Chassis and Engine Numbers

Vehicle Identification Number (VIN)

SHHMA87100U000001

Manufacturer, Make and Type of Vehicle
SHH: HONDA OF THE U.K. MFG., LTD. England. HONDA Passenger car

Line, Body and Engine Type
MA8: CIVIC 5-door/D14A2
MA9: CIVIC 5-door/D15Z3
MB1: CIVIC 5-door/D16Y2, D16Y3

Body and Transmission Type
7: 5-door Hatchback 5-speed Manual
8: 5-door Hatchback 4-speed Automatic

Vehicle Grade
1: 1.4i, 1.5i VTEC-E
2: 1.4i, 1.5i VTEC-E, 1.6i LS
3: 1.4i, 1.5i VTEC-E
4: 1.4i, 1.5i VTEC-E, 1.6i LS
5: 1.6i LS
6: 1.6i SR VTEC
7: 1.6i SR VTEC

Fixed Code

Auxiliary Number

Factory Code
U: Honda of the U.K. Manufacturing in England

Model Year
0: 1995

Serial Number

Engine Number

D14A2-E100001

Engine Type
D14A2: 1400 SOHC 16-valves Sequential Multiport Fuel-injected engine
D15Z3: 1500 SOHC 16-valves Sequential Multiport Fuel-injected VTEC-E engine
D16Y2: 1600 SOHC 16-valves Sequential Multiport Fuel-injected VTEC engine
D16Y3: 1600 SOHC 16-valves Sequential Multiport Fuel-injected engine

Serial Number

Transmission Number

S1LA-1000001

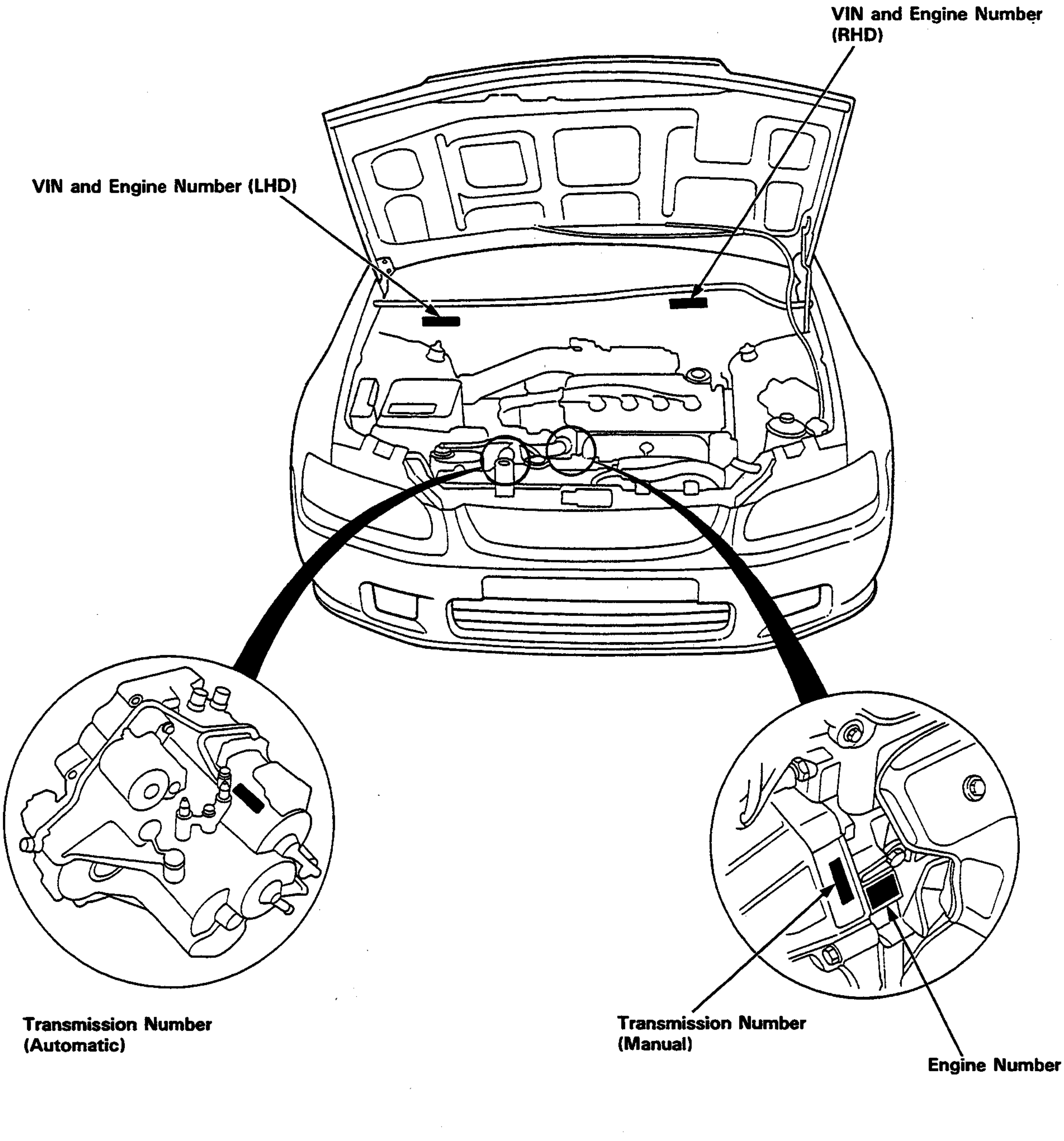
Transmission Type
S1LA: 4-speed Automatic
S20: 5-speed Manual

Serial Number
S1LA: 1000001 ~
S20: 2000001 ~

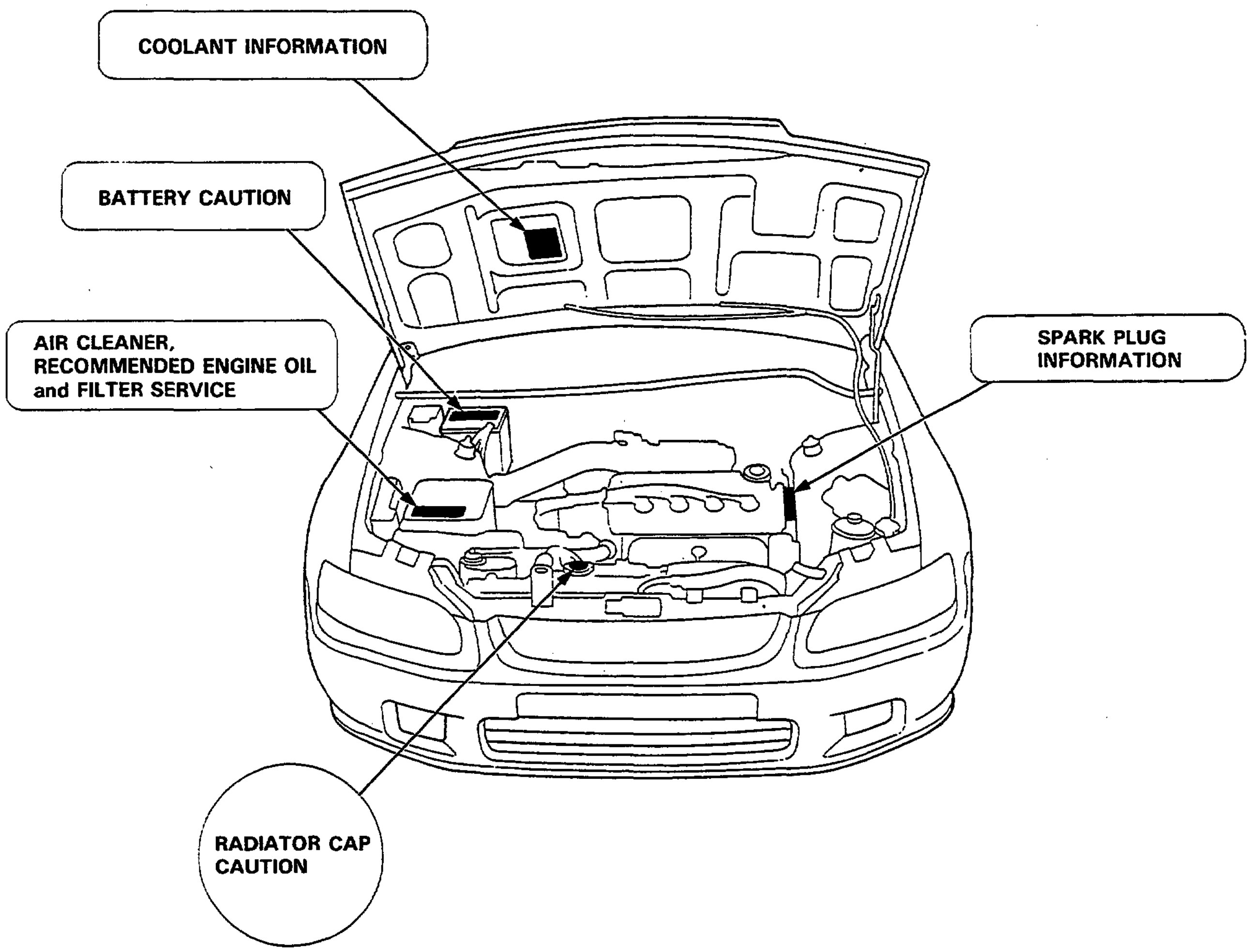
Model/VIN/Engine Number/Transmission Number List

MODEL	GRADE NAME	TRANS-MISSION TYPE	VEHICLE IDENTIFICATION NUMBER	ENGINE NUMBER	TRANSMISSION NUMBER
CIVIC 5-door	1.4i	5MT	SHHMA87100U000001 ~	D14A2-E100001 ~	S20-2000001 ~
	1.4i	5MT	SHHMA87200U000001 ~	D14A2-E100001 ~	S20-2000001 ~
	1.4i	4AT	SHHMA88200U000001 ~	D14A2-E100001 ~	S1LA-1000001 ~
	1.5i VTEC-E	5MT	SHHMA97100U000001 ~	D15Z3-E100001 ~	S20-2000001 ~
	1.5i VTEC-E	5MT	SHHMA97200U000001 ~	D15Z3-E100001 ~	S20-2000001 ~
	1.6i LS	5MT	SHHMB17200U000001 ~	D16Y3-E100001 ~	S20-2000001 ~
	1.6i LS	4AT	SHHMB18200U000001 ~	D16Y3-E100001 ~	S1LA-1000001 ~
	1.6i SR VTEC	5MT	SHHMB17600U000001 ~	D16Y2-E100001 ~	S20-2000001 ~
CIVIC 5-door with SRS airbag	1.4i	5MT	SHHMA87300U000001 ~	D14A2-E100001 ~	S20-2000001 ~
	1.4i	4AT	SHHMA88300U000001 ~	D14A2-E100001 ~	S1LA-1000001 ~
	1.4i	5MT	SHHMA87400U000001 ~	D14A2-E100001 ~	S20-2000001 ~
	1.4i	4AT	SHHMA88400U000001 ~	D14A2-E100001 ~	S1LA-1000001 ~
	1.5i VTEC-E	5MT	SHHMA97400U000001 ~	D15Z3-E100001 ~	S20-2000001 ~
	1.5i VTEC-E	5MT	SHHMA97300U000001 ~	D15Z3-E100001 ~	S20-2000001 ~
	1.6i LS	5MT	SHHMB17400U000001 ~	D16Y3-E100001 ~	S20-2000001 ~
	1.6i LS	4AT	SHHMB18400U000001 ~	D16Y3-E100001 ~	S1LA-1000001 ~
	1.6i LS	5MT	SHHMB17500U000001 ~	D16Y3-E100001 ~	S20-2000001 ~
	1.6i LS	4AT	SHHMB18500U000001 ~	D16Y3-E100001 ~	S1LA-1000001 ~
	1.6i SR VTEC	5MT	SHHMB17700U000001 ~	D16Y2-E100001 ~	S20-2000001 ~

Identification Number Locations

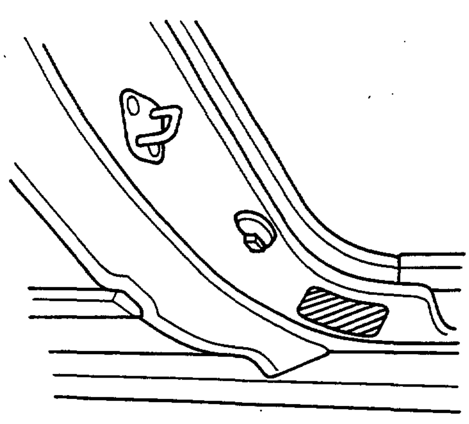


Warning/Caution Label Locations



TIRE INFORMATION

RHD:



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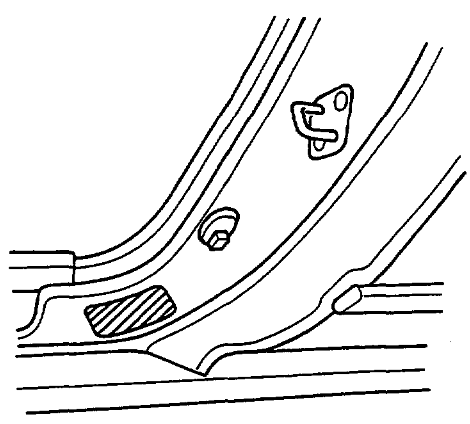
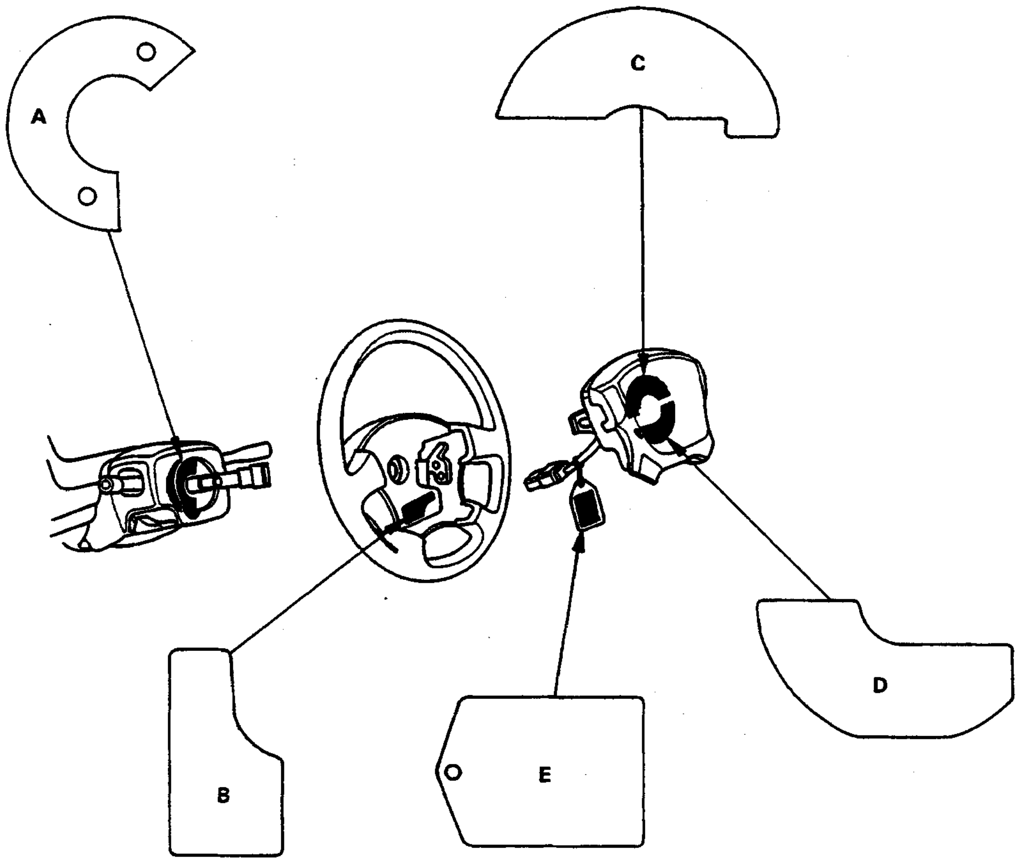


SRS Warning/Caution Label Locations



A: CABLE REAL CAUTION A

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

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

取扱い、保管はサービスマニュアルを参照してください。

AUSFÜHRLICHE ANMEISUNGEN SIND DEM ZU ENTINEMEN.

RAAD PLEEG HET WERKPLAATSHANDBOEK VOOR NADERE AANWIJZINGEN.

B: STEERING WHEEL CAUTION LABEL

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

C: DRIVER MODULE DANGER

- 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.

D: DRIVER MODULE WARNING

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

E: INFLATOR BAM LABEL
ISI manufactured inflator:

AIRBAG GAS GENERATOR 667.1
HERSTELLUNGSJAHR: 19XX
EINFÜHRER: HONDA DEUTSCHLAND
GMBH/OFFENBACH
BAM PT1-0468

DER GASGENERATOR DART NUR FÜR INSASSENRÜCK-HALTESYSTEME MIT LUFTSACK IN KRAFTFAHRZEUGE MONTIERT WERDEN.
DIE MONTAGE UND DEMONTAGE DES GASGENERATORS DARF NUR VON DAFÜR GESCHULTEM PERSONAL VOR-GENOMMEN WERDEN.

CAUTION CONTAINS FLAMMABLE SOLIDS US DOT-E	THE GAS GENERATOR SHOULD ONLY BE INSTALLAED 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	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.

F: HOOD WARNING LABEL

WARNING SRS
THIS VEHICLE IS EQUIPPED WITH A AIRBAG SYSTEM AS A SUPPLEMENTAL RESTRAINT SYSTEM. (SRS)
ALL S.R.S. ELECTRICAL WIRING AND CONNECTORS ARE COLORED YELLOW.
DO NOT USE ELECTRICAL TEST EQUIPMENT ON THESE CIRCUITS.
TAMPERING WITH OR DISCONNECTING THE S.R.S. WIRING COULD RESULT IN ACCIDENTAL FIRING OF THE INFLATOR OR MAKE THE SYSTEM INOPERATIVE, WHICH MAY RESULT IN SERIOUS INJURY.

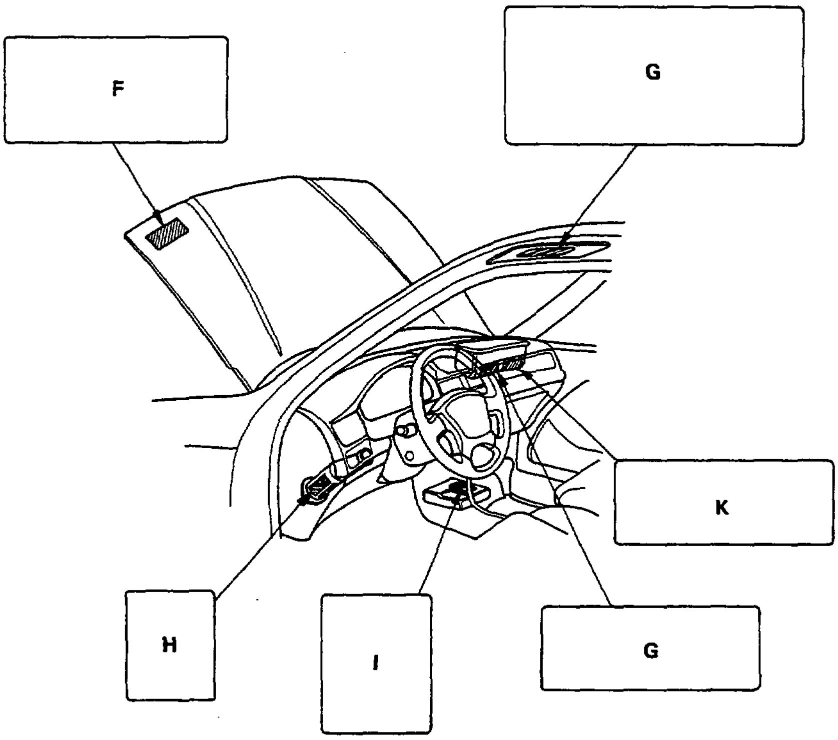
ATTENTION SRS
CE VEHICULE EST EQUIPE D'UN COUSSIN D'AIR DU COTE CONDUCTEUR QUI CONSTITUE UN SYSTEME DE RETENUE COMPLEMENTAIRE (S.R.S.).
TOUS LES FILS ET CONNECTEURS ELECTRIQUES DU SYSTEME DE RETENUE COMPLEMENTAIRE (S.R.S.) SONT DE COULEUR JAUNE. N'UTILISEZ PAS UN EQUIPEMENT D'ESSAIS ELECTRIQUES SUR CES CIRCUITS. NE TOUCHEZ PAS ET NE DEBRANCHEZ PAS LES FILS DU SYSTEME S.R.S. CAR CECI POURRAIT DE TRADUIRE PAR LE DECLENCHEMENT ACCIDENTEL DU GONFLEUR OU RENDRE LE SYSTEME INOPERANT ET VOUS EXPOSER AINSI A DE GRAVES BLESSURES.

WARNUNG SRS
DIESES FAHRZEUG IST MIT EINEM FAHRER-AIRBAG (SRS) ALS ZUSÄTZLICHEM RÜCKHALTESYSTEM AUSGERÜSTET.
ALLE ELEKTRISCHEN KABEL, SOWIE DIE ZUGEHÖRIGEN STECKVERBINDER DES S.R.S.-SYSTEMS SIND IN GELBER FARBE AUSGEFÜHRT. KEINE ELEKTRISCHEN PRÜFGERÄTE AN DIE S.R.S.-VERKABELUNG ANSCHLIEBEN. VERÄNDERN ODER UNTERBRECHEN DER S.R.S.-VERKABELUNG KANN UNKONTROLLIERTES ZÜNDEN DES GASGENERATORS AUSLÖSEN.
ODER DAS SYSTEM AUBER FUNKTION SETZEN WAS ZU ERNSTHAFTEN VERLETZUNGEN FÜHREN KANN.

WAARSCHUWING SRS
DIT VOERTUIG IS UITGERUST MET EEN LUCHTKUSSEN AAN DE BESTUURDERSKANT ALS EXTRA BESCHERMING (S.R.S.).
ALLE ELEKTRISCHE LEIDINGEN EN AANSLUITINGEN VAN DE S.R.S. ZIJN GEEL GEKLEURD. GEBRUIK GEEN ELEKTRISCHE TESTAPPARATUUR VOOR DEZE CIRCUITS. KNOEIEN MET OF LOSKOPPELEN VAN DE S.R.S. LEIDINGEN KAN LEIDEN TOT BRAND IN DE VULINRICHTING OF TOT UITSCHAKELEN VAN HET SYSTEEM: DIT KAN TOT ERNSTIGE ONGELUKKEN LEIDEN.

cont'd

LHD:



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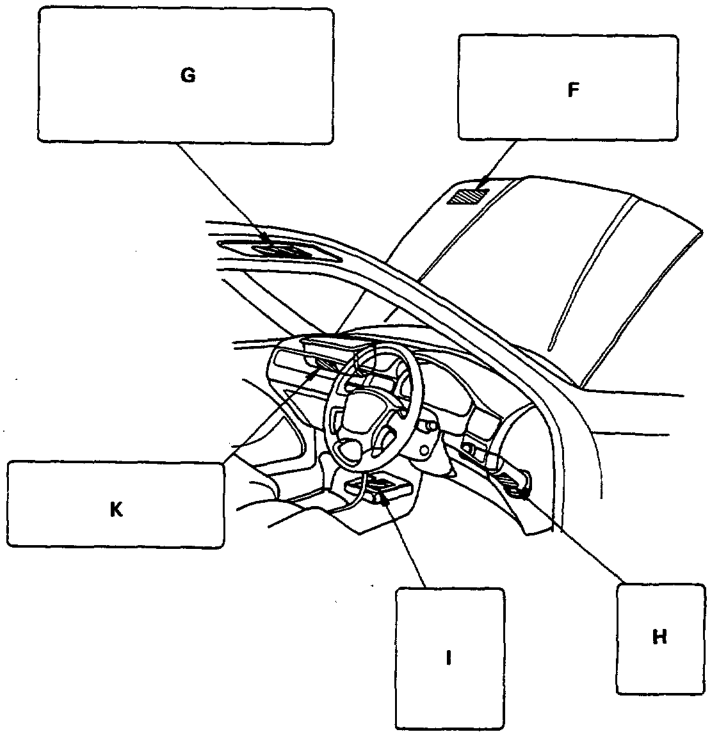


G: DRIVER INFORMATION (SUNVISOR)

SRS ALWAYS WEAR YOUR SEAT BELT
- THIS CAR IS EQUIPPED WITH A DRIVER 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 CEINTURE
- CE VEHICULE EST EQUIPE D'UN COUSSIN D'AIR POUR LE CONDUCTEUR QUI CONSTITUE UN SYSTEME DE RETENUE COMPLEMENTAIRE (S.R.S.).
- CE COUSSIN D'AIR COMPLETE LA FONCTION DE LA CEINTURE DE SECURITE.
- SI LE TEMOIN SRS S'ALLUME PENDANT LA CONDUITE, ADRESSEZ-VOUS A VOTRE CONCESSIONNAIRE HONDA OFFICIEL.

SRS SICHERHEITSGURTE BEI JEDER FAHRT ANLEGEN
- DIESES FAHRZEUG BESITZT EINEN FAHRER-AIRBAG ALS ZUSÄTZLICHES RÜCKHALTESYSTEM (S.R.S.).
- ES IST EINE ERGÄNZUNG ZUM SICHERHEITSGURT.
- WENN DIE SRS-KONTROLLEUCHTE WAHREND DER FAHRT AUFLEUCHTET, UMGEHEND FINEN HONDA HÄNDLER AUFSUCHEN.

SRS DRAAG ALTIJD UW VEILIGHEIDSGORDEL
- DIT VOERTUIG IS UITGERUST MET EEN LUCHTKUSSEN AAN DE BESTUURDERSKANT ALTS EXTRA BESCHERMING (S.R.S.).
- DIT IS ONTWORPEN ALS EXTRA BESCHERMING BIJ DE VEILIGHEIDSGORDEL.
- ALS HEL SRS-WAARCHUWINGSLAMPJE GAAT BRANDEN ONDER HET RIJDEN. NEEM DAN KONTAKT OP MET EEN HONDA DEALER.

H: STEERING COLUMN CAUTION LABEL

CAUTION SRS
TO AVOID DAMAGING THE S.R.S. CABLE OR REEL, WHICH COULD MAKE THE SYSTEM INOPERATIVE, REMOVE THE STEERING WHEEL BEFORE REMOVING THE STEERING SHAFT CONNECTOR BOLT.

ATTENTION SRS
POUR NE PAS RISQUER D'ENDOMMAGER LE CABLE OU L'ENROULEUR DU S.R.S. ET DE RENDRE AINST LE SYSTEME INOPERANT, RETIREZ LE VOLANT AVANT DE DEVINSSER LE BOULON D'ACCOUPLEMENT D'ARBRE DE DIRECTION.

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 STUURSCHACHT-CONNECTORBOUT VERWIJDERT.

I: MONITOR NOTICE

NOTICE
- NO SERVICEABLE PARTS INSIDE.
- REFER TO SERVICE (SHOP) MANUAL FOR DETAILED INSTRUCTIONS.

お願い
- 分解しないでください。
- 取扱い、保管はサービスマニュアルを参照してください。

REMARQUE
- AUCUNE PIECE REPARABLE A L'INTERIEUR.
- POUR LES INSTRUCTIONS DETAILL'EES, SE REPORTER AU MANUEL DE REPARATIONS.

LET UP!
- GEEN ONDERDELEN BINNEN DEZE UNIT WAARAAN WERKZAAMHEDEN KUNNEN WORDEN VERRICHT.
- RAADPLEEG HET WERKPLAATSHANDBOEX VOOR NADERE AANWIJZINGEN.

ACHTUNG
- DIE INNENTILE BEDÜRFEN KEINER WARTUNG.
- AUSFÜHRLICHE ANWEISUNGEN SIND DEM WERKSTATTHANDBUCH ZU ENTNEHMEN.

G: INFLATOR BAM LABEL
(KK, KG, KZ)

BEZEICHNUNG: BEIFAHRER-AIRBAG-MODUL TKA-1
HERSTELLER: TAKATA CORPORATION
TOKYO & TAKATA INC., AUBURN HILLS
& CHERAW 19XX

HERSTELLUNG: ECHIGAWA
EINFAHRER: HONDA DEUTSCHLAND GMBH,
OFFENBACH BAM-PT1-0523

UMGANG NUR DURCH GESCHULTES PERSONAL ERLAUBT.
VERWENDUNG NUR ALS INSASSEN-RÜCKHALTESYSTEM MIT LUFTSACK FÜR KRAFTFAHRZEUGE ERLAUBT.
BEI AUSLÖSUNG KANN DIE NICHT MONTIERTE EINHEIT ZUM GEFÖHRLICHEN WURFSTÜCK WERDEN.

(cont'd)

K: PASSENGER MODULE DANGER LABEL

SRS

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

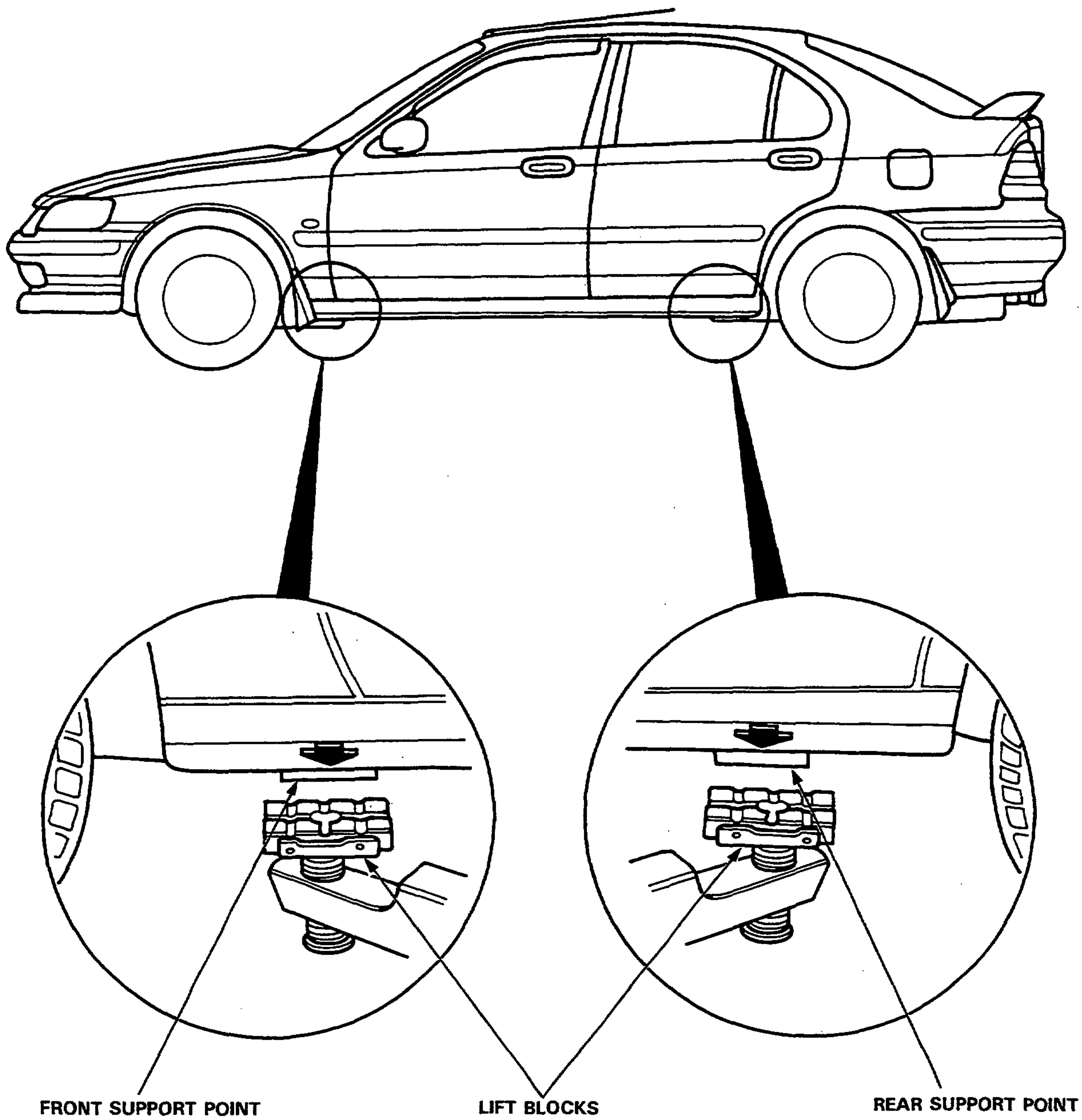
Lift and Support Points

Lift

WARNING When heavy rear components such as suspension, fuel tank, spare tyre and tailgate are to be removed, place additional weight in the luggage area 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 tyre/wheel assembly weighs approximately 14 kg (30 lbs), placing the front wheels in the trunk can assist with weight distribution.

1. Place the lift blocks as shown.
2. Raise the hoist until the tyres are slightly off the ground 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.



Lift and Support Points

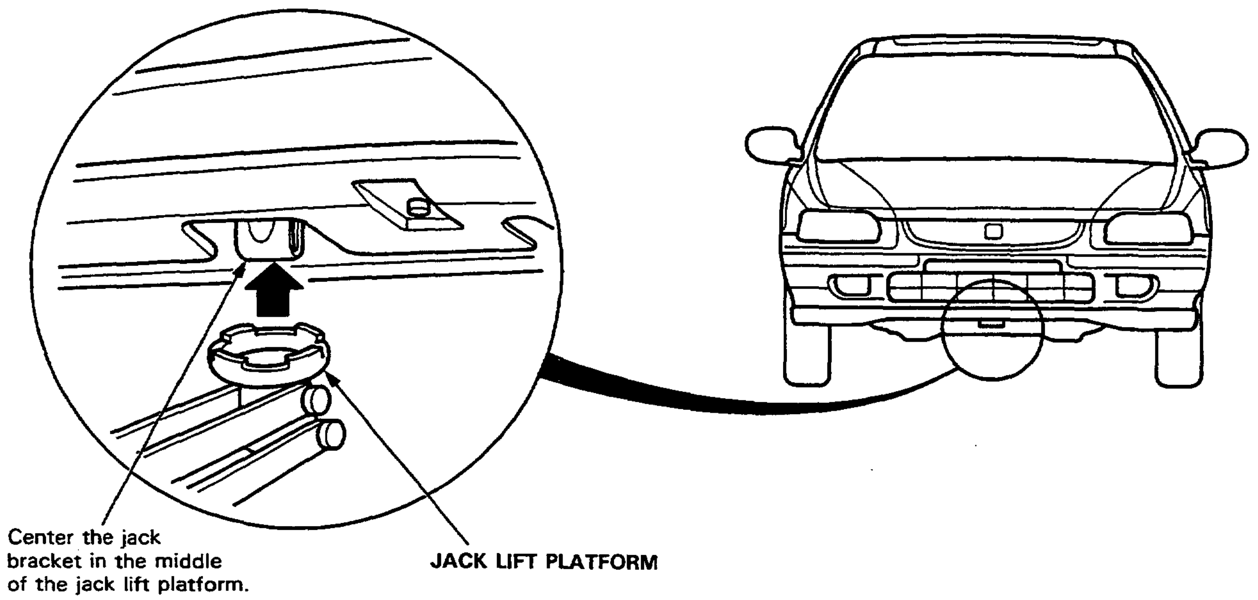
Floor Jack

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 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 1-13 so the car will be approximately level, then lower the car onto them.

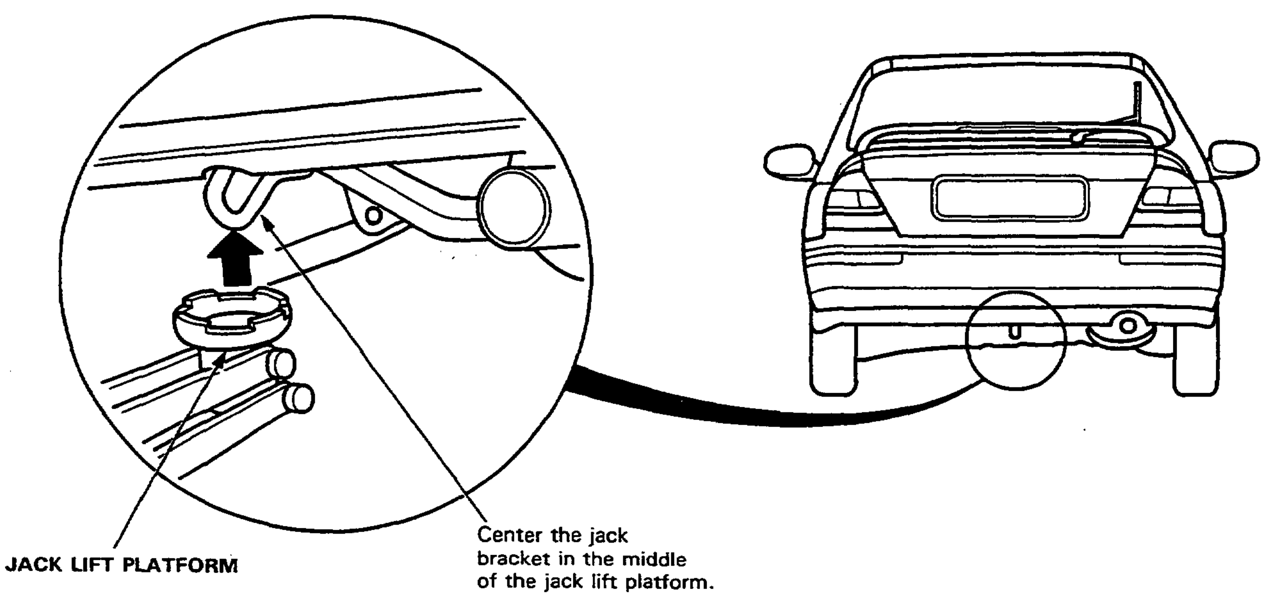
⚠ WARNING

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

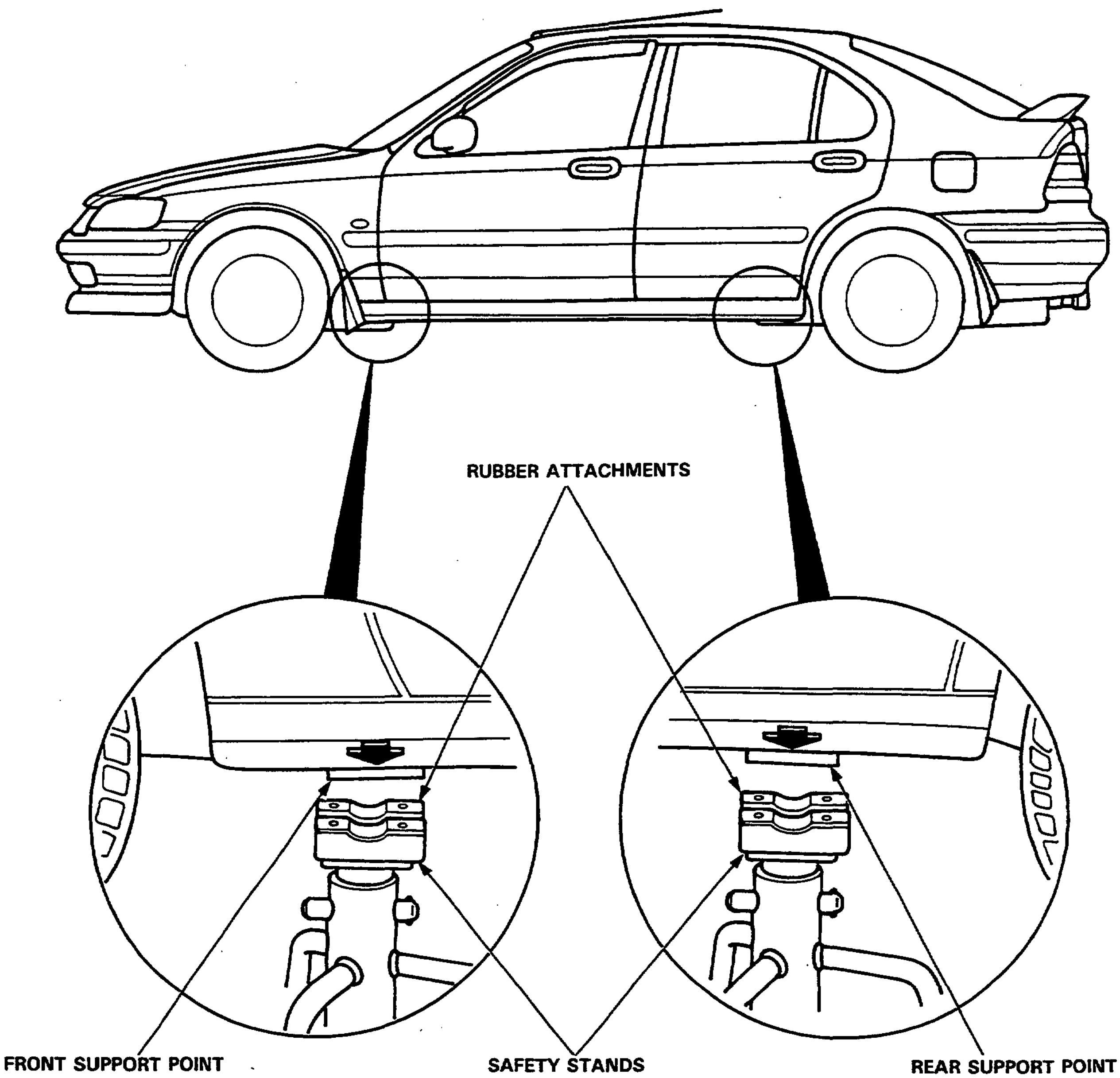
Front



Rear



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 tyres (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.

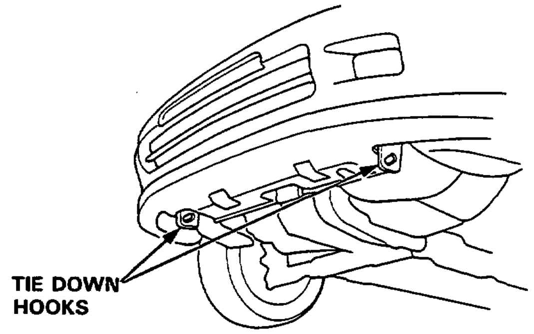
If the car cannot be transported by flat-bed, it should be towed with the front wheels off the ground. If due to damage, the car must be towed with the front wheels on the ground, do the following:

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

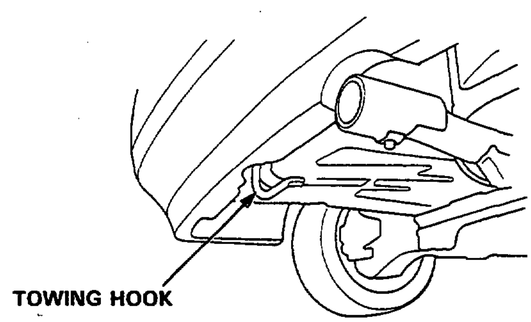
Automatic Transmission
- Release the parking brake.
- Start the engine.
- Shift to $\boxed{D_4}$ position, then $\boxed{N}$ position.
- Turn off the engine.

Then hook rope or chain to the towing hook or the tie down hooks.

FRONT:



REAR:



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.

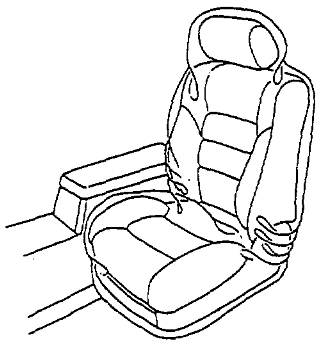
- It is best to tow the car no farther than 50 miles (80km), and keep the speed below 35 mph (55 km/h).

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.

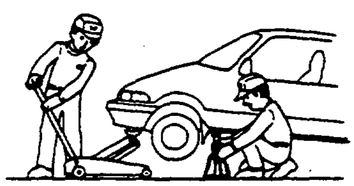
Preparation of Work

CAUTION: Observe all safety precautions and notes while working.

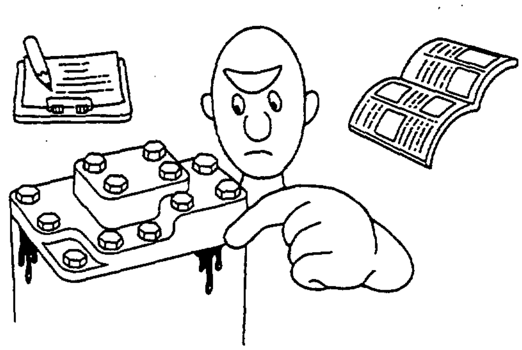
- Protect all painted surfaces and seats against dirt and scratches with a clean cloth or vinyl cover.



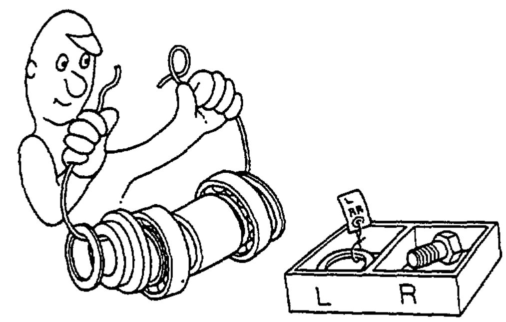
- Work safely and give your work your undivided attention. When either the front or rear wheels are to be raised, block the remaining wheels securely. Communicate at frequently as possible when work involves two or more workers. Do not run the engine unless the shop or working area is well ventilated.



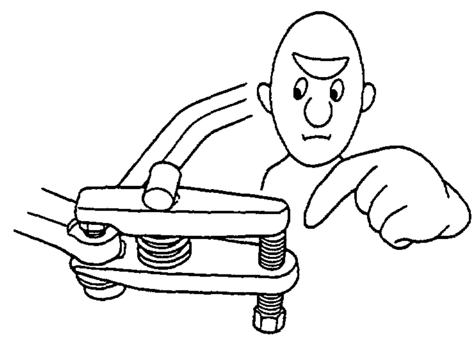
- Before removing or disassembling parts, they must be inspected carefully to isolate the cause for which service is necessary. Observe all safety notes and precautions and follow the proper procedures as described in this manual.



- Mark or place all removed parts in order in a parts rack so they can be reassembled in their original places.

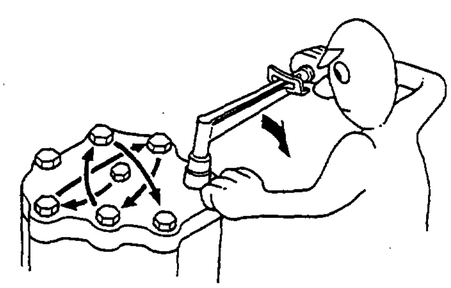


- Use the special tool when use of such a tool is specified.



- Parts must be assembled with the proper torque according to the maintenance standards established.

- When tightening a series of bolts or nuts, begin with the center or large diameter bolts and tighten them in crisscross pattern in two or more steps.



(cont'd)

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

(cont'd)

Abbreviations

(cont'd)

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
$\boxed{P}$	Park
$\boxed{R}$	Reverse
$\boxed{N}$	Neutral
$\boxed{D_4}$	Drive (1st through 4th gear)
$\boxed{D_3}$	Drive (1st through 3rd gear)
$\boxed{2}$	Second
$\boxed{1}$	First
1ST	Low (gear)
2ND	Second (gear)
3RD	Third (gear)
4TH	Fourth (gear)
5TH	Fifth (gear)

Standards and Service Limits

Cylinder Head/Valve Train — Section 6
D14A2, D16Y3 Engines

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 rpm (min⁻¹) and wide open throttle kPa (kgf/cm², psi)	Nominal	1,300 (13.0, 184)	
		Minimum	950 (9.5, 135)	
		Maximum variation	200 (2.0, 28)	
Cylinder head	Warpage		——	0.05 (0.002)
	Height		94.95 – 95.05 (3.738 – 3.742)	——
Camshaft	End play		0.05 – 0.15 (0.002 – 0.006)	0.5 (0.02)
	Camshaft-to-holder oil clearance		0.050 – 0.089 (0.002 – 0.004)	0.15 (0.006)
	Total runout		0.03 (0.001) max.	0.04 (0.002)
	Cam lobe height D14A2	IN	34.545 (1.3600)	——
		EX	35.175 (1.3848)	——
	D16Y3	IN	36.782 (1.4481)	——
		EX	36.947 (1.4546)	——
Valve	Valve clearance	IN	0.18 – 0.22 (0.007 – 0.009)	——
		EX	0.23 – 0.27 (0.009 – 0.011)	——
	Valve stem O.D.	IN	5.48 – 5.49 (0.2157 – 0.2161)	5.45 (0.2146)
		EX	5.45 – 5.46 (0.2146 – 0.2150)	5.42 (0.2134)
	Stem-to-guide clearance	IN	0.02 – 0.05 (0.001 – 0.002)	0.08 (0.003)
		EX	0.05 – 0.08 (0.002 – 0.003)	0.11 (0.004)
Valve seat	Width	IN	0.85 – 1.15 (0.033 – 0.045)	1.6 (0.063)
		EX	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.079)
	Stem installed height	IN	46.985 – 47.455 (1.8498 – 1.8683)	47.705 (1.8781)
		EX	48.965 – 49.435 (1.9278 – 1.9463)	49.685 (1.9561)
Valve spring	Free length	IN	48.58 (1.913)	——
		EX	49.19 (1.937)	——
Valve guide	I.D.	IN	5.51 – 5.53 (0.217 – 0.218)	5.55 (0.219)
		EX	5.51 – 5.53 (0.217 – 0.218)	5.55 (0.219)
	Installed height	IN	15.95 – 16.45 (0.628 – 0.648)	——
		EX	15.95 – 16.45 (0.628 – 0.648)	——
Rocker arm	Arm-to-shaft clearance	IN	0.017 – 0.050 (0.0007 – 0.0020)	0.08 (0.003)
		EX	0.018 – 0.054 (0.0007 – 0.0021)	0.08 (0.003)

Unit of length: mm (in)

Cylinder Head/Valve Train — Section 6
D15Z3, D16Y2 Engines

	MEASUREMENT				STANDARD (NEW)	SERVICE LIMIT
Compression	250 rpm (min-1) and wide open throttle kPa (kgf/cm², psi)			Nominal	1,300 (13.0, 184)	
				Minimum	1,150 (11.5, 166)	
				Maximum variation	200 (2.0, 28)	
Cylinder head	Warpage				—	0.05 (0.002)
	Height				92.95 – 93.05 (3.659 – 3.663)	—
Camshaft	End play				0.05 – 0.15 (0.002 – 0.006)	0.5 (0.02)
	Camshaft-to-holder oil clearance				0.050 – 0.089 (0.002 – 0.004)	0.15 (0.006)
	Total runout				0.03 (0.001) max.	0.04 (0.002)
	Cam lobe height	D15Z3	IN	Primary	38.427 (1.5129)	—
				Secondary	32.292 (1.2713)	—
			EX		37.997 (1.4959)	—
		D16Y2	IN	Primary	35.900 (1.4134)	—
				Mid	38.274 (1.5068)	—
				Secondary	36.195 (1.4250)	—
			EX		38.008 (1.4964)	—
Valve	Valve clearance		IN		0.18 – 0.22 (0.007 – 0.009)	—
			EX		0.23 – 0.27 (0.009 – 0.011)	—
	Valve stem O.D.		IN		5.48 – 5.49 (0.2157 – 0.2161)	5.45 (0.2146)
			EX		5.45 – 5.46 (0.2146 – 0.2150)	5.42 (0.2134)
	Stem-to-guide clearance		IN		0.02 – 0.05 (0.001 – 0.002)	0.08 (0.003)
			EX		0.05 – 0.08 (0.002 – 0.003)	0.12 (0.005)
Valve seat	Width		IN		0.85 – 1.15 (0.033 – 0.045)	1.6 (0.063)
			EX		1.25 – 1.55 (0.049 – 0.061)	2.0 (0.079)
	Stem installed height		IN		53.165 – 53.635 (2.0931 – 2.1116)	53.885 (2.1215)
			EX		53.165 – 53.635 (2.0931 – 2.1116)	53.885 (2.1215)
Valve spring	Free length	D15Z3	IN		54.78 (2.157)	—
			EX		58.23 (2.293)*1	—
					58.26 (2.294)*2	—
		D16Y2	IN		57.97 (2.282)	—
			EX		58.41 (2.300)	—
Valve guide	I.D.		IN		5.51 – 5.53 (0.217 – 0.218)	5.60 (0.220)
			EX		5.51 – 5.53 (0.217 – 0.218)	5.60 (0.220)
	Installed height		IN		17.85 – 18.35 (0.703 – 0.722)	—
			EX		18.65 – 19.15 (0.734 – 0.754)	—
Rocker arm	Arm-to-shaft clearance		IN		0.017 – 0.050 (0.0007 – 0.0020)	0.08 (0.003)
			EX		0.018 – 0.054 (0.0007 – 0.0021)	0.08 (0.003)

*1: NIHON HATSUJO manufactured valve spring. *2: CHUO HATSUJO manufactured valve spring.

Standards and Service Limits

Engine Block — Section 7

	MEASUREMENT			STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Wapage of deck surface			0.07 (0.003) max.	0.10 (0.004)
	Bore diameter			75.00 – 75.02 (2.953 – 2.954)	75.07 (2.956)
	Bore taper			——	0.05 (0.002)
	Reboring limit			——	0.5 (0.02)
Piston	Skirt O.D.	At 15 mm (0.6 in) from bottom of skirt		74.980 – 74.990 (2.9520 – 2.9524)	74.970 (2.9516)
	Clearance in cylinder			0.010 – 0.040 (0.0004 – 0.0016)	0.05 (0.002)
	Groove width (for ring)				
	Top		D15Z1	1.020 – 1.030 (0.0402 – 0.0406)	1.05 (0.041)
			Except D15Z1	1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
	Second		D15Z1	1.220 – 1.230 (0.0480 – 0.0484)	1.25 (0.049)
			Except D15Z1	1.520 – 1.530 (0.0598 – 0.0602)	1.55 (0.061)
	Oil		D15Z3, D16Y2	2.805 – 2.820 (0.1104 – 0.1110)	2.85 (0.112)
			D14A2, D16Y3	2.805 – 2.825 (0.1104 – 0.1112)	2.85 (0.112)
Piston ring	Ring-to-groove clearance	Top	D15Z3	0.035 – 0.060 (0.0014 – 0.0024)	0.13 (0.005)
			Except D15Z3	0.030 – 0.055 (0.0012 – 0.0022)*1	0.13 (0.005)
				0.030 – 0.060 (0.0012 – 0.0024)*2	0.13 (0.005)
		Second	D15Z3	0.035 – 0.060 (0.0014 – 0.0024)*1	0.13 (0.005)
				0.030 – 0.055 (0.0012 – 0.0022)*2	0.13 (0.005)
			Except D15Z3	0.030 – 0.055 (0.0012 – 0.0022)	0.13 (0.005)
	Ring end gap	Top		0.15 – 0.30 (0.006 – 0.012)	0.60 (0.024)
		Second		0.30 – 0.45 (0.012 – 0.018)	0.70 (0.028)
		Oil	D15Z3	0.20 – 0.50 (0.008 – 0.020)*1	0.70 (0.028)
				0.20 – 0.70 (0.008 – 0.028)*2	0.80 (0.031)
			D16Y2	0.20 – 0.50 (0.008 – 0.020)*1	0.70 (0.028)
				0.20 – 0.80 (0.008 – 0.031)*2	0.90 (0.035)
			D14A2, D16Y3	0.20 – 0.80 (0.008 – 0.031)	0.90 (0.035)
Piston Pin	O.D.			18.994 – 19.000 (0.7478 – 0.7480)	——
	Pin-to-piston clearance			0.010 – 0.022 (0.0004 – 0.0009)	——
Connecting rod	Pin-to-rod interference			0.014 – 0.040 (0.0006 – 0.0016)	——
	Small end bore diameter			18.96 – 18.98 (0.746 – 0.747)	——
	Large end bore diameter				
	Nominal		D14A2	43.0 (1.69)	——
			D15Z3	45.0 (1.77)	——
			D16Y2, D16Y3	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		D14A2, D15Z3	44.976 – 45.000 (1.7707 – 1.7717)	——
			D16Y2, D16Y3	54.976 – 55.000 (2.1644 – 2.1654)	——
	Rod journal diameter		D14A2	39.976 – 40.000 (1.5739 – 1.5748)	——
			D15Z3	41.976 – 42.000 (1.6256 – 1.6535)	——
			D16Y2, D16Y3	44.976 – 45.000 (1.7707 – 1.7717)	——
	Taper			0.0025 (0.00010) max.	0.005 (0.0002)
	Out-of round			0.0025 (0.00010) max.	0.005 (0.0002)
	End play			0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)
	Total runout			0.03 (0.001) max.	0.04 (0.002)
Bearings	Main bearing-to-journal oil clearance				
			No. 1 and 5 journals	0.018 – 0.036 (0.0007 – 0.0014)	0.05 (0.002)
			No. 2, 3 and 4 journals	0.024 – 0.042 (0.0009 – 0.0017)	0.05 (0.002)
	Rod bearing-to-journal oil clearance			0.020 – 0.038 (0.0008 – 0.0015)	0.05 (0.002)

*1: TEIKOKU PISTON RING manufactured piston ring.
*2: RIKEN manufactured piston ring.

Unit of length: mm (in)

Engine Lubrication — Section 8

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)	D14A2, D16Y3 D15Z3, D16Y2	4.0 (4.2, 3.5) for engine overhaul 4.2 (4.4, 3.7) for engine overhaul 3.3 (3.5, 2.9) for oil change, including filter 3.0 (3.2, 2.6) for oil change, without filter	
Oil pump	Inner-to-outer rotor radial clearance Pump body-to-outer rotor radial clearance Pump body-to-rotor axial clearance		0.02 – 0.14 (0.001 – 0.006) 0.10 – 0.18 (0.004 – 0.007) 0.03 – 0.08 (0.001 – 0.003)	0.20 (0.008) 0.20 (0.008) 0.15 (0.006)
Relief valve	Pressure setting 80°C (176°F) kPa (kgf/cm^2, psi)	 at idle at 3,000 rpm (min^{-1})	 70 (0.7, 10) min. 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: 0.4 ℓ (0.42 US qt, 0.35 Imp qt)	M/T A/T	4.5 (4.8, 4.0) for overhaul 3.6 (3.8, 3.2) for coolant change 4.4 (4.6, 3.9) for overhaul 3.5 (3.7, 3.1) for coolant change
Radiator cap	Opening pressure kPa (kgf/cm^2, psi)		93 – 123 (0.95 – 1.25, 14 – 18)
Thermostat	Start to opening °C (°F) Fully open °C (°F) Valve lift at fully open		76 – 80 (169 – 176) 90 (194) 8.0 (0.31) min.
Cooling fan	Thermoswitch "ON" temperature Thermoswitch "OFF" temperature	°C (°F) °C (°F)	91.0 – 95.0 (196 – 203) Subtract 3 – 8 (5 – 15) from actual "ON" temperature.

Fuel and Emissions — Section 11

	MEASUREMENT	STANDARD (NEW)	
Pressure regulator	Pressure with regulator vacuum hose disconnected kPa (kgf/cm^2, psi)	280 – 330 (2.8 – 3.3, 40 – 47)	
Fuel tank	Capacity ℓ (US gal, Imp gal)	55 (14.5, 12.1)	
Engine	Idle speed with headlight and cooling fan off rpm (min^{-1})	**M/T: Neutral**	**A/T: N or P position**
		750 ± 50	750 ± 50
	Idle CO	0.1 % max.	

Clutch — Section 12

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height to floor Stroke Total free play Pedal play Disengagement height to floor	 LHD RHD	161 (6.34) 130 – 140 (5.12 – 5.51) 12 – 21 (0.47 – 0.83) 1.0 – 10.0 (0.04 – 0.37) 81 (3.19) min. 79 (3.11) min.	— — — — — —
Flywheel	Clutch surface runout		0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet depth Thickness		1.3 (0.051) min. 8.4 – 9.1 (0.33 – 0.36)	0.2 (0.008) 6.0 (0.24)
Pressure plate	Warpage Diaphragm spring finger alignment		0.03 (0.001) max. 0.8 (0.03) max.	0.15 (0.006) 1.0 (0.04)

Standards and Service Limits

Manual Transmission — Section 13

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)		1.9 (2.0, 1.7) for overhaul 1.8 (1.9, 1.6) for oil change	
Mainshaft	End play		0.11 – 0.18 (0.004 – 0.007)	Adjust
	Diameter of ball bearing contact area (Transmission housing side)		21.987 – 22.000 (0.8656 – 0.8661)	21.930 (0.8634)
	Diameter of 4th, 5th gear contact area		26.980 – 26.993 (1.0622 – 1.0627)	26.930 (1.0602)
	Diameter of 3rd gear contact area		33.984 – 34.000 (1.3380 – 1.3386)	33.930 (1.3358)
	Diameter of ball bearing contact area (Clutch housing side)		25.977 – 25.990 (1.0227 – 1.0232)	25.920 (1.0205)
	Runout		0.02 (0.001) max.	0.05 (0.002)
Mainshaft 3rd and 4th gears	I.D.		39.009 – 39.025 (1.5358 – 1.5364)	39.07 (1.538)
	End play	3rd	0.06 – 0.21 (0.002 – 0.008)	0.33 (0.013)
		4th	0.06 – 0.19 (0.002 – 0.007)	0.31 (0.012)
	Thickness	3rd	30.22 – 30.27 (1.190 – 1.192)	30.15 (1.187)
		4th	30.12 – 30.17 (1.186 – 1.188)	30.05 (1.183)
Mainshaft 5th gear	I.D.		37.009 – 37.025 (1.4570 – 1.4577)	37.07 (1.459)
	End play		0.06 – 0.19 (0.002 – 0.007)	0.31 (0.012)
	Thickness		28.42 – 28.47 (1.119 – 1.121)	28.35 (1.116)
Countershaft	Diameter of needle bearing contact area		30.000 – 30.015 (1.1811 – 1.1817)	29.950 (1.1791)
	Diameter of 1st gear contact area		35.984 – 36.000 (1.4167 – 1.4173)	35.930 (1.4146)
	Diameter of ball bearing contact area		24.980 – 24.993 (0.9835 – 0.9840)	24.930 (0.9815)
	Runout		0.02 (0.0008) max.	0.05 (0.002)
Countershaft 1st gear	I.D.		41.009 – 41.025 (1.6145 – 1.6152)	41.07 (1.617)
	End play (When tightened by the specified torque)		0.03 – 0.10 (0.001 – 0.004)	0.22 (0.009)
	Thickness		30.41 – 30.44 (1.197 – 1.198)	30.36 (1.195)
Countershaft 2nd gear	I.D.		44.009 – 44.025 (1.7326 – 1.7333)	44.07 (1.735)
	End play (When tightened by the specified torque)		0.03 – 0.11 (0.001 – 0.004)	0.23 (0.009)
	Thickness		31.92 – 31.97 (1.257 – 1.259)	31.85 (1.254)
Spacer collar (Countershaft 2nd gear)	I.D.		33.000 – 33.010 (1.2992 – 1.2996)	33.05 (1.301)
	O.D.		38.989 – 39.000 (1.5350 – 1.5354)	38.93 (1.533)
	Length		32.03 – 32.06 (1.261 – 1.262)	32.01 (1.260)
Spacer collar (Mainshaft 4th and 5th gear)	I.D.		27.002 – 27.012 (1.0631 – 1.0635)	27.06 (1.065)
	O.D.	4th	33.989 – 34.000 (1.3381 – 1.3386)	33.93 (1.336)
		5th	31.984 – 32.000 (1.2592 – 1.2598)	31.93 (1.257)
	Length	4th	22.83 – 22.86 (0.899 – 0.900)	22.81 (0.898)
		5th	23.53 – 23.56 (0.926 – 0.928)	23.51 (0.926)
Reverse idler gear	I.D.		15.016 – 15.043 (0.5912 – 0.5922)	15.08 (0.594)
	Gear-to-reverse gear shaft clearance		0.032 – 0.077 (0.0013 – 0.0030)	0.14 (0.006)
Synchro ring	Ring-to-gear clearance (Ring pushed against gear)		0.85 – 1.10 (0.033 – 0.043)	0.4 (0.02)
Shift fork	Fork finger thickness		6.4 – 6.5 (0.252 – 0.255)	———
	Fork-to-synchro sleeve clearance		0.25 – 0.45 (0.010 – 0.018)	0.8 (0.032)
Reverse shift fork	Fork pawl groove width		12.7 – 13.0 (0.50 – 0.51)	———
	Fork-to-reverse idler gear clearance		0.5 – 1.1 (0.020 – 0.043)	1.8 (0.071)
	Groove width	A	7.05 – 7.25 (0.278 – 0.285)	———
		B	7.4 – 7.7 (0.29 – 0.30)	———
	Fork-to-5th/reverse shift piece pin clearance	A	0.05 – 0.35 (0.002 – 0.014)	0.5 (0.02)
		B	0.4 – 0.8 (0.02 – 0.03)	1.0 (0.04)
Shift arm A	Inner diameter of shift arm C contact point		13.05 – 13.13 (0.514 – 0.517)	———
	Shift arm A-to-shift arm C clearance		0.05 – 0.23 (0.002 – 0.009)	0.35 (0.014)
Shift arm B	Inner diameter of shift arm B shaft contact point		13.973 – 14.000 (0.5501 – 0.5512)	———
	Shift arm B-to-shaft clearance		0.013 – 0.070 (0.0005 – 0.0028)	0.16 (0.006)
	Shift arm B-to-shift piece clearance		0.2 – 0.5 (0.008 – 0.020)	0.62 (0.0244)
	Diameter of shift piece contact point		12.9 – 13.0 (0.508 – 0.512)	12.78 (0.5031)

Automatic Transmission — Section 14

Unit of length: mm (in)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)	5.9 (6.2, 5.2) for overhaul 2.7 (2.8, 2.4) for fluid change	
Hydraulic pressure kPa (kgf/cm², psi) D16Y3 engine	Line pressure at 2,000 rpm (min⁻¹) [N] or [P] position	830 – 880 (8.5 – 9.0, 120 – 130)	780 (8.0, 110)
	2nd clutch pressure at 2,000 rpm (min⁻¹) [D4] position 3rd clutch pressure at 2,000 rpm (min⁻¹) [D4] position 4th clutch pressure at 2,000 rpm (min⁻¹) [D4] position	390 (4.0, 57) throttle fully closed | 830 – 880 (8.5 – 9.0, 120 – 130) throttle more than 1/8 opened	340 (3.5, 50) throttle fully closed | 780 (8.0, 110) throttle more than 1/8 opened
	2nd clutch pressure at 2,000 rpm (min⁻¹) [2] position 1st clutch pressure at 2,000 rpm (min⁻¹) [D4] or [1] position	830 – 880 (8.5 – 9.0, 120 – 130)	780 (8.0, 110)
	Governor pressure at 60 km/h (38 mph)	179 – 189 (1.83 – 1.93, 26.0 – 27.4)	175 (1.78, 25.3)
	Throttle B pressure — Throttle fully closed Throttle fully open	0 – 15 (0 – 0.15, 0 – 2.1) 830 – 880 (8.5 – 9.0, 120 – 130)	——— 780 (8.0, 110)
	Throttle A pressure — Throttle fully closed Throttle fully open	0 – 15 (0 – 0.15, 0 – 2.1) 476 – 490 (4.85 – 5.0, 69.0 – 70)	——— 470 (4.8, 68)
Hydraulic pressure kPa (kgf/cm², psi) D14A2 engine	Line pressure at 2,000 rpm (min⁻¹) [N] or [P] position	780 – 830 (8.0 – 8.5, 110 – 120)	740 (7.5, 110)
	2nd clutch pressure at 2,000 rpm (min⁻¹) [D4] position 3rd clutch pressure at 2,000 rpm (min⁻¹) [D4] position 4th clutch pressure at 2,000 rpm (min⁻¹) [D4] position	390 (4.0, 57) throttle fully closed | 780 – 830 (8.0 – 8.5, 110 – 120) throttle more than 1/8 opened	340 (3.5, 50) throttle fully closed | 740 (7.5, 110) throttle more than 1/8 opened
	2nd clutch pressure at 2,000 rpm (min⁻¹) [2] position 1st clutch pressure at 2,000 rpm (min⁻¹) [D4] or [1] position	780 – 830 (8.0 – 8.5, 110 – 120)	740 (7.5, 110)
	Governor pressure at 60 km/h (38 mph)	180 – 190 (1.84 – 1.94, 26.2 – 27.6)	176 (1.79, 25.5)
	Throttle B pressure — Throttle fully closed Throttle fully open	0 – 15 (0 – 0.15, 0 – 2.1) 780 – 830 (8.0 – 8.5, 110 – 120)	——— 740 (7.5, 110)
	Throttle A pressure — Throttle fully closed Throttle fully open	0 – 15 (0 – 0.15, 0 – 2.1) 456 – 470 (4.65 – 4.8, 66.1 – 68)	——— 450 (4.6, 65)
Stall speed rpm (min⁻¹) (check with car on level ground)			
Clutch	Clutch initial clearance — 1st, 2nd 3rd, 4th 1st-hold	0.65 – 0.85 (0.026 – 0.033) 0.40 – 0.60 (0.016 – 0.024) 0.5 – 0.8 (0.02 – 0.03)	——— ——— ———
	Clutch return spring free length — 1st 2nd, 3rd, 4th 1st-hold	31.0 (1.22) 30.5 (1.20) 34.6 (1.36)	29.0 (1.14) 28.5 (1.12) 32.6 (1.28)
	Clutch disc thickness	1.88 – 2.00 (0.074 – 0.079)	Until grooves worn out
	Clutch plate thickness — 1st Except 1st	1.55 – 1.65 (0.061 – 0.065) 1.95 – 2.05 (0.077 – 0.081)	Discoloration Discoloration
	Clutch end plate thickness (except 1st-hold) — MARK 1 MARK 2 MARK 3 MARK 4 MARK 5 MARK 6 MARK 7 MARK 8 MARK 9 MARK 10 MARK 11 MARK 12 MARK 13	2.3 – 2.4 (0.091 – 0.094) 2.4 – 2.5 (0.094 – 0.098) 2.5 – 2.6 (0.098 – 0.102) 2.6 – 2.7 (0.102 – 0.106) 2.7 – 2.8 (0.106 – 0.110) 2.8 – 2.9 (0.110 – 0.114) 2.9 – 3.0 (0.114 – 0.118) 3.0 – 3.1 (0.118 – 0.122) 3.1 – 3.2 (0.122 – 0.126) 3.2 – 3.3 (0.126 – 0.130) 2.0 – 2.1 (0.079 – 0.083) 2.1 – 2.2 (0.083 – 0.087) 2.2 – 2.3 (0.087 – 0.091)	Discoloration ↕ Discoloration
	Clutch end plate thickness (1st-hold) — MARK 1 MARK 2 MARK 3 MARK 4 NO MARK MARK 6 MARK 7	2.05 – 2.10 (0.081 – 0.083) 2.15 – 2.20 (0.085 – 0.087) 2.25 – 2.30 (0.089 – 0.091) 2.35 – 2.40 (0.093 – 0.094) 2.45 – 2.50 (0.096 – 0.098) 2.55 – 2.60 (0.100 – 0.102) 2.65 – 2.70 (0.104 – 0.106)	Discoloration ↕ Discoloration

(cont'd)

Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission	Diameter of needle bearing contact area		
	On mainshaft stator shaft bearing	22.980 – 22.993 (0.9047 – 0.9052)	Wear or damage
	On mainshaft 2nd gear	35.975 – 35.991 (1.4163 – 1.4169)	
	On mainshaft 4th gear collar	31.975 – 31.991 (1.2589 – 1.2595)	
	On mainshaft 1st gear collar	30.975 – 30.991 (1.2195 – 1.2201)	
	On countershaft (L. side)	36.004 – 36.017 (1.4175 – 1.4180)	
	On countershaft 3rd gear	31.980 – 31.996 (1.2590 – 1.2600)	
	On countershaft 4th gear	27.980 – 27.993 (1.1016 – 1.1021)	
	On countershaft reverse gear collar	31.975 – 31.991 (1.2589 – 1.2595)	
	On countershaft 1st gear collar	31.975 – 31.991 (1.2589 – 1.2595)	
	On sub-shaft (L. side)	25.991 – 26.000 (1.0233 – 1.0236)	
	On sub-shaft 4th gear collar	27.980 – 27.993 (1.1016 – 1.1021)	
	On reverse idler gear shaft	13.990 – 14.000 (0.5508 – 0.5512)	
	On mainshaft 1st gear	35.000 – 35.016 (1.3780 – 1.3786)	
	On mainshaft 2nd gear	41.000 – 41.016 (1.6142 – 1.6148)	
	On mainshaft 4th gear	38.000 – 38.016 (1.4961 – 1.4967)	
	On countershaft 1st gear	38.000 – 38.016 (1.4961 – 1.4967)	Wear or damage
	Inside diameter of needle bearing contact area		
	On countershaft 3rd gear	38.000 – 38.016 (1.4961 – 1.4967)	Wear or damage
	On countershaft 4th gear	33.000 – 33.016 (1.2992 – 1.2998)	
	On countershaft reverse gear	38.000 – 38.016 (1.4961 – 1.4967)	
	On sub-shaft 4th gear	32.000 – 32.016 (1.2598 – 1.2605)	
	On reverse idler gear	18.007 – 18.020 (0.7089 – 0.7094)	
	On stator shaft (R. side)	29.000 – 29.013 (1.1417 – 1.1422)	
	On stator shaft (stator side)	27.000 – 27.021 (1.0630 – 1.0638)	
	On reverse idler gear shaft holder	14.416 – 14.434 (0.5676 – 0.5683)	Wear or damage
	End play		
	Mainshaft 1st gear	0.08 – 0.24 (0.003 – 0.009)	—
	Mainshaft 2nd gear	0.05 – 0.13 (0.002 – 0.0051)	—
	Mainshaft 4th gear	0.05 – 0.135 (0.002 – 0.0053)	—
	Countershaft 1st gear	0.1 – 0.5 (0.004 – 0.020)	—
	Countershaft 3rd gear	0.05 – 0.13 (0.002 – 0.0051)	—
	Countershaft 4th gear	0.05 – 0.13 (0.002 – 0.0051)	—
	Sub-shaft 4th gear	0.05 – 0.17 (0.002 – 0.007)	—
	Reverse idler gear	0.05 – 0.18 (0.002 – 0.007)	—
	Countershaft reverse gear	0.10 – 0.25 (0.004 – 0.010)	—
	Selector hub O.D.	51.87 – 51.90 (2.042 – 2.043)	Wear or damage
	Mainshaft 4th gear collar length	45.00 – 45.03 (1.772 – 1.773)	—
	Mainshaft 1st gear collar length	27.00 – 27.15 (1.063 – 1.069)	—
	Mainshaft 1st gear collar flange thickness	2.5 – 2.6 (2.098 – 2.102)	Wear or damage
	Countershaft distance collar length (28 mm)	38.97 – 39.00 (1.534 – 1.535)	—
		39.02 – 39.05 (1.536 – 1.537)	—
		39.07 – 39.10 (1.538 – 1.539)	—
		39.12 – 39.15 (1.540 – 1.541)	—
		39.17 – 39.20 (1.542 – 1.543)	—
		39.22 – 39.25 (1.544 – 1.545)	—
		39.27 – 39.30 (1.546 – 1.547)	—
		38.87 – 38.90 (1.530 – 1.531)	—
		38.92 – 38.95 (1.532 – 1.533)	—
	Countershaft reverse gear collar length	14.5 – 14.6 (0.571 – 0.575)	—
	Countershaft reverse gear collar flange thickness	2.4 – 2.6 (0.094 – 0.102)	Wear or damage
	Countershaft 1st gear collar length	14.5 – 14.6 (0.571 – 0.575)	—
	Countershaft 1st gear collar flange thickness	2.4 – 2.6 (0.094 – 0.102)	Wear or damage
	Sub-shaft 4th gear collar length	24.0 – 24.1 (0.945 – 0.949)	Wear or damage
	Sub-shaft 4th gear collar flange thickness	3.00 – 3.15 (0.118 – 0.124)	Wear or damage

Automatic Transmission — Section 14

Unit of length: mm (in)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Mainshaft 2nd gear thrust washer thickness		3.47 – 3.50 (0.137 – 0.138) 3.52 – 3.55 (0.139 – 0.140) 3.57 – 3.60 (0.141 – 0.142) 3.62 – 3.65 (0.143 – 0.144) 3.67 – 3.70 (0.145 – 0.146) 3.72 – 3.75 (0.147 – 0.148) 3.77 – 3.80 (0.148 – 0.150) 3.82 – 3.85 (0.151 – 0.152) 3.87 – 3.90 (0.153 – 0.154)	Wear or damage ↕ Wear or damage
	Thrust washer thickness Mainshaft 4th gear Mainshaft ball bearing L. side Mainshaft 1st gear L. side Mainshaft 1st gear R. side		 4.45 – 4.55 (0.175 – 0.179) 3.45 – 3.55 (0.136 – 0.140) 1.45 – 1.50 (0.057 – 0.059) 3.43 – 3.50 (0.135 – 0.138)	 Wear or damage ↕ Wear or damage
	Countershaft 3rd gear splined washer thickness (35 x 52 mm)		2.97 – 3.00 (0.117 – 0.118) 3.02 – 3.05 (0.119 – 0.120) 3.07 – 3.10 (0.121 – 0.122) 3.12 – 3.15 (0.123 – 0.124) 3.17 – 3.20 (0.125 – 0.126) 3.22 – 3.25 (0.127 – 0.128) 3.27 – 3.30 (0.129 – 0.130) 3.32 – 3.35 (0.131 – 0.132) 3.37 – 3.40 (0.133 – 0.134) 3.42 – 3.45 (0.135 – 0.136) 3.47 – 3.50 (0.137 – 0.138) 3.52 – 3.55 (0.139 – 0.140) 3.57 – 3.60 (0.141 – 0.142)	Wear or damage ↕ Wear or damage
	Sub-shaft 4th gear thrust washer thickness		2.93 – 3.00 (0.115 – 0.118)	Wear or damage ↕
	One-way clutch contact area I.D. Countershaft 1st gear Parking gear		 83.339 – 83.365 (3.2810 – 3.2821) 66.685 – 66.698 (2.6254 – 2.6259)	 Wear or damage
	Mainshaft feed pipe A, O.D.		8.97 – 8.98 (0.353 – 0.354)	8.95 (0.352)
	Mainshaft feed pipe B, O.D.		5.97 – 5.98 (0.2350 – 0.2354)	5.95 (0.234)
	Countershaft feed pipe O.D.		7.97 – 7.98 (0.3138 – 0.3142)	7.95 (0.313)
	Sub-shaft feed pipe O.D.		7.97 – 7.98 (0.3138 – 0.3142)	7.95 (0.313)
	Mainshaft sealing ring thickness (29 mm and 35 mm)		1.980 – 1.995 (0.0780 – 0.0785)	1.80 (0.071)
	Mainshaft bushing I.D.		6.018 – 6.030 (0.2369 – 0.2374)	6.045 (0.2380)
	Mainshaft bushing I.D.		9.000 – 9.015 (0.3543 – 0.3549)	9.030 (0.355)
	Countershaft bushing I.D.		8.000 – 8.015 (0.3150 – 0.3156)	8.030 (0.3161)
	Sub-shaft bushing I.D.		8.000 – 8.015 (0.3150 – 0.3156)	8.030 (0.3161)
	Mainshaft sealing ring groove width		2.025 – 2.060 (0.080 – 0.081)	2.080 (0.082)
Regulator valve body	Sealing ring contact I.D.		35.000 – 35.025 (1.3780 – 1.3782)	35.050 (1.3799)
Shifting device and parking brake control	Reverse shift fork finger thickness		5.90 – 6.00 (0.232 – 0.236)	5.40 (0.213)
	Parking brake ratchet pawl Parking brake gear		—— ——	Wear or other defect
	Throttle cam stopper height		27.0 – 27.1 (1.063 – 1.067)	——
Servo body	Shift fork shaft bore I.D.		14.000 – 14.010 (0.5512 – 0.5516)	——
	Shift fork shaft valve bore I.D.		37.000 – 37.039 (1.4567 – 1.4582)	37.045 (1.4585)
Oil pump	Oil pump gear side clearance	Drive	0.03 – 0.05 (0.001 – 0.002)	0.07 (0.003)
		Driven	0.04 – 0.06 (0.0016 – 0.0024)	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 driven gear shaft O.D.		13.980 – 13.990 (0.5504 – 0.5508)	Wear or damage

(cont'd)

Standards and Service Limits

Automatic Transmission (cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	Free Length	No. of Coils
Springs	Regulator valve spring A				
	D16Y3 engine	1.8 (0.07)	14.7 (0.58)	87.8 (3.46)	16.5
	D14A2 engine	1.8 (0.07)	14.7 (0.58)	85.4 (3.36)	16.5
	Regulator valve spring B	1.8 (0.07)	9.6 (0.38)	44.0 (1.73)	7.5
	Stator reaction spring	5.5 (0.22)	*26.4 (1.04)	30.3 (1.19)	2.1
	Torque converter check valve spring	1.0 (0.04)	8.4 (0.33)	33.8 (1.33)	8.2
	Modulator valve spring	1.2 (0.047)	*7.0 (0.276)	27.2 (1.071)	8.0
		1.2 (0.047)	*7.0 (0.276)	26.3 (1.035)	8.0
	Relief valve spring	1.1 (0.04)	8.6 (0.34)	37.1 (1.46)	13.4
	Cooler check valve spring	1.0 (0.04)	8.4 (0.33)	33.8 (1.33)	8.2
	Governor spring A	1.0 (0.04)	18.8 (0.74)	32.9 (1.30)	4.1
	Governor spring B	0.9 (0.04)	11.8 (0.47)	27.8 (1.09)	6.0
		0.9 (0.04)	11.8 (0.47)	29.1 (1.15)	6.0
	2 – 3 orifice control valve spring	0.9 (0.04)	6.6 (0.26)	33.2 (1.31)	14.9
	4 – 3 kick down valve spring	1.0 (0.04)	6.6 (0.26)	29.9 (1.18)	14.7
	2/3 – 4 orifice control valve spring	1.0 (0.04)	8.6 (0.34)	51.9 (2.04)	19.8
	2nd ON orifice control valve spring	0.9 (0.04)	8.0 (0.31)	24.1 (0.95)	9.6
	Throttle valve A spring	1.0 (0.04)	8.5 (0.33)	22.2 (0.87)	6.0
		1.0 (0.04)	8.5 (0.33)	22.1 (0.87)	5.5
		1.1 (0.04)	8.5 (0.33)	22.3 (0.87)	8.1
		1.1 (0.04)	8.5 (0.33)	22.3 (0.87)	7.6
	Throttle valve B adjusting spring	0.8 (0.03)	6.2 (0.24)	30 (1.18)	8
	Throttle valve A adjusting spring	0.8 (0.03)	6.2 (0.24)	27 (1.06)	8.5
	Throttle valve B spring	1.4 (0.06)	8.5 (0.33)	41.5 (1.63)	10.5
		1.4 (0.06)	8.5 (0.33)	41.5 (1.63)	11.2
		1.4 (0.06)	8.5 (0.33)	41.6 (1.64)	12.4
	1 – 2 shift valve spring	0.45 (0.018)	5.1 (0.20)	52.8 (2.08)	29
	1 – 2 shift valve ball spring	0.45 (0.018)	4.5 (0.18)	10.7 (0.42)	12.7
	2 – 3 shift valve spring	0.9 (0.04)	7.1 (0.28)	65.3 (2.57)	32.1
	2 – 3 shift valve ball spring	0.45 (0.018)	4.5 (0.18)	13.3 (0.52)	8.0
	3 – 4 shift valve spring	0.9 (0.04)	9.6 (0.38)	32.5 (1.28)	10.3
	3 – 4 shift valve ball spring	0.5 (0.02)	4.5 (0.18)	11.3 (0.44)	7.4
	1st-hold accumulator spring	4.0 (0.16)	21.5 (0.85)	71.7 (2.82)	8.3
	1st accumulator spring A	2.6 (0.10)	24.3 (0.96)	101.9 (4.01)	11.6
	1st accumulator spring B	2.3 (0.09)	*9.9 (0.39)	49.0 (1.93)	4.6
	2nd accumulator spring	3.5 (0.14)	22 (0.87)	77.0 (3.03)	9.5
	3rd accumulator spring	2.6 (0.10)	17.5 (0.69)	91.8 (3.61)	15.8
	4th accumulator spring	2.6 (0.10)	16 (0.63)	90.1 (3.55)	15.6
	Lock-up shift valve spring	0.9 (0.04)	7.6 (0.30)	73.7 (2.90)	32
	Lock-up timing valve spring	0.8 (0.03)	6.6 (0.26)	61.5 (2.42)	27.6
	Lock-up control valve spring	0.9 (0.04)	6.6 (0.26)	38.4 (1.51)	23.3
	Governor cut valve spring	0.8 (0.03)	7.6 (0.30)	44.5 (1.75)	17
	CPC valve spring	0.9 (0.04)	8.4 (0.33)	24.9 (0.98)	9.8
	Reverse control valve spring	0.7 (0.03)	7.1 (0.28)	40 (1.57)	20.8
	3 – 2 timing valve spring	1.2 (0.05)	8.6 (0.34)	45.6 (1.80)	14.7
	Servo control valve spring	0.9 (0.04)	6.4 (0.25)	34.1 (1.34)	17.5
	2 – 1 timing valve spring	0.7 (0.03)	5.6 (0.22)	33 (1.30)	21.7
	4th exhaust valve spring	0.9 (0.04)	6.6 (0.26)	43.3 (1.70)	22

*: Inside Diameter

Unit of length: mm (in)

Differential M/T — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Differential carrier	Pinion shaft bore diameter Carrier-to-pinion shaft clearance Driveshaft bore diameter Carrier-to-driveshaft clearance	18.000 – 18.018 (0.7087 – 0.7094) 0.013 – 0.047 (0.0005 – 0.0019) 26.025 – 26.045 (1.0246 – 1.0254) 0.045 – 0.086 (0.0018 – 0.0034)	—— 0.095 (0.004) —— 0.14 (0.006)
Differential pinion gear	Backlash Pinion gear bore diameter Pinion gear-to-pinion shaft clearance	0.05 – 0.15 (0.002 – 0.006) 18.042 – 18.066 (0.7103 – 0.7113) 0.055 – 0.095 (0.0021 – 0.0037)	—— —— 0.15 (0.006)
Set ring-to-bearing outer race		0 – 0.1 (0 – 0.004)	Adjust with shim

Differential A/T — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Differential carrier	Pinion shaft contact area I.D. Carrier-to-pinion clearance Driveshaft contact area I.D. Carrier-to-driveshaft clearance Ball bearing contact area O.D.	18.000 – 18.018 (15.8382 – 15.8540) 0.013 – 0.047 (0.0005 – 0.0019) 26.005 – 26.025 (1.0238 – 1.0246) 0.025 – 0.066 (0.0010 – 0.0026) 40.002 – 40.018 (1.5749 – 1.5755)	—— 0.10 (0.004) —— 0.12 (0.005) ——
Differential pinion gear	Backlash I.D. Pinion gear-to-pinion shaft clearance	0.08 – 0.15 (0.003 – 0.006) 18.041 – 18.061 (0.7103 – 0.7111) 0.054 – 0.090 (0.0021 – 0.0035)	—— —— 0.15 (0.006)
Set ring-to-bearing outer race		0 – 0.15 (0 – 0.006)	Adjust

Power Steering — Section 17

	MEASUREMENT	STANDARD (NEW)
Steering wheel	Play at steering wheel circumference Starting load at steering wheel circumference N (kgf, lbf) Engine running	0 – 10 (0 – 0.4) 30 (3.1, 6.8)
Pump	Pump pressure with valve closed (oil temp./speed: 40°C (105°F) min./idle. Do not run for more than 5 seconds). kPa (kgf/cm², psi) 1.6 ℓ model Except 1.6 ℓ model	 6,400 – 7,400 (65 – 75, 924 – 1,067) 5,400 – 6,400 (55 – 65, 782 – 924)
Power steering fluid	Recommended power steering fluid Fluid capacity ℓ (US qt, Imp qt) System LHD model System RHD model Reservoir	HONDA Power Steering Fluid-V 1.0 (1.06, 0.88) 0.9 (0.95, 0.85) 0.4 (0.42, 0.35)
Power steering belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	8.0 – 12.0 (0.31 – 0.47) with used belt 5.5 – 8.5 (0.22 – 0.33) with new belt
	Tension measured with belt tension gauge N (kgf, lbf)	340 – 490 (35 – 50, 77 – 110) with used belt 590 – 785 (60 – 80, 132 – 176) 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 the deflection or tension to used belt values.

Standards and Service Limits

Suspension — Section 18

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Camber	Front 1.6i SR VTEC	0° ± 1°	——
		Except 1.6i SR VTEC	-0°07′ ± 1°	——
		Rear	-0°50′ ± 45′	——
	Caster	Front	1°10′ ± 1°	——
	Total toe	Front	0 ± 2.0 (0 ± 0.08)	——
		Rear	In 2.3 ± 2 (0.09 ± 0.08)	——
	Front wheel turning angle	Inward wheel		
		1.6i SR VTEC	36° ± 2°	——
		Except 1.6i SR VTEC	40° ± 2°	——
		Outward wheel (Reference)		
		1.6i SR VTEC	30°	——
		Except 1.6i SR VTEC	33°	——
Wheel	Rim runout	Aluminum wheel Axial	0 – 0.3 (0 – 0.01)	1.6 (0.06)
		Radial	0 – 0.3 (0 – 0.01)	1.0 (0.04)
		Steel wheel Axial	0 – 0.7 (0 – 0.03)	1.7 (0.07)
		Radial	0 – 0.5 (0 – 0.02)	1.0 (0.04)
Wheel bearing	End play	Front	0 – 0.05 (0 – 0.002)	——
		Rear	0 – 0.05 (0 – 0.002)	——

Brakes — Section 19

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke at 196 N (20 kgf, 44 lbf) lever force		To be locked when pulled 6 – 10 notches	——
Foot brake pedal	Pedal height (with floor mat removed)	LHD model M/T	157 (6.18)	——
		A/T	162 (6.38)	——
		RHD model M/T	154 (6.06)	——
		A/T	159 (6.30)	——
	Free play		1 – 5 (1/16 – 13/64)	——
Master cylinder	Piston-to-pushrod clearance		0 – 0.4 (0 – 0.02)	——
Disc brake	Disc thickness	Front	20.9 – 21.1 (0.82 – 0.83)	19.0 (0.75)
		Rear	9.9 – 10.1 (0.39 –0.40)	8.0 (0.31)
	Disc runout		——	0.10 (0.004)
	Disc parallelism		——	0.015 (0.0006)
	Pad thickness	Front	11.0 – 11.7 (0.43 –0.46)	1.6 (0.06)
		Rear	7.3 – 8 (0.29 – 0.31)	1.6 (0.06)
Rear brake drum	I.D.		203.20 – 203.33 (8,000 – 8,005)	204 (8.03)
	Lining thickness		5.0 (0.20)	2.0 (0.08)
Brake booster	Characteristics at 196 N (20 kgf, 44 lbf) pedal force.		Vacuum mmHg (inHg)	Line pressure kPa (kg/cm², psi)
		Cars without ABS	0 (0)	1,280 (13.1, 185)
			300 (11.8)	5,390 (55.0, 782)
			500 (19.7)	8,130 (82.9, 1,175)
		Cars with ABS	0 (0)	950 (9.7, 134)
			300 (11.8)	5,520 (56.3, 800)
			500 (19.7)	8,570 (87.4, 1,240)

Air Conditioning — Section 22

	MEASUREMENT		STANDARD (NEW)
Air Conditioning system	Lubricant type: SP-10 (P/N 38899 – P13 – 003) (For refrigerant: HFC-134a (R-134a))		
	Lubricant capacity mℓ (fl oz, Imp oz)	Condenser	15 (1/2, 0.5)
		Evaporator	25 (5/6, 0.9)
		Line or hose	10 (1/3, 0.4)
		Receiver	10 (1/3, 0.4)
Compressor	Lubricant type: SP-10 (P/N 38899 – P13 – 003) (For refrigerant: HFC-134a (R-134a))		
	Lubricant capacity mℓ (fl oz, Imp oz)		120 – 140 (4 – 4 2/3, 4.2 – 4.9)
	Coil resistance at 68°F (20°C) Ω		2.95 – 3.35
	Pulley-to-pressure plate clearance		0.5 ± 0.15 (0.02 ± 0.006)
Compressor belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys		6.5 – 10.5 (0.26 – 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		340 – 490 (35 – 50, 77 – 110) with used belt 590 – 780 (60 – 80, 132 – 176) 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.

Unit of length: mm (in)

Electrical — Section 23

	MEASUREMENT	STANDARD (NEW)	
Ignition coil	Rated voltage V	12	
	Primary winding resistance at 20°C (68°F) Ω	0.6 – 0.8	
	Secondary winding resistance at 20°C (68°F) kΩ	13 – 19	
Spark plug	Type	Refer to Section 23	
	Electrode gap	$1.1^{\ 0}_{-0.1}$ ($0.043^{\ 0}_{-0.004}$)	
Ignition timing	At idle	16° ± 2° (Red) BTDC	
Alternator belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	7.0 – 10.5 (0.28 – 0.41) with used belt 5.0 – 7.0 (0.19 – 0.28) with new belt	
	Tension measured with belt tension gauge N (kgf, lbf)	340 – 490 (35 – 50, 77 – 110) with used belt 640 – 785 (65 – 80, 143 – 176) with new belt	
Alternator (BOSCH)	Output 13.5 V at hot A	75	
	Coil resistance (rotor) Ω	2.3	——
	Slip ring O.D.	14.4 (0.567)	14.0 (0.551)
	Brush length	12.5 (0.49)	2.5 (0.10)
	Brush spring tension g (oz)	330 (11.6)	——
Starter motor (VALEO 1.0 kW)	Type	Gear reduction	
	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 1.0 kW	14.3 – 14.7 (0.56 – 0.58)	9.5 (0.37)
	Brush spring tension (new) 1.0 kW N (kgf, lbf)	18.5 – 23.5 (1.85 – 2.35, 4.1 – 5.2)	——

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

Design Specifications

	ITEM			METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length			4,315 mm	169.9 in	
	Overall Width			1,695 mm	66.7 in	
	Overall Height			1,390 mm	54.7 in	
	Wheelbase			2,620 mm	103.1 in	
	Track	Front/Rear		1,475/1,465 mm	58.1/57.7 in	
	Ground Clearance			150 mm	5.9 in	
	Seating Capacity			Five		
WEIGHT	Curb Weight	1.4i	M/T	1,090 kg	2,403 lbs	
			A/T	1,115 kg	2,458 lbs	
		1.4i with ABS	M/T	1,105 kg	2,436 lbs	
			A/T	1,130 kg	2,491 lbs	
		1.5i VTEC-E	M/T	1,090 kg	2,403 lbs	
		1.5i VTEC-E with ABS	M/T	1,105 kg	2,436 lbs	
		1.6i LS	M/T	1,130 kg	2,491 lbs	
			A/T	1,155 kg	2,546 lbs	
		1.6i SR VTEC	M/T	1,145 kg	2,524 lbs	
	Weight Distributions (Front/Rear)					
		1.4i	M/T	640/450 kg	1,411/992 lbs	
			A/T	665/450 kg	1,466/992 lbs	
		1.4i with ABS	M/T	650/455 kg	1,433/1,003 lbs	
			A/T	675/455 kg	1,488/1,003 lbs	
		1.5i VTEC-E	M/T	640/450 kg	1,411/992 lbs	
		1.5i VTEC-E with ABS	M/T	650/455 kg	1,433/1,003 lbs	
		1.6i LS	M/T	660/470 kg	1,455/1,036 lbs	
			A/T	685/470 kg	1,510/1,036 lbs	
		1.6i SR VTEC	M/T	670/475 kg	1,477/1,047 lbs	
	Max. Permissible Weight (EC)	Except 1.6 ℓ		1,600 kg	3,527 lbs	
		1.6 ℓ		1,650 kg	3,638 lbs	
	Max. Permissible Axle Weight (EC)	Front Except 1.6 ℓ		810 kg	1,786 lbs	*: For towing a trailer
		Front 1.6 ℓ		845 kg	1,863 lbs	
		Rear Except 1.6 ℓ		810/870* kg	1,786/1,918* lbs	
		Rear 1.6 ℓ		840/880* kg	1,852/1,940* lbs	
ENGINE	Type	D14A2/D16Y3 Engines		Water-cooled, 4-stroke SOHC gasoline engine		
		D15Z3 engine		Water-cooled, 4-stroke SOHC VTEC-E gasoline engine		
		D16Y2 engine		Water-cooled, 4-stroke SOHC VTEC gasoline engine		
	Cylinder Arrangement			Inline 4-cylinder, transverse		
	Bore and Stroke	D14A2 engine		75.0 x 79.0 mm	2.95 x 3.11 in	
		D15Z3 engine		75.0 x 84.5 mm	2.95 x 3.33 in	
		D16Y2/D16Y3 engines		75.0 x 90.0 mm	2.95 x 3.54 in	
	Displacement	D14A2 engine		1,396 cm^3	85 cu-in	
		D15Z3 engine		1,493 cm^3	91 cu-in	
		D16Y2/D16Y3 engines		1,590 cm^3	97 cu-in	
	Compression Ratio	D14A2 engine		9.2		
		D15Z3 engine		9.3		
		D16Y2 engine		9.5		
		D16Y3 engine		9.1		
	Valve Train	D14A2/D16Y3 engines		Belt driven, 4 valves per cylinder, SOHC		
		D15Z3/D16Y2 engines		Belt driven, 4 valves per cylinder, SOHC VTEC		
	Lubricant System			Forced and wet sump, trochoid pump		
	Oil Pump Displacement at 6,000 min^{-1} (rpm)			42.6 ℓ (48.4 US qt, 40.3 Imp qt)/minute		
	Water Pump Displacement at 6,000 min^{-1} (rpm)			125 ℓ (132 US qt, 110 Imp qt)/minute		
	Fuel Required	D14A2/D15Z3/D16Y3 engines		UNLEADED gasoline with a Research Octane Number (RON) of 91 or higher		
		D16Y2 engine		Premium UNLEADED gasoline with a Research Octane Number (RON) of 95 or higher		

	ITEM		METRIC	ENGLISH	NOTES
STARTER	Make/Type, Output		Valeo/Gear Reduction, 1.0 kW		
	Normal Output		1.0 kW		
	Normal Voltage		12 V		
	Hour Rating		30 seconds		
	Direction of Rotation		Clockwise as view from gear end		
	Weight		approx. 3.2 kg	approx. 7.1 lbs	
CLUTCH	Type	M/T	Single plate dry, diaphragm spring		
		A/T	Torque converter		
	Facing Area	M/T	176 cm³	27 sq-in	
TRANSMISSION	Type	M/T	Synchronized 5-speed forward, 1 reverse		
		A/T	4-speed automatic with lock-up clutch, 1 reverse		
	Primary Reduction	Type/Ration	Direct/1 : 1		

	Manual Transmission		D14A2	D15Z3	D16Y2	D16Y3
TRANSMISSION	Gear Ration	1st	3.250	3.250	3.250	3.250
		2nd	1.761	1.761	1.900	1.900
		3rd	1.172	1.172	1.250	1.250
		4th	0.909	0.909	0.937	0.909
		5th	0.702	0.702	0.771	0.702
		Reverse	3.153	3.153	3.153	3.153
		Final	4.437	3.722	4.250	4.058
		Type	Single helical gear			

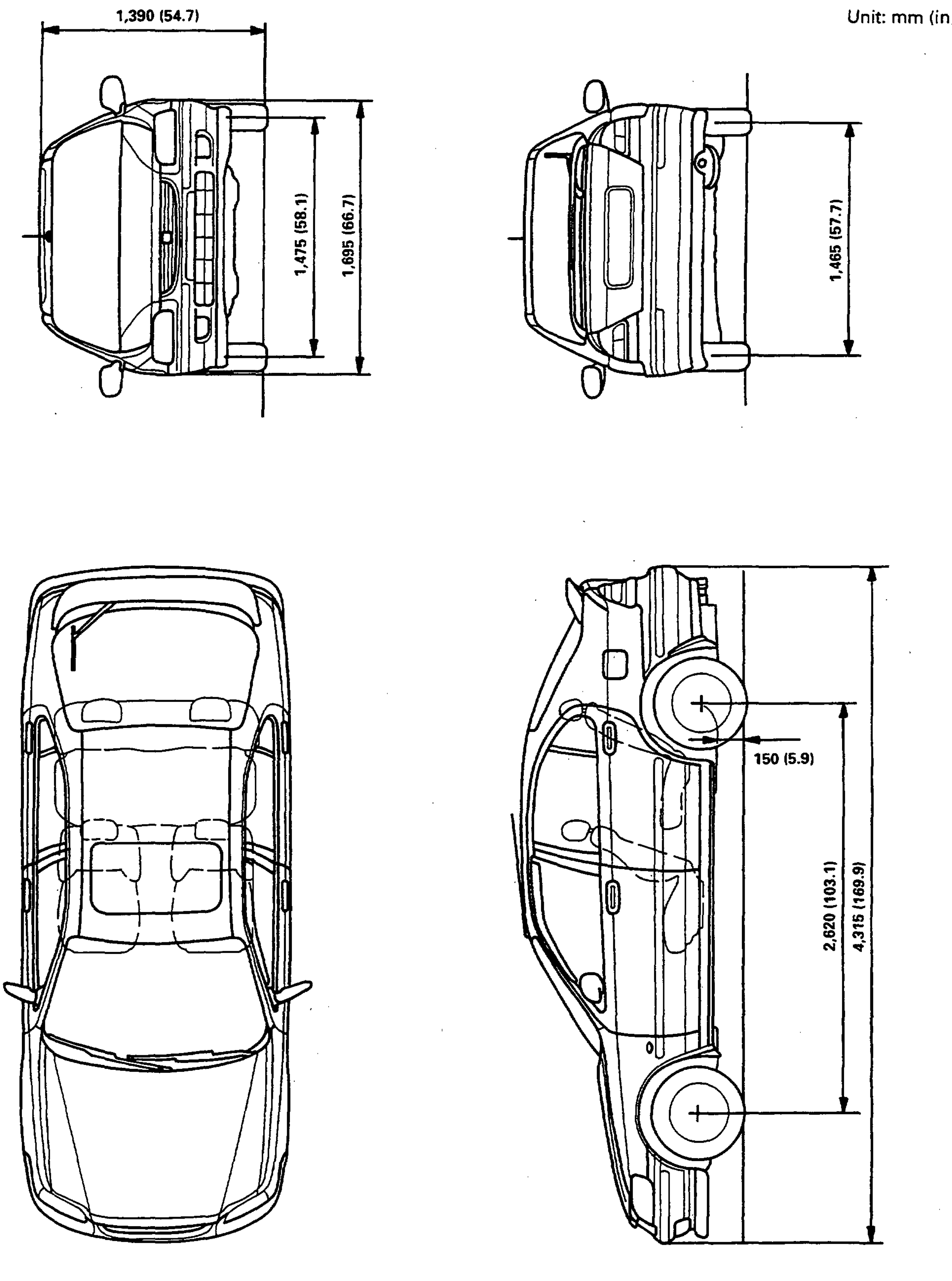
	ITEM		METRIC	ENGLISH	NOTES
TRANSMISSION	Automatic Transmission				
	Gear Ration	1st	2.600		
		2nd	1.393		
		3rd	0.975		
		4th	0.772		
		Reverse	1.954		
	Final Reduction Gear	Ratio	4.333		
		Type	Single helical gear		
AIR CONDITIONING	Cooling Capacity		4,040 kcal/h	16,023 BTU/h	
	Compressor	Type/Make	Scroll/HADSYS		
		No. of Cylinder	———		
		Capacity	85.7 mℓ/rev	5.22 cu-in/rev	
		Max. Speed	10,000 min⁻¹ (rpm)		
		Lubricant Capacity	SP-10 (P/N 38899 – P13 – 003)		
		Lubricant Type	120 mℓ	4 fl oz, 4.2 Imp oz	
	Condenser	Type	Corrugated fin		
	Evaporator	Type	Corrugated fin		
	Blower	Type	Sirocco fan		
		Motor Input	200 W/12 V		
		Speed Control	4-speed		
		Max. Capacity	410 m³/h	14,482 cu-ft/h	
	Temperature Control	Type	Air-mix		
	Compressor Clutch	Type	Dry, single plate, poly-V-belt drive		
		Power Consumption	42 W max./12 V		
	Refrigerant	Type	HFC-134a (R-134a)		
		Quantity	$550^{\ 0}_{-50}$ g	$19.4^{\ 0}_{-1.8}$ oz	

Design Specifications

(cont'd)

	ITEM		METRIC	ENGLISH	NOTES
STEERING SYSTEM	Type		Power assisted, rack and pinion		
	Overall Ratio	1.6i SR VTEC	17.5		
		Except 1.6i SR VTEC	17.1		
	Turns, Lock-to-Lock	1.6i SR VTEC	3.23		
		Except 1.6i SR VTEC	3.48		
	Steering Wheel Dia.		380 mm	15.0 in	
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°, 0°07'*		*: 1.6i SR VTEC
		Rear	−0° 50'		
	Caster	Front	1° 10'		
	Total Toe	Front	0 mm	0 in	
		Rear	In 2.3 mm	In 0.09 in	
BRAKE SYSTEM	Type	Front	Power-assisted self-adjusting ventilated disc		
		Rear	Power-assisted self-adjusting drum		
	Pad Surface Area	Front	48.7 cm² x 2	7.6 sq-in x 2	
		Rear	20.4 cm² x 2	3.2 sq-in x 2	
	Lining Surface Area	Rear	65.7 cm² x 2	10.2 sq-in x 2	Drum brake
	Parking Brake	Type	Mechanical actuating, rear two wheel brakes		
TIRE	Size and Pressure		See tire label (see page 1-5)		
ELECTRICAL	Battery		12 V – 36 AH/5 HR		*: 1.6i SR VTEC
	Starter		12 V – 1.0 kW		
	Alternator		12 V – 70 A		
	Fuses	In Under-dash Fuse/Relay Box	7.5 A, 10 A, 15 A, 20 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		
	Headlights	High/Low	12 V – 60/55 W (H4)		
	Front Turn Signal Lights		12 V – 21 W		
	Front Parking Lights		12 V – 5 W		
	Side Turn Signal Lights		12 V – 5 W		
	Rear Turn Signal Lights		12 V – 21 W		
	Brake/Tail-lights		12 V – 21/5 W		
	Back-up Lights		12 V – 21 W		
	Front Log Light*1		12 V – 55 W		
	Rear Fog Light		12 V – 21 W		
	License Plate Lights		12 V – 5 W		
	Ceiling Light		12 V – 5 W		
	Luggage Area Light		12 V – 5 W		
	Gauge Lights		12 V – 3.4 W		
	Glove Light		12 V – 5 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		

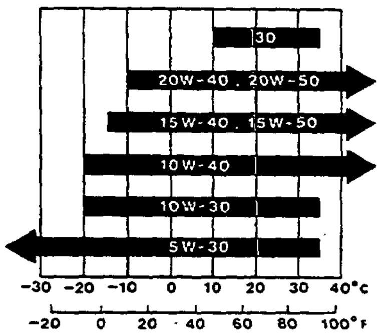
Body Specifications



Lubrication Points

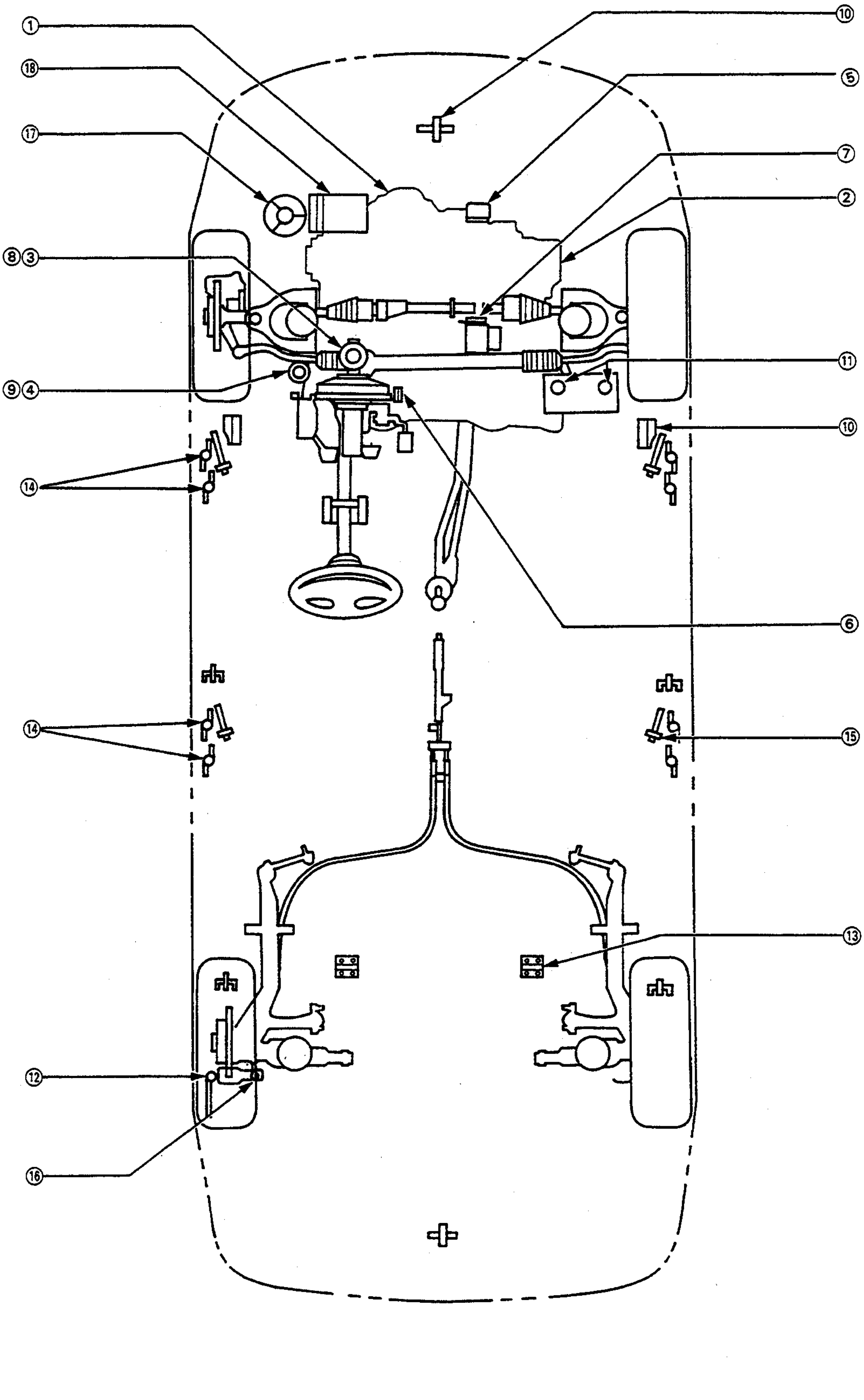
For the details of lubrication points and type of lubricants to be applied, refer to the illustrated index and various work procedure (such as Assembly/Reassembly, Replacement, Overhaul, Installation, etc.) contained in each section.

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	API Service Grades: SF or SG SAE Viscosity: 10 W–30 or 10 W–40
	Transmission — Automatic	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	Release fork (Manual transmission)	Urea Grease UM264 (P/N 41211–PY5–305)
6	Throttle cable end (Dashboard lower panel hole)	Silicone grease
7 8 9 10 11 12 13 14 15	Throttle cable end (Throttle link) Brake master cylinder pushrod Clutch master cylinder pushrod Hood hinges and hood latch Battery terminals Fuel fill lid Tailgate hinges Door hinges, upper and lower Door open detent	Multi-purpose grease
16	Rear brake calipers (Connection holes parking brake lever to parking brake cable)	Rust-preventive agent
17	Power steering system	Honda power steering fluid-V
18	Air conditioning compressor	Compressor oil: HADSYS: SP-10 (P/N 38899–P13–003) (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.		20	40	60	80	100	120	140	160	180	200
	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		Replace every 10,000 km (6,000 miles) or 12 months									
• Transmission oil				R			R			R	
Valve clearance			I		I		I		I		I
Belt tension and conditions (Alternator, Power steering, A/C)			I		I		I		I		I
Timing 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
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

•: 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			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, gear box and boots		I	I		I		I		I		I
Power steering function, hoses and connections		I	I	I	I	I	I	I	I	I	I
Pollen filter		Replace every 30,000 km (18,000 miles) or 12 months									
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
Tyres 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 after first registration									

Sever Driving Conditions

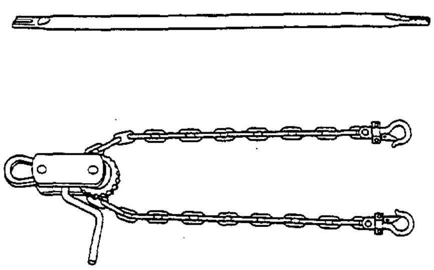
The following items must be serviced more frequently on cars normally used under severe driving conditions.
Refer to the chart below for the appropriate maintenance intervals.

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 trailer.

Condition	Maintenance Item	Operation	Interval
A B • • • F	Engine oil and oil filter	R	Every 5,000 km (3,000 miles) or 6 months
• • • • • F	Transmission oil	R	Every 20,000 km (12,000 miles) or 12 months
• B • • E •	Air cleaner element	R	Every 20,000 km (12,000 miles) or 12 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
• B C • E •	Power steering system	I	Every 10,000 km (6,000 miles) or 6 months

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

Ref. No	Tool Number	Description	Qty	Page Reference
①	07KAK–SJ40101	Engine Tilt Hanger Set	1	5-9
②	07MAC–SL00200	Ball Joint Remover, 28 mm	1	5-8
③	07MAK–PY30100	Engine Sub Hanger Stay	1	5-9
④	07744–0010600	Pin Driver, 8.0 mm	1	5-8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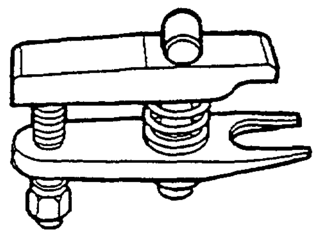
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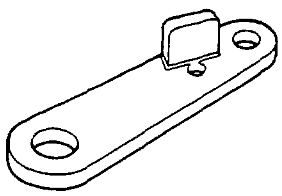
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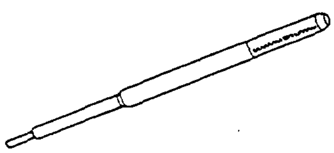
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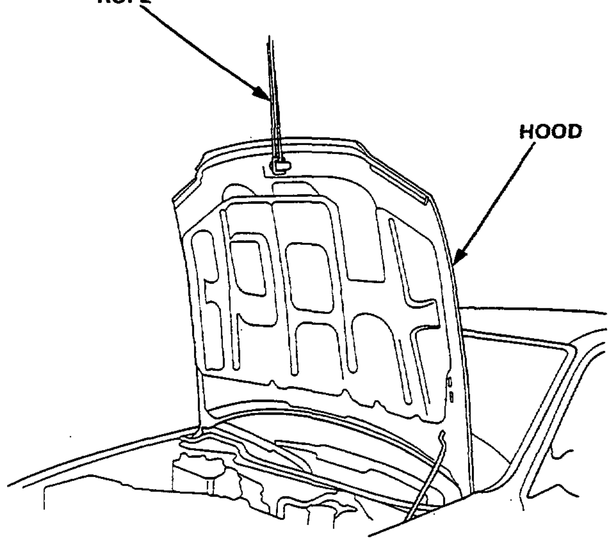
Engine Removal/Installation

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.**

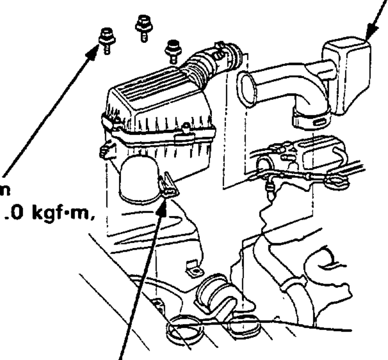
1. Fix the hood in a vertical position as shown in the illustration.



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

3. Remove the battery.

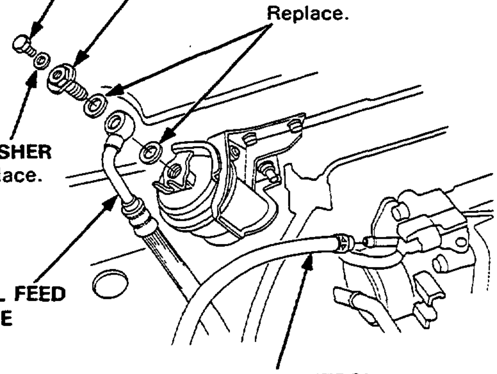
4. Remove the intake air duct and the air cleaner housing assembly.



5. 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.

6. Remove the fuel feed hose and evaporative emission (EVAP) control canister hose.



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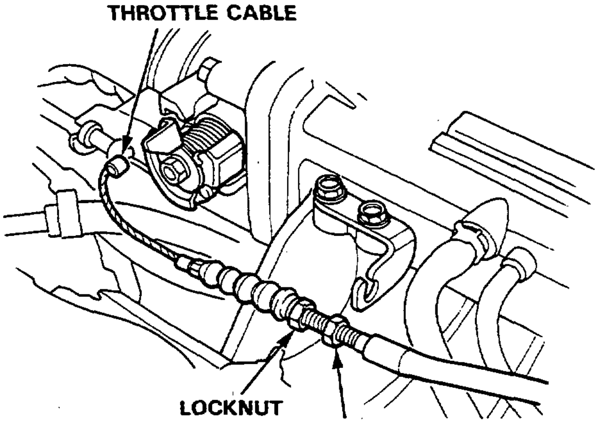
Engine Removal/Installation

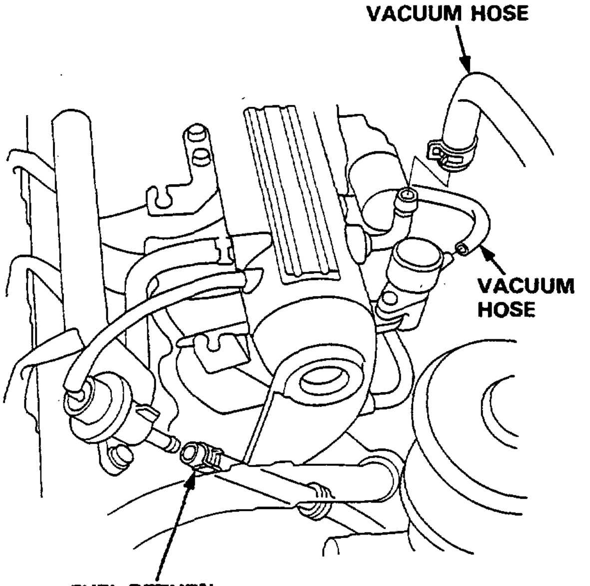
Removal (cont'd)

7. Remove the throttle cable by loosening the locknut, then slip the cable end out of the throttle linkage.

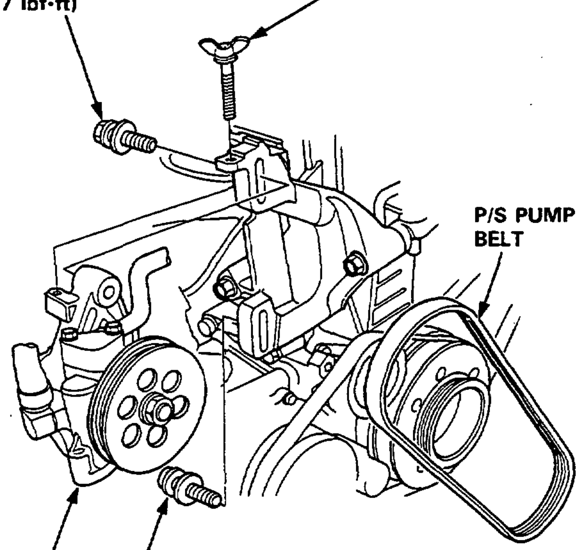
   NOTE:
   - Do not loosen the adjusting nut.
   - Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
   - Adjust the throttle cable when installing (see section 11).



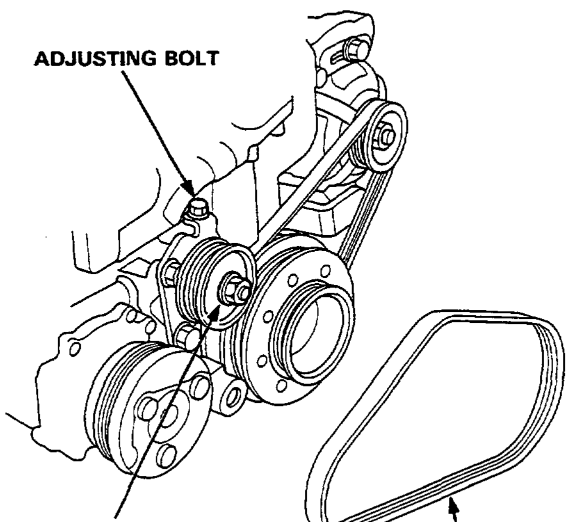
8. Remove the brake booster vacuum hose, vacuum hose and fuel return hose.



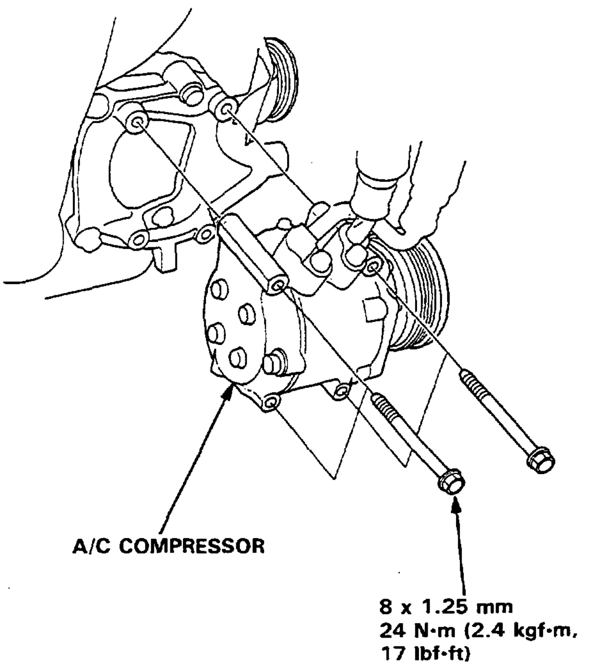
9. Remove the mounting bolt and adjusting bolt, then remove the power steering (P/S) pump belt and pump.
   - Do not disconnect the P/S hoses.



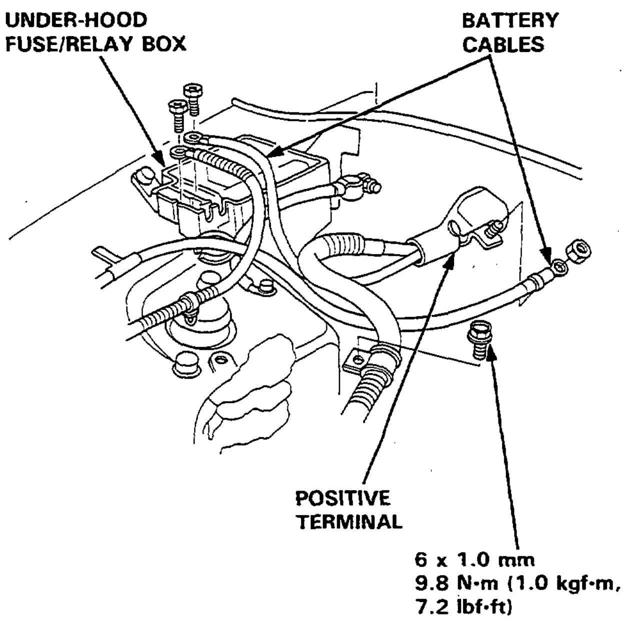
10. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C) compressor belt.



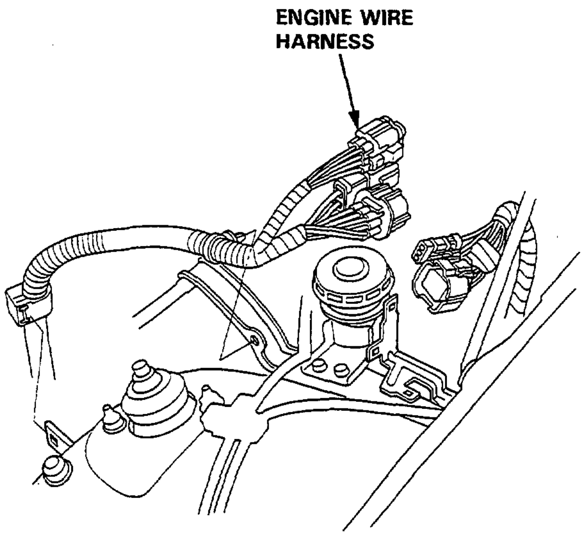
11. Remove the A/C compressor.
 ● Do not remove the A/C hoses.



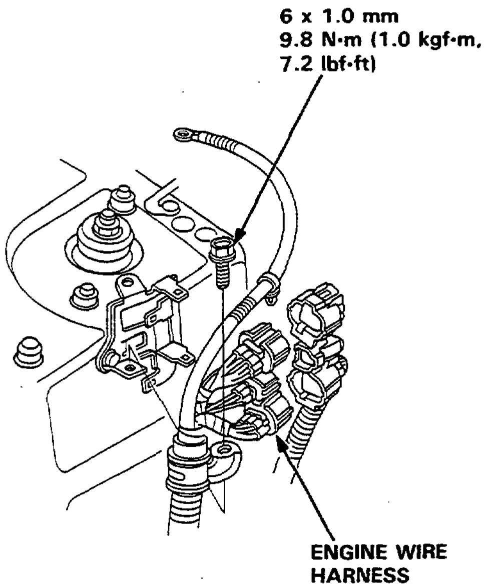
12. Remove the battery cables from the under-hood fuse/relay box and the positive terminal.



13. Remove the engine wire harness connectors on the left side of engine compartment.



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



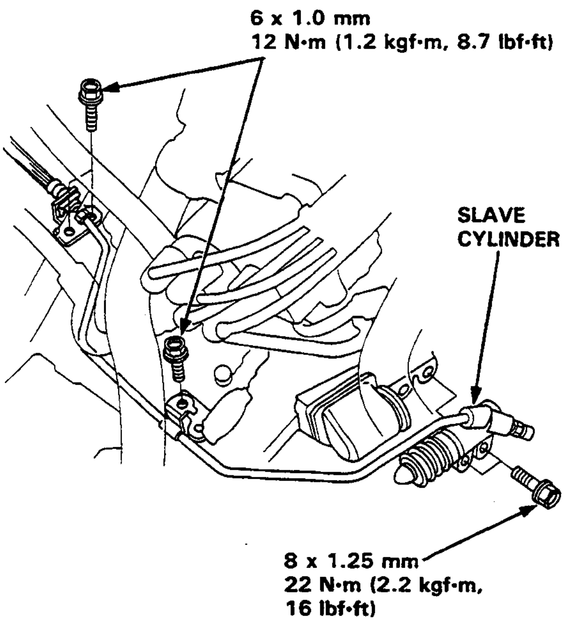
(cont'd)

Removal (cont'd)

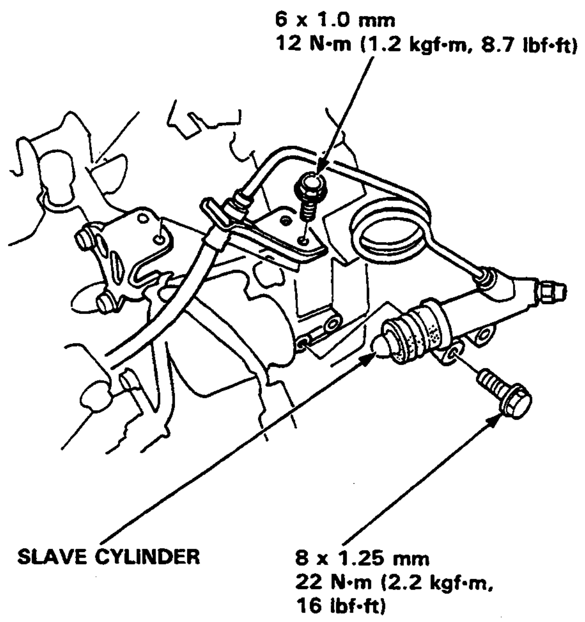
15. Remove the clutch slave cylinder and pipe/hose assembly for manual transmission (M/T).

    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.

LHD:



RHD:

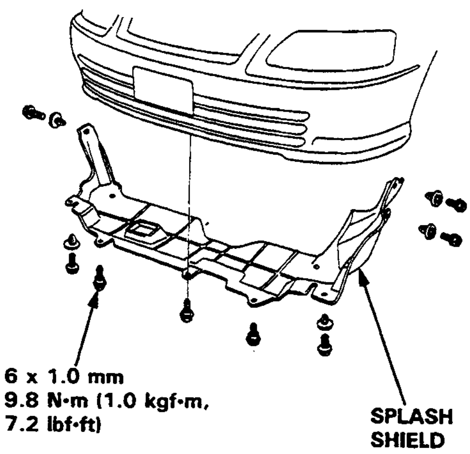


16. Remove the radiator cap.

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

17. Raise the hoist to full height.

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



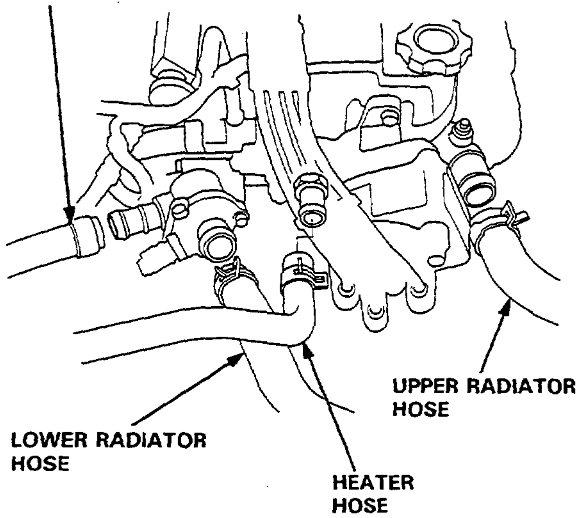
19. Drain the engine coolant (see page 10-4).
    - Loosen the drain plug in the radiator.

20. Drain the transmission oil or fluid.
    Reinstall the drain plug using a new washer.

21. Drain the engine oil. Reinstall the drain plug using a new washer.

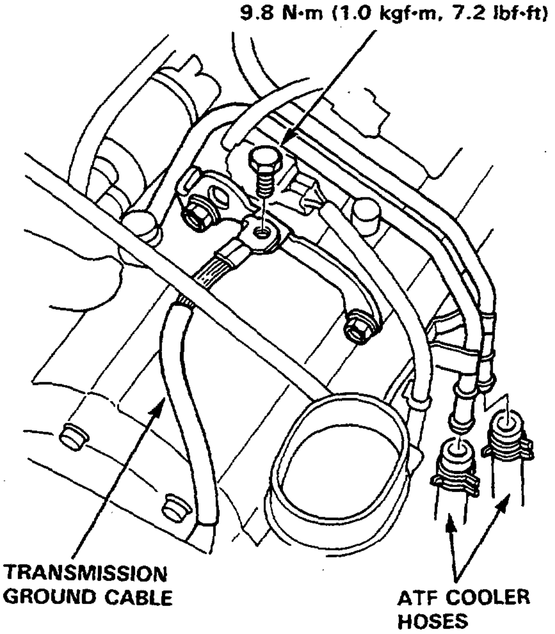
    CAUTION: Do not overtighten the drain plug.

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



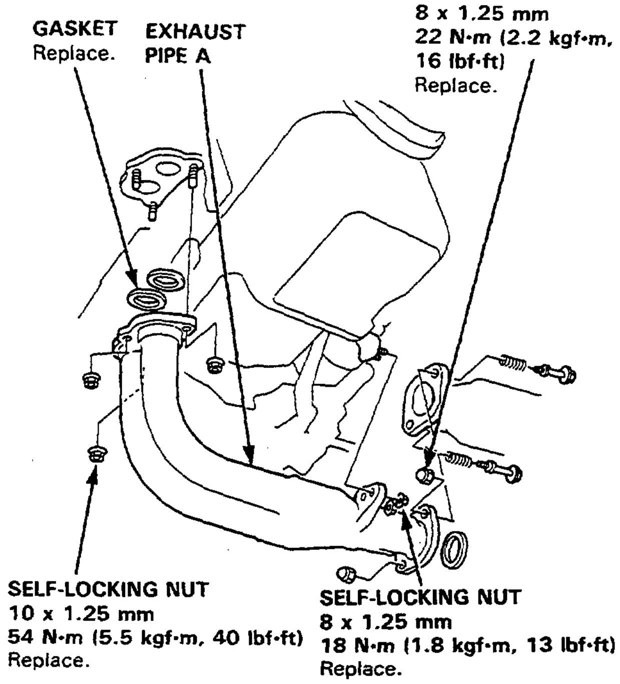
23. Remove the transmission ground cable.

24. (Automatic transmission) Remove the ATF cooler hoses.



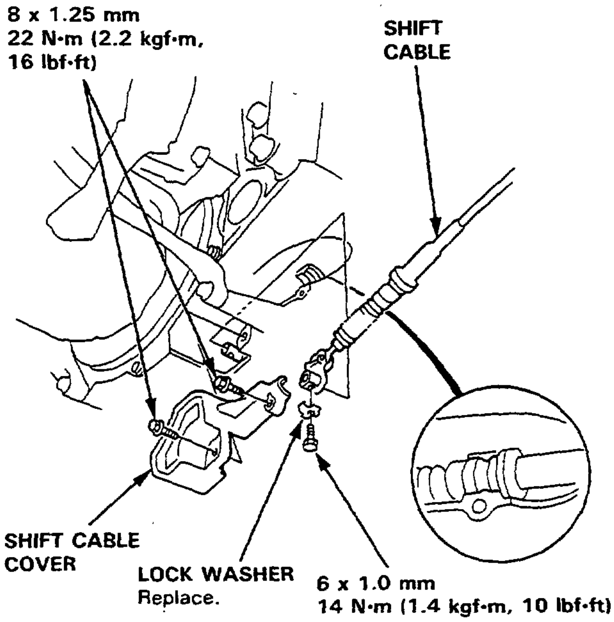
25. Raise the hoist to full height.

26. Remove the exhaust pipe A.



27. (Automatic transmission) Remove the shift cable.

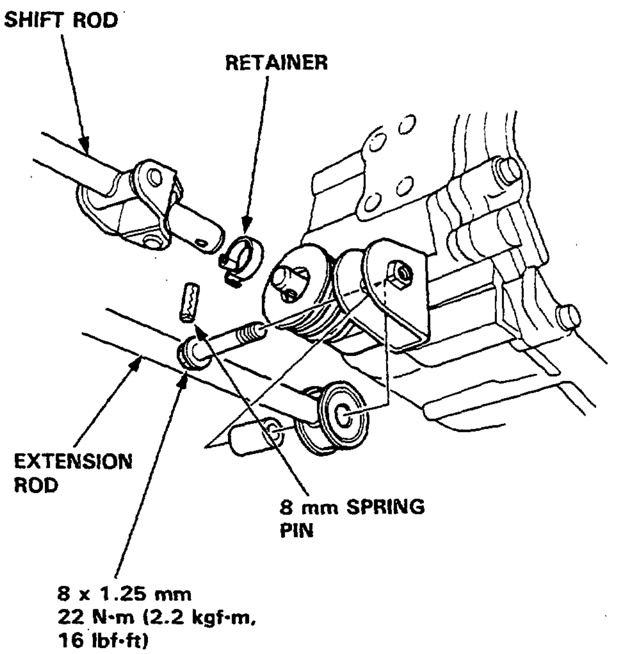
NOTE:
- Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
- Adjust the shift cable when installing (see section 14).



(cont'd)

Removal (cont'd)

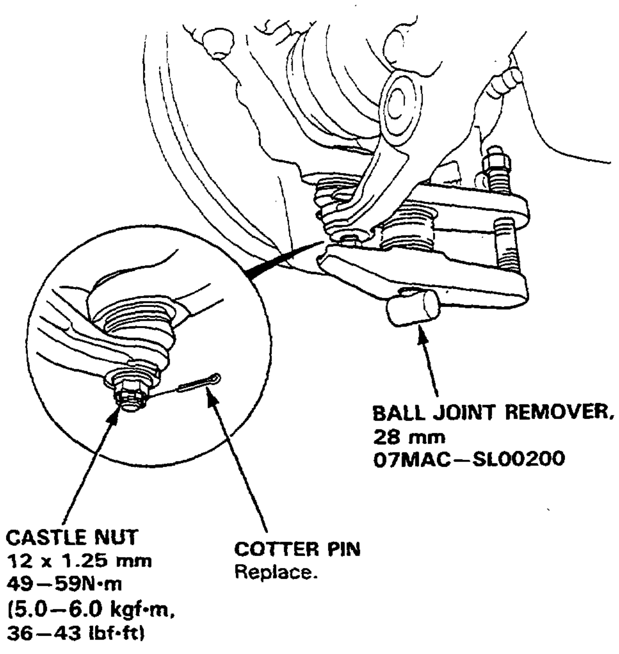
28. (Manual transmission) Remove the shift rod and extension rod.



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

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

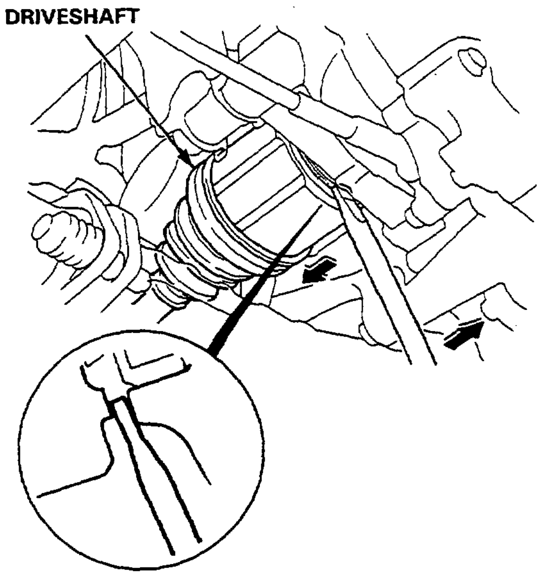
    NOTE: Adjust the tool so the jaws are parallel to each other.

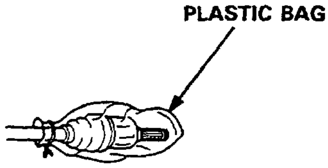


31. Remove the driveshafts.

    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.**

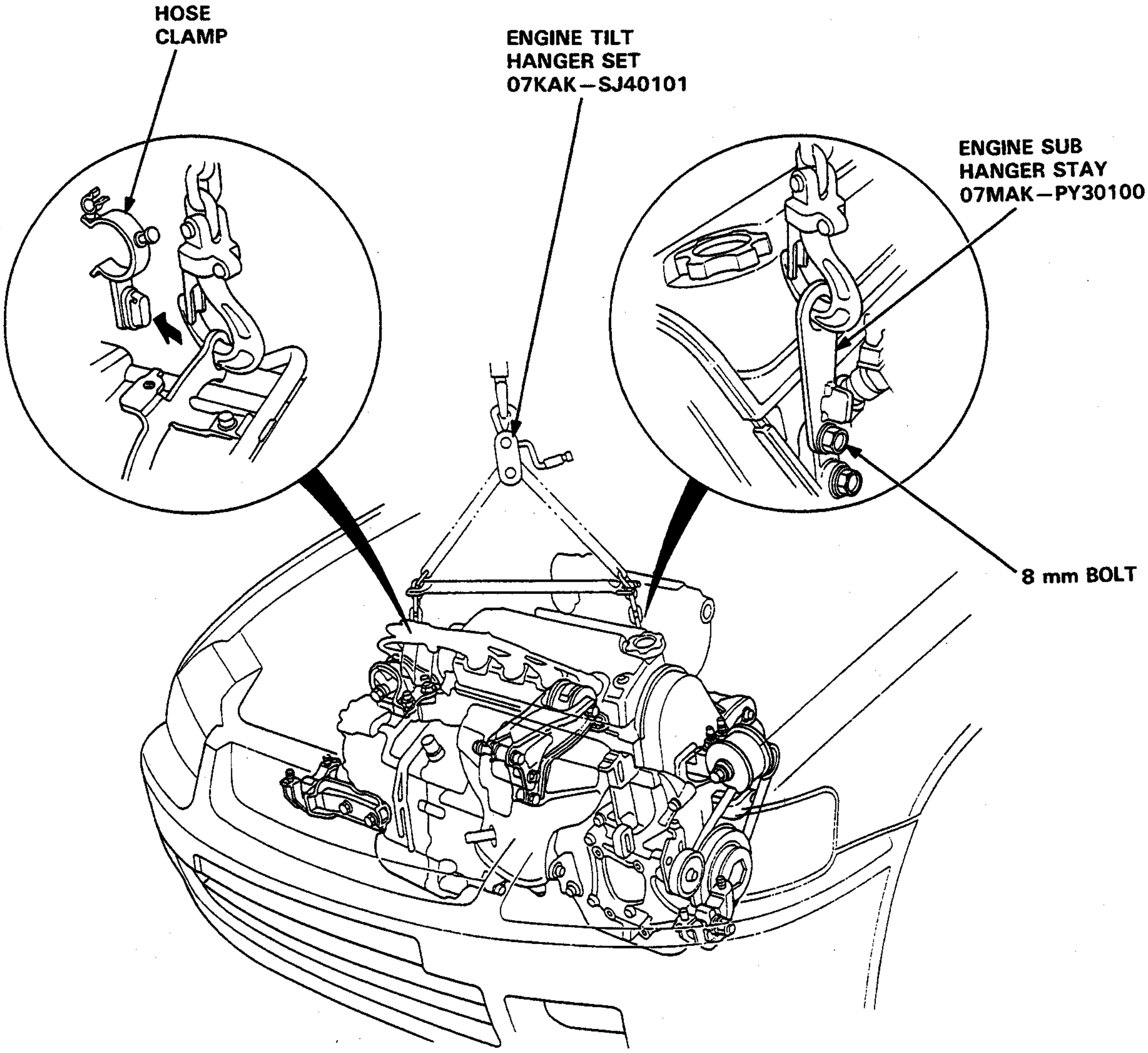
    NOTE: Coat all precision-finished surfaces with clean engine oil. Tie plastic bags over the driveshaft ends.





32. Lower the hoist.

33. Attach the chain hoist to the engine.

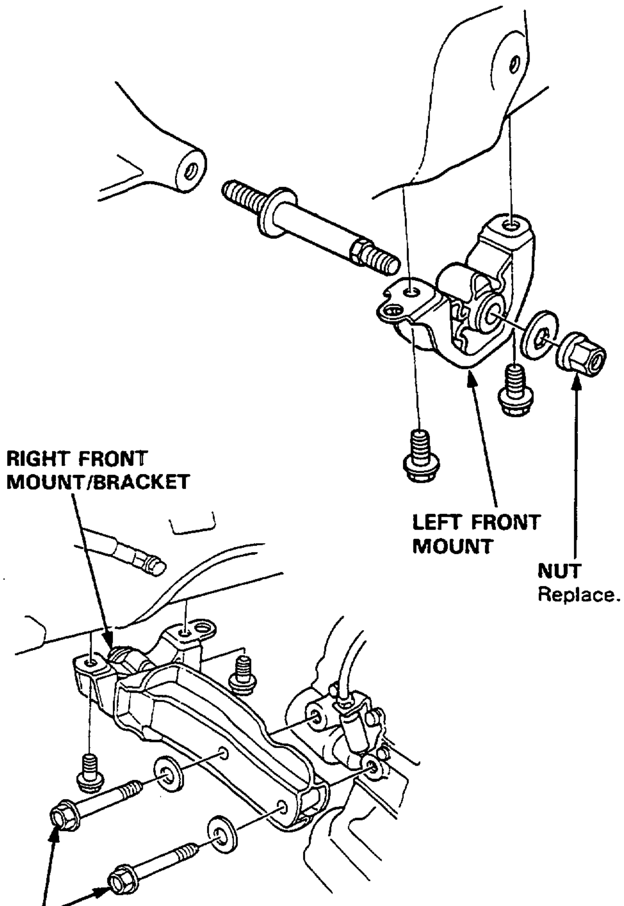


(cont'd)

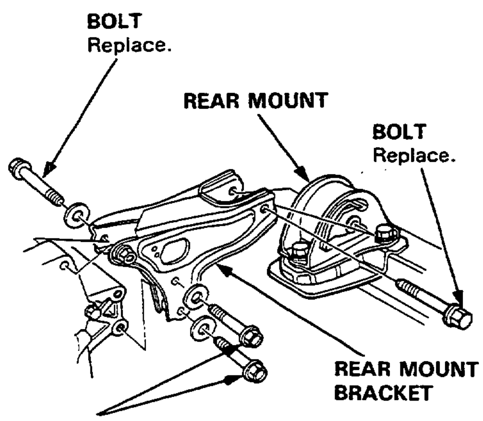
Engine Removal/Installation

Removal (cont'd)

34. Remove the left and right front mounts and brackets.

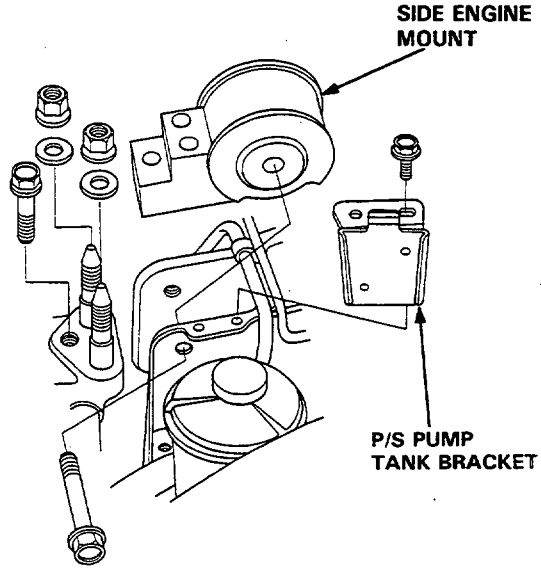


35. Remove the rear mount bracket.

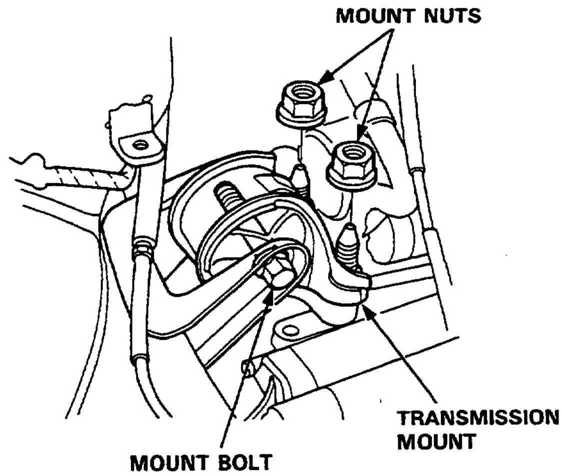


36. Remove the P/S pump tank bracket.

37. Remove the side engine mount.



38. Remove the transmission mount.



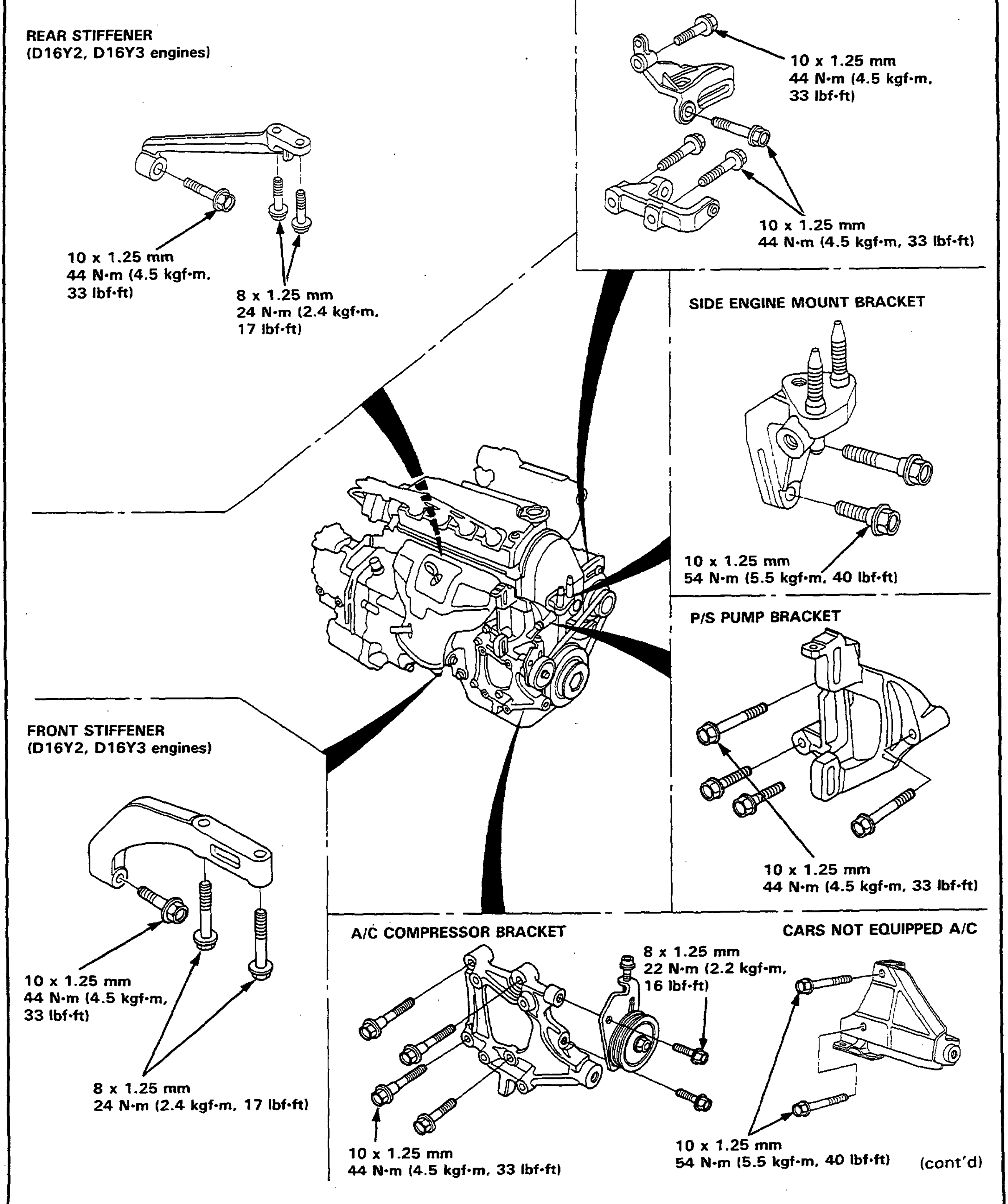
39. Check that the engine is completely free of vacuum hoses, fuel and engine coolant hoses and electrical wiring.

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

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

Installation

Bracket Bolts/Nuts Torque Specifications:



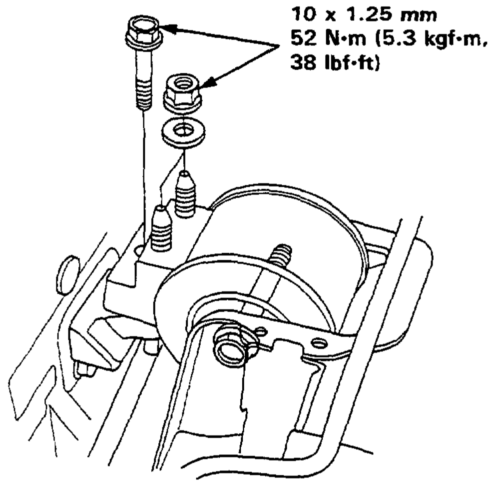
(cont'd)

Installation (cont'd)

Engine Installation

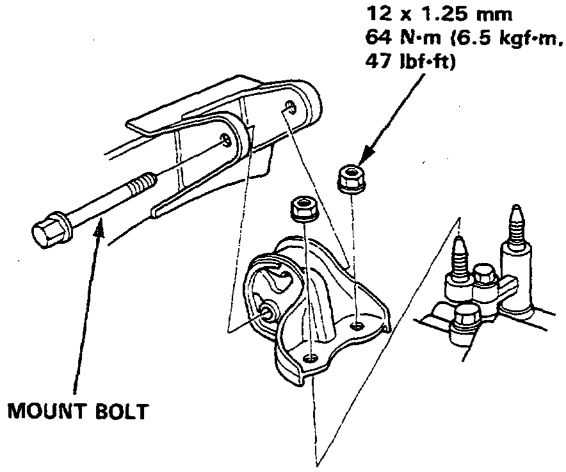
Install the engine in the reverse order of removal. Reinstall the mount bolts/nuts in the following sequence. Failure to follow these procedures may cause excessive noise and vibration, and reduce bushing life.

1. Install the side engine mount, then tighten the bolt/nuts on the engine side. Leave the mount bolt loose.

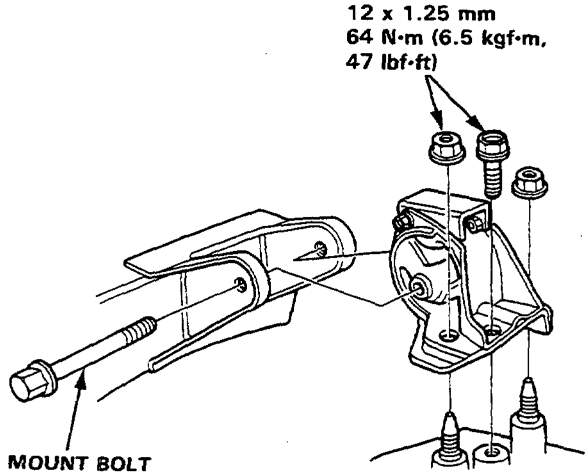


2. Install the transmission mount, then tighten the bolt/nuts on the transmission side. Leave the mount bolt loose.

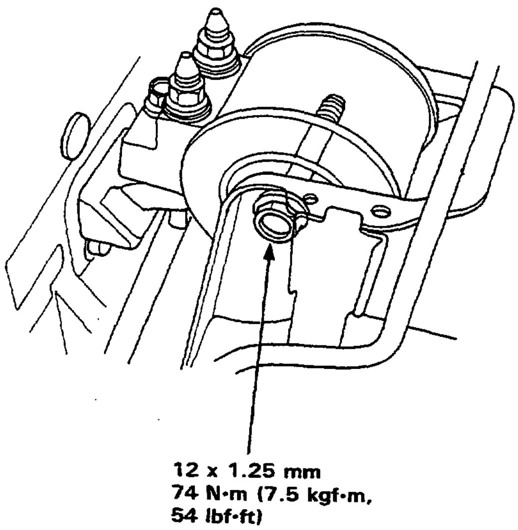
A/T:



M/T:

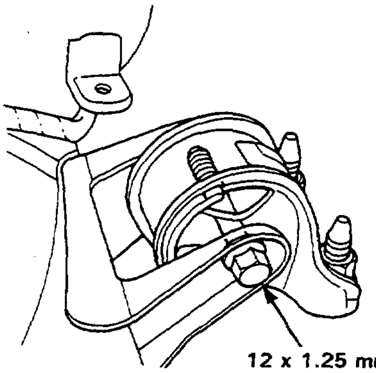


3. Tighten the mount bolt on the side engine mount.

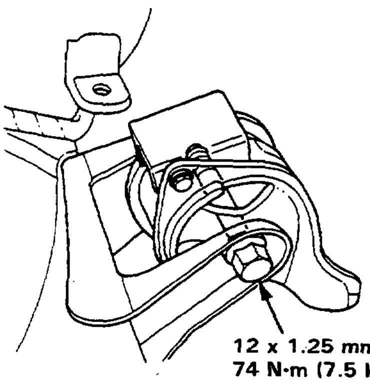


4. Tighten the mount bolt on the transmission mount.

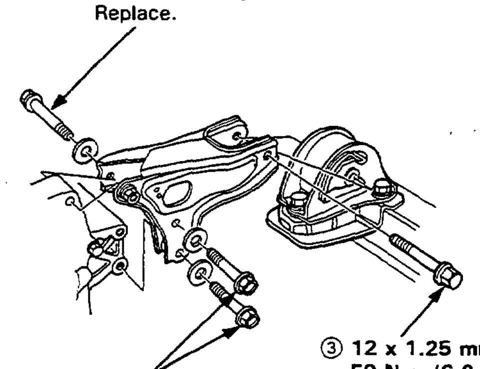
A/T:



M/T:

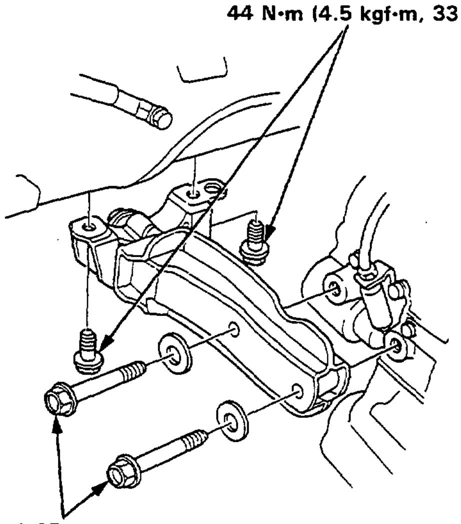


5. Install the rear mount bracket, then tighten the bolts in the numbered sequence as shown (①–③).

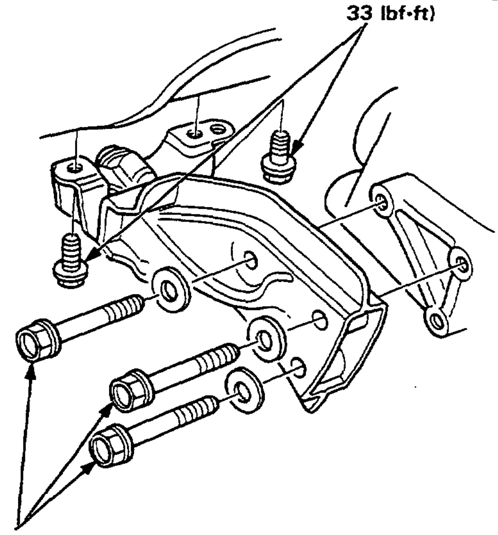


6. Install the right front mount/bracket, then tighten the bolts in the numbered sequence as shown (①–②).

A/T:



M/T:

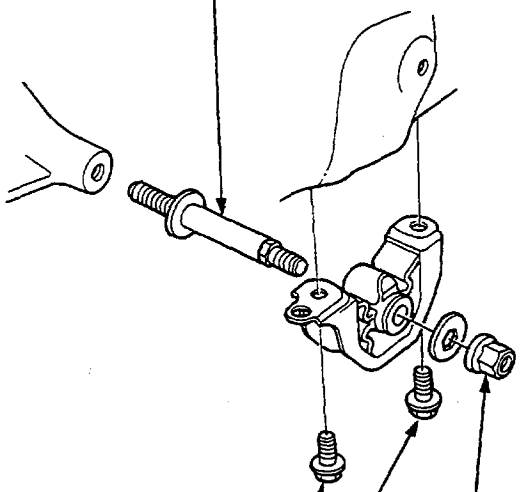


(cont'd)

Engine Removal/Installation

Installation (cont'd)

7. Install the left front mount, then tighten the bolts in the numbered sequence as shown (①–③).



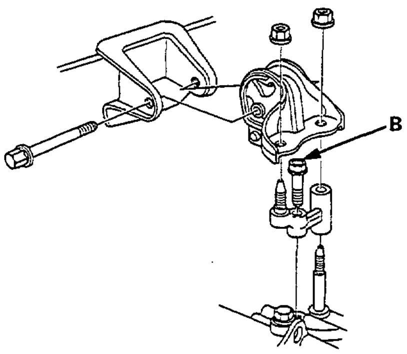
- Check that the spring clip on the end of each driveshaft clicks into place.

CAUTION: Use new spring clips.

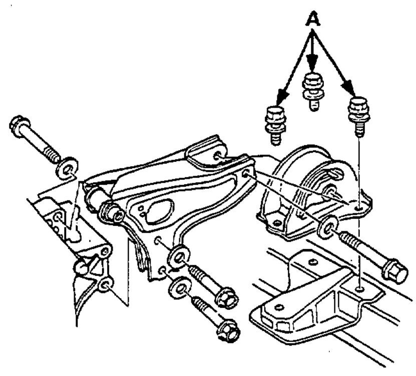
- Bleed air from the cooling system at the bleed bolt with the heater valve open (see page 10-4).
- Adjust the throttle cable (see section 11).
- Check the clutch pedal free play (see section 12).
- Check that the transmission shifts into gear smoothly.
- Adjust the tension of the following drive belts.
  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.

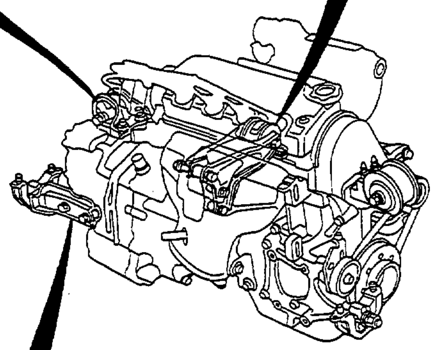
Mount and Bracket Bolts/Nuts Torque Value Specifications:

TRANSMISSION MOUNT:



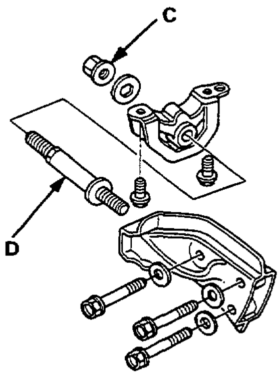
REAR MOUNT:



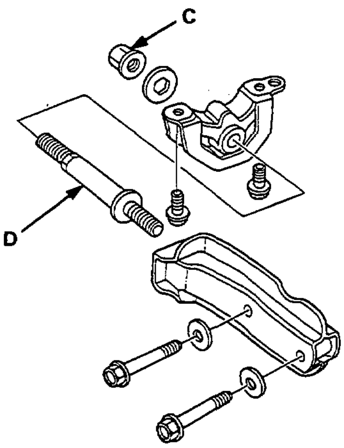


RIGHT FRONT MOUNT:

M/T:



A/T:



Torque Specifications:

A: 10 x 1.25 mm
64 N·m (6.5 kgf·m, 47 lbf·ft)

B: 12 x 1.25 mm
64 N·m (6.5 kgf·m, 47 lbf·ft)

C: 12 x 1.25 mm
59 N·m (6.0 kgf·m, 43 lbf·ft)
Replace.

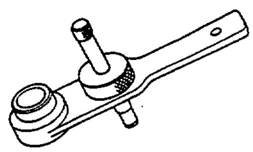
D: 12 x 1.25 mm
83 N·m (8.5 kgf·m, 61 lbf·ft)

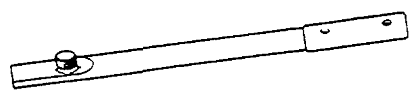
Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAH – PJ70100	Valve Guide Reamer, 5.525 mm	1	6-50
②	07JAA – 0010100	Socket Wrench, 17 mm	1	6-17
③	07JAB – 0010100	Pulley Holder Attachment, Pin type	1	6-17
④	07JAB – 0010200	Handle	1	6-17
⑤	07JAB – 0010400	Pulley Holder Attachment, HEX 50 mm	1	6-17
⑥	07LAJ – PR30101	Valve Inspection Set	1	6-10, 12
⑦	07LAJ – PR30201	Air Stopper	1	6-10, 12
⑧	07NAJ – P070100	Oil Pressure Gauge Attachment	1	6-6, 7
⑨	07PAD – 0010000	Stem Seal Driver	1	6-51
⑩	07406 – 0070001	Low Pressure Gauge	1	6-6, 7
⑪	07742 – 0010100	Valve Guide Driver, 5.5 mm	1	6-50
⑫	07757 – 0010000	Valve Spring Compressor	1	6-46


①


②


③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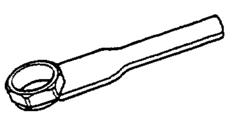
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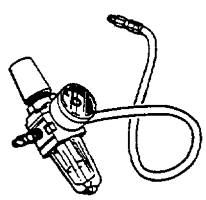
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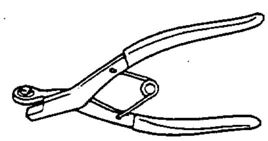
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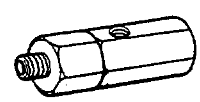
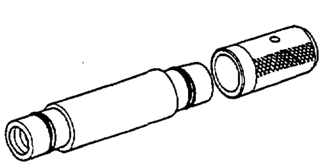
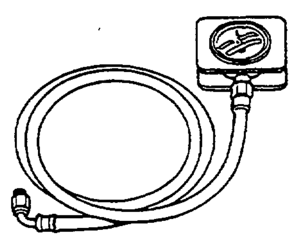
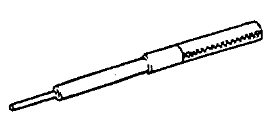
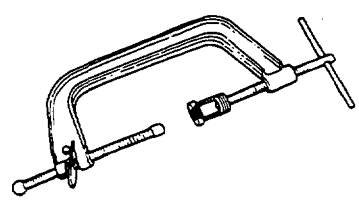

⑧


⑨


⑩

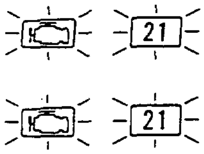

⑪


⑫

Variable Valve Timing and Valve Lift Electronic Control (VTEC): D16Y2, D15Z3 Engines

Troubleshooting Flowchart — VTEC Solenoid Valve

Refer to page 11-10 thru 11-19 before troubleshooting.



The 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 11-15).

↓

Start the engine.

↓

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

↓

Do the Road Test.*

↓

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.

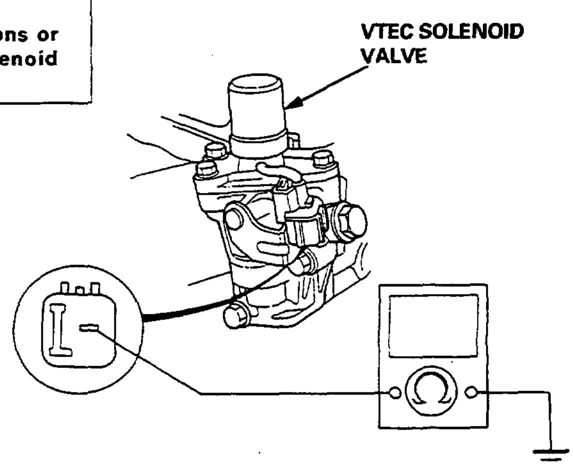
↓

Is there 14 – 30 Ω?

- NO → **Replace the VTEC solenoid valve.**
- YES ↓

(To page 6-5)

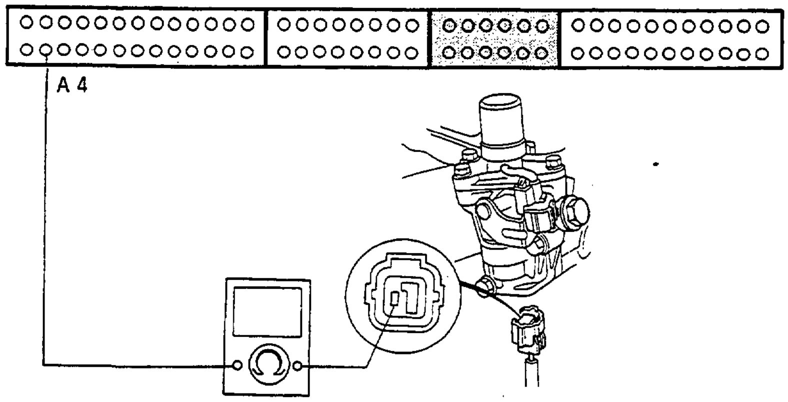
* Road Test:
Accelerate in 1st gear to an engine speed over 6,000 rpm (min^{-1}).
Hold that engine speed for at least two seconds.
If the MIL does not come on during the first road test, repeat this test two more times.



(From page 6-4)

Connect the test harness.

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

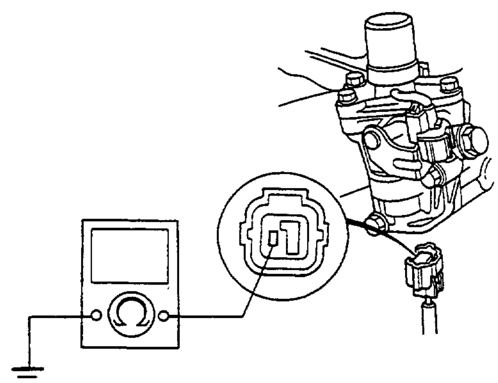


Is there continuity?

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

Connect the 1P connector from the VTEC solenoid valve.

(To page 6-6)

(cont'd)

Troubleshooting Flowchart — VTEC Solenoid Valve (cont'd)

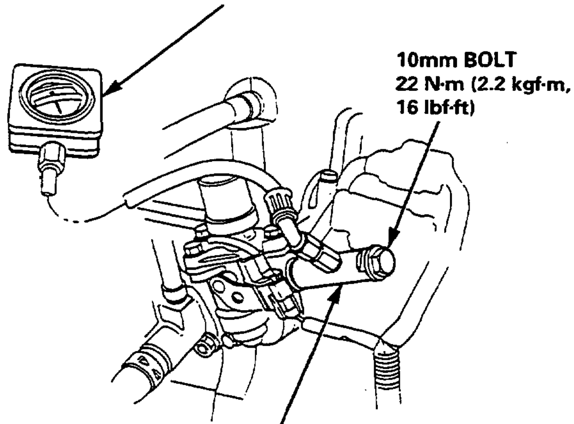
(From page 6-5)

Remove the 10 mm bolt, install the special tools, then reinstall the 10 mm bolt.

Connect a tachometer (see section 11).

Start the engine and warm it up to normal operating temperature (the cooling fan comes on).

Check oil pressure at engine speeds of D16Y2 engine: 1,000, 3,000 and 5,000 rpm (min^{-1}), D15Z3 engine: 1,000 and 3,000 rpm (min^{-1}).



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, 7psi)?

NO → **Inspect the VTEC solenoid valve**

YES ↓

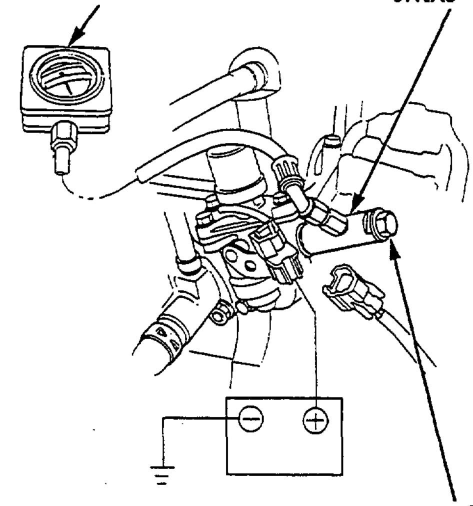
Disconnect the 1P connector from the VTEC solenoid valve.

(To page 6-7)

(From page 6-6)

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

Start the engine and check oil pressure at an engine speed of D16Y2 engine: 5,000 rpm (min^{-1}), D15Z3 engine: 3,000 rpm (min^{-1})



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

Is pressure above D16Y2 engine: 390 kPa (4.0 kgf/cm^2, 57psi), D15Z3 engine: 250 kPa (2.5 kgf/cm^2, 36 psi)?

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

YES ↓

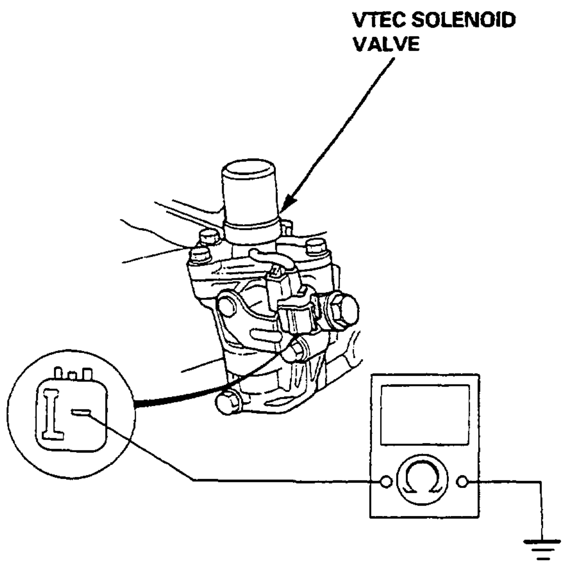
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

VTEC Solenoid Valve Inspection

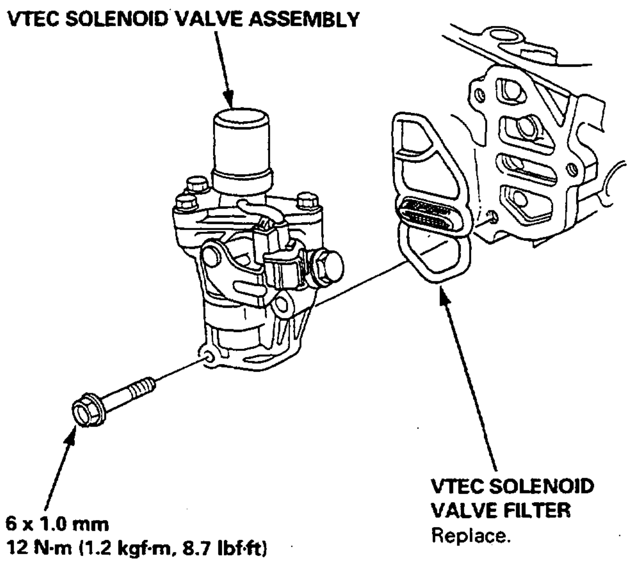
1. Disconnect the 1P connector from the VTEC solenoid valve.

2. Measure resistance between the terminal and body ground.

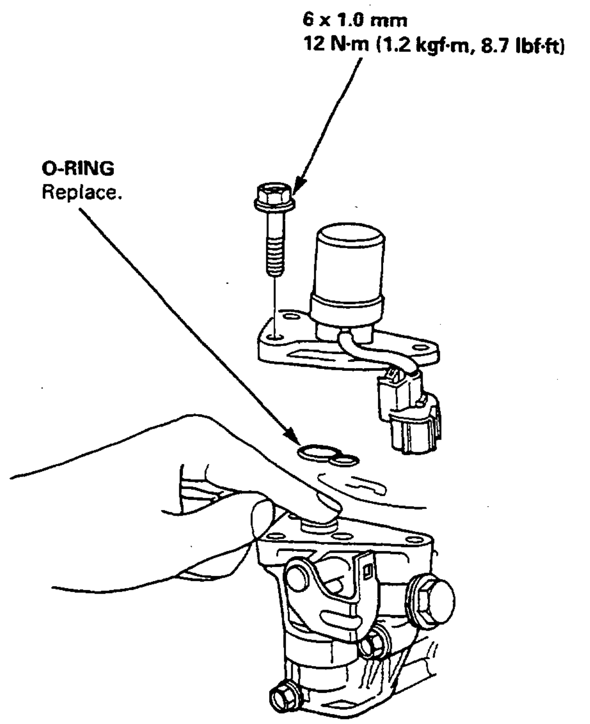
Resistance: 14 – 30 Ω



3. If the resistance is within specifications, remove the VTEC solenoid valve assembly from the cylinder head, and check the VTEC solenoid valve 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.

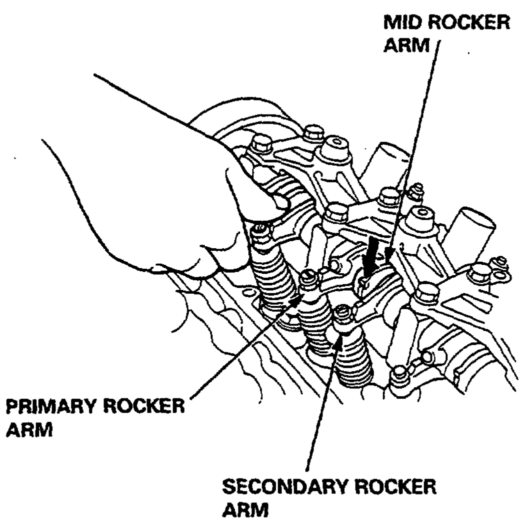


Rocker Arms — Manual Inspection (D16Y2 engine)

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

   NOTE: Refer to page 6-55 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.



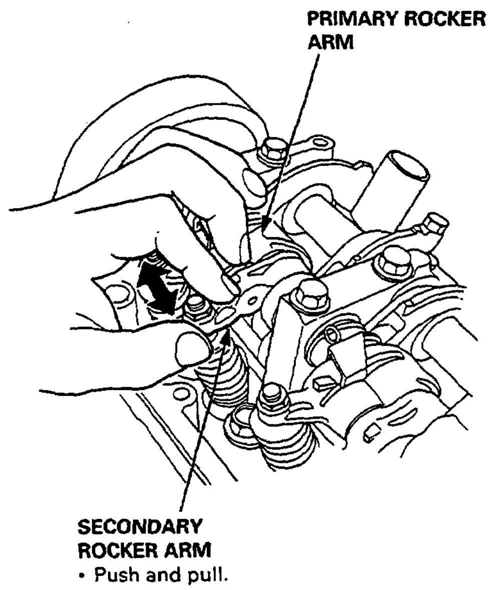
5. Check the intake mid rocker arm of each cylinder at TDC.
   - If the intake mid rocker arm does not move, remove the mid, primary and secondary intake rocker arms as an assembly and check that the pistons in the mid and primary rocker arms move smoothly.
   - Replace the intake rocker arms as an assembly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

Rocker Arms — Manual Inspection (D15Z3 engine)

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

   NOTE: Refer to page 6-55 when installing cylinder head cover.

3. Move the intake secondary rocker arm on the No. 1 cylinder manually.
4. Check that the intake secondary rocker arms move independently of the primary intake rocker arm.



5. Check the intake secondary rocker arm of each cylinder at TDC.
   - If the intake secondary rocker arm does not move, remove the primary and secondary intake rocker arms as an assembly and check that the pistons in the secondary and primary rocker arms move smoothly.
   - Replace the intake rocker arms as an assembly if there is any abnormality.

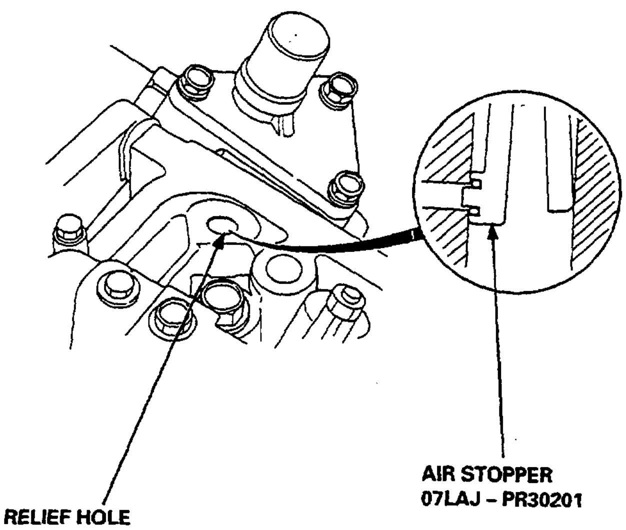
Rocker Arms — Inspection Using Special Tools (D16Y2 engine)

CAUTION
- **Before using the Valve Inspection Tool, make sure that the air pressure gauge on the air compressor indicates over 250 kPa (2.5 kgf/cm², 36 psi).**
- **Inspection the valve clearance before rocker arm inspection.**
- **Cover the timing belt with a shop towel to protect the belt.**
- **Check the intake mid rocker arm of each cylinder at TDC.**

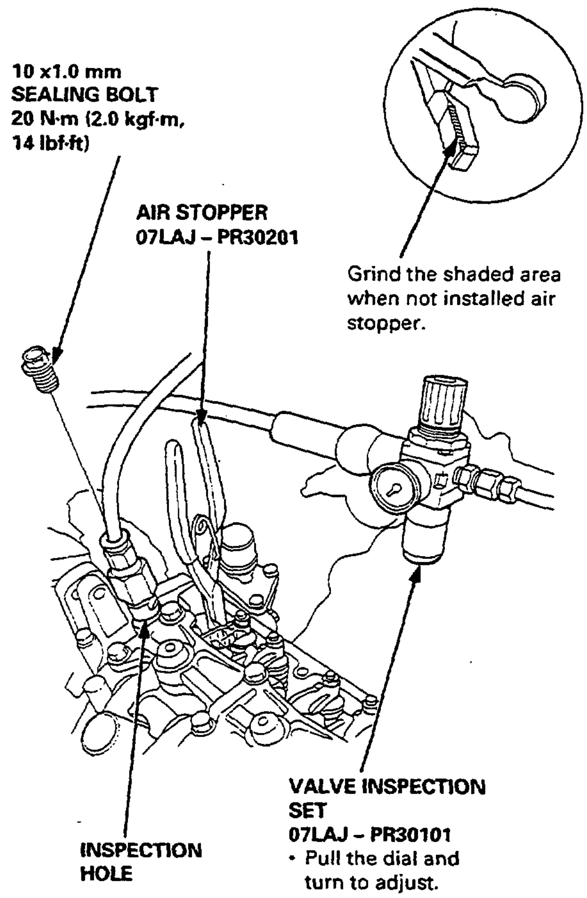
1. Remove the cylinder head cover.

   NOTE: Refer to page 6-55 when installing cylinder head cover.

2. Plug the relief hole with the special tool (Air Stopper).



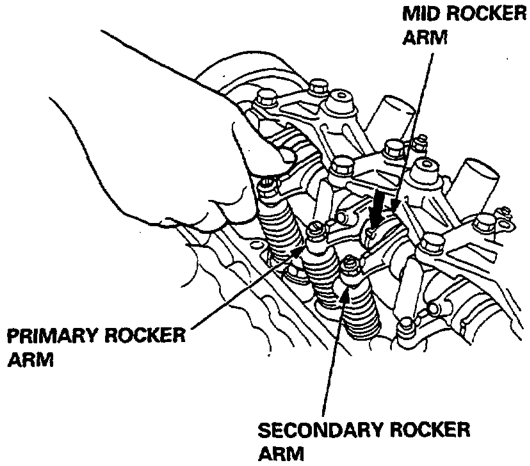
3. Remove the sealing bolt from the inspection hole and connect the Valve Inspection Tool.



4. Apply specified air pressure to the rocker arm synchronizing piston A/B, after loosening the regulator valve on the valve inspection set.

Specified Air Pressure:
250 kPa (2.5 kgf/cm², 36 psi)

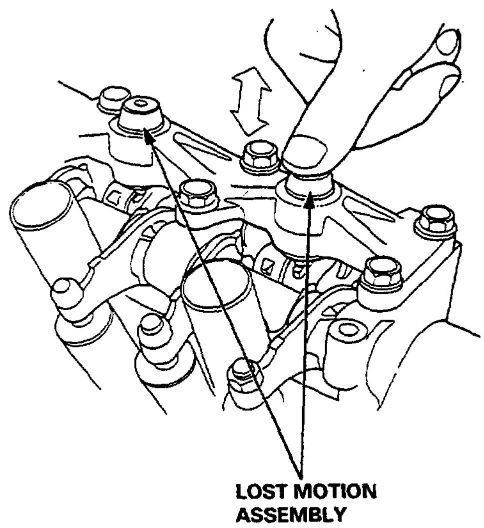
5. Make sure that the intake primary and secondary rocker arms are mechanically connected by piston and that the mid rocker arm does not move when pushed manually.



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

6. Remove the special tools.

7. Check for smooth operation of the 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.



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

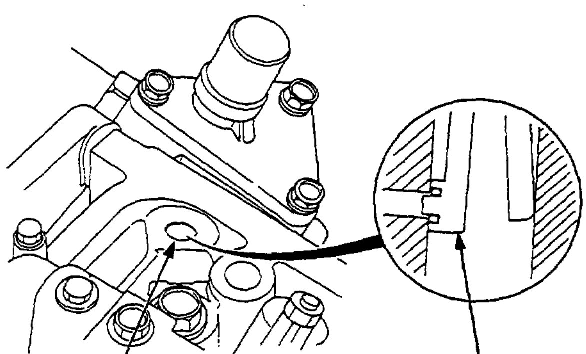
Rocker Arms — Inspection Using Special Tools (D15Z3 engine)

CAUTION:
- **Before using the Valve Inspection Tool, make sure that the air pressure gauge on the air compressor indicates over 250 kPa (2.5 kgf/cm², 36 psi).**
- **Inspect the valve clearance before rocker arm inspection.**
- **Cover the timing belt with a shop towel to protect the belt.**
- **Check the intake mid rocker arm of each cylinder at TDC.**

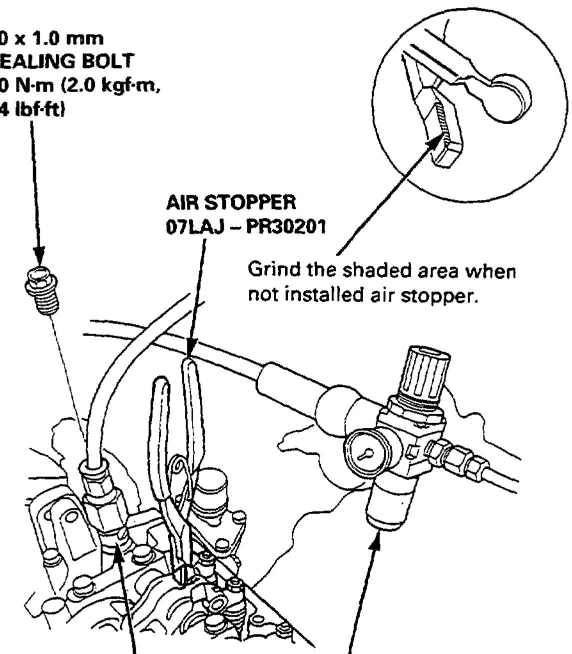
1. Remove the cylinder head cover.

   NOTE: Refer to page 6-55 when installing cylinder head cover.

2. Plug the relief hole with the special tool (Air Stopper).



3. Remove the sealing bolt from the inspection hole and connect the Valve Inspection Tool.

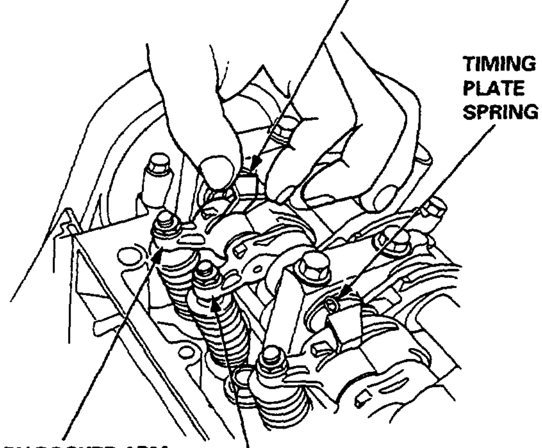


4. Apply specified air pressure to the intake rocker arm timing piston, after loosening the regulator valve on the valve inspection set.

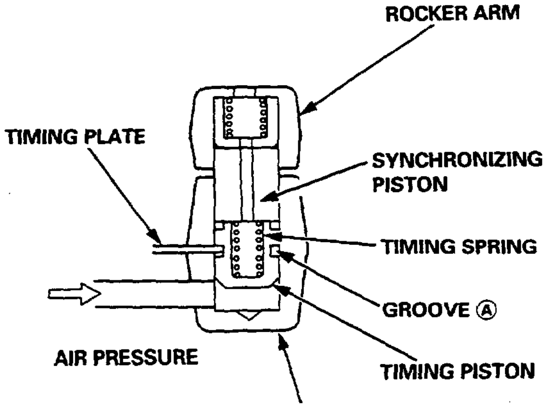
   Specified Air Pressure:
   250 kPa (2.5 kgf/cm², 36 psi)

5. With the specified air pressure applied, push up the timing plate; the synchronizing piston will pop out and engage the intake secondary rocker arm.
Visually check the engagement of the synchronizing piston.

NOTE:
- The synchronizing piston can be seen in the gap between the secondary and primary rocker arms.
- When the timing plate is engaged in the groove A on the timing piston, the piston will be locked in the pushed out position.



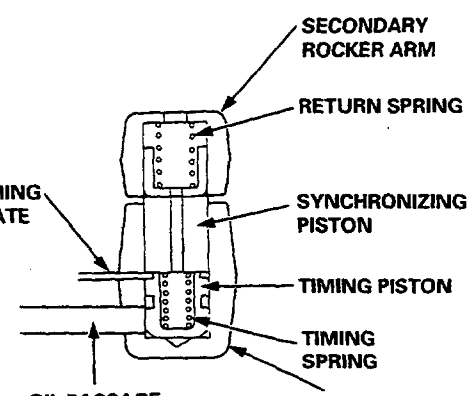
At Hight RPM:



6. Stop applying air pressure and push up the timing plate; the synchronizing piston will return to its original position with a click.
Visually check the disengagement of the synchronizing pistons.

NOTE:
- When the timing plate is pushed up, it will disengage the timing piston letting the synchronizing piston return to its original position by the return spring.
- Replace the intake rocker arms as an assembly if there is any abnormality.

At Low RPM:



7. Remove the special tools.

8. 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 100°F (38°C). Adjustment is the same for intake and exhaust valves.
- If the pulley bolt loosens while turning crank, tighten it to specified torque.

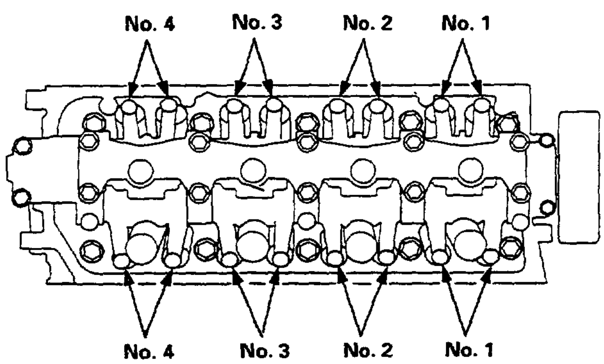
Specified Torque:
186 N·m (19.0 kgf·m, 137 lbf·ft)

1. Remove the cylinder head cover.

   NOTE: Refer to page 6-55 when installing cylinder head cover.

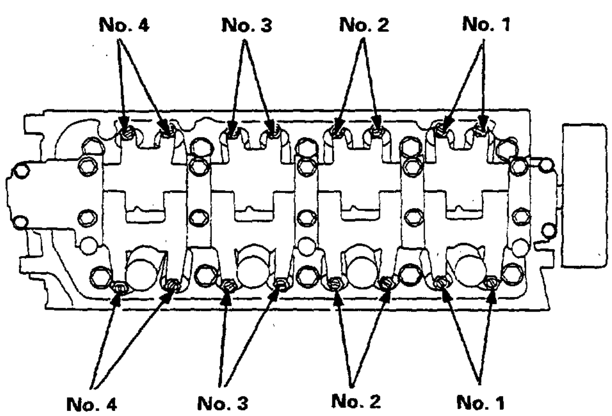
D16Y2 engine:

INTAKE

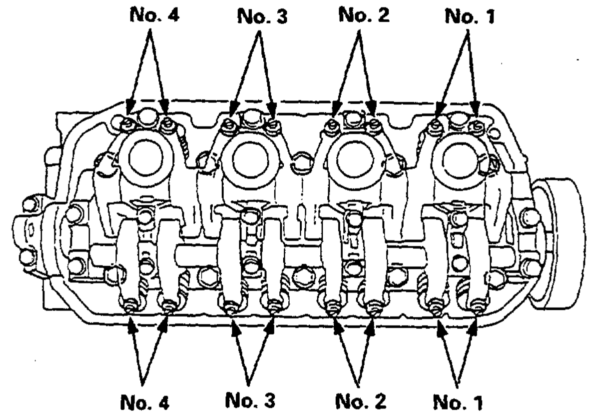


EXHAUST

D15Z3 engine:



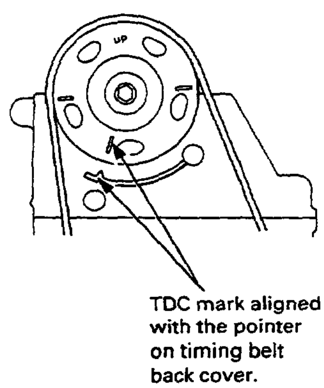
D14A2, D16Y3 engines:



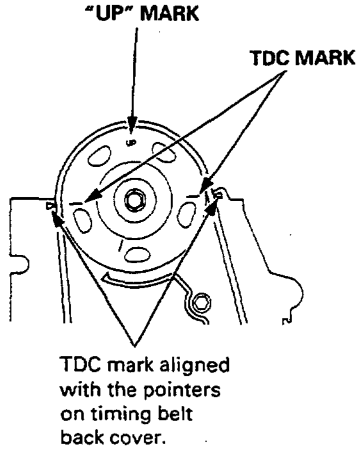
2. Set No. 1 piston at TDC. "UP" mark on the pulley should be at top, and TDC marks should align with cylinder head upper surface (D14A2 engine) or TDC groove should align with pointer(s) on the timing belt back cover (D15Z3, D16Y2, D16Y3 engines). The crankshaft pulley should be at TDC.

   Number 1 piston at TDC:

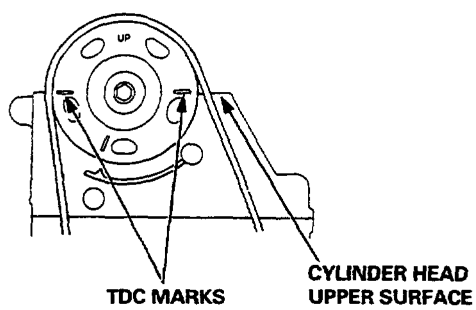
D16Y2, D16Y3 engines:



D15Z3 engine:



D14A2 engine:

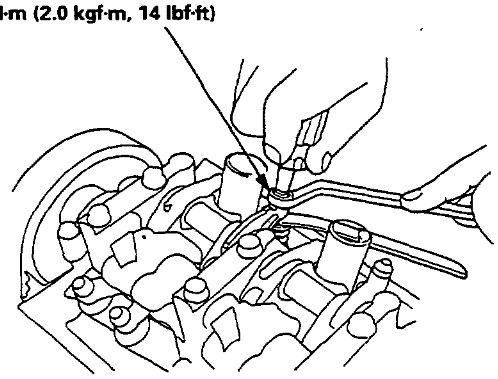


3. Adjust valves on No. 1 cylinder.

   Intake: 0.18 – 0.22 mm (0.007 – 0.009 in)
   Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in)

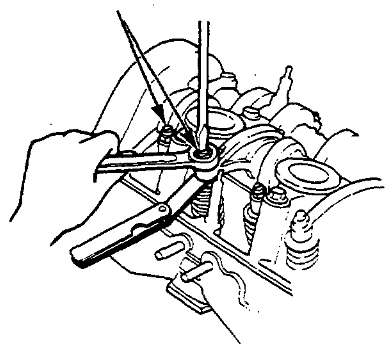
4. Loosen locknut and turn adjustment screw until feeler gauge slides back and forth with slight amount of drag.

D16Y2, D15Z3 engines:

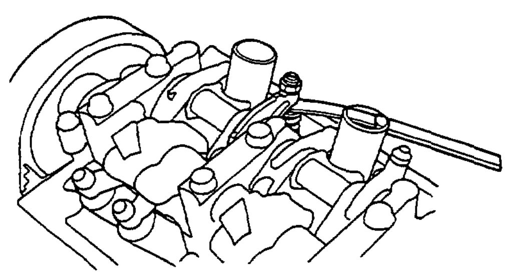


D16Y3, D14A2 engines:

CAUTION: Do not overtighten the locknuts, for the rocker arms are made of aluminum.



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



(cont'd)

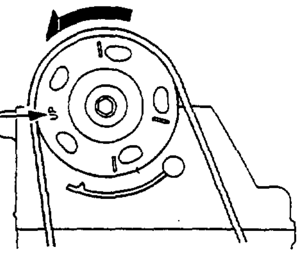
Valve Clearance

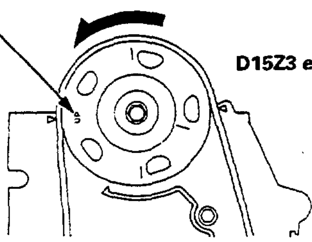
Adjustment (cont'd)

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

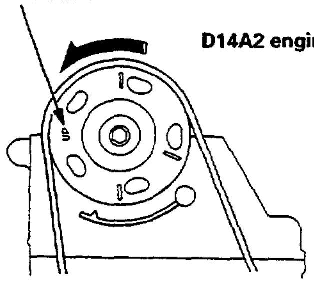
   Number 3 piston at TDC:

D16Y2, D16Y3 engines:





D15Z3 engine:

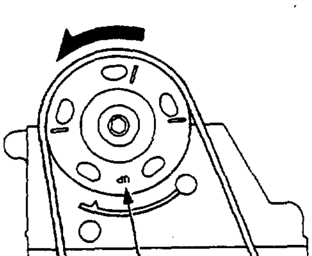


D14A2 engine:

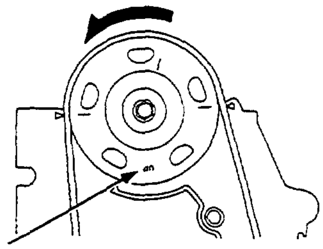
7. Rotate crankshaft 180° counterclockwise to bring No.4 piston to TDC. Both TDC grooves are once again visible. Adjust valves on No. 4 cylinder.

   Number 4 piston at TDC:

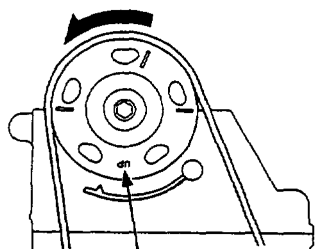
D16Y2, D16Y3 engines:



D15Z3 engine:



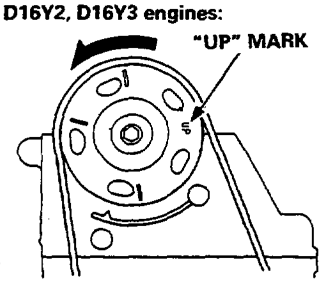
D14A2 engine:



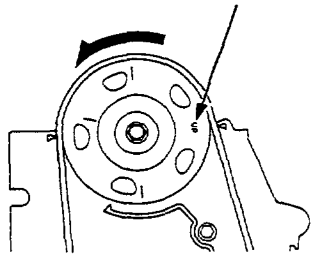
8. Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. The "UP" mark should be on the intake side. Adjust valves on No. 2 cylinder.

   Number 2 piston at TDC:

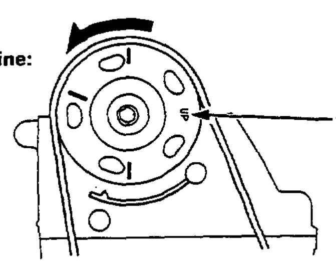
D16Y2, D16Y3 engines:



D15Z3 engine:



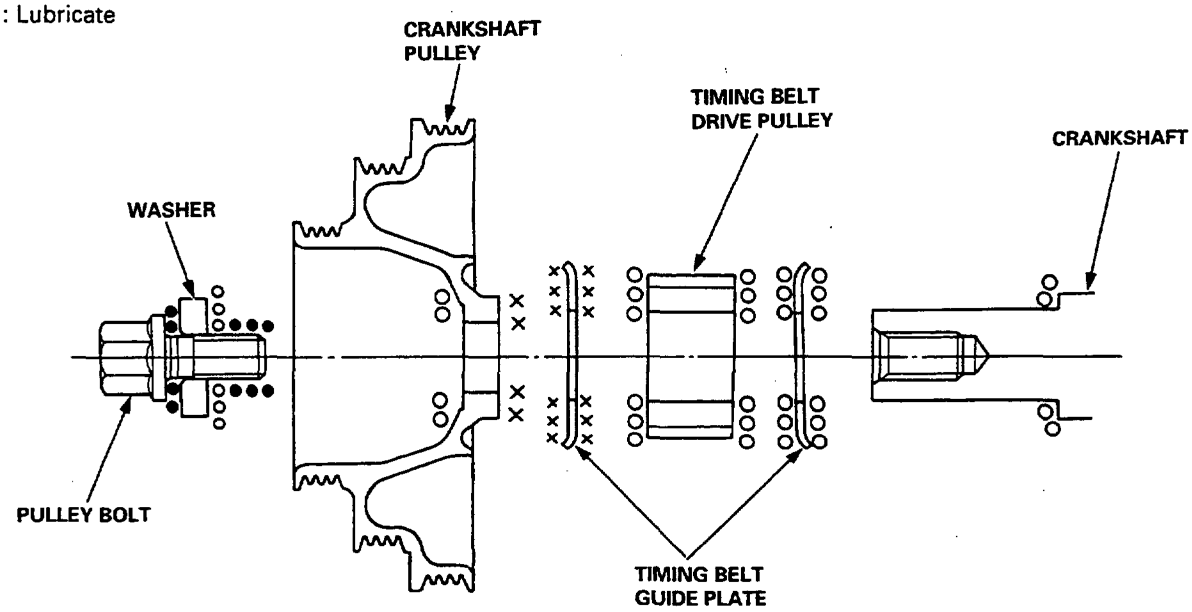
D14A2 engine:



Crankshaft Pulley and Pulley Bolt Replacement

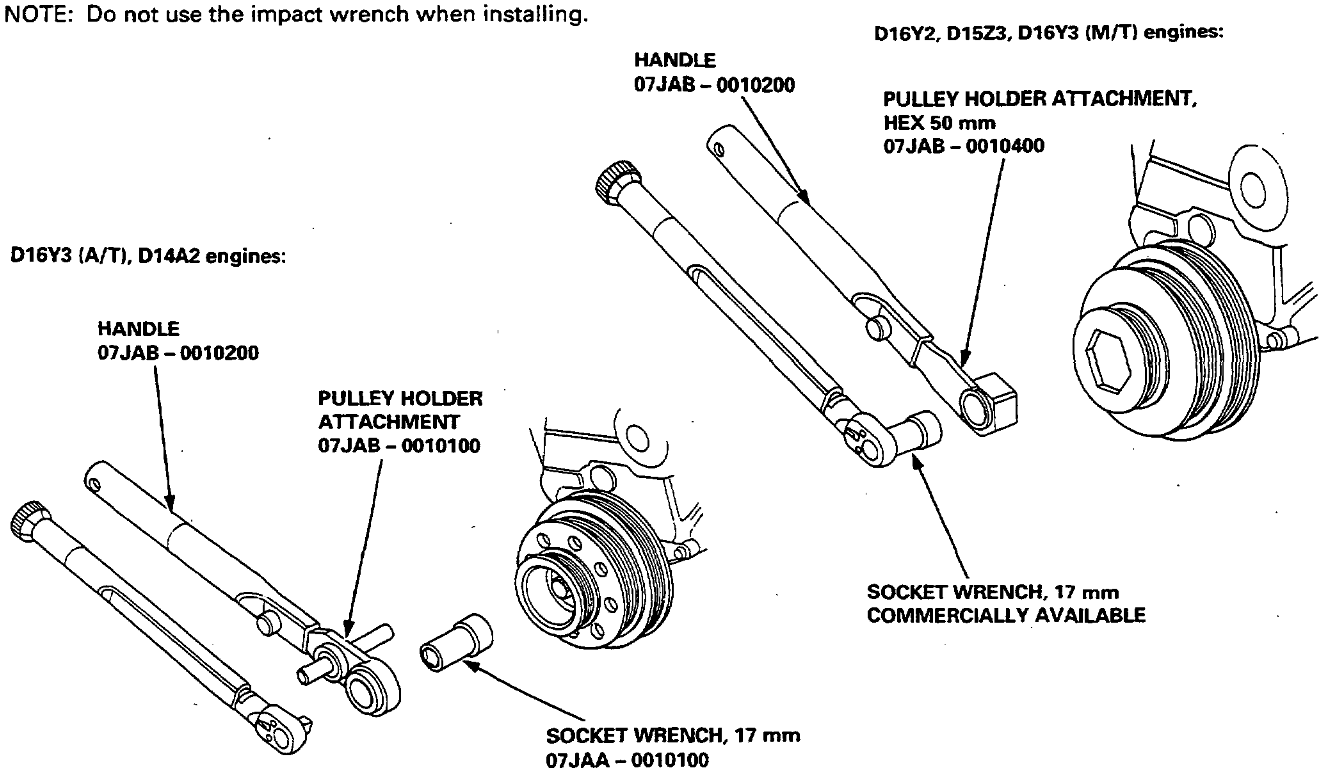
When installing and tightening the pulley, follow the procedure below.

Clean, remove any oil and lubricate points shown below.
O : Clean
X : Remove any oil
● : Lubricate



Crankshaft pulley bolt size and torque value:
14 x 1.25 mm
186 N·m (19.0 kgf·m, 137 lbf·ft)

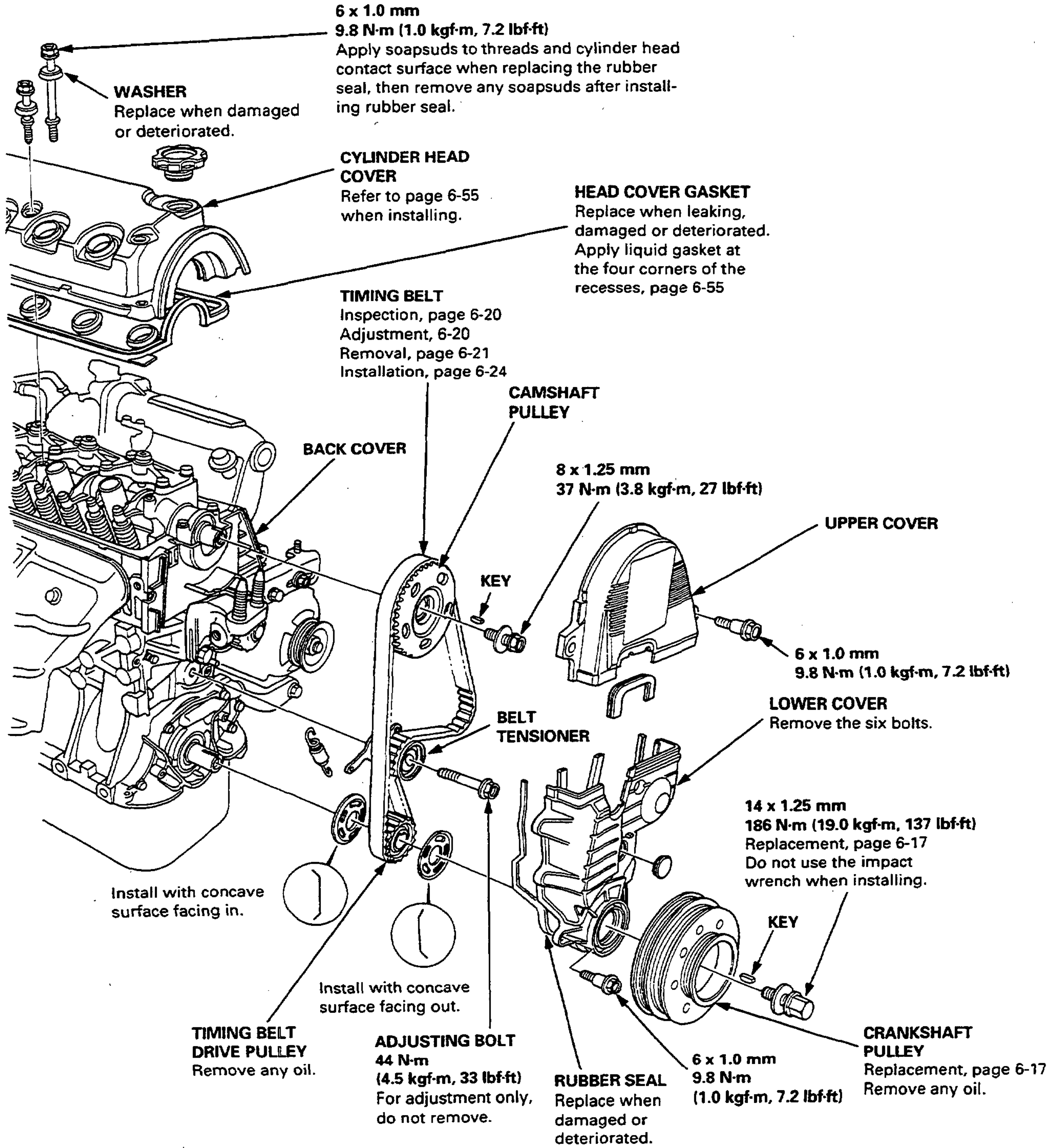
NOTE: Do not use the impact wrench when installing.



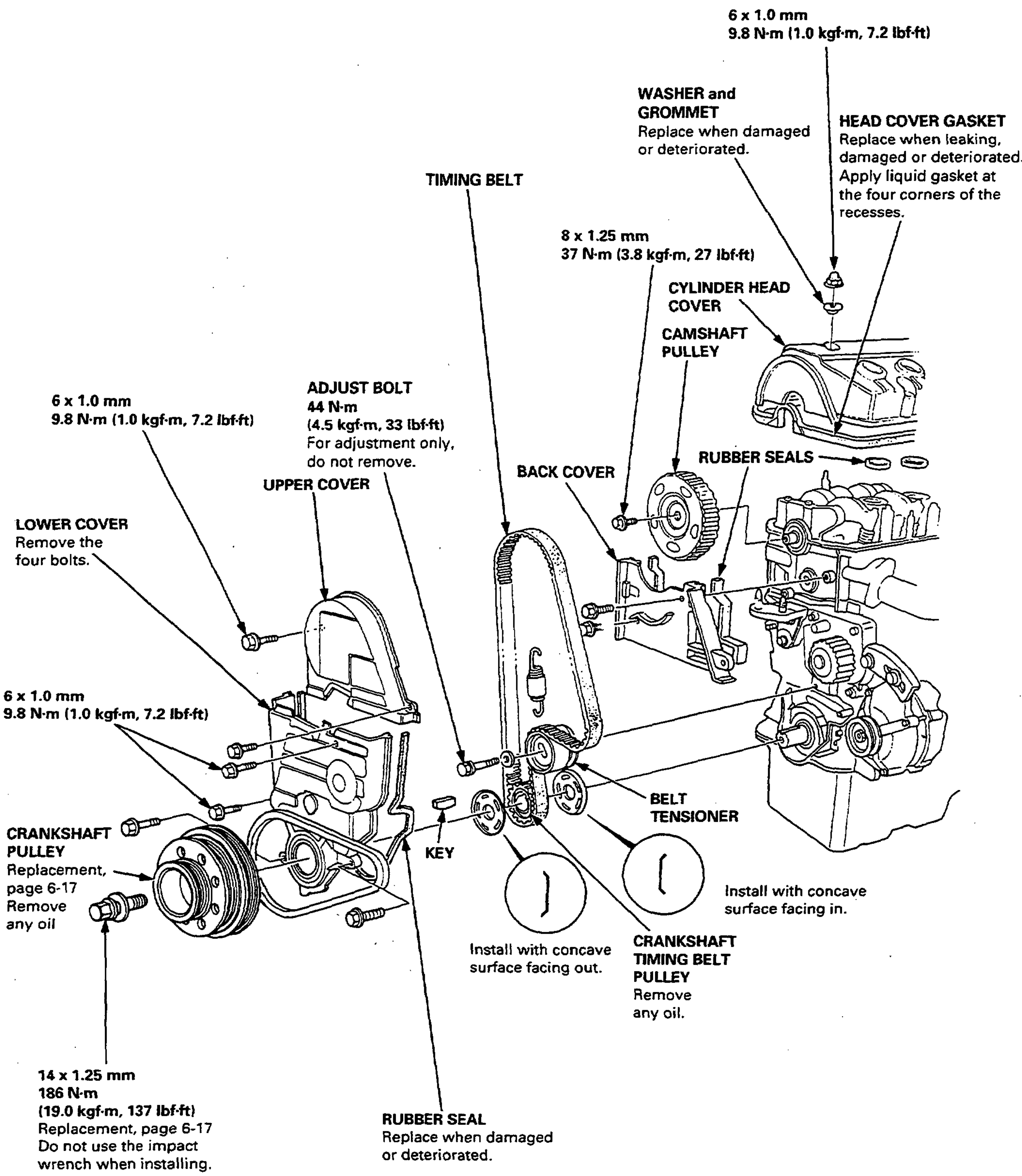
Illustrated Index

D16Y2, D15Z3 engines:

NOTE:
- Refer to page 6-25 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 disassembled items.
- Clean the upper cover and lower cover before installing.
- Replace the camshaft seals and crankshaft seals if there is oil leakage.
- Refer to page 6-17 before installing timing belt.



D16Y3, D14A2 engines:



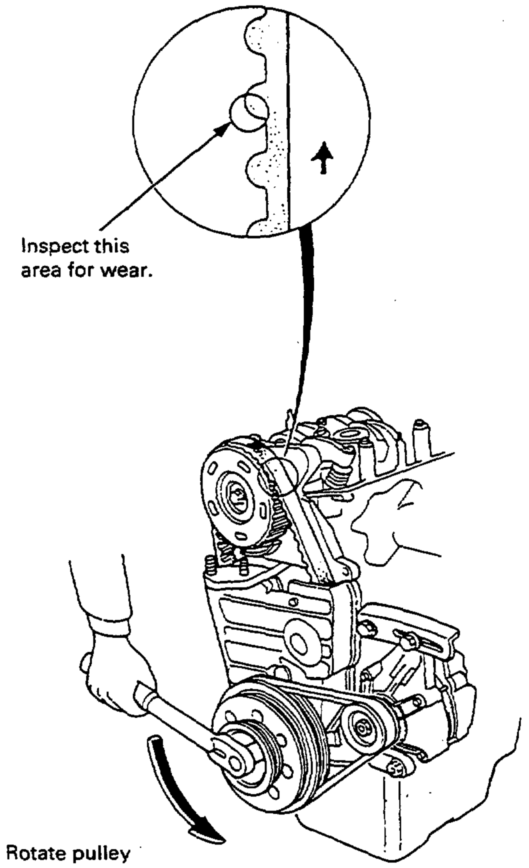
Timing Belt

Inspection

1. Disconnect the battery negative terminal first, then the positive terminal.
2. Remove the cylinder head cover.

   NOTE: Refer to page 6-55 when installing cylinder head cover.
3. Remove the upper cover.
4. 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.



5. After inspecting, retorque the crankshaft pulley bolt to 186 N·m (19.0 kgf·m, 137 lbf·ft).

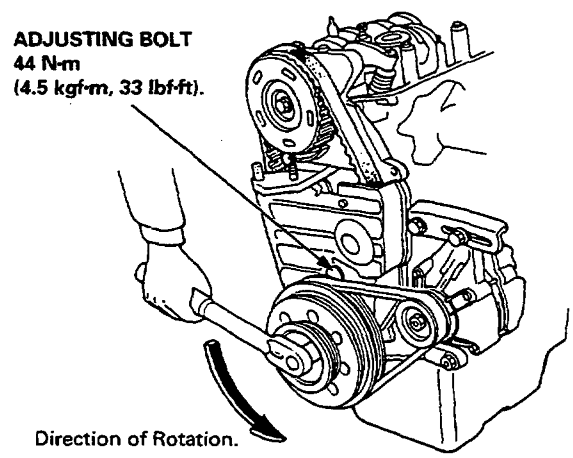
Tension Adjustment

CAUTION: Always adjust the 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.

1. Disconnect the battery negative terminal first, then the positive terminal.
2. Remove the cylinder head cover.

   NOTE: Refer to page 6-55 when installing cylinder head cover.
3. Set the No. 1 piston at TDC (see page 6-25).
4. Rotate the crankshaft revolutions to set the belt.
5. Set the No. 1 piston at TDC.
6. Loosen the adjusting bolt 2/3 – 1 turn.



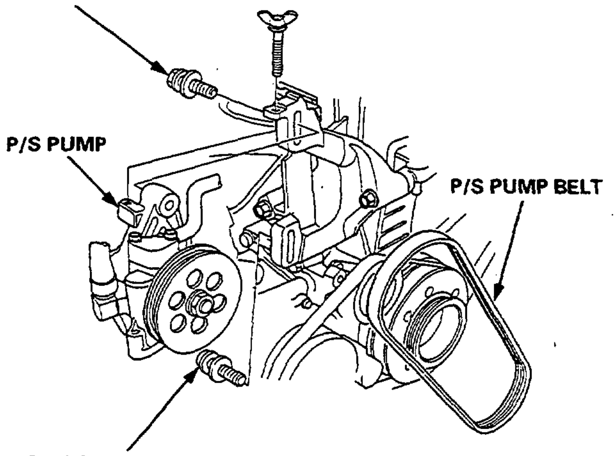
7. Rotate the crankshaft counterclockwise 3-teeth on the camshaft pulley to create tension on the timing belt.
8. Make sure the timing belt and the camshaft pulley are engaged securely.
9. Torque the adjusting bolt to 44 N·m (4.5 kgf·m, 33 lbf·ft).
10. After adjusting, retorque the crankshaft pulley bolt to 186 N·m (19.0 kgf·m, 137 lbf·ft).

Removal

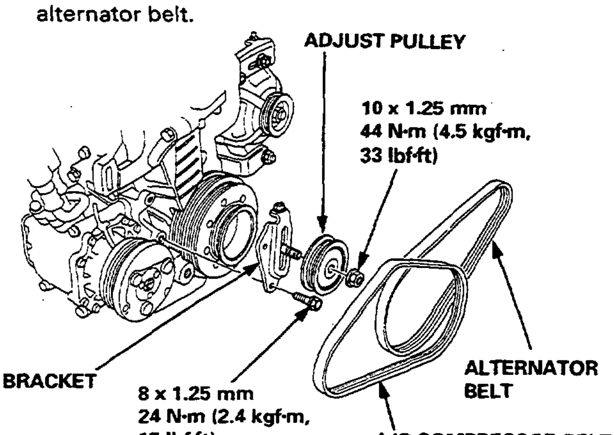
CAUTION: Inspect the water pump when replacing the timing belt.

NOTE:
- Turn the crankshaft so that No. 1 piston at TDC (see page 6-25).
- Before removing the timing belt, mark its direction of rotation if it to be reused.

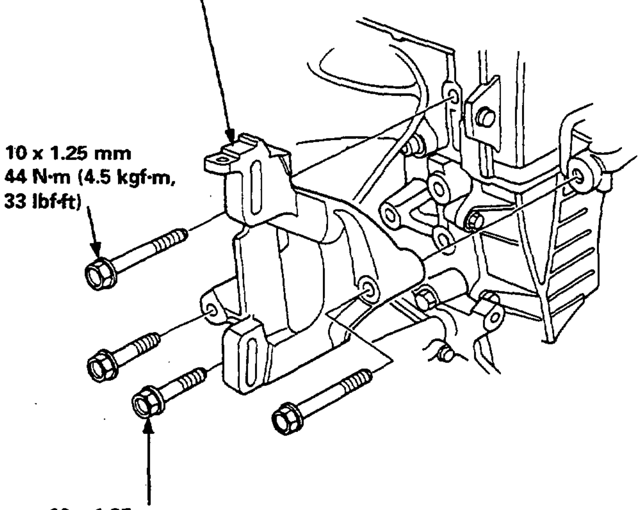
1. Disconnect the battery negative terminal first, then the positive terminal.
2. Remove the splash shield.
3. Remove the power steering pump.
   - Do not disconnect the P/S hoses.



4. Remove the A/C compressor adjust pulley with bracket and the belt (with A/C), then remove the alternator belt.

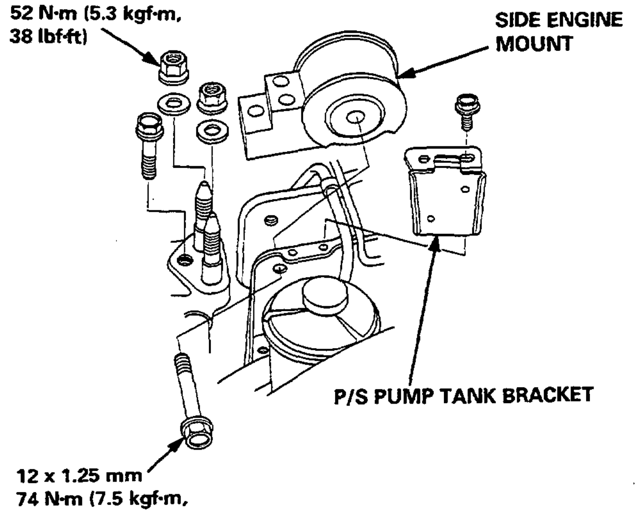


5. Remove the P/S pump bracket.
6. Loosen the alternator adjusting bolt and pivot nut, then remove the belt.



7. Remove the cruise control actuator and the P/S pump tank bracket.
8. Remove the side engine mount.

   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.



(cont'd)

Removal (cont'd)

9. Remove the cylinder head cover.

   NOTE: Refer to page 6-55 when installing cylinder head cover.

10. Remove the timing belt upper cover.

11. Remove the pulley bolt and crankshaft pulley (see page 6-17).

12. Remove the timing belt lower cover.

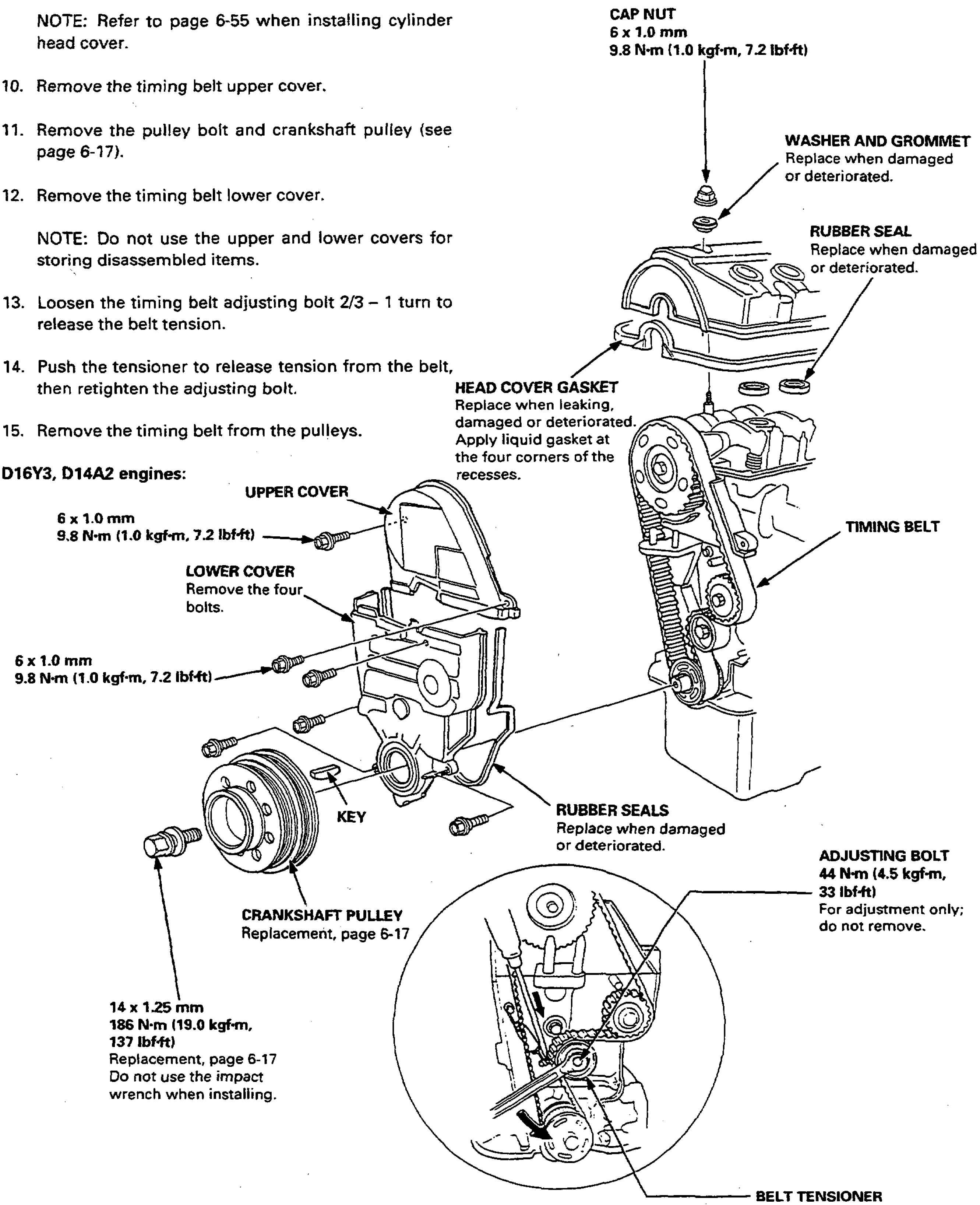
    NOTE: Do not use the upper and lower covers for storing disassembled items.

13. Loosen the timing belt adjusting bolt 2/3 – 1 turn to release the belt tension.

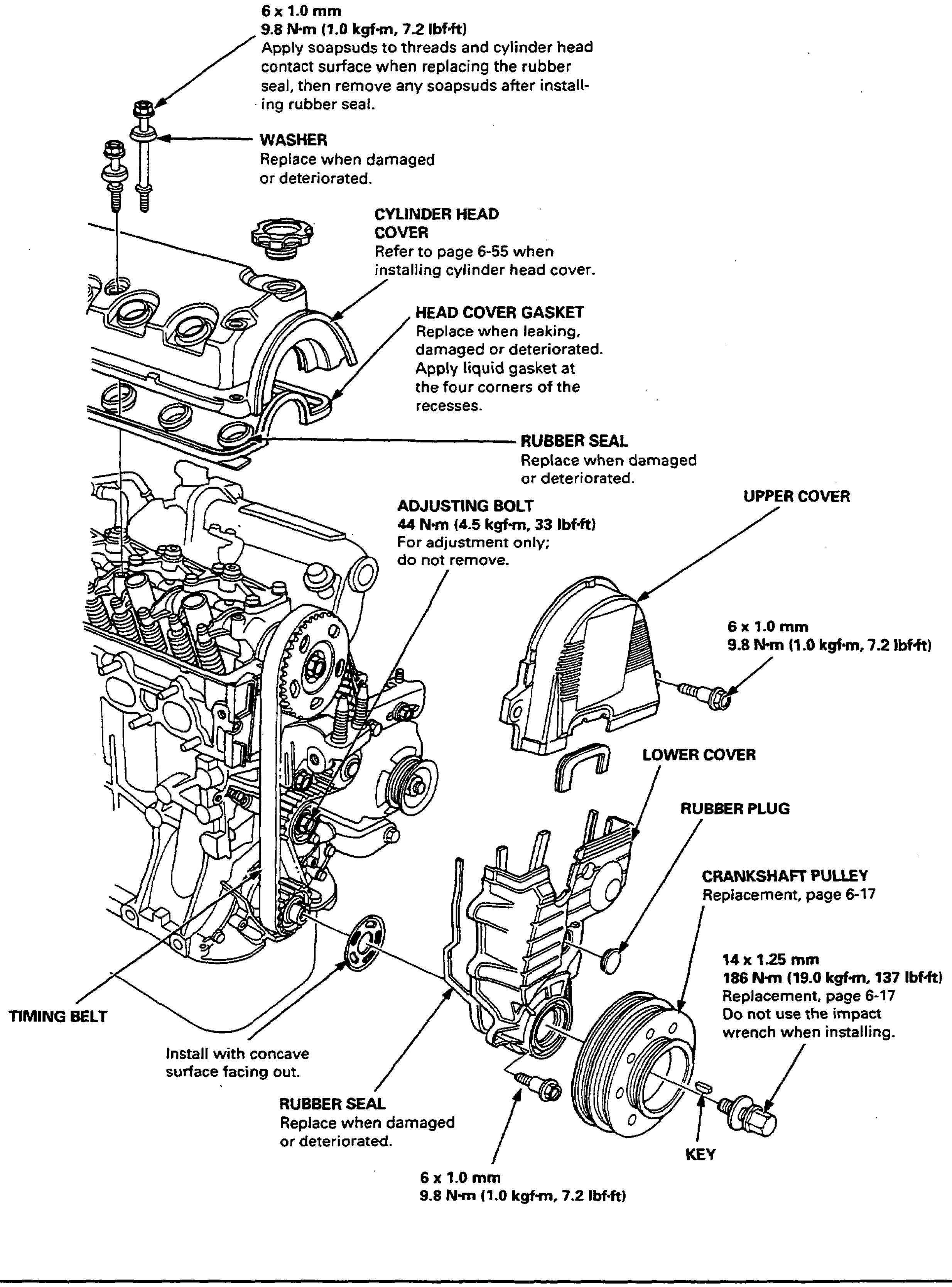
14. Push the tensioner to release tension from the belt, then retighten the adjusting bolt.

15. Remove the timing belt from the pulleys.

D16Y3, D14A2 engines:



D16Y2, D15Z3 engines:



Timing Belt

Installation

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

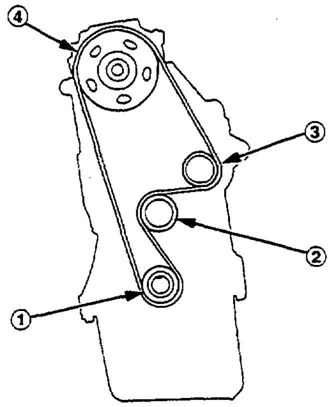
NOTE: Clean the upper and lower covers before installation.

1. Position the crankshaft and the cam pulleys as shown before installing the timing belt.

   A Set the crankshaft so that the No. 1 piston is at top-dead-center (TDC).

   NOTE: Align the groove on the teeth side of the timing belt drive pulley to the ⇩ pointer on the oil pump.

   B D14A2 engine: Align the TDC marks on the cam pulley with the cylinder head upper surface.
   D16Y2, D16Y3 engines: Align the TDC mark on the cam pulley with pointer on the back cover.
   D15Z3 engine: Align the TDC marks on the cam pulley with pointers (triangle marks) on the back cover.

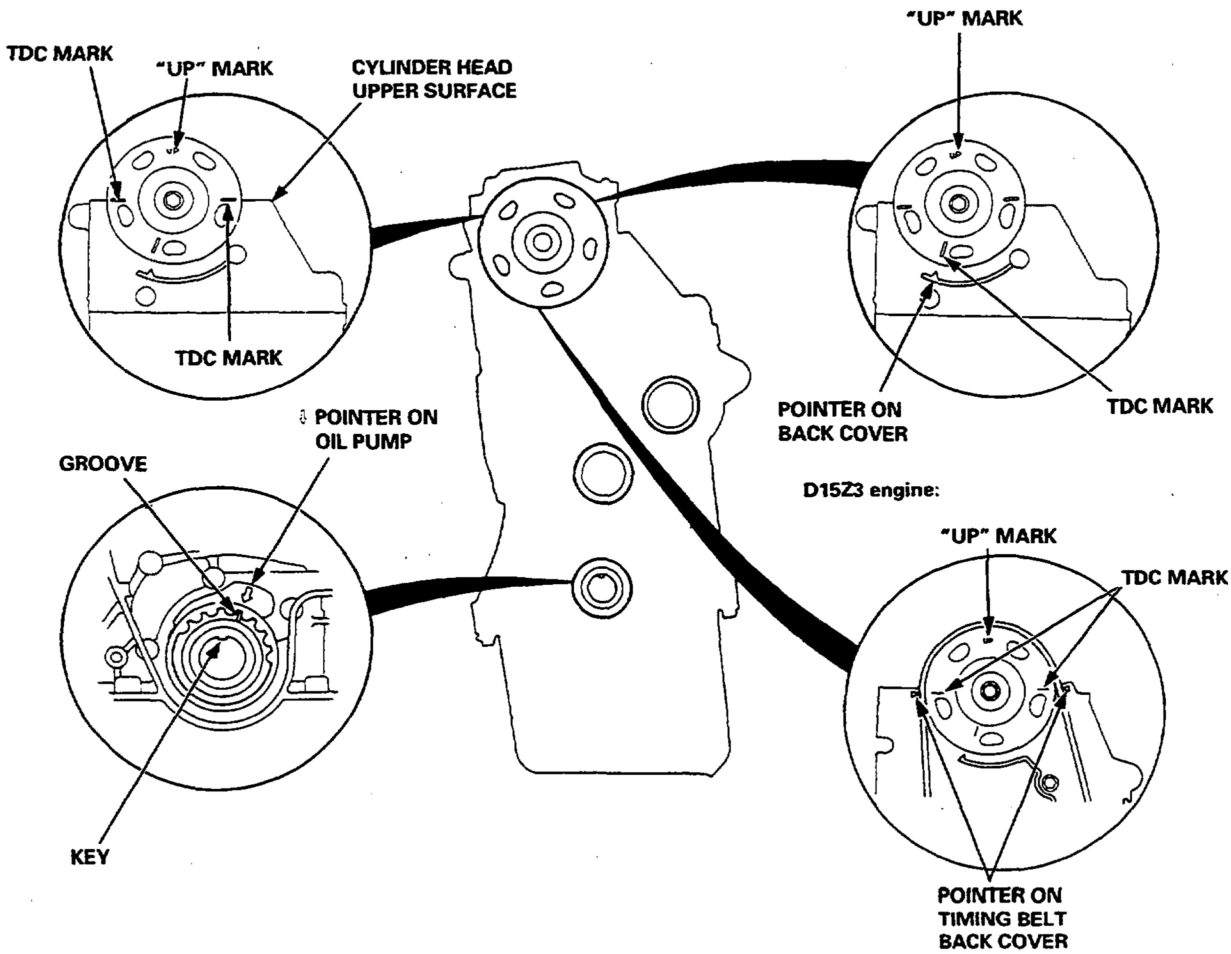


2. Install the timing belt tightly in the sequence shown.
   ① Timing belt drive pulley (crankshaft) → ② Adjusting pulley → ③ Water pump pulley → ④ camshaft pulley.

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

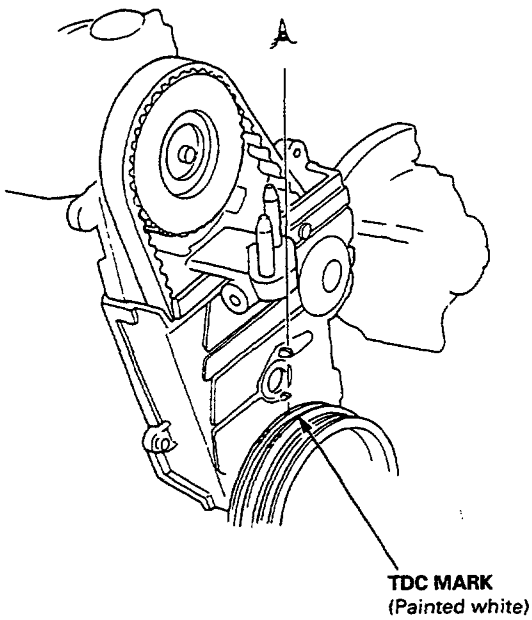
D14A2 engine:

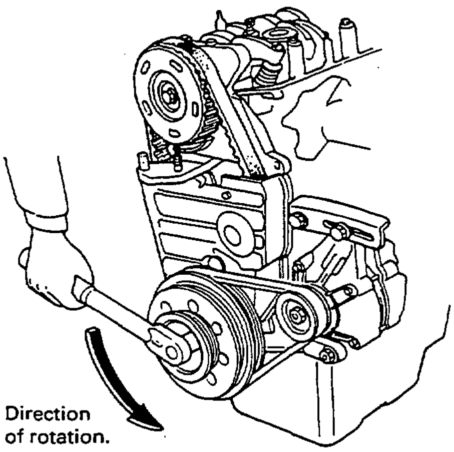
D16Y2, D16Y3 engines:



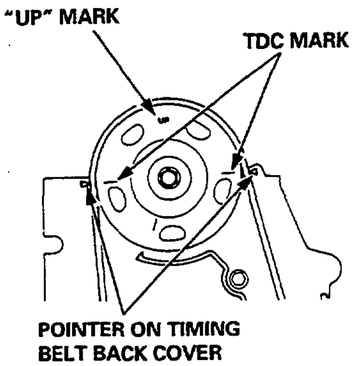
3. Loosen the adjusting bolt, and retighten it after tensioning the belt.
4. Install the timing belt guide plate and lower cover.
5. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-17).
6. Rotate the crankshaft pulley about 5 or 6 turns counterclockwise so that the timing belt positions on the pulleys.
7. Adjust the timing belt tension (see page 6-20).
8. Check the crankshaft pulley and the camshaft pulley at TDC.

CRANKSHAFT PULLEY:

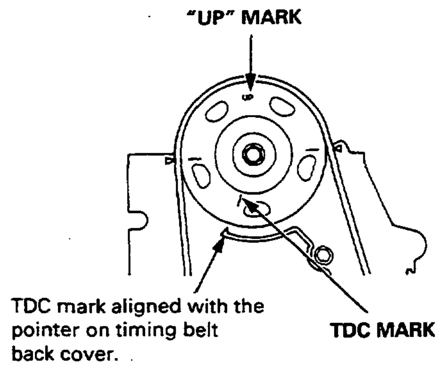




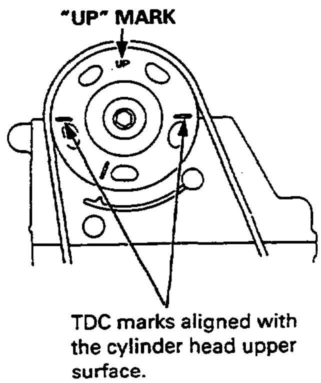
CAMSHAFT PULLEY:
D16Y2, D16Y3 engines:



D15Z3 engine:



D14A2 engine:



9. If the camshaft pulley is not positioned at TDC, remove the timing belt and adjust the positioning following the procedure on page 6-24, then reinstall the timing belt.

   NOTE: Refer to page 6-21 for timing belt removal.

   After installation, adjust the tension of each belt.
   - See section 23 for alternator belt tension adjustment.
   - See section 22 for A/C compressor belt tension adjustment.
   - See section 17 for P/S pump belt tension adjustment.

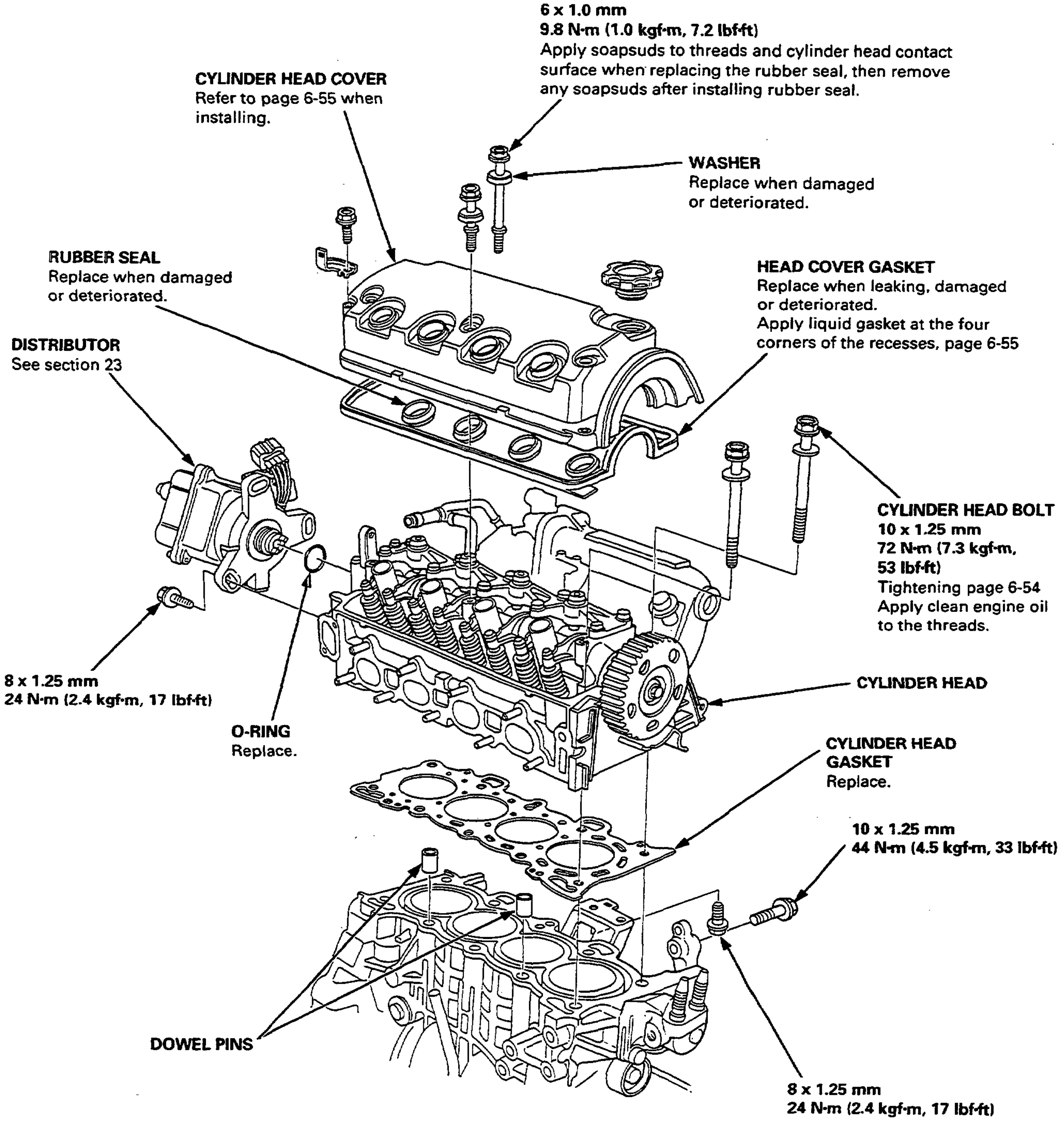
Cylinder Head

Illustrated Index

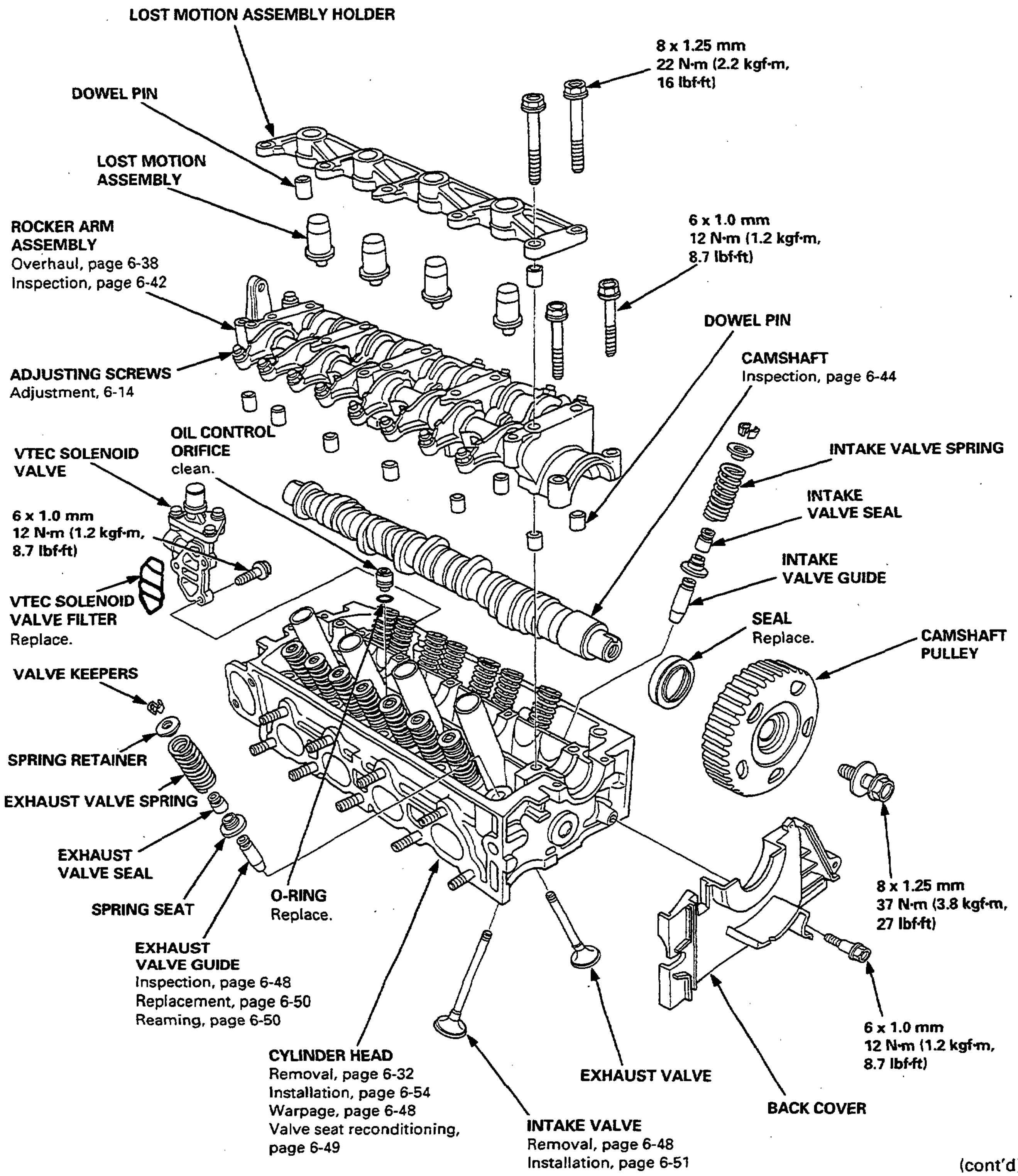
CAUTION:
- **To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 38°C (100°F) before removing it.**
- **In handling a metal gasket, take care not to fold it or damage the contact surface of the gasket.**

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

D16Y2 engine:



NOTE: Use new O-rings and gaskets when reassembling.
OIL Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.



