1
KH model, 3

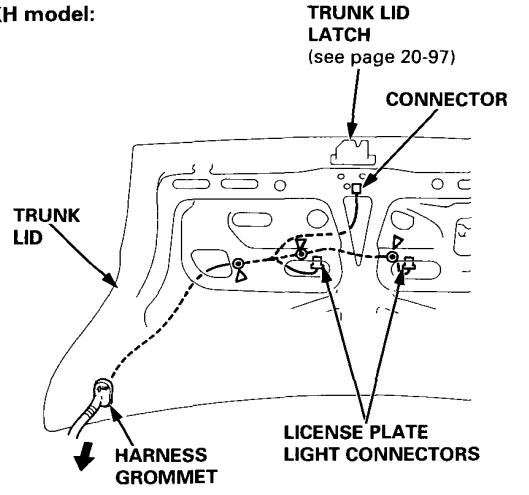


TRUNK LID LATCH
(see page 20-97)

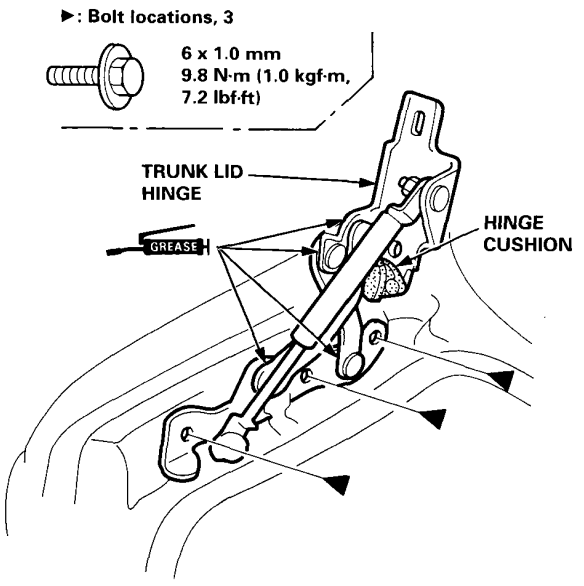
KG, KE models:



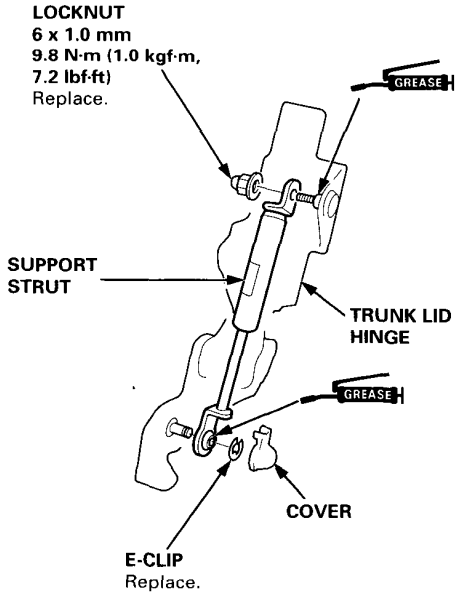
KH model:



4. If necessary, remove the trunk lid hinge.



5. If necessary, remove the support strut.



6. Installation is the reverse of the removal procedure.

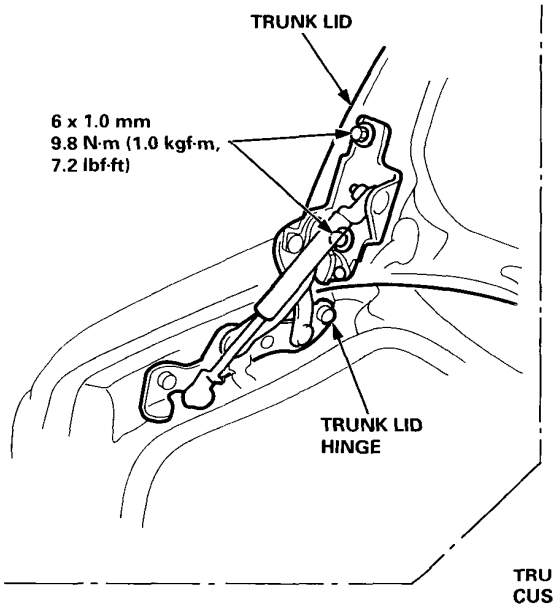
- Make sure the trunk lid locks securely.
- Make sure the trunk lid opens properly.
- Adjust the trunk lid alignment (see page 20-92).

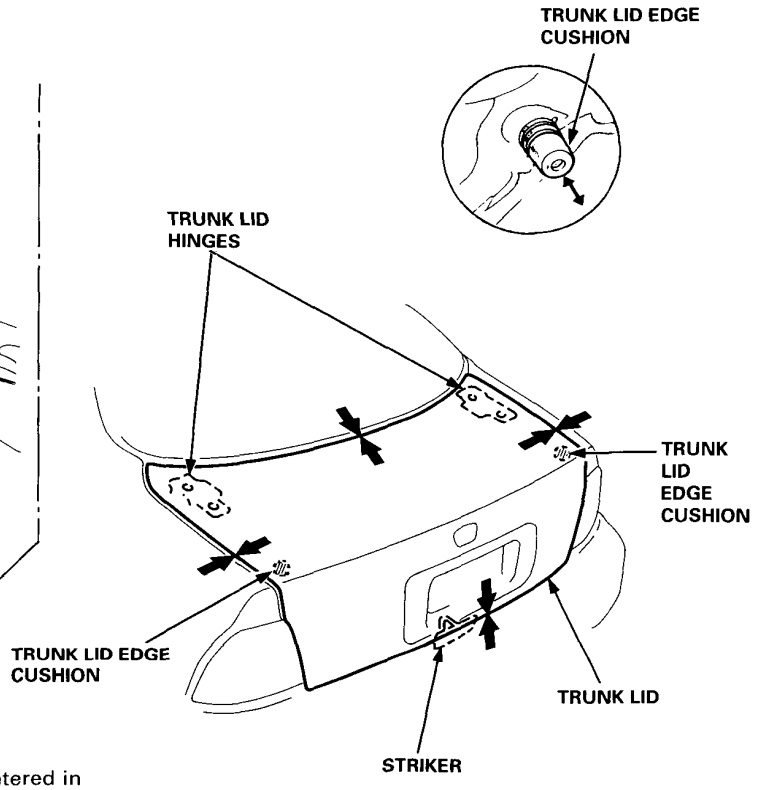
Trunk Lid

Adjustment

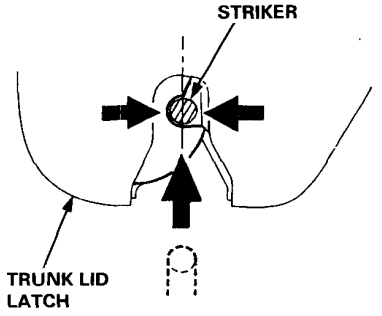
NOTE: Before adjusting the trunk lid, loosen each bolt slightly.

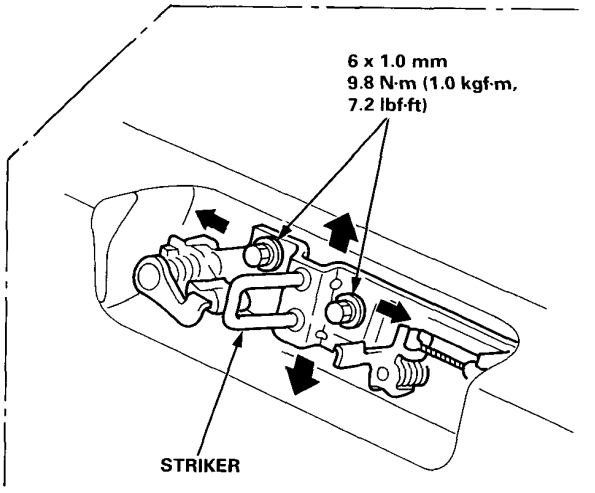
1. Adjust the trunk lid right and left, as well as fore and aft, by using the elongated holes.
2. Turn the trunk lid edge cushions, as necessary, to make the trunk lid fit flush with the body at the rear and side edges.
3. Adjust the fit between the trunk lid and the trunk lid opening by moving the striker.
4. After adjustment, tighten each bolt securely.





NOTE: Move the striker right or left until it's centered in the trunk lid latch as shown.





Opener Cables

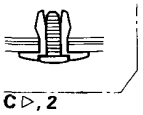
Replacement

NOTE:
- When removing the clips, use a clip remover.
- Take care not to bend the opener cables.

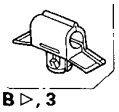
Hood Opener Cable:

NOTE: LHD is shown, RHD is symmetrical (except hood latch).

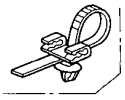
▷: Clip locations
A ▷, 11



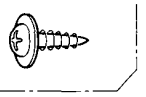
C ▷, 2

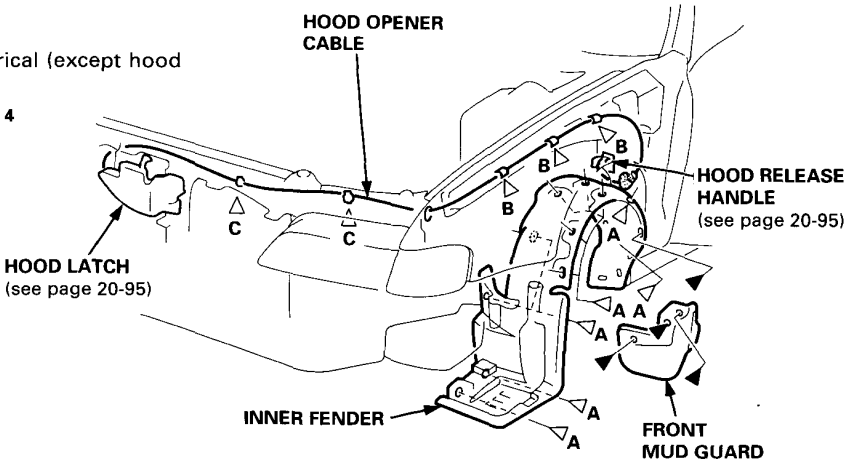


B ▷, 3



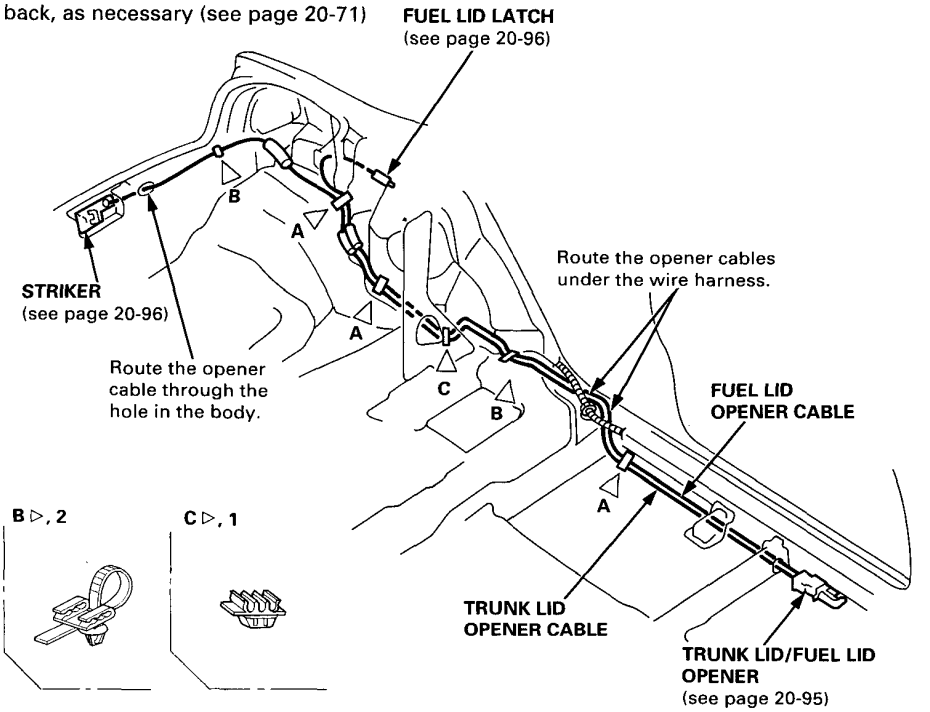
▶: Screw locations, 4



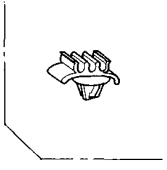


Trunk/Fuel Lid Opener Cables (LHD):

Remove the following parts:
- Rear seat cushion (see page 20-63)
- Door sill molding (see page 20-48)
- Rear shelf trim panel (see page 20-48)
- Left gusset cover and left side trim panel (see page 20-48)
- Pull the carpet back, as necessary (see page 20-71)
- Spare tire lid (see page 20-49)
- Rear trim panel and left trunk side panel (see page 20-49)



▷: Clip locations
A ▷, 3



B ▷, 2

C ▷, 1

(cont'd)

Opener Cables

Replacement (cont'd)

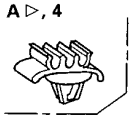
Trunk/Fuel Lid Opener Cables (RHD):

Remove the following parts:

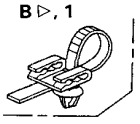
- Rear seat (see page 20-63)
- Door sill molding (see page 20-48)
- Rear shelf trim panel (see page 20-48)
- Left and right gusset covers, and left side trim panel (see page 20-48)
- Pull the carpet back, as necessary (see page 20-71)
- Spare tire lid (see page 20-49)
- Rear trim panel and left trunk side panel (see page 20-49)

▷: **Clip locations**

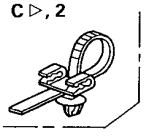
A ▷, 4



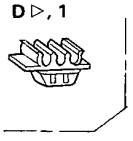
B ▷, 1

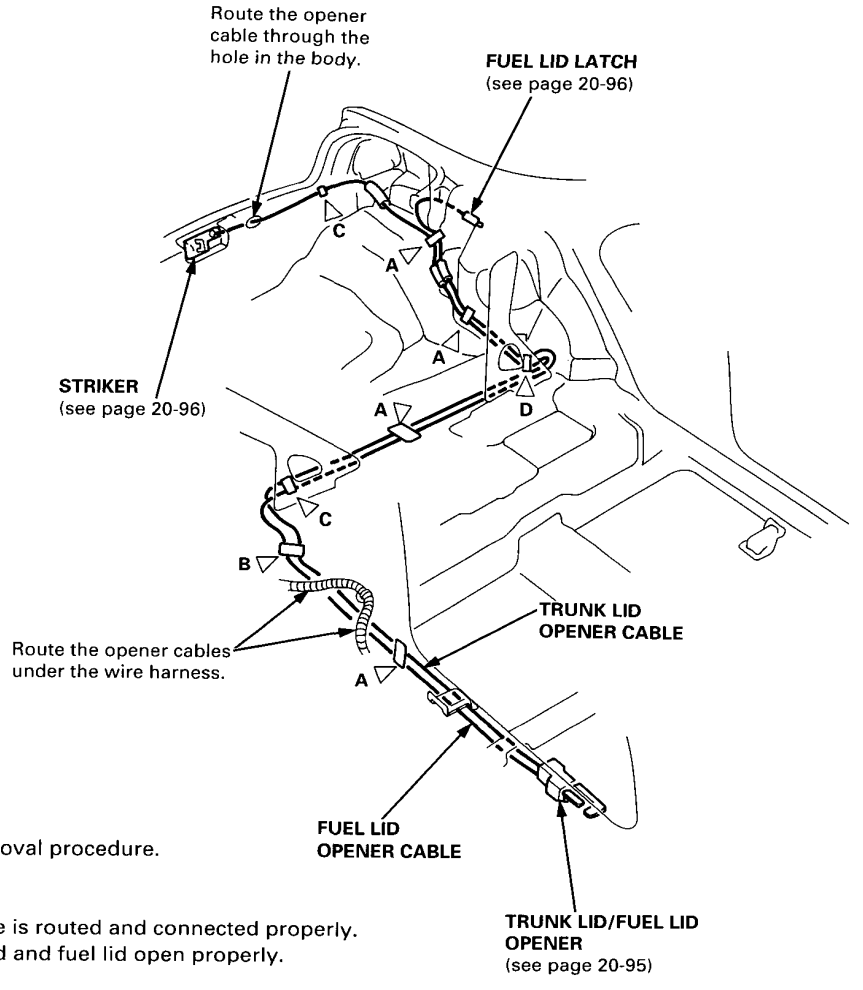


C ▷, 2



D ▷, 1





Installation is the reverse of the removal procedure.

NOTE:

- Make sure each opener cable is routed and connected properly.
- Make sure the hood, trunk lid and fuel lid open properly.

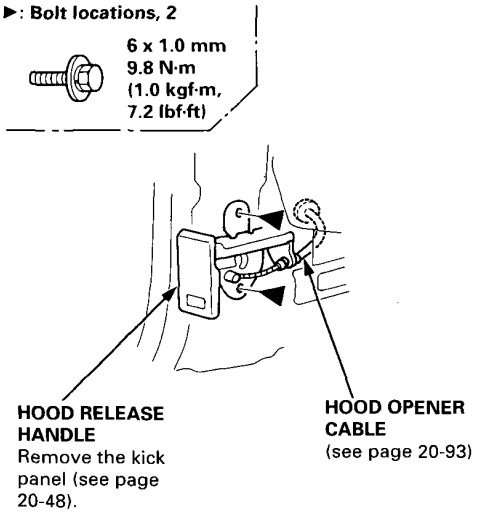
Opener and Latch

Replacement

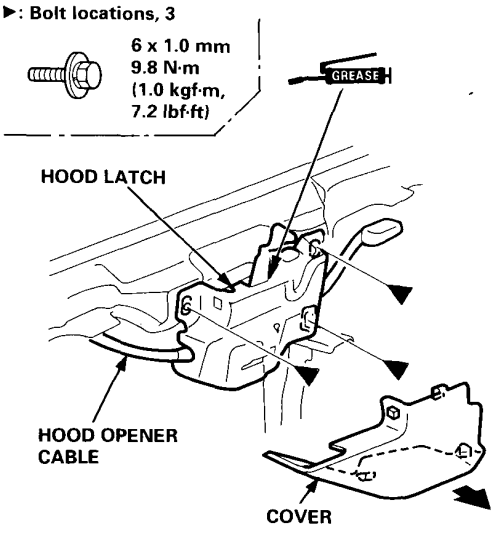
NOTE: Take care not to bend the opener cables.

Hood Release Handle:

NOTE: LHD is shown, RHD is symmetrical.

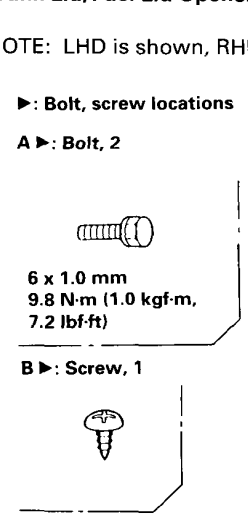


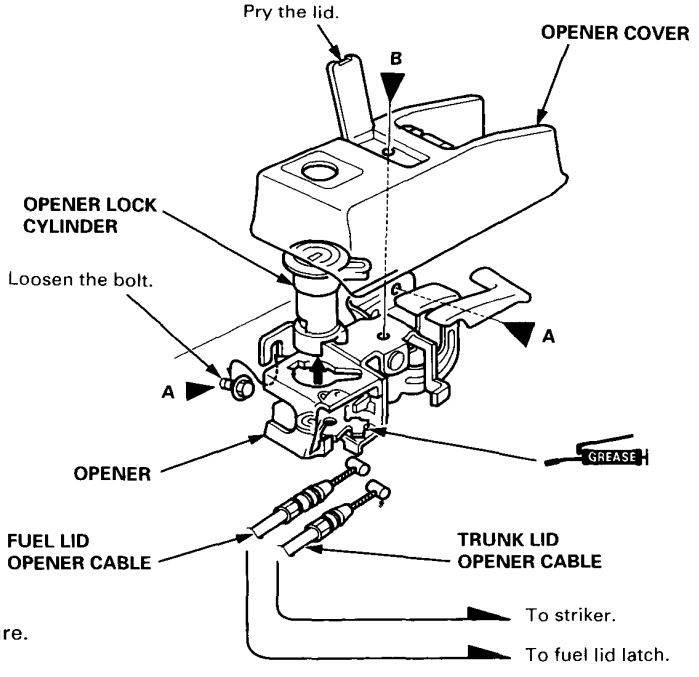
Hood Latch:



Trunk Lid/Fuel Lid Opener:

NOTE: LHD is shown, RHD is symmetrical.





Installation is the reverse of the removal procedure.

NOTE:

- Make sure each opener cable is connected properly.
- Make sure the hood locks securely.
- Make sure the hood, trunk lid and fuel lid open properly.

(cont'd)

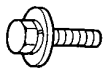
Opener and Latch

Replacement (cont'd)

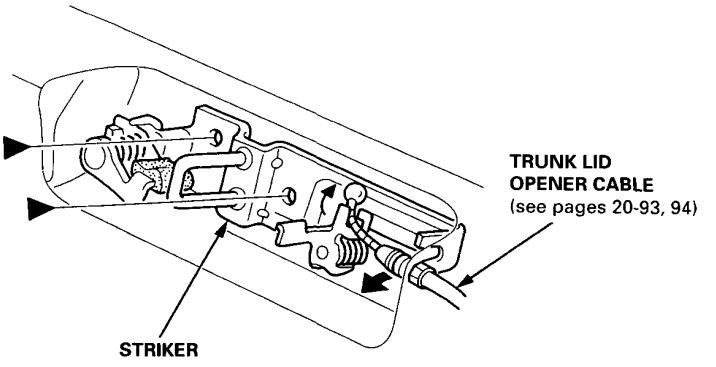
NOTE: Take care not to bend the opener cables.

Striker:

►: Bolt locations, 2

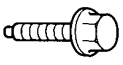


6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

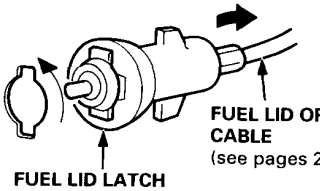


Fuel Lid Latch:

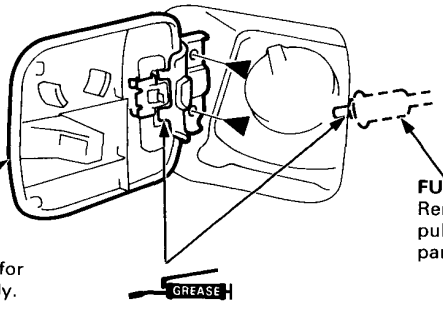
►: Bolt locations, 2



6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

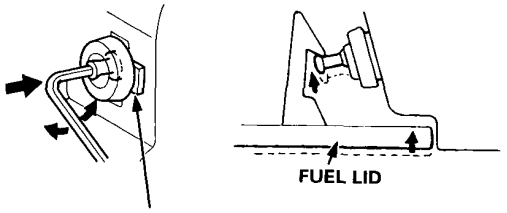


FUEL LID LATCH
Remove the fuel lid latch by turning it 90°.



FUEL LID
After installing, check for a flush fit with the body.

FUEL LID LATCH
Remove the rear trim panel, then pull the rear edge of the left trunk side panel back (see page 20-49).



FUEL LID LATCH
Push and turn the fuel lid latch to make the lid fit flush with the body.

Installation is the reverse of the removal procedure.

NOTE:

- Make sure each opener cable is connected properly.
- Make sure the trunk lid and fuel lid lock securely.
- Make sure the trunk lid and fuel lid open properly.

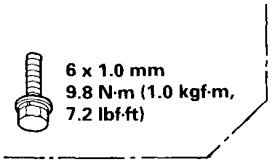
Trunk Lid Latch and Lock Cylinder

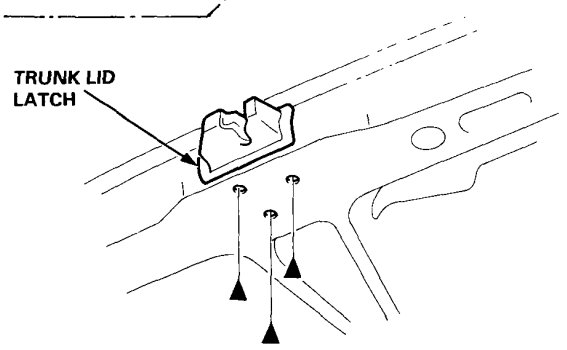
Replacement

NOTE: Take care not to bend the cylinder rod.

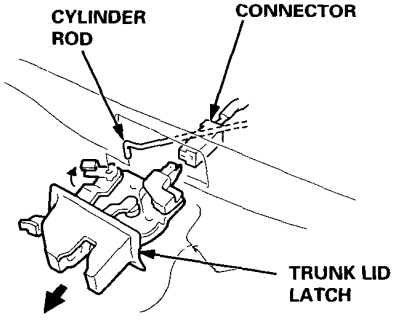
1. Remove the bolts.

►: Bolt locations, 3

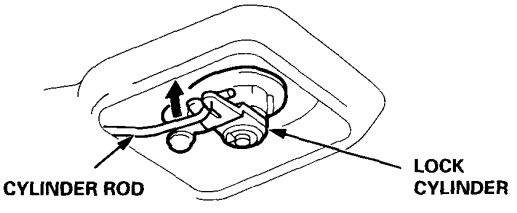




2. Pull the trunk lid latch.
Disconnect the cylinder rod and connector.

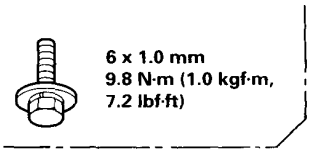


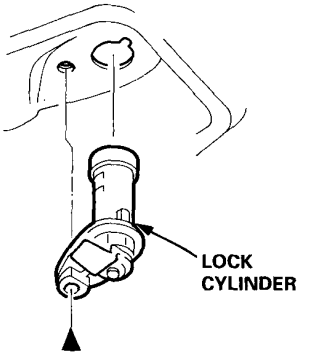
3. Disconnect the cylinder rod.



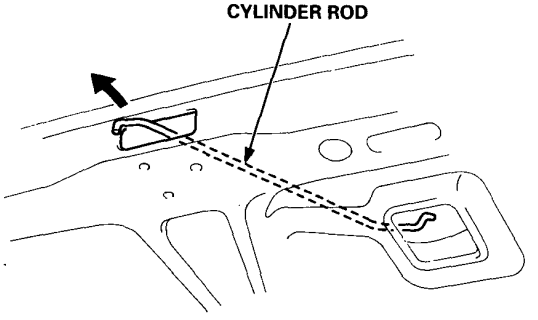
4. Remove the bolt, then pull the lock cylinder out.

►: Bolt location, 1



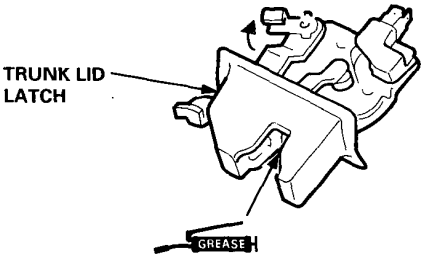


5. Pull the cylinder rod out.



6. Installation is the reverse of the removal procedure.

NOTE:
- Apply grease to the trunk lid latch.



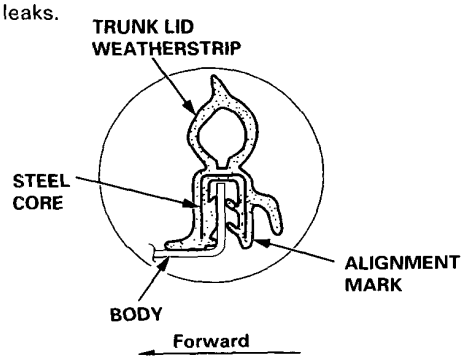
- Make sure the trunk lid locks securely.
- Make sure the trunk lid opens properly.
- Make sure the connector is connected properly.

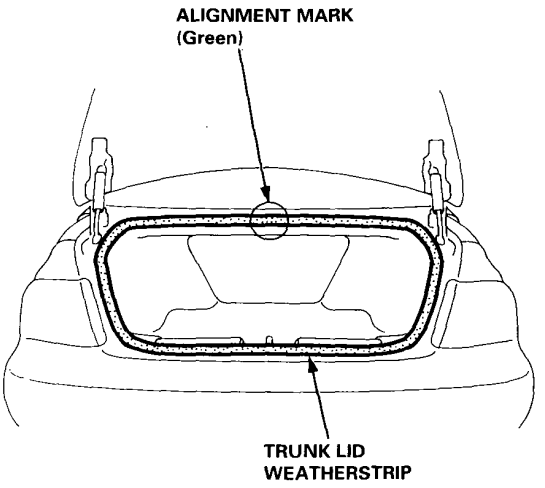
Trunk Lid Weatherstrip/License Plate Trim

Trunk Lid Weatherstrip Replacement

When installing the trunk lid weatherstrip, align it with the alignment mark on the trunk lid opening.

NOTE:
- Make sure there are no wrinkles in the weatherstrip.
- Check for water leaks.





License Plate Trim Replacement

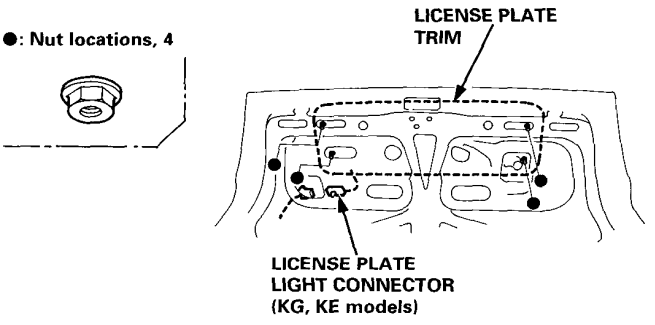
CAUTION: Wear gloves to remove and install the license plate trim.

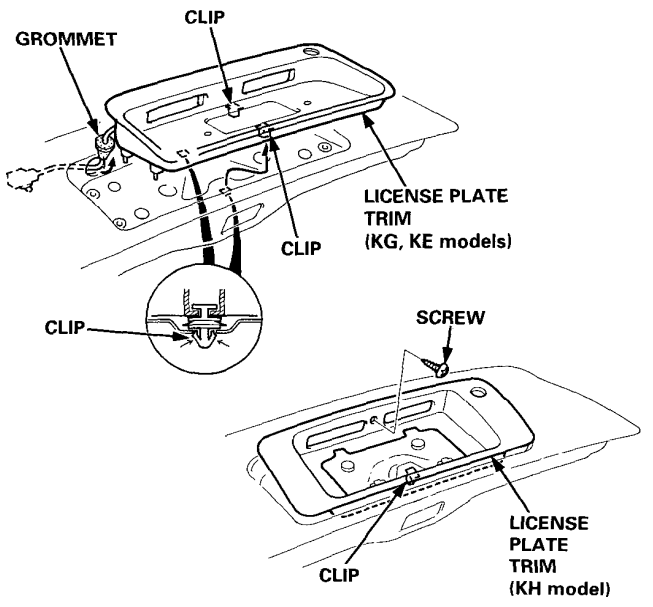
NOTE: Take care not to scratch the trunk lid.

1. Remove the trunk lid latch (see page 20-97).
2. Remove the nuts.

   NOTE:
   - Take care not to drop the nuts inside the trunk lid.
   - Disconnect the license plate light connector, then detach it from the trunk lid (KG, KE models).
3. KG, KE models: Detach the clips, then remove the license plate trim, and remove the grommet.
   KH model: Remove the screw and detach the clip, then remove the license plate trim.
4. Installation is the reverse of the removal procedure.

   NOTE: If damaged, replace the clip.





Front Grille/Side Window Molding

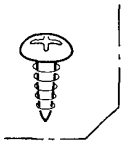
Front Grille Replacement

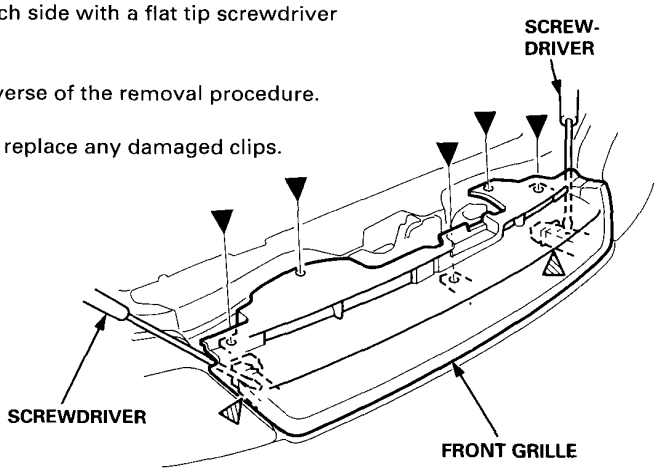
NOTE: Take care not to scratch the front grille.

1. Remove the front grille by removing the screws, and push the clips on each side with a flat tip screwdriver as shown.
2. Installation is the reverse of the removal procedure.

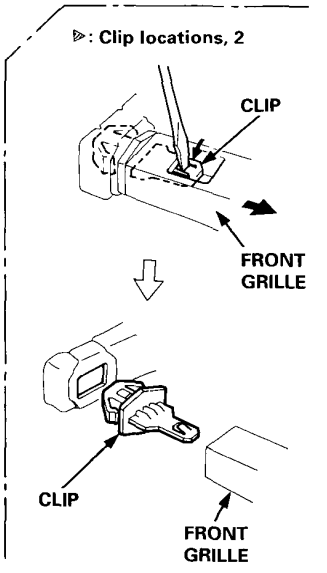
   NOTE: If necessary, replace any damaged clips.

►: Screw locations, 5





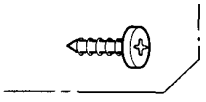
▷: Clip locations, 2



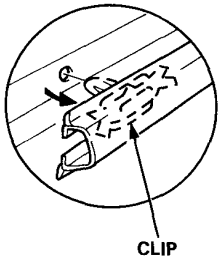
Side Window Molding Replacement

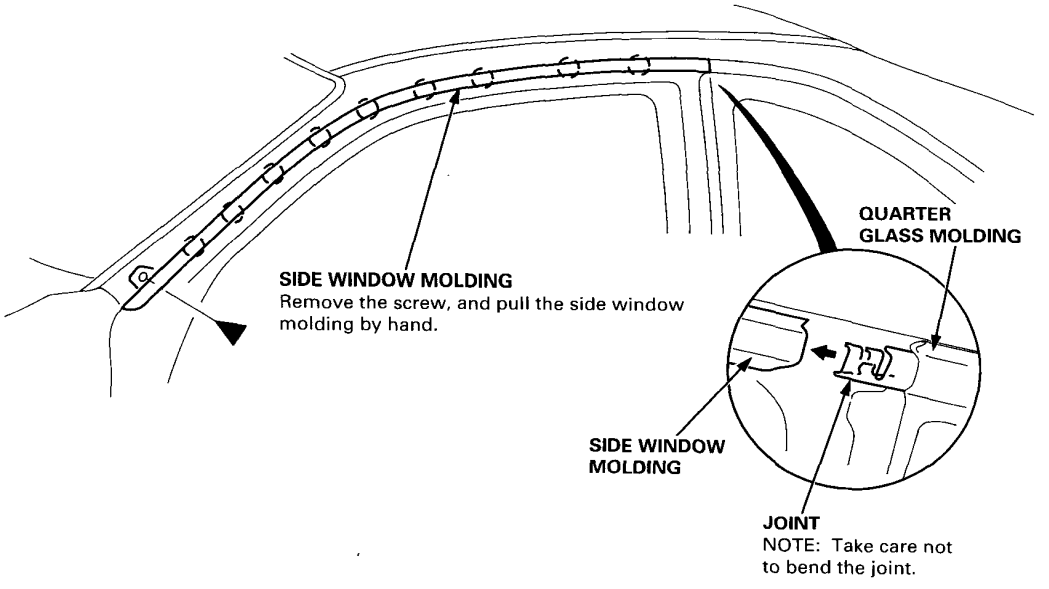
NOTE: Take care not to bend the side window molding and body.

►: Screw location, 1



(): Clip locations, 9





Installation is the reverse of the removal procedure.

NOTE: If necessary, replace any damaged clips.

Roof Molding

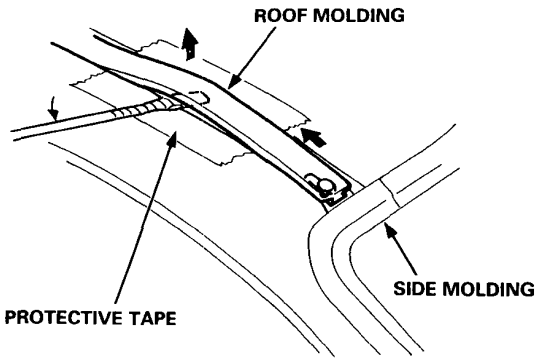
Replacement

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

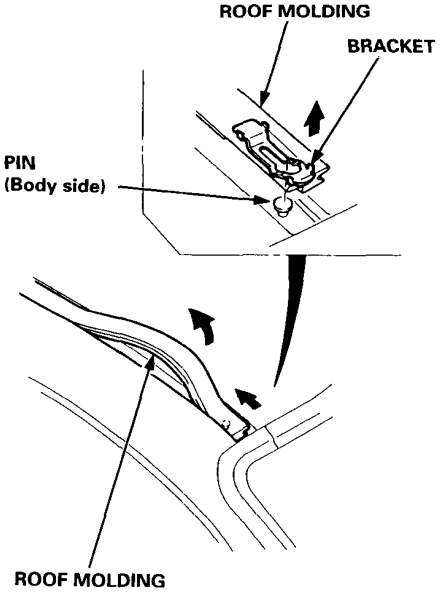
NOTE: Take care not to scratch the body and roof molding.

1. Pry the roof molding with a flat tip screwdriver as shown.

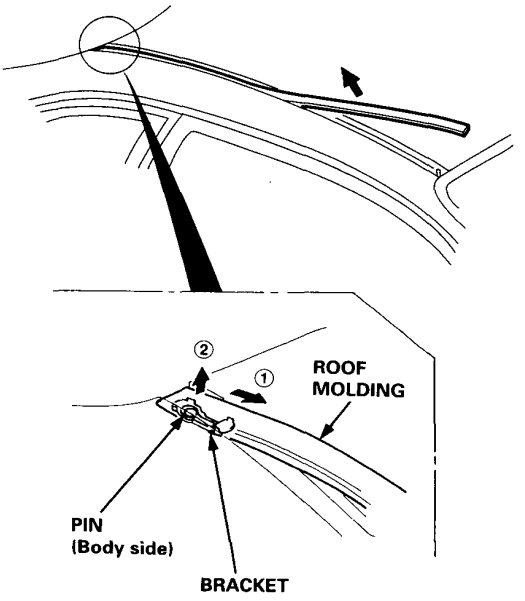
   CAUTION: Use protective tape on the body.



2. Pull and slide the roof molding, then detach the bracket on the end of the roof molding from the pin.

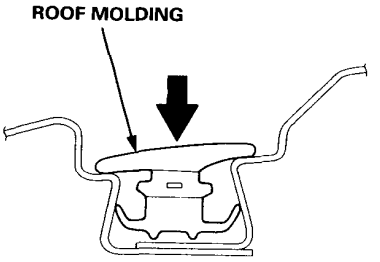


3. Pull the roof molding up, detach the bracket from the pin, then remove the roof molding.



4. Installation is the reverse of the removal procedure.

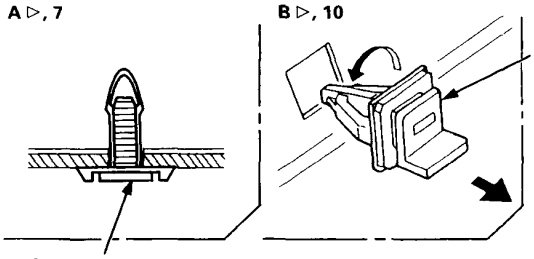
   NOTE:
   - Take care not to damage the windshield side molding.
   - Make sure the roof molding is installed securely.



Side Sill Panel

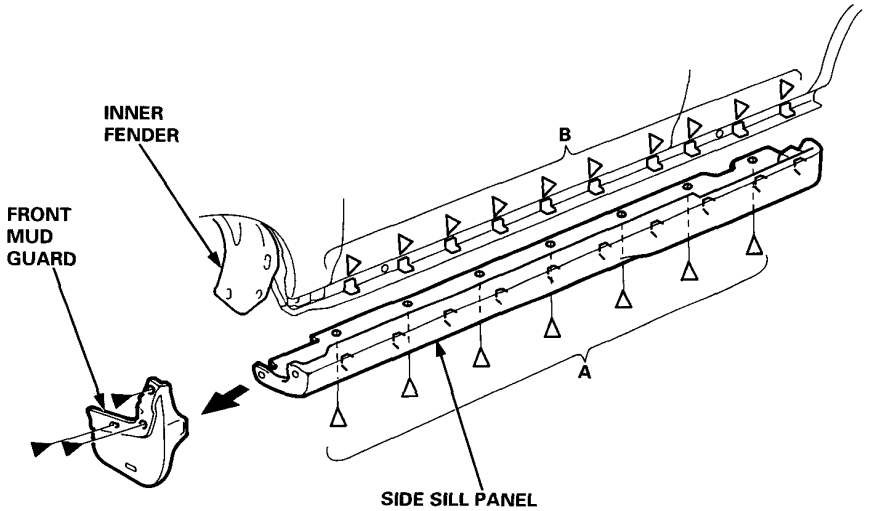
Replacement

▷: **Clip locations**

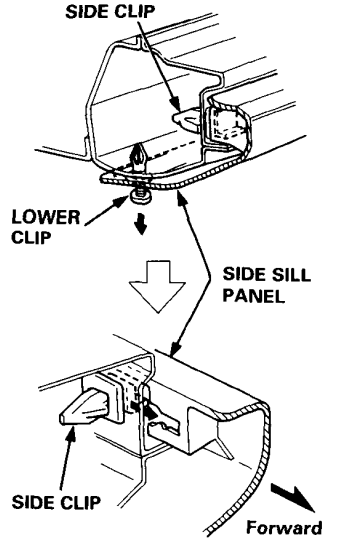


SIDE CLIP
Remove the side clips from the body by turning them 45°

NOTE: Loosen the screw, then remove the lower clip using a clip remover.



SIDE SILL PANEL
Remove the lower clips, then remove the side sill panel by sliding it forward.



NOTE: When removing the side sill panel, the side clips will stay in the body.

►: **Screw locations, 3**



To install the side sill panel, remove the side clips from the body, install them on the side sill panel, then install the side sill panel on the car.

NOTE:

- Take care not to twist the side sill panel.
- If necessary, replace any damaged side and lower clips.

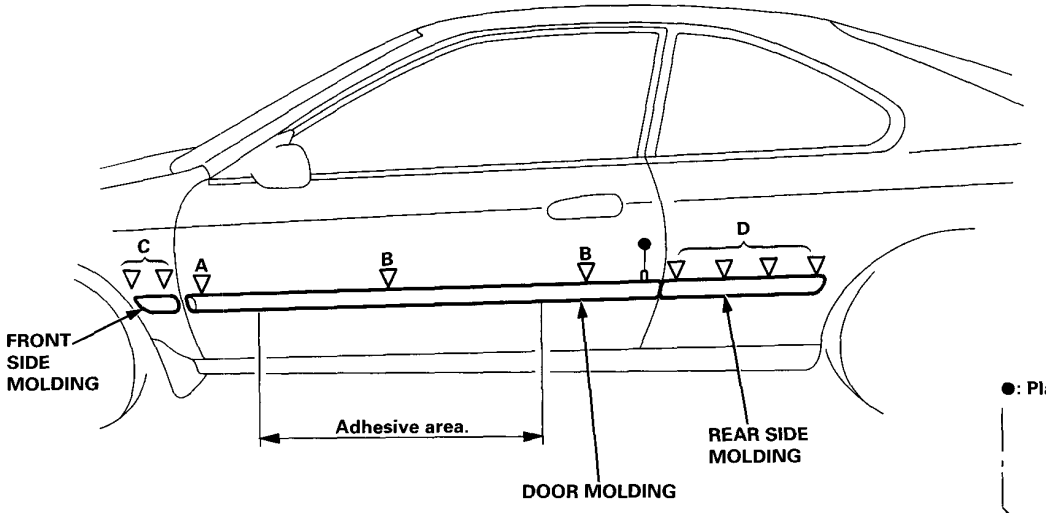
Door and Side Moldings

Replacement

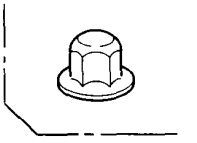
CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

NOTE:

- To remove the door molding, remove the door panel and plastic cover (see page 20-4).
- Take care not to bend the door molding.
- Before reassembling, clean the door bonding surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.
- The steel core in the door molding cannot be restored to it original shape once it is bent. Replace the door molding when the steel core is bent.

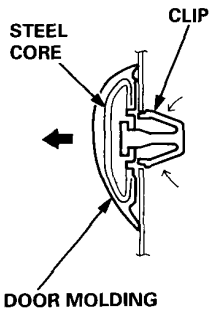


●: Plastic nut location, 1

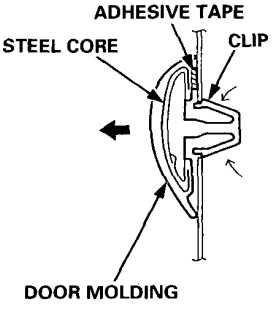


▷: Clip locations

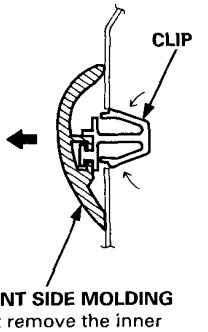
A ▷, 1



B ▷, 2

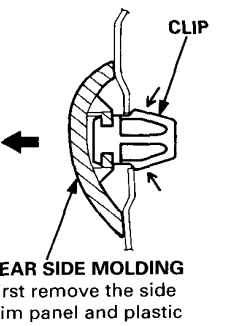


C ▷, 2



FRONT SIDE MOLDING
First remove the inner fender.

D ▷, 4



REAR SIDE MOLDING
First remove the side trim panel and plastic cover (see page 20-48).

Installation is the reverse of the removal procedure.

NOTE: If necessary, replace any damaged clips.

Door Molding

Removal

The following materials and tools are required to repair the door molding.

NOTE: Follow the manufacturer's instructions.

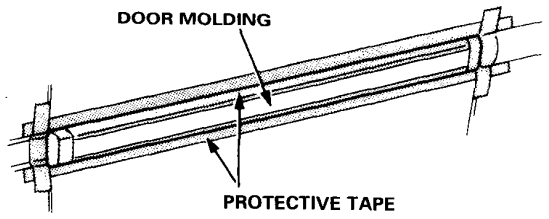
Materials: (Reference)
- Stripe remover
  3M 08907
- Stripe adhesive remover
  3M 08908
- Adhesive tape
  3M Super Automotive Attachment Tape

Tools:
- Protective tape
- Knife or Cutter
- Sponge or Shop towel
- Infrared dryer
- Film
- Putty knife
- Alcohol

CAUTION: Wear gloves to remove and install the door molding.

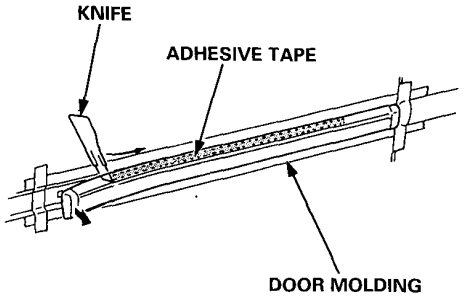
1. Remove the door panel and pull back the plastic cover (see page 20-4).

2. Apply protective tape on and around the molding.

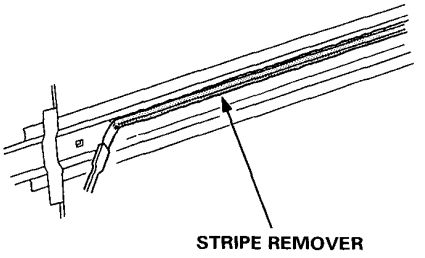


3. Release the clips from inside of the door.
   Carefully cut the adhesive tape with a knife or cutter while pulling the edge of the molding away from the door as shown.

   NOTE: Take care not to scratch or bend the molding.

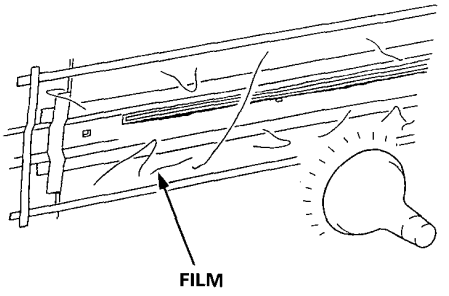


4. Apply the stripe remover evenly to the bonding surface of the door.

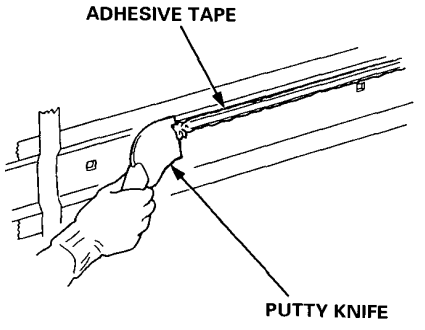


5. Cover the bonding surface of the door with a film, then heat to 40 – 50°C (104 – 122°F) for 5 – 10 minutes with an infrared dryer.

   NOTE: Use care when heating to prevent deformation of the door.



6. Scrape the adhesive tape with a putty knife.



(cont'd)

Door Molding

Removal (cont'd)

7. For removal of adhesive tape residue, follow-up with stripe adhesive remover, then scrape the adhesive tape with a putty knife.

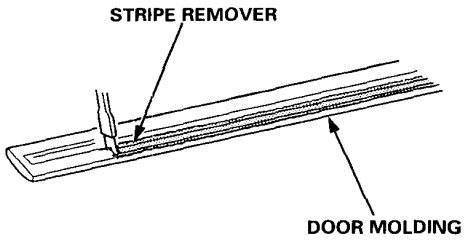
8. Peel off the protective tape, then clean the bonding surface with a sponge dampened in alcohol.

   NOTE: Make sure the bonding surface is kept free or water, oil and grease.

9. Remove the clips from the molding.

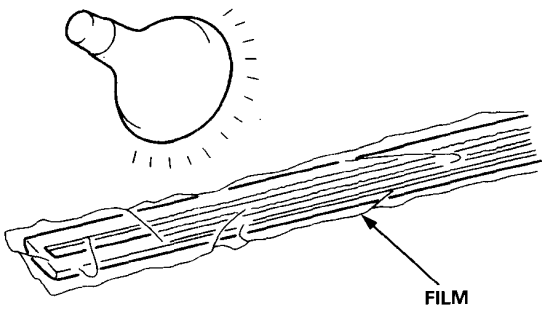
   NOTE: If necessary, replace any damaged clips.

10. Apply the stripe remover evenly to the bonding surface of the molding.

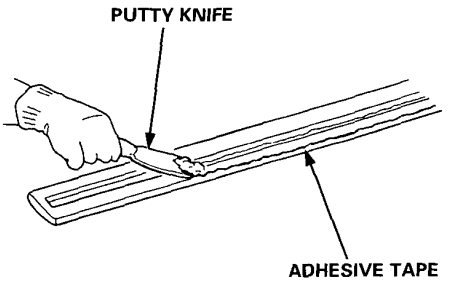


11. Wrap the molding with film, then heat to 40 – 50°C (104 – 122°F) for 5 – 10 minutes with an infrared dryer.

    NOTE: Use care when heating to prevent deformation of the molding.



12. Scrape the adhesive tape with a putty knife.



13. For removal of adhesive tape residue, follow-up with stripe adhesive remover, then scrape the adhesive tape with a putty knife.

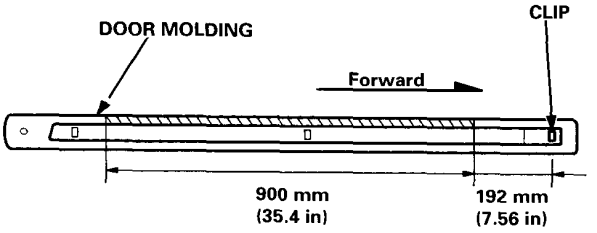
14. Peel off the protective tape, then clean the molding with a sponge dampened in alcohol.

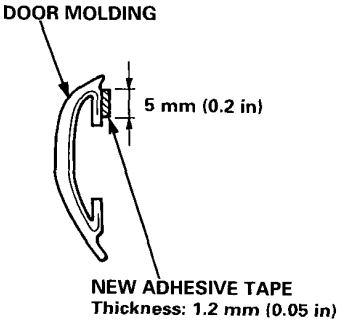
    NOTE: Make sure the bonding surface is kept free of water, oil and grease.

Installation

1. Glue the new adhesive tape to the molding as shown.

   : **Adhesive tape locations**





2. Install the clips on the molding.

3. Heat the bonding surface of the door and door molding with an infrared dryer.
   Door: 40 – 60°C (104 – 140°F)
   Molding: 20 – 30°C (68 – 86°F)

   NOTE: Use care when heating to prevent deformation of the molding.

4. Align the molding with the clip locations and set the molding. Lightly push on the molding until its edge is fully seated on the adhesive tape.

   NOTE: Do not spray water on the molding within the first 24 hours after installation.

5. Reassemble all removed parts.

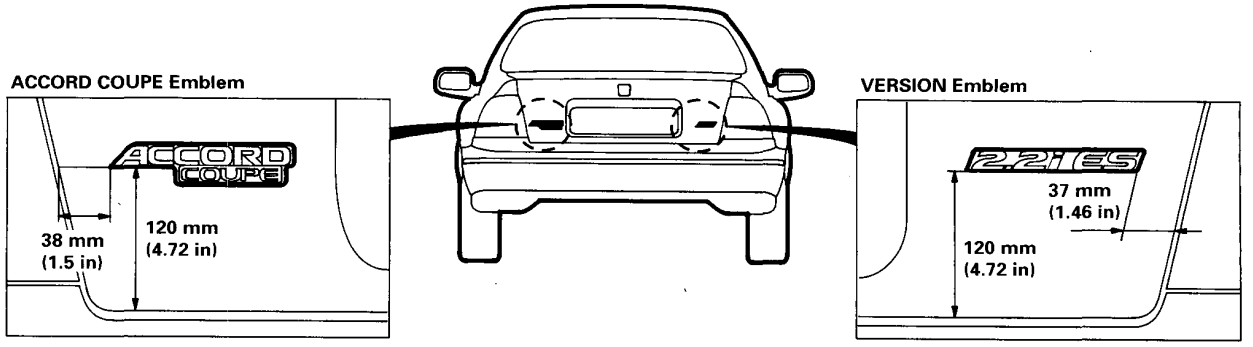
Rear Emblems, Fenderwell Trim/Wheelhouse Protector and Rear Air Outlet

Rear Emblems Installation

Apply the rear emblems where shown.

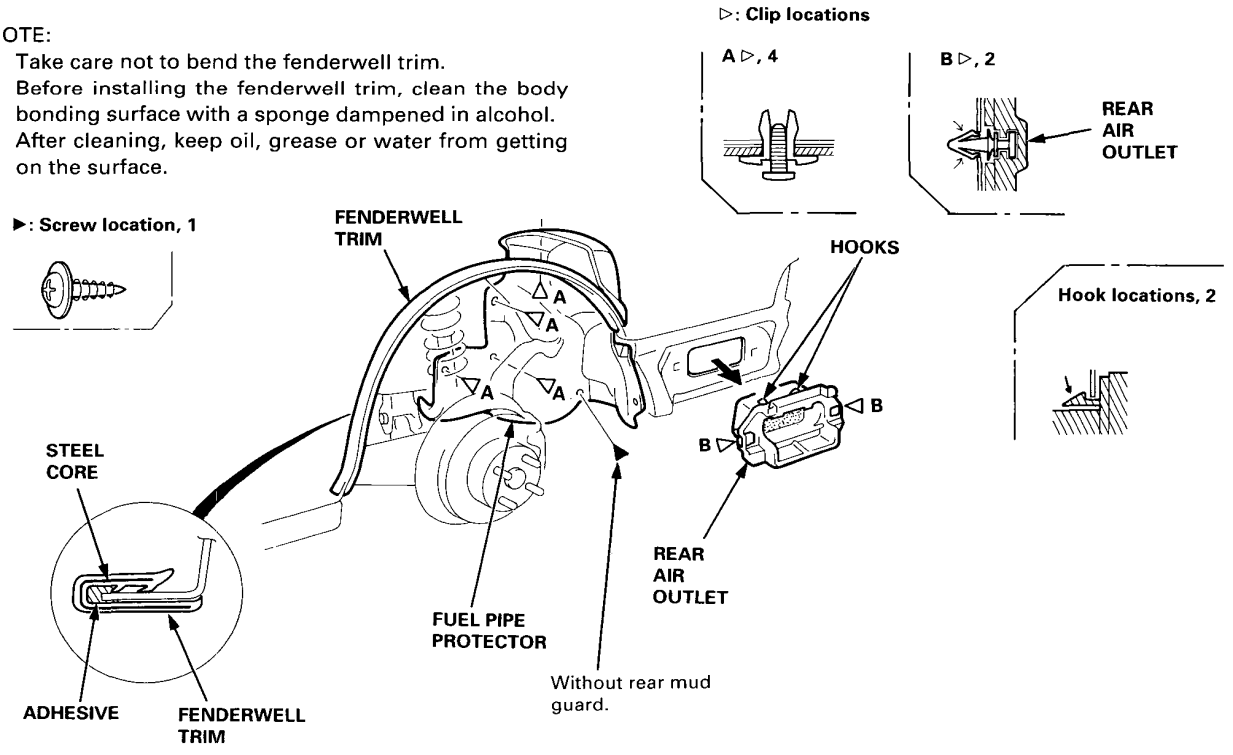
NOTE:
- Before applying, clean the body surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.
- When applying, make sure there are no wrinkles in the emblems.

Attachment Points (Reference):



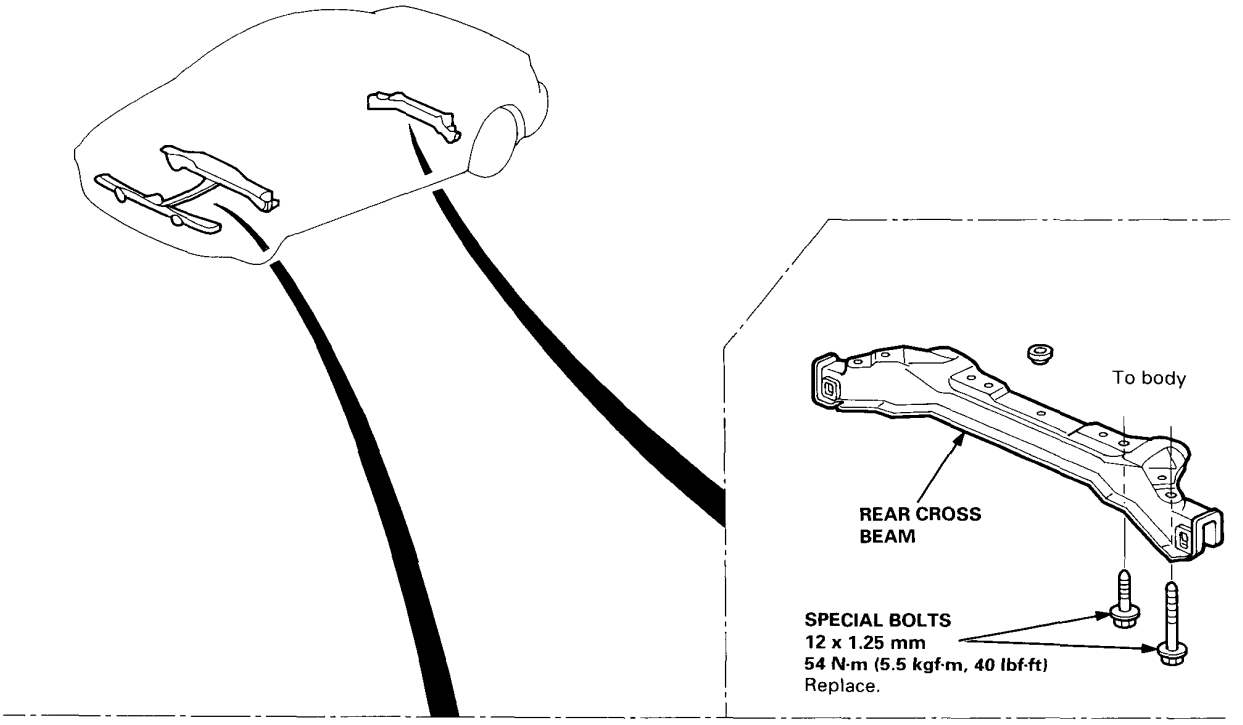
Fenderwell Trim/Wheelhouse Protector and Rear Air Outlet Replacement

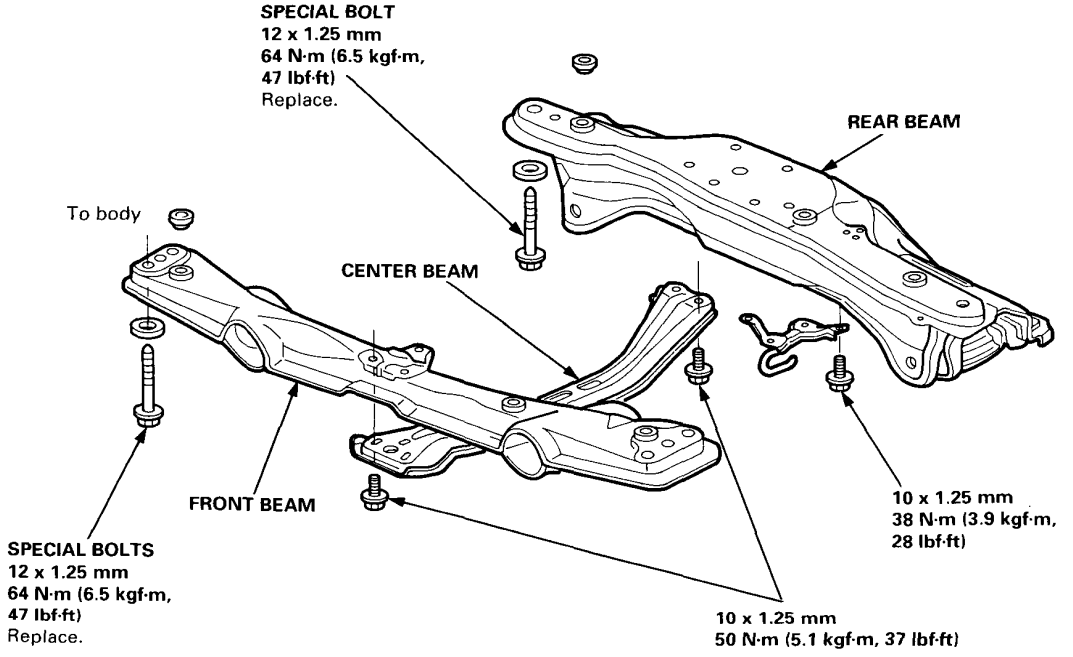
NOTE:
- Take care not to bend the fenderwell trim.
- Before installing the fenderwell trim, clean the body bonding surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease or water from getting on the surface.



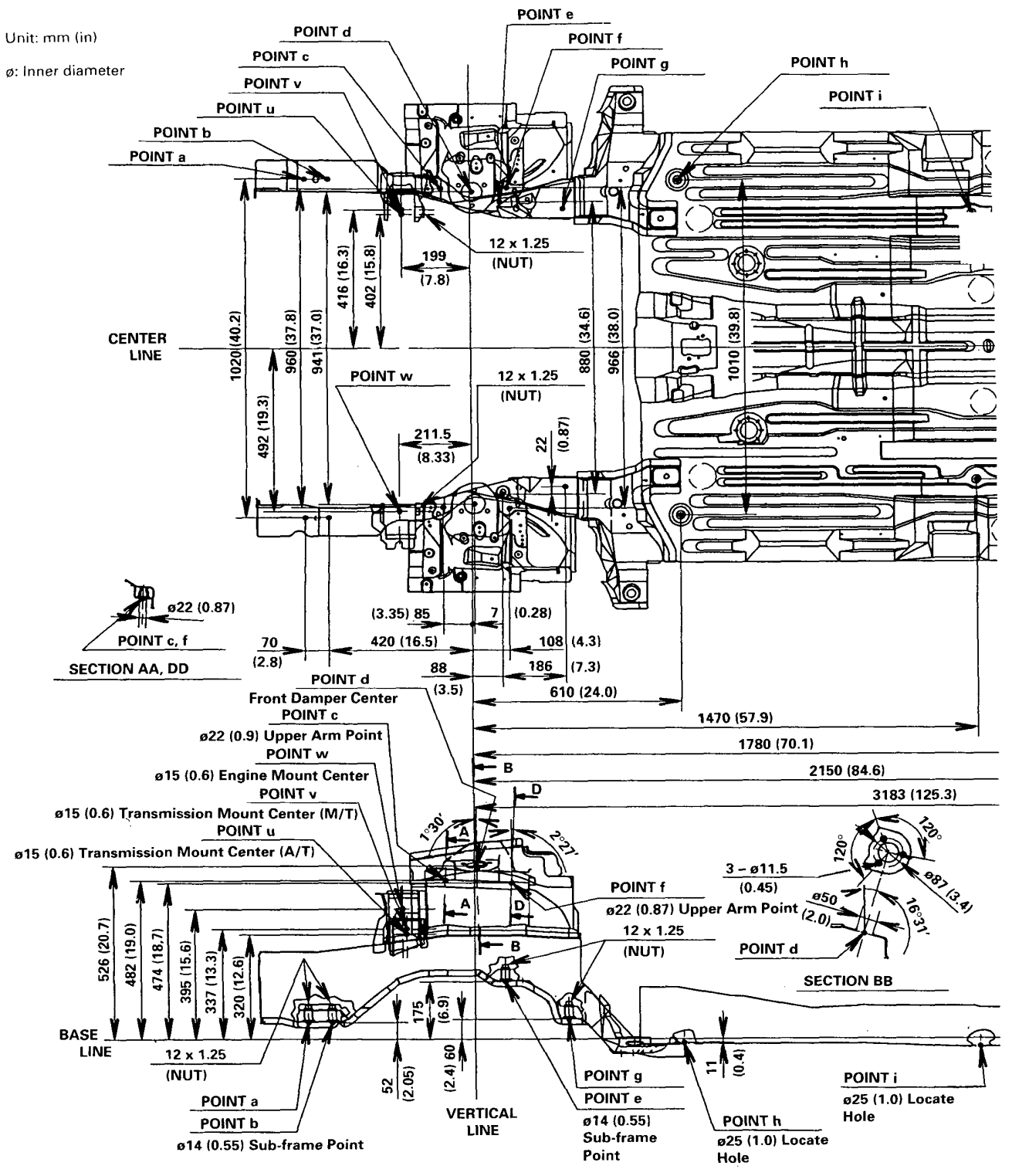
Sub-frame Torque Sequence:

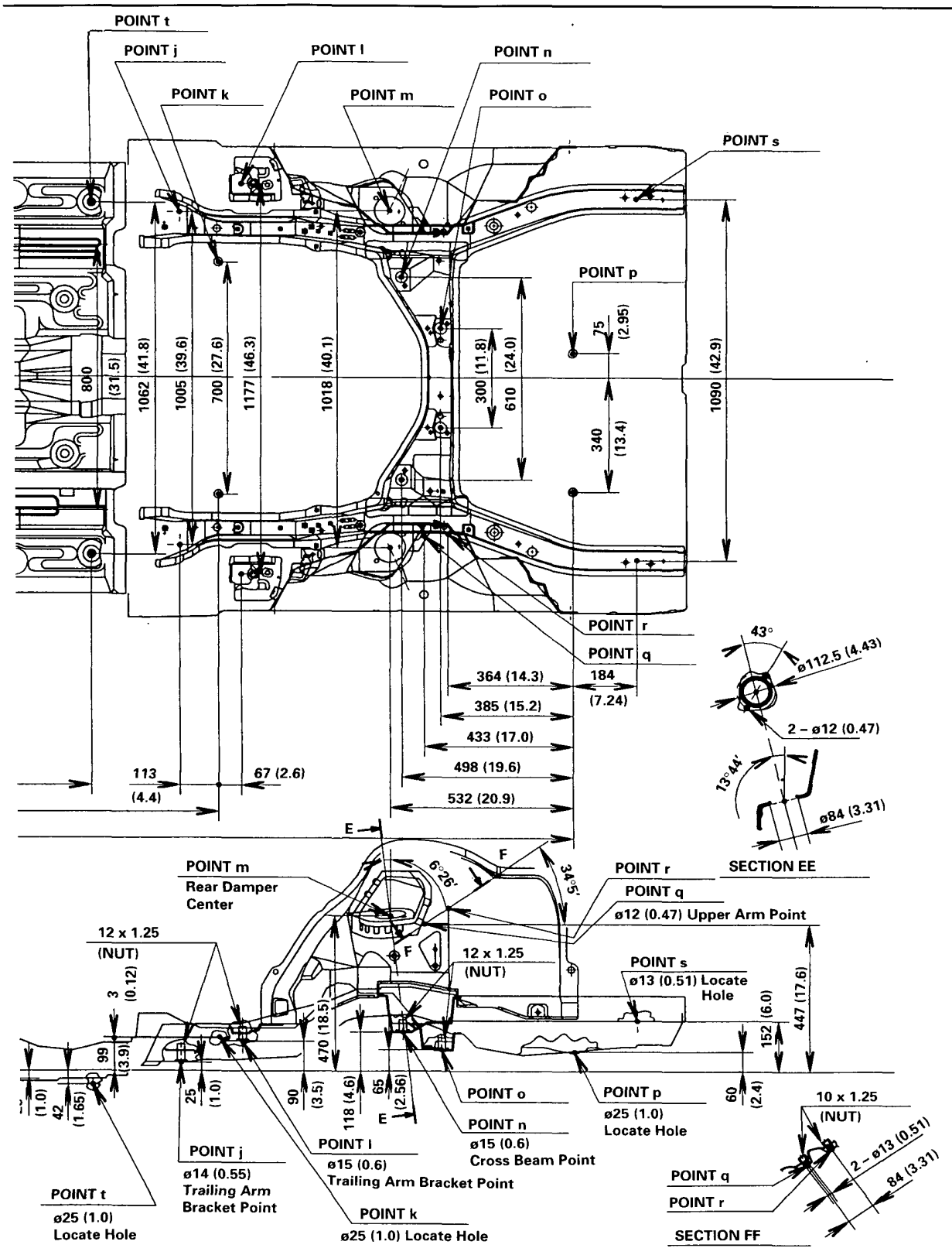
CAUTION: After loosening the sub-frame mounting bolts, be sure to replace them with new ones.





Frame Repair Chart




POINT t
POINT j
POINT l
POINT n
POINT k
POINT m
POINT o
POINT s
POINT p
800 (31.5)
1062 (41.8)
1005 (39.6)
700 (27.6)
1177 (46.3)
1018 (40.1)
300 (11.8)
610 (24.0)
75 (2.95)
340 (13.4)
1090 (42.9)
POINT r
POINT q
364 (14.3)
385 (15.2)
433 (17.0)
498 (19.6)
532 (20.9)
184 (7.24)
113 (4.4)
67 (2.6)
43°
ø112.5 (4.43)
2 – ø12 (0.47)
13°44'
ø84 (3.31)
SECTION EE
E
F
6°26'
34°5'
POINT m
Rear Damper Center
POINT r
POINT q
ø12 (0.47) Upper Arm Point
12 x 1.25 (NUT)
3 (0.12)
12 x 1.25 (NUT)
POINT s
ø13 (0.51) Locate Hole
99 (3.9)
470 (18.5)
152 (6.0)
447 (17.6)
42 (1.65)
(1.0)
25 (1.0)
90 (3.5)
118 (4.6)
65 (2.56)
60 (2.4)
POINT o
POINT p
ø25 (1.0) Locate Hole
10 x 1.25 (NUT)
POINT n
ø15 (0.6) Cross Beam Point
2 – ø13 (0.51)
84 (3.31)
POINT q
POINT r
SECTION FF
POINT j
ø14 (0.55) Trailing Arm Bracket Point
POINT l
ø15 (0.6) Trailing Arm Bracket Point
POINT t
ø25 (1.0) Locate Hole
POINT k
ø25 (1.0) Locate Hole

Heater and Air Conditioning

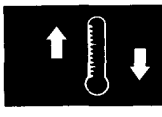
Heater **21-1**
Air Conditioning **22-2**

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

Some model versions of the Accord Coupe include a driver's airbag, located in the steering wheel hub, and a front passenger's airbag, located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Shop Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

⚠ WARNING

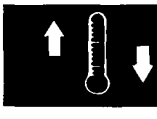
- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.**
- **All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.**



Heater

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Recirculation Control Switch
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*: Read SRS precautions before working in these areas.

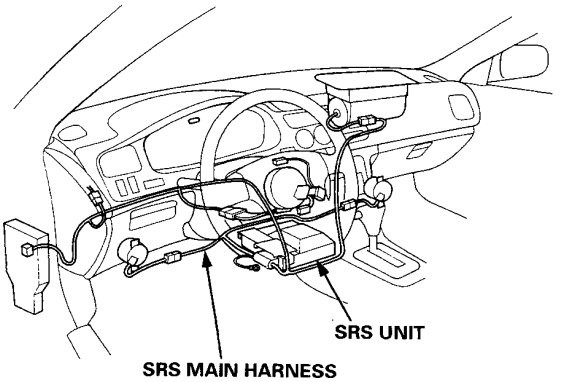


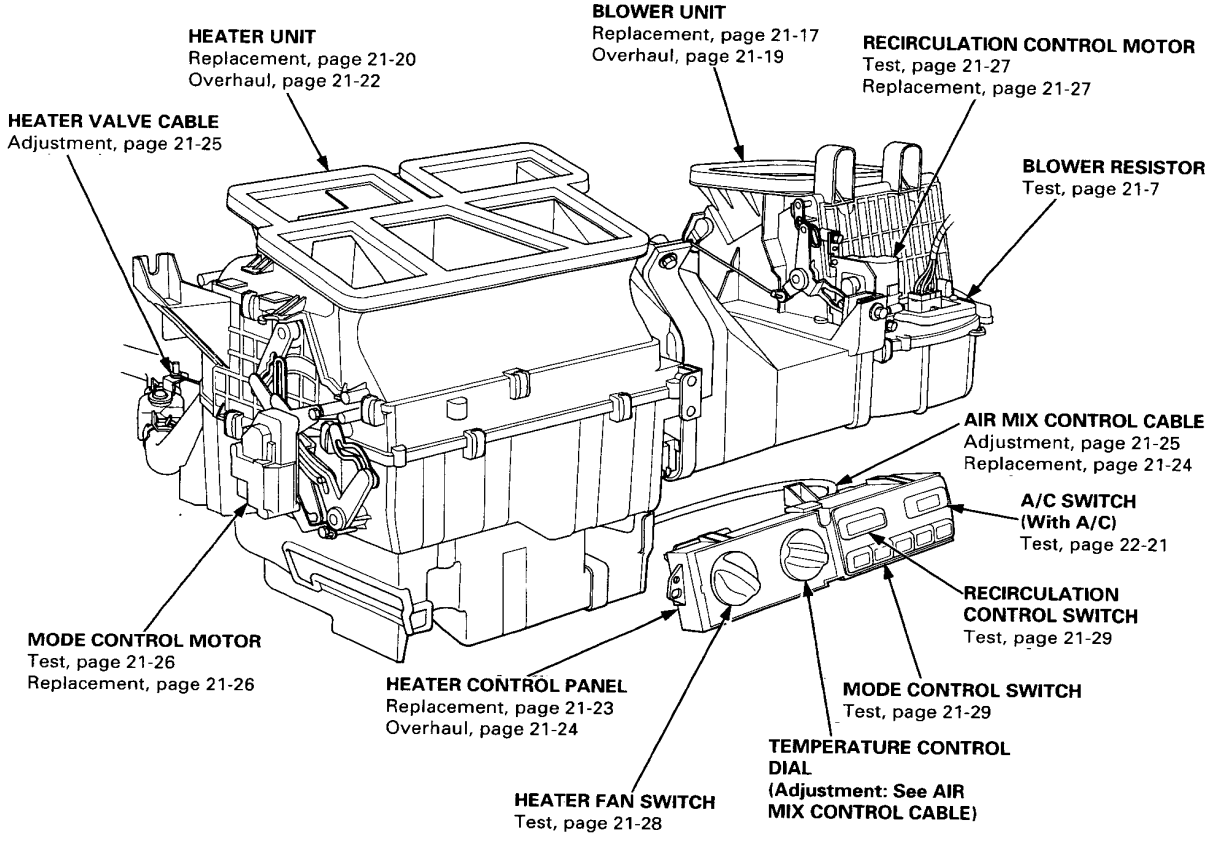
Illustrated index

CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

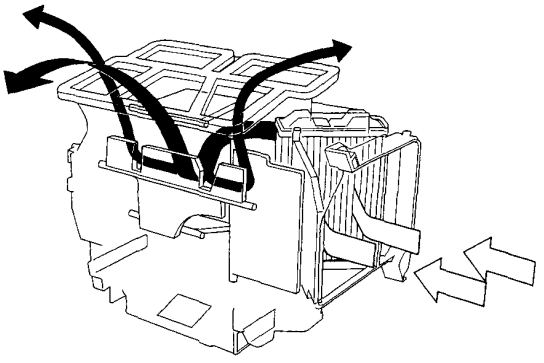




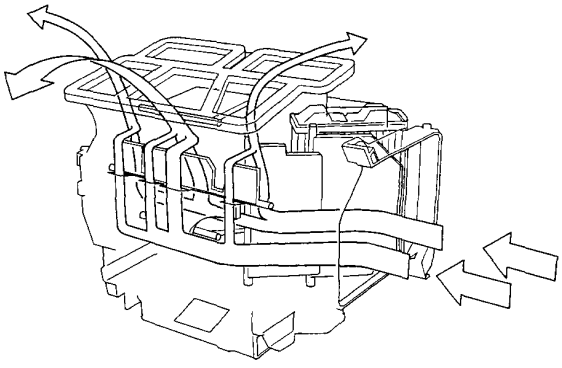
Heater Door Positions

(VENT)

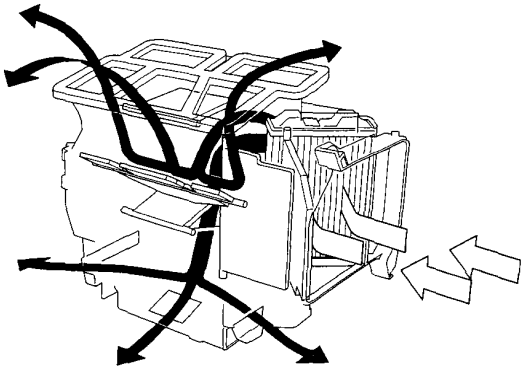
HOT

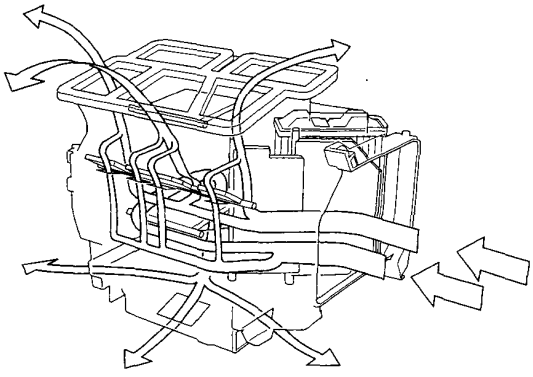


COOL



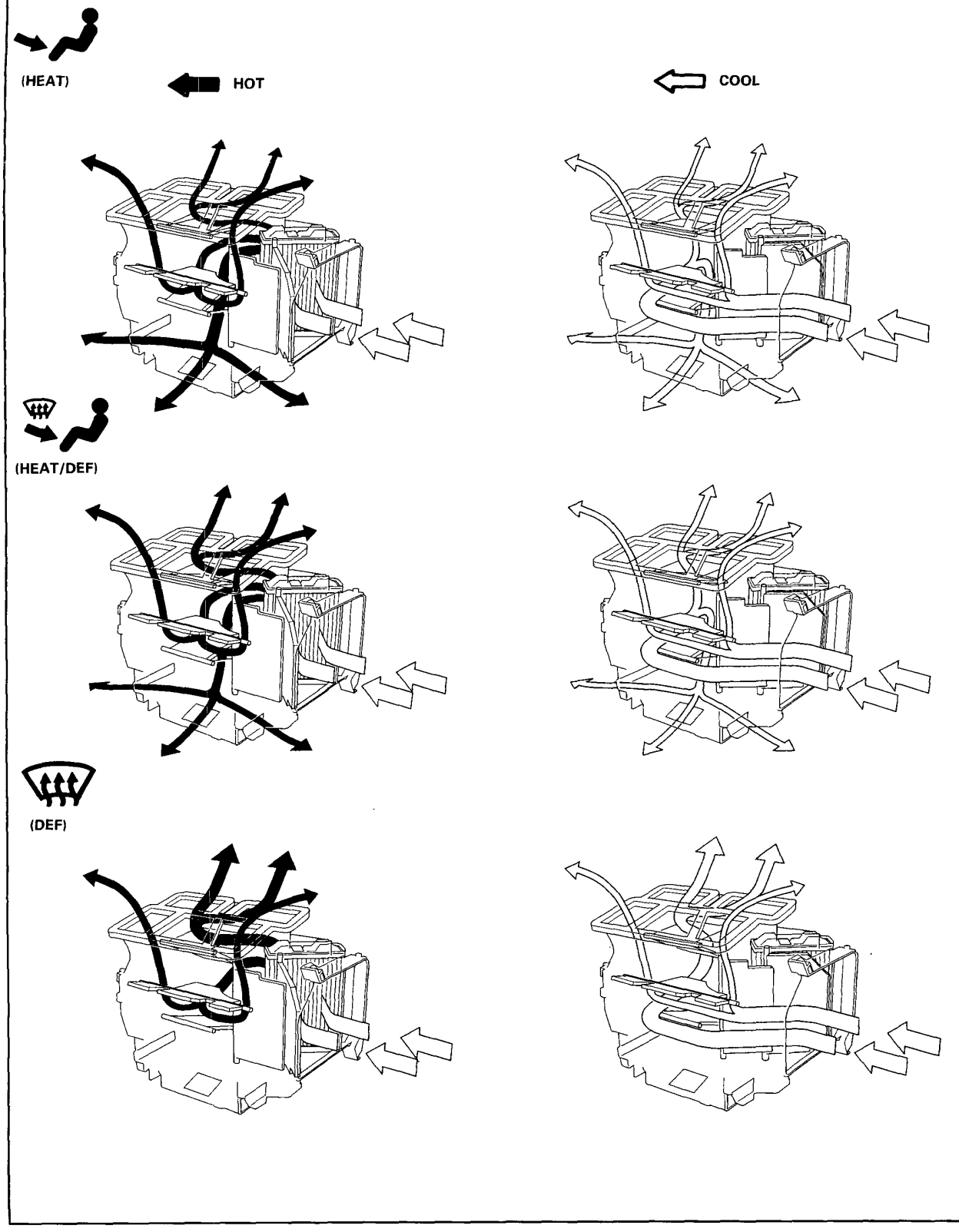
(HEAT/VENT)



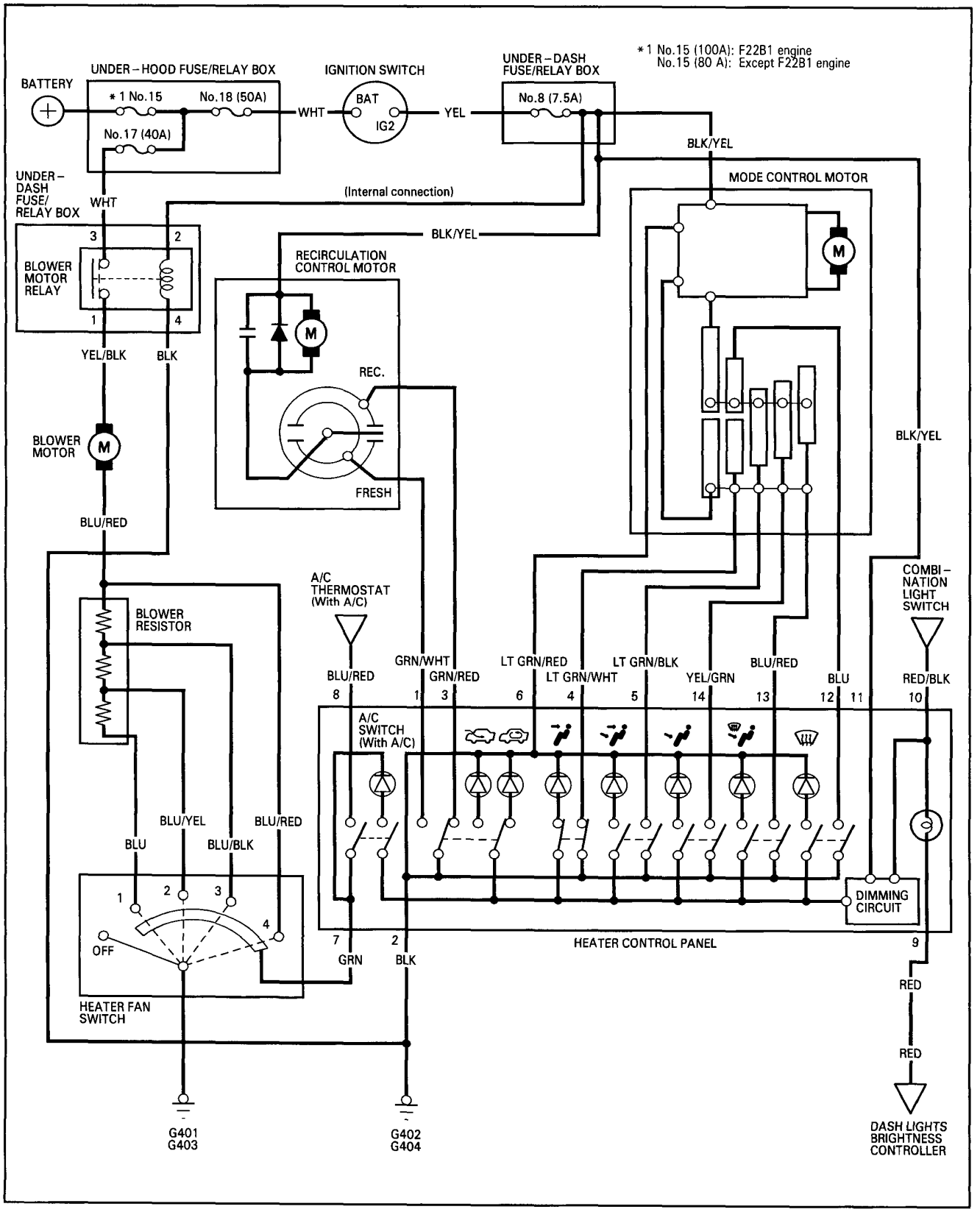


(cont'd)

Heater Door Positions (cont'd)



Circuit Diagram



Troubleshooting

Symptom Chart

NOTE: Check the engine coolant level and allow the engine to warm up before troubleshooting.

SYMPTOM		REMEDY
Hot air flow is low.	Blower motor runs, but one or more speeds are inoperative.	Follow the flowchart (see page 21-7).
	Blower runs properly.	Check for the following: • Clogged heater duct • Clogged heater outlet • Incorrect door position
No hot air flow	Blower motor does not run at all.	Follow the flowchart (see page 21-9).
	Blower motor runs.	Check for the following: • Clogged heater duct • Clogged blower outlet • Clogged heater valve • Faulty air mix door • Heater valve cable adjustment (see page 21-25) • Air mix control cable adjustment (see page 21-25) • Faulty thermostat (see section 10) • Clogged evaporator (with air conditioning) • Frozen evaporator (with air conditioning)
Mode control motor does not run, or one or more modes are inoperative.		Follow the flowchart (see page 21-12).
Recirculation control doors do not change between FRESH and RECIRCULATE.		Follow the flowchart (see page 21-14).

Blower Motor Speed

Blower motor runs, but one or more speeds are inoperative.

Turn the ignition switch ON (II), and the heater fan switch OFF.

Does the blower motor run? YES → (B) To page 21-8

NO

Turn the ignition switch OFF.

Disconnect the blower resistor 5P connector.

Measure the resistance between the No. 1 and No. 5 terminals of the blower resistor.

Is there approx. 2 – 3 ohms? NO → **Replace the blower resistor.**

YES

Reconnect the blower resistor 5P connector.

Remove the heater control panel (see page 21-23).

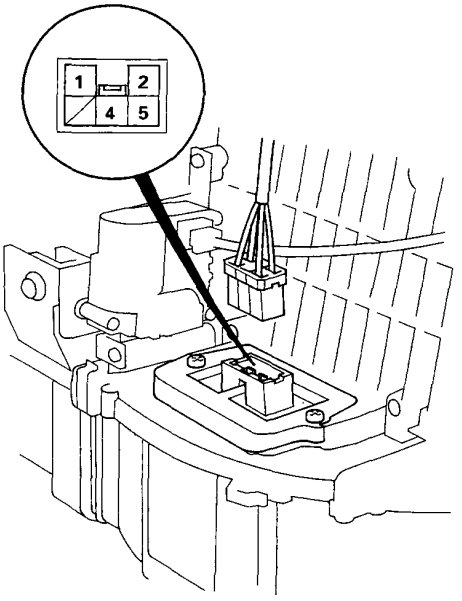
Disconnect the heater fan switch 8P connector.

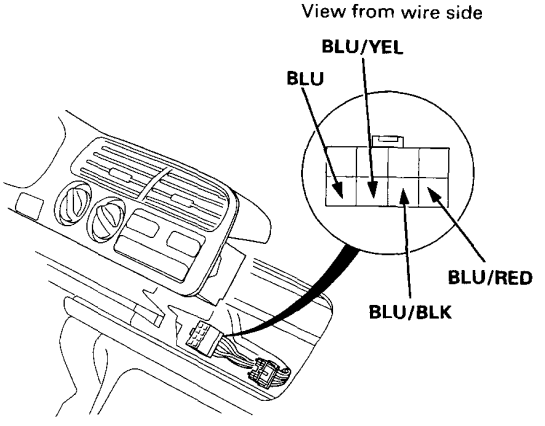
Turn the ignition switch ON (II).

At the heater fan switch 8P connector, ground each of these wires individually in the following order:
- BLU wire
- BLU/YEL wire
- BLU/BLK wire
- BLU/RED wire

(A)

To page 21-8





(cont'd)

Blower Motor Speed (cont'd)

From page 21-7

A

Does the blower motor run at progressively higher speeds?

YES → **Replace the heater fan switch.**

NO

Repair open or cause of excessive resistance in the appropriate wire(s) between the heater fan switch and the blower resistor.

From page 21-7

A

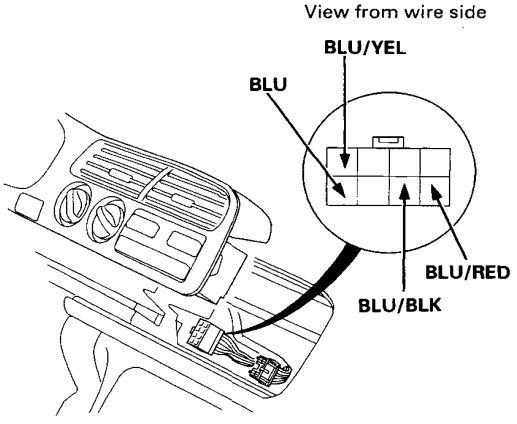
Turn the ignition switch OFF.

Remove the heater control panel (see page 21-23).

Disconnect the heater fan switch 8P connector.

Disconnect the blower resistor 5P connector.

Check each wire for continuity between the heater fan switch 8P connector and body ground:
- BLU wire
- BLU/YEL wire
- BLU/BLK wire
- BLU/RED wire



Is there continuity?

NO → **Replace the heater fan switch.**

YES

Repair short in the wire(s) between the heater fan switch and the blower resistor.

Blower Motor

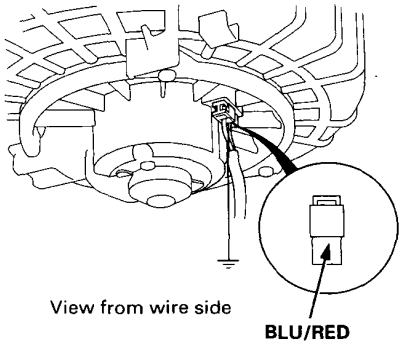
Blower motor does not run at all.

Check the No. 17 (30 A) fuse in the under-hood fuse/relay box.

Is the fuse OK? NO → **Replace the fuse and recheck.**

YES

At the blower motor 2P connector, connect the BLU/RED wire terminal to body ground with a jumper wire.



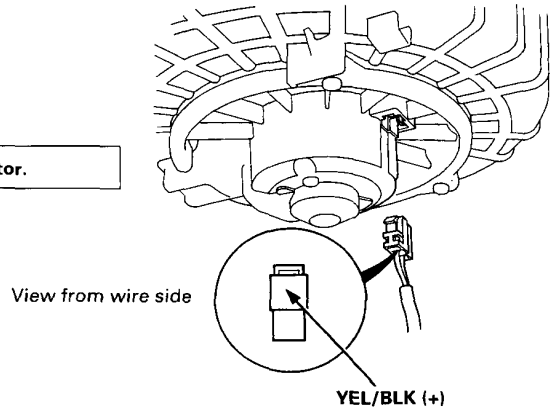
Turn the ignition switch ON (II).

Does the blower motor run? YES → To page 21-10

NO

Disconnect the blower motor 2P connector, and measure the voltage between the YEL/BLK wire terminal (+) and body ground (–).

Is there battery voltage? YES → **Replace the blower motor.**



NO

Turn the ignition switch OFF.

To page 21-11

(cont'd)

Blower Motor (cont'd)

From page 21-9

Turn the ignition switch OFF.

Remove the heater control panel (see page 21-23).

Disconnect the heater fan switch 8P connector.

Turn the ignition switch ON (II).

Measure the voltage between the BLU/RED wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the BLU/RED wire between the blower motor and the heater fan switch.**

YES

Turn the ignition switch OFF.

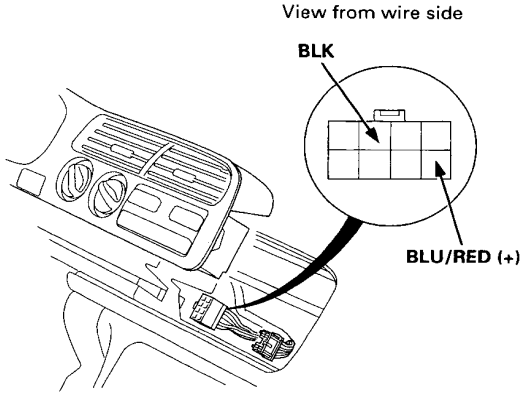
Check for continuity in the BLK wire between the heater fan switch and body ground.

Is there continuity?

NO → **Check for an open in the BLK wire between the heater fan switch and body ground. If the wire is OK, check for poor ground at G401 and G403.**

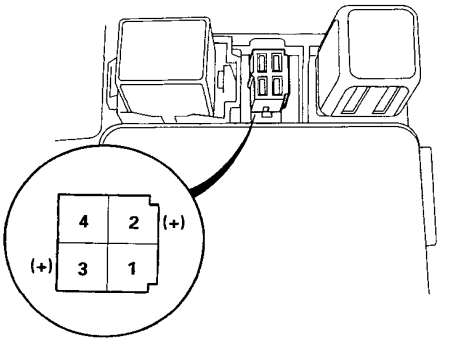
YES

Replace the heater fan switch.



From page 21-9

Remove the blower motor relay from the under-dash fuse/relay box, and test it (see page 21-28).



Is the relay OK?
NO → **Replace the blower motor relay.**
YES

Measure the voltage between the No. 3 terminal (+) and body ground (–).

Is there battery voltage?
NO → **Repair open in the WHT wire between the under-hood fuse/relay box and the under-dash fuse/ relay box.**
YES

Turn the ignition switch ON (II).

Measure the voltage between the No. 2 terminal (+) and body ground (–).

Is there battery voltage?
NO → **Replace the under-dash fuse/relay box.**
YES

Turn the ignition switch OFF.

Check for continuity between the No. 4 terminal and body ground.

Is there continuity?
NO → **Check for an open in the BLK wire between the under-dash fuse/ relay box and body ground. If the wire is OK, check for poor ground at G402 and G404.**
YES

Repair open in the YEL/BLK wire between the under-dash fuse/ relay box and the blower motor.

Mode Control Motor

Mode control motor does not run, or one or more modes are inoperative.

Disconnect the mode control motor 7P connector.

Turn the ignition switch ON (II).

Measure the voltage between the BLK/YEL wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the BLK/YEL wire between the under-dash fuse/relay box and the mode control motor.**

YES

Turn the ignition switch OFF.

Test the mode control motor (see page 21-26).

Is the mode control motor OK?

NO → Remove the mode control motor (see page 21-26).

Check the mode control linkage and doors for smooth movement.

Do the mode control linkage and doors move smoothly?

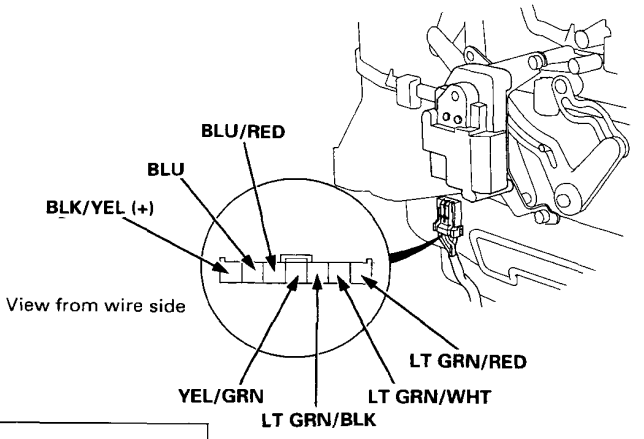
NO → **Repair the mode control linkage or doors.**

YES

Replace the mode control motor.

YES

To page 21-13



From page 21-12

Remove the heater control panel (see page 21-23).

Disconnect the heater control panel 14P connector.

Check each wire for continuity between the mode control motor and body ground:
- BLU wire
- BLU/RED wire
- YEL/GRN wire
- LT GRN/BLK wire
- LT GRN/WHT wire

Is there continuity?

YES → **Repair any short in the wire(s) between the mode control motor and the heater control panel.**

NO

Check the same wires for voltage.

Is there any voltage?

YES → **Repair short to power in the BLK/YEL wire between the mode control motor and the heater control panel. (This damages the heater control panel.)**

NO

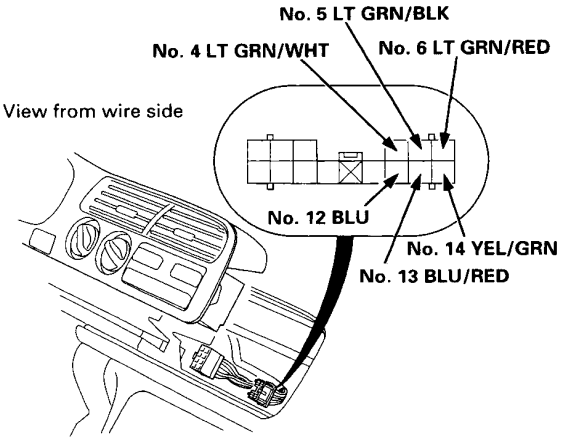
Check each wire for continuity between the mode control motor and the heater control panel:
- BLU wire
- BLU/RED wire
- YEL/GRN wire
- LT GRN/BLK wire
- LT GRN/WHT wire
- LT GRN/RED wire

Is there continuity?

NO → **Repair any open in the wire(s) between the mode control motor and the heater control panel.**

YES

Replace the heater control panel.



Recirculation Control Motor

Recirculation control doors do not change between FRESH and RECIRCULATE.

Disconnect the recirculation control motor 4P connector.

Turn the ignition switch ON (II).

Measure the voltage between the BLK/YEL wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the BLK/YEL wire between the under-dash fuse/relay box and the recirculation control motor.**

YES

Turn the ignition switch OFF.

Test the recirculation control motor (see page 21-27).

Is the recirculation control motor OK?

NO → Remove the recirculation control motor (see page 21-27).

YES

To page 21-15

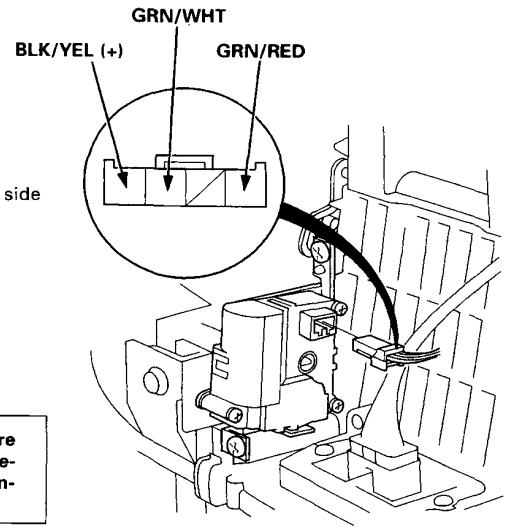
Check the recirculation control linkage and doors for smooth movement.

Do the recirculation control linkage and doors move smoothly?

NO → **Repair the recirculation control linkage or doors.**

YES

Replace the recirculation control motor.



From page 21-14

Remove the heater control panel (see page 21-23).

Disconnect the heater control panel 14P connector.

Check for continuity in the GRN/WHT and GRN/RED wires between the recirculation control motor and body ground.

Is there continuity?

YES → **Repair short in the GRN/WHT and/or GRN/RED wire(s) between the recirculation control motor and the heater control panel.**

NO

Check the same wires for voltage.

Is there any voltage?

YES → **Repair short to power in the BLK/YEL wire between the recirculation control motor and the heater control panel. (This damages the heater control panel.)**

NO

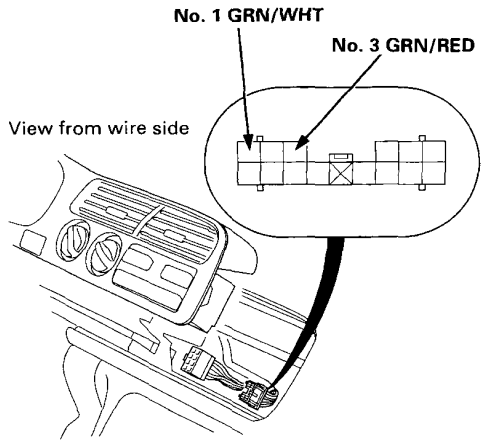
Check for continuity in the GRN/WHT and GRN/RED wires between the recirculation control motor and the heater control panel.

Is there continuity?

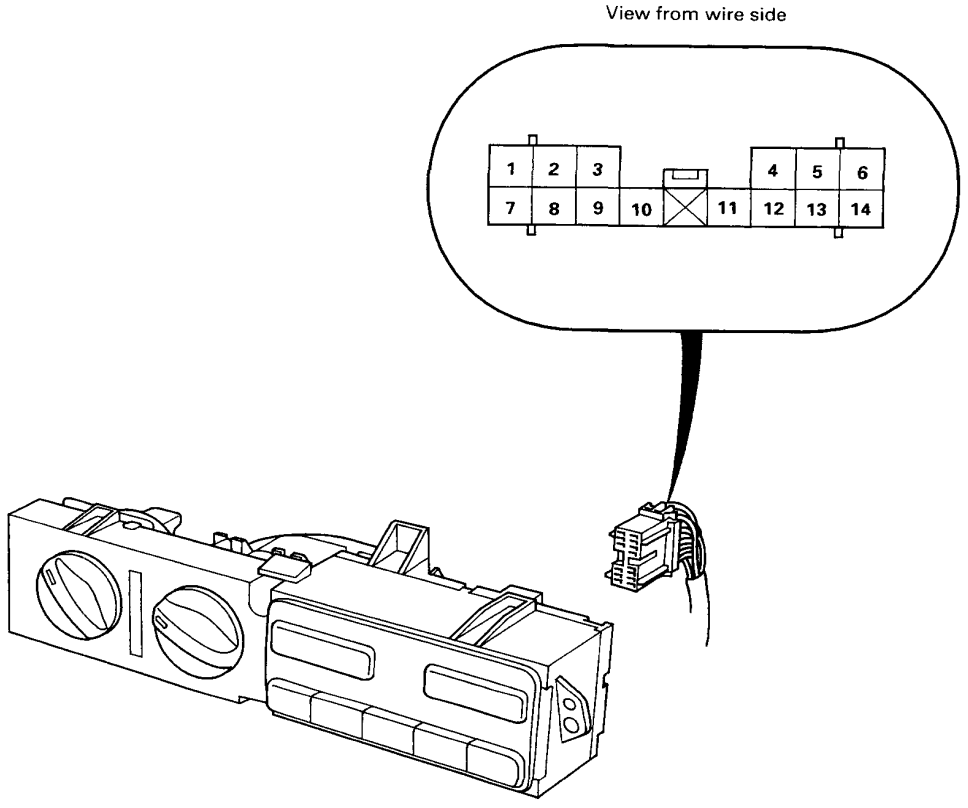
NO → **Repair open in the GRN/WHT and/or GRN/RED wire(s) between the recirculation control motor and the heater control panel.**

YES

Replace the heater control panel.



Heater Control Panel Input/Output Signals



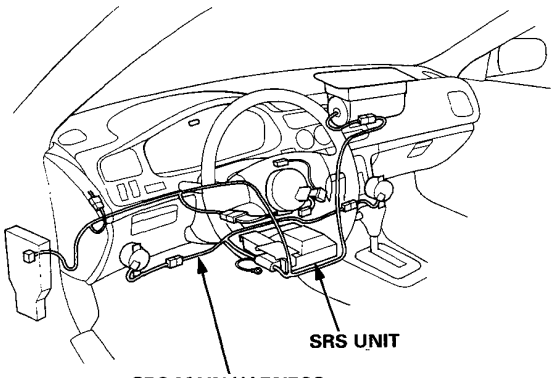
No.	Wire Color	Signal		No.	Wire Color	Signal	
1	GRN/WHT	FRESH	INPUT	8	BLU/RED	A/C THERMOSTAT	INPUT
2	BLK	GROUND	OUTPUT	9	RED	BRIGHTNESS CONTROLLER	OUTPUT
3	GRN/RED	RECIRCULATE	INPUT	10	RED/BLK	COMBINATION LIGHT SWITCH	INPUT
4	LT GRN/WHT	VENT	INPUT	11	BLK/YEL	IG2	INPUT
5	LT GRN/BLK	HEAT/VENT	INPUT	12	BLU	DEF	INPUT
6	LT GRN/RED	MODE CONTROL MOTOR (GND)	INPUT	13	BLU/RED	HEAT/DEF	INPUT
7	GRN	HEATER FAN SWITCH	OUTPUT	14	YEL/GRN	HEAT	INPUT

Blower Unit

Replacement

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

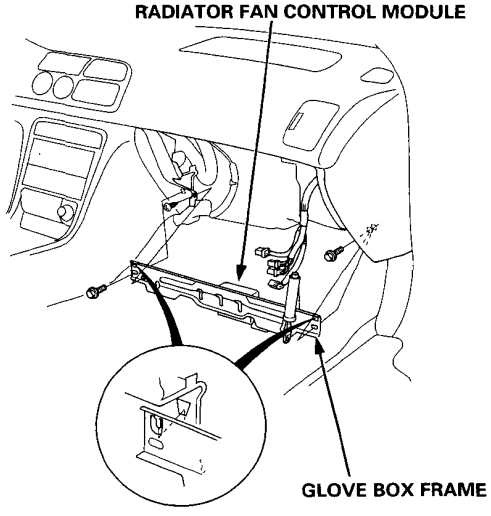
NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



NOTE: The blower motor, recirculation control motor and blower resistor can be replaced without removing the blower unit (see page 21-19).

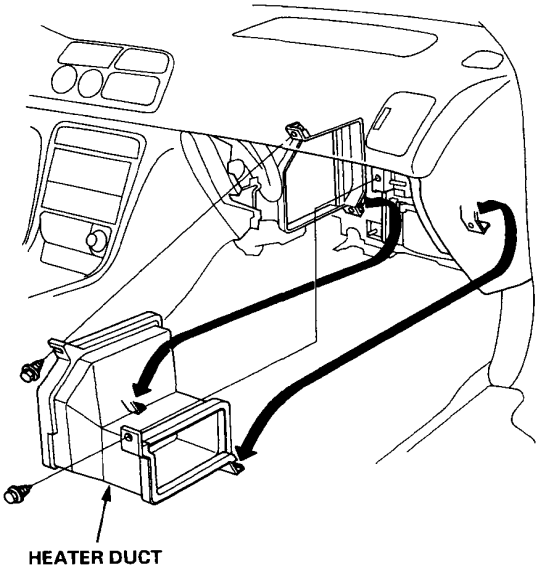
1. Remove the glove box (see section 20).

2. Remove the two bolts and the glove box frame, and disconnect the connectors from the radiator fan control module and the glove box frame.



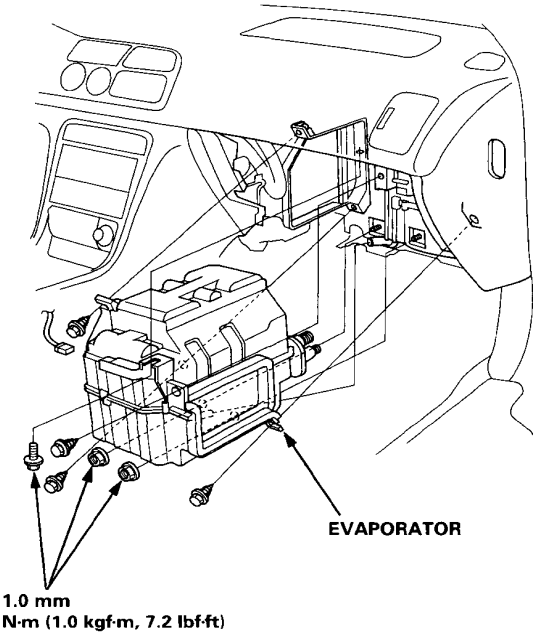
Without Air Conditioning

3-a. Remove the two self-tapping screws and the heater duct.



With Air Conditioning

3-b. Remove the evaporator (see page 22-28).

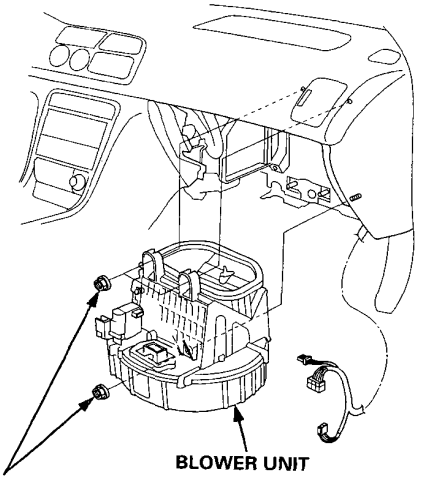


(cont'd)

Blower Unit

Replacement (cont'd)

4. Disconnect the connectors from the blower motor, blower resistor and the recirculation control motor, then remove the three mounting nuts and the blower unit.

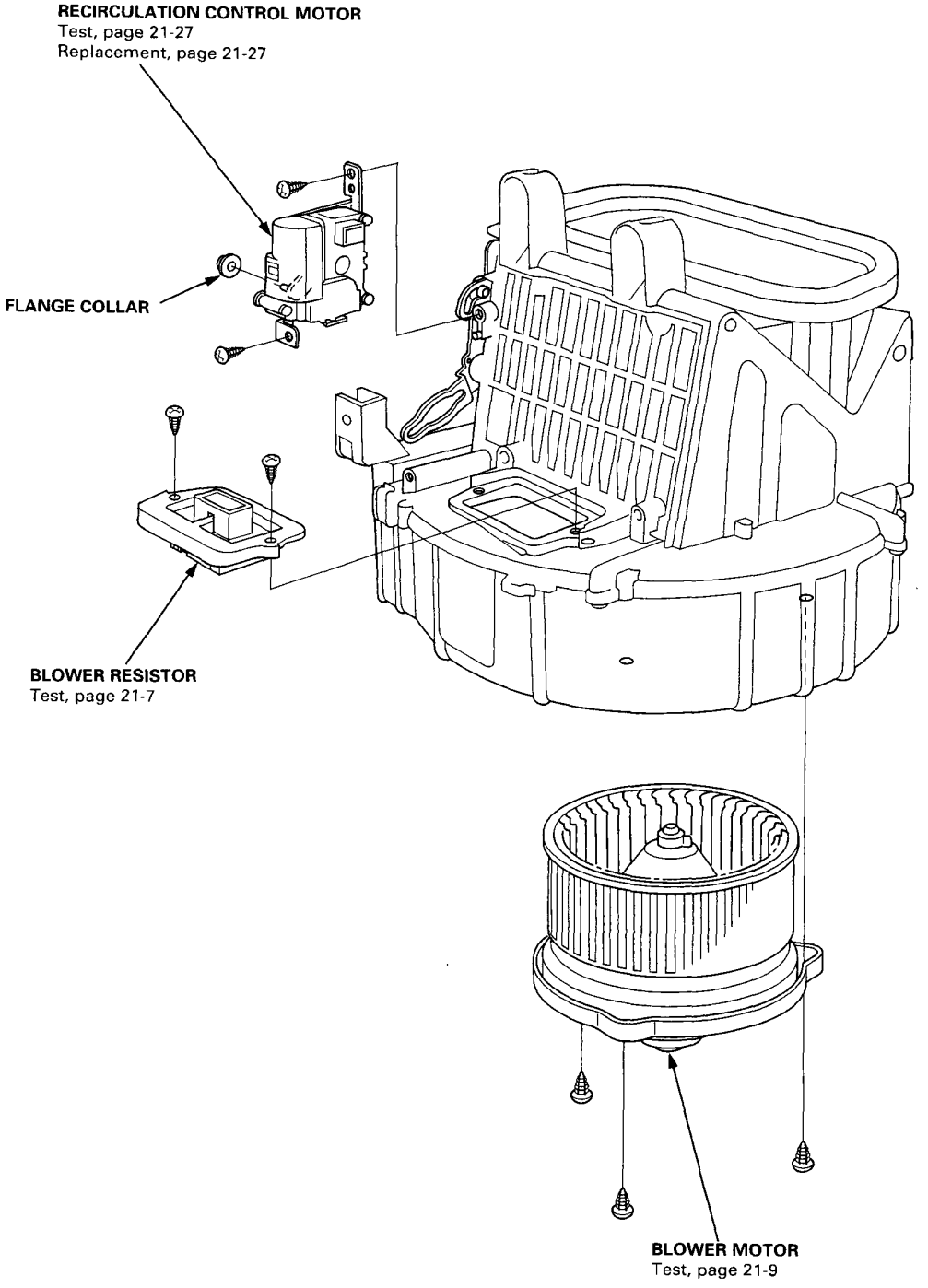


5. Install in the reverse order of removal, and make sure there are no air leaks.

Overhaul

NOTE:

- Before reassembly, make sure that the recirculation control doors and linkage move smoothly without binding.
- When reattaching the recirculation control motor, make sure its positioning will not allow the recirculation control doors to be pulled too far. Attach the recirculation control motor and all links, then connect power and ground, and watch the movement of the recirculation control doors.

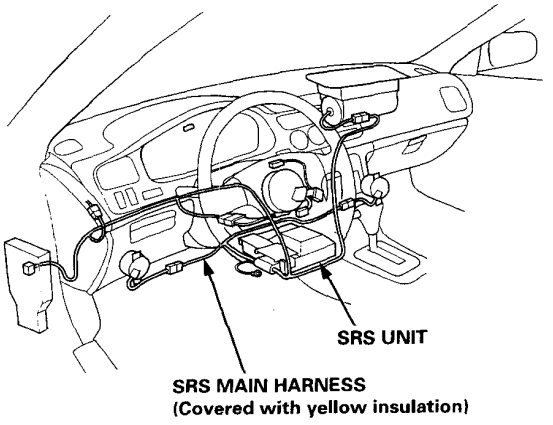


Heater Unit

Replacement

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

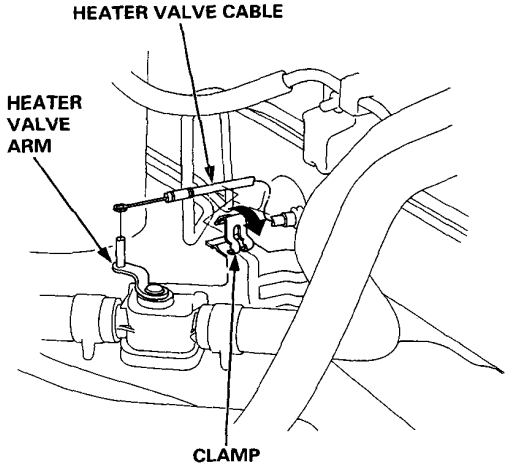
NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



1. When the engine is cool, drain the engine coolant from the radiator (see section 10).

   ⚠ WARNING Do not remove the radiator cap when the engine is hot; the engine coolant is under pressure and could severely scald you.

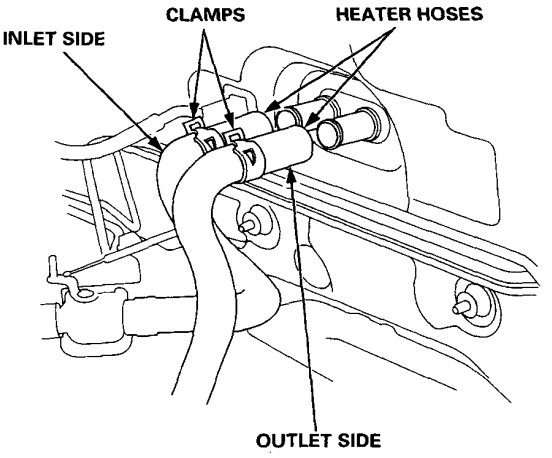
2. Open the clamp, then disconnect the heater valve cable from the heater valve arm.



3. Disconnect the heater hoses from the heater unit.

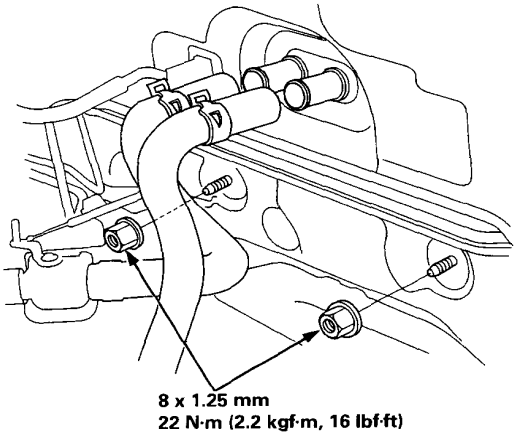
   CAUTION: Engine coolant will damage paint. Quickly rinse any spilled engine coolant from painted surfaces.

   NOTE: Engine coolant will run out when the hoses are disconnected; drain it into a clean drip pan.



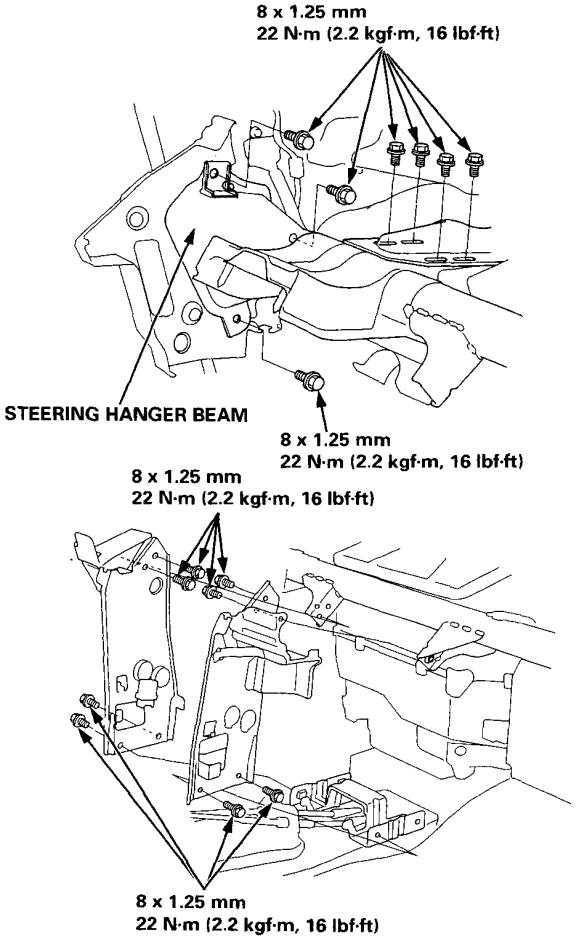
4. Remove the two mounting nuts from the heater unit.

   NOTE: When removing the mounting nuts, take care not to damage or bend the fuel pipes, brake pipes, etc.



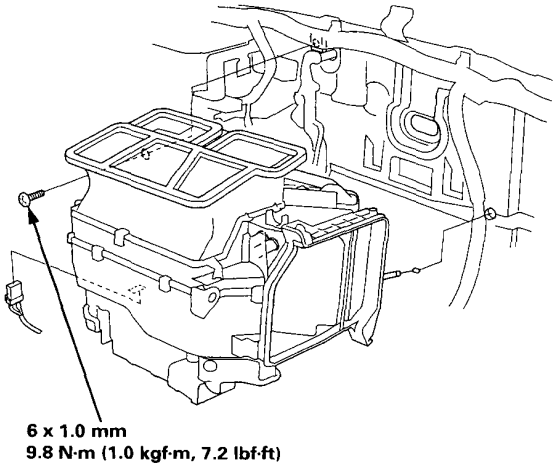
5. Remove the dashboard (see section 20).

6. Remove the mounting bolts and mounting nuts in the following sequence, then remove the steering hanger beam.



7. Remove the heater duct (see page 21-17) or the evaporator (see page 22-28).

8. Disconnect the mode control motor connector, then remove the mounting bolt and the heater unit.



9. Install in the reverse order of removal. Make note of the following items.

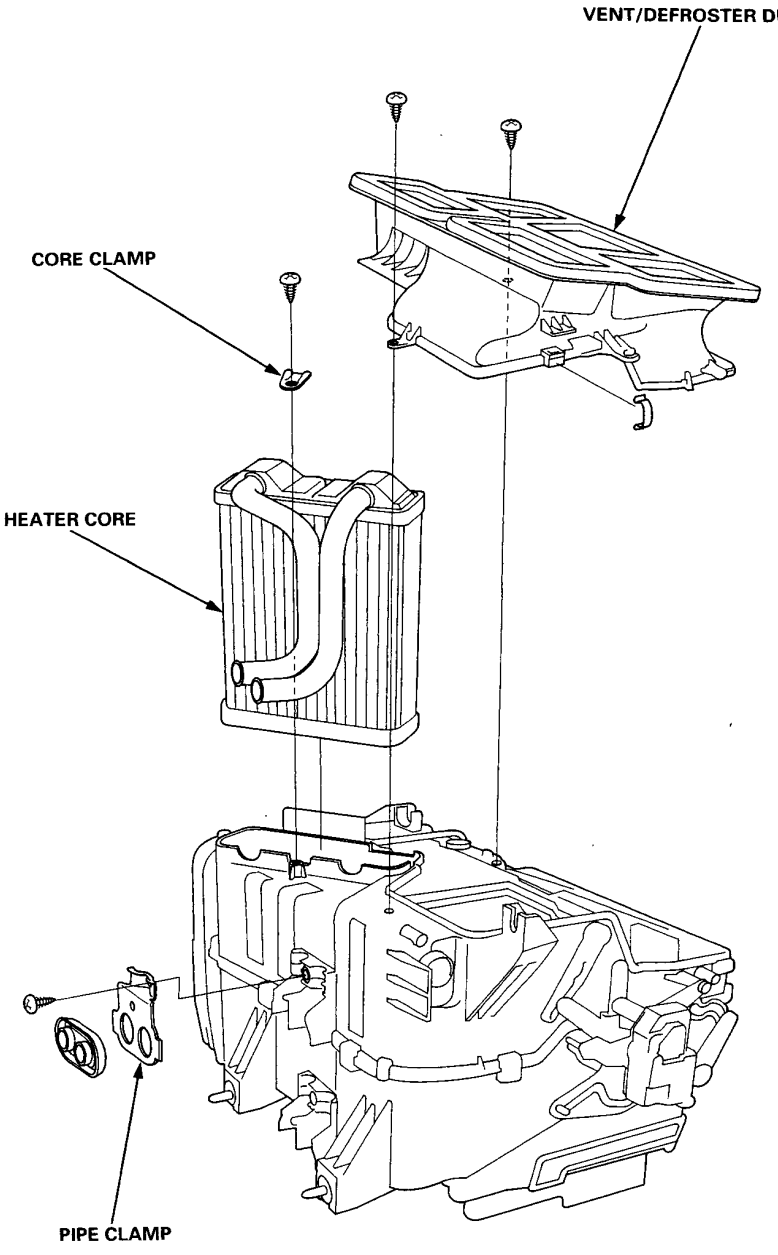
- *Apply sealant to the grommets.*
- Do not interchange the inlet and outlet heater hoses. Make sure that the clamps are secure.
- Loosen the bleed bolt on the engine, and refill the radiator and coolant reservoir with the proper engine coolant mixture (see section 10). Tighten the bleed bolt when all the trapped air has escaped and engine coolant begins to flow from it (see section 10).
- Connect all cables, and make sure they are properly adjusted (see page 21-25).

Heater Unit

Overhaul

1. Remove the two self-tapping screws and the vent/defroster duct.
2. Remove the self-tapping screw and pipe clamp.
3. Remove the self-tapping screw and core clamp.
4. Pull out the heater core.

   NOTE: Be careful not to bend the inlet and outlet pipes during heater core removal.
5. Assemble in the reverse order of disassembly.



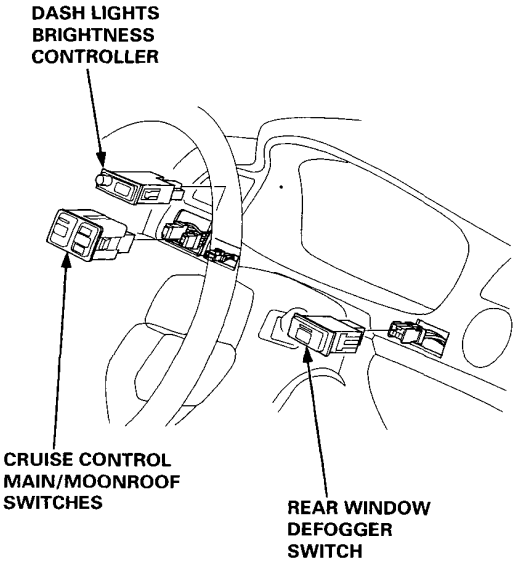
Heater Control Panel

Replacement

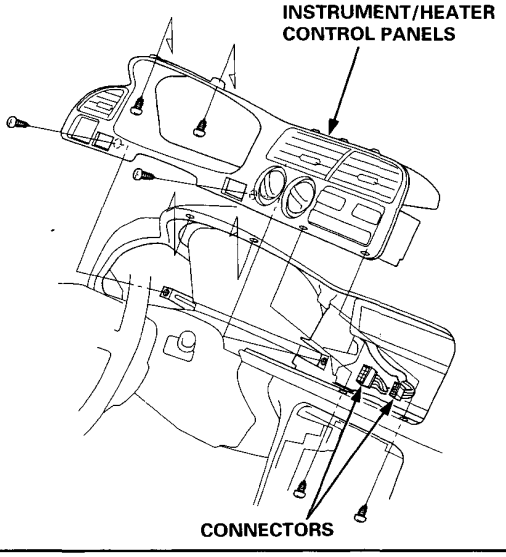
1. Disconnect the air mix control cable from the heater unit (see page 21-25).

2. Remove the stereo radio/cassette player (see section 23) and the glove box (see section 20).

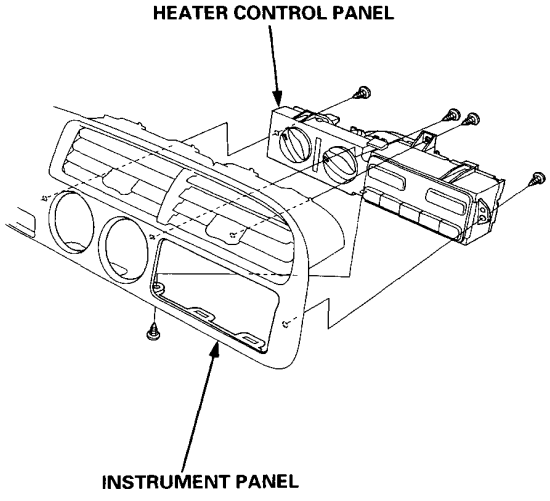
3. Remove the cruise control main/moonroof, dash lights brightness controller and rear window defogger switches.



4. Remove the six self-tapping screws, then pull out the instrument/heater control panels. Disconnect the connectors from the heater control panel, then remove the instrument/heater control panels.



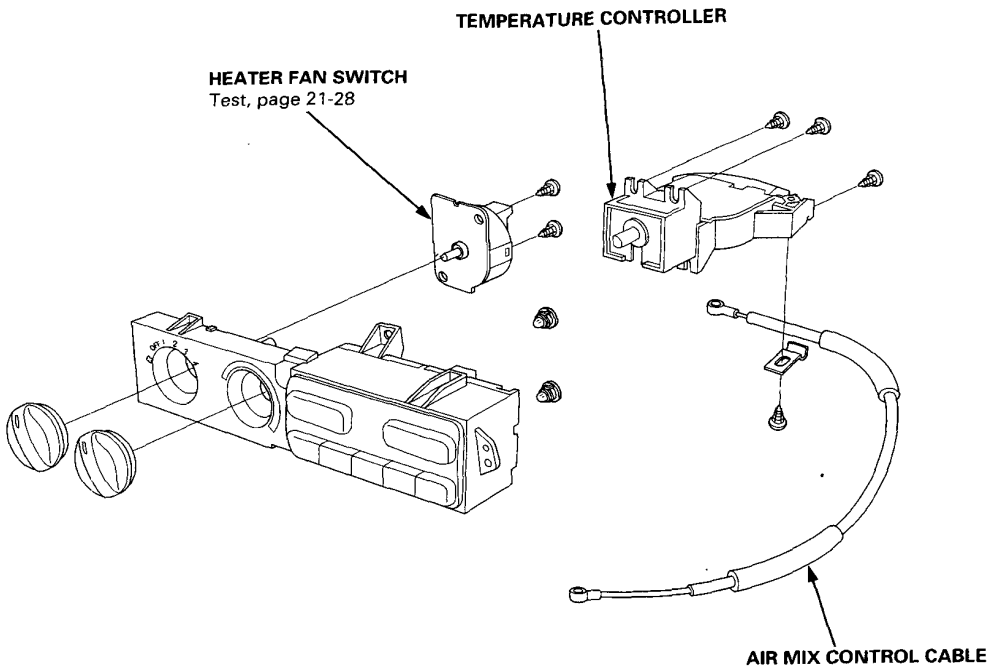
5. Remove the five self-tapping screws and the heater control panel from the instrument panel.



6. Install in the reverse order of removal, and adjust the air mix control cable at the heater unit (see page 21-25). If necessary, adjust the heater valve cable (see page 21-25).

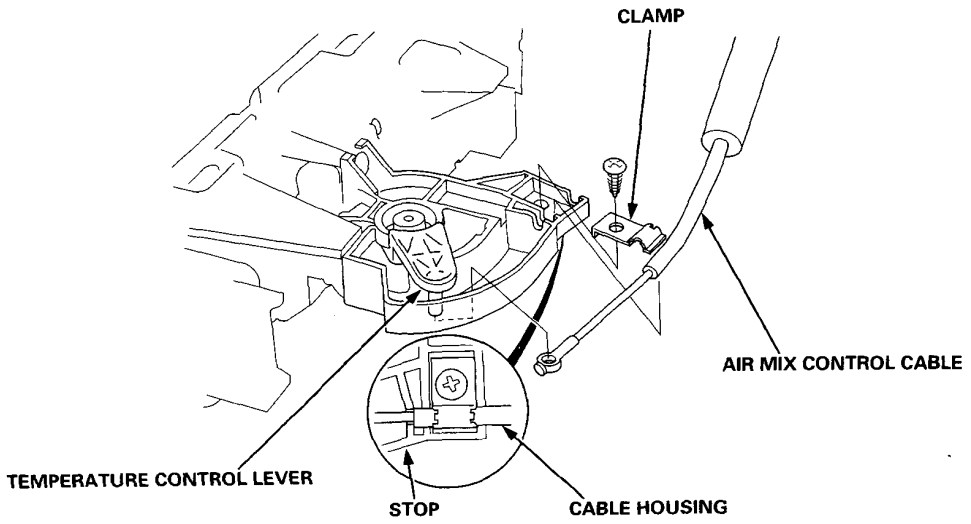
Heater Control Panel

Overhaul



Air Mix Control Cable Replacement

1. Remove the self-tapping screw and clamp.
2. Lift the end of the temperature control lever up, then remove the air mix control cable.

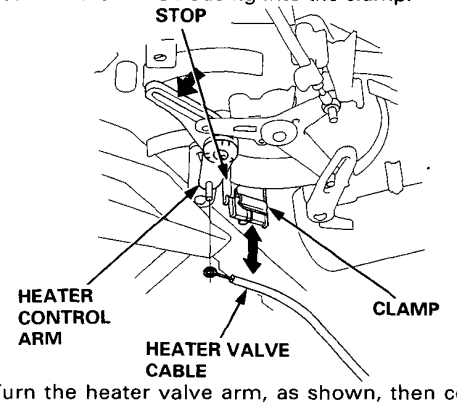


3. Install in the reverse order of removal. Make note of the following items.
   - Be sure the end of the cable housing is against the stop before tightening the cable clamp.
   - After assembly, check that the temperature control lever slides smoothly through the full stroke from right to left.

Heater Valve Cable

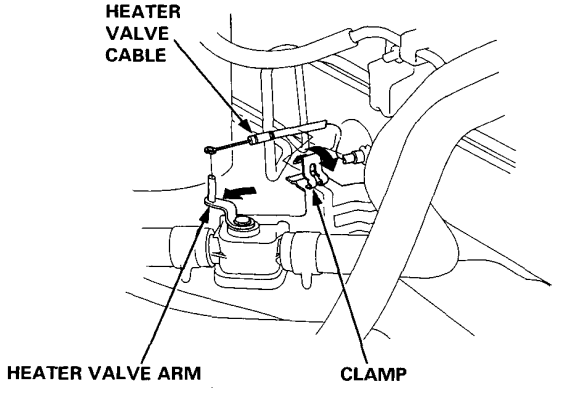
Adjustment

1. Disconnect the heater valve cable from the heater valve arm and clamp, and from the heater control arm and clamp.
2. Set the temperature control dial to MAX. COOL.
3. Turn the heater control arm, as shown, then connect the end of the heater valve cable to the heater control arm.
4. Gently slide the heater valve cable housing back from the end enough to take up any slack in the heater valve cable, but not enough to make the temperature control dial move. Hold the end of the heater valve cable housing against the stop, then snap the heater valve cable housing into the clamp.



5. Turn the heater valve arm, as shown, then connect the end of the heater valve cable to the heater valve arm.
6. Gently slide the heater valve cable housing back from the end enough to take up any slack in the heater valve cable, but not enough to make the temperature control dial move, then snap the heater valve cable housing into the clamp.

NOTE: The air mix control cable should always be adjusted whenever the heater valve cable has been disconnected.

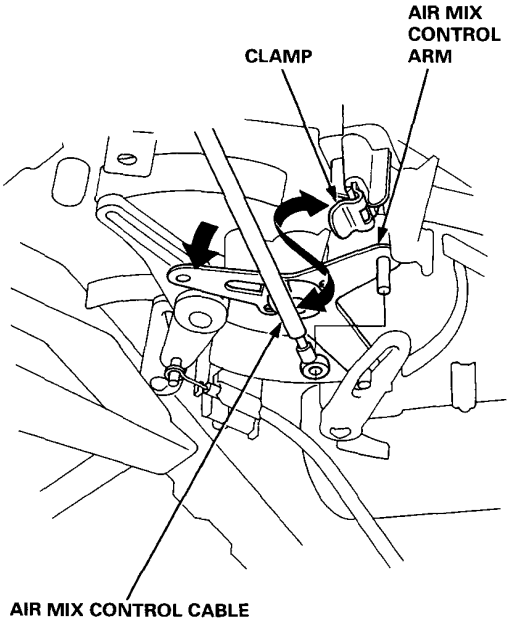


Air Mix Control Cable

Adjustment

1. Disconnect the air mix control cable from the air mix control arm and clamp.
2. Set the temperature control dial to MAX. COOL.
3. Turn the air mix control arm, as shown, then connect the end of the air mix control cable to the air mix control arm.
4. Gently slide the air mix control cable housing back from the end enough to take up any slack in the air mix control cable, but not enough to make the temperature control dial move, then snap the air mix control cable housing into the clamp.

NOTE: The heater valve cable should always be adjusted whenever the air mix control cable has been disconnected.



Mode Control Motor

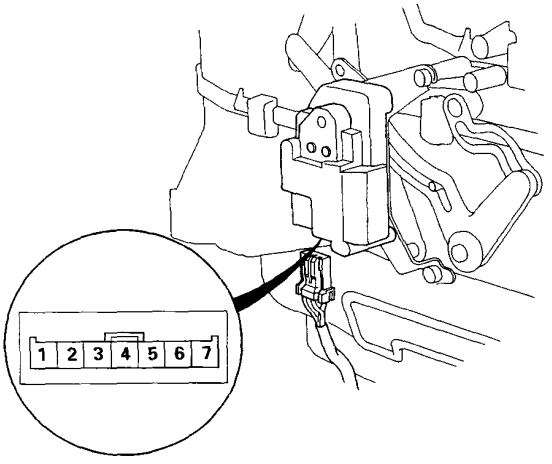
Test

1. Connect battery power to the No. 1 terminal, and ground the No. 7 terminal.

   CAUTION: Never connect the battery in the opposite direction.

2. Using a jumper wire, connect the No. 7 terminal individually to the No. 2, 3, 4, 5 and 6 terminals in that order. Each time the connection is made, the mode control motor should run smoothly and stop.

   NOTE: If the mode control motor does not run when jumping the first terminal, jump that terminal again after jumping the other terminals.
   The mode control motor is normal if it runs when jumping the first terminal again.

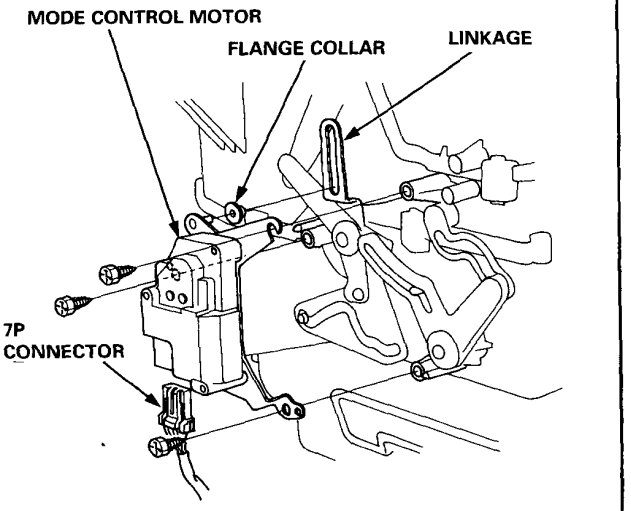


3. If the mode control motor does not run in step 2, remove it, and check the mode control linkage and doors for smooth movement. If the mode control linkage and doors move smoothly, replace the mode control motor.

Replacement

1. Disconnect the 7P connector from the mode control motor.

2. Remove the three self-tapping screws, mode control motor and the flange collar.



3. Install in the reverse order of removal, and after installation, make sure the mode control motor runs smoothly.

Recirculation Control Motor

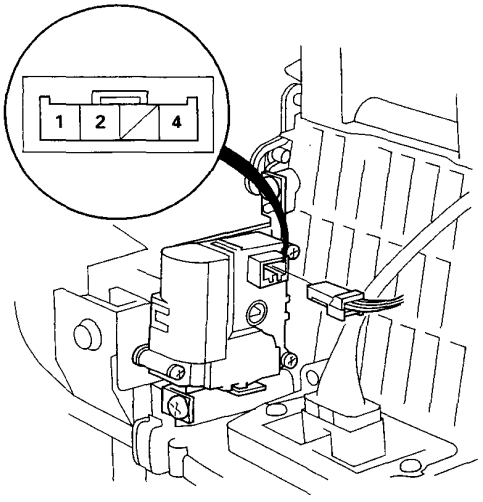
Test

1. Connect battery power to the No. 1 terminal, and ground the No. 2 and No. 4 terminals; the recirculation control motor should run smoothly.

   CAUTION: Never connect the battery in the opposite direction.

2. Disconnect the No. 2 or No. 4 terminals from ground; the recirculation control motor should stop at FRESH or RECIRCULATE.

   NOTE: Don't cycle the recirculation control motor for a long time.

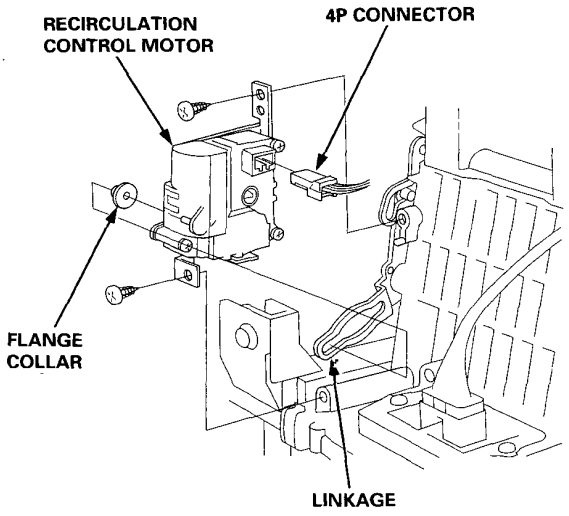


3. If the recirculation control motor does not run in step 1, remove it, and check the recirculation control linkage and doors for smooth movement. If the recirculation control linkage and doors move smoothly, replace the recirculation control motor.

Replacement

1. Disconnect the 4P connector from the recirculation control motor.

2. Remove the two self-tapping screws, recirculation control motor and the flange collar.

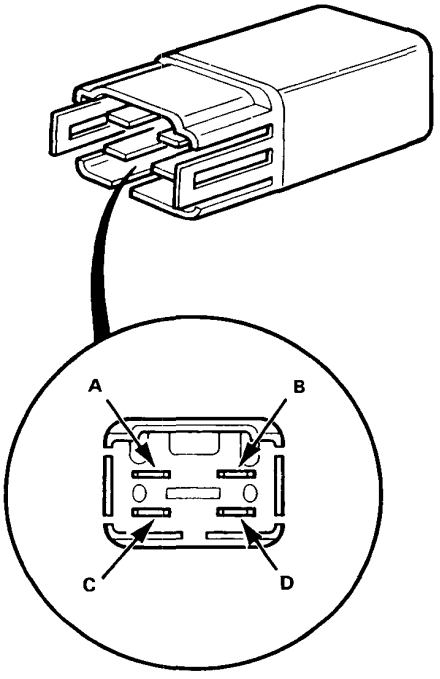


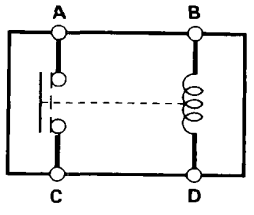
3. Install in the reverse order of removal, and after installation, make sure the recirculation control motor runs smoothly.

Relay

Test

There should be continuity between the A and C terminals when power and ground are connected to the B and D terminals, and there should be no continuity when power is disconnected.



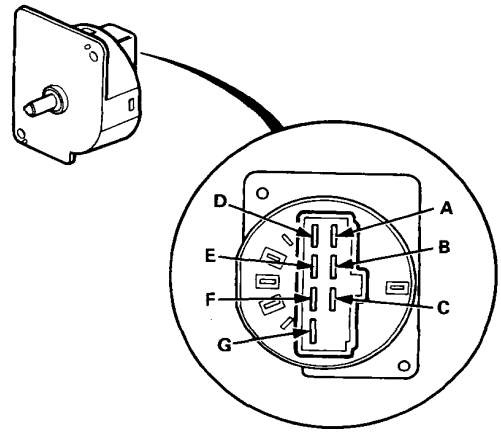


Heater Fan Switch

Test

Check for continuity between the terminals according to the table below.

Position \ Terminal	B	A	D	E	F	G
OFF						
1	○	○	○			
2	○	○		○		
3	○	○			○	
4	○	○				○

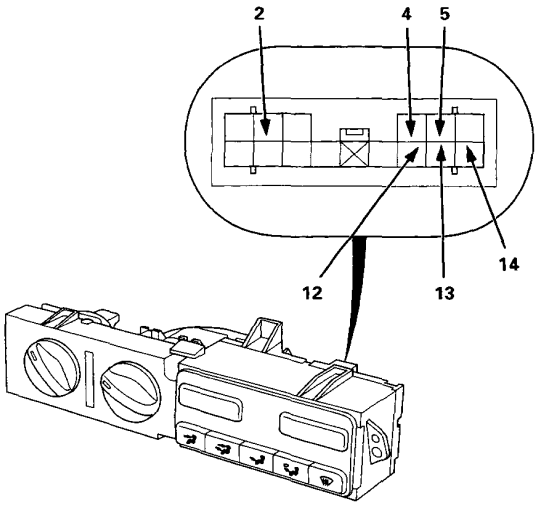


Mode Control Switch

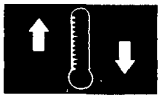
Test

Check for continuity between the terminals according to the table below.

Position \ Terminal	2	14	13	12	4	5
Heat	○	○				
Heat/Def	○		○			
Def	○			○		
Vent	○				○	
Heat/Vent	○					○



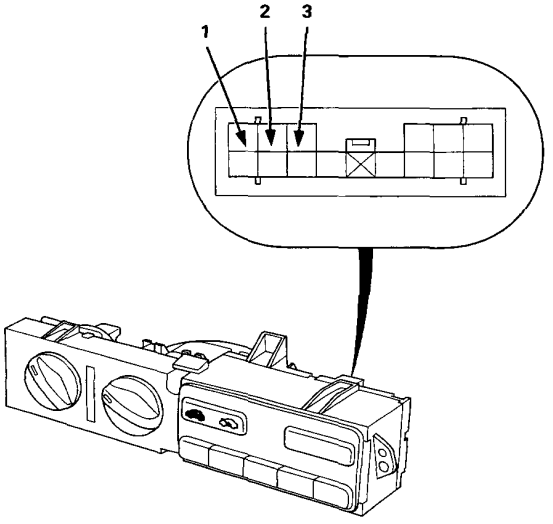
Recirculation Control Switch



Test

Check for continuity between the terminals according to the table below.

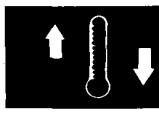
Position \ Terminal	3	1	2
Fresh		○	○
Recirculate	○		○



Air Conditioning

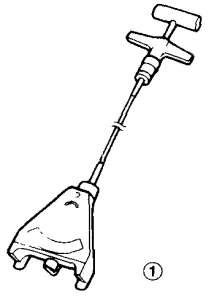
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*: Read SRS precautions before working in this area.

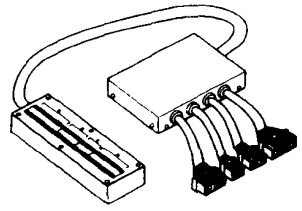


Special Tools

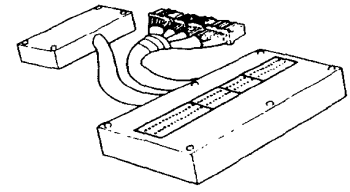
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JGG – 0010100 or 07JGG – 0010101	Belt Tension Gauge	1	22-42
②	07LAJ – PT3010A or 07LAJ – PT30100	Test Harness	1	22-15
③	07NAB – HAC0100	A/C Clutch Holder	1	22-35, 40
④	07QAD – P0A0100	Outer Screw Driver	1	22-36



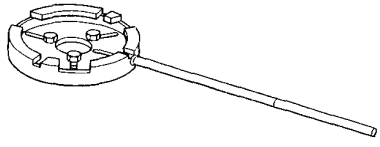
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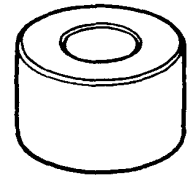
②



②



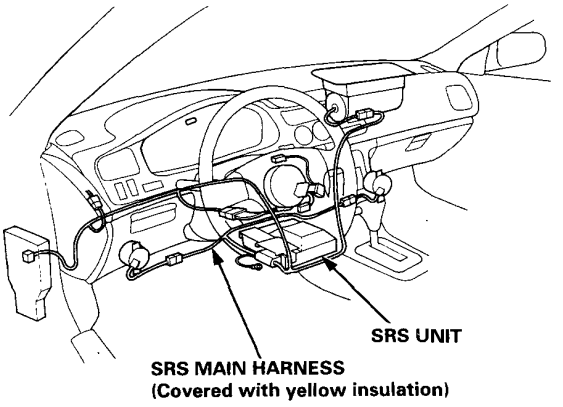
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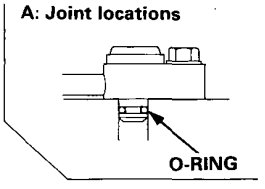


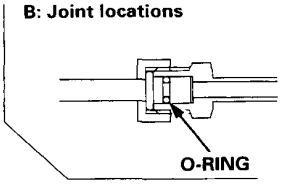
④

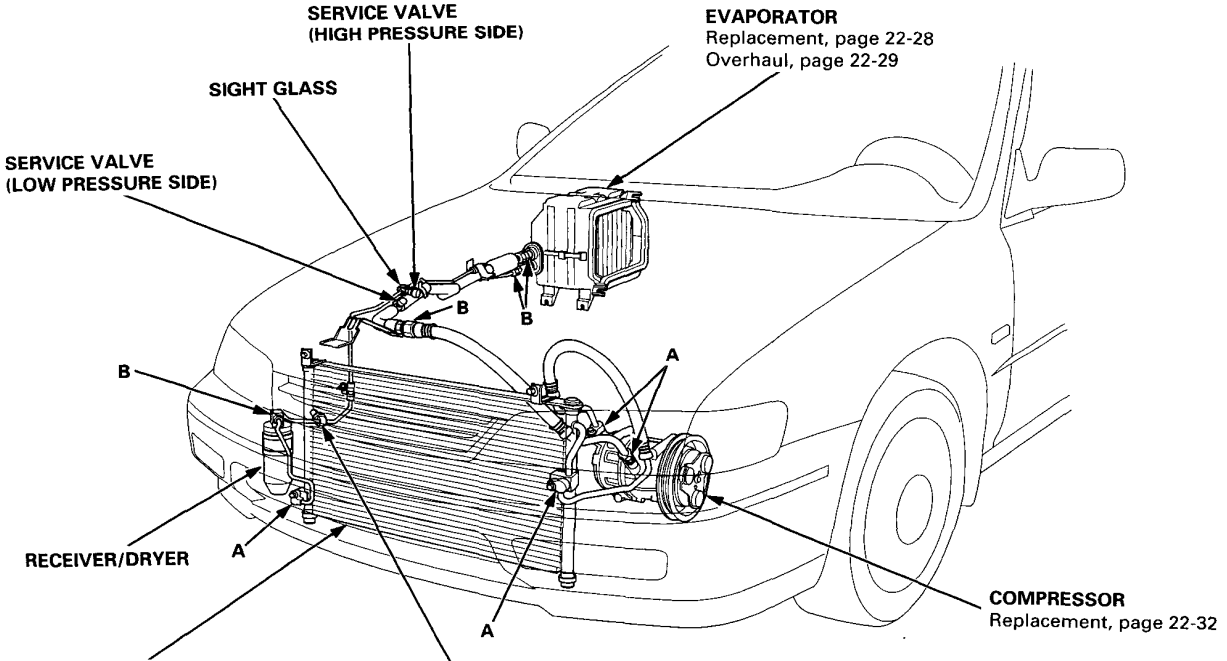
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



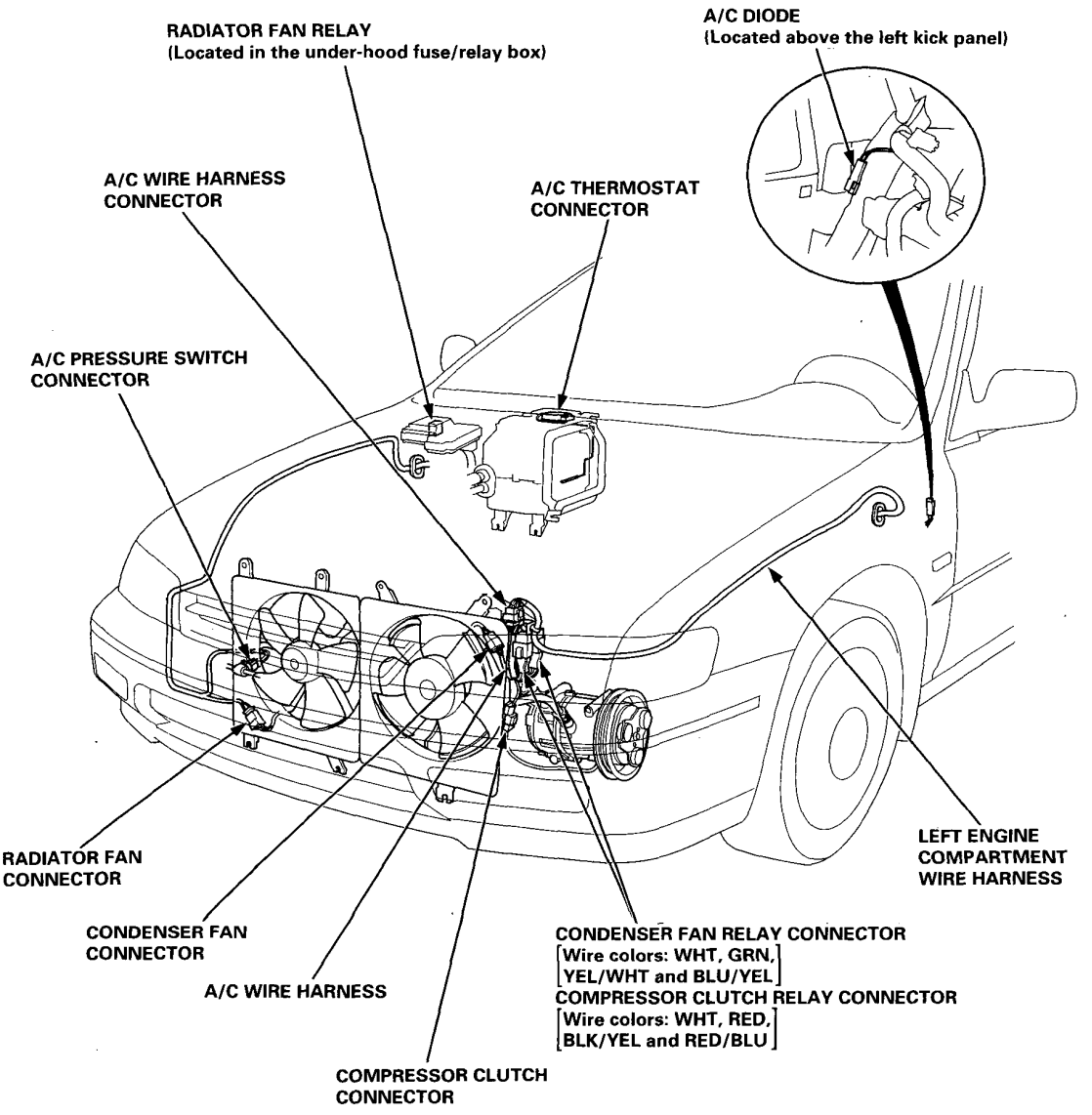




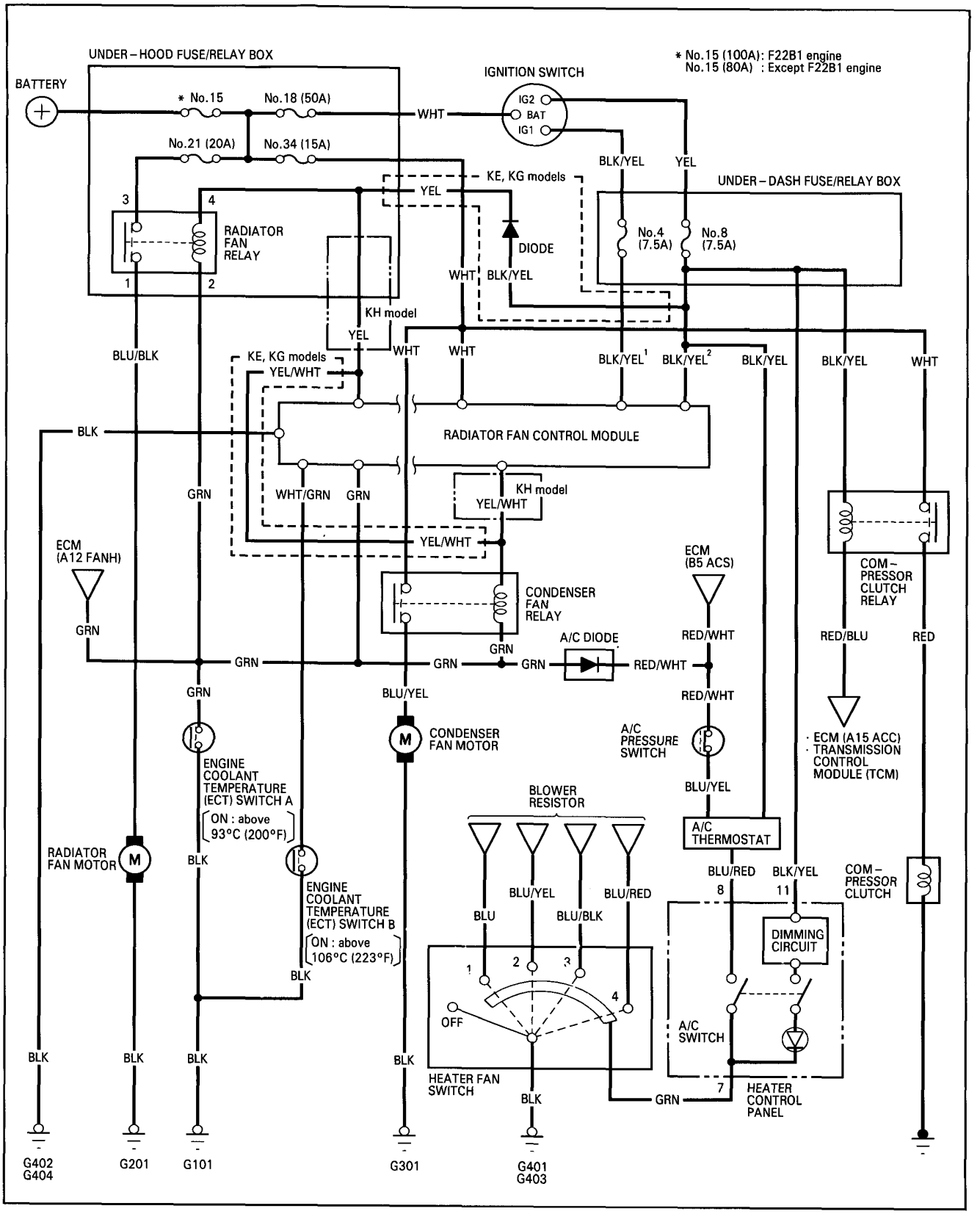


A/C PRESSURE SWITCH
When the refrigerant pressure is below 200 kPa (2.0 kgf/cm², 28 psi) due to refrigerant leakage or above 3,200 kPa (32 kgf/cm², 455 psi) due to refrigerant blockage, the A/C pressure switch opens the circuit to the A/C switch and stops the air conditioning to protect the compressor.

Wiring/Connector Locations



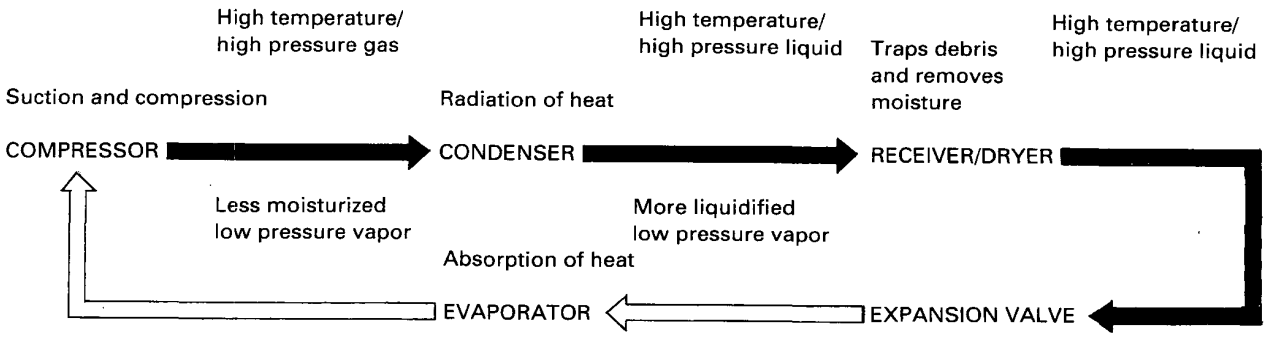
Circuit Diagram

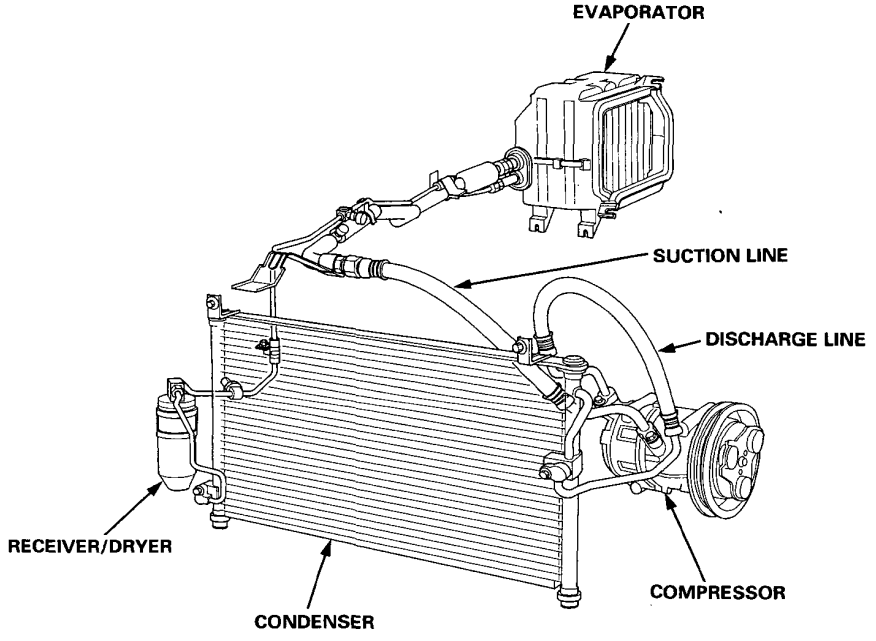


Description

Outline

The air conditioning system delivers cooled air into the passenger compartment by circulating refrigerant through the system as shown below.





This car uses HFC-134a (R-134a) refrigerant which does not contain chlorofluorocarbons. Pay attention to the following service items:

- Do not mix refrigerants CFC-12 (R-12) and HFC-134a (R-134a). They are not compatible.
- Use only the recommended polyalkyleneglycol (PAG) refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003) designed for the R-134a compressor. Intermixing the recommended (PAG) refrigerant oil with any other refrigerant oil will result in compressor failure.
- All A/C system parts (compressor, discharge line, suction line, evaporator, condenser, receiver/dryer, expansion valve, O-rings for joints) have to be proper for refrigerant R-134a. Do not confuse with R-12 parts.
- Use a halogen gas leak detector designed for refrigerant R-134a.
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.
- Separate the manifold gauge sets (pressure gauges, hoses, joints) for refrigerants R-12 and R-134a. Do not confuse them.

Troubleshooting

Reference Chart

- Any abnormality must be corrected before continuing the test.
- Because of the precise measurements needed, use a multimeter when testing.

Before performing any troubleshooting procedures check:
- Fuses *1 No. 34 (15 A), *1 No. 21 (20 A), *2 No. 8 (7.5 A), *2 No. 4 (7.5 A)
- Grounds No. G401, G402, G403, G404, G301, G201, G101
- Cleanliness and tightness of all connectors

*1: In the under-hood fuse/relay box
*2: In the under-dash fuse/relay box

SYMPTOM	REMEDY
Radiator fan does not run at all.	Perform the procedures in the flowchart (see page 22-8).
Condenser fan does not run at all.	Perform the procedures in the flowchart (see page 22-10).
Both fans (radiator and condenser) do not run for engine cooling, but they both run with the A/C on.	Perform the procedures in the flowchart (see page 22-12).
Both fans do not run at all.	Perform the procedures in the flowchart (see page 22-13).
Compressor clutch does not engage.	Perform the procedures in the flowchart (see page 22-14).
A/C system does not come on (compressor and both fans).	Perform the procedures in the flowchart (see page 22-16).

Radiator Fan

Radiator fan does not run at all.

Check the No. 21 (20 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?
- NO → **Replace the fuse and recheck.**
- YES

Remove the radiator fan relay from the under-hood fuse/relay box, and test it (see page 22-20).

Is the relay OK?
- NO → **Replace the radiator fan relay.**
- YES

Measure the voltage between the No. 3 terminal (+) and body ground (–).

Is there battery voltage?
- NO → **Replace the under-hood fuse/ relay box.**
- YES

Connect the No. 1 and No. 3 terminals with a jumper wire.

Does the radiator fan run?
- YES → To page 22-9
- NO

Disconnect the jumper wire.

Disconnect the radiator fan 2P connector.

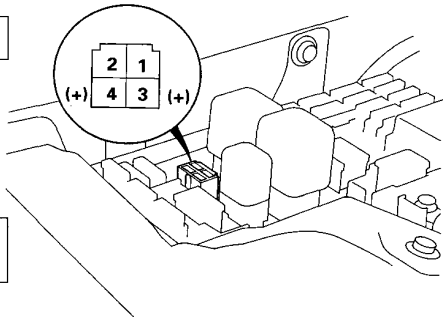
Check for continuity in the BLU/BLK wire between the No. 1 terminal and the radiator fan.

Is there continuity?
- NO → **Repair open in the BLU/BLK wire between the under-hood fuse/ relay box and the radiator fan.**
- YES

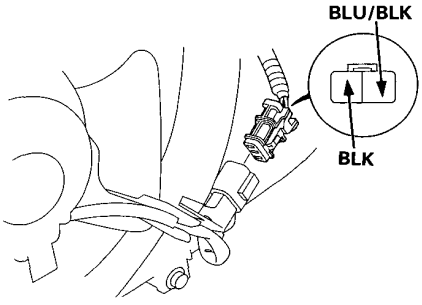
Check for continuity in the BLK wire between the radiator fan and body ground.

Is there continuity?
- NO → **Check for an open in the BLK wire between the radiator fan and body ground. If the wire is OK, check for poor ground at G201.**
- YES

Replace the radiator fan motor.



View from wire side



From page 22-8

Disconnect the jumper wire, and turn the ignition switch ON (II).

Measure the voltage between the No. 4 terminal (+) and body ground (–).

Is there battery voltage?

YES → **Repair open in the GRN wire between the under-hood fuse/relay box and the A/C diode.**

NO

KE, KG models

Repair open in the YEL wire or BLK/YEL wire or diode between the under-hood fuse/relay box and under-dash fuse/relay box.

KH model

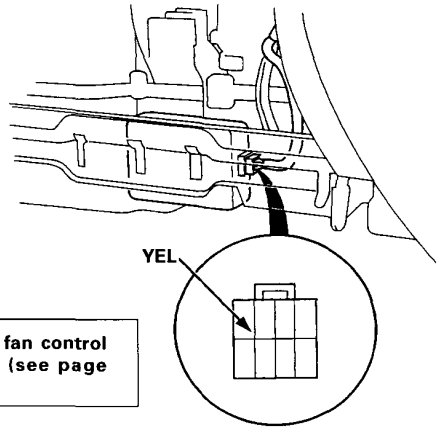
Measure the voltage between the YEL wire terminal (+) of the radiator fan control module and body ground (–).

Is there battery voltage?

NO → **Perform the radiator fan control module input tests (see page 22-20).**

YES

Repair open in the YEL wire between the under-hood fuse/relay box and the radiator fan control module.



View from wire side

Condenser Fan

Condenser fan does not run at all.

Check the No. 4 (7.5 A) and No. 8 (7.5 A) fuses in the under-dash fuse/relay box, and No. 34 (15 A) fuse in the under-hood fuse/relay box.

Are the fuses OK?
- NO → **Replace the fuses and recheck.**
- YES

Remove the condenser fan relay, and test it (see page 22-20).

Is the relay OK?
- NO → **Replace the condenser fan relay.**
- YES

Measure the voltage between the WHT wire terminal (+) and body ground (–).

Is there battery voltage?
- NO → **Repair open in the WHT wire between the under-hood fuse/relay box and the condenser fan relay.**
- YES

Connect the WHT and BLU/YEL wire terminals with a jumper wire.

Does the condenser fan run?
- YES → To page 22-11
- NO

Disconnect the jumper wire.

Disconnect the condenser fan 2P connector.

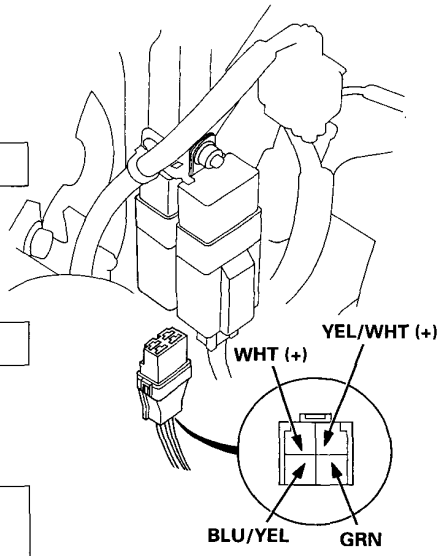
Check for continuity in the BLU/YEL wire between the condenser fan relay and the condenser fan.

Is there continuity?
- NO → **Repair open in the BLU/YEL wire between the condenser fan relay and the condenser fan.**
- YES

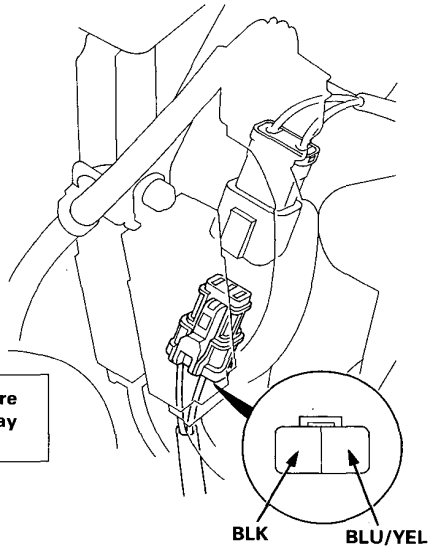
Check for continuity in the BLK wire between the condenser fan and body ground.

Is there continuity?
- NO → **Check for an open in the BLK wire between the condenser fan and body ground. If the wire is OK, check for poor ground at G301.**
- YES

Replace the condenser fan motor.



View from wire side



View from wire side

From page 22-10

Disconnect the jumper wire, and turn the ignition switch ON (II).

Measure the voltage between the YEL/WHT wire terminal (+) and body ground (–).

Is there battery voltage?

YES → **Repair open in the GRN wire between the condenser fan relay and the A/C diode.**

NO

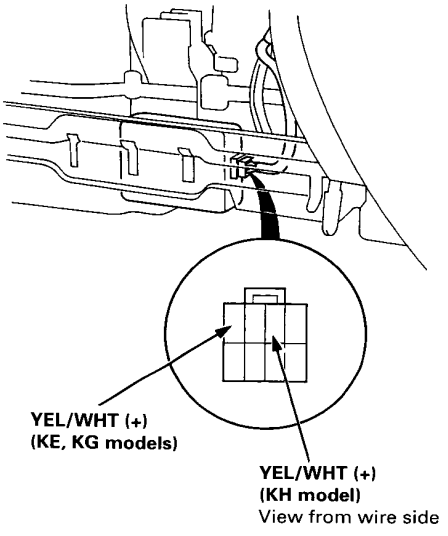
Measure the voltage between the YEL/WHT wire terminal (+) of the radiator fan control module and body ground (–).

Is there battery voltage?

NO → **Perform the radiator fan control module input tests (see page 22-19).**

YES

***Repair open in the* YEL/WHT *wire* between the condenser fan relay and the radiator fan control module.**



View from wire side

Engine Coolant Temperature (ECT) Switch A

Both fans (radiator and condenser) do not run for engine cooling, but they both run with the A/C on.

Disconnect the engine coolant temperature (ECT) switch A 2P connector.

Turn the ignition switch ON (II).

Measure the voltage between the GRN wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the GRN wire between the ECT switch A and the under-hood fuse/relay box, condenser fan relay.**

YES

Turn the ignition switch OFF, and check for continuity in the BLK wire between the ECT switch A and body ground.

Is there continuity?

NO → **Check for an open in the BLK wire between the ECT switch A and body ground. If the wire is OK, check for poor ground at G101.**

YES

Check the temperature gauge.

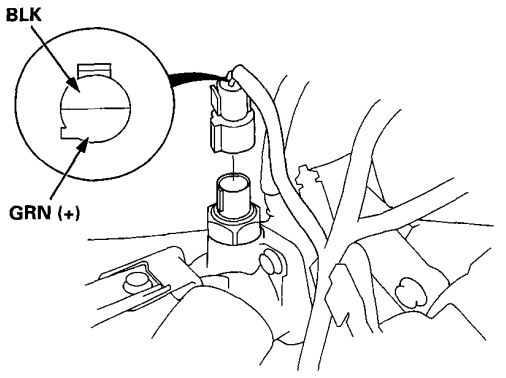
Does it read above normal?

NO → **Repair the cooling system.**

YES

Replace the ECT switch A.

View from wire side



Both Fans

Both fans do not run at all.

Check the No. 4 (7.5 A) and No. 8 (7.5 A) fuses in the under-dash fuse/relay box, and No. 34 (15 A) fuse in the under-hood fuse/relay box.

Are the fuses OK?

NO → **Replace the fuses and recheck.**

YES

Turn the ignition switch ON (II).

Measure the voltage between the BLK/YEL[2] wire terminal (+) of radiator fan control module and body ground (–).

Is there battery voltage?

NO → **Repair open in the BLK/YEL[2] wire between the under-dash fuse/relay box and the radiator fan control module.**

YES

Measure the voltage between the BLK wire terminal (+) of radiator fan control module and body ground (–).

Is there less than 1 volt?

NO → **Repair open in the BLK wire between the radiator fan control module and body ground.**

YES

Remove the A/C diode.

Measure the voltage between the GRN wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Replace the radiator fan control module.**

YES

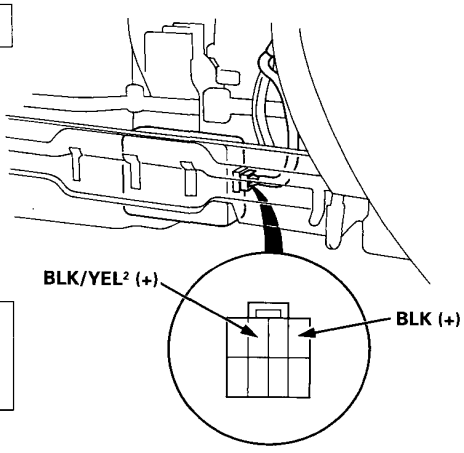
Test the A/C diode (see page 22-21).

Is the A/C diode OK?

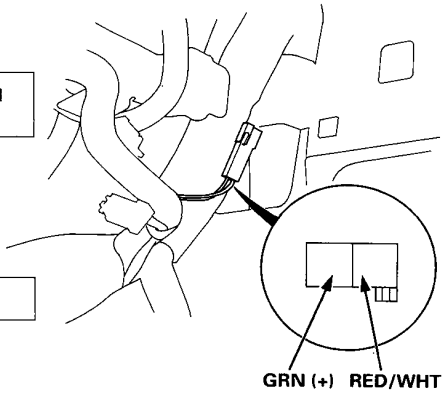
NO → **Replace the A/C diode.**

YES

Repair open in the RED/WHT wire between the A/C diode and the A/C pressure switch.



View from wire side



View from wire side

Compressor

Compressor clutch does not engage.

Check the No. 4 (7.5 A) and No. 8 (7.5 A) fuses in the under-dash fuse/relay box, and No. 34 (15 A) fuse in the under-hood fuse/relay box.

Are the fuses OK?

NO → **Replace the fuses and recheck.**

YES

Remove the compressor clutch relay, and test it (see page 22-20).

Is the relay OK?

NO → **Replace the compressor clutch relay.**

YES

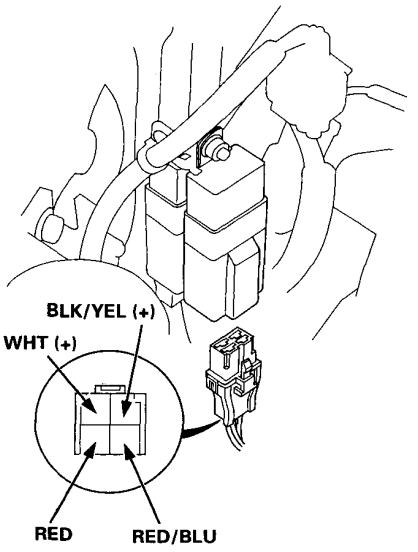
Measure the voltage between the WHT wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the WHT wire between the under-hood fuse/relay box and the compressor clutch relay.**

YES

Connect the WHT and RED wire terminals with a jumper wire.



View from wire side

Does the compressor clutch click?

NO → Disconnect the jumper wire.

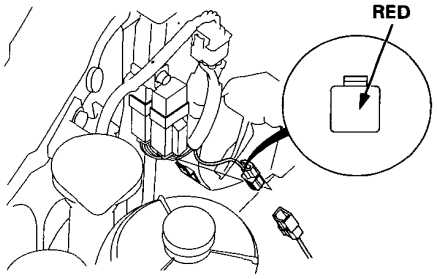
YES

Disconnect the jumper wire.

To page 22-15

Disconnect the compressor clutch 1P connector.

Check for continuity in the RED wire between the compressor clutch relay and the compressor clutch.



View from wire side

Is there continuity?

NO → **Repair open in the RED wire between the compressor clutch relay and the compressor clutch.**

YES

Inspect the compressor clutch clearance and the compressor clutch field coil (see page 22-34 or 39).

From page 22-14

Turn the ignition switch ON (II).

Measure the voltage between the BLK/YEL wire terminal (+) and body ground (–).

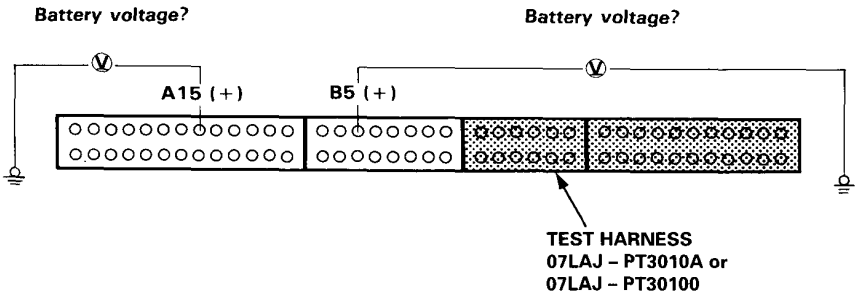
Is there battery voltage?

NO → **Repair open in the BLK/YEL wire between the under-dash fuse/relay box and the compressor clutch relay.**

YES

Turn the ignition switch OFF, and reinstall the compressor clutch relay.

Connect the test harness "A"and "B" connectors to the main wire harness only, not to the ECM (see section 11).



Turn the ignition switch ON (II).

Measure the voltage between the A15 terminal (+) and body ground (–).

Is there battery voltage?

NO → ***Repair open in the RED/BLU wire between the compressor clutch relay and the ECM.***

YES

Make sure the A/C and heater fan switches are OFF.

Measure the voltage between the B5 terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the RED/WHT wire between the A/C diode and the ECM.**

YES

Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

A/C System

A/C system does not come on (compressor and both fans).

Disconnect the A/C pressure switch 2P connector.

Turn the ignition switch ON (II).

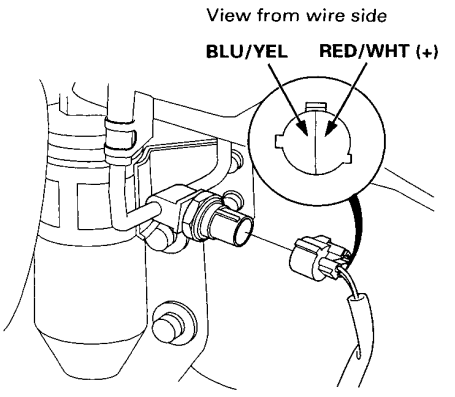
Measure the voltage between the RED/WHT wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the RED/WHT wire between the A/C diode and the A/C pressure switch.**

YES

Turn the ignition switch OFF.



Check for continuity between the No. 1 and No. 2 terminals of the A/C pressure switch.

Is there continuity?

NO → Check for A/C system pressure.

YES

Reconnect the A/C pressure switch 2P connector.

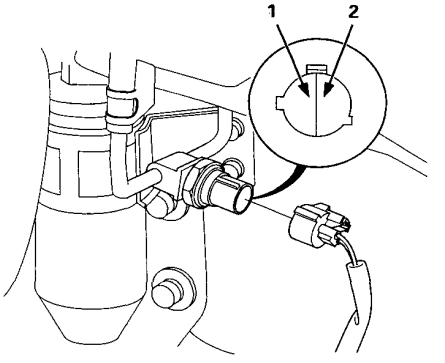
To page 22-17

Is the pressure within specifications?

NO → **Repair the A/C pressure problem.**

YES

Replace the A/C pressure switch.



From page 22-16

Disconnect the A/C thermostat 3P connector.

Turn the ignition switch ON (II).

Measure the voltage between the BLK/YEL wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the BLK/YEL wire between the under-dash fuse/relay box and the A/C thermostat.**

YES

Measure the voltage between the BLU/YEL wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the BLU/YEL wire between the A/C pressure switch and the A/C thermostat.**

YES

Turn the ignition switch OFF.