(cont'd)

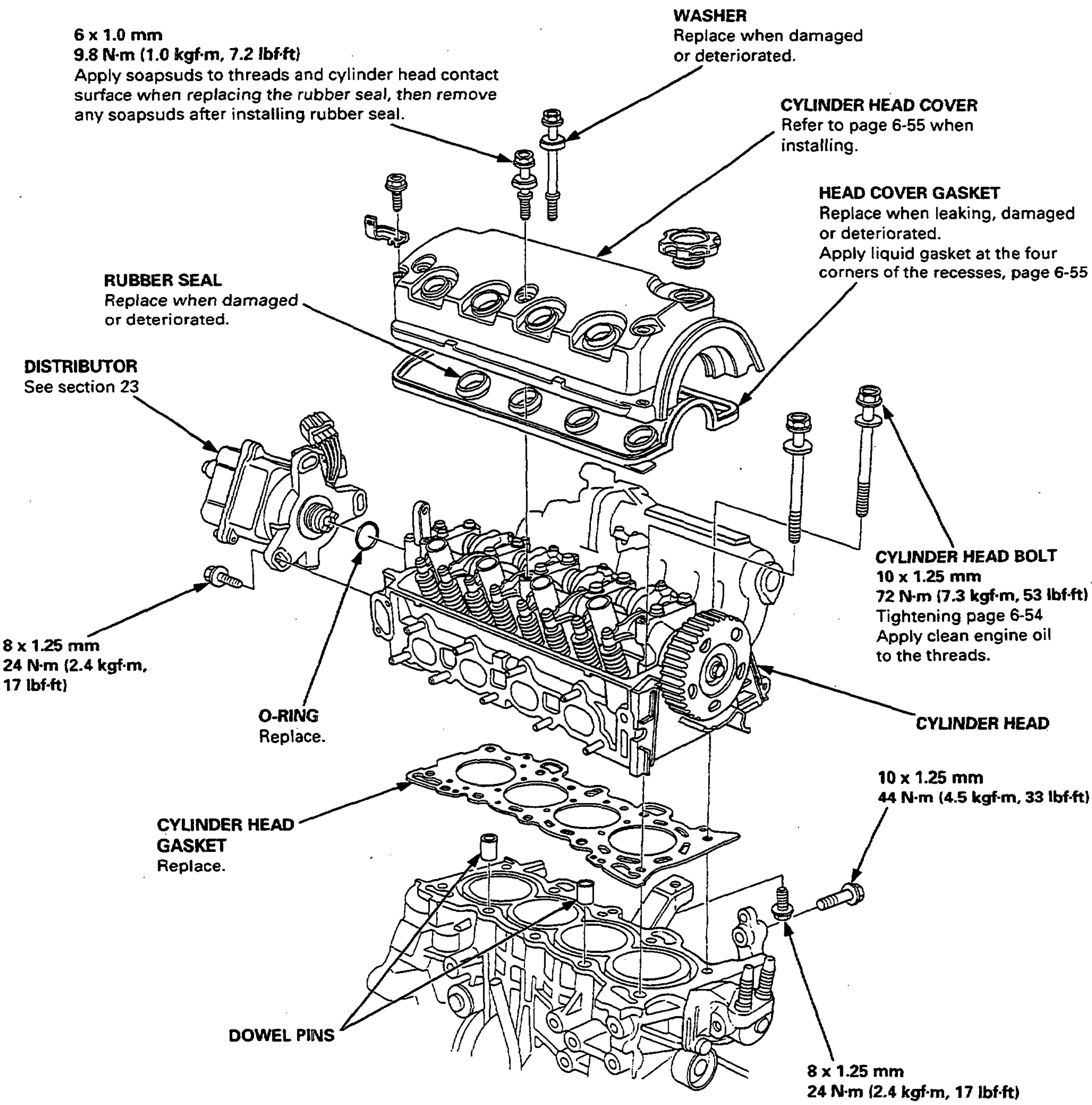
Cylinder Head

Illustrated Index (cont'd)

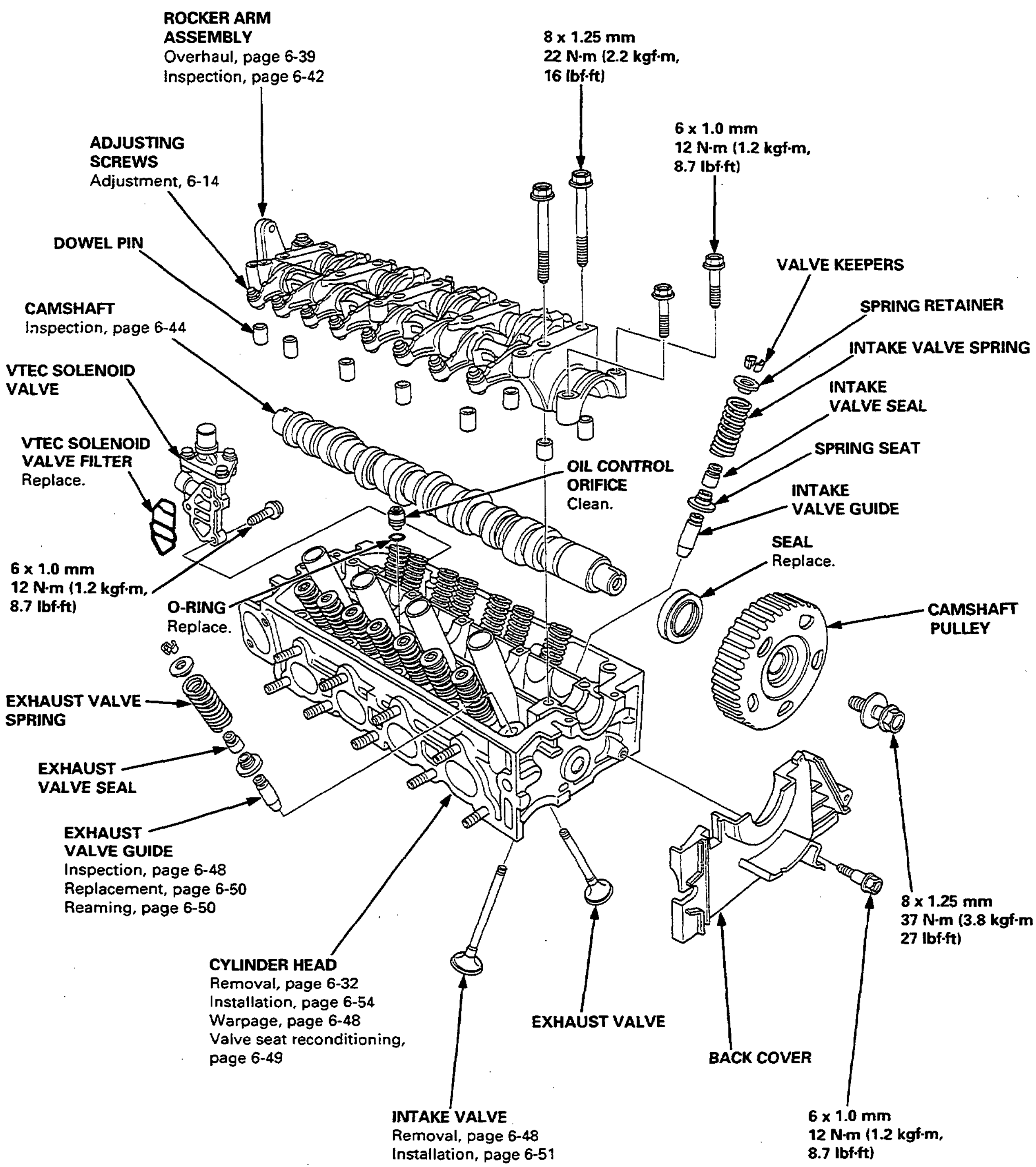
CAUTION:
- **To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 38°C (100°F) before removing it.**
- **In handling a metal gasket, take care not to fold it or damage the contact surface of the gasket.**

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

D15Z3 engine:



NOTE: Use new O-rings and gaskets when reassembling.
Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.

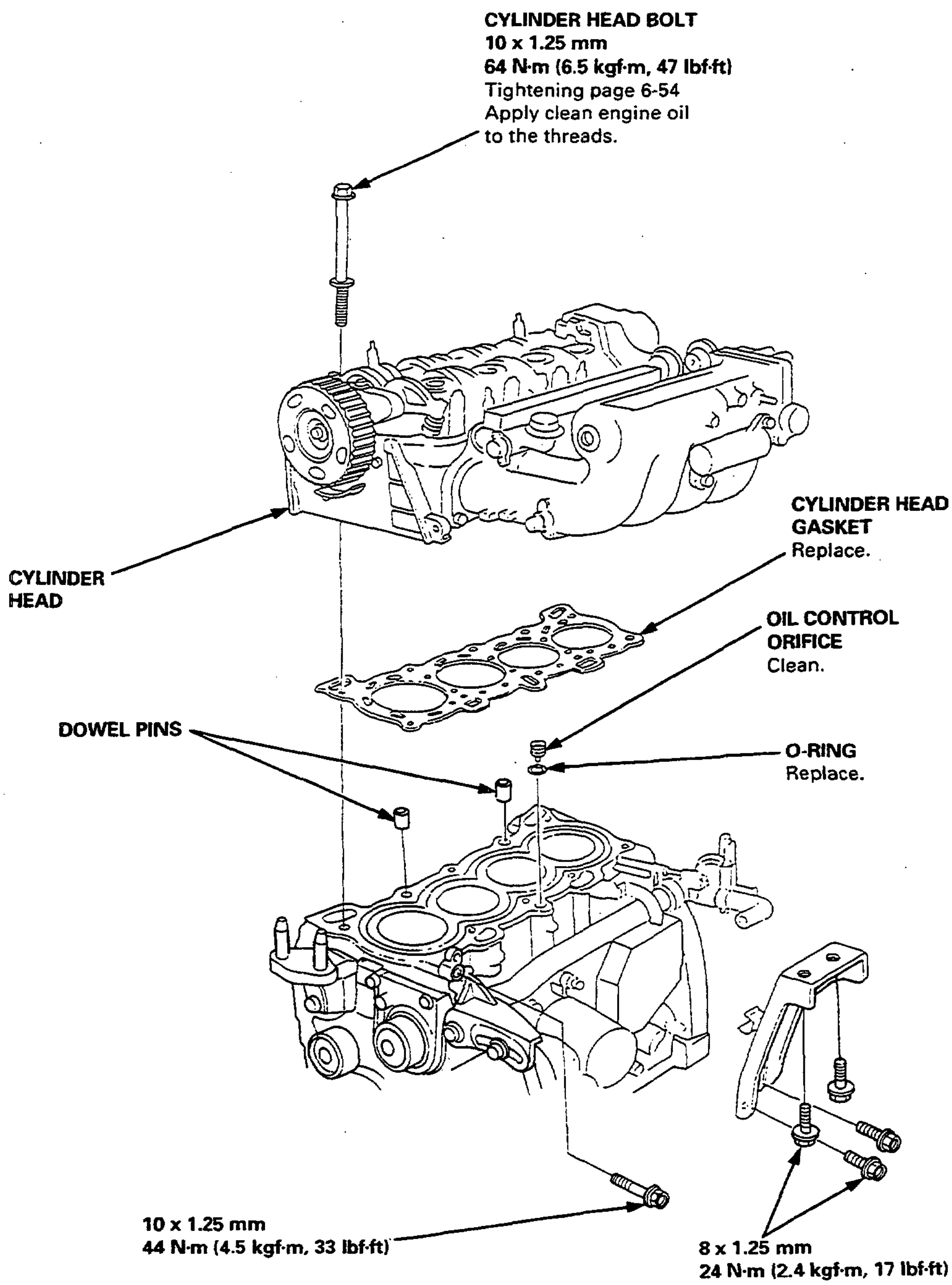


(cont'd)

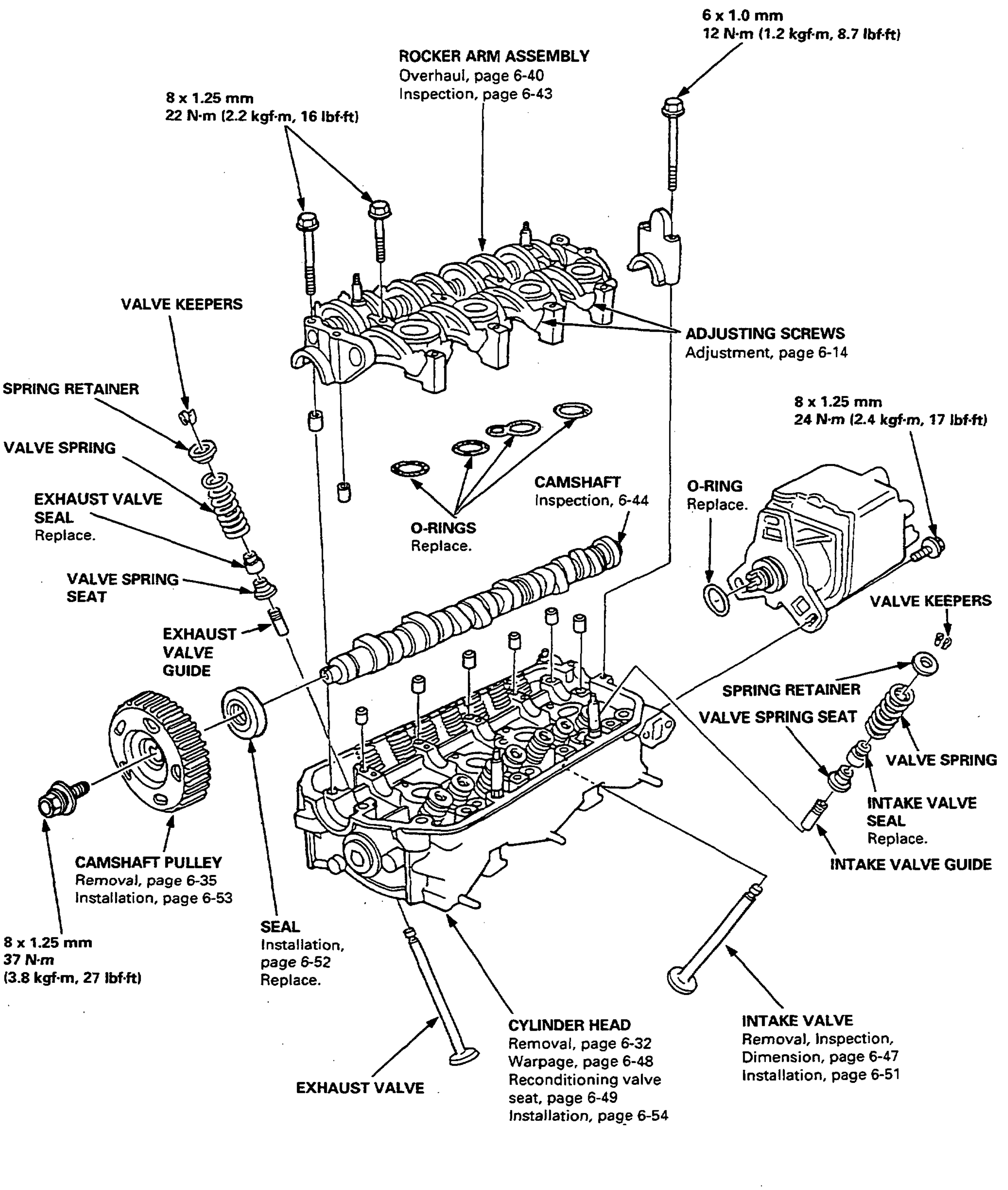
CAUTION:
- **To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 38°C (100°F) before removing it.**
- **In handling a metal gasket, take care not to fold it or damage the contact surface of the gasket.**

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

D16Y3, D14A2 engines:



NOTE: Use only new O-rings and new gaskets when reassembling.
Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.



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 bolt.**

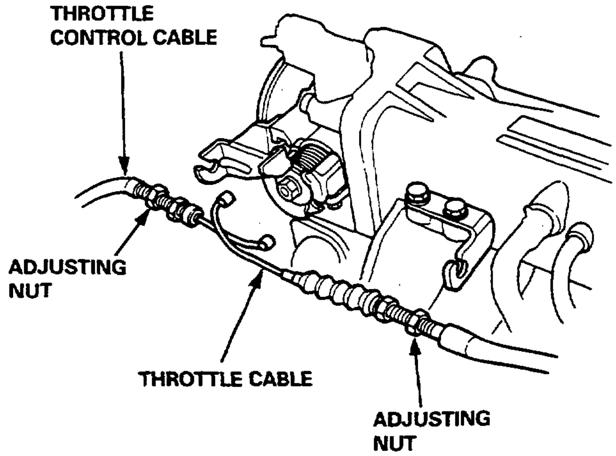
NOTE:
- Unspecified items are common.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses or interfere with other parts.
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 piston is at top dead center (see page 6-14).

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

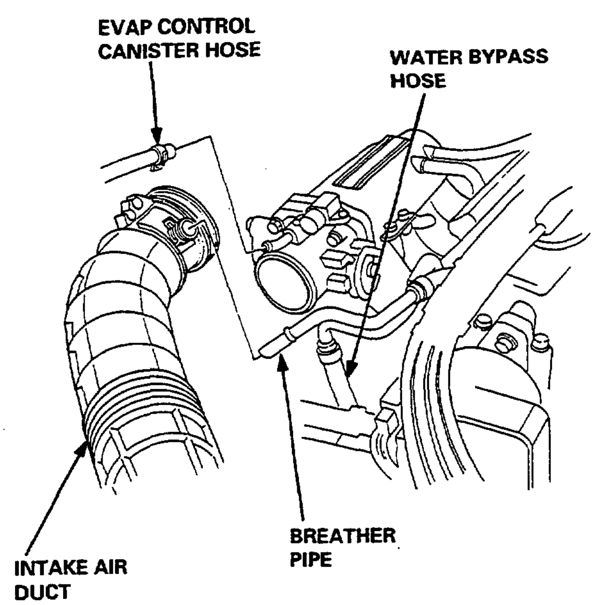
2. Drain the engine coolant (see page 10-4).
   - Remove the radiator cap speed draining.

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

   NOTE:
   - Take care not to bent the cable when removing it. Always replace any kinked cable with a new one.
   - Adjust the throttle cable and throttle control cable when installing (see section 11 and 14).



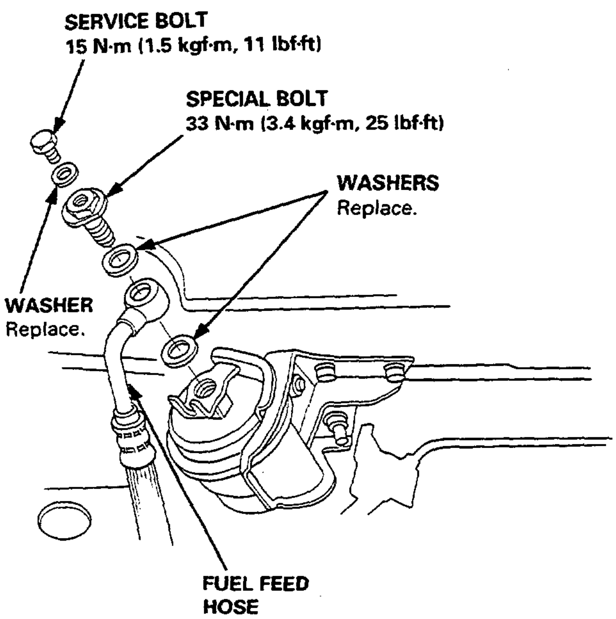
4. Remove the intake air duct, breather pipe, water bypass hose and evaporative emission (EVAP) control canister hose.



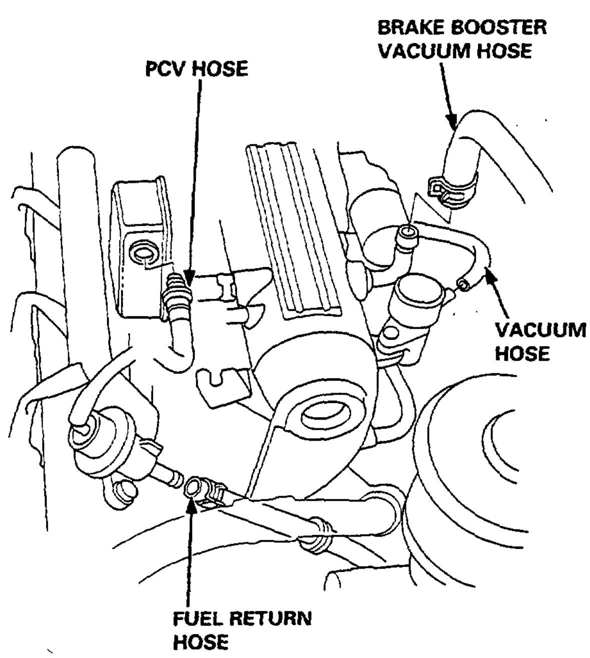
5. Relieve fuel pressure (see section11).

⚠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.

6. Remove the fuel feed hose.



7. Remove the fuel return hose, positive crankcase ventilation (PCV) hose, vacuum hose and brake booster vacuum hose.



8. Remove the power steering (P/S) pump belt, engine ground cable and P/S pump (see page 6-21).

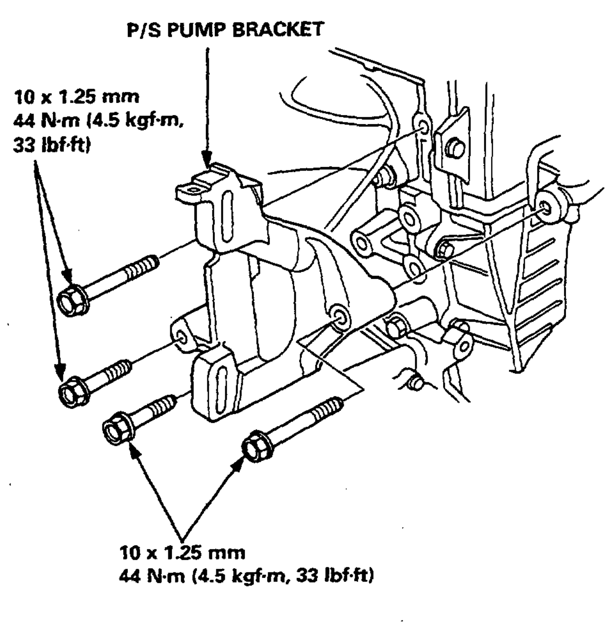
9. Remove the air conditioning (A/C) compressor belt (see page 6-21).

10. Remove the alternator belt (see page 6-21).

11. 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
- Throttle position sensor connector
- Manifold absolute pressure (MAP) sensor connector
- Heated oxygen sensor (HO2S) connector
- Engine coolant temperature (ECT) sensor connector
- ECT switch connector
- ECT gauge sending unit connector
- VTEC solenoid valve connector (D16Y2, D15Z3 engines)
- TDC/CKP/CYP sensor connector
- Exhaust gas recirculation (EGR) valve lift sensor connector (D15Z3 engine)

12. Remove the P/S pump bracket.

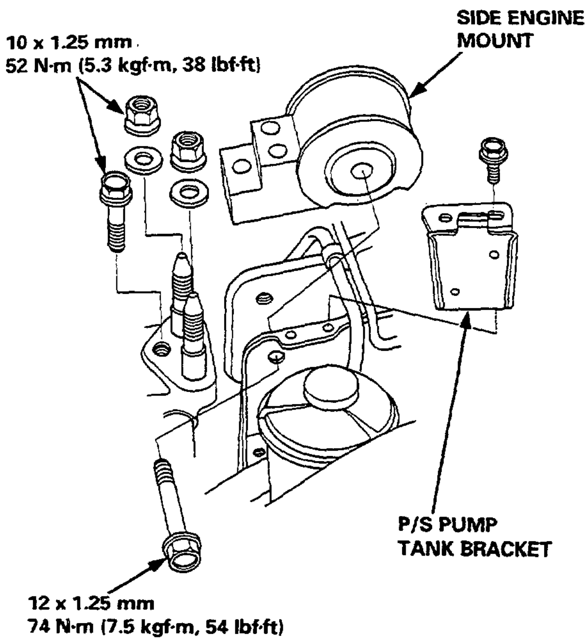


(cont'd)

Removal (cont'd)

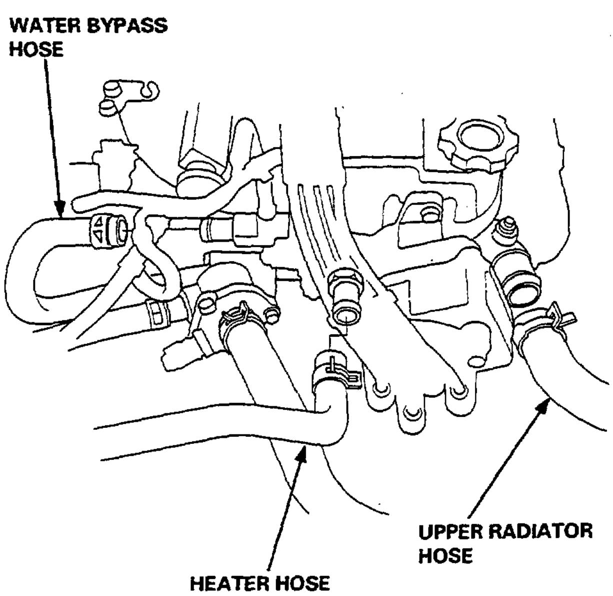
13. Remove the side engine mount and P/S pump tank bracket.

    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.

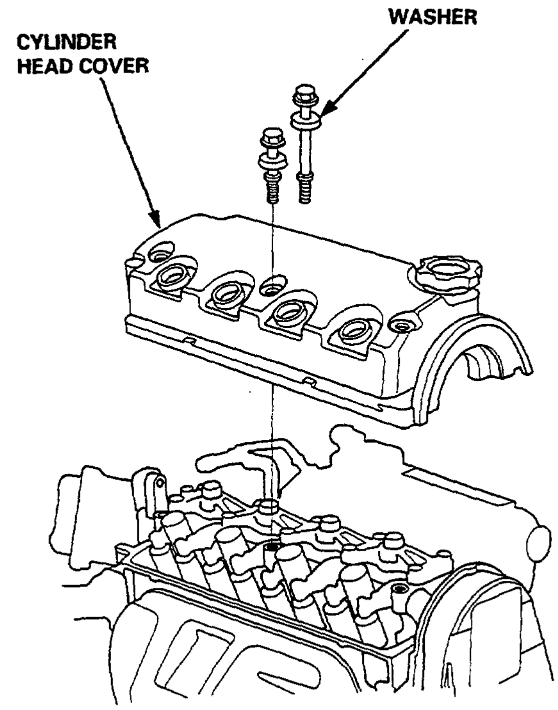


14. Remove the spark plug caps and distributor from the cylinder head.

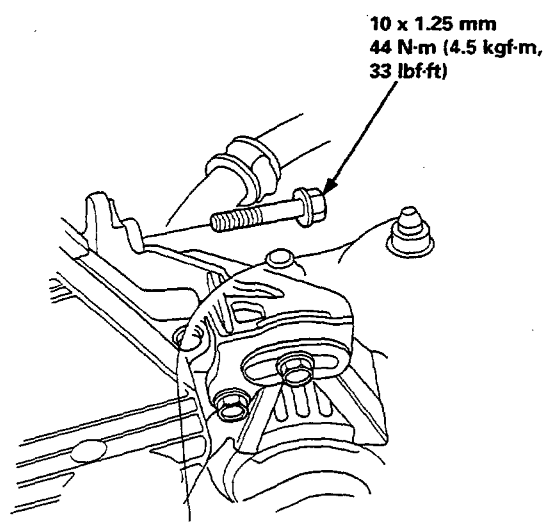
15. Remove the upper radiator hose, heater hose and water bypass hose.



16. Remove the cylinder head cover.

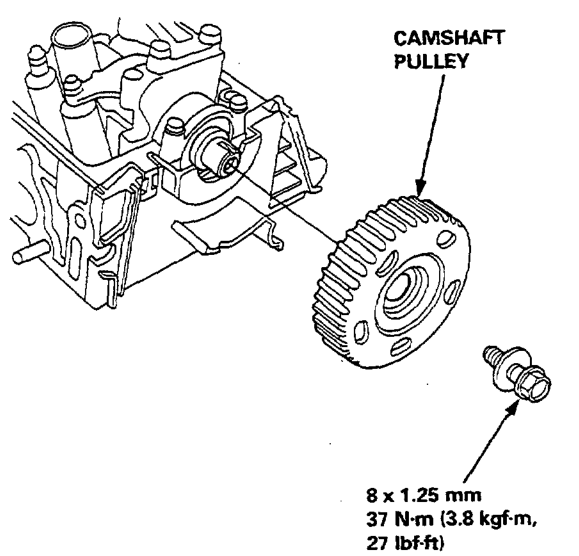


17. Remove the bolt from the alternator upper bracket.



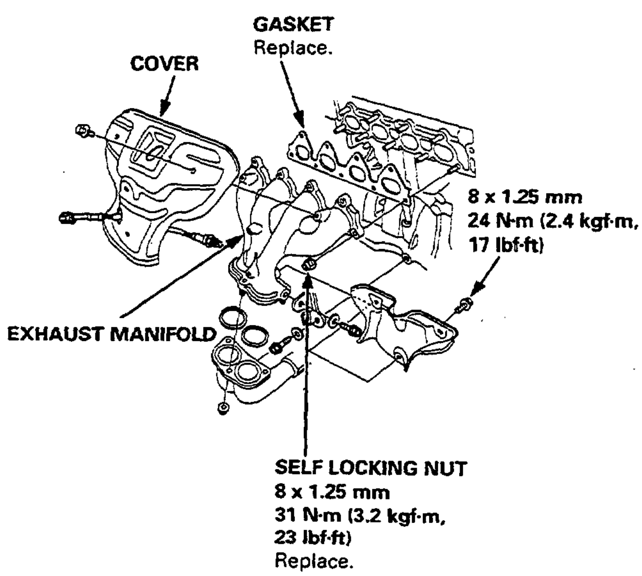
18. Remove the timing belt (see page 6-21).

19. Remove the camshaft pulley.

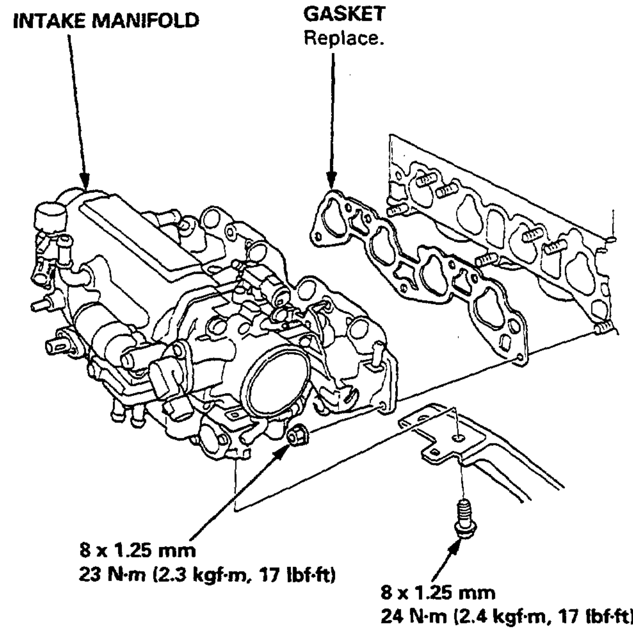


20. Remove the splash shield (see page 5-6).

21. Remove the exhaust manifold.

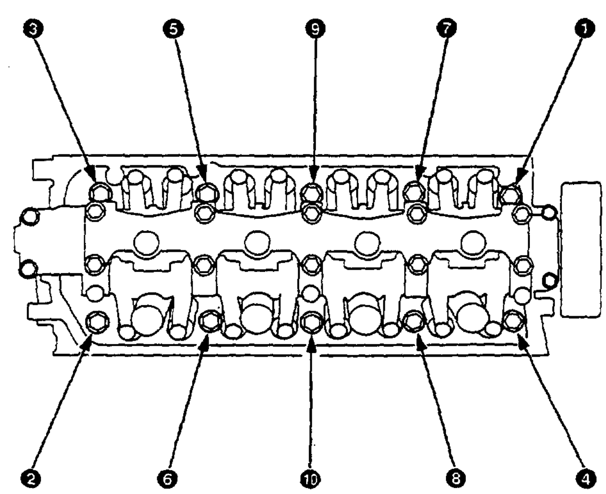


22. Remove the intake manifold.



23. 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.

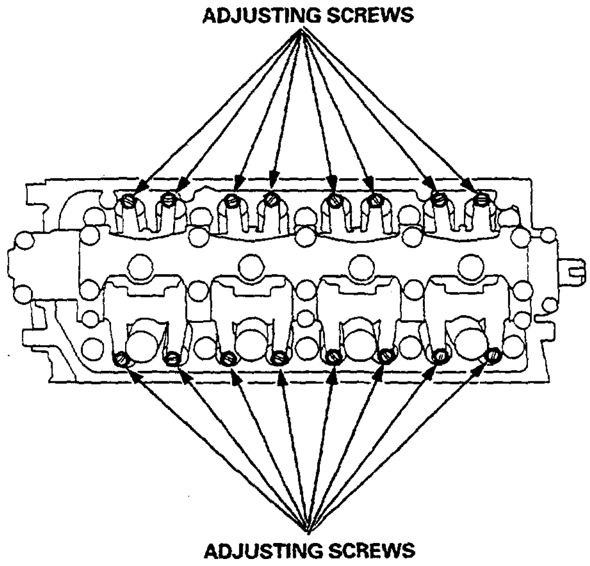


Rocker Arms

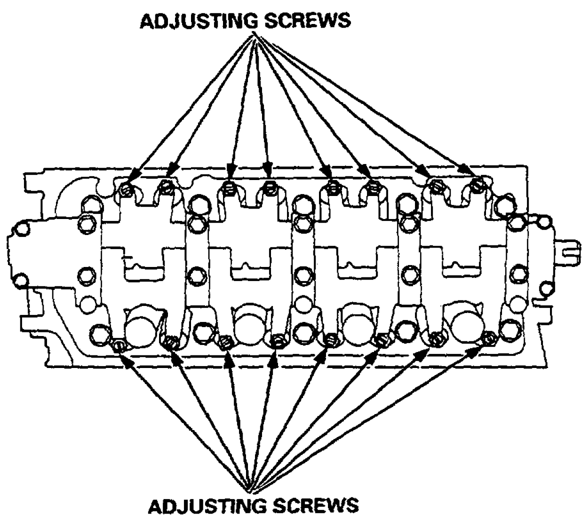
Removal

1. Loosen the adjusting screws.

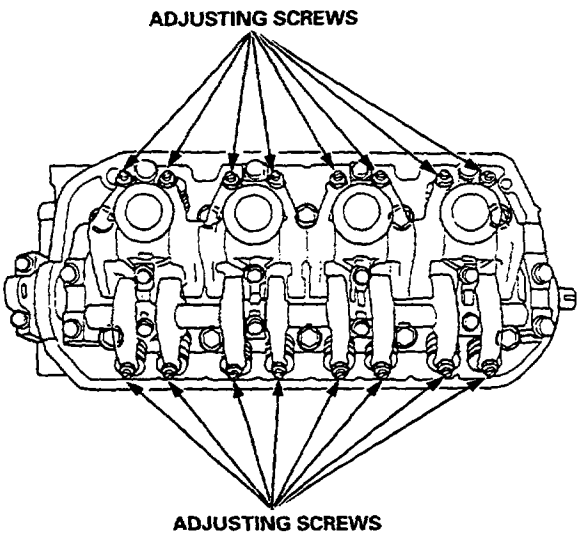
D16Y2 engine:



D15Z3 engine:



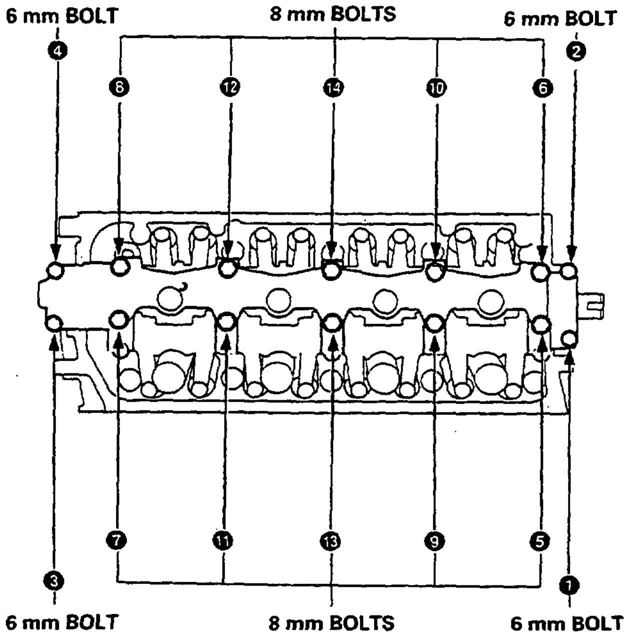
D16Y3, D14A2 engines:



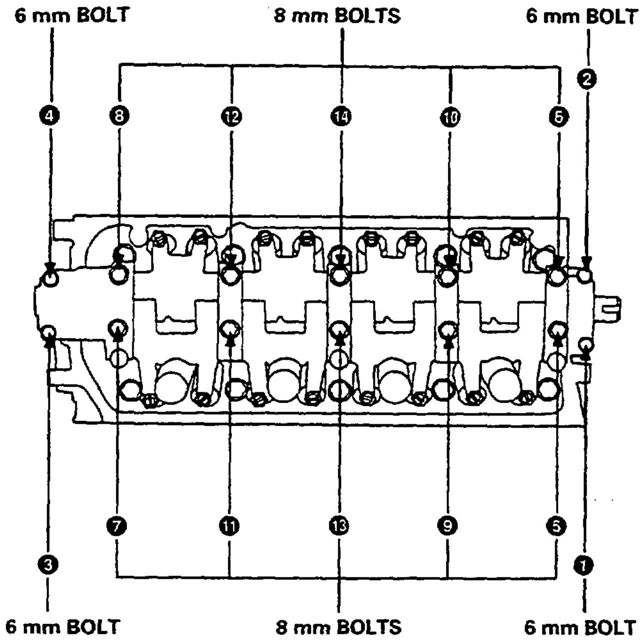
2. Unscrew the camshaft holder bolts, then remove the rocker arm assembly.

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 shaft.

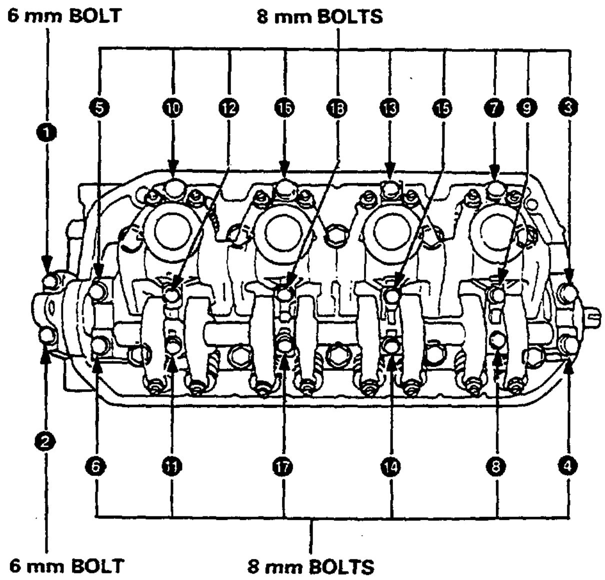
D16Y2 engine:



D15Z3 engine:



D16Y3, D14A2 engines:



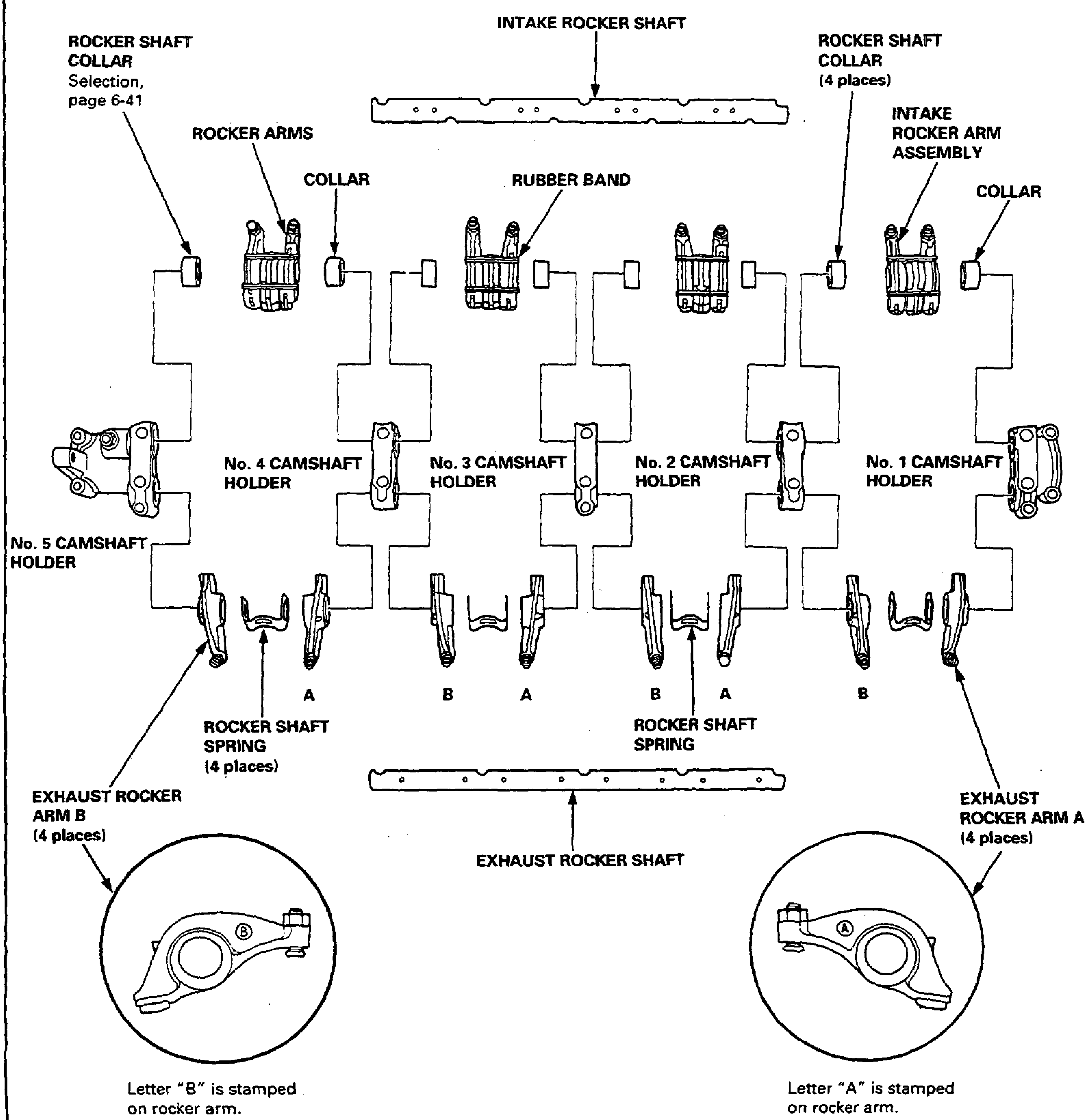
Rocker Arms

Overhaul

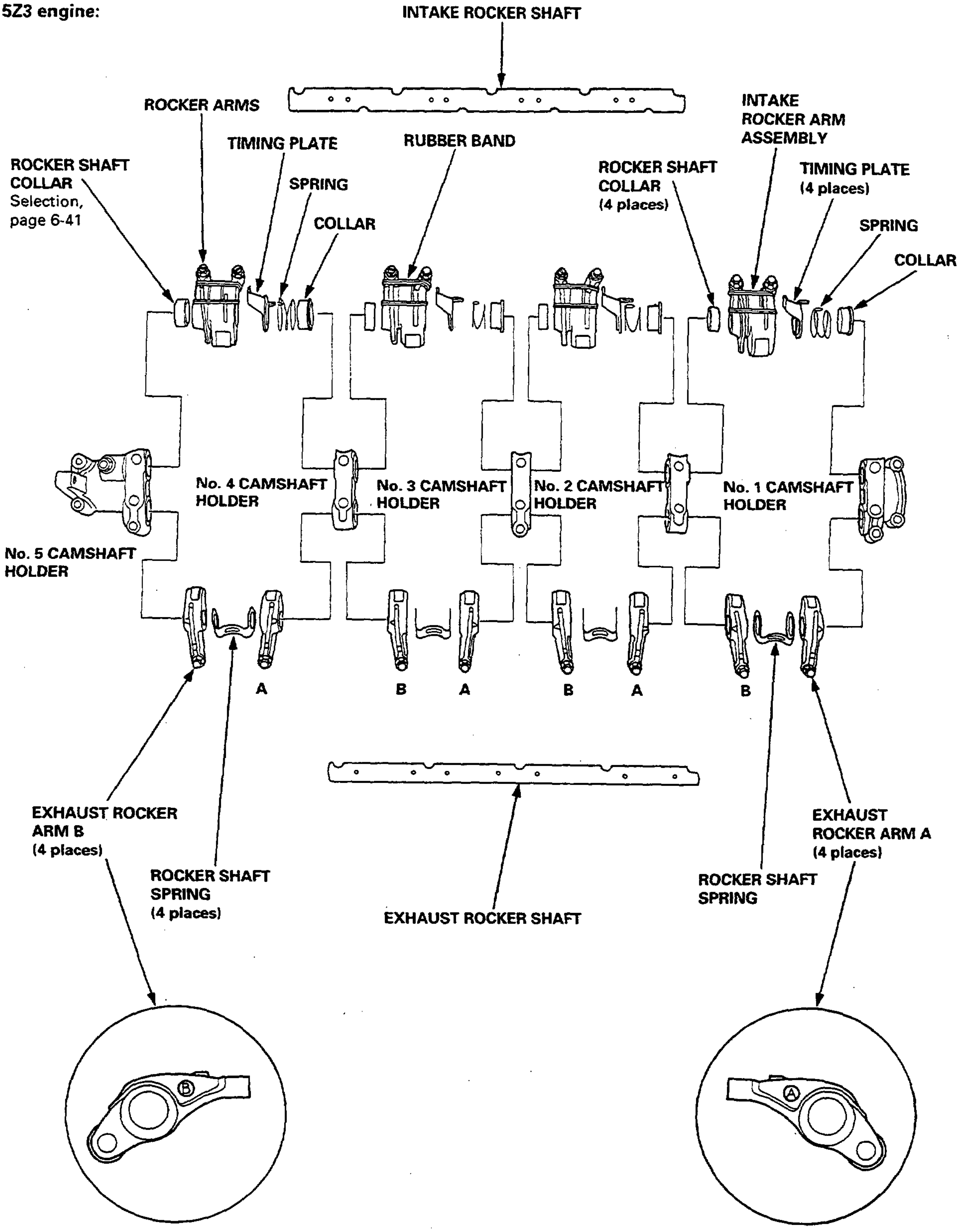
NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (see page 6-42).
- 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.

D16Y2 engine:



D15Z3 engine:



Letter "B" is stamped on rocker arm.

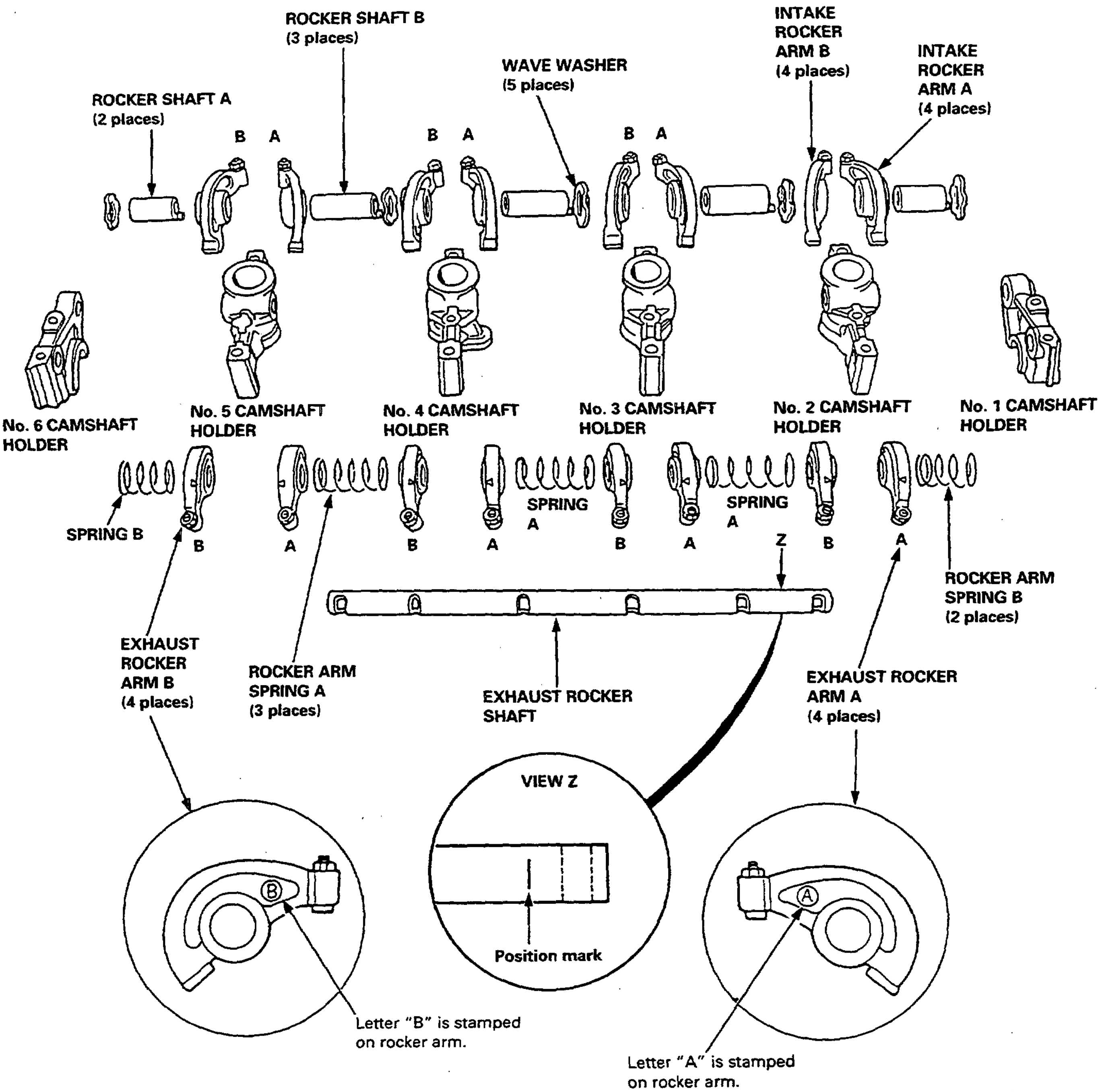
Letter "A" is stamped on rocker arm.

(cont'd)

Overhaul (cont'd)

NOTE:
- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (see page 6-43).
- 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.

D16Y3, D14A2 engines:



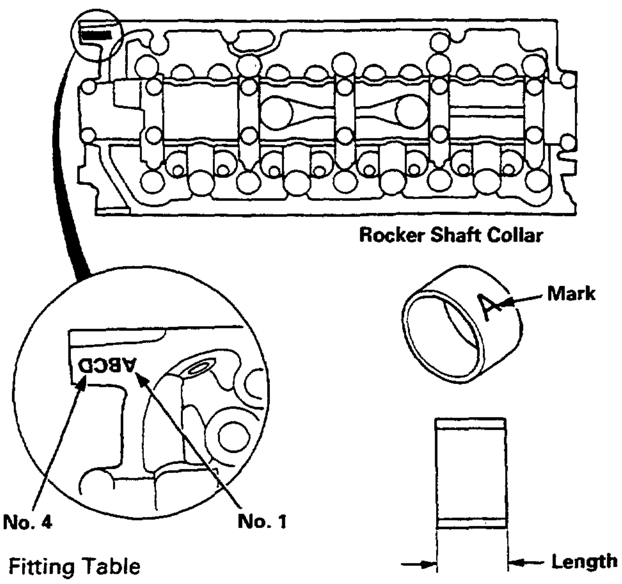
Rocker Shaft Collars

Selection (D16Y2 engine)

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.

Camshaft Holder Distance Code Location (Marks)

Marks have been stamped on the upper face end of the cylinder head as a code for the distance of each camshaft holder.
Use them, and the marks stamped on the rocker shaft collar (code for collar length), to choose the correct rocker shaft collars from the table below.



Fitting Table

Head Marks	A	B	C	D	E	F
Shaft Collar Marks	A	B	C	D	E	F

Rocker Shaft Collar

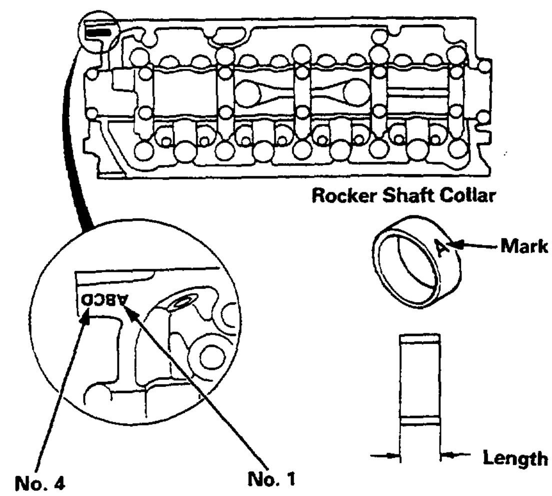
Marks	Part Number	Length mm (in)
A	14651 – P08 – 000	12.325 – 12.375 (0.4852 – 0.4872)
B	14652 – P08 – 000	12.275 – 12.325 (0.4833 – 0.4852)
C	14653 – P08 – 000	12.225 – 12.275 (0.4813 – 0.4833)
D	14654 – P08 – 000	12.175 – 12.225 (0.4793 – 0.4813)
E	14655 – P08 – 000	12.125 – 12.175 (0.4774 – 0.4793)
F	14656 – P08 – 000	12.075 – 12.125 (0.4754 – 0.4774)

Selection (D15Z3 engine)

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.

Camshaft Holder Length Code Location (Marks)

Marks have been stamped on the upper face end of the cylinder head as a code for the length of each camshaft holder.
Use them, and the marks stamped on the rocker shaft collar (code for collar length), to choose the correct rocker shaft collars from the table below.



Fitting Table

Cylinder Head Marks	A	B	C	D	E	F
Shaft Collar Marks	A	B	C	D	E	F

Rocker Shaft Collar

Marks	Part Number	Length mm (in)
A	14651 – P07 – 000	8.925 – 8.975 (0.3514 – 0.3533)
B	14652 – P07 – 000	8.875 – 8.925 (0.3494 – 0.3514)
C	14653 – P07 – 000	8.825 – 8.875 (0.3474 – 0.3494)
D	14654 – P07 – 000	8.775 – 8.825 (0.3455 – 0.3474)
E	14655 – P07 – 000	8.725 – 8.775 (0.3435 – 0.3455)
F	14656 – P07 – 000	8.675 – 8.725 (0.3415 – 0.3435)

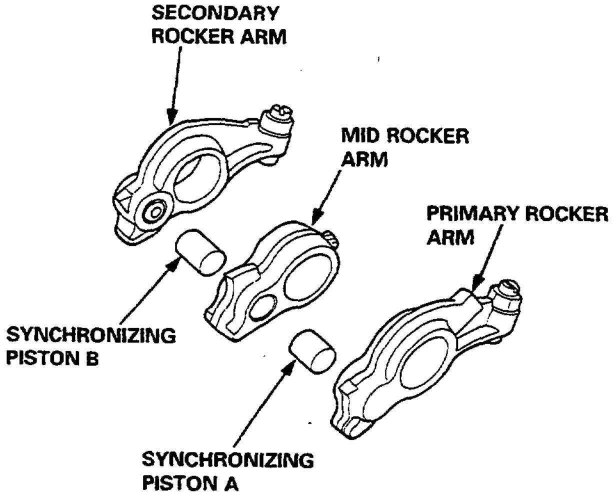
Rocker Arms and Lost Motion Assemblies

Inspection (D16Y2, D15Z3 engines)

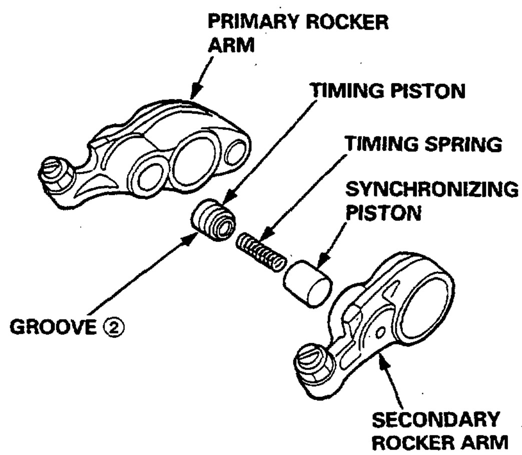
NOTE: When reassembling the primary rocker arm, carefully apply air pressure to oil passage of the rocker arm.

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

D16Y2 engine:



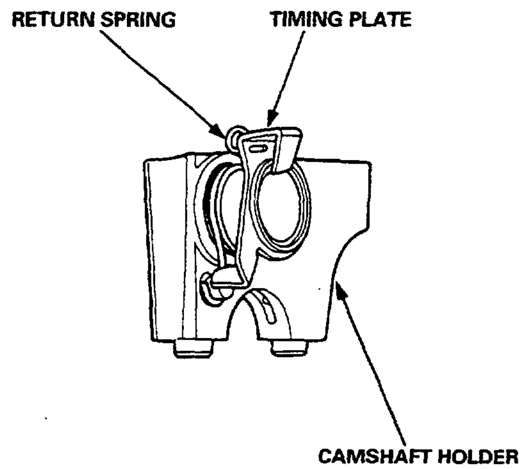
D15Z3 engine:



NOTE:
- Apply oil to the pistons when reassembling.
- Bundle the rocker arms with a band to prevent them from separating.

D15Z3 engine:

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



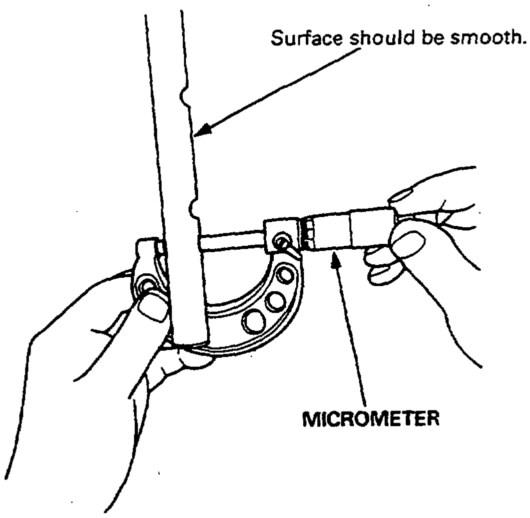
D16Y2 engine only:

2. Pushing the rocker arm top 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.

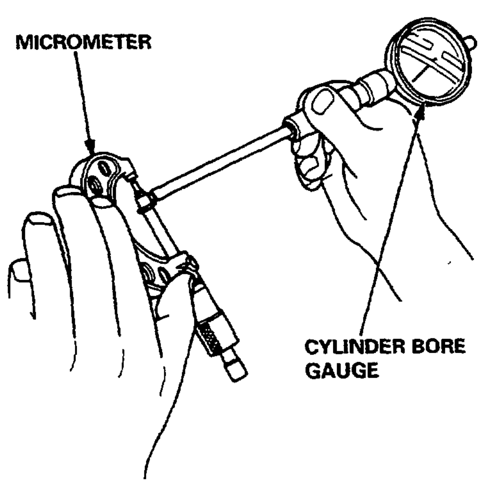
Clearance

Measure both the intake rocker shaft and exhaust rocker shaft.

1. Measure the diameter of shaft at the first rocker location.

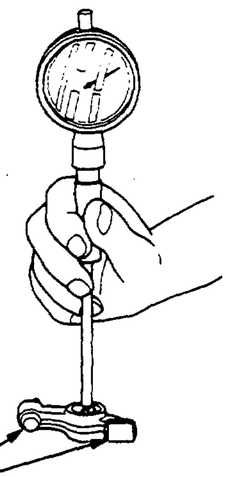


2. Zero the gauge to the shaft diameter.



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

Rocker Arm-to-Shaft Clearance:
Standard (New):
Intake: 0.017 – 0.050 mm (0.0007 – 0.0020 in)
Exhaust: 0.018 – 0.054 mm (0.0007 – 0.0021 in)
Service Limit: 0.08 mm (0.003 in)



4. Repeat for all the rockers.
   — If the clearance is over the service limit, replace the rocker shaft and all over tolerance rocker arms.

Camshaft

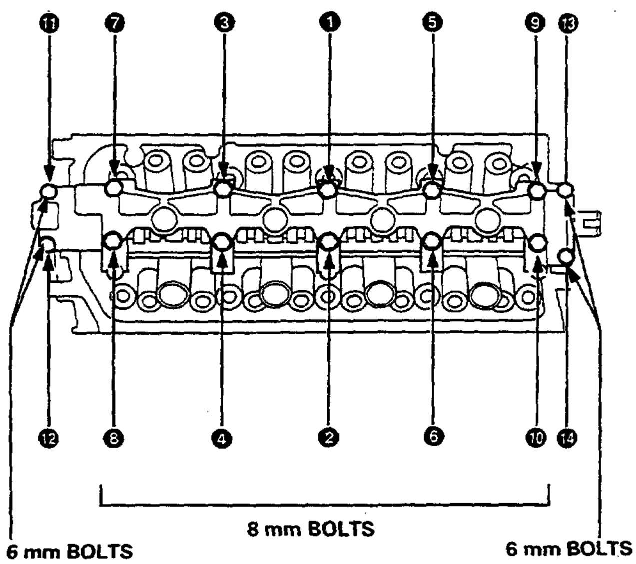
Inspection

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

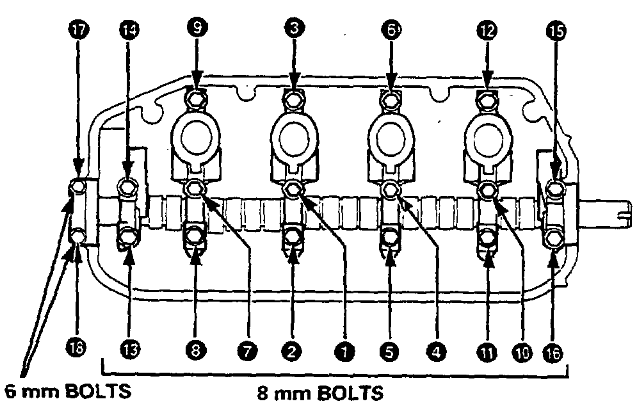
1. Put the camshaft and the camshaft holders on the cylinder head, then tighten the bolts to the specified torque.

   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)

D16Y2, D15Z3 engines:



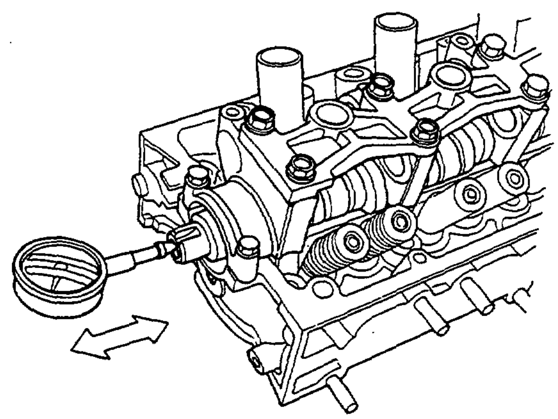
D16Y3, D14A2 engines:



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

3. Zero the dial indicator against the end of the camshaft. 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)

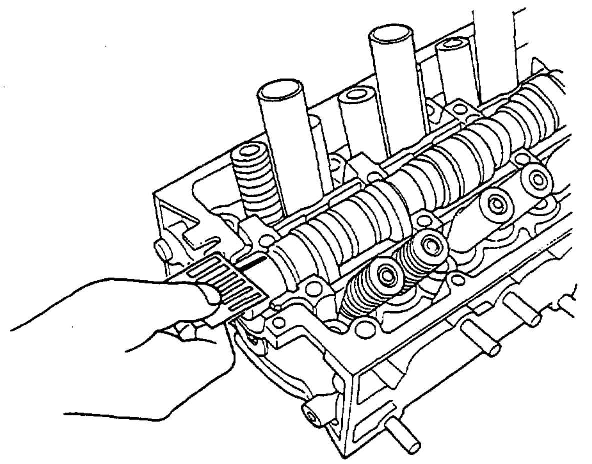


4. Remove the bolts, then remove the camshaft holders from the cylinder head.
   — Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.
   — Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.
   — Insert plastigage strip across each journal.

5. Install the camshaft holders and tighten the bolts to the specified torque.

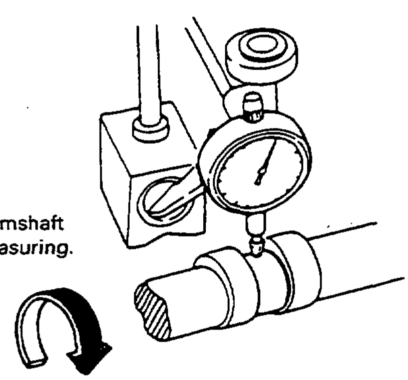
6. Remove the camshaft holders, then measure the widest portion of the plastigage on each journal.

Camshaft-to-Holder Oil Clearance:
Standard (New): 0.050 – 0.089 mm
(0.002 – 0.004 in)
Service Limit : 0.15 mm (0.006 in)



7. If the camshaft-to-holder oil clearance is out of tolerance:
   — And the camshaft has already been replaced, you must replace the cylinder head.
   — If the camshaft has not been replaced, first check the total runout with the camshaft supported on V-blocks.

Camshaft Total Runout:
Standard (New): 0.03 mm (0.001 in)
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 bearing clearance is still out of tolerance, replace the cylinder head.

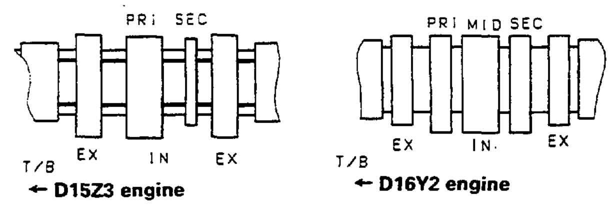
8. Check the cam lobe height wear.

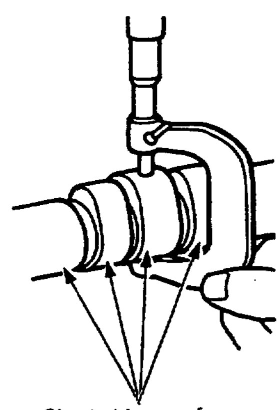
Cam lobe height standard (New)

Unit mm (in)

		INTAKE	EXHAUST
D14A2 engine		34.545 (1.3600)	35.175 (1.3848)
D16Y3 engine		36.782 (1.4481)	36.947 (1.4546)
D15Z3 engine	PRI	38.427 (1.5129)	37.997 (1.4959)
	SEC	32.292 (1.2713)	
D16Y2 engine	PRI	35.900 (1.4134)	38.008 (1.4964)
	SEC	36.195 (1.4250)	
	MID	38.274 (1.5068)	

PRI: Primary cam lobe, SEC: Secondary cam lobe.
MID: Mid cam lobe, T/B: Timing belt.
IN: Intake, EX: Exhaust





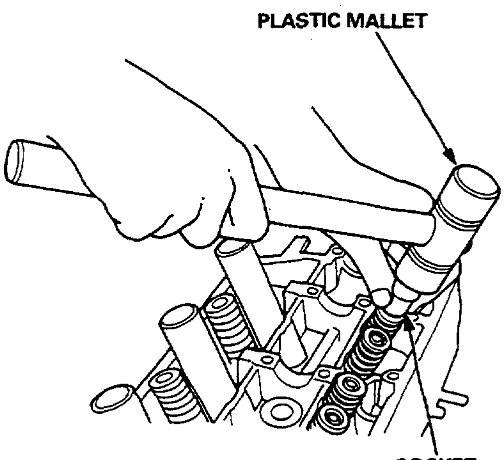
Check this area for wear.

Valves, Valve Springs and Valve Seals

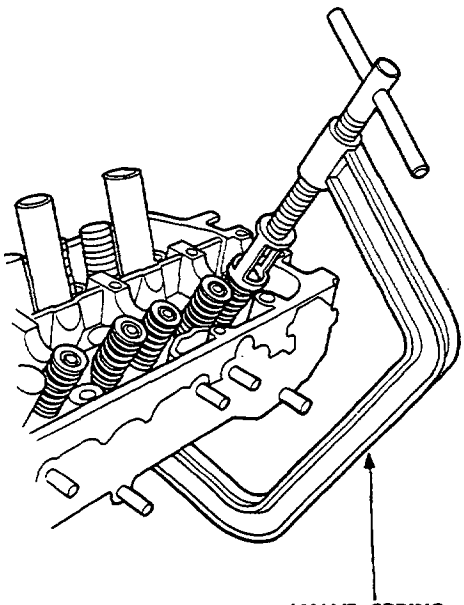
Replacement

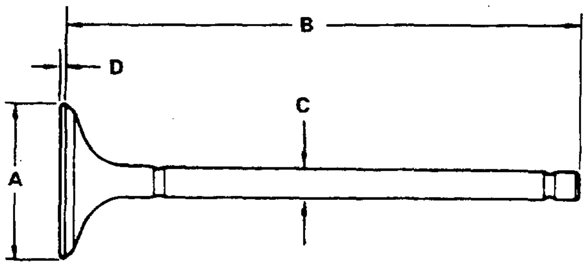
NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

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 keeper.





D16Y2 engine:
Intake Valve Dimensions

A Standard (New): 29.9 – 30.1 mm (1.18 – 1.19 in)
B Standard (New): 117.42 – 117.72 mm (4.623 – 4.635 in)
C Standard (New): 5.48 – 5.49 mm (0.2157 – 0.2161 in)
C Service Limit: 5.45 mm (0.2146 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): 25.9 – 26.1 mm (1.02 – 1.03 in)
B Standard (New): 114.60 – 114.90 mm (4.512 – 4.524 in)
C Standard (New): 5.45 – 5.46 mm (0.2146 – 0.2150 in)
C Service Limit: 5.42 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)

D15Z3 engine:
Intake Valve Dimensions

A Standard (New): 27.4 – 27.6 mm (1.08 – 1.09 in)
B Standard (New): 118.82 – 119.12 mm (4.678 – 4.690 in)
C Standard (New): 5.48 – 5.49 mm (0.2157 – 0.2161 in)
C Service Limit: 5.45 mm (0.2146 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): 23.4 – 23.6 mm (0.92 –0.93 in)
B Standard (New): 116.20 – 116.50 mm (4.575 – 4.587 in)
C Standard (New): 5.45 – 5.46 mm (0.2146 – 0.2150 in)
C Service Limit: 5.42 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)

D16Y3, D14A2 engines:
Intake Valve Dimensions

A Standard (New): 28.9 – 29.1 mm (1.14 – 1.15 in)
B Standard (New): 113.82 – 114.12 mm (4.481 – 4.493 in)
C Standard (New): 5.48 – 5.49 mm (0.2157 — 0.2161 in)
C Service Limit: 5.45 mm (0.2146 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): 24.9 – 25.1 mm (0.98 – 0.99 in)
B Standard (New): 117.40 – 117.70 mm (4.622 – 4.634 in)
C Standard (New): 5.45 – 5.46 mm (0.2146 — 0.2150 in)
C Service Limit: 5.42 mm (0.2134 in)
D Standard (New): 1.05 – 1.35 mm (0.041 – 0.053 in)
D Service Limit: 0.95 mm (0.037in)

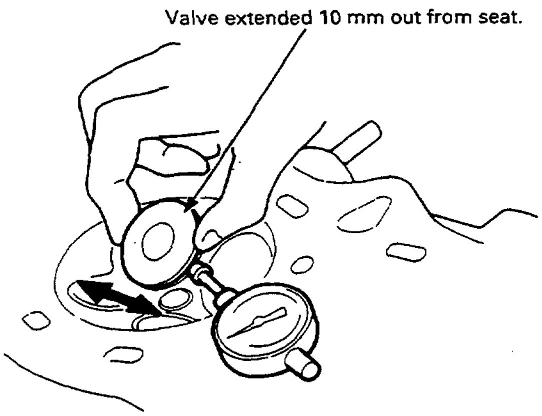
Valve Guides

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 – 0.10 mm
(0.002 – 0.004 in)
Service Limit: 0.16 mm (0.006 in)

Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.10 – 0.16 mm
(0.004 – 0.006 in)
Service Limit: 0.22 mm (0.009 in)



- If measurement exceeds the service limit, recheck using a new valve.
- If measurement is now within the 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): 0.02 – 0.05 mm
(0.001 – 0.002 in)
Service Limit: 0.08 mm (0.003 in)

Exhaust Valve Stem-to-Guide Clearance:
Standard (New): 0.05 – 0.08 mm
(0.002 – 0.003 in)
Service Limit: 0.11 mm (0.004 in)

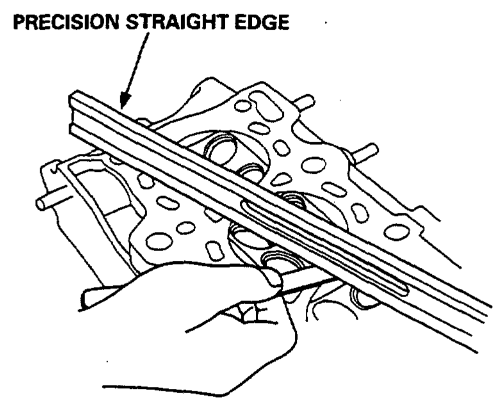
Cylinder Head

Warpage

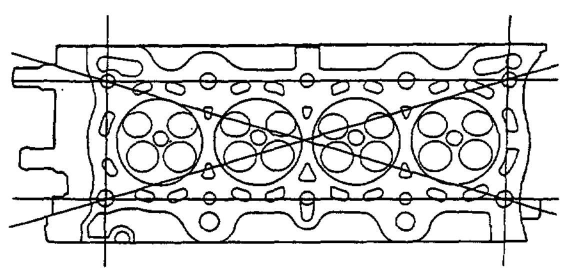
NOTE: If the camshaft-to-holder oil clearances (see page 6-45) are not within specification, the cylinder head cannot be resurfaced.

If the 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 D16Y2, D15Z3 engines: 93 mm (3.66 in), and D16Y3, D14A2 engines: 95 mm (3.74 in).



Measure along edges, and 3 ways across center.

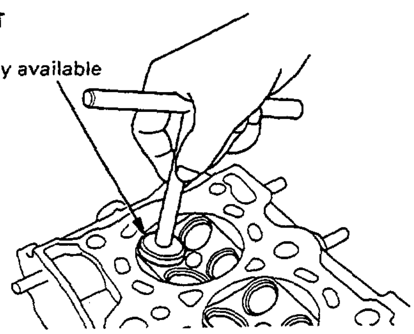


Cylinder Head Height:
D16Y2, D15Z3 engines:
Standard (New): 92.95 – 93.05 mm
(3.659 – 3.663 in)
D16Y3, D14A2 engines:
Standard (New): 94.95 – 95.05 mm
(3.738 – 3.742 in)

Reconditioning

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

   NOTE: If the guides are worn (see page 6-48), replace them (see page 6-50) before cutting the valve seats.

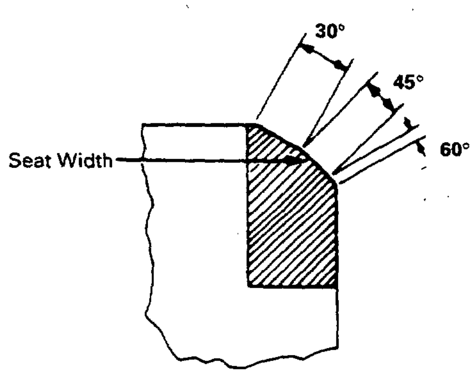


2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.

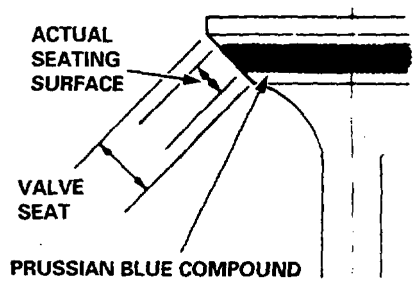
3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check the width of seat and adjust accordingly.

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

   Valve Seat Width:
   Standard (New):
   Intake: **0.85 – 1.15 mm (0.033 – 0.045 in)**
   Exhaust: **1.25 – 1.55 mm (0.049 – 0.061 in)**
   Service Limit:
   Intake: **1.6 mm (0.063 in)**
   Exhaust: **2.0 mm (0.079 in)**



5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert the valve in its original location in the head, then lift 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.

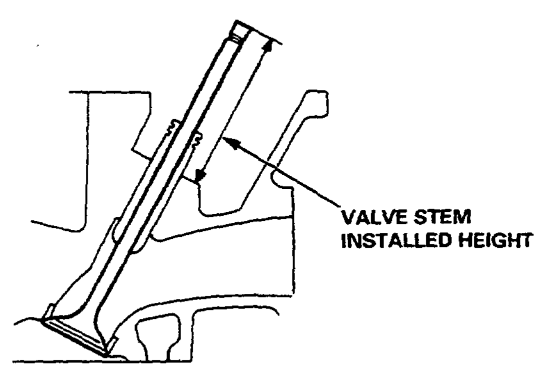
   NOTE: The final cut should always be made with the 45° cutter.

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

   D16Y2, D15Z3 engines:
   Intake, Exhaust Stem Installed Height:
   Standard (New): **53.17 – 53.64 mm (2.0931 – 2.112 in)**
   Service Limit: **53.89 mm (2.122 in)**

   D16Y3, D14A2 engines:
   Intake Valve Stem Installed Height:
   Standard (New): **46.99 – 47.46 mm (1.850 – 1.868 in)**
   Service Limit: **47.71 mm (1.878 in)**
   Exhaust Valve Stem Installed Height:
   Standard (New): **48.97 – 49.44 mm (1.9278 – 1.946 in)**
   Service Limit: **49.69 mm (1.956 in)**

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



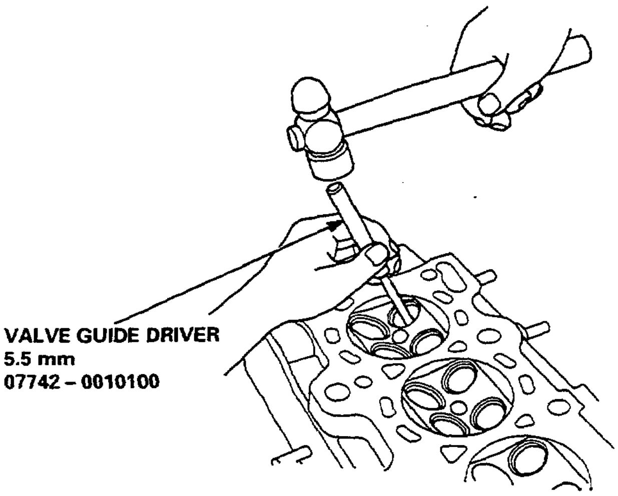
Valve Guides

Replacement

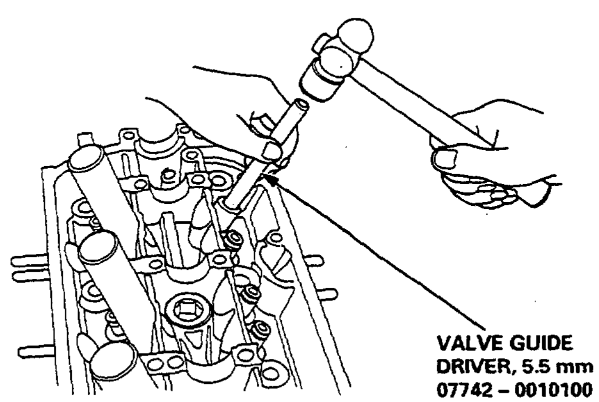
NOTE:
- For best results, heat cylinder head to 150°C (300°F) before removing or installing guides.
- It may be necessary to use an air hammer to remove some valve guides.

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

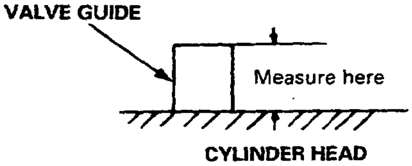
1. Drive the valve guide out from the bottom of the cylinder head.



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



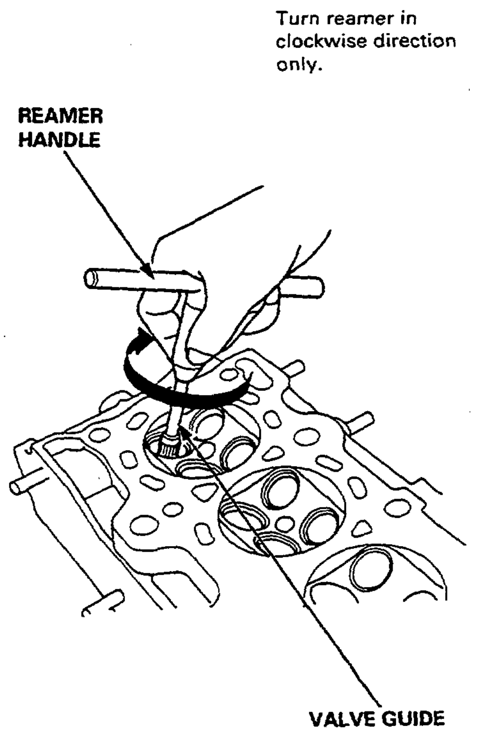
Valve Guide Installed Height:
D16Y2, D15Z3 engines:
Intake: 17.85 – 18.35 mm (0.703 – 0.722 in)
Exhaust: 18.65 – 19.15 mm (0.734 – 0.754 in)
D16Y3, D14A2 engines:
Intake: 15.95 – 16.45 mm (0.628 – 0.648 in)
Exhaust: 15.95 – 16.45 mm (0.628 – 0.648 in)



Reaming

NOTE: For new valve guides only.

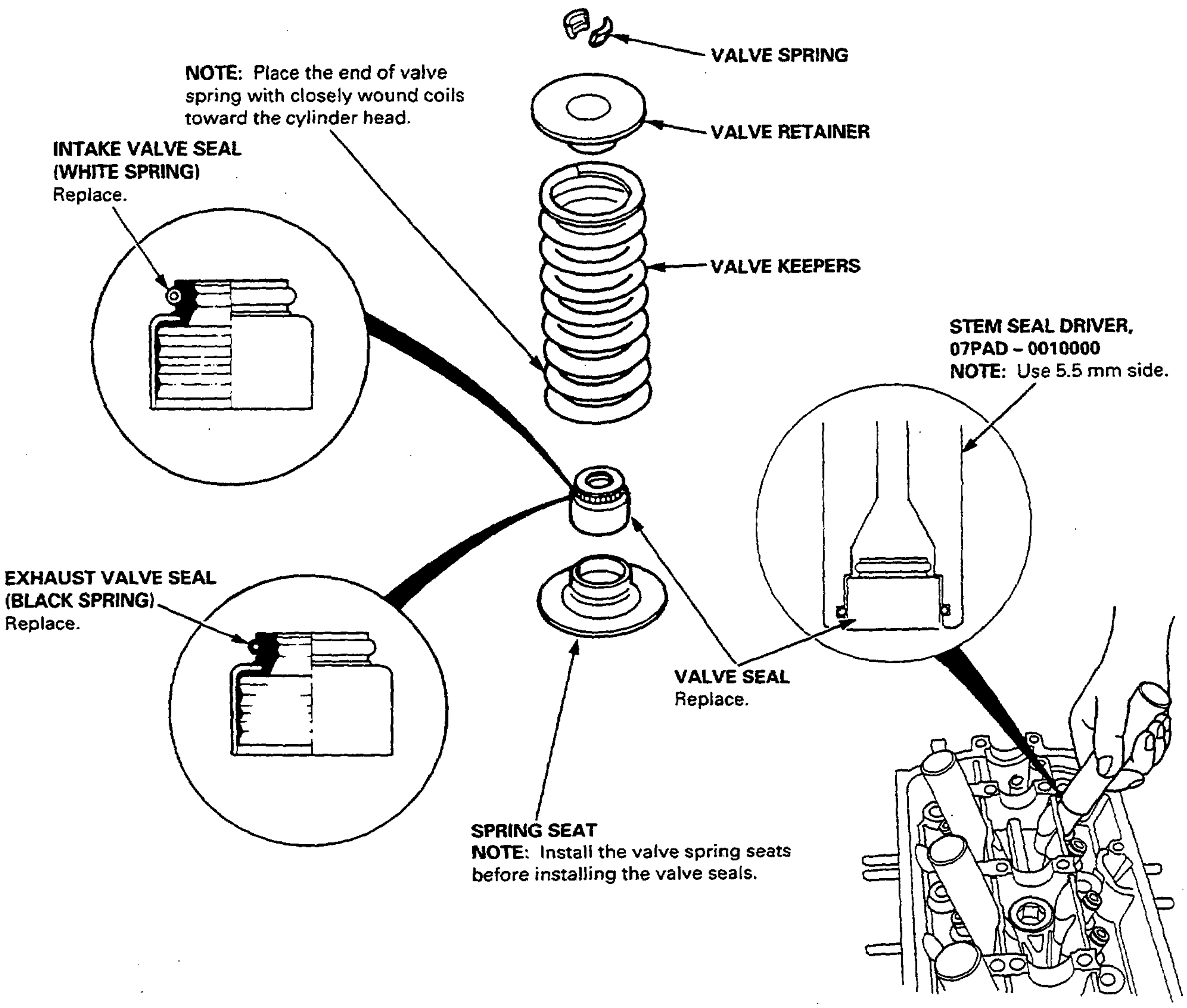
1. Coat both the reamer and valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check the clearance with a valve (see page 6-48).
   — Verify that the valve slides in the valve guide without exerting pressure.



Valves, Valve Springs and Valve Seals

Installation Sequence

NOTE: Exhaust and intake valve seals are NOT interchangeable.

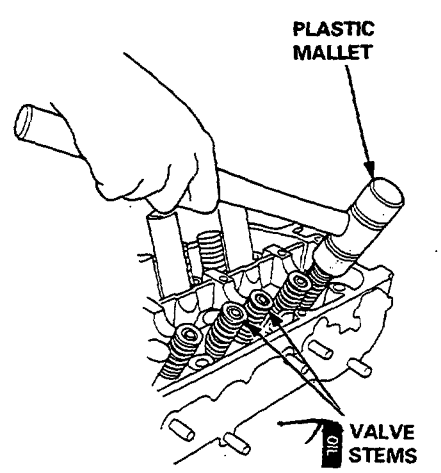


Valve Installation

When installing valves in cylinder head, coat valve stems with oil before inserting in to 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.



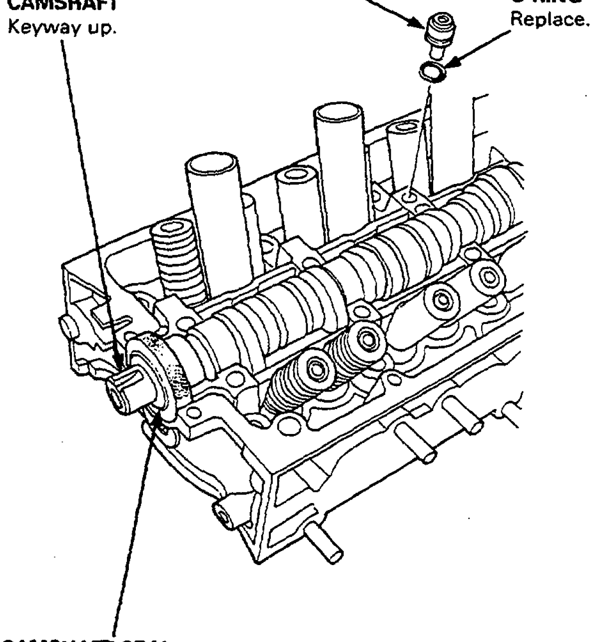
Camshaft/Rocker Arms and Camshaft Seal/Pulley

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 (D16Y2,D15Z3 engines).

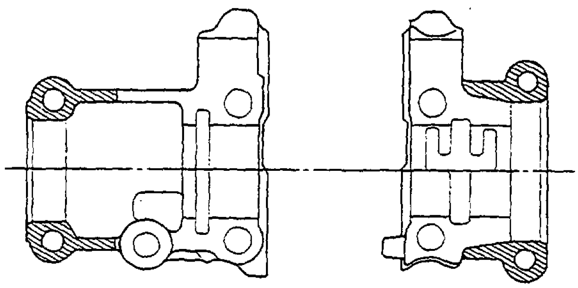


Lubricate cam lobes after reassembly.

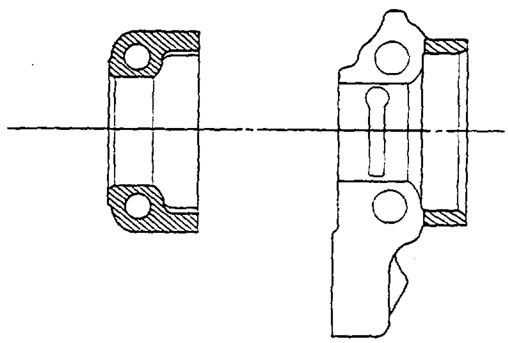
3. Turn the camshaft until its keyway is facing up. (No. 1 piston TDC).

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.

D16Y2, D15Z3 engines:



D16Y3, D14A2 engines:

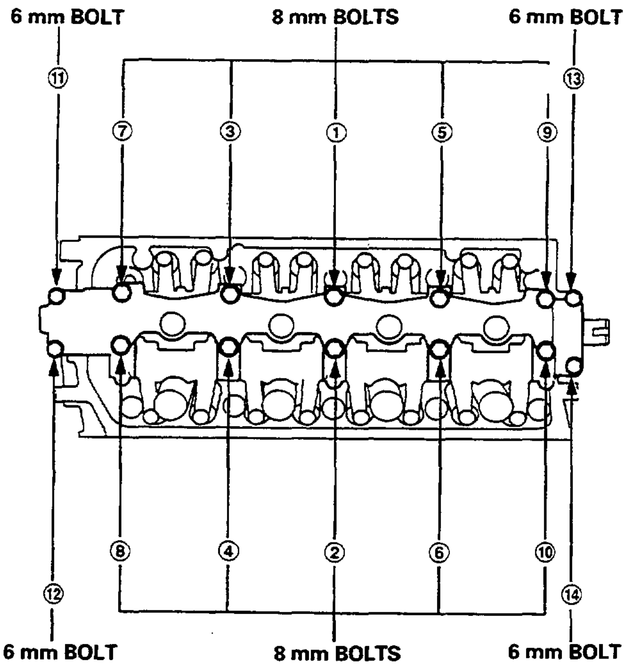


5. Set the rocker arm assembly in place and loosely install the bolts.
   — Make sure that the rocker arms are properly positioned on the valve stems.

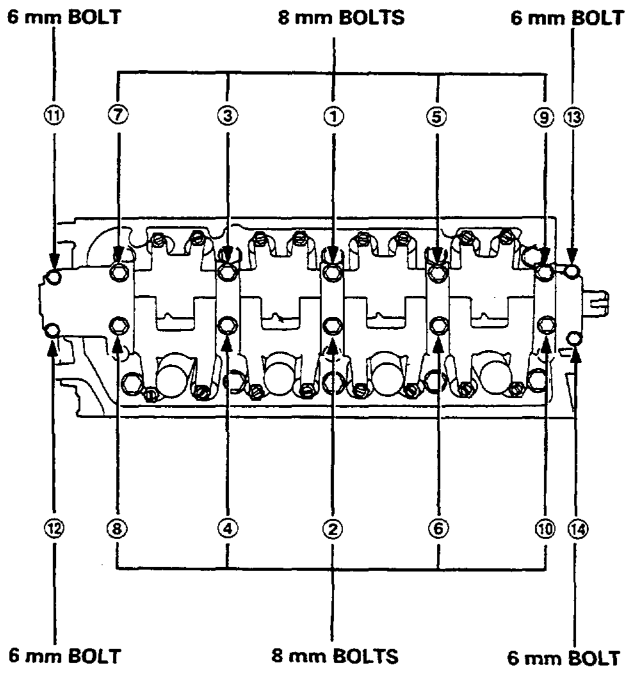
6. Tighten each bolt two turns at a time in the sequence shown below to ensure that the rockers do not bind on the valves.

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

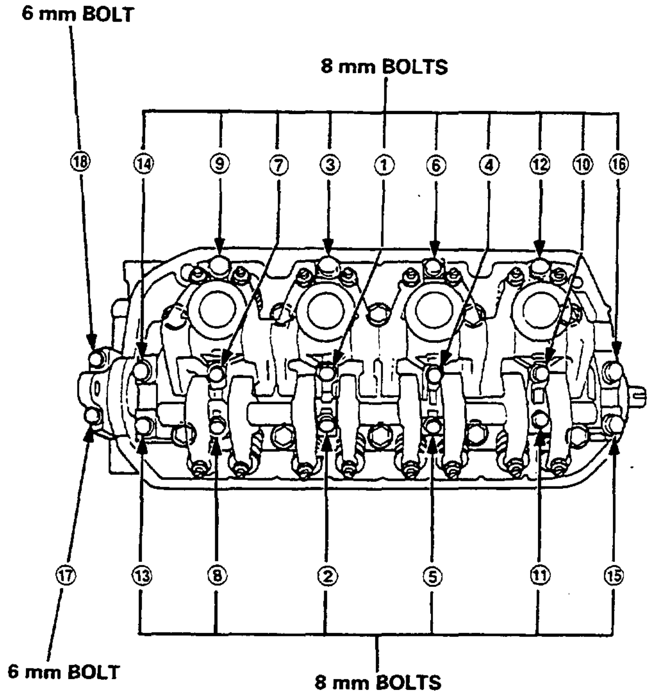
D16Y2 engine:



D15Z3 engine:

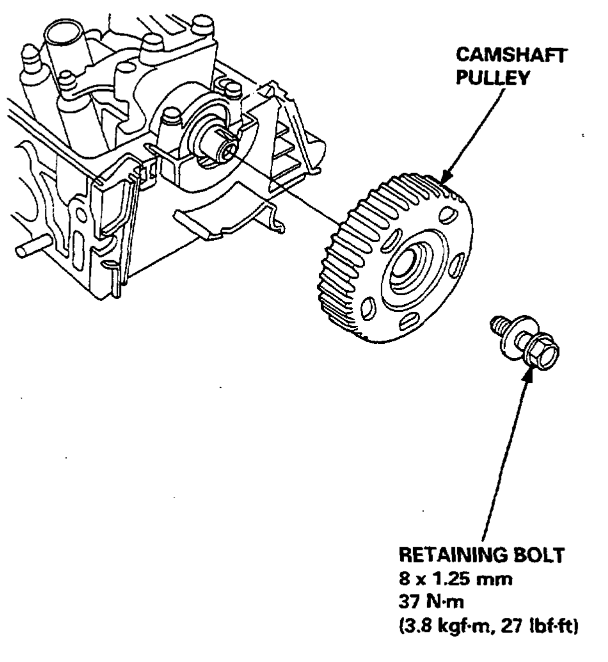


D16Y3, D14A2 engines:



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.



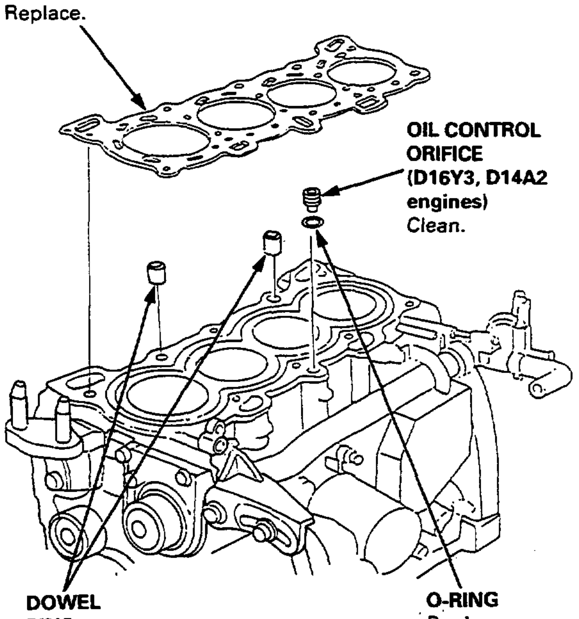
Cylinder Head

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 6-14).
- 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 (D16Y3, D14A2 engines).



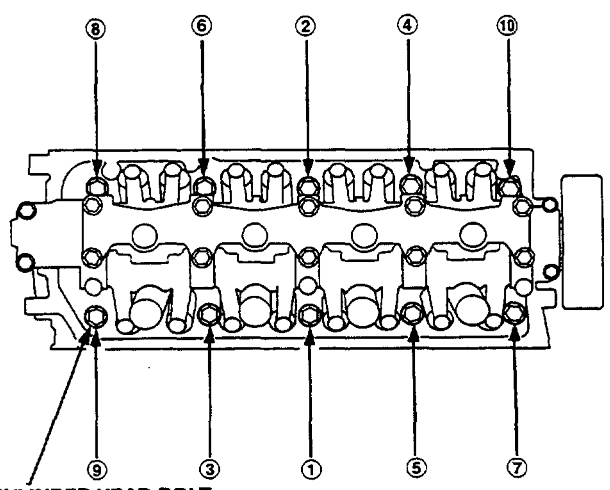
3. Position the camshaft correctly (see page 6-14).
4. Tighten the cylinder head bolts sequentially in two steps.

1st step: 29 N·m (3.0 kgf·m, 22 lbf·ft)
2nd step:
D16Y2, D15Z3 engines:
72 N·m (7.3 kgf·m, 53 lbf·ft)
D16Y3, D14A2 engines:
64 N·m (6.5 kgf·m, 47 lbf·ft)

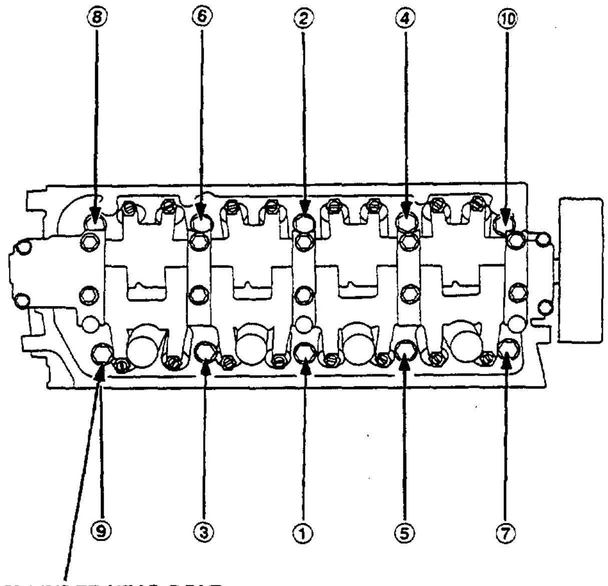
NOTE:
- We recommend using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten.
- If a bolt makes any noise while you are torquing it, loosen the bolt, and retighten it from the 1st step.

CYLINDER HEAD BOLTS TORQUE SEQUENCE

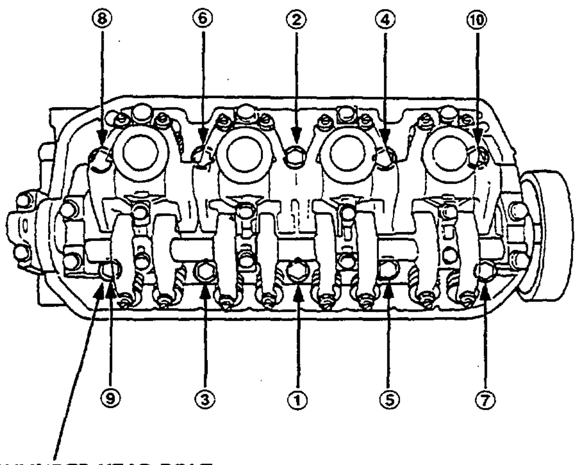
D16Y2 engine:



D15Z3 engine:



D16Y3, D14A2 engines:



5. Install the intake manifold and tighten the nuts in a crisscross pattern in 2 or 3 steps, beginning with the inner nuts (see pages 9-2 and 3).
   - 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 (see pages 9-4 thru 9-6).
   - Always use a new exhaust manifold gasket.

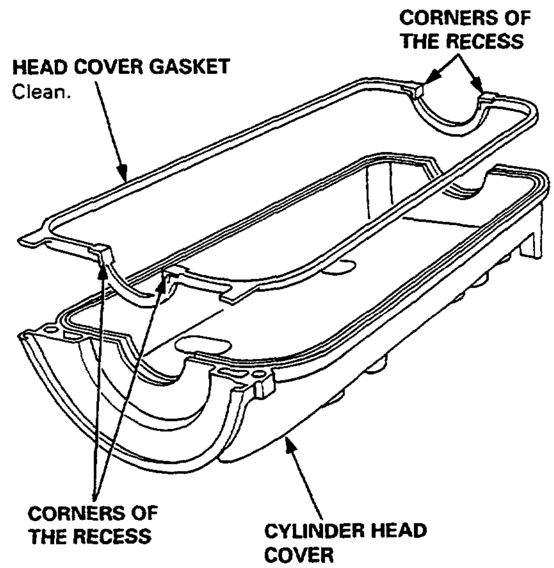
7. Install the exhaust manifold bracket, then install the exhaust pipe A and the bracket, and then install the cover.

8. Install the timing belt (see page 6-24).

9. Adjust the valve clearance (see page 6-14).

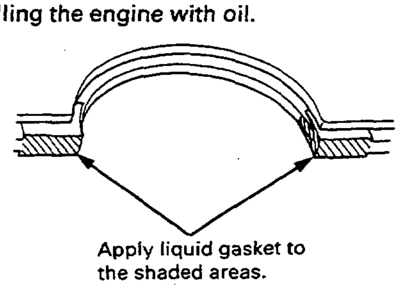
10. Install the head cover gasket in the groove of the cylinder head cover. Seat the recesses for the camshaft first, then work it into the groove around the outside edges.

   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.

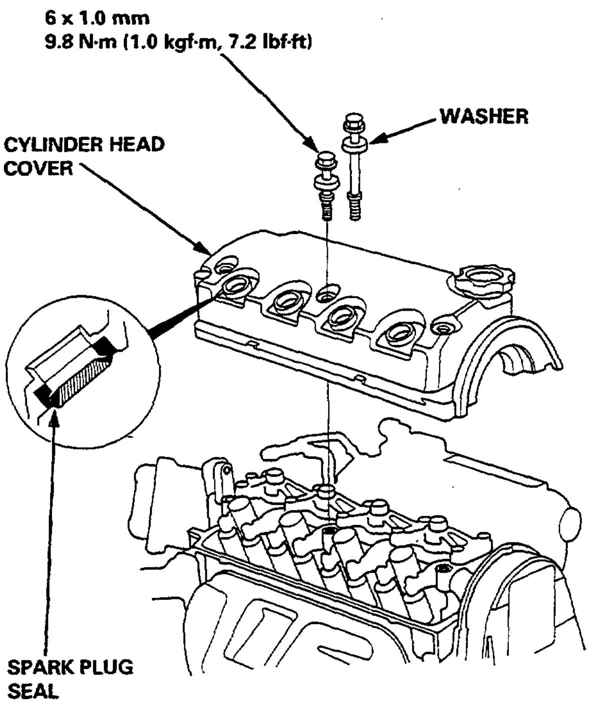


(cont'd)

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 (D16Y2, D15Z3 engines).
Once the cylinder head cover is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.

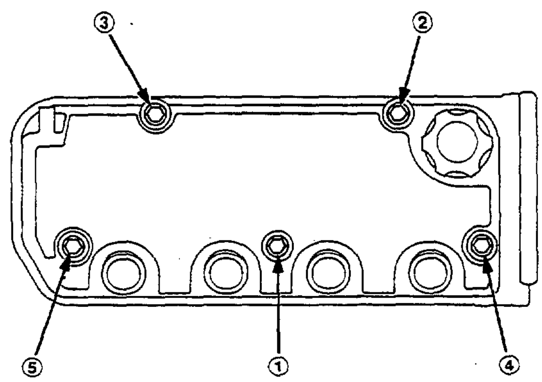
NOTE:
- Before installing the cylinder head cover, clean the cylinder head contacting surfaces with a shop towel.
- Do not touch the parts where liquid gasket was applied.
- Take care not to damage the spark plug seal when installing the cylinder head cover (D16Y2, D15Z3 engines).
- Visually check the spark plug seal for damage (D16Y2, D15Z3 engines).
- Replace the washer when damaged or deteriorated.



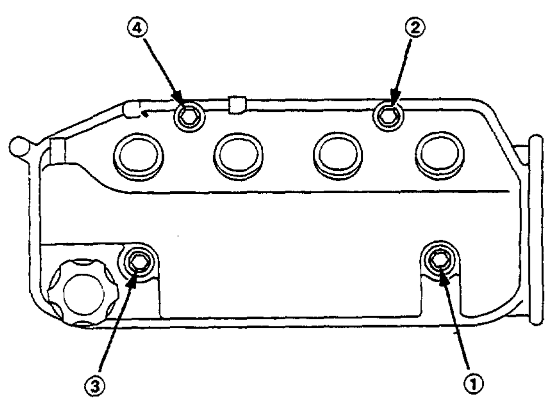
13. Tighten the nuts in 2 or 3 steps. In the final step, tighten all nuts, in sequence, to 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft).

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

D16Y2, D15Z3 engines:



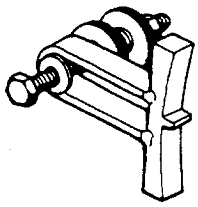
D16Y3, D14A2 engines:



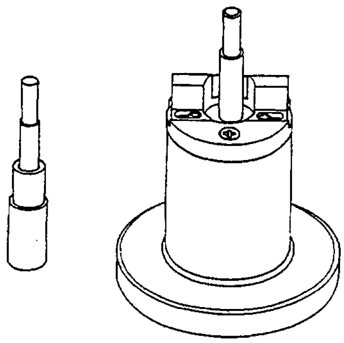
14. After installation, check that all tubes, hoses and connectors are installed correctly.

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07LAB–PV00100	Ring Gear Holder	1	7-5
②	07PAF–0010000	Piston Pin Assembly Tool Set	1	7-13, 14
②-1	07PAF–0010650	Pilot Collar, O.D. 19 mm	1	7-13, 14
③	07749–0010000	Handle Driver	1	7-18
④	07948–SB00101	Driver Attachment, 96 mm	1	7-18

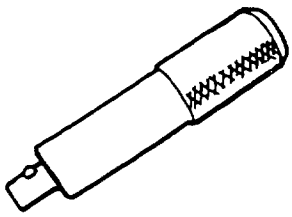


①

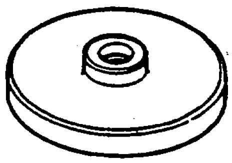


②

②-1



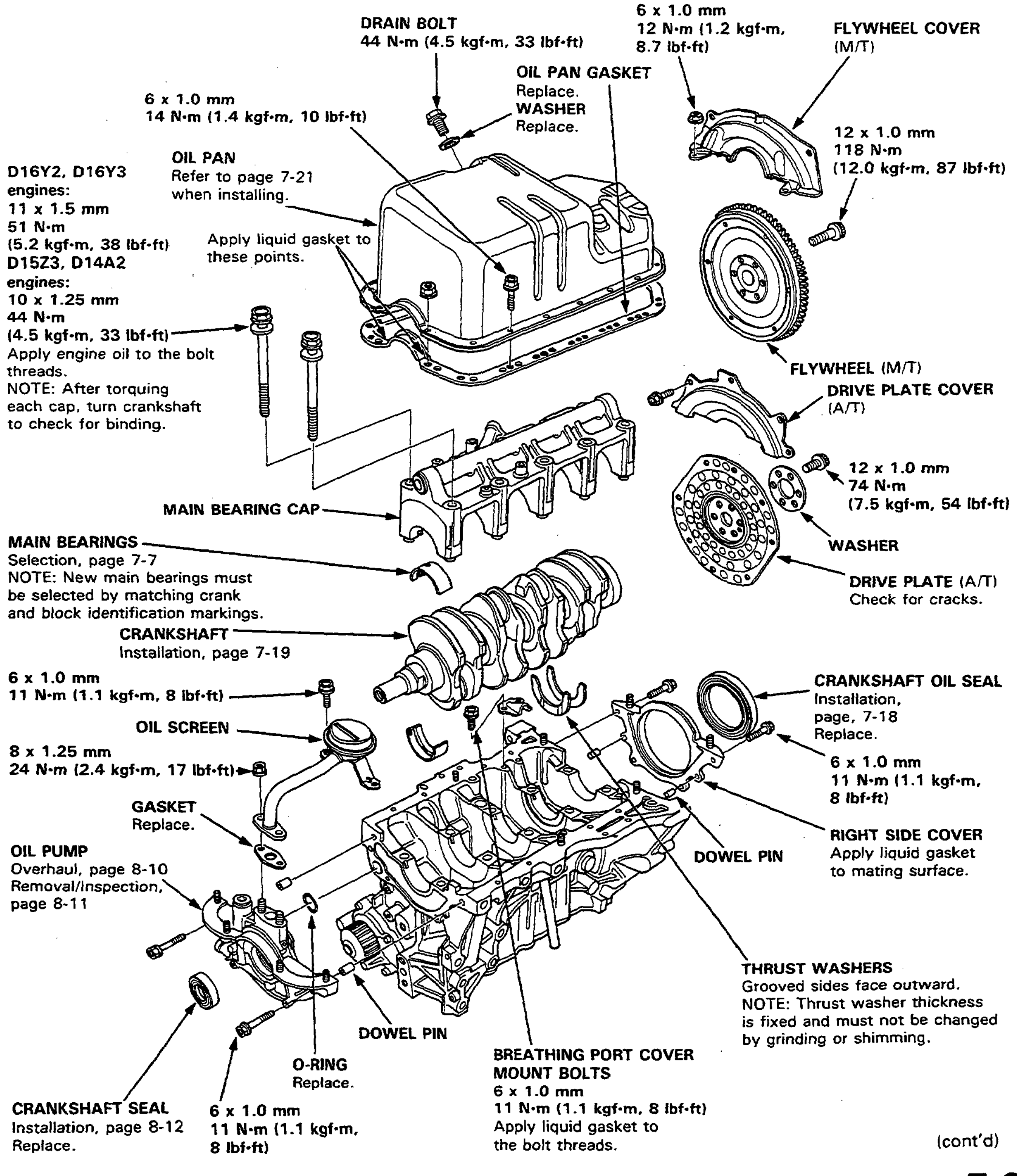
③



④

Lubricate all internal parts with engine oil during reassembly.

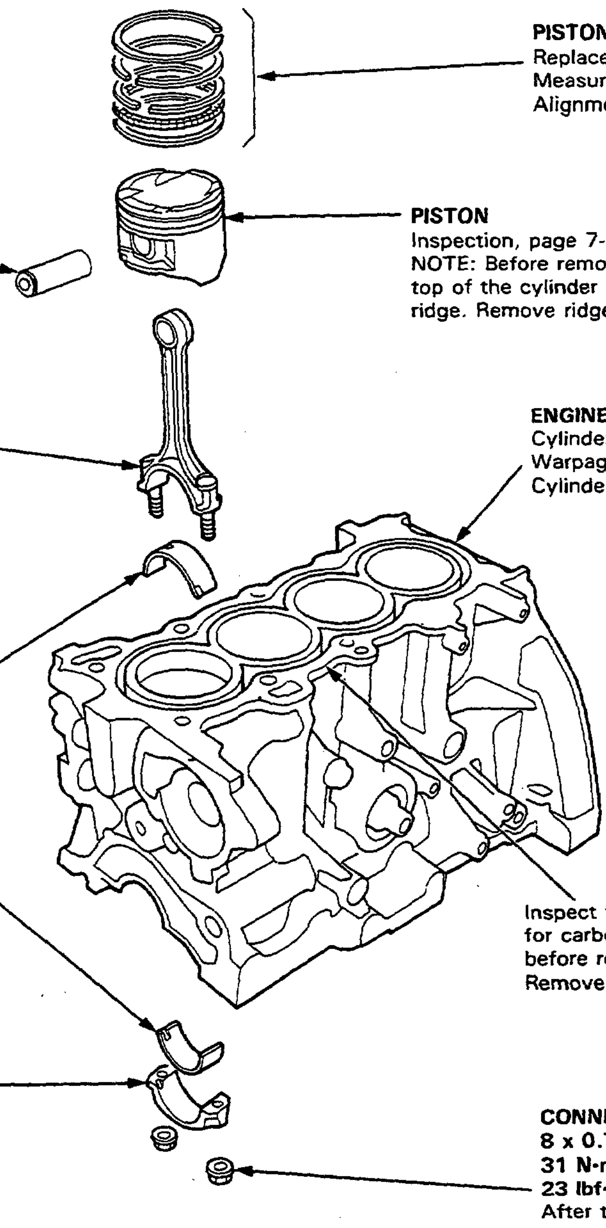
NOTE:
- Apply liquid gasket to the mating surfaces of the right side cover and oil pump case before installing them.
- Use liquid gasket, part No. 0Y740−99986.
- Clean the oil pan gasket mating surfaces before installing it.



(cont'd)

NOTE: New rod bearings must be selected by matching connecting rod assembly and crankshaft identification markings (see page 7-8).

Lubricate all internal parts with engine oil during reassembly.



PISTON RINGS
Replacement, page 7-16
Measurement, pages 7-16, 17
Alignment, page 7-17

PISTON PIN
Removal, page 7-13
Installation, page 7-14
Inspection, page 7-15

PISTON
Inspection, page 7-11
NOTE: Before removing piston, inspect the top of the cylinder bore for carbon build-up or ridge. Remove ridge if necessary, page 7-9

CONNECTING ROD
End play, page 7-5
Selection, page 7-14

ENGINE BLOCK
Cylinder bore inspection, page 7-12
Warpage inspection, page 7-12
Cylinder bore honing, page 7-13

CONNECTING ROD BEARINGS
Clearance, page 7-7
Selection, page 7-8

Inspect top of each cylinder bore for carbon build-up or ridge before removing piston.
Remove ridge if necessary, page 7-9

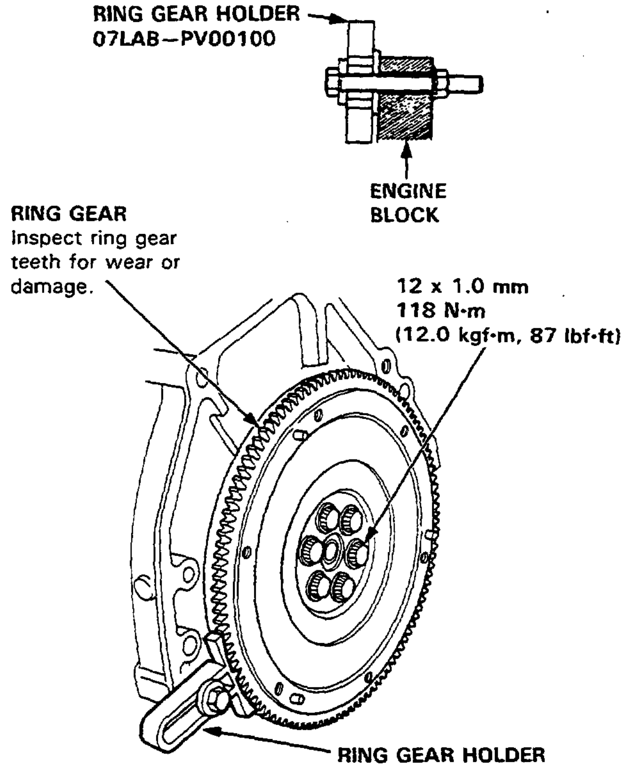
CONNECTING ROD BEARING CAP
Installation, page 7-19
NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

CONNECTING ROD CAP NUT
8 x 0.75 mm
31 N·m (3.2 kgf·m, 23 lbf·ft)
After torquing each bearing cap, rotate crankshaft to check for binding.

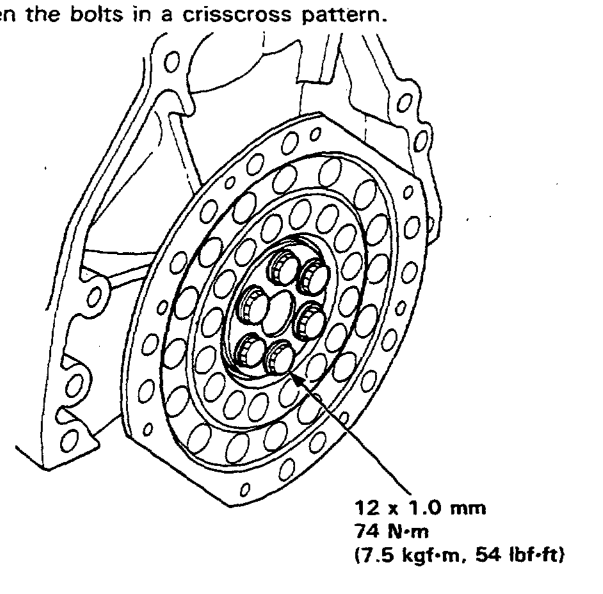
Flywheel and Drive Plate

Replacement

Manual Transmission:
Remove the six flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern.



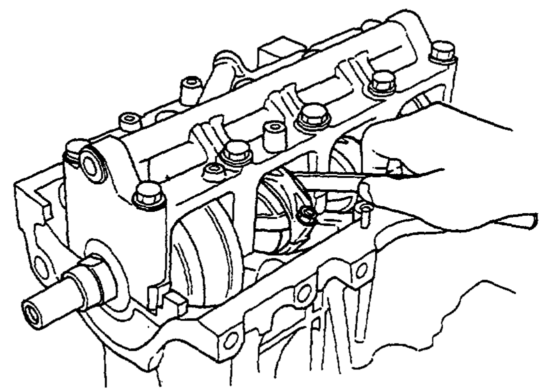
Automatic Transmission:
Remove the six drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern.



Connecting Rod and Crankshaft

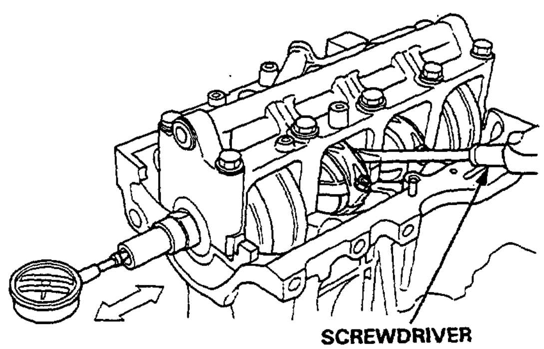
End Play

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 7-8 and 7-19).

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 if 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.

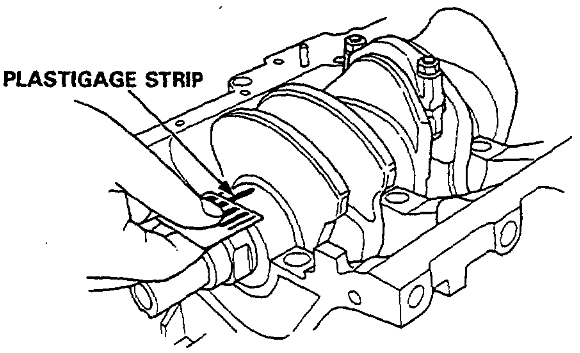
4. Reinstall the bearings and caps, then torque the bolts.

   1st step: 25 N·m (2.5 kgf·m, 18 lbf·ft)
   Final step:
   D16Y2, D16Y3 engines:
   51 N·m (5.2 kgf·m, 38 lbf·ft)
   D15Z3, D14A2 engines:
   44 N·m (4.5 kgf·m, 33 lbf·ft)

   NOTE: Do not rotate the crankshaft during inspection.

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

   Main Bearing-to-Journal Oil Clearance:
   Standard (New):
   No. 1, 5 Journals:
   0.018–0.036 mm (0.0007–0.0014 in)
   No. 2, 3, 4 Journals:
   0.024–0.042 mm (0.0009–0.0017 in)
   Service Limit: 0.05 mm (0.002 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.

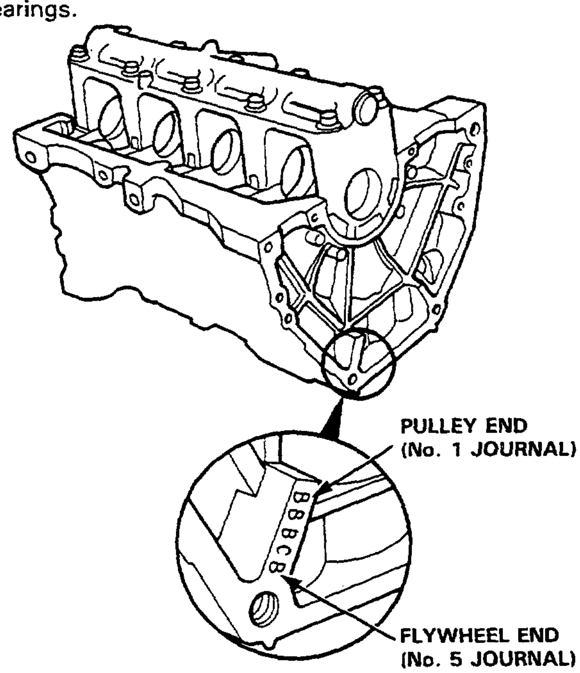
   NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

Selection

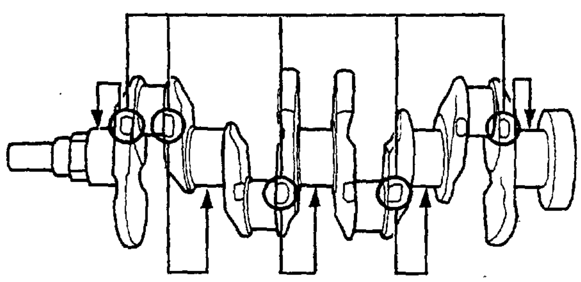
CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Crankshaft Bore Code Location (Marks)

Marks 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.



Main Journal Code Location (Numbers)



Bearing Identification

Color code is on the edge of the bearing. → Larger crank bore

→ Smaller bearing (thicker)

↓ Smaller main journal ↓ Smaller bearing (thicker)

	A	B	C	D
1	Red	Pink	Yellow	Green
2	Pink	Yellow	Green	Brown
3	Yellow	Green	Brown	Black
4	Green	Brown	Black	Blue

Clearance

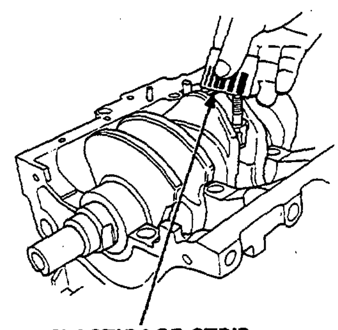
1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place the plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts.

   Torque
   31 N·m (3.2 kgf·m, 23 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:
   Standard (New): 0.020–0.038 mm (0.0008–0.0015 in)
   Service Limit: 0.05 mm (0.002 in)



6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, installl 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.

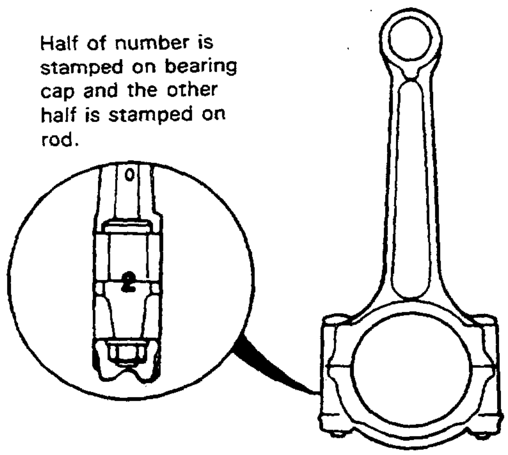
Connecting Rod Bearings

Selection

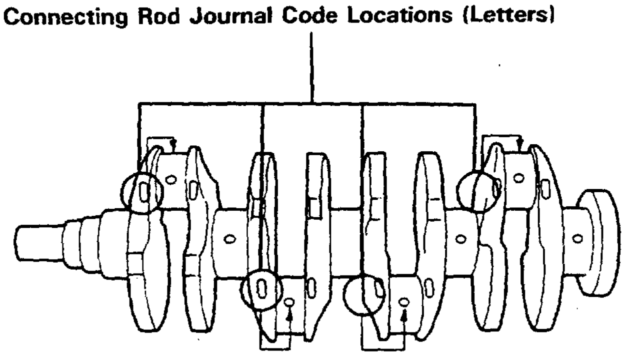
CAUTION: If the codes are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or detergent.

Connecting Rod Code Location (Numbers)

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



Connecting Rod Journal Code Locations (Letters)



Bearing Identification

Color code is on the edge of the bearing.

→ Larger big end bore

→ Smaller bearing (thicker)

↓ Smaller rod journal

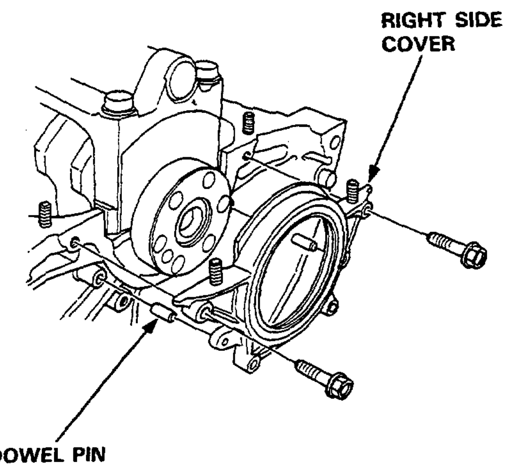
↓ Smaller bearing (thicker)

	1	2	3	4
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

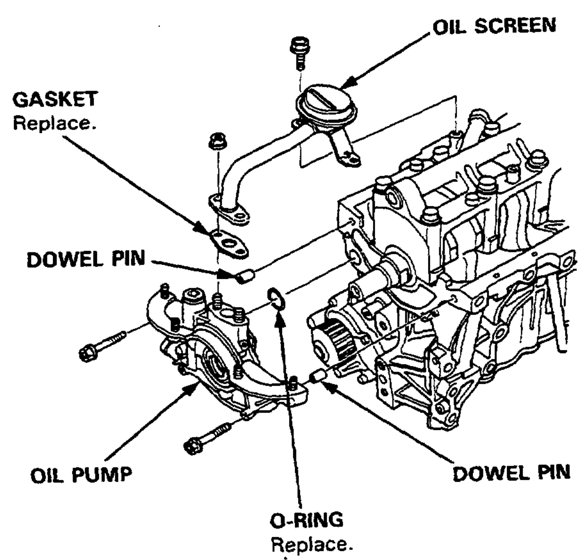
Pistons and Crankshaft

Removal

1. Remove the oil pan assembly.
2. Remove the right side cover.



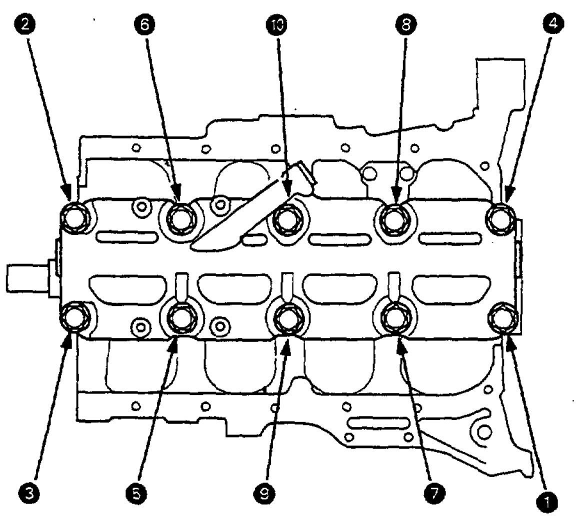
3. Remove the oil screen.
4. Remove the oil pump.



5. Remove the bolts and the bearing cap.

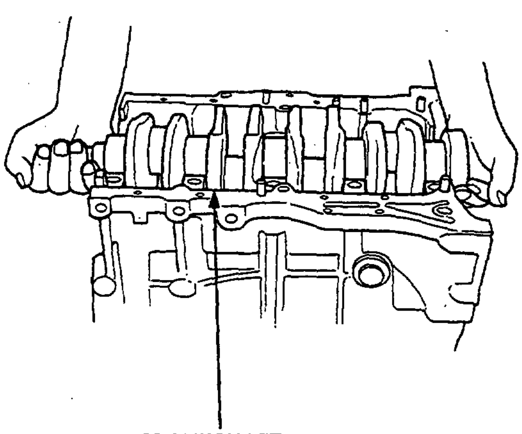
CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

MAIN BEARING CAP BOLTS LOOSENING SEQUENCE



6. Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.

7. Lift the crankshaft out of the engine, being careful not to damage journals.

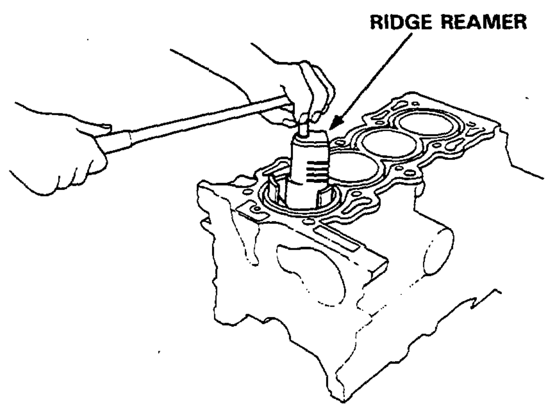


8. Remove the upper bearing halves from the connecting rods and set them aside with their respective caps.

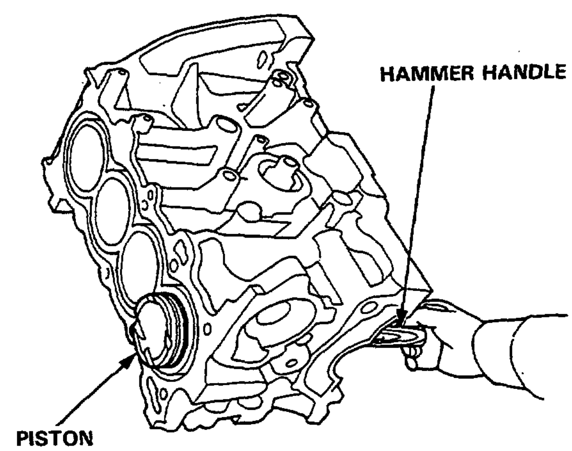
9. Reinstall the main caps and bearings on the engine in proper order.

10. 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.



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



12. Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.

13. 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.

Crankshaft

Inspection

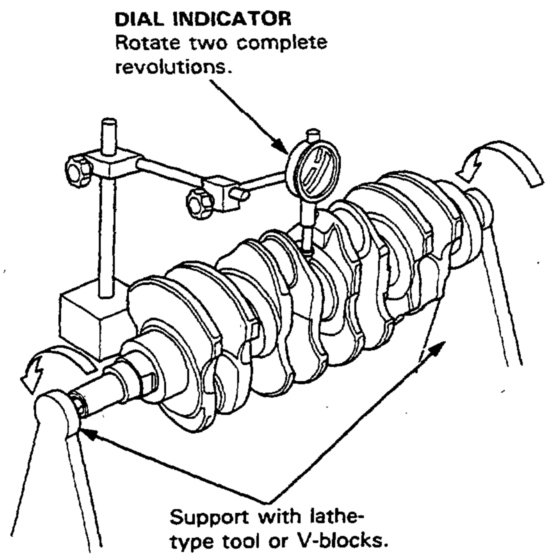
- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

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:

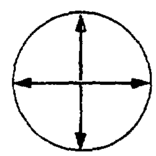
Standard (New): 0.03 mm (0.001 in) max.
Service Limit: 0.04 mm (0.002 in)

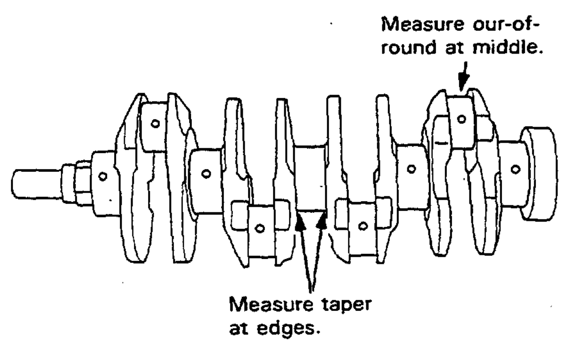


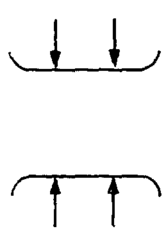
Out-of-Round and Taper

- 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): 0.0025 mm (0.0001 in) max.
Service Limit: 0.005 mm (0.0002 in)







- Measure taper at edges 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): 0.0025 mm (0.0001 in) max.
Service Limit: 0.005 mm (0.0002 in)

Inspection

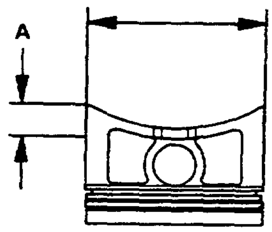
1. Check the piston for distortion or cracks.

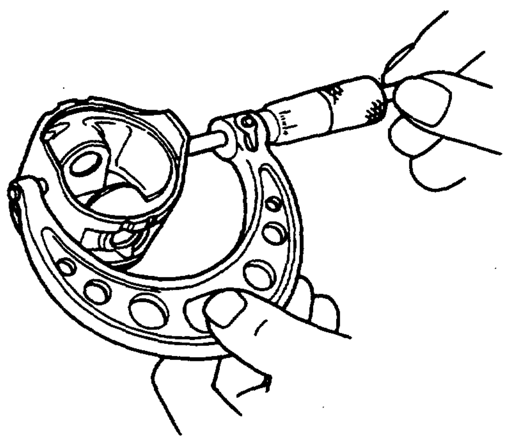
   NOTE: If cylinder is bored, an oversized piston must be used.

2. Measure piston diameter at a point A from bottom of skirt.

   A: 15 mm (0.6 in)

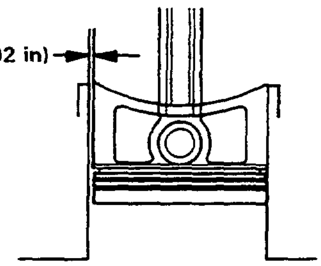
   Piston Diameter:
   Standard (New): 74.980–74.990 mm (2.9520–2.9524 in)
   Service Limit: 74.970 mm (2.9516 in)





3. Calculate difference between cylinder bore diameter (see page 7-12) and piston diameter.

   Piston-to-Cylinder Clearance
   Standard (New): 0.010–0.040 mm (0.0004–0.0016 in)
   Service Limit: 0.05 mm (0.002 in)



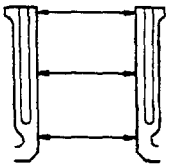
If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.

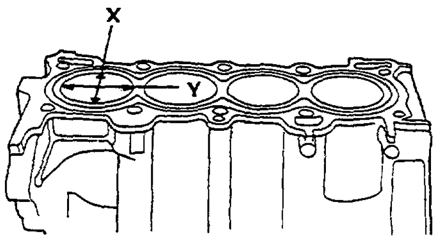
Oversize Piston Diameter
0.25: 75.23–75.24 mm (2.9618–2.9622 in)
0.50: 75.48–75.49 mm (2.9716–2.9720 in)

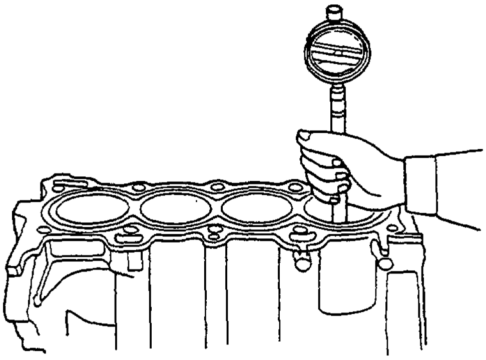
Cylinder Block

Inspection

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







Cylinder Bore Size:
Standard (New): 75.00–75.02 mm (2.953–2.954 in)
Service Limit: 75.07 mm (2.956 in)

Oversize
0.25: 75.25–75.27 mm (2.9626–2.9634 in)
0.50: 75.50–75.52 mm (2.9724–2.9732 in)

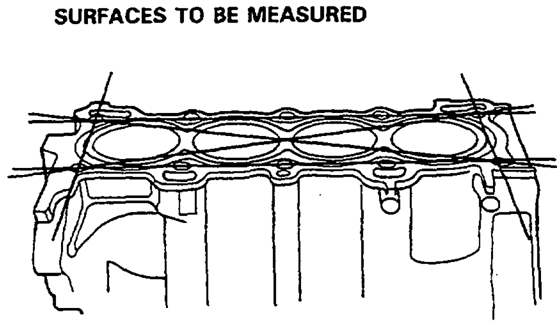
Bore Taper
Limit: (Difference between first and third measurement) 0.05 mm (0.002 in)

- If measurements in any cylinder are beyond Oversize Bore Service Limit, replace the block.
- If block is to be rebored, refer to Piston Clearance Inspection (see page 7-12, 13) after reboring.

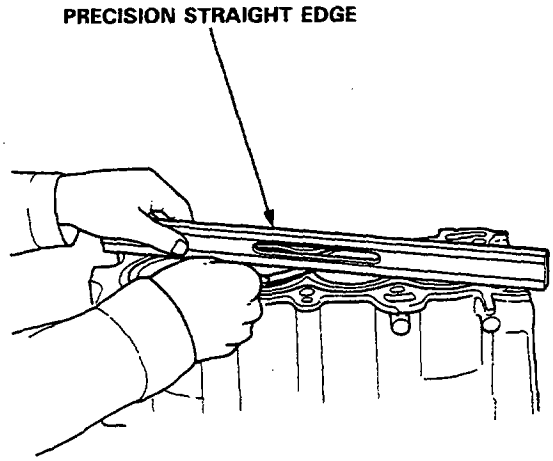
NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit: 0.50 mm (0.020 in)

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



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

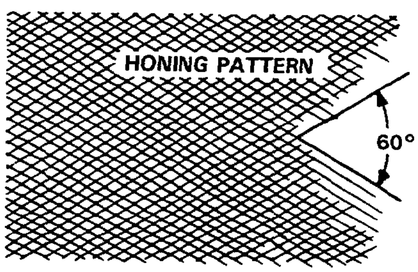


Bore Honing

1. Measure cylinder bores as shown on page 7-12. 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 dagree 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.

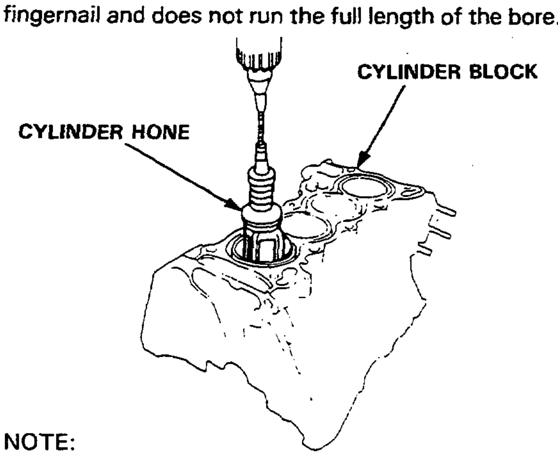


3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

   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.

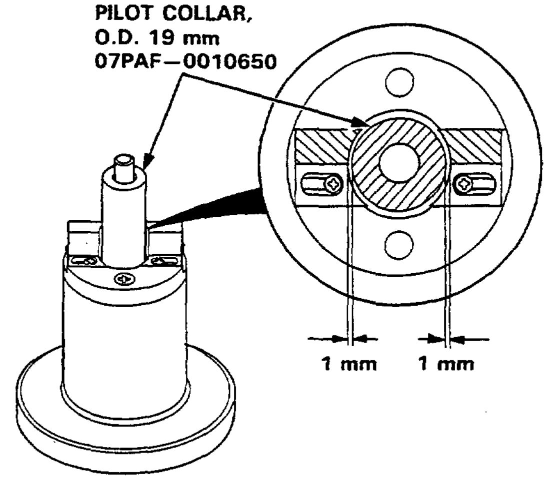


NOTE:
- After honing, clean the cylinder thoroughly with soapy water.
- Only a scored or scratched cylinder bore must be honed.

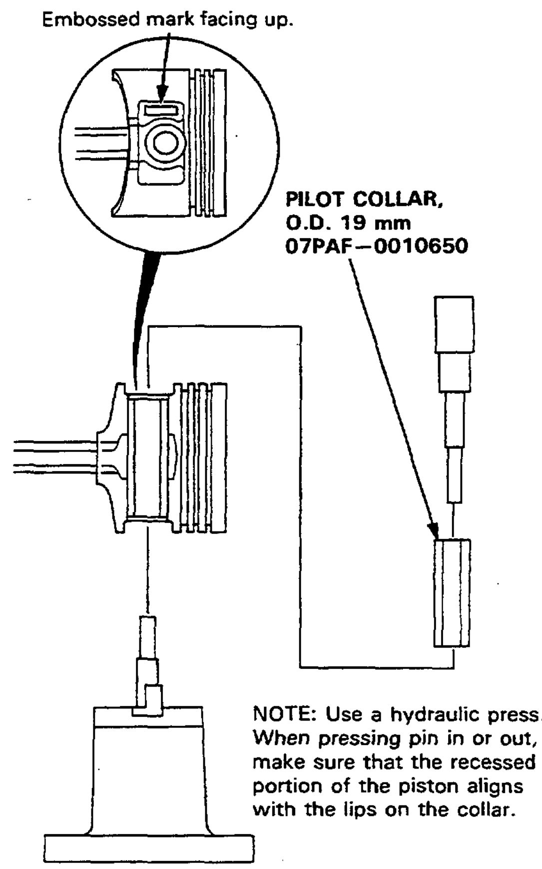
Removal

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.



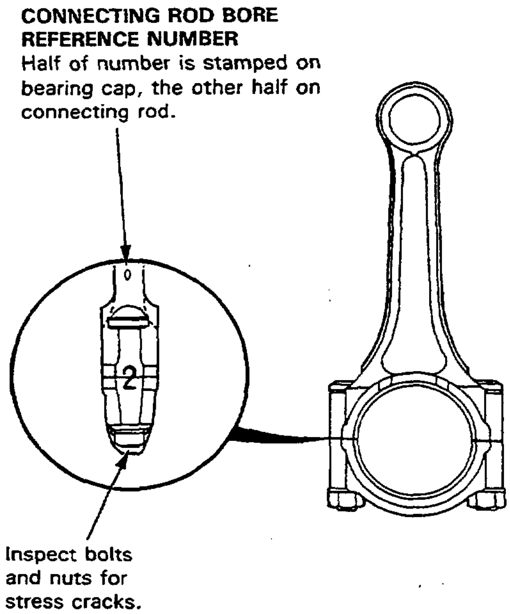
Connecting Rods

Selection

Each rod falls into one of four tolerance ranges (from 0 to + 0.024 mm (0 to + 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 (1, 2, 3, or 4) indicating the range.
You may find any combination of 1, 2, 3, or 4 in any engine.

Normal Bore Size:
D16Y2, D16Y3 engines: 48.0 mm (1.89 in)
D15Z3 engine: 45.0 mm (1.77 in)
D14A2 engine: 43.0 mm (1.69 in)

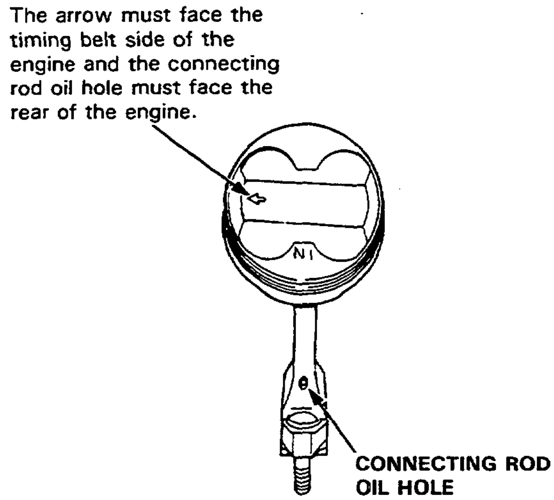
NOTE:
- Reference numbers are for big end bore size and do NOT indicate the position of the rod in the engine.
- Inspect connecting rod for cracks and heat damage.



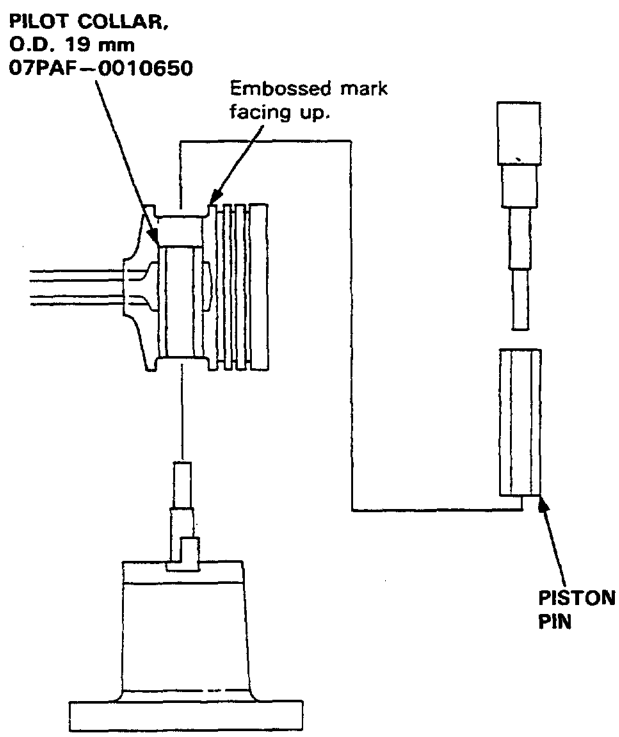
Piston Pins

Installation

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



1. Install the piston pin as shown.



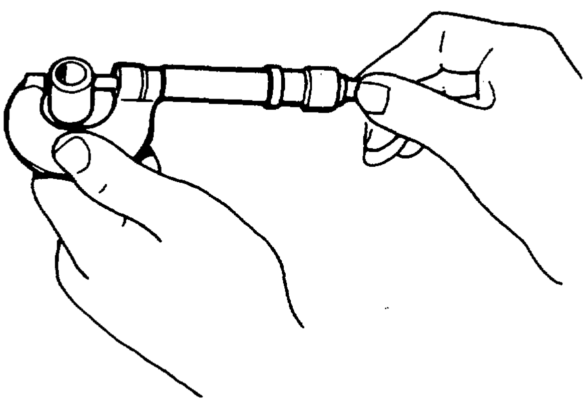
NOTE: Install the assembled piston and rod with the oil hole facing the intake manifold.

Inspection

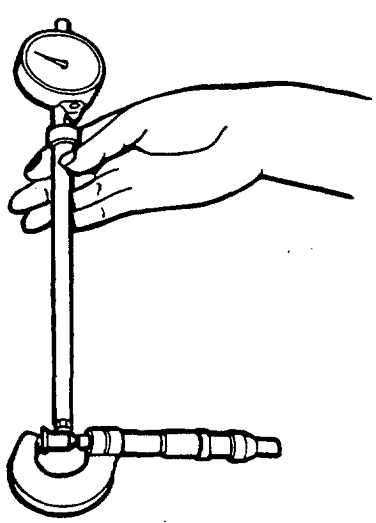
1. Measure the diameter of the piston pin.

Piston Pin Diameter:
Standard (New): **18.994–19.000 mm (0.7478–0.7480 in)**
Oversize: **18.997–19.003 (0.7479–0.7481 in)**

NOTE: All replacement piston pins are oversize.



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

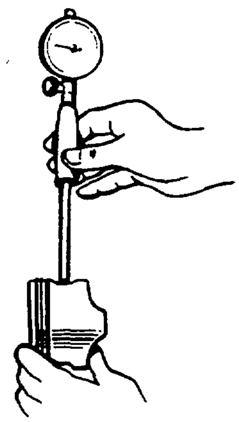


3. Measure the piston pin-to-piston clearance.

NOTE: Check the piston for distortion or cracks.

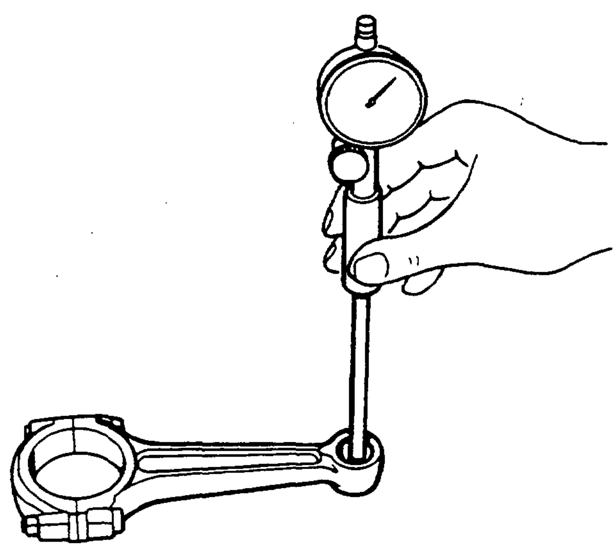
If the piston pin clearance is greater than 0.024 mm (0.0009 in), remeasure using an oversized piston pin.

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): **0.014–0.040 mm (0.0006–0.0016 in)**



Piston Rings

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:

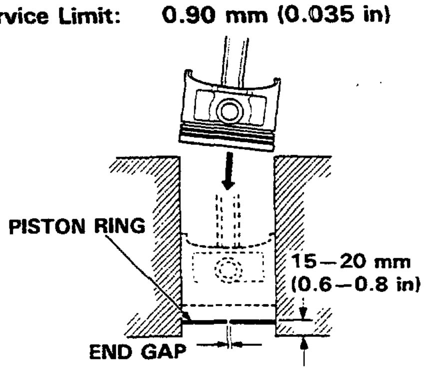
   - If the gap is too small, check to see if you have the proper rings for your engine.

   - If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-12. If the bore is over the service limit, the cylinder block must be rebored.

Piston Ring End-Gap:
Top Ring
Standard (New): 0.15—0.30 mm (0.006—0.012 in)
Service Limit: 0.60 mm (0.024 in)

Second Ring
Standard (New): 0.30—0.45 mm (0.012—0.018 in)
Service Limit: 0.70 mm (0.028 in)

Oil Ring
D16Y2 engine:
Standard (New): 0.20—0.80 mm (0.008—0.031 in)*1
0.20—0.50 mm (0.008—0.020 in)*2
Service Limit: 0.90 mm (0.035 in)*1
0.70 mm (0.028 in)*2
D15Z3 engine:
Standard (New): 0.20—0.70 mm (0.008—0.028 in)*1
0.20—0.50 mm (0.008—0.020 in)*2
Service limit: 0.80 mm (0.031 in)*1
0.70 mm (0.028 in)*2
D16Y3, D14A2 engines:
Standard (New): 0.20—0.80 mm (0.008—0.031 in)
Service Limit: 0.90 mm (0.035 in)



*1: RIKEN manufactured piston ring
*2: TEIKOKU PISTON RING manufactured piston ring

Replacement

1. Using a ring expander, remove the old piston rings.

2. Clean all ring grooves thoroughly.

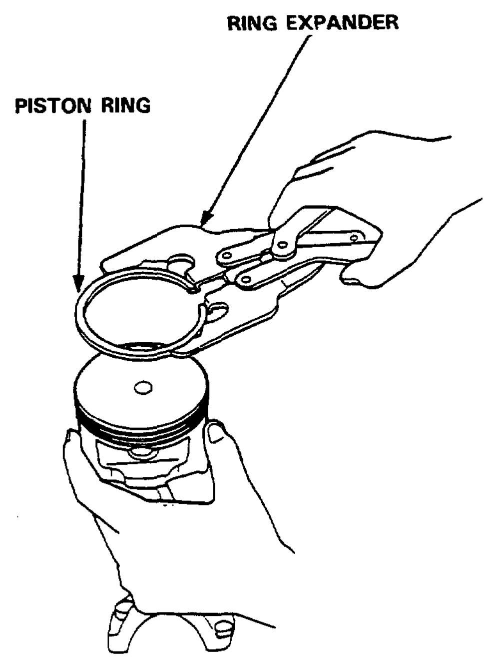
   NOTE:
   - Use a squared-off broken ring or ring groove cleaner with blade to fit piston grooves.
   - Top ring groove is 1.0 mm (0.039 in) wide (D15Z3 engine) or 1.2 mm (0.047 in) wide (except D15Z3 engine).
   - Second ring groove is 1.2 mm (0.047 in) wide (D15Z3 engine) or 1.5 mm (0.059 in) wide (except D15Z3 engine).
   - Oil ring groove is 2.8 mm (0.11 in) wide.
   - File down blade if necessary.

   CAUTION: Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.

   NOTE: If piston is to be separated from connecting rod, do not install new rings yet.

3. Install new rings in proper sequence and position (see page 7-17).

   NOTE: Do not reuse old piston rings.

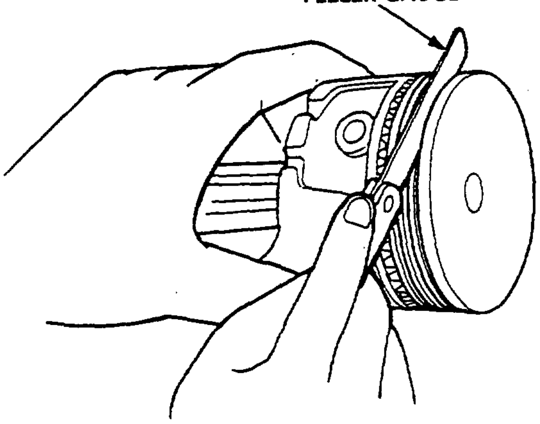


Ring-to-Groove Clearance

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

Top Ring Clearance
Standard (New):
D15Z3 engine:
0.035–0.060 mm (0.0014–0.0024 in)
Except D15Z3 engine:
0.030–0.060 mm (0.0012–0.0024 in)*1
0.030–0.055 mm (0.0012–0.0022 in)*2
Service Limit: 0.13 mm (0.005 in)

Second Ring Clearance
Standard (New):
D15Z3 engine:
0.030–0.055 mm (0.0012–0.0022 in)*1
0.030–0.060 mm (0.0012–0.0024 in)*2
Except D15Z3 engine:
0.030–0.055 mm (0.0012–0.0022 in)
Service Limit: 0.13 mm (0.005 in)



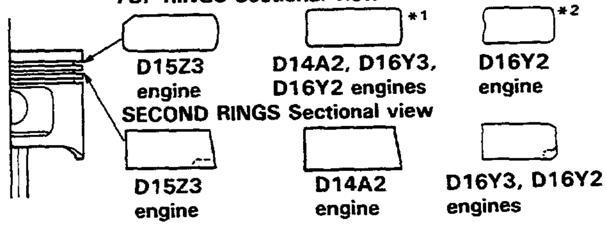
*1: RIKEN manufactured piston ring
*2: TEIKOKU PISTON RING manufactured piston ring

Alignment

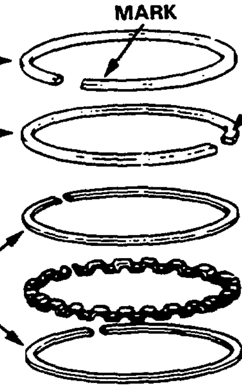
1. Install the rings as shown.

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

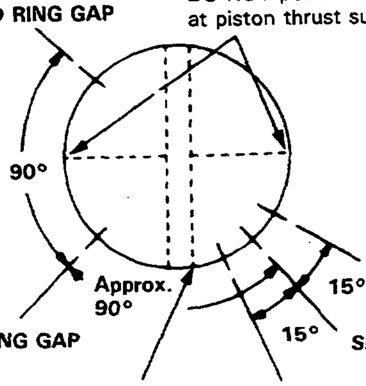
   NOTE: The manufacturing marks must be facing upward.



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



3. Position the ring end gaps as shown:



*1: RIKEN manufactured piston ring
*2: TEIKOKU PISTON RING manufactured piston ring

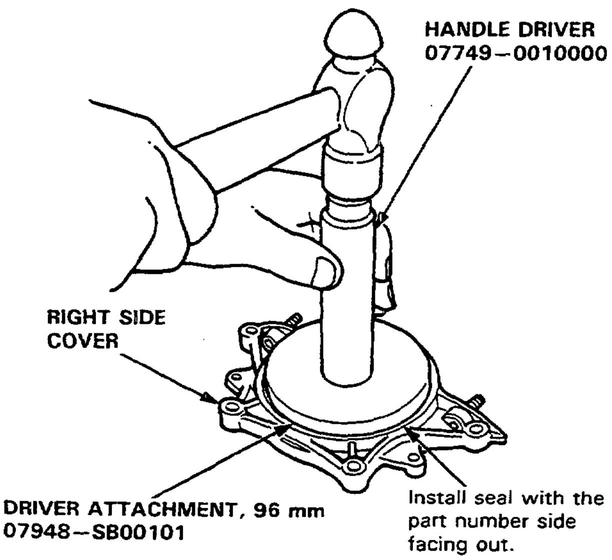
Crankshaft Oil Seal

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.

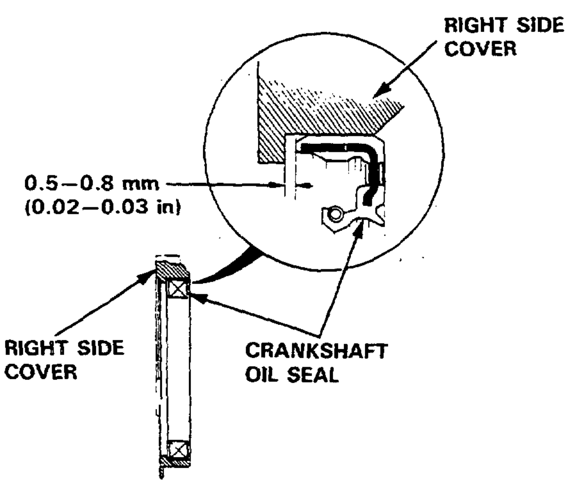
1. Drive in crankshaft oil seal against right side cover.

   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 8-12 for installation of the oil pump side crankshaft oil seal.

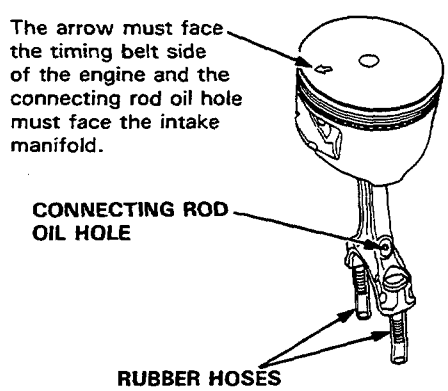
Pistons

Installation

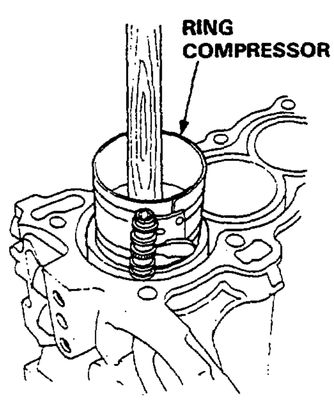
Before installing the piston, apply a coat of engine oil to the ring grooves and cylinder bores.

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 is 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:
     31 N·m (3.2 kgf·m, 23 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.

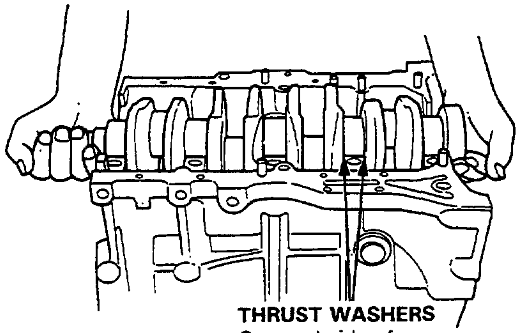


Crankshaft

Installation

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

1. Insert bearing halves in the cylinder block and connecting rods.
2. Hold the crankshaft so rod journals for cylinders No. 2 and No. 3 are straight down.
3. Lower the crankshaft into the block, seating the rod journals into connecting rods No. 2 and No. 3, and install the rod caps and nuts finger-tight.



4. Rotate the crankshaft clockwise, seat journals into connecting rods No. 1 and No. 4, and install the rod caps and nuts finger-tight.

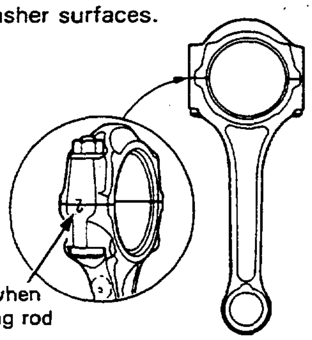
   NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.

5. Check rod bearing clearance with plastigage (see page 7-7), then torque the capnuts.

   Torque:
   31 N·m (3.2 kgf·m, 23 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.

6. Install the thrust washers on the No. 4 journal. Oil the thrust washer surfaces.

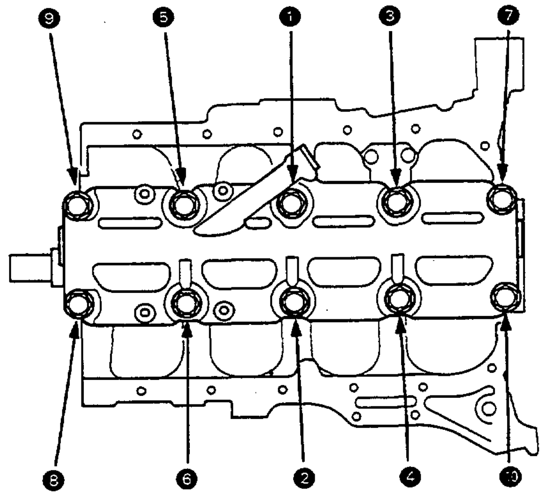


7. Install the main bearing caps.
   Check clearance with plastigage (see page 7-6), then tighten the bearing cap bolts in 2 steps.

   First step: **25 N·m (2.5 kgf·m, 18 lbf·ft)**
   Second step:
   D16Y2, D16Y3 engines:
   51 N·m (5.2 kgf·m, 38 lbf·ft)
   D15Z3, D14A2 engines:
   44 N·m (4.5 kgf·m, 33 lbf·ft)

   NOTE: Coat the thrust washer surfaces and bolt threads with oil.

MAIN BEARING CAP BOLTS TIGHTENING SEQUENCE



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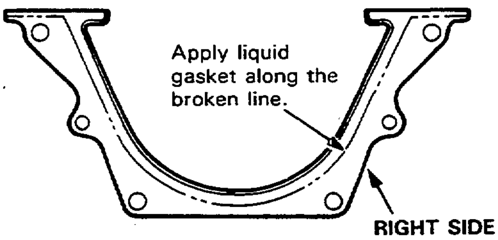
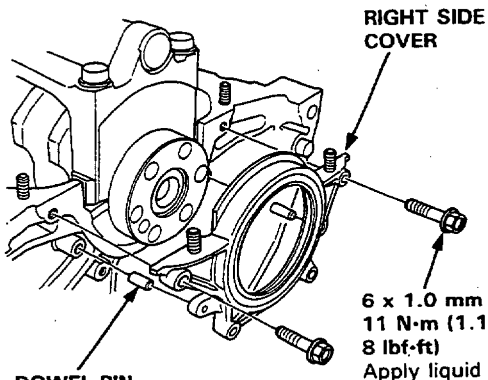
Installation (cont'd)

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.

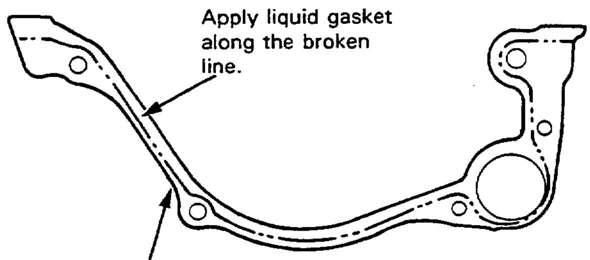
8. Apply liquid gasket to the block mating surface of the right side cover, then install it on the cylinder block.





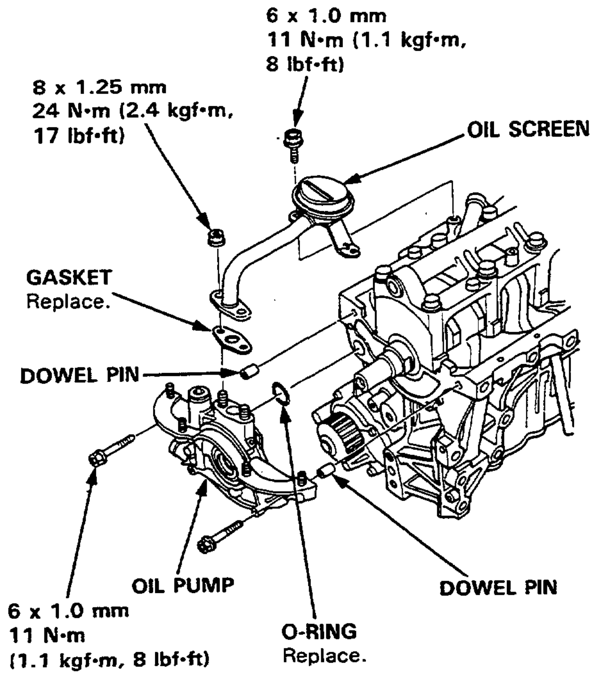
9. Apply liquid gasket to the oil pump mating surface of the block, then install the oil pump on the cylinder block.

- 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, then check that the oil seal lips are not distorted.

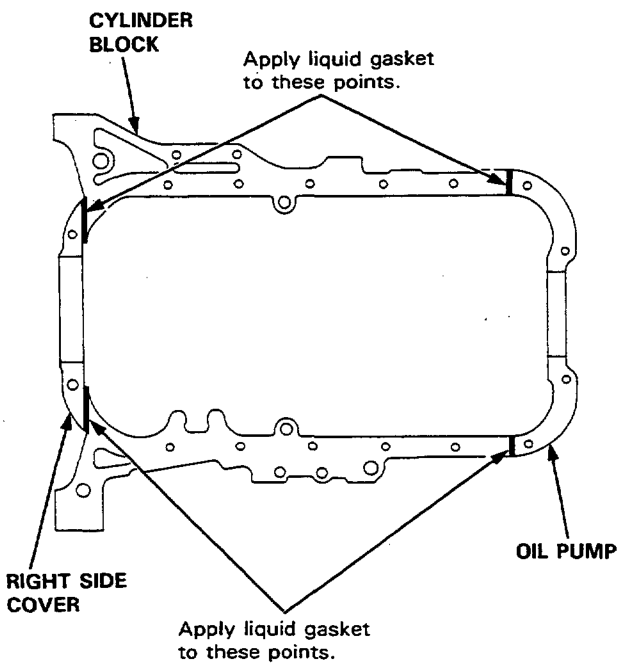


NOTE:
- Apply a light coat of oil to the crankshaft and to the lip of seal.
- Use new O-rings and apply oil when installing them.

10. Install the oil pump and oil screen.

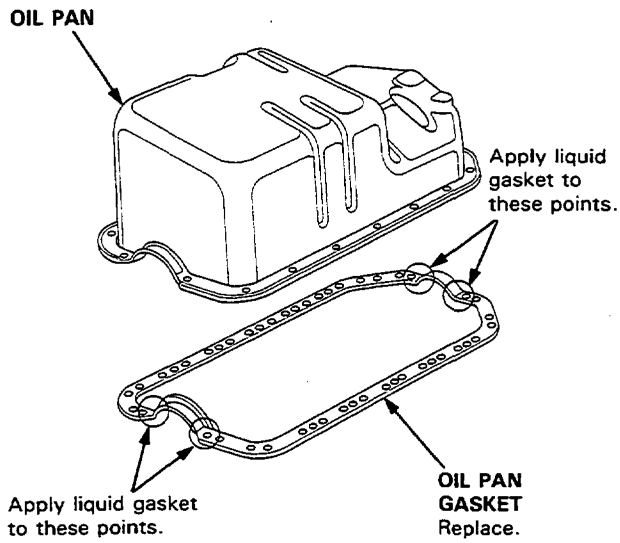


11. Apply liquid gasket on oil pump and right side cover mating areas as shown below.

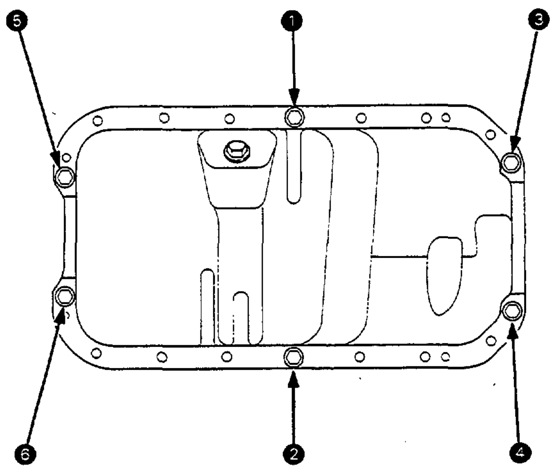


12. Install the oil pan gasket and oil pan.

NOTE:
- Use a new oil pan gasket.
- Install oil pan no more than five minutes after liquid gasket applied.



13. Tighten bolts and nuts finger tight at six points as shown below.



14. Tighten all bolts and nuts stating from bolt ① clockwise in three steps.

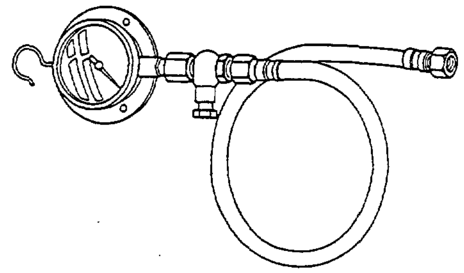
NOTE: Excessive tightening can cause distortion of oil pan gasket and oil leakage.

Torque: 14 N·m (1.4 kgf·m, 10 lbf·ft)

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07406 – 0030000	Oil Pressure Gauge Attachment	1	8-9
②	07506 – 3000000	Oil Pressure Gauge	1	8-9
③	07746 – 0010400	Driver Attachment, 52 x 55 mm	1	8-12
④	07749 – 0010000	Handle Driver	1	8-12

①



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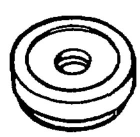

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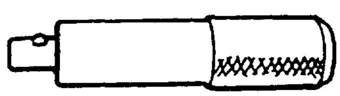
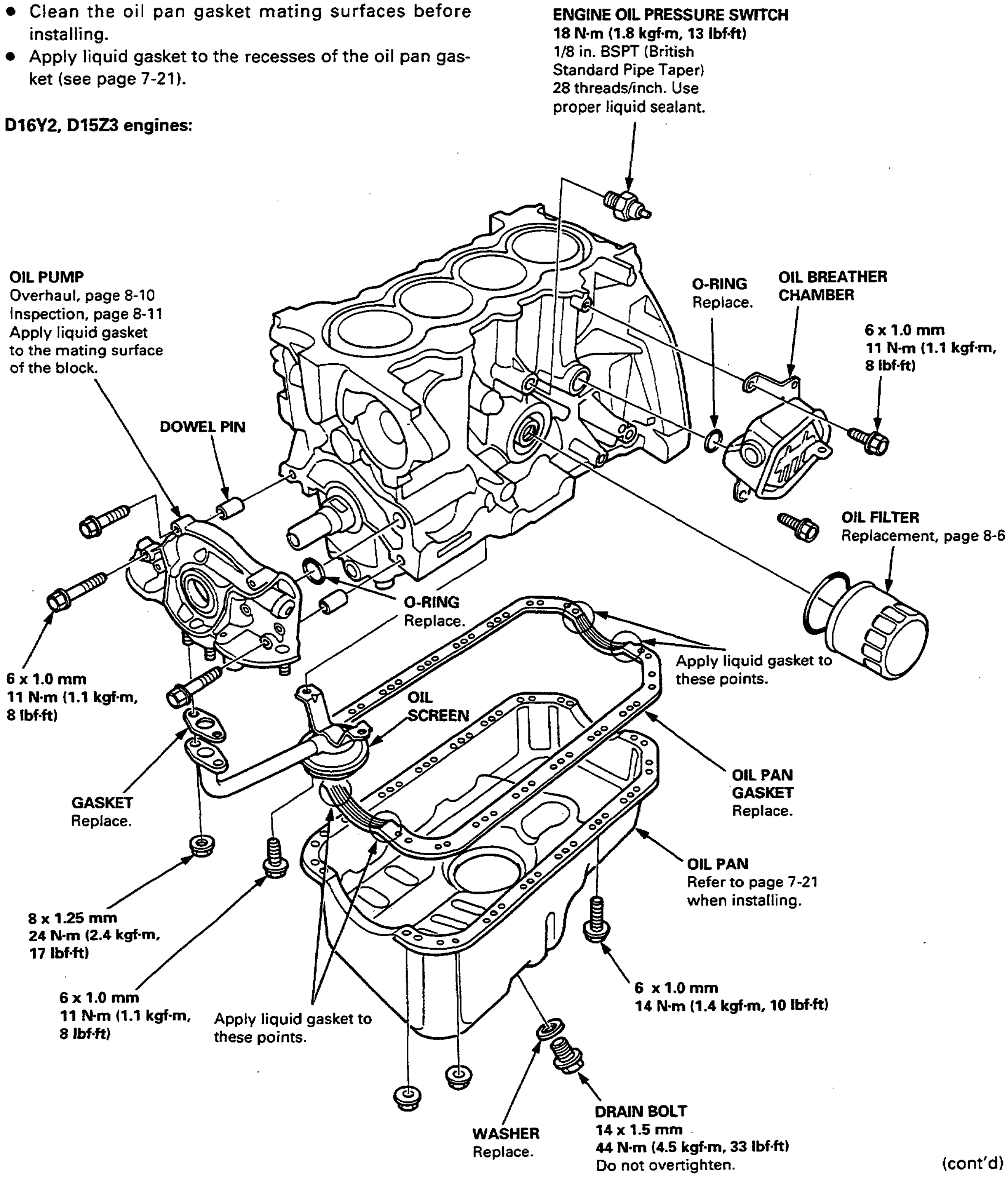


④

NOTE:
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 0Y740 – 99986.
- Clean the oil pan gasket mating surfaces before installing.
- Apply liquid gasket to the recesses of the oil pan gasket (see page 7-21).

CAUTION: Do not overtighten the drain bolt.

D16Y2, D15Z3 engines:



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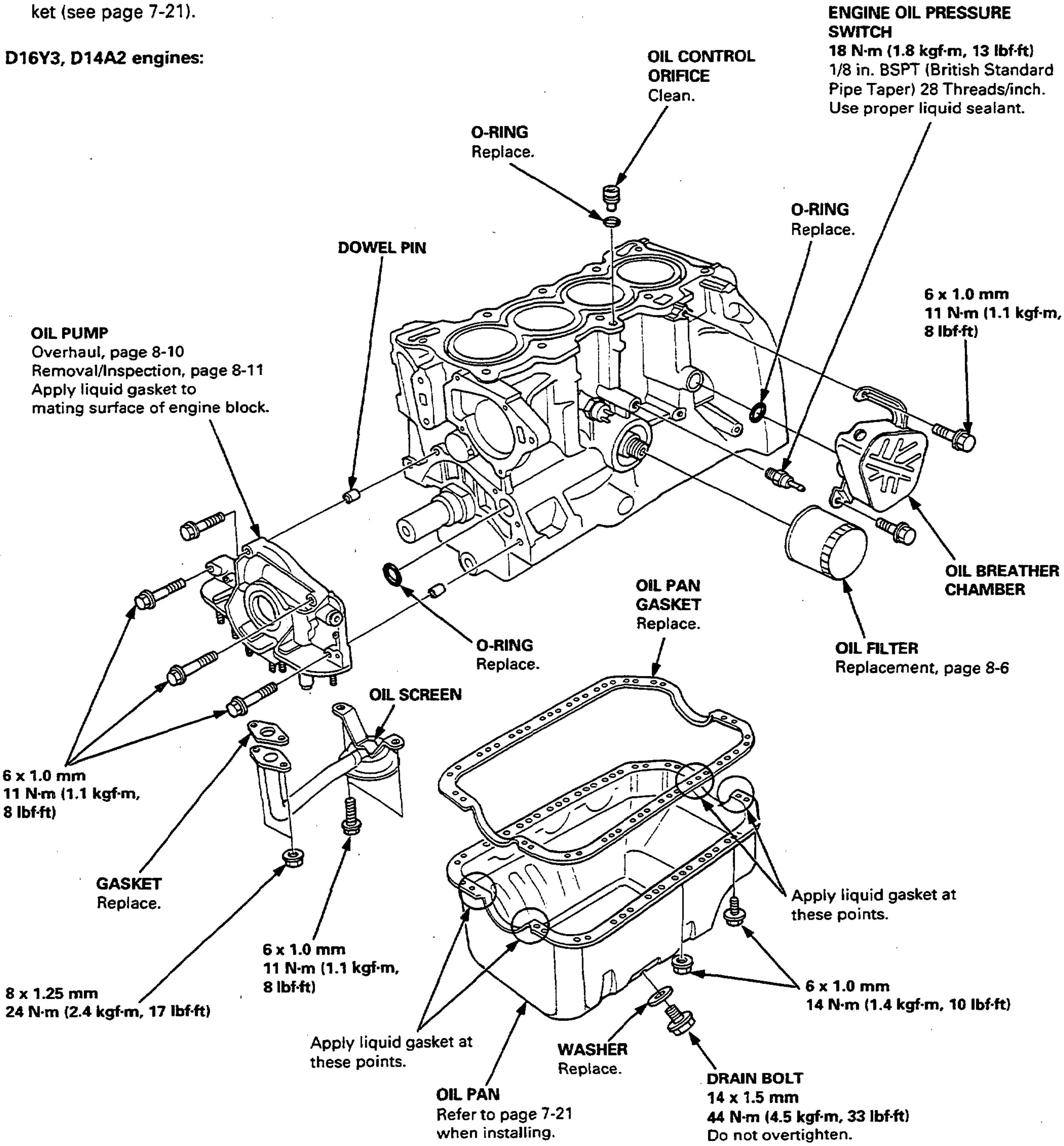
NOTE:
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 0Y740 – 99986.
- Clean the oil control orifice before installing.
- Clean the oil pan gasket mating surfaces before installing.
- Apply liquid gasket to the recesses of the oil pan gasket (see page 7-21).

CAUTION: Do not overtighten the drain bolt.

D16Y3, D14A2 engines:



Engine Oil

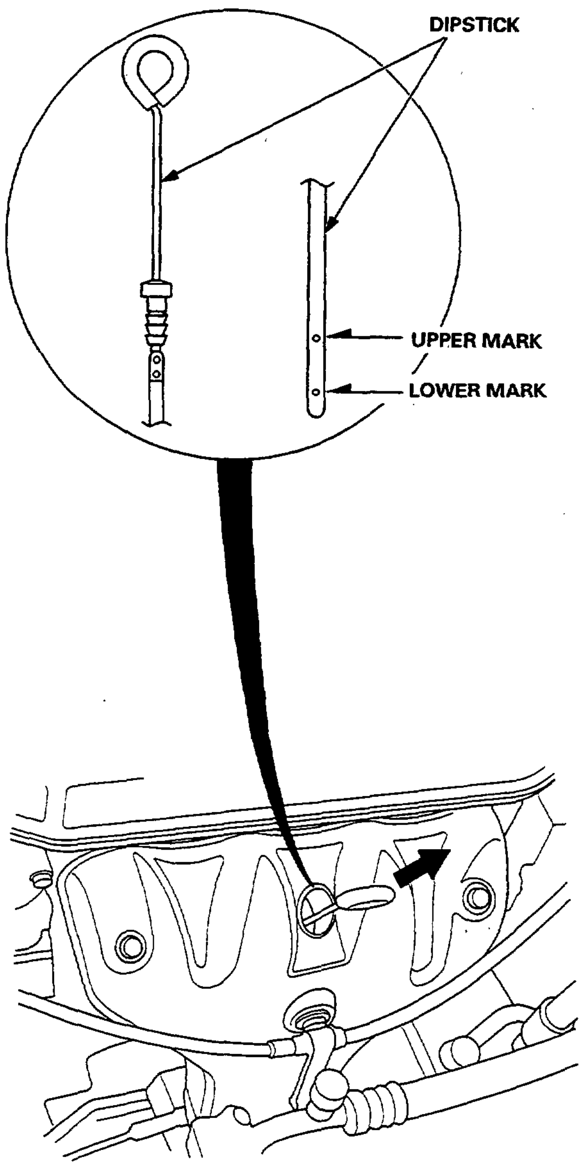
Inspection

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.

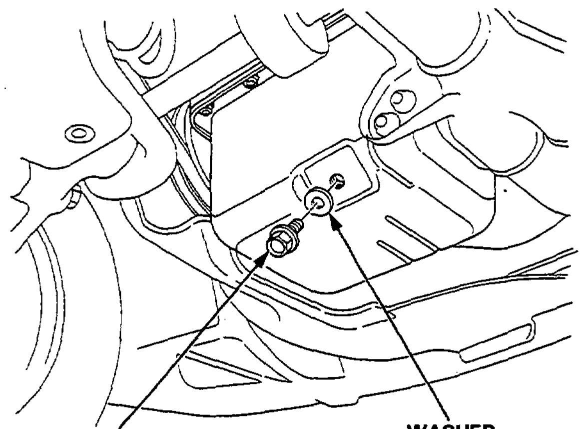


Replacement

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

1. Warm up the engine.

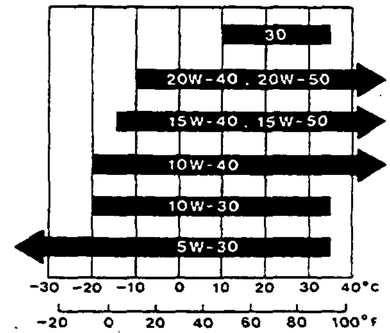
2. Drain the engine oil.



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

Requirement	Always use a fuel-efficient oil is that says "API Service SG or SH". SAE Viscosity: See chart below
Capacity	3.0 ℓ (3.2 US qt, 2.6 Imp qt) at oil change. 3.3 ℓ (3.5 US qt, 2.9 Imp qt) at change, including filter. D16Y2, D15Z3 engines: 4.2 ℓ (4.4 US qt, 3.7 Imp qt) D16Y3, D14A2 engines: 4.0 ℓ (4.2 US qt, 3.5 Imp qt) after engine overhaul.
Change	Every 10,000 km (6,000 miles) or 12 months

Engine Oil SAE Viscosity for Outside Temperature Ranges.



Ambient temperature ranges

Oil Filter

Replacement

JAPAN-MADE oil filter:

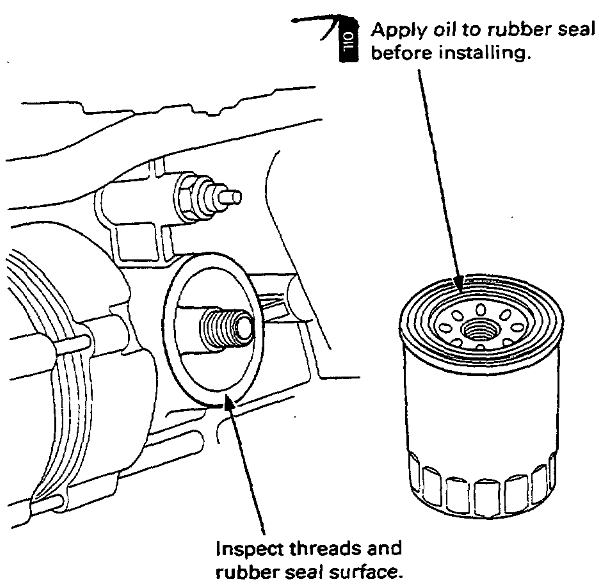
⚠ WARNING

- **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 oil filter wrench.

2. Inspect the threads and rubber seal on the new filter. Wipe off 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.

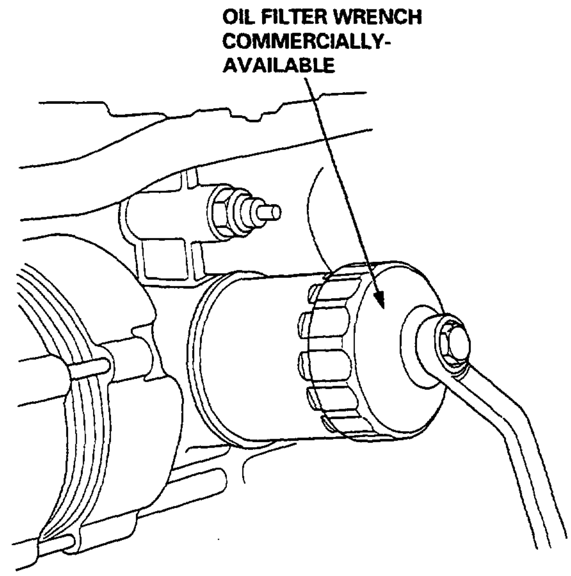


3. Install the oil filter by hand.

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

   Tighten: 7/8 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.

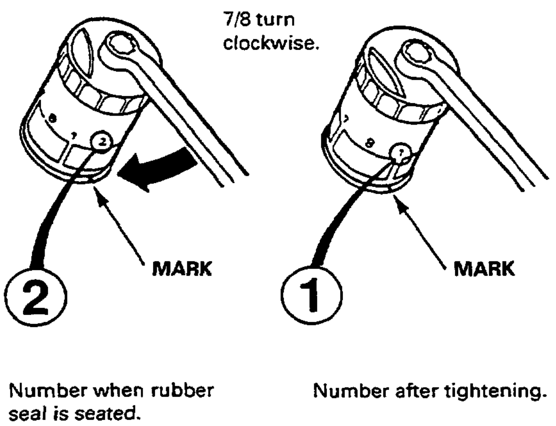


Eight numbers (1 to 8) are printed on the surface of the filter.

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

1) Make a mark on the engine 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.



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

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.

FRANCE-MADE oil filter:

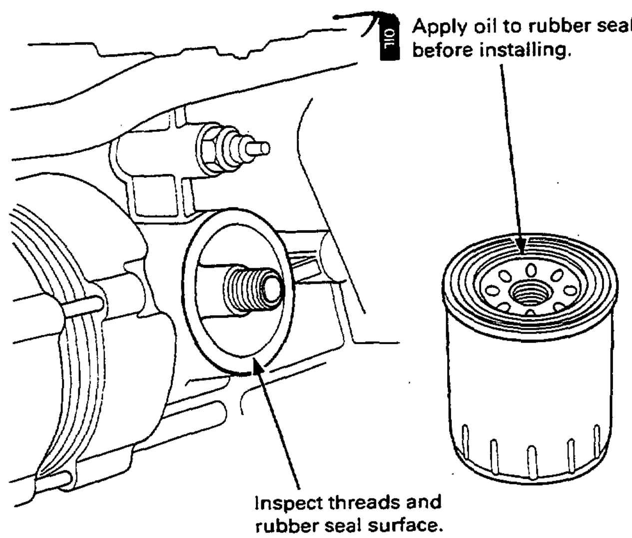
⚠ WARNING

- **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 oil filter wrench.

2. Inspect the threads and rubber seal on the new filter. Wipe off 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.



(cont'd)

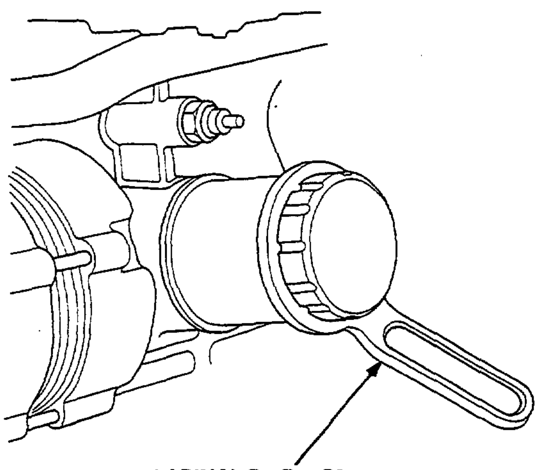
Oil Filter

Replacement (cont'd)

3. Install the oil filter by hand.
4. After the rubber seal seats, tighten the oil filter clockwise with the tool.

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

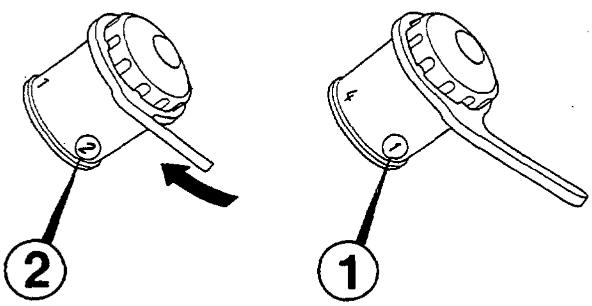
   CAUTION: Installation using other than the above procedure could result in serious engine damage due to oil leakage.



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 engine 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 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
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

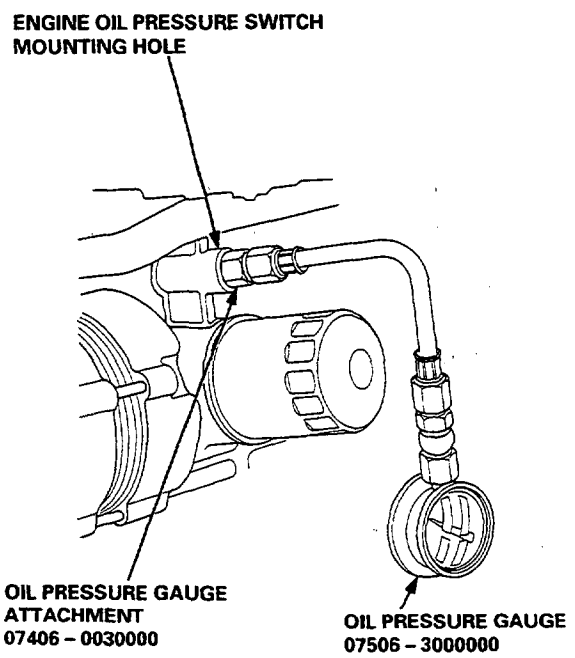
Testing

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: 70 kPa (0.7 kgf/cm², 10 psi) minimum
   At 3,000 rpm (min⁻¹): 340 kPa (3.5 kgf/cm², 50 psi) minimum

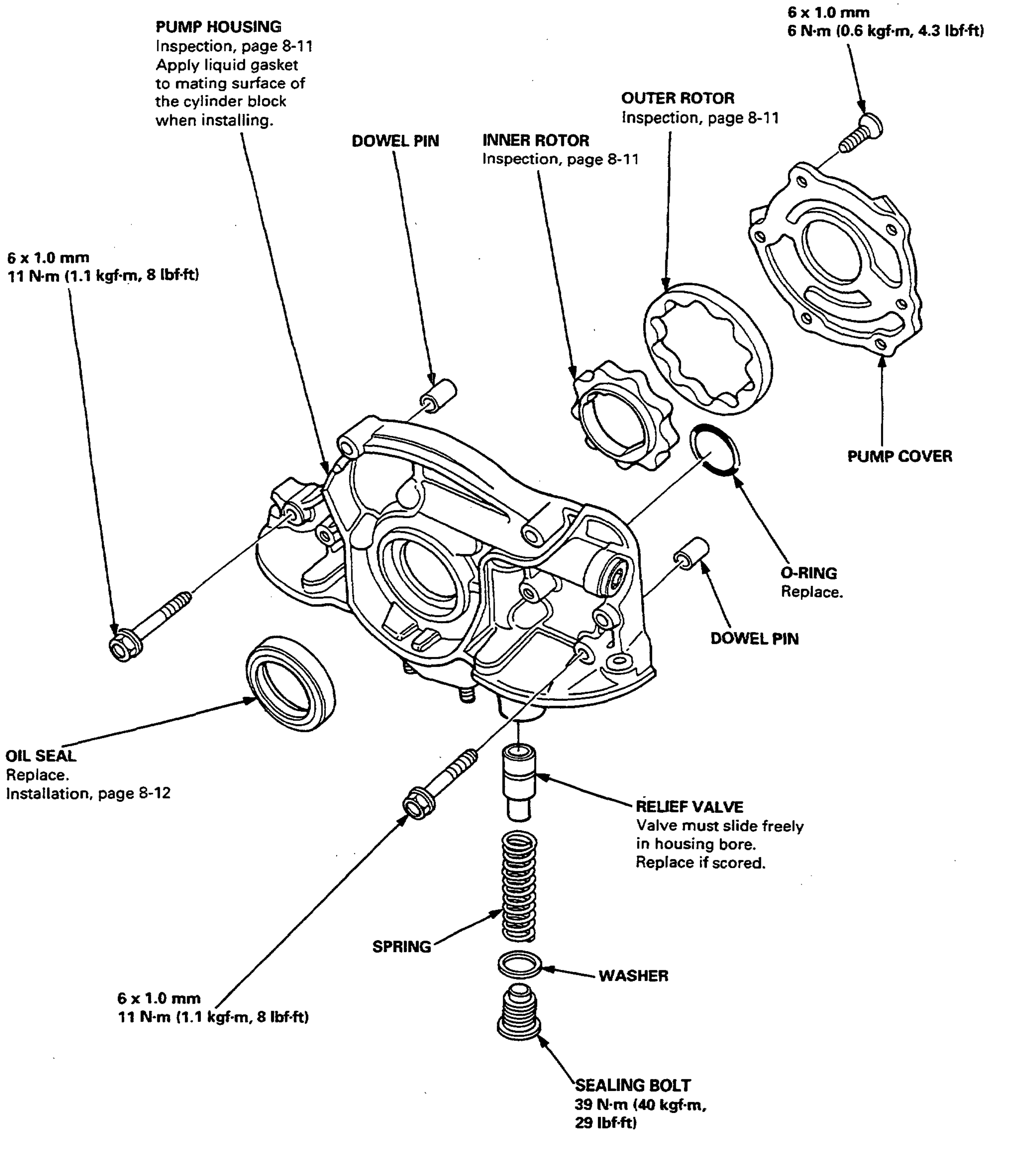
   - If oil pressure is within specifications, replace the oil pressure switch and recheck.
   - If oil pressure is NOT within specifications, inspect the oil pump (see page 8-11).



Oil Pump

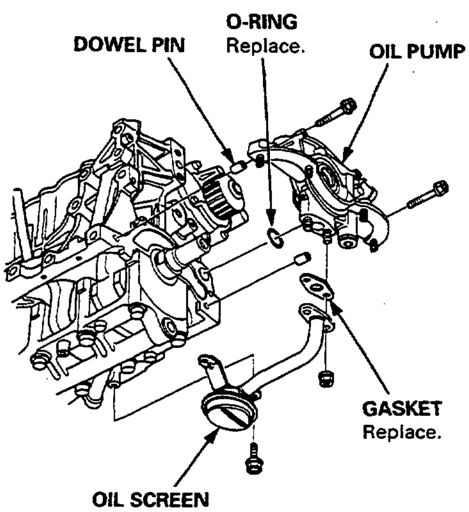
Overhaul

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.



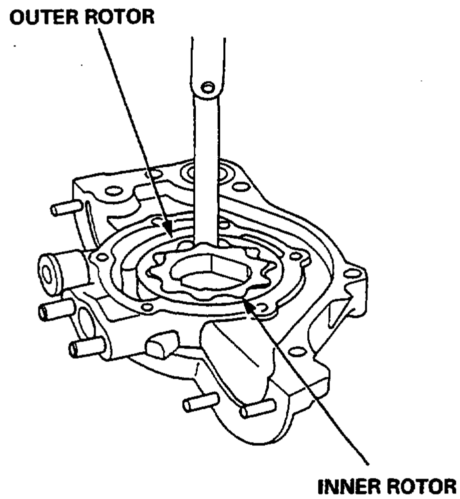
Removal/Inspection/Installation

1. Drain the engine oil.
2. Turn the crankshaft and align the white groove on the crankshaft pulley with the pointer on the lower cover.
3. Remove the cylinder head cover and upper cover.
4. Remove the power steering pump belt, air conditioner belt and the alternator belt.
5. Remove the crankshaft pulley and remove the lower cover.
6. Remove the timing belt.
7. Remove the drive pulley.
8. Remove the oil pan and oil screen.
9. Remove the oil pump.



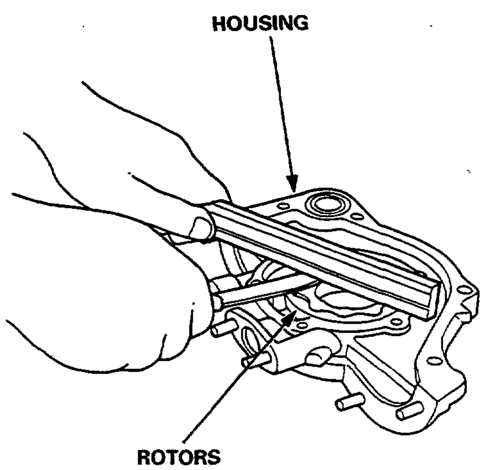
10. Remove the screws from the pump housing, then separate the housing and cover.
11. Check the inner-to-outer rotor radial clearance on the pump rotor.

Inner Rotor-to-Outer Rotor Radial Clearance
Standard (New): 0.02 – 0.14 mm (0.001 – 0.006 in)
Service Limit: 0.20 mm (0.008 in)



12. Check the housing-to-rotor axial clearance on the pump rotor.

Housing-to-Rotor Axial Clearance
Standard (New): 0.03 – 0.08 mm (0.001 – 0.003 in)
Service Limit: 0.15 mm (0.006 in)

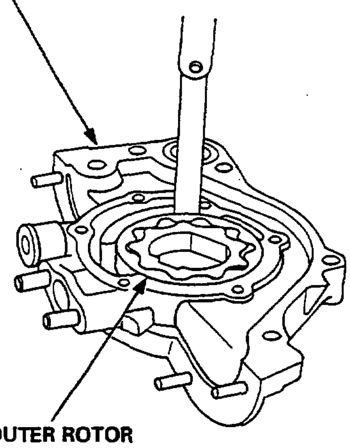


(cont'd)

Removal/Inspection/Installation (cont'd)

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

Housing-to-Outer Rotor Radial Clearance:
Standard (New): 0.10 – 0.18 mm
(0.004 – 0.007 in)
Service Limit: 0.20 mm (0.008 in)

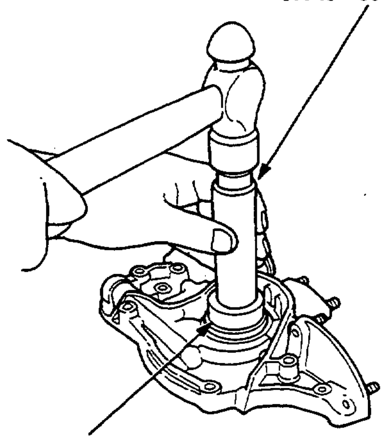


14. Inspect both rotors and pump housing for scoring or other damage. Replace parts if necessary.

15. Remove the old oil seal from the oil pump.

16. Gently tap in the new oil seal until the special tool bottoms on the pump.

NOTE: *The oil seal alone can be replaced without removing the oil pump.*



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

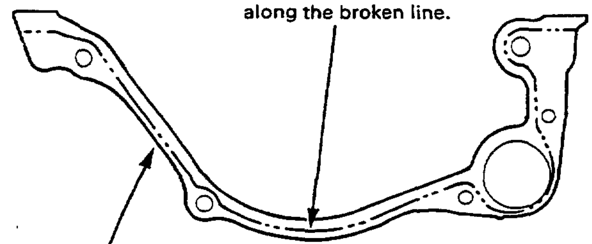
18. Check that the oil pump turns freely.

19. Apply a light coat of oil to the seal lip.

20. Install the two dowel pins and new O-ring on the oil pump.

21. Apply liquid gasket to the cylinder block mating surface of the oil 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.

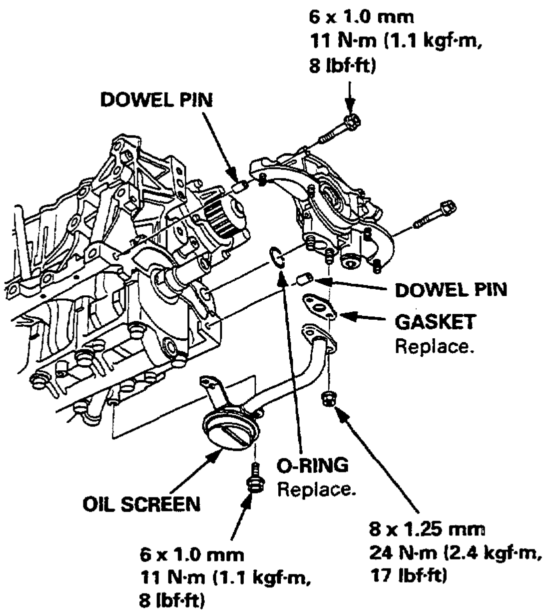


22. Install the oil pump on the cylinder block.
    - Apply grease to the lip of the oil pump seal. Then, install the oil pump onto the crankshaft. When the pump is in place, clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.

23. Install the oil screen.

24. Install the oil pan (see page 7-21).

    NOTE: Clean the oil pan gasket mating surfaces.



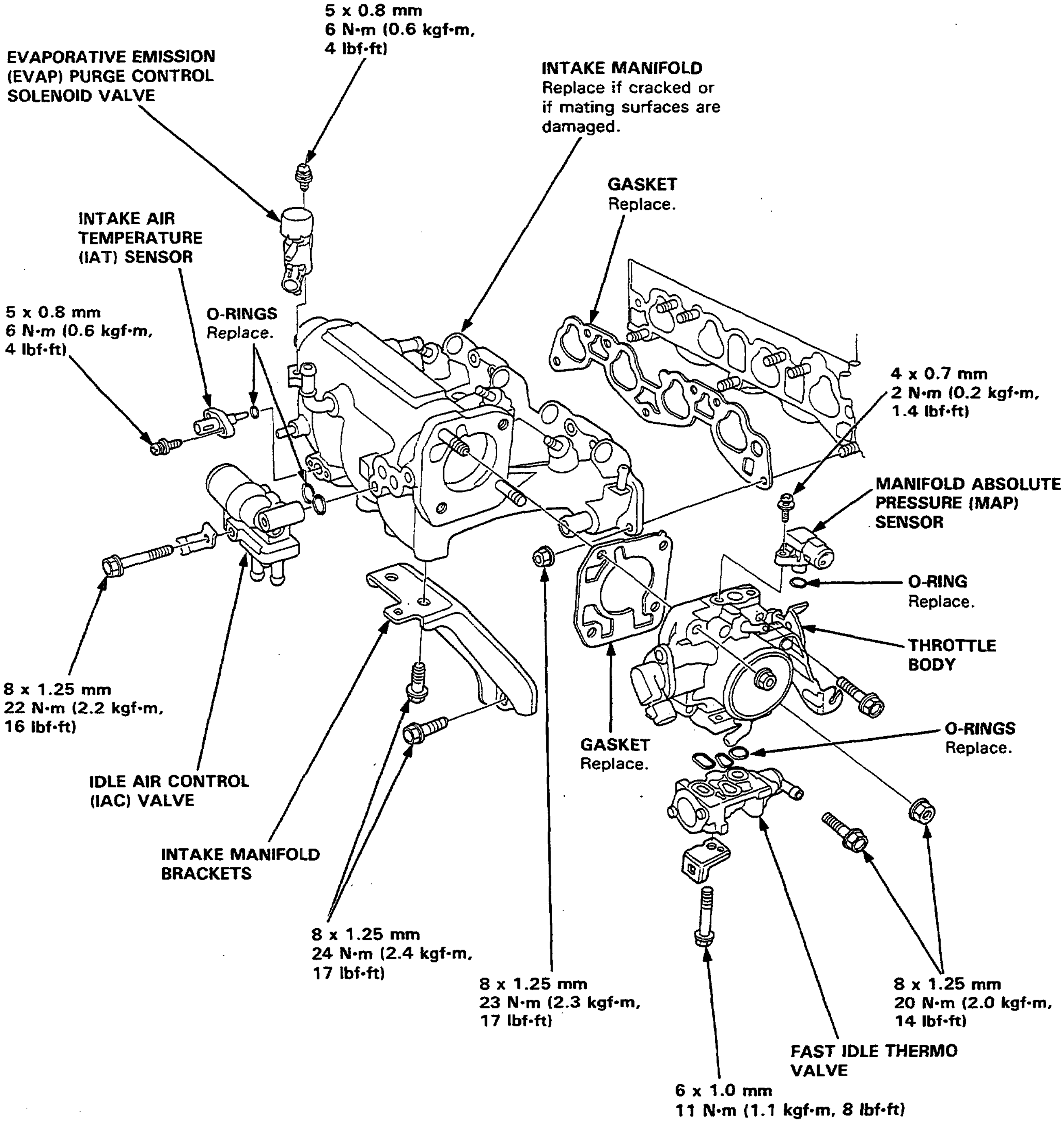
Intake Manifold

Replacement

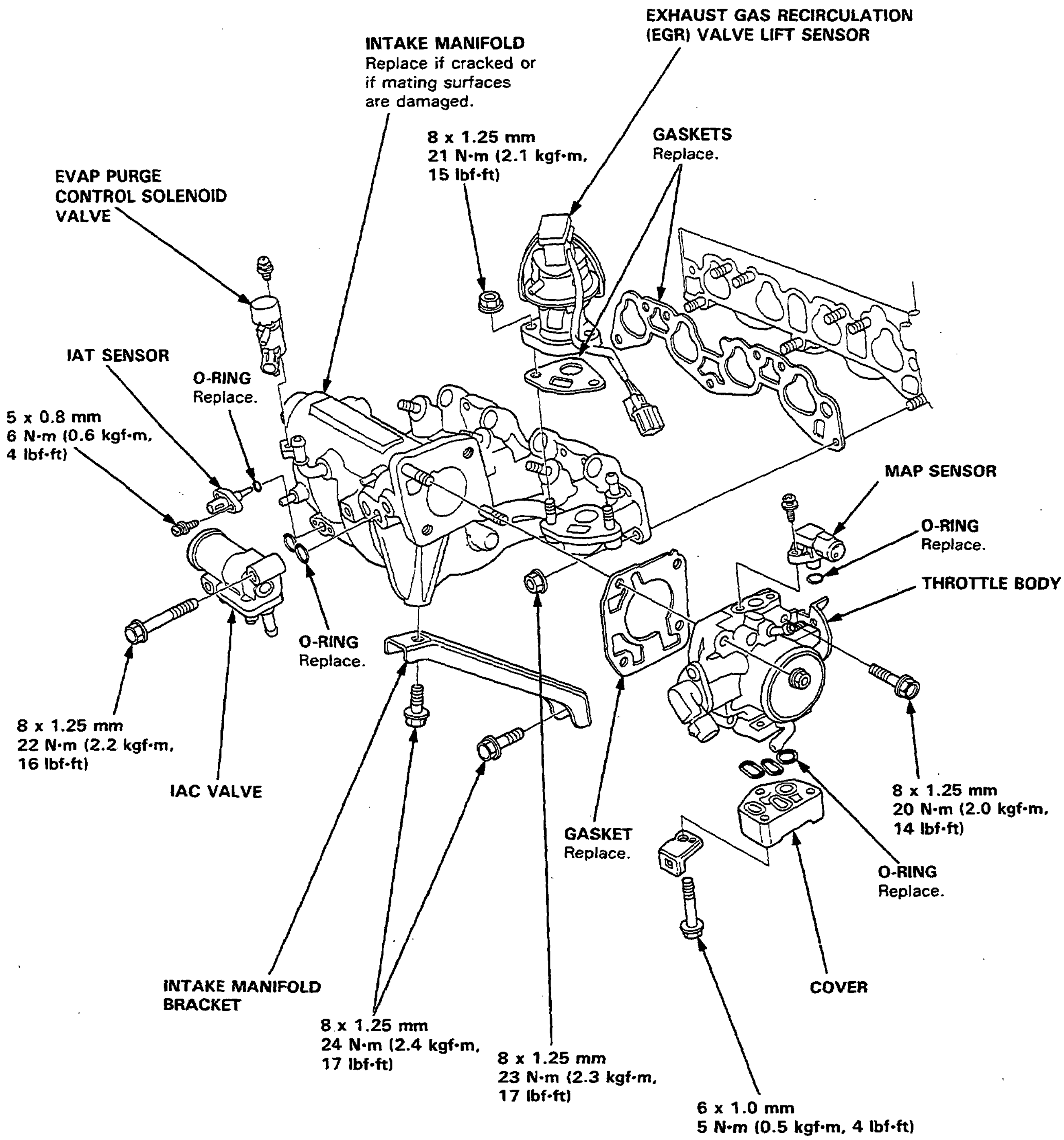
NOTE: Use new gaskets and O-rings when reassembling.

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

D16Y2, D16Y3, D14A2 engines:



D15Z3 engine:



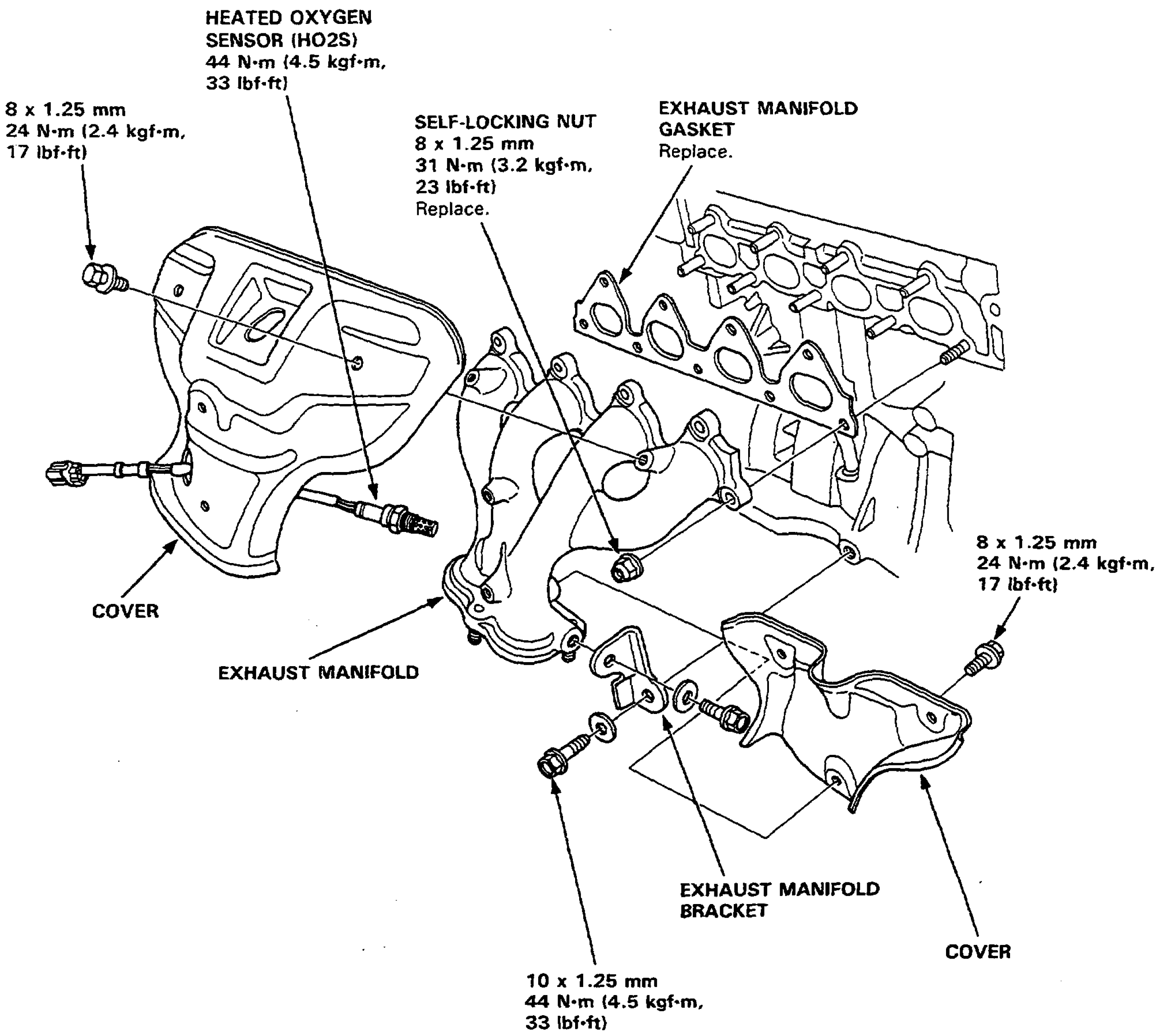
Exhaust Manifold

Replacement

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

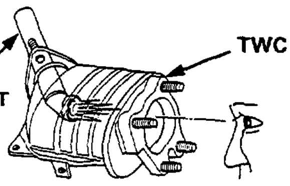
CAUTION:
- **Check for folds or scratches on the surface of the gasket.**
- **Replace with a new gasket if damaged.**

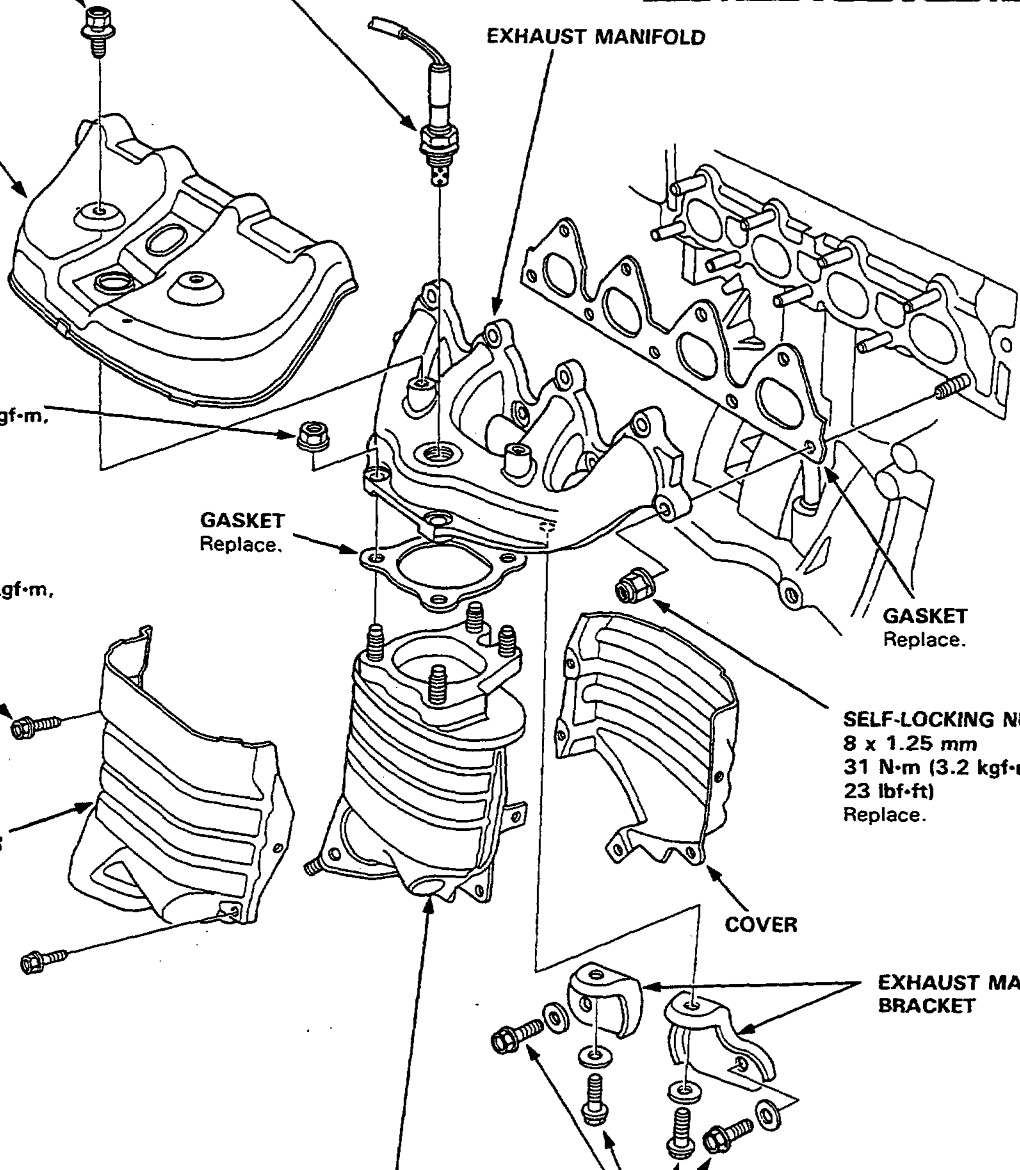
D16Y2 engine:



D15Z3 engine:

TWC Inspection:
Make a visual check for plugging, melting or cracking of the catalyst.





(cont'd)

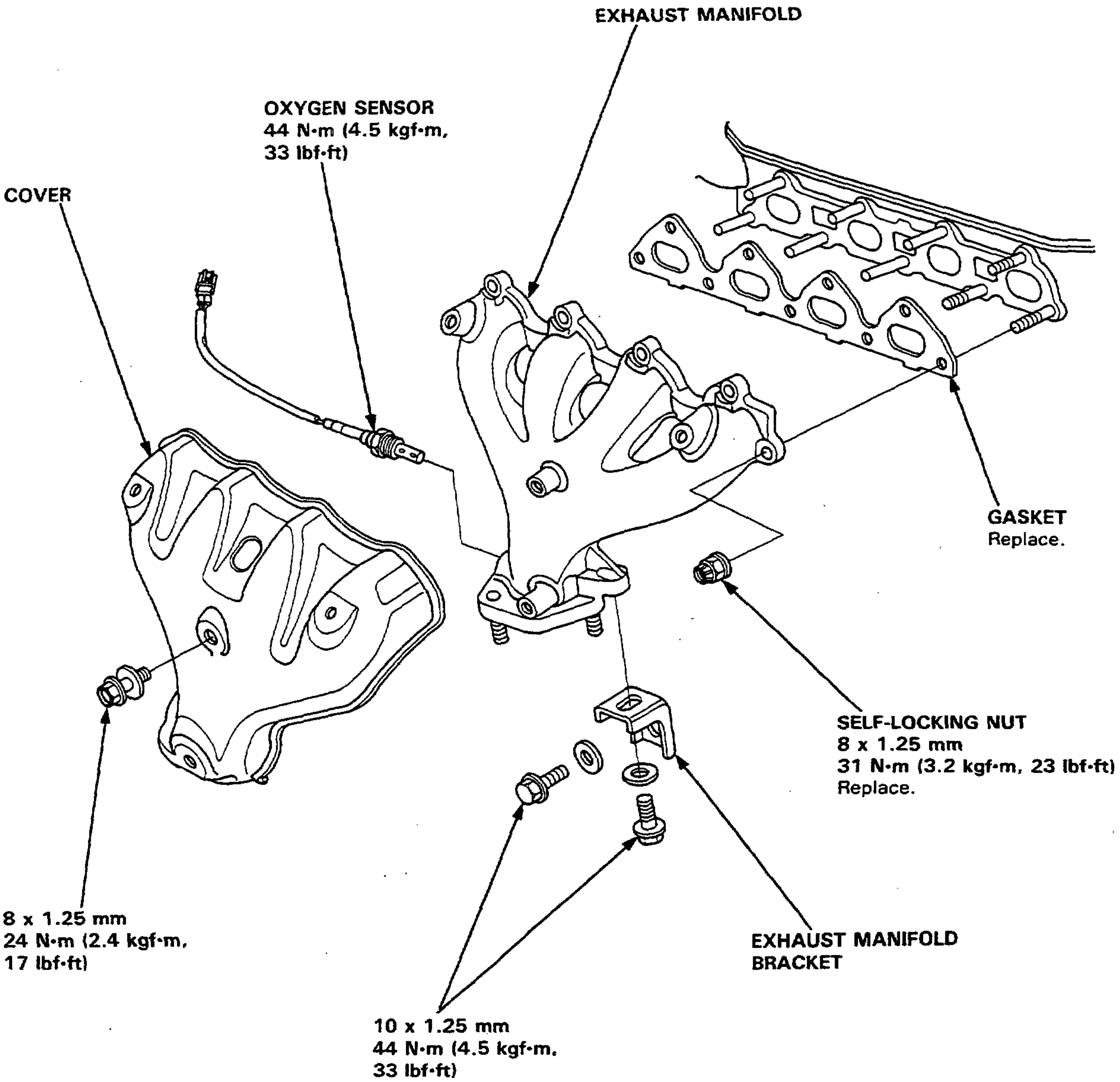
Exhaust Manifold

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.**

D16Y3, D14A2 engines:

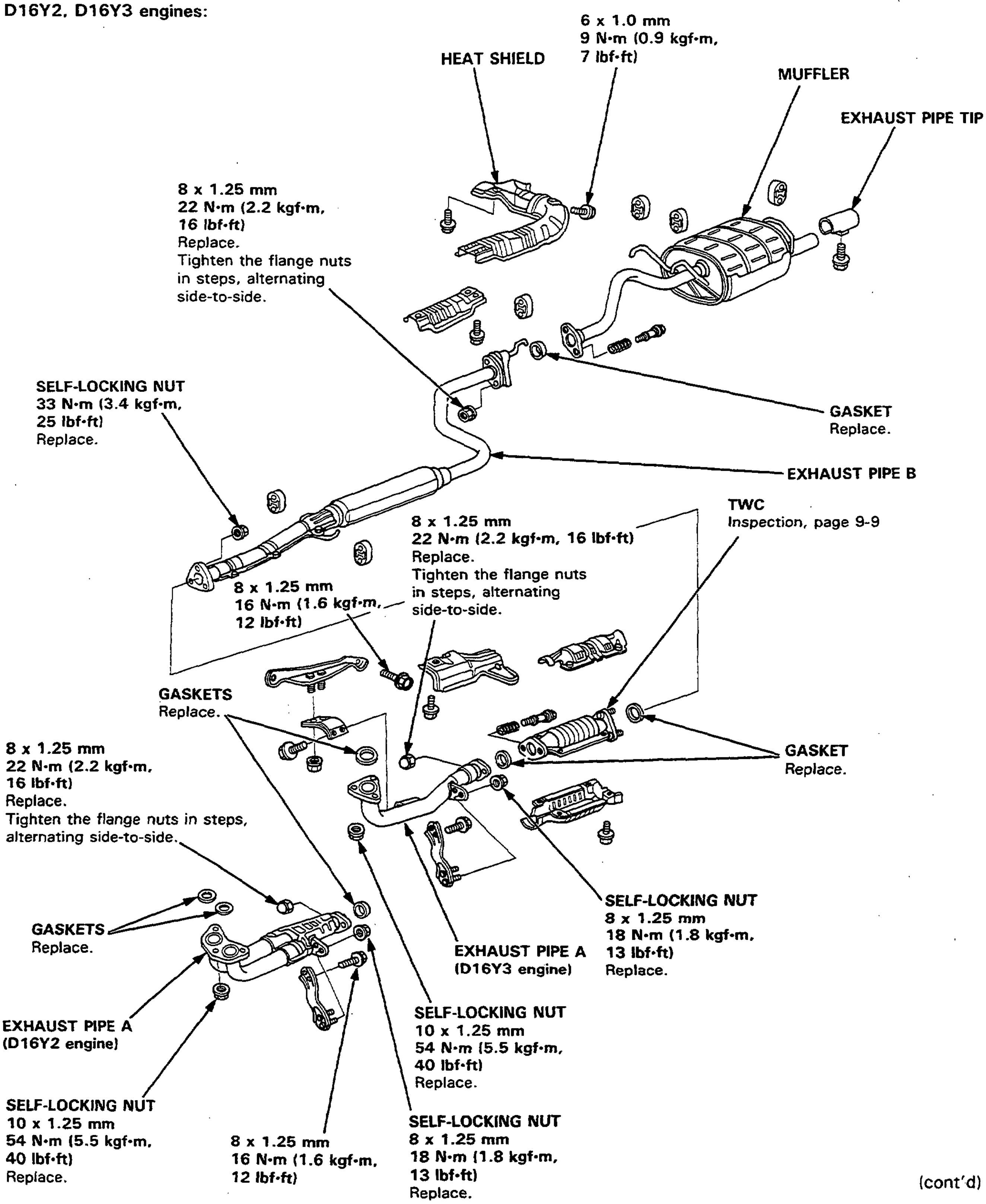


Exhaust Pipe and Muffler

Replacement

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

D16Y2, D16Y3 engines:



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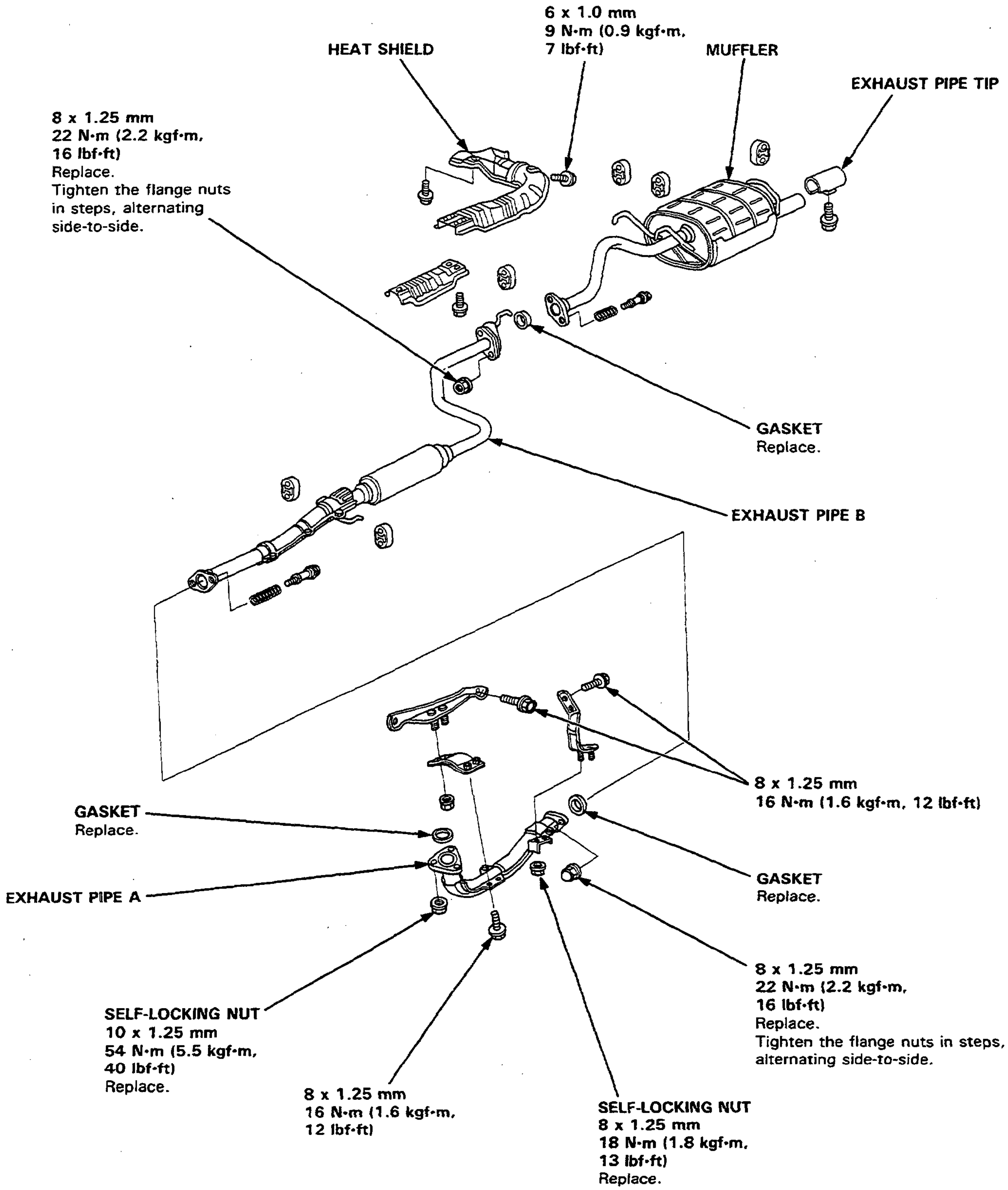
Exhaust Pipe and Muffler

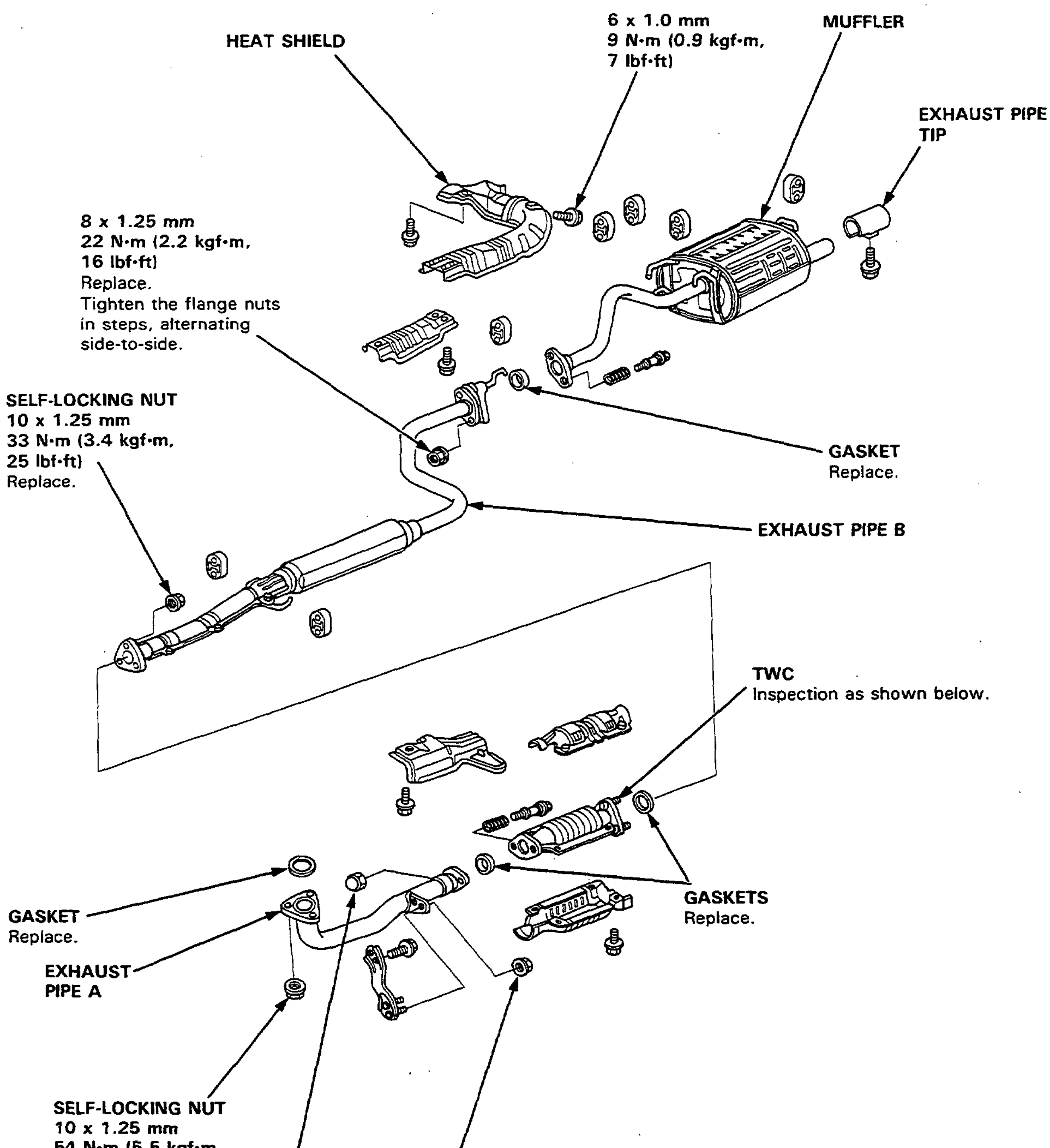
Replacement (cont'd)

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

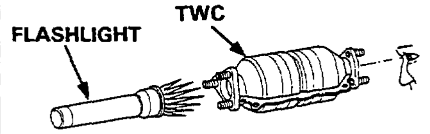
D15Z3 engine:



D14A2 engine:



TWC Inspection:
Make a visual check for plugging, melting or cracking of the catalyst.



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

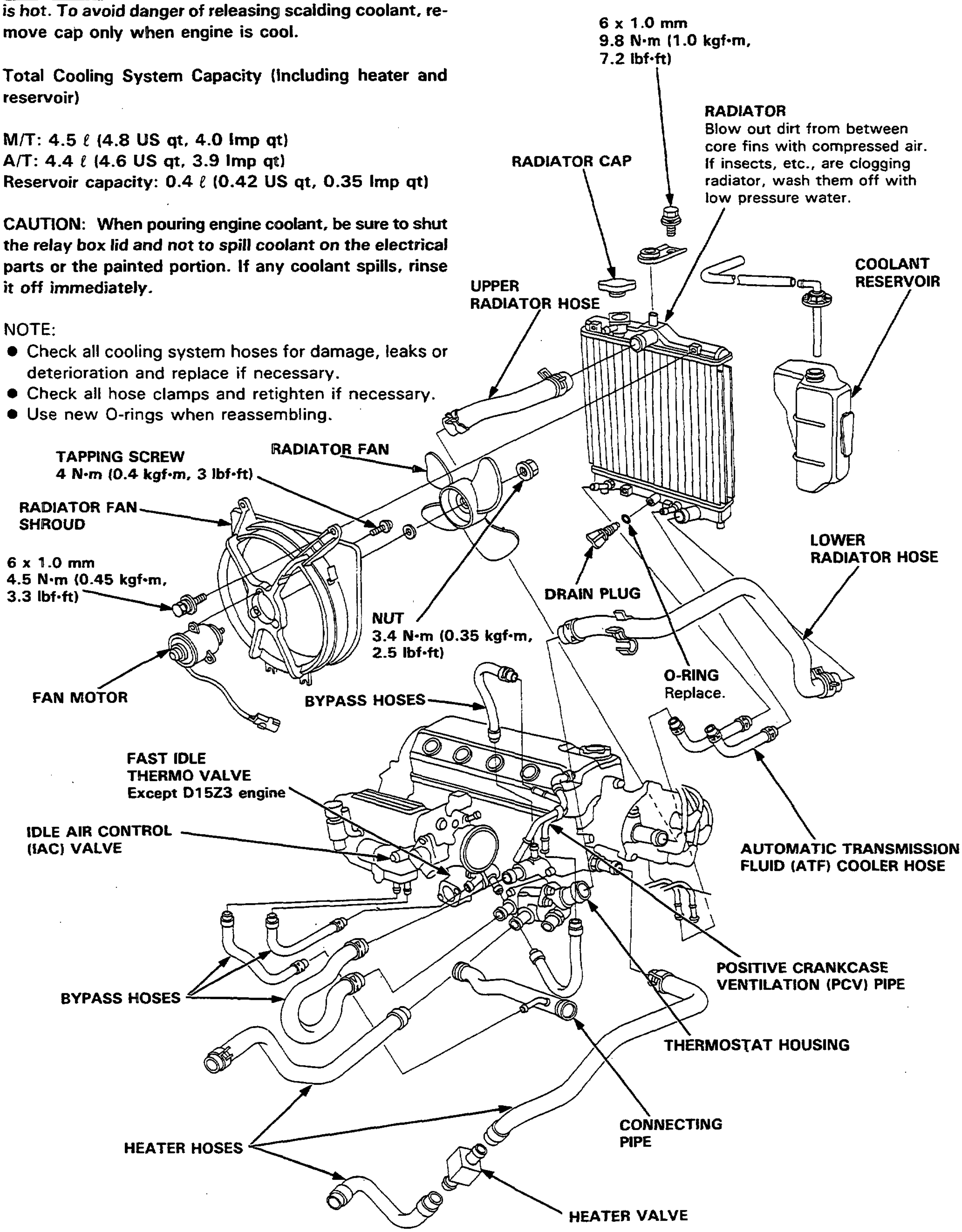
Total Cooling System Capacity (Including heater and reservoir)

M/T: 4.5 ℓ (4.8 US qt, 4.0 Imp qt)
A/T: 4.4 ℓ (4.6 US qt, 3.9 Imp qt)
Reservoir capacity: 0.4 ℓ (0.42 US qt, 0.35 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.



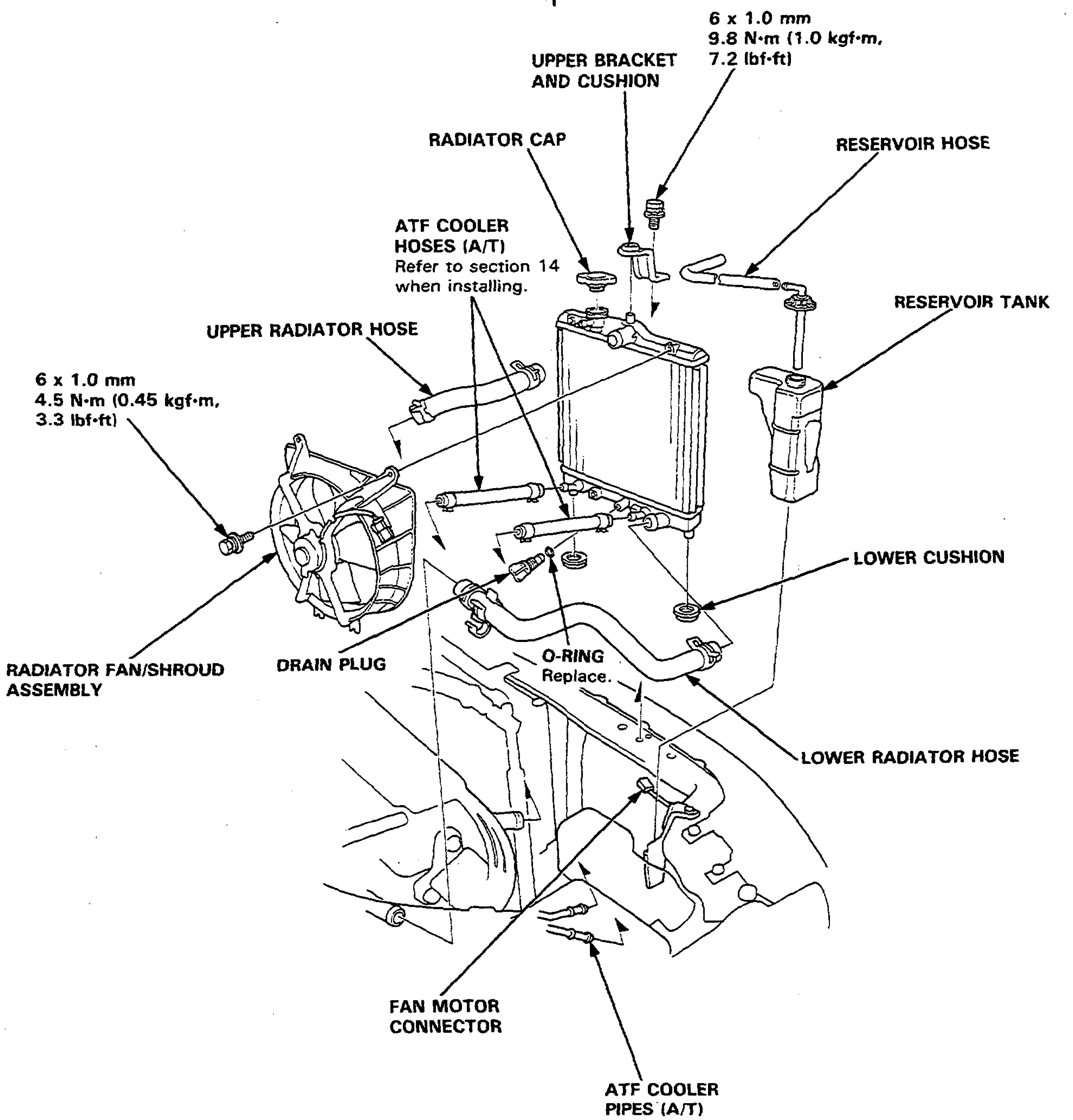
Radiator

Replacement

1. Drain the engine coolant.
2. Remove the upper and lower radiator hoses, and ATF cooler hoses.
3. Disconnect the fan motor connector.
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 and bleed the air.



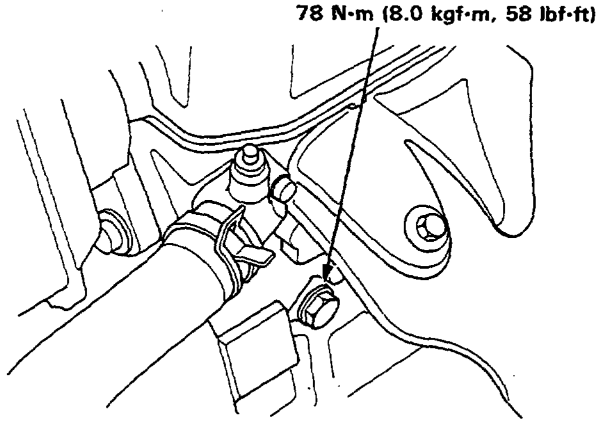
Radiator

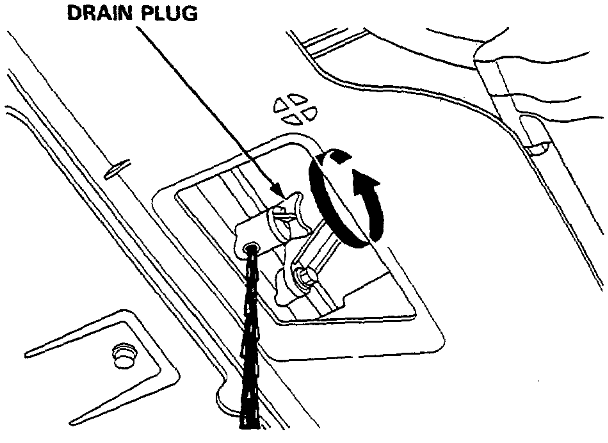
Refilling and Bleeding

⚠ WARNING Removing the radiator cap while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the radiator cap.

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

1. Start the engine. Slide the heater temperature control lever to maximum heat and turn off the engine. Make sure the engine and radiator are cool to the touch.
2. Remove the radiator cap.
3. Loosen the drain plug on the bottom of the radiator and remove the drain bolt on the engine block. Let the coolant drain out.





4. Remove the reservoir from its holder by pulling it straight up. Drain the coolant, then put the reservoir back in its holder.
5. When the coolant stops draining, apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer. Tighten it securely.
6. Tighten the radiator drain plug securely.
7. Mix the recommended antifreeze/coolant with an equal amount of water in a clean container.

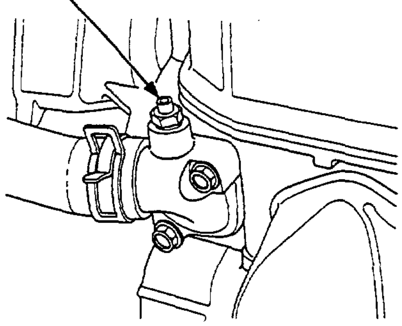
NOTE:
- Use only HONDA-RECOMMENDED antifreeze/coolant.
- For best corrosion protection, the coolant concentrations must be maintained year-round at 50% MINIMUM. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.

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

Radiator Coolant Refill Capacity: Including reservoir 0.4 ℓ (0.42 US qt, 0.35 Imp qt)

M/T: 4.5 ℓ (4.8 US qt, 4.0 Imp qt)
A/T: 4.4 ℓ (4.6 US qt, 3.9 Imp qt)

8. Pour coolant into the radiator up to the base of the filler neck.
9. Loosen the bleed bolt on top of the engine. Tighten it again when coolant comes out in a steady stream with no bubbles.

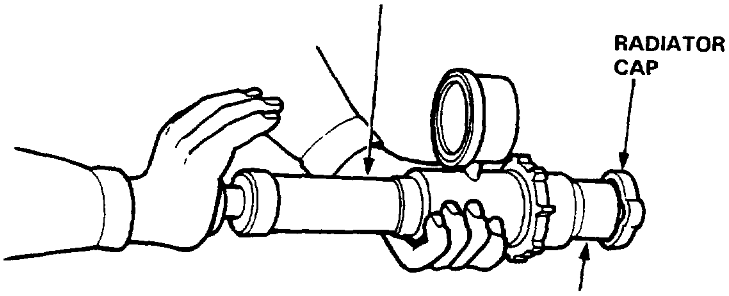


10. Refill the radiator to the base of the filler neck. Put the cap on the radiator, and tighten it only to the first stop. Start the engine and let it run until it warms up (the radiator cooling fan comes on at least twice).
11. Turn off the engine. Check the level in the radiator, add coolant if needed. Install the radiator cap, and tighten it fully.
12. Fill the reservoir to the MAX mark. Install the reservoir cap.

Radiator

Cap Testing

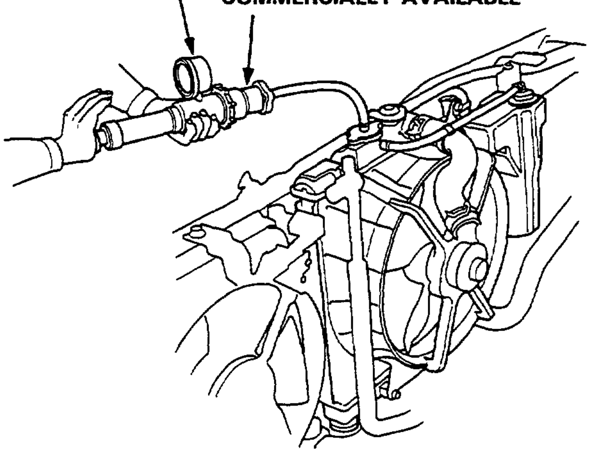
1. Remove the radiator cap, wet its seal with engine coolant, then install it on the pressure tester.
2. Apply a pressure of 93—123 kPa (0.95—1.25 kgf/cm^2, 14—18 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.



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/cm^2, 14—18 psi).
3. Inspect for engine coolant leaks and a drop in pressure.
4. Remove the tester and reinstall the radiator cap.

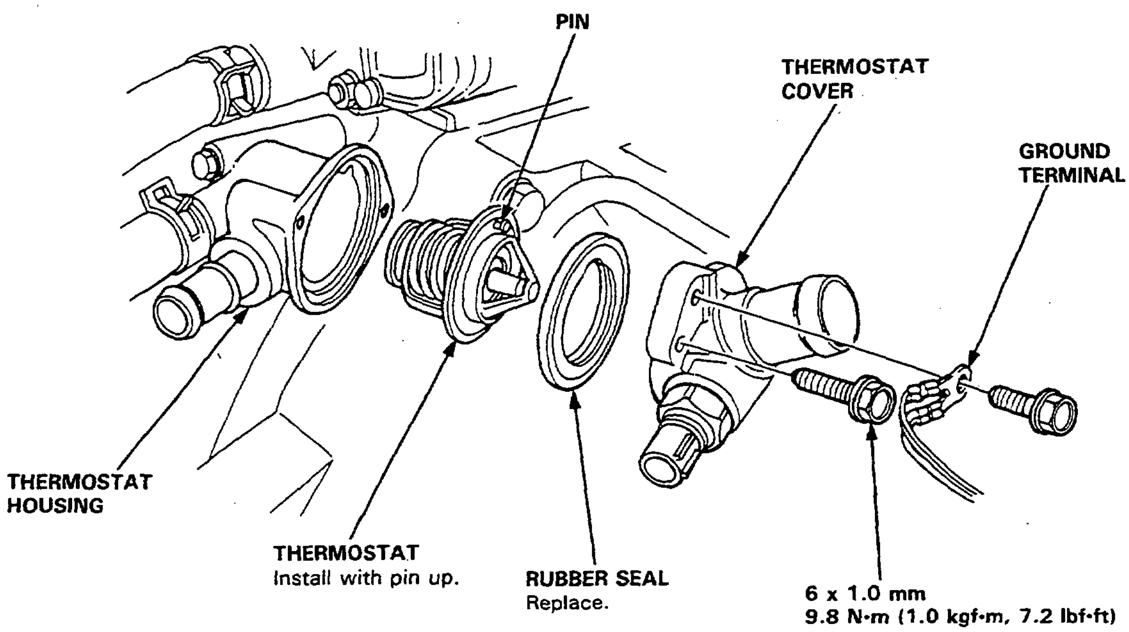
   NOTE: Check for engine oil in the coolant and/or coolant in engine oil.



Thermostat

Replacement

NOTE: Use new O-rings when reassembling.



Testing

Replace the thermostat if it is open at room temperature.

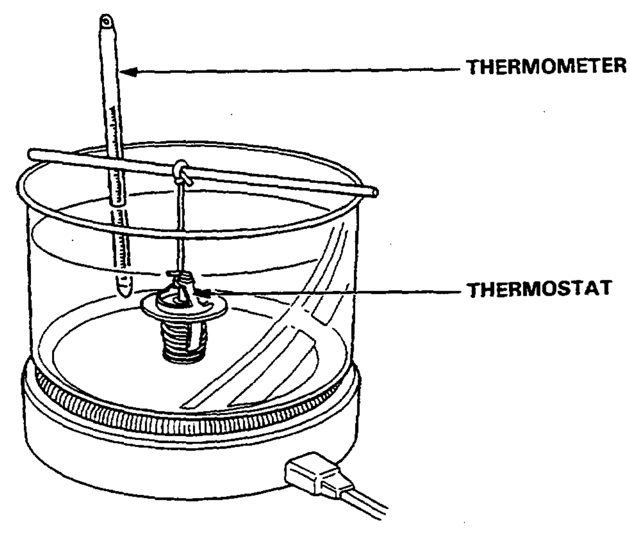
To test a closed thermostat:

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)



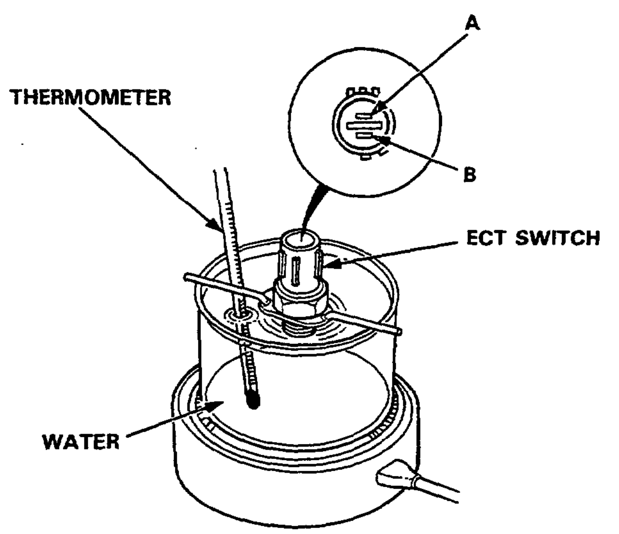
Engine Coolant Temperature (ECT) Switch

Testing

⚠ WARNING Removing the ECT switch while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the ECT switch.

NOTE: Bleed air from the cooling system after installing the ECT switch (see page 10-4).

1. Remove the ECT switch from the thermostat housing (see page 10-9).
2. Suspend the ECT switch in a container of water as shown.



3. Heat the water and check the temperature with a thermometer.

   CAUTION: Do not let the thermometer touch the bottom of hot container.

4. Measure the resistance between the A and B terminals according to the table.

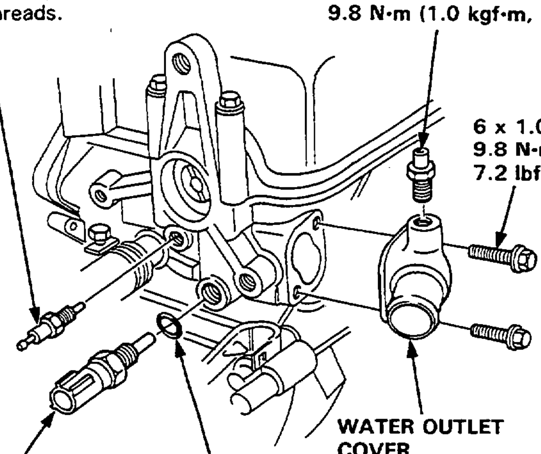
Temperature \ Terminal		A	B
Switch	Above 196—203°F (91—95°C)	O—	—O
	Below 181—189°F (83—87°C)		

Water Pump

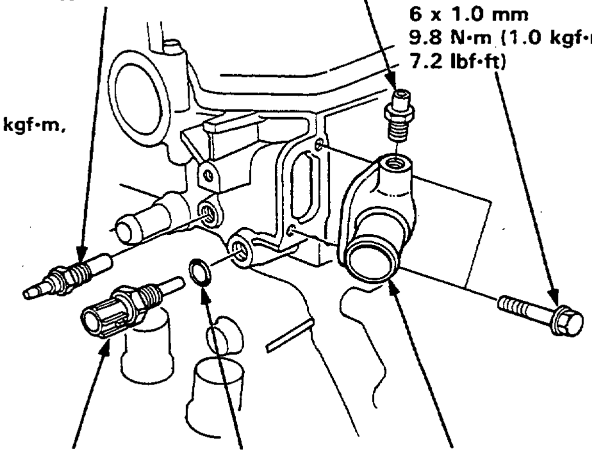
Illustrated Index

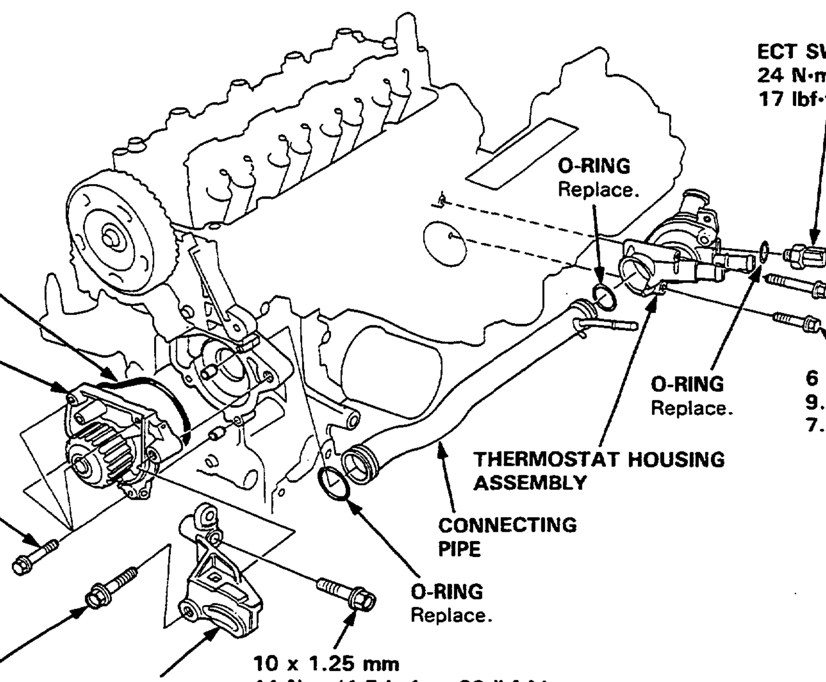
NOTE:
- Use new O-rings and new special bolts when reassembling.
- Use liquid gasket, Part No. 0Y740−99986.

D16Y3, D14A2 engines:



D16Y2, D15Z3 engines:



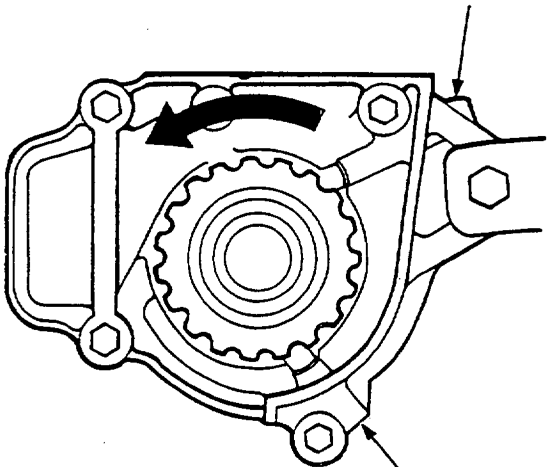


Water Pump

Inspection

1. Remove the timing belt (see page 6-21).
2. Check that the water pump pulley turns counter-clockwise.
3. Check for signs of seal leakage.

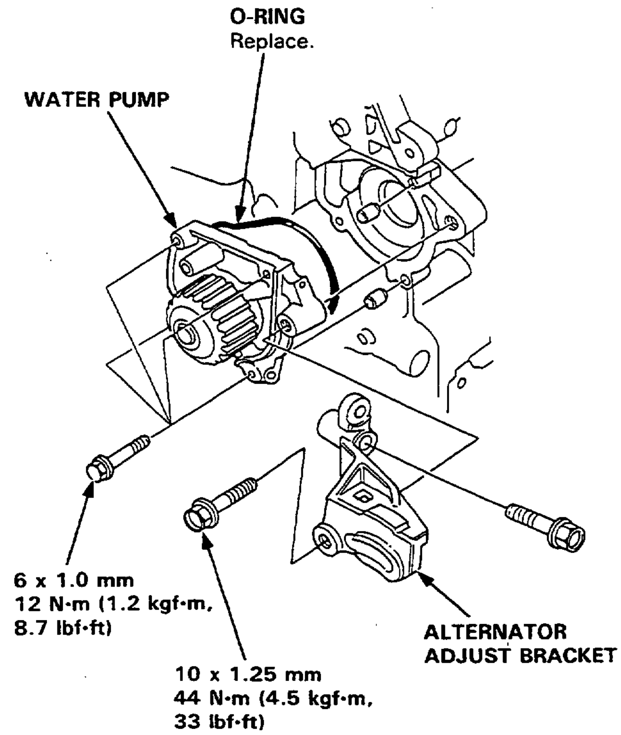
   NOTE: A small amount of "weeping" from the bleed hole is normal.



Replacement

1. Remove the timing belt (see page 6-21).
2. Remove the camshaft pulley and the back cover (see page 6-35).
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.

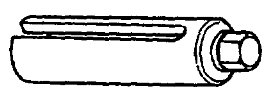


4. Install the water pump in the reverse order of removal.

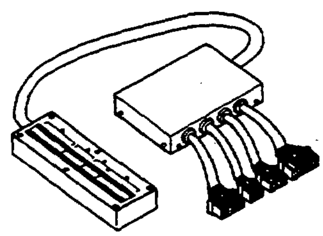
   NOTE:
   - Keep the O-ring in position when installing.
   - Clean the spilled engine coolant.

Special Tools

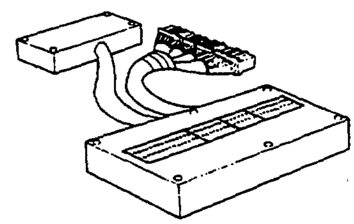
Ref. No	Tool Number	Description	Qty	Remarks
①	07LAA–PT50101	Oxygen Sensor Socket Wrench	1	
②	07LAJ–PT3010A	Test Harness	1	
	or			
	07LAJ–PT30100		1	
③	07PAZ–0010100	SCS Short Connector	1	
④	07406–0040001	Fuel Pressure Gauge Set	1	
④-1	07406–0040100	Pressure Gauge	(1)	Component Tools
④-2	07406–0040201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



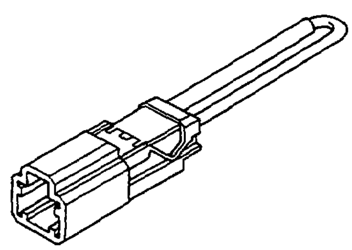
①



②



②



③

④

④-1

④-2

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. 15 BACK UP LIGHTS (10A) in the under-dash fuse/relay box, a poor connection at ECM terminal A13, or an intermittent open in the GRN/ORN wire between the ECM (A13) and the gauge assembly.

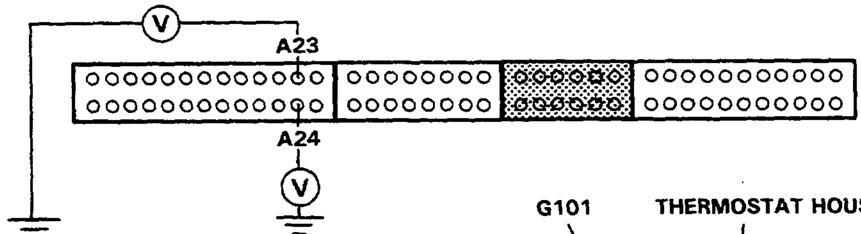
Turn the ignition switch ON.

Is the low oil pressure light on?

NO →
- **Replace No. 15 BACK-UP LIGHTS (10 A) fuse in the under-dash fuse/relay box.**
- **Repair open or short in YEL wire between No. 15 BACK-UP LIGHTS (10 A) fuse and gauge assembly.**

YES ↓

Try to start the engine.



Does the engine start?

NO → Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-17).

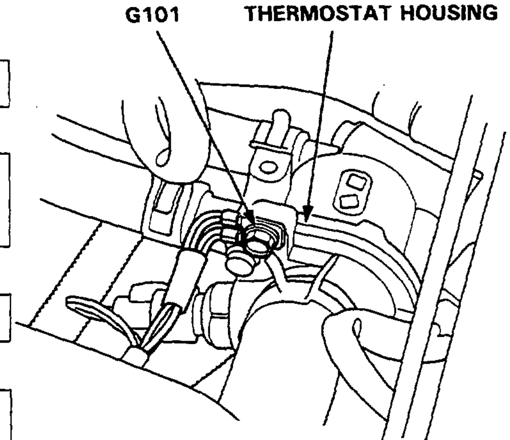
Turn the ignition switch ON.

Measure voltage between body ground and the following terminals individually: A23, A24.

Is there less than 1.0 V?

NO → **Repair open in BLK wire(s) between ECM and G101 (located at thermostat housing) that had more than 1.0 V.**

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



YES ↓

Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-17).

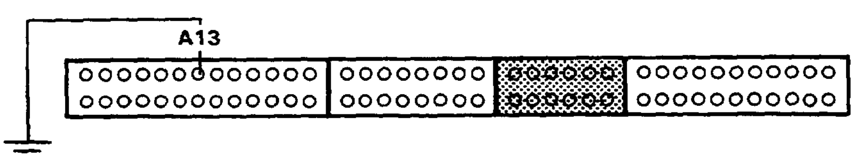
Connect A13 terminal to body ground.

Turn the ignition switch ON.

Is the MIL on?

NO →
- **Replace the MIL bulb.**
- **Repair open in GRN/ORN wire between ECM (A13) and gauge assembly.**

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



The Malfunction Indicator Lamp (MIL) stays on or comes on after two seconds.

Press the inertia switch button.

Does the MIL remain on?

NO → Intermittent failure, system is OK at this time.

YES ↓

Disconnect the 2P connector from the inertia switch.

Connect BLK/YEL terminal to BLK/RED terminal.

Does the MIL remain on?

NO → Replace the inertia switch.

YES ↓

Connect the SCS short connector to the service check connector (see page 11-14).

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 ↓

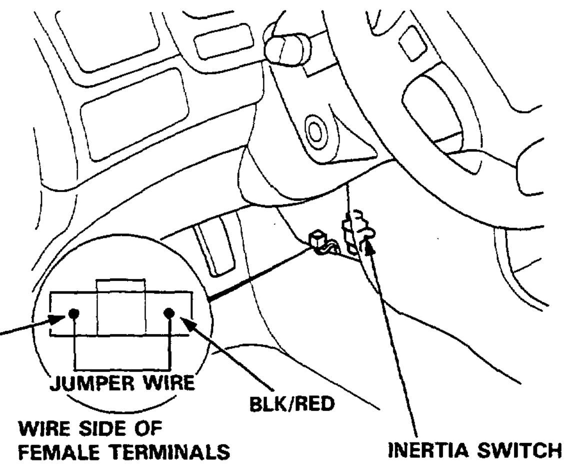
Remove the SCS short connector from the service check connector.

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 11-17). → Turn the ignition switch ON. → B

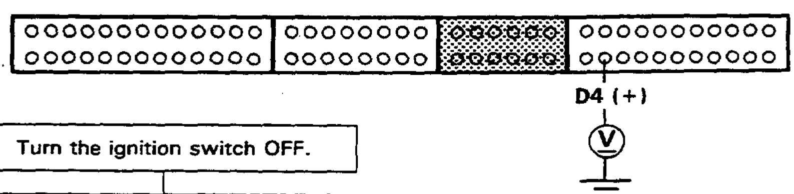
NO → A



LHD type is shown, RHD type is symmetrical.

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 FUEL PUMP fuse (15 A) in the under-dash fuse/relay box
  - An intermittent short in the BRN wire between the ECM (D4) and the service check connector
  - An intermittent open in the BLK wire between the service check connector and G401
  - An intermittent short in the GRN/ORN 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 or EGR valve lift sensor (D15Z3 engine)



(To page 11-24)

(To page 11-24)

(cont'd)

Engine Control Module (ECM) (cont'd)

(From page 11-23)

A

Inspect ECU (ECM) (15 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

NO — Repair short in YEL/WHT wire between ECU (ECM) (15 A) fuse and PGM-FI main relay. — Replace ECU (ECM) (15 A) fuse.

YES

Inspect the FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO — Repair short in BLK/YEL, BLK/RED wire between under-dash fuse/relay box and PGM-FI main relay. — Replace 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 (D15Z3 engine)

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 11-17).

(To page 11-25)

(From page 11-23)

B

Measure voltage between D4 (+) terminal and body ground.

Is there approx. 5 V?

NO — Repair short to body ground in BRN wire between the ECM (D4) and service check connector.

YES

Connect the SCS short connector to service check connector.

Measure voltage between D4 (+) terminal and body ground.

Is there approx. 5 V?

YES — * — Repair open in BRN wire between ECM (D4) and service check connector. — Repair open in BLK wire between service check connector and G401.

NO

Remove the SCS short connector from the service check connector.

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.

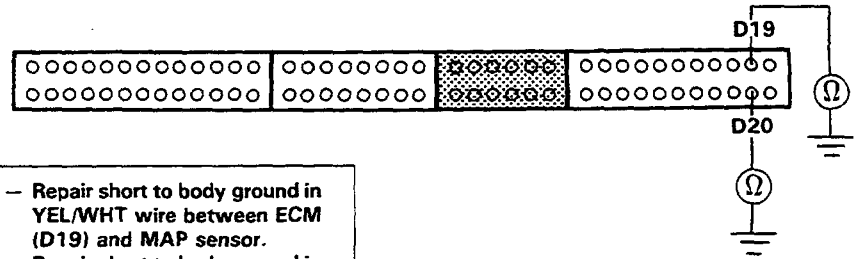
YES

Repair short to body ground in GRN/ORN wire between the ECM (A13) and MIL.

* NOTE: After repair, disconnect the SCS Short Connector, test drive the car, and recheck the MIL for a code.

(From page 11-24)

Check for continuity between body ground and D19, D20 terminals.



Is there continuity?

YES

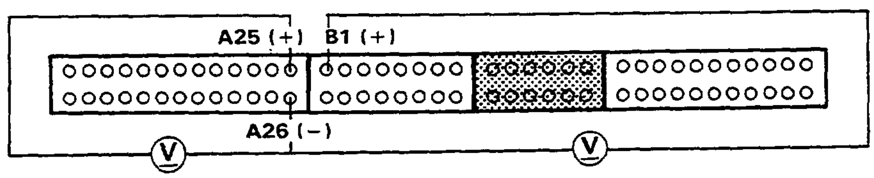
- Repair short to body ground in YEL/WHT wire between ECM (D19) and MAP sensor.
- Repair short to body ground in YEL/BLU wire between ECM (D20) and TP sensor or EGR valve lift sensor.

NO

Reconnect all the sensor connectors.
Reconnect the "D" connector to the ECM.

Turn the ignition switch ON.

Measure voltage between A26 (−) and the following: B1 (+) and A25 (+).



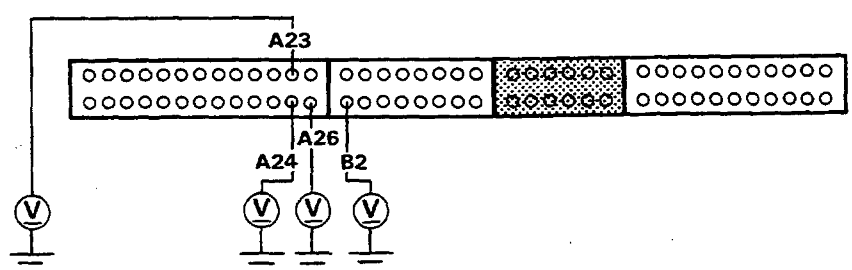
Is there battery voltage?

NO

- Repair open in YEL/BLK wire between ECM (A25, B1) and PGM-FI main relay.
- Check PGM-FI main relay and wiring connectors at PGM-FI main relay (see page 11-89).

YES

Measure voltage between body ground and the following terminals individually: A23, A24, A26, B2.



Is there less than 1.0 V?

NO

- Repair open in BLK wire between ECM (A23, A24) and G101 (located at thermostat housing).
- 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.

Econo Indicator (D15Z3 engine)

The ECONO indicator's purpose is to get better fuel economy. It does this by lighting to inform of the most economical driving operation.

Inspection of the Econo Indicator system.

Turn the ignition switch ON.

Is the Econo Indicator on when the ignition switch is first turned ON for two seconds?

NO → Turn the ignition switch OFF.

Inspect No. 12 ACG (IG) (15 A) [with SRS: No. 24 ACG (IG) (15 A)] fuse in the under-dash fuse/relay box.

Is the fuse OK?

NO →
- **Repair short in BLK/YEL wire between No. 12 ACG (IG) (15 A) [with SRS: No. 24 ACG (IG) (15 A)] fuse and gauge assembly.**
- **Replace No. 12 ACG (IG) (15 A) [with SRS: No. 24 ACG (IG) (15 A)] fuse.**

YES ↓

Connect the test harness 'D' connector to the main wire harness only, not to the ECM (see page 11-17).

Connect D18 terminal to body ground.

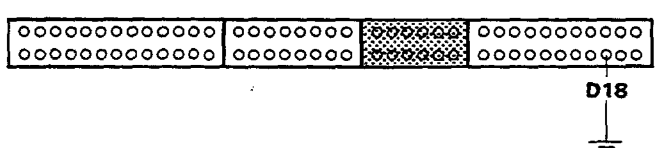
Turn the ignition switch ON.

Is the Econo Indicator on?

NO →
- **Replace the Econo Indicator bulb.**
- **Repair open in BLK/YEL wire between No. 12 ACG (IG) (15 A) [with SRS: No. 24 ACG (IG) (15 A)] fuse and gauge assembly.**
- **Repair open in PNK/GRN wire between gauge assembly and ECM (D18).**

YES ↓

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



YES (first question) ↓

(To page 11-27)

(From page 11-26)

Is the Econo Indicator off after two seconds?

NO

Turn the ignition switch OFF.

Disconnect the "D" connector from the ECM.

Turn the ignition switch ON.

Is the Econo Indicator on?

YES

Repair short in PNK/GRN wire between gauge assembly and ECM (D18).

NO

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

YES

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (M/T in neutral) until the radiator fan comes on, then let it idle.

Is the Econo Indicator off when the engine speed at the idle?

NO

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

YES

Road test with the transmission in 3rd gear, hold the engine speed at 2,500 rpm (min^{-1}).

Is the Econo Indicator on?

NO

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

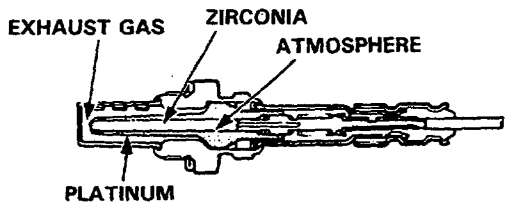
YES

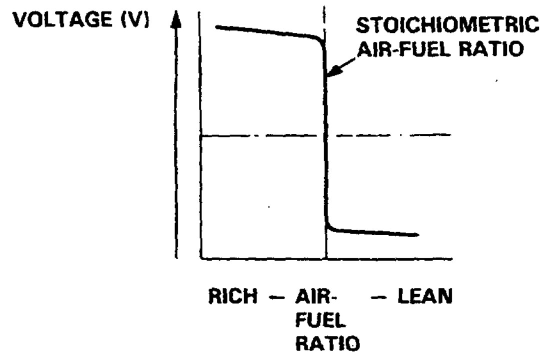
Econo Indicator System is OK.

Oxygen Sensor (O2S) [D16Y3, D14A2 engines]

The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 1: A problem in the Oxygen Sensor (O2S) circuit.

The Oxygen Sensor (O2S) 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. The O2S is installed in exhaust manifold.





– The MIL has been reported on.
– With the SCS short connector connected (see page 11-14), code 1 is indicated.

↓

Do the ECM Reset Procedure (see page 11-15).

↓

Inspect fuel pressure (see page 11-80).

↓

Is it normal?

NO → **Go to Fuel Supply System (see page 11-74).**

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 for at least one minute.

↓

Connect the SCS short connector to the service check connector (see page 11-14).

↓

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 O2S and the ECM.**

YES ↓

(To page 11-29)

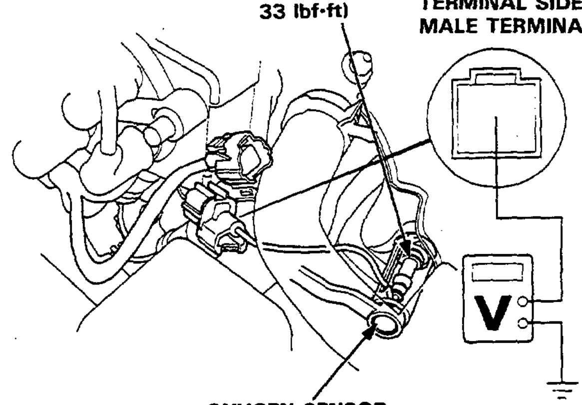
(From page 11-28)

Disconnect engine wire harness from the O2S.

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.

Open the throttle wide open, then quickly release it.

Measure voltage between the connector terminal and body ground.



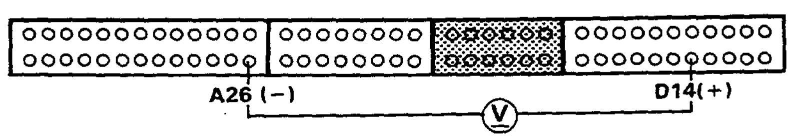
Is voltage above 0.6 V at wide open throttle and below 0.4 V when the throttle is quickly released?

- NO → **Replace the O2S.**
- YES ↓

Turn the ignition switch OFF.

Reconnect the engine wire harness to the O2S.

Connect the test harness between the ECM and connectors (see page 11-17).



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 for at least one minute.

Open the throttle wide open, then quickly release it.

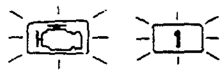
Measure voltage between D14 (+) terminal and A26 (–) terminal.

Is voltage above 0.6 V at wide open throttle and below 0.4 V when the throttle is quickly released?

- NO → **Repair short or open in WHT/RED wire between ECM (D14) and O2S.**
- YES ↓

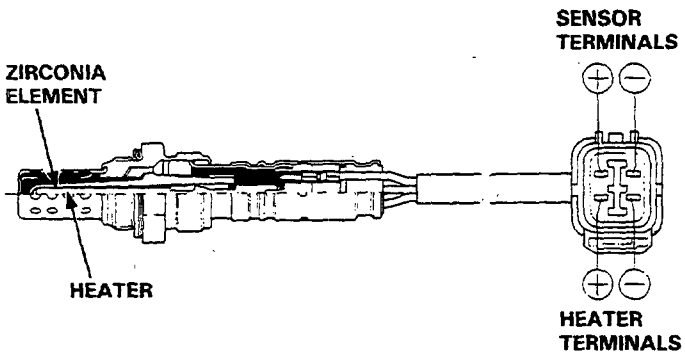
Substitute a known-good ECM and recheck. If symptom/indication goes away, replace the original ECM.

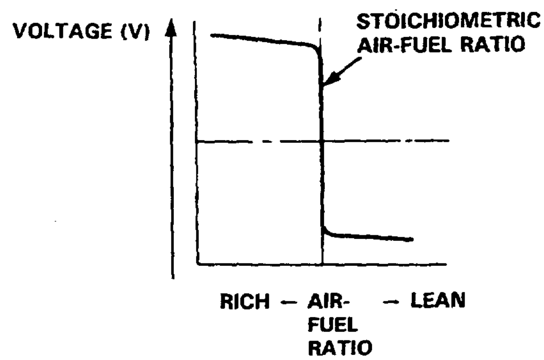
Heated Oxygen Sensor (HO2S) [D16Y2 engine]



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 manifold.





— The MIL has been reported on.
— With the SCS short connector connected (see page 11-14), code 1 is indicated.

↓

Do the ECM Reset Procedure (see page 11-15).

↓

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (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 11-14).

↓

Road test with the 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 ↓

Inspect fuel pressure (see page 11-80).

↓

Is it normal?

- NO → **Go to Fuel Supply System (see page 11-74).**
- YES ↓

(To page 11-31)

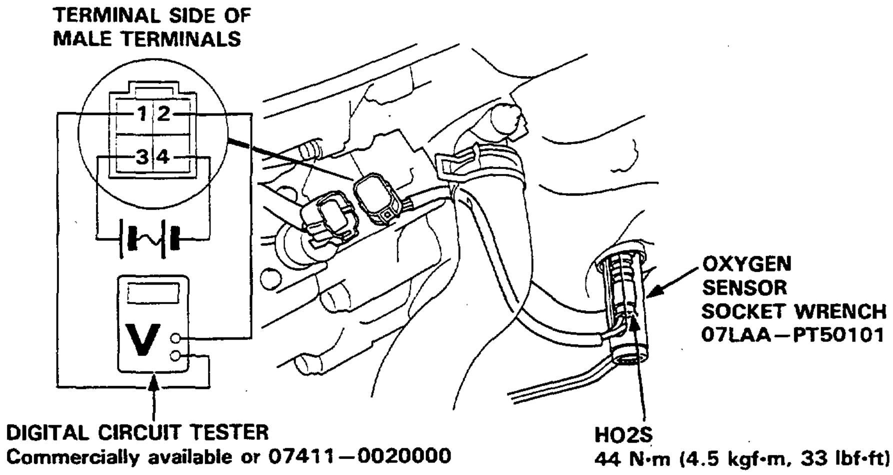
(From page 11-30)

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 ↓

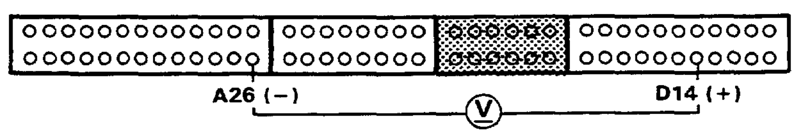
Turn the ignition switch OFF.

Connect the HO2S connector to engine wire harness.

Connect the test harness between the ECM and connectors (page 11-17).

Restart the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (M/T in neutral) until the radiator fan comes on, then let it idle.

Measure voltage between D14 (+) and A26 (−) terminal.

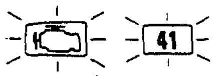


Is the voltage above 0.6 V at wide open throttle to 4,500 rpm (min^{-1}) and 0.4 V when the throttle is quickly released from 4,500 rpm (min^{-1})?

- 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 (HO2S) Heater [D16Y2 engine]



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 11-14), code 41 is indicated.**

↓

Do the ECM Reset Procedure (see page 11-15).

↓

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 HO2S and ECM.**
- YES ↓

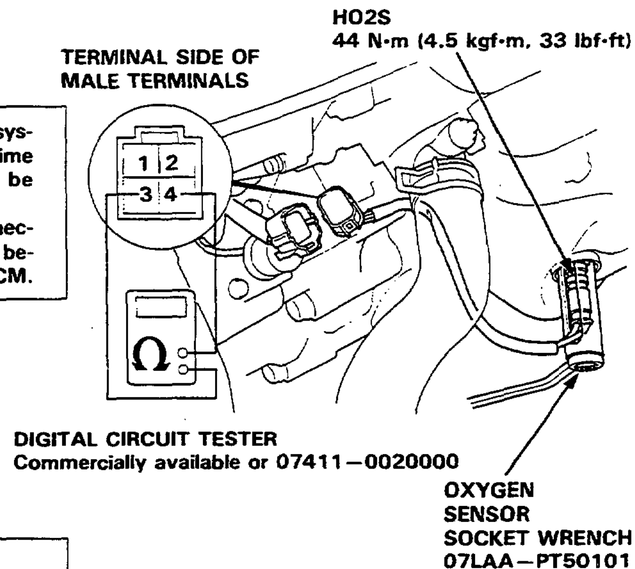
Turn the ignition switch OFF.

↓

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 ↓

Check for continuity to body ground on 3 and 4 terminals of the HO2S individually.

↓

Is there continuity?

- YES → **Replace the HO2S.**
- NO ↓

Check for continuity between terminal 4 and terminals 1 and 2 of the HO2S individually.

↓

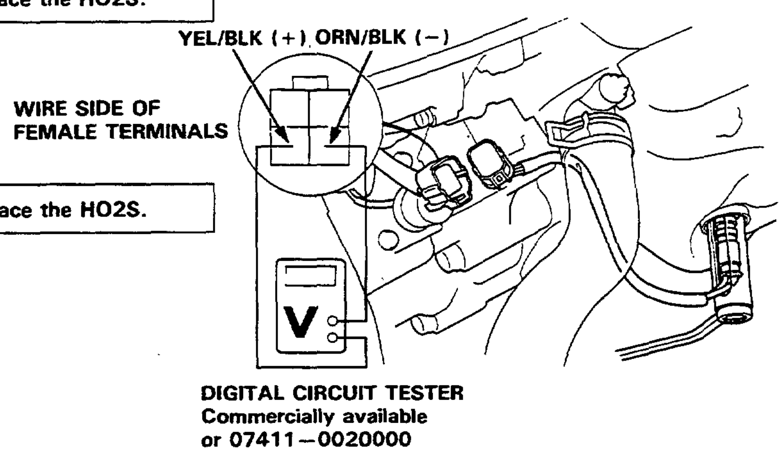
Is there continuity?

- YES → **Replace the HO2S.**
- NO ↓

Turn the ignition switch ON.

↓

At the engine wire harness, measure voltage between YEL/BLK (+) terminal and ORN/BLK (−) terminal.



Is there battery voltage?

- YES → Turn the ignition switch OFF. → B (To page 11-33)
- NO → A (To page 11-33)

(From page 11-32)

A

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

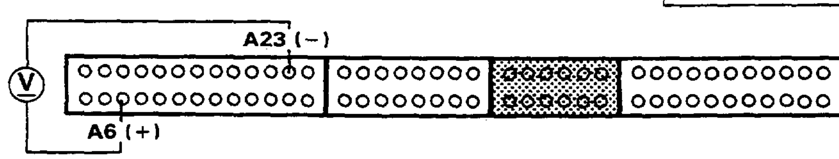
Turn the ignition switch OFF.

Reconnect the 4P connector to the HO2S.

Connect the test harness "A" connector to the main wire harness only, not the ECM (see page 11-17).

Turn the ignition switch ON.

Measure voltage between A6 (+) terminal and A23 (−) terminal.



Is there battery voltage?

NO → **Repair open in ORN/BLK wire between ECM (A6) and the HO2S.**

YES

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

(From page 11-32)

B

Disconnect the "A" connector from the ECM.

Turn the ignition switch ON.

At engine wire harness, measure voltage between YEL/BLK (+) terminal and ORN/BLK (−) terminal.

Is there battery voltage?

YES → **Repair short in ORN/BLK wire between ECM (A6) and HO2S.**

NO

Turn the ignition switch OFF.

Reconnect the HO2S connector.

Connect the test harness "A" connector to the main wire harness only, not the ECM (see page 11-17).

Connect an ammeter between terminals A6 (+) and A26 (−).

Turn the ignition switch ON.

Is the current less than 0.1 A?*

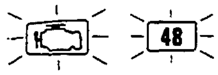
YES → **Replace the HO2S.**

NO

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

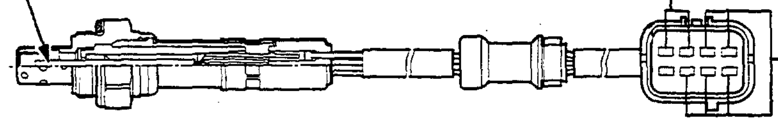
* Monitor over a 5 minute period unless the current drops below 0.1 A immediately.

Heated Oxygen Sensor (HO2S) [D15Z3 engine]



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 48: A problem in the Heated Oxygen Sensor (HO2S) circuit.

The Heated Oxygen Sensor (HO2S) operates over a wide air/fuel range. The HO2S is installed in exhaust mainfold.



– The MIL has been reported on.
– With service check connector jumped (see page 11-14), code 48 is indicated.

Do the ECM Reset Procedure (see page 11-15).

Start the engine.

Is the MIL on and does it indicate code 48?

NO → Road test with the transmission in 3rd gear. Hold the engine speed at 1,500 rpm (min^{-1}).

Is the MIL on and does it indicate code 48?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires between HO2S and ECM.**

YES → Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-17).

(Go to wire harness open check: ECM (D14) terminal and HO2S (see page 11-37).)

YES (first check) → Turn the ignition switch OFF.

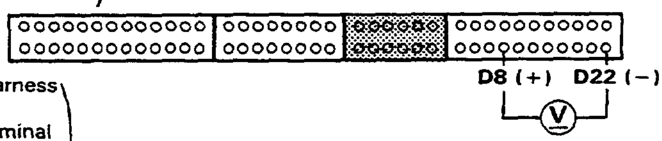
With the ignition switch OFF, wait for at least three minutes.

Connect the test harness between the ECM and connectors (see page 11-17).

Turn the ignition switch ON.

Measure voltage between D8 (+) terminal and D22 (–) terminal.

NOTE: Use DIGITAL MULTIMETER Commercially available or 07411–002000



Is there more than 0.5 V?

NO → (Go to wire harness short check: ECM (D8) terminal and the HO2S (see page 11-37).)

YES ↓

Is there more than 5.0 V?

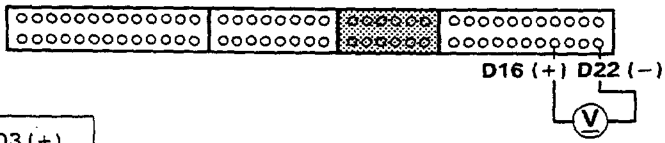
YES → A (To page 11-35)

NO → B (To page 11-35)

(From page 11-34)

A

Measure voltage between D16 (+) terminal and D22 (−) terminal.

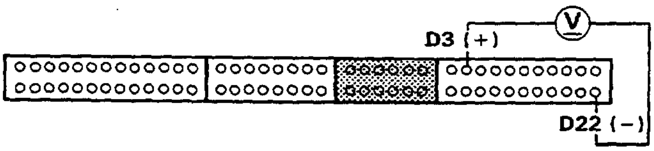


Is there more than 0.5 V?

NO → Go to wire harness short check: ECM (D16) terminal and HO2S (see page 11-37).

YES

Measure voltage between D3 (+) terminal and D22 (−) terminal.



Is there 0.3−4.9 V?

NO → Is there more than 4.9 V?

NO → Go to wire harness open check: ECM (D3) terminal and the HO2S (see page 11-37).

YES

Turn the ignition switch OFF.

Disconnect the 8P connector from the HO2S.

Turn the ignition switch ON.

B

(To page 11-36)

(Is there 0.3−4.9 V?) YES

Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (M/T in neutral) until the radiator fan comes on, then let it idle.

A

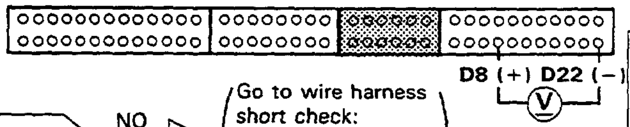
(To page 11-36)

(From page 11-34)

B

Disconnect the 8P connector from the HO2S.

Measure voltage between D8 (+) terminal and D22 (−) terminal.



Is there more than 5.0 V?

YES → **Replace the HO2S.**

NO

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

(cont'd)

Heated Oxygen Sensor (HO2S) Heater [D15Z3 engine]

41

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 11-14), code 41 is indicated.

Do the ECM Reset Procedure (see page 11-15).

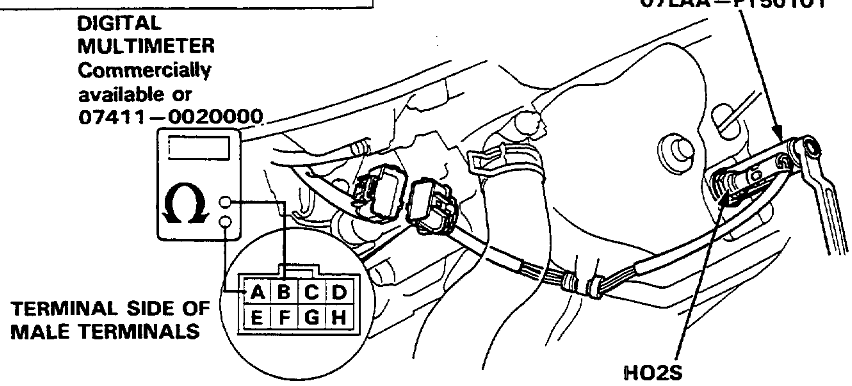
Start the engine.

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 HO2S and ECM.**

YES

Turn the ignition switch OFF.



Disconnect the 8P connector from the HO2S.

Measure resistance between terminals A and B on the HO2S.

Is there 2–13 Ω?

NO → **Replace the HO2S.**

YES

Check for continuity to body ground on each terminal on the HO2S.

Is there continuity?

YES → **Replace the HO2S.**

NO

Check for continuity between terminal A and terminals C–H individually.

Is there continuity?

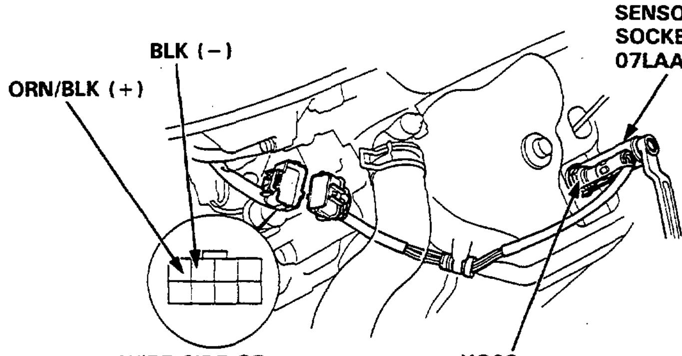
YES → **Replace the HO2S.**

NO

(To page 11-39)

(From page 11-38)

Start engine and keep engine rpm at idle.



Measure voltage between ORN/BLK (+) terminal and body ground.

Is there approx. 7 V?

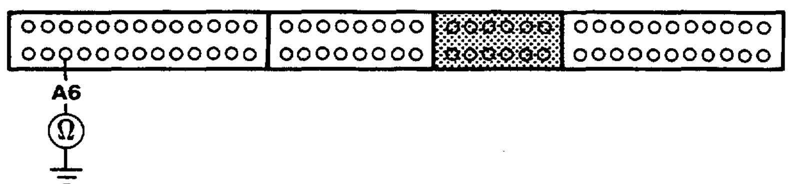
YES → Measure voltage ORN/BLK (+) terminal and BLK (−) terminal.

- Is there battery voltage?
- NO → **Repair open in BLK wire between the HO2S and G101 (located at thermostat housing).**
- 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 between the ECM and connectors. Disconnect "A" connector from the ECM only, not main wire harness (see page 11-17).



Check for continuity between A6 terminal and body ground.

Is there continuity?

YES → **Repair short in ORN/BLK wire between ECM (A6) and the HO2S.**

NO ↓

Check for continuity ORN/BLK wire between ECM (A6) and the HO2S.

Is there continuity?

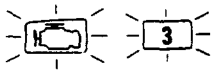
YES → **Repair open in ORN/BLK wire between ECM (A6) and the HO2S.**

NO ↓

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

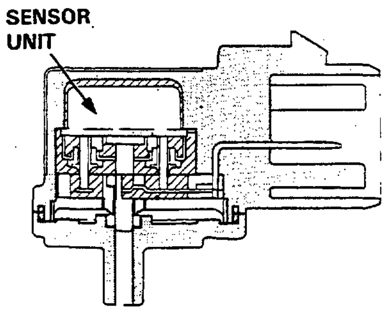
PGM-FI System

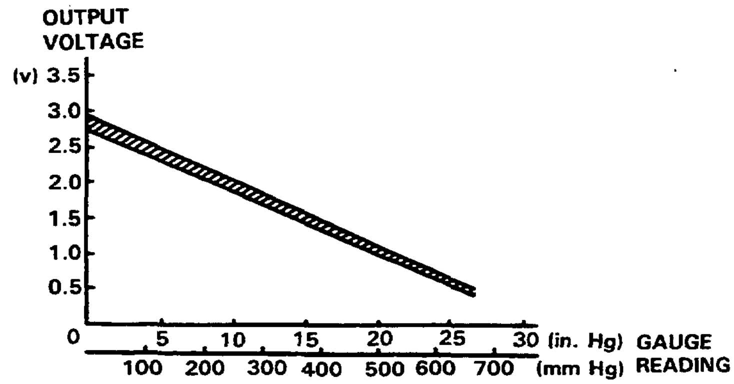
Manifold Absolute Pressure (MAP) Sensor



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.





- The MIL has been reported on.
- With the SCS short connector connected (see page 11-14), code 3 is indicated.

↓

Do the ECM Reset Procedure (see page 11-15).

↓

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 connection or loose wires between MAP sensor and ECM.**
- YES ↓

Turn the ignition switch OFF.

↓

Disconnect the 3P connector from the MAP sensor.

↓

Turn the ignition switch ON.

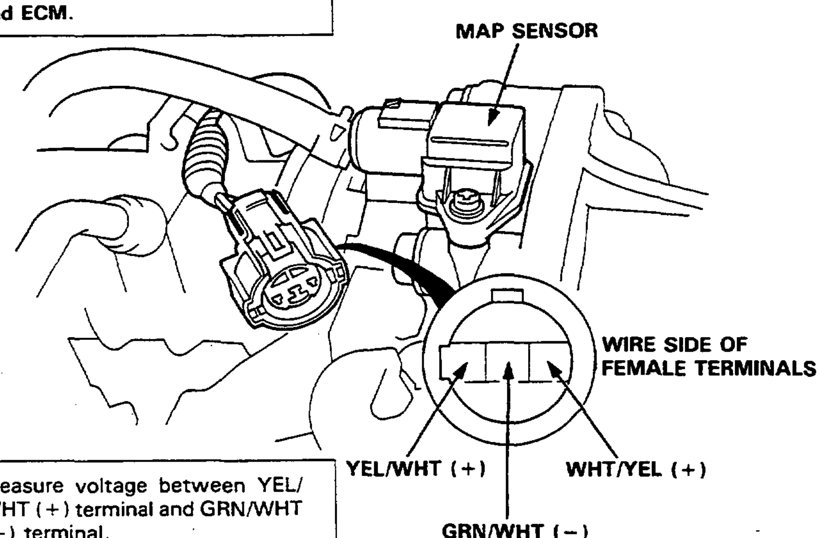
↓

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. → B (To page 11-41)
- NO → A (To page 11-41)



(From page 11-40)

A

Turn the ingition switch OFF.

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-17).

Turn the ignition switch ON.

Measure voltage between D19 (+) terminal and D21 (−) terminal.

Is there approx. 5 V?

YES

Repair open in YEL/WHT wire between ECM (D19) and the MAP sensor.

NO

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

(From page 11-40)

B

Is there approx. 5 V?

NO

Repair open in GRN/WHT wire between ECM (D21) and the MAP sensor.

YES

Measure voltage between WHT/YEL (+) terminal and GRN/WHT (−) terminal.

Is there approx. 5 V?

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 11-17).

Turn the ignition switch ON.

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.

NO

Turn the ignition switch OFF.

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-17).

Turn the ignition switch ON.

Measure voltage between D17 (+) terminal and D21 (−) terminal.

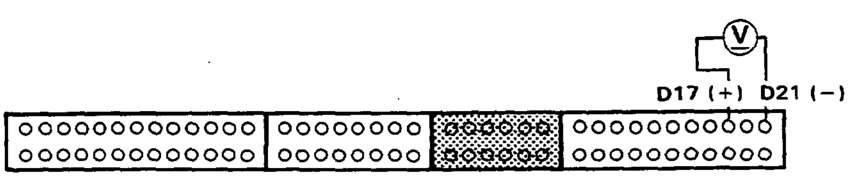
Is there approx. 5 V?

YES

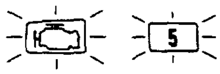
Repair open or short in WHT/YEL wire between ECM (D17) and the MAP sensor.

NO

Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.



Manifold Absolute Pressure (MAP) Sensor



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 5: A mechanical problem (vacuum leak) in the Manifold Absolute Pressure (MAP) Sensor System.

The MAP sensor converts manifold absolute pressure into electrical signals and inputs the ECM.

— The MIL has been reported on.
— With the SCS short connector connected (see page 11-14), code 5 is indicated.

Do the ECM Reset Procedure (see page 11-15).

Start the engine and keep engine speed at 2,000 rpm (min^{-1}) for one minute with the manual transmission in neutral (A/T: P or N position).

Is the MIL on and does it indicate code 5?

NO → **— Intermittent failure, system is OK at this time (test drive may be necessary).**
— Check vacuum connections.
— Make sure all connectors are secure.

YES ↓

Turn the ignition switch OFF.

Remove the MAP sensor from throttle body.

Connect a vacuum pump to the MAP sensor and apply vacuum.

Does it hold vacuum?

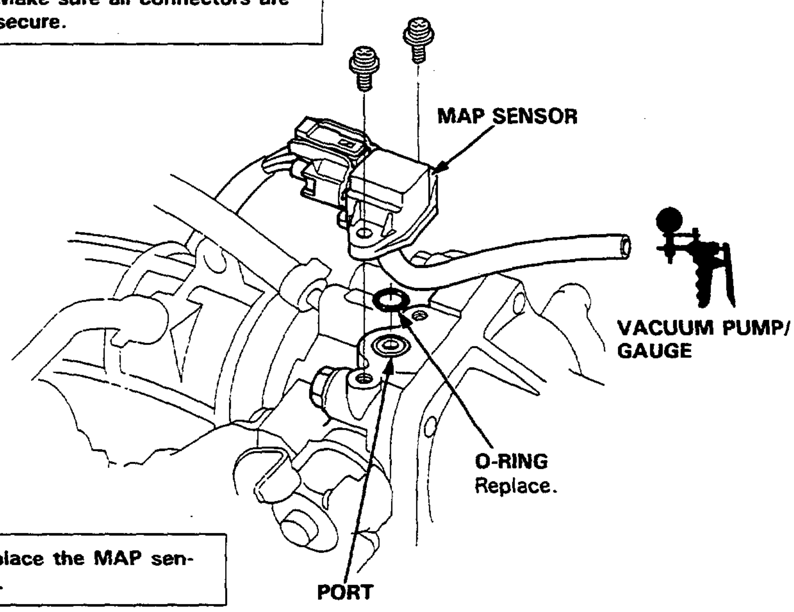
NO → **Replace the MAP sensor.**

YES ↓

Disconnect the vacuum pump from the MAP sensor.

Start the engine.

Put your finger over the MAP sensor port on the throttle body.



(To page 11-43)

(From page 11-42)

Is there manifold vacuum?

NO → **Remove restriction from throttle body.**

YES ↓

Turn the ignition switch OFF.

↓

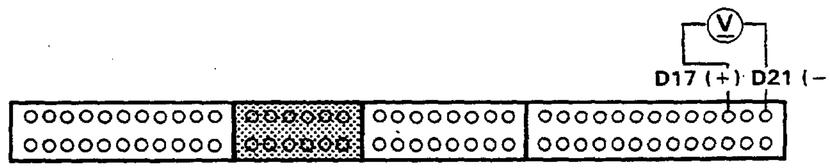
Connect the test harness between the ECM and connectors (see page 11-17).

↓

Turn the ignition switch ON.

↓

Measure voltage between D17 (+) terminal and D21 (−) terminal.



↓

Is there approx. 3 V?

NO → **Replace the MAP sensor.**

YES ↓

Install the MAP sensor.

↓

Start the engine and allow it to idle.

↓

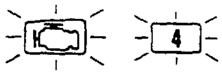
Is there approx. 1 V?

NO → **Replace the MAP sensor.**

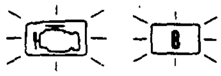
YES ↓

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

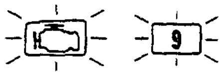
TDC/CKP/CYP Sensor



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 4: A problem in the Crankshaft Position (CKP) Sensor circuit.

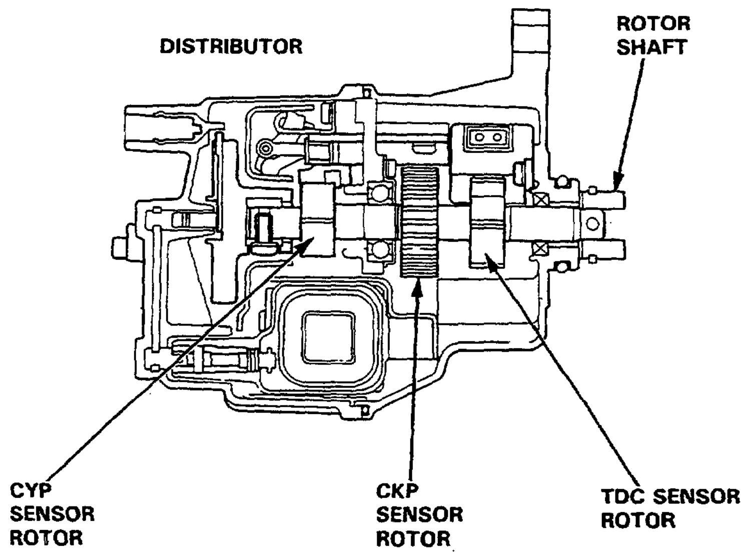


The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 8: A problem in the Top Dead Center (TDC) Sensor circuit.



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.



— The MIL has been reported on.
— With the SCS short connector connected (see page 11-14), code 4, 8 and/or 9 are indicated.

↓

Do the ECM Reset procedure (see page 11-15).

↓

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 TDC/CKP/CYP Sensor and ECM.

YES ↓

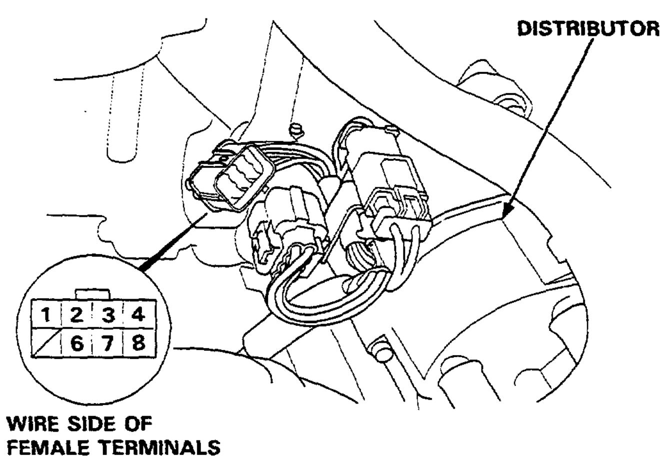
Turn the ignition switch OFF.

↓

Disconnect the 8P connector from the TDC/CKP/CYP sensor.

↓

(To page 11-45)



(From page 11-44)

Measure resistance between terminals of the indicated sensor.
*see table

Is there 350—700 Ω?

NO → **Replace the distributor ignition 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 ignition housing (see section 23).**

NO ↓

Reconnect the connector.

Connect the test harness to the main wire harness only, not to the ECM (see page 11-17).

Measure resistance between terminals of the indicated sensor on test harness.
*see table

Is there 350—700 Ω?

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**

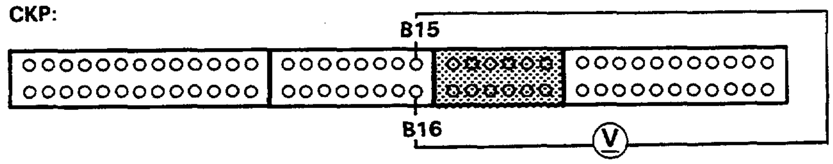
NO ↓

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

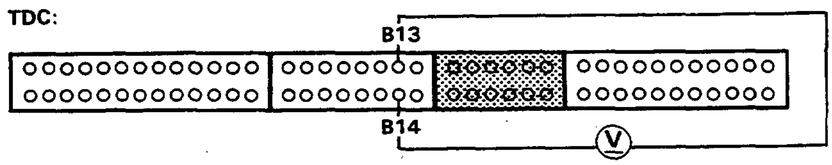
*:

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

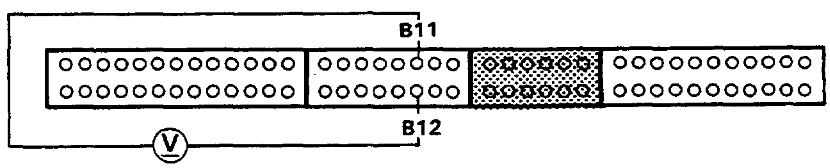
CKP:



TDC:



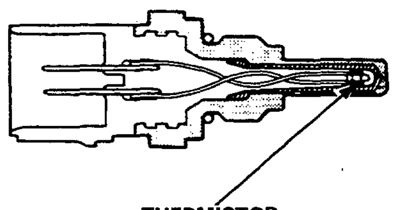
CYP:

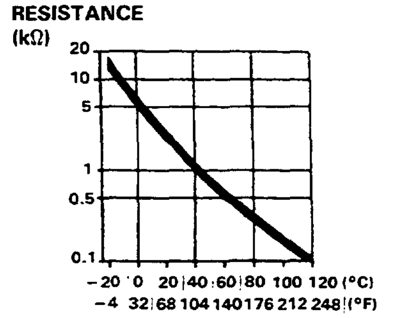


Engine Coolant Temperature (ECT) Sensor

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 11-14), code 6 is indicated.

↓

Do the ECM Reset Procedure (see page 11-15).

↓

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 at ECT sensor and ECM.**
- 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?

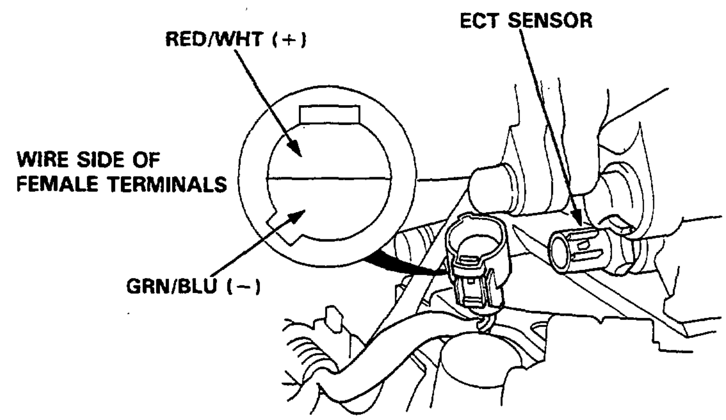
- NO → **Replace the ECT sensor.**
- YES ↓

(To page 11-47)

(From page 11-46)

Turn the ignition switch ON.

Measure voltage between RED/WHT (+) and body ground.

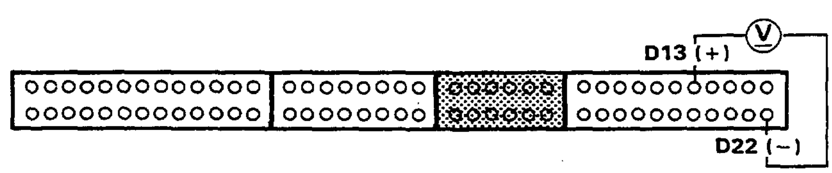


Is there approx. 5 V?

- **YES** → Measure voltage between RED/WHT (+) terminal and GRN/BLU (−) terminal.
  - Is there approx. 5 V?
    - **NO** → **Repair open in GRN/BLU wire between ECM (D22) and ECT 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 11-17).



Turn the ignition switch ON.

Measure voltage between D13 (+) terminal and D22 (−) terminal.

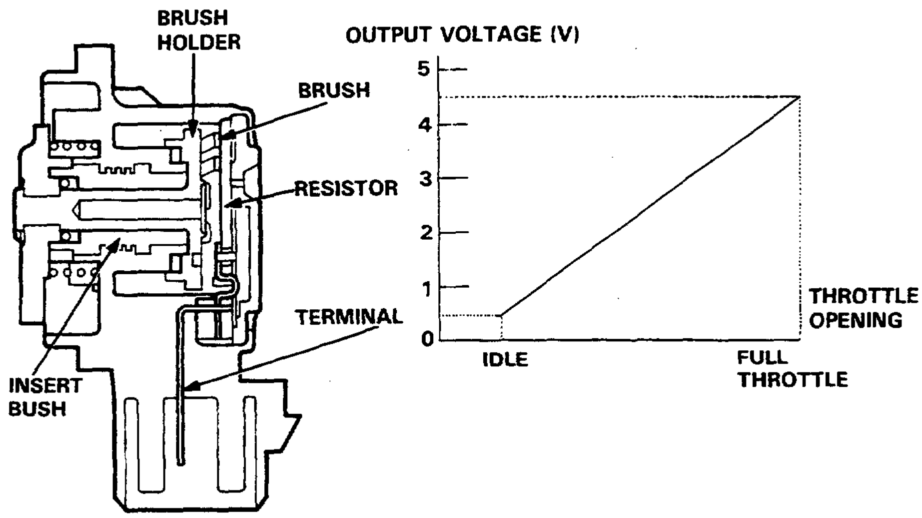
Is there approx. 5 V?

- **YES** → **Repair open or short in RED/WHT wire between ECM (D13) and ECT sensor.**
- **NO** → **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 TP Sensor varies the voltage signal to the ECM.



- The MIL has been reported on.
- With the SCS short connector connected (see page 11-14), code 7 is indicated.

↓

Do the ECM Reset Procedure (see page 11-15).

↓

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 TP sensor and ECM.**

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.

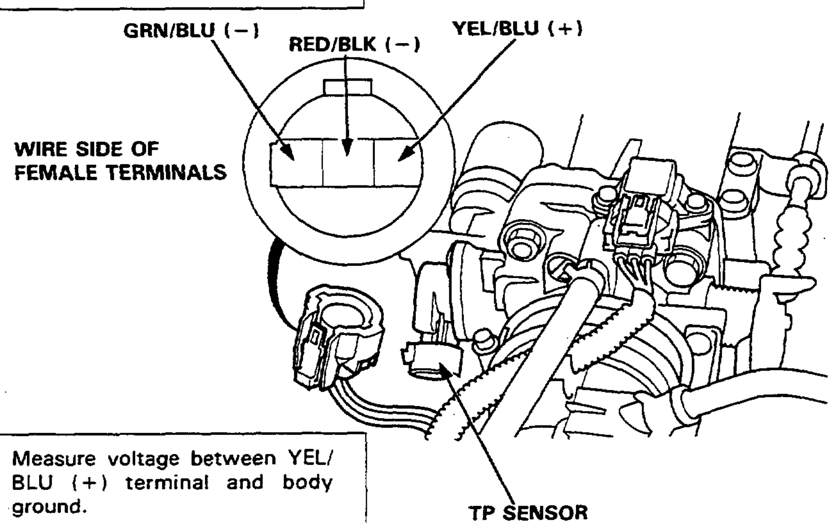
↓

Is there approx. 5 V?

NO → Measure voltage between YEL/BLU (+) terminal and body ground.

↓ B (To page 11-49)

YES ↓ A (To page 11-49)



(From page 11-48)

A

Turn the ignition switch OFF.

Reconnect the 3P connector.

Connect the test harness between the ECM and connectors (see page 11-17).

Turn the ignition switch ON.

Measure voltage between D11 (+) terminal and D22 (−) terminal.

Is voltage 0.5 V at full close throttle, and approx. 4.5 V at full open throttle?
NOTE: There should be a smooth transition from 0.5 V to approx. 4.5 V as the throttle is depressed.

NO

— Replace the throttle body.
— Repair open or short in RED/BLK wire between ECM (D11) and TP sensor.

YES

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

(From page 11-48)

B

Is there approx. 5 V?

YES

Repair open in GRN/BLU wire between ECM (D22) and TP sensor.

NO

Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-17).

Turn the ignition switch ON.

Measure voltage between D20 (+) terminal and D22 (−) terminal.

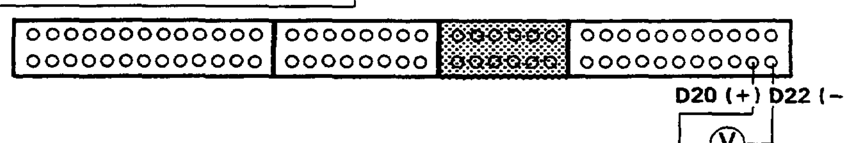
Is there approx. 5 V?

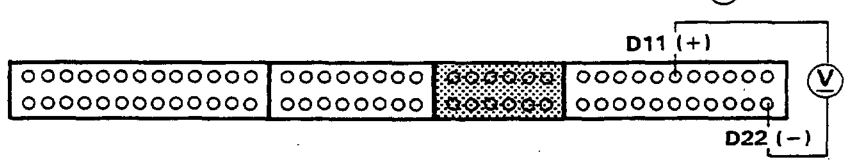
YES

Repair open in YEL/BLU wire between ECM (D20) and TP sensor.

NO

— Repair short in YEL/BLU wire between ECM (D20) and TP sensor.
— *Substitute a known-good ECM* and recheck. If prescribed voltage is now available, replace the original ECM.

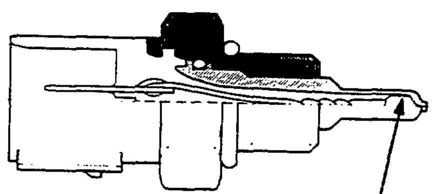


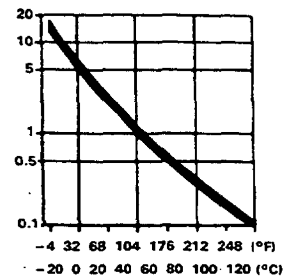


Intake Air Temperature (IAT) Sensor

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.





— The MIL has been reported on.
— With the SCS short connector connected (see page 11-14), code 10 is indicated.

↓

Do the ECM Reset Procedure (see page 11-15).

↓

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 ↓

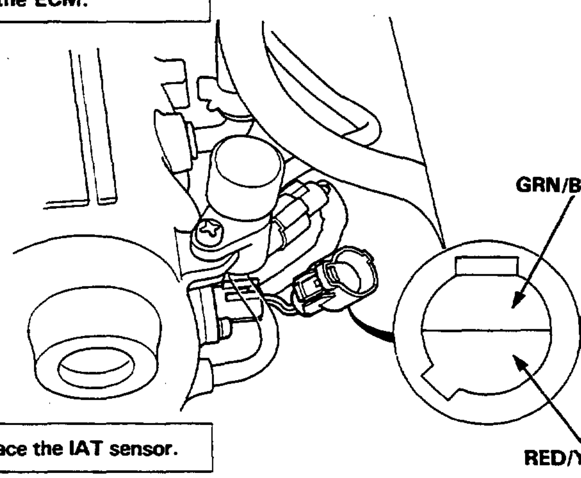
Turn the ignition switch OFF.

↓

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 11-51)

(From page 11-50)

Turn the ignition switch ON.

Measure voltage between RED/YEL (+) terminal and body ground.

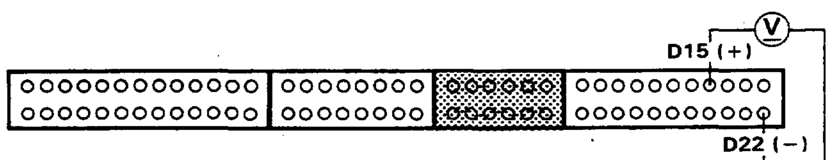
Is there approx. 5 V?

- 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 11-17).

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 11-14), code 15 is indicated.**

Do the ECM Reset Procedure (see page 11-15).

Start the engine

NOTE: If the engine won't start, it may take 20 seconds of cranking to set the code.

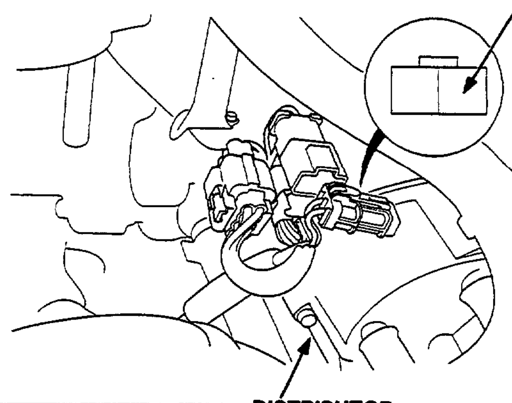
Is the MIL on and does it indicate code 15 ?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires between ICM and ECM.**

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the distributor.



Turn the ignition switch ON.

Measure voltage between BLK/YEL (+) terminal and body ground.

Is there battery voltage ?

NO → **Repair open in BLK/YEL wire between the 2P connector and ignition switch.**

YES

(To page 11-53)

(From page 11-52)

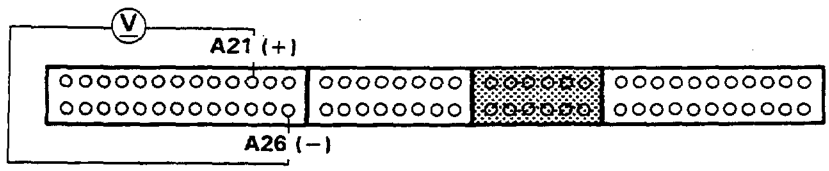
Turn the ignition switch OFF.

Reconnect the 2P connector.

Connect the test harness between the ECM and connectors (see page 11-17).

Turn the ignition switch ON.

Measure voltage between A21 (+) terminal 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 reckeck. 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 11-14), code 17 is indicated.

Do the ECM Reset Procedure (see page 11-15).

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.**

YES ↓

Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

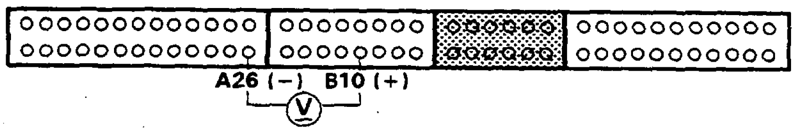
⚠ WARNING Block rear wheels before jacking up front of car.

Turn the ignition switch OFF.

Connect the test harness between the ECM and connectors (see page 11-17).

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.

(To page 11-55)

YES ↓

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

(From page 11-54)

Disconnect the "B" connector from the ECM only, not the main wire harness.

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.

Does voltage pulse 0 V and approx. 5 V?

NO:

- **Repair short in ORN wire between ECM (B10) and the VSS.**
- **Repair open in ORN wire between ECM (B10) and the VSS.**
- **If wire is OK, test the VSS.** ***(see section 23)***

YES:

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

Lock-up Control Solenoid Valve (A/T)

The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 19: A problem in the Lock-up Control Solenoid Valve A and/or B circuit.

- The MIL has been reported on.
- With the SCS short connector connected (see page 11-14), code 19 is indicated.

Do the ECM Reset Procedure (see page 11-15).

Test drive necessary.
Drive the car for several miles so that the transmission upshifts and downshifts several times.

Is the MIL on and does it indicate code 19?

NO — **Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the lock-up control solenoid valve A/B and the ECM.**

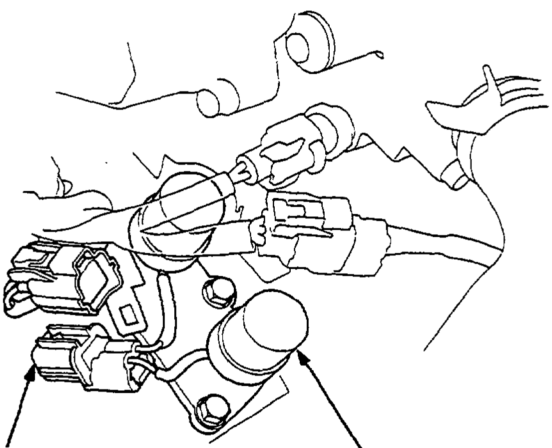
YES

Turn the ignition switch OFF.

Connect the test harness to the main harness ony, not to the ECM (see page 11-17).

Disconnect the 2P connector from the lock-up control solenoid valve.

Check for continuity between A19 or A17* and body ground.



*: Lock-up Control Solenoid Valve B

Does continuity exist?

YES — **Repair short in YEL or GRN/BLK* wire between ECM (A19 or A17*) and the 2P connector.**

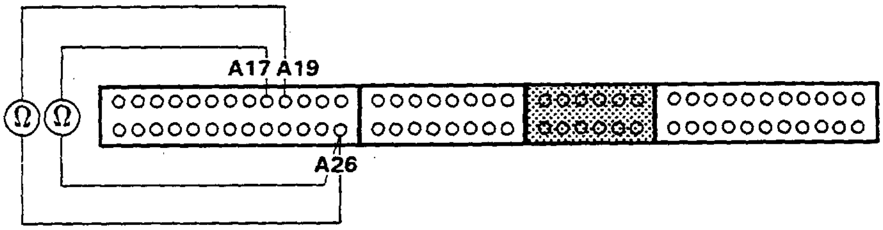
NO

(To page 11-57)

(From page 11-56)

Reconnect the 2P connector.

Measure resistance between A19 or A17* terminal and A26 terminal.



Is there 14—25 Ω?

NO → Check for continuity in YEL or GRN/BLK wire between ECM (A19 or A17*) and the 2P connector.

Does continuity exist?

YES → **Replace the lock-up control solenoid valve (see page 14-43).**

NO → **Repair open in YEL or GRN/BLK* wire between ECM (A19 or A17*) and the 2P connector.**

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

Idle Control System

System Troubleshooting Guide

NOTE:

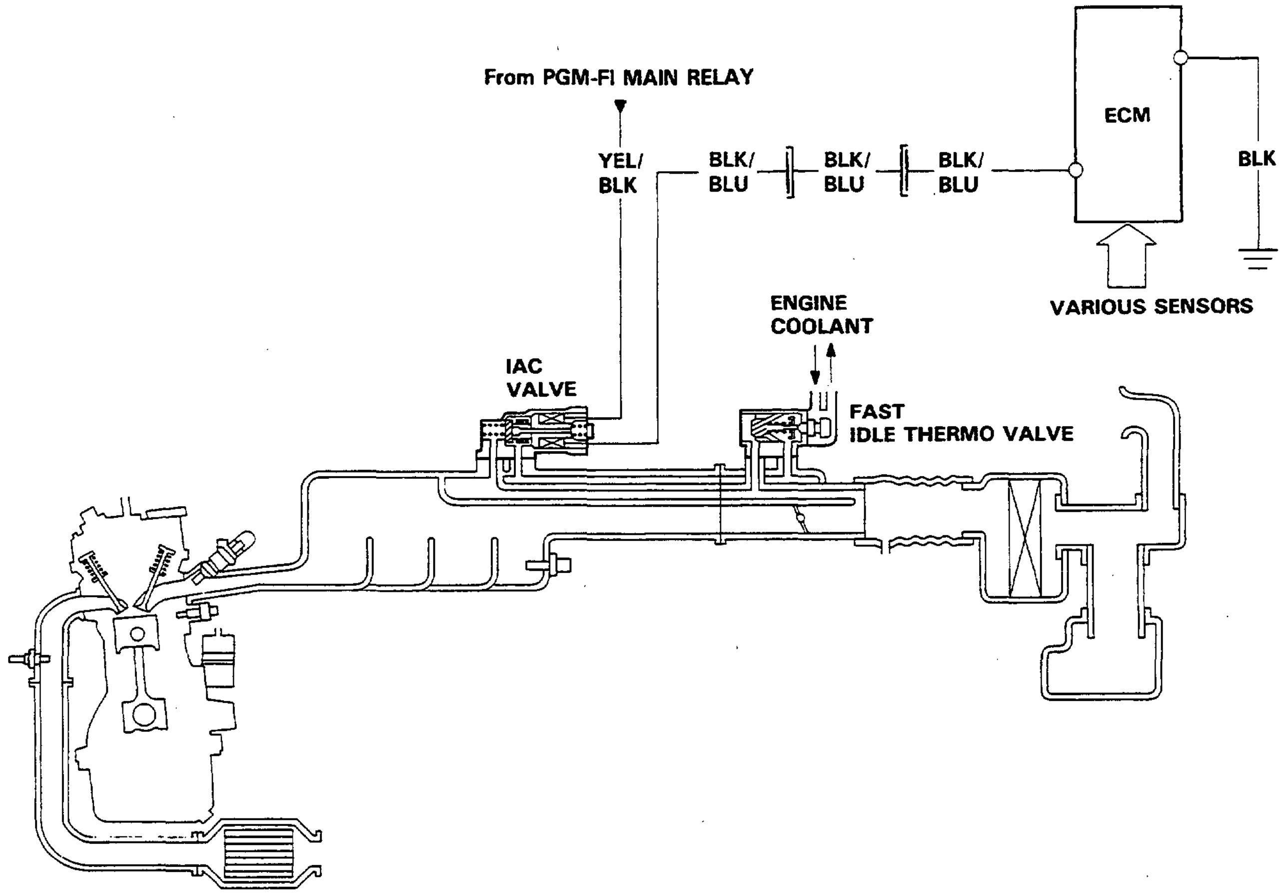
- Across each row in the chart, the sub-systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows 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.

SYMPTOM \ SUB-SYSTEM		IDLE ADJUSTING SCREW	IDLE AIR CONTROL VALVE	STARTER SWITCH SIGNAL	AIR CONDI-TIONING SIGNAL	AL-TERNATOR FR SIGNAL	AUTOMATIC TRANSAXLE GEAR POSITION SWITCH SIGNAL	M/T CLUTCH SWITCH SIGNAL*	FAST IDLE THERMO VALVE	HOSES AND CON-NECTIONS
PAGE		11-73	11-61	11-63	11-64	11-66	11-68	11-70	11-72	–
DIFFICULT TO START ENGINE WHEN COLD									①	
WHEN COLD FAST IDLE OUT OF SPEC [1,000–2,000 rpm (min^{-1})]		③	②						①	
ROUGH IDLE			②							①
WHEN WARM RPM TOO HIGH		③	①						②	③
WHEN WARM RPM TOO LOW	Idle speed is below specified rpm (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		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

*: D15Z3 engine

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.

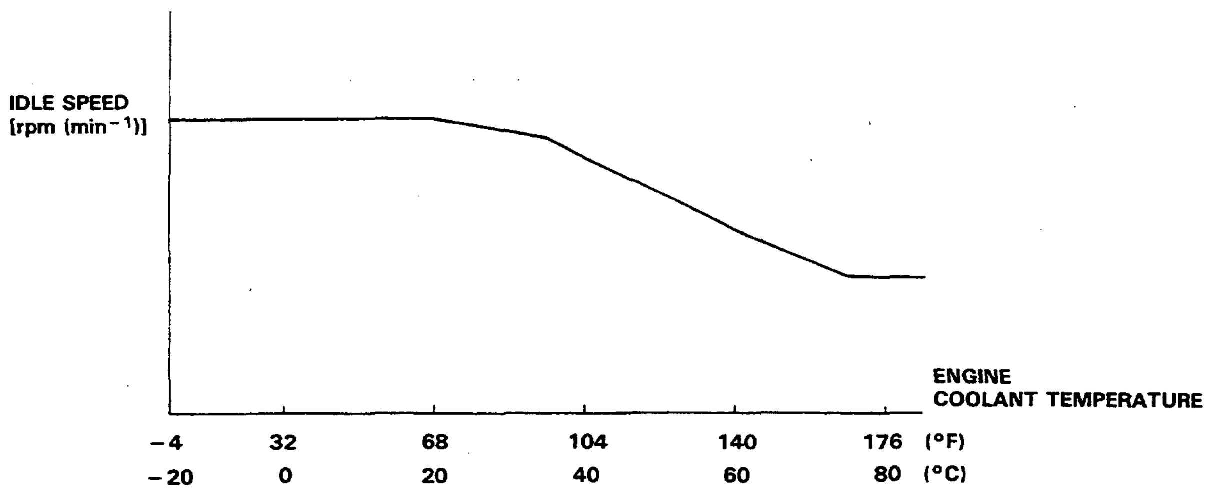


(cont'd)

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 engine 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.



3. 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)
   - Air conditioning signal (see page 11-64)
   - Alternator FR signal (see page 11-66)
   - A/T gear position signal (see page 11-68)
   - M/T clutch switch signal (D15Z3 engine) (see page 11-70)
   - Starter switch signal (see page 11-63)
   - Fast idle thermo valve (see page 11-72)
   - Hoses and connections
   - IAC Valve and its mounting O-rings

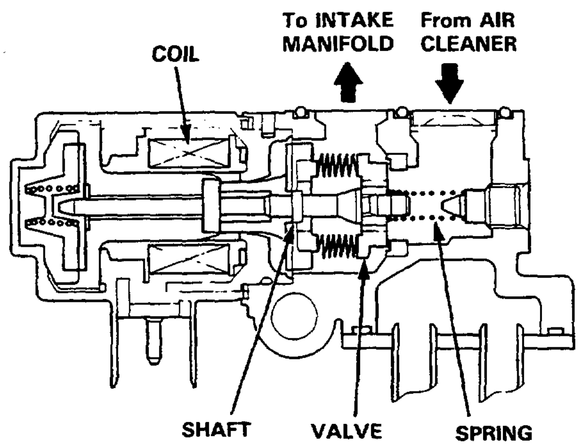
4. If the above items are normal, substitute a known-good IAC Valve and readjust the idle speed (see page 11-73).

   - 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.



— The MIL has been reported on.
— With the SCS short connector connected (see page 11-14), code 14 is indicated.

Do the ECM Reset Procedure (see page 11-15).

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.
  - With the engine running and the accelerator pedal released, disconnect the 2P connector from the IAC valve.
  - Is there a reduction in engine rpm?
    - YES → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connection or loose wires between IAC valve and ECM.**
    - NO → **Substitute a known-good IAC valve and retest.**
- YES → Disconnect the 2P connector from the IAC valve.

(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 11-17).

Turn the ignition switch ON.

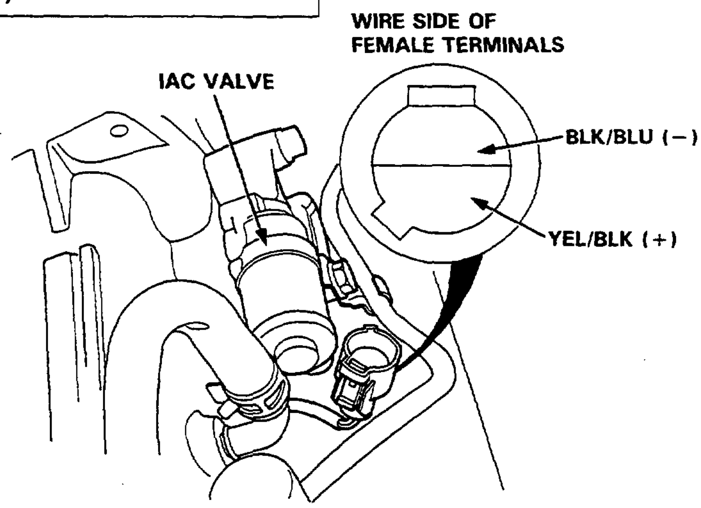
Momentarily connect A9 terminal to A23 terminal several times.

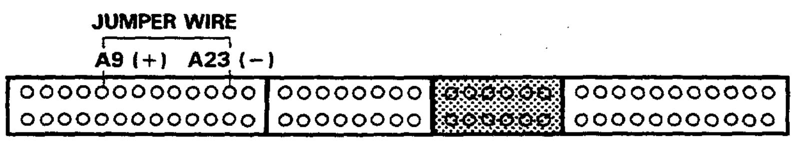
Does the IAC valve click?

YES → **Substitute a known-good ECM and retest. If symptom/indication goes away, replace the original ECM.**

NO ↓

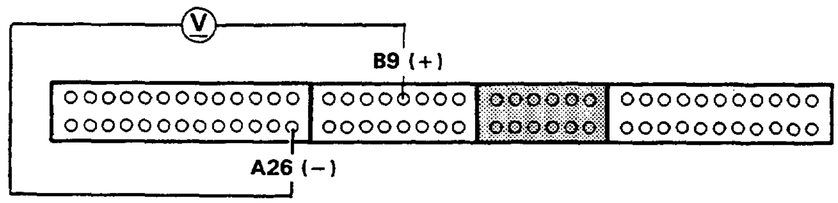
Repair open or short in BLK/BLU wire between IAC valve and ECM (A9). If the wire is OK, replace the IAC valve.





Starter Switch Signal

This signals the ECM when the engine is cranking.



NOTE:
- M/T: Clutch pedal must be depressed.
- A/T: Transmission in N or P position.

Inspection of Starter Switch Signal.

Connect the test harness between the ECM and connectors (see page 11-17).

Measure voltage between B9 (+) terminal and A26 (−) terminal with the ignition switch in the start position.

Is there battery voltage?

- YES → Starter switch signal is OK.
- NO → Inspect No. 18 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

- YES → **Repair open in BLK/WHT wire between ECM (B9) and No. 18 STARTER SIGNAL (7.5 A) fuse.**
- NO →
  - **Repair short in BLK/WHT wire between ECM (B9) and No. 18 STARTER SIGNAL (7.5 A) fuse.**
  - **Replace the No. 18 STARTER SIGNAL (7.5 A) fuse.**

Idle Control System

Air Conditioning Signal

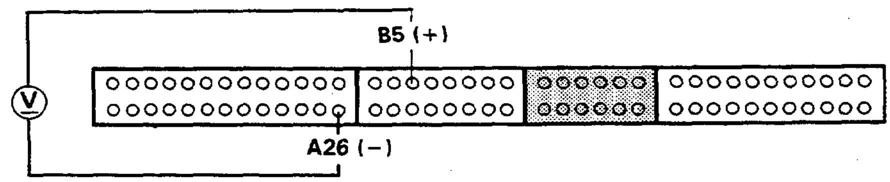
This signals the ECM when there is a demand for cooling from the air conditioning system.

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 11-17).

Turn the ignition switch ON.

Measure voltage between B5 (+) terminal and A26 (−) terminal.



Is there approx. 5 V?

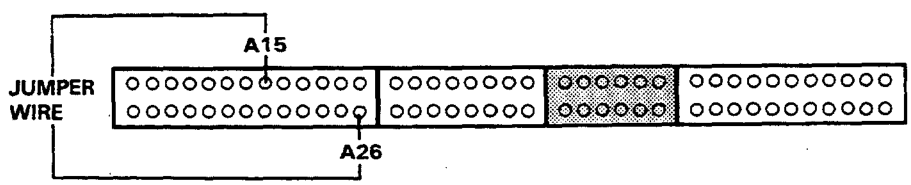
- NO → **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**
- YES ↓

Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

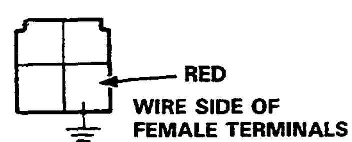
Turn the ignition switch ON.

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 terminal of the 4P connector on the A/C clutch relay to body ground several times.



  Is there a clicking noise from the A/C compressor clutch?

  - NO → **See air conditioner inspection (see section 22).**
  - YES → **Repair open in RED wire between ECM (A15) and A/C clutch relay.**

- YES ↓

Start the engine.

Blower switch ON.

(To page 11-65)

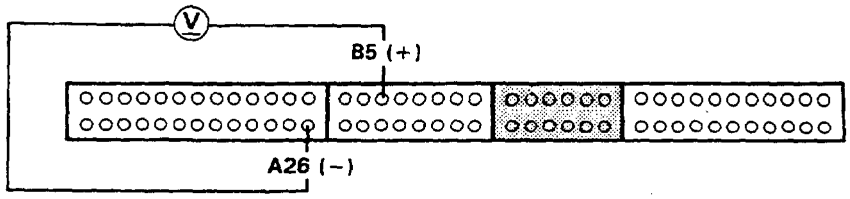
(From page 11-64)

A/C switch ON.

Does A/C operate?

YES → **Air conditioning signal is OK.**

NO →



Measure voltage between B5 (+) terminal and A26 (−) terminal.

Is voltage less than 1.0 V?

NO → **Repair open in BLU/RED wire between ECM (B5) and A/C pressure switch.**

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

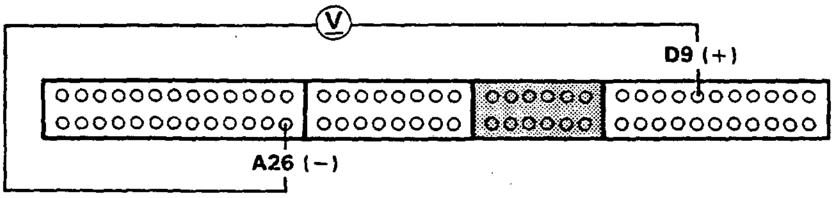
Idle Control System

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 11-17).



Turn the ignition switch ON.

Measure voltage between D9 (+) terminal and A26 (−) terminal.

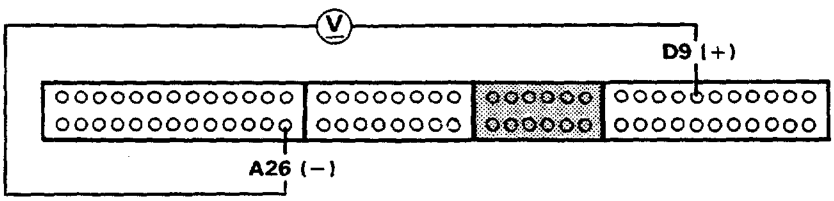
Is there approx. 5 V?

- 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.

Does the voltage decrease when headlights and rear defogger are turned on?

- NO → Turn the ignition switch OFF.
- YES ↓

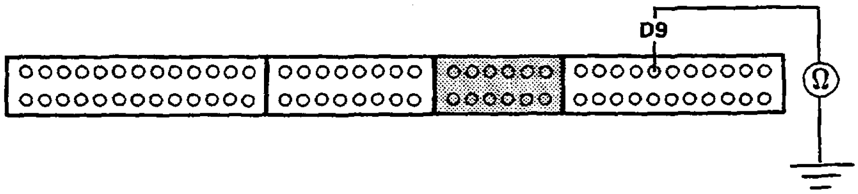
Alternator FR signal is OK.

(To page 11-67)

(From page 11-66)

Disconnect "D" connector from ECM only, not the main wire harness.

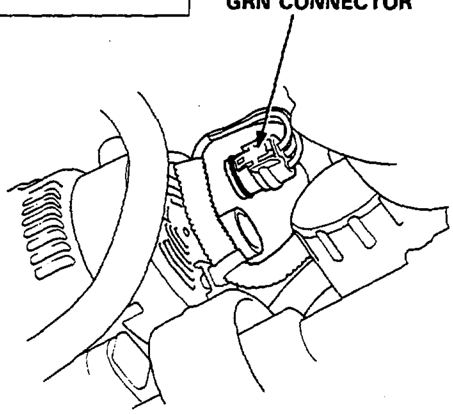
Disconnect the negative battery cable from the battery.



Check for continuity between D9 terminal and body ground.

Is there continuity?

- YES → Disconnect GRN connector from the alternator.
  - Check for continuity between D9 terminal and body ground.
  - Is there continuity?
    - NO → **See Alternator inspection (see section 23).**
    - YES → **Repair short in WHT/RED wire between ECM (D9) and 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 → **See Alternator inspection (see section 23).**
    - NO → **Repair open in WHT/RED wire between ECM (D9) and alternator.**



Idle Control System

Automatic Transaxle (A/T) Gear Position Signal

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 gear position indicator and select each position separately.

Does the indicator light properly?

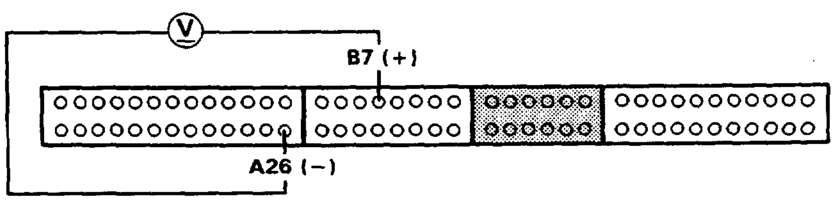
NO → **See A/T gear position indicator inspection (see section 14).**

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 11-17).

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

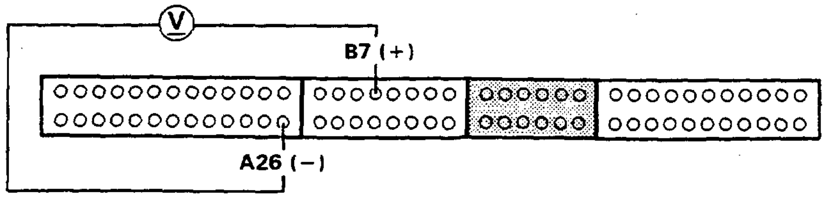
Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

Start the engine.

(To page 11-69)

(From page 11-68)

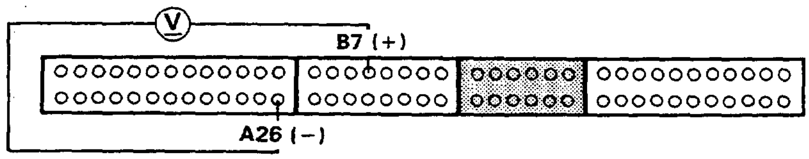


Measure voltage between B7 (+) terminal and A26 (−) terminal with the transmission [N] and [P] position individually.

Is there less than 1.0 V?

NO → Repair open in GRN wire between ECM (B7) and gauge assembly.

YES

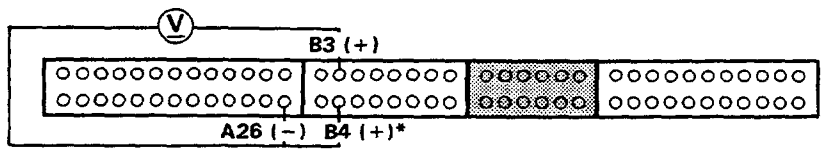


Measure voltage between B7 (+) terminal and A26 (−) terminal with the transmission in gear.

Is there approx. 5 V?

NO → Repair short in GRN wire between ECM (B7) and gauge assembly.

YES



Less than 1.0 V?

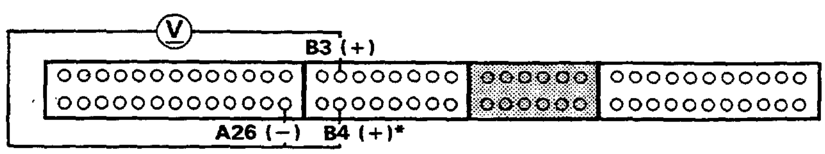
*: [D4]

Measure voltage between B3 or B4* terminal and A26 (−) terminal with the transmission in [D3] or [D4] position individually.

Is there less than 1.0 V?

NO → Repair open in GRN/BLU or GRN/BLK* wire between ECM (B3 or B4*) and A/T gear position switch.

YES



10 V?

Measure voltage between B3 or B4* (+) terminal and A26 (−) terminal with the transmission in [N] or [P] position.

Is there approx. 10 V?

NO → Repair short in GRN/BLU or GRN/BLK* wire between ECM (B3 or B4*) and A/T gear position switch.

YES

A/T Gear position signal is OK.

Idle Control System

M/T Clutch Switch Signal (D15Z3 engine)

This signals the ECM when the M/T clutch is engaged.

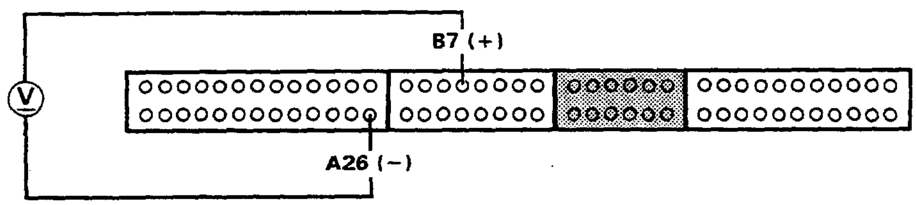
Inspection of M/T clutch switch signal.

Connect the test harness between the ECM and connectors (page 11-17).

Turn the ignition switch ON.

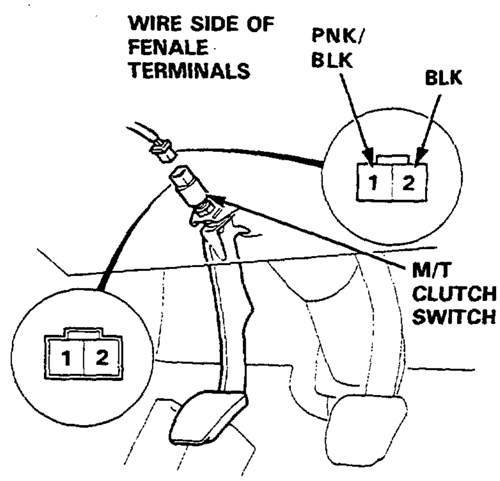
Measure voltage between B7 (+) terminal and A26 (−) terminal.

Is there appox. 5 V?



NO → Turn the ignition switch OFF.

Disconnect the 2P connector from the M/T clutch switch.



Turn the ignition switch ON.

Measure voltage between B7 (+) terminal and A26 (−) terminal.

Is there approx. 5 V?

YES → **Replace the M/T clutch switch.**

NO → Turn the ignition switch OFF.

Disconnect "B" connector from main wire harness only, not the ECM.

Turn the ignition switch ON.

Is there approx. 5 V?

YES → **Repair short in PNK/BLK wire between ECM (B7) and the M/T clutch switch.**

NO → **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**

YES → Depress the clutch pedal.

Measure voltage between B7 (+) terminal and A26 (−) terminal.

(To page 11-71)

(From page 11-70)

Is there approx. 5 V?

NO → **M/T clutch switch signal is OK.**

YES → Turn the ignition switch OFF.

Disconnect the 2P connector from the M/T clutch switch.

Depress the clutch pedal.

Check for continuity between the No. 1 terminal and No. 2 terminal on the M/T clutch switch.

Is there continuity?

NO → **Replace the M/T clutch switch.**

YES → Turn the ignition switch ON.

Measure voltage between PNK/BLK (+) terminal and body ground.

Is there approx. 5 V?

NO → **Repair open PNK/BLK wire between ECM (B7) and the M/T clutch switch.**

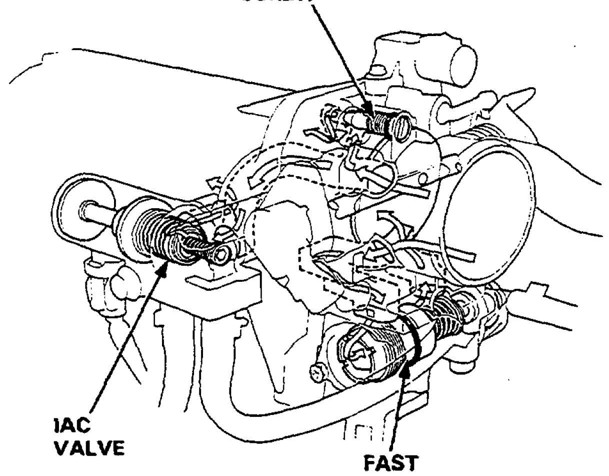
YES → **Repair open in BLK wire between the M/T clutch switch and G401 (located at front of engine compartment left side).**

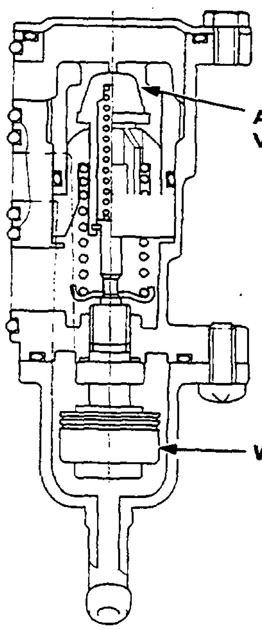
Idle Control System

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 manifold.

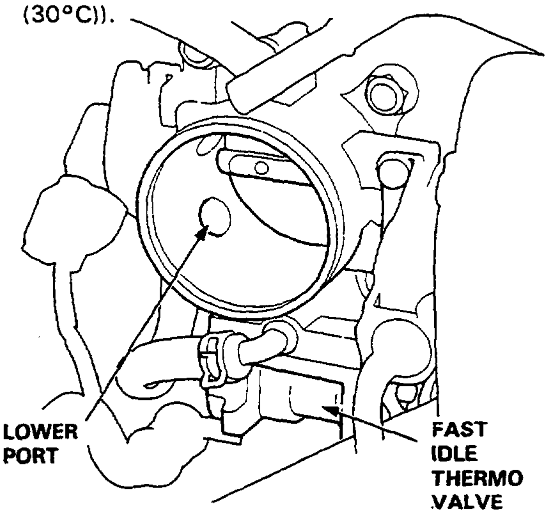




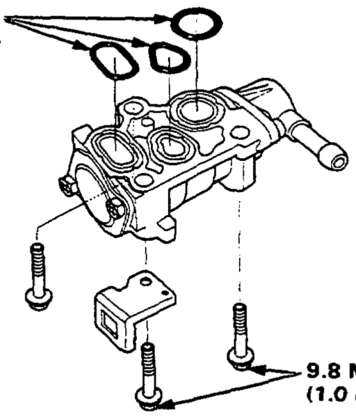
Inspection

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.



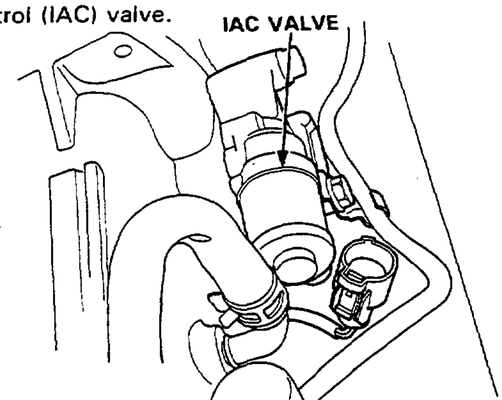
4. Start the engine. Hold the engine at 3,000 rpm (min⁻¹) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.
5. Check that the valve is completely closed. If not, air suction can be felt at the lower port in the throttle body.
   - If any suction is felt, the valve is leaking. Check engine coolant level and for air in the engine coolant system (see section 10). If OK, replace the fast idle thermo valve and recheck.

Idle Speed Setting

Inspection/Adjustment

NOTE: *Before the idle speed set, 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.



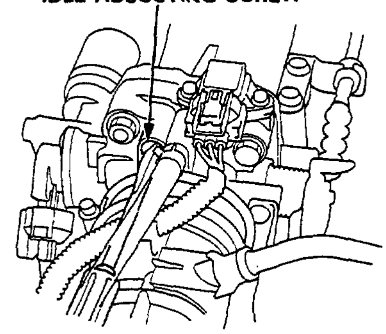
4. Start the engine with the accelerator pedal slightly depressed. Stabilize the engine speed at 1,000 rpm (min^{-1}), then slowly release the pedal until the engine idles.
5. Check idling in no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioning are not operating.

Idle speed should be:

M/T	550 ± 50 rpm (min^{-1})
A/T	550 ± 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 BACK UP (7.5 A) fuse in the under-hood fuse/relay box for 10 seconds to reset the ECM.
8. Restart and idle the engine with no-load conditions for one minute, then check the idle speed.

Idle speed should be:

M/T	750 ± 50 rpm (min^{-1})
A/T	750 ± 50 rpm (min^{-1}) (in [N] or [P] position)

9. Idle the engine for one minute with headlights (Low) and check the idle speed.

Idle speed should be:

M/T	750 ± 50 rpm (min^{-1})
A/T	750 ± 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 High and air conditioner on, then check the idle speed.

Idle speed should be:

M/T	810 ± 50 rpm (min^{-1})
A/T	810 ± 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.

SYMPTOM \ SUB-SYSTEM		FUEL LINES	FUEL TUBE/ QUICK-CONNECT FITTINGS	FUEL INJECTOR	FUEL PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	PGM-FI MAIN RELAY	CONTAM-INATED FUEL
PAGE		11-75	11-77	11-81	11-85	11-86	11-87	11-89	——
ENGINE WON'T START						③	①	②	
DIFFICULT TO START ENGINE WHEN COLD OR HOT						①	②		
ROUGH IDLE				①					②
POOR PER-FORMANCE	MISFIRE OR ROUGH RUNNING			①	③				②
	FAILS EMISSION TEST			②	①				
	LOSS OF POWER			③		②	①		
FREQUENT STALLING	WHILE WARMING UP				①				
	AFTER WARMING UP				①				

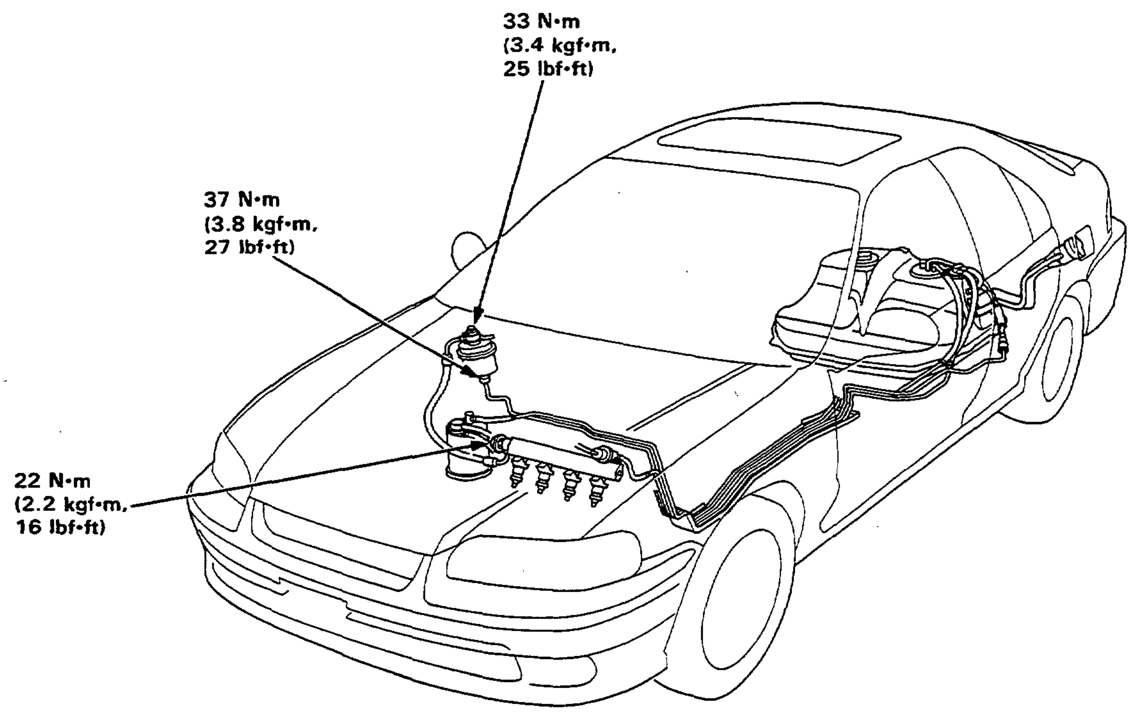
Fuel Supply System

System Description

The fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, PGM-FI main relay, fuel filter, fuel pressure regulator, fuel injectors, fuel pulsation damper, and fuel delivery and return lines. This system delivers pressure-regulated fuel to the fuel injectors and cuts the fuel delivery when the engine is not running.

Fuel Lines

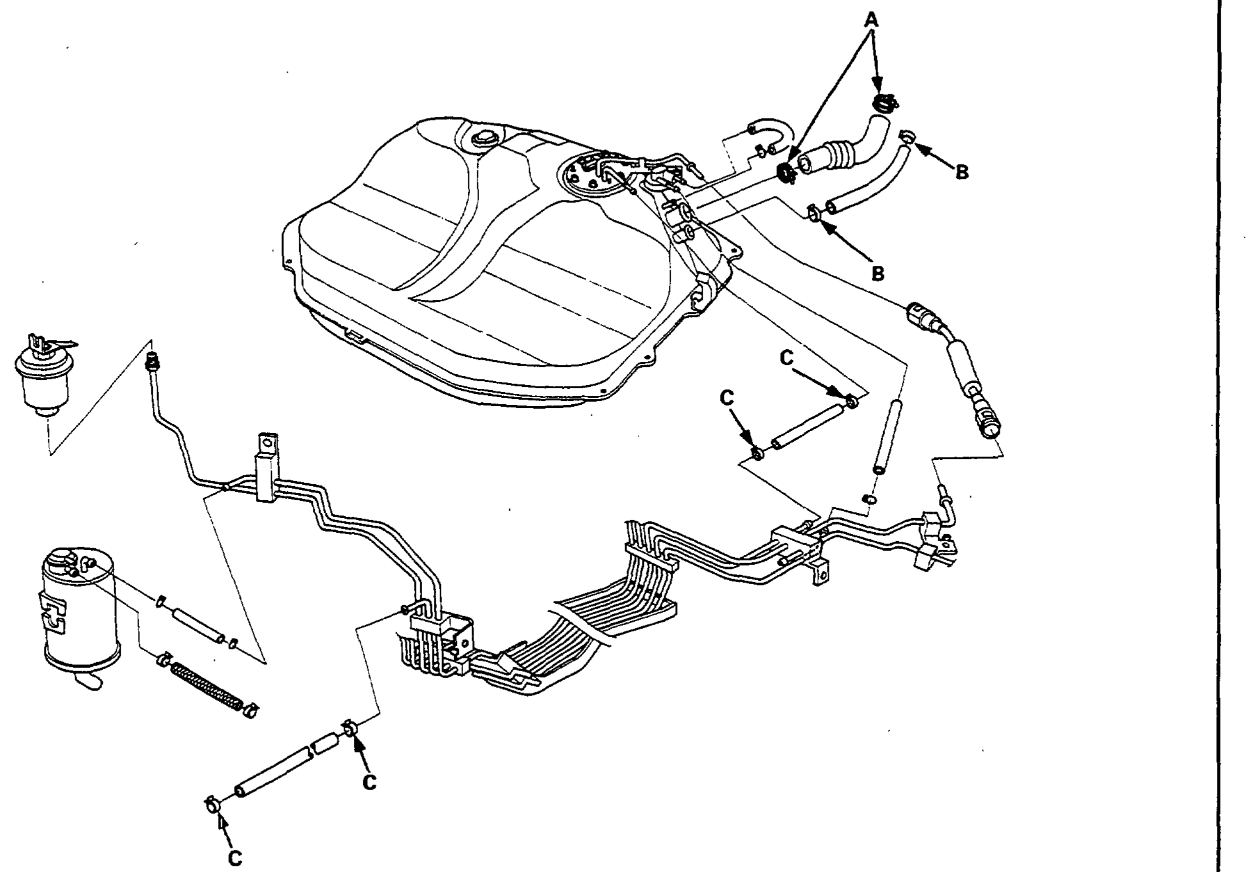
NOTE: Check all fuel system lines and hoses for damage, leaks or deterioration, and replace if necessary.

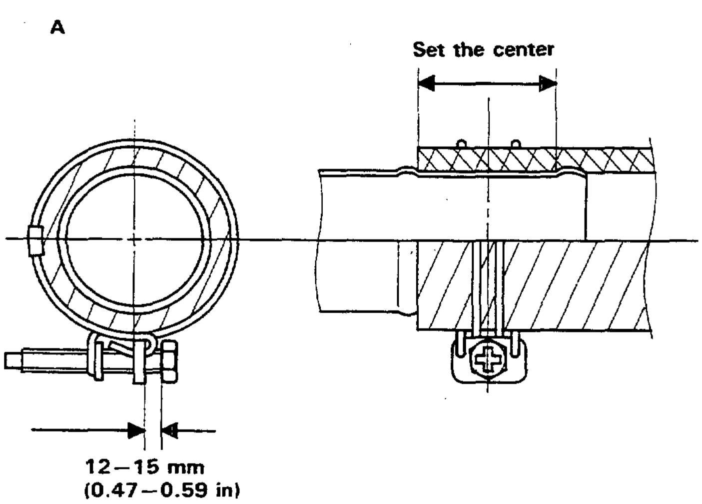


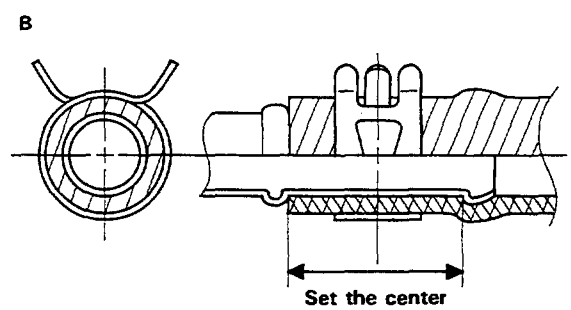
(cont'd)

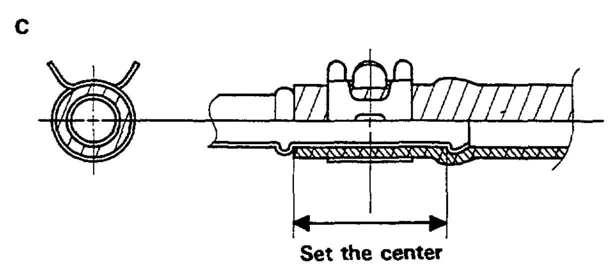
Fuel Lines (cont'd)

NOTE: Check all hose clamps and retighten if necessary.









Fuel Supply System

Fuel Pressure

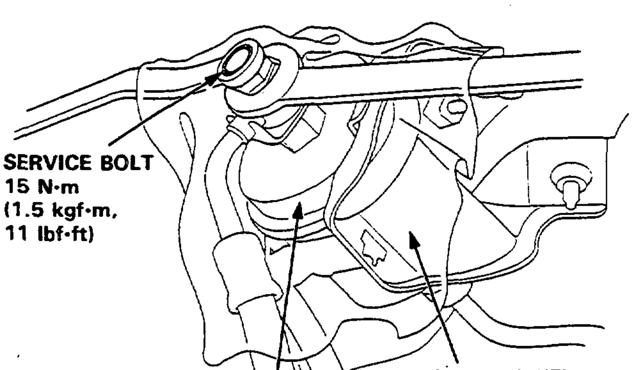
Relieving

WARNING

- **Do not smoke while working on the fuel system. Keep open flames away from your work area.**
- **Be sure to relieve fuel pressure while the engine is off.**

NOTE: Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the service bolt on top of the fuel filter.

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 service bolt at the fuel filter, while holding the special banjo bolt with another wrench.
4. Place a rag or shop towel over the service bolt.
5. Slowly loosen the service bolt one complete turn.



NOTE:
- A fuel pressure gauge can be attached at the 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.

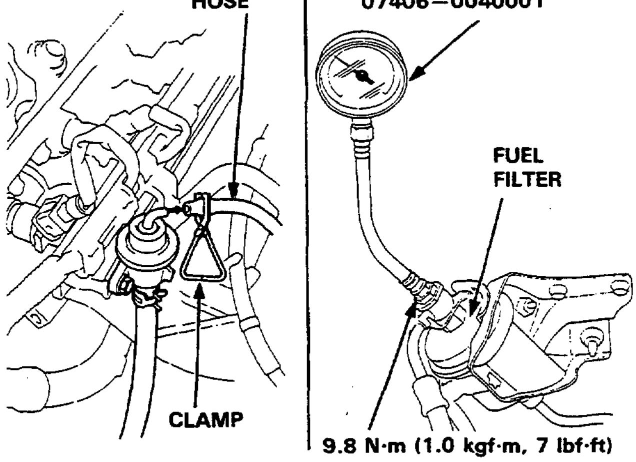
Inspection

1. Relieve fuel pressure (see page 11-80).
2. Remove the service bolt on the fuel filter 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 vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched.

   Pressure should be:
   270 – 320 kPa (2.8 – 3.3 kgf/cm², 40 – 47 psi)

4. Reconnect vacuum hose to the fuel pressure regulator.

   Pressure should be:
   220 – 260 kPa (2.2 – 2.7 kgf/cm², 31 – 38 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 11-88). If the fuel pump is OK, check the following:

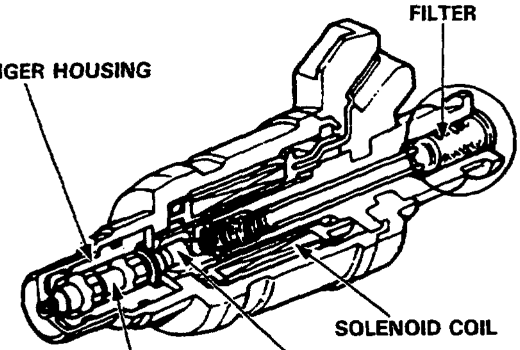
– If the fuel pressure is higher than specified, inspect for:
  - Pinched or clogged fuel return hose or line.
  - Faulty fuel pressure regulator (see page 11-86).

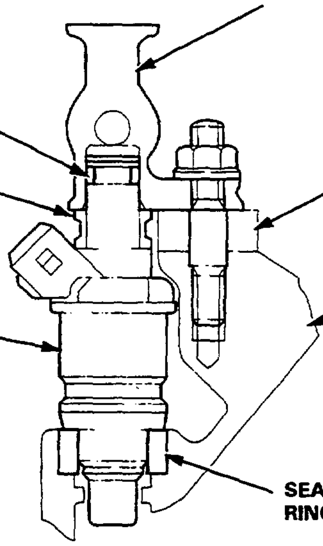
– If the fuel pressure is lower than specified, inspect for:
  - Clogged fuel filter.
  - Faulty fuel pressure regulator (see page 11-86).
  - Leakage in the fuel line.

Fuel Injectors

Description

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.





(cont'd)

Fuel Injectors (cont'd)

Testing

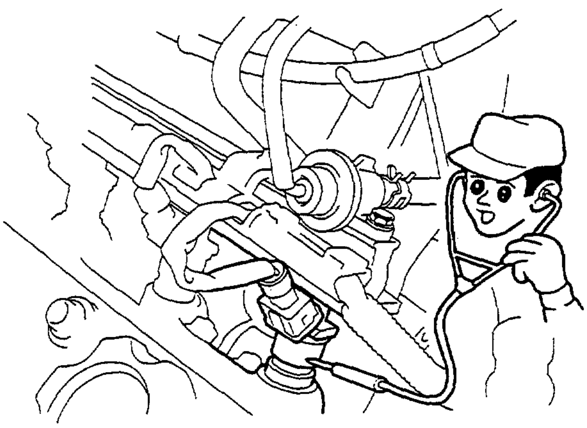
NOTE: Check the following items before testing: idle speed, ignition timing and idle CO%

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.



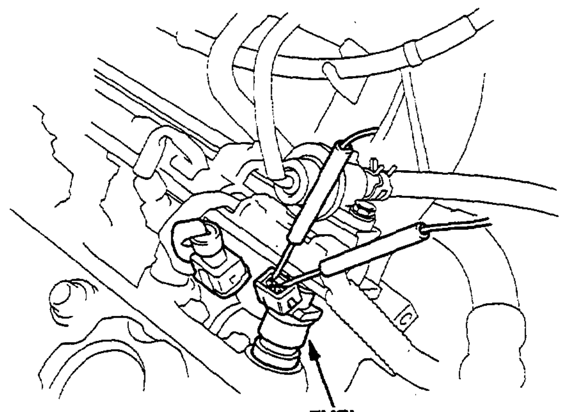
- If any fuel injector fails to make the typical clicking sound, check the sound again after replacing the fuel injector.
- If clicking sound is still absent, check the following.
  - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the PGM-FI main relay and the 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 11-22) and PGM-FI main relay (see page 11-89).

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: 10—13 Ω



- If the resistance is not as specified, replace the fuel injector.
- If the resistance is as specified, check the fuel pressure (see page 11-80).
- 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 fuel injector.
  - Whether there is any short-circuiting, wire breakage or poor connection in the wire betwen the fuel injector and the ECM.

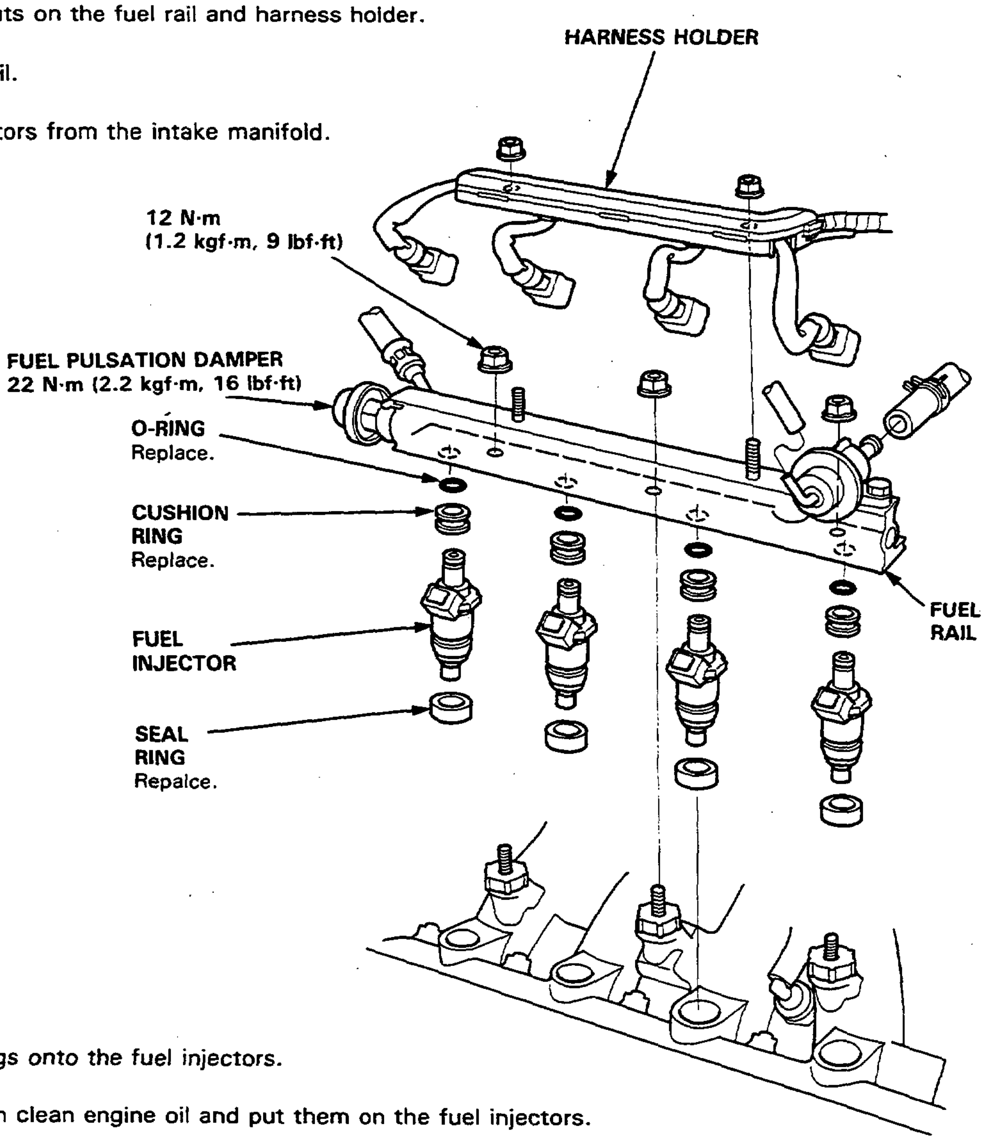
If all is OK, check the ECM (see page 11-22).

Replacement

WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

1. Relieve the fuel pressure (see page 11-80).
2. Disconnect the connectors from the fuel injectors.
3. Disconnect the vacuum hose 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 pulsation damper and fuel hose from the fuel rail.
5. Loosen the retainer nuts on the fuel rail and harness holder.
6. Disconnect the fuel rail.
7. Remove the fuel injectors from the intake manifold.



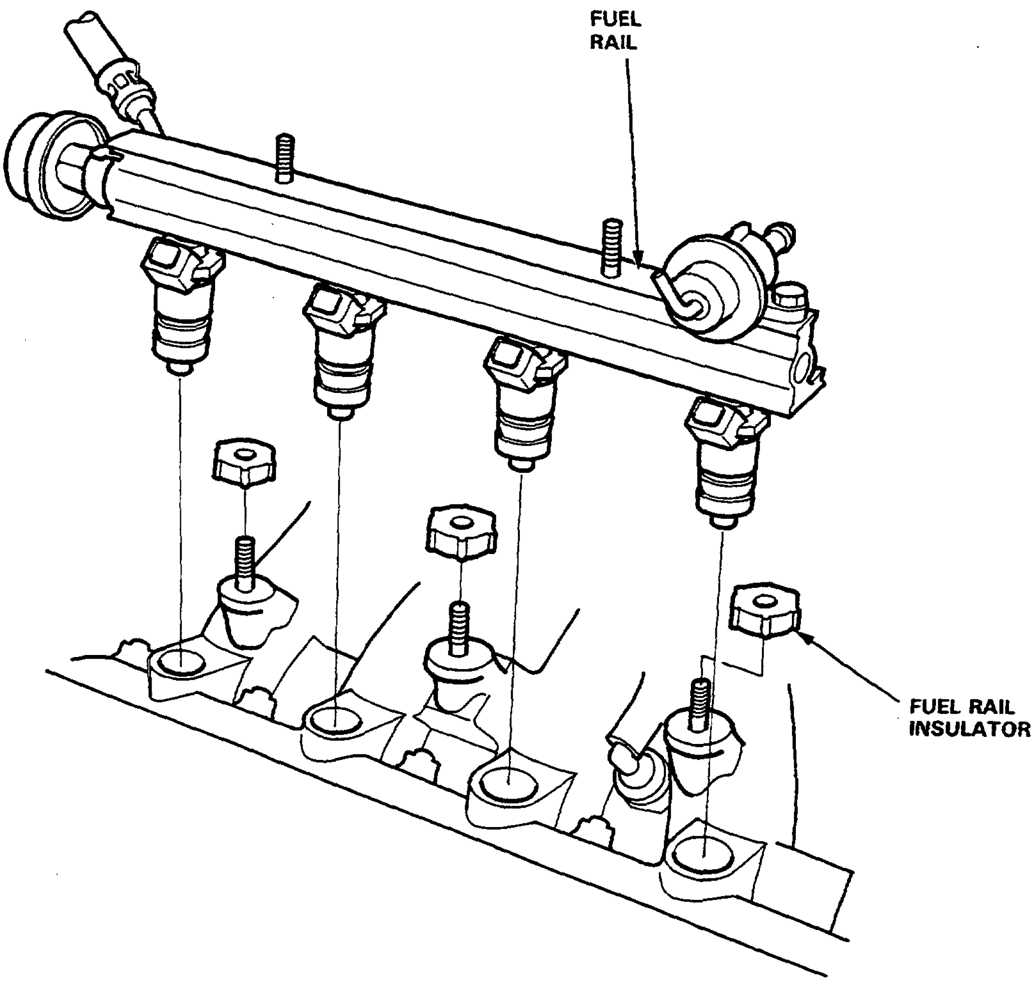
8. Slide new cushion rings onto the fuel injectors.
9. Coat new O-rings with clean engine oil and put them on the fuel injectors.
10. Insert the fuel injectors into the fuel rail first.
11. Coat new seal rings with clean engine oil and press them into the intake manifold.

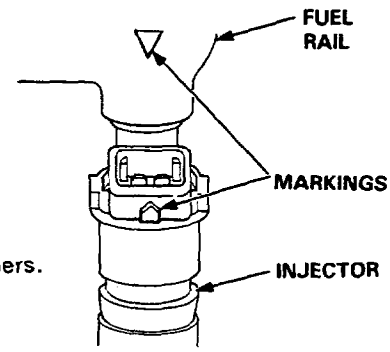
(cont'd)

Fuel Injectors (cont'd)

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.





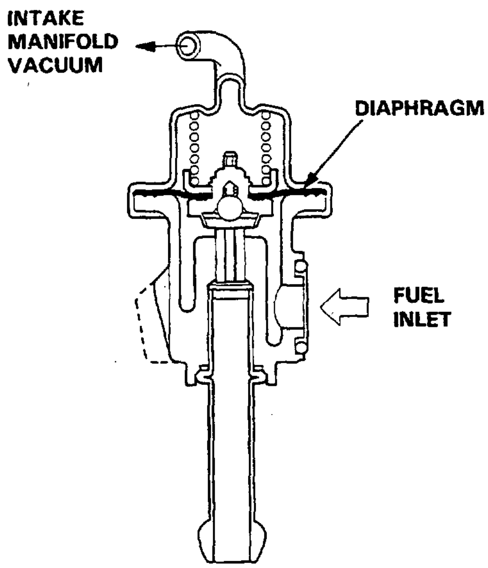
13. Align the center line on the connector with the mark on the fuel rail. (D15Z3 engine only)
14. Install and tighten the retainer nuts.
15. Connect the fuel hose and fuel pulsation damper to the fuel rail with new washers.
16. Connect the vacuum hose and fuel return hose to the fuel pressure regulator.
17. Install the connectors on the fuel injectors.
18. 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 Pressure Regulator

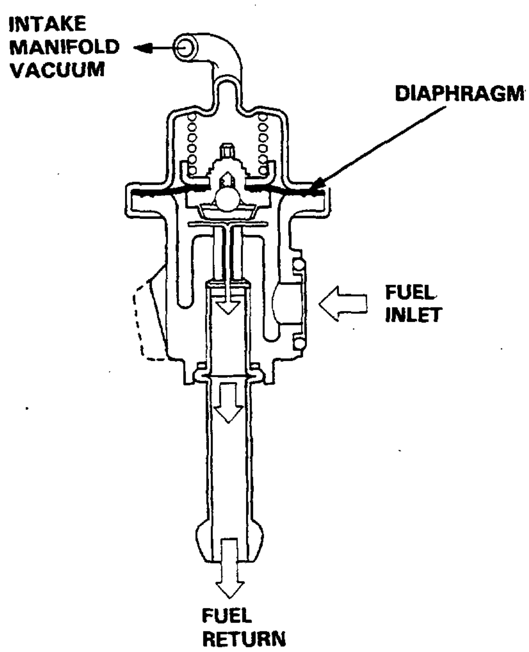
Description

The fuel pressure regulator maintains a constant fuel pressure to the fuel injectors. When the difference between the fuel pressure and manifold pressure exceeds 290 kPa (3.0 kgf/cm², 43 psi), the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.

CLOSED:



OPEN:

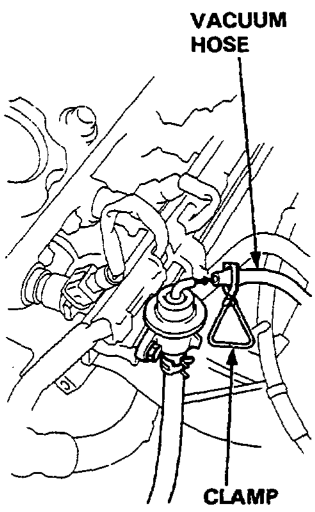


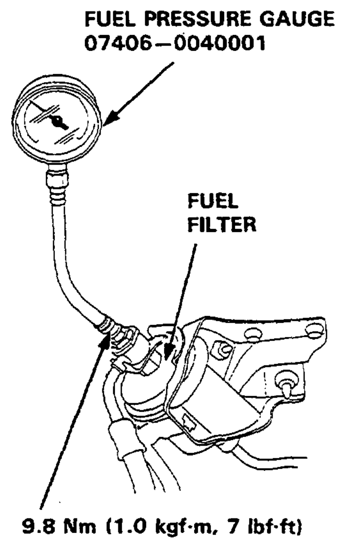
Testing

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 11-80).

   Pressure should be:
   270–320 kPa (2.8–3.3 kgf/cm², 40–47 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.

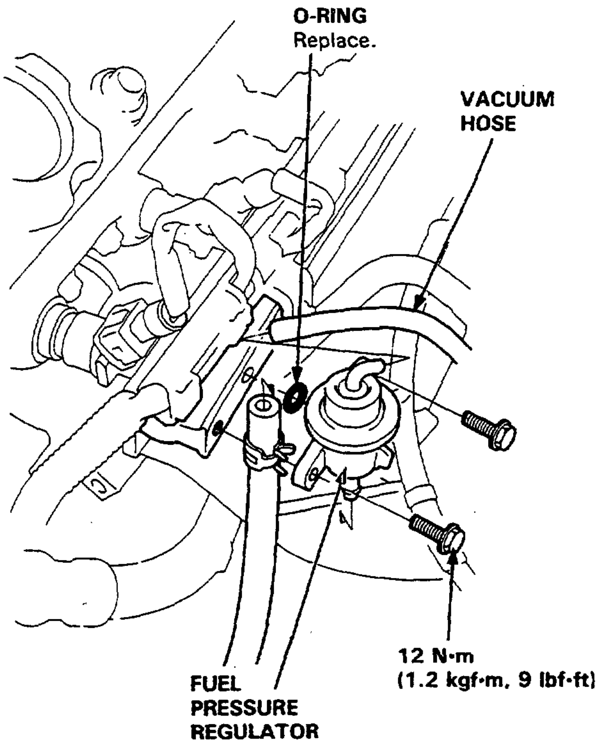
(cont'd)

Fuel Pressure Regulator (cont'd)

Replacement

⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from your work area.

1. Place a shop towel under fuel pressure regulator, then relieve fuel pressure (see page 11-80).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm mounting 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.

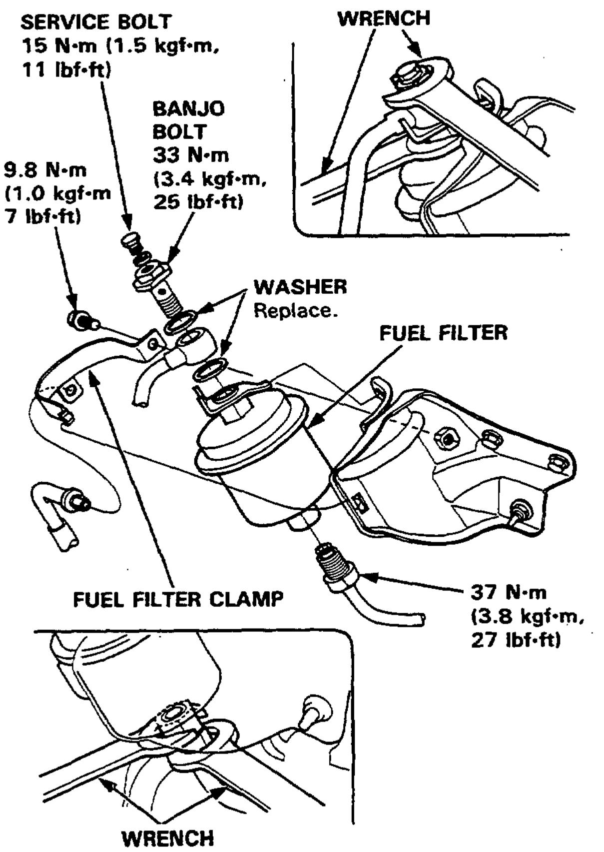
Fuel Filter

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 [270–320 kPa, 2.8–3.3 kgf/cm², 40–47 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.

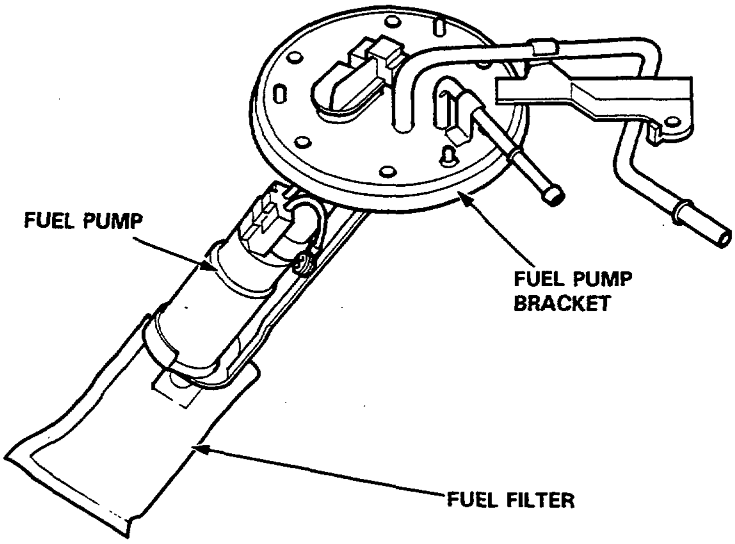
1. Disconnect the battery negative cable from the battery negative terminal.
2. Place a shop towel under and around the fuel filter.
3. Relieve fuel pressure (see page 11-80).
4. Support the fuel filter with a wrench, as shown, then remove the banjo bolt and the fuel feed pipe from the fuel filter.
5. 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.



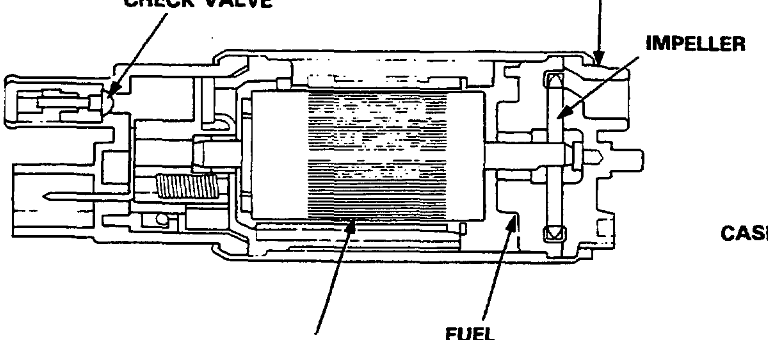
Fuel Pump

Description

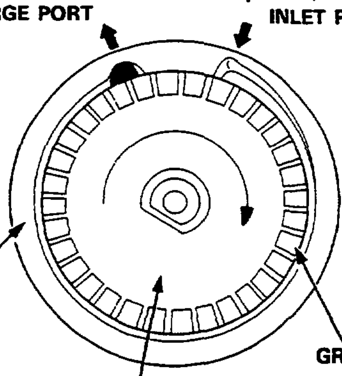
Because of its compact impeller design, the fuel pump (FP) is installed inside the fuel tank, thereby saving space and simplifying the fuel line system.



FUEL PUMP CROSS SECTION (Side view)



FUEL PUMP CROSS SECTION (Top view)



The fuel pump is comprised 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 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 Supply System

Fuel Pump (cont'd)

Testing

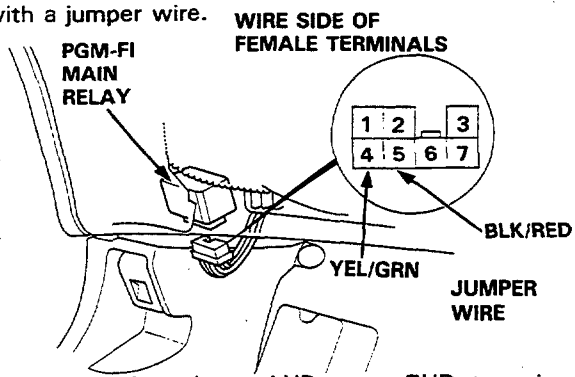
⚠WARNING Do not smoke during the test. Keep open flame away from your work area.

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. Jack up the car and support with jackstands.
2. Disconnect the 6P connector from the fuel unit wire harness.

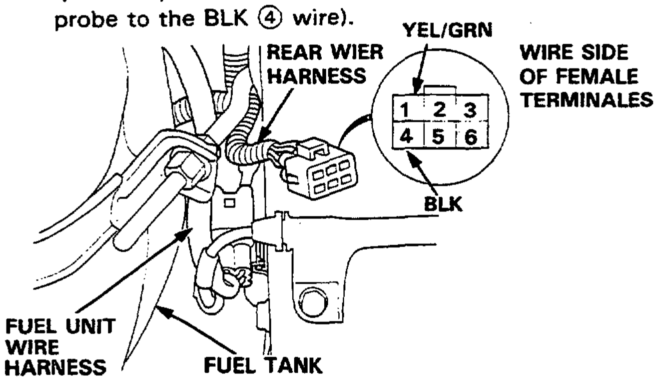
   CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

3. Disconnect the PGM-FI main relay connector and connect the YEL/GRN ④ wire and BLK/RED ⑤ wire with a jumper wire.



The illustration shows LHD type. RHD type is symmetrical.

4. Check that battery voltage is available at the rear wire harness when the ignition switch is turned ON (positive probe to the YEL/GRN ① wire, negative probe to the BLK ④ wire).

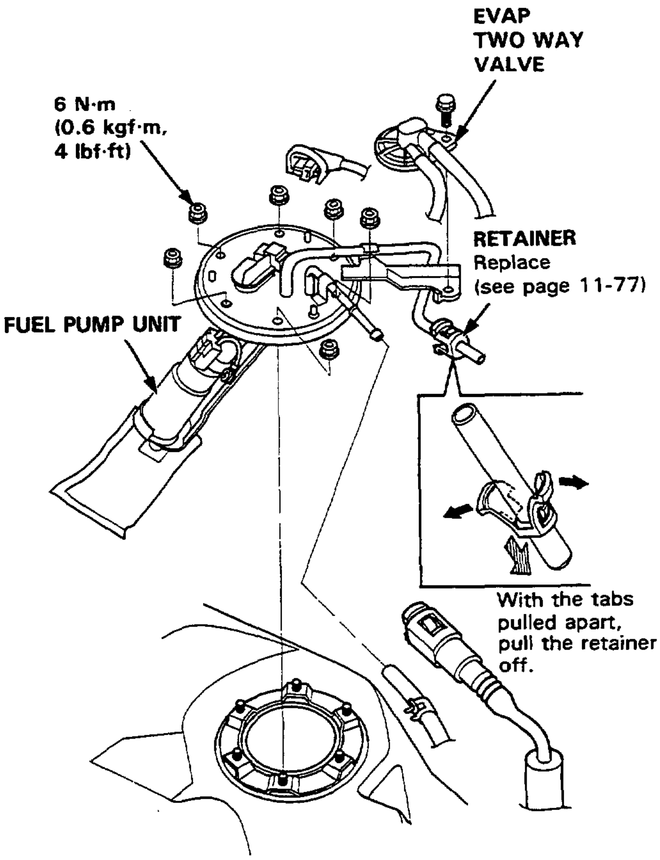


- If battery voltage is available, check the fuel unit wire harness, and replace the fuel pump.
- If there is no voltage, check the fuel pump ground and wire harness (see page 11-90).

Replacement

⚠WARNING Do not smoke while working on fuel system. Keep open flames away from your work area.

1. Relieve fuel pressure (see page 11-80).
2. Remove the fuel tank (see page 11-93).
3. Disconnect the fuel lines and connector from fuel pump.
4. Remove the EVAP two way valve.
5. Remove the fuel pump mounting nuts.
6. Remove the fuel pump from the fuel tank.



PGM-FI Main Relay

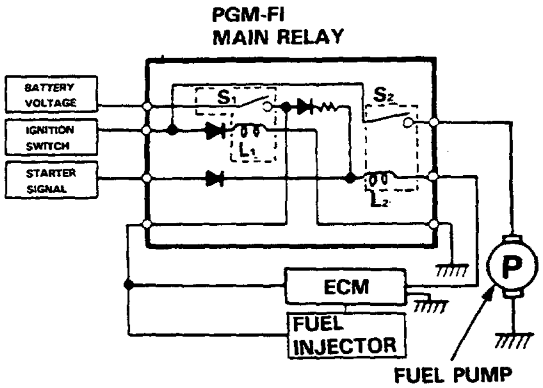
Description

The PGM-FI main relay actually contains two individual relays.

This relay is located at the left side (LHD) or right side (RHD) 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 2 seconds when the ignition is switched on, and when the engine is running, to supply power to the fuel pump.



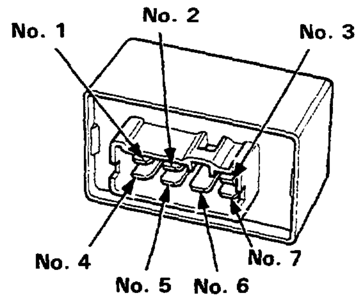
Relay Testing

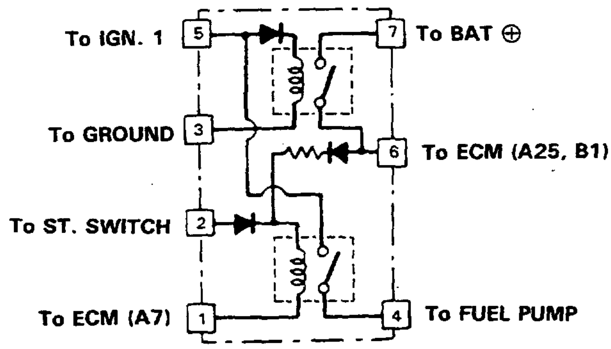
NOTE: If the car starts and continues to run, the PGM-FI main relay is OK.

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.

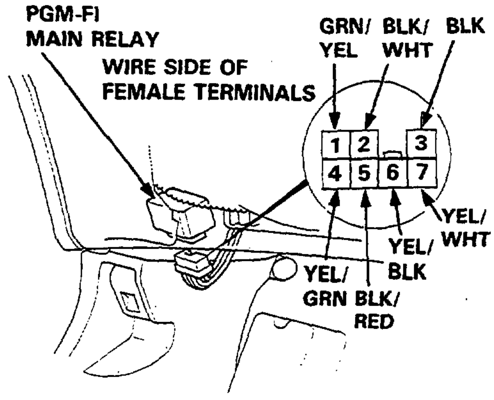
   - If there is continuity, the PGM-FI main relay is OK.
   - If there is no continuity, replace the PGM-FI main relay and retest.

(cont'd)

PGM-FI Main Relay

Troubleshooting Flowchart

NOTE: The inertia switch must be reset by pressing the button.



The illustration shows LHD type. RHD type is symmetrical.

- **Engine will not start.**
- **Inspection of PGM-FI main relay and relay harness.**

↓

Disconnect the PGM-FI main relay connector.

↓

Measure the voltage between YEL/WHT (+) terminal ⑦ and body ground.

↓

Is there battery voltage?

- NO →
  - **Replace the ECM (ECM) (15 A) fuse in the under-hood fuse/relay box.**
  - **Repair open in the YEL/WHT wire between the PGM-FI main relay and the ECU (ECM) (15 A) fuse.**
- YES ↓

Turn the ignition switch ON.

↓

Measure the voltage between BLK/RED (+) terminal ⑤ and body ground.

↓

Is there battery voltage?

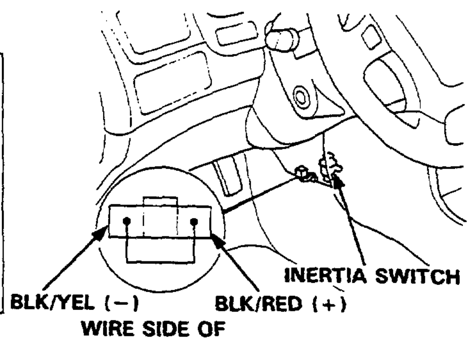
- NO → Disconnect the 3P connector from the inertia switch.
  ↓
  Measure the voltage between BLK/YEL (+) terminal and BLK/ RED (–) terminal.
  ↓
  Is there battery voltage?
  - NO →
    - **Replace the No. 2 No. 26 (15 A) fuse in the under-dash fuse/relay box.**
    - **Repair open in the BLK/YEL wire between the inertia switch and the No. 26 (15 A) fuse.**
    - **Repair open in the BLK/RED wire between the PGM-FI main relay and inertia switch.**
  - YES → **Replace the inertia switch.**
- YES ↓

Measure the voltage between BLK/RED (+) terminal ⑤ and BLK (–) terminal ③.

↓

Is there battery voltage?

- NO →
  - **Repair open in BLK wire between PGM-FI main relay and G101 (located at thermostat housing).**
  - **Repair open in BLK wire between PGM-FI main relay and spider unit (with spider system model only).**
  - **Check the spider unit (with spider system model only).**
- YES ↓



The illustration shows LHD type. RHD type is symmetrical.

(To page 11-91)

(From page 11-90)

Turn the ignition switch to the START position.

NOTE:
- M/T: Clutch pedal must be depressed.
- A/T: Transmission in $\boxed{N}$ or $\boxed{P}$ position.

Measure the voltage between BLK/WHT (+) terminal ② and body ground.

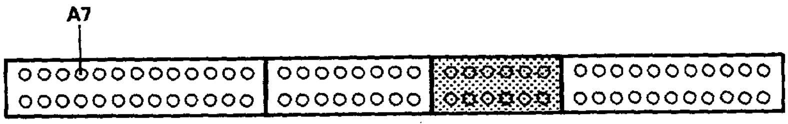
Is there battery voltage?

NO →
- Replace the No. 18 STARTER SIGNAL (7.5 A) fuse in the under-dash fuse/relay box.
- Repair open in the BLK/WHT wire between the PGM-FI main relay and the No. 18 STARTER SIGNAL (7.5 A) fuse.

YES ↓

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 11-17).



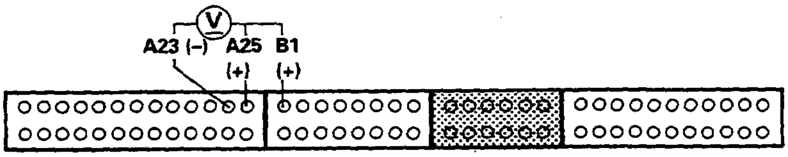
Check for continuity between GRN/YEL terminal ① and A7 terminal.

Is there continuity?

NO → Repair open in GRN/YEL 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.
- Repair open in the BLK wire between the ECM (A23) and G101 (located at thermostat housing).
- Replace the PGM-FI main relay.

YES ↓

(To page 11-92)

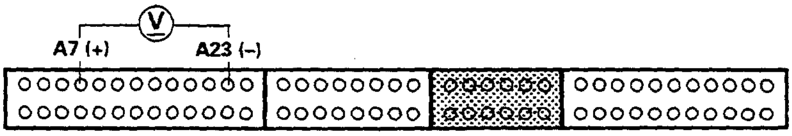
(cont'd)

PGM-FI Main Relay (cont'd)

(From page 11-90)

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?

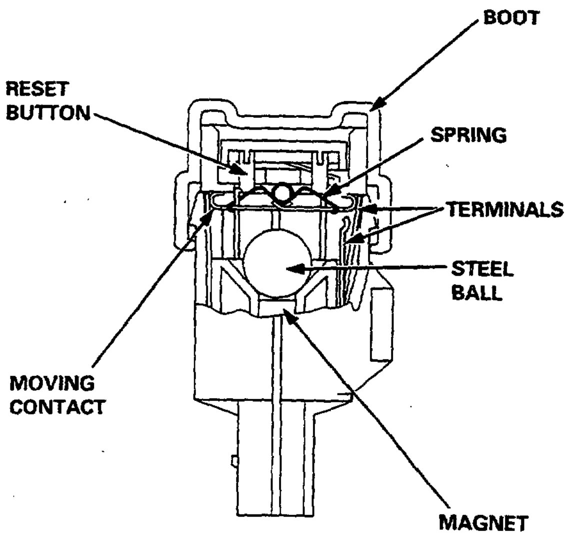
NO → **Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.**

YES → **Check the PGM-FI main relay.**

Inertia Switch

Description

The inertia switch is a safety device which automatically cuts off the fuel supply in the event of a collision or sudden impact. The switch is located behind the front ashtray on the driver side. After an impact, the switch must be reset by pressing the button before the engine can be restarted.

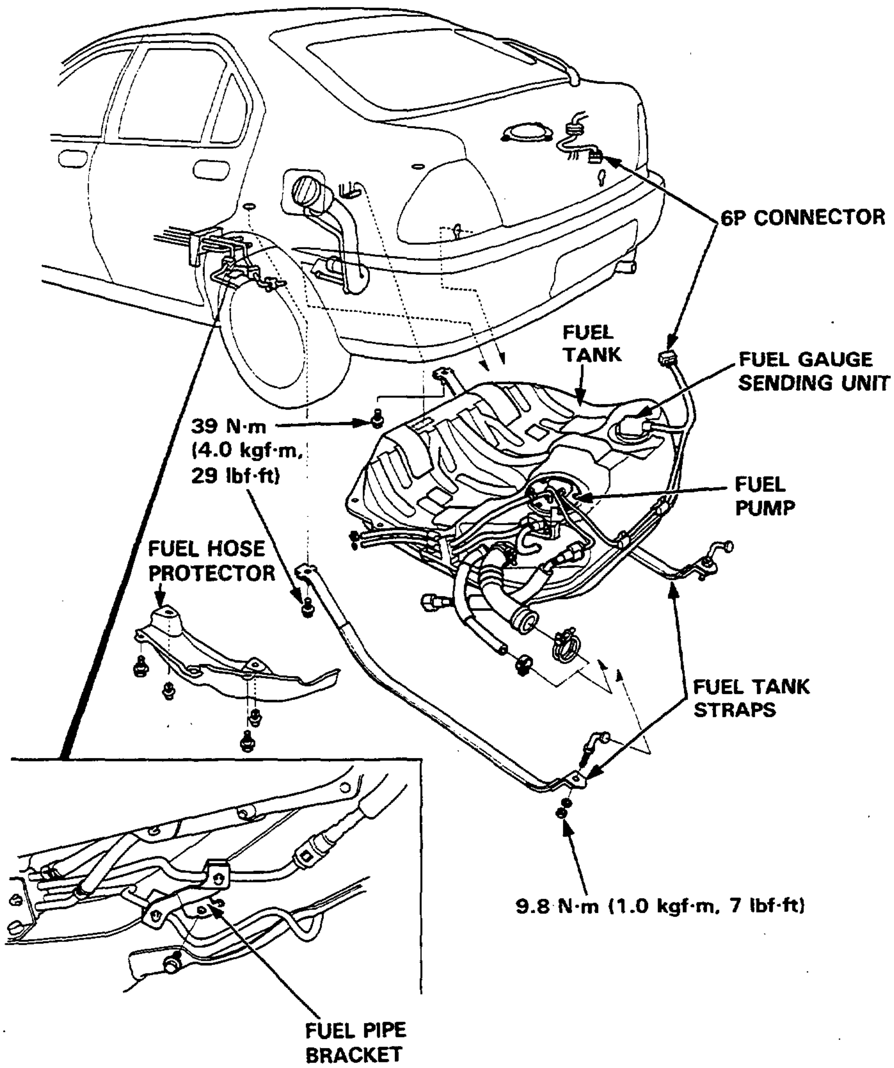


Fuel Tank

Replacement

⚠ WARNING **Do not smoke while working on fuel system. Keep open flames away from your work area.**

1. Relieve the fuel pressure (see page 11-80).
2. Jack up the car and support with jackstands.
3. Remove the fuel hose protector.
4. Remove the fuel pipe bracket.
5. Disconnect the hoses and quick-connect fittings (see page 11-77).
   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. Disconnect the 6P connector.
7. Place a jack, or other support, under the tank.
8. Remove the strap nuts and let the straps fall free.
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 parts in the reverse order of removal.
    NOTE: Before connecting the quick-connect fittings, install the fuel tube/quick-connect fittings assembly sponge rubber location between fuel tank flange and fuel fill tube.



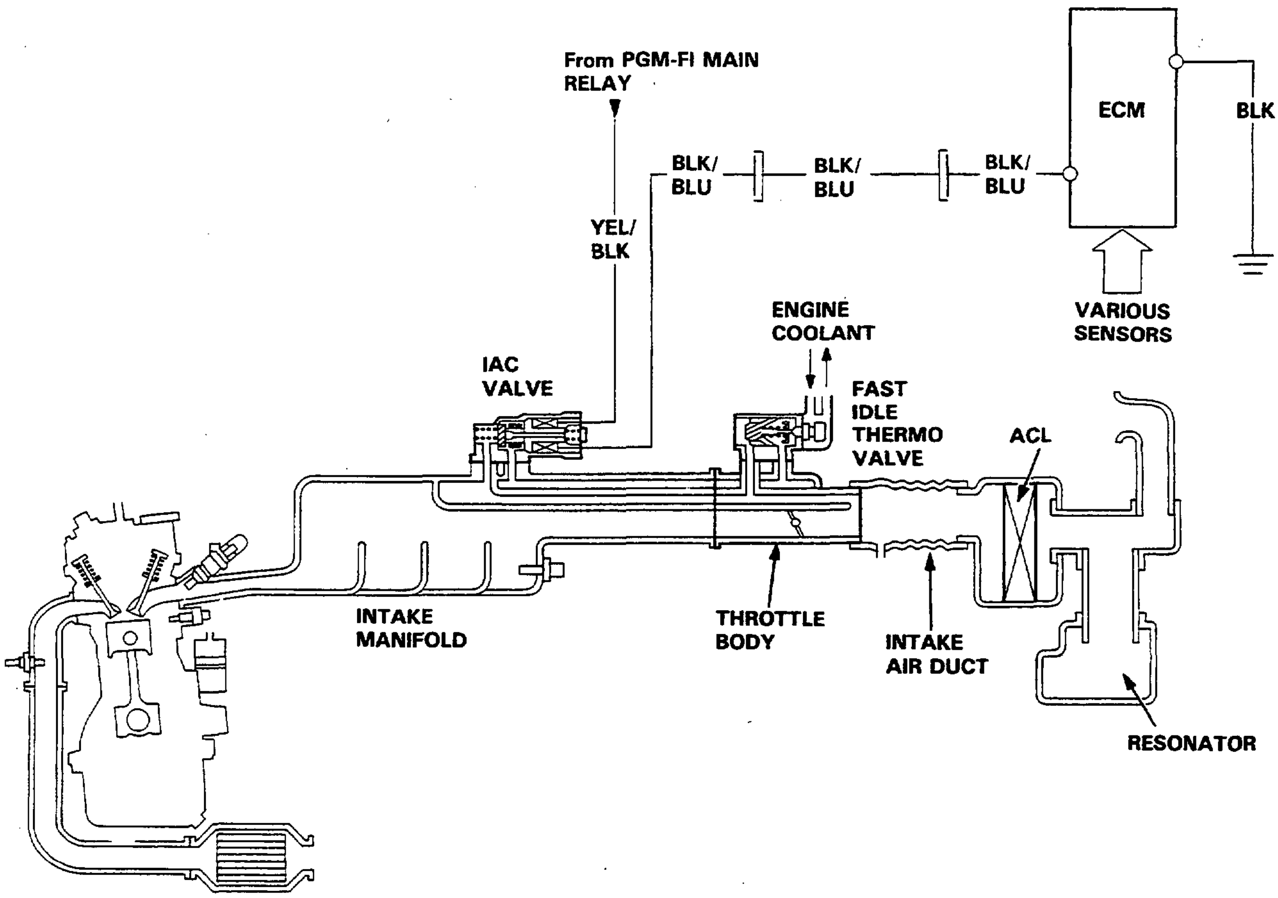
System Troubleshooting Guide

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.

SUB-SYSTEM / SYMPTOM	THROTTLE CABLE	THROTTLE BODY	AIR CLEANER AND INTAKE AIR DUCT
PAGE	11-97	11-98	11-96
WHEN COLD FAST IDLE OUT OF SPEC		①	
WHEN WARM IDLE SPEED TOO HIGH	②	①	
LOSS OF POWER		①	②

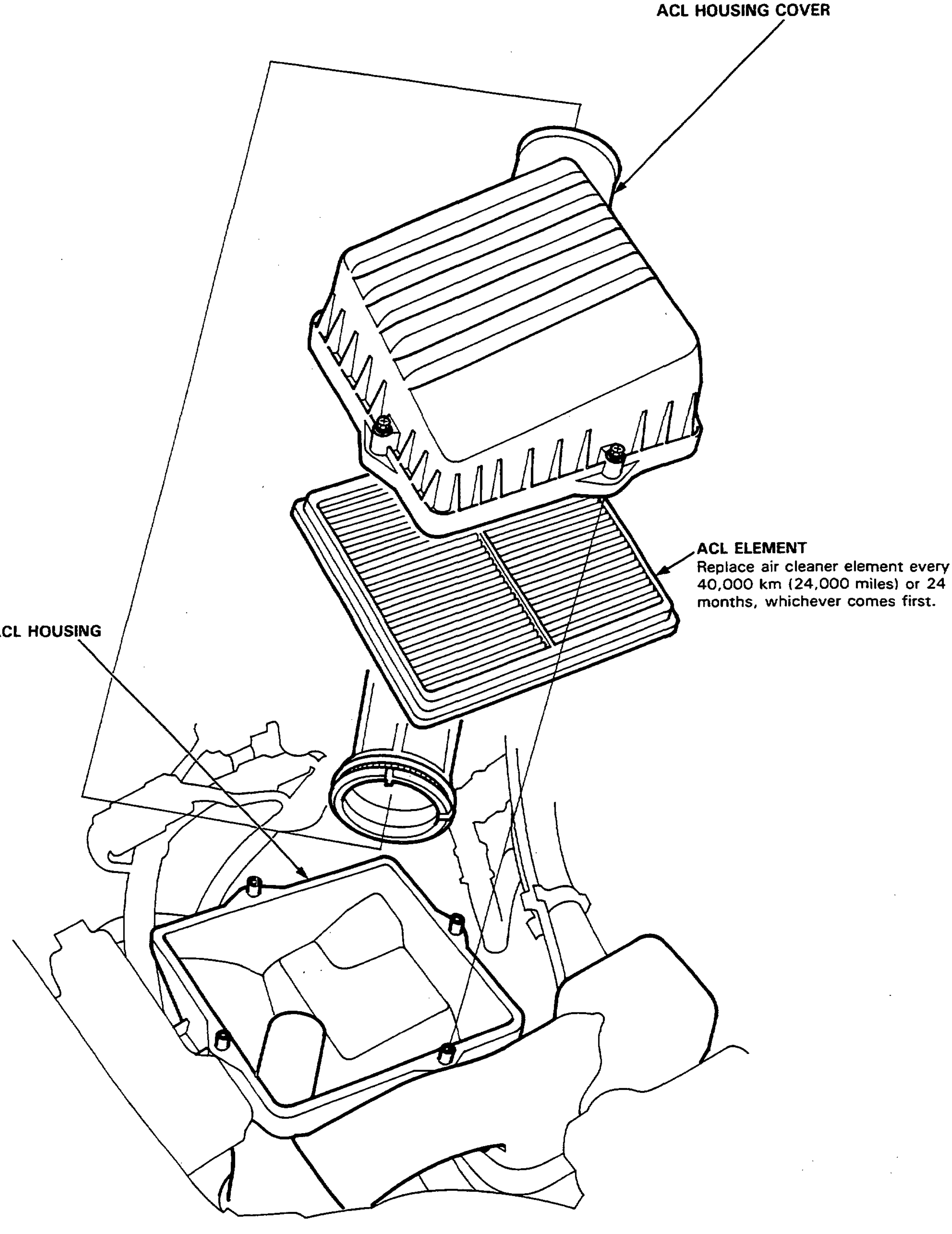
System Description

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 Valve (IAC) Valve, fast idle thermo valve, and intake manifold. A resonator in the intake air pipe provides additional silencing as air is drawn into the system.



Air Cleaner

Air Cleaner (ACL) Element Replacement



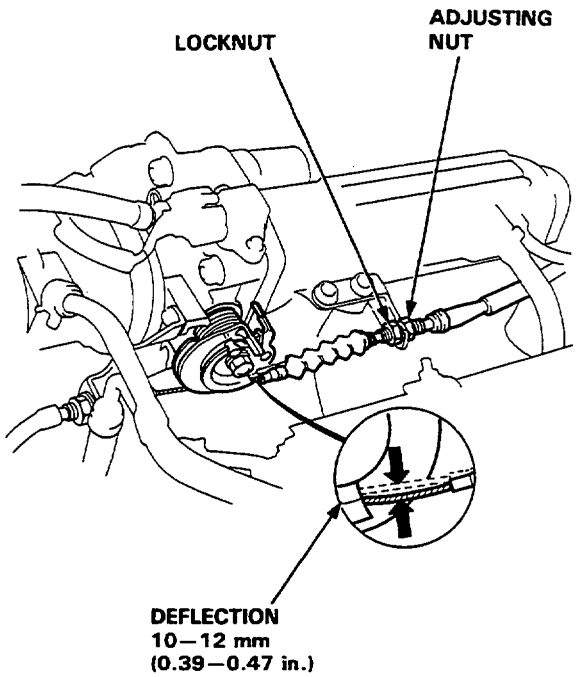
Throttle Cable

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. Check cable free play at the throttle linkage. Cable deflection should be 10—12 mm (0.39—0.47 in.).



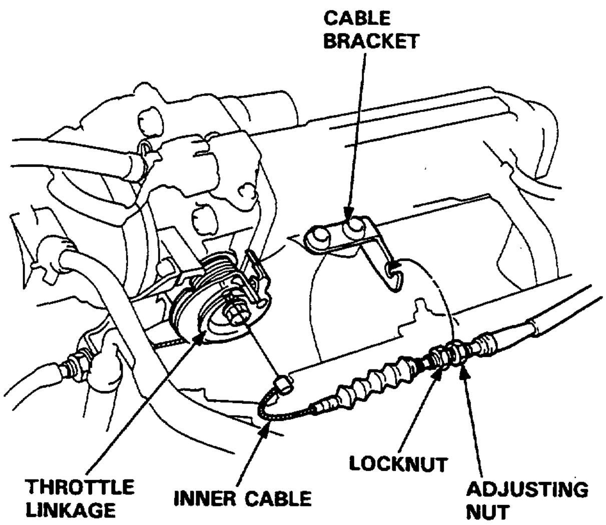
4. If deflection is not within specs, loosen the locknut, turn the adjusting nut until the deflection is as specified, then retighten the locknut.

5. 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.

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.

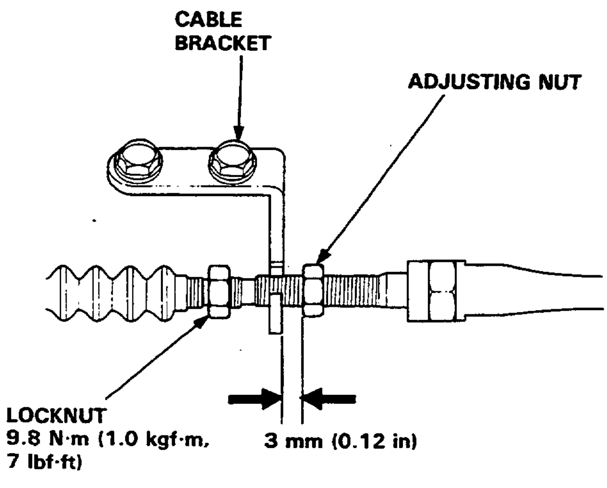
2. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.



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.

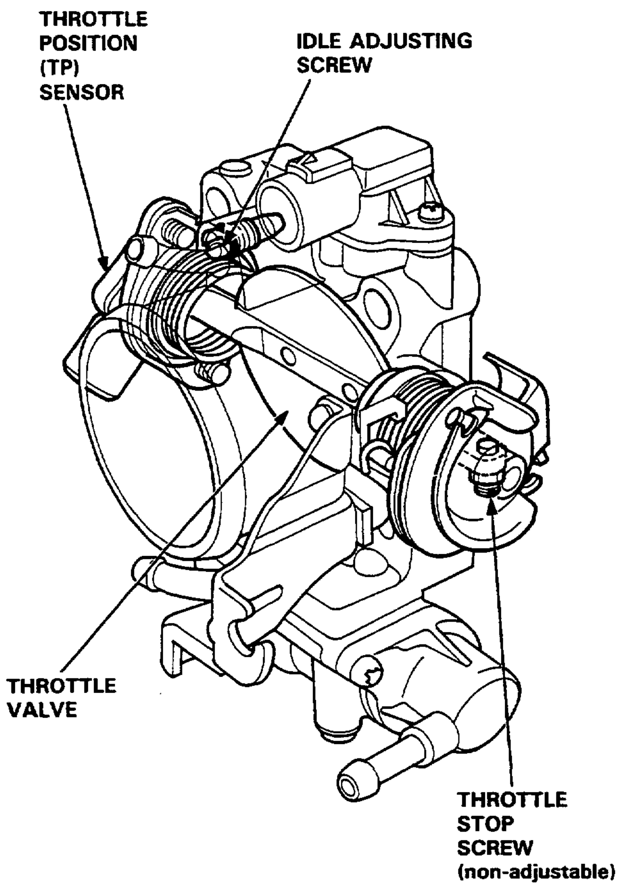
5. Tighten the locknut. The cable deflection should now be 10—12 mm (0.39—0.47 in.). If not, see Inspection/Adjustment.



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 which is fed 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.

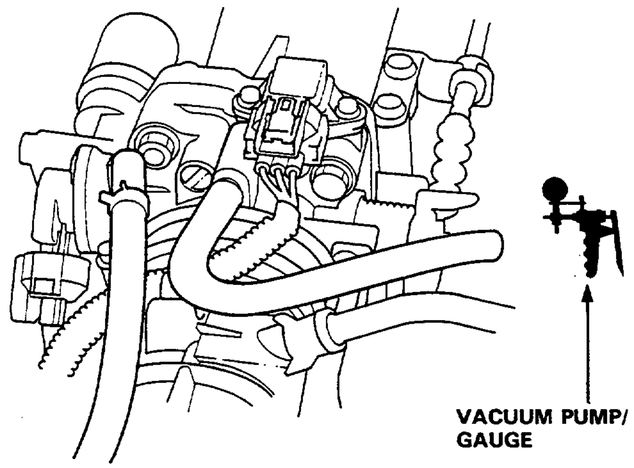


Inspection

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.

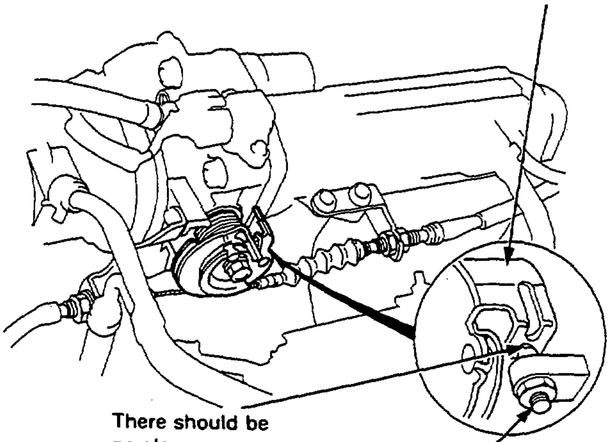


3. Allow the engine to idle and check that the gauge indicates no vacuum.
   - If there is vacuum, check the throttle cable (see page 11-97).

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.

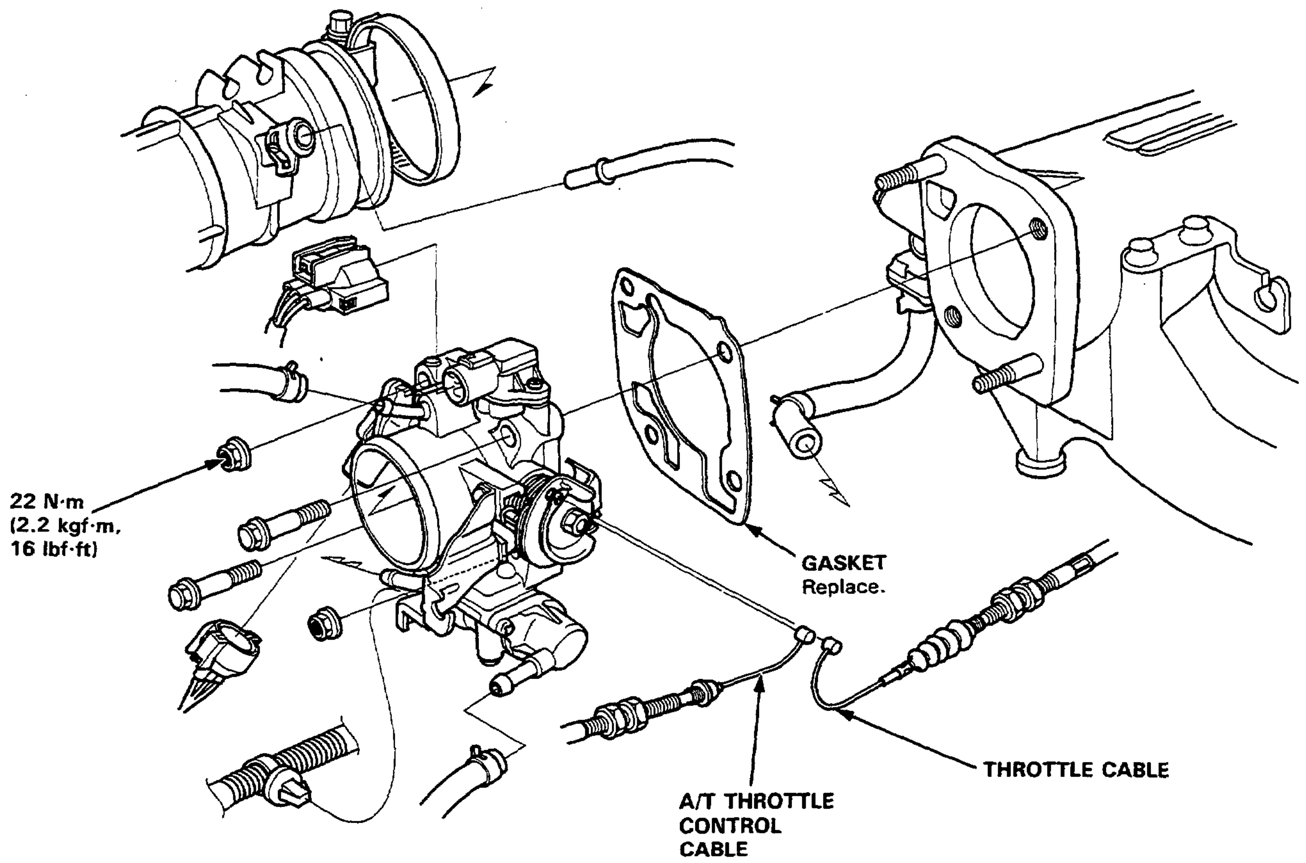


Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

(cont'd)

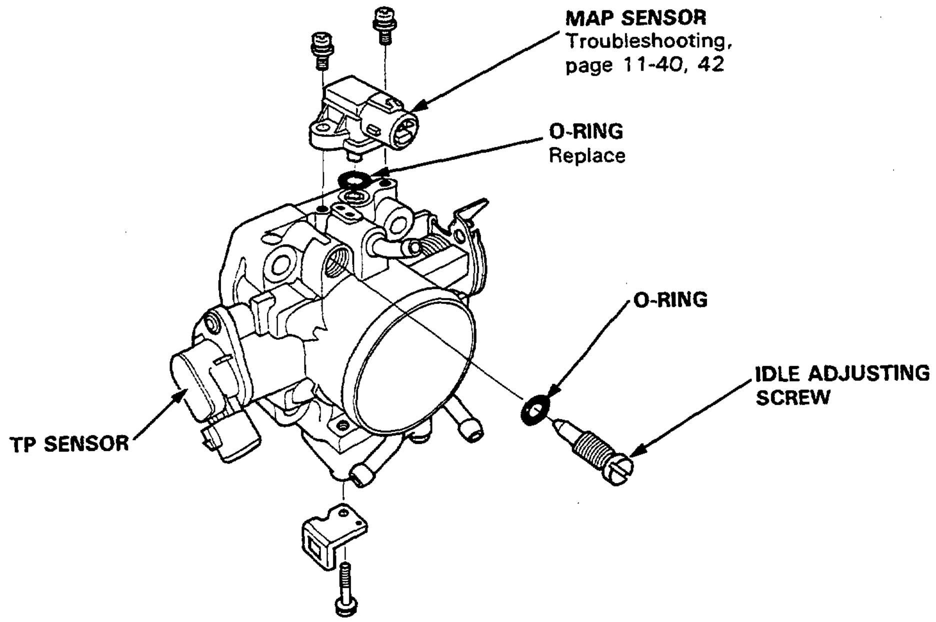
Throttle Body (cont'd)

Disassembly

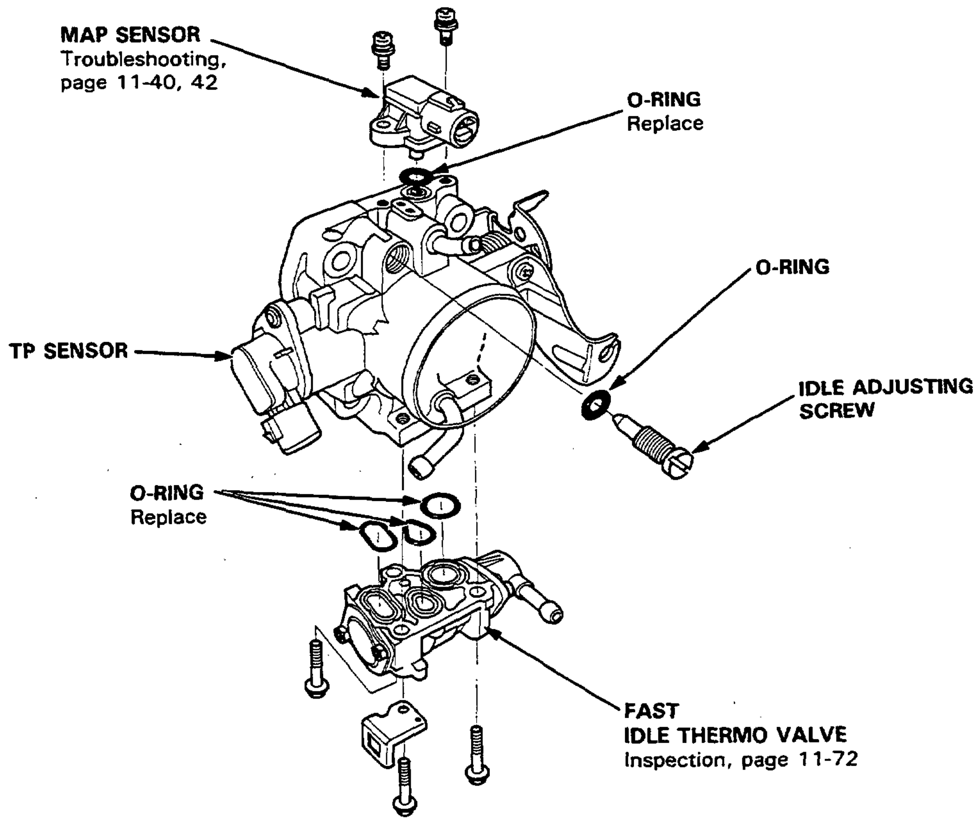


CAUTION:
- The throttle stop screw is non-adjustable.
- After reassembly, adjust the throttle cable (page 11-97), and A/T throttle control cable (section 14) for cars with A/T.
- The TP sensor is not removable.

D15Z3 engine:



Except D15Z3 engine:



Emission 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 most likely system ②, etc.

SUB-SYSTEM / SYMPTOM		THREE WAY CATALYTIC CONVERTER	EXHAUST GAS RECIRCULATION SYSTEM (D15Z3 engine only)	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
PAGE		11-103	11-104	11-109	11-110
ROUGH IDLE			①	②	
FREQUENT STALLING	AFTER WARMING UP		①		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		①		
	FAILS EMISSION TEST	①	③		②
	LOSS OF POWER	①	②		

System Description

The emission control system includes a Three Way Catalytic Converter (TWC), Exhaust Gas Recirculation (EGR) system (D15Z3 engine), 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.

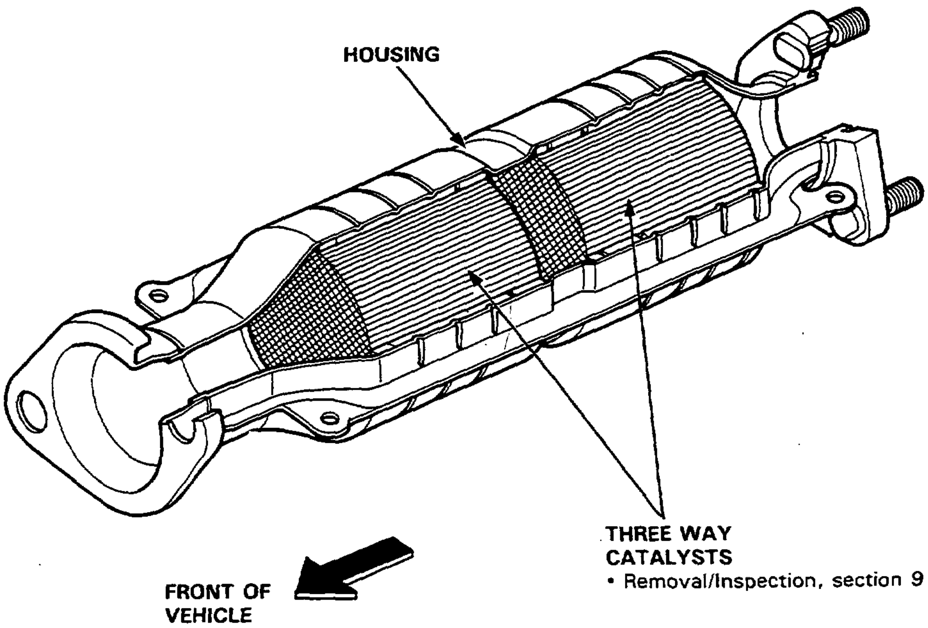
1. Connect a tachometer.
2. Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (A/T in [N] or [P] position, M/T in neutral) until the radiator fan comes on, then let it idle.
3. Check and adjust the idle speed, if necessary (see page 11-73).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

   CO meter should indicate 0.1% maximum.

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.

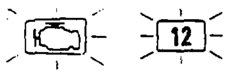


The illustration shows the TWC for except D15Z3 engine.

(cont'd)

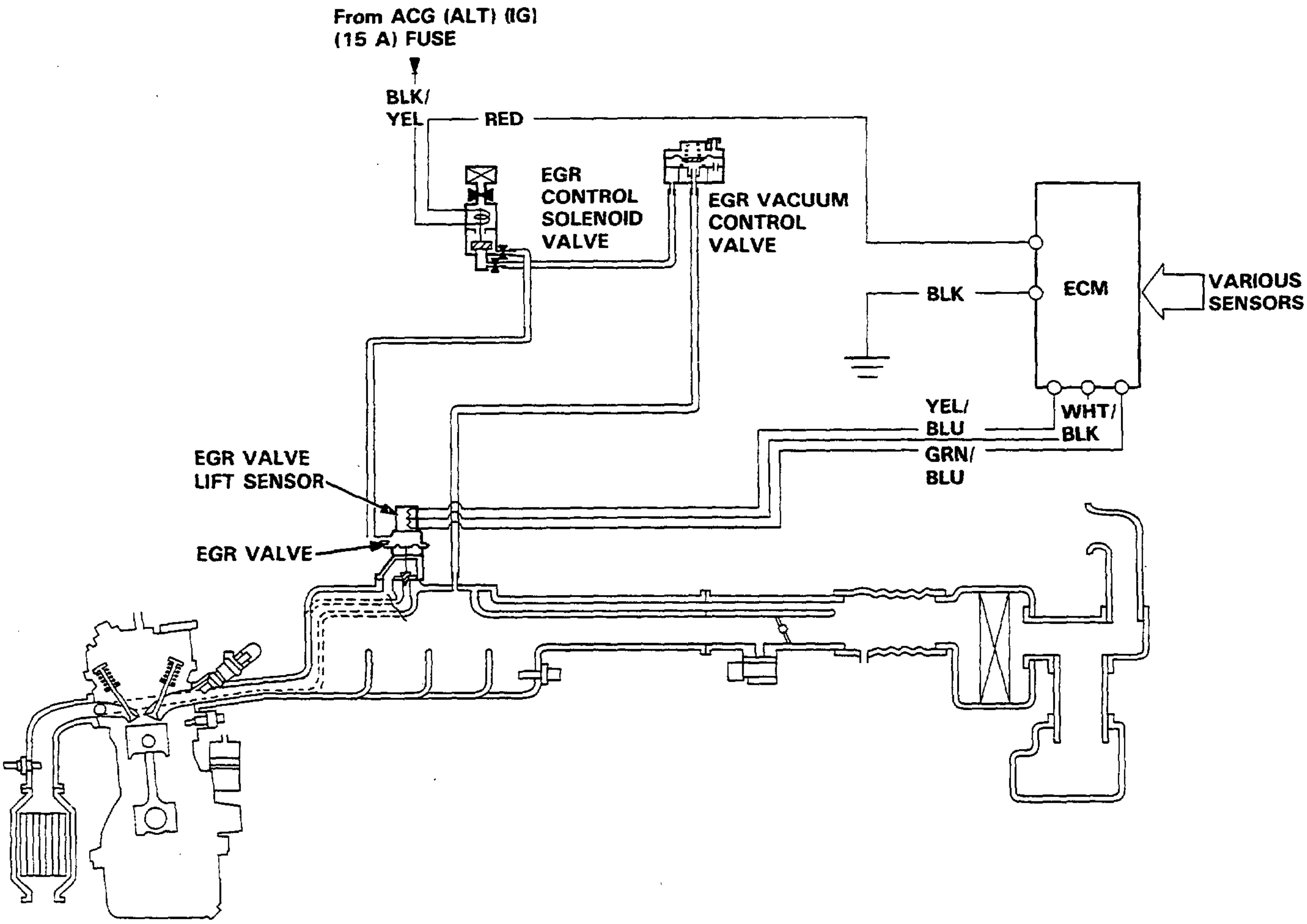
Emission Control System

Exhaust Gas Recirculation (EGR) System [D15Z3 engine]



The Malfunction Indicator Lamp (MIL) indicates code 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 comprised 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 11-14), code 12 is indicated.

↓

Do the ECM Reset Procedure (see page 11-15).

↓

Connect the SCS short connector to the service check connector (see page 11-14).

↓

Road test necessary: Start the engine. Hold the engine at 3,000 rpm (min^{-1}) with no load (M/T in neutral) until the radiator fan comes on, then let it idle.
Drive the car on the road for approx. 10 minutes. With the transmission in 1st or 2nd gear, try to keep the engine speed in the 1,700–2,800 rpm (min^{-1}).

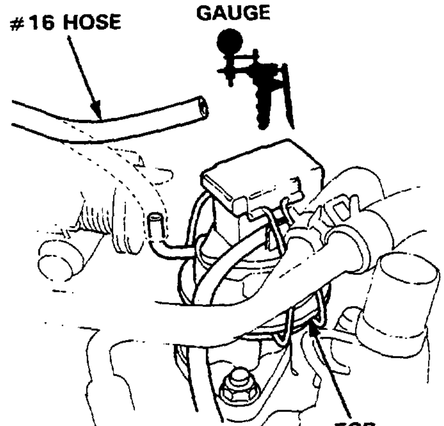
↓

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, EGR control solenoid valve and ECM.**

YES ↓

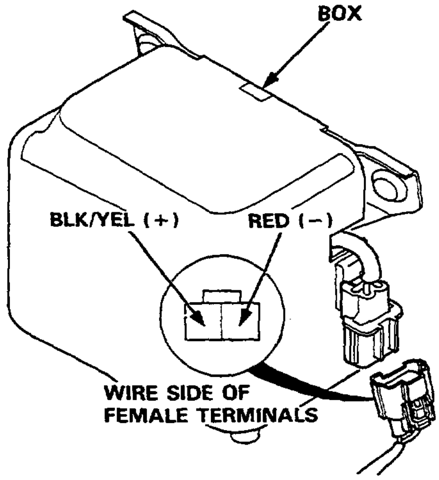
With the engine at idle, disconnect the #16 hose from the EGR valve and connect a vacuum pump/gauge to the hose.



↓

Is there any vacuum?

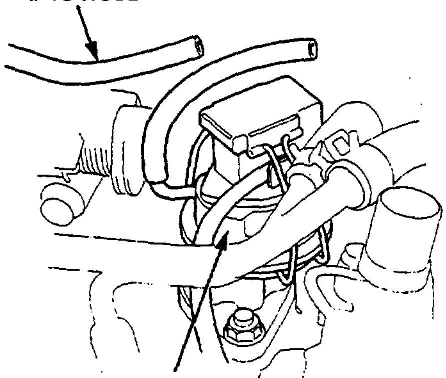
YES → Disconnect 2P connector from the control box and check the #16 hose for vacuum again.



↓ B (To page 11-106)

NO ↓

Move the vacuum pump/gauge to the EGR valve.



↓ A (To page 11-106)

(cont'd)

Exhaust Gas Recirculation (EGR) System [D15Z3 engine] (cont'd)

(From page 11-105)

A

With the engine at idle, apply 26.7 kPa (200 mmHg, 7.87 in. Hg) of vacuum to the EGR valve.

Does the engine stall or run rough and does the EGR valve hold vacuum?

NO → **Replace 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 and body ground.

Is there battery voltage?

NO → **Repair open or short in BLK/YEL wire between the EGR control solenoid valve and No. 12 (with SRS: No. 24) ACG (ALT) (IG) (15 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 11-107)

(From page 11-105)

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.

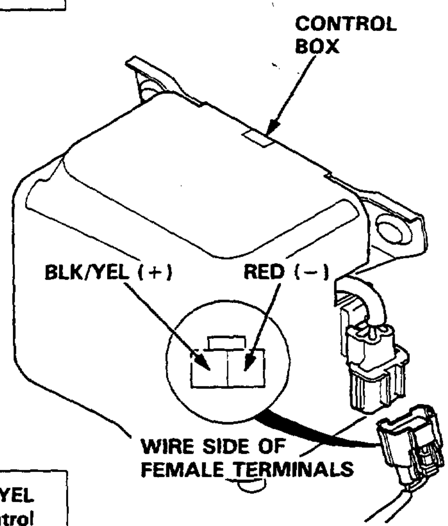
Check for continuity to ground on RED wire of 2P connector.

Is there continuity?

YES → **Repair short in RED wire between EGR control solenoid valve and ECM (A11).**

NO

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



(From page 11-106)

Connect the battery positive terminal to the A terminal of the 2P connector. While watching the vacuum gauge, connect the battery negative terminal to the B terminal.

Is there approx, 26.7 kPa (200 mmHg, 7.87 in. Hg) within 1 second?

NO → Turn the ignition switch OFF and inspect the #16 and #10 hoses for leaks, restrictions, or misrouting.

Are the hoses OK?

NO → Correct as necessary.

YES → Disconnect the lower hose on EGR control solenoid valve and connect a vacuum gauge to the hose.

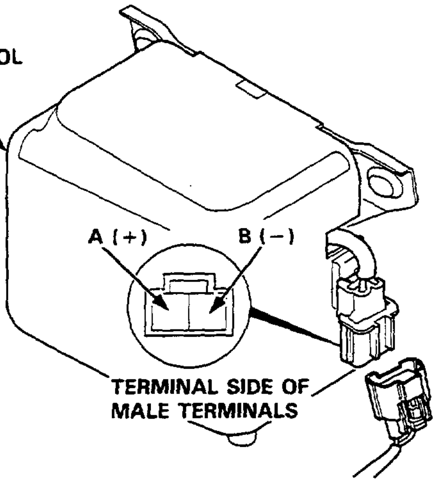
Start the engine and allow it to idle.

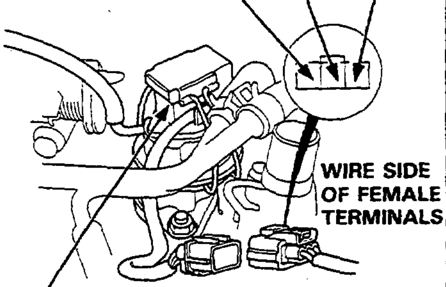
Is there 20.0—33.3 kPa (150—250 mmHg, 5.91—9.84 in. Hg) of vacuum?

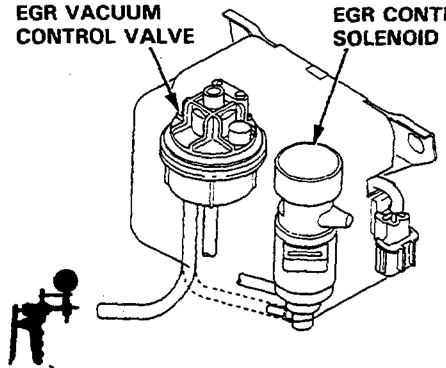
NO → Replace the EGR vacuum control valve.

YES → Replace the EGR control solenoid valve.

YES (from 26.7 kPa check) → Turn the ignition switch OFF and reconnect the 2P connector.







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 approx. 5V?

YES → A (To page 11-108)

NO → Measure voltage between YEL/BLU (+) terminal and body ground.

→ B (To page 11-108)

(cont'd)

Exhaust Gas Recirculation (EGR) System [D15Z3 engine] (cont'd)

(From page 11-107)

A

Turn the ignition switch OFF.

Reconnect the 3P connector to the EGR valve.

Connect the test harness between the ECM and connectors (see page 11-17).

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 26.7 kPa (200 mmHg, 7.87 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 ↓

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 A11 terminal to A26 terminal with a jumper wire.

Did the engine stall or run rough?

NO → **Repair open in RED wire between ECM (A11) and EGR control solenoid valve.**

YES ↓

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

(From page 11-107)

B

Is there approx. 5 V?

YES → **Repair open in GRN/BLU wire between EGR valve lift sensor and ECM (D22).**

NO ↓

Turn the ignition switch OFF.

Connect the test harness "D" connector to the ECM only, not to the main wire harness (see page 11-17).

Turn the ignition switch ON.

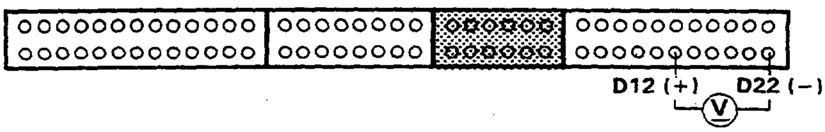
Measure voltage between D20 (+) terminal and D22 (−) terminal.

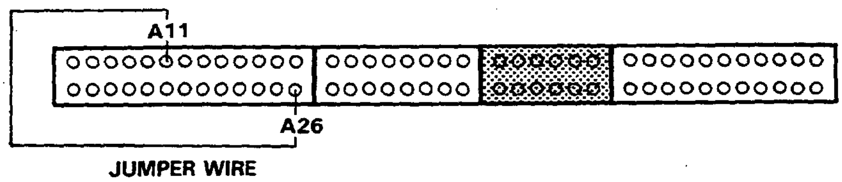
Is there approx. 5 V?

YES → **Repair open or short in YEL/BLU wire between EGR valve lift sensor and ECM (D20).**

NO ↓

Substitute a known-good ECM and recheck. If prescribed voltage is now available, replace the original ECM.

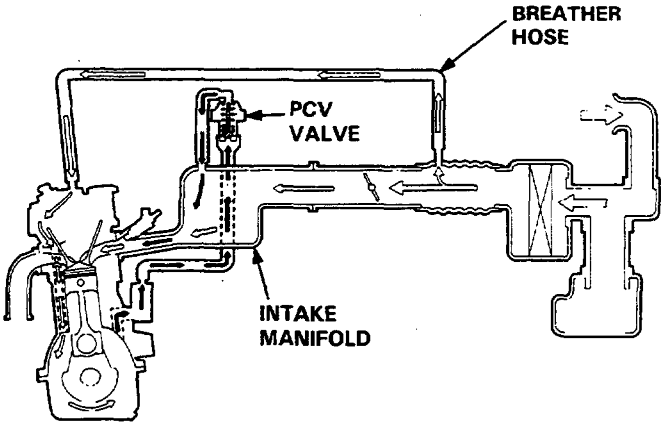




Positive Crankcase Ventilation (PCV) System

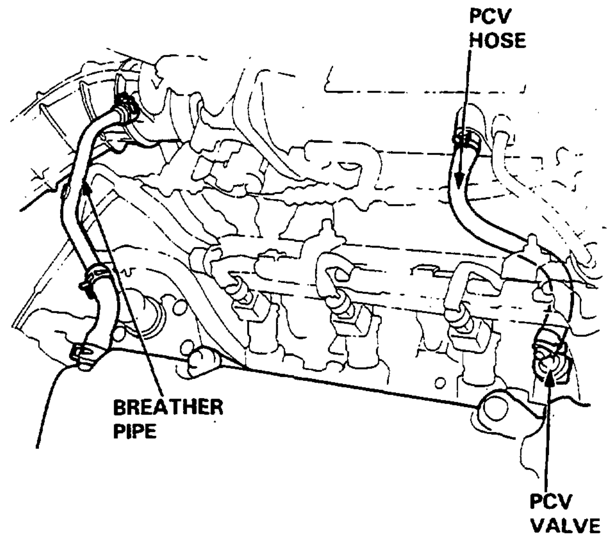
Description

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.

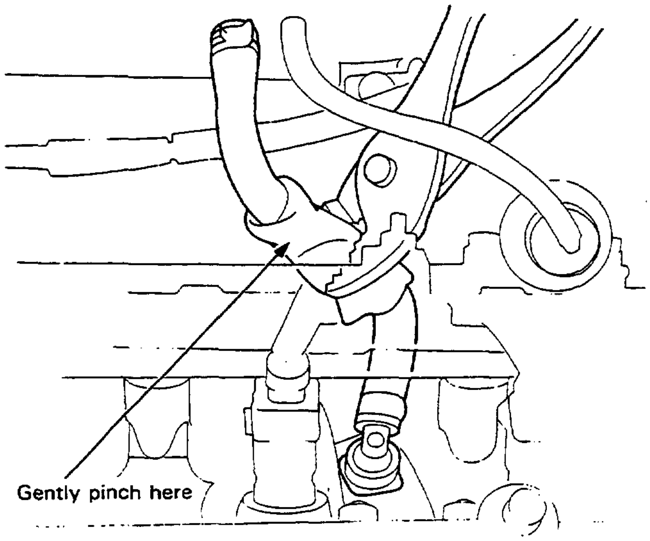


Inspection

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.

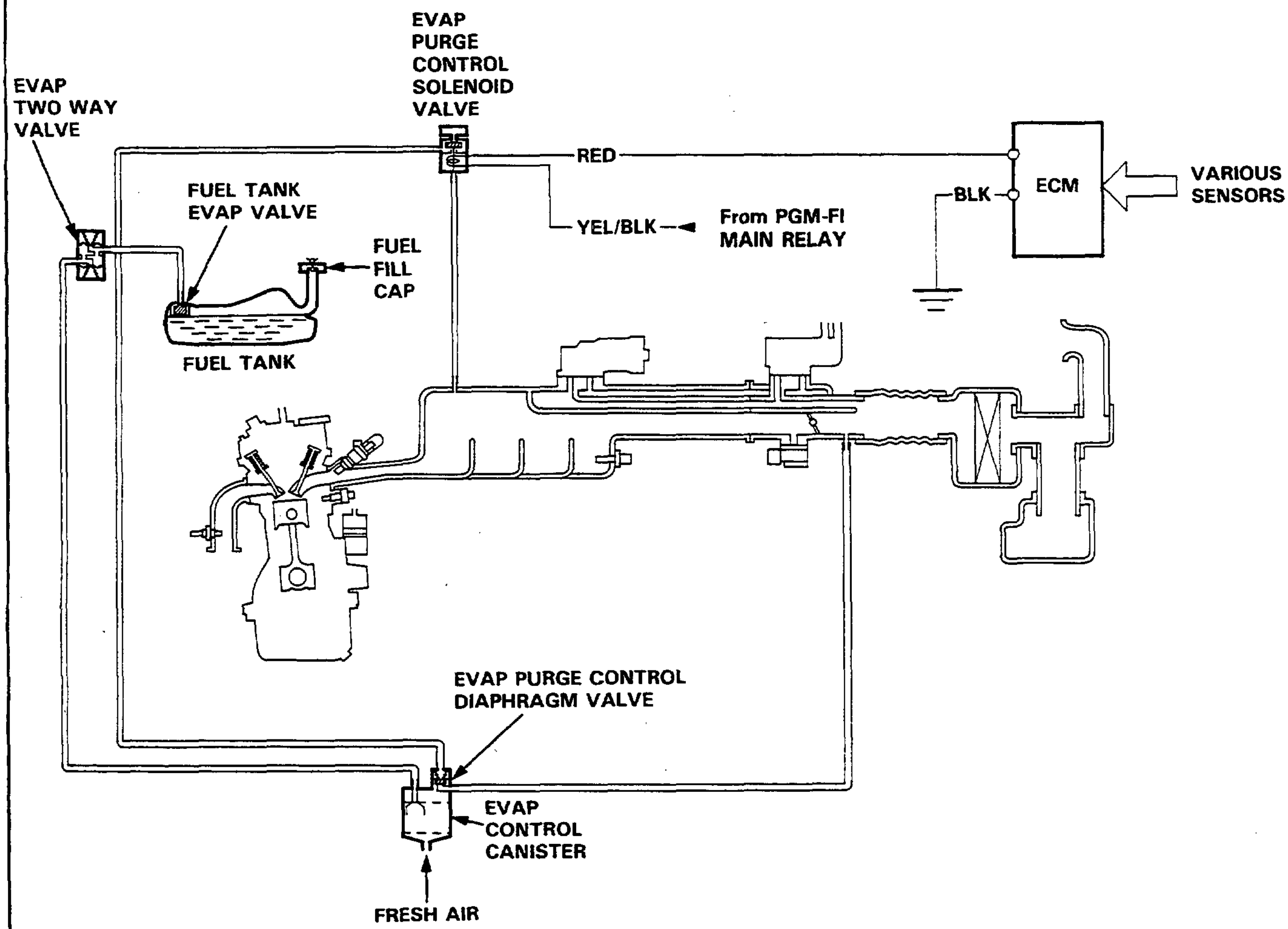
B. **Vapor Purge Control System**
EVAP control canister purging is accomplished by drawing fresh air through the EVAP control canister and into a port on the throttle body. The purging vacuum is controlled by the EVAP purge control diaphragm valve and the EVAP purge control solenoid valve.

EVAP PURGE CONTROL SOLENOID VALVE OFF AFTER STARTING ENGINE
(EVAP PURGE CONTROL DIAPHRAGM VALVE OPEN)

↑

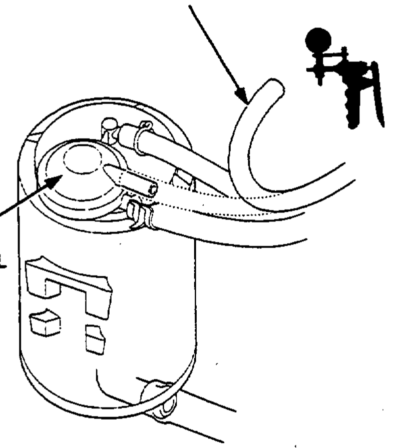
ENGINE COOLANT TEMPERATURE ABOVE 75°C (167°F)

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.



Inspection of Evaporative Emission Controls.

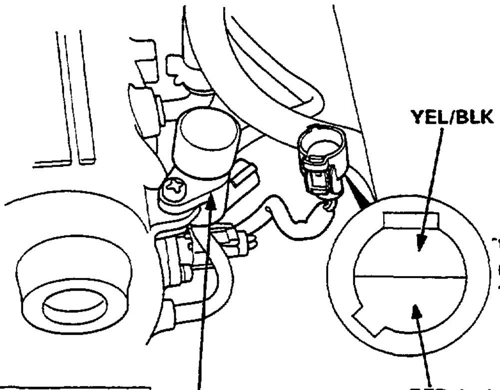
Disconnect #7 vacuum hose from the EVAP purge control diaphragm valve (on the EVAP Control canister) and connect a vacuum gauge to the hose.



Start the engine and allow it to idle.
NOTE: Engine coolant temperature must be below 75°C (167°F).

Is there vacuum?

- YES → Disconnect the 2P connector from the EVAP purge control solenoid valve.



  Measure voltage between YEL/BLK (+) terminal and RED (−) terminal.

  Is there battery voltage?

  - YES → **Inspect vacuum hose routing. If OK, replace the EVAP purge control solenoid valve.**
  - NO → Measure voltage between YEL/BLK (+) terminal and body ground.

    Is there battery voltage?

    - NO → **Repair open or short in YEL/BLK wire between PGM-FI main relay and the 2P connector.**
    - YES → **Inspect RED wire for an open to body ground between ECM (A20) and the 2P connector. If wire is OK, substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.**

- NO → 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 #7 vacuum hose after starting the engine.

(To page 11-112)

(cont'd)

Evaporative Emission Controls (cont'd)

(From page 11-111)

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.**

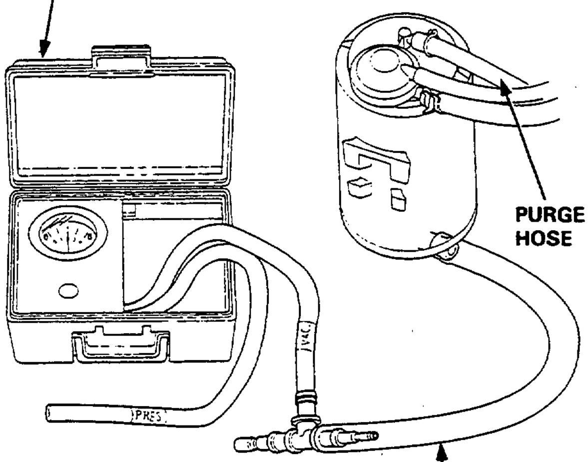
YES → **Inspect for a short in RED wire between ECM (A20) and the 2P connector. If wire is OK, substitute a known-good ECM and recheck. If symptom goes away, replace the original ECM.**

YES ↓

Reconnect the hose.

Remove fuel fill cap.

Connect a vacuum gauge to purge air hose.



Start the engine and raise engine speed to 3,500 rpm (min^{-1}).

Does vacuum appear on gauge within 1 minute?

NO → **Replace the EVAP control canister.**

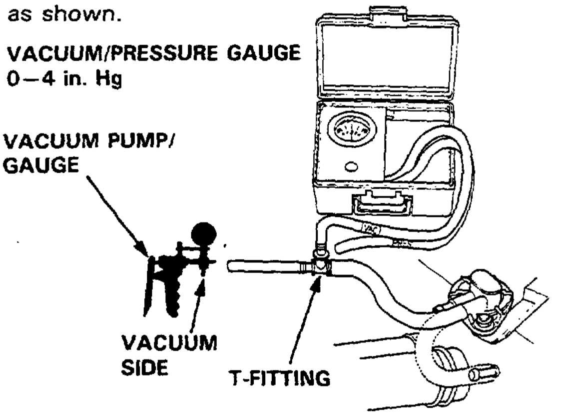
YES → **See EVAP two way valve test to complete. Evaporative emission controls are OK.**

Evaporative Emission (EVAP) Two Way Valve

Testing

1. Remove the fuel fill cap.

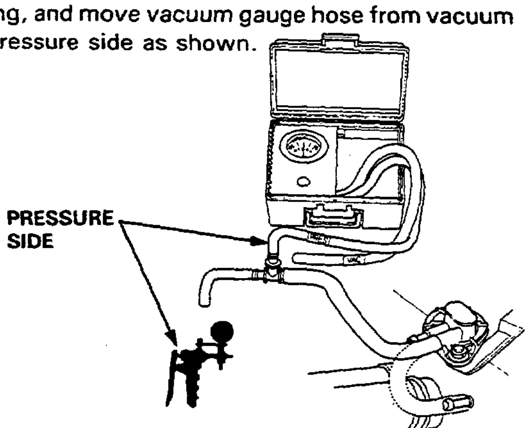
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.



3. Apply vacuum slowly and continuously while watching the gauge.

   Vacuum should stabilize momentarily at 0.7–2.0 kPa (5–15 mmHg, 0.2–0.6 in. Hg).
   - If vacuum stabilizes (valve opens) below 0.7 kPa (5 mmHg, 0.2 in. Hg) or above 2.0 kPa (15 mmHg, 0.6 in. Hg), install new EVAP two way valve and retest.

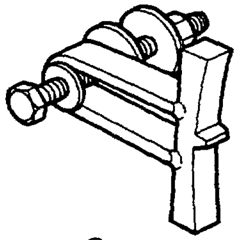
4. Move vacuum pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.

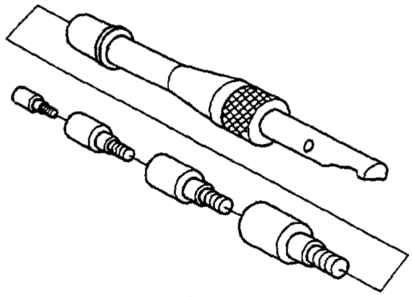


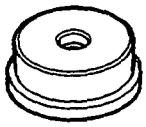
5. Slowly pressurize the vapor line while watching the gauge.

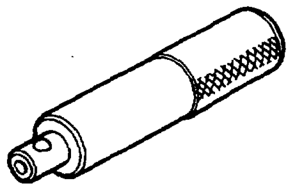
   Pressure should stabilize at 2.0–5.3 kPa (15–40 mmHg, 0.59–1.57 in. Hg).
   - If pressure momentarily stabilizes (valve opens) at 2.0–5.3 kPa (15–40 mmHg, 0.59–1.57 in. Hg), the valve is OK.
   - If pressure stabilizes below 2.0 kPa (15 mmHg, 0.59 in. Hg) or above 5.3 kPa (40 mmHg, 1.57 in. Hg), install a new EVAP two way valve and retest.

Ref. No.	Tool Number	Description	Qty	Remark
①	07LAB–PV00100 or 07924–PD20003	Ring Gear Holder	1	
②	07PAF–0020000	Clutch Alignment Tool Set	1	
③	07746–0010100	Attachment, 32 x 35 mm	1	
④	07749–0010000	Handle Driver	1	

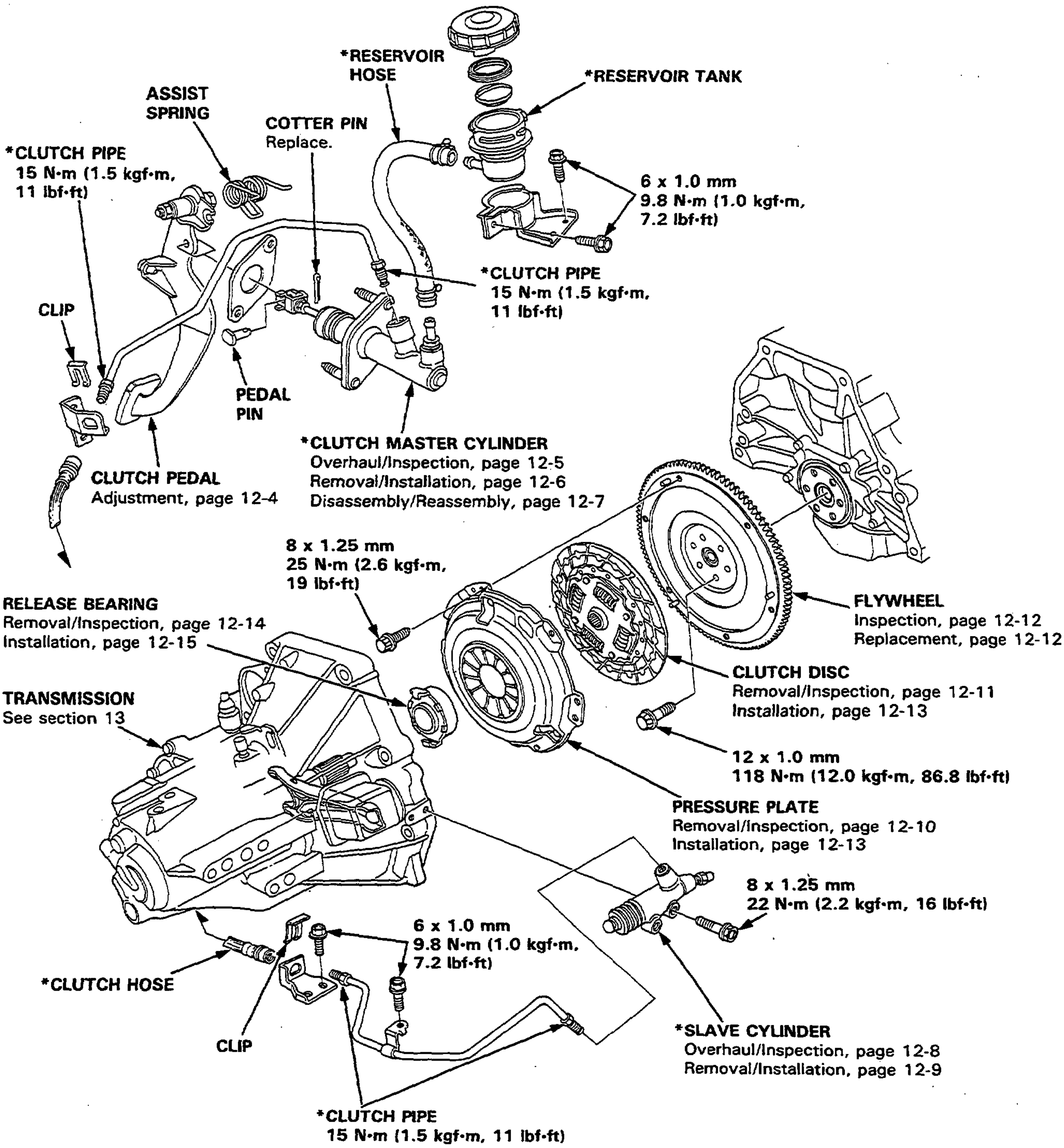

①


②


③


④

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.



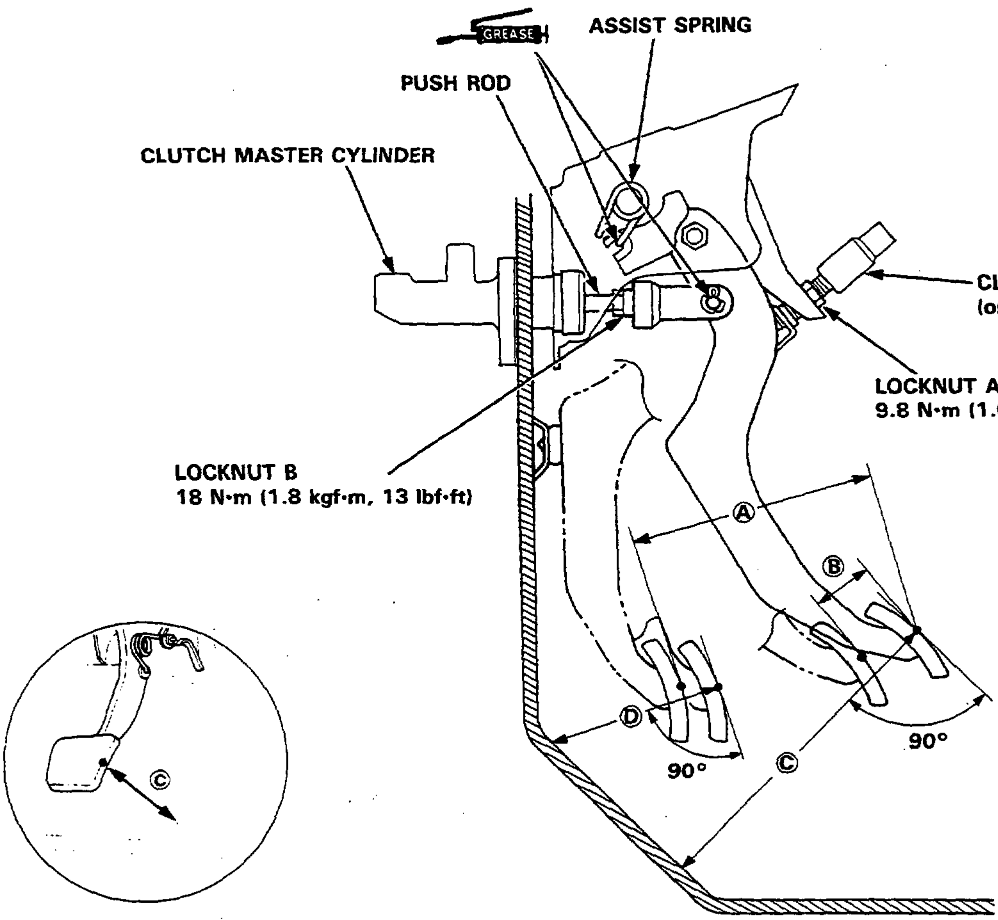
Clutch Pedal

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 clutch 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 (or adjusting bolt) in an additional 3/4 to 1 full turn.
6. Tighten locknut A.



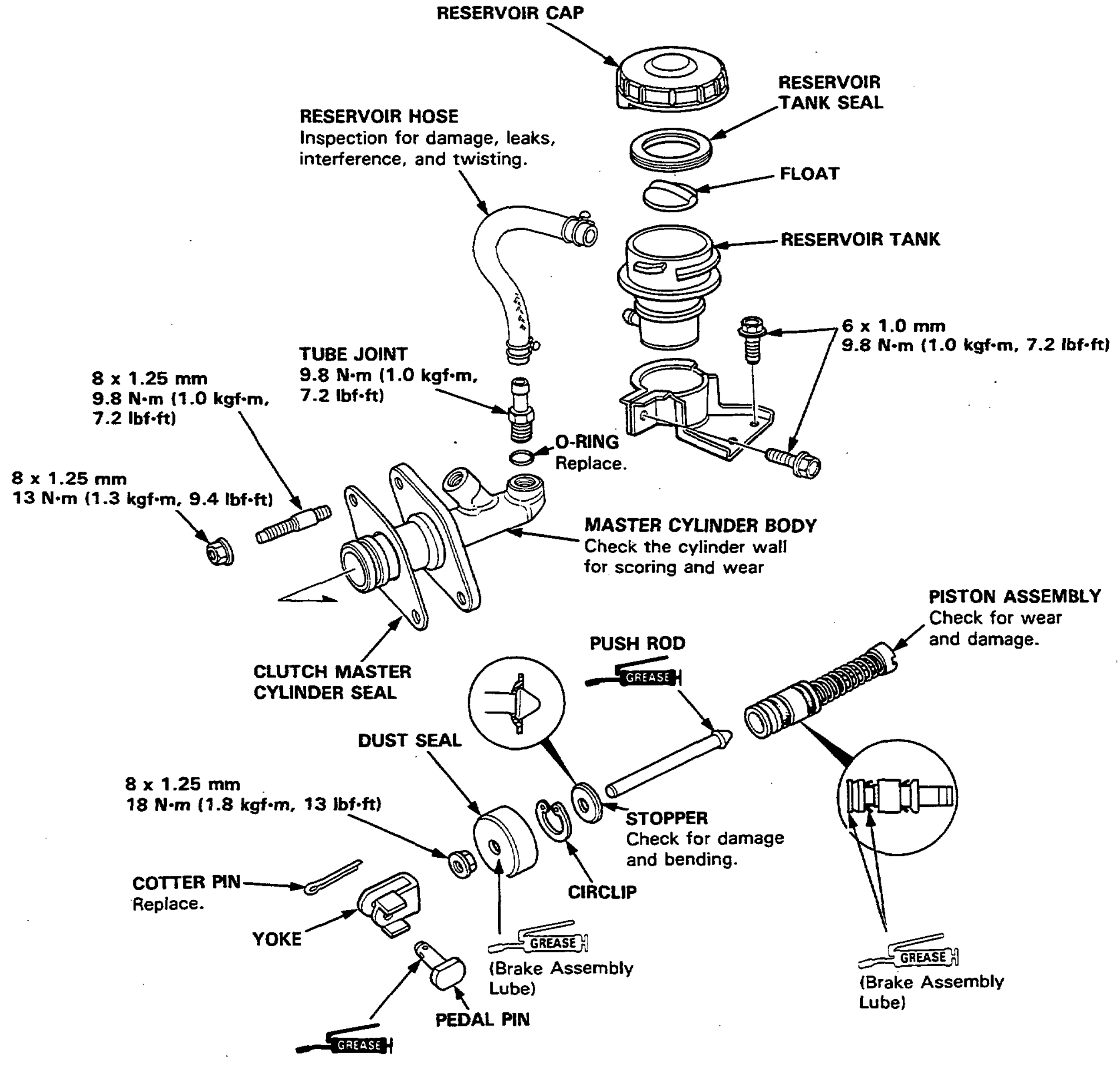
Ⓐ (STROKE at PEDAL): 130–140 mm (5.12–5.51 in)
Ⓑ (TOTAL CLUTCH PEDAL FREE PLAY): 12–21 mm (0.47–0.83 in) include the pedal play 1–10 mm (0.04–0.39 in)
Ⓒ (CLUTCH PEDAL HEIGHT): LHD: 161 mm (6.34 in) to the floor
RHD: 161 mm (6.34 in) to the floor
Ⓓ (CLUTCH PEDAL DISENGAGEMENT HEIGHT): LHD: 81 mm (31.9 in) minimum to the floor
RHD: 79 mm (3.11 in) minimum to the floor

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.



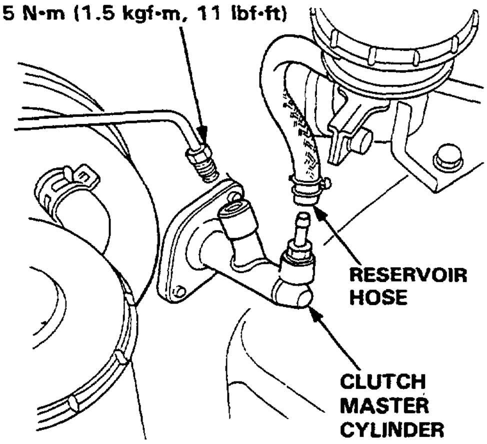
Clutch Master Cylinder

Removal/Installation

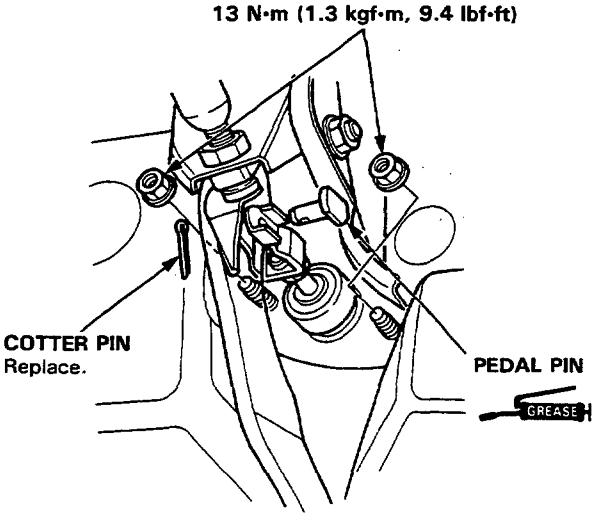
CAUTION:

- **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.**

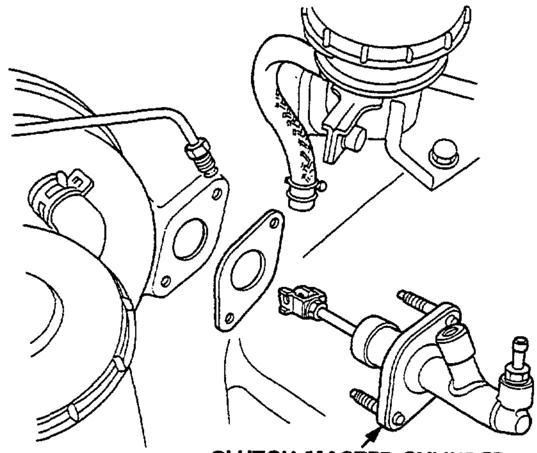
1. The brake fluid may be sucked out through the top of the master cylinder reservoir with a syringe.
2. Disconnect the clutch pipe and reservoir hose from the clutch master cylinder.



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.

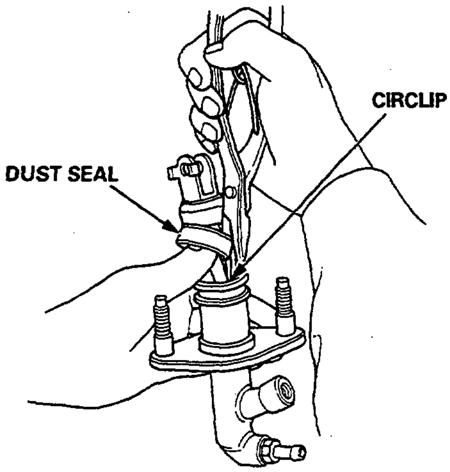
   NOTE: Bleed the clutch hydraulic system (see page12-9).

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.

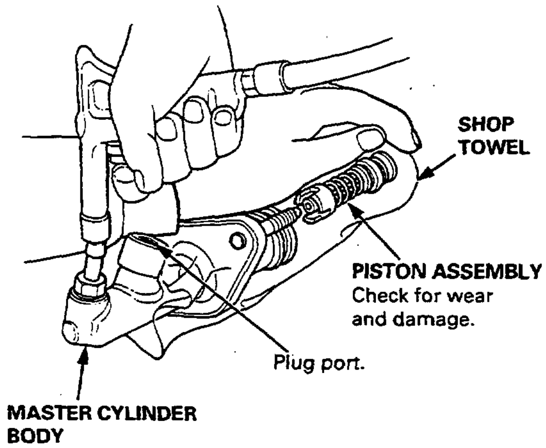
1. Remove the dust seal from the clutch master cylinder.

2. Pry the circlip off the clutch master cylinder.



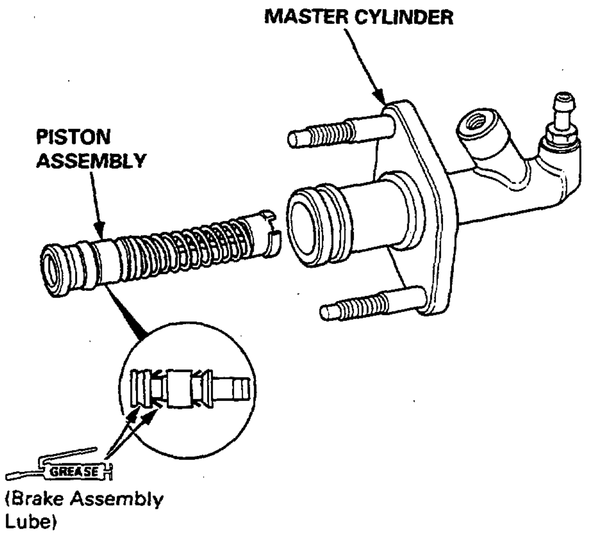
3. Carefully remove the piston by applying air pressure through the clutch line hole.

   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.**

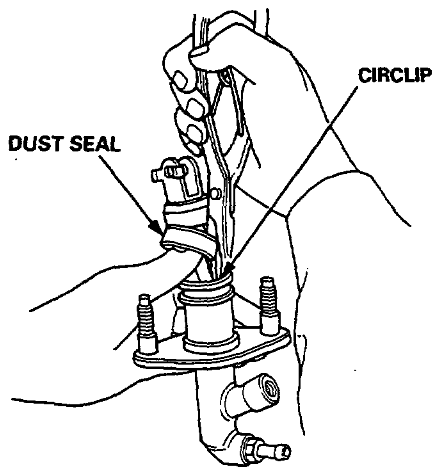


CAUTION:
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure not dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.**

4. Slide the piston assembly into the clutch master cylinder.



5. Install the circlip in the groove of the clutch master cylinder.



6. Install the dust seal.

Slave Cylinder

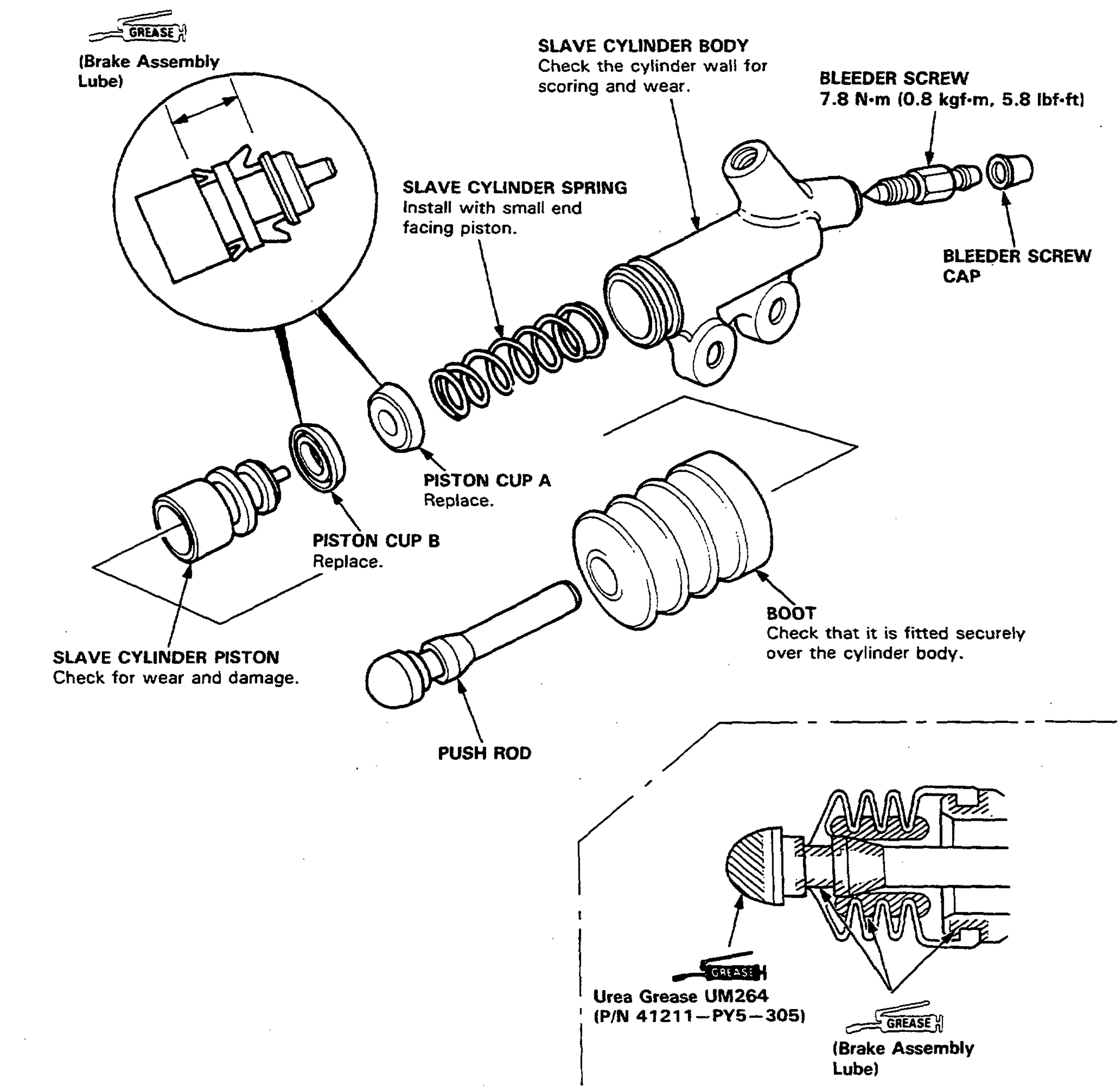
Overhaul/Inspection

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/N41211–PY5–305).

GREASE : Brake Assembly Lube or equivalent rubber grease.



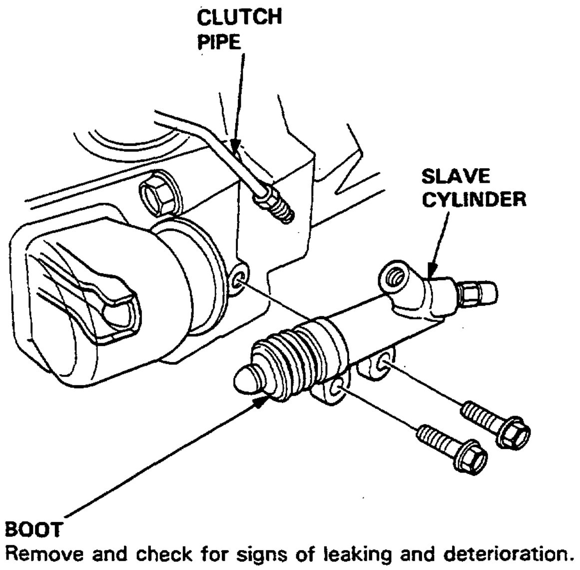
Removal/Installation

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).

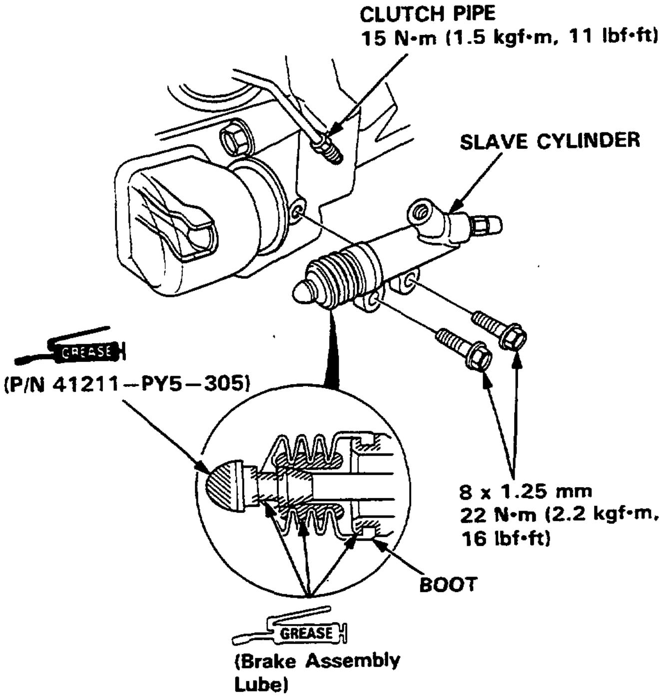
GREASE: Brake Assembly Lube or equivalent rubber grease.

1. Disconnect the clutch pipe from the slave cylinder.
2. Remove the slave cylinder from the clutch housing.

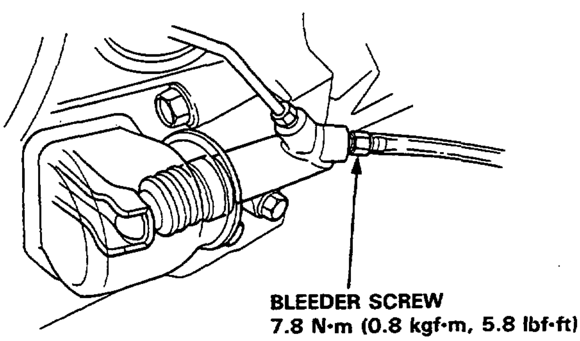


3. Install the slave cylinder in the reverse order of removal.

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.

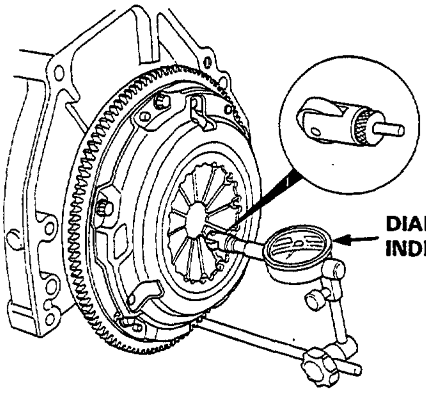


Pressure Plate

Removal/Inspection

1. Check the diaphragm spring fingers for height using the dial indicator.

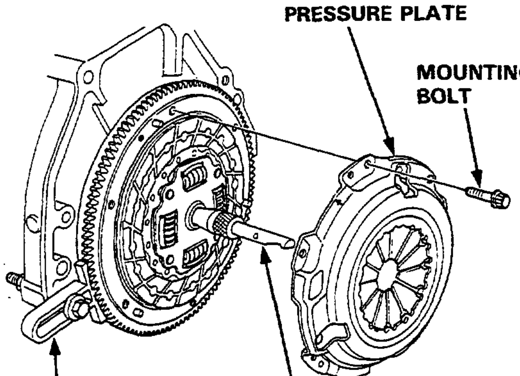
   Standard (New): 0.8 mm (0.03 in) max.
   Service Limit: 1.0 mm (0.04 in)

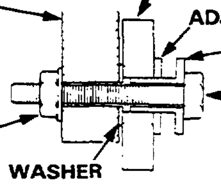


- If the height is more than the service limit, replace the pressure plate.

2. Install the special tools as shown.

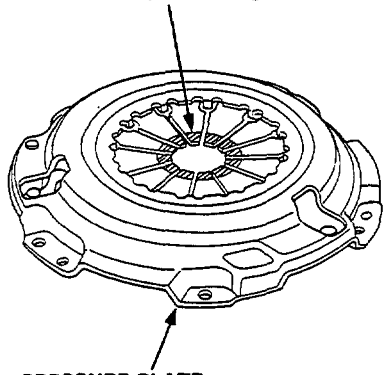
3. To prevent warping, unscrew the pressure plate mounting bolts in a crisscross pattern in several steps, then remove the pressure plate.





4. Inspect the pressure plate surface for wear, cracks, and burning.

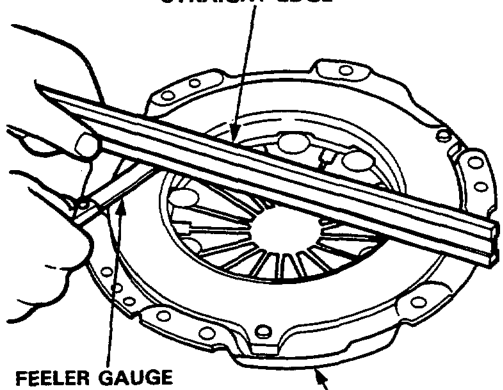
5. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.



6. Inspect for warpage using a straight edge and feeler gauge.

   NOTE: Measure across the pressure plate at three points.

   Standard (New): 0.03 mm (0.001 in) max.
   Service Limit: 0.15 mm (0.006 in)



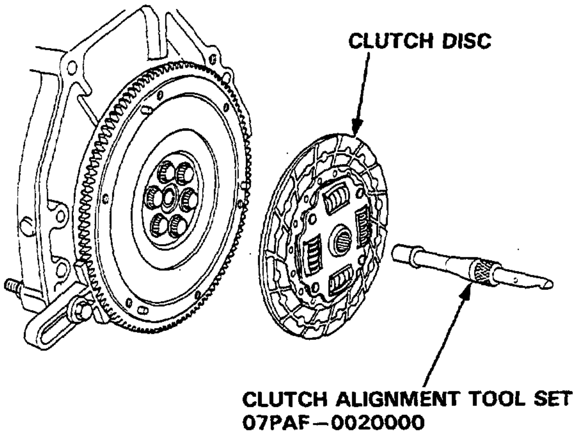
- If the warpage is more than the service limit, replace the pressure plate.