Reconnect the A/C thermostat 3P connector, and connect the BLU/RED wire terminal to ground with a jumper wire.

Start the engine.

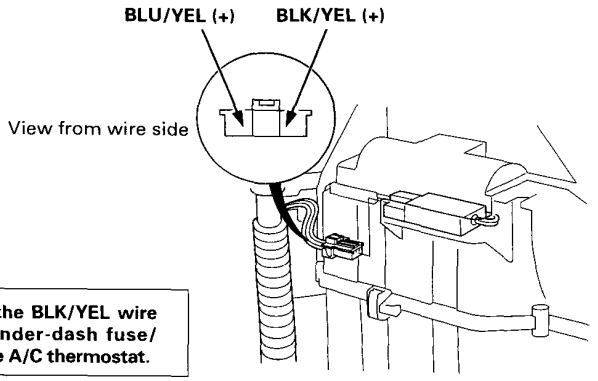
Do the radiator and condenser fans run and the compressor clutch engage?

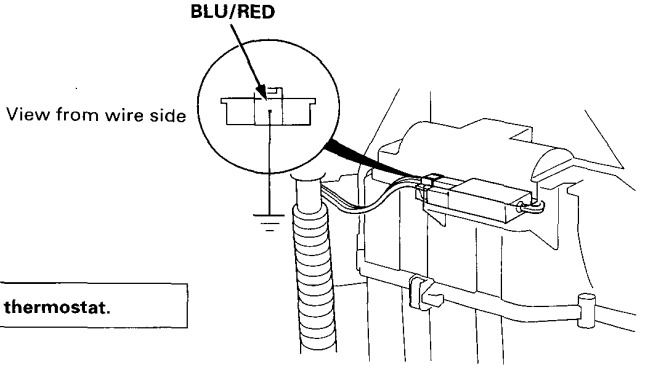
NO → **Replace the A/C thermostat.**

YES

Turn the ignition switch OFF, and disconnect the jumper wire.

To page 22-18





(cont'd)

A/C System (cont'd)

From page 22-17

Remove the heater control panel (see page 21-23).

Disconnect the heater control panel 14P connector.

Turn the ignition switch ON (II).

Measure the voltage between the BLU/RED wire terminal (+) and body ground (–).

Is there battery voltage?

NO → **Repair open in the BLU/RED wire between the A/C thermostat and the heater control panel.**

YES

Turn the ignition switch OFF.

Test the A/C switch (see page 22-21).

Is the A/C switch OK?

NO → **Replace the heater control panel (A/C switch).**

YES

Disconnect the heater fan switch 8P connector.

Check for continuity in the GRN wire between the heater control panel and the heater fan switch.

Is there continuity?

NO → **Repair open in the GRN wire between the heater control panel and the heater fan switch.**

YES

Check for continuity in the BLK wire between the heater fan switch and body ground.

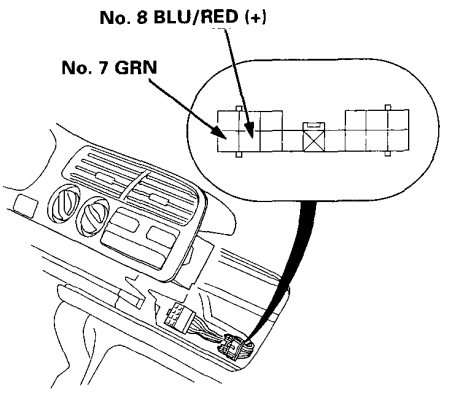
Is there continuity?

NO → **Check for an open in the BLK wire between the heater fan switch and body ground. If the wire is OK, check for poor ground at G401 and G403.**

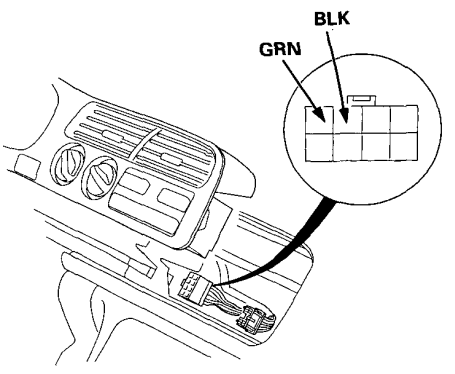
YES

Replace the heater fan switch.

View from wire side

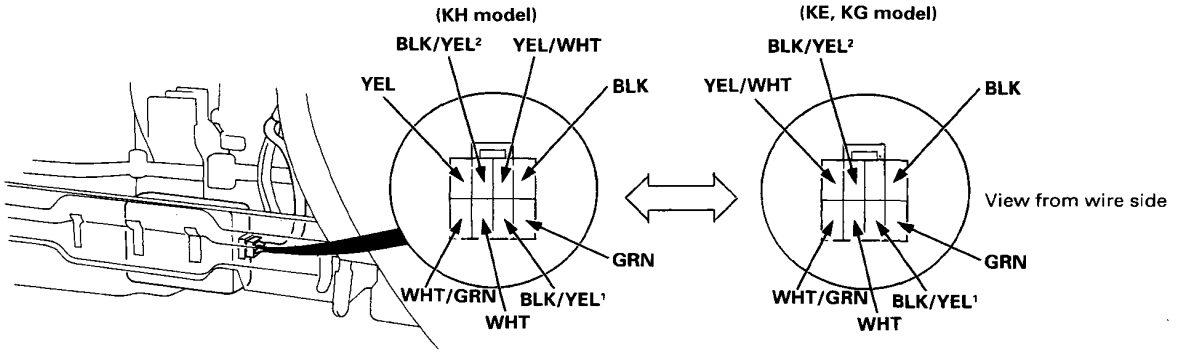


View from wire side



Radiator Fan Control Module Input Tests

NOTE: Perform the following tests with the radiator fan control module connected, the ignition switch ON, and the A/C switch OFF.
If you find the cause of a problem, correct it before you continue.



WIRE COLOR	TEST CONDITION	DESIRED RESULTS	CORRECTIVE ACTION IF DESIRED RESULTS ARE NOT OBTAINED
BLK	Check for voltage to body ground.	There should be less than one volt.	Repair open to body ground.
WHT	Check for battery voltage:	There should be battery voltage.	Check No. 34 (15 A) fuse in the under-hood fuse/relay box; if OK, repair open in the WHT wire.
BLK/YEL¹	Check for battery voltage: Ignition switch – ON (II)		Check No. 4 (7.5 A) fuse in the under-dash fuse/relay box; if OK, repair open in the BLK/YEL¹ wire.
BLK/YEL²	Check for battery voltage: Ignition switch – ON (II)		Check No. 8 (7.5 A) fuse in the under-dash fuse/relay box; if OK, repair open in the BLK/YEL² wire.
YEL/WHT	Check for battery voltage: Ignition switch – ON (II)		Replace radiator fan control module. Before you connect the new radiator fan control module, disconnect both fan relays. Check for continuity between the YEL/WHT (or YEL) wire and ground, using the 20 kΩ scale on your ohmmeter. There should be no continuity. If there is continuity, the new radiator fan control module will be damaged when you connect it.
YEL	Check for battery voltage: Ignition switch – ON (II)		
GRN	Connect to body ground: Ignition switch – ON (II)	Condenser fan and radiator fan should come on.	Check for an open in the GRN wire between the radiator fan control module and condenser fan relay or radiator fan relay. If OK, check for an open in the YEL/WHT wire between the radiator fan control module and condenser fan relay or the YEL wire between the radiator fan control module and radiator fan relay. If OK, test condenser fan relay or radiator fan relay.
WHT/GRN	Check for voltage.	Approx. 11 V (engine coolant temperature below 106°C [223°F])	Faulty engine coolant temperature (ECT) switch B, short to body ground or faulty radiator fan control module

A/C Thermostat

Test

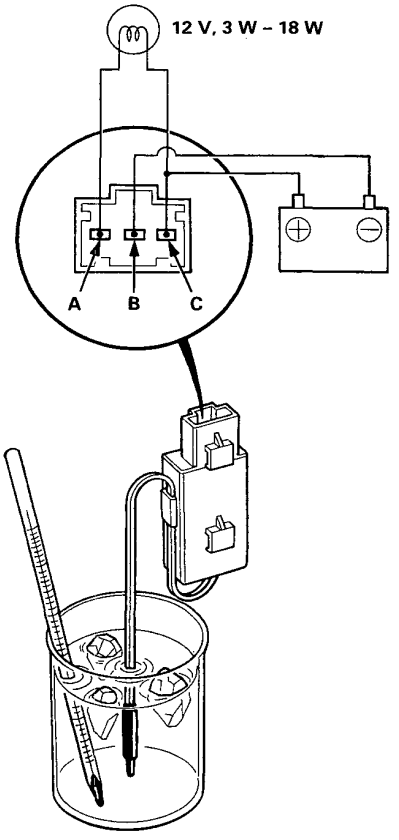
Connect battery power to the C terminal, ground the B terminal, and connect a test light between the A and B terminals.

NOTE: Use a 12 V, 3 W – 18 W test light.

Dip the A/C thermostat into a cup filled with ice water, and check the test light.

The light should go off at 2 – 4°C (36 – 39°F) or less, and should come on at 4 – 5°C (39 – 41°F) or more.

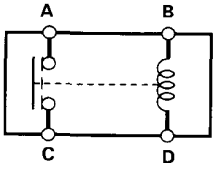
If the light doesn't come on and go off as specified, replace the A/C thermostat.



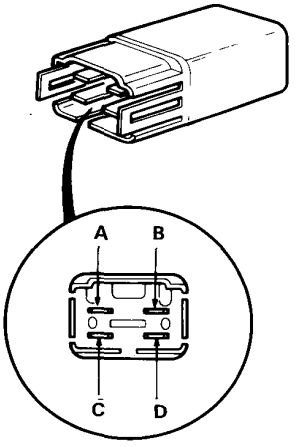
Relays

Test

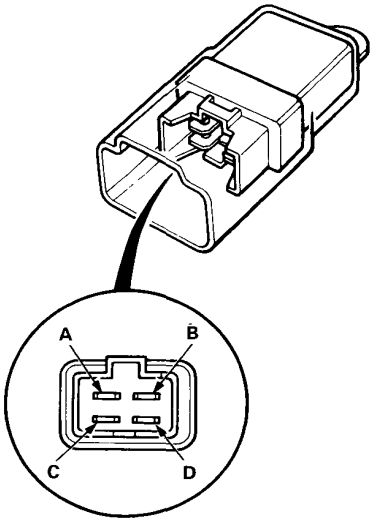
There should be continuity between the A and C terminals when power and ground are connected to the B and D terminals, and there should be no continuity when power is disconnected.



- Radiator fan relay



- Condenser fan relay
- Compressor clutch relay

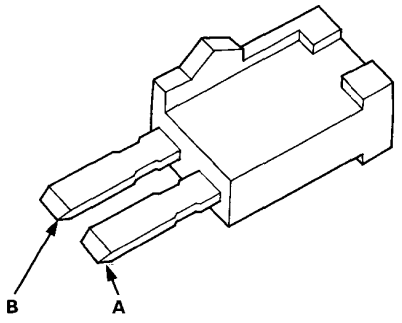


Diode

Test

NOTE: The diode is designed to pass current in one direction while blocking it in the opposite direction.
Use an analog ohmmeter or a digital ohmmeter equipped with a diode tester.

Check for current flow in both directions between the A and B terminals; there should be current flow in only one direction.



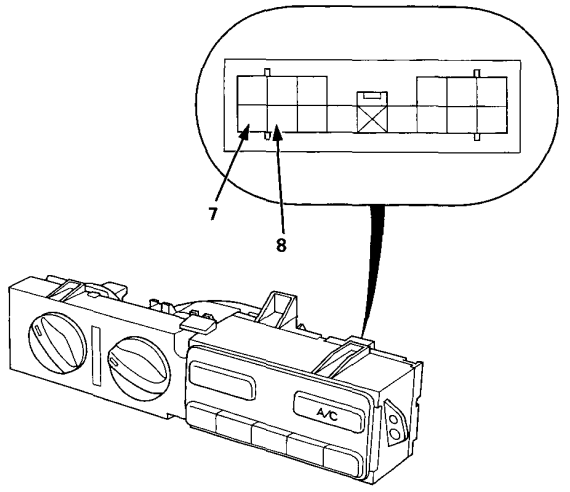


A/C Switch

Test

Check for continuity between the terminals according to the table below.

Position \ Terminal	7	8
ON	○	○
OFF		



A/C Service Tips and Precautions

The air conditioner system uses HFC-134a (R-134a) refrigerant and polyalkyleneglycol (PAG) refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003), which are not compatible with CFC-12 (R-12) refrigerant and mineral oil. Do not use R-12 refrigerant or mineral oil in this system, and do not attempt to use R-12 servicing equipment; damage to the air conditioner system or your servicing equipment will result.

Separate the manifold gauge sets (pressure gauges, hoses, joints) for refrigerants R-12 and R-134a. Do not confuse them.

⚠ WARNING When handing refrigerant (R-134a):

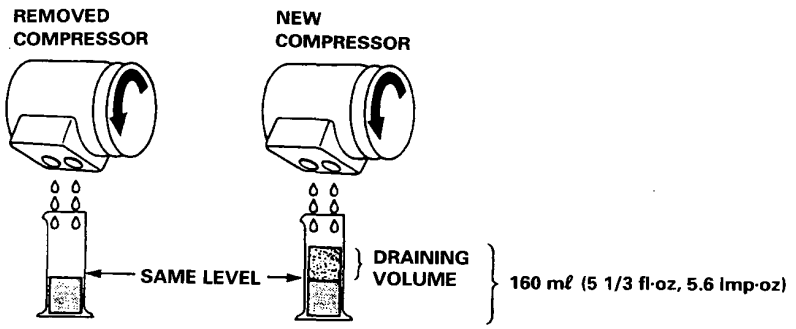
- **always wear eye protection.**
- **do not let refrigerant get on your skin or in your eyes. If it does:**
  - **— do not rub your eyes or skin.**
  - **— splash large quantities of cool water in your eyes or on your skin.**
  - **— rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.**
- **keep refrigerant containers (cans of R-134a) stored below 40°C (104°F)**
- **Keep away from open flame. Refrigerant, although non-flammable, will produce poisonous gas if burned.**
- ***work in well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small, enclosed area.***

1. Always disconnect the negative cable from the battery whenever replacing air conditioning parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before you reconnect each line.
3. Before connecting any hose or line, apply a few drops of refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003) to the O-ring.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, don't let refrigerant escape too fast; it will draw the compressor oil out of the system.
6. Add refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003) after replacing the following parts:

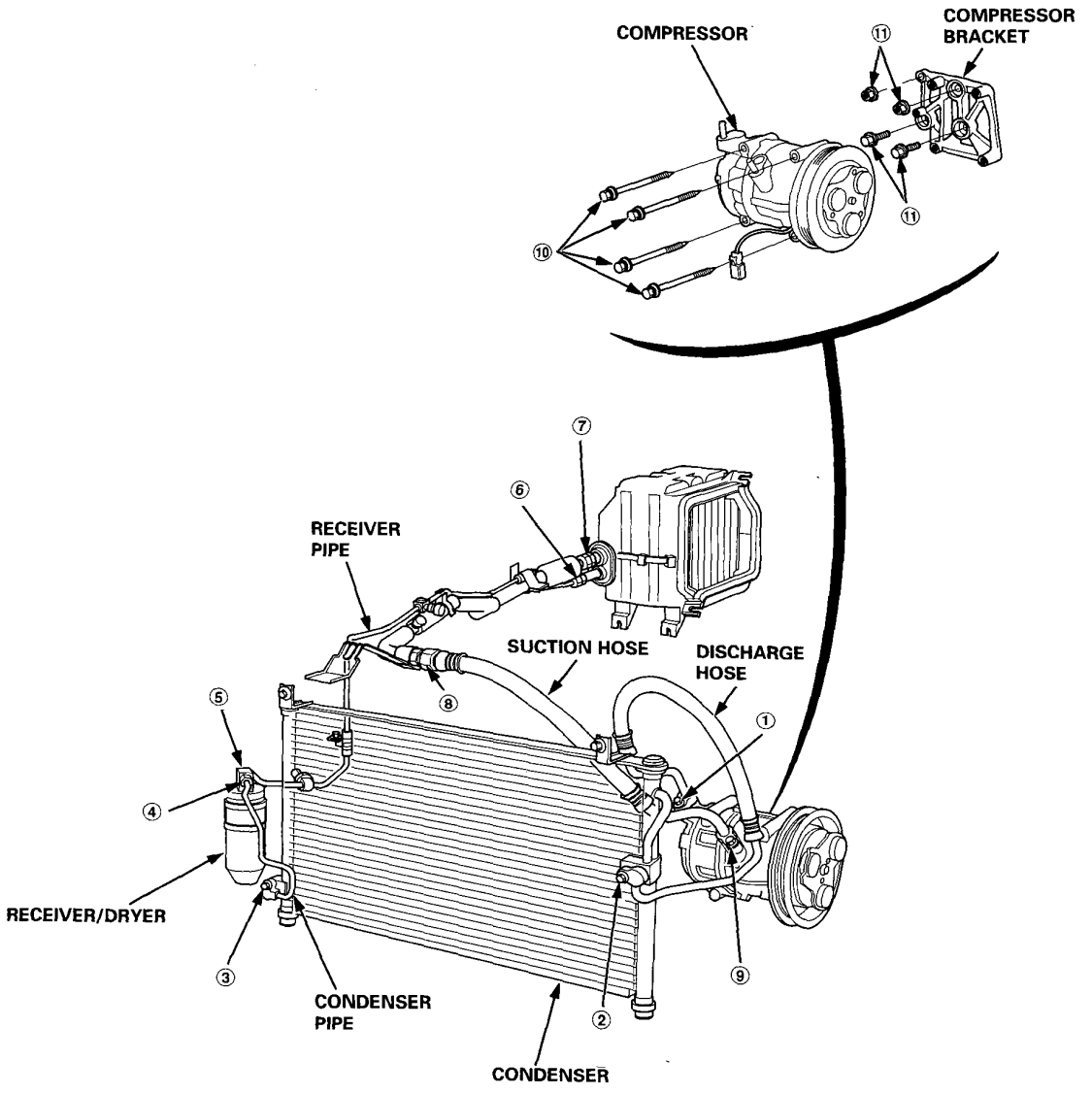
   NOTE:
   - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
   - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
   - Do not spill the refrigerant oil on the car; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

Condenser ..... **25 mℓ (5/6 fl·oz, 0.9 Imp·oz)**
Evaporator ..... **40 mℓ (1 1/3 fl·oz, 1.4 Imp·oz)**
Line or hose ..... **10 mℓ (1/3 fl·oz, 0.4 Imp·oz)**
Receiver/Dryer ..... **10 mℓ (1/3 fl·oz, 0.4 Imp·oz)**
Leakage repair ..... **25 mℓ (5/6 fl·oz, 0.9 Imp·oz)**
Compressor ..... **For compressor replacement, subtract the volume of oil drained from the removed compressor from 160 mℓ (5 1/3 fl·oz, 5.6 Imp·oz), and drain the calculated volume of oil from the new compressor: 160 mℓ (5 1/3 fl·oz, 5.6 Imp·oz) — Volume of removed compressor = Volume to drain from new compressor.**

NOTE: Even if no oil is drained from the removed compressor, don't drain more than 50 mℓ (1 2/3 fl·oz, 1.8 Imp·oz) from the new compressor.



A/C System Torque Specifications



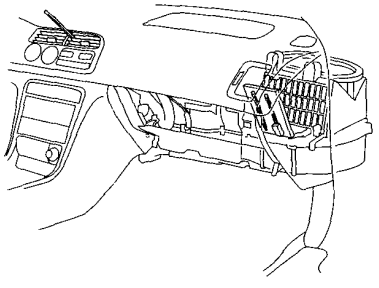
① Discharge hose to the compressor (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
② Discharge hose to the condenser (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
③ Condenser pipe to the condenser (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
④ Condenser pipe to the receiver/dryer	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑤ Receiver pipe to the receiver/dryer	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑥ Receiver pipe to the evaporator	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑦ Suction pipe to the evaporator	31 N·m (3.2 kgf·m, 23 lbf·ft)
⑧ Suction hose to the suction pipe	31 N·m (3.2 kgf·m, 23 lbf·ft)
⑨ Suction hose to the compressor (6 x 1.0 mm)	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑩ Compressor to compressor bracket (8 x 1.25 mm)	22 N·m (2.2 kgf·m, 16 lbf·ft)
⑪ Compressor bracket to cylinder block (10 x 1.25 mm)	49 N·m (5.0 kgf·m, 36 lbf·ft)

Performance Test

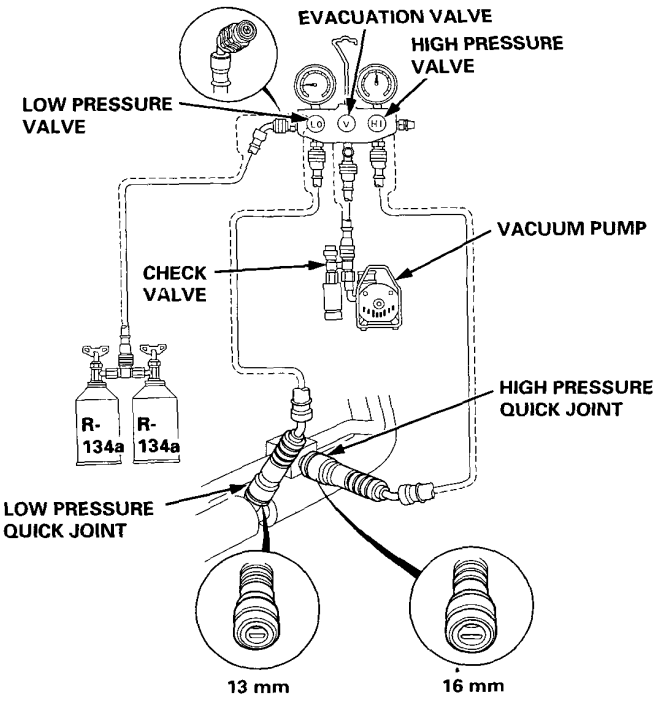
The performance test will help determine if the air conditioner system is operating within specifications.

NOTE:
- Only use gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

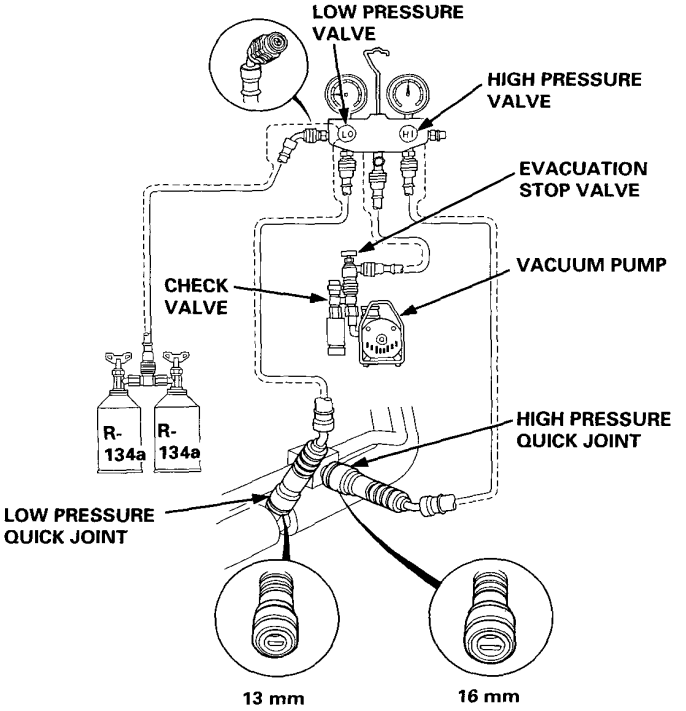
1. Connect a R-134a gauges as shown.
2. Insert a thermometer in the center vent outlet. Determine the relative humidity and ambient air temperature by a portable weather station calling the local weather station.
3. Test conditions:
   - Avoid direct sunlight.
   - Open hood.
   - Open front doors.
   - Set the temperature control lever to MAX COOL, the mode control switch on VENT and the recirculation control switch to RECIRCULATE.
   - Slide the heater fan switch to MAX.
   - Run the engine at 1,500 rpm (min^{-1}).
   - No driver or passengers in vehicle
4. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.
5. To complete the charts:
   - Mark the delivery temperature along the vertical line.
   - Mark the intake temperature (ambient air temperature) along the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point one line above and one line below the humidity level (10% above and 10% below the humidity level).
   - From each point, draw a horizontal line across to the delivery temperature.
   - The delivery temperature should fall between the two lines.
   - Complete the low side pressure test and high side pressure test in the same way.
   - Any measurements outside the line may indicate the need for further inspection.

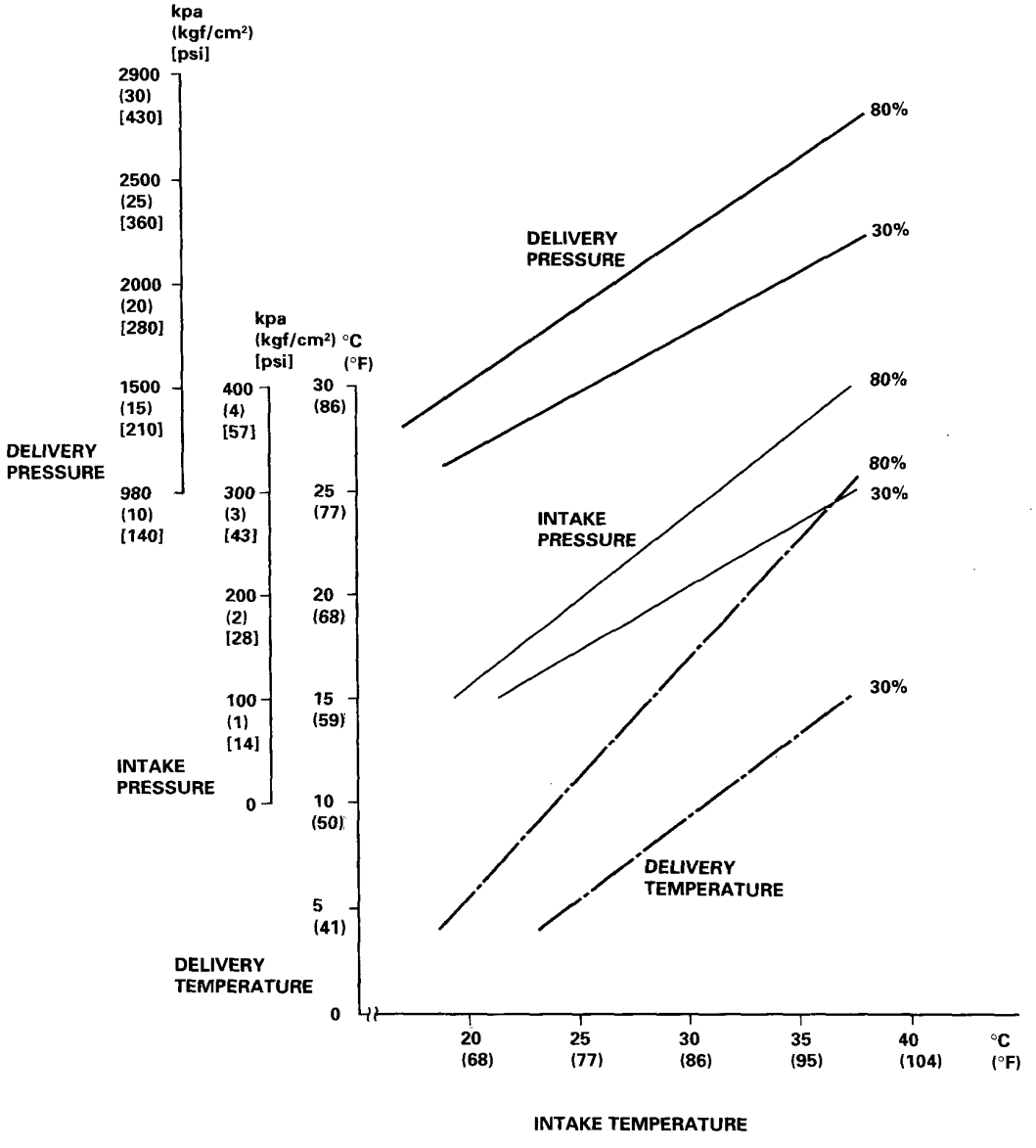


THREE VALVE GAUGE



TWO VALVE GAUGE




kpa
(kgf/cm²)
[psi]
2900
(30)
[430]
2500
(25)
[360]
2000
(20)
[280]
1500
(15)
[210]
980
(10)
[140]
DELIVERY
PRESSURE
kpa
(kgf/cm²)
[psi]
400
(4)
[57]
300
(3)
[43]
200
(2)
[28]
100
(1)
[14]
0
INTAKE
PRESSURE
°C
(°F)
30
(86)
25
(77)
20
(68)
15
(59)
10
(50)
5
(41)
0
DELIVERY
TEMPERATURE
80%
30%
DELIVERY
PRESSURE
80%
30%
INTAKE
PRESSURE
80%
30%
DELIVERY
TEMPERATURE
20
(68)
25
(77)
30
(86)
35
(95)
40
(104)
°C
(°F)
INTAKE TEMPERATURE

Pressure Test Chart

NOTE: Performance Test is on page 22-24.

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 200 kPa (2.0 kgf/cm², 28 psi) quickly, and then falls gradually.	Air in system	Recover, evacuate and recharge with specified amount. Evacuation: see page 22-45 Charging: see page 22-46
	No bubbles in sight glass when condenser is cooled by water.	Excessive refrigerant in system	Recover, evacuate and recharge with specified amount.
	Reduced or no air flow through condenser	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean. • Check voltage and fan rpm. • Check fan direction.
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system	• Restricted lines.
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigerant in system	• Check for leak. • Charge system.
	High and low pressures are balanced soon after stopping compressor. Low side is higher than normal.	• Faulty compressor discharge valve • Faulty compressor seal	Replace the compressor.
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum.	• Faulty expansion valve • Moisture in system	• Replace. • Recover, evacuate and recharge with specified amount.
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigerant	Repair the leaks. Recover, evacuate and recharge with specified amount. Charge as required.
	Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum.	• Frozen expansion valve • Faulty expansion valve	Replace the expansion valve.
	Discharge temperature is low and the air flow from vents is restricted.	Frozen evaporator	Run the fan with compressor off, then check A/C thermostat.
	Expansion valve is frosted.	Clogged expansion valve	Clean or replace.
	Receiver/dryer outlet is cool and inlet is warm (should be warm during operation).	Clogged receiver/dryer	Replace.
Suction pressure abnormally high	Low pressure hose and check joint are cooler than the temperature around evaporator.	• Expansion valve open too long • Loose expansion capillary tube	Repair or replace.
	Suction pressure is lowered when condenser is cooled by water.	Excessive refrigerant in system	Recover, evacuate and recharge with specified amount.
	High and low pressure are equalized as soon as the compressor is stopped, and both gauges fluctuate while running.	• Faulty gasket • Faulty high pressure valve • Foreign particle stuck in high pressure valve	Replace the compressor.
Suction and discharge pressures abnormally high	Reduced air flow through condenser.	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean condenser and radiator. • Check voltage and fan rpm. • Check fan direction.
	No bubbles in sight glass when condenser is cooled by water.	Excessive refrigerant in system	Recover, evacuate and recharge with specified amount.
Suction and discharge pressure abnormally low	Low pressure hose and metal end areas are cooler than evaporator.	Clogged or kinked low pressure hose parts	Repair or replace.
	Temperature around expansion valve is too low compared with that around receiver/dryer.	Clogged high pressure line	Repair or replace.
Refrigerant leaks	Compressor clutch is dirty.	Compressor shaft seal leaking	Replace the compressor.
	Compressor bolt(s) are dirty.	Leaking around bolt(s)	Tighten bolt(s) or replace compressor.
	Compressor gasket is wet with oil.	Gasket leaking	Replace the compressor.

Discharge

⚠ WARNING

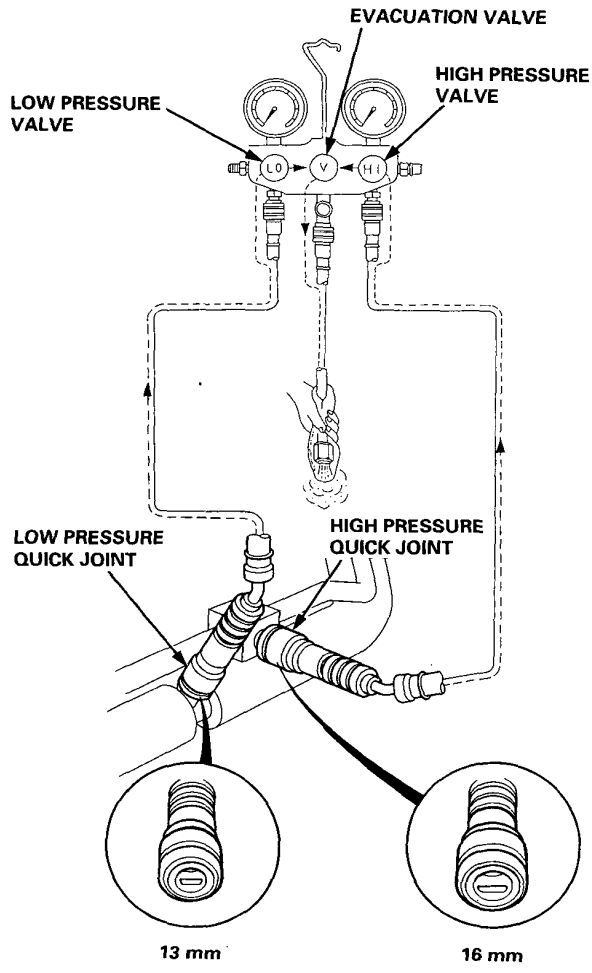
- **Keep away from open flames. The refrigerant, although nonflammable, will produce a poisonous gas if burned.**
- **Work in a well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small enclosed area.**

NOTE: Only use a gauge set for refrigerant HFC-134a (R-134a).

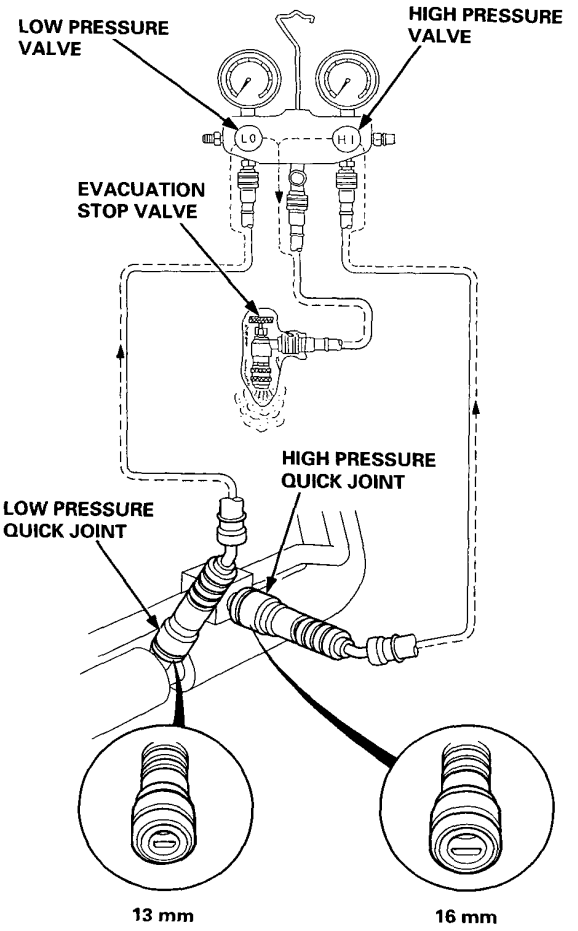
1. Connect the R-134a gauges as shown.
2. Disconnect the center hose of the gauge set, and place the free end in a shop towel.
3. Open the evacuation valve (two valve gauge: evacuate stop valve).
4. Slowly open the high pressure valve slightly to let refrigerant flow from the center hose only. Do not open the valve too wide. Check the shop towel to make sure no oil is being discharged with the refrigerant.

   CAUTION: If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.
5. After the high pressure gauge reading has dropped below 980 kPa (10 kgf/cm², 140 psi), open the low side valve to discharge both high and low sides of the system.
6. Note the gauge reading, and as system pressure drops, gradually open both high and low side valves fully until both gauges indicate 0 kPa (0 kgf/cm², 0 psi).

THREE VALVE GAUGE



TWO VALVE GAUGE

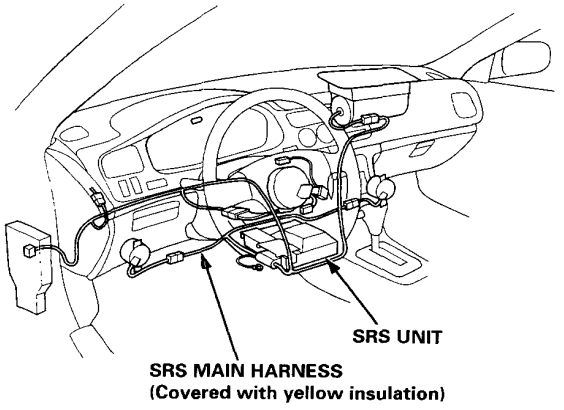


Evaporator

Replacement

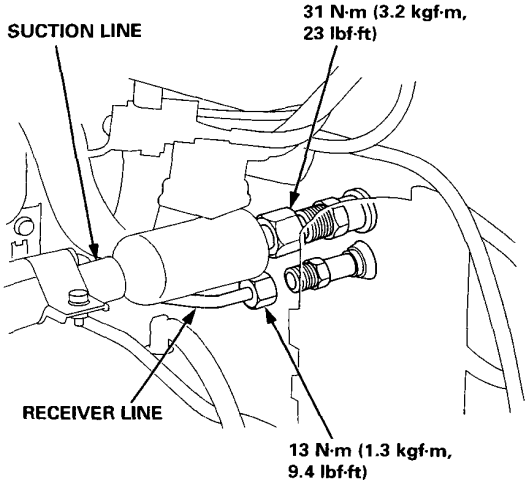
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

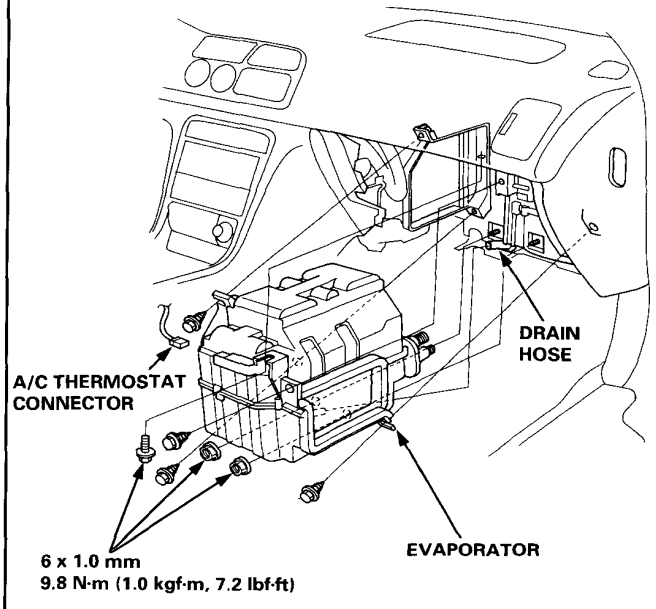


1. Discharge the refrigerant (see page 22-27).
2. Disconnect the receiver line and the suction line from the evaporator.

   NOTE: Plug or cap the lines immediately after disconnecting to avoid moisture and dust contamination into the system.



3. Remove the glove box (see section 20).
4. Remove the glove box frame (see page 21-17).
5. Disconnect the connector from the A/C thermostat. Remove the four self-tapping screws, two mounting nuts and the mounting bolt.
   Disconnect the drain hose, then remove the evaporator.



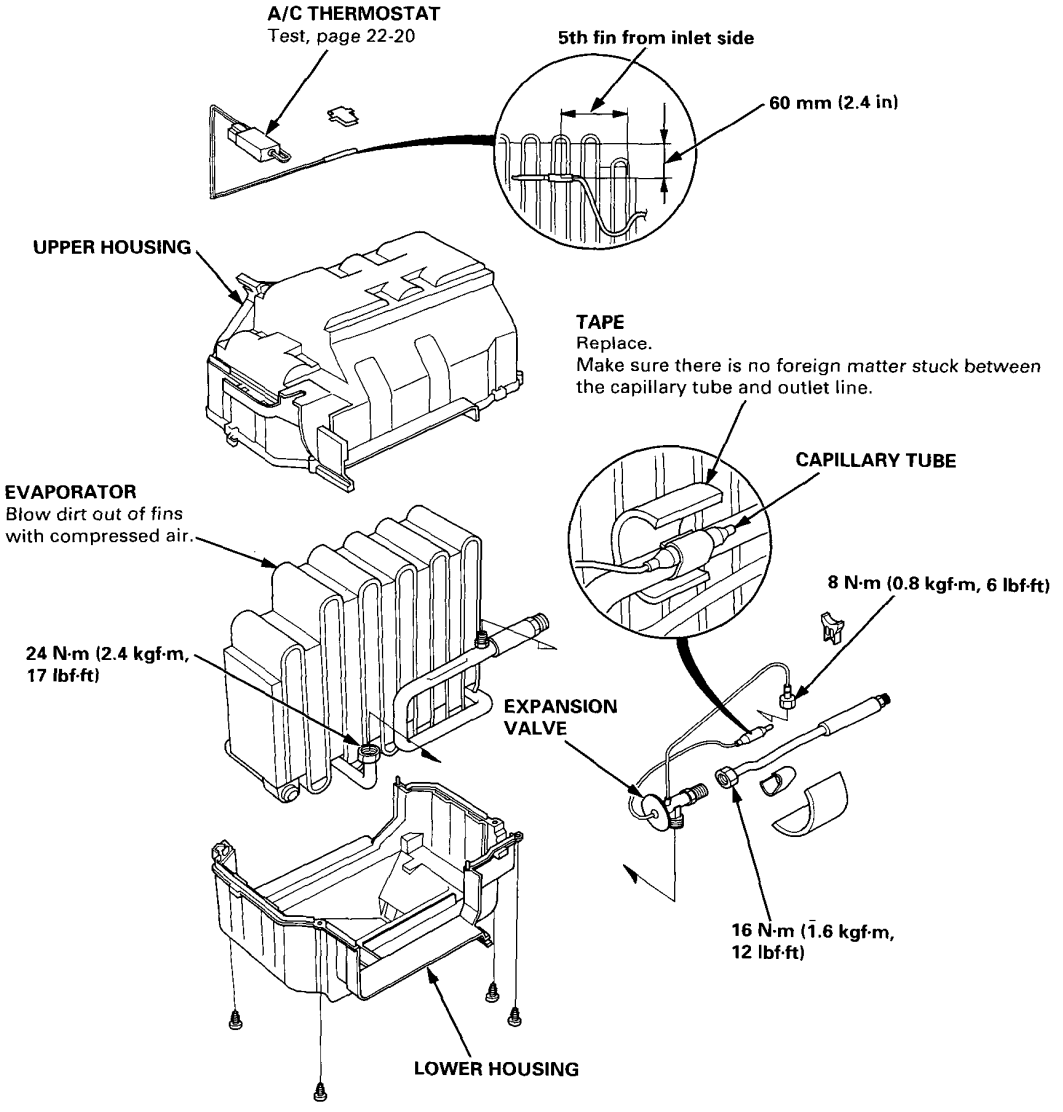
6. Install in the reverse order of removal. Make note of the following items.
   - If you're installing a new evaporator, add refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003) (see page 22-22).
   - Replace the O-rings with new ones at each fitting, and apply a thin coat refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003) before installing them.
     NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
   - Apply sealant to the grommets.
   - Make sure that there is no air leakage.
   - Charge the system (see page 22-46), and test its performance (see page 22-24).

Overhaul

1. Pull out the A/C thermostat sensor from the evaporator fins.
2. Remove the self-tapping screws and clamps from the housings.
3. Carefully separate the housings, then remove the evaporator.
4. If necessary, remove the expansion valve.

   NOTE: When loosening the expansion valve nuts, use a second wrench to hold the expansion valve or evaporator pipe. Otherwise, they can be damaged.
5. Assemble in the reverse order of disassembly. Make note of following items.

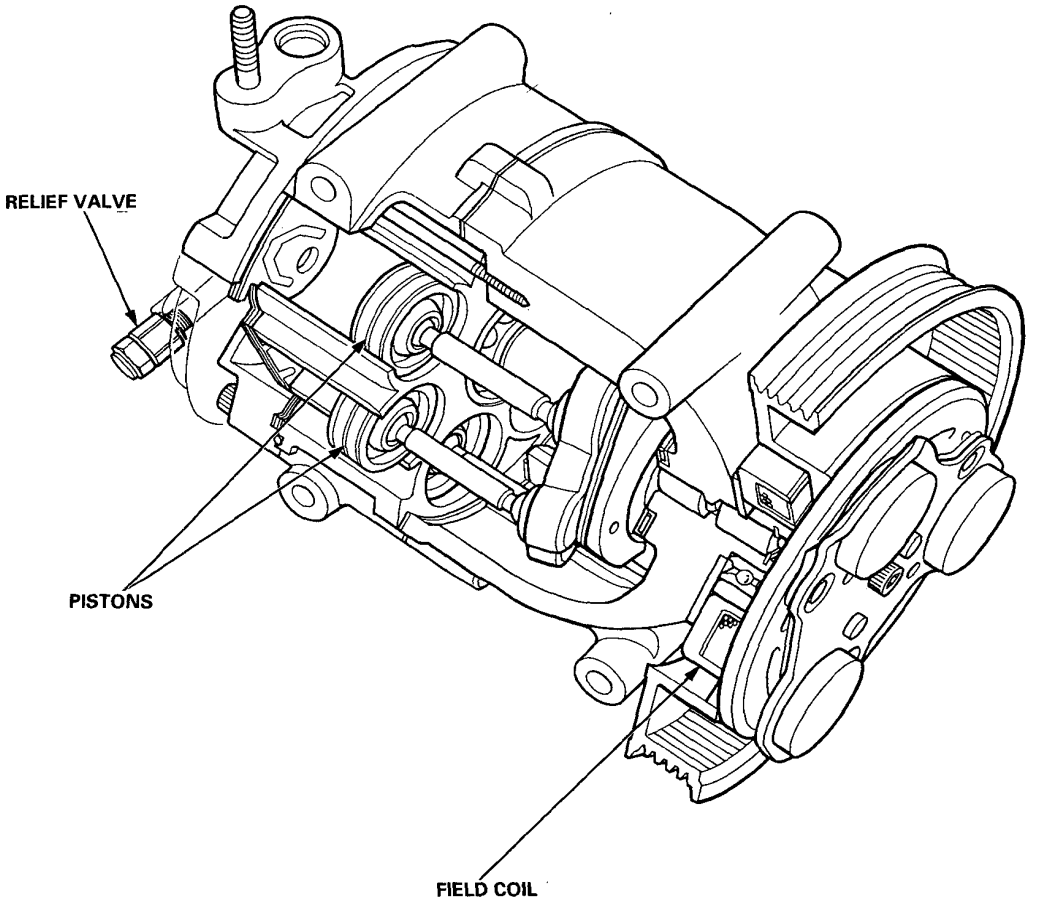
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003) before installing them.
     NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
   - Install the expansion valve capillary tube with the capillary tube in contact with the suction line directly, and wrap it with tape.
   - Reinstall the A/C thermostat sensor to its original location.



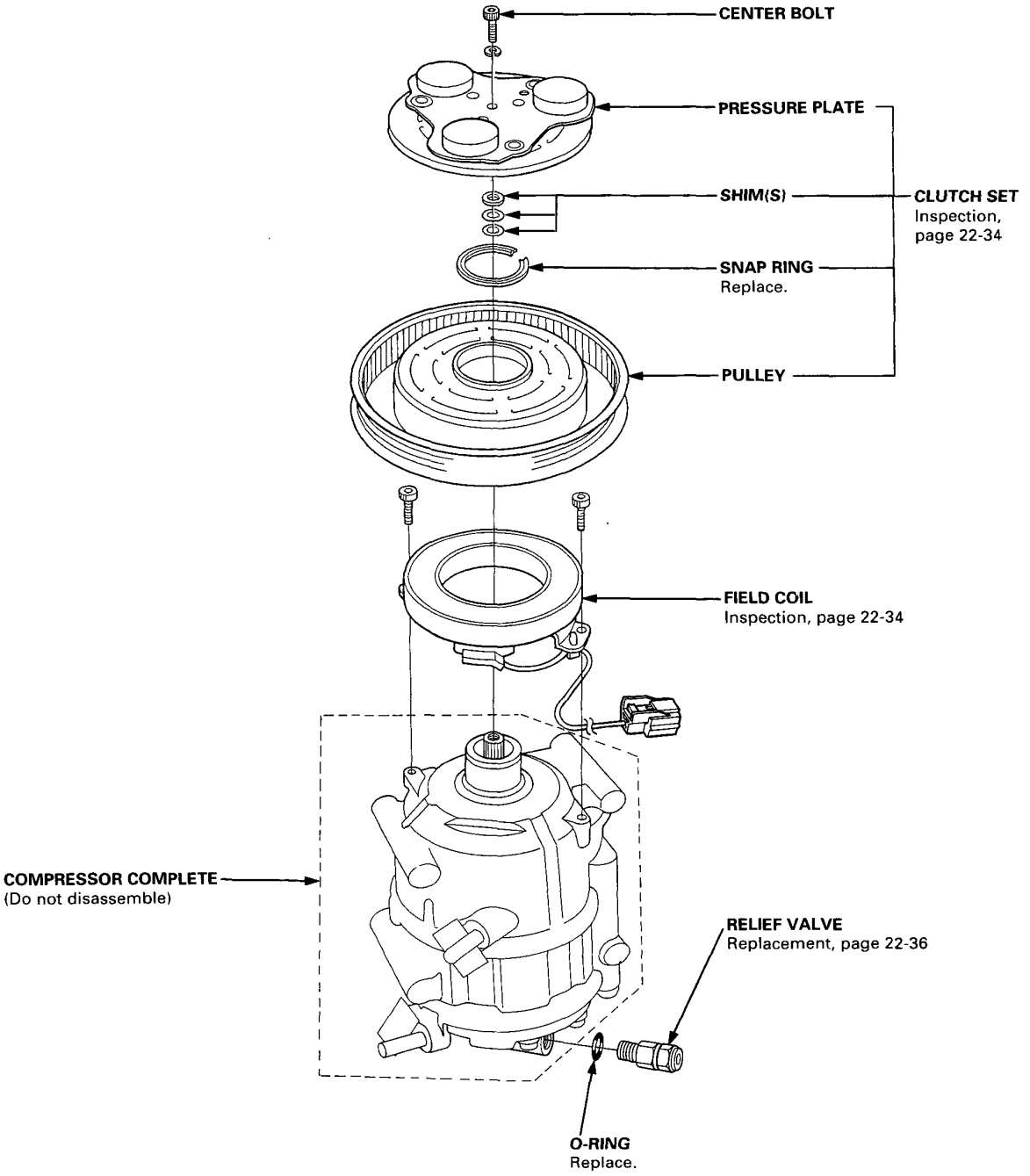
Compressor (Hadsys)

Description

This compressor is a Hadsys piston type compressor for HFC-134a (R-134a). A revolving inclined disc causes the seven reciprocating pistons to be pulled, thus compressing the refrigerant.



Illustrated Index



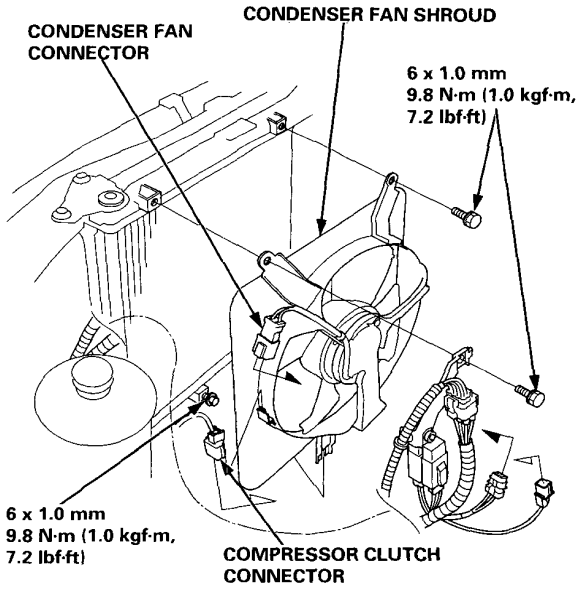
Compressor (Hadsys)

Replacement

1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioner work a few minutes. Then shut the engine off, and disconnect the negative cable from the battery.
2. Discharge the refrigerant (see page 22-27).
3. Remove the power steering pump (see section 17).

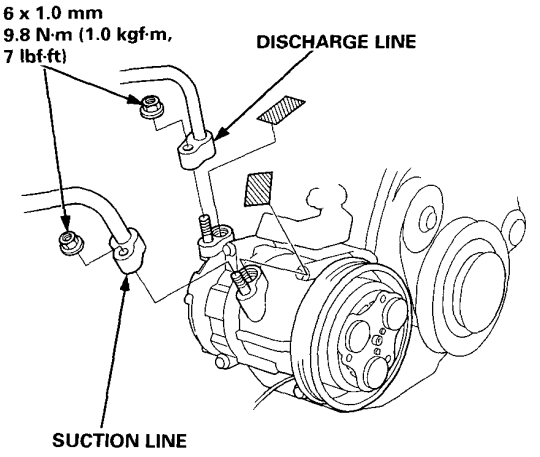
   NOTE: Do not disconnect the hoses from the power steering pump.
4. Remove the alternator (see section 23).
5. Disconnect the condenser fan connector.
   Disconnect the compressor clutch connector, then remove the compressor clutch connector from the condenser fan shroud.
   Loosen the lower mounting bolt, then remove the two upper mounting bolts and the condenser fan shroud.

   NOTE: Do not damage the radiator fins when removing the condenser fan shroud.



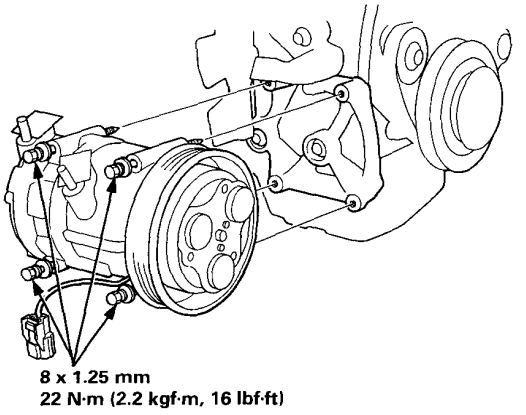
6. Remove the nuts, then disconnect the suction line and the discharge line from the compressor.

   NOTE: Plug or cap the lines immediately after disconnecting to avoid moisture and dust contamination into the system.

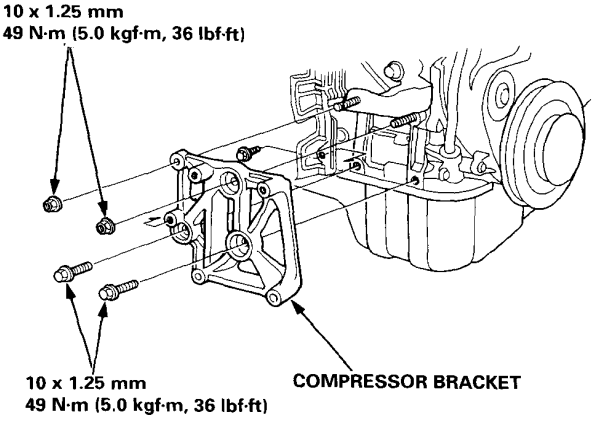


7. Remove the four mounting bolts and the compressor.

   NOTE: Do not damage the radiator fins when removing the compressor.



8. If necessary, remove the bolt from the heat insulator, the two mounting bolts, two mounting nuts and the compressor bracket.



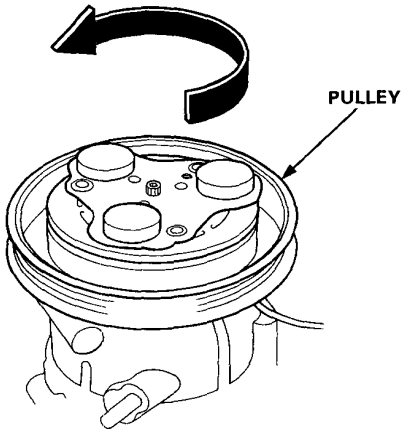
9. Install in the reverse order of removal. Make note of the following items.

- If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume. Subtract the volume of drained oil from 160 mℓ (5 1/3 fl·oz, 5.6 Imp·oz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them.
  NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Use refrigerant oil (Dn. S10X: P/N 38899 – P0A – 003) for R-134a Hadsys piston type compressors only.
  Use refrigerant oil (ND-OIL 8: P/N 38899 – PR7 – 003) for R-134a Nippondenso piston type compressors only.
- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the car; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
- Do not damage the radiator fins when installing the condenser fan shroud and the compressor.
- Adjust the A/C compressor belt (see page 22-42) and the power steering pump belt (see section 17).
- Charge the system (see page 22-46), and test its performance (see page 22-24).

Compressor (Hadsys)

Clutch Inspection

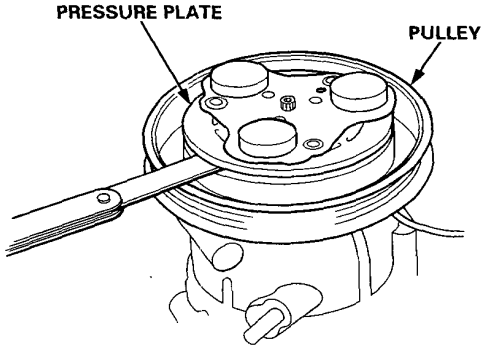
- Check the plated parts of the pressure plate for color changes , peeling or other damage. If there is damage, replace the clutch set.
- Check the pulley bearing play and drag by rotating the pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



- Measure the clearance between the pulley and the pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required, following the procedure on page 22-35.

Clearance: 0.5 $\pm$ $^{0.1}_{0.2}$ mm (0.02 $\pm$ $^{0.004}_{0.008}$ in)

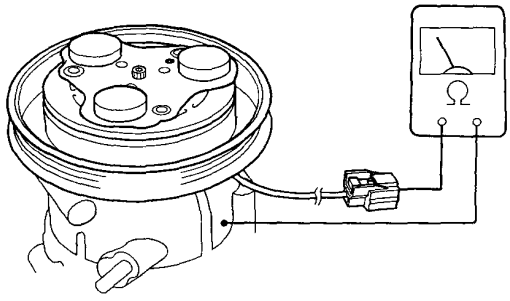
NOTE: The shims are available in six thicknesses: 0.1 mm, 1.0 mm, 1.25 mm, 1.5 mm, 1.75 mm, and 2.0 mm.



- Check resistance of the field coil.

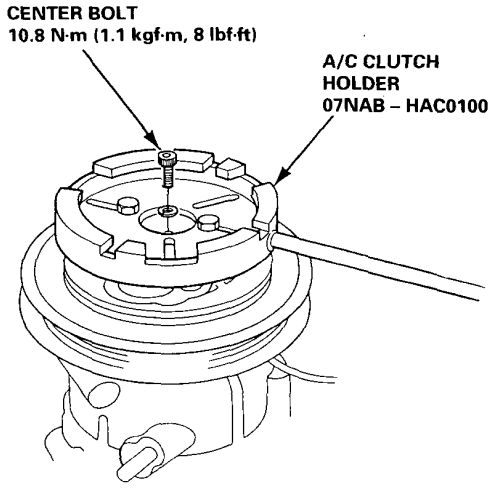
Field Coil Resistance: 3.0 $\pm$ 0.15 ohms at 20°C (68°F)

If resistance is not within specifications, replace the field coil.

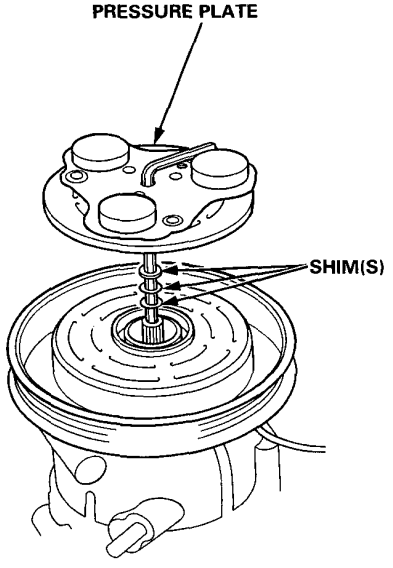


Clutch Overhaul

1. Remove the center bolt while holding the pressure plate.

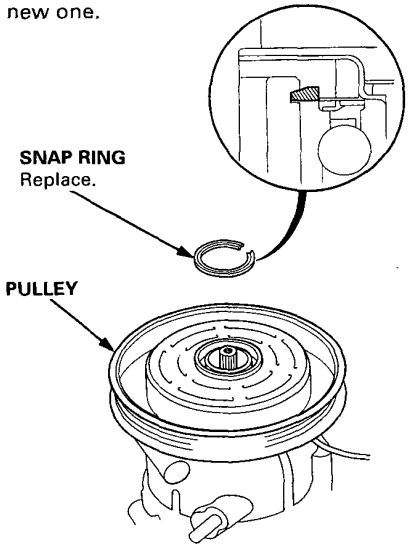


2. Remove the pressure plate and shim(s), taking care not to lose the shims.



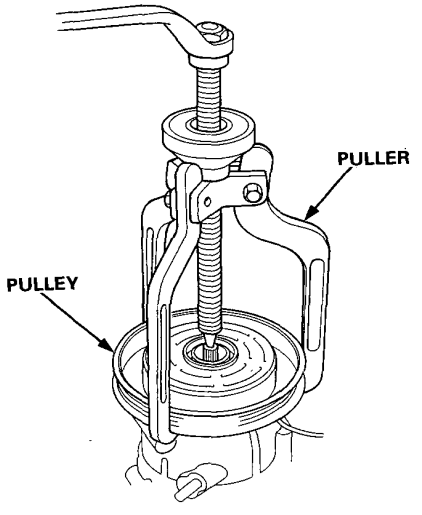
3. Remove the snap ring with snap ring pliers.

NOTE:
- Be careful not to damage the pulley and compressor during removal/installation.
- Once the snap ring is removed, replace it with a new one.



4. Remove the pulley from the shaft with a puller.

NOTE: Put the claws of the puller on the back of the pulley, not on the belt area; otherwise the pulley can be damaged. If the pulley doesn't come off easily, replace the compressor, clutch set and field coil as a whole.

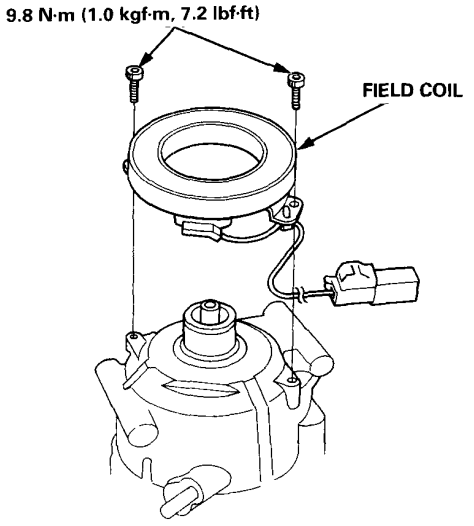


(cont'd)

Compressor (Hadsys)

Clutch Overhaul (cont'd)

5. Remove the two bolts and the field coil.

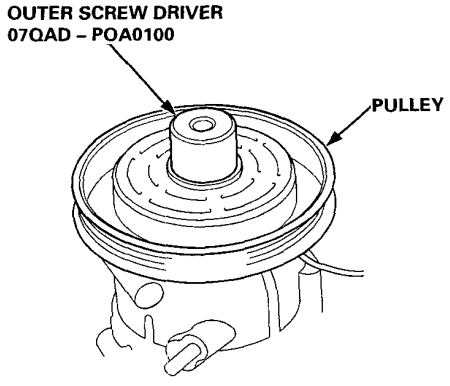


- Install the field coil with the wire side facing down (see above).

6. Clean the pulley and compressor sliding surfaces with non-petroleum solvent.

7. Position the pulley squarely over the field coil. Press the pulley onto the compressor boss with the special tool. If the pulley does not press on straight, remove it, and check the pulley and compressor boss for burrs or damage.

CAUTION: Maximum press load: 300 kgf (661 lbf)

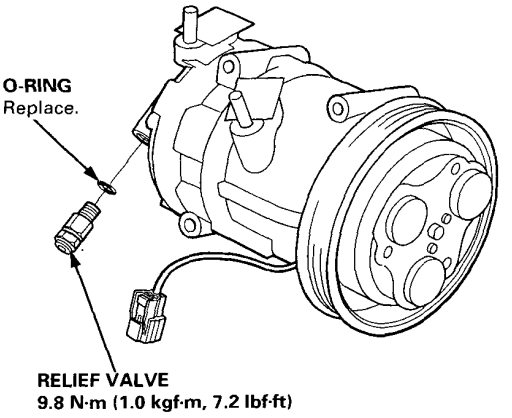


8. Install the remaning parts in reverse order of removal. Make note of the following items.
   - Make sure the snap ring is the groove properly.
   - Apply locking agent to the threads of the center bolt, and tighten it securely.
   - Make sure that the pulley turns smoothly after it's reassembled.

Relief Valve Replacement

1. Remove the relief valve and the O-ring.

NOTE:
- Do not let the compressor oil run out.
- Make sure there is no foreign matter in the system.



2. Clean the mating surfaces.

3. Replace the O-ring with a new one at the relief valve, and apply a thin coat of refrigerant oil (Dn. S10X: P/N 38899 – P0A – 003) before installing it.

NOTE:
- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the car; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

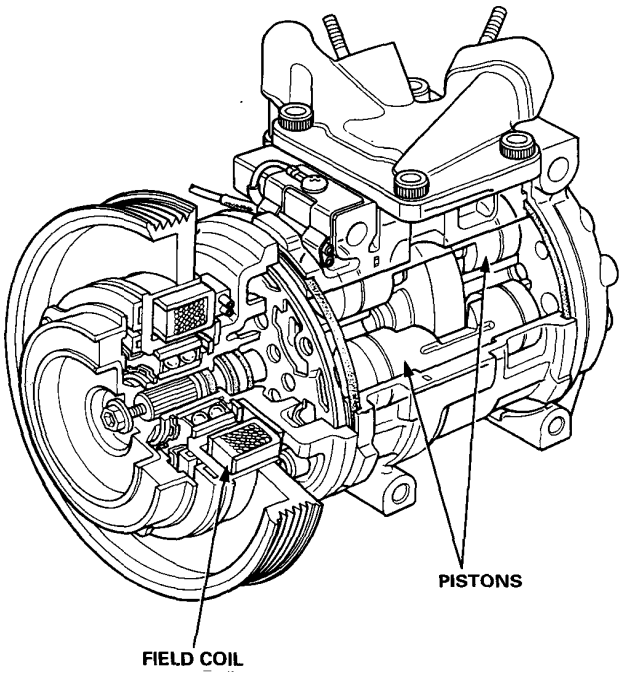
4. Install and tighten the relief valve.

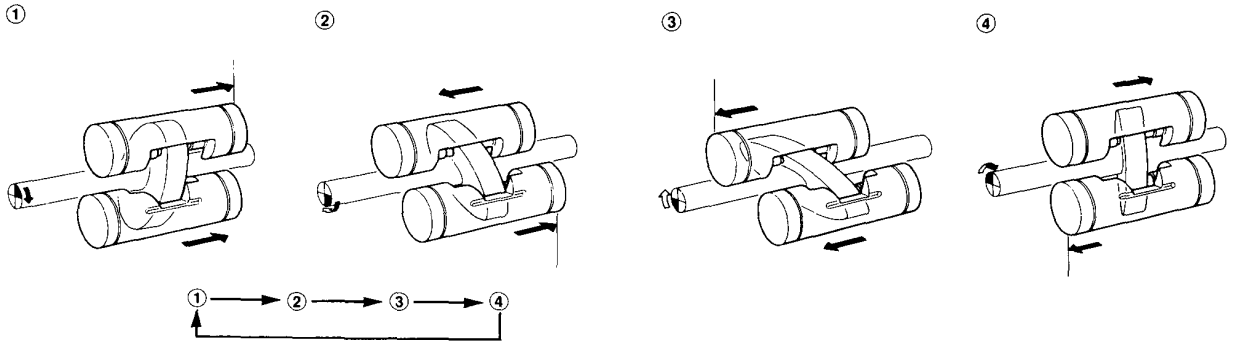
5. Charge the system (see page 22-46), and test its performance (see page 22-24).

Compressor (Nippondenso)

Description

This compressor is a Nippondenso piston type compressor for HFC-134a (R-134a). A revolving inclined disc drives the surrounding 10 reciprocating pistons. As the inclined disc revolves, it pushes the pistons, protected by a ceramic shoe, thus compressing the refrigerant.

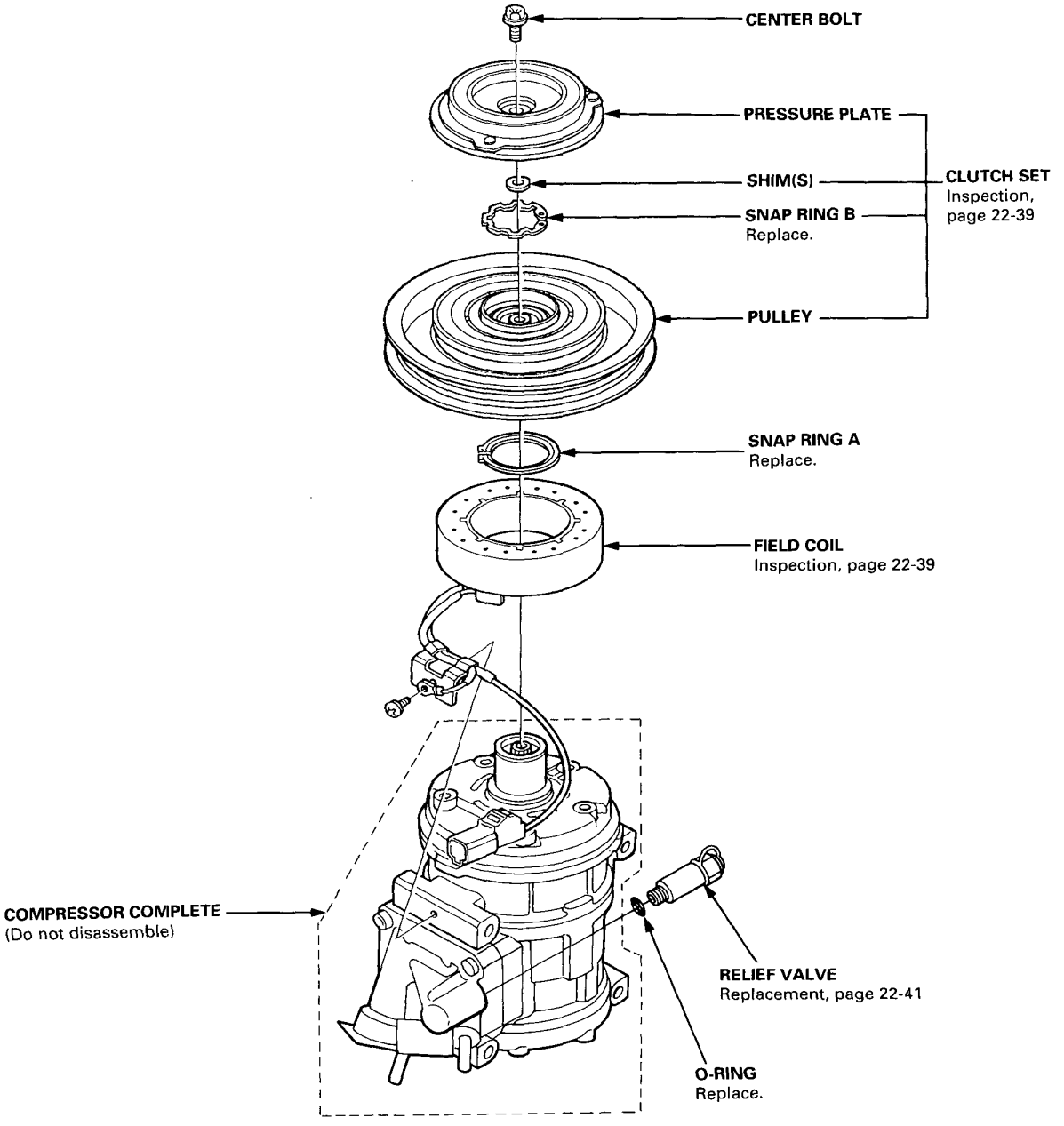




Compressor (Nippondenso)

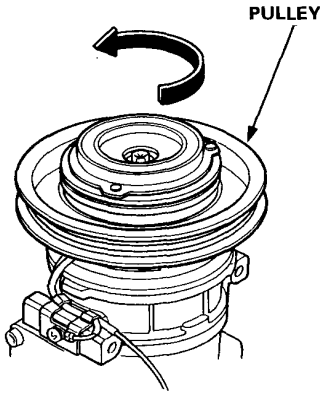
Illustrated Index

NOTE: For replacement, use the same method as for Hadsys compressor (see page 22-32).



Clutch Inspection

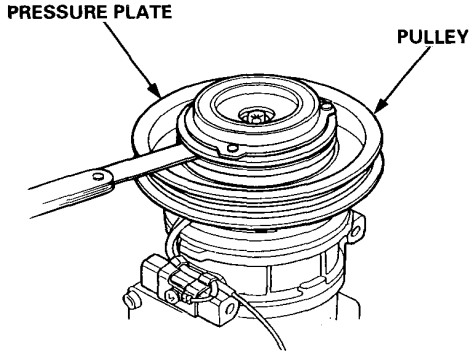
- Check the plated parts of the pressure plate for color changes, peeling or other damage. If there is damage, replace the clutch set.
- Check the pulley bearing play and drag by rotating the pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



- Measure the clearance between the pulley and the pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required, following the procedure on page 22-40.

  Clearance: 0.5 ± 0.15 mm (0.02 ± 0.006 in)

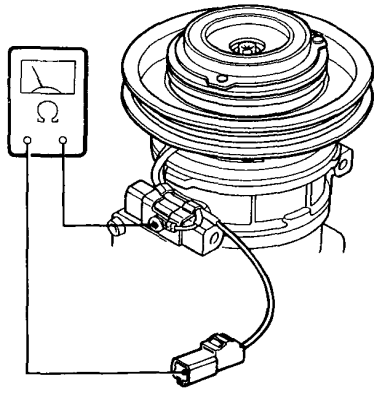
  NOTE: The shims are available in three thicknesses: 0.1 mm, 0.3 mm and 0.5 mm.



- Check resistance of the field coil.

  Field Coil Resistance: 3.6 ± 0.2 ohms at 20°C (68°F)

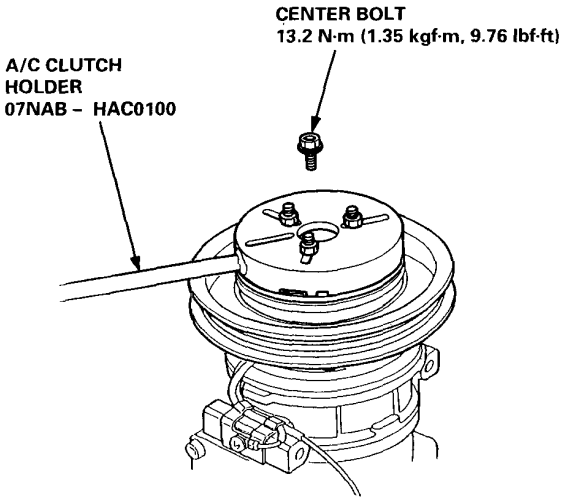
  If resistance is not within specifications, replace the field coil.



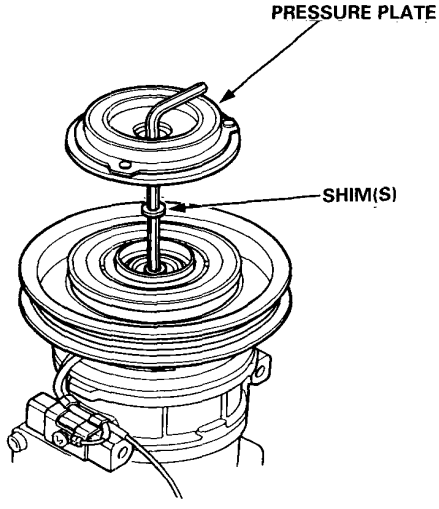
Compressor (Nippondenso)

Clutch Overhaul

1. Remove the center bolt while holding the pressure plate.

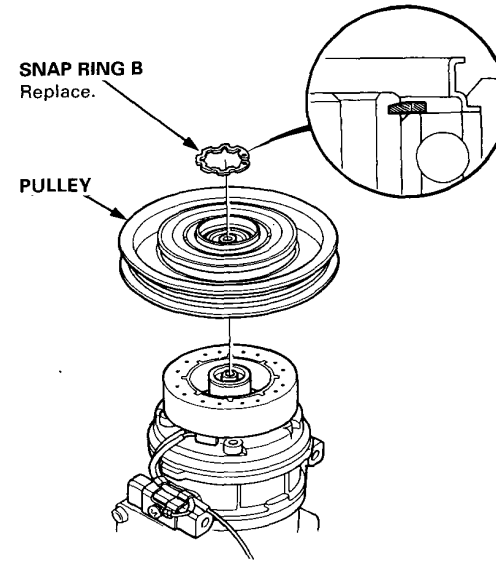


2. Remove the pressure plate and shim(s), taking care not to lose the shims.



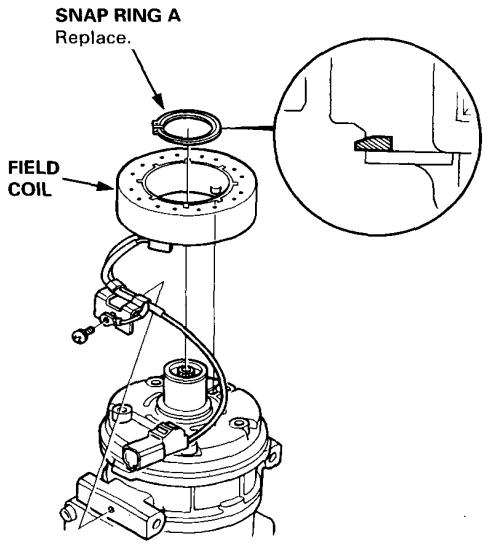
3. Remove the snap ring B with snap ring pliers, then remove the pulley.

NOTE:
- Be careful not to damage the pulley and compressor during removal/installation.
- Once the snap ring B is removed, replace it with a new one.



4. Remove the screw from the field coil ground terminal. Remove the snap ring A with snap ring pliers, then remove the field coil.

   NOTE:
   - Be careful not to damage the field coil and compressor during removal/installation.
   - Once the snap ring A is removed, replace it with a new one.



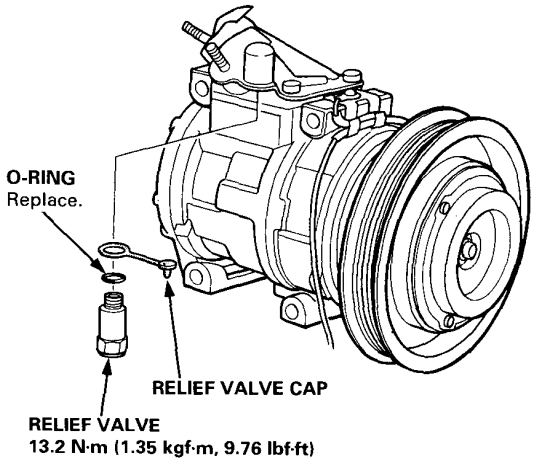
5. Install in the reverse order of removal. Make note of the following items.

   - Install the field coil with the wire side facing down (see above).
   - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
   - Make sure the snap rings are in the grooves properly.
   - Apply locking agent to the threads of the center bolt, and tighten it securely.
   - Make sure that the pulley turns smoothly after it's reassembled.

Relief Valve Replacement

1. Remove the relief valve, cap and the O-ring.

   NOTE:
   - Do not let the compressor oil run out.
   - Make sure there is no foreign matter in the system.



2. Clean the mating surfaces.

3. Replace the O-ring with a new one at the relief valve, and apply a thin coat of refrigerant oil (ND-OIL 8: P/N 38899 – PR7 – 003) before installing it.

   NOTE:
   - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
   - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
   - Do not spill the refrigerant oil on the car; if may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

4. Install and tighten the relief valve.

5. Charge the system (see page 22-46), and test its performance (see page 22-24).

A/C Compressor Belt

Adjustment

Deflection Method

1. Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the A/C compressor and the crankshaft pulley.

   A/C Compressor Belt
   Used Belt: 8.0 – 10.5 mm (0.31 – 0.41 in)
   New Belt: 5.0 – 7.0 mm (0.20 – 0.28 in)

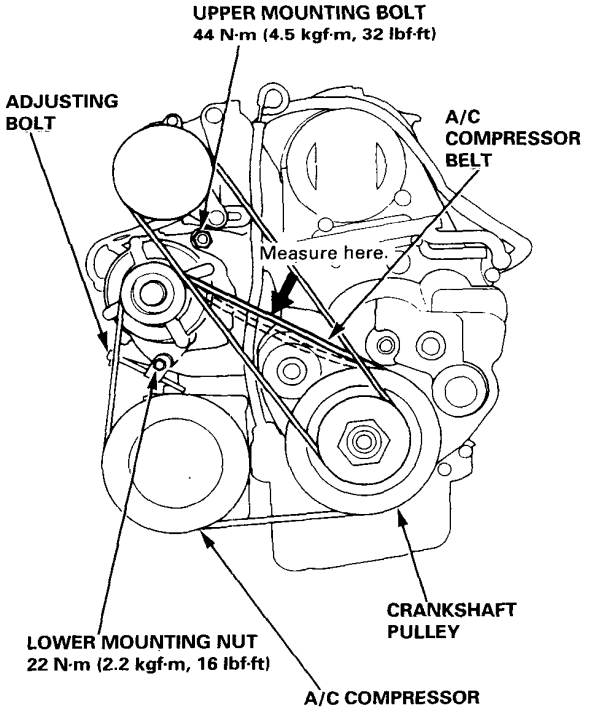
   Power Steering Pump Belt
   Used Belt: 13.0 – 16.0 mm (0.51 – 0.63 in)
   New Belt: 11.0 – 12.5 mm (0.43 – 0.49 in)

   NOTE:
   - If there are cracks or any damage evident on the belt, replace it with a new one.
   - "Used belt" means a belt which has been used for five minutes or more.
   - "New belt" means a belt which has been used for less than five minutes.

2. Loosen the upper mounting bolt and the lower mounting nut of the alternator.

3. Turn the adjusting bolt to get proper belt tension, then retighten the lower mounting nut and the upper mounting bolt.

4. Recheck the deflection of the A/C compressor belt.



Tension Gauge Method

1. Attach the belt tension gauge to the A/C compressor belt as shown below, and measure the tension of the belt.

   A/C Compressor Belt
   Used Belt: 440 – 590 N (45 – 60 kgf, 99 – 132 lbf)
   New Belt: 930 – 1130 N (95 – 115 kgf, 209 – 254 lbf)

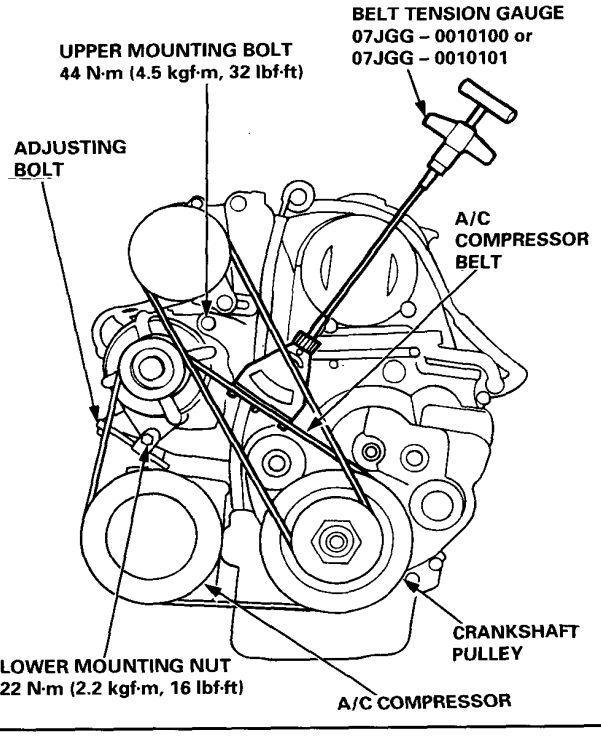
   Power Steering Pump Belt
   Used Belt: 390 – 540 N (40 – 55 kgf, 88 – 121 lbf)
   New Belt: 740 – 880 N (75 – 90 kgf, 165 – 198 lbf)

   NOTE:
   - If there are cracks or any damage evident on the belt, replace it with a new one.
   - Follow the manufacturer's instructions for the belt tension gauge.
   - "Used belt" means a belt which has been used for five minutes or more.
   - "New belt" means a belt which has been used for less than five minutes.

2. Loosen the upper mounting bolt and the lower mounting nut of the alternator.

3. Turn the adjusting bolt to get proper belt tension, then retighten the lower mounting nut and the upper mounting bolt.

4. Recheck the tension of the A/C compressor belt.



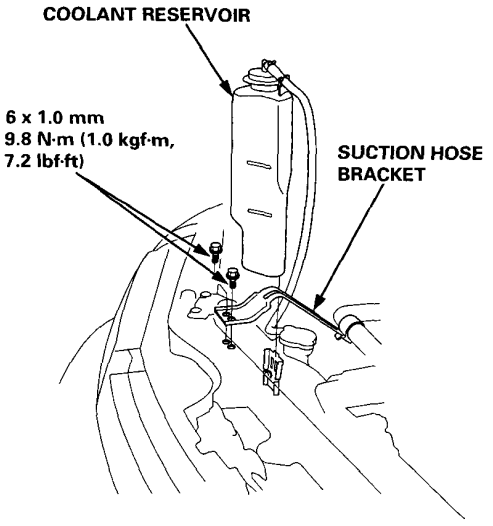
Condenser

Replacement

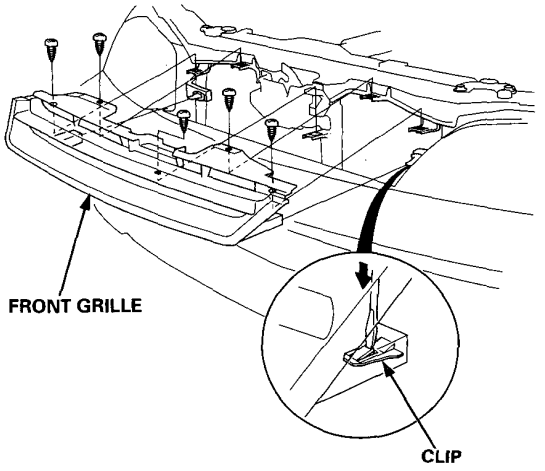
1. Discharge the refrigerant (see page 22-27).

2. Remove the coolant reservoir.
   Remove the two bolts and the suction hose bracket.

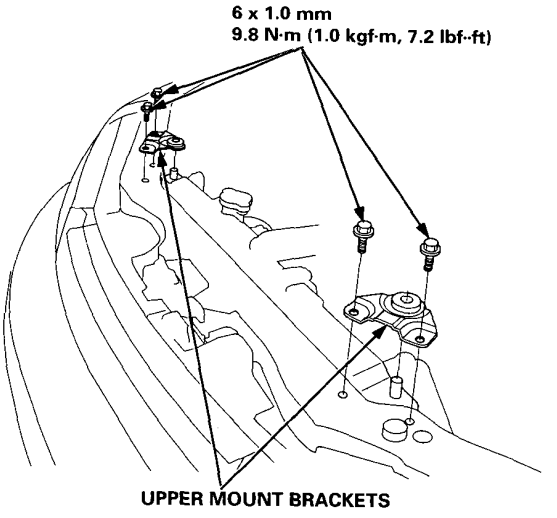
   NOTE: Do not disconnect the reservoir hose from the coolant reservoir and the radiator.



3. Remove the five self-tapping screws, and push the clips on each side with a flat tip screwdriver as shown, then remove the front grille.

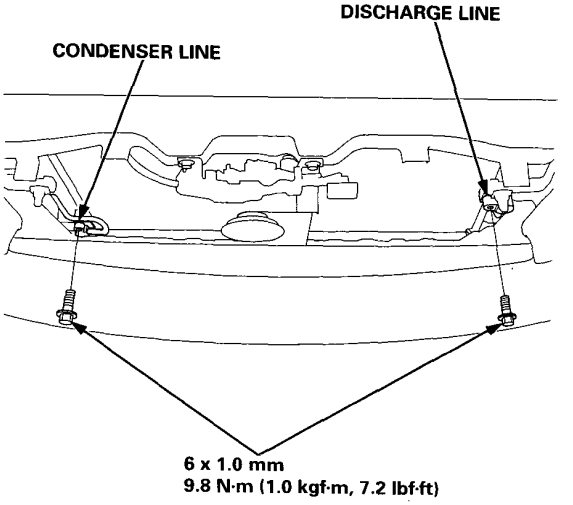


4. Remove the four bolts and the two radiator upper mount brackets.



5. Remove the bolts, and disconnect the discharge line and the condenser line from the condenser.

   NOTE: Plug or cap the lines immediately after disconnecting to avoid moisture and dust contamination into the system.



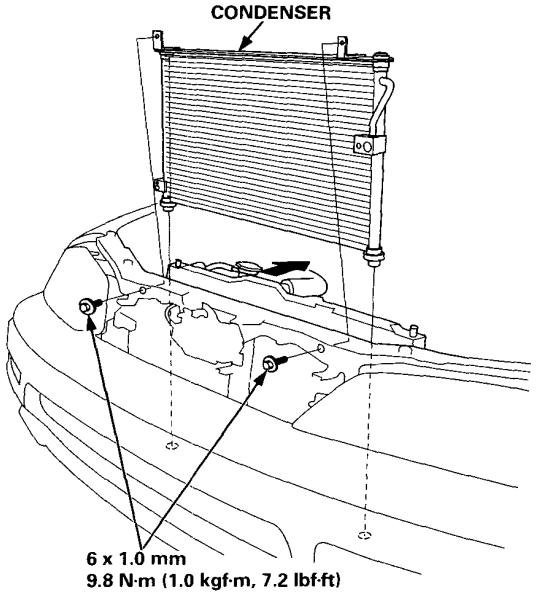
(cont'd)

Condenser

Replacement (cont'd)

6. Remove the two mounting bolts, and lift out the condenser as shown.

   NOTE: Do not damage the radiator and condenser fins when removing the condenser.



7. Install in the reverse order of removal. Make note of the following items.

   - If you're installing a new condenser, add refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003) (see page 22-22).
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (Nippondenso: ND-OIL 8, P/N 38899 – PR7 – 003 or Hadsys: Dn. S10X, P/N 38899 – P0A – 003) before installing them.
     NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
   - Do not damage the radiator and condenser fins when installing the condenser.
   - Be sure to install the condenser mount cushions securely into the holes.
   - Charge the system (see page 22-46), and test its performance (see page 22-24).

Evacuation

NOTE:
- Only use a gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a R-134a refrigerant vacuum pump. (If the system has been open for several days, the receiver/dryer should be replaced.)

2. Connect a R-134a refrigerant gauge, pump and refrigerant containers (cans of R-134a) as shown.

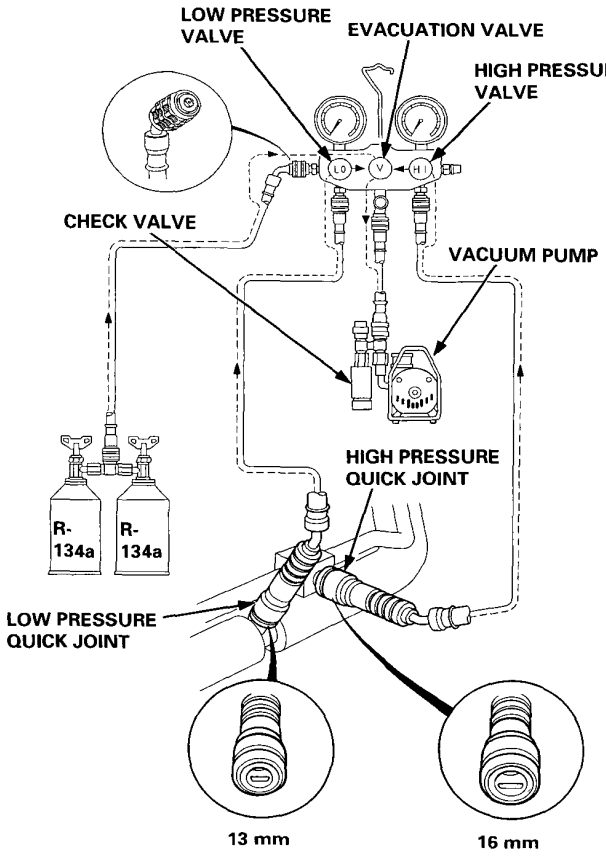
   NOTE: Do not open the cans.

3. Start the pump, then open the both pressure valves, and evacuation valve (two valve gauge: evacuation stop valve). Run the pump for about 15 minutes. Close both pressure valves and the evacuation valve (two valve gauge: evacuation stop valve), and stop the pump. The low pressure gauge should indicate above 93.3 kPa (700 mmHg, 27.6 in-Hg), and remain steady with the valves closed.

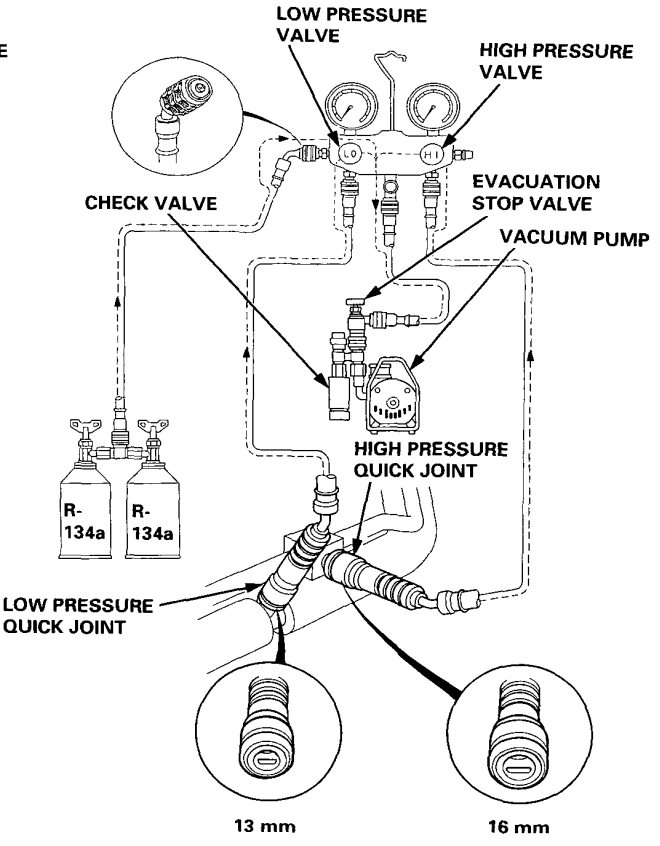
   NOTE: If low pressure does not reach more than 93.3 kPa (700 mmHg, 27.6 in-Hg) in 15 minutes, there is probably a leak in the system. Check for leaks, and repair (see Leak Test).

4. If there are no leaks, open the valves and continue pumping for at least another 15 minutes. Then close both valves, and stop the pump.

THREE VALVE GAUGE



TWO VALVE GAUGE



Charging

NOTE:
- Only use a gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

⚠ WARNING When handling refrigerant (R-134a):
- **always wear eye protection.**
- **do not let refrigerant get on your skin or in your eyes. If it does:**
  - **— do not rub your eyes or skin.**
  - **— splash large quantities of cool water in your eyes or on your skin.**
  - **— rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.**
- **keep refrigerant containers (cans of R-134a) stored below 40°C (104°F).**
- **keep away from open flame. Refrigerant, although non-flammable, will produce poisonous gas if burned.**
- **work in well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small, enclosed area.**

CAUTION: Do not overcharge the system; the compressor will be damaged.

1. After the leak test, check that the high pressure valve is closed, and start the engine.

   NOTE: Run the engine below 1,500 rpm (min^{-1}).

2. Open the front door.
   Turn the A/C switch ON.
   Set the temperature control lever to MAX. COOL.
   Set the mode control switch on VENT.
   Slide the heater fan switch to MAX.

3. Open the low pressure valve, and charge with R-134a refrigerant.

   ⚠ WARNING
   - **Do not open the high pressure valve.**
   - **Do not turn the cans upside down.**

4. Charge the system with refrigerant capacity.

   Refrigerant capacity: 650 $^{+0}_{-50}$ g (22.9 $^{+0}_{-1.8}$ oz)

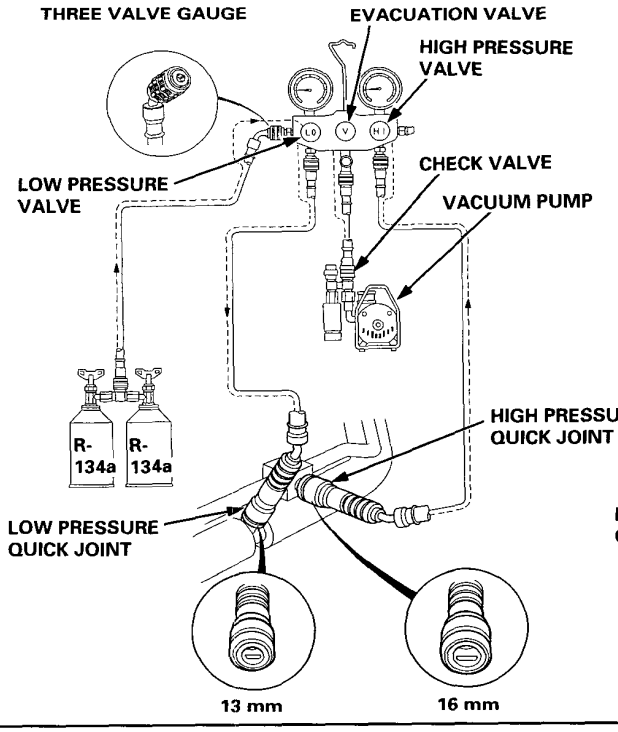
5. When fully charged, close the low pressure valve and the refrigerant cans. Check the system.

6. Stop the engine, and disconnect the charge hose quickly.

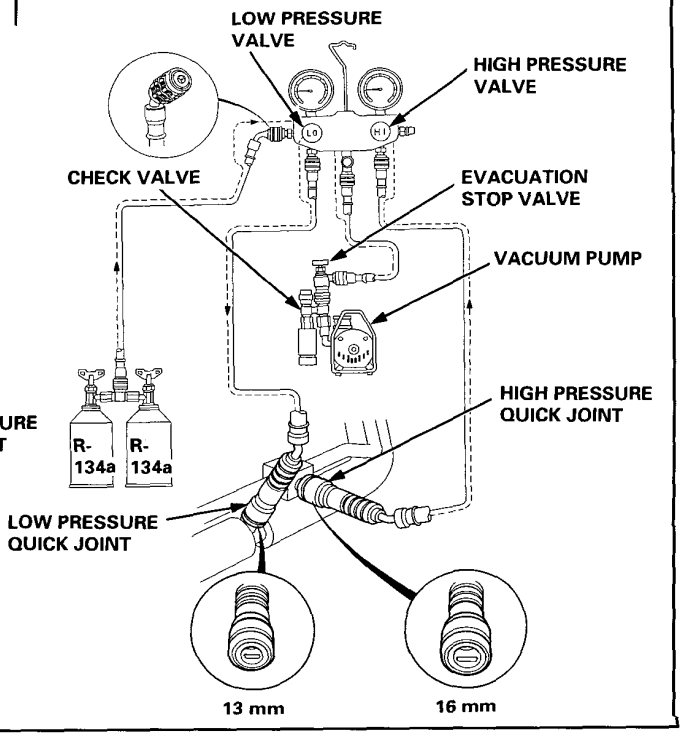
7. Check the system for leaks using a leak detector proper to refrigerant R-134a.

   NOTE: Particularly check for leaks around the compressor, condenser, and receiver/dryer.

THREE VALVE GAUGE



TWO VALVE GAUGE



Leak Test

NOTE:
- Only use a gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

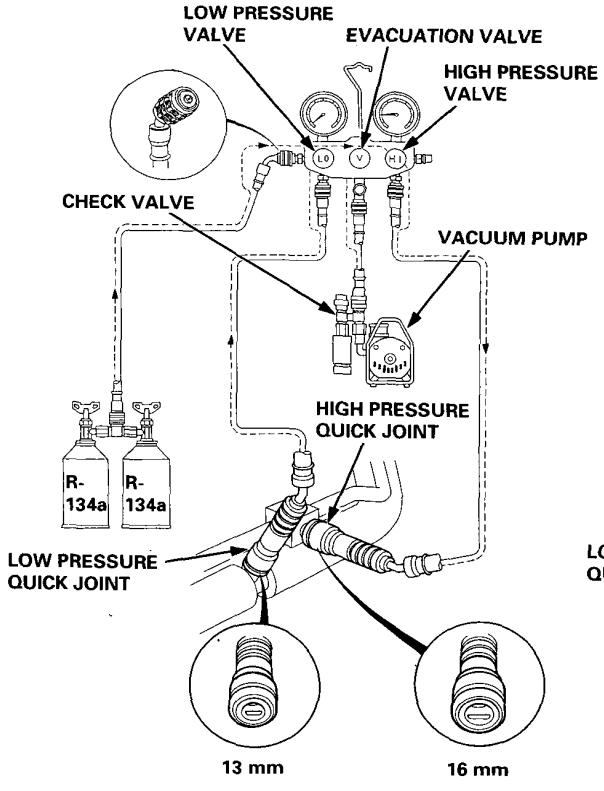
⚠ WARNING When handling refrigerant (R-134a):
- **always were eye protection.**
- **do not let refrigerant get on your skin or in your eyes. If it does:**
  - **— do not rub your eyes or skin.**
  - **— splash large quantities of cool water in your eyes or on your skin.**
  - **— rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.**
- **keep refrigerant containers (cans of R-134a) stored below 40°C (104°F).**
- **keep away from open flame. Refrigerant, although non-flammable, will produce poisonous gas if burned.**
- **work in well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small, enclosed area.**

1. Close the evacuation valve (two valve gauge; evacuation stop valve).
2. Open the cans.
3. Open high pressure valve to charge the system to about 98 kPa (1.0 kgf/cm², 14 psi), then close it.

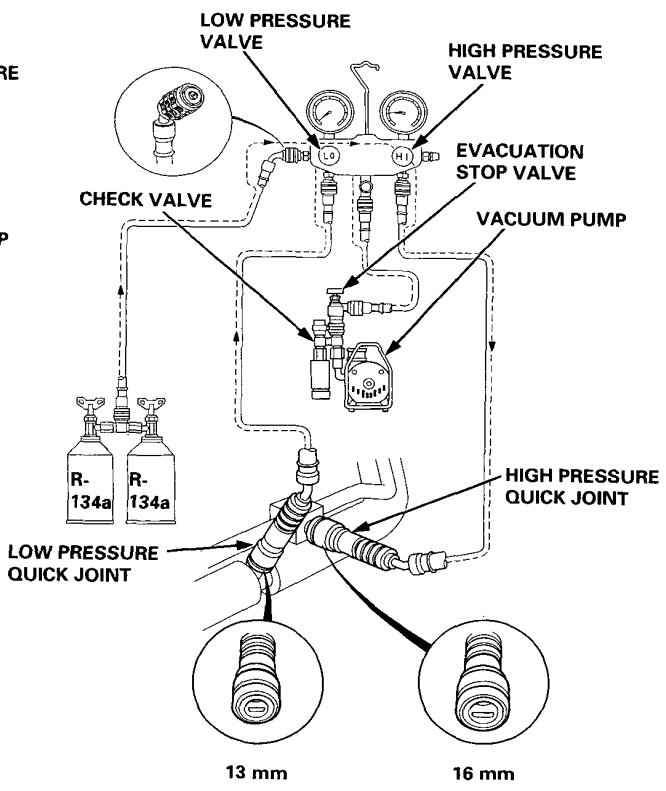
   NOTE: Close the low pressure valve.
4. Check the system for leaks using a leak detector proper to refrigerant R-134a.

   NOTE: Particularly check for leaks around the compressor, condenser, and receiver/dryer.
5. If you find any leaks, tighten the joint nuts and bolts to the specified torque.
6. Recheck the system for leaks using a leak detector.
7. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), release any charge in the system.
8. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 22-45).

THREE VALVE GAUGE



TWO VALVE GAUGE



Read this before you do any electrical work on the car.

Some model versions of the Accord Coupe include a driver's airbag, located in the steering wheel hub, and a front passenger's airbag, located in the dashboard above the glove box. Information necessary to safely service the SRS is included in this Shop Manual. Items marked with an asterisk (*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

⚠ WARNING

- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.**
- **All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.**

Electrical

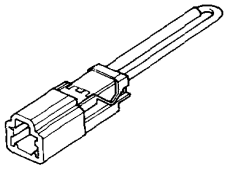
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*Read the SRS precautions on page 23-324, then install the short connectors on the airbags before working in these areas.

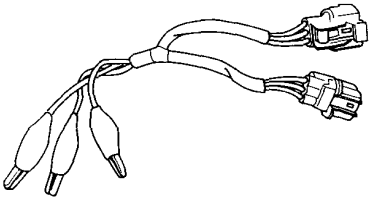


Special Tools

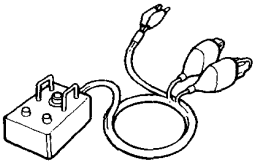
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07PAZ – 0010100	SCS Short Connector	1	23-95
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③	07HAZ – SG00400	Deployment Tool	1	23-350
④	07MAZ – SL00500	Test Harness A	1	23-333
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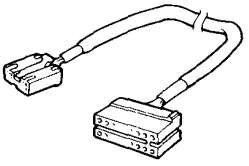
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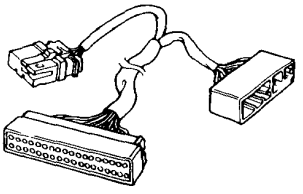
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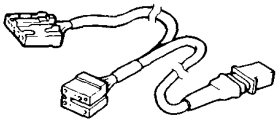
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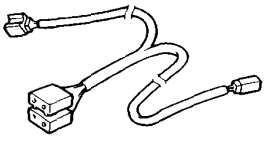
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⑤



⑥



⑦

Troubleshooting

Tips and Precautions

Before Troubleshooting

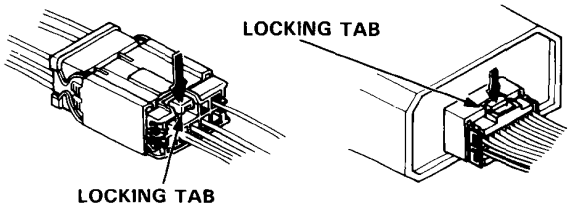
- Check applicable fuses in the appropriate fuse/relay box.
- Check the battery for damage, state of charge, and clean and tight connections.
- Check the alternator belt tension.

CAUTION:

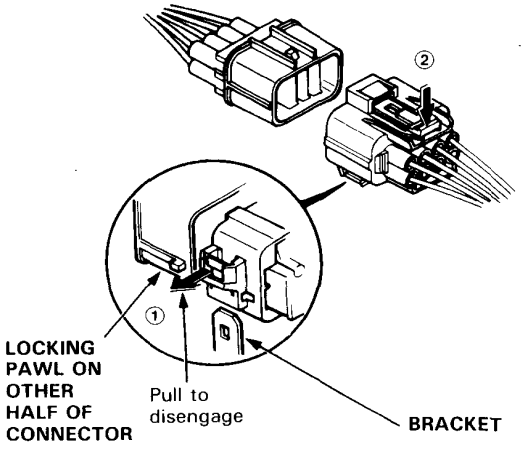
- **Do not quick-charge a battery unless the battery ground cable has been disconnected, otherwise you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the battery ground cable loosely connected or you will severely damage the wiring.**

Handling Connectors

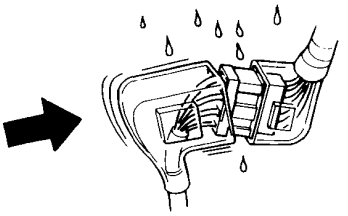
- Make sure the connectors are clean and have no loose wire terminals.
- Make sure multiple cavity connectors are packed with grease (except watertight connectors).
- All connectors have push-down release type locks.



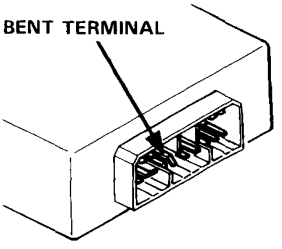
- Some connectors have a clip on their side used to attach them to a mount bracket on the body or on another component. This clip has a pull type lock.
- Some mounted connectors cannot be disconnected unless you first release the lock and remove the connector from its mount bracket.



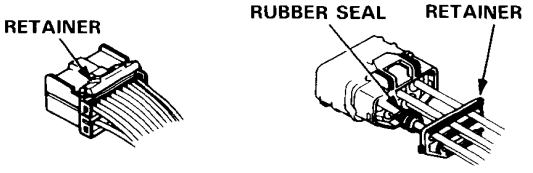
- Never try to disconnect connectors by pulling on their wires; pull on the connector halves instead.
- Always reinstall plastic covers.



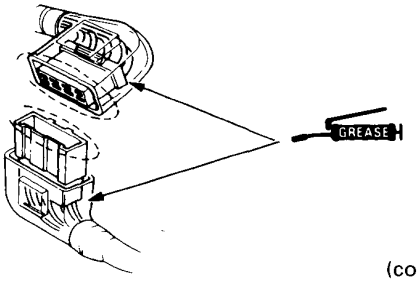
- Before connecting connectors, make sure the terminals are in place and not bent.



- Check for loose retainer and rubber seals.



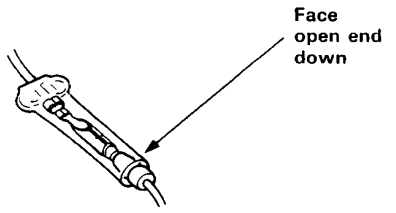
- The backs of some connectors are packed with grease. Add grease if necessary. If the grease is contaminated, replace it.



(cont'd)

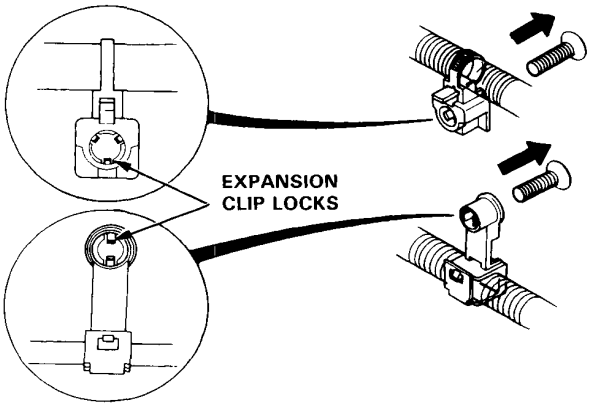
Tips and Precautions (cont'd)

- Insert the connector all the way and make sure it is securely locked.
- Position wires so that the open end of the cover faces down.

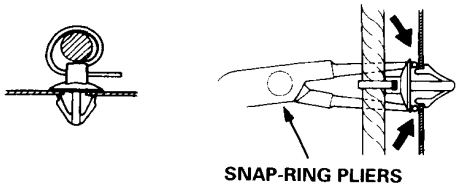


Handling Wires and Harnesses

- Secure wires and wire harnesses to the frame with their respective wire ties at the designated locations.
- Remove clips carefully; don't damage their locks.

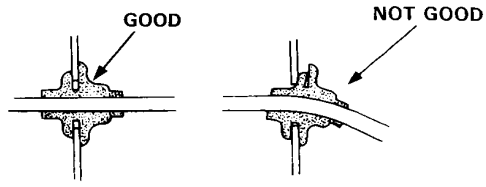


Slip pliers under the clip base and through the hole at an angle, then squeeze the expansion tabs to release the clip.



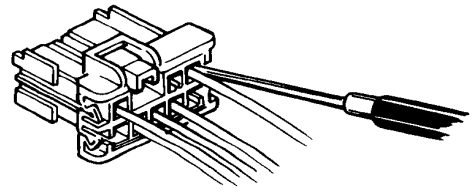
- After installing harness clips, make sure the harness doesn't interfere with any moving parts.
- Keep wire harnesses away from exhaust pipes and other hot parts, from sharp edges of brackets and holes, and from exposed screws and bolts.

- Seat grommets in their grooves properly.

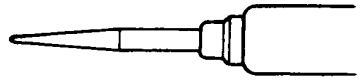


Testing and Repairs

- Do not use wires or harnesses with broken insulation. Replace them or repair them by wrapping the break with electrical tape.
- After installing parts, make sure that no wires are pinched under them.
- When using electrical test equipment, follow the manufacturer's instructions and those described in this manual.
- If possible, insert the probe of the tester from the wire side (except waterproof connector).



- Use a probe with a tapered tip.



Five-step Troubleshooting

1. Verify The Complaint
   Turn on all the components in the problem circuit to verify the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. Analyze The Schematic
   Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.

   Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.

3. Isolate The Problem By Testing The Circuit
   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

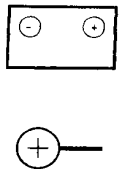
4. Fix The Problem
   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

5. Make Sure The Circuit Works
   Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on the fuse. Make sure no new problems turn up and the original problem does not recur.

How to Use This Section

Schematic Symbols

BATTERY



GROUND

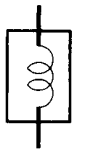
Ground terminal | Component ground



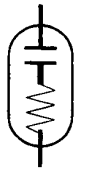
FUSE



COIL, SOLENOID



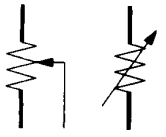
CIGARETTE LIGHTER



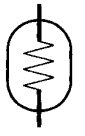
RESISTOR



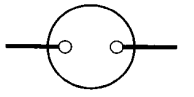
VARIABLE RESISTOR



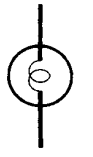
THERMISTOR



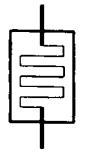
IGNITION SWITCH



BULB



HEATER



MOTOR



PUMP



CIRCUIT BREAKER



HORN



DIODE

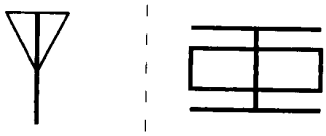


SPEAKER, BUZZER

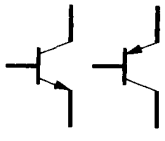


ANTENNA

Mast | Window

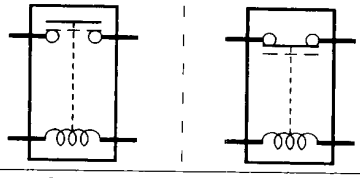


TRANSISTOR (Tr)



RELAY (In normal position)

Normally open relay | Normally closed relay

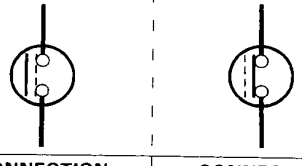


CONDENSER

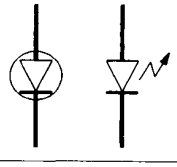


SWITCH (In normal position)

Normally open switch | Normally closed switch

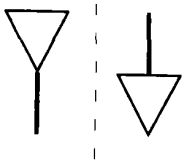


LIGHT EMITTING DIODE (LED)

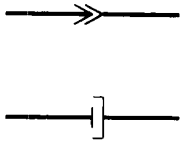


CONNECTION

Input | Output



CONNECTOR



REED SWITCH

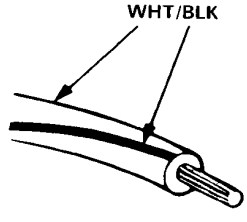


Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics:

WHT	White
YEL	Yellow
BLK	Black
BLU	Blue
GRN	Green
RED	Red
ORN	Orange
PNK	Pink
BRN	Brown
GRY	Gray
PUR	Purple
LT BLU	Light Blue
LT GRN	Light Green

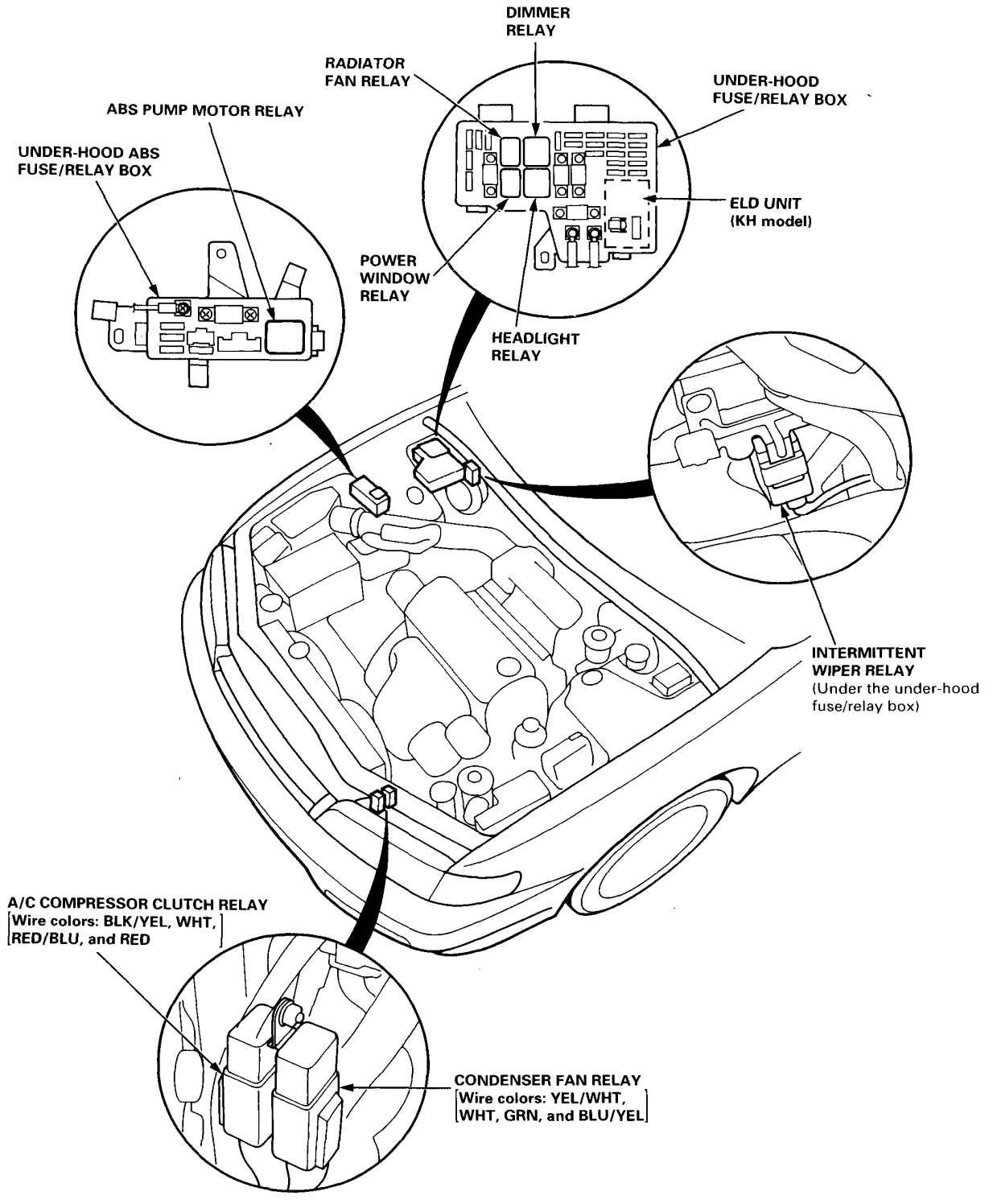
The wire insulation has one color or one color with another color stripe. The second color is the stripe.



Relay and Control Unit Locations

Engine Compartment

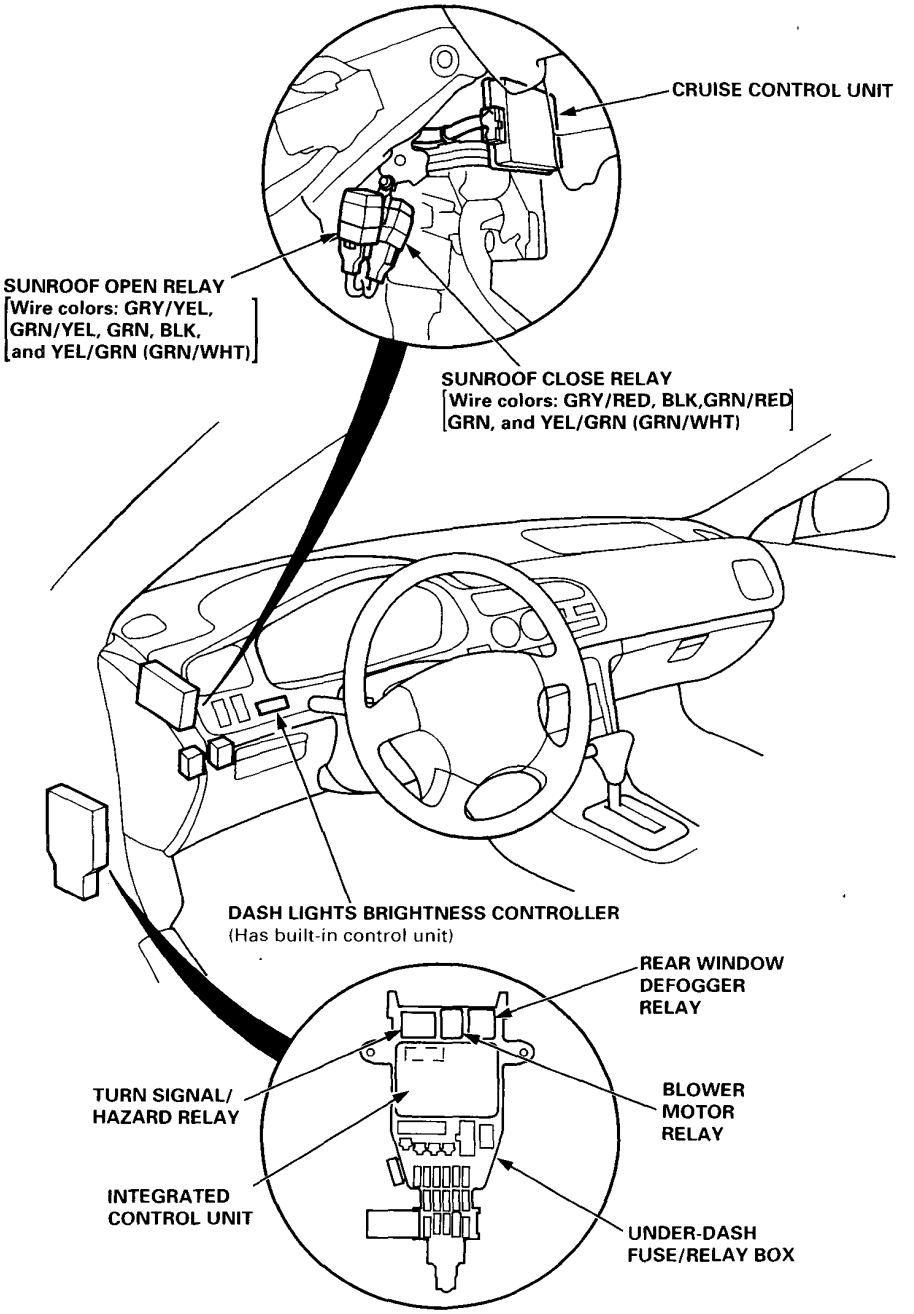
NOTE: LHD type is shown, RHD type is similar.



Relay and Control Unit Locations

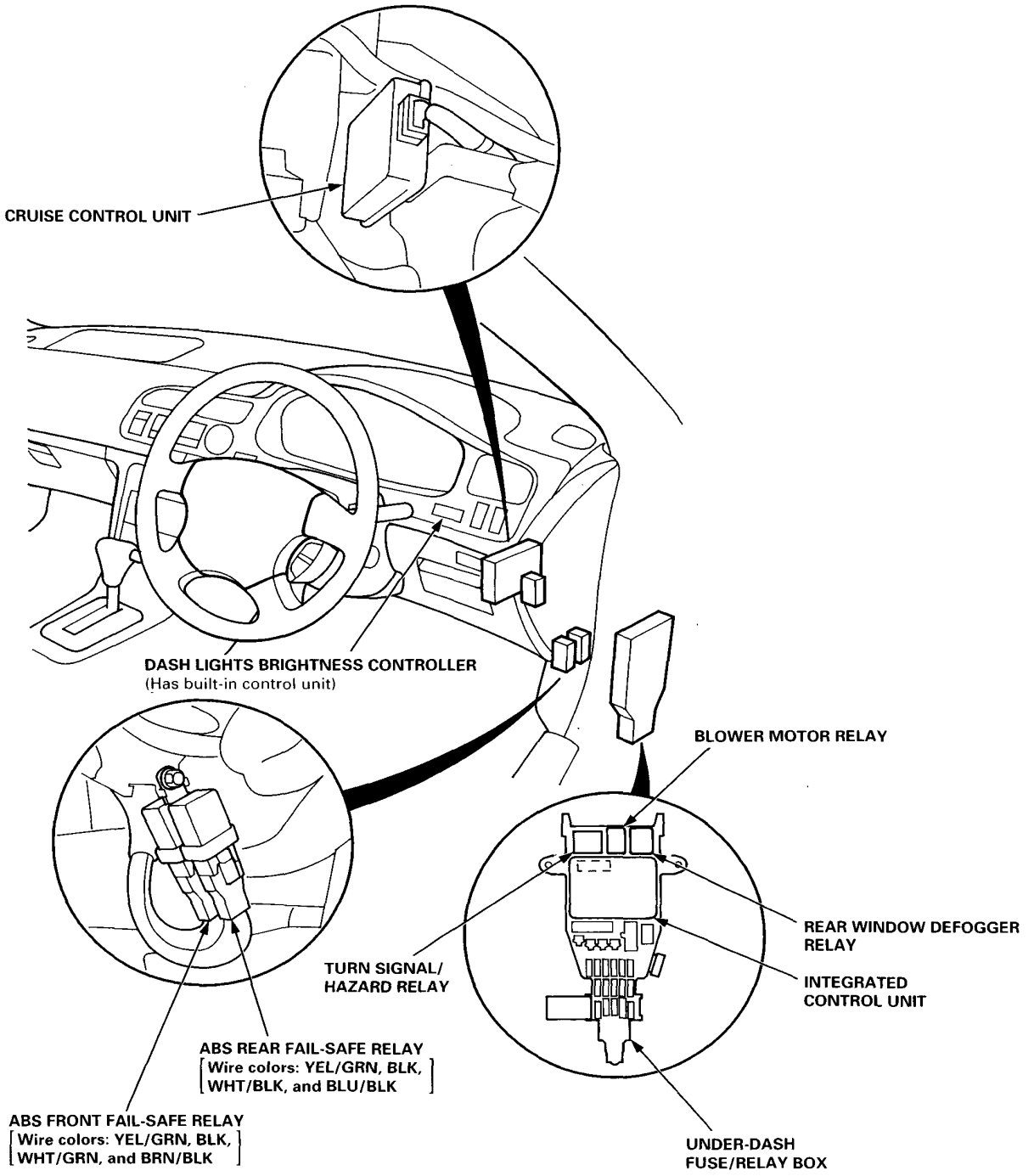
Dashboard

LHD type:



(GRN/WHT): KH model

RHD type:

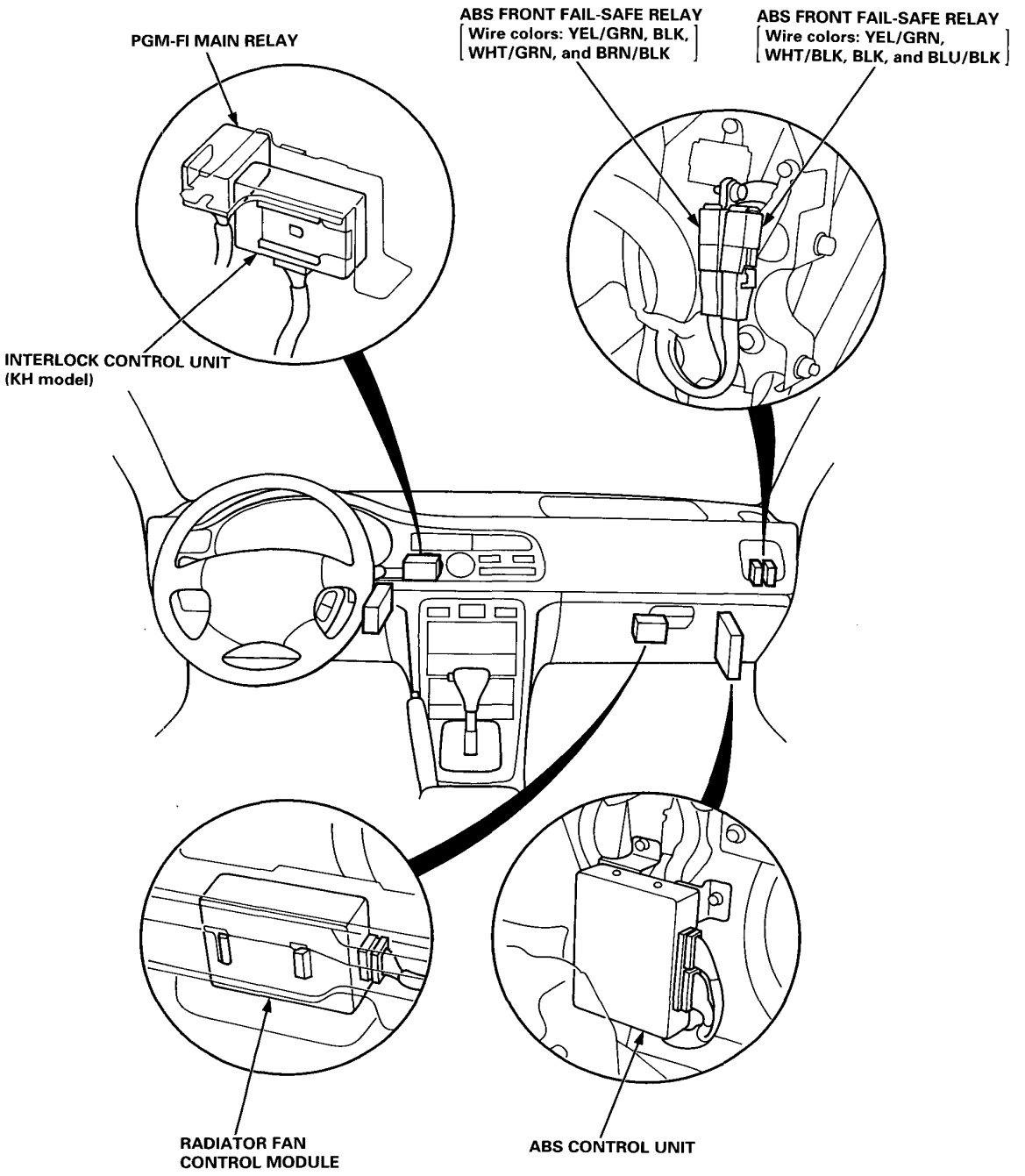


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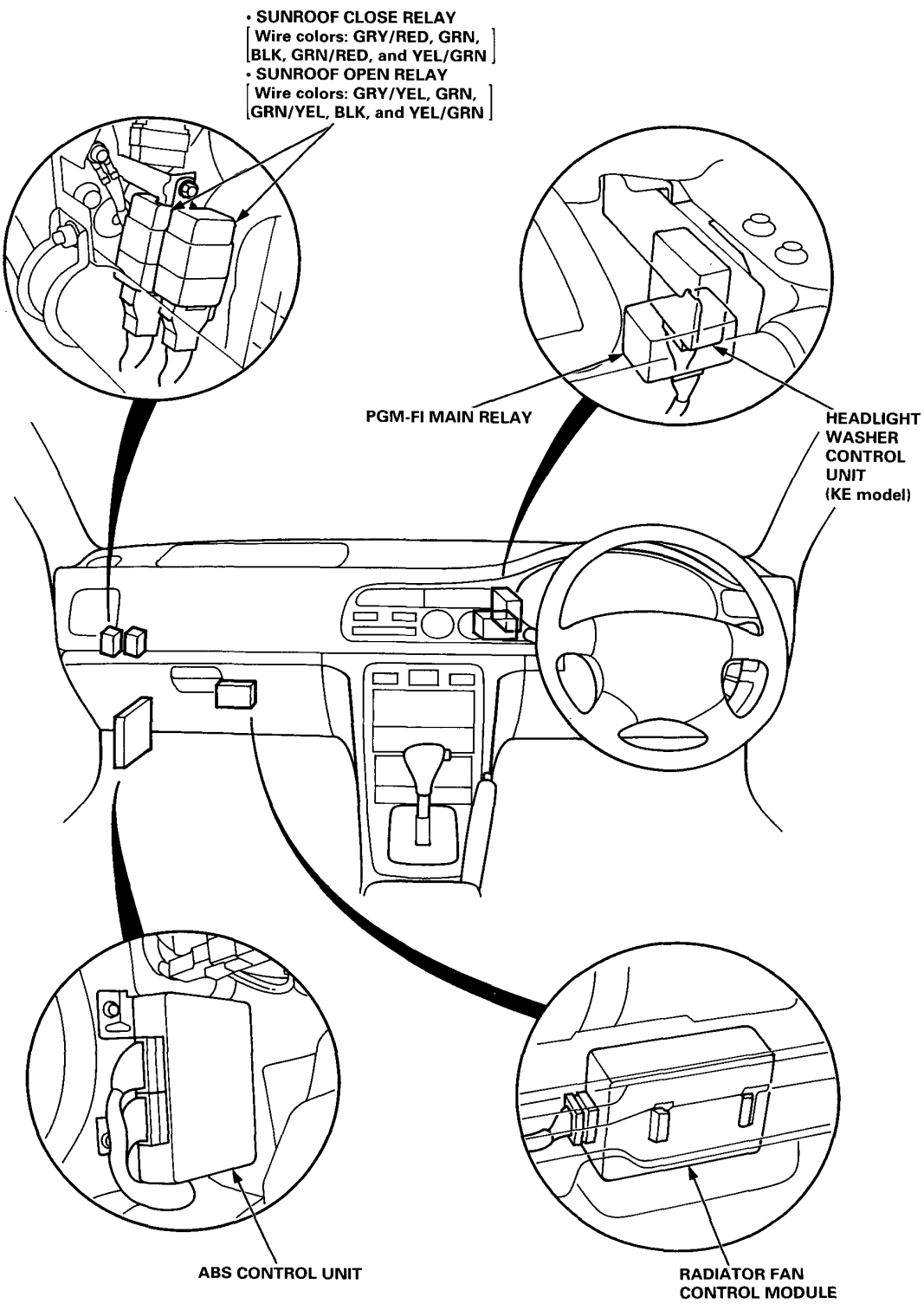
Relay and Control Unit Locations

Dashboard (cont'd)

LHD type:



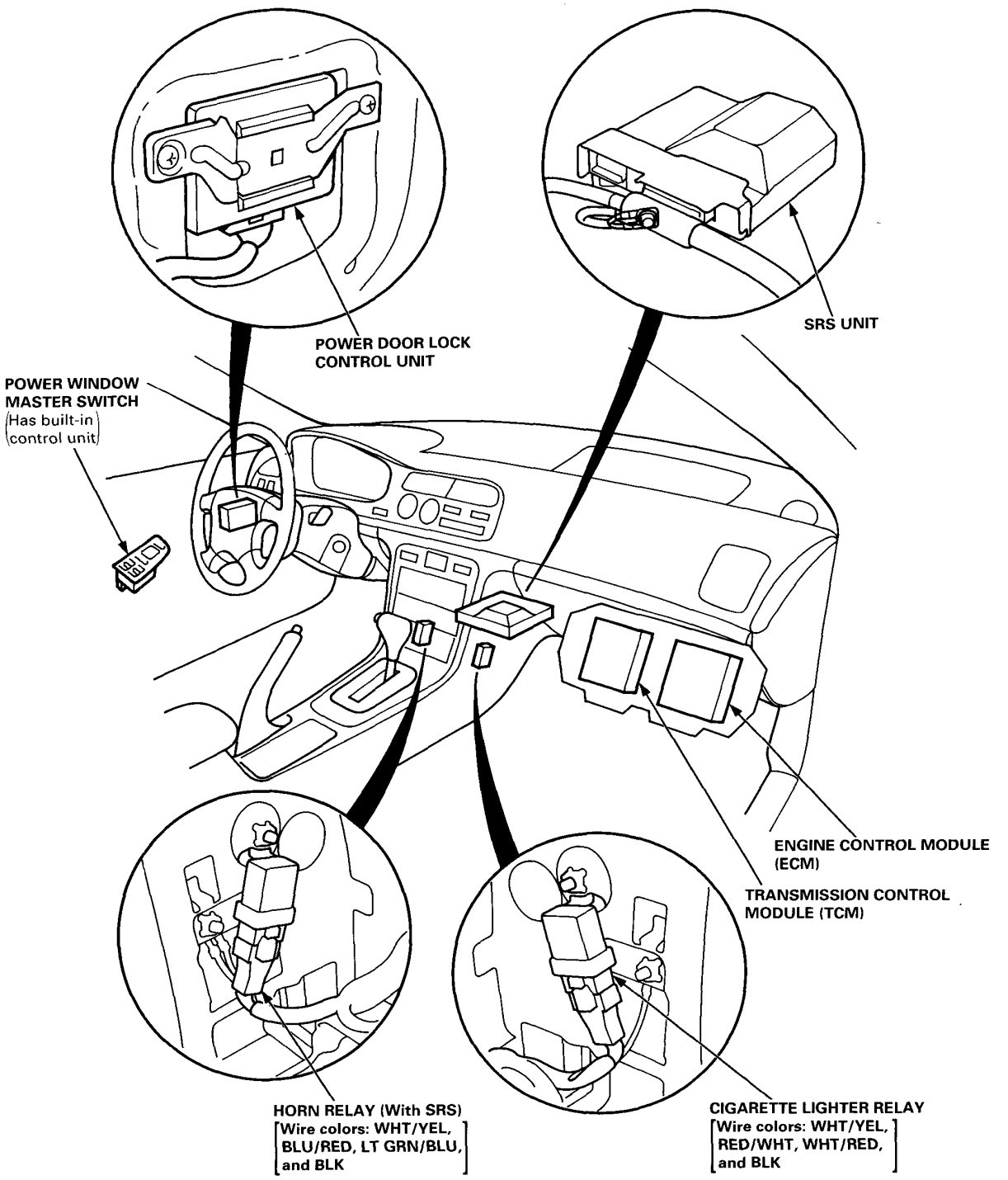
RHD type:


• SUNROOF CLOSE RELAY
[Wire colors: GRY/RED, GRN, BLK, GRN/RED, and YEL/GRN]
• SUNROOF OPEN RELAY
[Wire colors: GRY/YEL, GRN, GRN/YEL, BLK, and YEL/GRN]
PGM-FI MAIN RELAY
HEADLIGHT WASHER CONTROL UNIT (KE model)
ABS CONTROL UNIT
RADIATOR FAN CONTROL MODULE

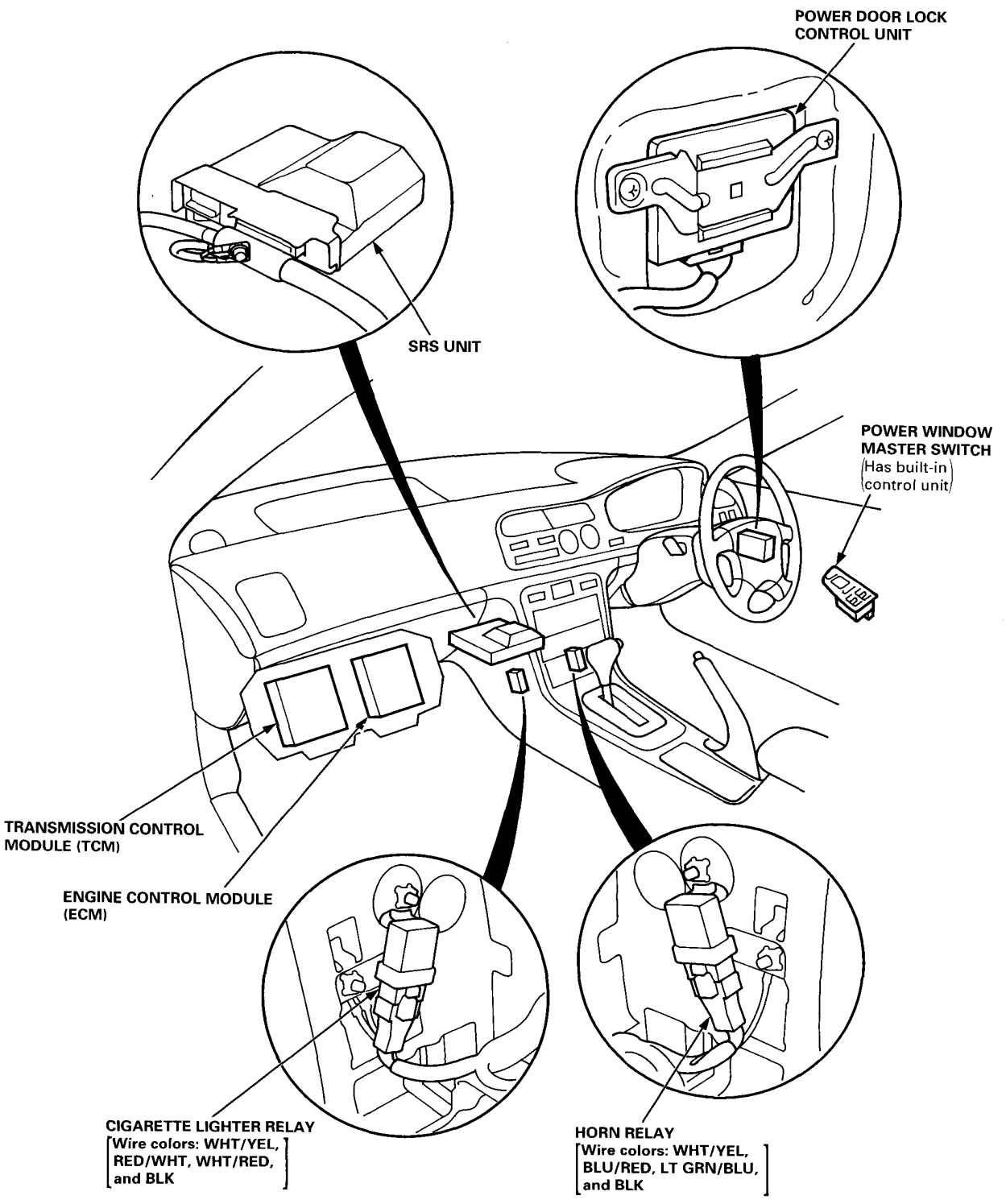
Relay and Control Unit Locations

Dashboard (cont'd)

LHD type:



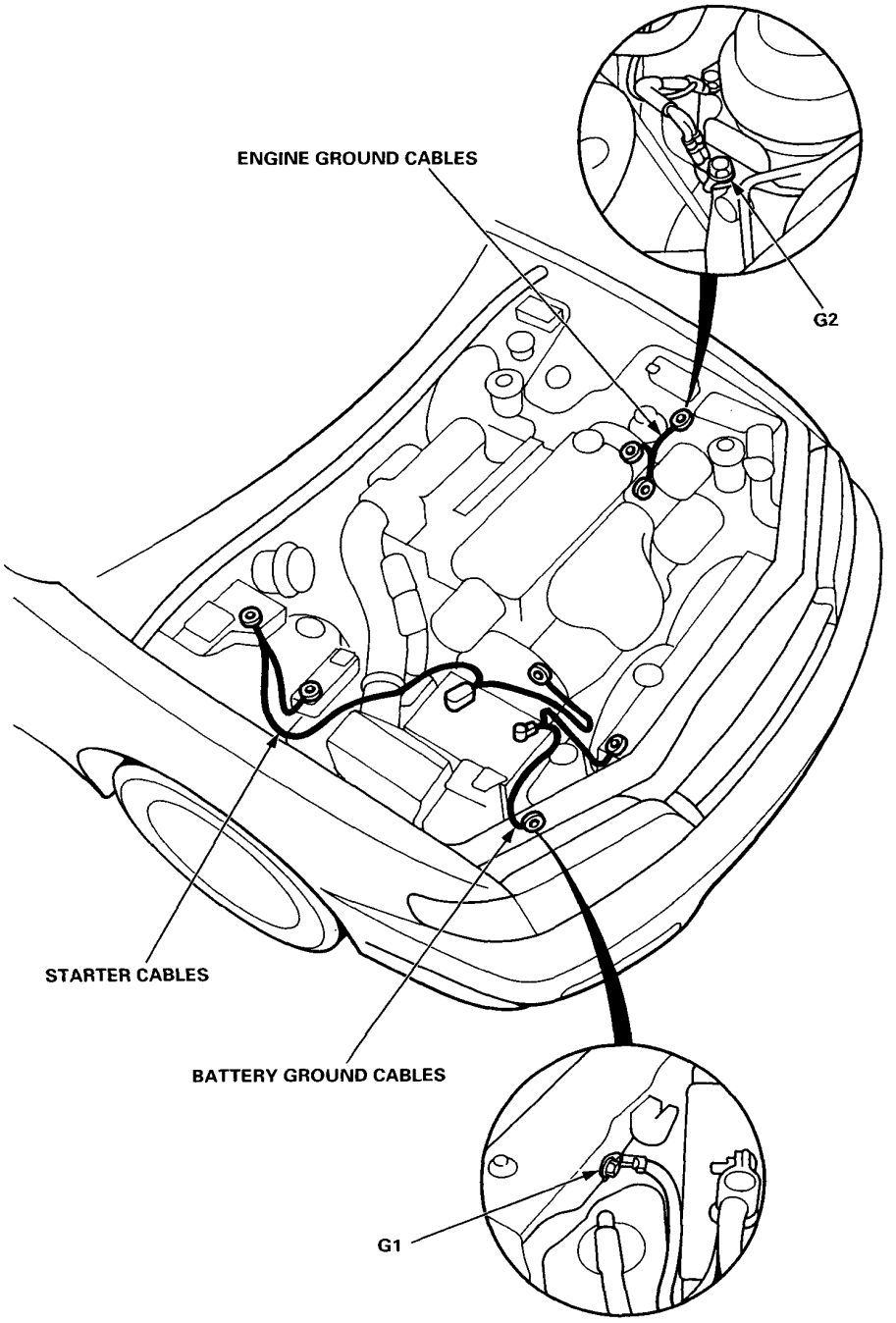
RHD type:

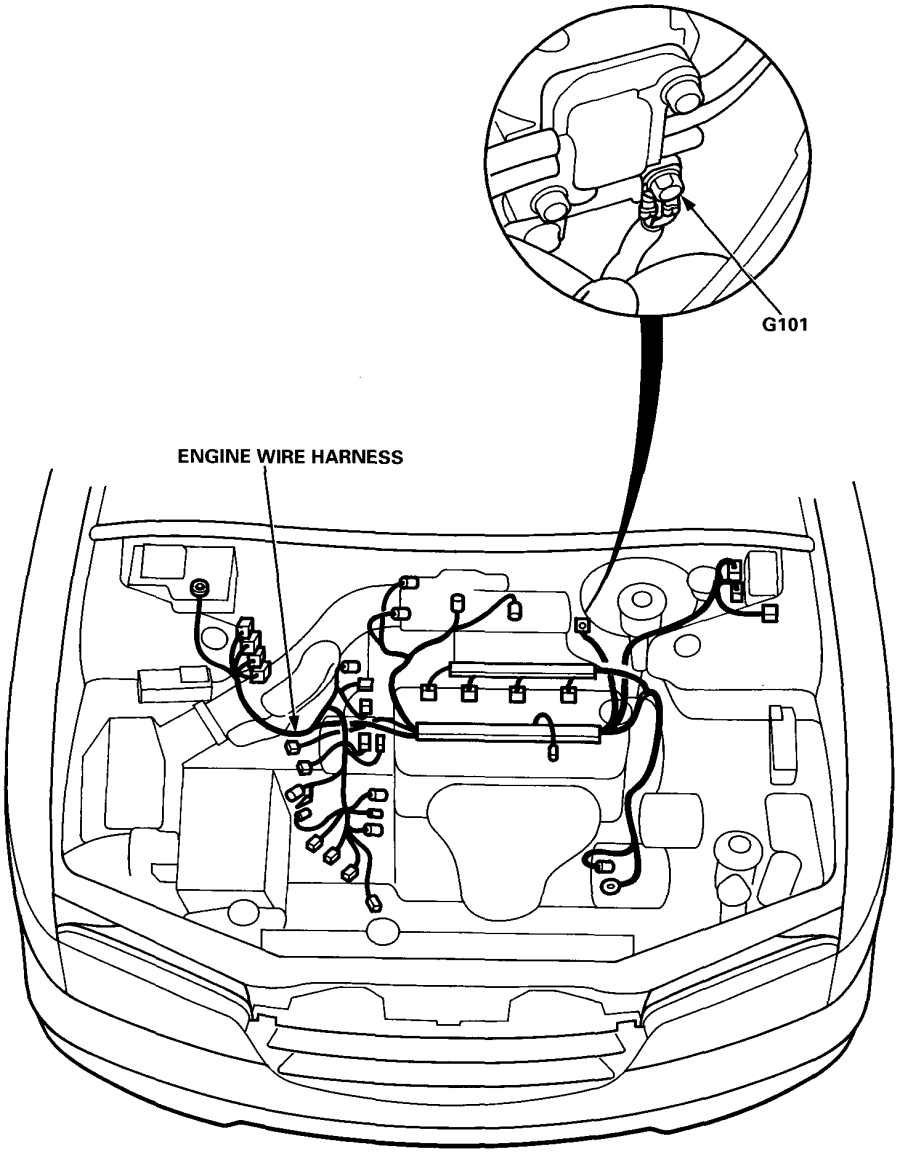

POWER DOOR LOCK CONTROL UNIT
SRS UNIT
POWER WINDOW MASTER SWITCH (Has built-in control unit)
TRANSMISSION CONTROL MODULE (TCM)
ENGINE CONTROL MODULE (ECM)
CIGARETTE LIGHTER RELAY [Wire colors: WHT/YEL, RED/WHT, WHT/RED, and BLK]
HORN RELAY [Wire colors: WHT/YEL, BLU/RED, LT GRN/BLU, and BLK]

Wire Harness and Ground Locations

Engine Compartment

NOTE: LHD type is shown, RHD type is similar.



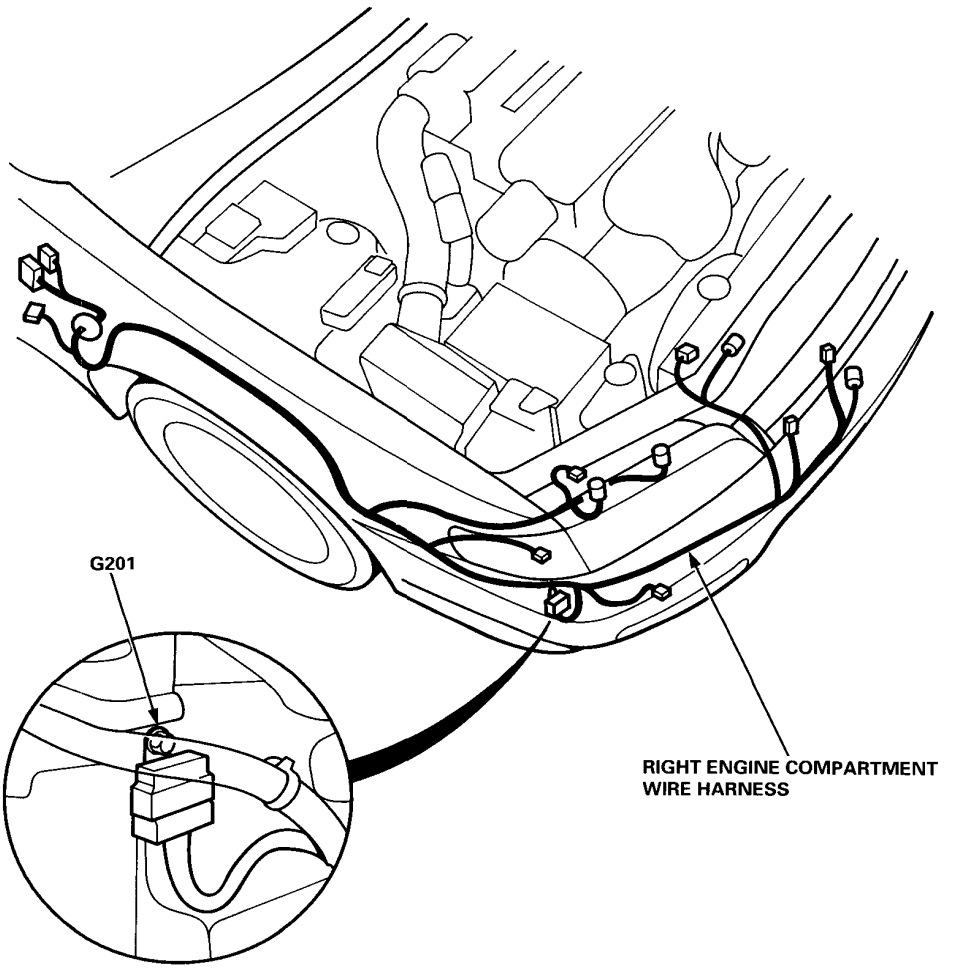


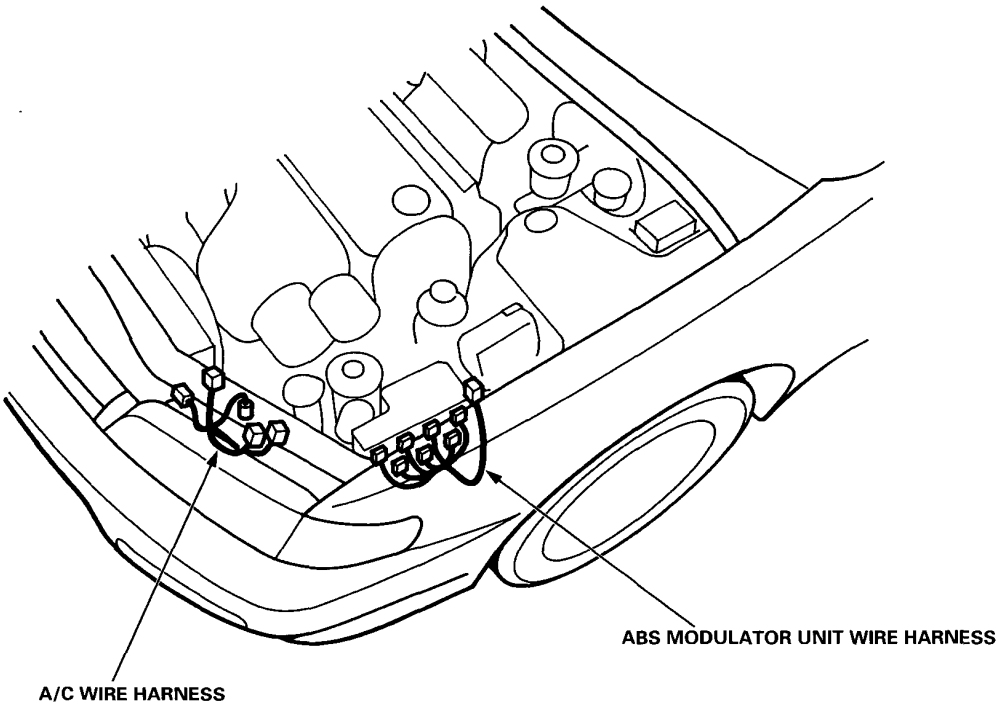
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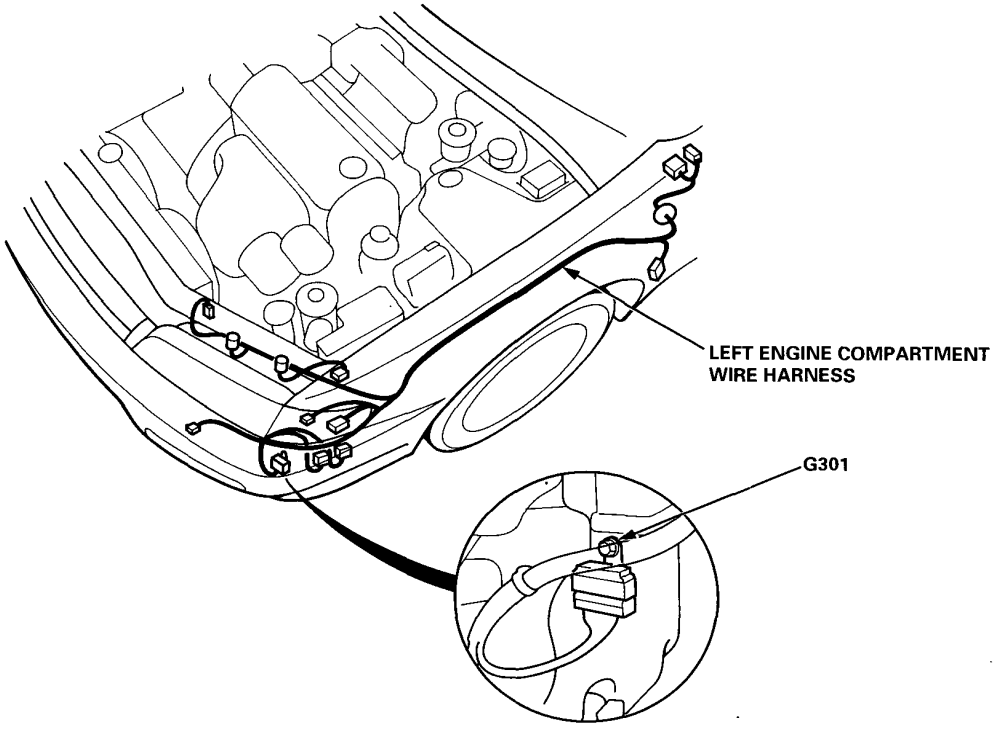
Wire Harness and Ground Locations

Engine Compartment (cont'd)

NOTE: LHD type is shown, RHD type is similar.




ABS MODULATOR UNIT WIRE HARNESS
A/C WIRE HARNESS

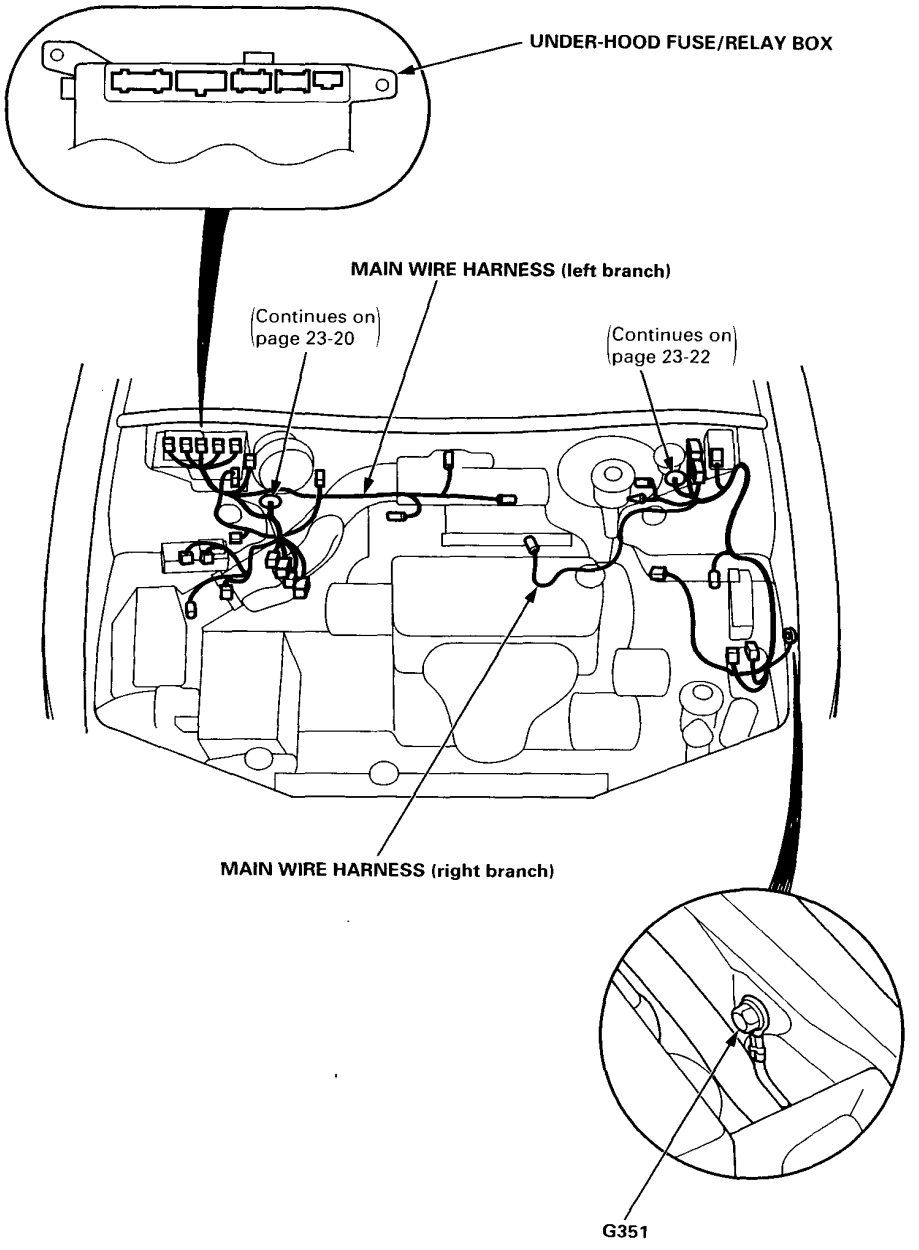

LEFT ENGINE COMPARTMENT
WIRE HARNESS
G301

(cont'd)

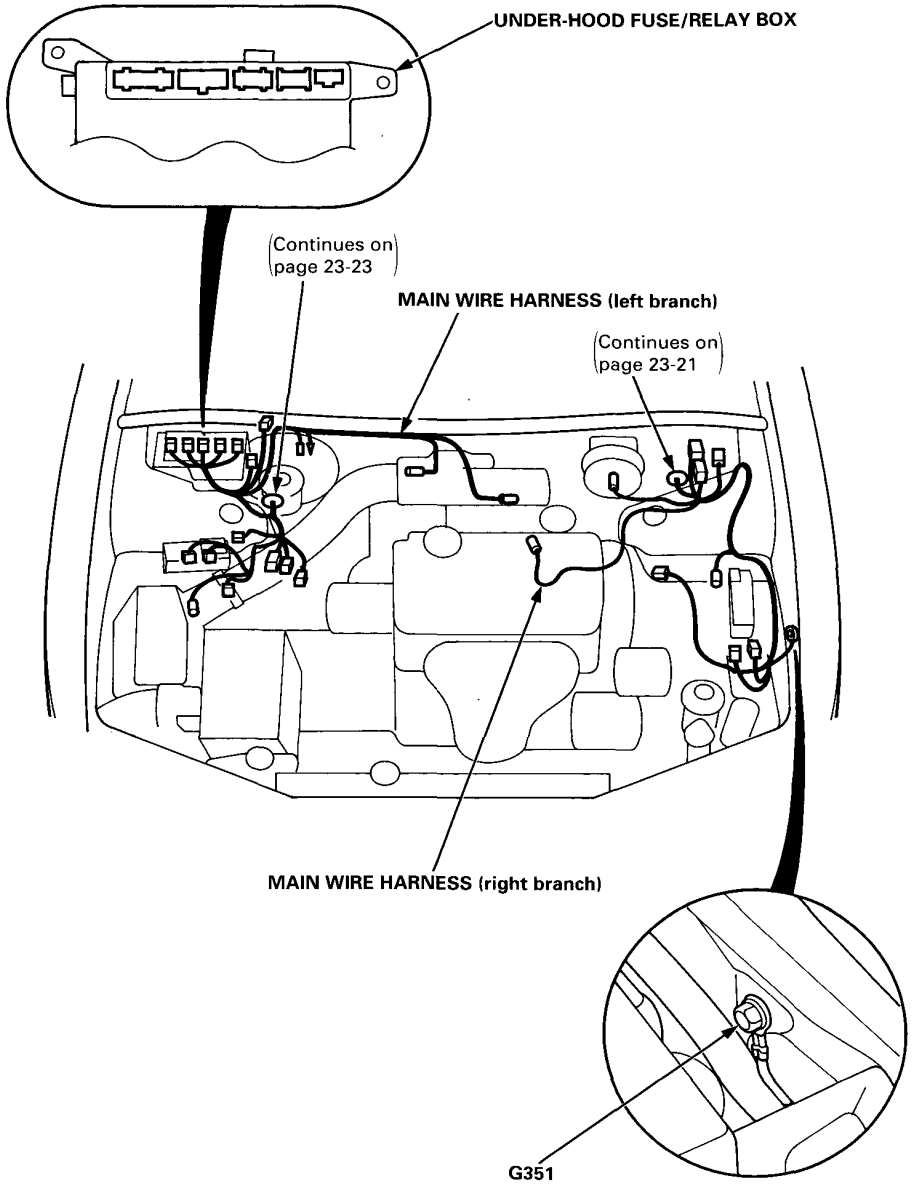
Wire Harness and Ground Locations

Engine Compartment (cont'd)

LHD type:



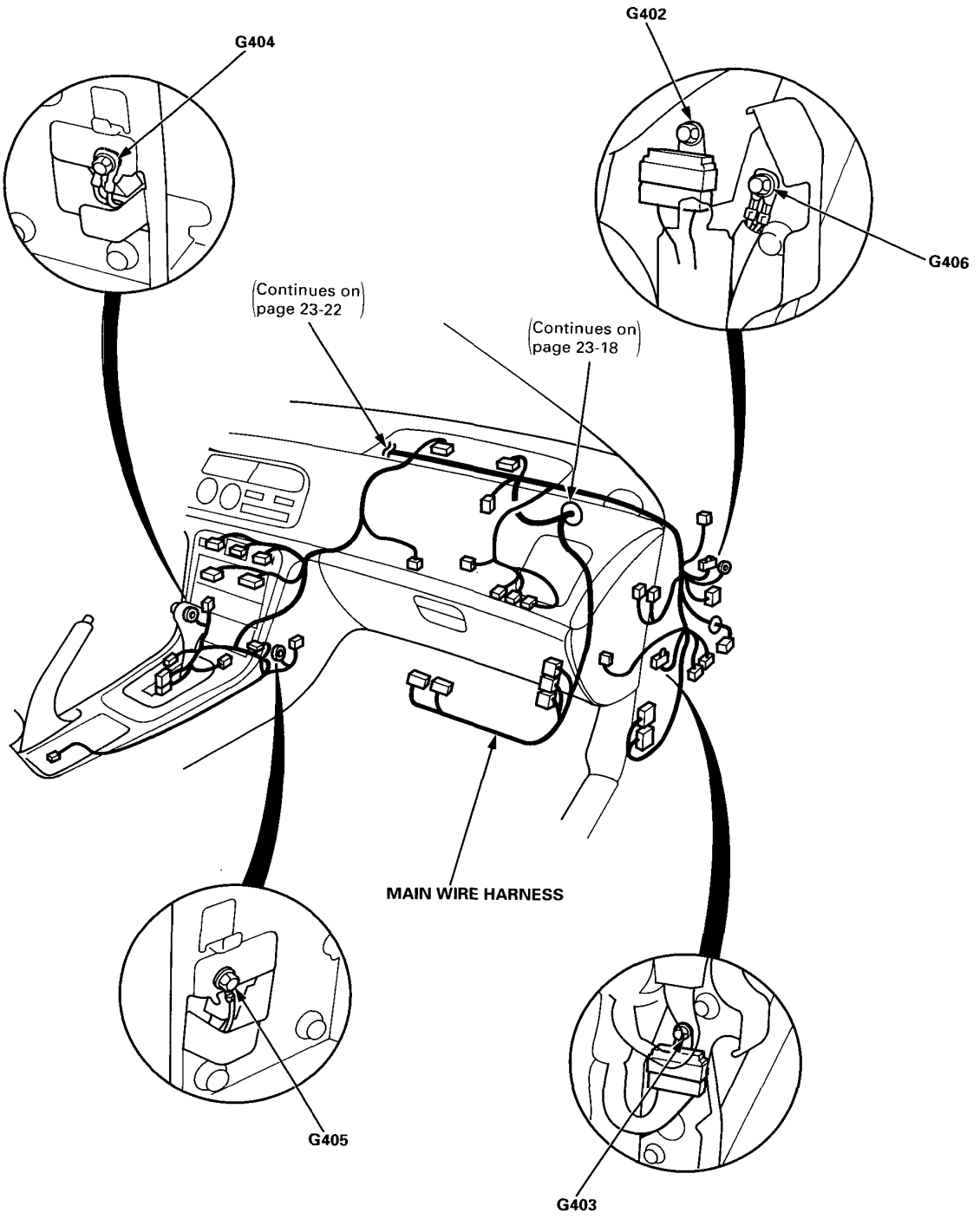
RHD type:


UNDER-HOOD FUSE/RELAY BOX
(Continues on page 23-23)
MAIN WIRE HARNESS (left branch)
(Continues on page 23-21)
MAIN WIRE HARNESS (right branch)
G351

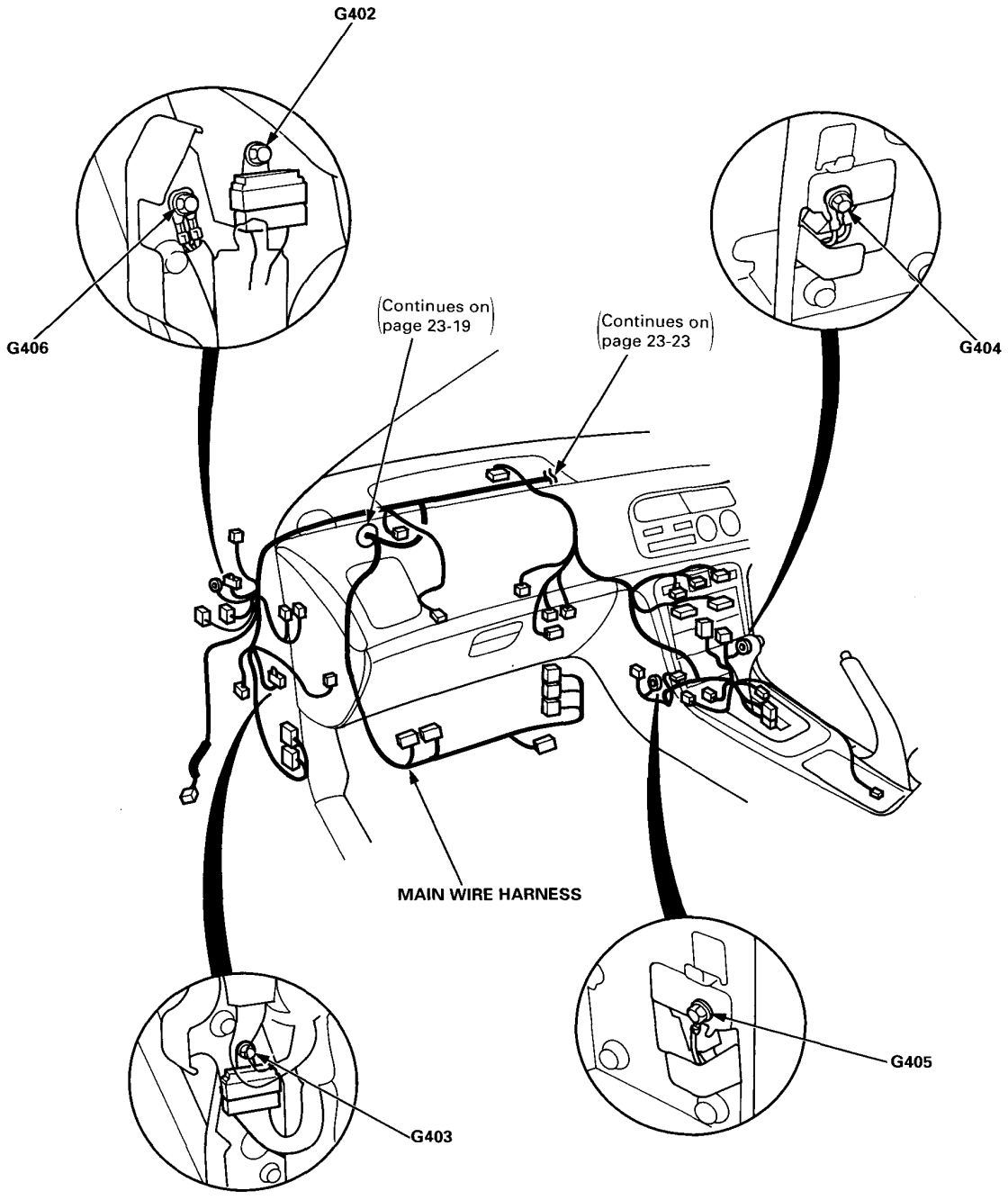
Wire Harness and Ground Locations

Dashboard/Floor

LHD type:



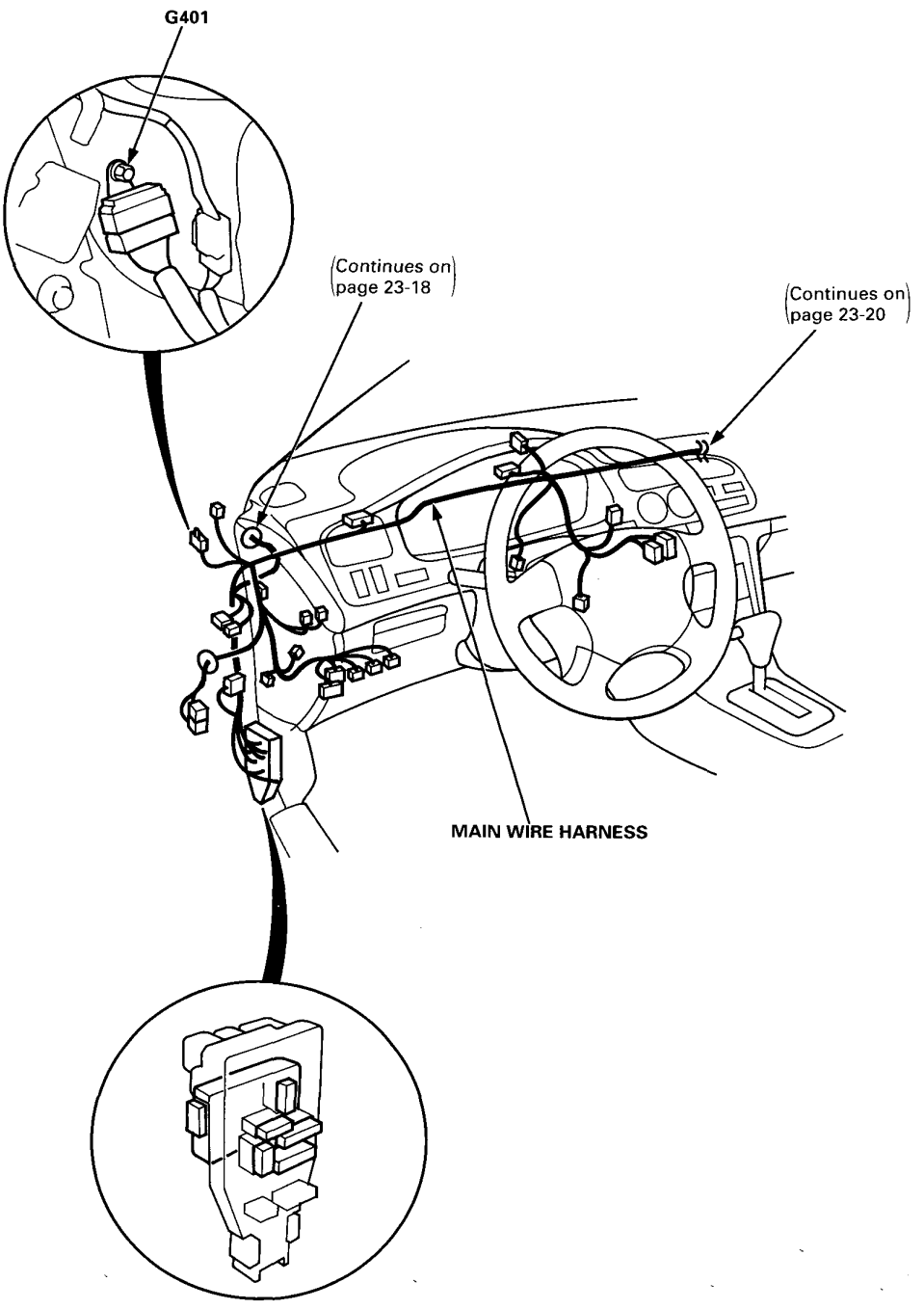
RHD type:


G402
G406
(Continues on page 23-19)
(Continues on page 23-23)
G404
MAIN WIRE HARNESS
G403
G405

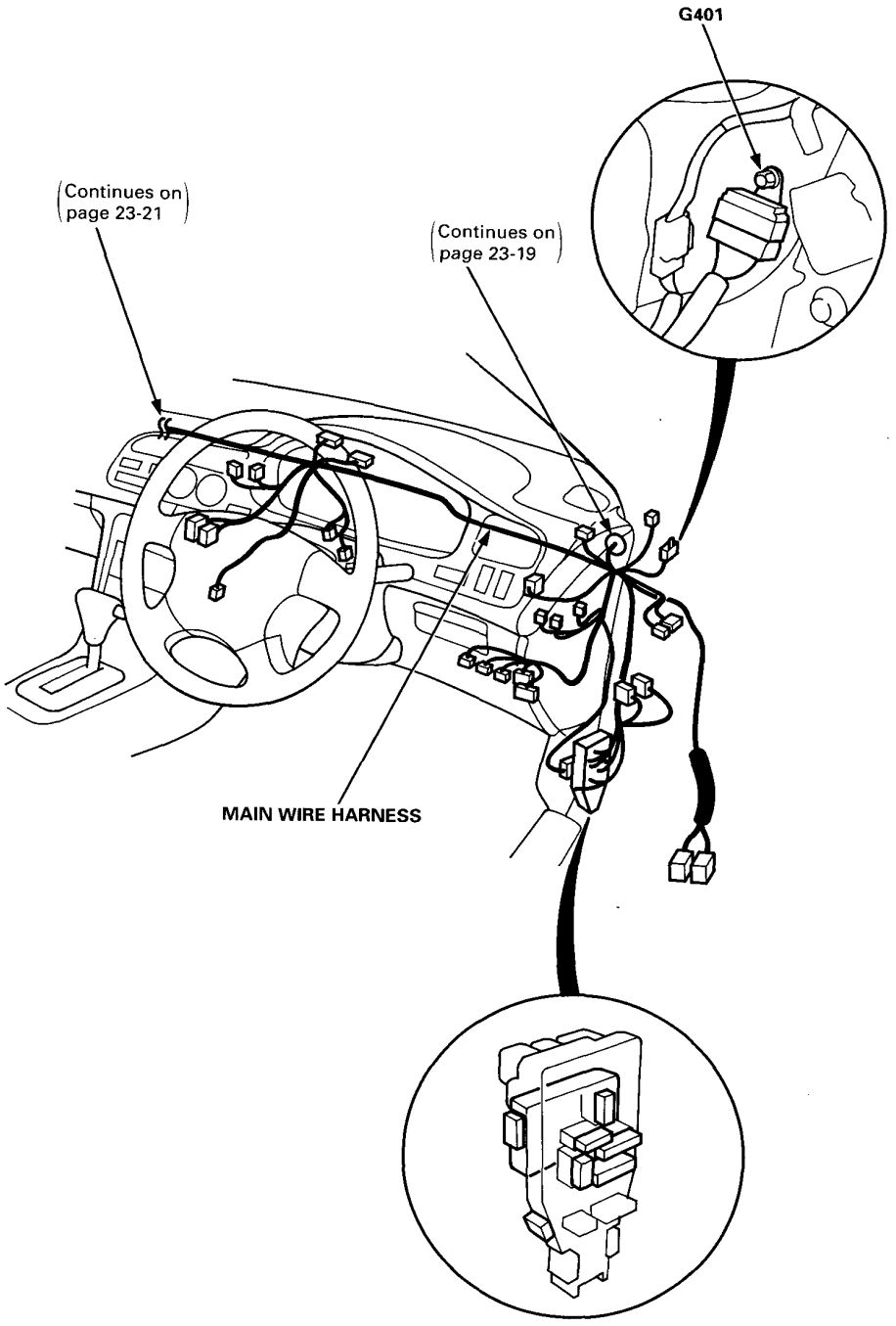
Wire Harness and Ground Locations

Dashboard/Floor (cont'd)

LHD type:



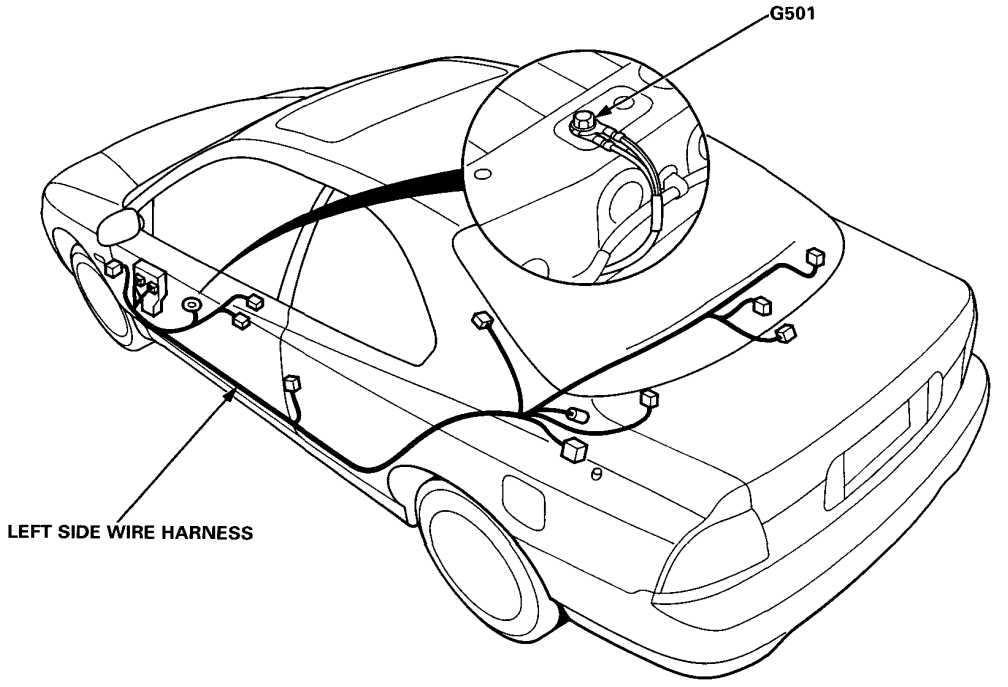
RHD type:

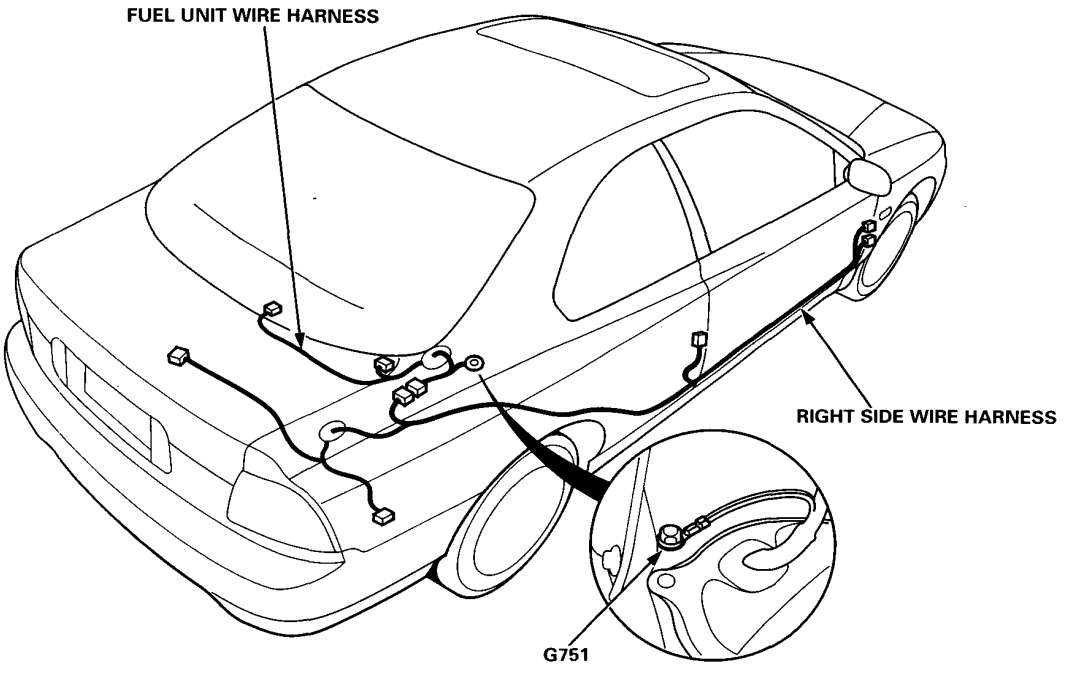

G401
(Continues on page 23-21)
(Continues on page 23-19)
MAIN WIRE HARNESS

Wire Harness and Ground Locations

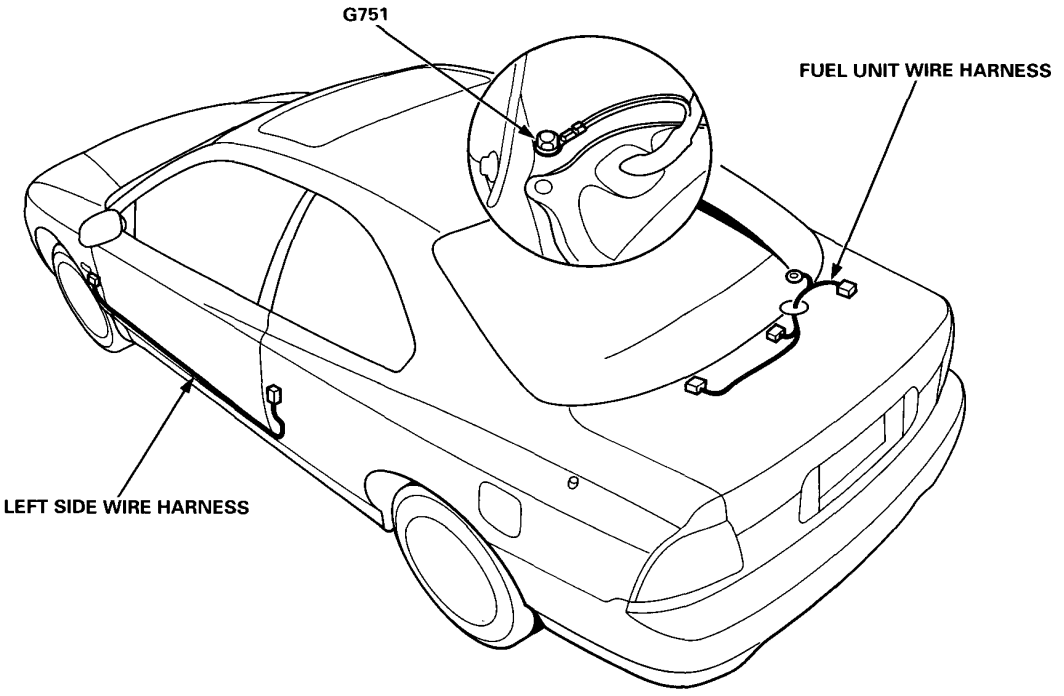
Floor/Rear

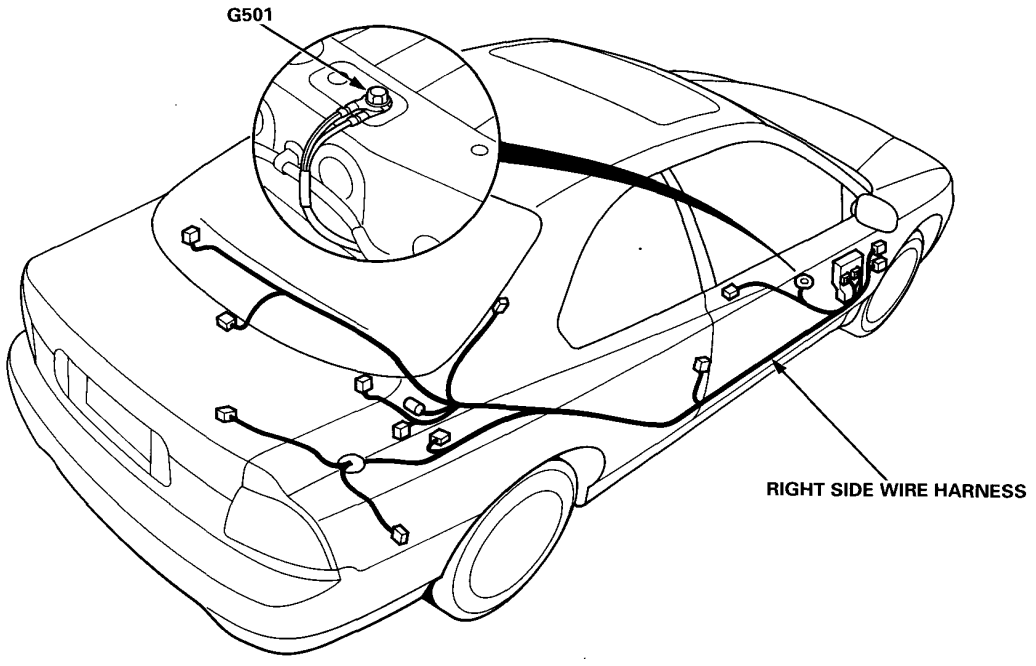
LHD type:





RHD type:

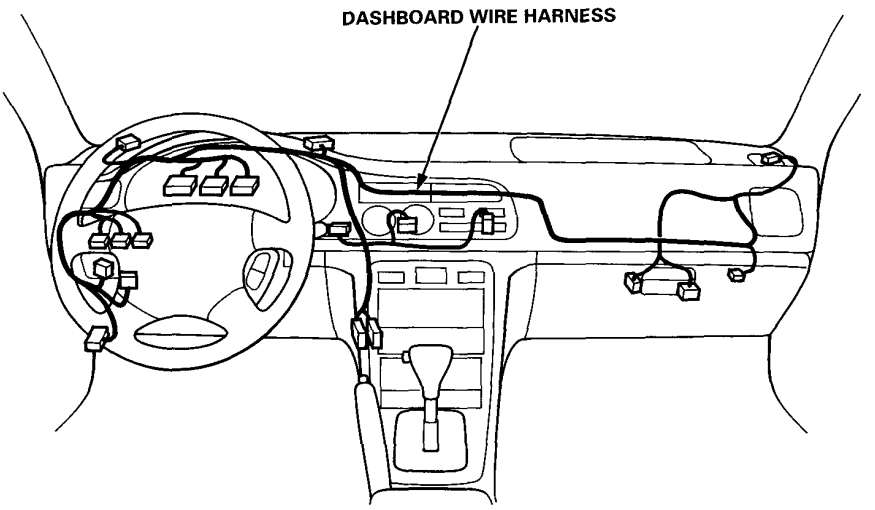

G751
FUEL UNIT WIRE HARNESS
LEFT SIDE WIRE HARNESS

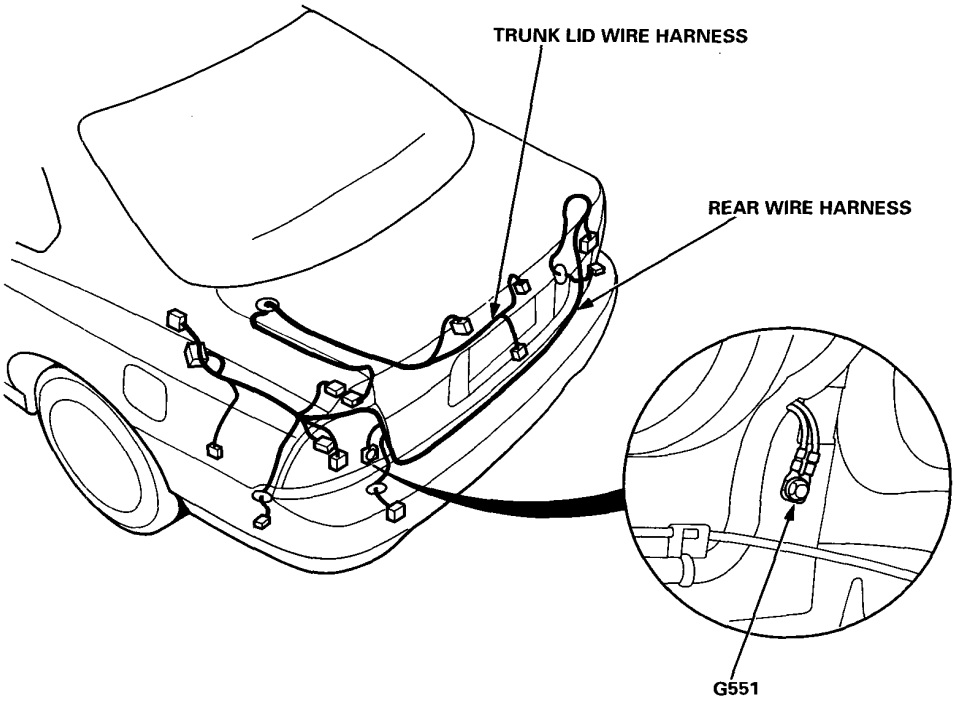

G501
RIGHT SIDE WIRE HARNESS

Wire Harness and Ground Locations

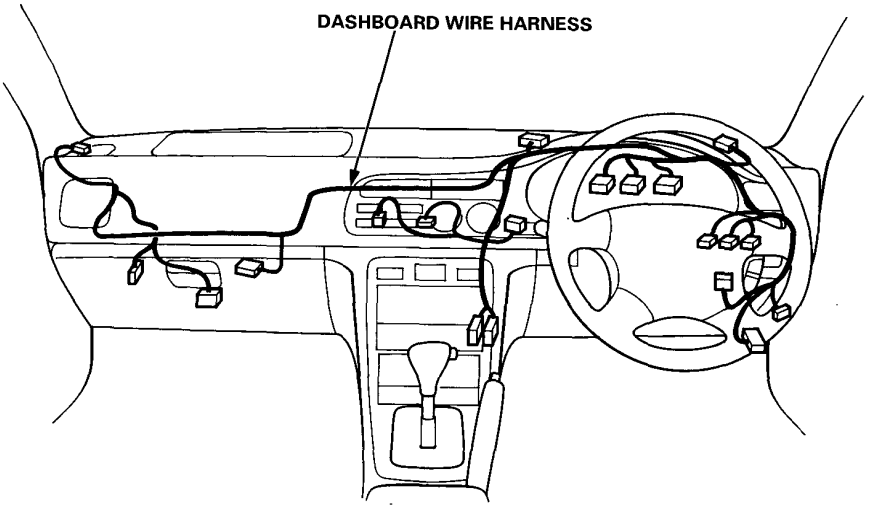
Dashboard/Rear

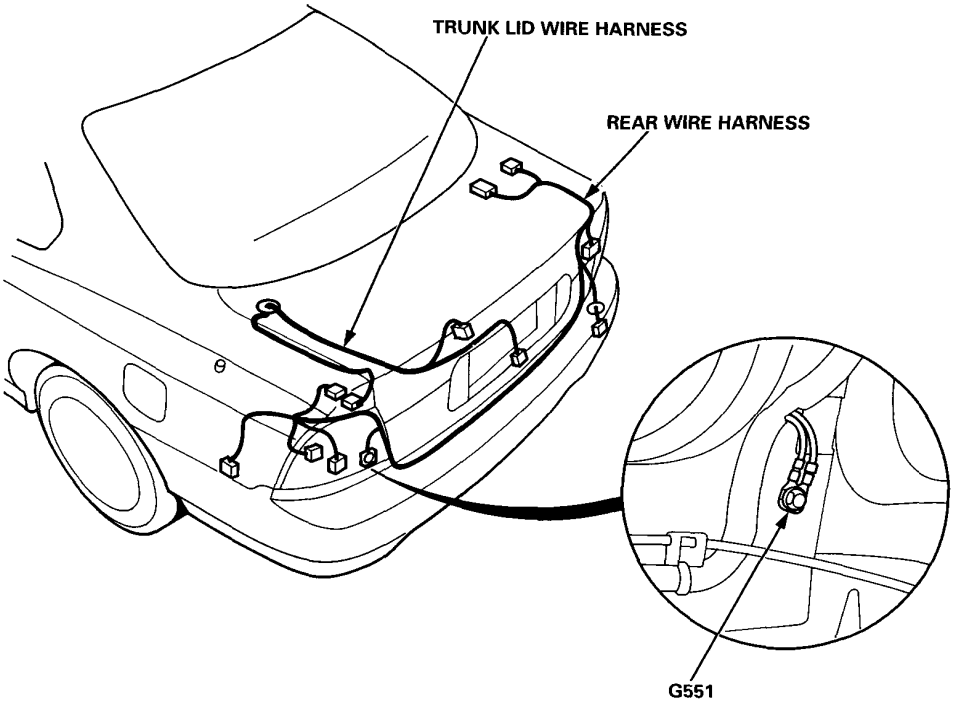
LHD type:





RHD type:

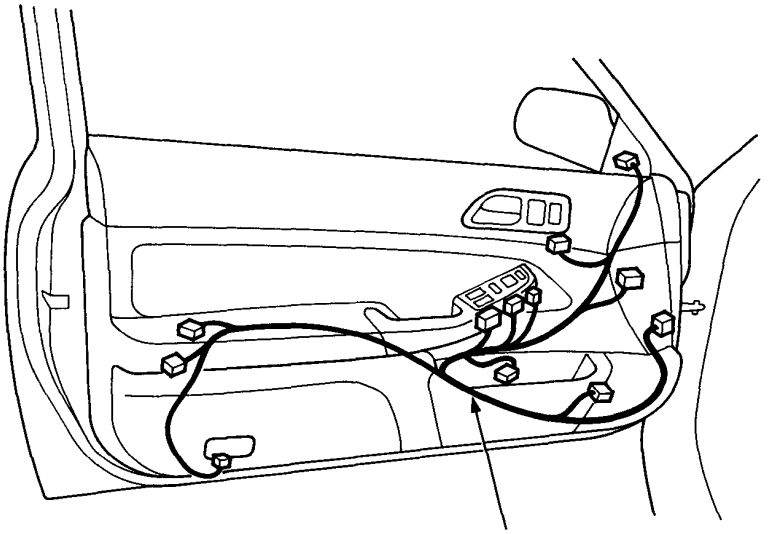

DASHBOARD WIRE HARNESS


TRUNK LID WIRE HARNESS
REAR WIRE HARNESS
G551

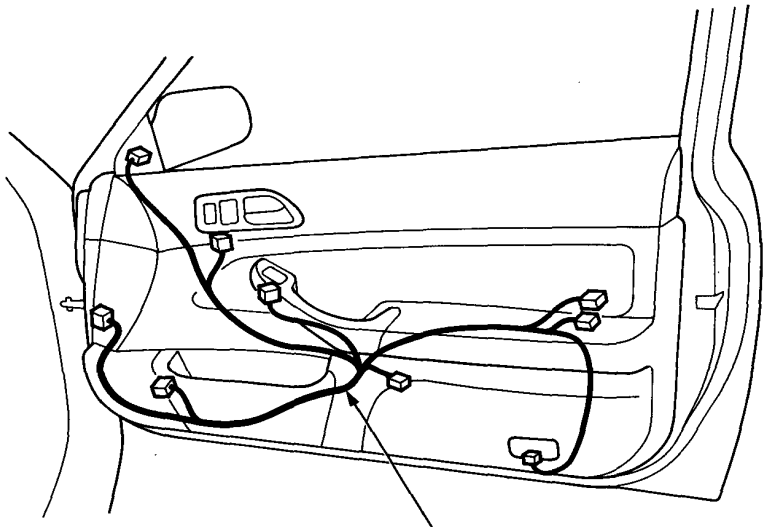
Wire Harness and Ground Locations

Door

NOTE: LHD type is shown, RHD type is symmetrical.