Clutch Disc

Removal/Inspection

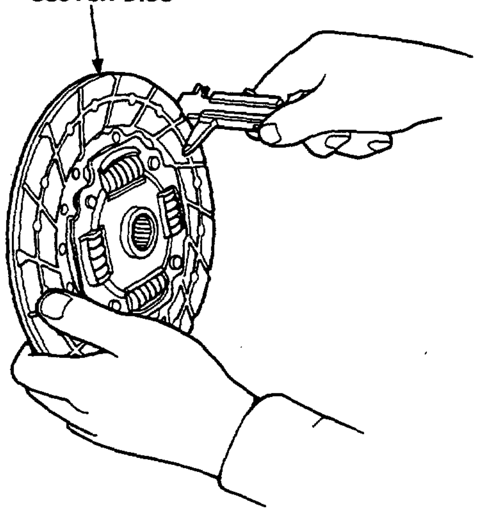
1. Remove the clutch disc and special tools.

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.

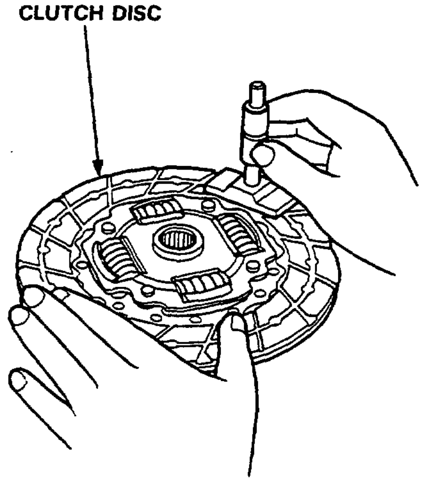
Standard (New): 7.7–8.2 mm (0.30–0.32 in)
Service Limit: 5.5 mm (0.22 in)

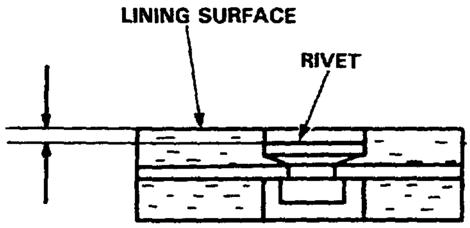


- If the thickness is less than the service limit, replace the clutch disc.

4. Measure the rivet depth from the lining surface to the rivets, on both sides.

Standard (New): 1.3 mm (0.051 in) min.
Service Limit: 0.2 mm (0.008 in)





- If the rivet depth is less than the service limit, replace the clutch disc.

Flywheel

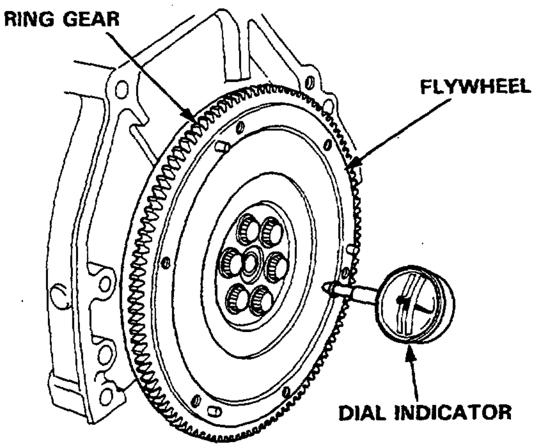
Inspection

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.

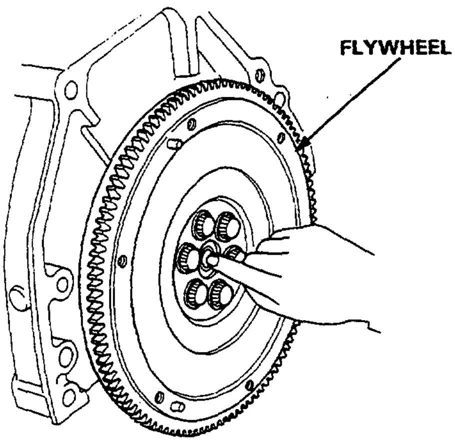
   NOTE: The runout can be measured with engine installed.

   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.

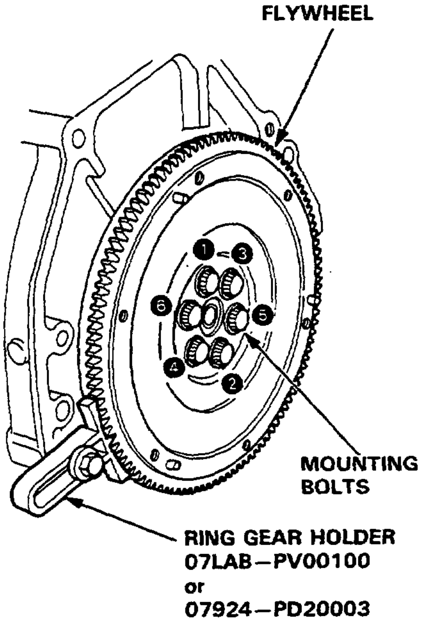


4. Turn the inner race of the flywheel bearing with your finger. The bearing should turn smoothly and quietly. Check that the bearing outer race fits tightly in the flywheel. If the race does not turn smoothly, quietly, or fit tight in the flywheel, replace the bearing.

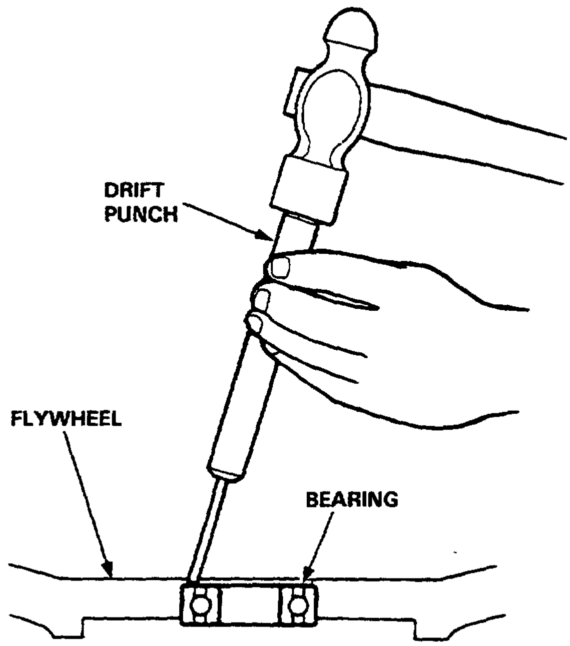


Replacement

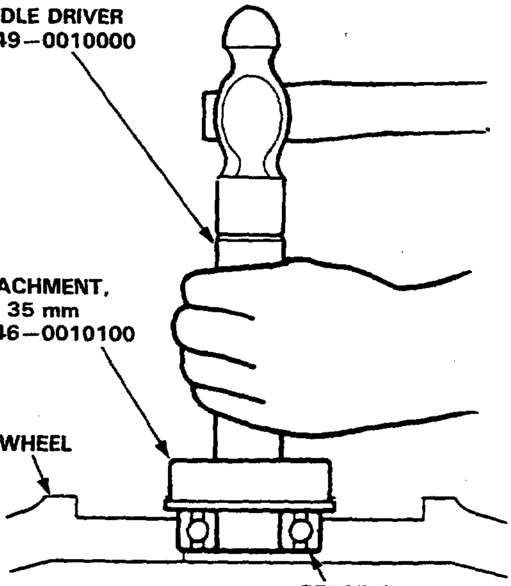
1. Install the special tool as shown.
2. Remove the flywheel mounting bolts in a crisscross pattern in several steps as shown and remove the flywheel.



3. Remove the ball bearing from the flywheel.

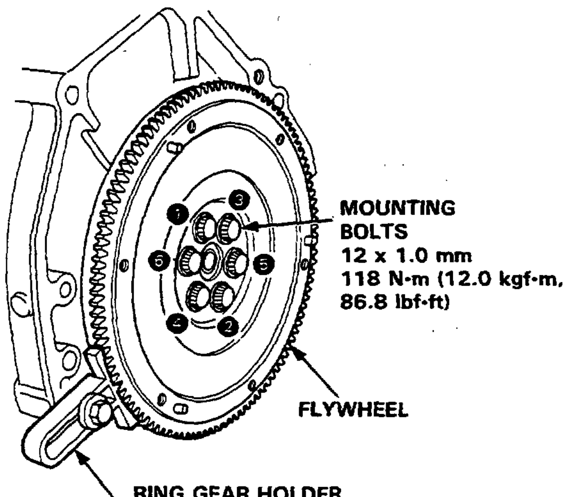


4. Drive the new bearing into the flywheel using the special tools as shown.



5. Align the hole in the flywheel with the crankshaft dowel pin, and install the flywheel. Install the mounting bolts finger-tight.

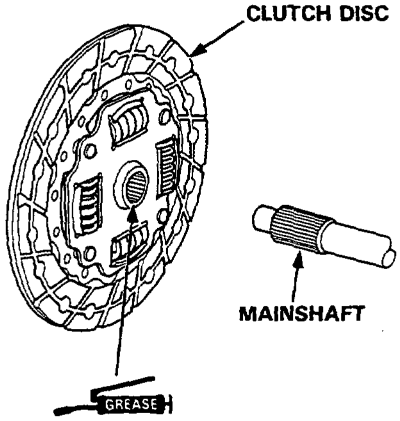
6. Install the special tool, then torque the flywheel mounting bolts in a crisscross pattern in several steps as shown.



Installation

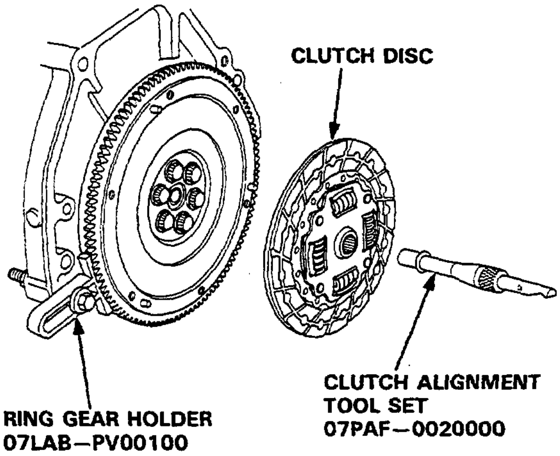
1. Apply grease to inner dia. Spline thinly and uniformly, mate and slide mainshaft, and remove extra overflow grease.

   NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211–PY5–305).



2. Install the ring gear holder.

3. Install the clutch disc using the special tools as shown.



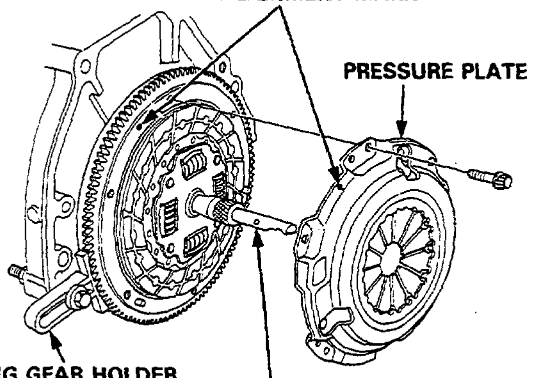
(cont'd)

Clutch Disc, Pressure Plate

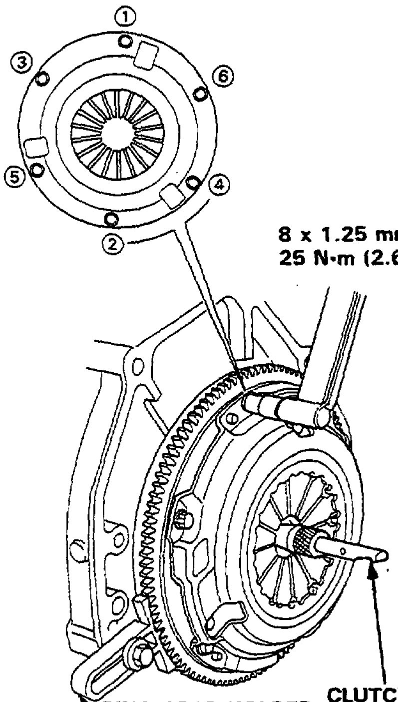
Installation (cont'd)

4. Install the pressure plate.

   NOTE: Align the mark on the flywheel with the mark on the pressure plate.



5. Torque the mounting bolts in a crisscross pattern as shown. Tighten the bolts in several steps to prevent warping the diaphragm spring.



6. Remove the special tools.

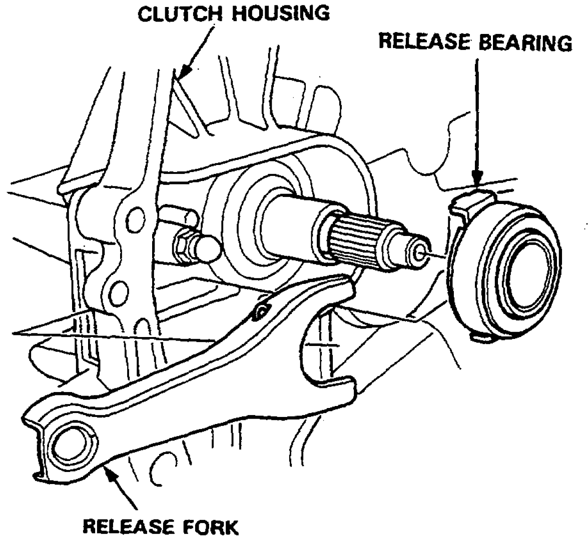
7. Check the diaphragm spring fingers for height (see page 12-10).

Release Bearing

Removal/Inspection

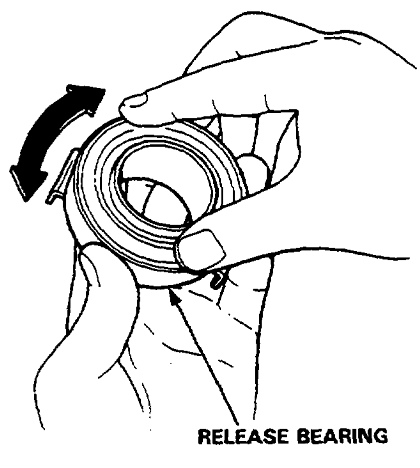
1. Remove the release fork boot from the clutch housing.

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.

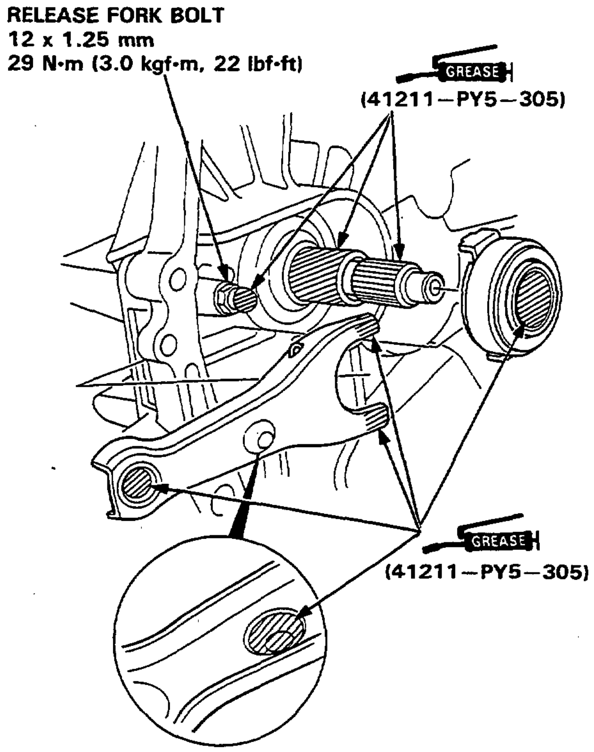
Release Bearing

Installation

NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211—PY5—305).

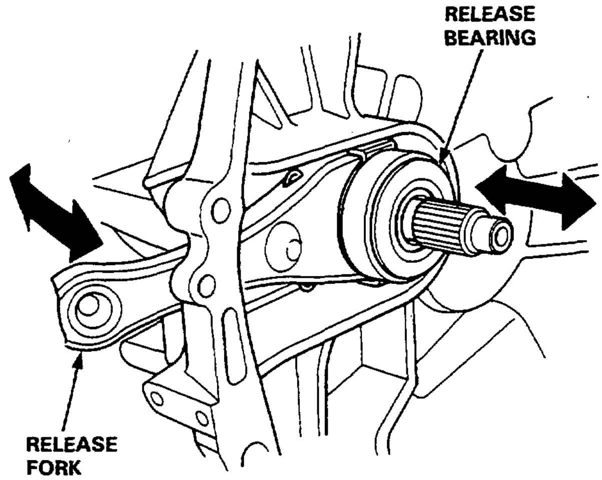
1. With the release fork slid between the release bearing pawls, install the release bearing on the mainshaft while inserting the release fork through the hole in the clutch housing.

2. Align the detent of the release fork with the release fork bolt, then press the release fork over the release fork bolt sequarely.



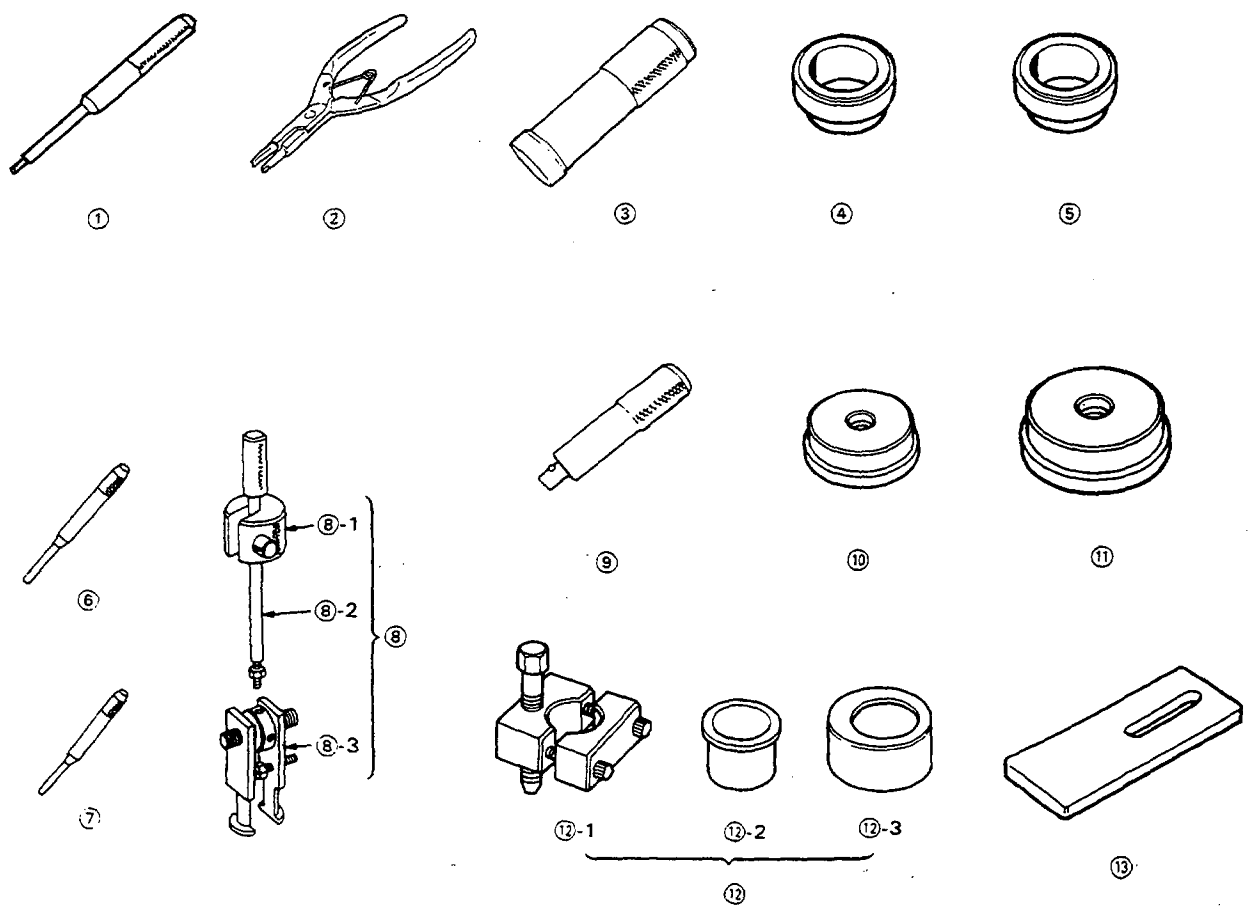
3. Move the release fork right and left to make sure that it fits properly against the release bearing, and that the release bearing slides smoothly.

4. Install the release fork boot; make sure the boot seals around the release fork and clutch housing.



Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07744–0010600	Pin Driver, 8.0 mm	1	
②	07LGC–0010100	Snap Ring Pliers	1	
③	07746–0030100	Driver, 40 mm	1	
④	07746–0030400	Driver, 35 mm	1	
⑤	07746–0030300	Driver, 30 mm	1	
⑥	07744–0010200	Pin Driver, 3.0 mm	1	
⑦	07GAD–PG20100	Pin Driver, 5.0 mm	1	
⑧	07JAC–PH80000	Adjustable Bearing Remover Set	1	
⑧-1	07JAC–PH80100	Bearing Remover Attachment	(1)	Component Tools
⑧-2	07JAC–PH80200	Remover Handle Assembly	(1)	
⑧-3	07741–0010201	Remover Weight	(1)	
⑨	07749–0010000	Handle Drive	1	
⑩	07746–0010300	Driver Attachment, 42 x 47 mm	1	
⑪	07746–0010400	Driver Attachment, 52 x 55 mm	1	
⑫	07GAJ–PG20102	Mainshaft Clearance Inspection Tool Set	1	
⑫-1	07GAJ–PG20110	Mainshaft Holder	(1)	Component Tools
⑫-2	07GAJ–PG20120	Collar	(1)	
⑫-3	07GAJ–PG20130	Mainshaft Base	(1)	
⑬	07979–PJ40001	Magnet Stand Base	1	

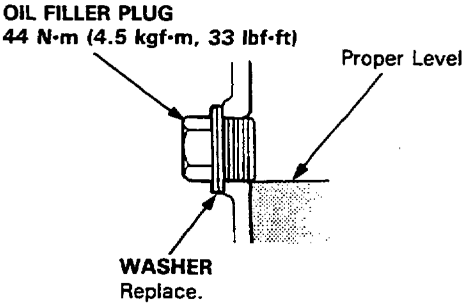


Maintenance

Transmission Oil

NOTE: Check the oil with the engine OFF and car on level ground.

1. Remove the oil filler plug, then check the level and condition of the oil.

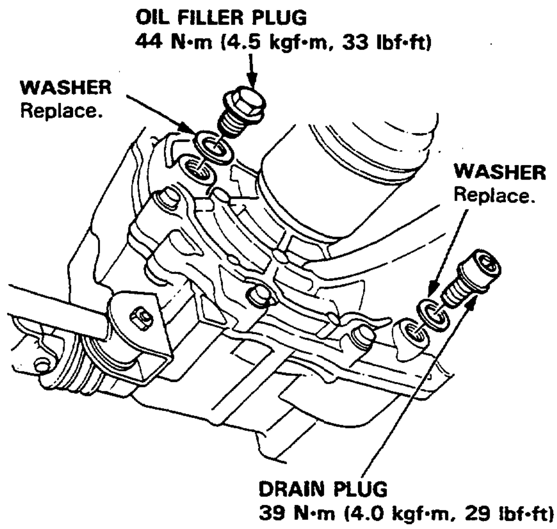


2. The oil level must be up to the filler hole. If it is below the hole, add oil until it runs out, then reinstall the oil filler plug with a new washer.
3. If the transmission oil is dirty, remove the drain plug and drain the oil.
4. Reinstall the drain plug with a new washer, and refill the transmission 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
   1.8 ℓ (1.9 US qt, 1.6 Imp qt) at oil change
   1.9 ℓ (2.0 US qt, 1.7 Imp qt) at overhaul

   Use only SAE 10W–30 or 10W–40, API service SF or SG grade.

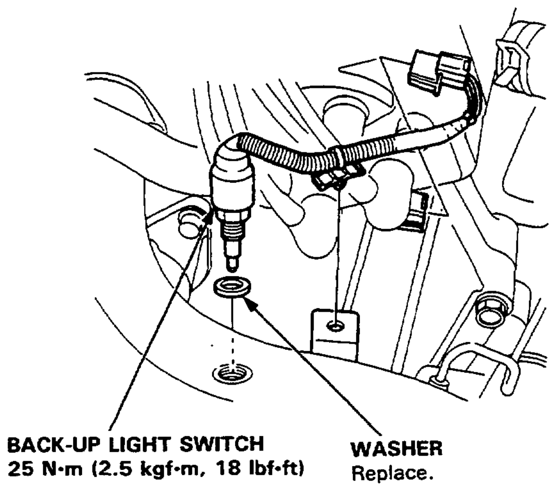


Back-up Light Switch

Replacement

NOTE: To test the back-up light switch, see section 23.

1. Disconnect the connector, then remove the back-up light switch connector from the connector clamp.
2. Remove the back-up light switch.



3. Install the new washer and back-up light switch.
4. Connect the back-up light switch connector.

Transmission Assembly

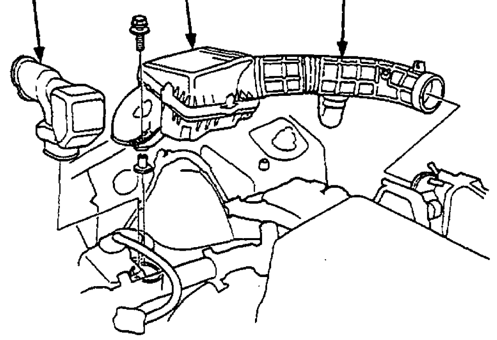
Removal

⚠ WARNING

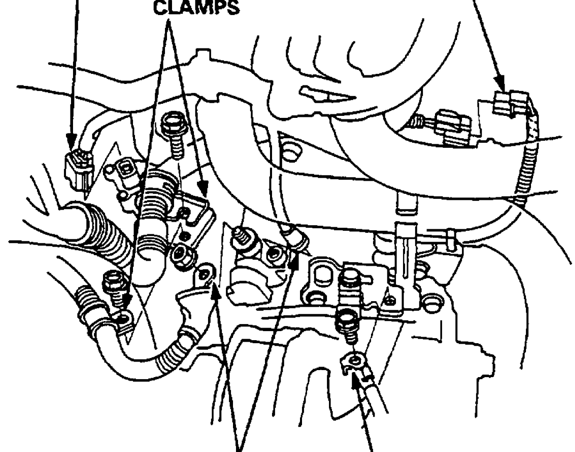
- **Make sure jacks and safety stands are placed properly, see section 1).**
- **Apply parking brake and block rear wheels so car will not roll off stands and fall on you while working under it.**

CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the negative (−) cable first, then the positive (+) cable from the battery.
2. Remove the intake air tube, intake air duct and air cleaner housing assembly.
3. Drain transmission oil (see page 13-3).



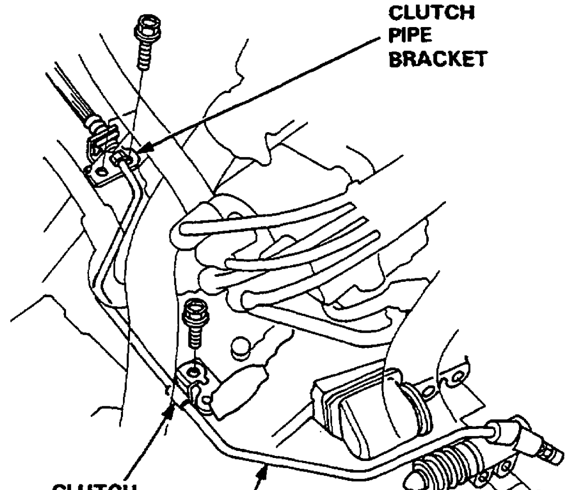
4. Disconnect the starter motor cables and transmission ground wire.
5. Remove the wire harness clamps.
6. Disconnect the back-up light switch connector and vehicle speed sensor (VSS) connector.



7. Remove the clutch pipe bracket, clutch pipe clamp, and slave cylinder.

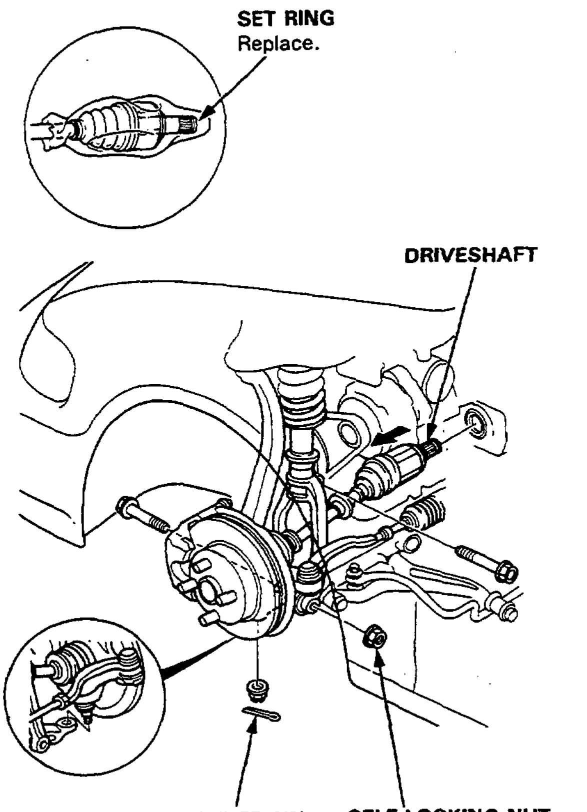
CAUTION:

- **Do not operate the clutch pedal once the slave cylinder has been removed.**
- **Take care not to bend the clutch pipe.**

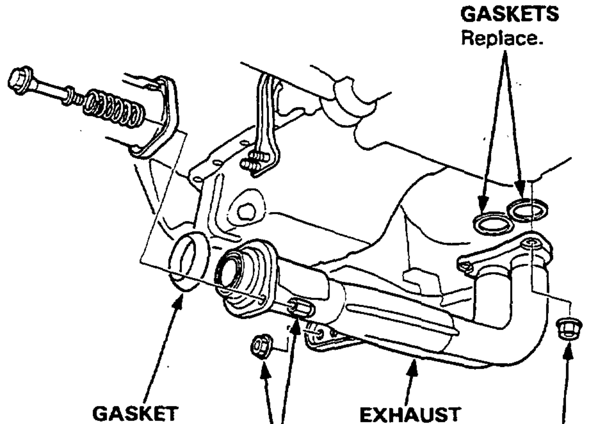


8. Remove the driveshafts (see section 16).

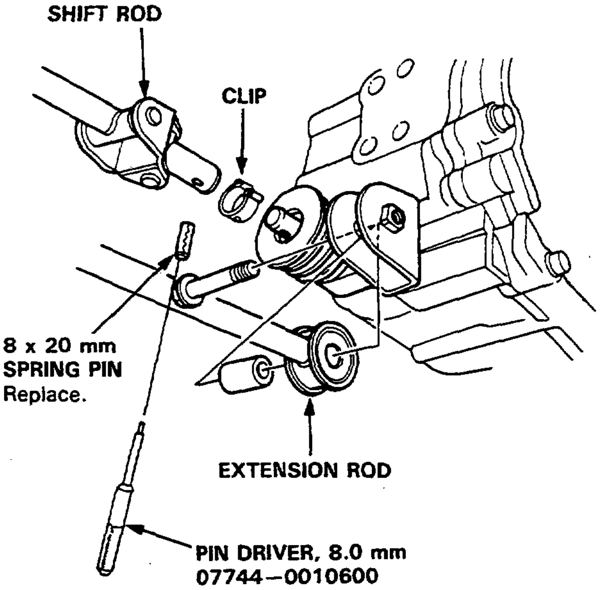
   NOTE: Coat all the precision finished surfaces with clean engine oil or grease. Tie plastic bags over the driveshaft ends.



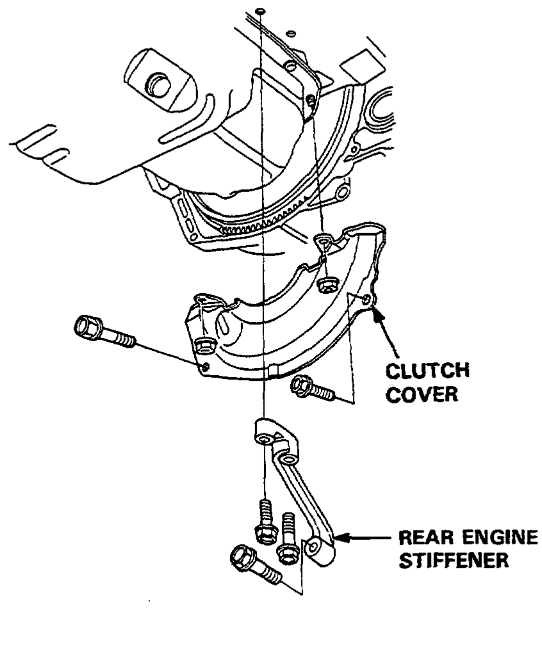
9. Remove exhaust pipe A.



10. Remove the shift rod and extension rod.



11. Remove the rear engine stiffener and clutch cover.

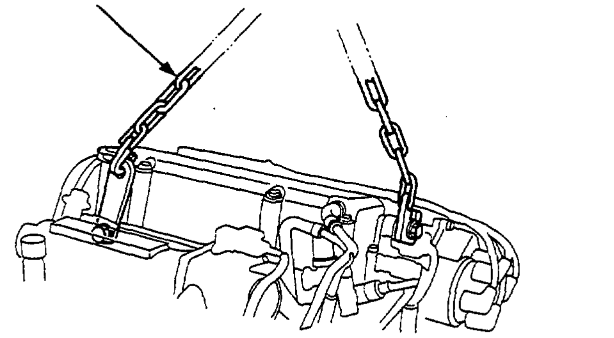


(cont'd)

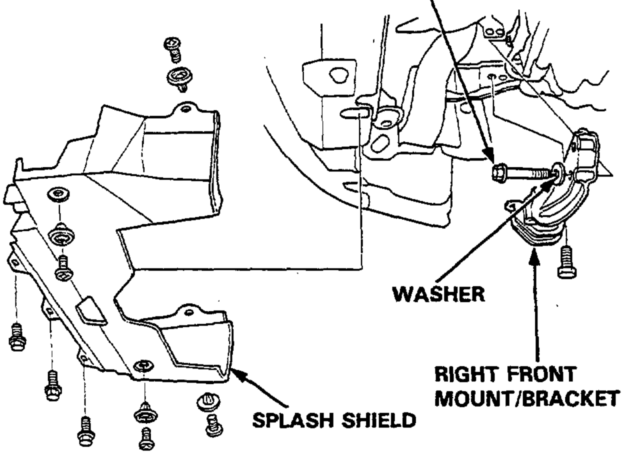
Transmission Assembly

Removal (cont'd)

12. Install the bolts in the cylinder head and attach a chain hoist to the bolts, then lift the engine slightly to unload the mounts.

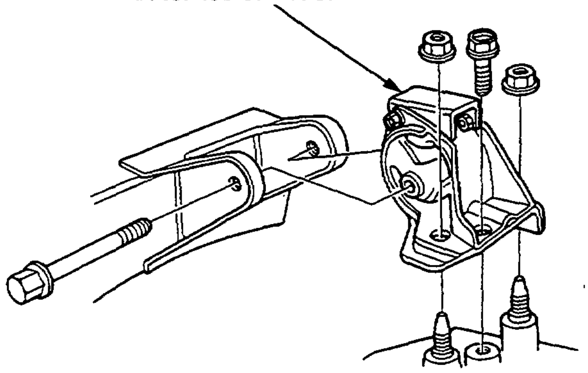


13. Remove the splash shield and right front mount/bracket.

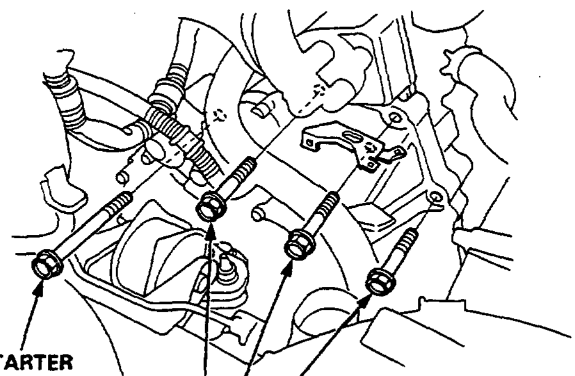


14. Place a jack under the transmission.

15. Remove the transmission mount.



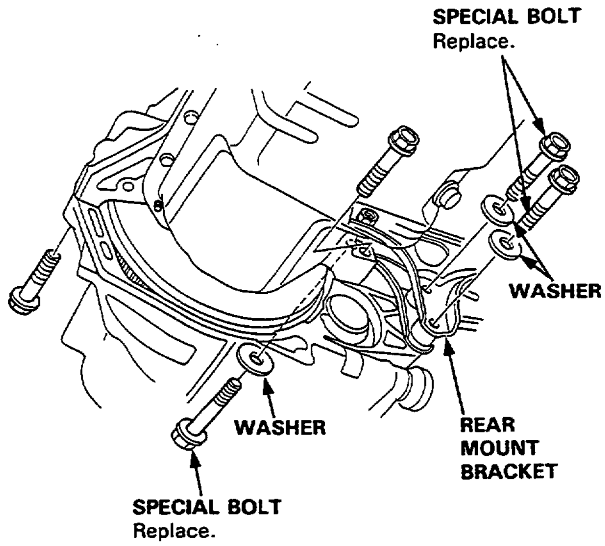
16. Remove the three upper transmission mounting bolts and the lower starter mounting bolt.



17. Remove the rear mount bracket bolts and transmission mounting bolts.

18. Pull the transmission away from the engine until it clears the mainshaft, then lower it on the transmission jack.

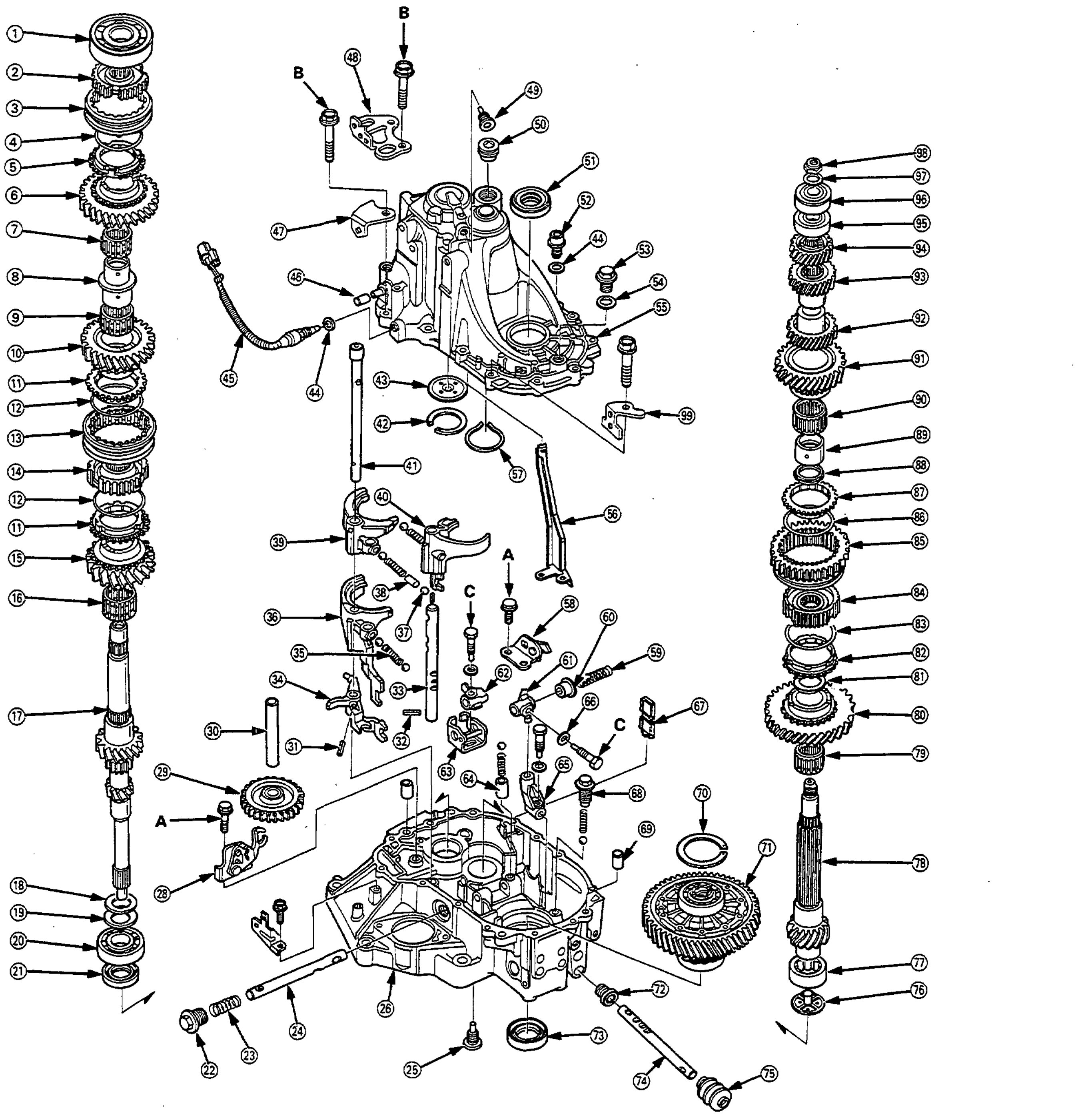
    CAUTION: Take care not to bend the clutch pipe.



Refer to the drawing below for the transmission disassembly/reassembly.
Clean all parts thoroughly in solvent and dry with compressed air.

Lubricate all parts with oil before reassembly.

NOTE: This transmission uses no gaskets between the major housings; use liquid gasket (P/N 0Y740—99986). Assemble the housings within 20 minutes after applying the liquid gasket and allow it to cure at least 20 minutes after assembly before filling the transmission with oil. If 20 minutes have passed after applying liquid gasket, replace it.



NOTE: Always clean the magnet ⑰ whenever the transmission housing is disassembled.

Torque Value
A - 15 N•m (1.5 kgf•m, 11 lbf•ft) B - 27 N•m (2.8 kgf•m, 20 lbf•ft) C - 31 N•m (3.2 kgf•m, 23 lbf•ft)

① BALL BEARING
② 5TH SYNCHRO HUB
③ 5TH SYNCHRO SLEEVE
④ SYNCHRO SPRING
⑤ SYNCHRO RING
⑥ 5TH GEAR
⑦ 32 x 37 x 23.5 mm NEEDLE BEARING
⑧ SPACER COLLAR
⑨ 34 x 39 x 23 mm NEEDLE BEARING
⑩ 4TH GEAR
⑪ SYNCHRO RING
⑫ SYNCHRO SPRING
⑬ 3RD/4TH SYNCHRO SLEEVE
⑭ 3RD/4TH SYNCHRO HUB
⑮ 3RD GEAR
⑯ 34 x 39 x 27.5 mm NEEDLE BEARING
⑰ MAINSHAFT
⑱ WASHER
⑲ SPRING WASHER
⑳ BALL BEARING Check for wear and operation.
㉑ 26 x 42 x 7 mm OIL SEAL Replace.
㉒ 28 mm PLUG BOLT 54 N•m (5.5 kgf•m 40 lbf•ft)
㉓ 1ST/2ND SELECT SPRING L. 36.26 mm (1.428 in)
㉔ SHIFT ARM SHAFT
㉕ INTERLOCK GUIDE BOLT 39 N•m (4.0 kgf•m, 29 lbf•ft)
㉖ CLUTCH HOUSING
㉘ REVERSE SHIFT HOLDER
㉙ REVERSE IDLER GEAR
㉚ REVERSE IDLER GEAR SHAFT
㉛ 5 x 22 mm SPRING PIN Replece.
㉜ 3 x 12 mm SPRING PIN Replece.
㉝ 1ST/2ND SHIFT FORK SHAFT
㉞ 5TH/REVERSE SHIFT PIECE
㉟ SPRING L. 17.3 mm (0.68 in)
㊱ 3RD/4TH SHIFT FORK
㊲ STEEL BALL (5/16 in)
㊳ 5 x 10 mm ROLLER
㊴ 5TH SHIFT FORK
㊵ 1ST/2ND SHIFT FORK
㊶ 5TH/REVERSE SHIFT FORK SHAFT
㊷ 65 mm THRUST SHIM (*1) 70 mm THRUST SHIM (*2) Selection, page 13-30
㊸ OIL GUIDE PLATE
㊹ WASHER Replece.
㊺ BACK-UP LIGHT SWITCH 25 N•m (2.5 kgf•m, 18 lbf•ft)
㊻ BREATHER CAP
㊼ BACK-UP LIGHT SWITCH HARNESS STAY
㊽ TRANSMISSION HANGER
㊾ 10 mm SEALING BOLT 9.8 N•m (1.0 kgf•m, 7.2 lbf•ft)
㊿ 32 mm SEALING BOLT 25 N•m (2.5 kgf•m, 18 lbf•ft)
51 OIL SEAL Replece.
52 OIL DRAIN PLUG 39 N•m (4.0 kgf•m, 29 lbf•ft)
53 OIL FILLER PLUG 44 N•m (4.5 kgf•m, 33 lbf•ft)
54 WASHER Replece.
55 TRANSMISSION HOUSING
56 OIL GUTTER PLATE
57 52 mm SNAP RING
58 REVERSE LOCK CAM
59 REVERSE SELECT SPRING L. 63.4 mm (2.496 in)
60 REVERSE SELECT RETAINER
61 SHIFT ARM C
62 SHIFT ARM B
63 INTERLOCK
64 COLLAR
65 SHIFT ARM A
66 SPRING WASHER
67 MAGNET
68 SET BALL SPRING BOLT 22 N•m (2.2 kgf•m, 16 lbf•ft)
69 14 x 20 mm DOWEL PIN
70 72 mm THRUST SHIM (*1) 80 mm THRUST SHIM (*2) Selection, see section 15
71 DIFFERENTIAL ASSEMBLY See section 15
72 14 x 25 x 17.5 mm OIL SEAL Replece.
73 35 x 56 x 8 mm OIL SEAL Replece.
74 SHIFT ROD
75 BOOT
76 OIL GUIDE PLATE
77 30 x 47 x 21 mm NEEDLE BEARING (*1) 30 x 55 x 21 mm NEEDLE BEARING (*2)
78 COUNTERSHAFT
79 36 x 41 x 25.5 mm NEEDLE BEARING Check for wear and operation.
80 1ST GEAR
81 FRINCTION DAMPER
82 SYNCHRO RING
83 SYNCHRO SPRING
84 1ST/2ND SYNCHRO HUB
85 REVERSE GEAR
86 SYNCHRO SPRING
87 SYNCHRO RING
88 FRICTION DAMPER
89 SPACER
90 39 x 44 x 27 mm NEEDLE BEARING
91 2ND GEAR
92 3RD GEAR
93 4TH GEAR
94 5TH GEAR
95 BALL BEARING (*1) NEEDLE BEARING (*2)
96 BALL BEARING
97 SPRING WASHER
98 LOCKNUT 108→0→108 N•m (11.0→0→11.0 kgf•m, 79.6→0→79.6 lbf•ft)
99 RELEASE PIPE STAY

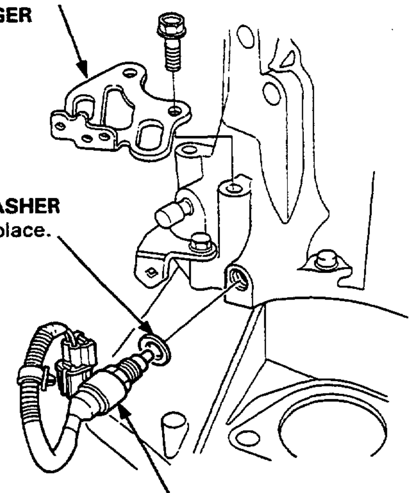
*1: D14A2, D15Z3 engines
*2: D16Y2, D16Y3 engines

Transmission Housing

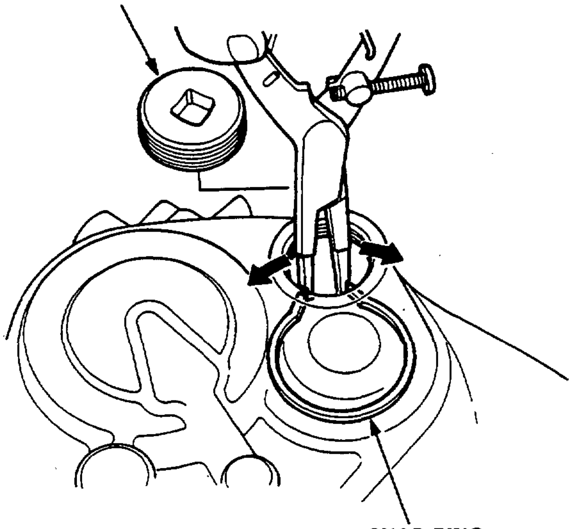
Removal

NOTE: Place the clutch housing on two pieces of wood thick enough to keep the mainshaft from hitting the workbench.

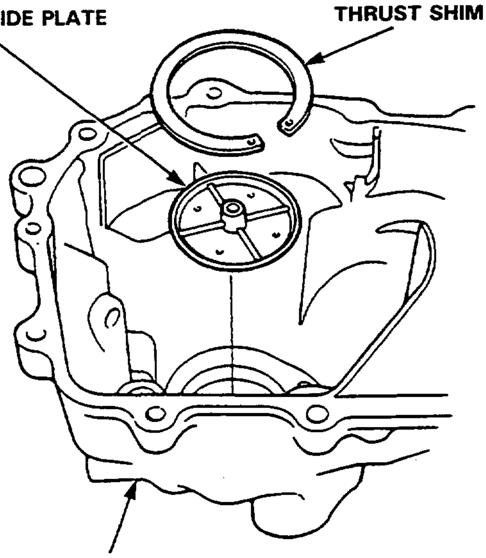
1. Remove the back-up light switch.
2. Remove transmission hanger.



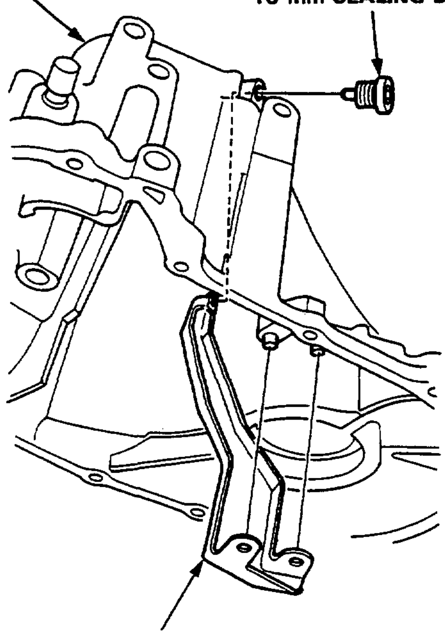
3. Loosen the transmission housing attaching bolts in a crisscross pattern in several steps, then remove them.
4. Remove the 32 mm sealing bolt.



5. Expand the snap ring on the countershaft ball bearing, and remove it from the groove using a pair of snap ring pliers.
6. Separate the transmission housing from the clutch housing, and wipe it clean of the sealant.
7. Remove the thrust shim and oil guide plate from the transmission housing.



8. Remove the 10 mm sealing bolt and oil gutter plate.

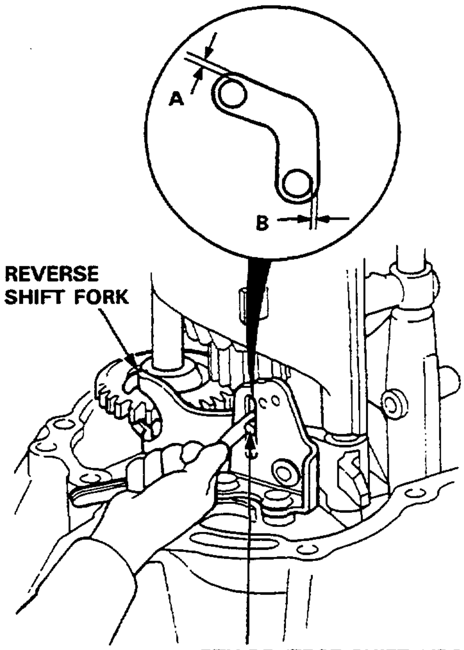


Reverse Shift Fork

Clearance Inspection

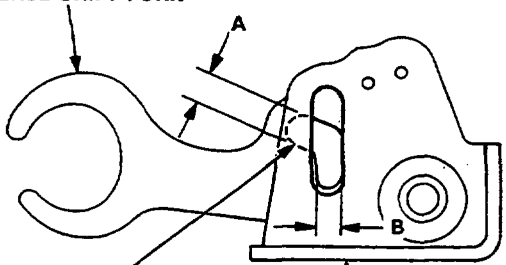
1. Measure the clearances between the reverse shift fork and 5th/reverse shift piece pin.

   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.

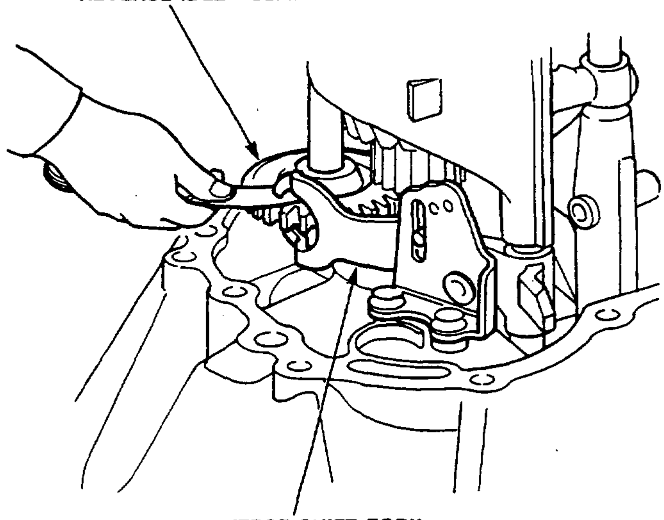
   Standard: A: 7.05–7.25 mm (0.278–0.285 in)
   B: 7.4–7.7 mm (0.29–0.30 in)



- If the widths of the grooves are not within the standard, replace the reverse shift holder with a new one.
- If the width of the grooves are within the standard, replace the 5th/reverse shift piece with a new one.

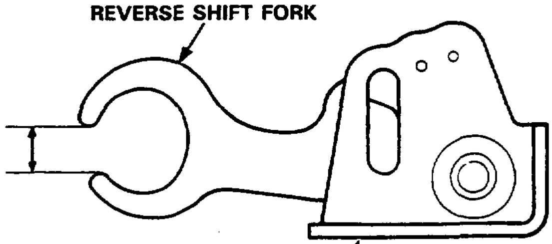
3. Measure the clearance between the reverse idler gear and the reverse shift fork.

   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: 12.7–13.0 mm (0.500–0.512 in)

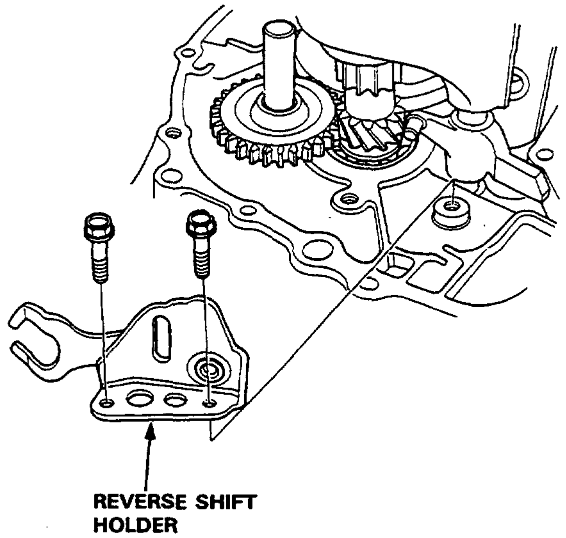


- If the width is not within the standard, replace the reverse shift holder with a new one.
- If the width is within the standard, replace the reverse idler gear with a new one.

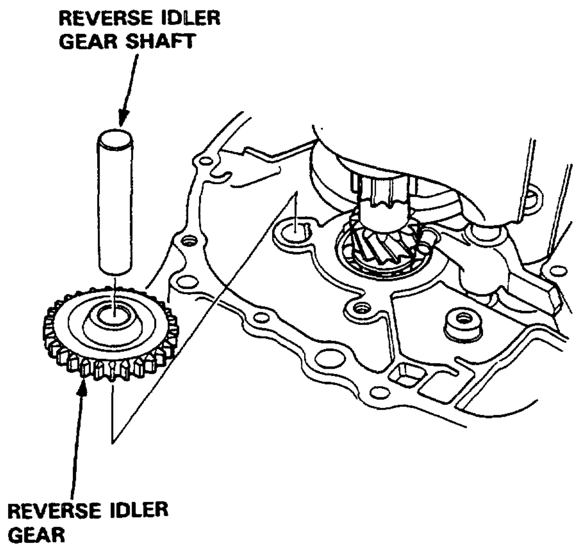
Reverse Idler Gear

Removal

1. Remove the reverse shift holder.



2. Remove the reverse idler gear shaft and reverse idler gear.

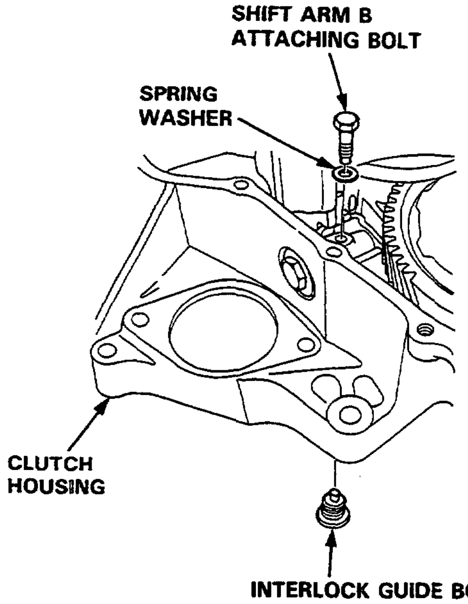


Mainshaft, Countershaft, Shift Fork

Disassembly

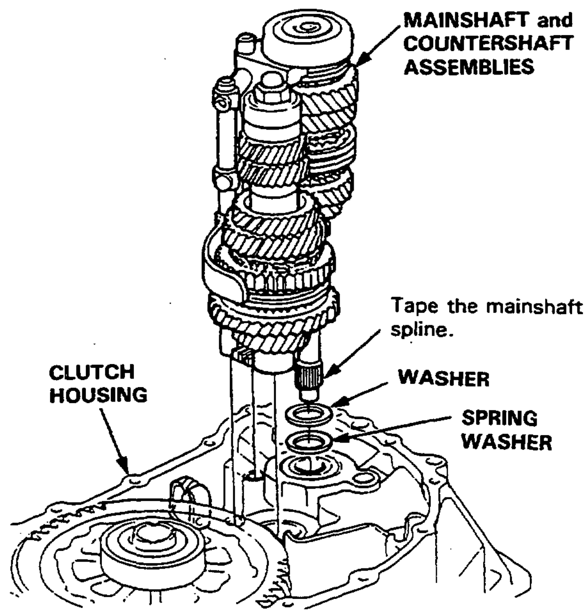
1. Remove the interlock guide bolt from under the clutch housing.

2. Remove the shift arm B attaching bolt.



3. Remove the mainshaft and countershaft assemblies with the shift fork from the clutch housing.

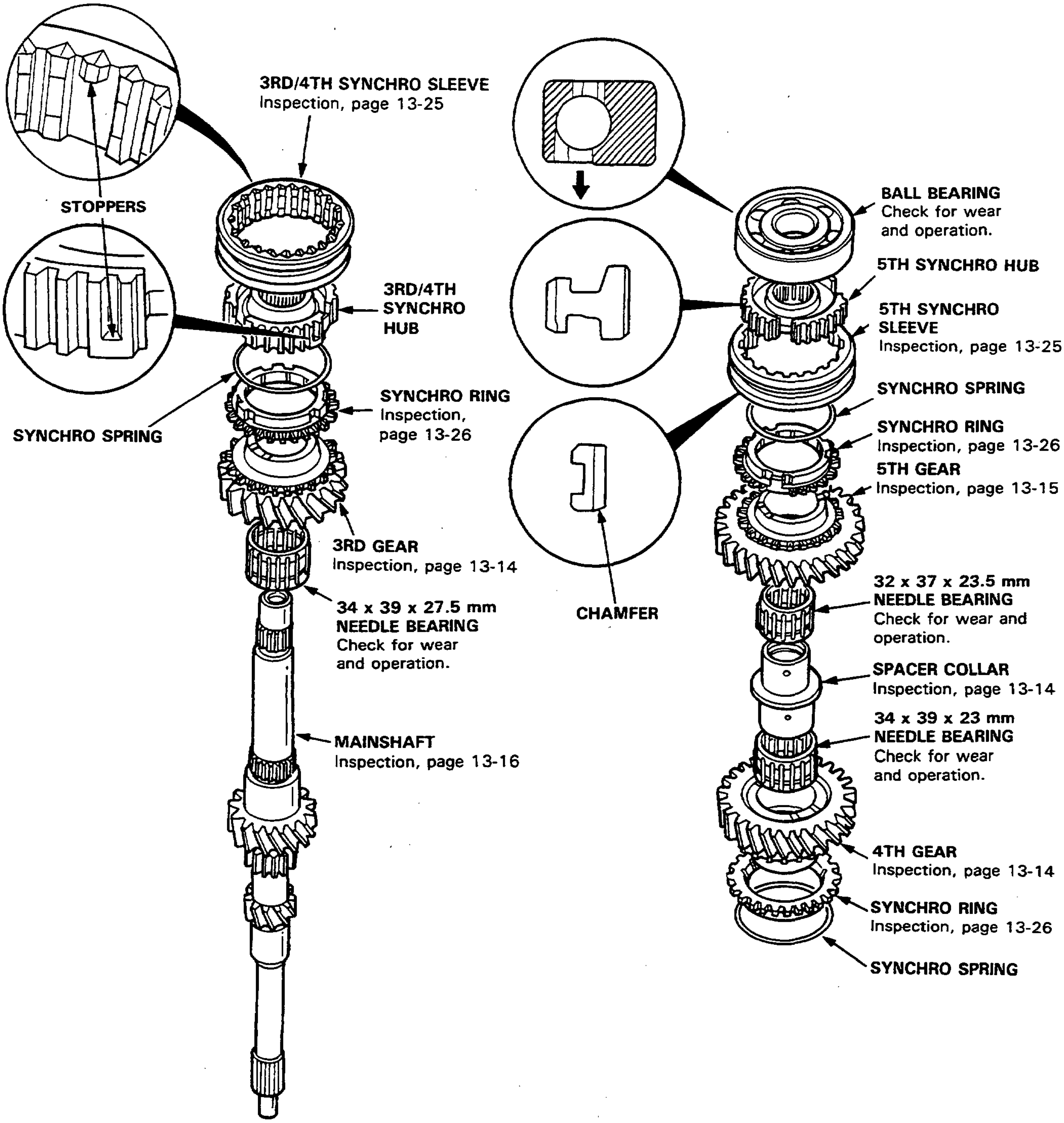
NOTE: Before removing the mainshaft and countershaft assemblies, tape the mainshaft spline to protect it.



Index

NOTE: The 3rd/4th and 5th synchro hubs 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.

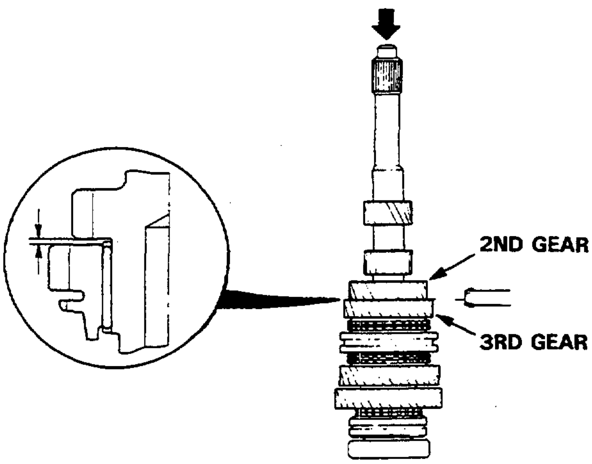


Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

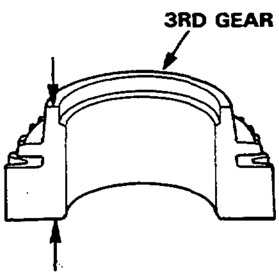
1. Measure the clearance between 2nd and 3rd gears.

   Standard: 0.06–0.21 mm (0.002–0.008 in)
   Service Limit: 0.33 mm (0.013 in)



2. If the clearance is more than the service limit, measure the thickness of 3rd gear.

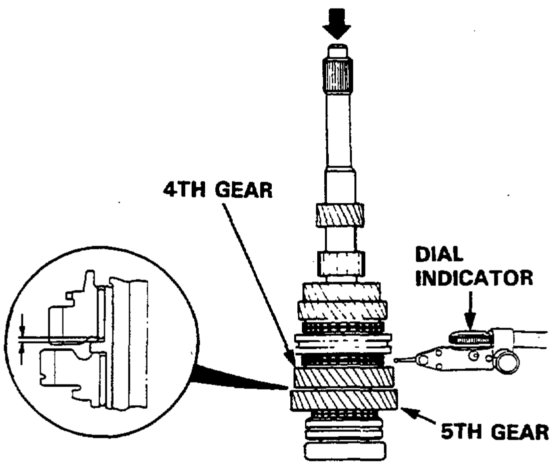
   Standard: 30.22–30.27 mm (1.190–1.192 in)
   Service Limit: 30.15 mm (1.187 in)



- 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.

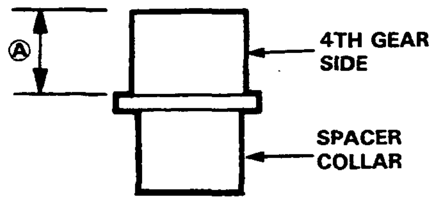
3. Measure the clearance between 4th gear and the spacer collar.

   Standard: 0.06–0.19 mm (0.002–0.007 in)
   Service Limit: 0.31 mm (0.012 in)



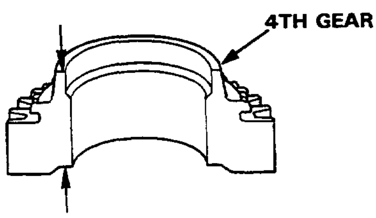
4. If the clearance is more than the service limit, measure distance Ⓐ on the spacer collar.

   Standard: 22.83–22.86 mm (0.899–0.900 in)
   Service Limit: 22.81 mm (0.898 in)



5. 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.

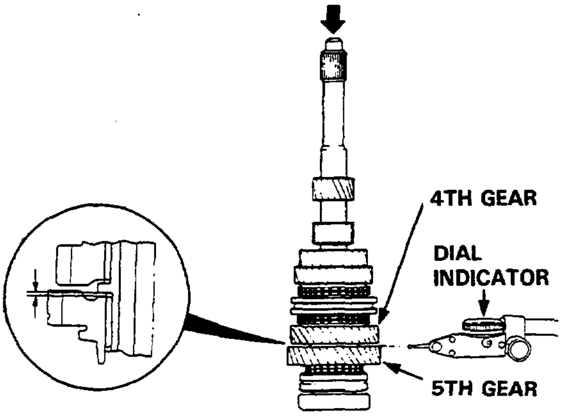
   Standard: 30.12–30.17 mm (1.186–1.188 in)
   Service limit: 30.05 mm (1.183 in)



- 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.

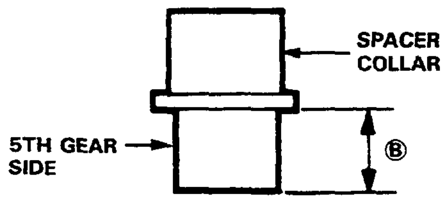
6. Measure the clearance between the spacer collar and 5th gear.

Standard: 0.06–0.19 mm (0.002–0.007 in)
Service limit: 0.31 mm (0.012 in)



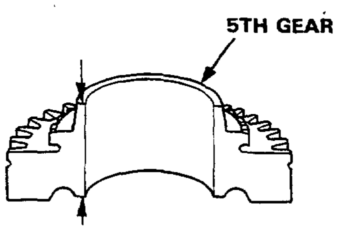
7. If the clearance is more than the service limit, measure distance Ⓑ on the spacer collar.

Standard: 23.53–23.56 mm (0.926–0.928 in)
Service Limit: 23.51 mm (0.926 in)



8. If distance Ⓑ is less than service limit, replace the spacer collar with a new one.
If distance Ⓑ is within the service limit, measure thickness of 5th gear.

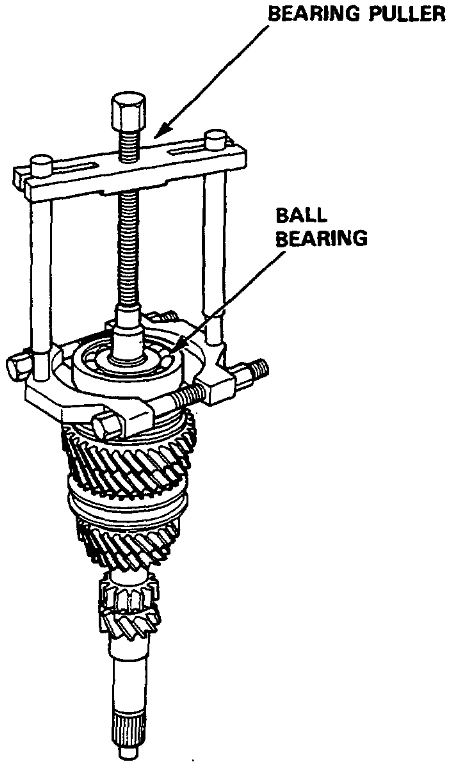
Standard: 28.42–28.47 mm (1.119–1.121 in)
Service Limit: 28.35 mm (1.116 in)



- 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.

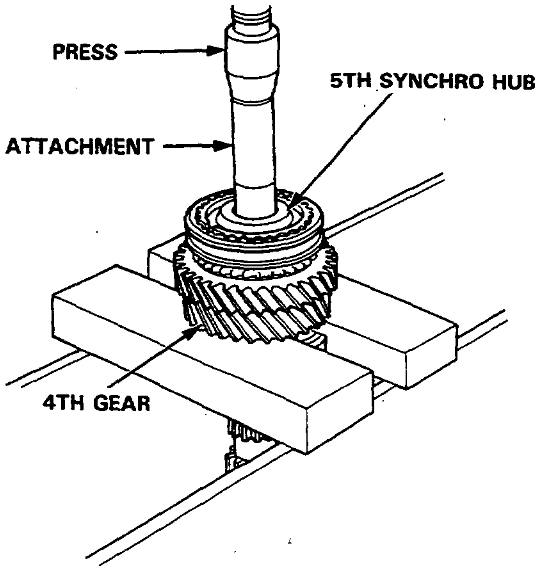
Disassembly

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 4th gear on steel blocks, and press the mainshaft out of the 5th synchro hub as shown.

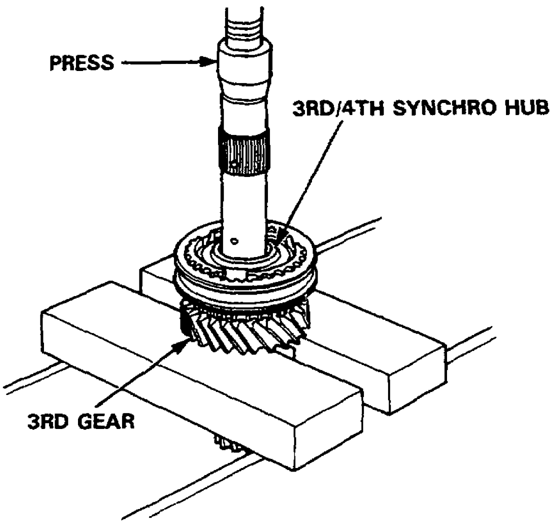


(cont'd)

Mainshaft Assembly

Disassembly (cont'd)

3. Support the 3rd gear on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub as shown.

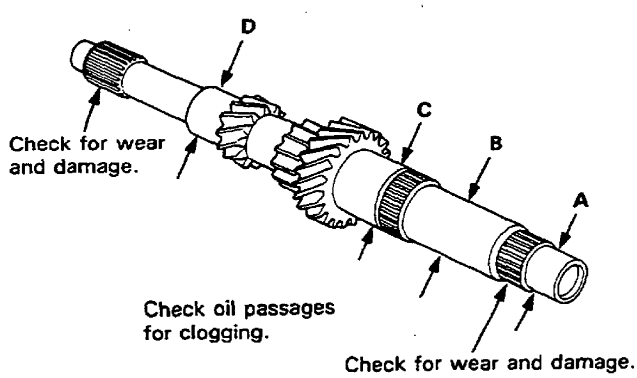


Inspection

1. Inspect the gear surface and bearing surface for wear and damage, then measure the mainshaft at points A, B, C, and D.

Standard: A: 21.987–22.000 mm (0.8656–0.8661 in)
B: 26.980–26.993 mm (1.0622–1.0627 in)
C: 33.984–34.000 mm (1.3380–1.3386 in)
D: 25.977–25.990 mm (1.0227–1.0232 in)

Service Limit: A: 21.930 mm (0.8634 in)
B: 26.930 mm (1.0602 in)
C: 33.930 mm (1.3358 in)
D: 25.920 mm (1.0205 in)

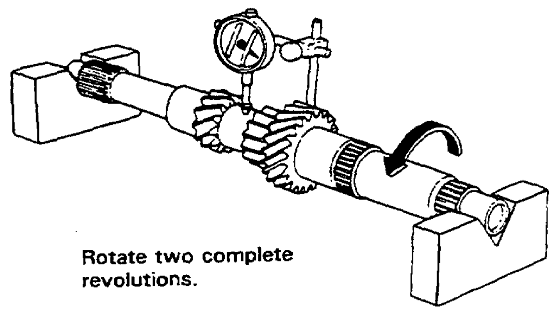


- If any part of the mainshaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

Standard: 0.02 mm (0.001 in) max.
Service Limit: 0.05 mm (0.002 in)

NOTE: Support the mainshaft at both ends as shown.



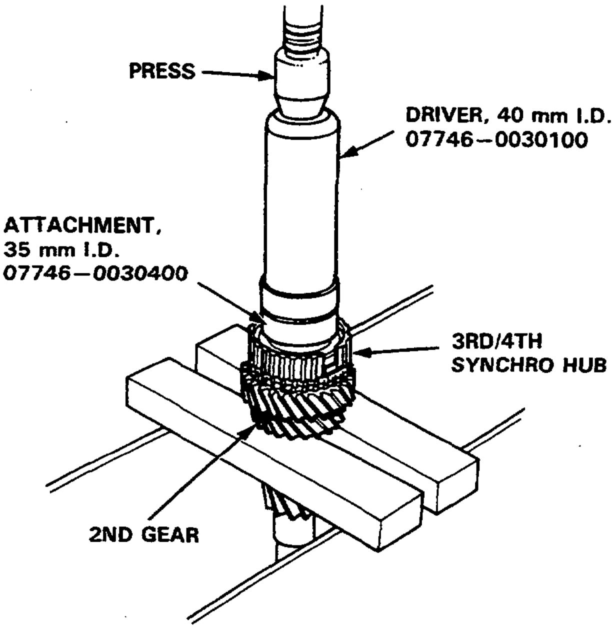
- If the runout is more than the service limit, replace the mainshaft with a new one.

Reassembly

CAUTION: When installing the 3rd/4th and 5th synchro hubs, support the shaft on steel blocks, and install the synchro hubs using a press.

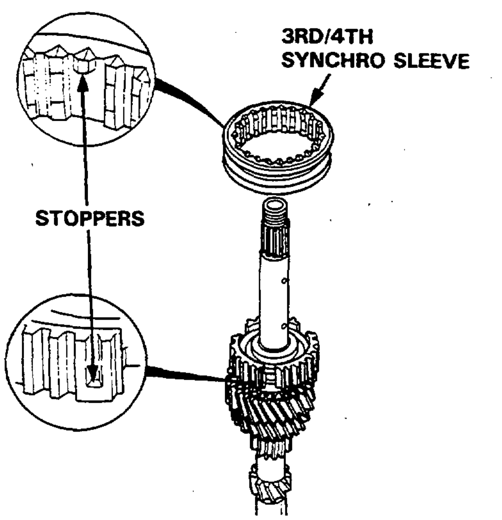
NOTE: Refer to page 13-13 for reassembly sequence.

1. Support 2nd gear on steel blocks, then install the 3rd/4th synchro hub using the special tools and a press as shown.

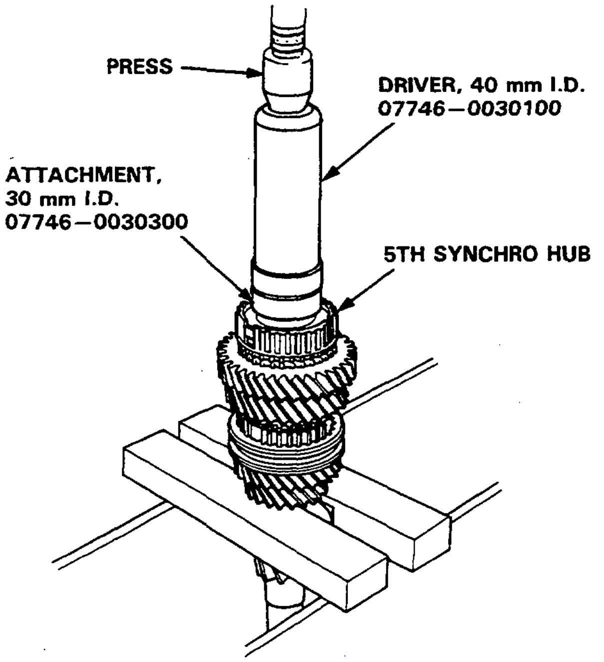


2. Install the 3rd/4th synchro sleeve by aligning the stoppers of the 3rd/4th synchro sleeve and hub.

   NOTE: After installing, Check the operation of the 3rd/4th synchro hub set.

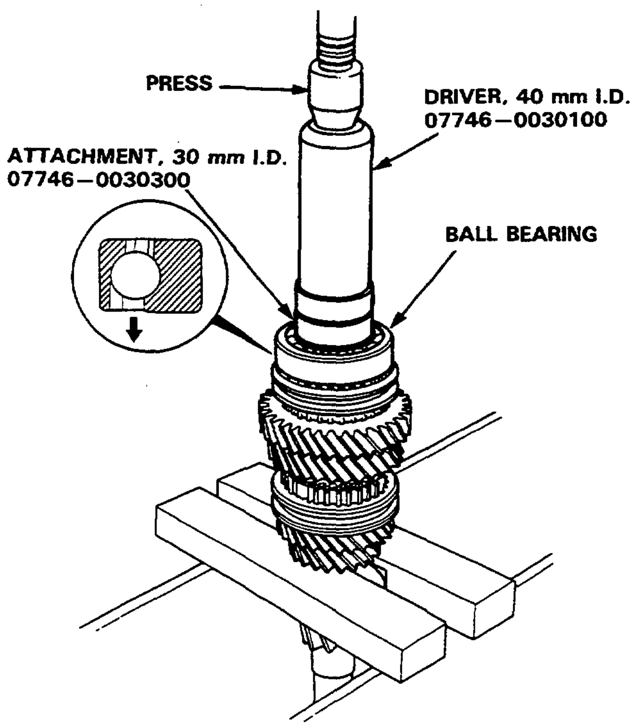


3. Install the 5th synchro hub using the special tools and a press as shown.



4. Install the ball bearing using the special tools and a press as shown.

   NOTE: Install the ball bearing with the tapered end facing down.

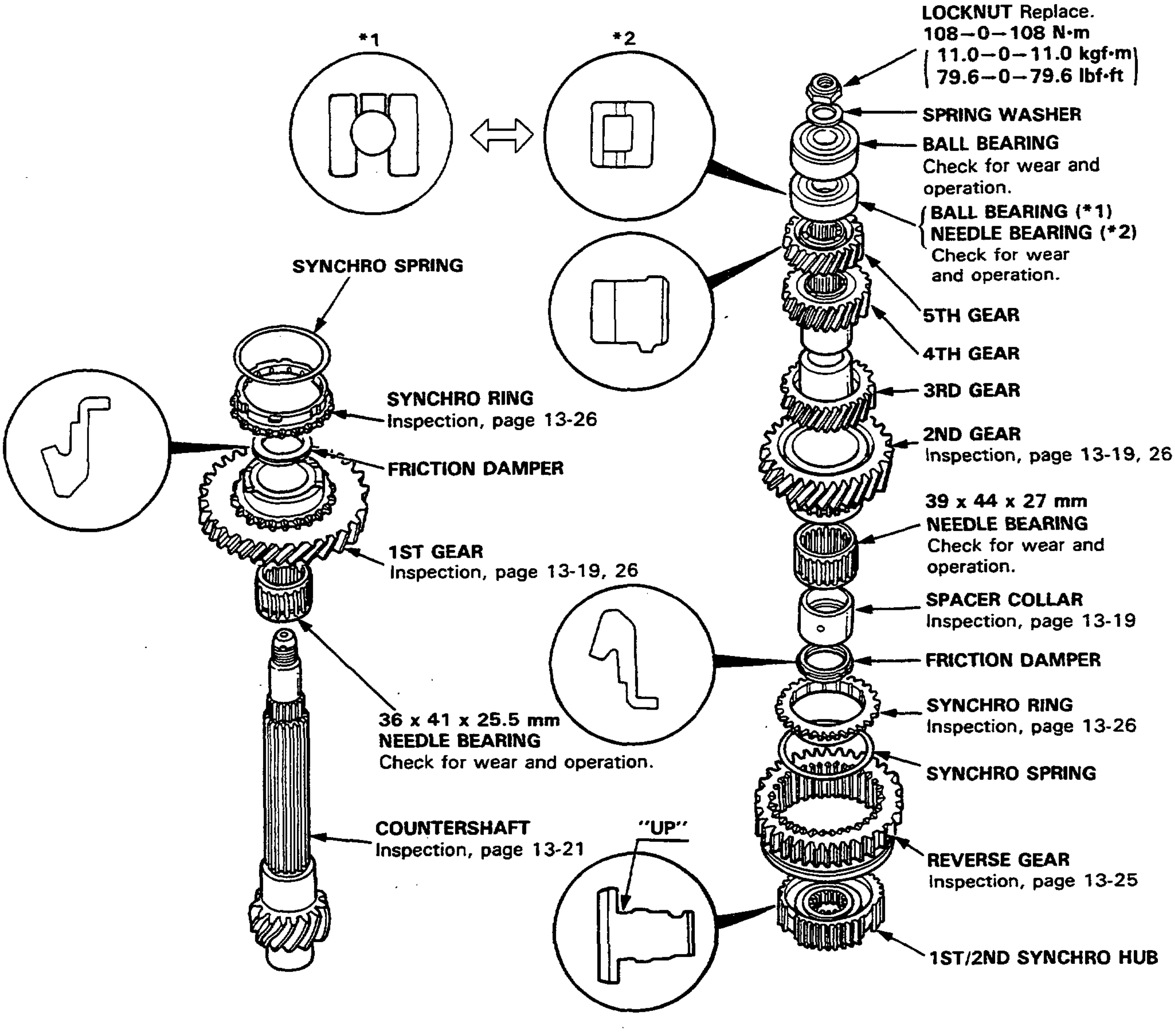


Countershaft Assembly

Index

NOTE: The 3rd, 4th, and 5th gears 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 gears, however, should be installed with a press before lubricating them.



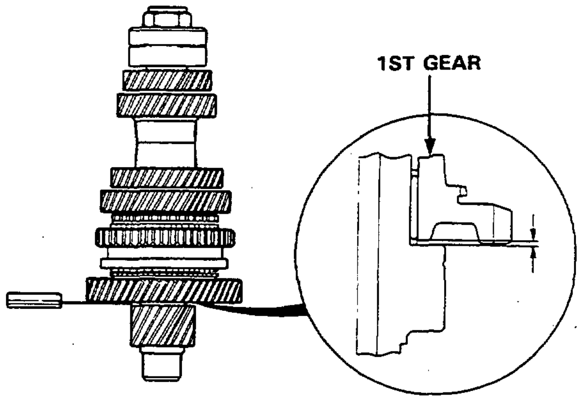
*1: D14A2, D15Z3 engines
*2: D16Y2, D16Y3 engines

Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

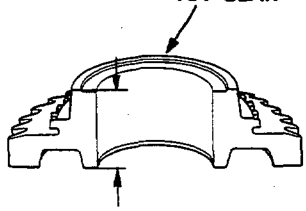
1. Measure the clearance between the countershaft and 1st gear.

   Standard: 0.03–0.10 mm (0.001–0.004 in)
   Service Limit: 0.22 mm (0.009 in)



2. If the clearance is more than the service limit, measure the thickness of 1st gear.

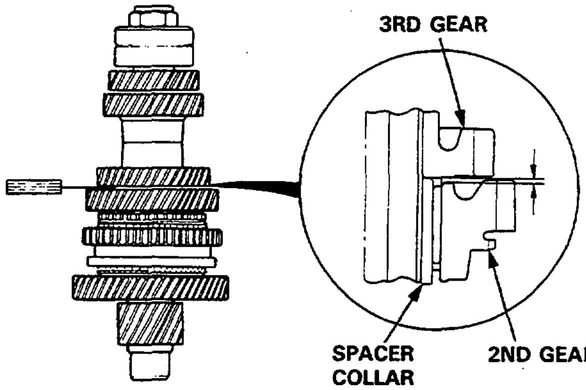
   Standard: 30.41–30.44 mm (1.197–1.198 in)
   Service Limit: 30.36 mm (1.195 in)



- If the thickness of 1st gear is less than the service limit, replace 1st gear with a new one.
- If the thickness of 1st gear is within the service limit, replace the 1st/2nd synchro hub with a new one.

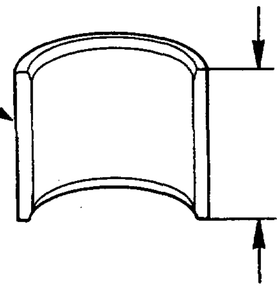
3. Measure the clearance between 2nd and 3rd gears.

   Standard: 0.03–0.11 mm (0.001–0.004 in)
   Service Limit: 0.23 mm (0.009 in)



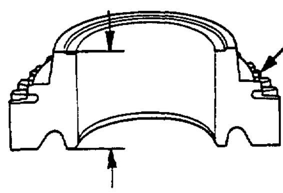
4. If the clearance is more than the service limit, measure the thickness of the spacer collar.

   Standard: 32.03–32.06 mm (1.261–1.262 in)
   Service Limit: 32.01 mm (1.260 in)



5. If the thickness is less than the service limit, replace the spacer collar with a new one.
   If the thickness is within the service limit, measure the thickness of 2nd gear.

   Standard: 31.92–31.97 mm (1.257–1.259 in)
   Service Limit: 31.85 mm (1.254 in)



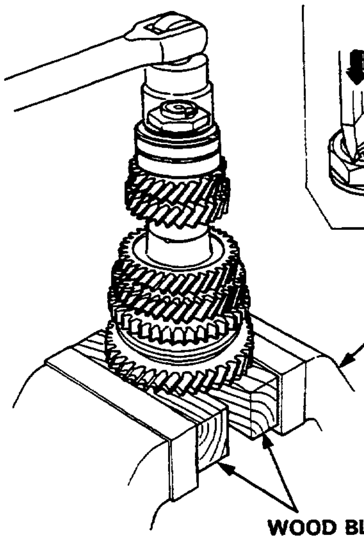
- If the thickness of 2nd gear is less than the service limit, replace 2nd gear with a new one.
- If the thickness of 2nd gear is within the service limit, replace the 1st/2nd synchro hub with a new one.

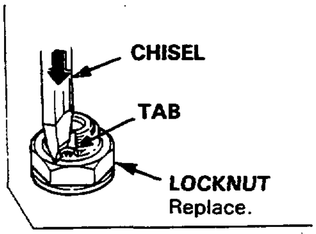
Countershaft Assembly

Disassembly

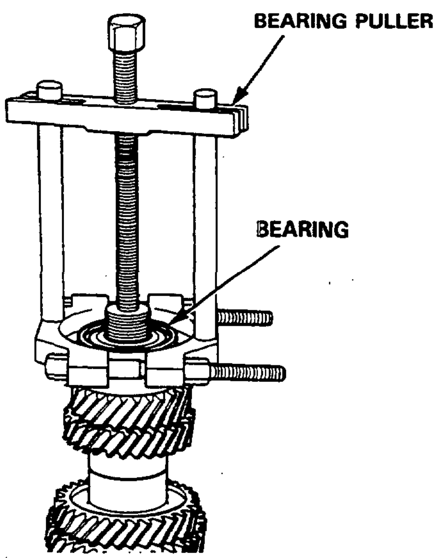
CAUTION: Remove the gears using a press and steel blocks as shown. Use of a jaw-type puller can damage the gear teeth.

1. Securely clamp the countershaft assembly in a bench vise with wood blocks.
2. Raise the locknut tab from the groove of the countershaft, then remove the locknut and the spring washer.

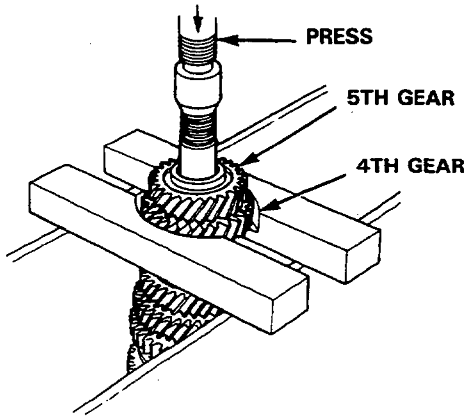




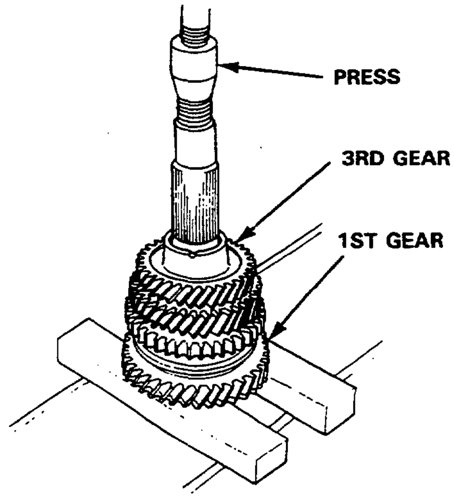
3. Remove the bearings using a bearing puller as shown.



4. Support 4th gear on steel blocks, and press the countershaft out of 5th and 4th gears as shown.



5. Support 1st gear on steel blocks, and press the countershaft out of 3rd gear as shown.

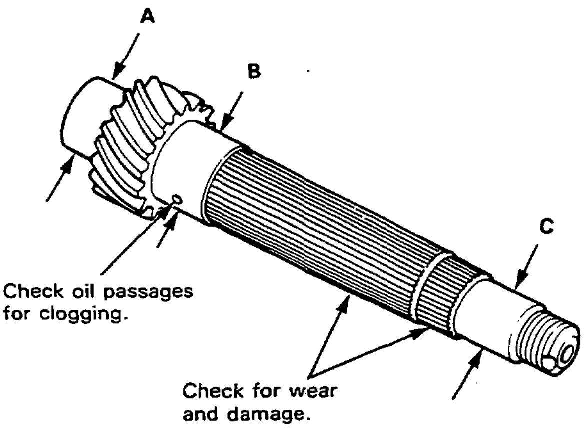


Inspection

1. Inspect the gear surfaces and bearing surfaces for wear and damage, then measure the countershaft at points A, B, and C.

Standard: A: 30.000–30.015 mm (1.1811–1.1817 in)
B: 35.984–36.000 mm (1.4167–1.4173 in)
C: 24.980–24.993 mm (0.9835–0.9840 in)

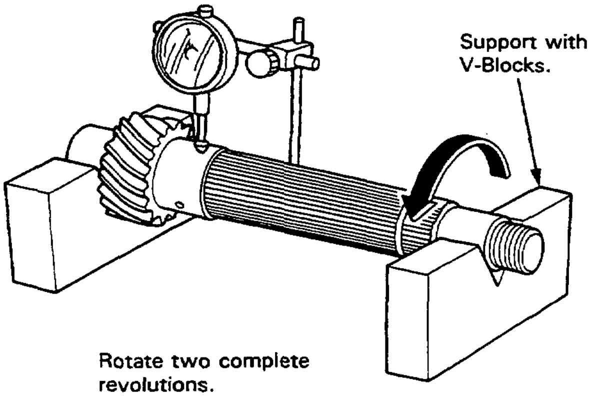
Service Limit: A: 29.950 mm (1.1791 in)
B: 35.930 mm (1.4146 in)
C: 24.930 mm (0.9815 in)



- 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 (0.001 in) max.
Service Limit: 0.05 mm (0.002 in)



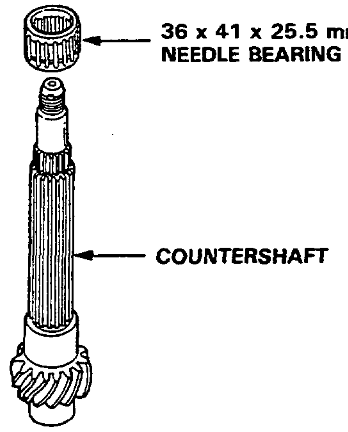
- If the runout is more than the service limit, replace the countershaft with a new one.

Reassembly

CAUTION:
- **Press the 3rd, 4th, and 5th gears on the countershaft without lubrication.**
- **When installing the 3rd, 4th, and 5th gears, support the shaft on steel blocks and install the gears using a press.**

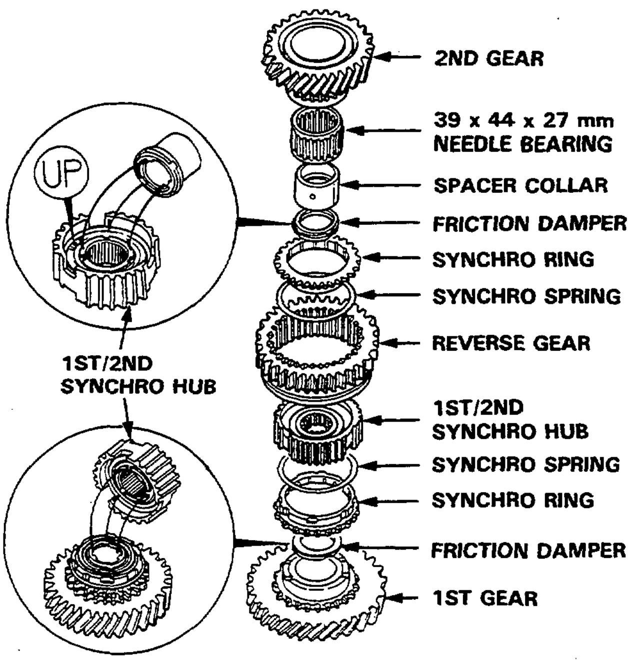
NOTE: Refer to page 13-18 for reassembly sequence.

1. Install the needle bearing on the countershaft.



2. Assemble the parts below as shown.

NOTE: Check that the fingers of the friction damper are securely set in the grooves of the 1st/2nd synchro hub.

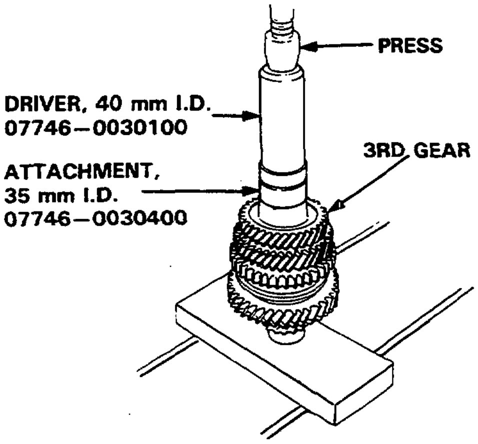


3. Install the parts on the countershaft.

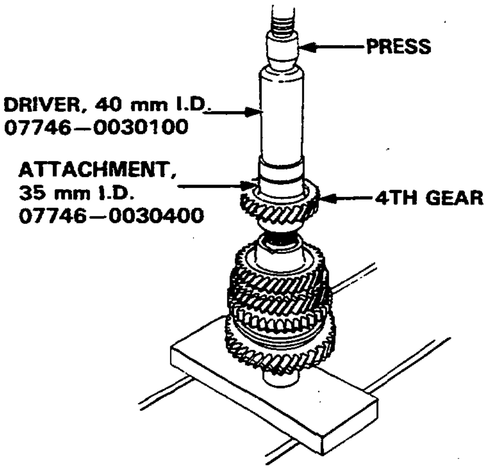
(cont'd)

Reassembly (cont'd)

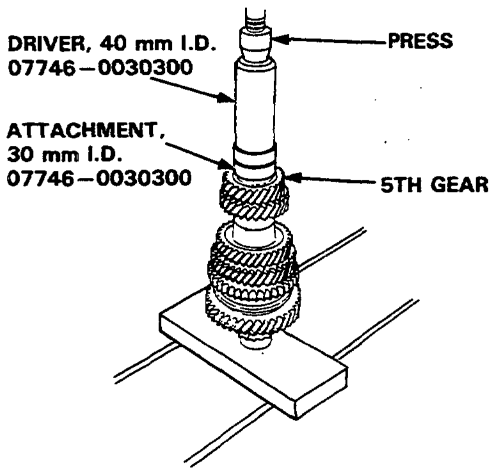
4. Support the countershaft on a steel block as shown and install 3rd gear using the special tools and a press as shown.



5. Install 4th gear using the special tools and a press as shown.

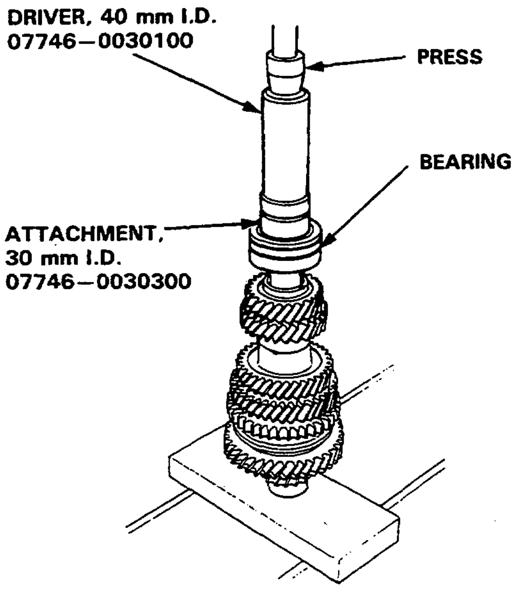


6. Install 5th gear using the special tools and a press as shown.



7. Install the bearings using the special tools and a press as shown.

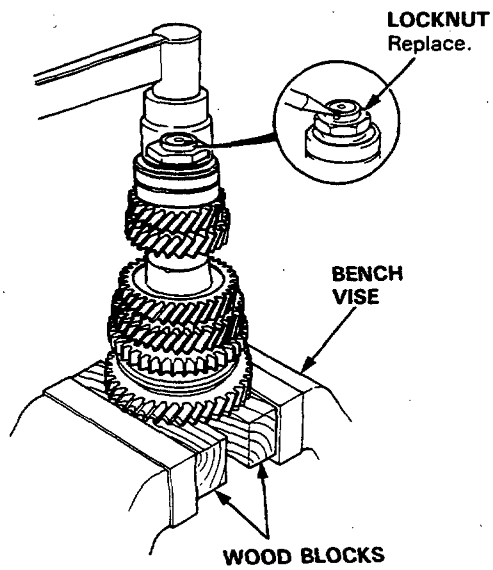
CAUTION: Install the bearings with a maximum pressure of 7.8 kN (800 kgf, 5.786 lbf).



8. Securely clamp the countershaft assembly in a bench vise with wood blocks.

9. Install the spring washer, tighten the locknut, then stake the locknut tab into groove.

LOCKNUT
108–0–108 N·m
(11.0–0–11.0 kgf·m, 79.6–0–79.6 lbf·ft)



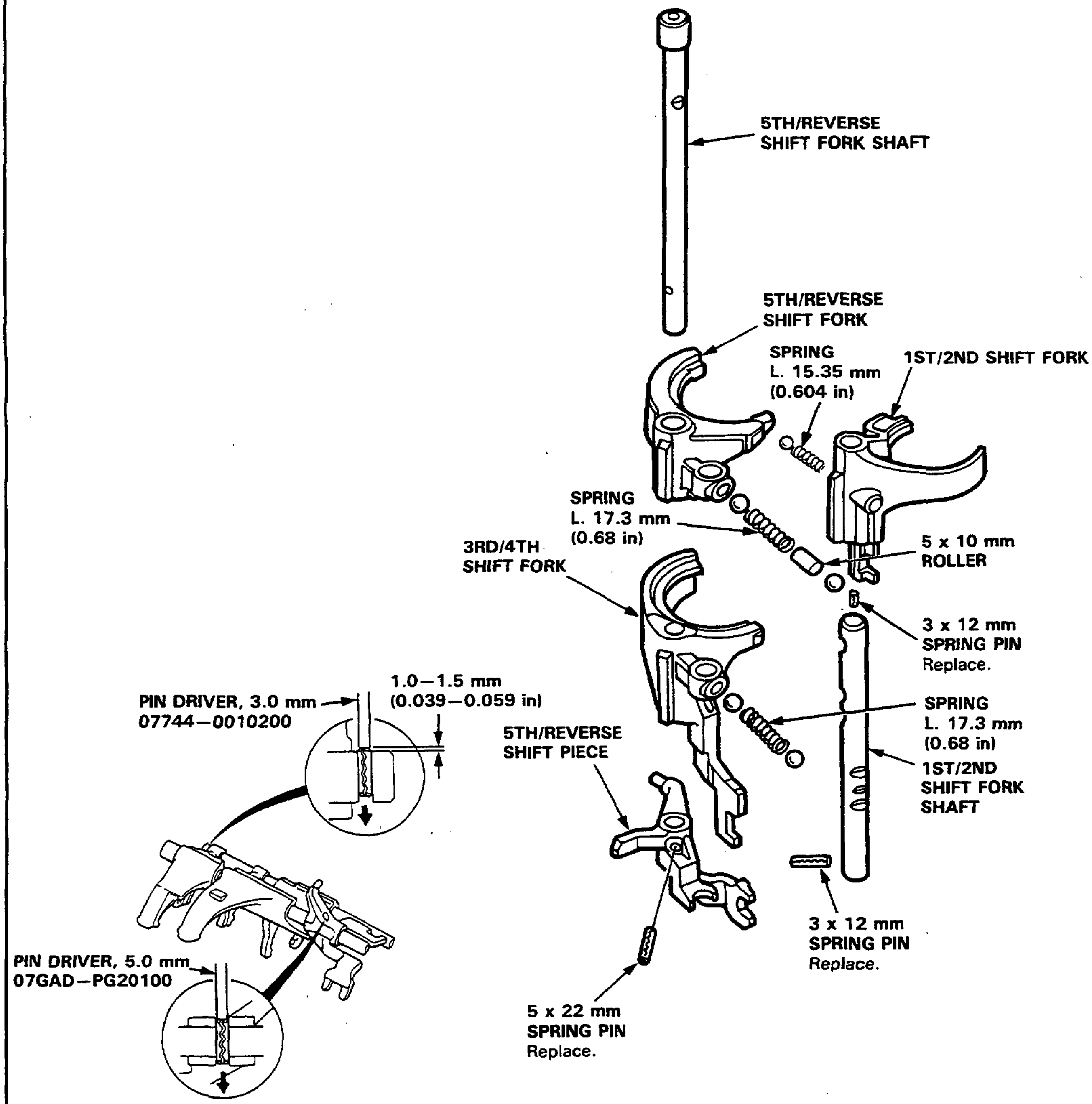
Shift Fork Assembly

Disassembly/Reassembly

NOTE:

- When disassembling, pay attention to the steel balls as the springs may force them out.
- When assembling, install the shift fork shaft with its detents facing the hole where the balls are inserted.
- The steel balls are all of the same size (5/16 in).

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

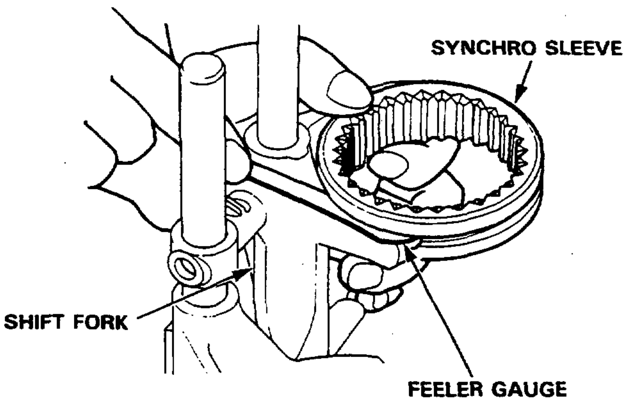


Shift Fork Assembly

Clearance Inspection

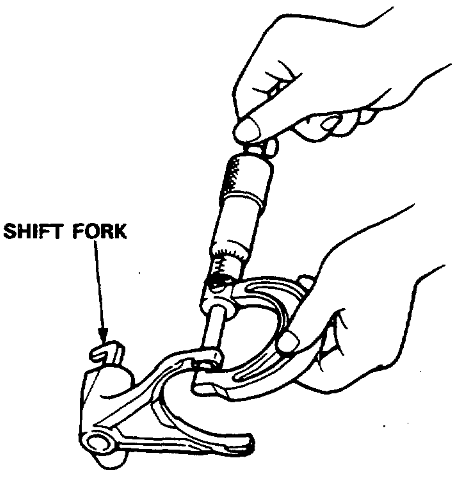
1. Measure the clearance between each shift fork and its matching synchro sleeve.

   Standard: 0.25—0.45 mm (0.010—0.018 in)
   Service Limit: 0.8 mm (0.032 in)



2. If the clearance is more than the service limit, measure the thickness of the shift fork fingers.

   Standard: 6.4—6.5 mm (0.25—0.26 in)

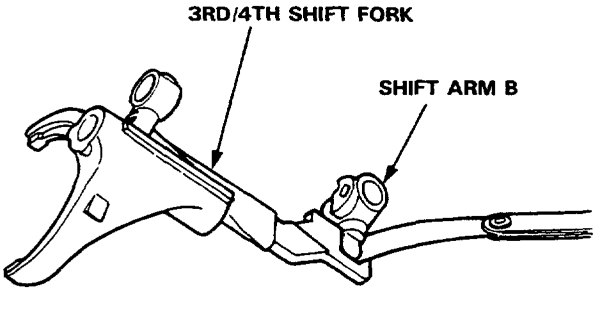


3. If the thickness of the shift fork fingers is not within the standard, replace the shift fork with a new one. If the thickness of the shift fork fingers is within the standard, replace the synchro sleeve with a new one.

   NOTE: The synchro sleeve and synchro hub should be replaced as a set.

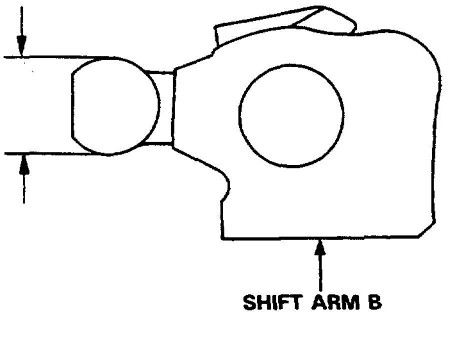
4. Measure the clearance between the 3rd/4th shift fork and shift arm B.

   Standard: 0.2—0.5 mm (0.008—0.019 in)
   Service Limit: 0.62 mm (0.024 in)



5. If the clearance is more than the service limit, measure the width of the shift arm B.

   Standard: 12.9—13.0 mm (0.508—0.512 in)
   Service Limit: 12.78 mm (0.503 in)



6. If the width of the shift arm B is not within the service limit, replace the shift arm B with a new one. If the width of the shift arm B is within the service limit, replace the 3rd/4th shift fork with a new one.

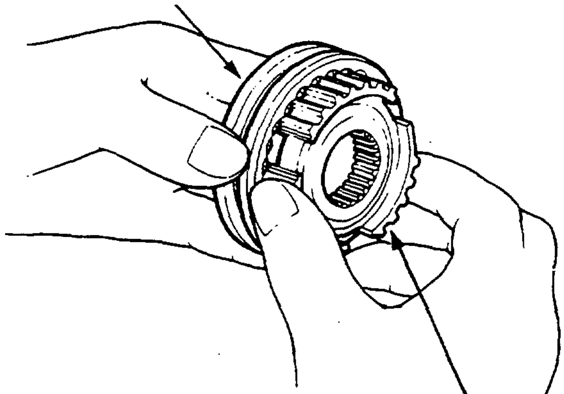
Synchro Sleeve, Synchro Hub

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.

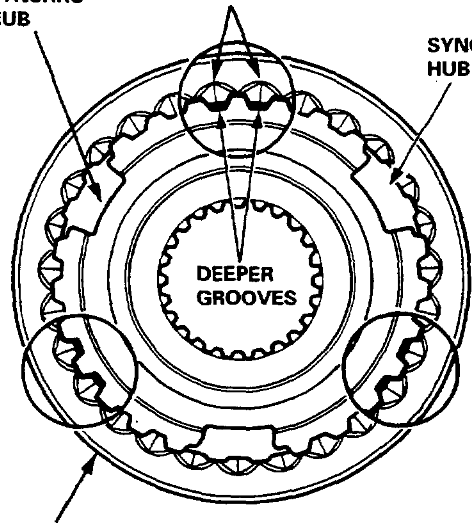
   NOTE: If replacement is required, always replace the synchro sleeve and synchro hub as a set.



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 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.

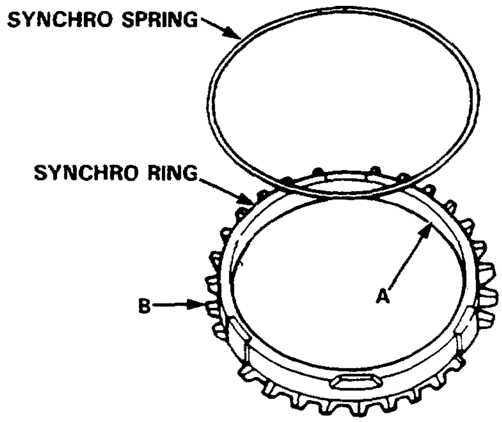
2. Coat the cone surface of the gear with oil, and place the synchro ring on the matching gear. Rotate the synchro ring, making sure that it does not slip.

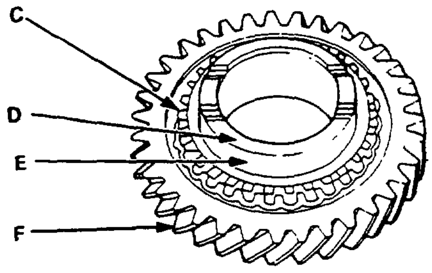
   Measure the clearance between the synchro ring and gear all the way around.

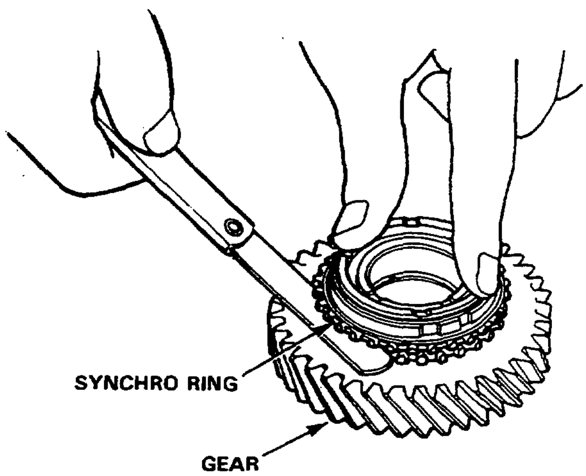
   NOTE: Hold the synchro ring against the gear evenly while measuring the clearance.

   Synchro Ring-to-Gear Clearance
   Standard: 0.85 – 1.10 mm (0.033 – 0.043 in)
   Service Limit: 0.4 mm (0.02 in)

   If the clearance is less than the service limit, replace the synchro ring and synchro cone.







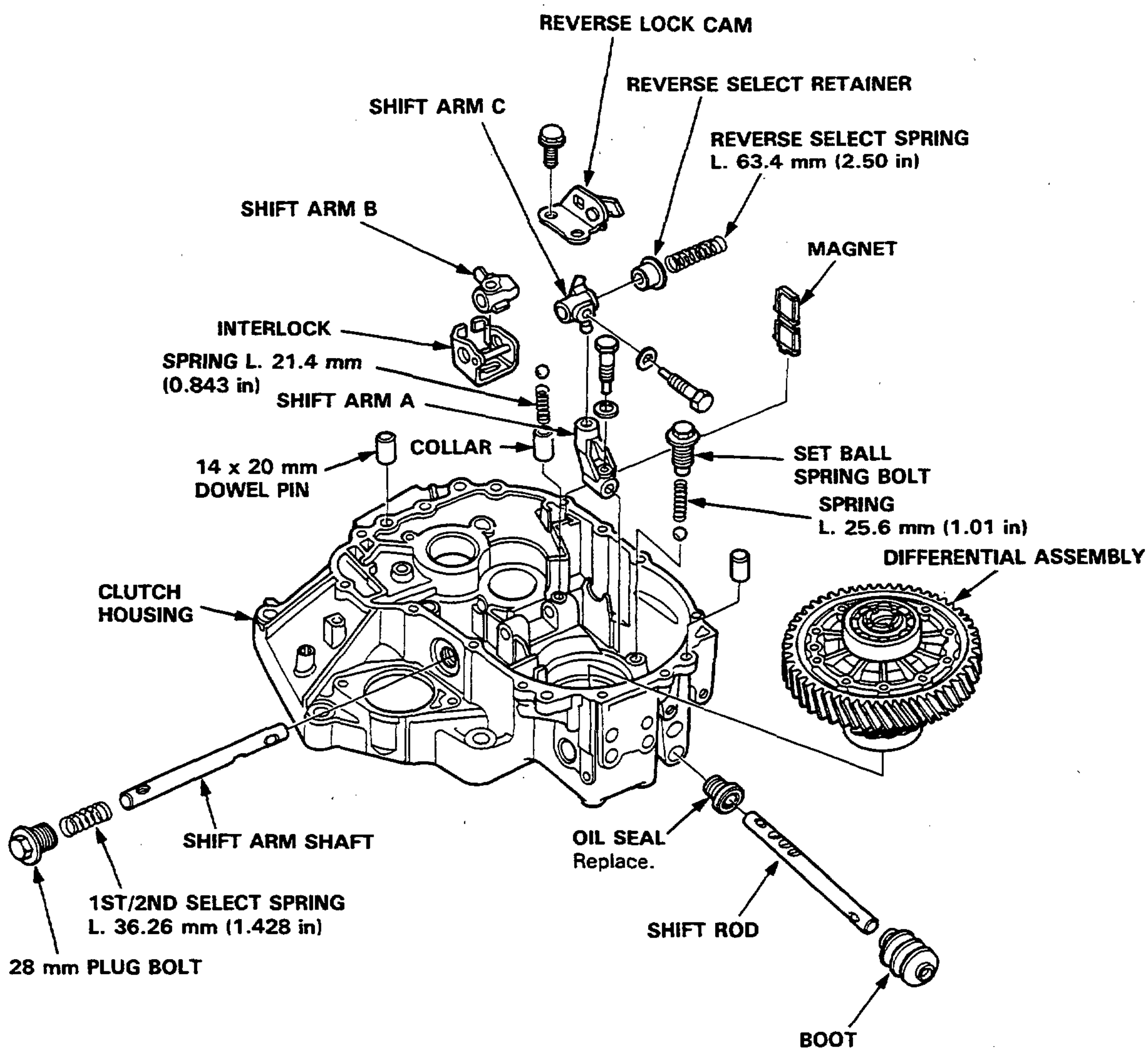
Shift Rod

Removal

NOTE: The steel balls are all of the same size (5/16 in).

1. Remove the differential assembly.
2. Remove the 28 mm plug bolt and 1st/2nd select spring.
3. Remove the shift arm C attaching bolt.
4. Remove the shift arm shaft.

   NOTE: Be careful not to lose the steel ball.
5. Remove the steel ball, spring, and collar.
6. Remove shift arms C and B, and the interlock, then remove the reverse select spring and retainer.
7. Remove the shift arm A attaching bolt, the set ball spring bolt, set spring, and steel ball.
8. Remove the shift rod, then remove the shift arm A.
9. Remove the reverse lock cam.
10. Remove the magnet.

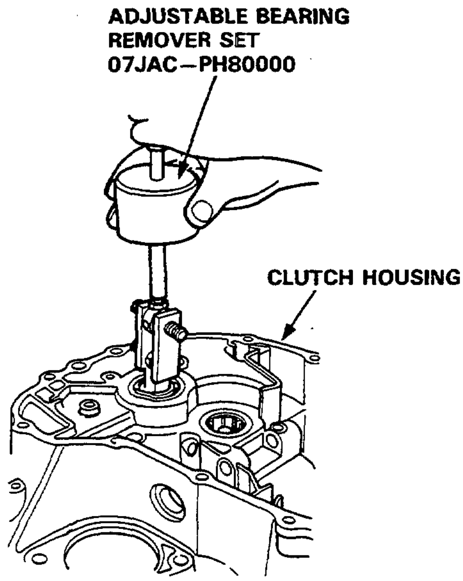


Clutch Housing Bearing

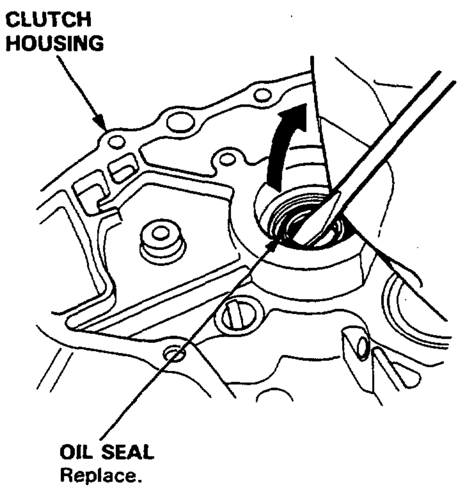
Replacement

Mainshaft

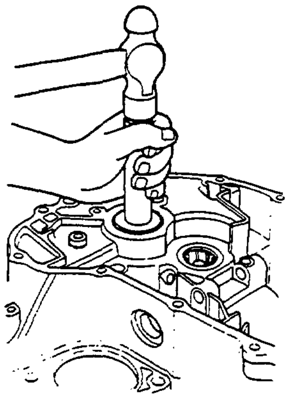
1. Remove the ball bearing using the special tool as shown.

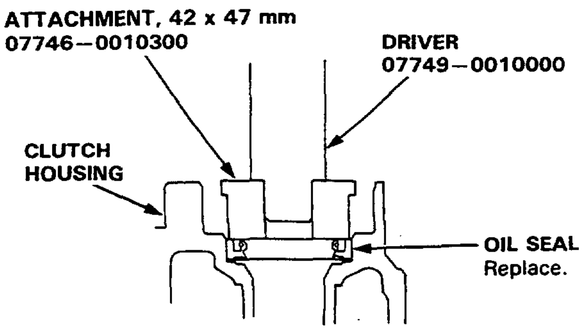


2. Remove the oil seal from the clutch housing.

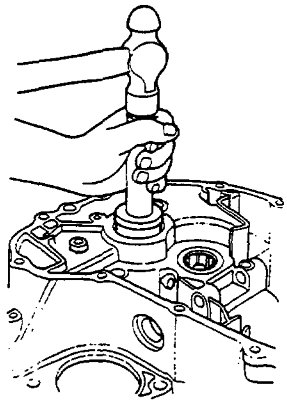


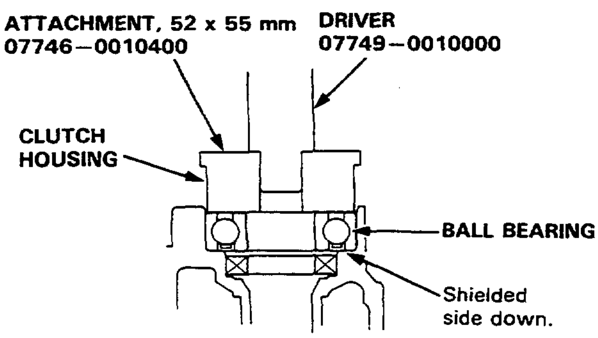
3. Drive the new oil seal into the clutch housing using the special tools as shown.





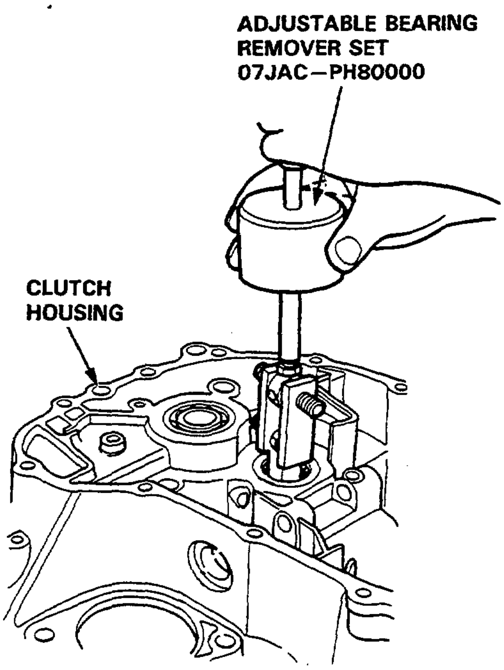
4. Drive the ball bearing into the clutch housing using the special tools as shown.



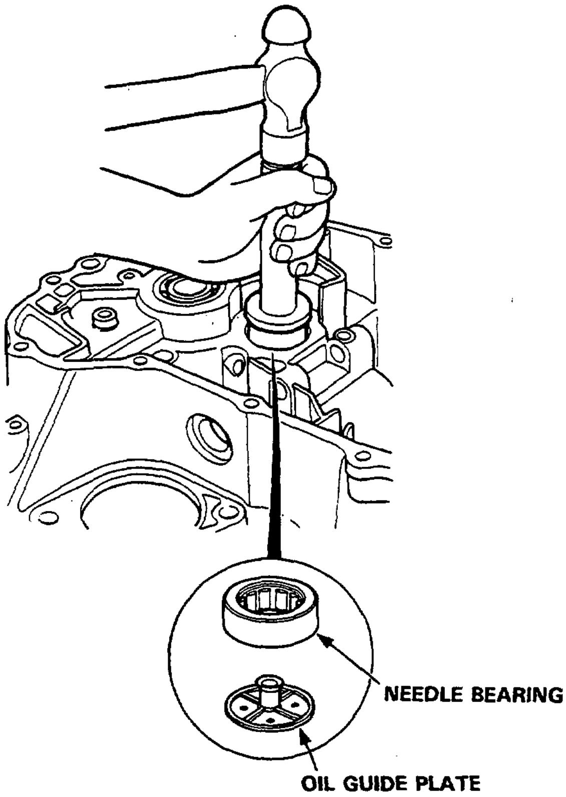


Countershaft

1. Remove the needle bearing using the special tool as shown, then remove the oil guide plate.

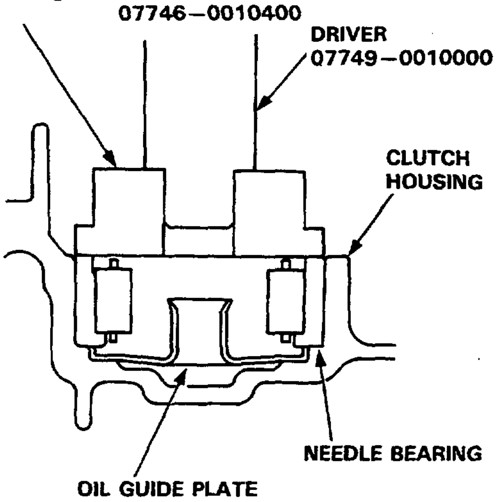


2. Install the oil guide plate, then drive the needle bearing into the clutch housing using the special tools as shown.



D14A2, D15Z3 engines: ATTACHMENT, 42 x 47 mm
07746–0010300

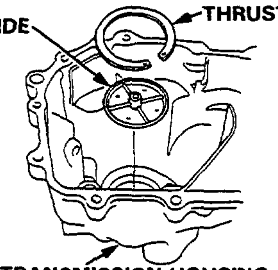
D16Y2, D16Y3 engines: ATTACHMENT, 52 x 55 mm
07746–0010400



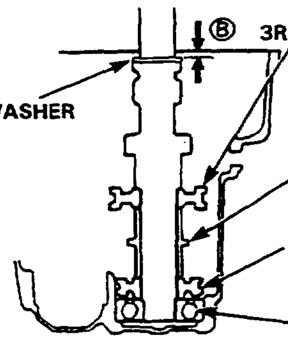
Mainshaft Thrust Shim

Adjustment

1. Remove the thrust shim and oil guide plate from the transmission housing.



2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, ball bearing, and thrust washer on the mainshaft. Install the assembly in the transmission housing.

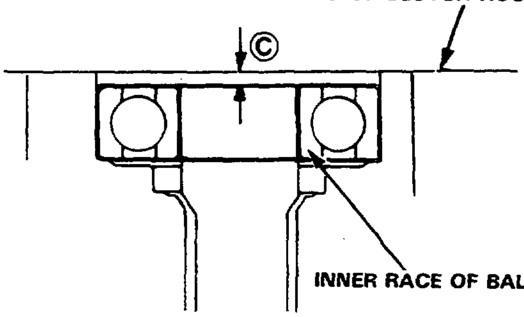


3. Measure the distance Ⓑ between the end of the transmission housing and thrust washer.

   NOTE:
   - Use a straight edge and vernier caliper.
   - Measure at three locations and average the readings.

4. Measure the distance Ⓒ between the surfaces of the clutch housing and bearing inner race.

   NOTE:
   - Use a straight edge and depth gauge.
   - Measure at three locations and average the readings.



5. Select the proper shim on the basis of the following calculations:

   NOTE: Use only one thrust shim.

   (Basic Formula)
   (B) + (C) − 0.95 = shim thickness

   Example of calculation:
   Distance Ⓑ (2.00 mm) + Distance Ⓒ (0.09 mm) = 2.09 mm
   subtract the spring washer height (0.95 mm) = the required thrust shim (1.14 mm)

65 mm THRUST SHIM: D14A2, D15Z3 engines

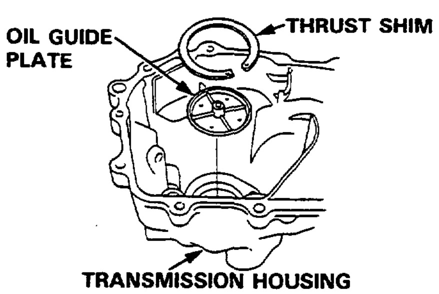
	Part Number	Thickness
A	23931−PL3−A10	0.60 mm (0.0236 in)
B	23932−PL3−A10	0.63 mm (0.0284 in)
C	23933−PL3−A10	0.66 mm (0.0260 in)
D	23934−PL3−A10	0.69 mm (0.0272 in)
E	23935−PL3−A10	0.72 mm (0.0283 in)
F	23936−PL3−A10	0.75 mm (0.0295 in)
G	23937−PL3−A10	0.78 mm (0.0307 in)
H	23938−PL3−A10	0.81 mm (0.0319 in)
I	23939−PL3−A10	0.84 mm (0.0331 in)
J	23940−PL3−A10	0.87 mm (0.0343 in)
K	23941−PL3−A10	0.90 mm (0.0354 in)
L	23942−PL3−A10	0.93 mm (0.0366 in)
M	23943−PL3−A10	0.96 mm (0.0378 in)
N	23944−PL3−A10	0.99 mm (0.0390 in)
O	23945−PL3−A10	1.02 mm (0.0402 in)
P	23946−PL3−A10	1.05 mm (0.0413 in)
Q	23947−PL3−A10	1.08 mm (0.0425 in)
R	23948−PL3−A10	1.11 mm (0.0437 in)
S	23949−PL3−A10	1.14 mm (0.0449 in)
T	23950−PL3−A10	1.17 mm (0.0461 in)
U	23951−PL3−A10	1.20 mm (0.0472 in)
V	23952−PL3−A10	1.23 mm (0.0484 in)
W	23953−PL3−A10	1.26 mm (0.0496 in)
X	23954−PL3−A10	1.29 mm (0.0508 in)
Y	23955−PL3−A10	1.32 mm (0.0520 in)
Z	23956−PL3−A10	1.35 mm (0.0531 in)
AA	23957−PL3−A10	1.38 mm (0.0543 in)
AB	23958−PL3−A10	1.41 mm (0.0555 in)
AC	23959−PL3−A10	1.44 mm (0.0567 in)
AD	23960−PL3−A10	1.47 mm (0.0579 in)
AE	23961−PL3−A10	1.50 mm (0.0591 in)
AF	23962−PL3−A10	1.53 mm (0.0602 in)
AG	23963−PL3−A10	1.56 mm (0.0614 in)
AH	23964−PL3−A10	1.59 mm (0.0626 in)
AI	23965−PL3−A10	1.62 mm (0.0638 in)
AJ	23966−PL3−A10	1.65 mm (0.0650 in)
AK	23967−PL3−A10	1.68 mm (0.0661 in)
AL	23968−PL3−A10	1.71 mm (0.0673 in)
AM	23969−PL3−A10	1.74 mm (0.0685 in)
AN	23970−PL3−A10	1.77 mm (0.0697 in)
AO	23971−PL3−A10	1.80 mm (0.0709 in)

70 mm THRUST SHIM: D16Y2, D16Y3 engines

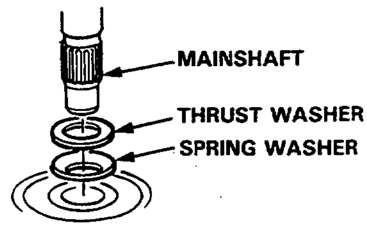
	Part Number	Thickness
A	23931–PL3–B00	0.60 mm (0.0236 in)
B	23932–PL3–B00	0.63 mm (0.0284 in)
C	23933–PL3–B00	0.66 mm (0.0260 in)
D	23934–PL3–B00	0.69 mm (0.0272 in)
E	23935–PL3–B00	0.72 mm (0.0283 in)
F	23936–PL3–B00	0.75 mm (0.0295 in)
G	23937–PL3–B00	0.78 mm (0.0307 in)
H	23938–PL3–B00	0.81 mm (0.0319 in)
I	23939–PL3–B00	0.84 mm (0.0331 in)
J	23940–PL3–B00	0.87 mm (0.0343 in)
K	23941–PL3–B00	0.90 mm (0.0354 in)
L	23942–PL3–B00	0.93 mm (0.0366 in)
M	23943–PL3–B00	0.96 mm (0.0378 in)
N	23944–PL3–B00	0.99 mm (0.0390 in)
O	23945–PL3–B00	1.02 mm (0.0402 in)
P	23946–PL3–B00	1.05 mm (0.0413 in)
Q	23947–PL3–B00	1.08 mm (0.0425 in)
R	23948–PL3–B00	1.11 mm (0.0437 in)
S	23949–PL3–B00	1.14 mm (0.0449 in)
T	23950–PL3–B00	1.17 mm (0.0461 in)
U	23951–PL3–B00	1.20 mm (0.0472 in)
V	23952–PL3–B00	1.23 mm (0.0484 in)
W	23953–PL3–B00	1.26 mm (0.0496 in)
X	23954–PL3–B00	1.29 mm (0.0508 in)
Y	23955–PL3–B00	1.32 mm (0.0520 in)
Z	23956–PL3–B00	1.35 mm (0.0531 in)
AA	23957–PL3–B00	1.38 mm (0.0543 in)
AB	23958–PL3–B00	1.41 mm (0.0555 in)
AC	23959–PL3–B00	1.44 mm (0.0567 in)
AD	23960–PL3–B00	1.47 mm (0.0579 in)
AE	23961–PL3–B00	1.50 mm (0.0591 in)
AF	23962–PL3–B00	1.53 mm (0.0602 in)
AG	23963–PL3–B00	1.56 mm (0.0614 in)
AH	23964–PL3–B00	1.59 mm (0.0626 in)
AI	23965–PL3–B00	1.62 mm (0.0638 in)
AJ	23966–PL3–B00	1.65 mm (0.0650 in)
AK	23967–PL3–B00	1.68 mm (0.0661 in)
AL	23968–PL3–B00	1.71 mm (0.0673 in)
AM	23969–PL3–B00	1.74 mm (0.0685 in)
AN	23970–PL3–B00	1.77 mm (0.0697 in)
AO	23971–PL3–B00	1.80 mm (0.0709 in)

6. Install the oil guide plate and selected thrust shim in the transmission housing.

   NOTE:
   - Clean the thrust washer, spring washer and thrust shim thoroughly before installation.
   - Install the thrust washer, spring washer and thrust shim properly.



7. Install the thrust washer and spring washer in the mainshaft.



8. Install the mainshaft in the clutch housing.
9. Place the transmission housing over the mainshaft and onto the clutch housing.
10. Tighten the clutch and transmission housings with several 8 mm bolts.

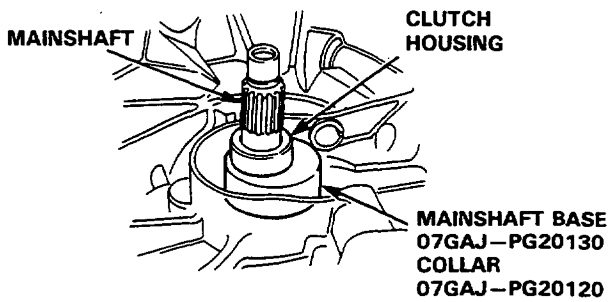
    NOTE: It is not necessary to use sealing agent between the housings.

    8 x 1.25 mm
    27 N·m (2.8 kgf·m, 20 lbf·ft)

11. Tap the mainshaft with a plastic hammer.
12. Check the thrust clearance in the manner described below.

    CAUTION: Measurement should be made at room temperature.

    a. Slide the mainshaft base and the collar over the mainshaft.



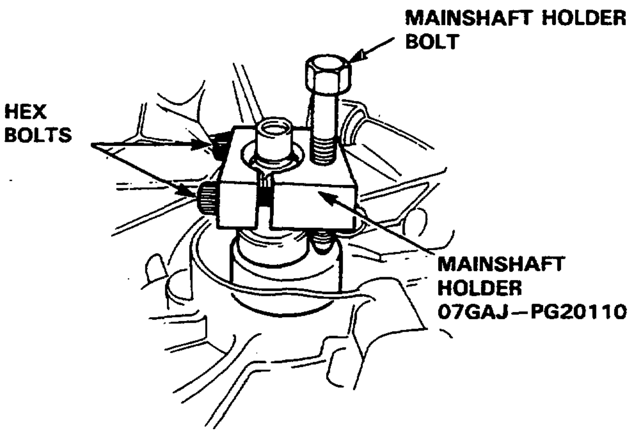
(cont'd)

Mainshaft Thrust Shim

Adjustment (cont'd)

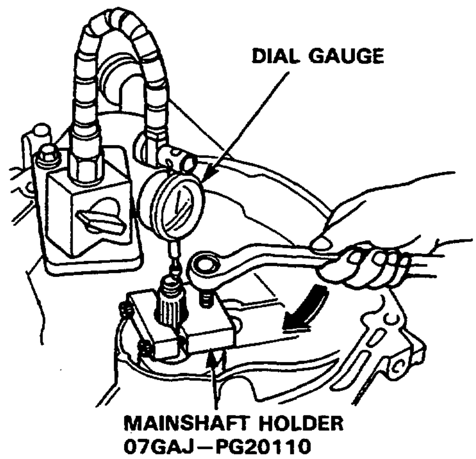
b. Attach the mainshaft holder to the mainshaft as follows:

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.



c. Seat the mainshaft fully by tapping its end with a plastic hammer.
d. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

e. Zero a dial gauge on the end of the mainshaft.



f. 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.

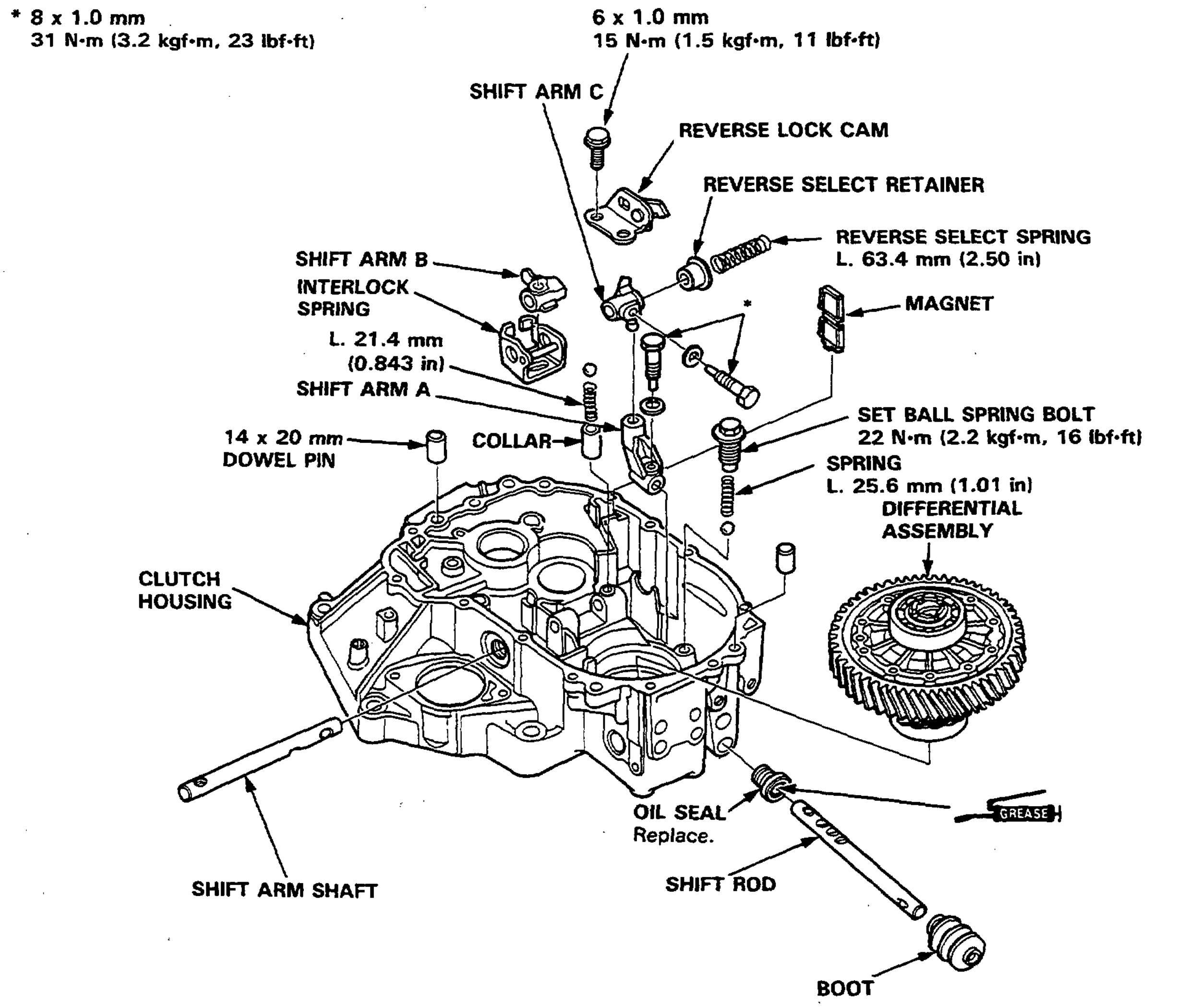
g. If the reading is within the standard, the clearance is correct.
If the reading is not within the standard, recheck the shim thickness.

Standard: 0.11–0.18 mm (0.004–0.007 in)

Reassembly

NOTE: The steel balls are all of the same size (5/16 in).

1. Install the magnet and reverse lock cam.
2. Set shift arm A on the clutch housing, then install the shift rod.
3. Install the spring washer and shift arm A attaching bolt.
4. Install the steel ball, spring, and set ball spring bolt.
5. Install shift arm B in the interlock, then set it on the clutch housing.
6. Insert shift arm shaft in the clutch housing
7. Install the collar, spring, and steel ball into the case. Compress the ball and insert the shift arm shaft.
8. Install shift arm C in shift arm A, then insert the shift arm shaft.
9. Install the reverse select retainer and reverse select spring onto shift arm shaft.
10. Install the differential assembly.



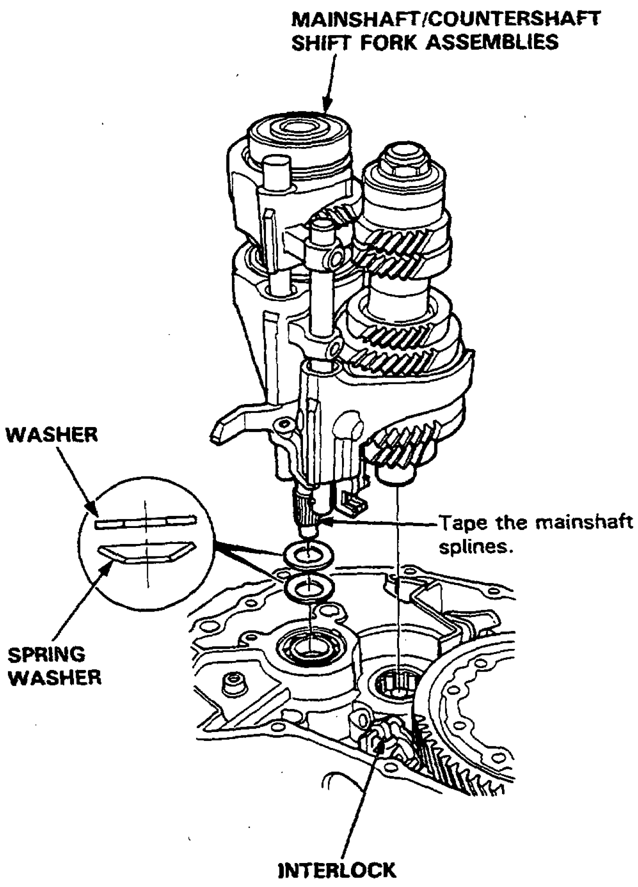
(cont'd)

Reassembly (cont'd)

11. Set the 36 mm spring washer and washer.

12. Install the mainshaft, countershaft, and shift fork assemblies.

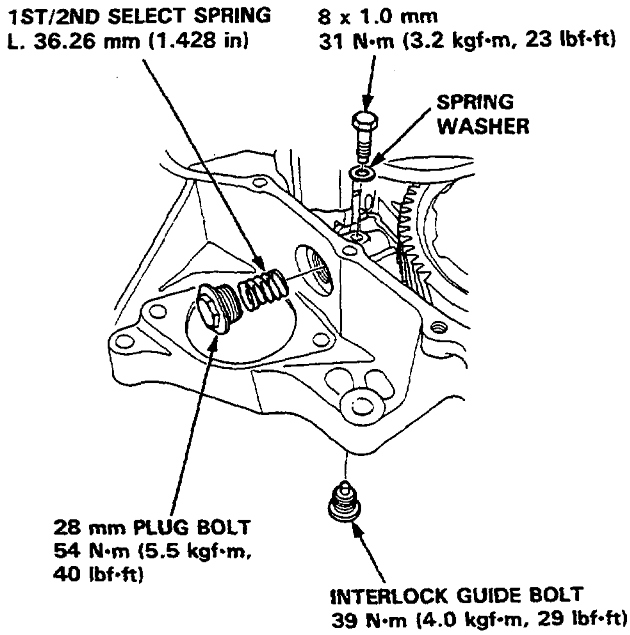
    NOTE: Align the finger of the interlock with the groove in the shift fork shaft.



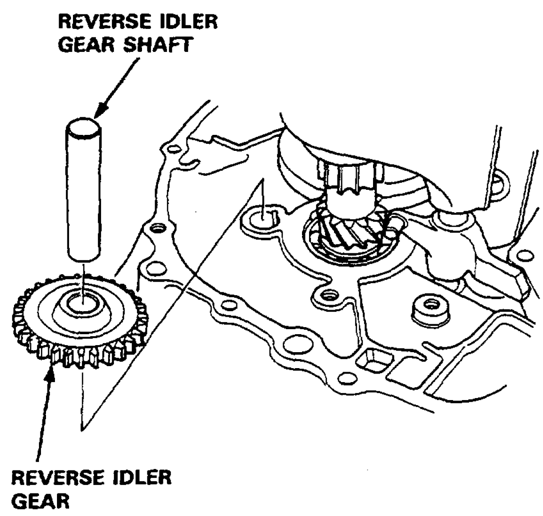
13. Install the spring washer and shift arm B attaching bolt.

14. Install the 1st/2nd select spring, 28 mm plug bolt, and interlock guide bolt.

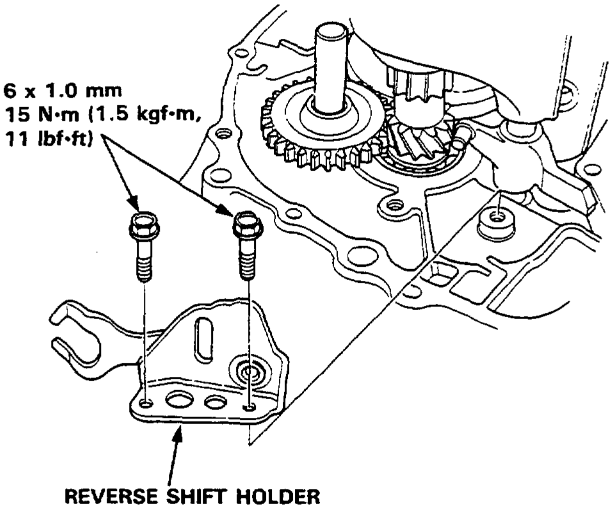
    NOTE: Apply liquid gasket (P/N 0Y740−99986) to the threads of the 28 mm plug bolt and interlock guide bolt.



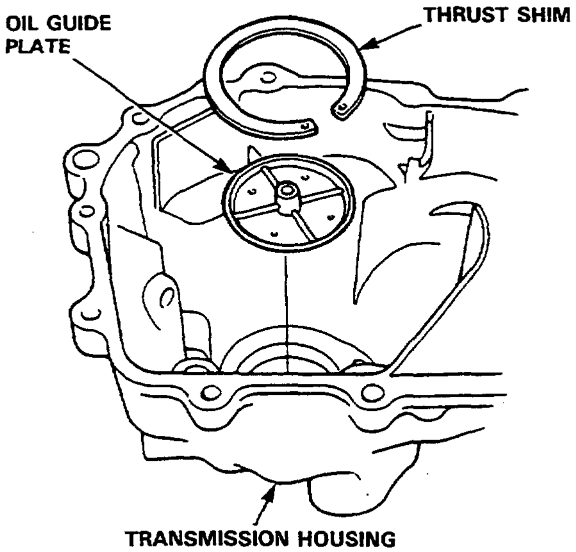
15. Install the reverse idler gear and reverse idler gear shaft.



16. Install the reverse shift holder.

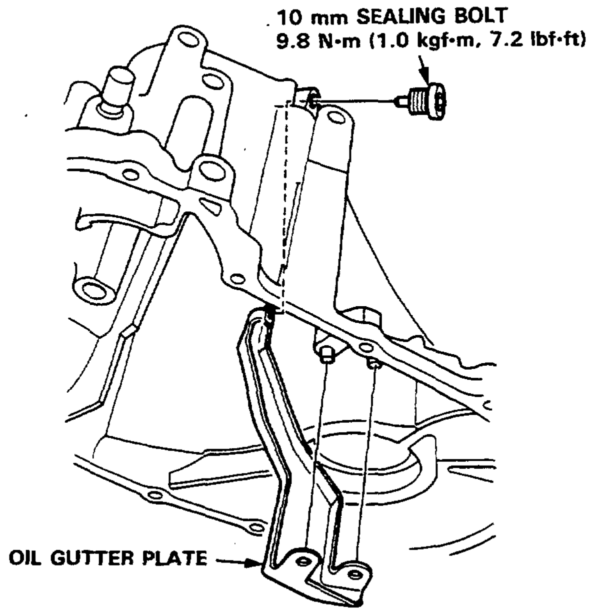


17. Install the oil guide plate and thrust shim on the transmission housing.



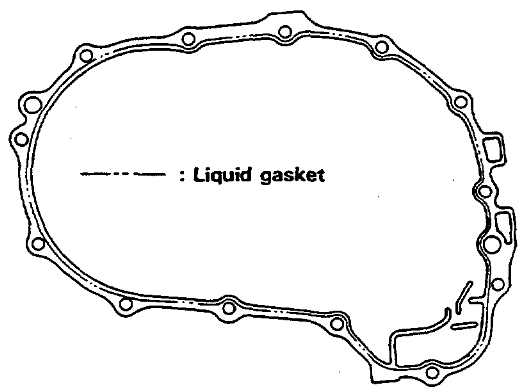
18. Install the oil gutter plate and 10 mm sealing bolt.

NOTE: Apply liquid gasket (P/N 0Y740–99986) to the threads of the 10 mm sealing bolt.



19. Apply liquid gasket to the surface of the transmission housing mating with the clutch housing as shown.

NOTE:
- Use liquid gasket (P/N 0Y740–99986).
- Remove the dirty oil from the sealing surface.
- 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.



(cont'd)

Reassembly (cont'd)

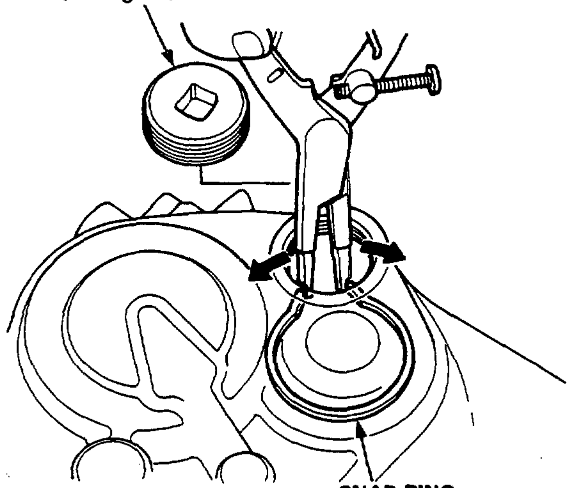
20. Install the dowel pins and the transmission housing.

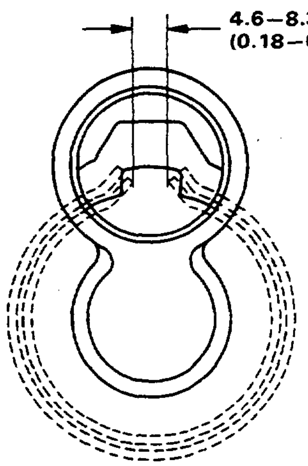
21. Lower the transmission housing with the snap ring pliers, and set the snap ring into the groove of the countershaft bearing.

    NOTE: Check that the snap ring is securely seated in the groove of the countershaft bearing.

22. Install the 32 mm sealing bolt.

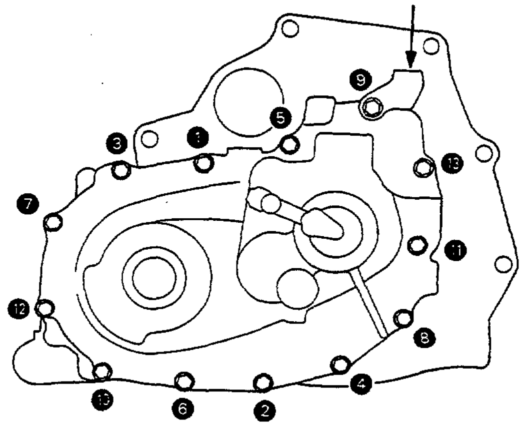
    NOTE: Apply liquid gasket (P/N 0Y740−99986) to the threads.



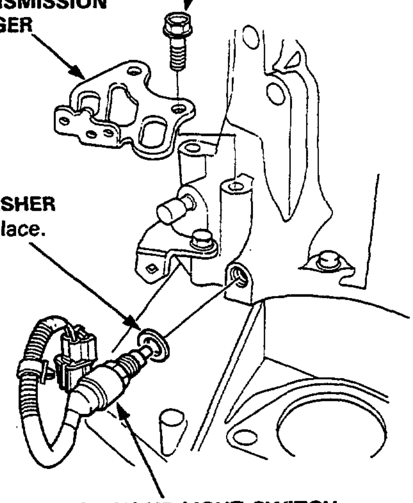


23. Tighten the transmission housing attaching bolts in the numbered sequence in several steps shown below.

    8 x 1.25 mm
    Torque: 27 N·m(2.8 kgf·m, 20 lbf·ft)



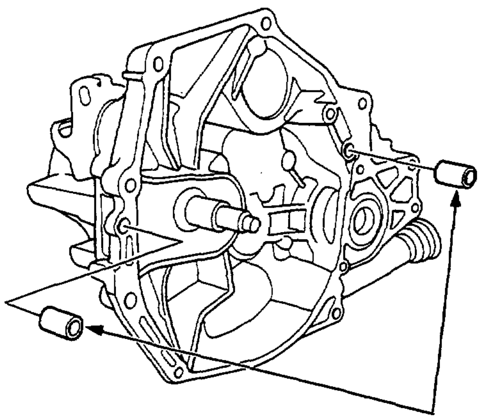
24. Install the back-up light switch and transmission hanger.



Transmission Assembly

Installation

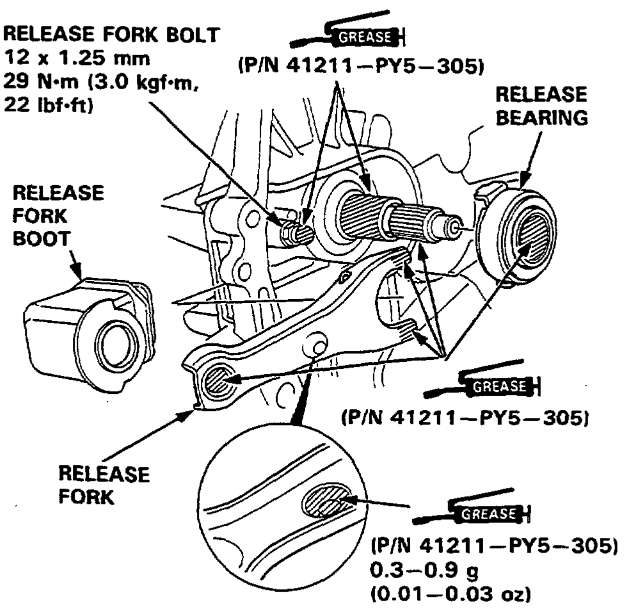
1. Install the dowel pins.



2. Apply grease to the parts as shown, then install the release fork and release bearing.

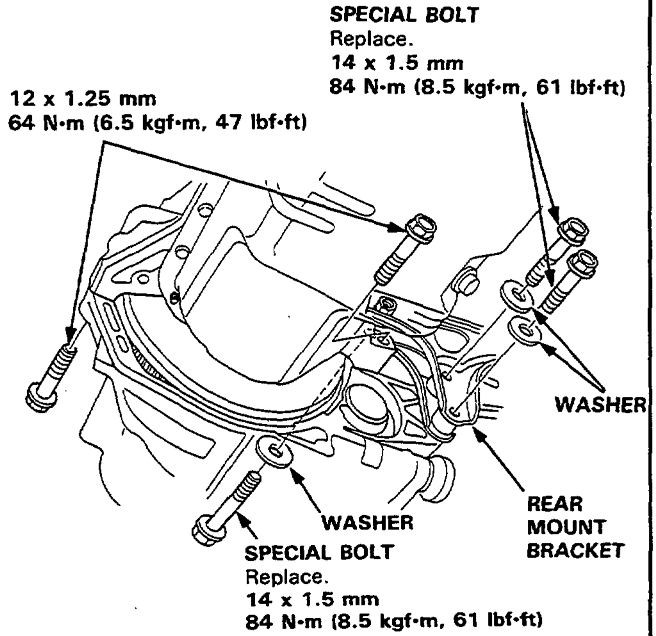
   NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211–PY5–305).

3. Install the release fork boot.

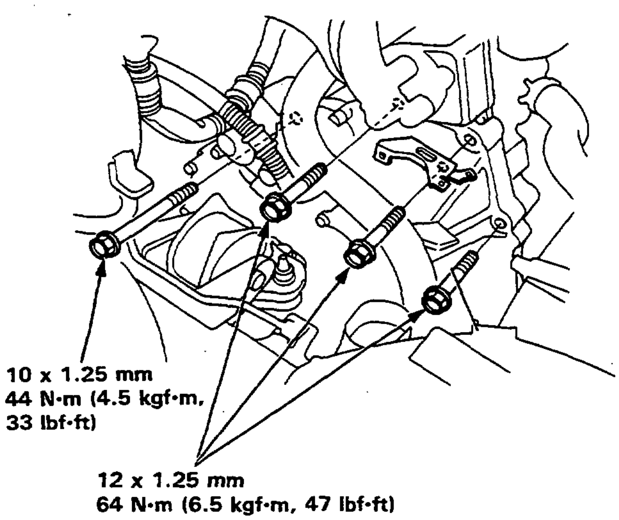


4. Place the transmission on the transmission jack, and raise it to the engine level.

5. Install the transmission mounting bolts and rear mount bracket bolts.



6. Install the three upper transmission mounting bolts and the lower starter mounting bolt.

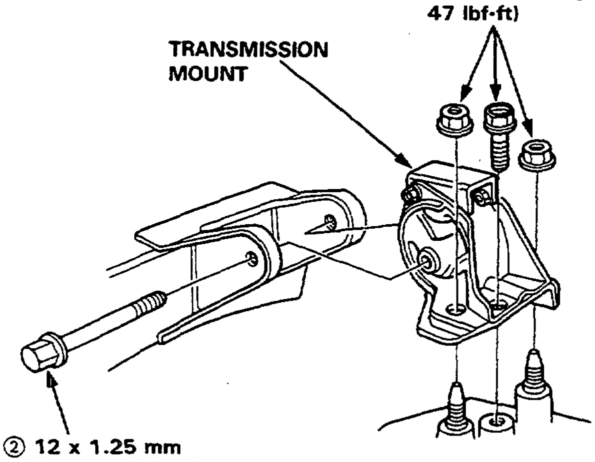


(cont'd)

Installation (cont'd)

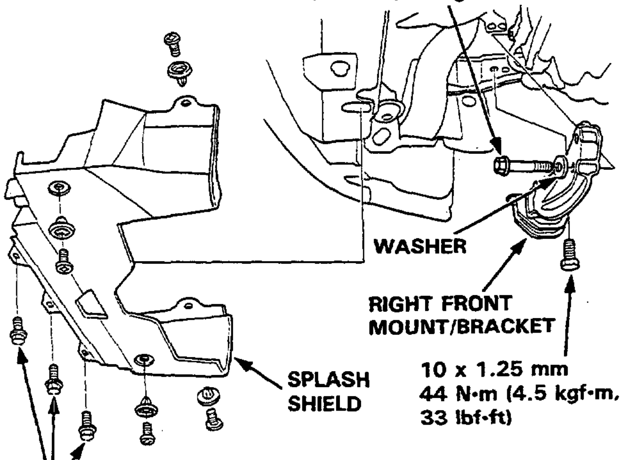
7. Raise the transmission, then install the transmission side mount.

   NOTE:
   - Torque the mounting bolt and nuts in the sequence shown.
   - Check that the bushings are not twisted or offset.

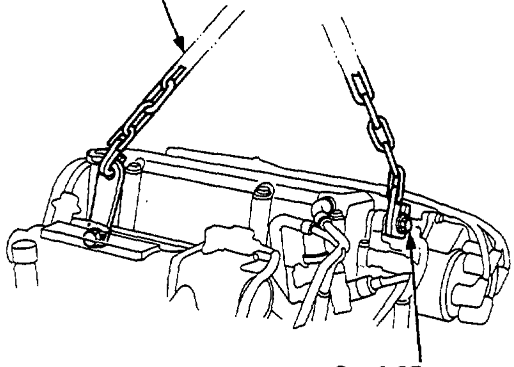


8. Install the right front mount/bracket.

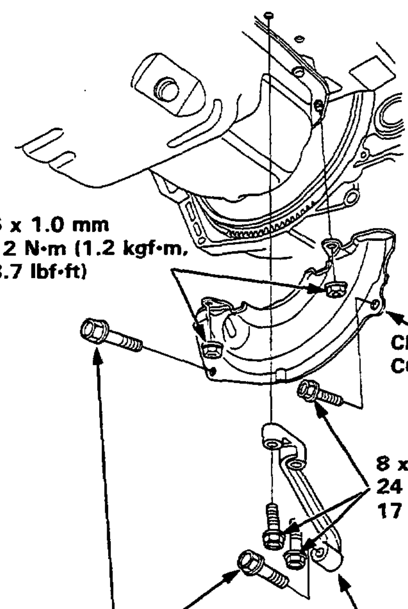
9. Install the splash shield.



10. Remove the chain hoist, then reinstall the distributor mounting bolt.



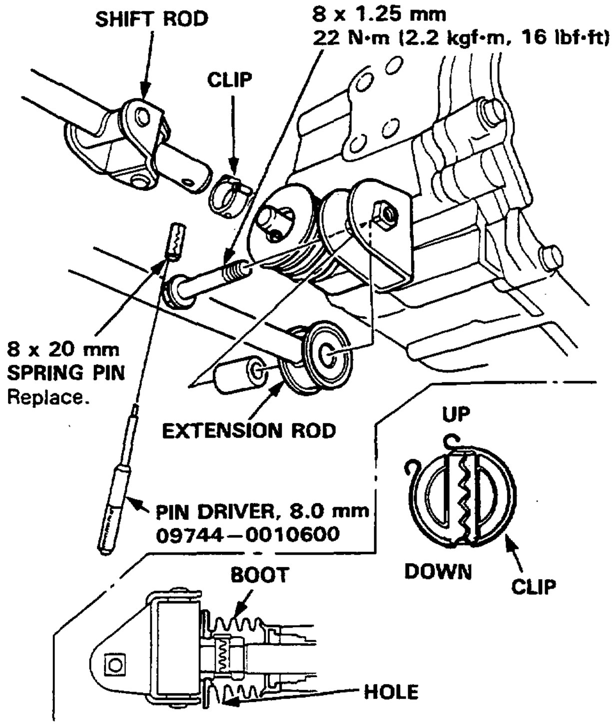
11. Install the clutch cover and the rear engine stiffener.



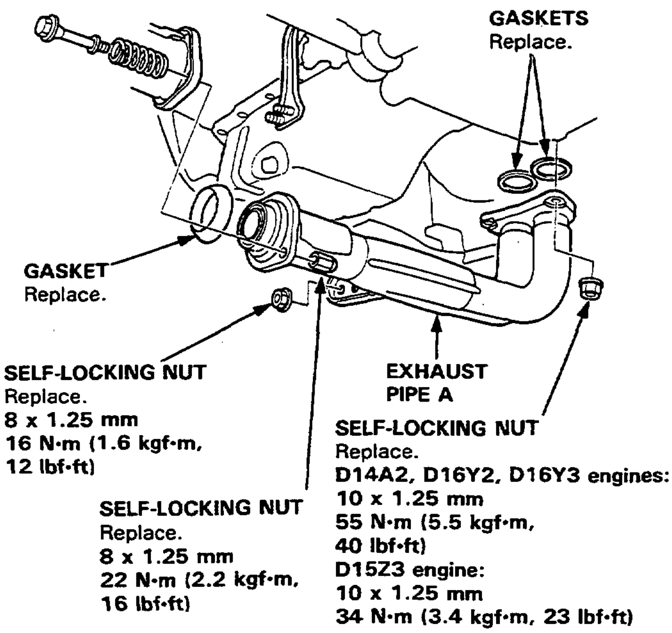
12. Install the shift rod, spring pin, and clip.

NOTE:
- Install the clip as shown.
- Turn the boot so the hole is facing down.
- Make sure the boot is installed on the shift rod.

13. Install the extension rod.



14. Install exhaust pipe A.

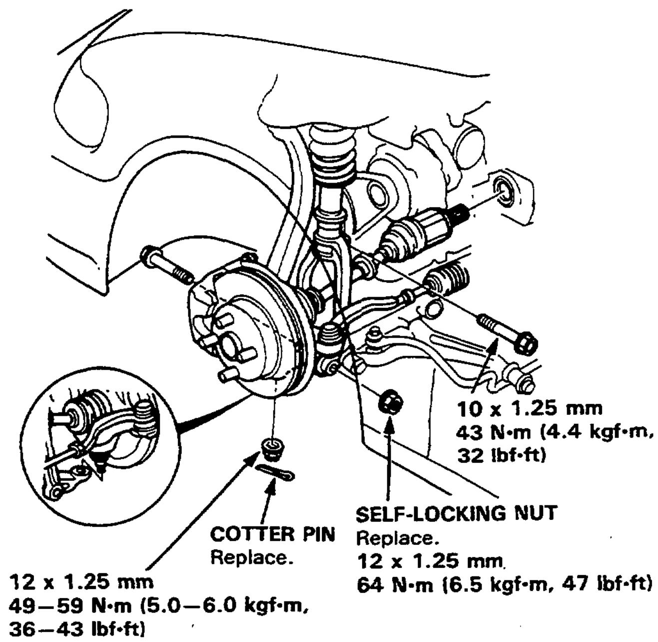


15. Install the driveshafts (see section 16).

NOTE: Replace the set rings with new ones.

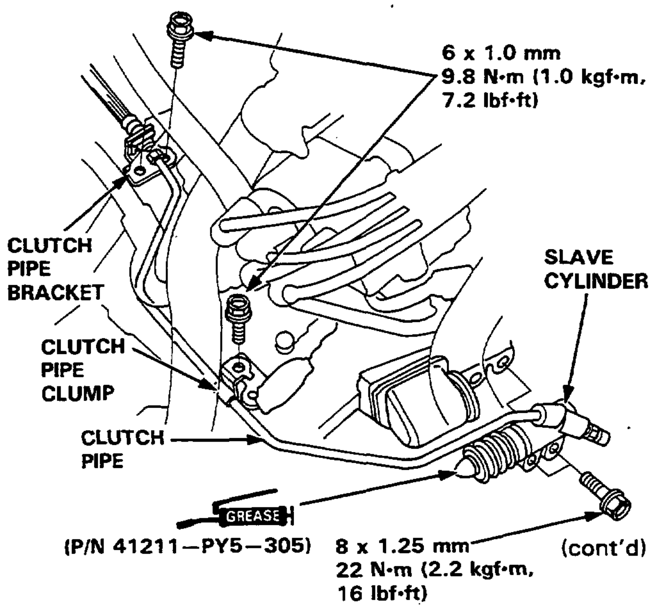
16. Install the ball joint onto the lower arm (see section 16).

17. Install the damper fork.



18. Install the slave cylinder, then install the clutch pipe stay.

NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211–PY5–305).



(cont'd)

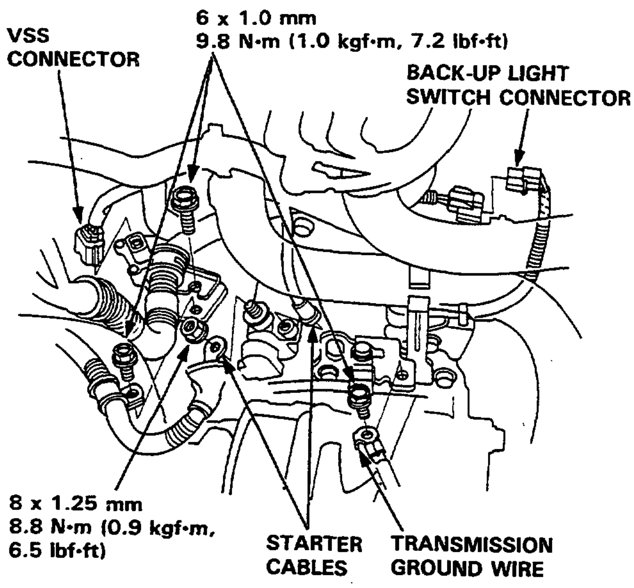
Transmission Assembly

Installation (cont'd)

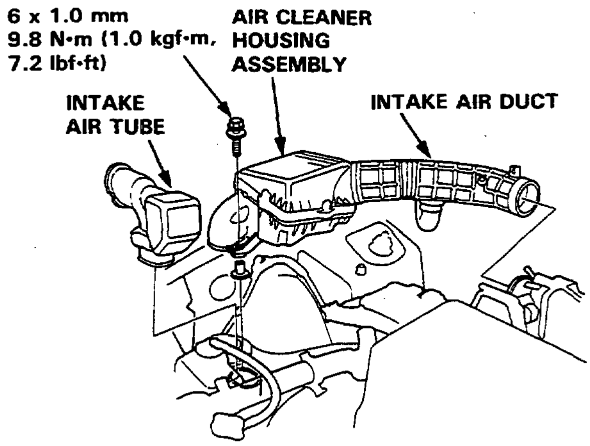
19. Connect the vehicle speed sensor (VSS), back-up light switch connectors, transmission ground wire, and starter cables.

    NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out (see section 23).

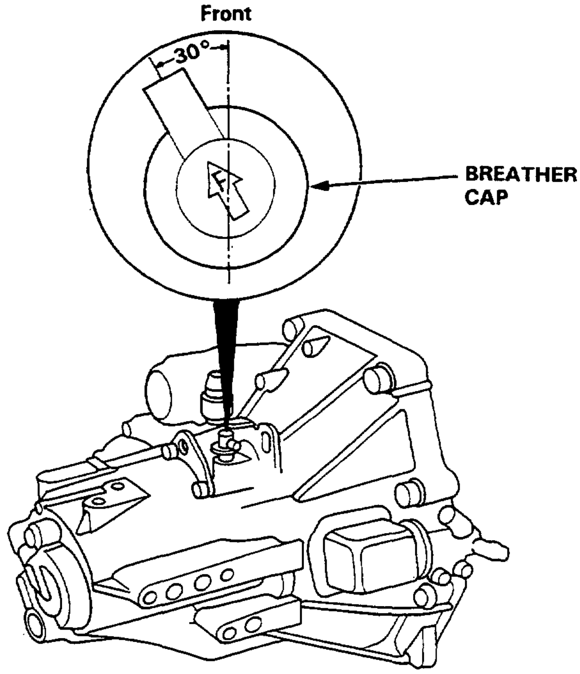
20. Install the wire harness clamp.



21. Install the intake air duct, air cleaner housing assembly, and intake air tube.



22. Turn the breather cap so that the "F" mark points at an angle of 30° towards the front of the car as shown.

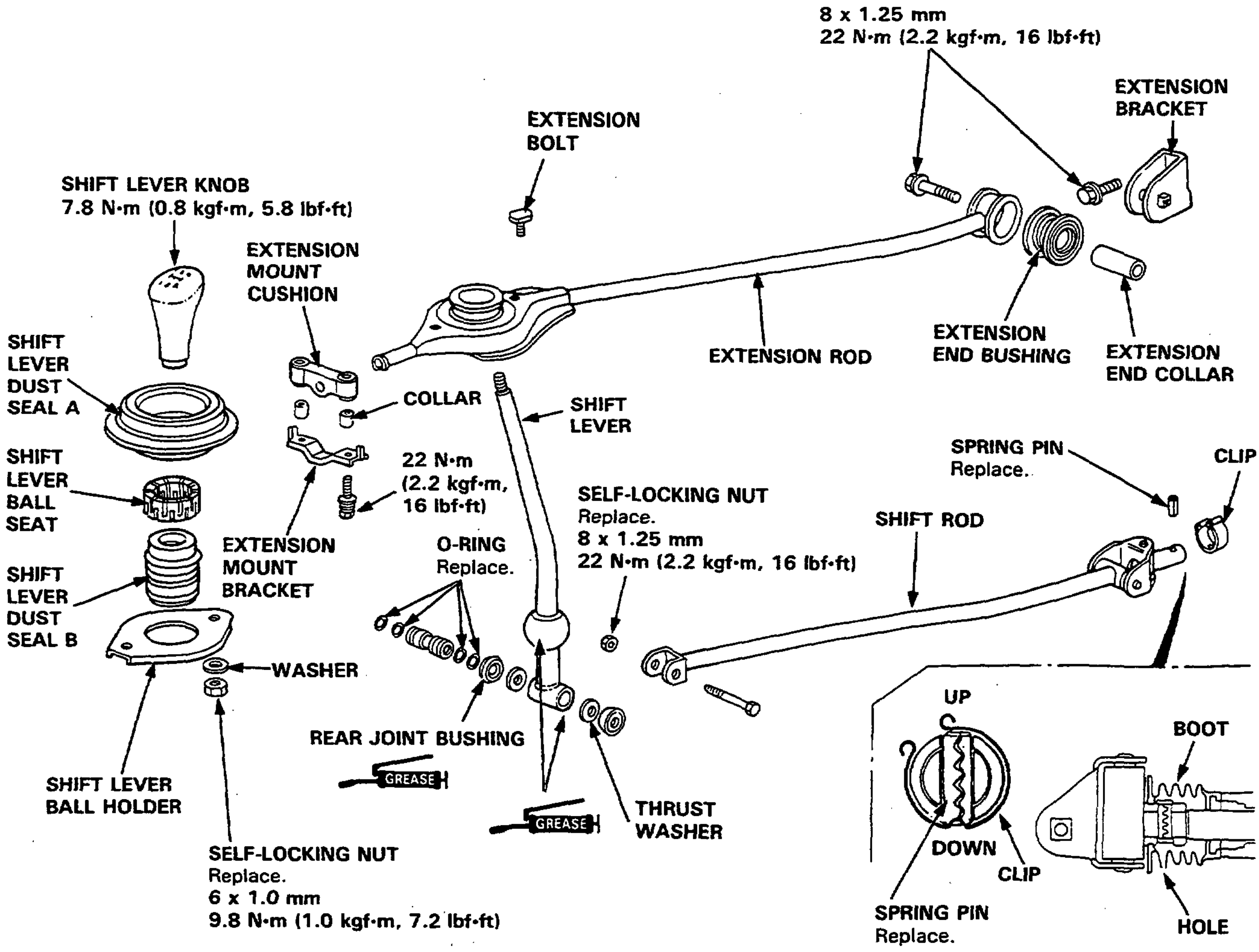


23. Refill the transmission with oil (see page 13-3).
24. Connect the positive (+) cable first, then the negative (−) cable to the battery.
25. Check the clutch operation.
26. Shift the transmission and check for smooth operation.
27. Adjust ignition timing (see section 23).
28. Check the front wheel alignment (see section 18).

Gearshift Mechanism

Overhaul

NOTE:
- Inspect rubber parts for wear and damage when disassembling, replace any worn or damaged parts.
- *Install the clip as shown.*
- Turn the boot so the hole is facing down as shown.
- Make sure the boot is installed on the shift rod.



SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
(If automatic transmission maintenance is required)

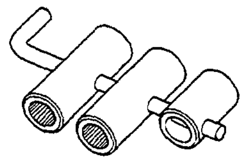
Some versions of the KE and KG Civic 5D models include a driver's airbag, located in the steering wheel hub, and a front passenger's airbag, located in the dashboard above the glove box. The SRS unit of these model versions is not part of the airbag assembly and has built-in sensors (SRS Type III). Information 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.**
- **Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).**
- **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.**
- **Service work nearby and in the areas listed below may affect the SRS and must therefore be performed by an authorized Honda dealer.**

- Steering wheel
- Behind the dashboard
- Under-dash fuse/relay box
- Front console
- Car stereo unit and other accessories
- A/C heater

Ref No.	Tool Number	Description	Qty	Remark
①	07PAB−0010000	Mainshaft Holder Set	1	
②	07HAC−PK40101	Housing Puller	1	
③	07JAC−PH80000	Adjustable Bearing Remover Set	1	
③-1	07JAC−PH80100	Bearing Remover Attachment	(1)	
③-2	07JAC−PH80200	Remover Handle Assembly	(1)	Component Tools
③-3	07741−0010201	Remover Weight	(1)	
④	07LAE−PX40000	Clutch Spring Compressor Set	1	
④-1	07GAE−PG40200	Clutch Spring Compressor Bolt	(1)	
④-2	07HAE−PL50100	Clutch Spring Compressor Attachment	(1)	Component Tools
④-3	07LAE−PX40100	Clutch Spring Compressor Attachment	(1)	
⑤	07LAJ−PT30100 or 07LAJ−PT3010A	Test Harness	1	
⑥	07LGC−0010100	Snap Ring Pliers	1	
⑦	07406−0020004	A/T Oil Pressure Gauge Set	1	
⑧	07406−0070001	A/T Low Pressure Gauge	1	
⑨	07746−0010100	Driver Attachment, 32 x 35 mm	1	
⑩	07746−0010500	Driver Attachment, 62 x 68 mm	1	
⑪	07746−0010600	Driver Attachment, 72 x 75 mm	1	
⑫	07746−0030100	Driver ID 40 mm	1	
⑬	07749−0010000	Handle Driver	1	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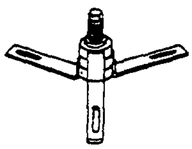
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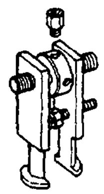
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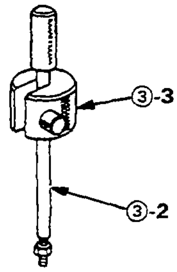
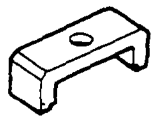



④-1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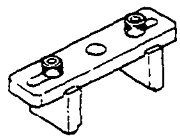
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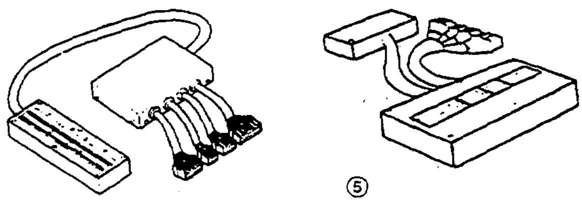
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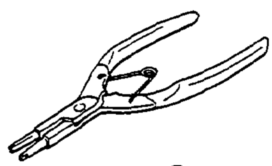
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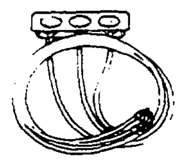
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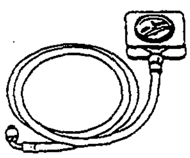
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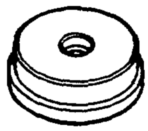
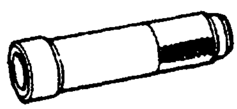

⑨ ⑩ ⑪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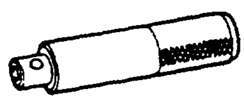

⑬

Description

The automatic transmission is a combination of a 3-element torque converter and triple-shaft automatic transmission which provides 4 speeds forward and 1 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 assembly in a single unit. The torque converter is 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, countershaft and sub-shaft. The mainshaft is in line with the engine crankshaft.

The mainshaft includes the 1st, and 2nd/4th clutches, and gears for 3rd, 2nd, 4th, reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with the 4th gear).

The countershaft includes the 3rd clutch and gears for 3rd, 2nd, 4th, reverse, 1st and parking. Reverse and 4th gears can be locked to the countershaft at its center, providing 4th gear or reverse, depending on which way the selector is moved.

The sub-shaft includes the 1st-hold clutch and gears for 1st and 4th.

The gears on the mainshaft are in constant mesh with those on the countershaft and sub-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 $\boxed{D_4}$, $\boxed{D_3}$, $\boxed{2}$, $\boxed{1}$ and $\boxed{R}$.

Hydraulic Control

The valve body assembly includes the main valve body, secondary valve body, regulator valve body, servo body, modulator valve body, lock-up valve body, and governor body, through the respective separator plates.

They are bolted on the torque converter housing.

The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, 3-2 timing valve, 4th exhaust valve, relief valve, and oil pump gears.

The secondary valve body contains the 4-3 kick-down valve, 2nd ON orifice control valve, 2-3 orifice control valve, 2-1 timing valve, Clutch Pressure Control (CPC) valve, servo control valve, reverse control valve, and governor cut valve.

The regulator valve body contains the pressure regulator valve, lock-up control valve, torque converter check valve, and cooler check valve.

The servo body contains the servo valve which is integrated with the shift fork shaft, throttle valves A and B, 2/3-4 orifice control valve, and accumulators.

The modulator valve body, which is bolted on the servo body, contains the modulator valve.

The lock-up valve body contains the lock-up shift valve and lock-up timing B valve, and is bolted on the regulator valve body.

The governor body is bolted on the torque converter housing near the differential.

Fluid from the regulator passes through the manual valve to the various control valves.

Lock-up Mechanism

In $\boxed{D_4}$ position, 2nd, 3rd and 4th, and $\boxed{D_3}$ 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 engine control module (ECM) optimizes the timing of the lock-up mechanism.

The lock-up shift valve controls the range of lock-up according to the lock-up control solenoid valves A and B, and throttle valve B. The lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the ECM.

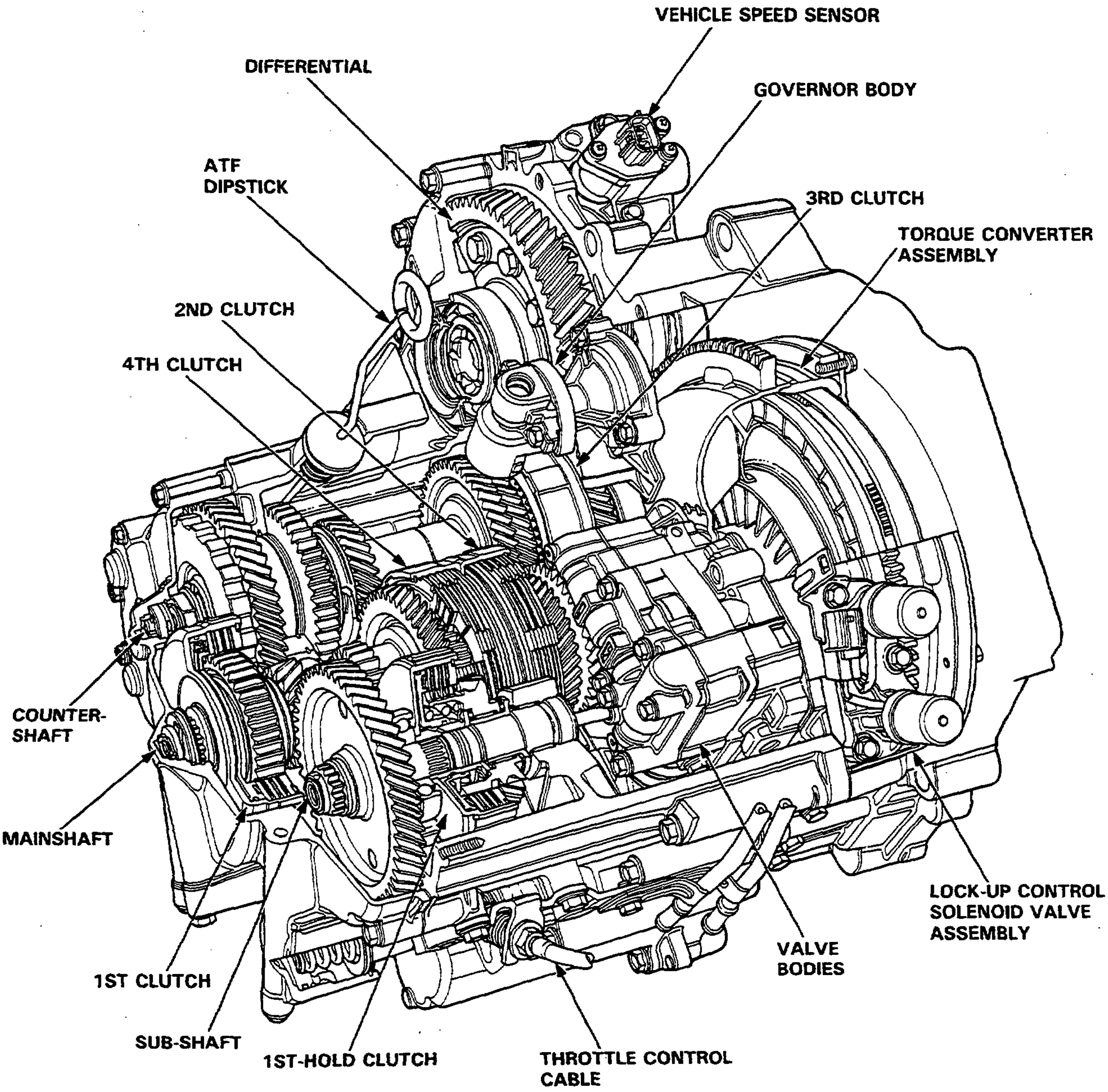
(cont'd)

Gear Selection
The shift lever has seven positions; [P] PARK, [R] REVERSE, [N] NEUTRAL, [D4] 1st through 4th positions, [D3] 1st through 3rd positions, [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 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. Downshifts through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in 2nd, 3rd and 4th with the transmission in [D4] or [D3] position.
[D3] DRIVE (1st through 3rd)	For rapid acceleration at highway speeds and general driving; starts off in 1st, shifts automatically to 2nd then 3rd, depending on vehicle speed and throttle position. Downshifts through lower gears on deceleration to stop.
[2] SECOND	Driving in 2nd gear; stays in 2nd gear, does not shift up and down. For engine braking or better traction starting off on loose or slippery surface.
[1] FIRST	Driving in 1st gear; stays in 1st gear, does not shift up. For engine braking.

Starting is possible only in [P] and [N] positions through use of a slide-type, neutral-safety switch.

Automatic Transaxle (A/T) Gear Position Indicator
A/T Gear position indicator in the instrument panel shows what gear has been selected without having to look down at the console.


VEHICLE SPEED SENSOR
DIFFERENTIAL
GOVERNOR BODY
ATF DIPSTICK
3RD CLUTCH
TORQUE CONVERTER ASSEMBLY
2ND CLUTCH
4TH CLUTCH
COUNTER-SHAFT
MAINSHAFT
LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY
VALVE BODIES
1ST CLUTCH
SUB-SHAFT
1ST-HOLD CLUTCH
THROTTLE CONTROL CABLE

Description

Clutches

The four speed automatic transmission uses hydraulically-actuated clutches to engage or disengage the transmission gears. When hydraulic pressure is introduced into the clutch drum, the clutch piston moves. 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 hydraulic 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. This allows the gear to spin independently of its shaft, transmitting no power.

1st Clutch
The 1st clutch engages/disengages 1st gear, and is located at the end of the mainshaft, just behind the right side cover. The 1st clutch is supplied hydraulic pressure by its oil feed pipe within the mainshaft.

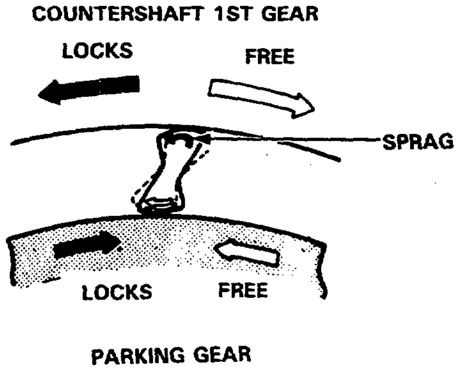
1st-hold Clutch
The 1st-hold clutch engages/disengages 1st-hold or [1] position, and is located at the center of the sub-shaft. The 1st-hold clutch is supplied hydraulic pressure by its oil feed pipe within the sub-shaft.

2nd Clutch
The 2nd clutch engages/disengages 2nd gear, and is located at the center of the mainshaft. The 2nd clutch is joined back-to-back to the 4th clutch. The 2nd clutch is supplied hydraulic pressure through the mainshaft by a circuit connected to the regulator valve body.

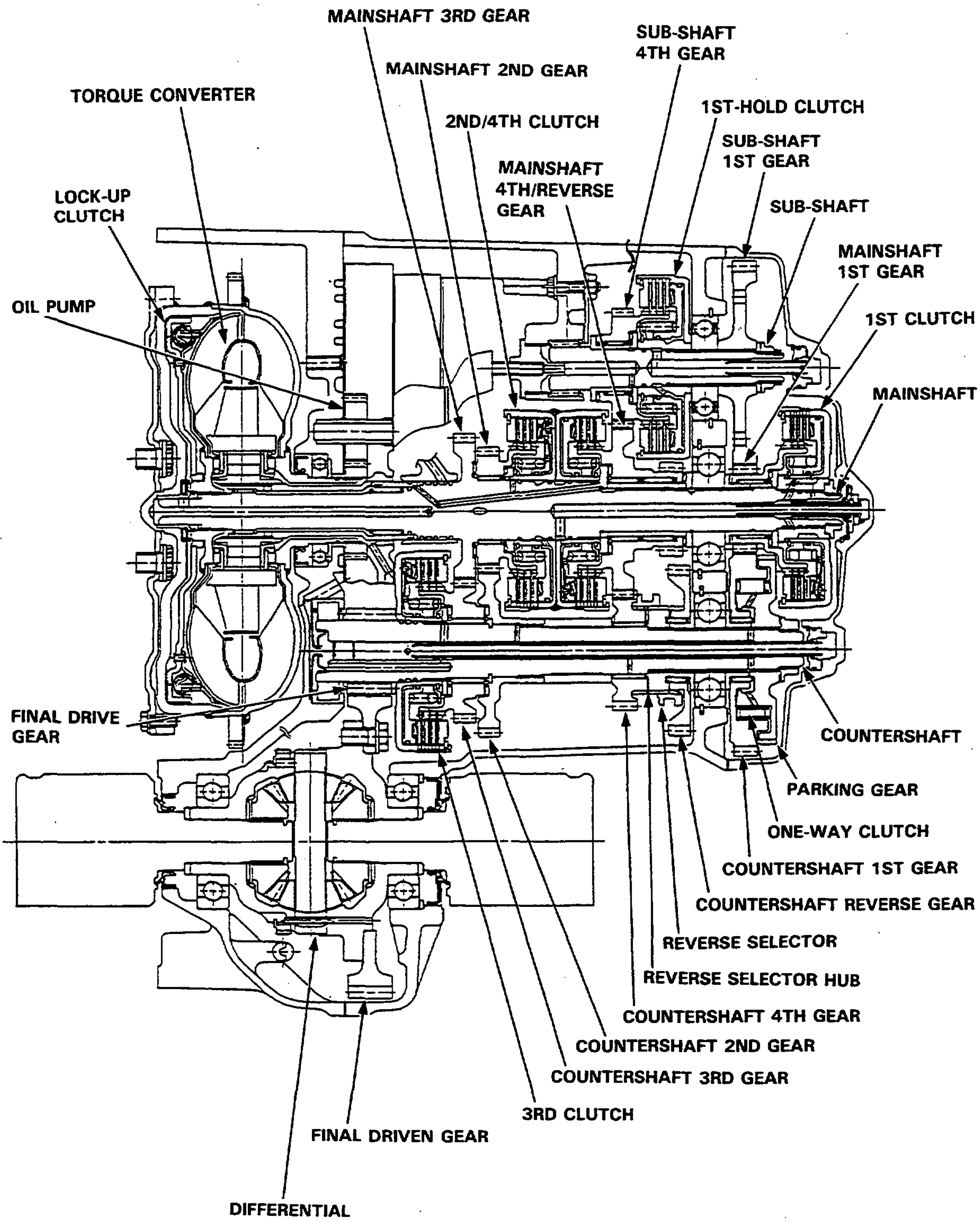
3rd Clutch
The 3rd clutch engages/disengages 3rd gear, and is located at the end of the countershaft, opposite the right side cover. The 3rd clutch is supplied hydraulic pressure by its oil feed pipe within the countershaft.

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 2nd clutch. The 4th clutch is supplied hydraulic pressure by its oil feed pipe within the mainshaft.

One-way Clutch
The one-way clutch is positioned between the parking gear and 1st gear, with the parking gear splined to the countershaft. The 1st gear provides the outer race surface, and the parking 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 [D_4], [D_3] or [2] position. However, the one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the [D_4], [D_3] or [2] position. This is because the increased rotational speed of the gears on the countershaft over-ride 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.


MAINSHAFT 3RD GEAR
SUB-SHAFT 4TH GEAR
MAINSHAFT 2ND GEAR
TORQUE CONVERTER
1ST-HOLD CLUTCH
2ND/4TH CLUTCH
SUB-SHAFT 1ST GEAR
MAINSHAFT 4TH/REVERSE GEAR
LOCK-UP CLUTCH
SUB-SHAFT
MAINSHAFT 1ST GEAR
OIL PUMP
1ST CLUTCH
MAINSHAFT
FINAL DRIVE GEAR
COUNTERSHAFT
PARKING GEAR
ONE-WAY CLUTCH
COUNTERSHAFT 1ST GEAR
COUNTERSHAFT REVERSE GEAR
REVERSE SELECTOR
REVERSE SELECTOR HUB
COUNTERSHAFT 4TH GEAR
COUNTERSHAFT 2ND GEAR
COUNTERSHAFT 3RD GEAR
3RD CLUTCH
FINAL DRIVEN GEAR
DIFFERENTIAL

Description

Power Flow

RANGE \ PART		TORQUE CONVERTER	1ST-HOLD CLUTCH	1ST GEAR 1ST CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH GEAR	4TH CLUTCH	REVERSE GEAR	PARKING GEAR
P		○	×	×	×	×	×	×	×	○
R		○	×	×	×	×	×	○	○	×
N		○	×	×	×	×	×	×	×	×
D4	1ST	○	×	○	×	×	×	×	×	×
	2ND	○	×	○*	○	×	×	×	×	×
	3RD	○	×	○*	×	○	×	×	×	×
	4TH	○	×	○*	×	×	○	○	×	×
D3	1ST	○	×	○	×	×	×	×	×	×
	2ND	○	×	○*	○	×	×	×	×	×
	3RD	○	×	○*	×	○	×	×	×	×
2		○	×	○*	○	×	×	×	×	×
1		○	○	○	×	×	×	×	×	×

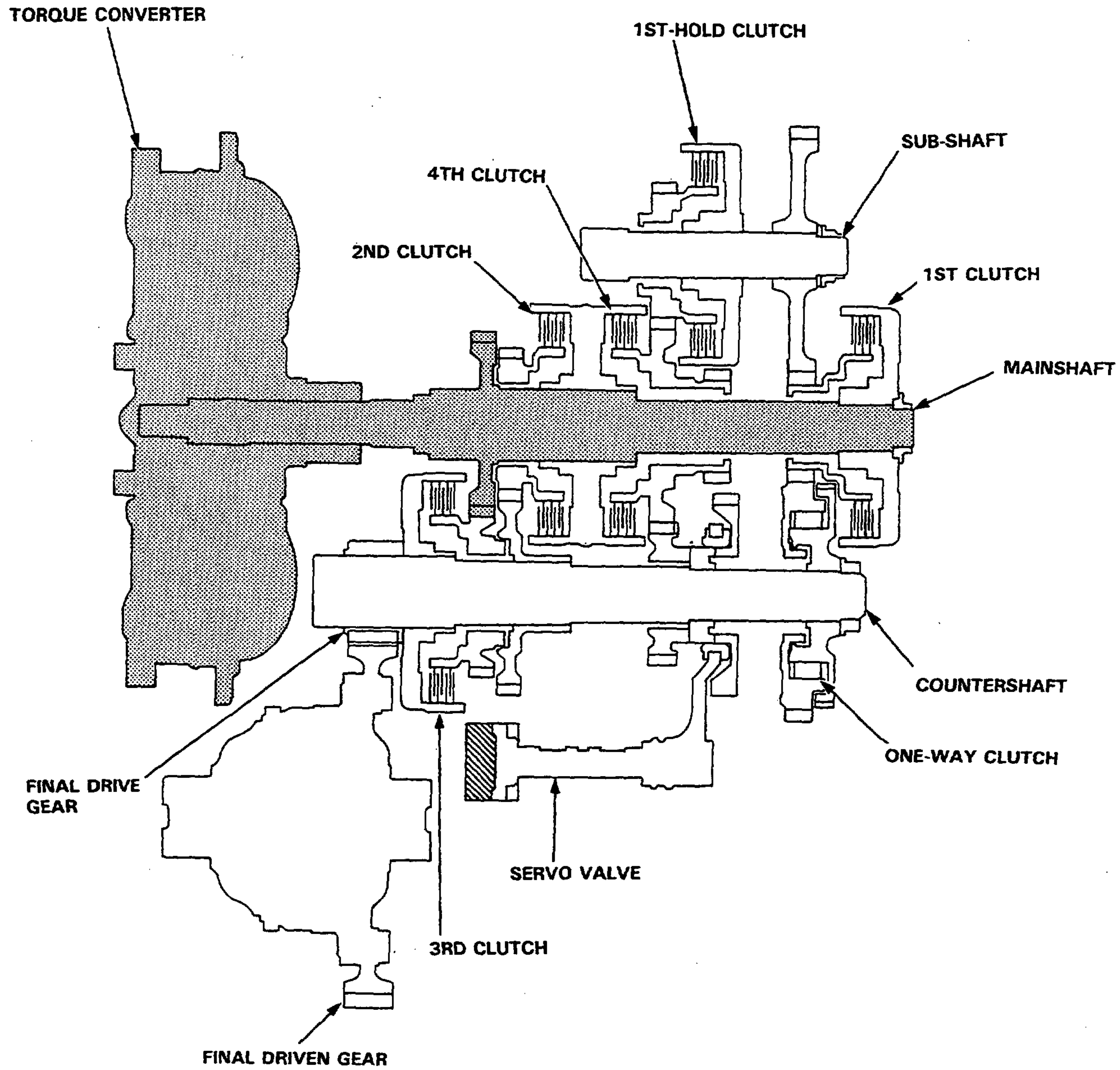
○: Operates, ×: Doesn't operate, *: Although the 1st clutch engages, driving power is not transmitted because the one-way clutch slips.

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 pawl interlocking the parking gear.



(cont'd)

Description

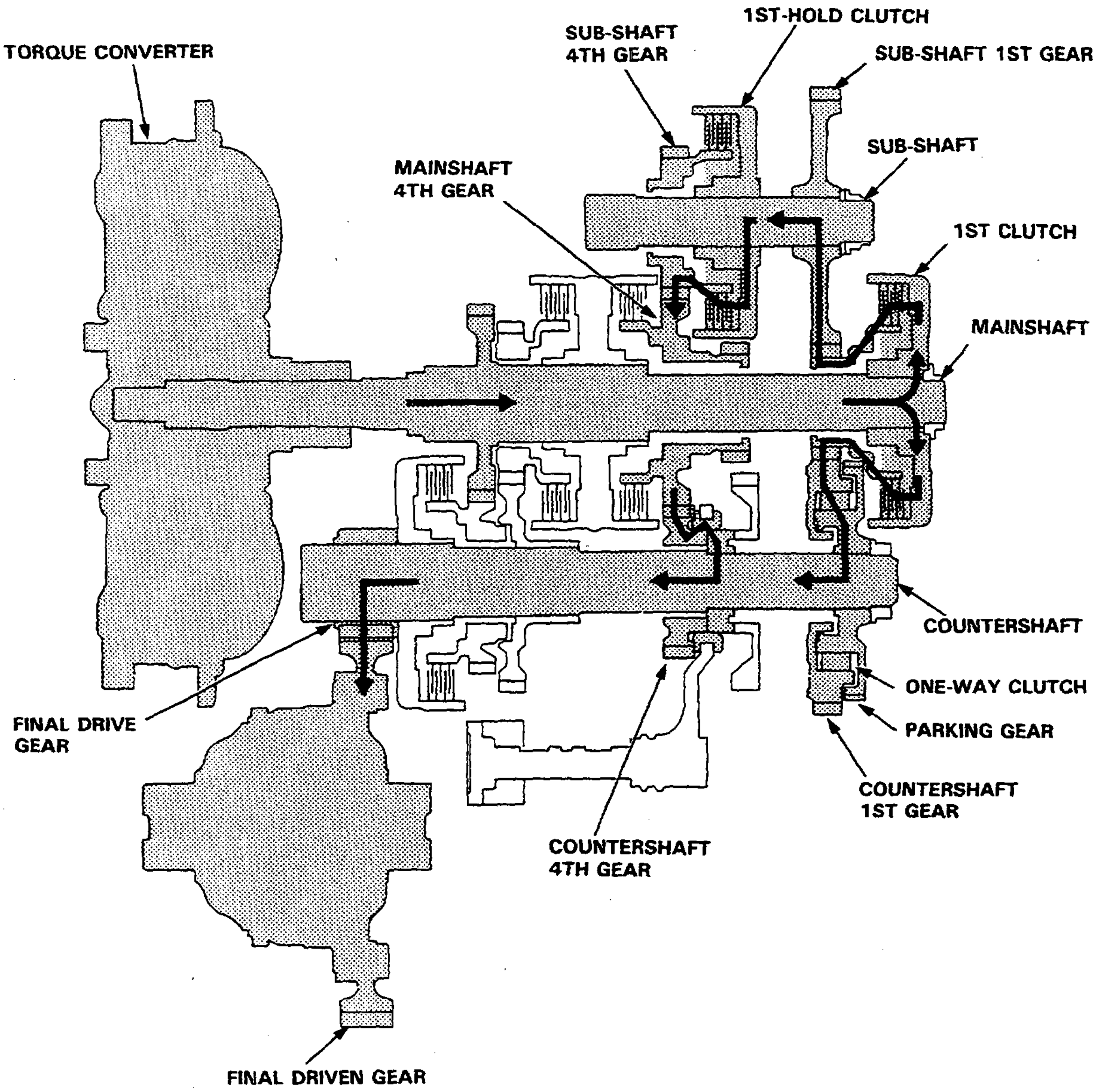
Power Flow (cont'd)

[1] Position Acceleration

In [1] position, hydraulic pressure is applied to the 1st clutch and 1st-hold clutch.

The power flow when accelerating is as follows;

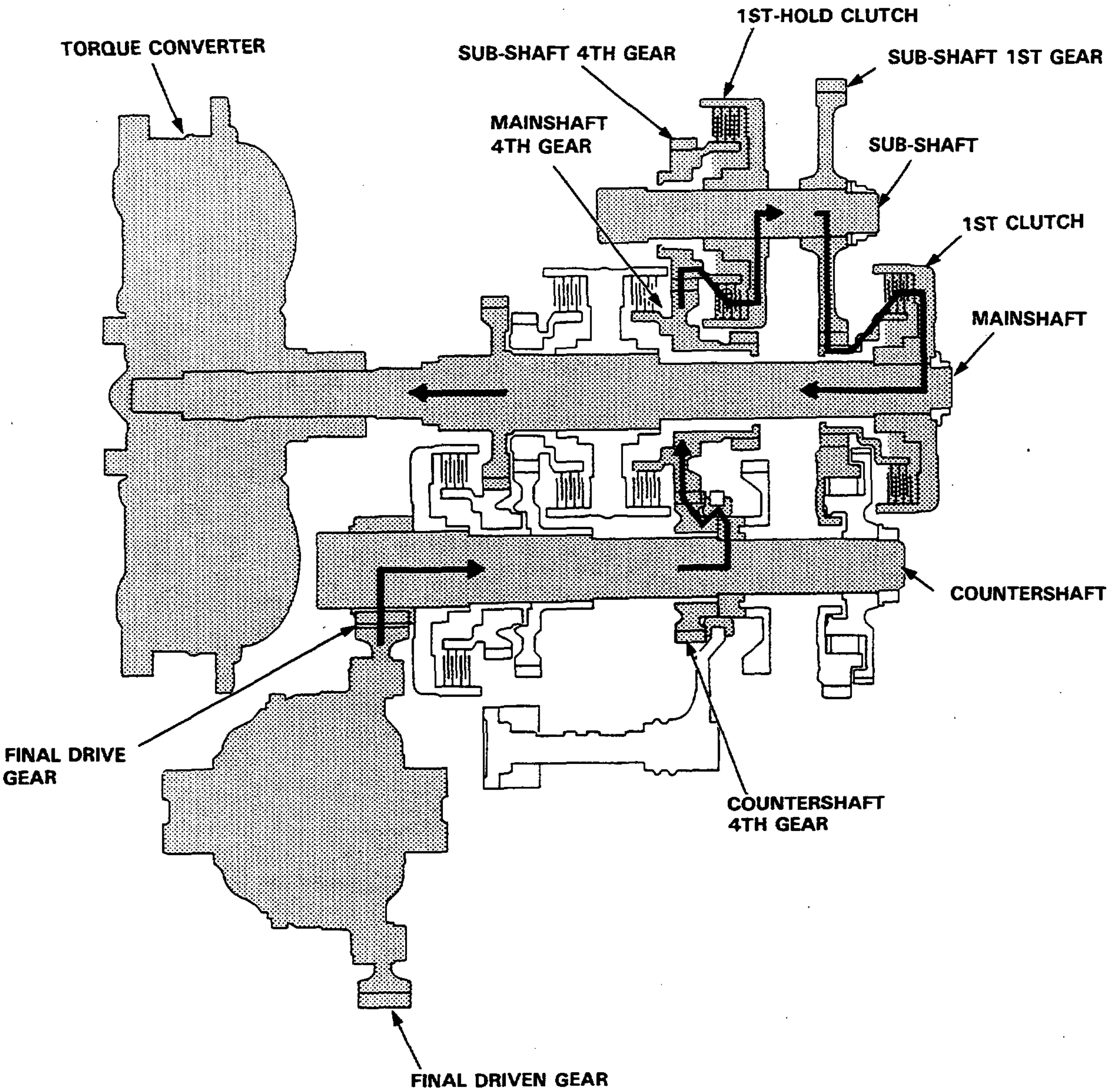
1. Hydraulic pressure is applied to the 1st clutch on the mainshaft and power is transmitted via the 1st clutch to the mainshaft 1st gear.
2. Hydraulic pressure is also applied to the 1st-hold clutch on the sub-shaft. Power transmitted to the mainshaft 1st gear is conveyed via the countershaft 1st gear to the one-way clutch, and via the sub-shaft 1st gear to the 1st-hold clutch. The one-way clutch is used to drive the countershaft, and the 1st-hold clutch drives the countershaft via the 4th gears.
3. Power is transmitted to the final drive gear and drives the final driven gear.



[1] Position Deceleration

The power flow when decelerating is as follows;

1. Rolling resistance from the road surface goes through the front wheels to the final drive gear, then to the sub-shaft 1st gear via the 4th gear, and 1st-hold clutch which is applied during deceleration.
2. The one-way clutch becomes free at this time because torque reverses.
3. The counterforce conveyed to the countershaft 4th gear turns the sub-shaft 4th gear via the mainshaft 4th gear. At this time, since hydraulic pressure is also applied to the 1st clutch, counterforce is also transmitted to the mainshaft. As a result, engine braking can be obtained with 1st gear.



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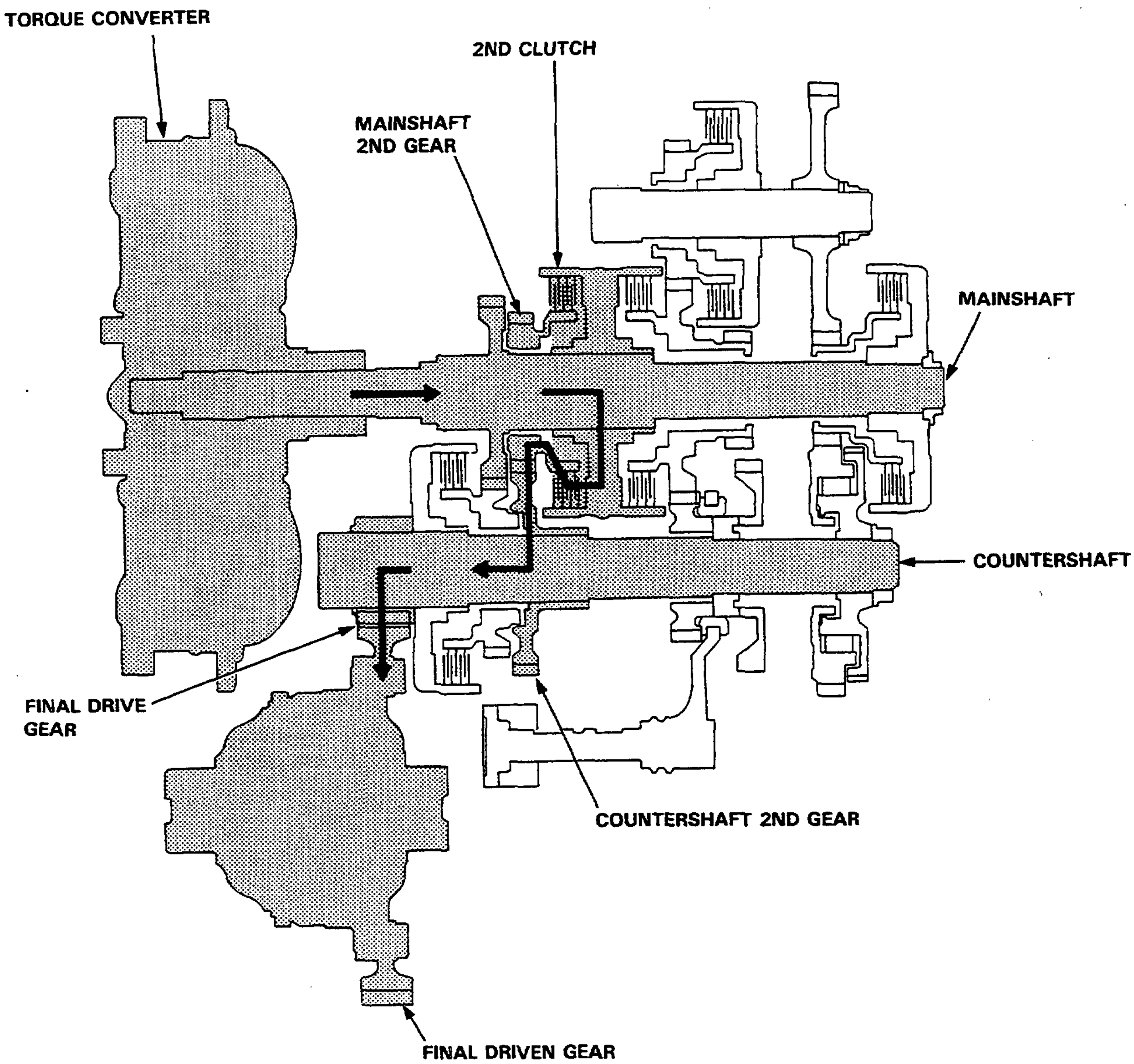
Power Flow (cont'd)

[2] Position

[2] Position is provided to drive only 2nd speed.

1. Hydraulic pressure is applied to the 2nd clutch on the mainshaft, and power is transmitted via the 2nd clutch to the mainshaft 2nd gear.
2. Power transmitted to the mainshaft 2nd gear is conveyed via the countershaft 2nd gear, and drives the countershaft.
3. Power is transmitted to the final drive gear and 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 1st gear, power from 1st gear is cut off at the one-way clutch.

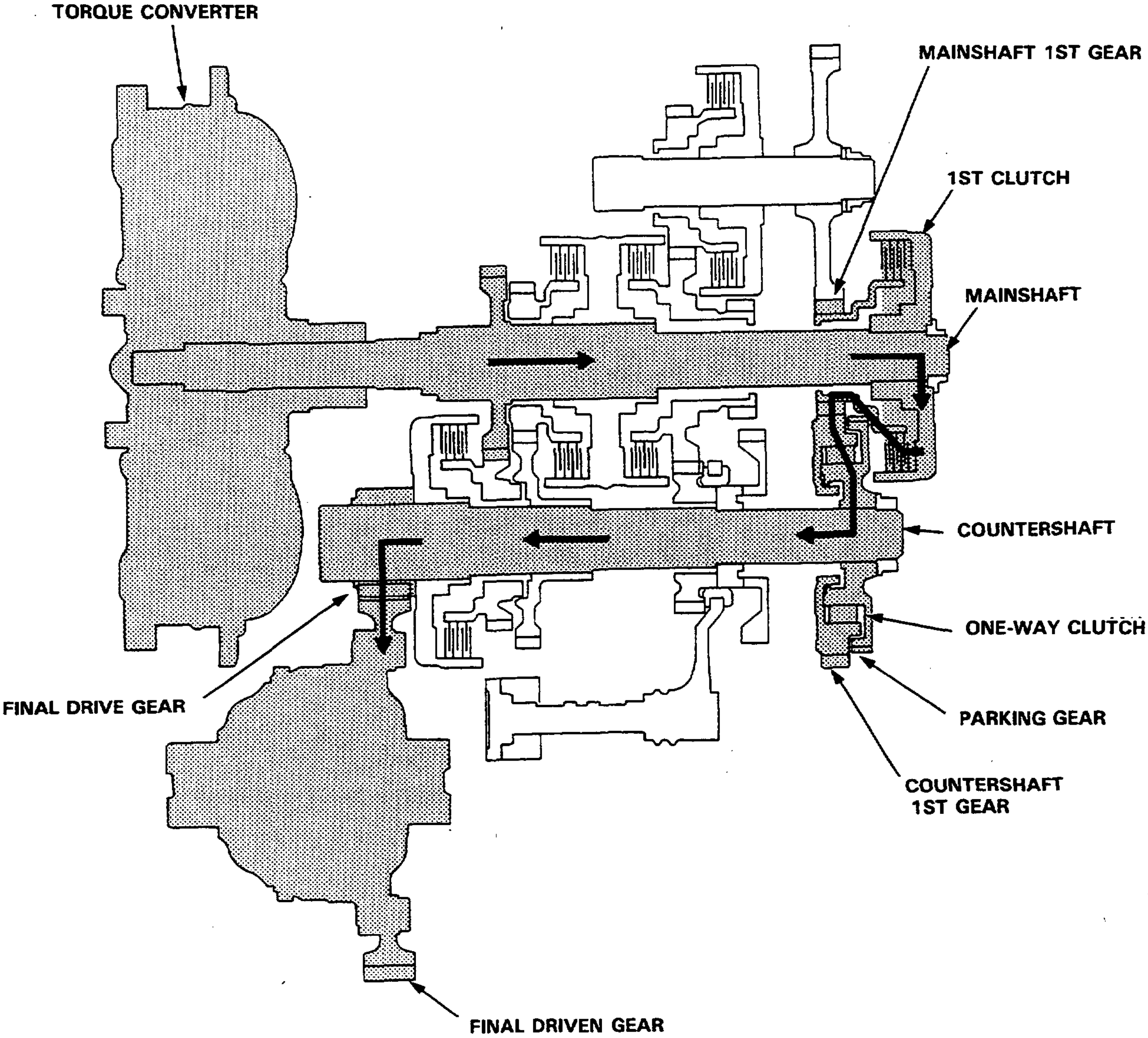


In [D4] or [D3] position, the optimum gear is automatically selected from 1st, 2nd, 3rd and 4th speeds, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

[D4] or [D3] Position, 1st speed

1. Hydraulic pressure is applied to the 1st clutch, which rotates together with the mainshaft, and the mainshaft 1st gear rotates.
2. Power is transmitted to the countershaft 1st gear, and drives the countershaft via the one-way clutch.
3. Power is transmitted to the final drive gear and drives the final driven gear.

   NOTE: In [D4] or [D3] position, hydraulic pressure is not applied to the 1st-hold clutch.



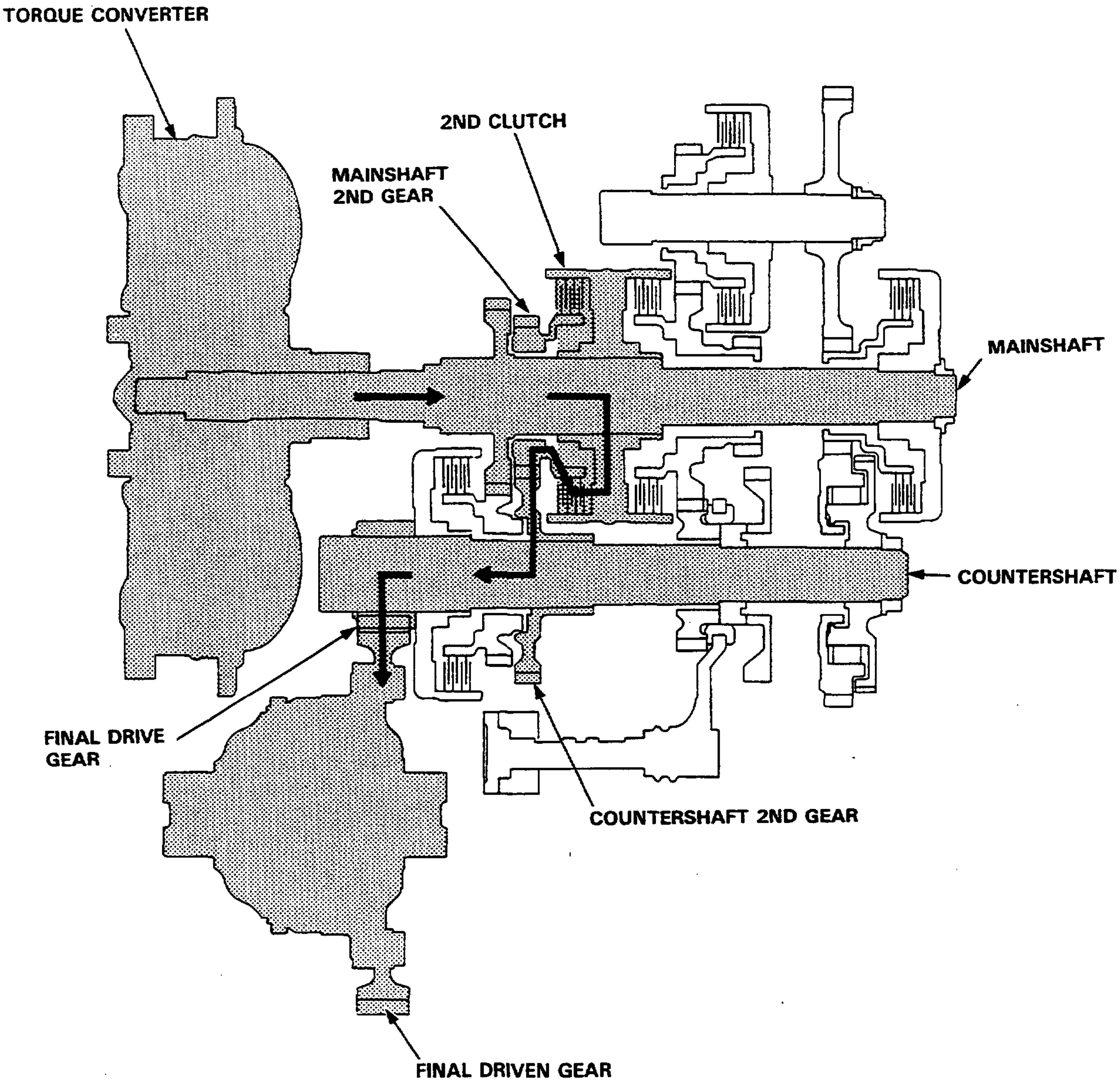
(cont'd)

Power Flow (cont'd)

D4 or D3 Position, 2nd speed

1. Hydraulic pressure is applied to the 2nd clutch, which rotates together with the mainshaft, and the mainshaft 2nd gear rotates.
2. Power is transmitted to the countershaft 2nd gear, and drives the countershaft.
3. Power is transmitted to the final drive gear and 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.

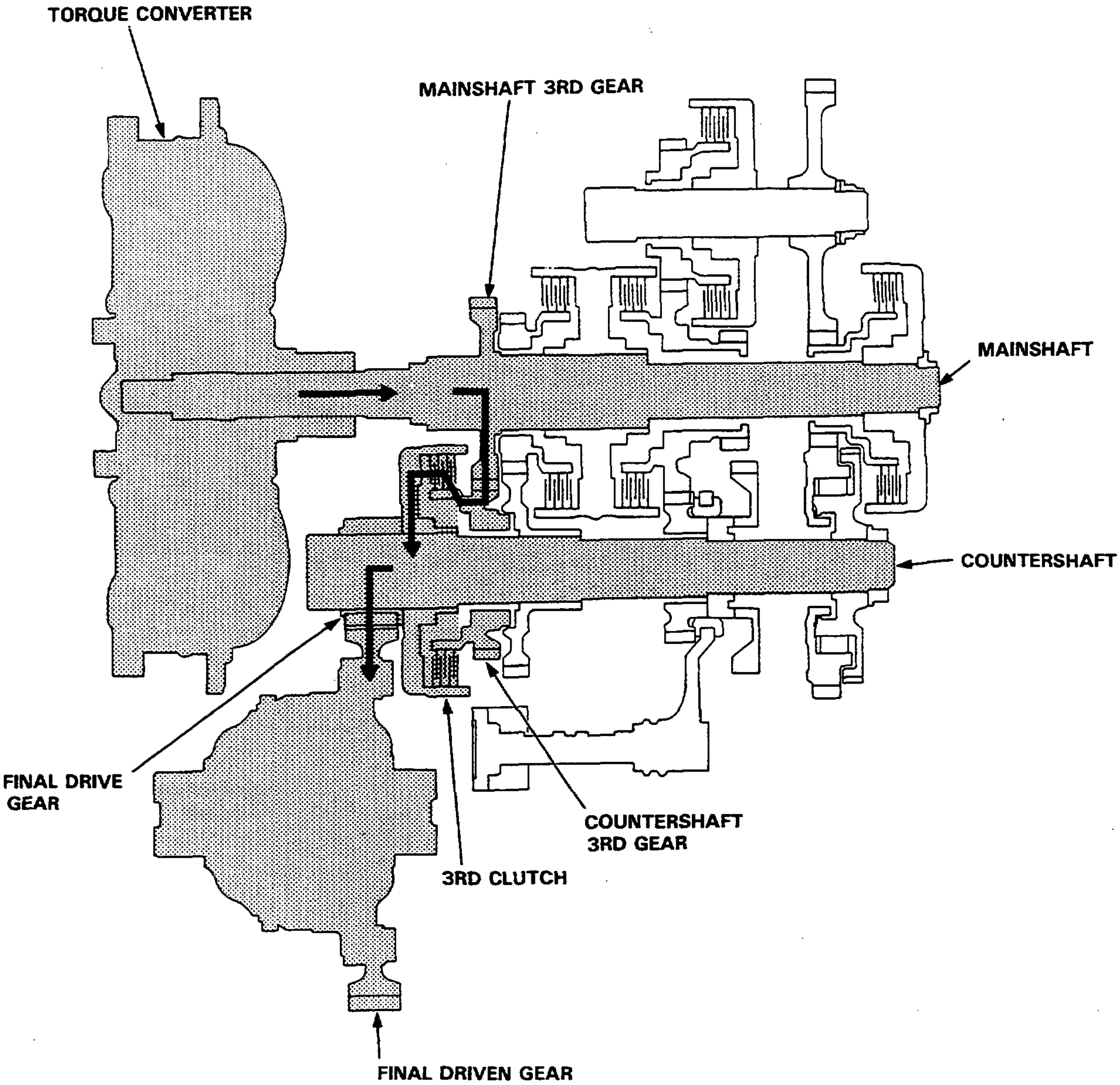


D4 or D3 Position, 3rd speed

1. Hydraulic pressure is applied to the 3rd clutch. Power from the mainshaft 3rd gear is transmitted to the countershaft 3rd gear.

2. Power is transmitted to the final drive gear and 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.



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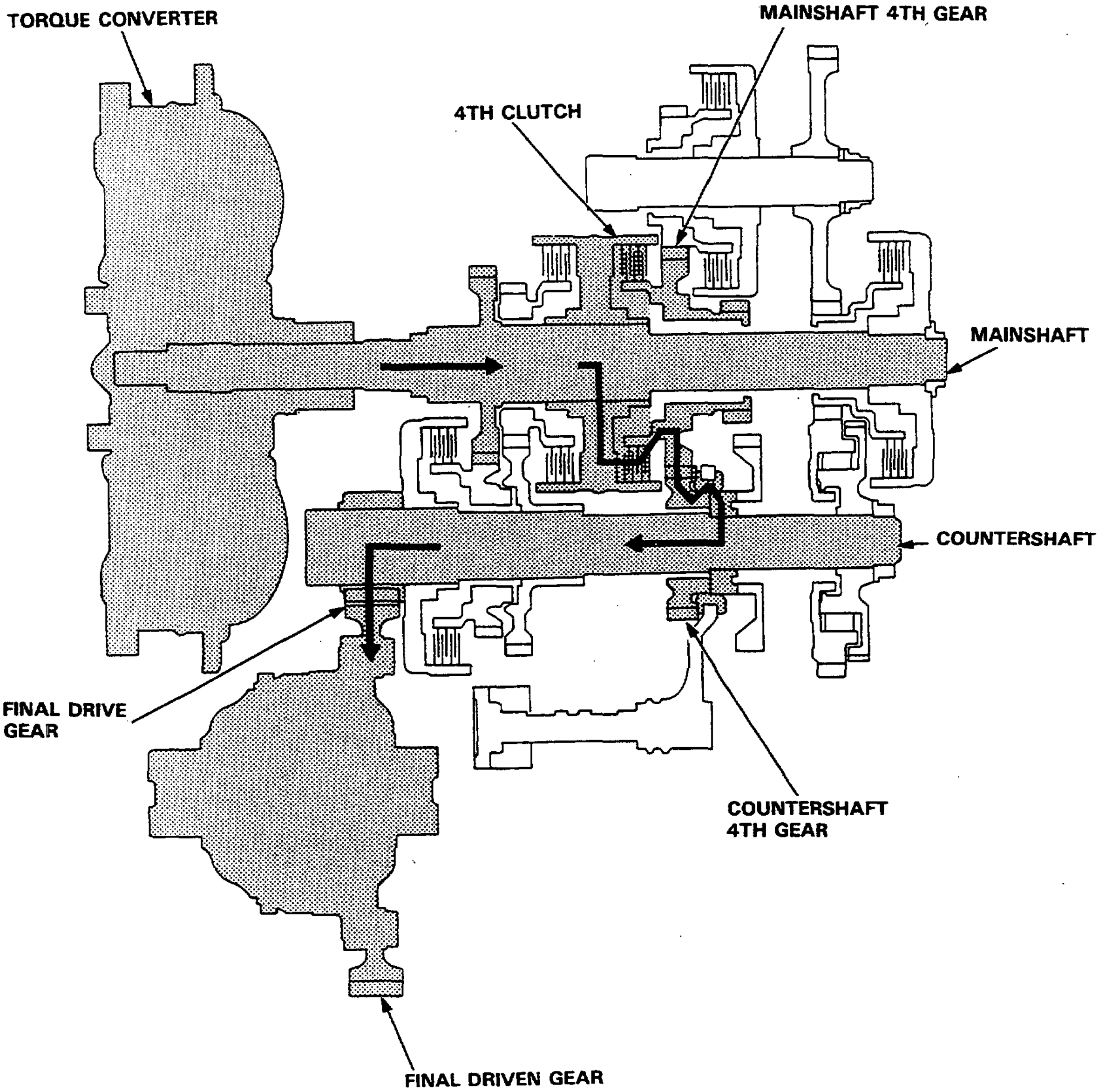
Description

Power Flow (cont'd)

[D4] Position, 4th speed

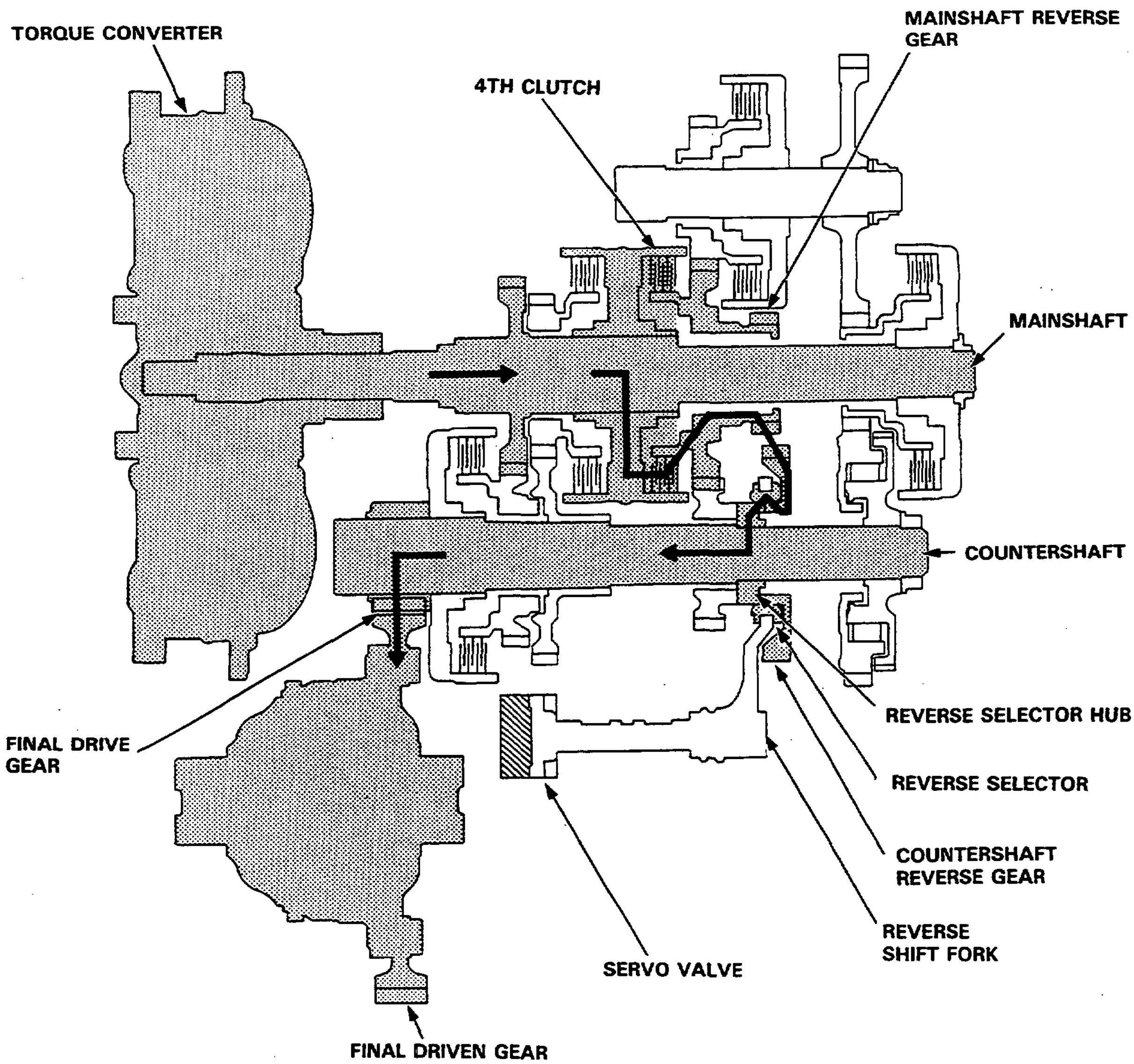
1. Hydraulic pressure is applied to the 4th clutch, which rotates together with the mainshaft, and the mainshaft 4th gear rotates.
2. Power is transmitted to the countershaft 4th gear, and drives the countershaft.
3. Power is transmitted to the final drive gear and drives the final driven gear.

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

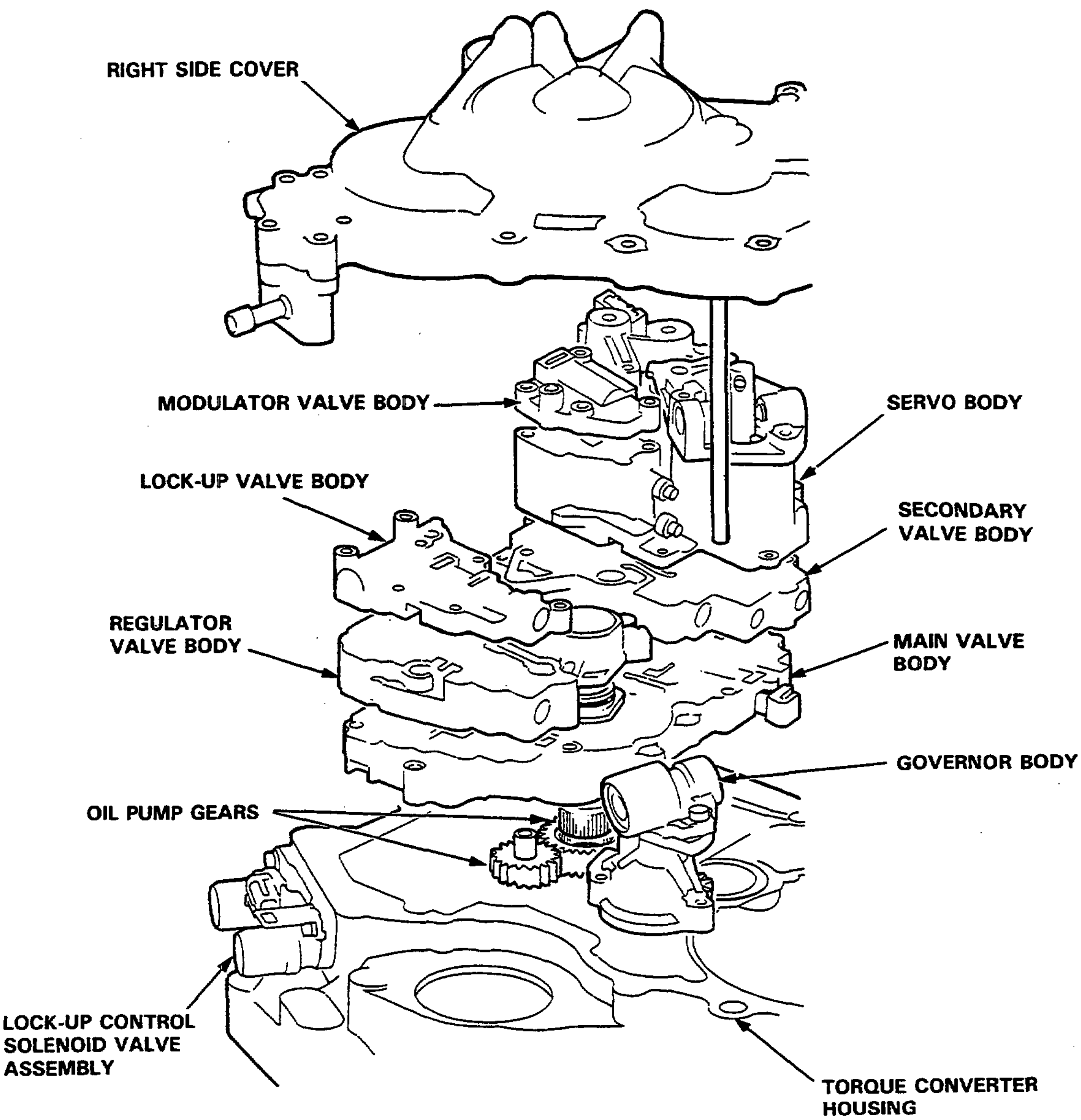
1. Hydraulic pressure is switched by the manual valve to the servo valve, which moves the reverse shift fork to the reverse position. The reverse shift fork engages with the reverse selector, reverse selector hub, and the countershaft reverse gear.
2. Hydraulic pressure is also applied to the 4th clutch. Power is transmitted from the mainshaft reverse gear via the reverse idler gear to the countershaft reverse gear.
3. Rotation direction of the countershaft reverse gear is changed via the reverse idler gear.
4. Power is transmitted to the final drive gear and drives the final driven gear.



Description

Hydraulic Control

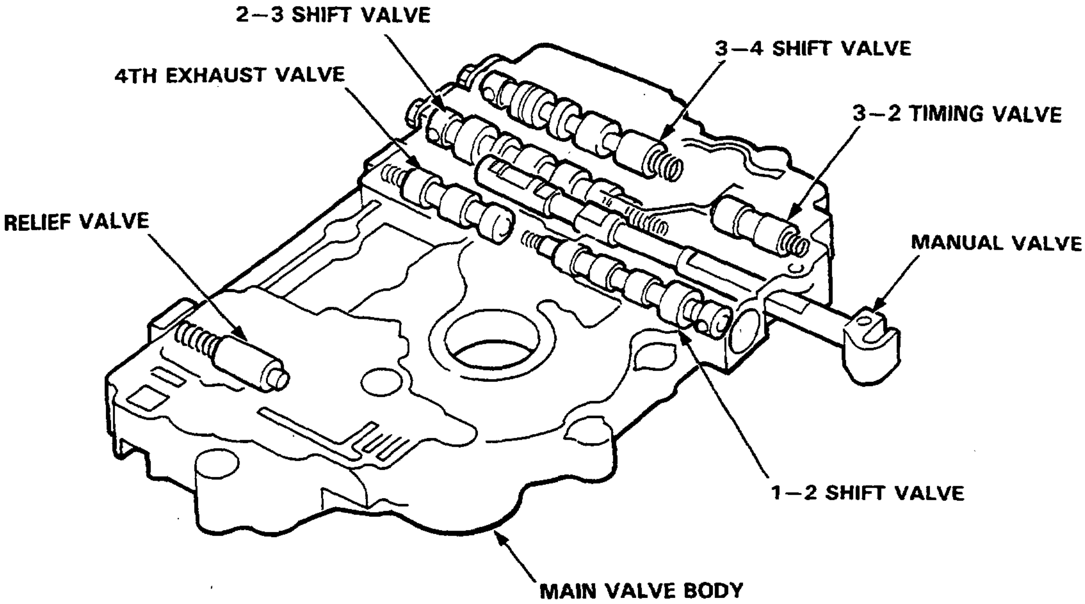
The valve bodies include the main valve body, secondary valve body, regulator valve body, servo body, lock-up valve body, governor body and modulator valve body.
The oil pump is driven by splines behind the torque converter which is attached to the engine. Oil flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve, directing pressure to each of the clutches.



Main Valve Body

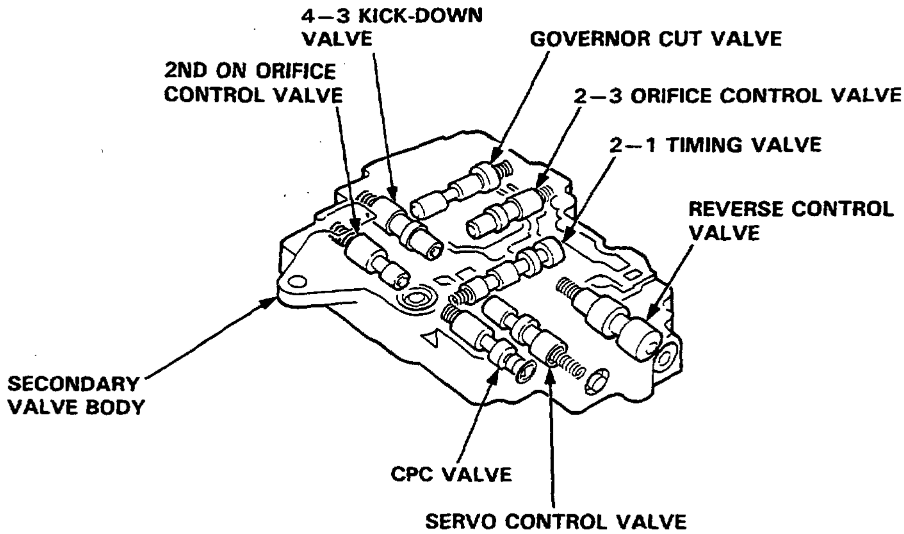
The manual valve, 1–2 shift valve, 2–3 shift valve, 3–4 shift valve, 4th exhaust valve, 3–2 timing valve, and relief valve are all assembled in the main valve body.

The primary function of this valve body is to switch oil passages on and off and to control the hydraulic pressure going to the hydraulic control system.



Secondary Valve Body

The secondary valve body is located on the main valve body. The 2nd ON orifice control valve, 4–3 kick-down valve, 2–3 orifice control valve, governor cut valve, 2–1 timing valve, reverse control valve, servo control valve, and clutch pressure control (CPC) valve are assembled in the secondary valve body.

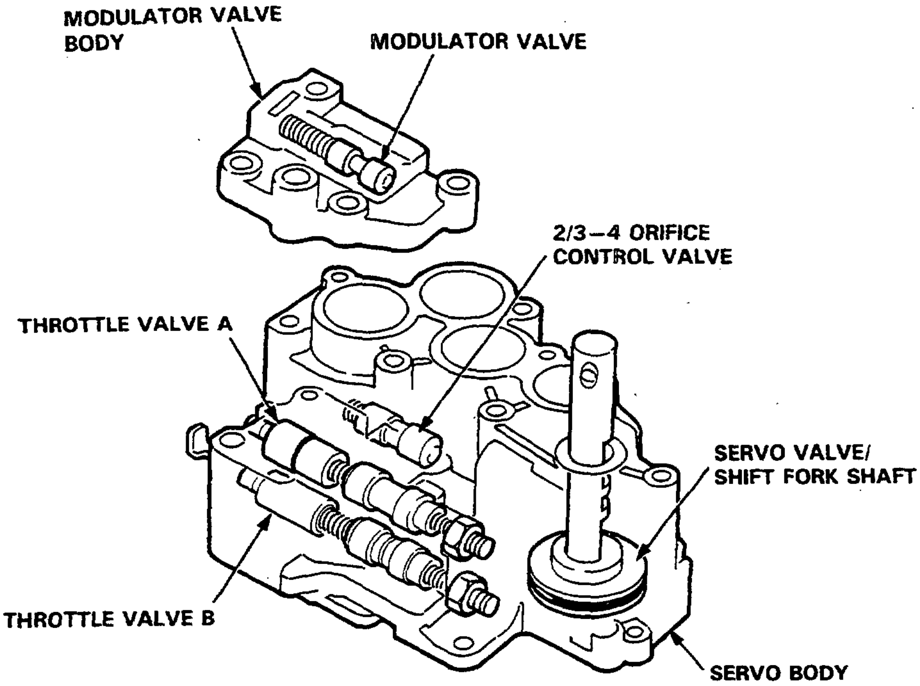


(cont'd)

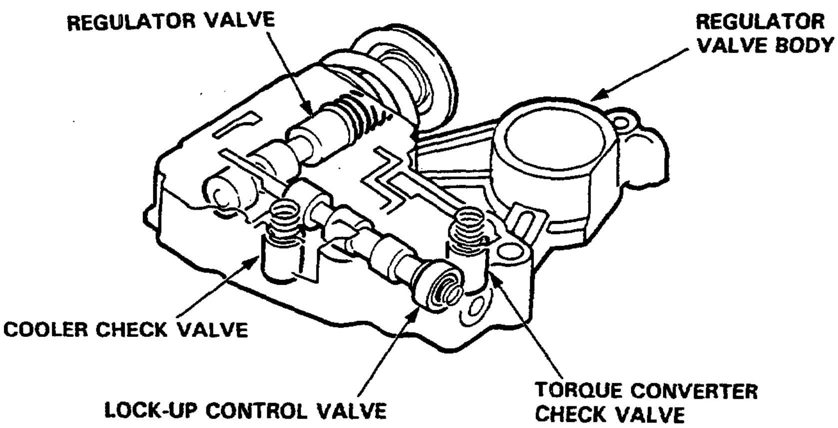
Hydraulic Control (cont'd)

Servo Body
The servo body is located on the secondary valve body.
The servo valve which is integrated with the shift fork shaft, throttle valve A and B, 2/3—4 orifice control valve, and accumulator pistons are all assembled in the servo body.

Modulator Valve Body
The modulator valve body with the modulator valve is located on the servo body.



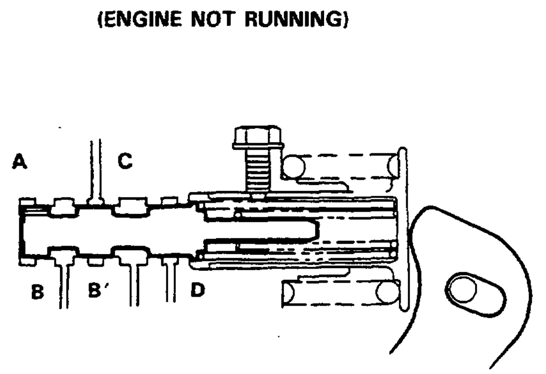
Regulator Valve Body
The regulator valve body is located on the main valve body. The regulator valve body consists of the regulator valve, torque converter check valve, cooler check valve, and lock-up control valve.

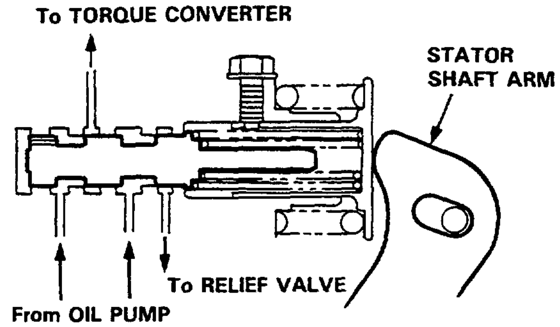


Regulator Valve

The regulator valve maintains a constant hydraulic pressure from the oil pump to the hydraulic control system, while also furnishing oil to the lubricating system and torque converter.

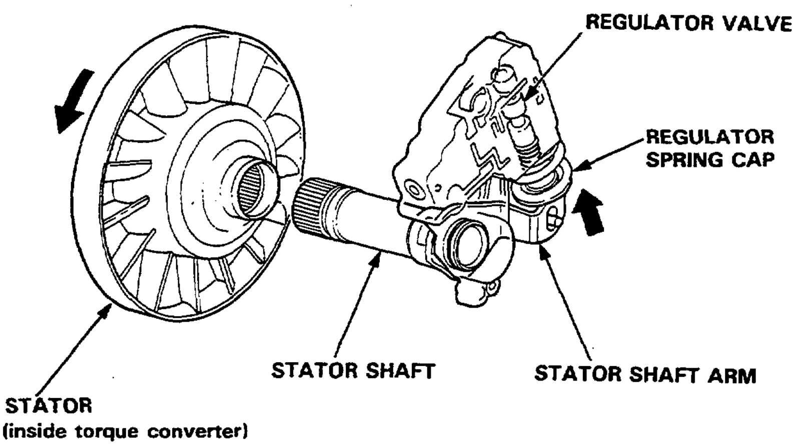
Oil flows through B and B'. The oil which enters through B flows through the valve orifice to A, pushing the regulator valve to the right. According to the level of hydraulic pressure through B, the position of the valve changes, and the amount of the oil through B' from D thus changes. This operation is continued, thus maintaining the line pressure.





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 to 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 shaft arm pushes the regulator spring cap in this ➡ direction in proportion to the reaction. The 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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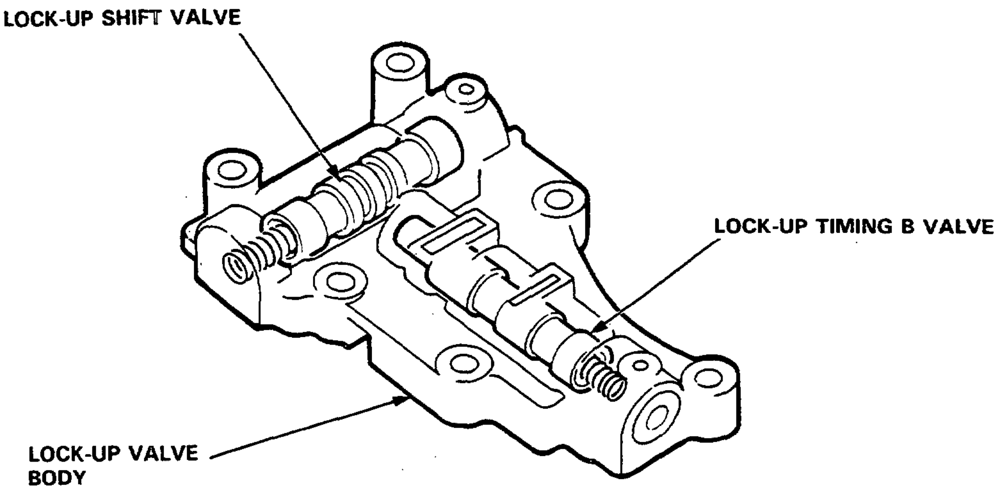
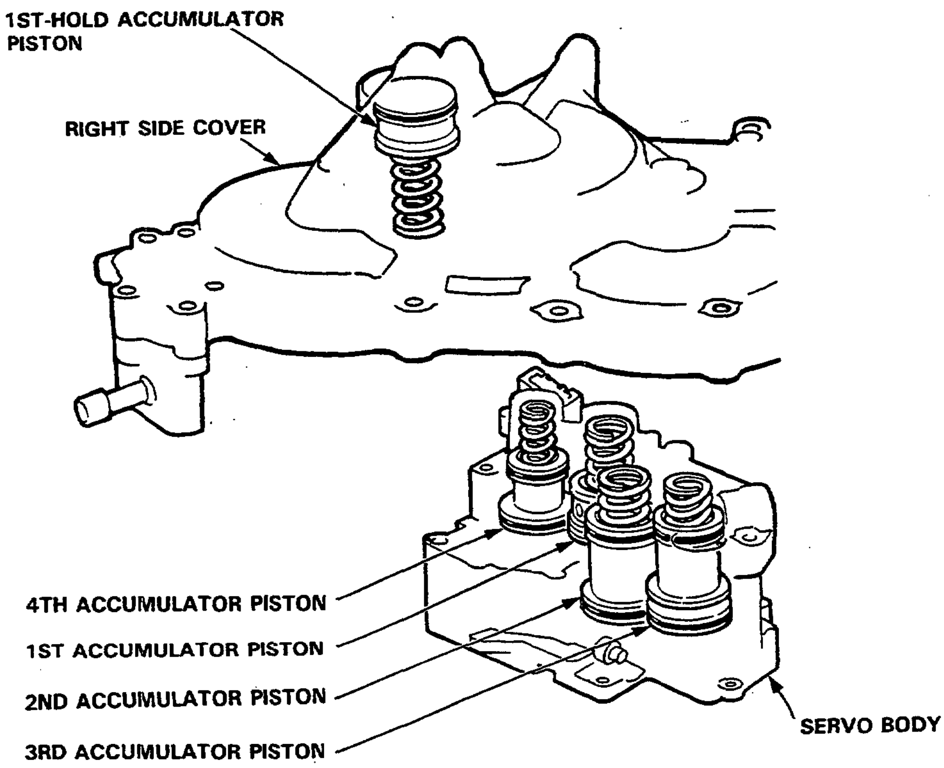
Hydraulic Control (cont'd)

Lock-up Valve Body
The lock-up valve body with the lock-up shift valve and lock-up timing B valve is located on the regulator valve body.



Accumulator Pistons
The accumulator pistons are built into the servo body and right side cover. The 1st-hold accumulator piston is in the right side cover, and the 1st, 2nd, 3rd, and 4th accumulator pistons are built in the servo body.

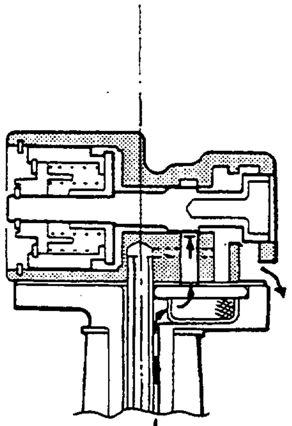


Governor Valve

The governor valve generates hydraulic pressure depending on the car speed. The governor valve generates high pressure when the car speed is high, and low pressure when the car speed is low.

The governor valve-generated pressure acts on the shift valve and is one of the two causes of automatic speed change. The governor gear meshes with the final gear, rotates the governor shaft and operates the governor valve using centrifugal force. The governor valve receives the line pressure. Adjusting this line pressure causes governor pressure to be generated. This pressure is thus adjusted to the value that balance with the power generated by the centrifugal force of the primary, secondary and third weights (centering around the rotation axis) depending on the force due to the difference between the governor valve diameters and the number of revolutions. This number of revolutions depends on car speed. Governor pressure increases as car speed increases.

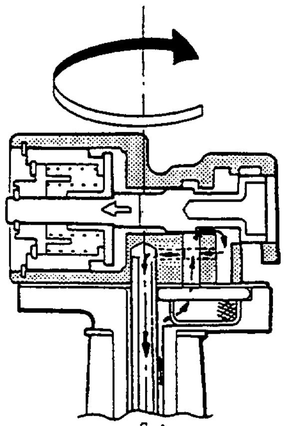
When STOPPING



From MANUAL VALVE

The governor pressure applied on the shift valve is caused to leak into the casing.

At HIGH SPEED



To SHIFT VALVE From MANUAL VALVE

Description

Hydraulic Flow

General Chart of Hydraulic Pressure

Oil Pump → Regulator Valve → Line Pressure / Torque Converter Pressure / Lubrication Pressure

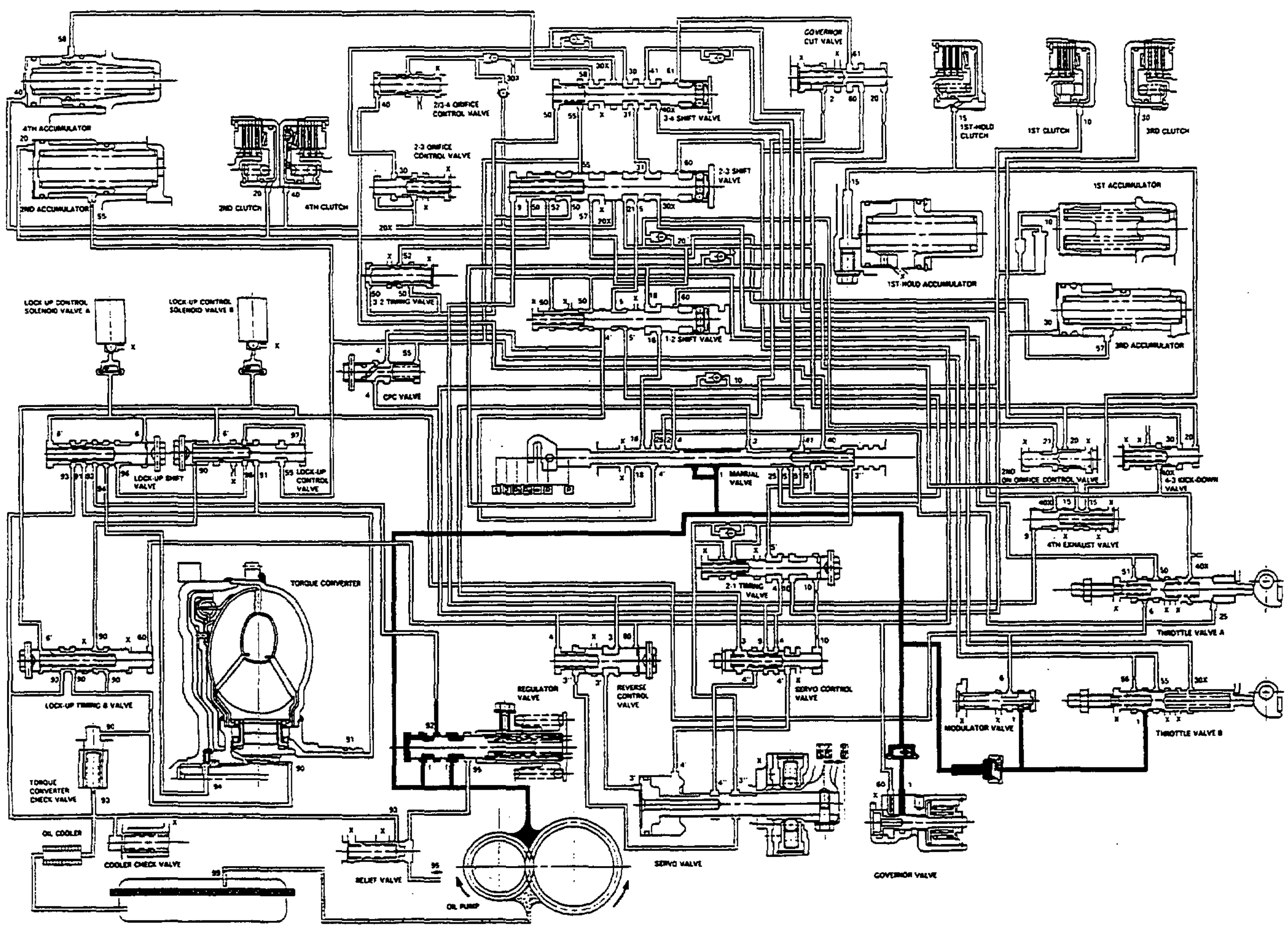
Distribution of Hydraulic Pressure

- Regulator Valve → Line Pressure / Torque Converter Pressure / Lubrication Pressure
- Manual Valve → To Select Line Pressure
- Modulator Valve → Modulator Pressure
- 1-2 Shift Valve
- 2-3 Shift Valve → Clutch Pressure
- 3-4 Shift Valve
- Throttle Valve A → Throttle A Pressure
- Throttle Valve B → Throttle B Pressure
- Governor Valve → Governor Pressure

NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE
1	LINE	16	1ST-HOLD CLUTCH	57	THROTTLE B
2	LINE	18	LINE	58	THROTTLE B
3	LINE	20	2ND CLUTCH	60	GOVERNOR
3′	LINE	21	2ND CLUTCH	61	GOVERNOR
3″	LINE	25	LINE	90	TORQUE CONVERTER
4	LINE	30	3RD CLUTCH	91	TORQUE CONVERTER
4′	LINE	31	3RD CLUTCH	92	TORQUE CONVERTER
5	LINE	40	4TH CLUTCH	93	OIL COOLER
5′	LINE	41	4TH CLUTCH	94	TORQUE CONVERTER
5″	LINE	50	THROTTLE A	95	LUBRICATION
6	MODULATOR	51	THROTTLE A	96	TORQUE CONVERTER
6′	MODULATOR	52	THROTTLE A	97	TORQUE CONVERTER
10	1ST CLUTCH	55	THROTTLE B	99	SUCTION
15	1ST-HOLD CLUTCH	56	THROTTLE B	X	BLEED

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 line pressure (1). The torque converter inlet pressure (92) enters (94) of 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.



(cont'd)

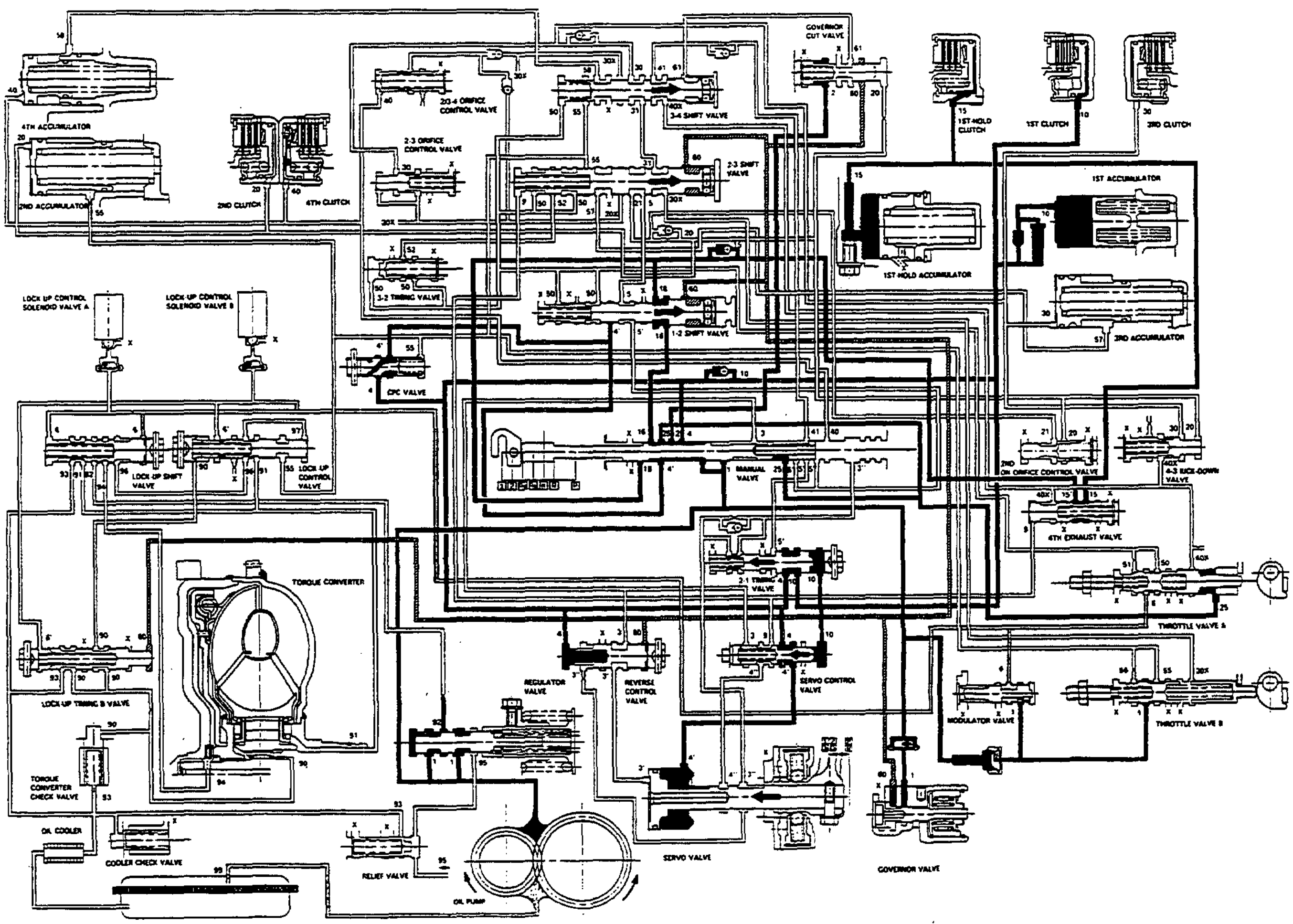
Description

Hydraulic Flow (cont'd)

$\boxed{1}$ Position

The line pressure (1) becomes the line pressure (4) and 1st-hold clutch pressure (16) as it passes through the manual valve. Also, the line pressure (1) goes to the governor valve and becomes the governor pressure (60). The governor pressure (60) is supplied to the 1-2 and 2-3 shift valves. The shift valves remain on the right side because the governor pressure is lower than the valve spring tension.
The line pressure (4) becomes the 1st clutch pressure (10) via the orifice, then goes to the 1st clutch. The 1st clutch pressure (10) is also supplied to the servo control valve and 2-1 timing valve to move them to the left side.
The 1st-hold clutch pressure (16) goes to the 1st-hold clutch via the 1-2 shift valve, orifice and 4th exhaust valve.
In the $\boxed{1}$ position, the 1st clutch and 1st-hold clutch are engaged.
The line pressure (4) also goes to the servo valve via the servo control valve, and holds on the servo valve in the driving range.

NOTE: When used, "left" and "right" indicates direction on the flowchart.



[2] Position

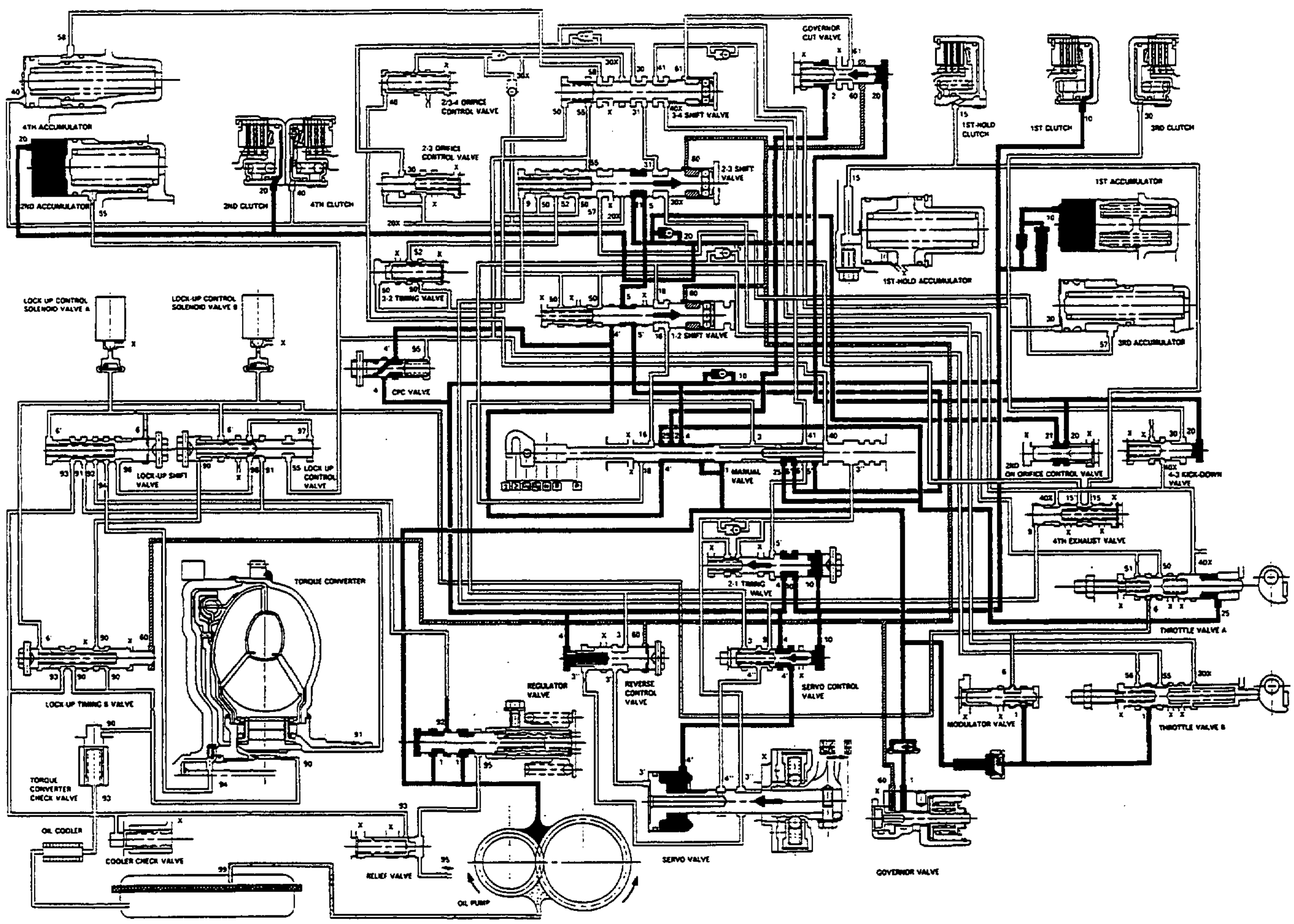
The line pressure (1) becomes the line pressure (2), (4), (4'), (25) as it passes through the manual valve. Also, the line pressure (1) goes to the governor valve and becomes the governor pressure (60). The governor pressure (60) is supplied to the 1-2 and 2-3 shift valves, but the 1-2 and 2-3 shift valves remain on the right side.

The line pressure (25) goes to the 2-3 shift valve via the 1-2 shift valve and becomes the 2nd clutch pressure (21). The 2nd clutch pressure (21) becomes the 2nd clutch pressure (20) as it passes through the orifice, then goes to the 2nd clutch.

The line pressure (4) becomes the 1st clutch pressure (10) and flows to the 1st clutch, servo control valve and 2-1 timing valve. The line pressure (4') also holds on the servo valve in the driving range as in the [1] Position.

In the [2] position, the 1st clutch and 2nd clutch are engaged. However, no power from the 1st clutch is transmitted by means of the one-way clutch.

NOTE: When used, "left" and "right" indicates direction on the flowchart.



(cont'd)

Description

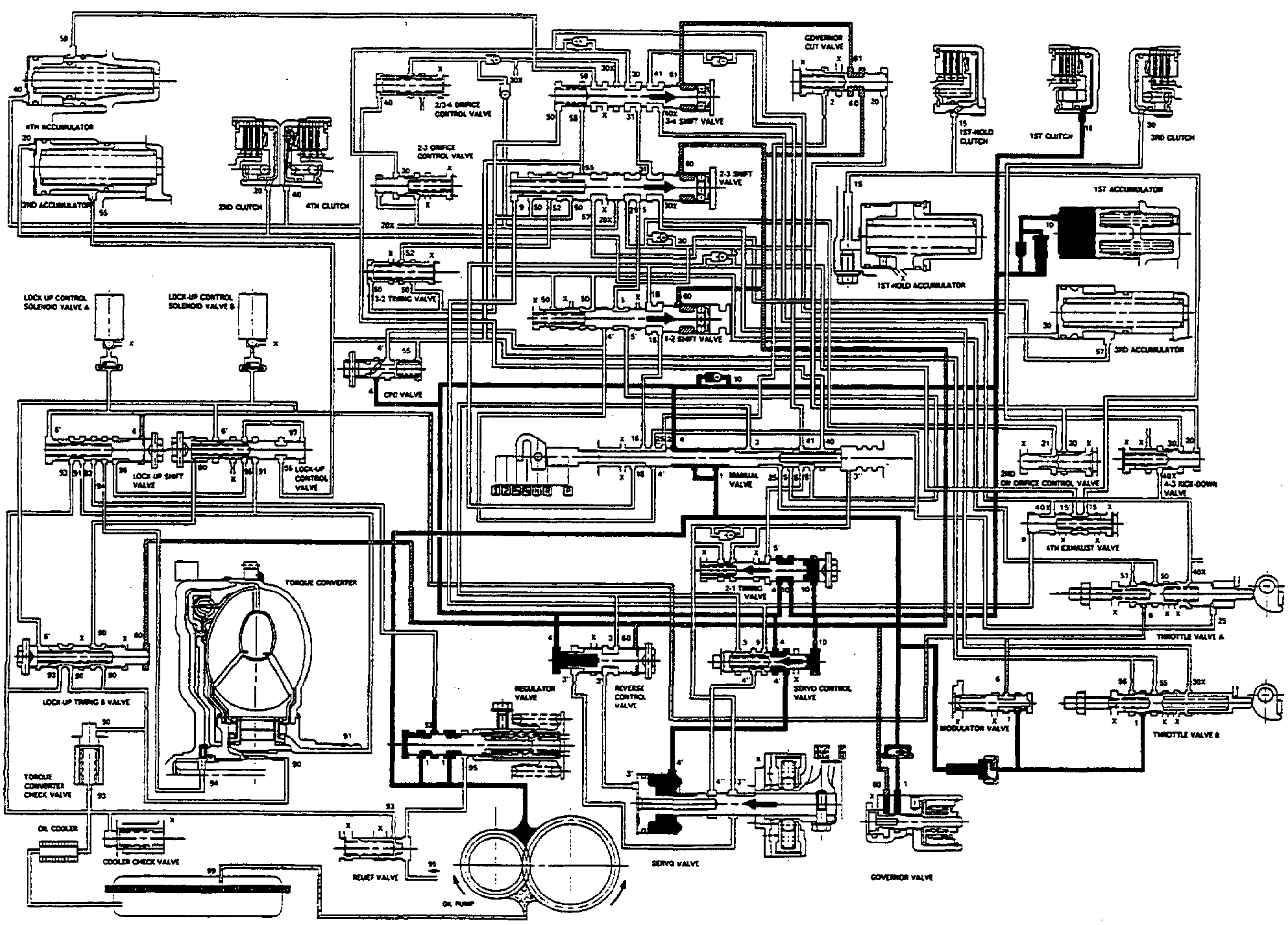
Hydraulic Flow (cont'd)

[D4] or [D3] Position

1. 1st speed
   The flow of fluid through the torque converter is the same as in the [N] position. The line pressure (1) becomes the line pressure (4). The line pressure (4) becomes the 1st clutch pressure (10) as it passes through the orifice. The 1st clutch pressure (10) is supplied to the 1st clutch and 1st accumulator, consequently the vehicle will move as the engine power is transmitted.
   The line pressure (1) becomes the governor pressure (60) by the governor valve and travels to each shift valve. But, all shift valves remain on the right side because the governor pressure (60) is lower than the shift valve spring tension.
   The line pressure (1) also flows to the modulator valve and throttle valve B.

In the [D4] or [D3] position, the line pressure (4') flows to the servo valve and holds it on in the driving range as in the [1] and [2] position

NOTE: When used, "left" or "right" indicates direction on the flowchart.



2. 2nd speed

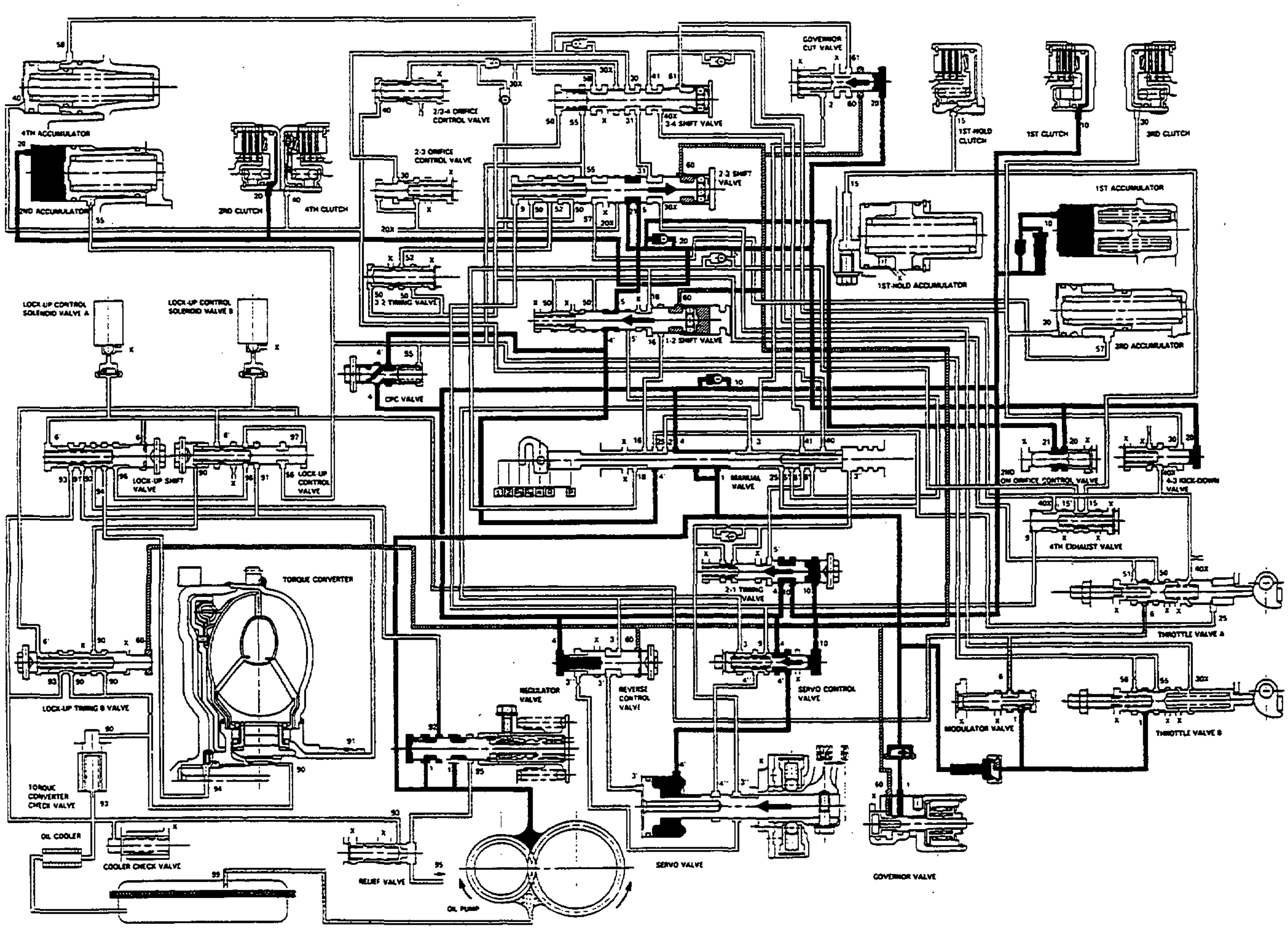
The flow of fluid up to the 1-2 and 2-3 shift valves is the same as the 1st speed range. As the speed of the car reaches the prescribed value, the 1-2 shift valve is moved to the left side by the governor pressure (60) and uncovers the oil port leading to the 2nd clutch; the 2nd clutch is engaged.

Fluid flows by way of:

Line Pressure (4) → CPC Valve-Line Pressure (4') → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-2nd Clutch Pressure (21) → Orifice-2nd Clutch Pressure (20) → 2nd Clutch.

The 2nd clutch pressure (20) is also supplied to the governor cut valve. The governor cut valve is moved to the left side to cover the oil port of the governor pressure (60) to the 3-4 shift valve. The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted by means of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the flowchart.



(cont'd)

Description

Hydraulic Flow (cont'd)

3. 3rd speed

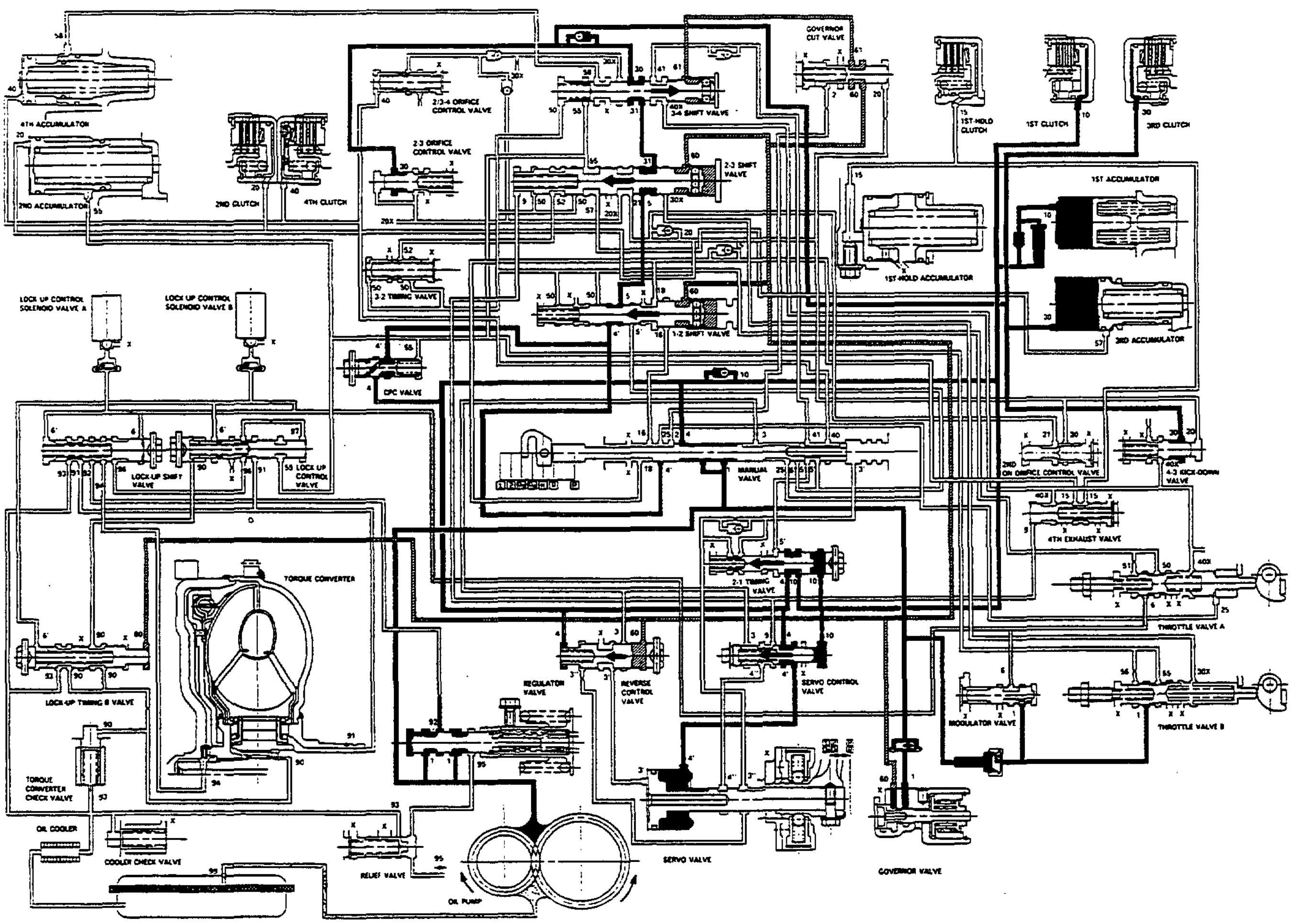
The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as the 2nd speed range. As the speed of the car reaches the prescribed value, the 2-3 shift valve is moved to the left side by the governor pressure (60) and uncovers the oil port leading to the 3rd clutch. Since the 1-2 shift valve is kept on the left side, and the 3-4 shift valve is on the right side to uncover the oil port leading to the 3rd clutch, the 3rd clutch is engaged.

Fluid flows by way of:

Line Pressure (4) → CPC Valve-Line Pressure (4') → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-3rd Clutch Pressure (31) → 3-4 Shift Valve-3rd Clutch Pressure (30) → Orifice → 3rd Clutch.

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted by means of the one-way clutch as in the 2nd speed.

NOTE: When used, "left" and "right" indicates direction on the flowchart.



4. 4th speed

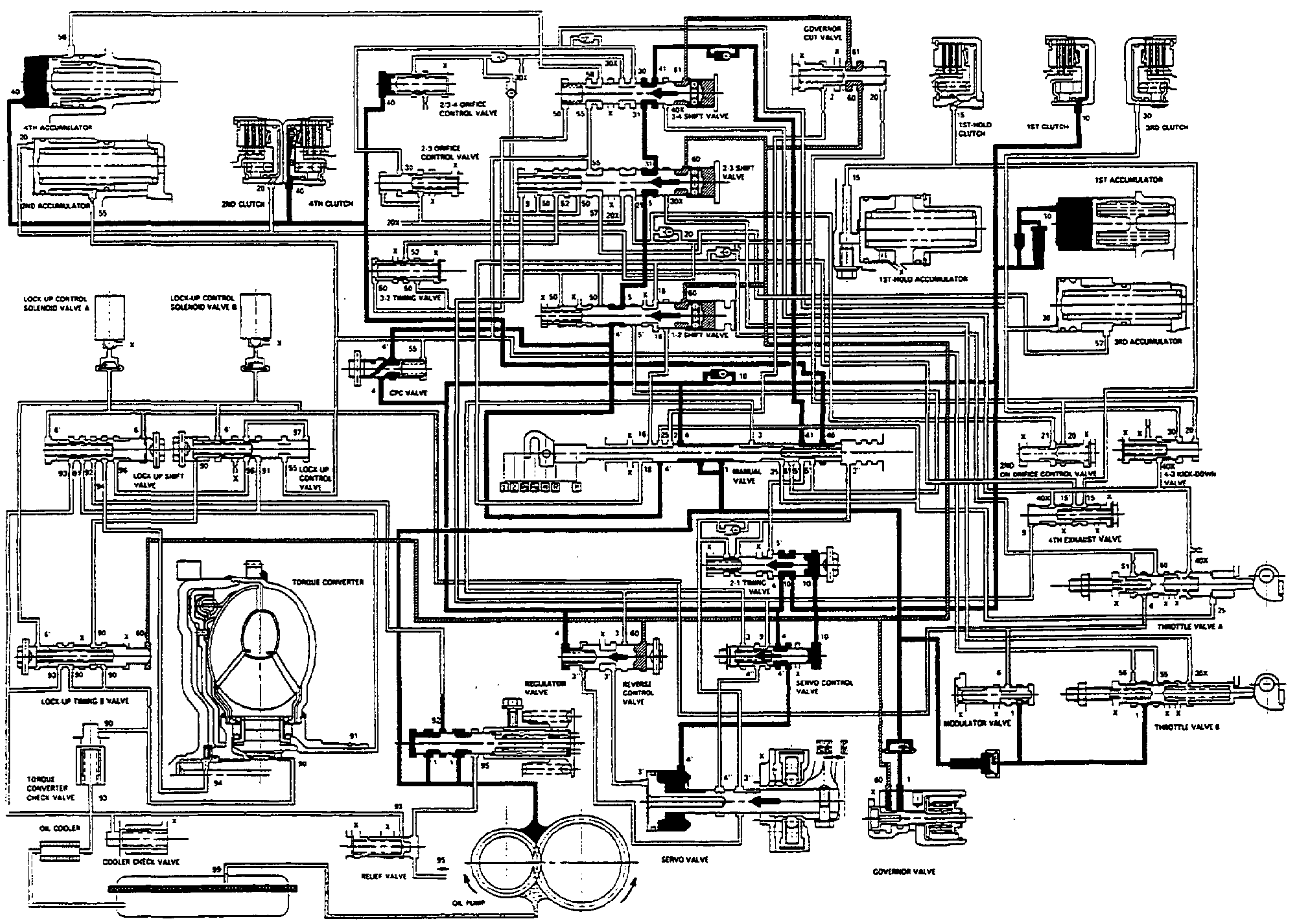
The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as the 3rd speed range. As the speed of the car reaches the prescribed value, the 3-4 shift valve is moved to the left side by the governor pressure (60) and uncovers the oil port leading to the 4th clutch. Since the 1-2 and 2-3 shift valves are kept on the left side, the fluid flows through to the 4th clutch; the power is transmitted through the 4th clutch.

Fluid flows by way of:

Line Pressure (4) → CPC Valve-Line Pressure (4') → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-3rd Clutch Pressure (31) → 3-4 Shift Valve-4th Clutch Pressure (41) → Orifice → Manual Valve-4th Clutch Pressure (40) → 4th Clutch.

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted by means of the one-way clutch as in the 3rd speed.

NOTE: When used, "left" or "right" indicates direction on the flowchart.



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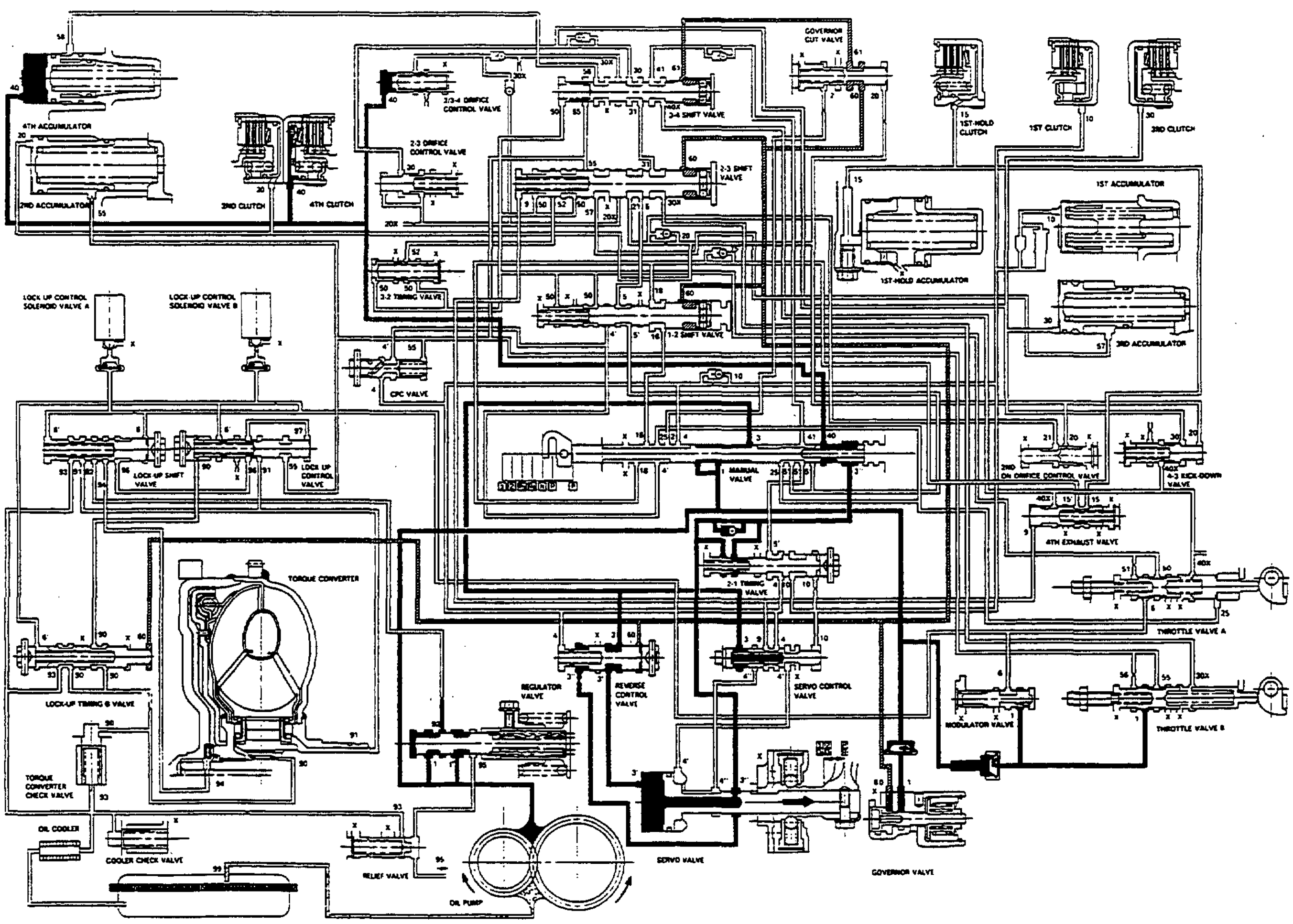
Description

Hydraulic Flow (cont'd)

[R] Position

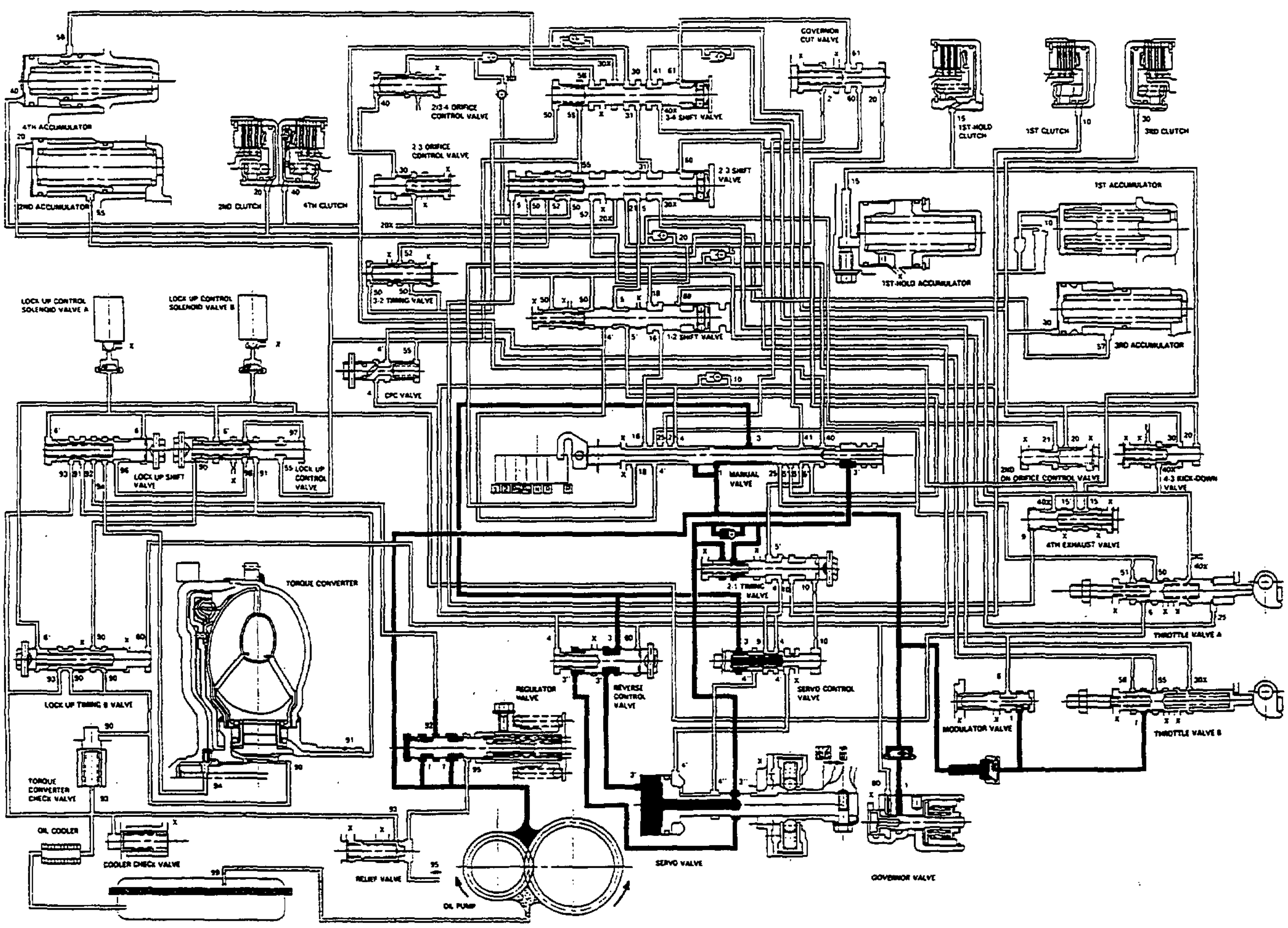
The flow of fluid through the torque converter circuit is the same as in the [N] position. The line pressure (1) becomes the line pressure (3) as it passes the manual valve. It then flows through the reverse control valve to the servo valve, causing the reverse shift fork shaft to be moved to the reverse position. The line pressure (3'') from the servo valve goes to the manual valve and becomes the 4th clutch pressure (40). Then it goes to the 4th clutch; the power is transmitted through the 4th clutch.
When the [R] position is selected while the vehicle is moving forward at more than a certain speed, the line pressure (3) is cut by the governor pressure (60) which activates the reverse control valve.
When shifting to [R] from [D4], [D3], [2] or [1] position, the servo control valve is moved to the left side by 1st clutch pressure (10). The servo control valve combines with the reverse shift fork shaft detent system to control movement of the servo valve.

NOTE: When used, "left" and "right" indicates direction on the flowchart.



[P] Position

The flow of fluid through the torque converter circuit is the same as in the [N] position. The line pressure (1) becomes the line pressure (3) as it passes the manual valve. The line pressure (3) flows through the the reverse control valve to the servo valve, causing the reverse shift fork 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.



Description

Lock-up System

Lock-up Clutch

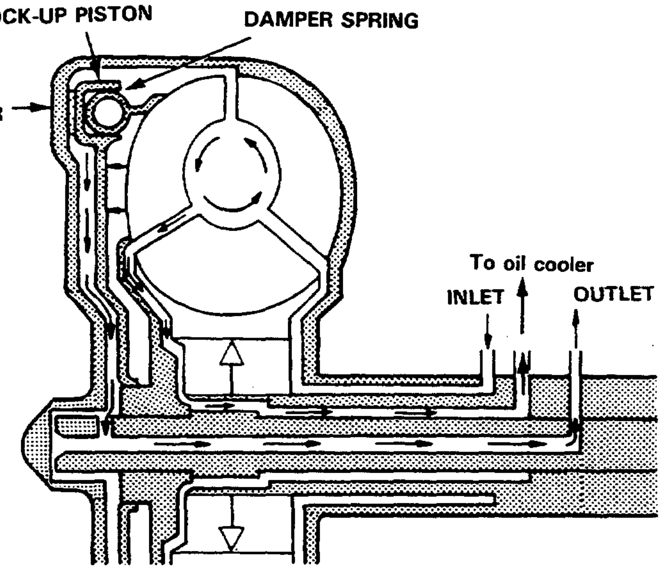
1. Operation (clutch on)

With the lock-up clutch on, the oil in the chamber between the torque converter cover and lock-up piston is discharged, and the converter oil exerts pressure through the piston against the converter cover. As a result, the converter turbine is locked on the converter cover firmly. 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

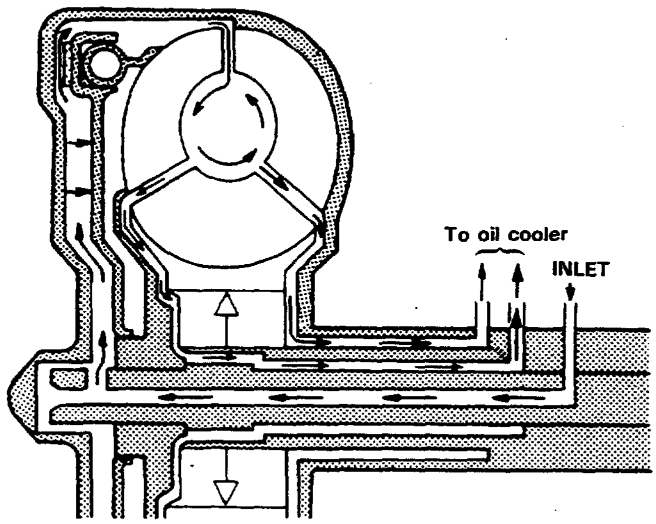


2. Operation (clutch off)

With the lock-up clutch off, the oil flows in the reverse of CLUTCH ON. As a result, the lock-up piston is moved away from the converter cover; that is, the torque converter lock-up is released.

Power flow

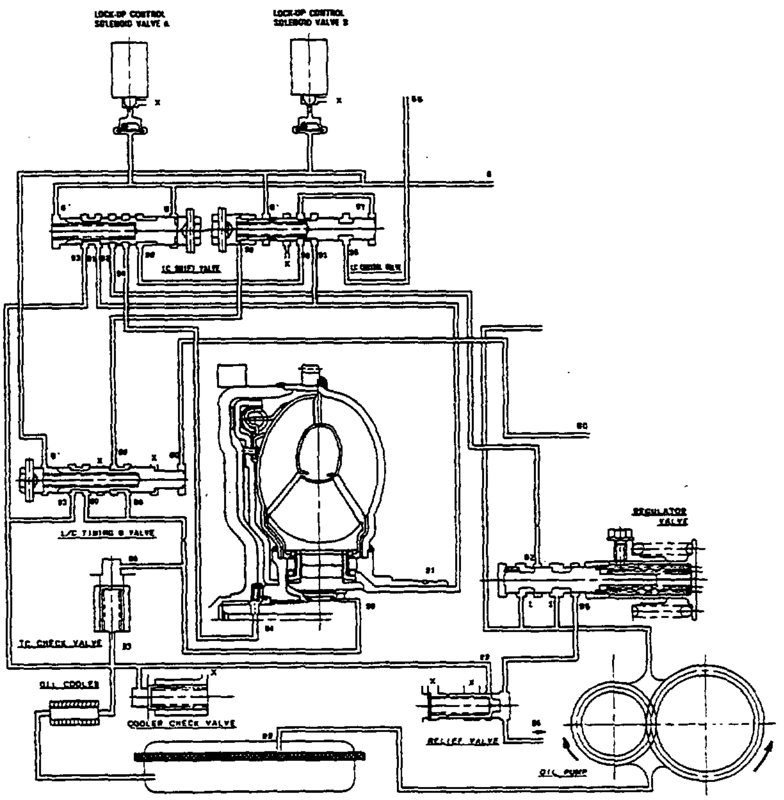
Engine
↓
Drive plate
↓
Torque converter cover
↓
Pump
↓
Turbine
↓
Mainshaft



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 ECM optimizes the timing of the lock-up system. Under certain conditions, the lock-up operation is applied during deceleration, in 2nd, 3rd and 4th speed.

The lock-up shift valve controls the range of lock-up according to lock-up control solenoid valves A and B, and the throttle valve. 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 ECM.
From sensor input signals, the ECM detects 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.

Solenoid valve / Lock-up condition	A	B
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	Duty operation OFF ⟶ ON
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up during deceleration	ON	Duty operation OFF ⟶ ON

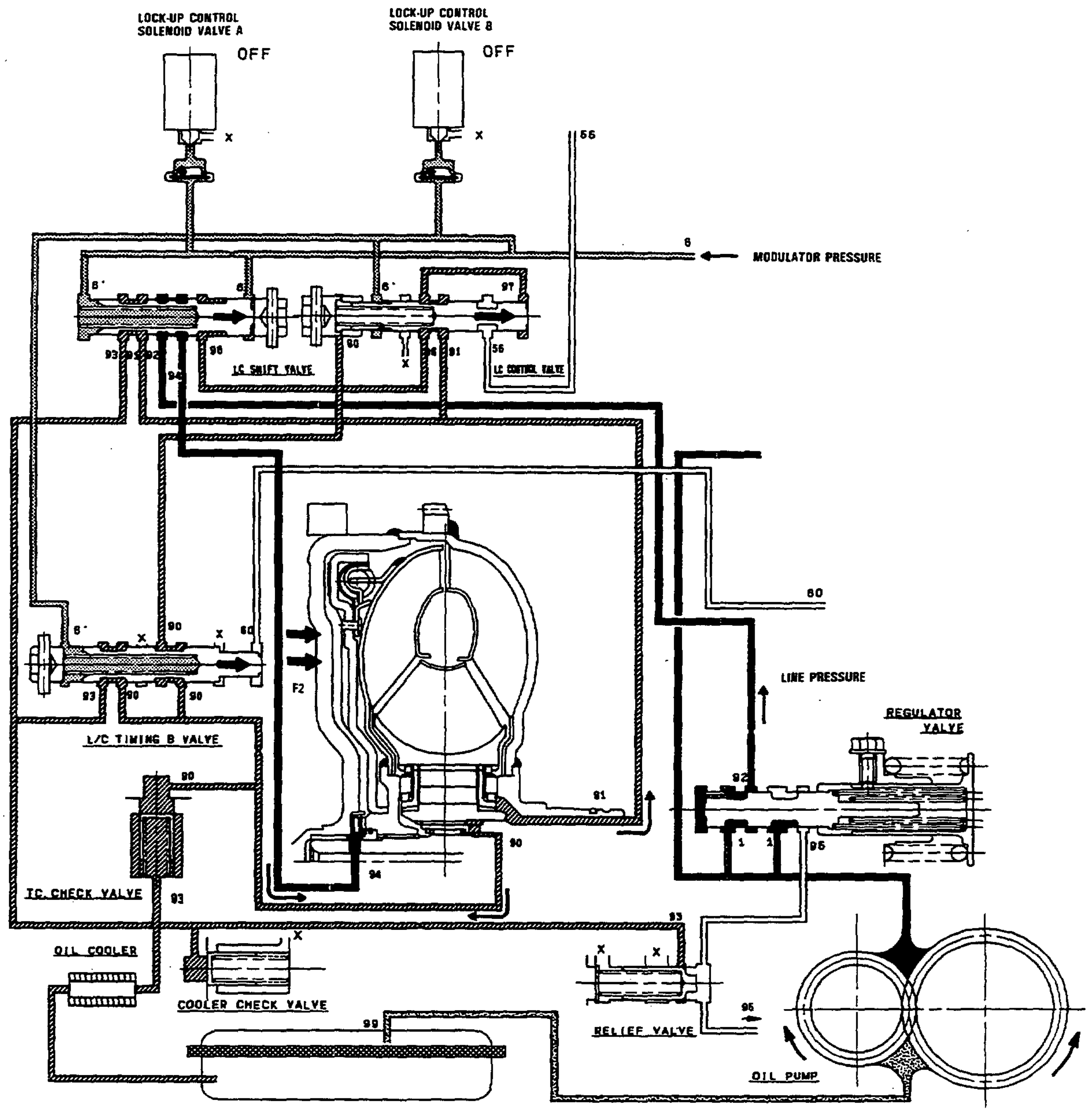


(cont'd)

Lock-Up System (cont'd)

No Lock-up
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 pressure on both ends of the lock-up shift valve are equal, and the lock-up 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; the lock-up clutch is OFF.

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: Duty operation (ON ↔ OFF)

The ECM switches the solenoid valve A to 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.

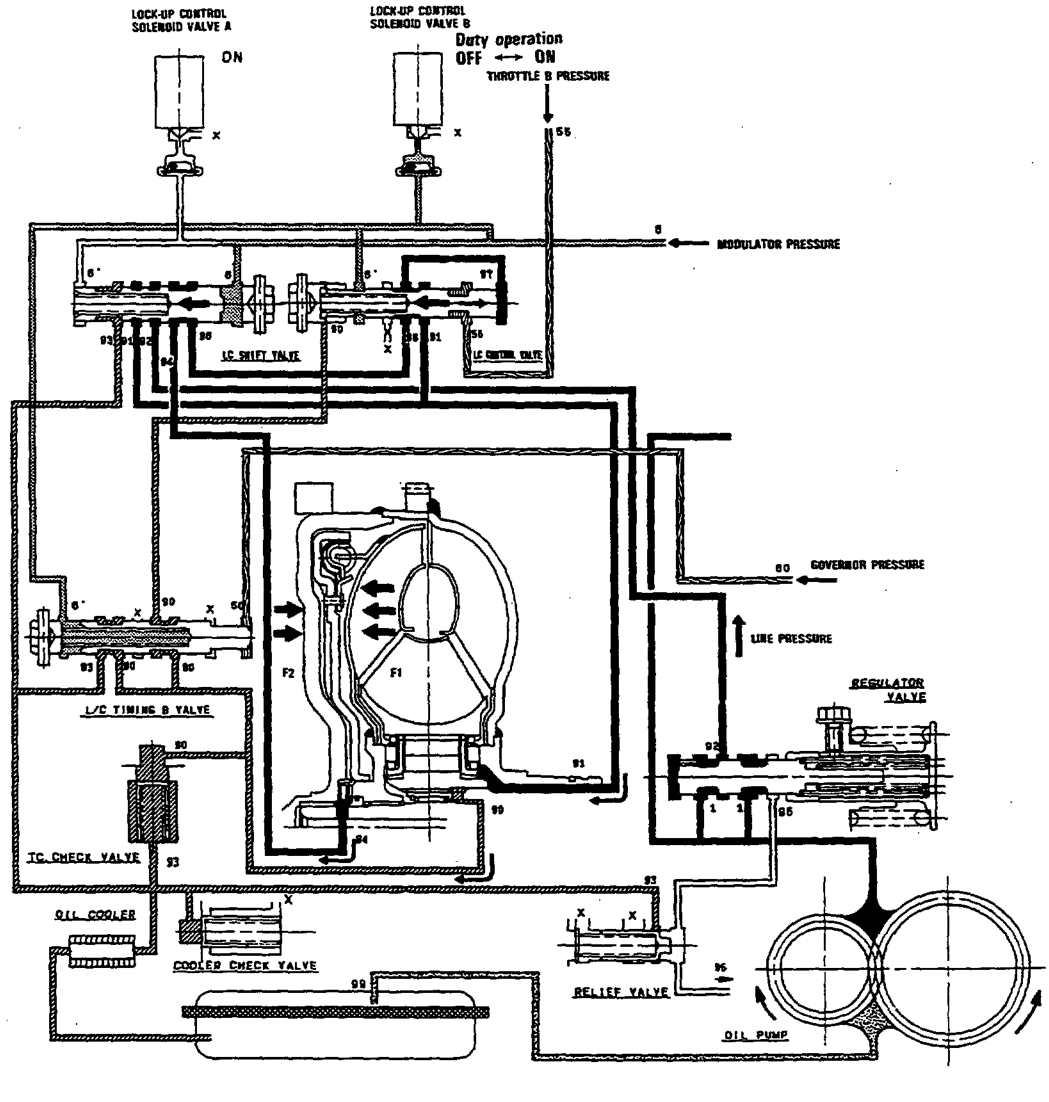
The torque converter pressure is separated into two passages:

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 B valve is determined by the governor 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 throttle B pressure, torque converter back pressure and torque converter pressure regulated by the check valve. In low speed range, the throttle B pressure working on the right side of the lock-up control valve is low, causing the valve to be moved to the right side. With the lock-up control solenoid valve B to ON and OFF alternately, the modulator pressure is maintained in the left side 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 (F2) to be lowered slightly, resulting in partial lock-up.

NOTE: When used, "left" or "right" indicates direction on the flowchart.



(cont'd)

Lock-Up System (cont'd)

Half Lock-up

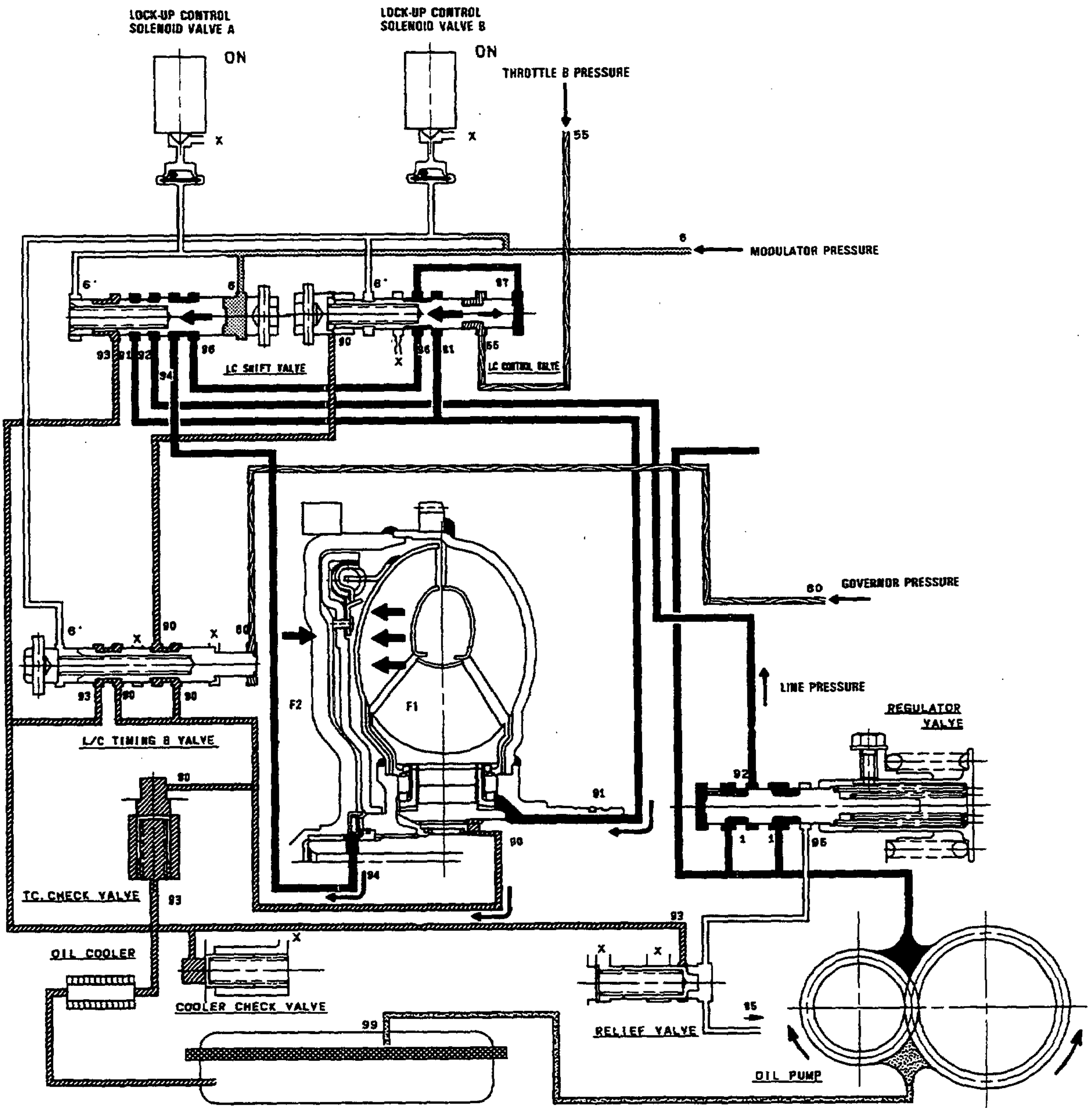
Lock-up Control Solenoid Valve A: ON   Lock-up Control Solenoid Valve B: ON

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 B valve is low. However, the governor pressure is still low at this time, consequently the lock-up timing B 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.

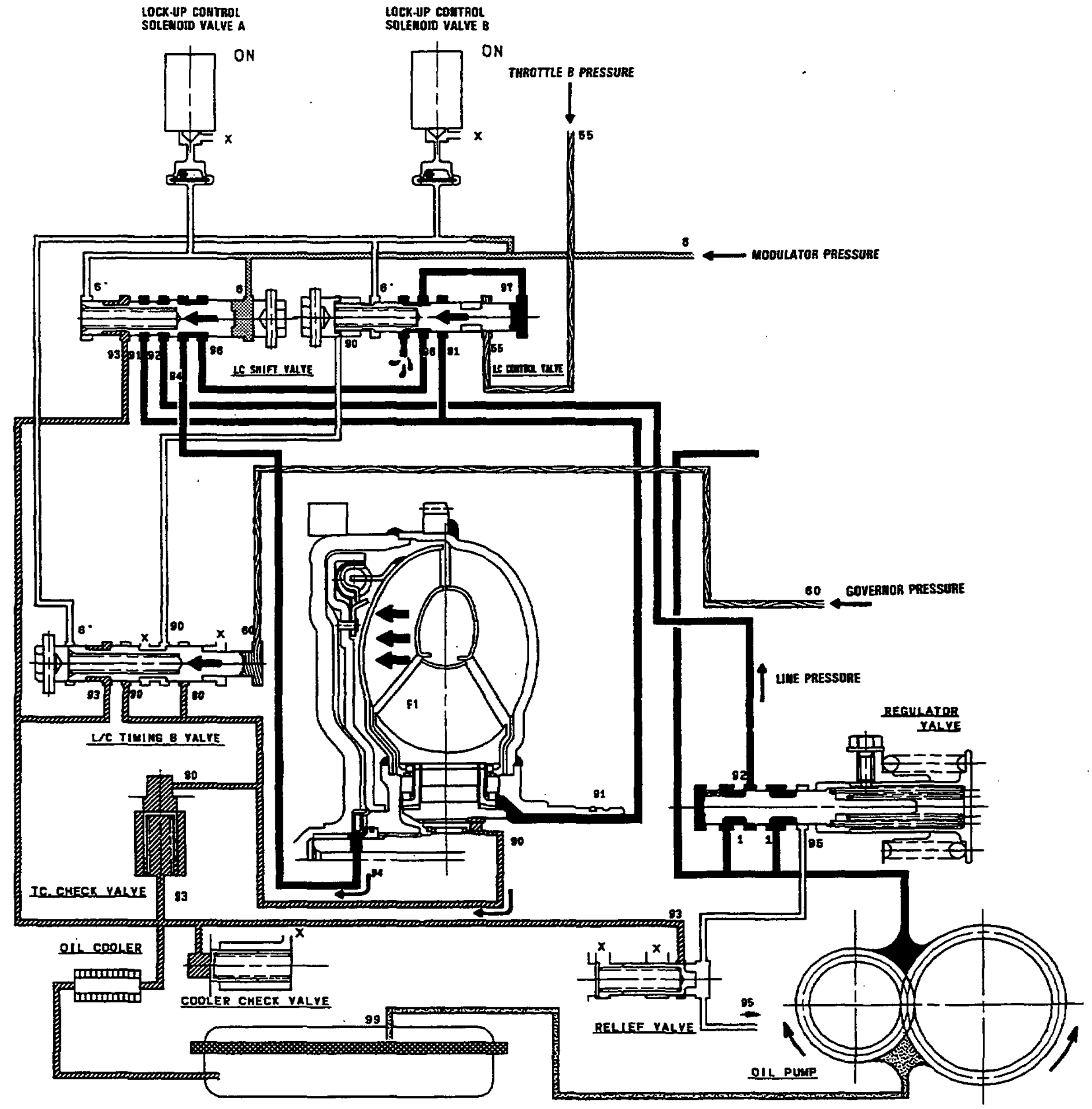


Full Lock-up

Lock-up Control Solenoid Valve A: ON   Lock-up Control Solenoid Valve B: ON

When the vehicle speed further increases, the governor pressure is increased. The lock-up timing B 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 side 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); the lock-up control valve is moved to the left side. 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.



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Description

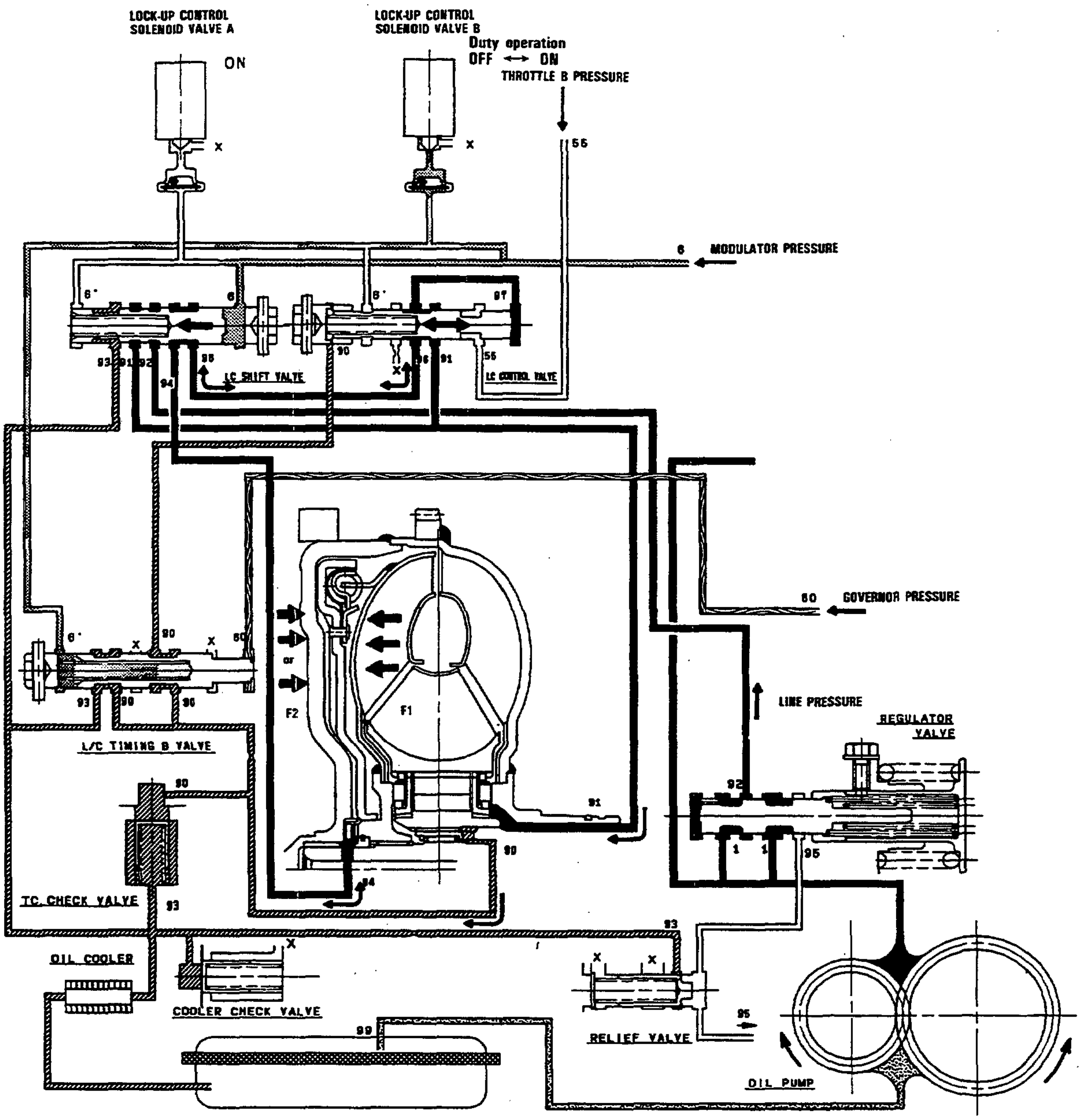
Lock-Up System (cont'd)

Deceleration Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: Duty Operation (ON ↔ OFF)

The ECM switches the solenoid valve B to ON and OFF alternately at high speeds 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.

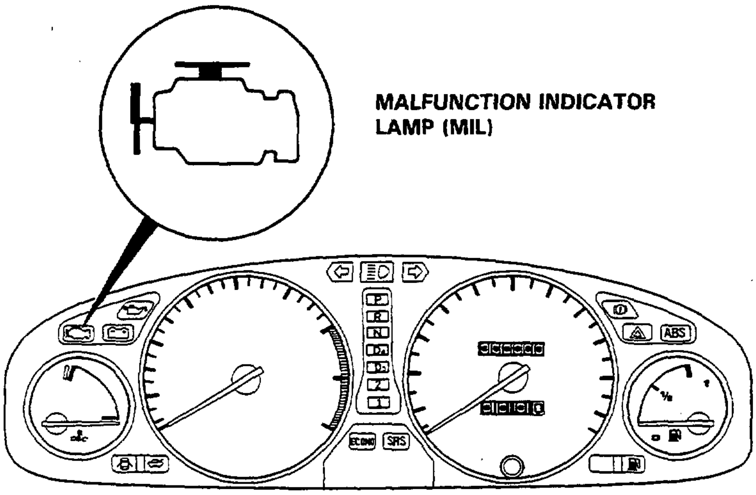


Troubleshooting Procedures

If the lock-up control system is suspected to be faulty, do the following:

1. If the malfunction indicator lamp (MIL) comes on, check and inspect PGM-FI system according to PGM-FI Troubleshooting (see section 11).

NOTE:
PGM-FI system
The PGM-FI system on this model is a sequential multiport fuel injection system.



2. If the malfunction indicator lamp (MIL) does not come on or it blinks other than nineteen times while connecting the Service Check Connector terminals with the special tool, check and inspect according to the Symptom-to-Component Chart (see page 14-44 thru 47).

3. Check the lock-up control solenoid valve (see page 14-43).

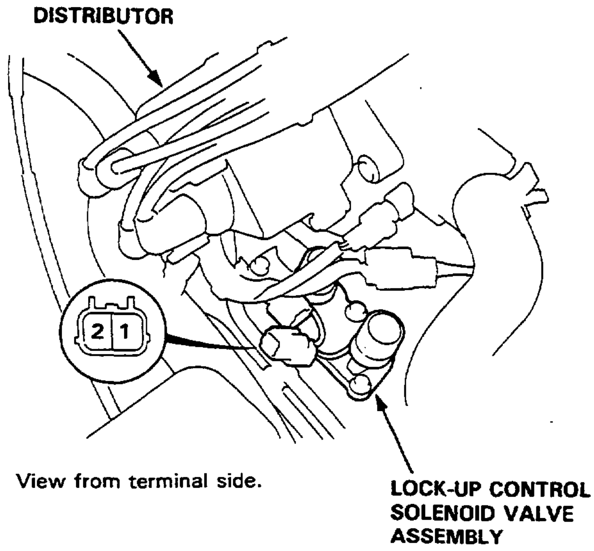
Lock-up Control Solenoid Valve A/B

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: 14.1—15.5 Ω (at 25°C)



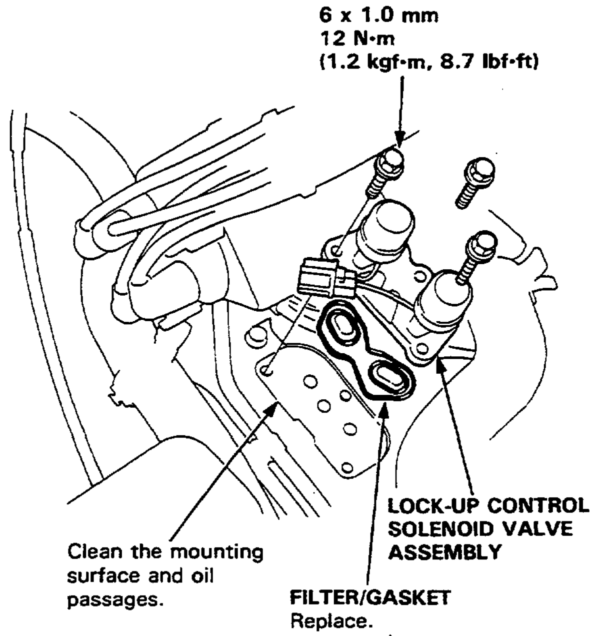
3. Replace the lock-up control solenoid valve assembly if the resistance is out of specification.
4. Connect the No. 1 terminal of the lock-up control solenoid valve connector to the battery positive terminal and body ground. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal and body ground. A clicking sound should be heard.
5. If there is no clicking, check for continuity between the engine control module (ECM) A19 or A17 harness and body ground using the Test Harness: 07LAJ—PT30100 or 07LAJ—PT3010A (see section 11).

   NOTE: Always use the Test Harness (07LAJ—PT30100 or 07LAJ—PT3010A) for checking.
6. Replace the lock-up control solenoid valve assembly if there is continuity between the ECM A19 or A17 harness and body ground.

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.

Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE LIST	Check these items on the NOTES CHART
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, U
No engine braking in [1] position.	12	C, D, L
Slips in 1st gear.	8, 29, 44, 48	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44	C, L, U
Slips in 4th gear.	11, 23, 32	C, L, U
Slips in reverse gear.	11, 32, 34	C
Flares on 1—2 upshift.	3, 15	E, L, V
Flares on 2—3 upshift.	3, 15, 24, 44	E, H, L, V
Flares on 3—4 upshift.	3, 15, 25, 44	E, I, L, 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, 27, 47	E, H, I, L, V
Harsh shift (1—2).	2, 9	C, D, V
Harsh shift (2—3).	2, 10, 23, 24	C, D, H, L, V
Harsh shift (3—4).	2, 11, 23, 25	C, D, I, L, V
Harsh kick-down shifts.	2, 23, 27, 28	L, V, Q
Harsh kick-down shift (2—1).	48	O
Harsh downshift at closed throttle.	15	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 shift 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, 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, 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 control cable too short.
3.	Throttle control cable too long.
4.	Wrong type ATF.
5.	Idle rpm too low/high.
6.	Oil pump worn or binding.
7.	Rgulator valve stuck.
8.	1st clutch defective.
9.	2nd clutch defective.
10.	3rd clutch defective.
11.	4th clutch defective.
12.	1st-hold clutch defective.
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.	2—3 orifice control valve stuck.
25.	2/3-4 orifice control valve stuck.
26.	2nd ON orifice control valve stuck.
27.	4—3 kick-down valve stuck.
28.	4th exhaust valve stuck.
29.	1st accumulator defective.
30.	2nd accumulator defective.
31.	3rd accumulator defective.
32.	4th/reverse 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.	Feedpipe 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)

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	Items on the NOTES CHART
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 shop 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 2—3 orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the 2/3-4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve (CPC) is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment of 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 squeek.
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 feedpipe guide in the right side cover is scored by the mainshaft, 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 bushings for the 1st and 4th feedpipe are loose or damaged. If the 1st feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the right side cover.
O.	A worn or damaged one-way (sprag) clutch is mostly a result of shifting the transmission in $\boxed{D_3}$ or $\boxed{D_4}$ 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 3rd 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 3rd 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 control cable adjustment may clear this problem.
U.	Check if servo separator plate is installed. If it was not installed, the servo valve may have been pushed out by hydraulic pressure causing a leak (internal) affecting all forward gears.
V.	Throttle control 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 pressures which may cause harsh shifts, erratic shifts and torque converter hunting.

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

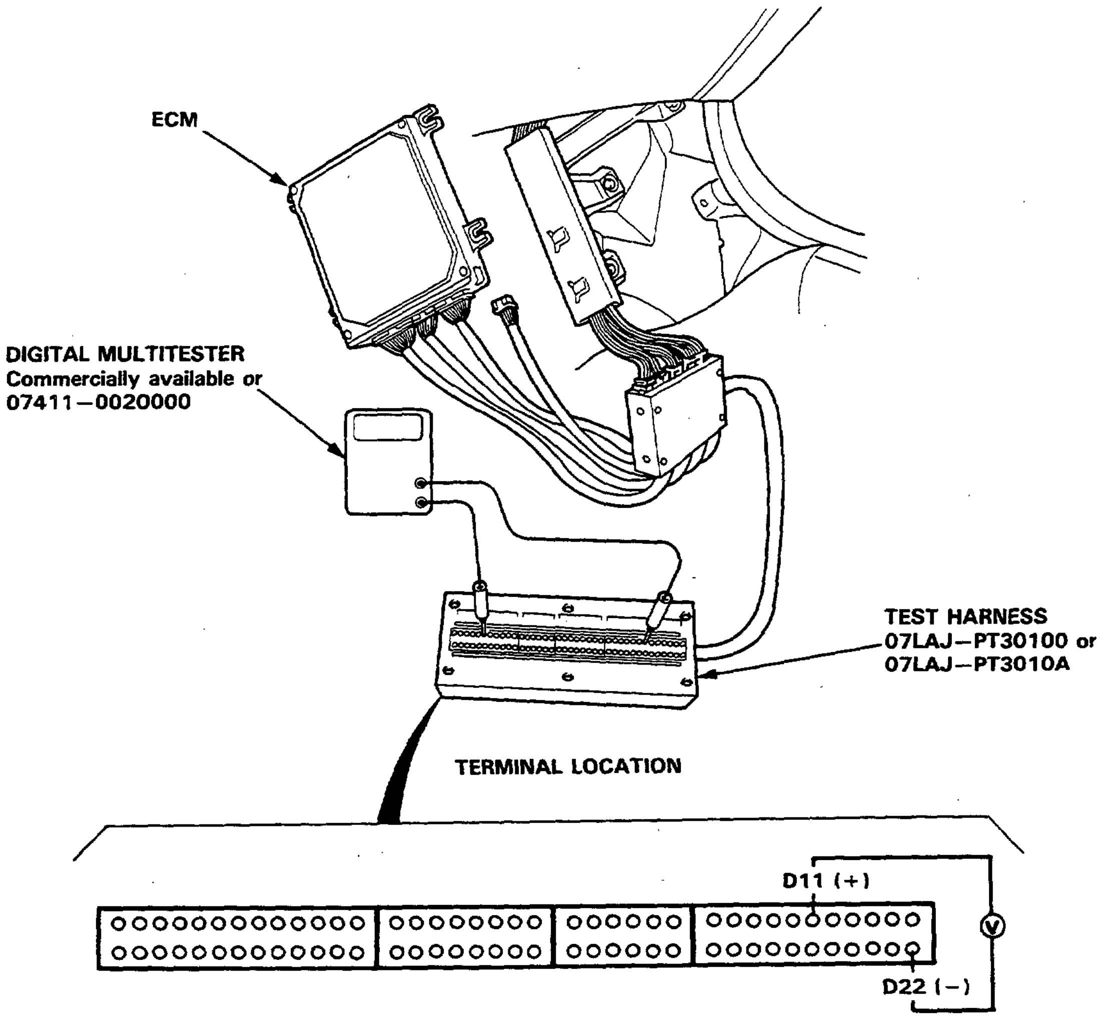
1. Apply parking brake and block the wheels. Start the engine, then move the shift lever to $\boxed{D_4}$ position while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.

2. Repeat same test in $\boxed{D_3}$ position.

3. Shift the shift lever to $\boxed{D_4}$ 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 multitester to check voltage between D11 (+) terminal and D22 (−) terminal for the throttle position sensor.



D14A2 engine: D4 Position

- **Upshift**

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th
Full-closed throttle	mph	15.2 – 19.2	36.7 – 40.7	49.7 – 53.7
	km/h	24.5 – 30.9	59.1 – 65.5	80.0 – 86.4
Throttle position sensor voltage: 1.27 V	mph	21.2 – 25.2	49.8 – 53.8	66.3 – 72.3
	km/h	34.1 – 40.6	80.1 – 86.6	107 – 116
Throttle position sensor voltage: 2.03 V	mph	26.1 – 34.1	60.8 – 72.8	83.4 – 95.4
	km/h	42.0 – 54.9	97.8 – 117	134 – 154
Full-opened throttle	mph	49.8 – 54.3	91.8 – 99.3	143.6 – 154.1
	km/h	80.1 – 87.4	148 – 160	231.1 – 248.0

- **Downshift**

Throttle Opening	Unit of speed	4th → 3rd	3rd → 2nd	2nd → 1st
Full-closed throttle	mph	8.9 – 12.9	28.7 – 32.7	——
	km/h	14 – 20.8	46.2 – 52.6	——
Full-opened throttle	mph	41.1 – 45.6	83.4 – 90.9	121.0 – 131.5
	km/h	66.1 – 73.4	134 – 146	194.8 – 211.6

- **Lock-up**

Throttle Opening	Unit of speed	D4 Position		D3 Position	
		Lock-up ON	Lock-up OFF	Lock-up ON	Lock-up OFF
Full-closed throttle	mph	15 – 17	14 – 16	60 – 64	57 – 61
	km/h	24 – 27	23 –26	97 – 103	92 – 98
Throttle position sensor voltage: 2.03 V	mph	66 – 70	54 – 58	66 – 70	57 – 61
	km/h	107 – 113	87 – 93	107 – 113	92 – 98
Full-opened throttle	mph	88 – 91	85 – 88	82 – 86	78 – 82
	km/h	141 – 147	136 – 142	132 – 138	126 – 132

(cont'd)

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D16Y3 engine: [D4] Position

- **Upshift**

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th
Full-closed throttle	mph	14.9 – 18.9	36.1 – 40.1	48.9 – 52.9
	km/h	24.0 – 30.4	58.1 – 64.5	78.7 – 85.1
Throttle position sensor voltage: 1.27 V	mph	19.9 – 23.9	47.7 – 51.7	62.0 – 68.0
	km/h	32.0 – 38.5	76.8 – 83.2	99.8 – 109
Throttle position sensor voltage: 2.03 V	mph	25.1 – 33.1	60.1 – 72.1	79.3 – 91.3
	km/h	40.4 – 53.3	96.7 – 116	128 – 147
Full-opened throttle	mph	53.1 – 57.6	99.8 – 107.3	146.3 – 156.8
	km/h	85.5 – 92.7	161 – 172.7	235.4 – 252.3

- **Downshift**

Throttle Opening	Unit of speed	4th → 3rd	3rd → 2nd	2nd → 1st
Full-closed throttle	mph	8.7 – 12.7	28.3 – 32.3	——
	km/h	14 – 20.4	45.5 – 52.0	——
Full-opened throttle	mph	35.5 – 40.0	89.8 – 97.3	124.8 – 135.3
	km/h	57.1 – 64.4	145 – 157	200.8 – 217.7

- **Lock-up**

Throttle Opening	Unit of speed	[D4] Position		[D3] Position	
		Lock-up ON	Lock-up OFF	Lock-up ON	Lock-up OFF
Full-closed throttle	mph	15 – 17	14 – 16	60 – 64	57 – 61
	km/h	24 –27	23 –26	97 – 103	92 – 98
Throttle position sensor voltage: 2.03 V	mph	66 – 70	54 – 58	66 – 70	57 – 61
	km/h	107 – 113	87 – 93	107 – 113	92 – 98
Full-opened throttle	mph	88 – 91	84 – 88	82 – 86	78 – 81
	km/h	141 – 147	135 – 141	132 – 138	125 – 131

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 shift lever 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 shift lever 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 the parking brake and block all four wheels.

2. Connect the 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 cooling 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 [1], [D4] 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:
   Specification: 2,600 rpm (min^{-1})
   Service Limit: 2,400–2,800 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 [1] position	• Slippage of 1st clutch, 1st-hold clutch or 1st gear one-way clutch
Stall rpm high in [2] position	• Slippage of 2nd clutch.
Stall rpm high in [D4] position	• Slippage of 1st clutch, 1st gear one-way clutch
Stall rpm high in [R] position	• Slippage of 4th clutch
Stall rpm low in [D4], [2], [1] and [R] positions	• Engine output low • Torque converter one-way clutch slipping

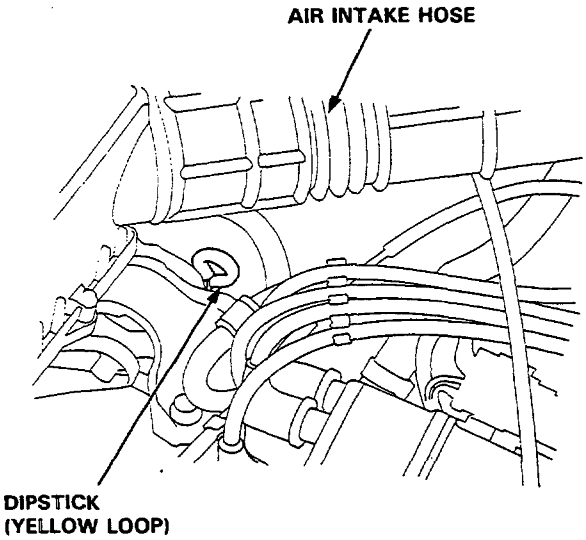
Fluid Level

Checking/Changing

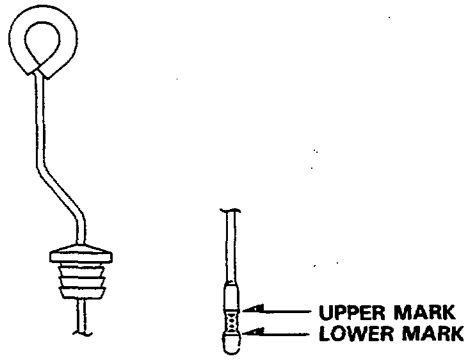
Checking

NOTE: Check the fluid level with the engine at normal operating temperature (the cooling fan comes on).

1. Park the car on level ground. Shut 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.

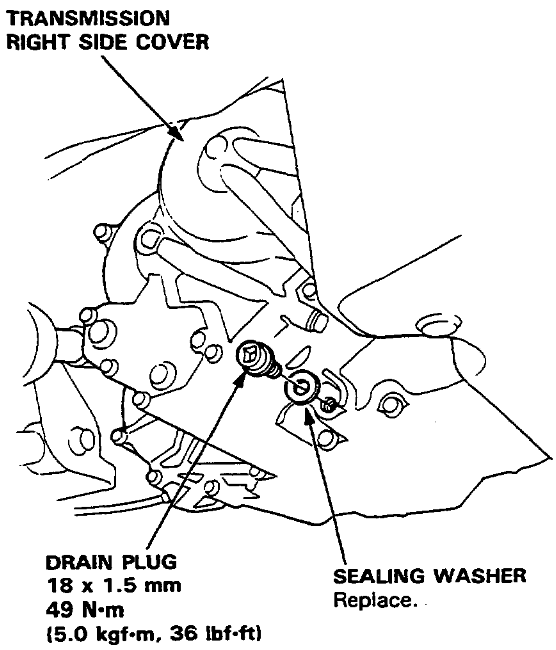


5. If the level is below the lower mark, add fluid into the tube to bring it to the upper mark. Use Honda Premium Formula Automatic Transmission Fluid or an equivalent DEXRON® II Automatic Transmission Fluid (ATF) only.
6. Insert the dipstick back in the transmission.

Changing

1. Bring the transmission up to operating temperature by driving the car. Park the car on level ground, turn the engine off, then remove drain plug.
2. Reinstall the drain plug with a new washer, then refill the transmission to the upper mark on the dipstick.

Automatic Transmission Fluid Capacity:
2.7 ℓ (2.8 US qt., 2.4 Imp qt.) at change
5.9 ℓ (6.2 US qt., 5.2 Imp qt.) after overhaul



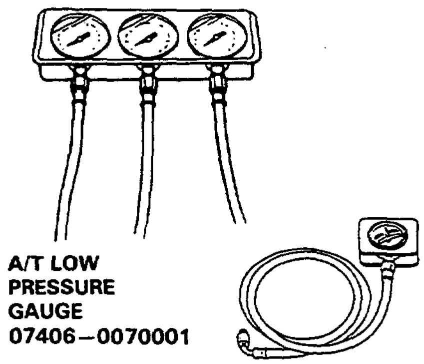
⚠WARNING
- **While testing, be careful of the rotating front wheels.**
- **Make sure lifts, jacks, and safety stands are placed properly (see section 1).**

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(s).

   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.



4. Start the engine and measure the respective pressure as follows.
   - Line Pressure
   - Clutch Pressure
   - Throttle A/Throttle B Pressure
   - Governor 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.

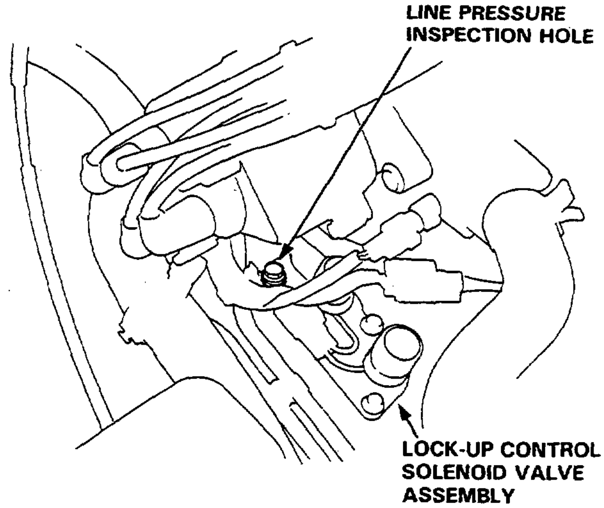
- **Line Pressure**

–1. Set the parking brake and block both rear wheels securely.

–2. Run the engine at 2,000 rpm (min^{-1}).

–3. Shift the shift lever to [N] or [P] position.

–4. Measure line pressure.



PRESSURE	SHIFT LEVER 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	D14A2 Engine	780–830 kPa (8.0–8.5 kgf/cm² 110–120 psi)	740 kPa (7.5 kgf/cm² 110 psi)
				D16Y3 Engine	830–880 kPa (8.5–9.0 kgf/cm² 120–130 psi)	780 kPa (8.0 kgf/cm² 110 psi)

NOTE: Higher pressures may be indicated if measurements are made in shift lever positions other than [N] or [P] position.

(cont'd)

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- **Clutch Pressure Measurement**

⚠WARNING While testing, be careful of the rotating front wheels.

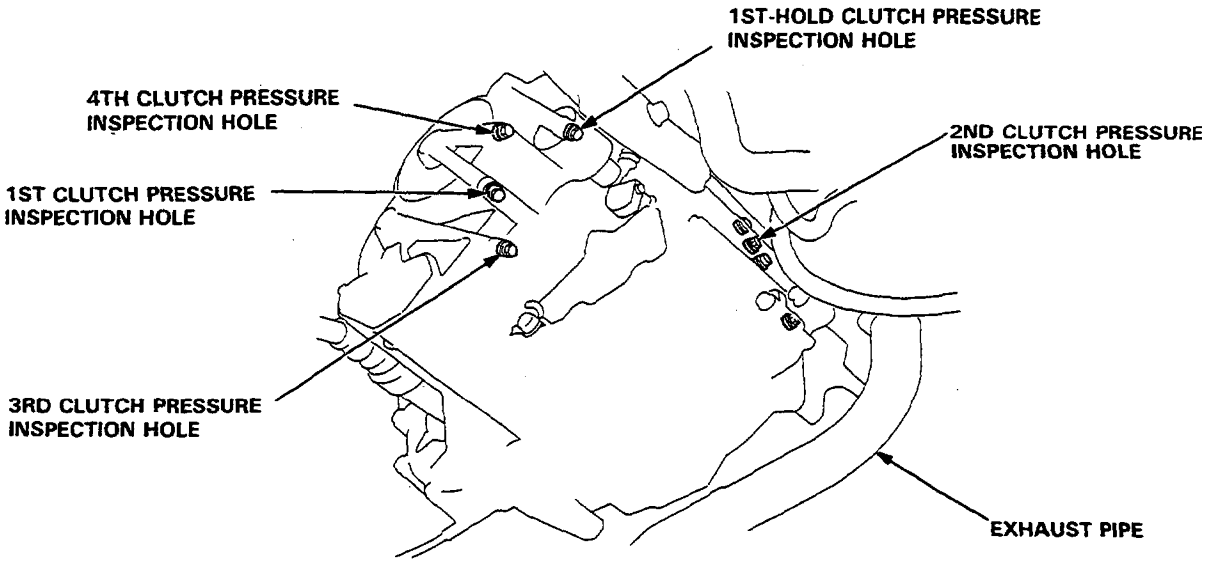
–1. Set the parking brake and block both rear wheels securely.

–2. Raise the front of the car and support them 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.



D14A2 Engine

PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st Clutch	[1] or [D4]	No or low 1st pressure	1st Clutch	780—830 kPa (8.0—8.5 kgf/cm², 110—120 psi)	740 kPa (7.5 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	390 kPa (4.0 kgf/cm², 57 psi) throttle control drum fully closed 780—830 kPa (8.0—8.5 kgf/cm², 110—120 psi) throttle control drum more than 1/8 opened	340 kPa (3.5 kgf/cm², 50 psi) throttle control drum fully closed 740 kPa (7.5 kgf/cm², 110 psi) throttle control drum more than 1/8 opened
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		
	[R]		Servo Valve or 4th Clutch	780—830 kPa (8.0—8.5 kgf/cm², 110—120 psi)	740 kPa (7.5 kgf/cm², 110 psi)

D16Y3 Engine

PRESSURE	SHIFT LEVER 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	390 kPa (4.0 kgf/cm², 57 psi) throttle control drum fully closed 830—880 kPa (8.5—9.0 kgf/cm², 120—130 psi) throttle control drum more than 1/8 opened	340 kPa (3.5 kgf/cm², 50 psi) throttle control drum fully closed 780 kPa (8.0 kgf/cm², 110 psi) throttle control drum more than 1/8 opened
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		
	[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)

- **Throttle A/Throttle B Pressure Measurement**

WARNING While testing, be careful of the rotating front wheels.

–1. Allow the front wheels to rotate freely.

–2. Remove the cable end of the throttle control cable from the throttle control drum.

NOTE: Do not loosen the locknuts, simply unhook the cable end.

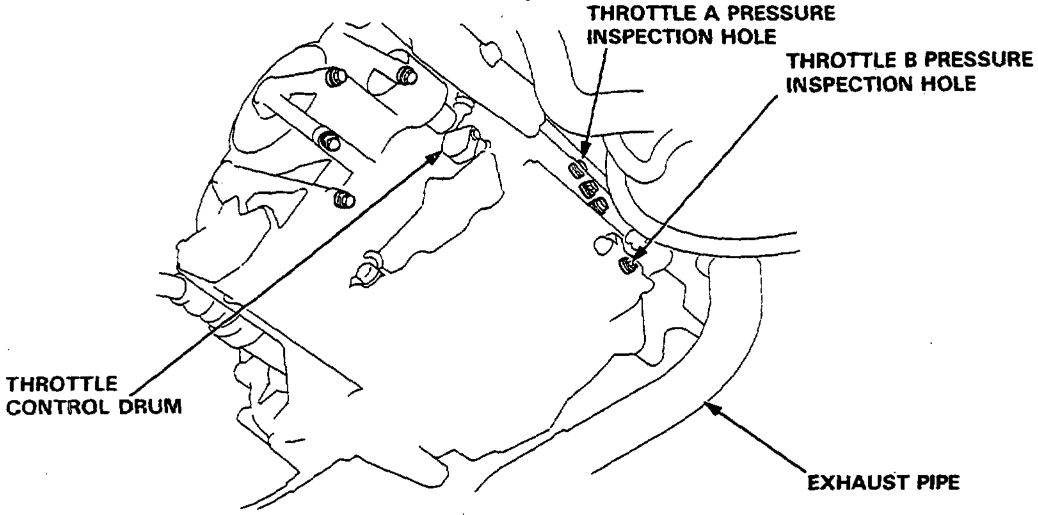
–3. Shift to $\boxed{D_4}$ or $\boxed{D_3}$ position.

–4. Run the engine at 1,000 rpm (min^{-1}).

–5. Measure full-closed throttle A/B pressure.

–6. Move the throttle control drum to full-opened throttle position.

–7. Measure full-opened throttle A/B pressure.



PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE		
				Standard		Service Limit
Throttle A	$\boxed{D_4}$ or $\boxed{D_3}$	Pressure too high	Throttle valve A Modulator Valve	0–15 kPa (0–0.15 kgf/cm², 0–2.1 psi) throttle control drum fully closed		—
		No or low Throttle A pressure		D14A2 Engine	456–470 kPa (4.65–4.8 kgf/cm², 66.1–68 psi) throttle control drum fully opened	450 kPa (4.6 kgf/cm², 65psi) throttle control drum fully opened
				D16Y3 Engine	476–490 kPa (4.85–5.0 kgf/cm², 69.0–70 psi) throttle control drum fully opened	470 kPa (4.8 kgf/cm², 68 psi) throttle control drum fully opened
Throttle B	$\boxed{D_4}$ or $\boxed{D_3}$	Pressure too high	Throttle Valve B	0–15 kPa (0–0.15 kgf/cm², 0–2.1 psi) throttle control drum fully closed		—
		No or low Throttle B pressure		D14A2 Engine	780–830 kPa (8.0–8.5 kgf/cm², 110–120 psi) throttle control drum fully opened	740 kPa (7.5 kgf/cm², 110 psi) throttle control drum fully opened
				D16Y3 Engine	830–880 kPa (8.5–9.0 kgf/cm², 120–130 psi) throttle control drum fully opened	780 kPa (8.0 kgf/cm², 110 psi) throttle control drum fully opened

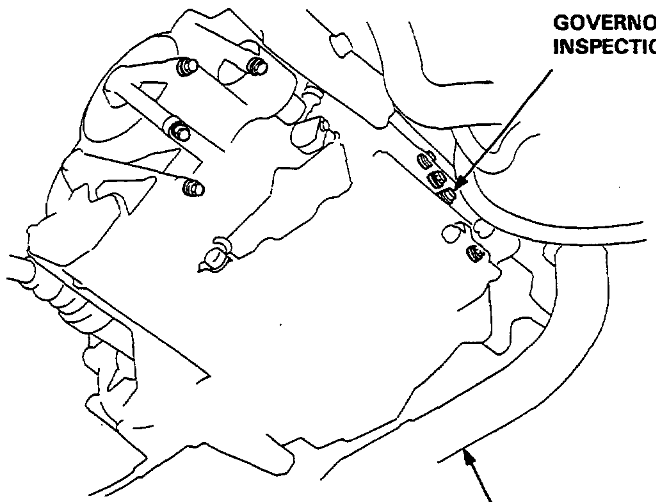
- **Governor Pressure Measurement**

⚠WARNING While testing, be careful of the rotating front wheels.

—1. Allow the front wheels to rotate freely.

—2. Run the vehicle at 38 mph (60 km/h).

—3. Measure the governor pressure.



PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE		
					Standard	Service Limit
Governor	[D4] or [D3]	No or low governor pressure	Governor Valve	D14A2 Engine	180—190 kPa (1.84—1.94 kgf/cm², 26.2—27.6 psi)	176 kPa (1.79 kgf/cm², 25.5 psi)
				D16Y3 Engine	179—189 kPa (1.83—1.93 kgf/cm², 26.0—27.4 psi)	175 kPa (1.78 kgf/cm², 25.3 psi)

Removal

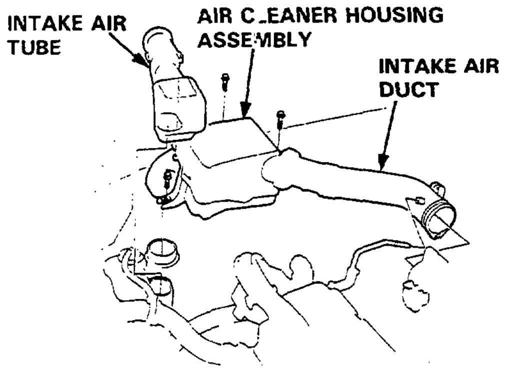
⚠ WARNING

- **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.**

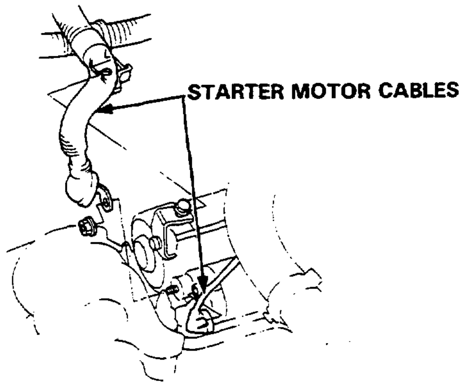
CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative (−) cable first, then the positive (+) cable from the battery.

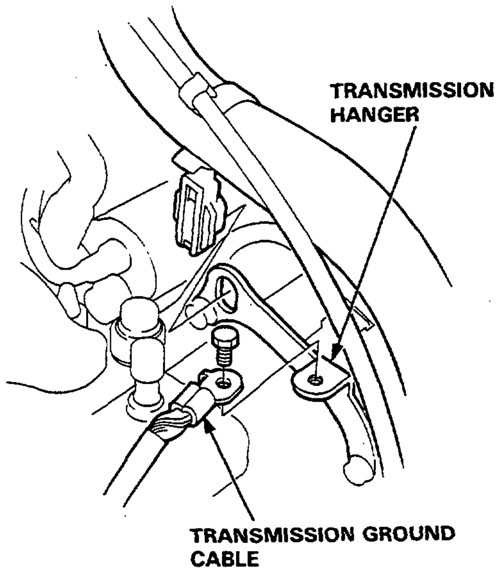
2. Remove the intake air tube, intake air duct and air cleaner housing assembly.



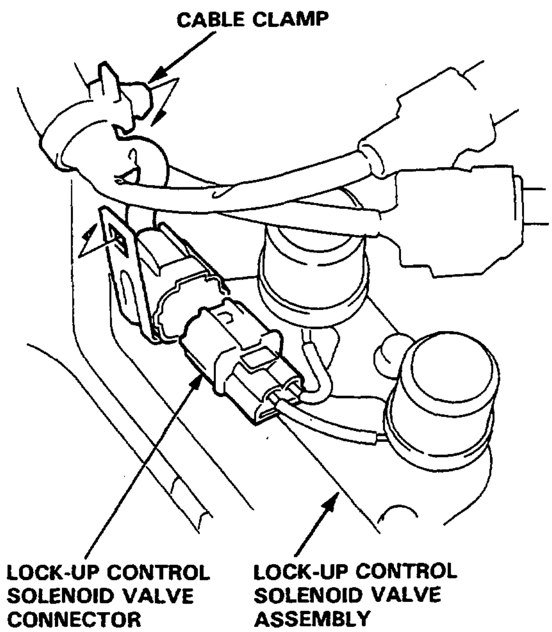
3. Remove the starter motor cables and cable holder from the starter motor.



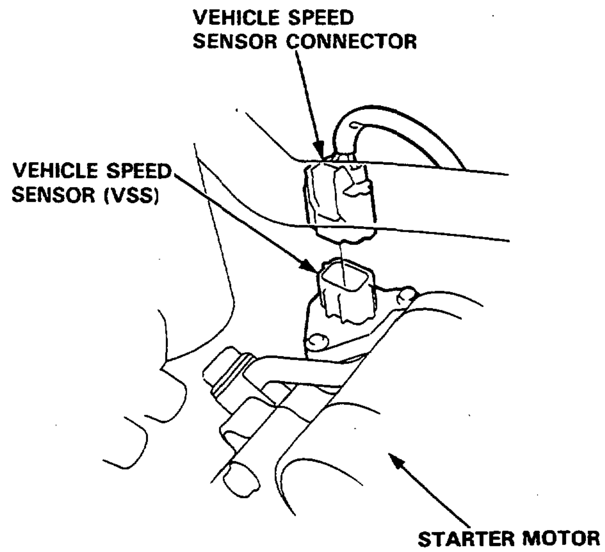
4. Remove the transmission ground cable from the transmission hanger.



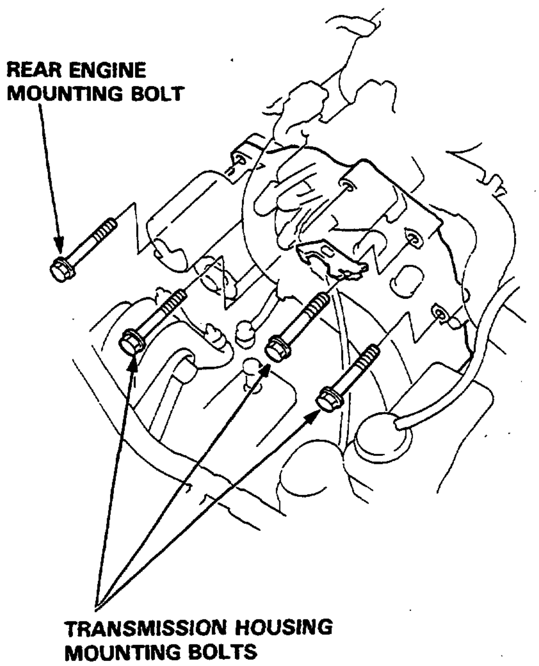
5. Disconnect the lock-up control solenoid valve connector.



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



7. Remove the transmission housing mounting bolts and rear engine mounting bolt.

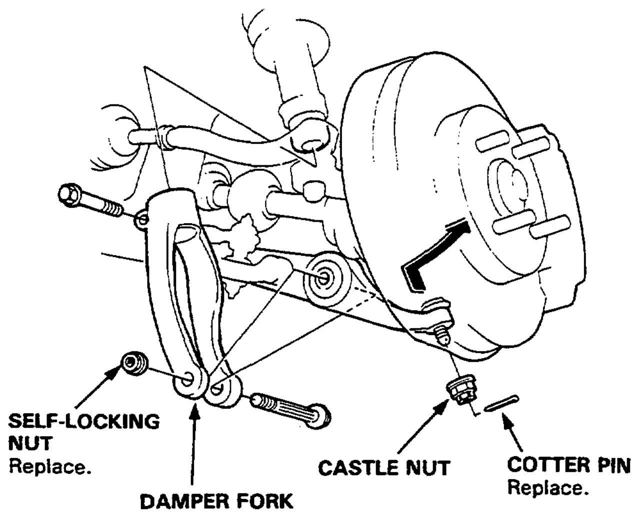


8. Remove the drain plug and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer (see page 14-52).

9. Remove the cotter pins and castle nuts, then separate the ball joints from the lower arm (see Section 18).

10. Remove the damper fork bolts, then separate the damper forks and lower arms.

11. Remove the right damper pinch bolt, then separate the damper fork and damper.

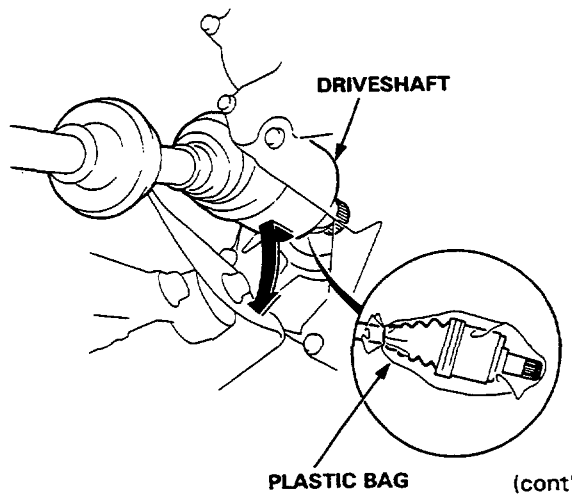


12. Pry the right and left driveshafts out of the differential.

13. Pull on the inboard joint and remove the right and left driveshafts (see Section 16).

14. Tie plastic bags over the driveshaft ends.

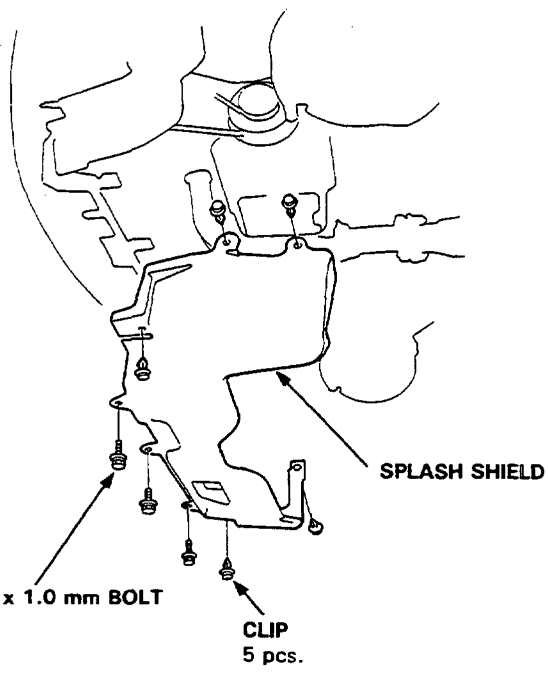
NOTE: Coat all precision finished surfaces with clean engine oil.



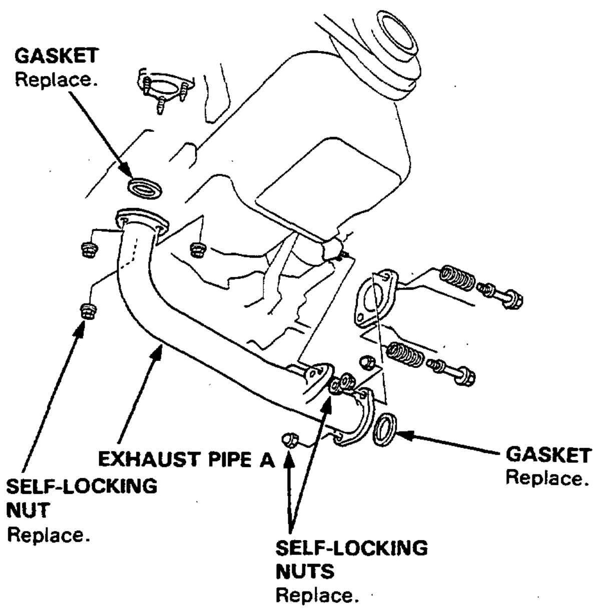
(cont'd)

Removal (cont'd)

15. Remove the splash shield.

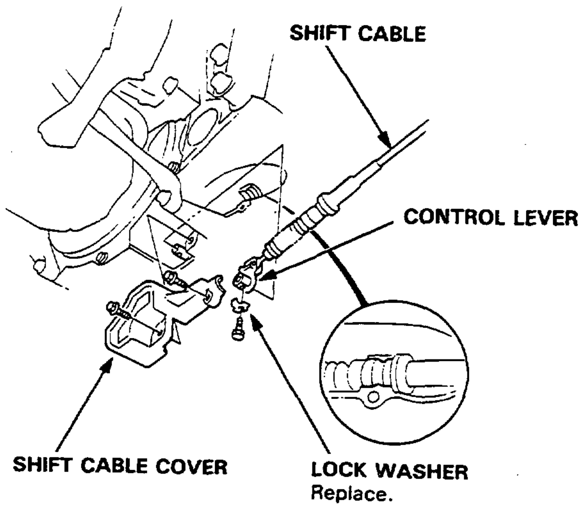


16. Remove the exhaust pipe A.



17. Remove the shift cable cover, then remove the shift cable by removing the control lever.

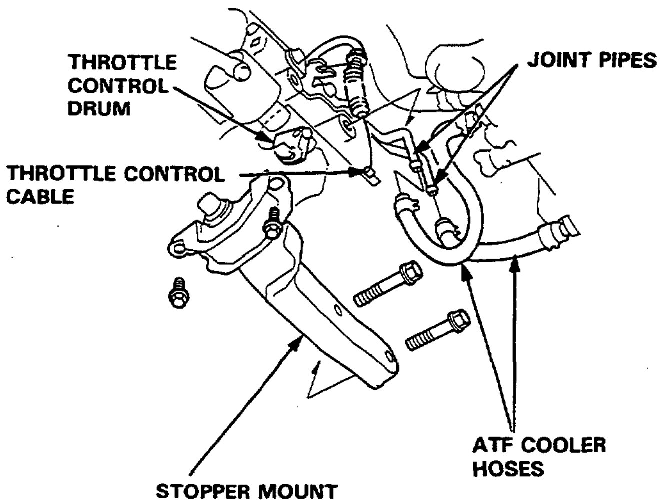
CAUTION: Take care not to bend the shift cable while removing it.



18. Remove the stopper mount, then remove the end of the throttle control cable from the throttle control drum.

19. Remove the ATF cooler hoses at the joint pipes. Turn the ends of the cooler hoses up to prevent ATF from flowing out, then plug the joint pipes.

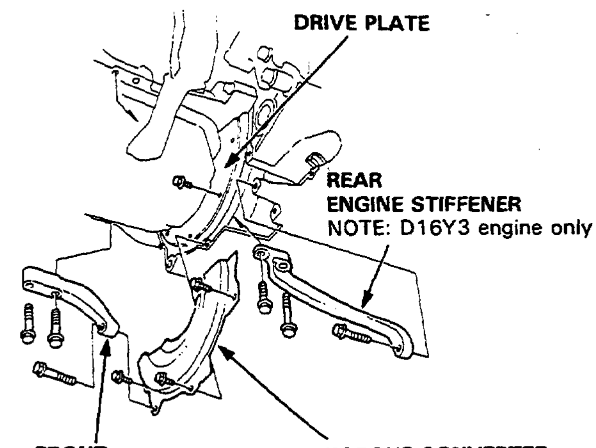
NOTE: Check for any signs of leakage at the hose joints.



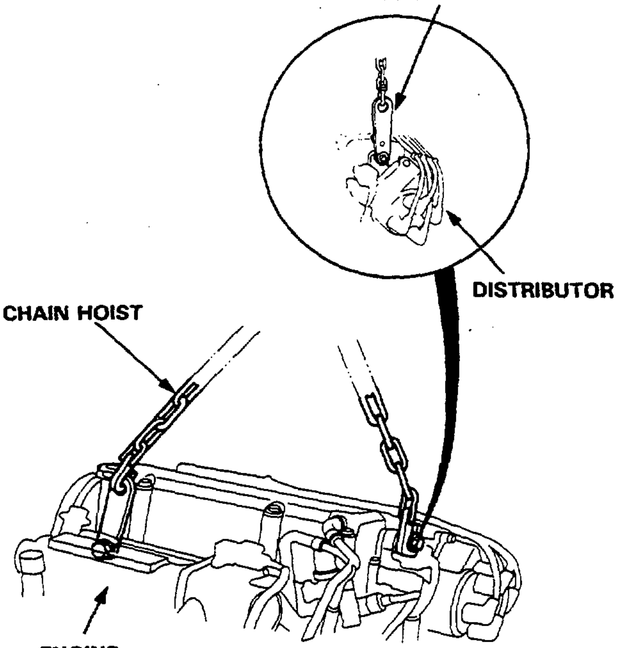
20. Remove the engine stiffeners and torque converter cover.

NOTE: Only the D16Y3 engine uses a rear engine stiffener.

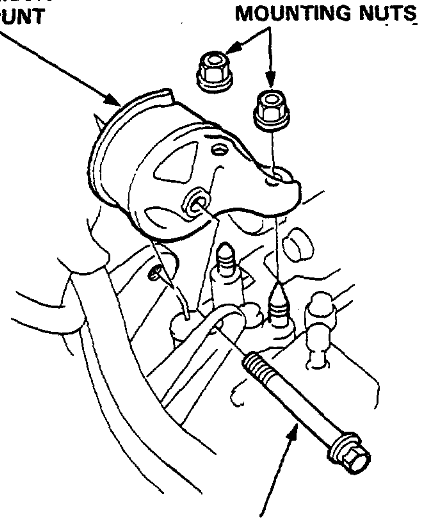
21. Remove the eight drive plate bolts one at a time while rotating the crankshaft pulley.



22. Attach a hoisting bracket to the engine using the distributor mounting bolt, then lift the engine slightly.

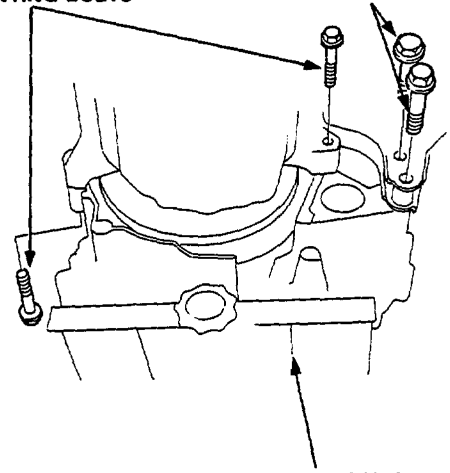


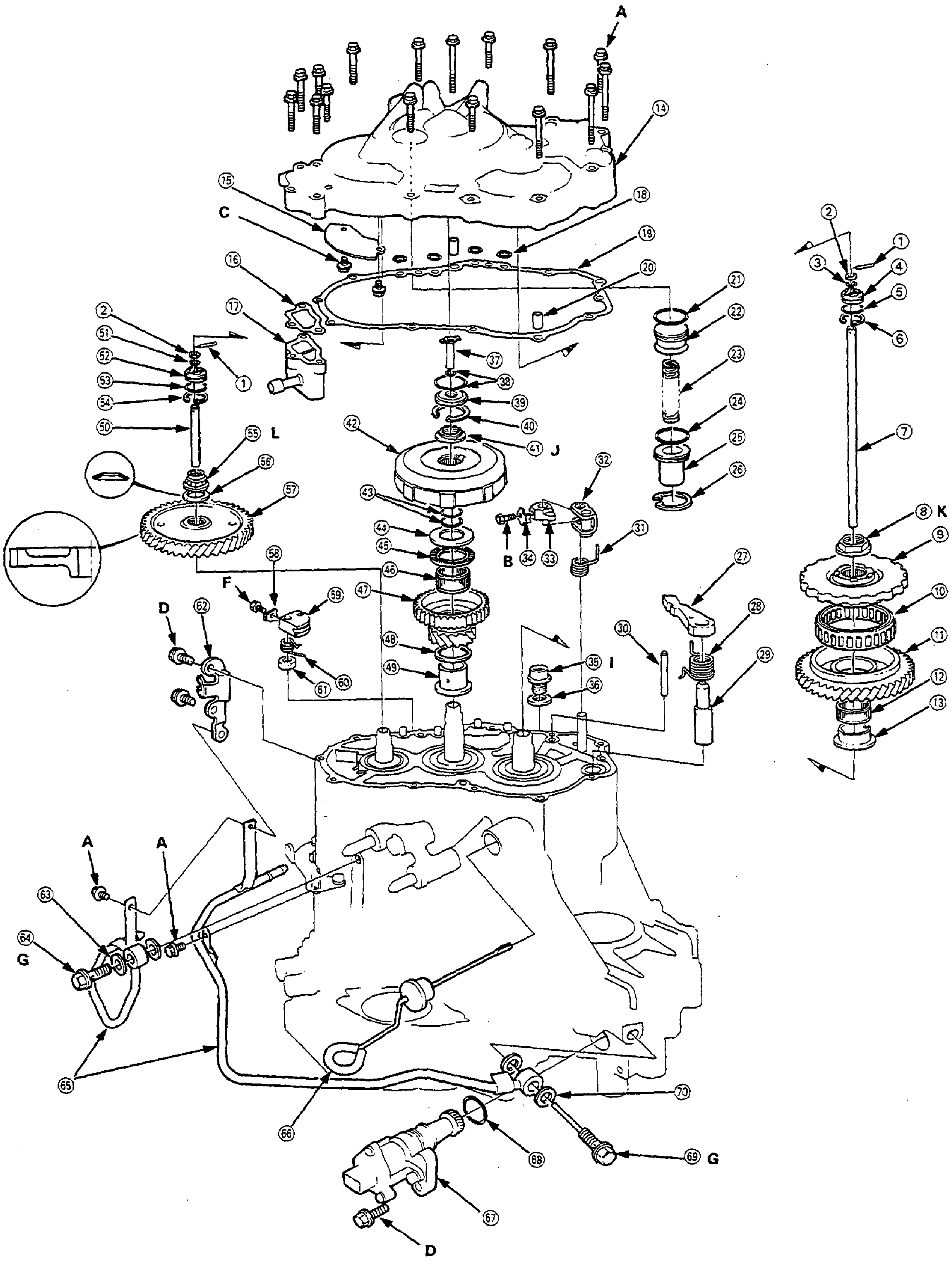
23. Place a jack under the transmission and raise the transmission just enough to take weight off of the mounts, then remove the transmission side mount.



24. Remove the transmission housing mounting bolts and rear engine mounting bolts.

25. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.



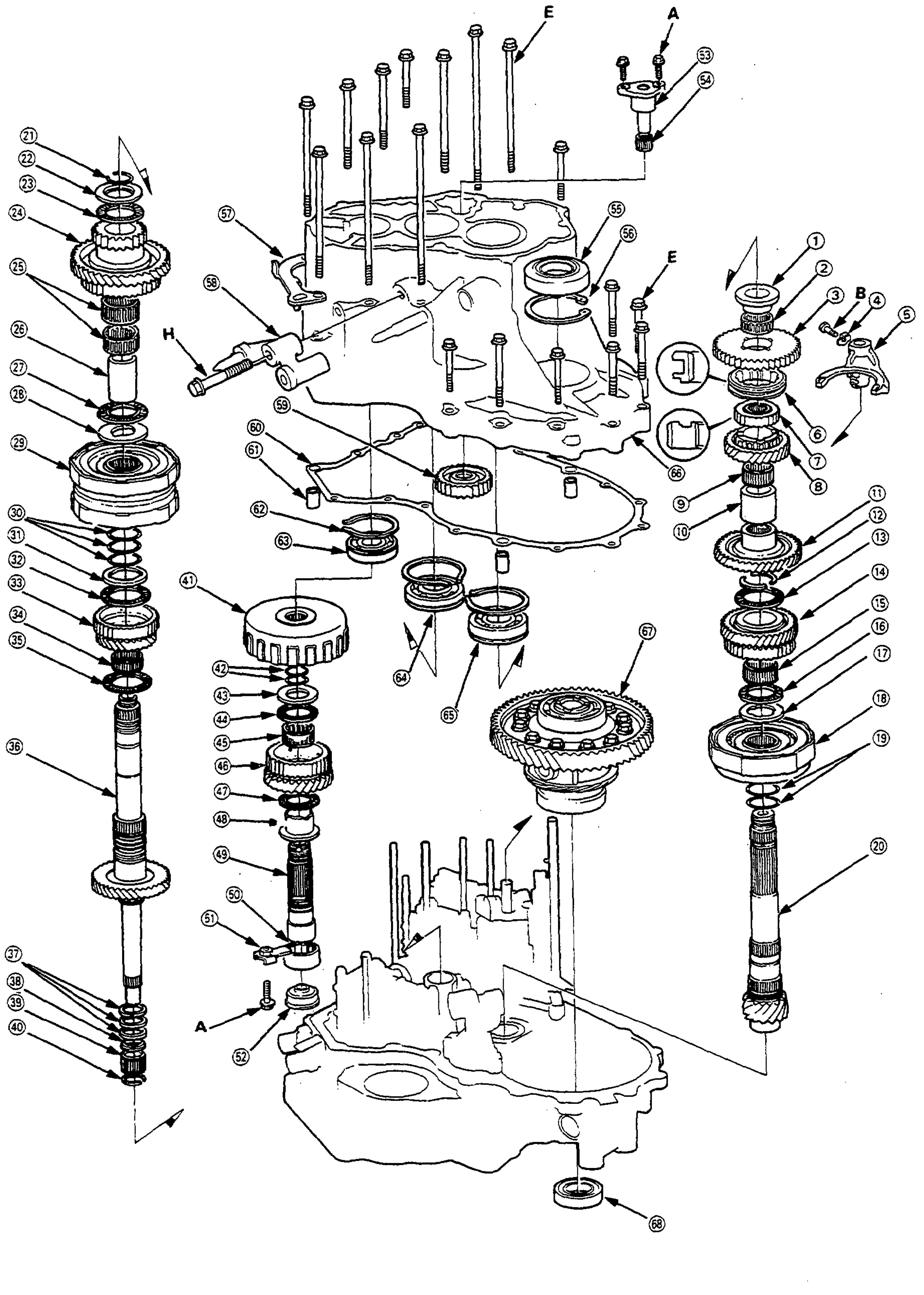


A
B
C
D
F
G
I
J
K
L

1. **ROLLER**
2. **COLLAR**
3. **O-RING** Replace.
4. **FEED PIPE FLANGE**
5. **O-RING** Replace.
6. **SNAP RING**
7. **3RD CLUTCH FEED PIPE**
8. **COUNTERSHAFT LOCKNUT (FLANGE NUT)** Replace.
9. **PARKING GEAR**
10. **ONE-WAY CLUTCH ASSEMBLY**
11. **COUNTERSHAFT 1ST GEAR**
12. **NEEDLE BEARING**
13. **COUNTERSHAFT 1ST GEAR COLLAR**
14. **RIGHT SIDE COVER**
15. **BREATHER COVER**
16. **BREATHER CHAMBER GASKET** Replace.
17. **BREATHER CHAMBER**
18. **O-RINGS** Replace.
19. **RIGHT SIDE COVER GASKET** Replace.
20. **DOWEL PINS**
21. **O-RING** Replace.
22. **1ST-HOLD ACCUMULATOR PISTON**
23. **1ST-HOLD ACCUMULATOR SPRING**
24. **O-RING** Replace.
25. **1ST-HOLD ACCUMULATOR COVER**
26. **SNAP RING**
27. **PARKING BRAKE PAWL**
28. **PARKING BRAKE PAWL SPRING**
29. **PARKING BRAKE PAWL SHAFT**
30. **PARKING BRAKE PAWL STOPPER**
31. **PARKING BRAKE LEVER SPRING**
32. **PARKING BRAKE LEVER**
33. **PARKING BRAKE STOPPER** Selective part
34. **LOCK WASHER** Replace.
35. **DRAIN PLUG**
36. **SEALING WASHER** Replace.
37. **1ST CLUTCH FEED PIPE**
38. **O-RINGS** Replace.
39. **FEED PIPE GUIDE**
40. **SNAP RING**
41. **MAINSHAFT LOCKNUT (FLANGE NUT)** Replace.
42. **1ST CLUTCH ASSEMBLY**
43. **O-RINGS** Replace.
44. **THRUST WASHER**
45. **THRUST NEEDLE BEARING**
46. **NEEDLE BEARING**
47. **MAINSHAFT 1ST GEAR**
48. **THRUST WASHER**
49. **MAINSHAFT 1ST GEAR COLLAR**
50. **1ST-HOLD CLUTCH FEED PIPE**
51. **O-RING** Replace.
52. **FEED PIPE GUIDE**
53. **O-RING** Replace.
54. **SNAP RING**
55. **SUB-SHAFT LOCKNUT (FLANGE NUT)** Replace.
56. **CONICAL SPRING WASHER** Replace.
57. **SUB-SHAFT 1ST GEAR**
58. **LOCK WASHER** Replace.
59. **THROTTLE CONTROL DRUM**
60. **THROTTLE CONTROL DRUM SPRING**
61. **OIL SEAL** Replace.
62. **THROTTLE CONTROL CABLE HOLDER**
63. **SEALING WASHERS** Replace.
64. **ATF COOLER PIPE JOINT BOLT**
65. **ATF COOLER PIPES**
66. **ATF DIPSTICK**
67. **VEHICLE SPEED SENSOR**
68. **O-RING** Replace.
69. **ATF COOLER PIPE JOINT BOLT**
70. **SEALING WASHERS** 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	Special bolt
C	11 N•m (1.1 kgf•m, 8 lbf•ft)	6 x 1.0 mm	
D	22 N•m (2.2 kgf•m, 16 lbf•ft)	8 x 1.25 mm	
F	8 N•m (0.8 kgf•m, 6 lbf•ft)	5 x 0.8 mm	
G	28 N•m (2.9 kgf•m, 21 lbf•ft)	12 x 1.25 mm	ATF cooler pipe joint bolt
I	49 N•m (5.0 kgf•m, 36 lbf•ft)	18 x 1.5 mm	Drain plug
J	93 N•m (9.5 kgf•m, 69 lbf•ft)	19 x 1.25 mm	Mainshaft locknut (flange nut): Left-hand threads
K	137→0→137 N•m (14.0→0→14.0 kgf•m, 101→0→101 lbf•ft)	23 x 1.25 mm	Countershaft locknut (flange nut)
L	93 N•m (9.5 kgf•m, 69 lbf•ft)	19 x 1.25 mm	Sub-shaft locknut (flange nut)

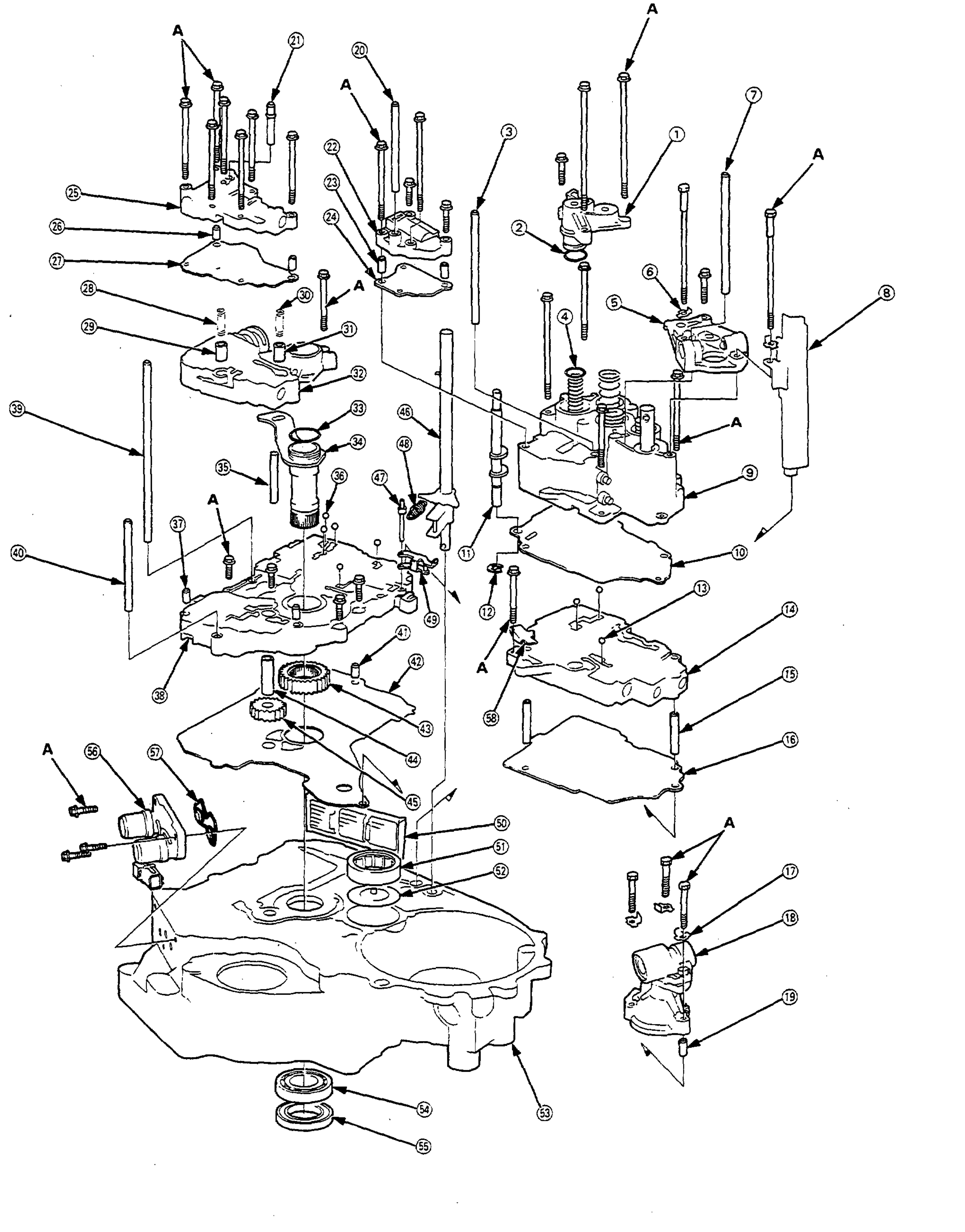

E
A
H
B
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68

1. **COUNTERSHAFT REVERSE GEAR COLLAR**
2. **NEEDLE BEARING**
3. **COUNTERSHAFT REVERSE GEAR**
4. **LOCK WASHER** Replace.
5. **REVERSE SHIFT FORK**
6. **REVERSE SELECTOR**
7. **REVERSE SELECTOR HUB**
8. **COUNTERSHAFT 4TH GEAR**
9. **NEEDLE BEARING**
10. **DISTANCE COLLAR, 28 mm** Selective part
11. **COUNTERSHAFT 2ND GEAR**
12. **COTTERS**
13. **THRUST NEEDLE BEARING**
14. **COUNTERSHAFT 3RD GEAR**
15. **NEEDLE BEARING**
16. **THRUST NEEDLE BEARING**
17. **SPLINED WASHER** Selective part
18. **3RD CLUTCH ASSEMBLY**
19. **O-RINGS** Replace.
20. **COUNTERSHAFT**
21. **SNAP RING**
22. **THRUST WASHER**
23. **THRUST NEEDLE BEARING**
24. **MAINSHAFT 4TH/REVERSE GEAR**
25. **NEEDLE BEARINGS**
26. **4TH/REVERSE GEAR COLLAR**
27. **THRUST NEEDLE BEARING**
28. **THRUST WASHER**
29. **2ND/4TH CLUTCH ASSEMBLY**
30. **O-RINGS** Replace.
31. **THRUST WASHER, 36.5 x 51 mm** Selective part
32. **THRUST NEEDLE BEARING**
33. **MAINSHAFT 2ND GEAR**
34. **NEEDLE BEARING**
35. **THRUST NEEDLE BEARING**
36. **MAINSHAFT**
37. **SEALING RINGS, 35 mm**
38. **SEALING RING, 29 mm**
39. **NEEDLE BEARING**
40. **SET RING**
41. **1ST-HOLD CLUTCH ASSEMBLY**
42. **O-RINGS** Replace.
43. **THRUST WASHER**
44. **THRUST NEEDLE BEARING**
45. **NEEDLE BEARING**
46. **SUB-SHAFT 4TH GEAR**
47. **THRUST NEEDLE BEARING**
48. **SUB-SHAFT 4TH GEAR COLLAR**
49. **SUB-SHAFT**
50. **NEEDLE BEARING**
51. **NEEDLE BEARING STOPPER**
52. **OIL GUIDE CAP** Replace.
53. **REVERSE IDLER GEAR SHAFT/HOLDER**
54. **NEEDLE BEARING**
55. **OIL SEAL** Replace.
56. **SET RING, 80 mm** Selective part
57. **TRANSMISSION HANGER**
58. **TRANSMISSION MOUNT BRACKET**
59. **REVERSE IDLER GEAR**
60. **TRANSMISSION HOUSING GASKET** Replace.
61. **DOWEL PIN**
62. **SNAP RINGS**
63. **TRANSMISSION HOUSING SUB-SHAFT BEARING**
64. **TRANSMISSION HOUSING MAINSHAFT BEARING**
65. **TRANSMISSION HOUSING COUNTERSHAFT BEARING**
66. **TRANSMISSION HOUSING**
67. **DIFFERENTIAL ASSEMBLY**
68. **OIL SEAL** 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	Special bolt
E	33 N•m (3.4 kgf•m, 25 lbf•ft)	8 x 1.25 mm	
H	49 N•m (5.0 kgf•m, 36 lbf•ft)	12 x 1.25 mm	

Torque Converter Housing/Valve Body



1. ACCUMULATOR COVER
2. O-RING Replace.
3. OIL FEED PIPE
4. O-RING Replace.
5. LOCK WASHERS Replace.
6. DETENT BASE
7. OIL FEED PIPE
8. BAFFLE PLATE
9. SERVO BODY
10. SERVO SEPARATOR PLATE
11. THROTTLE CONTROL SHAFT
12. E-RING
13. CHECK BALLS
14. SECONDARY VALVE BODY
15. DOWEL PINS
16. SECONDARY SEPARATOR PLATE
17. LOCK WASHERS Replace.
18. GOVERNOR BODY
19. DOWEL PIN
20. OIL FEED PIPE
21. OIL FEED PIPE
22. MODULATOR VALVE BODY
23. DOWEL PINS
24. MODULATOR SEPARATOR PLATE
25. LOCK-UP VALVE BODY
26. DOWEL PINS
27. LOCK-UP SEPARATOR PLATE
28. COOLER CHECK VALVE SPRING
29. COOLER CHECK VALVE
30. TORQUE CONVERTER CHECK VALVE SPRING
31. TORQUE CONVERTER CHECK VALVE
32. REGULATOR VALVE BODY
33. O-RING Replace.
34. STATOR SHAFT
35. STOPPER SHAFT
36. CHECK BALLS
37. DOWEL PINS
38. MAIN VALVE BODY
39. OIL FEED PIPE
40. OIL FEED PIPE
41. DOWEL PIN
42. MAIN SEPARATOR PLATE
43. OIL PUMP DRIVE GEAR
44. OIL PUMP DRIVEN GEAR SHAFT
45. OIL PUMP DRIVEN GEAR
46. CONTROL SHAFT
47. DETENT ARM SHAFT
48. DETENT SPRING
49. DETENT ARM
50. ATF STRAINER
51. TORQUE CONVERTER HOUSING COUNTERSHAFT NEEDLE BEARING
52. OIL GUIDE PLATE
53. TORQUE CONVERTER HOUSING
54. TORQUE CONVERTER HOUSING MAINSHAFT BALL BEARING
55. OIL SEAL Replace.
56. LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY
57. LOCK-UP CONTROL SOLENOID FILTER/GASKET Replace.
58. STOPPER SHAFT STAY

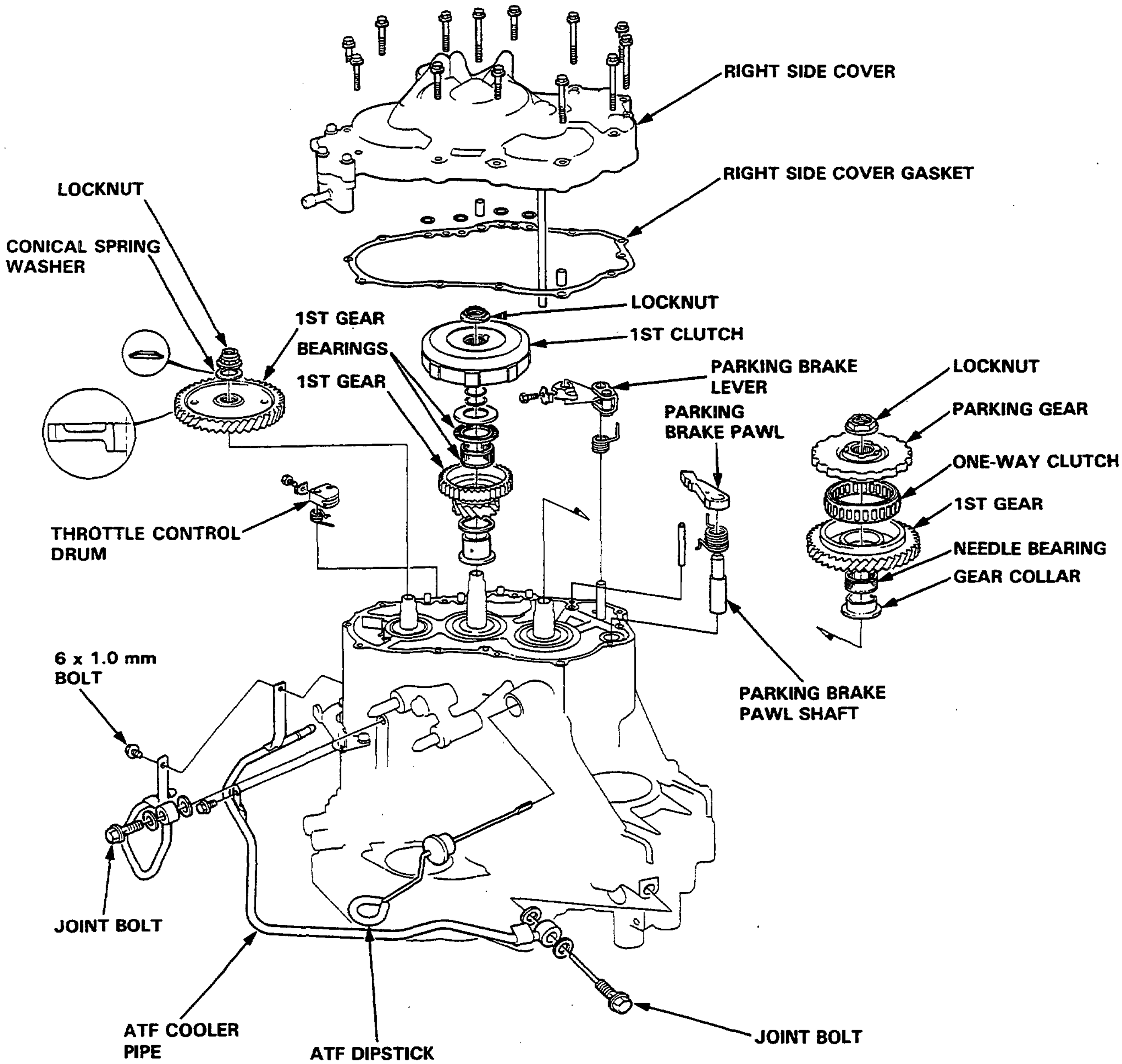
TORQUE SPECIFICATIONS

Ref. No.	Torque Value	Bolt Size	Remarks
A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	

Right Side Cover

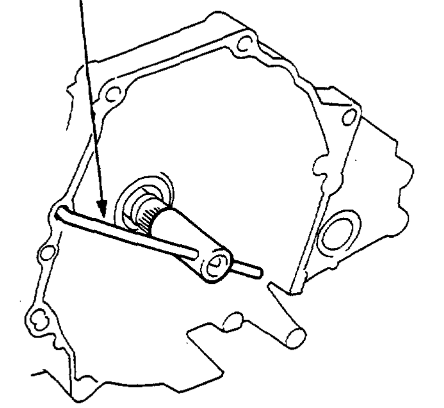
Removal

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
  - O-rings
  - Each shaft locknut
  - Conical spring washer
  - Sealing washers



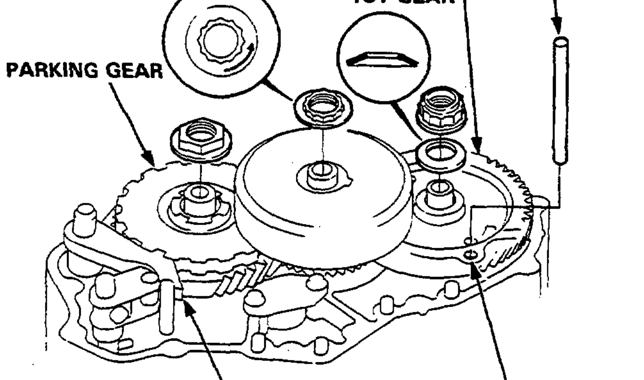
1. Remove the 13 bolts securing the right side cover, then remove the cover.

2. Slip the special tool onto the mainshaft.



3. Engage the parking brake pawl with the parking gear.

4. Align the hole of the sub-shaft 1st gear with the hole of the transmission housing, then insert a pin to hold the sub-shaft while removing the sub-shaft locknut.

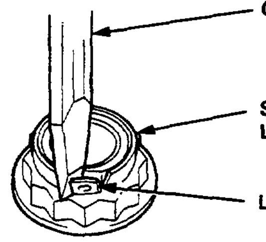


5. Pry the lock tabs of the mainshaft and countershaft locknuts.

6. Cut the lock tab of the sub-shaft locknut using a chisel as shown. Then remove the locknut from each shaft.

NOTE:
- Mainshaft locknut has left-hand threads.
- Clean the old countershaft locknut. It is used to press the parking gear onto the countershaft.
- Always wear safety glasses.

CAUTION: Keep all of the chiseled particles out of the transmission.



7. Remove the lock pin that was installed to hold the sub-shaft.

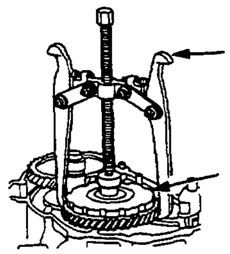
8. Remove the special tool from the mainshaft after removing the locknut.

9. Remove the 1st clutch and mainshaft 1st gear assembly from the mainshaft.

10. Remove the sub-shaft 1st gear.

11. Remove the parking brake pawl.

12. Using a puller, remove the parking gear, one-way clutch and countershaft 1st gear assembly.



13. Remove the parking brake lever from the control shaft.

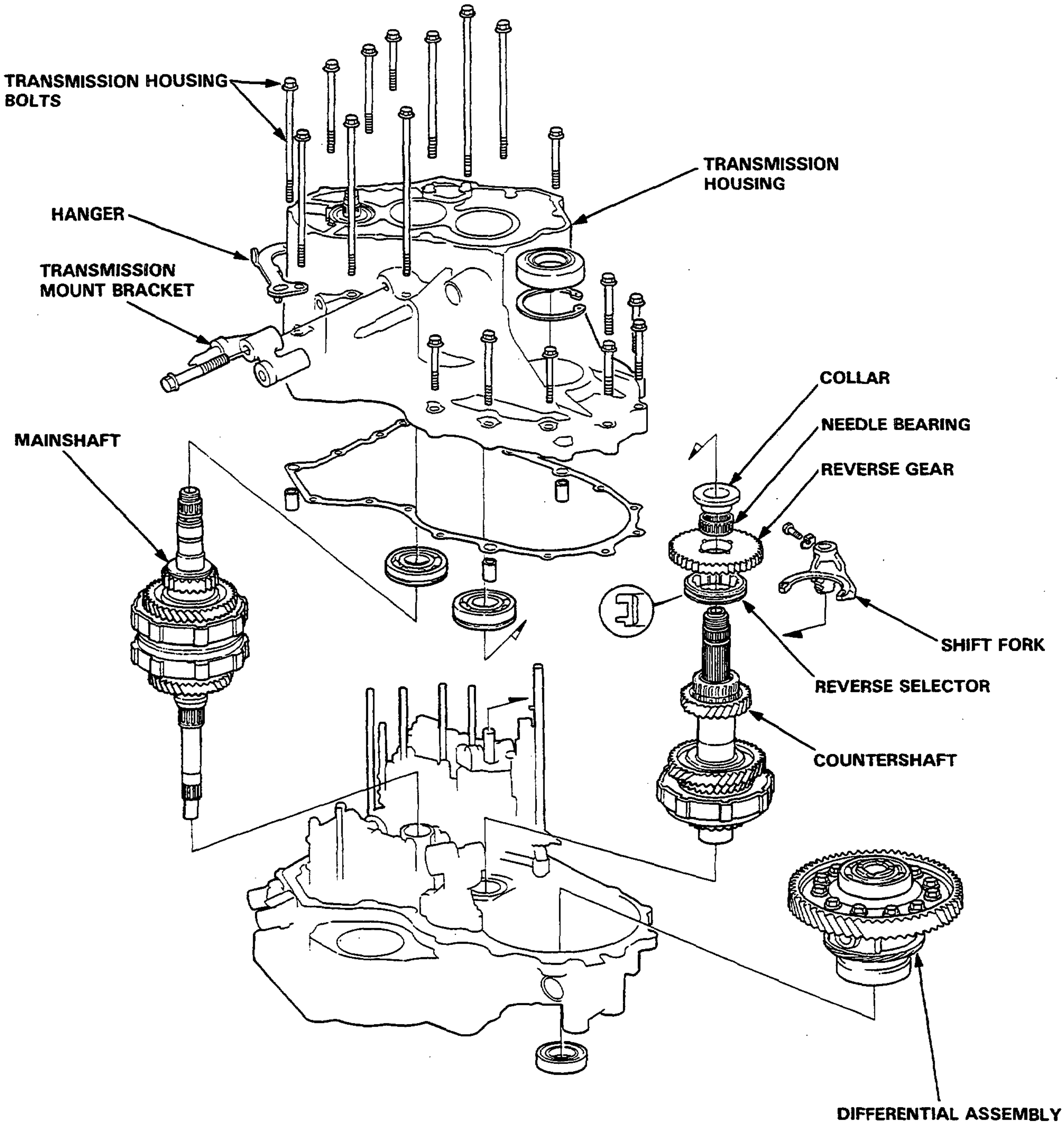
14. Remove the throttle control drum from the throttle control shaft.

15. Remove the ATF cooler pipes.

16. Remove the ATF dipstick.

Transmission Housing

Removal



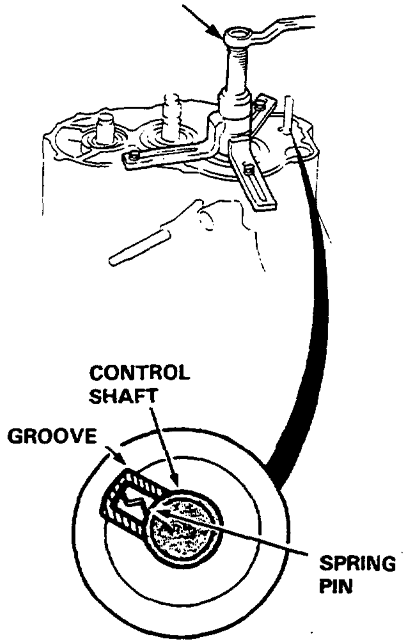
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- When removing the transmission housing, replace the following:
  - Transmission housing gasket
  - Lock washer

1. Remove the transmission mount bracket.

2. Remove the transmission housing mounting bolts and hanger.

3. Align the spring pin of the control shaft with the transmission housing groove by turning the control shaft.

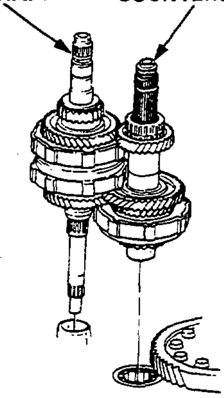
4. Install the special tool on the transmission housing, then remove the housing as shown.



5. Remove the countershaft reverse gear with the collar and needle bearing.

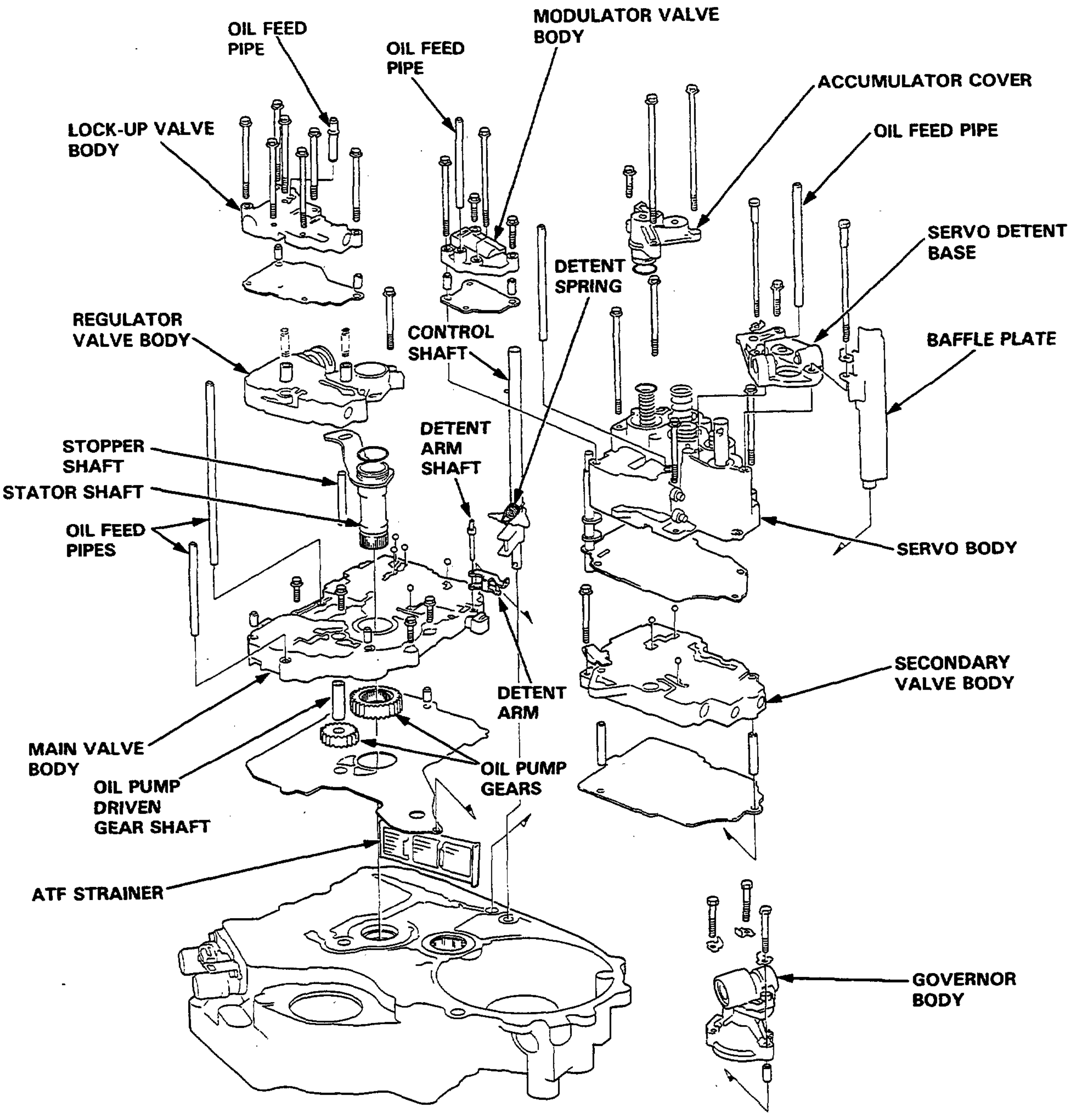
6. Remove the lock bolt securing the shift fork, then remove the fork with the reverse selector from the countershaft.

7. Remove the countershaft and mainshaft subassembly together.



8. Remove the differential assembly.

Removal


OIL FEED PIPE
OIL FEED PIPE
MODULATOR VALVE BODY
ACCUMULATOR COVER
LOCK-UP VALVE BODY
OIL FEED PIPE
SERVO DETENT BASE
DETENT SPRING
REGULATOR VALVE BODY
CONTROL SHAFT
BAFFLE PLATE
STOPPER SHAFT
DETENT ARM SHAFT
STATOR SHAFT
OIL FEED PIPES
SERVO BODY
SECONDARY VALVE BODY
DETENT ARM
MAIN VALVE BODY
OIL PUMP DRIVEN GEAR SHAFT
OIL PUMP GEARS
ATF STRAINER
GOVERNOR BODY

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 washers

1. Remove the oil feed pipes from the servo body, modulator valve body and main valve body.

2. Remove the three bolts securing the accumulator cover, then remove the accumulator cover.

3. Remove the three bolts securing the servo detent base, then remove the servo detent base and baffle plate.

4. Remove the four bolts securing the modulator valve body, then remove the modulator valve body and separator plate.

5. Remove the four bolts securing the servo body, then remove the servo body and separator plate.

6. Remove the bolt securing the secondary valve body, then remove the secondary valve body and separator plate.

7. Remove the seven bolts securing the lock-up valve body, then remove the lock-up valve body and separator plate.

8. Remove the bolt securing the regulator valve body, then remove the regulator valve body.

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 four bolts securing the main valve body, then remove the main valve body.

13. Remove the oil pump driven gear shaft, then remove the oil pump gears.

14. Remove the three bolts securing the governor body, then remove the governor body.

15. Remove the main separator plate with two dowel pins.

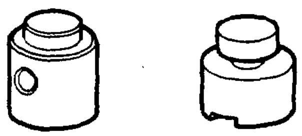
16. Remove the ATF strainer.

Valve Caps

Description

- Caps with one projected tip and one flat end are installed with the flat end toward the spring.
- Caps with a projected tip on each end are installed with the smaller tip toward the spring. The small tip is a spring guide.

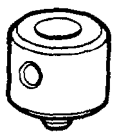
Toward outside of valve body.



Toward spring.

- Caps with one projected tip and hollow end are installed with the tip toward the spring. The tip is a spring guide.

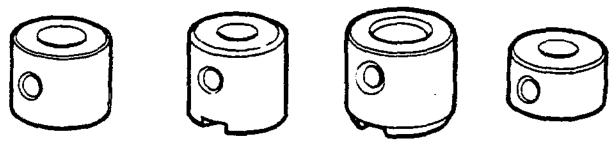
Toward outside of valve body.



Toward spring.

- Caps with hollow ends are installed with the hollow end away from the spring.
- Caps with notched ends are installed with the notch toward the spring.
- Caps with flat ends and a hole through the center are installed with the smaller hole toward the spring.

Toward outside of valve body.



Toward spring.

- Caps with flat ends and a groove around the cap are installed with the groove side opposite the spring.

Toward outside of valve body.

Toward spring.

Valve Body

Repair

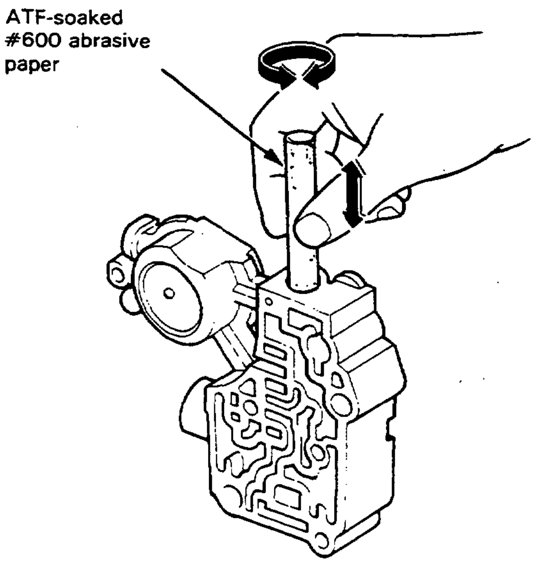
NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the valve bodies.

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.

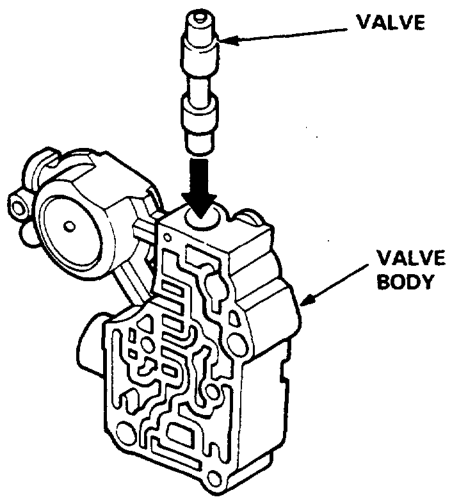
   CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

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 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 and 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.

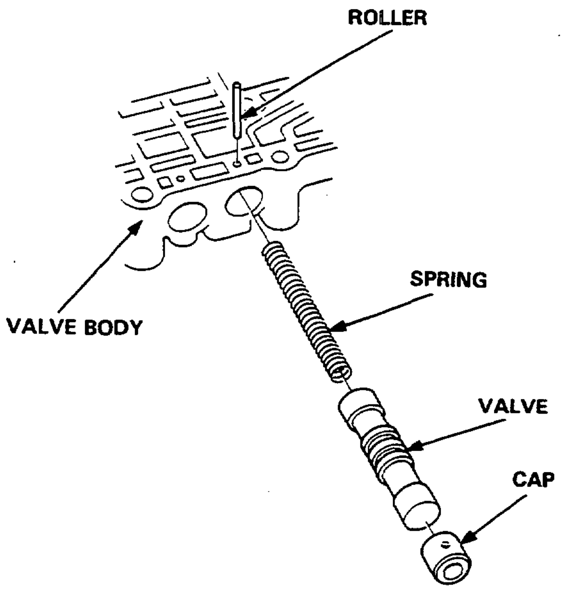


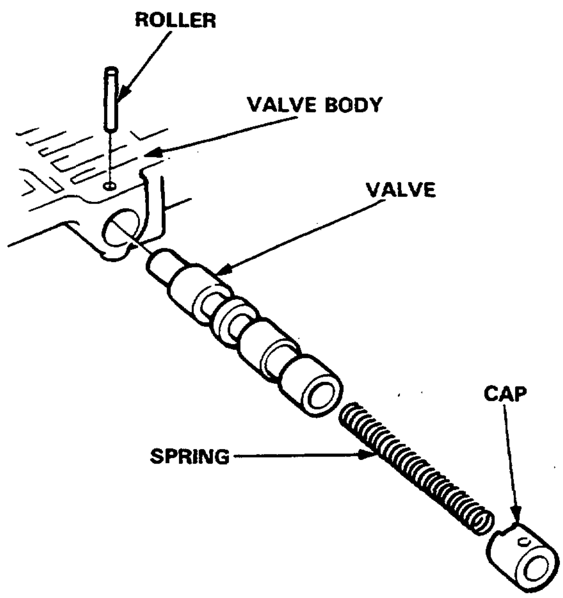
7. Remove the valve and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

Assembly

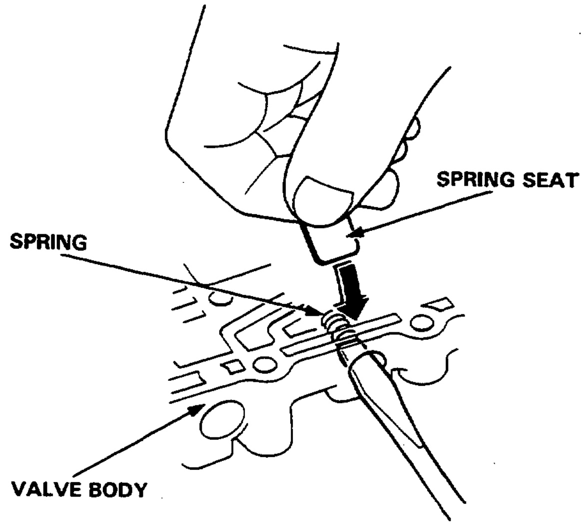
NOTE: Coat all parts with ATF before assembly.

- Install the valve, valve spring and cap in the valve body and secure with the roller.

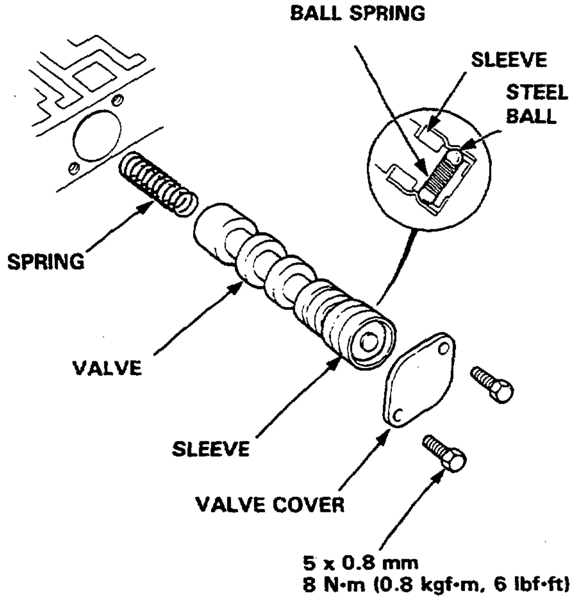




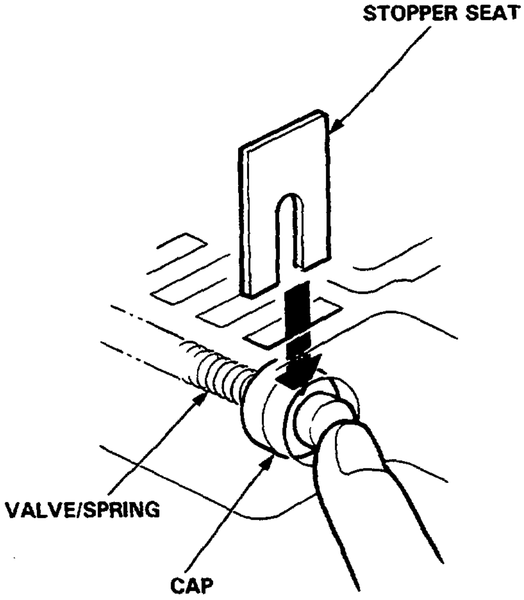
- Set the spring in the valve and install it in the valve body. Push the spring in with a screwdriver, then install the spring seat.



- Slide the spring into the hole in the big end of the shift valve. While holding the steel balls with the tips of your fingers, put the sleeve over the shift valve. Place the shift spring in the shift valve, then slip it into the valve body and install the valve cover.

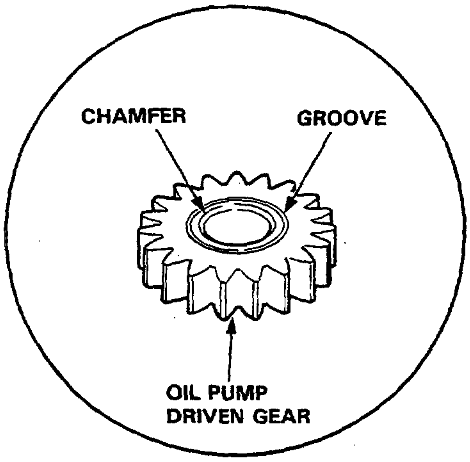


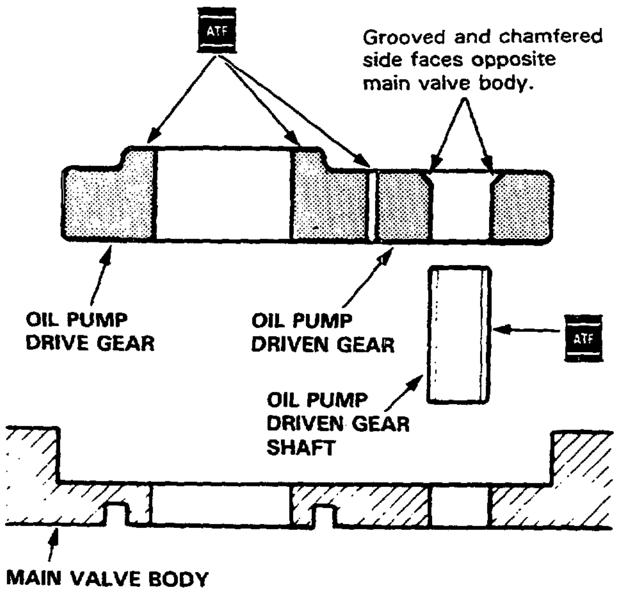
- Install the valve, spring and cap in the valve body. Push the cap, then install the stopper seat.



Inspection

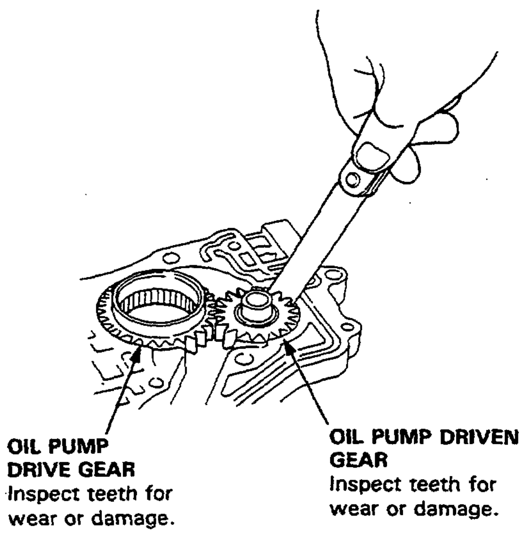
1. Install the oil pump gears and oil pump driven gear shaft in the main valve body.





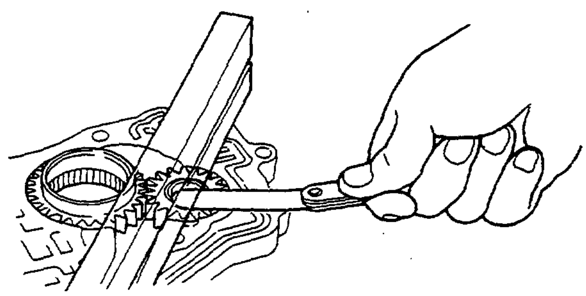
2. Measure the side clearance of the oil pump drive and driven gears.

Oil Pump Gears Side (Radial) Clearance:
Standard (New): Drive Gear
0.210–0.265 mm
(0.0083–0.0104 in)
Driven Gear
0.07–0.125 mm
(0.0028–0.0049 in)



3. Remove the oil pump driven gear shaft and measure the thrust clearance of the oil pump driven gear-to-main valve body.

Oil Pump Drive/Driven Gear thrust (Axial) Clearance:
Standard (New):
Drive Gear: 0.03–0.05 mm (0.001–0.002 in)
Driven Gear: 0.04–0.06 mm (0.0016–0.0024 in)
Service Limit: 0.07mm (0.0028 in)



Regulator Valve Body

Disassembly/Inspection/Reassembly

NOTE:

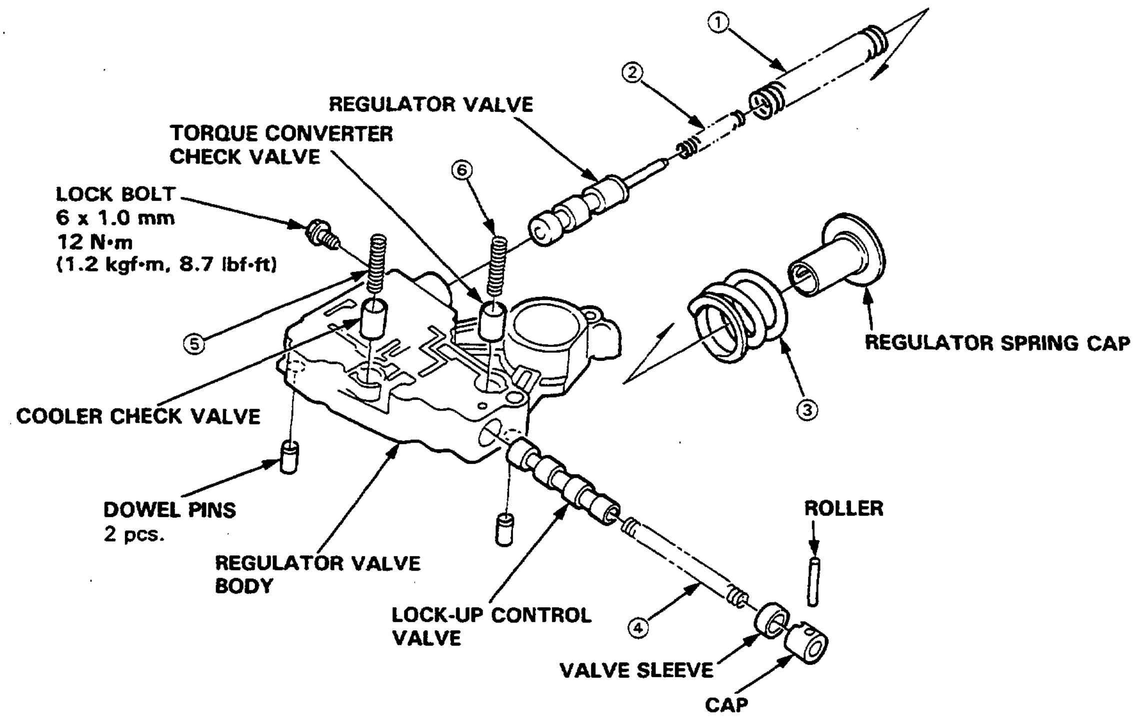
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-75.

1. Hold the regulator spring cap in place while removing the lock bolt. Once the 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 in the reverse order of the disassembly procedure.

   NOTE:
   - Coat all parts with ATF.
   - Align the hole in the regulator cap with the hole in the valve body, press the spring cap into the body and tighten the lock bolt.



SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Regulator valve spring A D16Y3 engine	1.8 (0.071)	14.7 (0.579)	87.8 (3.457)	16.5
	D14A2 engine	1.8 (0.071)	14.7 (0.579)	85.4 (3.362)	16.5
②	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	7.5
③	Stator reaction spring	5.5 (0.217)	*26.4 (1.039)	30.3 (1.193)	2.1
④	Lock-up control valve spring	0.9 (0.035)	6.6 (0.260)	38.4 (1.512)	23.3
⑤	Cooler check valve spring	1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	8.2
⑥	Torque converter check valve spring	1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	8.2

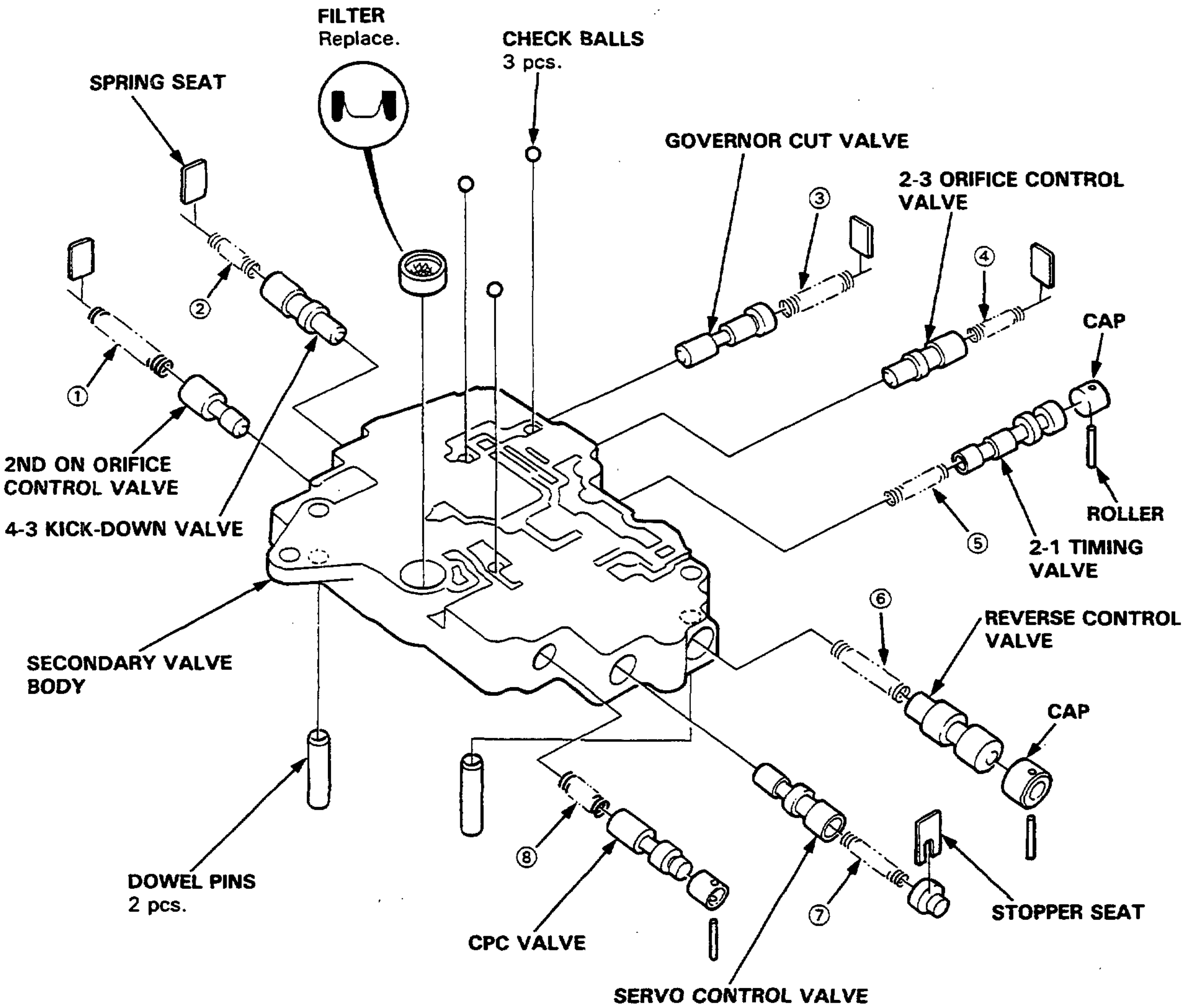
*: Inside Diameter

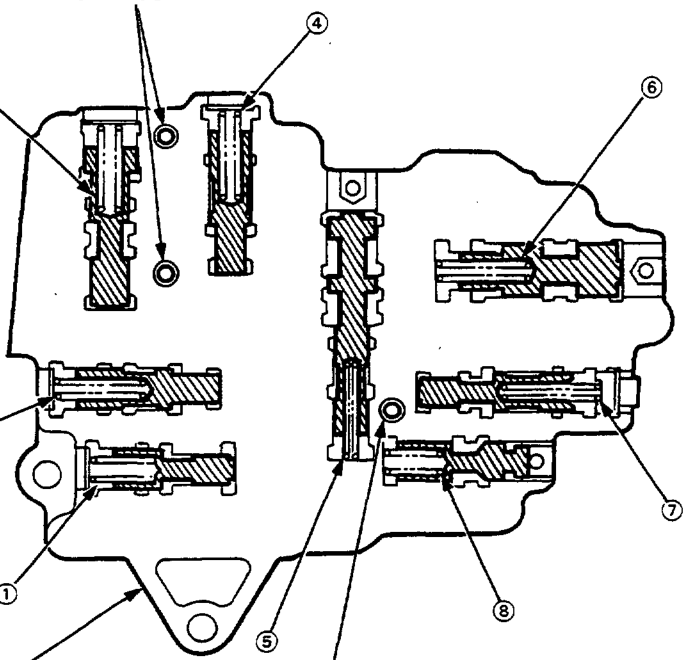
Secondary Valve Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Replace 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 14-75.
- Coat all parts with ATF before reassembly.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.





SPRING SPECIFICATIONS

Unit of length: mm (in)

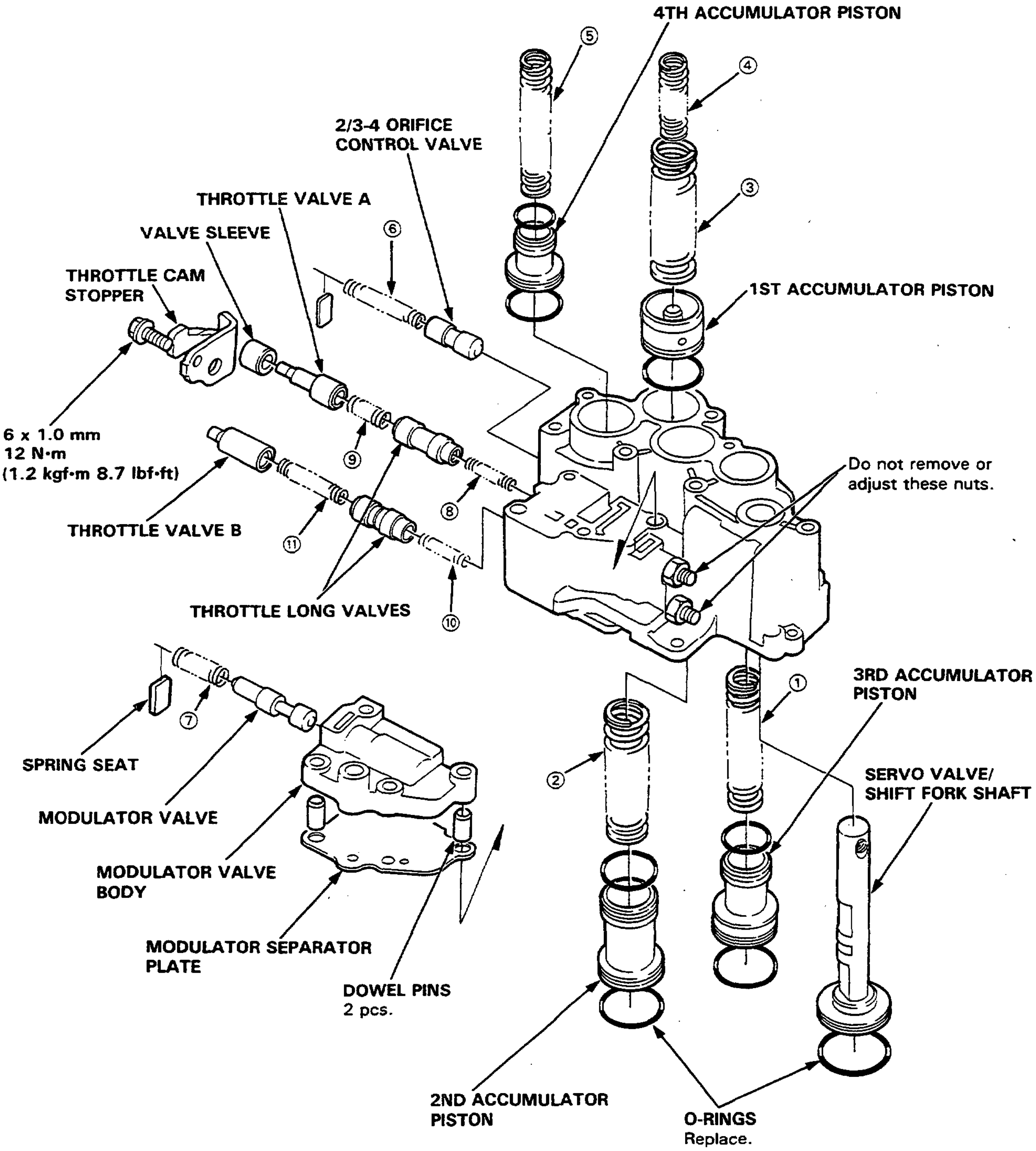
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	2nd ON orifice control valve spring	0.9 (0.035)	8.0 (0.315)	24.1 (0.949)	9.6
②	4-3 kick-down valve spring	1.0 (0.039)	6.6 (0.260)	29.9 (1.177)	14.7
③	Governor cut valve spring	0.8 (0.031)	7.6 (0.299)	44.5 (1.752)	17.0
④	2-3 orifice control valve spring	0.9 (0.035)	6.6 (0.260)	33.2 (1.307)	14.9
⑤	2-1 timing valve spring	0.7 (0.028)	5.6 (0.220)	33.0 (1.299)	21.7
⑥	Reverse control valve spring	0.7 (0.028)	7.1 (0.280)	40.0 (1.575)	20.8
⑦	Servo control valve spring	0.9 (0.035)	6.4 (0.252)	34.1 (1.343)	17.5
⑧	CPC (Clutch Pressure Control) valve spring	0.9 (0.035)	8.4 (0.331)	24.9 (0.980)	9.8

Servo Body/Modulator Valve Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Coat all parts with ATF before reassembly.
- Replace the O-rings.



SPRING SPECIFICATIONS

Unit of length: mm (in)

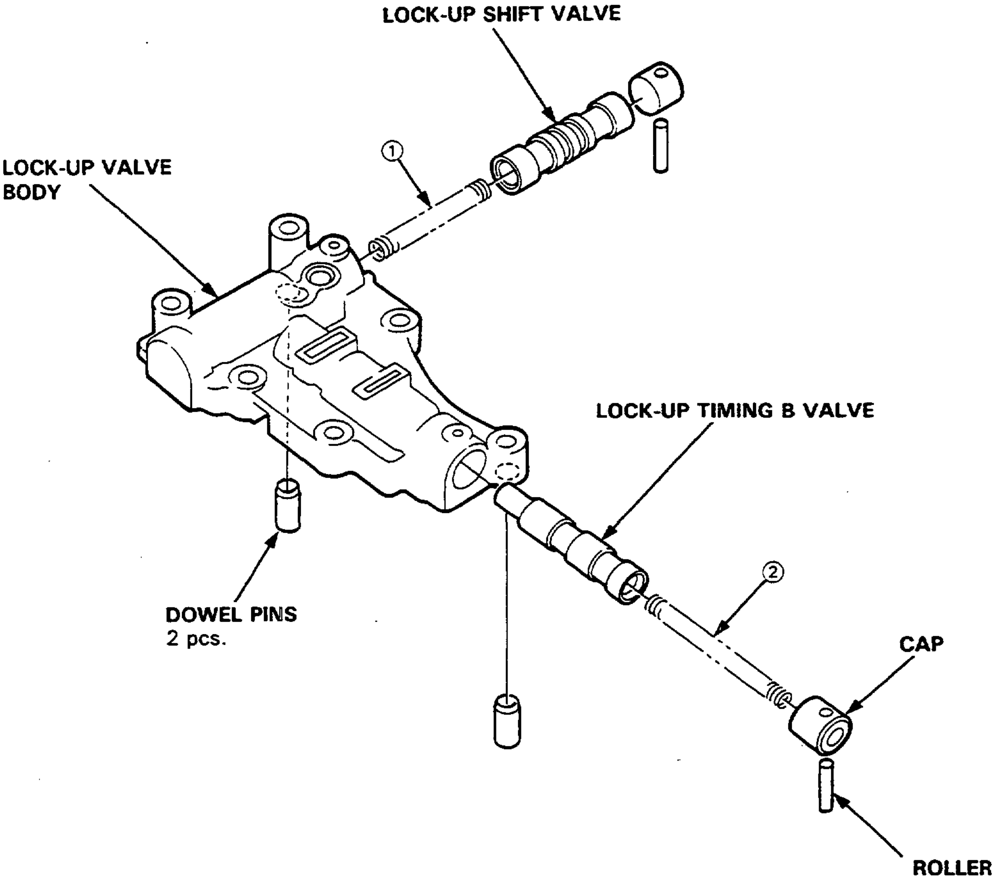
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3rd accumulator spring	2.6 (0.102)	17.5 (0.689)	91.8 (3.614)	15.8
②	2nd accumulator spring	3.5 (0.138)	22.0 (0.866)	77.0 (3.031)	9.5
③	1st accumulator spring A	2.6 (0.102)	24.3 (0.957)	101.9 (4.012)	11.6
④	1st accumulator spring B	2.3 (0.091)	*9.9 (0.390)	49.0 (1.929)	4.6
⑤	4th accumulator spring	2.6 (0.102)	16.0 (0.630)	90.1 (3.547)	15.6
⑥	2/3-4 orifice control valve spring	1.0 (0.039)	8.6 (0.339)	51.9 (2.043)	19.8
⑦	Modulator valve spring	1.2 (0.047)	*7.0 (0.276)	27.2 (1.071)	8.0
		1.2 (0.047)	*7.0 (0.276)	26.3 (1.035)	8.0
⑧	Throttle valve A adjusting spring	0.8 (0.031)	6.2 (0.244)	27.0 (1.063)	8.5
⑨	Throttle valve A spring	1.1 (0.043)	8.5 (0.335)	22.3 (0.878)	8.1
		1.0 (0.039)	8.5 (0.335)	22.2 (0,874)	6.0
		1.1 (0.043)	8.5 (0.335)	22.3 (0.878)	7.6
		1.0 (0.039)	8.5 (0.335)	22.1 (0.870)	5.5
⑩	Throttle valve B adjusting spring	0.8 (0.031)	6.2 (0.244)	30.0 (1.181)	8.0
⑪	Throttle valve B spring	1.4 (1.653)	8.5 (0.335)	41.5 (1.634)	10.5
		1.4 (1.653)	8.5 (0.335)	41.5 (1.634)	11.2
		1.4 (1.653)	8.5 (0.335)	41.6 (1.638)	12.4

*: Inside diameter

Lock-up Valve Body

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Replace 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 14-75.
- Coat all parts with ATF before reassembly.



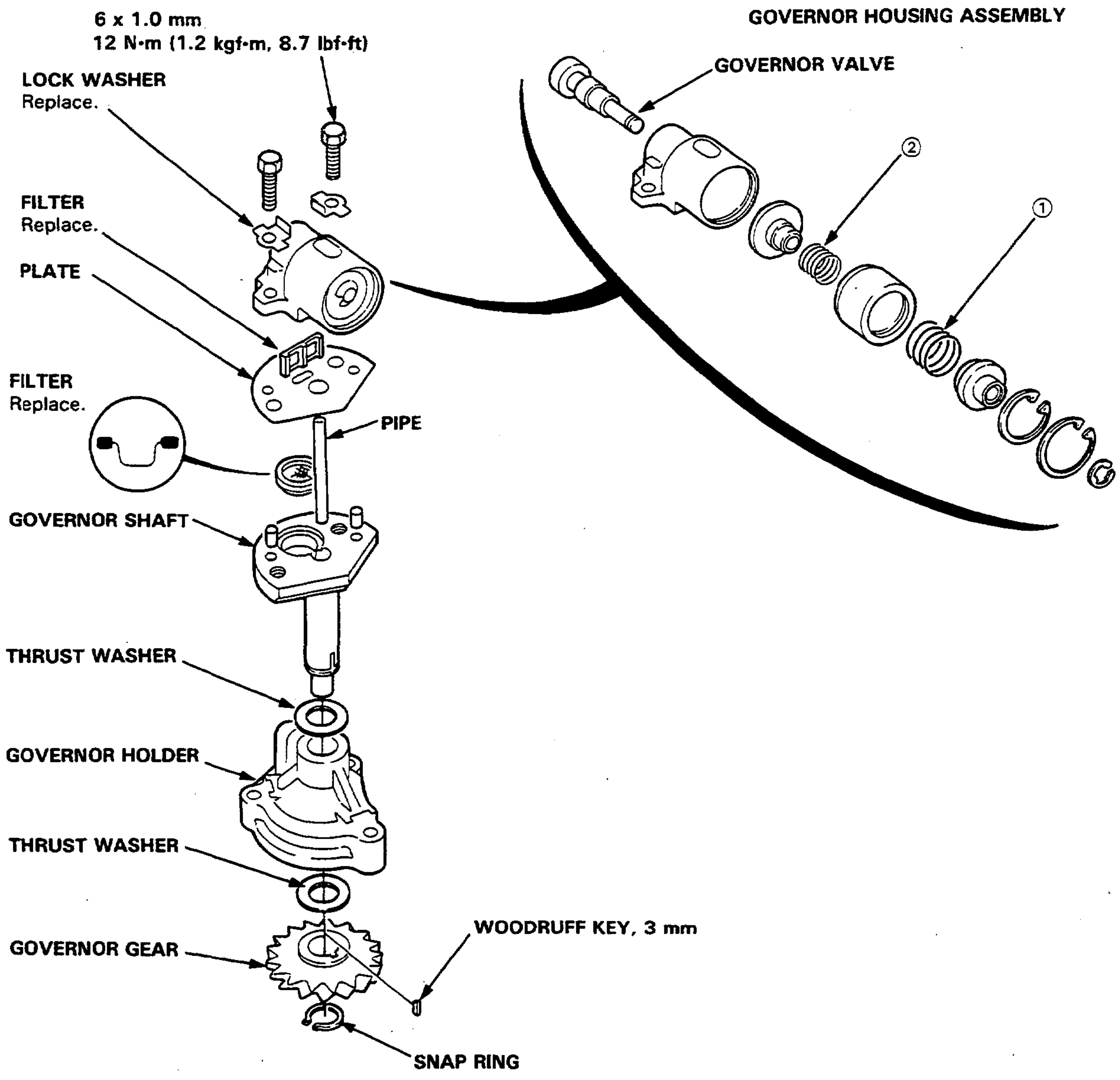
SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
②	Lock-up timing B valve spring	0.8 (0.031)	6.6 (0.260)	61.5 (2.421)	27.6

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Check that the governor works smoothly; replace it if it does not.
- Coat all parts with ATF before reassembly.



SPRING SPECIFICATIONS

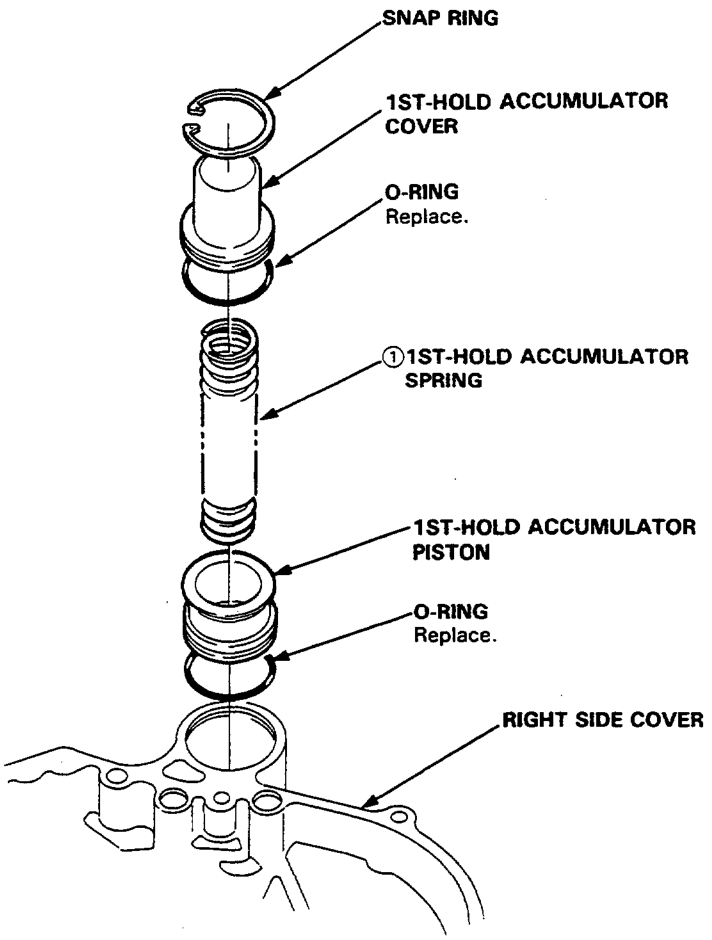
Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Governor spring A	1.0 (0.039)	18.8 (0.740)	32.9 (1.295)	4.1
②	Governor spring B	0.9 (0.035)	11.8 (0.465)	27.8 (1.094)	6.0
		0.9 (0.035)	11.8 (0.465)	29.1 (1.146)	6.0

1st-hold Accumulator/Right Side Cover

Disassembly/Inspection/Reassembly

NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Coat all parts with ATF before reassembly.



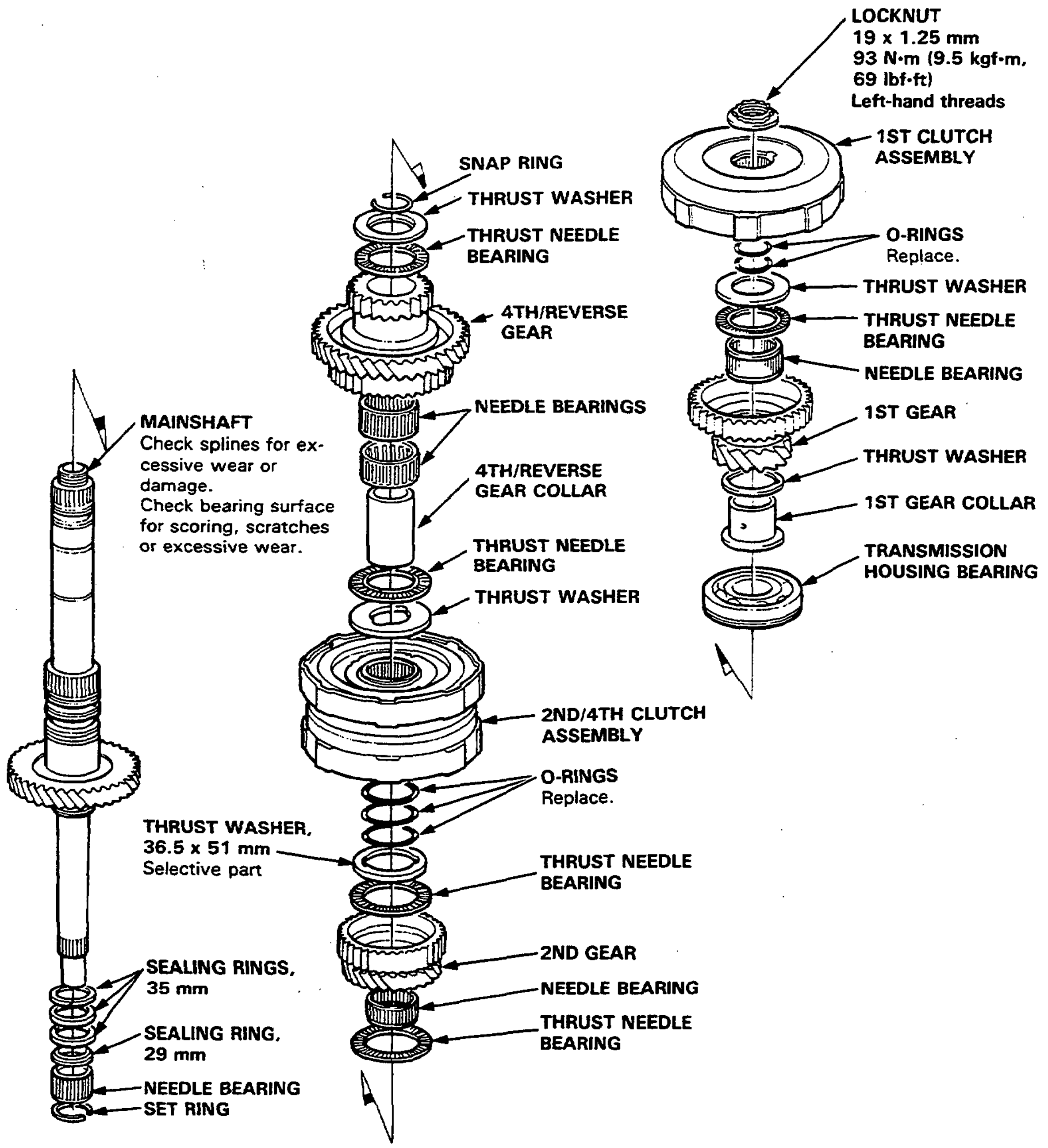
SPRING SPECIFICATIONS

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st-hold accumulator spring	4.0 (0.157)	21.5 (0.846)	71.7 (2.823)	8.3

Disassembly/Inspection/Reassembly

NOTE:
- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing 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 damaging the O-rings.
- Locknut has left-hand threads.



Mainshaft

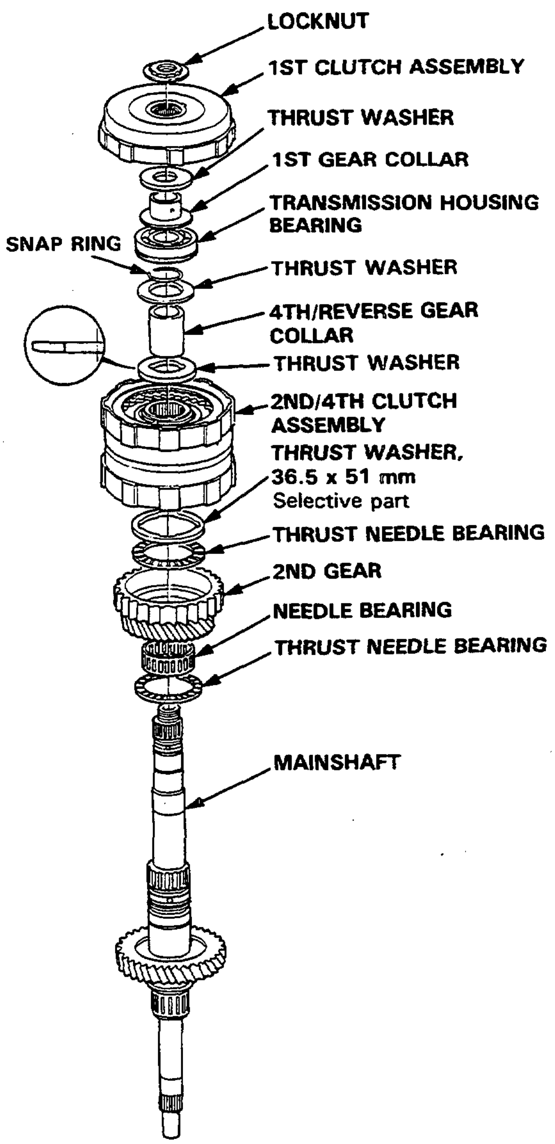
Inspection

- Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

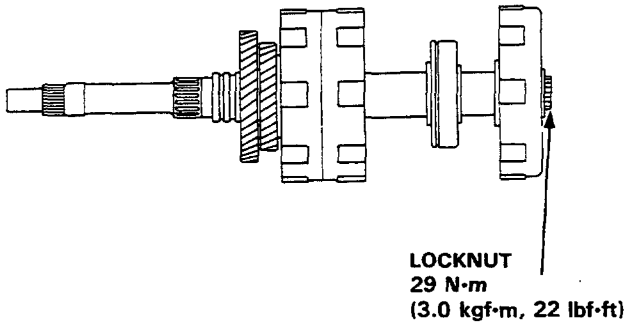
1. Remove the mainshaft bearing from the transmission housing (see page 14-112).
2. Assemble the parts below on the mainshaft.

NOTE: Do not assemble the O-rings while inspecting.



3. Torque the mainshaft locknut to 29 N·m (3.0 kgf·m, 22 lbf·ft).

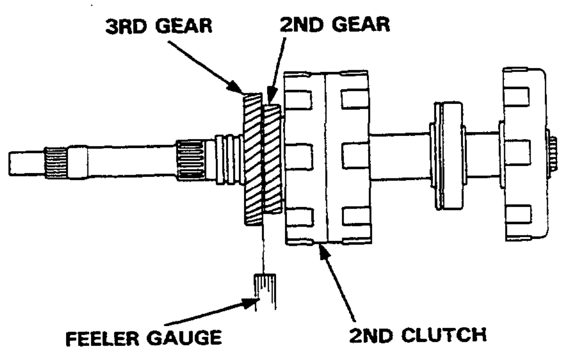
NOTE: Mainshaft locknut has left-hand threads.

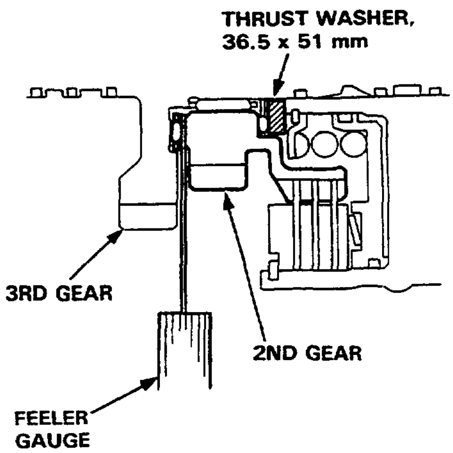


4. Hold 2nd gear against the 2nd clutch, then measure the clearance between 2nd gear and 3rd gear with a feeler gauge.

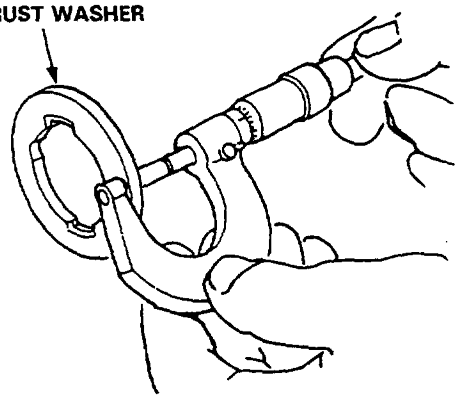
NOTE: Take measurements in at least three places and take the average as the actual clearance.

STANDARD: 0.05–0.13 mm (0.002–0.005 in)





5. If the clearance is out of tolerance, remove the thrust washer and measure the thickness.



6. Select and install a new washer then recheck.

THRUST WASHER 36.5 x 51 mm

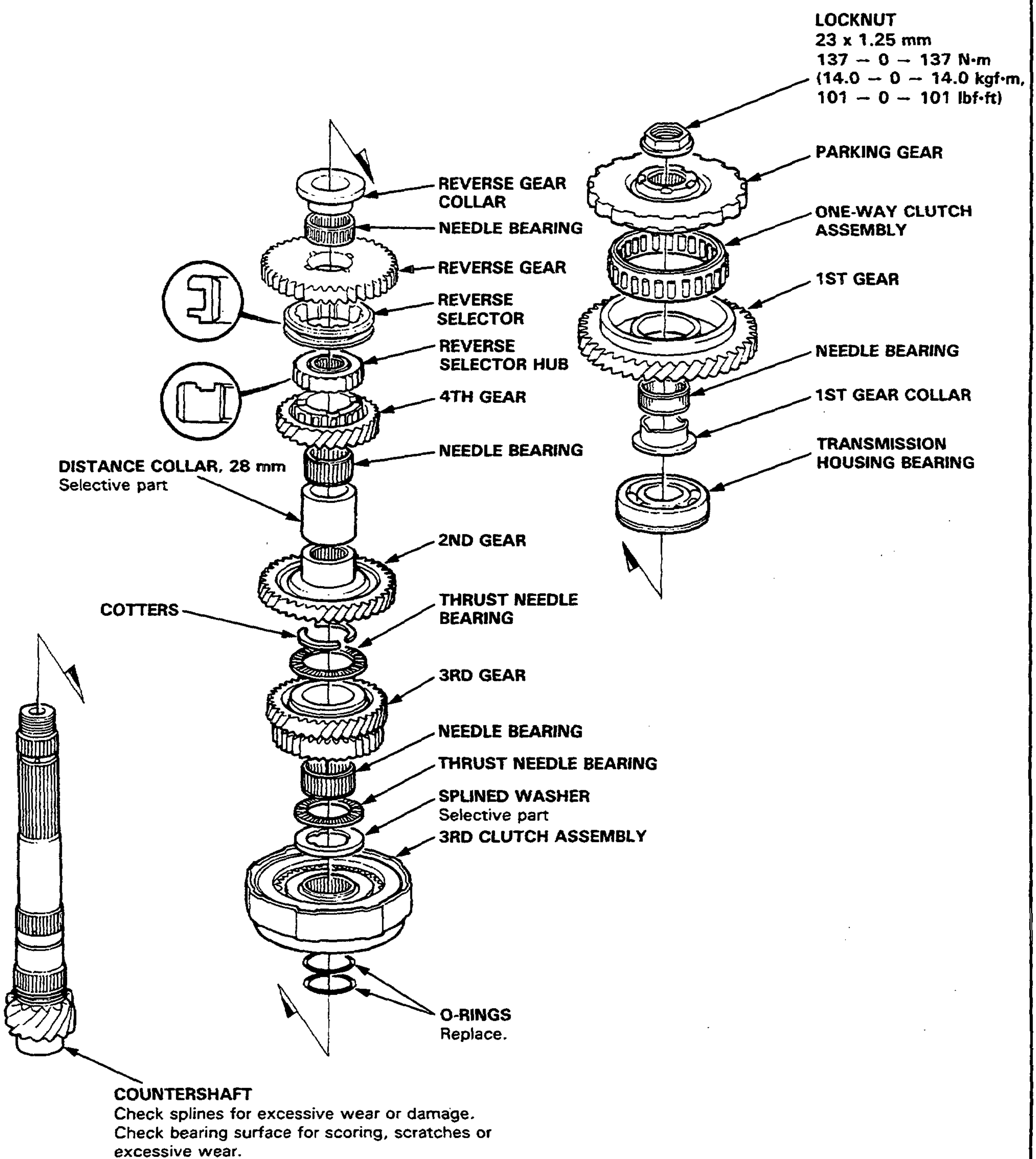
No.	Part Number	Thickness
1	90441-PC9-010	3.50 mm (0.138 in)
2	90442-PC9-010	3.55 mm (0.140 in)
3	90443-PC9-010	3.60 mm (0.142 in)
4	90444-PC9-010	3.65 mm (0.144 in!
5	90445-PC9-010	3.70 mm (0.146 in)
6	90446-PC9-010	3.75 mm (0.148 in)
7	90447-PC9-010	3.80 mm (0.150 in)
8	90448-PC9-010	3.85 mm (0.152 in)
9	90449-PC9-010	3.90 mm (0.154 in)

7. After replacing the thrust washer, make sure the clearance is within tolerance.

Countershaft

Disassembly/Inspection/Reassembly

NOTE:
- Lubricate all parts with ATF before reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing 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 damaging the O-rings.

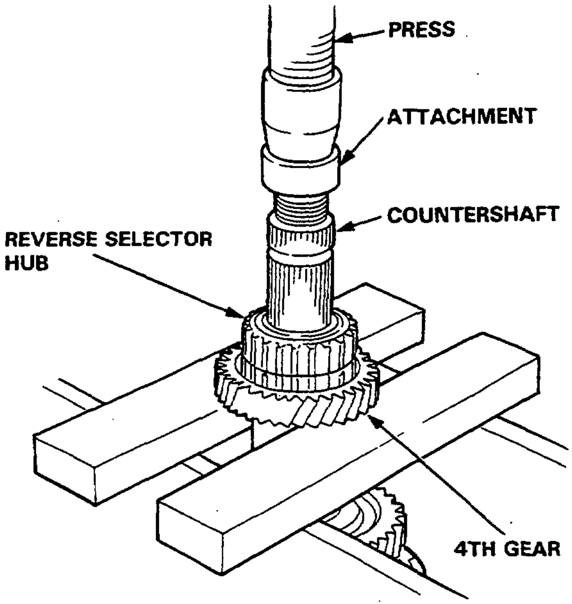


Disassembly/Reassembly

1. Using a hydraulic press, press out the countershaft while supporting 4th gear.

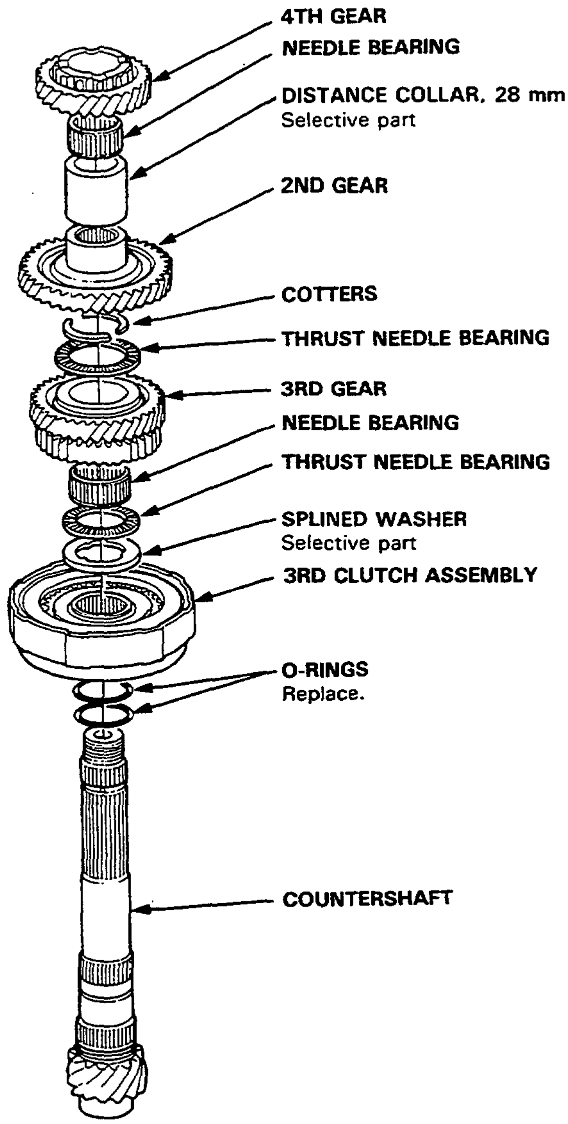
   NOTE: Place an attachment between the press and the countershaft to prevent damage to the shaft.

   CAUTION: Do not allow the countershaft to fall and hit the ground.



2. Assemble the parts below on the countershaft as shown below.

   NOTE:
   - Lubricate all parts with ATF during assembling.
   - Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.



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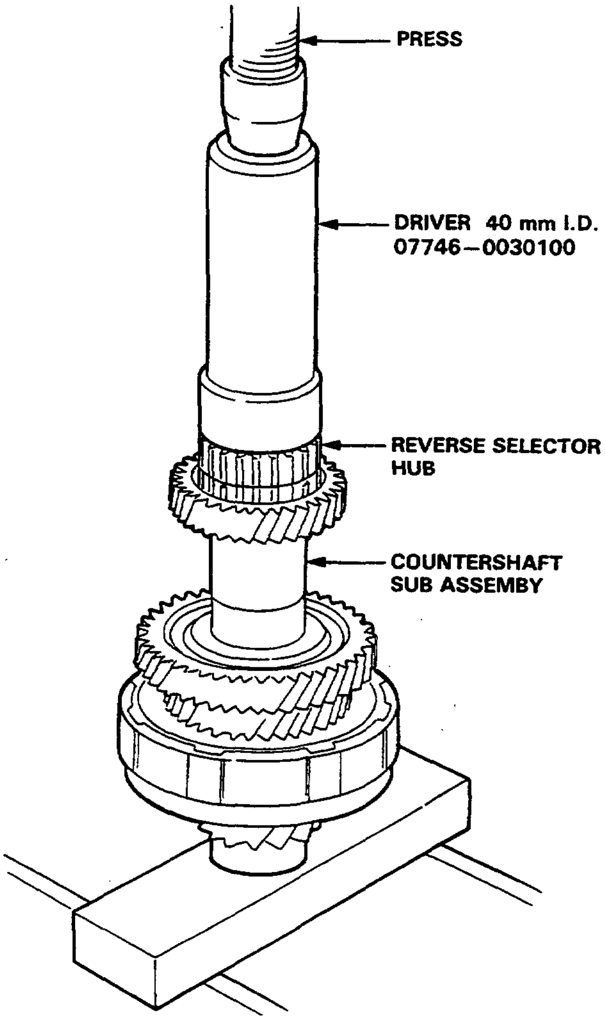
Disassembly/Reassembly (cont'd)

3. Install the reverse selector hub on the countershaft sub assembly, and then press the reverse selector hub using the special tool and a press as shown.



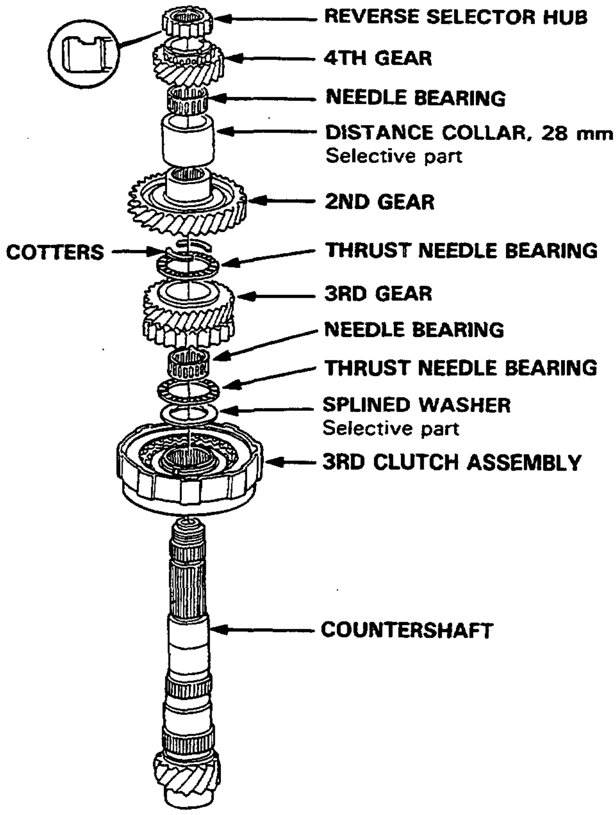
Inspection

- Clearance Measurement

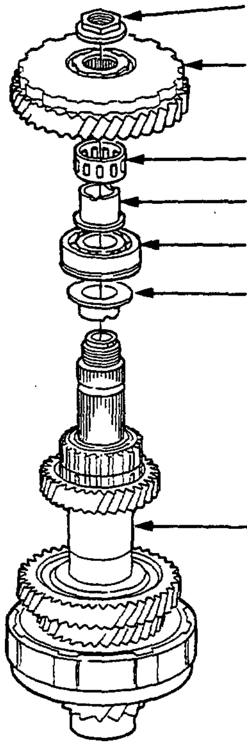
  NOTE: Lubricate all parts with ATF during assembly.

1. Remove the countershaft bearing from the transmission housing (see page 14-112).
2. Install the parts below on the countershaft using the special tool and a press as described on this page.

   NOTE: Do not assemble the O-rings while inspecting.



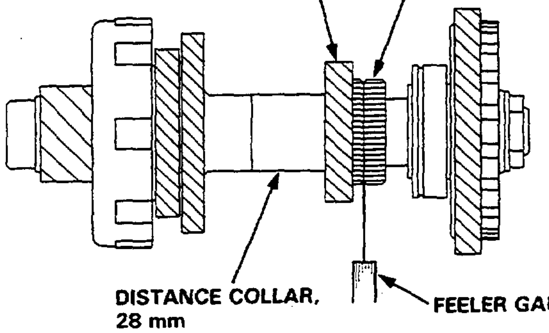
3. Install the parts below on the countershaft sub-assembly, then torque the locknut to 29 N·m (3.0 kgf·m, 22 lbf·ft).

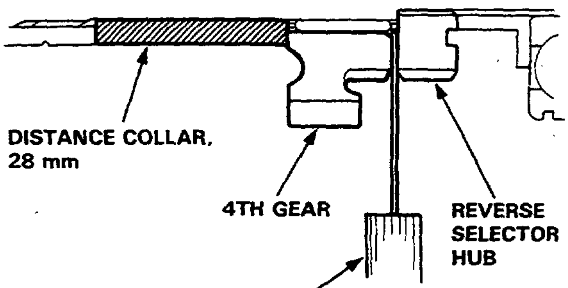


4. Measure the clearance between 4th gear and the reverse selector hub with a feeler gauge.

NOTE: Take measurements in at least three places and take the average as the actual clearance.

STANDARD: 0.05–0.13 mm (0.002–0.005 in)





(cont'd)

Countershaft

Inspection (cont'd)

5. Measure the clearance between 3rd gear and 2nd gear using a feeler gauge, while leaving the feeler gauge from step 4 between 4th gear and reverse selector hub.

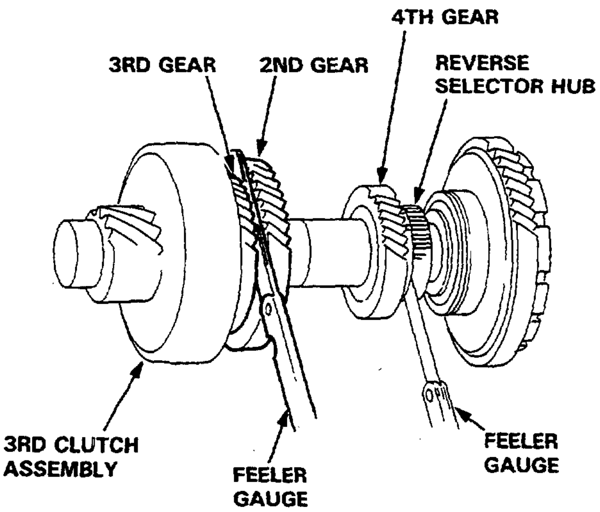
   —1. Measure the clearance with 3rd gear pushed towards the 3rd clutch.

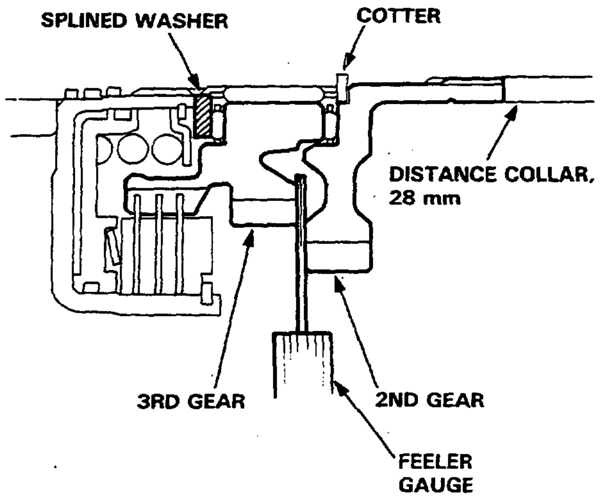
   —2. Measure the clearance with 3rd gear pushed towards the 2nd gear.

   NOTE: Take measurements in at least three places and take the average as the actual clearance.

   —3. Subtract the measurements of step 2 from step 3, and you have the clearance between 3rd gear and 2nd gear.

   STANDARD: 0.05—0.13 mm (0.002—0.005 in)





6. If the clearance is out of tolerance, remove the splined washer and/or distance collar and measure the thickness and/or the width.

7. Select and install a new distance collar, then recheck.

DISTANCE COLLAR 28 mm

No.	Part Number	Thickness
1	90503-PC9-000	39.00 mm (1.535 in)
2	90504-PC9-000	39.10 mm (1.539 in)
3	90505-PC9-000	39.20 mm (1.543 in)
4	90507-PC9-000	39.30 mm (1.547 in)
5	90508-PC9-000	39.05 mm (1.537 in)
6	90509-PC9-000	39.15 mm (1.541 in)
7	90510-PC9-000	39.25 mm (1.545 in)
8	90511-PC9-000	38.90 mm (1.531 in)
9	90512-PC9-000	38.95 mm (1.533 in)

8. After replacing the distance collar, make sure the clearance is within tolerance.

9. Select and install a new splined washer, then recheck.

SPLINED WASHER 35 x 52 mm

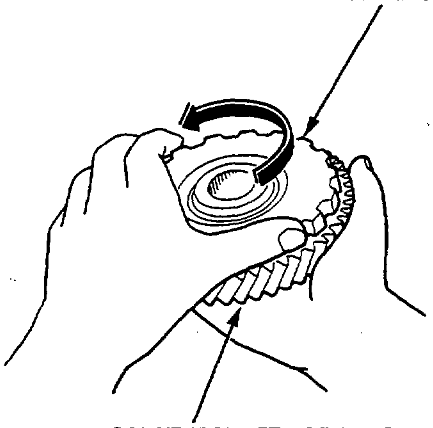
No.	Part Number	Thickness
1	90411-PF4-000	3.00 mm (0.118 in)
2	90412-PF4-000	3.05 mm (0.120 in)
3	90413-PF4-000	3.10 mm (0.122 in)
4	90414-PF4-000	3.15 mm (0.124 in)
5	90415-PF4-000	3.20 mm (0.126 in)
6	90416-PF4-000	3.25 mm (0.128 in)
7	90417-PF4-000	3.30 mm (0.130 in)
8	90418-PF4-000	3.35 mm (0.132 in)
9	90419-PF4-000	3.40 mm (0.134 in)
10	90411-P24-J00	3.45 mm (0.136 in)
11	90412-P24-J00	3.50 mm (0.138 in)
12	90413-P24-J00	3.55 mm (0.140 in)
13	90414-P24-J00	3.60 mm (0.142 in)

10. After replacing the splined washer, make sure the clearance is within tolerance.

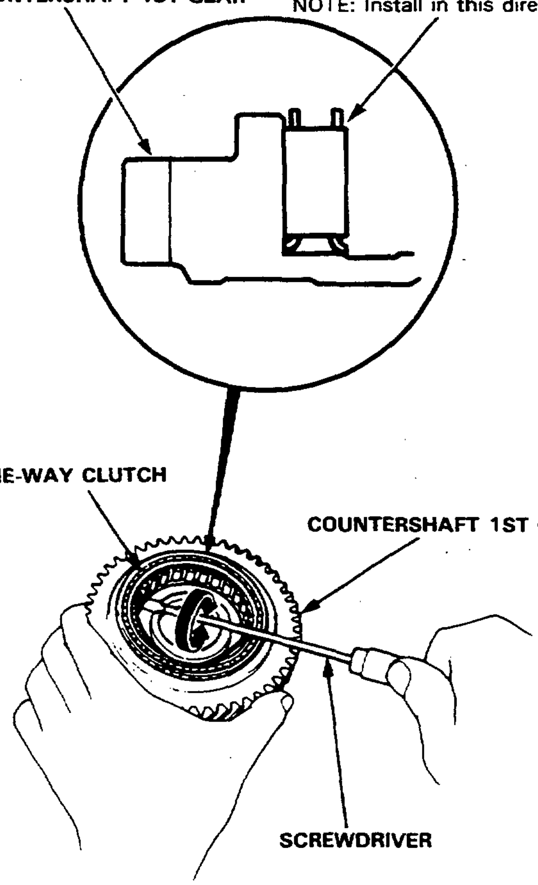
One-way Clutch/Parking Gear

Disassembly/Inspection

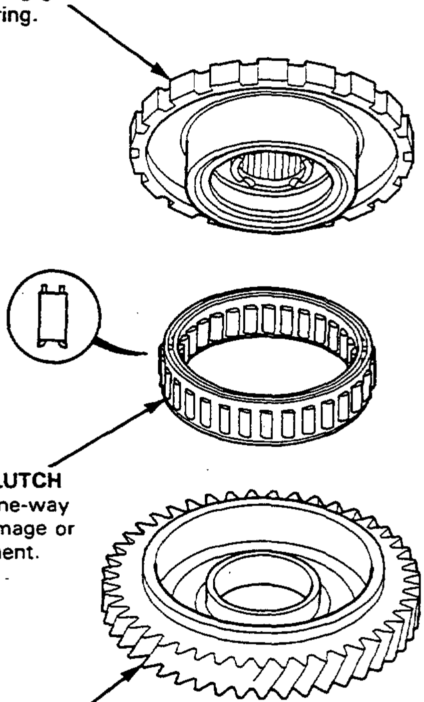
1. Separate countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.



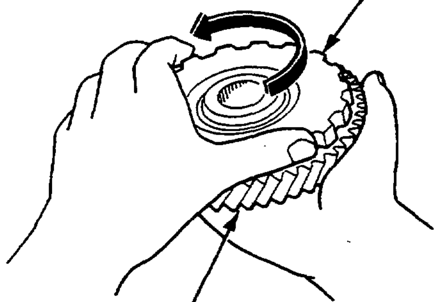
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



Inspect the parts as follows:



3. After the parts are assembled, hold countershaft 1st gear and turn the parking gear in the direction shown to be sure it turns freely.

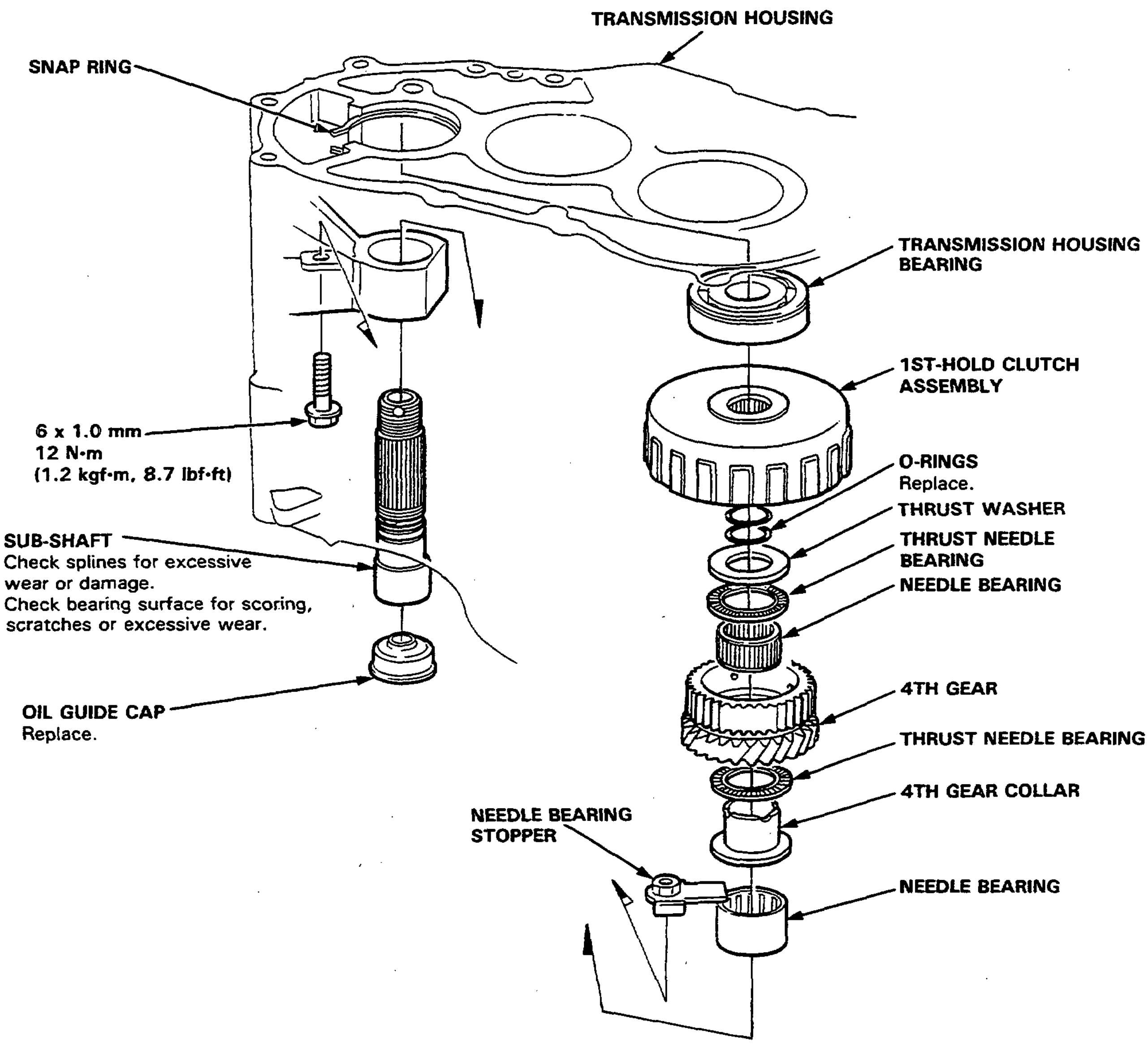


Sub-shaft

Disassembly/Inspection/Reassembly

NOTE:

- Lubricate all parts with ATF before reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing 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 damaging the O-rings.

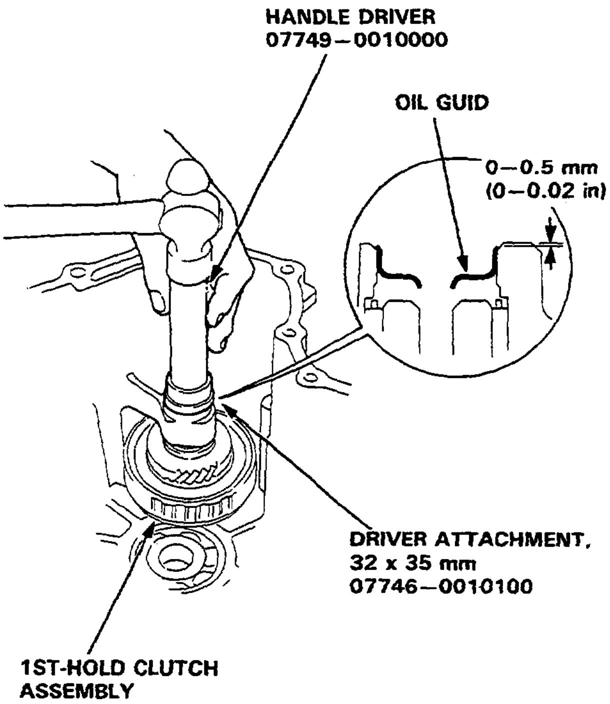


Disassembly/Reassembly

1. Remove the oil guide cap by pushing the sub-shaft inside the transmission housing.
2. Remove the 1st-hold clutch assembly by pulling the sub-shaft, then remove the sub-shaft.
3. Install new O-rings on the sub-shaft.

   NOTE: Wrap the shaft splines with tape to prevent damaging the O-rings.
4. Place the sub-shaft in the transmission housing and install the 1st-hold clutch assembly.
5. Install new oil guide cap using the special tools as shown.

   NOTE: Install the oil guide cap in the direction shown.

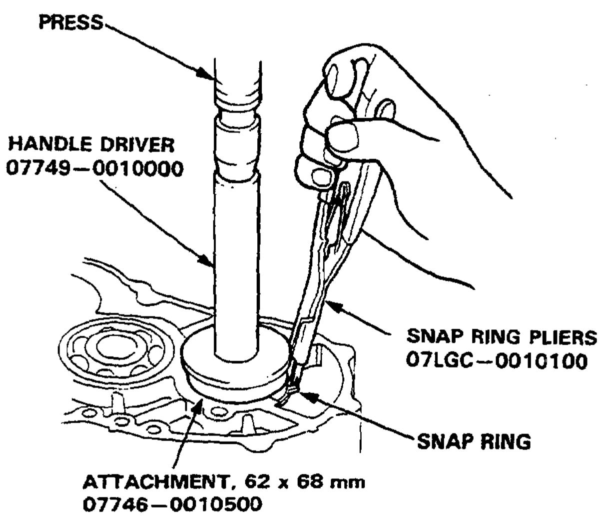


Sub-shaft Bearings

Replacement

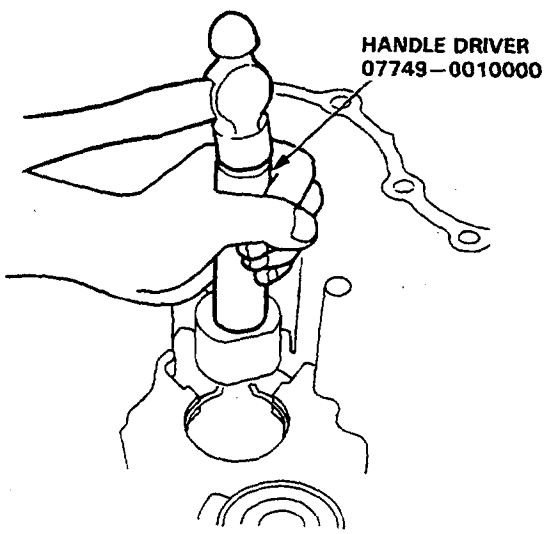
NOTE: Lubricate all parts with ATF before reassembly.

1. To remove the sub-shaft ball bearing from the transmission housing, expand the snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.

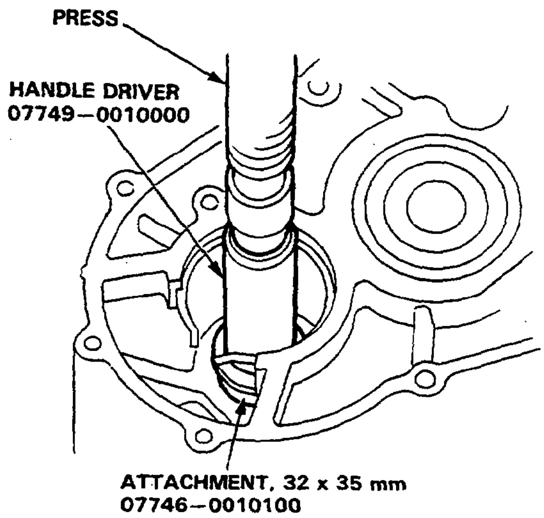


2. Remove the needle bearing stopper.

3. Remove the needle bearing from the transmission housing using the special tool.



4. Install the new needle bearing in the transmission housing using the special tools and a press as shown.

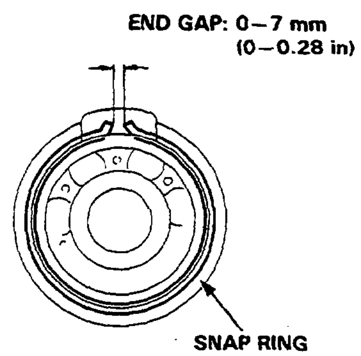


5. Expand the snap ring with snap ring pliers, then insert the ball bearing part-way into the housing using the special tools and a press as described in step 1. Install the bearing with the groove facing outside the housing.