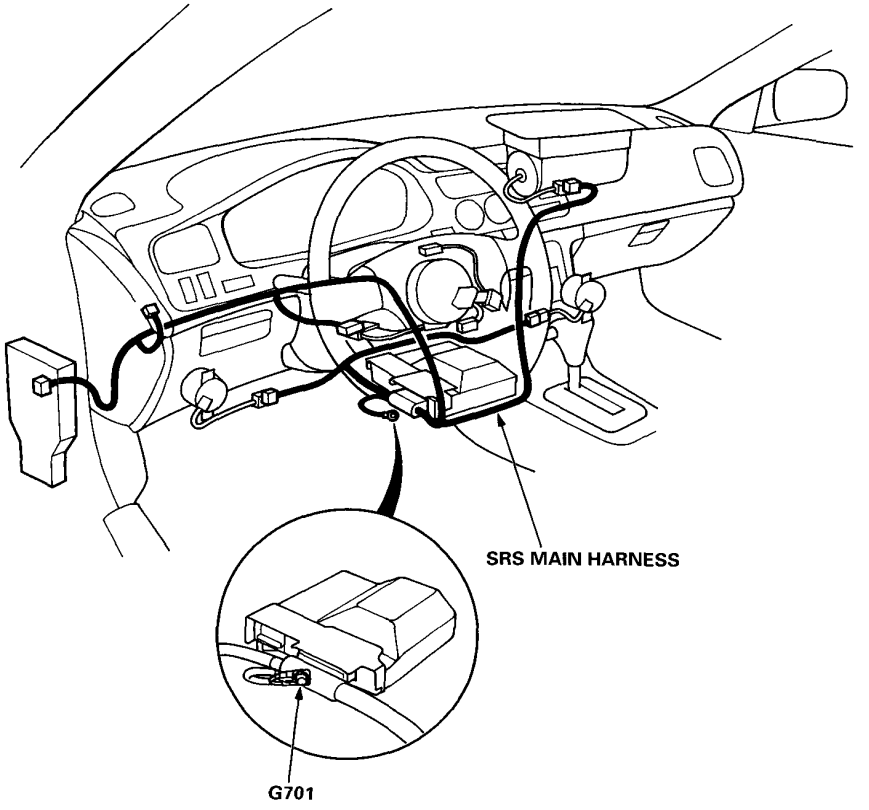


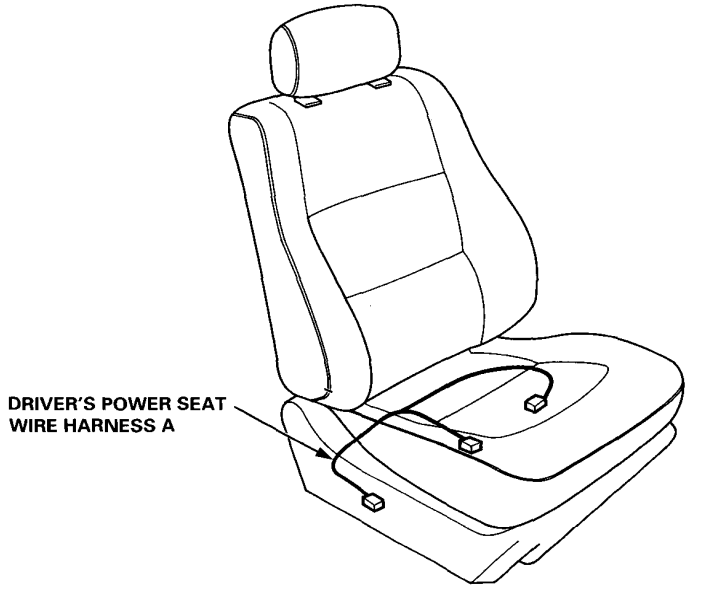
DRIVER'S DOOR WIRE HARNESS



PASSENGER'S DOOR WIRE HARNESS

NOTE: LHD type is shown, RHD type is symmetrical.

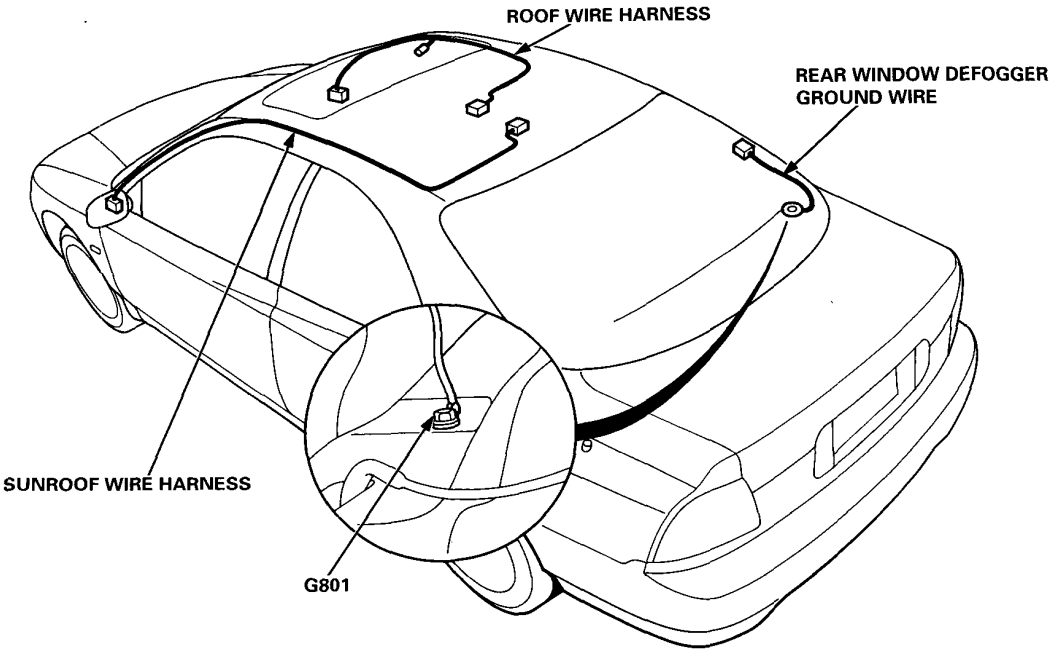




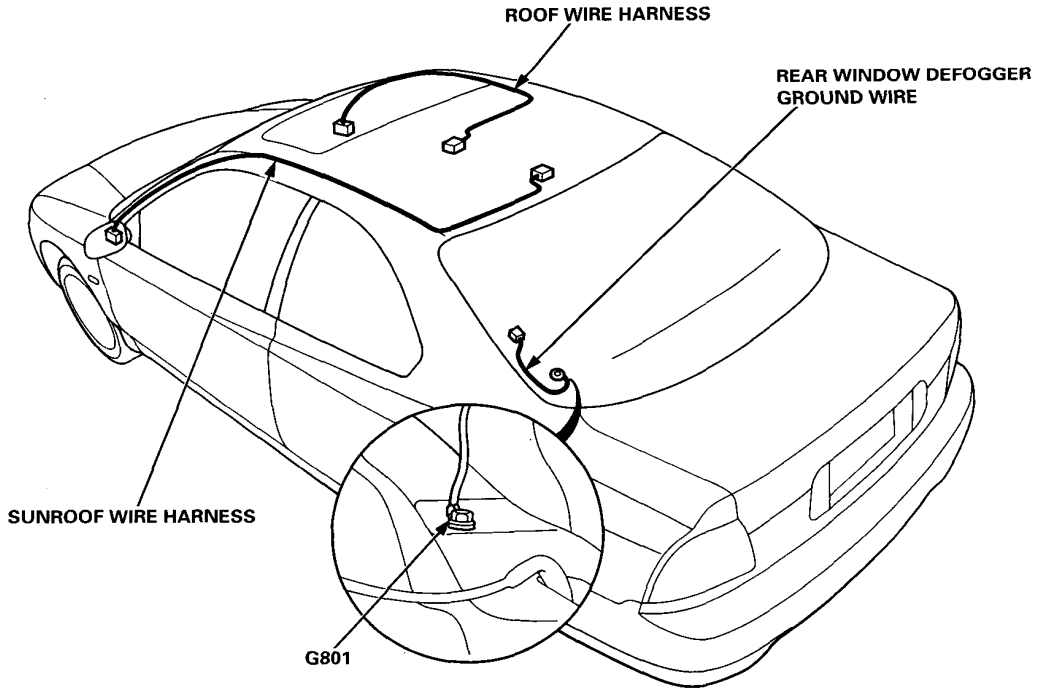
Wire Harness and Ground Locations

Roof/Rear

LHD type:



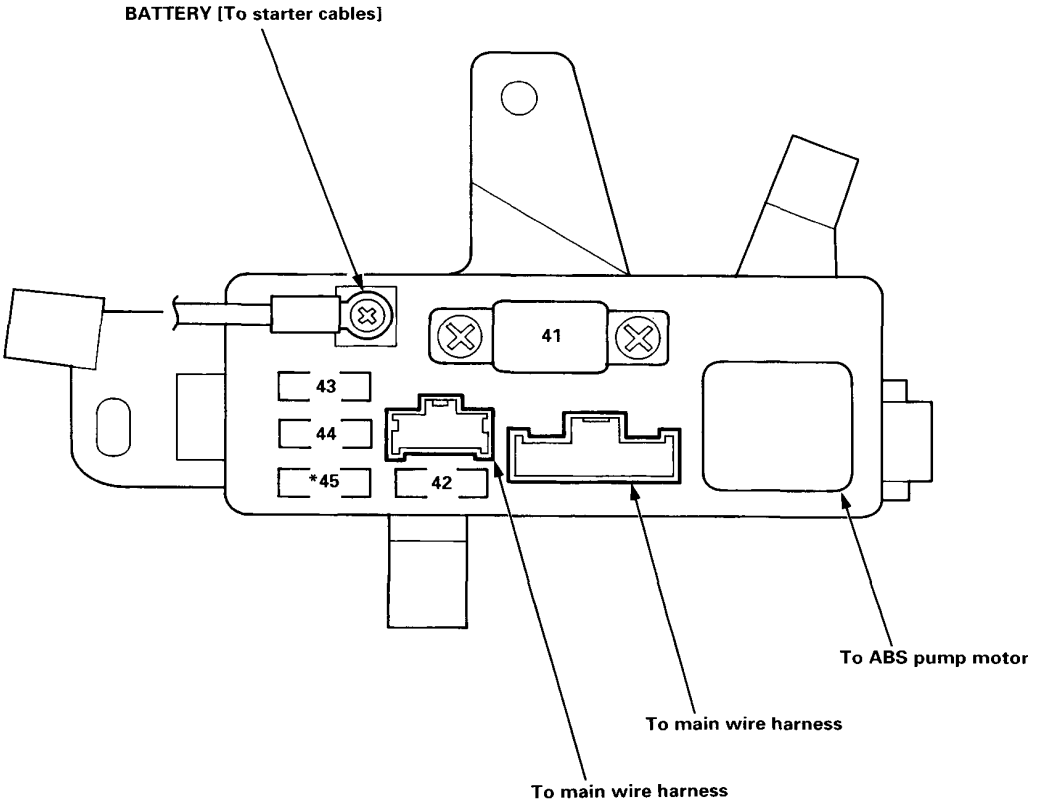
RHD type:



Fuses

Under-hood ABS Fuse/Relay Box

NOTE: LHD type is shown, RHD type is similar.



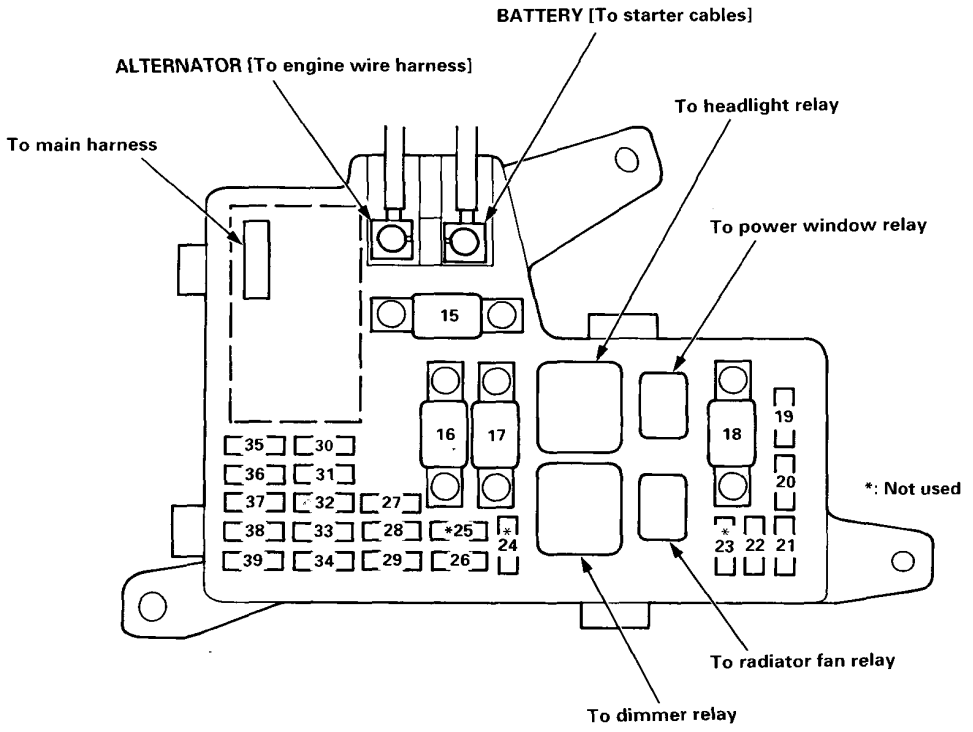
Fuse Number	Amps	Wire Color	Component(s) or Circuit(s) Protected
41	40 A	———	ABS pump motor relay (contacts)
42	10 A	GRN	ABS control unit
43	20 A	WHT/GRN	ABS front solenoids
44	15 A	WHT/BLK	ABS rear solenoids, ABS control unit
45	———	———	Not used

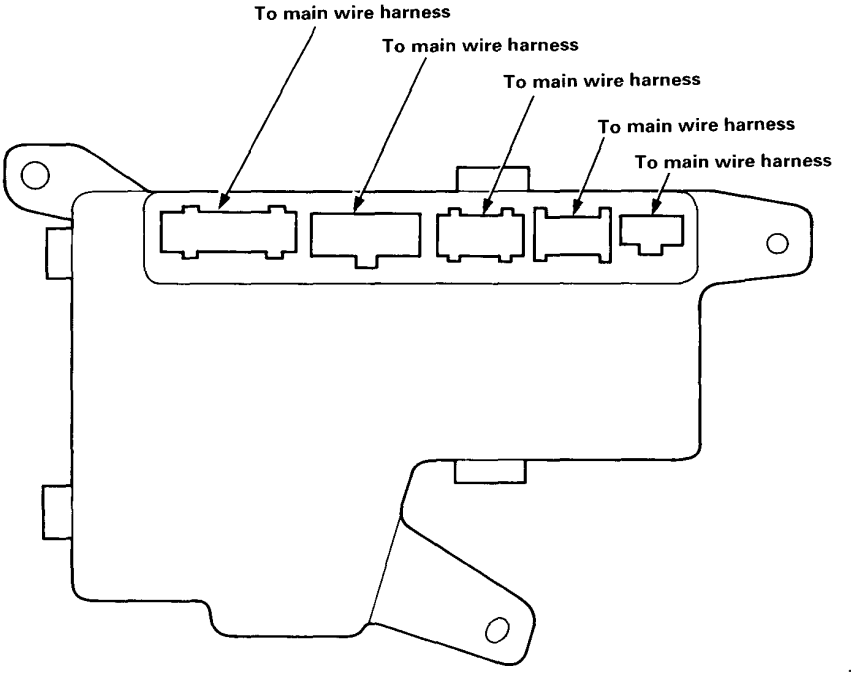
*: Not used

Fuses

Under-hood Fuse/Relay Box

NOTE: LHD type is shown, RHD type is similar.





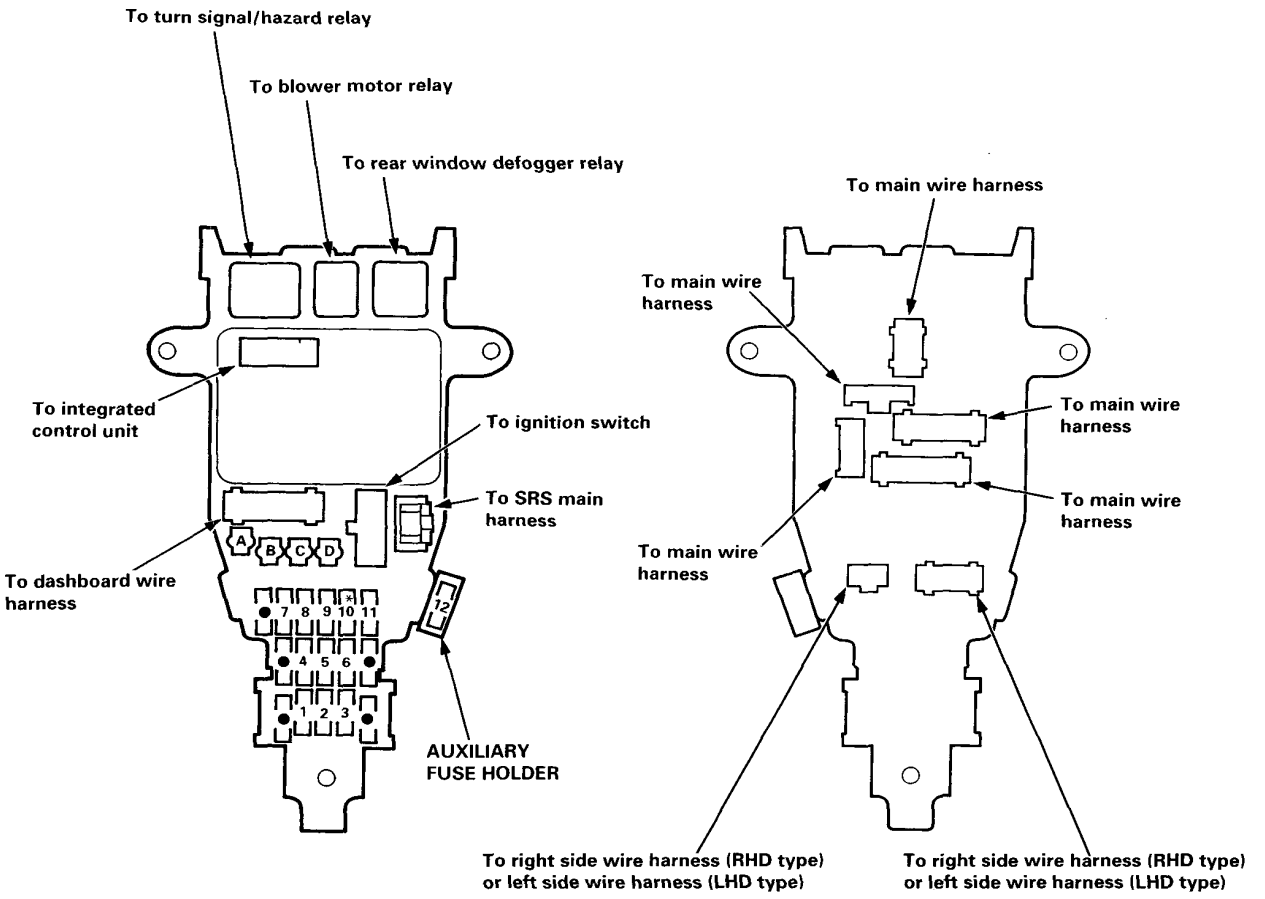
Fuse Number	Amps	Wire Color	Component(s) or Circuit(s) Protected
15	*1 100 A *2 80 A	———	Battery, Power distribution
16	40 A	WHT/GRN	Rear window defogger, Noise condenser
17	40 A	WHT	Blower motor
18	50 A	WHT	Ignition switch (BAT)
19	20 A	RED/YEL	Left headlight, High beam indicator light
20	20 A	RED/GRN	Right headlight
21	20 A	BLU/BLK	Radiator fan motor
22	7.5 A	RED/YEL	Rear fog light (Except KH)
23	———	———	Not used
24	———	———	Not used
25	———	———	Not used
26	20 A	BLU/BLK	Front passenger's power window motor
27	30 A	WHT/BLK	Headlight washer control unit (KE)
28	20 A	GRN/WHT	Driver's power window motor, Power window control unit
29	30 A	GRN	Sunroof motor
30	20 A	WHT/YEL	Horns, Brake lights, Key interlock solenoid (KH)
31	20 A	RED	Driver's power seat up-down motor (Height-adjustable power seat)
32	15 A	RED/GRN	Dash lights, Parking lights, Taillights, License plate lights
33	15 A	WHT/GRN	PGM-FI main relay, Alternator (Except KH)
34	15 A	WHT	Radiator fan control module, Condenser fan motor, A/C compressor clutch relay
35	15 A	WHT/GRN	Turn signal/hazard relay
36	15 A	RED/WHT	Cigarette lighter, Stereo radio/cassette player, Data link connector
37	7.5 A	WHT/BLU	Integrated control unit, Power antenna motor, Trunk light, Courtesy lights, Ceiling light
38	20 A	WHT	Power door lock control unit
39	7.5 A	WHT/YEL	ECM, Clock, Transmission control module (TCM), Stereo radio/cassette player

*1: F22B1 engine
*2: Except F22B1 engine

Fuses

Under-dash Fuse/Relay Box

NOTE: RHD type is shown, LHD type is similar.

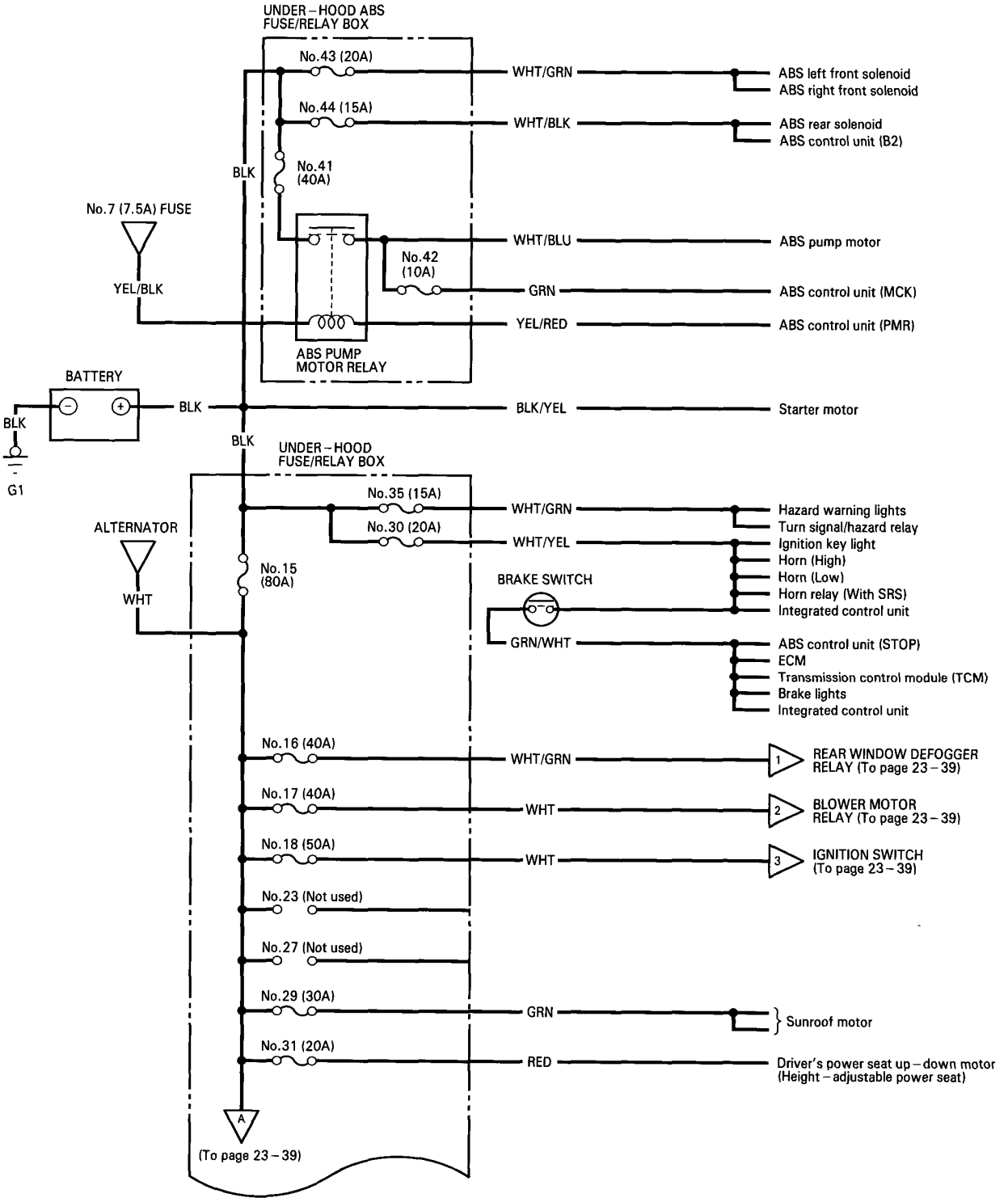


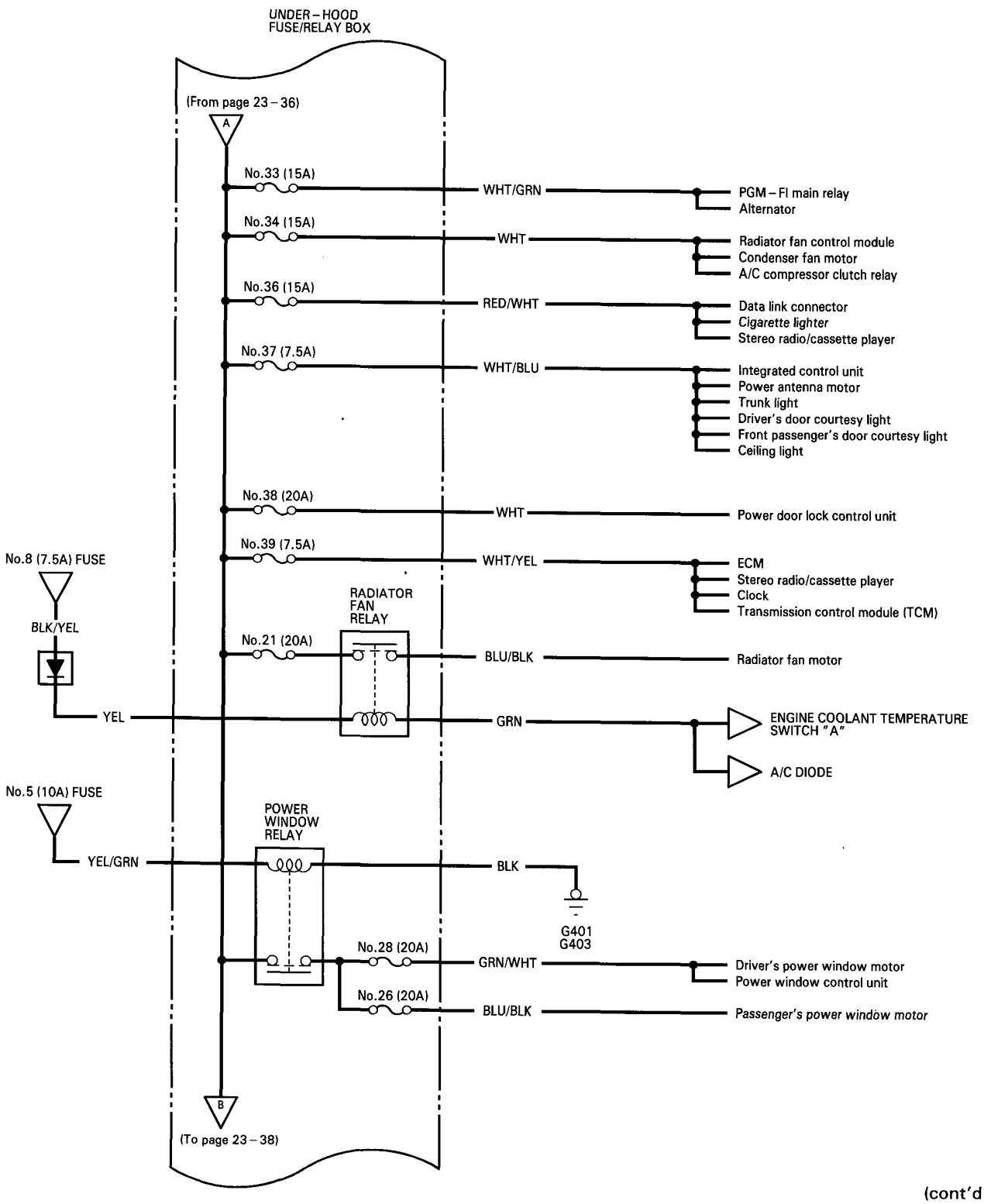
● : Spare fuse
* : Not used
A, B, C, D } To optional connector

Fuse Number	Amps	Wire Color	Component(s) or Circuit(s) Protected
1	10 A	YEL	Gauge assembly, Back-up lights, Clock, Vehicle speed sensor (VSS), Shift lock solenoid (KH model)
		Fuse/relay box socket	Integrated control unit
2	15 A	BLK/YEL	PGM-FI main relay
		RED	SRS unit (VA)
3	10 A	PNK	SRS unit (VB)
4	7.5 A	BLK/YEL	Alternator, Transmission control module (TCM), ELD unit (KH model), Radiator fan control module, Cruise control system, Charging system light, EGR control solenoid valve, Engine mount control solenoid valve (A/T), Intake air resonator (IAR) control solenoid valve
5	10 A	YEL/GRN	Sunroof open relay, Sunroof close relay, Power window relay, Headlight adjuster units, Headlight washer control unit (Except KH)
6	30 A	GRN/BLK	Windshield wiper motor, Intermittent wiper relay, Windshield washer motor
		Fuse/relay box socket	Integrated control unit (Except KH model)
7	7.5 A	YEL/BLK	ABS inspection connector, ABS control unit, ABS pump motor relay, Power mirror actuators, Power mirror defoggers
		Fuse/relay box socket	Optional connector (B)
8	7.5 A	BLK/YEL	Recirculation control motor, Heater control panel, Rear window defogger indicator light, Mode control motor, Radiator fan control module, A/C compressor clutch relay, A/C thermostat
		Fuse/relay box socket	Rear window defogger relay, Blower motor relay
9	7.5 A	BLU/RED	PGM-FI main relay, ECM, Gauge (Brake check circuit)
10	———	———	Not used
11	10 A	WHT/YEL	Cigarette lighter relay
		Fuse/relay box socket	Optional connector (A)
12	7.5 A	YEL/WHT	Turn signal/hazard relay (Except KG model)

Power Distribution

Circuit Identification (KG model)

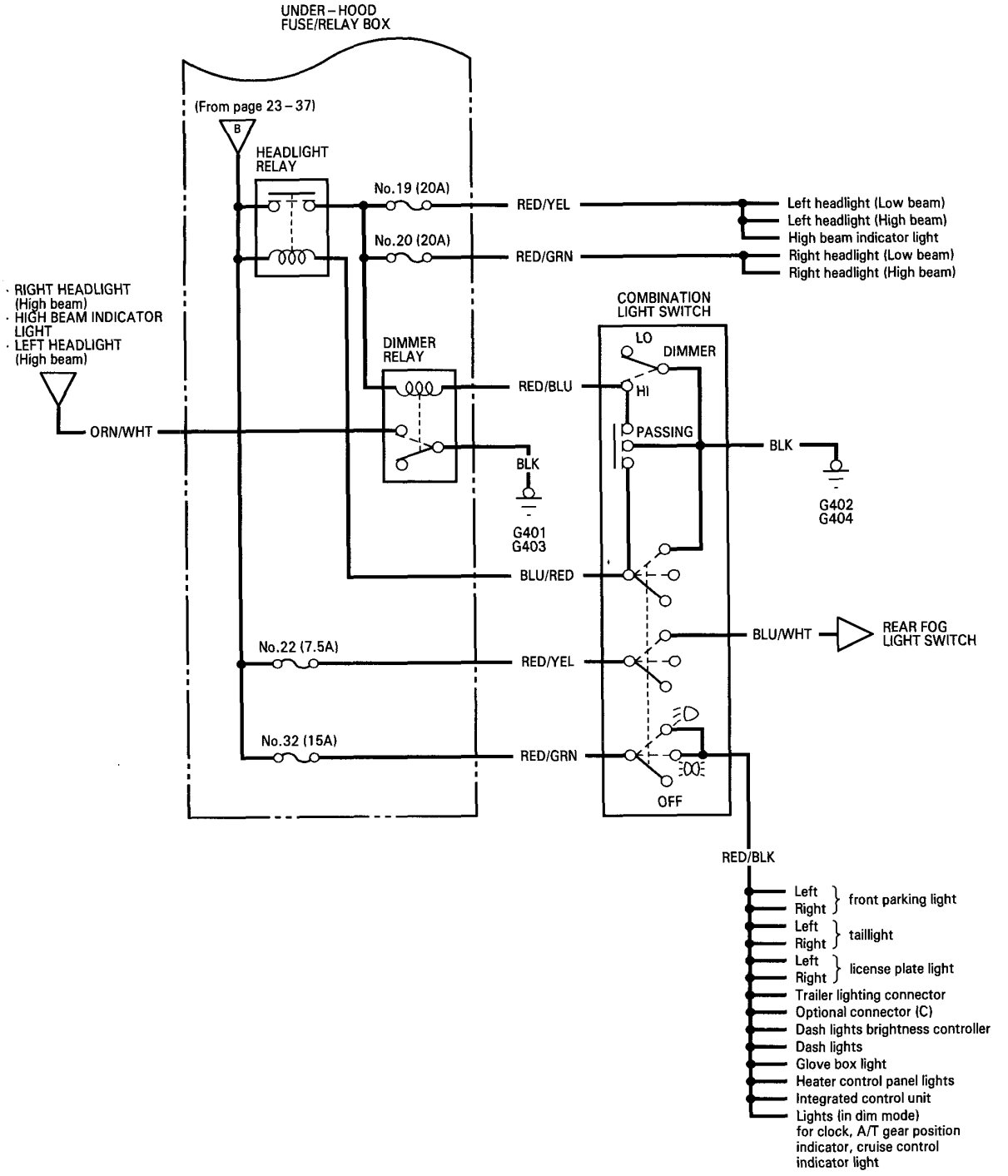


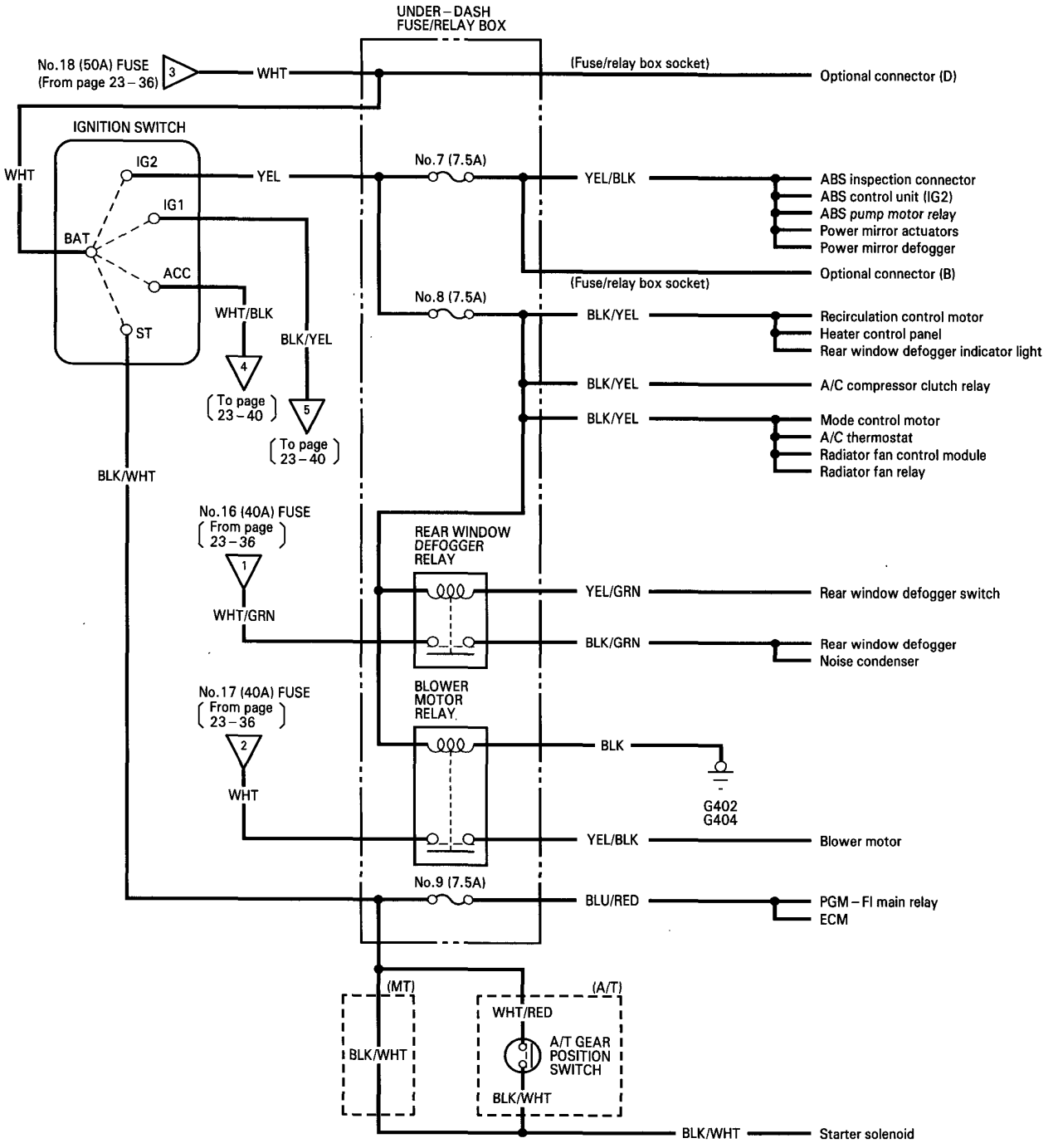

UNDER-HOOD
FUSE/RELAY BOX
(From page 23-36)
A
No.33 (15A)
WHT/GRN
PGM-FI main relay
Alternator
No.34 (15A)
WHT
Radiator fan control module
Condenser fan motor
A/C compressor clutch relay
No.36 (15A)
RED/WHT
Data link connector
Cigarette lighter
Stereo radio/cassette player
No.37 (7.5A)
WHT/BLU
Integrated control unit
Power antenna motor
Trunk light
Driver's door courtesy light
Front passenger's door courtesy light
Ceiling light
No.38 (20A)
WHT
Power door lock control unit
No.39 (7.5A)
WHT/YEL
ECM
Stereo radio/cassette player
Clock
Transmission control module (TCM)
No.8 (7.5A) FUSE
BLK/YEL
RADIATOR
FAN
RELAY
No.21 (20A)
BLU/BLK
Radiator fan motor
YEL
GRN
ENGINE COOLANT TEMPERATURE
SWITCH "A"
A/C DIODE
No.5 (10A) FUSE
POWER
WINDOW
RELAY
YEL/GRN
BLK
G401
G403
No.28 (20A)
GRN/WHT
Driver's power window motor
Power window control unit
No.26 (20A)
BLU/BLK
Passenger's power window motor
B
(To page 23-38)

(cont'd)

Power Distribution

Circuit Identification (KG model cont'd)

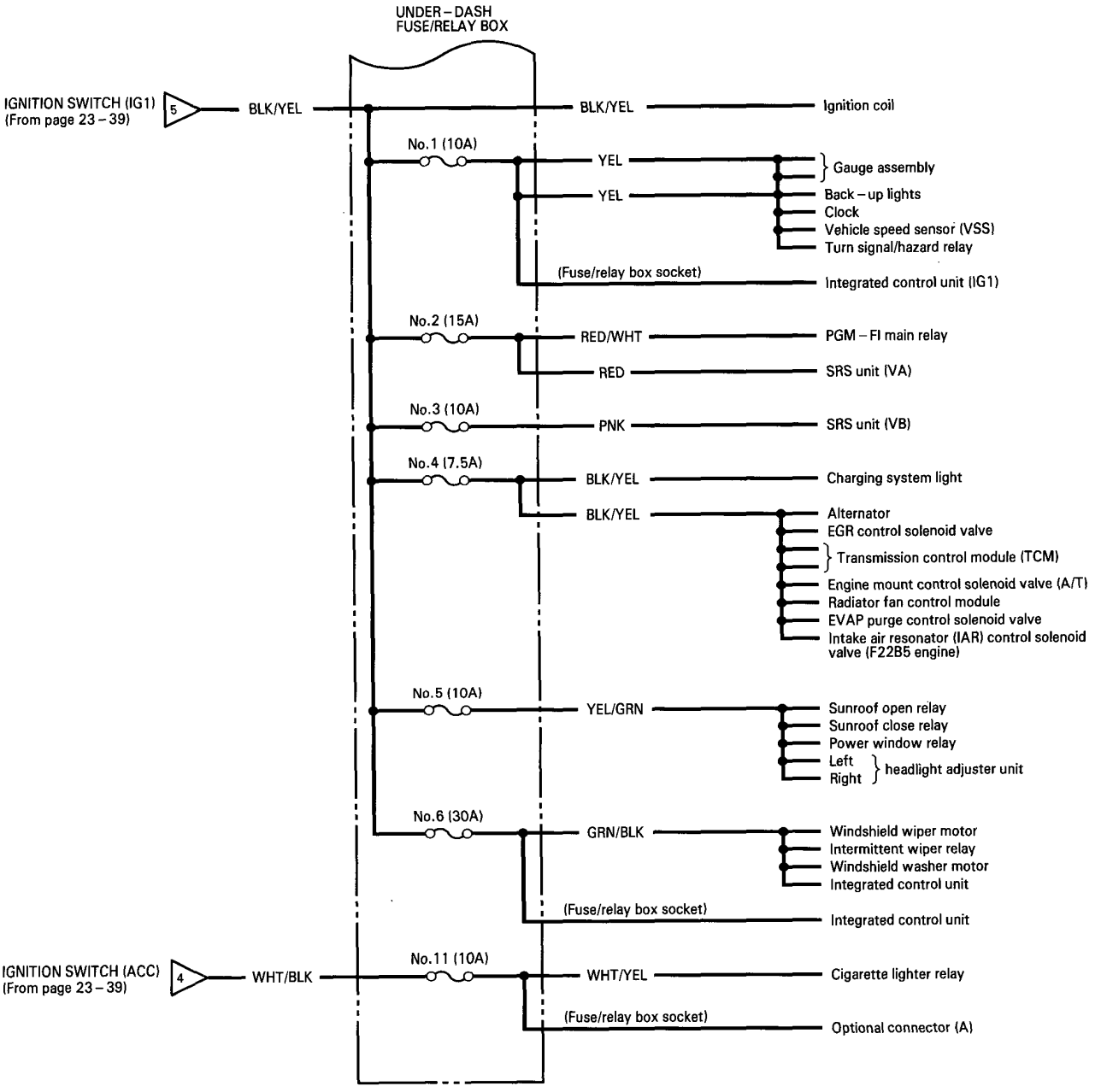



UNDER – DASH FUSE/RELAY BOX
No.18 (50A) FUSE (From page 23 – 36)
3
WHT
(Fuse/relay box socket)
Optional connector (D)
IGNITION SWITCH
WHT
IG2
YEL
No.7 (7.5A)
YEL/BLK
ABS inspection connector
ABS control unit (IG2)
ABS pump motor relay
Power mirror actuators
Power mirror defogger
IG1
BAT
ACC
Optional connector (B)
(Fuse/relay box socket)
No.8 (7.5A)
WHT/BLK
ST
BLK/YEL
BLK/YEL
Recirculation control motor
Heater control panel
Rear window defogger indicator light
4
5
To page 23 – 40
To page 23 – 40
BLK/YEL
A/C compressor clutch relay
BLK/YEL
Mode control motor
A/C thermostat
Radiator fan control module
Radiator fan relay
BLK/WHT
No.16 (40A) FUSE (From page 23 – 36)
1
WHT/GRN
REAR WINDOW DEFOGGER RELAY
YEL/GRN
Rear window defogger switch
BLK/GRN
Rear window defogger
Noise condenser
No.17 (40A) FUSE (From page 23 – 36)
2
WHT
BLOWER MOTOR RELAY
BLK
G402
G404
YEL/BLK
Blower motor
No.9 (7.5A)
BLU/RED
PGM – FI main relay
ECM
(MT)
(A/T)
BLK/WHT
WHT/RED
A/T GEAR POSITION SWITCH
BLK/WHT
BLK/WHT
Starter solenoid

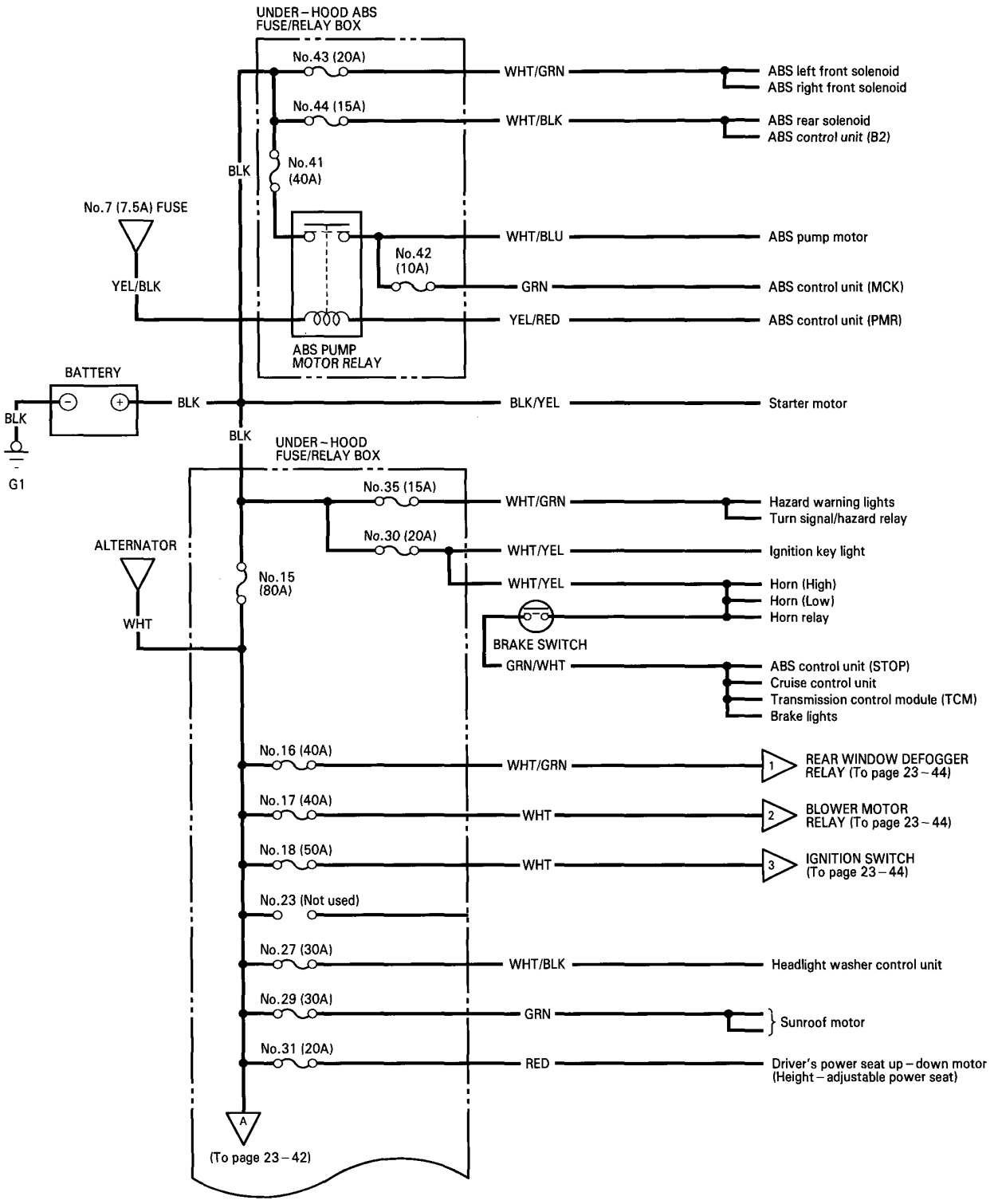
(cont'd)

Power Distribution

Circuit Identification (KG model cont'd)



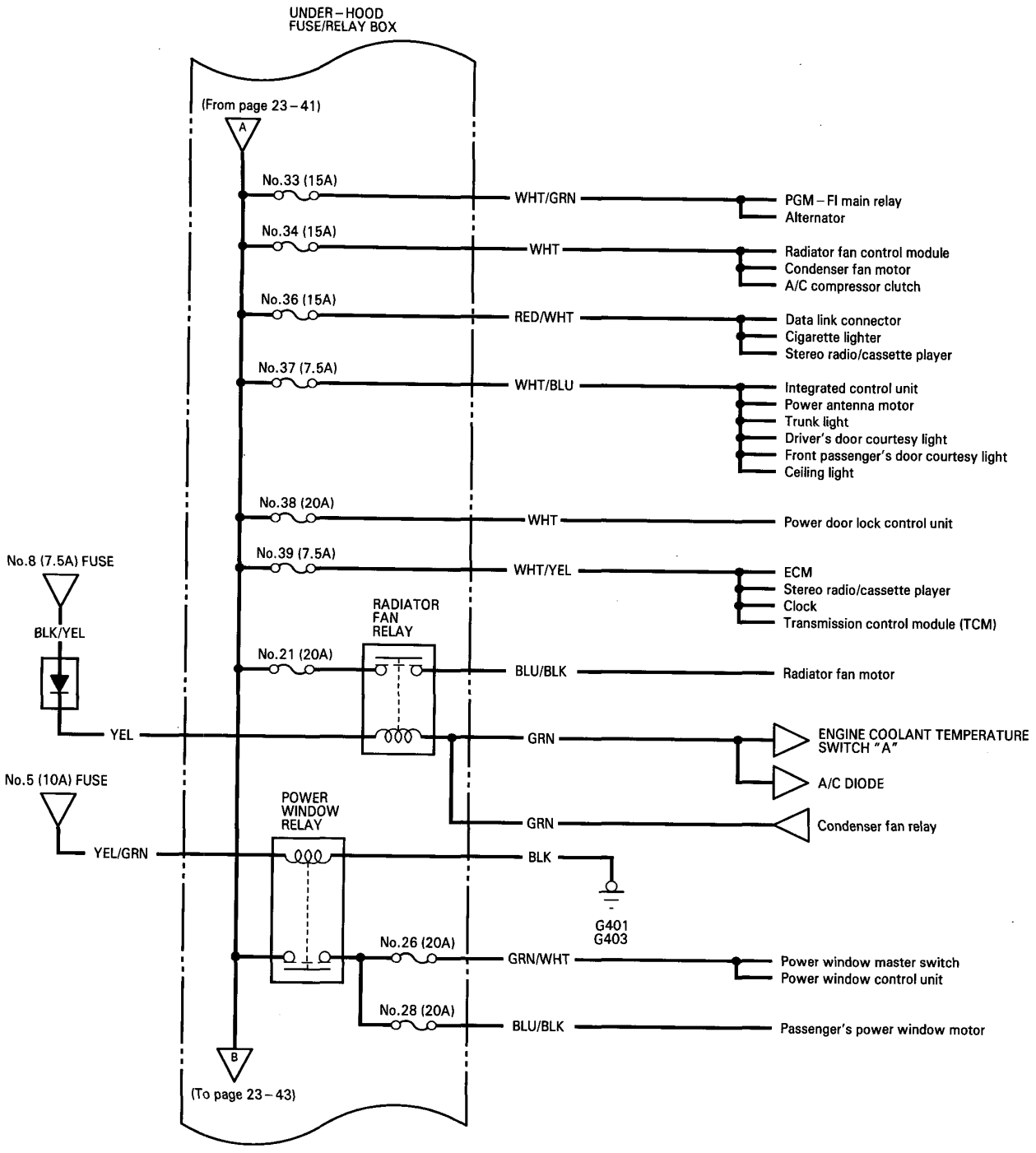
Circuit Identification (KE model)

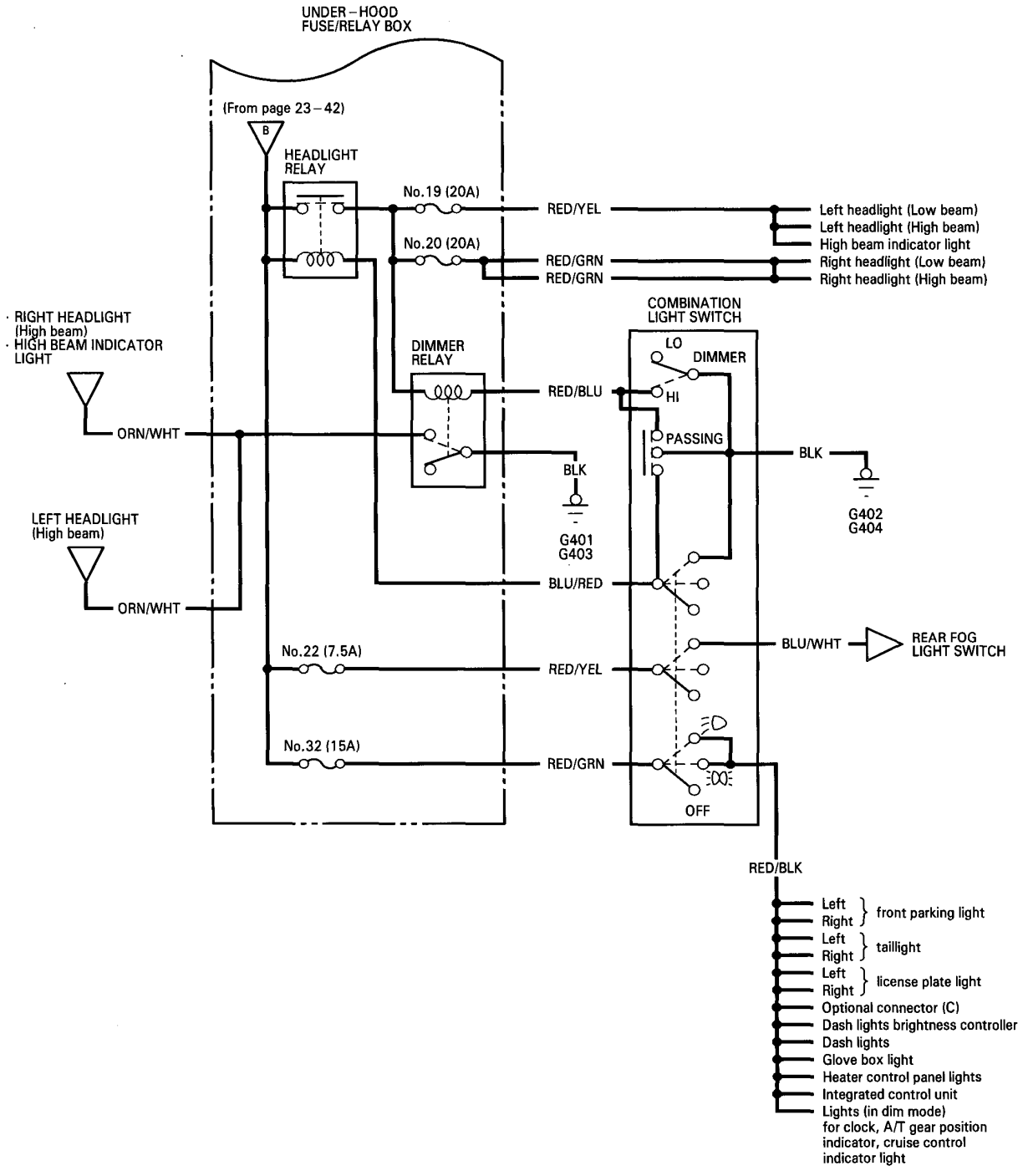


(cont'd)

Power Distribution

Circuit Identification (KE model cont'd)

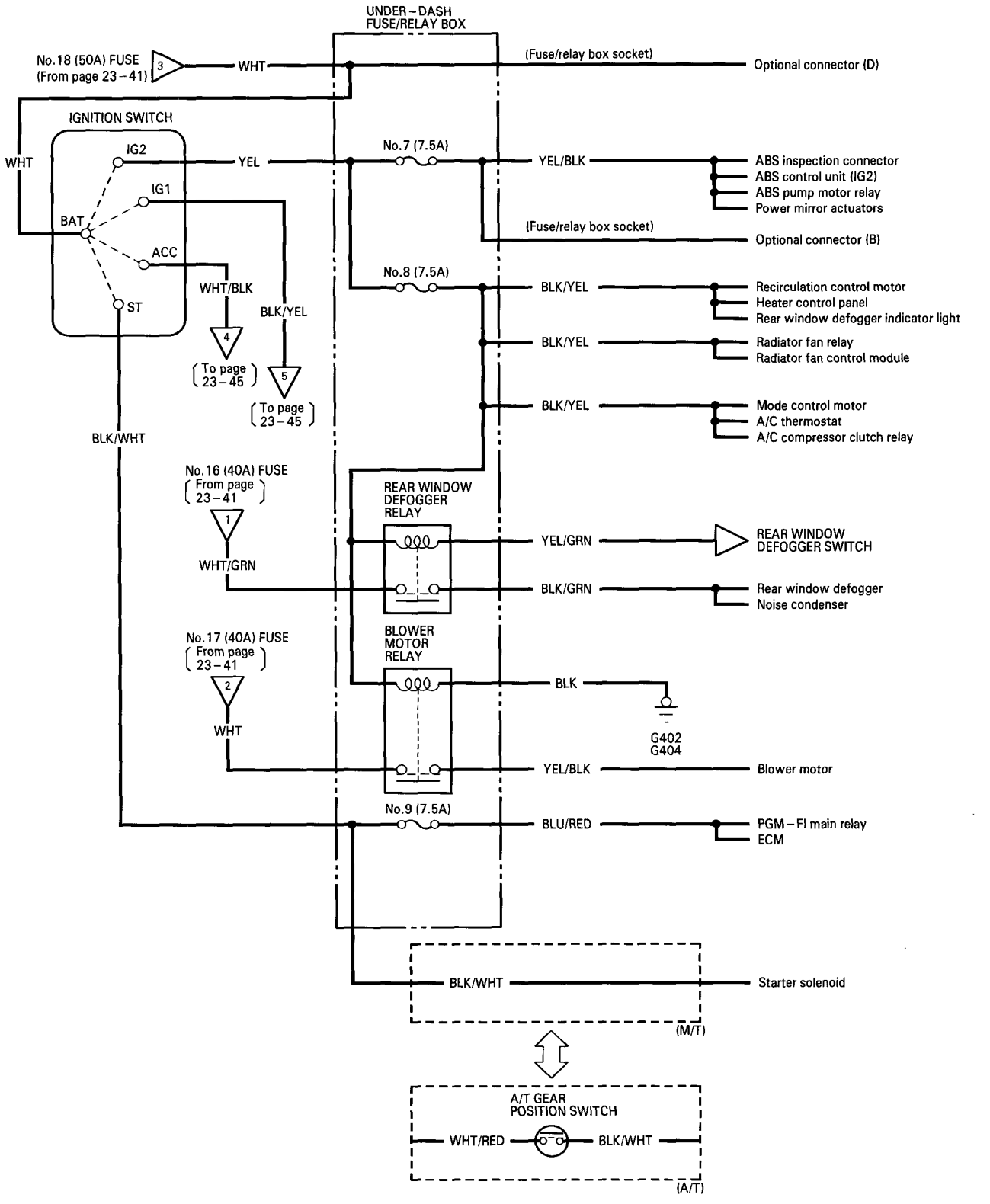


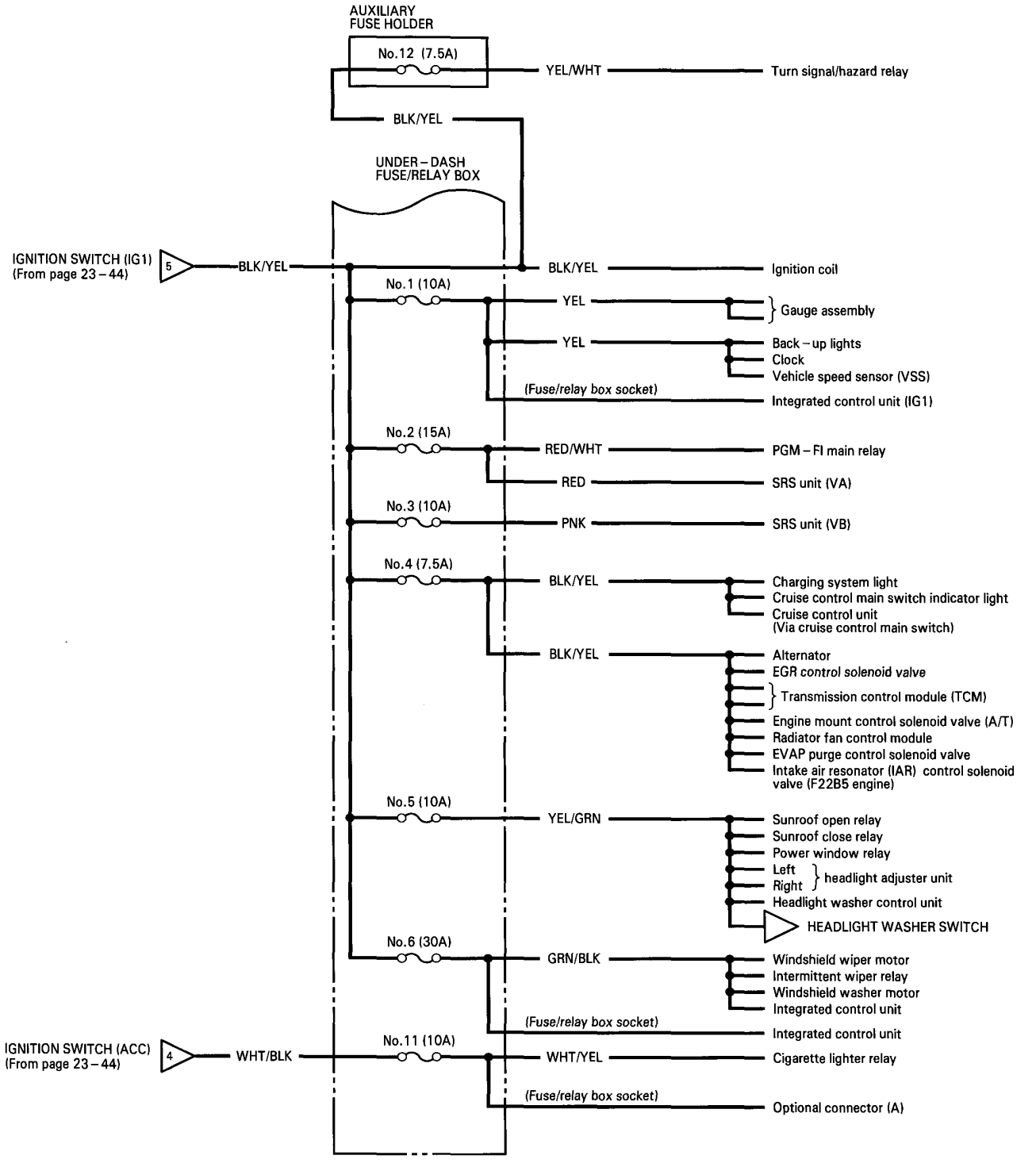

UNDER-HOOD
FUSE/RELAY BOX
(From page 23-42)
B
HEADLIGHT
RELAY
No.19 (20A)
No.20 (20A)
RED/YEL
RED/GRN
RED/GRN
Left headlight (Low beam)
Left headlight (High beam)
High beam indicator light
Right headlight (Low beam)
Right headlight (High beam)
COMBINATION
LIGHT SWITCH
LO
DIMMER
HI
PASSING
DIMMER
RELAY
RED/BLU
BLK
G401
G403
BLK
G402
G404
· RIGHT HEADLIGHT
(High beam)
· HIGH BEAM INDICATOR
LIGHT
ORN/WHT
LEFT HEADLIGHT
(High beam)
ORN/WHT
BLU/RED
BLU/WHT
REAR FOG
LIGHT SWITCH
No.22 (7.5A)
RED/YEL
No.32 (15A)
RED/GRN
OFF
RED/BLK
Left
Right
front parking light
Left
Right
taillight
Left
Right
license plate light
Optional connector (C)
Dash lights brightness controller
Dash lights
Glove box light
Heater control panel lights
Integrated control unit
Lights (in dim mode)
for clock, A/T gear position
indicator, cruise control
indicator light

(cont'd)

Power Distribution

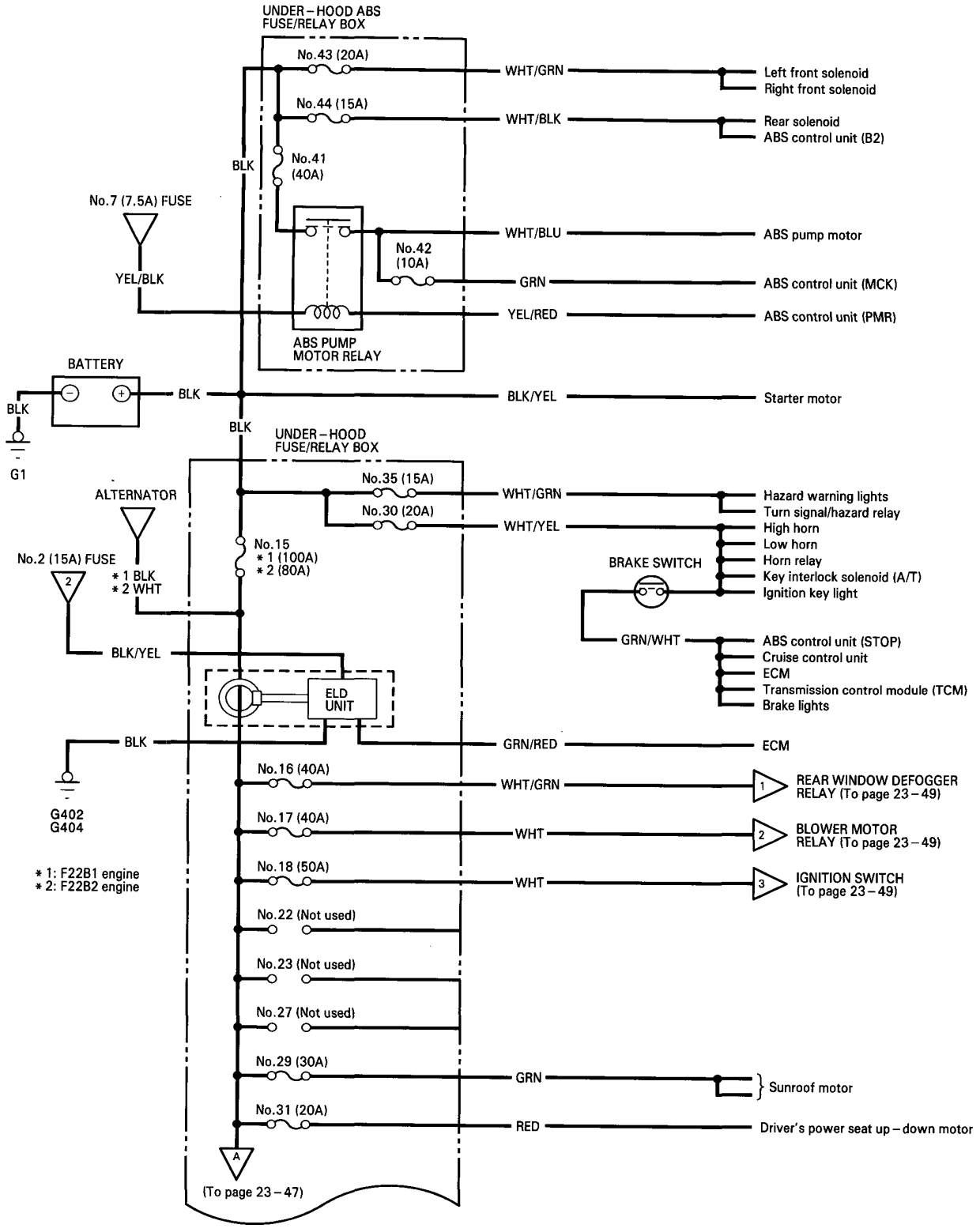
Circuit Identification (KE model cont'd)

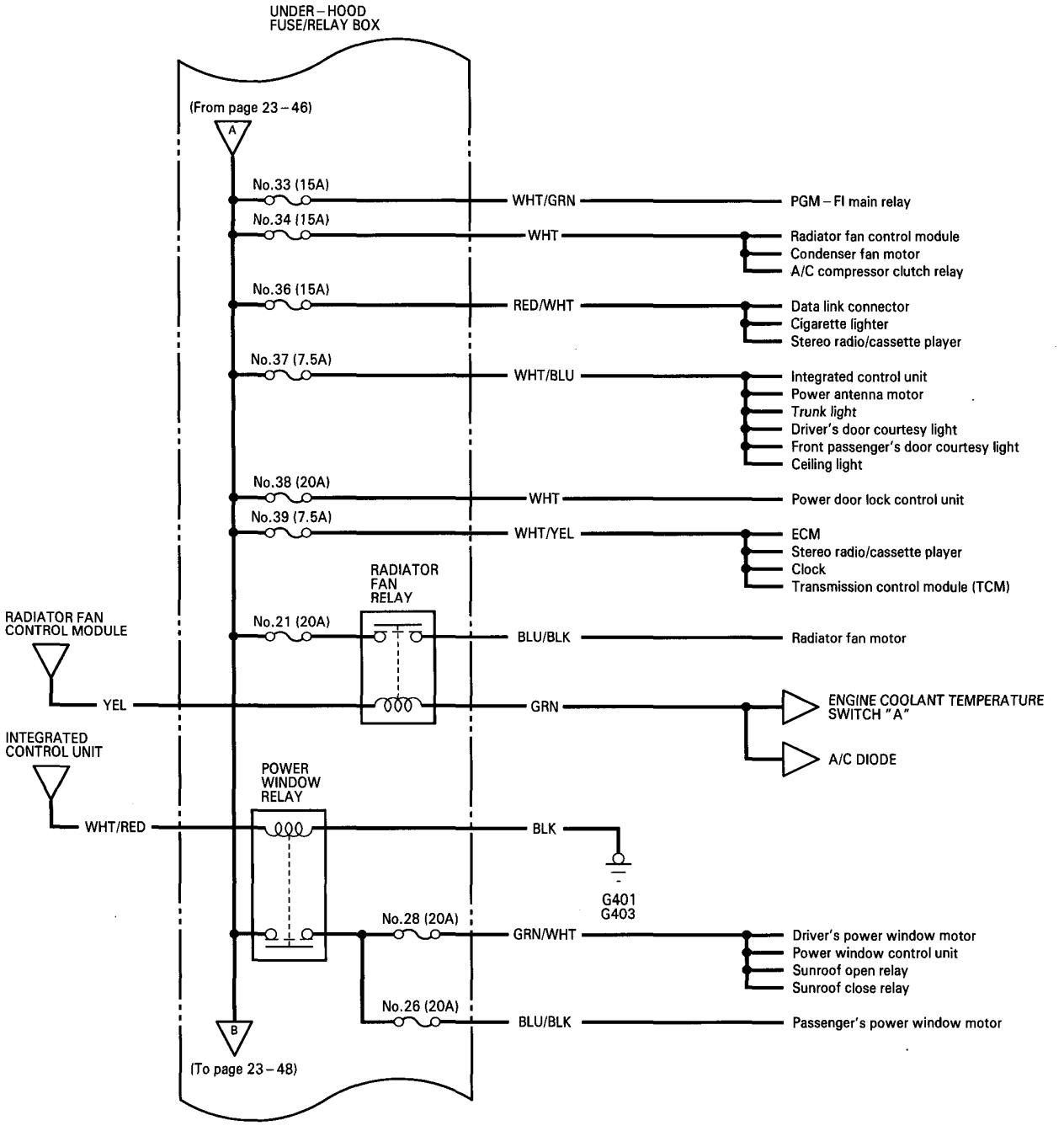



AUXILIARY
FUSE HOLDER
No.12 (7.5A)
YEL/WHT
Turn signal/hazard relay
BLK/YEL
UNDER – DASH
FUSE/RELAY BOX
IGNITION SWITCH (IG1)
(From page 23 – 44)
5
BLK/YEL
BLK/YEL
Ignition coil
No.1 (10A)
YEL
Gauge assembly
YEL
Back – up lights
Clock
Vehicle speed sensor (VSS)
(Fuse/relay box socket)
Integrated control unit (IG1)
No.2 (15A)
RED/WHT
PGM – FI main relay
RED
SRS unit (VA)
No.3 (10A)
PNK
SRS unit (VB)
No.4 (7.5A)
BLK/YEL
Charging system light
Cruise control main switch indicator light
Cruise control unit
(Via cruise control main switch)
BLK/YEL
Alternator
EGR control solenoid valve
Transmission control module (TCM)
Engine mount control solenoid valve (A/T)
Radiator fan control module
EVAP purge control solenoid valve
Intake air resonator (IAR) control solenoid valve (F22B5 engine)
No.5 (10A)
YEL/GRN
Sunroof open relay
Sunroof close relay
Power window relay
Left
Right
headlight adjuster unit
Headlight washer control unit
HEADLIGHT WASHER SWITCH
No.6 (30A)
GRN/BLK
Windshield wiper motor
Intermittent wiper relay
Windshield washer motor
Integrated control unit
(Fuse/relay box socket)
Integrated control unit
IGNITION SWITCH (ACC)
(From page 23 – 44)
4
WHT/BLK
No.11 (10A)
WHT/YEL
Cigarette lighter relay
(Fuse/relay box socket)
Optional connector (A)

Power Distribution

Circuit Identification (KH model)

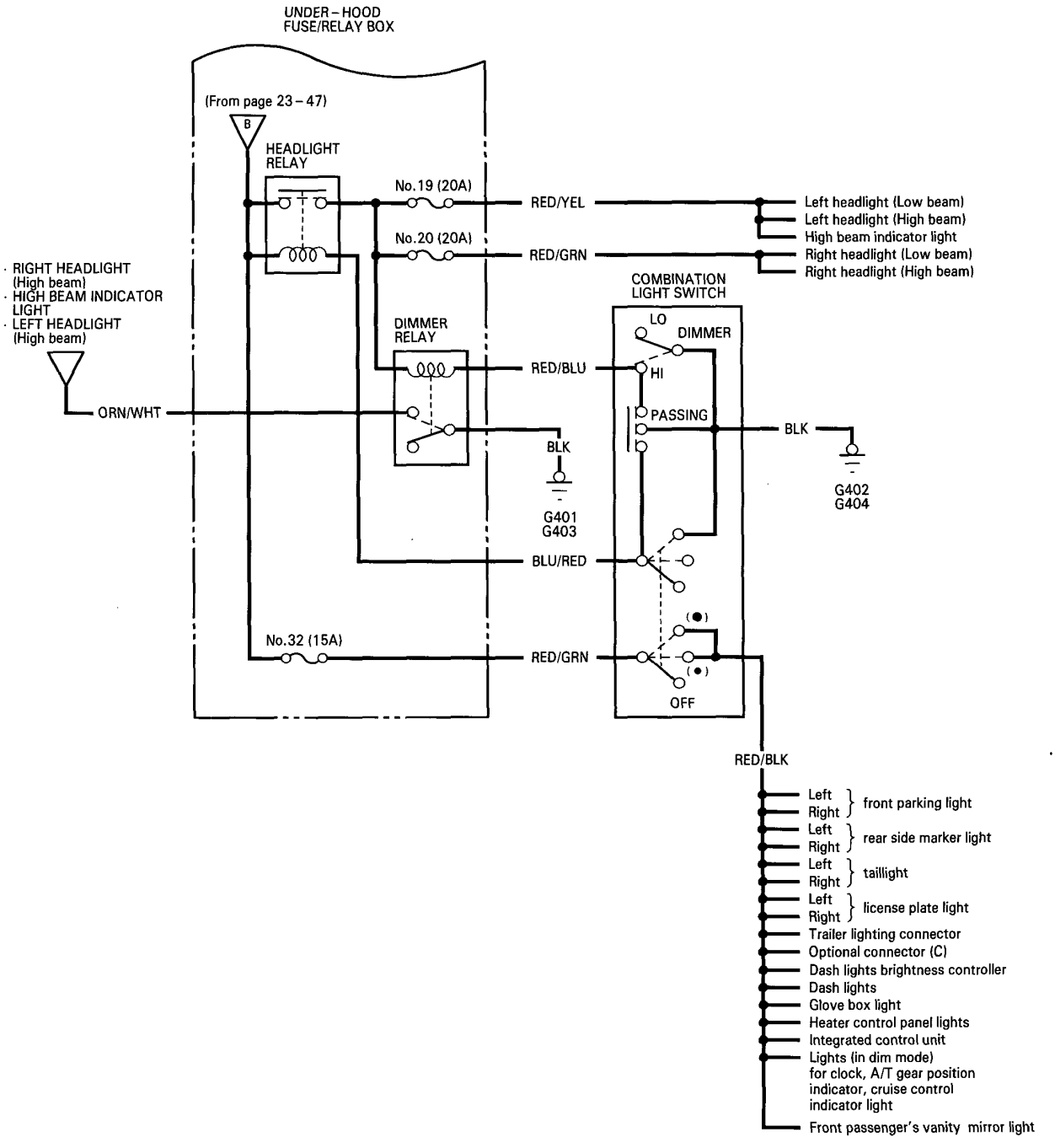


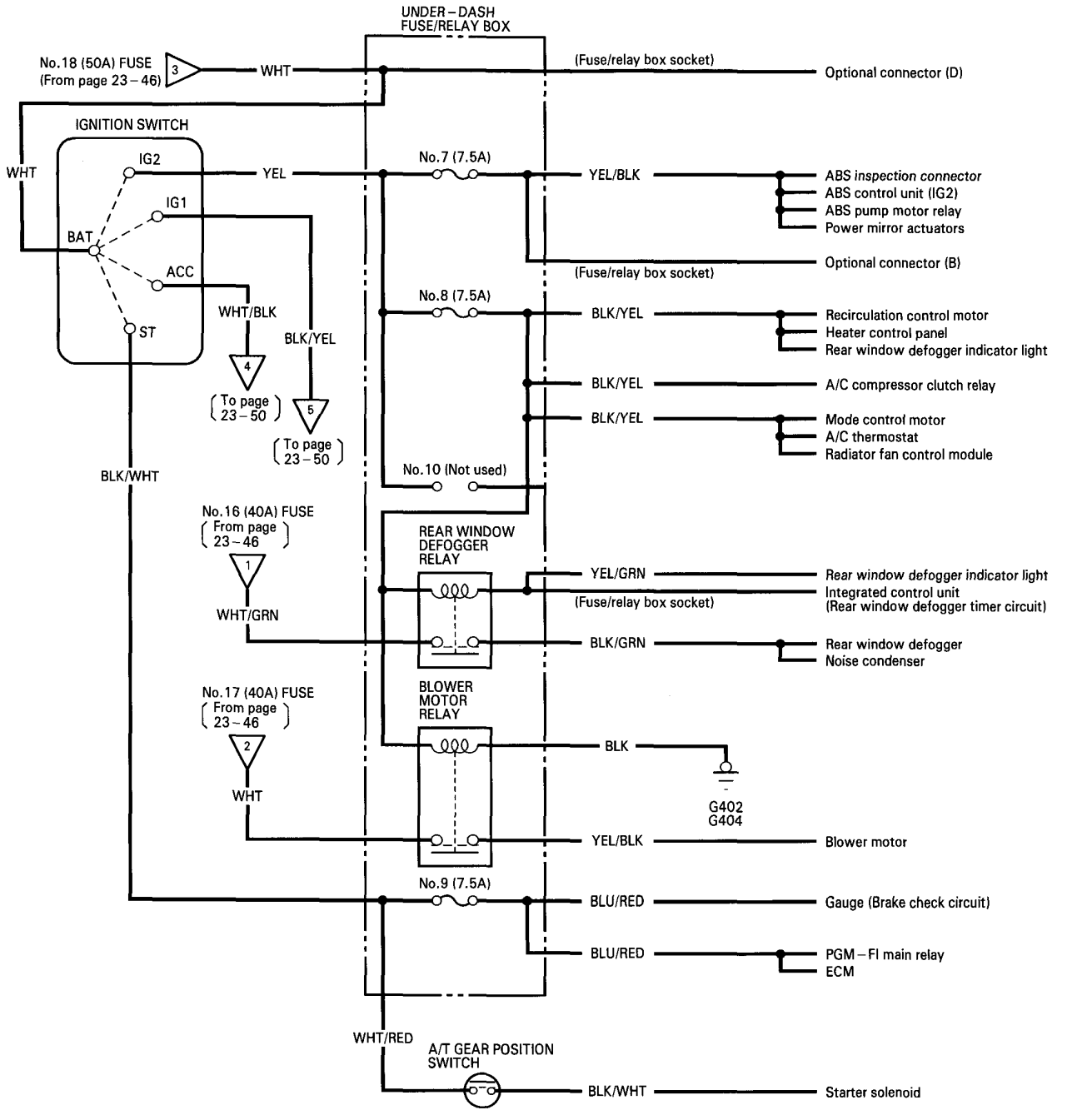

UNDER – HOOD
FUSE/RELAY BOX
(From page 23 – 46)
A
No.33 (15A)
WHT/GRN
PGM – FI main relay
No.34 (15A)
WHT
Radiator fan control module
Condenser fan motor
A/C compressor clutch relay
No.36 (15A)
RED/WHT
Data link connector
Cigarette lighter
Stereo radio/cassette player
No.37 (7.5A)
WHT/BLU
Integrated control unit
Power antenna motor
Trunk light
Driver's door courtesy light
Front passenger's door courtesy light
Ceiling light
No.38 (20A)
WHT
Power door lock control unit
No.39 (7.5A)
WHT/YEL
ECM
Stereo radio/cassette player
Clock
Transmission control module (TCM)
RADIATOR FAN
RELAY
RADIATOR FAN
CONTROL MODULE
No.21 (20A)
BLU/BLK
Radiator fan motor
YEL
GRN
ENGINE COOLANT TEMPERATURE
SWITCH "A"
A/C DIODE
INTEGRATED
CONTROL UNIT
POWER
WINDOW
RELAY
WHT/RED
BLK
G401
G403
No.28 (20A)
GRN/WHT
Driver's power window motor
Power window control unit
Sunroof open relay
Sunroof close relay
No.26 (20A)
BLU/BLK
Passenger's power window motor
B
(To page 23 – 48)

(cont'd)

Power Distribution

Circuit Identification (KH model cont'd)

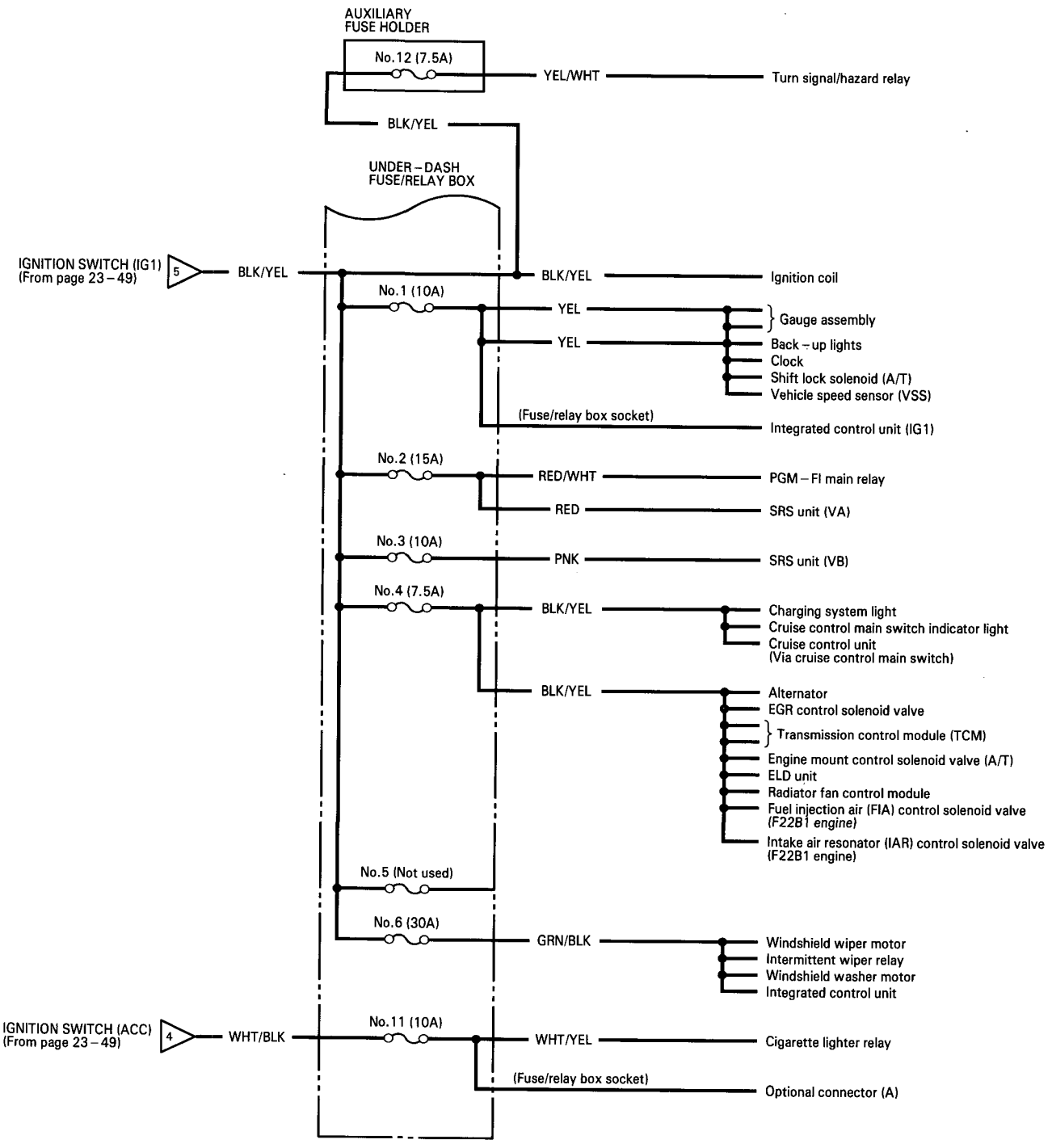



UNDER – DASH FUSE/RELAY BOX
No.18 (50A) FUSE (From page 23 – 46)
3
WHT
(Fuse/relay box socket)
Optional connector (D)
IGNITION SWITCH
WHT
IG2
YEL
No.7 (7.5A)
YEL/BLK
ABS inspection connector
ABS control unit (IG2)
ABS pump motor relay
Power mirror actuators
IG1
BAT
ACC
ST
(Fuse/relay box socket)
Optional connector (B)
No.8 (7.5A)
WHT/BLK
BLK/YEL
BLK/YEL
Recirculation control motor
Heater control panel
Rear window defogger indicator light
4
5
To page 23 – 50
To page 23 – 50
BLK/YEL
A/C compressor clutch relay
BLK/YEL
Mode control motor
A/C thermostat
Radiator fan control module
BLK/WHT
No.10 (Not used)
No.16 (40A) FUSE
From page 23 – 46
1
WHT/GRN
REAR WINDOW DEFOGGER RELAY
YEL/GRN
Rear window defogger indicator light
Integrated control unit (Rear window defogger timer circuit)
(Fuse/relay box socket)
BLK/GRN
Rear window defogger
Noise condenser
No.17 (40A) FUSE
From page 23 – 46
2
WHT
BLOWER MOTOR RELAY
BLK
G402
G404
YEL/BLK
Blower motor
No.9 (7.5A)
BLU/RED
Gauge (Brake check circuit)
BLU/RED
PGM – FI main relay
ECM
WHT/RED
A/T GEAR POSITION SWITCH
BLK/WHT
Starter solenoid

(cont'd)

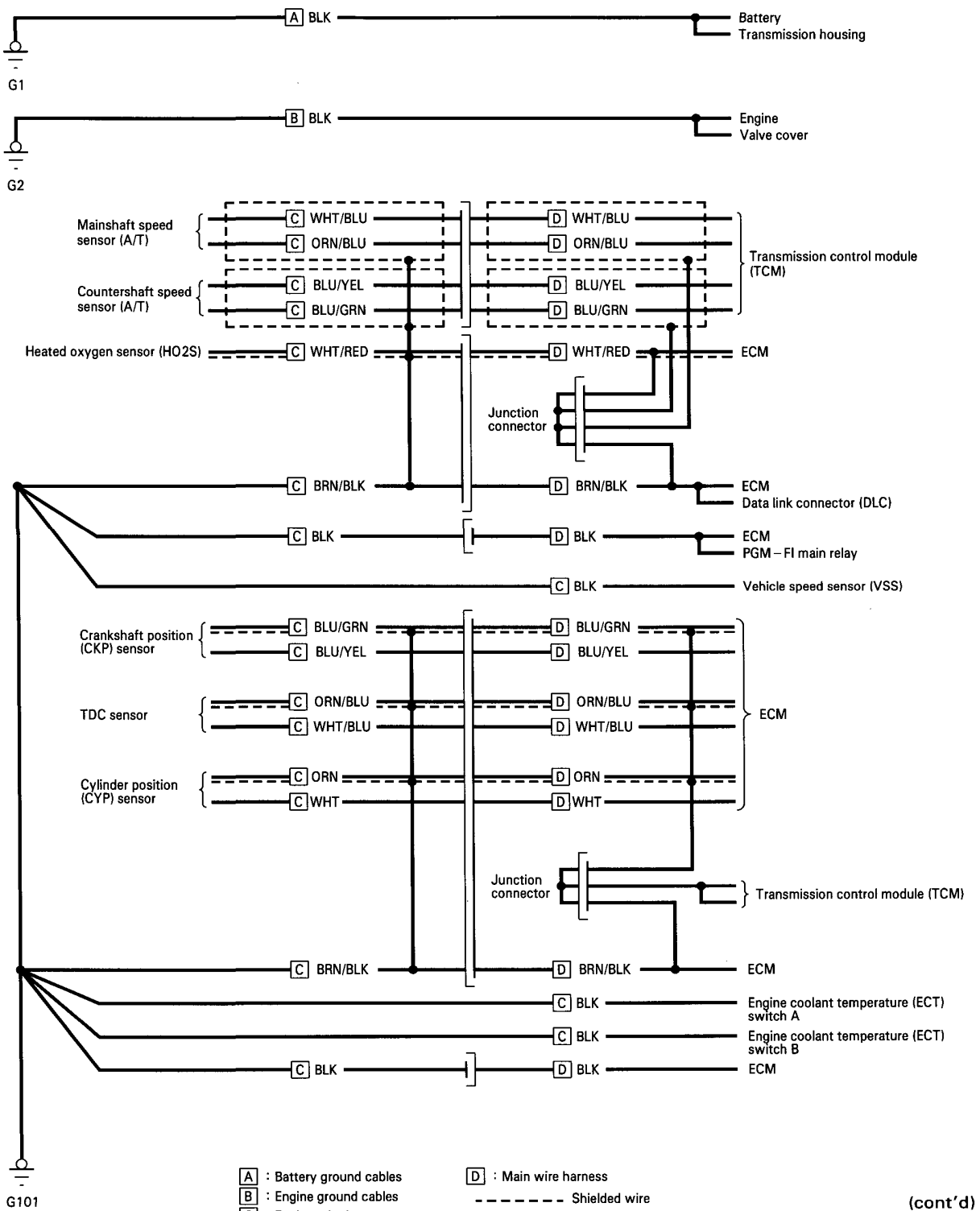
Power Distribution

Circuit Identification (KH model cont'd)



Ground Distribution

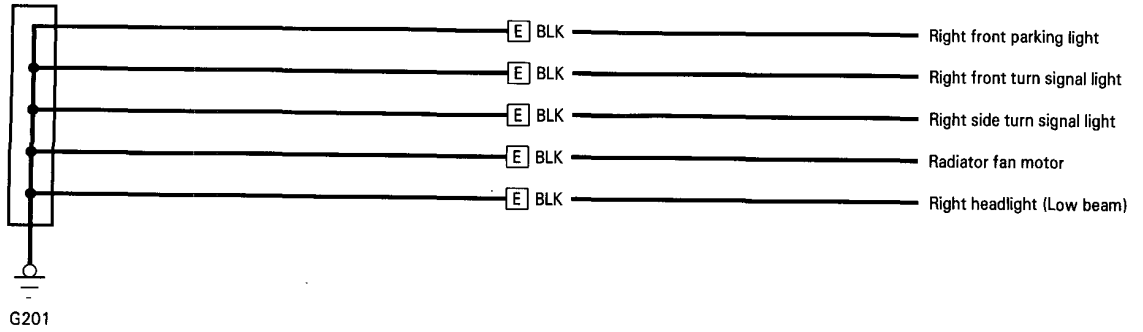
Circuit Identification (KG model)

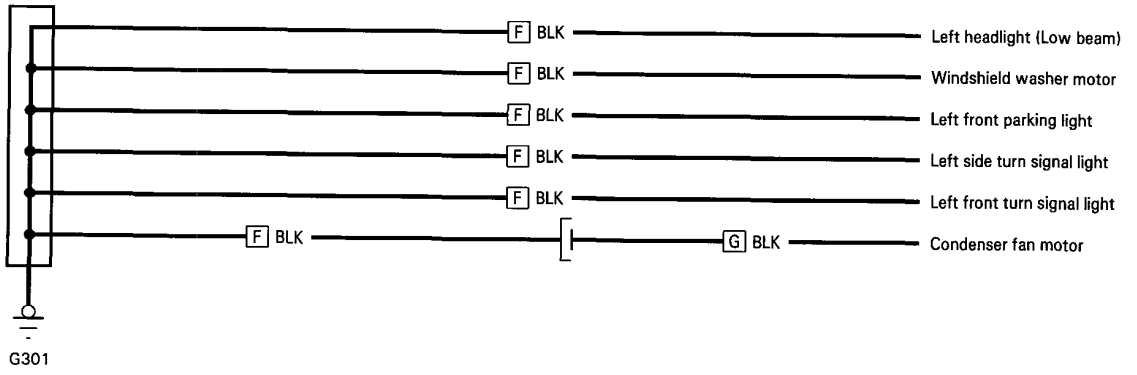


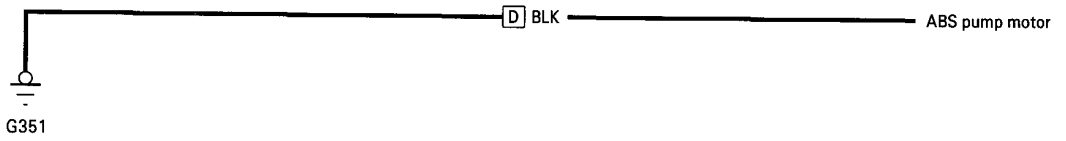
(cont'd)

Ground Distribution

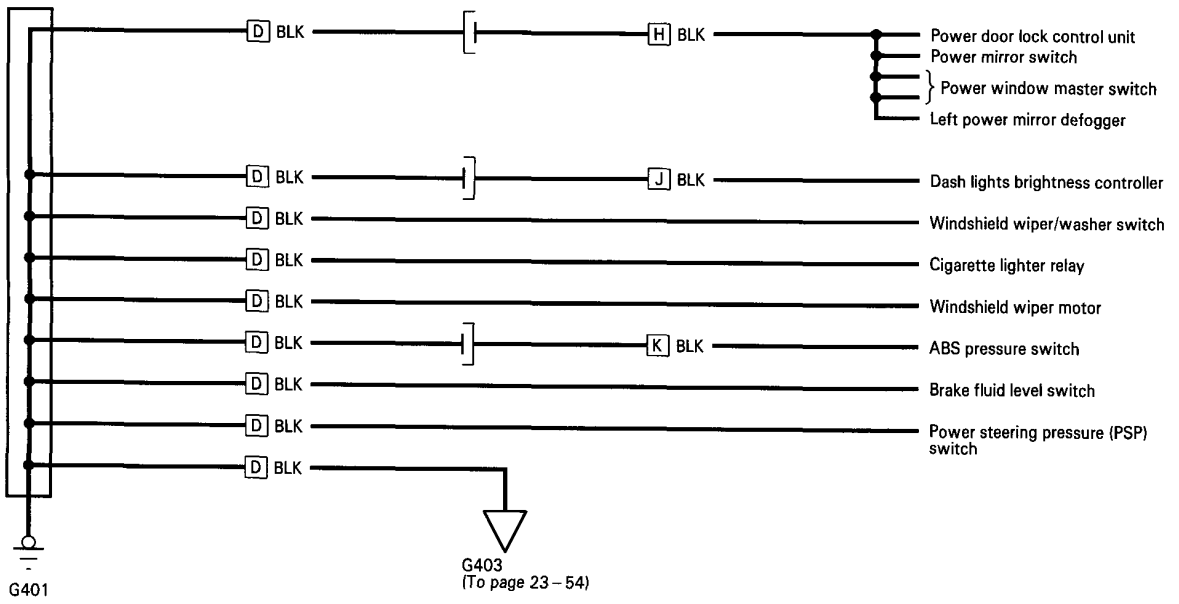
Circuit Identification (KG model cont'd)

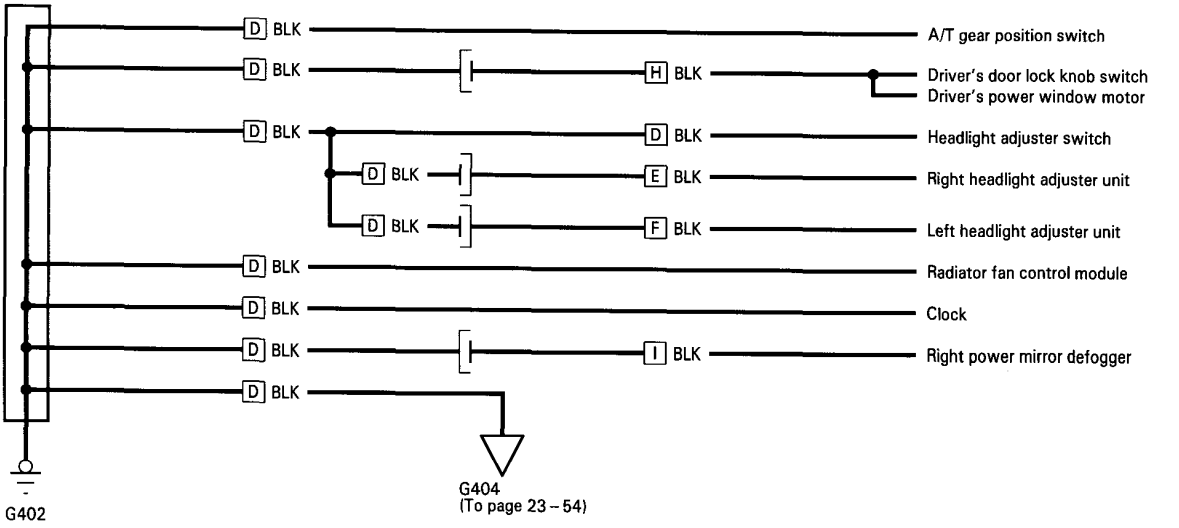






D : Main wire harness
E : Right engine compartment wire harness
F : Left engine compartment wire harness
G : A/C wire harness



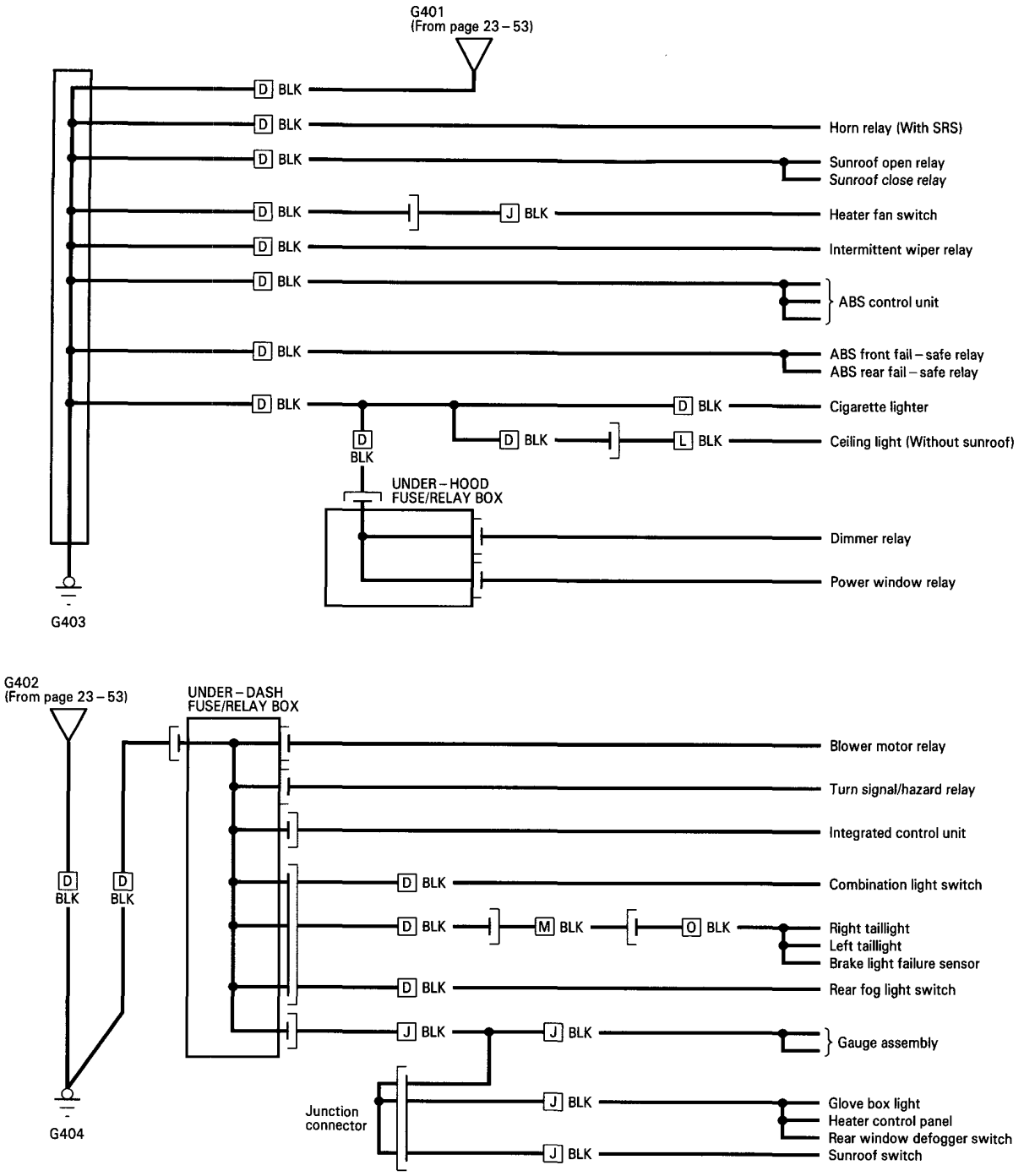


D : Main wire harness
E : Right engine compartment wire harness
F : Left engine compartment wire harness
H : Driver's door wire harness
J : Passenger's door wire harness
J : Dashboard wire harness
K : ABS wire harness

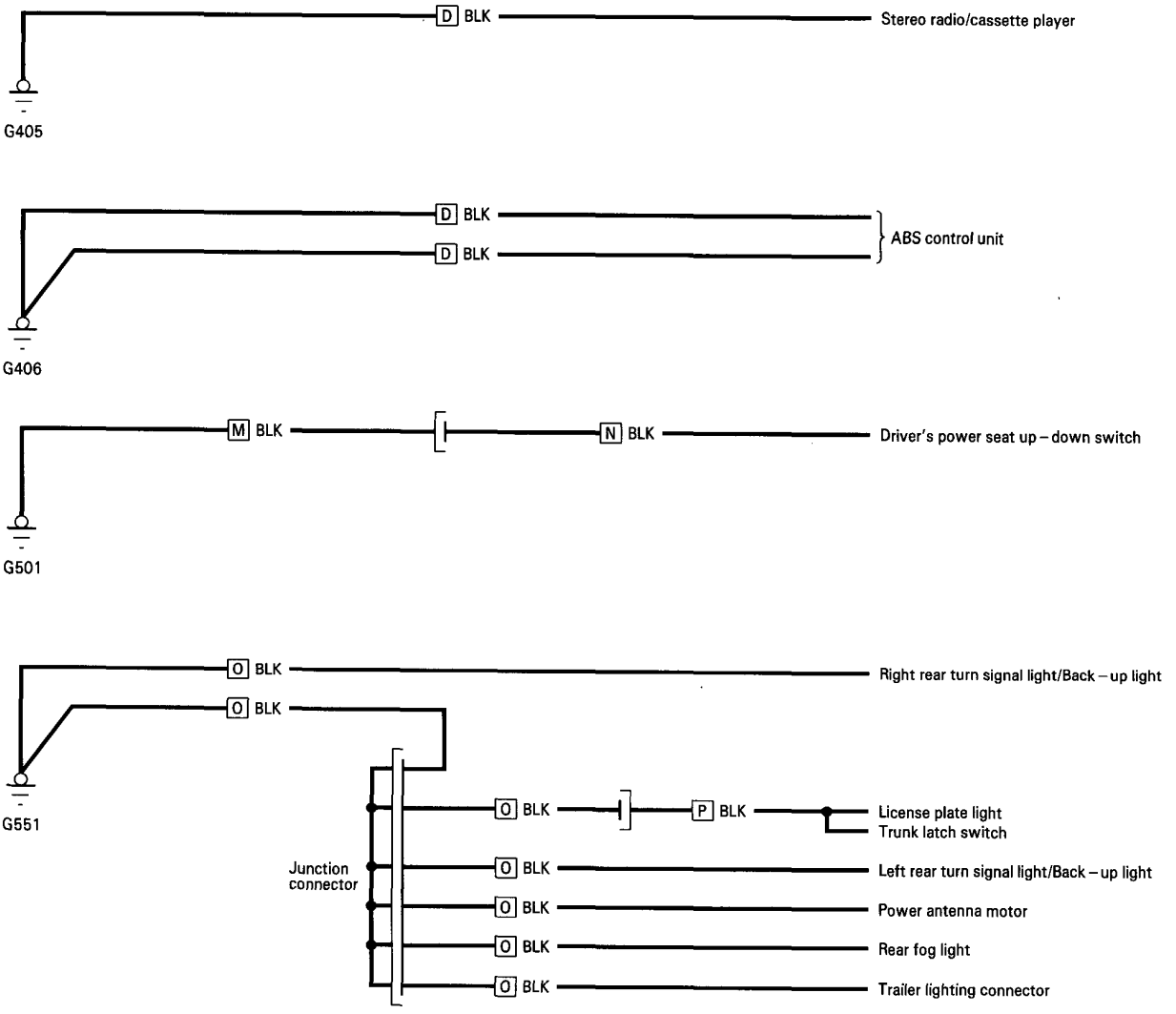
(cont'd)

Ground Distribution

Circuit Identification (KG model cont'd)



D : Main wire harness
J : Dashboard wire harness
L : Roof wire harness
M : Left side wire harness
O : Rear wire harness

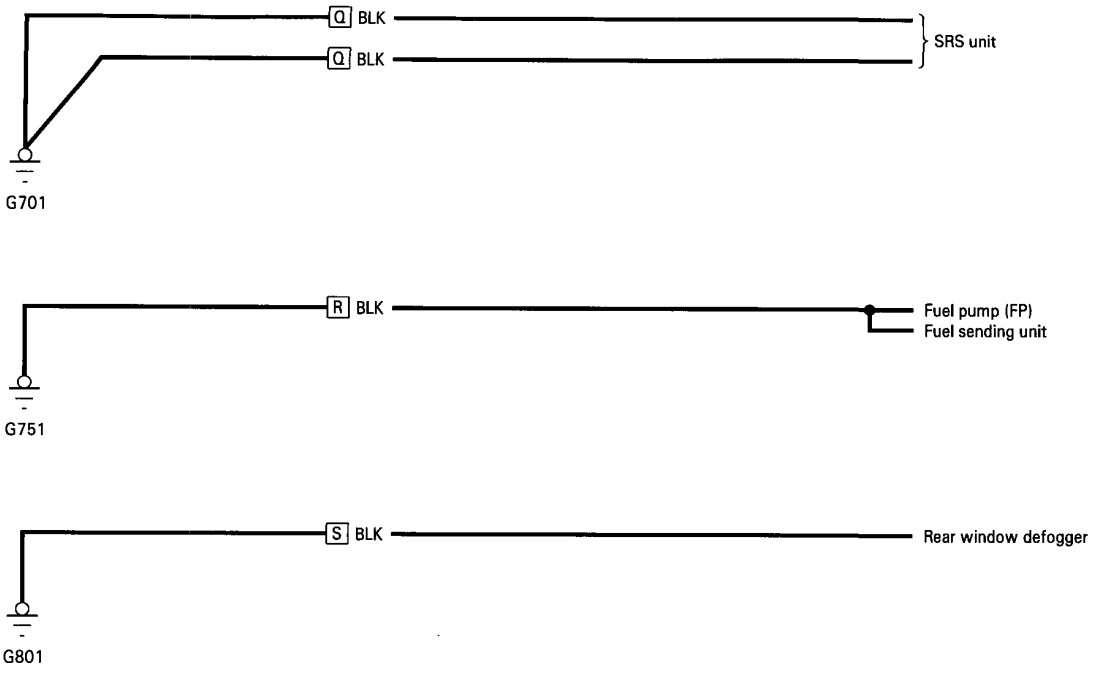


D : Main wire harness
M : Left side wire harness
N : Driver's power seat wire harness A
O : Rear wire harness
P : Trunk lid wire harness

(cont'd)

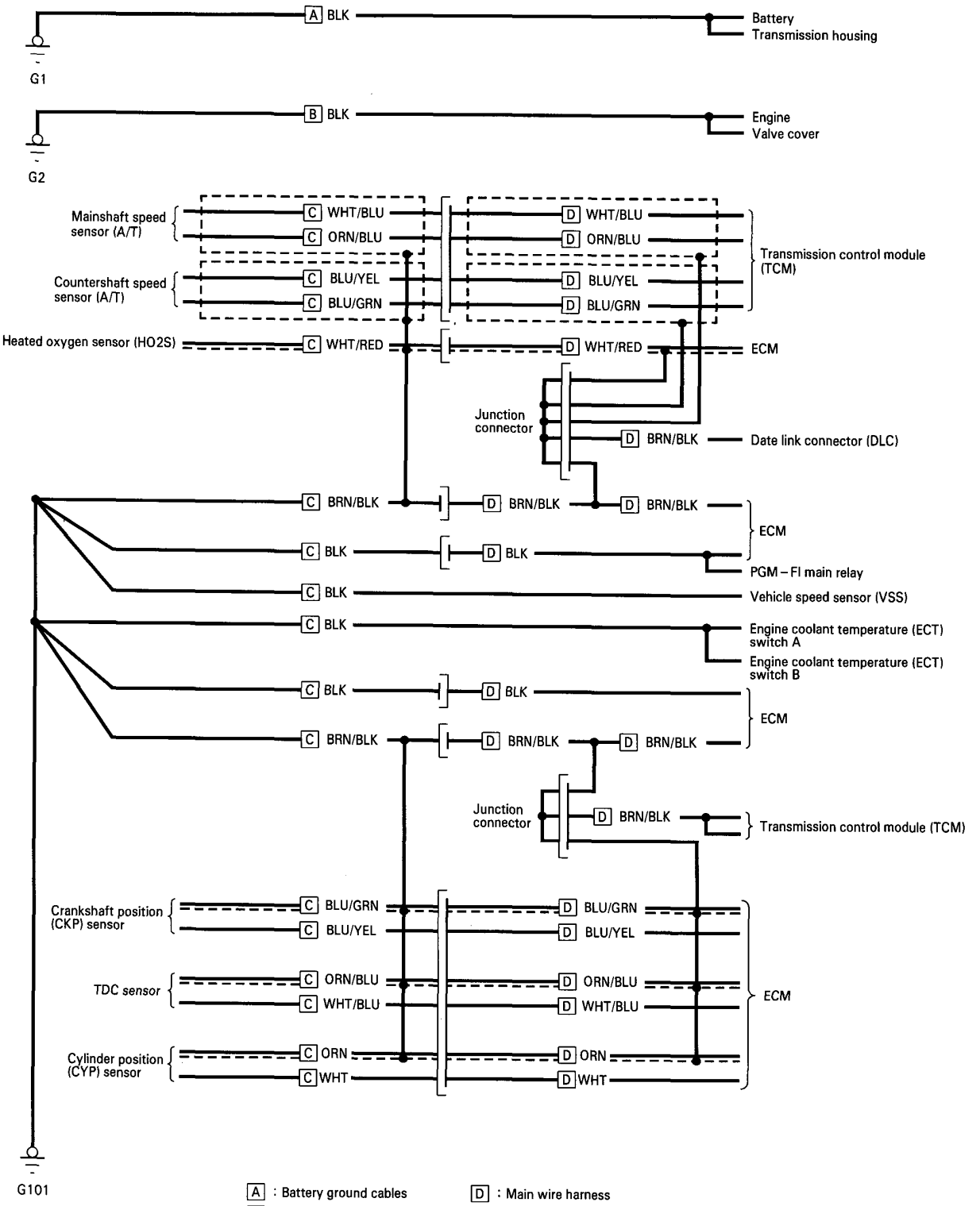
Ground Distribution

Circuit Identification (KG model cont'd)



Q : SRS main harness
R : Fuel unit wire harness
S : Rear window defogger ground wire

Circuit Identification (KE model)

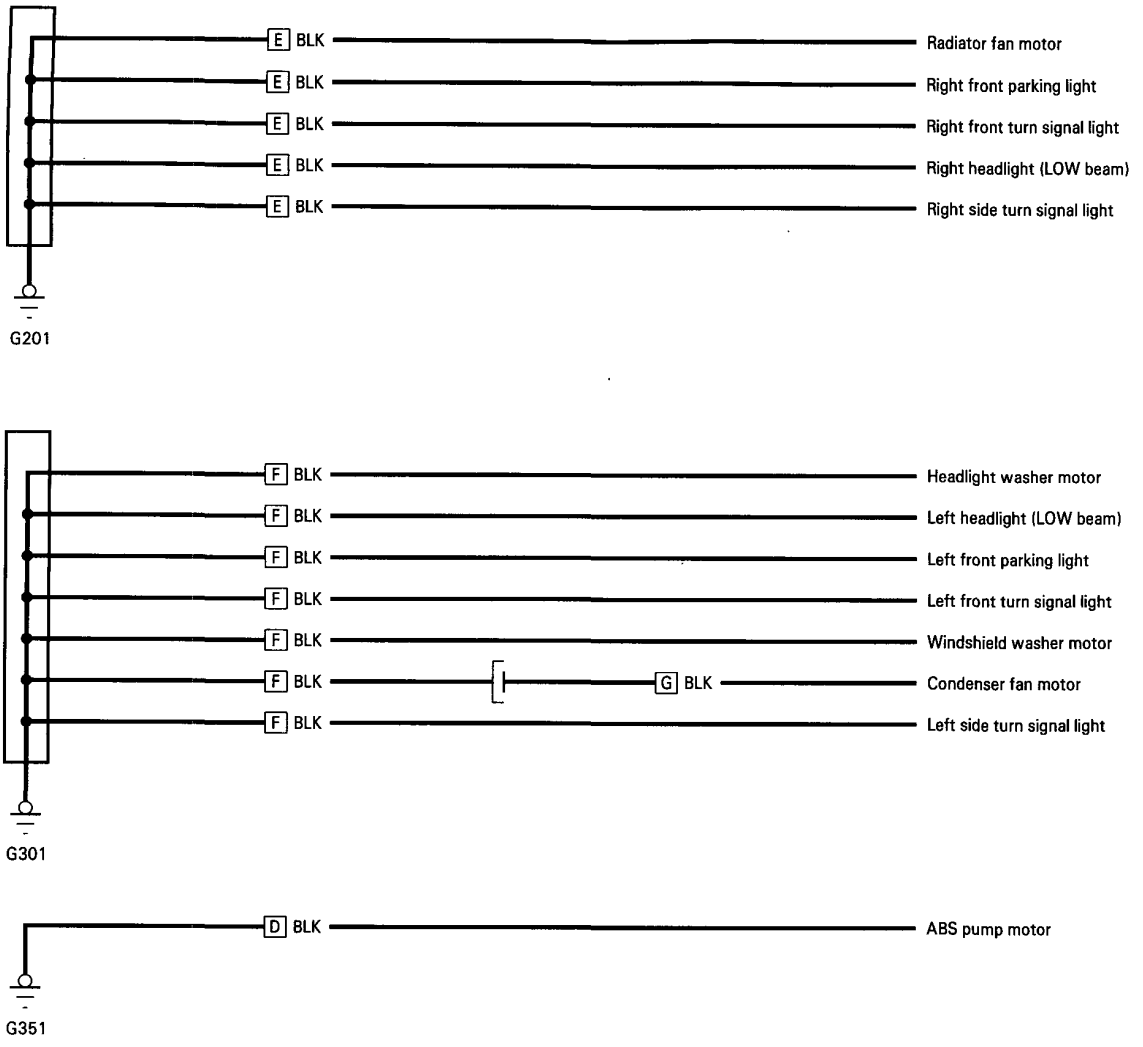


A : Battery ground cables
B : Engine ground cables
C : Engine wire harness
D : Main wire harness
Shielded wire

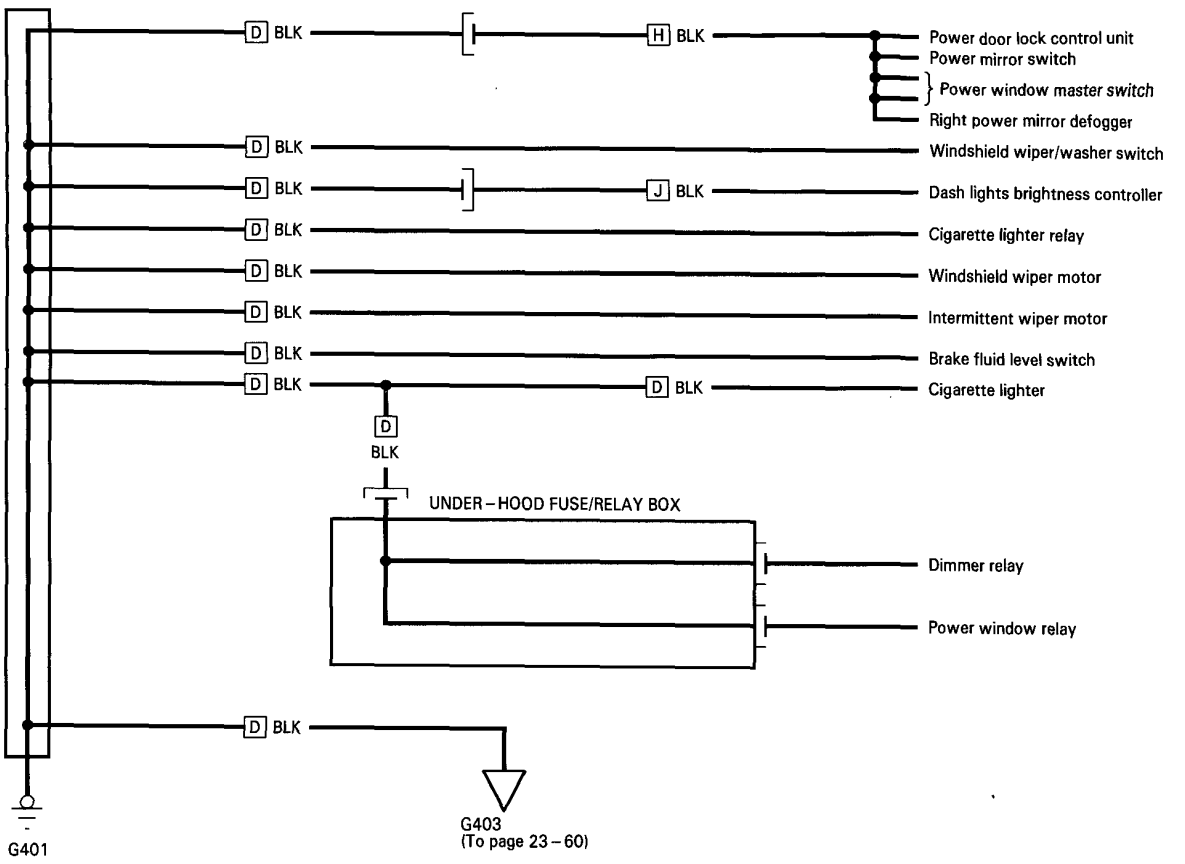
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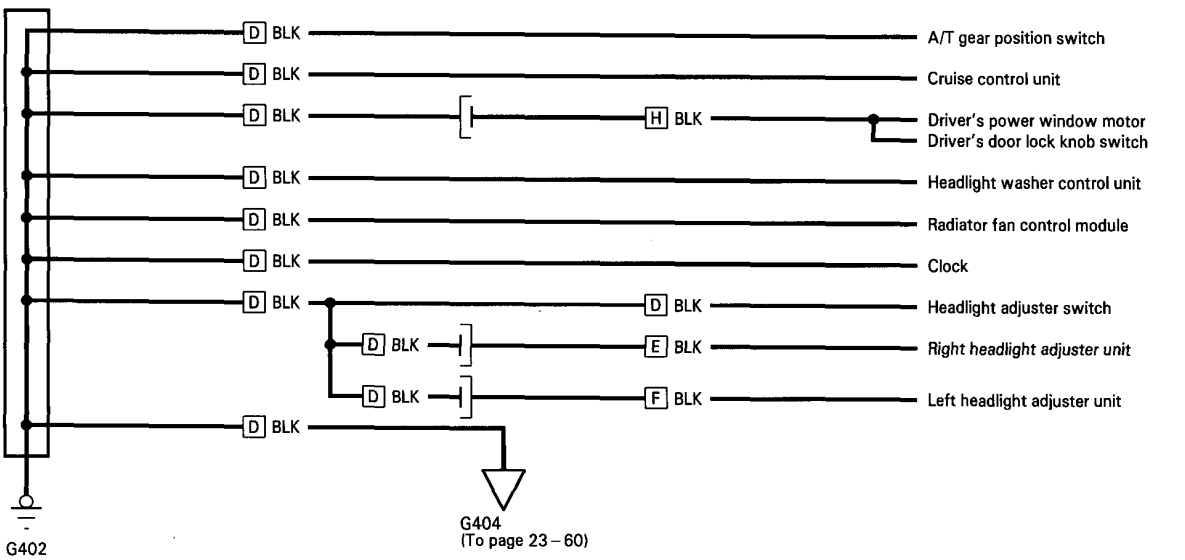
Ground Distribution

Circuit Identification (KE model cont'd)



D : Main wire harness
E : Right engine compartment wire harness
F : Left engine compartment wire harness
G : A/C wire harness



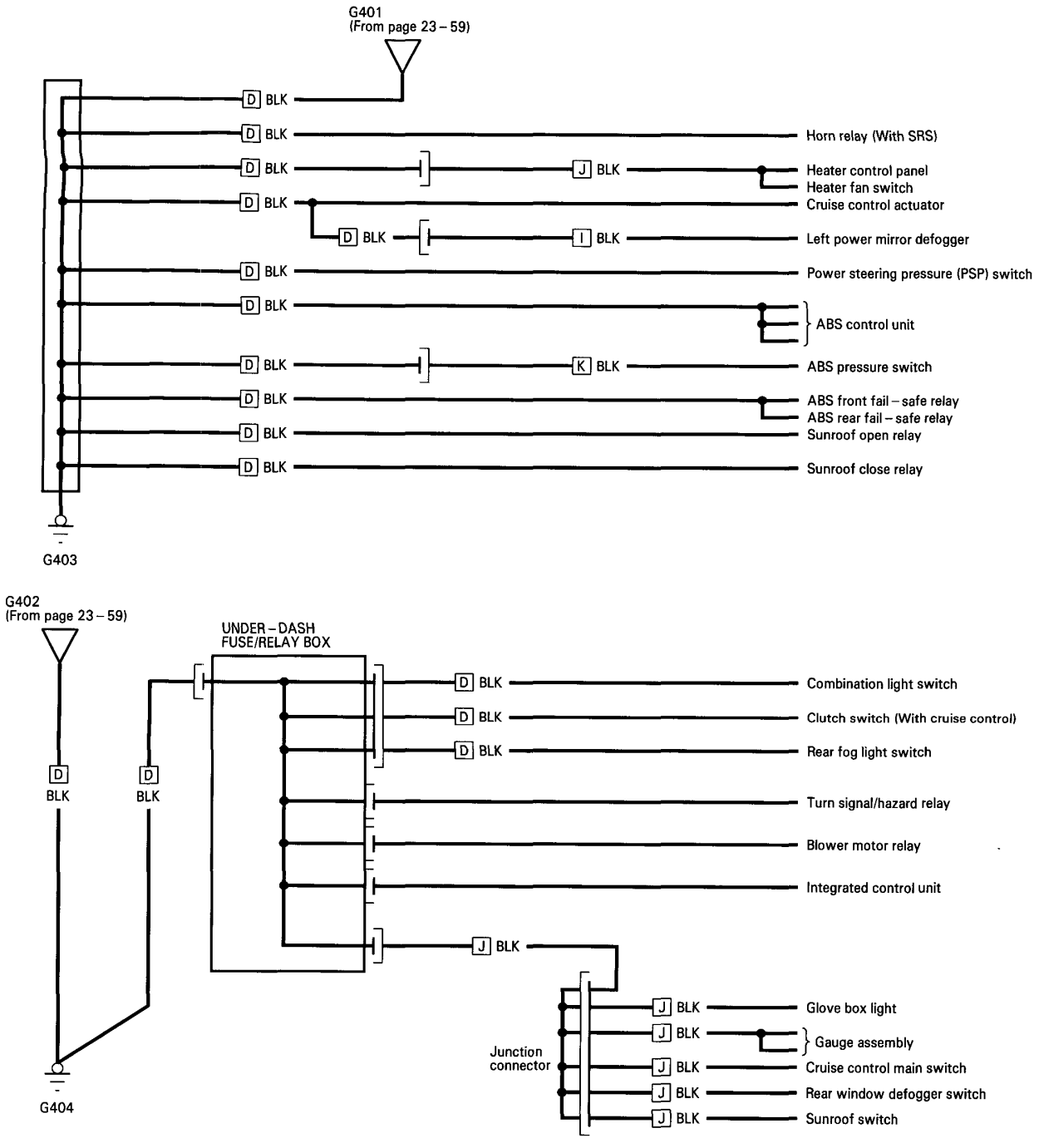


D : Main wire harness
E : Right engine compartment wire harness
F : Left engine compartment wire harness
H : Driver's door wire harness
J : Dashboard wire harness
L : Roof wire harness

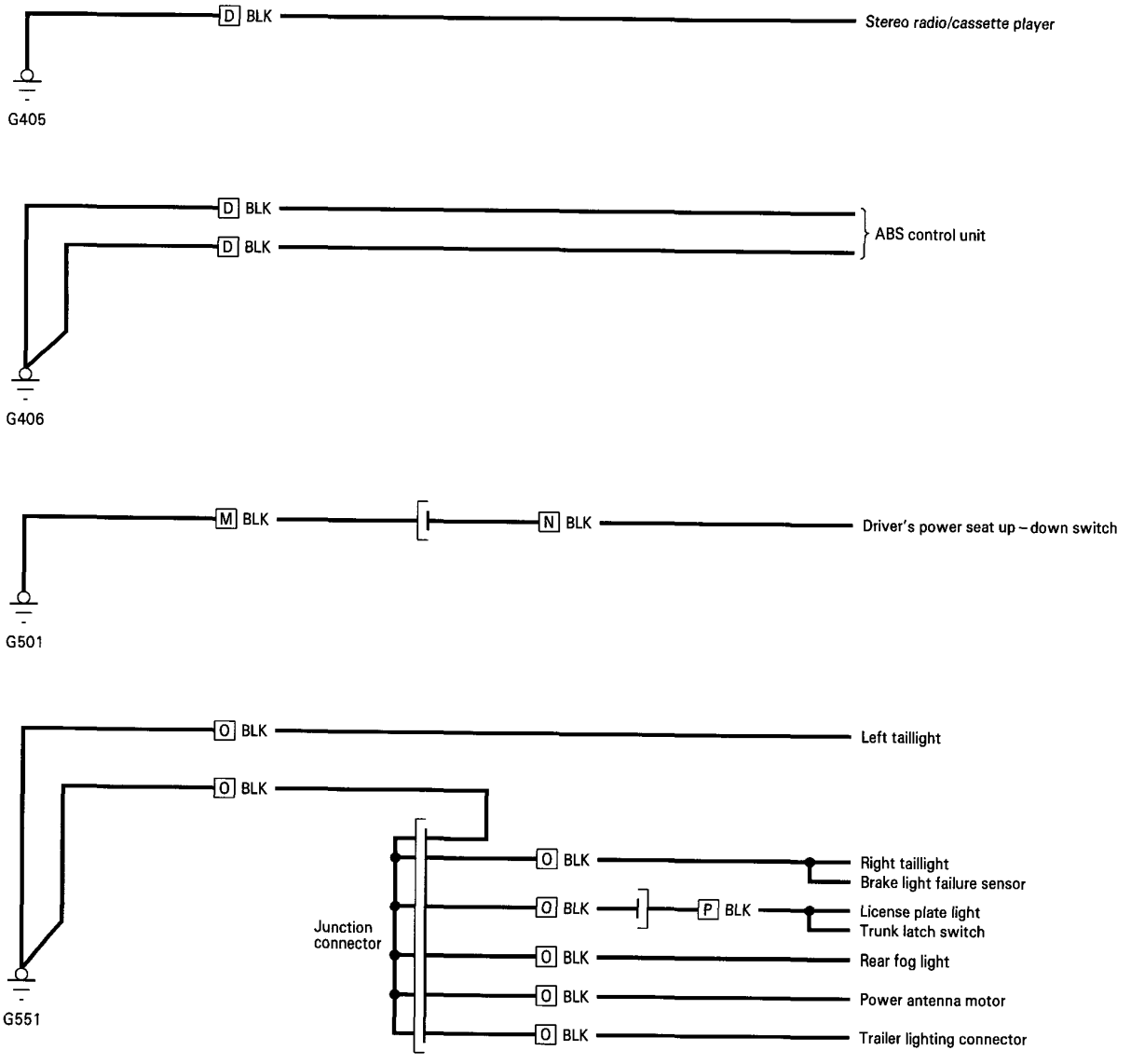
(cont'd)

Ground Distribution

Circuit Identification (KE model cont'd)



D : Main wire harness
I : Passenger's door wire harness
J : Dashboard wire harness
K : ABS wire harness

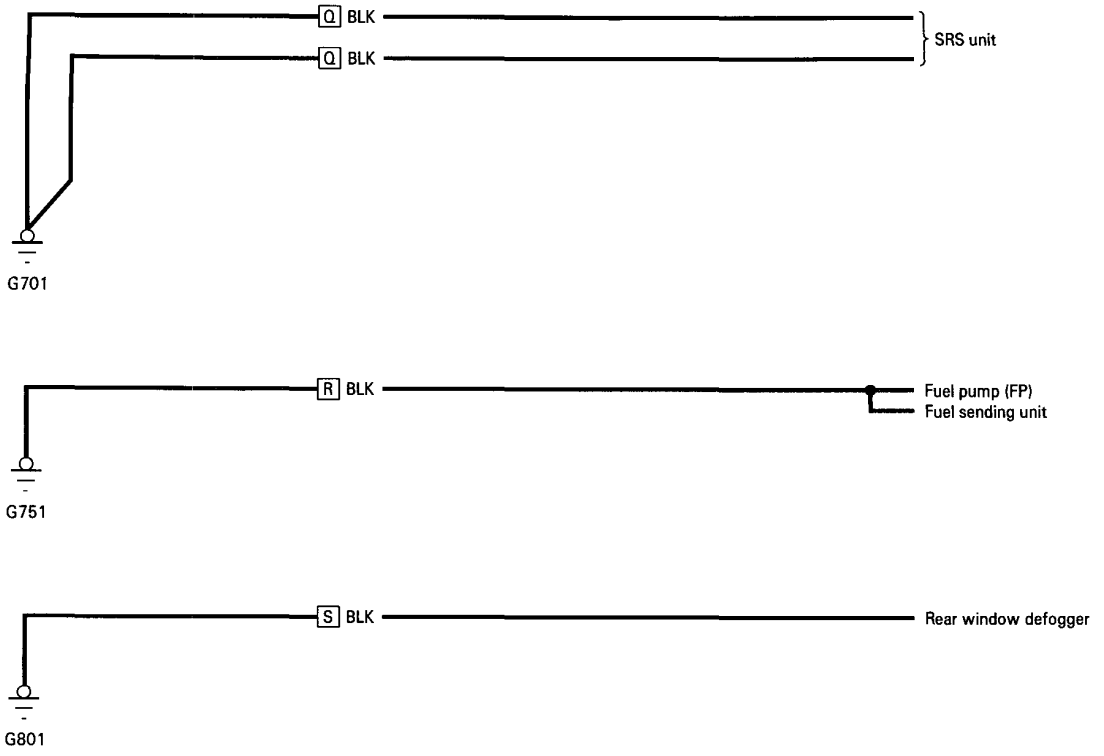


D : Main wire harness
M : Left side wire harness
N : Driver's power seat wire harness A
O : Rear wire harness
P : Trunk lid wire harness

(cont'd)

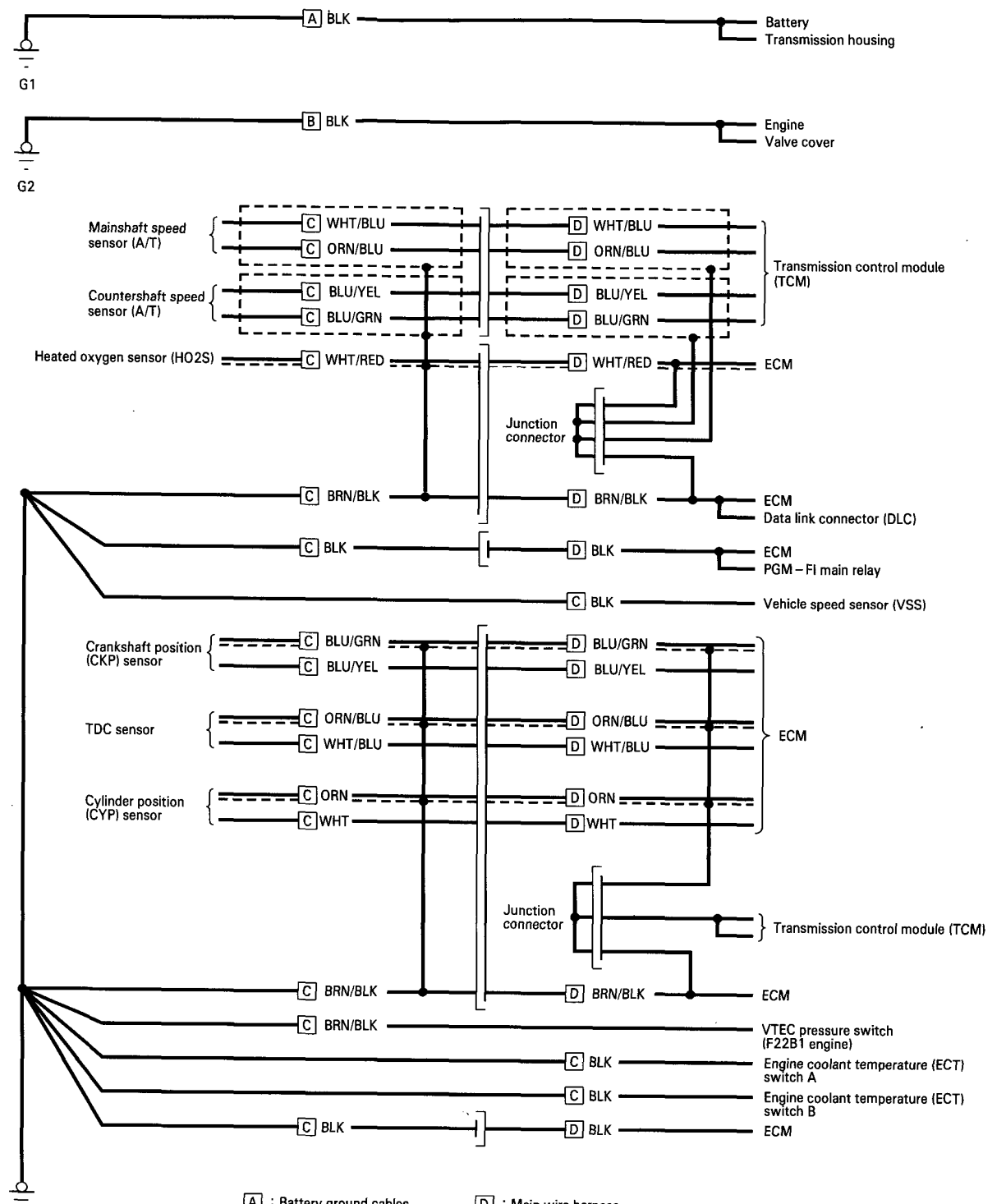
Ground Distribution

Circuit Identification (KE model cont'd)



Q : SRS main harness
R : Fuel unit wire harness
S : Rear window defogger ground wire

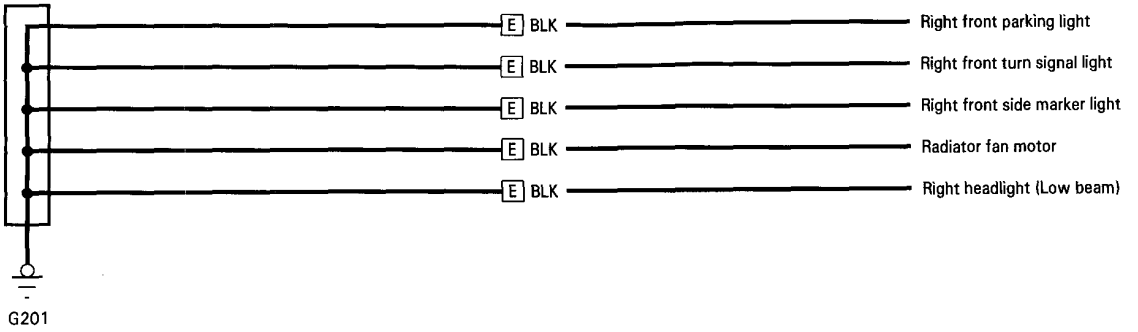
Circuit Identification (KH model)

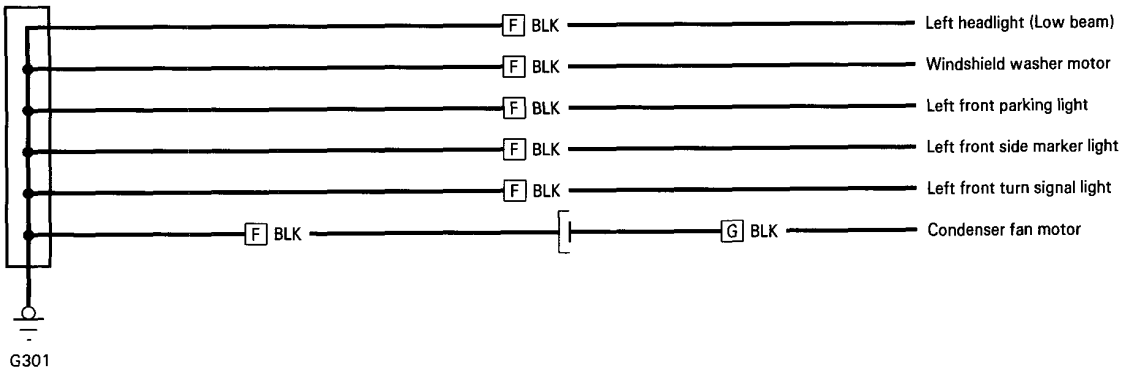


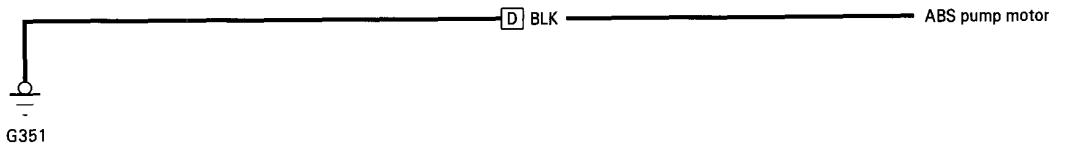
(cont'd)

Ground Distribution

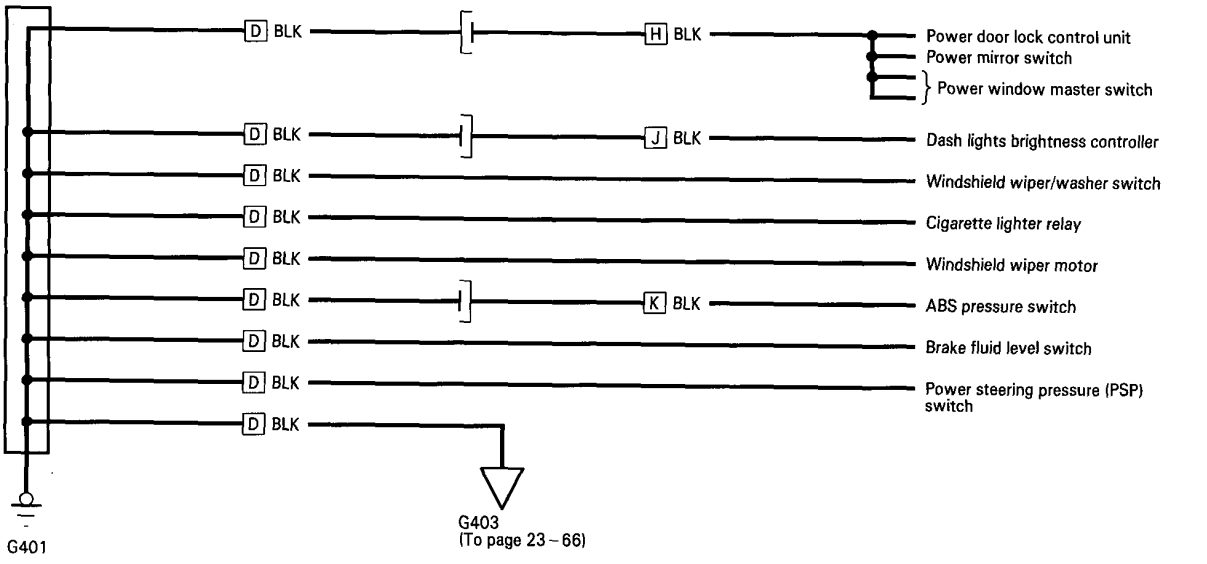
Circuit Identification (KH model cont'd)

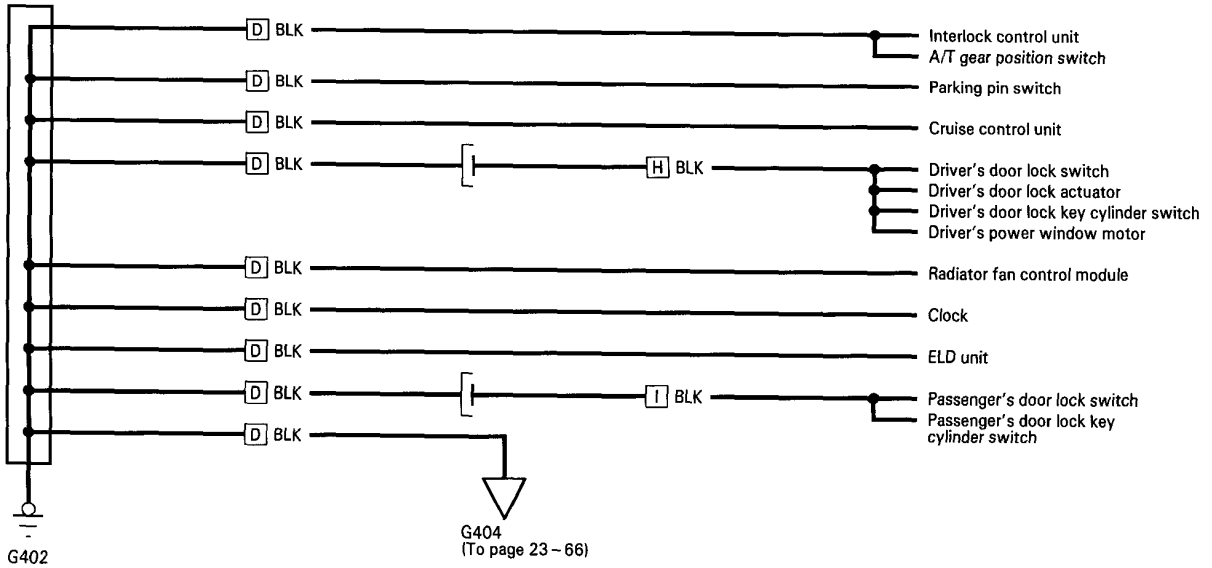






D : Main wire harness
E : Right engine compartment wire harness
F : Left engine compartment wire harness
G : A/C wire harness



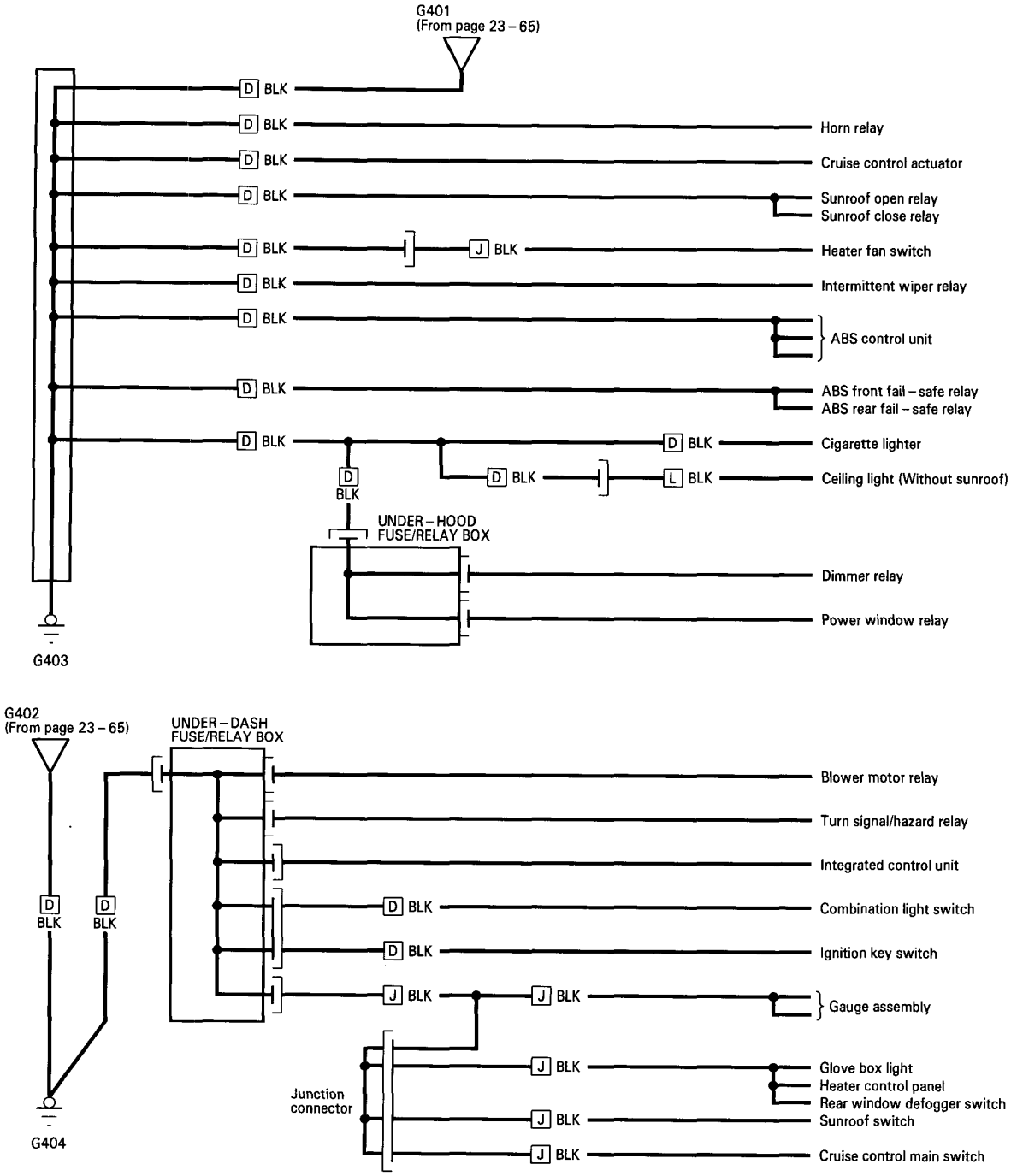


D : Main wire harness
H : Driver's door wire harness
I : Passenger's door wire harness
J : Dashboard wire harness
K : ABS wire harness

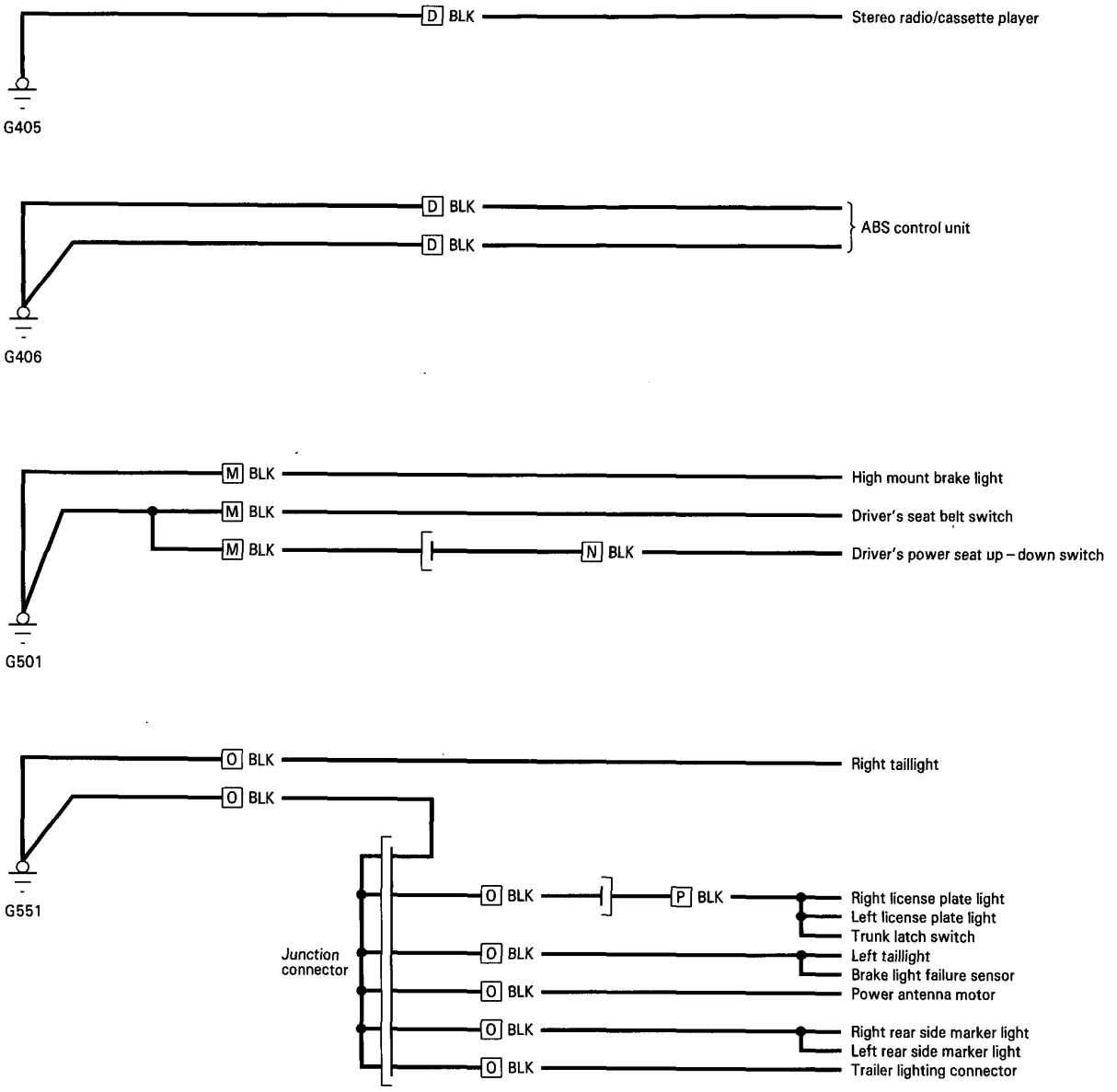
(cont'd)

Ground Distribution

Circuit Identification (KH model cont'd)



D : Main wire harness
J : Dashboard wire harness
L : Roof wire harness

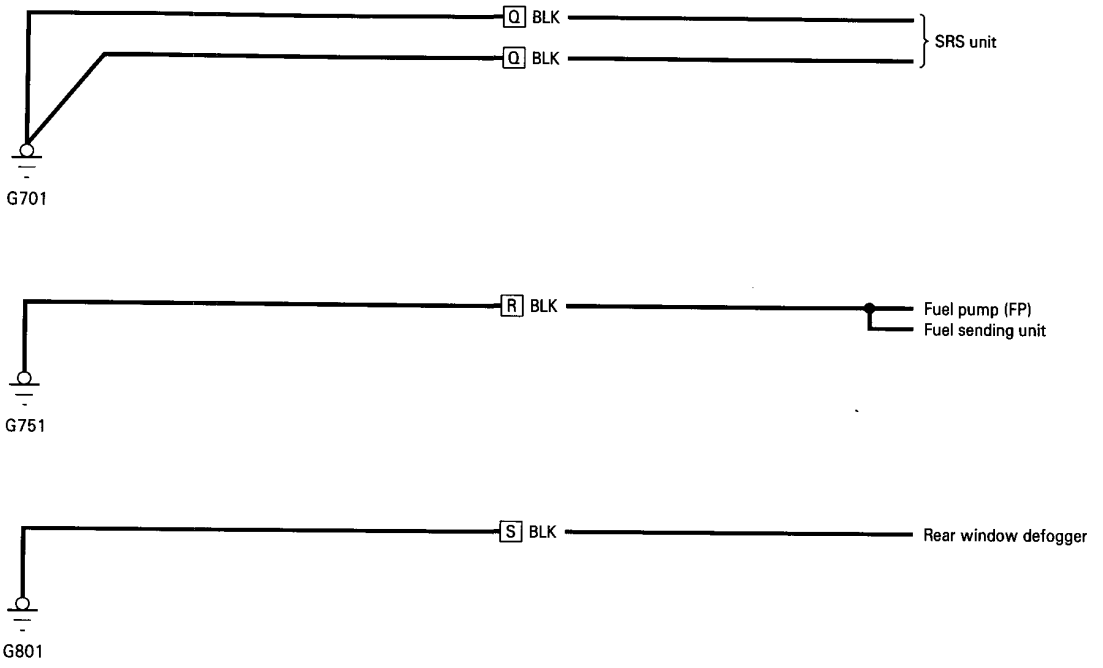


D : Main wire harness
M : Left side wire harness
N : Driver's power seat wire harness A
O : Rear wire harness
P : Trunk lid wire harness

(cont'd)

Ground Distribution

Circuit Identification (KH model cont'd)



Q : SRS main harness
R : Fuel unit wire harness
S : Rear window defogger ground wire

Battery

Test

⚠ WARNING

- **Battery fluid (electrolyte) contains sulfuric acid. It may cause severe burns if it gets on your skin or in your eyes.**
  Wear protective clothing and a face shield.
  — If electrolyte gets on your skin or clothes, rinse it off with water immediately.
  — If electrolyte gets in your eyes, flush it out by splashing water in your eyes for at least 15 minutes; call a physician immediately.

- **A battery gives off hydrogen gas. If ignited, the hydrogen will explode and could crack the battery case and splatter acid on you. Keep sparks, flames, and cigarettes away from the battery.**

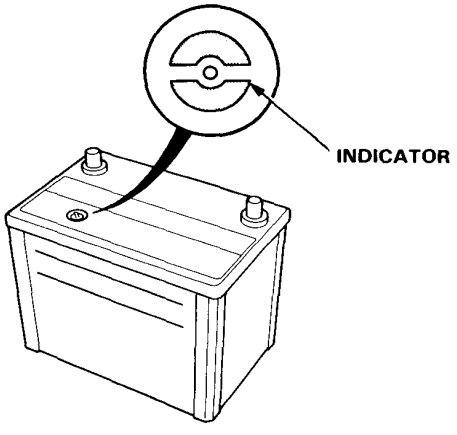
- **Overcharging will raise the temperature of the electrolyte. This may force electrolyte to spray out of the battery vents. Follow the charger manufacturer's instructions, and charge the battery at a proper rate.**

NOTE: To get accurate results, the temperature of the electrolyte must be between 21 and 38°C (70 and 100°F) before testing.

Test Equipment Required:

- Battery Tester with:
  Voltmeter with 0 – 18 V scale, ammeter with 0 – 100 V A and 0 – 500 A scales, and a carbon pile with 0 – 300 W

- 12 V Battery Charger:
  Fast charge capability of 50 A and slow charge capability of 5 A.



Test Procedure:

1. Check for damage: If the case is cracked or the terminals are loose, replace the battery.

2. Check indicator (for basic charge condition): Blue or Green is OK. If the indicator is red, peel the tape off, remove the caps, and add distilled water; then reinstall the caps and tape. If the indicator is clear, go to step 3.

3. Test battery load capacity by connecting a battery tester, and applying a load of three times the battery ampere hour rating.
   When the load has been applied for exactly 15 seconds, the battery voltage reading should stay above 9.6 V.
   - If the reading stays above 9.6 V, the battery is OK; clean its terminals and case, and reinstall it.
   - If the reading is between 6.5 and 9.6 V, connect a battery charger and charge the battery for three minutes at an initial rate of 40 amps.

   CAUTION: Amperage will drop as voltage increases; do not increase the amperage to compensate or you may damage the battery.

   - Watch the battery voltage during the entire three minutes; the highest reading should stay below 15.5 V.

     — If the reading stays below 15.5 V, the battery is OK; clean its terminals and case, and reinstall it.

     — If the reading exceeds 15.5 V any time during the three minutes of fast charge, the battery is not good; replace it.

   - If the reading drops below 6.5 V, slow charge the battery by connecting a battery and charge at five amps for no more than 24 hours (or until the indicator shows full charge, or the specific gravity of the electrolyte is at least 1.250).
     Then test load capacity again.

     — If the voltage stays above 9.6 V, the battery is OK; clean its terminals and case, and reinstall it.

     — If the voltage still drops below 6.5 V, the battery is not good; replace it.

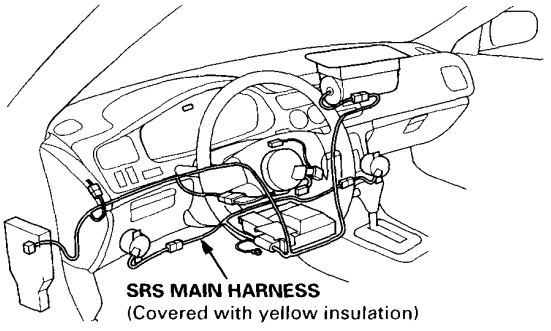
Under-dash Fuse/Relay Box

Removal/Installation

CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

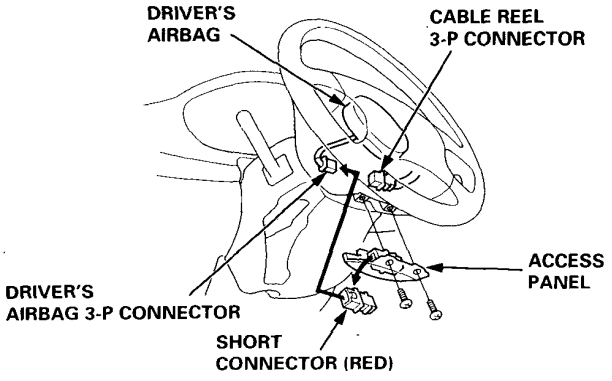
NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Connect the short connectors (RED) to the airbag 3-P connectors.

Driver's Side:

- Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.
- Disconnect the 3-P connector between the driver's airbag and cable reel, then connect the short connector (RED) to the airbag side of the connector.

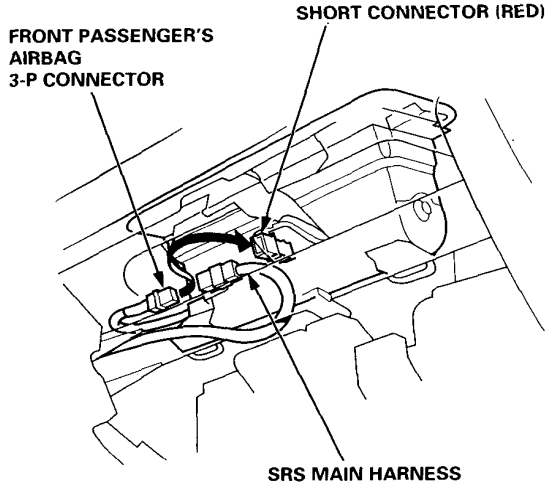


Front Passenger's Side:

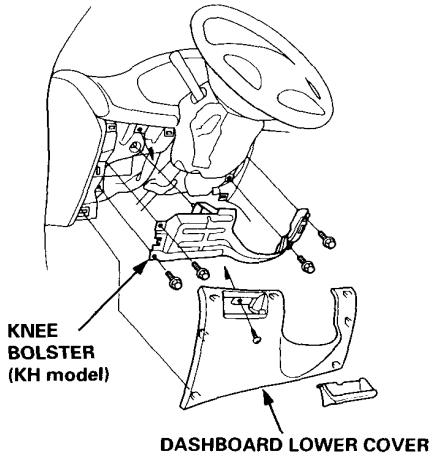
- Remove the glove box.

  NOTE: Before removing the glove box, remove the glove box damper (see section 20).

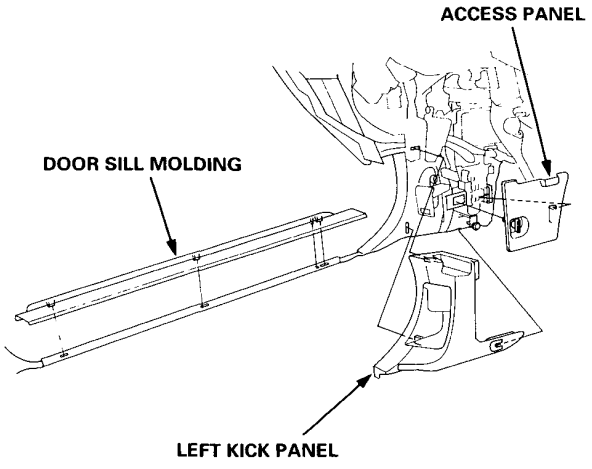
- Disconnect the front passenger's airbag 3-P connector from the SRS main harness, and connect the short connector (RED) to the front passenger's airbag 3-P connector.



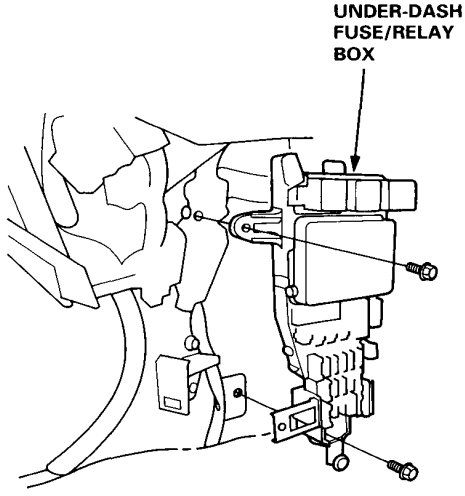
3. Remove the driver's foot rest (see section 20).
4. Remove the dashboard lower cover and knee bolster.