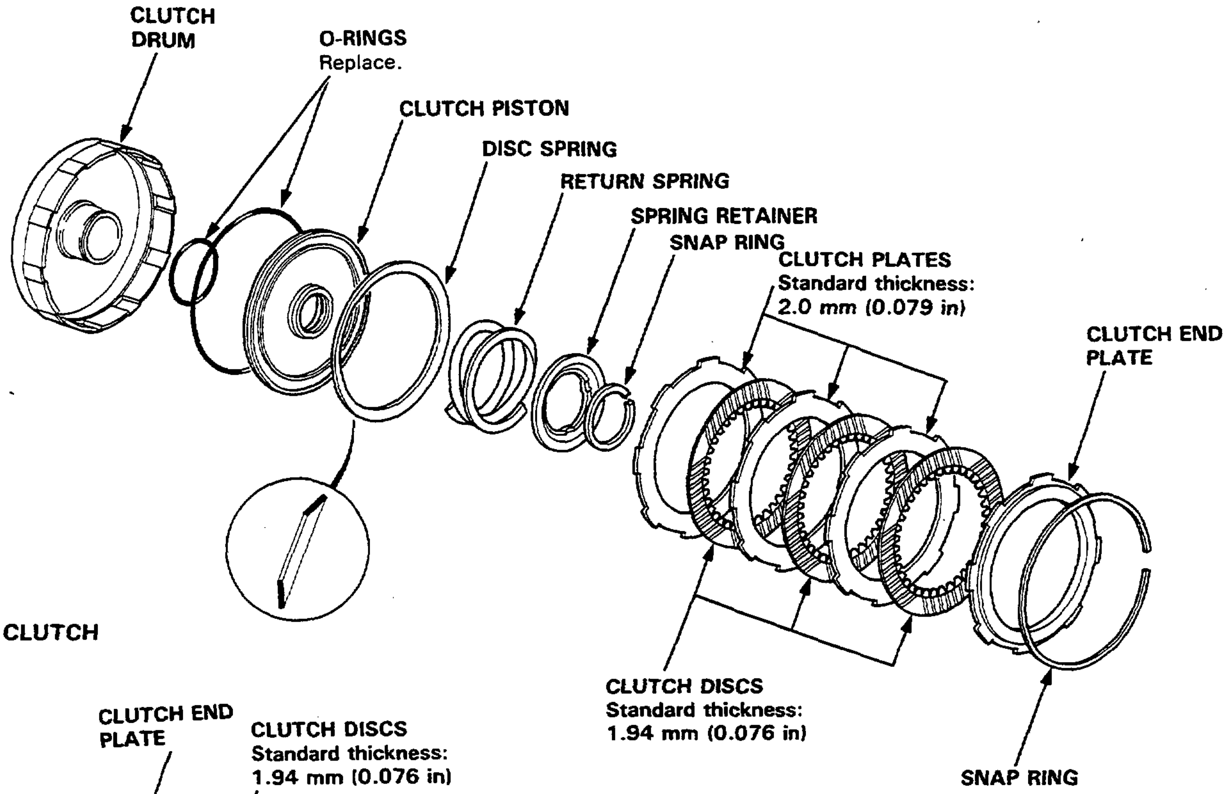
6. Release the pliers, then push the bearing down into the housing until the snap ring snaps in place around it.

7. After installing the ball bearing verify the following:

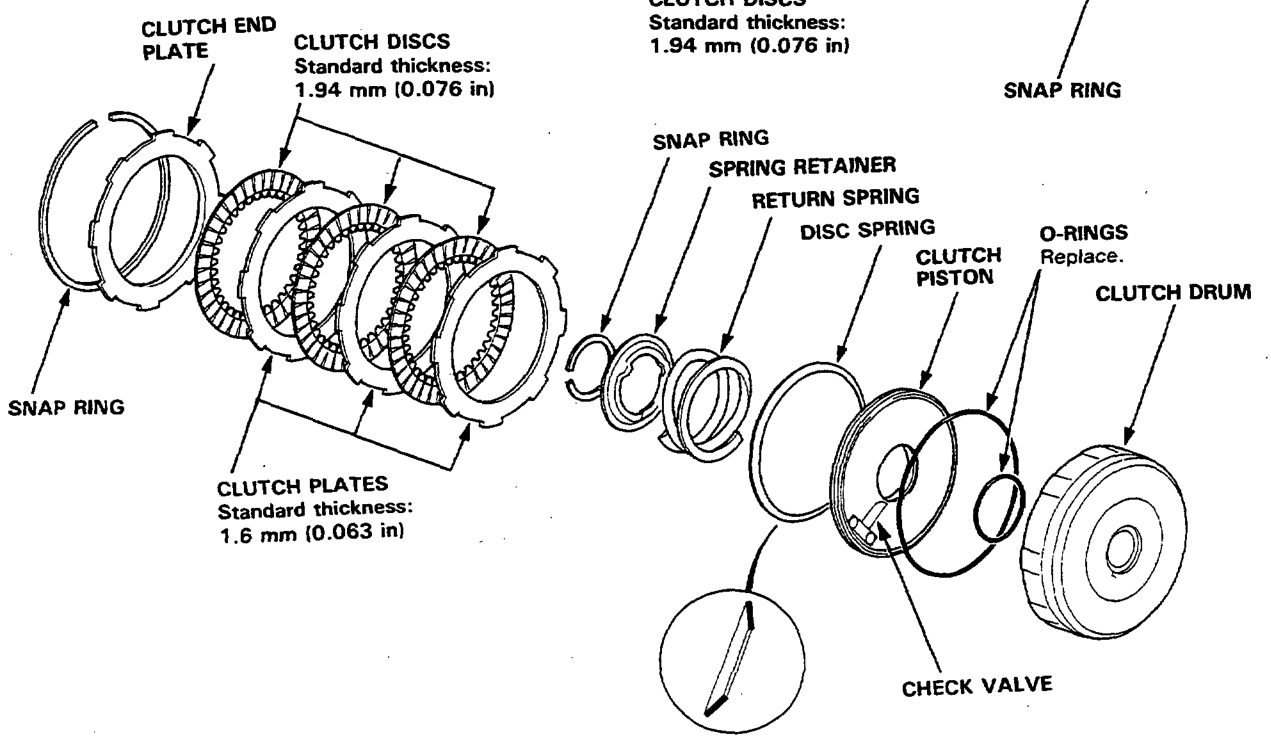
   - The snap ring is seated in the bearing and housing grooves.
   - The snap ring operates properly.
   - The ring end gap is correct.



3RD CLUTCH



1ST CLUTCH



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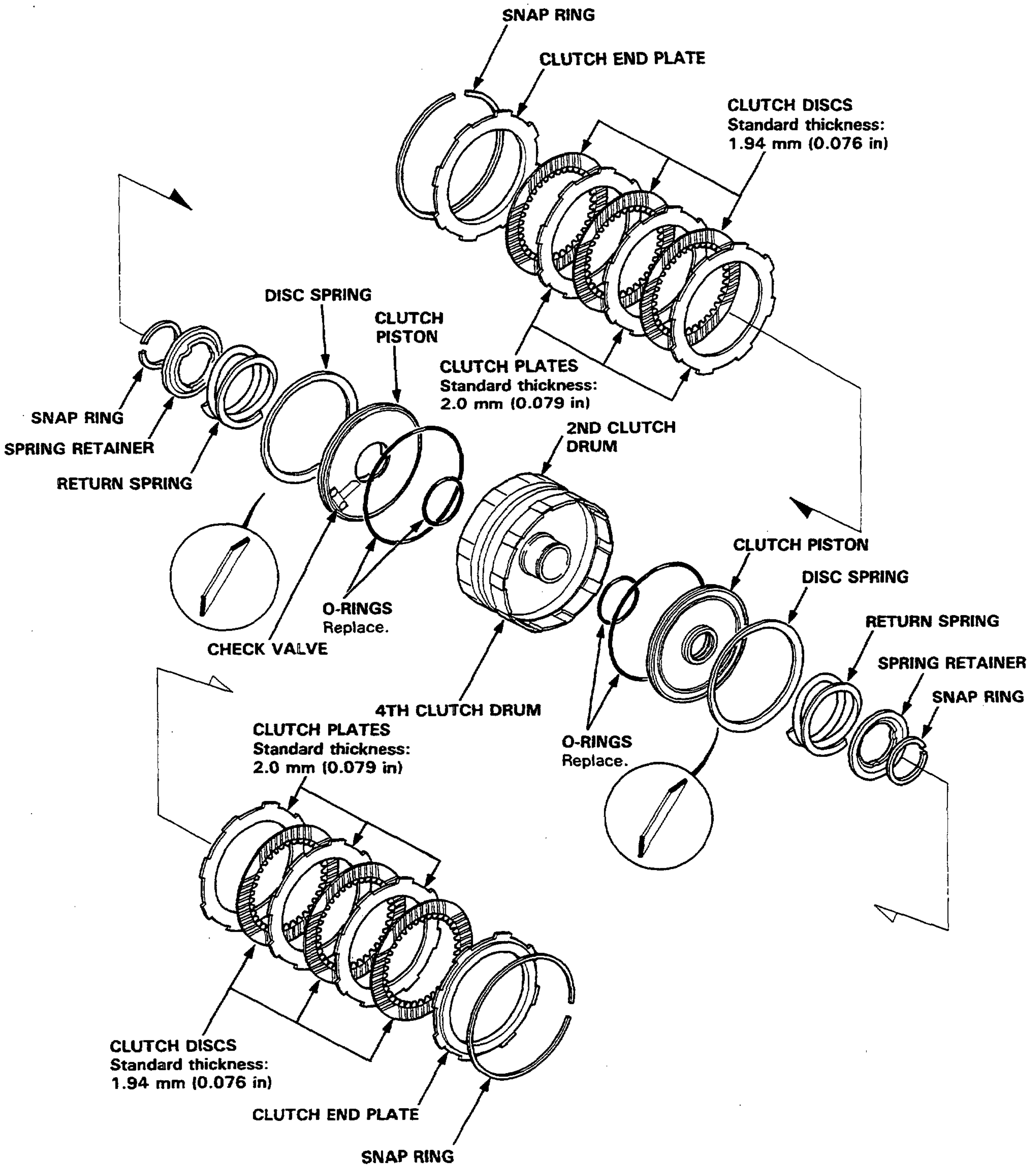
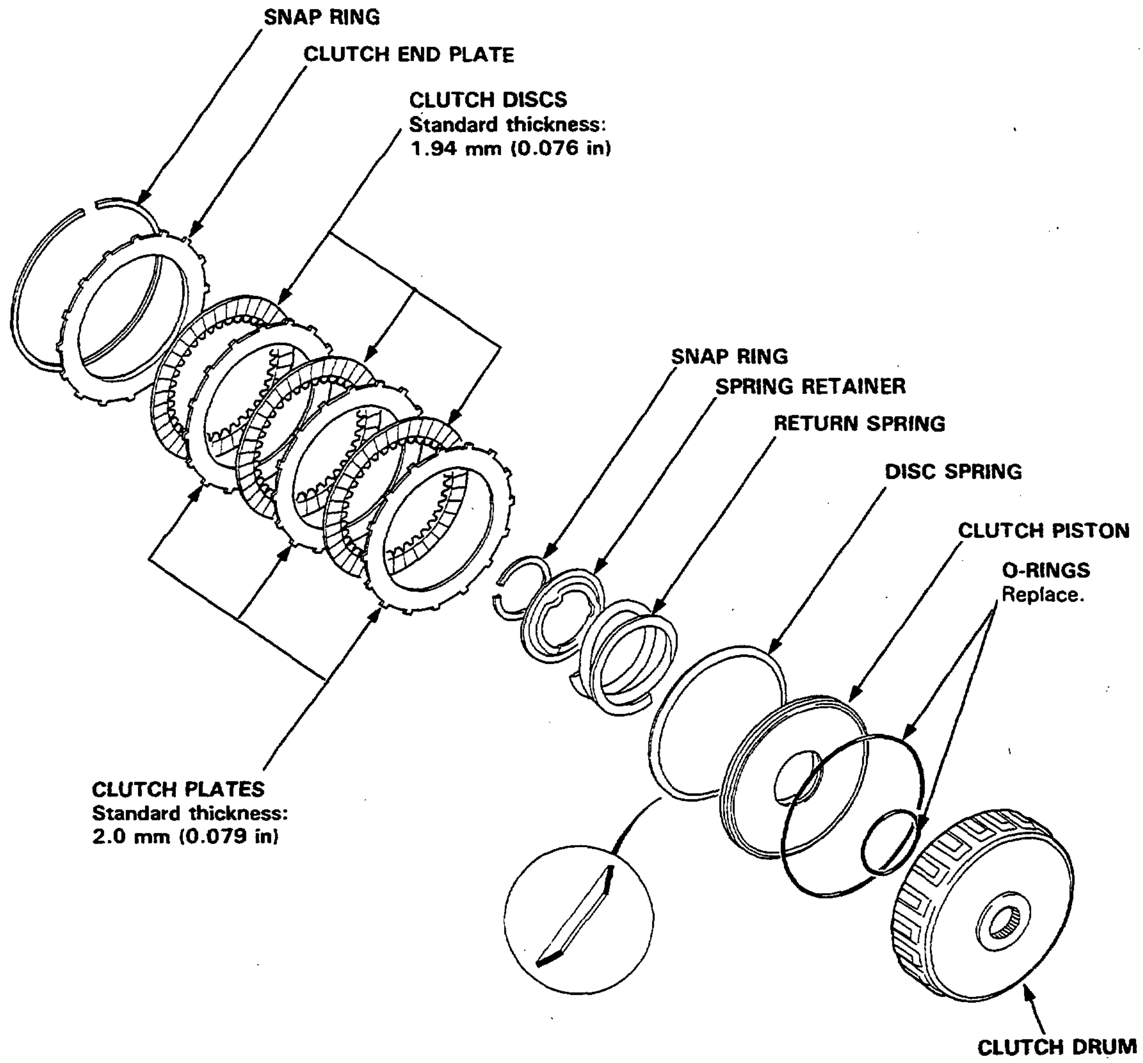
2ND/4TH CLUTCH

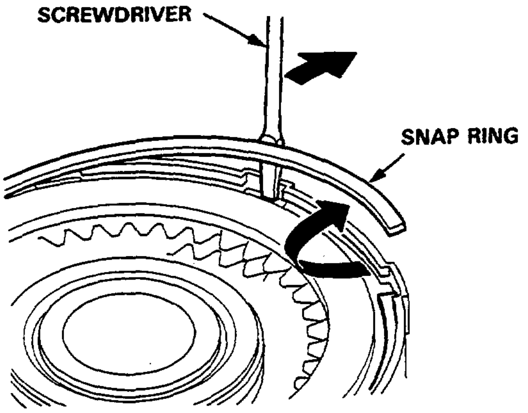


1ST-HOLD CLUTCH

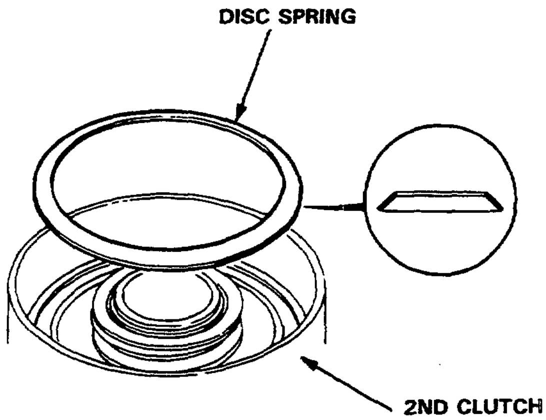


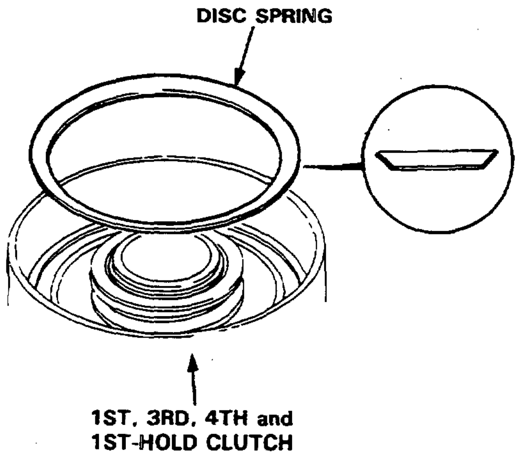
Disassembly

1. Remove the snap ring, then remove the clutch end plate, clutch discs and plates.

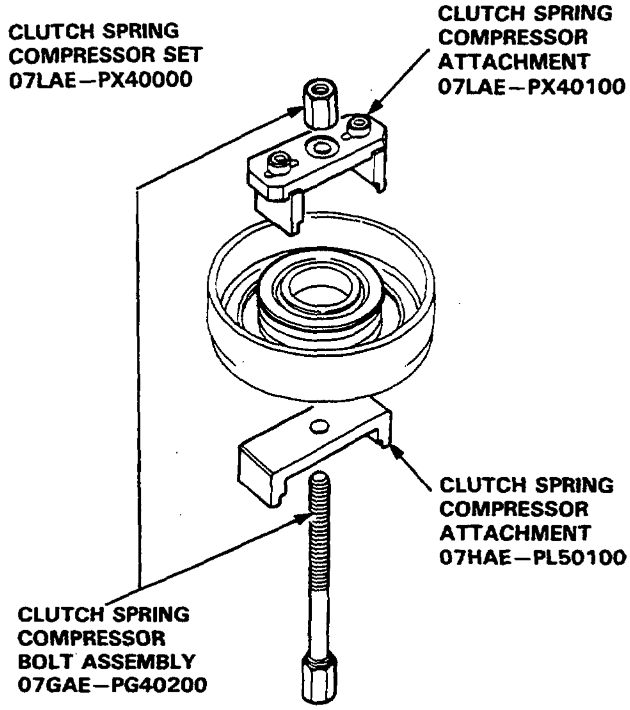


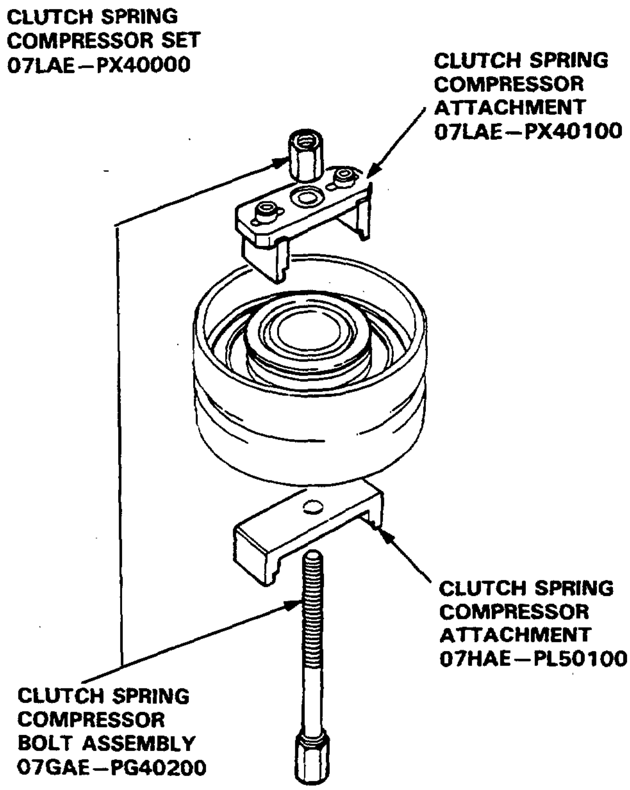
2. Remove the disc spring.



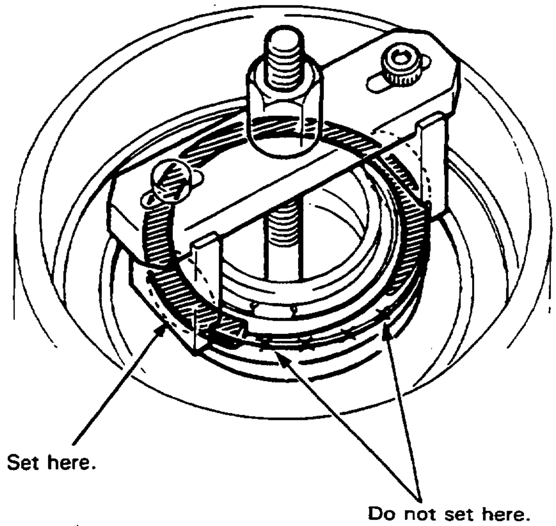


3. Install the special tools as shown.

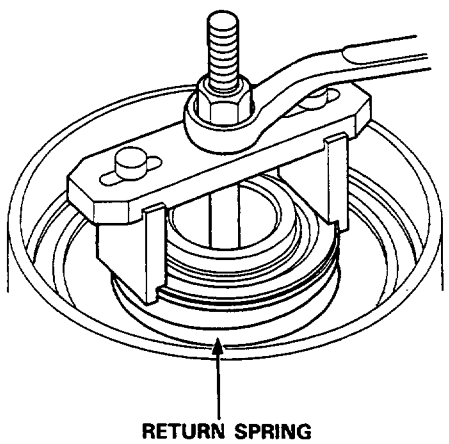




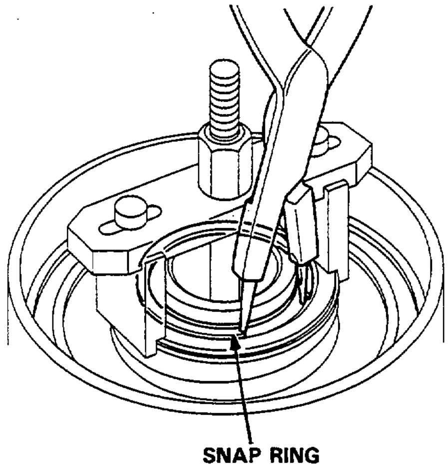
CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



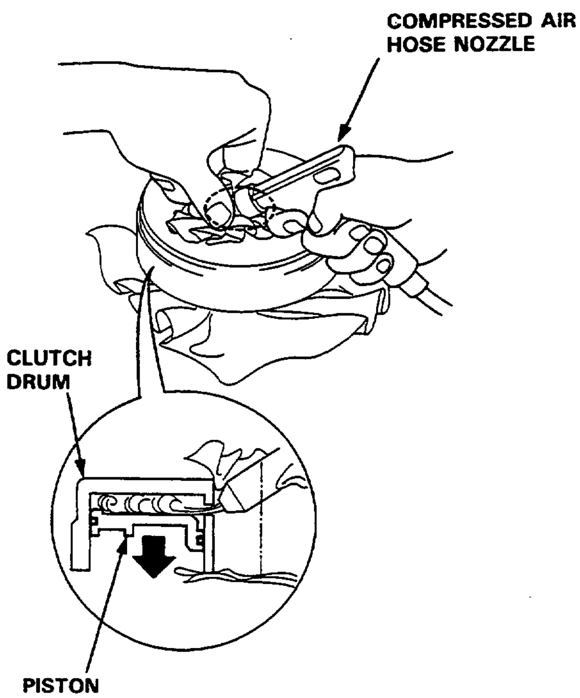
4. Compress the return spring.



5. Remove the snap ring. Then remove the special tools, spring retainer and return spring.



6. Wrap a shop towel 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.

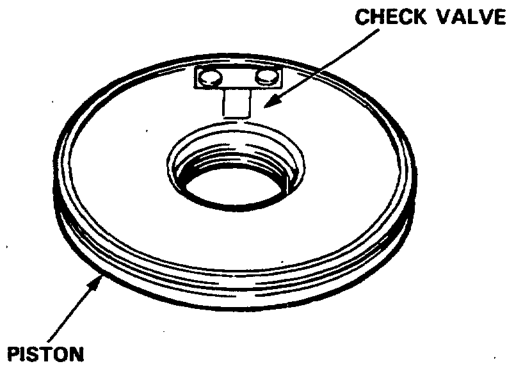


Reassembly

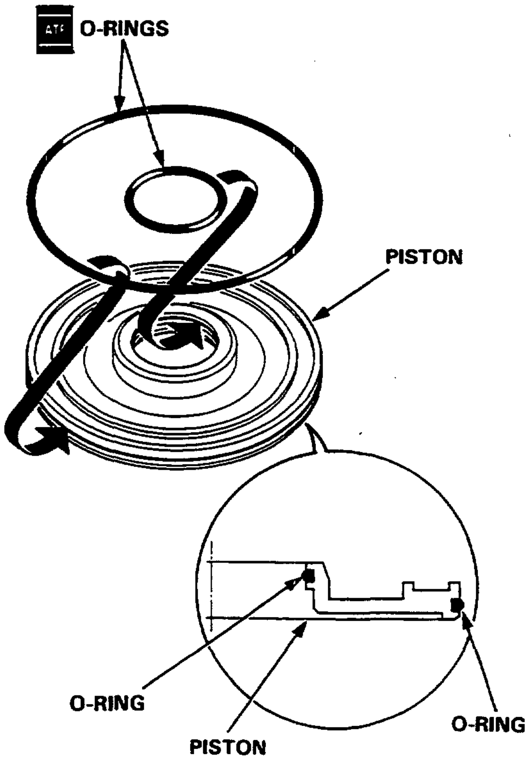
NOTE:
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before reassembly.

1. Inspect the check valve; if it's loose, replace the piston.

   NOTE: Except 1st-hold clutch.



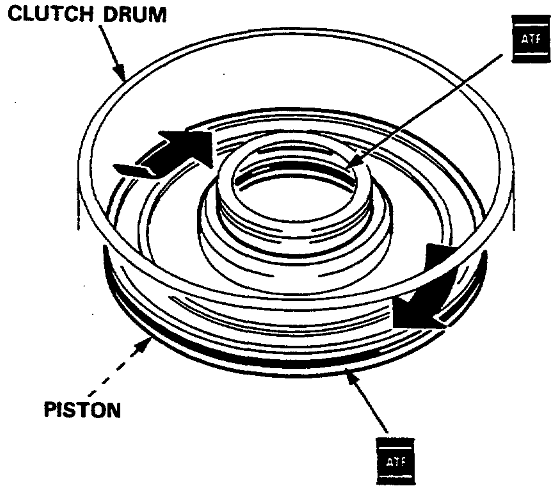
2. Install new O-rings on the clutch piston.



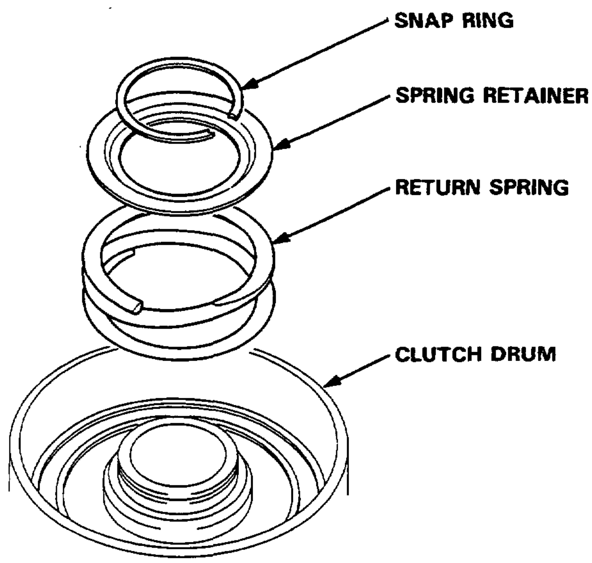
3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

   NOTE: Lubricate the piston O-ring with ATF before installing.

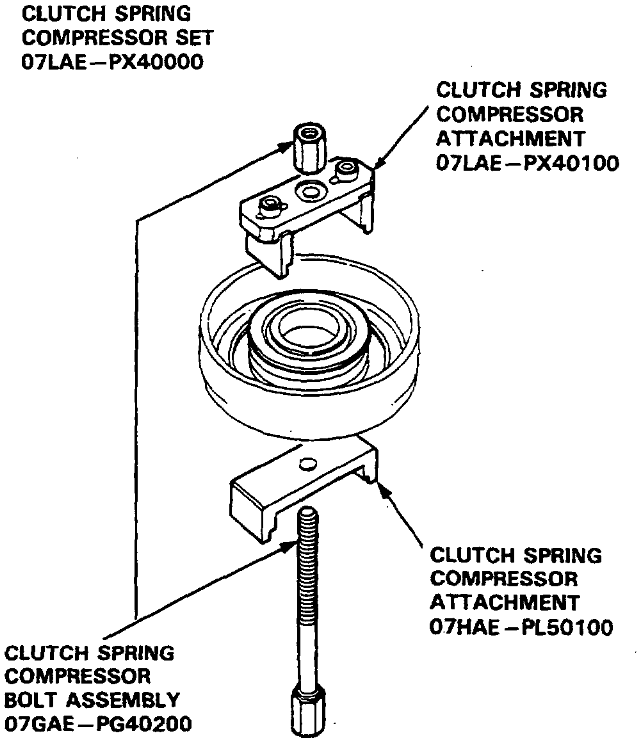
   CAUTION: Do not pinch the O-ring by installing the piston with too much force.

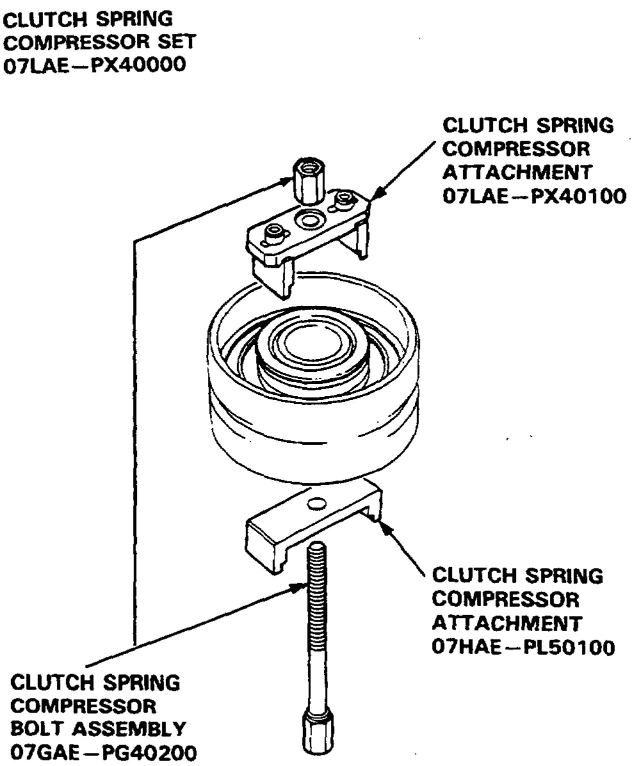


4. Install the return spring and spring retainer, and position the snap ring on the retainer.

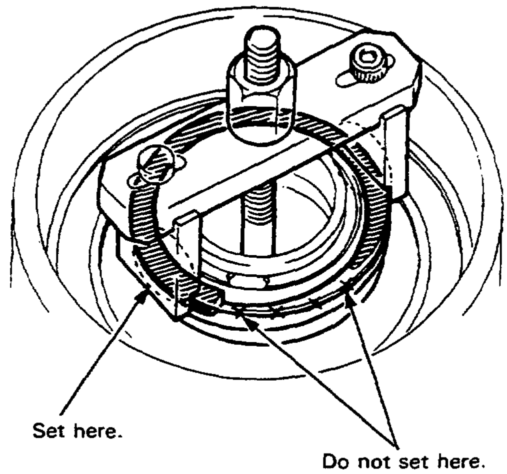


5. Install the special tools as shown.

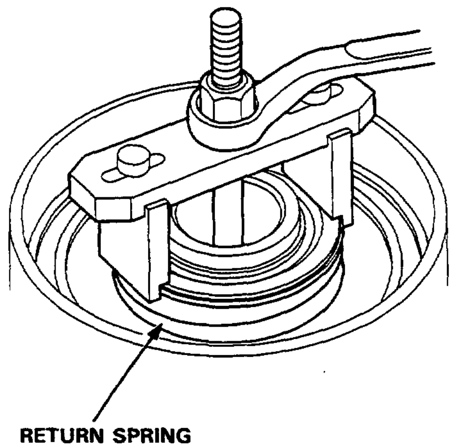




CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



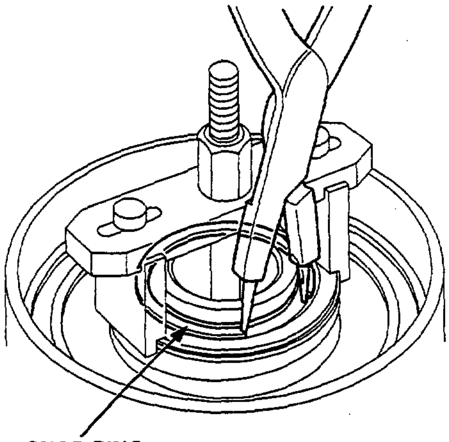
6. Compress the return spring.



(cont'd)

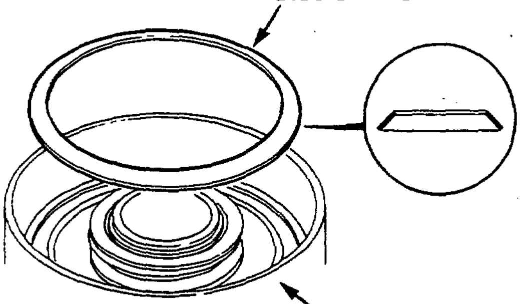
Reassembly (cont'd)

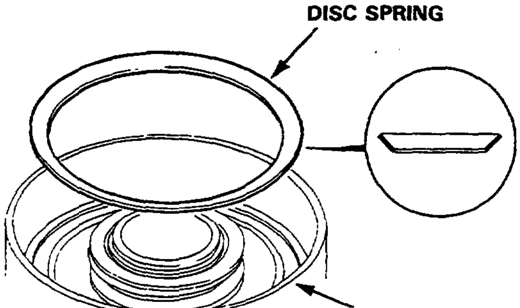
7. Install the snap ring.



8. Remove the special tools.
9. Install the disc spring.

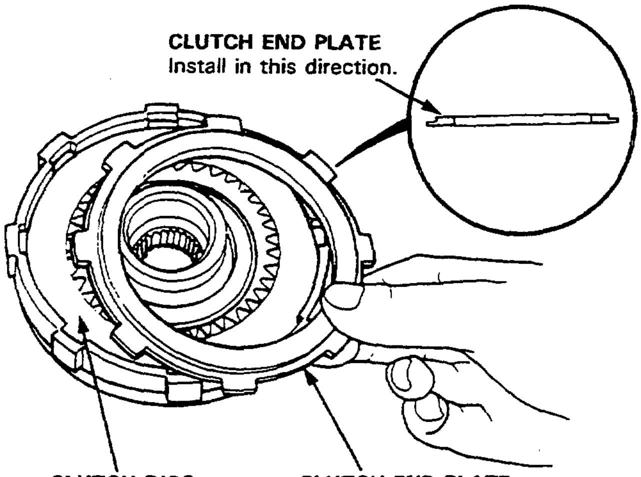
   NOTE: Install the disc spring in the direction shown.



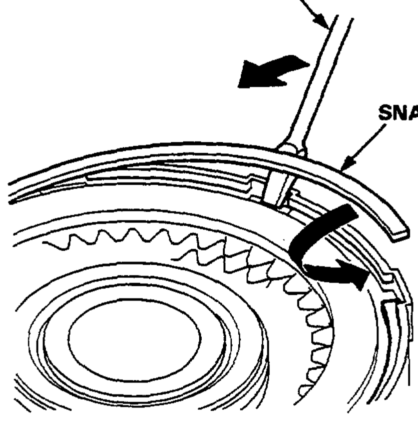


10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.
11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with flat side toward the disc.

    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.

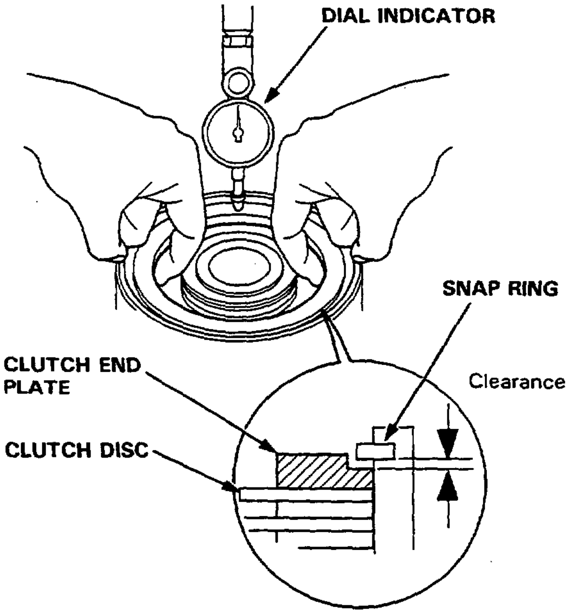


13. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

NOTE: Measure at three locations.

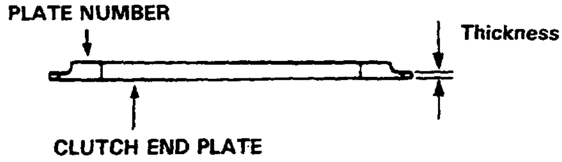
Clutch End Plate-to-Top Disc Clearance:

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	0.50–0.80 mm (0.020–0.031 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.



1ST, 2ND, 3RD and 4TH CLUTCH

Plate No.	Part Number	Thickness
1	22551–PC9–000	2.4 mm (0.094 in)
2	22552–PC9–000	2.5 mm (0.098 in)
3	22553–PC9–000	2.6 mm (0.102 in)
4	22554–PC9–000	2.7 mm (0.106 in)
5	22555–PC9–000	2.8 mm (0.110 in)
6	22556–PC9–000	2.9 mm (0.114 in)
7	22557–PC9–000	3.0 mm (0.118 in)
8	22558–PC9–000	3.1 mm (0.122 in)
9	22559–PC9–000	3.2 mm (0.126 in)
10	22560–PC9–000	3.3 mm (0.130 in)
11	22561–PC9–000	2.1 mm (0.082 in)
12	22562–PC9–000	2.2 mm (0.086 in)
13	22563–PC9–000	2.3 mm (0.090 in)

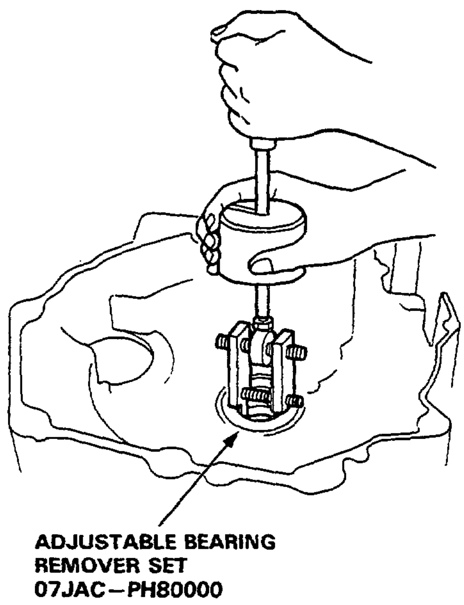
1ST-HOLD CLUTCH

Plate No.	Part Number	Thickness
1	22551–PS5–003	2.1 mm (0.082 in)
2	22552–PS5–003	2.2 mm (0.086 in)
3	22553–PS5–003	2.3 mm (0.090 in)
4	22554–PS5–003	2.4 mm (0.094 in)
5 (No mark)	22555–PS5–003	2.5 mm (0.098 in)
6	22556–PS5–003	2.6 mm (0.102 in)
7	22557–PS5–003	2.7 mm (0.106 in)

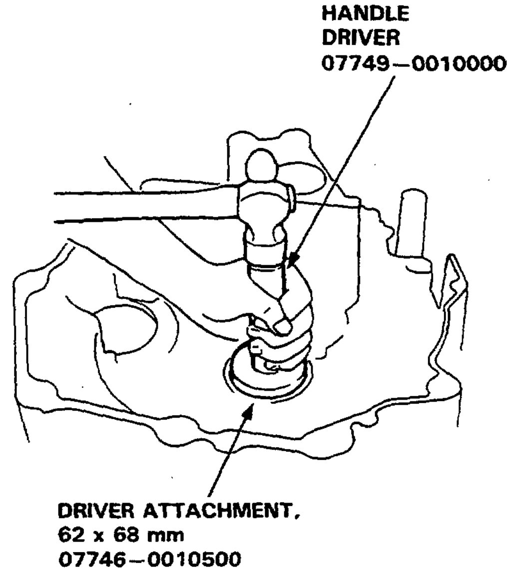
Torque Converter Housing Bearings

Mainshaft Bearing/Oil Seal Replacement

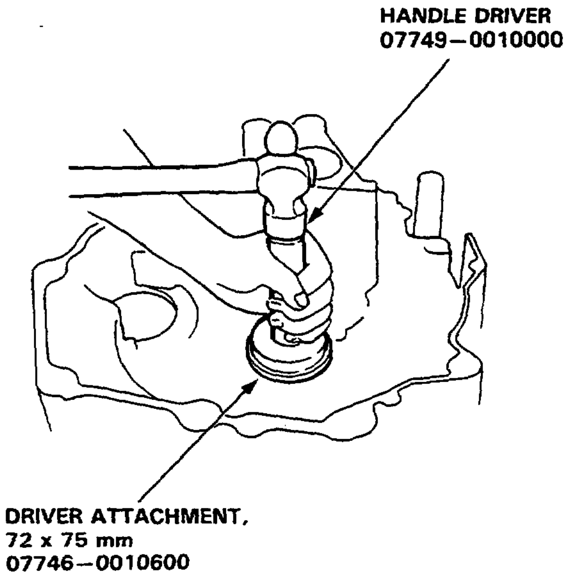
1. Pull up the mainshaft bearing and oil seal using the special tools as shown.



2. Drive in the new mainshaft bearing until it bottoms in the housing, using the special tools as shown.

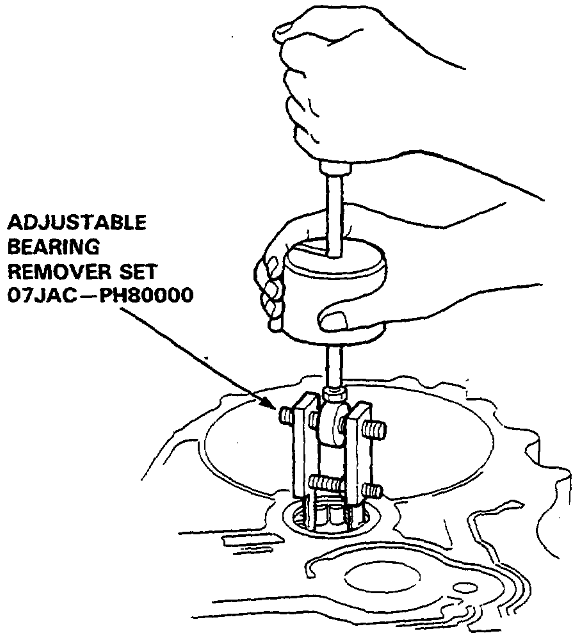


3. Install the new oil seal flush with the housing using the special tools as shown.

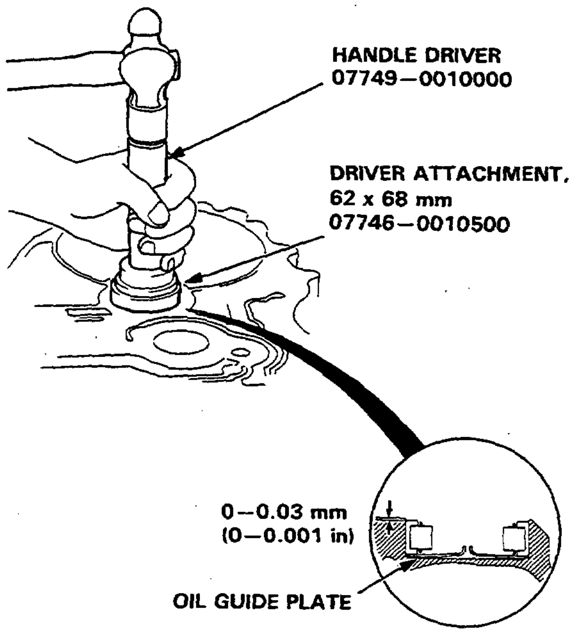


Countershaft Bearing Replacement

1. Remove the countershaft bearing using the special tools as shown.



2. Install the oil guide plate.
3. Drive the new bearing into the housing using the special tools as shown.

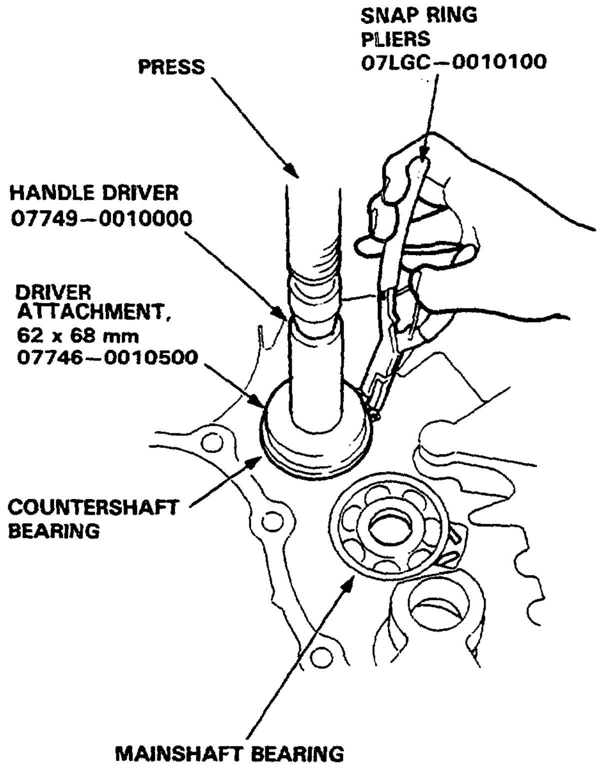


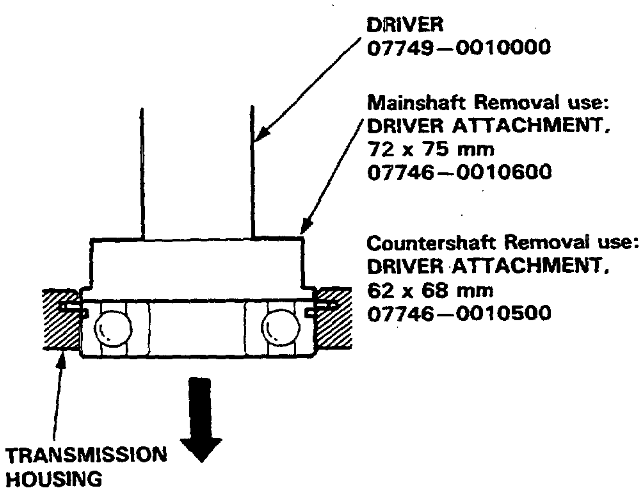
Transmission Housing Bearings

Mainshaft/Countershaft Bearings Replacement

1. To remove the mainshaft and countershaft bearings from the transmission housing, expand each snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.

   NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.

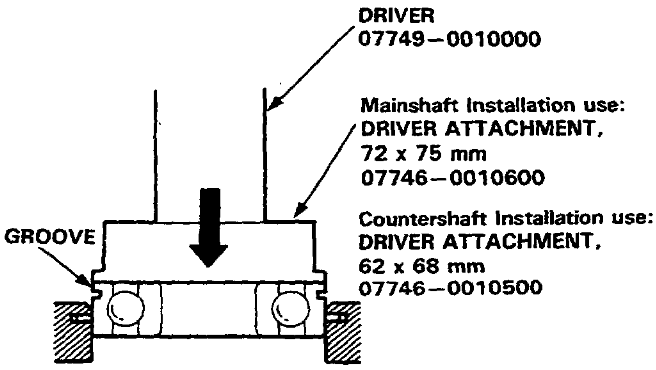




2. Expand each snap ring with snap ring pliers, insert the new bearing part-way into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing.

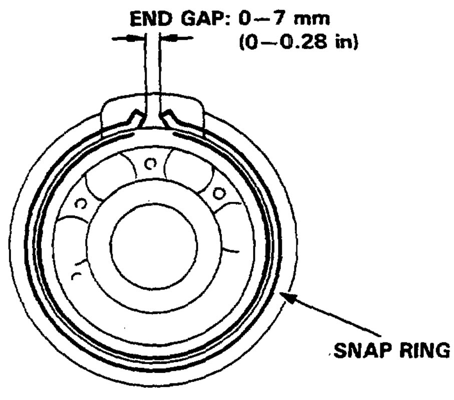
   NOTE: Coat all parts with ATF.

3. Release the pliers, then push the bearing down into the housing until the ring snaps in place around it.



4. After installing the bearing verify the following:

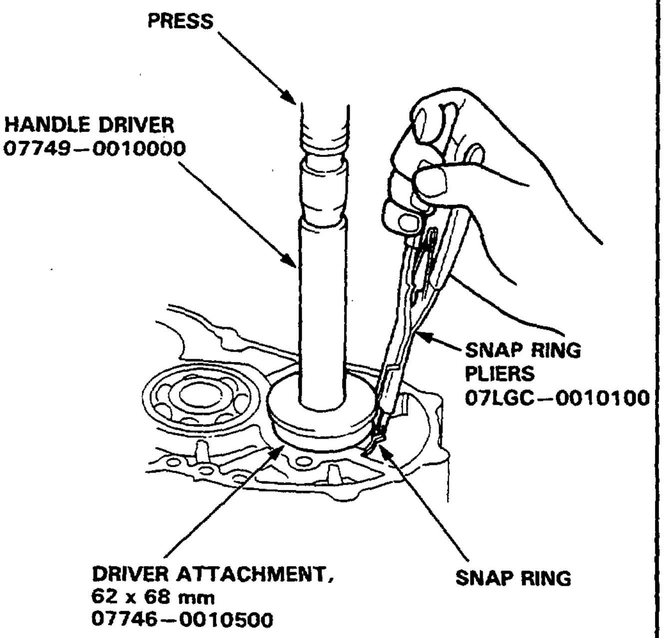
   - The snap ring is seated in the bearing and housing grooves.
   - The snap ring operates properly.
   - The ring end gap is correct.

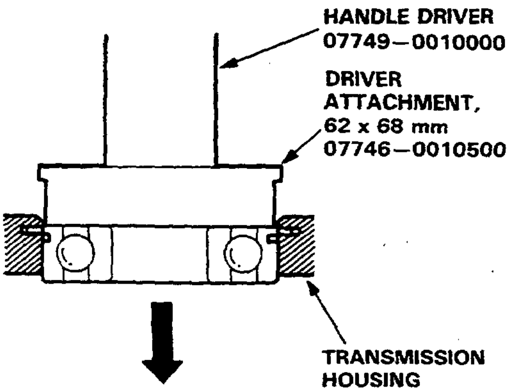


Sub-shaft Bearing Replacement

1. To remove the sub-shaft bearing from the transmission housing, expand the snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.

   NOTE: Do not remove the snap ring unless it's necessary to clean the groove in the housing.

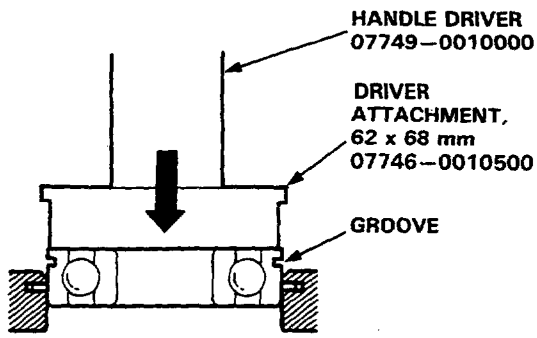




2. Expand the snap ring with snap ring pliers, insert the new bearing part-way into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing.

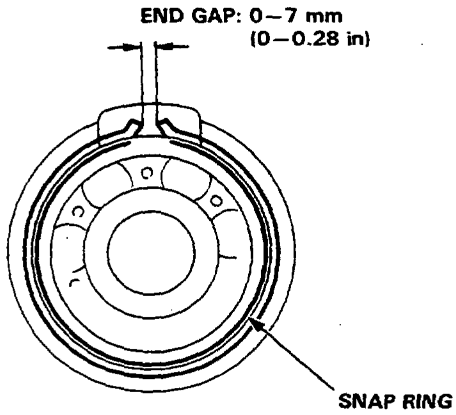
   NOTE: Coat all parts with ATF.

3. Release the pliers, then push the bearing down into the housing until the ring snaps in place around it, using the special tools as shown.



4. After installing the bearing verify the following:

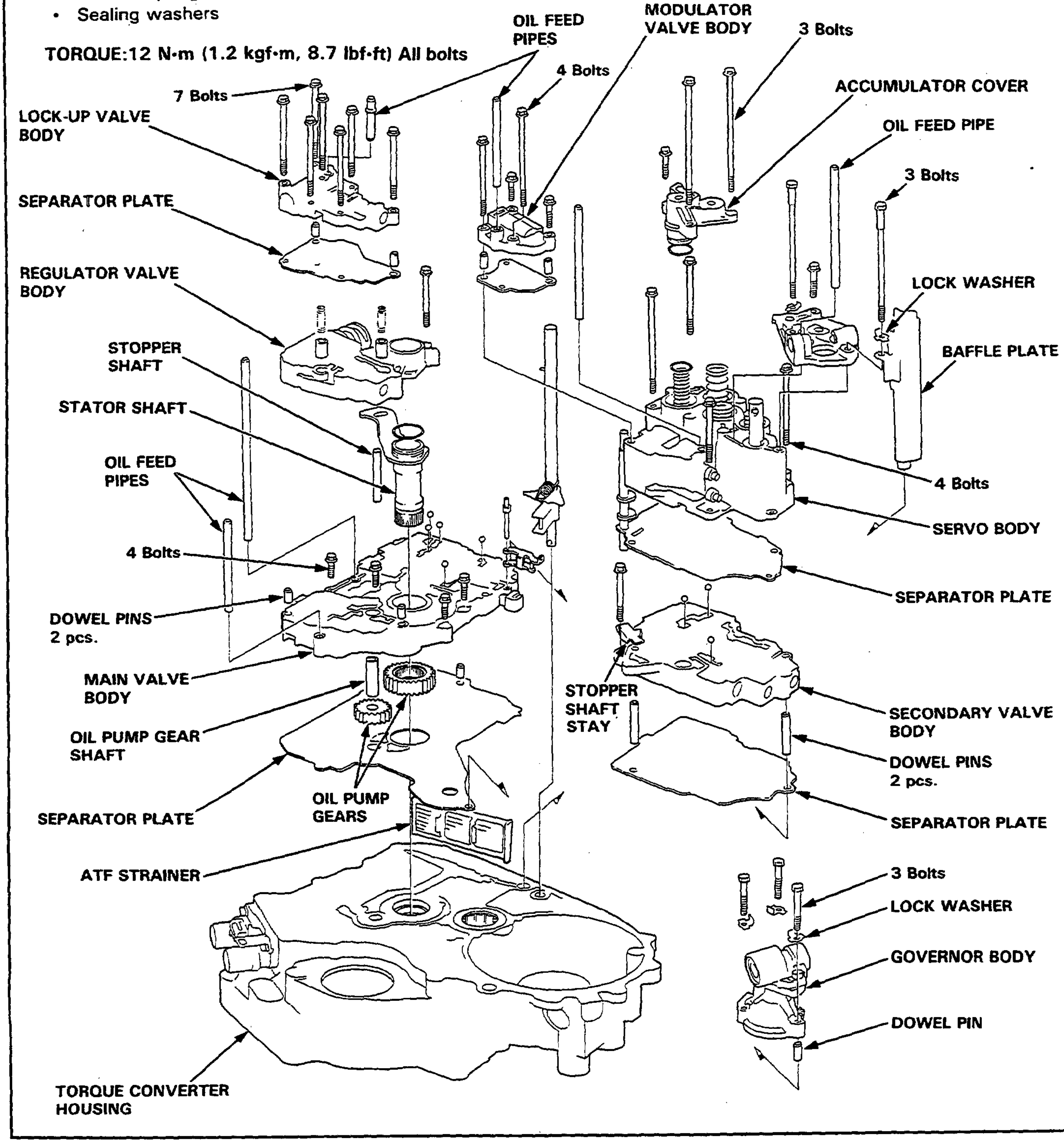
   - The snap ring is seated in the bearing and housing grooves.
   - The snap ring operates properly.
   - The ring end gap is correct.



Reassembly

NOTE:
- Coat all parts with ATF.
- Replace the parts below:
  - O-rings
  - Lock washers
  - Gaskets
  - Locknuts
  - Conical spring washer
  - Sealing washers

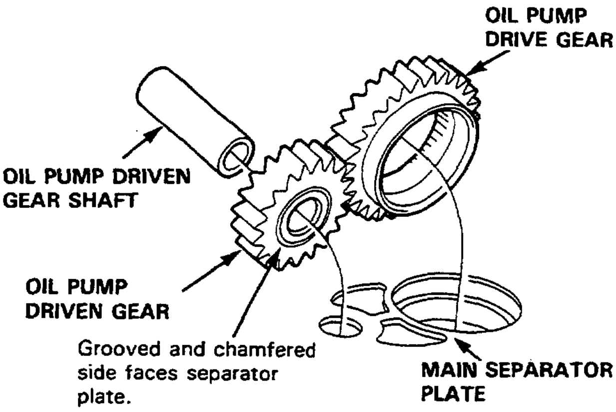
TORQUE:12 N·m (1.2 kgf·m, 8.7 lbf·ft) All bolts



1. Install the ATF strainer in the torque converter housing.

2. Install the main separator plate with two dowel pins on the torque converter housing. Then install the oil pump drive gear, driven gear and driven gear shaft.

   NOTE: Install the oil pump driven gear with its grooved and chamfered side facing down.

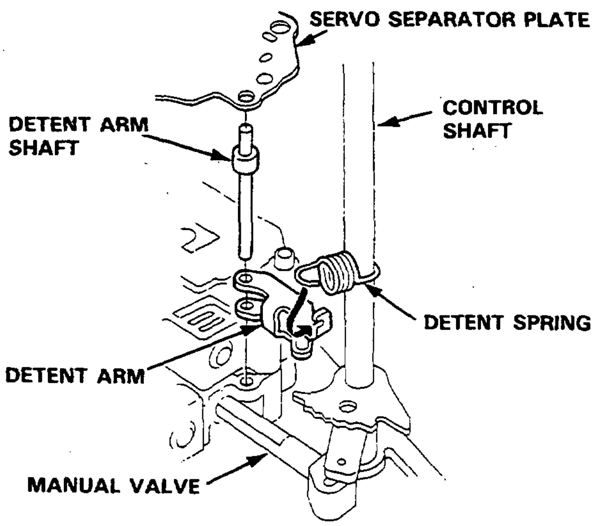


3. Install the main valve body and loosely tighten the bolts. Make sure the oil pump drive gear rotates smoothly in the normal operating direction and the oil pump driven gear shaft moves smoothly in the axial and normal operating directions.

4. Install the secondary valve body, separator plate and two dowel pins on the main valve body.

5. Install the control shaft in the housing, with the control shaft and manual valve together.

6. Install the detent arm and arm shaft in the main valve body, then hook the detent spring to the detent arm.



7. Install the servo body and separator plate with four bolts.

8. Install the modulator valve body, separator plate and two dowel pins with four bolts.

9. Install the accumulator cover with three bolts.

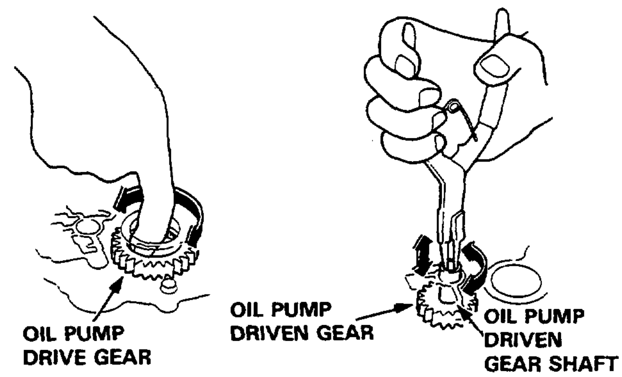
10. Install the servo detent base and baffle plate with three bolts and new lock washers.

11. Install the governor body with three bolts and new lock washers.

12. Tighten the four bolts to 12 N•m (1.2 kgf•m, 8.7 lbf•ft) on the main valve body. Make sure the oil pump drive gear and oil pump driven gear shaft move smoothly.

13. If the oil pump drive gear and oil pump driven gear shaft do not move freely, loosen the four bolts on the main valve body and disassemble the valve bodies. Realign the oil pump driven gear shaft and reassemble the valve bodies, then retighten the bolts 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.



14. Install the stator shaft and stopper shaft.

15. Install the stopper shaft stay on the secondary valve body with one bolt.

16. Install the regulator valve body with one bolt.

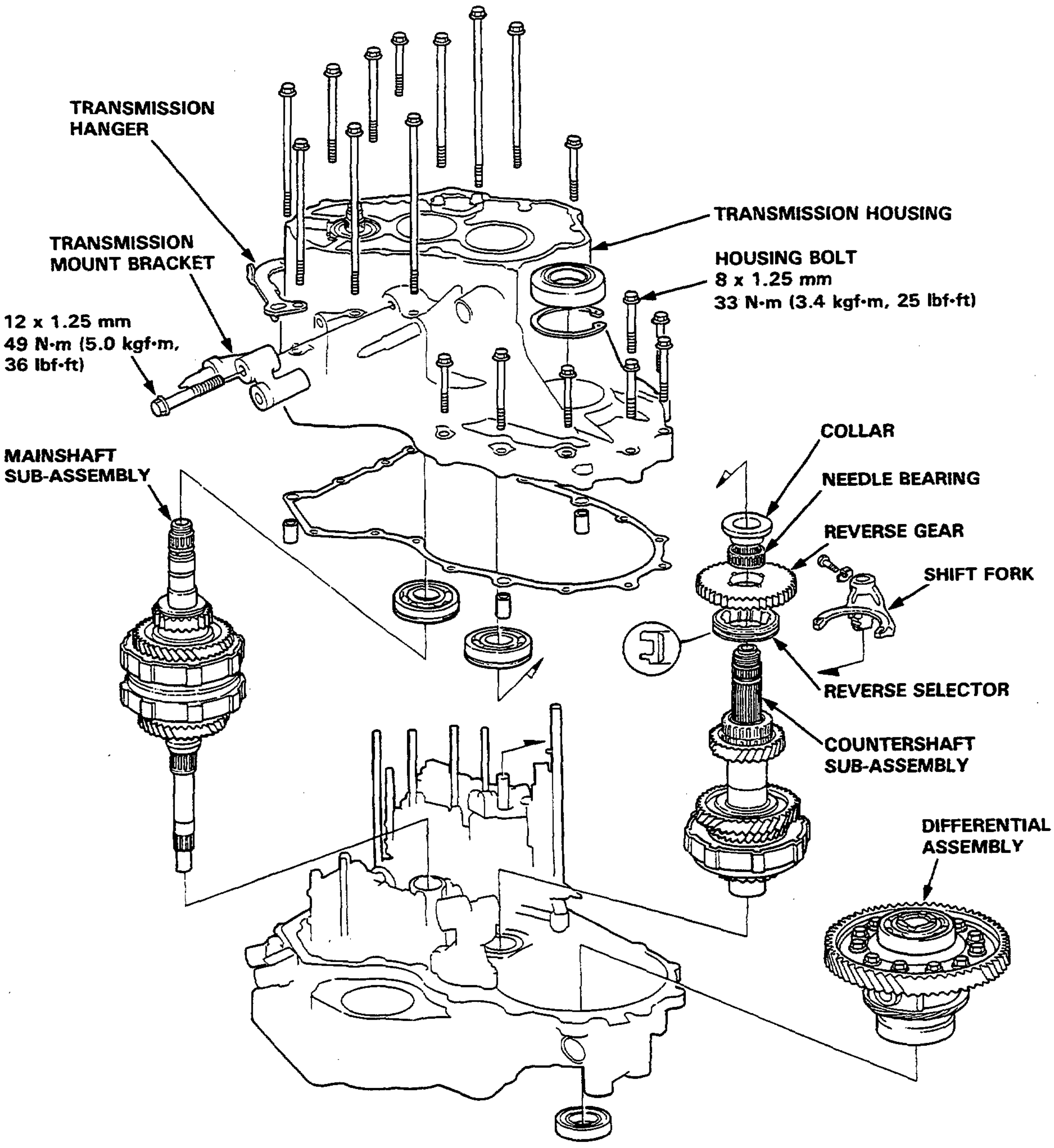
17. Install the torque converter check valve, cooler check valve and valve springs in the regulator valve body.

18. Install the lock-up valve body, separator plate and two dowel pins with seven bolts.

19. Install the oil feed pipes.

(cont'd)

Reassembly (cont'd)



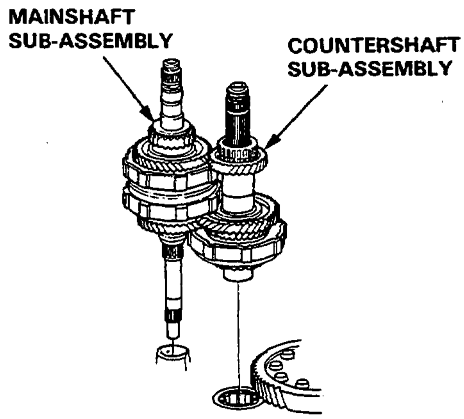
20. Install the sub-shaft assembly in the transmission housing (see pages 14-98 and 99).

21. Install the reverse idler gear and gear shaft holder (see page 14-120).

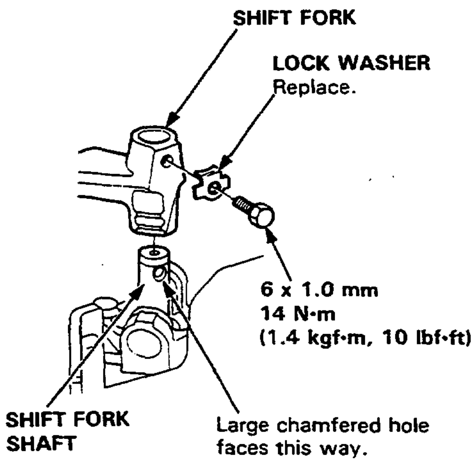
22. Install the differential assembly in the torque converter housing.

CAUTION: Take care not to damage the governor body.

23. Install the mainshaft and countershaft sub assembly together in the torque converter housing.



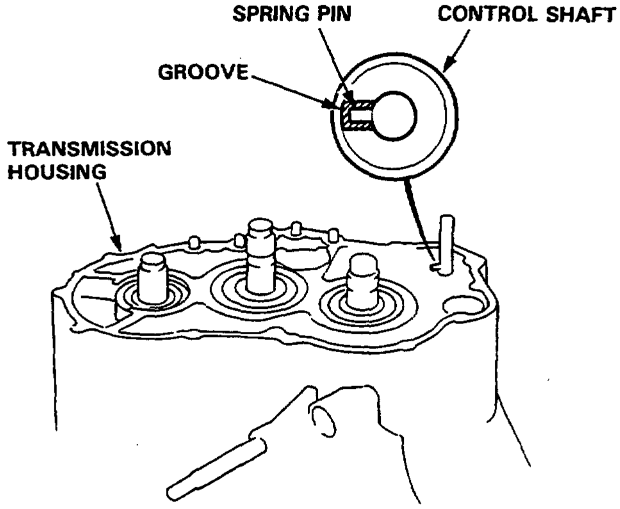
24. Turn the shift fork shaft so the large chamfered hole is facing the fork bolt hole, then install the shift fork with the reverse selector and torque the lock bolt. Bend the lock tab against the bolt head.



25. Install the reverse gear with the collar and needle bearing on the countershaft.

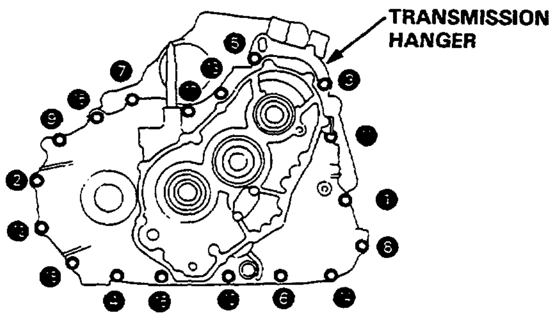
26. Align the spring pin of the control shaft with the transmission housing groove by turning the control shaft.

27. Place the transmission housing on the torque converter housing with a new gasket and the dowel pins.



28. Install the transmission housing bolts along with the transmission hanger, then torque the bolts in two or more steps in the sequence shown.

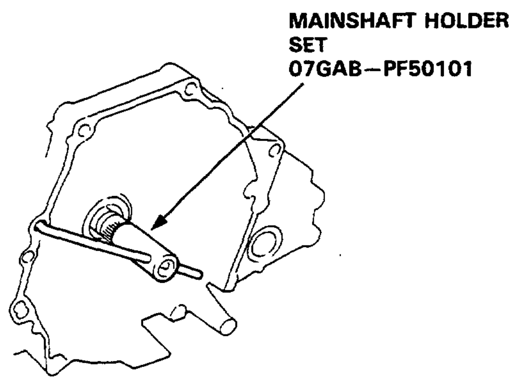
TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)



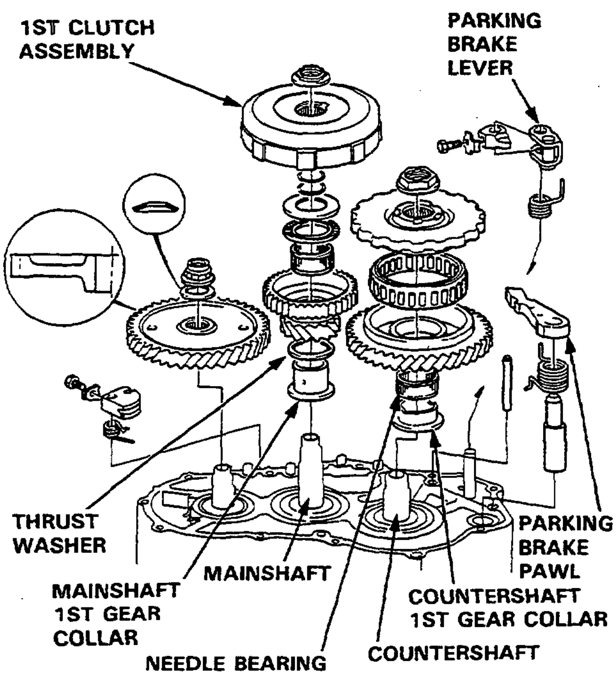
(cont'd)

Reassembly (cont'd)

29. Slip the special tool onto the mainshaft as shown.

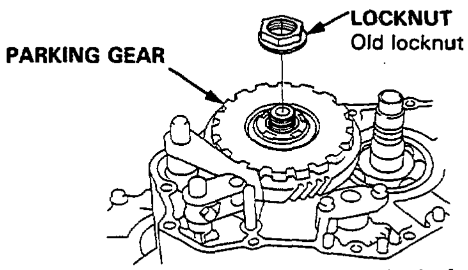


30. Install the parking brake lever on the control shaft.
31. Install the mainshaft 1st gear collar and thrust washer on the mainshaft.
32. Install the countershaft 1st gear collar and needle bearing on the countershaft.
33. Install the parking gear, countershaft 1st gear and one-way clutch assembly on the countershaft.
34. Install the parking brake pawl in the transmission housing, then engage it with the parking gear.



35. Use the old locknut to tighten the parking gear to the specified torque, then loosen it.

TORQUE: 137 N·m (14.0 kgf·m, 101 lbf·ft)



36. Install new O-rings on the mainshaft.

    NOTE: Wrap the splines with tape to prevent damaging O-rings.

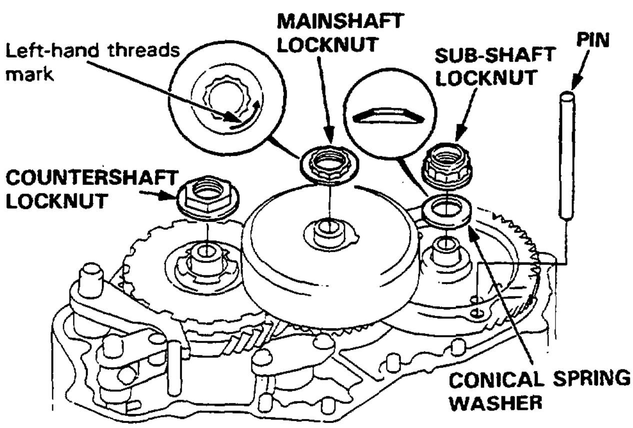
37. Install mainshaft 1st gear and 1st clutch assembly on the mainshaft. Then install sub-shaft 1st gear on the sub-shaft.
38. Align the hole of the sub-shaft 1st gear with the hole of the transmission housing, then insert a pin to hold the sub-shaft while tightening the sub-shaft locknut.
39. Install the conical spring washer on the sub-shaft, and new locknuts on each shaft.

    CAUTION: Install the conical spring washer in the direction shown.

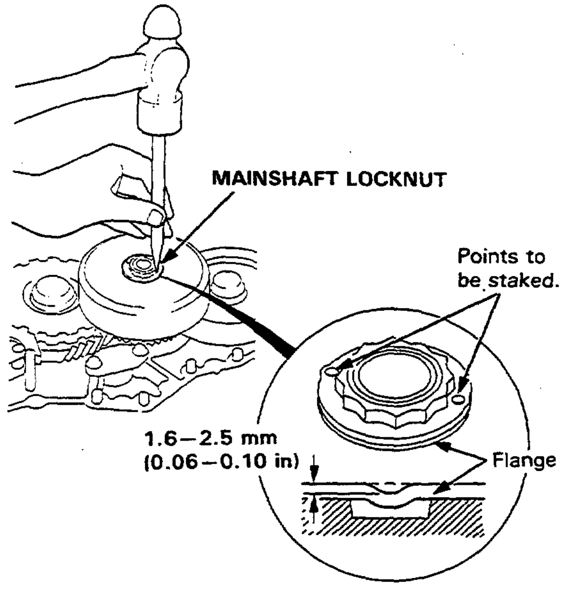
40. Tighten the locknuts to their specified torque.

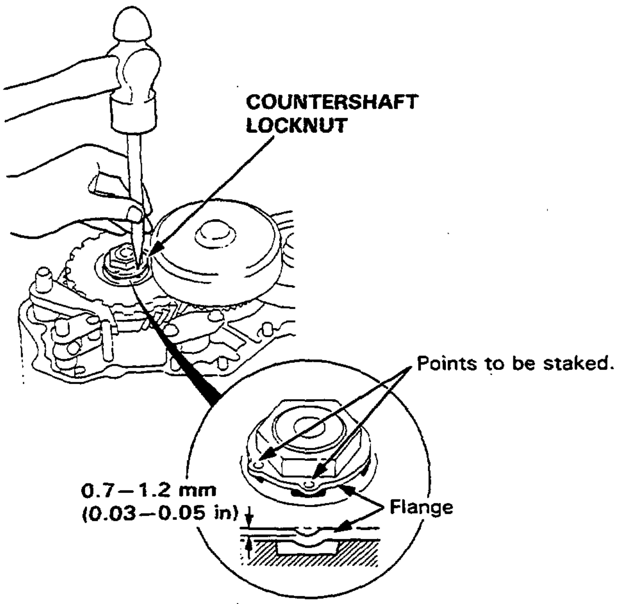
TORQUE:
- **MAINSHAFT 93 N·m (9.5 kgf·m, 69 lbf·ft)**
- **COUNTERSHAFT**
  137 N·m (14.0 kgf·m, 101 lbf·ft)
- **SUB-SHAFT**
  93 N·m (9.5 kgf·m, 69 lbf·ft)

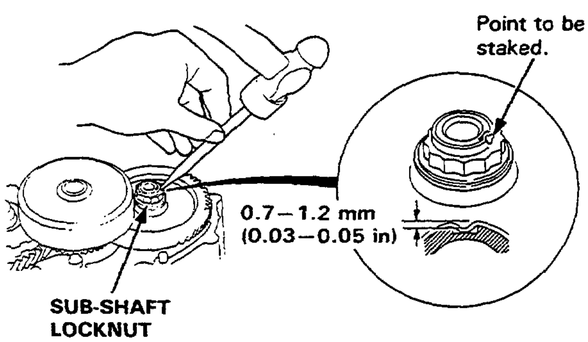
NOTE: Mainshaft locknut has left-hand threads.



41. Stake each locknut using a 3.5 mm punch.



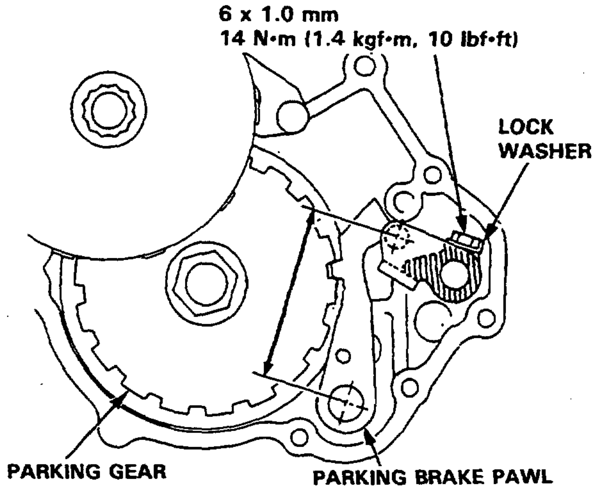




42. Set the parking brake lever in the Park position, then verify that the parking brake pawl engages to the parking gear.

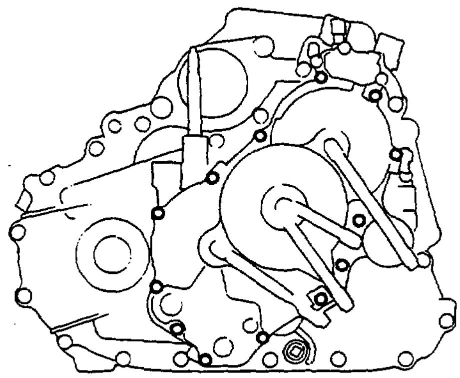
43. If the pawl does not engage fully, check the parking brake pawl stopper clearance as described on page 14-120.

44. Tighten the lock bolt and bend the lock tab.



45. Install the right side cover.

TORQUE:12 N·m (1.2 kgf·m, 8.7 lbf·ft)



46. Install the throttle control drum with the drum spring on the throttle control shaft.

TORQUE: 8 N·m (0.8 kgf·m, 6 lbf·ft)

47. Install the ATF cooler pipes with the joint bolts and new sealing washers.

TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)

48. Install the transmission mount bracket.

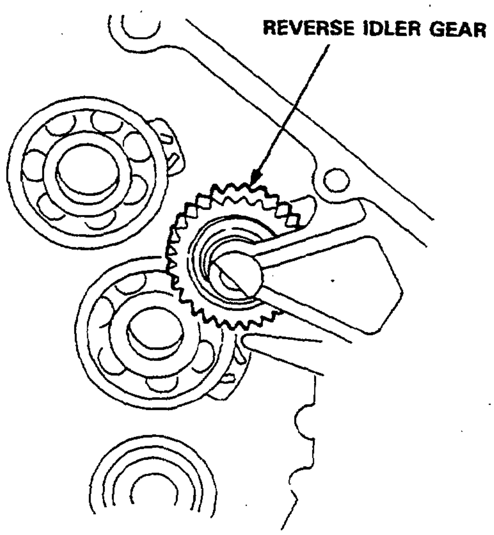
TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)

49. Install the ATF dipstick.

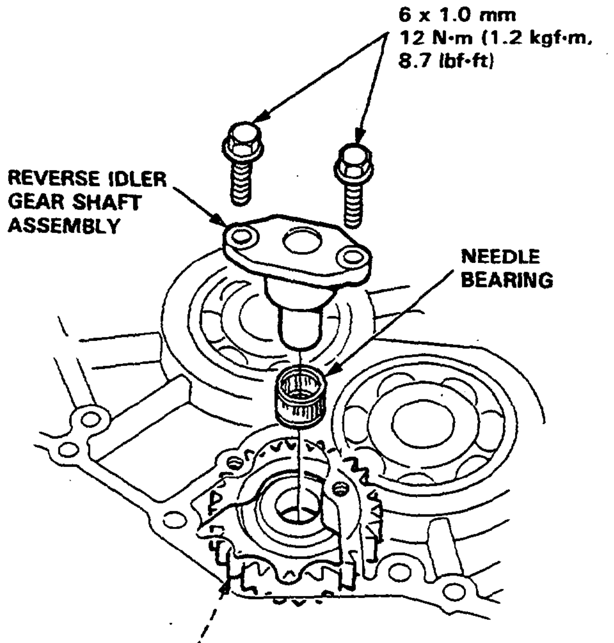
Reverse Idler Gear

Installation

1. Install the reverse idler gear.



2. Install the reverse idler gear shaft holder and needle bearing into the transmission housing, then tighten the bolts.



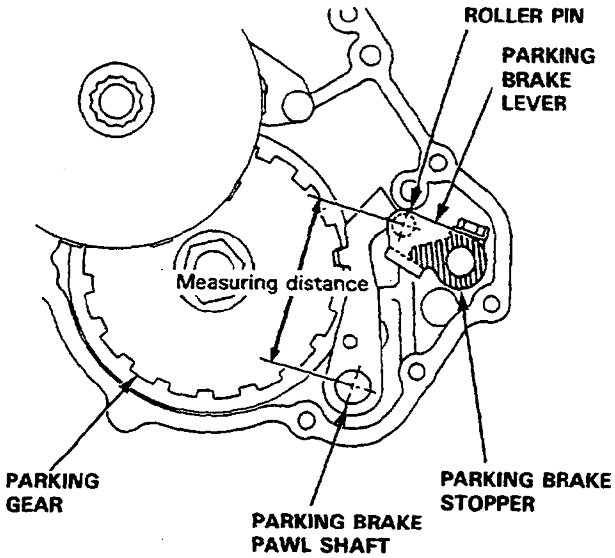
Parking Brake Stopper

Inspection/Adjustment

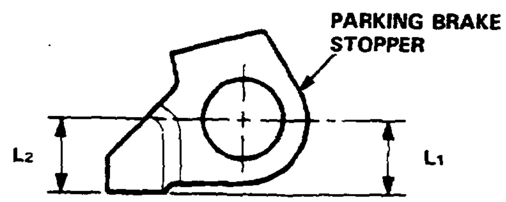
1. Set the parking brake lever in the [P] position.

2. Measure the distance between the parking brake pawl shaft and the parking brake lever roller pin as shown.

   STANDARD: 78.75–79.75 mm (3.10–3.14 in)



3. If the measurement is out of tolerance, select and install the appropriate parking brake stopper from the table below.



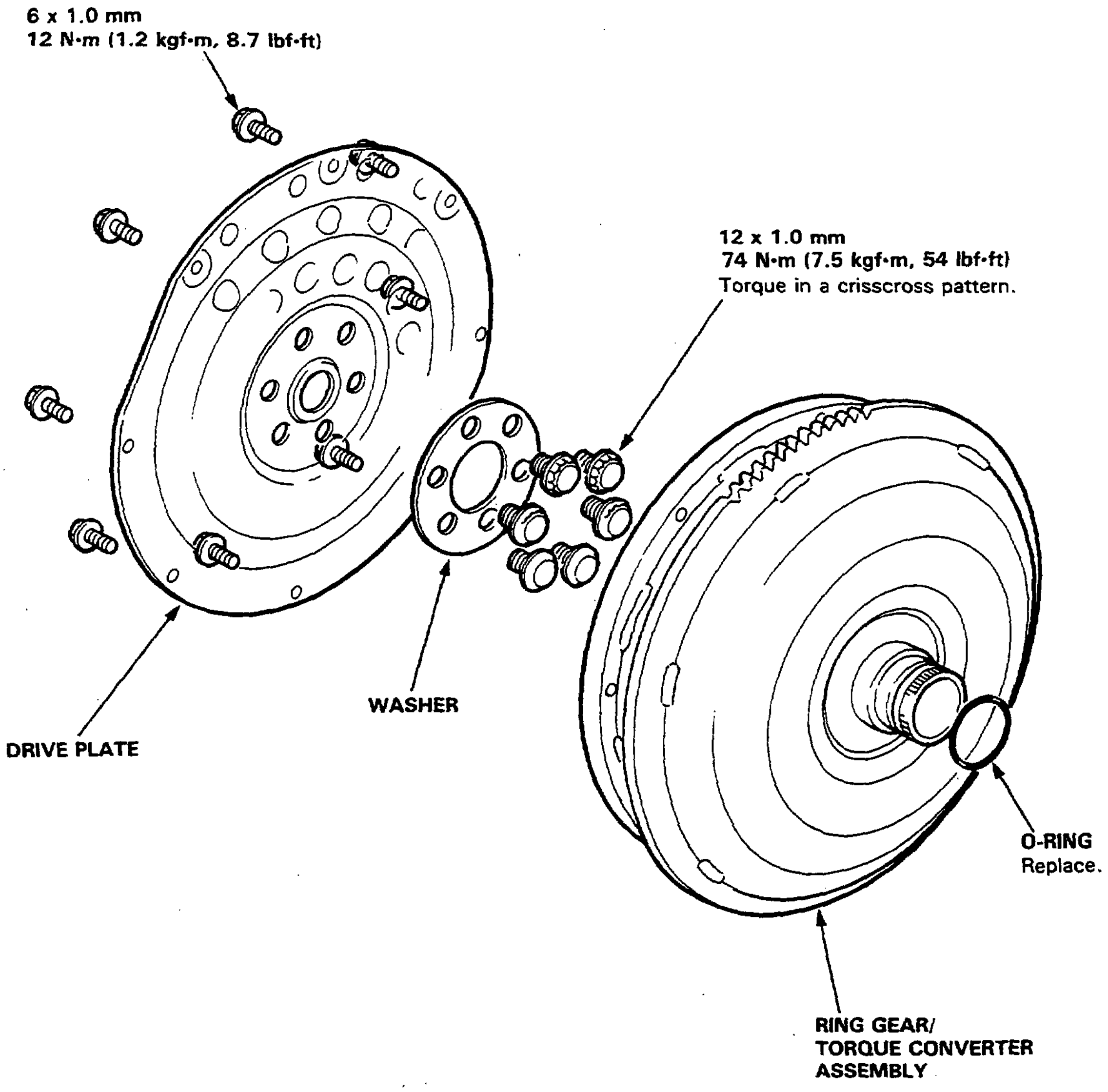
PARKING BRAKE STOPPER

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.

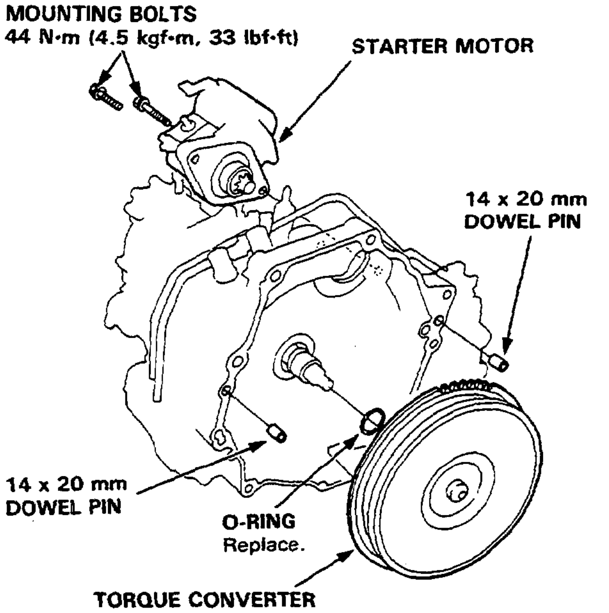
Torque Converter/Drive Plate

Disassembly



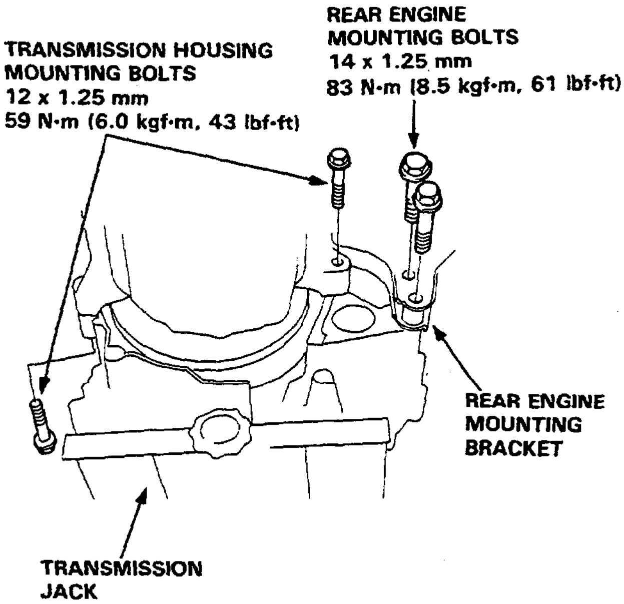
Installation

1. Install the starter motor on the torque converter housing, then install the 14 mm dowel pins in the torque converter housing.

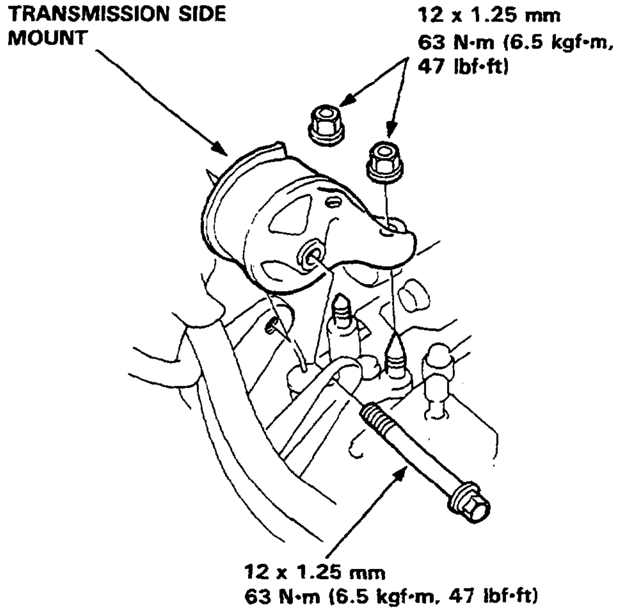


2. Place the transmission on a transmission jack, and raise to the engine level.

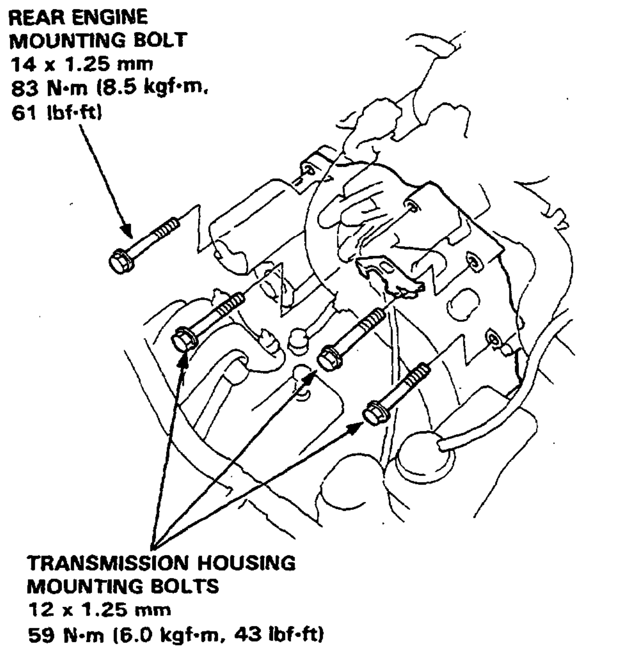
3. Attach the transmission to the engine, then install two transmission housing mounting bolts and two rear engine mounting bolts.



4. Install the transmission side mount.



5. Install the remaining transmission housing mounting bolts and the remaining rear engine mounting bolt.



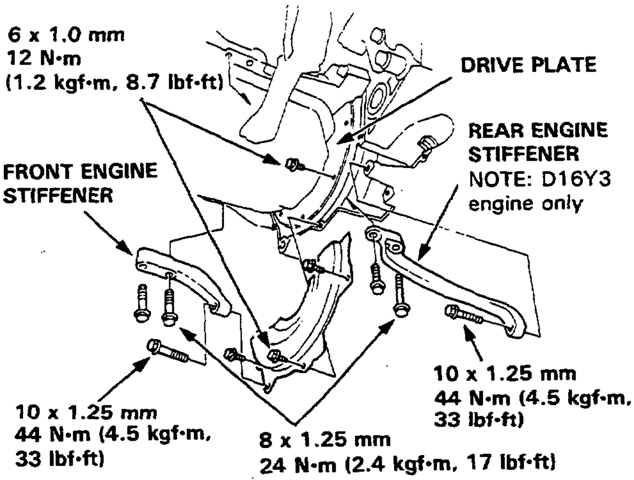
6. Remove the transmission jack and the hoist from the engine.

7. 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)

8. Install the torque converter cover and engine stiffeners.

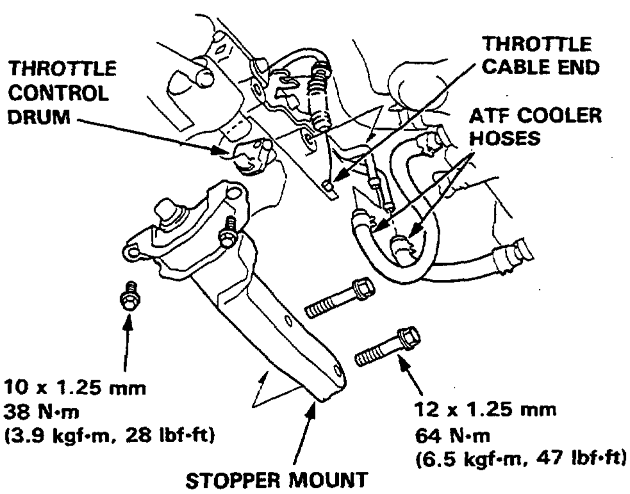
   NOTE: Only the D16Y3 engine uses a rear engine stiffener.



9. Tighten the crankshaft pully bolt to specified torque (see section 6).

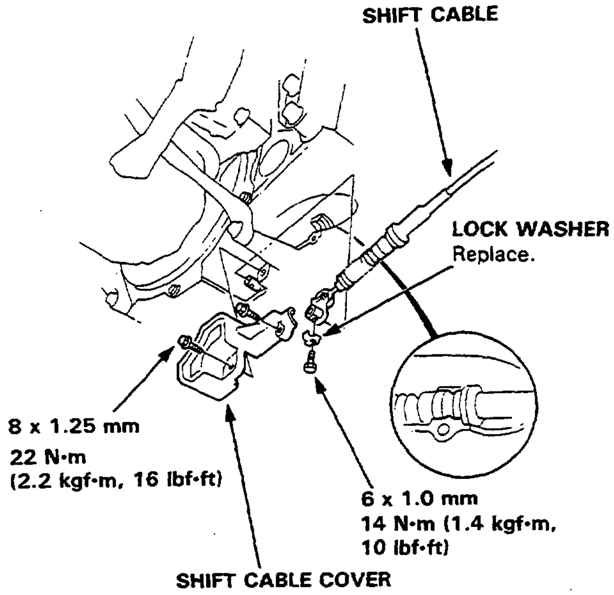
10. Connect the ATF cooler hoses to the joint pipes (see page 14-130).

11. Connect the throttle control cable and install the stopper mount.

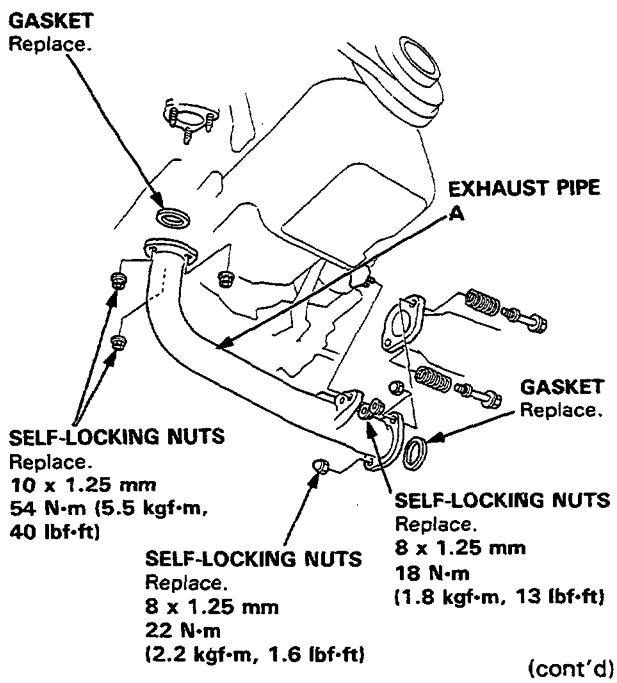


12. Install the control drum with a new lock washer to the control shaft, then install the shift cable cover.

    CAUTION: Take care not to bend the shift cable.

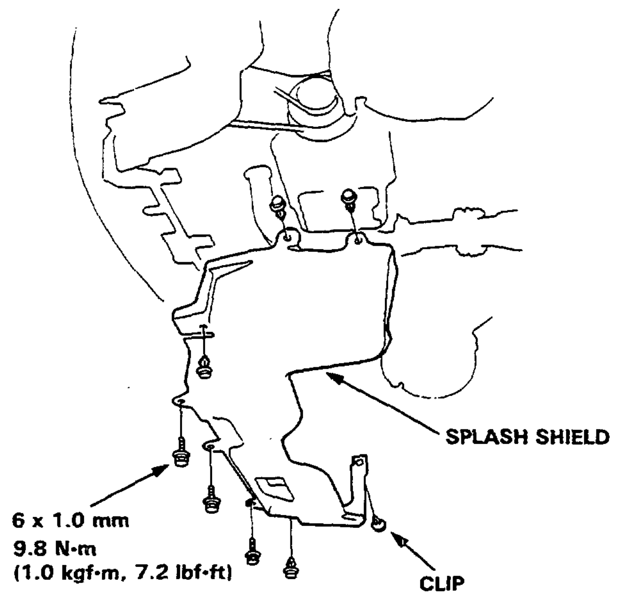


13. Install the exhaust pipe A.



(cont'd)

14. Install the splash shield.

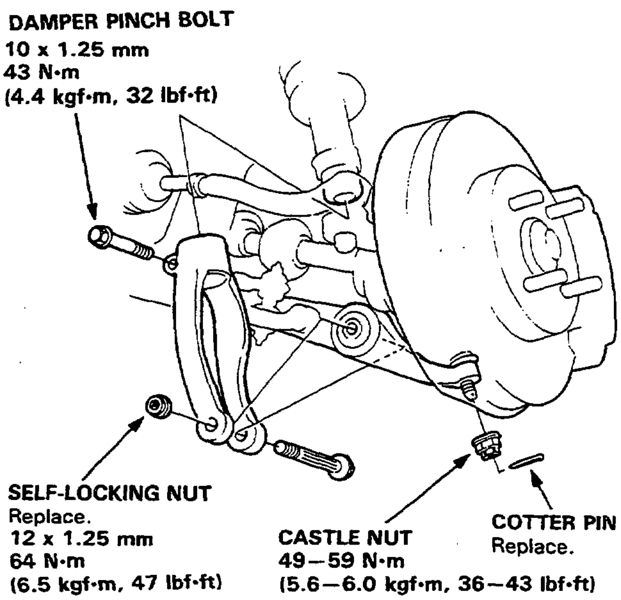


15. Install a new set ring on the end of each driveshaft.

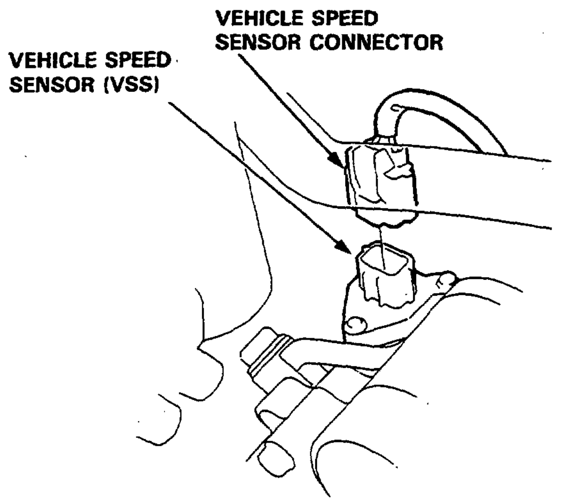
16. Install the right and left driveshafts (see Section 16).

    NOTE: Turn the right and left steering knuckle fully outward, and slide each drive shaft into the differential until you feel its spring clip engage the side gear.

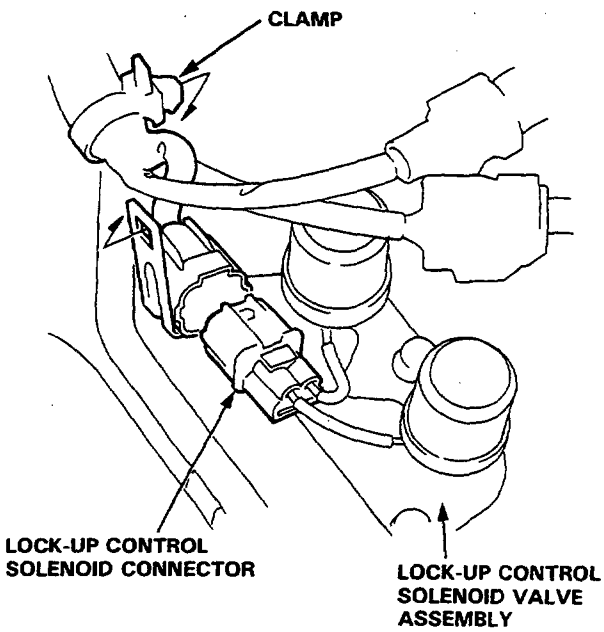
17. Install the damper fork, then install the right and left ball joints to the each lower arm with the castle nuts and a new cotter pins.



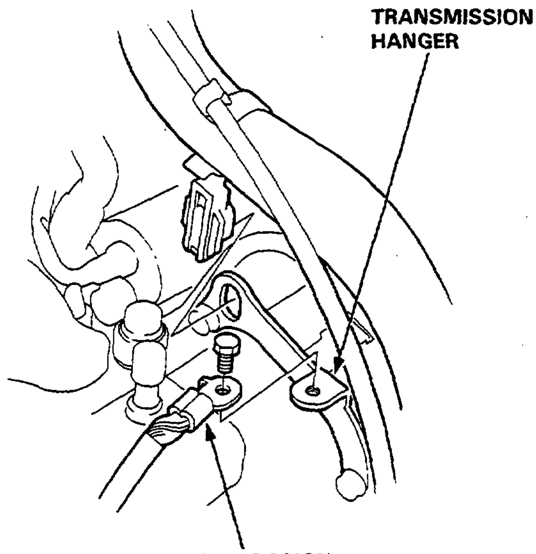
18. Connect the vehicle speed sensor (VSS) connector.



19. Connect the lock-up control solenoid connector, and clamp the harness on the lock-up control solenoid connector stay.

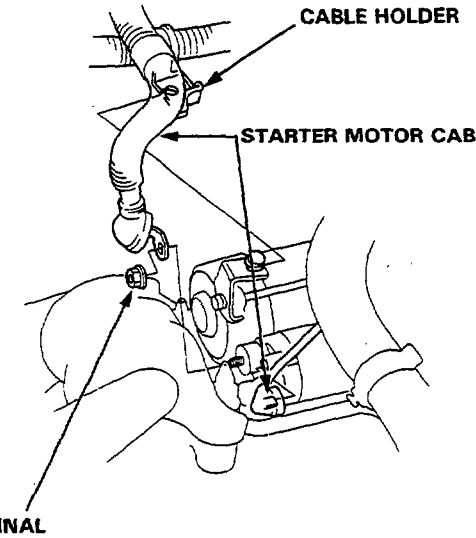


20. Connect the transmission ground cable.

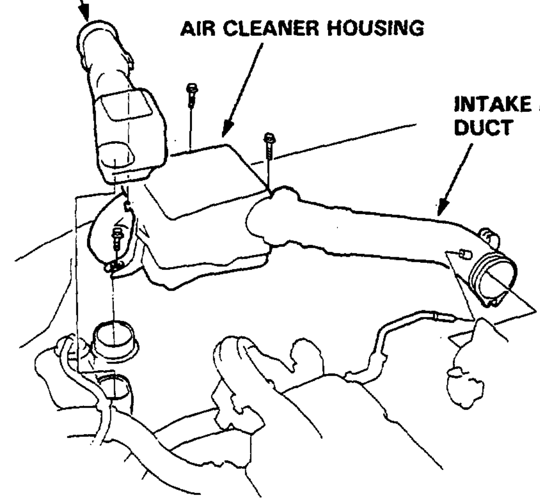


21. Connect the starter motor cables on the starter motor, and install the cable holder.

NOTE: When installing the starter motor cable, make sure that the crimped side of the ring terminal is facing out (see section 23).



22. Install the air cleaner housing assembly, intake air duct and intake air tube.



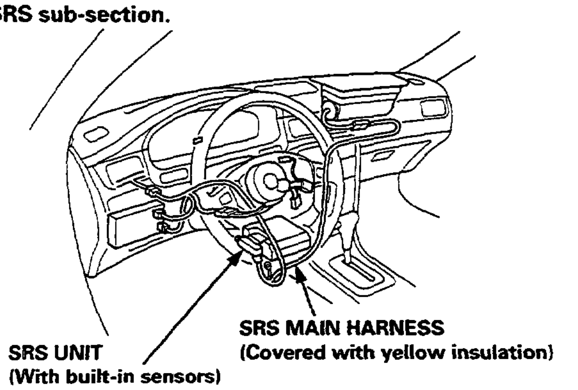
23. Refill the transmission with ATF (see page 14-52).
24. Connect the positive (+) cable first, then the negative (−) cable to the battery.
25. Check the ignition timing (see section 23).
26. Start the engine. Set the parking brake, and shift the transmission through all gears, three times. Check shift cable adjustment as described on page 14-127.
27. Check the throttle control cable adjustment as described on page 14-132.
28. Check that front wheel alignment (see section 18).
29. Let the engine reach operating temperature (the cooling fan comes on) with the transmission in N or P position, then turn it off and check fluid level.
30. Road test as described on pages 14-48 thru 50.

Shift Cable

Removal/Installation

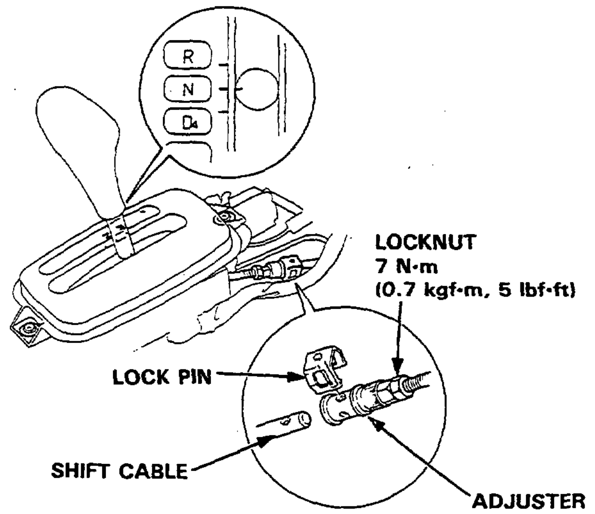
CAUTION:

- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

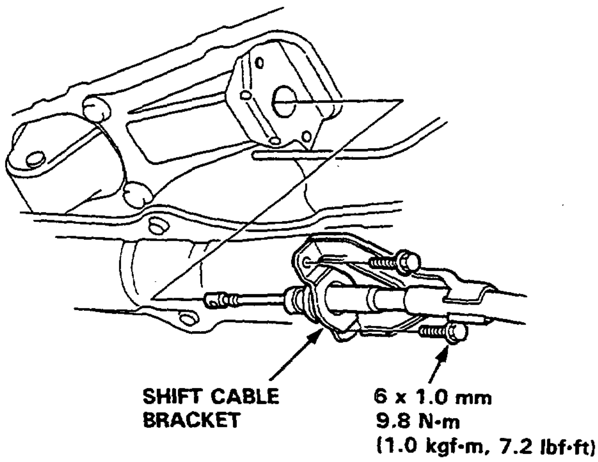


⚠WARNING Make sure lifts are placed properly (see section 1).

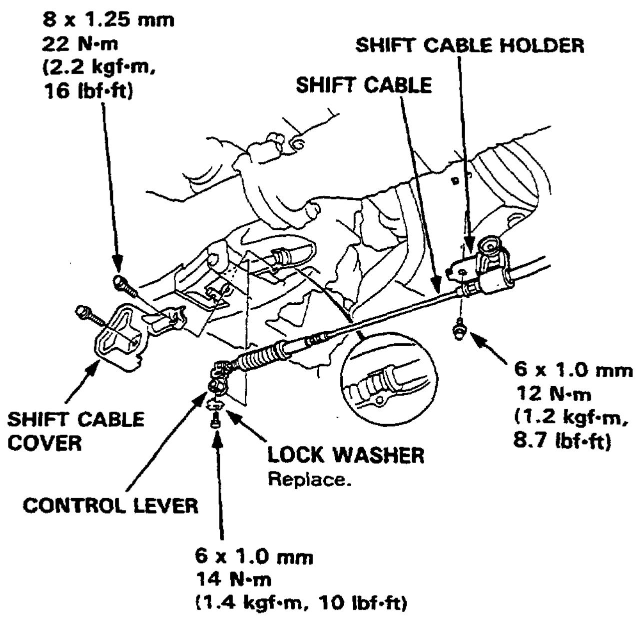
1. Remove the front console (see section 20).
2. Shift to N position, then remove the lock pin from the cable adjuster.
   NOTE: LHD is shown; RHD is similar.



3. Remove the shift cable bracket.



4. Remove the shift cable holder.
5. Remove the shift cable cover.
6. Remove the control drum from the control shaft, then remove the shift cable. Take care not to bend the cable when removing/installing it.

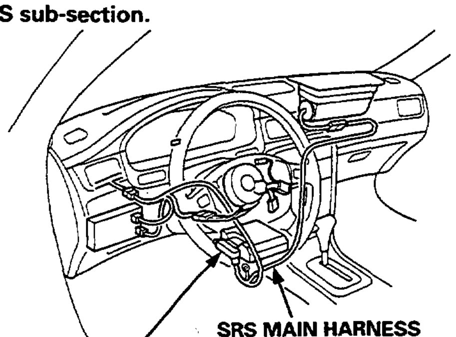


7. Install the shift cable in the reverse order of removal.
8. Check the cable adjustment on reassembly (see page 14-127).

Adjustment

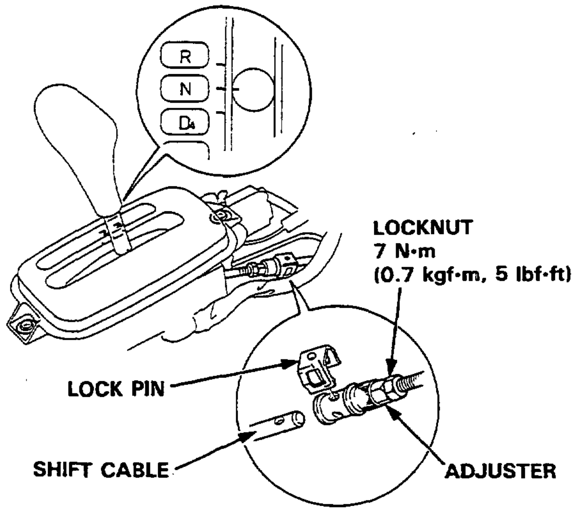
CAUTION:

- ***All SRS wire harnesses are covered with yellow insulation.***
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

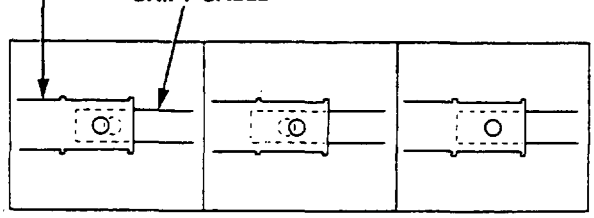


⚠WARNING **Make sure lifts are placed properly (see section 1).**

1. With the engine off, remove the front console (see section 20).
2. Shift to [N] position, then remove the lock pin from the cable adjuster.
   NOTE: LHD is shown; RHD is similar.



3. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable. There are two holes in the end of the shift cable. They are positioned 90° apart to allow cable adjustment in 1/4 turn increments.



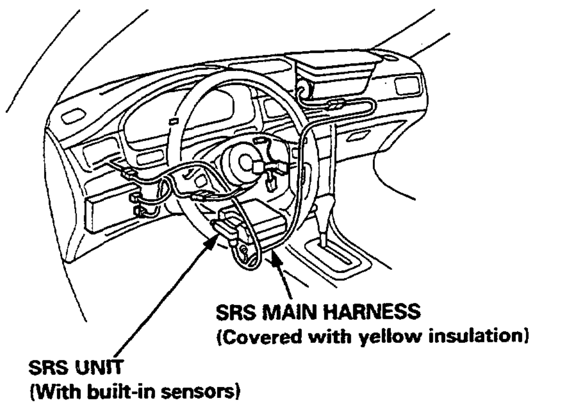
4. *If not perfectly aligned, loosen the locknut on the shift cable and adjust as required.*
5. Tighten the locknut to 7 N·m (0.7 kgf·m, 5. lbf·ft)
6. *Install the lock pin on the adjuster.* If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.
7. Make sure the lock pin is seated in the adjuster securely.
8. Move the shift lever to each gear and verify that the shift position indicator follows the automatic transaxle gear position switch.
9. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting on page 14-44 thru 47.

Shift Lever

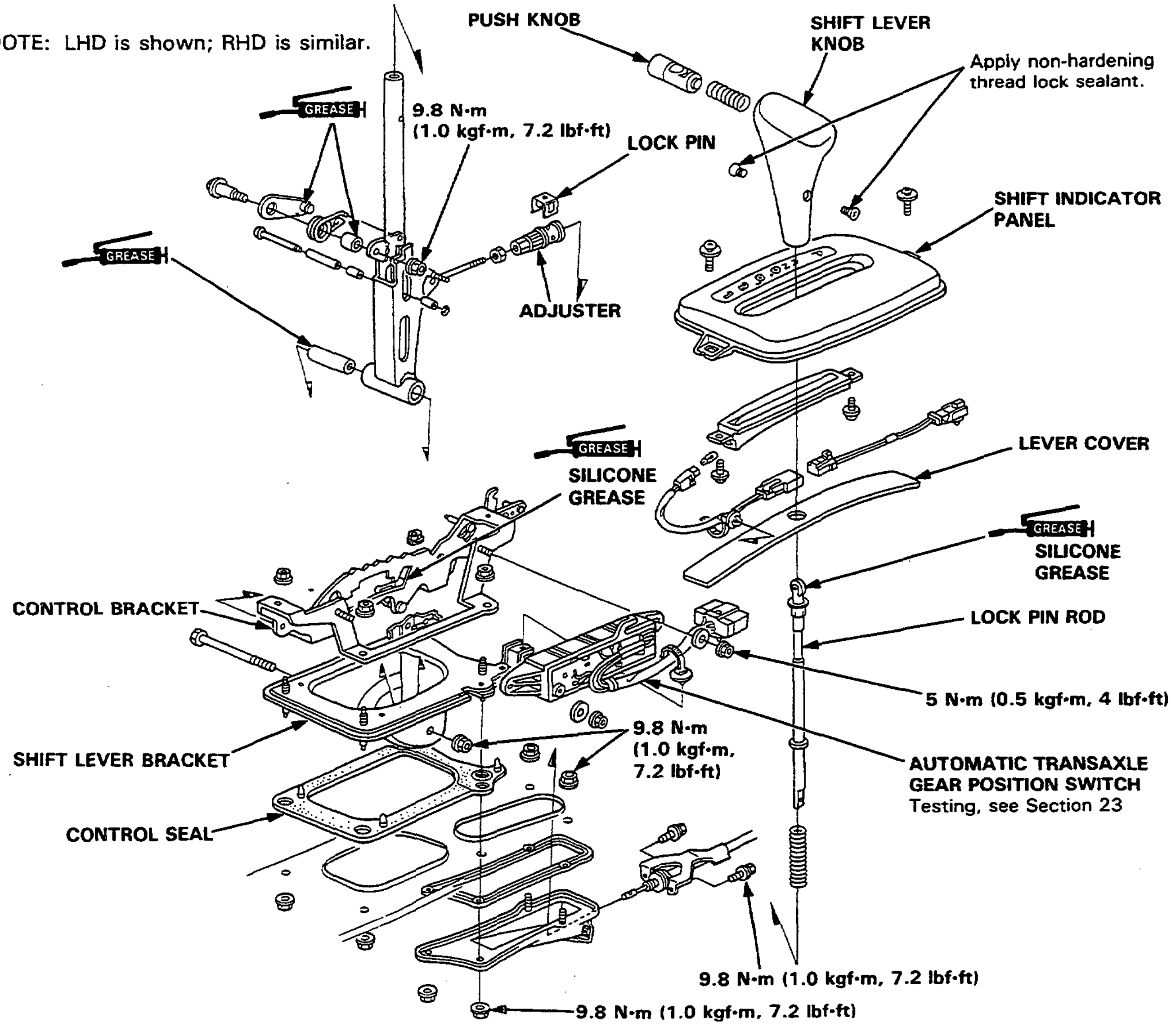
Disassembly/Reassembly

CAUTION:

- All SRS wire harnesses are covered with yellow insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.
- Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.
- For additional precautions, refer to page 23-B6 in the SRS sub-section.



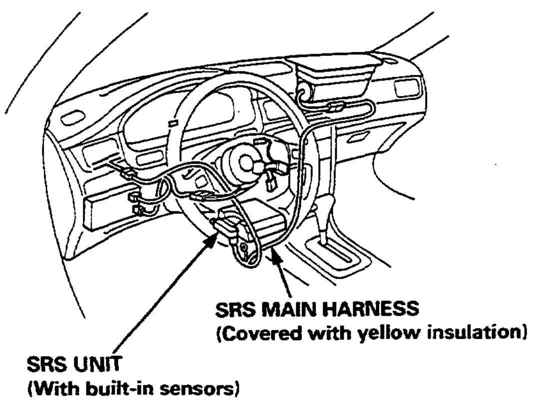
NOTE: LHD is shown; RHD is similar.



Shift Indicator Panel

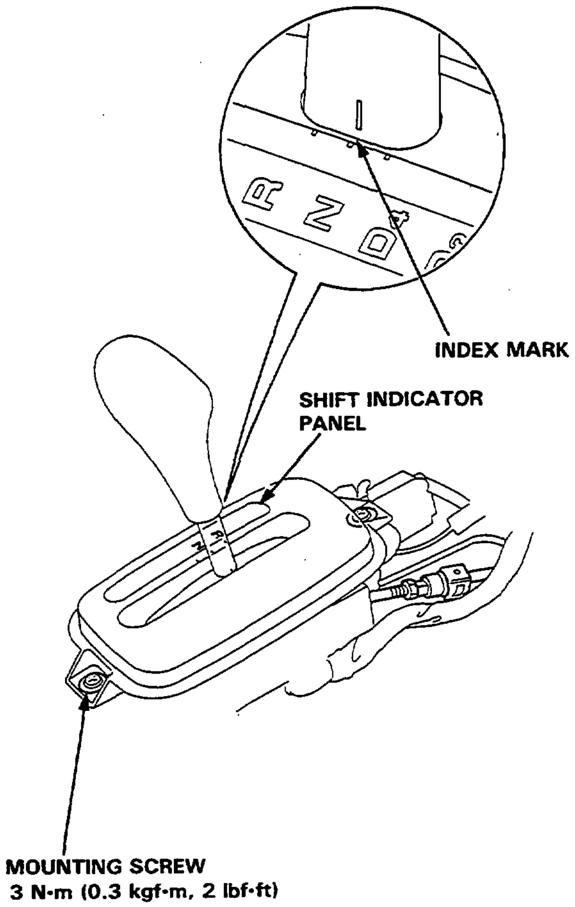
Adjustment

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



1. Check that the index mark on the indicator aligns with the $\boxed{N}$ mark on the shift indicator panel when the transmission is in NEUTRAL.
2. If not aligned, remove the front console (see section 20).
3. Remove the shift indicator panel mounting screws and adjust by moving the panel.

   NOTE: Whenever the shift indicator panel is removed, reinstall the panel as described above.

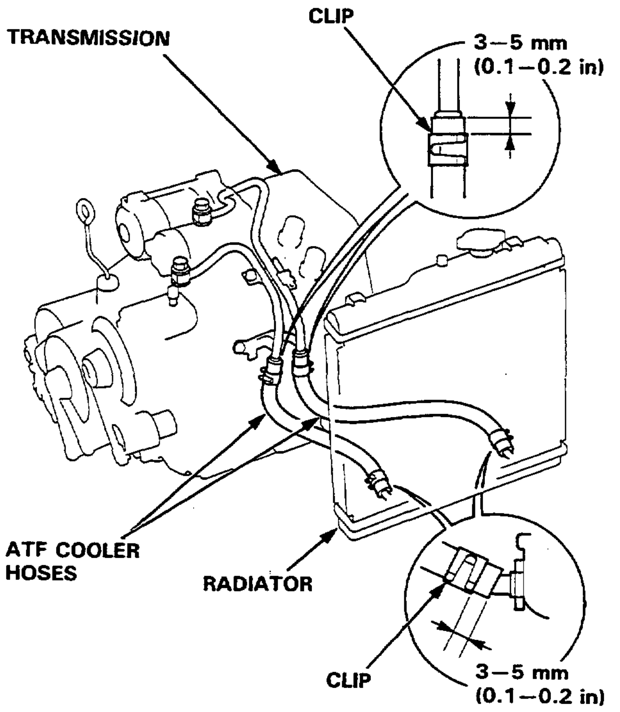


NOTE: LHD is shown; RHD is similar.

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.



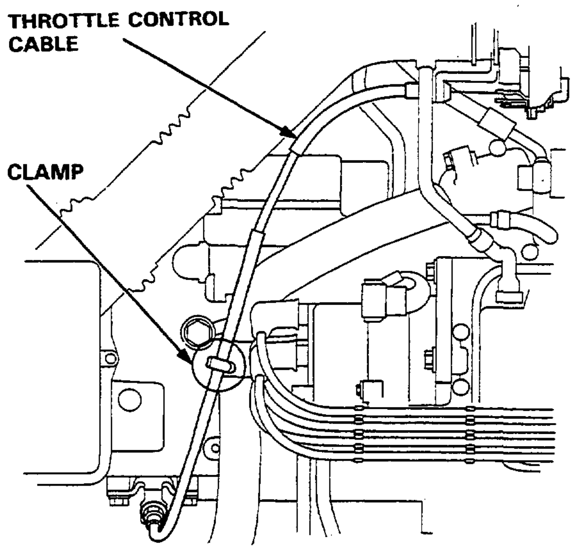
Throttle Control Cable

Inspection

NOTE: Before inspecting the throttle control cable, make sure:

- throttle cable free play is correct (see section 11).
- Idle speed is correct (see section 11).
- To warm up the engine to normal operating temperature (the cooling fan comes on).

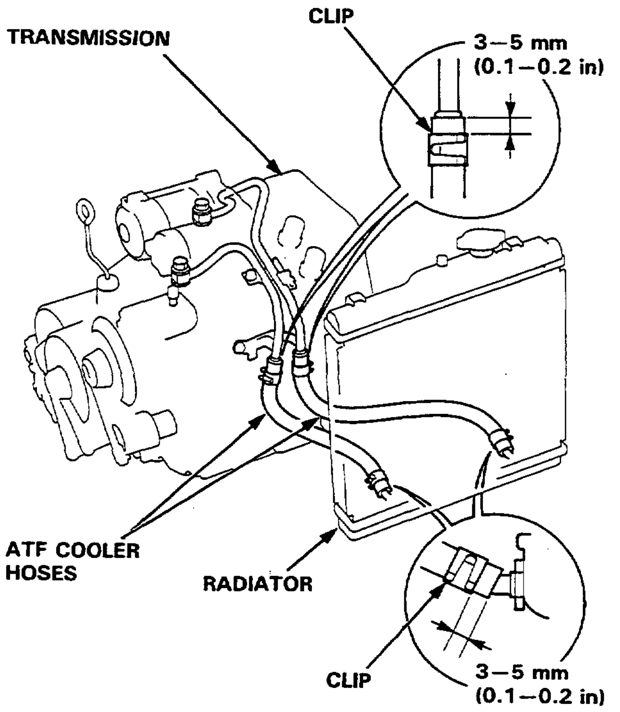
1. Verify that the throttle control cable is clamped correctly in three positions.



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.



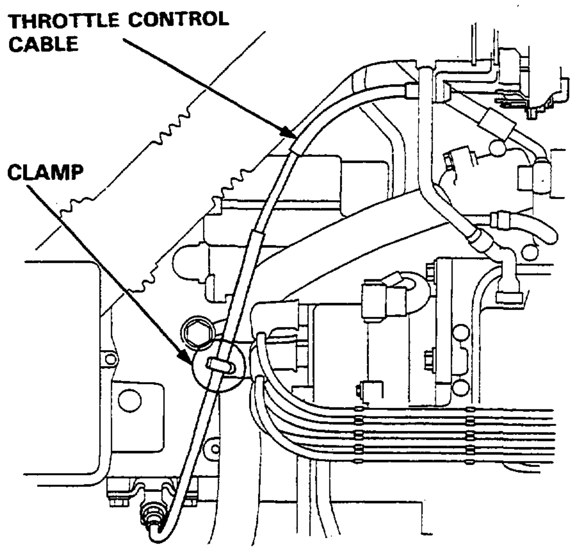
Throttle Control Cable

Inspection

NOTE: Before inspecting the throttle control cable, make sure:

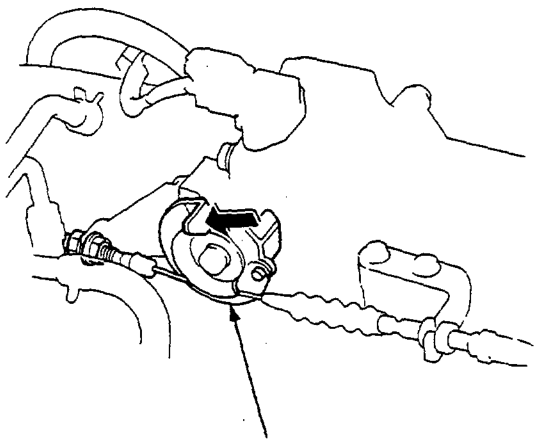
- throttle cable free play is correct (see section 11).
- Idle speed is correct (see section 11).
- To warm up the engine to normal operating temperature (the cooling fan comes on).

1. Verify that the throttle control cable is clamped correctly in three positions.

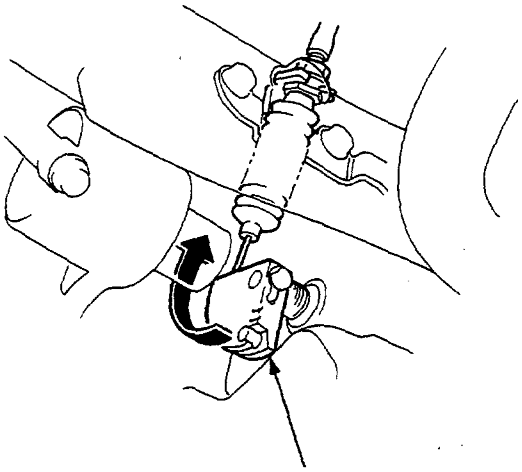


2. Verify that the throttle control drum is synchronized with the throttle linkage while depressing and releasing the accelerator pedal.

3. If the throttle control drum is not synchronized with the throttle linkage, adjust the throttle control cable.

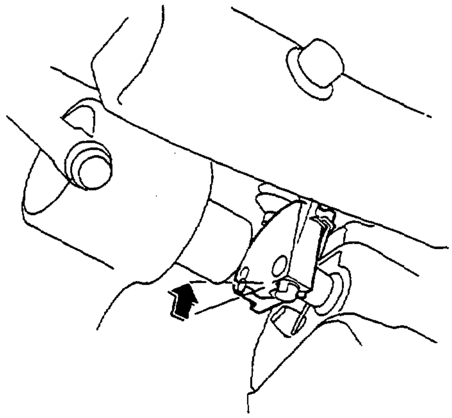


THROTTLE LINKAGE



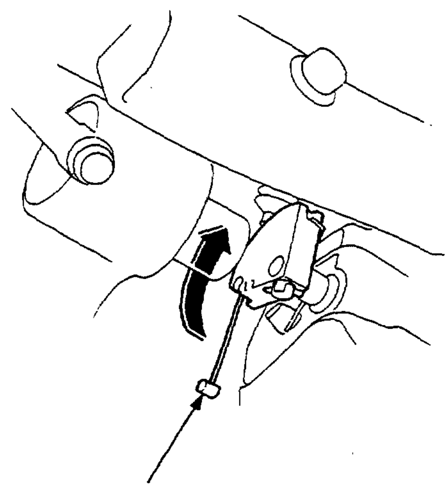
THROTTLE CONTROL DRUM

4. Check that there is play in the throttle control drum while depressing the accelerator pedal to the full-throttle position.



5. Remove the cable end of the throttle control cable from the throttle control drum.

6. Check that the throttle control drum moves smoothly.



CABLE END

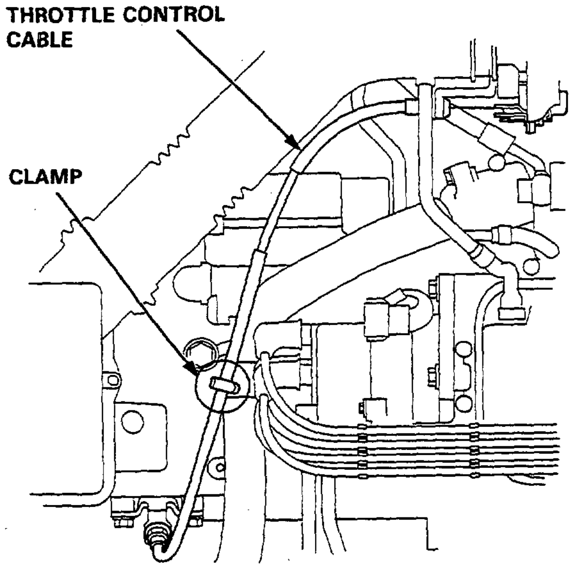
Throttle Control Cable

Adjustment

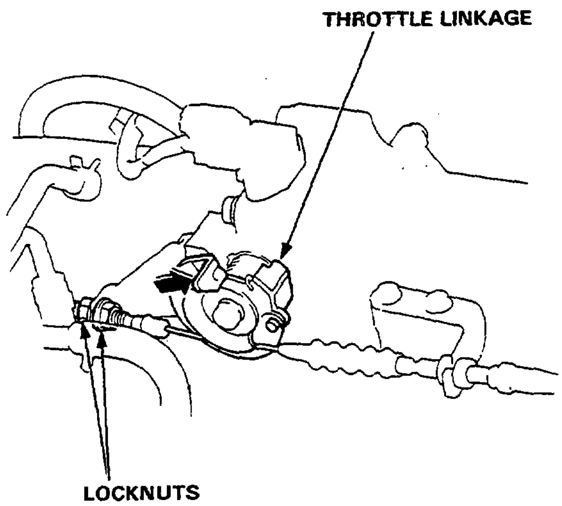
NOTE: Before adjusting the throttle control cable, make sure:

- throttle cable free play is correct (see section 11).
- Idle speed is correct (see section 11).
- To warm up the engine to normal operating temperature (the cooling fan comes on).

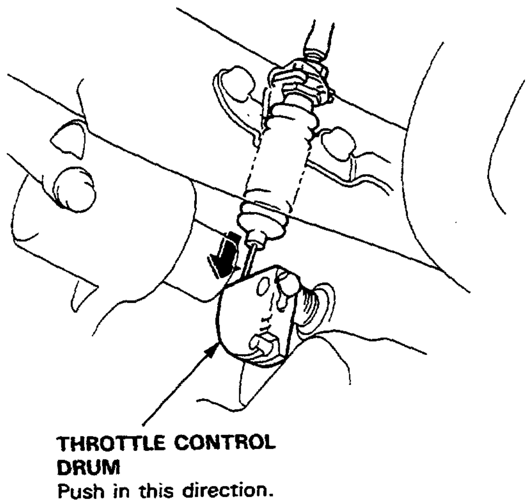
1. Verify that the throttle control cable is clamped correctly in three positions.



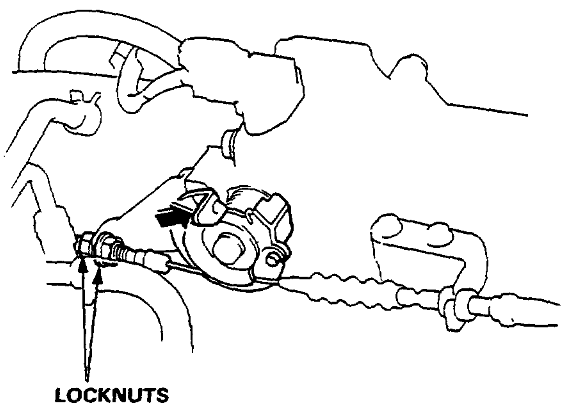
2. Verify that the throttle linkage is in the full-closed position.
3. Loosen the locknut of the throttle control cable at the throttle linkage.



4. Remove the free play of the throttle control cable with the locknut, while pushing the throttle control drum to the full-closed position as shown.

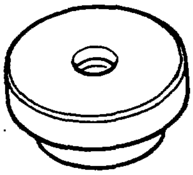


5. Tighten the locknuts.



6. After tightening the locknuts, inspect the synchronization and throttle control drum movement.

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JAD–PH80101	Seal Driver Attachment	1	15-8
②	07JAD–PH80200	Pilot, 26 x 30 mm	1	15-8
③	07746–0030100	Driver, 40 mm I.D.	1	15-4, 6
④	07749–0010000	Driver	1	15-8
⑤	07947–SD90200	Seal Driver Attachment	1	15-8
⑥	07947–6110501 or 07947–6110500	Seal Driver Attachment	1	15-8



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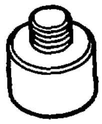
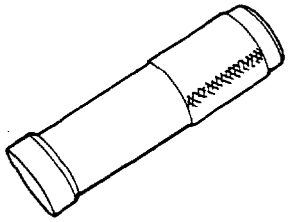
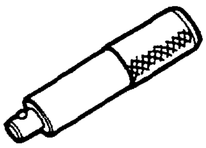


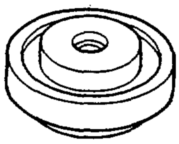
②



③



④



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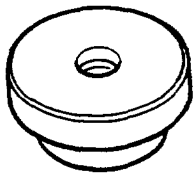
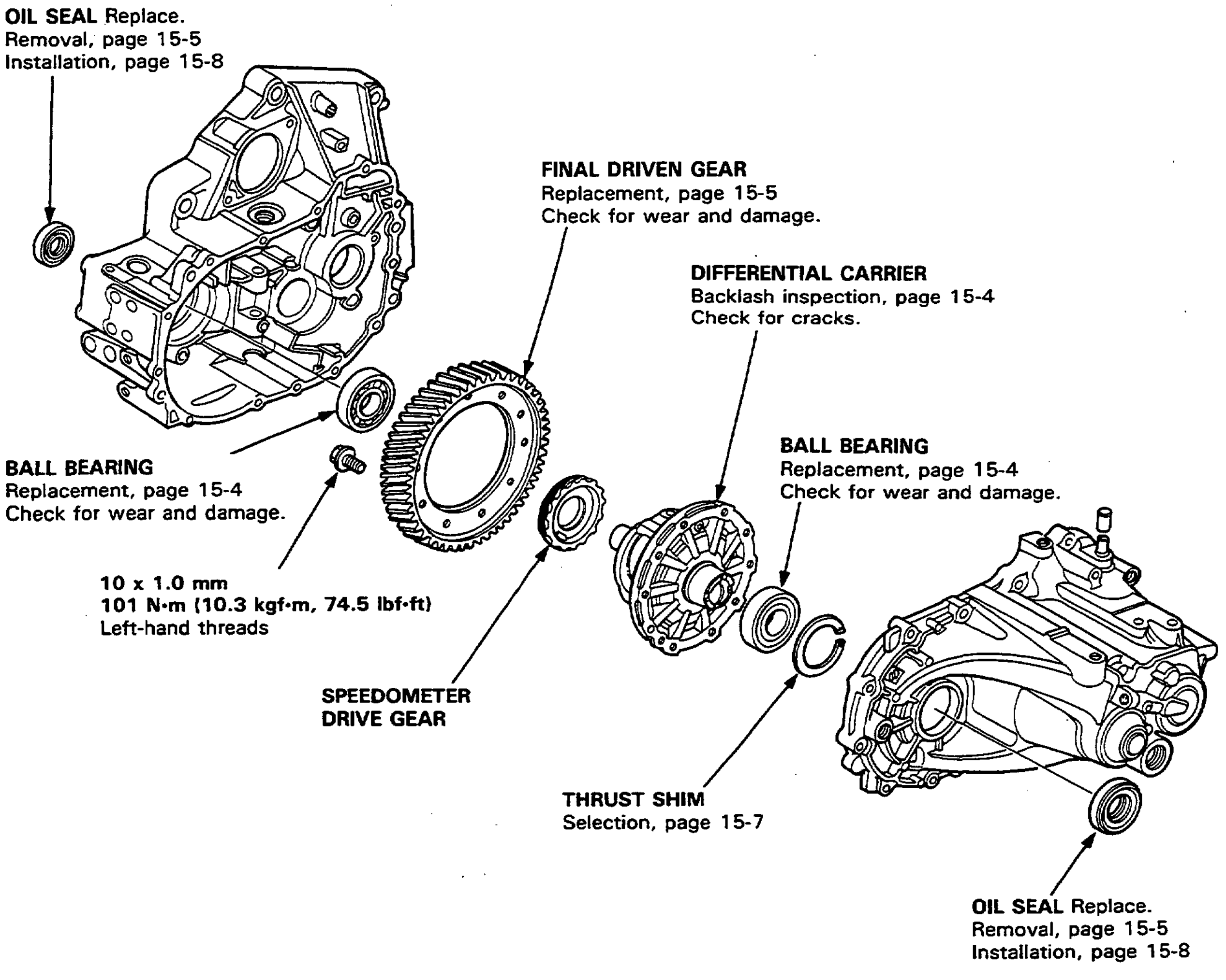


⑥

Illustrated Index

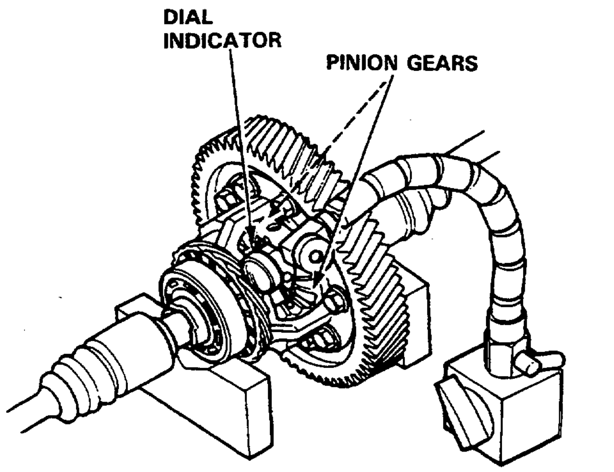


Differential (Manual Transmission)

Backlash Inspection

1. Place differential assembly on V-blocks and install both driveshafts.
2. Measure backlash of both pinion gears.

   Standard (New): 0.05—0.15 mm (0.002—0.006 in)

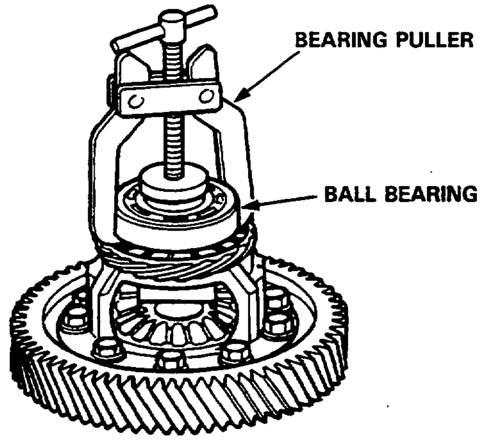


3. If the backlash is not within the standard, replace the differential carrier.

Bearing Replacement

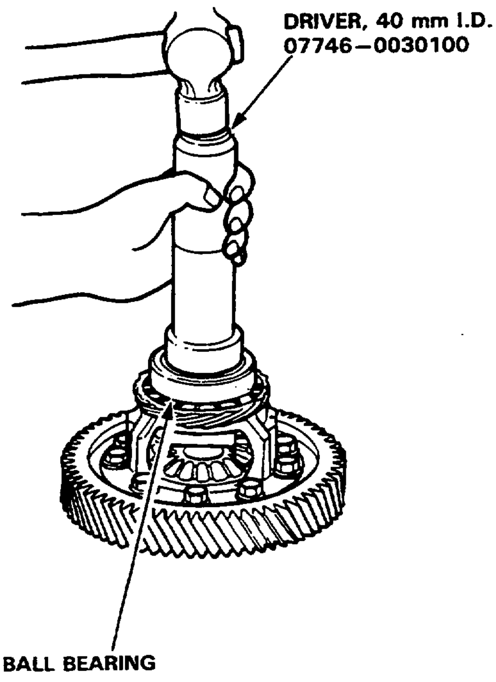
NOTE: Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove ball bearings using a bearing puller as shown.



2. Install new ball bearings using the special tool as shown.

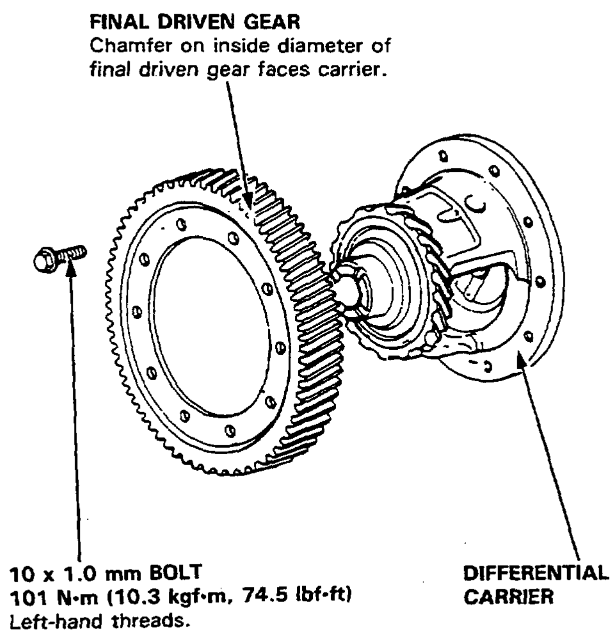
   NOTE: Drive the bearings sequarely until they bottom against the carrier.



Final Driven Gear Replacement

1. Remove the bolts in a crisscross pattern in several steps, then remove the final driven gear from the differential carrier.

   NOTE: The final driven gear bolts have left-hand threads.

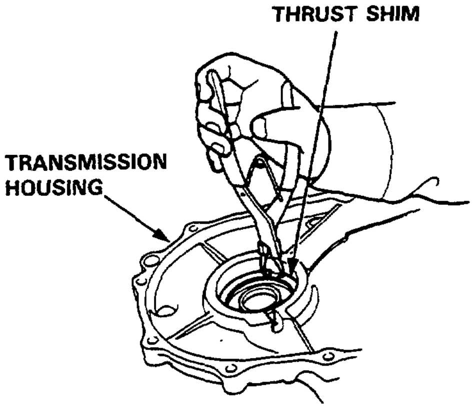


2. Install the final driven gear by tightening the bolts in a crisscross pattern in several steps.

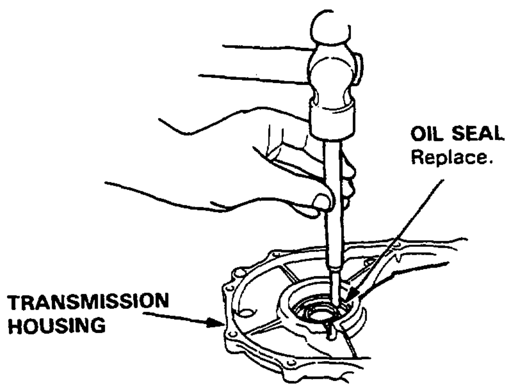
Oil Seal Removal

1. Remove the differential assembly.

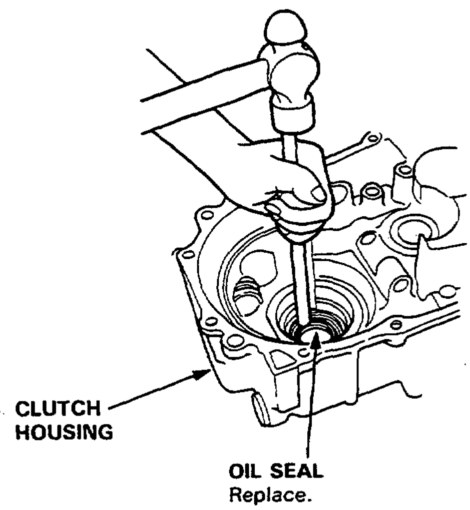
2. Remove the thrust shim from the transmission housing.



3. Remove the oil seal from the transmission housing.

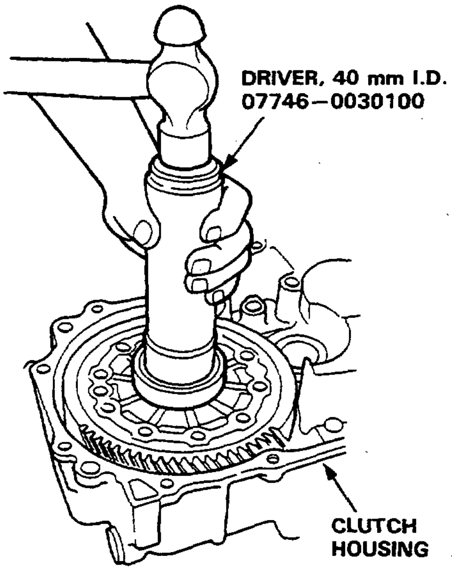


4. Remove the oil seal from the clutch housing.



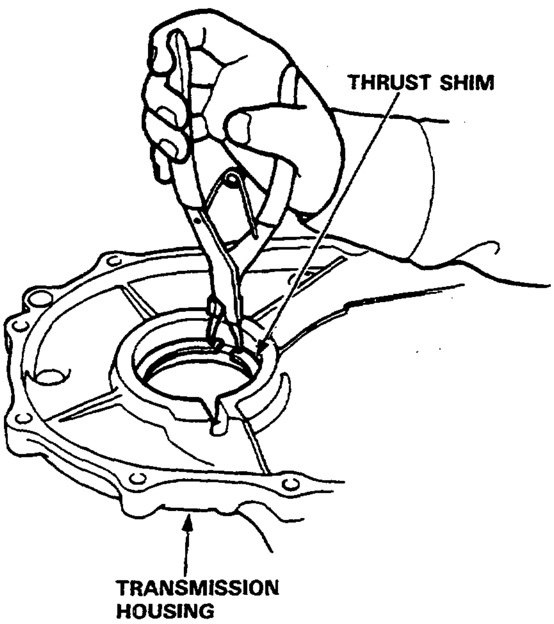
Installation

1. Install the differential assembly, making sure it bottoms in the clutch housing, using the special tool as shown.



2. Install the thrust shim.

   NOTE: Install the same size thrust shim that was removed.



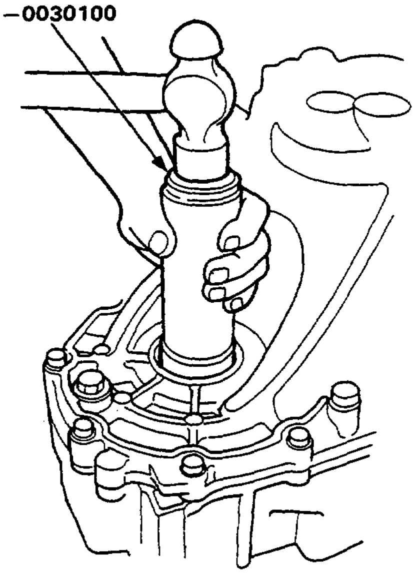
3. Install the transmission housing (see section 13).

   NOTE: Do not apply liquid gasket to the mating surface of the clutch housing.

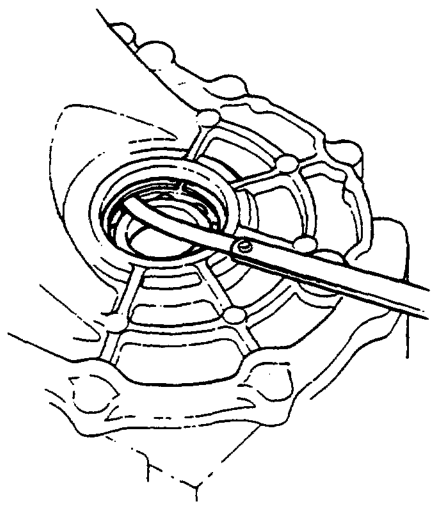
4. Tighten the transmission housing attaching bolts (see section 13).

   8 x 1.25 mm
   27 N·m (2.8 kgf·m, 20 lbf·ft)

5. Use the special tool to bottom differential assembly in the clutch housing.



6. Measure clearance between thrust shim and bearing outer race in transmission housing.



7. If the clearance is more than the standard, select a new thrust shim from the following table.

NOTE: If the clearance measured in step 6 is within the standard, go to step 10.

Standard: 0–0.10 mm (0.004 in)

72 mm THRUST SHIM: D14A2, D15Z3 Engines

Part Number	Thickness
41441–PL3–A00	1.0 mm (0.0394 in)
41442–PL3–A00	1.1 mm (0.0433 in)
41443–PL3–A00	1.2 mm (0.0472 in)
41444–PL3–A00	1.3 mm (0.0512 in)
41445–PL3–A00	1.4 mm (0.0551 in)
41446–PL3–A00	1.5 mm (0.0591 in)
41447–PL3–A00	1.6 mm (0.0630 in)
41448–PL3–A00	1.7 mm (0.0669 in)
41449–PL3–A00	1.8 mm (0.0709 in)
41450–PL3–A00	1.05 mm (0.0413 in)
41451–PL3–A00	1.15 mm (0.0453 in)
41452–PL3–A00	1.25 mm (0.0492 in)
41453–PL3–A00	1.35 mm (0.0532 in)
41454–PL3–A00	1.45 mm (0.0571 in)
41455–PL3–A00	1.55 mm (0.0610 in)
41456–PL3–A00	1.65 mm (0.0650 in)
41457–PL3–A00	1.75 mm (0.0689 in)

80 mm THRUST SHIM: D16Y2, D16Y3 Engines

Part Number	Thickness
41441–PL3–B00	1.0 mm (0.0394 in)
41442–PL3–B00	1.1 mm (0.0433 in)
41443–PL3–B00	1.2 mm (0.0472 in)
41444–PL3–B00	1.3 mm (0.0512 in)
41445–PL3–B00	1.4 mm (0.0551 in)
41446–PL3–B00	1.5 mm (0.0591 in)
41447–PL3–B00	1.6 mm (0.0630 in)
41448–PL3–B00	1.7 mm (0.0669 in)
41449–PL3–B00	1.8 mm (0.0709 in)
41450–PL3–B00	1.05 mm (0.0413 in)
41451–PL3–B00	1.15 mm (0.0453 in)
41452–PL3–B00	1.25 mm (0.0492 in)
41453–PL3–B00	1.35 mm (0.0532 in)
41454–PL3–B00	1.45 mm (0.0571 in)
41455–PL3–B00	1.55 mm (0.0610 in)
41456–PL3–B00	1.65 mm (0.0650 in)
41457–PL3–B00	1.75 mm (0.0689 in)

8. Remove the bolts and transmission housing.

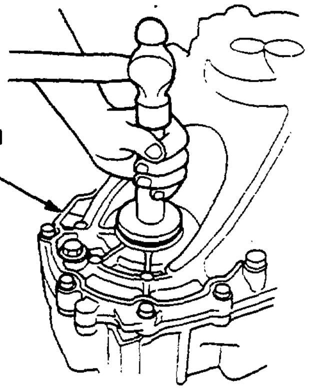
9. Replace the thrust shim selected in step 7, then recheck the clearance.

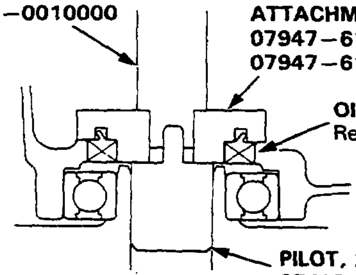
10. Remove the bolts and transmission housing. Apply liquid gasket to the surface of the transmission housing and reassemble (see section 13).

Differential (Manual Transmission)

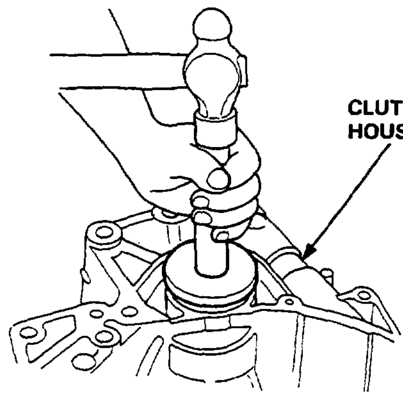
Oil Seal Installation

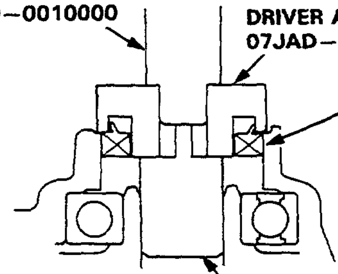
1. Install the oil seal into the transmission housing using the special tools as shown.



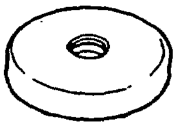


2. Install the oil seal into the clutch housing using the special tools as shown.





Ref. No.	Tool Number	Description	Qty	Remark
①	07JAD–PH80101	Driver Attachment, 58 mm	1	
②	07JAD–PH80200	Pilot, 26 x 30 mm	1	
③	07746–0030100	Driver, 40 mm I.D.	1	
④	07749–0010000	Handle Driver	1	
⑤	07947–6110501 or 07947–6110500	Driver Attachment, 68 mm	1	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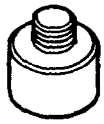
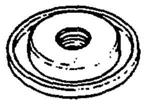
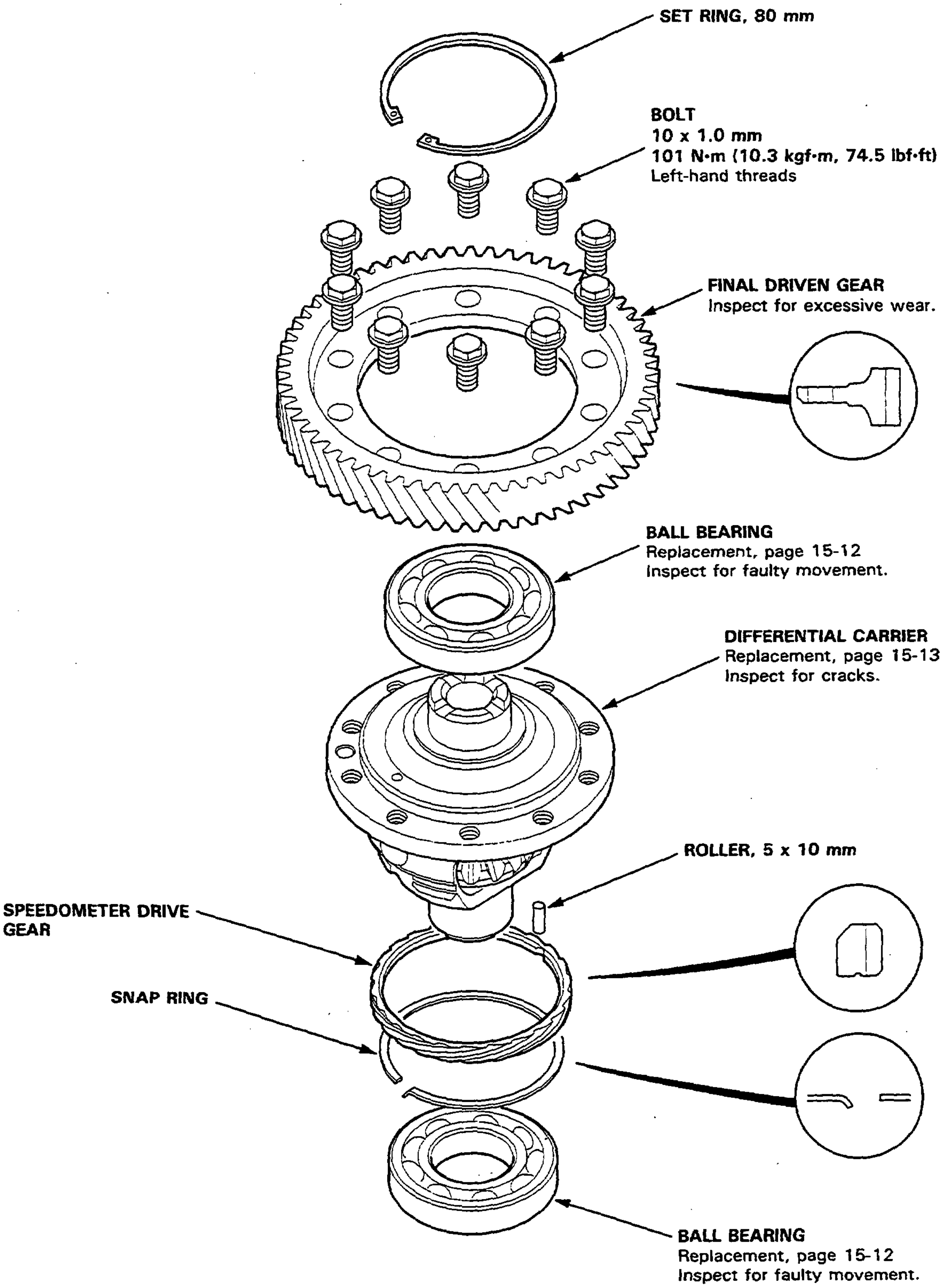

②


③


④


⑤

Illustrated Index

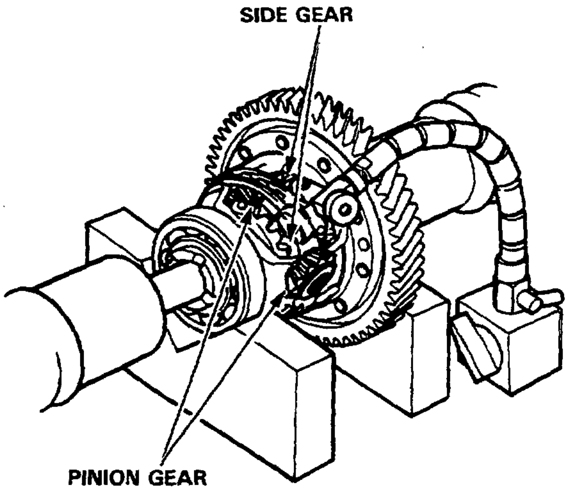


Backlash Inspection

1. Place differential assembly on V-blocks and install both axles.

2. Check backlash of both pinion gears.

   Standard (New): 0.05–0.15 mm (0.002–0.006 in)

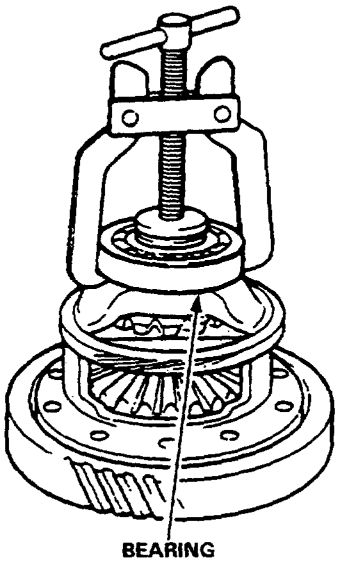


3. If backlash is out of tolerance, replace the differential carrier.

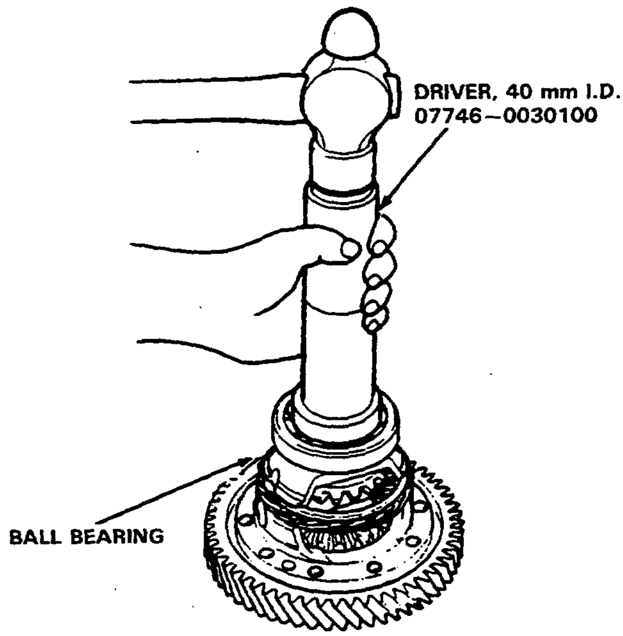
Bearing Replacement

NOTE: Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove bearings using a bearing puller.



2. Install new bearings using the special tool as shown.

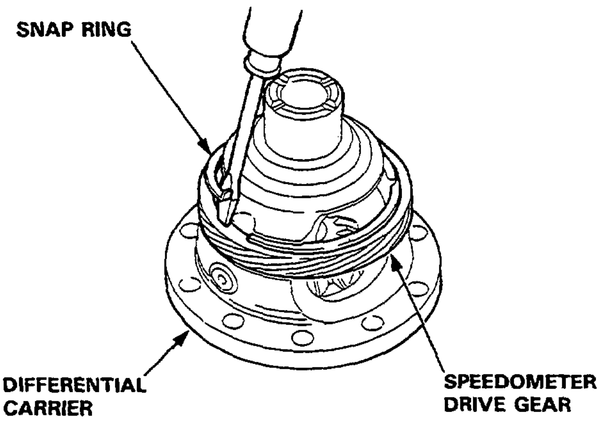


Differential Carrier Replacement

1. Remove the final driven gear from the differential carrier.

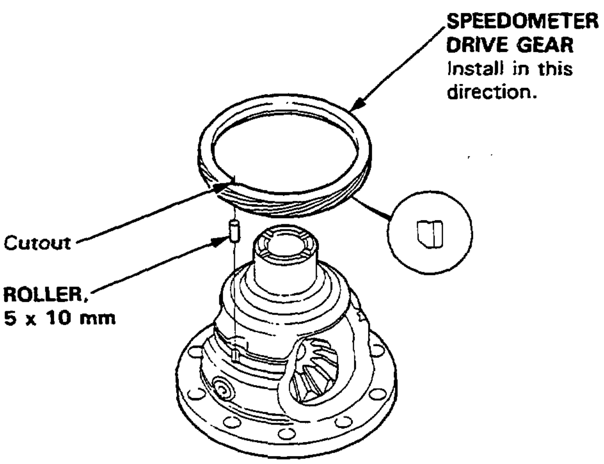
   NOTE: The final driven gear bolts have left-hand threads.

2. Pry the snap ring off differential carrier, then remove the speedometer drive gear and 5 x 10 mm roller.

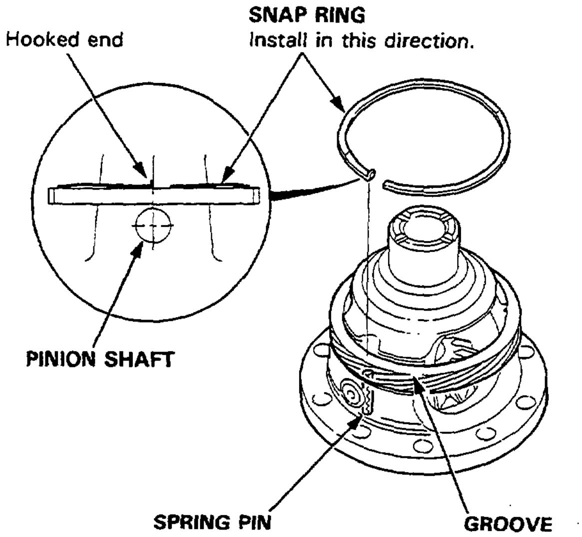


3. Install the 5 x 10 mm roller in the differential carrier.

4. Install the speedometer drive gear with its chamfered side facing the carrier. Align the cutout on the bore of the speedometer drive gear with the 5 x 10 mm roller.



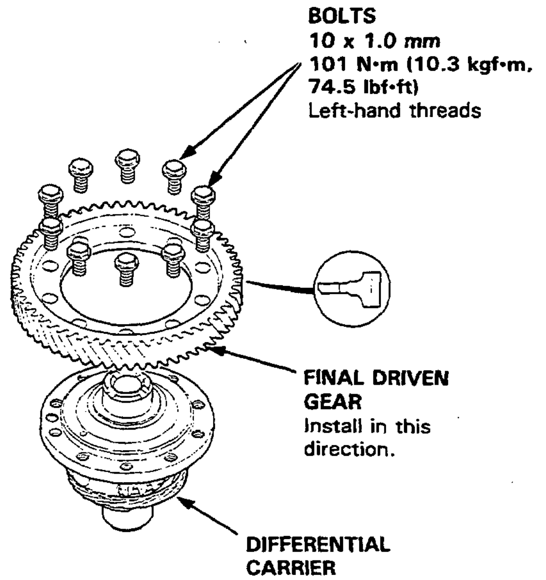
5. Align the hooked end of the snap ring with the pinion shaft as shown, then install the snap ring in the differential carrier groove.



6. Install the final driven gear, then tighten the bolts specified torque.

   TORQUE: 101 N·m (10.3 kgf·m, 74.5 lbf·ft)

   NOTE: The final driven gear bolts have left-hand threads.

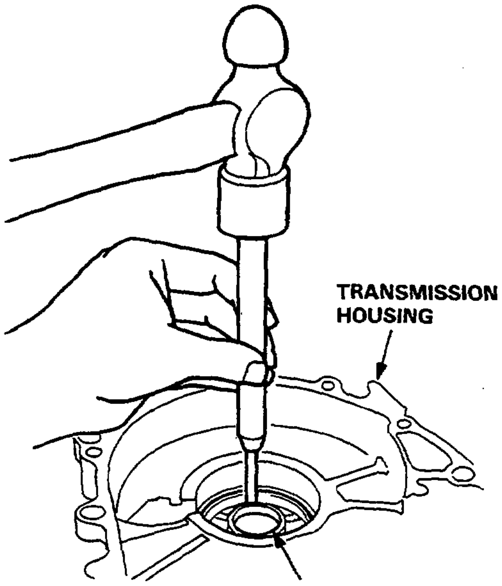


7. Install the ball bearings (see page 15-12).

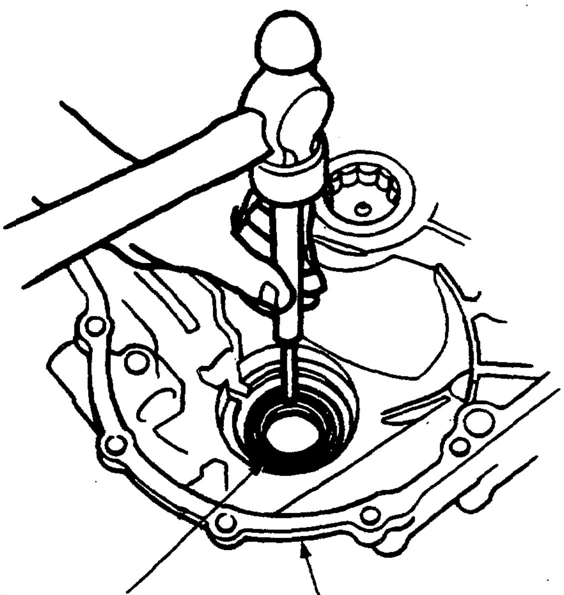
Differential (Automatic Transmission)

Oil Seal Removal

1. Remove the differential assembly.
2. Remove the oil seal from the transmission housing.

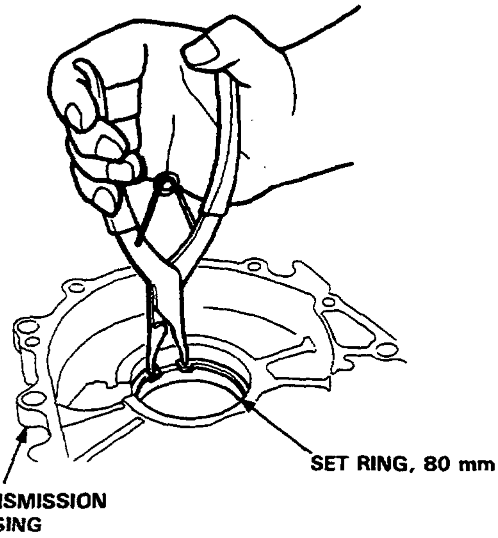


3. Remove the oil seal from the torque converter housing.

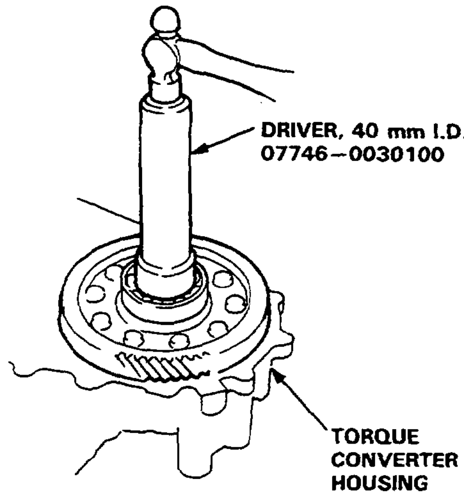


Oil Seal Installation/Side Clearance

1. Install a 2.50 mm (0.098 in) set ring, 80 mm in transmission housing.
NOTE: Do not install the oil seal yet.

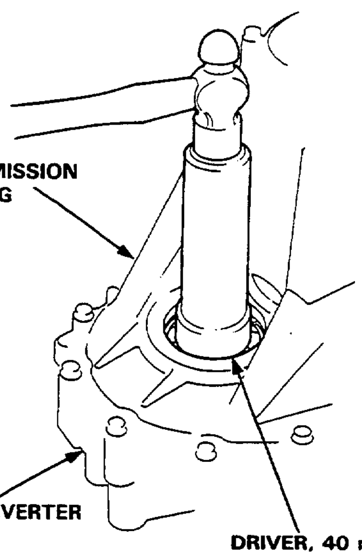


2. Install the differential assembly into the torque converter housing using the special tool as shown.



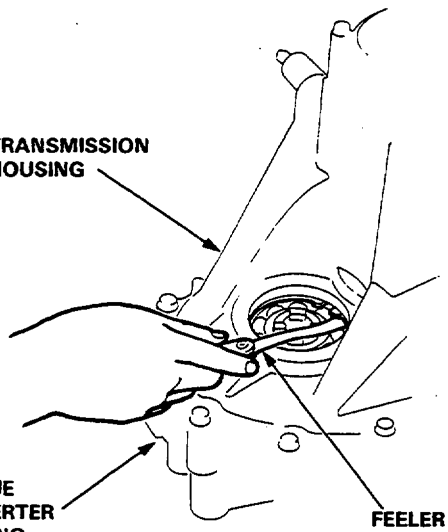
3. Assemble the transmission (see section 14).
Install the transmission housing and tighten the bolts (see section 14).

4. Tap on the transmission housing side of the differential assembly with the special tool to seat the differential assembly in the torque converter housing.



5. Measure the clearance between the set ring, 80 mm and outer race of the ball bearing in the transmission housing.

STANDARD: 0–0.15 mm (0–0.006 in)



6. If the clearance is more than the standard, select a new set ring, 80 mm from the following table and install:

SET RING, 80 mm

Part Number	Thickness
90414–689–000	2.50 mm (0.098 in)
90415–689–000	2.60 mm (0.102 in)
90416–689–000	2.70 mm (0.106 in)
90417–689–000	2.80 mm (0.110 in)
90418–689–000	2.90 mm (0.114 in)
90419–PH8–000	3.00 mm (0.118 in)

NOTE: If the set ring, 80 mm-to-ball bearing outer race clearance measured in step 5 is less than the specification, it is not necessary to perform steps 7 and 8.

7. Remove the transmission housing.

8. Replace the 2.50 mm (0.098 in) set ring, 80 mm with the one of the correct thickness selected in step 5.

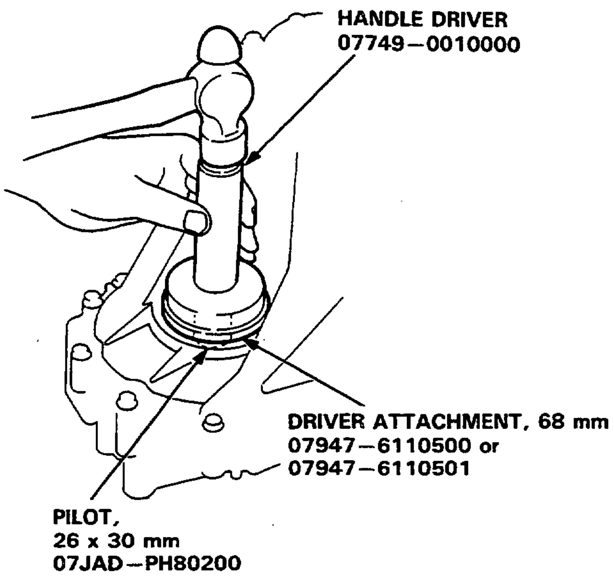
9. Install the transmission housing (see section 14).

(cont'd)

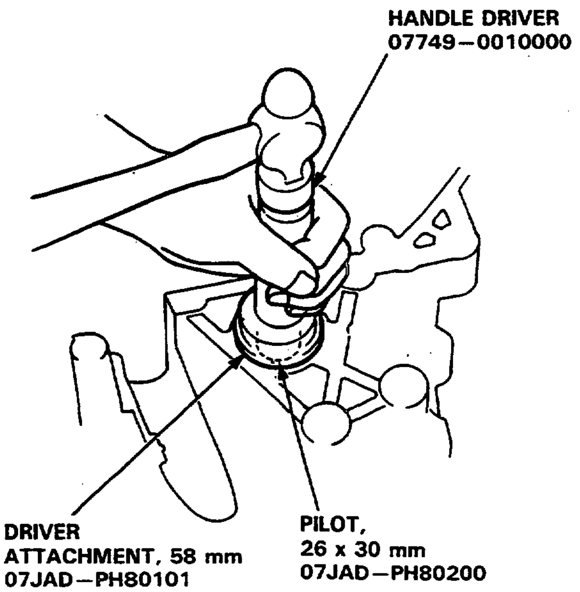
Differential (Automatic Transmission)

Oil Seal Installation/Side Clearance (cont'd)

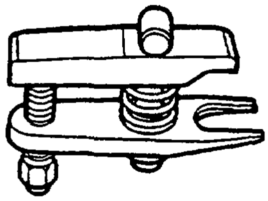
10. Install the oil seal in the transmission housing using the special tools as shown.



11. Install the oil seal in the torque converter housing using the special tools as shown.



Ref. No.	Tool Number	Description	Qty	Page Reference
①	07MAC–SL00200	Ball Joint Remover, 28 mm	1	16-4



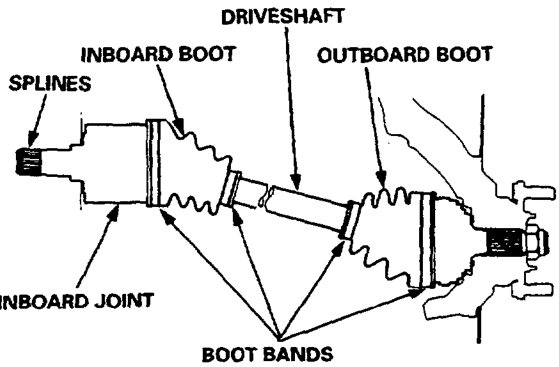
①

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.

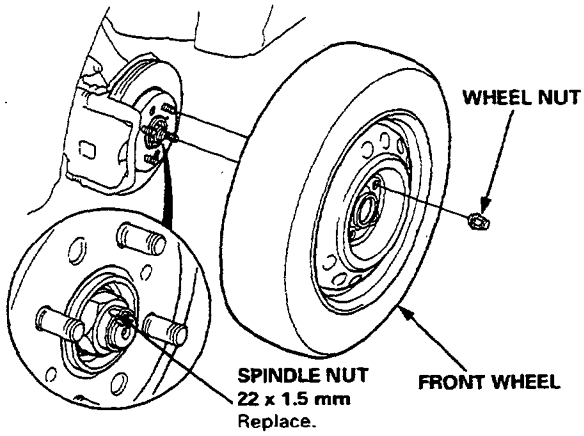
Twisted or Cracked
Make sure the driveshaft is not twisted or cracked.
Replace it if necessary.



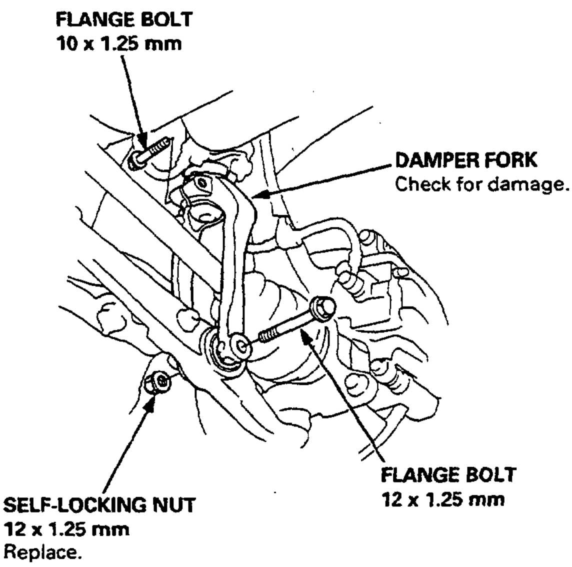
Removal

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 bolts.
7. Remove the damper fork.



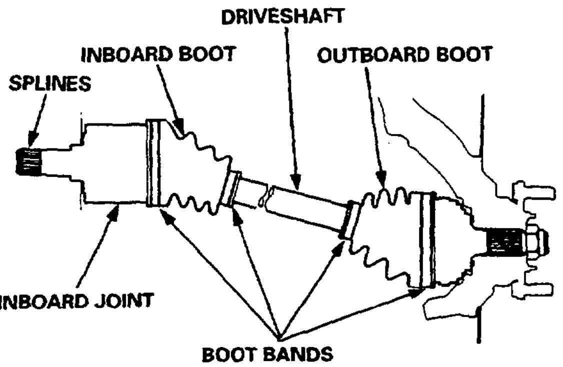
(cont'd)

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.

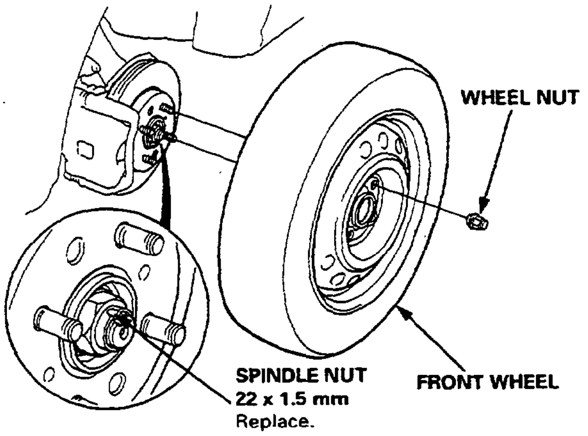
2. Raise the front of car, and support it with safety stands in the proper locations (see section 1).

3. Remove the wheel nuts and front wheels.

4. Drain the transmission oil or fluid (see section 13 or 14).

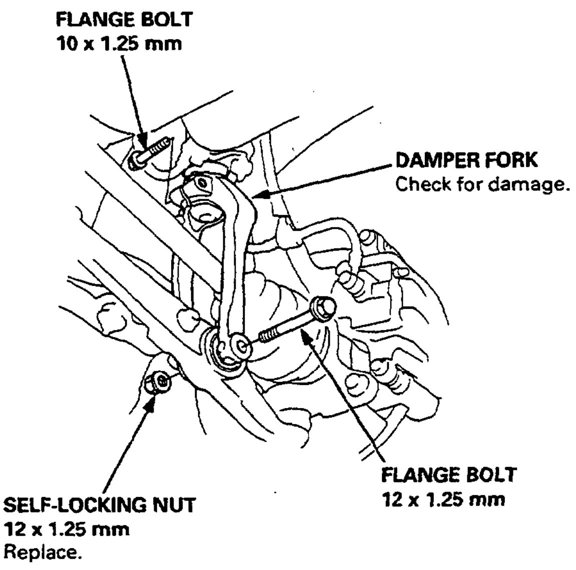
   NOTE: It is not necessary to drain the differential oil when the left driveshaft is removed.

5. Raise the locking tab on the spindle nut, then remove the nut.



6. Remove the self-locking nut and flange bolts.

7. Remove the damper fork.



(cont'd)

Removal (cont'd)

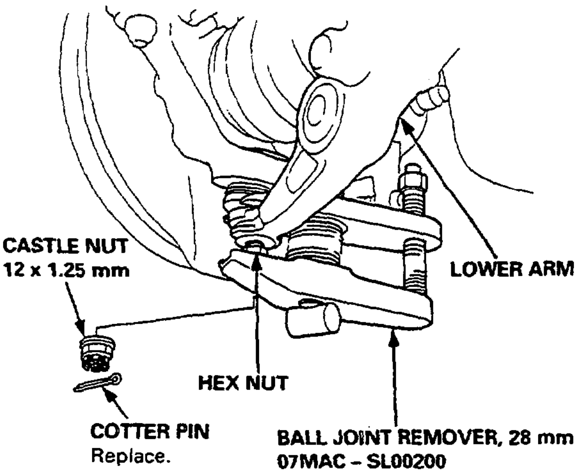
8. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

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.

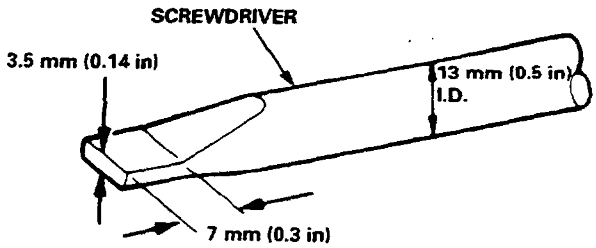
10. Use the ball joint remover, 28 mm, as shown on page 18-12, to separate the ball joint and lower arm.

    CAUTION: Be careful not to damage the ball joint boot.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

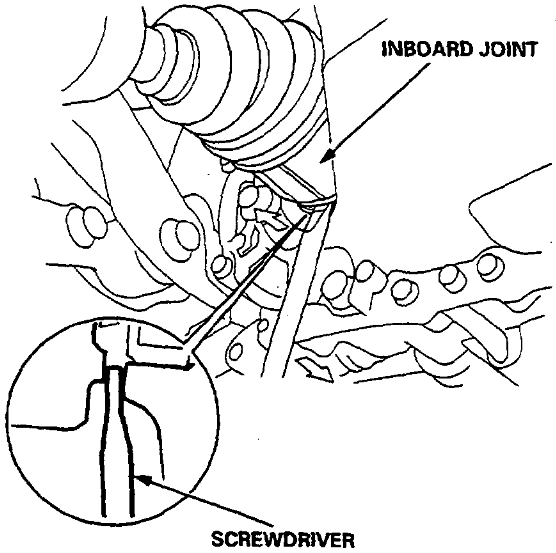


11. Pry the driveshaft assembly with a screwdriver, as shown, to force the set ring at the driveshaft end past the groove.

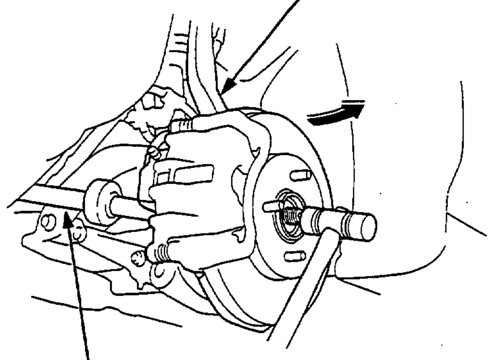


12. Pull the inboard joint, and remove the driveshaft from the differential case as an assembly.

    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.**



13. Pull the knuckle outward, and remove the driveshaft outboard joint from the front wheel hub using a plastic hammer.



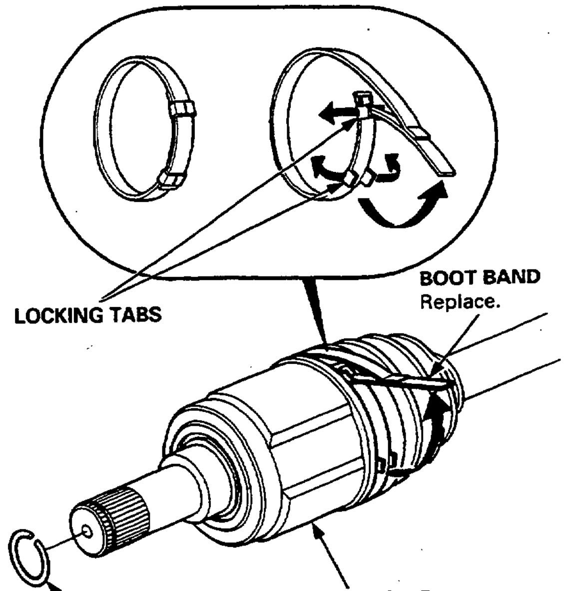
Disassembly

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.



(cont'd)

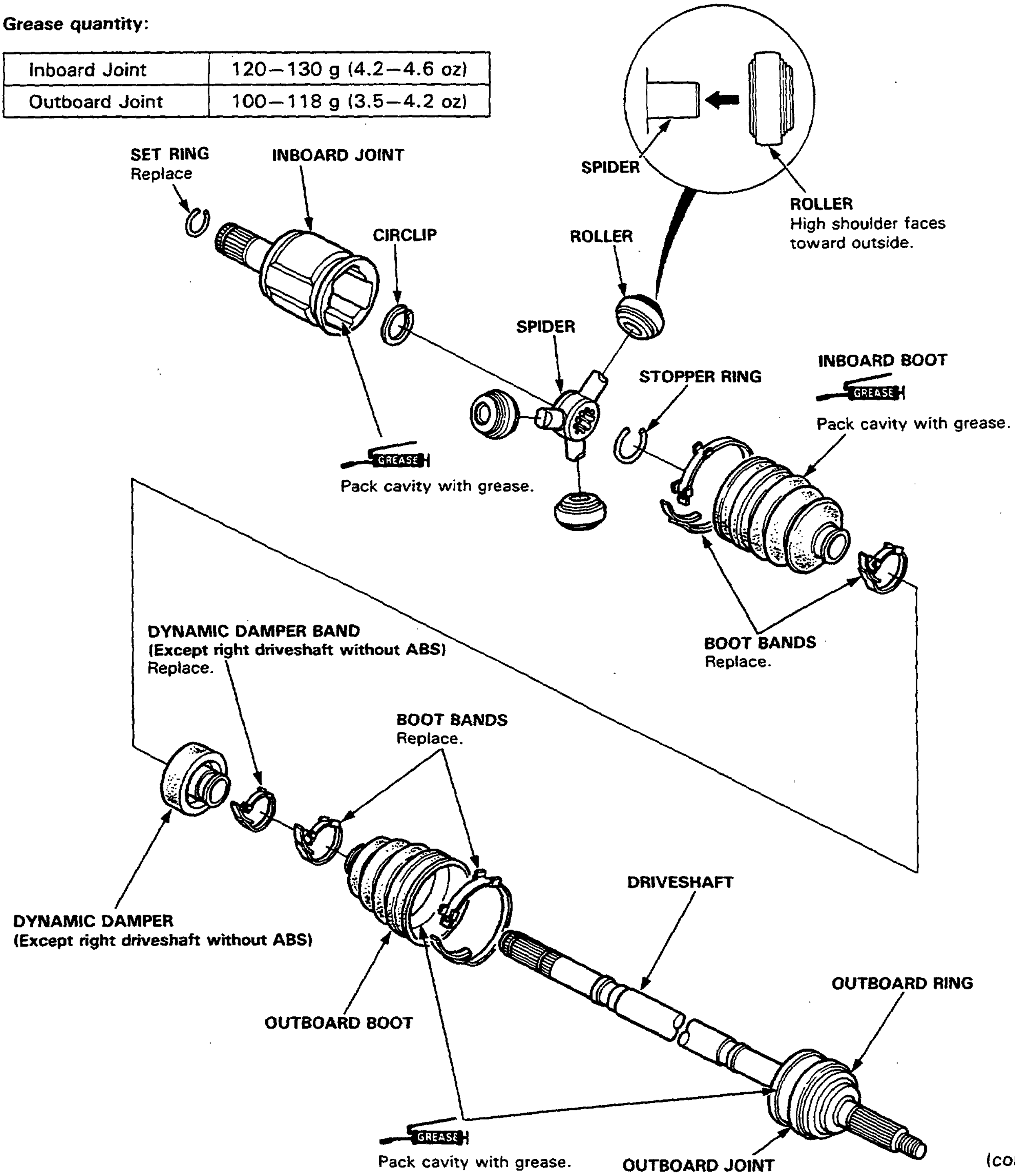
Reassembly

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 joint grease included in the new driveshaft set.

Grease quantity:

Inboard Joint	120–130 g (4.2–4.6 oz)
Outboard Joint	100–118 g (3.5–4.2 oz)

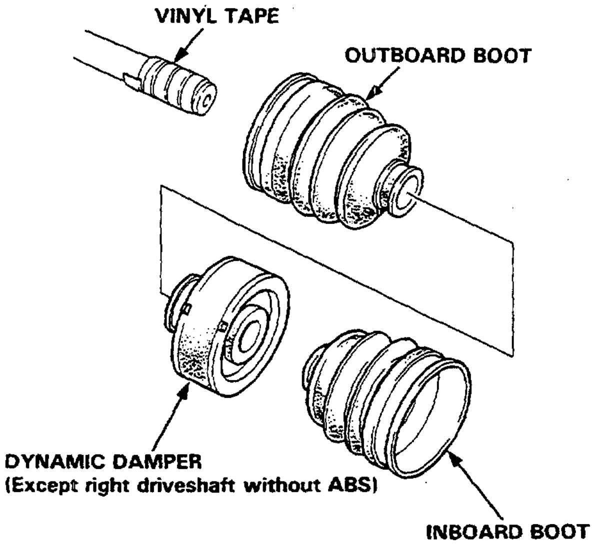


(cont'd)

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.



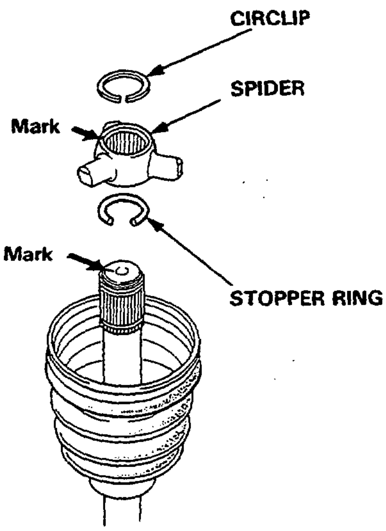
3. Install the stopper ring into the driveshaft groove.

   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.

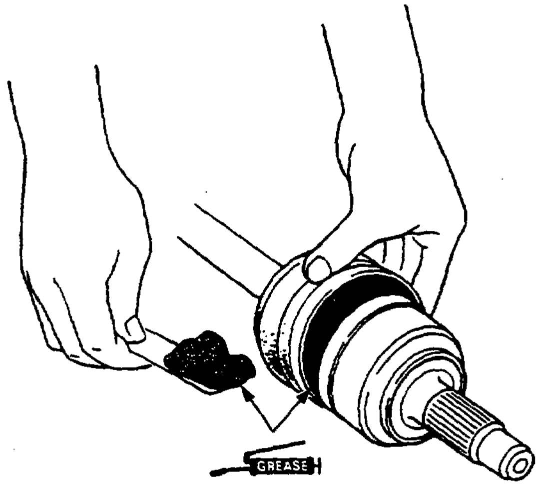
5. Fit the circlip into the driveshaft groove.

   NOTE: Always rotate the circlip in its groove to be sure it is fully seated.



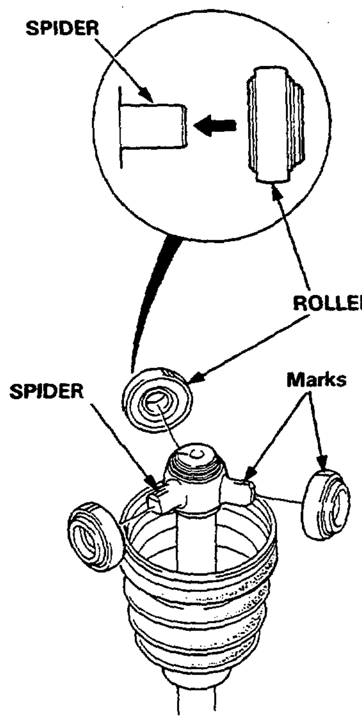
6. Pack the outboard joint with the joint grease included in the new driveshaft set.

   Grease Quantity: 100—118 g (3.5—4.2 oz)



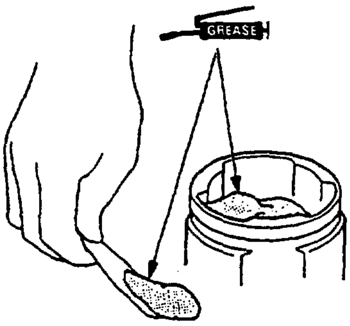
7. Fit the rollers to the spider with their high shoulders facing outward.

   NOTE:
   - Reinstall the rollers in their original positions on the spider by aligning the marks.
   - Hold the driveshaft pointed up, to prevent the spider and rollers from falling off.



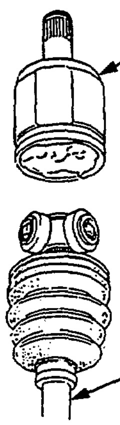
8. Pack the inboard joint with the joint grease included in the new driveshaft set.

Grease quantity: 120 – 130 g (4.2 – 4.6 oz)



9. Fit the inboard joint onto the driveshaft.

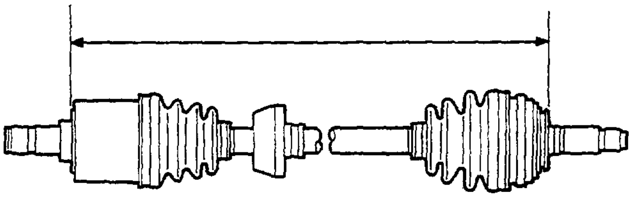
NOTE:
- Reinstall the inboard joint onto the driveshaft by aligning the marks on the inboard joint and the rollers.
- Hold the driveshaft so the inboard joint points up to prevent it from falling off.



10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and full extension.

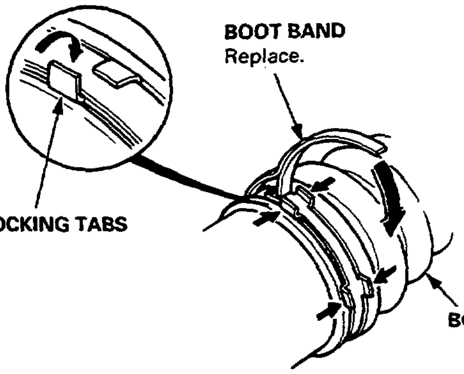
NOTE: The ends of boots seat in the groove of the driveshaft and joint.

Left : 773 – 778 mm (30.4 – 30.6 in)
Right: 503 – 508 mm (18.8 – 20.0 in)



11. Install new boot bands on the boots, and bend both sets of locking tabs.

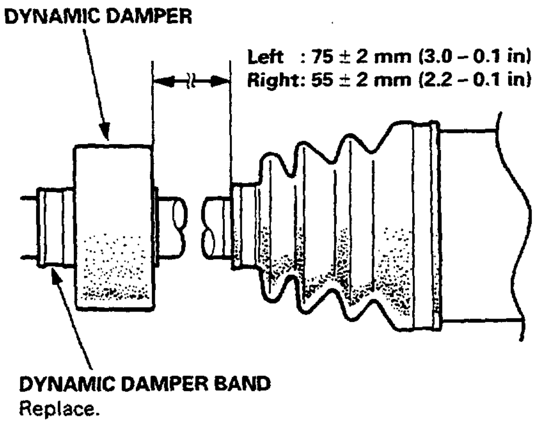
12. Lightly tap on the doubled-over portions to reduce their height.



(cont'd)

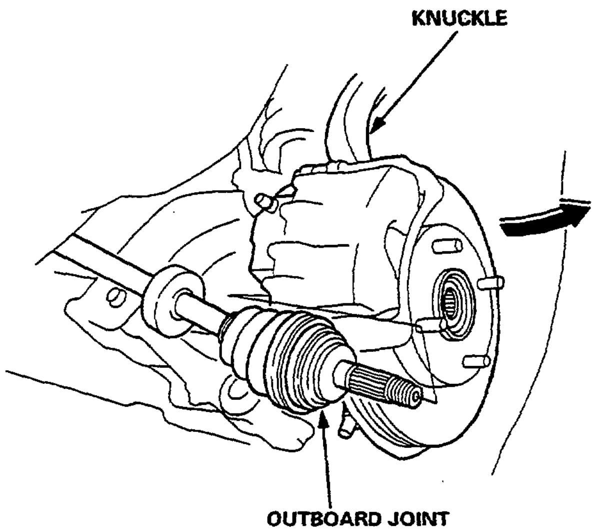
Reassembly (cont'd)

13. Except right driveshaft without ABS, 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.



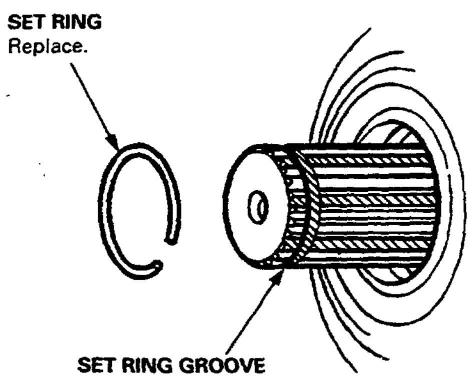
Installation

1. Install the outboard joint into the knuckle.

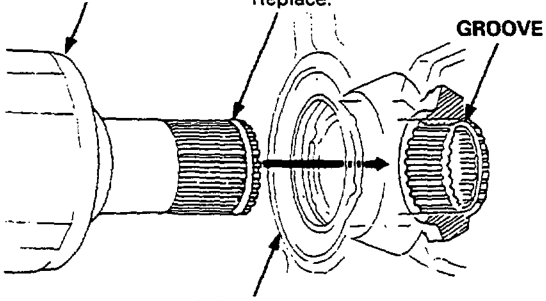


2. Install the new set ring onto the driveshaft groove.

   CAUTION: Always use a new set ring whenever the driveshaft is being installed.



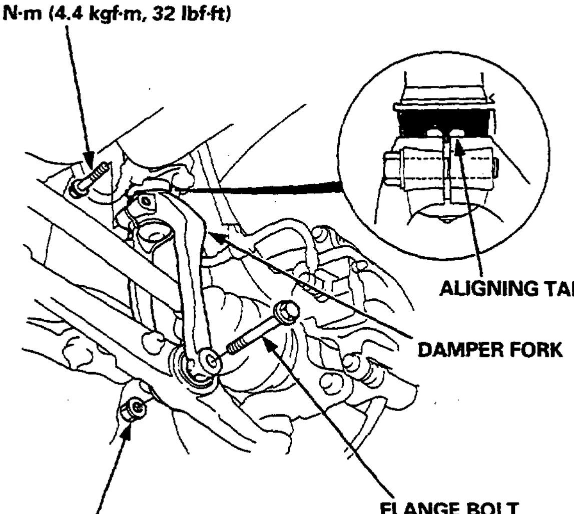
3. Insert the inboard end of the driveshaft into the differential until the set ring locks in the groove.



4. 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.

5. Loosely install the flange bolts and the new self-locking nut.

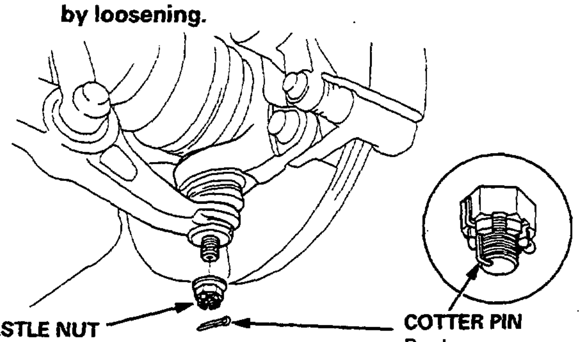
   NOTE: The bolts and nut should be tightened with the vehicle's weight on the damper.



6. 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.

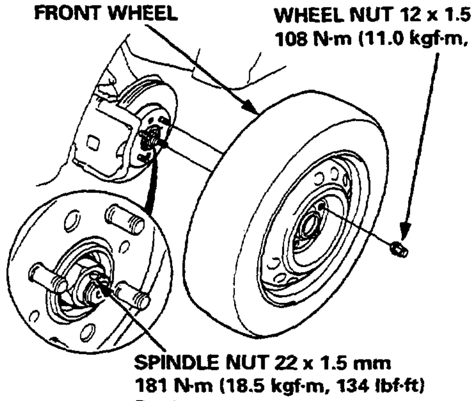
   CAUTION:
   - **Be careful not to damage the ball joint boot.**
   - **Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.**



7. Install a new spindle nut, then tighten 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 the wheel.



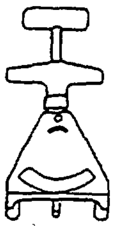
9. Tighten the flange bolt and the new self-locking nut with the vehicle's weight on the damper.

10. Refill the transmission with recommended oil or fluid (see section 13 or 14).

11. Check the front wheel alignment and adjust if necessary (see page 18-4).

Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07JGG – 0010100	Belt Tension Gauge	1	17-20
②	07MAC – SL00200	Ball Joint Remover, 28 mm	1	17-45
③	07NAK – SR30100	Joint Adapter Kit		
③-1	07NAK – SR30110	P/S Joint Adapter (Pump)	1	17-22
③-2	07NAK – SR30120	P/S Joint Adapter (Hose)	1	17-22
④	07406 – 0010200	P/S Pressure Gauge	1	17-22
④-1	07406 – 0010300	Pressure Control Valve	1	17-22
④-2	07406 – 0010400	Pressure Gauge	1	17-22
⑤	07746 – 0010200	Attachment, 37 x 40 mm	1	17-41
⑥	07947 – 6340500	Driver Attachment	1	17-41



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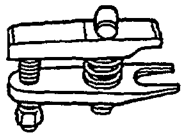

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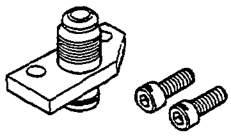
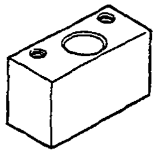
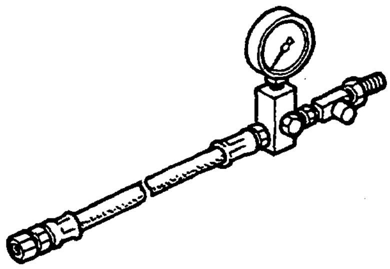


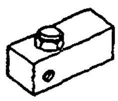
③-1



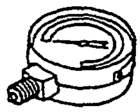
③-2



④

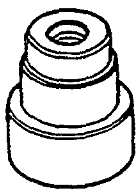


④-1



④-2

⑤



⑥

Component Locations

Index

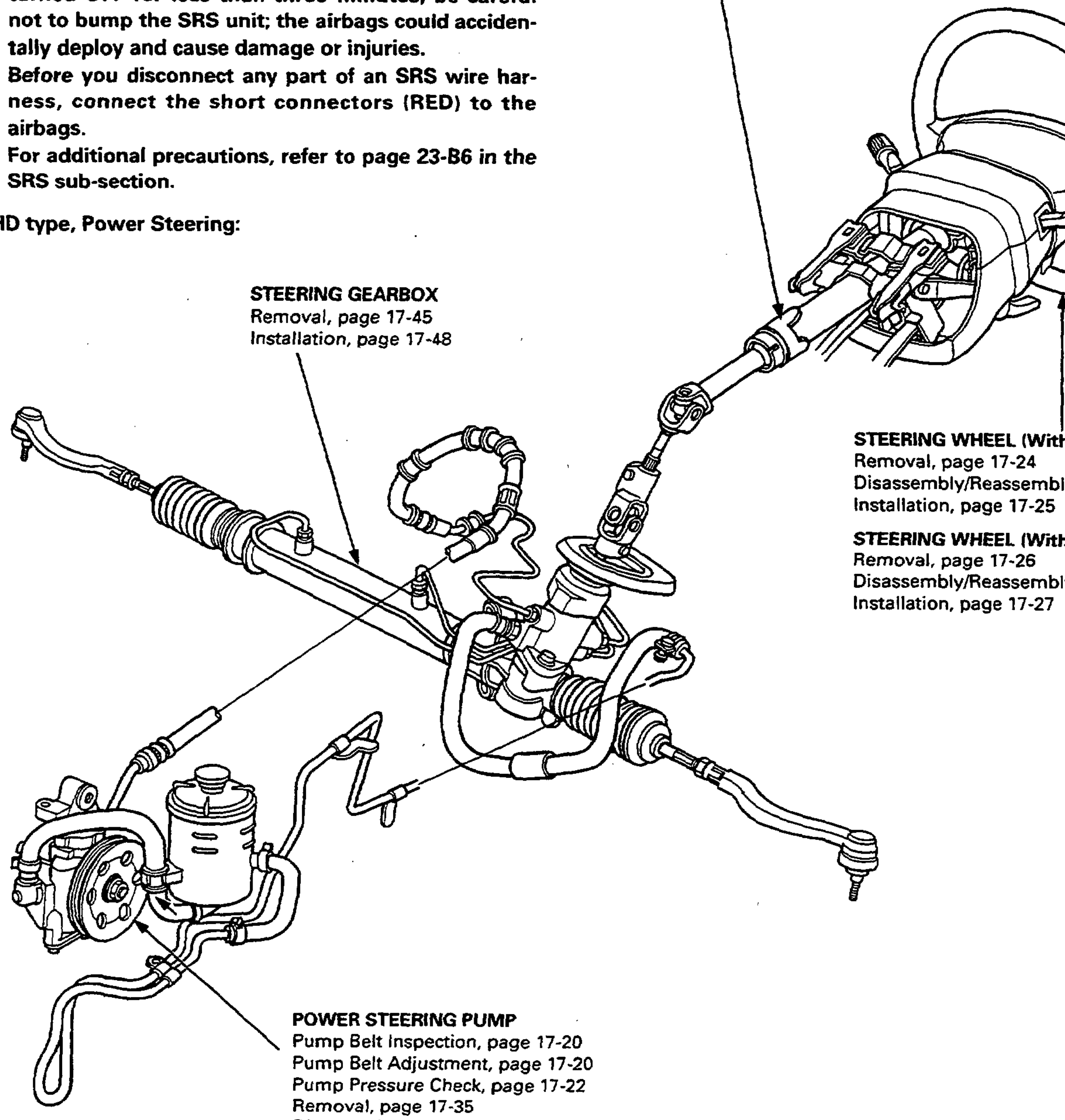
NOTE:

- 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.

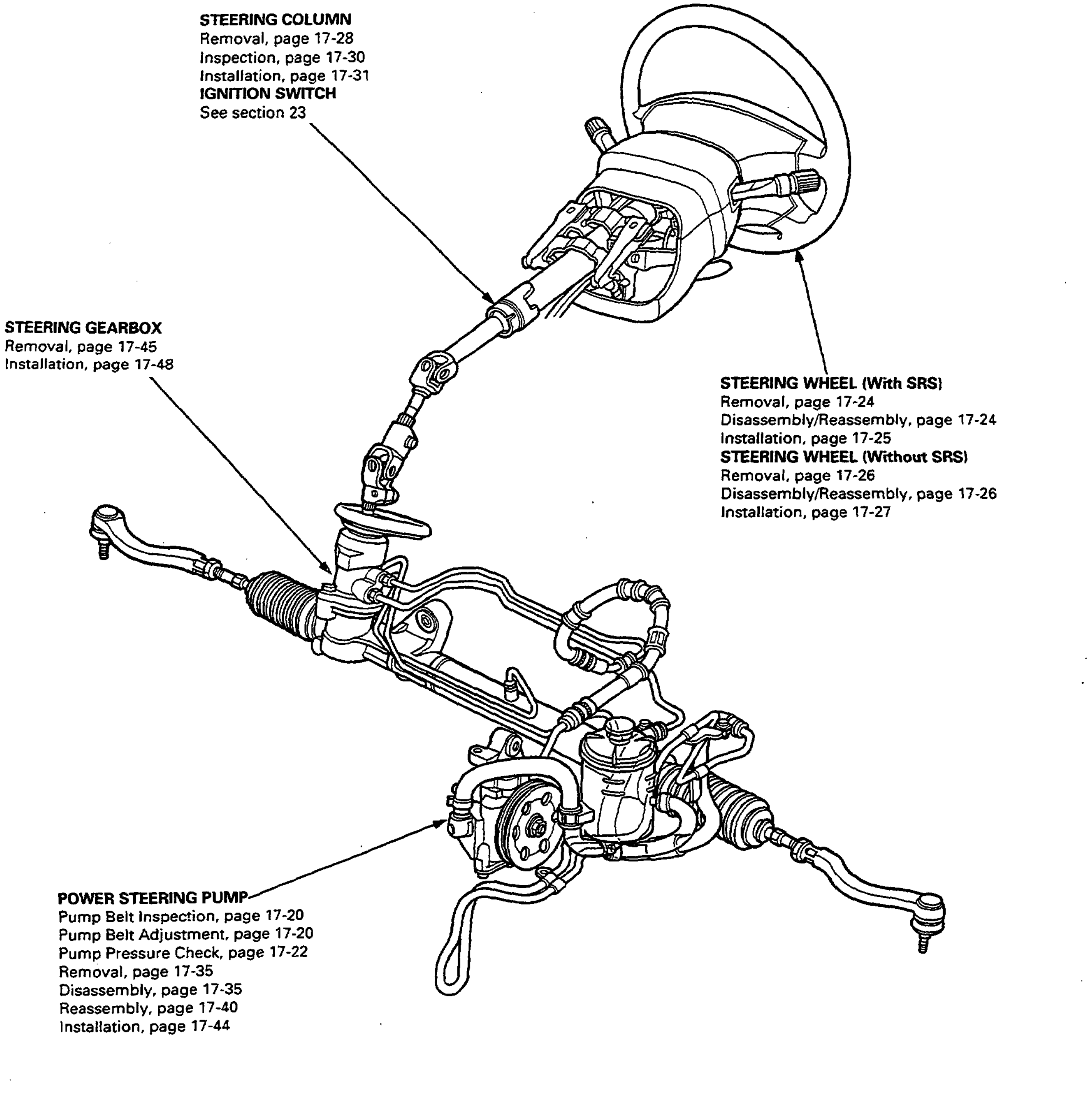
CAUTION:

- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

LHD type, Power Steering:



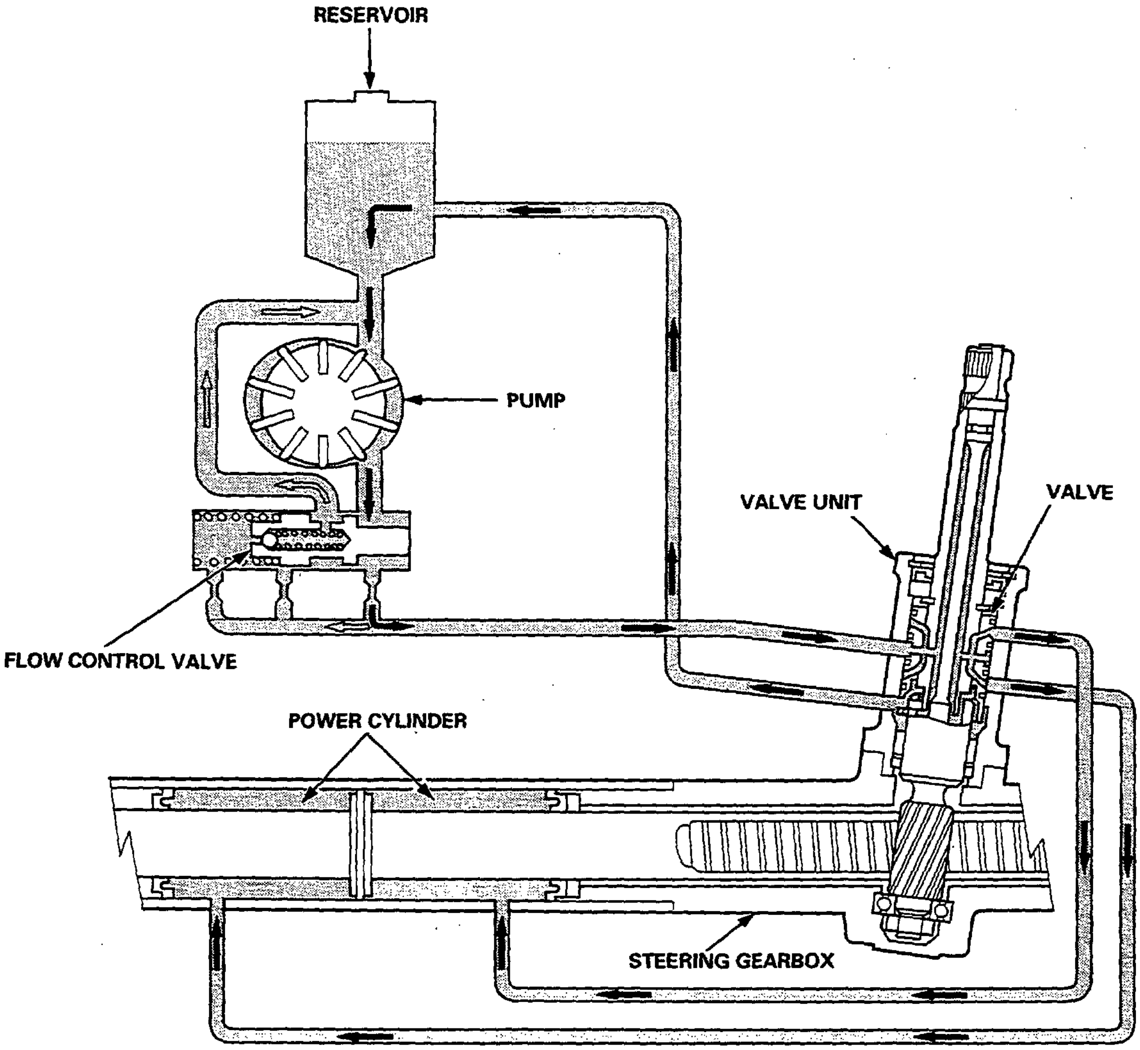
RHD type, Power Steering:



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.

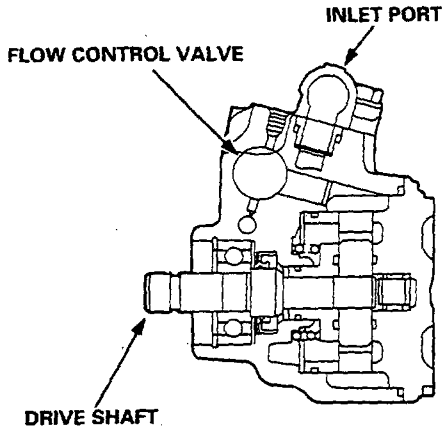


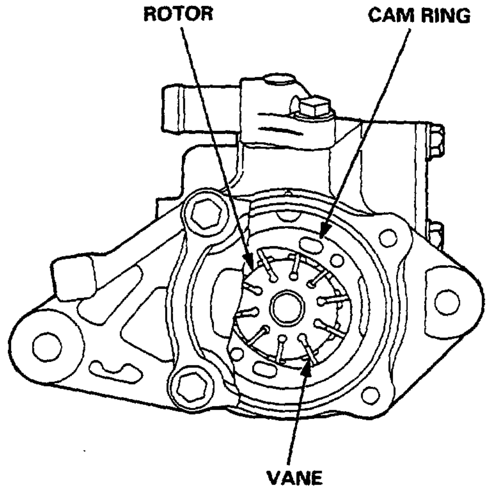
System Description

Steering Pump

Construction

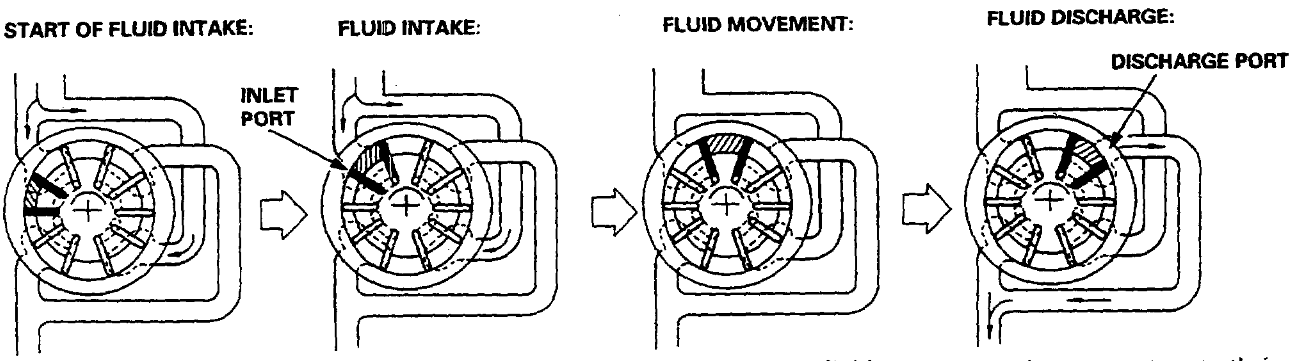
The pump is a vane-type incorporating a flow control valve (with an integrated relief valve) and is driven by a V-belt from the crank pulley. The pump features 10 vanes. Each vane performs two intake/discharge operations for every rotation of the rotor. This means that the hydraulic fluid pressure pulse 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.

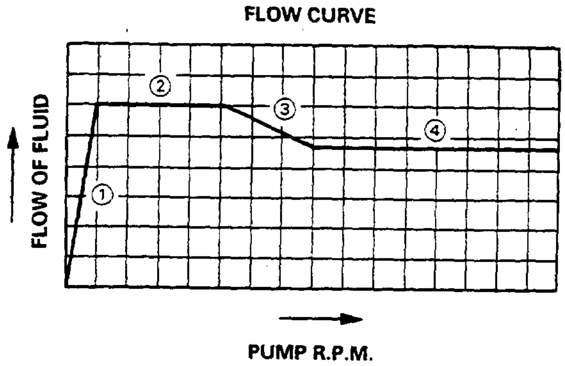
The volume of the vane chamber increases so that fluid is sucked in.

The sucked-in fluid moves toward the discharge port.

As the vanes return to their original position on the inner side, the volume of the vane chamber decreases so the fluid is discharged from the discharge port.

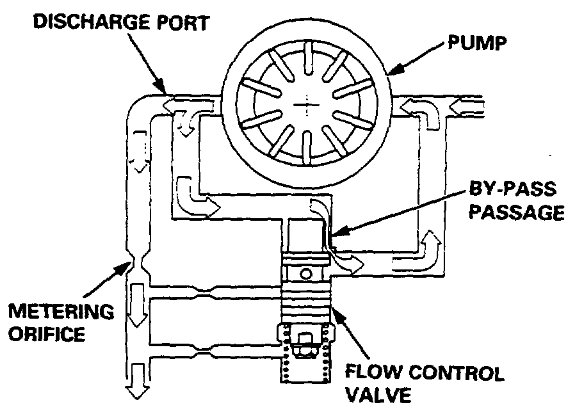
Flow Control

The flow control valve in the pump performs the following steps ① through ④ to control the flow of fluid, i.e., 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.

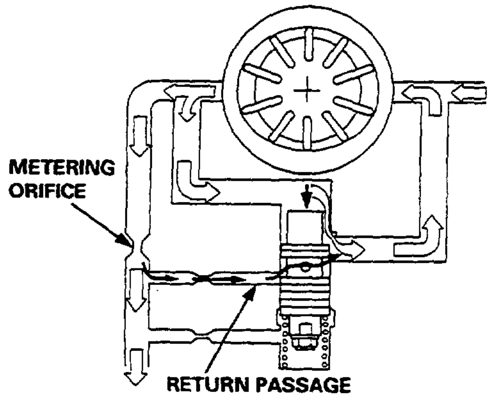


① When the engine starts, fluid discharged from the discharge port starts to run through the metering orifice in the pump. The discharge volume increases as the engine speed increases.

② As the flow has already been regulated by the metering orifice when the engine speed is at or near the idle speed, a constant and regulated amount of fluid is discharged until the engine speed reaches the middle speed range. As the engine speed increases, the pressure difference between the ends of the metering orifice increases. A pressure difference is created between the top and bottom ends of the flow control valve, too, pushing the flow control valve to open the by-pass passage. This allows the excess fluid to return to the inlet port preventing pressure at the discharge port from rising excessively.



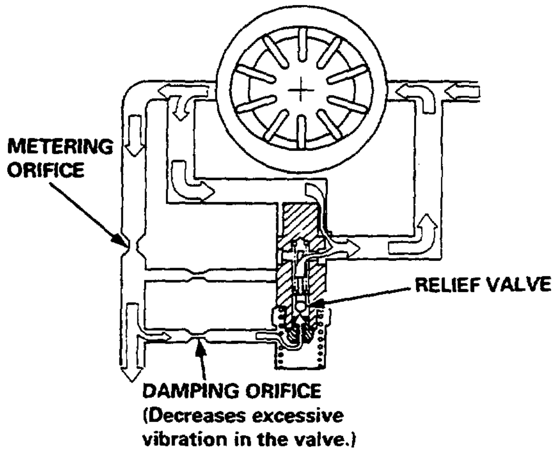
③ As the engine speed continues to increase, the flow control valve is pushed back further. When the engine speed reaches a given speed, the return passage outside the metering orifice is connected to the inlet port, and the opening to the inlet port widens in proportion to the increase in engine speed. This makes part of the fluid regulated by the metering orifice return to the inlet port of the pump; there by discharged fluid from the pump is decreased slowly by this amount.



④ The orifice in the return passage regulates and maintains the flow of fluid discharged from the pump at a given level until the engine speed reaches the high speed range.

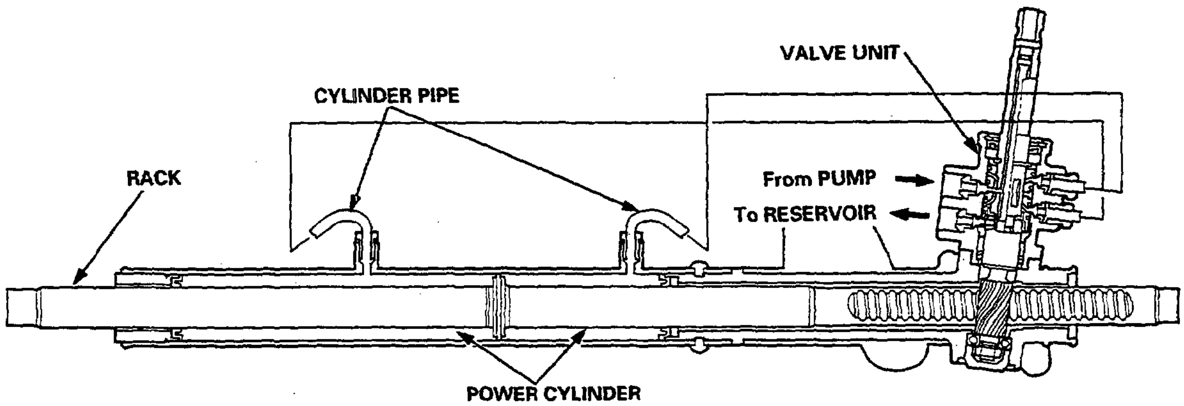
Pressure Relief

Pressure outside of the metering 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 relieve the pressure. As the flow control valve is pushed back by the pressure difference this time, the flow of fluid in the bypass passage increases, controlling the pressure outside the metering orifice. The above operations are repeated to provide constant discharge pressure from the pump.



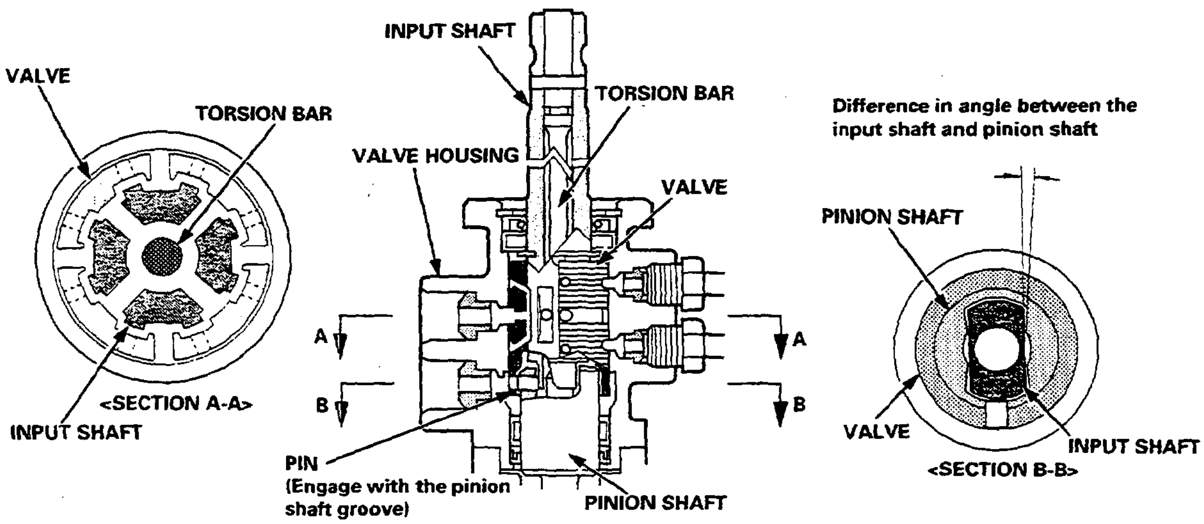
Steering Gearbox

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

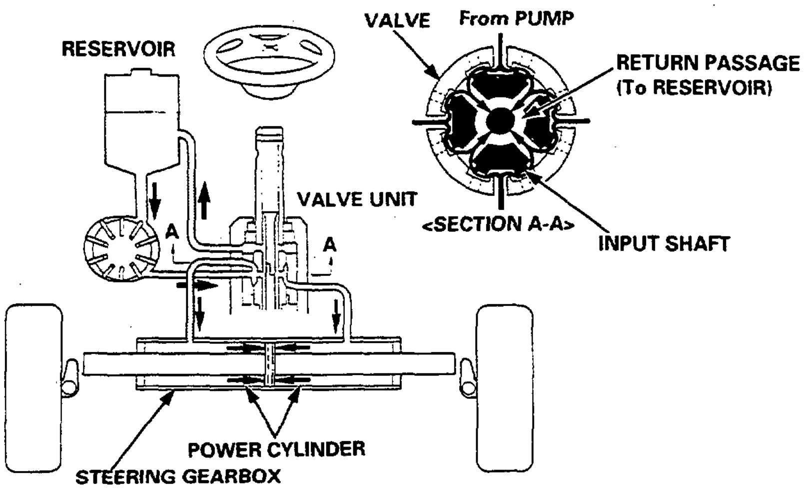
Inside the valve unit is the valve, which is coaxial with the pinion shaft, and controls the steering fluid pressure. The valve housing is connected with the fluid pipe from the pump, return pipe to the pump, and the two cylinder pipes from the respective power cylinder.
The pinion shaft is double – 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

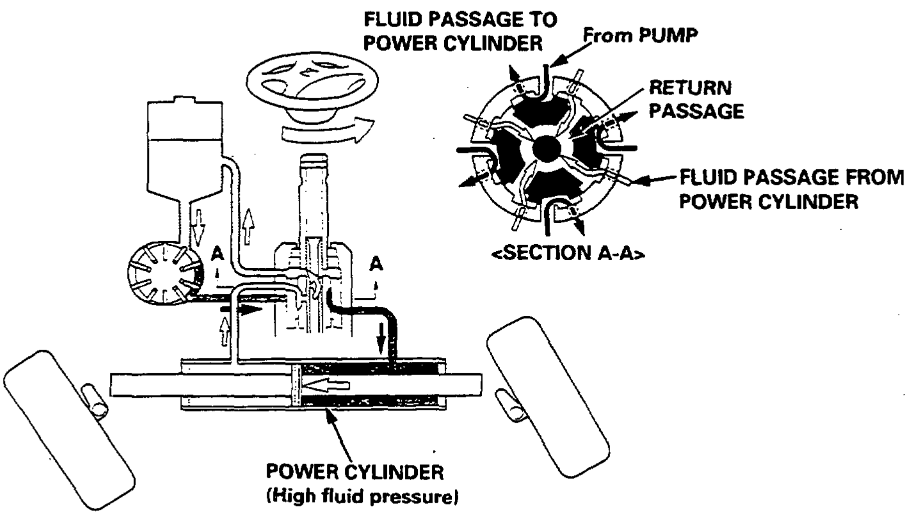
Low assist at higher speeds:

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 speed, 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).



Troubleshooting

General Troubleshooting

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes 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?

Hard Steering

Check pump fluid pressure (see page 17-22).
Measure steady-state fluid pressure while idling with the shut-off valve fully open.
It should be 1,500 kPa (15 kgf/cm², 213 psi) or below.

Abnormal fluid pressure

- Fluid pressure is too low:
  Check the return circuit pipe and hose between the gearbox and pump for clogging and deformation.
- Fluid pressure is too high:
  Check the pipe and hose connected from the pump to the gearbox for clogging and deformation.

Normal pipe and hose

Faulty steering gearbox

Normal

Check pump fluid pressure (see page 17-22).
Measure pump relief pressure while idling with the shut-off valve fully closed.
1.6 ℓ model only:
It should be 6,400 – 7,400 kPa (65 – 75 kgf/cm², 924 – 1,067 psi)
Other model:
It should be 5,400 – 6,400 kPa (55 – 65 kgf/cm², 782 – 924 psi)

Too low relief pressure

Check the flow control valve.
- Check the valve for smooth movement in the housing.
- Check the relief valve for leaks.

Normal

Faulty pump assembly

Abnormal

Faulty flow control valve

Normal relief pressure

Go to page 17-11

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 3.2 N (0.33 kgf, 0.72 lbf) or below.

- Abnormal → Check cylinder pipes A and B for deformation.
  - Not deformed → Faulty steering gearbox
  - Deformed → Faulty cylinder pipe
- Normal → Check the parts other than the gearbox-related parts for proper rotation.
  - Improper rotation of the steering column-related parts(s)
  - Faulty steering joint
  - Faulty rack end/tie-rod end ball joints
  - Interference in the steering system

  Normal → Faulty steering gearbox

(cont'd)

General Troubleshooting (cont'd)

CAUTION: When inspecting, do not holding the steering wheel all the way to right or left.

Symptom	Probable cause	Remedy
Shock or vibration when wheel is turned to full lock.	Pump belt slipping on pulley (pump stops momentarily).	Adjust belt tension (page 17-20) or replace belt, if necessary.
	Check the flow control valve (see page 17-36).	Clean the flow control valve or replace the pump, if necessary.
Assist (excessively light steering) at high speed.	Measure force required to turn wheel with car parked on dry paved surface (page 17-18).	If below 30 N (3.1 kgf, 6.8 lbf), replace the steering gearbox.
Steering kicks back during wide turns.	Belt slipping on pulley.	Adjust belt tension (page 17-20) or replace belt, if necessary.
	Sticking power valve machanism.	Replace steering gearbox.
	Rack guide too loose.	Replace steering gearbox.
Wheel will not return smoothly.	Check cylinder pipes A and B for deformation.	If either A or B cylinder pipe is deformed, replace it. If cylinder pipe A and B are normal, replace steering gearbox.
	Tire pressure too low.	Inflate to correct pressure.
	Improper front wheel alignment.	Readjust front wheel alignment or replace parts as necessary.
	Improperly rack clearance.	Replace steering gearbox.

Uneven or rough steering.

- Improperly adjusted rack guide. → Replace steering 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 [**1.6 ℓ model only:** 6,400 – 7,400 kPa (65 – 75 kgf/cm², 924 – 1,067 psi) **Other model:** 5,400 – 6,400 kPa (55 – 65 kgf/cm², 782 – 924 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.

Symptom	Probable cause / condition	Remedy
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.
	Improperly rack clearance.	Replace the steering gearbox.
	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 rack end 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.

Troubleshooting

Fluid Leaks

Steering Gearbox — Check the gearbox assembly for fluid leaks carefully. Fluid can leak out of various points, depending on location of the faulty oil seals/seal rings.

If leaking from the following sections on the steering gearbox, replace the whole gearbox as an assembly.

CAUTION: Do not try to disassemble to gearbox.

- Leaking from the oil seal on the top of the valve housing.
- Leaking from the cylinder end into left or right tie-rod boots.
- Leaking from the shaft upper end section or pin engagement section of the pinion shaft.
- Leaking from the mating surface of the valve body unit and gearbox.

Pipes

Symptom	Remedy
Leaking from cylinder pipe A or B connections (at flare nut).	Tighten the connector. If it's still leaking, replace the pipe or steering gearbox.
Leaking caused by damaged cylinder pipe A or B.	Replace cylinder pipe A or B.
Leaking from feed pipe and return pipe on the valve body unit (at flare nut).	Tighten the connector. If it's still leaking, replace the pipe or steering gearbox.

Location	Symptom	Remedy
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.

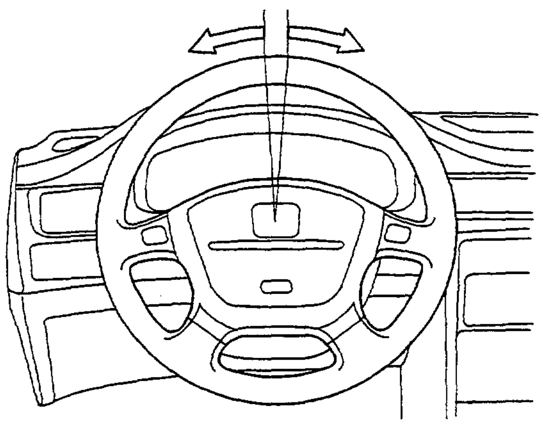
Inspection and Adjustment

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.

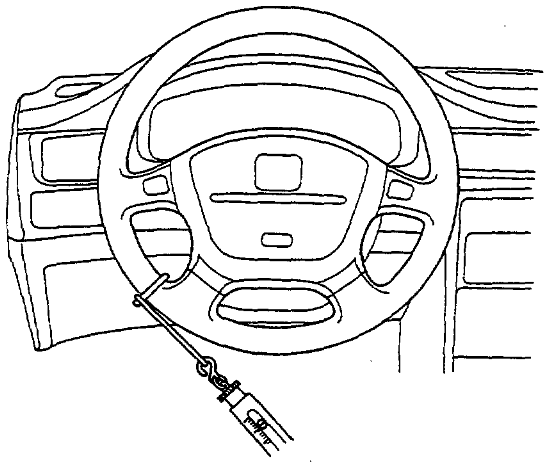
ROTATIONAL PLAY: 0 – 10 mm (0 – 0.39 in)

If the play exceeds the service limit, inspect the steering linkage and gearbox as described on the next page.



Power Assist Check with Car Parked

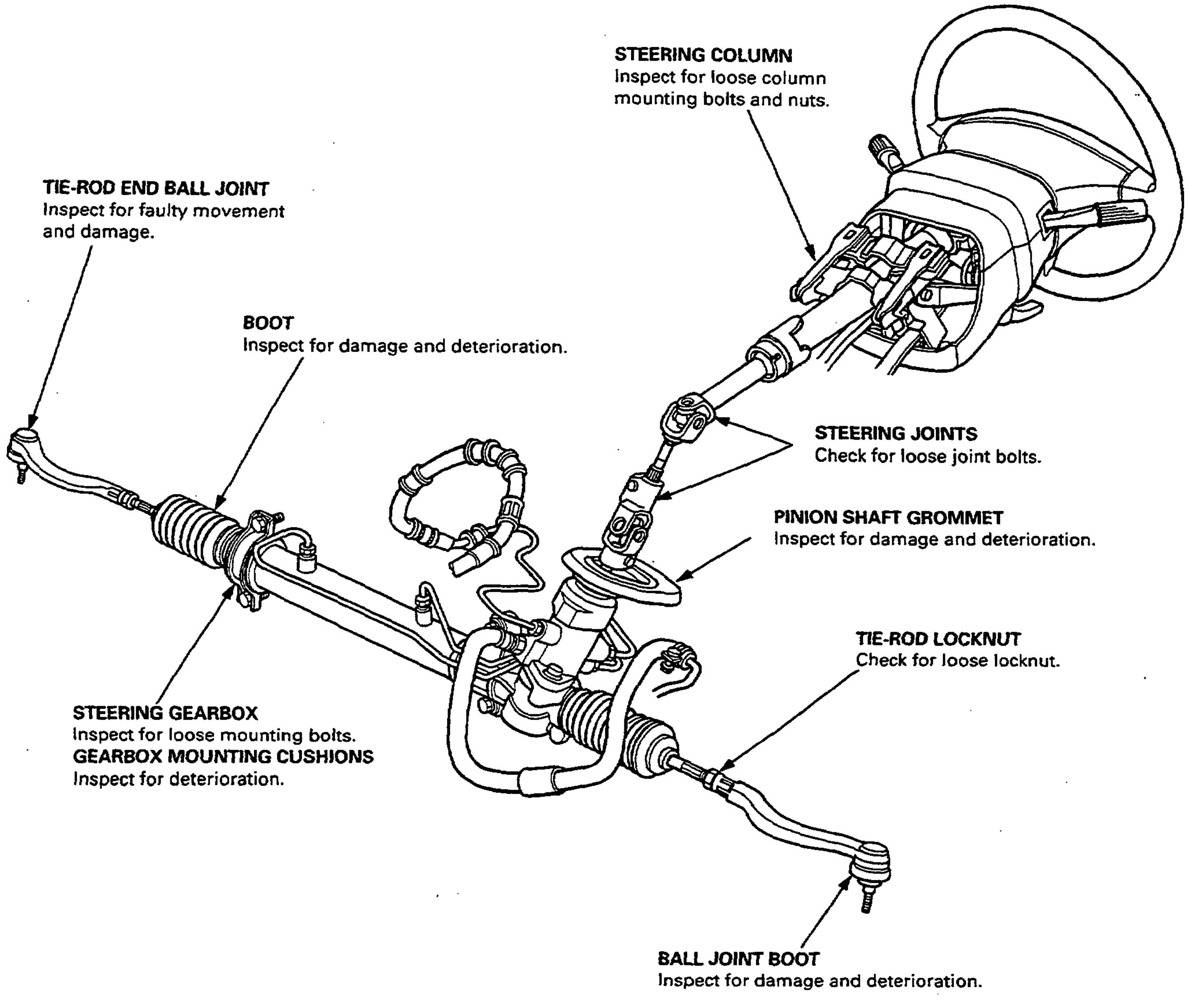
1. Check the power steering fluid level (see page 17-21) and pump belt tension (see page 17-20).
2. Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.
3. Attach a spring scale to the steering wheel. With the engine idling and the car 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 30 N (3.1 kgf, 6.8 lbf). If it reads more check the gearbox and pump.

Steering Linkage and Gearbox

NOTE: LHD type is shown, RHD type is symmetrical.



Inspection and Adjustment

Pump Belt

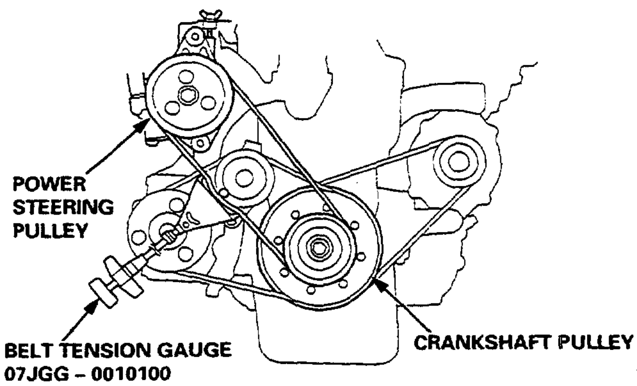
NOTE: When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

Inspection

Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension:
Used Belt: 340 – 490 N (35 – 50 kgf, 77 – 110 lbf)
New Belt: 590 – 785 N (60 – 80 kgf, 132 – 176 lbf)

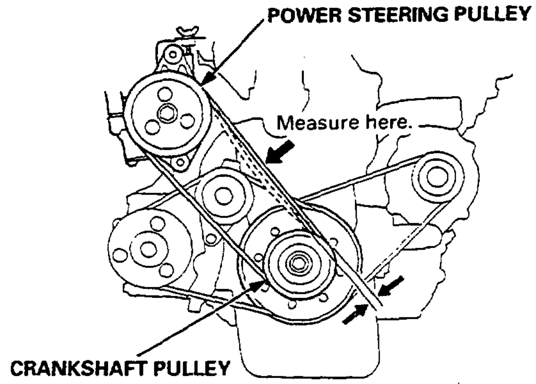
NOTE:
- If there are cracks or any damage evident on the belt, replace it with a new one.
- Follow the manufacturer's instructions for the tension gauge.



Inspect the pump belt for cracks or any damage.
Replace the belt with a new one if necessary.

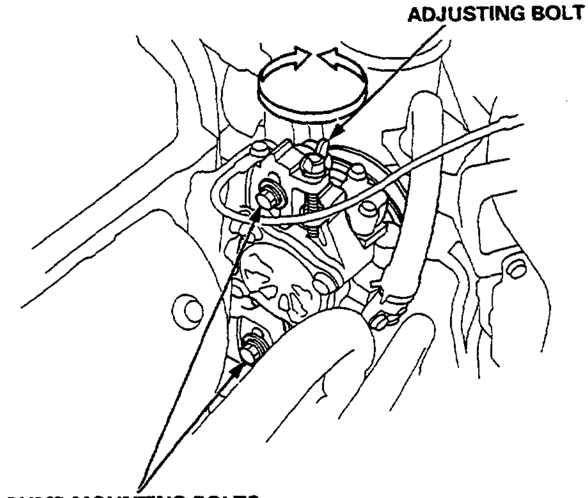
Measurement without Belt Tension Gauge:
Apply a force of 98 N (10 kgf, 22 lbf) and measure the deflection between the power steering pump and the crankshaft pulleys.

Deflection:
Used Belt: 8.0 – 12.0 mm (0.31 – 0.47 in)
New Belt: 5.5 – 8.5 mm (0.22 – 0.33 in)



Adjustment

1. Loosen the power steering pump mounting bolts.
2. Turn the adjusting bolt to get the proper belt tension, then retighten the bolts.
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.

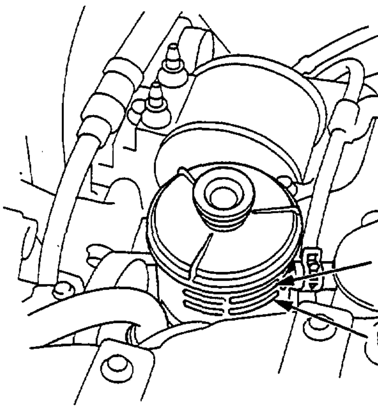


Fluid Replacement

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:
LHD: 1.0 liter (1.06 US. qt, 0.88 Imp.qt)
RHD: 0.9 liter (0.95 US. qt, 0.85 Imp.qt)
at disassembly

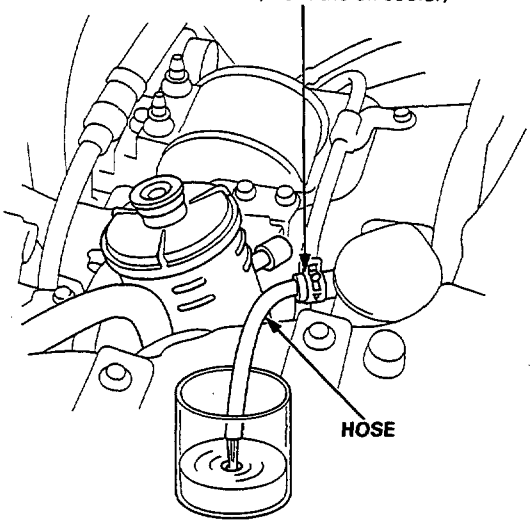


1. Raise the reservoir and disconnect the return hose that goes to the oil cooler.

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 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.

Inspection and Adjustment

Pump Pressure Check

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

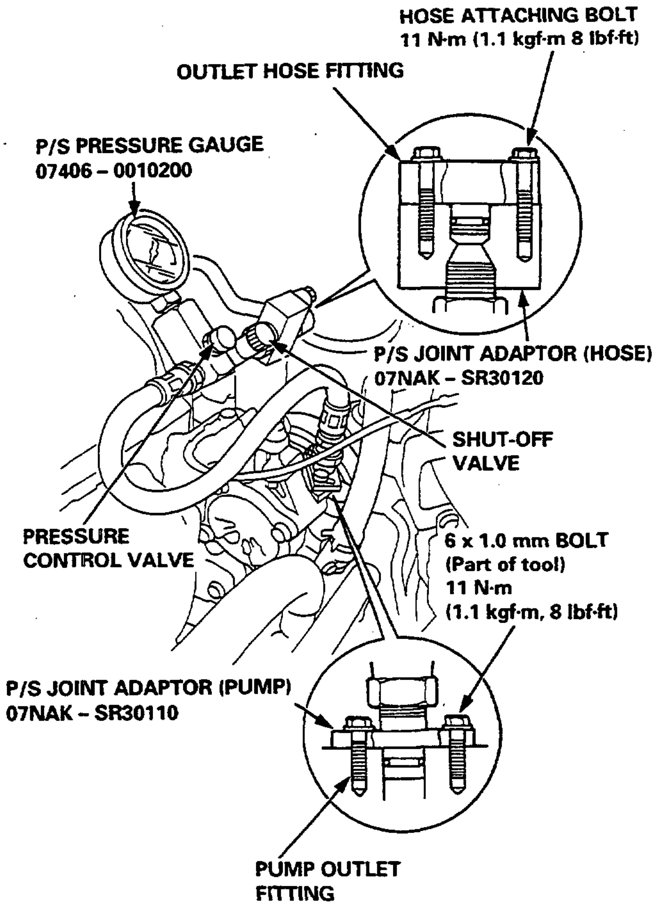
NOTE: First check the power steering fluid level and pump belt tension.

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.

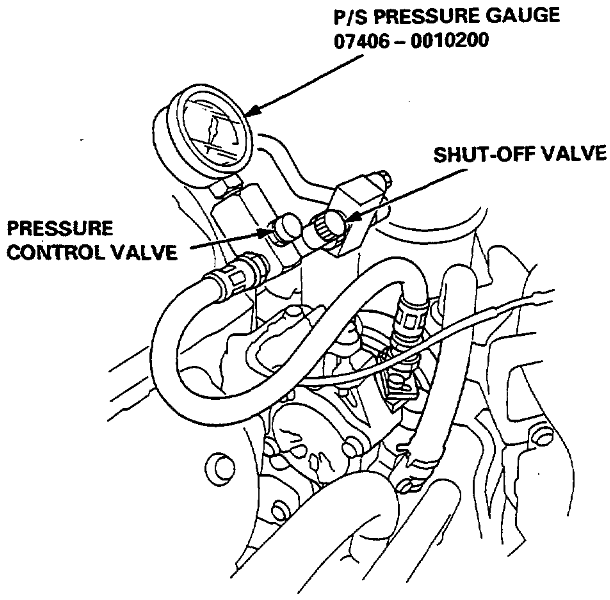
8. Measure steady-state fluid pressure while idling with the shut-off valve fully open. If the pump is in good condition, the gauge should read less than 1500 kpa (15 kgf/cm², 213 psi).
   If it reads high, check the feed line or valve body unit (see General Troubleshooting 17-10).

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.

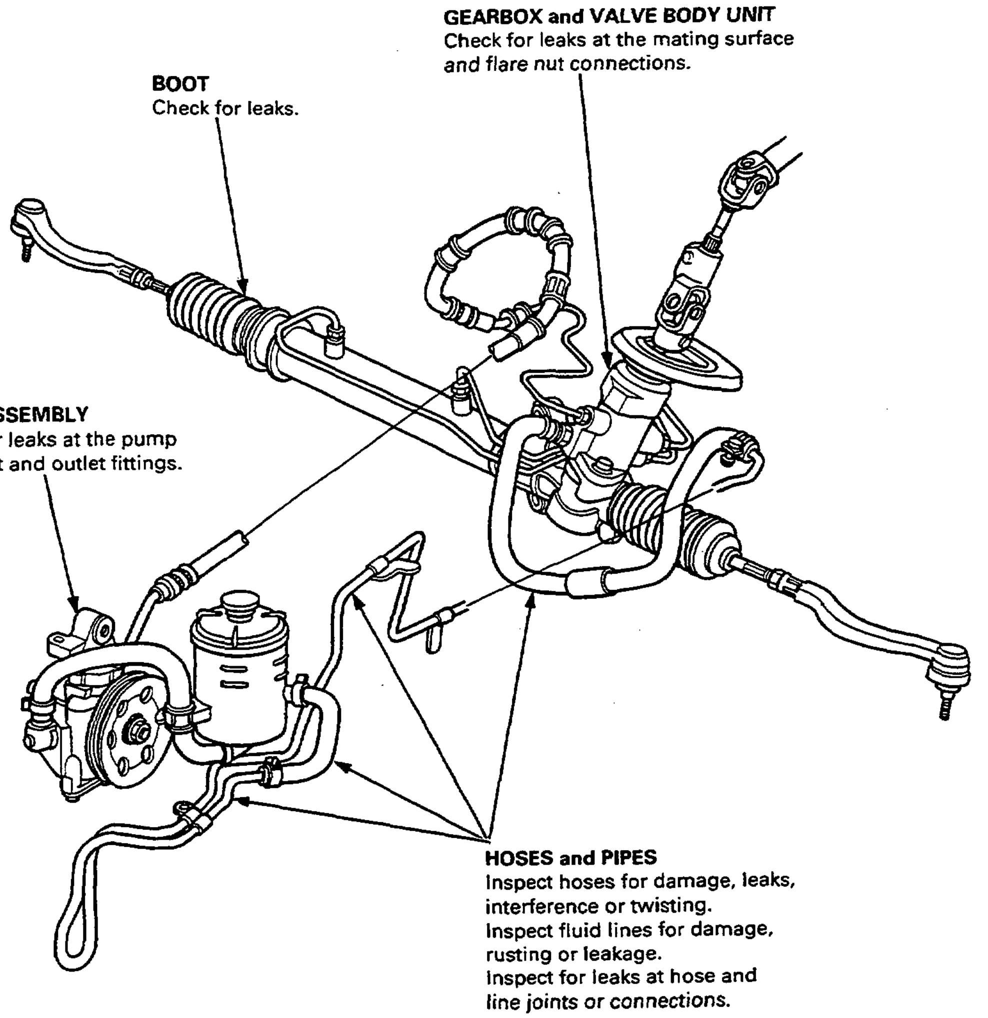
    CAUTION: Do not keep the shut-off valve closed more then 5 seconds or the pump could be damaged by over-heating.

    If the pump is in good condition, the gauge should read at least [1.6 ℓ model only: 6,400 – 7,400 kpa (65 – 75 kgf/cm², 924 – 1,067 psi) Other model: 5,400 – 6,400 kPa (55 – 65 kgf/cm², 782 – 924 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.

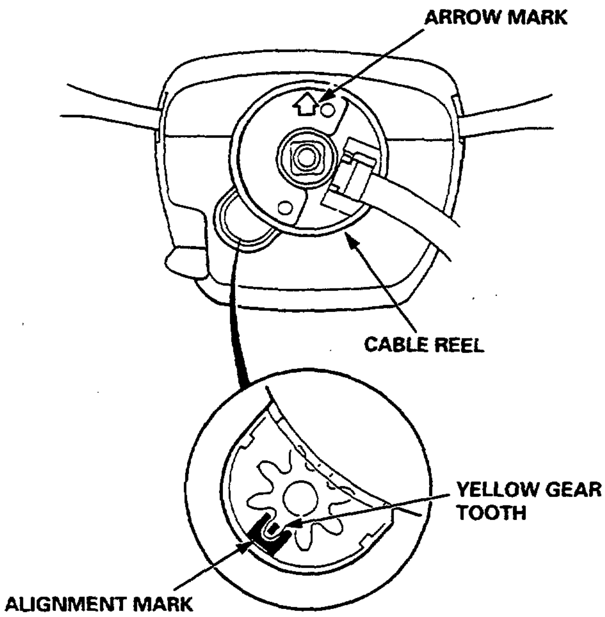


Installation

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.**

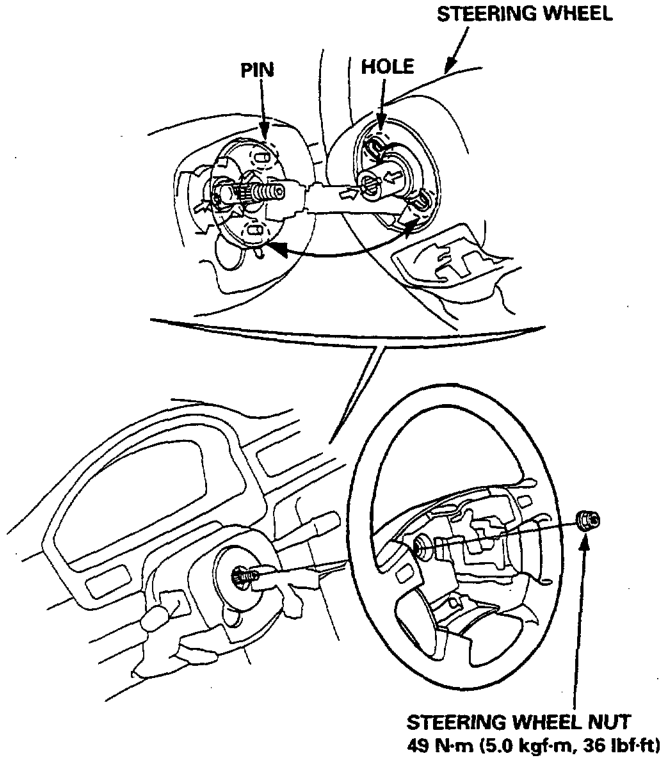
⚠WARNING Confirm that the airbag assembly is securely attached to the steering wheel; otherwise, severe personal injury could result during airbag deployment.

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.



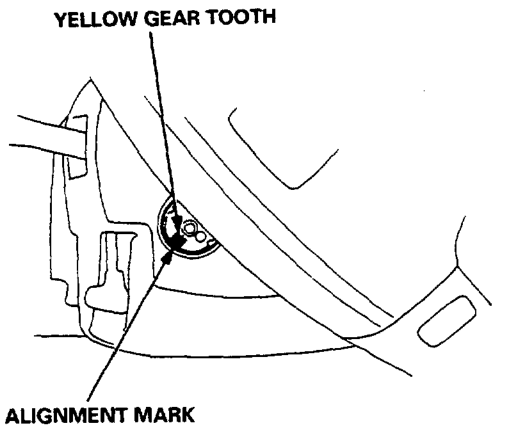
2. Install the steering wheel.

   NOTE: Be sure the steering wheel shaft engages the cable reel and canceling sleeve.



3. Install the airbag assembly (see page 23-B6).

4. 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.
   - 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.

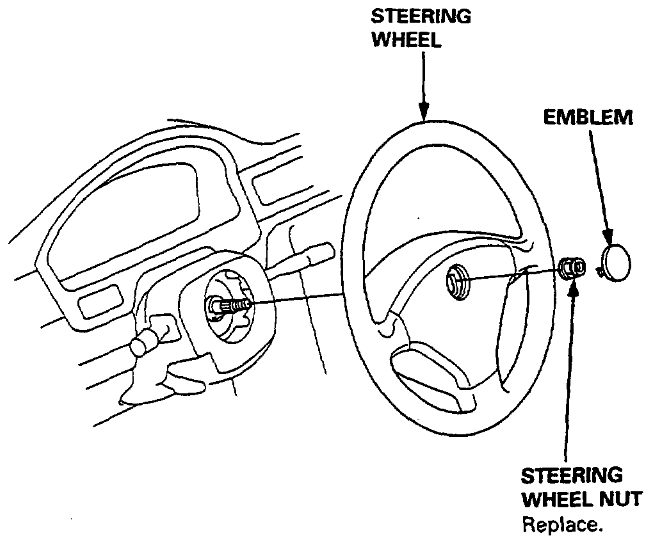
1. Remove the emblem with small screw driver.

   NOTE: Be careful not to damage the emblem and steering wheel.

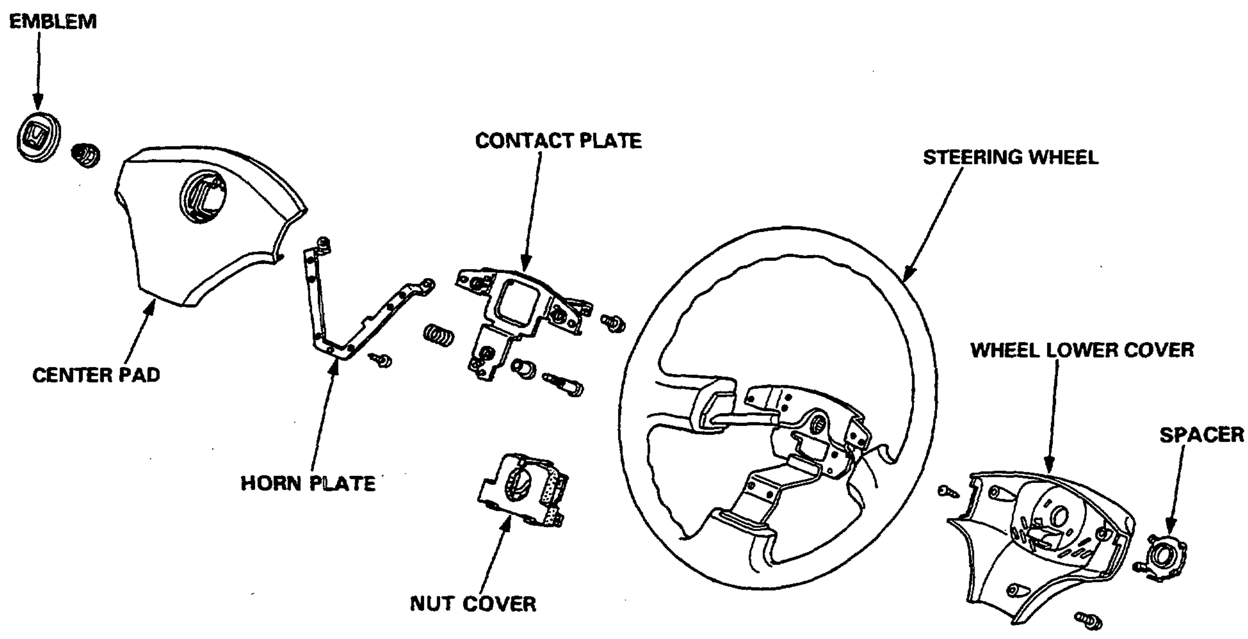
2. Remove the steering wheel nut.

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

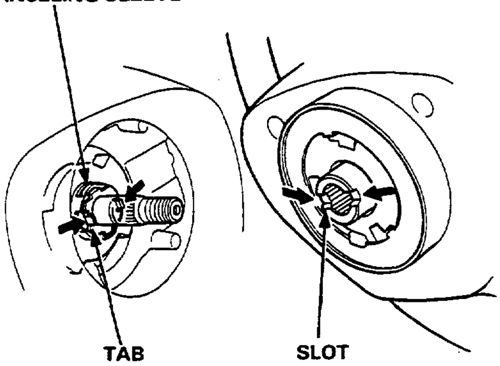


Installation

1. Install the steering wheel with the front wheels in the straight ahead position.

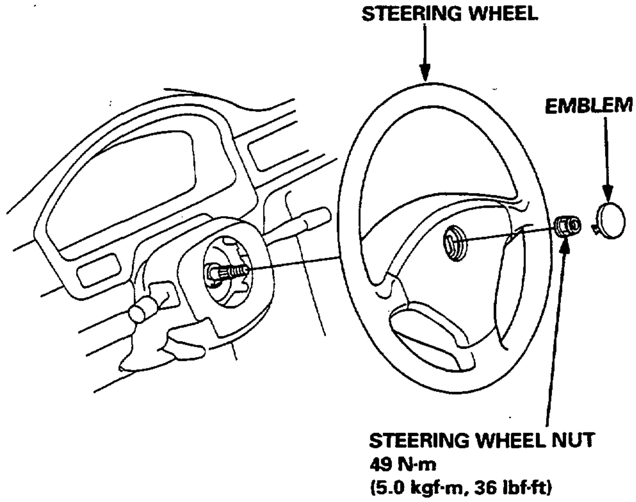
   NOTE: Align the slots on steering wheel and tabs on the turn signal canceling sleeve.

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.



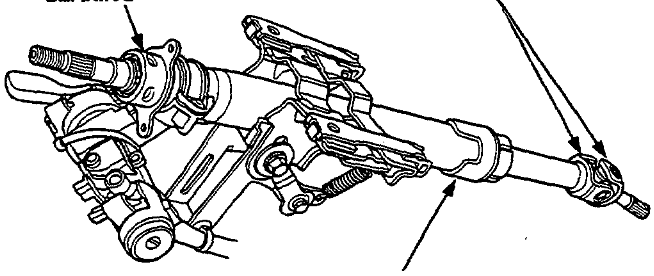
4. After installing the steering wheel, check the horn buttons for proper operation.

Steering Column

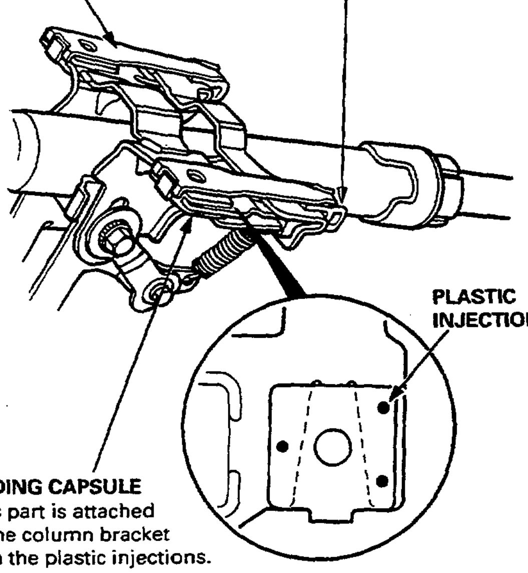
Inspection

- 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 for distortion or breakage.
  Replace them as an assembly if they are distorted or broken.

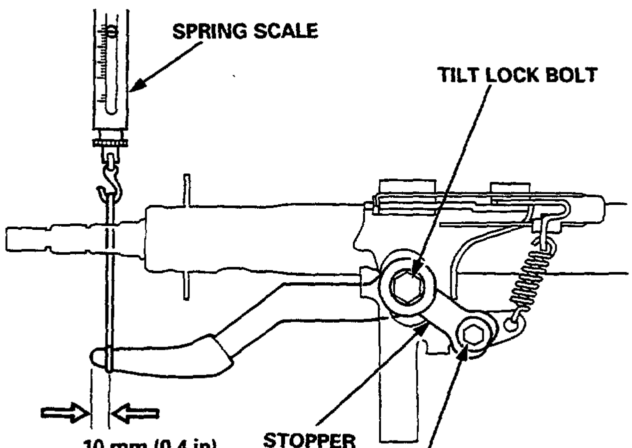


- Check the tilt mechanism for proper movement and damage.

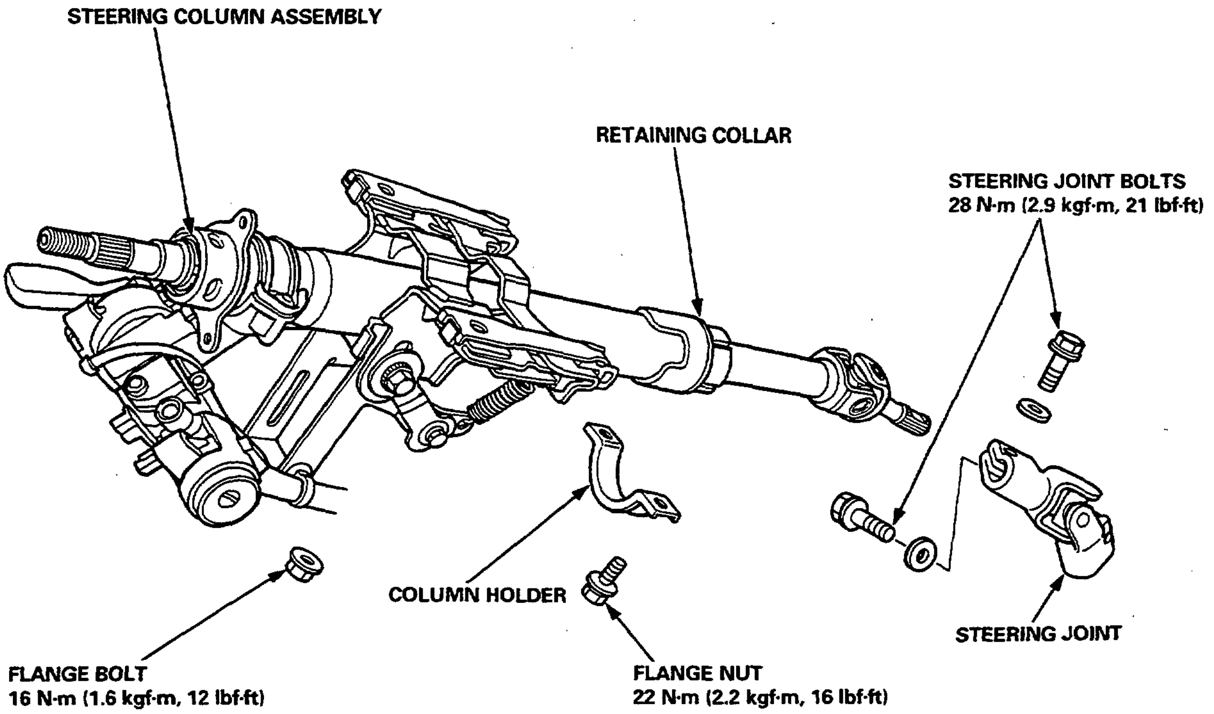
  — Attach a spring scale to the knob of the tilt lever. Measure the preload required to move the lever.

  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.



Installation



(cont'd)

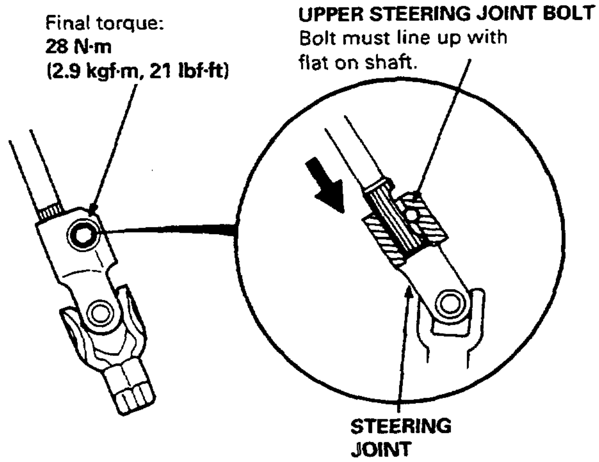
Steering Column

Installation (cont'd)

CAUTION:

- **All SRS electrical wiring harnesses are covered with yellow insulation.**
- **When disconnecting the SRS wire harness, install the *short connector* on the airbag, then disconnect the wire harness.**
- **Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.**

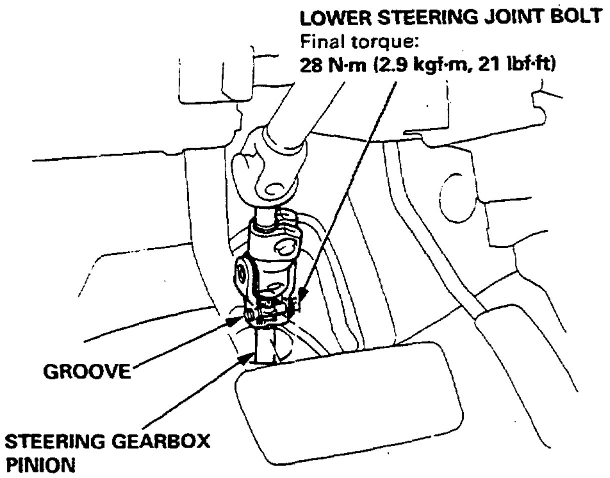
1. Slip the upper end of the steering joint onto the column shaft (line up the bolt hole with the flat on the shaft), and loosely install the upper steering joint bolt.



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.

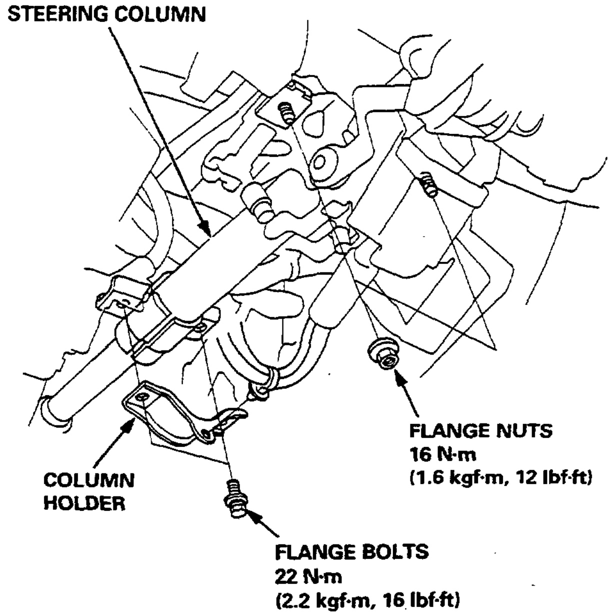
NOTE:

- 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.

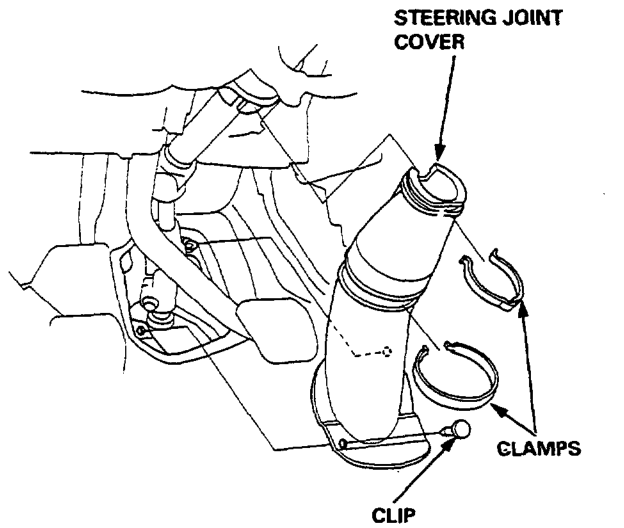


3. Install the steering column with the flange nuts, then install the column holder and flange bolts.

4. Tighten the upper and lower steering joint bolts loosely installed in step 2.



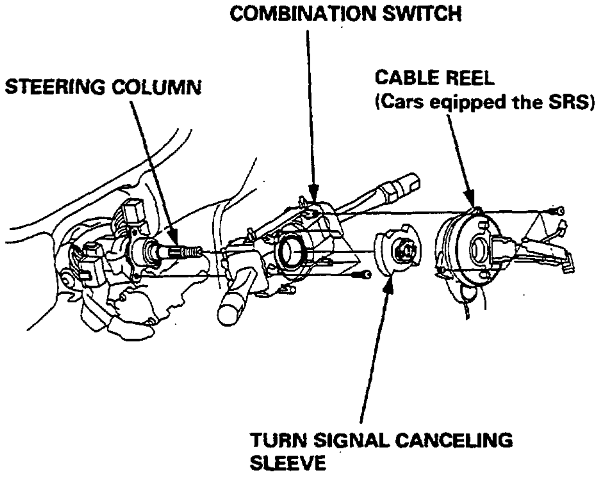
5. Install the steering joint cover with the clamps and clip.



6. Connect the ignition switch wire connectors to the under-dash fuse/relay box.

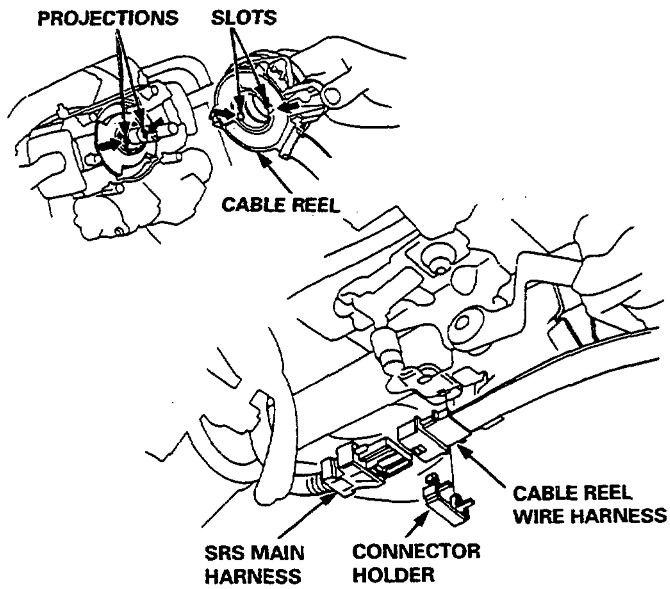
7. Install the combination switch and turn signal canceling sleeve onto the steering column.

   NOTE: Be sure the wires are not caught or pinched by any parts when installing the combination switch.

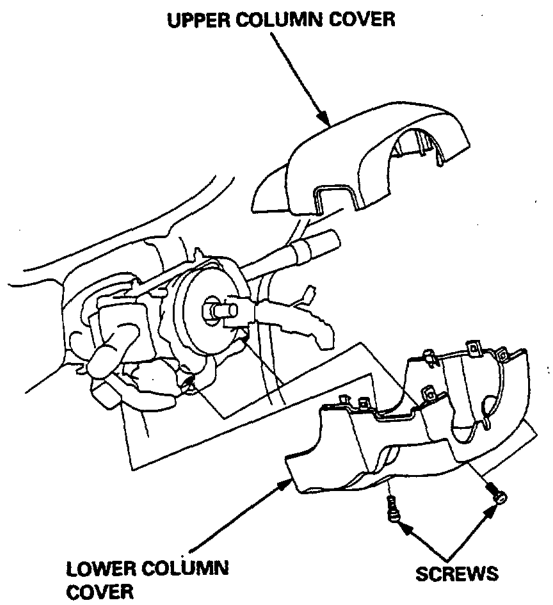


8. If cars equipped the SRS, install the cable reel onto the steering column, then connect the SRS main harness and cable reel wire harness and install the connector holder.

   NOTE: Align the slot in the cable reel with the projection on the canceling sleeve.

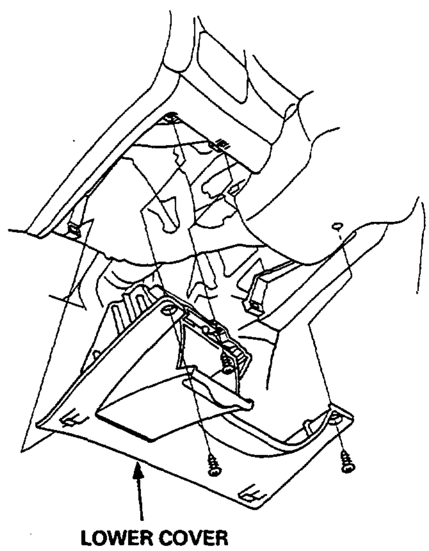


9. Install the column covers.



10. Install the lower cover.

11. Install the steering wheel (see page 17-25 and 27).



Power Steering Hoses, Pipes

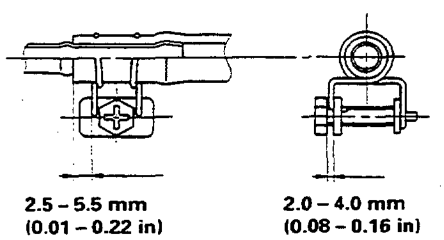
Replacement

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, and replace with new ones if necessary.

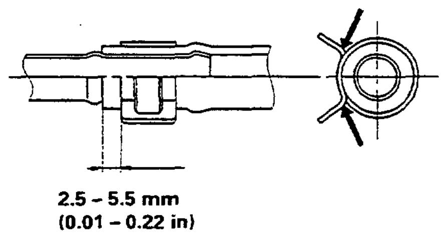
⟨ADJUSTABLE HOSE CLAMP:⟩

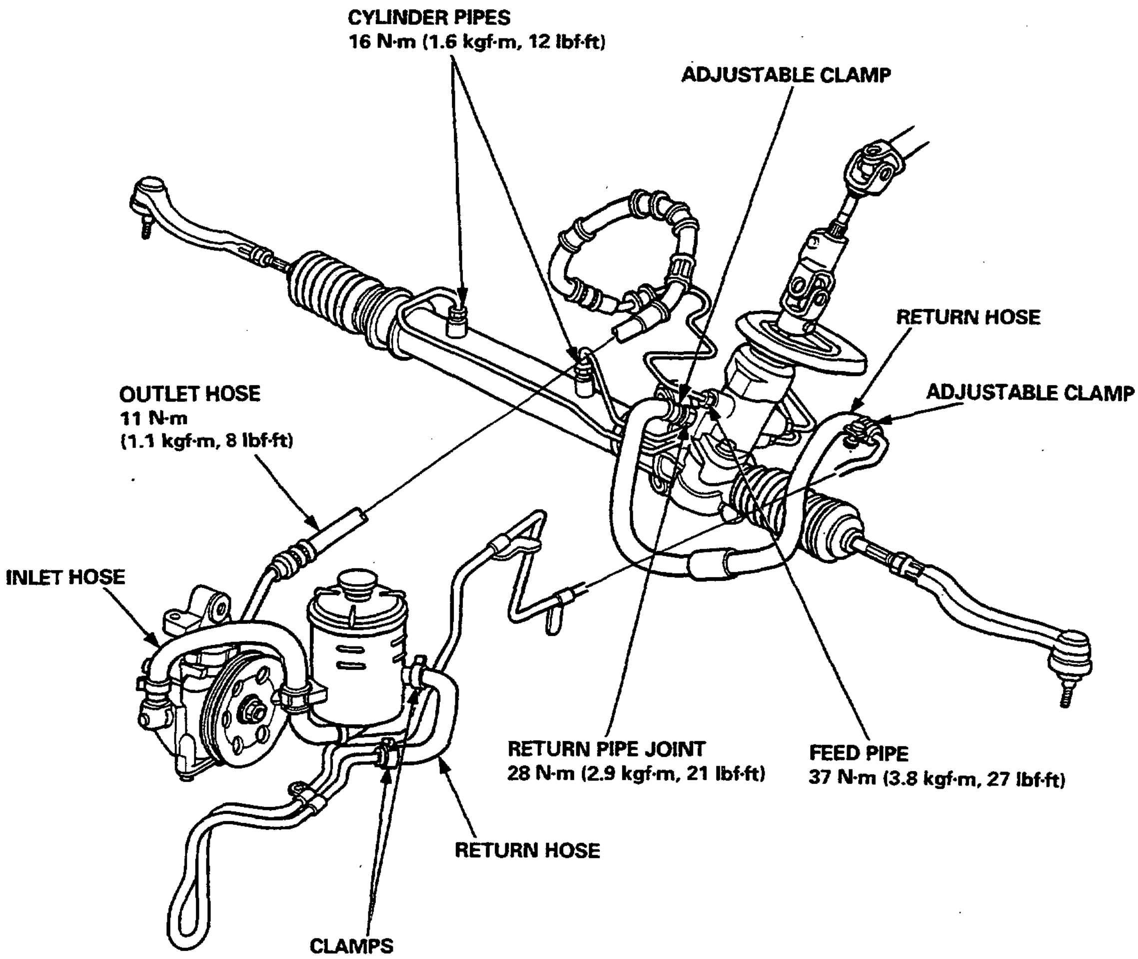
Put over the pipe until the hose stops at the stopper.



⟨HOSE CLAMP:⟩

Put over the pipe until the hose stops at the stopper.





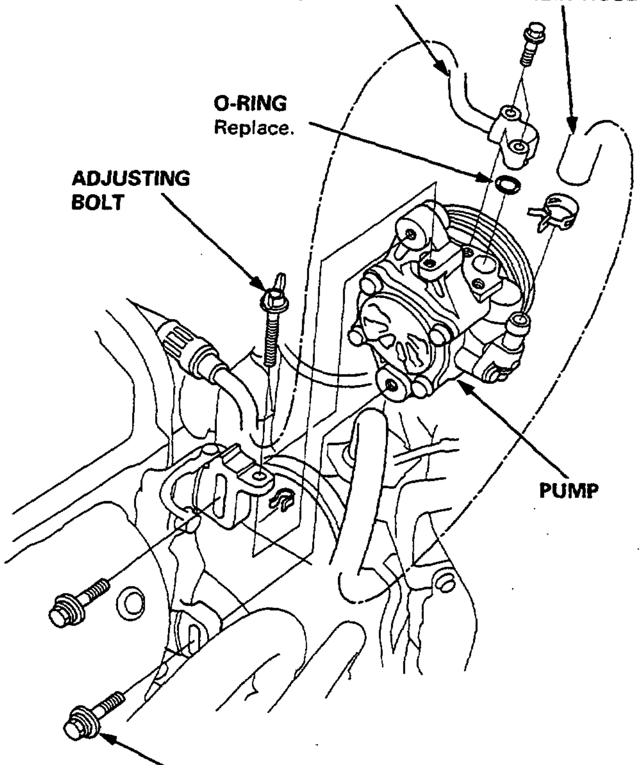
Removal

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.
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 any foreign material. See page 17-44 for pump installation.



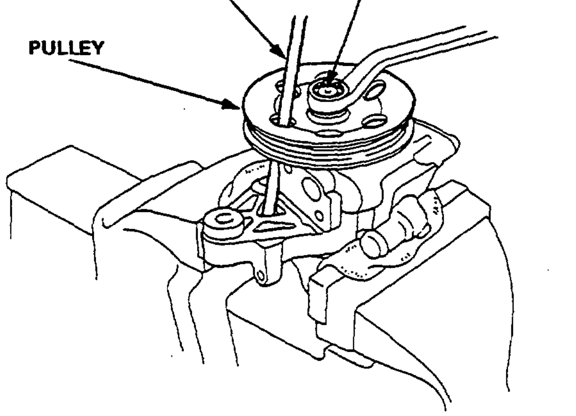
Disassembly

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.

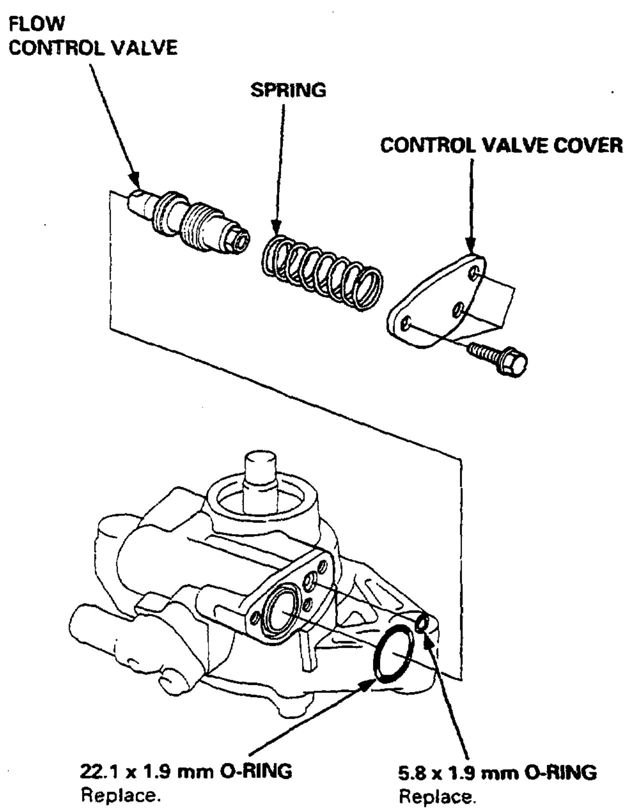


(cont'd)

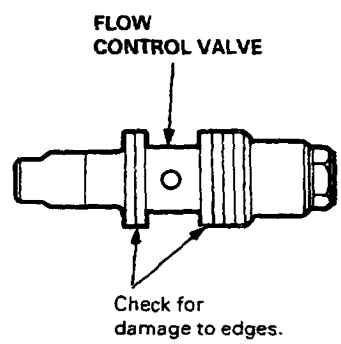
Disassembly (cont'd)

Flow Control Valve Removal/Inspection

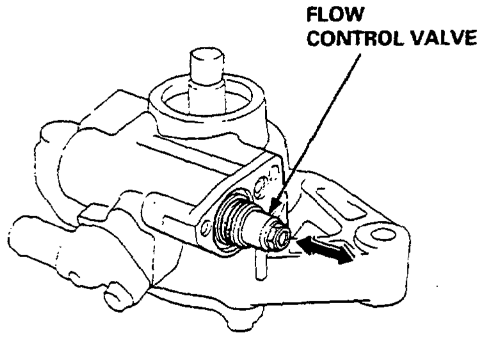
1. Remove the control valve cover by removing the three flange bolts.
2. Remove the spring, flow control valve and O-rings.



3. Check the flow control valve for wear, burrs, and other damage to the edges of the grooves in the valve.

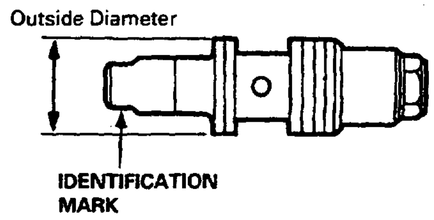


4. Inspect the bore for the flow control valve for scratches or wear.
5. Slip the valve back in the pump and check that it moves in and out smoothly.



— If OK, go on step 6, if not replace the valve and recheck the valve movement.

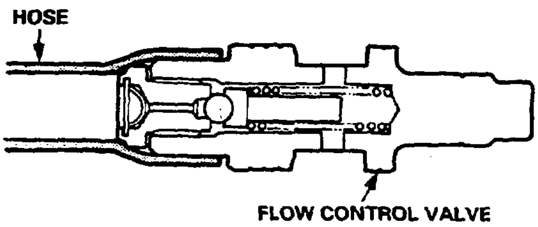
NOTE: The original valve was selected for a precise fit in the pump housing bore, so make sure the new one has the same identification mark.



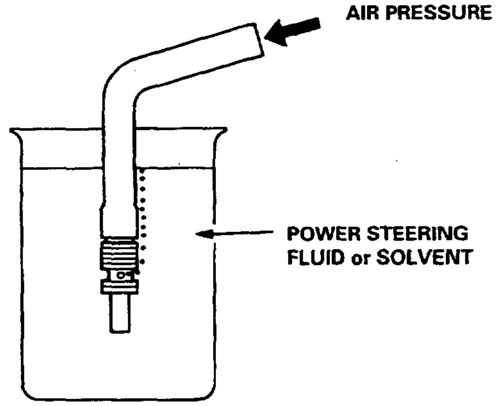
Mark	Part Name	Outside Diameter mm (in)
A	FLOW CONTROL VALVE A	17.991 – 17.996 (0.7083 – 0.7085)
B	FLOW CONTROL VALVE B	17.996 – 18.001 (0.7085 – 0.7087)

— If the valve movement still incorrect, replace the pump as an assembly.

6. Attach a hose to the end of the valve as shown.

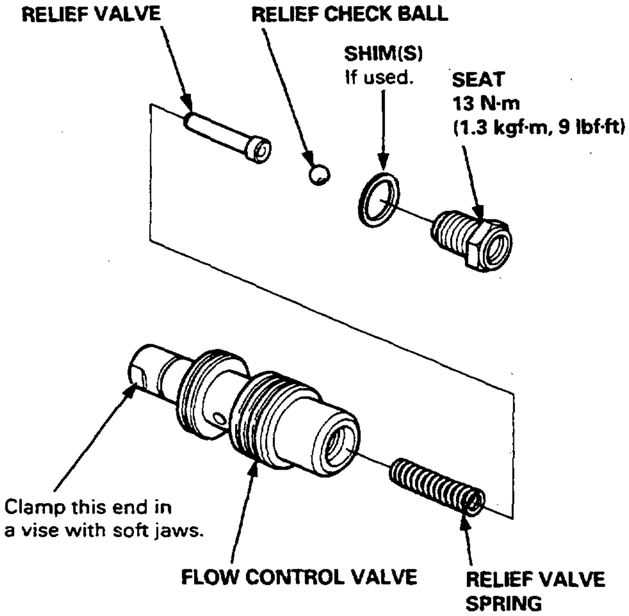


7. Submerge the valve in a container of power steering fluid or solvent, and blow in the hose. If air bubbles leak through the valve at less than 100 kPa (1.0 kgf/cm², 14.2 psi), replace or repair it as follows.



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.



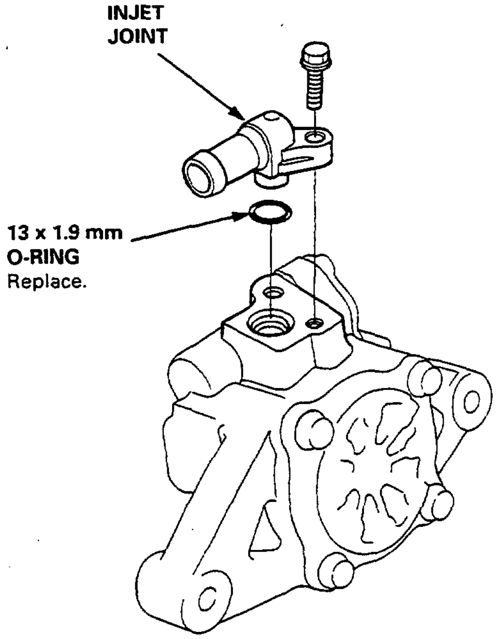
10. Clean all the parts in solvent, dry them off, then reassemble and retest the valve. See page 17-43 for flow control valve installation.

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.

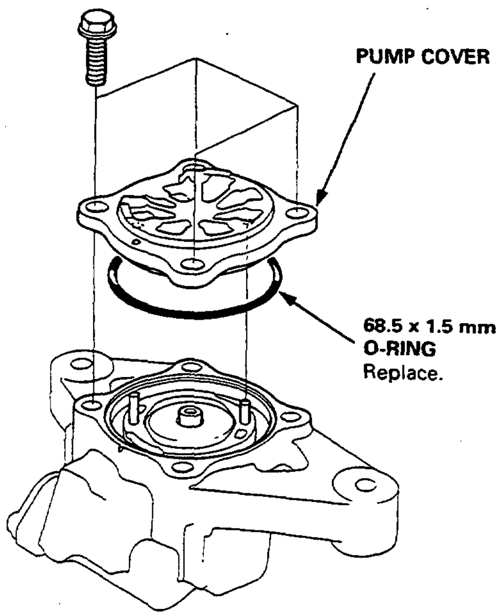
Pump Rotor Removal

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.



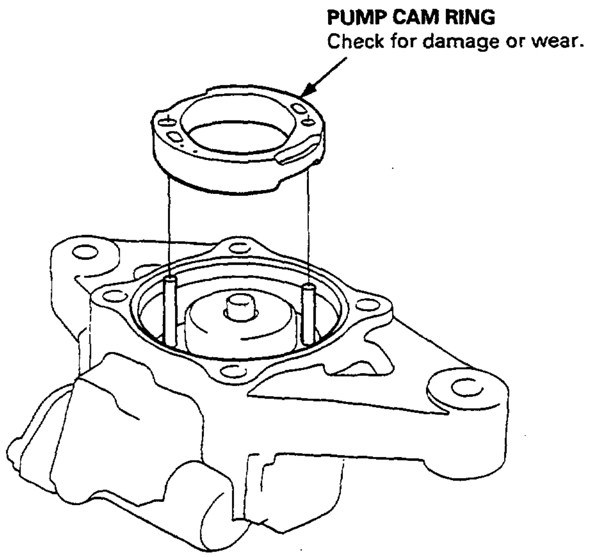
(cont'd)

Power Steering Pump

Disassembly (cont'd)

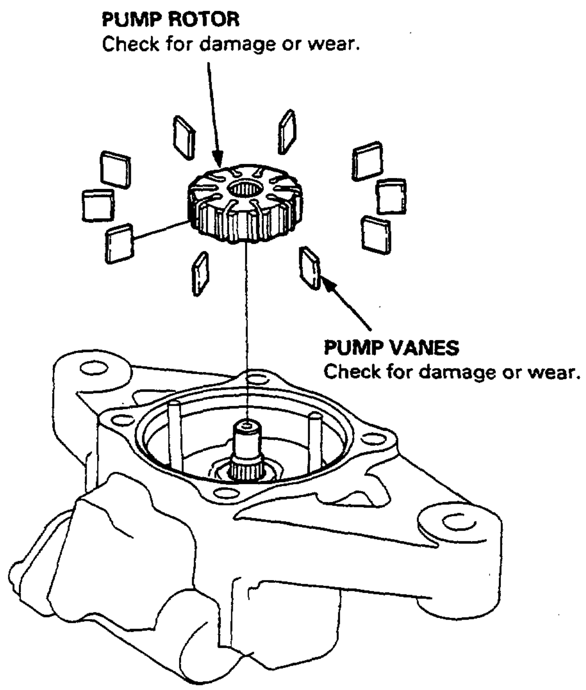
3. Remove the pump cam ring from the pump housing.

   NOTE: Replace the pump as an assembly, if the cam ring must be replaced.



4. Remove the pump rotor and vanes.

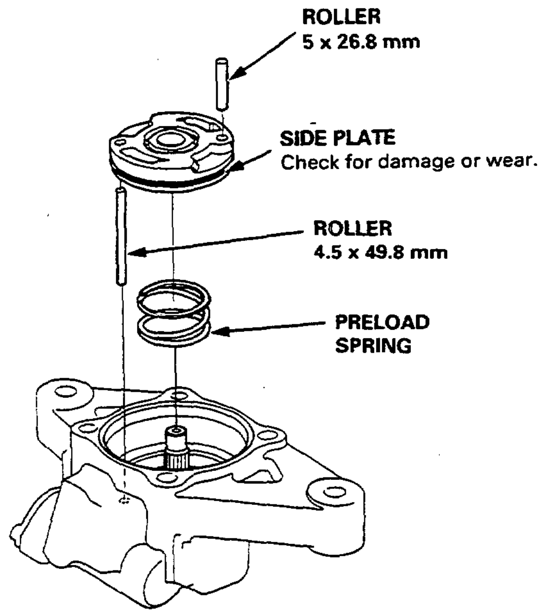
   NOTE: Replace the pump as an assembly, if the pump rotor or vanes must be replaced.



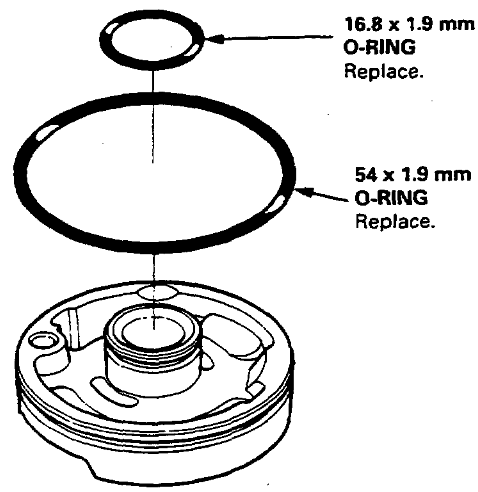
5. Remove the two rollers from the side plate.

6. Remove the side plate and preload spring.

   NOTE: Replace the pump as an assembly, if the side plate must be replaced.



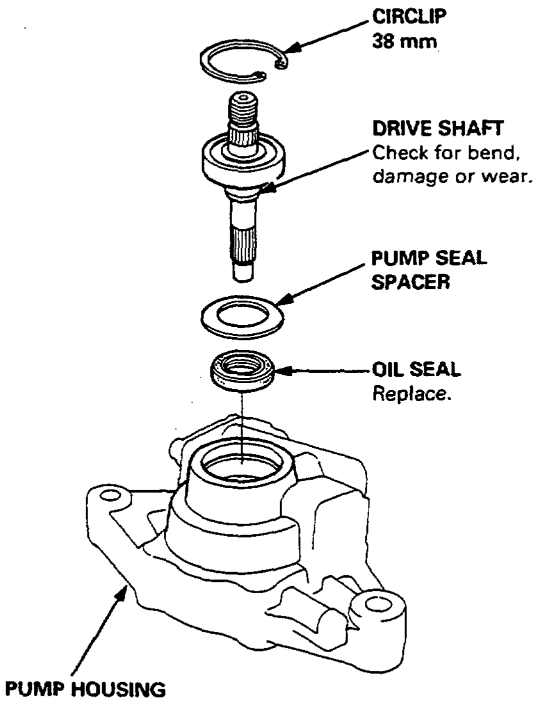
7. Remove the O-rings from the side plate.



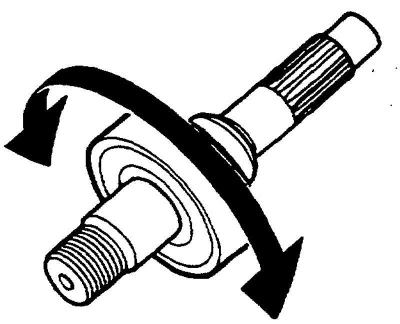
8. Remove the circlip, then remove the drive shaft assembly from the pump housing using a plastic hammer.

9. Remove the seal spacer and oil seal.

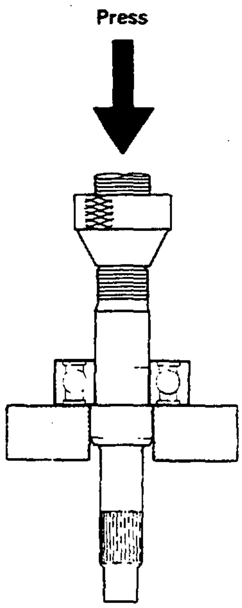
10. Inspect the pump housing for damage on the sealing surfaces.



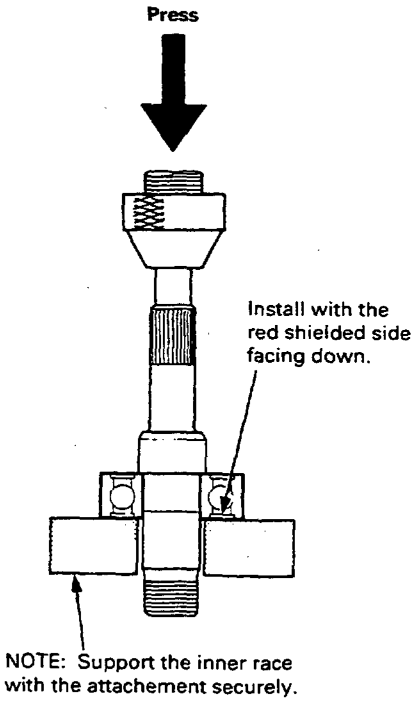
11. Inspect the bearing by rotating the outer race slowly. If any play or roughness is felt, replace the bearing.



12. Remove and discard the bearing using a press.



13. Install the new bearing using a press.

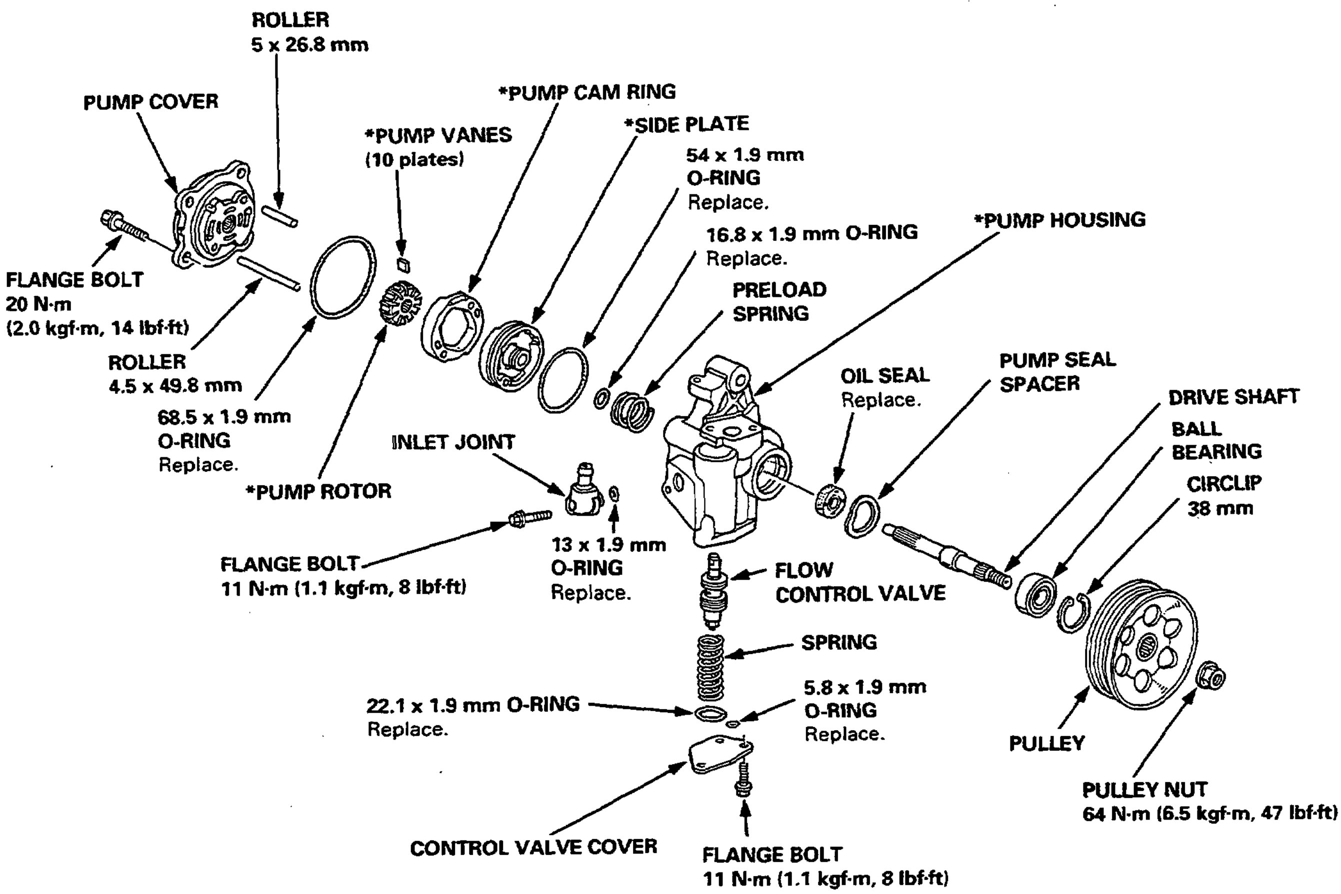


Power Steering Pump

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.



Pump Rotor Installation

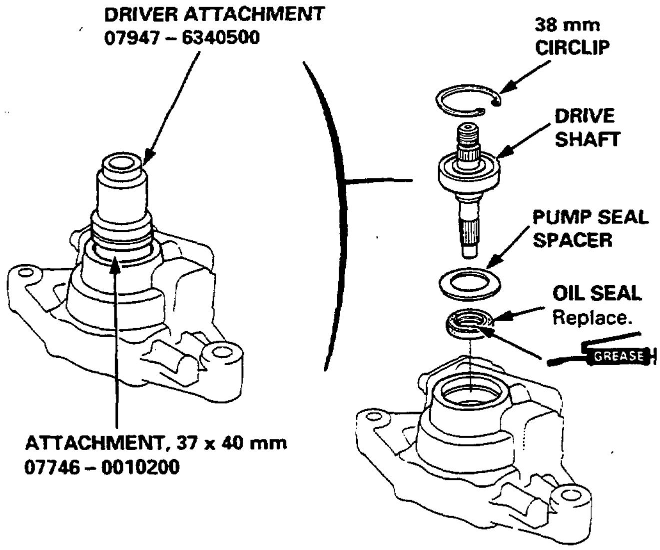
1. Coat the lip of the new oil seal with steering grease (Honda P/N 08733 – B070E).

2. Install the new oil seal in the pump housing by hand, then install the pump seal spacer.

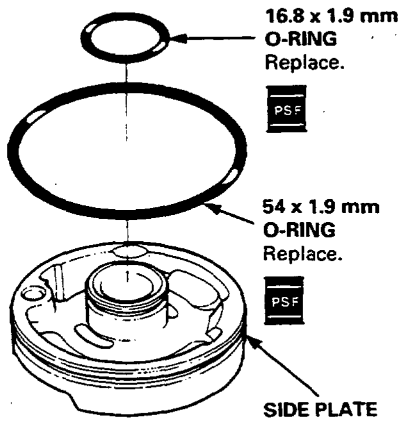
   NOTE: Insert the oil seal with its grooved side facing in.

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.

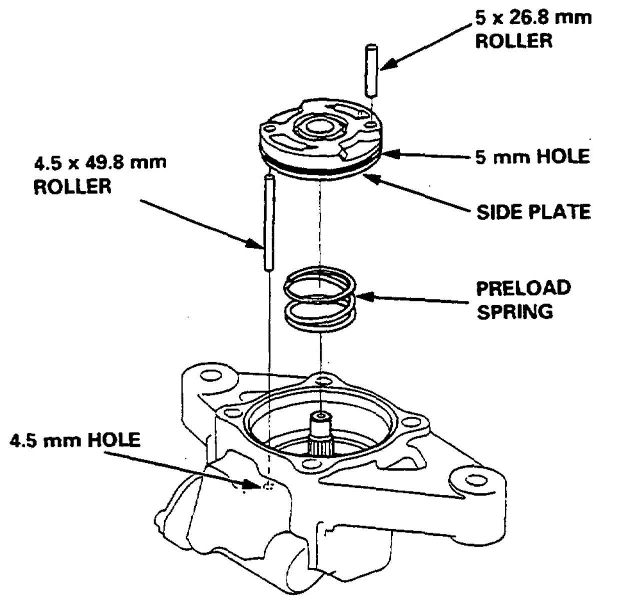


6. Install the preload spring in the pump housing.

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.

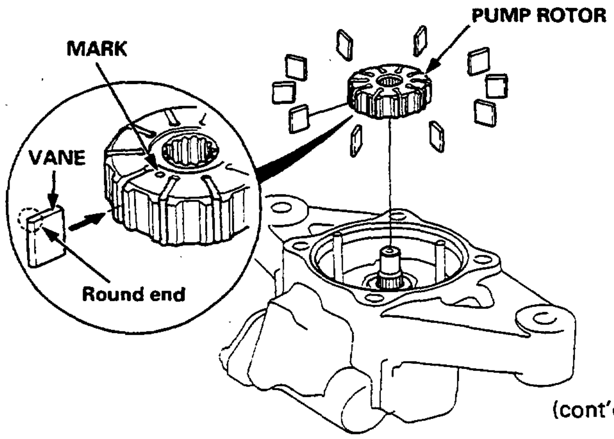
9. Set the 5 x 26.8 mm roller in the 5 mm hole in the side plate.



10. Assemble pump rotor to the drive shaft with the "○" mark on the rotor facing upward.

11. Set the 10 vanes in the grooves in the rotor.

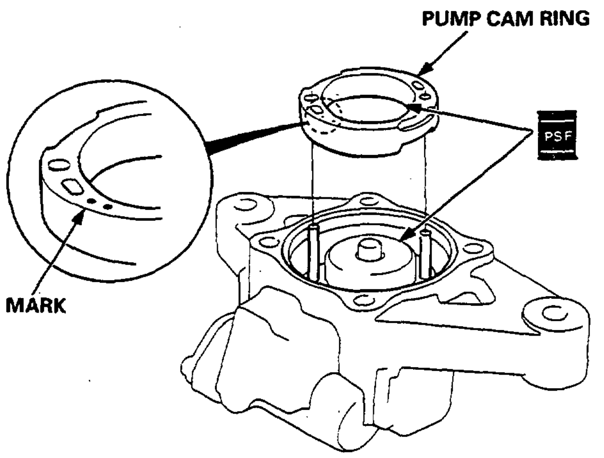
    NOTE: Be sure that the round ends of the vanes are in contact with the sliding surface of the cam ring.



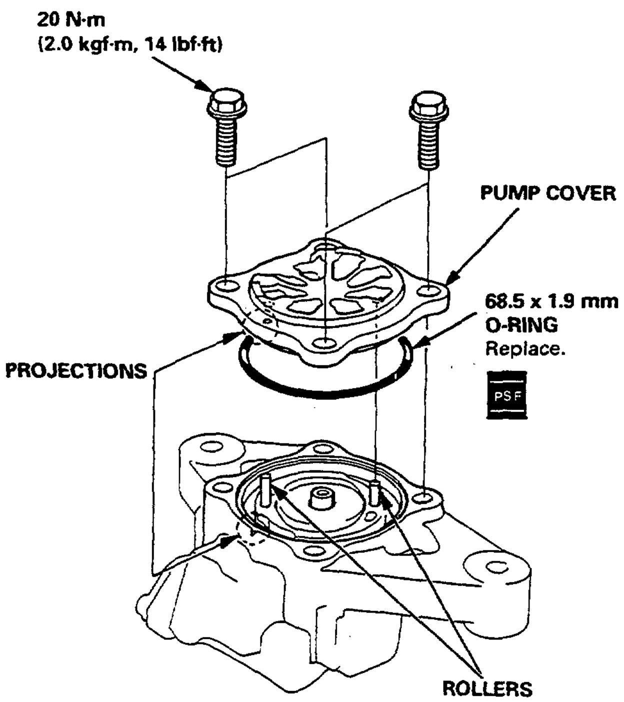
(cont'd)

Reassembly (cont'd)

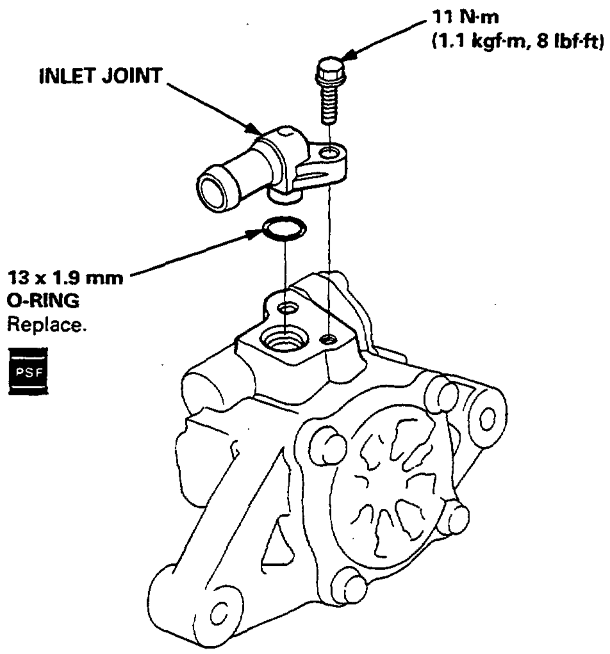
12. Set the pump cam ring over the two rollers with the "8" mark on the cam ring upward.
13. Apply clean power steering fluid to the vanes and cam ring.



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.

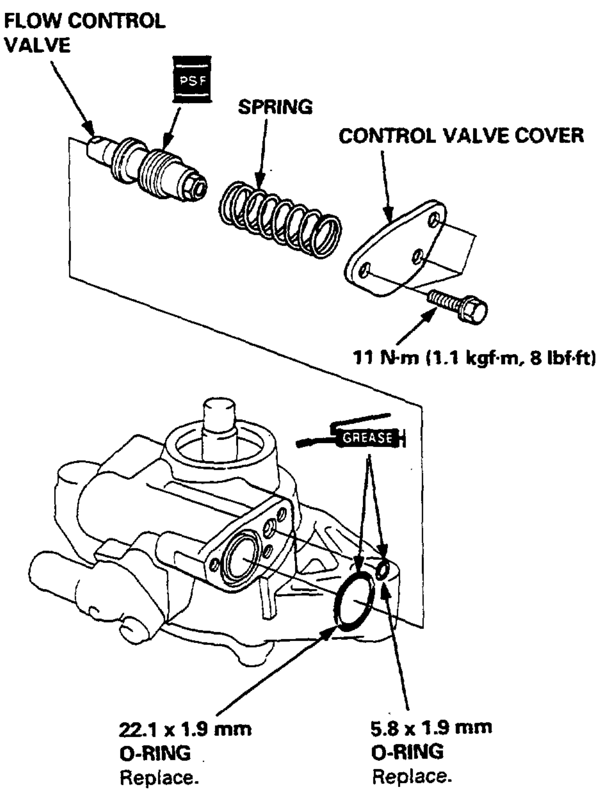


17. Set the 13 x 1.9 mm O-ring on the inlet joint.
18. Install the inlet joint on the pump housing.



Flow Control Valve Installation

1. Apply steering grease (Honda P/N 08733 – B070E) to new O-rings.
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.

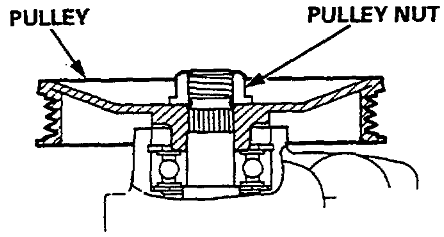


Pulley Installation

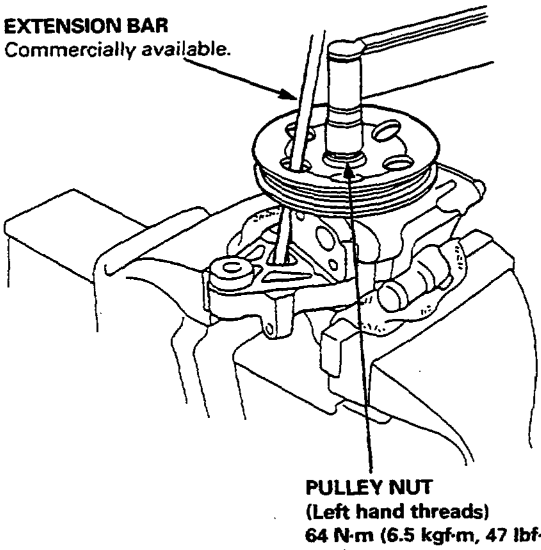
1. Hold the steering pump in a vise with soft jaws.

   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.



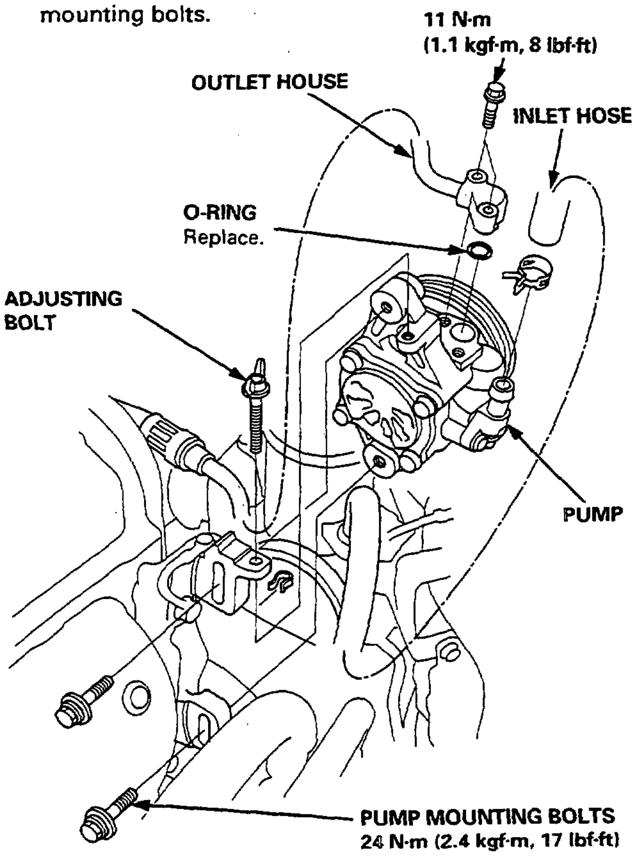
4. Check that the pump turns smoothly by turning the pulley.

Power Steering Pump

Installation

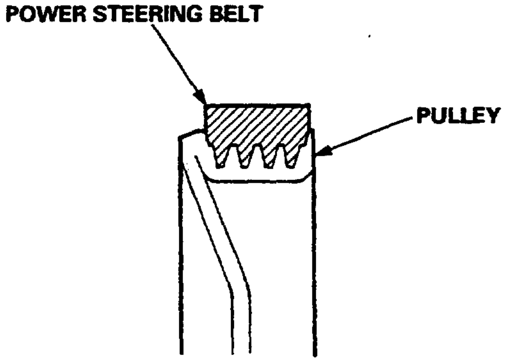
1. Connect the inlet and outlet hoses. Tighten the pump fittings securely.

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.**



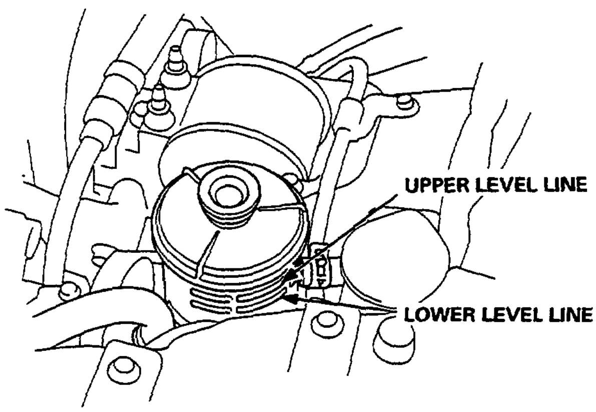
4. Adjust the pump belt (see page 17-20).

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:
   LHD: 1.0 liter (1.06 US.qt, 0.88 Imp.qt)
   RHD: 0.9 liter (0.95 US.qt, 0.85 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.

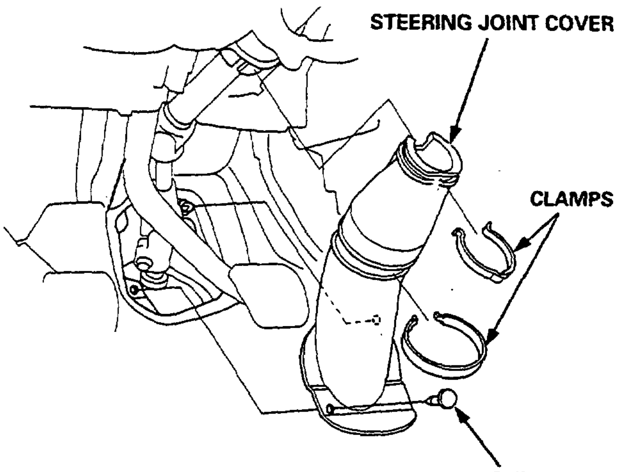
CAUTION: Do not fill the reservoir beyond the upper level line.

Steering Gearbox

Removal

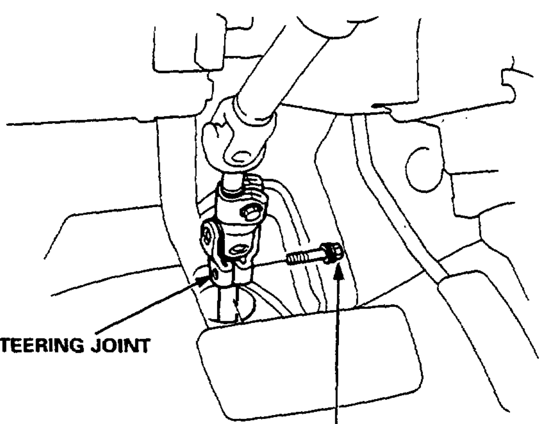
NOTE: Using solvent and a brush, wash any oil and dirt off the valve body unit, its lines, and the end if the gearbox. Blow dry with compressed air.

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 move the joint toward the column.

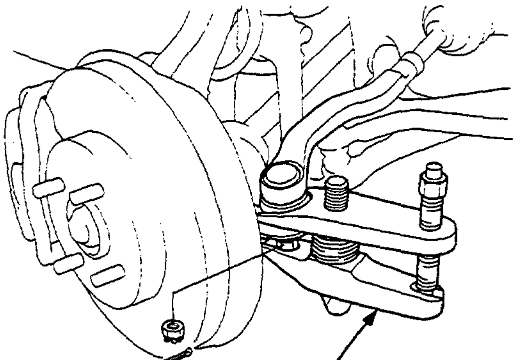
   NOTE: Lock the steering shaft with the ignition key to retain the steering shaft position.



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.

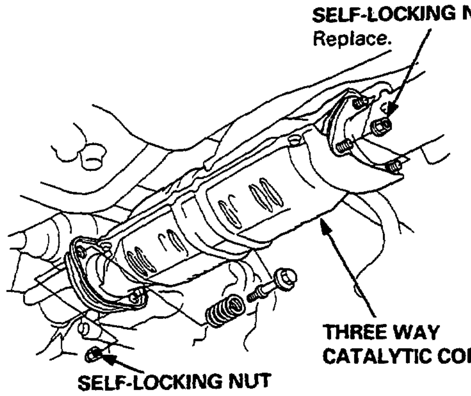
   NOTE: Remove the ball joint using the Ball Joint Remover, 28 mm (07MAC – SL00200). Refer to page 18-11 for how to use the ball joint remover.
8. Separate the tie-rod ball joint and knuckle using the special tool.

   CAUTION: Avoid damaging the ball joint boot.



9. Disconnect the shift linkage (M/T model: see section 13, A/T model: see section 14).
10. Separate the three way catalytic converter by removing the self-locking nuts.

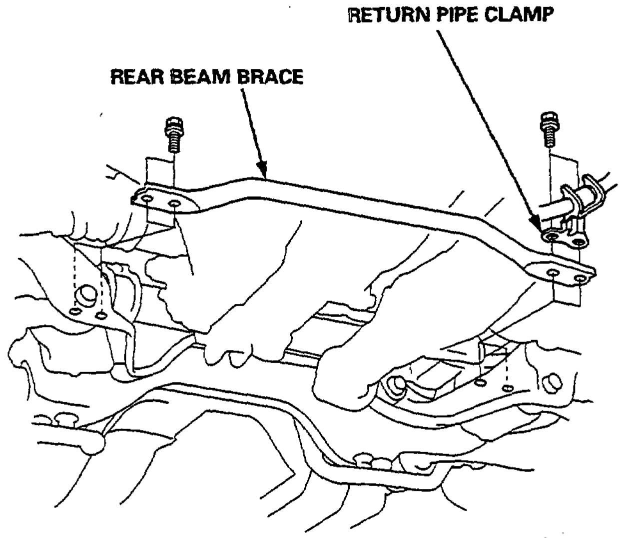
    NOTE: Always replace the gaskets with new ones.



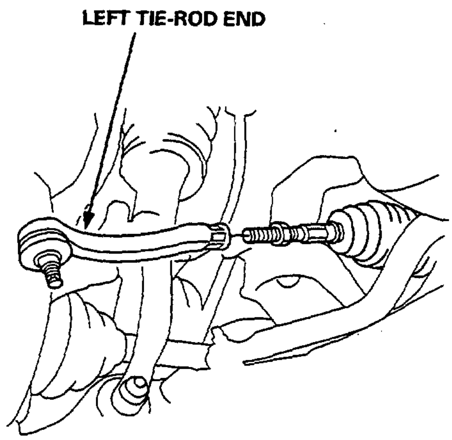
(cont'd)

Removal (cont'd)

11. Remove the return pipe clamp from the left side of the rear beam, and move the return pipe above the steering gearbox.
12. Remove the rear beam brace.



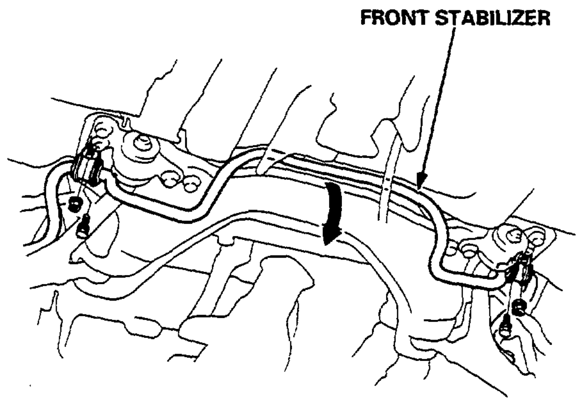
13. Remove the left tie-rod end, then slide the rack all the way to the right.



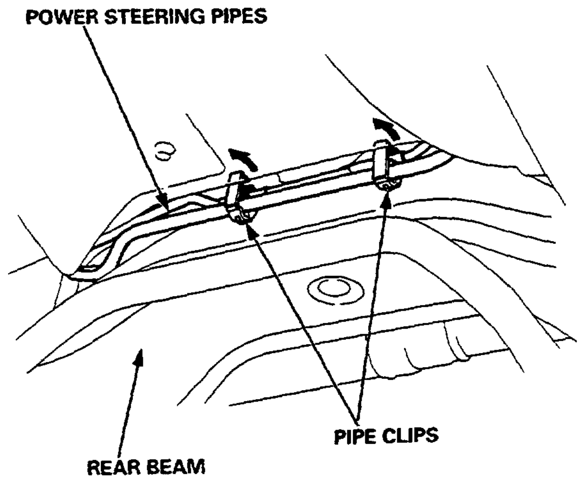
14. RHD only: Remove the pipe clips.

    1) Remove the fastener from the front stabilizer mounting section and lower the front stabilizer.

    NOTE: Do not disconnect the front stabilizer from the joint.



    2) Remove the two power steering pipes from the pipe clips on the top of the rear beam.

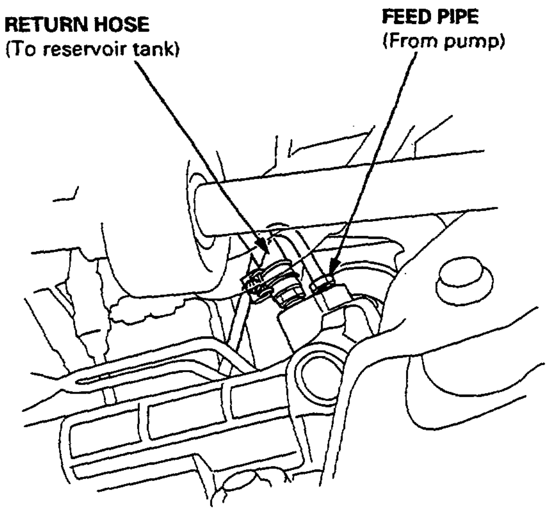


15. Disconnect the two lines from the valve body unit on the steering gearbox.

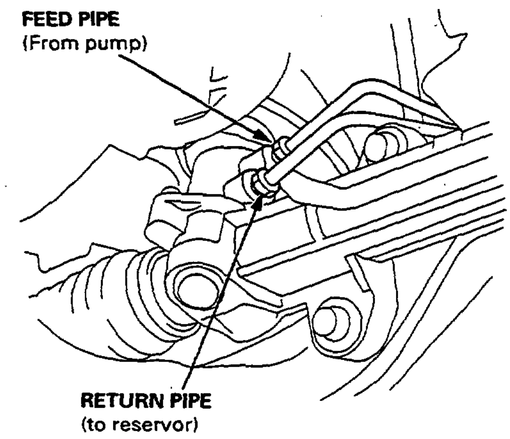
CAUTION: After disconnecting the hose and pipe, plug or seal the hose and pipe with a piece of tape or equivalent to prevent foreign materials from entering the valve body unit.

NOTE:
- Place the pipe 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.

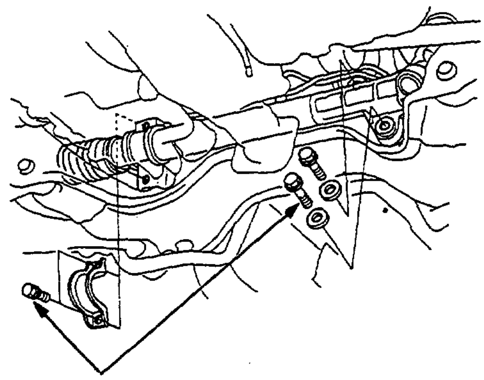
⟨LHD type:⟩



⟨RHD type:⟩



16. Remove the steering gearbox mounting bolts.



NOTE: For RHD type, on removing the gear box. Hang the engine and down the rear beam 30 mm downward. Remove the gear box downward.

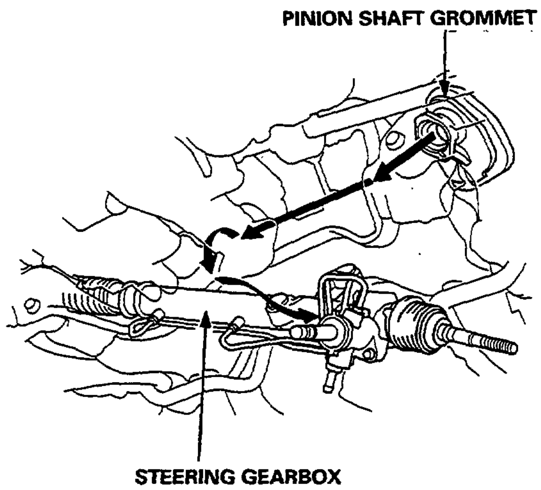
17. Pull the steering gearbox all the way down to clear the pinion shaft from the bulkhead, and remove the pinion shaft grommet.

18. Move the steering gearbox to the right so the left rack end clears the rear beam.

19. Hold the steering gearbox and slide the rack all the way to the left, then place the left rack end below the rear beam.

20. Move the steering gearbox to the left, and tilt the left side down to remove it from the car.

CAUTION: Do not try to disassemble to steering gearbox. If the gearbox is faulty, replace the whole gearbox as an assembly.



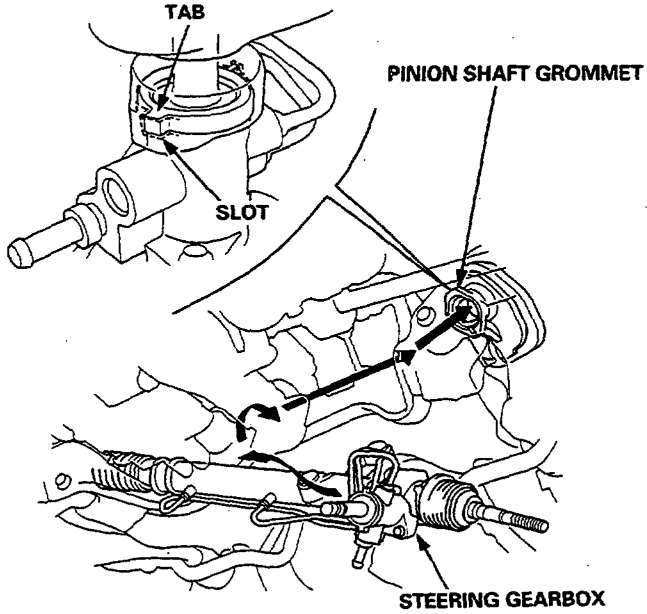
Steering Gearbox

Installation

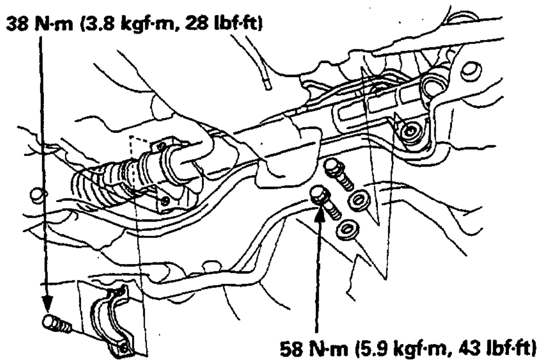
CAUTION: Be careful not to bend or damage the piping when installing the gearbox.

NOTE: For RHD type, installing the rear beam on the original position.

1. Before installing the gearbox, slide the rack all the way to right.
2. Pass the right side of the steering gearbox above and through the right side of the rear beam.
3. Hold the steering gearbox and slide the rack all the way to the right.
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.
   NOTE: Align the tab on the valve body with the slot in the pinion shaft grommet.

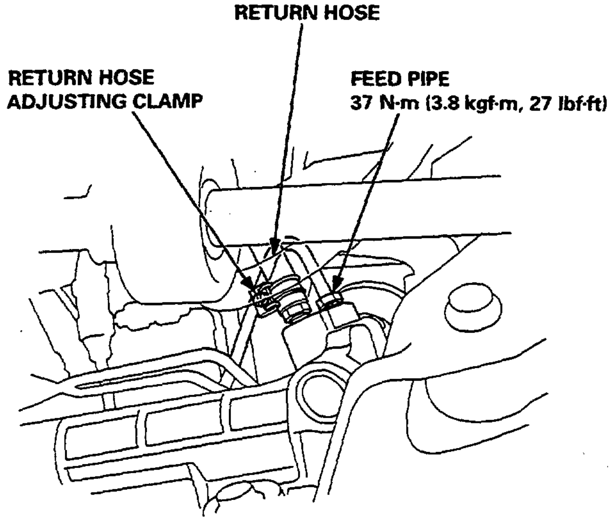


6. Install and tighten the gearbox mounting bolts.
   NOTE: After installing the gearbox, check the air hose connections for interference with adjacent parts.

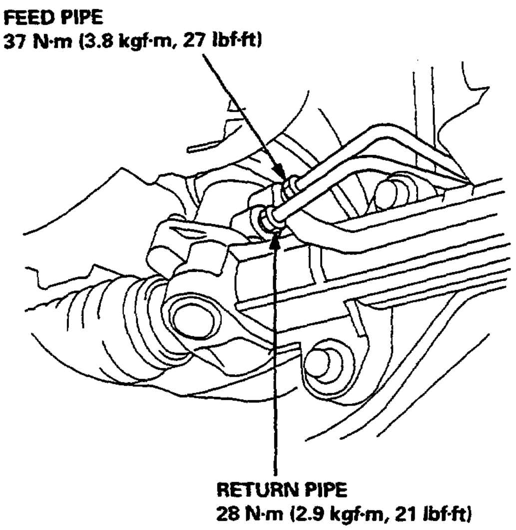


7. Connect the power steering fluid lines to the valve body unit.

⟨LHD type:⟩



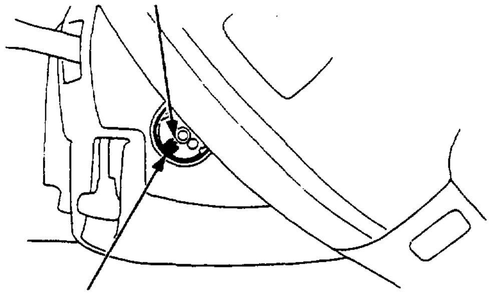
⟨RHD type:⟩



8. Center the steering rack within its stroke.

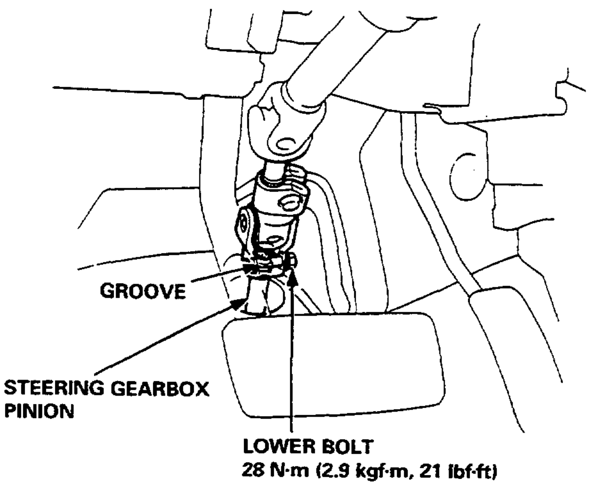
9. If equipped with SRS, make sure that the cable reel of the SRS is centered as follows:

- Turn the steering wheel left approx. 150 degrees, check the cable reel position.
- 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 in the straight ahead position.

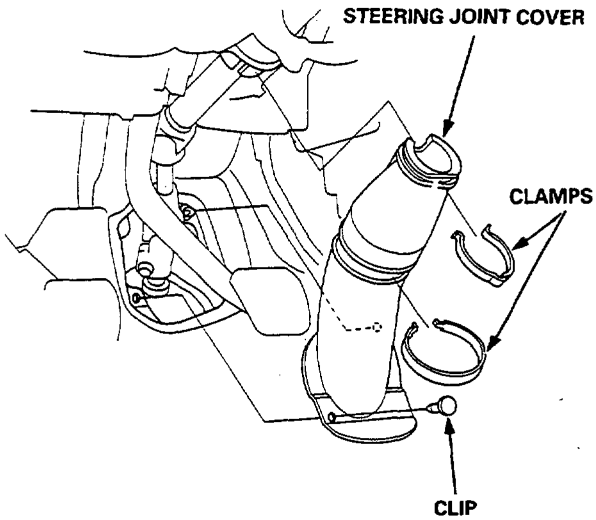


10. Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove around the shaft), and tighten the lower bolt.

NOTE:
- 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 the lower end of the steering joint.



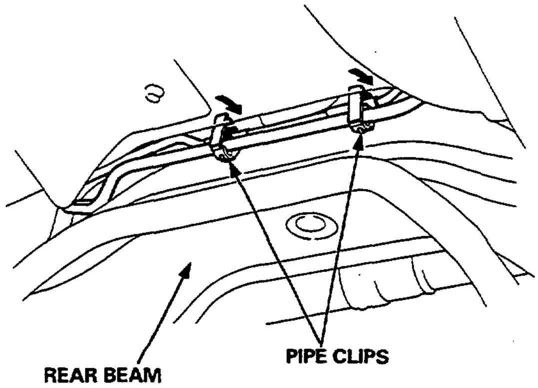
11. Install the steering joint cover with the clamps and clips.



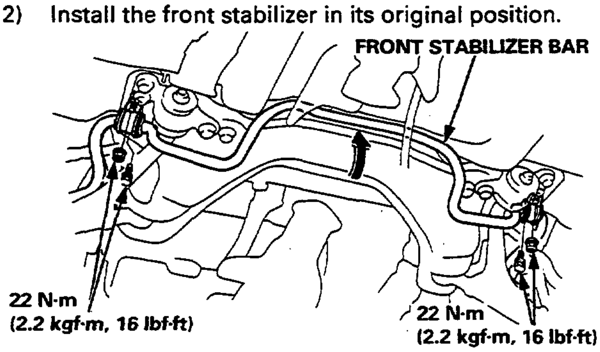
12. RHD only: Install the pipe clips.

1) Secure the two pipes with the pipe clips in the top of the rear beam.

NOTE: After installation of the pipes, check them for bend, interference with the adjacent parts, and other abnormalities.



2) Install the front stabilizer in its original position.

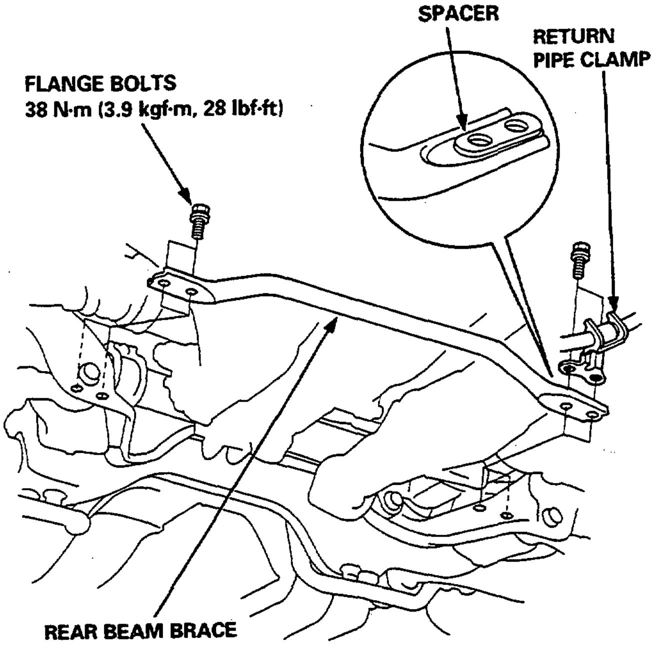


(cont'd)

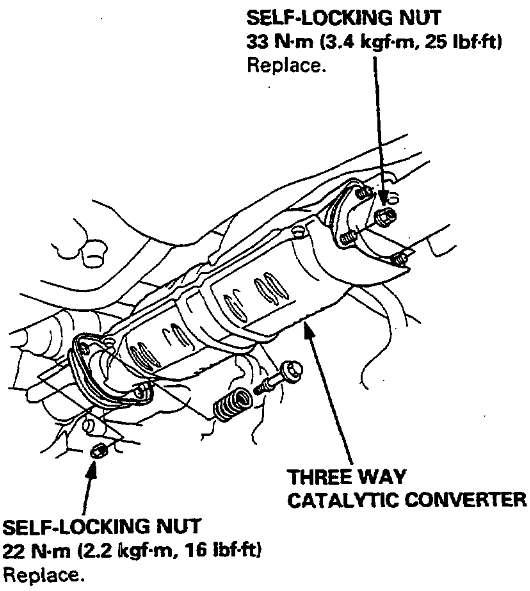
Installation (cont'd)

13. Install the rear beam brace and return pipe clamp on the rear beam.

    NOTE: Set the rear beam brace with its spacer side toward the return pipe clamp.

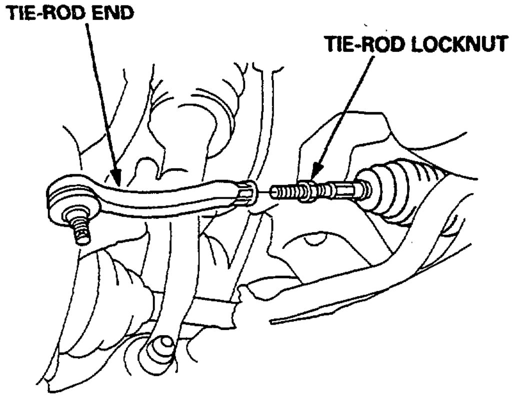


14. Install the three way catalytic converter with the new gaskets and new self-locking nuts.



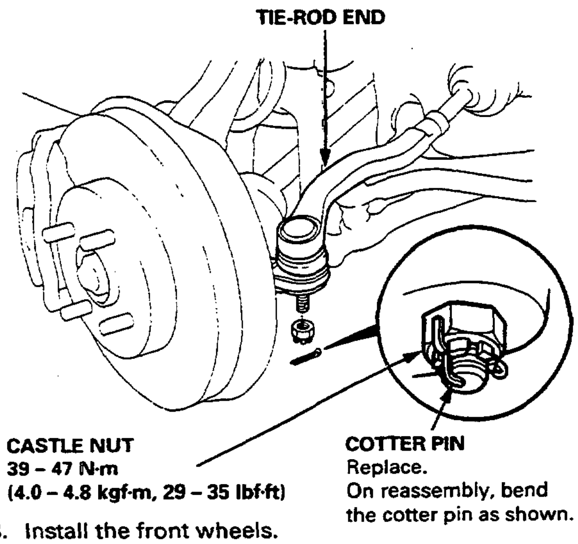
15. Connect the shift linkage (M/T model: see section 13, A/T model: see section 14).

16. Thread the right and left tie-rod ends onto the rack an equal number of turns.



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.

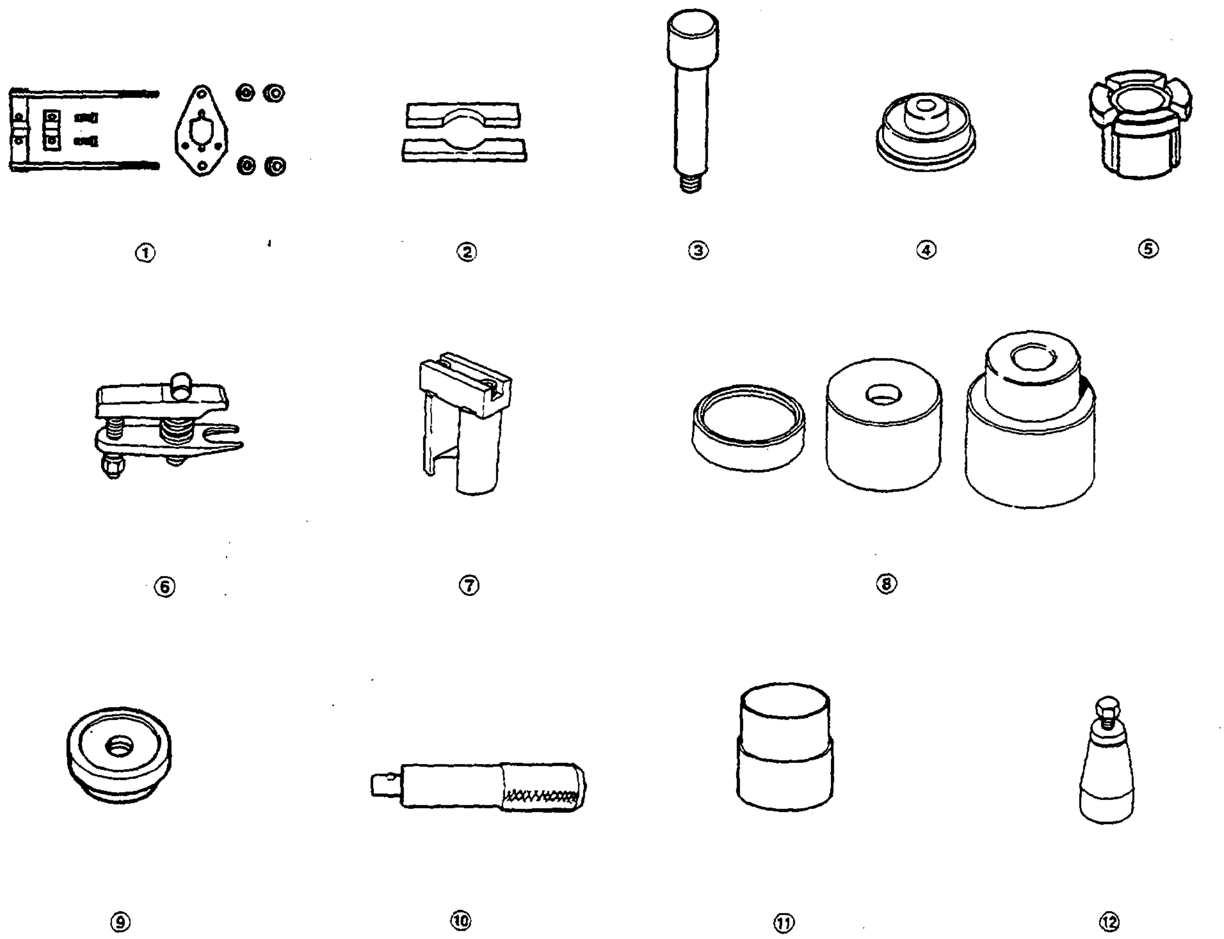
19. Fill the system with power steering fluid and bleed air from the system (see page 17-21).

20. After installation, perform the following checks.

    - Check the gearbox for leaks (see page 17-23).
    - Adjust the front alignment (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.

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07GAE – SE00102 or 07GAE – SE00101	Spring Compressor	1	18-23, 25, 36, 38
②	07GAE – SD40700	Hub Dis/Assembly Base	2	18-14
③	07GAF – SE00100	Hub Dis/Assembly Tool	1	18-14, 15
④	07HAD – SF10100	Driver Attachment	1	18-15
⑤	07HGK – 0010101	Wheel Alignment Gauge Attachment	1	18-5
⑥	07MAC – SL00200	Ball Joint Remover, 28 mm	1	18-12, 13
⑦	07NAD – SS00101 or 07NAD – SS00100	Bushing Driver	1	18-22, 34
⑧	07PAF – 0030000	Ball Joint Remover/Installer Set	1	18-18
⑨	07746 – 0010500	Attachment, 62 x 68 mm	1	18-14, 16
⑩	07749 – 0010000	Driver	1	18-14, 15, 16
⑪	07965 – SD90100	Support Base	1	18-15, 16
⑫	07974 – SA50700	Ball Joint Boot Clip Guide	1	18-18, 19

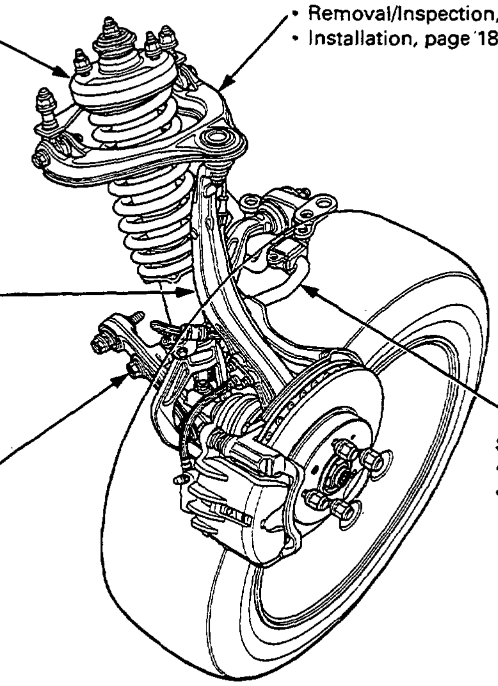


Component Locations

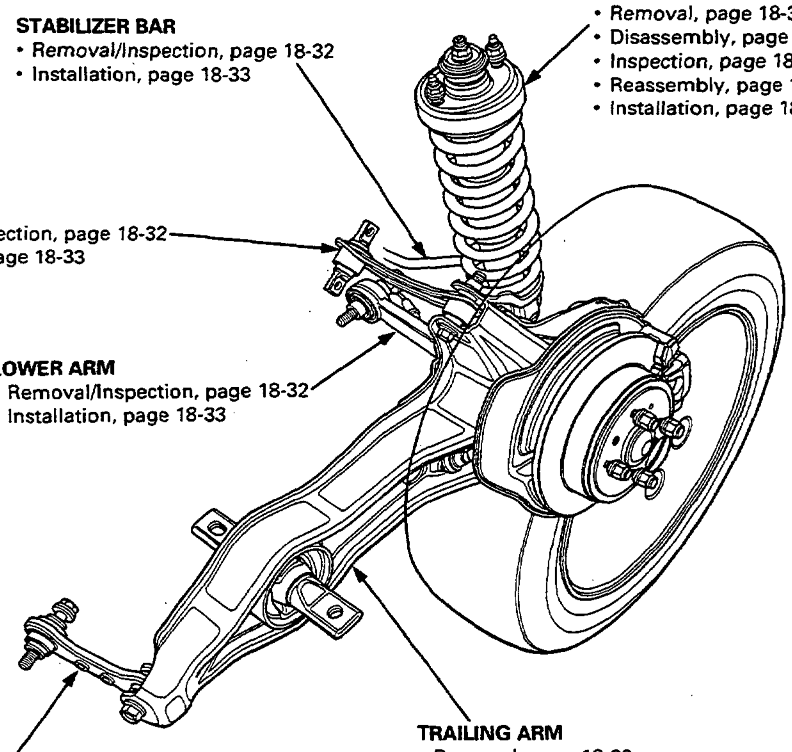
Index

Wheel Alignment, page 18-4

⟨Front Suspension:⟩



⟨Rear Suspension:⟩

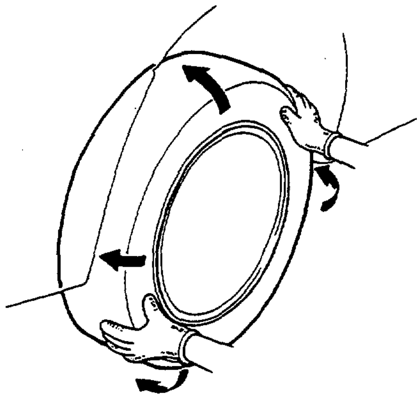


Wheel Alignment

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 (i.e., camber caster, toe, and/or turning angle) is adjusted.

Check camber.

Check and adjust caster.

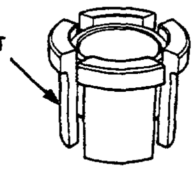
Check and adjust toe.

Check turning angle.

If any of the above needed adjustment, recheck all.

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.

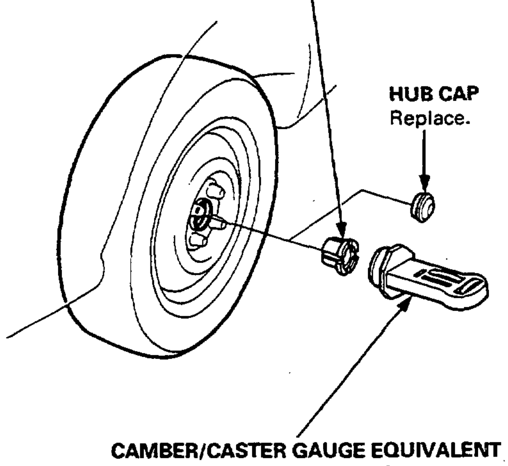
Camber

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°07′ ± 1°
   0° ± 1° (Engine type D16Y2 only)
   Rear: −0°50′ ± 45′

6. If out of specification, check for bent or damaged suspension components.



Caster

Inspection

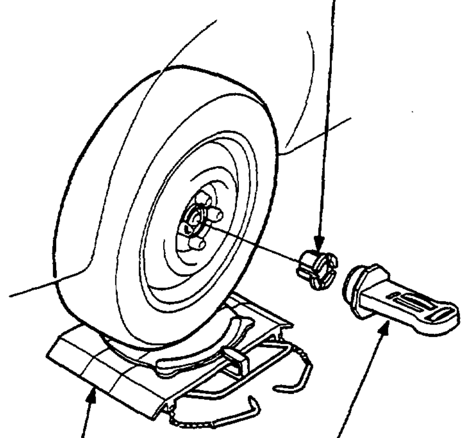
1. Remove the wheel cap.
2. Raise the car and set the turning radius gauges beneath the front wheels, and place boads under the rear wheels the same thickness as one of the turning radius gauges, then lower the car.

   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: 1°10′ ± 1°

6. If out of specification, check for bent or damaged suspension components.



Wheel Alignment

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 ± 2 mm (0 ± 0.08 in)

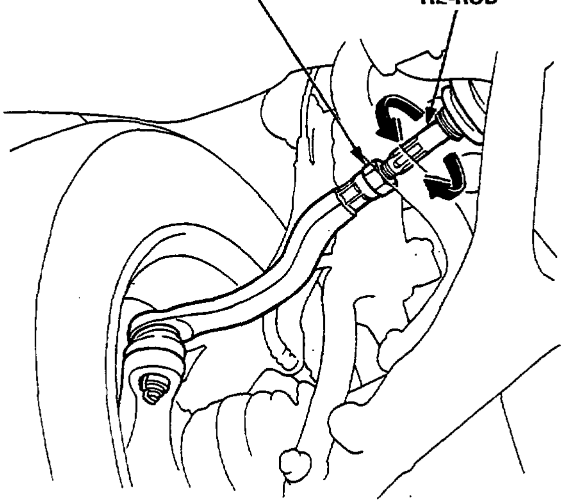
   — If adjustment is required, go on to step 3.

   — 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.

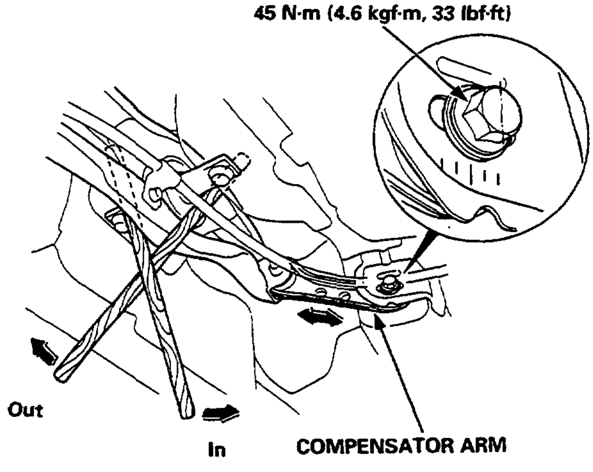
   Rear toe-in: 2.3 ± 2 mm (0.09 ± 0.08 in)

   — If adjustment is required, go to step 3.

   — If no adjustment is required, remove alignment equipment.

Adjustment

3. Before adjustment, note the locations of flange bolts on the right and left compensator arms.
4. Loosen the flange bolts and slide the compensator arm in or out as shown, to adjust the toe.
5. Tighten the flange bolts.



- Example
  After the rear toe inspection, the wheel is 2 mm (0.08 in) out of the specification.
- — Move the arm so the adjusting bolt moves 2 mm (0.08 in) inward from the position recorded before the adjustment.
- — The distance the adjusting bolt is moved should be equal to the amount out-of-specification.

Turning Angle Inspection

1. Jack up the front of the car. Set the turning radius gauges beneath the front wheels, then lower the car.

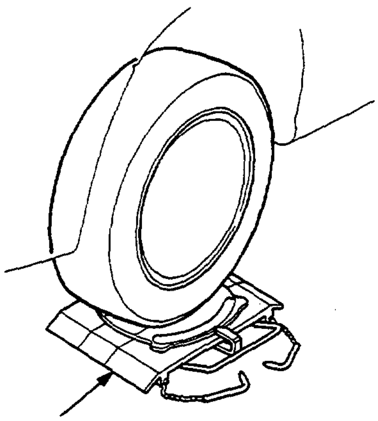
2. Jack up the rear of the car. Place boards that are the same thickness as the turning radius gauges under the rear wheels, then lower the car.

   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: **40° ± 2°**
   36° ± 2° (Engine type D16Y2 only)
   Outward wheel (reference): **33°**
   30° (Engine type D16Y2 only)

4. If the turning angle is not within the specifications, check for bent or damaged suspension components.



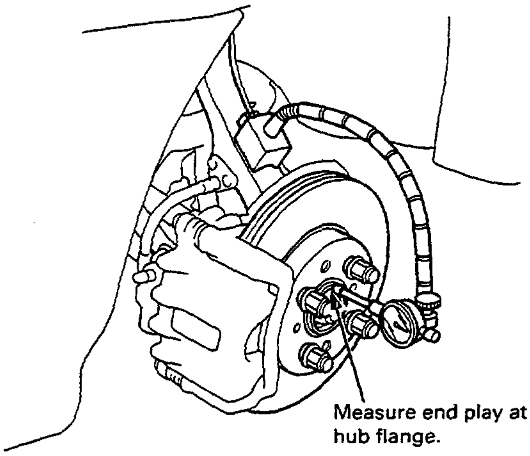
Wheel/Hub Inspection

Bearing End Play

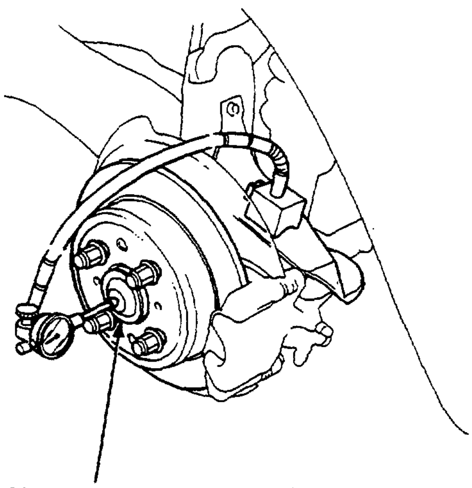
1. Raise the car off the ground, and support it with safety stands in the proper locations (see section 1).
2. Remove the wheels, then reinstall the wheel nuts.
3. Attach the dial gauge as shown.
4. Measure the bearing end play by moving the disc in or outward.

   Front/Rear:
   Standard: 0 – 0.05 mm (0 – 0.002 in)

〈Front:〉



〈Rear:〉

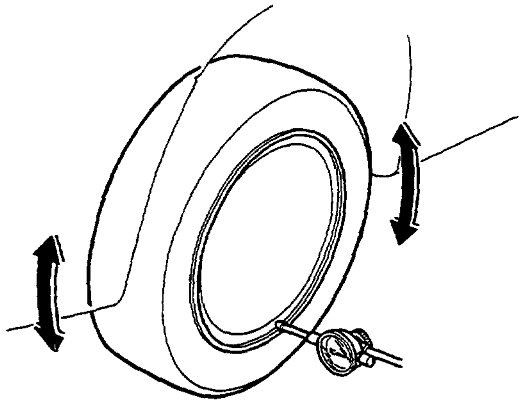


5. If the bearing end play measurement is more than the standard, replace the wheel bearing.

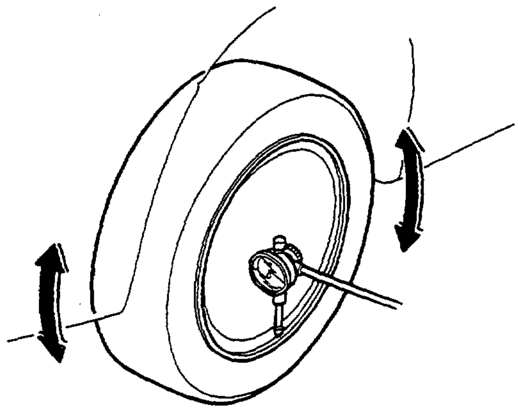
Wheel Runout

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 – 0.7 mm (0 – 0.03 in)
   Aluminum Wheel: 0 – 0.3 mm (0 – 0.01 in)
   Service Limit:
   Steel Wheel: 1.7 mm (0.07 in)
   Aluminum Wheel: 1.6 mm (0.06 in)



   Front and Rear Wheel Radial Runout:
   Standard:
   Steel Wheel: 0 – 0.5 mm (0 – 0.02 in)
   Aluminum Wheel: 0 – 0.3 mm (0 – 0.01 in)
   Service Limit:
   Steel Wheel: 1.0 mm (0.04 in)
   Aluminum Wheel: 1.0 mm (0.04 in)

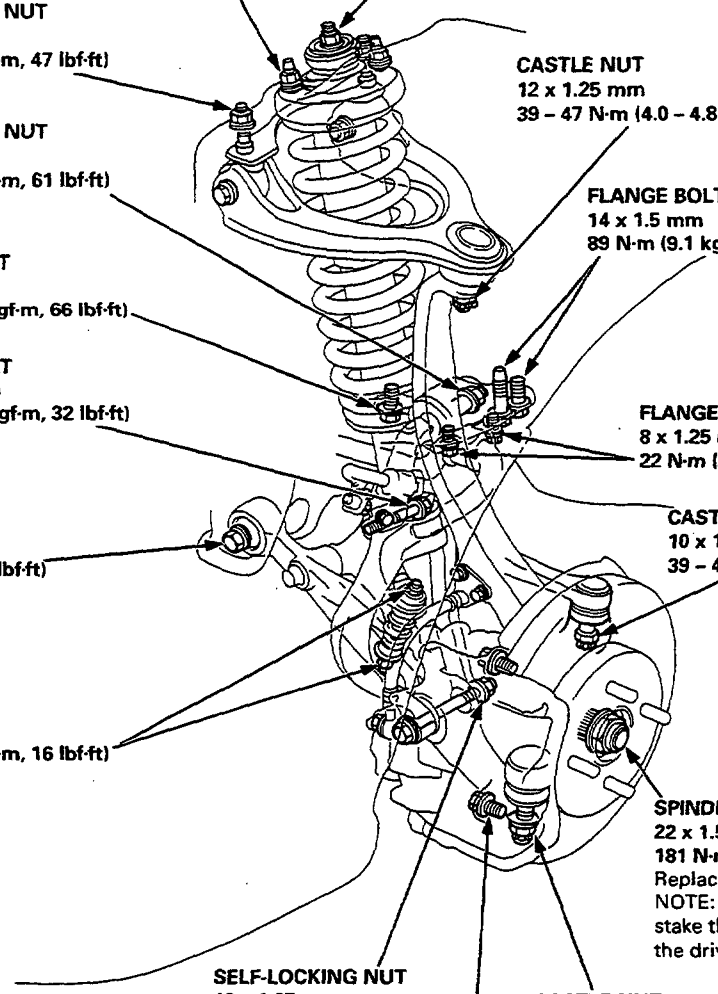


5. If the wheel runout is more than the service limit, replace the wheel.

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.**

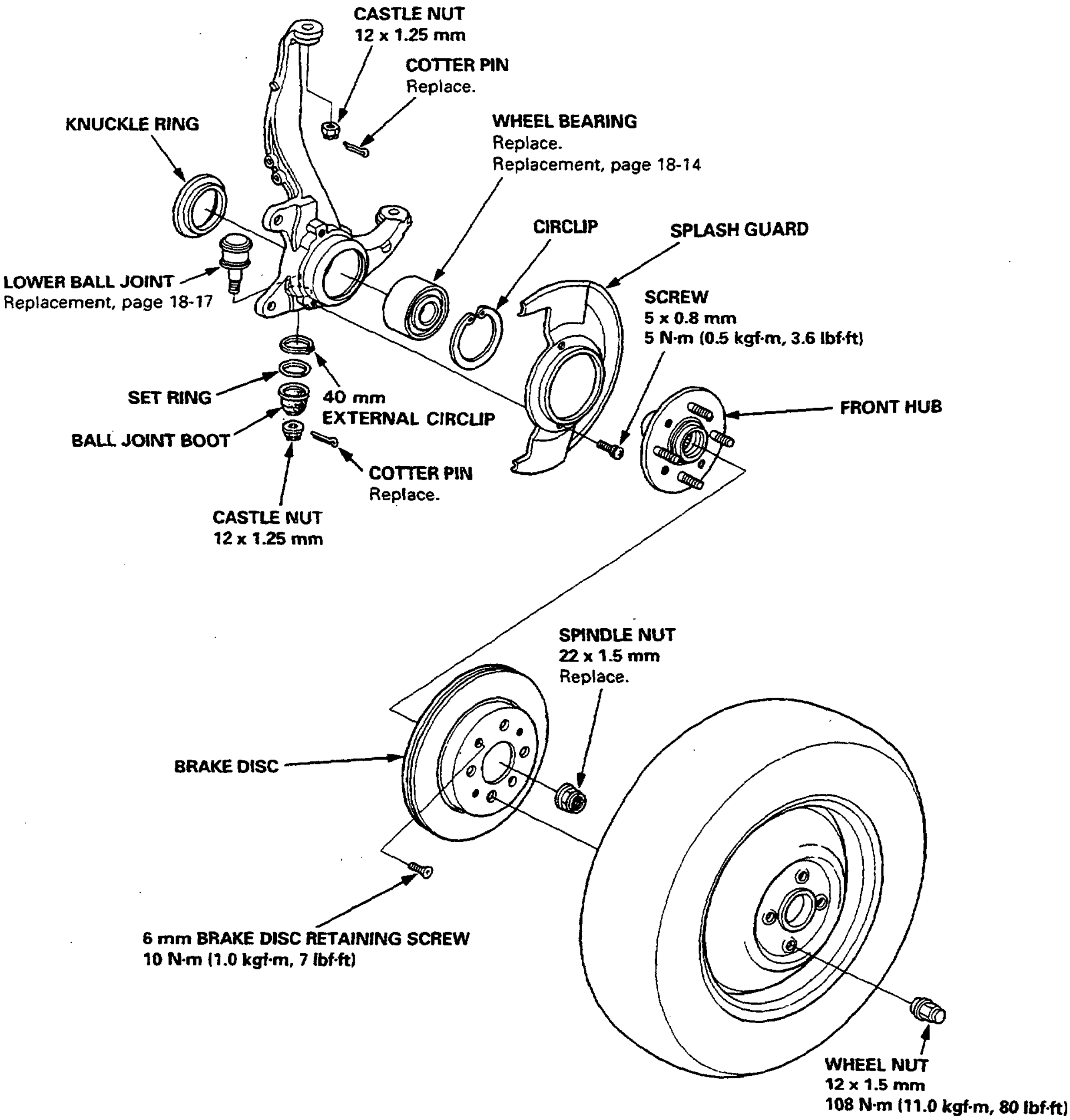
NOTE: Wipe off the grease before tightening the nut at the ball joint.



Knuckle/Hub

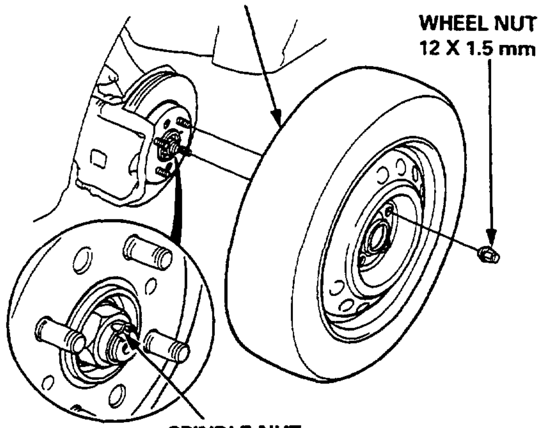
Illustrated Index

NOTE:
- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- On the aluminum wheels, remove the center cap from the inside of the wheel after removing the wheel.
- 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.



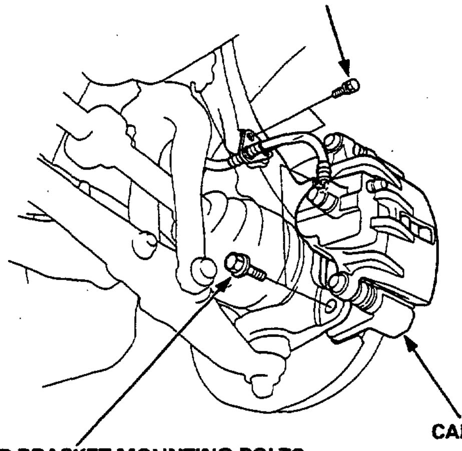
Knuckle Removal

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.



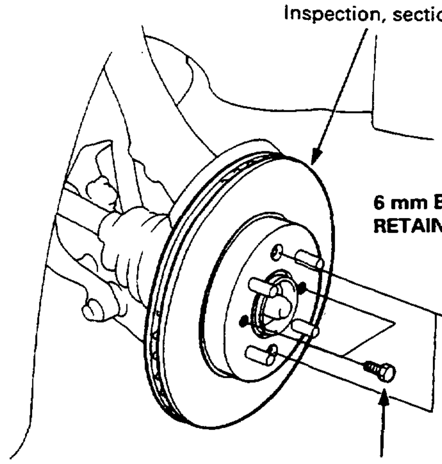
5. Remove the brake hose mounting bolts.
6. Remove the caliper bracket mounting bolts, and hang the caliper to one side.

   CAUTION: To prevent accidental damage to the caliper or brake hose, use a short piece of wire to hang the caliper from the undercarriage.



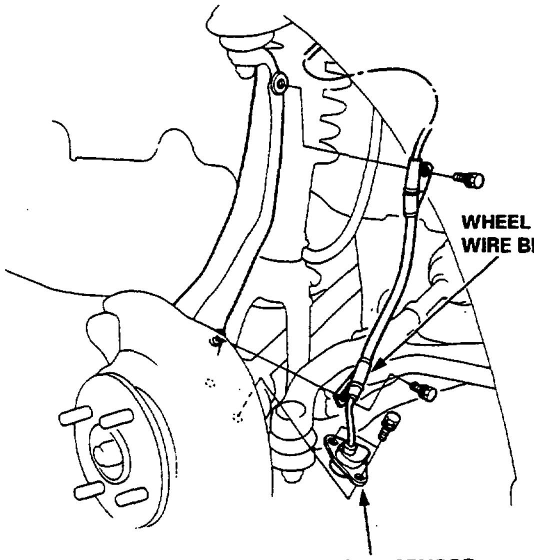
7. Remove the 6 mm brake disc retaining screws.
8. Screw the two 8 x 1.25 mm bolts into the disc to push it away from the hub.

   NOTE: Turn each bolt two turns at a time to prevent cocking the disc excessively.
9. Remove the brake disc from the knuckle.
10. Check the front hub for damage or cracks.



11. 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.*



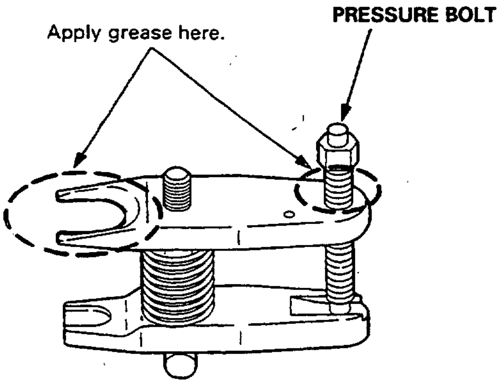
(cont'd)

Knuckle/Hub (cont'd)

NOTE: Use ball joint remover, 28 mm, to separate the ball joints from the suspension or tie-rod end.

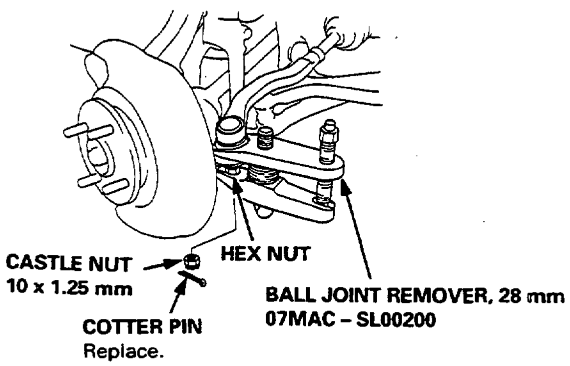
CAUTION: Be careful not to damage the ball joint boot.

12. Clean any dirt or grease off the ball joint.
13. Remove the cotter pin from the tie-rod end ball joint castle nut, and remove the nut.
14. 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.

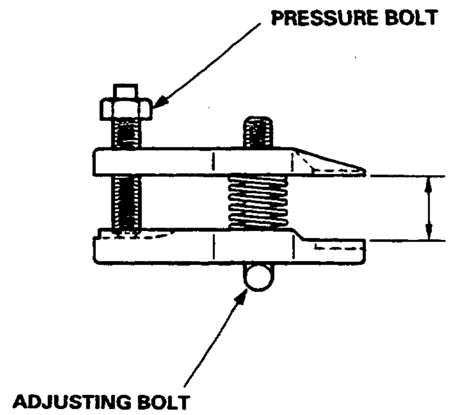


15. Install a 10 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end to prevent damage to the threaded end of the ball joint.
16. Use the ball joint remover, 28 mm, as shown. Insert the jaws carefully, making sure you do not damage the ball joint boot.
17. Adjust the jaw spacing by turning the pressure bolt.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



18. 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.



19. 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.

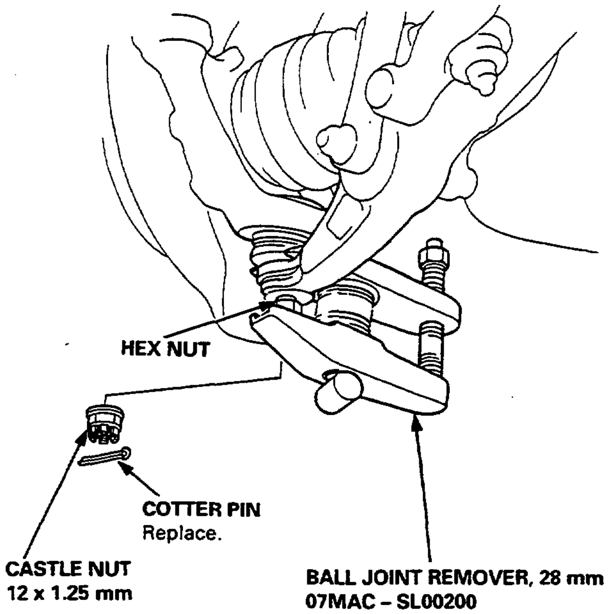
20. Remove the tool, then remove the nut from the end of the ball joint and pull the ball joint out of the steering/suspension arm. Inspect the ball joint boot and replace it if damaged.

21. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

22. 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.

23. Use the special tool as shown on page 18-12 to separate the ball joint and lower arm.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

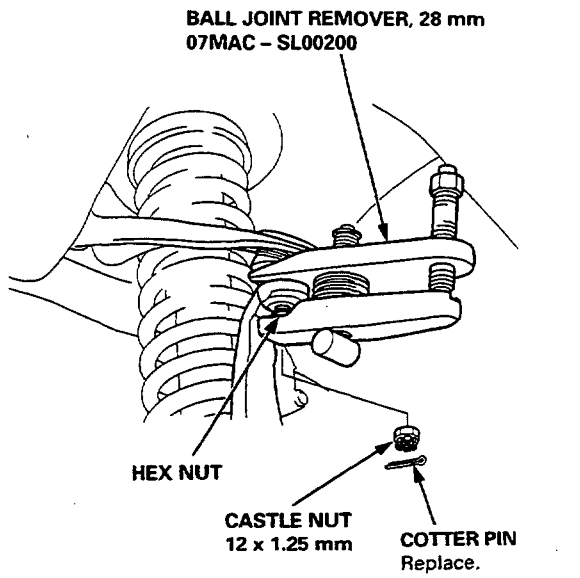


24. Remove the cotter pin from the upper ball joint castle nut, and remove the nut.

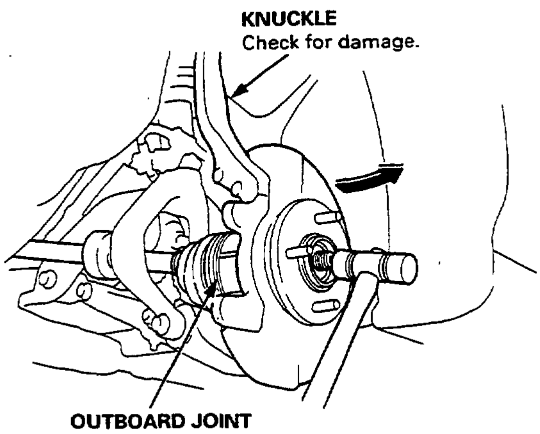
25. Install the 12 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

26. Use the special tool as shown on page 18-12 to separate the ball joint and knuckle.

    NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



27. Pull the knuckle outward and remove the driveshaft outboard joint from the knuckle using a plastic hammer, then remove the knuckle.



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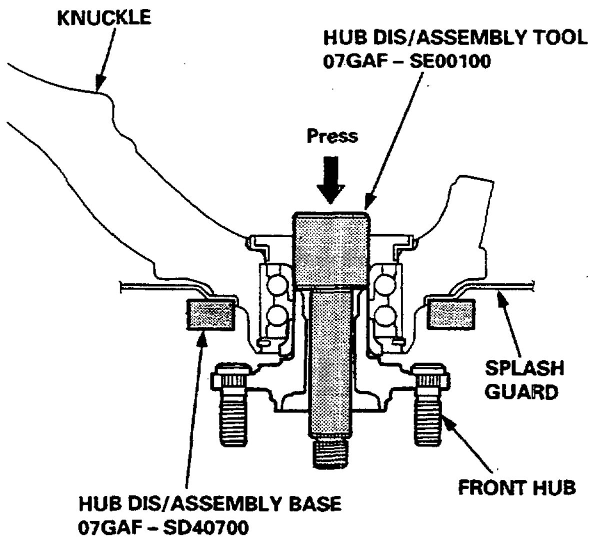
Wheel Bearing Replacement

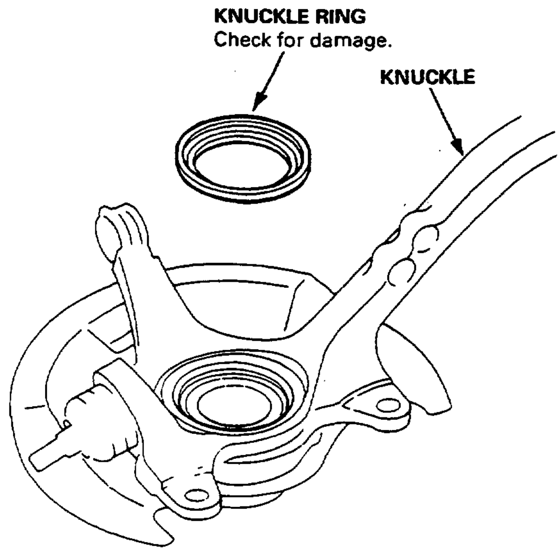
NOTE: Replace the bearing with a new one after removal.

1. Separate the front hub from the knuckle using the special tools and a press as shown.

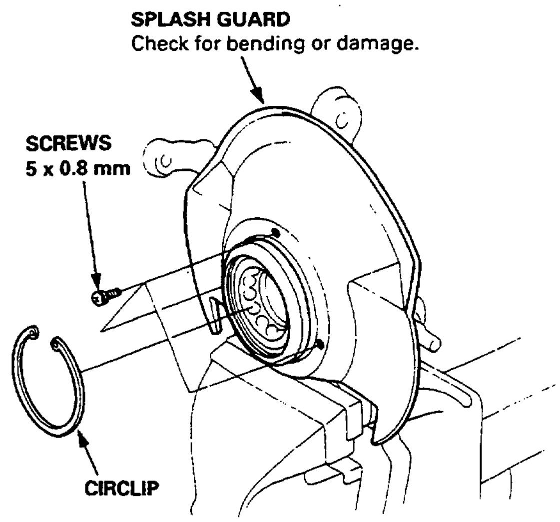
CAUTION:
- **Take care not to distort the splash guard.**
- **Hold onto the hub to keep it from falling when pressed clear.**



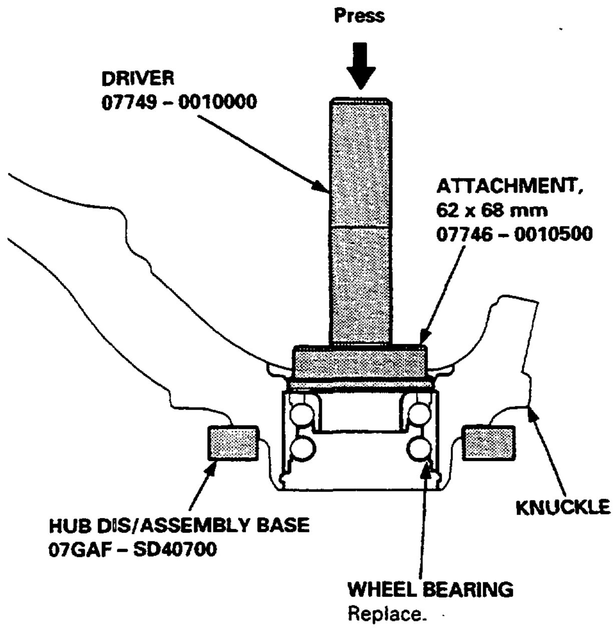
2. Remove the knuckle ring from the knuckle.



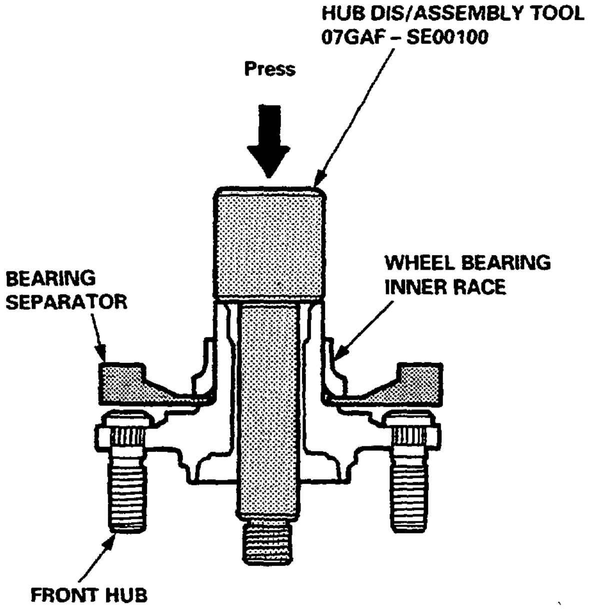
3. Remove the circlip and the splash guard from the knuckle.



4. Press the wheel bearing out of the knuckle using the special tools and a press as shown.

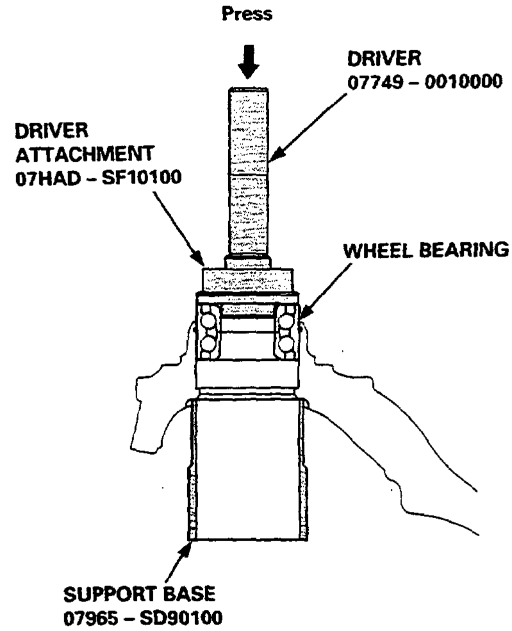


5. Remove the wheel bearing inner race from the front hub using the special tool and a commercially available bearing separator as shown.



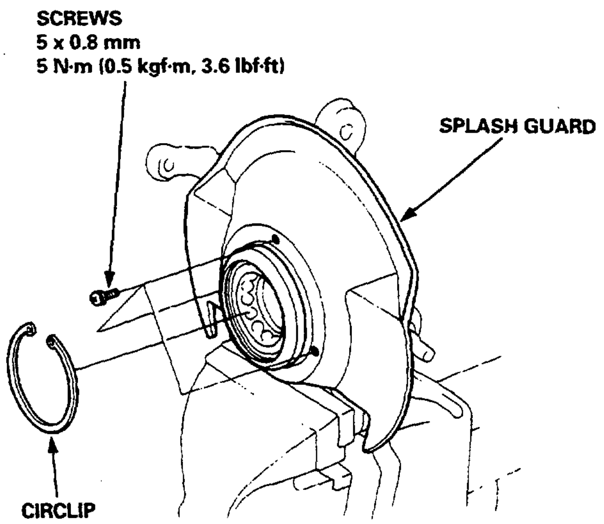
NOTE: Wash the knuckle and hub thoroughly in high flash point solvent before reassembly.

6. Press a new wheel bearing into the knuckle using the special tools and a press as shown.



7. Install the circlip securely in the knuckle groove.

8. Install the splash guard and tighten the screws.

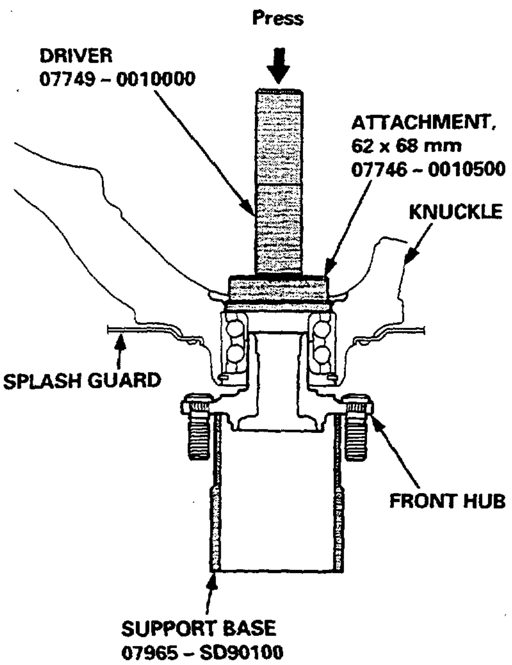


(cont'd)

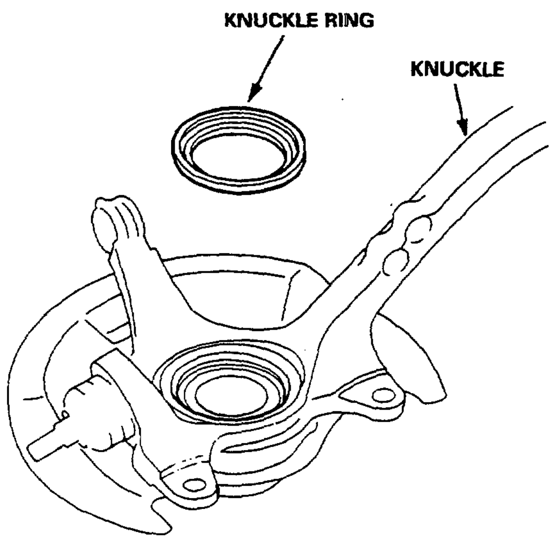
Knuckle/Hub (cont'd)

9. Install the front hub on the knuckle using the special tools and a press as shown.

   CAUTION: Take care not to distort the splash guard.



10. Install the knuckle ring on the knuckle.



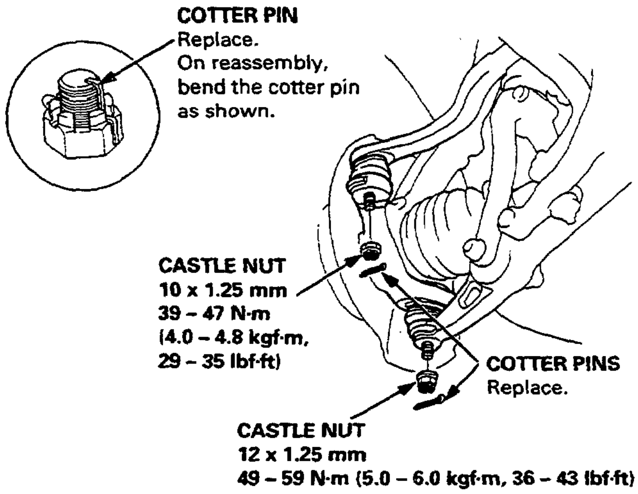
Knuckle Installation

1. Install the knuckle on the driveshaft.

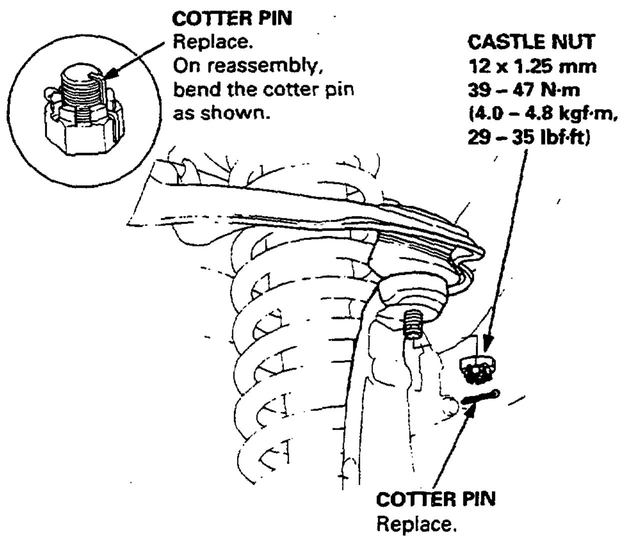
2. Install the knuckle on the lower arm and the tie-rod, then tighten the castle nuts and install new cotter pins.

   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.**

   NOTE: Wipe off the grease before tightening the nut at the ball joint.



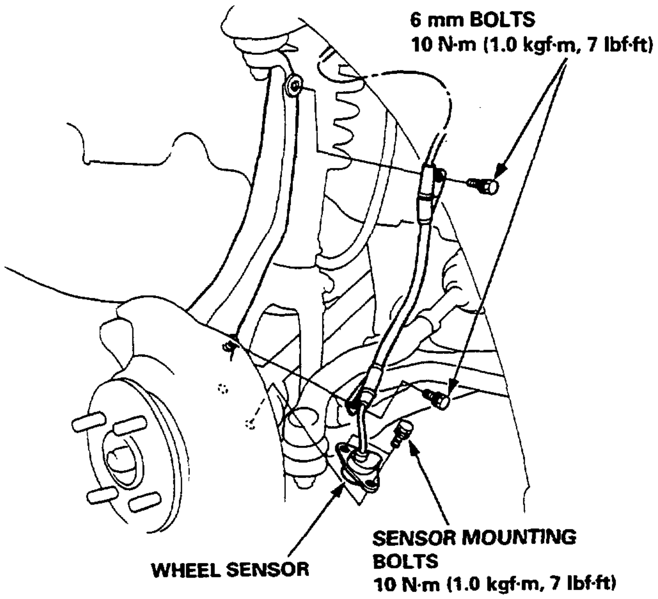
3. Install the knuckle on the upper arm, then tighten the castle nut and install a new cotter pin.



4. Install the wheel sensor with the sensor mounting bolts *(for cars with ABS).*

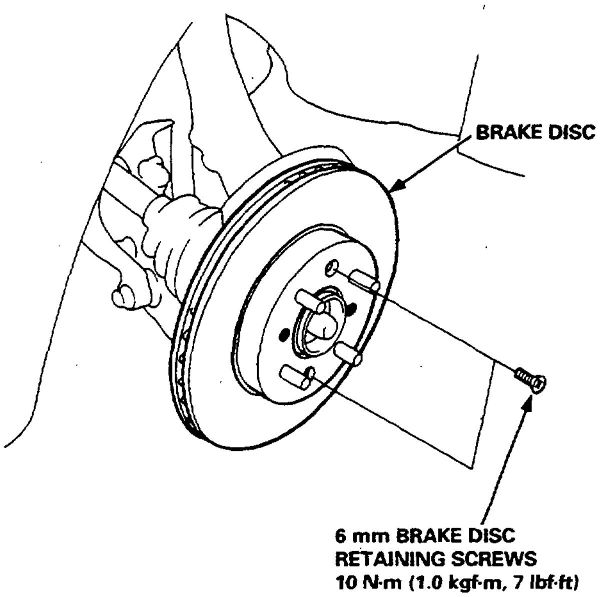
5. Install the sensor wire with the two 6 mm bolts (for cars with ABS).

   NOTE: Be careful when installing the sensors to avoid twisting wires.



6. Install the brake disc with the 6 mm brake disc retaining screws.

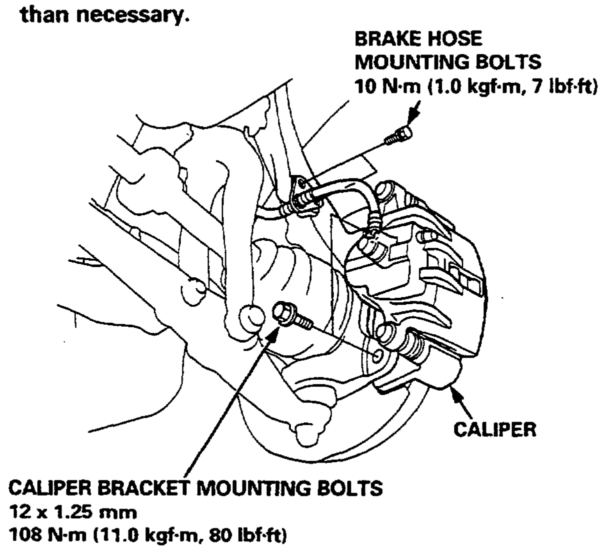
   NOTE: Before installing the brake disc, clean the mating surfaces of the front hub and brake disc.



7. Install the brake caliper with the caliper bracket mounting bolts.

8. Install the brake hose with the brake hose mounting bolts.

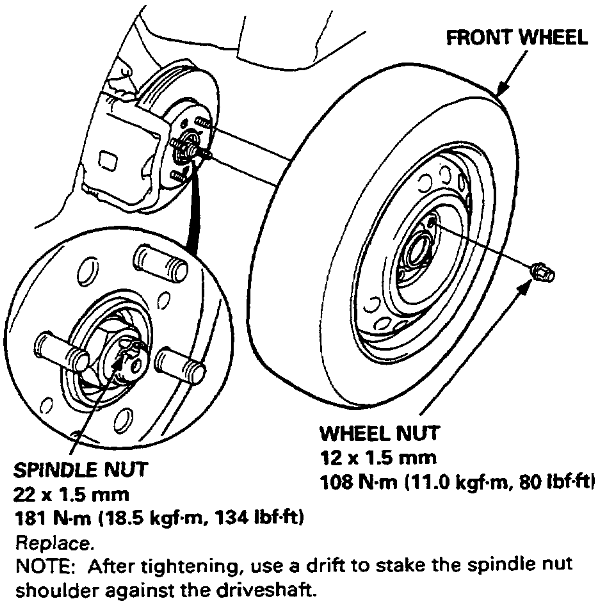
   CAUTION: Be careful not to twist the hose more than necessary.



9. Install a new spindle nut, then tighten the nut.

10. Install the wheel with the wheel nuts.

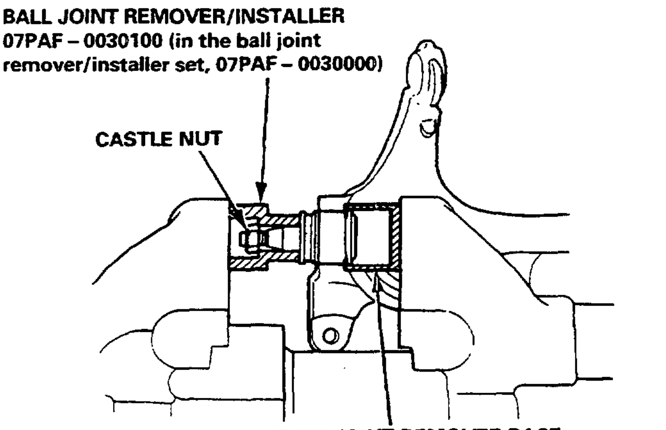
    NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and wheel.



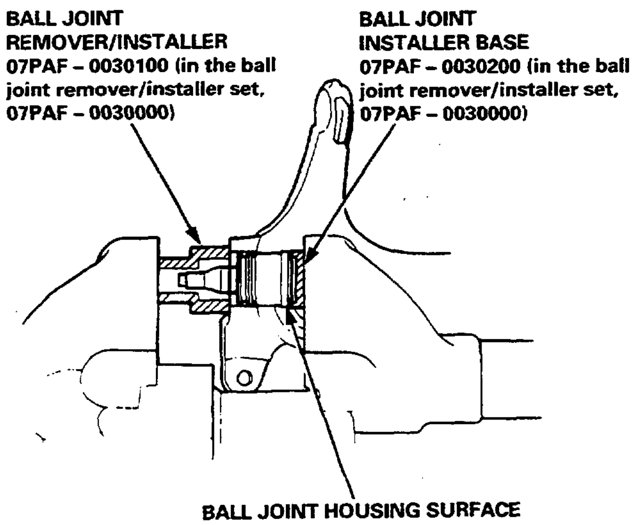
11. Check the front wheel alignment, and adjust if necessary *(see page 18-4).*

Lower Ball Joint Replacement

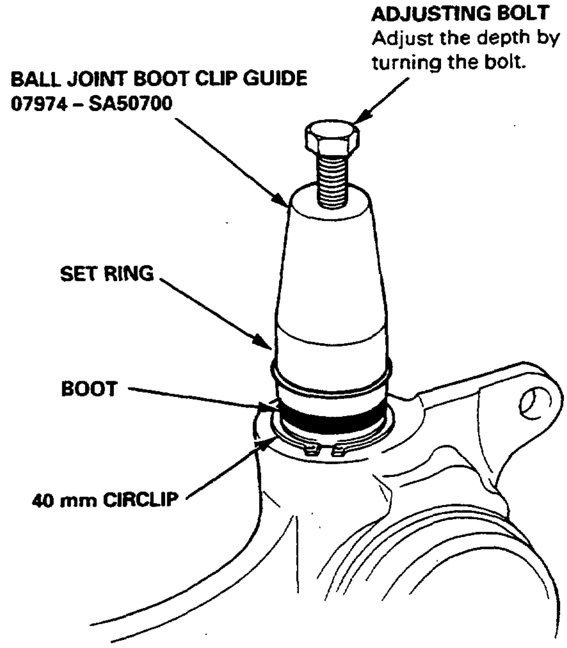
1. Remove the knuckle (see page 18-11).
2. Remove the boot by prying the set ring off.
3. Check the boot for deterioration and damage, replace if it is necessary.
4. Remove the 40 mm circlip.
5. Install the special tools on the ball joint and tighten the castle nut.
6. Position the special tools over the ball joint as shown, then set the assembly in a vise. Press the ball joint out of the knuckle.



7. Place the ball joint in position by hand.
8. Install the special tools over the ball joint as shown, then press the ball joint in.



9. Install the 40 mm circlip.
10. Install the ball joint boot and set ring using the special tool (see page 18-19).



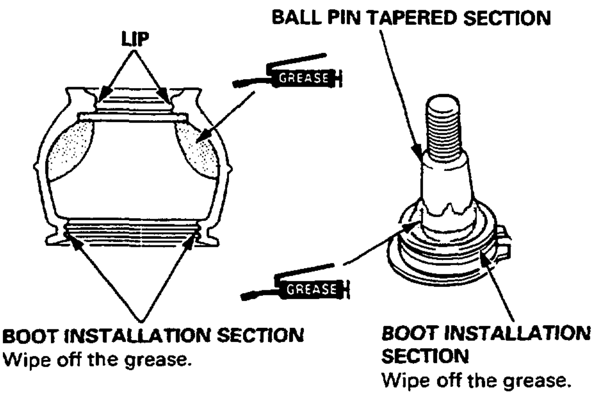
11. Install the knuckle (see page 18-16).
12. Check the front wheel alignment and adjust if necessary (see page 18-4).

Lower Ball Joint Boot Replacement

1. Remove the boot set ring.

   CAUTION: Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.

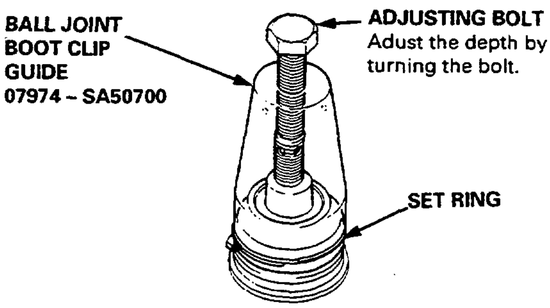


3. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.

   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. 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.

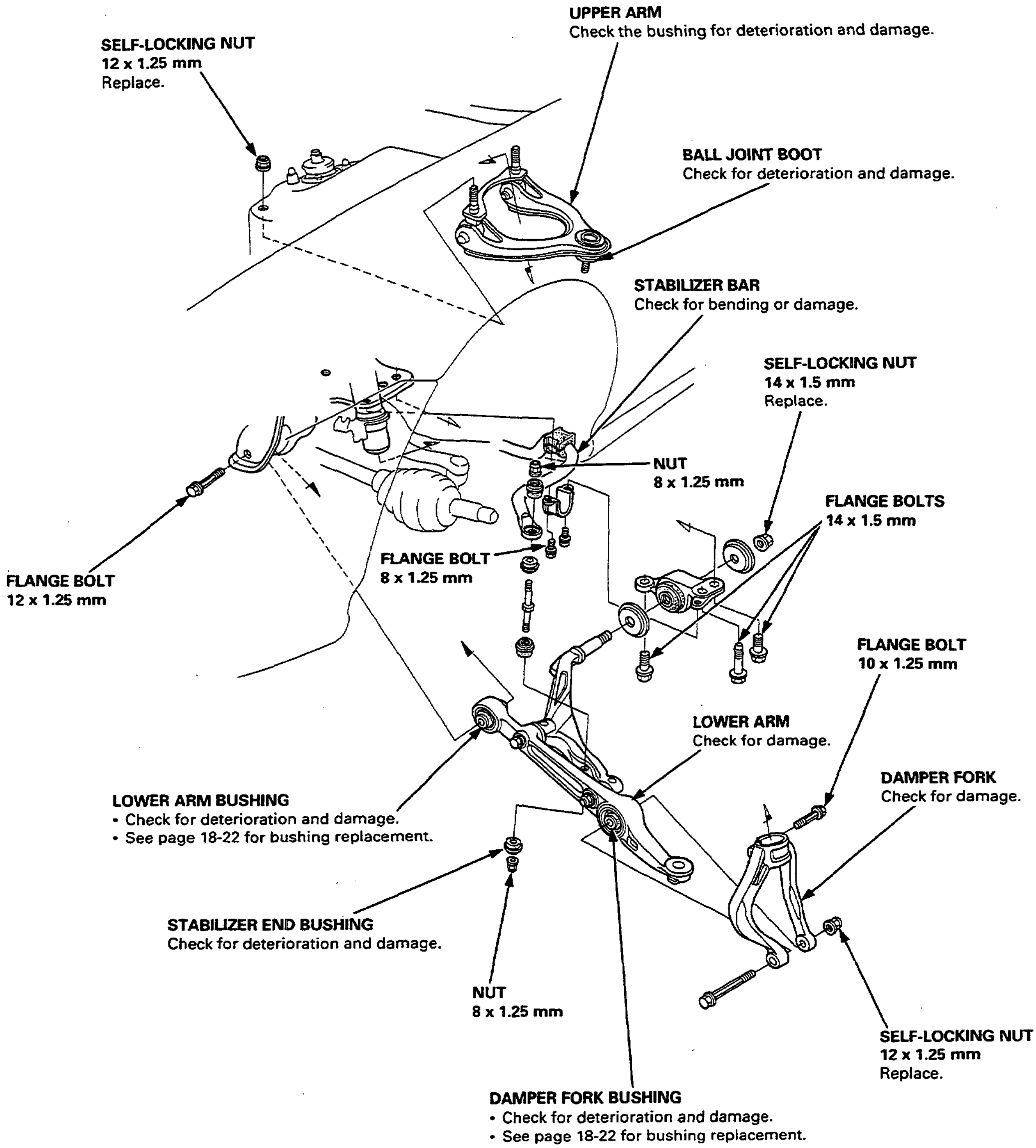


CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

Suspension Arms

Removal/Inspection

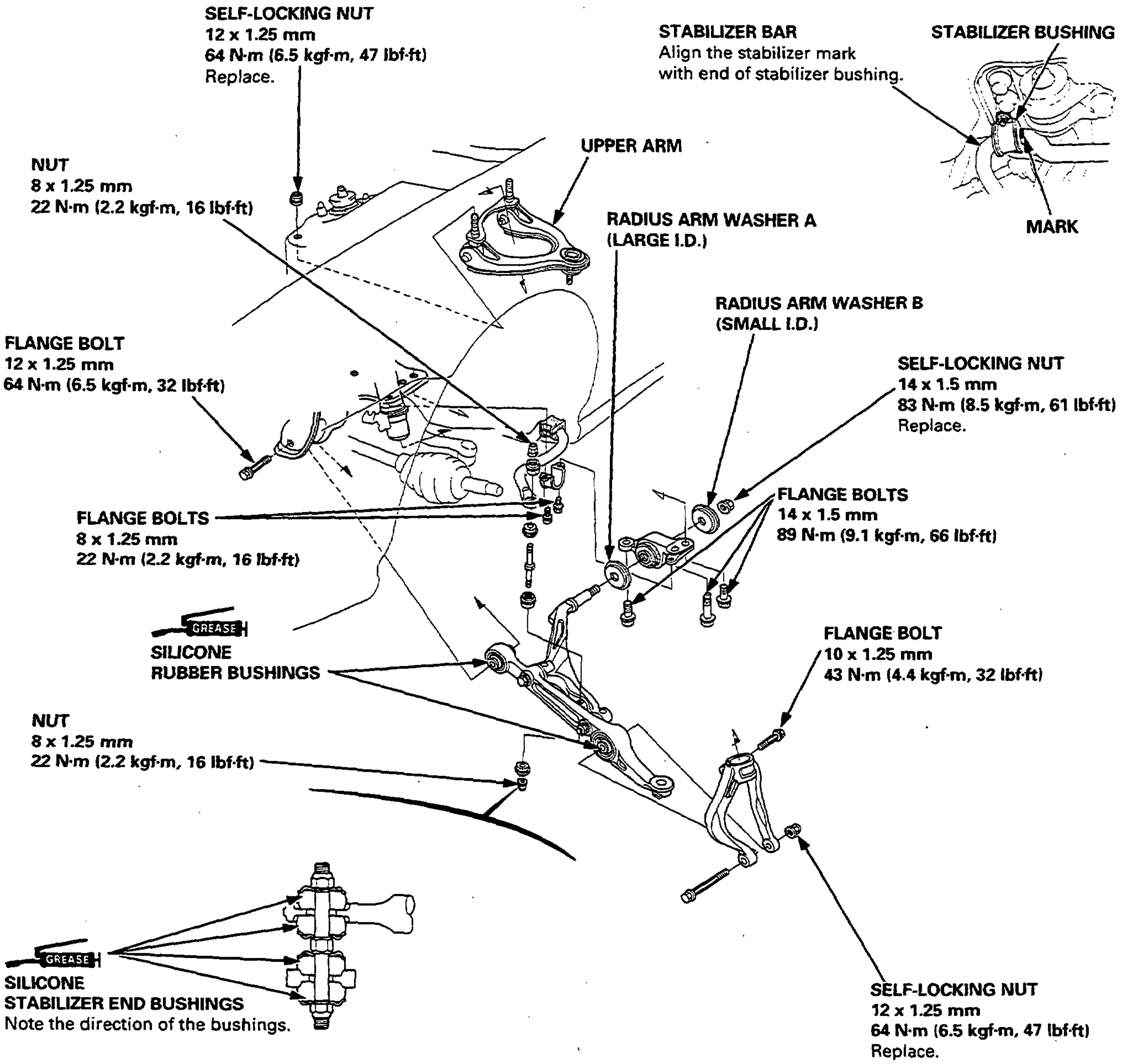
CAUTION:
- **Replace the self-locking nuts after removal.**



Installation

CAUTION: Any bolts or nuts connected to rubber mounts or bushings should be tightened with the vehicle on the ground.

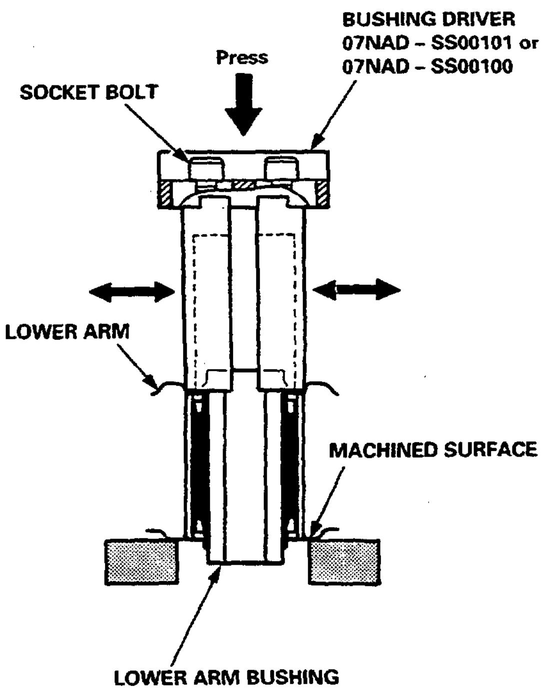
NOTE:
- Wipe off the dirt, oil or grease on the threads before tightening the fasteners.
- The right and left damper forks are not interchangeable. The left damper fork is marked with "VL" while the right damper fork is marked with "VR".
- The right and left upper arms are not interchangeable. The left upper arm is marked with "●".
- When installing the radius arm washers, the "FR" mark faces the front of the car.
- After installing the suspension arm, check the front wheel alignment, and adjust if necessary (see page 18-4).



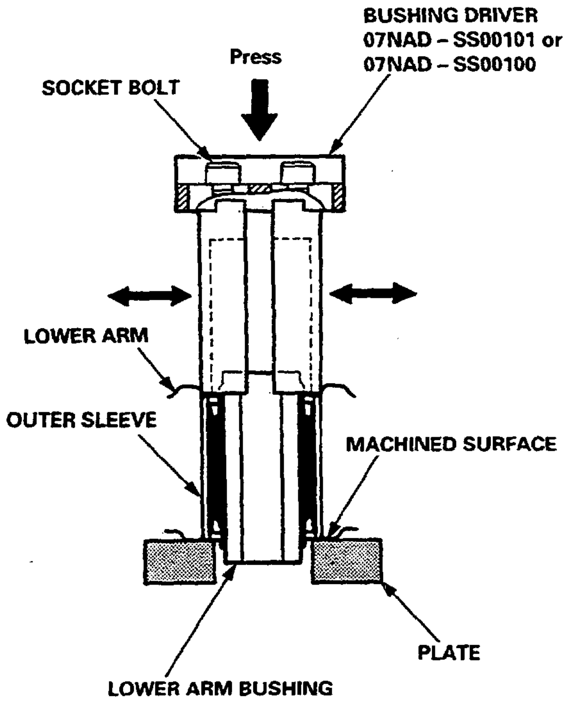
Lower Arm Bushing Replacement

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.**



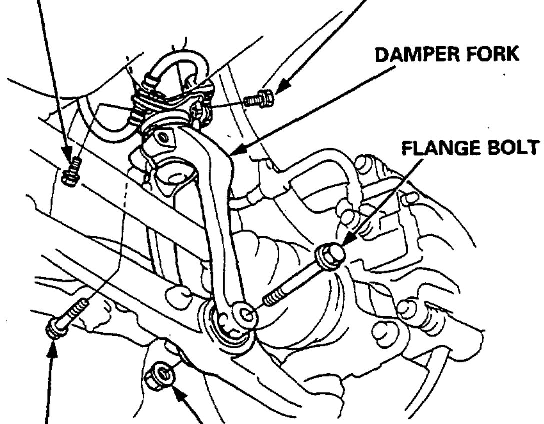
5. Position the lower arm on the press with the machined surface facing down.
6. Adjust the bushing driver so that it matches the inner diameter of the bushing hole, then tighten the socket bolt securely.
7. Position the bushing driver on the outer sleeve of the bushing.
8. Press the bushing into the lower arm using the bushing driver and a press until the edge of the bushing reaches on the plate as shown.



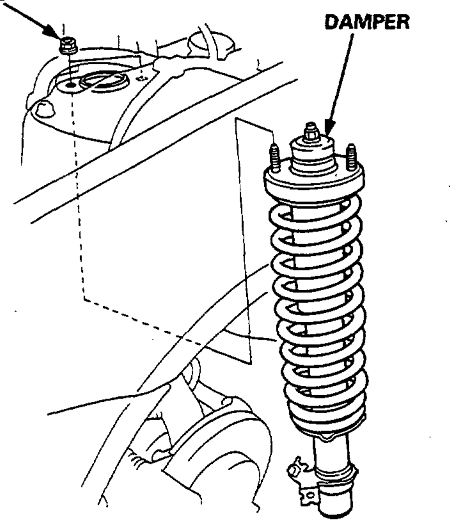
Front Damper

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 that connects the damper fork to the damper.
4. Remove the flange bolt and self-locking nut, then remove the damper fork.



5. Remove the damper by removing the two flange nuts.

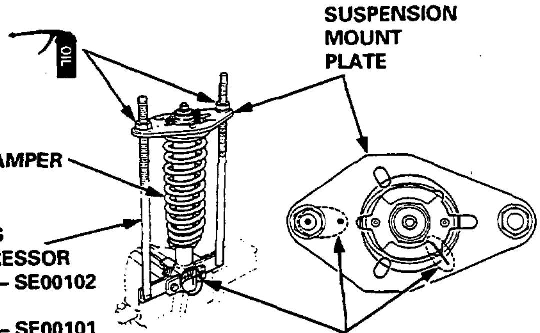


Disassembly

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.

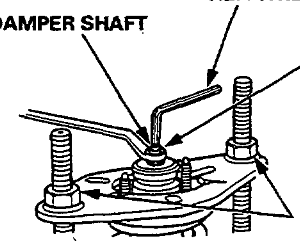
4. Mark the damper case and the spring compressor holder with paint as shown.
5. Mark the mount plate and the spring compressor, and mount plate and damper mounting base with paint as shown.



6. Compress the damper to 2 – 3 cm (0.8 – 1.2 in) by tightening the compressor nuts.

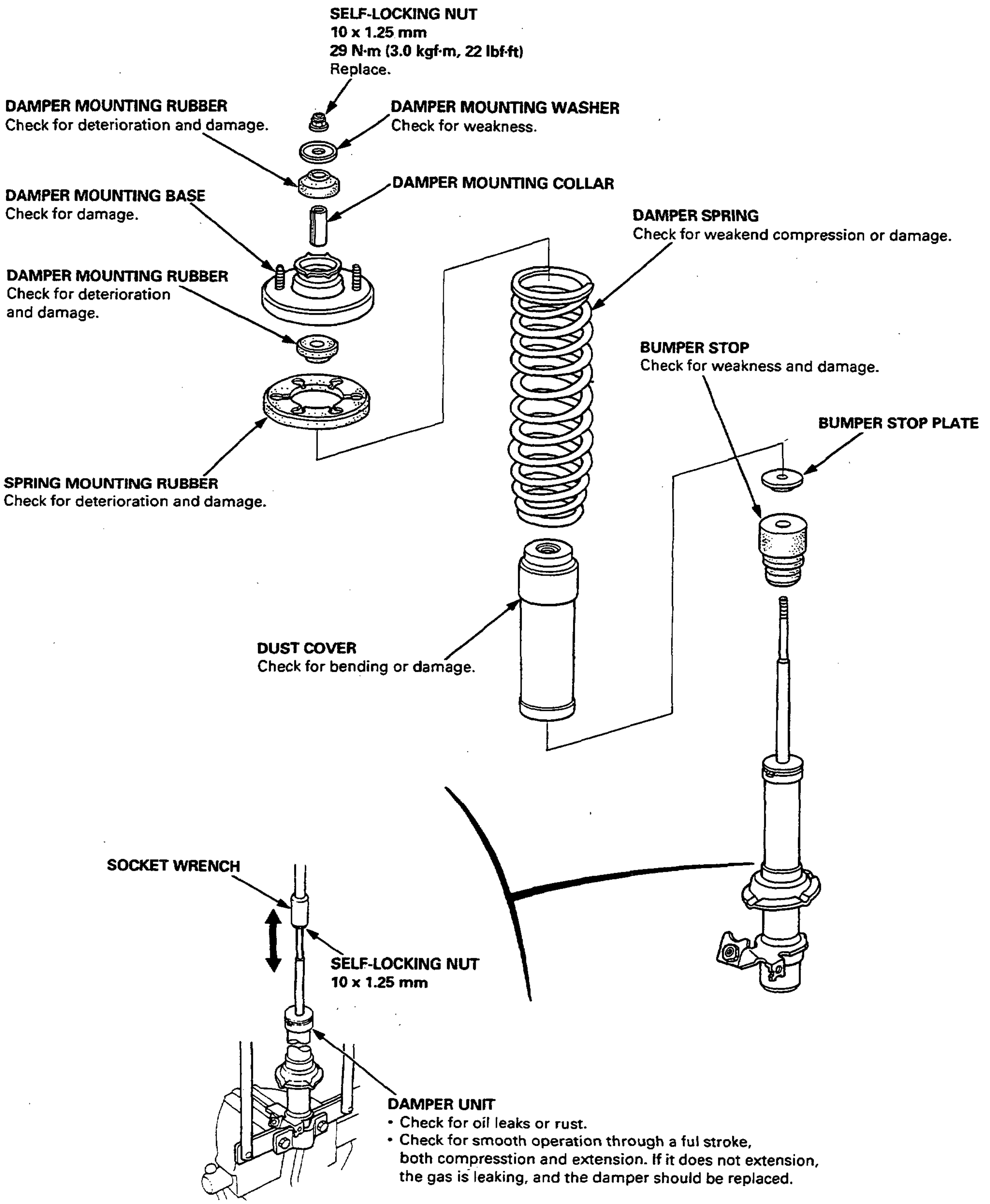
   NOTE: Turn each compressor nut gradually and equally.

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.

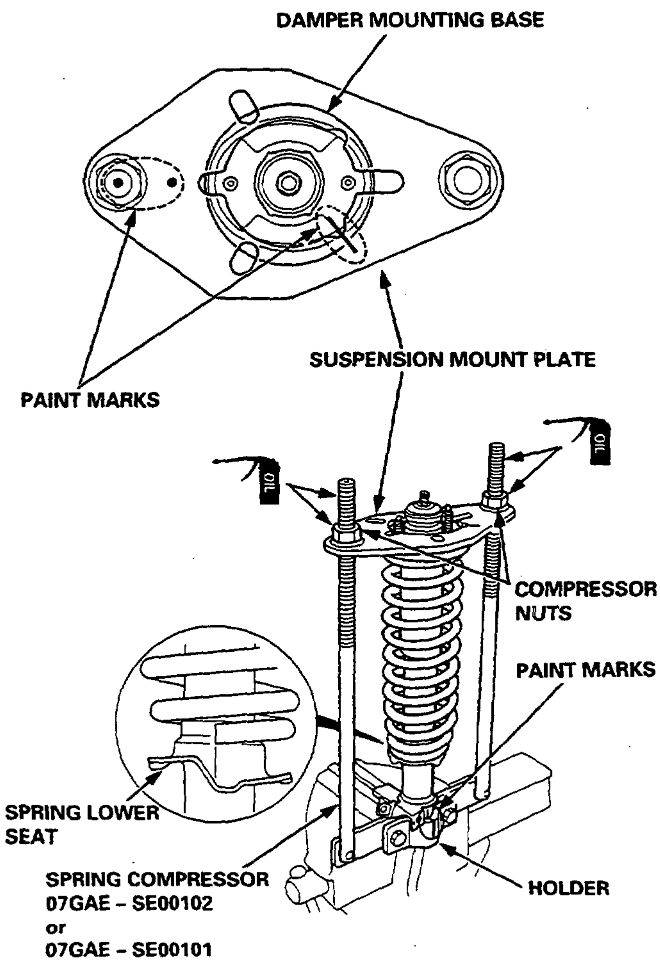
2. Reassemble the damper in reverse order of disassembly except the damper mounting washer and self-locking nut.

   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.

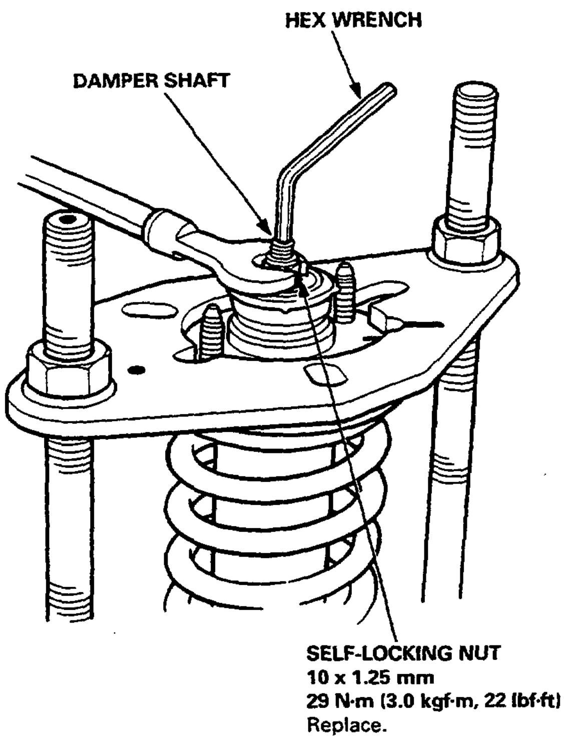


6. Compress the damper spring by turning the compressor nuts.

   NOTE: Turn each compressor nut gradually and equally.

7. Install the damper mounting washer, then loosely install a new self-locking nut.

8. Hold the damper shaft with a hex wrench and tighten the self-locking nut.

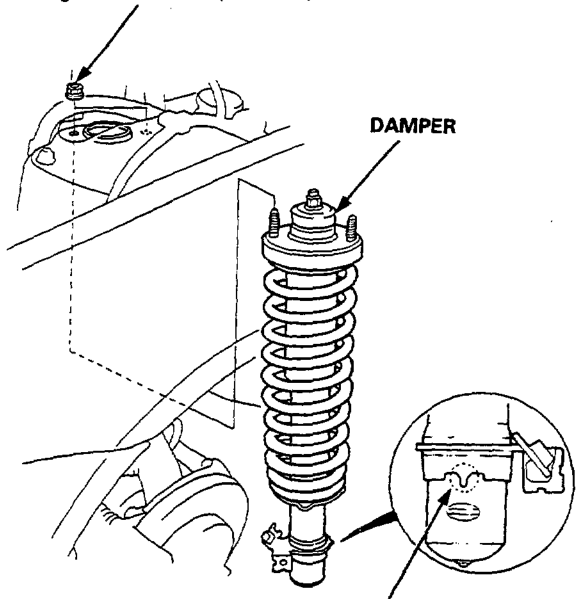


9. Remove the damper from the spring compressor.

Front Damper

Installation

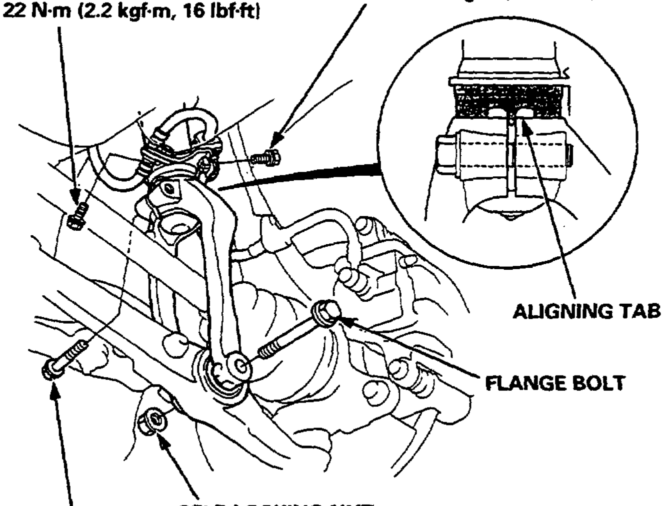
1. Loosely install the damper on the frame with the aligning tab facing inside, then loosely install the two flange nuts.



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, and connects the damper fork to the damper.
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.



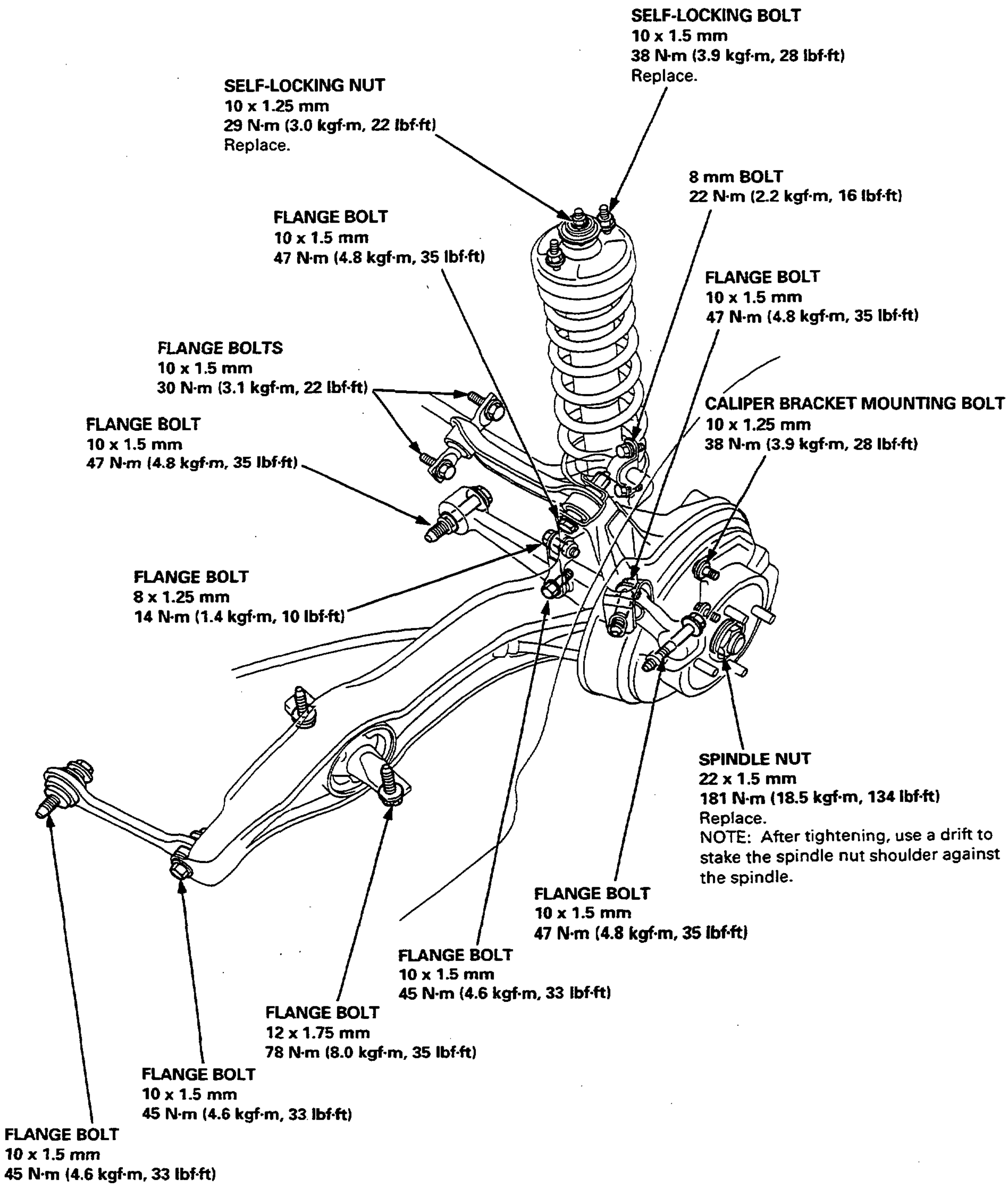
10. Install the front wheel (see page 18-17).

Rear Suspension

Torque Specifications

CAUTION:

- Replace the self-locking nut after removal.
- Any bolts or nuts connected to rubber mounts or bushings should be tightened with the vehicle on the ground.



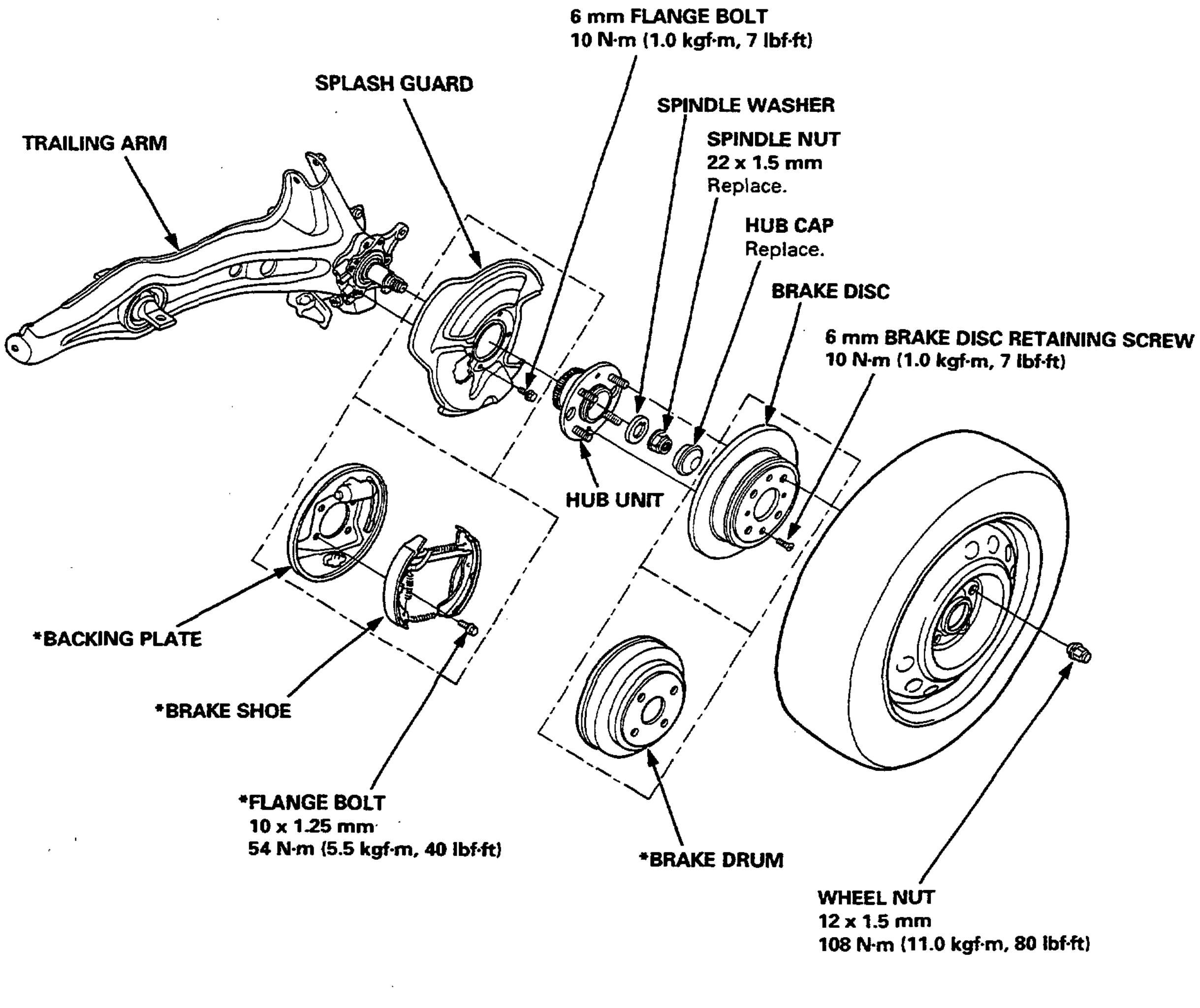
Rear Suspension

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.
- On the aluminum wheels, remove the center cap from the inside of the wheel after removing the wheel.
- Before installing the brake disc (or brake drum), clean the mating surfaces of the rear hub and the brake disc (or brake drum).
- Before installing the wheel, clean the mating surfaces of the brake disc (or brake drum) and wheel.

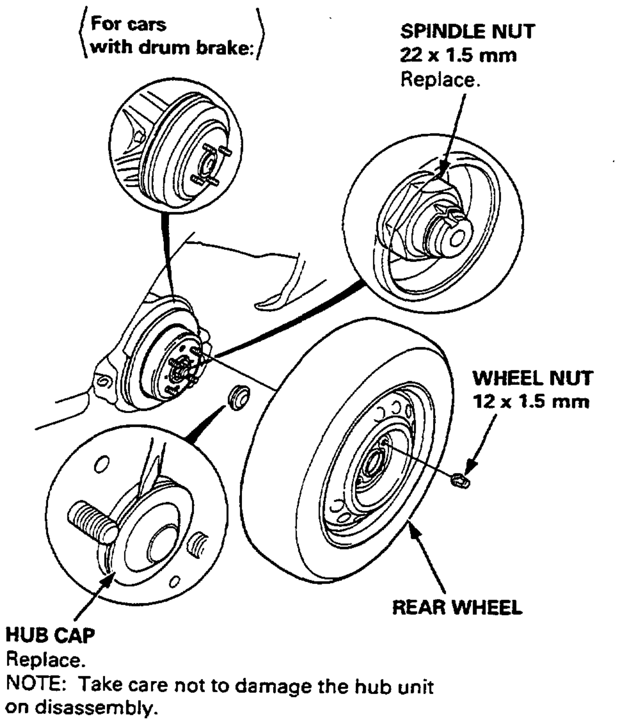
*: For cars with drum brake.



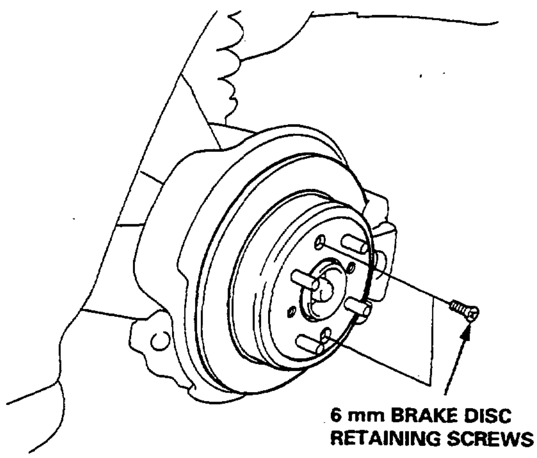
Hub Bearing Unit

Removal

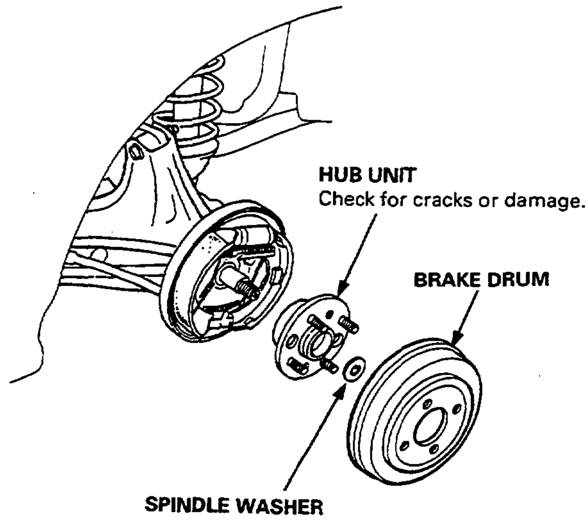
1. Loosen the wheel nuts slightly.
2. Raise the rear of car, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and rear wheel.
4. Pull the parking brake lever up.
5. Remove the hub cap.
6. Raise the locking tab on the spindle nut, then remove the nut.



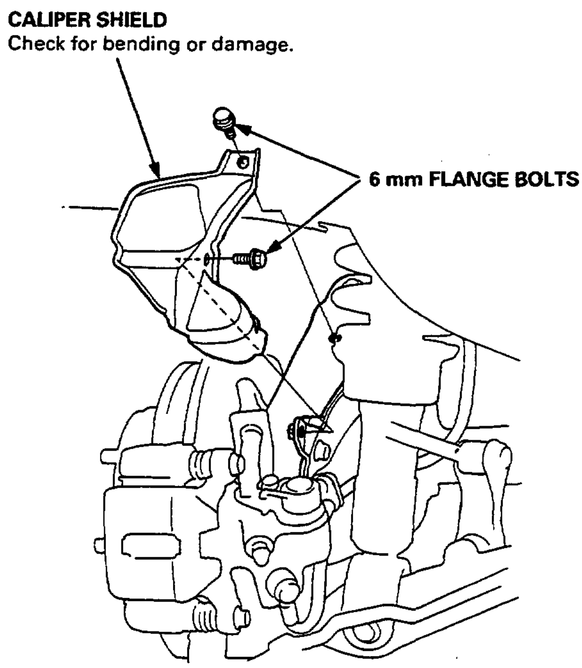
7. Remove the 6 mm brake disc retaining screws.



8. Release the parking brake lever.
9. Remove the brake drum, hub unit and spindle washer (for cars with drum brake).



10. Remove the 6 mm flange bolts and caliper shield.



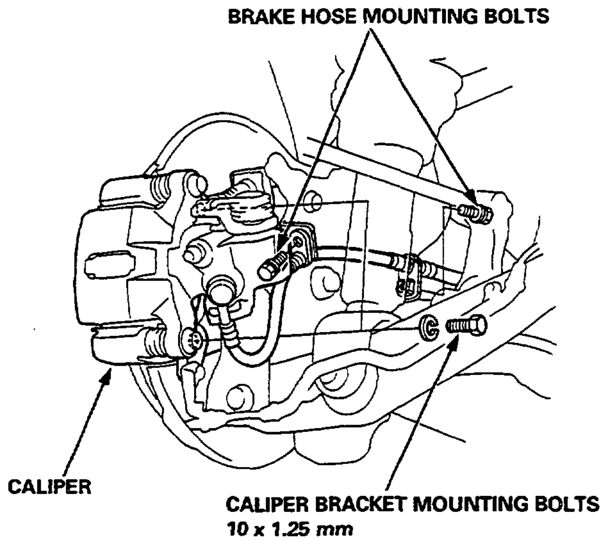
(cont'd)

Hub Bearing Unit (cont'd)

11. Remove the two brake hose mounting bolts.

12. 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.

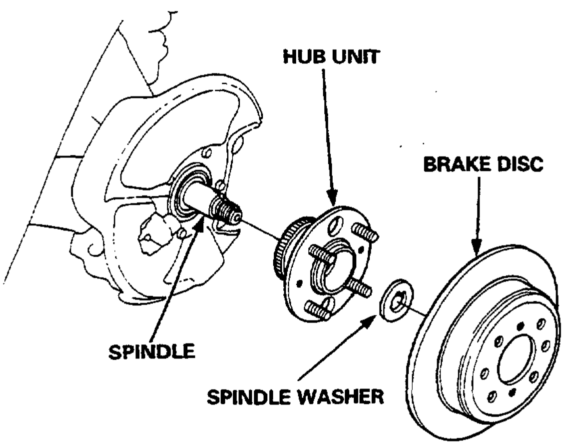


13. Screw two 8 x 1.25 mm bolts into the disc to push it away from the hub.

    NOTE: Turn each bolt two turns at a time to prevent cocking the disc excessively.

14. Remove the brake disc.

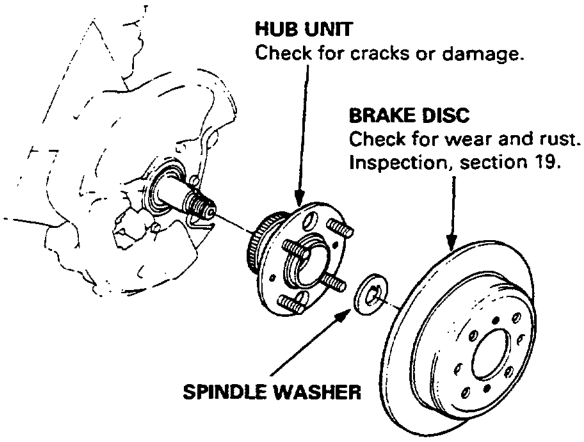
15. Remove the hub unit from the knuckle.



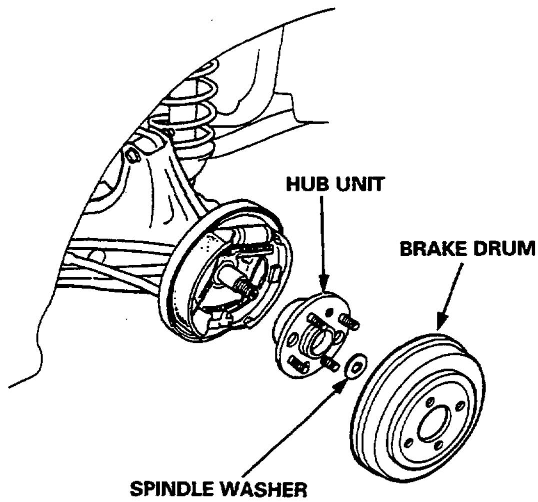
Installation

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).



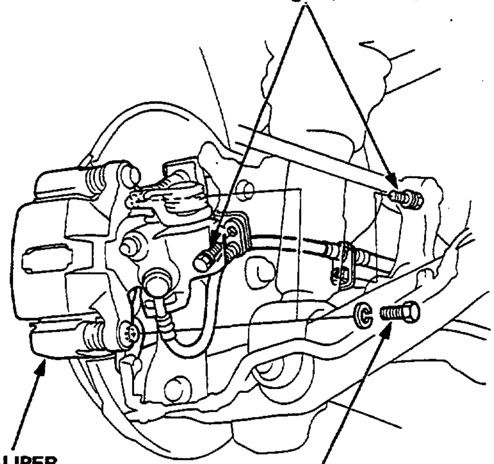
〈For cars with drum brake:〉



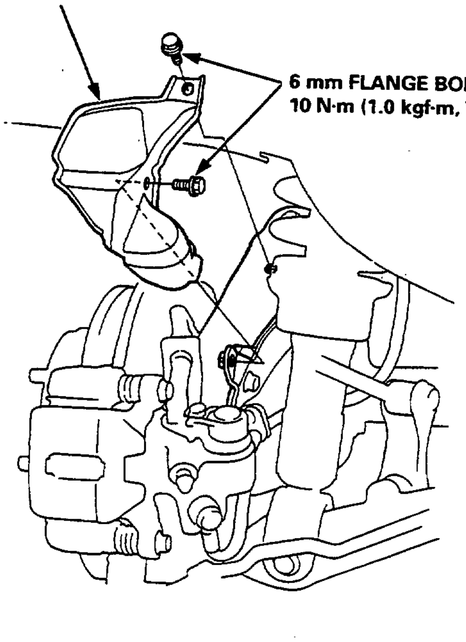
2. Install the brake caliper with the caliper bracket mounting bolts.

3. Install the brake hose with the brake hose mounting bolts.

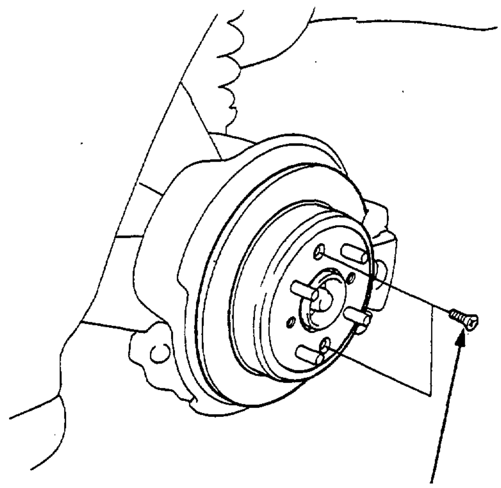
   CAUTION: Be careful not to twist the hose more than necessary.



4. Install the caliper shield with the 6 mm flange bolts.



5. Tighten the 6 mm brake disc retaining screws.

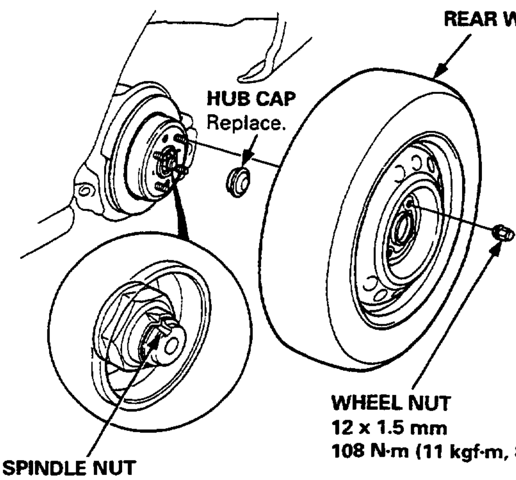


6. Install a new spindle nut, then tighten the nut.

7. Install a new hub cap.

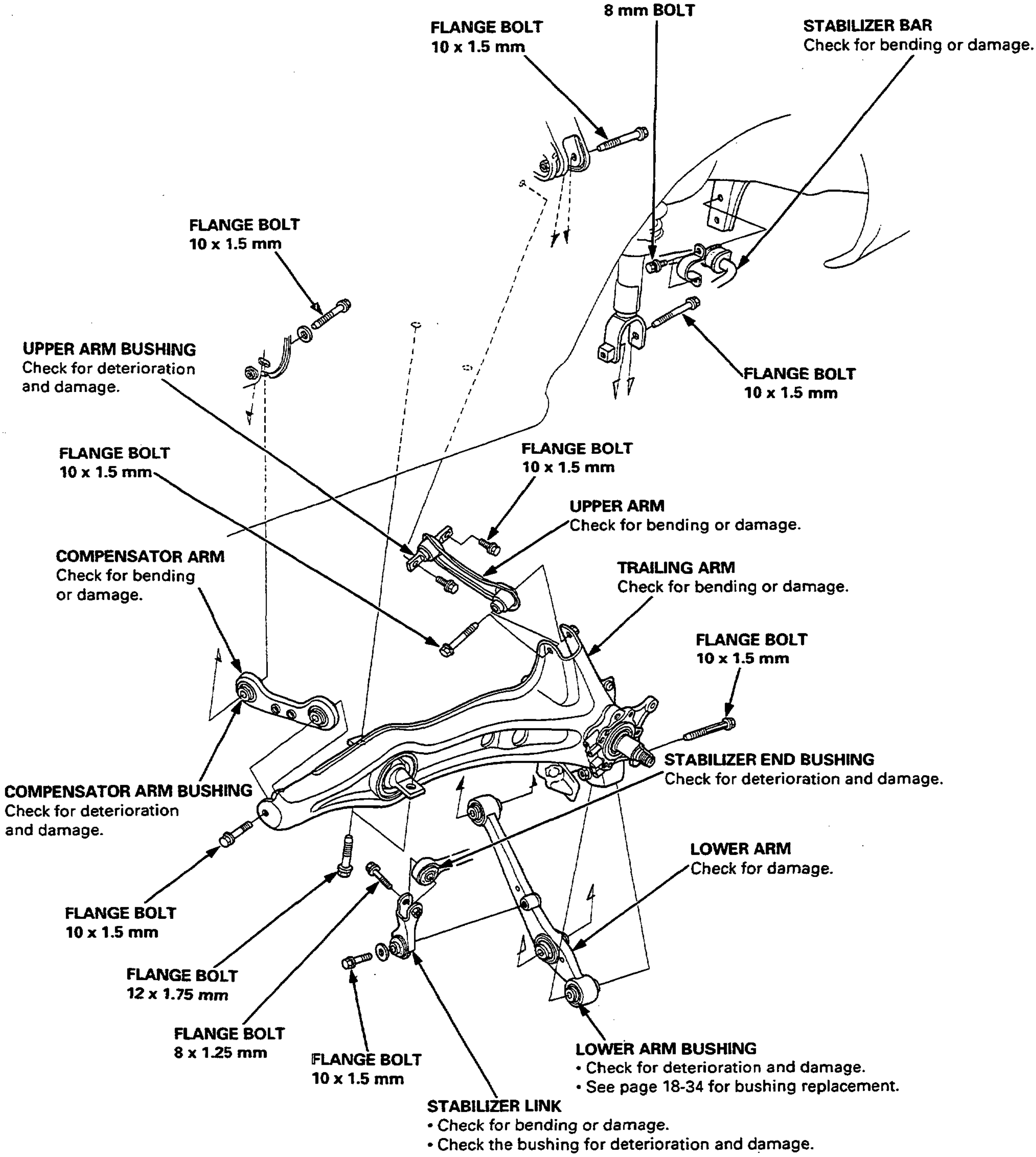
8. Install the rear wheel with the wheel nuts.

   NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and wheel.



Suspension Arms

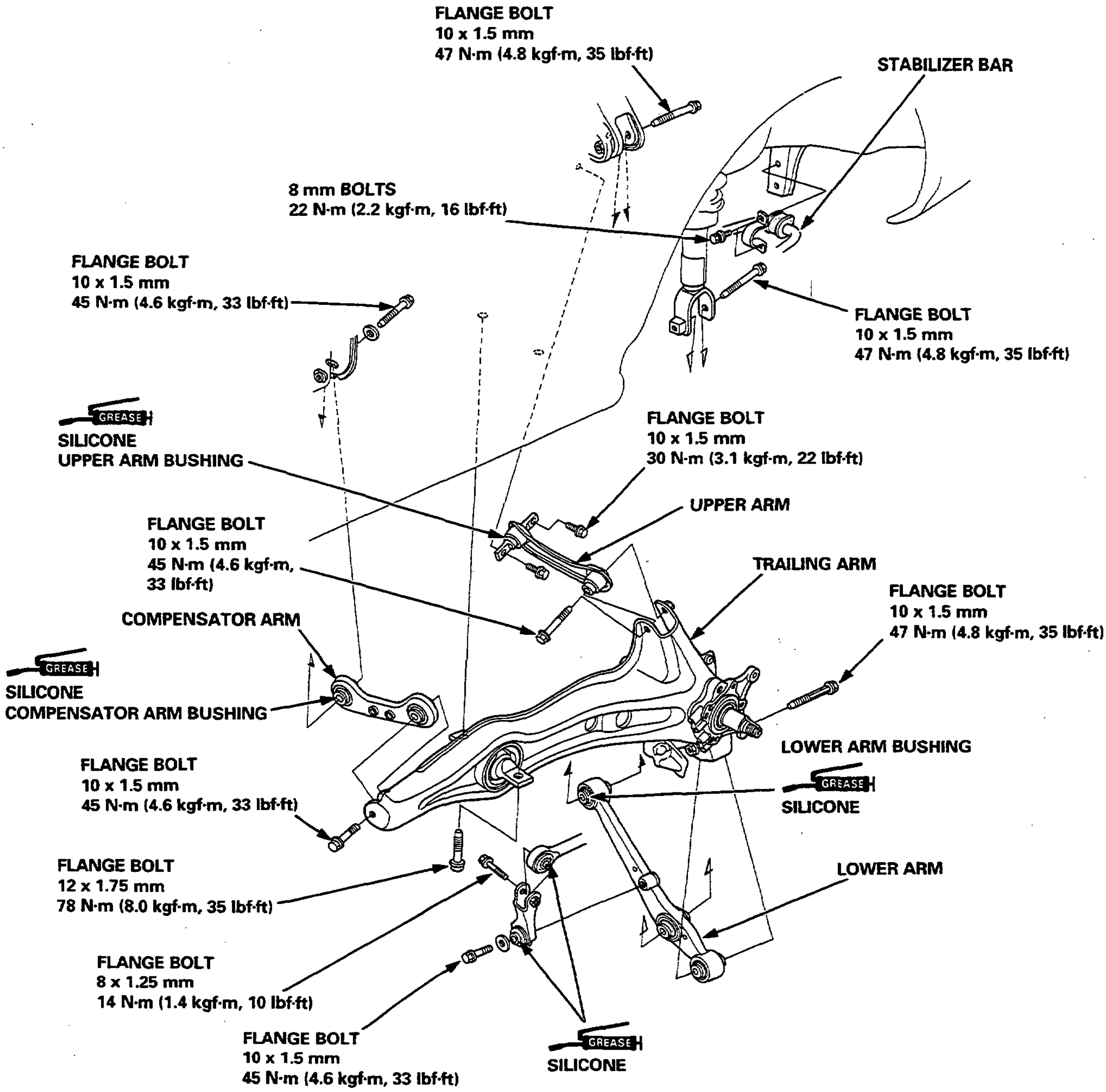
Removal/Inspection



Installation

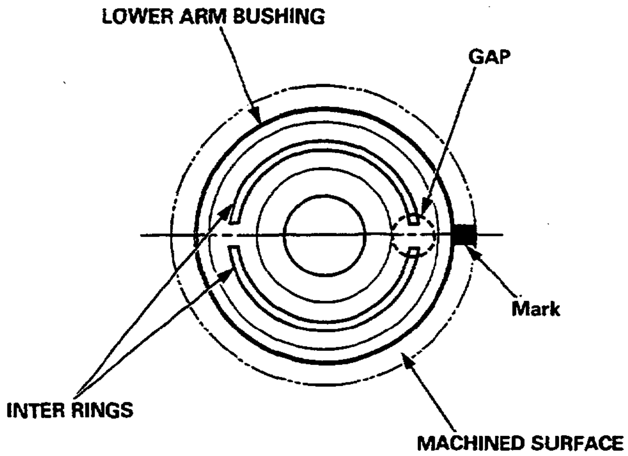
CAUTION: Any bolts or nuts connected to rubber mounts or bushings should be tightened with the vehicle on the ground.

NOTE:
- Make sure the flange bolts on the right and compensator arms are installed in the same direction.
- "L" is stamped on the left lower arm and "R" on the right lower arm.
- "↑ UP L" is stamped on the left upper arm and "↑ UP R" on the right upper arm.
- The right and left compensator arm are symmetrical. Install so the "↑ UP" mark stamped side faces forward.
- After installing the suspension arm, check the rear wheel alignment and adjust if necessary (see page 18-4).



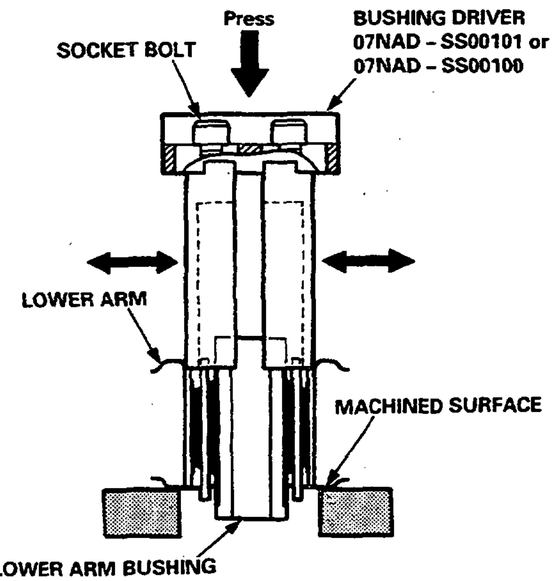
Lower Arm Bushing Replacement

1. Mark on the machined surface of the lower arm so that they are in line with the gaps on the inter rings.

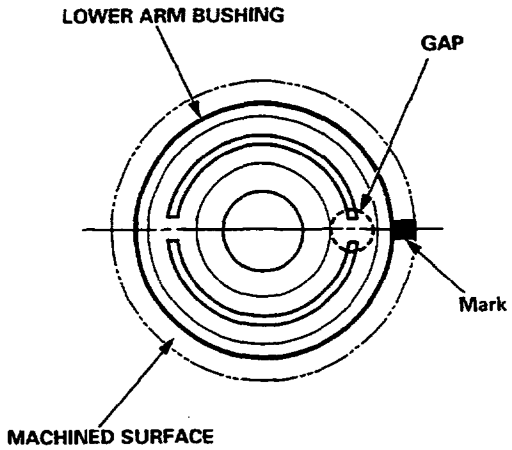


2. Position the lower arm on the press with the machined surface facing down.
3. Adjust the bushing driver so that it matches the inner diameter of the bushing hole, then tighten the socket bolt securely.
4. Position the bushing driver on the bushing.
5. Remove the bushing by pressing on the bushing driver with a press as shown.

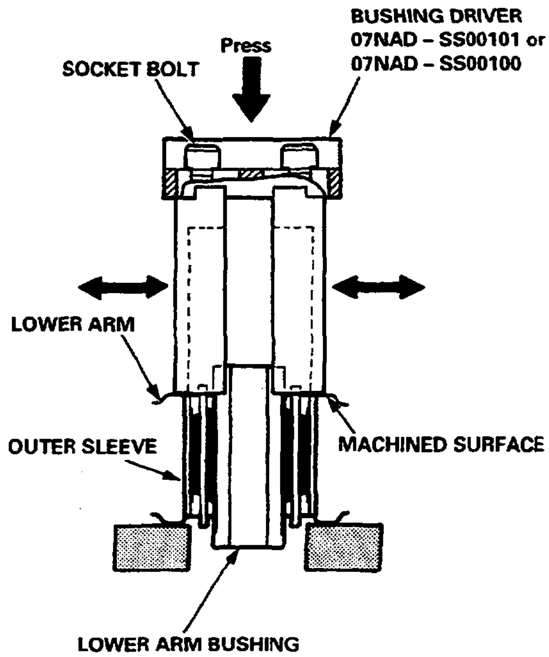
CAUTION:
- **Support the lower arm at machined surface as shown.**
- **Be careful not to damage the inside of the bushing hole while pressing on the bushing.**



6. Position the lower arm bushing by aligning the gap on the bushing with the mark on the lower arm when viewed from the top.



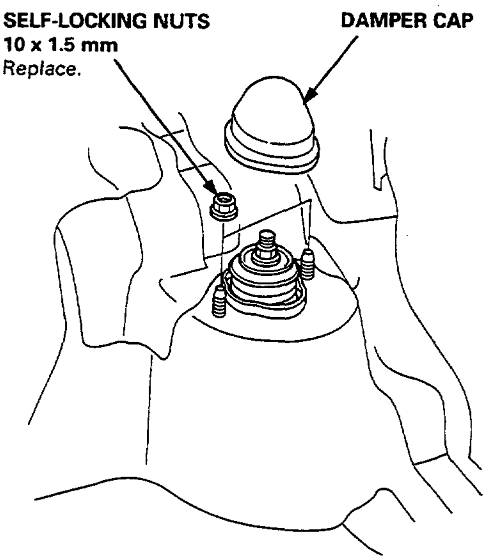
7. Adjust the bushing driver so that it matches with the outer diameter of the bushing.
8. Position the bushing driver on the outer sleeve of the bushing.
9. Press the bushing into the lower arm using the bushing driver and a press until the edge of the bushing aligns with machined surface on the lower arm as shown.



Rear Damper

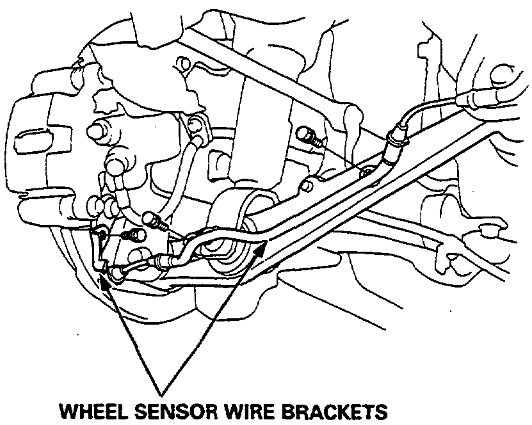
Removal

1. Remove the rear wheels (see page 18-29).
2. Remove the trunk side panel (see section 20).
3. Remove the damper cap.
4. Remove the two self-locking nuts.

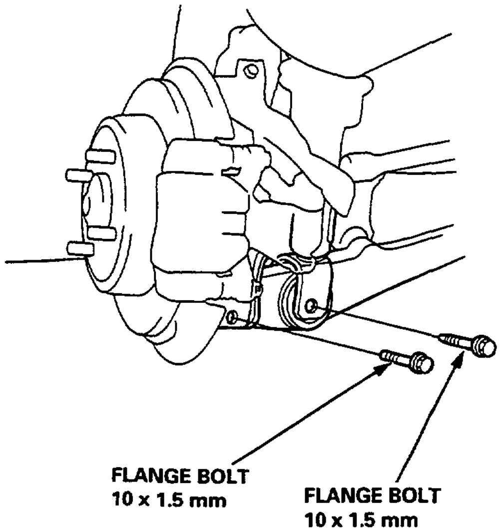


5. Remove the wheel sensor wire brackets (for cars with ABS).

   NOTE: Do not disconnect the wheel sensor connector.



6. Remove the flange bolt on the damper.
7. Remove the flange bolt that connects the lower arm to the trailing arm.



8. 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.

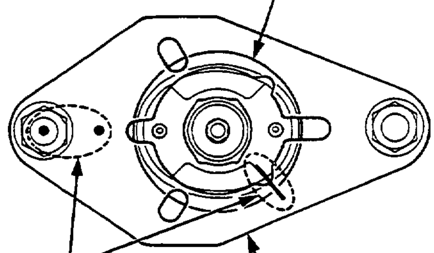
2. Install the suspension mount plate on the spring compressor.

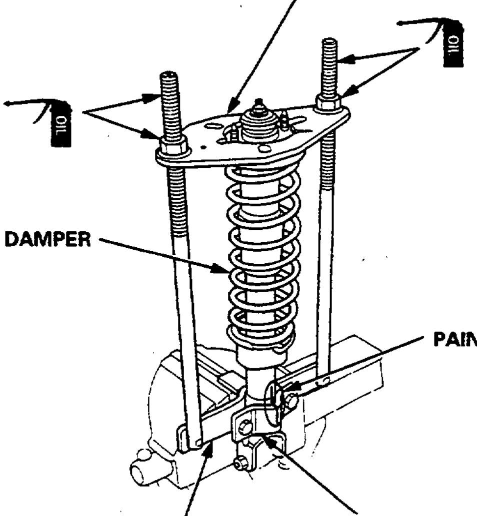
3. Support the spring compressor with damper on the vise, then tighten the damper holder bolts securely.

   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.





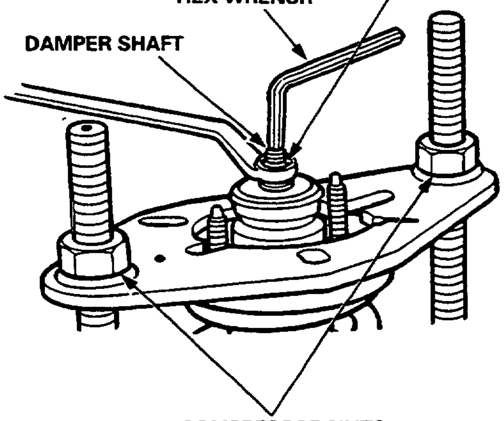
6. Compress the damper to 2 – 3 cm (0.8 – 1.2 in) by tightening the compressor nuts.

   NOTE: Turn each compressor nut gradually and equally.

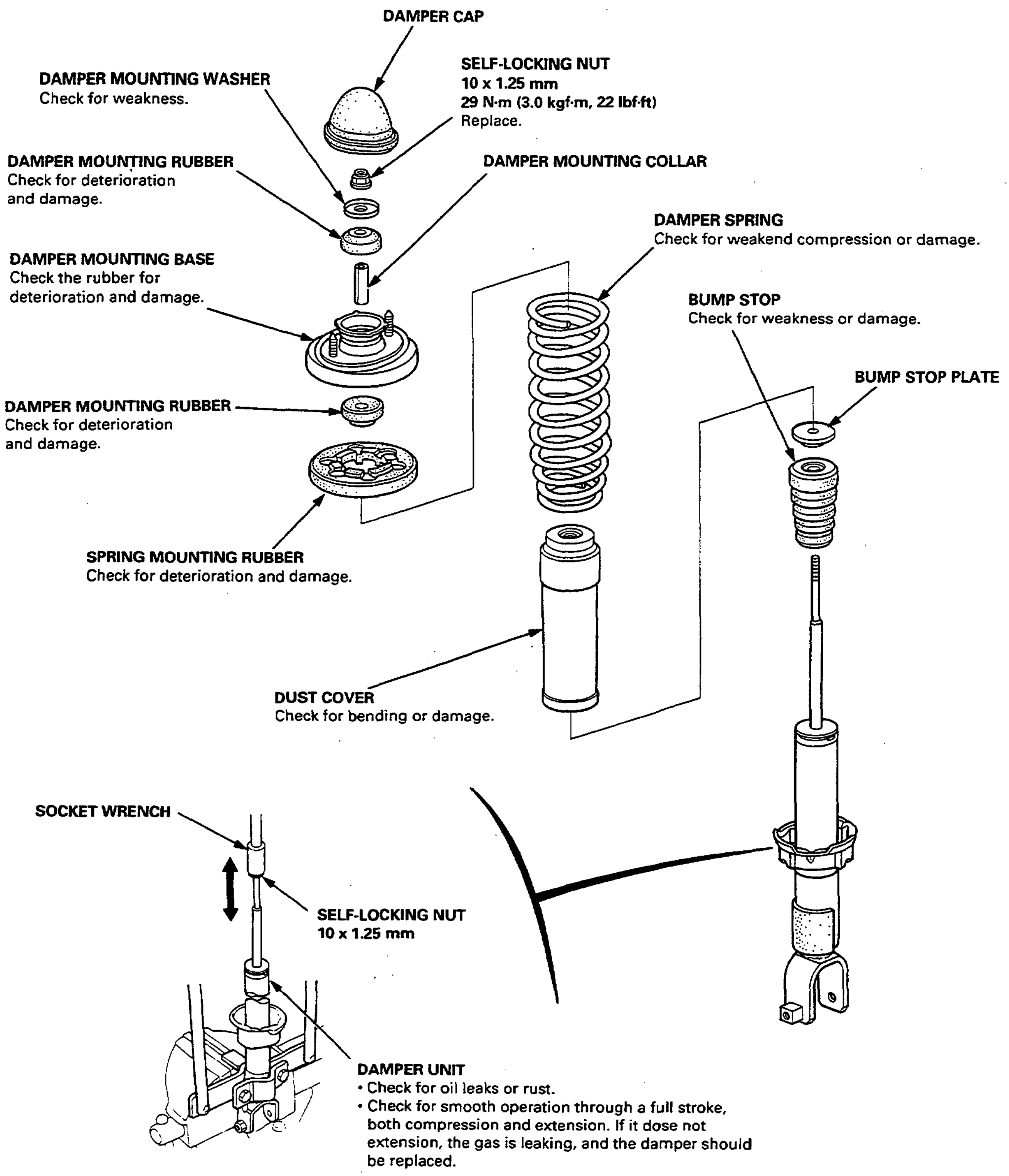
7. Hold the damper shaft with a hex wrench and remove the self-locking nut.

8. Loosen the compressor nuts, then remove the suspension mount plate.

9. Disassemble the damper on the next page.



Inspection


DAMPER CAP
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 weakend compression or damage.
DAMPER MOUNTING BASE
Check the rubber for deterioration and damage.
BUMP STOP
Check for weakness or damage.
BUMP STOP PLATE
DAMPER MOUNTING RUBBER
Check for deterioration and damage.
SPRING MOUNTING RUBBER
Check for deterioration and damage.
DUST COVER
Check for bending or damage.
SOCKET WRENCH
SELF-LOCKING NUT
10 x 1.25 mm
DAMPER UNIT
• Check for oil leaks or rust.
• Check for smooth operation through a full stroke, both compression and extension. If it dose not extension, 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.

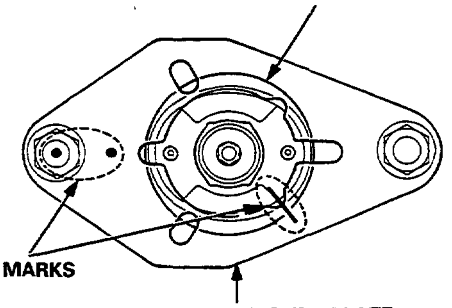
2. Reassemble the damper in reverse order of disassembly except the damper mounting washer and selflocking nut.

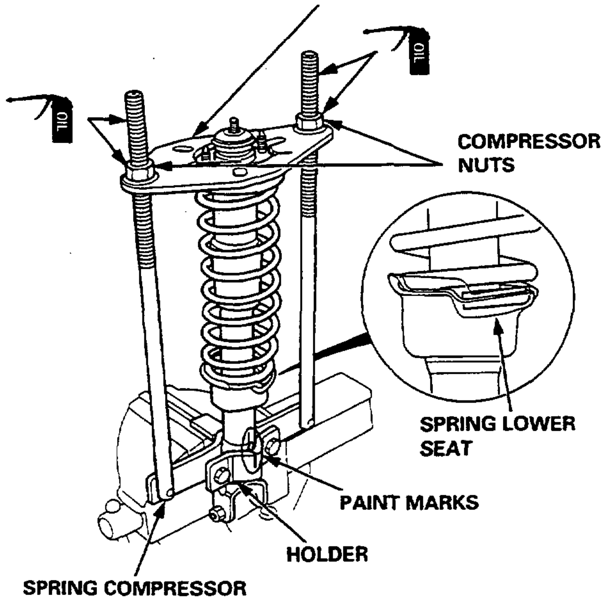
   NOTE: Align the bottom of damper spring and spring lower seat as shown.

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.



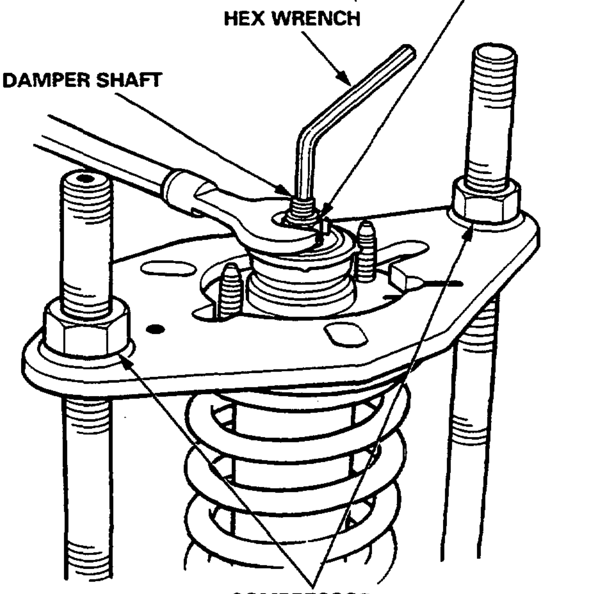


6. Compress the damper spring by turning the compressor nuts.

   NOTE: Turn each compressor nut gradually and equally.

7. Install the damper mounting washer, then loosely install a new self-locking nut.

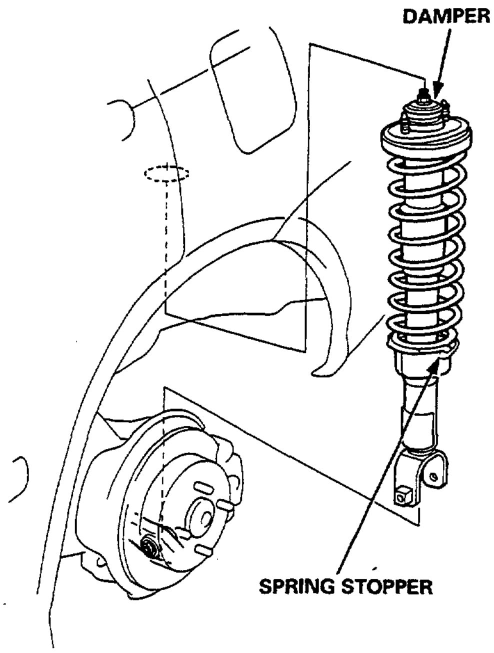
8. Hold the damper shaft with a hex wrench and tighten the self-locking nut.



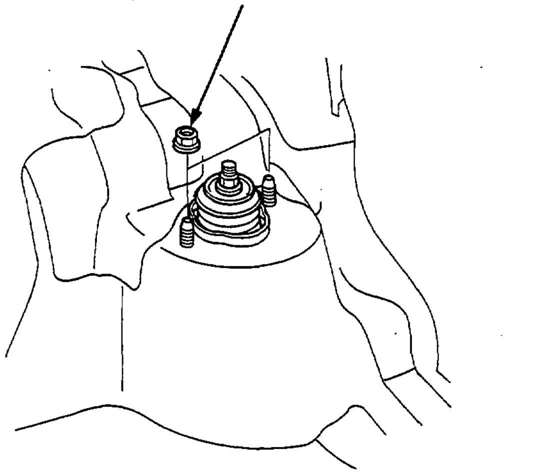
9. Remove the damper from the spring compressor.

Installation

1. Lower the rear suspension and position the damper with the spring stopper pointed toward left side of the car.



2. Loosely install the two self-locking nuts.



3. Install the wheel sensor wire bracket (for cars with ABS).

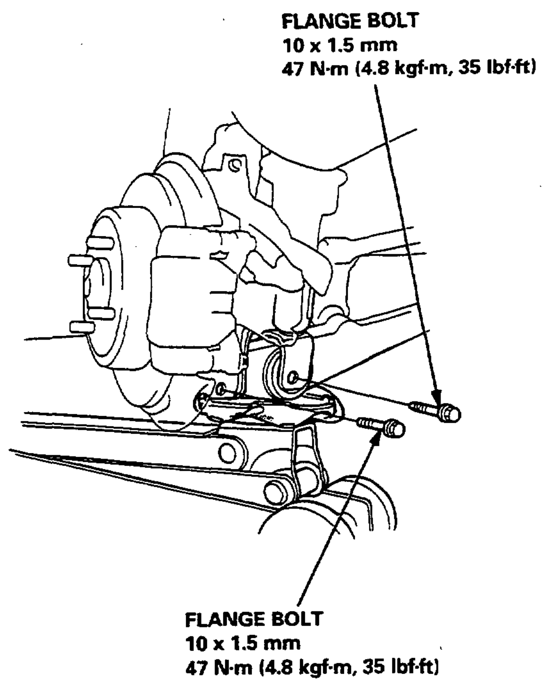
   NOTE: Be careful when installing the sensors to avoid twisting wires.

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. Install the flange bolts, then tighten the bolts.

   NOTE: The flange bolt should be tightened with the damper under vehicle load.

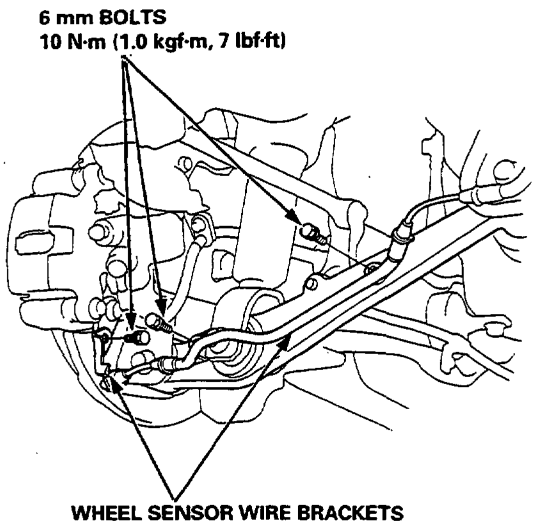


(cont'd)

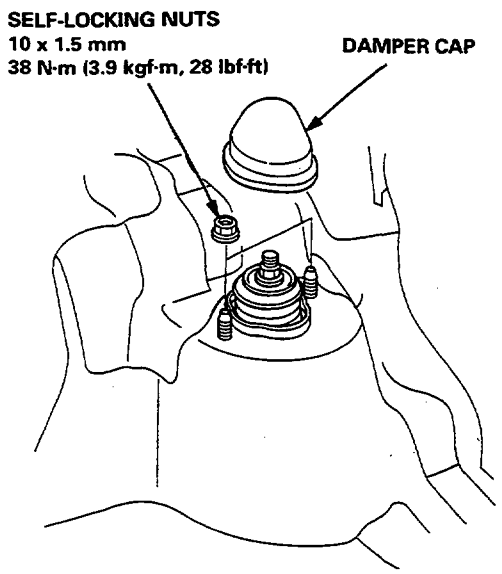
Rear Damper

Installation (cont'd)

6. Install the wheel sensor wire brackets with the three 6 mm bolts (for cars with ABS).



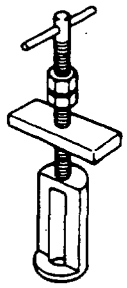
7. Tighten the two self-locking nuts on the top of the damper to the specified torque.
8. Install the damper cap.
9. Install the trunk side panel (see section 20).

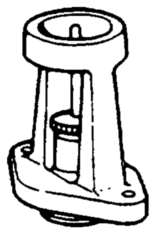


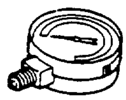
10. Install the rear wheels (see page 18-31).
11. Check the rear wheel alignment, and adjust if necessary (see page 18-4).

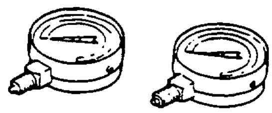
Special Tools

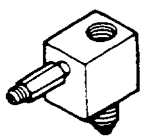
Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAE – SG00100	Brake Spring Compressor	1	19-26, 30
②	07JAG – SD40100	Pushrod Adjustment Gauge	1	19-18
③	07504 – 6340100	Brake master power kit		
③-1	07404 – 5790300	Vacuum Gauge	1	19-19
③-2	07406 – 5790200	Pressure Gauges	2	19-20
③-3	07410 – 5790100	Pressure Gauge Attachment C	2	19-20
③-4	07410 – 5790500	Tube Joint Adapter	1	19-19
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	19-26, 30


①


②


③-1


③-2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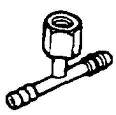
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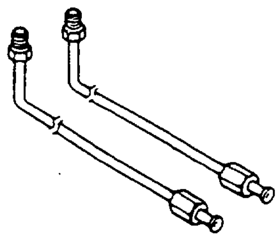
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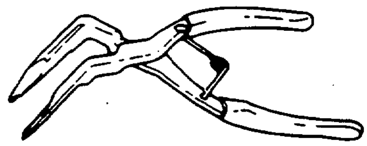
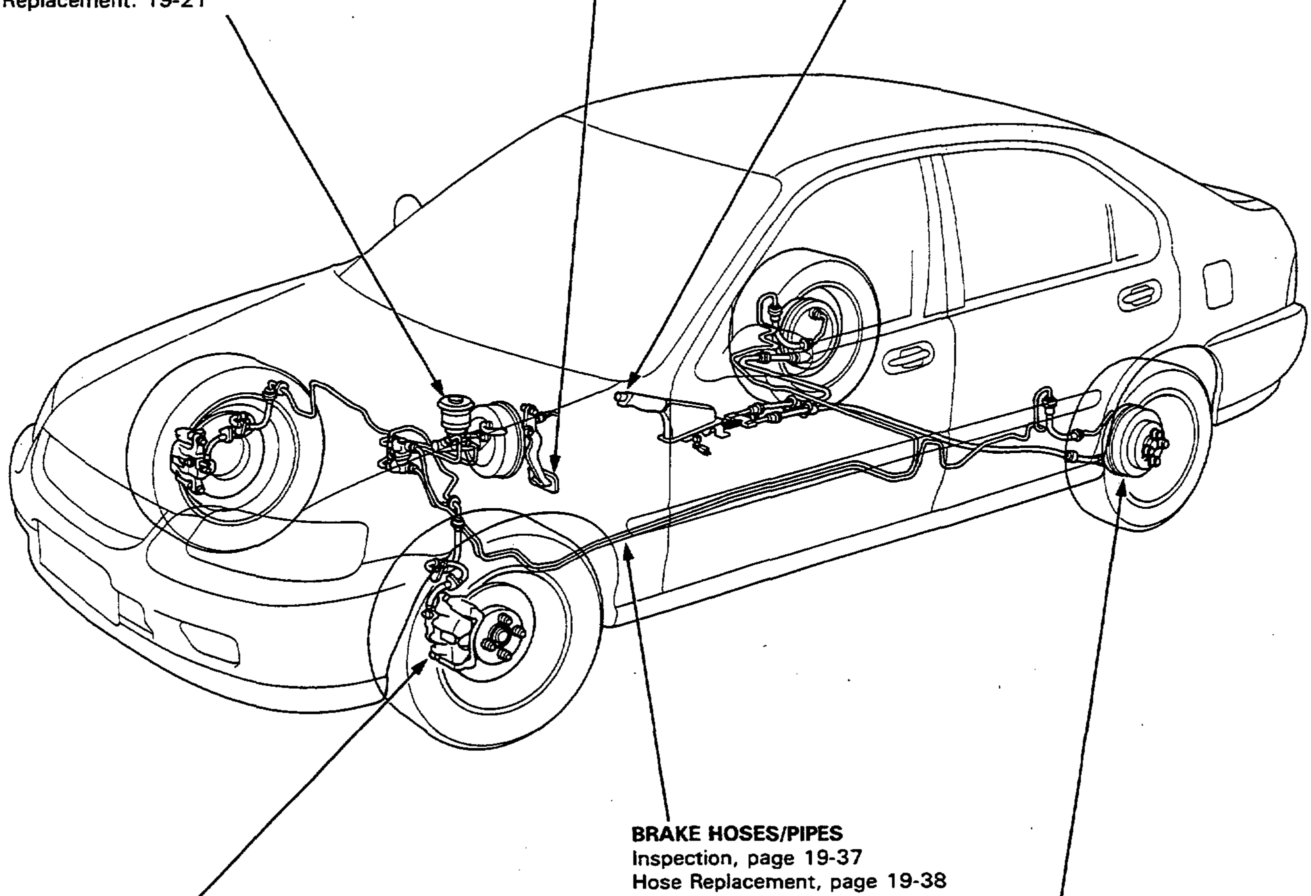

⑤

Component Locations

Index



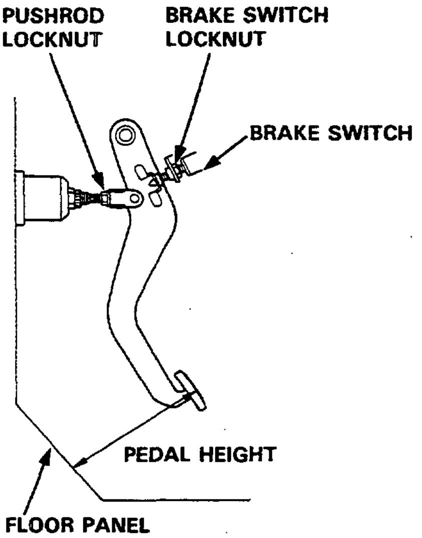
Inspection and Adjustment

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.

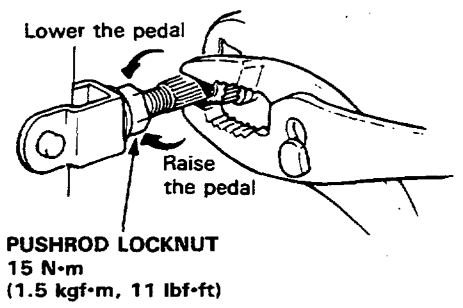
2. Turn up the floor mat, and measure the pedal height from the left side center of the pedal pad.



Standard Pedal Height (with floor mat removed):
RHD:
M/T: 154 mm (6.07 in)
A/T: 159 mm (6.26 in)
LHD:
M/T: 157 mm (6.19 in)
A/T: 162 mm (6.38 in)

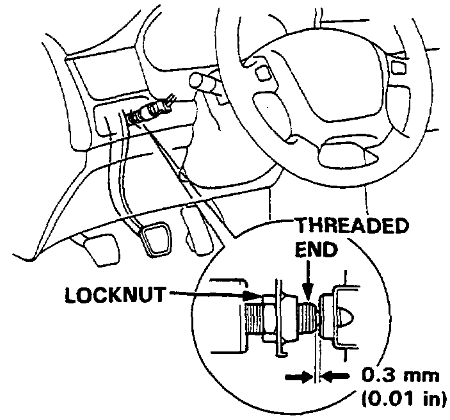
3. Loosen the pushrod locknut, and screw the pushrod in or out with pliers until the standard pedal height from the floor is reached. After adjustment, tighten the locknut firmly.

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.

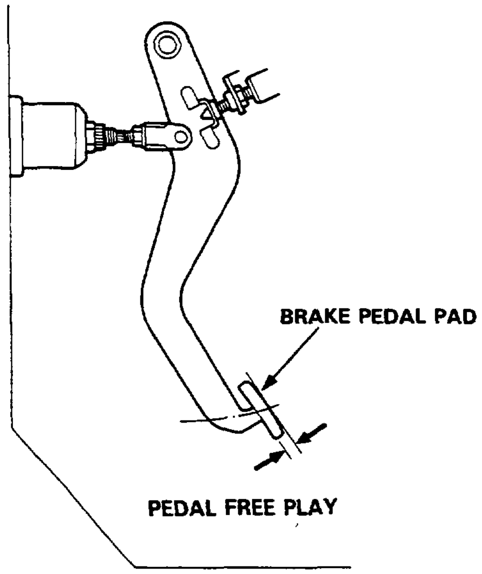
Pedal Free Play

1. Stop the engine, and 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.

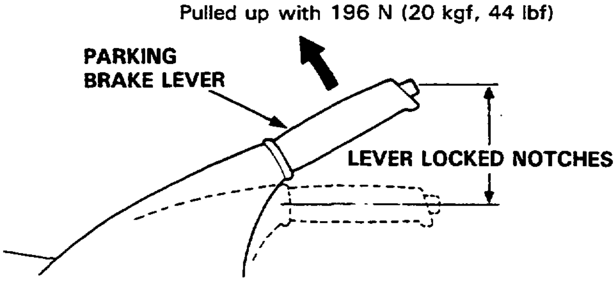


Parking Brake

Inspection

1. Pull the parking brake lever with 196 N (20 kgf, 44 lbf) force to fully applied the parking brake. The parking brake lever should be locked within the specified notches.

   Lever Locked Notches: 6—10



2. Adjust the parking brake if the lever notches are out of specification.

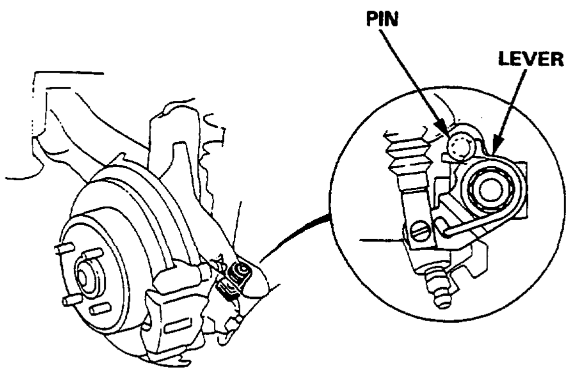
Adjustment

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.

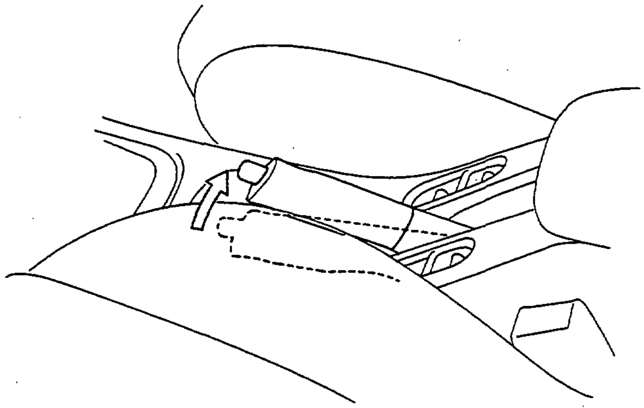
1. Raise the rear wheels off the ground and support on safety stands.

   ⚠ WARNING Block the front wheels before jacking up the rear of the car.

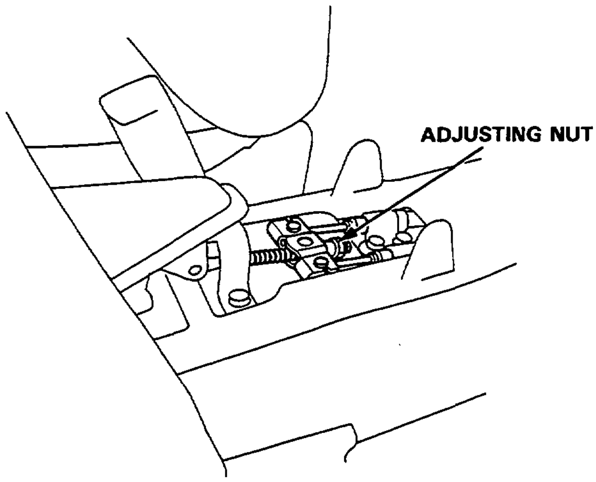
2. Make sure the parking brake arm on the rear brake caliper contacts the brake caliper pin.