5. Remove the door sill molding, left kick panel and access panel.

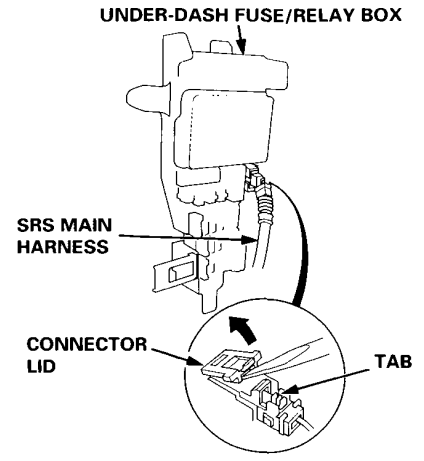


6. Remove the two mounting bolts, and pull the under-dash fuse/relay box away from the left kick panel.



7. Disconnect the under-dash fuse/relay box connectors, and take out the under-dash fuse/relay box.

   NOTE: The SRS main harness connector is double locked. To remove it, first lift the connector lid, then press the connector tab down and pull the connector out.



Installation:

1. Reconnect the connectors to the under-dash fuse/relay box.

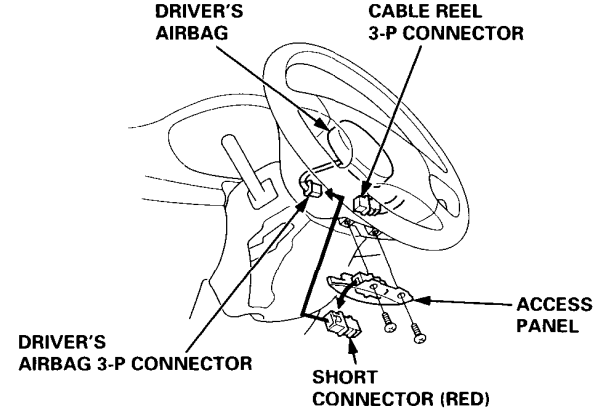
   NOTE: To reinstall the SRS main harness connector, push it into position until it clicks, then close the connector lid.

2. Install the under-dash fuse/relay box.

3. Disconnect the short connectors (RED) from the airbags.

4. Reconnect the airbag 3-P connectors.

5. Attach the driver's airbag short connector (RED) to the access panel, and reinstall the panel.



6. Reinstall the glove box.

7. Connect both the negative cable and positive cable to the battery.

8. Confirm that all systems work properly.

Power Relays

Relay Test

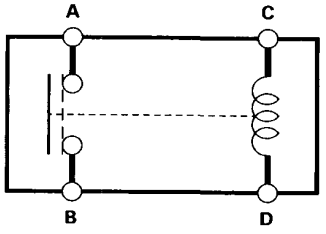
NOTE: See page 23-218 for turn signal/hazard relay input test.

NORMALLY-OPEN Type:

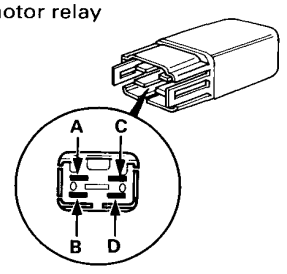
1. Remove the power relay from its socket.

2. Check for continuity between the terminals.
   - There should be continuity between the A and B terminals when power and ground are connected to the C and D terminals.
   - There should be no continuity between the A and B terminals when power is disconnected.

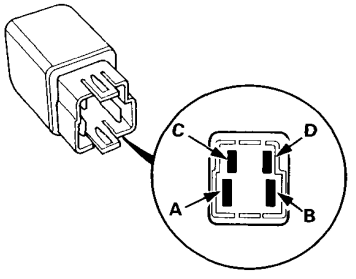
Terminal / Power (C – D)	A	B
Disconnected		
Connected	○	○



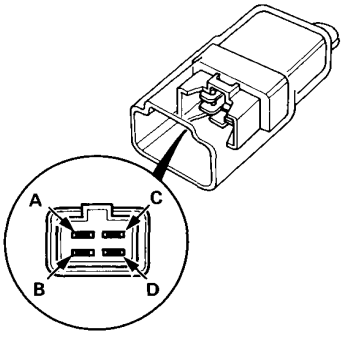
- Radiator fan relay
- Power window relay
- Blower motor relay



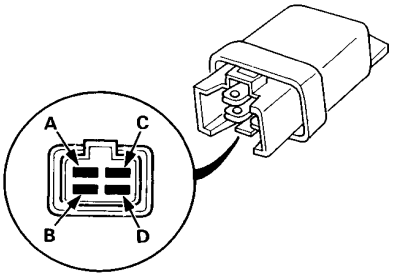
- ABS pump motor relay



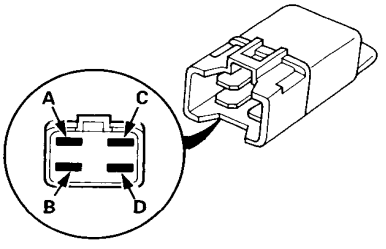
- Condenser fan relay
- A/C compressor clutch relay



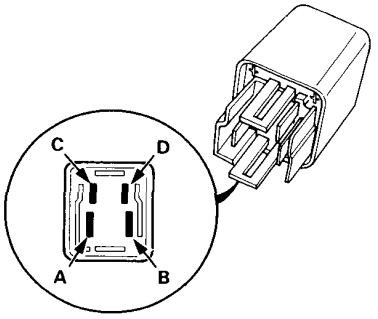
- Horn relay
- Cigarette lighter relay
- ABS front fail-safe relay (RHD type)
- ABS rear fail-safe relay (RHD type)



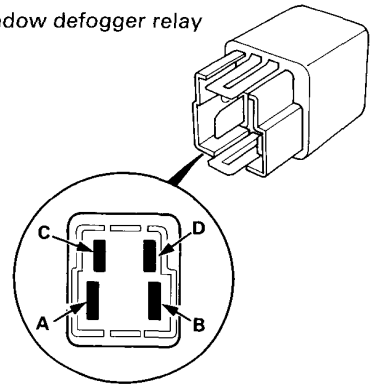
- ABS front fail-safe relay (LHD type)
- ABS rear fail-safe relay (LHD type)



- Headlight relay



- Rear window defogger relay



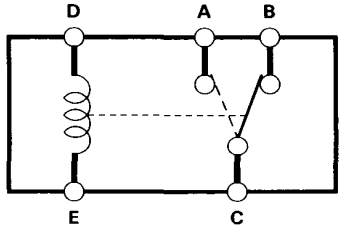
FIVE-TERMINAL Type:

1. Remove the power relay from its socket.

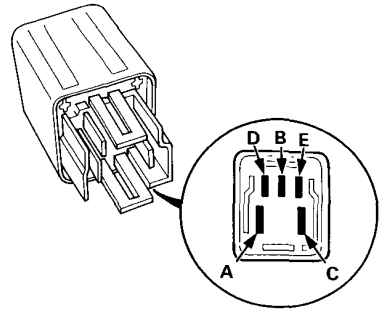
2. Check for continuity between the terminals.

   - There should be continuity between the A and C terminals when power and ground are connected to the D and E terminals.
   - There should be continuity between the B and C terminals when power is disconnected.

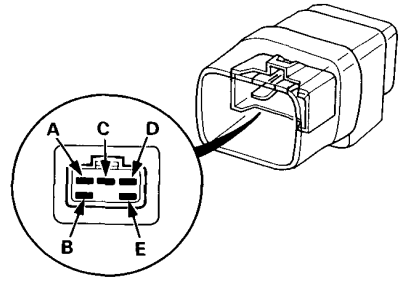
Terminal / Power (D – E)	A	B	C
Disconnected		○	○
Connected	○		○



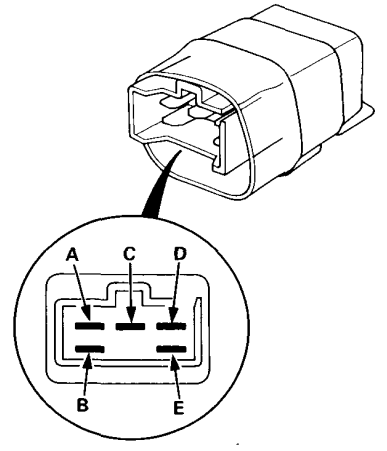
- Dimmer relay



- Intermittent wiper relay



- Sunroof open relay
- Sunroof close relay

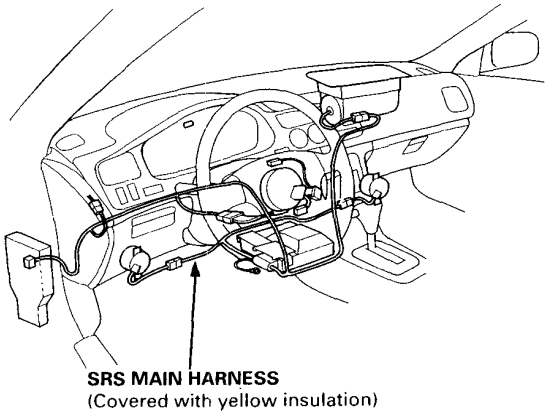


Ignition Switch

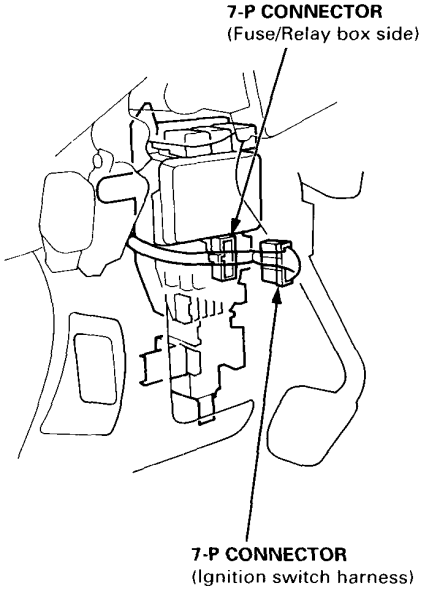
Test

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

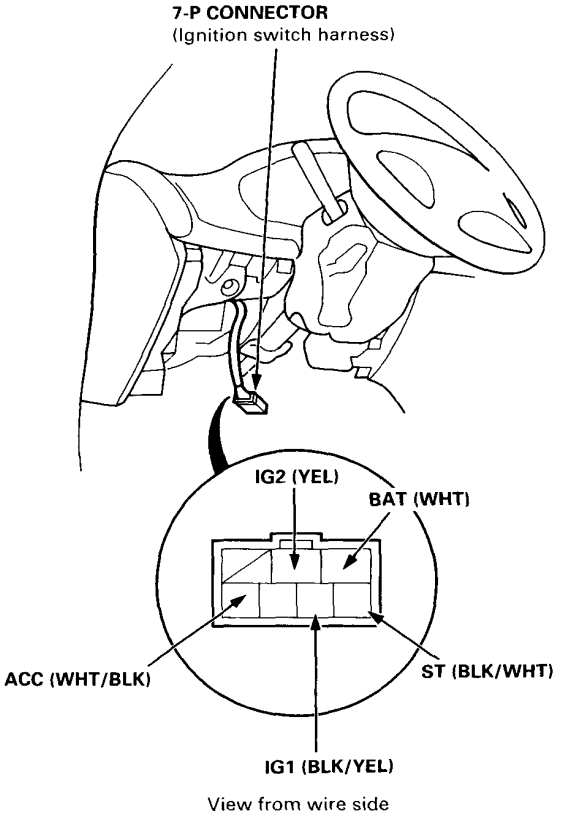


1. Remove the dashboard lower cover, left knee bolster (KH model) and access panel (see page 23-70).
2. Disconnect the switch harness 7-P connector from the under-dash fuse/relay box.



3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	WHT/BLK (ACC)	WHT (BAT)	BLK/YEL (IG1)	YEL (IG2)	BLK/WHT (ST)
0					
I	○—○				
II	○—○	○—○	○—○		
III		○—○	○—○		○—○



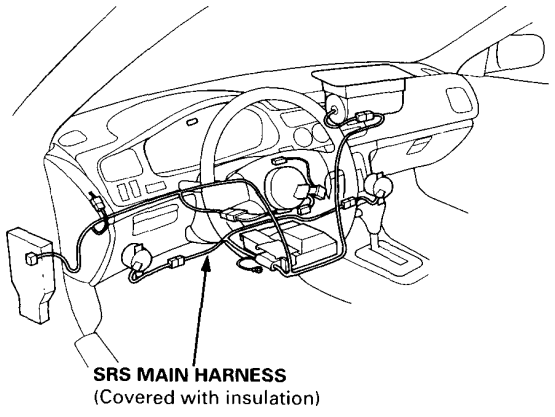
View from wire side

4. If the continuity checks do not agree with the table, check for a bad connection between the switch and switch harness.
   - If connection is OK, replace the switch.
   - If connection isn't OK, repair as necessary, and recheck. If continuity checks still do not agree with the table, replace the switch.

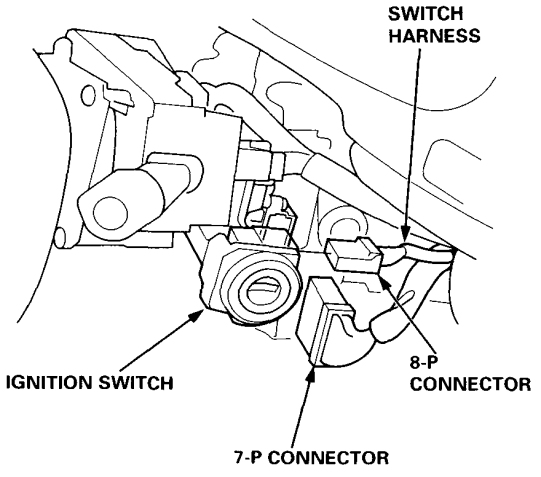
Electrical Switch Replacement

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

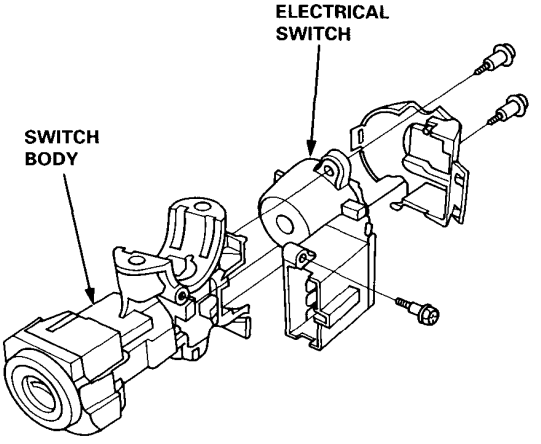


1. Remove the dashboard lower cover and knee bolster (see page 23-70).
2. Remove the steering column covers (see page 23-76).
3. Disconnect the connectors from the switch.



4. Remove the column holder mounting bolts and nuts (see page 23-77).
5. Lower the steering column assembly.
6. Center punch each of the two shear bolts, and drill their heads off with a 5 mm (3/16 in) drill bit (see page 23-77).

   CAUTION: Do not damage the switch body when removing the shear bolts.
7. Remove the shear bolts from the switch body, then remove the switch assembly.
8. Remove the three screws, and replace the electrical switch.

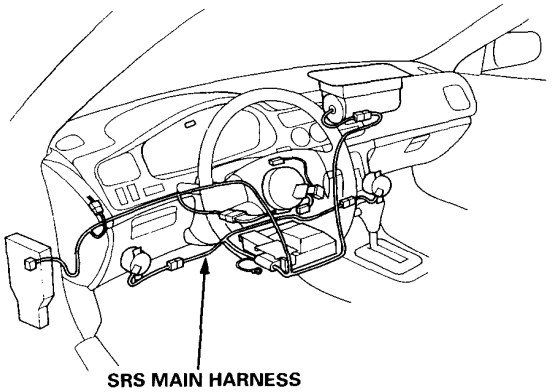


Ignition Switch

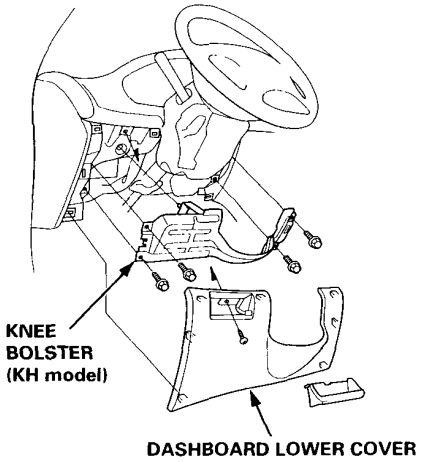
Steering Lock Replacement

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

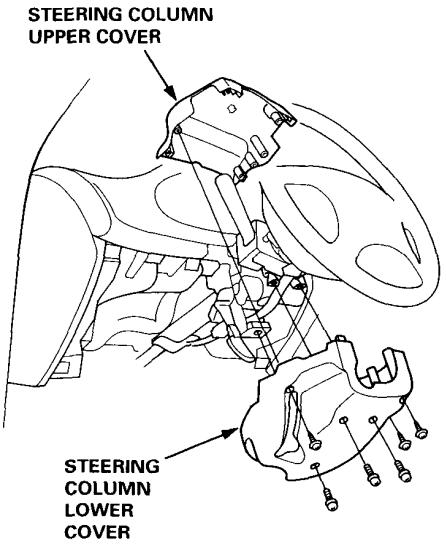
NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.



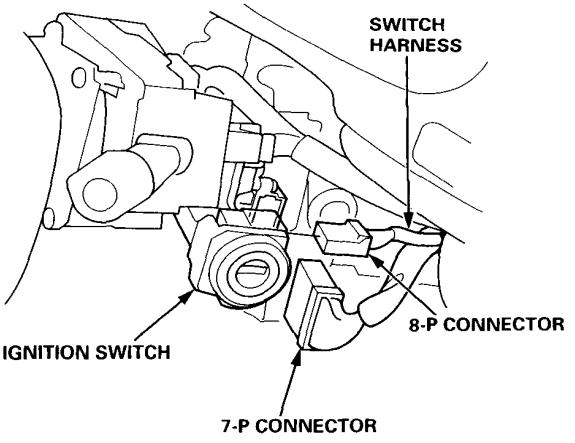
1. Disconnect the battery ground cable, then disconnect the starter (positive) cable.
2. Remove the dashboard lower cover and knee bolster.



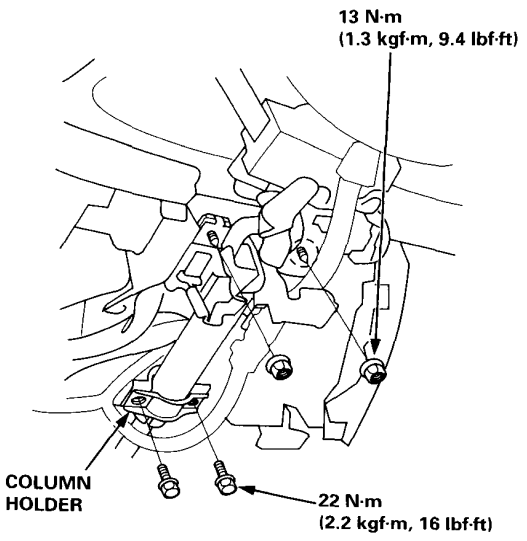
3. Remove the steering column covers.



4. Disconnect the connectors from the switch.



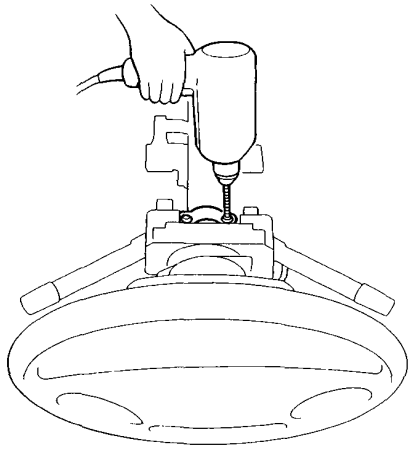
5. Remove the column holder mounting bolts and nuts.



6. Lower the steering column assembly.

7. Center punch each of the two shear bolts, and drill their heads off with a 5 mm (3/16 in) drill bit.

CAUTION: Do not damage the switch body when removing the shear bolts.



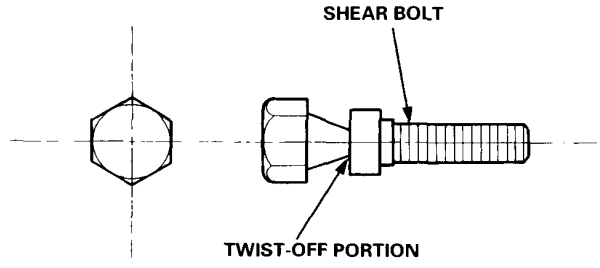
8. Remove the shear bolts from the switch body.

9. Install the new ignition switch without the key inserted.

10. Loosely tighten the new shear bolts.

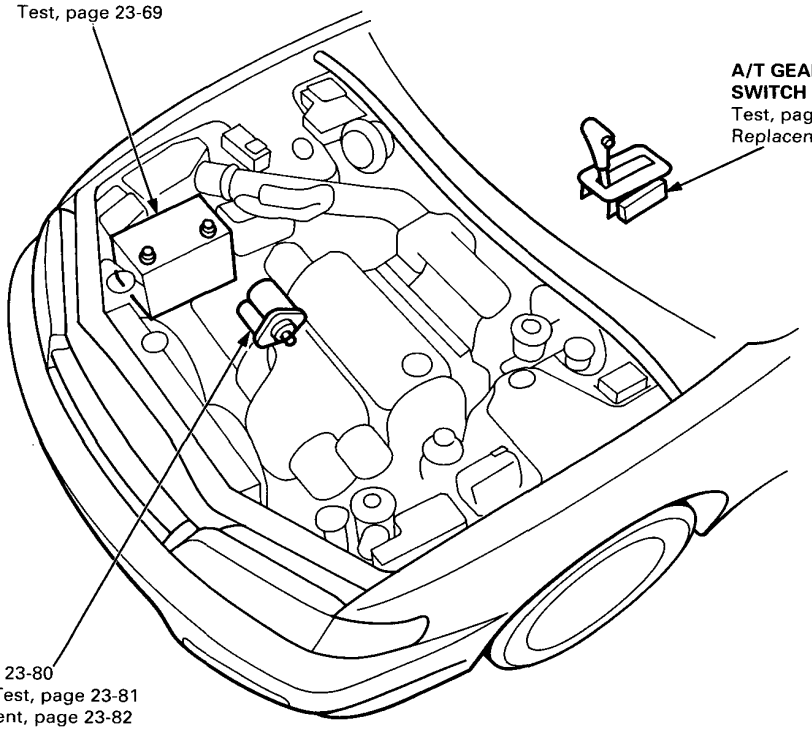
11. Insert the ignition key, and check for proper operation of the steering wheel lock and that the ignition key turns freely.

12. Tighten the shear bolts until the hex heads twist off.



Starting System

Component Location Index

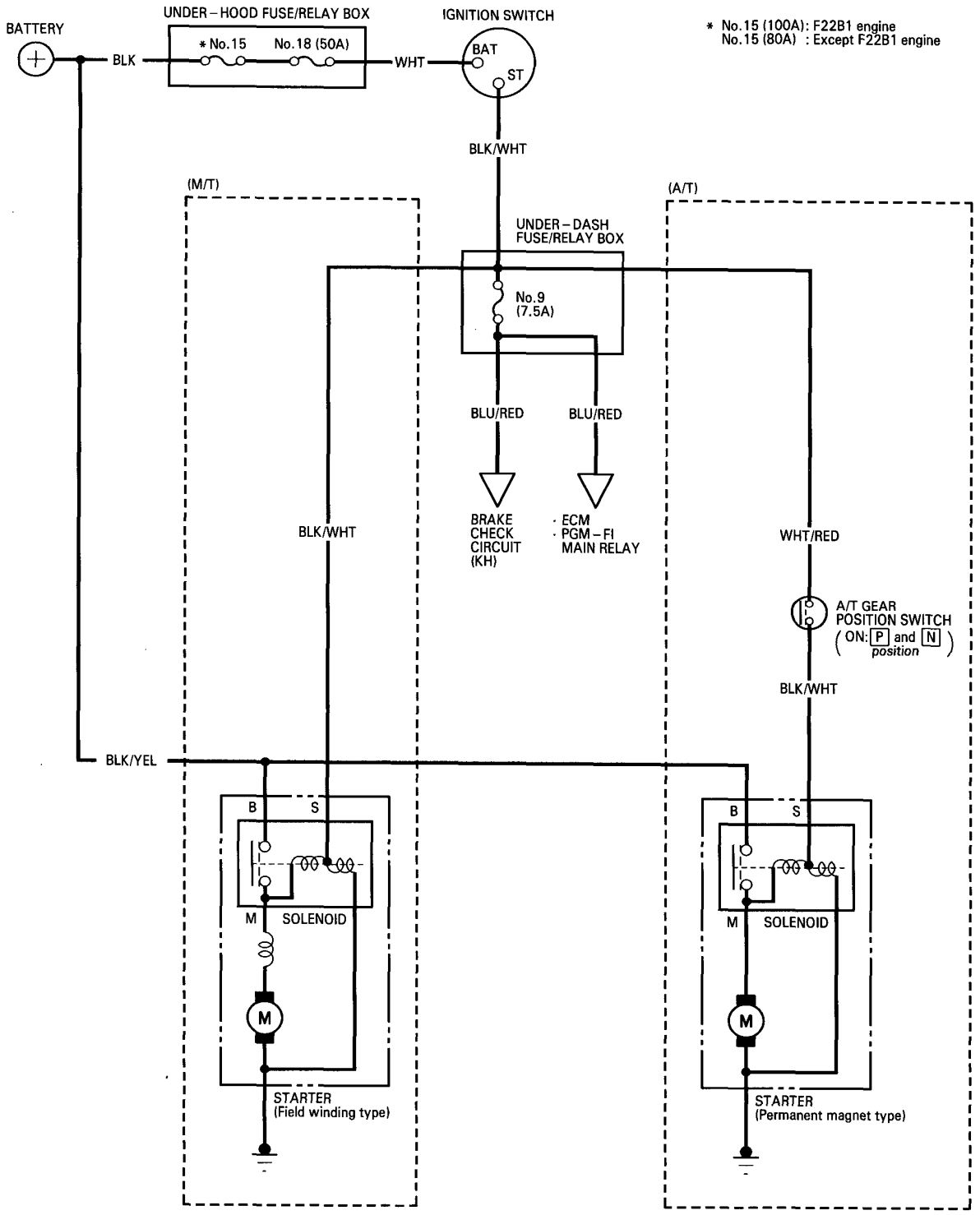


Description

The starter/engine combinations are shown in the table below.

F20B3 engine F22B5 engine	M/T	NIPPONDENSO (1.4 kW)
F20B3 engine (KE) F22B5 engine (KE)	A/T	MITSUBA (1.4 kW)
F20B3 engine (KG) F22B1 engine F22B2 engine F22B5 engine (KG)	A/T	MITSUBA (1.6 kW)

Circuit Diagram



Starter Test

NOTE: The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

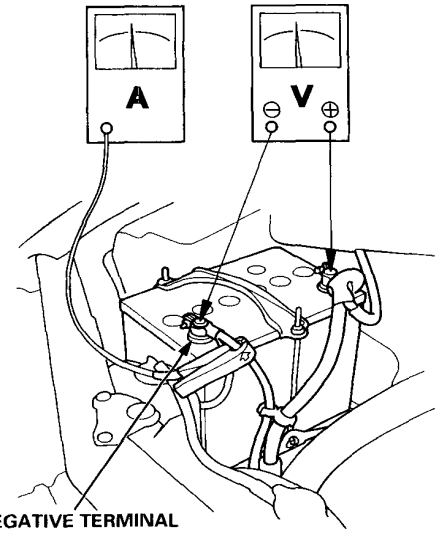
Recommended Procedure:

- Use a starter system tester.
- Connect and operate the equipment in accordance with the manufacturer's instructions.
- Test and troubleshoot as described.

Alternate Procedure:

- Use the following equipment:
  — Ammeter, 0 – 400 A
  — Voltmeter, 0 – 20 V (accurate within 0.1 volt)
  — Tachometer, 0 – 1,200 rpm (min^{-1})

- Hook up voltmeter and ammeter as shown.

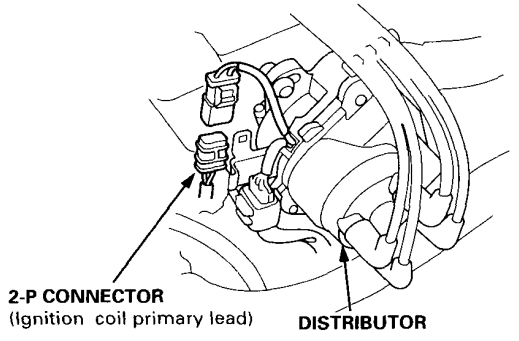


NOTE: After this test, or any subsequent repair, reset the ECM to clear any codes (see section 11).

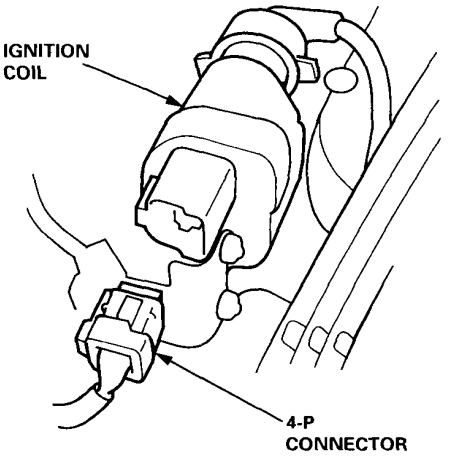
Check Starter Engagement

1. Disconnect the 4-P (2-P) connector from the ignition coil.

Except F22B2 engine:



F22B2 engine:

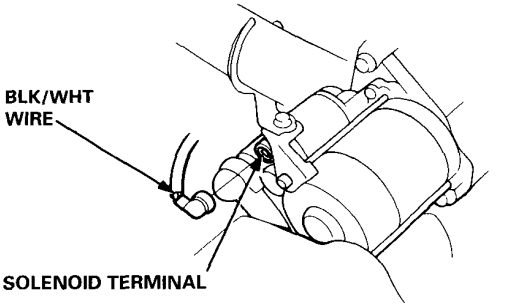


2. Turn the ignition switch to "Start". The starter should crank the engine.

3. Check the battery, battery positive cable, ground, and the wire connections for looseness and corrosion. Test again. If the starter still does not crank the engine, go to step 4.

4. Bypass the ignition switch circuit as follows (make sure the transmission is in neutral):
   Unplug the connector (BLK/WHT wire and solenoid terminal) from the starter. Then connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.

   - If the starter still does not crank the engine, remove it, and diagnose its internal problems.
   - If the starter cranks the engine, go to step 5.



5. Check for an open in the BLK/WHT wire circuit between the starter and ignition switch, and connectors.

6. Check the ignition switch (see page 23-74).

7. On cars with automatic transmission, check the A/T gear position switch (neutral position switch) and connector.

Check for Wear and Damage
The starter should crank the engine smoothly and steadily. If the starter engages, but cranks the engine erratically, remove it. Inspect the starter, drive gear, and flywheel ring gear for damage.

- Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. Replace the gears if damaged.

Check Cranking Voltage and Current Draw
Cranking voltage should be no less than 8.5 volts.
Current draw should be no more than 350 amperes.

If cranking voltage is too low, or current draw too high, check for:
- Dead or low battery
- Open circuit in starter armature commutator segments
- Starter armature dragging
- Shorted armature winding
- Excessive drag in engine

Check Cranking rpm
Engine speed during cranking should be above 100 rpm (min^{-1}).

If speed is too low, check for:

- Loose battery or starter terminals
- Excessively worn starter brushes
- Open circuit in commutator segments
- Dirty or damaged helical spline or drive gear
- Defective drive gear overrunning clutch

Check Starter Disengagement
Turn the ignition switch to "III", and release to "II". The starter drive gear should disengage from the flywheel ring gear when you release the key.

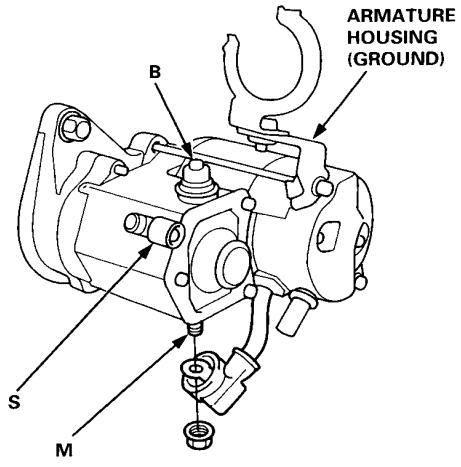
If the drive gear hangs up on the flywheel ring gear, check for:

- Solenoid plunger and switch malfunction
- Dirty drive gear assembly or damaged overrunning clutch

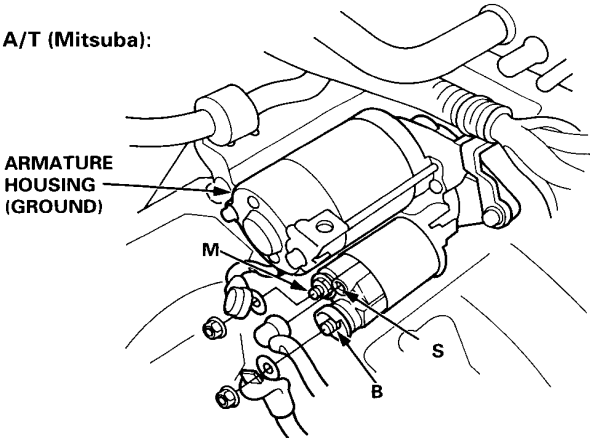
Starter Solenoid Test

1. Check the hold-in coil for continuity between the S terminal and the armature housing (ground). The coil is OK if there is continuity.

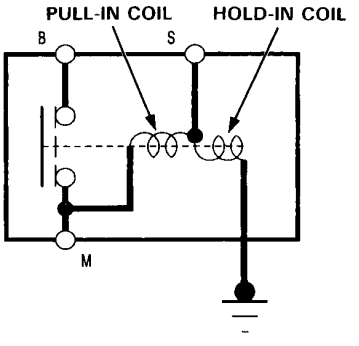
M/T (Nippondenso):



A/T (Mitsuba):



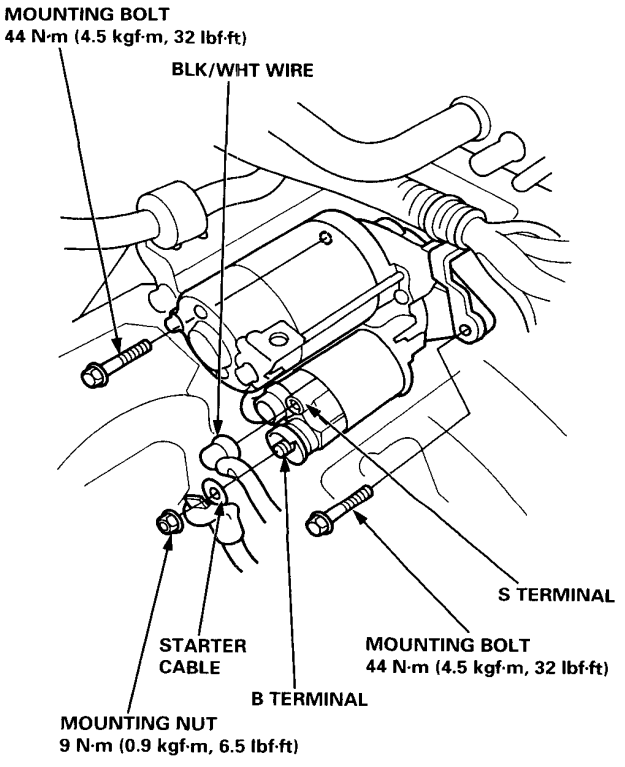
2. Check the pull-in coil for continuity between the S and M terminals. The coil is OK if there is continuity.



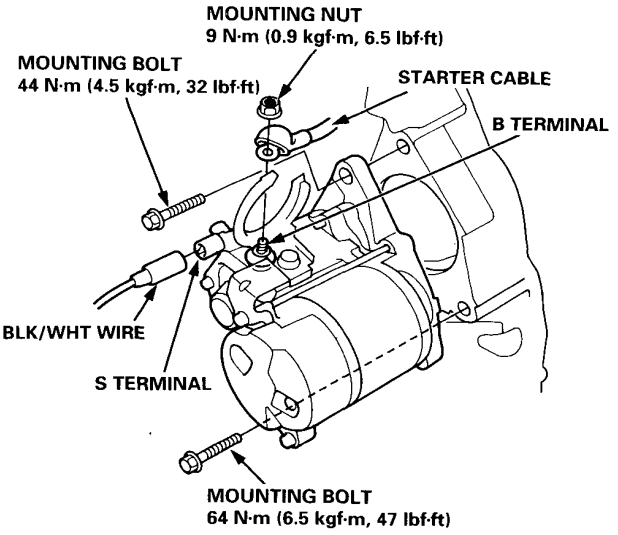
Starter Replacement

1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Remove the engine wire harness and radiator lower hose from the bracket on the starter motor.
3. Disconnect the starter cable from the B terminal on the solenoid, then the BLK/WHT wire from the S terminal.

A/T (Mitsuba):

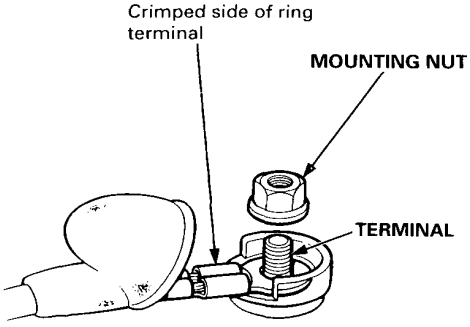


M/T (Nippondenso):



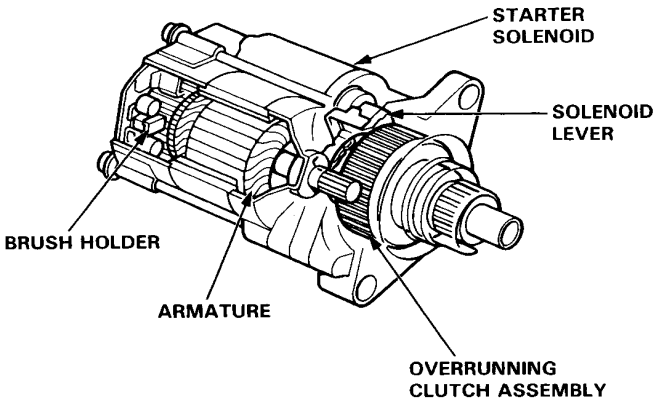
4. Remove the two bolts holding the starter, then remove the starter.
5. Install in the reverse order of removal.

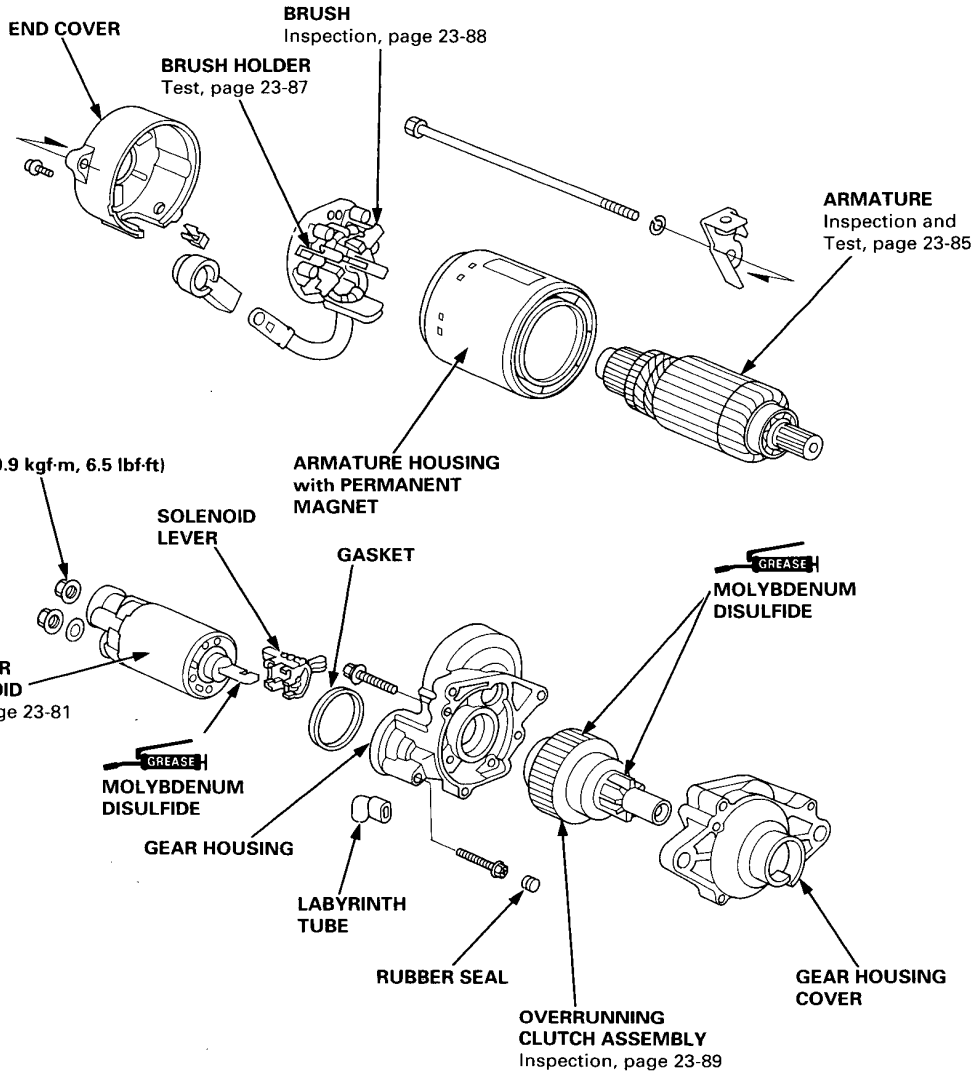
NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out.



Starter Overhaul (Mitsuba)

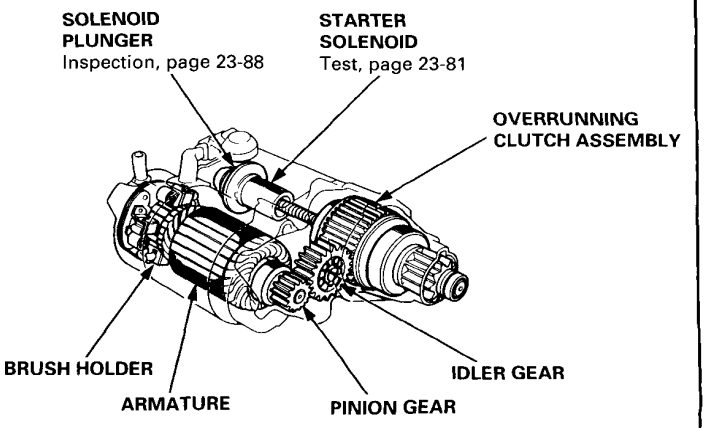
CAUTION: Before removing the starter, disconnect the negative cable from the battery.

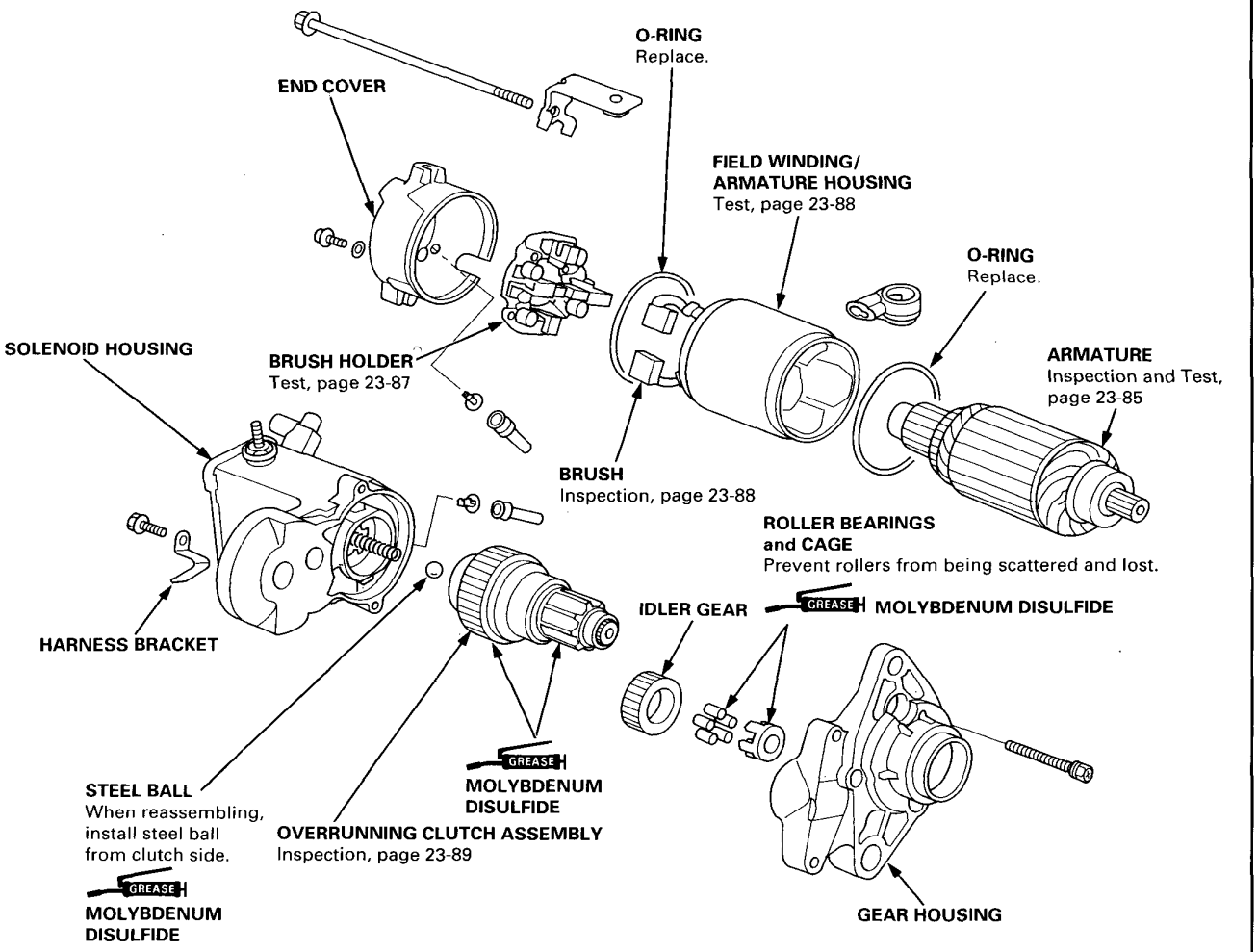




Starter Overhaul (Nippondenso)

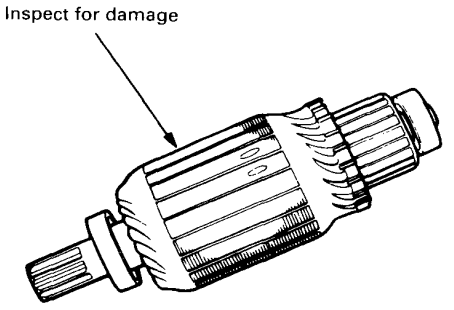
CAUTION: Disconnect the battery negative cable before removing the starter.





Armature Inspection and Test

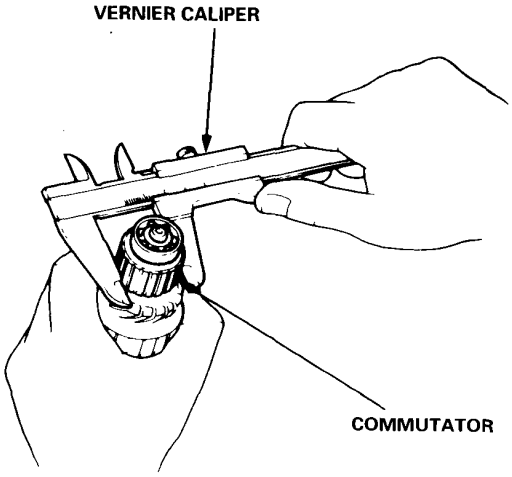
1. Inspect the armature for wear or damage due to contact with the field coil magnets.



2. A dirty or burnt commutator surface may be resurfaced with emery cloth or a lathe within the following specifications.

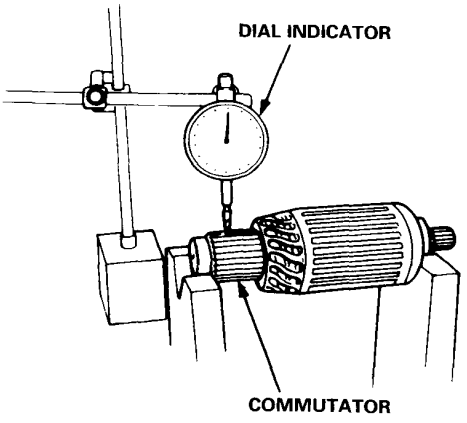
Commutator Diameter

	Standard (NEW)	Service Limit
Nippondenso (1.4 kW)	29.9 – 30.0 mm (1.177 – 1.181 in)	29.0 mm (1.14 in)
Mitsuba (1.4 kW) (1.6 kW)	28.0 – 28.1 mm (1.102 – 1.106 in)	27.5 mm (1.083 in)



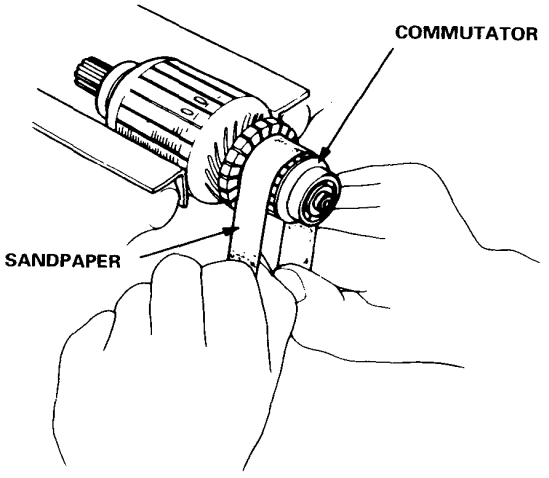
Commutator Runout

	Standard (NEW)	Service Limit
Nippondenso (1.4 kW)	0 – 0.02 mm (0 – 0.001 in)	0.05 mm (0.002 in)
Mitsuba (1.4 kW) (1.6 kW)		



3. If the commutator runout and diameter are within limits, check the commutator for damage or for carbon dust or brass chips between the segments.

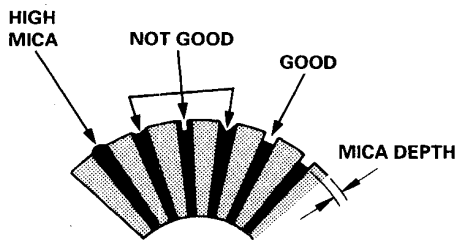
4. If the surface is dirty, recondition it with #500 or #600 sandpaper.



(cont'd)

Armature Inspection and Test (cont'd)

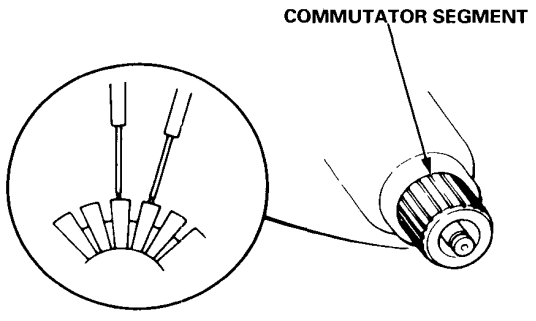
5. Check for mica depth. If necessary, undercut mica with a hacksaw blade to achieve proper depth.



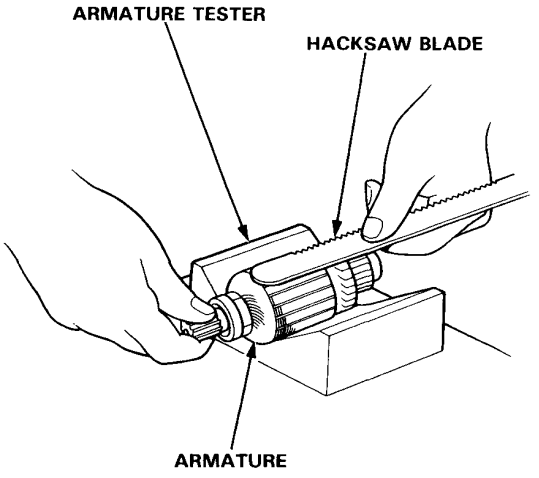
Commutator Mica Depth

	Standard (NEW)	Service Limit
Nippondenso (1.4 kW)	0.5 – 0.8 mm (0.02 – 0.03 in)	0.2 mm (0.008 in)
Mitsuba (1.4 kW) (1.6 kW)	0.4 – 0.5 mm (0.016 – 0.02 in)	0.15 mm (0.006 in)

6. Check for continuity between the segments of the commutator. If an open circuit exists between any segments, replace the armature.

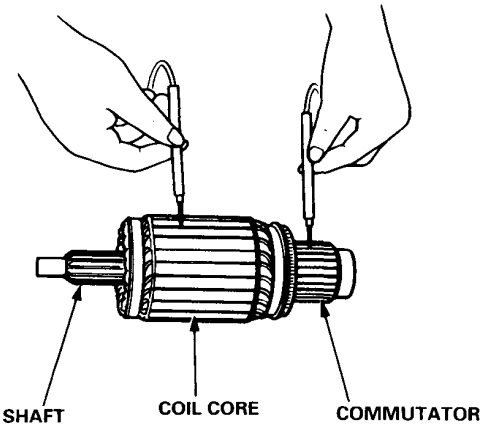


7. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.



If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.

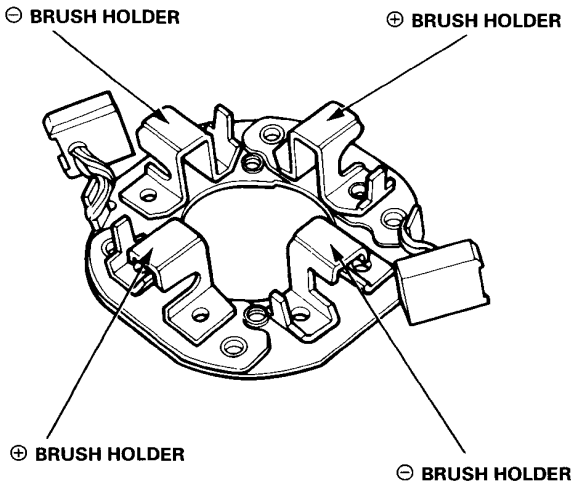
8. Check with an ohmmeter that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If continuity exists, replace the armature.



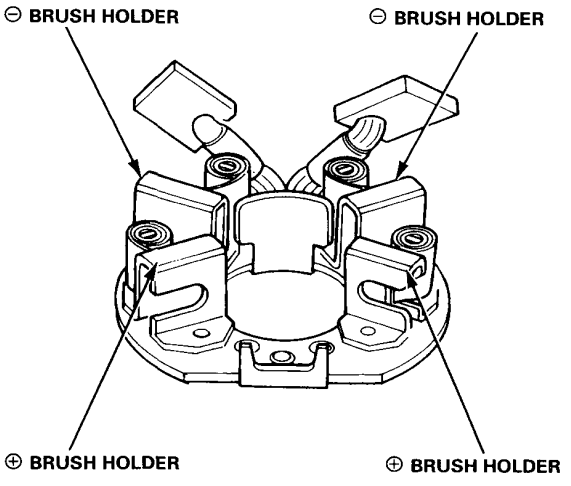
Starter Brush Holder Test

1. Check that there is no continuity between the ⊕ and ⊖ brush holders.
2. If continuity exists, replace the brush holder assembly.

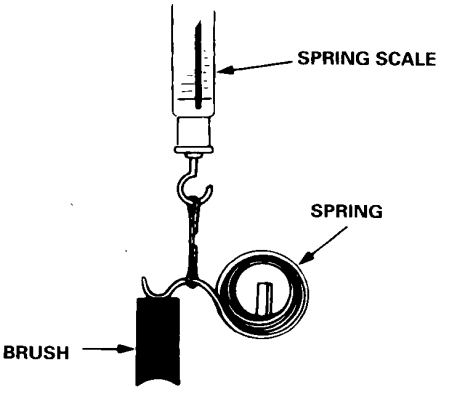
Nippondenso:



Mitsuba:



3. Insert the brush into the brush holder, and bring the brush into contact with the commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush. If it is out of spec, replace the brush holder assembly.



Spring Tension:

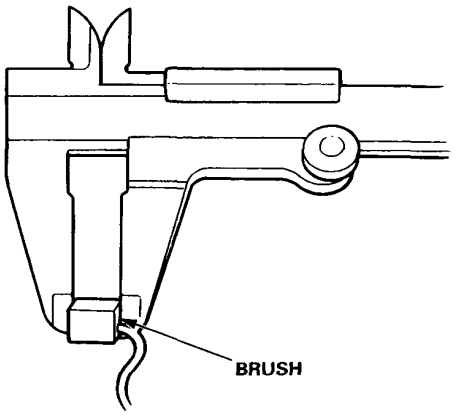
	Spring Tension
Nippondenso (1.4 kW)	18 – 24 N (1.8 – 2.4 kgf, 4.0 – 5.3 lbf)
Mitsuba (1.4 kW) (1.6 kW)	16 – 18 N (1.6 – 1.8 kgf, 3.5 – 4.0 lbf)

Starter Brush Inspection

Measure the brush length. If not within the service limit, replace the armature housing and brush holder assembly.

Brush Length

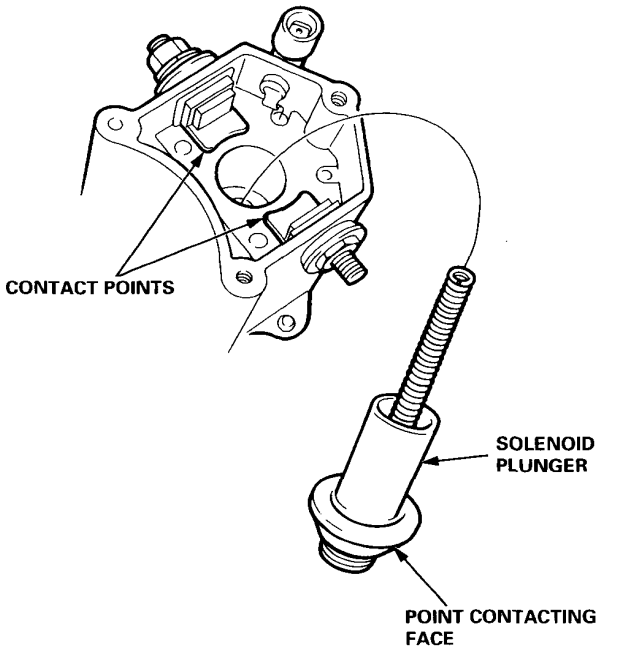
	Standard (NEW)	Service Limit
Nippondenso (1.4 kW)	15.0 – 15.5 mm (0.59 – 0.61 in)	10.0 mm (0.39 in)
Mitsuba (1.4 kW) (1.6 kW)	15.8 – 16.2 mm (0.62 – 0.64 in)	11.0 mm (0.43 in)



NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

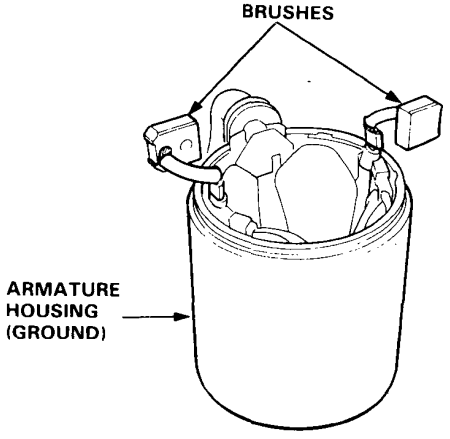
Solenoid Plunger Inspection (Nippondenso)

Check the contact points and the face of the starter solenoid plunger for burning, pitting or any other defects. If surfaces are rough, recondition them with a strip of #500 or #600 sandpaper.



Starter Field Winding Test (Nippondenso)

1. Check for continuity between the brushes. If there is no continuity, replace the armature housing.

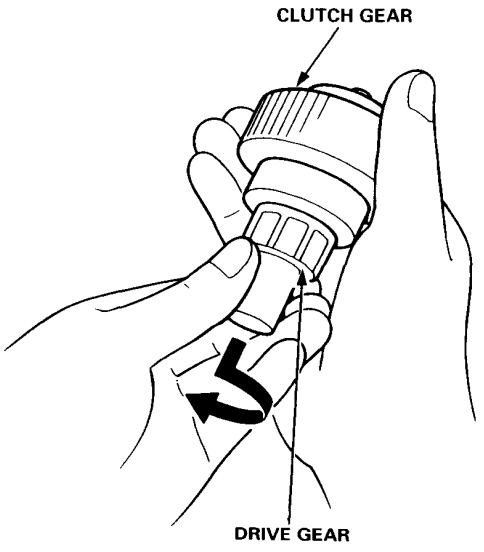


2. Check for continuity between each brush and the armature housing (ground).

   If continuity exists, replace the armature housing.

Overrunning Clutch Inspection

1. Slide the overrunning clutch along the shaft. Does it move freely? If not, replace it.
2. Rotate the overrunning clutch both ways. Does it lock in one direction and rotate smoothly in reverse? If it does not lock in either direction or it locks in both directions, replace it.

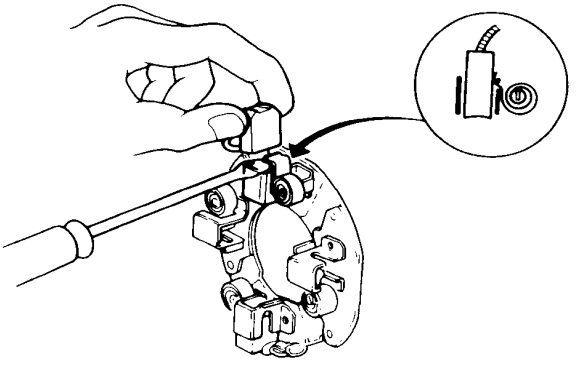


3. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.
4. Check the condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

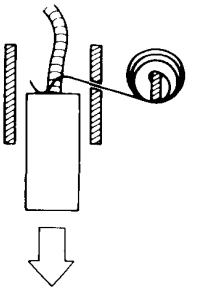
Starter Reassembly

Reassemble the starter in the reverse order of disassembly.

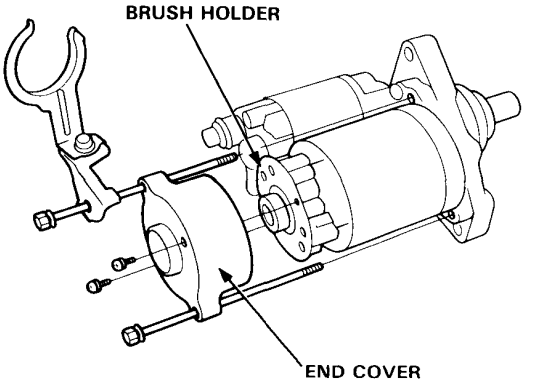
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next, pry back each brush spring again, and push the brush down until it seats against the commutator, then release the spring against the end of the brush.



3. Install the end cover on the brush holder.



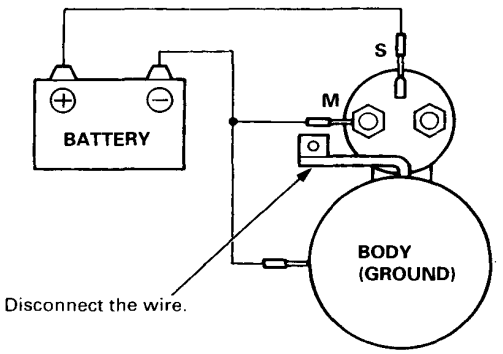
Performance Test

NOTE: Before starting the following checks, disconnect the wire from terminal M, and make a connection as described below using as heavy a wire as possible (preferably equivalent to the wire used for the car).

Pull-in Coil Test:

Connect the battery as shown. If the starter pinion pops out, it is working properly.

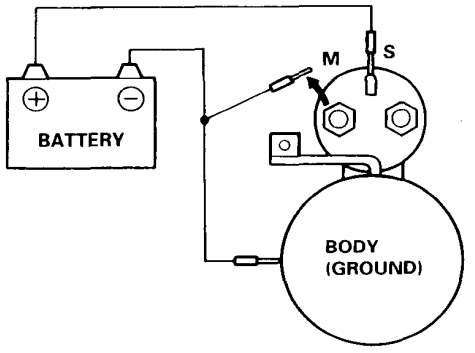
CAUTION: Do not leave the battery connected for more than 10 seconds.



Hold-in Coil Test:

Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil is working properly.

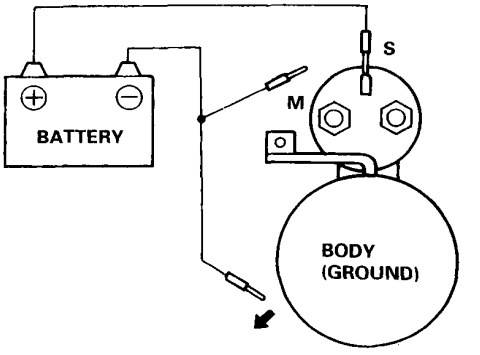
CAUTION: Do not leave the battery connected for more than 10 seconds.



Retracting Test:

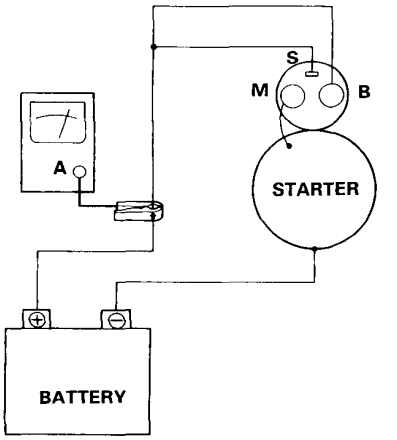
Disconnect the battery also from the body. If the pinion retracts immediately, it is working properly.

CAUTION: Do not leave the battery connected for more than 10 seconds.



Starter No-load Test:

1. Clamp the starter firmly in a vise.
2. Connect the starter to the battery as described in the diagram below, and confirm that the motor starts and keeps rotating.



3. If the electric current and motor speed meet the specifications when the battery voltage is at 11 V, the starter is working properly.

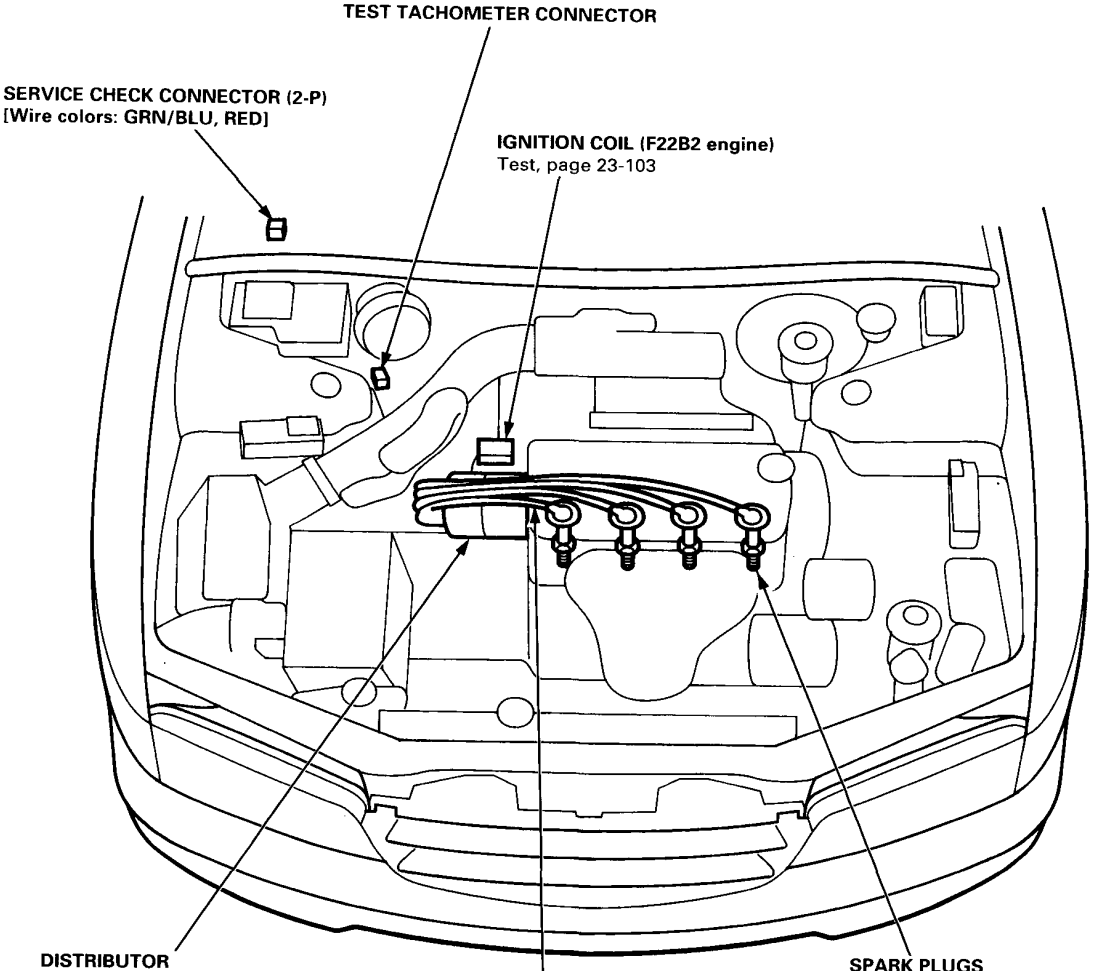
Specifications:

Mitsuba (1.4 kW) (1.6 kW)	80 A or less (Electric current), 2600 rpm or more (Motor- speed)
Nippondenso (1.4 kW)	90 A or less (Electric current), 3000 rpm or more (Motor-speed)

Component Location Index

IGNITION TIMING CONTROL SYSTEM
- Description, page 23-92
- Troubleshooting, section 11
- Inspection and Setting, page 23-95

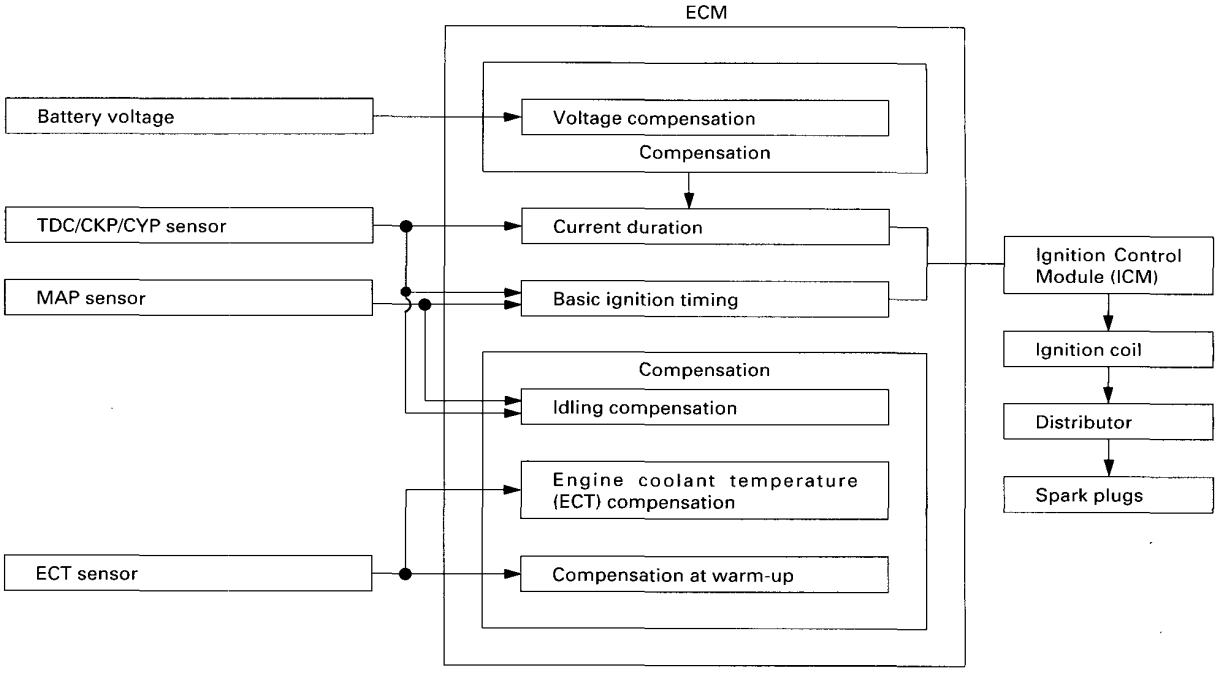
NOTE: LHD type is shown.



Ignition System

Description

Ignition Timing Control:
The programmed ignition (PGM-IG) used in this engine provides optimum control of ignition timing. A microcomputer determines the timing in response to engine speed and manifold vacuum. The input signals are transmitted by the TDC/CKP/CYP sensor, throttle position (TP) sensor, engine coolant temperature (ECT) sensor, and MAP sensor. This system, which is not dependent on a governor or vacuum diaphragm, is capable of setting lead angles with complicated characteristics which cannot be provided by conventional governors or diaphragms.



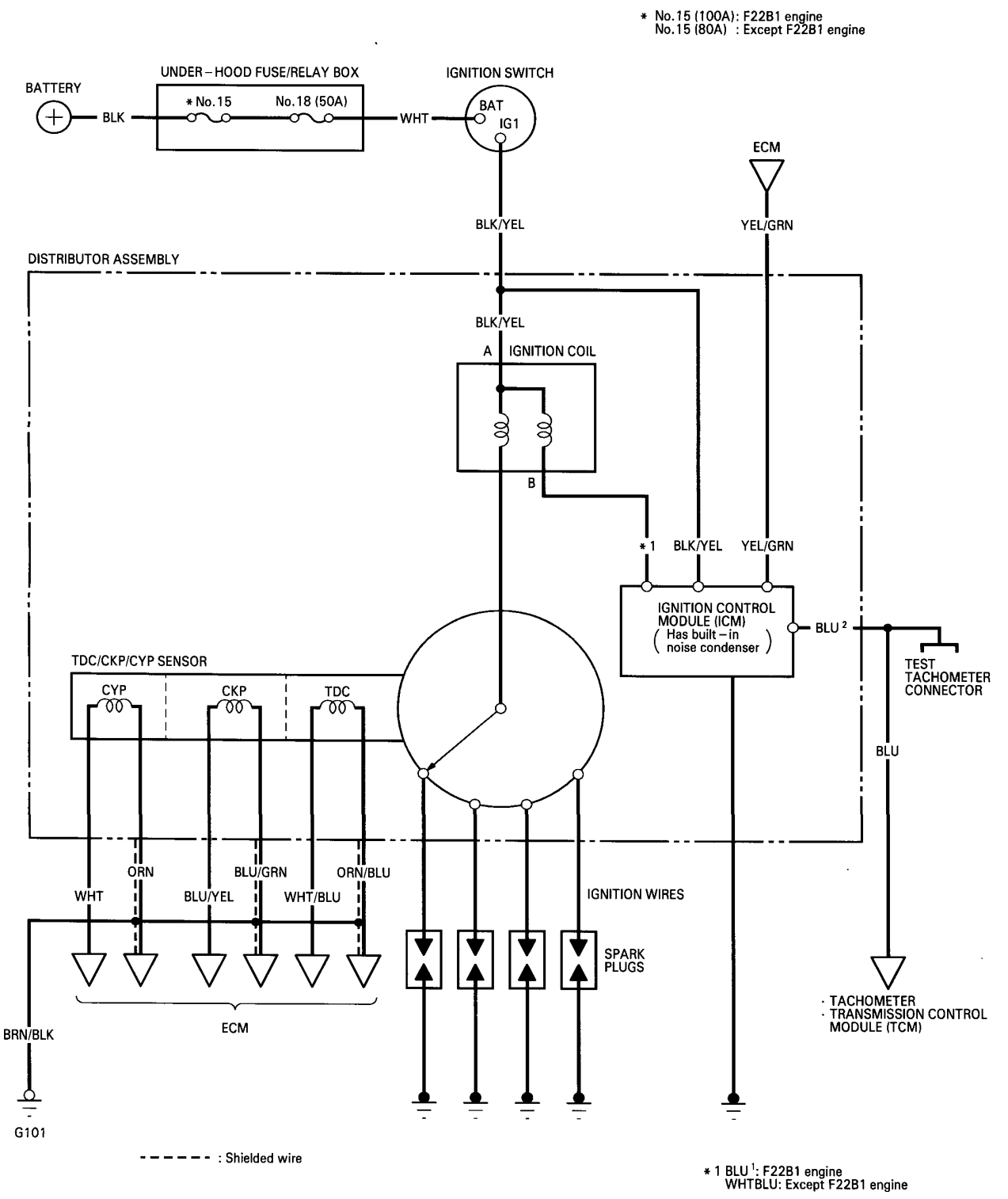
Basic Control:
The control unit has stored within it the optimum basic ignition timing for operating conditions based upon engine speed and intake manifold pressure. With compensating signals from sensors, the system determines optimum ignition timing and duration for ambient conditions and sends voltage pulses to the ICM.

Compensation of ignition timing:

Compensation Item	Related Sensor and Information	Description
Idling	TDC/CKP/CYP sensor MAP sensor TH sensor	Ignition timing is controlled to the target speed with compensation according to the idling speed.
Compensation at warm-up	ECT sensor IAT sensor	Lag angle is adjusted according to warm-up conditions to bring about a good balance between operating performance and exhaust gas level.
ECT compensation	ECT sensor	Compensation for lead angle at low engine coolant temperature and lag angle at high engine coolant temperature.

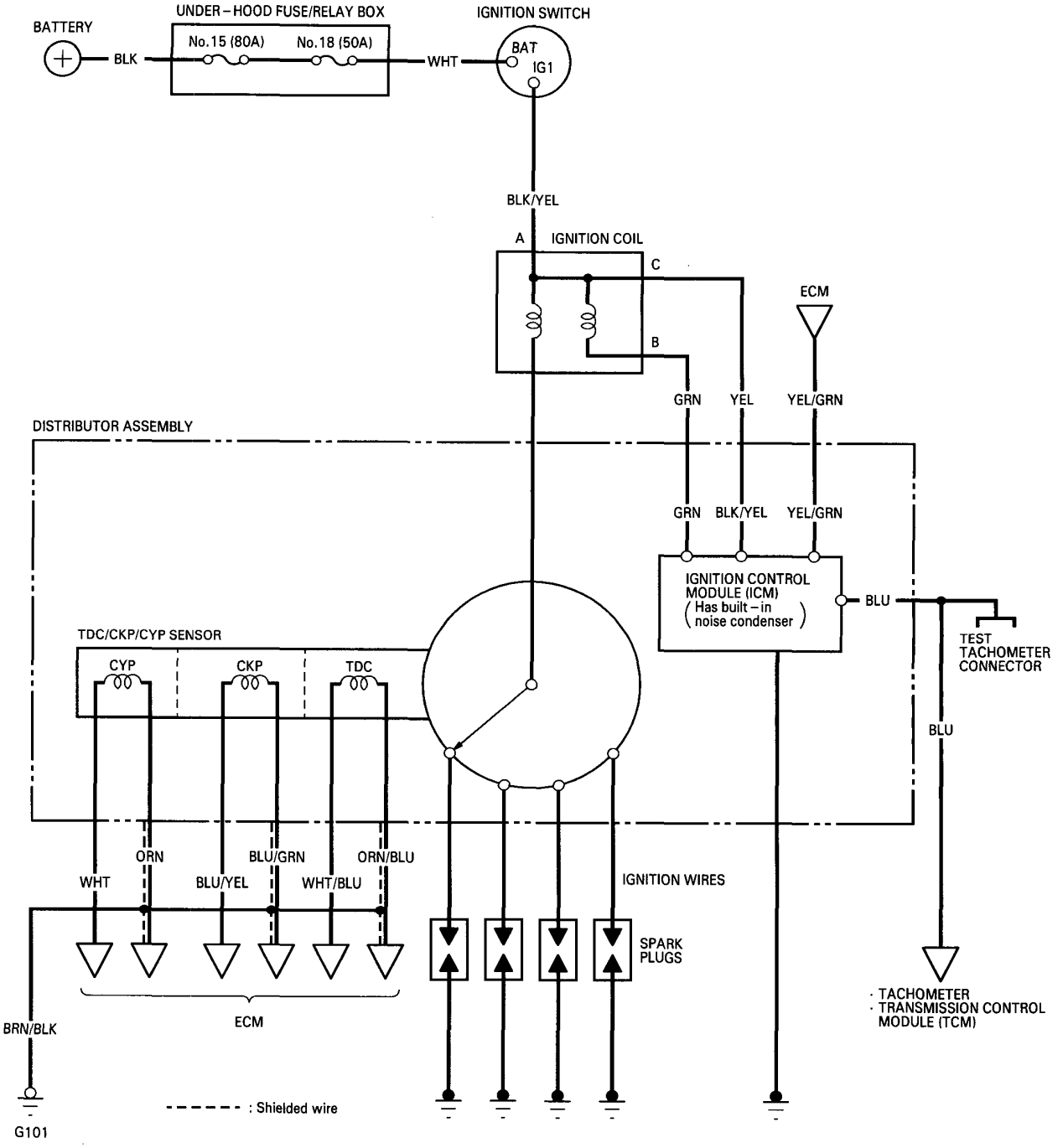
Control at Start:
Ignition timing is fixed at 8° BTDC for cranking. The cranking is detected by the CKP sensor (cranking rpm) and starter signal.

Circuit Diagram (Except F22B2 engine)



Ignition System

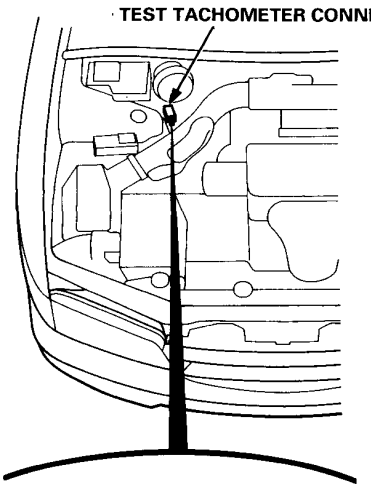
Circuit Diagram (F22B2 engine)

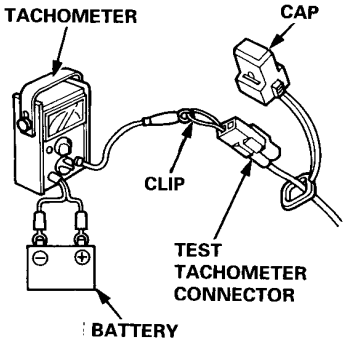


Idle Speed Inspection

1. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.

2. Connect a tachometer to the test tachometer connector.





Idle speed:
F22B1 engine
F22B2 engine

M/T	700 ± 50 rpm (min^{-1}) in neutral
A/T	700 ± 50 rpm (min^{-1}) in [N] or [P] position

F22B5 engine
F20B3 engine

M/T	770 ± 50 rpm (min^{-1}) in neutral
A/T	770 ± 50 rpm (min^{-1}) in [N] or [P] position

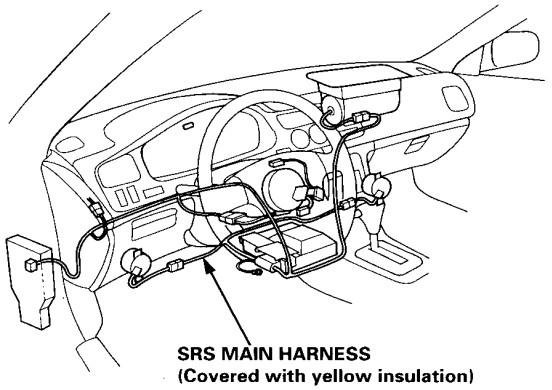
NOTE: All electrical systems should be turned OFF.

3. Adjust the idle speed if necessary (see section 11).

Ignition Timing Inspection and Setting

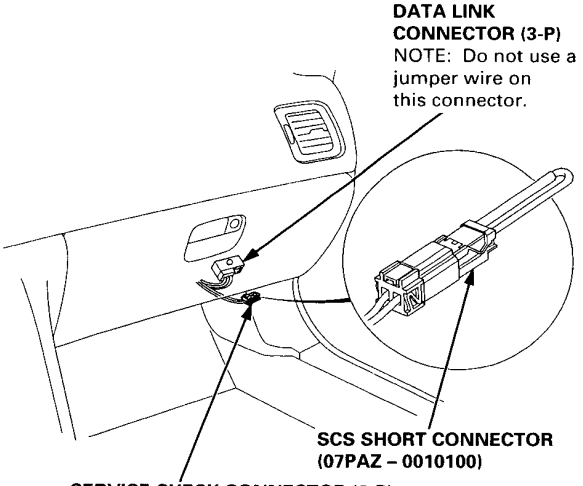
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connector(s).**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.



1. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.

2. Pull out the service check connector located behind the glove box. Connect the GRN/BLU and RED terminals with the SCS short connector.



NOTE: LHD type is shown, RHD type is symmetrical.

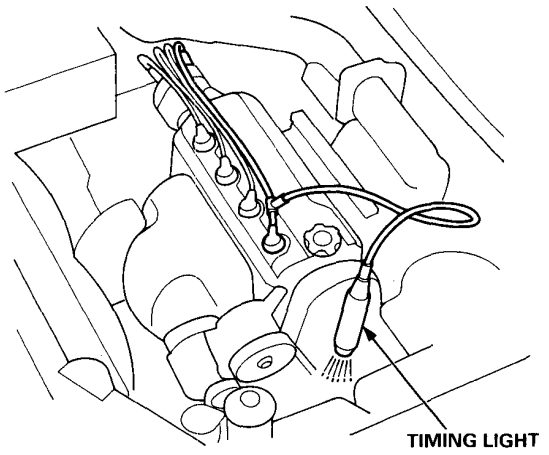
(cont'd)

Ignition Timing Inspection and Setting (cont'd)

3. Check the idle speed (see page 23-95).

4. Connect a timing light to the No. 1 ignition wire.

   - Point the light toward the pointer on the timing belt cover.



5. Adjust ignition timing, if necessary, to the following specifications:

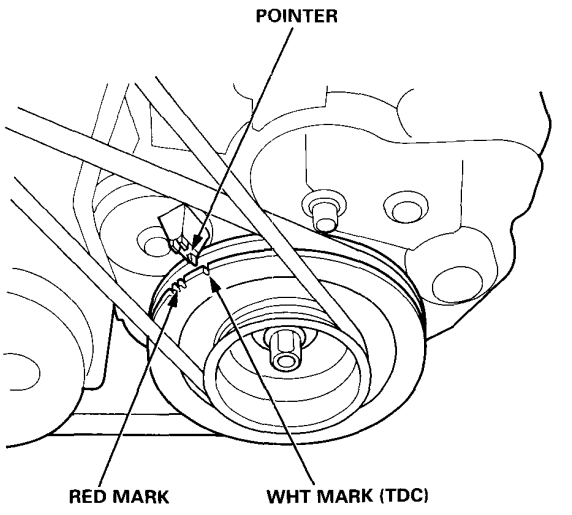
Ignition Timing:
F22B1 engine
F22B2 engine

M/T	15° ± 2° BTDC (RED) at 700 ± 50 rpm (min^{-1}) in neutral
A/T	15° ± 2° BTDC (RED) at 700 ± 50 rpm (min^{-1}) in N or P position

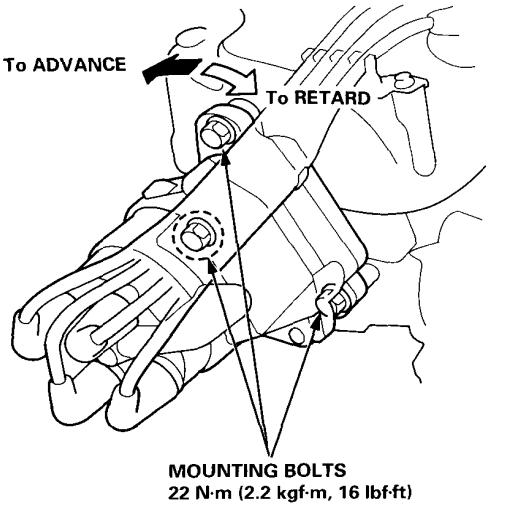
F22B5 engine
F20B3 engine

M/T	15° ± 2° BTDC (RED) at 770 ± 50 rpm (min^{-1}) in neutral
A/T	15° ± 2° BTDC (RED) at 770 ± 50 rpm (min^{-1}) in N or P position

NOTE:
- Shift lever must be in neutral.
- All electrical systems should be turned OFF.



6. To adjust ignition timing, loosen the distributor mounting bolts, and turn the distributor housing counterclockwise to advance the timing, or clockwise to retard the timing.



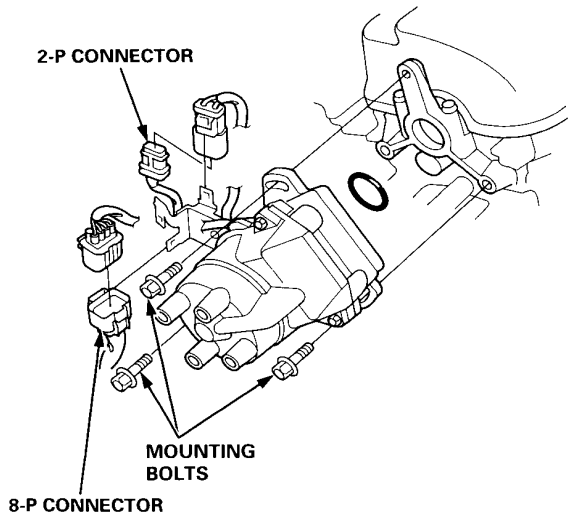
7. Tighten the adjusting bolts, and recheck the timing.

8. Remove the SCS short connector from the service check connector.

Distributor Removal

NOTE: Before you remove the distributor, bring the No. 1 piston to compression stroke TDC (see section 6).

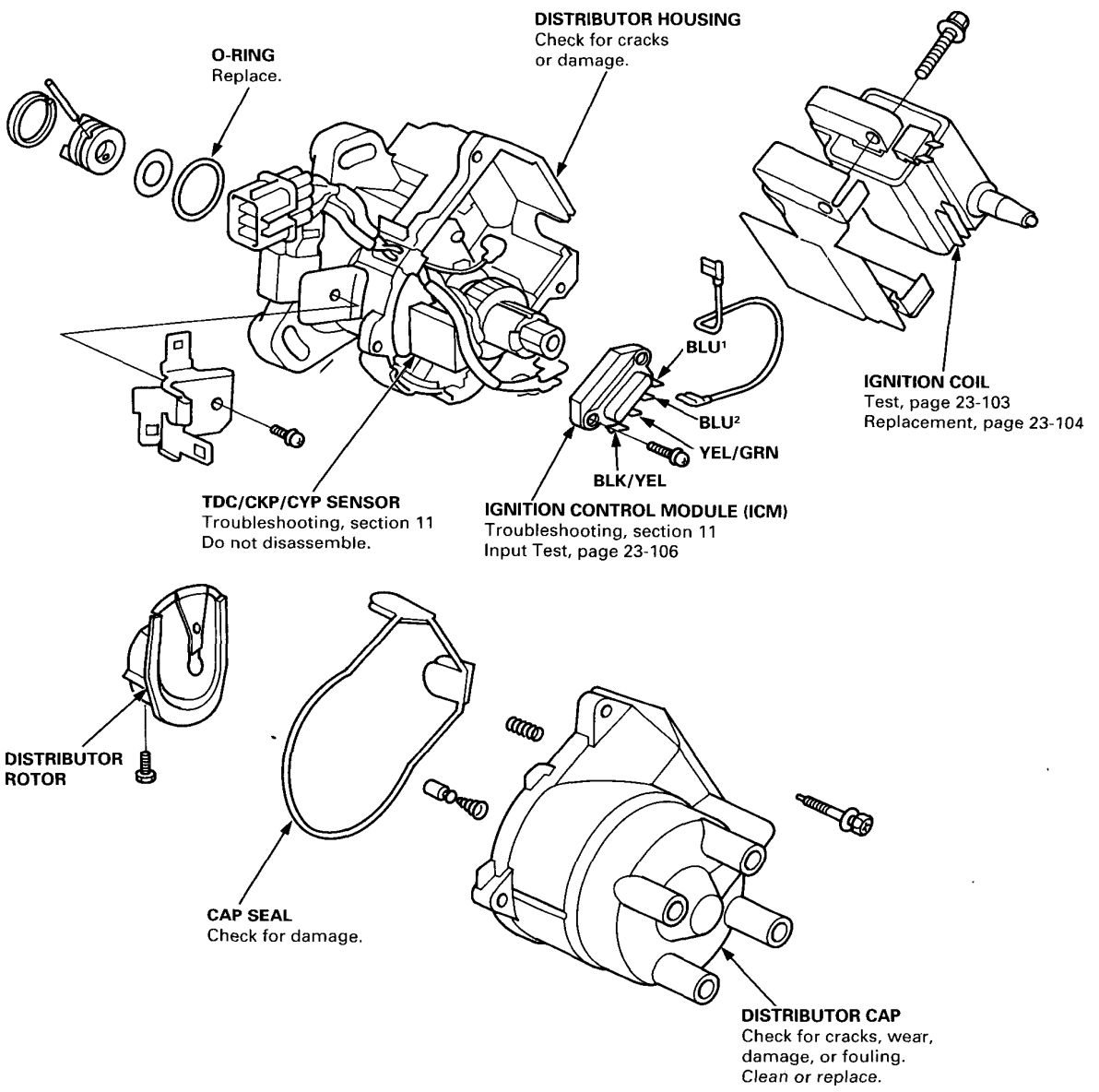
1. Disconnect the 2-P and 8-P connectors from the distributor.



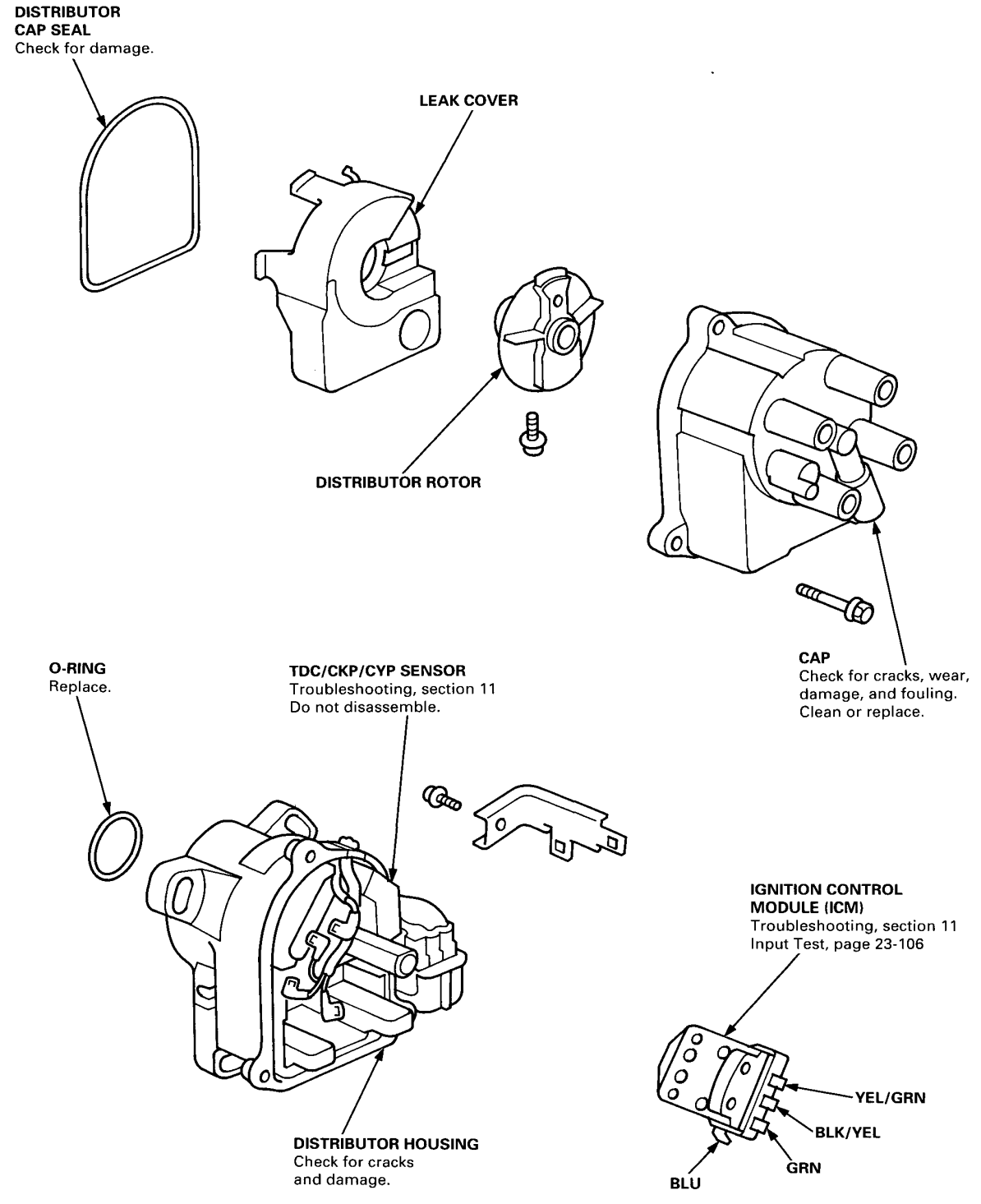
2. Disconnect the ignition wires from the distributor cap.

3. Remove the distributor mounting bolts, then remove the distributor from the cylinder head.

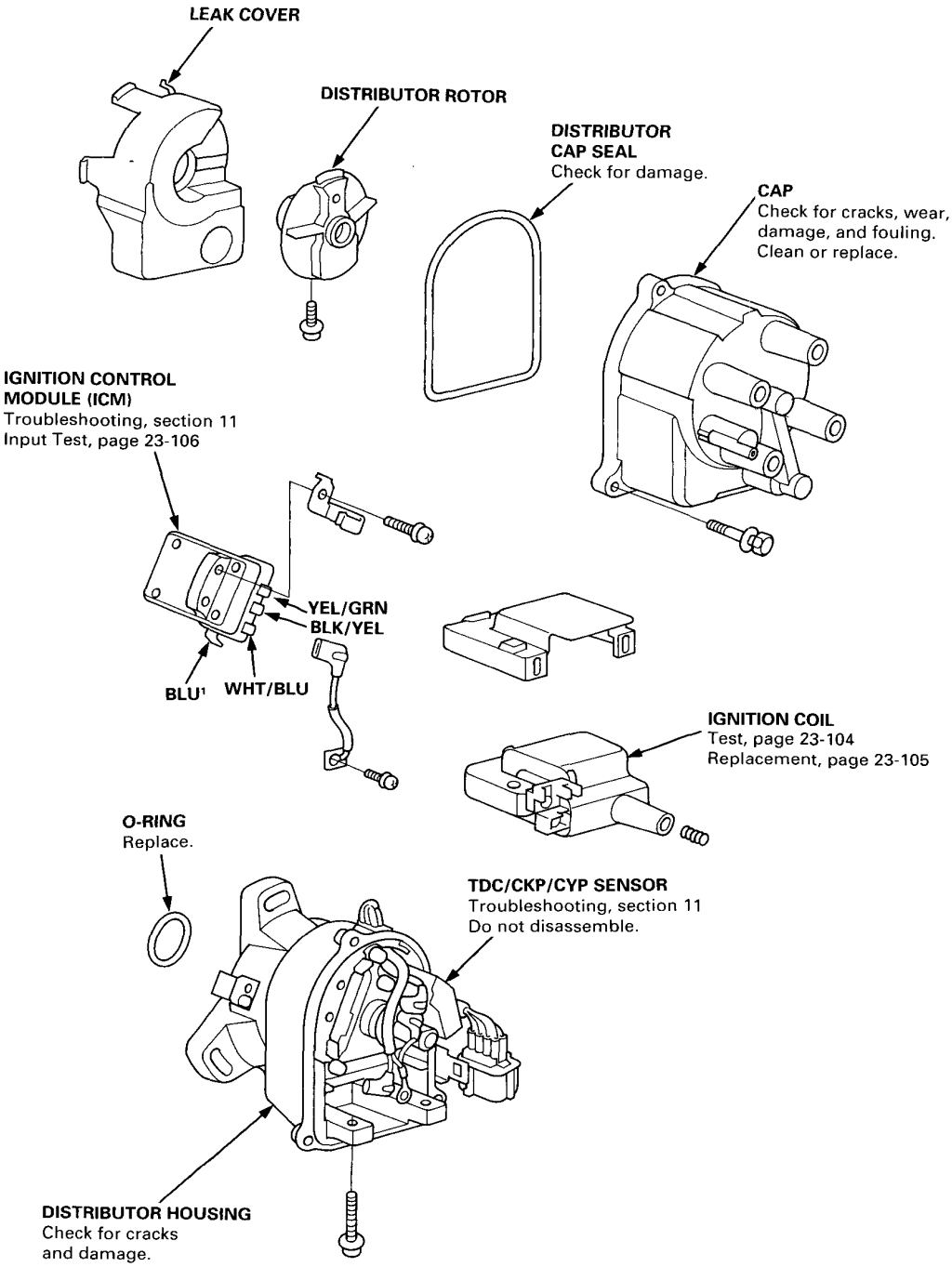
Distributor Overhaul (F22B1 engine)



Distributor Overhaul (F22B2 engine)



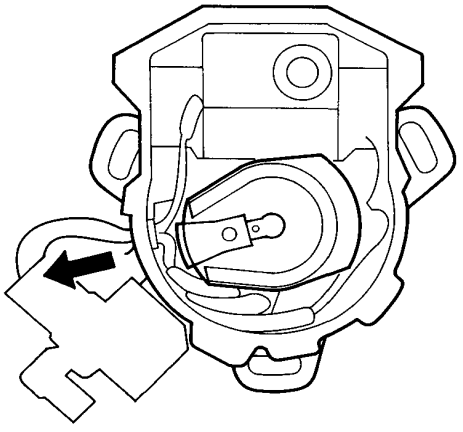
Distributor Overhaul (Except F22B1/F22B2 engine)

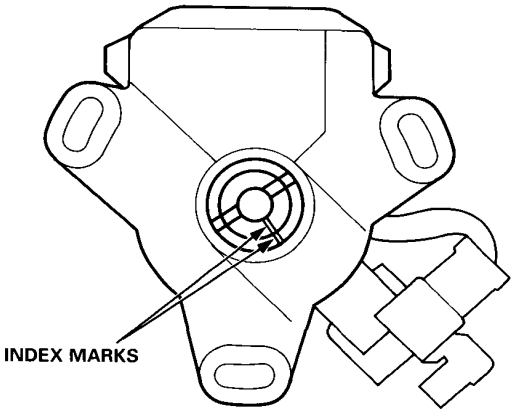


Distributor Reassembly

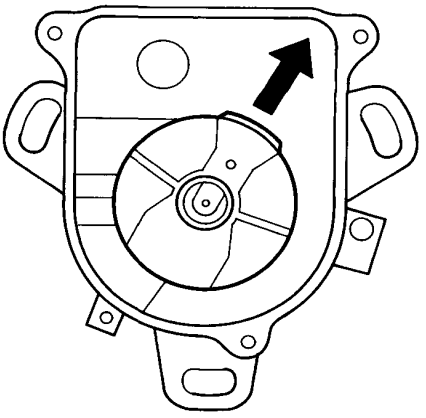
1. When reassembling the distributor, install the distributor rotor so that it faces in the direction shown (toward the No. 1 cylinder).
2. Align the index mark on the distributor housing with the index mark on the end of the shaft.

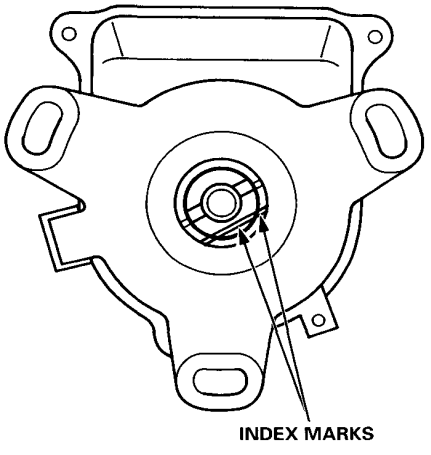
F22B1 engine:





Except F22B1 engine:



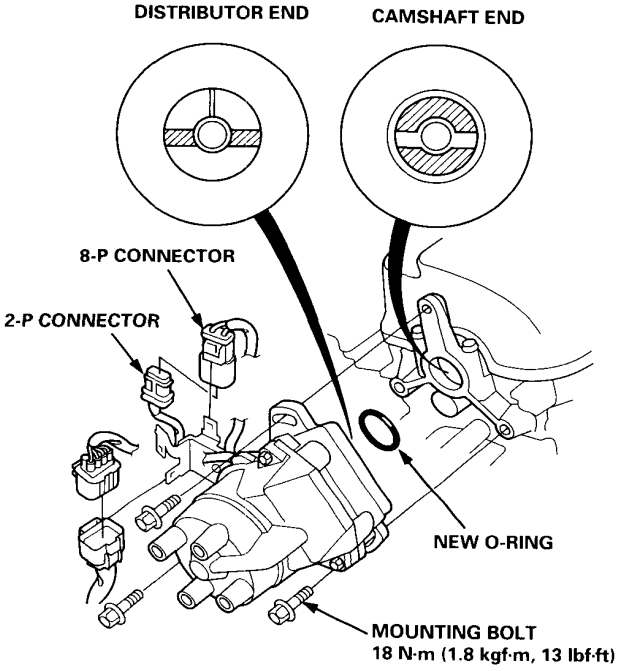


Distributor Installation

NOTE: Before you install the distributor, bring the No. 1 piston to compression stroke TDC (see section 6).

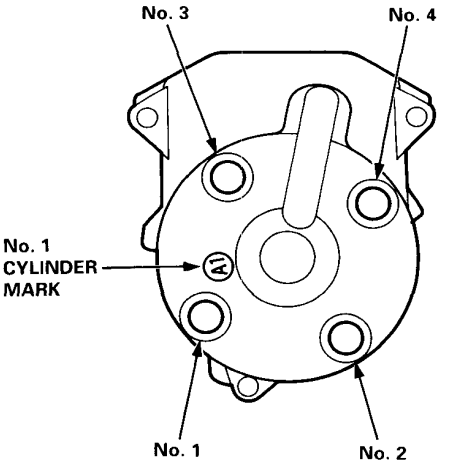
1. Coat a new O-ring with engine oil, then install it.
2. Slip the distributor into position.

   NOTE: The lugs on the end of the distributor and their mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.

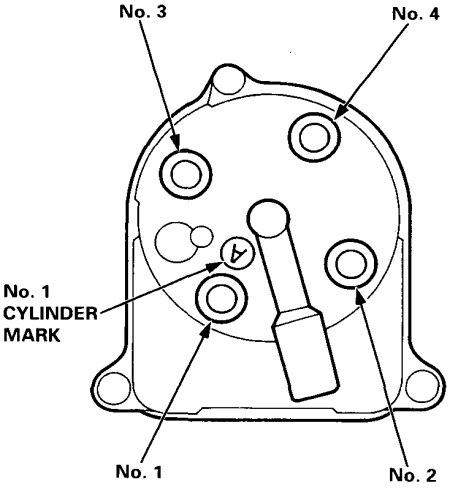


3. Install the mounting bolts, and tighten them lightly.
4. Connect the 2-P and 8-P connectors to the distributor.
5. Connect the ignition wires as shown.

F22B1 engine:



Except F22B1 engine:



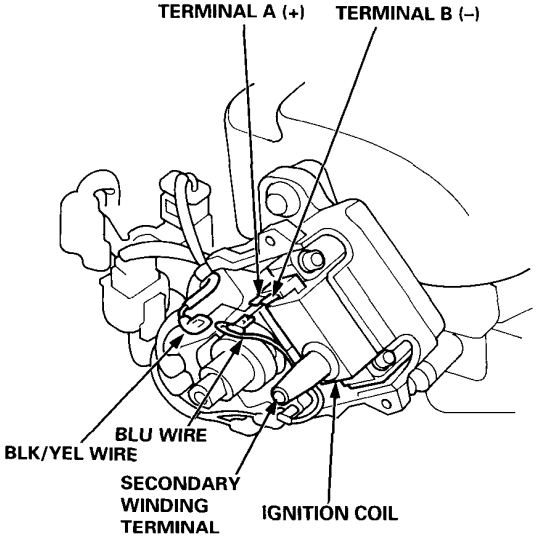
6. Set the timing with a timing light (see page 23-95).
7. After setting the timing, tighten the mounting bolts.

Ignition Coil Test

F22B1 engine:

1. Turn the ignition switch OFF, and remove the distributor cap.

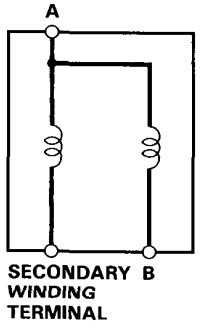
2. Remove the BLK/YEL and BLU wires from terminals A (+) and B (–) respectively.



3. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specifications.

   NOTE: Resistance will vary with the coil temperature; specifications are at 20°C (68°F)

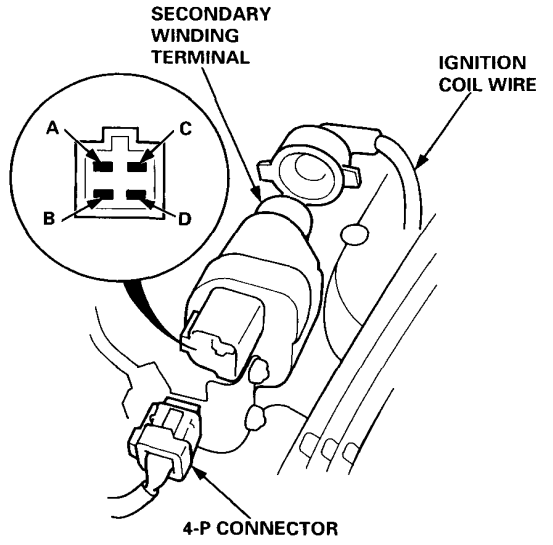
   Primary Winding Resistance
   (Between the A and B terminals):
   0.4 – 0.6 Ω
   Secondary Winding Resistance
   (Between the A and secondary winding terminals):
   22 – 34 kΩ



F22B2 engine:

1. Turn the ignition switch OFF.

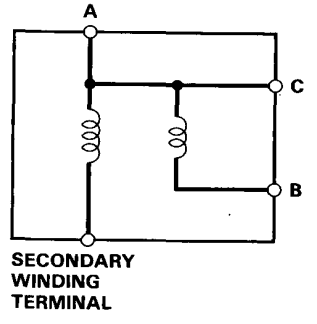
2. Disconnect the 4-P connector and ignition coil wire.



3. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specifications.

   NOTE: Resistance will vary with the coil temperature; specifications are at 20°C (68°F)

   Primary Winding Resistance
   (Between the A and B terminals):
   0.6 – 0.8 Ω
   Secondary Winding Resistance
   (Between the A and secondary winding terminals):
   14 – 22 kΩ



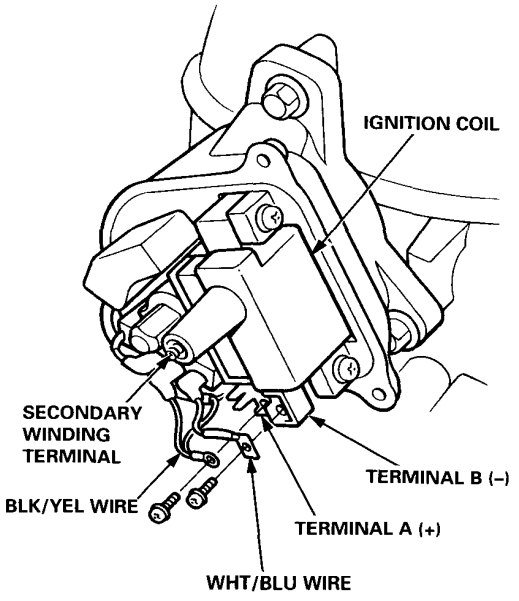
4. Check for continuity between the A and C terminals. Replace the coil if there is no continuity.

(cont'd)

Ignition Coil Test (cont'd)

Except F22B1/F22B2 engine:

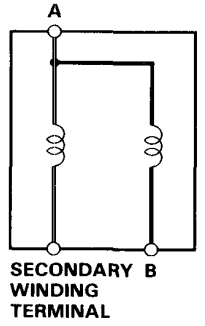
1. Turn the ignition switch OFF, and remove the distributor cap.
2. Disconnect the BLK/YEL and WHT/BLU wires from the terminals by removing the two screws.



3. Using an ohmmeter, measure resistance between the terminals. If the resistance is not within specifications, replace the coil.

   NOTE: Resistance will vary with coil temperature; specifications are at 20°C (68°F).

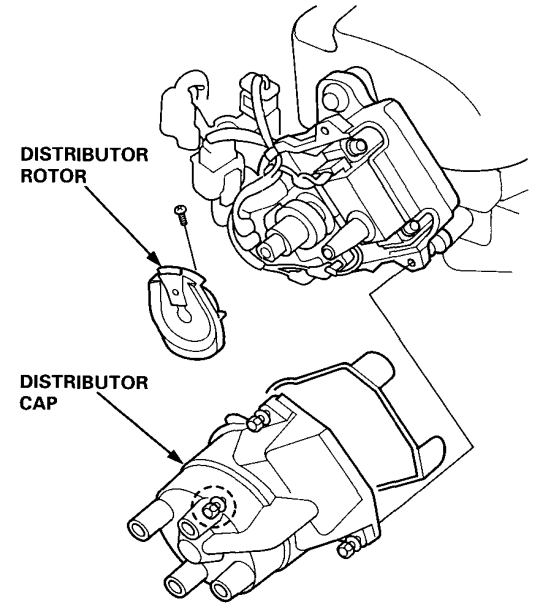
   Primary Winding Resistance (Between the A and B terminals): 0.6 – 0.8 Ω
   Secondary Winding Resistance (Between the A and secondary winding terminals): 13 – 19 kΩ



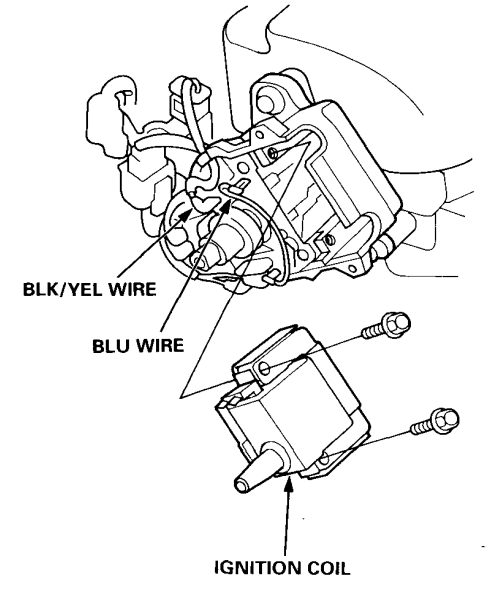
Ignition Coil Replacement

F22B1 engine:

1. With the ignition switch OFF, remove the distributor cap and distributor rotor.

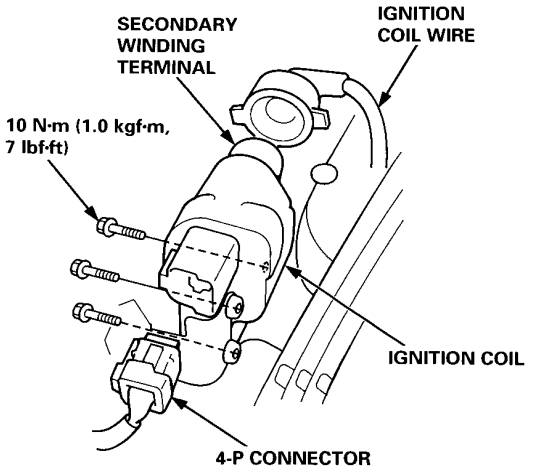


2. Disconnect the BLK/YEL and BLU wires from the coil.
3. Remove the two screws, and slide the ignition coil out of the distributor housing.



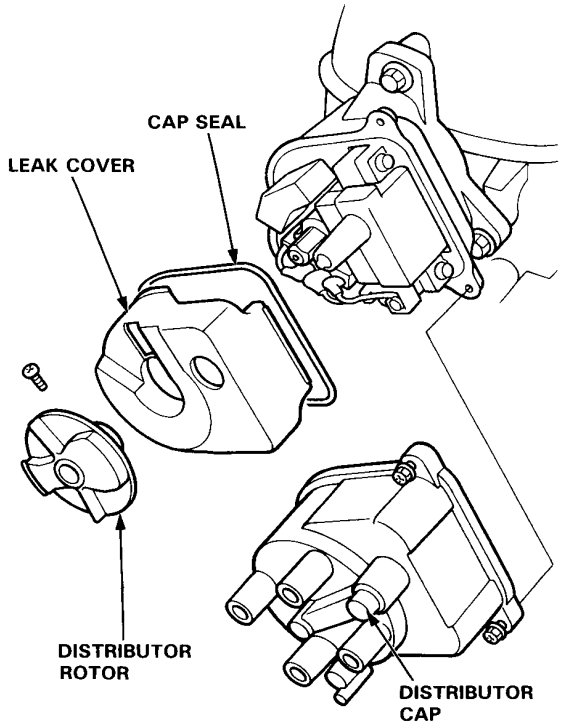
F22B2 engine:

1. Turn the ignition switch OFF.
2. Disconnect the 4-P connector and ignition coil wire.
3. Remove the three 6 mm bolts.

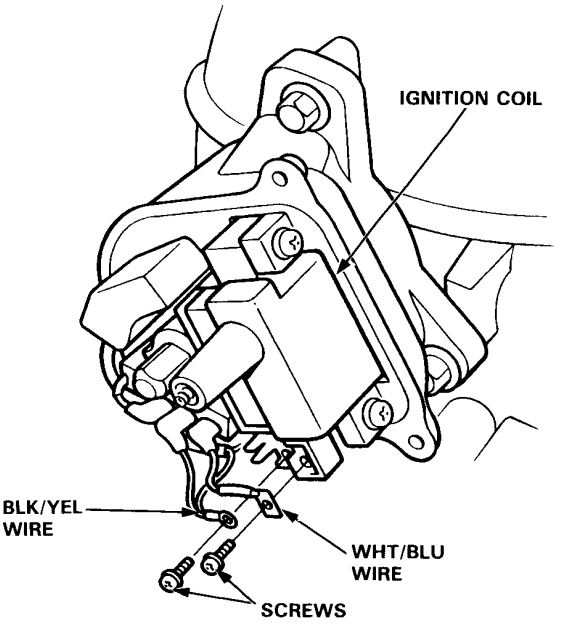


Except F22B1/F22B2 engine:

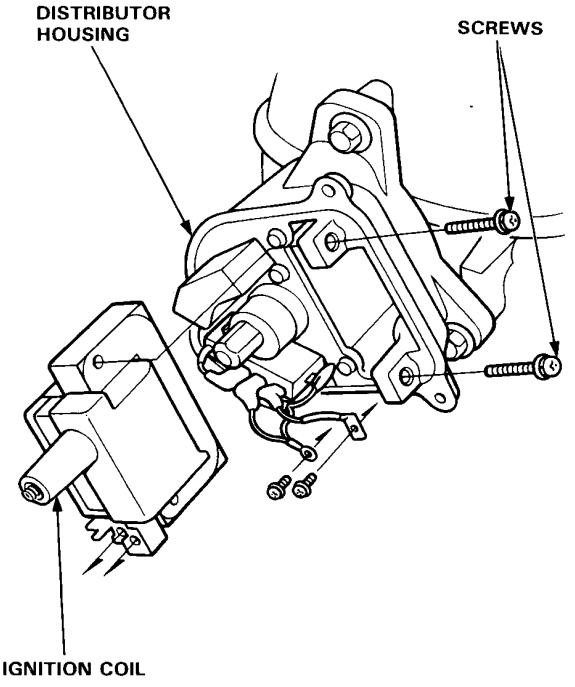
1. Turn the ignition switch OFF, remove the distributor cap, distributor rotor, and cap seal, then remove the leak cover.



2. Disconnect the BLK/YEL and WHT/BLU wire from the terminals by removing the two screws.



3. Remove the two screws, and slide the ignition coil out of the distributor housing.



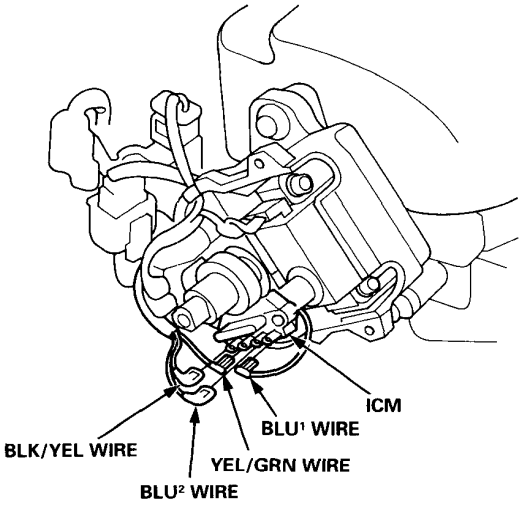
Ignition Control Module (ICM) Input Test

NOTE:
- See section 11 when the malfunction indicator lamp (MIL) turned on.
- Perform an input test for the ignition control module (ICM) after finishing the fundamental tests for the ignition system and the fuel and emissions systems.
- The tachometer should operate normally if the ICM is OK.

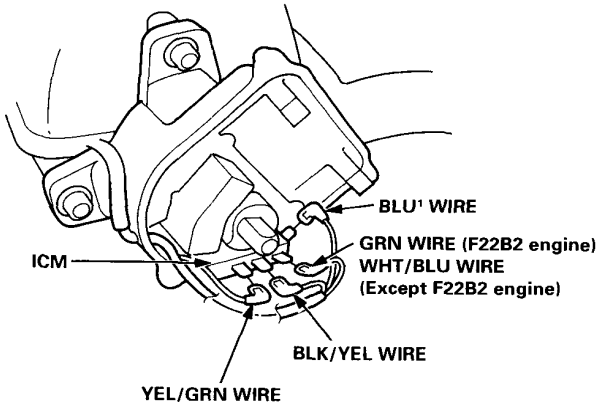
1. Remove the distributor cap, the distributor rotor, and the leak cover.

2. Disconnect the wires from the ICM.

F22B1 engine:



Except F22B1 engine:



3. Turn the ignition switch ON (II). Check for voltage between the BLK/YEL wire and body ground. There should be battery voltage.

   - If there is no battery voltage, check the BLK/YEL wire between the ignition switch and the ICM.
   - If there is battery voltage, go to step 4.

4. Turn the ignition switch ON (II). Check for voltage between the *1 wire and body ground. There should be battery voltage.

   - If there is no battery voltage, check:
     — Ignition coil
     — *1 wire between the ignition coil and the ICM
   - If there is battery voltage, go to step 5.

5. Check the YEL/GRN wire between the ECM and the ICM.

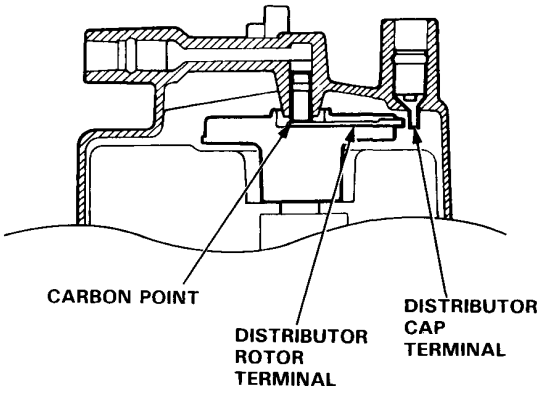
6. Check the BLU² wire between the tachometer and the ICM.

7. If all tests are normal, replace the ICM.

*1: BLU¹ wire (F22B1 engine)
GRN wire (F22B2 engine)
WHT/BLU wire (Except F22B1, F22B2 engine)

Distributor Top End Inspection

1. Check for rough or pitted rotor and cap terminals.
2. Scrape or file off the carbon deposits. Smooth the rotor terminal with an oil stone or #600 sandpaper if rough.

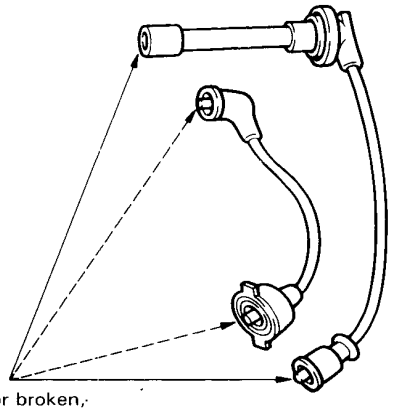


3. Check the distributor cap for cracks, wear and damage. If necessary, clean or replace it.

Ignition Wire Inspection and Test

CAUTION: Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wires; you might break them inside.

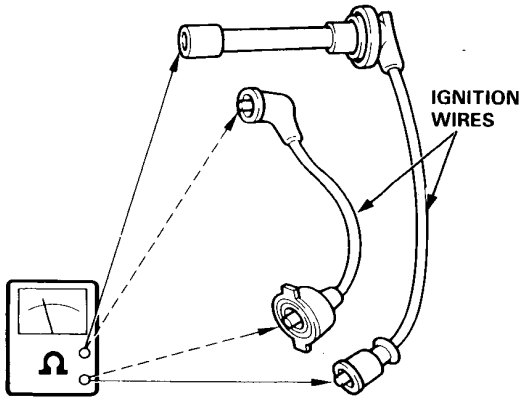
1. Check the condition of the wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the wire.



Check for broken, corroded, or bent terminals.

2. Connect ohmmeter probes and measure resistance.

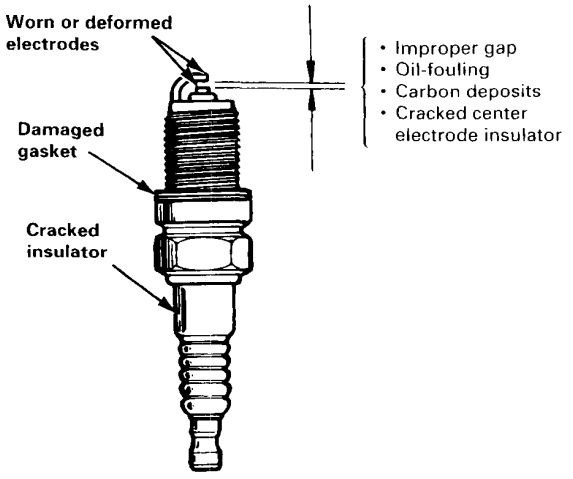
Ignition Wire Resistance:
25 kΩ max. at 20°C (68°F)



3. If resistance exceeds 25 kΩ, replace the ignition wire.

Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



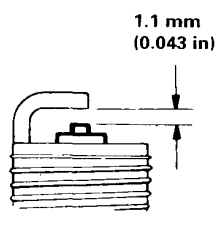
Burned or worn electrodes may be caused by:
- Advanced ignition timing
- Loose spark plug
- Plug heat range too low
- Insufficient cooling

Fouled plug may be caused by:
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too high
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires

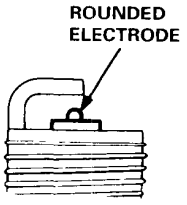
2. Check the electrode gap.
   - Adjust the gap with a suitable gapping tool.

Electrode Gap

Standard	1.1 $^{+0}_{-0.1}$ mm (0.043 $^{+0}_{-0.004}$ in)



- Replace the plug if the center electrode is rounded as shown below:



NOTE: Use only the spark plugs listed below.

Spark Plugs
- **F22B1 engine**
- **F22B2 engine**

ZFR5F-11 (NGK) KJ16CR-L11 (Nippondenso)	For all normal driving
ZFR6F-11 (NGK) KJ20CR-L11 (Nippondenso)	For hot climates or continuous high speed driving

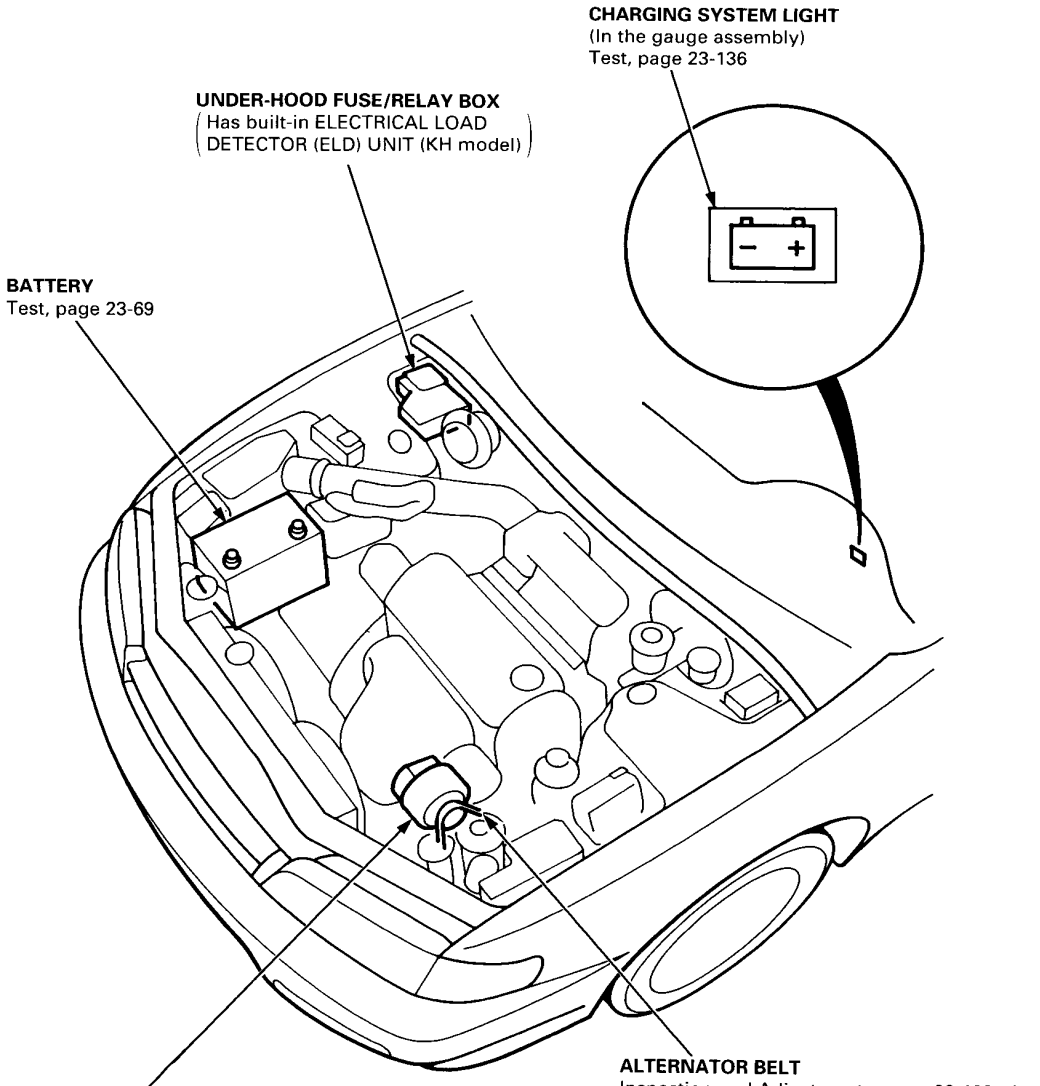
- **F20B3 engine**
- **F22B5 engine**

ZFR6F-11 (NGK) KJ20CR-L11 (Nippondenso)	For all normal driving
ZFR5F-11 (NGK) KJ16CR-L11 (Nippondenso)	For cold climates (Except F22B5 engine)
ZFR7F-11 (NGK) KJ22CR-L11 (Nippondenso)	For hot climates or continuous high speed driving

3. Apply a small quantity of anti-seize compound to the plug threads, and screw the plugs into the cylinder head finger-tight. Then torque them to 18 N·m (1.8 kgf·m, 13 lbf·ft).

Charging System

Component Location Index



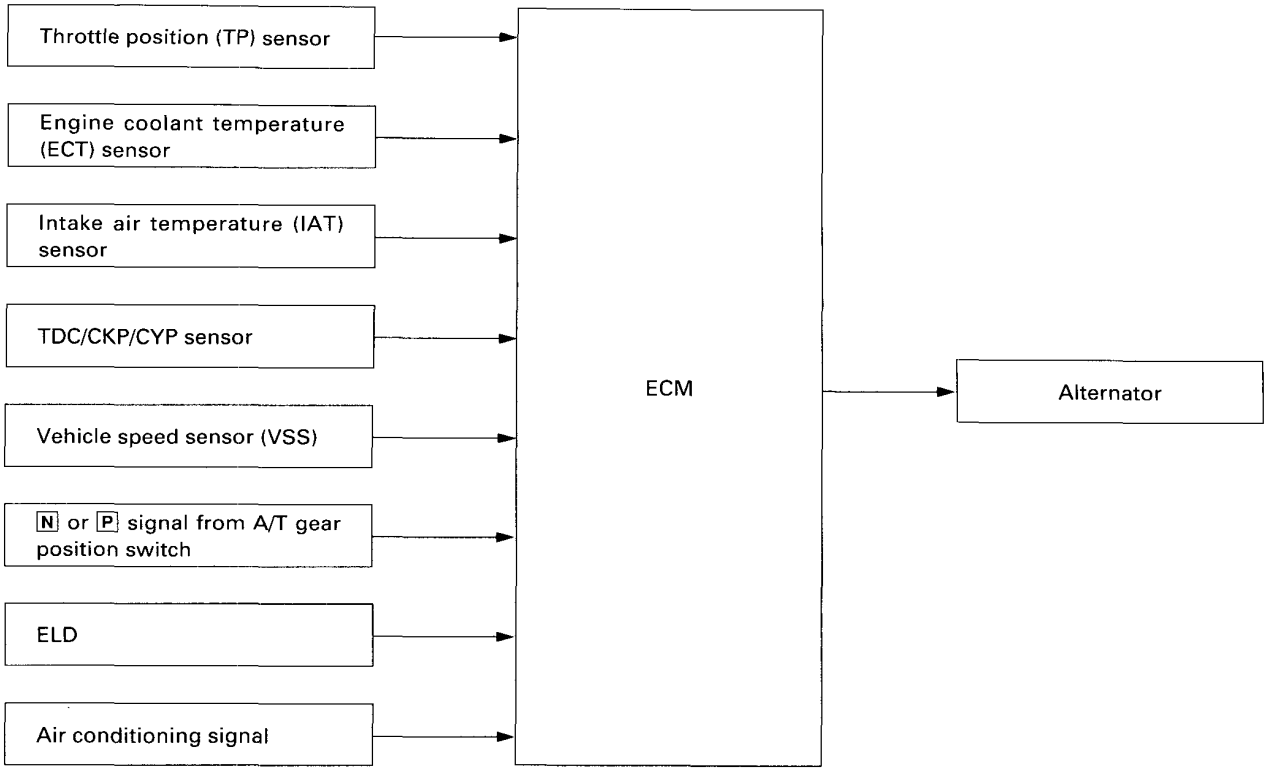
NOTE:
The alternator/engine combinations are shown in the table below.

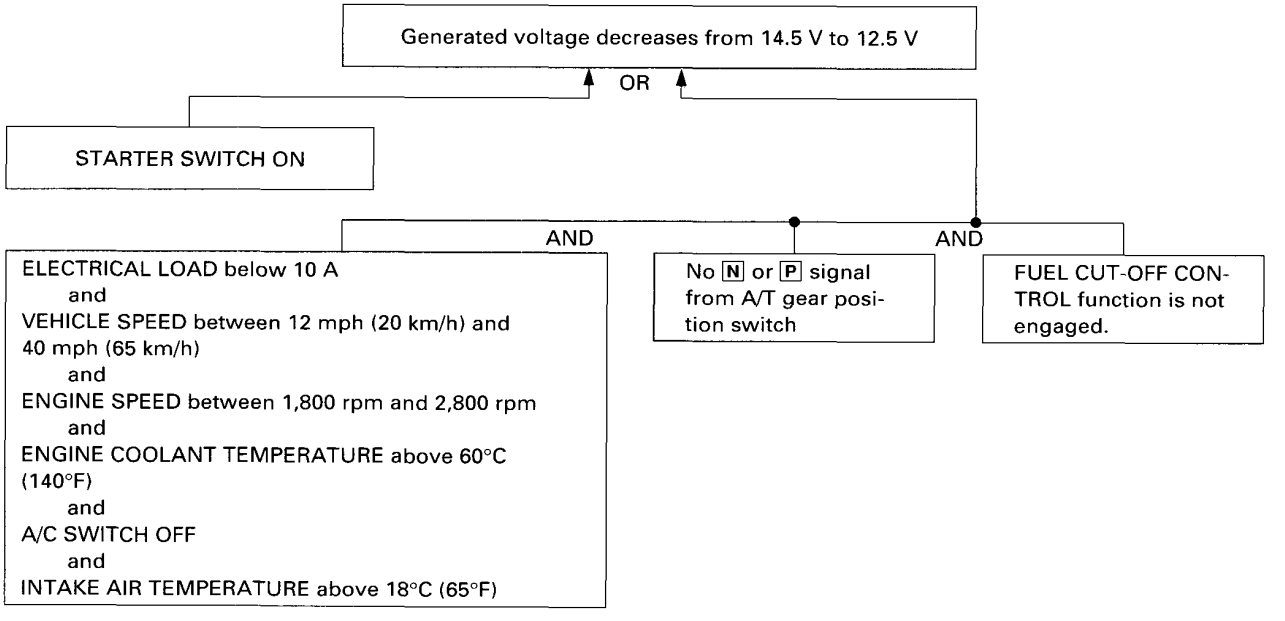
F22B1 engine	NIPPONDENSO (90 A)
F22B2 engine F22B5 engine F20B3 engine	NIPPONDENSO (80 A)

Description

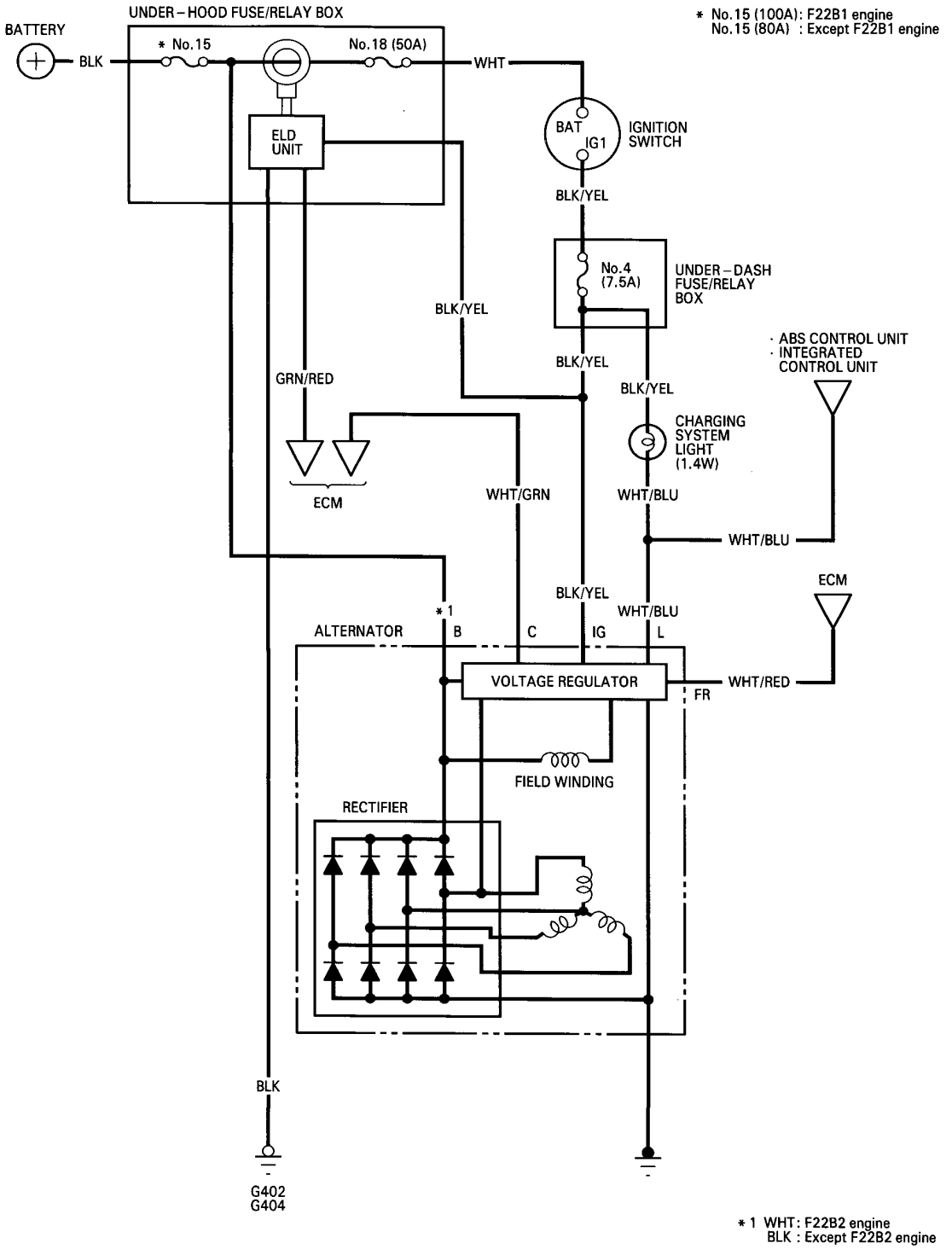
Alternator Control System (KH model)

To improve fuel economy, the alternator control system within the ECM changes the voltage generated at the alternator in accordance with driving conditions.



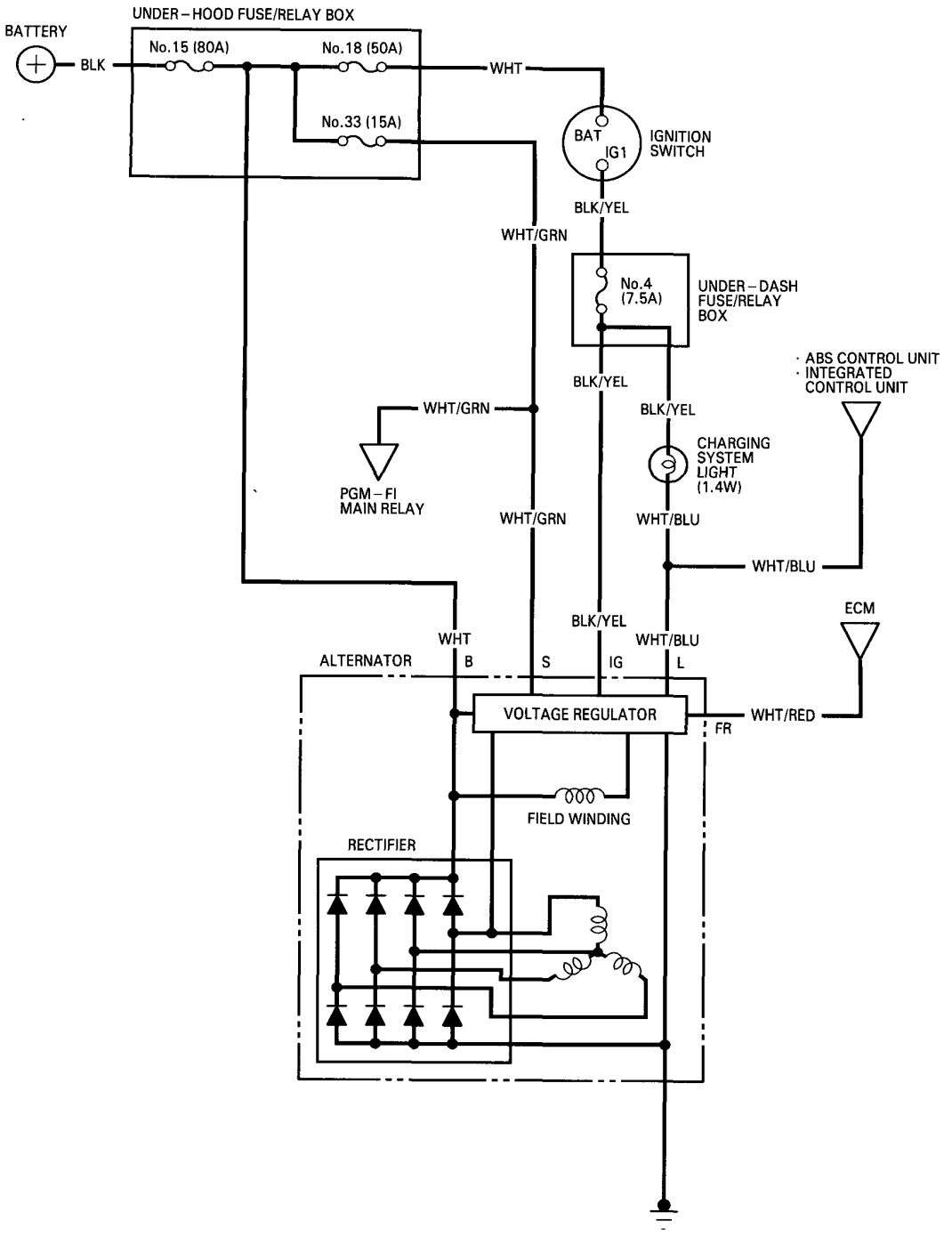


Circuit Diagram (KH model)



Charging System

Circuit Diagram (Except KH model)



Troubleshooting

NOTE:

- Before troubleshooting check:
  - — Tightness of the alternator belt (see page 23-123, 124).
  - — That the malfunction indicator lamp (MIL) of the ECM does not blink. If it indicates DTC 20, refer to section 11.
- Troubleshoot by performing following tests in the order listed below.

Malfunction:
— Charging system light does not go off.
— Charging system light does not go on.
— Battery is dead or low.

1. Test the operation of the alternator and regulator (see page 23-114).

2. Test the operation of the charging system light (see page 23-115).

(KH model)

3. Check the IG and C terminal voltages of the alternator connector (see page 23-116).

(Except KH model)

3. Check the IG and S terminal voltages of the alternator connector (see page 23-117).

Charging system light does not go off because the engine idle speed is too low:
— Check the idle speed.

(cont'd)

Troubleshooting (cont'd)

Alternator/Regulator Operation Test:
1. Be sure to use a good battery (see page 23-69). Connect an ammeter, and a voltmeter as shown.
2. Start the engine, and let it idle until it reaches normal operating temperature (cooling fan comes on two times).
3. Raise the engine speed to 2,000 rpm (min^{-1}) and hold it there. Turn the headlights (High beam) on and check the voltage at the battery terminals.

Is the voltage between 13.9 and 15.1 V?

YES — NO

Test the alternator (see page 23-118).

1. Turn the blower motor and the rear window defogger on, and check the battery voltage.

Is the battery voltage less than 13.5 V?

YES — NO

Turn also the stereo radio/cassette player, brake lights, etc. on

Is the battery voltage less than 13.5 V?

YES — NO

Test the alternator (see page 23-118).

1. Read the amperage.

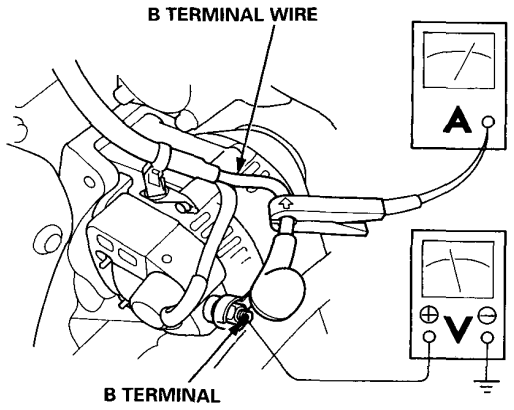
*Are there more than *A?*

YES — NO

Test the alternator (see page 23-118).

Alternator/Regulator operation is OK. Test the charging system light operation (see page 23-115).

CAUTION: As the headlights warm up considerably, do not cover them.



*A: F22B2, F22B5, F20B3 engine 65 A
F22B1 engine 70 A

Charging System Light Test:
1. Turn the ignition switch on (II).

Does the charging system light come on?

YES

Start the engine.

Does the charging system light go off?

YES

Charging system light circuit is OK.
Check the voltages at the IG and C (S) terminals (see page 23-116, 117).

NO

1. Turn the ignition switch off.
2. Disconnect the 4-P connector and short its L (WHT/BLU) terminal to body ground.
3. Turn the ignition switch on (II).

Does the charging system light come on?

YES

Charging system light circuit is OK. Check the voltages at the IG and C (S) terminals (see page 23-116, 117).

NO

- **Blown bulb**
- **An open in the WHT/BLU wire**
- **Loose/disconnected terminal**

1. Turn the ignition switch off.
2. Disconnect the 4-P connector.
3. Turn the ignition switch on (II).

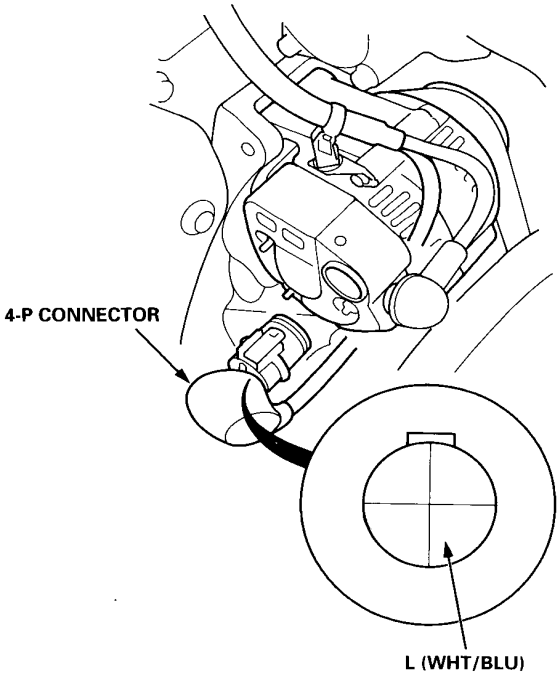
Does the charging system light go off?

YES

Check the voltages at the IG and C (S) terminals (see page 23-116, 117).

NO

- **Disconnect the ABS control unit and the integrated control unit as applicable. If the charging system light stays on.**
- **Short in the WHT/ BLU terminal wire**



View from terminal side

(cont'd)

Troubleshooting (cont'd)

Voltage Checks at IG and C Terminals (KH model):
1. Turn the ignition switch off.

Are the B terminal, the 4-P connector and under-hood fuse/relay box terminals securely tightened ?

YES / NO

Tighten or reconnect the terminals securely.

1. Disconnect the 4-P connector and turn the ignition switch on.
2. *Measure the voltage* between body ground and the IG terminal of the 4-P connector.

Is there battery voltage?

YES / NO

— Blown No. 4 (7.5 A) fuse in the under-dash fuse/relay box
— An open in the BLK/YEL wire

1. Connect the 4-P connector.
2. Start the engine and turn the headlights (High beam) on.
3. Measure the voltage between the C terminal of the 4-P connector and the positive terminal of the battery.

Is voltage 1 V or less?

YES / NO

1. Stop the engine and connect the ECU test harness (see section 11).
2. Check for continuity between the C terminal of the 4-P connector and the A16 terminal of the test harness.

Is there continuity?

YES / NO

An open in the WHT/GRN wire

1. Check for continuity between the C terminal and body ground, and between the A 16 terminal and body ground.

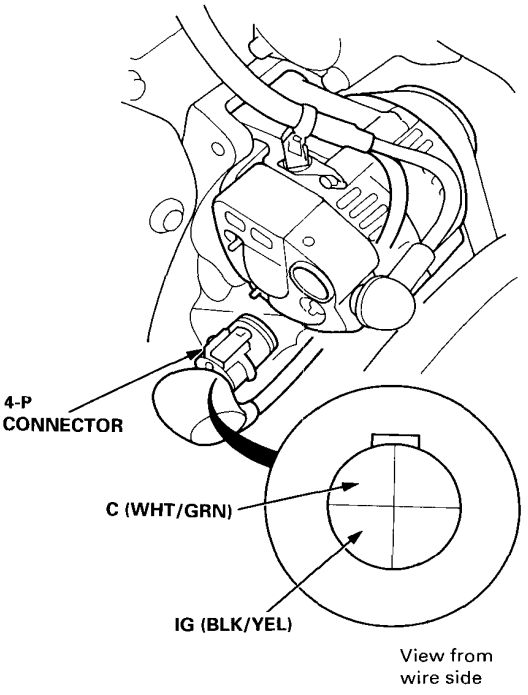
Is there continuity?

YES / NO

Faulty ECM

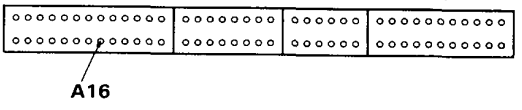
Short in the WHT/GRN wire

Check the battery (see page 23-69).



CAUTION: Be sure to use a voltmeter with its plus terminal connected to battery plus and its minus terminal to the C terminal of the 4-P connector.

ECU TEST HARNESS
07LAJ – PT3010A
(07LAJ – PT30100)



CAUTION: The ECU test harness must not touch the ECM.

Voltage Checks at IG and S Terminals (Except KH model):
1. Turn the ignition switch off.

Are the B terminal, the 4-P connector and under-hood fuse/relay box terminals securely tightened?

YES — NO

Tighten or reconnect the terminals securely.

1. Disconnect the 4-P connector and turn the ignition switch on (II).
2. Measure the voltage between body ground and the IG terminal of the 4-P connector.

Is there battery voltage?

YES — NO

- **Blown No. 4 (7.5 A) fuse in the under-dash fuse/relay box**
- **An open in the BLK/YEL wire**

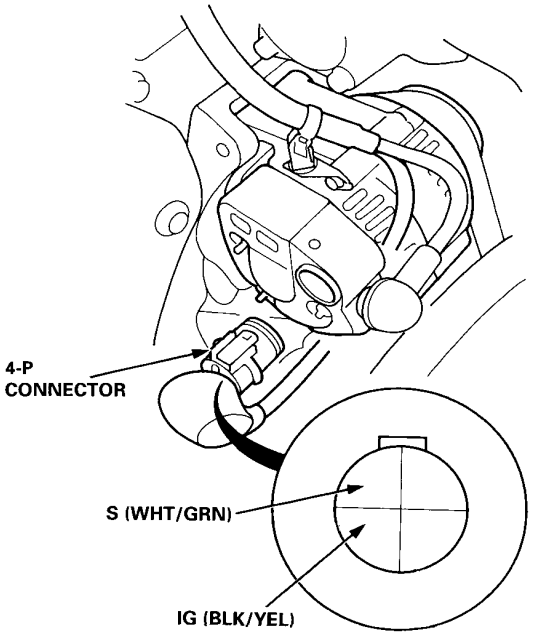
1. Measure the voltage between body ground and the S terminal of the 4-P connector.

Is there battery voltage?

YES — NO

- **Blown No. 33 (15 A) fuse in the under-hood fuse/relay box**
- **An open in the WHT/GRN wire**

Check the battery (see page 23-69)

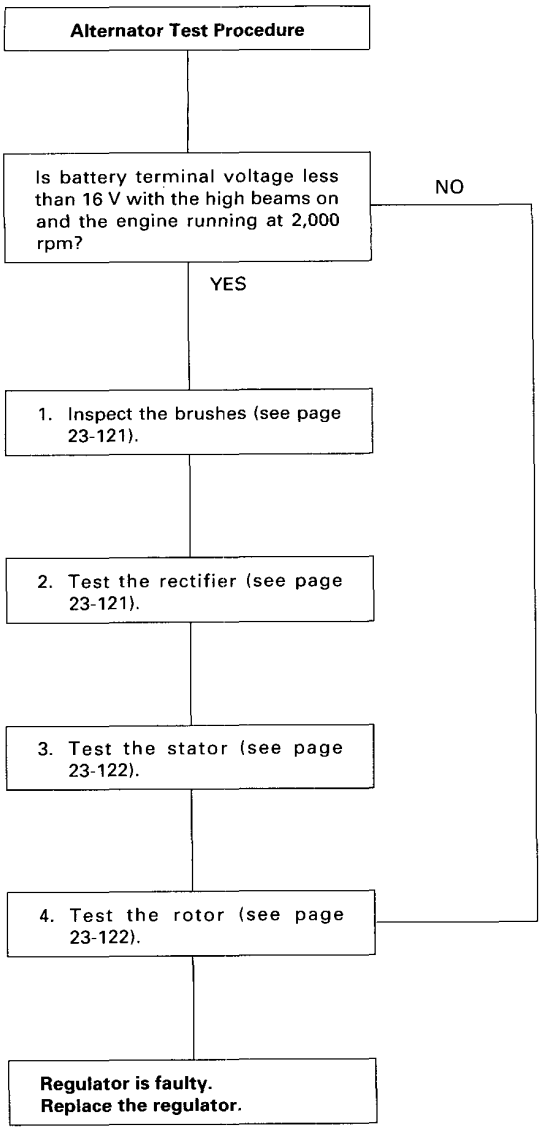


View from wire side

Troubleshooting

Alternator Test:

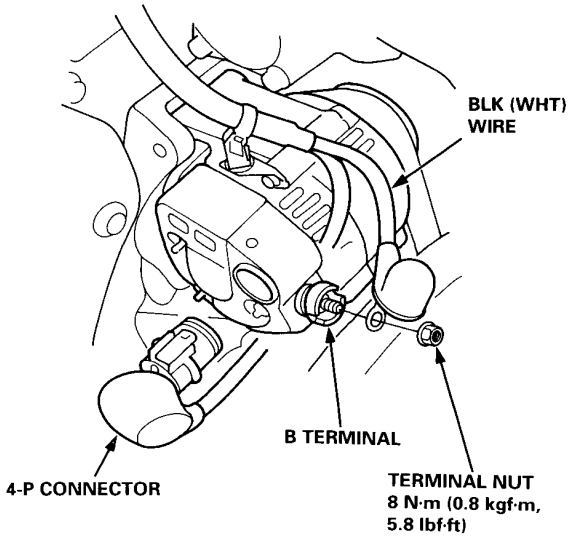
NOTE: Because an overall check is necessary to avoid misleading conclusions, test the alternator in the order described below.



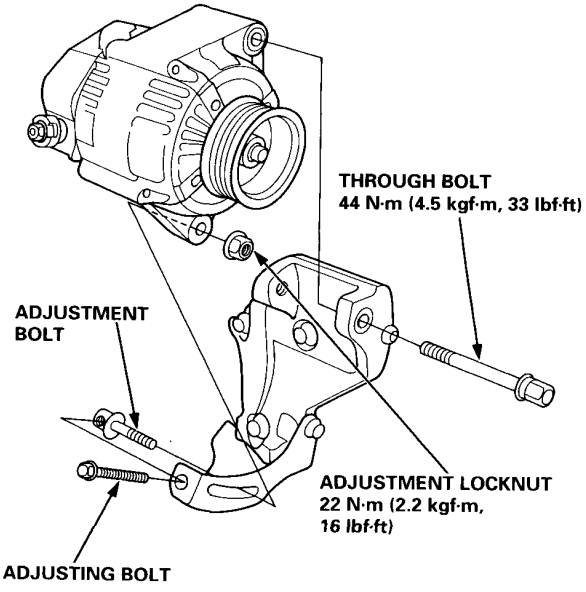
Alternator Replacement

1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Remove the power steering pump (see section 17).
3. Disconnect the 4-P connector from the alternator.
4. Remove the terminal nut and the BLK (WHT) wire from the B terminal.

BLK: F22B1 engine
WHT: Except F22B1 engine



5. Loosen the through bolt, then loosen the adjustment locknut, and remove the adjusting bolt.

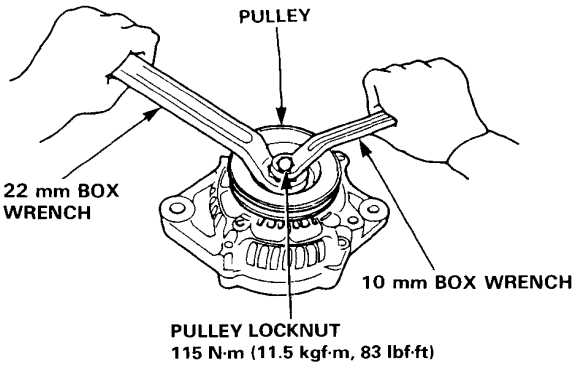


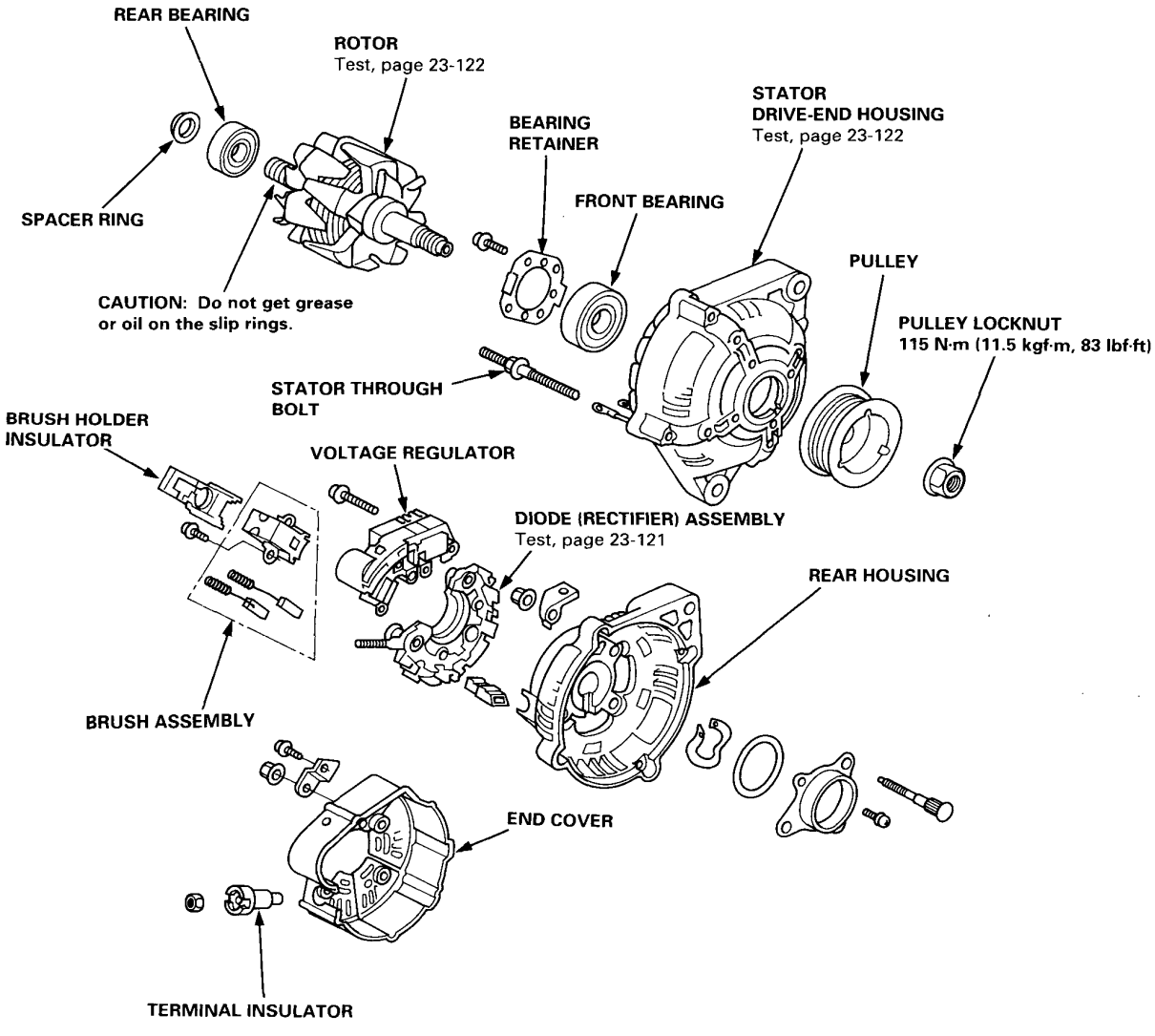
6. Remove the belt from the alternator.
7. Remove the adjustment bolt and nut.
8. Remove the through bolt, then remove the alternator.
9. After installing the alternator, adjust the alternator belt tension (see page 23-123, 124).

Alternator Overhaul

NOTE: Do not remove the pulley unless the front bearing needs replacement.

To loosen the pulley locknut, use 10 mm and 22 mm wrenches. If necessary, use an impact wrench.

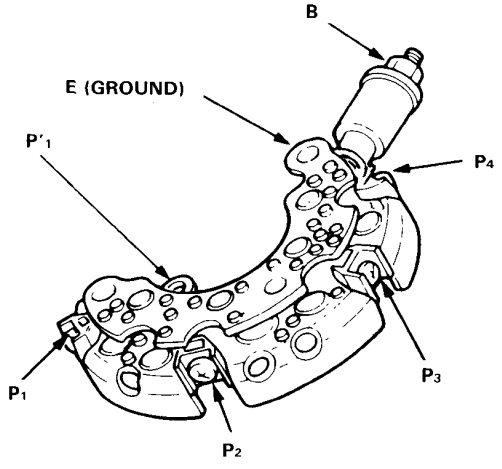


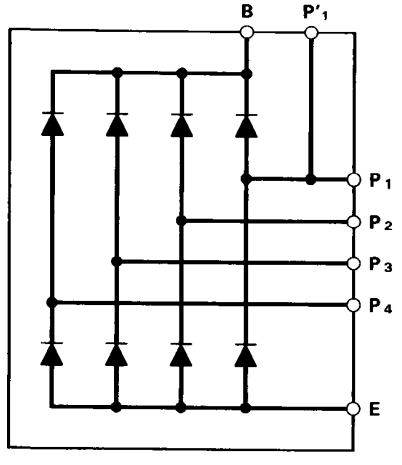


Rectifier Test

NOTE: The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of eight diodes (four pairs), each diode must be tested for continuity in both directions with an ohmmeter that has diode checking capability; a total of 16 checks.

1. Check for continuity in each direction, between the B and P, and between the E (ground) and P terminals of each diode pair. All diodes should have continuity in only one direction.





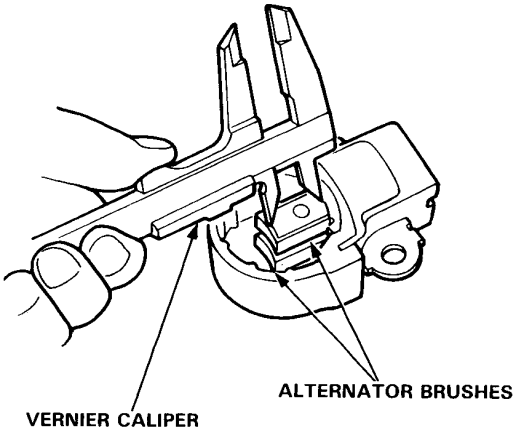
2. If any of the eight diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

Alternator Brush Inspection

1. Remove the end cover, then take out the brush holder by removing its two screws.

2. Measure the length of the brushes with a vernier caliper.

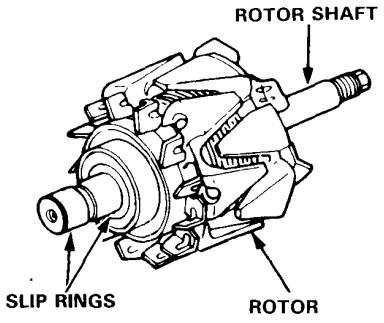
Alternator Brush Length:
Standard: 10.5 mm (0.41 in)
Service Limit: 1.5 mm (0.06 in)



If the brushes are less than the service limit, replace the alternator brush assembly.

Rotor Slip Ring Test

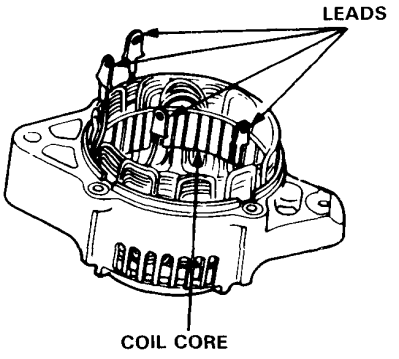
1. Check that there is continuity between the slip rings.



2. Check that there is no continuity between the slip rings and the rotor or rotor shaft.
3. If the rotor fails either continuity check, replace the alternator.

Stator Test

1. Check that there is continuity between each pair of leads.



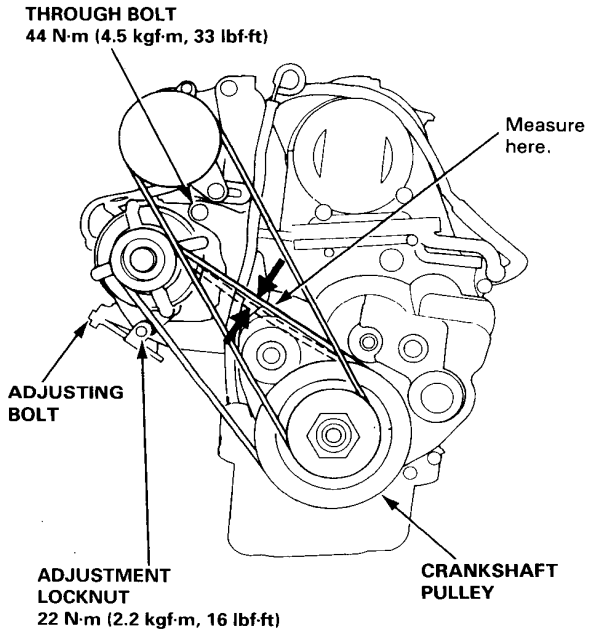
2. Check that there is no continuity between each lead and the coil core.
3. If the coil fails either continuity check, replace the alternator.

Alternator Belt Inspection and Adjustment (Without A/C)

Deflection Method:
Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the alternator and the crankshaft pulley.

Deflection: 10.5 – 12.5 mm (0.41 – 0.49 in)

NOTE: On a brand-new belt (one that has been run for less than five minutes), the deflection should be 8 – 10 mm (0.31 – 0.39 in) when first measured. If the belt is worn or damaged, replace it.



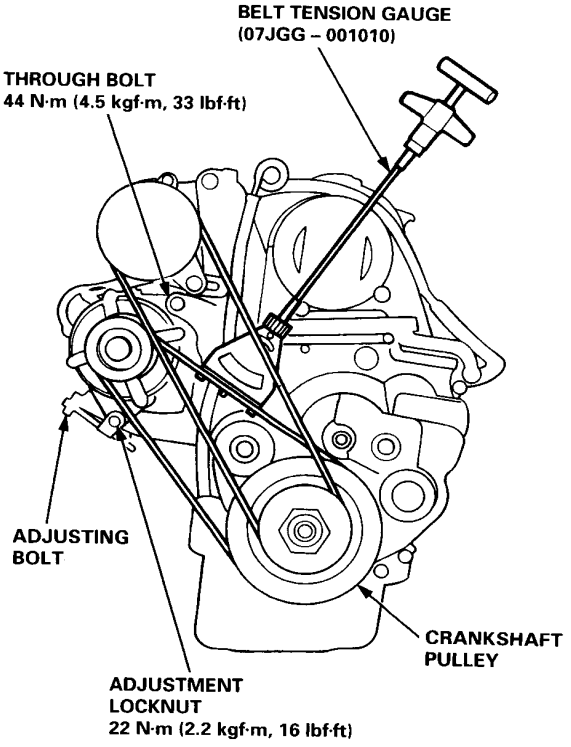
If adjustment is necessary:
1. Loosen the through bolt and adjustment locknut.
2. Turn the adjusting bolt to obtain the proper belt tension, then retighten the nut and through bolt.
3. Recheck the belt deflection.

   NOTE: For the power steering pump belt adjustment, refer to section 17.

Belt Tension Gauge Method:
Following the gauge manufacturer's instructions, attach the belt tension gauge to the belt, and measure the tension.

Tension: 290 – 440 N (30 – 45 kgf, 66 – 99 lbf)

NOTE: On a brand-new belt (one that has been run for less than five minutes), the deflection should be 540 – 740 N (55 – 75 kgf, 120 – 170 lbf) when first measured. If the belt is worn or damaged, replace it.



If adjustment is necessary:
1. Loosen the through bolt and adjustment locknut.
2. Turn the adjusting bolt to obtain the proper belt tension, then retighten the nut and through bolt.
3. Recheck the tension of the belt.

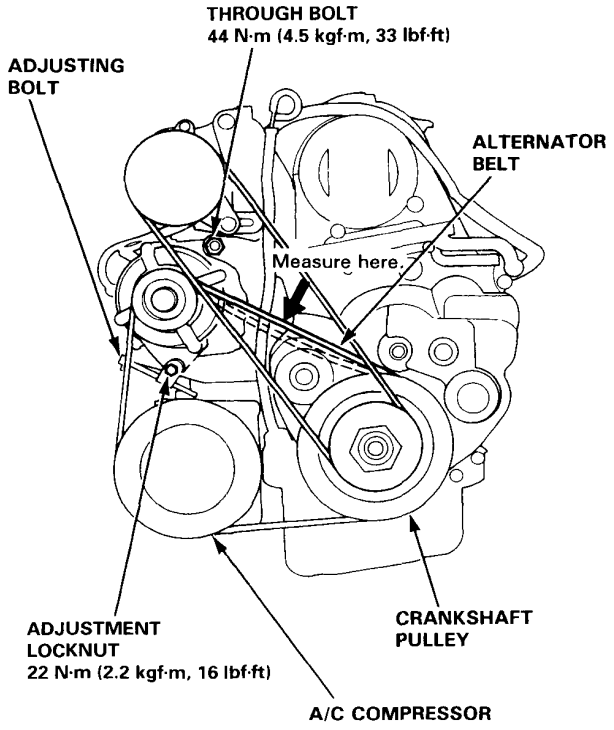
   NOTE: For the power steering pump belt adjustment, refer to section 17.

Alternator Belt Inspection and Adjustment (With A/C)

Deflection Method:
Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the alternator and the crankshaft pulley.

Deflection: 8 – 10.5 mm (0.31 – 0.41 in)

NOTE: On a brand-new belt (one that has been run for less than five minutes), the deflection should be 5 – 7 mm (0.20 – 0.28 in) when first measured. If the belt is worn or damaged, replace it.



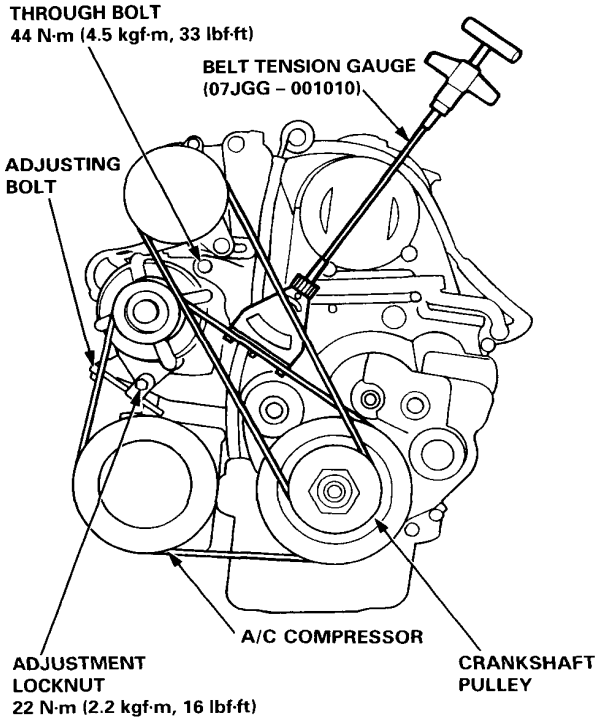
If adjustment is necessary:
1. Loosen the through bolt and adjustment locknut.
2. Turn the adjusting bolt to obtain the proper belt tension, then retighten the nut and through bolt.
3. Recheck the belt deflection.

   NOTE: For the power steering pump belt adjustment, refer to section 17.

Belt Tension Gauge Method:
Following the gauge manufacturer's instructions, attach the belt tension gauge to the belt, and measure the tension.

Tension: 440 – 590 N (45 – 60 kgf, 99 – 132 lbf)

NOTE: On a brand-new belt, (one that has been run for less than five minutes), the tension should be 950 – 1150 N (95 – 115 kgf, 209 – 254 lbf) when first measured. If the belt is worn or damaged, replace it.



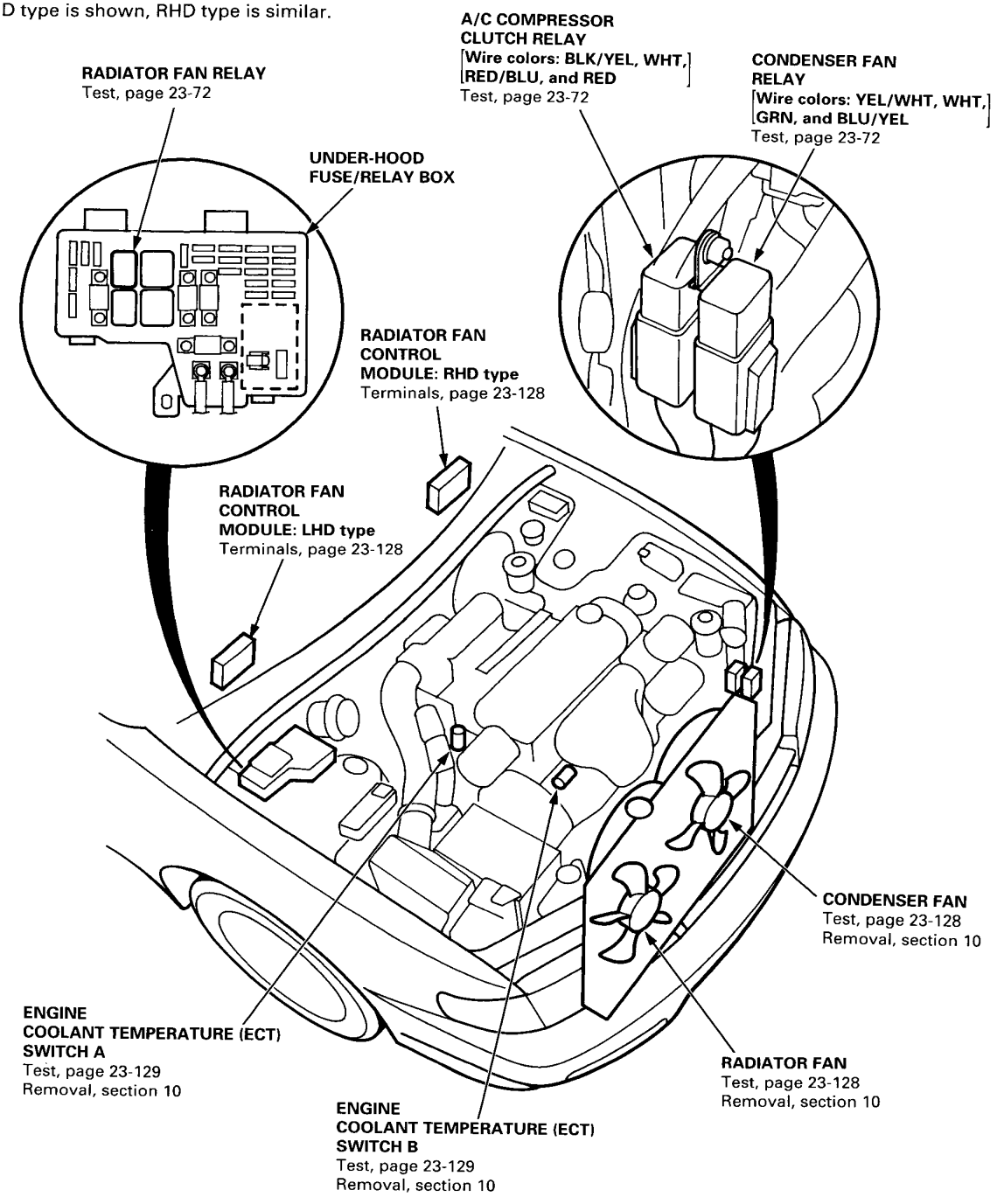
If adjustment is necessary:
1. Loosen the through bolt and adjustment locknut.
2. Turn the adjusting bolt to obtain the proper belt tension, then retighten the nut and through bolt.
3. Recheck the tension of the belt.

   NOTE: For the power steering pump belt adjustment, refer to section 17.

Fan Controls

Component Location Index

NOTE: LHD type is shown, RHD type is similar.

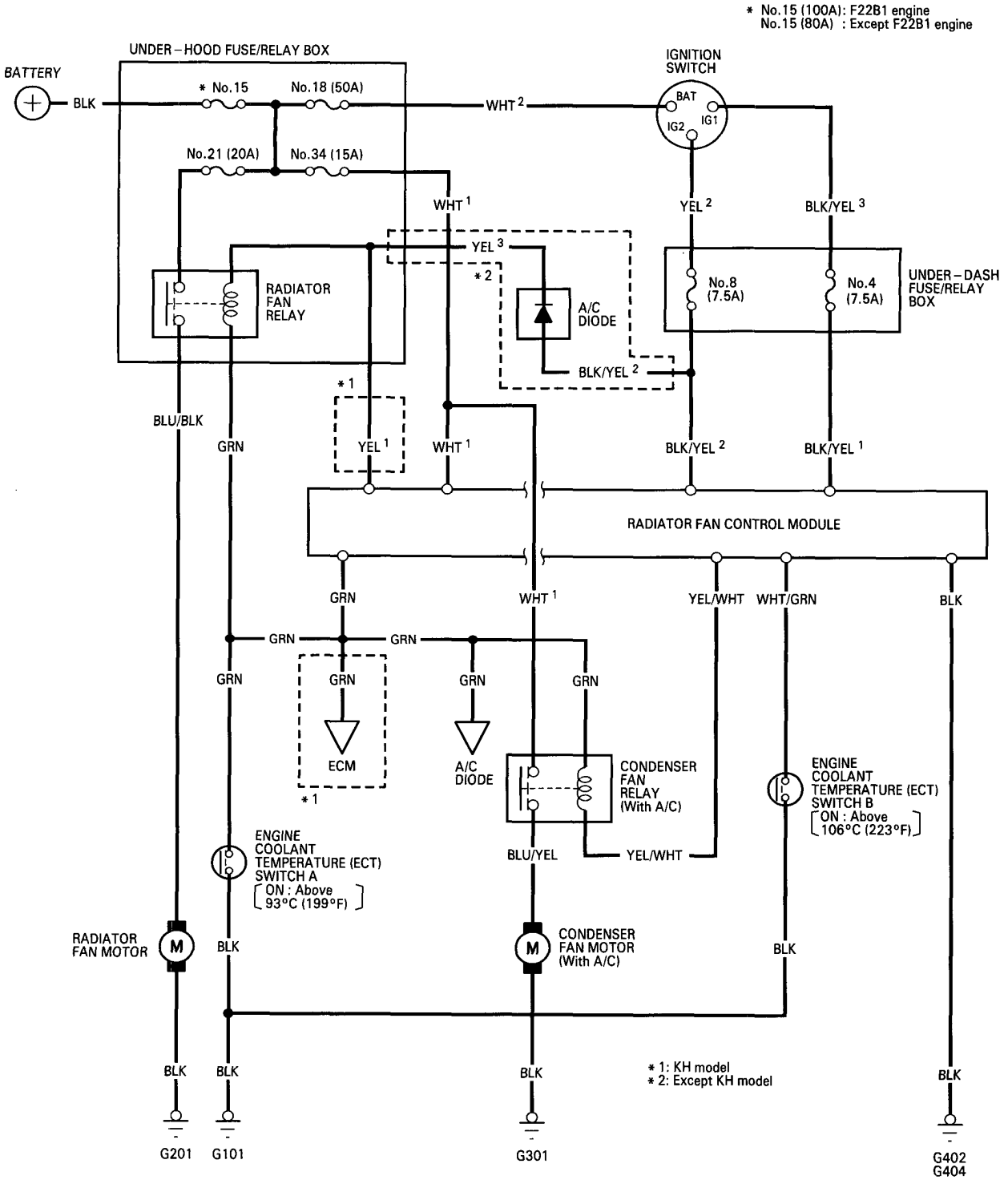


Radiator Fan Control:
When the engine coolant temperature is above approximately 106°C (223°F) after the engine has stopped, the radiator fan will run for about 15 minutes. Engine coolant temperature (ECT) switch A is in the thermostat housing. ECT switch B is located behind the water outlet housing. The radiator fan control module is located behind the glove box.

Fan Controls

Circuit Diagram

NOTE: Different wires with the same color have been given a number suffix to distinguish them (for example, WHT [1] and WHT [2] are not the same).



Troubleshooting

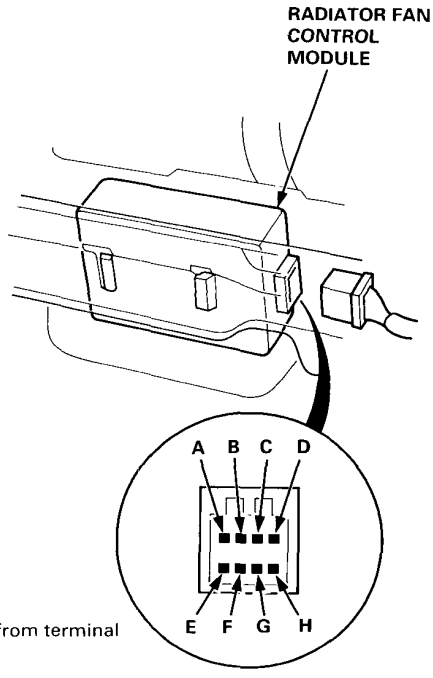
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 21 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 34 (15 A) fuse (In the under-hood fuse/relay box)	Blown No. 4 (7.5 A) fuse (In the under-dash fuse/relay box)	Blown No. 8 (7.5 A) fuse (In the under-dash fuse/relay box)	Radiator fan or condenser fan relay	Radiator fan or condenser fan motor	Engine coolant temperature (ECT) switch A	Engine coolant temperature (ECT) switch B	Faulty radiator fan control module	A/C system	Poor ground	Open circuit, loose or disconnected terminals
Only one fan runs (with engine running and A/C ON).		1				2	3					G201 G301	WHT[1], *[1]YEL[1], *[2]YEL[3], *[2]BLK/YEL[2], YEL/WHT, BLU/BLK, BLU/YEL or GRN
Fans do not run.	Under all conditions				1			2		3		G101 G402 G404	*[2]BLK/YEL[2], or GRN
	A/C ON										1		
Radiator fan control module fails to function properly.			1	2					3	4		G101 G402 G404	WHT[1], BLK/YEL[1], WHT/GRN, *[1]YEL[1] or YEL/WHT

*1: KH model
*2: Except KH model

Fan Controls

Radiator Fan Control Module Terminals



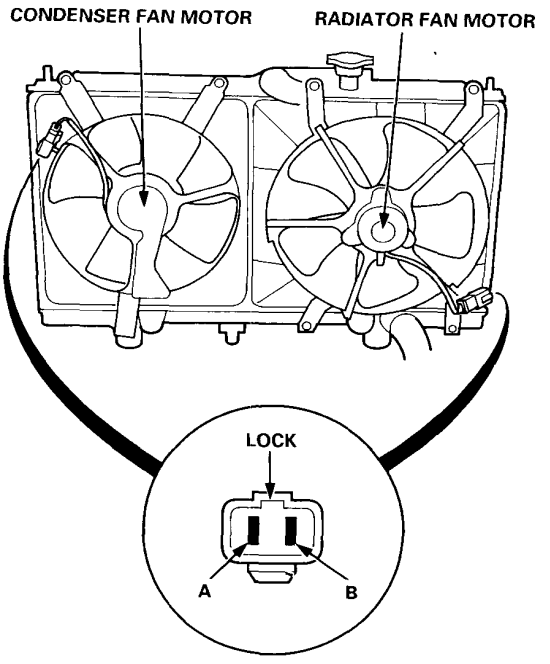
NOTE: See section 22 for the input test.

Terminal	Wire	Connects to
A	*1YEL1	Radiator fan relay (Coil ⊕)
	*2YEL/WHT	Condenser fan relay (Coil ⊕)
B	BLK/YEL2	Power supply (For radiator fan and condenser fan relays via radiator fan control module with ignition switch ON)
C	*1YEL/WHT	Condenser fan relay (Coil ⊕)
D	BLK	Ground (G402, G404)
E	WHT/GRN	Engine coolant temperature (ECT) switch B
F	WHT1	Power supply (For radiator fan control module with ignition switch OFF)
G	BLK/YEL1	IG1 (Control module reset signal)
H	GRN	Radiator fan and condenser fan relays (Coil ⊖)

*1: KH model
*2: Except KH model

Fan Motor Test

1. Disconnect the 2-P connectors from each fan motor.



View from terminal side

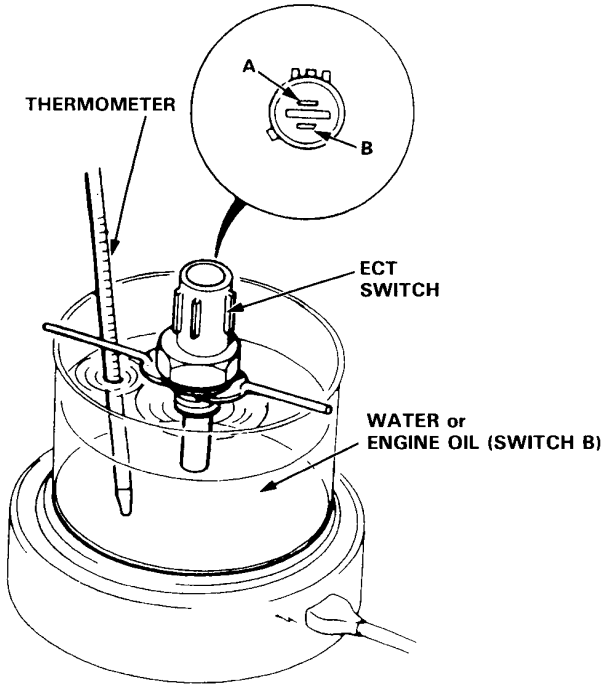
2. Test the motor by connecting battery power to the A terminal, and ground the B terminal.
3. If the motor fails to run or does not run smoothly, replace it.

Engine Coolant Temperature (ECT) Switch Test

NOTE: Bleed air from the cooling system after installing the engine coolant temperature (ECT) switch (see section 10).

1. Remove ECT switch A from the thermostat housing and ECT switch B from the water outlet housing.
2. Suspend each ECT switch in a container of water or engine oil as shown.

   NOTE: The illustration shows ECT switch A.



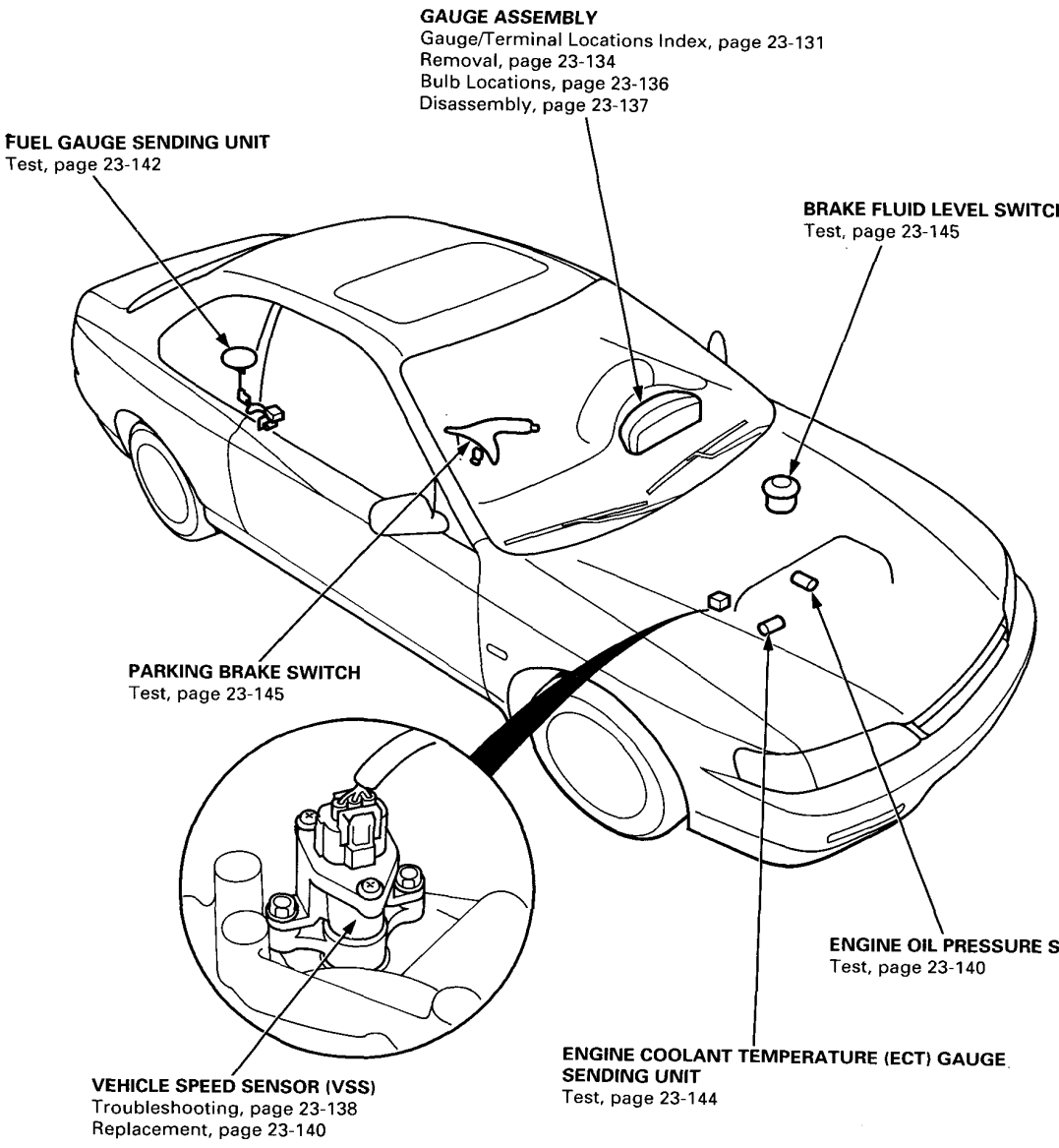
3. Heat the water or engine oil, and check its temperature with a thermometer.
4. Check each ECT switch for continuity between the A and B terminals according to the table.

Operation		Temperature	Terminal A	Terminal B
SWITCH A	ON	90° – 96°C (194° – 205°F)	○—○	
	OFF	2° – 7°C (36° – 45°F) lower than the temperature when it goes on		
SWITCH B	ON	103° – 109°C (217° – 228°F)	○—○	
	OFF	4° – 9°C (39° – 48°F) lower than the temperature when it goes on		

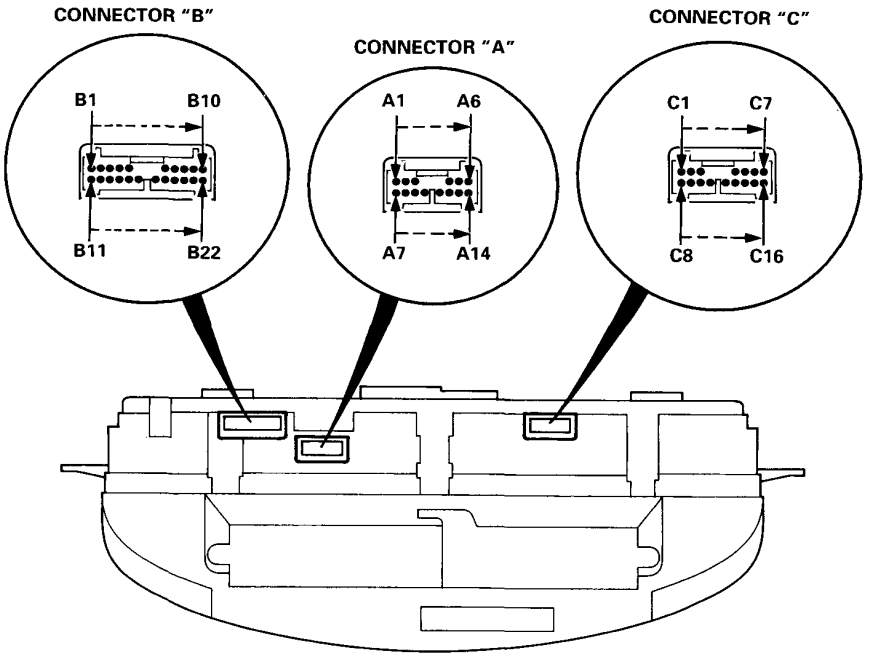
Gauge Assembly

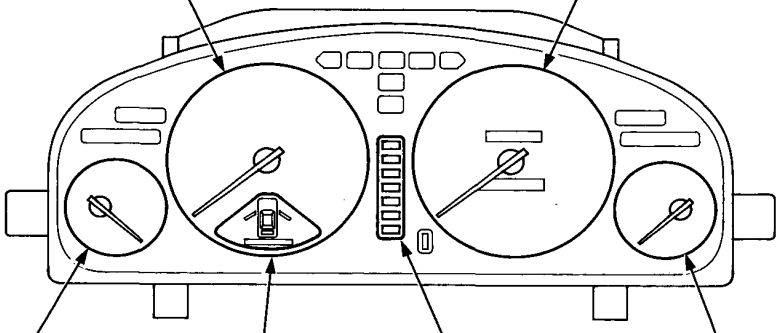
Component Location Index

NOTE: LHD type is shown, RHD type is similar.



Gauge/Terminal Locations Index





TACHOMETER:
Indicates 100 rpm at 200 pulses per minute of the ignition control module (ICM).

SPEEDOMETER:
Indicates 60 km/h [60 mph] at 637 [1,026] rpm of the vehicle speed sensor (VSS).

ENGINE COOLANT TEMPERATURE (ECT) GAUGE:
Gauge Test, page 23-144
Sending Unit Test, page 23-144

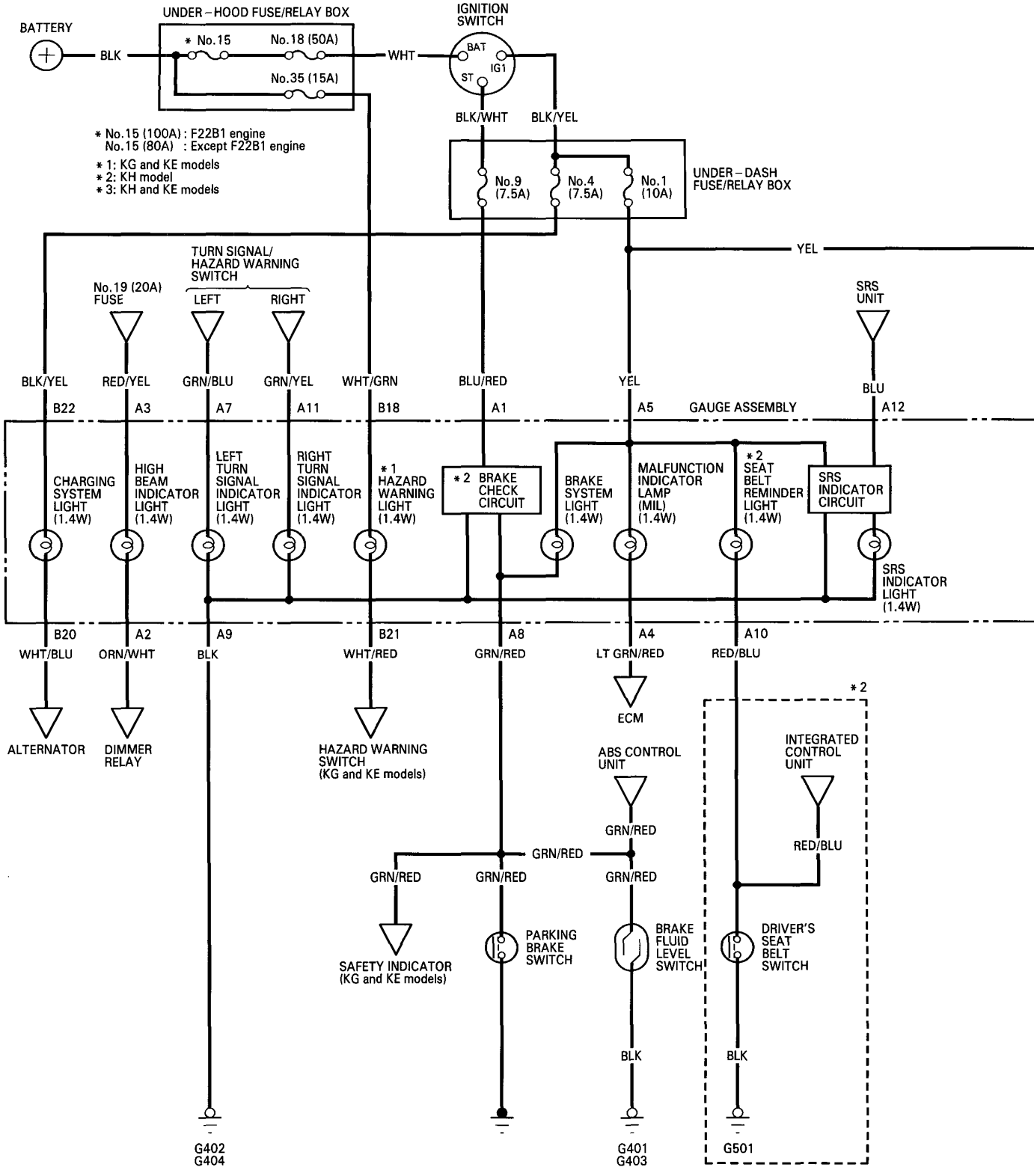
SAFETY INDICATOR:
See page 23-154

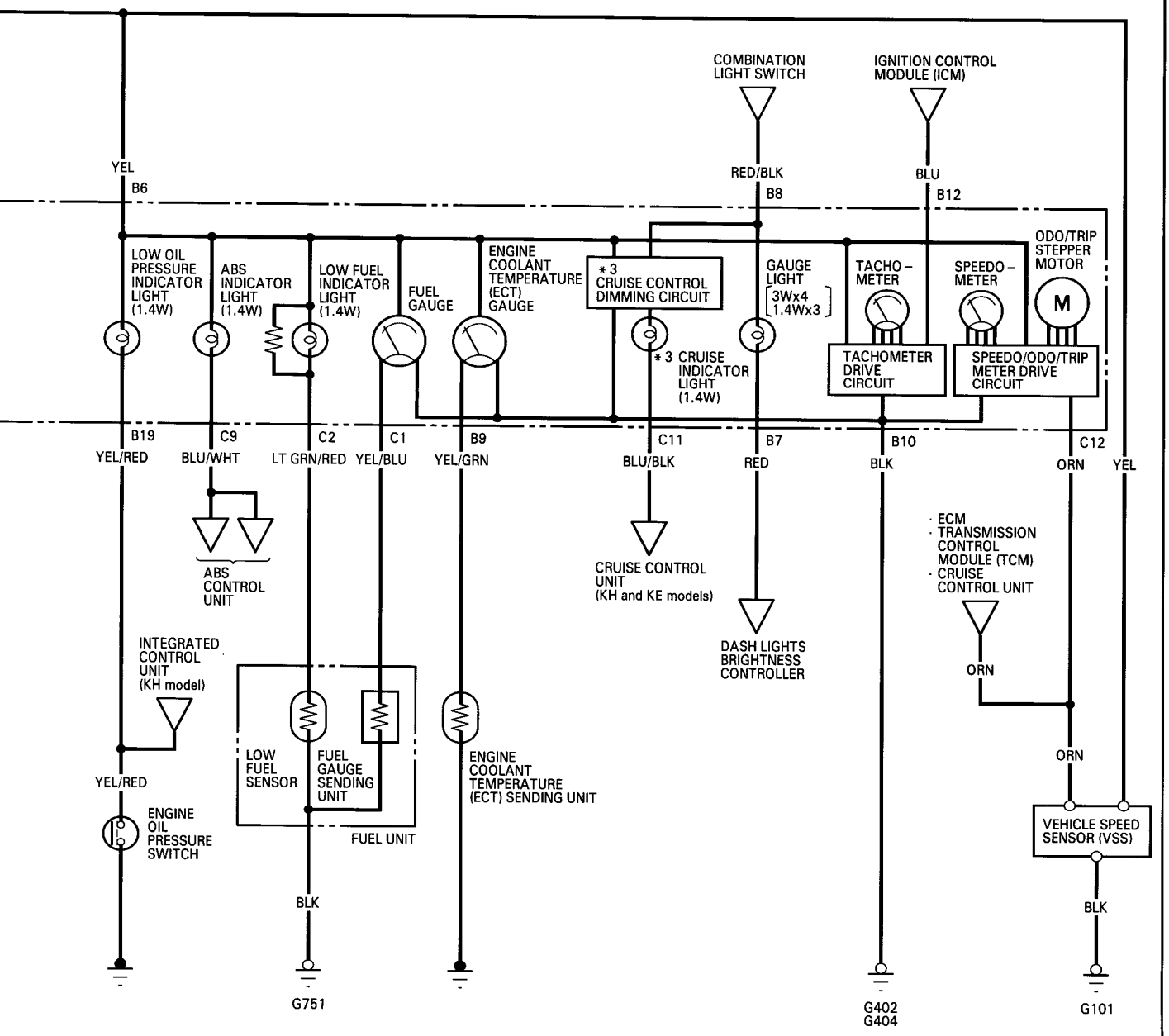
A/T GEAR POSITION INDICATOR (A/T):
See page 23-163

FUEL GAUGE:
Gauge Test, page 23-141
Sending Unit Test, page 23-142

Gauge Assembly

Circuit Diagram



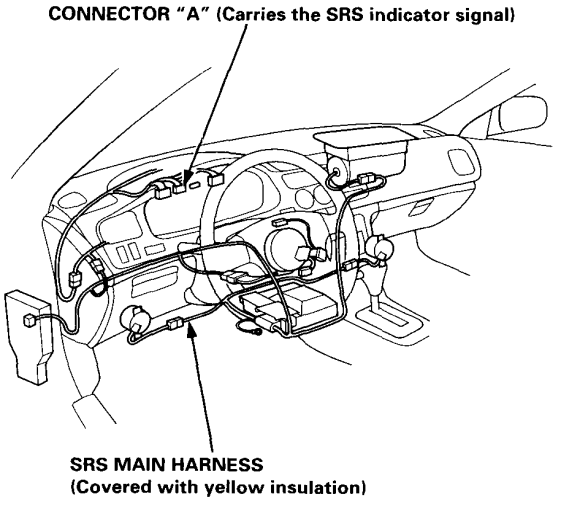

COMBINATION LIGHT SWITCH
IGNITION CONTROL MODULE (ICM)
YEL
B6
RED/BLK
B8
BLU
B12
LOW OIL PRESSURE INDICATOR LIGHT (1.4W)
ABS INDICATOR LIGHT (1.4W)
LOW FUEL INDICATOR LIGHT (1.4W)
FUEL GAUGE
ENGINE COOLANT TEMPERATURE (ECT) GAUGE
*3 CRUISE CONTROL DIMMING CIRCUIT
GAUGE LIGHT 3Wx4 1.4Wx3
TACHO-METER
SPEEDO-METER
ODO/TRIP STEPPER MOTOR
M
*3 CRUISE INDICATOR LIGHT (1.4W)
TACHOMETER DRIVE CIRCUIT
SPEEDO/ODO/TRIP METER DRIVE CIRCUIT
B19
YEL/RED
C9
BLU/WHT
C2
LT GRN/RED
C1
YEL/BLU
B9
YEL/GRN
C11
BLU/BLK
B7
RED
B10
BLK
C12
ORN
YEL
ABS CONTROL UNIT
CRUISE CONTROL UNIT (KH and KE models)
DASH LIGHTS BRIGHTNESS CONTROLLER
· ECM
· TRANSMISSION CONTROL MODULE (TCM)
· CRUISE CONTROL UNIT
ORN
INTEGRATED CONTROL UNIT (KH model)
LOW FUEL SENSOR
FUEL GAUGE SENDING UNIT
FUEL UNIT
ENGINE COOLANT TEMPERATURE (ECT) SENDING UNIT
YEL/RED
ENGINE OIL PRESSURE SWITCH
ORN
VEHICLE SPEED SENSOR (VSS)
BLK
BLK
BLK
G751
G402
G404
G101

Gauge Assembly

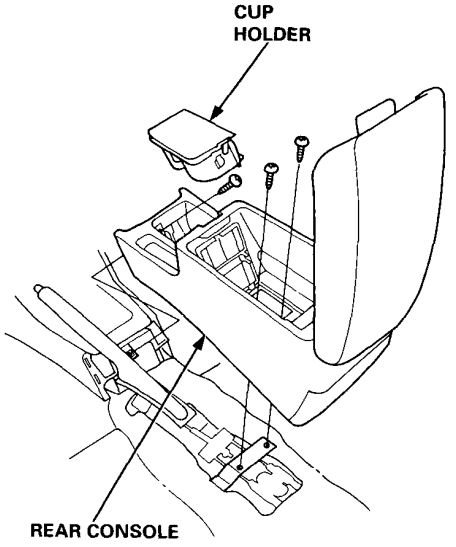
Removal

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

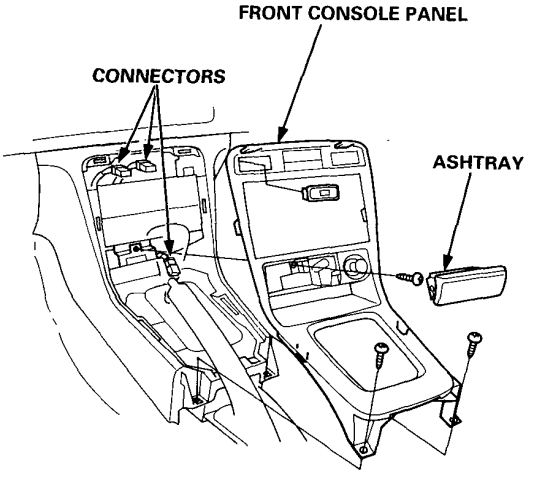
NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



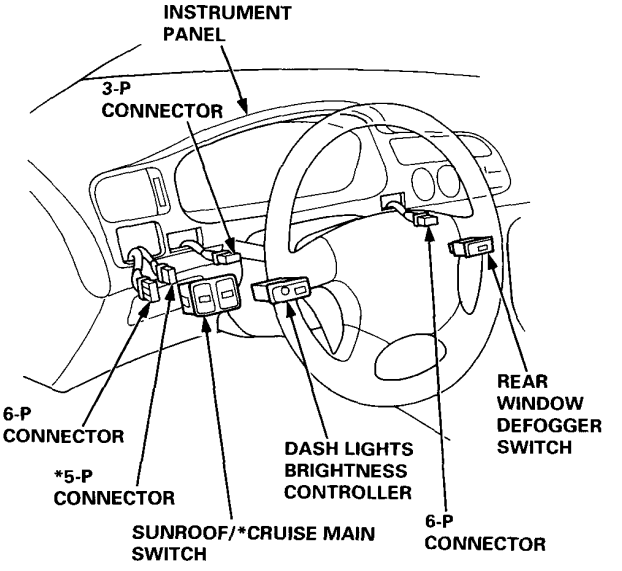
1. Remove the rear console.



2. Remove the front console panel.

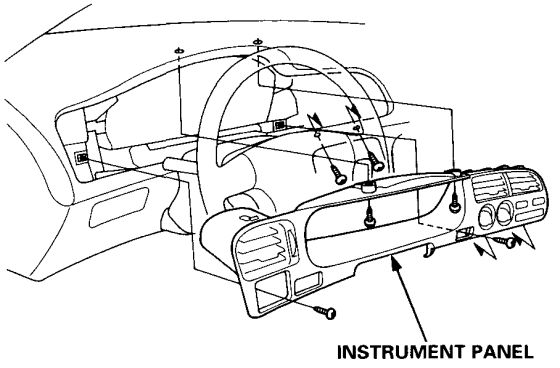


3. Remove the stereo radio/cassette player.
4. Remove the switches from the instrument panel.



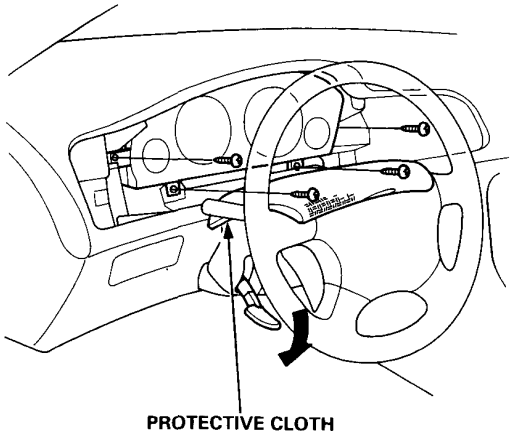
*: KH and KE models

5. Remove the instrument panel.
If necessary, disconnect the air mix control cable from the heater unit (see section 21).

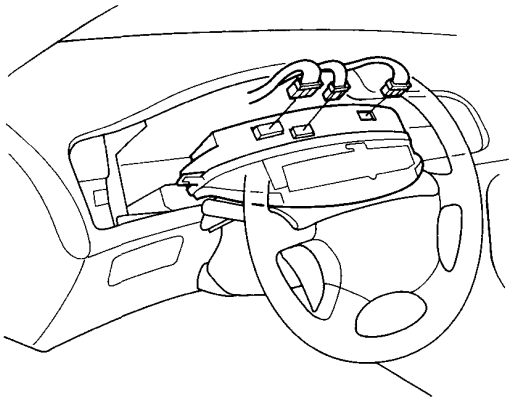


6. Remove the four screws, and spread a protective cloth on the upper column cover.

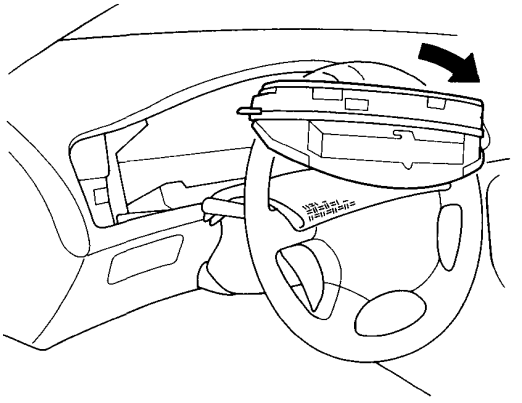
7. Tilt the steering wheel down with the tilt adjustment lever.



8. Pry the gauge assembly out, and disconnect the connectors.



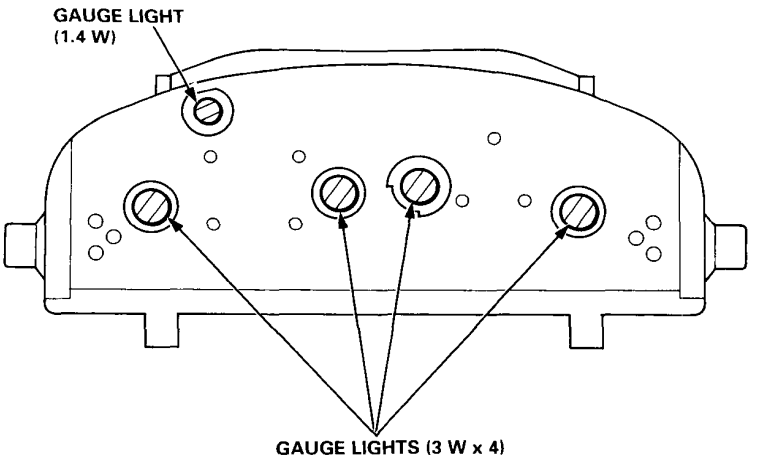
9. Carefully remove the gauge assembly.

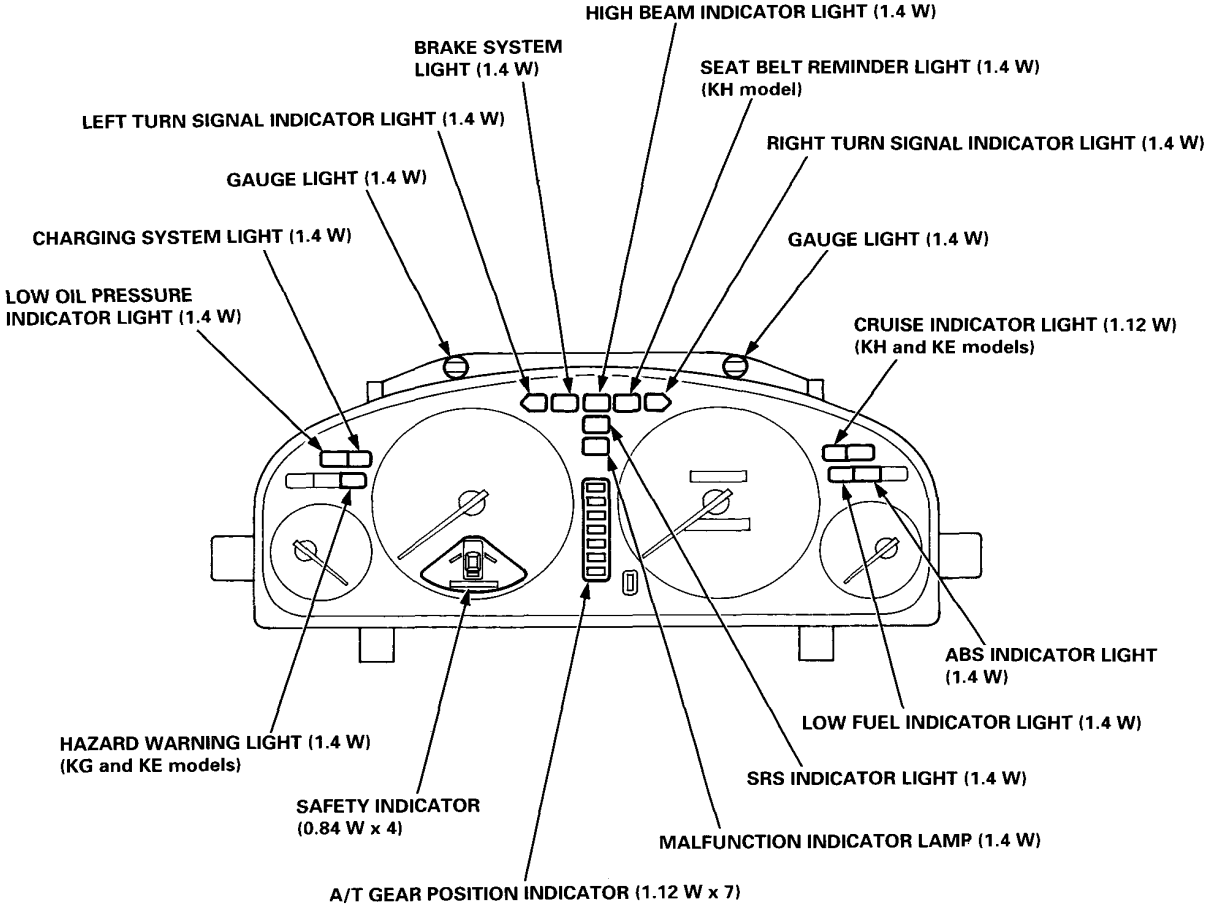


10. Install in the reverse order of removal.

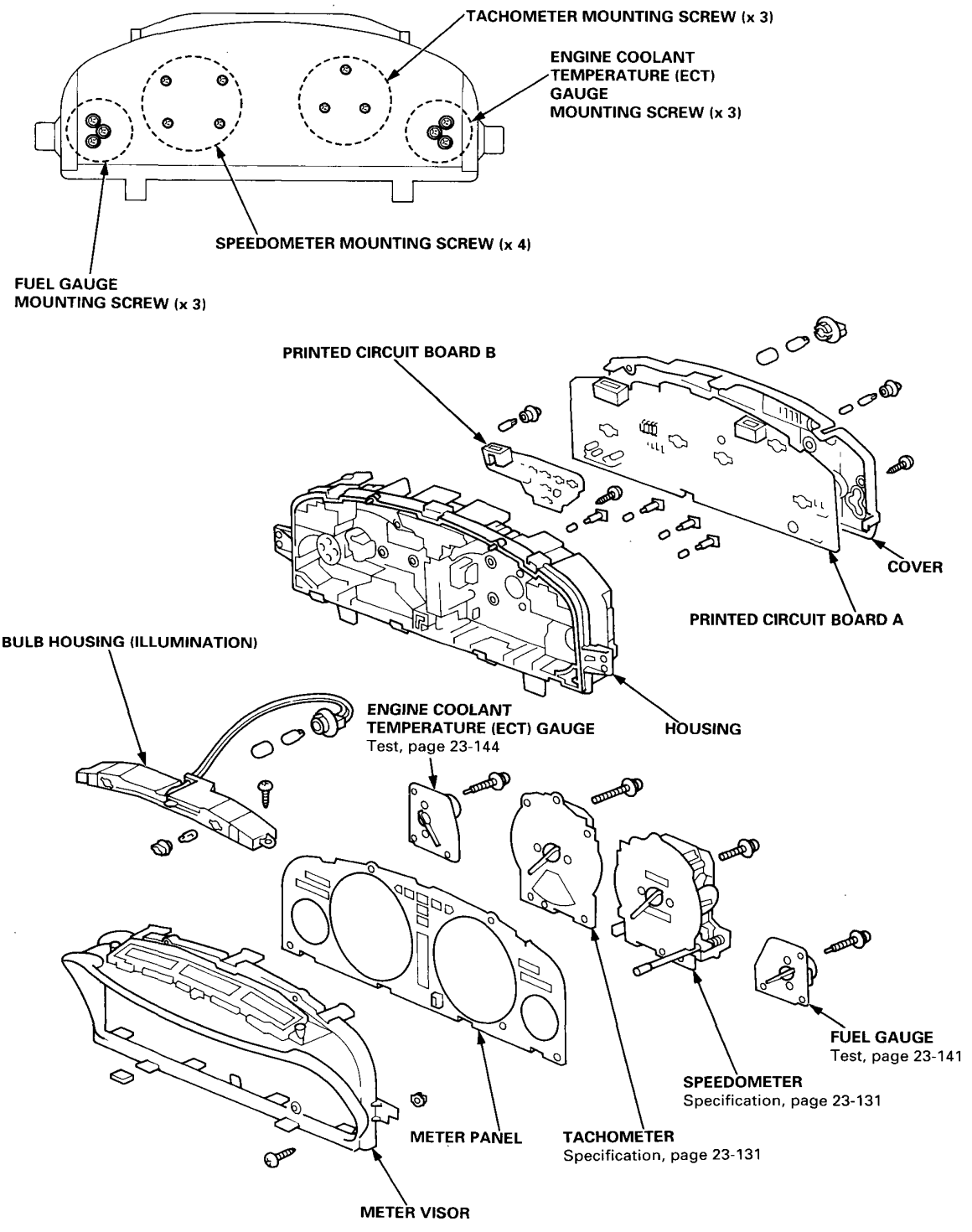
Gauge Assembly

Bulb Locations





Disassembly



Speedometer/Trip Meter/Odometer

Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected	Blown No. 1 (10 A) fuse (In the under-dash fuse/relay box)	Speedometer	Odo/Trip meter	Printed circuit board	Vehicle speed sensor (VSS) input test	Odometer connector at printed circuit board	VSS test flowchart
Odometer and trip meter work, but speedometer does not.		1		2			
Speedometer works, but odometer and trip meter do not.			1	2		3	
Speedometer, odometer, and trip meter do not work.	1				2		3

VSS Input Test (At harness side of 3-P connector)

No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• An open in the wire • Poor ground (G101)
2	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse • Short to ground
3	ORN	Ignition switch ON (II)	Check for voltage to ground: There should be about 5 V.	• Short to ground • An open in the wire

NOTE: A short to ground in the ORN wire can be caused by a short in any component connected to it.

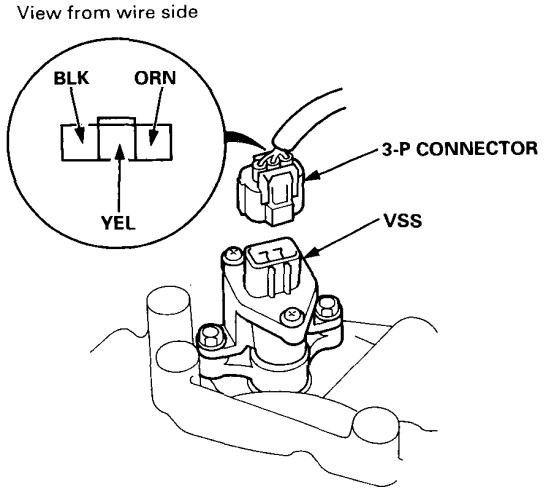
VSS Test
Speedometer does not work.

1. Inspect No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.
2. Disconnect the 3-P connector at the VSS.
3. Turn the ignition switch ON (II).
4. Measure voltage between the YEL wire terminal and the BLK wire terminal in the harness side of the 3-P connector.

- Is there battery voltage?

YES → A (To next page)

NO → B (To next page)



(From previous page)

(From previous page)

A

YES

B

NO

1. Check for continuity between the BLK terminal and body ground.
- Is there continuity?

YES | NO

Repair open between VSS and ground G101.

Repair open in the YEL wire, between the VSS and the under-dash fuse/relay box.

1. Measure voltage between the ORN and the BLK wire terminals.
- Is there about 5 V?

YES | NO

Repair open in the ORN wire or short to body ground.

1. Connect the Test Harness (07LAJ – PT30200) between the VSS and the engine wire harness.
2. Raise the front of the car, and support it with safety stands.
3. Connect the GRN Test Harness clip to the positive probe of a voltmeter, and connect the RED Test Harness clip to the negative probe.
4. Put the car in neutral with the ignition switch ON (II).
5. Slowly rotate one wheel with the other wheel blocked.
- Does voltage pulse from 0 to about 5 V?

YES | NO

Replace the VSS (see page 23-140).

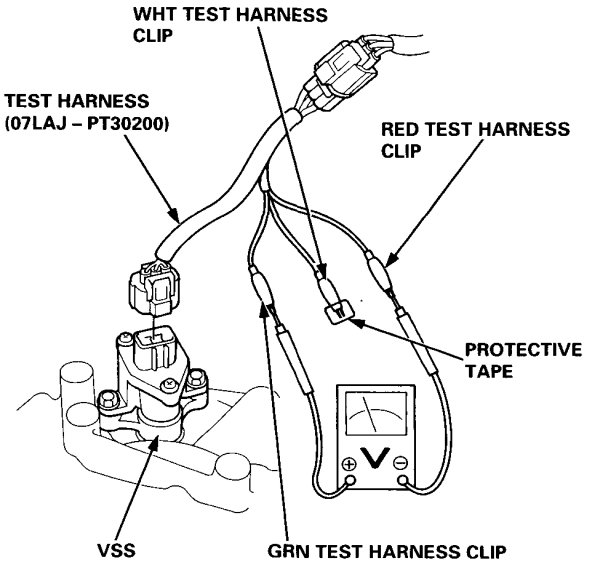
1. Disconnect the 16-P connector at the speedometer.
2. Touch a probe to the ORN wire, and connect it to body ground through a voltmeter.
3. Slowly rotate one wheel with the other wheel blocked.
- Does the meter indicate pulsing voltage?

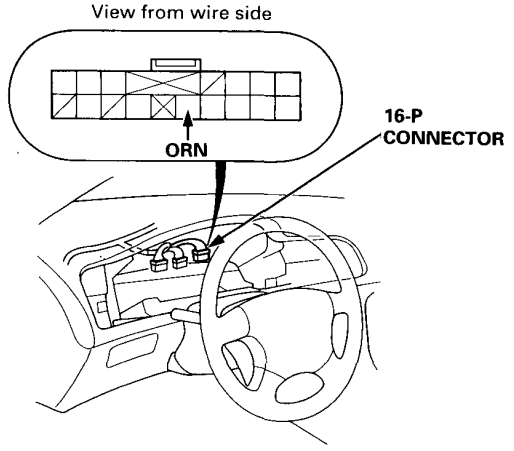
YES | NO

Repair open in the ORN wire between the VSS and the speedometer.

Replace the speedometer.

1. Disconnect the Test Harness.
2. Reconnect the 3-P connector at the VSS.



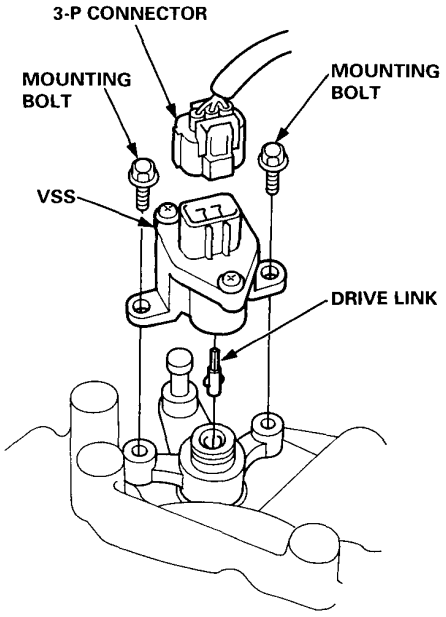


Vehicle Speed Sensor (VSS)

Replacement

1. Disconnect the 3-P connector from the vehicle speed sensor (VSS).
2. Remove the mounting bolts, then remove the VSS.

   NOTE: The VSS drive link is a very small part, be careful not to lose it.



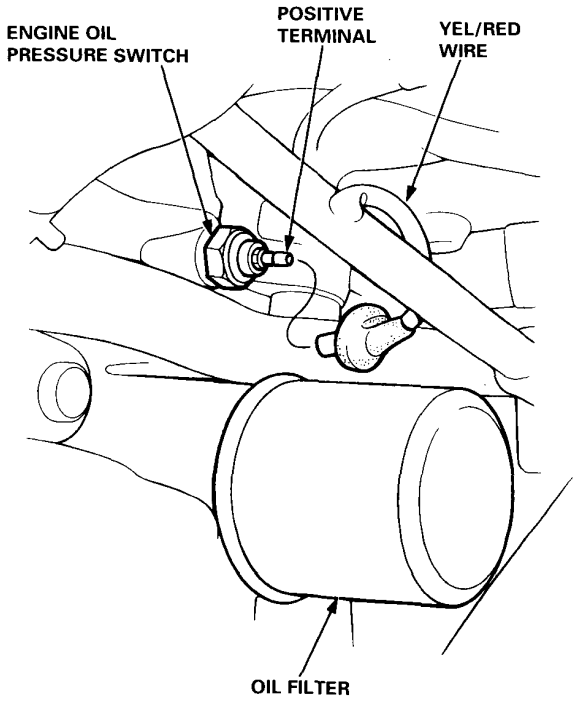
3. Install in the reverse order of removal.

Engine Low Oil Pressure Indicator System

Switch Test

1. Remove the YEL/RED wire from the engine oil pressure switch.
2. Check for continuity between the positive terminal and the engine (ground).

   - There should be continuity with the engine stopped.
   - There should be no continuity when the engine runs.



3. If the switch fails to operate, check the engine oil level. If the engine oil level is OK, check the engine oil pressure and, if necessary, inspect the oil pump (see section 8).

Fuel Gauge

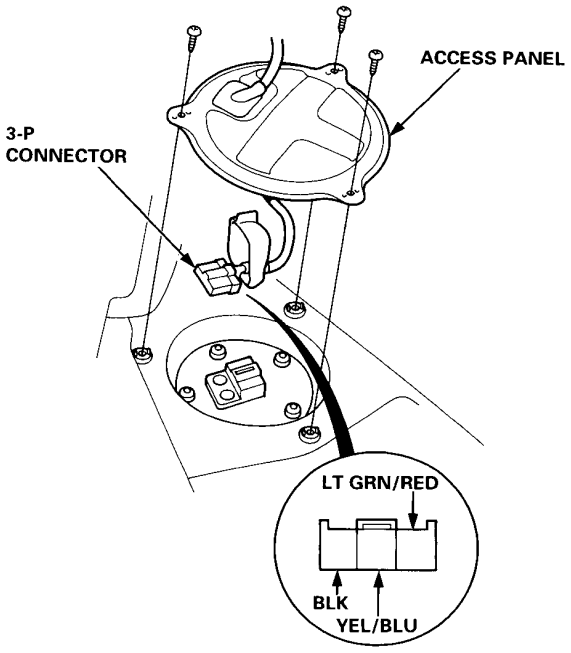
Gauge Test

NOTE: Refer to page 23-133 for the fuel gauge system circuit.

1. Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.

2. Remove the access panel from the floor.

3. Disconnect the 3-P connector from the fuel gauge sending unit.



View from wire side

4. Connect the voltmeter positive probe to the YEL/BLU terminal and the negative probe to the BLK terminal, then turn the ignition switch ON (II). There should be between 5 and 8 V.

   - If the voltage is as specified, go to step 5.
   - If the voltage is not as specified, check for:
     — An open in the YEL/BLU or BLK wire
     — Poor ground (G751)

5. Turn the ignition switch OFF. Attach a jumper wire between the YEL/BLU and BLK terminals, then turn the ignition switch ON (II).
   Check that the pointer of the fuel gauge starts moving toward the "F" mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "F" on the gauge dial. Failure to do so may damage the fuel gauge.

   NOTE: The fuel gauge is a bobbin (cross-coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

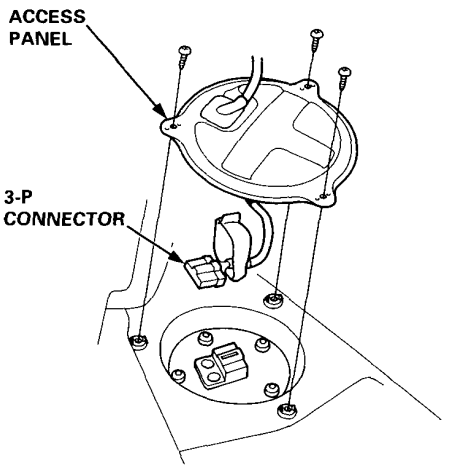
   - If the pointer of the fuel gauge does not move at all, replace the gauge.
   - If the gauge is OK, inspect the fuel gauge sending unit.

Fuel Gauge

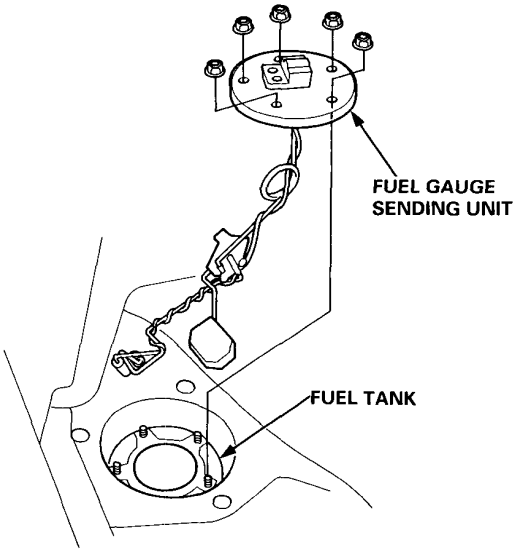
Sending Unit Test

⚠ WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

1. Open the trunk.
2. Remove the fuel tank access panel.
3. With the ignition switch OFF, disconnect the 3-P connector from the fuel gauge sending unit.

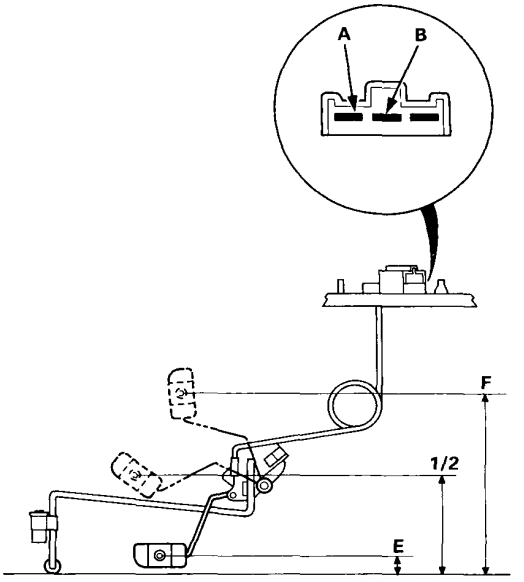


4. Remove the five nuts, and take the fuel gauge sending unit out of the fuel tank.



5. Measure the resistance between the A and B terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance (Ω)	105 – 110	25.5 – 39.5	3 – 5



If unable to obtain the above readings, replace the fuel gauge sending unit.

Low Fuel Indicator System

Indicator Light Test

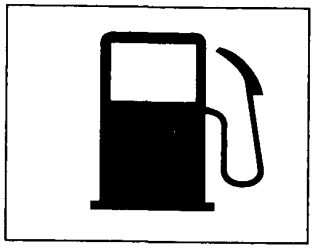
NOTE: Refer to page 23-133 for the diagram of the low fuel indicator circuit.

1. Park the car on level ground.

   ⚠ WARNING Do not smoke while working on the fuel system. Keep open flame away from the work area. Drain fuel only into an approved container.

2. Drain the fuel into an approved container. Then install the drain bolt with a new washer.

3. Add less than 8.6 ℓ (2.2 U.S. Gal, 1.9 Imp. Gal) of fuel, and turn the ignition switch ON. The low fuel indicator light should come on within four minutes.

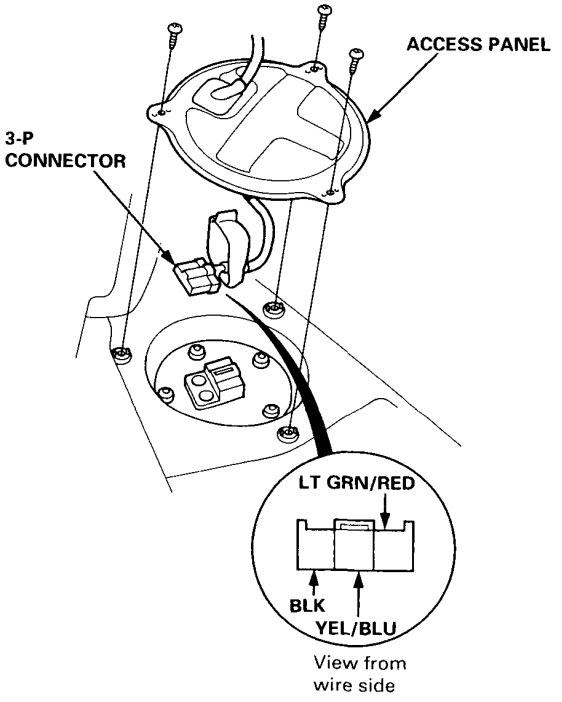


LOW FUEL INDICATOR LIGHT

- If the light goes on within four minutes, go on to step 5.
- If the light does not go on within four minutes, go on to step 4.

4. Remove the fuel tank access panel, and disconnect the 3-P connector from the fuel gauge sending unit. Connect the LT GRN/RED terminal to the BLK terminal with a jumper wire.

   - If the light comes on, the problem is the sending unit.
   - If the light does not come on, the problem is an open in the LT GRN/RED wire to the gauge assembly, no power to the gauge, a bad bulb, or poor ground.



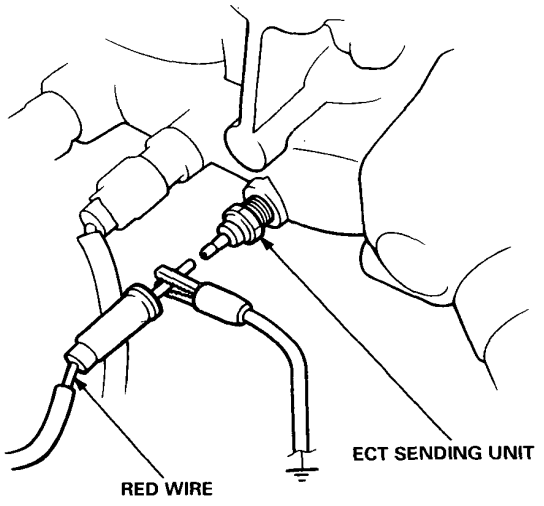
5. Add one more gallon of fuel [approx. 4 ℓ (0.9 Imp. Gal, 1.1 U.S. Gal).
   The light should go off within four minutes.

Engine Coolant Temperature (ECT) Gauge

Gauge Test

NOTE: Refer to page 23-133 for the wiring description of the engine coolant temperature (ECT) gauge circuit diagram.

1. Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.
2. Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the ECT gauge sending unit and ground it with a jumper wire.



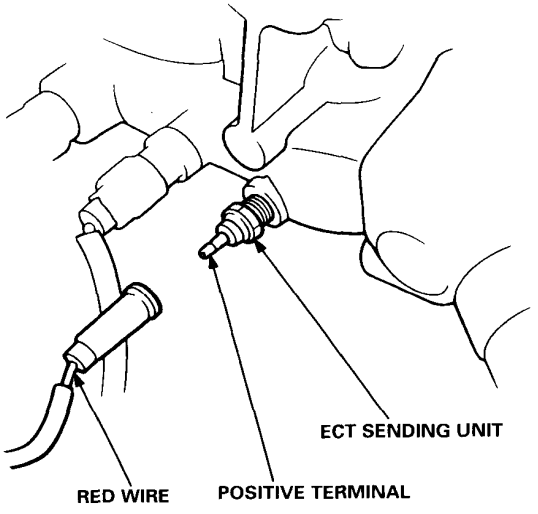
3. Turn the ignition switch ON.
   Check that the pointer of the ECT gauge starts moving toward the "H" mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "H" on the gauge dial. Failure to do so may damage the gauge.

   - If the pointer of the gauge does not move at all, check for an open in the YEL/GRN wire.
     If the wires are OK, replace the ECT gauge.
   - If the ECT gauge works, test the ECT sending unit.

ECT Sending Unit Test

1. Disconnect the YEL/GRN wire from the ECT sending unit.
2. With the engine cold, use an ohmmeter to measure resistance between the positive terminal and the engine (ground).



3. Check the temperature of the coolant.
4. Run the engine and measure the change in resistance with the engine at operating temperature (the radiator fan comes on).

Temperature	56°C (133°F)	85°C (185°F) – 100°C (212°F)
Resistance (Ω)	142	49 – 32

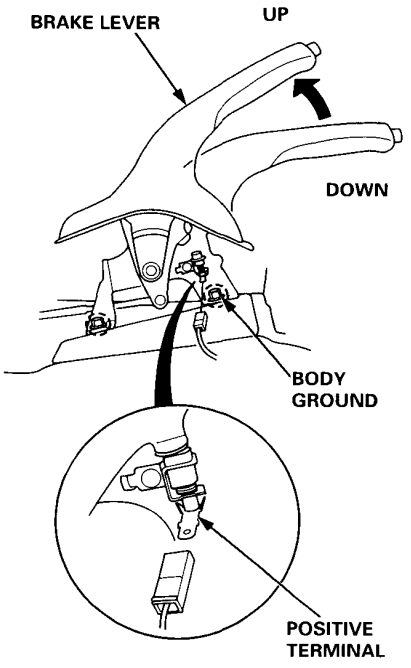
5. If the obtained readings are substantially different from the specifications above, replace the sending unit.

Brake System Indicator

Parking Brake Switch Test

1. Remove the rear console and disconnect the connector from the switch.
2. Check for continuity between the terminals in each switch position according to the table.

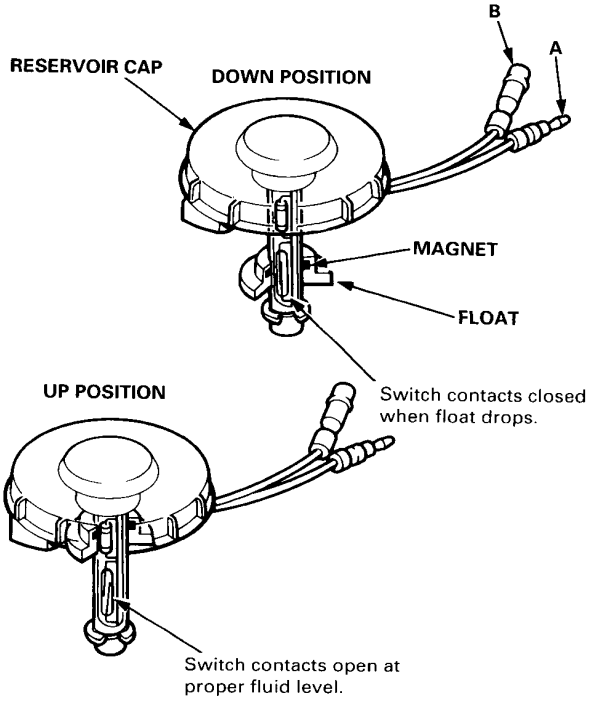
Position \ Terminal	Positive Terminal	Body Ground
BRAKE LEVER UP	○———	———○
BRAKE LEVER DOWN		



Brake Fluid Level Switch Test

1. Remove the reservoir cap. Check that the float moves up and down freely; if it doesn't, replace the reservoir cap assembly.
2. Check for continuity between the terminals in each switch position according to the table.

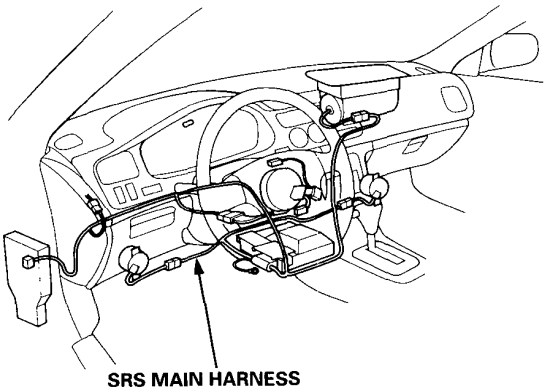
Position \ Terminal	A	B
FLOAT UP		
FLOAT DOWN	○———	———○



Interlock System (KH model)

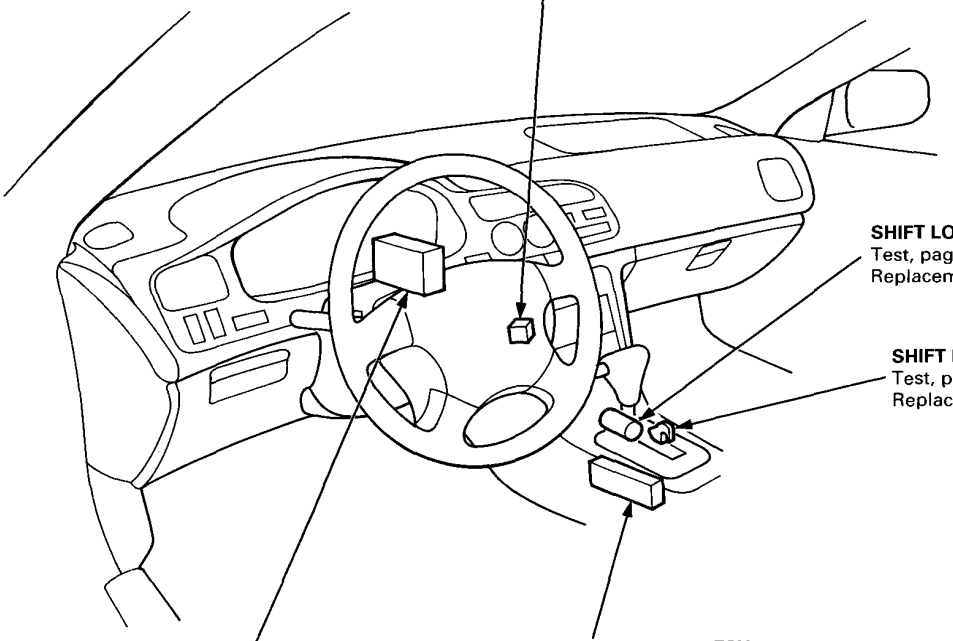
Component Location Index

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**



SRS MAIN HARNESS
(Covered with yellow insulation)

KEY INTERLOCK SOLENOID
and KEY INTERLOCK SWITCH
(In the steering lock assembly)
Test, page 23-151



SHIFT LOCK SOLENOID
Test, page 23-152
Replacement, page 23-152

SHIFT LOCK PIN SWITCH
Test, page 23-153
Replacement, page 23-153

INTERLOCK CONTROL UNIT
Input Test, page 23-150

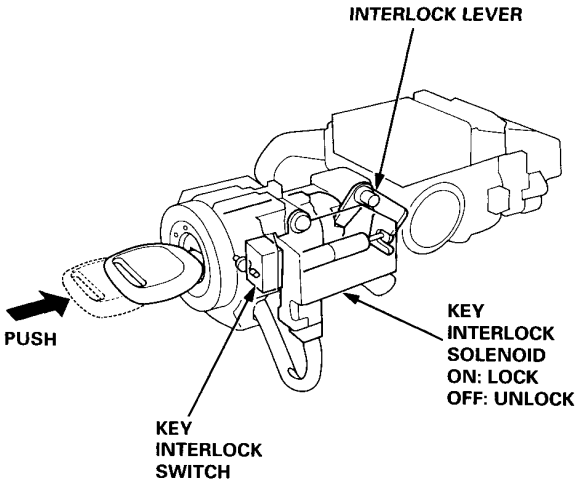
A/T GEAR POSITION SWITCH
Test, page 23-168
Replacement, page 23-169

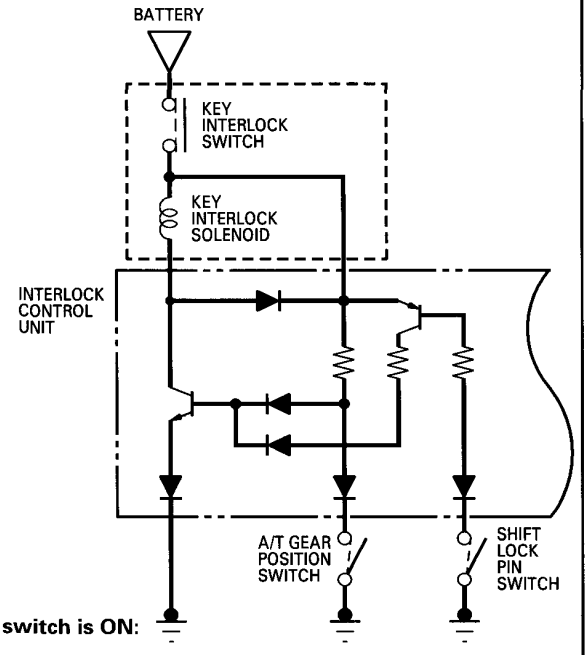
Description

The car is equipped with the following devices to prevent inadvertent shifting:

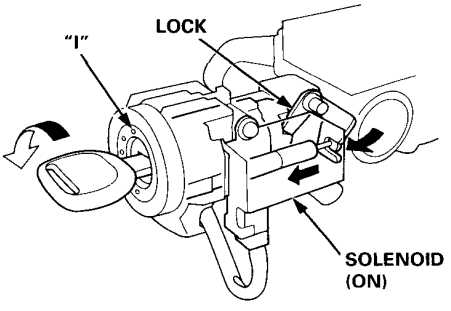
- Key cylinder with interlocked ignition key (Key Interlock System)
- Shift lever with shift lock (Shift lock System)

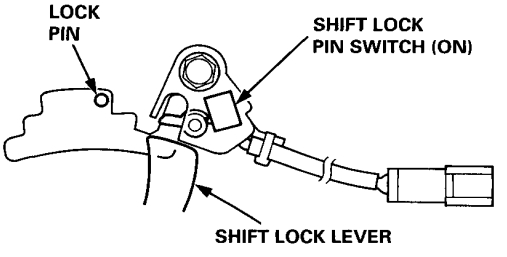
Key Interlock System:
When the shift lever is in any other position than [P] or is not securely locked in [P] (shift lock pin switch is ON), a solenoid is activated, making it impossible to remove the ignition key from the ignition switch.
To be able to remove the key, the shift lever must be in [P] and must be securely locked in this position (shift lock pin switch must be turned off by the lock pin).



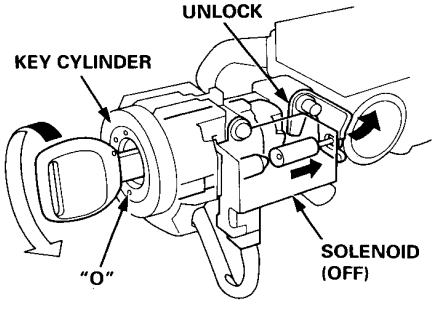


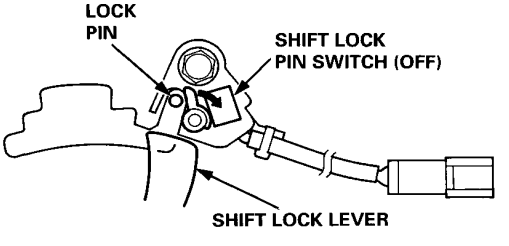
The shift lever is in any other position than [P] and the shift lock pin switch is ON:





The shift lever is in [P] and the shift lock pin switch is OFF:





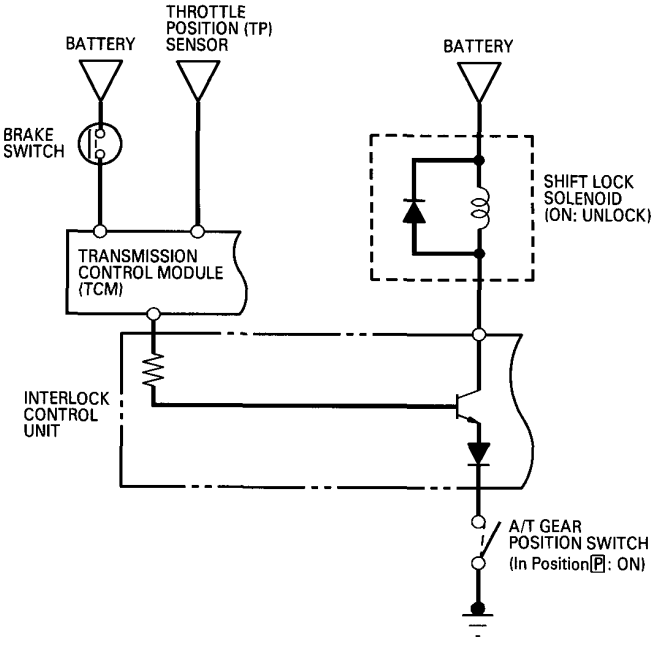
(cont'd)

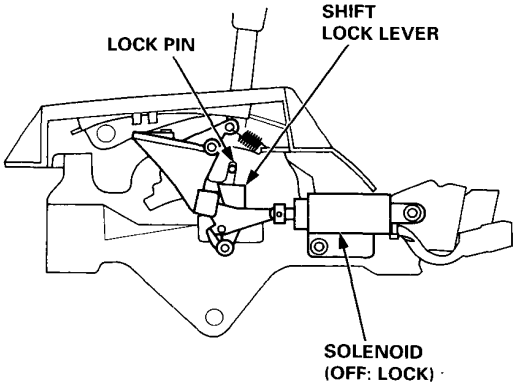
Interlock System (KH model)

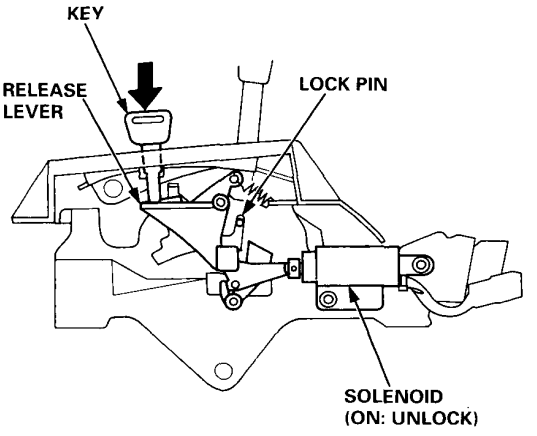
Description (cont'd)

Shift Lock System:
The shift lock system prevents the shift lever from moving to [R] or [D] from position [P] unless you step on the brake pedal.

NOTE:
- The shift lever cannot be shifted when the brake pedal and the accelerator are depressed at the same time.
- In case of system malfunction, the shift lever can be released by pushing a key into the release slot near the shift lever.

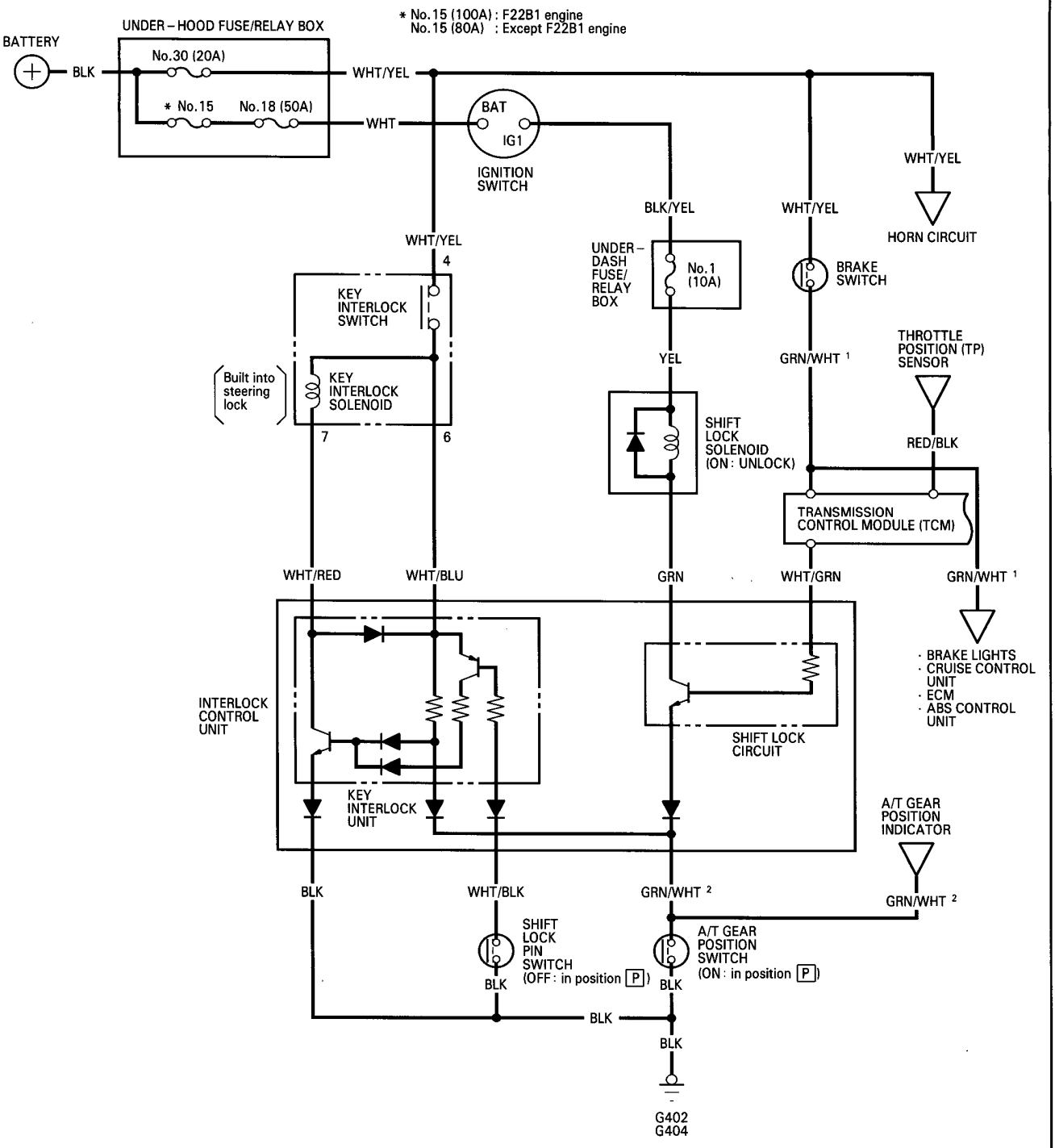






Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example, GRN/WHT [1] and GRN/WHT [2] are not the same).

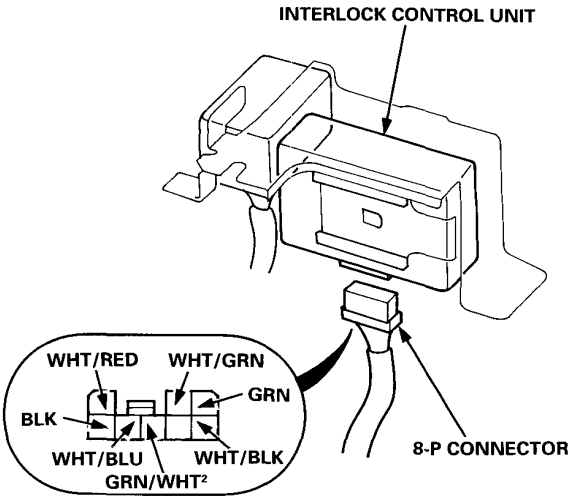


Interlock System (KH model)

Control Unit Input Test

1. Disconnect the 8-P connector from the interlock control unit.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If a test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, substitute a known-good control unit, and recheck the system. If the check is OK, the control unit must be faulty; replace it.

NOTE: If the shift lock solenoid clicks when the ignition switch is turned ON (II) and you step on the brake pedal (with the shift lever in P), the shift lock system is electronically normal; if the shift lever cannot be shifted from P, test the A/T gear position switch as described on page 23-168, and see section 14.



View from wire side

Shift Lock System:

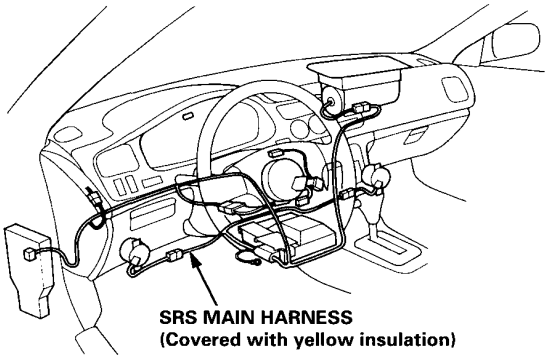
No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	WHT/GRN	Ignition switch ON (II), brake pedal pushed	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty transmission control module • Faulty brake switch • Faulty throttle position (TP) sensor • An open in the wire
		Ignition switch ON, brake pedal and accelerator pushed at the same time	Check for voltage to ground: There should be less than battery voltage.	
2	GRN/WHT²	Shift lever in P	Check for continuity to ground: There should be continuity.	• Faulty A/T gear position switch • Poor ground (G402, G404) • An open in the wire
3	GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse • Faulty shift lock solenoid • An open in the wire

Key Interlock System:

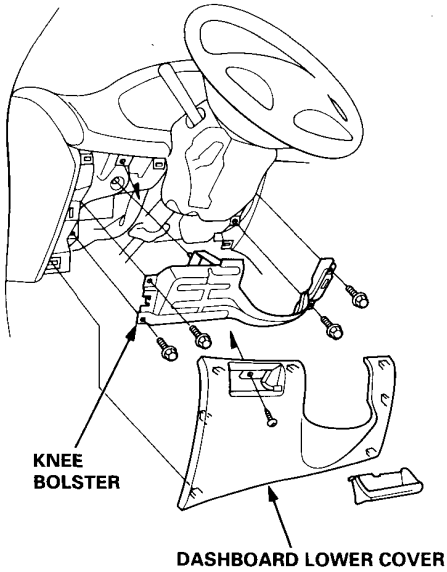
No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	GRN/WHT²	Shift lever in P	Check for continuity to ground: There should be continuity.	• Faulty A/T gear position switch • Poor ground (G402, G404) • An open in the wire
3	WHT/RED WHT/BLU	Ignition switch turned to ACC (I), the key pushed all the way in	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty steering lock assembly (key interlock solenoid) • An open in the wire
4	WHT/BLK	Shift lever in P, push button pressed	Check for continuity to ground: There should be continuity.	• Faulty shift lock pin switch • Poor ground (G402, G404) • An open in the wire
		Shift lever in P, push button released	Check for continuity to ground: There should be no continuity.	• Faulty shift lock pin switch • Short to ground

Key Interlock Solenoid Test

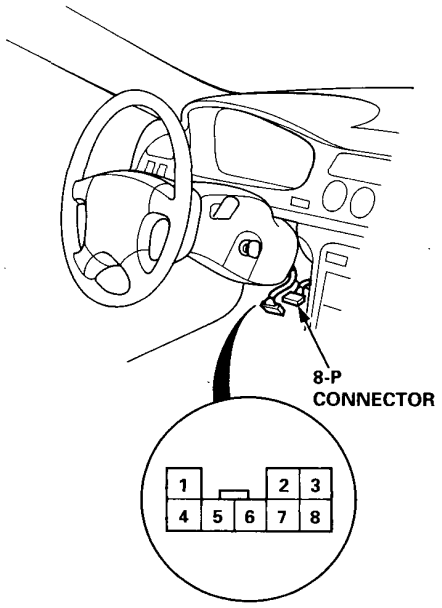
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**



1. Remove the dashboard lower cover and knee bolster.



2. Disconnect the 8-P connector from the main wire harness.



View from wire side

3. Check for continuity between the terminals in each switch position according to the table.

Position		Terminal 4 (WHT/YEL)	6 (WHT/BLU)	7 (WHT/RED)
Ignition switch ACC (I)	key pushed in	○	○	○
	key released		○	○

4. Check that the key cannot be removed with power and ground connected to the No. 4 and No. 7 terminals.
   - If the key cannot be removed, the key interlock solenoid is OK.
   - If the key can be removed, replace the steering lock assembly (the interlock solenoid is not available separately).

Interlock System (KH model)

Shift Lock Solenoid Test/Replacement

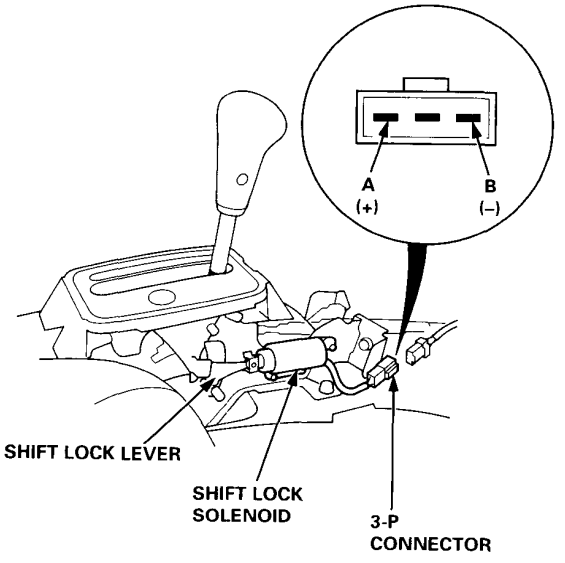
Test:

1. Remove the front console, then disconnect the shift lock solenoid 3-P connector from the main wire harness.

   NOTE: Do not connect power to the B (–) terminal (reverse polarity) or you will damage the diode inside the solenoid.

2. Connect battery power to the A terminal and ground to the B terminal momentarily. Check the solenoid. If it does not work, replace it.

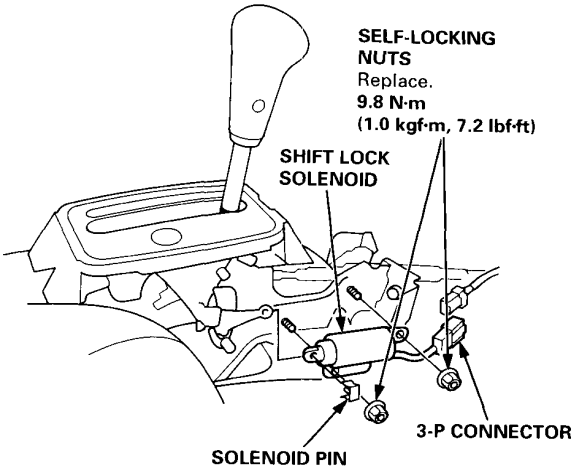
   NOTE:
   - When the shift lock solenoid is ON, check that there is a clearance of 3.9 ± 0.5 mm (0.15 ± 0.020 in) between the top of the shift lock lever and the lock pin groove (see clearance check on this page).
   - When the shift lock solenoid is OFF, make sure that the lock pin is blocked by the shift lock lever.
   - If it is not, adjust the position of the shift lock solenoid.



Replacement:

1. Remove the solenoid pin.

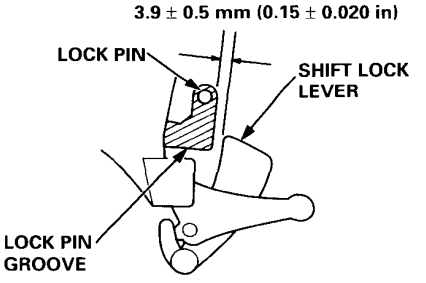
2. Remove the self-locking nuts and shift lock solenoid.



3. Install the new shift lock solenoid in the reverse order of removal, and adjust its position.

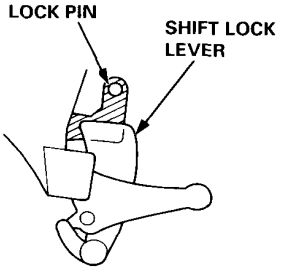
   - When the shift lock solenoid is ON, check that there is a clearance of 3.9 ± 0.5 mm (0.15 ± 0.020 in) between the top of the shift lock lever and the lock pin groove, and tighten the self-locking nuts.

   NOTE: Use brand-new self-locking nuts.



   - When the shift lock solenoid is OFF, make sure that the lock pin is blocked by the shift lock lever.

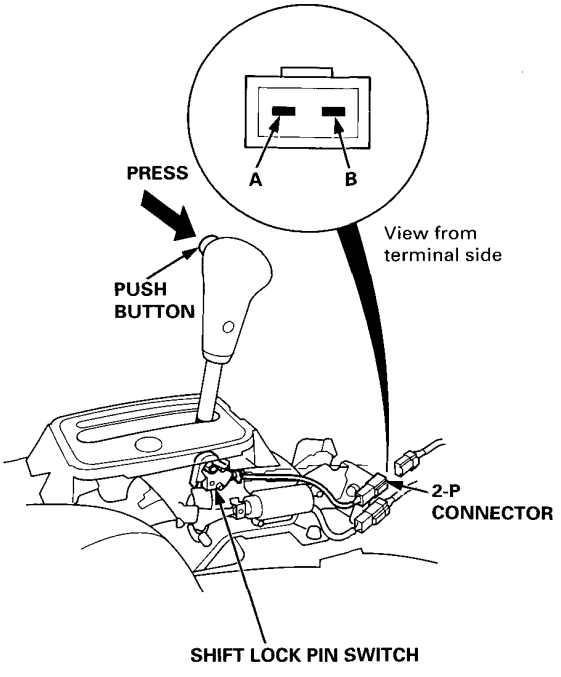
   NOTE: Test the solenoid after you assembled it.



Shift Lock Pin Switch Test

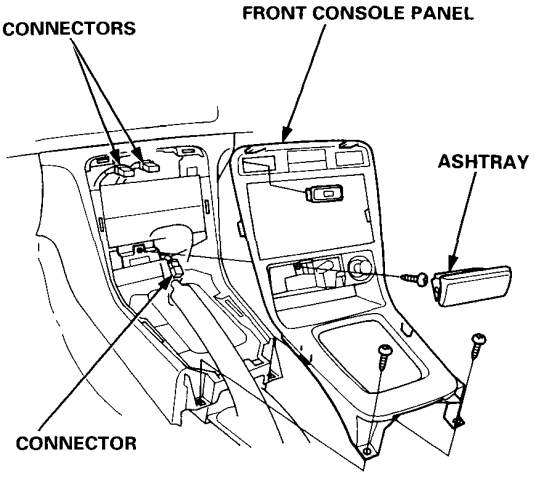
1. Remove the rear console (see page 23-134).
2. Remove the front console panel.
3. Remove the stereo radio/cassette player (see page 23-222).
4. Remove the front console (see section 20).
5. Disconnect the shift lock pin switch 2-P connector from the main wire harness.
6. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		A	B
Push button	Pressed	○	○
	Released		

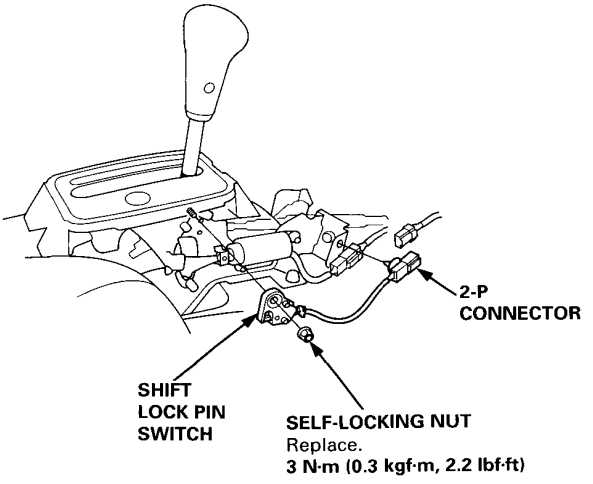


Shift Lock Pin Switch Replacement

1. Remove the rear console (see page 23-134).
2. Remove the front console panel.



3. Remove the stereo radio/cassette player (see page 23-222).
4. Remove the front console (see section 20).
5. Disconnect the shift lock pin switch 2-P connector from the main wire harness.
6. Remove the self-locking nut and shift lock pin switch.

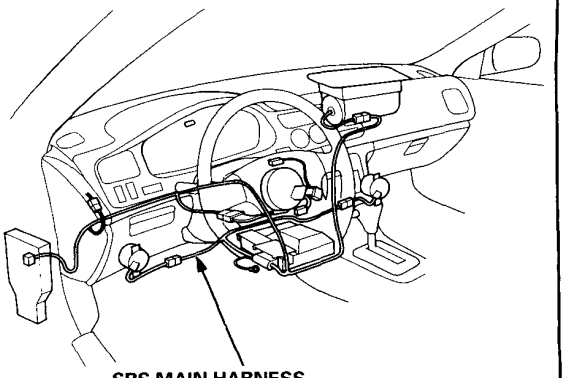


Safety Indicator

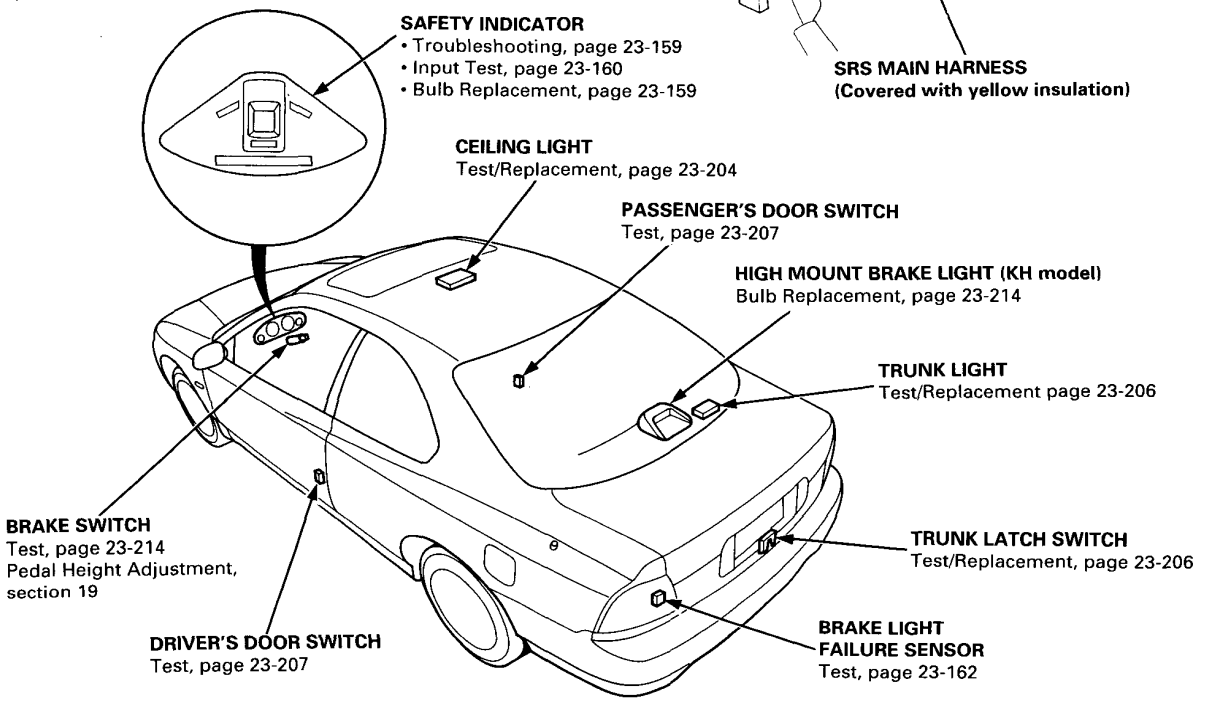
Component Location Index

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



SRS MAIN HARNESS
(Covered with yellow insulation)



SAFETY INDICATOR
- Troubleshooting, page 23-159
- Input Test, page 23-160
- Bulb Replacement, page 23-159

CEILING LIGHT
Test/Replacement, page 23-204

PASSENGER'S DOOR SWITCH
Test, page 23-207

HIGH MOUNT BRAKE LIGHT (KH model)
Bulb Replacement, page 23-214

TRUNK LIGHT
Test/Replacement page 23-206

BRAKE SWITCH
Test, page 23-214
Pedal Height Adjustment, section 19

TRUNK LATCH SWITCH
Test/Replacement, page 23-206

DRIVER'S DOOR SWITCH
Test, page 23-207

BRAKE LIGHT FAILURE SENSOR
Test, page 23-162

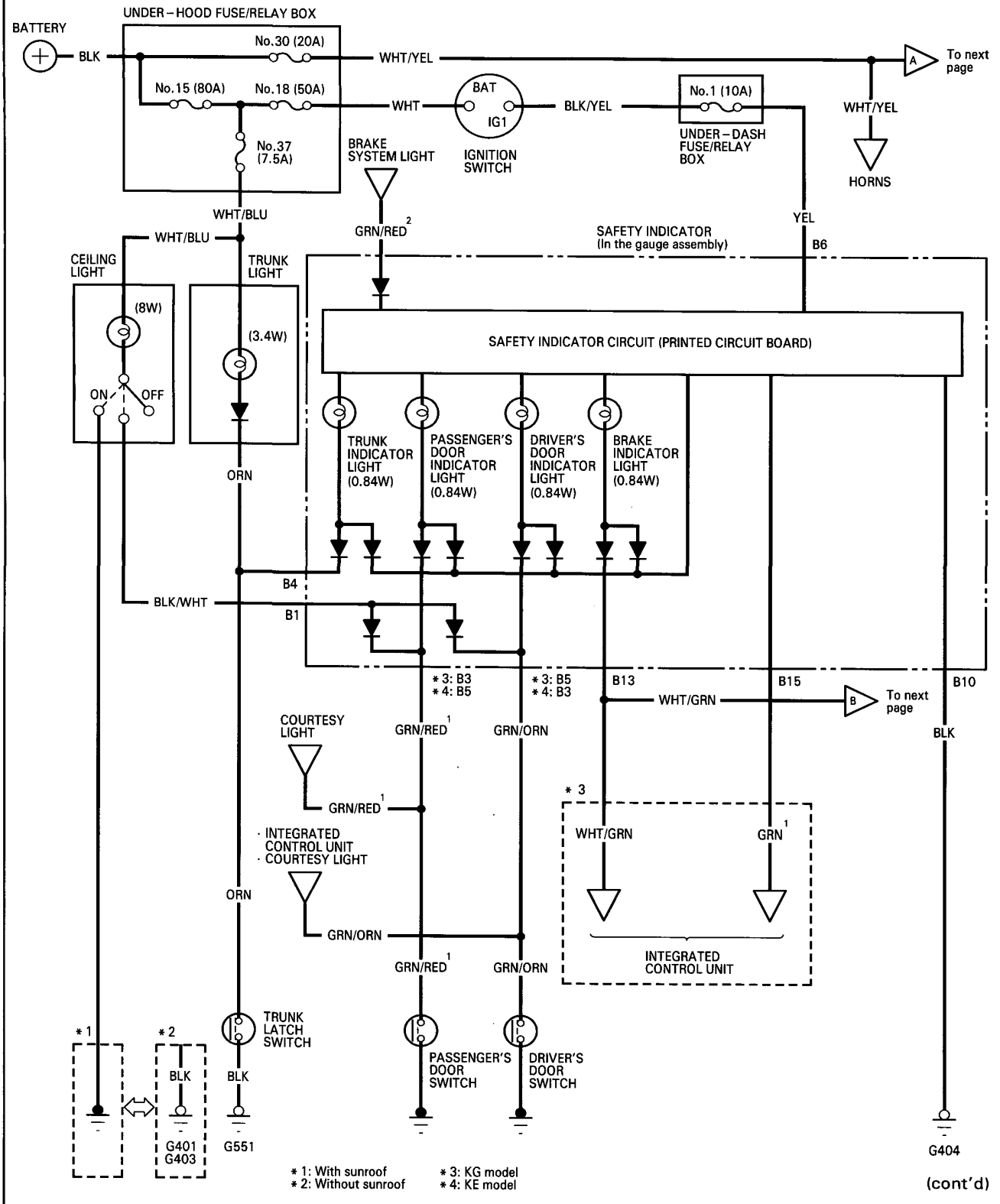
Description

Safety Indicator System:
Bulbs are used to indicate when the trunk lid or a door is not fully closed, or when a brake light is faulty. The bulbs will remain ON for about two seconds after the ignition switch has been turned ON (II) to show that the system circuit is functioning.

Brake Light Bulb Failure Indicator: KH and KE models
If all brake light bulbs are OK, the indicator light stays off because the WHT/GRN wire is constantly being grounded by the brake light failure sensor. With the brake light off, the ground is provided through the diode, the failure sensor relay coil, and the bulb filaments. With the brake light on, both relays in the sensor, connected in series, supply ground. If either of the two bulbs is not working, the chain is broken and the WHT/GRN wire is not being grounded. The indicator light comes on.

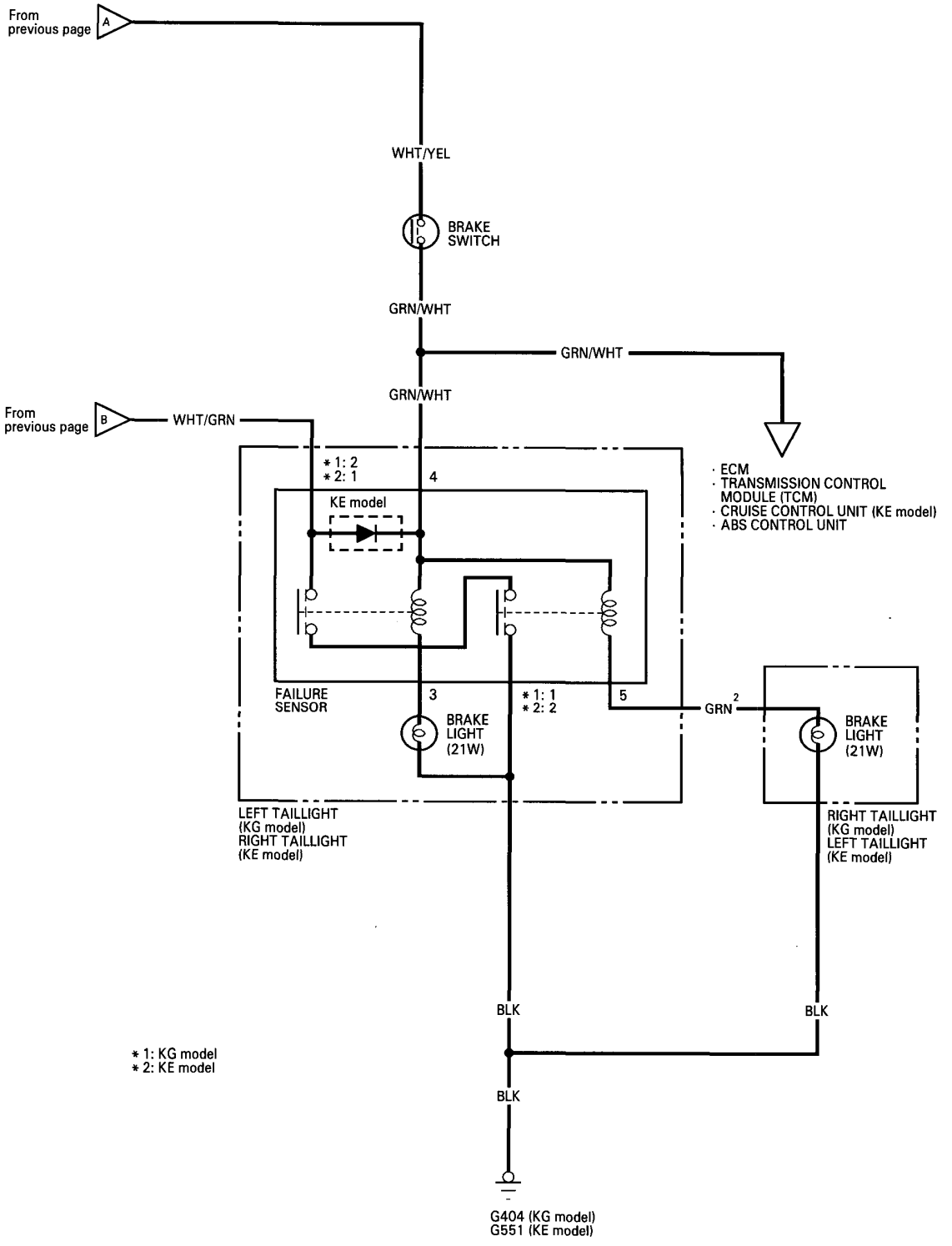
Brake Light Bulb Failure Indicator: KG model
When the ignition switch is turned ON, the brake indicator light stays on.
When the brake pedal is depressed once, the brake indicator light should go out. If there is defect in the brake system (blown fuse, faulty brake light switch, open or short circuit and blown bulbs), the brake indicator light stays on with the brake pedal operated.

Circuit Diagram (KG and KE models)

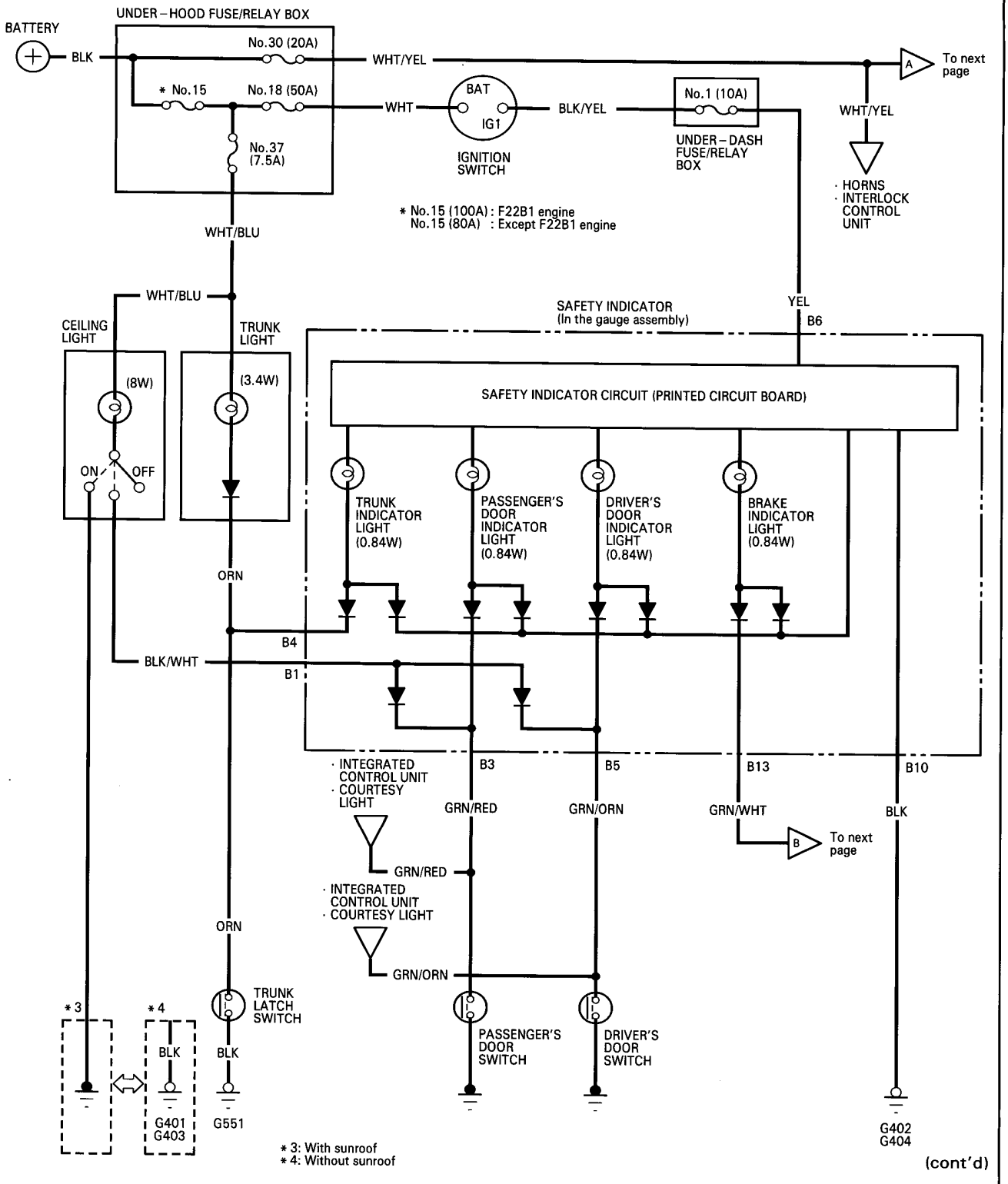


Safety Indicator

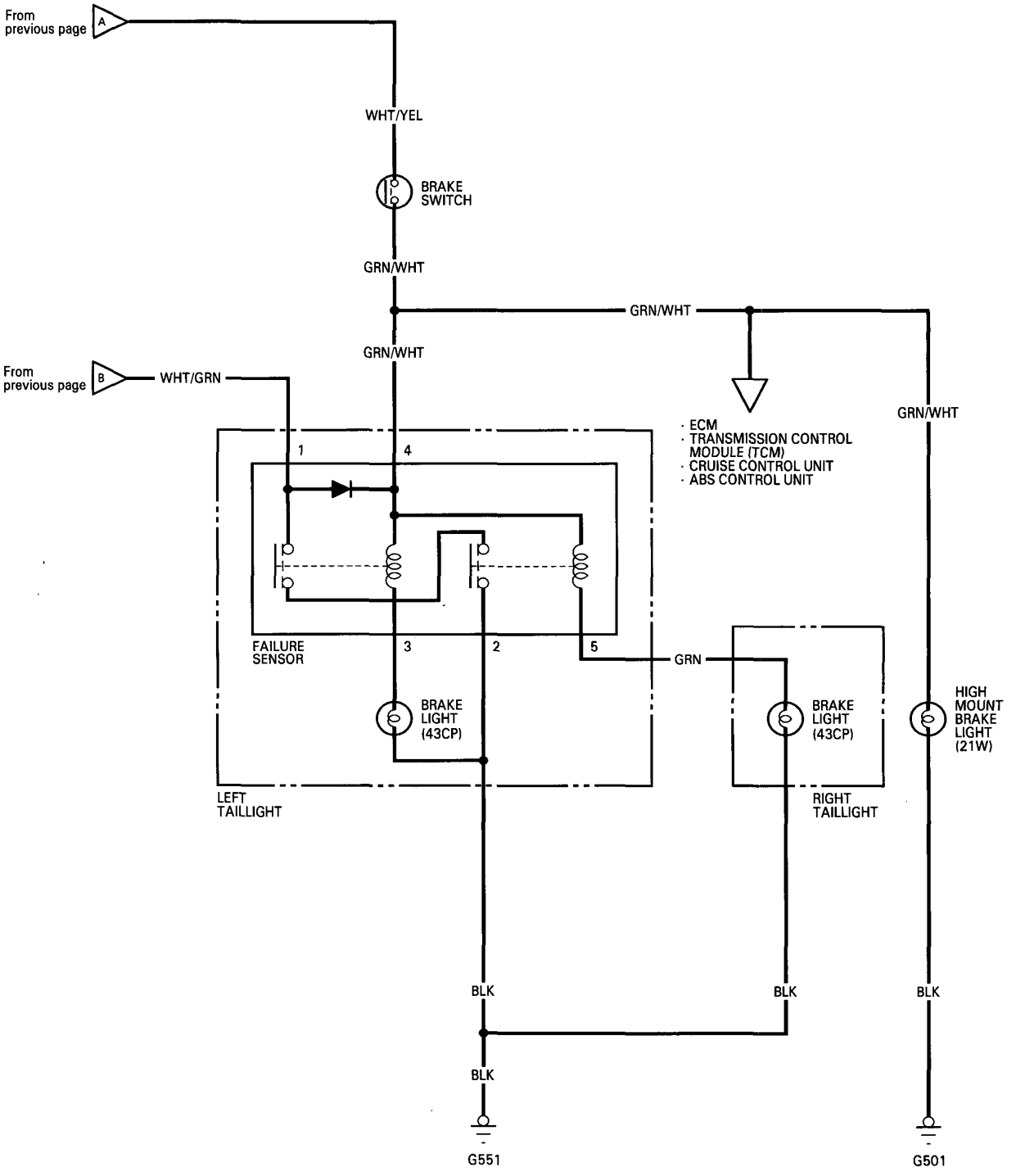
Circuit Diagram (KG and KE models cont'd)



Circuit Diagram (KH model)



Circuit Diagram (KH model cont'd)



Troubleshooting

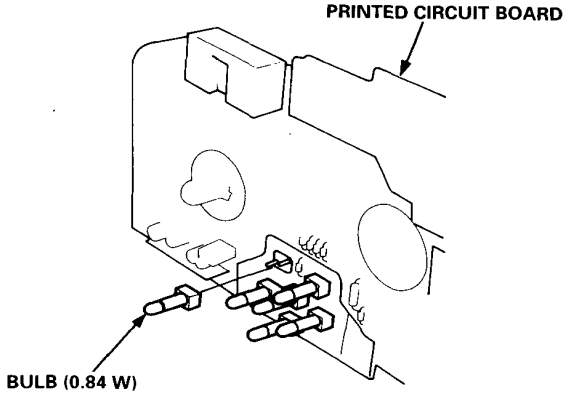
NOTE:
- The numbers in the table show the troubleshooting sequence.
- Make sure that the ceiling light bulb and the trunk light bulb are not blown.

Symptom \ Item to be inspected	Blown No. 1 (10 A) fuse (In the under-dash fuse/relay box)	Blown No. 37 (7.5 A) fuse (In the under-hood fuse/relay box)	Safety indicator input test	Blown bulb	Brake light failure sensor	Door switch	Trunk latch switch	Poor ground	Open circuit, loose or disconnected terminals
No indicators operate.	1		2					G402 G404	YEL
Indicator lights do not come on when the ignition switch is turned to ON (II).			1	2					
Door indicator light does not come on with doors open.			2	3		1			GRN/ORN or GRN/RED
Trunk indicator light does not come on with trunk lid open.			2	3			1	G551	ORN
Brake indicator light does not come on with blown brake light bulb.			1	3	2				WHT/GRN, *1 GRN[2] or *2 GRN
Brake indicator light remains on with good brake light bulbs.			2		1			G404 or G551	
Ceiling light does not come on with door open (with switch in middle position).		1	2	3					BLK/WHT

*1: KG and KE models *2: KH model

Bulb Replacement

1. *Remove the gauge assembly (see page 23-134).*
2. Remove the printed circuit board from the housing (see page 23-137).
3. *Remove the bulb.*



Safety Indicator

Indicator Input Test

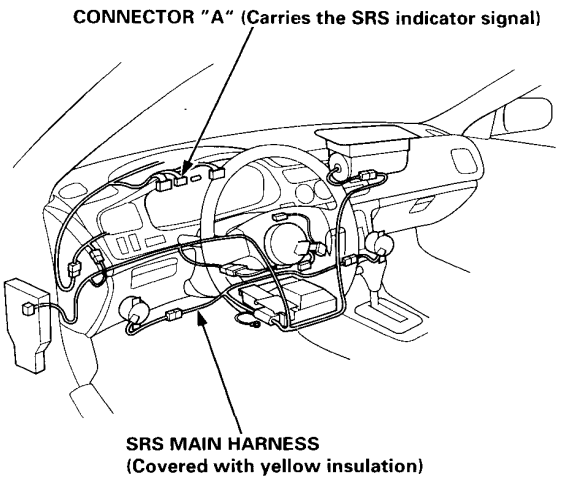
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

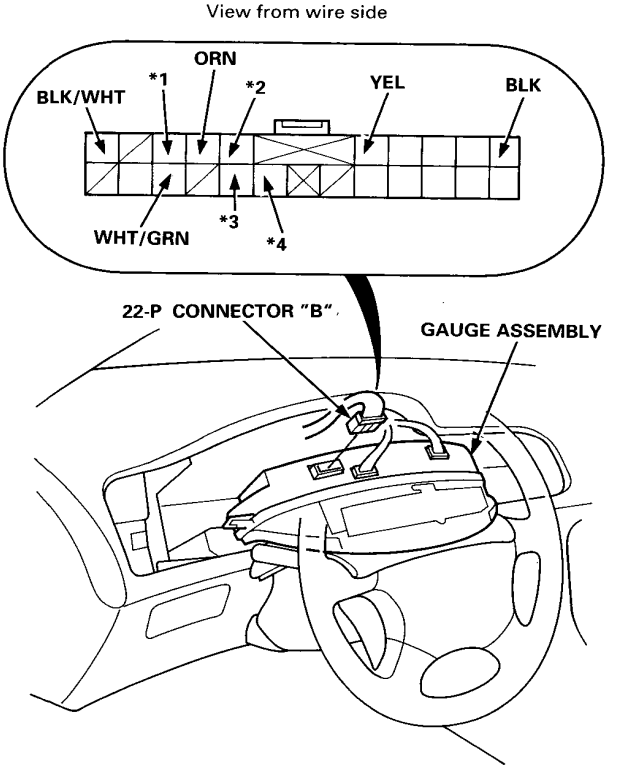
NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

1. Remove the gauge assembly from the dashboard (see page 23-134), and disconnect the 22-P connector from the gauge assembly.

2. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the printed circuit board A must be faulty; replace it.





***1: GRN/RED[1] (KG model)**
GRN/RED (KH model)
GRN/ORN (KE model)
***2: GRN/ORN (KG and KH models)**
GRN/RED[1] (KE model)
***3: GRN[1] (KG model)**
***4: GRN/RED[2] (KG and KE models)**

No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
3	WHT/GRN	Brake pedal pushed	Check for continuity to ground: There should be less than 200 ohms with the pedal pushed.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty brake switch • Blown brake light bulbs • Faulty brake light failure sensor • Poor ground (G551) or (G402, G404) • An open in the wire
4	ORN	Trunk lid open	Check for continuity to ground: There should be continuity. NOTE: Before testing, remove No. 37 (7.5 A) fuse from the under-hood fuse/relay box.	• Faulty trunk latch switch • An open in the wire
5	BLK/WHT	Ceiling light switch in middle position	Connect to ground: The ceiling light should come on.	• Blown No. 37 (7.5 A) fuse in the under-hood fuse/relay box • Faulty ceiling light • An open in the wire
*1 6	GRN/ORN	Driver's door open	Check for continuity to ground: There should be continuity. NOTE: Before testing, remove No. 37 (7.5 A) fuse from the under-hood fuse/relay box.	• Faulty door switch • An open in the wire
	GRN/RED[1] or GRN/RED	Passenger's door open		
*4 7	GRN/RED[2]	Ignition switch ON	Attach to ground: The brake system light should come on.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Blown bulb • An open in the wire
*3 8	GRN[1]	With brake pedal released, ignition switch OFF to ON	Check for continuity in both directions between the GRN[1] and BLK terminals: There should be continuity in only one direction as the ignition switch is turned ON, then no continuity in both directions with brake pedal pushed.	• Faulty brake light circuit failure sensor

Safety Indicator

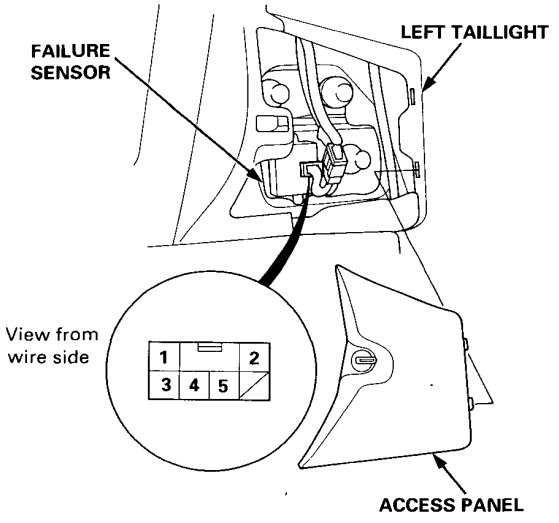
Brake Light Failure Sensor Test

1. First make sure the brake lights come on when the brake pedal is pressed.

   - If all the brake lights come on, go to step 2.
   - If one of the brake lights does not come on, check whether the bulb is blown. If the bulb is OK, go to step 2.
   - If none of the brake lights come on, check the brake light circuit (see page 23-156).

2. Open the trunk lid and the taillight access panel to the left (LHD type) or right (RHD type) taillight. Make sure the BRAKE LAMP light in the safety indicator does not come on and stay on, when the No. 2 (KG model) or No. 1 (KE and KH models) terminal of the 6-P connector is grounded and the ignition switch is turned from OFF to ON (II).

   NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



   - If the BRAKE LAMP light comes on and stays on, check for an open in the WHT/GRN wire between the safety indicator and the No. 2 (KG model) or No. 1 (KE and KH models) terminal of the failure sensor, and whether the safety indicator circuit (printed circuit board) has a problem.
   - If the BRAKE LAMP light does not stay on, go to step 3.

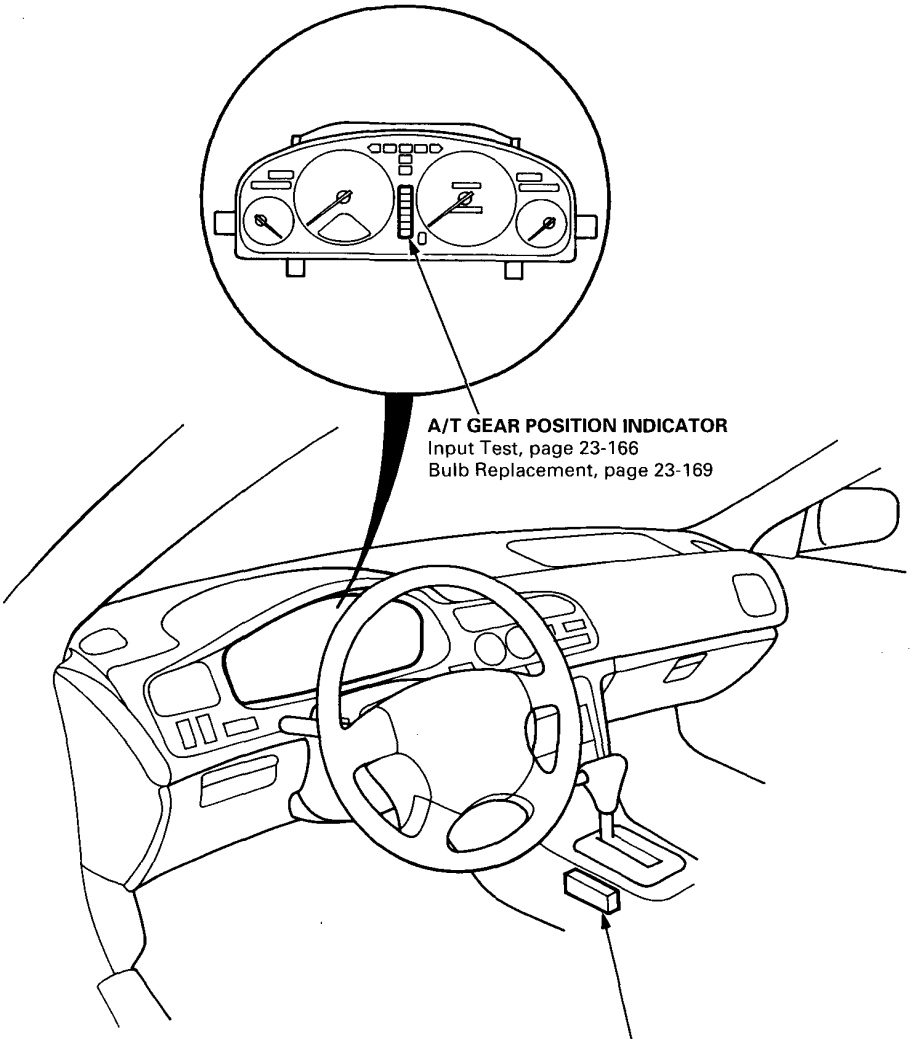
3. Make sure the BRAKE LAMP light does not come on when the ignition switch is turned from OFF to ON (II) with the No. 1 (KG model) or No. 2 (KE and KH models) terminal of the 6-P connector grounded and the brake pedal pressed.

   - If the BRAKE LAMP light come on and stays on, replace the failure sensor.
   - If the BRAKE LAMP does not stay on, check for an open in the BLK wire between the No. 1 (KG model) or No. 2 (KE and KH models) terminal of the failure sensor and ground, and check for a poor ground at G402, G404 (G551).

A/T Gear Position Indicator

Component Location Index

NOTE: LHD type is shown, RHD type is similar.

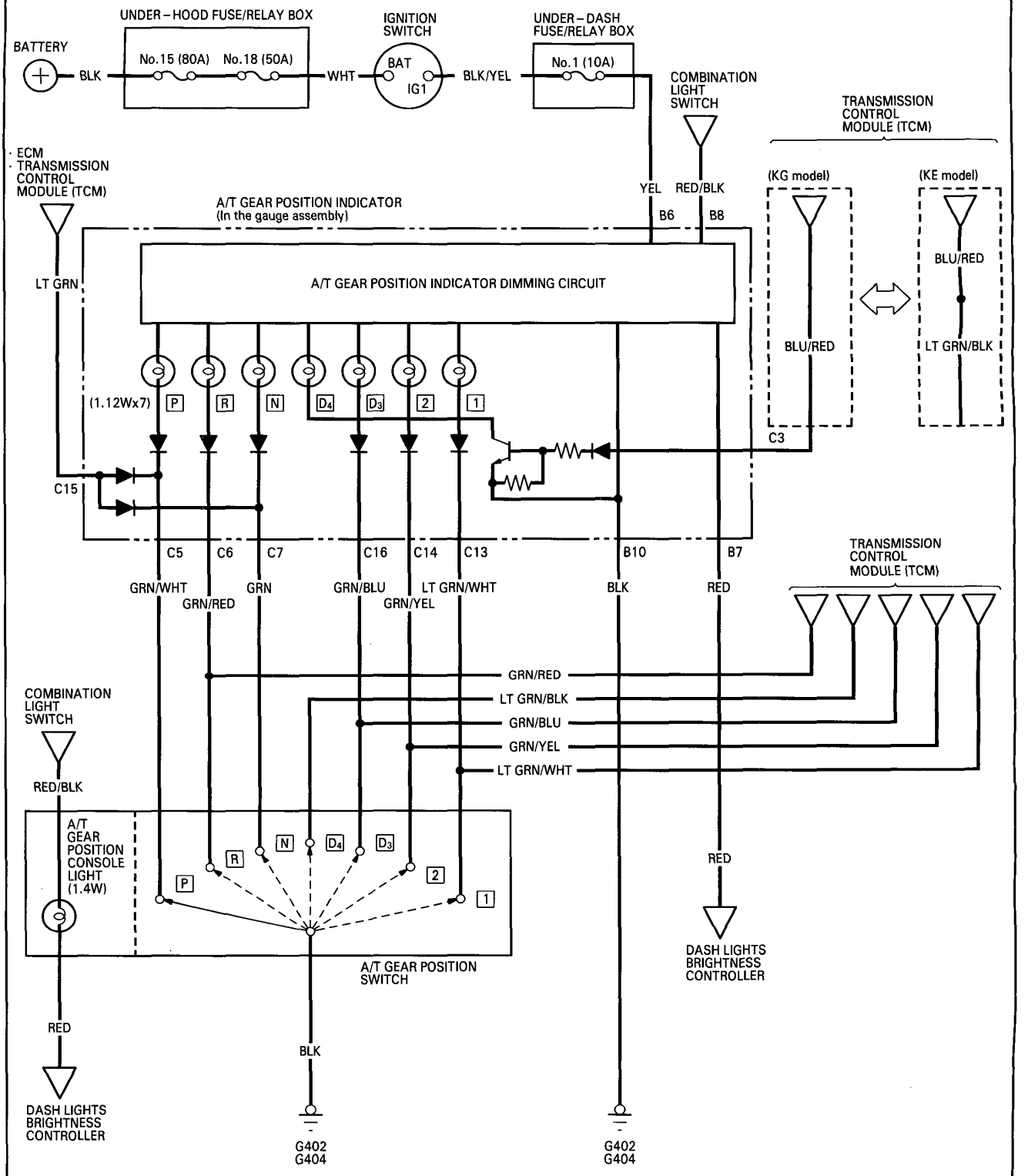


A/T GEAR POSITION INDICATOR
Input Test, page 23-166
Bulb Replacement, page 23-169

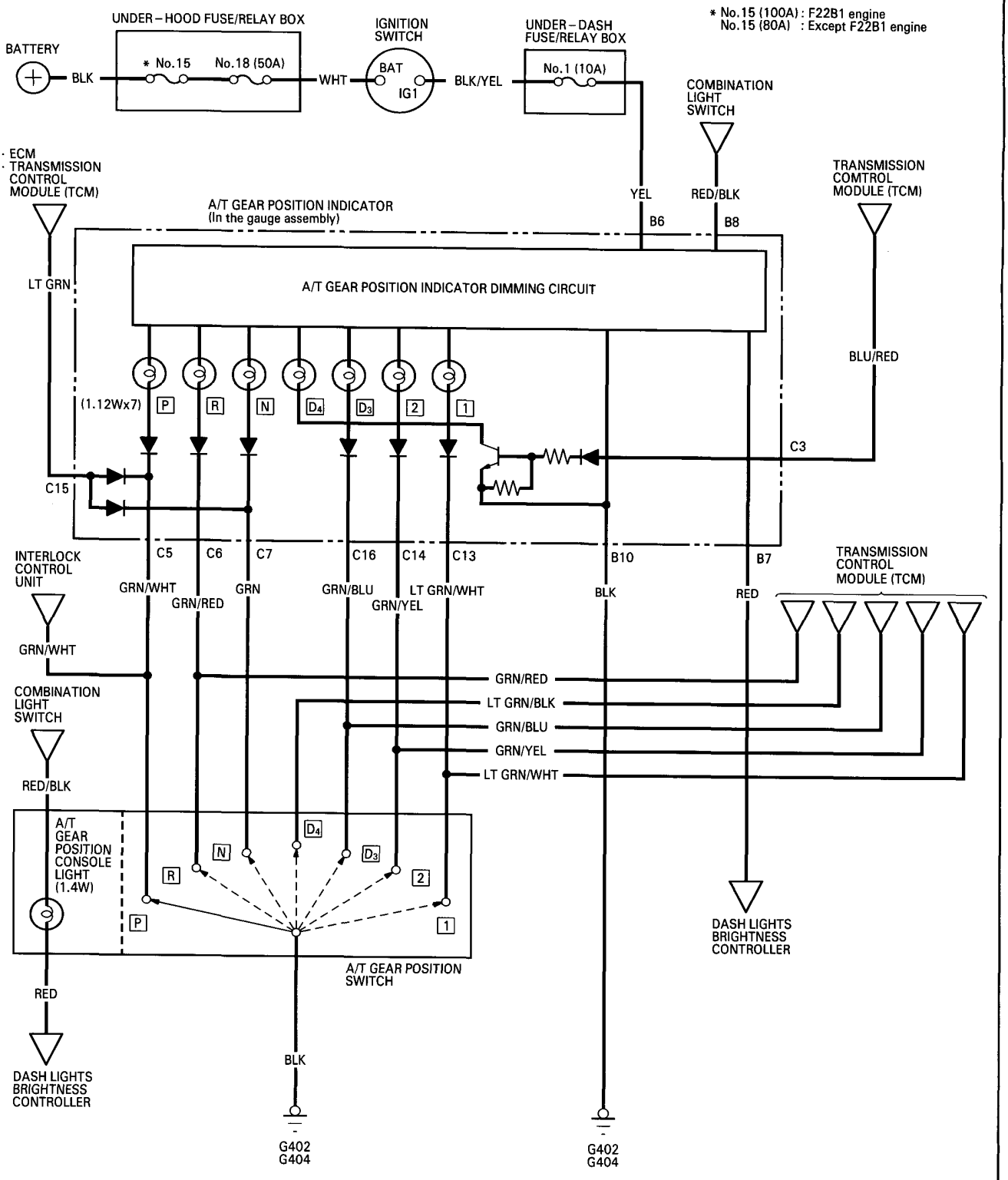
A/T GEAR POSITION SWITCH
Test, page 23-168
Replacement, page 23-169

A/T Gear Position Indicator

Circuit Diagram (KG and KE models)



Circuit Diagram (KH model)



A/T Gear Position Indicator

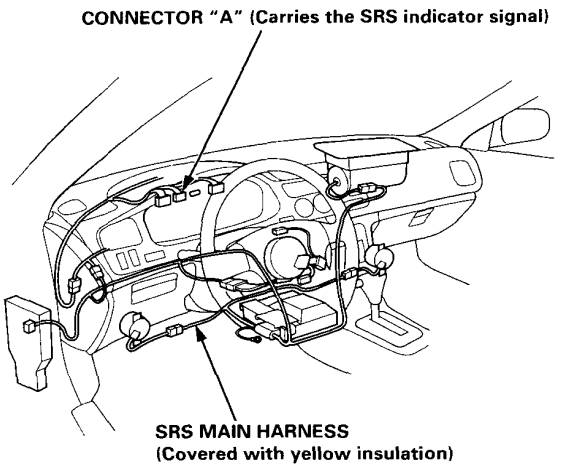
Indicator Input Test

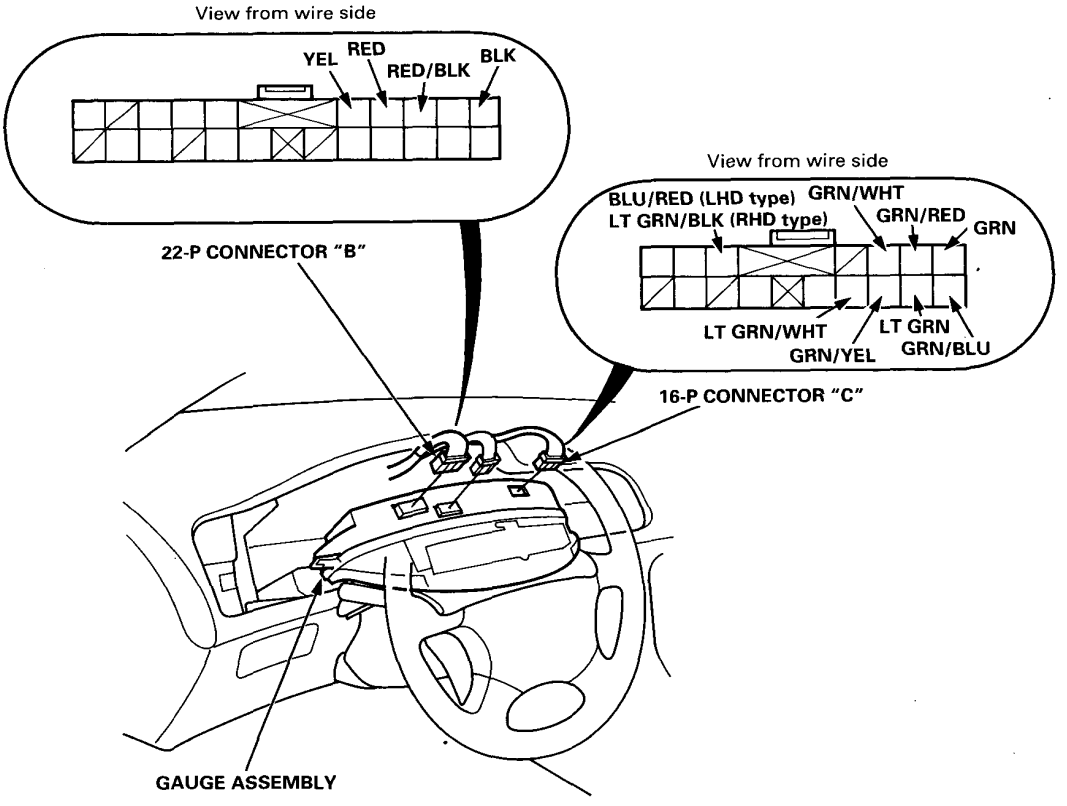
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

1. Remove the gauge assembly (see page 23-134), and disconnect all connectors from it.

2. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the 22-P and 16-P connectors.
     — If a test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, but the indicator is faulty, replace the printed circuit board.





No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: *There should be continuity.*	• Poor ground (G402, G404) • *An open in the wire*
2	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
3	GRN/WHT	*Shift lever in* [P] NOTE: Don't push the brake pedal.	*Check for continuity to ground:* There should be continuity.	• *Faulty A/T gear position switch* • Poor ground (G402, G404) • An open in the wire
	GRN/RED	Shift lever in [R]		
	GRN	Shift lever in [N]		
	GRN/BLU	Shift lever in [D3]		
	GRN/YEL	Shift lever in [2]		
	LT GRN/WHT	Shift lever in [1]		
4	RED/BLK and RED	Combination light switch ON and dash lights brightness control dial on full bright	Check for voltage between RED/BLK and RED terminals: There should be battery voltage.	• Blown No. 32 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • Faulty dash lights brightness control system • An open in the wire
5	* BLU/RED or LT GRN/BLK	Ignition switch ON (II), shift lever in [D4]	Check for voltage to ground: There should be about 5 V.	• Faulty A/T gear position switch • Faulty TCM • An open in the wire
	LT GRN	Ignition switch ON (II)	Check for voltage to ground: There should be about 5 V.	• Faulty TCM • Faulty ECM • *An open in the wire*

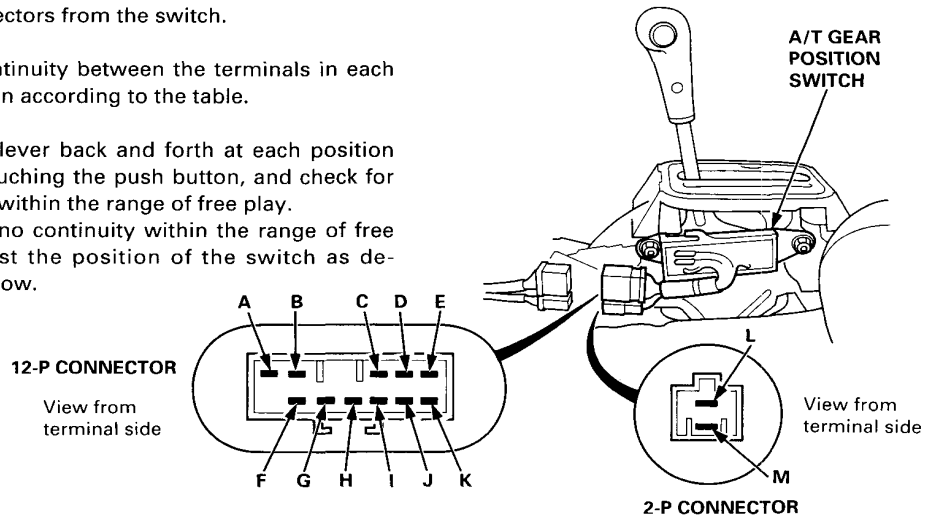
*: BLU/RED (LHD type)
LT GRN/BLK (RHD type)

A/T Gear Position Indicator

A/T Gear Position Switch Test/Adjustment

Test:

1. Remove the front console, then disconnect the 12-P and 2-P connectors from the switch.
2. Check for continuity between the terminals in each switch position according to the table.
   - Move the lever back and forth at each position without touching the push button, and check for continuity within the range of free play.
   - If there is no continuity within the range of free play, adjust the position of the switch as described below.



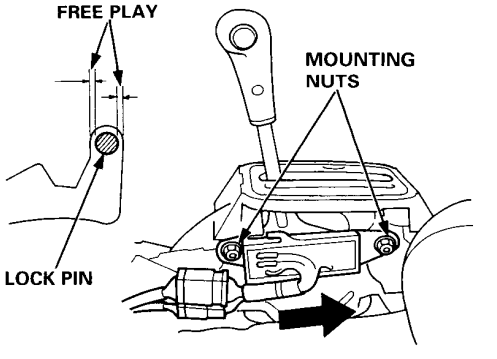
* : With cruise control

Position \ Terminal	A/T Gear Position Switch * A	I	B	C	D	E	F	J	K	Back-up Light Switch G	H	Neutral Position Switch L	M
1		○	○										
2	○	○		○									
D3	○	○			○								
D4	○	○				○							
P		○					○					○	○
R		○						○		○	○		
N		○							○			○	○

Adjustment:

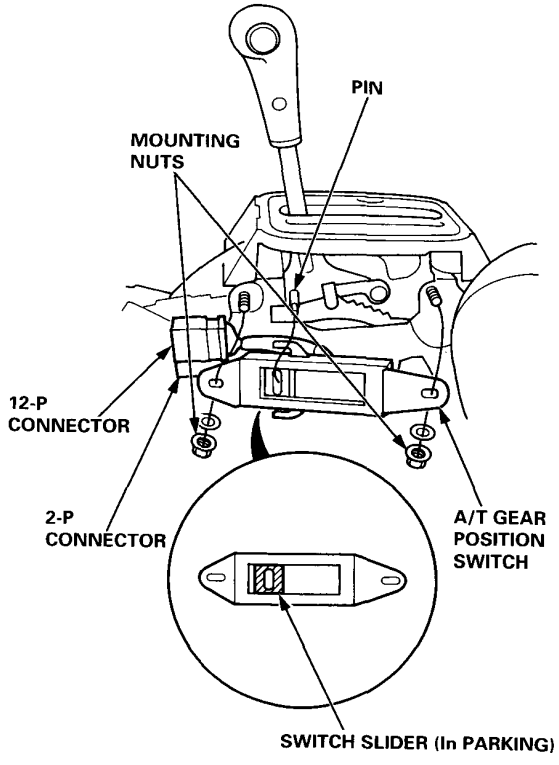
1. Shift to P and loosen the mounting nuts.
2. Slide the switch rearward [up to 2.0 mm (0.08 in)] until there is continuity between the "F" and "I" terminals within the range of the shift lever.
3. Recheck for continuity between the terminals.

NOTE:
- If adjustment is not possible, check for a damaged shift lever detent and/or bracket. If there is no damage, replace the A/T gear position switch.
- The engine should start when the shift lever is in P anywhere within the range of free play.



A/T Gear Position Switch Replacement

1. Remove the front console, then disconnect the 12-P and 2-P connectors from the switch.
2. Remove the two mounting nuts and the switch.



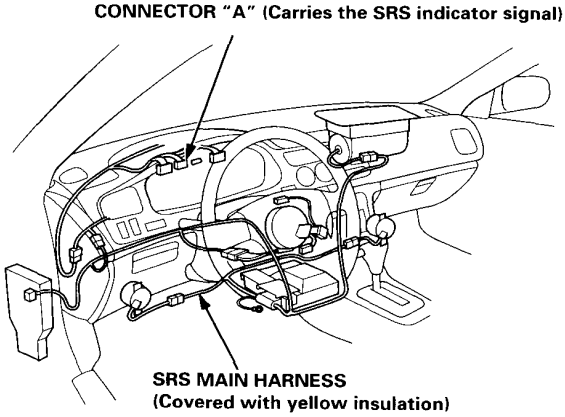
3. Position the slider of the new switch to [P] as shown above.
4. Shift the lever to the [P] position.
5. Attach the switch, and tighten the two mounting nuts.
6. Test the switch in the [P] and [N] positions.

   NOTE: The engine should start when the shift lever is in [P] anywhere within the range of free play.
7. Connect the 12-P and 2-P connectors, clamp the harness, and install the console.

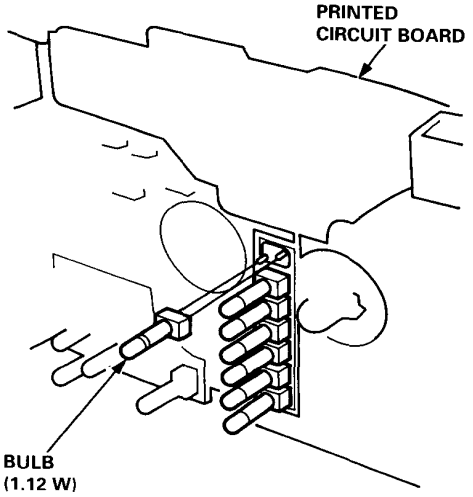
Bulb Replacement

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



1. Remove the gauge assembly (see page 23-134).
2. Disassemble the gauge assembly (see page 23-137).
3. Replace the bulbs at the printed circuit board.

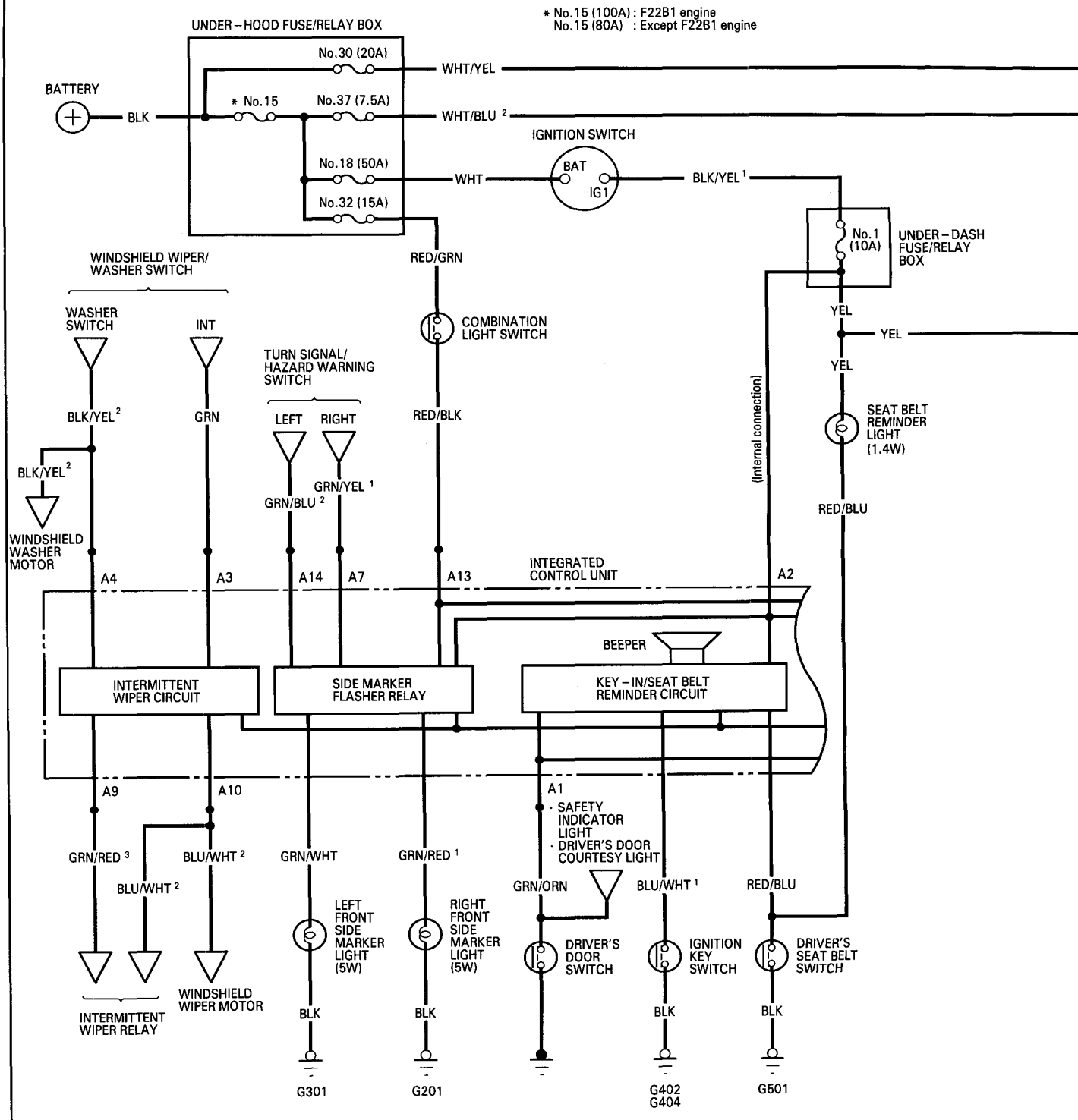


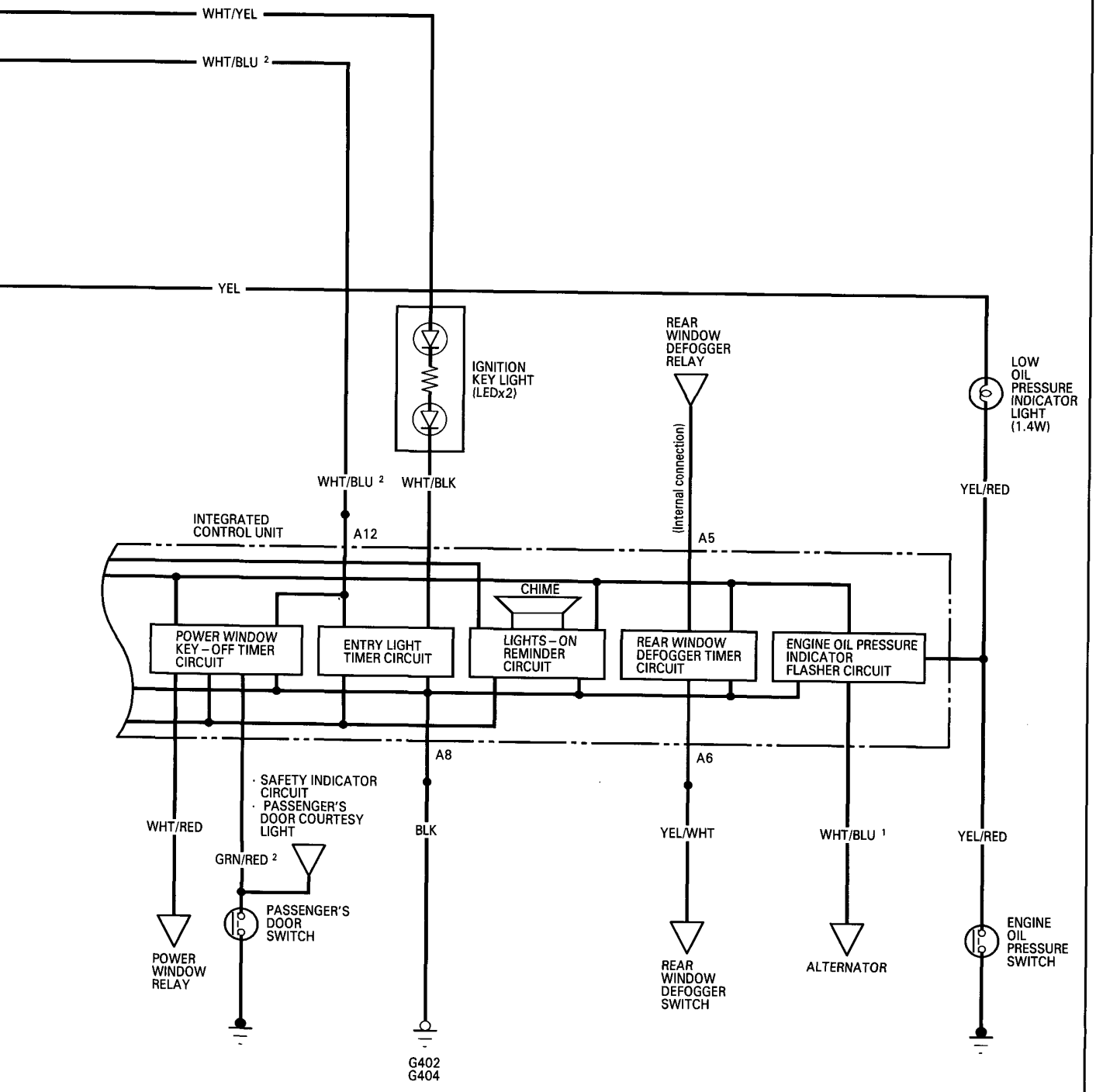
4. Install in the reverse order of removal.

Integrated Control Unit

Circuit Diagram (KH model)

NOTE: Different wires with the same color have been given a number suffix to distinguish them (for example, BLK/YEL[1] and BLK/YEL[2] are not the same).




WHT/YEL
WHT/BLU 2
YEL
IGNITION KEY LIGHT (LEDx2)
REAR WINDOW DEFOGGER RELAY
LOW OIL PRESSURE INDICATOR LIGHT (1.4W)
WHT/BLU 2
WHT/BLK
(Internal connection)
YEL/RED
INTEGRATED CONTROL UNIT
A12
A5
CHIME
POWER WINDOW KEY – OFF TIMER CIRCUIT
ENTRY LIGHT TIMER CIRCUIT
LIGHTS – ON REMINDER CIRCUIT
REAR WINDOW DEFOGGER TIMER CIRCUIT
ENGINE OIL PRESSURE INDICATOR FLASHER CIRCUIT
A8
A6
· SAFETY INDICATOR CIRCUIT
· PASSENGER'S DOOR COURTESY LIGHT
WHT/RED
BLK
YEL/WHT
WHT/BLU 1
YEL/RED
GRN/RED 2
PASSENGER'S DOOR SWITCH
POWER WINDOW RELAY
REAR WINDOW DEFOGGER SWITCH
ALTERNATOR
ENGINE OIL PRESSURE SWITCH
G402
G404

Integrated Control Unit

Input Test (KH model)

CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

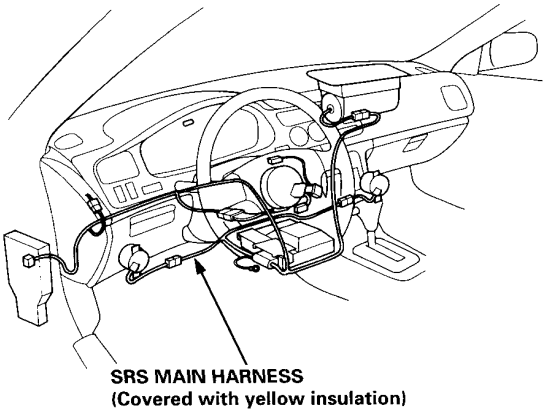
NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.

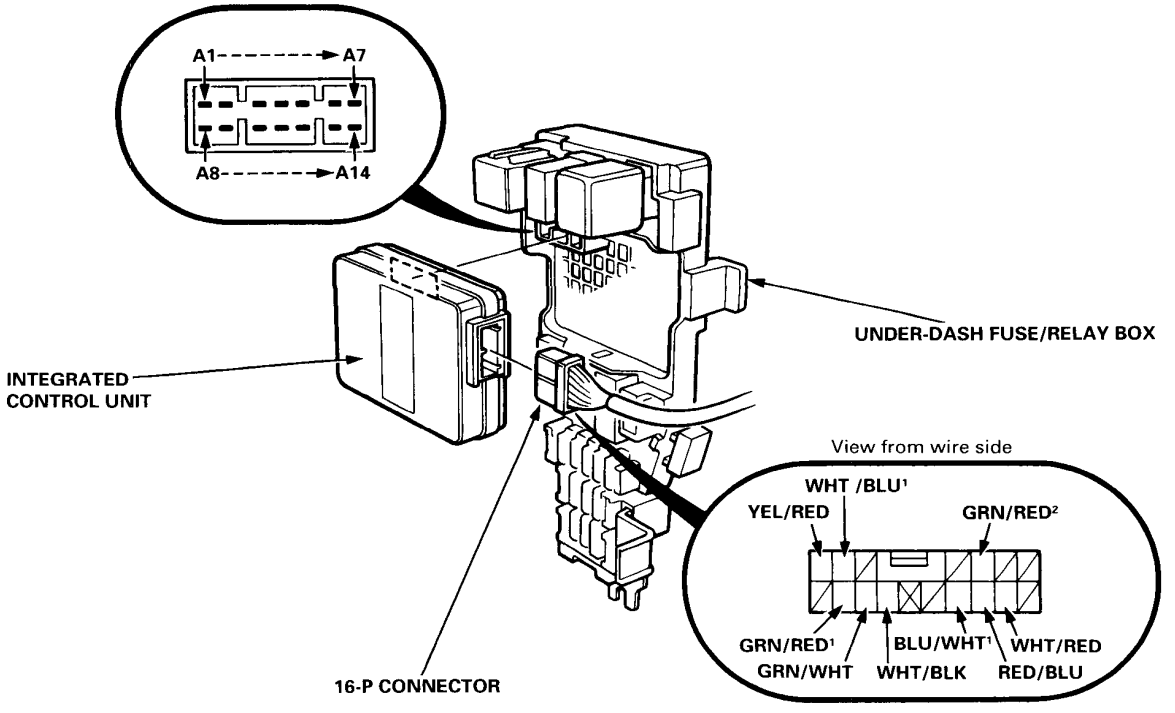
1. Remove the driver's side kick panel, then disconnect the 16-P connector from the integrated control unit.

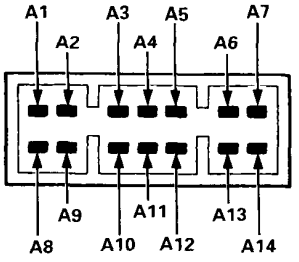
2. Remove the integrated control unit from the under-dash fuse/relay box.

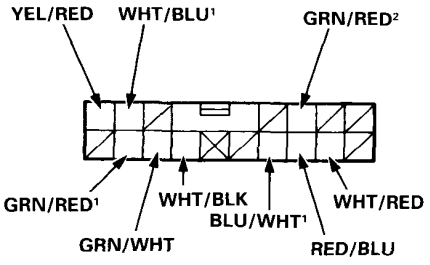
3. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connectors.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.









View from wire side

Intermittent Wiper System:

No.	Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A9	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • Faulty intermittent wiper relay • An open in the wire
3	A3	Ignition switch ON (II) and wiper switch at INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • An open in the wire
4	A4	Ignition switch ON (II) and washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • Faulty washer switch • An open in the wire
5	A10	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • An open in the wire

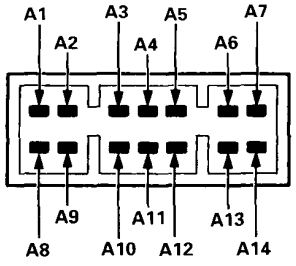
Side Marker Light Flasher System:

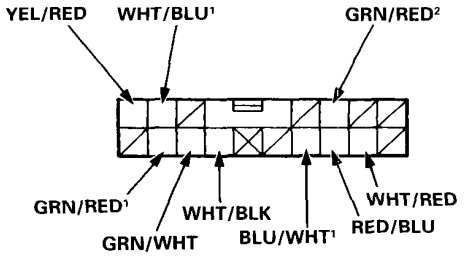
No.	Wire/ Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A2	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
3	A13	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 32 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • An open in the wire
4	A14	Ignition switch ON (II) and turn signal switch in left turn position	Check for voltage to ground: There should be 0 – 12 – 0 – 12 V repeatedly.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Faulty turn signal system • An open in the wire
5	A7	Ignition switch ON (II) and turn signal switch in right turn position		
6	GRN/WHT	Connect the A2 terminal to the GRN/WHT (or GRN/RED1) terminal.	Check front side marker light operation: Left (or Right) front side marker light should come on as the battery is connected.	• Blown bulb • Poor ground G301 (or G201) • An open in the wire
7	GRN/RED1			

(cont'd)

Integrated Control Unit

Input Test (KH model cont'd)





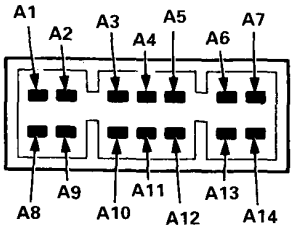
View from wire side

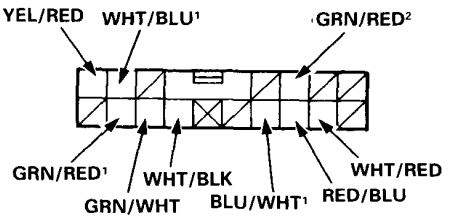
Seat Belt Reminder and Key-in Warning System:

No.	Wire/ Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A2	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
3	A1	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire
4	BLU/WHT¹	Ignition key is inserted into the ignition switch.	Check for voltage to ground: There should be 1 V or less.	• Faulty ignition key switch • An open in the wire • Poor ground (G402, G404)
5	RED/BLU	Driver's seat belt is not buckled.	Check for voltage to ground: There should be 1 V or less.	• Faulty seat belt switch • Poor ground (G501) • Blown bulb • An open in the wire

Power Window Key-off Timer System:

No.	Wire/ Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A1	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire
3	A12	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 37 (7.5 A) fuse in the under-hood fuse/relay box • An open in the wire
4	GRN/RED²	Passenger's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty door switch • An open in the wire
5	WHT/RED	Connect the A12 terminal to the RED terminal.	Check window operation: Power windows should operate as the switch is turned.	• Faulty power window relay • Poor ground (G401, G403) • An open in the wire





View from wire side

Entry Light Timer System:

No.	Wire/ Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A12	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 37 (7.5 A) fuse in the under-hood fuse/relay box • An open in the wire
3	WHT/BLK	Under all conditions	Attach to ground: Ignition key light should come on.	• Blown LED • An open in the wire
4	A1	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire

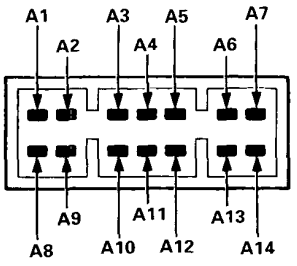
Lights-on Reminder System:

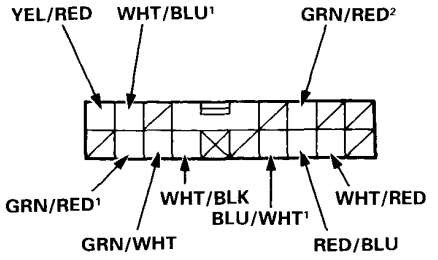
No.	Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A13	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 32 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • An open in the wire
3	A2	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
4	A1	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire • Poor ground (G402, G404)

(cont'd)

Integrated Control Unit

Input Test (KH model cont'd)





View from wire side

Rear Window Defogger Timer Circuit:

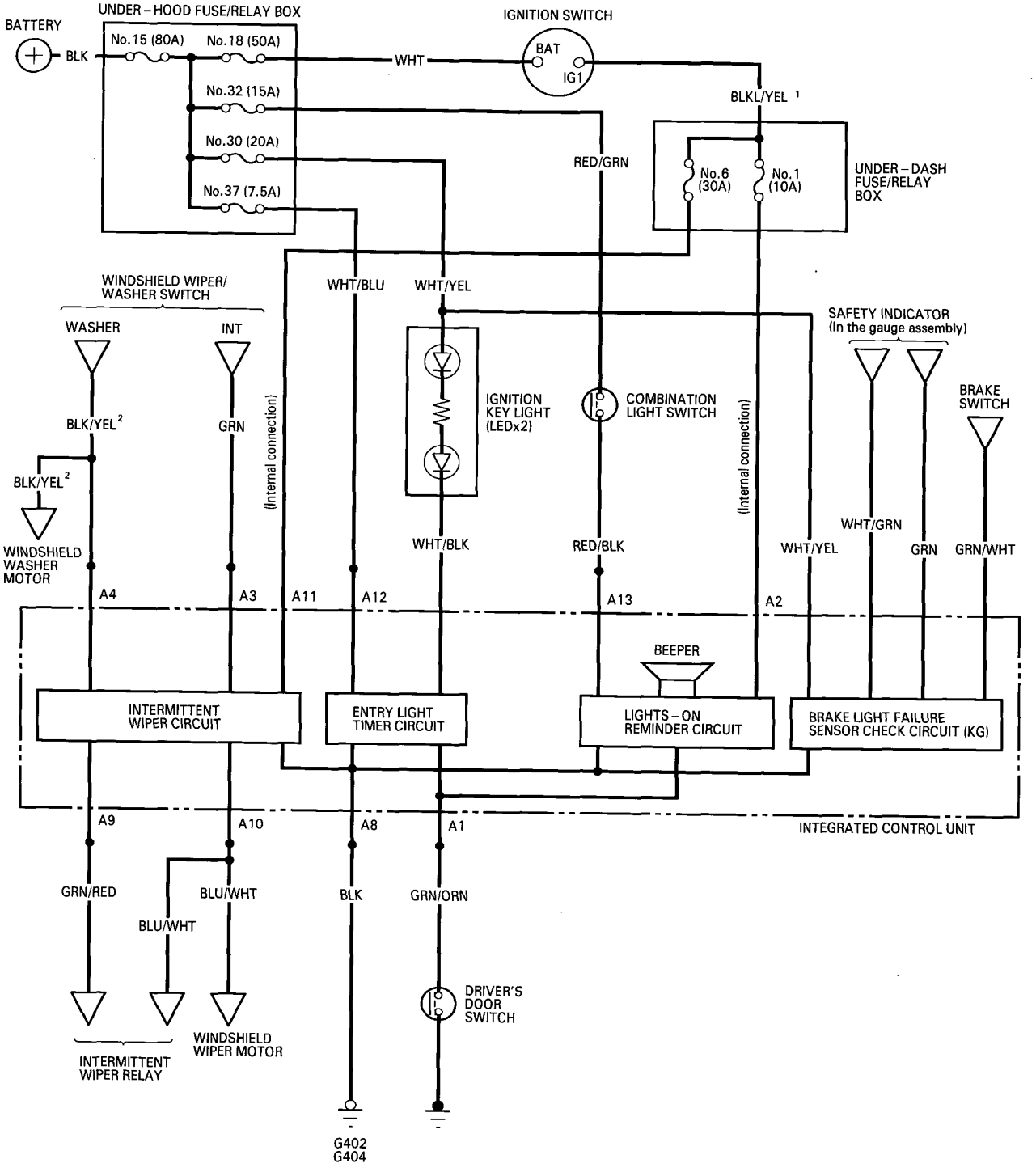
No.	Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A6	Defogger switch pushed	Check for continuity to ground: There should be continuity as the switch is pushed.	• Faulty defogger switch • Poor ground (G402, G404) • An open in the wire
3	A5	Ignition switch ON (II)	Attach to ground: Rear window defogger should work and the defogger switch indicator light should come on.	• Blown No. 8 (7.5 A) fuse in the under-dash fuse/relay box • Faulty defogger relay • Blown bulb • An open in the wire
4	A2	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire

Oil Pressure Indicator Flasher System:

No.	Wire/ Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A2	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
3	WHT/BLU¹	Engine running	Check for voltage to ground: There should be 1 V or less	• Faulty charging system • An open in the wire
4	YEL/RED	Ignition switch OFF	Check for continuity to ground: There should be continuity.	• Faulty oil pressure switch • An open in the wire
		Ignition switch ON (II)	Check light operation. If the light does not come on, attach the YEL/RED terminal to ground: Light should come on as the ignition switch is turned ON (II).	• Blown bulb • An open in the wire
		Start the engine.	Check for voltage to ground: There should be battery voltage.	• Insufficient oil • Improper lubrication • Faulty oil pressure switch

Circuit Diagram (KG and KE models)

NOTE: Different wires with the same color have been given a number suffix to distinguish them (for example, BLK/YEL[1] and BLK/YEL[2] are not the same).



Integrated Control Unit

Input Test (KG and KE models)

CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

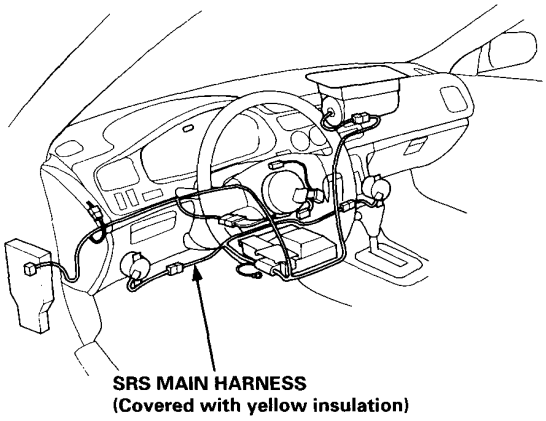
NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.

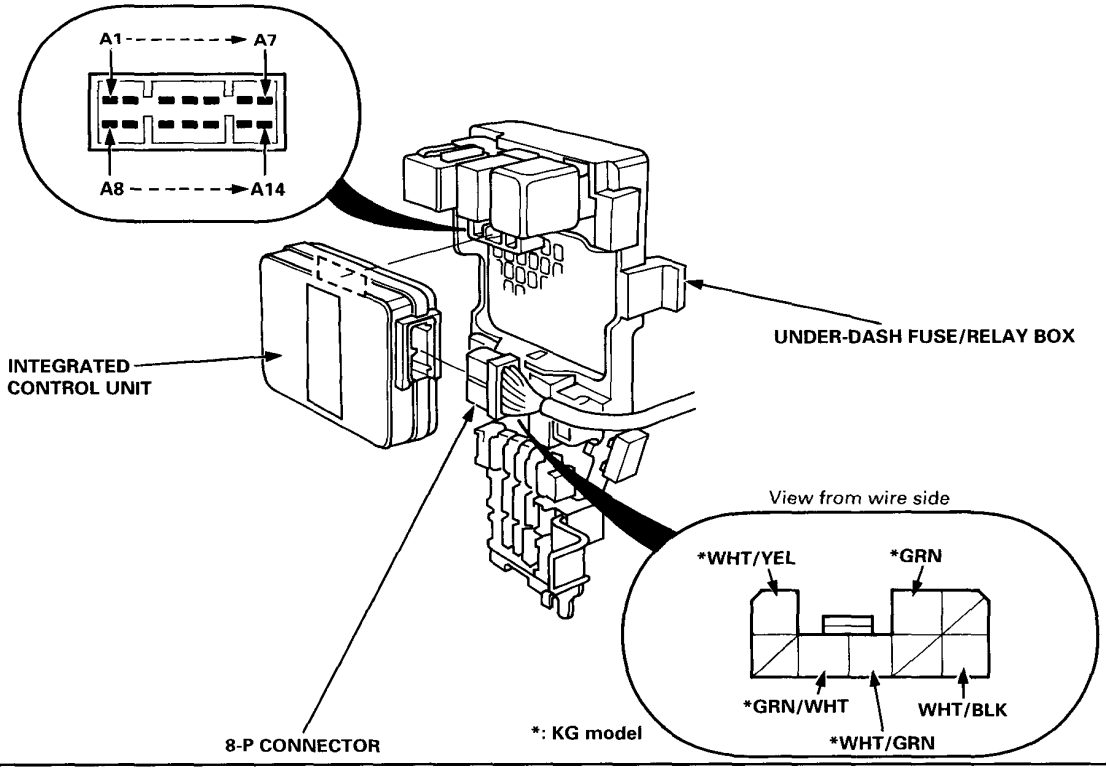
1. Remove the driver's side kick panel, then disconnect the 8-P connector from the integrated control unit.

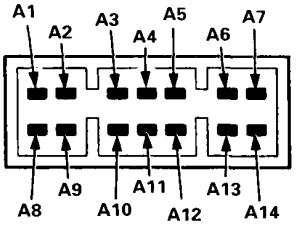
2. Remove the integrated control unit from the under-dash fuse/relay box.

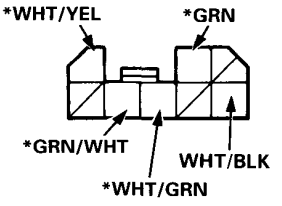
3. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connectors.
     - — If any test indicates a problem, find and correct the cause, then recheck the system.
     - — If all the input tests prove OK, the control unit must be faulty; replace it.









*: KG model

View from wire side

Entry Light Timer System:

No.	Wire/ Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A12	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 37 (7.5 A) fuse in the under-hood fuse/relay box • An open in the wire
3	WHT/BLK	Under all conditions	Attach to ground: Ignition key light should come on.	• Blown LED • An open in the wire
4	A1	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire

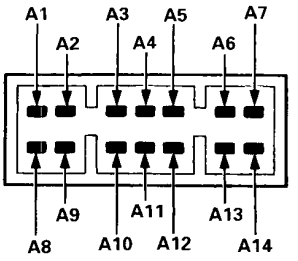
Lights-on Reminder System:

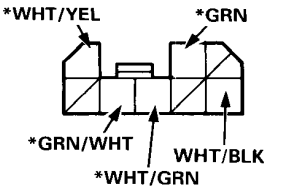
No.	Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A13	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 32 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • An open in the wire
3	A2	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
4	A1	Driver's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door switch • An open in the wire

(cont'd)

Integrated Control Unit

Input Test (KG and KE models cont'd)





*: KG model

View from wire side

Intermittent Wiper System:

No.	Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	A9	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • Faulty intermittent wiper relay • An open in the wire
3	A3	Ignition switch ON (II) and wiper switch at INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • An open in the wire
4	A4	Ignition switch ON (II) and washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • Faulty washer switch • An open in the wire
5	A10	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • An open in the wire
6	A11	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (30 A) fuse in the under-dash fuse/relay box • Faulty under-dash fuse/relay box

BRAKE LIGHT FAILURE SENSOR CHECK SYSTEM (KG model):

No.	Wire/ Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	A8	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 37 (7.5 A) fuse in the under hood fuse/relay box • An open in the wire
3	WHT/GRN	Brake pedal pushed	Check for continuity to ground: There should be continuity.	• Faulty brake light failure sensor • An open in the wire • Poor ground (G551)
4	GRN	Ignition switch ON	Attach to ground: Brake indicator light in the safety indicator should come on.	• Faulty safety indicator (in the gauge assembly) • An open in the wire
5	GRN/WHT	Brake pedal pushed	Check for voltage to ground: There should be battery voltage.	• Faulty brake switch • An open in the wire
		Brake pedal released	Check for continuity to ground: There should be continuity.	• Poor ground (G551) • An open in the wire

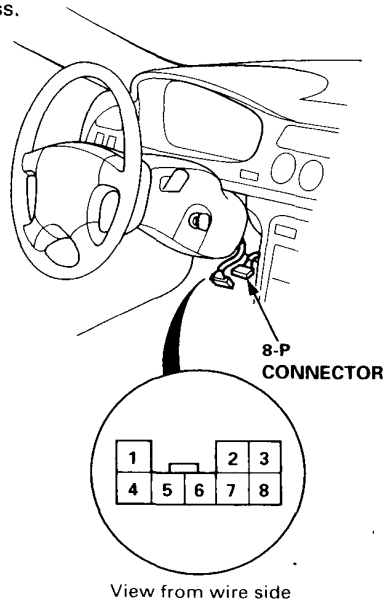
Key-in Reminder System (KH model)

Ignition Key Switch Test

NOTE: Refer to page 23-170 for the diagram of the key-in beeper circuit, and page 23-174 for the input test of the beeper circuit.

When the ignition key is not removed, the key-in beeper in the integrated control unit senses ground through the closed ignition key switch. When you open the driver's door, the beeper circuit senses ground through the closed door switch. With ground at the "BLU/WHT1" and "A1" terminals, the beeper sounds.

1. Remove the dashboard lower cover and knee bolster (see page 23-70).
2. Disconnect the 8-P connector from the main wire harness.



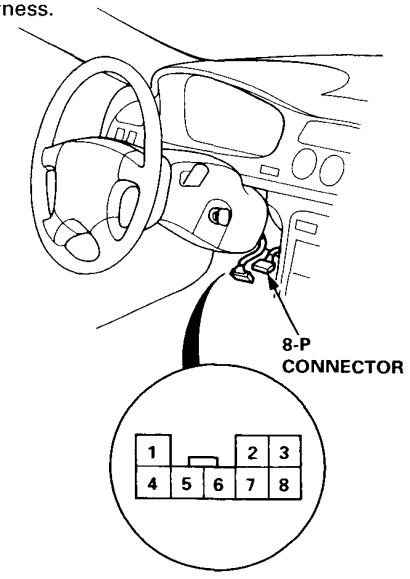
View from wire side

3. Check continuity between terminals No. 5 and No. 8.
   - There should be continuity with the key in the ignition switch.
   - There should be no continuity with the key removed.

Entry Light Timer System

Ignition Key Light Test

1. Remove the dashboard lower cover and knee bolster (see 23-70).
2. Disconnect the 8-P connector from the main wire harness.



View from wire side

3. The LED should come on when power is connected to terminal No. 4, and ground is connected to terminal No. 2.
   If the LED does not come on, replace it.

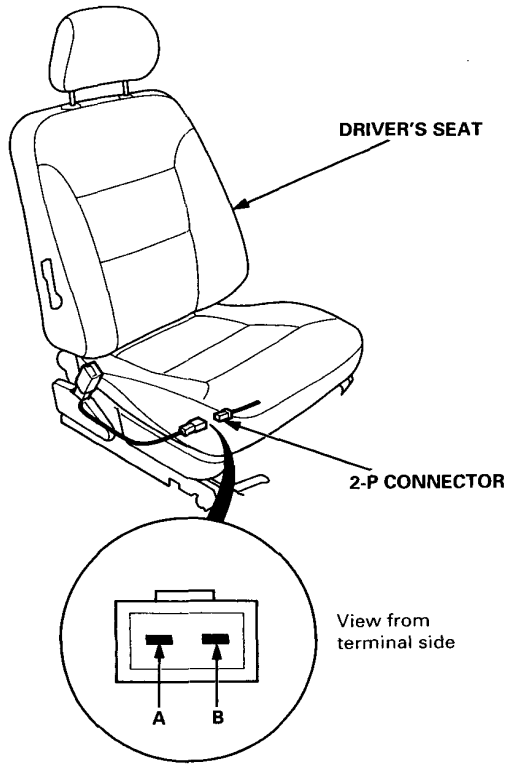
Seat Belt Reminder System (KH model)

Seat Belt Switch Test

1. Slide the driver's seat to the middle position, then disconnect the 2-P connector from the back of the seat.

2. Check for continuity between the A and B terminals in each condition according to the table.

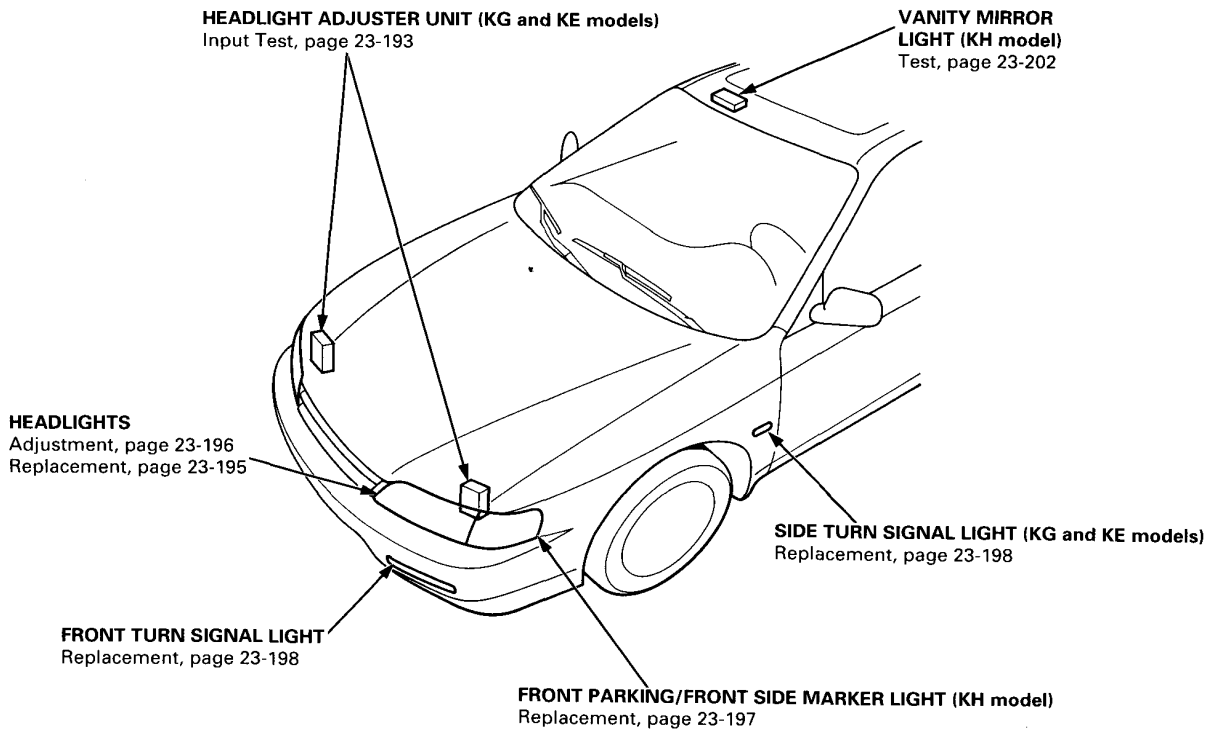
Terminal / Condition	A	B
UNBUCKLED	○	○
BUCKLED		

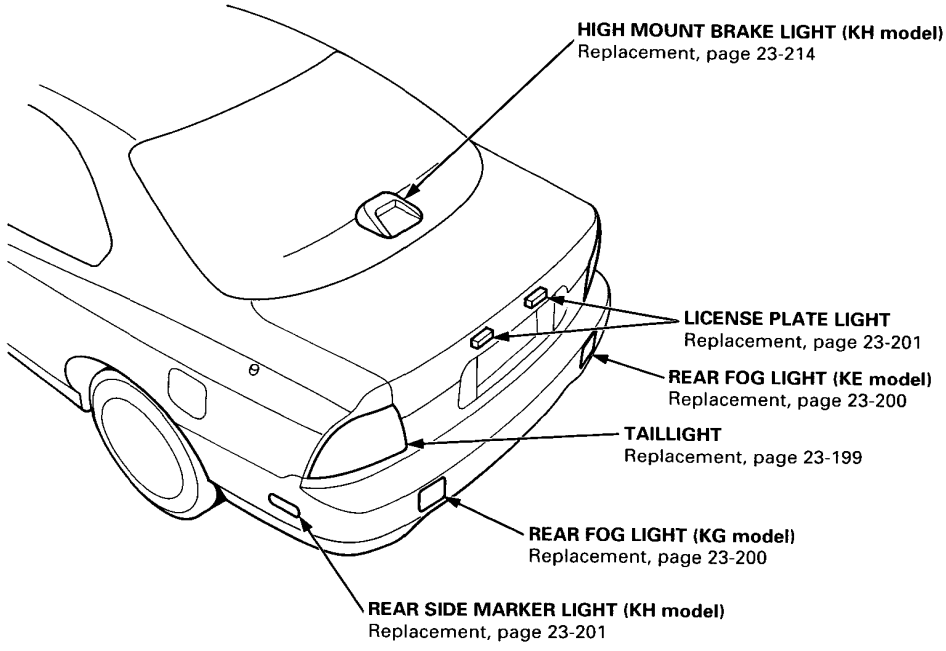


NOTE: Refer to page 23-170 for the diagram of the seat belt reminder circuit.

3. If necessary, replace the seat belt switch.

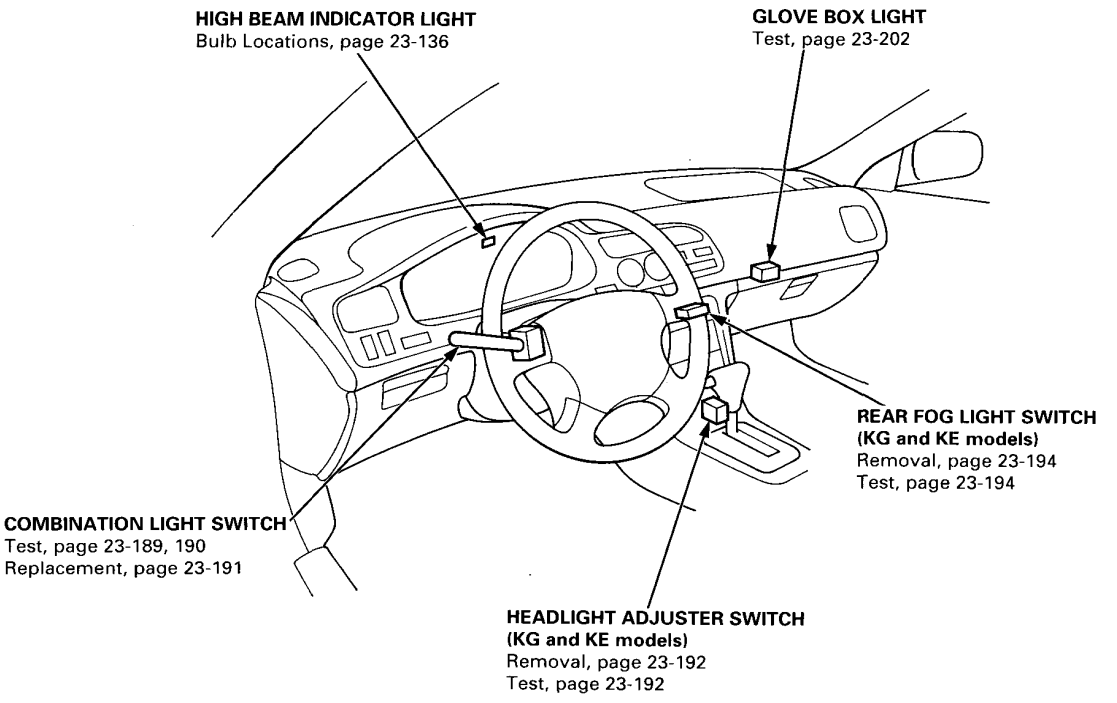
Component Location Index

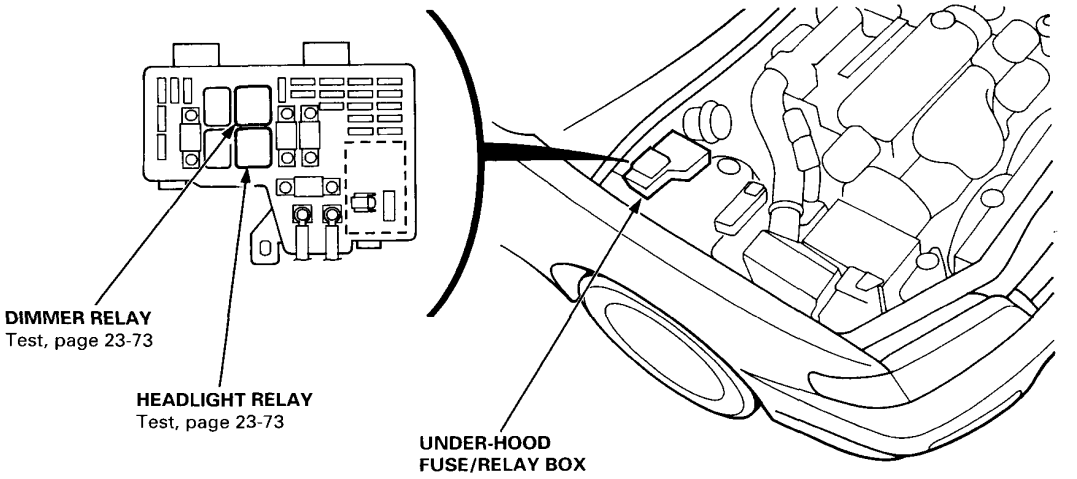




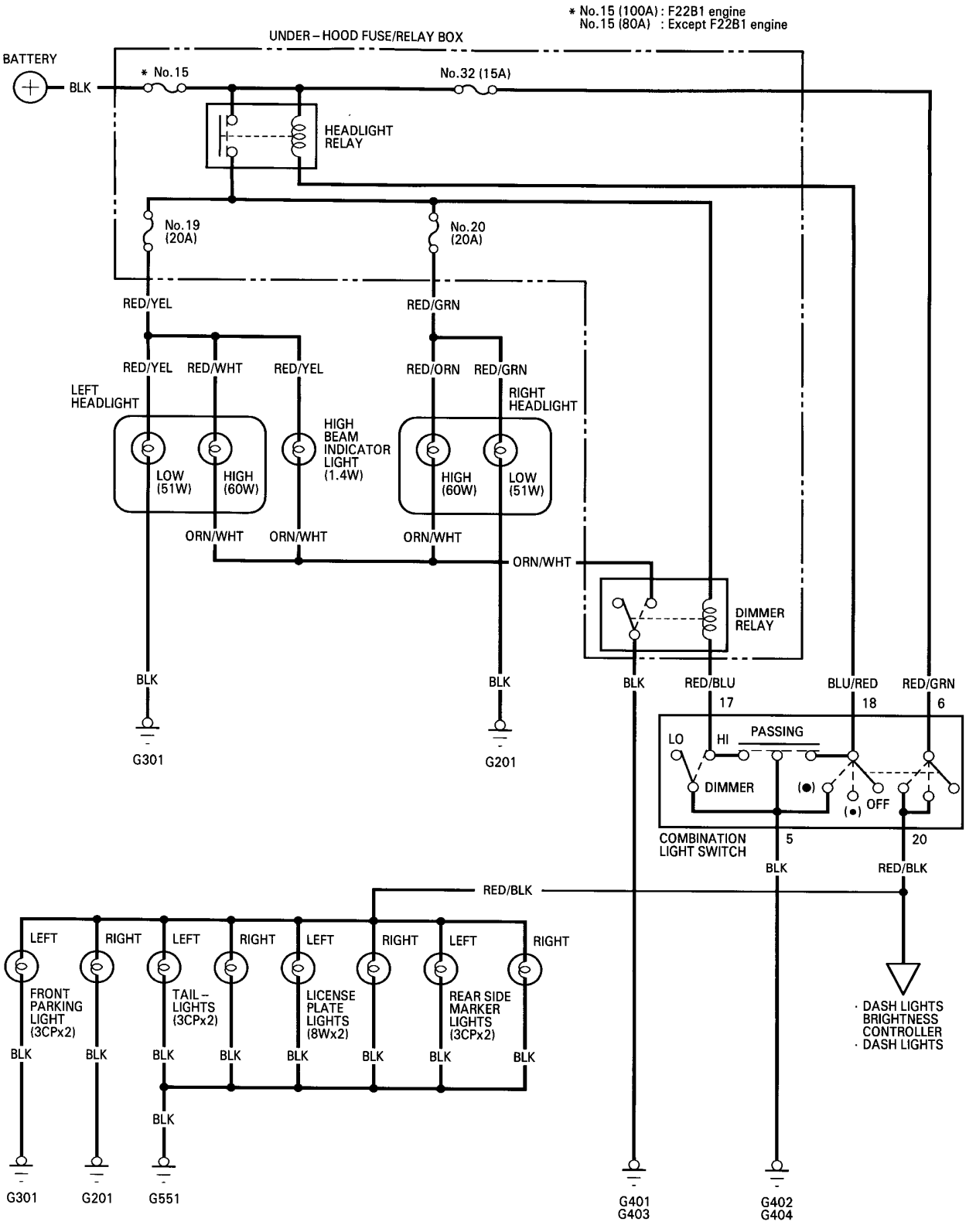
Lighting System

Component Location Index



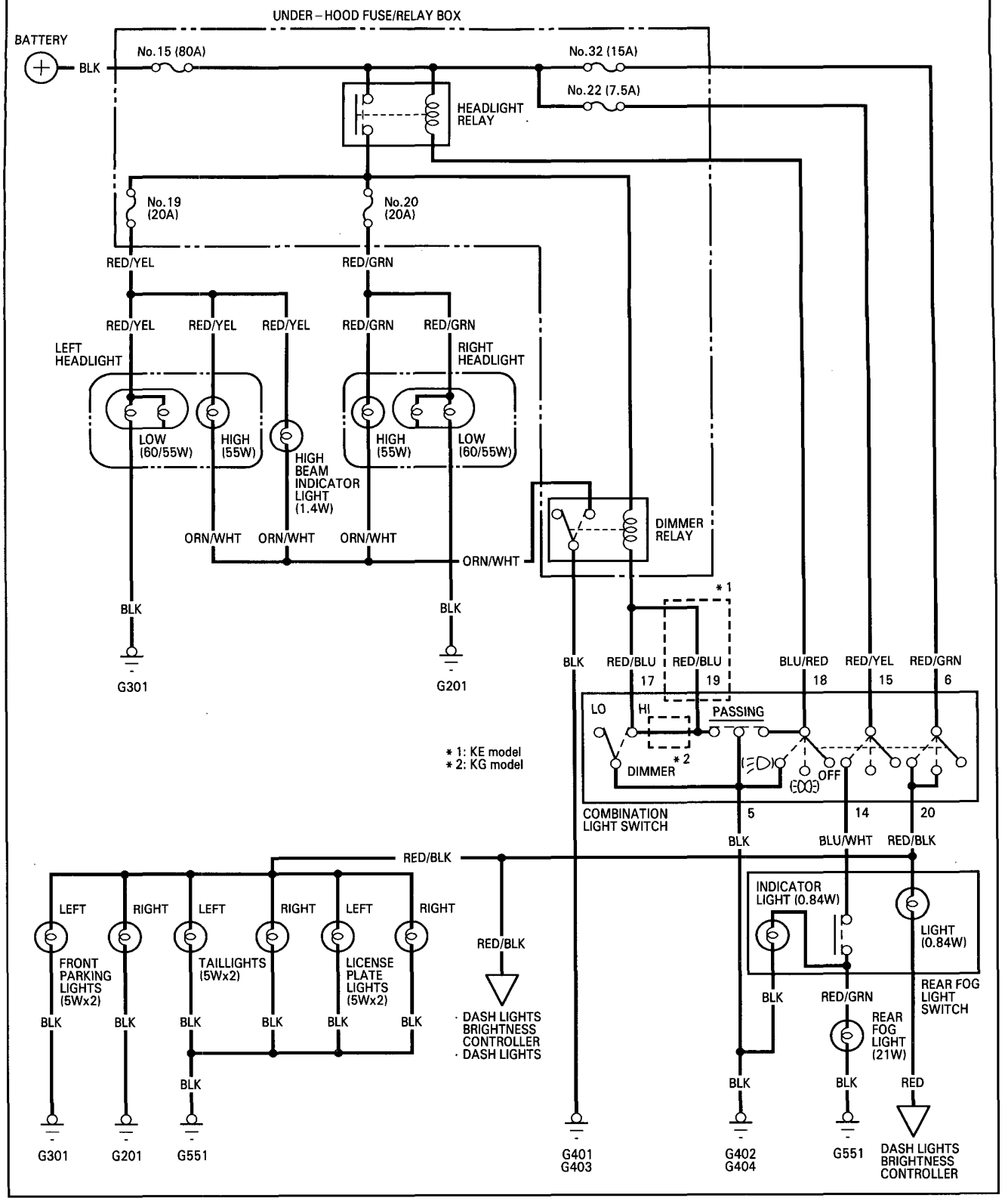


Circuit Diagram (KH model)

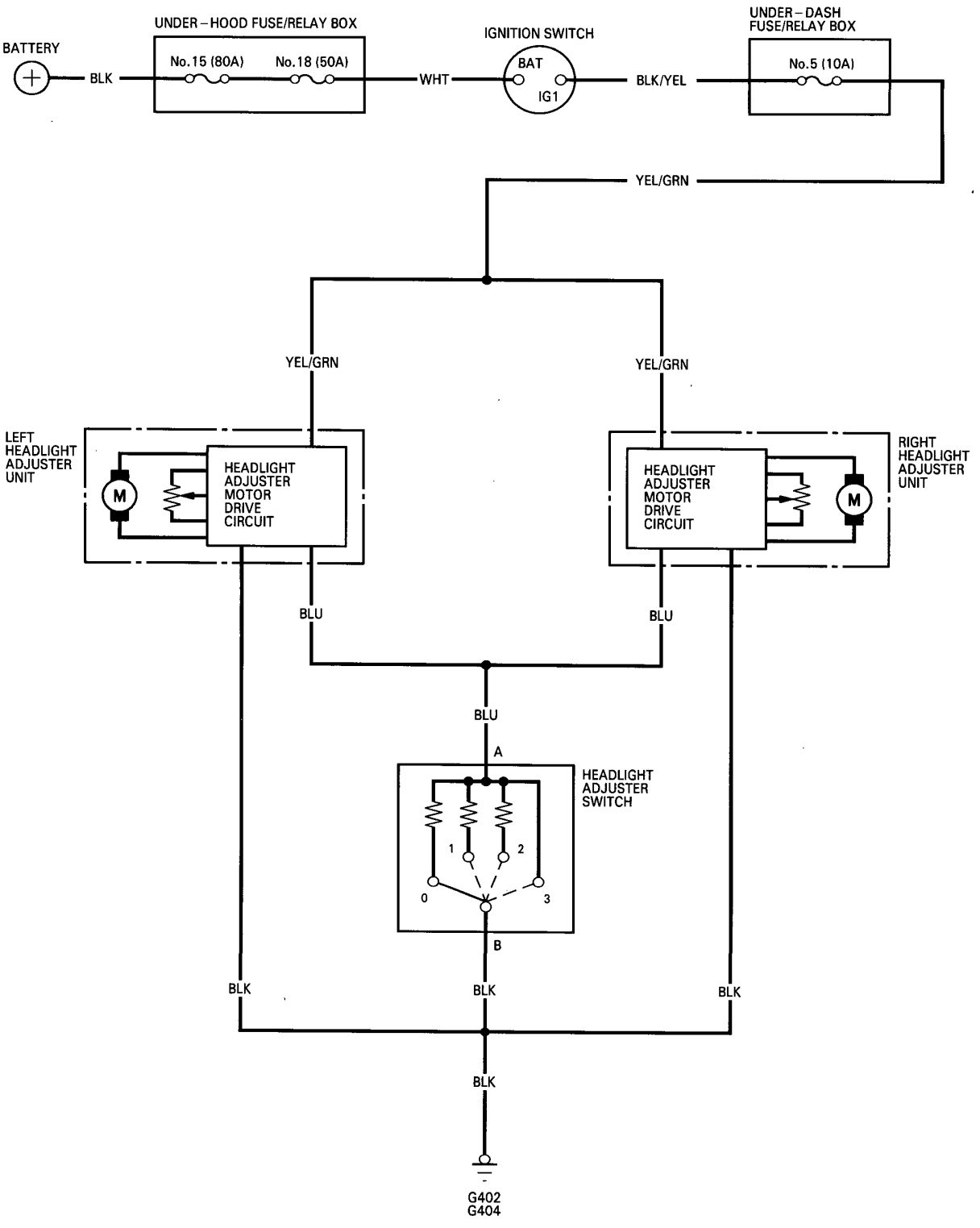


Lighting System

Circuit Diagram (KG and KE models)



Circuit Diagram (KG and KE models)

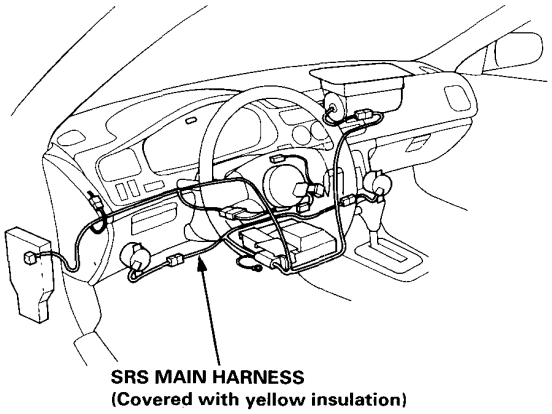


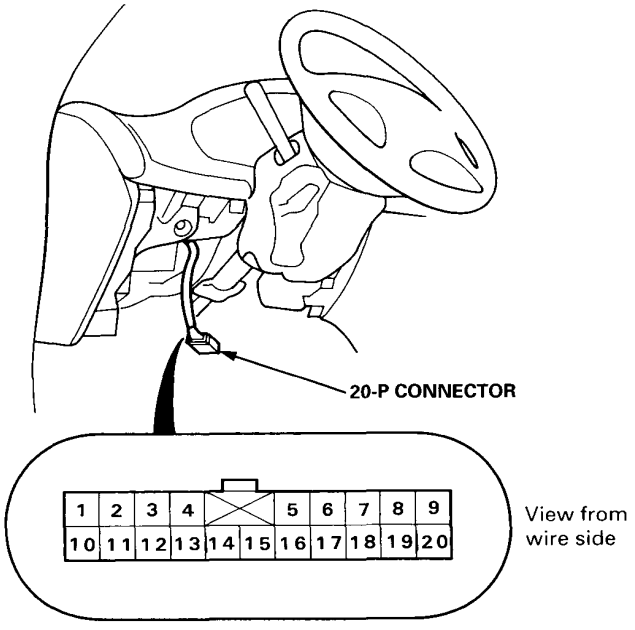
Combination Light Switch Test (KG and KE models)

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows the LHD type. RHD type is symmetrical to LHD type.

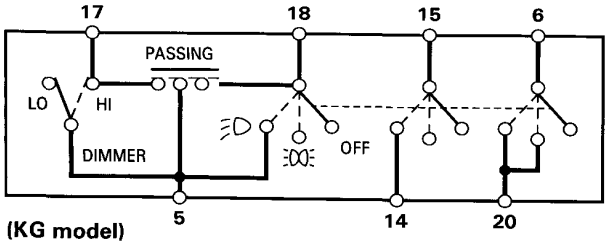
1. Remove the dashboard lower cover.
2. Disconnect the 20-P connector from the main wire harness.
3. Inspect the connector terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, check for continuity between them in each switch position according to the table.
     — If there is no continuity between any of them, check for continuity in the switch harness.
     — If there is continuity in the switch harness, replace the combination light switch.
     — If there is no continuity in the switch harness, replace it.



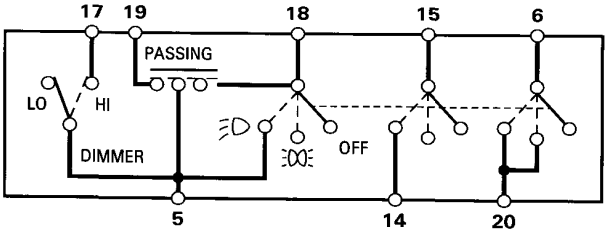


Headlight/Dimmer/Passing Switch:

(KG model)



(KE model)



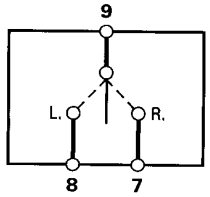
(KG model)

Position			Terminal 20	17	18	5	6	14	15
Headlight switch	OFF								
	≡D		○	—	—	—	○		
		LOW	○	—	○	○	○	○	○
		HIGH	○	○	○	○	○	○	○
Passing switch (Headlight switch "OFF")		OFF							
		ON		○	○	○			
Passing switch (Headlight switch "≡D")		OFF			○	○			
		ON		○	○	○			

(KE model)

Position			Terminal 20	19	17	18	5	6	14	15
Headlight switch	OFF									
	≡D		○	—	—	—	—	○		
		LOW	○			○	○	○	○	○
		HIGH	○			○	○	○	○	○
Passing switch (Headlight switch "OFF")		OFF								
		ON		○		○	○			
Passing switch (Headlight switch "≡D")		OFF				○	○			
		ON		○		○	○			

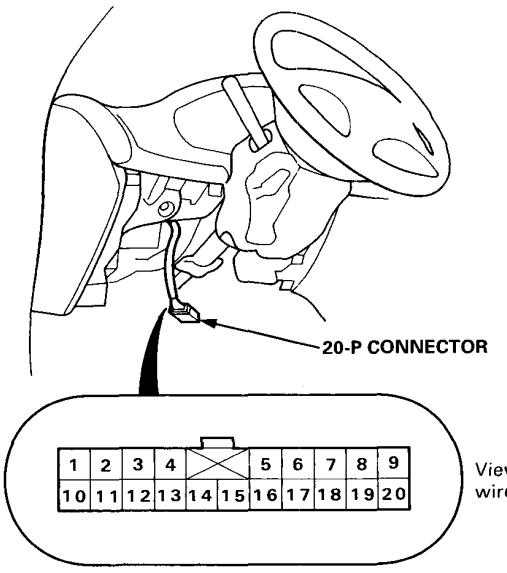
Turn Signal Switch:



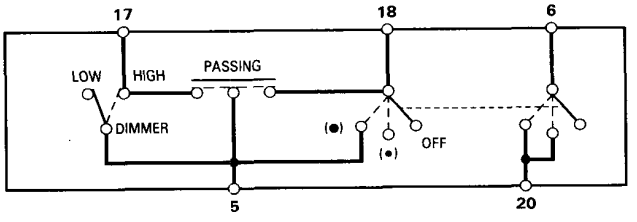
Position	Terminal 9	8	7
RIGHT	○		○
Neutral			
LEFT	○	○	

Combination Light Switch Test (KH model)

1. Remove the dashboard lower cover and knee bolster.
2. Disconnect the 20-P connector from the main wire harness.
3. Inspect the connector terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, check for continuity between them in each switch position according to the table.
     - — If there is no continuity between any of them, check for continuity in the switch harness.
     - — If there is continuity in the switch harness, replace the combination light switch.
     - — If there is no continuity in the switch harness, replace it.

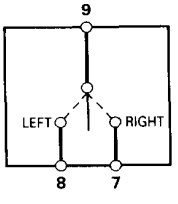


Headlight/Dimmer/Passing Switch



Position		Terminal	20	17	18	5	6
Headlight switch	OFF						
	•		○				○
	•	LOW	○				○
					○	○	
		HIGH	○				○
				○	○	○	
Passing switch (Headlight switch "OFF")		OFF					
		ON		○	○	○	
Passing switch (Headlight switch "●")		OFF			○	○	
		ON		○	○	○	

Turn Signal Switch

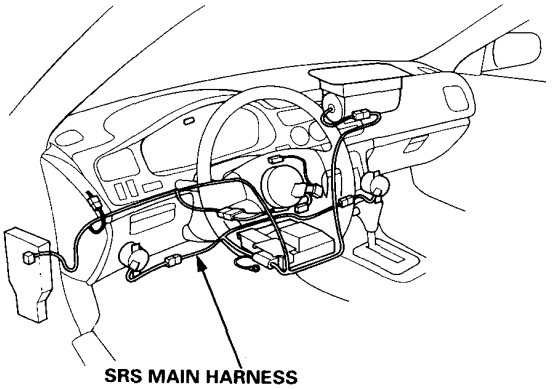


Position	Terminal	9	8	7
RIGHT		○		○
Neutral				
LEFT		○	○	

Combination Light Switch Replacement

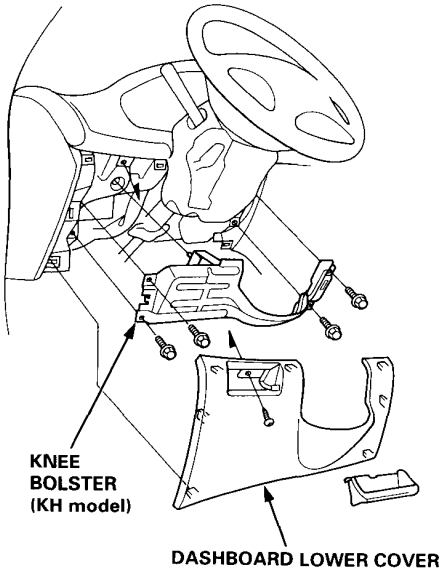
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

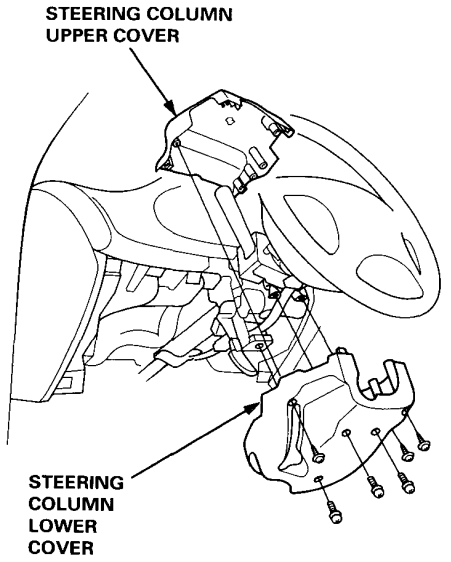


SRS MAIN HARNESS
(Covered with yellow insulation)

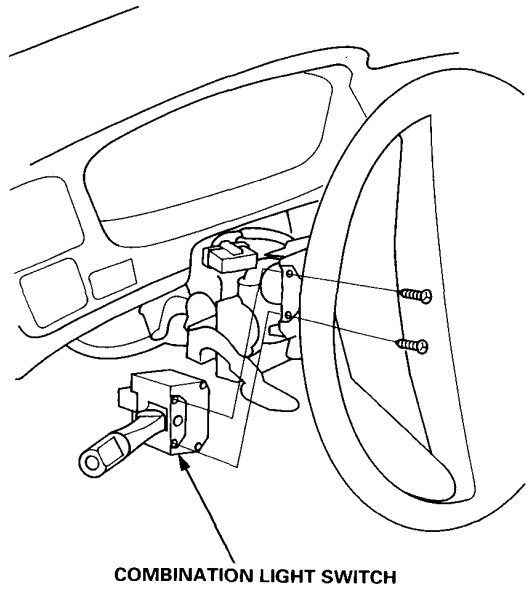
1. Remove the dashboard lower cover and knee bolster (KH).



2. Remove the steering column covers.



3. Disconnect the connector from the combination light switch, then remove the two screws and the switch.



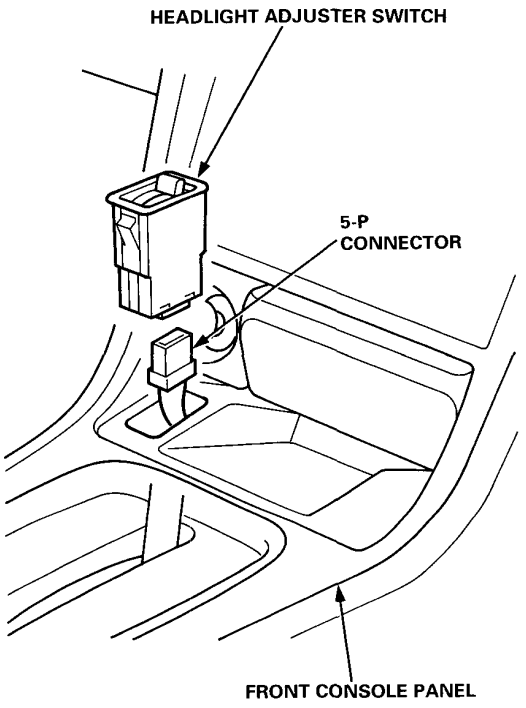
Headlight Adjuster Switch Removal (KG and KE models)

1. Carefully pry the headlight adjuster switch out of the front console panel.

   NOTE: Be careful not to damage the switch and front console panel when prying the switch out.

2. Disconnect the 5-P connector from the switch.

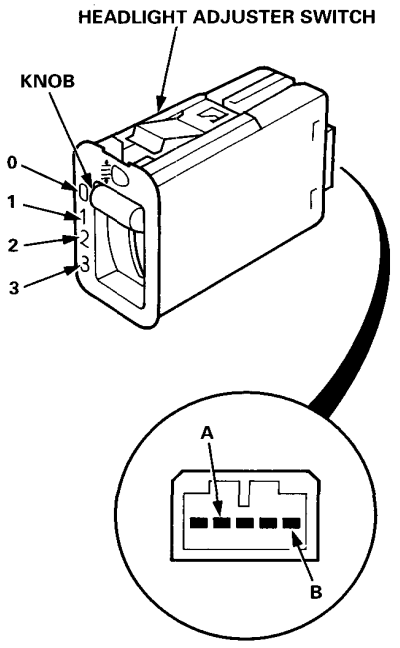
   NOTE: KE model is shown, KG model is symmetrical.



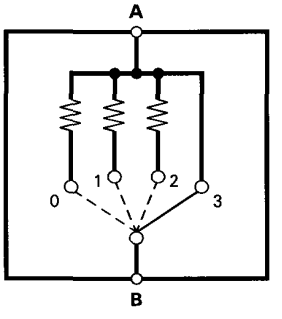
Headlight Adjuster Switch Test (KG and KE models)

1. Remove the switch from the front console panel.

2. Measure the resistance between the A and B terminals at 0, 1, 2, and 3 positions by moving the knob. Replace the switch if the resistance is not within specifications.



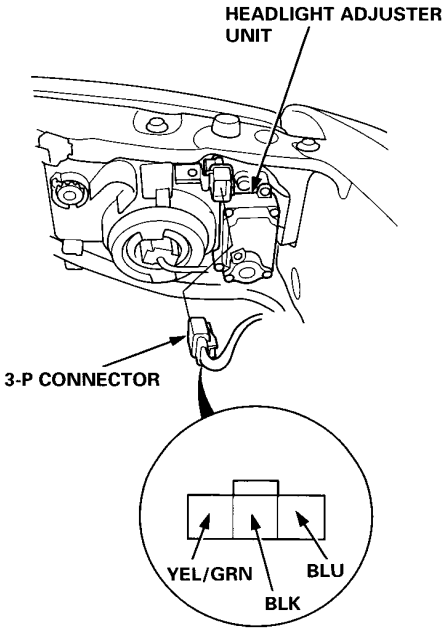
Knob Position	0	1	2	3
Resistance [Approx. (Ω)]	681	301	115	0



Headlights Adjuster Unit Input Test (KG and KE models)

NOTE: Before testing, check for
— blown No. 5 (10 A) fuse in the under-dash fuse/relay box.
— bent, loose, or corroded terminals.

1. Disconnect the 3-P connectors from each headlight adjuster unit.



View from wire side

2. Check for continuity between the BLK terminal and body ground. There should be continuity.

   - If there is no continuity, check for
     — an open in the wire.
     — poor ground (G402, G404).
   - If there is continuity, go to step 3.

3. Check for voltage between the YEL/GRN terminal and body ground with the ignition switch ON. There should be battery voltage.

   - If there is no voltage, check for an open in the wire.
   - If there is battery voltage, go to step 4.

4. Using an ohmmeter, measure resistance between the BLU terminal and body ground in position "O" of the headlight adjuster switch. There should be approximately 750 ohms.

   - If resistance is not within specification, check for
     — an open in the wire.
     — faulty headlight adjuster switch.
   - If resistance is within specification, go to step 5.

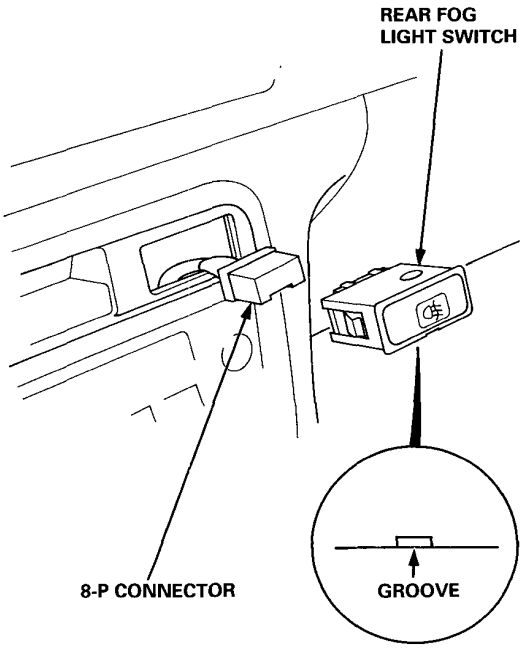
5. If all tests normal, but the headlight adjuster unit does not operate, check for frozen, stuck or improperly installed headlight adjuster unit. If the mechanical check is OK, replace the headlight adjuster unit.

6. After installing, recheck the system.

Rear Fog Light Switch Removal (KG and KE models)

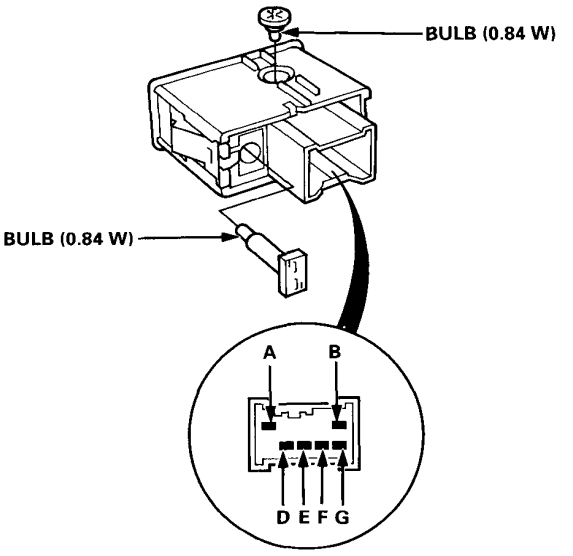
1. Carefully pry the rear fog light switch out of the front console panel.
2. Disconnect the 8-P connector from the rear fog light switch.

   NOTE: KG model is shown, KE model is symmetrical.

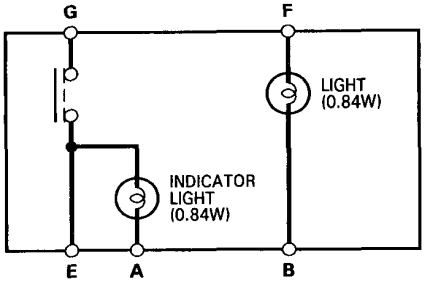


Rear Fog Light Switch Test (KG and KE models)

1. Carefully pry the rear fog light switch out of the front console panel.
2. Disconnect the 8-P connector from the rear fog light switch.
3. Check for continuity between the terminals in each switch position according to the table.



Terminal / Position	B		F	A		E	G
OFF	○	○	○				
				○	○	○	
ON	○	○	○				
				○	○	○	○

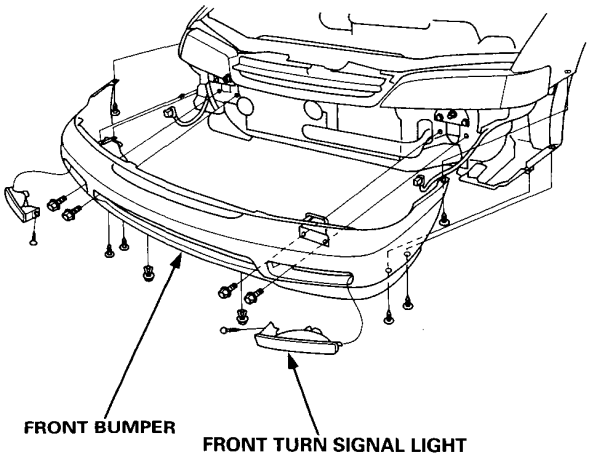


Headlights

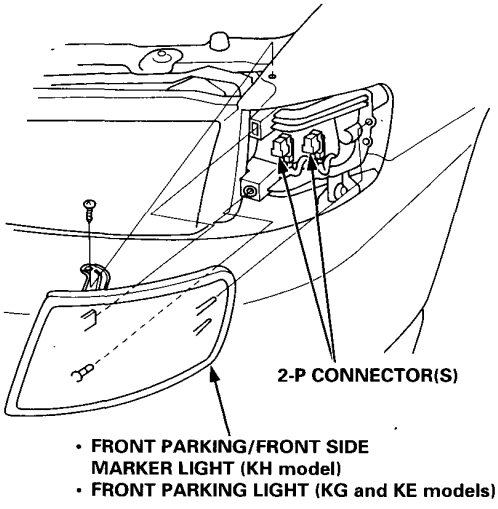
Replacement

CAUTION:
- **Halogen headlights can become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.**
- **Do not try to replace or clean the headlights with the lights on.**

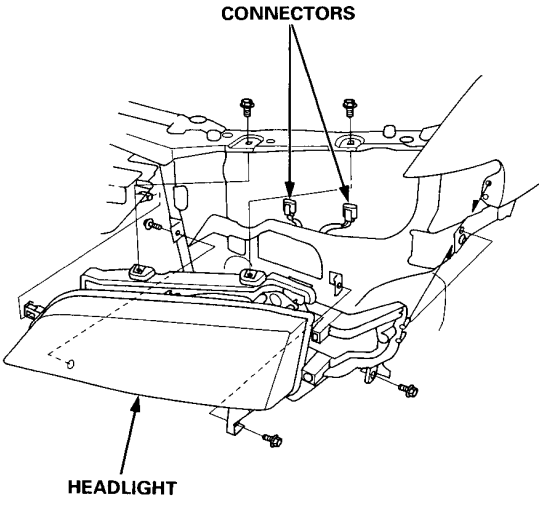
1. Remove the front turn signal lights.
2. Remove the front bumper.



3. Remove the screw, and separate the front parking/front side marker lights from the headlight assembly.
4. Disconnect the 2-P connector(s) from the front parking/front side marker light.



5. Disconnect the connectors from the headlight.
6. Remove the mounting bolts and headlight.



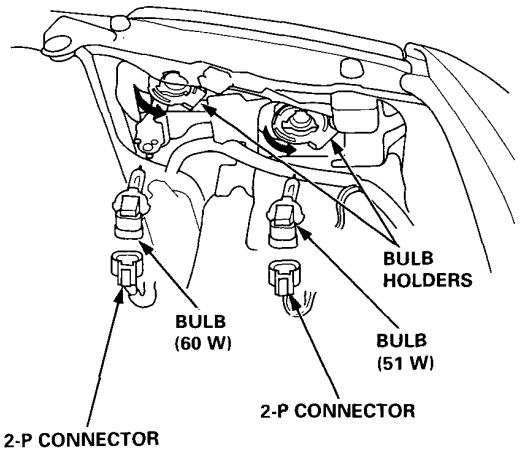
Headlights

Bulb Replacement

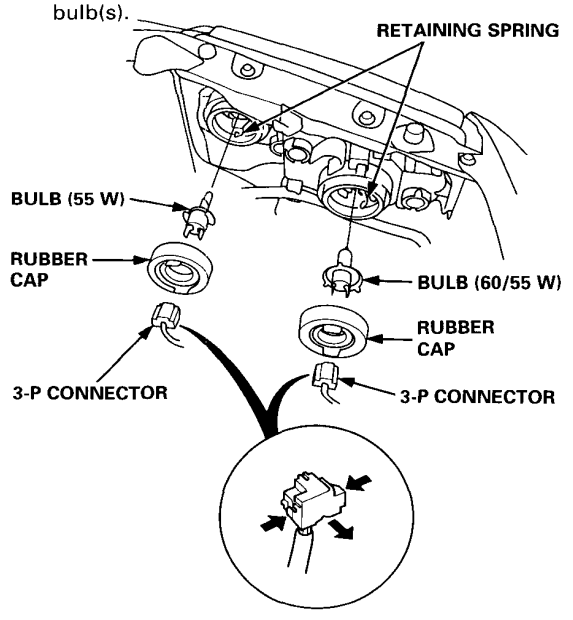
CAUTION:
- **Halogen headlights can become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.**
- **Do not try to replace or clean the headlights with the lights on.**
- **Do not touch the glass of the halogen bulbs.**

1. Disconnect the connector(s) from the headlight.

KH model:
- Turn the bulb holder(s) counterclockwise, and remove the bulb(s).



KG and KE models:
- Turn the retaining spring(s) out, and remove the bulb(s).



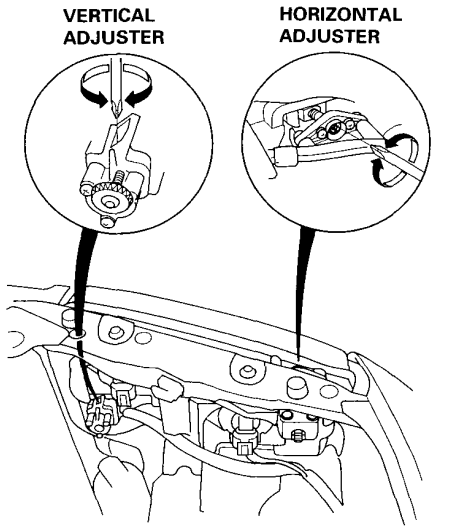
Adjustment

CAUTION:
- **Halogen headlights can become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.**
- **Do not try to replace or clean the headlights with the lights on.**

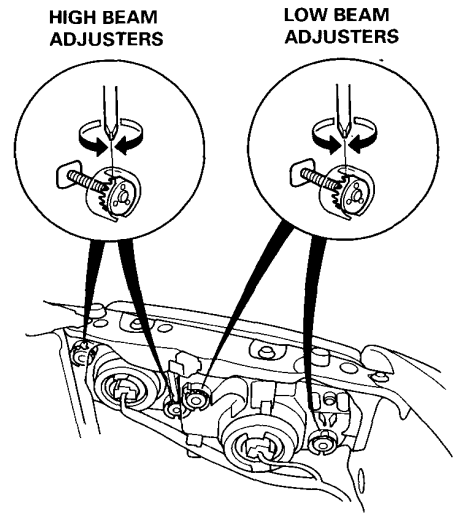
1. Adjust the headlights to local requirements by turning the adjusters.

NOTE: As the outer lenses are made of a resin material, don't cover the headlights when they are turned on.

KH model:



KG and KE models:



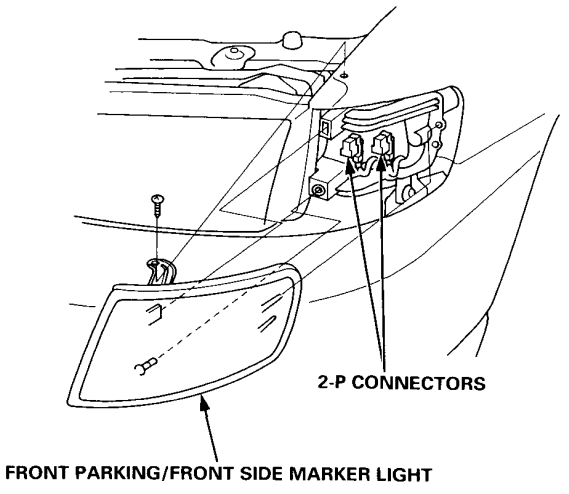
Front Parking/Front Side Marker Lights

Replacement

KH model:

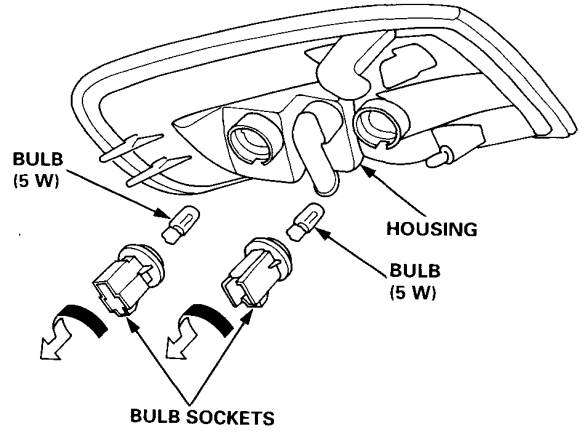
1. Remove the screw, and separate the front parking/front side marker lights from the headlight assembly.

   NOTE: Be careful not to damage the headlight and the front fender.



2. Disconnect the 2-P connectors from the light.

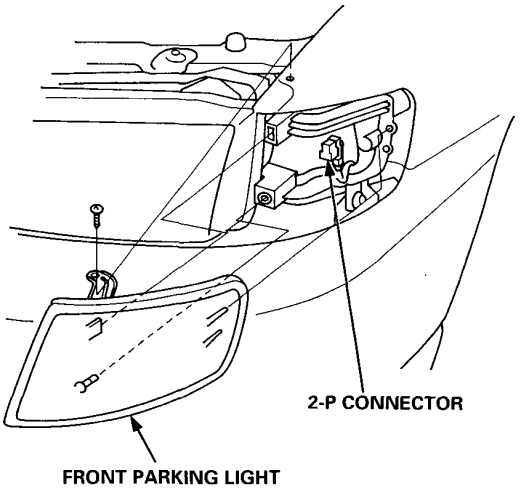
3. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.



KG and KE models:

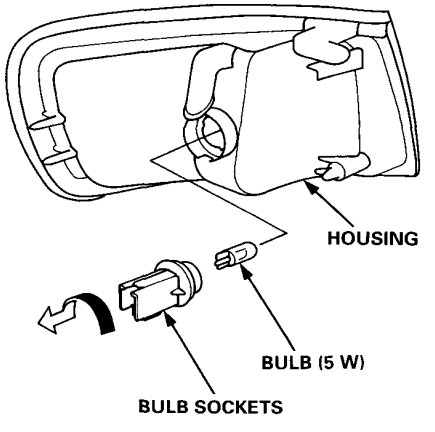
1. Remove the screw, and separate the front parking light from the headlight assembly.

   NOTE: Be careful not to damage the headlight and the front fender.



2. Disconnect the 2-P connector from the light.

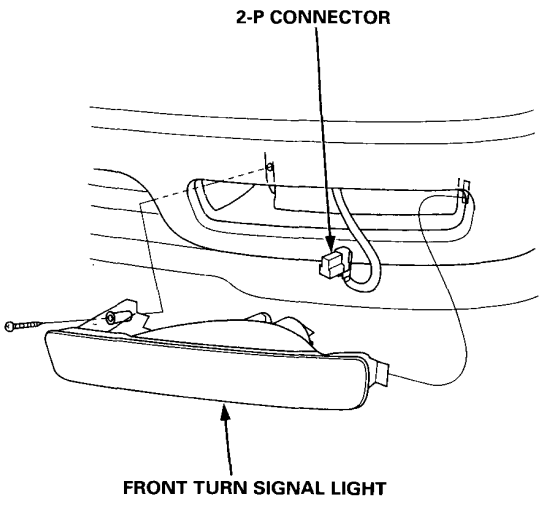
3. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.



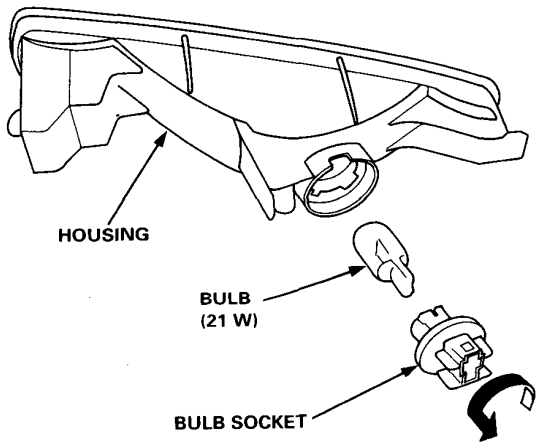
Front Turn Signal Lights

Replacement

1. Remove the screw, and pull the front turn signal light assembly out of the front bumper.



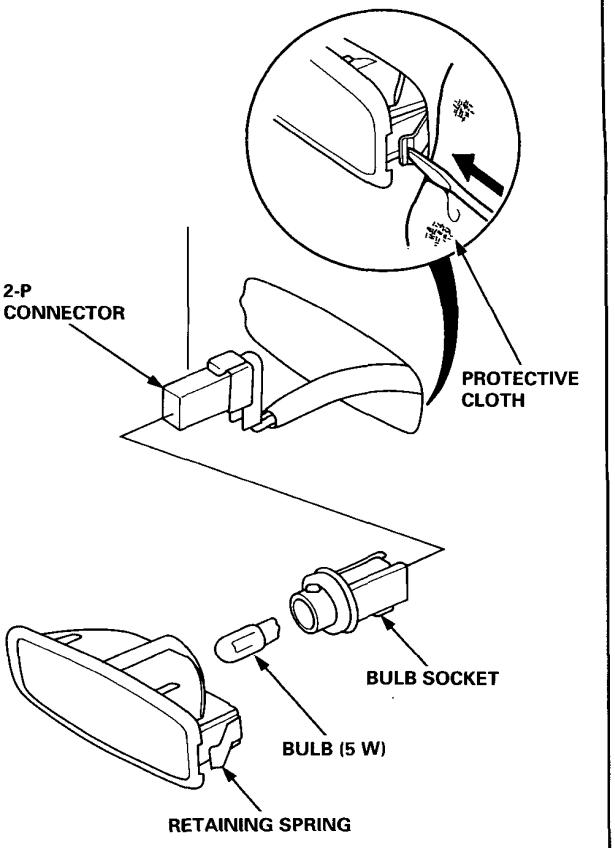
2. Disconnect the 2-P connector from the light.
3. To replace the bulb, turn the bulb socket 45° counterclockwise, and remove it from the housing.



Side Turn Signal Lights (KG and KE models)

Replacement

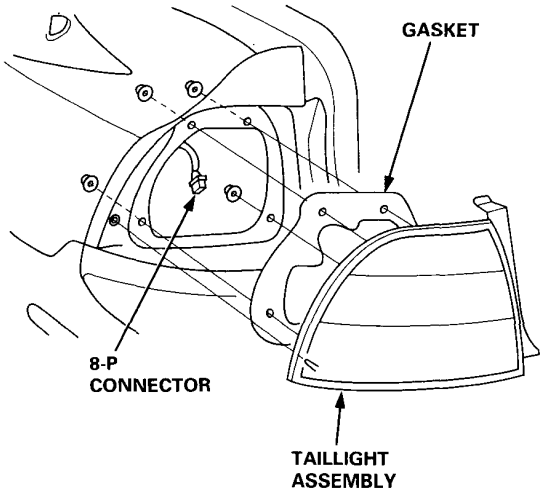
1. Push the retaining spring, and remove the side turn signal light.
2. Remove the bulb socket from the light housing, then replace the bulb.



Taillights

Replacement

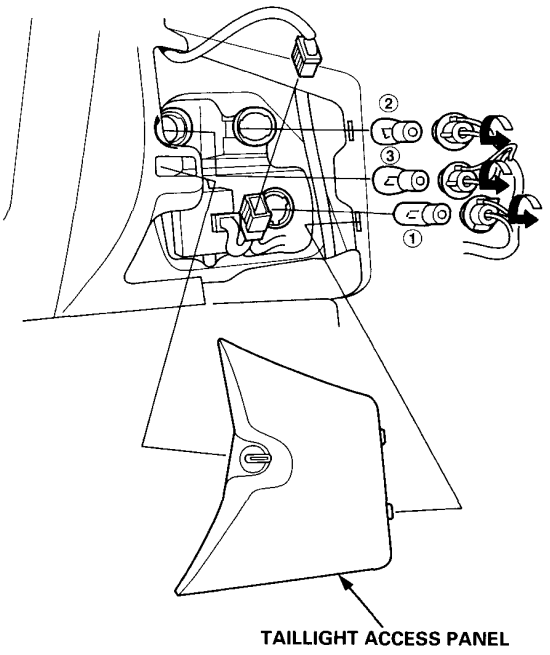
1. Open the trunk lid, and remove the taillight access panel.
2. Disconnect the 8-P connector from the taillight assembly.
3. Remove the four mounting nuts and the taillight assembly.



NOTE:
- Inspect the gasket; replace it if it is distorted or stays compressed.
- After installing them, run water over the lights to make sure they do not leak.

Bulb Replacement

1. Open the trunk lid, and remove the taillight access panel.



2. Remove the faulty bulb by pushing it in and then turning it 45° counterclockwise.

KG and KE models:

① BRAKE LIGHT/TAILLIGHT BULB (21/5 W)

② TURN SIGNAL LIGHT BULB (21 W)

③ BACK-UP LIGHT BULB (21 W)

KH model:

① BRAKE LIGHT/TAILLIGHT BULB (43/3CP)

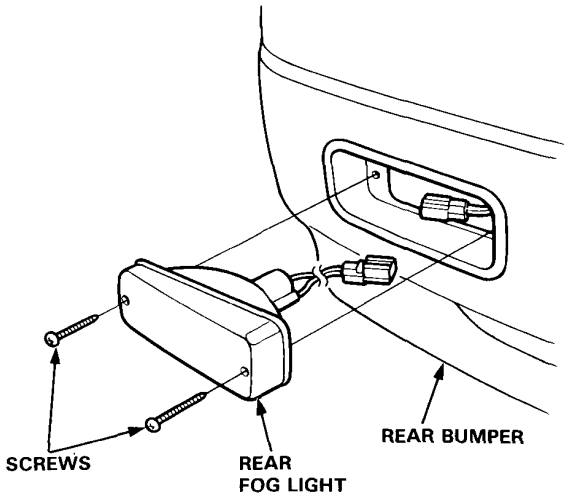
② TURN SIGNAL LIGHT BULB (32CP)

③ BACK-UP LIGHT BULB (32CP)

Rear Fog Light (KG and KE models)

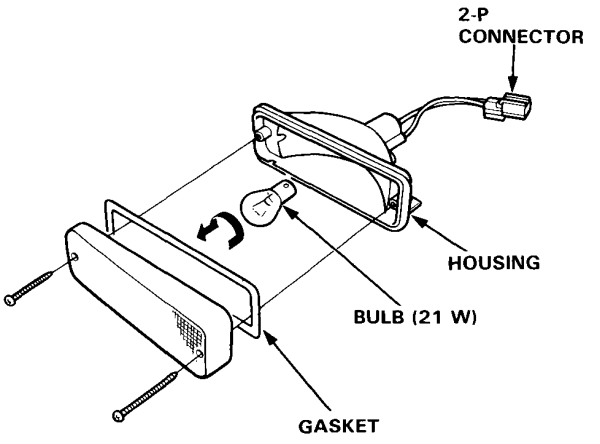
Replacement

1. Remove the two screws from the rear fog light, and then pull the light out of the rear bumper.
2. Disconnect the 2-P connector from the light.



Bulb Replacement

1. Remove the lens from the rear fog light housing.
2. Push and turn the bulb, and then take the bulb out of the housing.



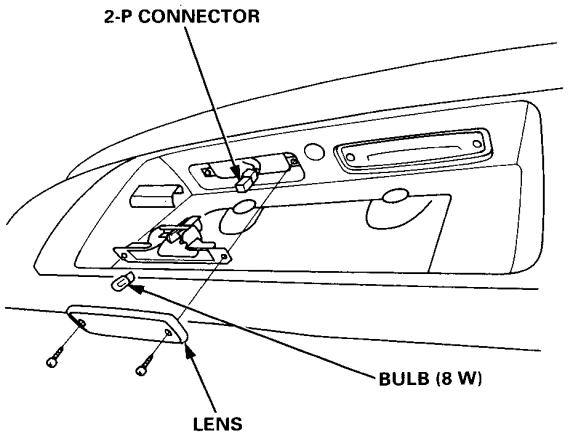
NOTE:
- Inspect the gasket; replace if it is distorted or stays compressed.
- After installation, run water over the lights to make sure they do not leak.

License Plate Lights

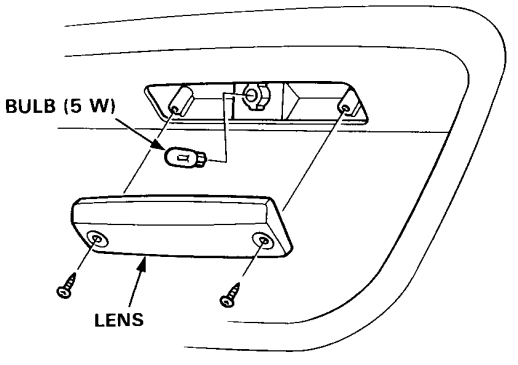
Replacement

1. Remove the two screws from the license plate light assembly.
2. Take the lens off, then replace the bulb.

KH model:



KG and KE models:

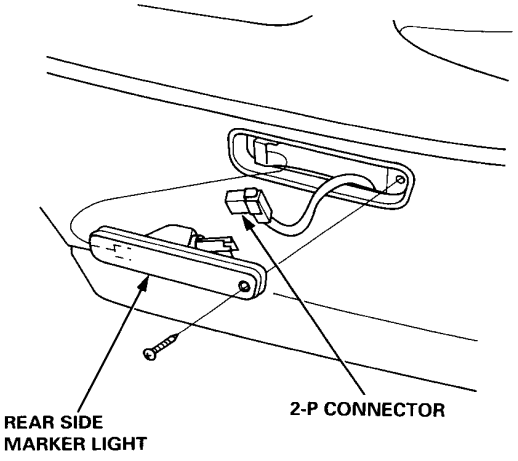


Rear Side Marker Lights (KH model)

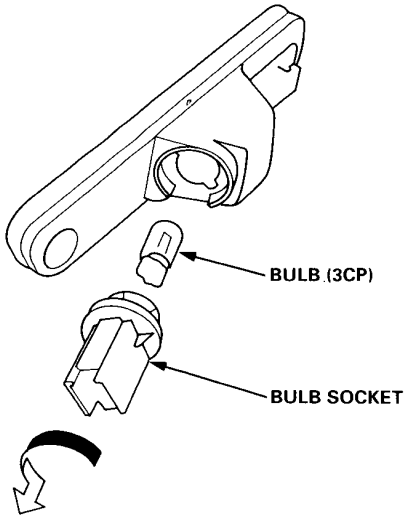
Replacement

1. Remove the screw from the rear side marker light assembly.
2. Carefully pry the light out of the rear bumper, and disconnect the 2-P connector from it.

   NOTE: Be careful not to damage the rear bumper.



3. Remove the bulb socket by turning it 45° counter-clockwise.



Glove Box Light

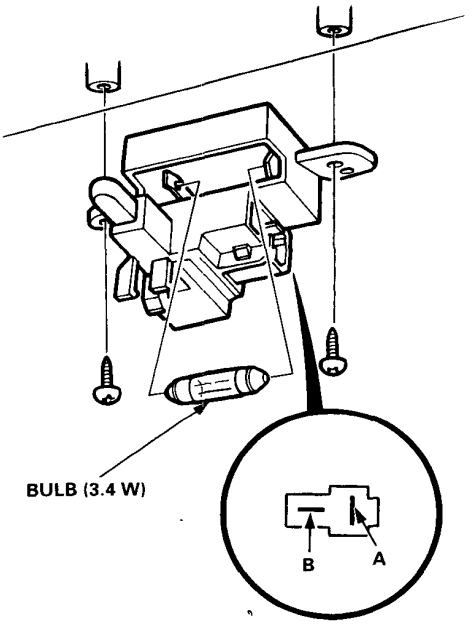
Test

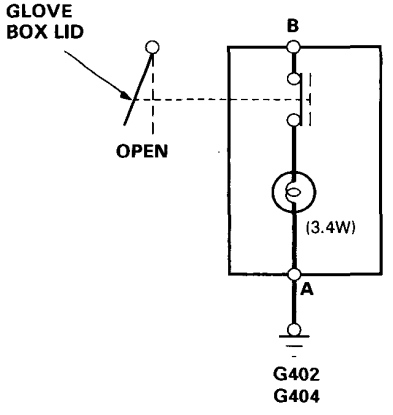
1. Open the glove box, and disconnect the 2-P connector.

   NOTE: If necessary, remove the glove box.

2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A		B
CLOSE (OFF)			
OPEN (ON)	○	—⊙—	○



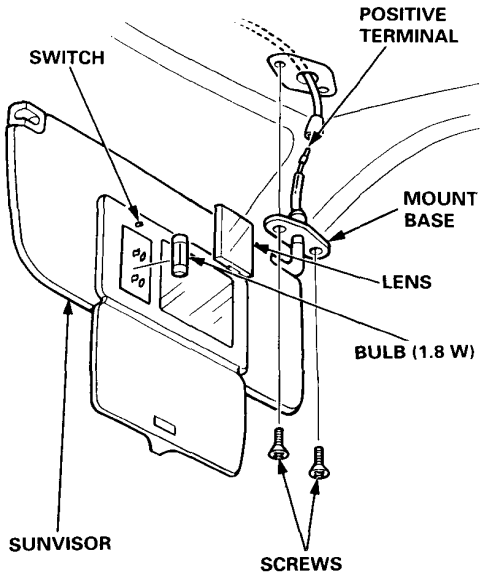


Vanity Mirror Light (KH model)

Test

NOTE: There is only a passenger's vanity mirror light.

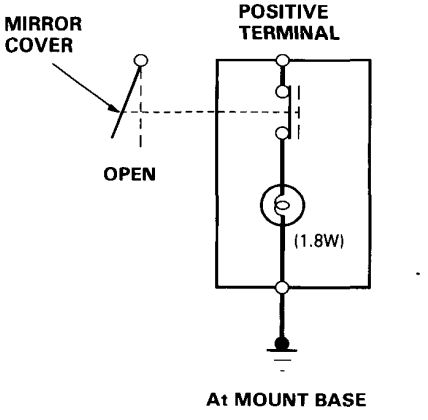
1. Remove the two screws from the sunvisor bracket.
2. Disconnect the connector, and remove the sunvisor.



3. Check for continuity between the terminals in each switch position according to the table.

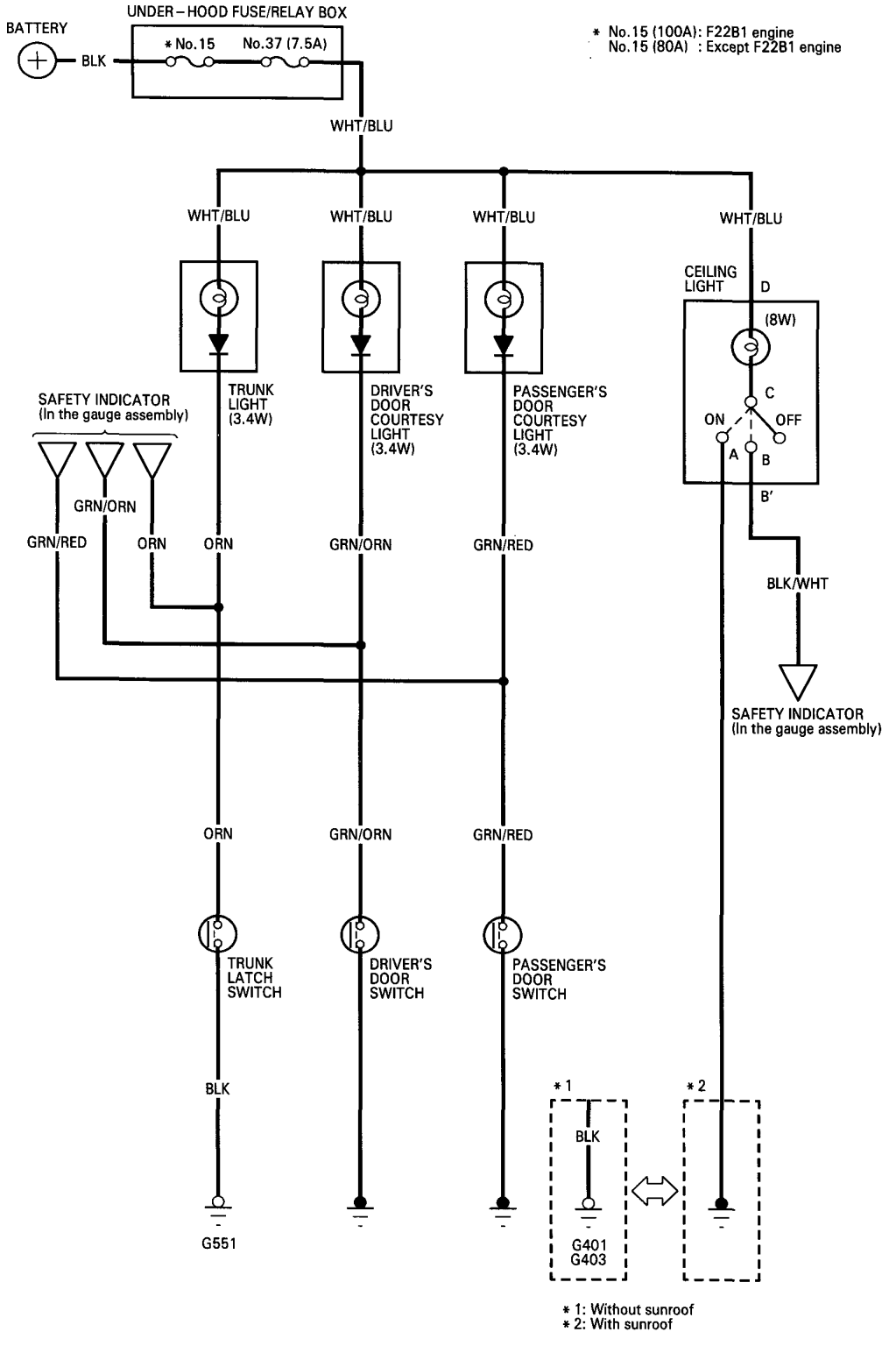
Terminal / Position	POSITIVE TERMINAL		MOUNT BASE
CLOSE (OFF)			
OPEN (ON)	○	—⊙—	○

4. If necessary, pry off the lens, and replace the bulb.



Ceiling/Courtesy/Trunk Lights

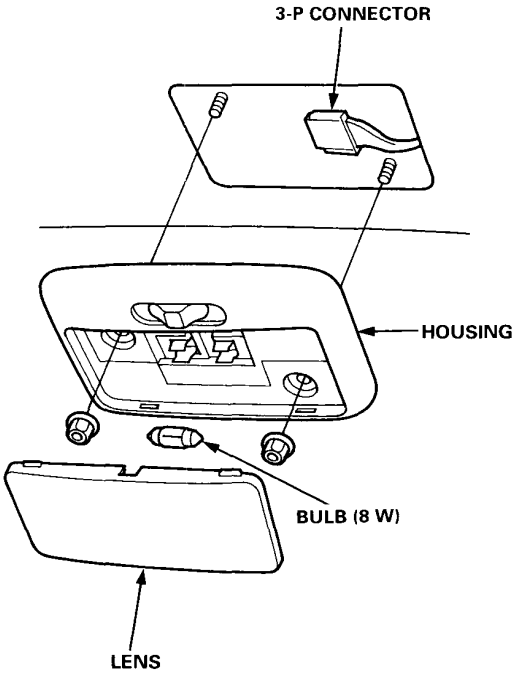
Circuit Diagram



Ceiling/Courtesy/Trunk Lights

Ceiling Light Test (With Sunroof)

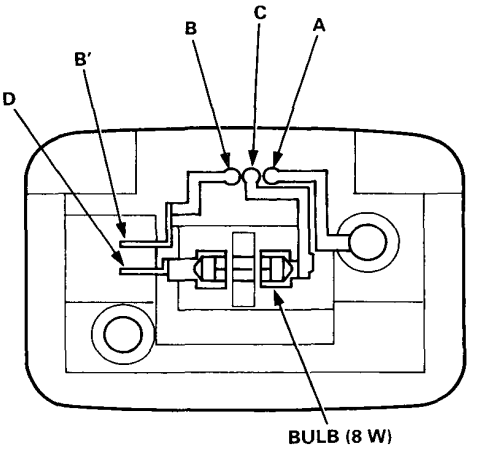
1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the two mounting nuts and the housing.

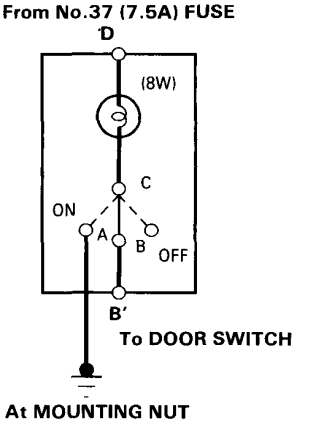


4. Disconnect the 3-P connector from the housing.

5. Check for continuity between the terminals in each switch position according to the table.

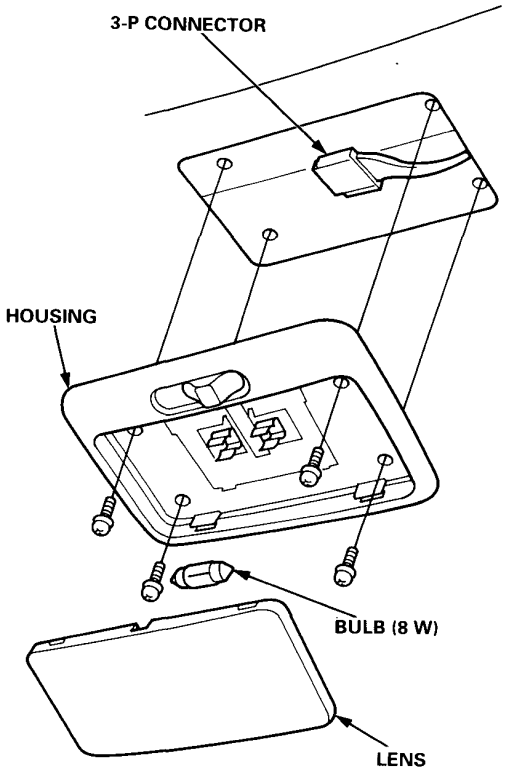
Terminal / Position	A	B or B'	C		D
OFF			○	○	○
MIDDLE		○	○	○	○
ON	○		○	○	○





Ceiling Light Test (Without Sunroof)

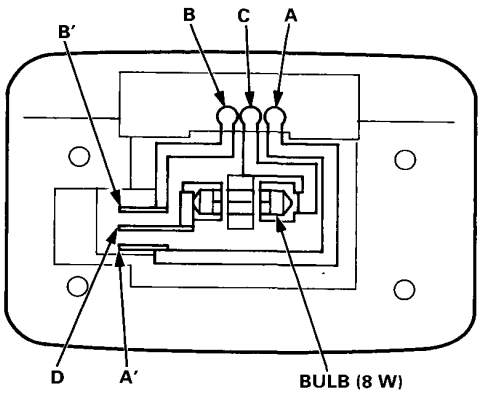
1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the four screws and the housing.

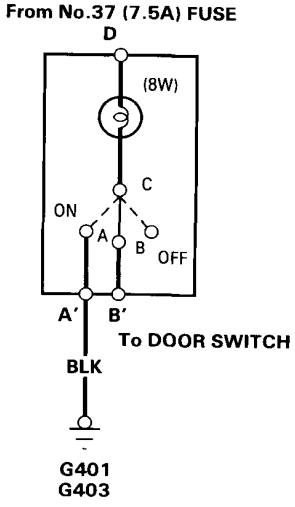


4. Disconnect the 3-P connector from the housing.

5. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A or A'	B or B'	C		D
OFF			○	⌀	○
MIDDLE		○	○	⌀	○
ON	○		○	⌀	○

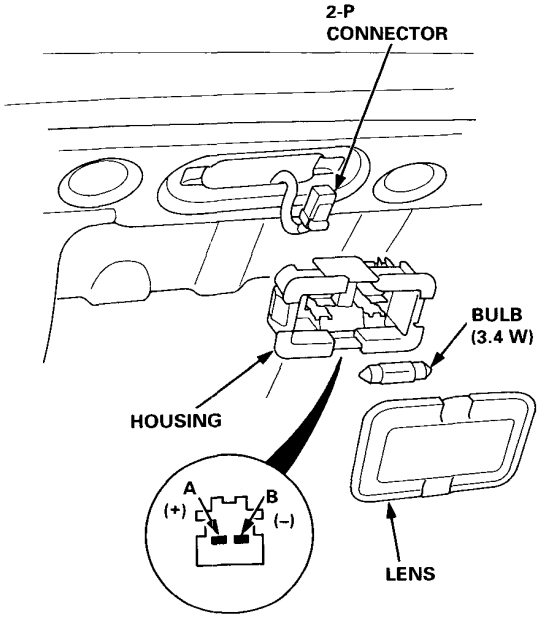




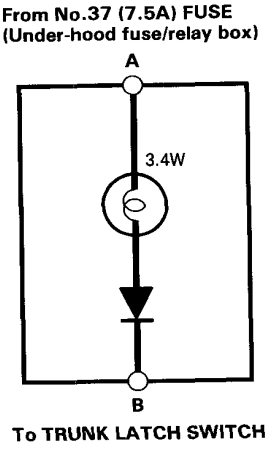
Ceiling/Courtesy/Trunk Lights

Trunk Light Test/Replacement

1. Pry off the trunk light lens from the housing.
2. Pry out the light assembly.
3. Disconnect the 2-P connector from the housing.
4. Make sure that the bulb is OK. Check for continuity between the A (+) and B (–) terminals.

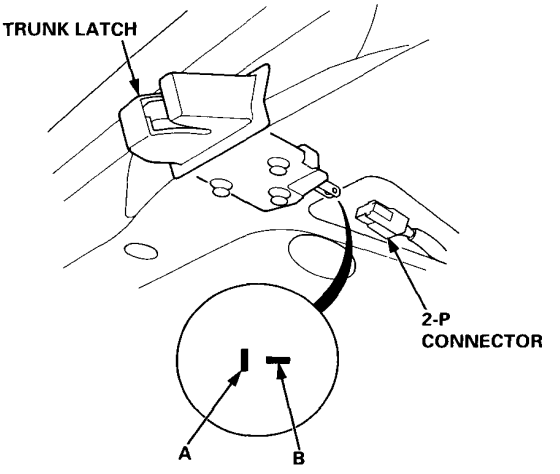


View from terminal side



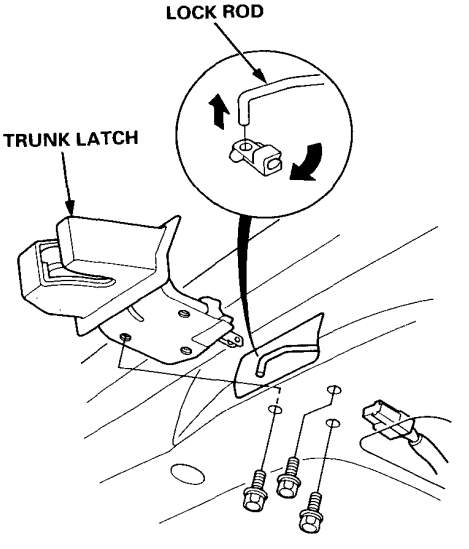
Latch Switch Test/Replacement

1. Open the trunk lid, and remove the trunk rear trim panel.
2. Disconnect the 2-P connector from the trunk latch.
3. Check for continuity between the terminals in each switch position according to the table.



Position \ Terminal	A	B
OPEN	○	○
CLOSE		

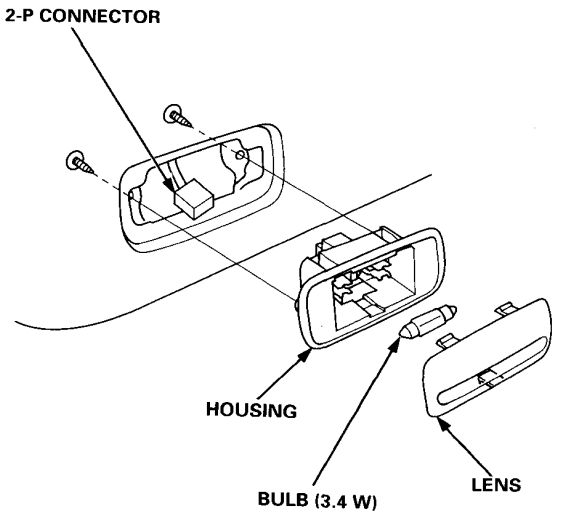
4. If necessary, remove the three bolts from the trunk lid, then remove the trunk latch assembly. The switch cannot be replaced separately.

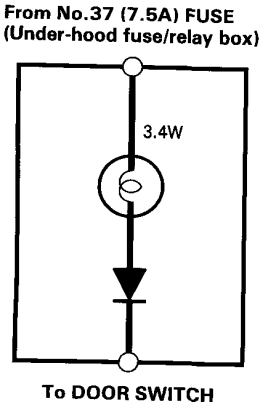


Courtesy Lights Replacement

NOTE: The bulb or lens alone can be replaced without removing the door panel.

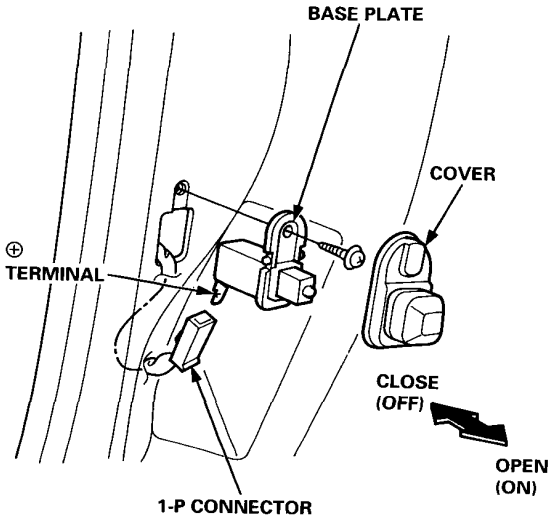
1. To replace the entire light, remove the door panel (see section 20).
2. Remove the two screws, then remove the light housing from the door panel.
3. Disconnect the 2-P connector, and remove the light.





Door Switch Test

1. Remove the cover and the screw, then pull the switch out.
2. Disconnect the 1-P connector, and remove the switch.

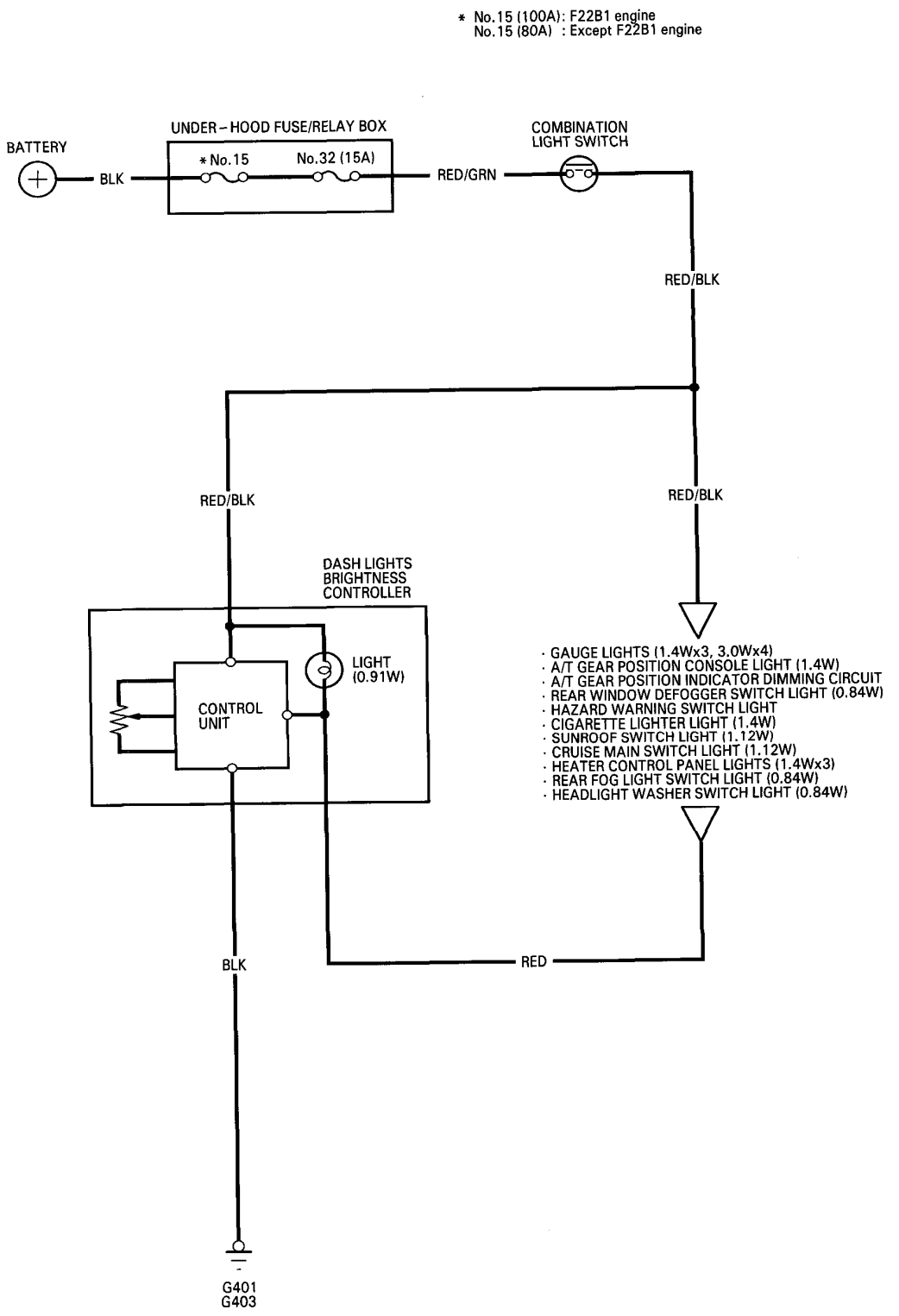


3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	⊕ TERMINAL	BASE PLATE
CLOSE (OFF)		
OPEN (ON)	○	○

Dash Lights Brightness Controller

Circuit Diagram



Controller Input Test

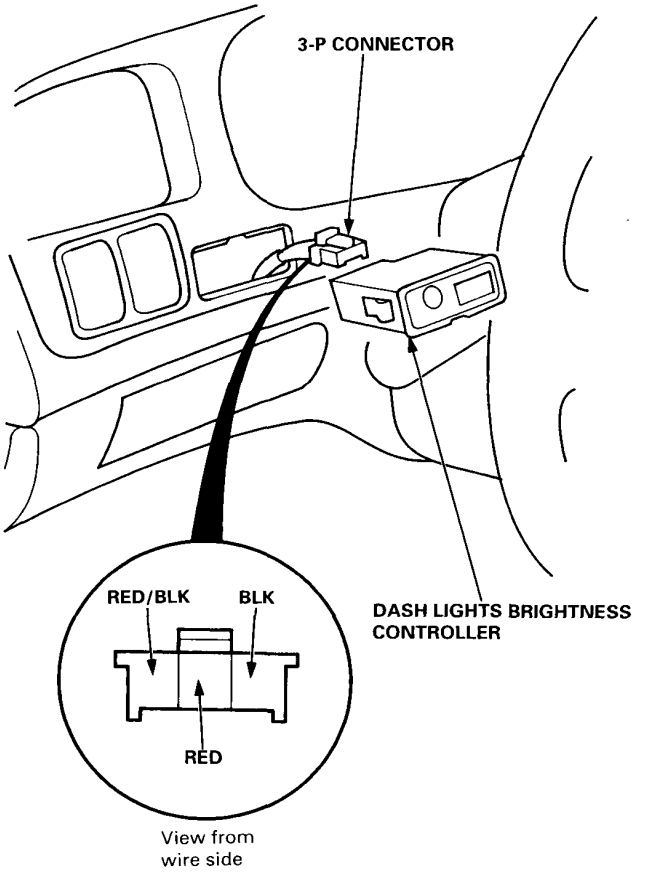
NOTE: The control unit is built into the dash lights brightness controller.

1. Carefully pry the controller out of the dashboard, then disconnect the 3-P connector from the controller.

2. Inspect the connector and socket terminals to be sure they are all making good contact.

   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the controller must be faulty; replace it.

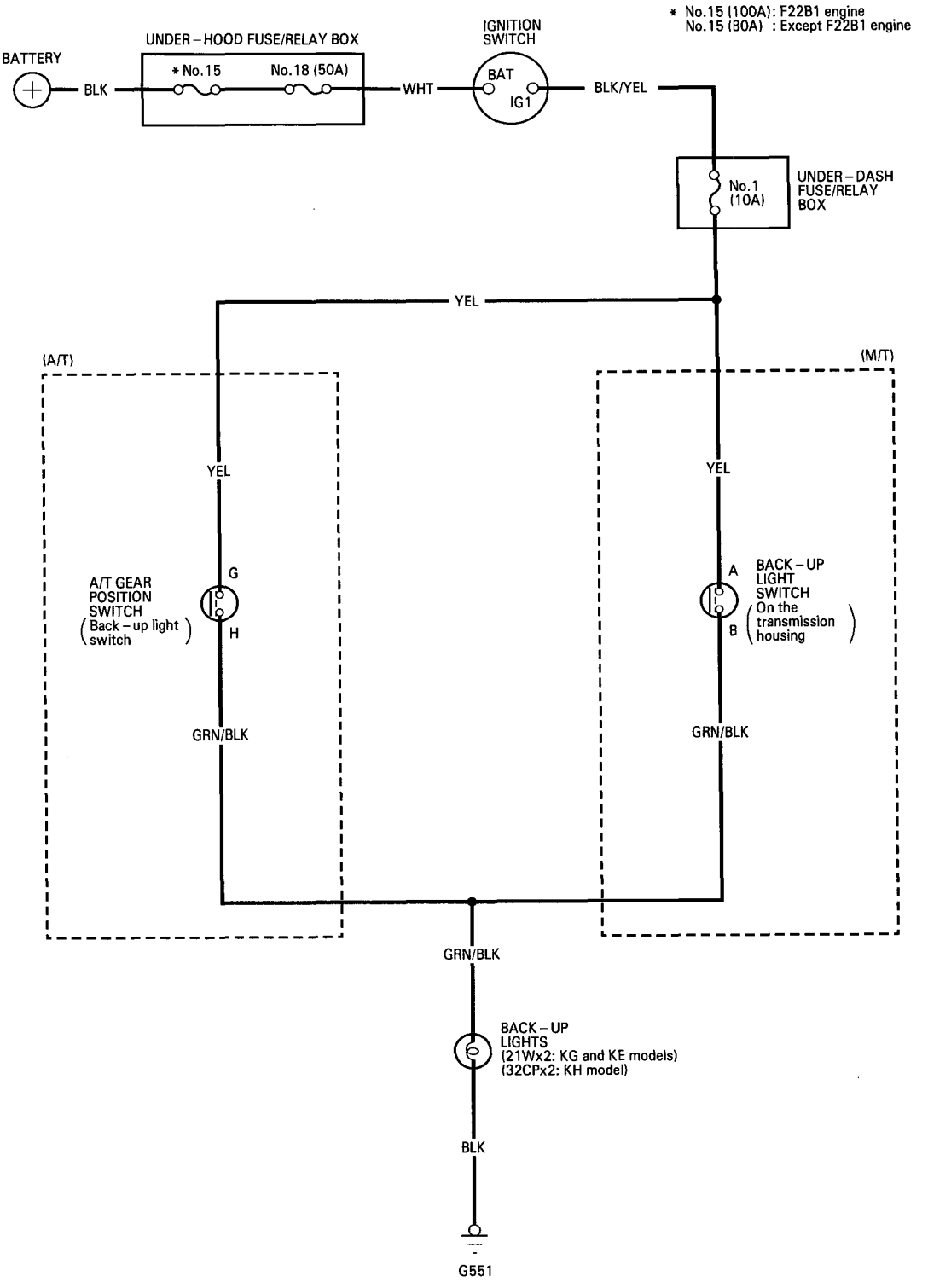
   NOTE: LHD type is shown, RHD type is similar.



No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G403) • An open in the wire
2	RED/BLK	Headlight switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 32 (15 A) fuse in the under-hood fuse/relay box • Faulty combination light switch • An open in the wire
3	RED	Headlight switch ON	Connect to ground: Dash lights should come on full bright.	• An open in the wire

Back-up Lights

Circuit Diagram

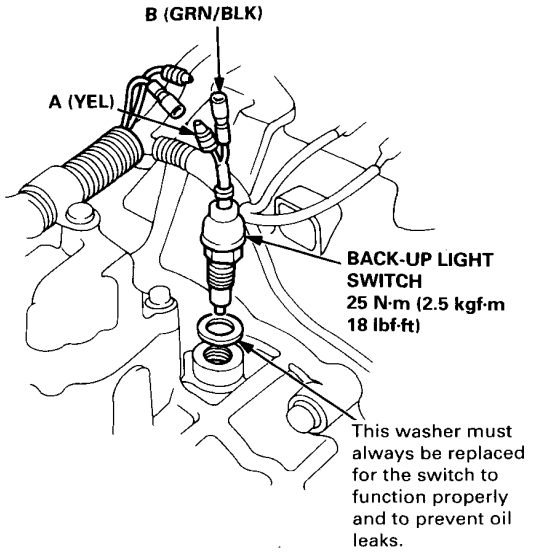


Test

Manual Transmission:

NOTE: Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.

1. Test the back-up light switch by moving the shift lever to reverse and turning the ignition switch ON (II).
2. If the back-up lights do not go on, check the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, disconnect the connector from the back-up light switch.



4. Check for continuity between the terminals in each switch position according to the table.

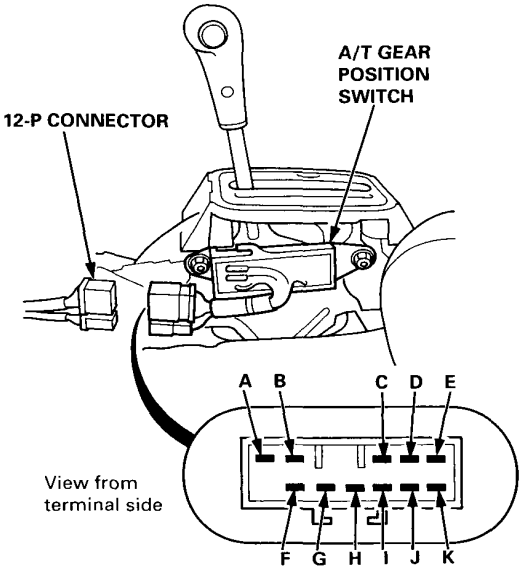
Position \ Terminal	A	B
REVERSE	○	○
ALL EXCEPT REVERSE		

- If there is no continuity, replace the back-up light switch.
- If there is continuity, but the back-up lights do not go on, check for:
  — Poor ground (G551)
  — An open in the YEL or GRN/BLK wire

Automatic Transmission:

NOTE: Check the No. 1 (10 A) fuse in the under-dash fuse/relay box before testing.

1. Test the back-up light switch by shifting the shift lever to [R] and turning the ignition switch ON (II).
2. If the back-up lights do not go on, check the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, disconnect the 12-P connector from the A/T gear position switch (back-up light switch).

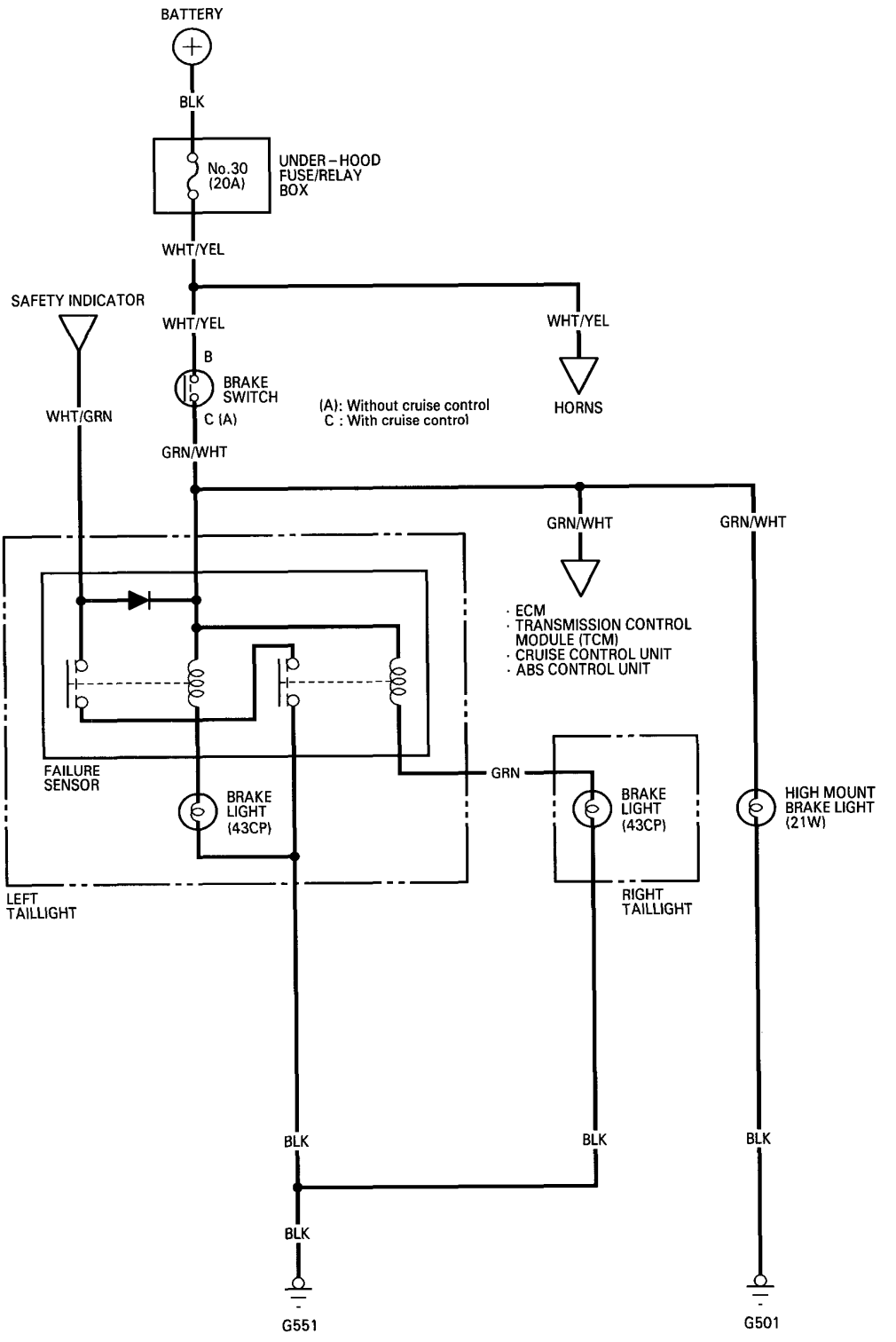


4. Check for continuity between the "G" and "H" terminals. Move the lever back and forth at the [R] position without touching the push button, and check for continuity within the range of free play of the shift lever.

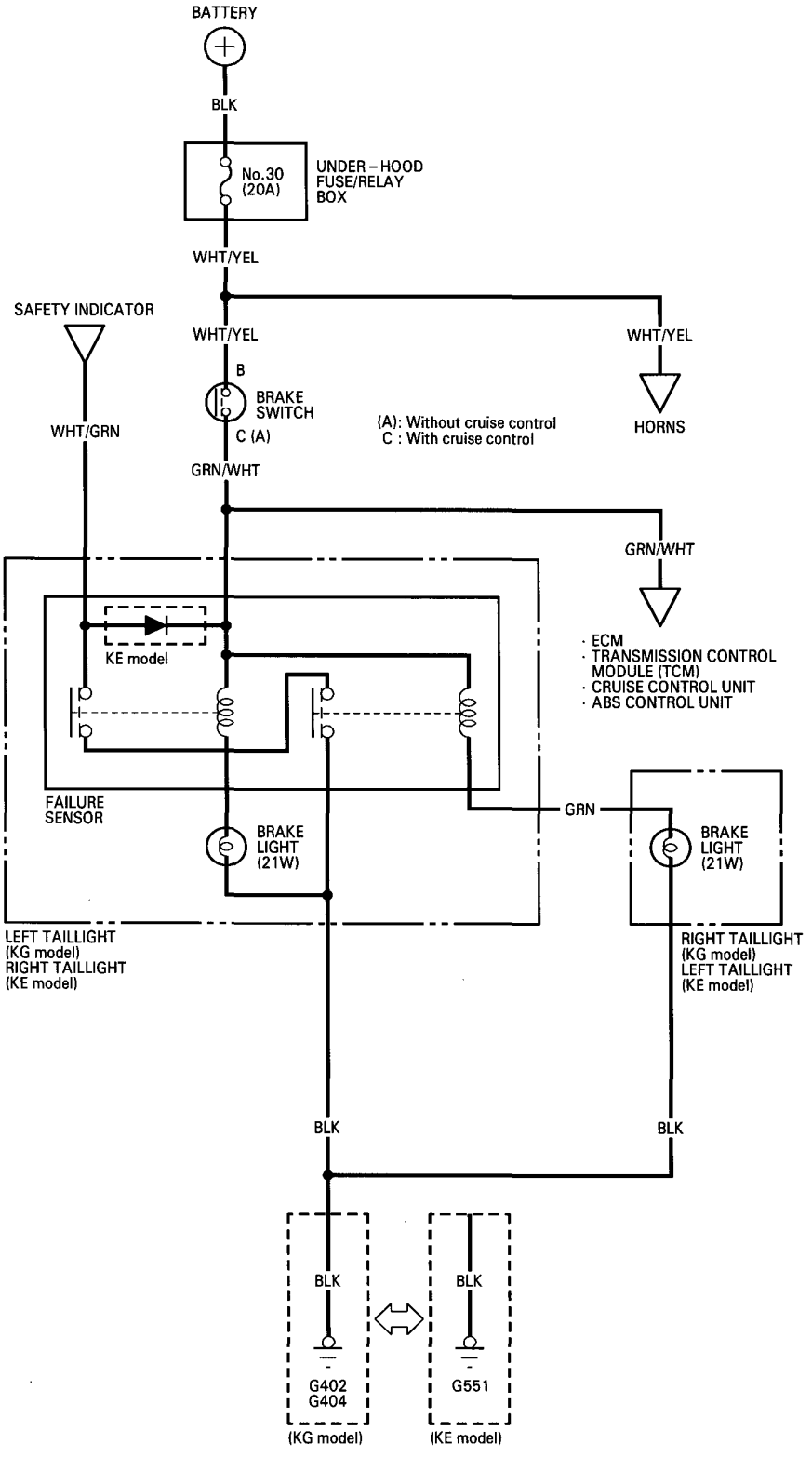
- If there is no continuity within the range of free play, adjust the A/T gear position switch (see page 23-168).
- If there is continuity, but the back-up lights do not go on, check for:
  — Poor ground (G551)
  — An open in the YEL or GRN/BLK wire

Brake Lights and High Mount Brake Light

Circuit Diagram (KH model)



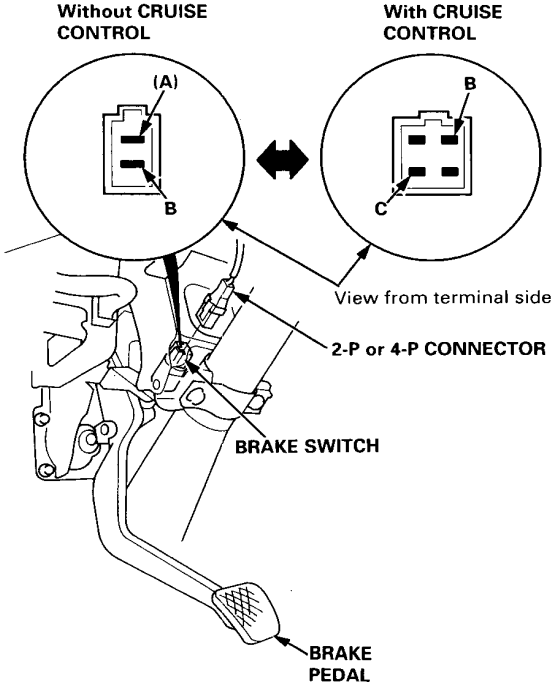
Circuit Diagram (KG and KE models)



Brake Lights and High Mount Brake Light

Brake Switch Test

1. If one of the brake lights does not go on, check the bulb in the taillight or the high mount brake light.
2. If none of the brake lights go on, check the No. 30 (20 A) fuse in the under-hood fuse/relay box.
3. If the fuse and bulbs are OK, disconnect the 2-P or 4-P connector from the brake switch.



4. Check for continuity between the terminals in each switch position according to the table.

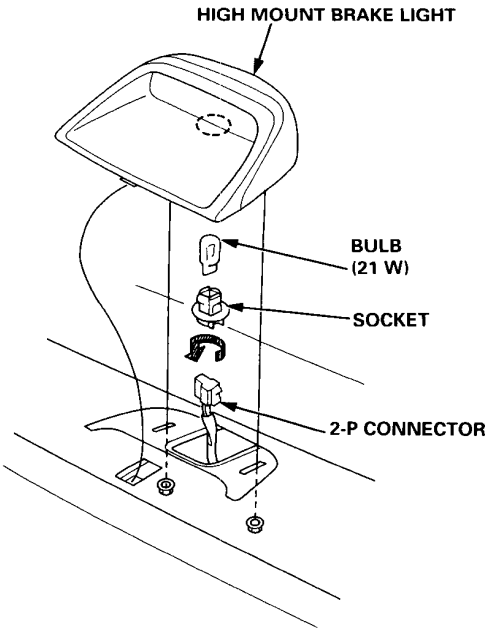
Terminal / Position	B	C or (A)
RELEASED		
PUSHED	○	○

- If there is no continuity, adjust the pedal height (see section 19), and recheck.
- If there is still no continuity, replace the switch.
- If there is continuity, but the brake lights do not go on, check for:
  — Poor ground *1 (G402, G404) *2 (G551)
  — An open in the WHT/YEL or GRN/WHT wire
  — Faulty brake light failure sensor (see page 23-162)

(A): Without cruise control
C : With cruise control
*1 : KG model
*2 : KE and KH models

High Mount Brake Light Replacement (KH model)

1. Open the trunk lid, and disconnect the 2-P connector from the high mount brake light.
2. Remove the two nuts, then remove the high mount brake light from the rear shelf.



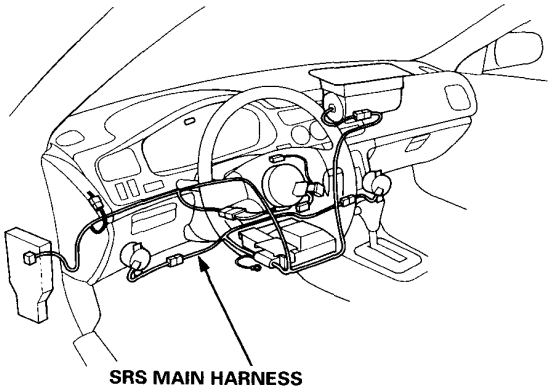
3. Install the high mount brake light in the reverse order of removal. Clean the rear window glass before installing the light.

Side Marker/Turn Signal/Hazard Flasher System

Component Location Index

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

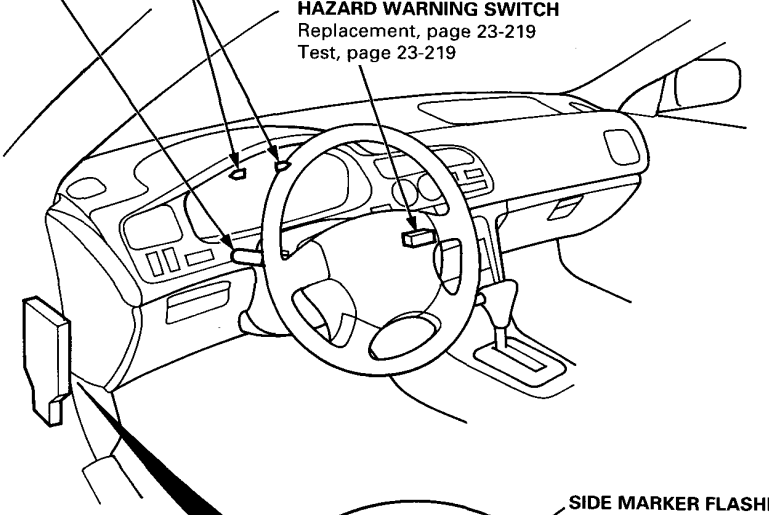
NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



COMBINATION LIGHT/TURN SIGNAL SWITCH
Test, page 23-189, 190
Replacement, page 23-191

TURN SIGNAL INDICATOR LIGHTS
(In the gauge assembly)
Bulb Locations, page 23-136

HAZARD WARNING SWITCH
Replacement, page 23-219
Test, page 23-219



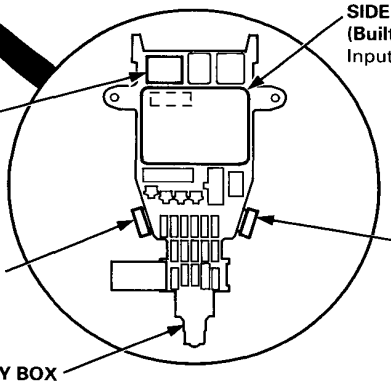
SIDE MARKER FLASHER CIRCUIT (KH model)
(Built into the integrated control unit)
Input Test, page 23-173

TURN SIGNAL/HAZARD RELAY
Input Test, page 23-218

AUXILIARY FUSE HOLDER
(KE model)

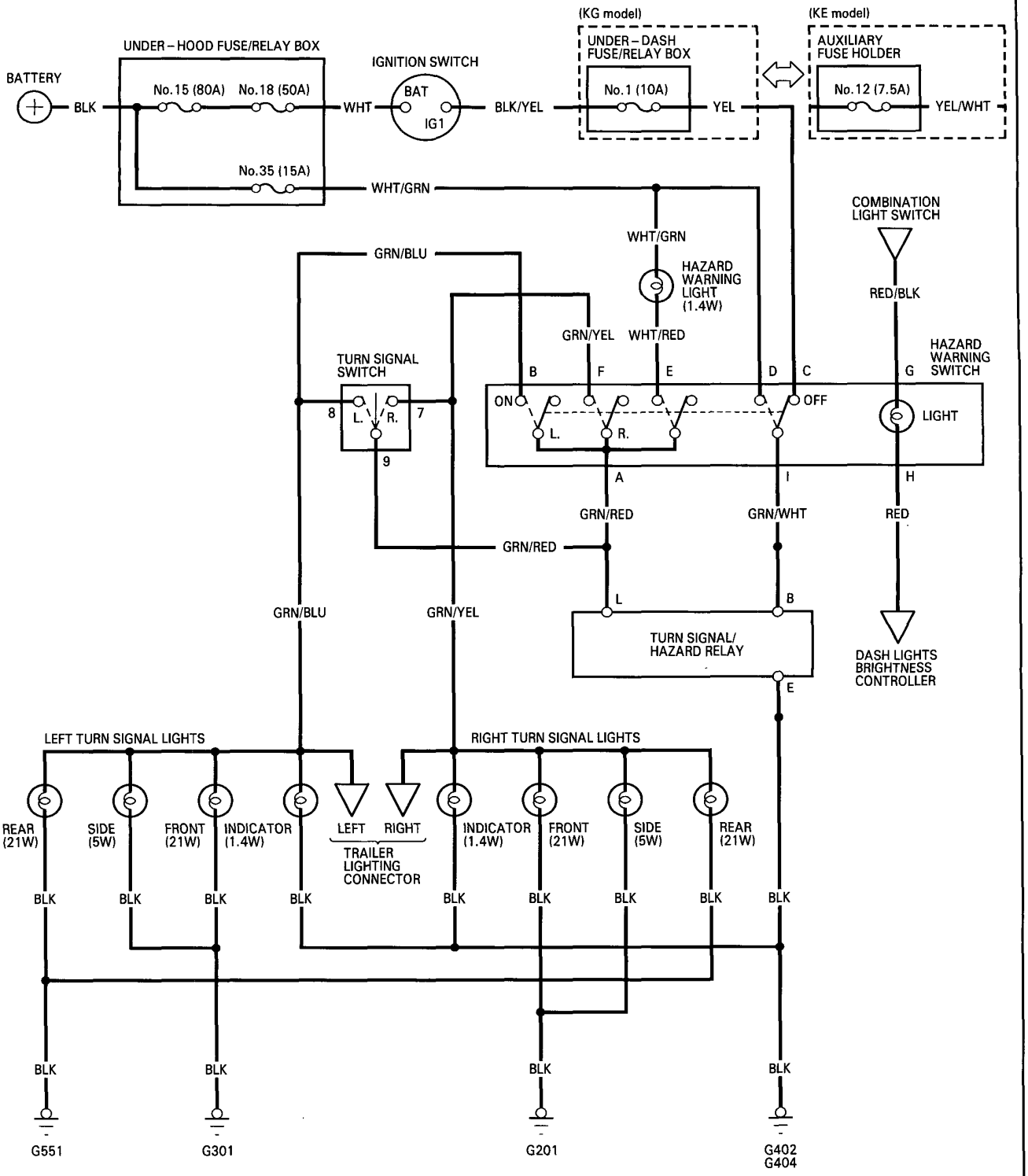
AUXILIARY FUSE HOLDER
(KH model)

UNDER-DASH FUSE/RELAY BOX



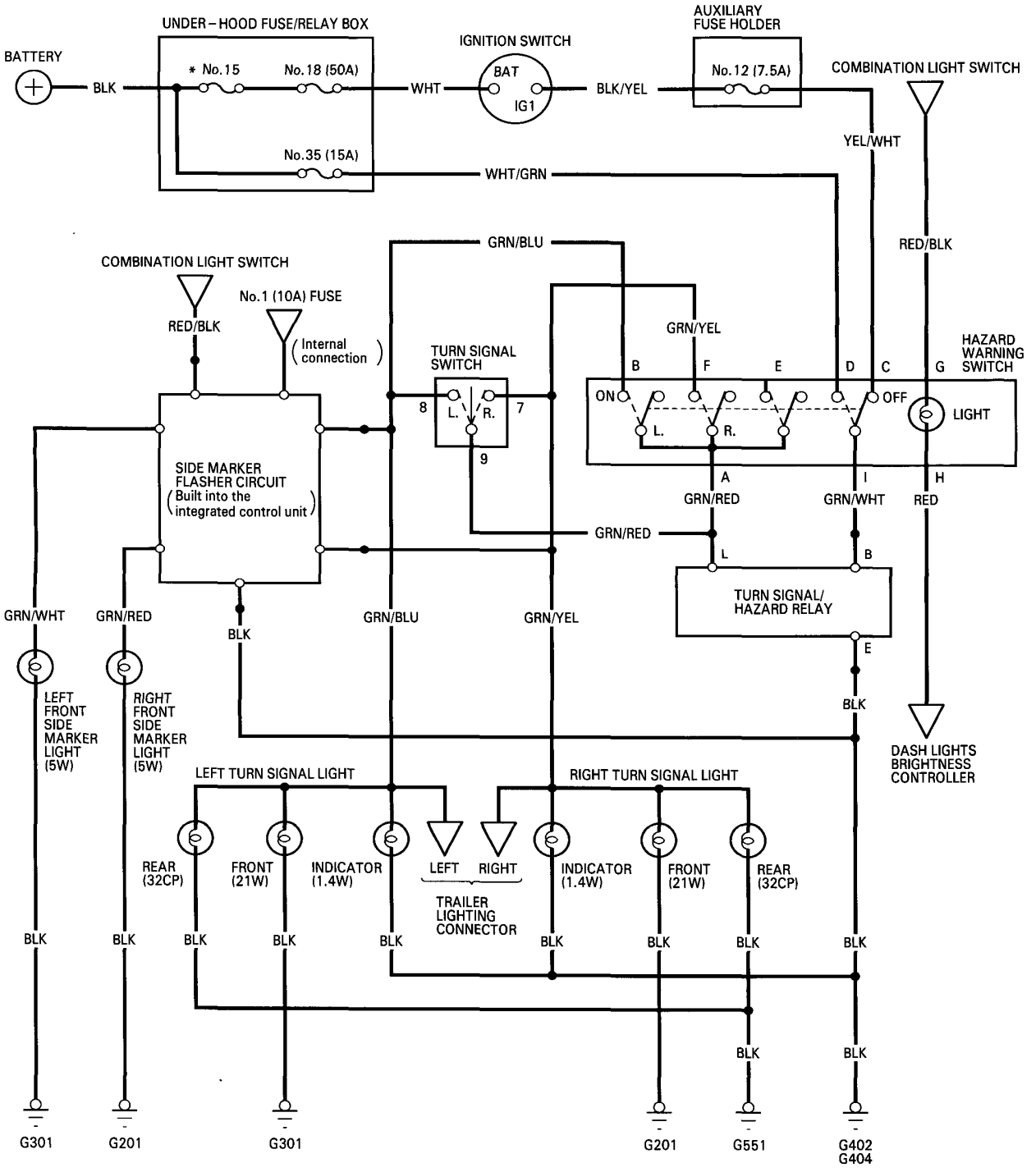
Side Marker/Turn Signal/Hazard Flasher System

Circuit Diagram (KG and KE models)



Circuit Diagram (KH model)

* No.15 (100A) : F22B1 engine
No.15 (80A) : Except F22B1 engine

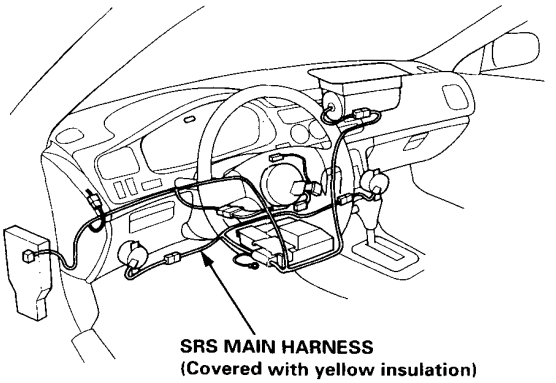


Side Marker/Turn Signal/Hazard Flasher System

Turn Signal/Hazard Relay Input Test

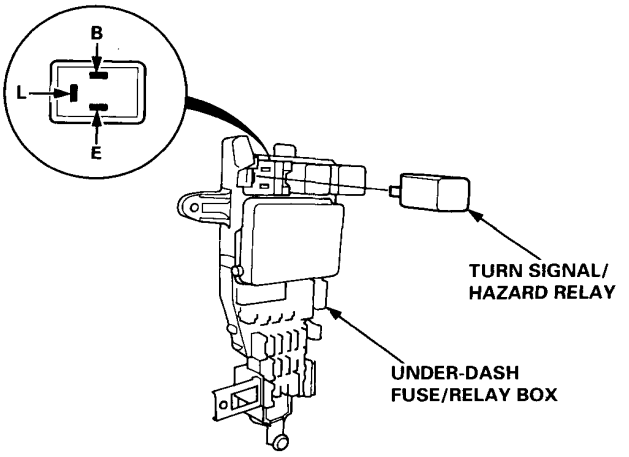
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- ***Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.***

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



1. Remove the turn signal/hazard relay from the under-dash fuse/relay box.

2. Inspect the relay and fuse/relay box socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the fuse/relay box socket.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the turn signal/hazard relay must be faulty; replace it.

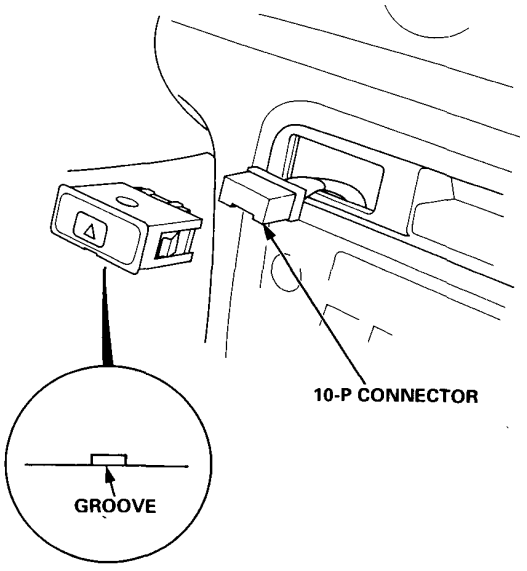


No.	Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
1	E	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	B	Ignition switch ON (II)	Check for voltage to ground: *There should be battery voltage.*	• Blown No. 12 (7.5 A) fuse in the auxiliary fuse holder (KH and KE models) • *Blown No. 1 (10 A) fuse in the* under-dash fuse/relay box (KG model) • An open in the wire • Faulty hazard warning switch
		Hazard warning switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 35 (15 A) fuse in the under-hood fuse/relay box • An open in the wire • Faulty hazard warning switch
3	L	Hazard warning switch ON; connect the B terminal to the L terminal.	Hazard lights should come on.	• Poor ground (G201, G301, G402, G404, G551) • Faulty hazard warning switch • Faulty side marker flasher circuit • An open in the wire
		Ignition switch ON (II) and turn signal switch in right or left; connect the B terminal to the L terminal.	Right or left turn signal lights should come on.	• Faulty turn signal switch

Hazard Warning Switch Replacement

CAUTION: Be careful not to damage the hazard warning switch or the front console panel when prying the switch out.

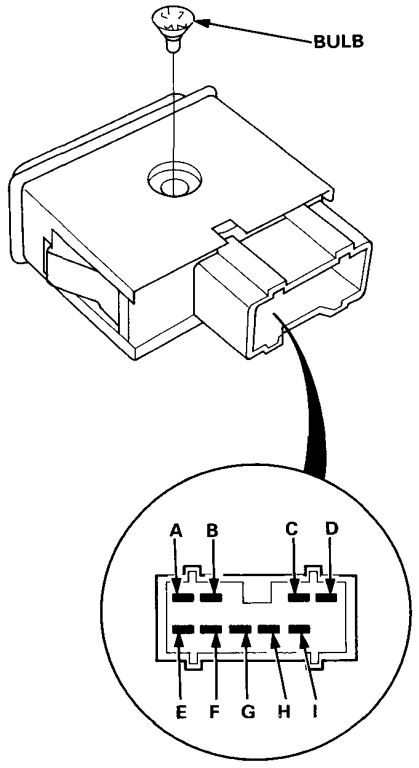
1. Carefully pry the hazard warning switch out of the front console panel.
2. Disconnect the 10-P connecter from the hazard warning switch.

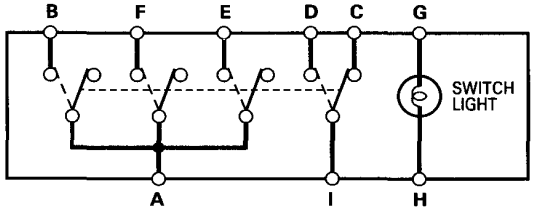


3. Install in the reverse order of removal.

Hazard Warning Switch Test

1. Carefully pry the hazard warning switch out of the front console panel.
2. Check for continuity between the terminals in each switch position according to the table.





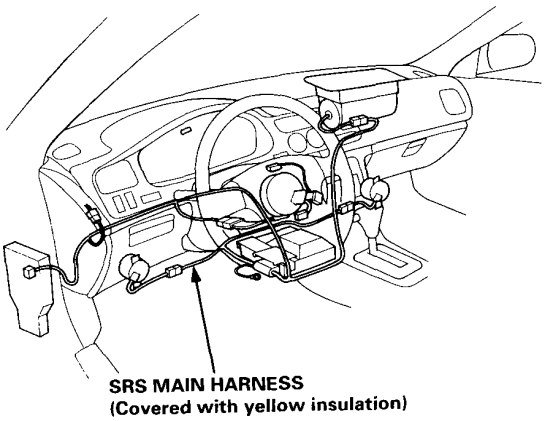
Terminal / Position	G		H	A	B	C	D	E	F	I
OFF	○	⊖	○			○				○
ON	○	⊖	○	○	○		○	○	○	○

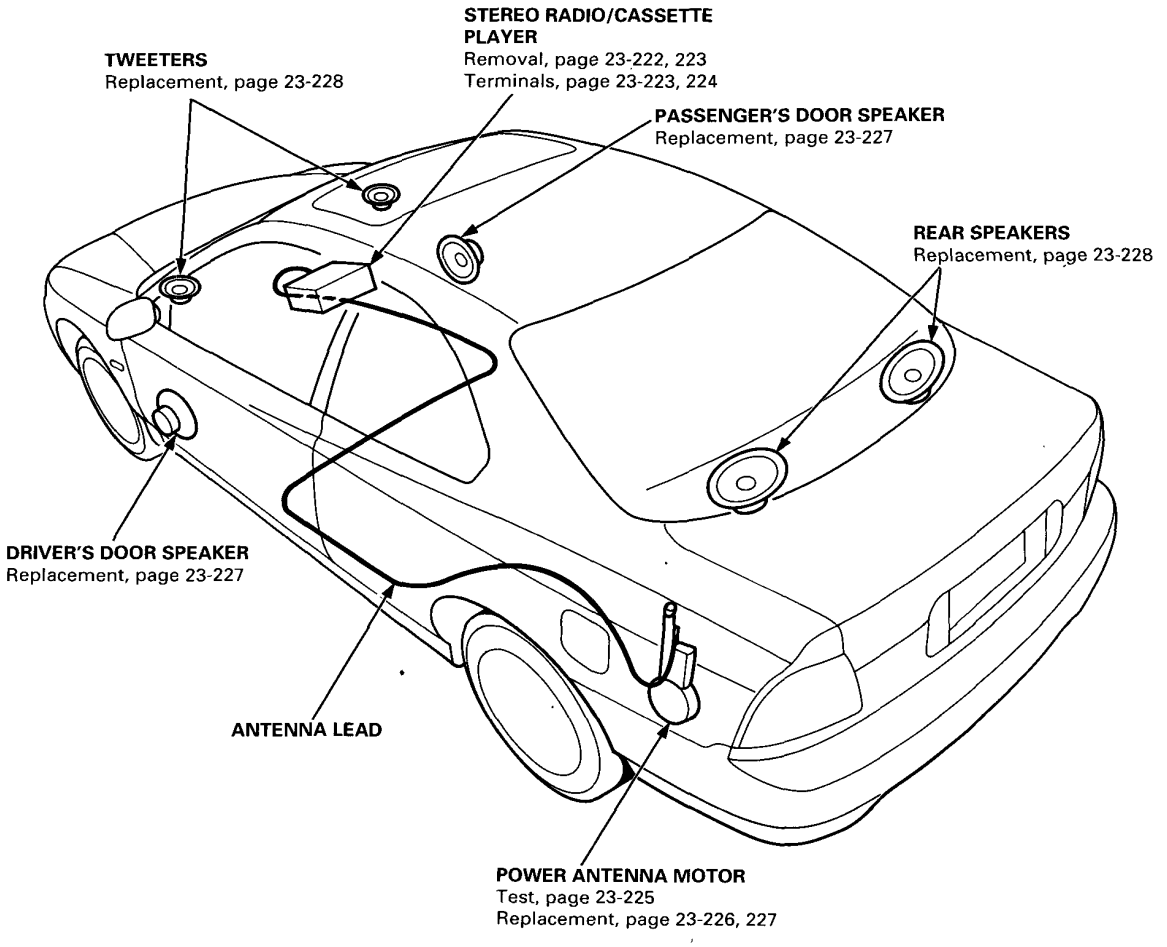
Stereo Sound System

Component Location Index

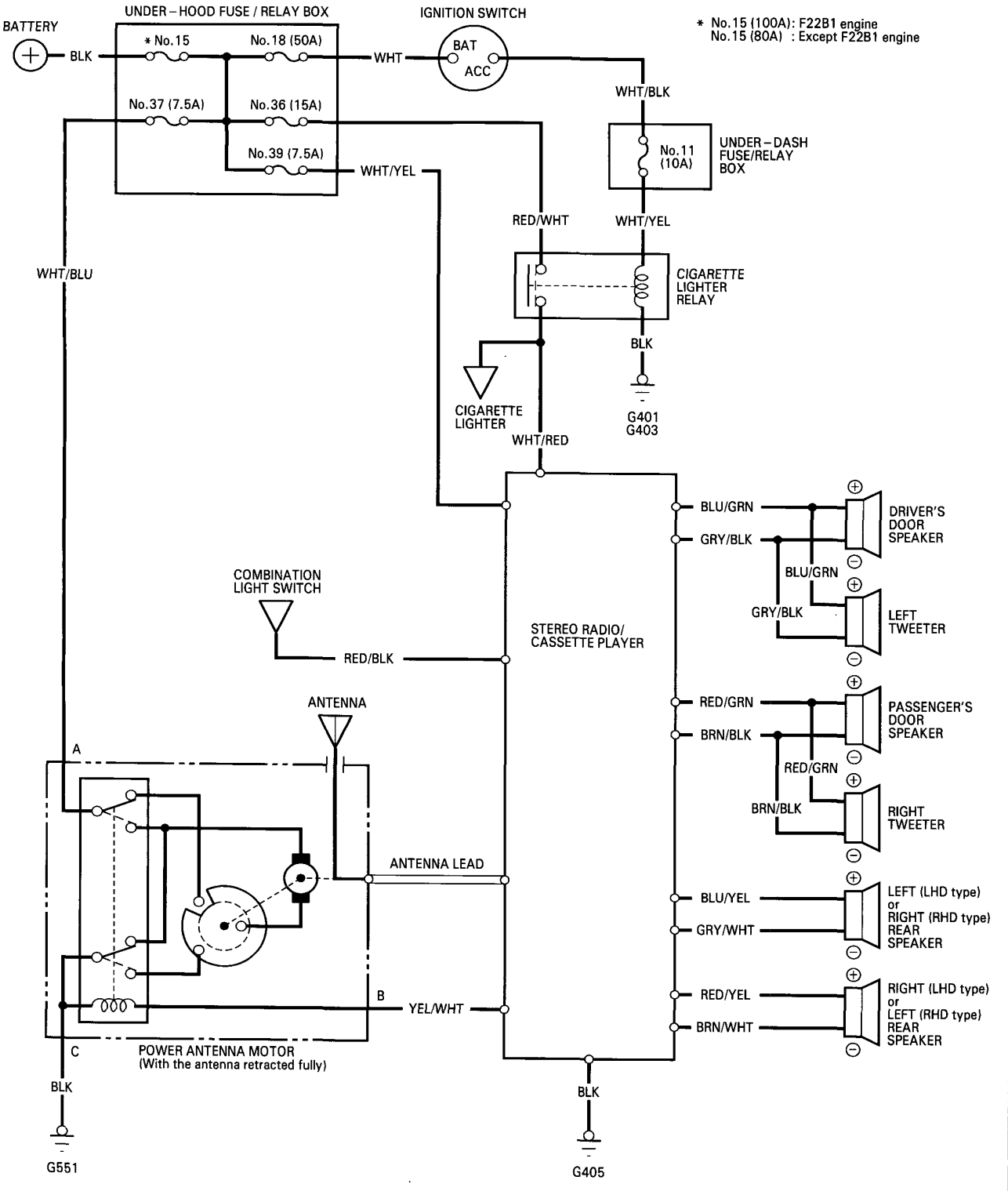
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.





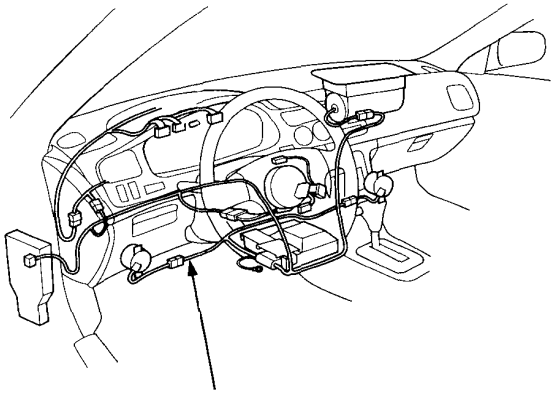
Circuit Diagram



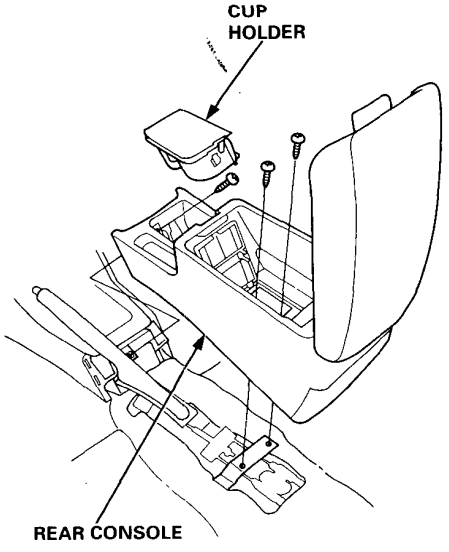
Stereo Sound System

Removal (KH model)

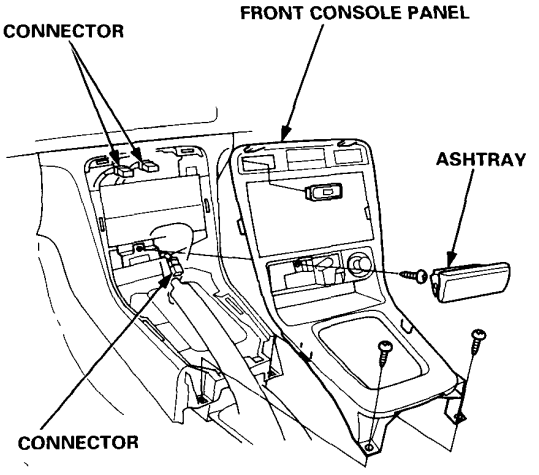
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**



1. Remove the rear console.

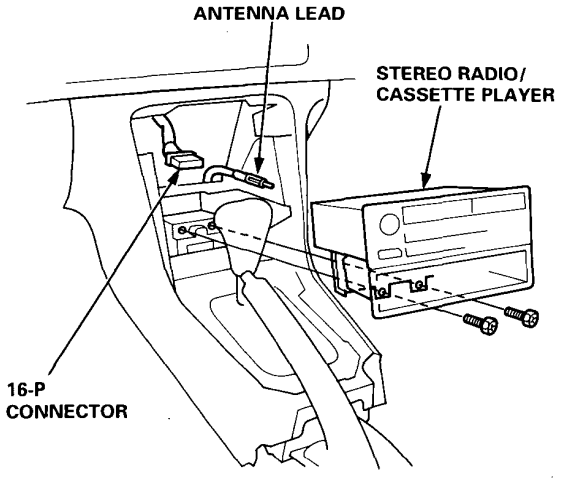


2. Remove the front console panel.

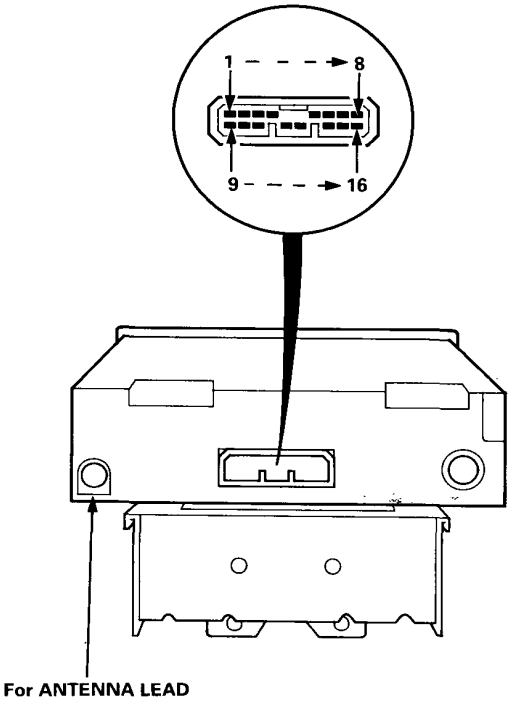


3. Remove the two screws. Pull the stereo radio/cassette player out part of the way.

4. Disconnect the 16-P connector and antenna lead, then remove the stereo radio/cassette player.



Stereo Radio/Cassette Player Terminals (KH model)

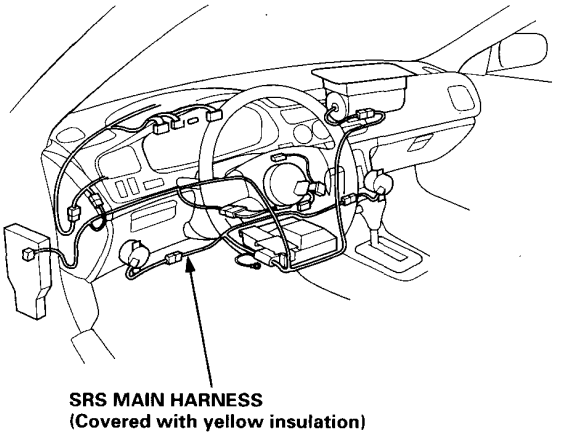


Terminal	Wire	Connects to
1	RED/GRN	Passenger's door speaker ⊕
2	BLU/GRN	Driver's door speaker ⊕
3	RED/BLK	Lights-on signal
4	WHT/YEL	Constant power (Tuning memory)
5	WHT/RED	ACC (Main stereo power supply)
6	YEL/WHT	Radio switched power (To antenna)
7	BLU/YEL	Left rear speaker ⊕
8	RED/YEL	Right rear speaker ⊕
9	BRN/BLK	Passenger's door speaker ⊖
10	GRY/BLK	Driver's door speaker ⊖
11	—	(not used)
12	—	(not used)
13	—	(not used)
14	BLK	Ground (G405)
15	GRY/WHT	Left rear speaker ⊖
16	BRN/WHT	Right rear speaker ⊖

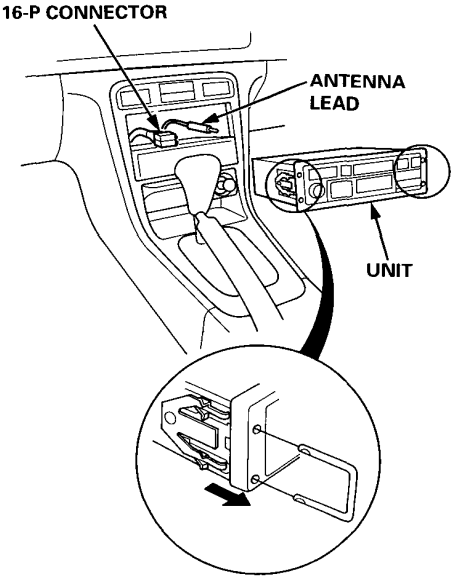
Removal (KG and KE models)

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

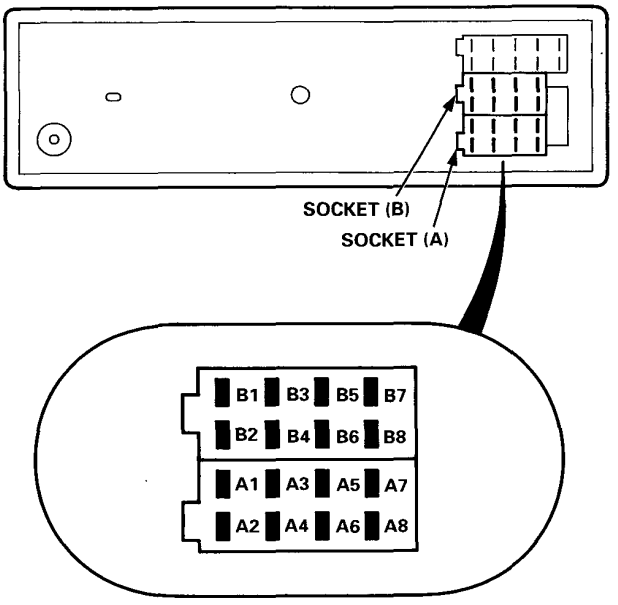


1. Remove the needle remover to pull out the stereo radio/cassette player.



Stereo Sound System

Stereo Radio/Cassette Player Terminals (KG and KE models)



KG model:

Terminal	Wire	Connects to
A1	—	(not used)
A2	—	(not used)
A3	—	(not used)
A4	WHT/YEL	Constant power (Tuning memory)
A5	YEL/WHT	Radio switched power (To antenna)
A6	RED/BLK	Lights-on signal
A7	WHT/RED	ACC (Main stereo power supply)
A8	BLK	Ground (G405)
B1	RED/YEL	Right rear speaker ⊕
B2	BRN/WHT	Right rear speaker ⊖
B3	RED/GRN	Passenger's door speaker ⊕
B4	BRN/BLK	Passenger's door speaker ⊖
B5	BLU/GRN	Driver's door speaker ⊕
B6	GRY/BLK	Driver's door speaker ⊖
B7	BLU/YEL	Left rear speaker ⊕
B8	GRY/WHT	Left rear speaker ⊖

KE model:

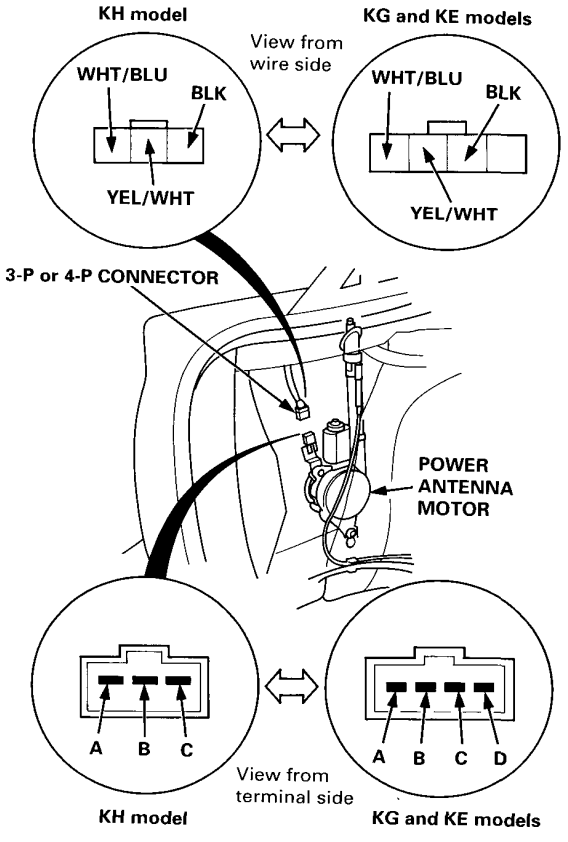
Terminal	Wire	Connects to
A1	—	(not used)
A2	—	(not used)
A3	—	(not used)
A4	WHT/YEL	Constant power (Tuning memory)
A5	YEL/WHT	Radio switched power (To antenna)
A6	RED/BLK	Lights-on signal
A7	WHT/RED	ACC (Main stereo power supply)
A8	BLK	Ground (G405)
B1	BLU/YEL	Right rear speaker ⊕
B2	GRY/WHT	Right rear speaker ⊖
B3	BLU/GRN	Driver's door speaker ⊕
B4	GRY/BLK	Driver's door speaker ⊖
B5	RED/GRN	Passenger's door speaker ⊕
B6	BRN/BLK	Passenger's door speaker ⊖
B7	RED/YEL	Left rear speaker ⊕
B8	BRN/WHT	Left rear speaker ⊖

Power Antenna Motor Test

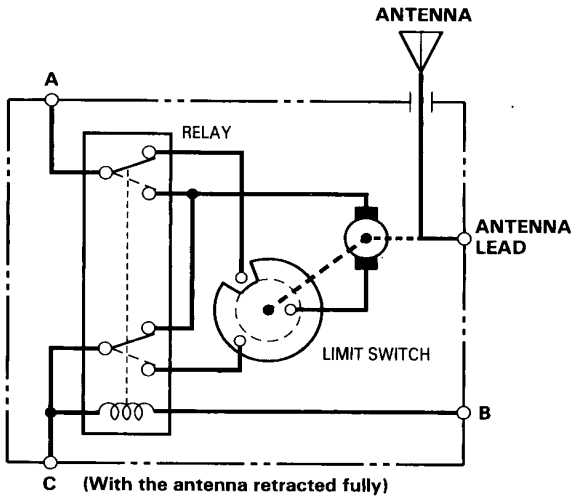
1. Remove the trunk side trim panel.
2. Disconnect the 3-P or 4-P connector from the motor, and remove the connector from its clamp.
3. Check for power to the motor at the connector terminals:
   - There should be battery voltage between the WHT/BLU (+) and BLK (–) terminals all the time.
   - There should be battery voltage between the YEL/WHT (+) and BLK (–) terminals only with the ignition and radio switched ON.
4. Test motor operation:

   EXTEND: Connect battery power to the "A" and "B" terminals, and ground the "C" terminal.

   RETRACT: Disconnect power from the "B" terminal.



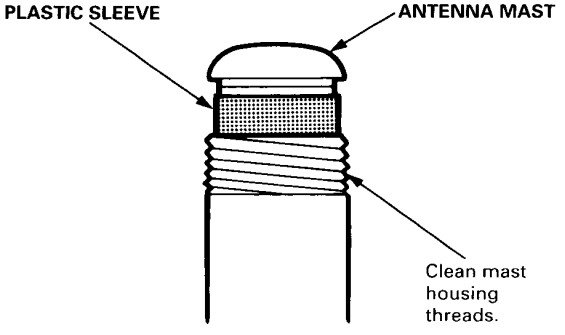
5. If the motor fails to run or does not run smoothly, replace it.



Sticking Antenna:

The antenna sticks in either the up or down position.

1. Remove the antenna nut, spacer, and bushing (see page 23-226).
2. Clean the antenna mast housing threads, and reinstall the spacer and bushing.



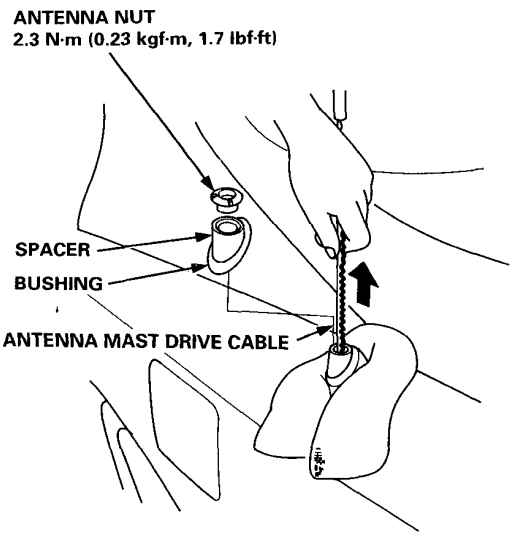
3. Tighten the antenna nut to 2.3 N·m (0.23 kgf·m, 1.7 lbf·ft). If you overtighten the nut, the antenna may stick. If sticking occurs, back the nut off a little, then turn the radio on and off to raise and lower the antenna again. Repeat until the antenna moves freely.

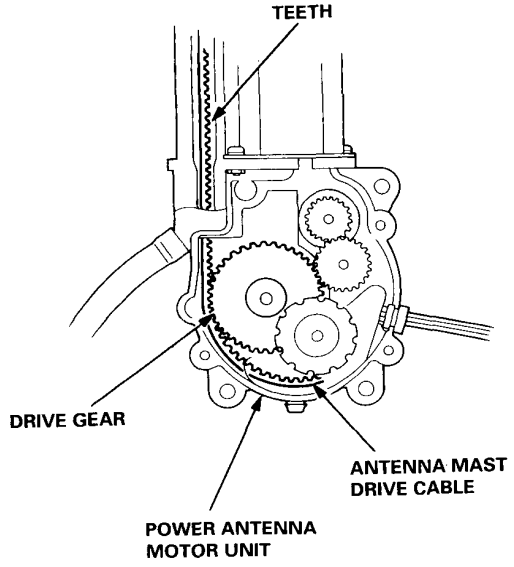
Antenna Mast Replacement

Removal

NOTE: The antenna mast alone can be replaced without having to remove the power antenna motor.

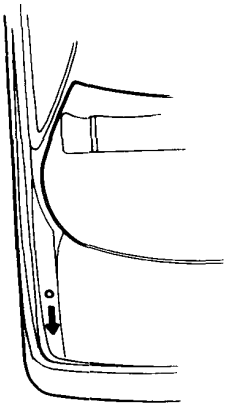
1. Remove the antenna nut, spacer and bushing.
2. Carefully withdraw the antenna mast while extending it by turning the radio switch ON.





Installation

1. Hold the antenna so the teeth on the drive cable face in the direction shown, then insert the cable into the antenna housing.

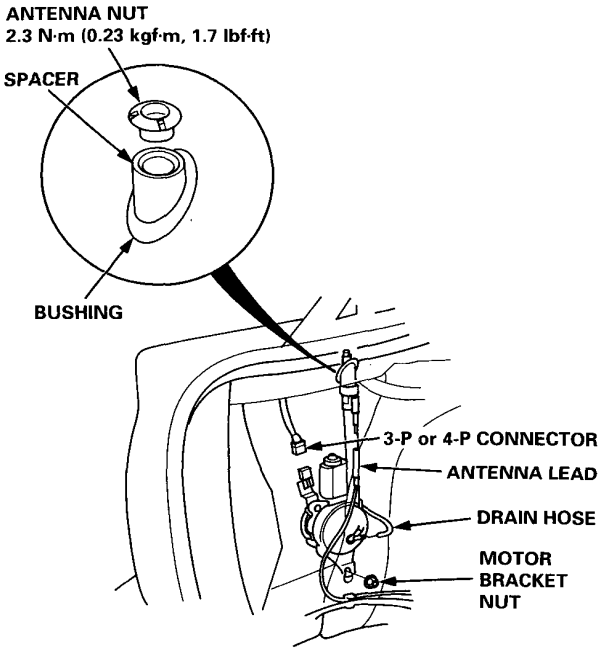


Direction of the teeth

2. Check for engagement of the cable teeth with the drive gear by carefully moving the cable up and down.
3. Turn the radio switch "OFF", and let the motor pull the drive cable into the antenna housing.
4. Clean the antenna housing threads, then insert the antenna into the housing. Install the bushing and spacer, and install and tighten the antenna nut to 2.3 N·m (0.23 kgf·m, 1.7 lbf·ft).
5. Check that the antenna mast retracts and extends fully when the radio switch is turned ON and OFF repeatedly. If you overtighten the nut, the antenna may stick. If sticking occurs, back the nut off a little, then raise and lower the antenna again. Repeat until the antenna moves freely.

Power Antenna Motor Replacement

1. Remove the trunk side trim panel.
2. Disconnect the 3-P or 4-P connector and antenna lead from the motor, then remove the antenna nut, spacer, bushing and motor bracket nut.

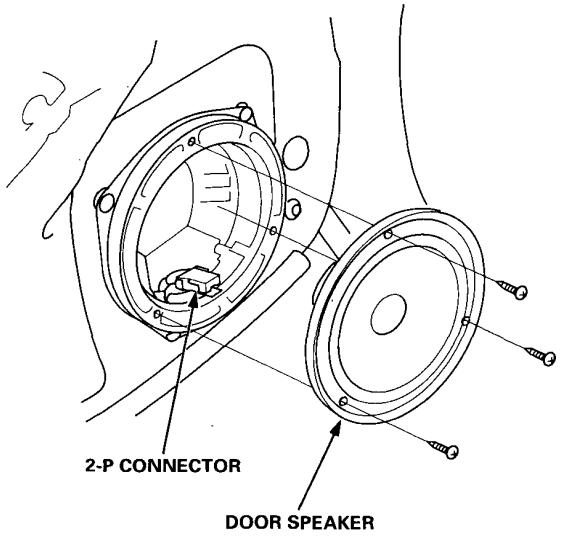


3. Remove the motor and antenna as an assembly.
4. Install in the reverse order of removal.

   NOTE: Tighten the antenna nut, then tighten the motor bracket nut.

Door Speaker Replacement

1. Remove the door panel.
2. Remove the three screws, then disconnect the 2-P connector from the speaker.

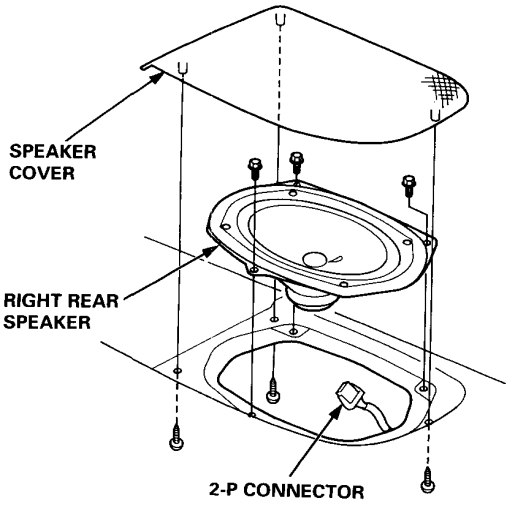


3. Install in the reverse order of removal.

Stereo Sound System

Rear Speaker Replacement

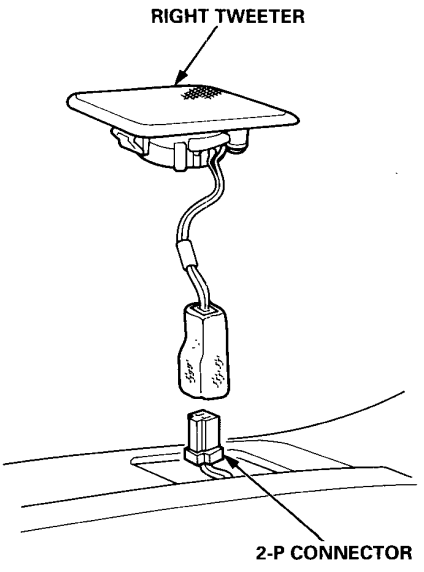
1. Remove the three screws from the trunk side, then remove the speaker cover.
2. Remove the three screws, disconnect the 2-P connector from the speaker, and remove the speaker.



3. Install in the reverse order of removal.

Tweeter Replacement

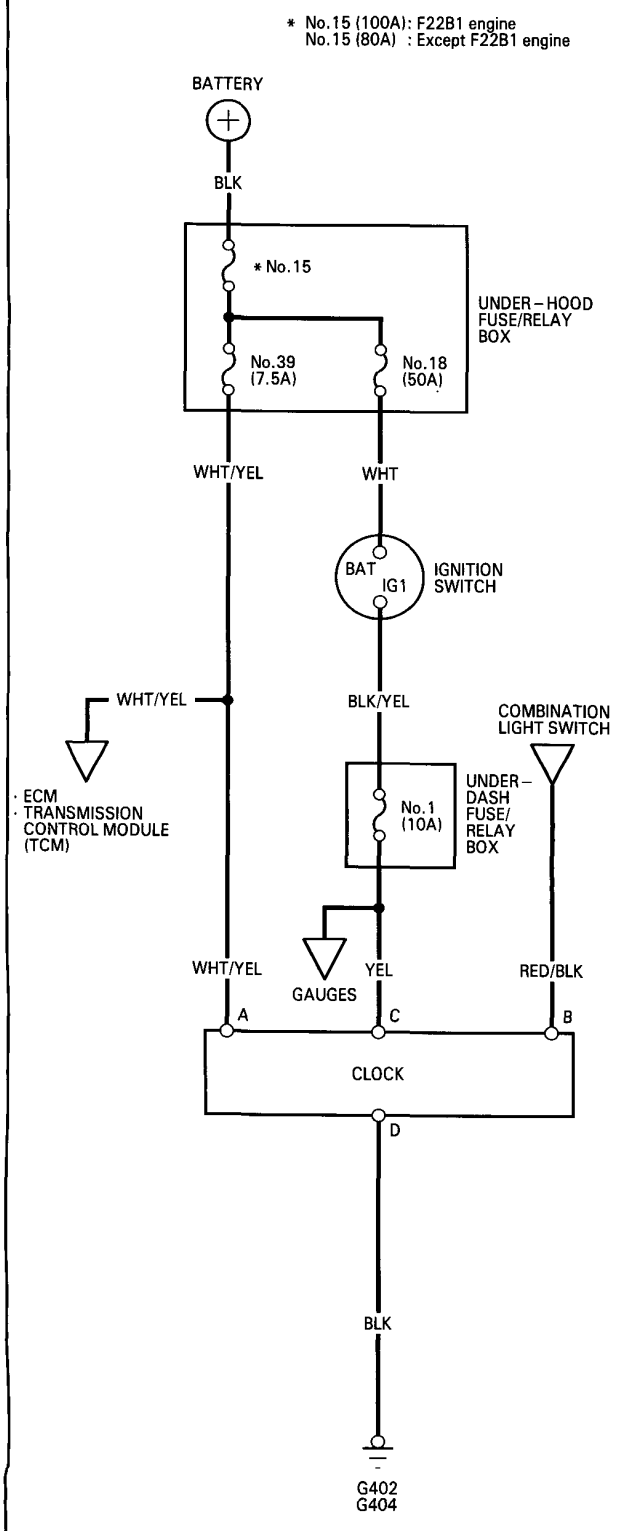
1. Carefully pry the tweeter out of the dashboard, then disconnect the 2-P connector from the tweeter.



2. Install in the reverse order of removal.

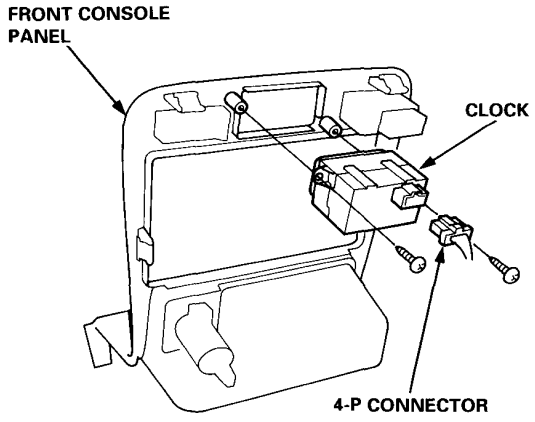
Clock

Circuit Diagram

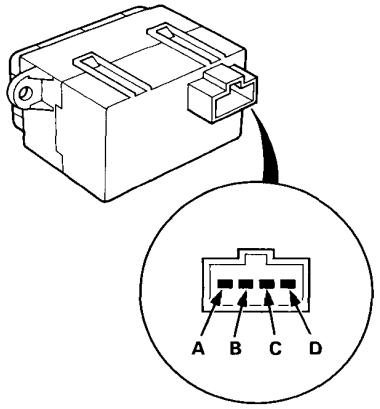


Removal

1. Remove the rear console (see page 23-134).
2. Remove the front console panel (see page 23-134).
3. Disconnect the 4-P connector from the clock.
4. Remove the two screws.



Terminals



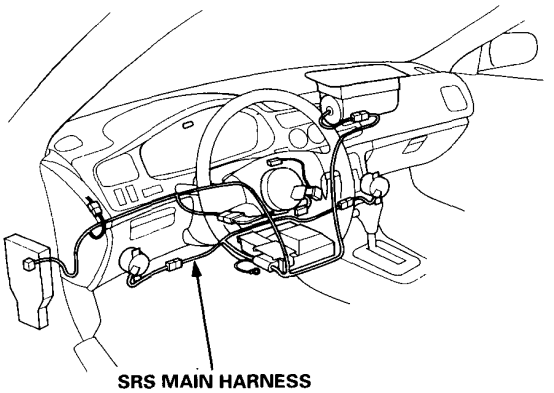
Terminal	Wire	Connects to
A	WHT/YEL	Constant power (Time memory)
B	RED/BLK	Lights-on signal
C	YEL	IG1 (Main clock power supply)
D	BLK	Ground (G402, G404)

Cigarette Lighter

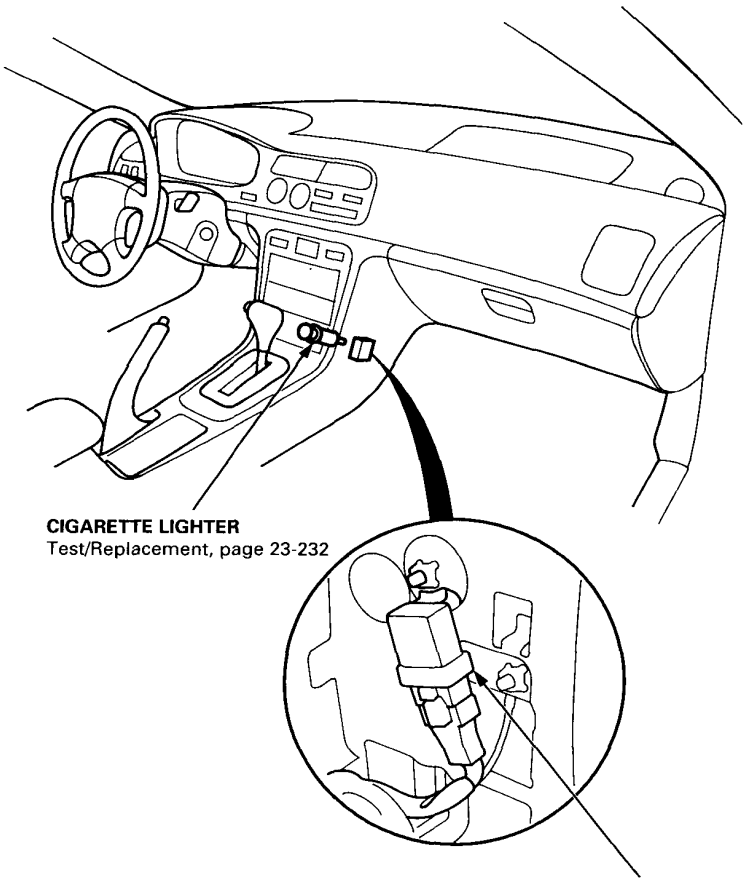
Component Location Index

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



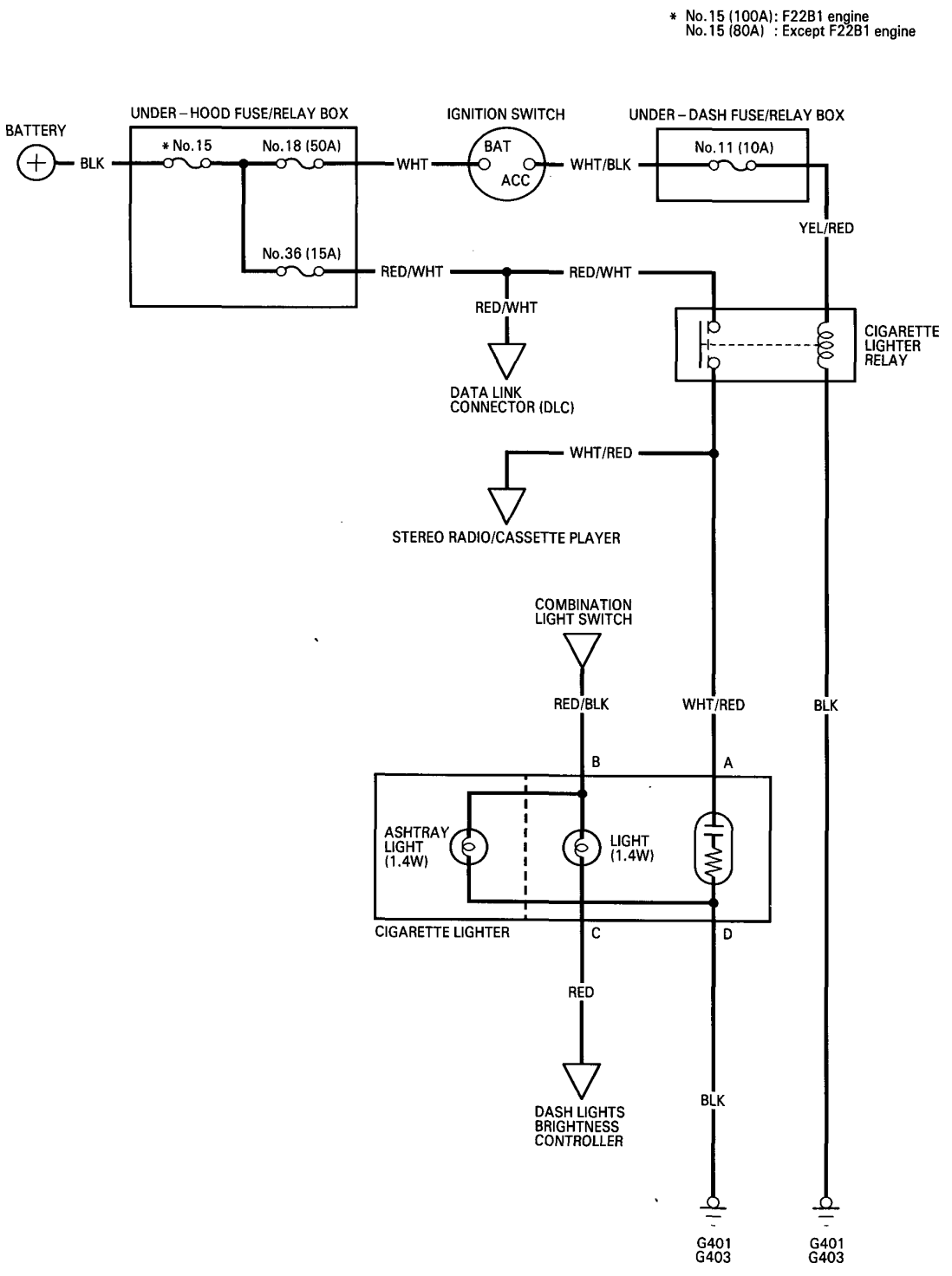
SRS MAIN HARNESS
(Covered with yellow insulation)



CIGARETTE LIGHTER
Test/Replacement, page 23-232

CIGARETTE LIGHTER RELAY
Test, page 23-72

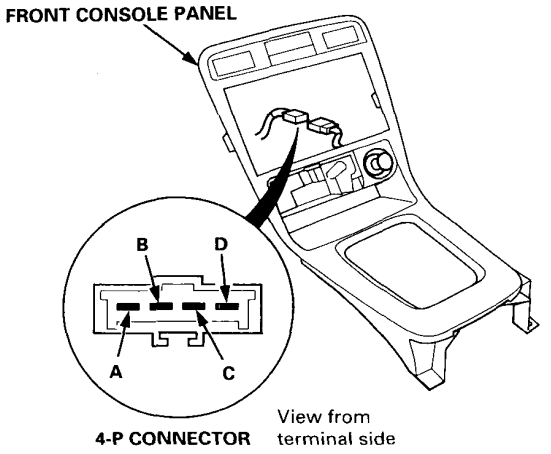
Circuit Diagram



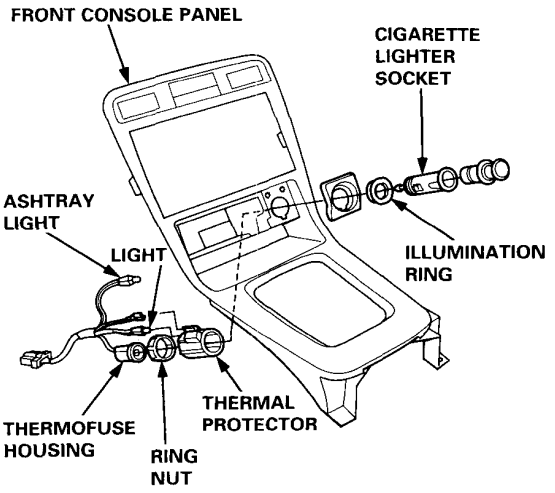
Cigarette Lighter

Test/Replacement

1. Remove the rear console (see page 23-134).
2. Remove the front console panel (see page 23-134).
3. Disconnect the 4-P connector from the cigarette lighter.
4. Inspect the connector terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, go to step 5.



5. Turn the ignition switch ON (II).
6. Check for voltage between the A and D terminals. There should be battery voltage.
   - If there is no battery voltage, check for
     — blown No. 36 (15 A) fuse in the under-hood fuse/relay box.
     — blown No. 11 (10 A) fuse in the under-dash fuse/relay box.
     — faulty cigarette lighter relay.
     — poor ground (G401, G403).
     — an open in the wire.
7. Turn the headlight switch ON, and check for voltage between the B and D terminals. There should be battery voltage.
   - If there is no voltage, check for
     — blown No. 32 (15 A) fuse in the under-hood fuse/relay box.
     — faulty combination light switch.
     — an open in the wire.
8. If all tests prove OK, replace the cigarette lighter.



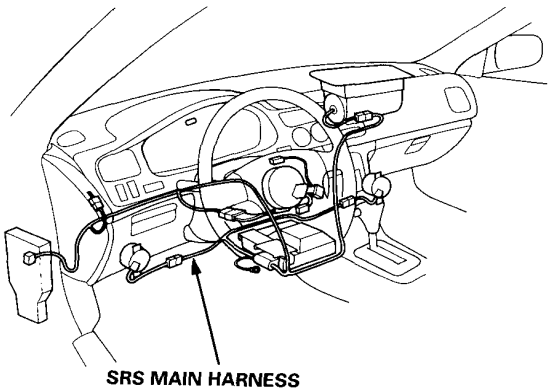
9. Disconnect the thermofuse housing from the socket.
10. Remove the ring nut, and separate the cigarette lighter socket from the thermal protector.
11. When installing the cigarette lighter, align each lug on the face panel, illumination ring, and cigarette lighter socket with the groove in the hole, then position the bulb housing on the thermal protector between the stops in the console panel.

Component Location Index

CAUTION:

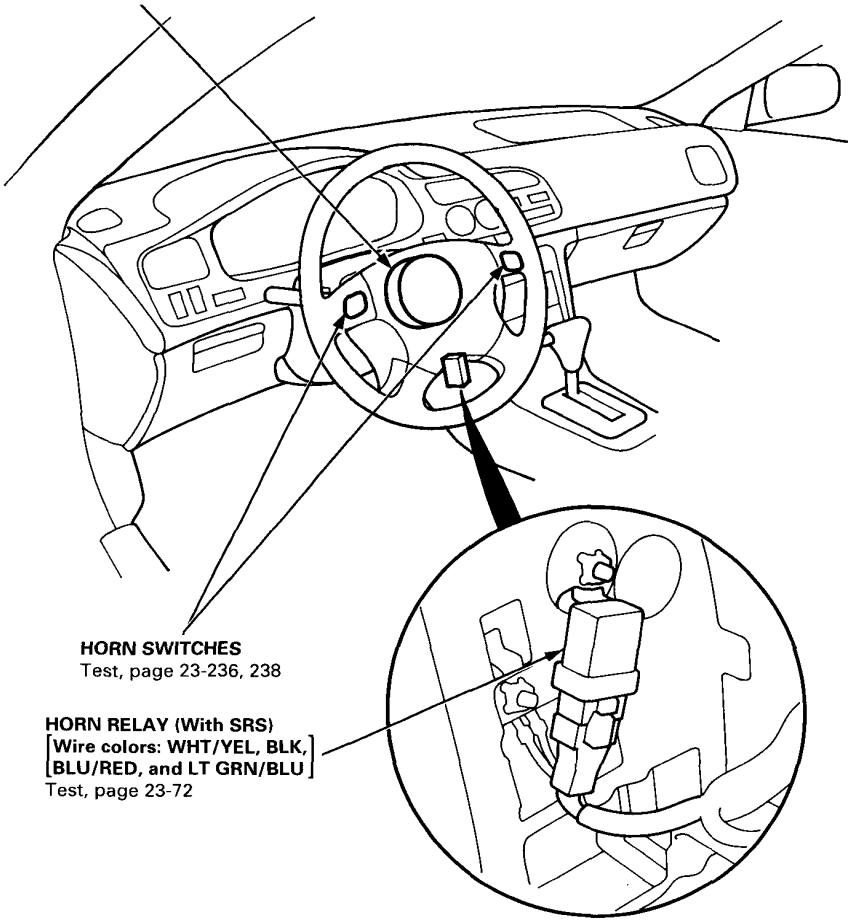
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



SRS MAIN HARNESS
(Covered with yellow insulation)

- **CONTACT RING**
  (Without cruise control and SRS)
  Test, page 23-239
- **SLIP RING**
  (With cruise control, without SRS)
  Test, page 23-238, 239
- **CABLE REEL**
  (With cruise control and SRS)
  Test, page 23-236, 237

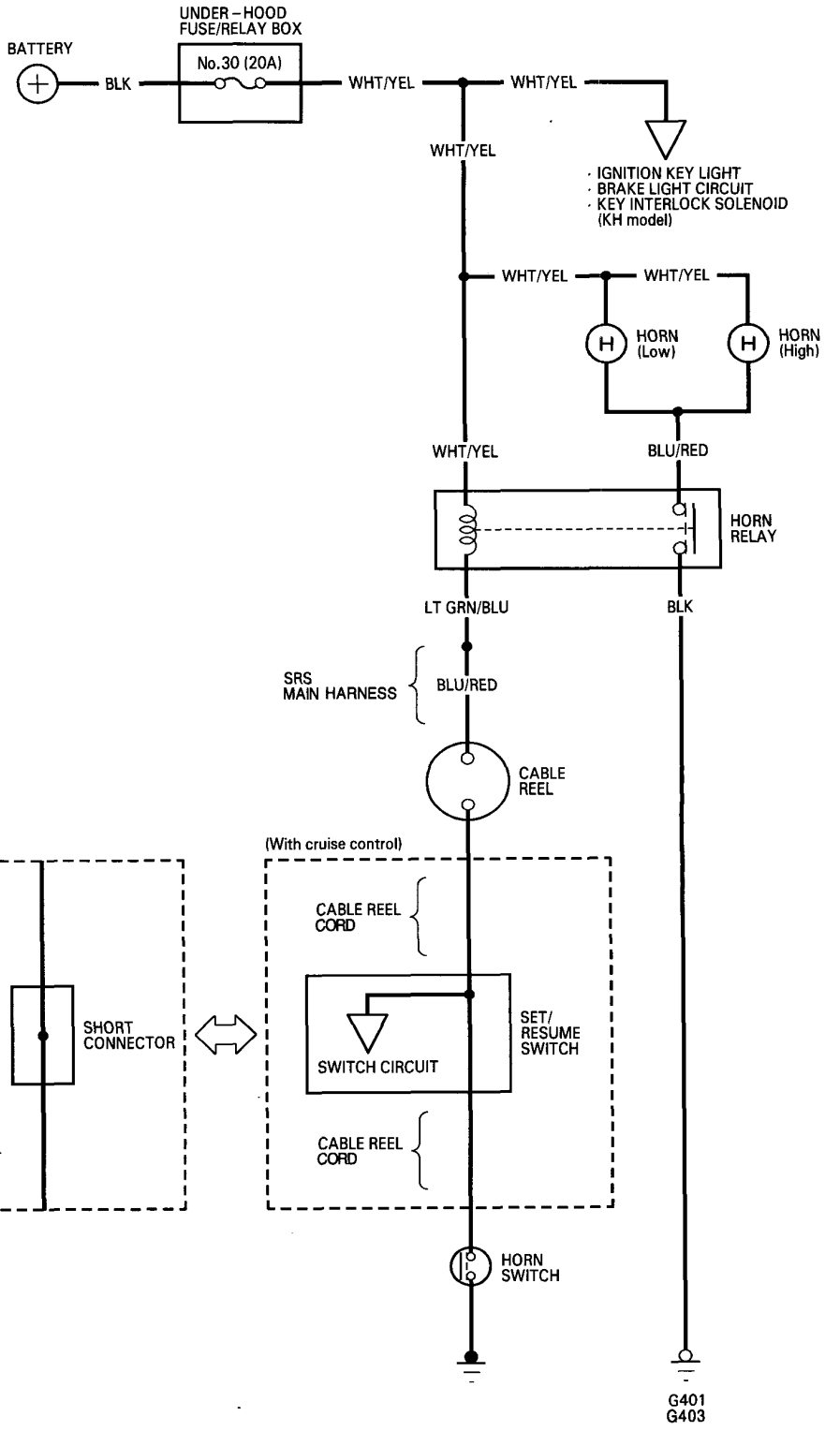


HORN SWITCHES
Test, page 23-236, 238

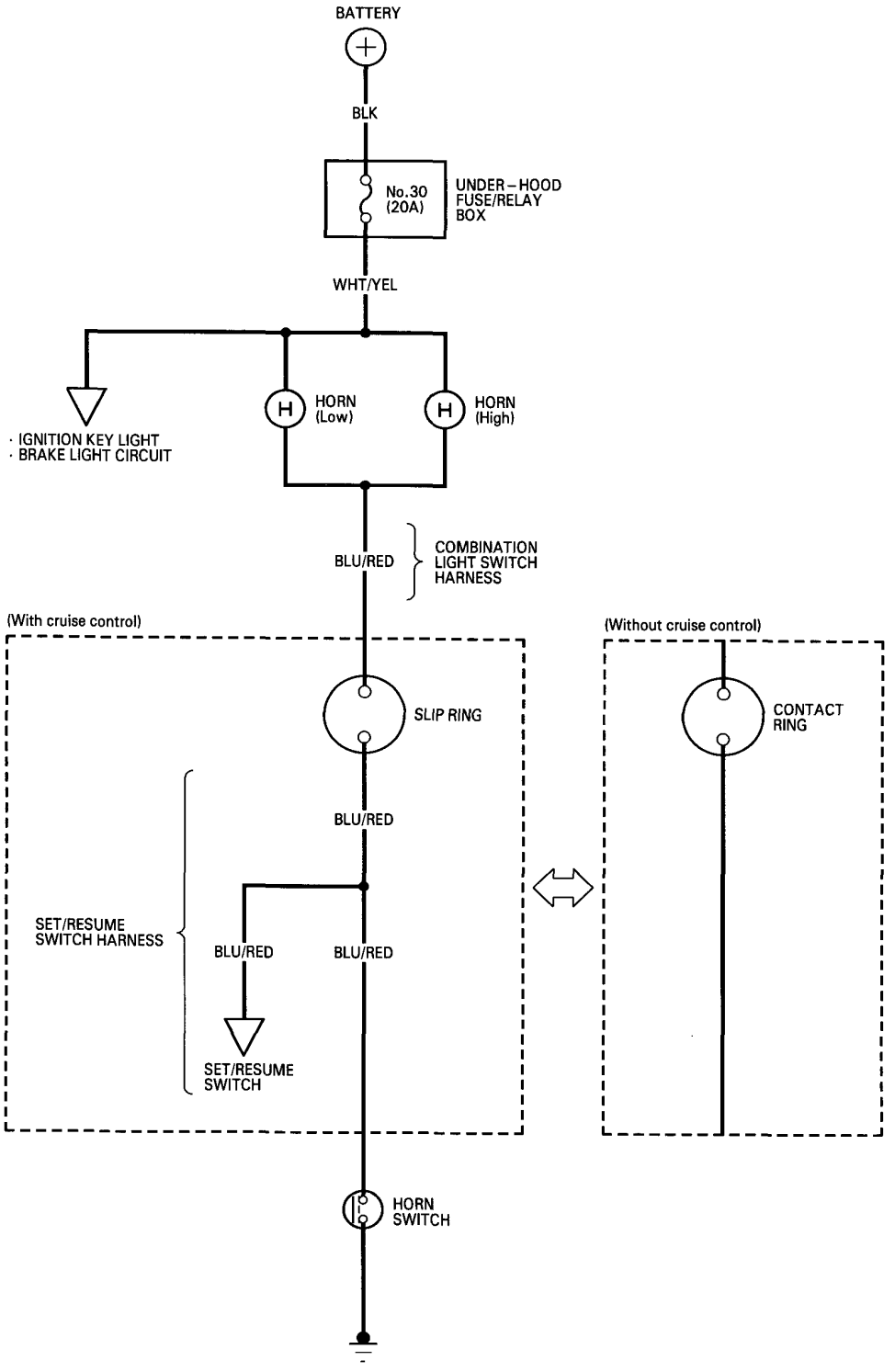
HORN RELAY (With SRS)
[Wire colors: WHT/YEL, BLK, BLU/RED, and LT GRN/BLU]
Test, page 23-72

Horns

Circuit Diagram (With SRS)



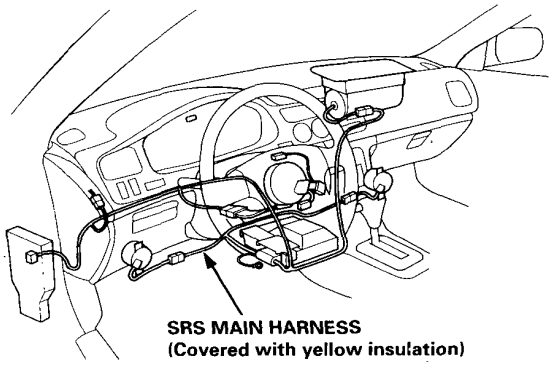
Circuit Diagram (Without SRS)



Switch Test (With SRS)

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

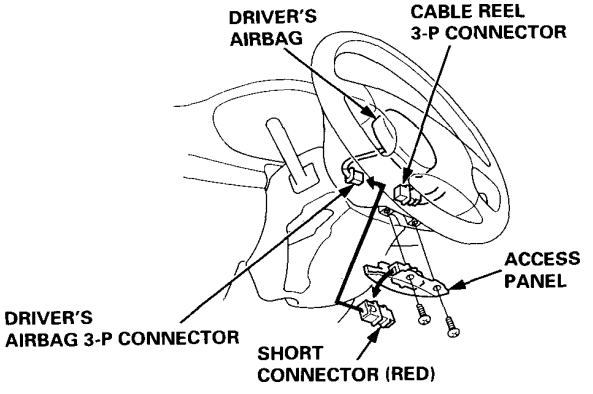


1. Disconnect the battery negative cable, then disconnect the positive cable.

2. Connect the short connectors (RED) to the airbag side of the connectors.

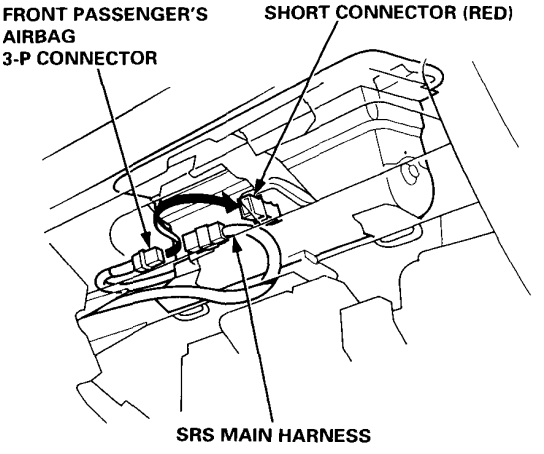
   Driver's Side:

   - Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.
   - Disconnect the 3-P connector between the driver's airbag and cable reel, then connect the short connector (RED) to the airbag side of the connector.



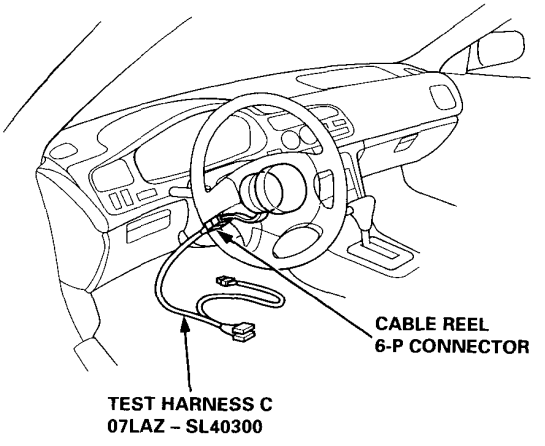
Front Passenger's Side:

- Remove the glove box.
  NOTE: Before removing the glove box, remove the glove box damper (see section 20).
- Disconnect the front passenger's airbag 3-P connector from the SRS main harness, and connect the short connecter (RED) to the front passenger's airbag 3-P connector.

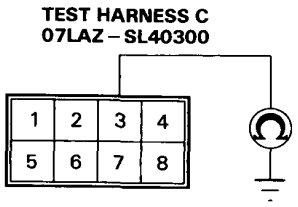


3. Remove the dashboard lower cover and knee bolster (KH model).

4. Disconnect the cable reel 6-P connector from the SRS main harness, then connect Test Harness C only to the cable reel side of the 6-P connector.

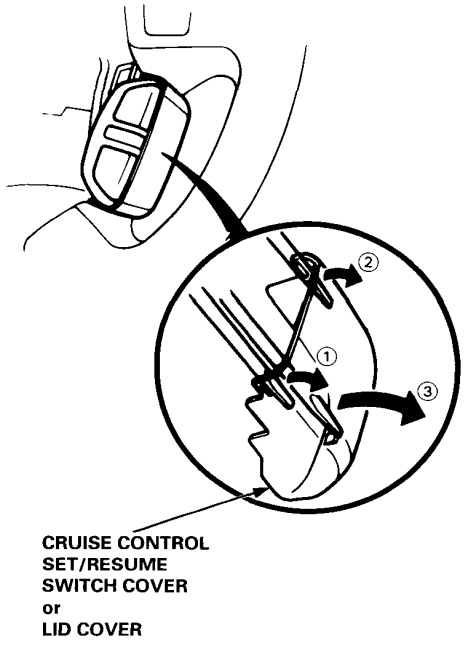


5. Check for continuity between the No. 3 terminal of the 8-P connector of Test Harness C and body ground with the horn switch pressed.

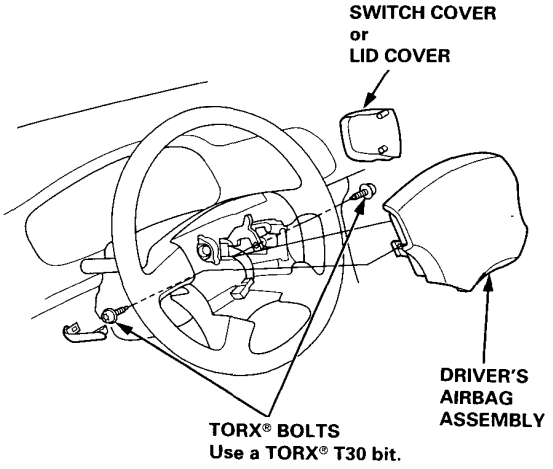


- If there is continuity, the horn switch is OK.
- If there is no continuity, go to step 6.

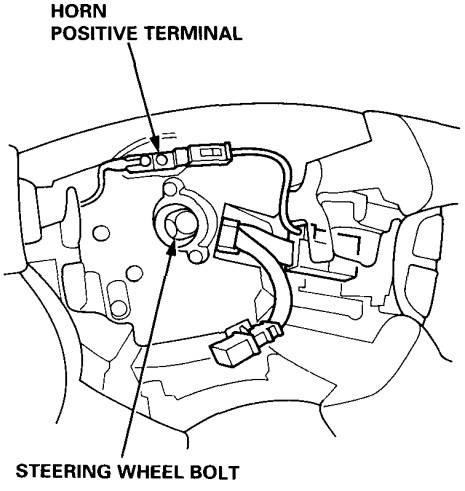
6. Carefully remove the cruise control set/resume switch cover or lid cover by prying between the cover and the switch in the sequence shown.



7. Remove the two TORX® bolts using a TORX® T30 bit, then remove the driver's airbag assembly.



8. Check for continuity between the horn positive terminal and steering wheel bolt with the horn switch pressed.



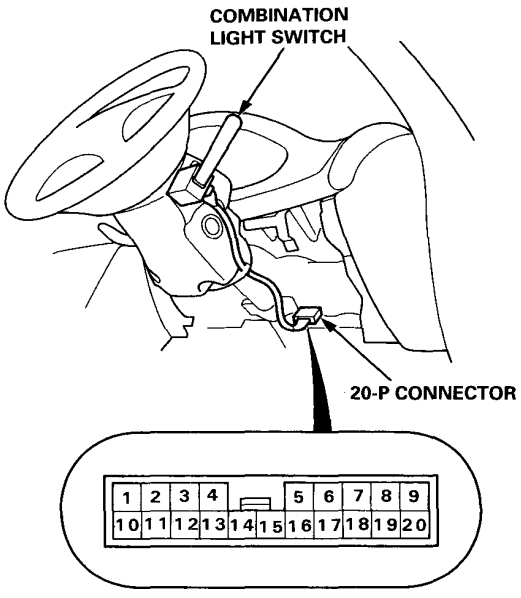
- If there is continuity
  — replace the cable reel.
  — check the set/resume switch.
- If there is no continuity, replace the horn switch.

Switch Test (Without SRS)

With Cruise Control:

NOTE: RHD type is shown, LHD type is similar.

1. Remove the dashboard lower cover.
2. Disconnect the 20-P connector of the combination light switch harness from the main wire harness.



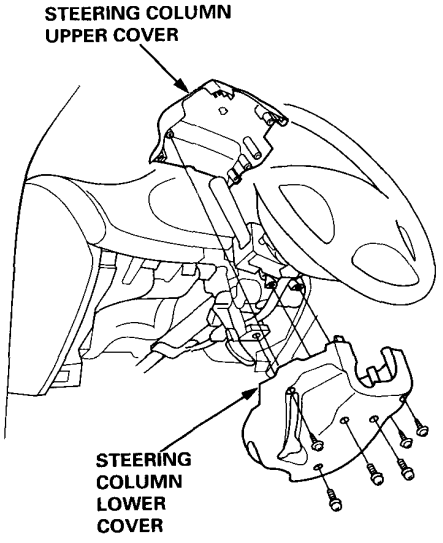
View from wire side

3. Check for continuity between No. 16 terminal and body ground in each switch position according to the table.

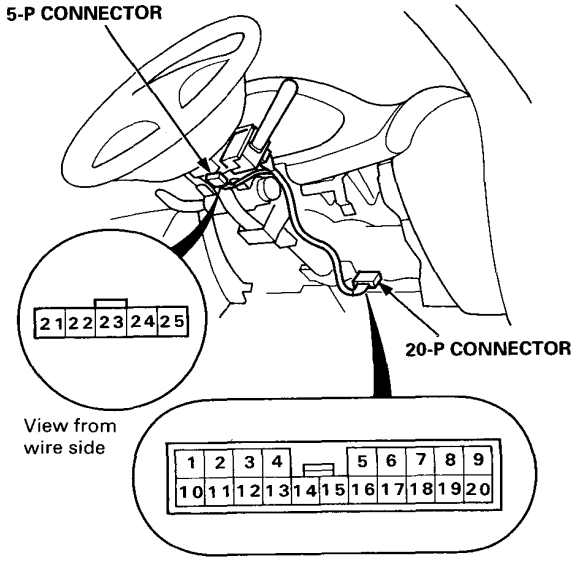
Terminal / Horn switch	16	Body ground
PUSH	○	○
RELEASE		

- If there is continuity, the horn switch is good.
- If there is no continuity, go to step 4.

4. Remove the steering column upper and lower covers.



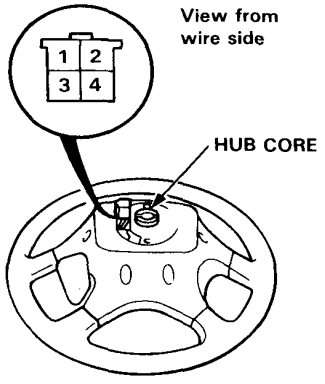
5. Disconnect the 5-P connector from the slip ring.
6. Check for continuity between No. 16 and No. 25 terminals of the combination light switch harness.



View from wire side

- If there is continuity, go to step 7.
- If there is no continuity, replace the combination light switch harness.

7. Remove the steering wheel, then turn it over.



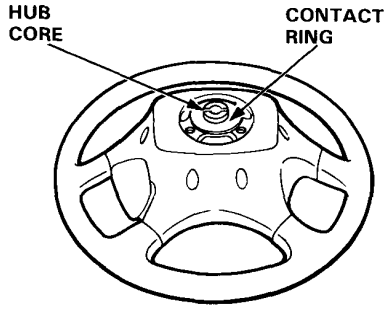
8. Check for continuity between No. 3 terminal and hub core in each switch position according to the table.

Terminal / Horn switch	3	Hub core
PUSH	○	○
RELEASE		

- If there is continuity, check the slip ring (see page 23-240).
- If there is no continuity, replace the horn switch.

Without Cruise Control:

1. Remove the steering wheel, then turn it over.



2. Check for continuity between the contact ring and hub core in each switch position according to the table.

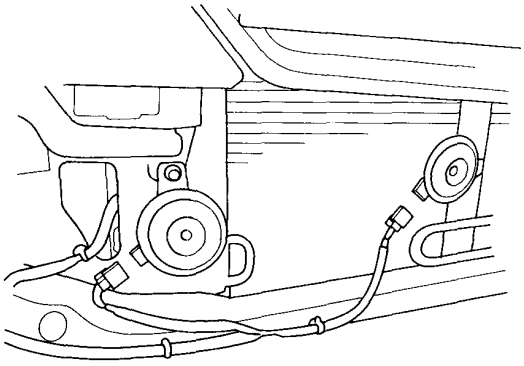
Terminal / Horn switch	Hub core	Contact ring
PUSH	○	○
RELEASE		

- If there is no continuity, check the horn switch.

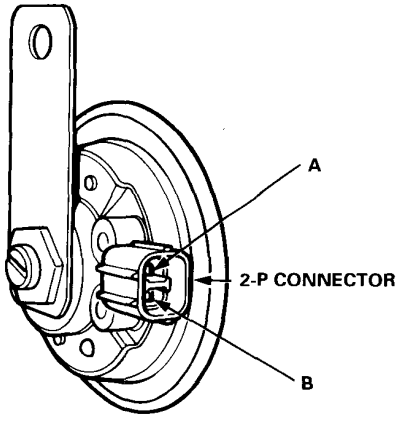
Horns

Test

1. Remove the front bumper (see section 20).
2. Disconnect the 2-P connector, and remove the horn.



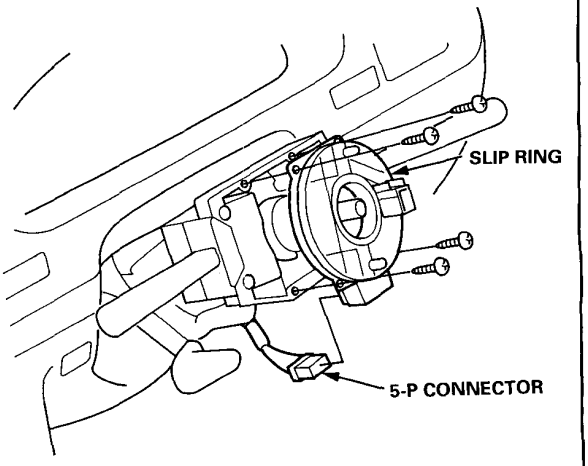
3. Test the horn by connecting battery power to one terminal and grounding the other. The horn should sound.



4. If the horn fails to sound, replace it.

Slip Ring Test (With Cruise Control)

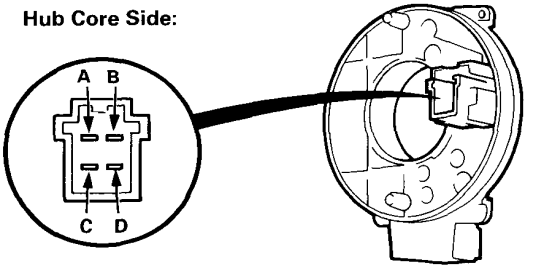
1. Remove the steering wheel.
2. Disconnect the 5-P connector from the slip ring.
3. Remove the four screws, then remove the slip ring.



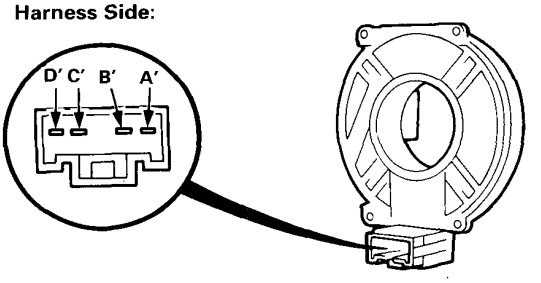
4. Check for continuity between the terminals by rotating the slip ring according to the table.

Terminal / Position	B	C	D	A'	B'	D'
Rotate the slip ring.	○			○		
		○				○
			○		○	

Hub Core Side:



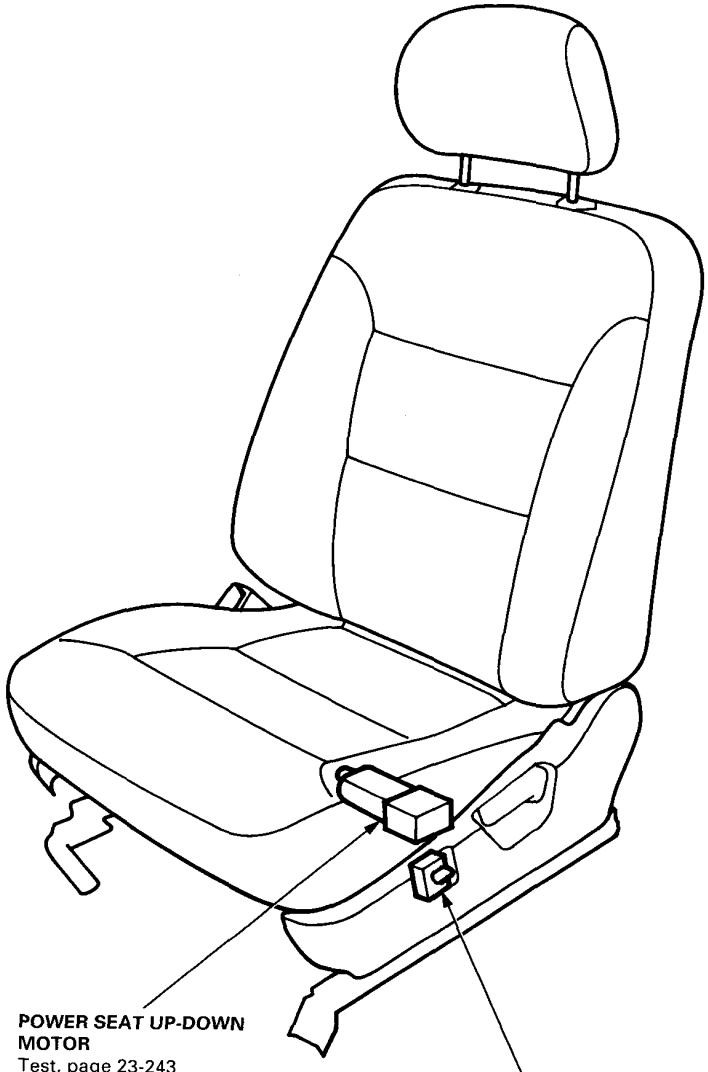
Harness Side:



Power Seat

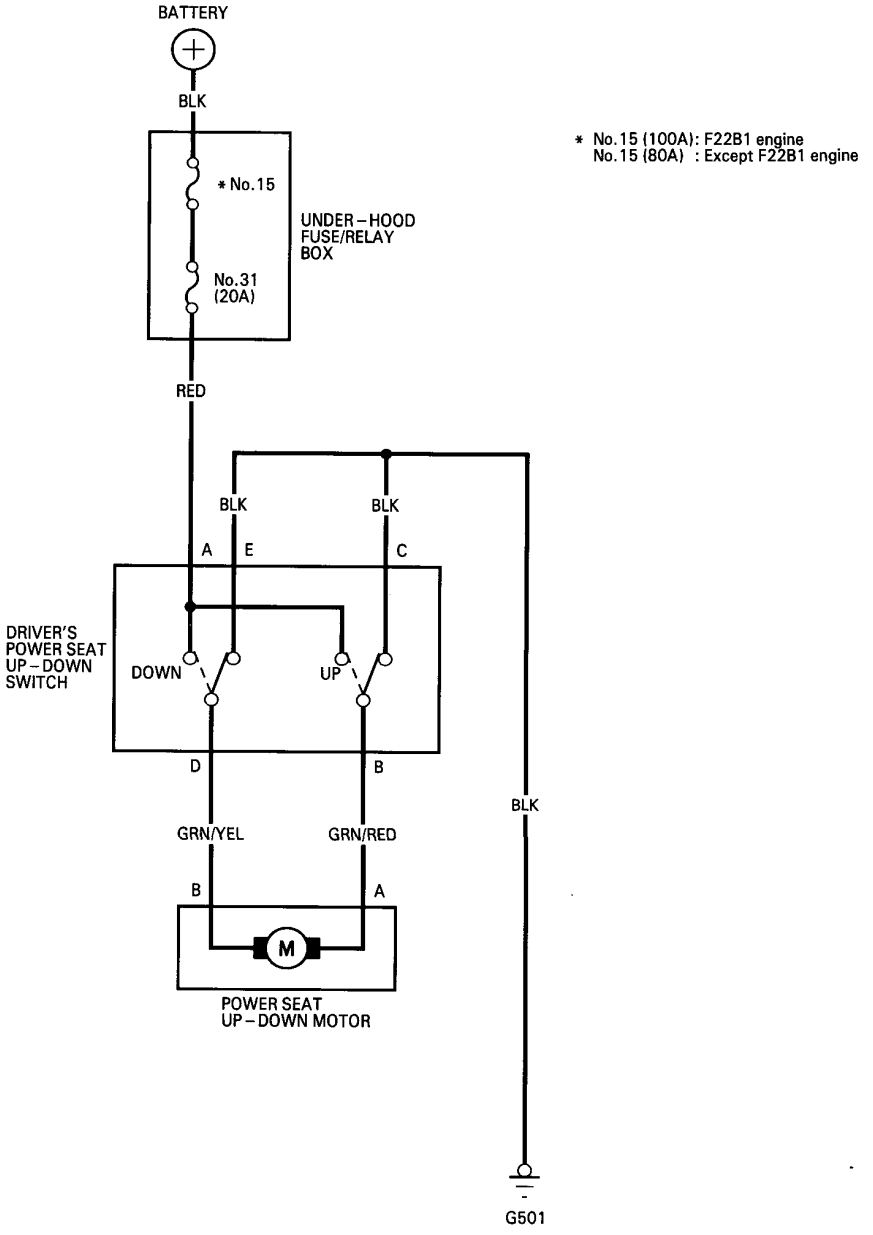
Component Location Index

NOTE: LHD type is shown, RHD type is symmetrical.



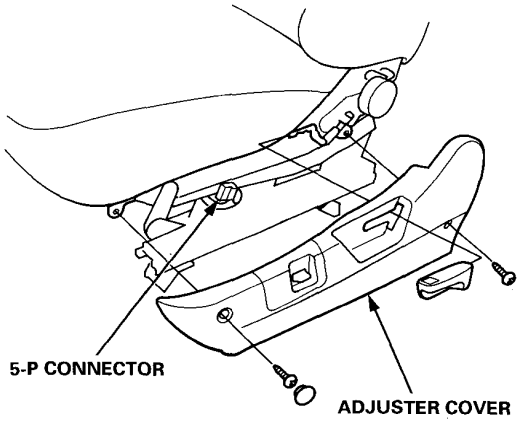
Power Seat

Circuit Diagram



Switch Test

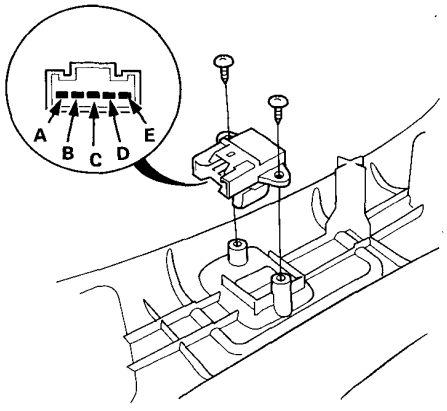
1. Remove the adjuster cover from the driver's seat by removing the two screws.



2. Disconnect the 5-P connector from the driver's power seat up-down switch, then remove the driver's power seat up-down switch from the adjuster cover by removing its two mounting screws.

3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	A	B	C	D	E
UP	○—○				
DOWN	○			○	



Power Seat Up-down Motor Test

CAUTION: Be careful not to damage the seat, interior trim or body.

1. Remove the driver's seat (see section 20).

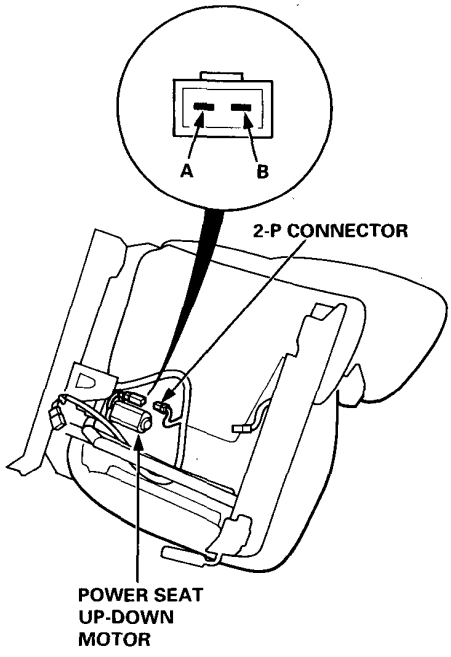
2. Disconnect the 2-P connector from the power seat up-down motor.

3. Test the motor:

Position \ Terminal	A	B
UP	⊕	⊖
DOWN	⊖	⊕

CAUTION: *When the motor stops running, disconnect* battery power immediately.

View from terminal side



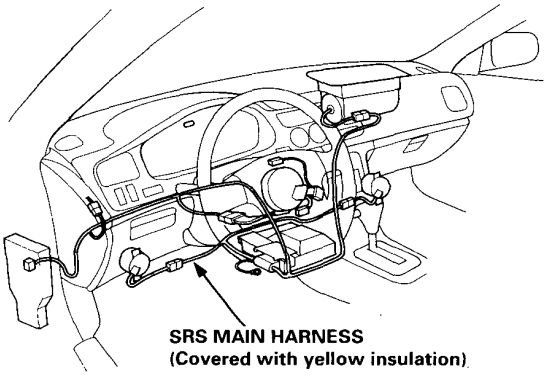
4. If the motor does not run or fails to run smoothly, replace it (see section 20).

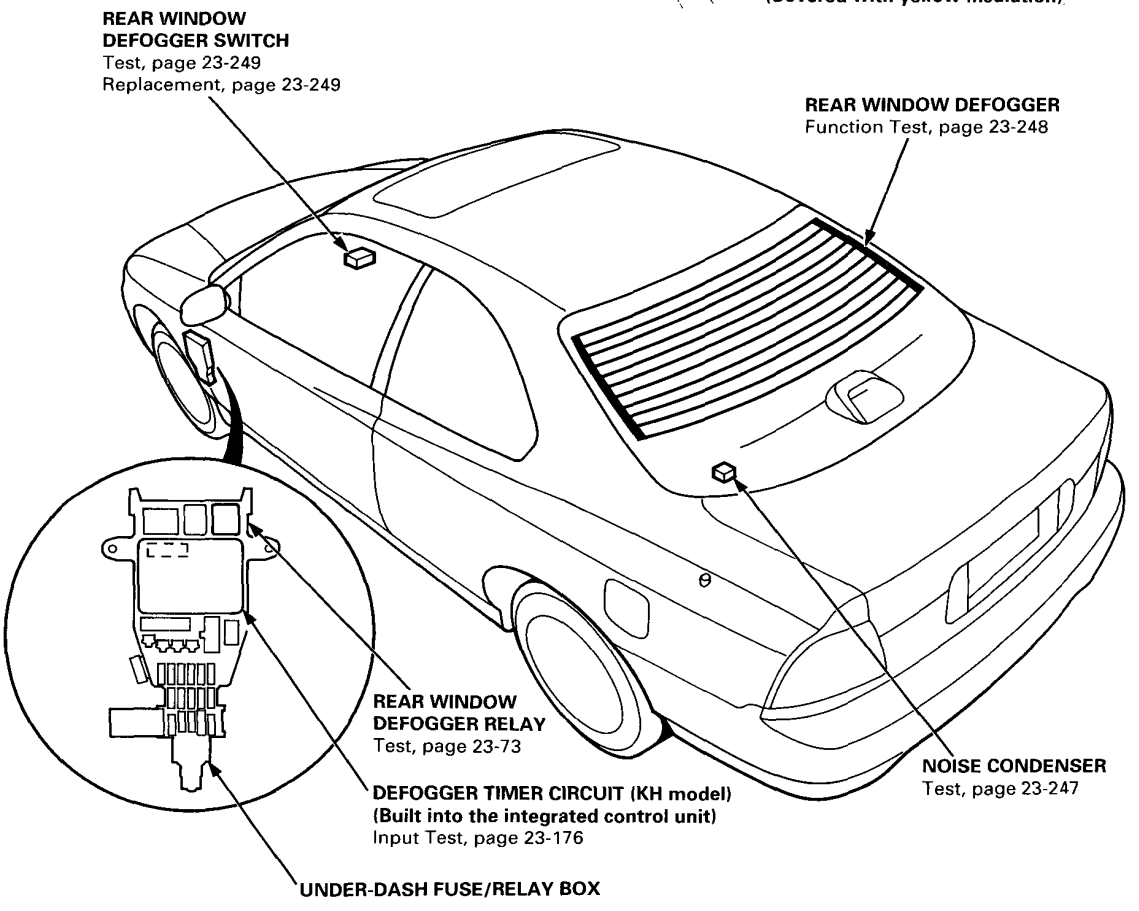
Rear Window Defogger

Component Location Index

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.

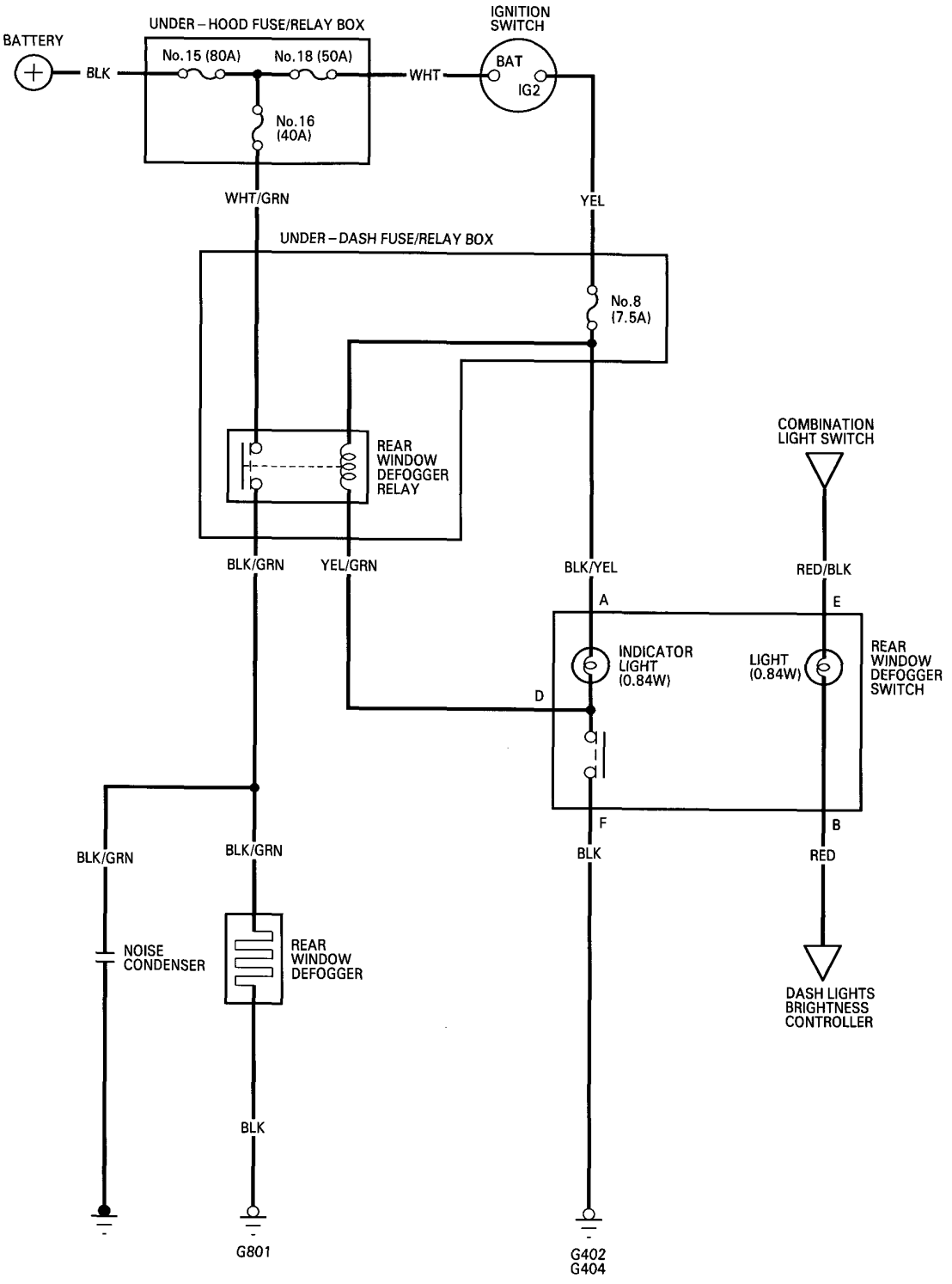




Description (KH model)

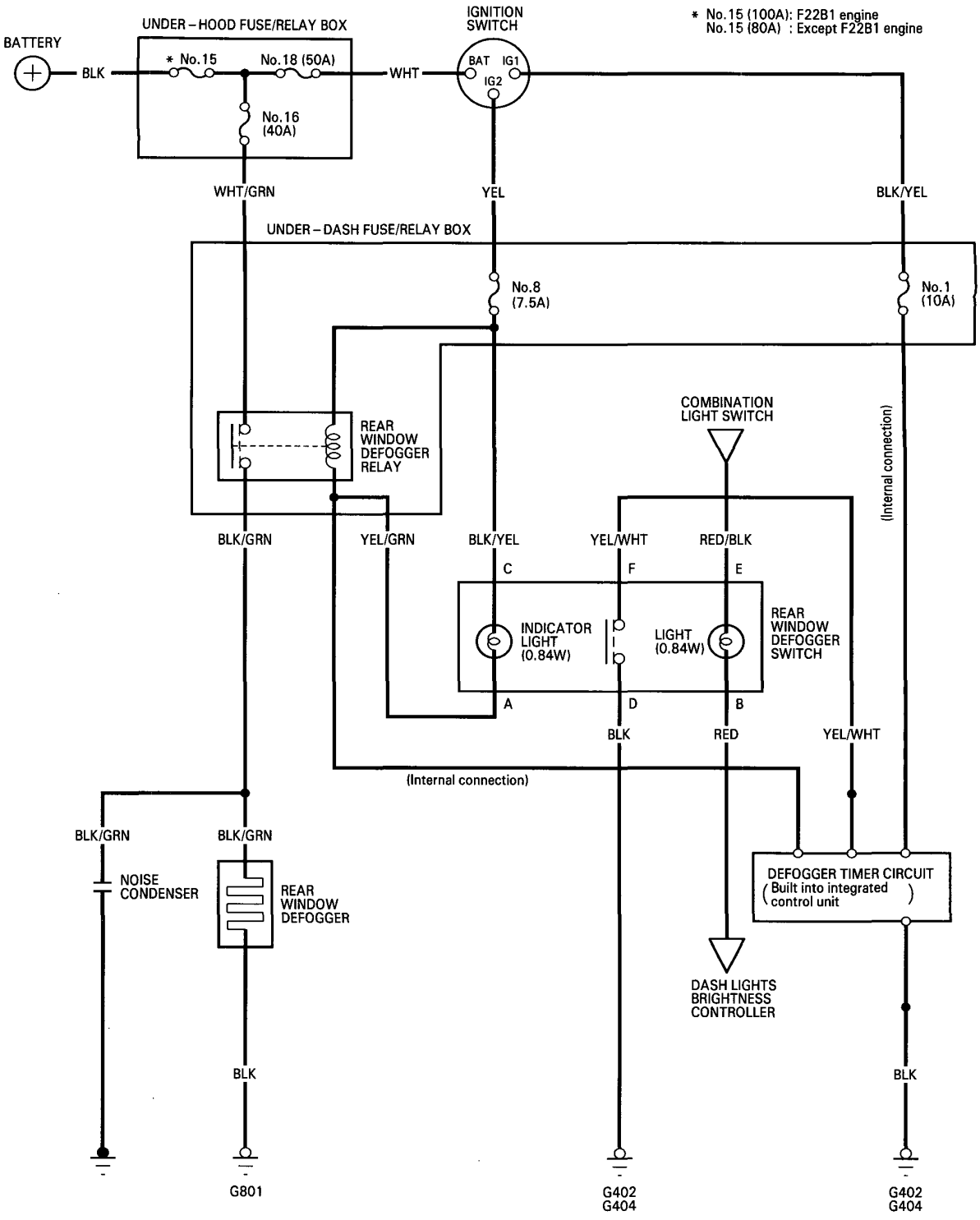
Function:
The rear window defogger is controlled by the integrated control unit. When the defogger switch in the instrument panel is pushed, it sends a signal to the defogger timer in the integrated control unit, and the defogger stays on for about 25 minutes, or until the ignition is switched off. The indicator light in the switch comes on when the defogger is on.

Circuit Diagram (KG and KE models)



Rear Window Defogger

Circuit Diagram (KH model)



Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected	Blown indicator light bulb	Blown N. 8 (7.5 A) fuse (In the under-dash fuse/relay box)	Defogger timer circuit input (In the integrated control unit)	Blown No. 1 (10 A) fuse (In the under-dash fuse/relay box)	Blown No. 16 (40 A) fuse (In the under-hood fuse/relay box)	Function test	Defogger relay	Broken defogger wire	Defogger switch	Poor ground	Open circuit, loose or disconnected terminals
Defogger works, but indicator light does not go on.	1										BLK/YEL or *1YEL/GRN
Defogger does not work and indicator light does not go on.		1	*14	*13					2	G402 G404	YEL, *1BLK/YEL or *1YEL/WHT
Defogger does not work, but indicator light goes on.					1	2	3	4		G801	WHT/GRN, BLK/GRN or *2YEL/GRN
Operation time is too long or too short. Normal operation time is about 25 minutes.			*11								YEL/WHT

*1: KH model
*2: KG and KE models

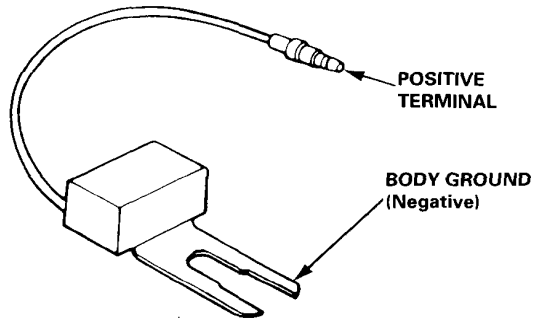
Noise Condenser Capacity

Test:

1. Use a commercially available condenser tester. Connect the tester probes and measure the condenser capacity.

   NOTE: Do not confuse the tester probes or you may damage the condenser.

   Noise condenser capacity: 0.47 ± 0.09 microfarads (μF)



2. If not within the specification, replace the noise condenser.

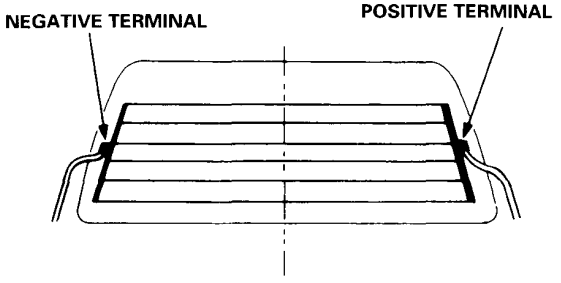
Rear Window Defogger

Function Test

CAUTION: Be careful not to scratch or damage the defogger wires with the tester probe.

1. Check for voltage between the positive terminal and body ground with the ignition switch and defogger switch ON.
   There should be battery voltage.

   - If there is no voltage, check for
     — faulty defogger relay.
     — faulty defogger switch.
     — faulty integrated control unit (KH model).
     — an open in the BLK/GRN wire.
   - If there is battery voltage, go to step 2.



2. Turn the defogger switch OFF. Check for continuity between the negative terminal and body ground.

   - If there is no continuity, check for an open in the defogger ground wire.
   - If there is continuity, go to step 3.

3. Touch the voltmeter positive probe to the halfway point of each defogger wire, and the negative probe to the negative terminal.
   There should be approximately 6 V with the ignition switch and the defogger switch ON.

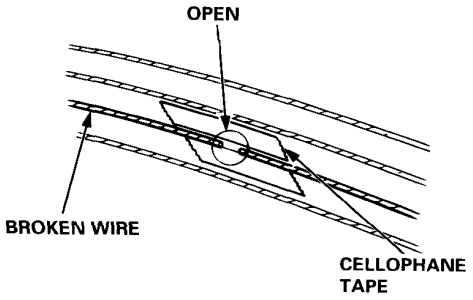
   - If the voltage is as specified, the defogger wire is OK.
   - If the voltage is not as specified, repair the defogger wire.
     — If it is more than 6 V, there is a break in the negative half of the wire.
     — If it is less than 6 V, there is a break in the positive half of the wire.

Defogger Wires Repair

NOTE: To make an effective repair, the broken section must be no longer than one inch.

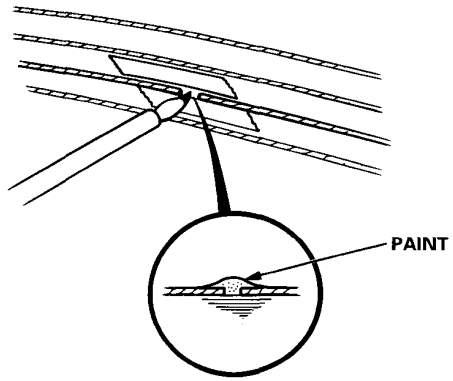
1. Lightly rub the area around the broken section with fine steel wool, then clean it with alcohol.

2. Carefully mask above and below the broken portion of the defogger wire with cellophane tape.



3. Using a small brush, apply a heavy coat of silver conductive paint extending about 3 mm (1/8 in) on both sides of the break. Allow 30 minutes to dry.

   NOTE: Thoroughly mix the paint before use.



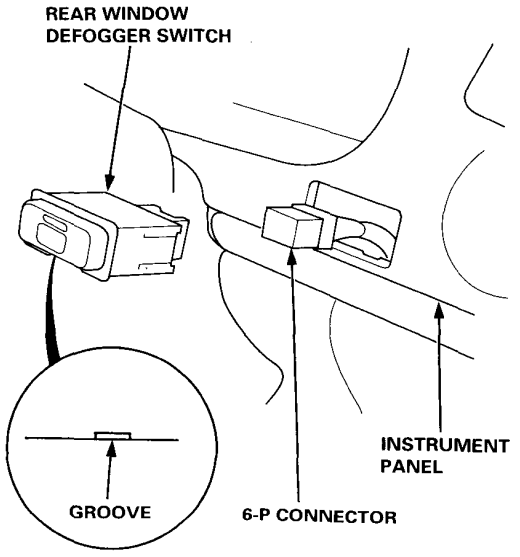
4. Check for continuity in the repaired wire.

5. Apply a second coat of paint in the same way. Let it dry three hours before removing the tape.

Switch Replacement

CAUTION: Be careful not to damage the rear window defogger switch or the instrument panel when prying the switch out.

1. Carefully pry the switch out of the instrument panel.
2. Disconnect the 6-P connector from the switch.



3. Install in the reverse order of removal.

Switch Test

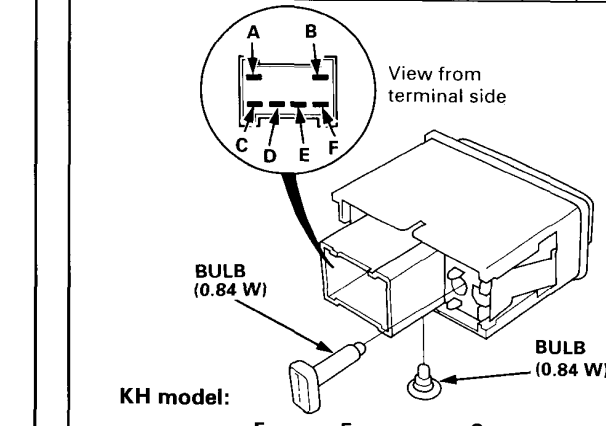
1. Remove the rear window defogger switch from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.

KH model:

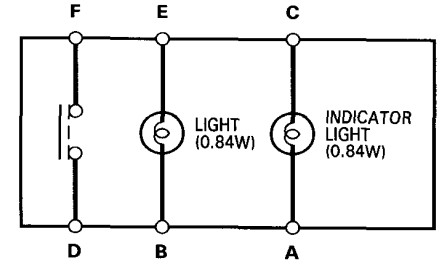
Terminal / Position	D	F	A		C	B		E
ON	○	○	○	○	○	○	○	○
OFF								

KG and KE models:

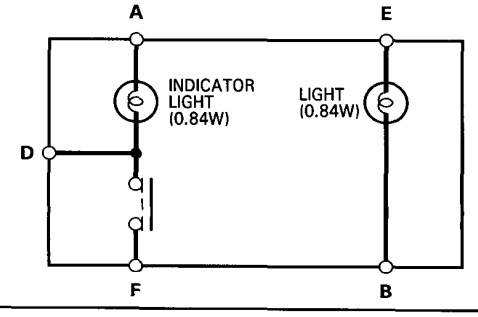
Terminal / Position	D	F		A	B		E
ON	○	○	○	○	○	○	○
OFF	○		○	○			



KH model:



KG and KE models:

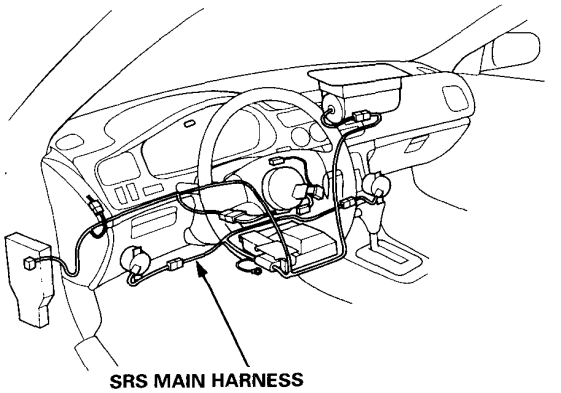


Sunroof

Component Location Index

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



SRS MAIN HARNESS
(Covered with yellow insulation)

SUNROOF SWITCH
Function test, page 23-255
Test, page 23-256

SUNROOF MOTOR
Test, page 23-256
Replacement, section 20

SUNROOF OPEN RELAY
[**Wire colors: GRY/RED, GRN/RED GRN, BLK, and YEL/GRN or (GRN/WHT)**
Test, page 23-73]

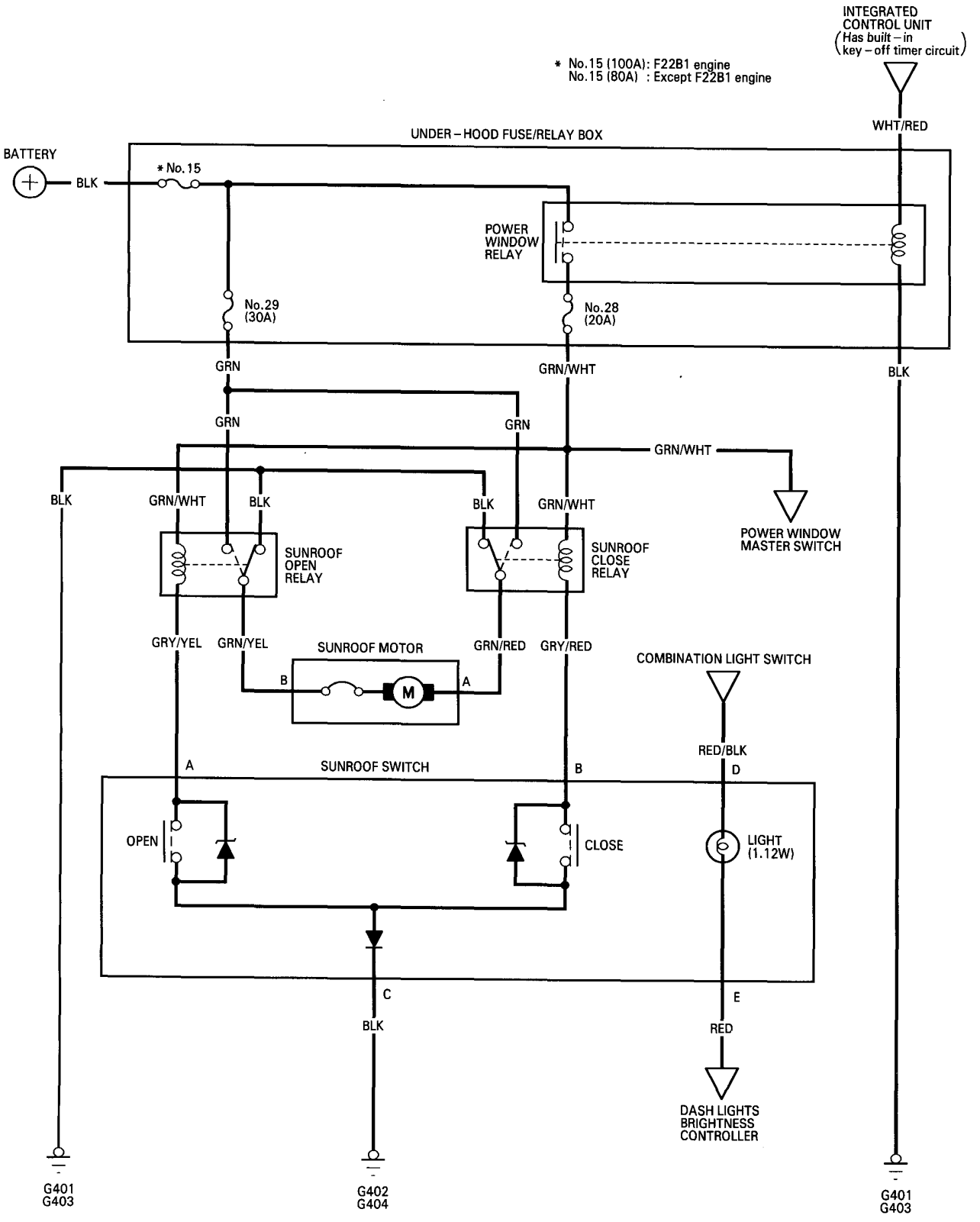
SUNROOF CLOSE RELAY
[**Wire colors: GRY/RED, GRN/RED GRN, BLK, and YEL/GRN or (GRN/WHT)**
Test, page 23-73]

(GRN/WHT): KH model

Description (KH model)

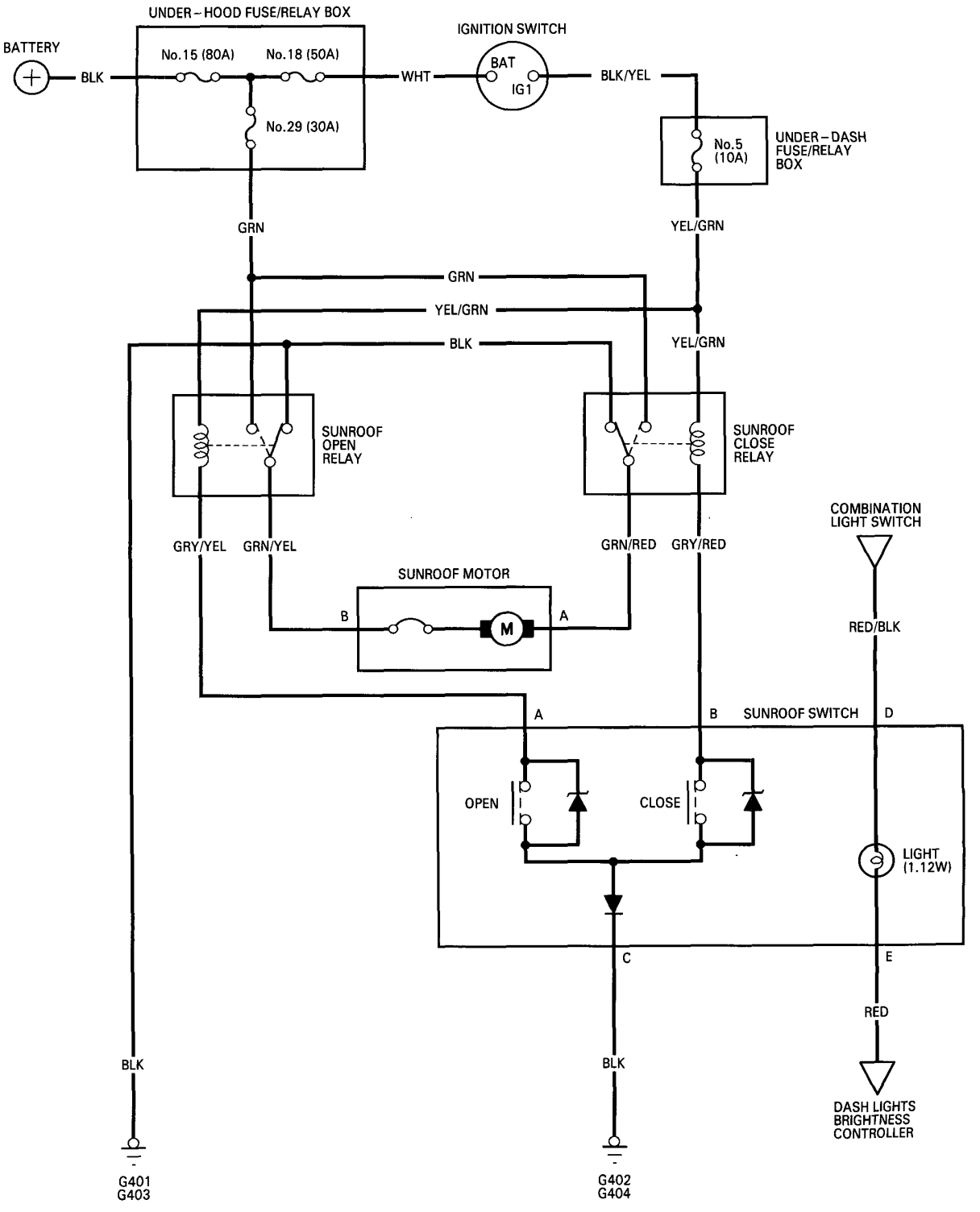
Sunroof Key-off Timer Operation:
The sunroof can still be operated for about 10 minutes after the ignition switch is turned from the "II" to the "I" or "O" position, as long as neither of the doors has been opened. This provides a convenience to parked occupants while offering a degree of security against unwanted or accidental sunroof operation.

Circuit Diagram (KH model)



Sunroof

Circuit Diagram (KG and KE models)



Troubleshooting (KH model)

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom		Clutch out of adjustment, foreign matter stuck between guide rail, sunroof, or outer cable not attached properly.	Blown No. 37 (7.5 A) fuse (In the under-hood fuse/relay box)	Blown No. 29 (30 A) fuse (In the under-hood fuse/relay box)	Blown No. 28 (20 A) fuse (In the under-hood fuse/relay box)	Function Test	Power window relay	Open relay	Close relay	Sunroof motor	Sunroof switch	Door switches	Key-off timer circuit (In the integrated control unit)	Poor ground	Open circuit in wires, loose or disconnected terminals
Sunroof does not move, but motor turns.		1													
Sunroof does not move, and motor does not turn (sunroof can be moved with sunroof wrench).	With either switch		1	2	3	6	4			7	5			G401 G402 G403 G404	GRN, WHT/RED, GRN/WHT GRY/YEL or GRY/RED
	With OPEN switch							1	2		3				GRY/YEL or GRY/RED
	With CLOSE switch							2	1		3				GRY/RED or GRY/YEL
The sunroof does not work within 10 minutes after the ignition switch is OFF (neither front doors opened).			1									2	3		

Sunroof

Troubleshooting (KG and KE models)

NOTE: The numbers in the table show the troubleshooting sequence.

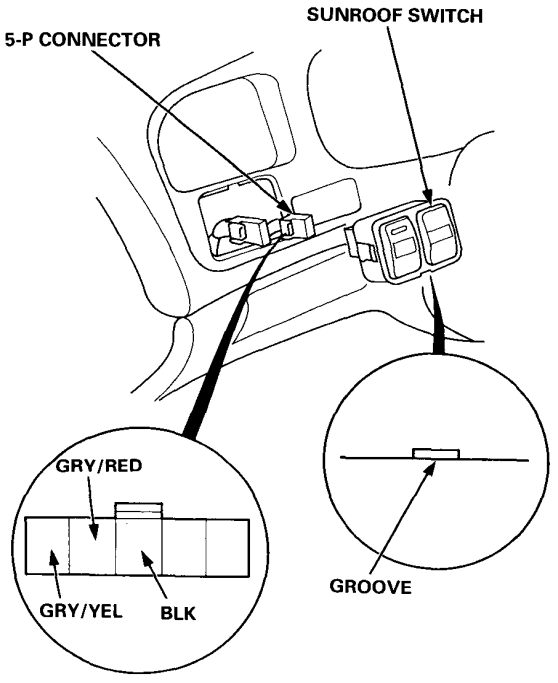
Symptom / Item to be inspected		Clutch out of adjustment, foreign matter stuck between guide rail, and sunroof, or outer cable not attached properly	Blown No. 29 (30 A) fuse (In the under-hood fuse/relay box)	Blown No. 5 (10 A) fuse (In the under-dash fuse/relay box)	Function Test	Open relay	Close relay	Sunroof motor	Sunroof switch	Poor ground	Open circuit in wires, loose or disconnected terminals
Sunroof does not move, but motor turns.		1									
Sunroof does not move, and motor does not turn (sunroof can be moved with sunroof wrench).	With either switch		1	2	3			5	4	G401 G402 G403 G404	GRN, YEL/GRN, GRY/YEL or GRY/RED
	With OPEN switch					1	2		3		GRY/YEL or GRY/RED
	With CLOSE switch					2	1		3		GRY/RED or GRY/YEL

Function Test

NOTE: Be careful not to damage the switch and the instrument panel.

1. Carefully pry out the switch(es) from the instrument panel.
2. Disconnect the connector(s) from the switch(es).

   NOTE: LHD type is shown, RHD type is symmetrical.



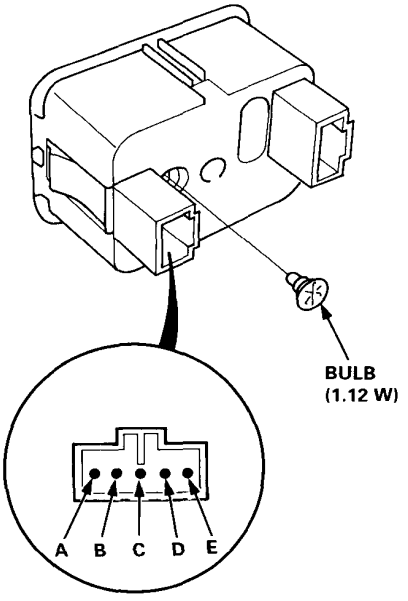
View from wire side

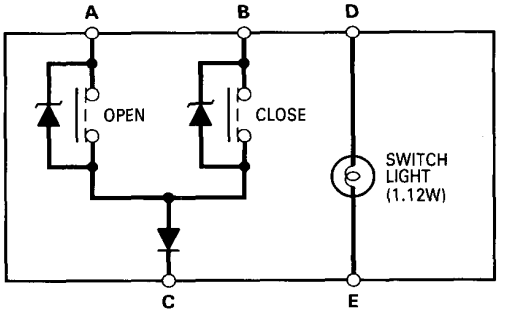
3. Connect the GRY/YEL terminal to body ground with a jumper wire, then turn on the ignition switch. The sunroof should open.
   - If the sunroof opens, check the switch.
   - If the sunroof doesn't open, check for an open in the GRY/YEL wire.
4. Connect the GRY/RED terminal to body ground with a jumper wire, then turn on the ignition switch. The sunroof should close.
   - If the sunroof closes, check the switch.
   - If the sunroof doesn't close, check for an open in the GRY/RED wire.
5. Check for continuity to body ground on the BLK wire. There should be continuity.
   - If there is continuity, check the switch.
   - If there is no continuity, check for an open in the BLK wire.

Sunroof

Switch Test

1. Carefully remove the switch(es) from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.





Position \ Terminal	A	B		C	D		E
OFF							
OPEN	○		▶	○	○	⊖	○
CLOSE		○	▶	○			

NOTE: The switch contains three diodes. Use an analog ohmmeter, or a digital ohmmeter equipped with a diode tester.

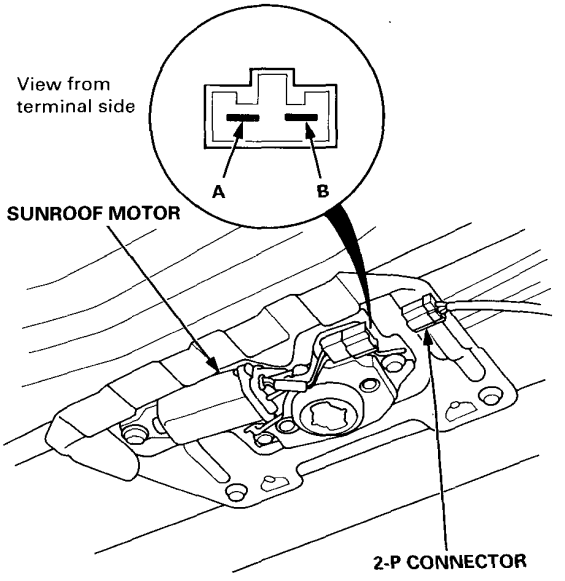
Motor Test

1. Remove the headliner (see section 20).
2. Disconnect the 2-P connector from the sunroof motor.
3. Check the motor by connecting power and ground according to the table.

Position \ Terminal	A	B
OPEN	⊖	⊕
CLOSE	⊕	⊖

4. If the motor does not run, replace it.

   NOTE: See closing force check in section 20 for motor clutch test.



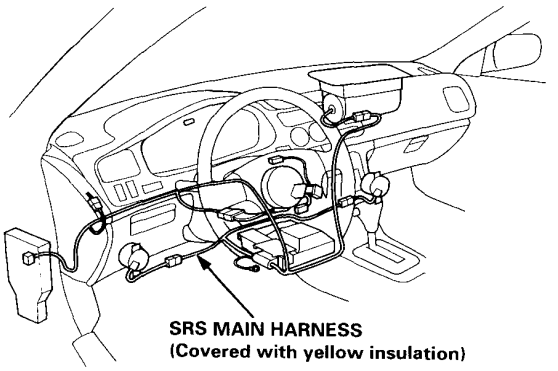
Power Mirrors

Component Location Index

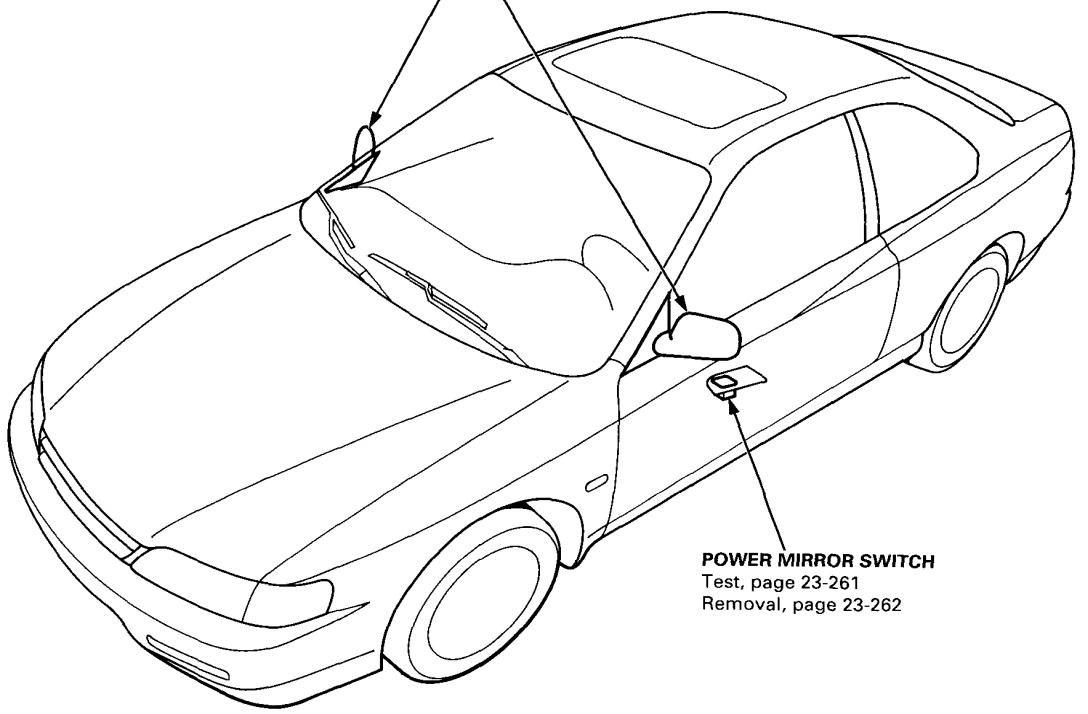
CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



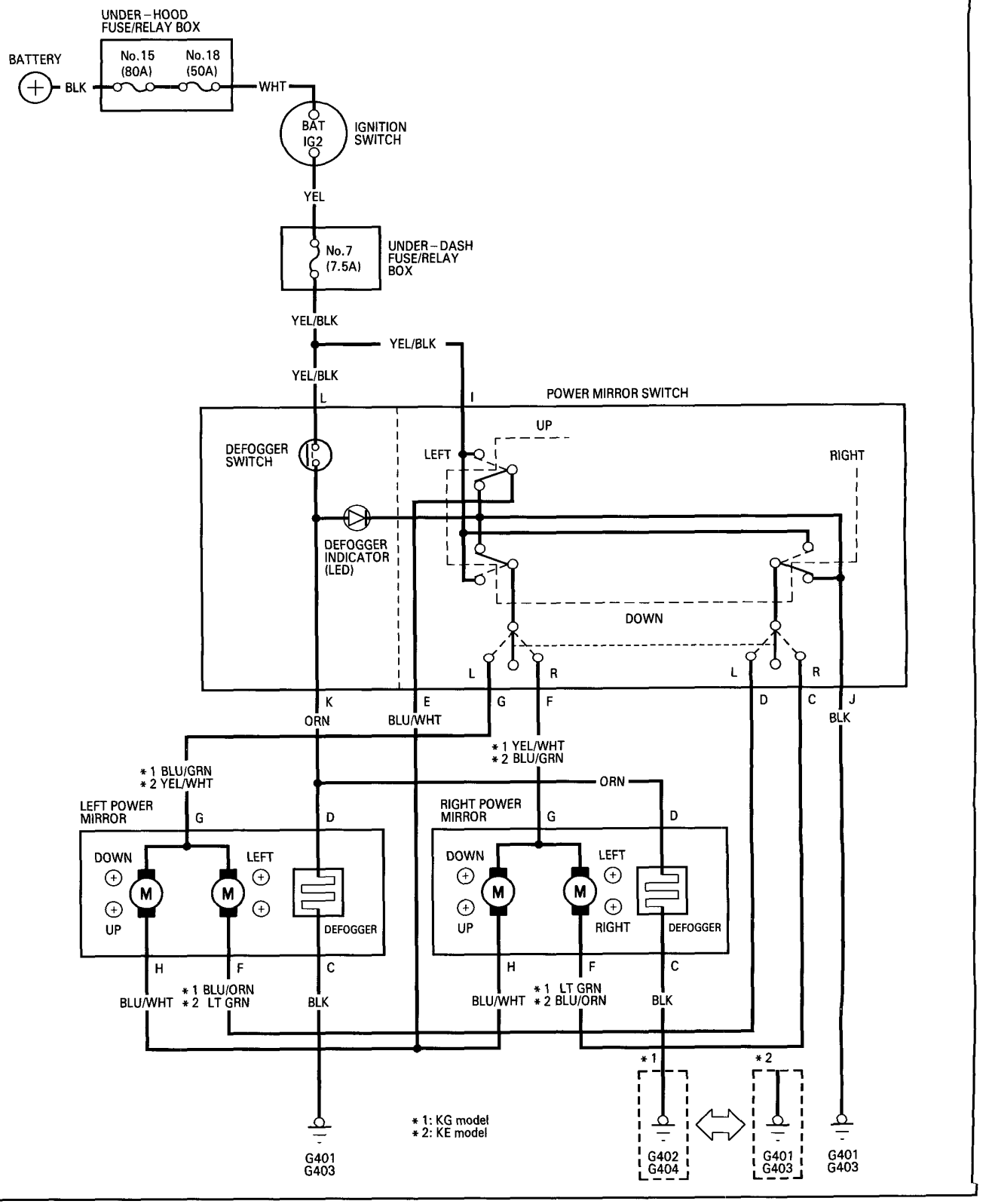
POWER MIRRORS
Function Test, page 23-260
Test, page 23-262
Replacement, section 20



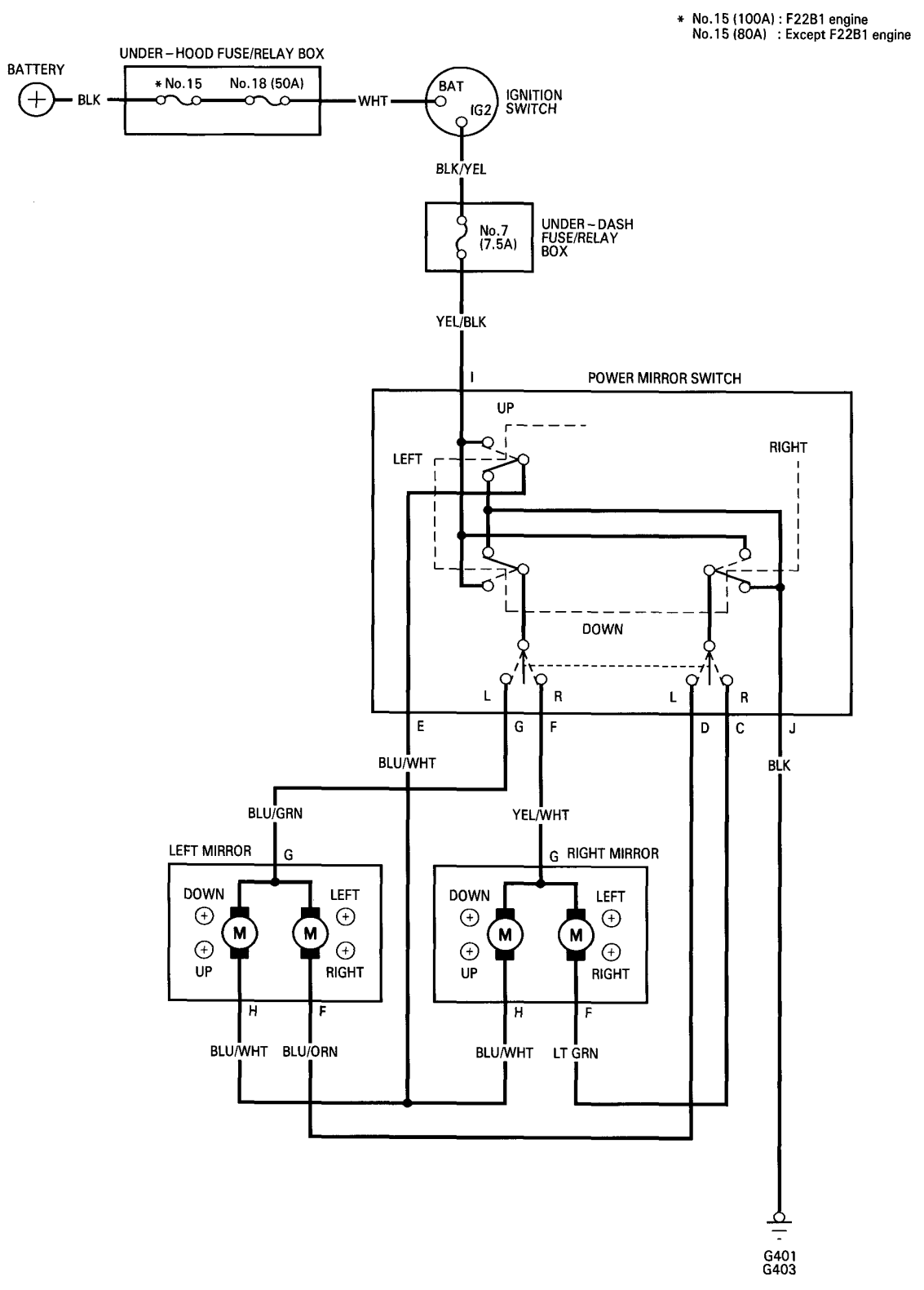
POWER MIRROR SWITCH
Test, page 23-261
Removal, page 23-262

Power Mirrors

Circuit Diagram (With Defogger)



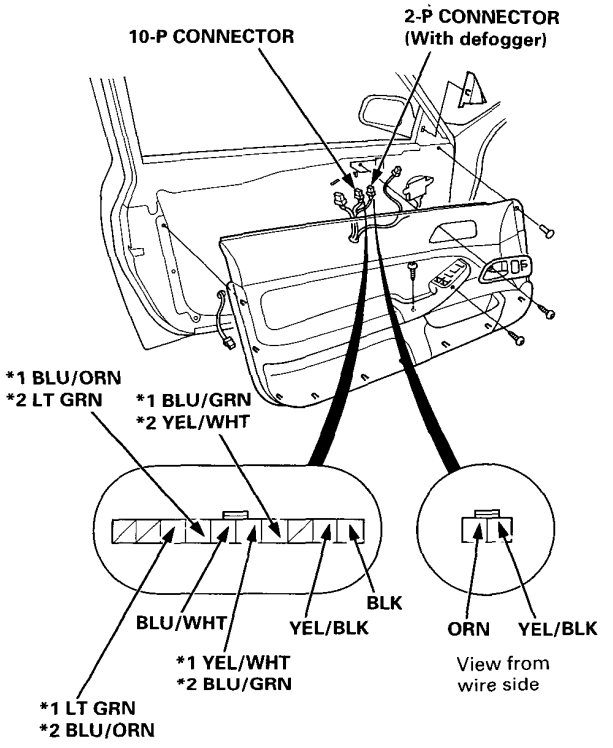
Circuit Diagram (Without Defogger)



Power Mirrors

Function Test

NOTE:
- To test, remove the driver's door panel (see page 23-262), then disconnect all connectors from the door panel.
- Before testing, check the No. 7 (7.5 A) fuse in the under-dash fuse/relay box.
- LHD type is shown, RHD type is similar.



*1: LHD type
*2: RHD type

Mirror Actuator Test

One or both inoperative:

1. Check for voltage between the YEL/BLK terminal of the 10-P connector and body ground with the ignition switch ON (II).
   There should be battery voltage.
   - If there is no voltage, check for an open in the YEL/BLK wire.
   - If there is battery voltage, go to step 2.

2. Check for continuity between the BLK terminal and body ground.
   There should be continuity.
   - If there is no continuity, check for
     — an open in the BLK wire.
     — poor ground (G401, G403).

Left mirror inoperative:

Connect the YEL/BLK terminal of the 10-P connector to the *1 BLU/GRN or *2 YEL/WHT terminal, and the BLU/WHT (or *1 BLU/ORN or *2 LT GRN) terminal to body ground with jumper wires. The left mirror should tilt down (or swing left) when the ignition switch is turned ON (II).

- If the mirror does not tilt down (or does not swing left), check for an open in the BLU/WHT (or *1 BLU/ORN or *2 LT GRN) wire between the left mirror and the switch. If the wire is OK, check the left mirror actuator.
- If the mirror neither tilts down nor swings left, repair the *1 BLU/GRN or *2 YEL/WHT wire between the left mirror and the switch.
- If the mirror operates properly, check the mirror switch.

Right mirror inoperative:

Connect the YEL/BLK terminal of the 10-P connector to the *1 YEL/WHT or *2 BLU/GRN terminal, and the BLU/WHT (or *1 LT GRN or *2 BLU/ORN) terminal to body ground with jumper wires. The right mirror should tilt down (or swing left) when the ignition switch is turned ON (II).

- If the mirror does not tilt down (or does not swing left), check for an open in the BLU/WHT (or *1 LT GRN or *2 BLU/ORN) wire between the right mirror and the switch. If the wire is OK, check the right mirror actuator.
- If the mirror neither tilts down nor swings left, repair the *1 YEL/WHT or *2 BLU/GRN wire between the right mirror and the switch.
- If the mirror operates properly, check the mirror switch.

Defogger Test (With defogger)

1. Check for voltage between the YEL/BLK terminal of the 2-P connector and body ground with the ignition switch ON (II).
   There should be battery voltage.
   - If there is no voltage, check for an open in the YEL/BLK wire between the under-dash fuse/relay box and the switch.
   - If there is battery voltage, go to step 2.

2. Connect the YEL/BLK terminal of the 2-P connector to the ORN terminal with a jumper wire.
   Both the right and left mirrors should gradually warm up when the ignition switch is turned ON (II).
   - If neither warms up, repair the ORN wire.
   - If only one fails to warm up, check its mirror defogger element.
   - If both warm up, check the switch.

Switch Test

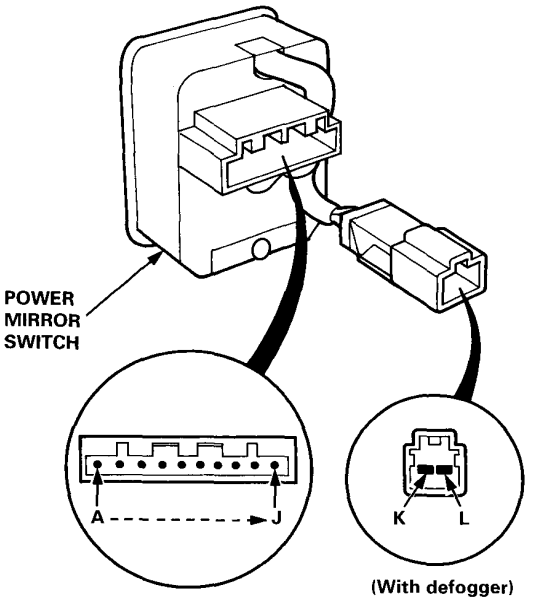
1. Remove the switch as described under "Switch Removal" on page 23-262.
2. Check for continuity between the terminals in each switch position according to the table.

Mirror Switch:

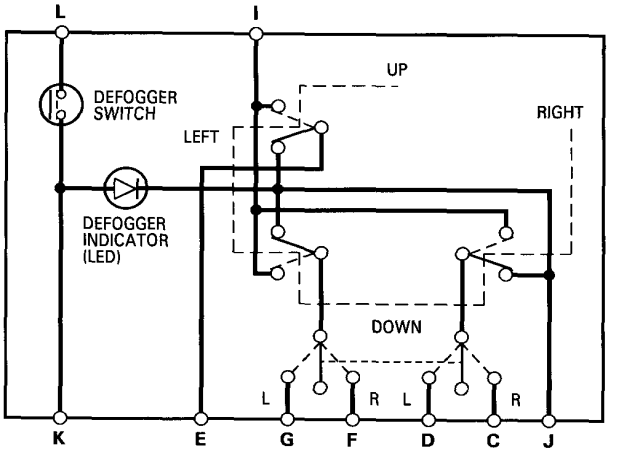
Position		C	D	E	F	G	I	J
R	OFF	○		○	○			○
	UP	○		○	○		○	
	DOWN	○		○	○		○	○
	LEFT	○		○	○		○	○
	RIGHT	○		○	○		○	○
L	OFF		○	○		○		○
	UP		○	○		○	○	
	DOWN		○	○		○	○	○
	LEFT		○	○		○	○	○
	RIGHT		○	○		○	○	○

Defogger Switch (With defogger):

Position	L	K	LED	J
ON	○	○	⊳	○
OFF		○	⊳	○



(With defogger)

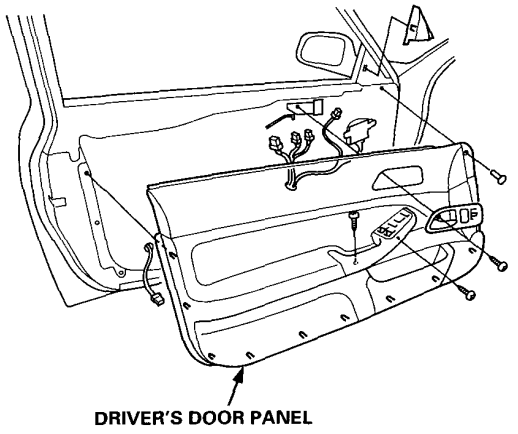


Power Mirrors

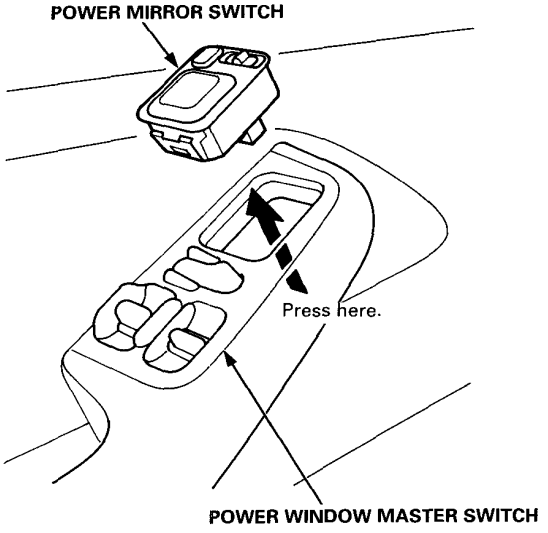
Switch Removal

1. Remove the two screws and the clip, and remove the driver's door panel part of the way.
2. Disconnect the connectors from the driver's door panel, and remove the driver's door panel.

   NOTE: LHD type is shown, RHD type is similar.



3. Remove the power mirror switch from the power window master switch by carefully pressing from below.

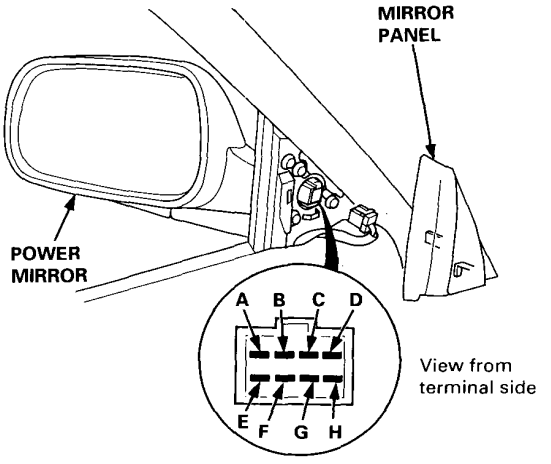


4. Install in the reverse order of removal.

Power Mirror Test

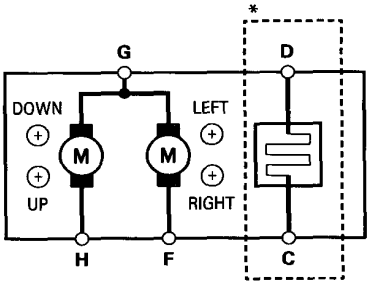
1. Remove the mirror panel, then disconnect the 8-P connector from the power mirror actuator.

   NOTE: LHD type is shown, RHD type is similar.



2. Check mirror actuator operation by connecting power and ground according to the table.

Terminal / Position	F	G	H
TILT UP		⊖	⊕
TILT DOWN		⊕	⊖
SWING LEFT	⊖	⊕	
SWING RIGHT	⊕	⊖	



*: With defogger

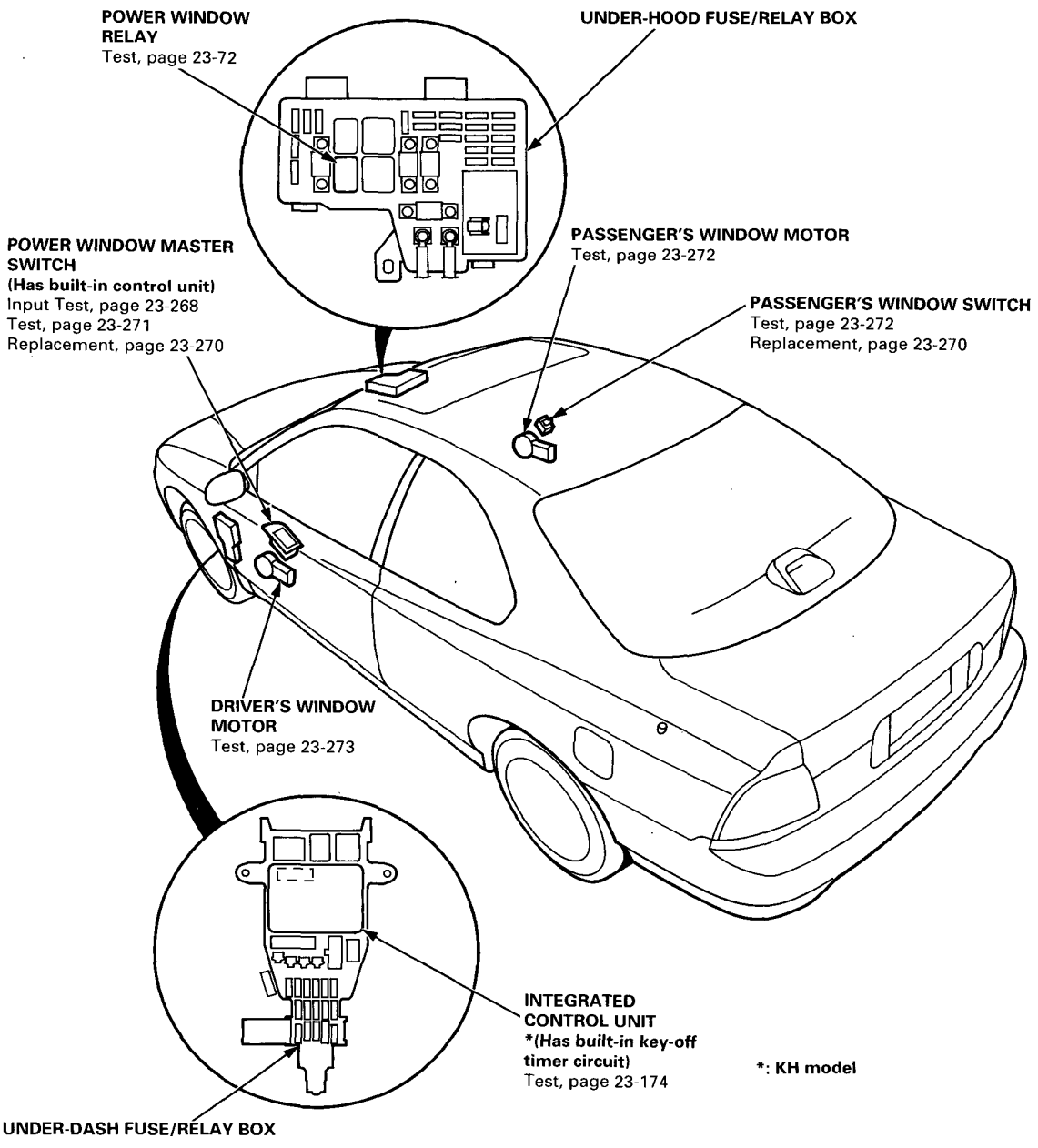
With defogger

3. Check for continuity between the C and D terminals (R x 10^3 scale).
   There should be continuity.
4. If the power mirror fails to operate properly, replace it.

Power Windows

Component Location Index

NOTE: LHD type is shown, RHD type is symmetrical.



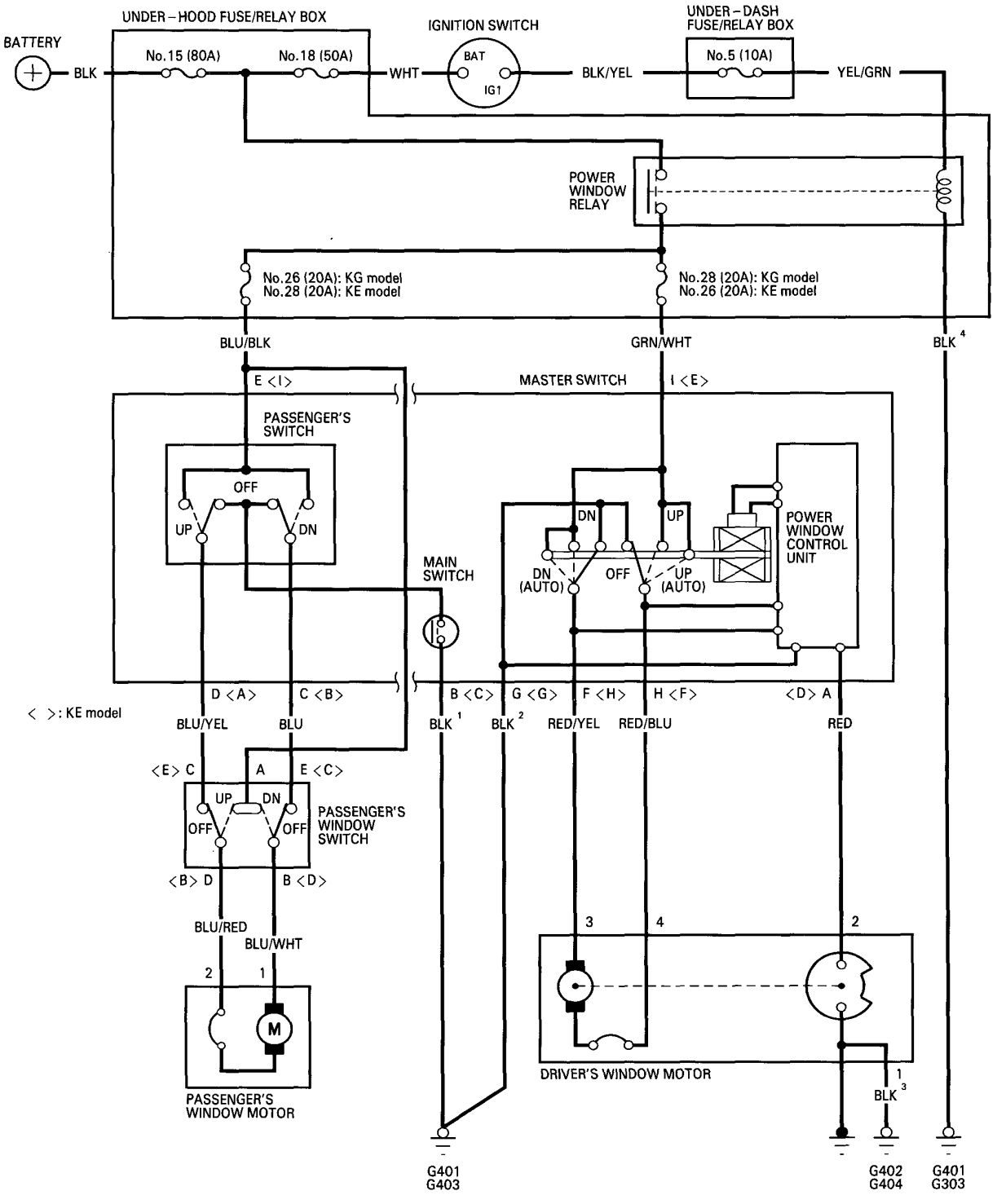
Description

Power Window Key-off Timer Operation (KH model):
The power windows can still be operated for about 10 minutes after the ignition switch is turned from the "II" to the "I" or "O" position, as long as neither of the front doors has been opened. This provides a convenience to parked occupants while offering a degree of security against unwanted or accidental window operation.

Power Windows

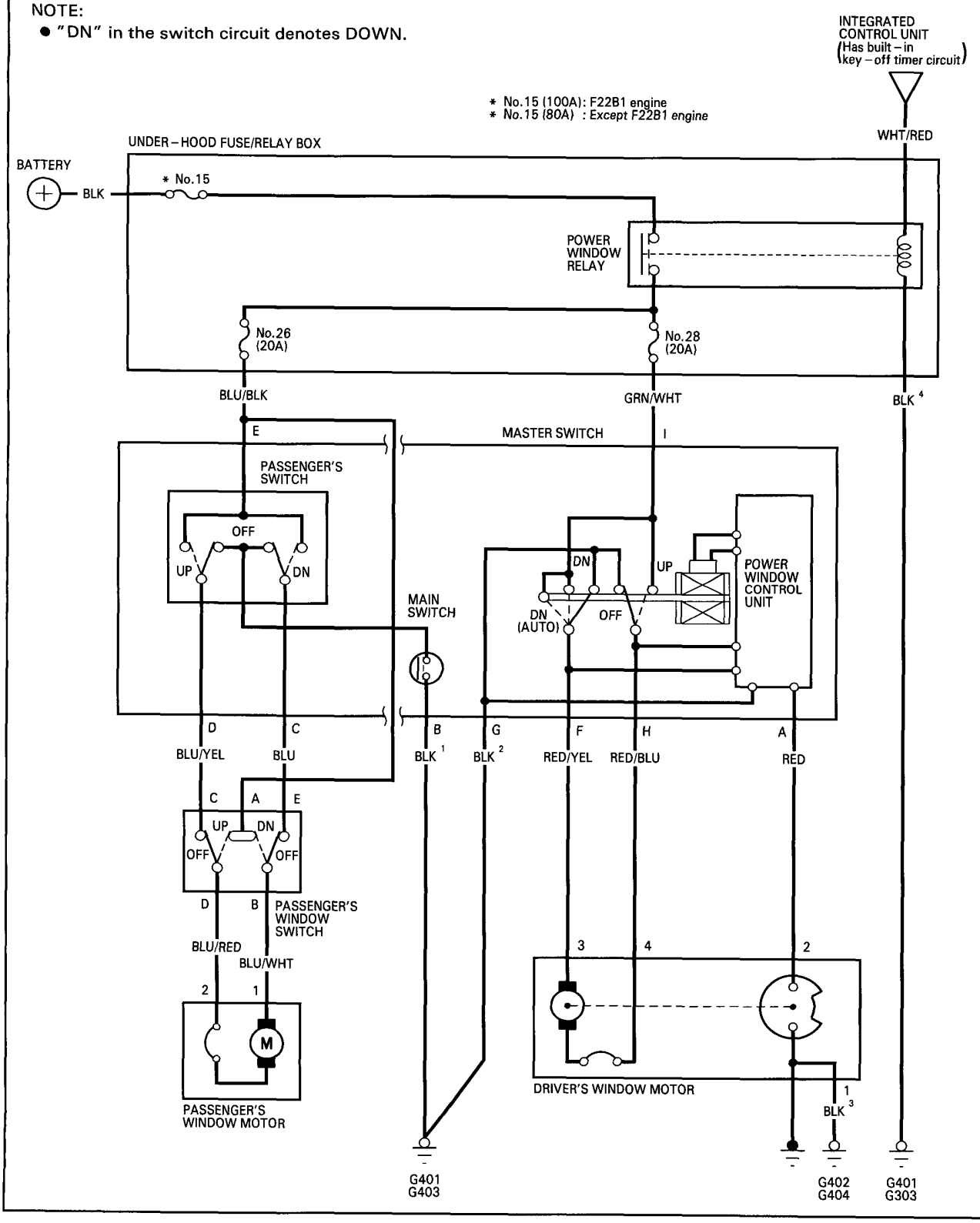
Circuit Diagram (KG and KE models)

NOTE:
- "DN" in the switch circuit denotes DOWN.



Circuit Diagram (KH model)

NOTE:
- "DN" in the switch circuit denotes DOWN.



Power Windows

Troubleshooting (KG and KE models)

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown No. 15 (80 A) fuse (In the under-hood fuse/relay box)	Blown No. 5 (7.5 A) fuse (In the under-dash fuse/relay box)	Power window relay	Blown No. 28 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 26 (20 A) fuse (In the under-hood fuse/relay box)	Power window master switch	Passenger's switch	Driver's motor	Pulser (In driver's motor)	Passenger's motor	Window regulator	Power window master switch input	Poor ground	Open circuit in the wires, loose or disconnected terminals
All windows do not work.	1	2	3										G401 G403	YEL/GRN
Driver's window does not work.				1	<1>			2			3	4	G402 G404	GRN/WHT
Driver's window does not work in AUTO.						1			2			3		RED
Passenger's window does not work.				<1>	1	2	3			4	5			BLU/BLK

< >: KE model

Troubleshooting (KH model)

NOTE: The numbers in the table show the troubleshooting sequence.

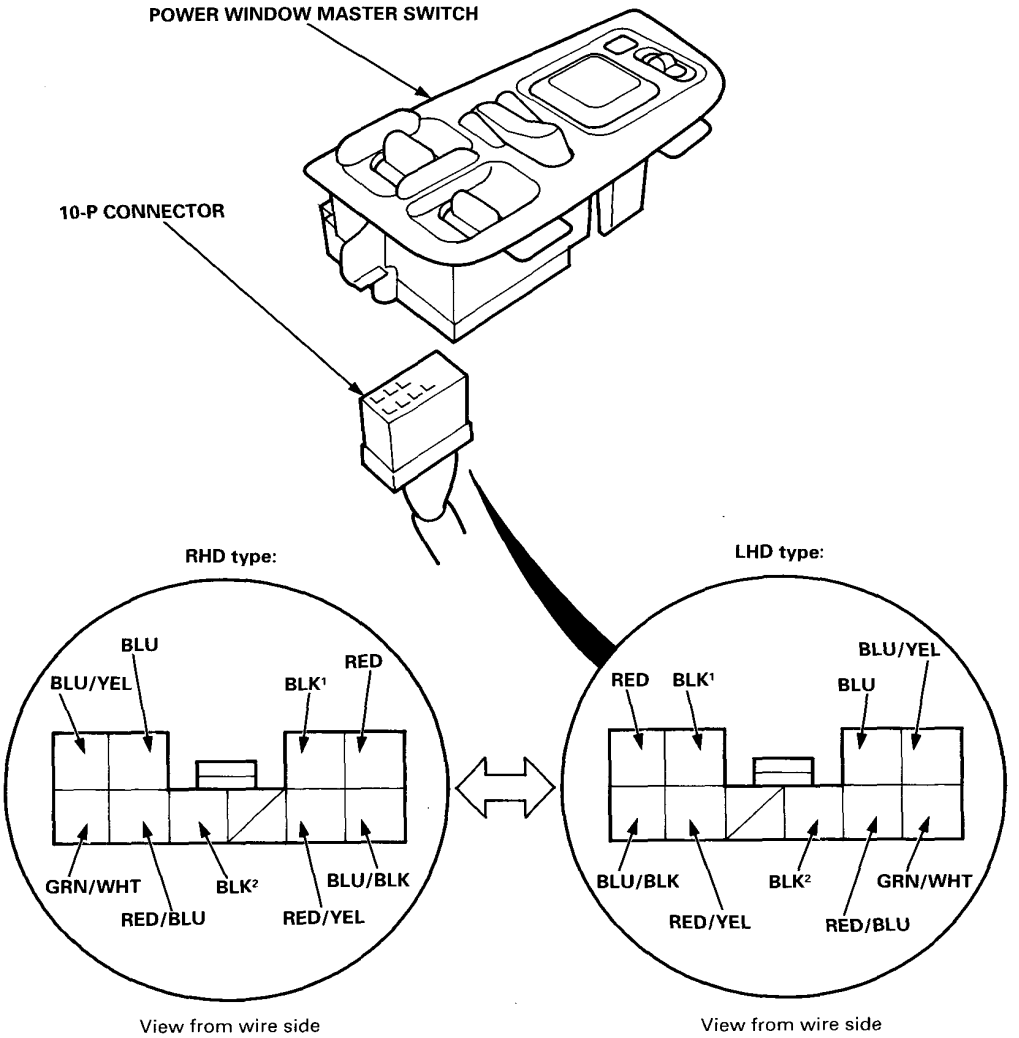
Item to be inspected / Symptom	Blown No. 15 (* A) fuse (In the under-hood fuse/relay box)	Blown No. 37 (7.5 A) fuse (In the under-hood fuse/relay box)	Power window relay	Blown No. 28 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 26 (20 A) fuse (In the under-hood fuse/relay box)	Power window master switch	Passenger's switch	Driver's motor	Pulser (In driver's motor)	Passenger's motor	Window regulator	Power window master switch input	Door switches	Key-off timer circuit (In the integrated control unit)	Poor ground	Open circuit in the wires, loose or disconnected terminals
All windows do not work.	1	2	3											4	G401 G402 G403 G404	WHT/RED
Driver's window does not work.				1				2			3	4			G402 G404	GRN/WHT
Driver's window does not work in AUTO.						1			2			3				RED
Passenger's window does not work.					1	2	3			4	5					BLU/BLK
All windows do not work within 10 minutes after the ignition switch is OFF (neither front door opened).		1											2	3		

* (100 A): F22B1 engine
(80 A): Except F22B1 engine

Master Switch Input Test

NOTE: The control unit is built into the power window master switch, and only controls driver's door window operations.

1. Remove the driver's door panel, and disconnect the 10-P connector from the master switch.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If a test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the power window master switch must be faulty; replace it.



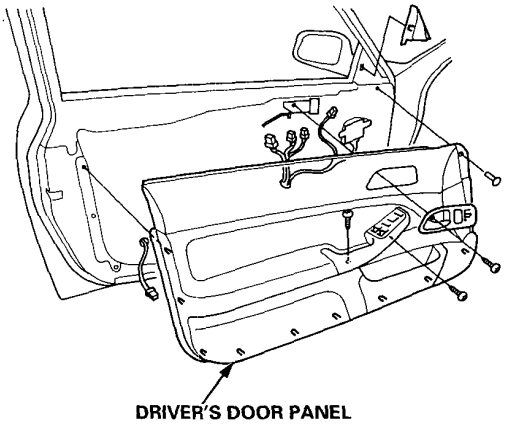
No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK[1] BLK[2]	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G403) • An open in the wire
2	GRN/WHT BLU/BLK	Ignition switch ON(II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 26 or 28 (20 A) fuse in the under-hood fuse/relay box. • Faulty power window relay • An open in the wire
3	RED/BLU and RED/YEL	Connect the GRN/WHT terminal to the RED/BLU terminal, and the RED/YEL terminal to the BLK[2] terminal, then turn the ignition switch ON (II).	Check the driver's window motor: It should run (the window moves down).	• Faulty driver's window motor • An open in the wire
4	BLU/YEL and BLU	Connect the BLU/BLK terminal to the BLU/YEL terminal, and the BLU terminal to the BLK[1] terminal, then turn the ignition switch ON (II).	Check the front passenger's window motor: It should run (the window moves down).	• Faulty passenger's window motor • Faulty passenger's window switch • An open in the wire
5	RED and BLK[2]	Connect the GRN/WHT terminal to the RED/YEL terminal, and the BLK[1] terminal to the RED/BLU terminal, then turn the ignition switch ON (II).	Check for resistance between the RED and BLK[2] terminals: Between 20 – 50 ohms should be indicated as the driver's motor runs.	• Faulty pulser • Faulty driver's window motor • An open in the wire

Power Windows

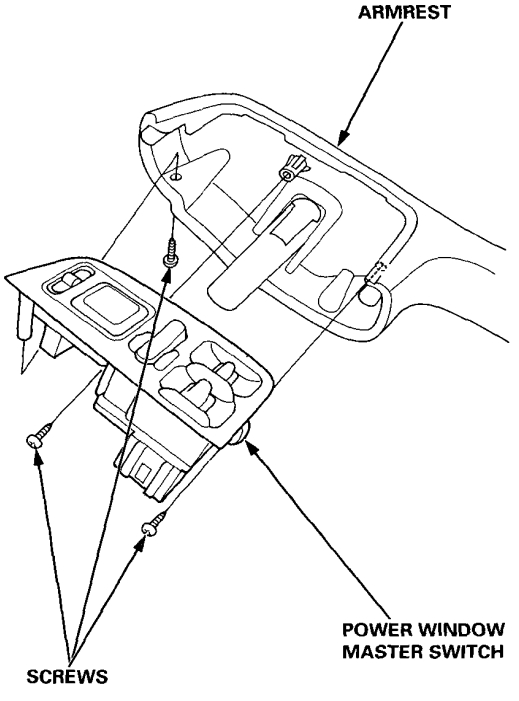
Master Switch Replacement

1. Remove the driver's door panel, and disconnect all connectors.

   NOTE: LHD type is shown, RHD type is similar.



2. Remove the power window master switch from the armrest by removing the three mounting screws.

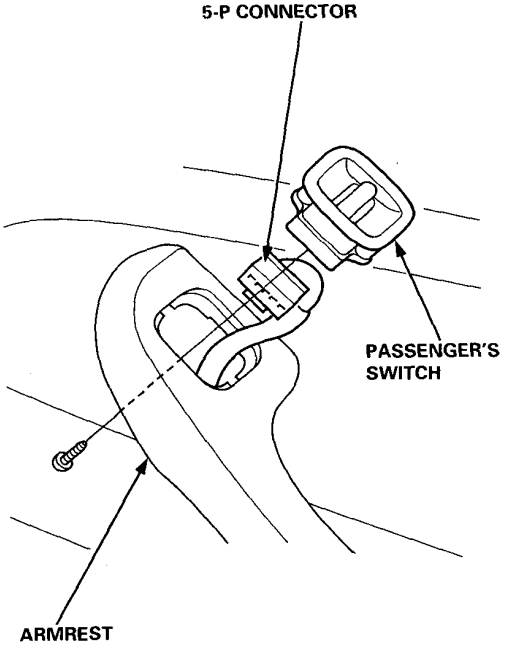


3. Install in the reverse order of removal.

Passenger's Window Switch Replacement

1. Remove the switch from the armrest by removing the mounting screw, then disconnect the 5-P connector from the passenger's window switch.

   NOTE: LHD type is shown, RHD type is similar.

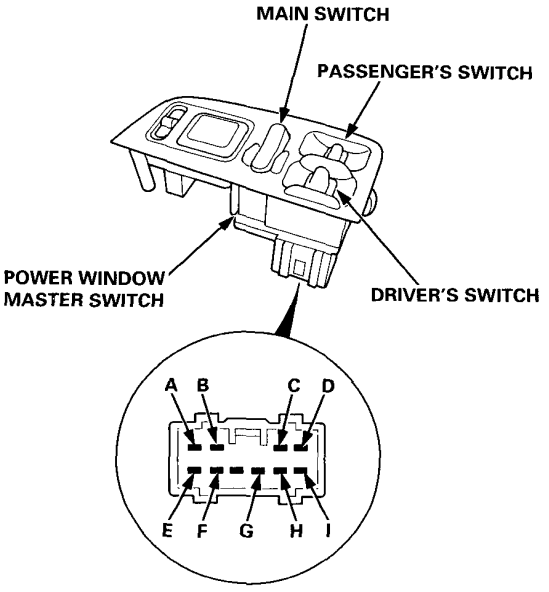


2. Install in the reverse order of removal.

Master Switch Test

LHD type:

1. Remove the door panel (see page 23-270).
2. Remove the power window master switch from the armrest.
3. Check for continuity between the terminals in each switch position according to the tables.



Driver's Switch:

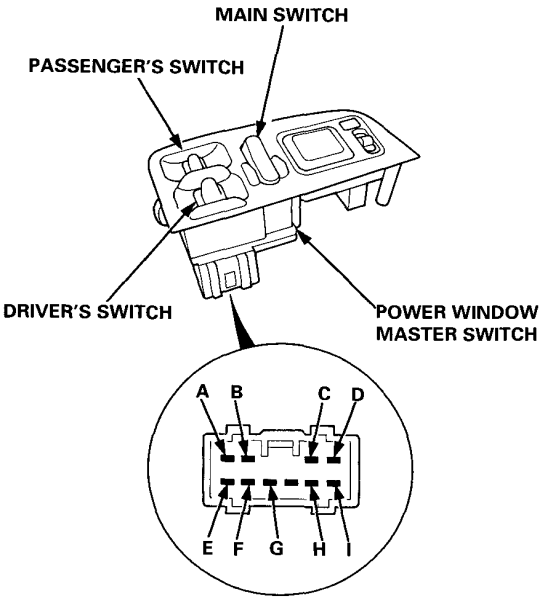
The driver's switch is combined with the control unit so you cannot isolate the switch to test it. Instead, run the *master switch input test procedures* No. 1, 2, 3, and 5 on page 23-268. If the tests are normal, the driver's switch must be faulty.

Passenger's Switch:

Position \ Terminal / Main Switch		B	C	D	E
OFF	ON	○	○	○	
	OFF		○	○	
UP	ON	○	○	○	○
	OFF			○	○
DOWN	ON	○	○	○	○
	OFF		○		○

RHD type:

1. Remove the door panel (see page 23-270).
2. Remove the power window master switch from the armrest.
3. Check for continuity between the terminals in each switch position according to the tables.



Driver's Switch:

The driver's switch is combined with the control unit so you cannot isolate the switch to test it. Instead, run the *master switch input test procedures* No. 1, 2, 3, and 5 on page 23-268. If the tests are normal, the driver's switch must be faulty.

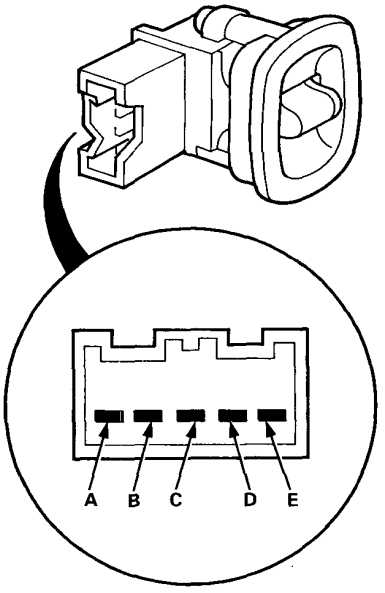
Passenger's Switch:

Position \ Terminal / Main Switch		A	B	C	I
OFF	ON	○	○	○	
	OFF	○	○		
UP	ON	○			○
			○	○	
	OFF	○			○
DOWN	ON		○		○
		○		○	
	OFF		○		○

Power Windows

Passenger's Window Switch Test

1. Remove the switch from the armrest, then disconnect the 5-P connector.



2. Check for continuity between the terminals in each switch position according to the table.

LHD type:

Position \ Terminal	A	B	C	D	E
UP	○			○	
		○			○
OFF			○	○	
		○			○
DOWN	○	○			
			○	○	

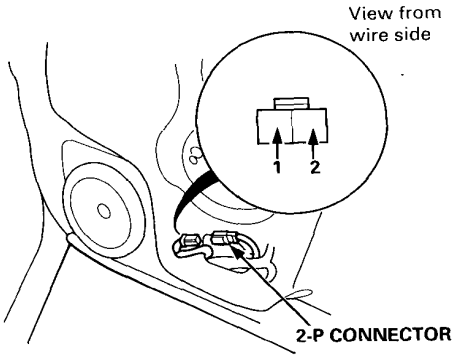
RHD type:

Position \ Terminal	A	B	C	D	E
UP	○	○			
			○	○	
OFF			○	○	
		○			○
DOWN	○			○	
		○			○

Passenger's Window Motor Test

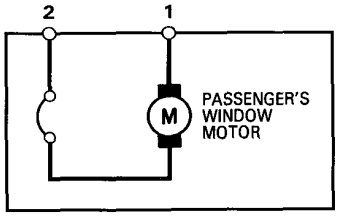
1. Remove the passenger's door panel.
2. Disconnect the 2-P connector from the motor.

NOTE: LHD type is shown, RHD type is similar.



3. Check window motor operation by connecting power and ground according to the table.

Direction \ Terminal	1	2
UP	⊖	⊕
DOWN	⊕	⊖



CAUTION: When the motor stops running, disconnect one lead immediately.

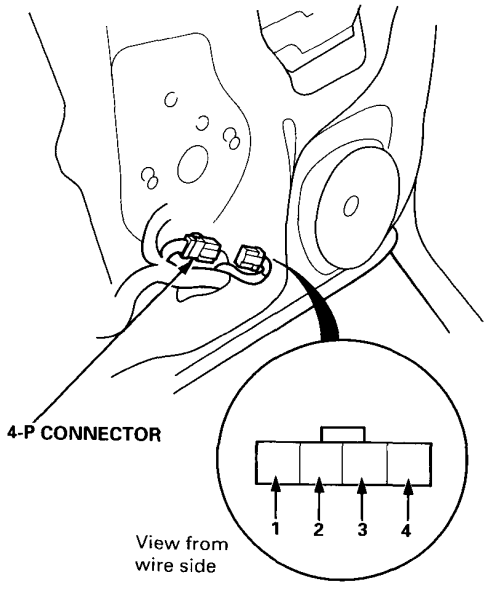
4. If the motor does not run or fails to run smoothly, replace it.

Driver's Window Motor Test

Motor Test:

1. Remove the driver's door panel (see page 23-270).

   NOTE: LHD type is shown, RHD type is similar.



2. Test the motor in each direction by connecting battery power and ground according to the table.

Terminal / Direction	3	4
UP	⊖	⊕
DOWN	⊕	⊖

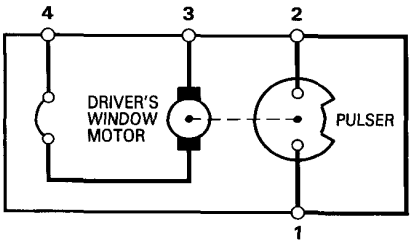
CAUTION: When the motor stops running, disconnect one lead immediately.

3. If the motor does not run or fails to run smoothly, replace it.

Pulser Test:

1. Connect the test leads of an analog ohmmeter to the No. 1 and No. 2 terminals.

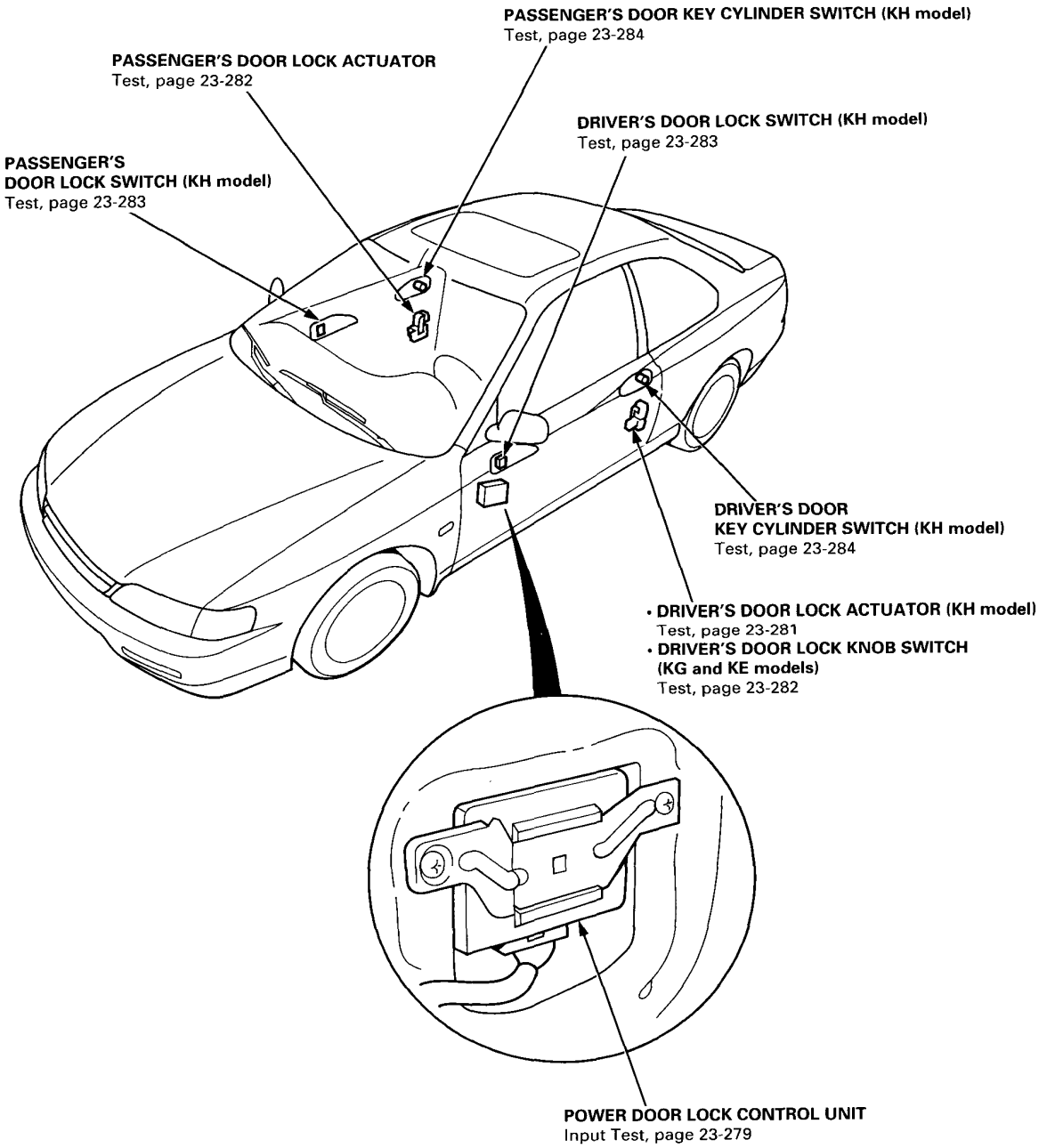
2. Run the motor by connecting power and ground to the No. 3 and No. 4 terminals. The ohmmeter needle should move back and forth alternately.



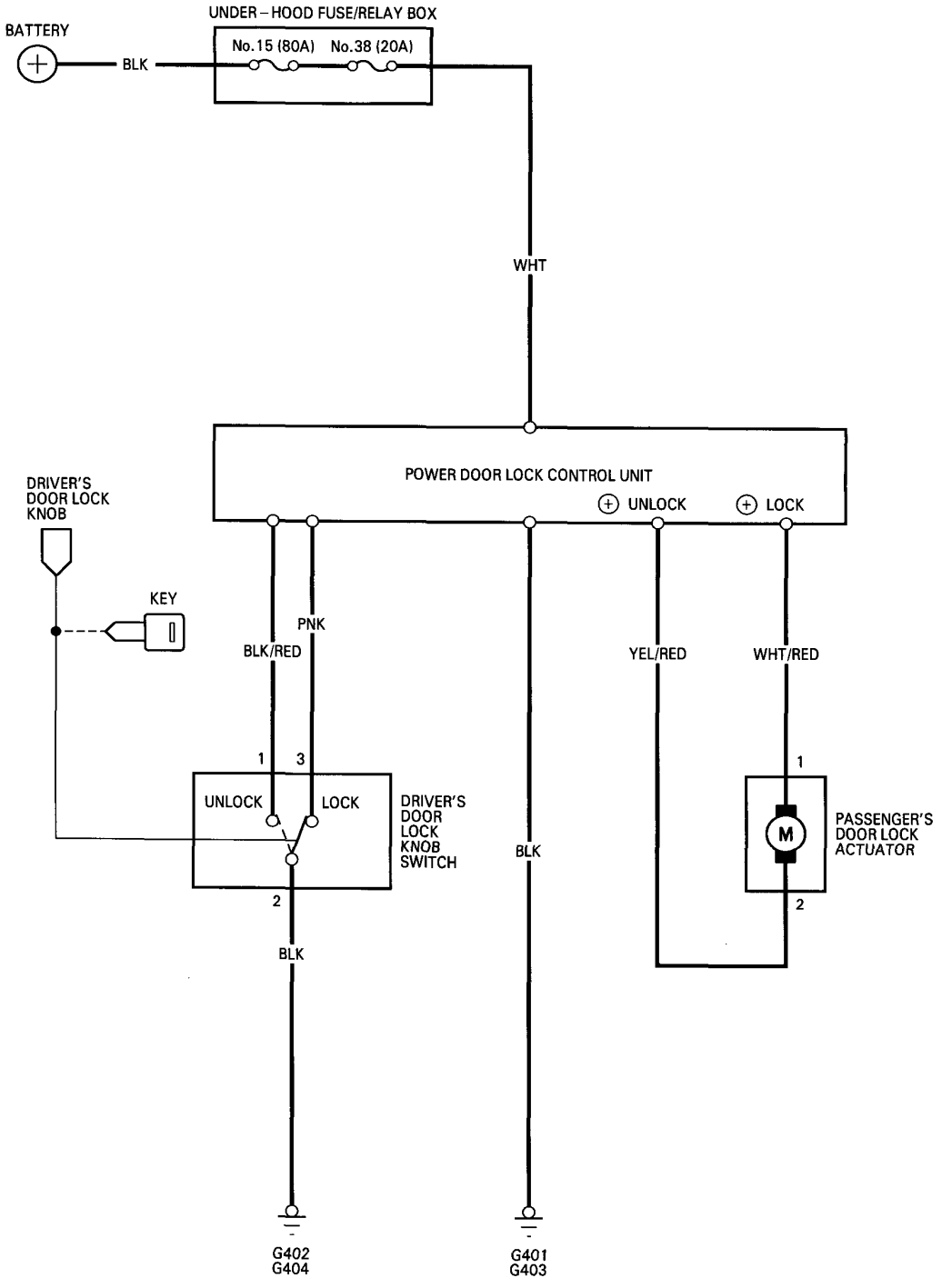
Power Door Locks

Component Location Index

NOTE: LHD type is shown, RHD type is symmetrical.

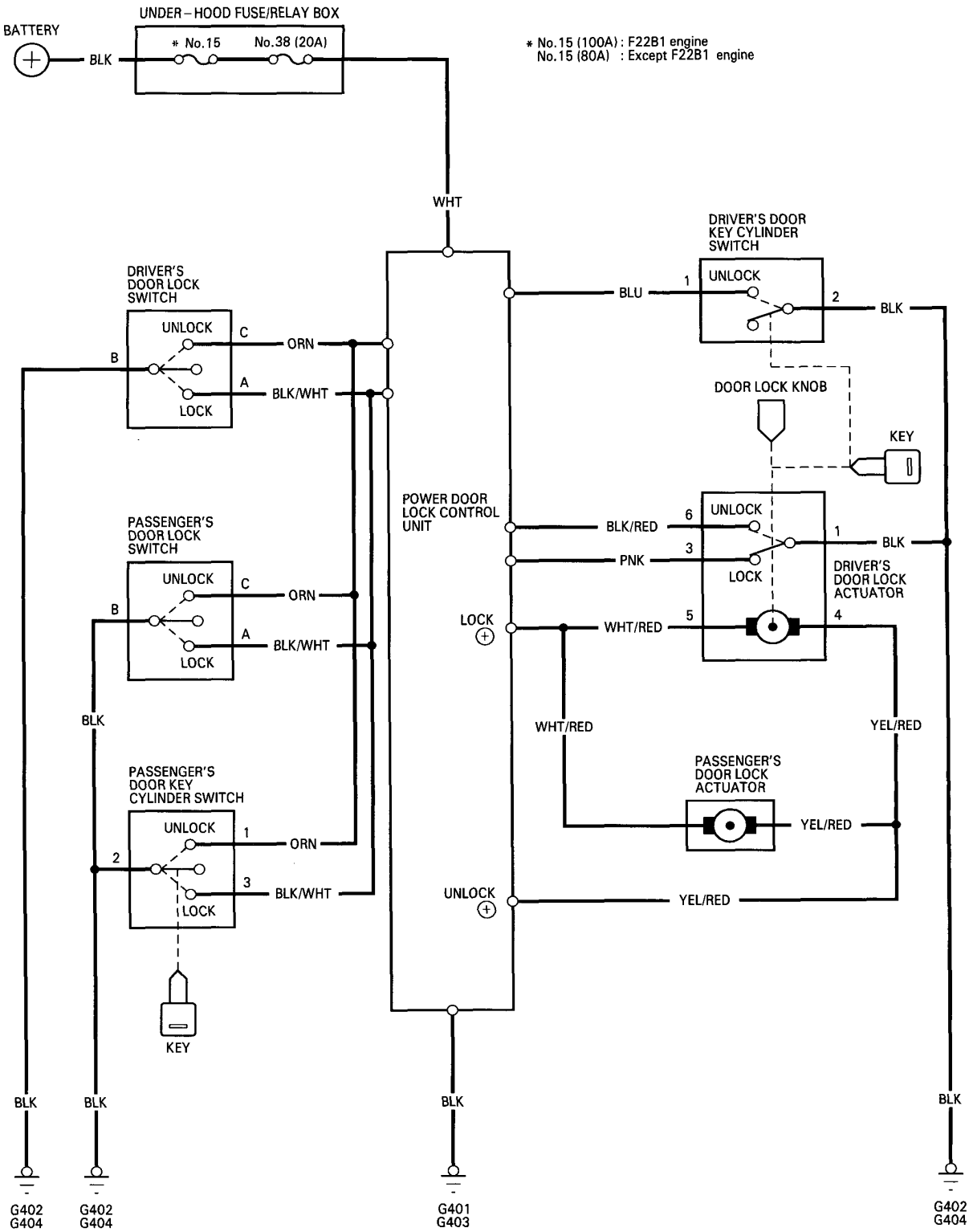


Circuit Diagram (KG and KE models)



Power Door Locks

Circuit Diagram (KH model)



Troubleshooting (KG and KE models)

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom / Item to be inspected		Blown No. 38 (20 A) fuse (In the under-hood fuse/relay box)	Disconnected or obstructed door lock rod/ linkage	Driver's door lock knob switch	Passenger's door actuators	Control unit input	Poor ground	Open circuit, loose or disconnected terminals
Power door lock system doesn't operate at all.		1				2	G401 G403	WHT
Doors don't lock or unlock with driver's door lock knob switch.	Both doors		1	2		3	G402 G404	BLK/RED or PNK
	One door		1		2		G401 G403	YEL/RED or WHT/RED

Power Door Locks

Troubleshooting (KH model)

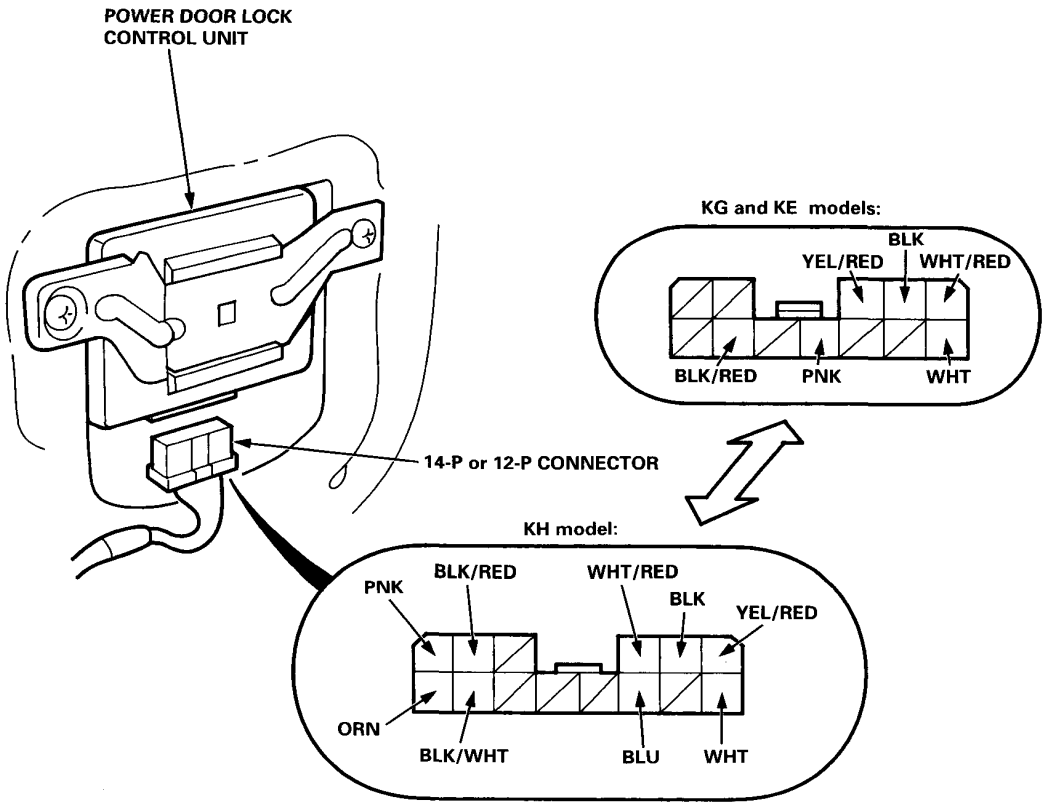
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom / Item to be inspected		Blown No. 38 (20 A) fuse (In the under-hood fuse/relay box)	Disconnected or obstructed door lock rod/linkage	Driver's door lock knob switch (In the door lock actuator or door lock)	Driver's door key cylinder switch	Passenger's door key cylinder switch	Driver's door lock actuator	Passenger's door lock actuator	Driver's door lock switch	Passenger's door lock switch	Control unit input	Poor ground	Open circuit, loose or disconnected terminals
Power door lock system doesn't work at all.		1									2	G401 G403	WHT
Doors don't lock or unlock with the driver's door lock switch.	Both doors								1		2	G402 G404	ORN or BLK/WHT
	One door		1				2	3					WHT/RED or YEL/RED
Doors don't lock or unlock with the passenger's door lock switch.	Both doors									1	2	G402 G404	ORN or BLK/WHT
	One door		1				2	3					WHT/RED or YEL/RED
Doors don't lock or unlock with the driver's door lock knob.	Both doors		1	2							3	G402 G404	BLK/RED or PNK
	One door		1				2	3					WHT/RED or YEL/RED
Doors don't lock or unlock with the passenger's door key.	Both doors					1					2	G402 G404	ORN or BLK/WHT
	One door		1				2	3					WHT/RED or YEL/RED
Doors don't unlock with the driver's door key.	Driver's door		1				2						WHT/RED or YEL/RED
	*Both doors			2	1						3	G402 G404	BLU or BLK/RED

*: If the system is working normally, both doors will unlock when you hold the door key in the unlock position (key cylinder switch and door lock knob switch turned ON) for one second or more.

Control Unit Input Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 14-P or 12-P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



View from wire side

(cont'd)

Power Door Locks

Control Unit Input Test (cont'd)

Disconnect the 14-P or 12-P connector from the power door lock control unit.

No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401, G403) • An open in the wire
2	WHT/RED and YEL/RED	Connect the YEL/RED terminal to the WHT terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door lock operation: Passenger's door (*All doors) should unlock.	• Faulty actuator • An open in the wire • Blown No. 38 (20 A) fuse in the under-hood fuse/relay box
		Connect the WHT/RED terminal to the WHT terminal, and the YEL/RED terminal to the BLK terminal momentarily.	Check door lock operation: Passenger's door (*All doors) should lock.	

Reconnect the 14-P or 12-P connector to the power door lock control unit.

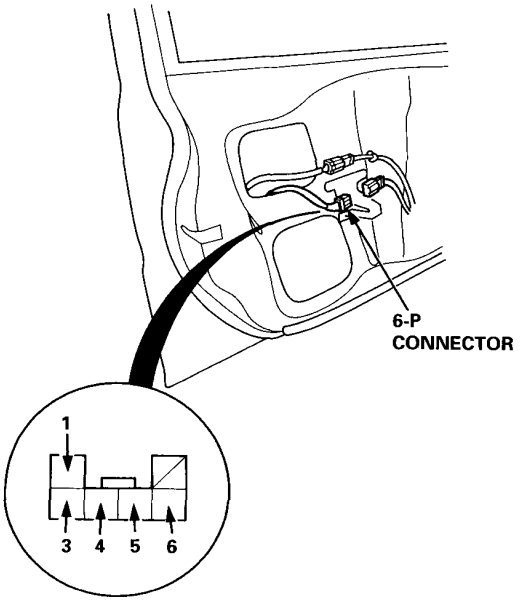
No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
3	WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 38 (20 A) fuse in the under-hood fuse/relay box • An open in the wire
*4	BLK/WHT	Driver's door lock switch in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock switch • Poor ground (G402, G404) • An open in the wire
	ORN	Driver's door lock switch in UNLOCK		
	BLK/WHT	Passenger's door lock switch in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty passenger's door lock switch • Poor ground (G402, G404) • An open in the wire
	ORN	Passenger's door lock switch in UNLOCK		
	BLK/WHT	Passenger's door key cylinder in LOCK	Check for voltage to ground: There should be 1 V or less as the switch is turned.	• Faulty passenger's door key cylinder switch • Poor ground (G402, G404) • An open in the wire
	ORN	Passenger's door key cylinder in UNLOCK		
5	PNK	Driver's door lock knob in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock knob switch • Poor ground (G402, G404) • An open in the wire
	BLK/RED	Driver's door lock knob in UNLOCK		
*6	BLU	Driver's door key cylinder in UNLOCK	Check for voltage to ground: There should be 1 V or less as the switch is turned.	• Faulty driver's door key cylinder switch • Poor ground (G402, G404) • An open in the wire

*: KH model

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

Driver's Door Lock Actuator Test (KH model)

1. Remove the door panel (see section 20).
2. Disconnect the 6-P connector from the actuator.



View from wire side

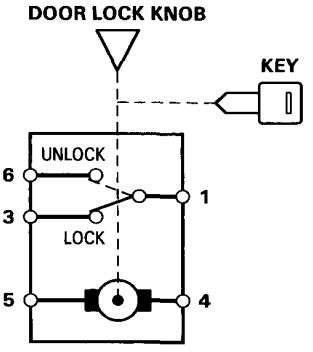
3. Check actuator operation by connecting power and ground according to the table.

Terminal / Position	4	5
LOCK	⊖	⊕
UNLOCK	⊕	⊖

CAUTION: To prevent damage to the actuator, apply battery voltage only momentarily.

4. Check for continuity between the terminals in each switch position according to the table.

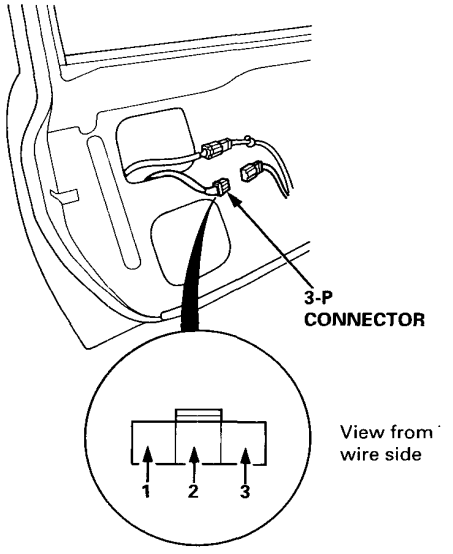
Terminal / Position	1	3	6
LOCK	○——	——○	
UNLOCK	○——		——○



Power Door Locks

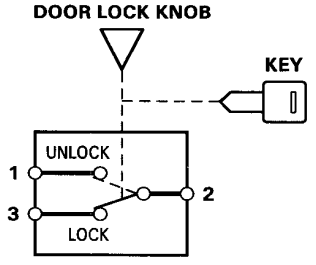
Driver's Door Lock Knob Switch Test (KG and KE models)

1. Remove the door panel (see section 20).
2. Disconnect the 3-P connector from the knob switch.



3. Check for continuity between the terminals in each switch position according to the table.

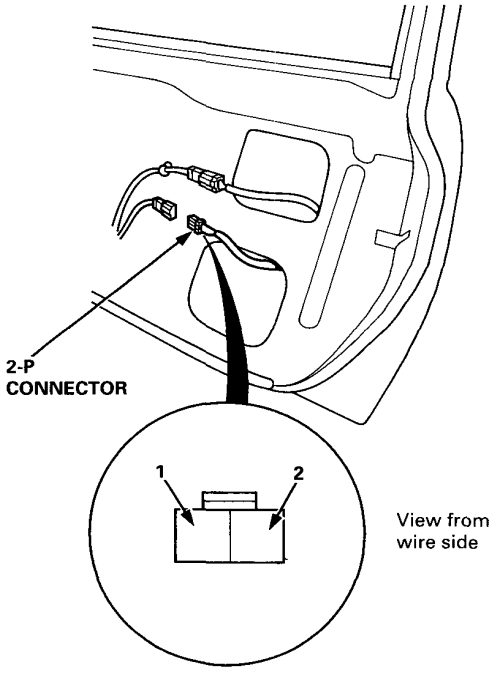
Position \ Terminal	1	2	3
LOCK		○	○
UNLOCK	○	○	



4. If the knob switch fails to work properly, replace it.

Passenger's Door Lock Actuator Test

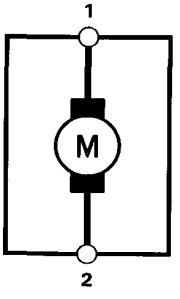
1. Remove the door panel (see section 20).
2. Disconnect the 2-P connector from the actuator.



3. Check actuator operation by connecting power and ground according to the table.

Position \ Terminal	1	2
LOCK	⊕	⊖
UNLOCK	⊖	⊕

CAUTION: To prevent damage to the actuator, apply battery voltage only momentarily.

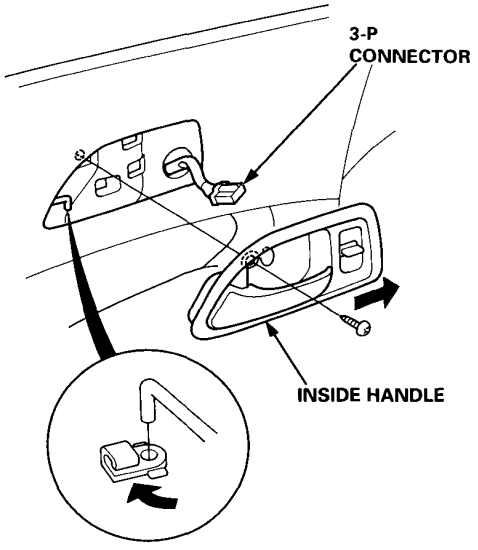


4. If the actuator fails to work properly, replace it.

Door Lock Switch Test (KH model)

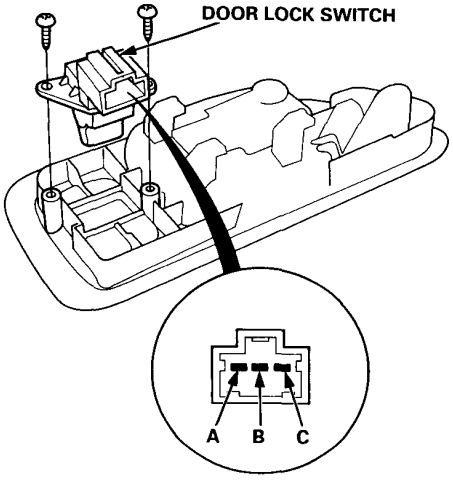
1. Remove the inside handle.
2. Disconnect the 3-P connector from the switch.

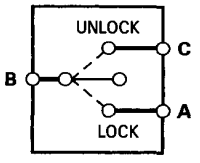
   NOTE: The driver's door lock switch is shown; the front passenger's door lock switch is similar.



3. Check for continuity between the terminals in each switch position according to the table.

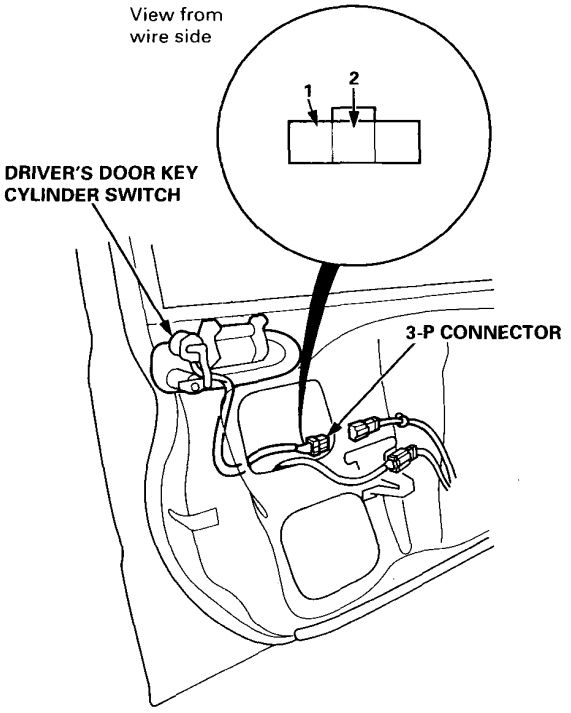
Position \ Terminal	A	B	C
LOCK	○	○	
OFF			
UNLOCK		○	○





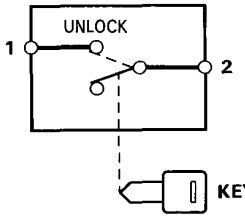
Driver's Door Key Cylinder Switch Test (KH model)

1. Remove the door panel (see section 20).
2. Disconnect the 3-P connector from the switch.



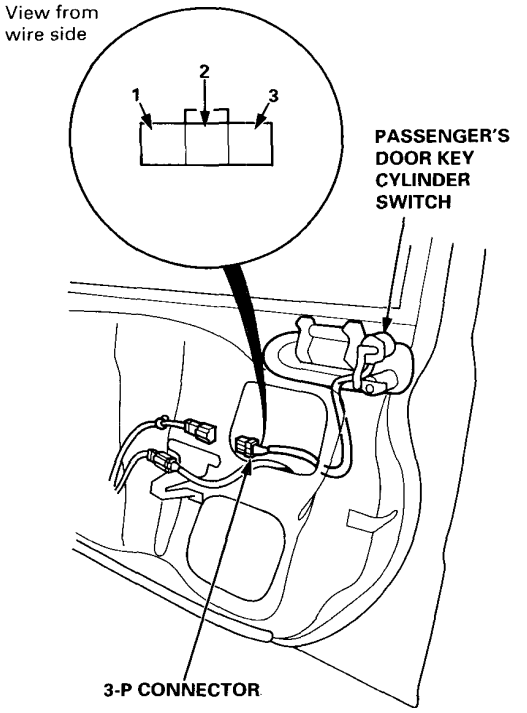
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	2
UNLOCK	○	○
OFF		



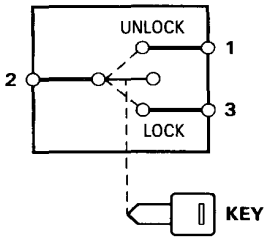
Passenger's Door Key Cylinder Switch Test (KH model)

1. Remove the door panel (see section 20).
2. Disconnect the 3-P connector from the switch.



3. Check for continuity between the terminals in each switch position according to the table.

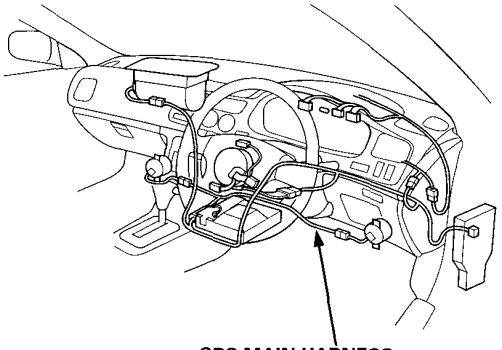
Position \ Terminal	1	2	3
LOCK		○	○
OFF			
UNLOCK	○	○	



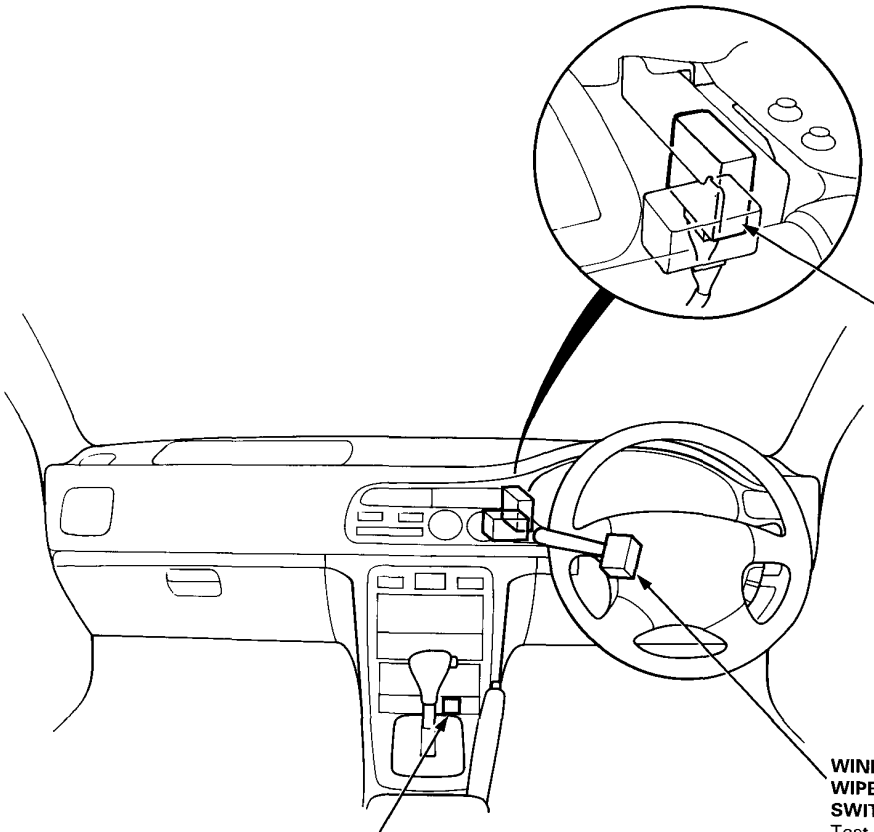
Component Location Index

CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE:
- RHD type is shown, LHD type is similar.
- Only KE models are equipped with headlight washers.



SRS MAIN HARNESS
(Covered with yellow insulation)



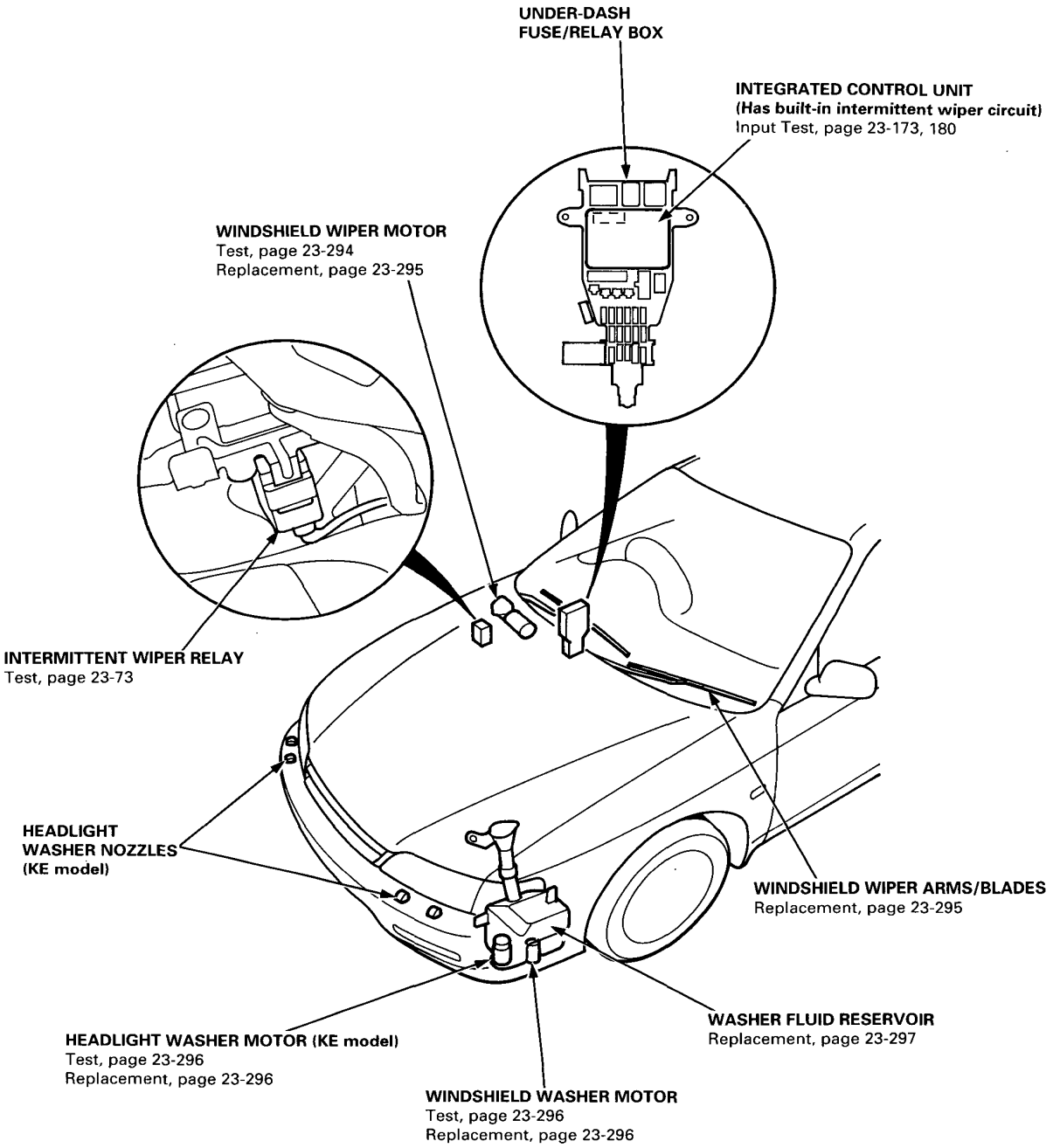
HEADLIGHT WASHER CONTROL UNIT (KE model)
Input Test, page 23-290

WINDSHIELD WIPER/WASHER SWITCH
Test, page 23-292
Removal, page 23-291

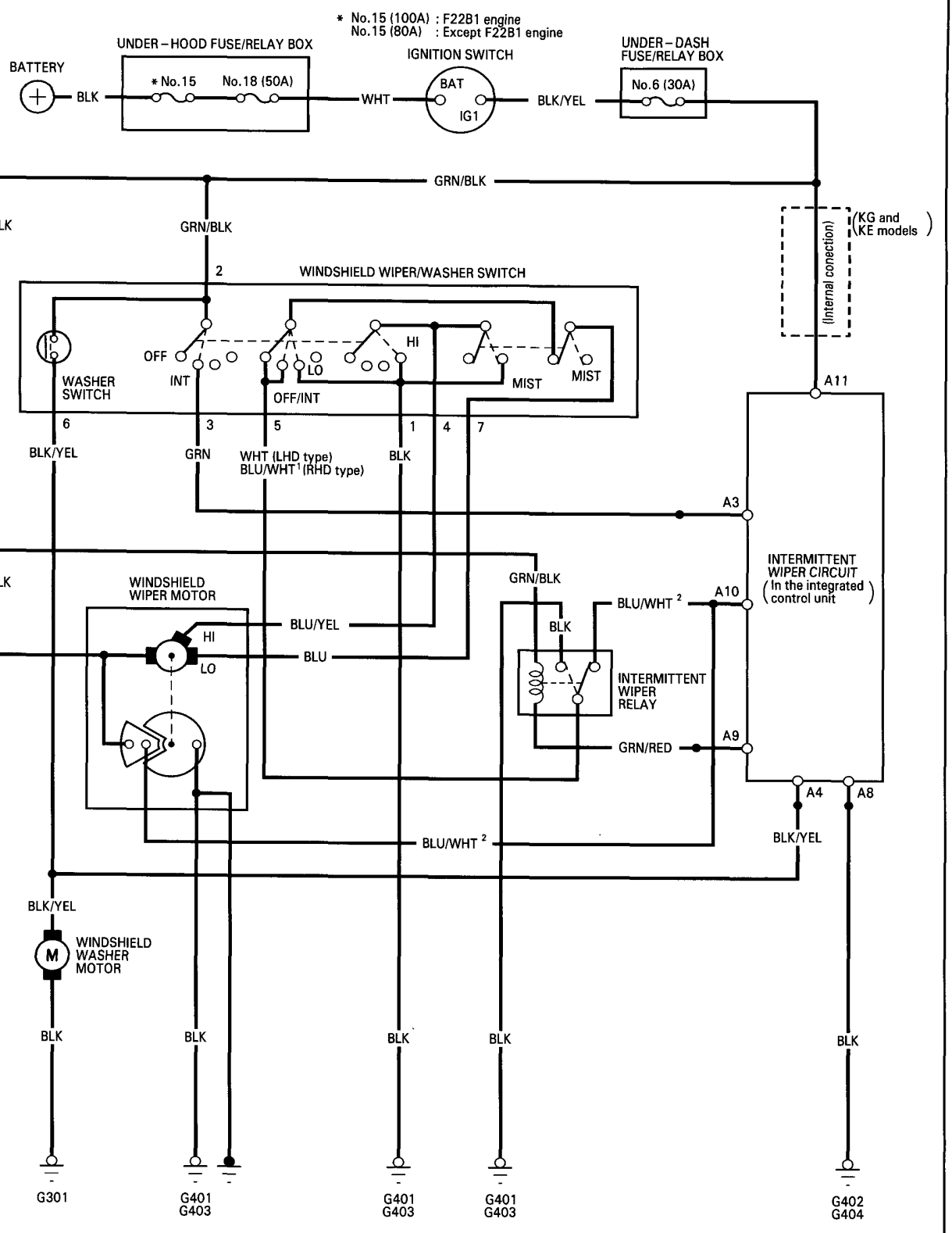
HEADLIGHT WASHER SWITCH
Test, page 23-293

Wiper/Washer

Component Location Index

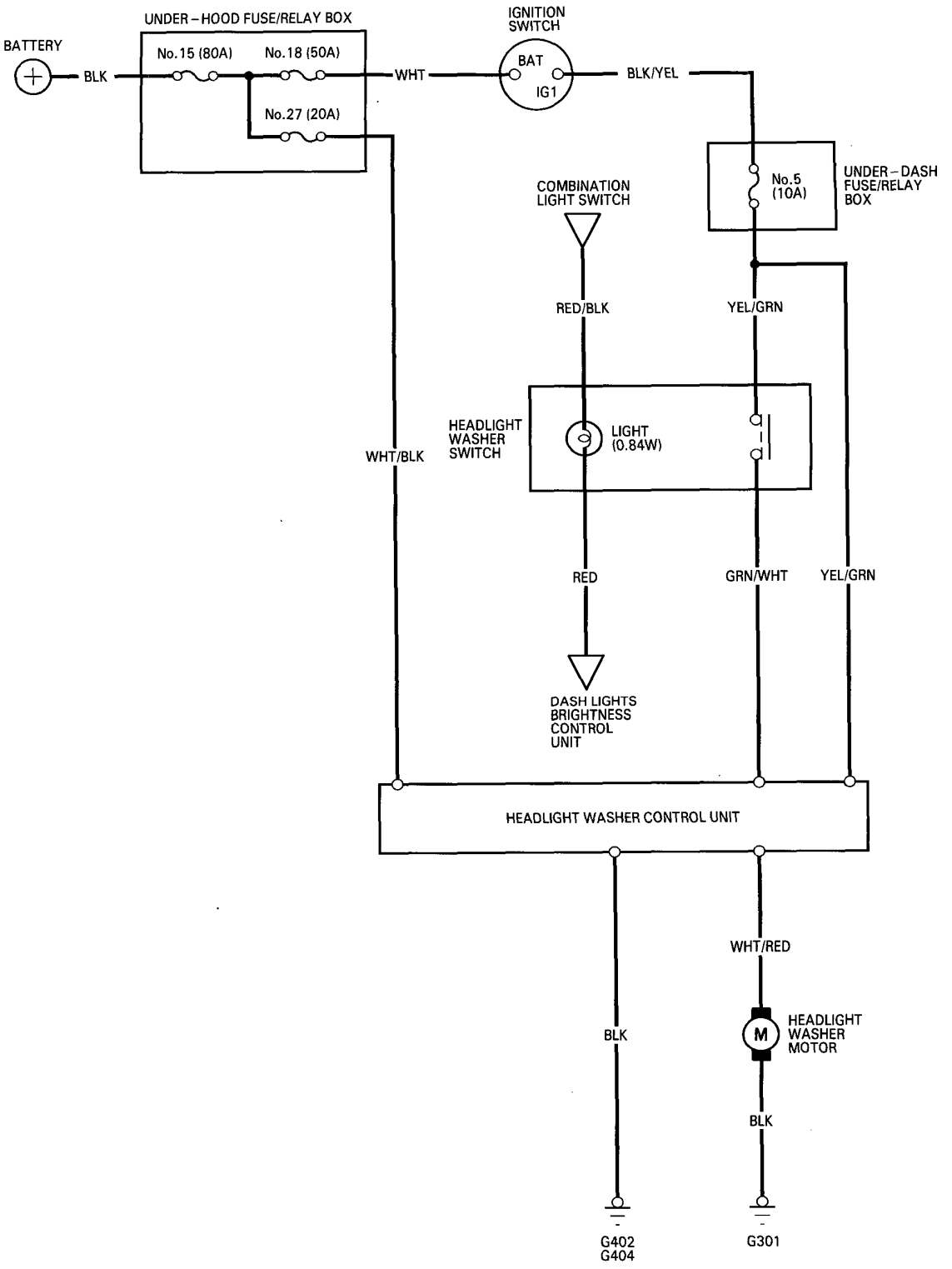


Circuit Diagram



Wiper/Washer

Circuit Diagram (KE model)



Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Windshield Wiper/Washer:

Symptom	Item to be inspected	Blown No. 6 (30 A) fuse (In the under-dash fuse/relay box)	Wiper switch	Mist switch	Wiper motor assembly	Washer switch	Washer motor	Intermittent wiper relay	Combined operation of wiper/washer (In the integrated control unit)	Not enough washer fluid in reservoir	Disconnected or blocked washer hose or clogged outlet	Disconnected wiper linkage	Poor ground	Open circuit, loose or disconnected terminals
Wipers do not work.	In all positions	1	4		2							3	G401 G403	GRN/BLK
	In INT		1		3			2						GRN, *1 WHT or *2 BLU/WHT[1]
	In LO or HI		1		2									BLU/YEL or BLU
	In MIST			1	2									BLU/YEL
Blades do not return to park position when wipers are turned OFF.			2		1									BLU/WHT
Erratic intermittent cycle or wipers do not work in INT.								1	2					GRN/BLK, GRN, BLU/WHT[2] or GRN/RED
Little or no washer fluid is pumped.						4	3			1	2		G301	BLK/YEL
Wipers and washer do not work at the same time.									1					BLK/YEL

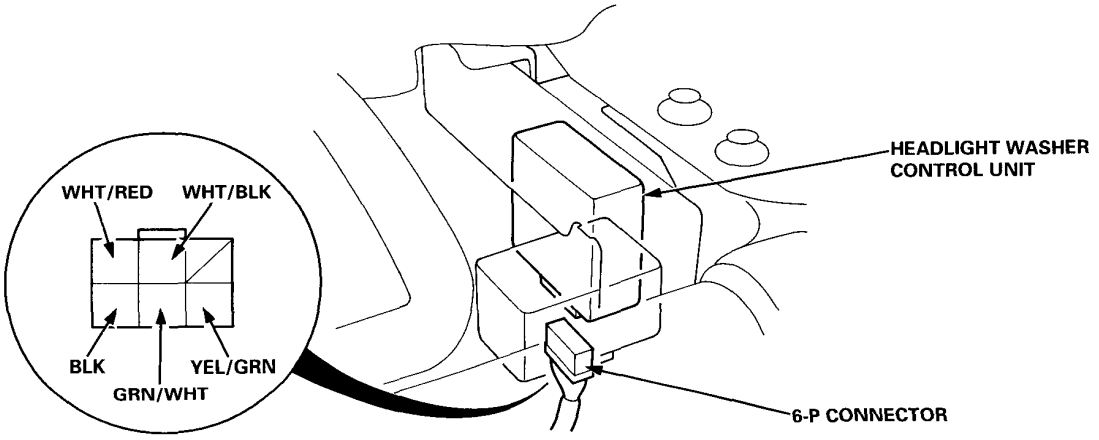
*1: LHD type *2: RHD type

Headlight Washer:

Symptom	Item to be inspected	Blown No. 27 (20 A) fuse (In the under-hood fuse/relay box)	Blown No. 5 (10 A) fuse (In the under-dash fuse/relay)	Headlight washer switch	Headlight washer motor	Headlight washer control unit input	Insufficient washer fluid in reservoir	Disconnected blocked washer hose or clogged outlet	Poor ground	Open circuit, loose or disconnected terminals
Little or no washer fluid is pumped.		2	3	4	5	7	1	6	G301 G402 G404	WHT/BLK, YEL/GRN, GRN/WHT or WHT/RED

Headlight Washer Control Unit Input Test (KE model)

1. Remove the dashboard lower cover.
2. Disconnect 6-P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals lock OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



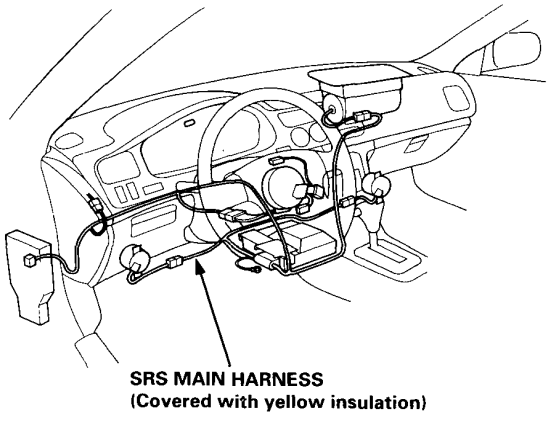
No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	WHT/BLK	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 27 (20 A) fuse in the under-hood fuse/relay box • An open in the wire
3	YEL/GRN	Ignition switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 5 (10 A) fuse in the under-dash fuse relay/box • An open in the wire
4	GRN/WHT	Ignition switch and headlight washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 5 (10 A) fuse in the under-dash fuse/relay box • Faulty headlight washer switch • An open in the wire
5	WHT/RED	Connect the WHT/BLK terminal to the WHT/RED terminal with a jumper wire.	Check the motor: It should run.	• Faulty headlight washer motor. • Poor ground (G301) • An open in the wire

Switch Removal

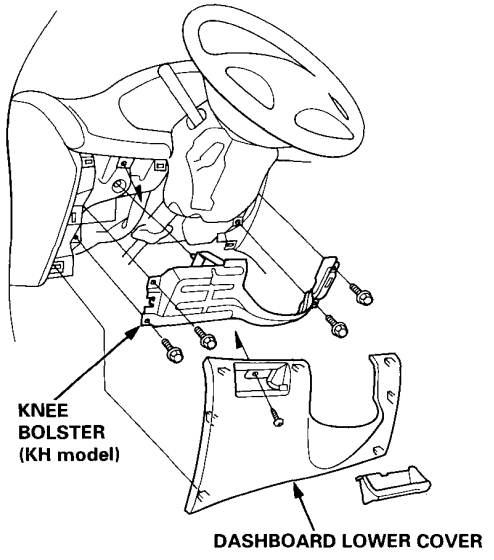
CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

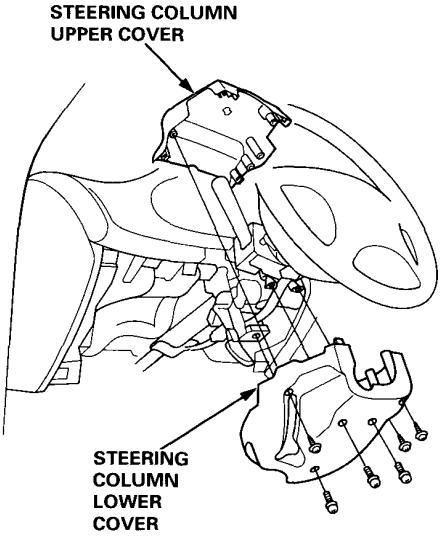
NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



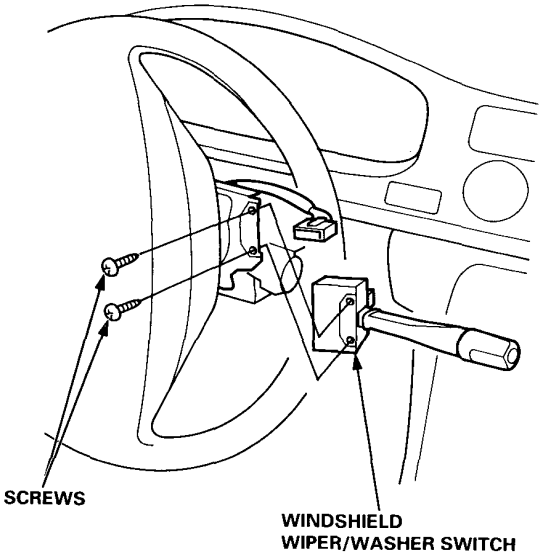
1. Remove the dashboard lower cover and knee bolster (KH model).



2. Remove the steering column covers.



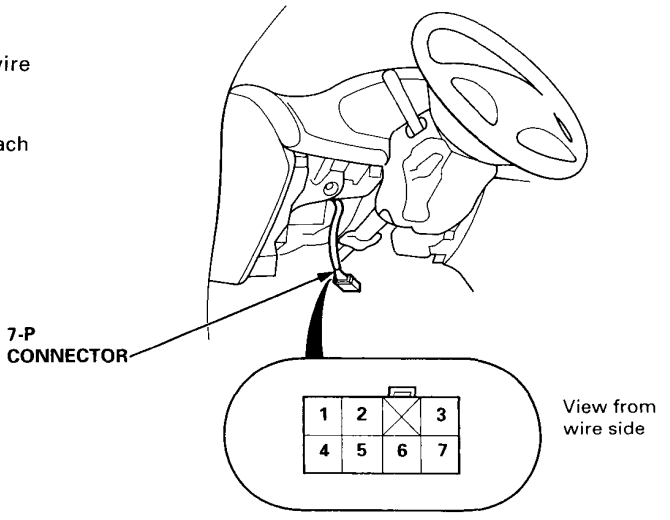
3. Remove the two screws and the switch.



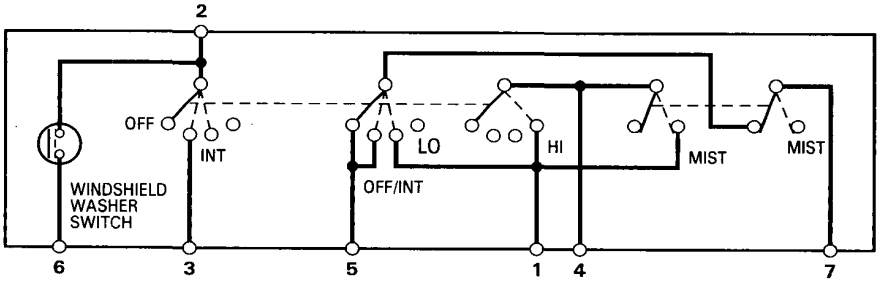
4. Install in the reverse order of removal.

Wiper/Washer Switch Test

1. Remove the dashboard lower cover and knee bolster (KH model).
2. Disconnect the 7-P connector from the main wire harness.
3. Check for continuity between the terminals in each switch position according to the table.



Windshield Wiper/Washer Switch



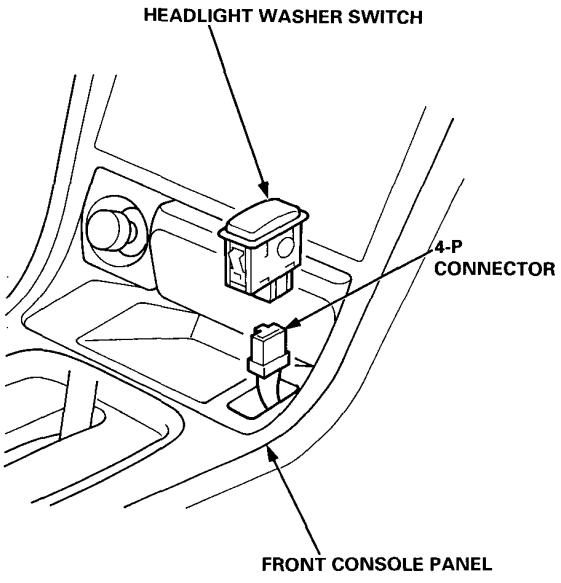
Terminal / Position	1	2	3	4	5	6	7
OFF					○		○
INT		○	○		○		○
LO	○						○
HI	○			○			
Mist switch "ON"	○			○			
Washer switch "ON"		○				○	

Headlight Washer Switch Removal (KE model)

1. Carefully pry the headlight washer switch out of the front console panel.

   NOTE: Be careful not to damage the switch and front console panel when prying the switch out.

2. Disconnect the 4-P connector from the switch.

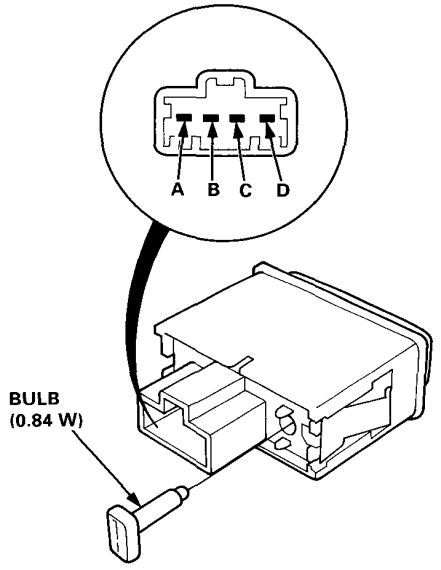


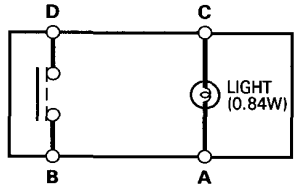
Headlight Washer Switch Test (KE model)

1. Remove the switch from the front console panel.

2. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	B	D	A		C
ON			○	⊖	○
OFF	○	○			



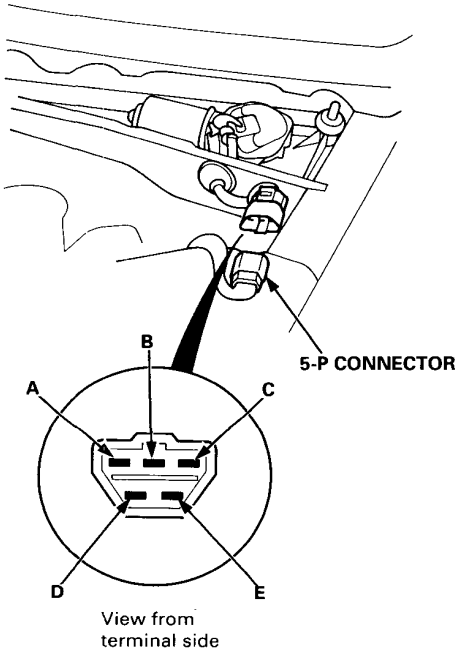


Windshield Wiper Motor Test

1. Open the hood.
2. Disconnect the 5-P connector from the windshield wiper motor.
3. Test the motor by connecting battery power and ground according to the table.

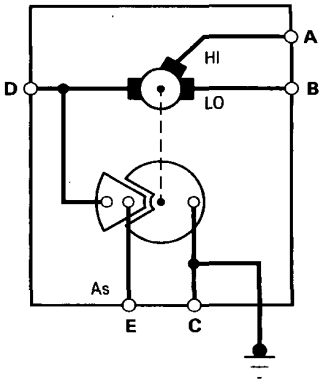
Terminal / Position	A	B	D
LOW SPEED		⊖	⊕
HIGH SPEED	⊖		⊕

NOTE: LHD type is shown, RHD type is symmetrical.



View from terminal side

4. If the motor fails to run smoothly, replace it.
5. Connect an analog voltmeter between the E and the C terminals. Run the motor at low or high speed.



NOTE: As (Automatic stop)

The voltmeter should indicate 0 V and 4 V or less alternately.

NOTE:
- Use an analog tester.
- Use the car battery.

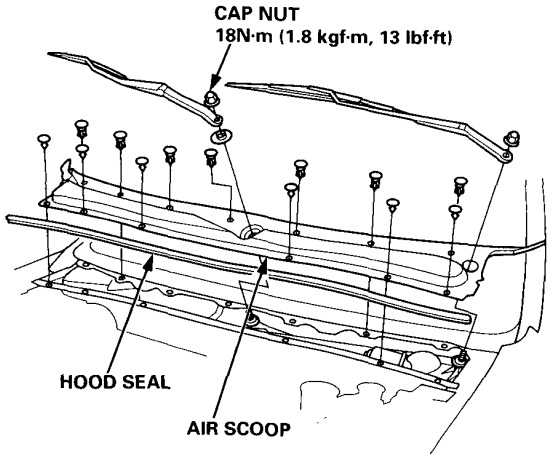
Windshield Wiper Motor Replacement

NOTE: LHD type is shown, RHD type is similar.

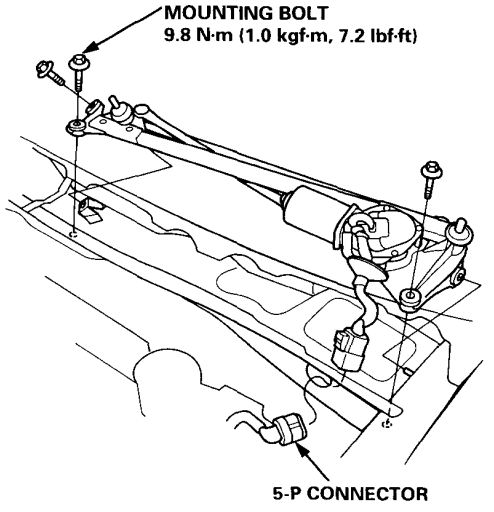
1. Open the hood, and remove the cap nuts and wiper arms.

   NOTE: Remove the wiper arms carefully without damaging the hood.

2. Remove the hood seal and air scoop by prying out their trim clips.

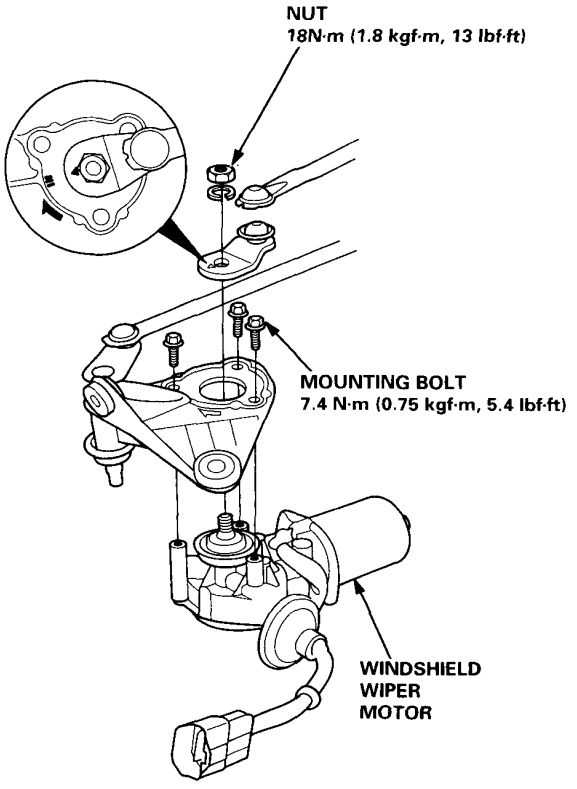


3. Disconnect the 5-P connector from the windshield wiper motor.



4. Remove the wiper linkage assembly by removing the three mounting bolts.

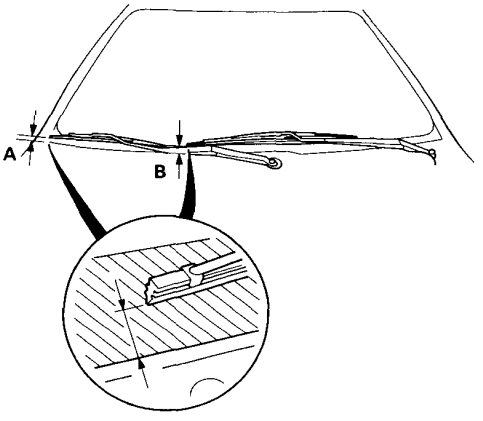
5. Remove the three mounting bolts and the nut from the wiper linkage to remove the windshield wiper motor.



6. Install the windshield wiper motor in the reverse order of removal.

7. Install the windshield wiper arms as shown below.

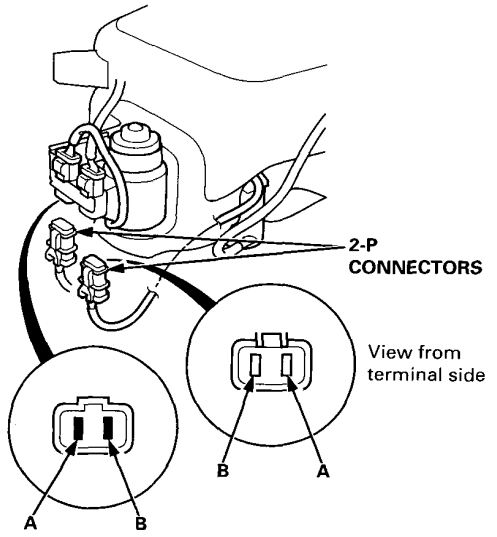
   A: 33 mm (1.3 in)
   B: 25 mm (1 in)



Wiper/Washer

Washer Motor(s) Test

1. Remove the inner fender.
2. Disconnect the 2-P connector(s) from the washer motor(s).



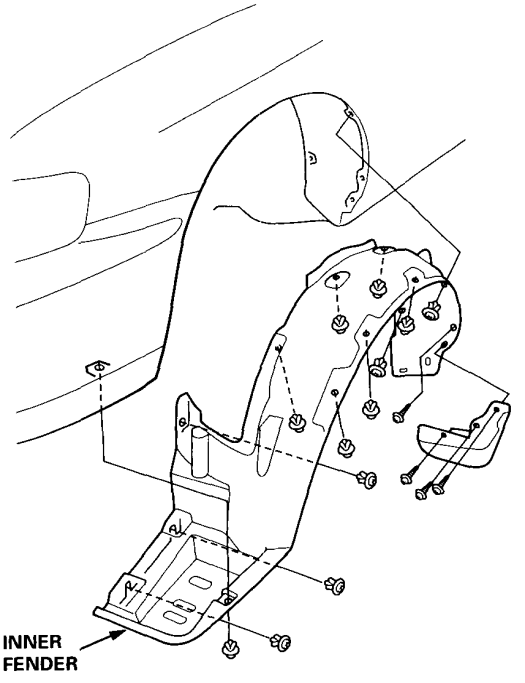
3. Test the washer motor operation by connecting battery power and ground according to the table.

Terminal / Battery	A	B
Disconnected		
Connected	⊕	⊖

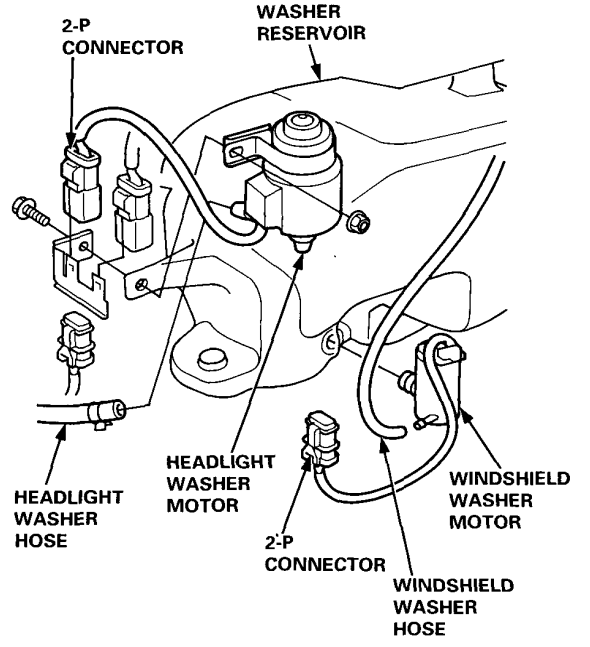
- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly, but little or no washer fluid is pumped, check for a disconnected or blocked washer hose, or a clogged pump outlet in the motor.

Washer Motor(s) Replacement

1. Remove the inner fender.



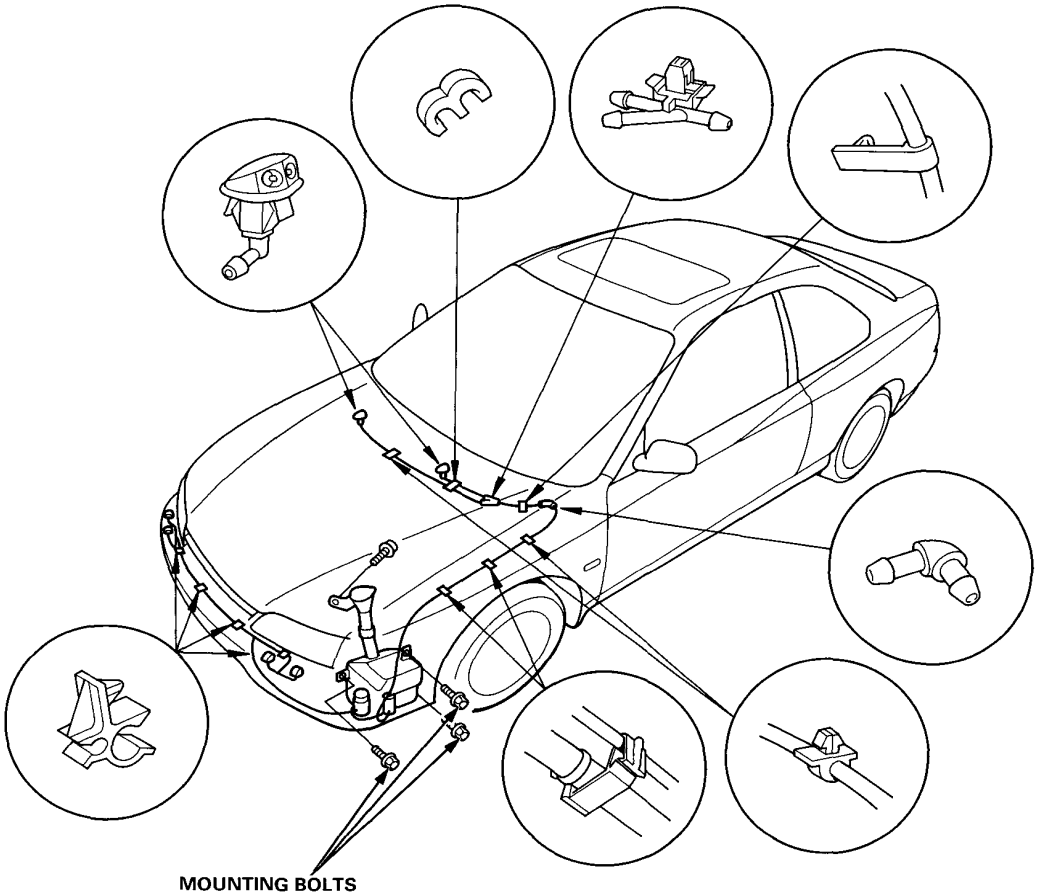
2. Disconnect the hose and the 2-P connector(s) from the washer motor(s).
3. Remove the washer motor(s) from the washer reservoir.



Washer Replacement

1. Remove the inner fender and the front bumper.
2. Remove the washer filler neck.
3. Disconnect the hose and the 2-P connector(s) from the washer motor(s).
4. Remove the washer reservoir by removing the mounting bolts.
5. Remove the washer motor from the washer reservoir.
6. Remove the washer nozzles and washer hose.

NOTE:
- Take care not to pinch the hoses during reinstallation.
- Install the grommets firmly.
- After installation, adjust the aim of the washer nozzles.



MOUNTING BOLTS
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

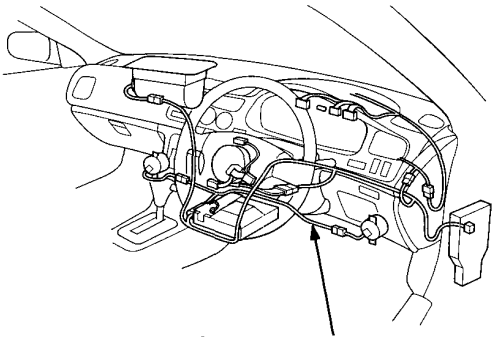
Cruise Control

Component Location Index

CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: RHD type is shown, LHD type is similar.

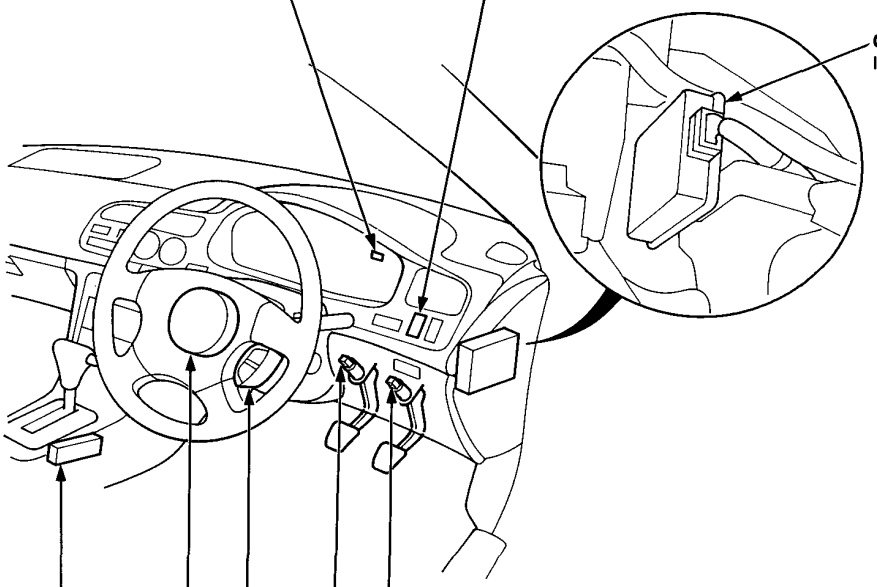


SRS MAIN HARNESS
(Covered with yellow insulation)

CRUISE INDICATOR LIGHT
(Built into gauge assembly)
Bulb Location, page 23-136

MAIN SWITCH
Test, page 23-303
Replacement, page 23-303

CRUISE CONTROL UNIT
Input Test, page 23-304



BRAKE SWITCH
Test, page 23-310

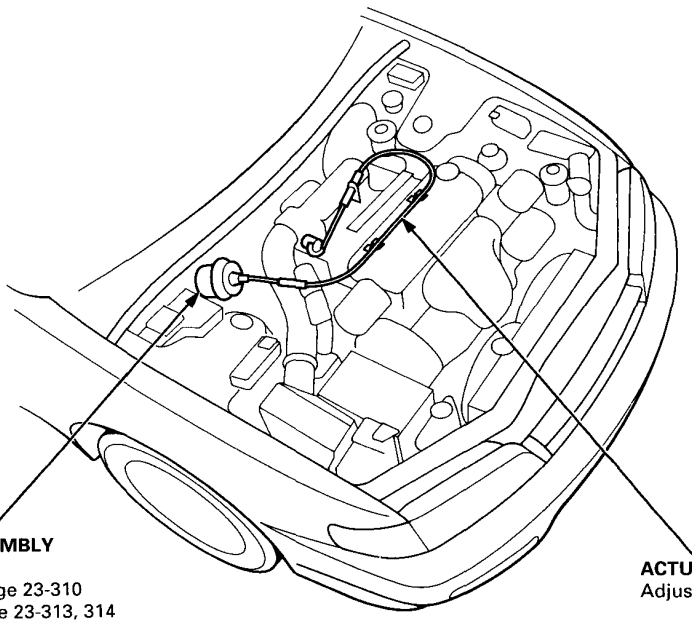
CLUTCH SWITCH (M/T)
Test, page 23-303

SET/RESUME SWITCH
Test, page 23-306
Replacement, page 23-307, 309

CABLE REEL
Test, page 23-306
SLIP RING
Test, page 23-308

A/T GEAR POSITION SWITCH
Test, page 23-168

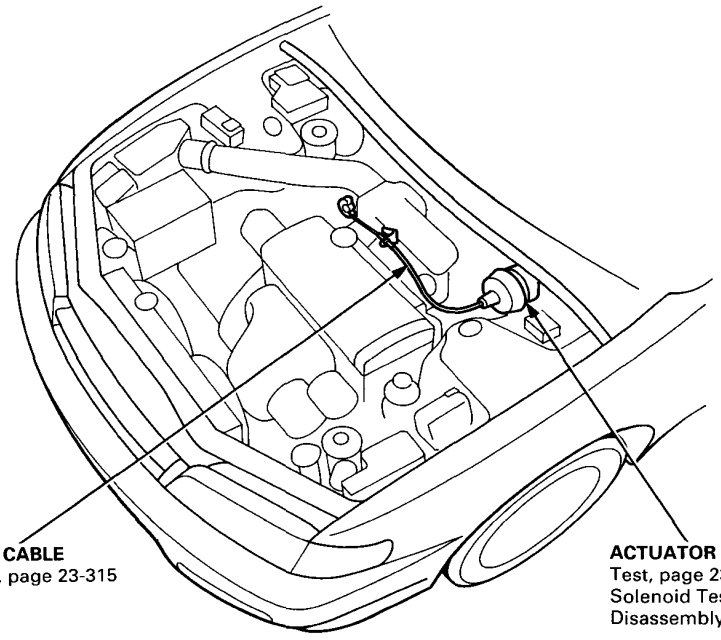
LHD type:



ACTUATOR ASSEMBLY
Test, page 23-311
Solenoid Test, page 23-310
Disassembly, page 23-313, 314

ACTUATOR CABLE
Adjustment, page 23-315

RHD type:

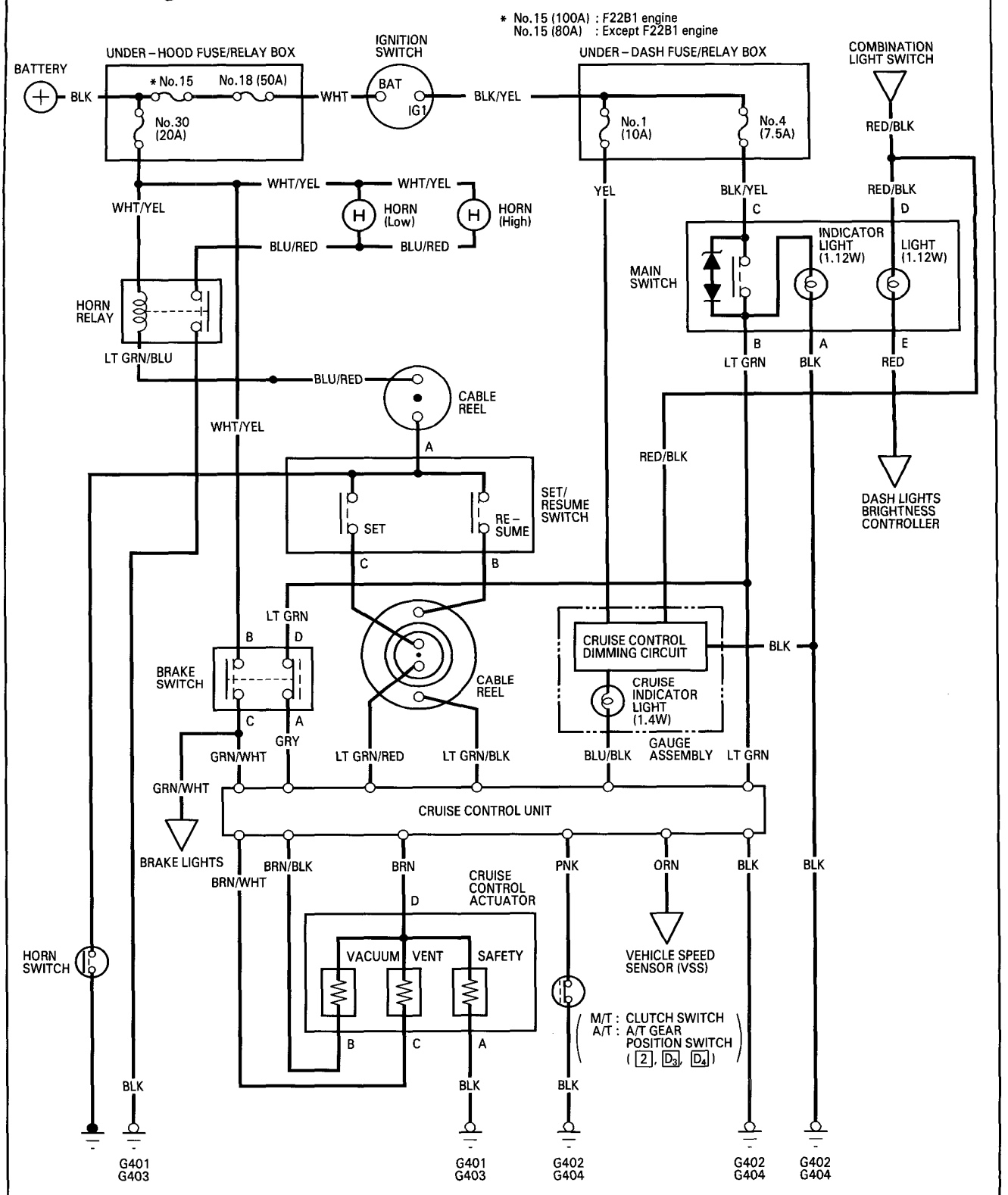


ACTUATOR CABLE
Adjustment, page 23-315

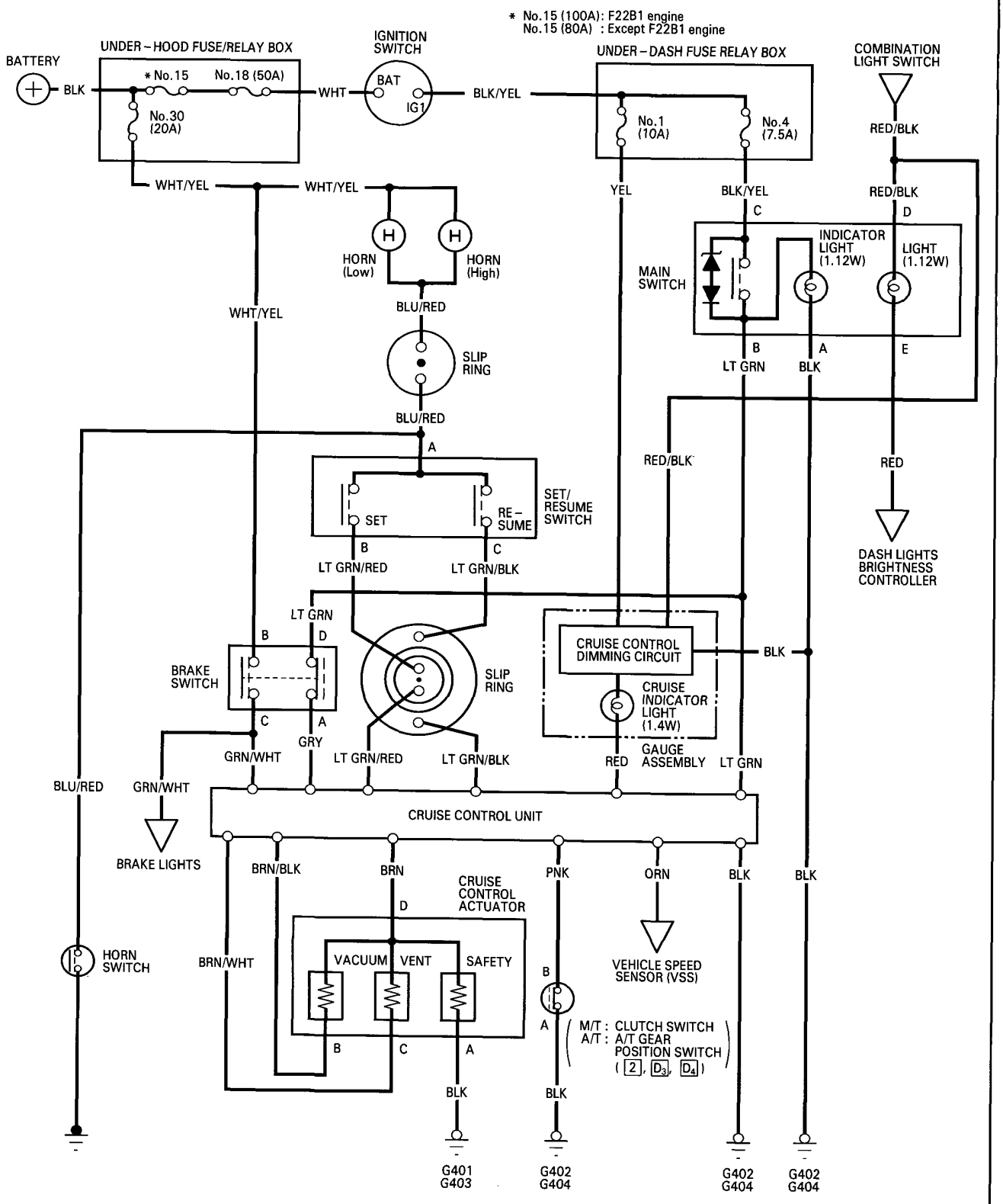
ACTUATOR ASSEMBLY
Test, page 23-311
Solenoid Test, page 23-310
Disassembly, page 23-313, 314

Cruise Control

Circuit Diagram (With SRS)



Circuit Diagram (Without SRS)



Cruise Control

Troubleshooting

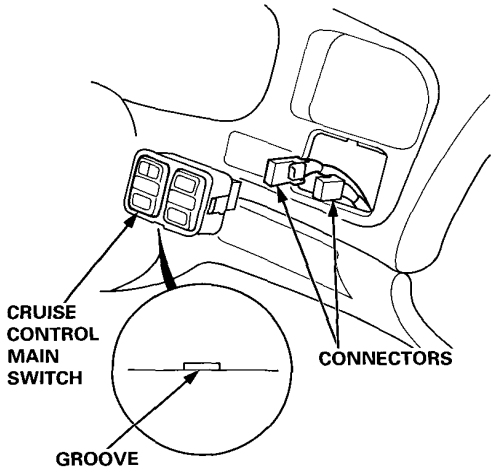
NOTE:
- The numbers in the table show the troubleshooting sequence.
- Before troubleshooting,
  - — check the No. 1 (10 A) and No.4 (7.5 A) fuses in the under-dash fuse/relay box, and the No. 30 (20 A) fuse in the under-hood fuse/relay box.
  - — check that the horn sounds.
  - — check the tachometer to see if it works properly.

Item to be inspected / Symptom	Main switch	SET/RESUME switch	Brake switch and mounting	Clutch switch and mounting (M/T)	A/T gear position switch (A/T)	Vehicle speed sensor (VSS)	Dimming circuit in gauges	Actuator and cable deflection	Control unit	Poor ground	Open circuit, loose or disconnected terminals
Cruise control cannot be set.	1	2	3	4					5	G402, G404	LT GRN/RED, LT GRN, GRY, ORN, BRN/WHT, BRN/BLK, BRN or PNK
Cruise control can be set, but indicator light does not go on.							1		2	G402, G404	YEL or BLU/BLK
Cruise speed is noticeably higher or lower than what was set.						1		2	3		
Excessive overshooting or undershooting when trying to set speed.						2		1	3		
Steady speed is not held even on a flat road with cruise control set.						1		2	3		
Car does not decelerate or accelerate accordingly when SET or RESUME button is pushed.		1							2		LT GRN/BLK LT GRN/RED
Set speed is not cancelled when clutch pedal is pushed (M/T).				1					2		PNK
Set speed is not cancelled when shift lever is moved to N (A/T).					1				2		PNK
Set speed is not cancelled when brake pedal is pushed.			1						2		GRN/WHT
Set speed is not cancelled when main switch is pushed OFF.	1								2		LT GRN
Set speed is not resumed when RESUME button is pushed (with main switch on, but set speed is temporarily cancelled).		1							2		LT GRN/BLK LT GRN/RED

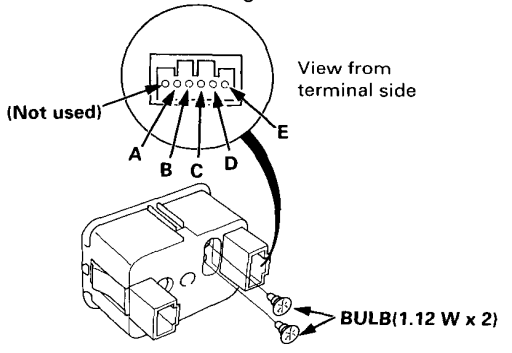
Main Switch Test/Replacement

NOTE: Be careful not to damage the switch and the instrument panel.

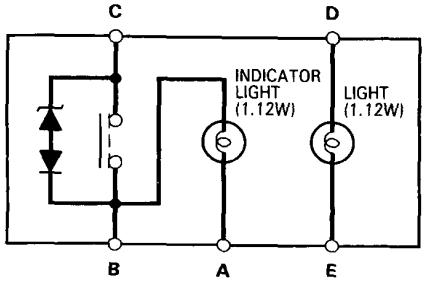
1. Carefully pry the switches out of the instrument panel, and disconnect the connectors.



2. Check for continuity between the terminals in each switch position according to the table.



Terminal / Position	A		B	C	D		E
OFF	○	○	○		○	○	○
ON	○	○	○	○	○	○	○

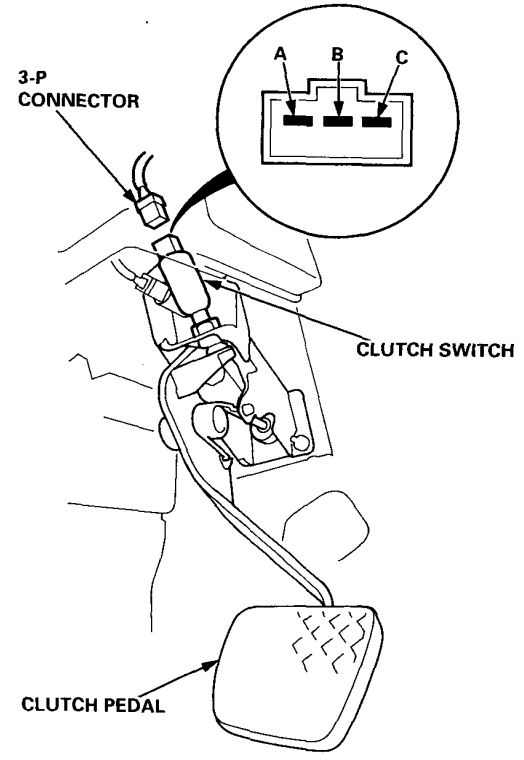


- If there is no continuity, replace the switch.

Clutch Switch Test (M/T)

1. Disconnect the 3-P connector from the clutch switch.
2. Check for continuity between the terminals according to the table.

Terminal / Clutch Pedal	B	C
PUSHED		
RELEASED	○	○



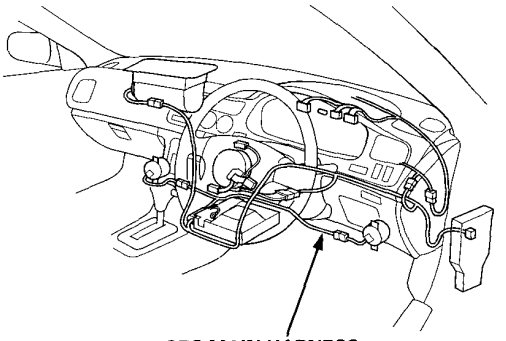
3. If necessary, replace the switch or adjust pedal height (see section 12).

Control Unit Input Test

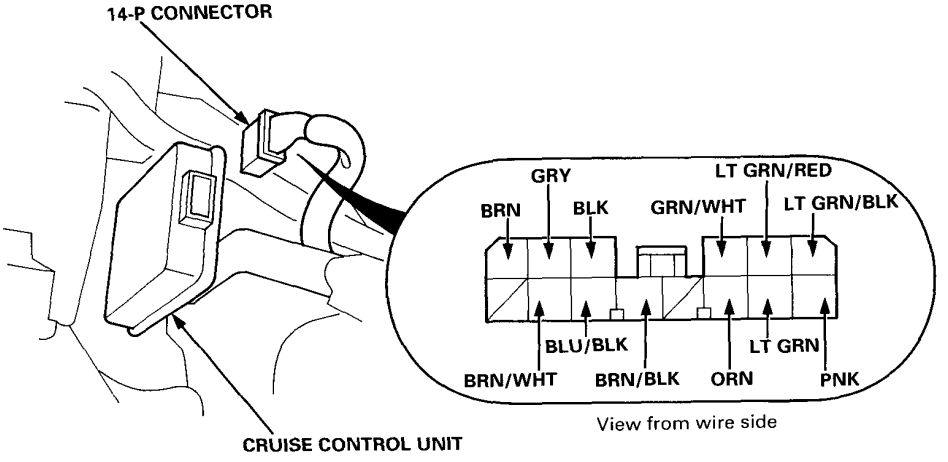
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**

NOTE: RHD type is shown, LHD type is similar.

1. Remove the dashboard lower cover and knee bolster (KH model).
2. Disconnect the 14-P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
   - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
   - If the terminals look OK, make the following input tests at the connector.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the control unit must be faulty; replace it.



SRS MAIN HARNESS
(Covered with yellow insulation)



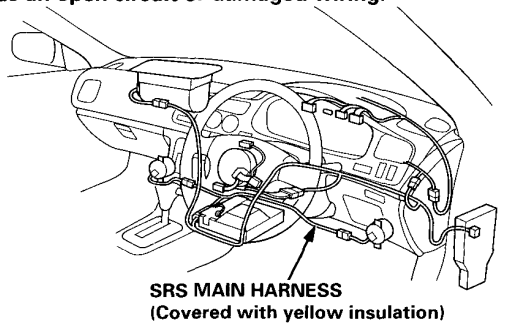
View from wire side



No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G402, G404) • An open in the wire
2	LT GRN	Ignition switch ON (II) and main switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 4 (7.5 A) fuse in the under-dash fuse/relay box • Faulty main switch • An open in the wire
3	LT GRN/ BLK	Resume button pushed	Check for voltage to ground: There should be battery voltage.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty set/resume switch • Faulty cable reel • An open in the wire
4	LT GRN/ RED	Set button pushed		
5	PNK	M/T: Clutch pedal released A/T: Shift lever in 2, D3 or D4	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity when the clutch pedal is depressed or when the shift lever is in other positions.	• Faulty or misadjusted clutch switch (M/T) • Faulty A/T gear position switch • Poor ground (G402, G404) • An open in the wire
6	ORN	Ignition switch ON (II) and main switch ON; raise the front of the car, and rotate one wheel slowly.	Check for voltage between the ORN ⊕ and BLK ⊖ terminals: There should be 0 – 5 V or more –0 – 5 V or more repeatedly.	• Faulty vehicle speed sensor (VSS) • An open in the wire
7	GRY	Ignition switch ON (II), main switch ON and brake pedal pushed, then released	Check for voltage to ground: There should be 0 V with the pedal pushed and battery voltage with the pedal released.	• Faulty brake switch • An open in the wire
8	GRN/WHT	Brake pedal pushed, then released	Check for voltage to ground: There should be battery voltage with the pedal pushed, and 0 V with the pedal released.	• Blown No. 30 (20 A) fuse in the under-hood fuse/relay box • Faulty brake switch • An open in the wire
9	BLU/BLK	Ignition switch ON (II)	Attach to ground: Cruise indicator light in the gauge assembly comes on.	• Blown bulb • Blown No. 1 (10 A) fuse in the under-dash fuse/relay box • Faulty dimming circuit in the gauge assembly • An open in the wire
10	BRN/WHT	Under all conditions	Check for resistance to ground: There should be 80 – 120 Ω.	• Faulty actuator solenoid • An open in the wire
11	BRN/BLK	Under all conditions	Check for resistance to ground: There should be 70 – 110 Ω.	
12	BRN	Under all conditions	Check for resistance to ground: There should be 40 – 60 Ω.	

Set/Resume Switch Test (With SRS)

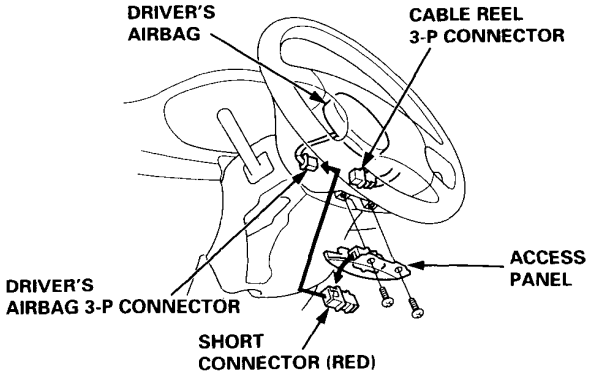
CAUTION:
- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **Before disconnecting any part of the SRS wire harness, connect the short connectors.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**



1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Connect the short connectors (RED) to the airbag side of the connectors.

Driver's Side:

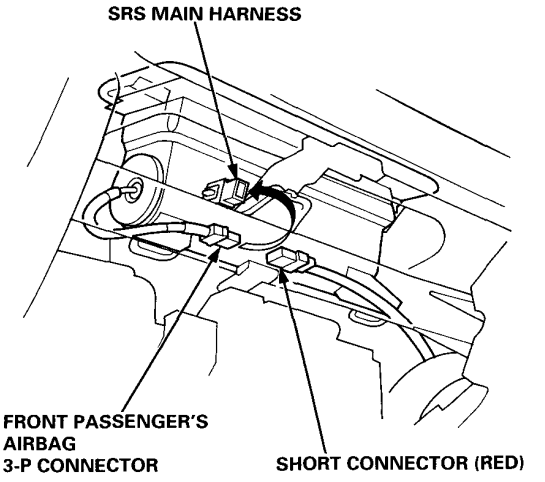
- Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.
- Disconnect the 3-P connector between the driver's airbag and cable reel, then connect the short connector (RED) to the airbag side of the connector.



Front Passenger's Side:

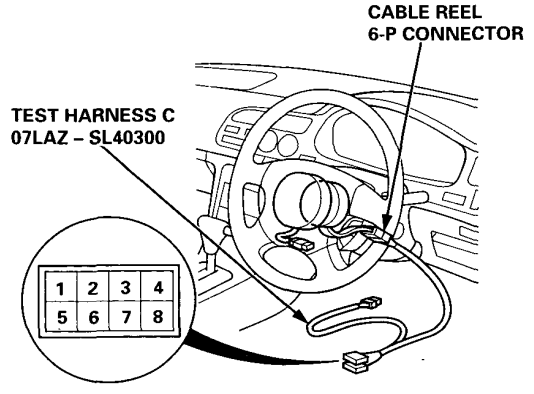
- Remove the glove box.
  NOTE: Before removing the glove box, remove the glove box damper (see section 20).

- Disconnect the front passenger's airbag 3-P connector from the SRS main harness, and connect the short connecter (RED) to the front passenger's airbag 3-P connector.



3. Remove the dashboard lower cover and knee bolster (KH model).

4. Disconnect the cable reel 6-P connector from the SRS main harness, then connect Test Harness C only to the cable reel side of the 6-P connector.

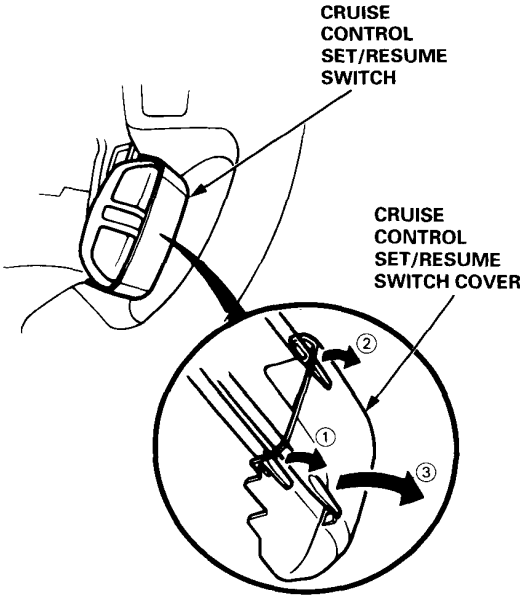


5. Check for continuity between the terminals of Test Harness C in each switch position according to the table.

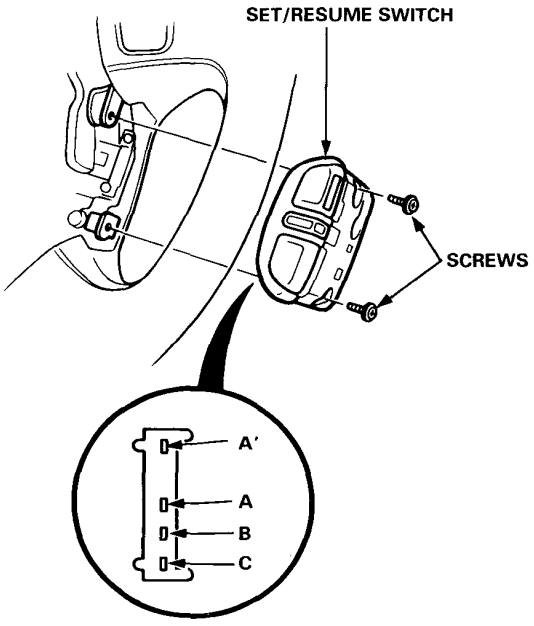
Position \ Terminal	3	2	1
SET (ON)	○	○	
RESUME (ON)	○		○

- If there is continuity, and it matches the table, the switch is OK.
- If there is no continuity in one or both positions, go to step 6.

6. Carefully remove the cruise control set/resume switch cover by prying between the cover and the switch in the sequence shown.



7. Remove the two screws and cruise control set/resume switch.



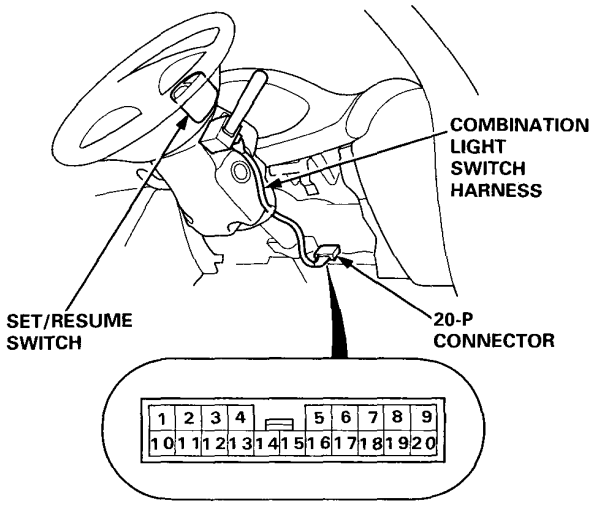
8. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	A	A'	B	C
OFF	○	○		
SET (ON)	○	○		○
RESUME (ON)	○	○	○	

- If there is no continuity in one or both positions, replace the switch.
- If there is continuity and it matches the table, replace the cable reel.

Set/Resume Switch Test (Without SRS)

1. Remove the dashboard lower cover.
2. Disconnect the combination light switch 20-P connector from the main wire harness.



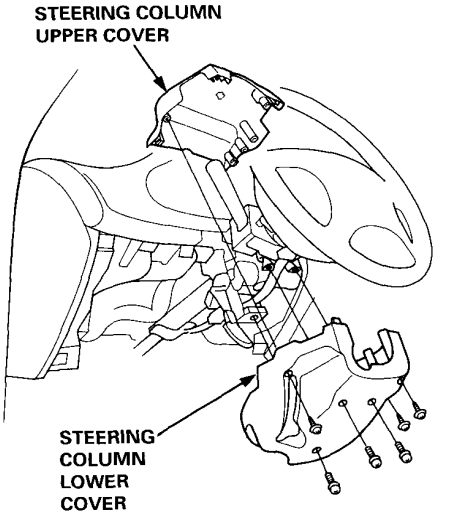
View from wire side

3. Check for continuity between the terminals in each switch position according to the table.

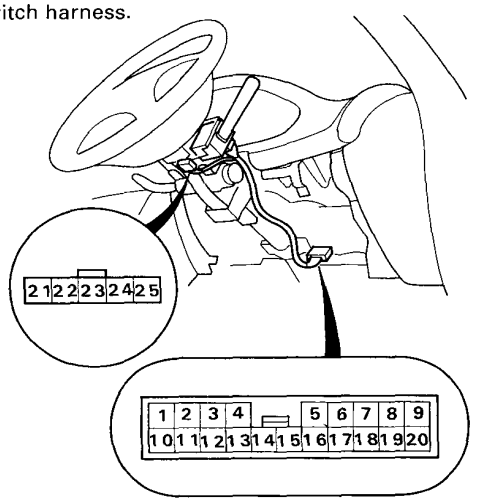
Position \ Terminal	1	2	3	4
SET (ON)		○	○	
RESUME (ON)	○		○	

- If there is continuity, the switch is OK.
- If there is no continuity in any position, go to step 4.

4. Remove the steering column upper and lower covers.



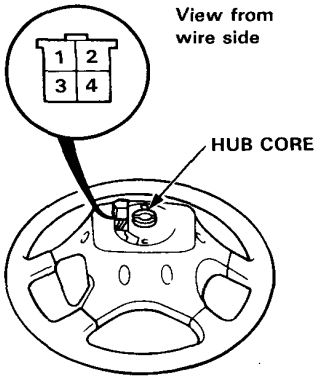
5. Disconnect the 5-P connector from the slip ring.
6. Check for continuity between the terminals of the switch harness.



Switch harness \ Terminal	4	13	16	21	22	25
LT GRN/BLK	○			○		
LT GRN/RED	○				○	
BLU/RED			○			○

- If there is no continuity in any position, replace the switch harness.
- If there is continuity, go to step 8.

7. Remove the steering wheel, then turn it over.



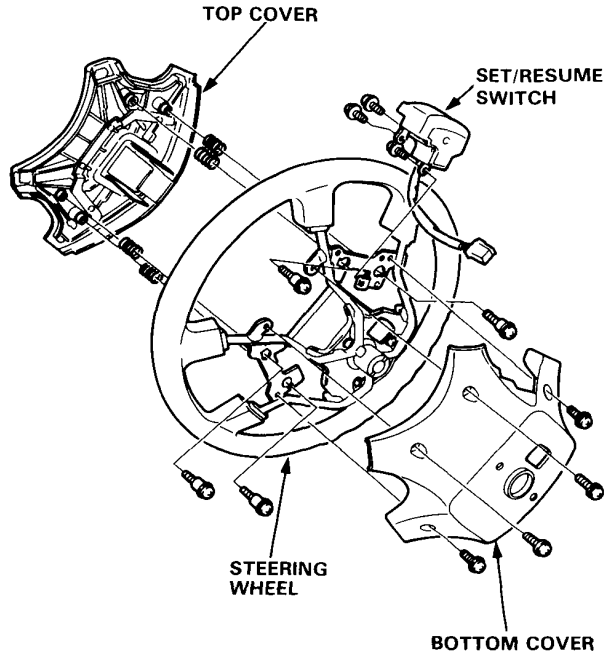
8. Check for continuity between the terminals in each switch position at the slip ring side according to the table.

Terminal / Position	1	2	3	4
SET (ON)			○——	——○
RESUME (ON)		○——	——○	

- If there is continuity, check the slip ring.
- If there is no continuity, replace the set/resume switch.

Set/Resume Switch Replacement (Without SRS)

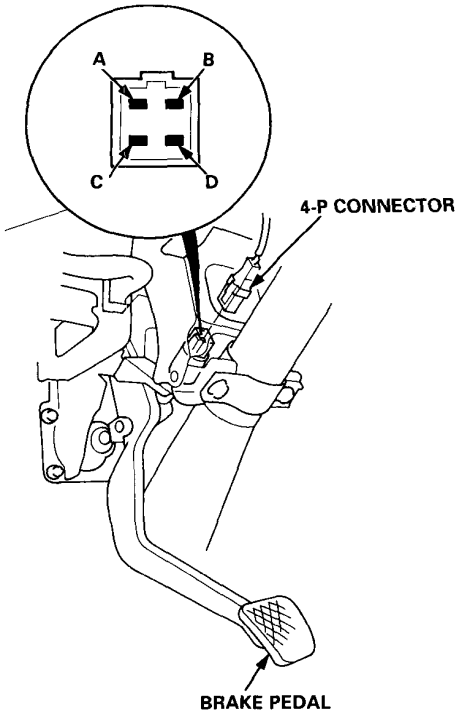
1. Remove the steering wheel.
2. Remove the covers.
3. Remove the three screws and the set/resume switch from the steering wheel.



Cruise Control

Brake Switch Test

1. Disconnect the 4-P connector from the switch.



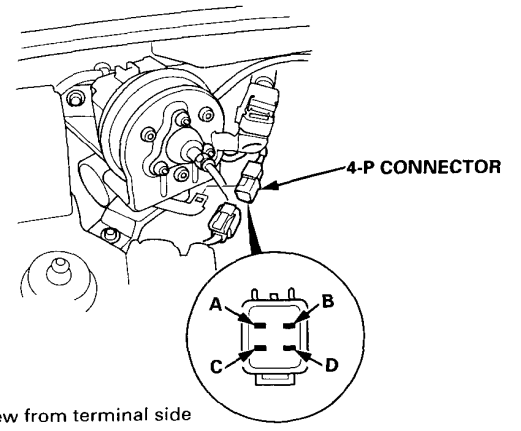
2. Check for continuity between the terminals according to the table.

Terminal / Brake Pedal	A	B	C	D
PUSHED		○	○	
RELEASED	○			○

3. If necessary, replace the switch or adjust pedal height (see section 19).

Actuator Solenoid Test

1. Disconnect the 4-P connector from the actuator.

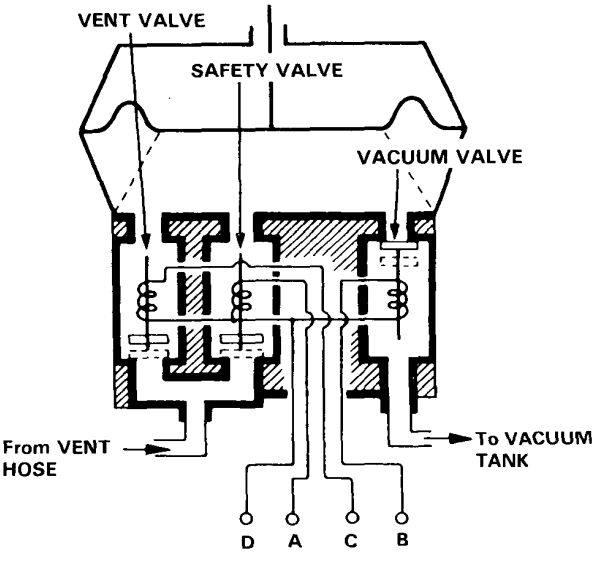


View from terminal side

2. Check for resistance between the terminals according to the table.

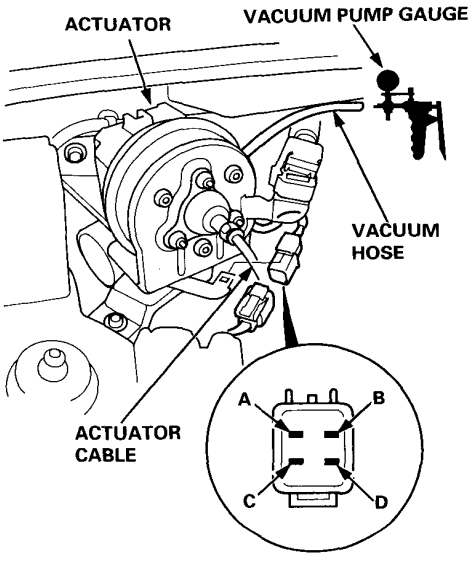
Terminal / Resistance (Ω)	A	B	C	D
VENT SOLENOID 40 – 60Ω			○	○
VACUUM SOLENOID 30 – 50Ω		○		○
SAFETY SOLENOID 40 – 60Ω	○			○

NOTE: Resistance will vary slightly with temperature; specified resistance is at 20°C (70°F).



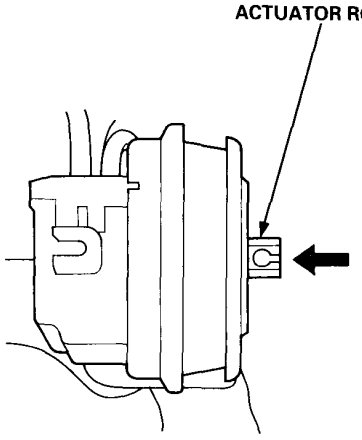
Actuator Test

1. Disconnect the actuator cable from the actuator rod, and disconnect the 4-P connector.
2. Connect battery power to the D terminal and ground to the A, B, and C terminals.
3. Connect a vacuum pump. Then apply vacuum to the actuator.

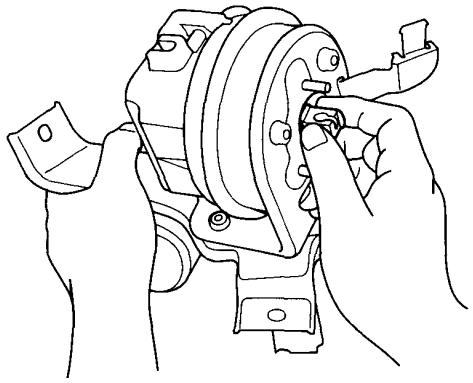


View from terminal side

4. The actuator rod should pull in completely. If the rod pulls in only part-way or not at all, check for a leaking vacuum line or defective solenoid.



5. With voltage and vacuum still applied, try to pull the actuator rod out by hand. You should not be able to pull it out. If you can, it is defective.

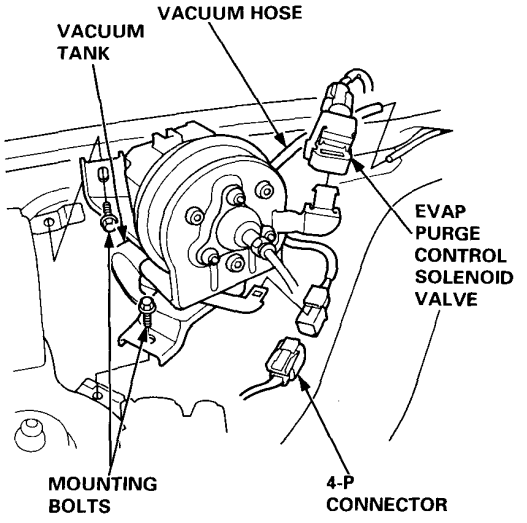


6. Disconnect ground from the C terminal. The actuator rod should return. If it does not return, but the vent hose and filter are not plugged, the solenoid valve assembly is defective.
7. Repeat steps 2 through 5, and disconnect ground from the A terminal. The actuator rod should return. If it does not return, but the vent hose and filter are not plugged, the solenoid valve assembly is defective.
8. If you replace the solenoid valve assembly, be sure to use new O-rings on each solenoid.

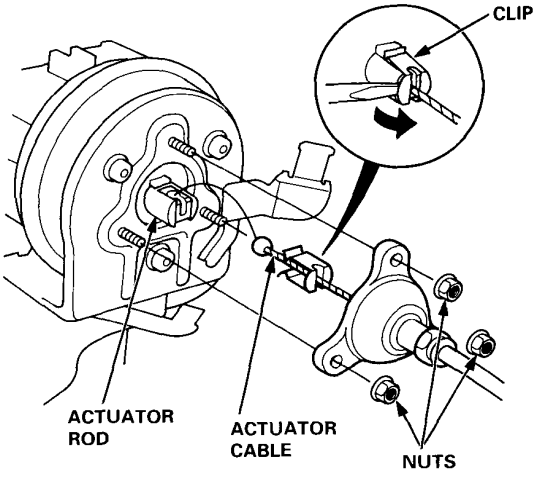
Actuator/Cable Replacement

1. Disconnect the 4-P connector from the actuator.
2. Remove the two mounting bolts and the actuator with the bracket.

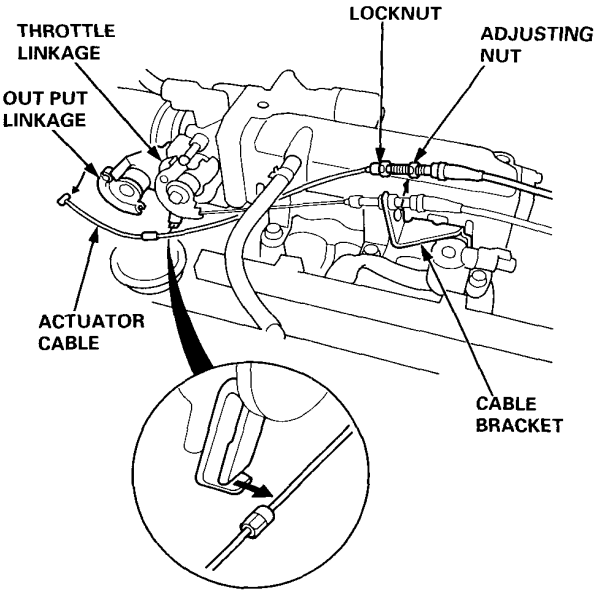
   NOTE: LHD type is shown. RHD type is similar.



3. Remove the EVAP purge control solenoid valve from the actuator bracket (LHD type).
4. Remove the vacuum hose.
5. Remove the three nuts.
6. Disconnect the actuator cable from the actuator rod by releasing the clip from the rod with a screwdriver as shown.

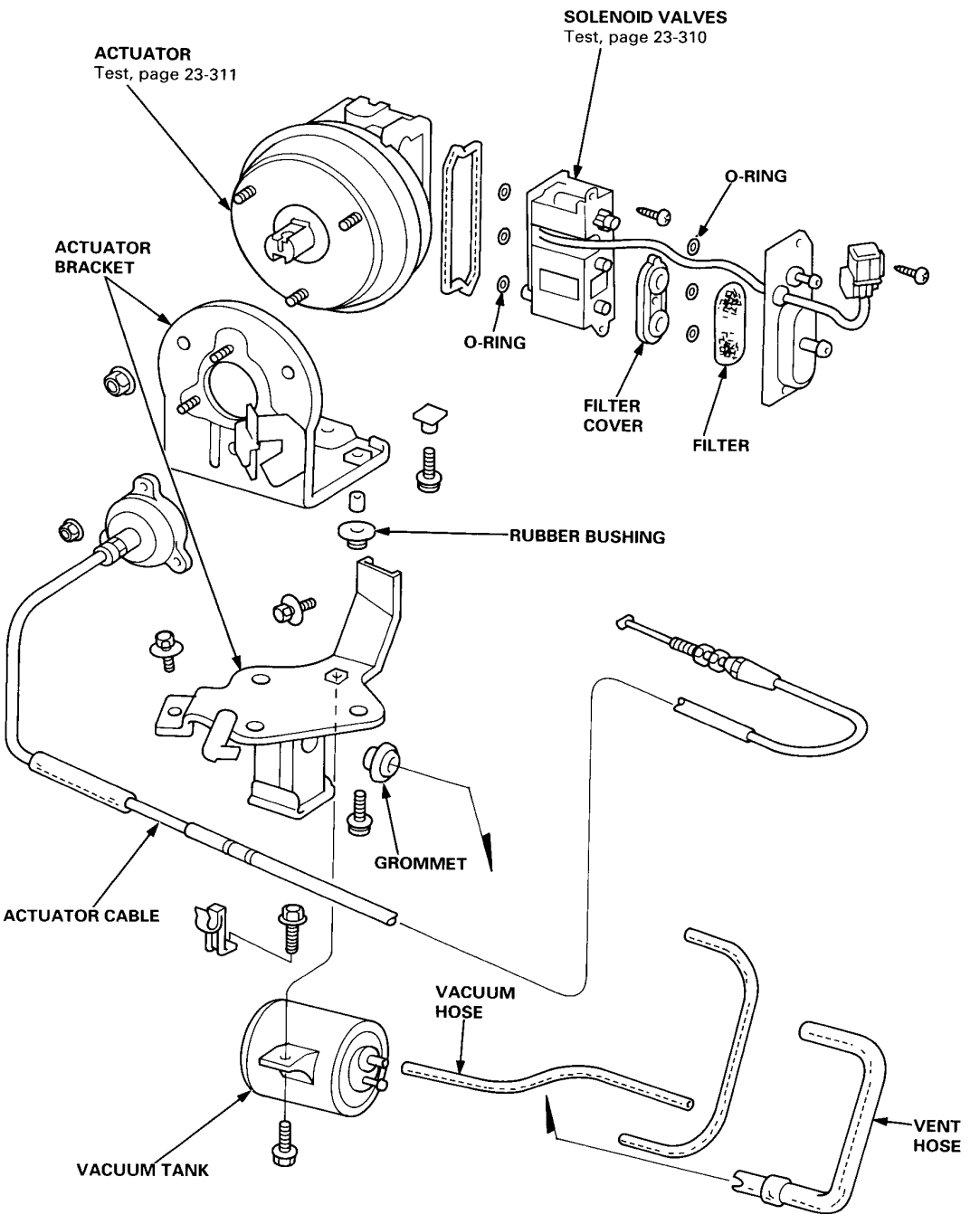


7. Loosen the locknut, then disconnect the actuator cable from the throttle linkage.

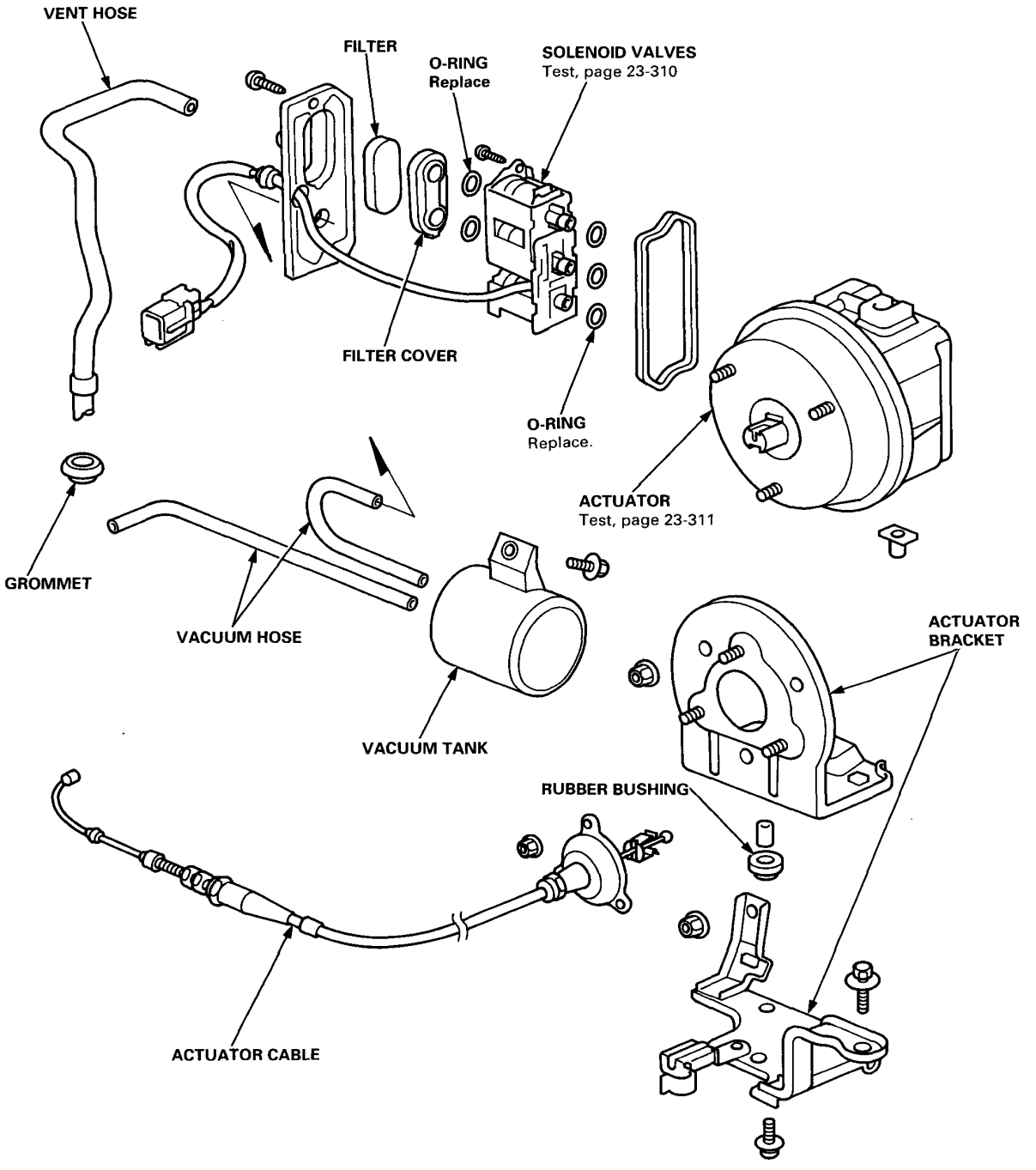


8. Install in the reverse order of removal, and adjust free play at the throttle linkage after connecting the actuator cable.

Actuator Disassembly (LHD type)



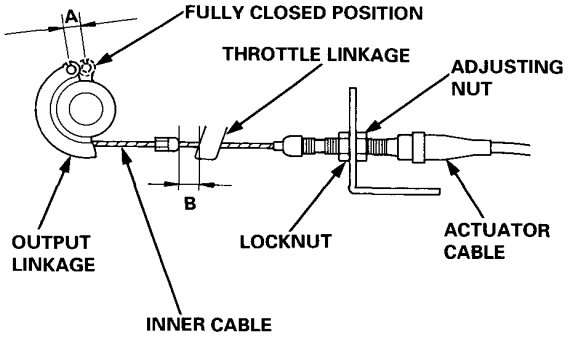
Actuator Disassembly (RHD type)



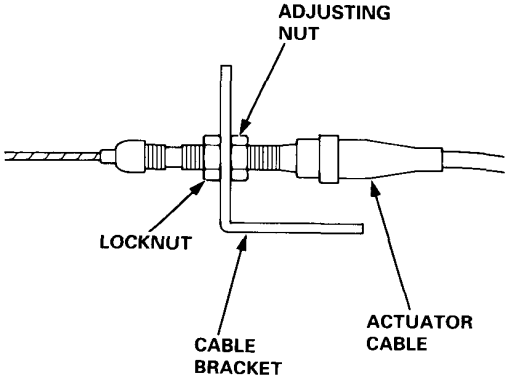
Actuator Cable Adjustment

1. Check that the actuator cable moves smoothly with no binding or sticking.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.
3. Measure the amount of movement of the output linkage and the inner cable until the engine speed starts to increase. At first, the output linkage should be turned to the fully closed position. Free play at A and B should be 5 ± 0.5 mm (0.20 ± 0.02 in).

FREE PLAY (A, B): 5 ± 0.5 mm (0.20 ± 0.02 in)

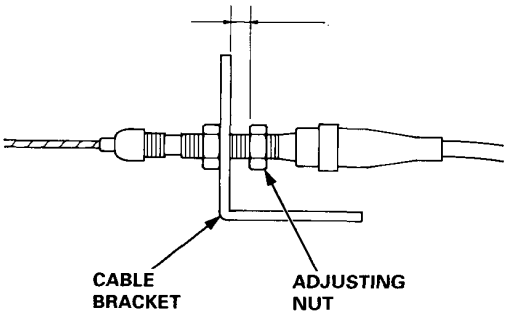


4. If the free play is not within specs, move the cable to the point where the engine speed starts to increase, and tighten the locknut and adjusting nut.

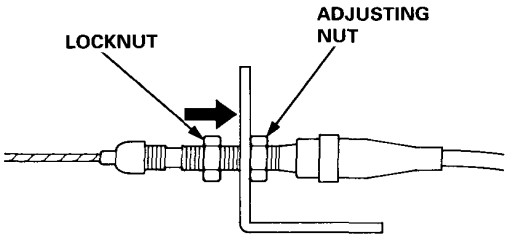


5. Turn the adjusting nut until it is 5 ± 0.5 mm (0.20 ± 0.02 in) away from the bracket.

5 ± 0.5 mm (0.02 ± 0.02 in)



6. Pull the cable so that the adjusting nut touches the bracket, and tighten the locknut.

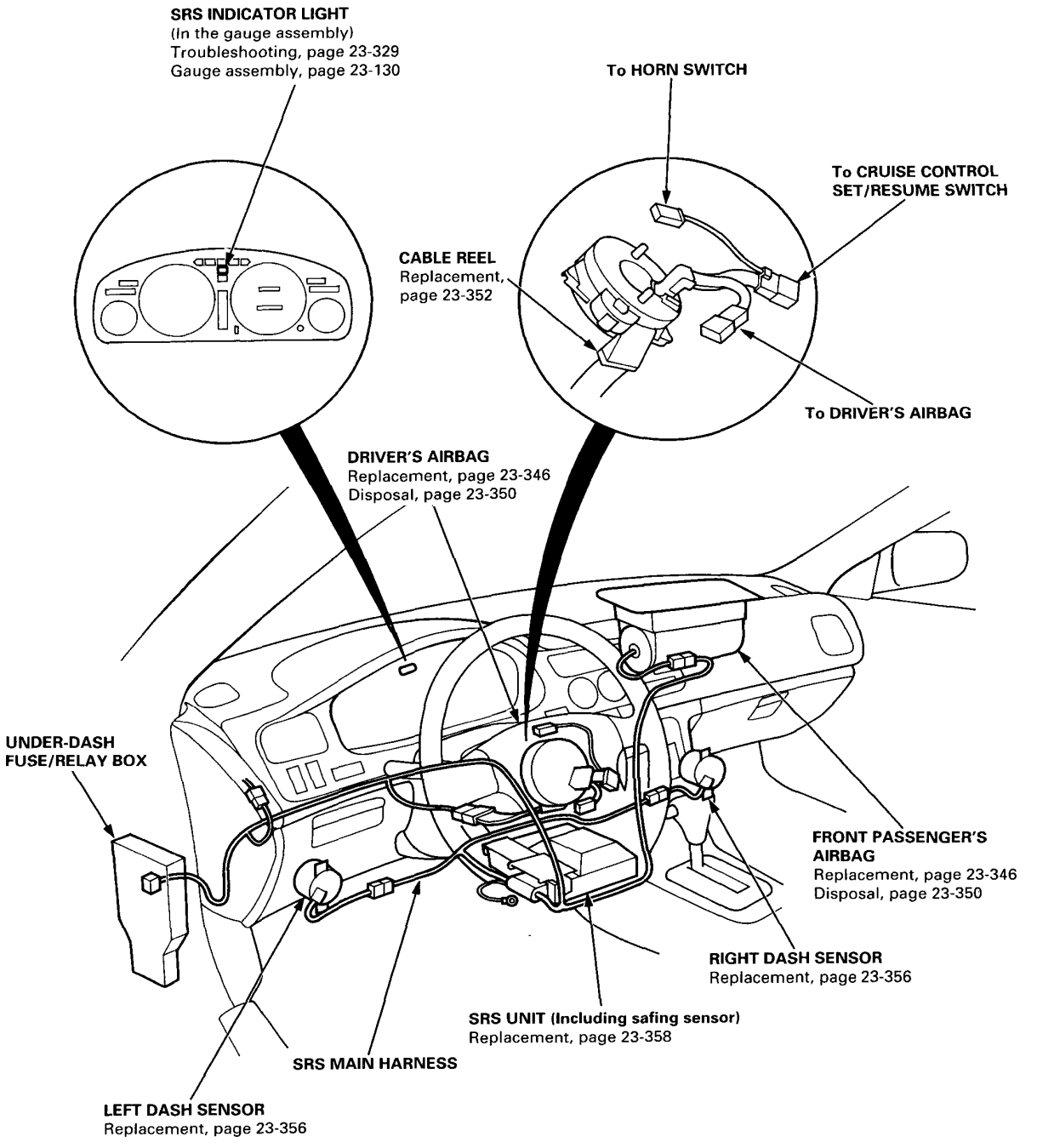


Supplemental Restraint System (SRS)

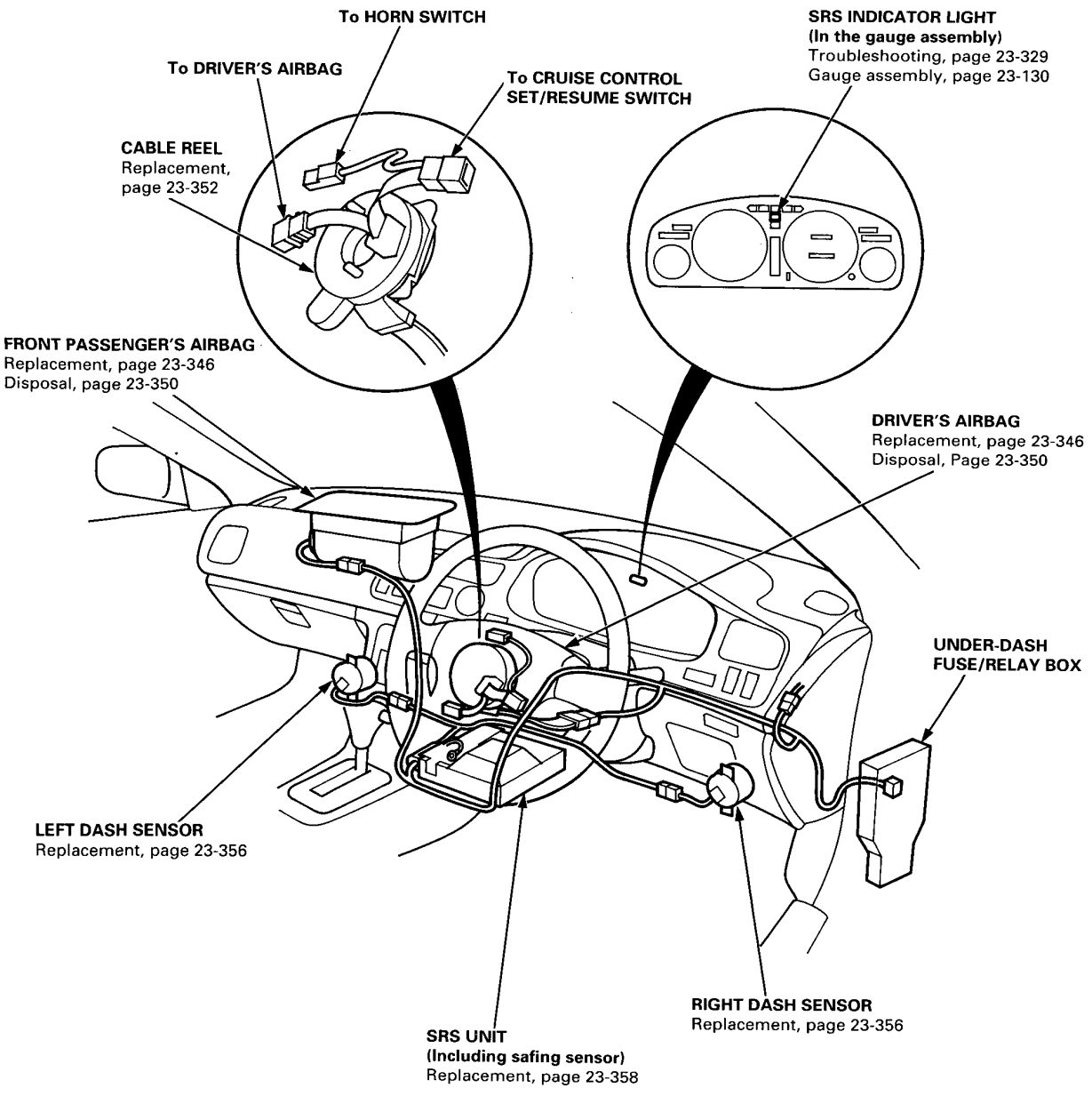
Component Location Index 23-318
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Circuit Diagram 23-321
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  Replacement 23-346
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  Replacement 23-352
Dash Sensor
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Supplemental Restraint System (SRS)

Component Location Index (LHD)



Component Location Index (RHD)

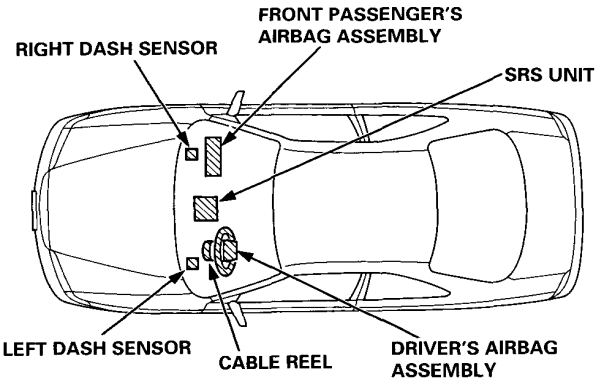


Supplemental Restraint System (SRS)

Description

The SRS is a safety device which, when used in conjunction with the seat belt, is designed to help protect the driver and front passenger in a frontal impact exceeding a certain set limit. The system consists of left and right dash sensors, the SRS unit (including safing sensor), the cable reel and driver's airbag, and a front passenger's airbag.

NOTE: The illustration shows LHD type. RHD type is symmetrical to LHD type.



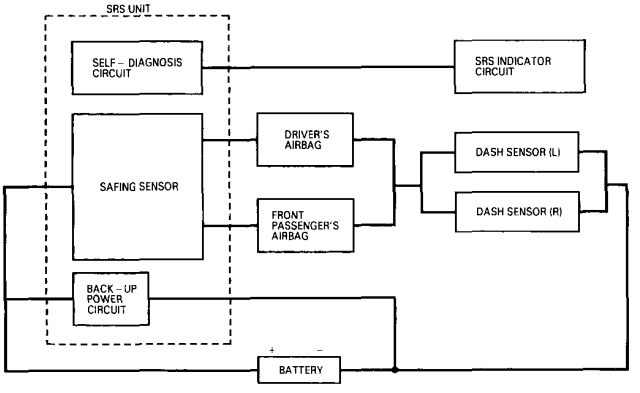
Operation

As shown in the diagram below, the left and right dash sensors are connected in parallel. The parallel set of sensors is connected in series to each airbag inflator circuit and the car battery. In addition, a back-up power circuit is connected in parallel with the car battery. The back-up power circuit and the safing sensor are located inside the SRS unit.

For the SRS to operate:

(1) One or both sets of safing sensor contacts must close, and one or both dash sensors must activate.
(2) Electrical energy must be supplied to the airbag inflators by the battery, or the back-up power circuit if the battery voltage is too low.
(3) The inflator charges must ignite and deploy the airbags.

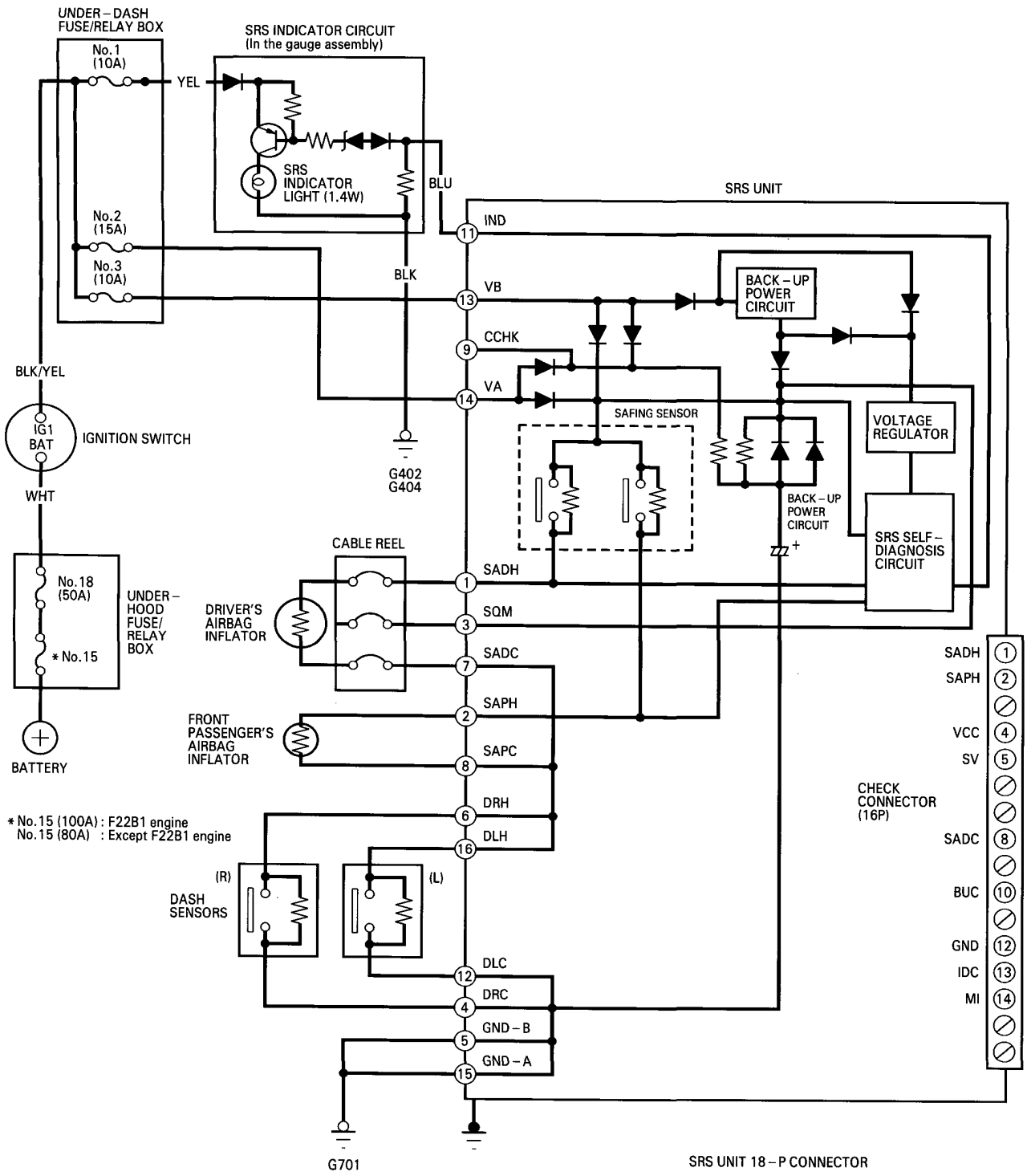
It takes about 0.1 second from the beginning of an airbag's deployment until it is completely deflated.



Self-diagnosis system

A self-diagnosis circuit is built into the SRS unit; when the ignition switch is turned ON (II), the SRS indicator light comes on and goes off after about six seconds if the system is operating normally. If the light does not come on, or does not go off after six seconds, or if it comes on while driving, it indicates an abnormality in the system. The system must be inspected and repaired as soon as possible.

Circuit Diagram

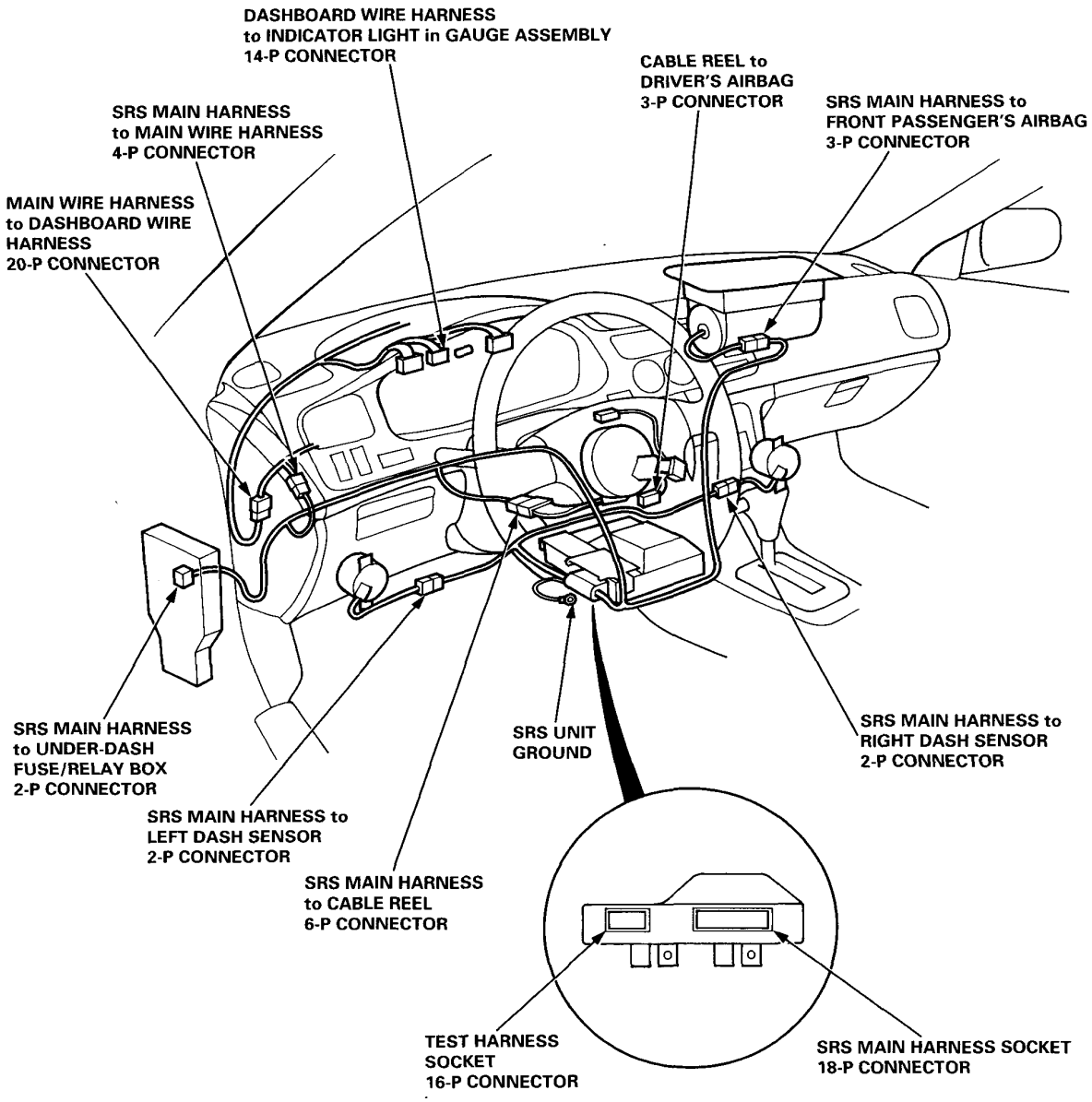


Supplemental Restraint System (SRS)

Wiring Locations (LHD)

CAUTION: Make sure all SRS ground locations are clean and grounds are securely attached.

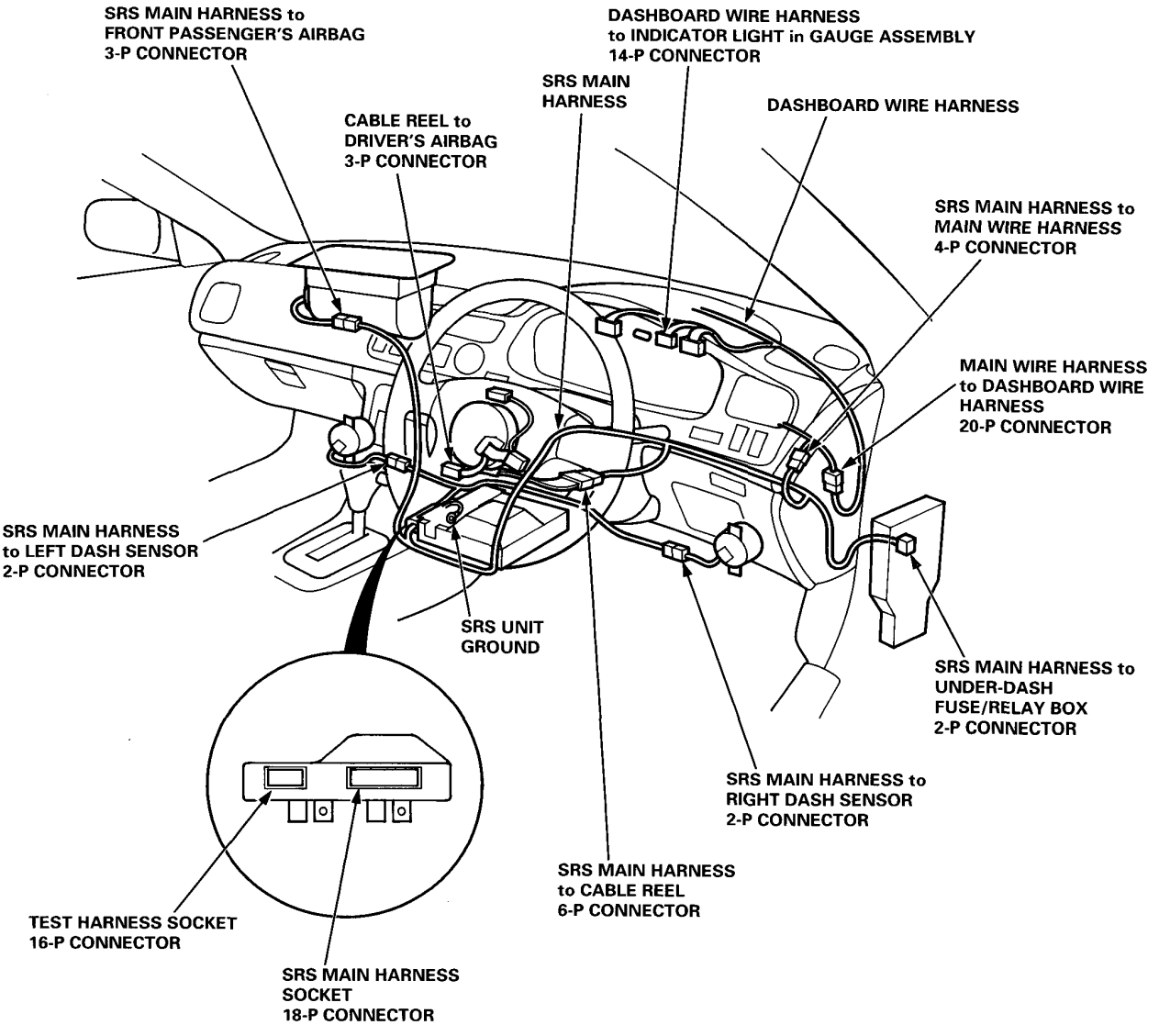
NOTE:
- All SRS electrical wiring harnesses are covered with yellow insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.



Wiring Locations (RHD)

CAUTION: Make sure all SRS ground locations are clean and grounds are securely attached.

NOTE:
- All SRS electrical wiring harnesses are covered with yellow insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.

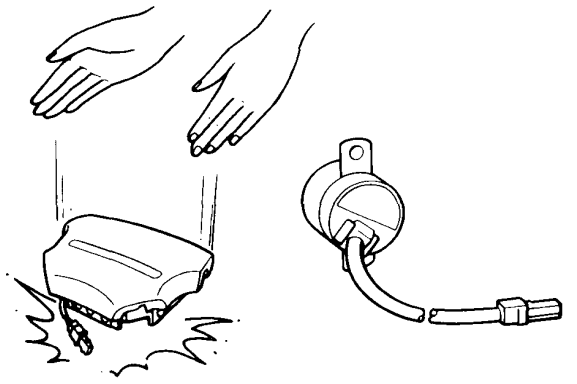


Supplemental Restraint System (SRS)

General Precautions

- Carefully inspect any SRS part before you install it. Do not install any part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation:

  — Airbag assemblies
  — Dash sensors
  — Cable reel
  — SRS unit



- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental deployment and possible injury.

- Do not install used SRS parts from another car. When making SRS repairs, use only new parts.

- Except when performing electrical inspections, always disconnect both the negative cable and positive cable from the battery before beginning work.

- Replacement of the combination light and wiper/washer switches and the cruise control switch can be done without removing the steering wheel:

  — Combination light and wiper/washer switch replacement (see page 23-191)
  — Cruise control set/resume switch replacement (see page 23-307)

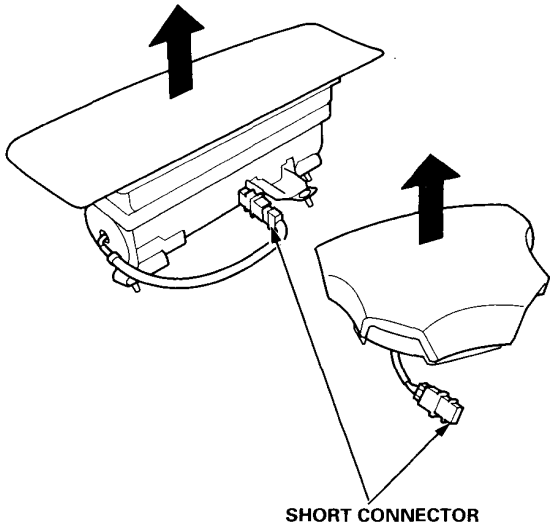
Airbag Handling and Storage

Do not try to disassemble the airbag assembly. It has no serviceable parts. Once an airbag has been operated (deployed), it cannot be repaired or reused.

For temporary storage of the airbag assembly during service, please observe the following precautions:

- Store the removed airbag assembly with the pad surface up.

⚠WARNING If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.



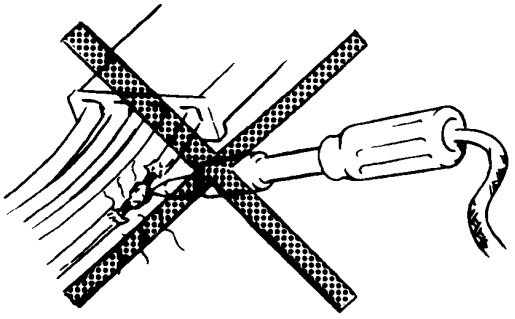
- Store the removed airbag assembly on a secure flat surface away from any high heat source (exceeding 100°C/212°F) and free of any oil, grease, detergent or water.

CAUTION: Improper handling or storage can internally damage the airbag assembly, making it inoperative. If you suspect the airbag assembly has been damaged, install a new unit, and refer to the Deployment/Disposal Procedures for disposing of the damaged airbag.

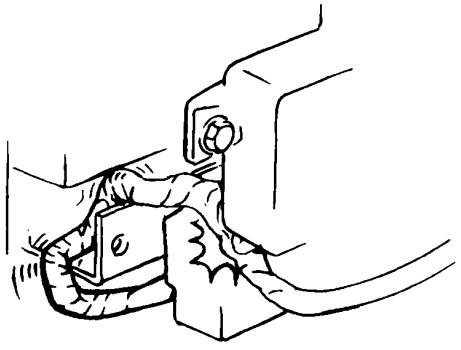
Wiring Precautions

- Never attempt to modify, splice or repair SRS wiring.

  NOTE: All SRS electrical wiring harnesses are covered with yellow insulation.



- Be sure to install the harness wires so that they are not pinched or interfering with other car parts.



- Make sure all SRS ground locations are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

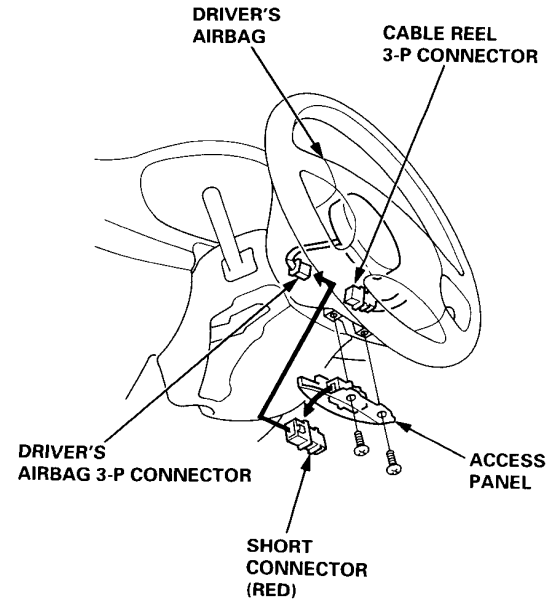
Connecting the Short Connectors

⚠ WARNING To avoid accidental deployment and possible injury, always connect the protective short connectors on the driver's (and passenger's airbag) connector(s) before working near any SRS wiring.

1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Connect the short connectors (RED):

Driver's Side:

- Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.



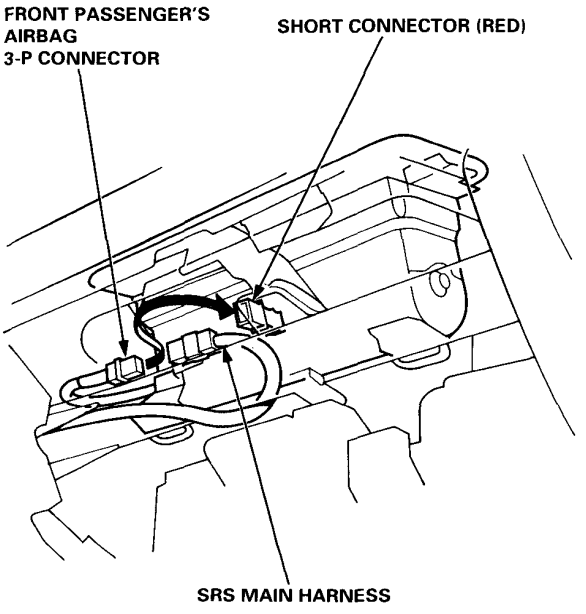
- Disconnect the 3-P connector between the driver's airbag and cable reel, then connect the short connector (RED) to the airbag side of the connector.

(cont'd)

Wiring Precautions (cont'd)

Front Passenger's Side:

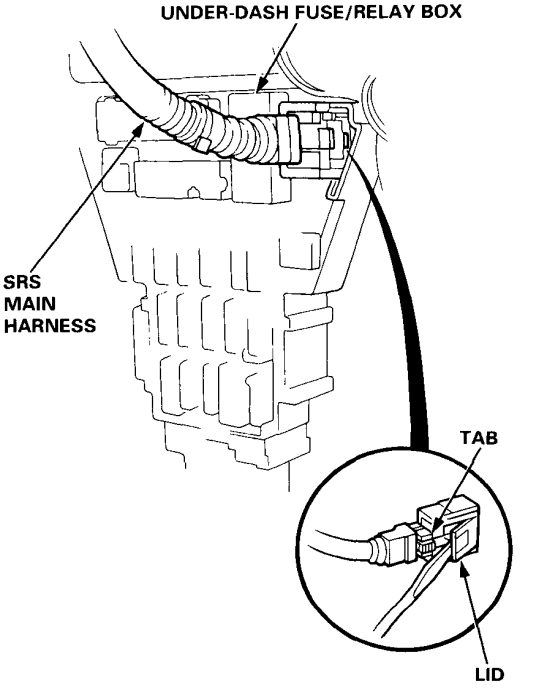
- Remove the glove box damper (see section 20), and then remove the glove box.
- Disconnect the 3-P connector between the front passenger's airbag and SRS main harness, then connect the short connector (RED) to the airbag side of the connector.



Disconnecting the SRS Connector from the Under-dash Fuse/Relay Box:

CAUTION: Avoid breaking the connector; it's double-locked.

1. First lift the connector lid with a thin screwdriver, then press the connector tab down and pull the connector out.

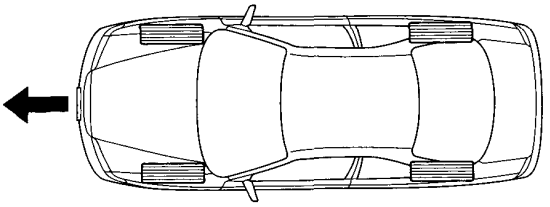


2. To reinstall the connector, push it into position until it clicks, then close its lid.

Steering-related Precautions

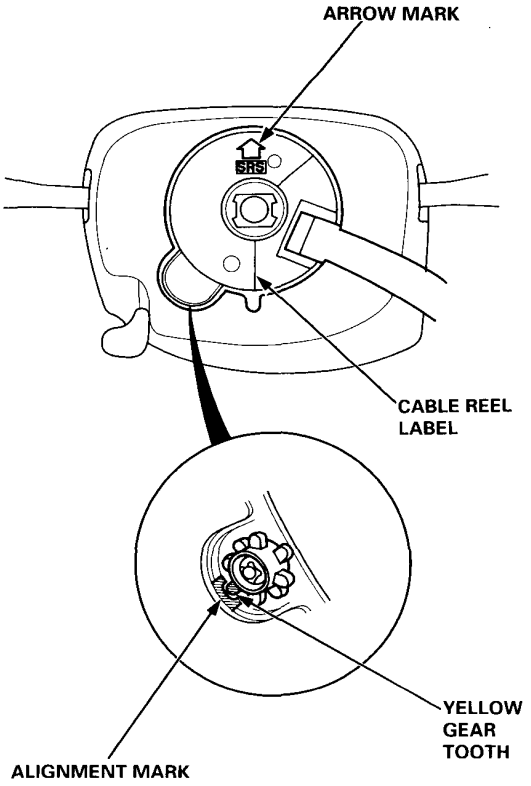
Steering Wheel and Cable Reel Alignment

NOTE: To avoid misalignment of the steering wheel or airbag on reassembly, make sure the wheels are turned straight ahead before removing the steering wheel.



Rotate the cable reel clockwise unit it stops.
Then rotate it counterclockwise (approximately two turns) until:

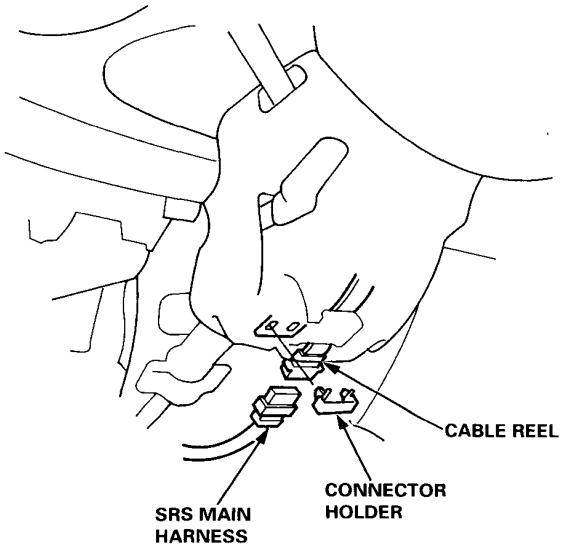
— The yellow gear tooth lines up with the alignment mark on the cover.
— The arrow mark on the cable reel label points straight up.



Steering Column Removal

CAUTION:

- **Before removing the steering column, first disconnect the connector between the cable reel and the SRS main harness.**
- **If the steering column is going to be removed without dismounting the steering wheel, lock the steering by turning the ignition key to 0-LOCK position or remove the key from the ignition so that the steering wheel will not turn.**



Do not replace the original steering wheel with any other design; it will make it impossible to properly install the airbag (use only genuine Honda replacement parts).

After reassembly, confirm that the wheels are still turned straight ahead and that the steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjustment of the tie-rods, not by removing and repositioning the steering wheel.

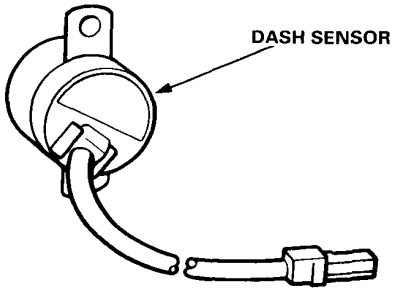
Sensor Inspection

CAUTION: Take extra care when painting or doing body work in the area below the dashboard. Avoid direct exposure of the sensors or wiring to heat guns, welding, or spraying equipment.

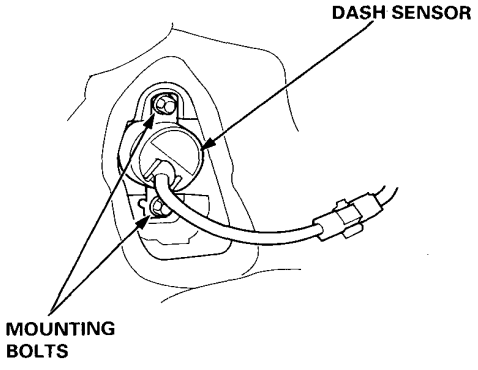
⚠ WARNING

- **Disconnect both the negative and positive battery cables.**
- **Connect the short connectors before working below the dashboard near the dash sensors.**

- After any degree of frontal body damage, inspect both dash sensors. Replace a sensor if it is dented, cracked, or deformed.



- Be sure the sensors are installed securely.



Inspection After Deployment

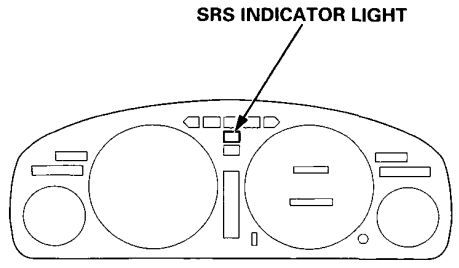
After a collision in which the airbags were deployed, inspect the following:

1. Inspect the dash sensors for physical damage. If the sensors are damaged, replace them.
2. Inspect all the SRS wire harnesses. Replace, don't repair, any damaged harnesses.
3. Inspect the cable reel for heat damage. If there is any damage, replace the cable reel.
4. After the car is completely repaired, turn the ignition switch ON (II). If the SRS indicator light comes on for about six seconds and then goes off, the SRS system is OK. If the indicator light does not function properly, go to SRS Troubleshooting.

Troubleshooting

Self-diagnosis Function

The SRS unit includes a self-diagnosis function. If there is a failure in the sensors, SRS unit, inflator, or their circuits, the SRS indicator light in the gauge assembly comes ON.



As a system check, the SRS indicator light also comes on when the ignition is first turned ON to the (II) position. If the light goes off after approximately six seconds, the system is OK.
If the SRS indicator light remains on (or fails to come on in the system check mode), one of the SRS components (or the wiring/connectors in-between) is faulty.

Troubleshooting Precautions

- Always use the test harness. Do not use test probes directly on component connector terminals or wires; you may damage them or the SRS unit.
- When connecting any of the test harnesses to the system, push the connectors straight-in; do not bend the connector terminals.
- Before disconnecting any part of the SRS wire harness, connect the short connectors (RED) to the driver's airbag (and the front passenger's airbag).

SRS Indicator Light Troubleshooting

Possible conditions:

1. SRS indicator light does not come on at all — see page 23-332.
2. SRS indicator light stays on constantly — see page 23-334.
3. SRS indicator light comes on in combination with a failure of another electrical system (charging system light). Check for damage/corrosion at the under-dash fuse/relay box connector.

NOTE:
- Before starting the applicable troubleshooting, check the condition of all SRS connectors and ground points.
- If the fault is not found after completing the applicable troubleshooting, substitute a known-good SRS unit, and check whether the indicator light goes off.

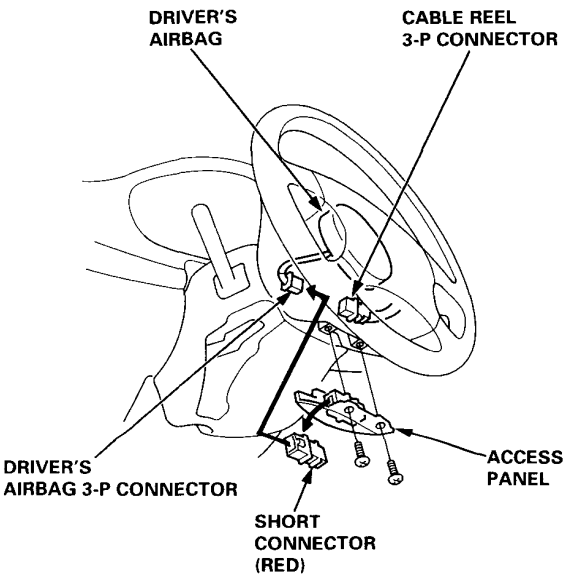
Connecting the Short Connectors

⚠ WARNING To avoid accidental deployment and possible injury, always connect the protective short connectors to the driver's airbag connector (and front passenger's airbag) before working near any SRS wiring.

1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Connect the short connectors (RED):

Driver's Side:

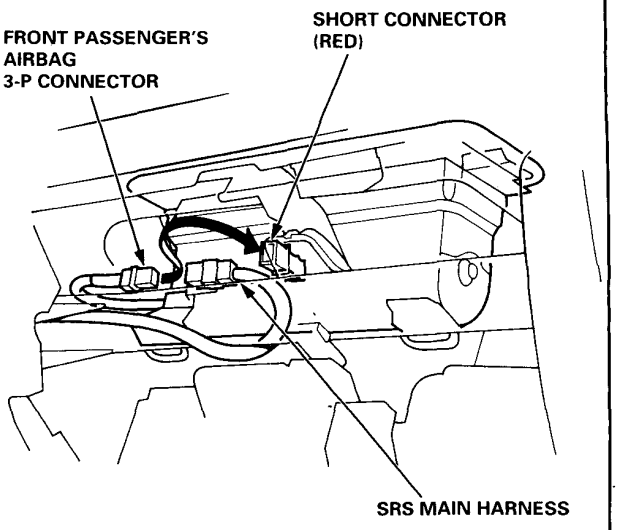
- Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.



- Disconnect the connector between the driver's airbag and the cable reel, then connect the short connector (RED) to the airbag side of the connector.

Front Passenger's Side:

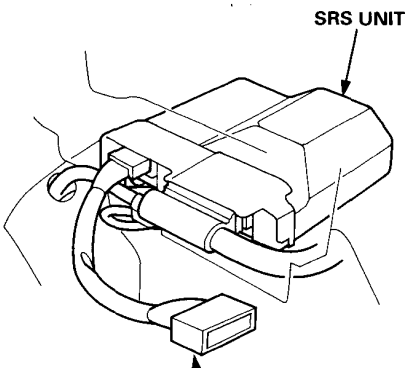
- Remove the glove box damper (see section 20), and then remove the glove box.



- Disconnect the connector between the front passenger's airbag and SRS main harness, then connect the short connector (RED) to the airbag side of the connector.

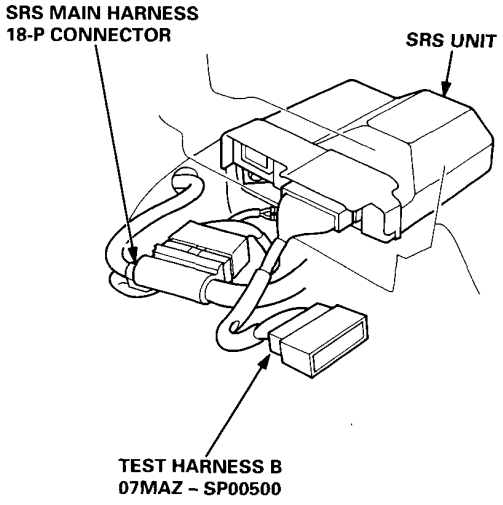
Test Harnesses and Attachment Points

Test Harness A



1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Test Harness B

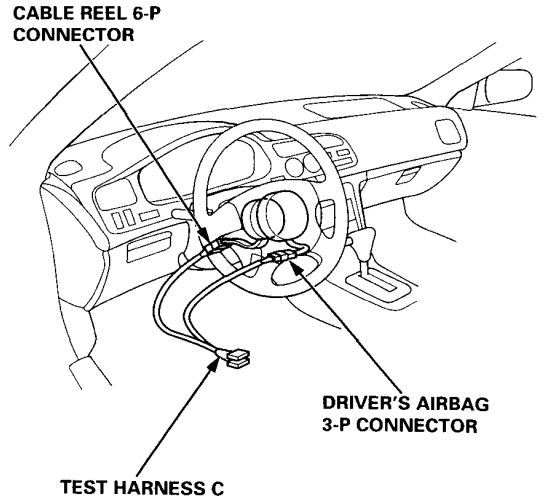


ROW A (SRS UNIT END)

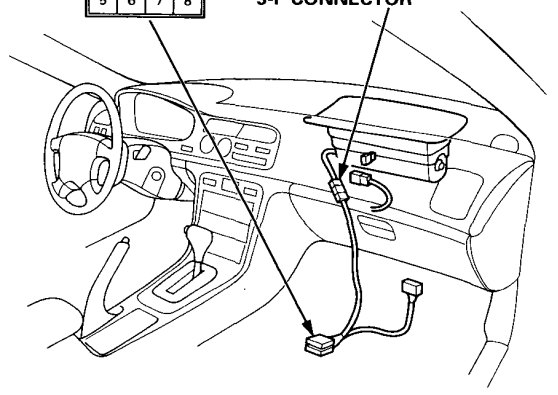
A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

ROW B (WIRE HARNESS END)

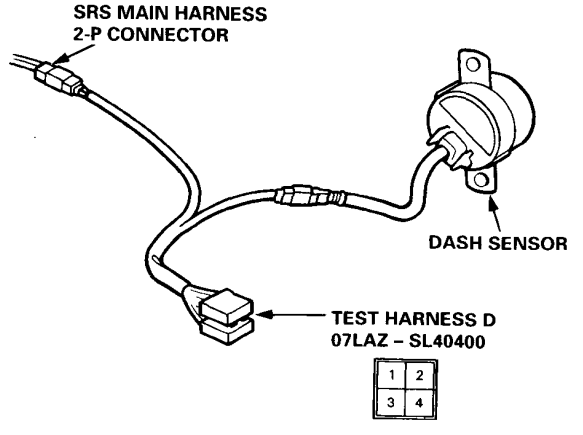
Test Harness C



1	2	3	4
5	6	7	8



Test Harness D



1	2
3	4

Troubleshooting

The SRS Indicator Does Not Light

CAUTION: Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental airbag deployment and possible injury.

Check the SRS indicator light and the No. 1 fuse:
1. Disconnect the battery negative cable, then disconnect the positive cable. Connect the short connectors to the airbags (see page 23-330).
2. Reconnect the battery positive cable, and then the negative cable.
3. Turn the ignition switch ON (II).

Does the charging system light come on (in the gauge assembly)?

YES

1. Inspect the No. 1 (10 A) fuse (in the under-dash fuse/relay box).

Is No. 1 fuse OK ?

YES

Repair open in dashboard wire harness between the No. 1 fuse and gauge assembly.

NO

Replace the fuse.

NO

Check the SRS unit and SRS indicator light:
1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 18-P connector from the SRS unit.
3. Turn the ignition switch ON (II).

Does the SRS indicator light come on?

YES

Faulty SRS unit; replace the SRS unit.

NO

Check the SRS indicator light and SRS main harness:
1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 4-P connector from the main wire harness.
3. Turn the ignition switch ON (II).

Does the SRS indicator light come on?

YES

Faulty SRS main harness; replace the SRS main harness.

NO

Check the SRS indicator light bulb and dashboard wire harness:
1. Turn the ignition switch OFF.
2. Remove the gauge assembly, then inspect the SRS indicator light bulb.

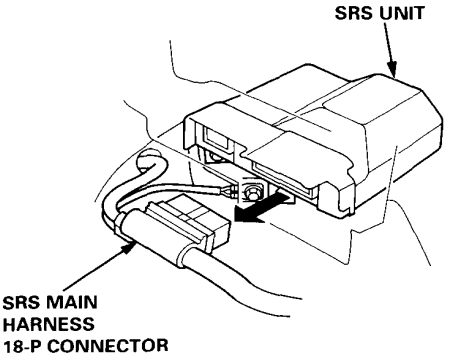
Is the SRS indicator light bulb OK?

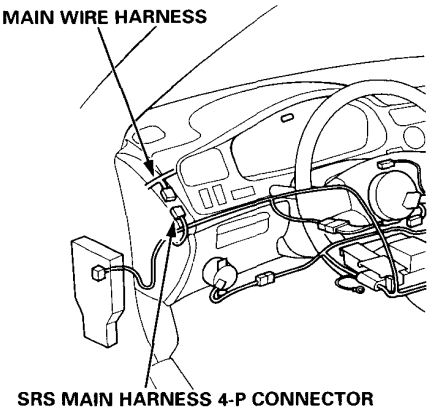
YES

NO

Replace the indicator light bulb.

(To page 23-333)





(From page 23-332)

Check for short or open in the dashboard wire harness:
1. Connect a voltmeter between the No. 12 terminal (+) of the 14-P connector and body ground (–).
2. Turn the ignition switch ON (II).

Is there less than 8.5 V?

YES

NO

Short in BLU wire of the dashboard wire harness; replace the dashboard wire harness.

Check for open in the dashboard wire harness, poor ground, faulty SRS indicator circuit, or faulty SRS unit:
1. Turn the ignition switch OFF.
2. Connect the voltmeter between the No. 5 terminal (+) and the No. 9 terminal (–) of the dashboard wire harness 14-P connector.
3. Turn the ignition switch ON (II).
4. Measure the voltage between the No. 5 terminal (+) and the No. 9 terminal (–).

Is there battery voltage?

YES

NO

Check for open in the dashboard wire harness or gauge assembly, or poor ground:
1. Check for continuity between the No. 9 terminal and body ground.

Does continuity exist?

YES

Repair open in the BLK wire (No. 9 terminal) between the gauge assembly and body ground, or look for a poor ground (G402, G404).

Repair open in the YEL wire (No. 5 terminal) of the dashboard wire harness between the gauge assembly and the No. 1 (10 A) fuse.

Check the SRS unit and SRS indicator circuit:
1. Turn the ignition switch OFF.
2. Reconnect each connector to the gauge assembly and SRS unit, then connect Test Harness A to the SRS unit.
3. Turn the ignition ON (II), and measure the voltage between the No. 13 terminal (+) and body ground (–) for six seconds after the ignition has been turned ON (II).

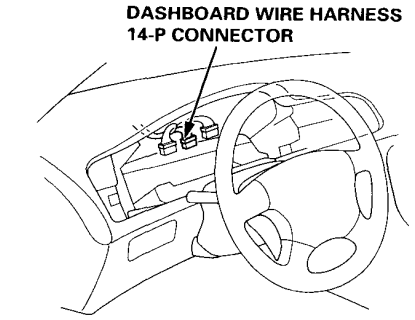
Is there more than 8.5 V?

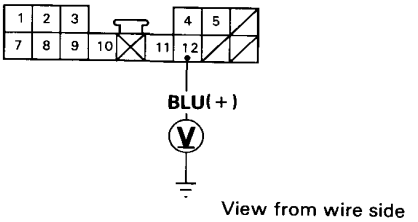
YES

NO

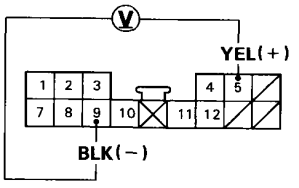
Faulty SRS unit; replace the SRS unit.

Faulty SRS indicator circuit (in the gauge assembly); replace the gauge assembly.

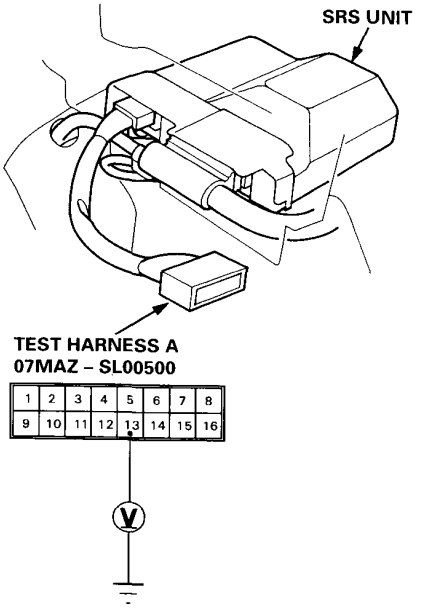




View from wire side



View from wire side

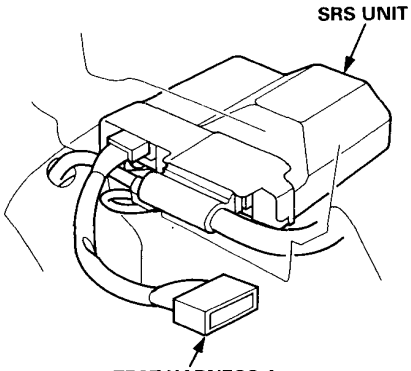


(cont'd)

SRS Indicator Light Stays on Continuously

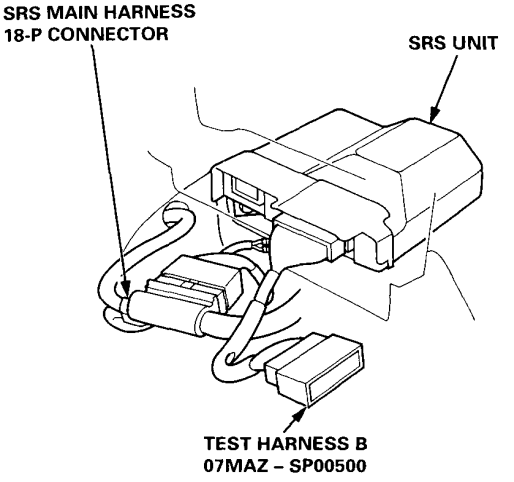
NOTE: Before troubleshooting, make sure that battery voltage is 12 V or more. Otherwise you'll obtain wrong test readings.

1. Make a photocopy of the chart on page 23-335.
2. Connect Test Harness A to the SRS unit as shown.



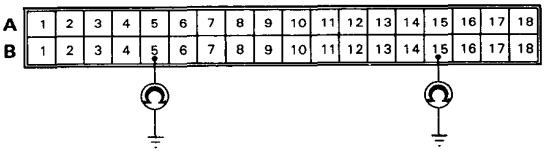
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

3. Turn the ignition switch ON (II).
   - Voltages in the chart assume the car's "battery voltage" is about 12 volts. Less than 12 volts will result in different or possibly false readings.
   - Do not disconnect the airbags from the circuit when checking SRS unit voltages.
4. First, check for voltage between Test Harness Terminal No. 12 (+) and ground (–).
   - If no voltage is indicated, go to step 8, and continue checking all the other terminals.
   - If voltage is indicated, there is a poor ground at the SRS unit. Read the following NOTE, and then go on to step 5.
5. Disconnect the battery negative cable, then disconnect the positive cable. Connect the short connectors (RED) to the airbags (see page 23-330).
6. Connect Test Harness B between the SRS unit and SRS main harness 18-P connector.



7. Check for continuity between the B5 terminal and body ground, and B15 terminal and body ground.

TEST HARNESS B
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   - If there is continuity at either terminal, the SRS unit is faulty. Replace it, reconnect the airbags and battery cables, and check the voltages according to the chart on page 23-335.
   - If there is no continuity at either terminal, the SRS unit ground, the SRS unit component grounds or the SRS main harness is faulty. Check the grounds (check wire and SRS unit mounting bolts), and, if necessary, replace the SRS main harness. Reconnect the airbags and battery cables, then check the voltages according to the chart on page 23-335.

8. Record your voltage readings, for each terminal, in the row of blank boxes near the top of the chart.

9. Compare each reading with the voltage ranges listed in the column below it. If the reading is within a range, circle that range.

	0	0	–	4.5 –5.5	12.0 –14.3	–
	8.6 –11.3	8.6 –11.3	–	4.5 –5.5	12.0 –14.3	–
Failure Mode Voltage	5.7 –7.4	5.7 –7.4	–	4.5 –5.5	12.0 –14.3	–
	8.6 –11.3	2.9 –3.7	–	4.5 –5.5	12.0 –14.3	–
	2.9 –3.7	8.7 –11.2	–	4.5 –5.5	12.0 –14.3	–

Circle the range if your reading is within it.

- If you circled all the Failure Mode ranges across any row, check the car for the Probable Failure Mode listed at the end of the row. (Refer to the letter for that mode on the following pages.)

2.0 –8.5	8.4 –10.9	–	–	B • Short in one dash sensor • Short to driver's or passenger's airbag inflator (body ground)
2.0 –8.5	8.4 –10.9	–	–	C Short in safing sensor or open in both dash sensors
2.0 –8.5	8.4 –10.9	–	–	D Open in one dash sensor
2.0 –8.5	8.4 –10.9	–	–	E Open in driver's airbag inflator or cable reel

If you circled all the ranges in this row, follow the troubleshooting procedure under failure mode "C" on the following pages.

- If you did not circle all the ranges across any row, replace the SRS unit with a known-good unit, and retest.
  - — If all your voltage readings are now normal, replace the original SRS unit.
  - — If your voltage readings are still not normal but they don't fit within a complete row of Failure Mode ranges, check the condition of the terminals in each of the SRS connectors shown in the system diagram on page 23-322.

NOTE: Do not disconnect the airbags or battery cables when checking SRS unit voltages.

Test Harness Terminal	1 SADH	2 SAPH	–	4 VCC	5 SV	–	–	8 SADC	–	10 BUC1	–	12 GND	13 IDC	14 M1	–	–	Probable Failure Mode
Normal Voltage	4.3 –5.6	4.3 –5.6	–	4.5 –5.5	12.0 –14.3	–	–	5.6 –7.3	–	11.5 –14.5	–	0	8.5 –13.6	8.4 –10.9	–	–	
Your Voltage Reading		–	–			–	–		–		–				–	–	
Failure Mode Voltage	2.8 –3.7	2.8 –3.7	–	4.5 –5.5	12.0 –14.3	–	–	3.7 –4.9	–	11.5 –14.5	–	0	2.0 –8.5	8.4 –10.9	–	–	A Open in one safing sensor contact
	0	0	–	4.5 –5.5	12.0 –14.3	–	–	0	–	11.5 –14.5	–	0	2.0 –8.5	8.4 –10.9	–	–	B • Open in both safing sensor contacts • Short in one dash sensor • Short to driver's or passenger's airbag inflator (body ground)
	8.6 –11.3	8.6 –11.3	–	4.5 –5.5	12.0 –14.3	–	–	11.2 –14.6	–	11.5 –14.5	–	0	2.0 –8.5	8.4 –10.9	–	–	C Short in safing sensor or open in both dash sensors
	5.7 –7.4	5.7 –7.4	–	4.5 –5.5	12.0 –14.3	–	–	7.4 –9.7	–	11.5 –14.5	–	0	2.0 –8.5	8.4 –10.9	–	–	D Open in one dash sensor
	8.6 –11.3	2.9 –3.7	–	4.5 –5.5	12.0 –14.3	–	–	3.7 –4.9	–	11.5 –14.5	–	0	2.0 –8.5	8.4 –10.9	–	–	E Open in driver's airbag inflator or cable reel
	2.9 –3.7	8.7 –11.2	–	4.5 –5.5	12.0 –14.3	–	–	3.7 –4.9	–	11.5 –14.5	–	0	2.0 –8.5	8.4 –10.9	–	–	F Open in front passenger's airbag inflator
	8.6 –11.3	8.6 –11.3	–	4.5 –5.5	12.0 –14.3	–	–	0	–	11.5 –14.5	–	0	2.0 –8.5	8.4 –10.9	–	–	G Open in driver's and passenger's airbag inflator
	4.3 –5.6	4.3 –5.6	–	0	0	–	–	5.6 –7.3	–	11.5 –14.5	–	0	2.0 –8.5	8.4 –10.9	–	–	H Blown SRS fuse (No. 3 10 A) or open in the wire
	4.3 –5.6	4.3 –5.6	–	4.5 –5.5	12.0 –14.3	–	–	5.6 –7.3	–	11.5 –14.5	–	0	0 (8.5 –13.6)	8.4 –10.9	–	–	I Short (or open) in SRS indicator wire harness

Troubleshooting (cont'd)

Mode A: Open in one safing sensor contact

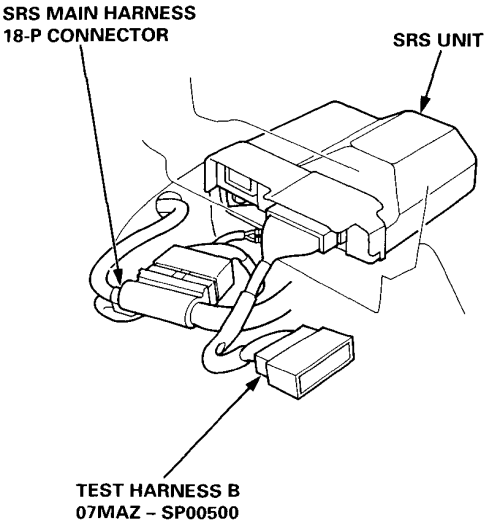
- The SRS unit is faulty. Substitute a known-good SRS unit, and recheck the voltages according to the chart on page 23-335.

Mode B:

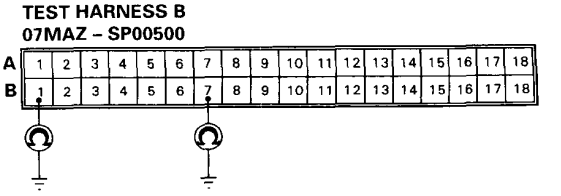
- **Short to driver's or passenger's airbag inflator (body ground)**
- **Short in dash sensor**
- **Open in both safing sensor contacts**

1. Disconnect the battery negative cable, and then disconnect the positive cable. Then connect the short connectors (RED) to the airbags (see page 23-330).

2. Connect Test Harness B between the SRS unit and SRS main harness 18-P connector.

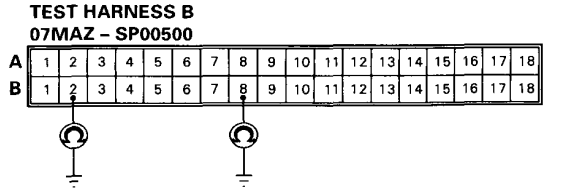


3. Reconnect the driver's airbag connector, then check continuity between the B1 terminal and body ground, and between the B7 terminal and body ground.



- If there is continuity at either terminal, go to step 6.
- If there is no continuity at either terminal, go to step 4.

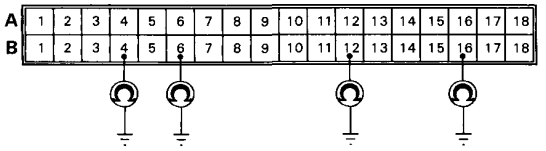
4. Reconnect the front passenger's airbag connector, then check continuity between the B2 terminal and body ground, and between the B8 terminal and body ground.



- If there is continuity at either terminal, go to step 10.
- If there is no continuity at either terminal, go to step 5.

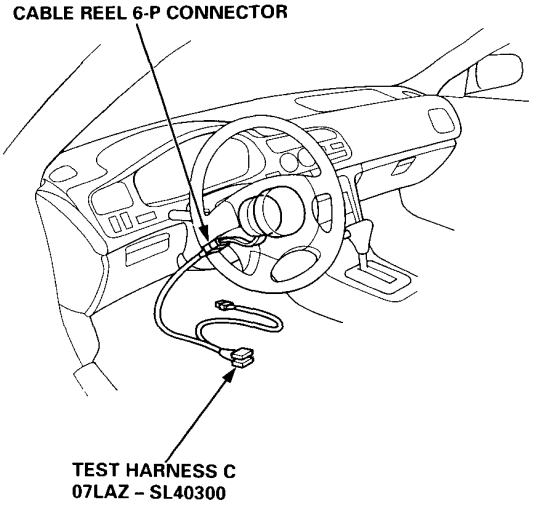
5. Check continuity between body ground and each terminal of both dash sensors.

TEST HARNESS B
07MAZ – SP00500



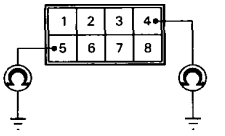
- If there is continuity at any of the terminals, go to step 12.
- If there is no continuity at any terminal, go to step 13.

6. Disconnect the cable reel 6-P connector from the SRS main harness, then connect Test Harness C only to the cable reel side of the 6-P connector.



7. Check continuity between the No. 4 terminal and body ground, and between the No. 5 terminal and body ground.

TEST HARNESS C
07LAZ – SL40300

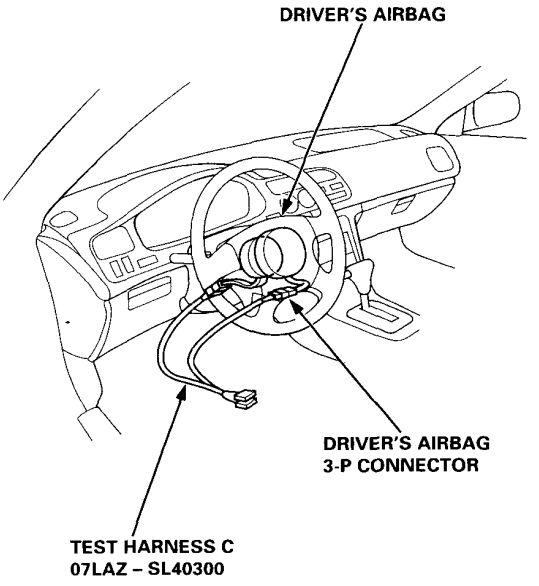


- If there is continuity at either terminal, go to step 8.
- If there is no continuity at either terminal, the SRS main harness is faulty. Replace it, and re-check the voltages according to the chart on page 23-335.

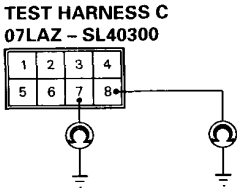
(cont'd)

Troubleshooting (cont'd)

8. Disconnect the driver's airbag 3-P connector from the cable reel, then connect Test Harness C to the driver's airbag 3-P connector.

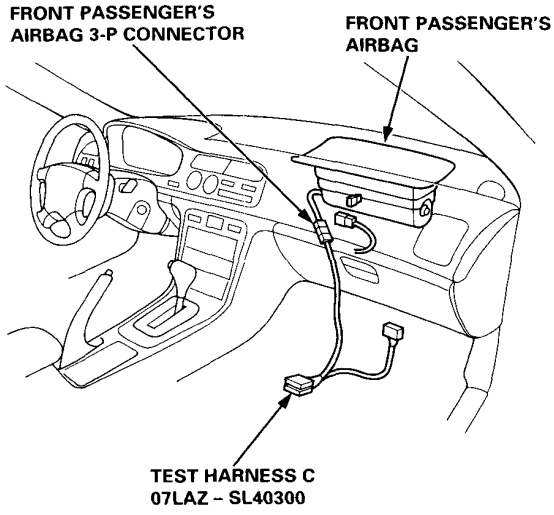


9. Check continuity between the No. 7 terminal and body ground, and between the No. 8 terminal and body ground.

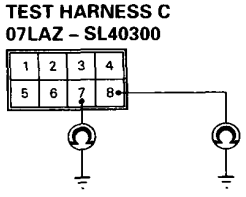


- If there is continuity at either terminal, the driver's airbag inflator is faulty. Replace it, and recheck the voltages according to the chart on page 23-335.
- If there is no continuity at either terminal, the cable reel is faulty. Replace it, and recheck the voltages according to the chart on page 23-335.

10. Disconnect the front passenger's airbag 3-P connector from the SRS main harness, then connect Test Harness C to the airbag side of the connector.

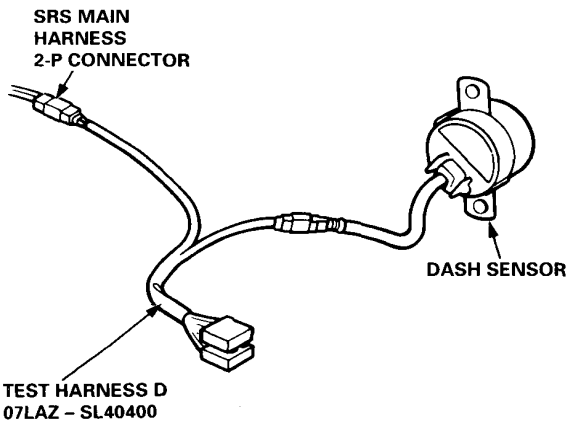


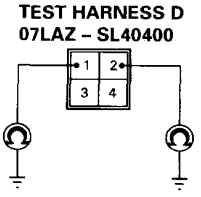
11. Check continuity between the No. 7 terminal and body ground, and between the No. 8 terminal and body ground.



- If there is continuity at either terminal, the front passenger's airbag inflator is faulty. Replace it, and recheck the voltages according to the chart on page 23-335.
- If there is no continuity at either terminal, the SRS main harness is faulty. Replace it, and recheck the voltages according to the chart on page 23-335.

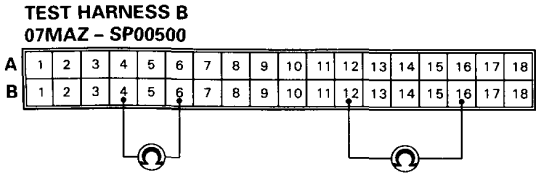
12. Connect Test Harness D between the dash sensor and SRS main harness 2-P connector. Check continuity between the No. 1 terminal and body ground, and between the No. 2 terminal and body ground.





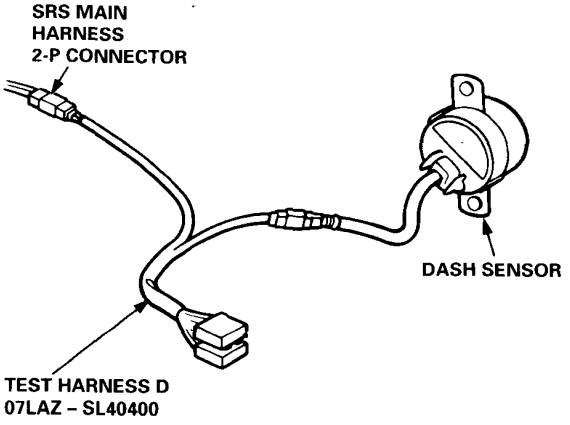
- If there is continuity at either terminal, the dash sensor is faulty. Replace it and recheck the voltages according to the chart on page 23-335.
- If there is no continuity at either terminal, the SRS main harness is faulty. Replace it and recheck the voltages according to the chart on page 23-335.

13. *Measure* the resistance between the left dash sensor terminals B12 and B16, and between the right dash sensor terminals B4 and B6.



- If resistance is 3.8 – 4.2 kΩ for both sensors, the SRS unit is faulty. Substitute a known-good SRS unit, and recheck the voltages according to the chart on page 23-335.
- If resistance is less than 3.8 kΩ for either sensor, go to step 14.

14. Connect Test Harness D between the dash sensor and SRS main harness 2-P connector. Measure the resistance between the No. 1 terminal and No. 2 terminal.





- If resistance is 3.8 – 4.2 kΩ, the SRS main harness is faulty. Replace it and recheck the voltages according to the chart on page 23-335.
- If resistance is less than 3.8 kΩ, the dash sensor is faulty. Replace it and recheck the voltages according to the chart on page 23-335.

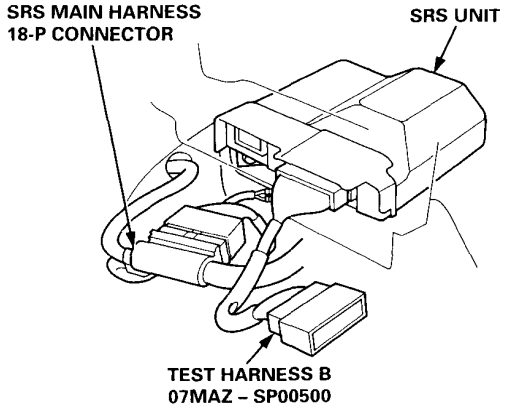
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Troubleshooting (cont'd)

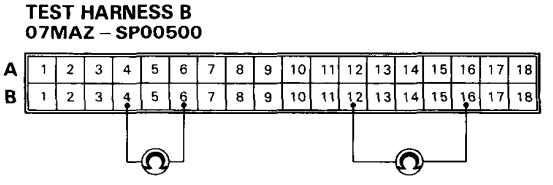
Mode C: Short in one safing sensor, or open in both dash sensors
Mode D: Open in one dash sensor

1. Disconnect the battery negative cable, then disconnect the positive cable. Then connect the short connectors (RED) to the airbags (see page 23-330).

2. Connect Test Harness B between the SRS unit and SRS main harness 18-P connector.

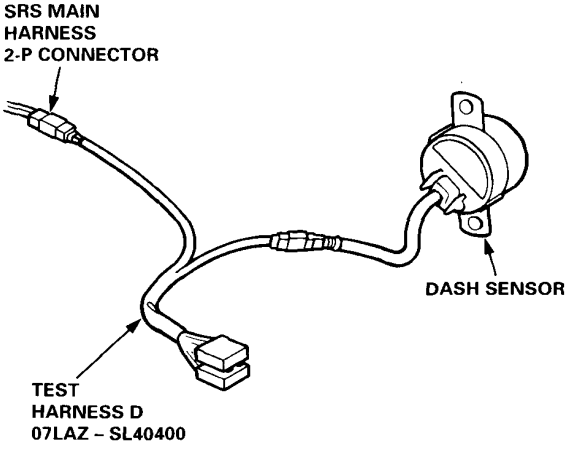


3. Measure the resistance between the left dash sensor terminals B12 and B16, and between the right dash sensor terminals B4 and B6.



- If resistance is more than 5 kΩ for either set of terminals, go to step 4.
- If resistance is less than 5 kΩ for both sets of terminals, the SRS unit is faulty. Substitute a known-good SRS unit, and recheck the voltages according to the chart on page 23-335.

4. Connect Test Harness D between the dash sensor and SRS main harness 2-P connector. Measure the resistance between the No. 1 terminal and No. 2 terminal.



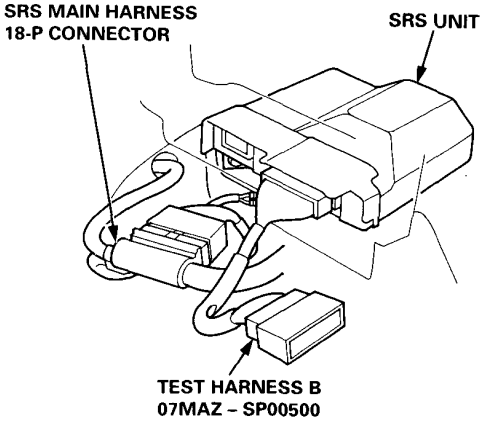


- If resistance is more than 5 kΩ, the dash sensor is faulty. Replace the dash sensor, and recheck the voltages according to the chart on page 23-335.
- If resistance is less than 5 kΩ, the SRS main harness is faulty. Replace the SRS main harness, and recheck the voltages according to the chart on page 23-335.

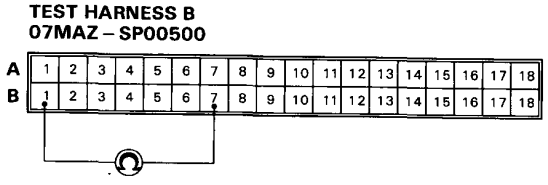
Mode E: Open in driver's airbag inflator or cable reel

1. Disconnect the battery negative cable, then disconnect the positive cable. Then connect the short connectors (RED) to the airbags (see page 23-330).

2. Connect Test Harness B between the SRS unit and the SRS main harness 18-P connector.

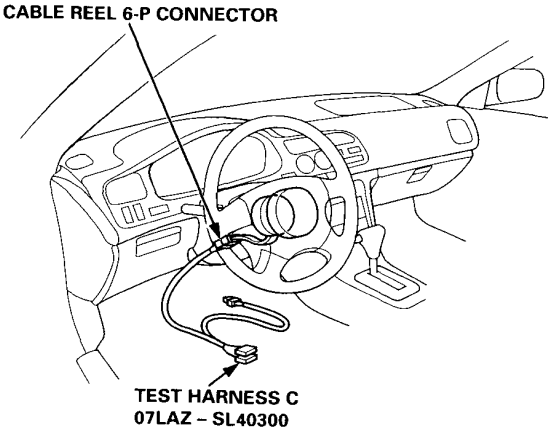


3. Reconnect the driver's airbag connector, then measure the resistance between the B1 and B7 terminals.

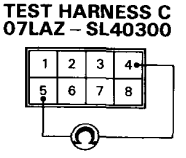


- If resistance is more than 0.2 kΩ, go to step 4.
- If resistance is less than 0.2 kΩ, the SRS unit is faulty. Substitute a known-good SRS unit, and recheck the voltages according to the chart on page 23-335.

4. Disconnect the cable reel 6-P connector from the SRS main harness, then connect Test Harness C only to the cable reel side of the connector.



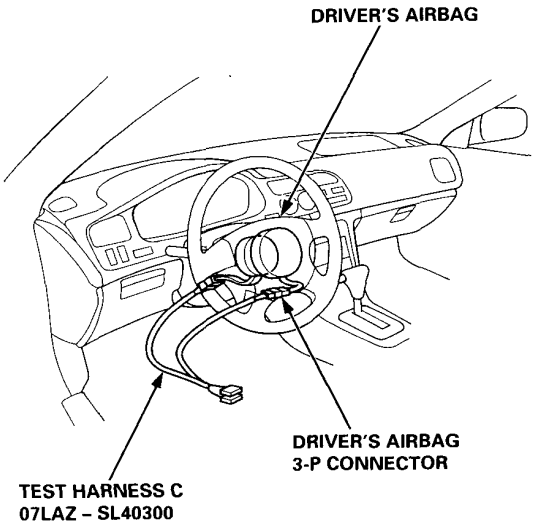
5. Measure the resistance between the No. 4 terminal and the No. 5 terminal.



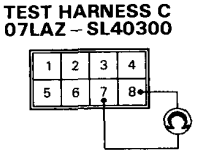
- If resistance is more than 0.2 kΩ, go to step 6.
- If resistance is less than 0.2 kΩ, the SRS main harness is faulty. Replace it and recheck the voltages according to the chart on page 23-335.

(cont'd)

6. Disconnect the driver's airbag 3-P connector from the cable reel, then connect Test Harness C to the driver's airbag 3-P connector.



7. Measure the resistance between the No. 7 terminal and the No. 8 terminal.

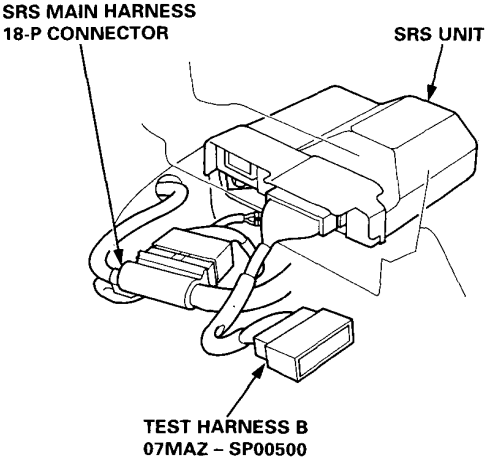


- If resistance is more than 0.2 kΩ, the driver's airbag inflator is faulty. Replace the airbag assembly, and recheck the voltages according to the chart on page 23-335.
- If resistance is less than 0.2 kΩ, the cable reel is faulty. Replace it and recheck the voltages according to the chart on page 23-335.

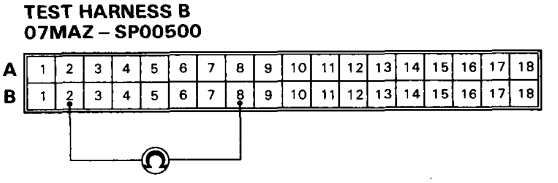
Mode F: Open in front passenger's airbag inflator

1. Disconnect the battery negative cable, then disconnect the positive cable. Then connect the short connectors (RED) to the airbags (see page 23-330).

2. Connect Test Harness B between the SRS unit and SRS main harness 18-P connector.

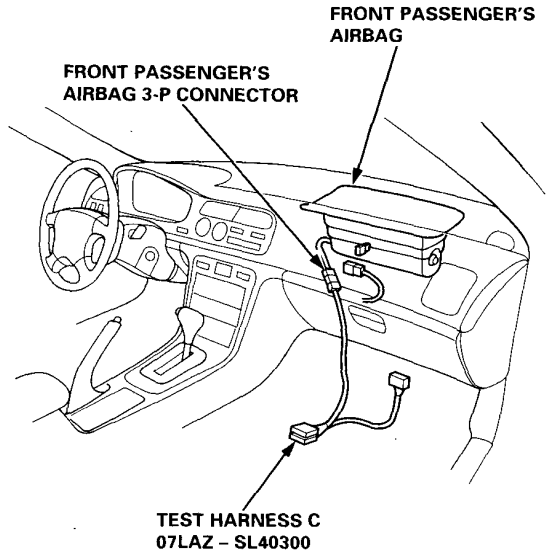


3. Reconnect the front passenger's airbag connector, then measure the resistance between the B2 terminal and the B8 terminal.

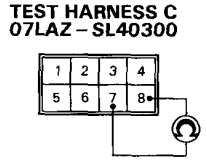


- If resistance is more than 0.2 kΩ, go to step 4.
- If resistance is less than 0.2 kΩ, the SRS unit is faulty. Substitute a known-good SRS unit, and recheck the voltages according to the chart on page 23-335.

4. Disconnect the front passenger's airbag 3-P connector from the SRS main harness, then connect Test Harness C to the front passenger's airbag side of the connector.



5. Measure the resistance between the No. 7 terminal and the No. 8 terminal.



- If resistance is more than 0.2 kΩ, the front passenger's airbag inflator is faulty. Replace the front passenger's airbag assembly, and recheck the voltages according to the chart on page 23-335.
- If resistance is less than 0.2 kΩ, the SRS main harness is faulty. Replace it and recheck the voltages according to the chart on page 23-335.

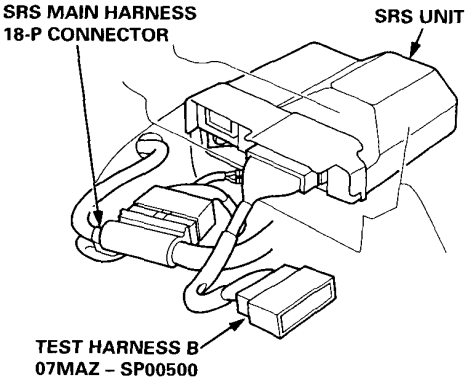
Mode H: Blown SRS No. 3 fuse, or open in the wire

1. Check the SRS No. 3 (10 A) fuse in the under-dash fuse/relay box. If it's OK, go to step 2. If it's blown, replace it with a new 10 A fuse, then turn the ignition switch ON (II):

   - If the fuse doesn't blow, go on to step 2.
   - If the fuse blows, troubleshoot as necessary to find the short.

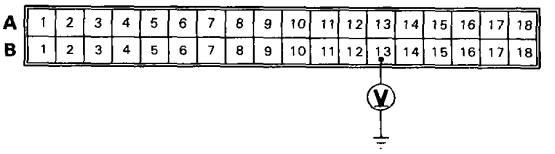
2. Disconnect the battery negative cable, then disconnect the positive cable. Then connect the short connectors (RED) to the airbags (see page 23-330).

3. Connect Test Harness B between the SRS unit and the SRS main harness 18-P connector.



4. Reconnect the positive and negative cable to the battery.

5. Measure the voltage between the B13 terminal (+) and body ground (–) with the ignition switch ON (II).

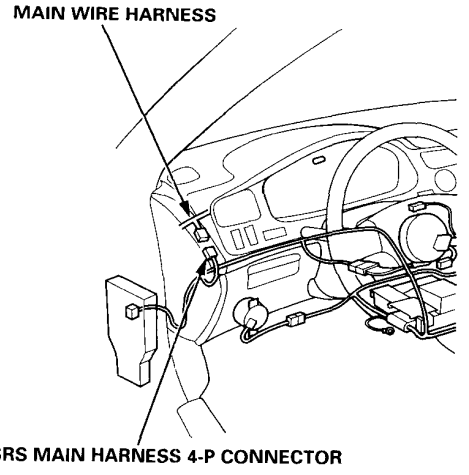


- If there is battery voltage, the SRS unit is faulty. Replace it and recheck the voltages according to the chart on page 23-335.
- If there is less than battery voltage, the SRS main harness is faulty. Replace it and recheck the voltages according to the chart on page 23-335.

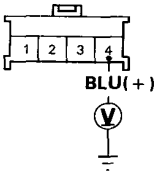
(cont'd)

Mode I: Short or open in SRS indicator wire harness

1. Disconnect the SRS main harness 4-P connector from the main wire harness.



2. Turn the ignition switch ON (II), and wait for six seconds. Measure the voltage between the No. 4 terminal (+) and body ground (–) on the SRS main harness 4-P connector side.

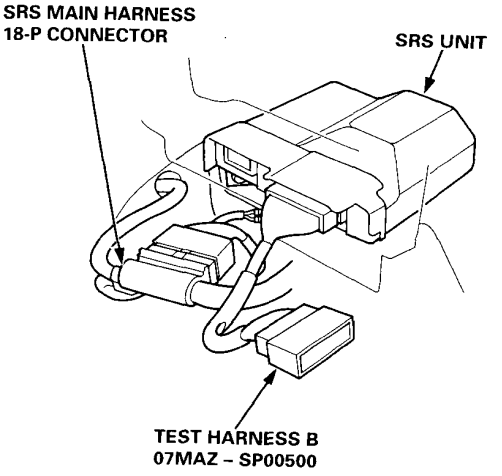


View from wire side

- If voltage is more than 8.5 V, go to step 8.
- If voltage is less than 8.5 V, go to step 3.

3. Disconnect the battery negative cable, then disconnect the positive cable. Then connect the short connectors (RED) to the airbags (see page 23-330).

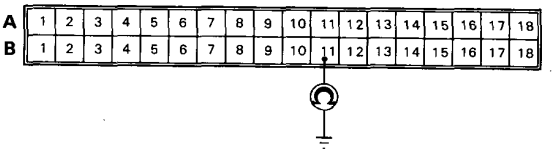
4. Connect Test Harness B between the SRS unit and the SRS main harness 18-P connector.



5. Reconnect the battery positive cable and negative cable.

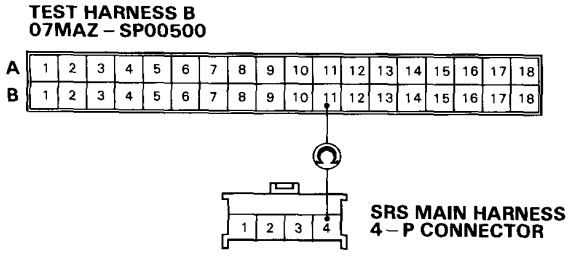
6. Check for continuity between the B11 terminal and body ground.

TEST HARNESS B
07MAZ – SP00500



- If there is continuity, the SRS main harness is shorted. Replace the SRS main harness, and recheck the voltages according to the chart on page 23-335.
- If there is no continuity, go to step 7.

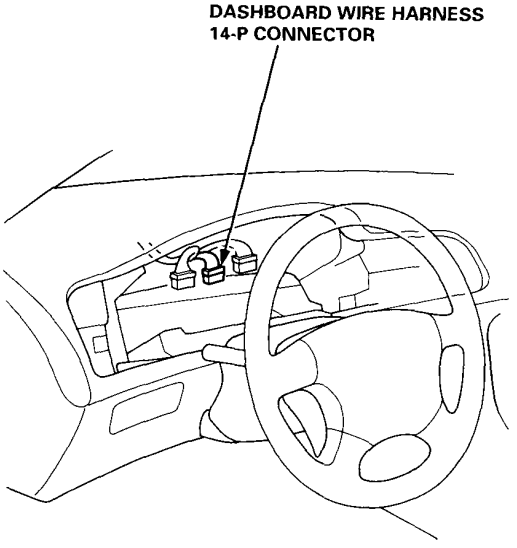
7. Check for continuity between the B11 terminal of Test Harness B and the No. 4 terminal of the SRS main harness 4-P connector.



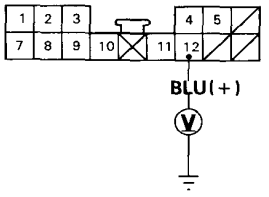
View from wire side

- If there is continuity, the SRS unit is faulty. Replace it and recheck the voltages according to the chart on page 23-335.
- If there is no continuity, there is an open in the SRS main harness. Replace the SRS main harness, and recheck the voltages according to the chart on page 23-335.

8. Reconnect the SRS main harness 4-P connector to the main wire harness. Disconnect the dashboard wire harness 14-P connector from the gauge assembly.



9. Turn the ignition switch ON (II), and wait for six seconds. Measure the voltage between the No. 12 terminal (+) and body ground (–).



View from wire side

- If voltage is more than 8.5 V, the SRS indicator circuit is faulty (in the gauge assembly). Replace the gauge assembly, and recheck the voltages according to the chart on page 23-335.
- If voltage is less than 8.5 V, the dashboard wire harness (or the main wire harness) is faulty. Replace it and recheck the voltages according to the chart on page 23-335.

Airbag Assembly Replacement

⚠ WARNING Store a removed airbag assembly with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:

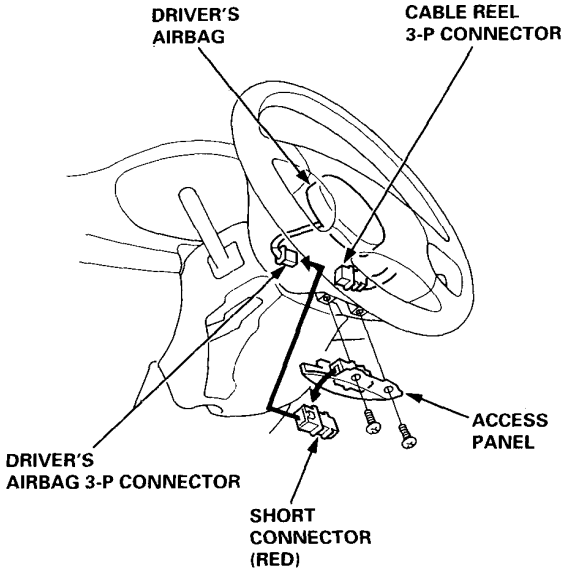
- **Do not install used SRS parts from another car. When repairing, use only new SRS parts.**
- **Carefully inspect the airbag assembly before you install it. Do not install an airbag assembly that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.**
- **Always keep the short connectors (RED) on the airbags when the harness is disconnected.**
- **Do not disassemble or tamper with the airbag assembly.**

1. Disconnect the battery negative cable, then disconnect the positive cable.

2. Connect the short connectors (RED) to the airbag side of the connectors:

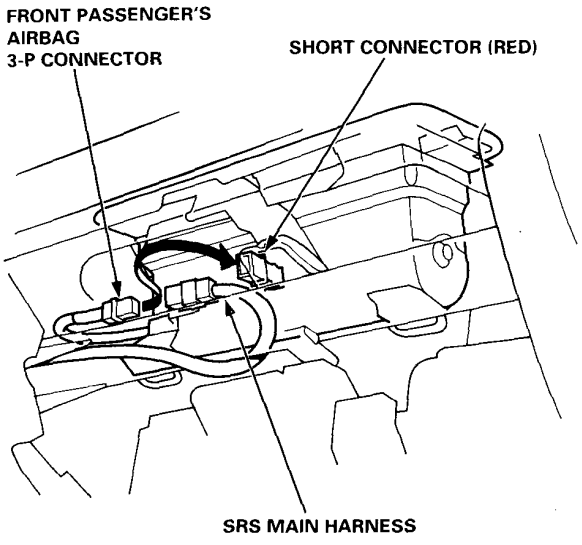
Driver's Side:

- Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.
- Disconnect the 3-P connector between the driver's airbag and cable reel, then connect the short connector (RED) to the airbag side of the connector.



Front Passenger's Side:

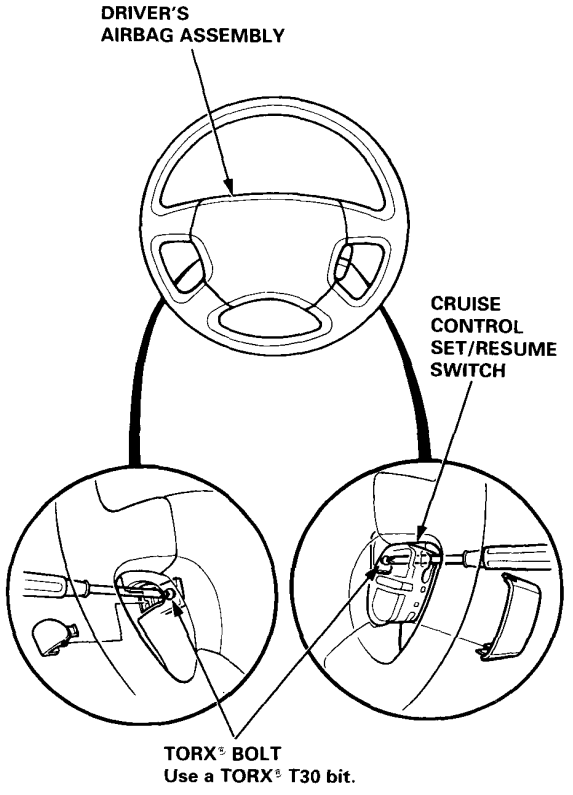
- Remove the glove box damper (see section 20), then remove the glove box.
- Disconnect the front passenger's airbag 3-P connector from the SRS main harness, and connect the short connector (RED) to the front passenger's airbag 3-P connector.



3. Remove the airbags:

Driver's Side:

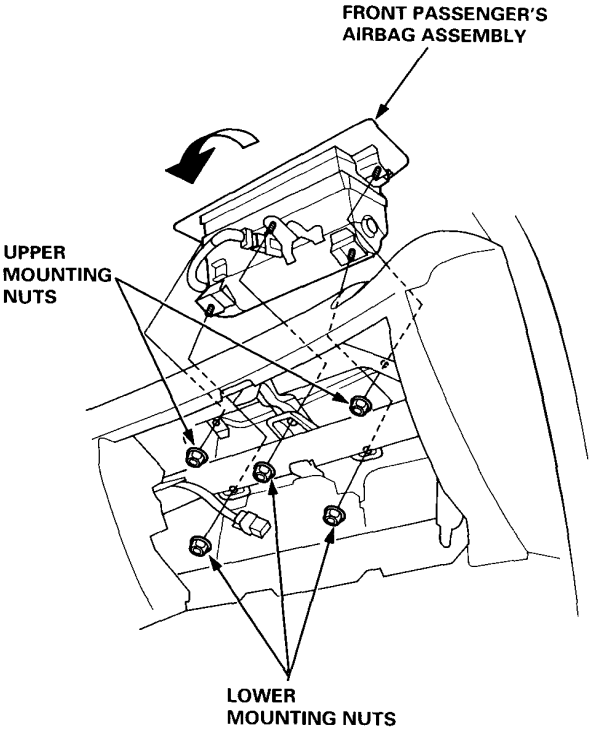
- Remove the two TORX® bolts using a TORX® T30 bit, then remove the driver's airbag assembly.



Front Passenger's Side:

- Remove the five mounting nuts, then lift the front passenger's airbag out of the dashboard.

NOTE: Do not confuse the lower mounting nuts with the upper mounting nuts. The upper mounting nuts are not self-locking.



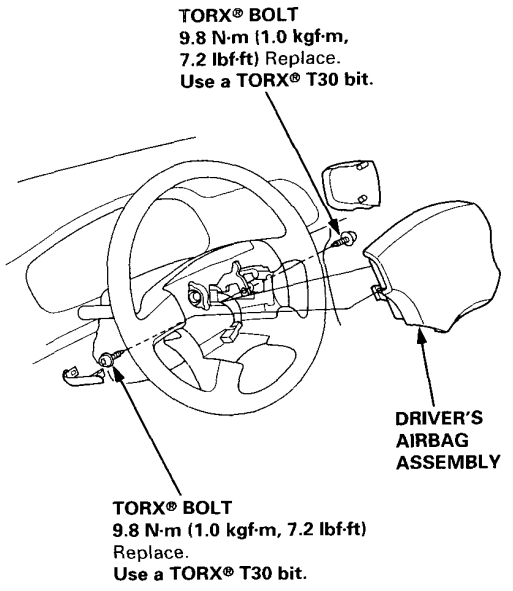
(cont'd)

Airbag Assembly Replacement (cont'd)

CAUTION: Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts.

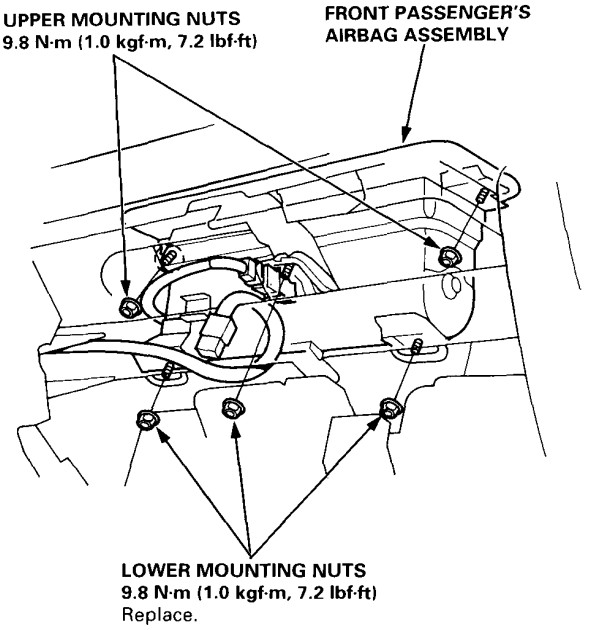
4. Install the new airbags:

   Driver's Side: Place the driver's airbag assembly in the steering wheel, and secure it with new TORX® bolts.



Front Passenger's Side:

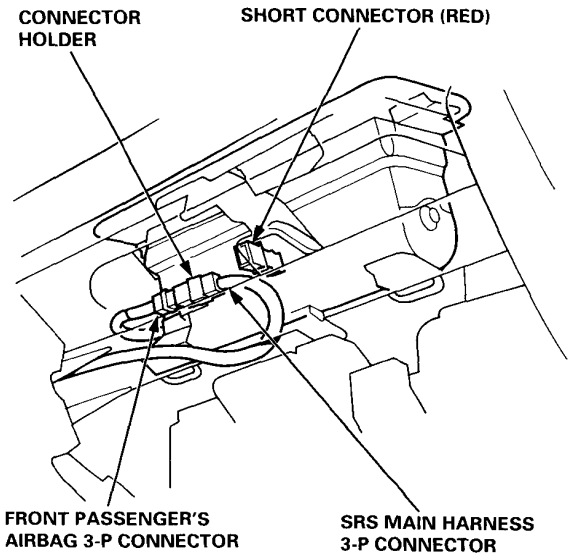
- Place the front passenger's airbag assembly in the dashboard.
- Loosely install all five mounting nuts.
- Tighten the upper two nuts first, then the lower three nuts.



5. Remove and properly store the short connectors, then reconnect the airbag connectors.

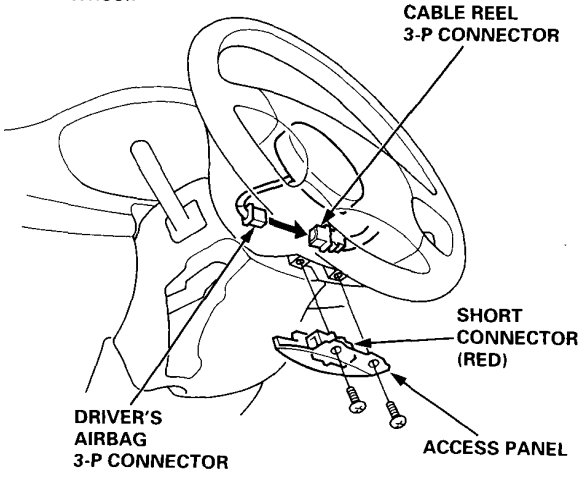
Front Passenger's Side:

- Attach the SRS main harness 3-P connector to the connector holder.
- Then reinstall the glove box on the dashboard.



Driver's Side:

- Remove the short connector (RED) from the driver's airbag connector, then connect the airbag 3-P connector to the cable reel 3-P connector.
- Attach the short connector (RED) to the access panel, then reinstall the panel on the steering wheel.



6. Connect the battery positive cable, then connect the negative cable.

7. After installing the airbag assembly, confirm proper system operation:

- Turn the ignition ON (II): The instrument panel SRS indicator light should come on for about six seconds and then go off.
- Make sure both horn buttons work.
- Take a test drive, and make sure the cruise control switches work.

Airbag Assembly Disposal

Before scrapping any airbags (including those in a whole car to be scrapped), the airbags must be deployed. If the car is still within the warranty period, before you deploy the airbags, the Honda District Service Manager must give approval and/or special instructions. Only after the airbags have been deployed (as the result of vehicle collision, for example), they can be scrapped.
If the airbags appear intact (not deployed), treat them with extreme caution.
Follow this procedure:

Deploying the Airbags: In-car

NOTE: If an SRS car is to be entirely scrapped, its airbags should be deployed while still in the car. The airbags should not be considered as salvageable parts and should never be installed in another car.

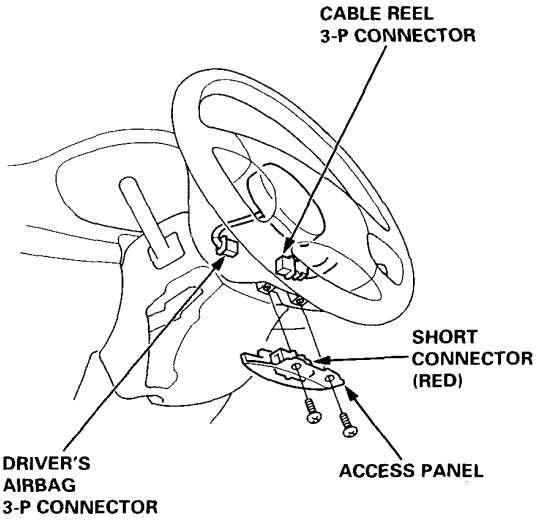
⚠ WARNING Confirm that each airbag assembly is securely mounted; otherwise, severe personal injury could result from deployment.

1. Disconnect the battery negative cable, then disconnect the positive cable.

2. Confirm that the special tool is functioning properly by following the check procedure on the label of the tool set box, or on page 23-351.

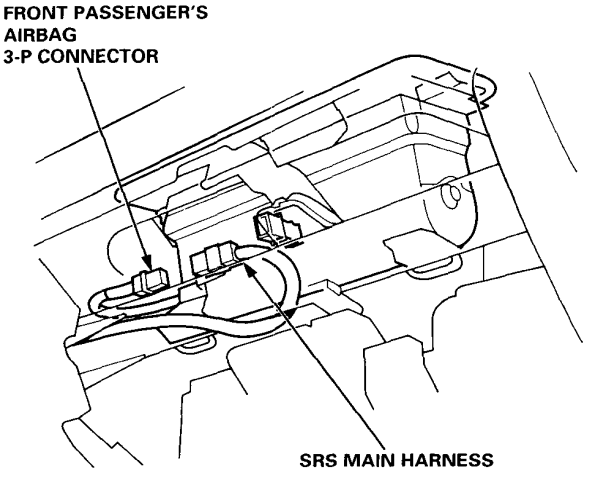
Driver's Airbag:

3. Remove the access panel, then disconnect the 3-P connector between the driver's airbag and the cable reel.

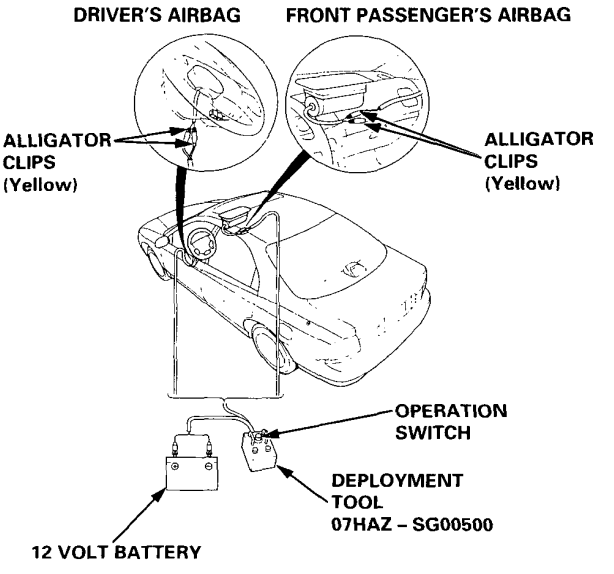


Front Passenger's Airbag:

4. Remove the glove box damper (see section 20), then remove the glove box. Then disconnect the 3-P connector between the front passenger's airbag and SRS main harness.



5. Cut off the airbag connector, strip the ends of the airbag wires, and connect the special tool alligator clips to the airbag. Place the special tool approximately 10 meters (thirty feet) away from the airbag.



6. Connect a 12 volt battery to the tool:

   - If the green light on the tool comes on, the airbag igniter circuit is defective and cannot deploy the airbag. Go to Damaged Airbag Special Procedure.
   - If the red light on the tool comes on, the airbag is ready to be deployed.

7. Push the tool's deployment switch. The airbag should deploy (deployment is both highly audible and visible a loud noise and rapid inflation of the bag, followed by slow deflation).

   - If audible/visible deployment happens and the green light on the tool comes on, continue with this procedure.
   - If the airbag doesn't deploy, yet the green light comes ON, its igniter is defective. Go to Damaged Airbag Special Procedure.

   ⚠ WARNING During deployment, the airbag assembly can become hot enough to burn you. Wait thirty minutes after deployment before touching the assembly.

8. Dispose of the complete airbag assembly. No part of it can be reused. Place it in a sturdy plastic bag, and seal it securely.

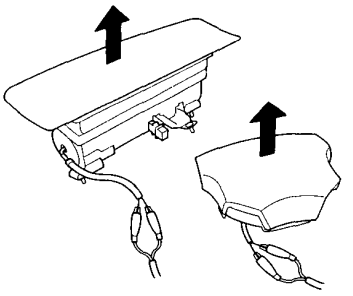
   CAUTION:
   - **Wear a face shield and gloves when handling a deployed airbag.**
   - **Wash your hands and rinse them well with water after handling a deployed airbag.**



Deploying the Airbag: Out-of-car

NOTE: If an intact airbag assembly has been removed from a scrapped car, or has been found defective or damaged during transit, storage or service, it should be deployed as follows:

⚠ WARNING Position the airbag assembly face up, outdoors on flat ground at least 10 meters (thirty feet) from *any obstacles or people*.



1. Confirm that the special tool is functioning properly by following the check procedure on this page or on the tool box label.
2. Remove the short connector from the airbag connector.
3. Follow steps 5, 6, 7, and 8 of the in-car deployment procedure.

Damaged Airbag Special Procedure

⚠ WARNING If an airbag cannot be deployed, it should not be treated as normal scrap; it should still be considered a potentially explosive device that can cause serious injury.

1. If installed in a car, follow the removal procedure on page 23-346.
2. In all cases, make sure a short connector is properly installed on the airbag connector.
3. Package the airbag in exactly the same packaging that the new replacement part came in.
4. Mark the outside of the box "DAMAGED AIRBAG NOT DEPLOYED" so it does not get confused with your parts stock.
5. Contact your Honda District Service Manager for how and where to return it for disposal.

Deployment Tool: Check Procedure

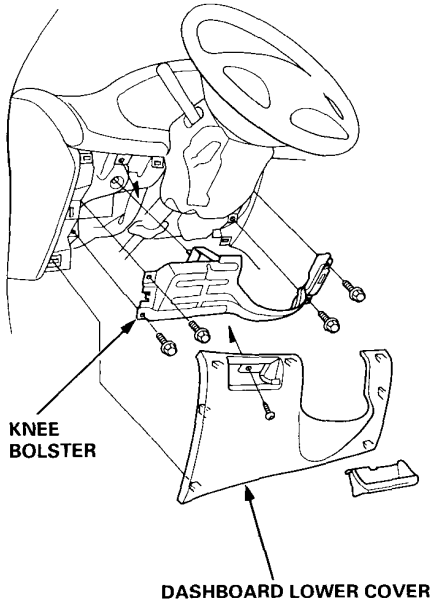
1. Connect the yellow clips to both switch protector handles on the tool; connect the tool to a battery.
2. Push the operation switch: green means the tool is OK; red means the tool is faulty.
3. Disconnect the battery and the yellow clips.

Cable Reel Replacement

⚠ WARNING Store a removed airbag assembly with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

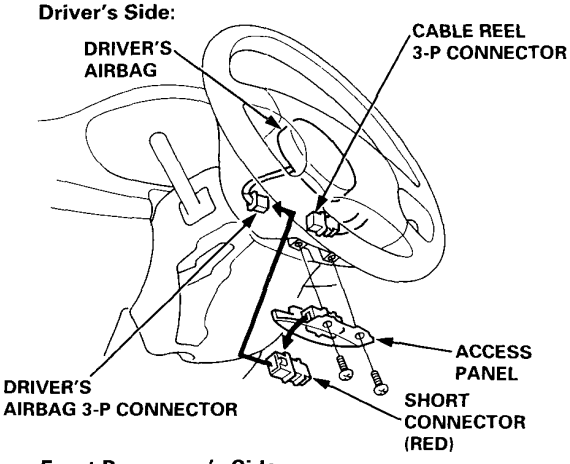
CAUTION:
- **Carefully inspect the airbag assembly before installing it. Do not install an airbag assembly that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.**
- **Always keep the short connectors on the airbags connector when the harness is disconnected.**
- **Do not disassemble or tamper with the airbag assembly.**

1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Make sure the wheels are aligned straight ahead.
3. Remove the dashboard lower cover and knee bolster.

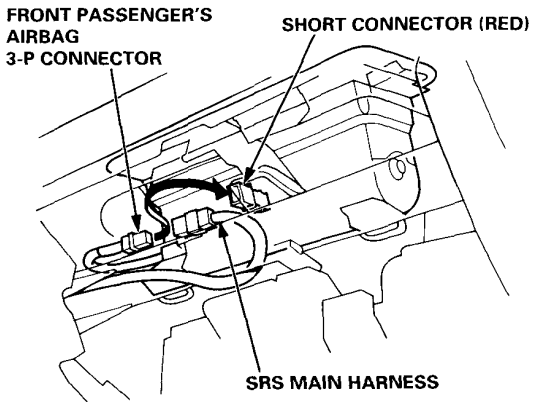


4. Remove the glove box damper (see section 20), then remove the glove box.
5. Connect the short connectors to the airbags.

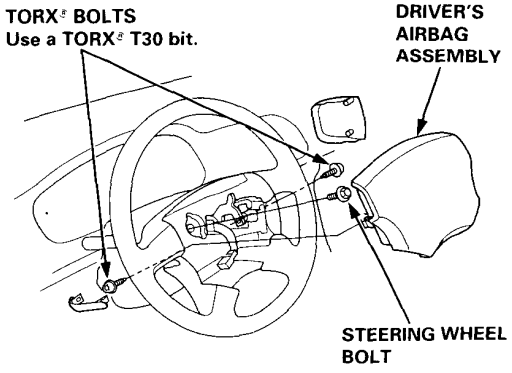
Driver's Side:



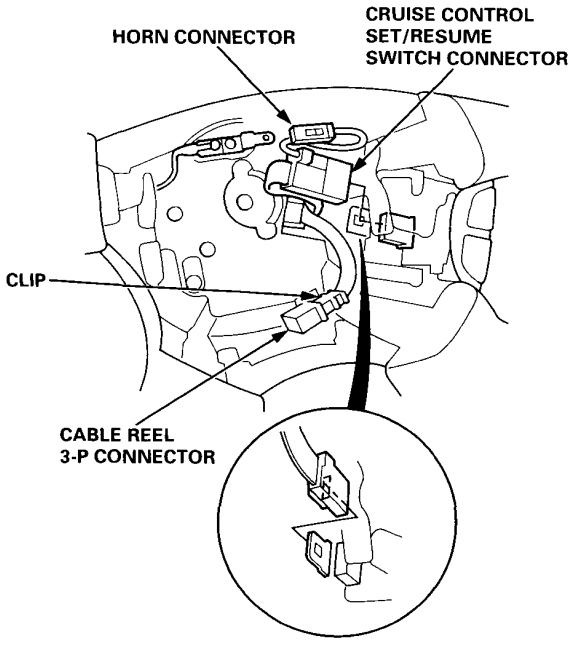
Front Passenger's Side:



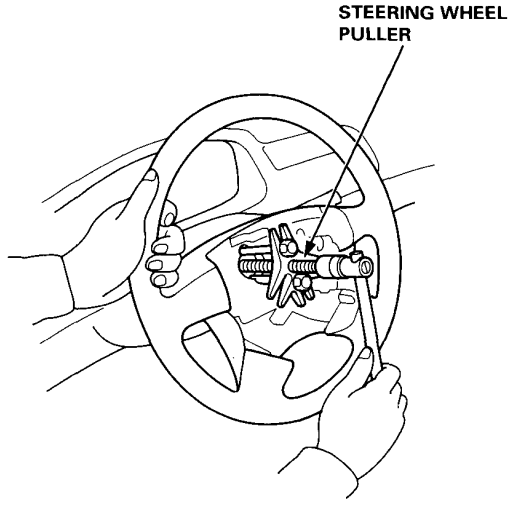
6. Remove the driver's airbag assembly from the steering wheel (two T30 TORX® bolts), then remove the steering wheel bolt.



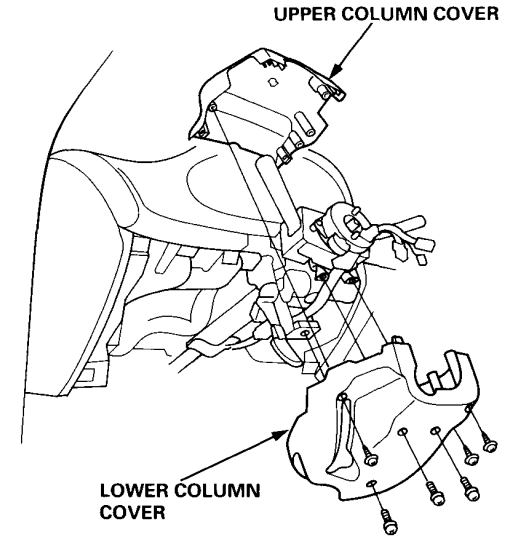
7. Disconnect the connectors from the horn and cruise control set/resume switches, then remove the cable reel 3-P connector from its clip.



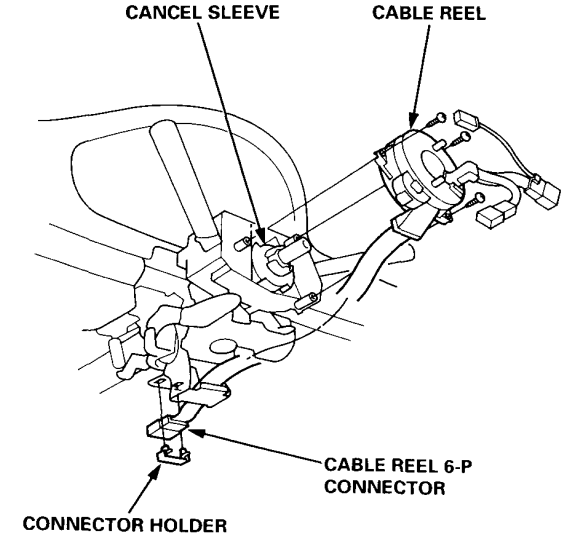
8. Remove the steering wheel using a commercially available steering wheel puller.



9. Remove the upper and lower column covers.



10. Disconnect the 6-P connector between the cable reel and SRS main harness, then remove the connector holder from the steering column.



11. Remove the cable reel from the column.

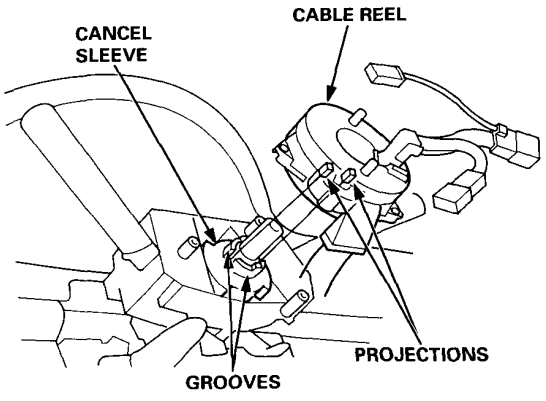
(cont'd)

Cable Reel Replacement (cont'd)

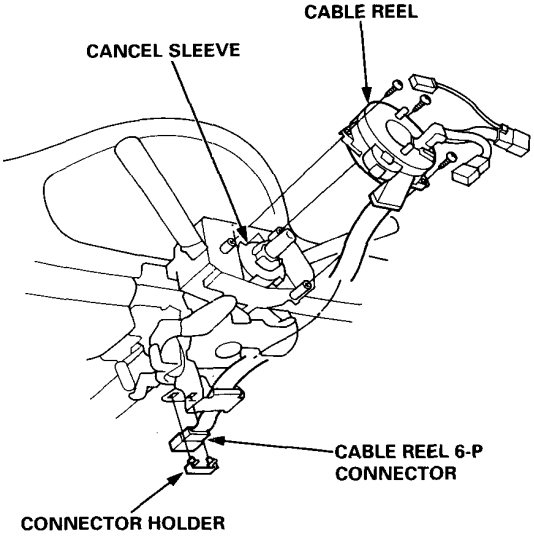
CAUTION:

- **Before installing the steering wheel, the front wheels should be aligned straight ahead.**
- **Be sure to install the harness wires so that they are not pinched or interfering with other car parts.**
- **After reassembly, confirm that the wheels are still turned straight ahead and that the steering wheel spoke angle is correct (road test). If minor spoke angle adjustment is necessary, do so only by adjustment of the tie-rods, not by removing and repositioning the steering wheel.**

12. Align the cancel sleeve grooves with the cable reel projections.



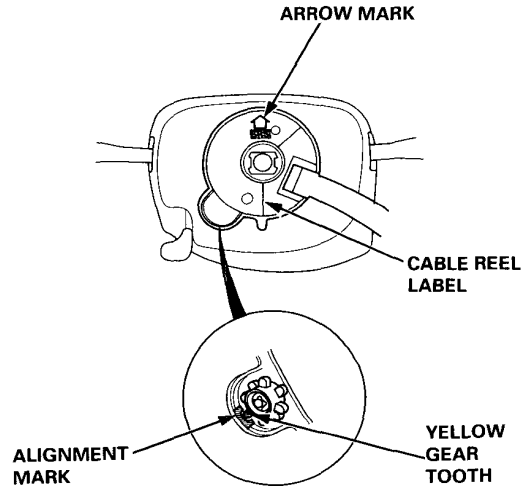
13. Carefully install the cable reel on the steering column shaft. Then attach the connector holder to the steering column.



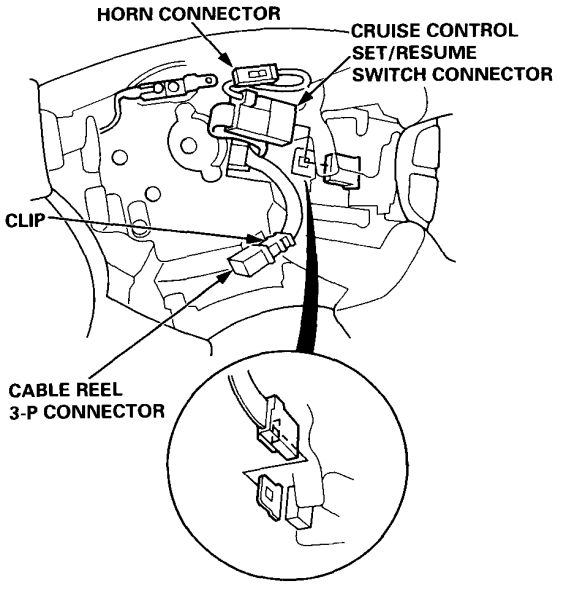
14. Install the steering column upper *and lower covers.*

15. Center the cable reel. Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two turns) until:

    - The yellow gear tooth lines up with the alignment mark on the cover.
    - The arrow mark on the cable reel label points straight up.

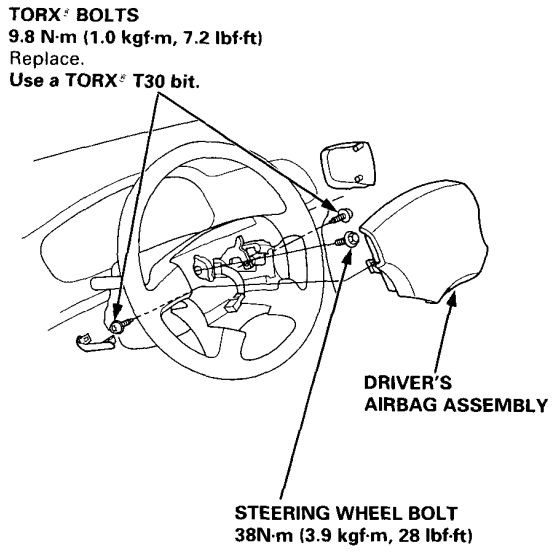


16. Install the steering wheel, and attach the cable reel 3-P connector to the clip.



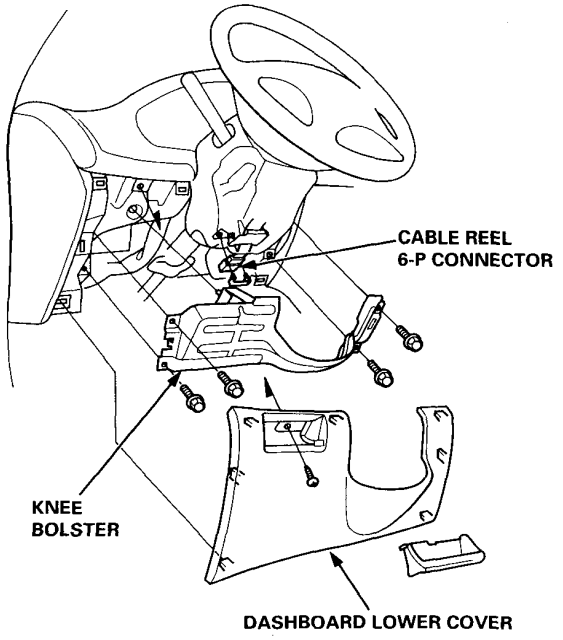
17. Connect the horn connector and cruise control set/resume switch connector.

18. Install the steering wheel bolt.



19. Install the driver's airbag assembly.

20. Connect the cable reel 6-P connector to the SRS main harness, then install the knee bolster and dashboard lower cover.

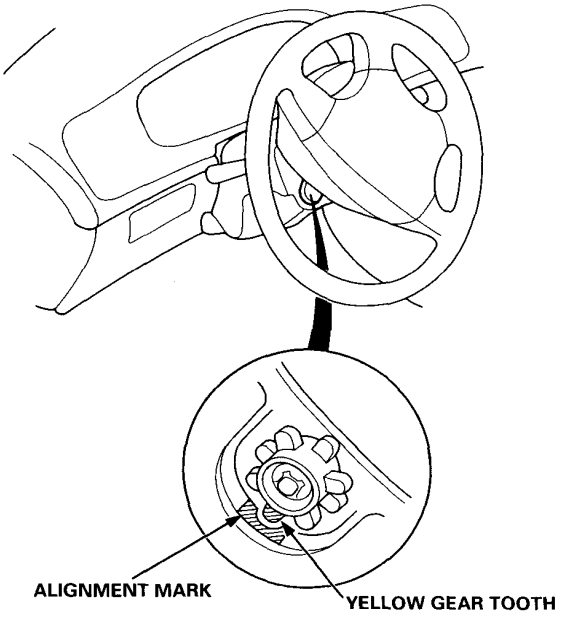


21. Remove and properly store the short connectors (RED), then reconnect the airbag connectors (and reinstall the glove box).

22. Reconnect the battery positive cable, then the negative cable.

23. After installing the cable reel, confirm proper system operation:

- Turn the ignition ON (II); the instrument panel SRS indicator light should come on for about six seconds and then go off.
- Make sure both horn buttons work.
- Make sure the headlight and wiper switches work.
- Go for a test drive, and make sure the cruise control switches work.
- Rotate the steering wheel counterclockwise to make sure the yellow gear tooth lines up with the slot on the cover.

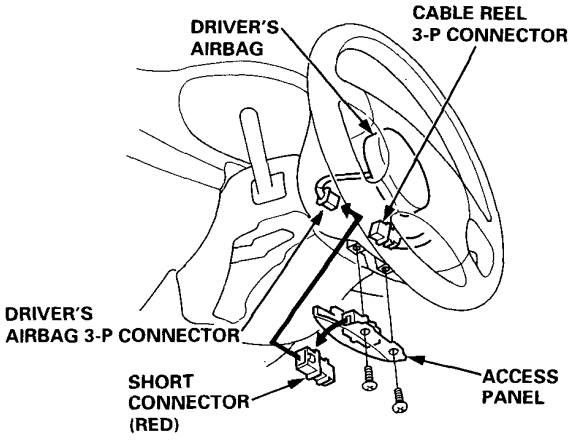


Dash Sensor Replacement

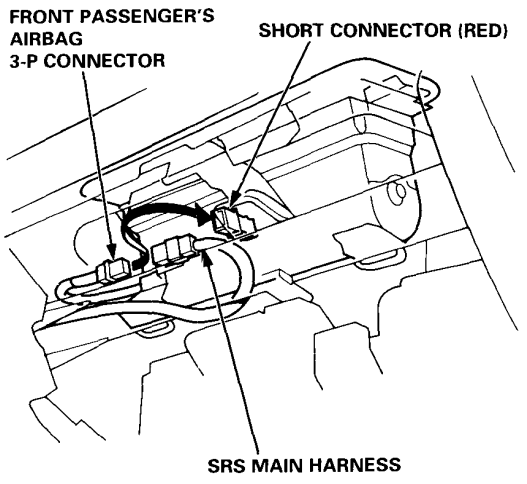
CAUTION:
- **Do not damage the sensor wiring.**
- **Do not install used SRS parts from another car. When repairing an SRS, use only new parts.**
- **Replace a sensor if it is dented, cracked, or deformed.**

1. Disconnect the battery negative cable, then disconnect the positive cable.
2. Remove the glove box damper (see section 20), then remove the glove box.
3. Connect the short connectors to the airbags.

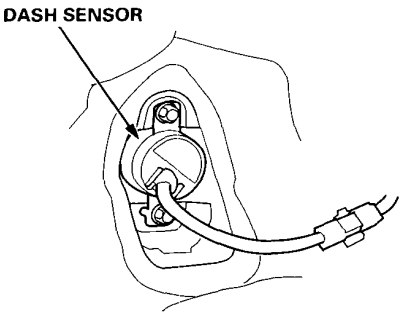
Driver's Side:



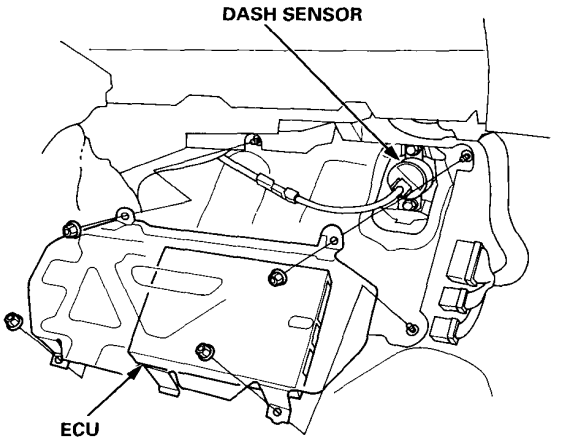
Front Passenger's Side:



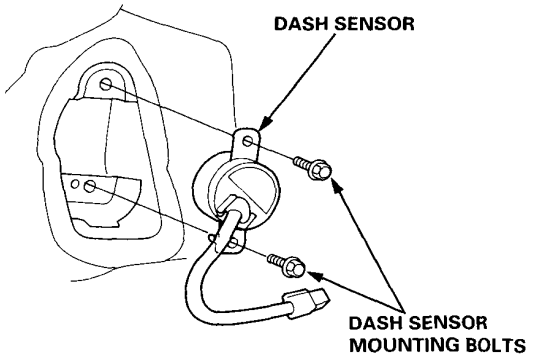
4. Driver's side:
   Remove the footrest and steering joint cover, then pull the carpet back and pull the rubber floor pad up.



5. Front passenger's side:
   Remove the door sill molding and pull back the carpet, then remove the ECU. Pull the rubber floor pad up.



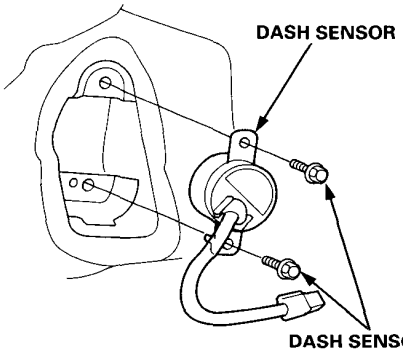
6. Remove the two mounting bolts, then remove the dash sensor.



CAUTION:

- **Be sure to install the harness wires so that they are not pinched or interfering with other car parts.**
- **Carefully inspect the dash sensors for signs of being dropped or improperly handled, such as dents, cracks or deformation.**
- **For the SRS to function properly, the right and left sensors must be installed on the proper sides.**

7. Install the sensor securely.



8. Reinstall all other removed parts.
9. Remove and properly store the short connectors (RED), then reconnect the airbag connectors (and reinstall the access panel and the glove box).
10. Reconnect the battery positive cable, then the negative cable.
11. After installing the dash sensor, confirm proper system operation: Turn the ignition ON (II): the instrument panel SRS indicator light should come on for about six seconds and then go off.

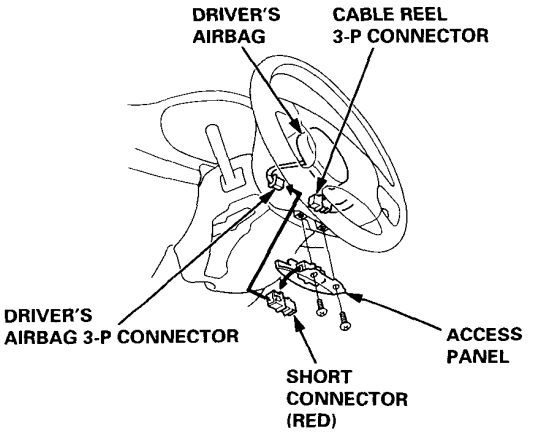
SRS Unit Replacement

CAUTION:

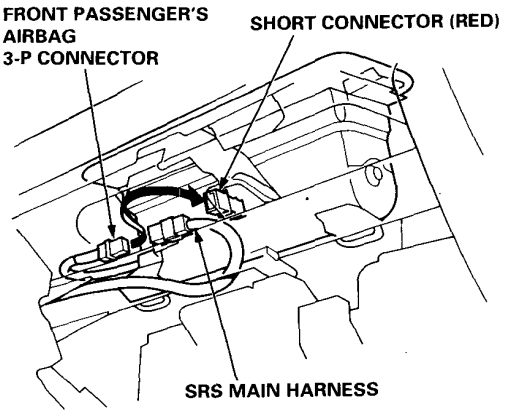
- **Before disconnecting any part of the SRS wire harness, connect the short connectors (RED) to the airbags.**
- **Do not damage the SRS unit terminals or connectors.**
- **Do not disassemble the SRS unit; it has no serviceable parts.**
- **Store the SRS unit in a clean, dry area.**
- **Do not use any SRS unit which has been subjected to water damage or shows signs of being dropped or improperly handled, such as dents, cracks or deformation.**

1. Disconnect the battery negative cable, then the positive cable.
2. Connect the short connectors to the airbags.

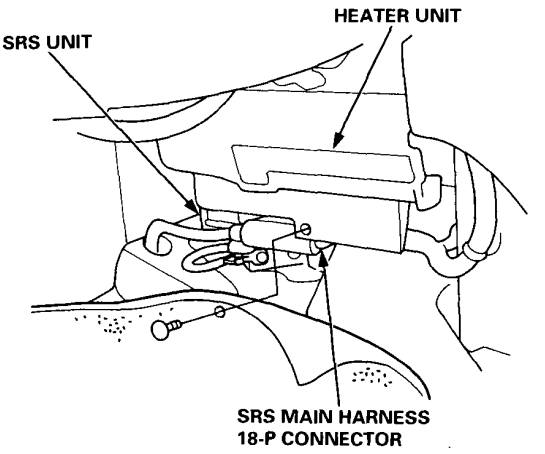
Driver's Side:



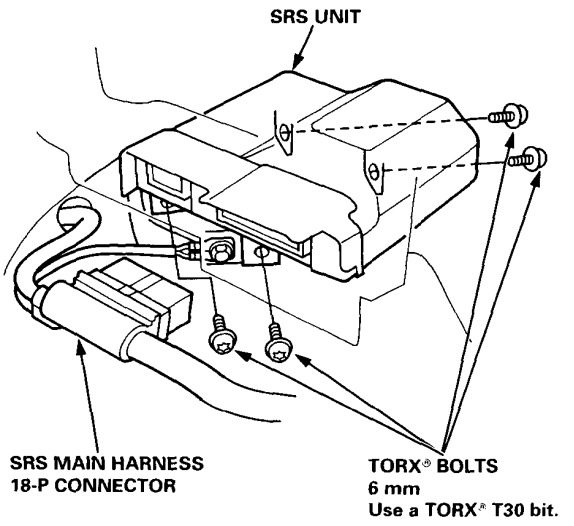
Front Passenger's Side:



3. Pull down the carpeting from *both sides of the* heater unit and front console.
4. Disconnect the SRS main harness 18-P connector from the SRS unit.

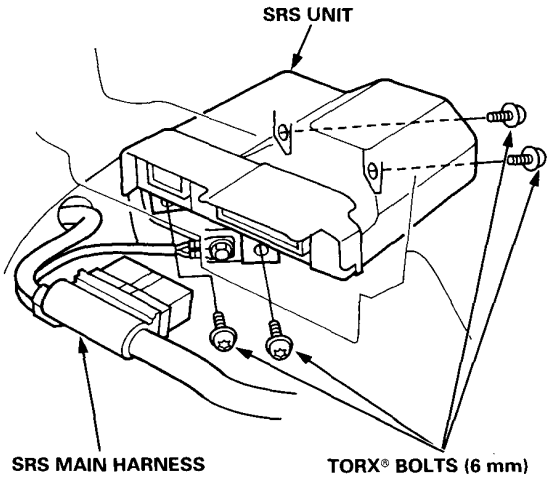


5. Remove the four TORX® bolts from the SRS unit, then pull out the SRS unit from the left side.

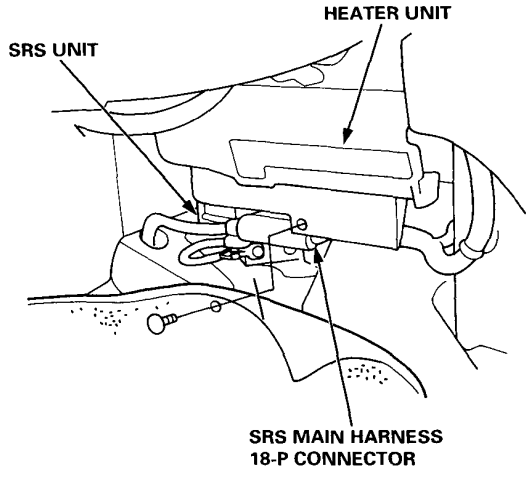


CAUTION: Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts.

6. Install the new SRS unit.



7. Connect the SRS main harness 18-P connector to the SRS unit, then push it into position until it clicks.



8. Put the carpet back in place.

9. Remove and properly store the short connectors, then reconnect the airbag connectors (and reinstall the access panel and the glove box).

10. Reconnect the battery positive cable, then the negative cable.

11. After installing the SRS unit, confirm proper system operation: Turn the ignition ON (II): the instrument panel SRS indicator light should come on for about six seconds and then go off.

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