3. Pull the parking brake lever up on 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.

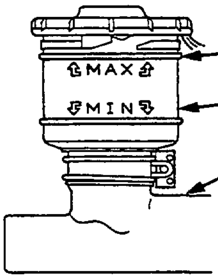
Inspection and Adjustment

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 mix different brands of brake fluid as they may not be compatible.**
- **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.

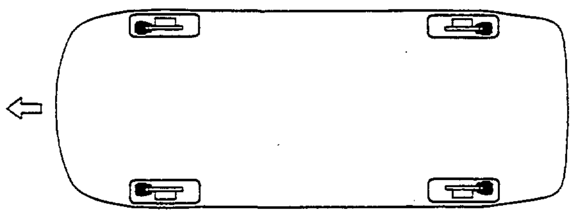


MAX (UPPER) LEVEL LINE
RESERVOIR
MASTER CYLINDER

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.

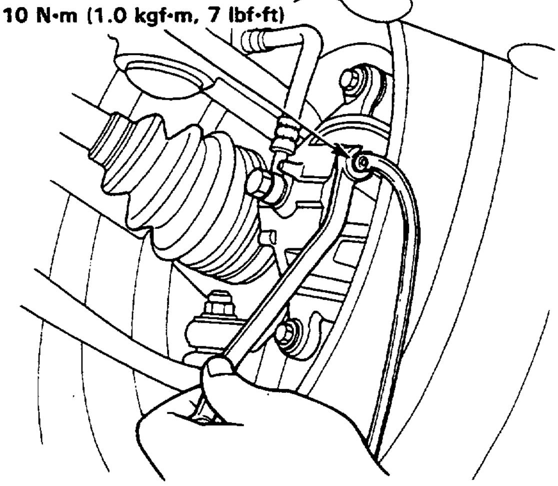
<BLEEDING SEQUENCE:>

❹ Front Right **❶ Rear Right**



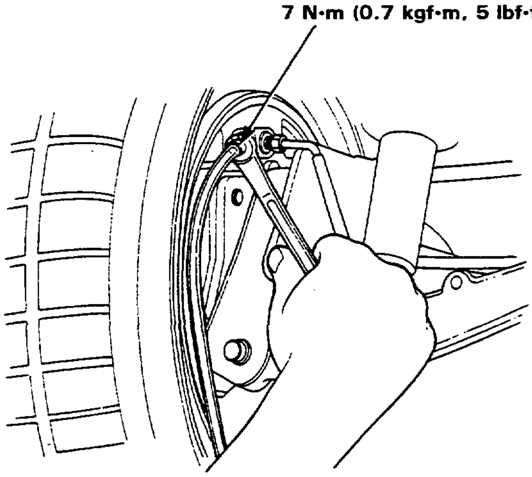
❷ Front Left **❸ Rear left**

FRONT
BLEED SCREW
10 N·m (1.0 kgf·m, 7 lbf·ft)



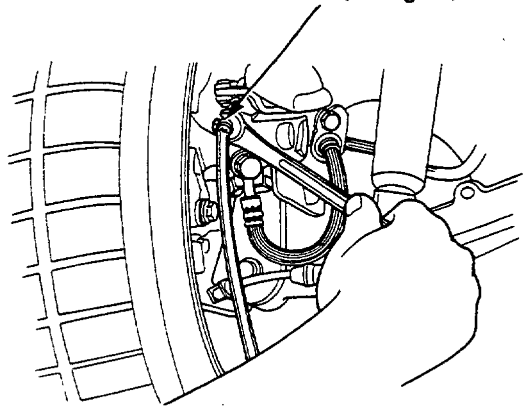
REAR
Drum brake

BLEED SCREW
7 N·m (0.7 kgf·m, 5 lbf·ft)



Disc brake

BLEED SCREW
10 N·m (1.0 kgf·m, 7 lbf·ft)



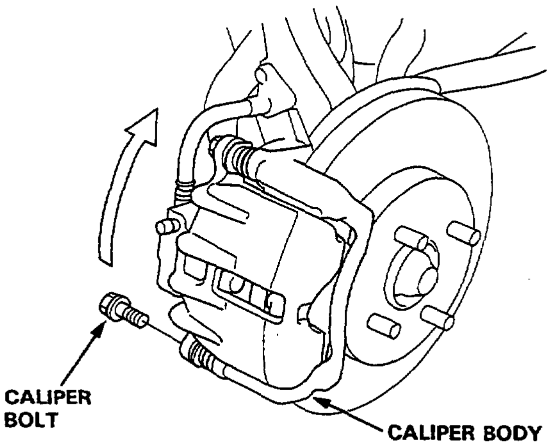
Front Brake Pads

Inspection and Replacement

WARNING

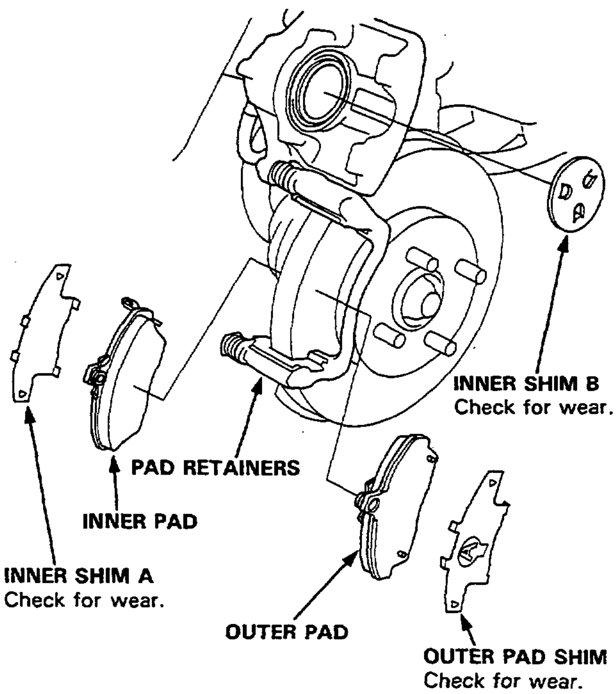
- **Never use an air hose or dry brush to clean brake assembiles.**
- **Use a vacuum cleaner to avoid breathing brake dust.**

1. Loosen the front wheel nuts slightly, then raise the car and support on safety stands.
2. Remove the caliper bolt, and pivot the caliper up out of the way.



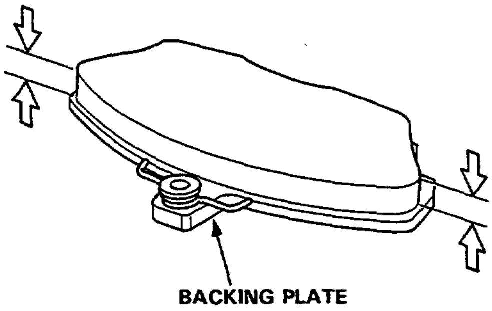
NOTE: Check the hoses and pin boots for damage or deterioration.

3. Remove the pad shims, pad retainers and pads.



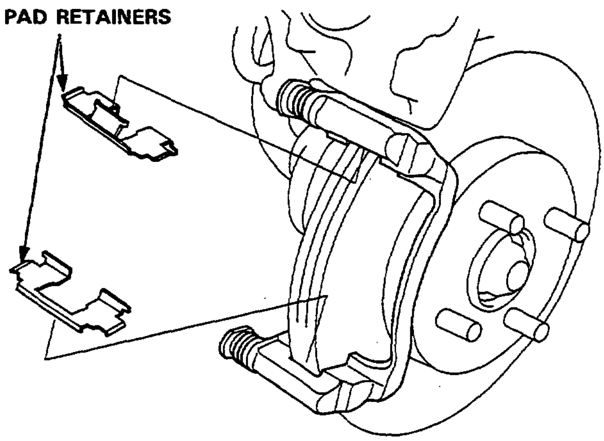
4. Using vernier calipers, measure the thickness of each brake pad lining.

Brake Pad Thickness:
Standard: 11.0–11.7 mm (0.44–0.46 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

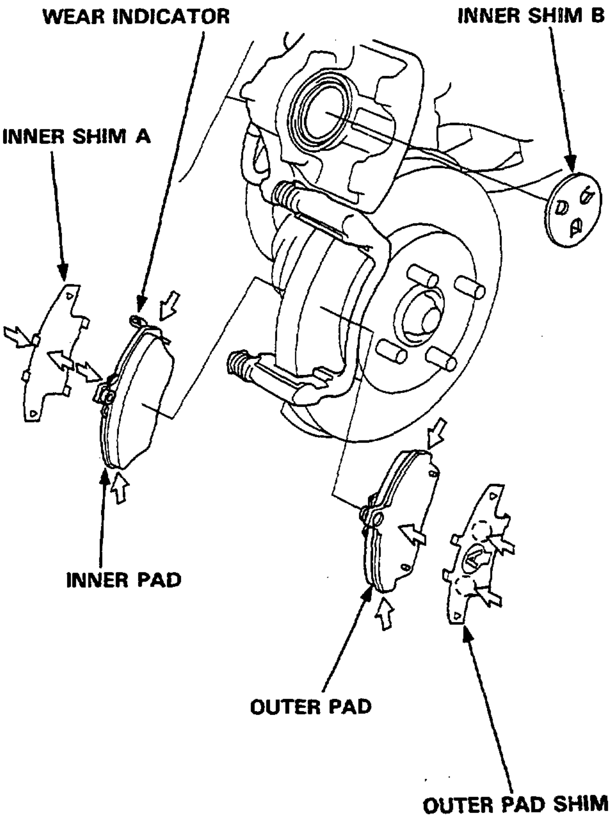
Inspection and Replacement (cont'd)

9. Apply Molykote® M77 grease to the both side of the pad shims and the back of the pads. Wipe excess grease off the shims.

10. Install the brake pads and pad shims correctly.

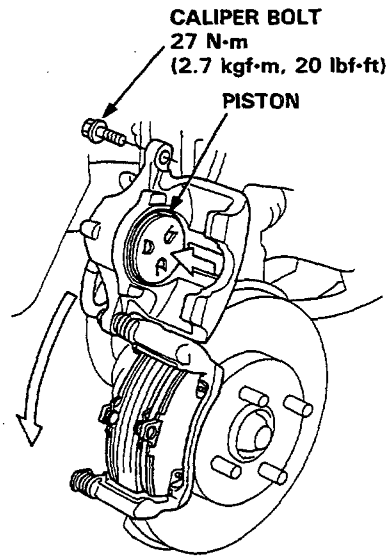
⚠ WARNING
- **When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.**
- **Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.**

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 and tighten it.



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).

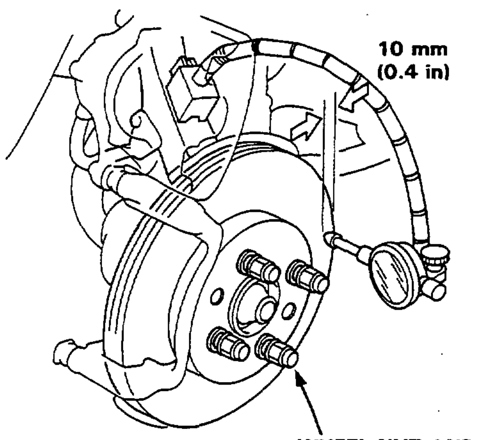
3. Inspect the disc surface for damage or cracks. Clean the disc thoroughly and remove all rust.

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 out 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: 19.0 mm (0.75 in)



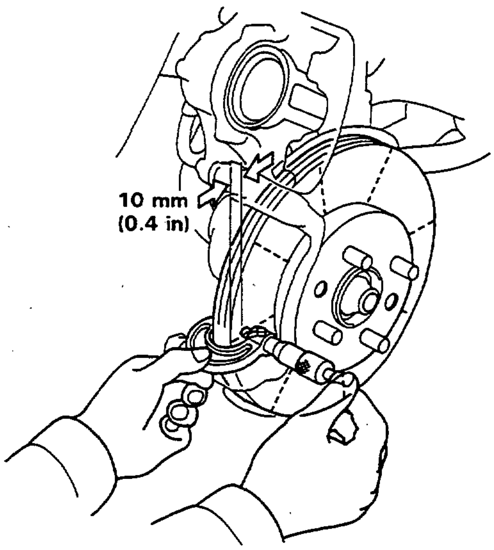
NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in)

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: **20.9–21.1 mm (0.82–0.83 in)**
Max. Refinishing Limit: 19.0 mm (0.75 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

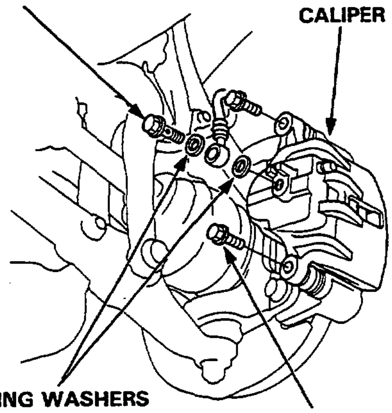
⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**

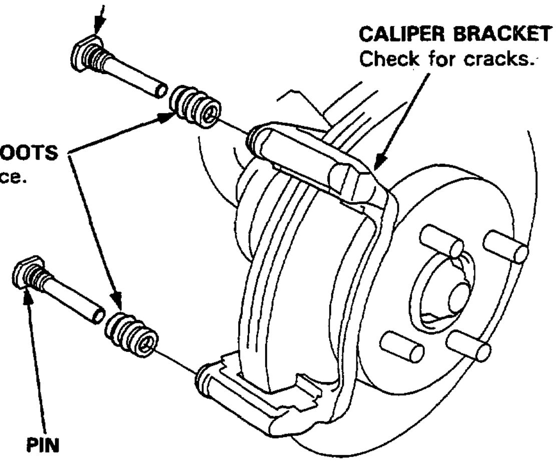
CAUTION:

- **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, then remove the caliper from the bracket.



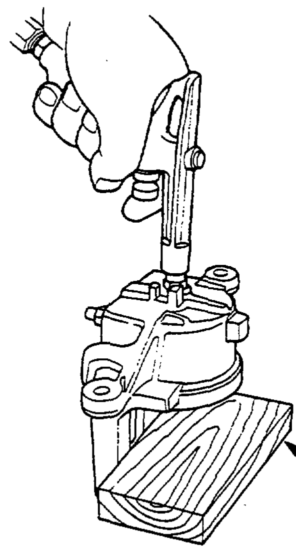
3. Remove the pins and pin boots from the caliper bracket.



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.

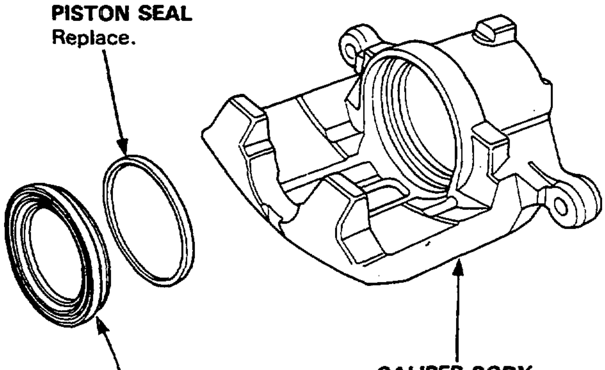
⚠ WARNING

- **Do not place your fingers in front of the piston.**
- **Do not use high air pressure; use an OSHA-approved 30 PSI nozzle.**



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

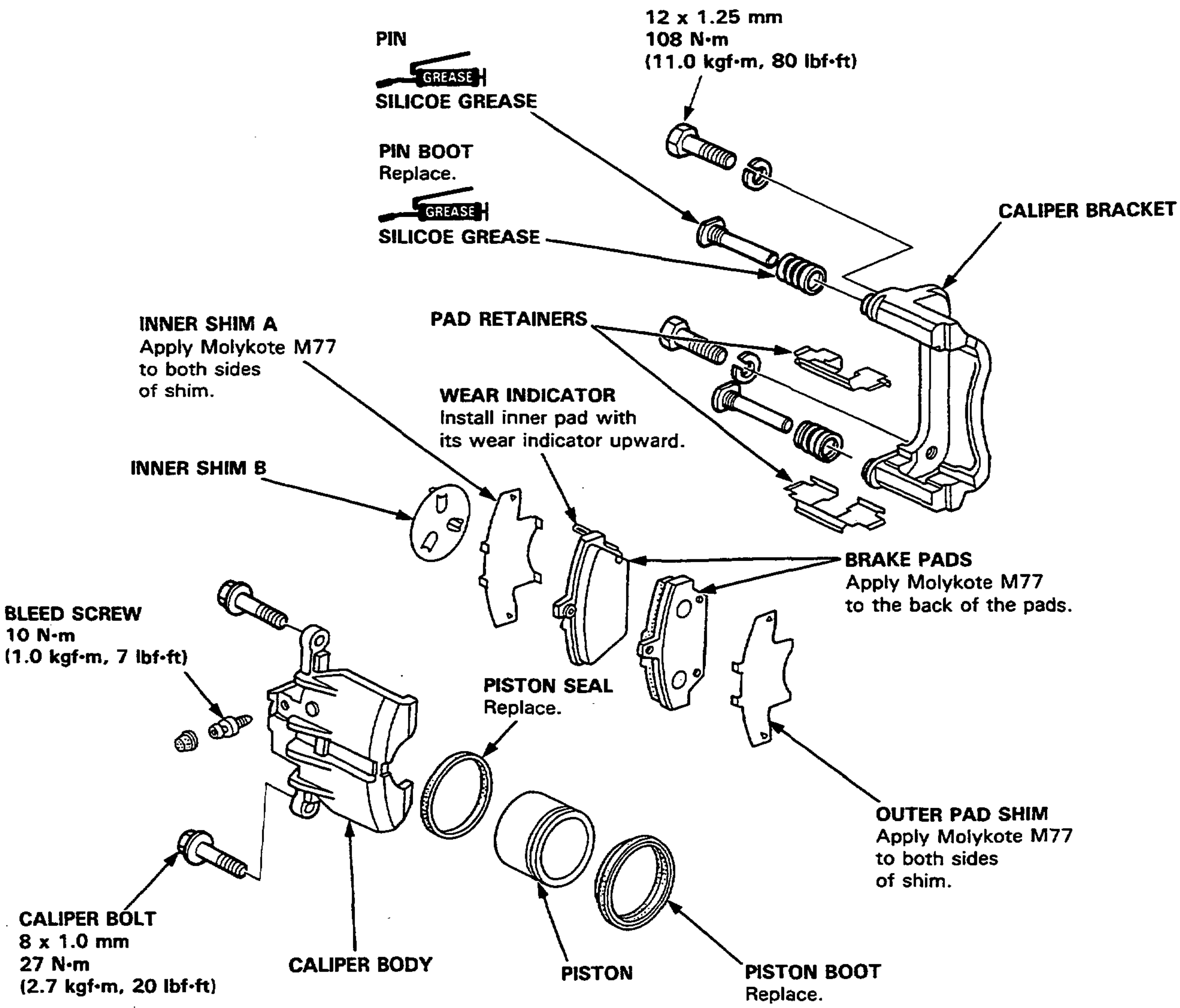
- Never use an air hose or dry brush to clean brake assemblies.
- Use a vacuum cleaner to avoid breathing brake dust.
- Contaminated brake discs or pads reduce stopping ability.
- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.

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 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 and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.



Front Brake Caliper

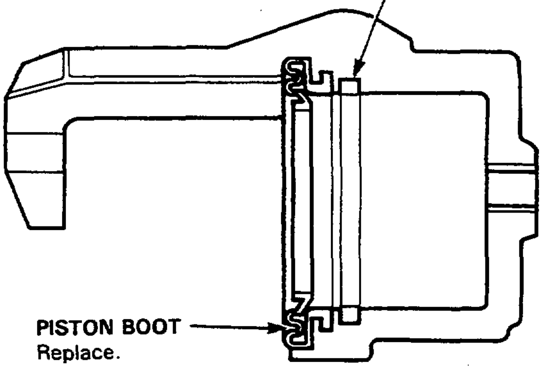
Reassembly (cont'd)

1. Clean the piston and caliper bore with brake fluid, and inspect for wear or damage.

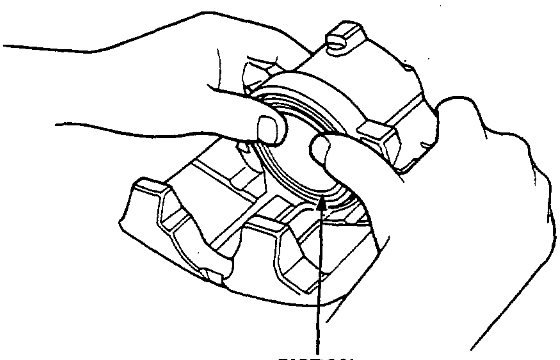
2. Coat a new piston seal with assembly fluid (BRITISH PETROLEUM BREOX BCF 11S), and install the seal in the cylinder groove.

3. Apply assembly fluid (BRITISH PETROLEUM BREOX BCF 11S) to the sealing lips and inside of a new piston boot, and install the boot in the cylinder groove.

   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.



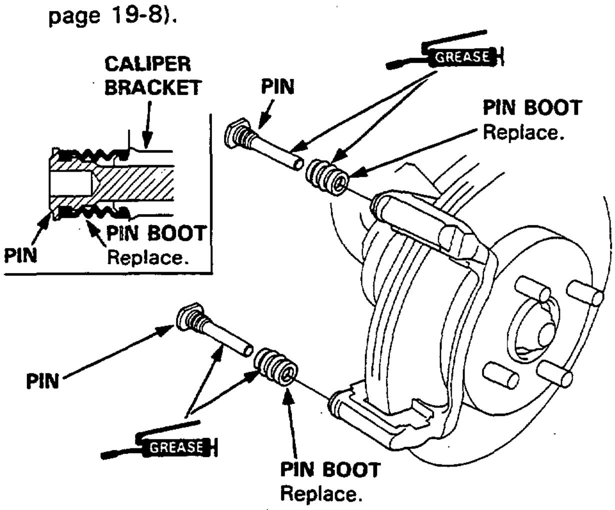
5. Apply the silicone grease to sliding surface of the pins and inside of the new pin boots.

6. Install the pin boots into the groove in the caliper bracket properly.

7. Insert the pins into the caliper bracket.

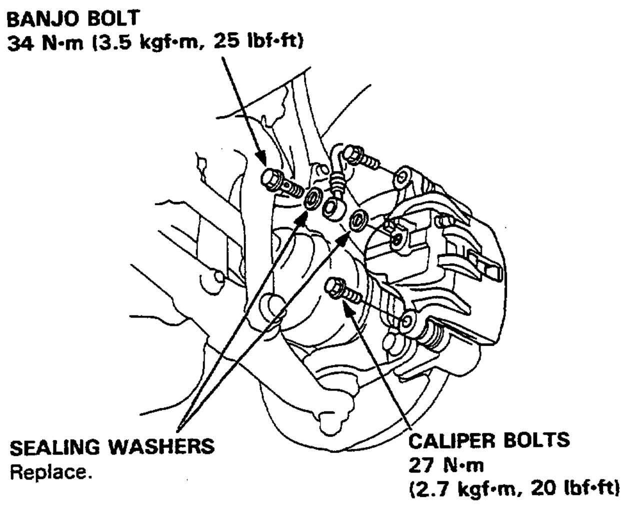
8. Install the pin boots into the groove in pins properly.

9. Install the brake pads in their original positions (see page 19-8).



10. Connect the brake hose to the caliper with new sealing washers, and tighten the banjo bolt.

11. Tighten the caliper bolts.



12. Fill the brake reservoir and bleed the brake system (see page 19-6).

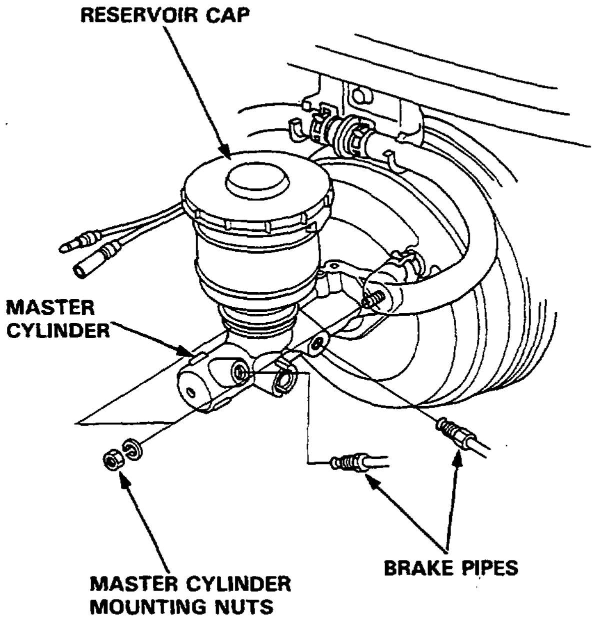
13. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.

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.**

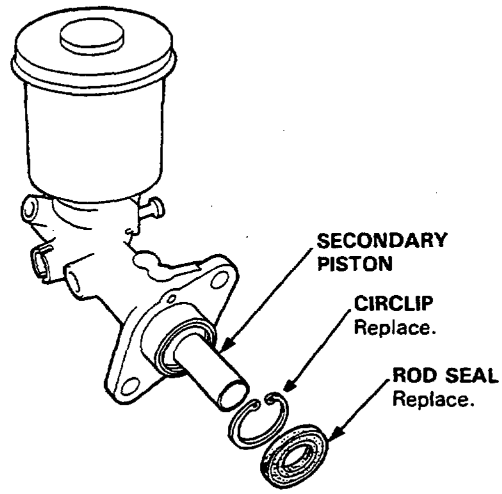
1. Disconnect the brake fluid level switch connectors.
2. Remove the reservoir cap from the master cylinder.
3. The brake fluid may be sucked out through the top of the master cylinder reservoir.
4. Disconnect the brake pipes from the master cylinder.
5. Remove the master cylinder mounting nuts and the master cylinder from the brake booster.



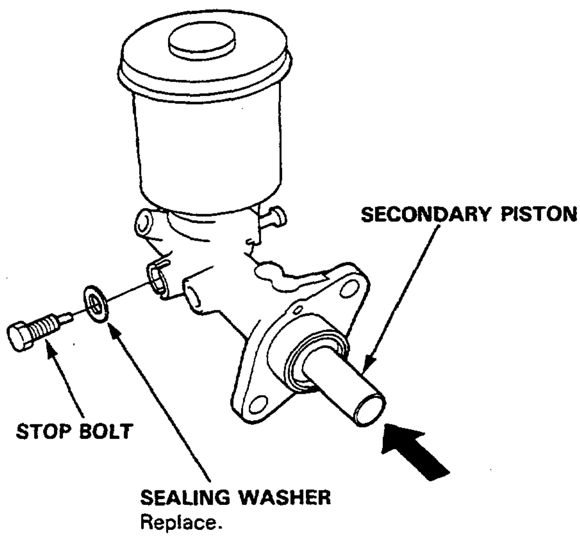
Disassembly

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)

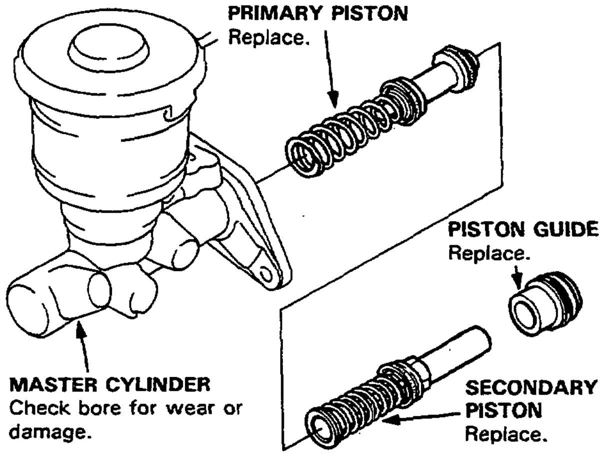
Master Cylinder

Disassembly (cont'd)

5. Remove the piston guide, secondary piston and primary piston.

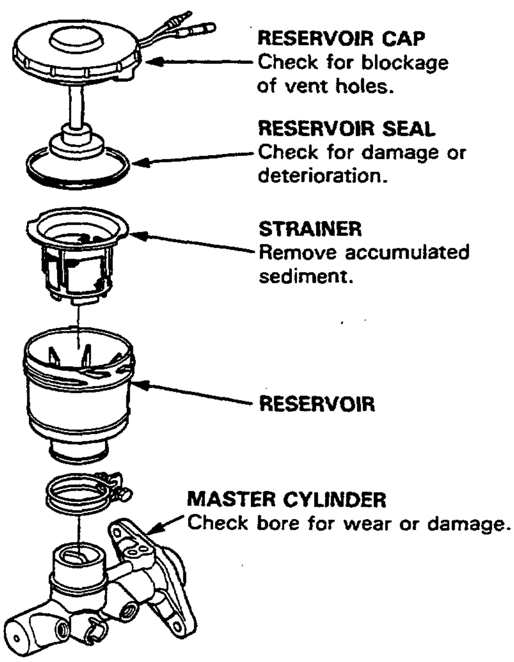
   NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side port.

   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.**



6. Remove the reservoir cap, strainer and reservoir from the master clyinder.

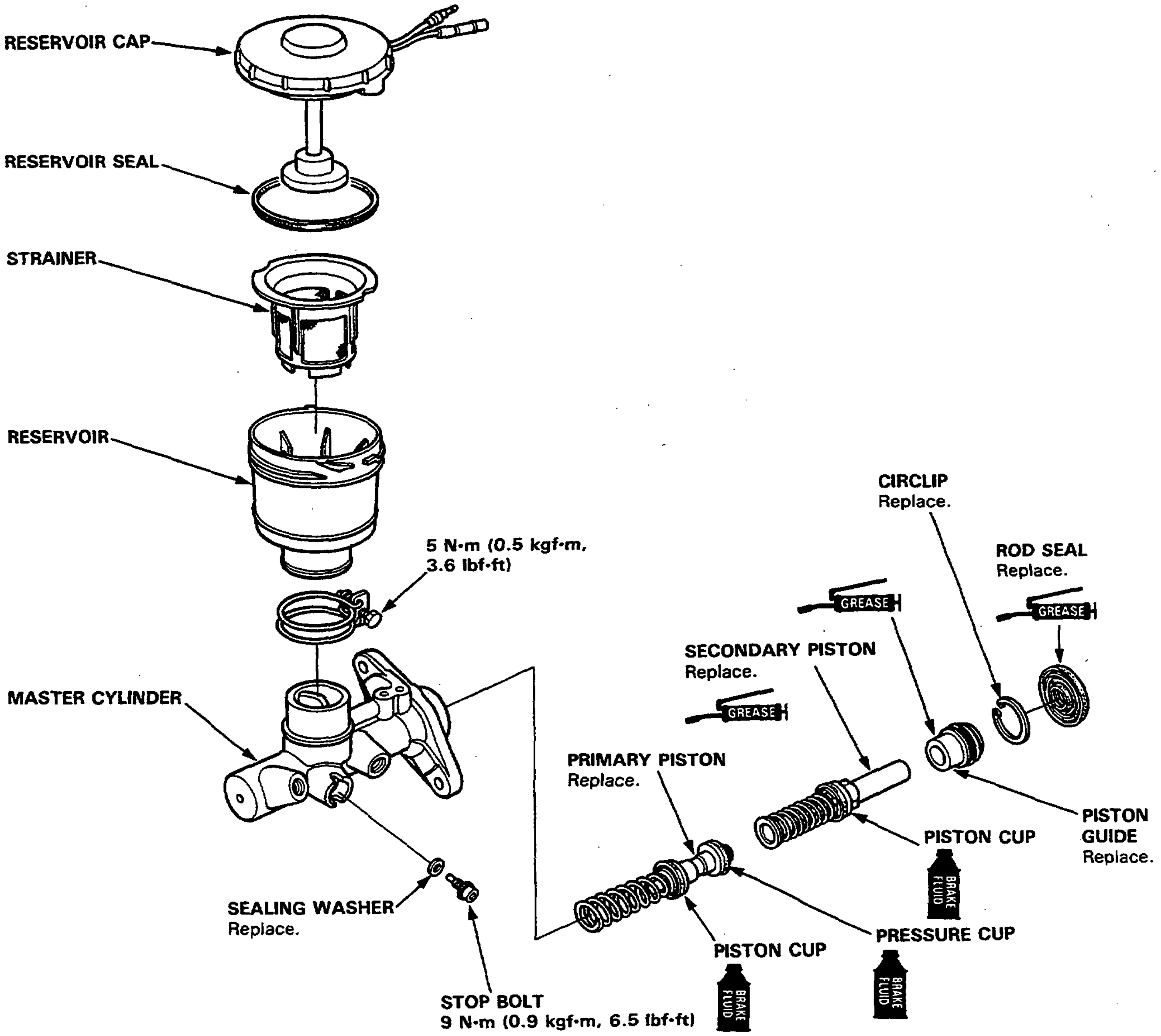
7. Remove the reservoir seal from the reservoir cap.



Reassembly

CAUTION:
- If replacing the primary piston. Secondary piston or madter 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.

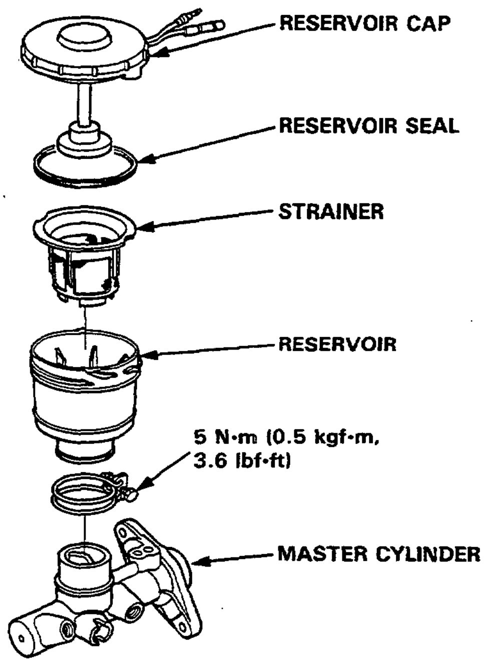


Reassembly (cont'd)

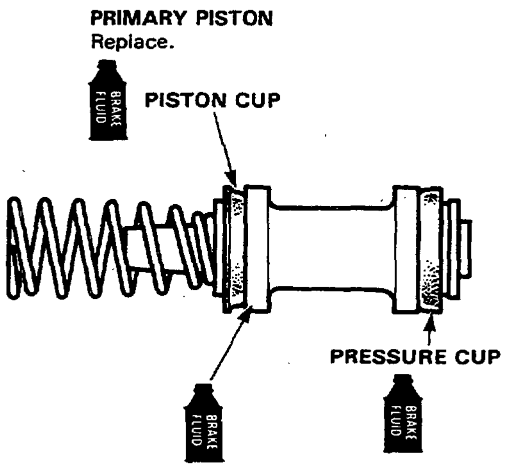
1. Install the reservoir on the master cylinder with a clamp as shown.

2. Install the reservoir seal in the groove of the reservoir cap.

3. Install the strainer and reservoir cap on the reservoir.

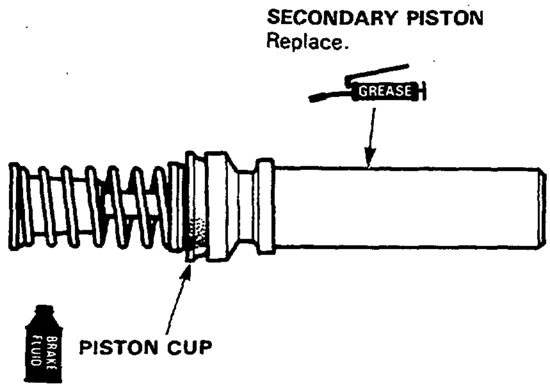


4. Coat the cups of a new primary piston with clean brake fluid, then install the primary piston into the master cylinder.

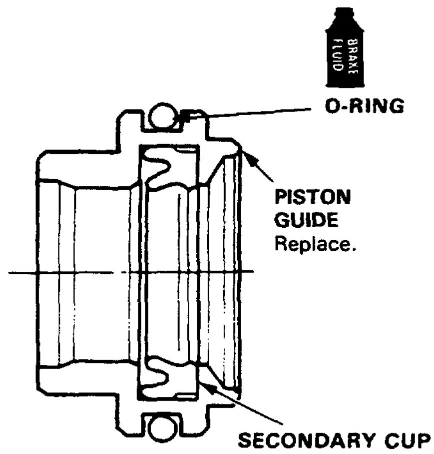


5. Coat the cup of a new secondary piston with clean brake fluid.

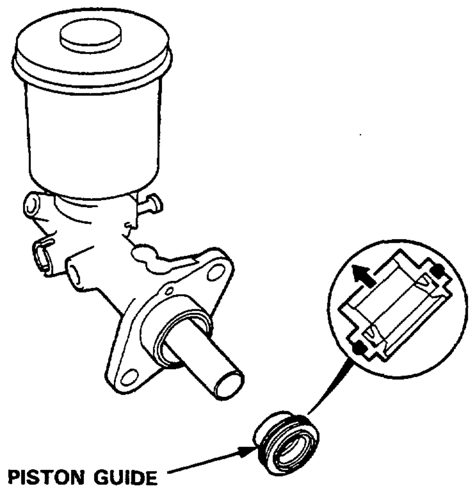
6. Apply recommended grease in the master cylinder seal set to the piston, and install the piston into the master cylinder.



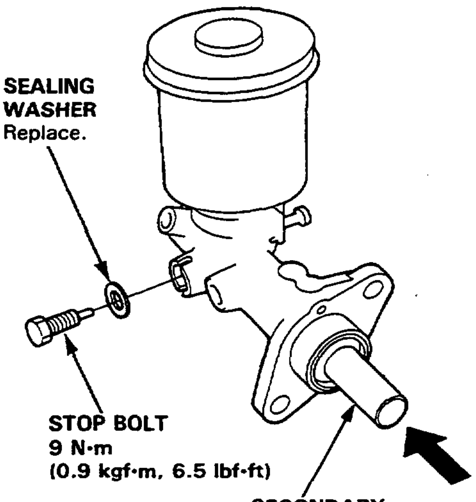
7. Apply recommended grease in the master cylinder seal set to a new O-ring and the secondary cup in a new piston guide.



8. Install the piston guide into the master cylinder.

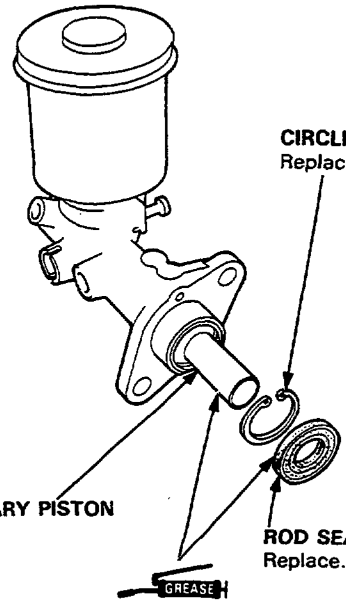


9. *Install the stop bolt with a new sealing washer while pushing in the secondary piston, and tighten the stop bolt.*



10. Install a new circlip while pushing in the secondary piston.

11. Apply recommended grease in the master cylinder seal set to a new rod seal and install the seal onto the master cylinder.



12. Adjust the pushrod clearance (see page 19-18).

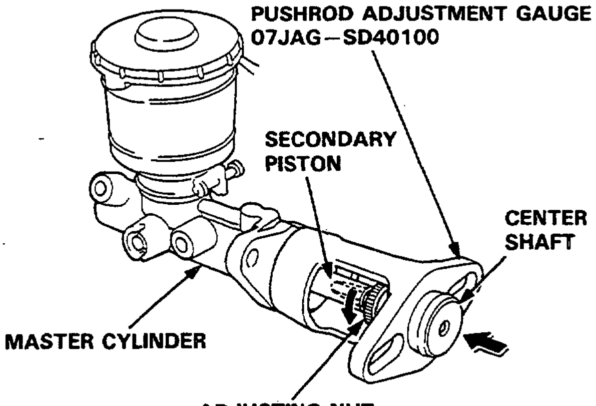
13. Install the master cylinder (see page 19-19).

Master Cylinder

Pushrod Clearance Adjustment

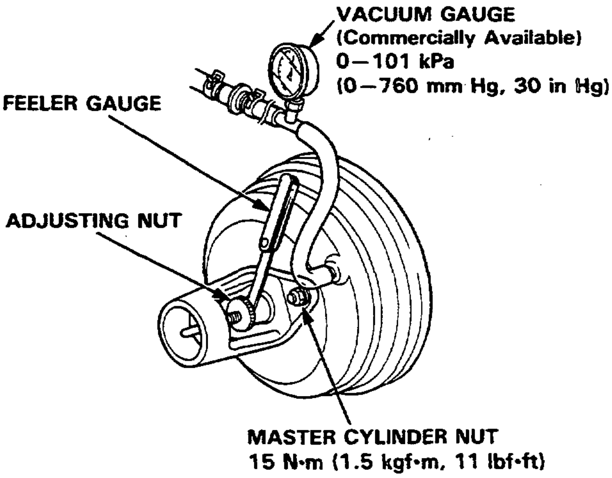
NOTE: Master cylinder pushrod-to piston clearance must be checked and adjustments made, if necessary, before installing master cylinder.

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 a 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)

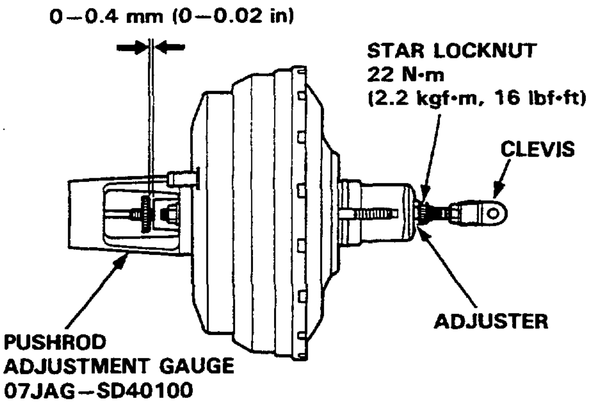


NOTE: If the clearance between the gauge body and adjusting nut is 0.4 mm (0.02 in), the pushrod-to-piston clearance is 0 mm. However, if the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm (0.02 in) or more. Therefore, it must be adjusted and rechecked.

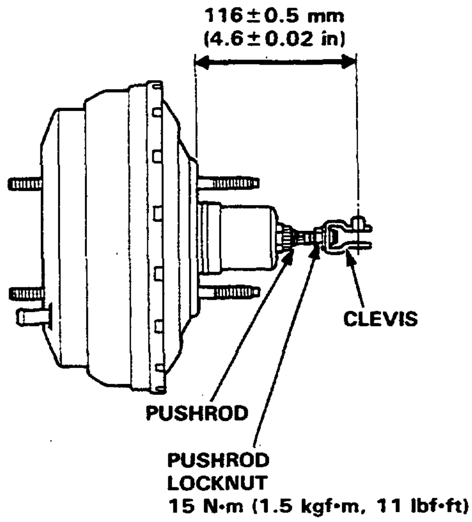
6. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust.

   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.



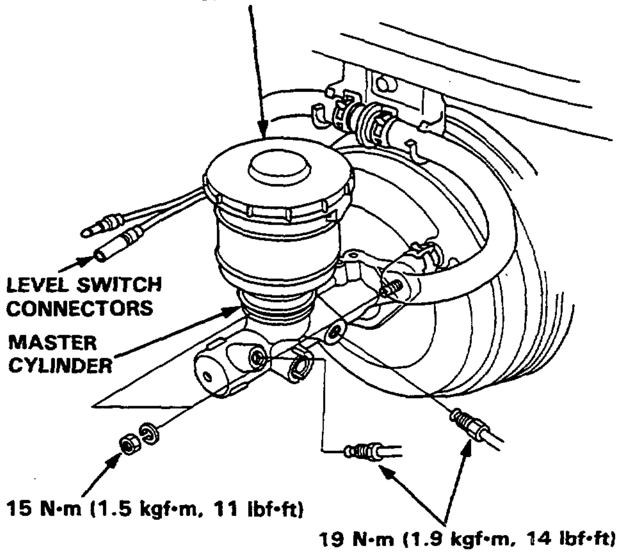
10. Install the master cylinder (see page 19-19).

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 19-19).

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.

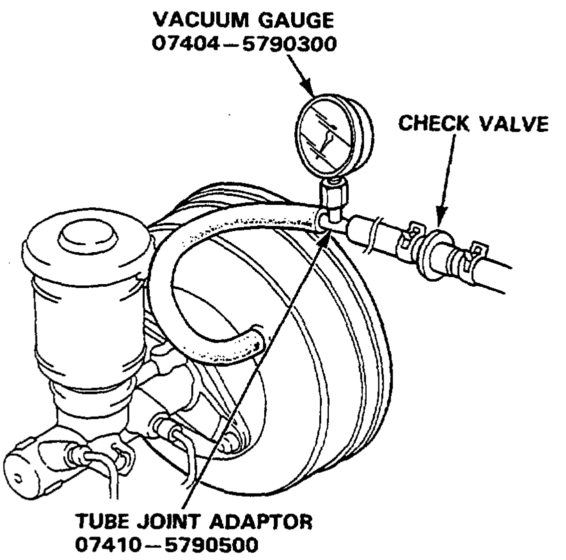


5. After installation, perform the following inspections and adjust if necessary.
   - Brake pedal height (see page 19-4)
   - Brake pedal free play (see page 19-4)

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

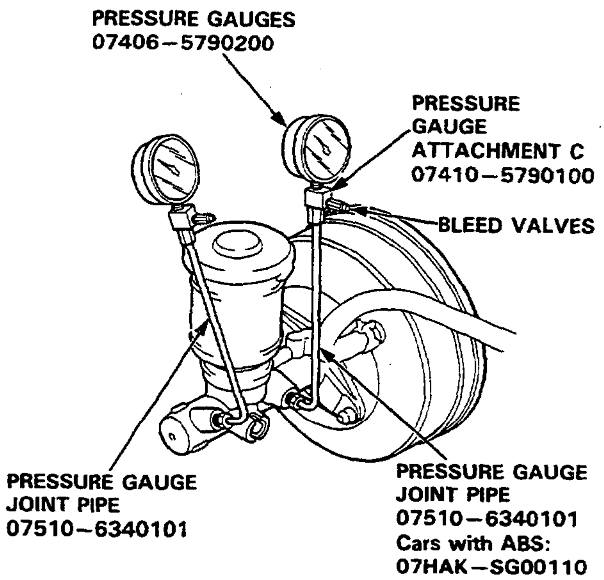
   CAUTION: Do not try to disassemble the brake booster. Replace the brake booster as an assembly with new one.

(cont'd)

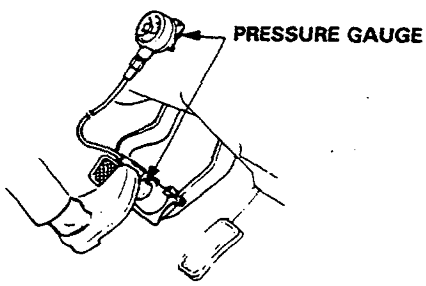
Inspection (cont'd)

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 196 N (20 kgf, 44 lbf) or pressure. The following pressures should be observed at the pressure gauges in each vacuum.



Cars Without ABS

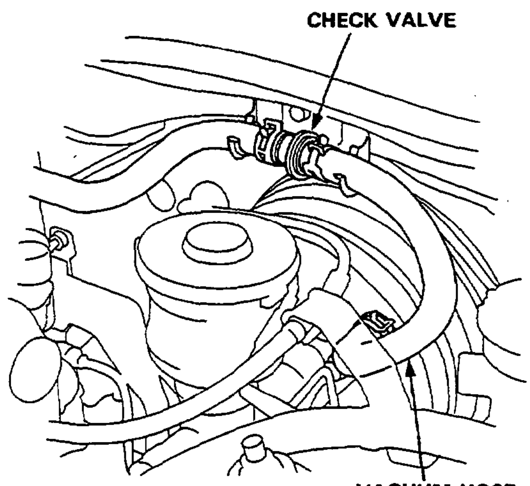
Vacuum mm (in) Hg	Min. Line Pressure kPa (kgf/cm², psi)
0 (0) 300 (11.8) 500 (19.7)	1,290 (13.1, 190) 5,420 (55, 782) 8,170 (82.9, 1,170)

Cars With ABS

Vacuum mm (in) Hg	Min. Line Pressure kPa (kgf/cm², psi)
0 (0) 300 (11.8) 500 (19.7)	957 (9.7, 137) 5,550 (56.3, 800) 8,620 (87.4, 1,240)

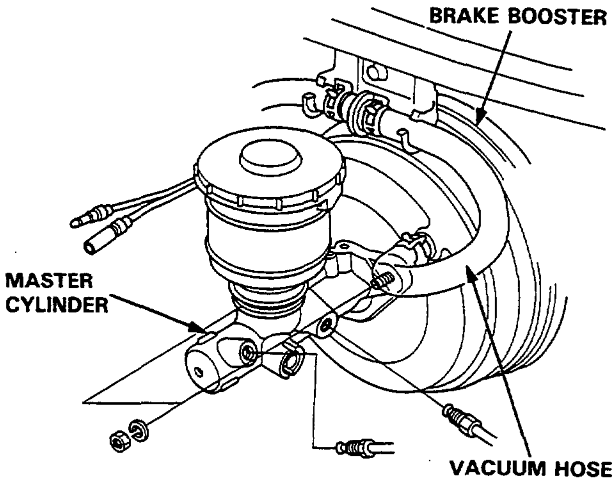
6. Inspect the master cylinder for leaks if the readings do not fall within the limits shown above.

Check Valve Test
1. Disconnect the brake booster vacuum hose at the booster.
2. Start the enigne 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.

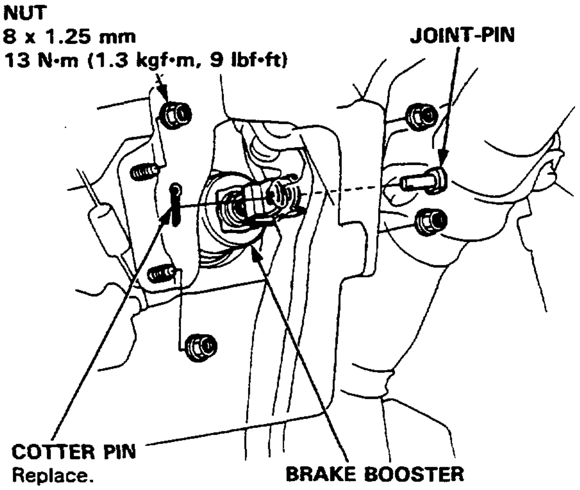


Replacement

1. Remove the master cylinder (see page 19-13).
2. Disconnect the vacuum hose from the brake booster.



3. Remove the cotter pin and the joint-pin.
4. Remove the brake booster mounting nuts.
5. Remove the brake booster.



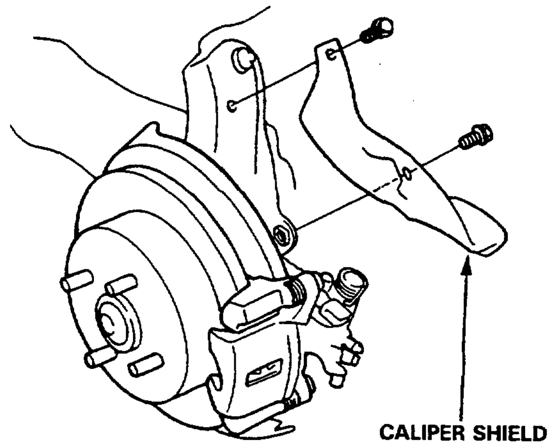
NOTE: Adjust the pushrod length before installing the booster (see page 19-18).

6. Install the brake booster in the reverse order of removal.
7. Install the master cylinder (see page 19-19).
8. 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 and Replacement

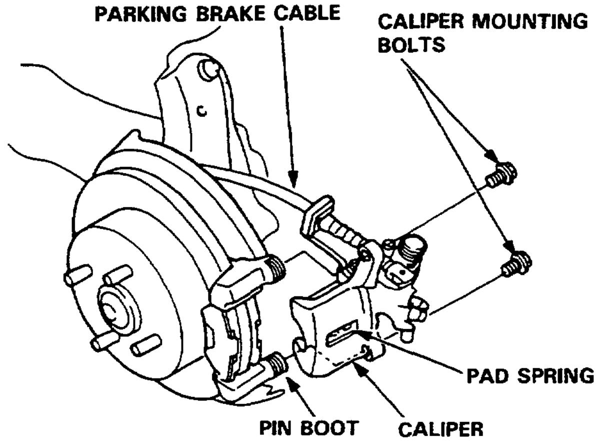
⚠ WARNING
- **Never use an air hose or dry brush to clean brake assemblies.**
- **Use a vacuum cleaner to avoid breathing brake dust.**

1. Block the front wheels, loosen the rear wheel nuts slightly, support the rear of car on safety stands, then remove the rear wheels.
   Release the parking brake.
2. Remove the caliper shield.



3. Remove the two caliper mounting 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.**



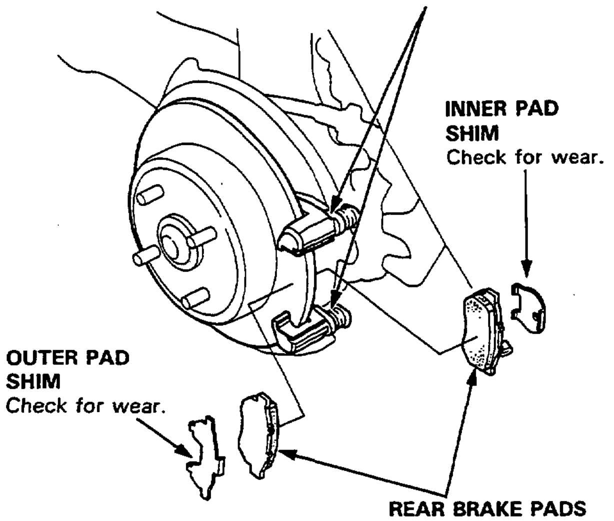
NOTE: Check the hoses and pin boots for damage or deterioration.

(cont'd)

Rear Brake Pads

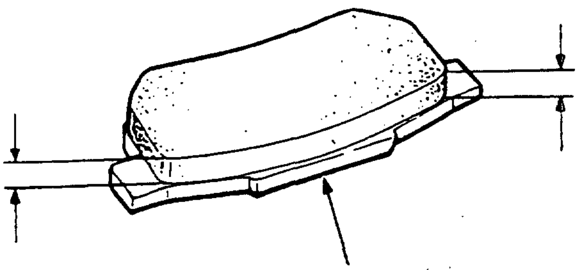
Inspection and Replacement (cont'd)

4. Remove the pad shims, pads and pad retainer.



5. Using vernier calipers, measure the thickness of each brake pad lining.

   Brake Pad Thickness:
   Standard: 7.3–8.0 mm (0.29–0.32 in)
   Service Limit: 1.6 mm (0.06 in)

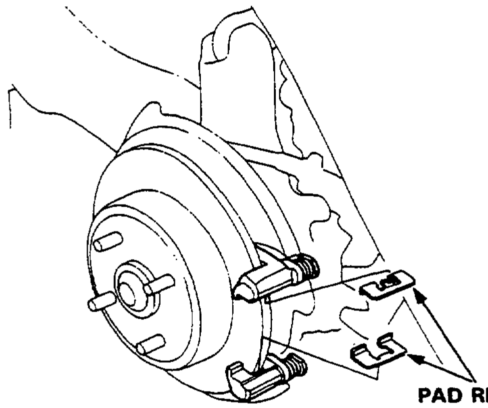


NOTE: Measurement does not include pad backing plate thickness.

6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.

7. Check the brake disc for damage or cracks.

8. Make sure that the pad retainers are installed in the correct positions.

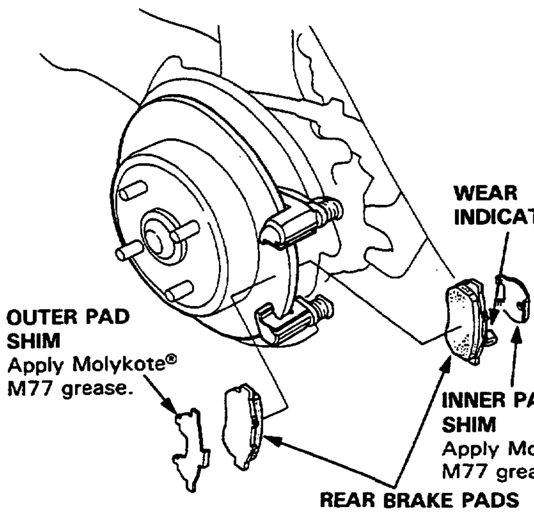


9. Apply Molykote® M77 to the pad side of the shims. Wipe excess grease off the shims.

10. 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.

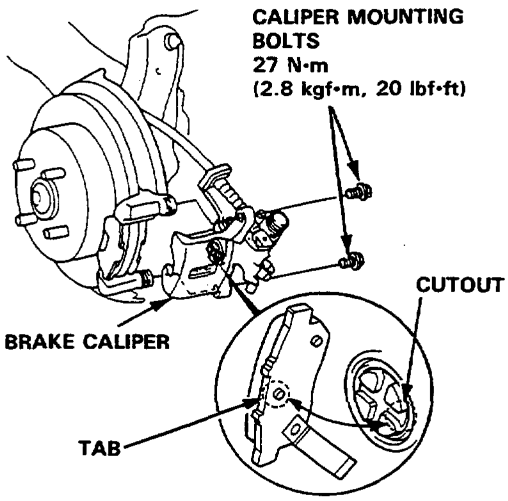


11. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning the piston back.

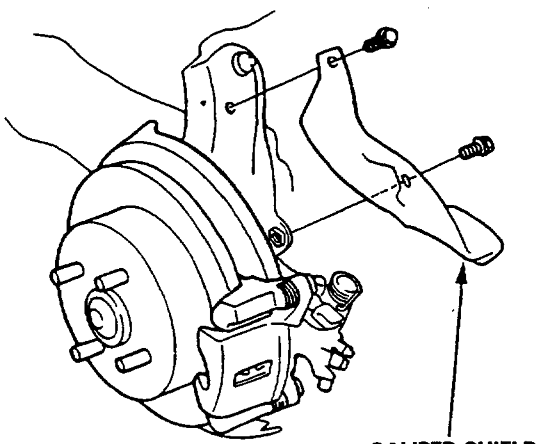
CAUTION: Lubricate the boot with rubber grease to avoid twisting the piston boot. If piston boot is twisted, back it out so it sits properly.

12. Install the brake caliper.

13. Install and tighten the caliper mounting bolts.



14. Install the caliper shield.



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

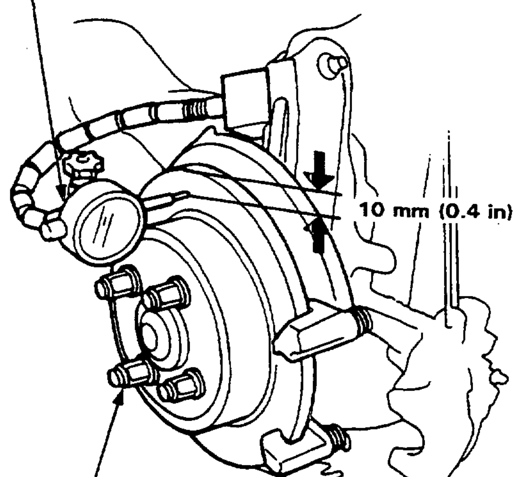
Disc Runout Inspection

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 19-21).
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.

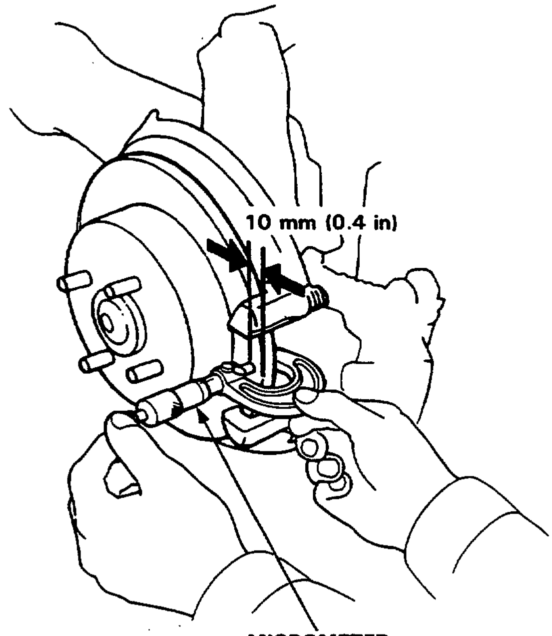
   Max. Refinishing Limit: 8.0 mm (0.32 in)



NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

Thickness and Parallelism Inspection

1. Loosen the rear wheel lug nuts slightly, then raise the car and support on safety stands. Remove the rear wheels.
2. Remove the brake pads (see page 19-21).
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 measurement.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc.

   NOTE: See page 18-30 for brake disc replacement.

Rear Brake Caliper

Disassembly

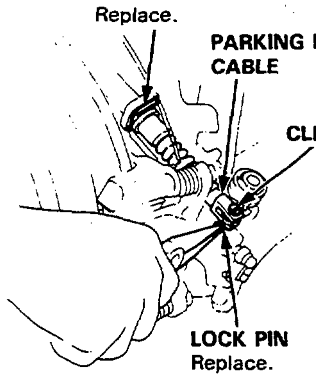
⚠ WARNING

- **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.**

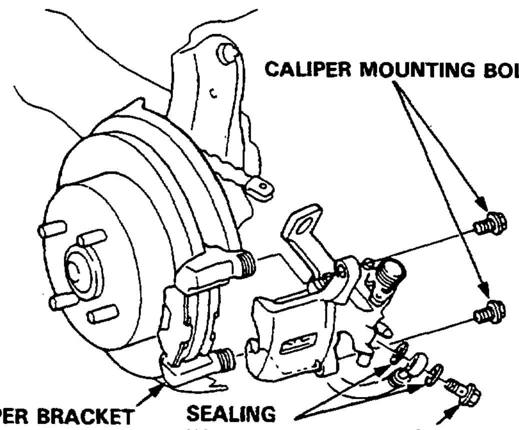
CAUTION:

- **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.**

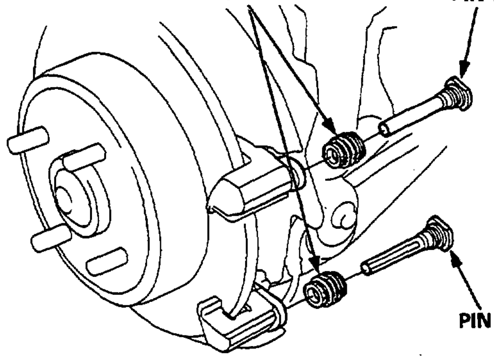
1. Remove the caliper shield (see page 19-21).
2. Remove the lock pin and clevis pin.
   Remove the cable clip, and disconnect the cable from the arm.



3. Remove the banjo bolt and two sealing washers.
4. Remove the two caliper mounting bolts and caliper body from the bracket.

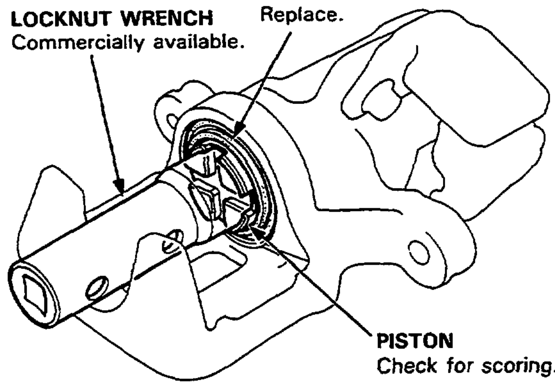


5. Remove the pins and pin boots from the caliper bracket.



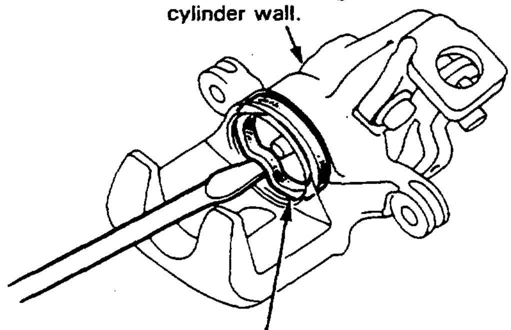
6. Remove the pad spring from the caliper body.
7. Remove the piston by rotating the piston counterclockwise with the special tool, and remove the piston boot.

   CAUTION: Avoid damaging the piston.



8. Remove the piston seal.

   CAUTION: Take care not to damage the cylinder bore.



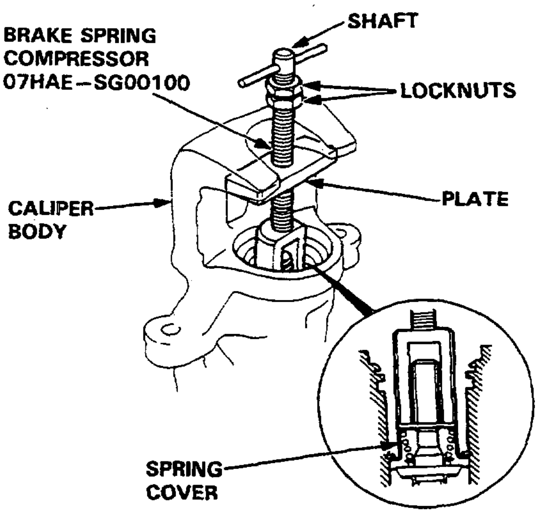
(cont'd)

Disassembly (cont'd)

9. Install the special tool between the caliper body and spring cover, then position the locknuts as shown. Turn the shaft until the plate just contacts the caliper body.

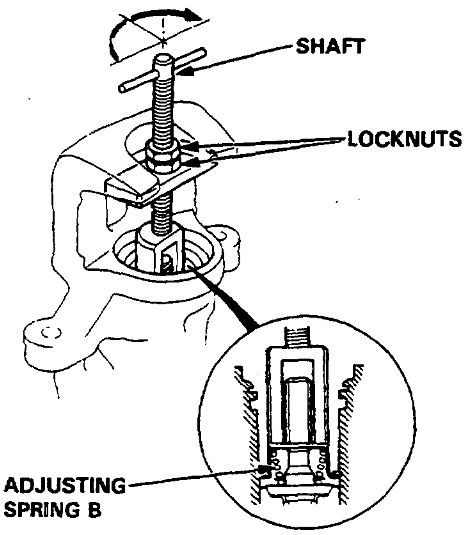
   CAUTION: Be careful not to damage the inside of the caliper cylinder during caliper disassembly.

   NOTE: Do not compress the spring under the spring cover.



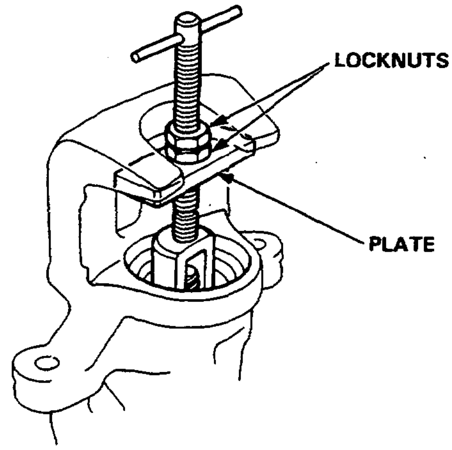
10. Turn the shaft clockwise 1/4—1/2 turn to compress the adjusting spring B in the caliper body.

    CAUTION: To prevent damage to the inner components, do not turn the shaft more than 1/2 turn.

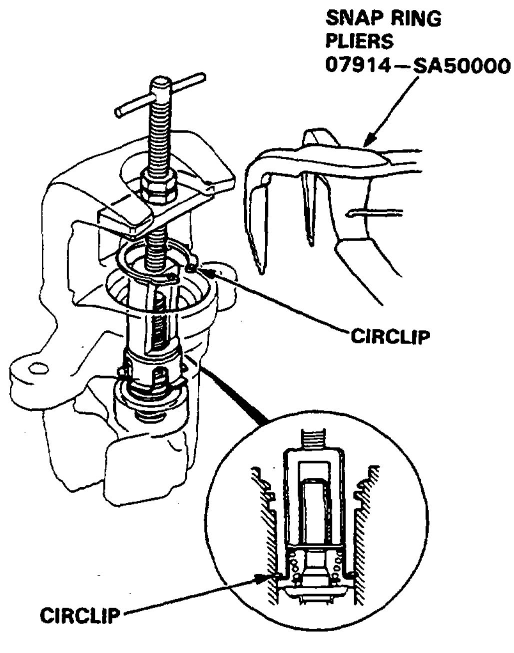


11. Lower the locknuts fully, and tighten the locknuts securely.

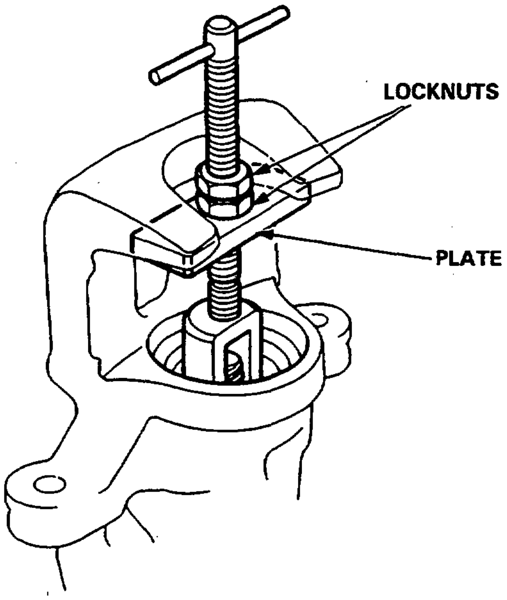
    NOTE: Keep the locknuts in this position until you reinstall the circlip.



12. Remove the circlip with snap ring pliers.

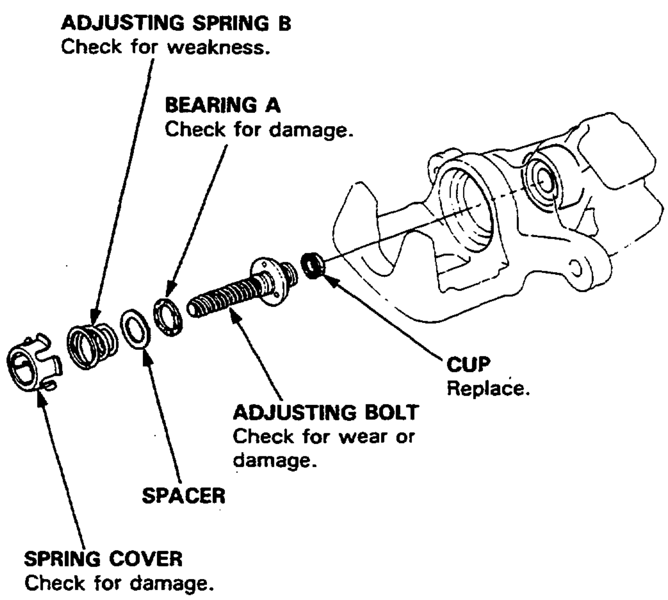


13. Hold the plate with your fingers, and turn the shaft counterclockwise. Remove the special tool from the caliper.

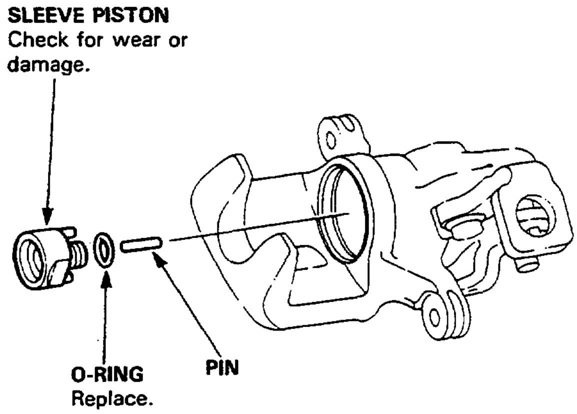


14. Remove the adjusting bolt.

15. Remove the spring cover, adjusting spring B, spacer, bearing A and cup from the adjusting bolt.



16. Remove the sleeve piston, and remove the pin from the cam.

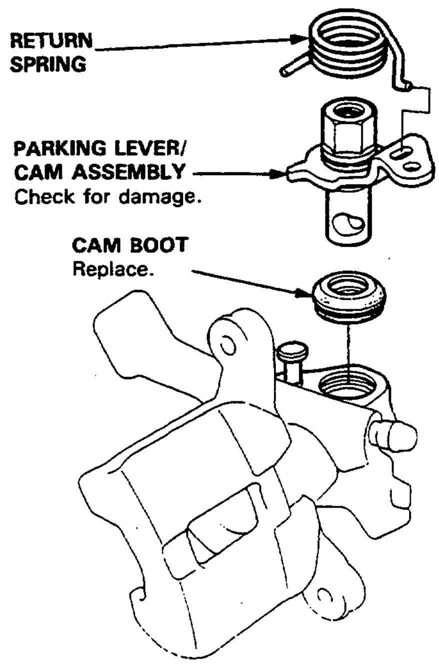


17. Remove the return spring.

18. 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.

19. 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:

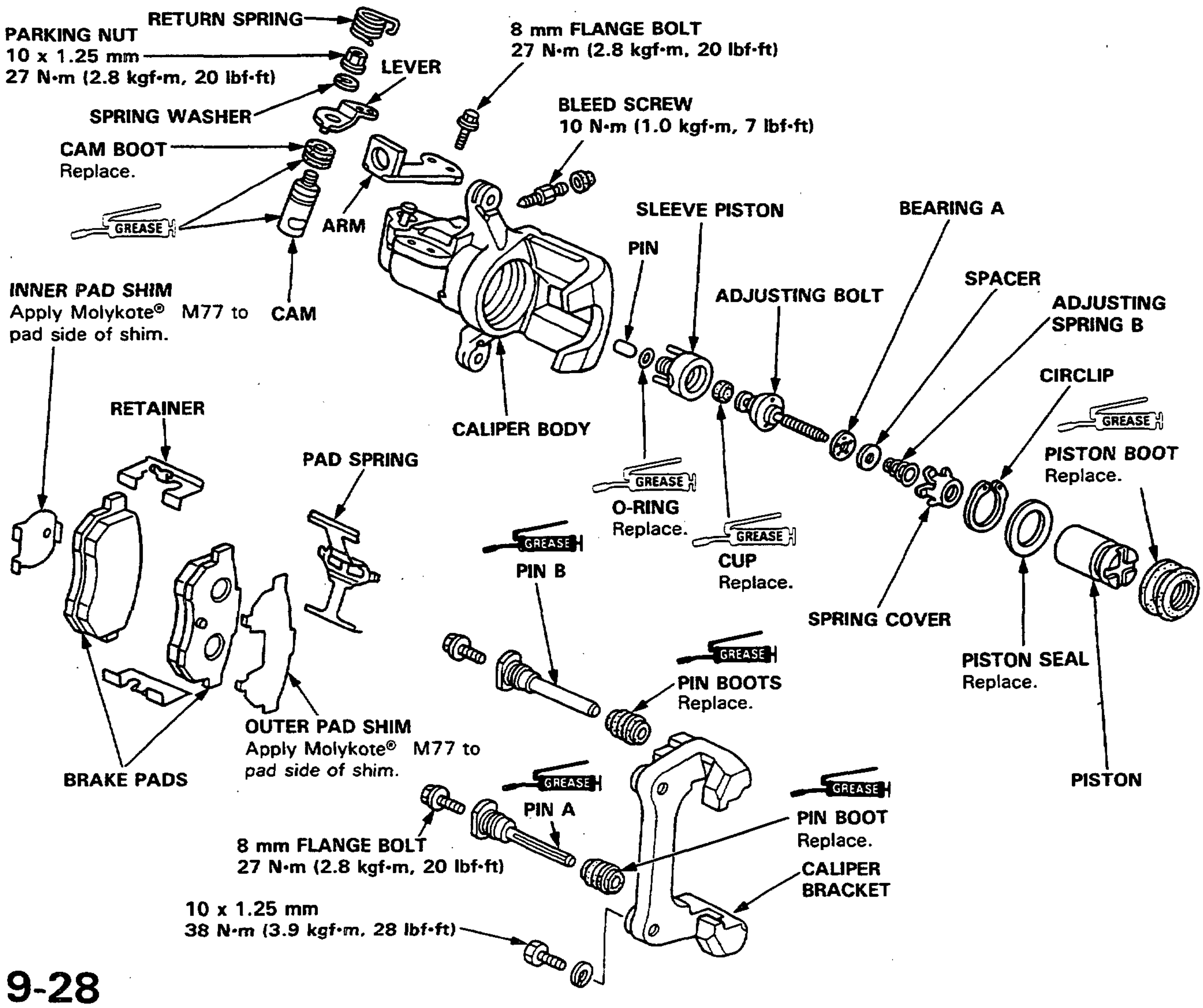
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **Clean all parts in brake fluid and air dry; blow out all passage with compressed air.**
- **Before reassembling, check that all parts are free of dust and 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 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 and caliper bore with clean brake fluid.
- Replace all rubber parts with new ones whenever disassembled.

GREASE : Brake cylinder grease (P/N: 08733—B020E) or equivalent rubber grease.

GREASE : Silicon grease (SHIN ETSU G40M) or equivalent silicon grease.



1. Pack all cavities of the needle bearing with the rubber grease.

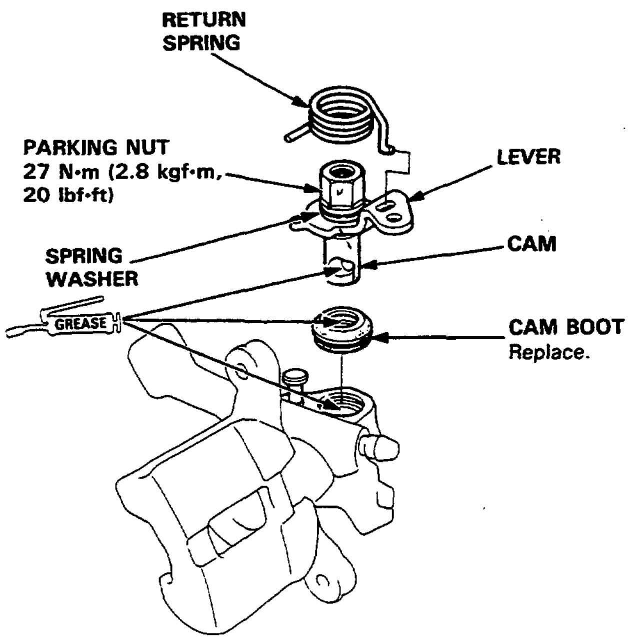
2. Coat the new cam boot with the rubber grease, and install it in the caliper body.

3. Apply the rubber grease 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.**

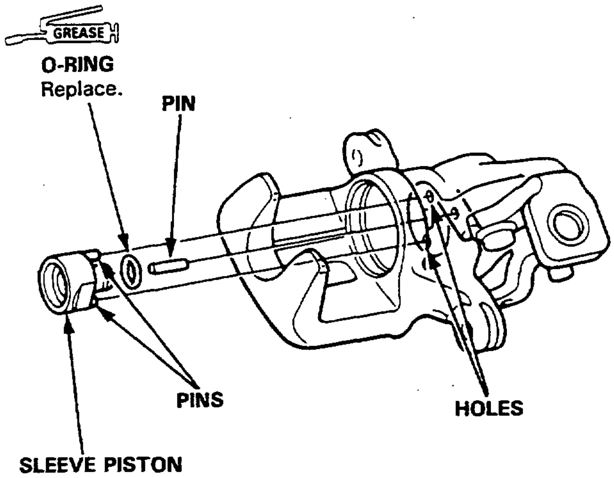
GREASE : Brake cylinder grease (P/N: 08733–B020E) or equivalent rubber grease.



5. Install the pin in the cam.

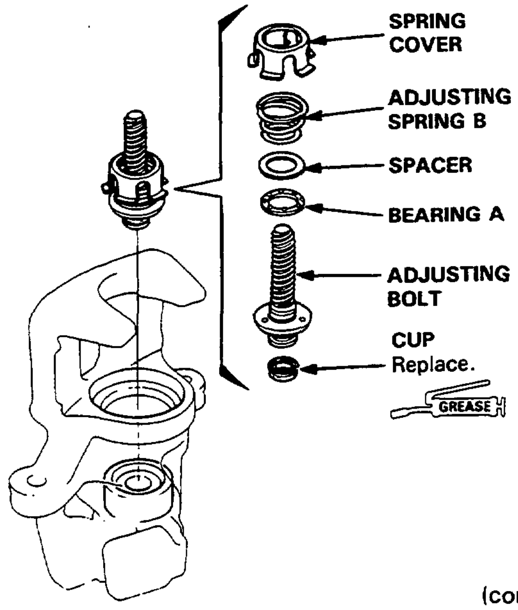
6. Apply the rubber grease to the new O-ring, and install it on the sleeve piston.

7. Install the sleeve piston so the hole in the bottom of the piston is aligned with the pin in the cam, and the two pins on the piston are aligned with the holes in the caliper.



8. Coat a new cup with rubber grease, and install it with its groove facing the bearing A side of the adjusting bolt.

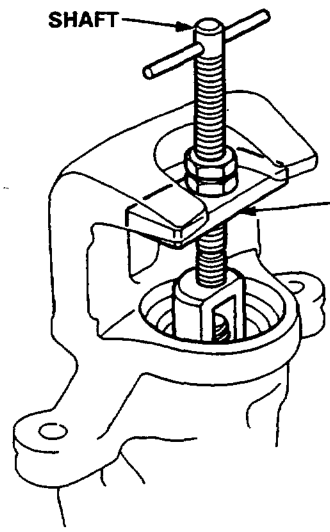
9. Fit the bearing A, spacer, adjusting spring B and spring cover on the adjusting bolt, and install them in the caliper cylinder.



(cont'd)

Reassembly (cont'd)

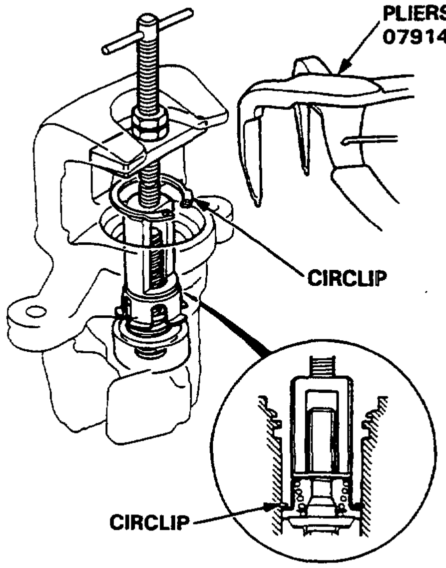
10. Install the special tool on the spring cover, and turn the shaft until the locknut contacts the plate.



11. Check that the flared end of the spring cover is below the circlip groove.

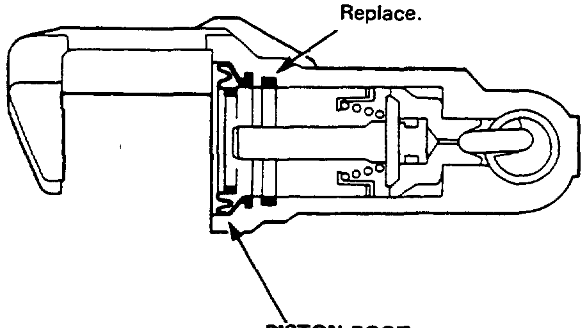
12. Install the circlip in the groove, then remove the special tool.

NOTE: Check that the circlip is seated in the groove properly.



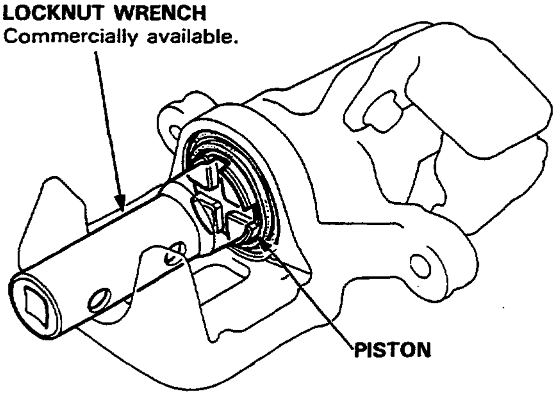
13. Coat a new piston seal with assembly fluid (BRITISH PETROLEUM BREOX BCF 11S), and install it in the caliper.

14. Apply brake cylinder grease (P/N: 08733–B020E) or equivalent rubber grease to the sealing lips and inside of a new piston boot, and install it in the caliper.

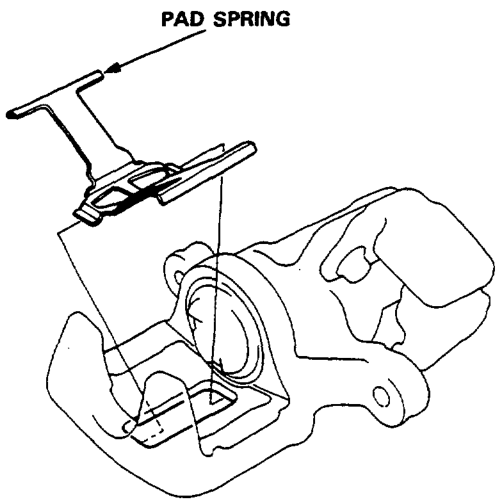


15. Coat the outside of the piston with brake fluid, and install it on the adjusting bolt while rotating it clockwise with the special tool.

CAUTION: Avoid damaging the piston and piston boot.



16. Install the pad spring on the caliper.

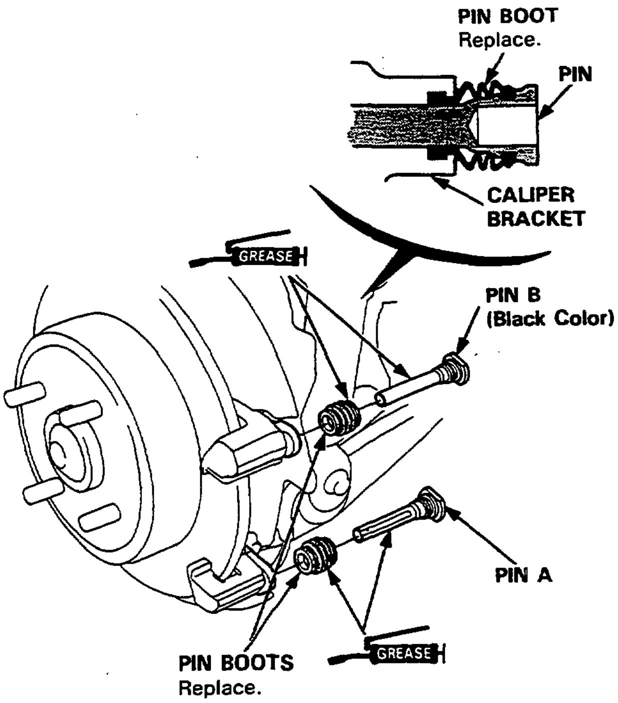


17. Apply the silicon grease (SHIN ETSU G40M) or equivalent grease to the sliding surface of the pins and inside the new pin boots.

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 grooves in the pins properly.

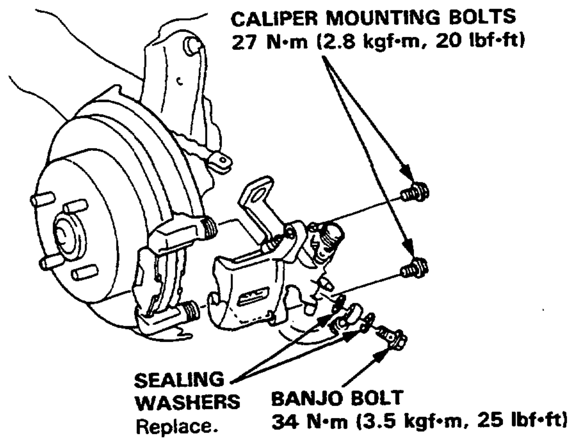


21. Install the brake pad retainers and brake pads (see page 19-22).

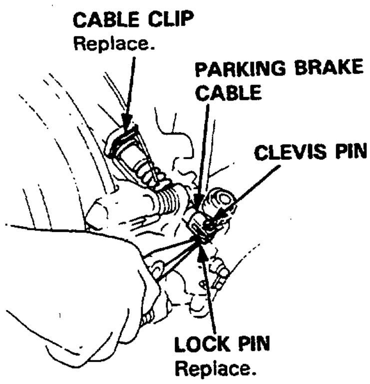
22. Align the cutout in the piston with the tab on the inner pad (see page 19-23).

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. Fill the brake reservoir and bleed the brake system (see page 19-6).

27. Operate the brake pedal several times, then adjust the parking brake (see page 19-5).

28. 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

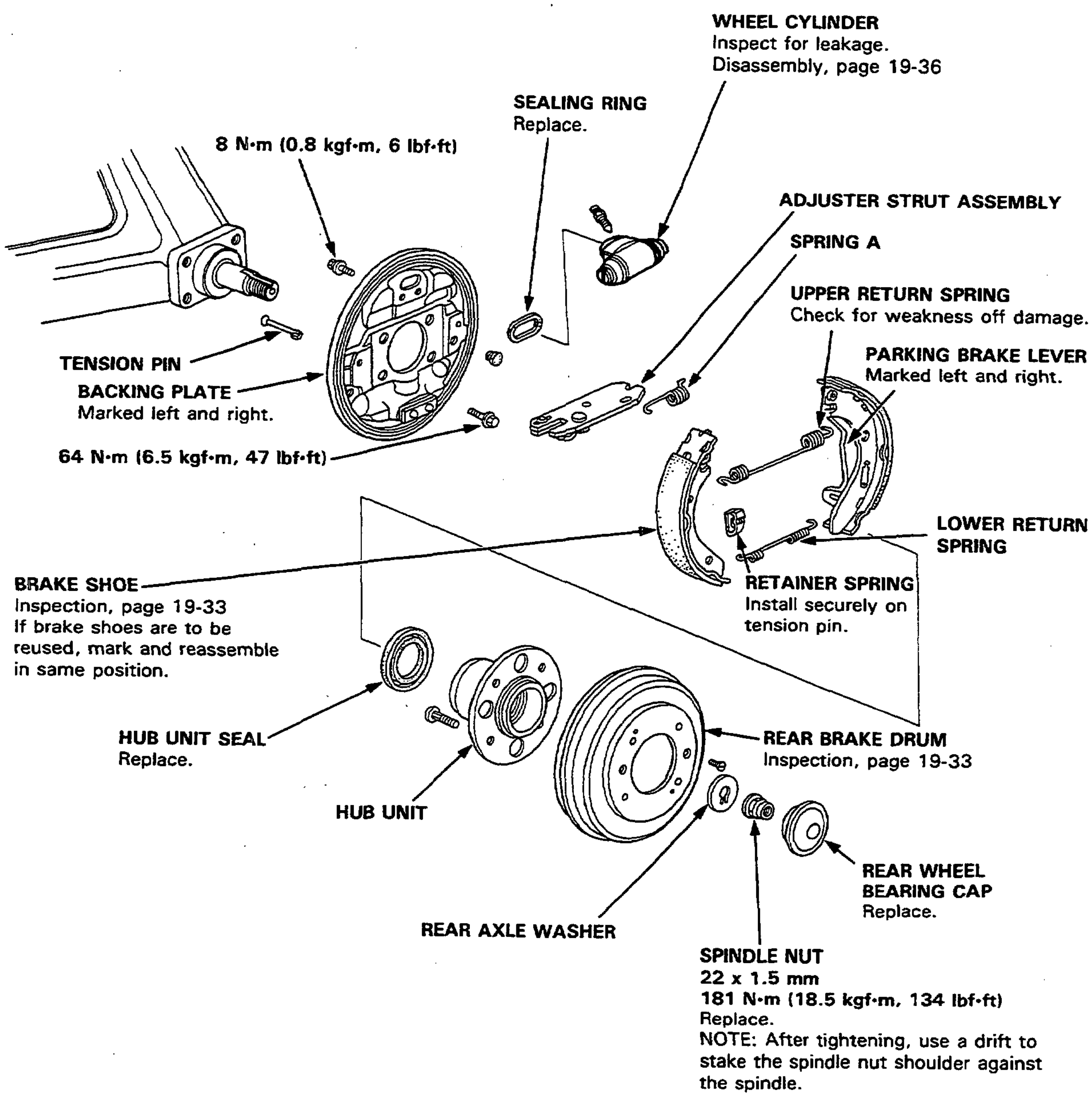
Index/Inspection

⚠ WARNING

- **Never use an air hose or dry brush to clean brake assemblies.**
- **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

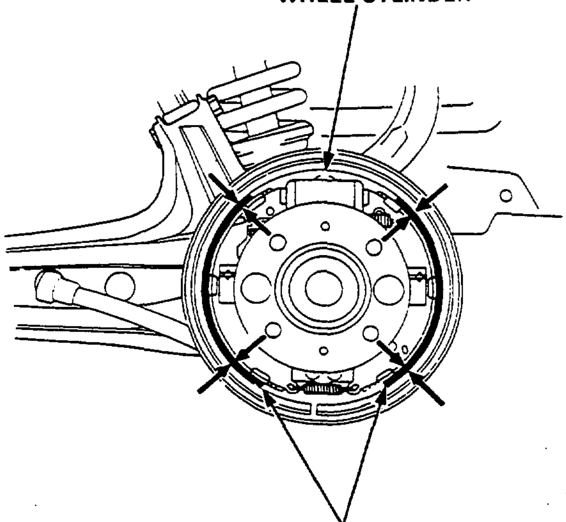
Inspection

1. Check the wheel cylinders for leakage.

2. Check the brake linings for cracking, glazing, wear or contamination.

3. Measure the brake lining thickness.

   Brake Lining Thickness:
   Standard: 5 mm (0.197 in.)
   Service Limit: 2.0 mm (0.08 in.)

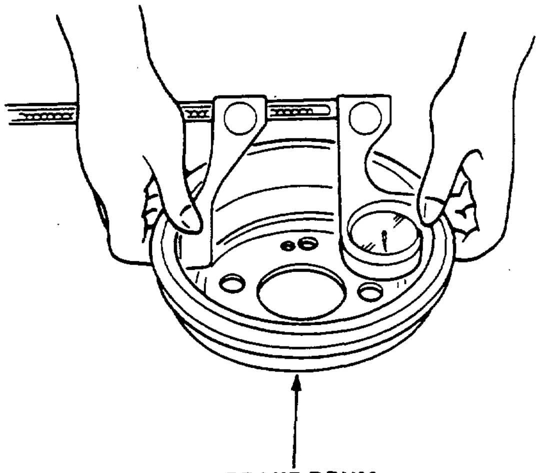


NOTE: Measurement does not include brake shoe thickness.

4. Check the bearings in the hub unit for smooth operation. If defective, refer section 18.

5. Measure inside diameter of the brake drum.

   Drum Inside Diameter:
   Standard 203.20–203.33 mm (8.000–8.005 in.)
   Service Limit: 204 mm (8.03 in.)

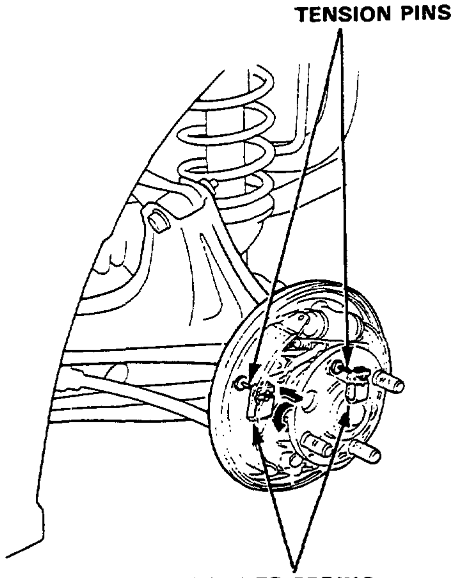


6. Check the brake drum for scoring, grooving, cracks.

Rear Brake Shoes

Disassembly

1. Remove the tension pins by pushing the retainer spring and turning them.



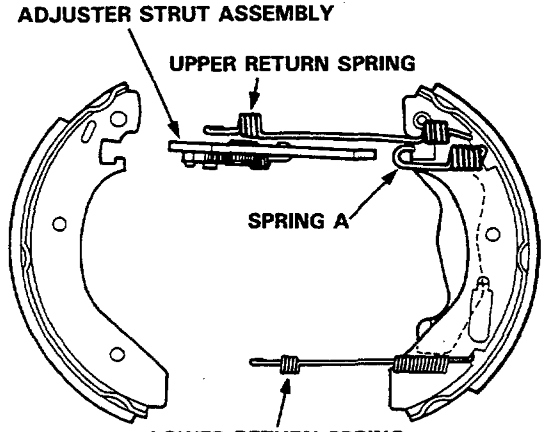
2. Lower the brake shoe assembly and remove the lower return spring.

   NOTE: Make sure not to damage the dust cover on the wheel cylinder.

3. Remove the brake shoe assembly.

4. Disconnect the parking brake cable from the parking brake lever.

5. Remove the spring A and upper return spring, adjuster strut assembly, and separate the brake shoes.



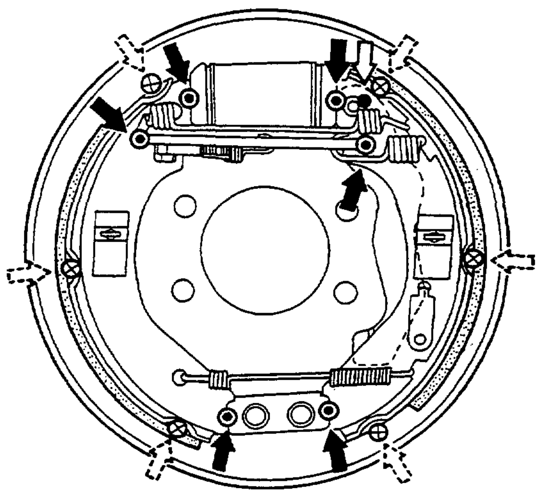
NOTE: Inspect all parts for worn, rust, and damage.

Reassembly

NOTE: Before reassembling, check that all parts are clean.

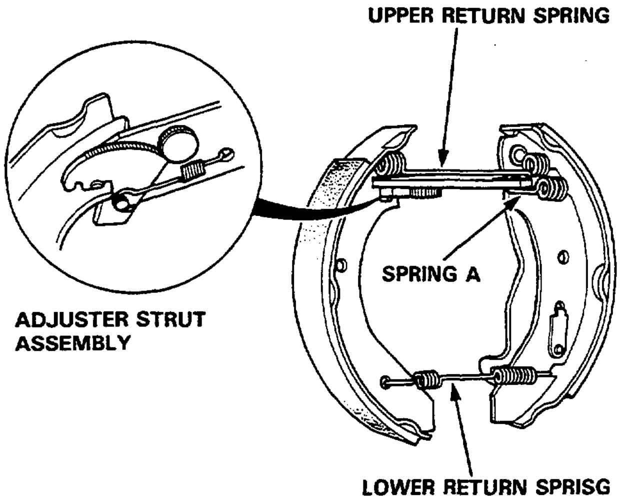
1. Install the adjuster strut assembly, then upper return spring and spring A in the brake shoes.
2. Connect the parking cable to the parking brake lever.
3. Apply grease on each sliding surface.

   CAUTION: Contaminated the brake linings reduce stopping power. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.



Greasing Symbols:
- Brake shoe ends
- Opposite the edge of the shoe
- Sliding surface

4. Install the brake shoe assembly, then hook the lower return spring.
5. Install the tension pins and retaining springs.

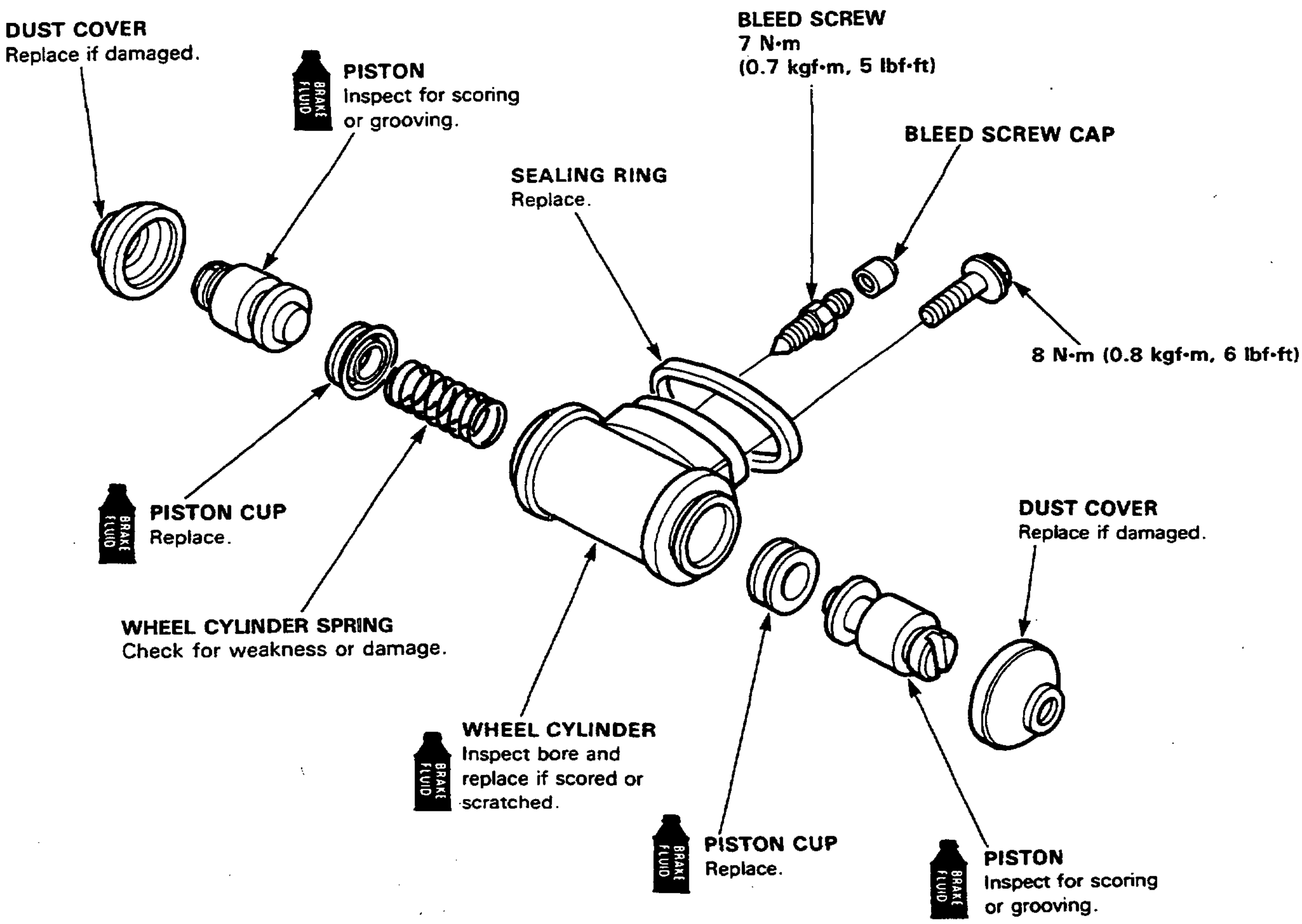


6. Install the brake drum.
7. If the wheel cylinder has been removed, bleed the brake system (see page 19-6).
8. Depress the brake pedal several times to set the self adjusting brake.
9. Adjust the parking brake (see page 19-5).

Wheel Cylinder

Disassembly and Inspection

CAUTION:
- Use only clean DOT3 or DOT4 brake fluid.
- Use only new replacement parts.
- Brake fluid will damage the painted, plastic and rubber parts. Whenever handling fluid, protect the painted, plastic or rubber parts by covering with a rag. If fluid does get on these parts, wipe it off with a clean cloth.
- Blow all passages with compressed air before reassembling.
- Clean all parts thoroughly with the clean brake fluid.
- Do not allow dirt or other foreign matter to contaminate the brake fluid.
- Lubricate all parts with clean brake fluid during reassembly.

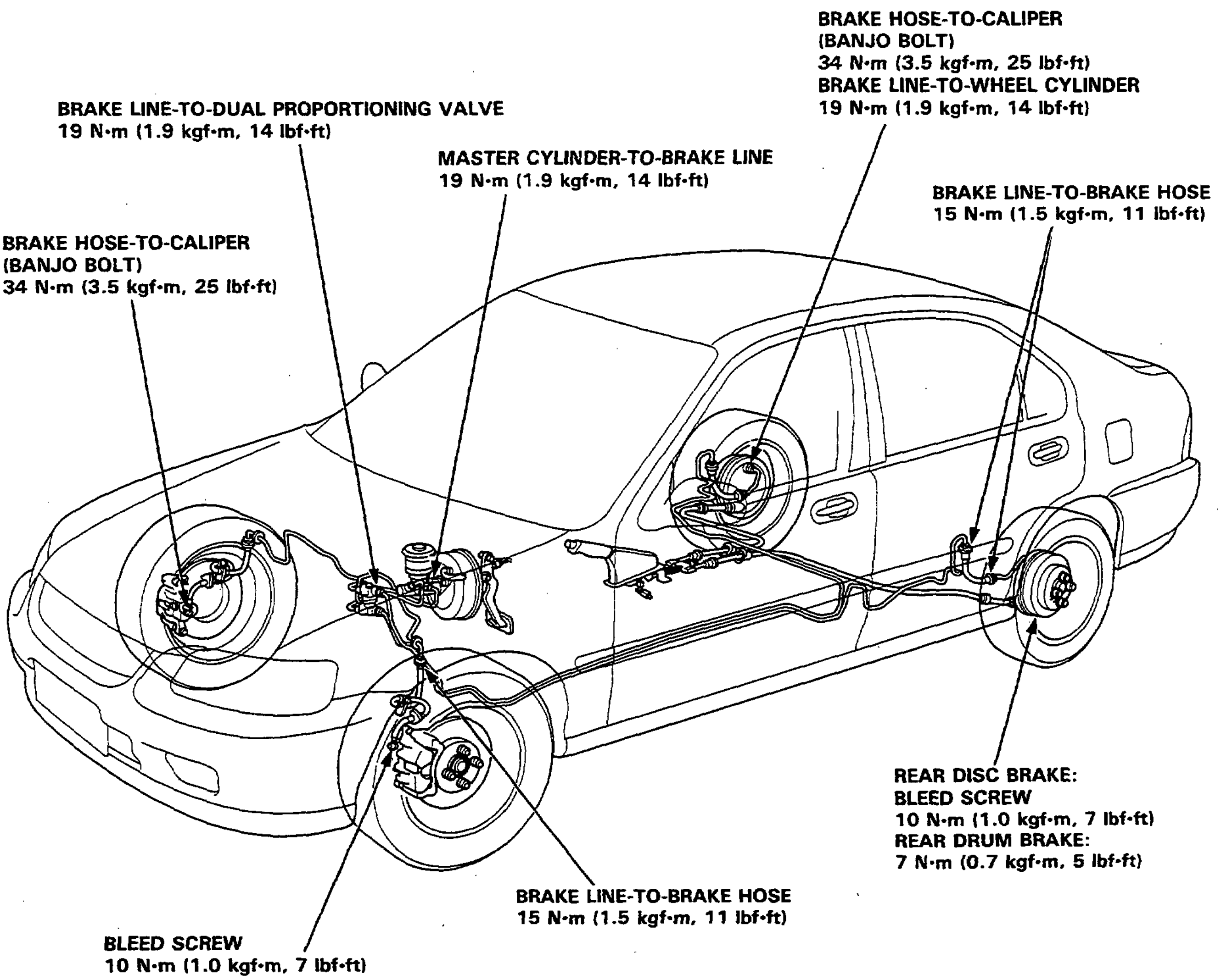


Brake Hoses/Pipes

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.

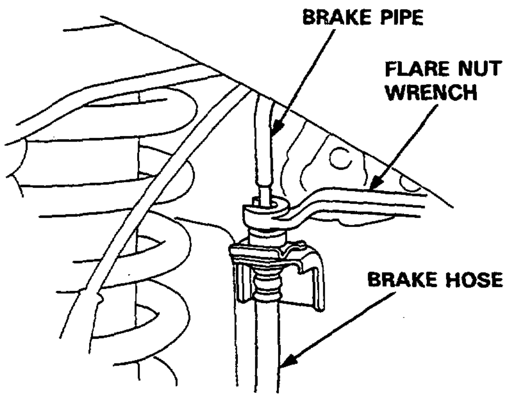
   CAUTION: Replace the brake hose clip whenever the brake hose is serviced.



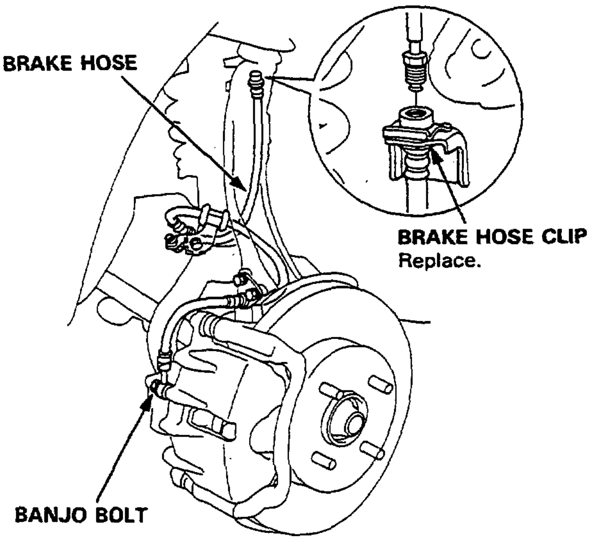
Hose Replacement

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.**

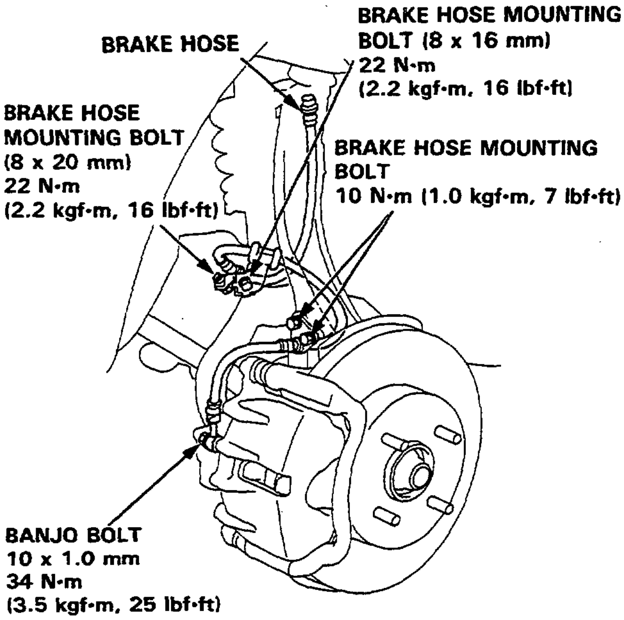
1. Replace the brake hose if the hose is twisted, cracked, or if it leaks.
2. Disconnect the brake hose from the brake pipe using a 10 mm flare nut wrench.



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.

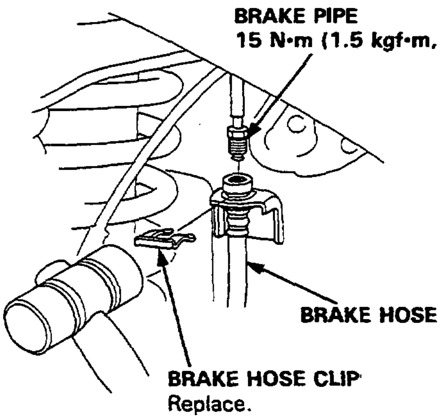


5. Install the brake hose on the knuckle and damper first, then connect the brake hose to the caliper with the banjo bolt and new sealing washers.



CAUTION: Do not twist the brake hose excessively.

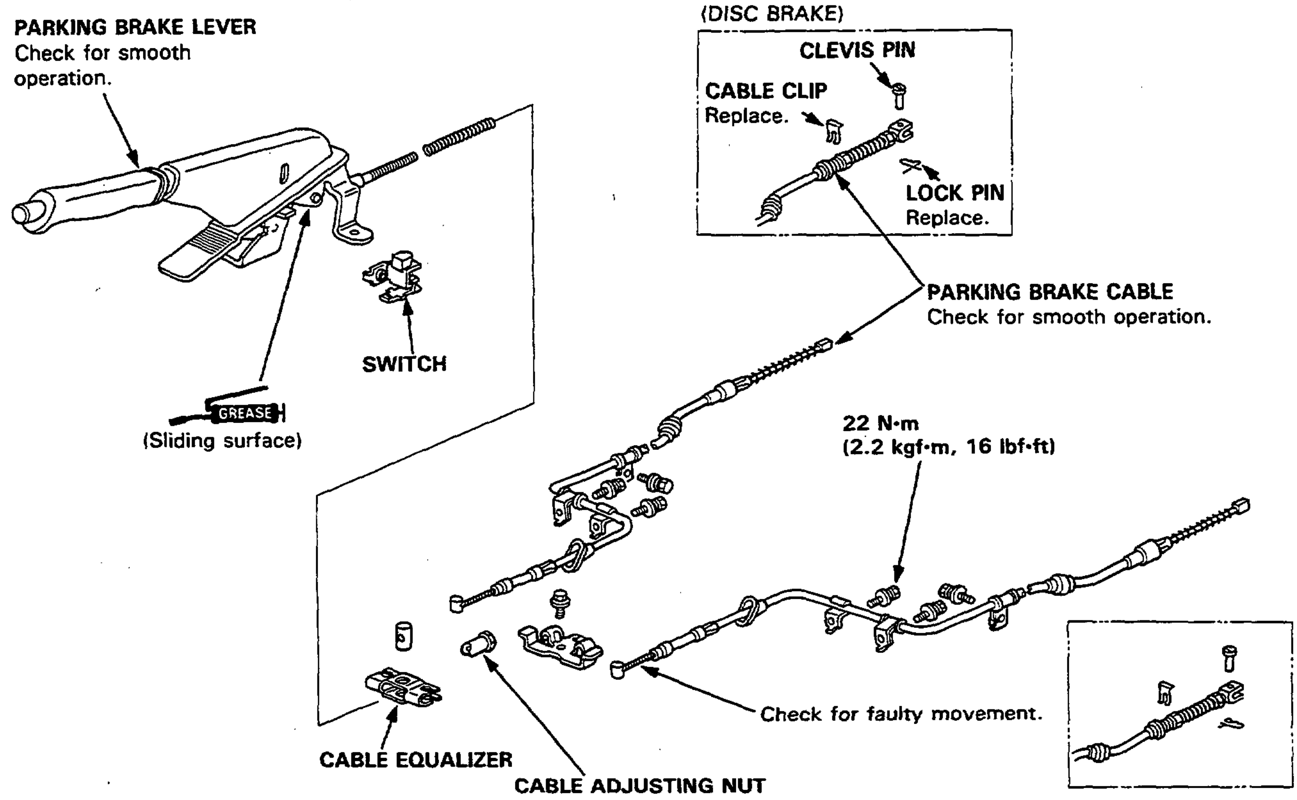
6. Install a new brake hose clip on the brake hose.
7. Connect the brake pipe to the brake hose.



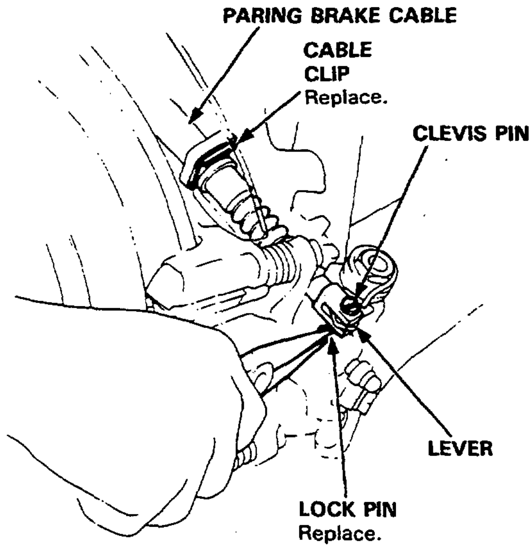
8. After installing the brake hose, bleed the brake system (see page 19-6).
9. Perform the following checks.
   - Check the brake hose and line joint for leaks, and tighten if necessary.
   - Check the brake hoses for interference or twisting.

Inspection and Replacement

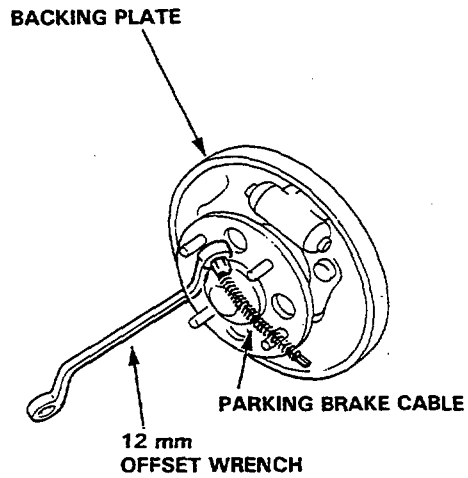
CAUTION: The parking brake cables must not be bent or distorted. This will lead to stiff operation and premature cable failure.



REAR DISC BRAKE
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.

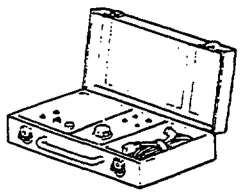


REAR DRUM BRAKE
Remove the parking brake cable from the backing plate using a 12 mm offset wrench as shown.



Special Tools

Ref. No.	Tool Number	Description	Qty	Page Reference
①	07HAJ – SG00602	ALB Checker	1	19-129
②	07PAZ – 0010100	SCS Short Connector	1	19-60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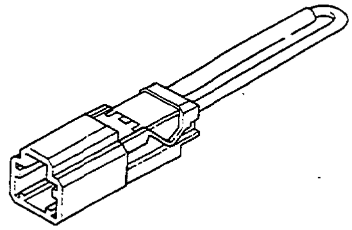
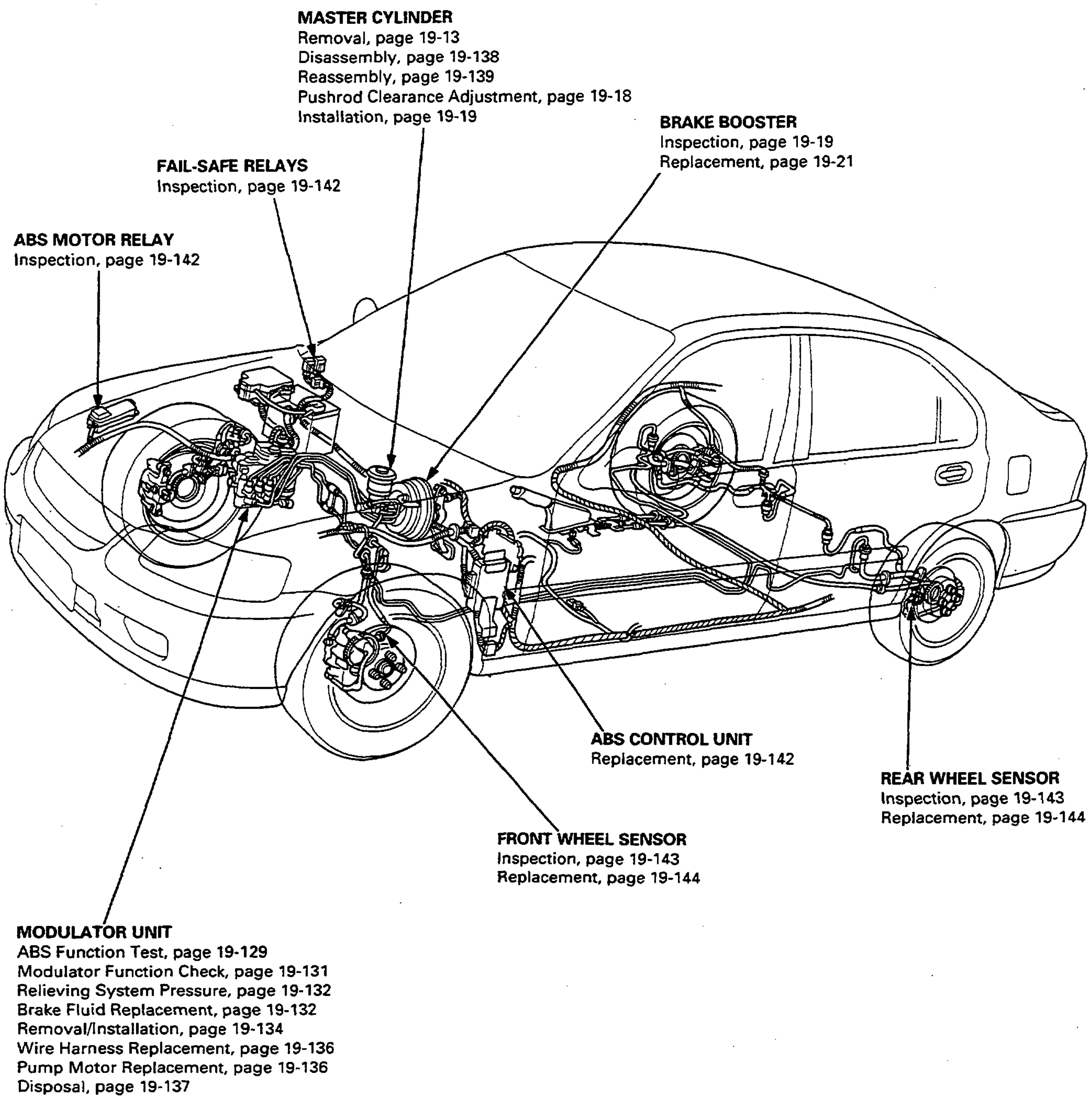

②

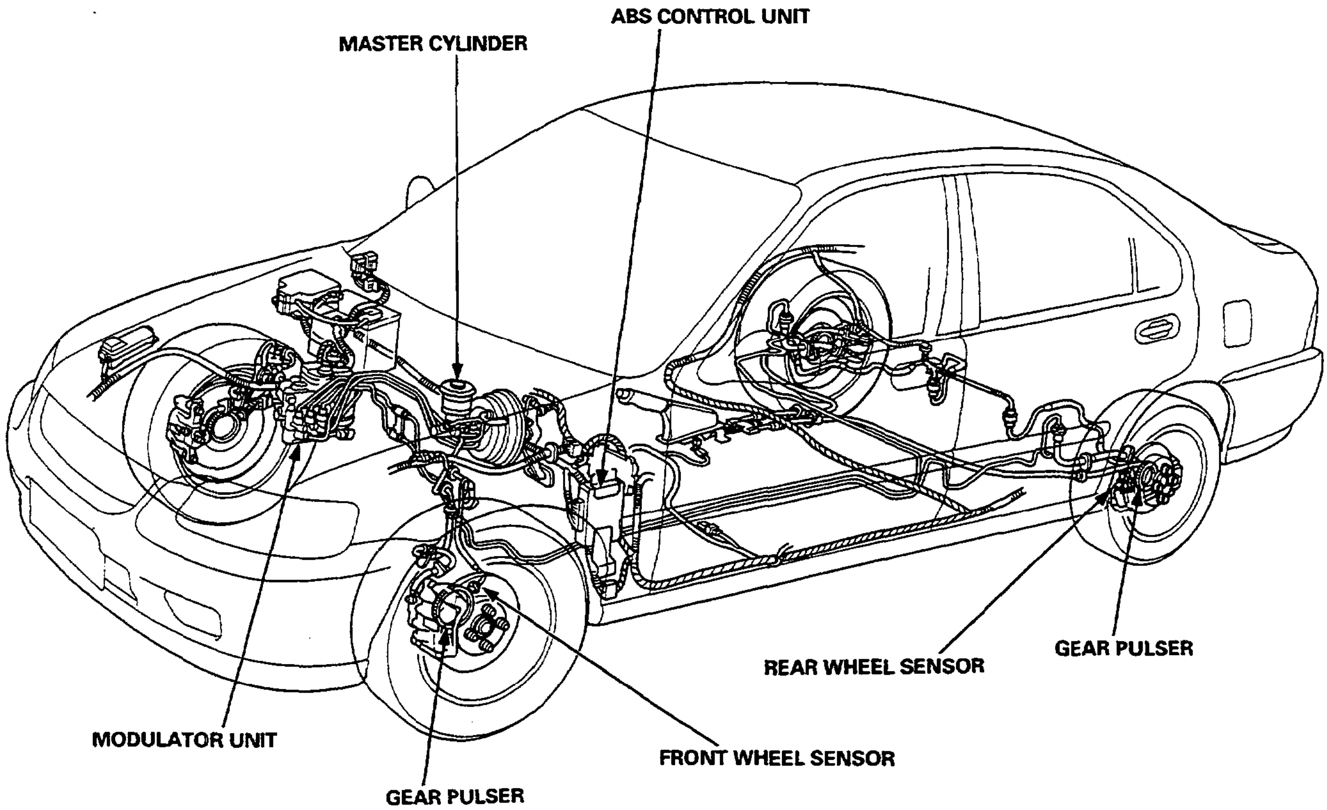
⚠ WARNING The accumulator contains high pressure nitrogen gas; do not puncture, expose to flame, or attempt to disassemble the accumulator or it may explode; severe personal injury may result.



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 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.

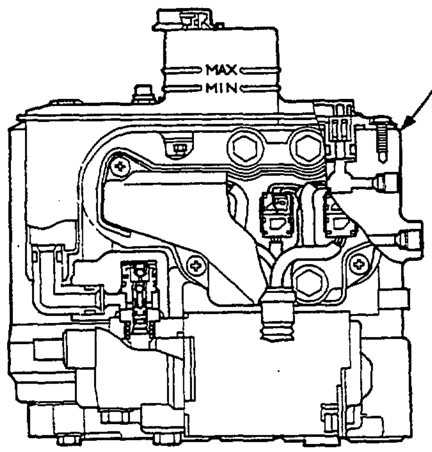


PART NAME	MAJOR FUNCTION
Gear pulser	Attached to the rotating part of the wheel and detects the wheel speed together with the wheel sensor.
Wheel sensor	Generates pulse signal corresponding to the revolution of the gear pulser.
ABS control unit	Controls the working of the anti-lock brake system by performing 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:

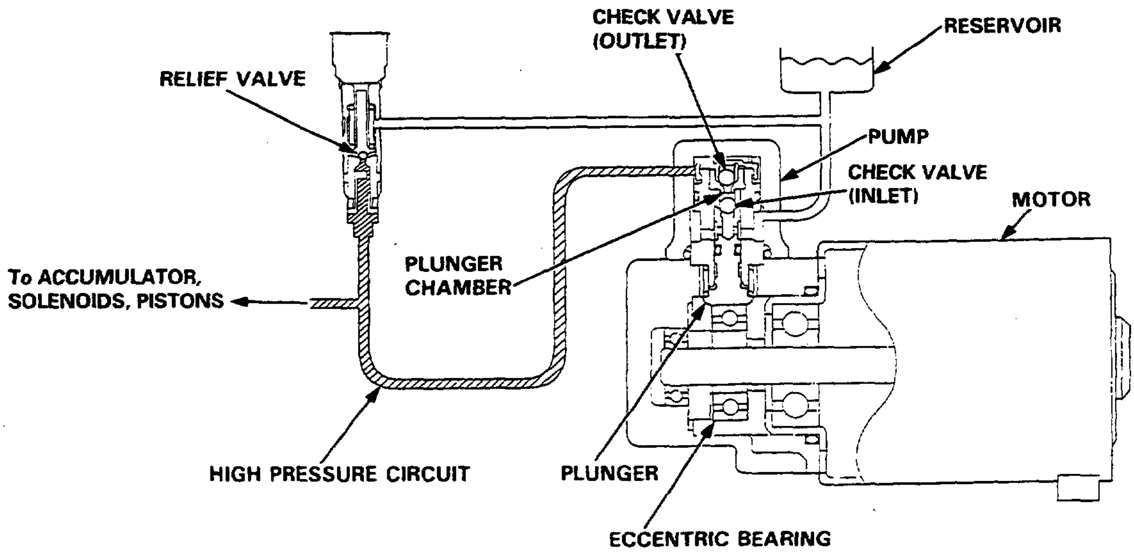
The modulator unit consists of the following sub-units. It adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the ABS control unit.

- ABS pump and motor: Supplies high-pressure brake fluid to control the ABS operation.
- Accumulator: Stores high-pressure brake fluid.
- 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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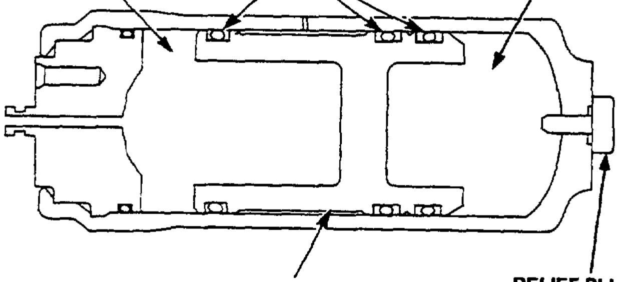
Features/Construction (cont'd)

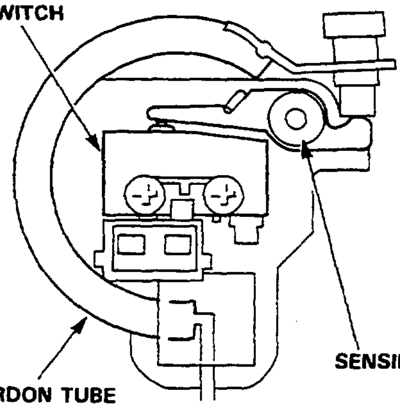
Accumulator:

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.

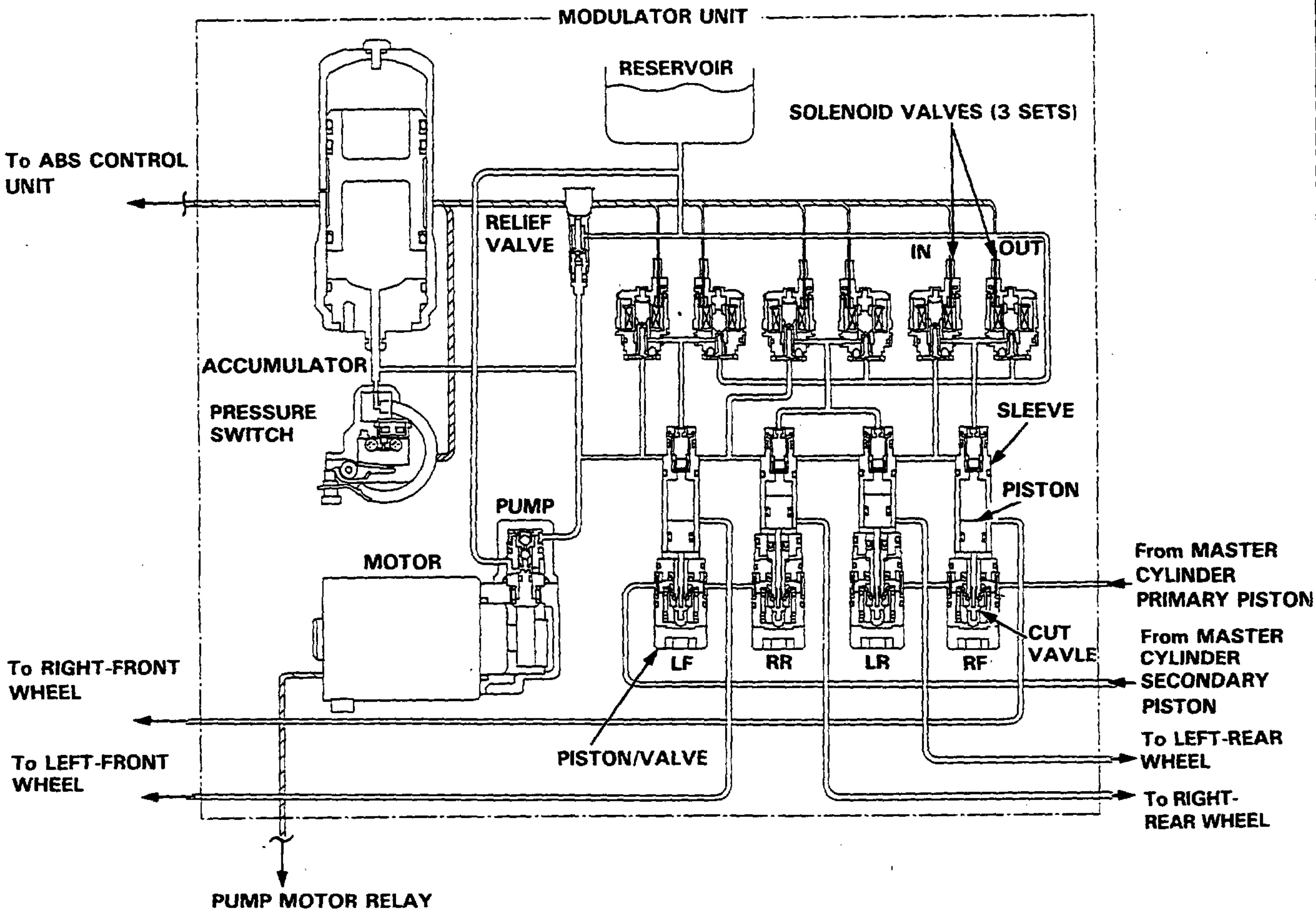


Piston/valve:

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.



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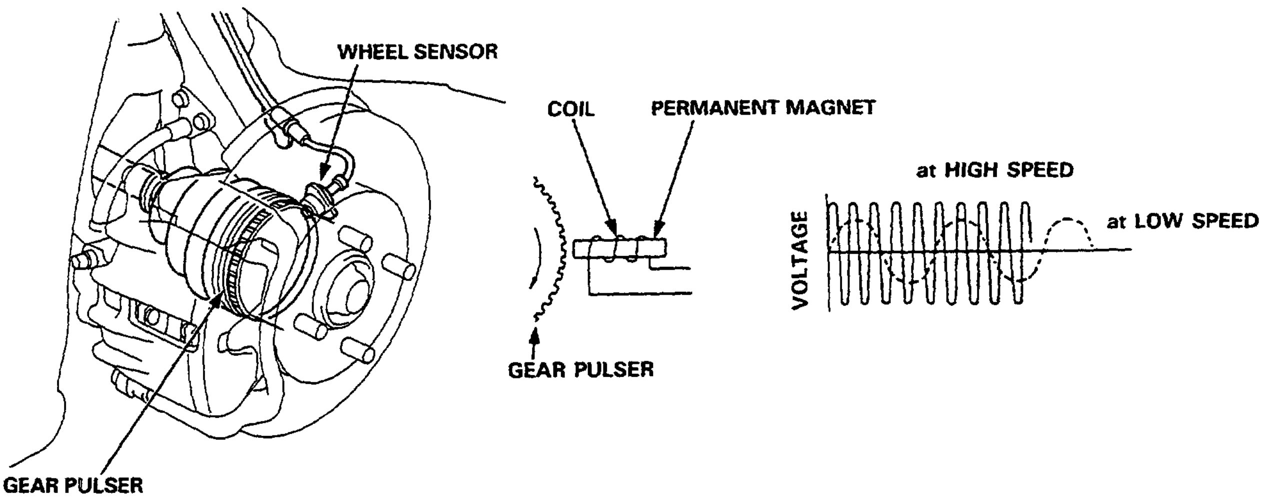
Anti-lock Brake System (ABS)

Features/Construction (cont'd)

Wheel sensor:

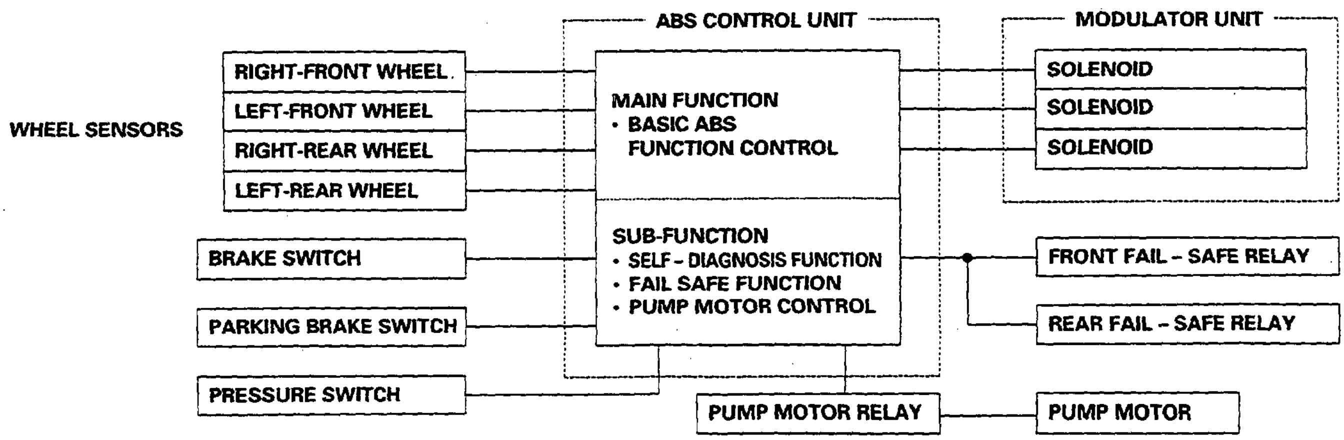
The wheel sensor is a contactless type that detects the rotating speed of a wheel. It consists of a permanent magnet and coil. When the gear pulsers attached to the rotating parts of each wheel turn, the magnetic flux around the coil in the wheel sensor alternates, generating voltages with frequency 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:

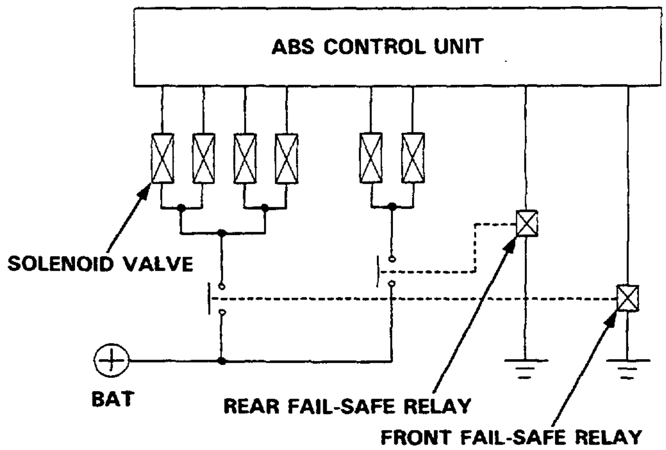
The ABS control unit monitors the brake fluid pressure in the accumulator by the pressure switch ON/OFF signals. The ABS control unit turns the pump on when the pressure in the accumulator drops, and stops the pump when the pressure rises to the specified value.
If the pressure does not reach the specified 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.

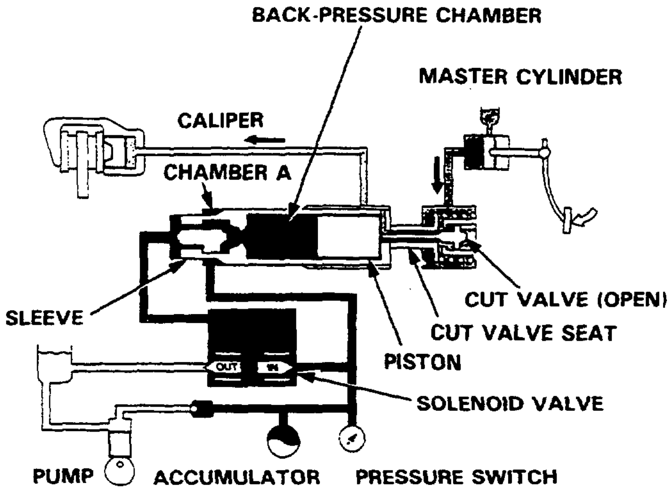
To check the indicator light bulb, the light is activated when the ignition switch is first turned on. The light goes off after the engine is started if there is no abnormality in the system.

Operation

The following description of ABS operation is for one of the front wheels. The ABS operation for the remaining wheels is the same.

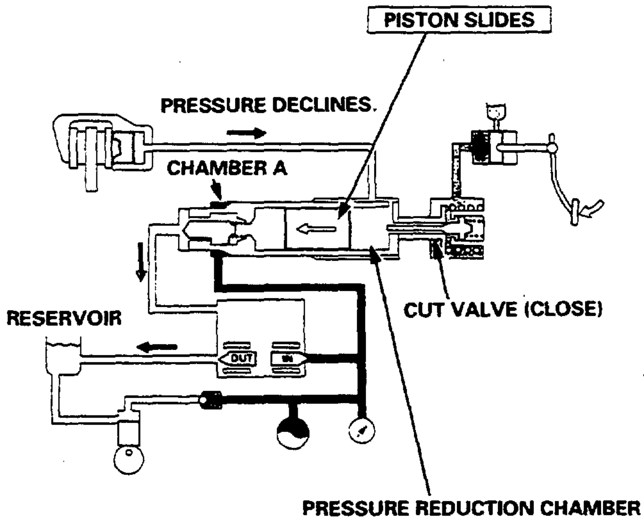
Ordinary braking function:

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.

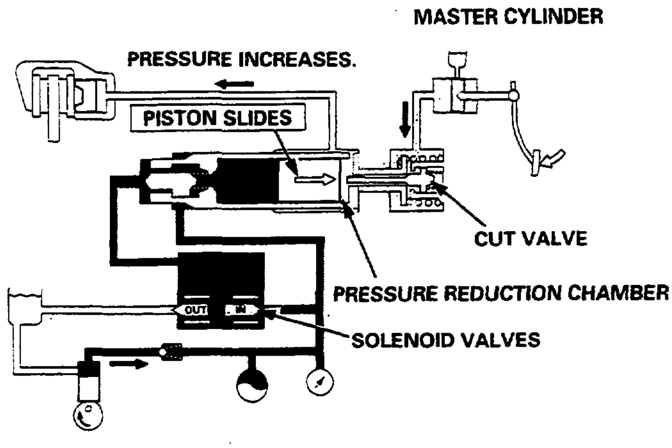


When ABS is functioning:

- 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.

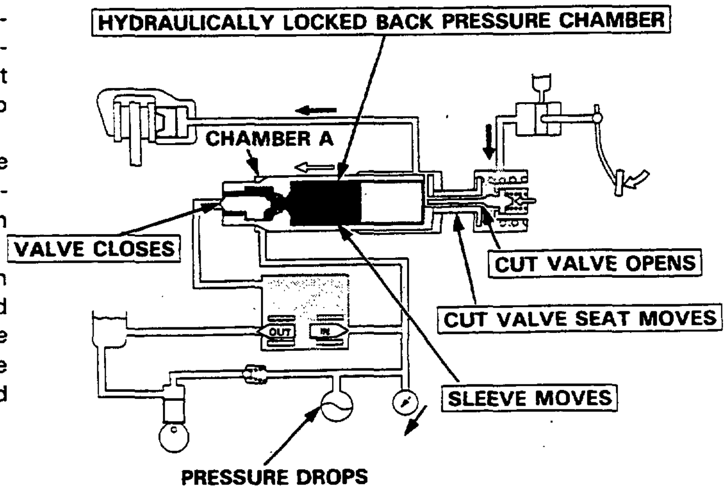


- Control by increasing caliper fluid pressure:
  When the ABS control unit senses that the caliper fluid pressure declined, and the wheel speed is restored, it signals the solenoid inlet valve to open and the solenoid outlet valve to close.
  As a result, the high pressure brake fluid is transmitted 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.

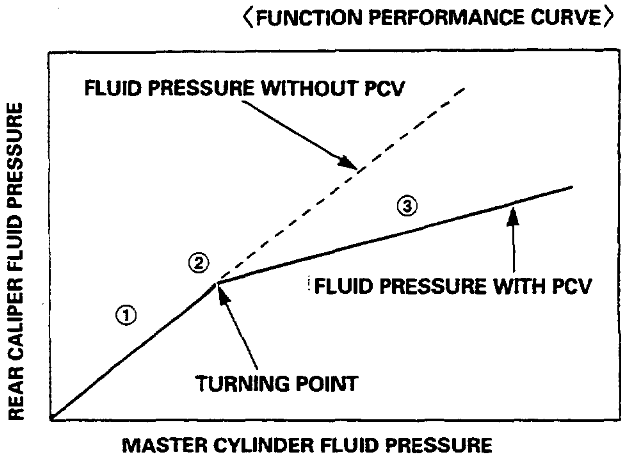


(cont'd)

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.

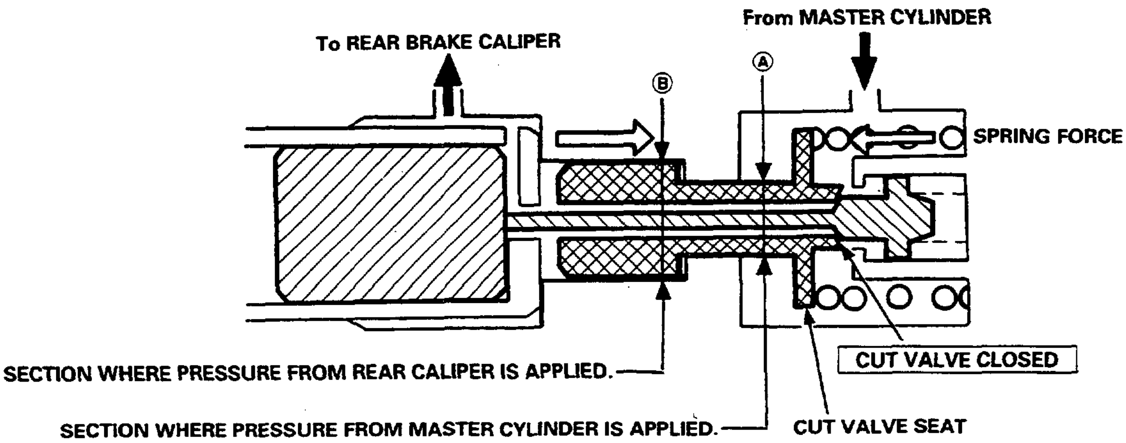


The cut valve seat in the rear brake system has a shoulder between sections A and B. Section A, where pressure from the master cylinder is applied, has a smaller diameter than section B, where pressure from the rear brake caliper is applied. This design provides the proportioning control valve function as follows.

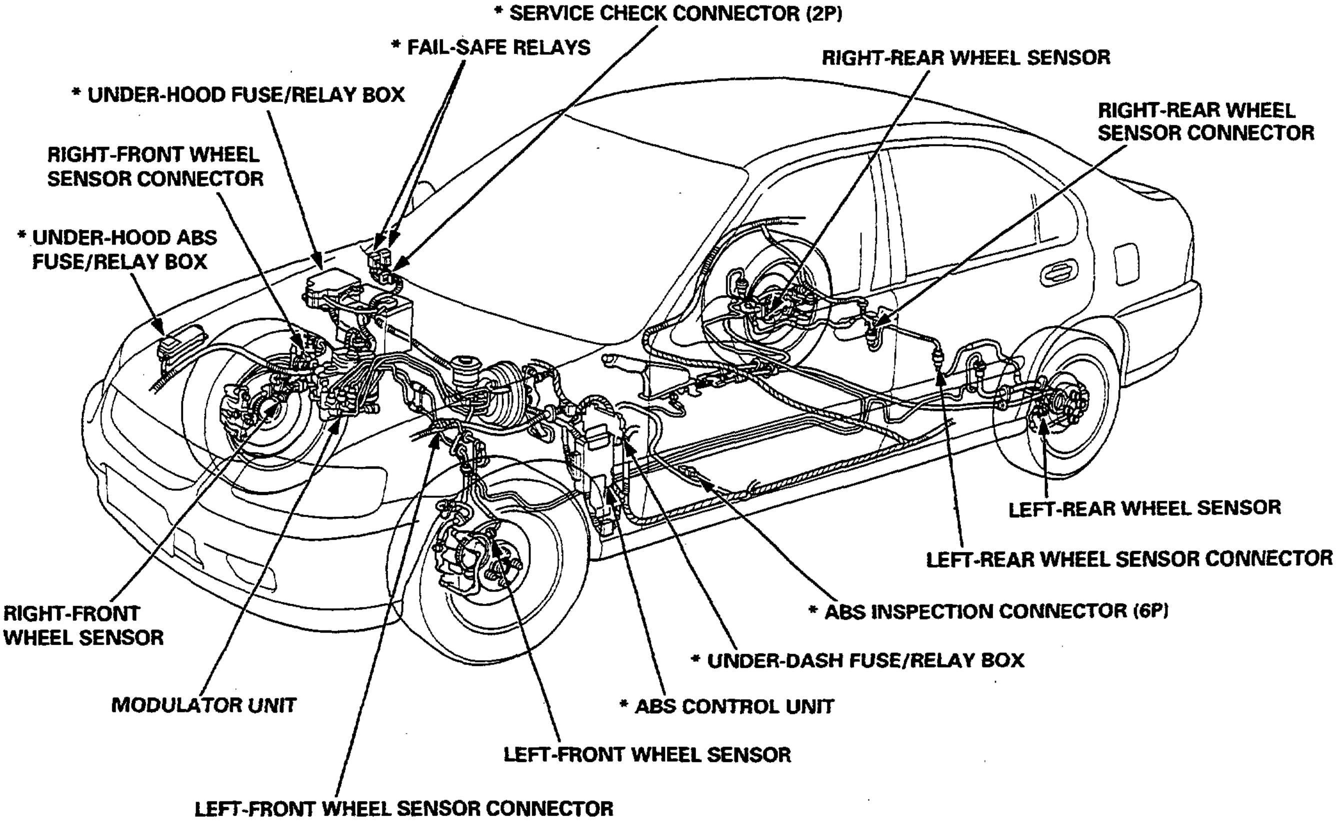
1. When the fluid pressure from the master cylinder is below the turning point, the cut valve seat is pushed by the spring force and the cut valve is open. Therefore, the fluid pressure from the master cylinder is transmitted to the rear brake caliper side. Under these conditions, fluid pressure from 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.

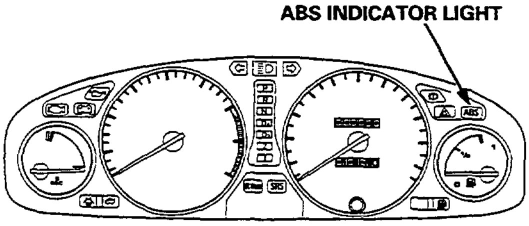
3. When the fluid from the master cylinder exceeds the turning point, the fluid pressure from the master cylinder rises, while the pressure to the rear brake caliper remains at the turning point value. As a result, the cut valve seat moves away from the cut valve and the cut valve opens. The passage 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.



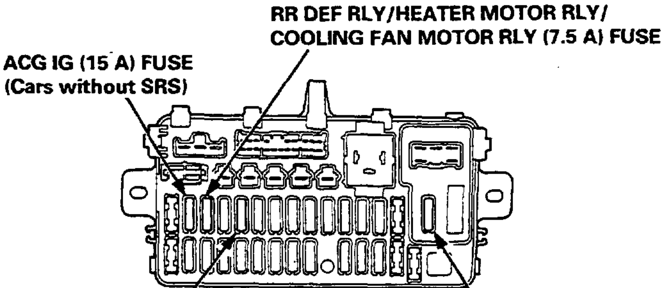
The parts with asterisk (*): LHD type is shown, RHD type is symmetrical.



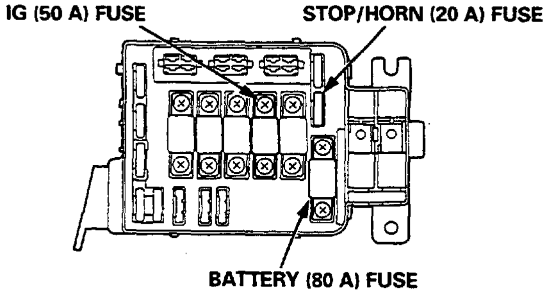
GAUGE ASSEMBLY



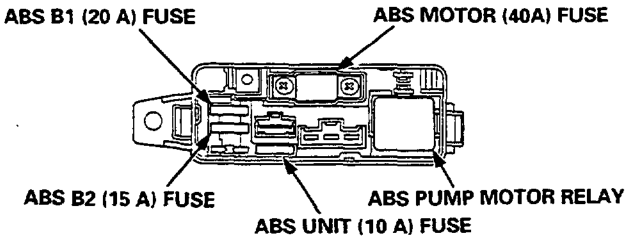
UNDER-DASH FUSE/RELAY BOX



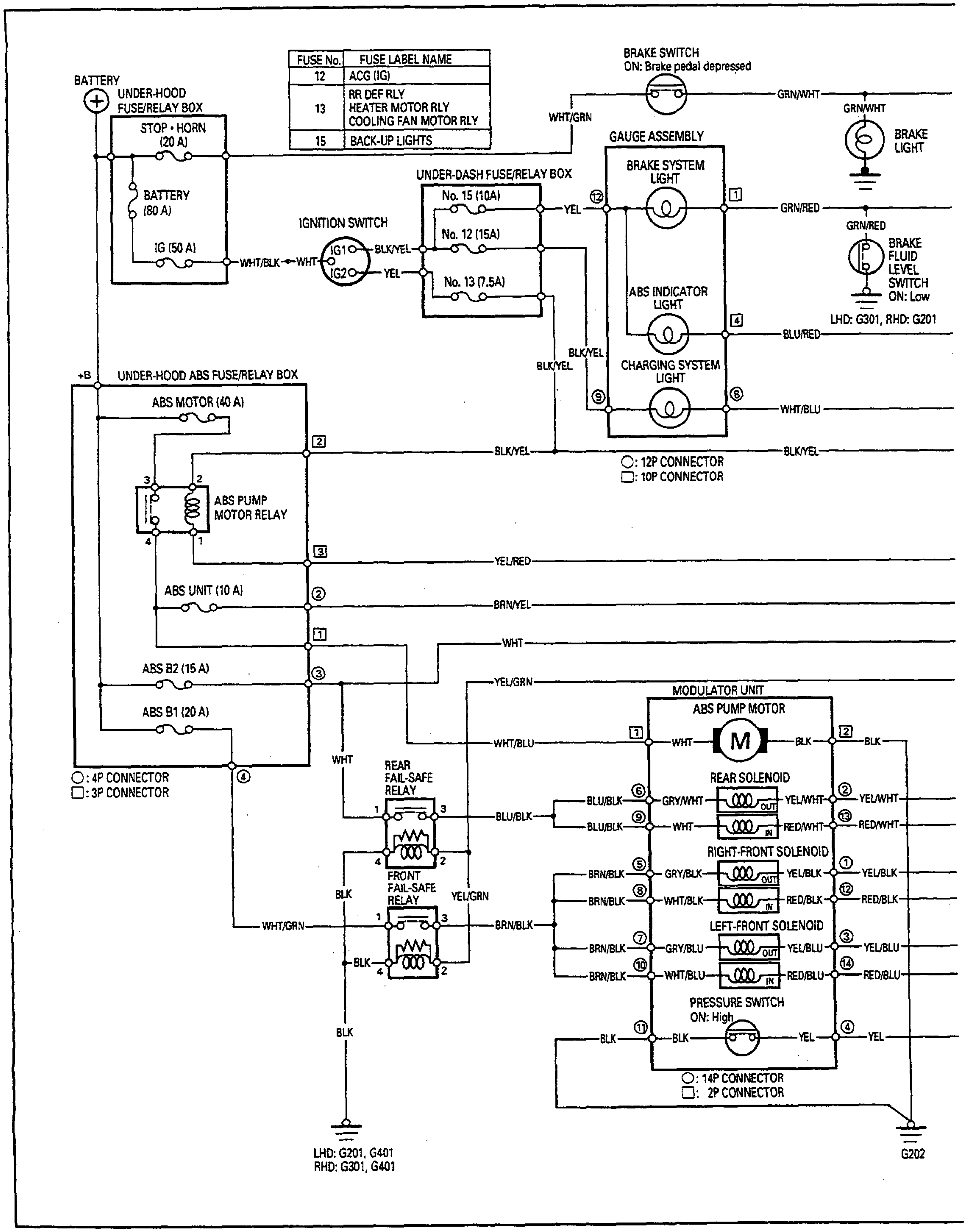
UNDER-HOOD FUSE/RELAY BOX



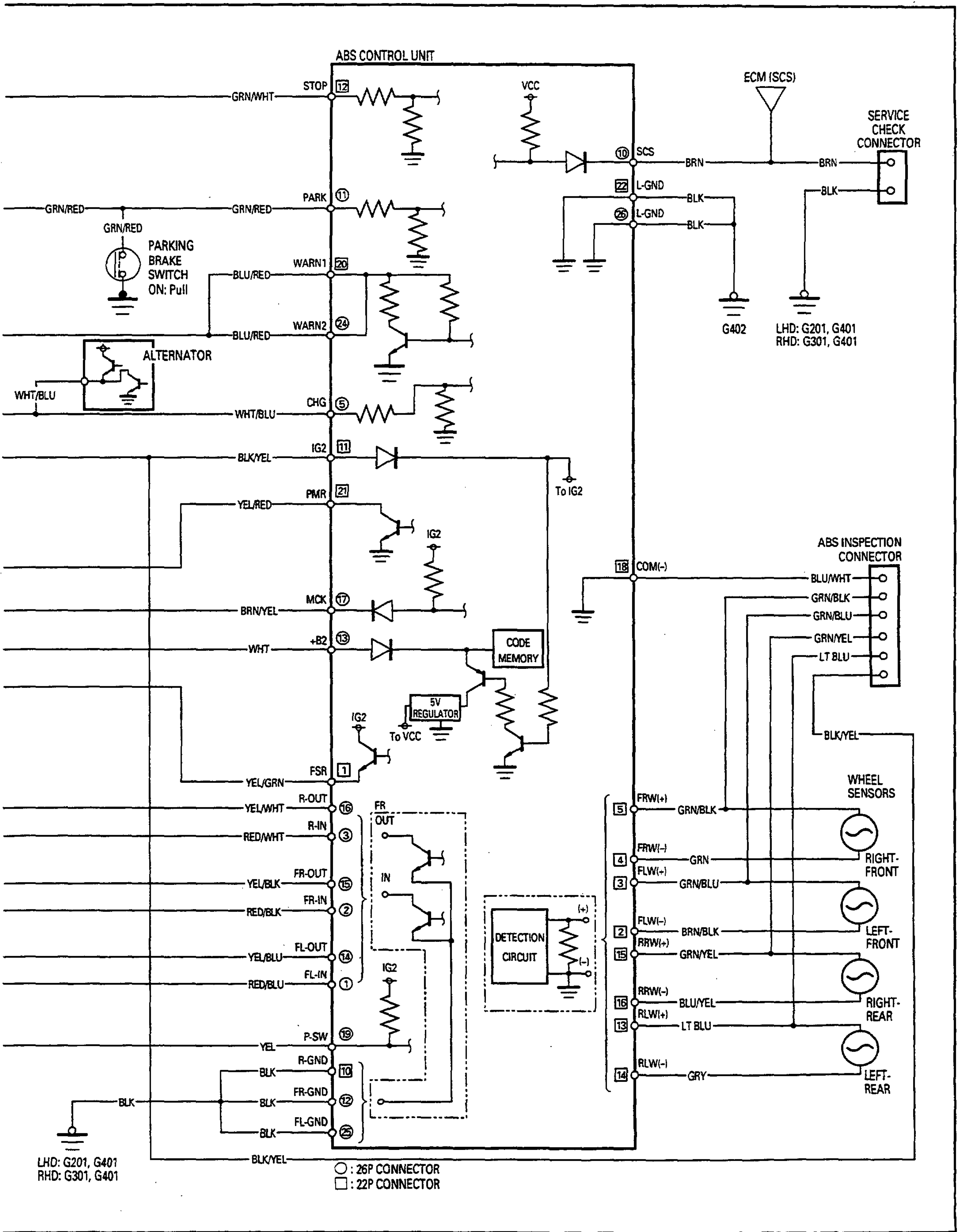
UNDER-HOOD ABS FUSE/RELAY BOX



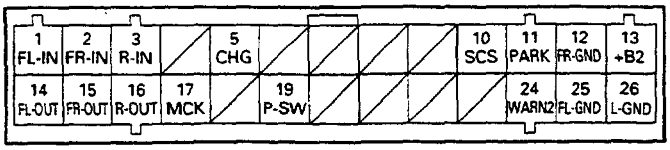
Circuit Diagram



FUSE No.	FUSE LABEL NAME
12	ACG (IG)
13	RR DEF RLY HEATER MOTOR RLY COOLING FAN MOTOR RLY
15	BACK-UP LIGHTS


ABS CONTROL UNIT
STOP 12
GRN/WHT
VCC
ECM (SCS)
SERVICE CHECK CONNECTOR
10 SCS
BRN
BRN
22 L-GND
BLK
26 L-GND
BLK
BLK
PARK 11
GRN/RED
GRN/RED
GRN/RED
PARKING BRAKE SWITCH ON: Pull
WARN1 20
BLU/RED
WARN2 24
BLU/RED
G402
LHD: G201, G401
RHD: G301, G401
ALTERNATOR
WHT/BLU
CHG 5
WHT/BLU
IG2 11
BLK/YEL
To IG2
PMR 21
YEL/RED
IG2
ABS INSPECTION CONNECTOR
18 COM(–)
BLU/WHT
GRN/BLK
GRN/BLU
GRN/YEL
LT BLU
MCK 17
BRN/YEL
+B2 13
WHT
CODE MEMORY
5V REGULATOR
To VCC
IG2
BLK/YEL
FSR 1
YEL/GRN
WHEEL SENSORS
R-OUT 16
YEL/WHT
FR OUT
5 FRW(+)
GRN/BLK
R-IN 3
RED/WHT
IN
FRW(–) 4
GRN
RIGHT-FRONT
FR-OUT 15
YEL/BLK
FLW(+) 3
GRN/BLU
FR-IN 2
RED/BLK
DETECTION CIRCUIT
(+)
(–)
FLW(–) 2
BRN/BLK
LEFT-FRONT
FL-OUT 14
YEL/BLU
RRW(+) 15
GRN/YEL
FL-IN 1
RED/BLU
IG2
RRW(–) 16
BLU/YEL
RIGHT-REAR
RLW(+) 13
LT BLU
P-SW 19
YEL
R-GND 10
BLK
RLW(–) 14
GRY
LEFT-REAR
BLK
FR-GND 12
BLK
FL-GND 25
BLK
LHD: G201, G401
RHD: G301, G401
BLK/YEL
○ : 26P CONNECTOR
□ : 22P CONNECTOR

ABS Control Unit Terminal Arrangement

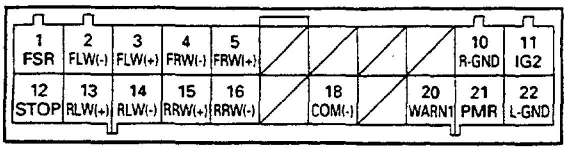


26P CONNECTOR

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, Solenoid 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	BRN	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	+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, Solenoid 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	BRN/YEL	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/RED	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



22P CONNECTOR **TERMINAL SIDE OF MALE TERMINALS** 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/BLK	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	BLK/YEL	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.	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	BLU/WHT	COM (–) (Common negative)	Ground for ALB checker when it is connected.		
20	BLU/RED	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. (Refer to the Symptom-to-System Chart for diagnostic period.)
- 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.)
  ⑤ After the DTC is stored in the control unit, the CPU stops self-diagnosis.

Kickback and Pump Operation:

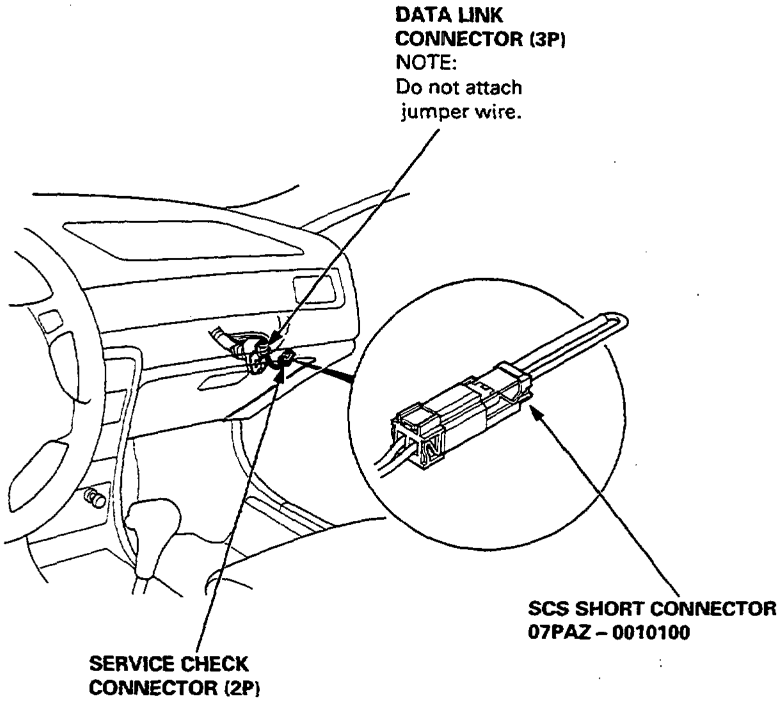
- When the engine is started, the ABS control unit begins the initial diagnosis and operates the solenoid valve one time. The kickback may be felt when the brake pedal is depressed.
- When the ABS control unit detects the pressure switch OFF signal during the initial diagnosis, it operates the pump motor, 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.
- After the repair finished off, test drive the car and check the ABS indicator light does not come ON again during the test. (Refer to the Symptom-to-System Chart for diagnostic period.)

Diagnostic Trouble Code (DTC) Indication

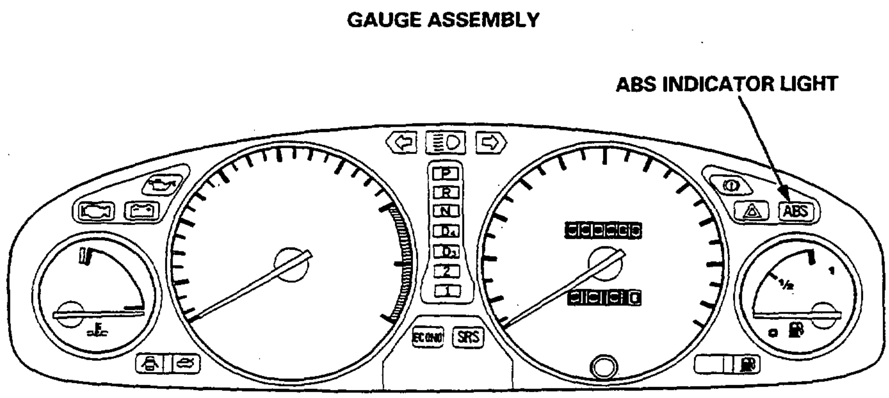
1. Connect the SCS short connector to the service check connector located under the dash of the passenger's seat side.



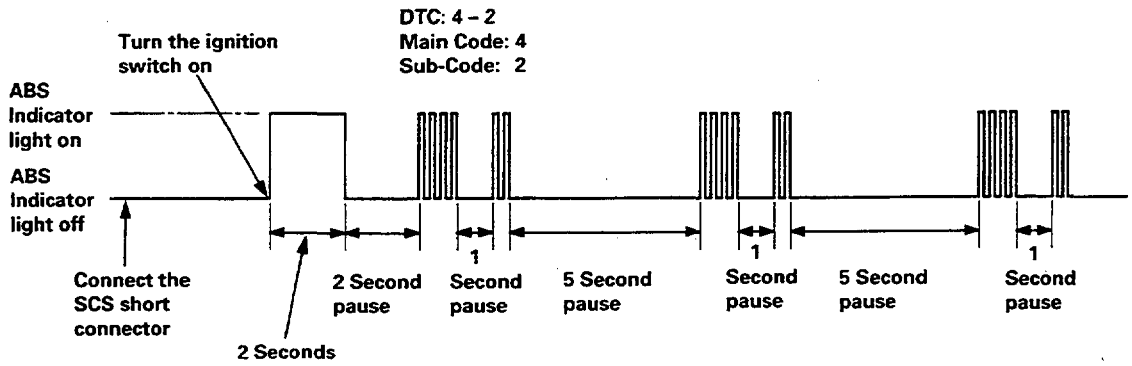
2. Turn the ignition switch ON, but do not start the engine.

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 (When the ABS control unit detected a problem three times.):



- Turn the ignition switch ON. The ABS indicator light comes on for two seconds to check the bulb.
- The ABS control unit indicates the DTC three times.
- 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) 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
—		ABS indicator light does not come on when ignition switch is turned ON					• Blown BACK-UP LIGHTS (10 A) fuse • Open circuit between the BACK-UP 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 RR DEF RLY/HEATER MOTOR RLY/COOLING FAN MOTOR RLY (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
1	—	ABS pump motor over-run	○	○			• Air mixed in the ABS brake fluid • 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 RR DEF RLY/HEATER MOTOR RLY/COOLING FAN MOTOR RLY (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 • 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
1	3	High pressure leakage			○		• Leaking outlet valve • Leaking relief valve • Poor contact in pressure switch circuit
1	4	Pressure switch	○				• Short to body ground between the ABS control unit and pressure switch • Pressure switch stuck ON • Faulty ABS control unit
1	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 (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
		19-66
		19-68
	• 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.	19-71
• 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.	19-73
• 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 is detected, that is during the engine in motion. The count is erased when the ABS functions.	19-79
	• 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.	19-81
• 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 switch 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.	19-82
• 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.	19-83

(cont'd)

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.	19-87
• (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.	19-87
• 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.	19-88 19-91 19-94 19-97
• 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.	19-100
	• 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.	19-102 19-104 19-107
• 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.	19-109 19-113 19-120
• Intermittent interruption in the wheel sensor • Rough road driving—(No problem)	• The ABS indicator light is turned on when the ABS functions continuously.	19-127
• (No problem)	• The ABS indicator light is turned on when there is a difference between the CPU data.	19-128
• (No problem)	• The ABS indicator light is turned on when there is a abnormality in the IC at the regular diagnosis.	19-128

Troubleshooting

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 (10 A) fuse
- Open circuit between the BACK-UP 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 (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 (10 A) fuse is blown.

Is the fuse OK?

NO — **Replace the fuse and recheck.**

YES

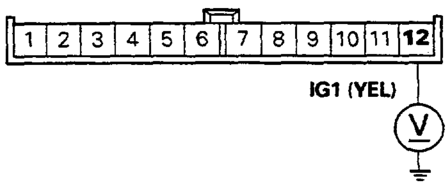
NOTE: Reinstall the fuse if it is OK.

Disconnect the gauge assembly 12P connector.

Turn the ignition switch ON.

Measure the voltage between the gauge assembly 12P connector No. 12 (YEL) terminal and body ground.

GAUGE ASSEMBLY 12P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Is there battery voltage?

NO —
- **Repair open in the YEL wire between the BACK-UP 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 19-67)

(From page 19-66)

Connect the gauge assembly 12P connector.

↓

Connect the gauge assembly 10P connector No. 4 (BLU/RED) 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/RED) terminal or 26P connector No. 24 (BLU/RED) terminal to body ground.

↓

Does the ABS indicator light come on?

- NO → **Repair open in the BLU/RED 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.

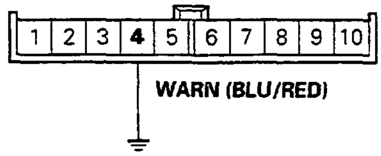
↓

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 (G402).
- NO ↓

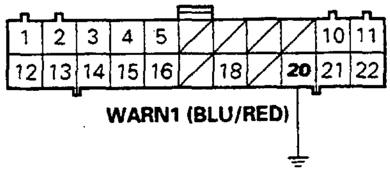
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

GAUGE ASSEMBLY 10P CONNECTOR

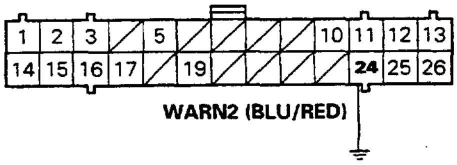


WIRE SIDE OF FEMALE TERMINALS

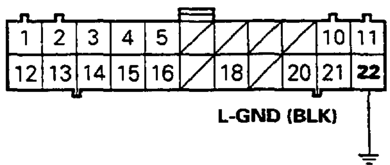
ABS CONTROL UNIT 22P CONNECTOR

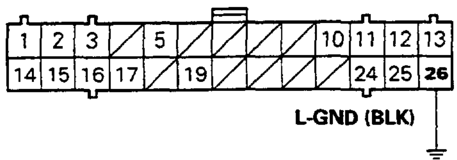


ABS CONTROL UNIT 26P CONNECTOR



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 RR DEF RLY/HEATER MOTOR RLY/COOLING FAN MOTOR RLY (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 19-60), 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 RR DEF RLY/HEATER MOTOR RLY/COOLING FAN MOTOR RLY (7.5 A) fuse in the under-dash fuse/relay box.

NOTE: The IG2 power source is checked in this step.

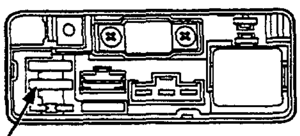
Is the fuse OK?

NO → **Replace the fuse and recheck.**

YES

Check the ABS B2 (15 A) fuse in the under-hood ABS fuse/relay box.

UNDER-HOOD ABS FUSE/RELAY BOX



ABS B2 (15 A) FUSE

Is the fuse OK?

NO → **Replace the fuse and recheck.**

YES

(To page 19-69) NOTE: Reinstall the fuse if it is OK.

(From page 19-68)

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) 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) terminal and body ground.

Is there battery voltage?

NO → **Repair open in the WHT wire between the under-hood ABS fuse/relay box and ABS control unit.**

YES ↓

NOTE: The WARN line is checked in this step with the ABS control unit connectors disconnected.

Turn the ignition switch ON.

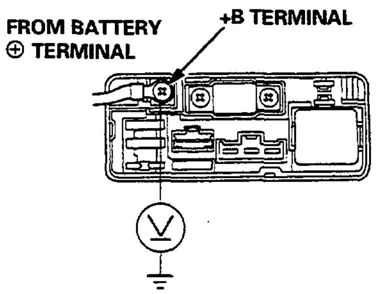
Does the ABS indicator light come on?

YES → **Repair short to body ground in the BLU/RED wire between the ABS indicator light and ABS control unit.**

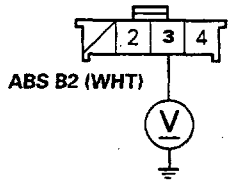
NO ↓

(To page 19-70)

UNDER-HOOD ABS FUSE/RELAY BOX

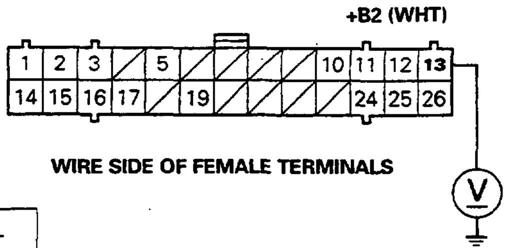


UNDER-HOOD ABS FUSE/RELAY BOX 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Troubleshooting

ABS Indicator Light Does Not Go Off (cont'd)

(From page 19-69)

Measure the voltage between the ABS control unit 22P connector No. 11 (BLK/YEL) terminal and body ground.

NOTE: The IG2 line is checked in this step.

Is there battery voltage?

NO → **Repair open in the BLK/YEL wire between the RR DEF RLY/HEATER MOTOR RLY/COOLING FAN MOTOR RLY (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.

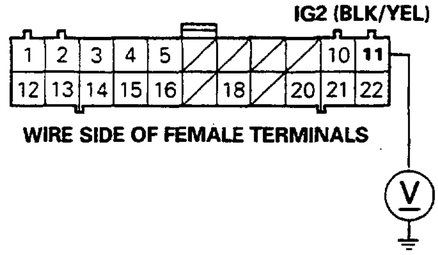
Is there battery voltage?

NO → **Repair open in the WHT/BLU wire between the alternator and ABS control unit.**

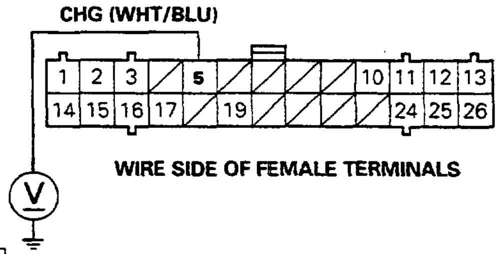
YES ↓

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:

- Air mixed in the ABS brake fluid
- 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 19-60), 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 ↓

Bleed ABS brake fluid of air (see page 19-132).

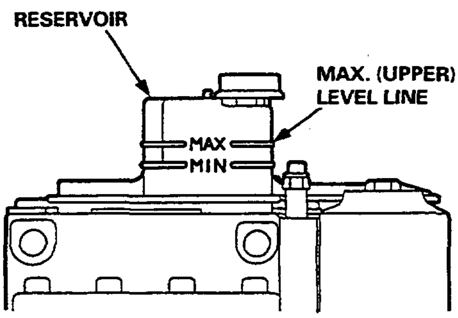
↓

Does the ABS indicator light go off after the bleeding?

YES → **Air mixed ABS brake fluid.**

NO ↓

(To page 19-72)



(cont'd)

ABS Pump Motor Over-run (cont'd)

(From page 19-71)

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 relief 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.

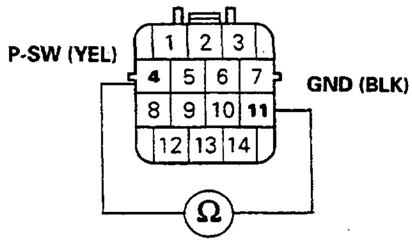
Is there battery voltage?

YES → **Repair open in YEL wire between the pressure switch and ABS control unit.**

NO ↓

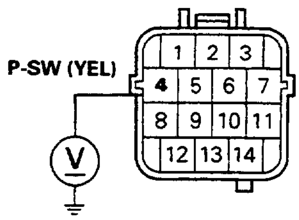
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

MODULATOR UNIT 14P CONNECTOR



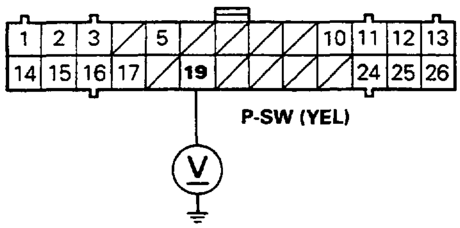
WIRE SIDE OF FEMALE TERMINALS

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

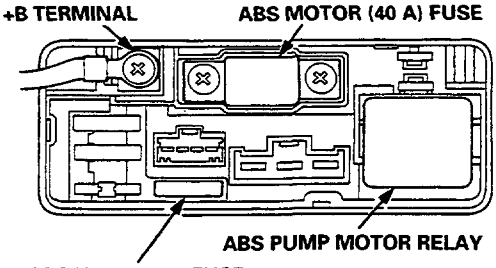
The ABS control unit checks the conditions at the pump motor relay drive (PMR) terminal and motor check (MCK) terminal during the initial diagnosis and regular diagnosis.
When the ABS control unit detects the following conditions during the diagnosis, it keeps the ABS indicator light on.
When the following 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 RR DEF RLY/HEATER MOTOR RLY/COOLING FAN MOTOR RLY (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

UNDER-HOOD ABS FUSE/RELAY BOX



— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-60), 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 19-74)

(cont'd)

ABS Pump Motor (cont'd)

(From page 19-73)

Remove the ABS pump motor relay and check it (see page 19-142)

Is the relay OK?

- NO → **Replace the ABS pump motor relay.**

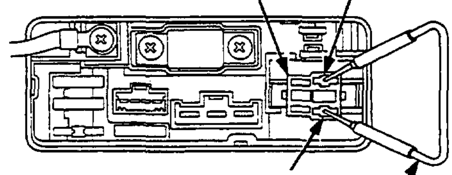
  NOTE: If the relay is stuck ON, the motor may be damaged.
  Check the pump motor operation.

- YES ↓

Bleed high pressure fluid from the modulator unit bleed screw (see page 19-132).

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 19-76) *To pump motor drive circuit check*
- YES ↓

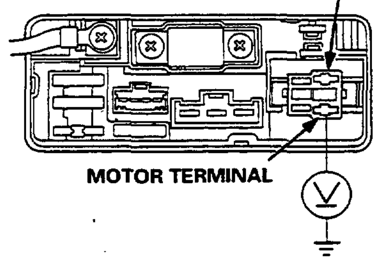
Remove the jumper wire.

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.

UNDER-HOOD ABS FUSE/RELAY BOX



Is there battery voltage?

- NO → (To page 19-77) To motor check (MCK) circuit check
- YES ↓

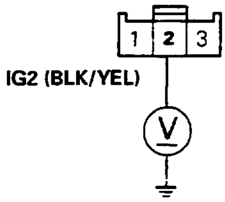
(To page 19-75)

(From page 19-74)

Measure the voltage between the under-hood ABS fuse/relay box 3P connector No. 2 (BLK/YEL) terminal and body ground.

NOTE: The ABS pump motor relay coil circuit is checked beginning with this step.

UNDER-HOOD ABS FUSE/RELAY BOX 3P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Is there battery voltage?

NO → **Repair open in the BLK/YEL wire between the RR DEF RLY/ HEATER MOTOR RLY/COOLING FAN MOTOR RLY (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?

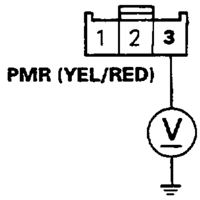
YES → (To page 19-78) To short to body ground check of the ABS pump motor relay coil circuit

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.

UNDER-HOOD ABS FUSE/RELAY BOX 3P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

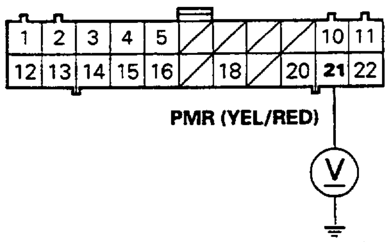
Is there battery voltage?

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.

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

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.

(cont'd)

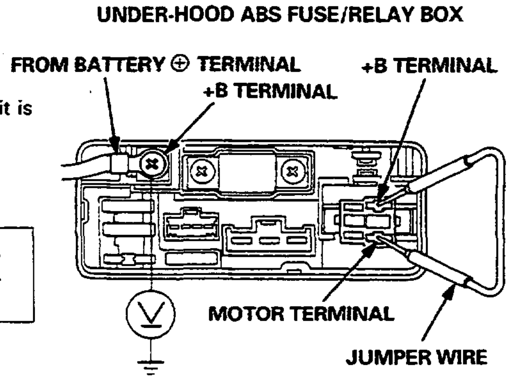
Troubleshooting

ABS Pump Motor (cont'd)

(From page 19-74)

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.

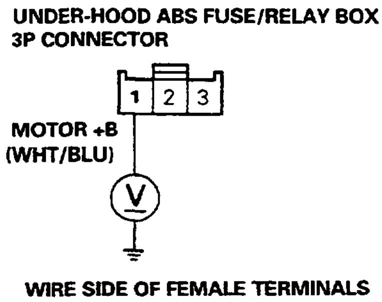


Is there battery voltage?

- 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.



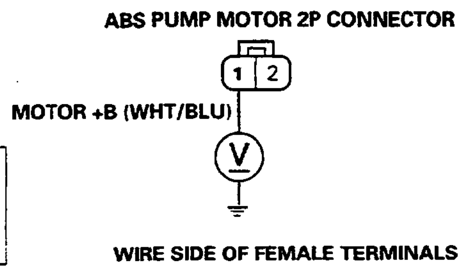
Is there battery voltage?

- NO → **Replace the under-hood ABS fuse/relay box.**
- YES ↓

Disconnect the ABS pump motor 2P connector.

↓

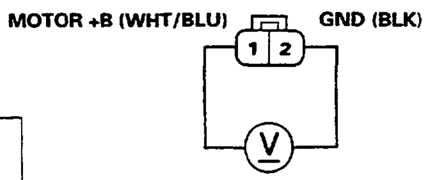
Measure the voltage between the ABS pump motor 2P connector No. 1 (WHT/BLU) terminal and body ground.



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 (G202).**
- YES ↓

Replace the ABS pump motor.

(From page 19-74)

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 (BRN/YEL) 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 (BRN/YEL) terminal and body ground.

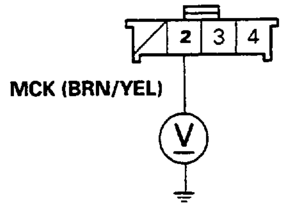
Is there battery voltage?

YES → **Repair open in the BRN/YEL wire between the under-hood ABS fuse/relay box and ABS control unit.**

NO ↓

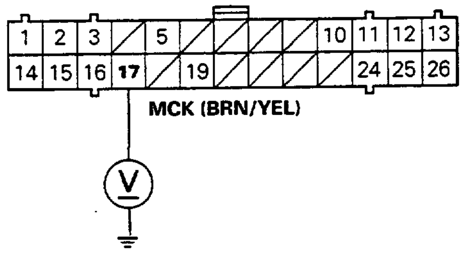
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

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 19-75)

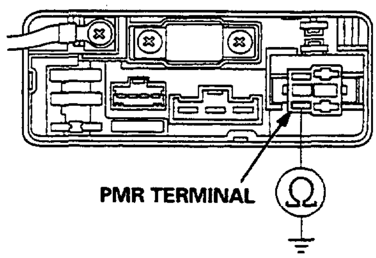
Remove the ABS pump motor relay.

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.

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.

UNDER-HOOD ABS FUSE/RELAY BOX



Is there continuity?

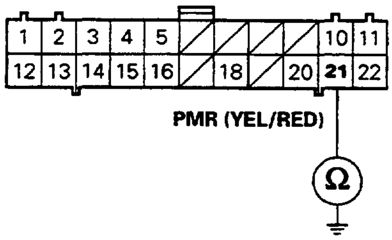
YES → **Replace the under-hood ABS fuse/relay box. (Short circuit inside the box)**

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.

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

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.

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

—With engine running, ABS indicator light is ON.
—With the SCS short connector connected (see page 19-60), DTC 1-3 is indicated.

Check the modulator unit for brake fluid leakage.

Is there leakage?

YES → **Tighten the modulator unit fitting, or replace the modulator unit if it cannot be repaired.**

NO

Start the engine.

Does the ABS pump motor operate?

YES → Turn the ignition switch OFF after the ABS pump motor stops, and wait for 30 minutes.

NOTE: This step lets the accumulator gas cool.

Restart the engine.

Does the ABS pump motor operate?

YES → Wait until the ABS pump motor stops.

NO

NO

(To page 19-80)

(cont'd)

High Pressure Leakage (cont'd)

(From page 19-79)

Turn the ignition switch OFF.

Disconnect the modulator unit 14P connector.

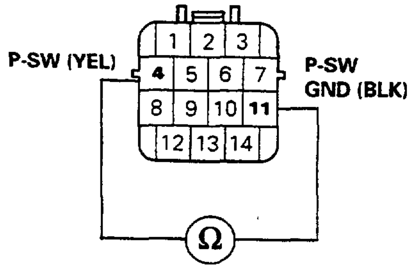
After 30 minutes, check for continuity between the modulator unit 14P connector No. 4 (YEL) and No. 11 (BLK) terminals.

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 19-60), DTC 1-4 is indicated.

Bleed the high pressure brake fluid from the modulator unit (see page 19-132).

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.

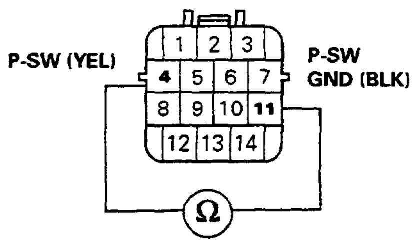
Is there continuity?

YES — **Repair short to body ground in the YEL wire between the ABS control unit and modulator unit.**

NO

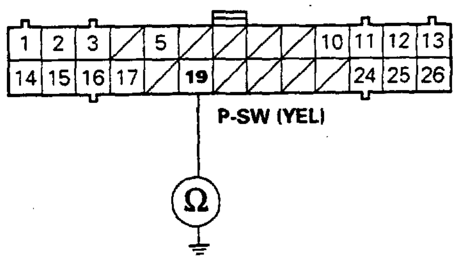
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Troubleshooting

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 19-60), 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 ↓

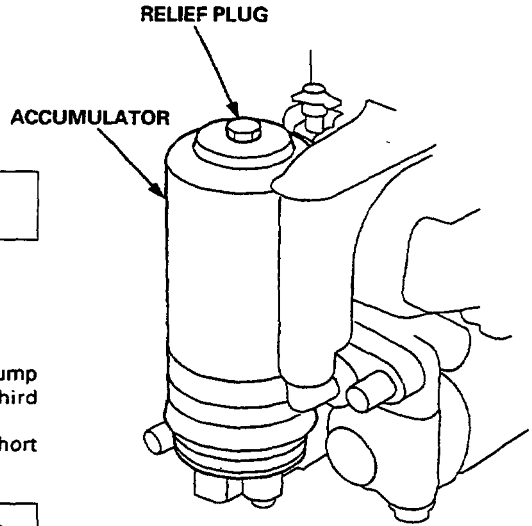
Confirm the ABS code (see page 19-60).

Is code 1-8 indicated?

NO → **Perform the appropriate troubleshooting 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 (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 19-60), 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 19-85)

NO ↓

Remove the gauge assembly (see section 23), then disconnect the gauge assembly 12P connector.

↓

Measure the voltage between the gauge assembly 12P connector No. 12 (YEL) terminal and body ground.

↓

Is there battery boltage? — NO → **Repair open in the YEL wire between the BACK-UP LIGHTS (10 A) fuse and gauge assembly.**

YES ↓

Check the brake system light bulb.

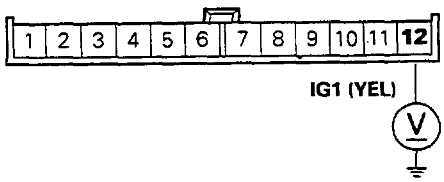
↓

Is the bulb OK? — NO → **Replace the brake system light bulb.**

YES ↓

(To page 19-84)

GAUGE ASSEMBLY 12P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Parking Brake (cont'd)

(From page 19-83)

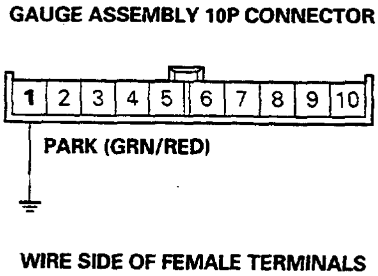
Connect the gauge assembly 12P connector.

Connect the gauge assembly 10P connector No. 1 (GRN/RED) terminal to body ground.

Does the brake system light come on?

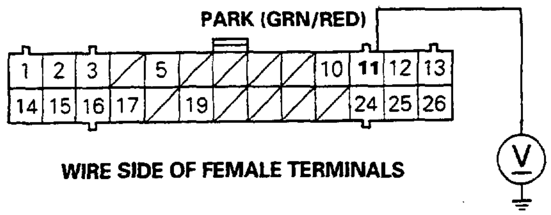
NO — **Replace the printed circuit board in the gauge assembly.**

YES — **Repair open in the GRN/RED wire between the gauge assembly and parking brake switch.**



(From page 19-83)

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

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.

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)**

NO → 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 19-86)

(cont'd)

Parking Brake (cont'd)

(From page 19-85)

Check the parking brake switch (see section 23).

Is the switch OK?

NO → **Replace the parking brake switch. (Switch stuck ON)**

YES ↓

Disconnect the ABS control unit 26P connector.

Does the brake system light go off?

YES → **Replace the ABS control unit. (Short to the body ground inside the unit)**

NO ↓

Repair short to body ground in the GRN/RED wire between the brake system light, parking brake switch and brake fluid level switch.

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.

Troubleshooting

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 19-60), DTC 4-1 is indicated.

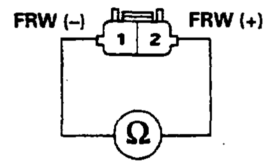
↓

Disconnect the right-front wheel sensor 2P connector.

↓

Measure the resistance between the wheel sensor 2P connector No. 1 and No. 2 terminals.

RIGHT-FRONT WHEEL SENSOR 2P CONNECTOR

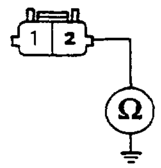


↓

Is there 600 ~ 900 Ω? — NO → **Replace the right-front wheel sensor.**

YES ↓

Check for continuity between the wheel sensor 2P connector No. 2 terminal and body ground.



WIRE SIDE OF FEMALE TERMINALS

↓

Is there continuity? — YES → **Replace the right-front wheel sensor.**

NO ↓

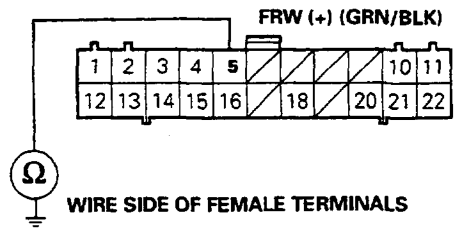
Disconnect the ABS control unit 22P connector.

↓

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.

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

↓

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 19-89)

(From page 19-88)

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 600 – 900 Ω?

YES → (To page 19-90)

NO → Connect the ABS control unit 22P connector No. 5 (GRN/BLK) terminal to body ground.

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.

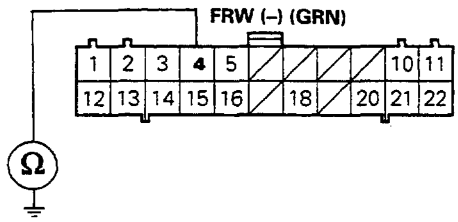
NOTE: Check with the ABS control unit 22P connector disconnected.

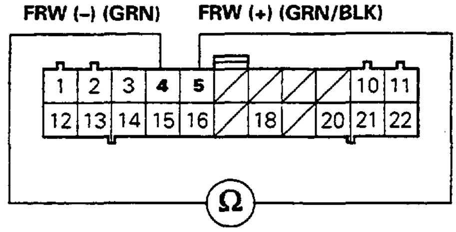
Is there continuity?

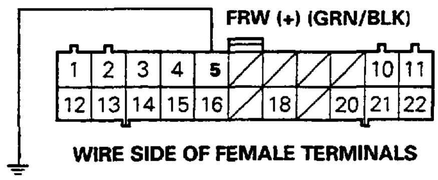
NO → **Repair open in the GRN/BLK wire between the ABS control unit and right-front wheel sensor.**

YES → **Repair open in the GRN wire between the ABS control unit and right-front wheel sensor.**

ABS CONTROL UNIT 22P CONNECTOR

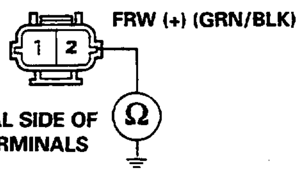






WIRE SIDE OF FEMALE TERMINALS

RIGHT-FRONT WHEEL SENSOR 2P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS

(To page 19-90)

(cont'd)

Troubleshooting

Right-front Wheel Sensor (cont'd)

(From page 19-89)

Measure the right-front wheel sensor air gap (see page 19-143).

Is the air gap OK?

NO → **Correct the right-front wheel sensor air gap.**

YES

Connect the ALB checker to the ABS inspection connector (see page 19-129).

Start the engine.

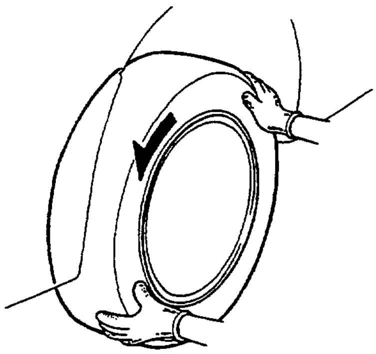
Turn the Mode Selector switch to "5".

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:

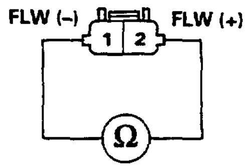
- Open circuit, internal short or short to body ground in the left-front wheel sensor
- Open circuit or short to body ground in the positive (+) wire between the left-front wheel sensor and ABS control unit
- Open circuit or short to body ground in the negative (–) wire between the left-front wheel sensor 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 19-60), 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.

LEFT-FRONT WHEEL SENSOR 2P CONNECTOR

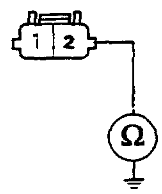


Is there 600 – 900 Ω?

NO → **Replace the left-front wheel sensor.**

YES

Check for continuity between the wheel sensor 2P connector No. 2 terminal and body ground.



WIRE SIDE OF FEMALE TERMINALS

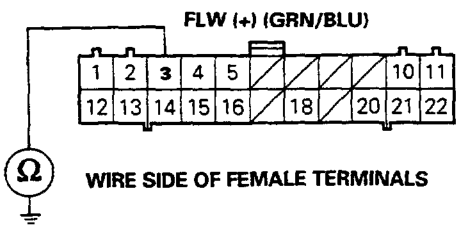
Is there continuity?

YES → **Replace the left-front wheel sensor.**

NO

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. 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 19-92)

(cont'd)

Left-front Wheel Sensor (cont'd)

(From page 19-91)

Check for continuity between the ABS control unit 22P connector No. 2 (BRN/BLK) terminal and body ground.

Is there continuity?

YES → Repair short to body ground in the BRN/BLK 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/BLK) and No. 3 (GRN/BLU) terminals.

Is there 600 – 900 Ω?

NO → Connect the ABS control unit 22P connector No. 3 (GRN/BLU) terminal to body ground.

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.

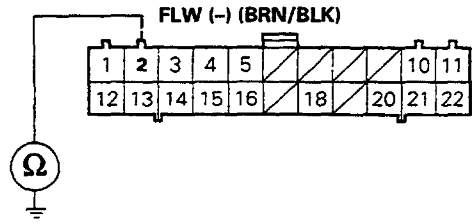
YES ↓

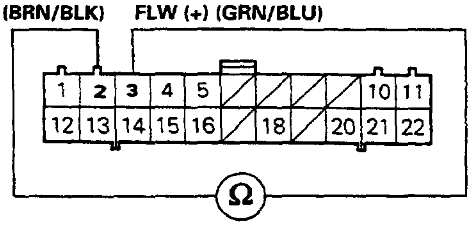
Repair open in the BRN/BLK wires between the ABS control unit and left-front wheel sensor.

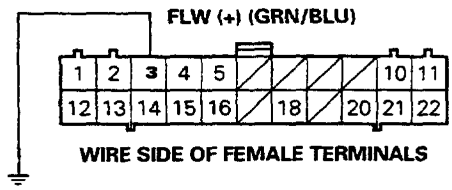
YES ↓

(To page 19-93)

ABS CONTROL UNIT 22P CONNECTOR

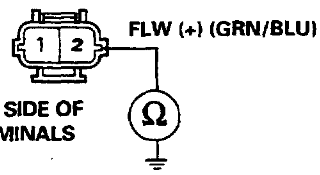






WIRE SIDE OF FEMALE TERMINALS

LEFT-FRONT WHEEL SENSOR 2P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS

NOTE: Check with the ABS control unit 22P connector disconnected.

(From page 19-92)

Measure the left-front wheel sensor air gap (see page 19-143).

Is the air gap OK?

NO → **Correct the left-front wheel sensor air gap.**

YES

Connect the ALB checker to the ABS inspection connector (see page 19-129).

Start the engine.

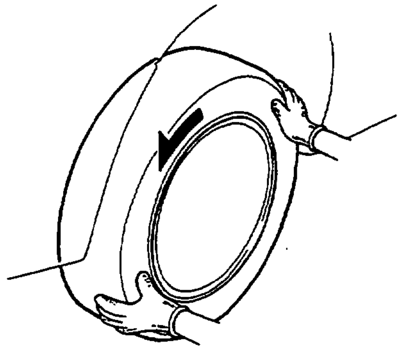
Turn the Mode Selector switch to "4".

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.**

Troubleshooting

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 19-60), DTC 4-4 is indicated.

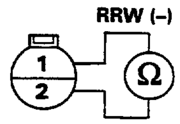
↓

Disconnect the right-rear wheel sensor 2P connector.

↓

Measure the resistance between the wheel sensor 2P connector No. 1 and No. 2 terminals.

RIGHT-REAR WHEEL SENSOR
2P CONNECTOR

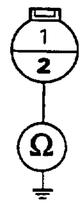


↓

Is there 700 – 1,100 Ω? — NO → **Replace the right-rear wheel sensor.**

YES ↓

Check for continuity between the wheel sensor 2P connector No. 2 terminal and body ground.



WIRE SIDE OF FEMALE TERMINALS

↓

Is there continuity? — YES → **Replace the right-rear wheel sensor.**

NO ↓

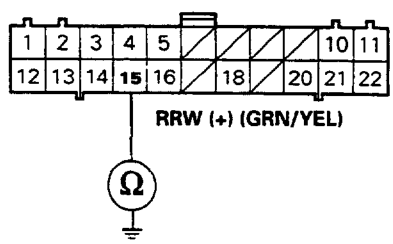
Disconnect the ABS control unit 22P connector.

↓

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.

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

↓

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 19-95)

(From page 19-94)

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 700 – 1,100 Ω?

YES ↓

(To page 19-96)

NO → Connect the ABS control unit 22P connector No. 15 (GRN/YEL) terminal to body ground.

Disconnect the right-rear wheel sensor 2P connector.

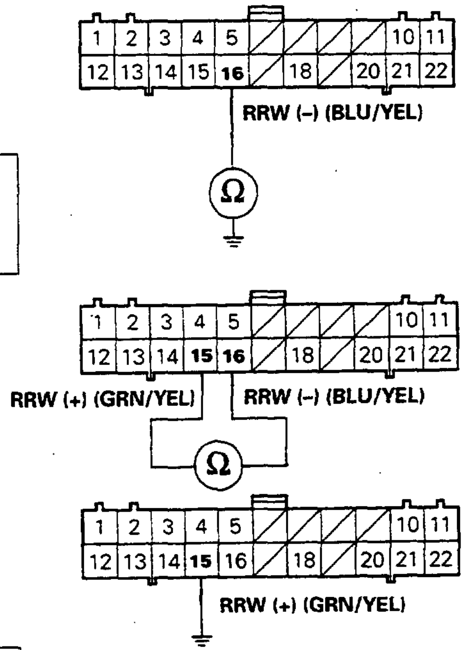
Check for continuity between the wheel sensor 2P connector No. 2 (GRN/YEL) terminal and body ground.

Is there continuity?

NO → **Repair open in the GRN/YEL wire between the ABS control unit and right-rear wheel sensor.**

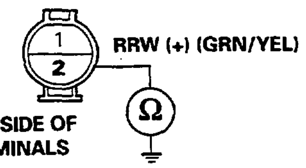
YES → **Repair open in the BLU/YEL wire between the ABS control unit and right-rear wheel sensor.**

ABS CONTROL UNIT 22P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

RIGHT-REAR WHEEL SENSOR 2P CONNECTOR



TERMINAL SIDE OF MALE TERMINALS

NOTE: Check with the ABS control unit 22P connector disconnected.

(cont'd)

Troubleshooting

Right-rear Wheel Sensor (cont'd)

(From page 19-95)

Measure the right-rear wheel sensor air gap (see page 19-143).

Is the air gap OK?

NO → **Correct the right-rear wheel sensor air gap.**

YES ↓

Connect the ALB checker to the ABS inspection connector (see page 19-129).

Start the engine.

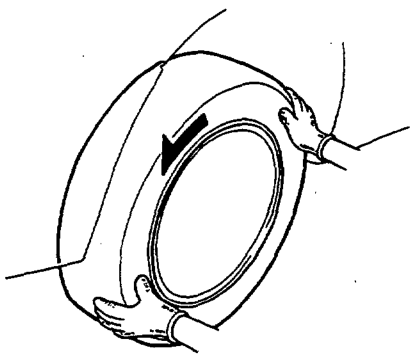
Turn the Mode Selector switch to "3".

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 19-60), DTC 4-8 is indicated.

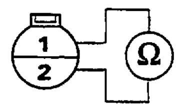
↓

Disconnect the left-rear wheel sensor 2P connector.

↓

Measure the resistance between the wheel sensor 2P connector No. 1 and No. 2 terminals.

LEFT-REAR WHEEL SENSOR 2P CONNECTOR

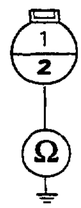


↓

Is there 700 – 1,100 Ω? — NO → **Replace the left-rear wheel sensor.**

YES ↓

Check for continuity between the wheel sensor 2P connector No. 2 terminal and body ground.



WIRE SIDE OF FEMALE TERMINALS

↓

Is there continuity? — YES → **Replace the left-rear wheel sensor.**

NO ↓

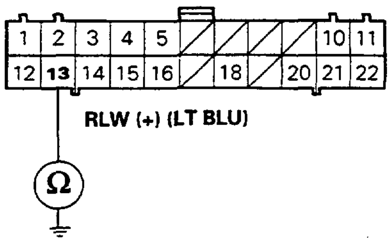
Disconnect the ABS control unit 22P connector.

↓

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.

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

↓

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 19-98)

(cont'd)

Left-rear Wheel Sensor (cont'd)

(From page 19-97)

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.

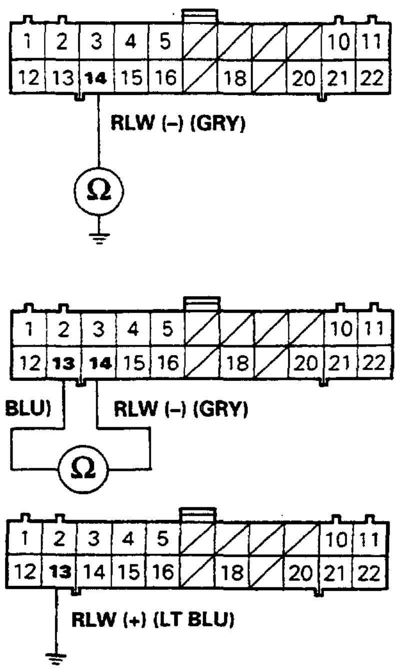
Measure the resistance between the ABS control unit 22P connector No. 13 (LT BLU) and No. 14 (GRY) terminals.

Is there 700 – 1,100 Ω?

- NO → Connect the ABS control unit 22P connector No. 13 (LT BLU) terminal to the body ground.
  - 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.**
- YES ↓

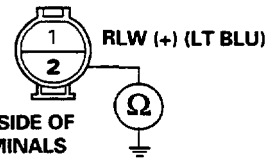
(To page 19-99)

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 19-98)

Measure the left-rear wheel sensor air gap (see page 19-143).

Is the air gap OK?

NO → **Correct the left-rear wheel sensor air gap.**

YES

Connect the ALB checker to the ABS inspection connector (see page 19-129).

Start the engine.

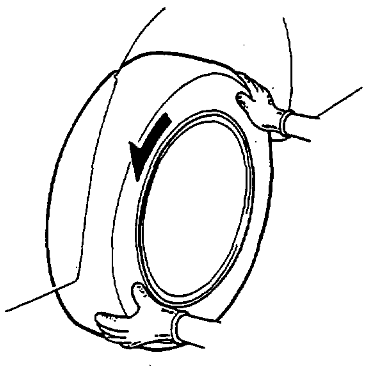
Turn the Mode Selector switch to "2".

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

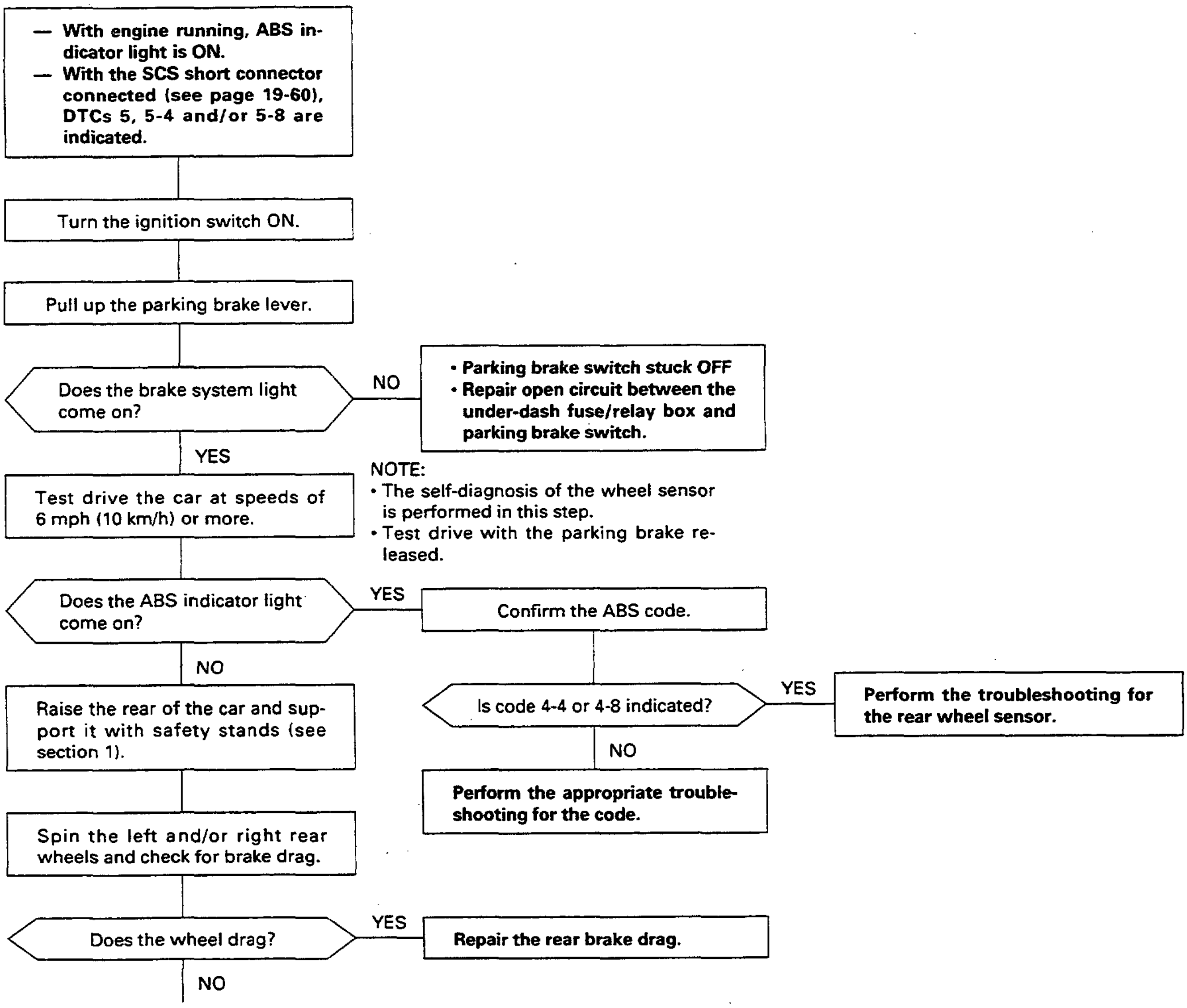
- **Intermittent failure, the system is OK at this time.**
- **Test drive the car. If the symptom reappears, replace the ABS control unit.**

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



(To page 19-101)

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

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-60), DTC 6 is indicated.

Start the engine.

Does the ABS indicator light go off?

YES → **The ABS is OK at this time. Check for damaged wire harness between the ABS control unit, solenoids and fail-safe relays (intermittent short to power).**

NO

Confirm the ABS code that appears first.

Is code 6 indicated?

NO → **Perform the appropriate troubleshooting for the code.**

YES

Turn the ignition switch OFF.

(To page 19-103)

(From page 19-102)

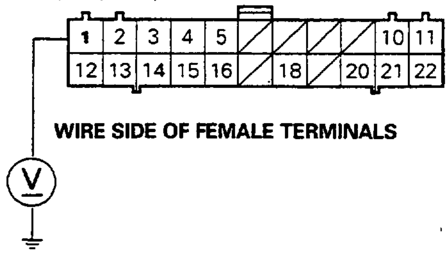
Disconnect the ABS control unit 22P connector.

Start the engine.

Measure the voltage between the ABS control unit 22P connector No. 1 (YEL/GRN) terminal and body ground.

ABS CONTROL UNIT 22P CONNECTOR

FSR (YEL/GRN)



WIRE SIDE OF FEMALE TERMINALS

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.

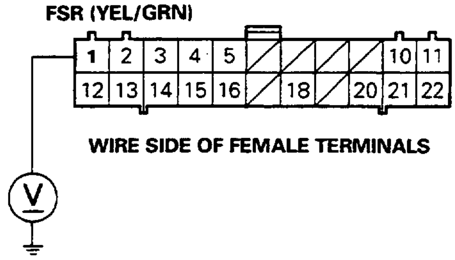
Connect the ABS control unit 22P connector.

Turn the ignition switch ON.

Measure the voltage between the ABS control unit 22P connector No. 1 (YEL/GRN) terminal and body ground.

ABS CONTROL UNIT 22P CONNECTOR

FSR (YEL/GRN)



WIRE SIDE OF FEMALE TERMINALS

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 19-104) and DTC 6-4 (see page 19-107).

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

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-60), DTC 6-1 is indicated.

Start the engine.

Does the ABS indicator light go off?

YES → **The ABS is OK at this time. Check for damaged wire harness between the ABS control unit, solenoids and front fail-safe relay (intermittent short to power).**

NO ↓

Confirm the ABS code that appears first.

Is code 6-1 indicated?

NO → **Perform the appropriate troubleshooting for the code.**

YES ↓

Check the front fail-safe relay (see page 19-142).

Wire colors of the front fail-safe relay connector: WHT/GRN, BRN/BLK, YEL/GRN, BLK

Is the relay OK?

NO → **Replace the front fail-safe relay.**

YES ↓

Disconnect the modulator unit 14P connector.

Visually check the modulator wire harness.

Is there a short to power?

YES → **Replace the modulator wire harness (or repair short).**

NO ↓

(To page 19-105)

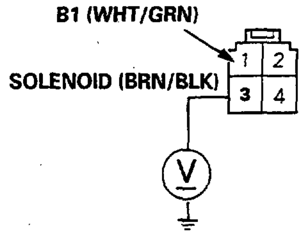
(From page 19-104)

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.

FRONT FAIL-SAFE RELAY CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Is there battery voltage? — YES → **Repair short to power in the BRN/BLK wire between the front fail-safe relay and modulator unit.**

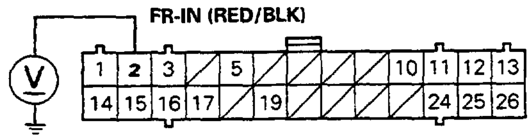
NO ↓

Turn the ignition switch OFF.

Disconnect the ABS control unit 26P connector.

Start the engine.

ABS CONTROL UNIT 26P CONNECTOR



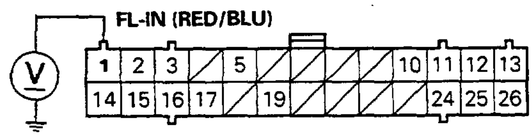
WIRE SIDE OF FEMALE TERMINALS

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 19-106)

(cont'd)

Front Fail-safe Relay (cont'd)

(From page 19-105)

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.

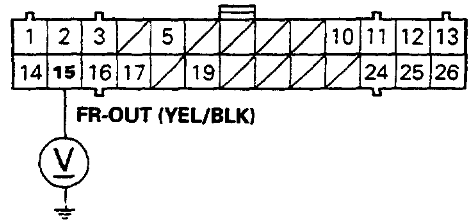
Is there battery voltage?

YES — **Repair short to power in the YEL/BLU wire between the ABS control unit and modulator unit.**

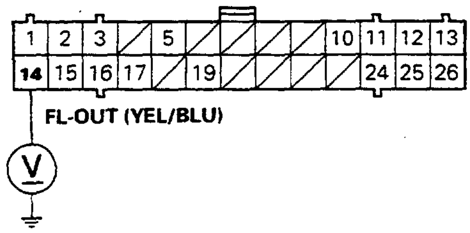
NO

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

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-60), DTC 6-4 is indicated.

Start the engine.

Does the ABS indicator light go off?

YES — **The ABS is OK at this time. Check for damaged wire harness between the ABS control unit, solenoid and rear fail-safe relay (intermittent short to power).**

NO

Confirm the ABS code that appears first.

Is code 6-4 indicated?

NO — **Perform the appropriate troubleshooting for the code.**

YES

Check the rear fail-safe relay (see page 19-142).

Wire colors of the rear fail-safe relay connector: WHT, BLU/BLK, YEL/GRN, BLK

Is the relay OK?

NO — **Replace the rear fail-safe relay.**

YES

Disconnect the modulator unit 14P connector.

Visually check the modulator wire harness.

Is there a short to power?

YES — **Replace the modulator wire harness (or repair short).**

NO

(To page19-108)

(cont'd)

Rear Fail-safe Relay (cont'd)

(From page 19-107)

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.

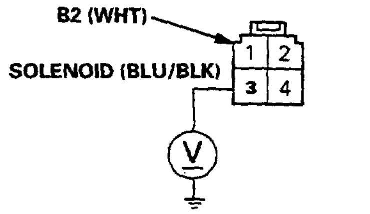
↓

Is there battery voltage?

- YES → **Repair short to power in the YEL/WHT wire between the ABS control unit and modulator unit.**
- NO ↓

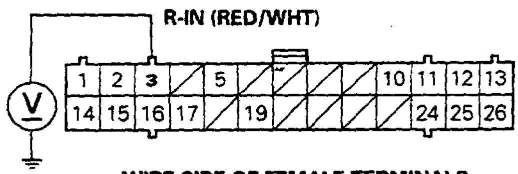
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

REAR FAIL-SAFE RELAY CONNECTOR

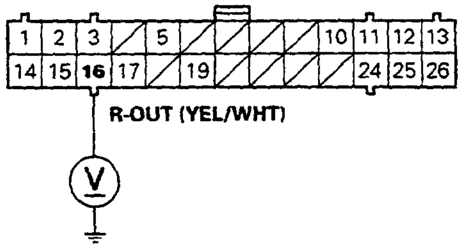


WIRE SIDE OF FEMALE TERMINALS

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



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 19-60), 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 troubleshooting for the code.**
- YES ↓

Check the ABS B1 (20 A) fuse in the under-hood ABS fuse/relay box.

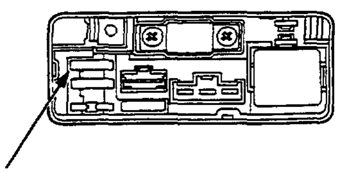
↓

Is the fuse OK?
- NO → **Replace the fuse, and recheck.**
- YES ↓

NOTE: Reinstall the fuse if it is OK.

(To page 19-114)

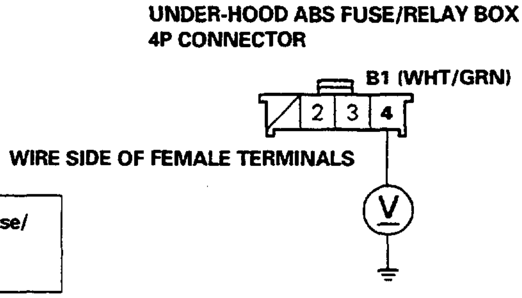
UNDER-HOOD ABS FUSE/RELAY BOX



(cont'd)

Left-front Solenoid (cont'd)

(From page 19-113)



Measure the voltage between the under-hood ABS fuse/relay box 4P connector No. 4 (WHT/GRN) terminal and body ground.

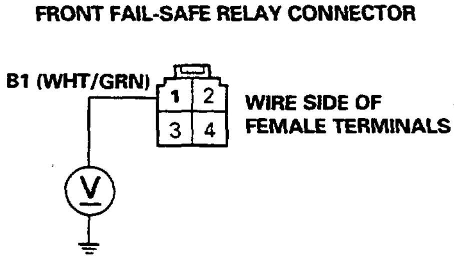
Is there battery voltage?

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 19-142).

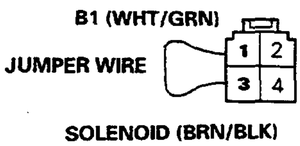
Is the relay OK?

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 19-115)

(From page 19-114)

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.

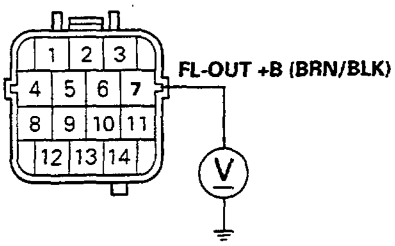
Is the resistance as specified?
Inlet: 2.5 – 2.9 Ω or 6.5 – 7.5 Ω
Outlet: 2.5 – 2.9 Ω or 3.3 – 3.9 Ω

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)**

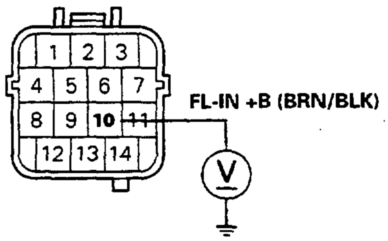
YES

(To page 19-116)

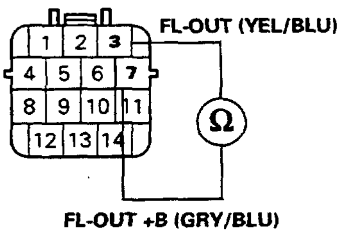
MODULATOR UNIT 14P CONNECTOR



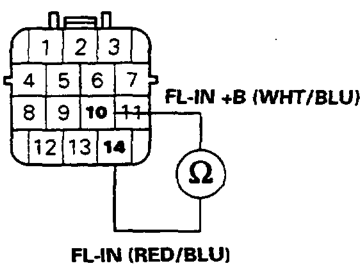
TERMINAL SIDE OF MALE TERMINALS



MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

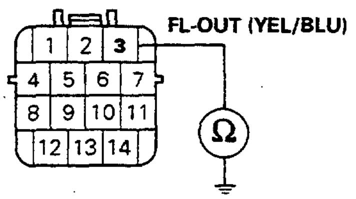


(cont'd)

Left-front Solenoid (cont'd)

(From page 19-115)

MODULATOR UNIT 14P CONNECTOR

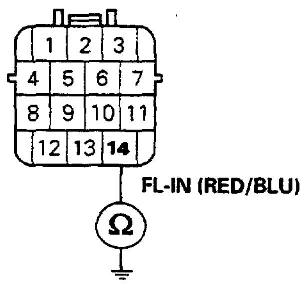


WIRE SIDE OF FEMALE TERMINALS

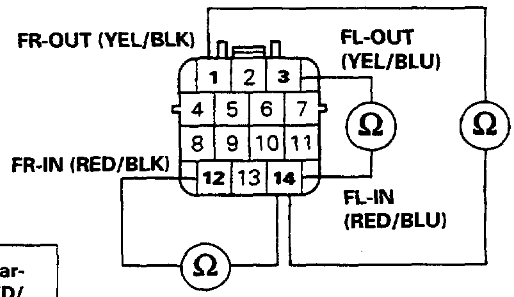
Check for continuity between the modulator unit 14P connector No. 3 (YEL/BLU) and No. 14 (RED/BLU) terminals and body ground.

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 ↓



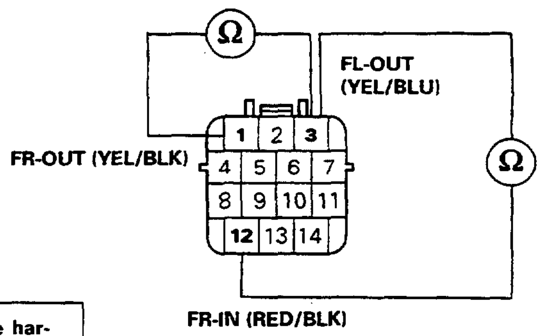
Check for continuity between the modulator unit 14P connector No. 14 (RED/BLU) terminal and following terminals:
- No. 3 (YEL/BLU): Left-front outlet
- No. 12 (RED/BLK): Right-front inlet
- No. 1 (YEL/BLK): Right-front outlet



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): Right-front outlet



Is there continuity?

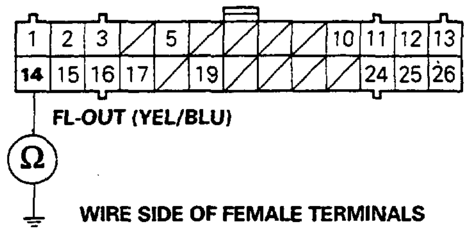
- YES → Replace the modulator wire harness. (Short to the RED/BLK or YEL/BLK wire in the YEL/BLU wire)
- NO ↓

(To page 19-117)

(From page 19-116)

Disconnect the ABS control unit 26P connector.

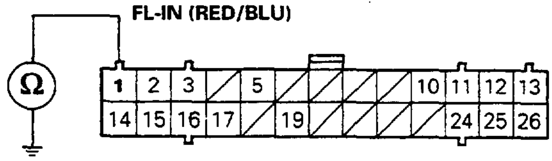
Check for continuity between the ABS control unit 26P connector No. 14 (YEL/BLU) and No. 1 (RED/BLU) terminals and body ground.



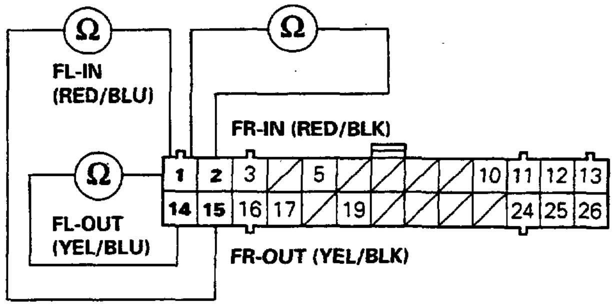
Is there continuity?

YES → **Repair short to body ground in the YEL/BLU or RED/BLU wire between the ABS control unit and modulator unit.**

NO ↓



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): Right-front outlet

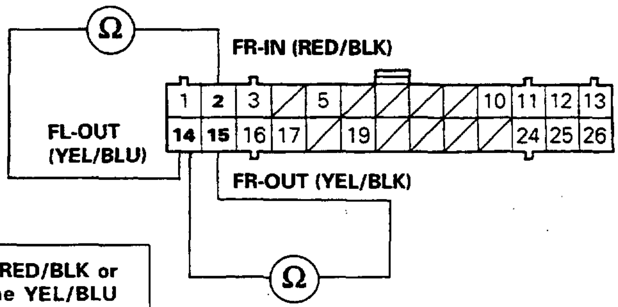


Is there continuity?

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): Right-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 19-118)

(cont'd)

Left-front Solenoid (cont'd)

(From page 19-117)

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.**

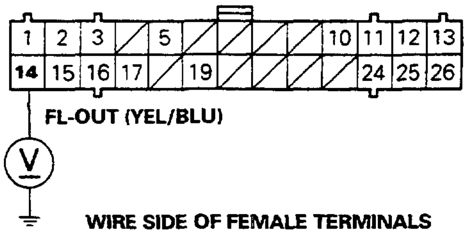
YES

Remove the rear fail-safe relay.

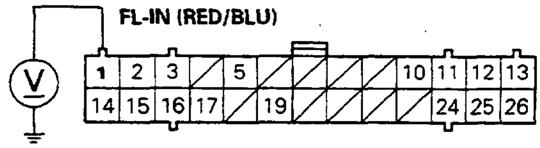
Remove the jumper wire from the front fail-safe relay connector.

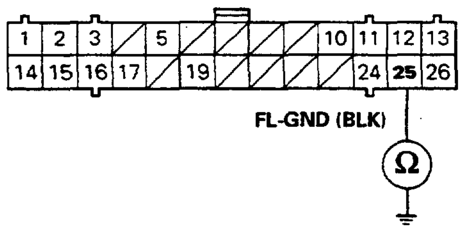
(To page 19-119)

ABS CONTROL UNIT 26P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS





(From page 19-118)

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.

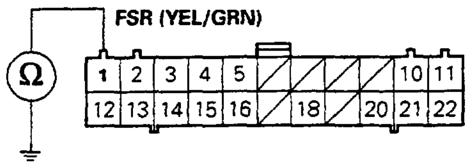
Is there continuity?

NO → **Repair open in the BLK wire between the front fail-safe relay and body ground, or poor ground.**

YES ↓

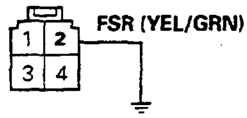
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

ABS CONTROL UNIT 22P CONNECTOR



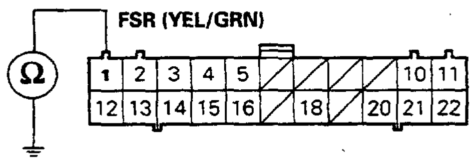
WIRE SIDE OF FEMALE TERMINALS

FRONT FAIL-SAFE RELAY CONNECTOR



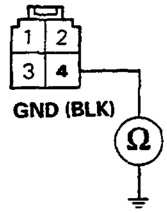
WIRE SIDE OF FEMALE TERMINALS

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.

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-60), DTC 7-4 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 7-4 indicated?

NO → **Perform the appropriate troubleshooting for the code.**

YES ↓

(To page 19-121)

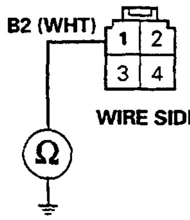
(From page 19-120)

Remove the rear fail-safe relay.

Wire colors of the rear fail-safe relay connector: WHT, BLU/BLK, YEL/GRN, BLK

Measure the voltage between the rear fail-safe relay connector No. 1 (WHT) terminal and body ground.

REAR FAIL-SAFE RELAY CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Is there battery voltage?

NO → **Repair open in the WHT wire between the under-hood ABS fuse/relay box and rear fail-safe relay.**

YES

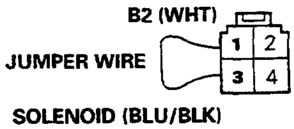
Check the rear fail-safe relay (see page 19-142).

Is the relay OK?

NO → **Replace the rear fail-safe relay.**

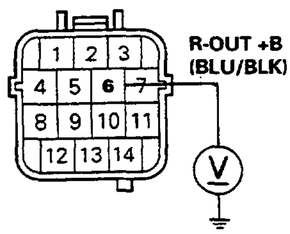
YES

Disconnect the modulator unit 14P connector.



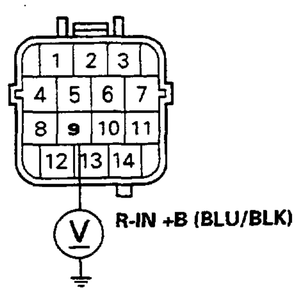
Connect the rear fail-safe relay connector No. 1 (WHT) and No. 3 (BLU/BLK) terminals using a jumper wire.

MODULATOR UNIT 14P CONNECTOR



Measure the voltage between the modulator unit 14P connector No. 6 (BLU/BLK) and No. 9 (BLU/BLK) terminals and body ground.

TERMINAL SIDE OF MALE TERMINALS



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 19-122)

(cont'd)

Rear Solenoid (cont'd)

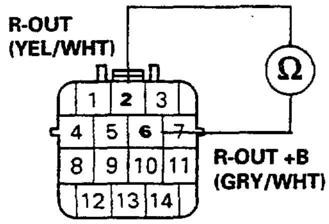
(From page 19-121)

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:

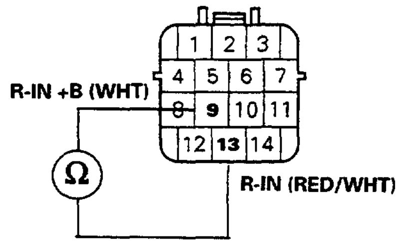
	STANDARD RESISTANCE	
	A TYPE	B TYPE
Inlet Solenoid	2.5 – 2.9 Ω	6.5 – 7.5 Ω
Outlet Solenoid	2.5 – 2.9 Ω	3.3 – 3.9 Ω

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.

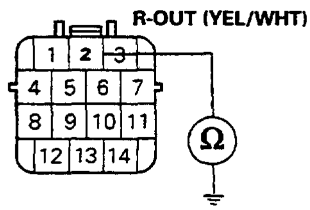


Is the resistance as specified?
Inlet: 2.5 – 2.9 Ω or 6.5 – 7.5 Ω
Outlet: 2.5 – 2.9 Ω or 3.3 – 3.9 Ω

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

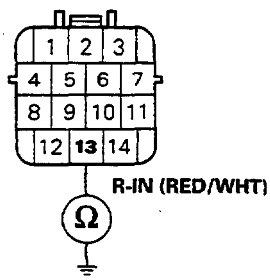
Check for continuity between the modulator unit 14P connector No. 2 (YEL/WHT) and No. 13 (RED/WHT) terminals and body ground.



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 19-123)

(From page 19-122)

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 ↓

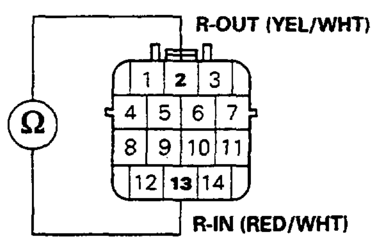
Check for continuity between the modulator unit 14P connector No. 2 (YEL/WHT) terminal and following terminals:
- No. 12 (RED/BLK): Right-front inlet
- No. 1 (YEL/BLK): Right-front outlet
- No. 14 (RED/BLU): Left-front inlet
- No. 3 (YEL/BLU): Left-front outlet

Is there continuity?

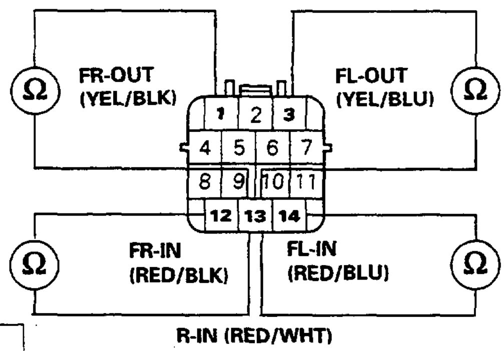
- YES → Replace the modulator wire harness. (Short to the RED/BLK, YEL/BLK, RED/BLU or YEL/BLU wire in the YEL/WHT wire)
- NO ↓

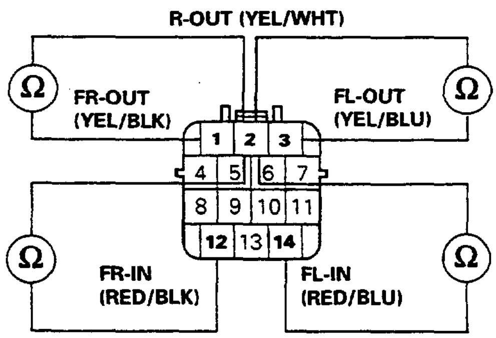
(To page 19-124)

MODULATOR UNIT 14P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



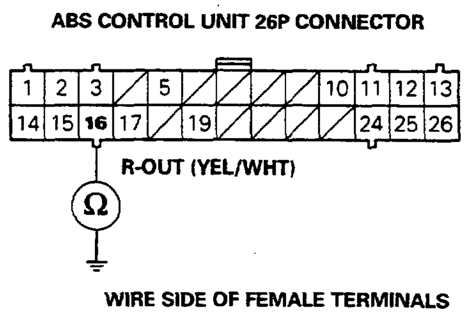


(cont'd)

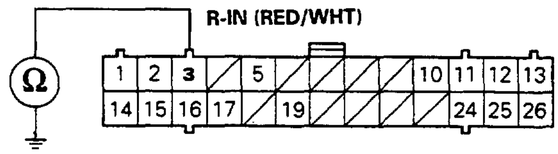
Rear Solenoid (cont'd)

(From page 19-123)

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.

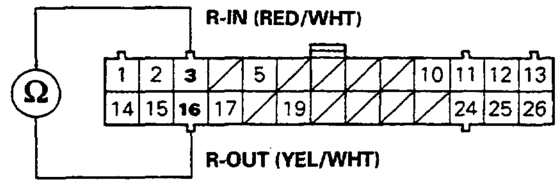


Is there continuity?

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.

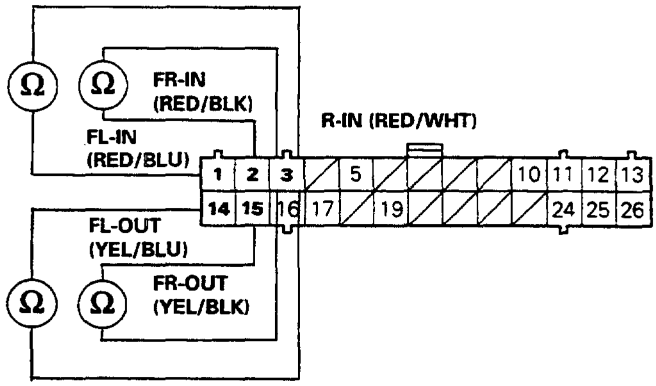


Is there continuity?

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.**

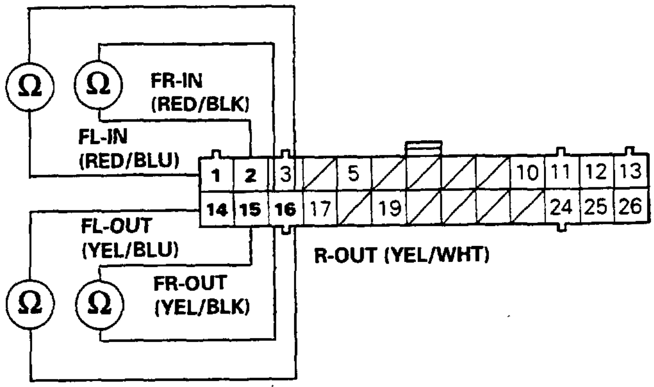
NO ↓

(To page 19-125)

(From page 19-124)

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

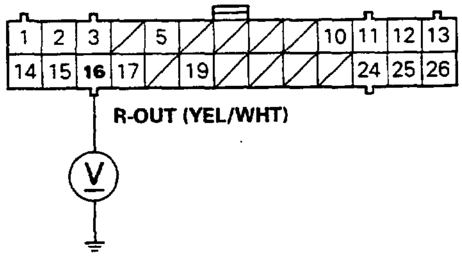


WIRE SIDE OF FEMALE TERMINALS

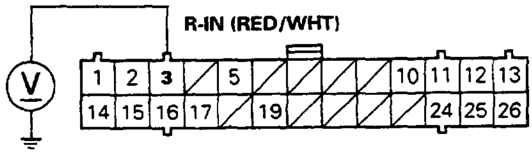
Is there continuity? — YES → **Repair short to the RED/BLK, YEL/BLK, RED/BLU or YEL/BLU wire in the YEL/WHT wire between the ABS control unit and modulator unit.**

NO ↓

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.

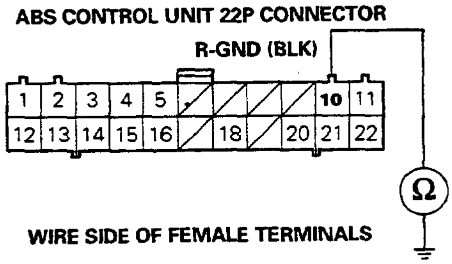


Is there battery voltage? — NO → **Repair open in the YEL/WHT or RED/WHT wire between the ABS control unit and modulator unit.**

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 19-126)

(cont'd)

Rear Solenoid (cont'd)

(From page 19-125)

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.

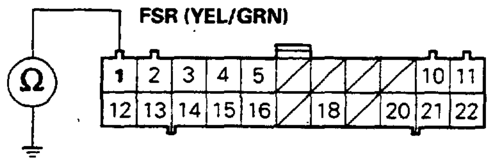
Is there continuity?

NO → **Repair open in the BLK wire between the rear fail-safe relay and body ground, or poor ground.**

YES ↓

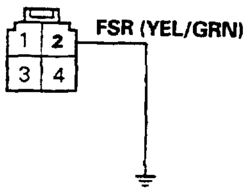
Check for loose ABS control unit connectors. If necessary, substitute a known-good ABS control unit and recheck.

ABS CONTROL UNIT 22P CONNECTOR



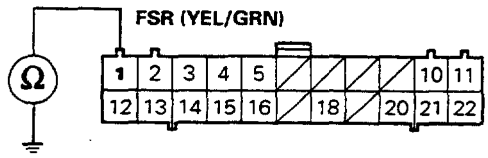
WIRE SIDE OF FEMALE TERMINALS

REAR FAIL-SAFE RELAY CONNECTOR



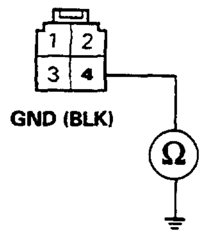
WIRE SIDE OF FEMALE TERMINALS

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

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-60), DTC 8-1 is indicated.

↓

Test drive the car at speeds of 12 mph (20 km/h) or more for more than 2 minutes.

↓

Does the ABS indicator light come on?

NO → **• The system is OK at this time. Check for loose wheel sensor connectors and sensor installation condition (intermittent trouble).**
• Probable cause was driving over rough roads.

YES ↓

Confirm the ABS code (see page 19-60).

↓

Is code 8-1 indicated?

NO → **Perform the appropriate troubleshooting for the code.**
• Faulty wheel sensor
• Chipped pulser gear

YES ↓

Replace the 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.

— With engine running, ABS indicator light is ON.
— With the SCS short connector connected (see page 19-60), DTC 8-2 is indicated.

Start the engine.

Does the ABS indicator light come on?
NO → **The system is OK at this time.**
YES ↓

Confirm the ABS code (see page 19-60).

Is code 8-2 indicated?
NO → **Perform the appropriate troubleshooting for the code.**
YES ↓

Replace the ABS control unit.

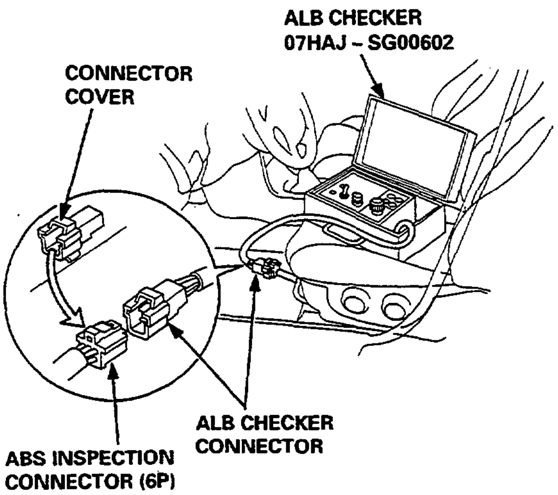
Diagnostic Trouble Code (DTC) 8-4: IC (Intergrated Circuit) Diagnosis

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.

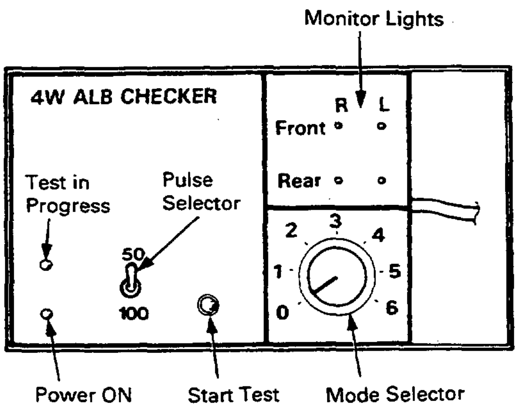
Replace the ABS control unit if DTC 8-4 is indicated with the SCS short connector connected (see page 19-60).

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 19-66.
4. With the ignition switch OFF, disconnect the ABS inspection connector (6P) from the connector cover located on the cross-member under the driver's seat, 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)

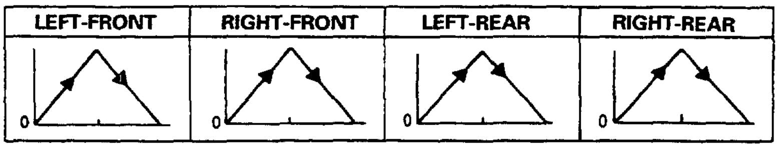
ABS Function Test (cont'd)

Operation Sequence Simulated by Modes of ALB Checker

NOTE: The wheel sensors and sensor wire harnesses are not checked by the ALB checker.

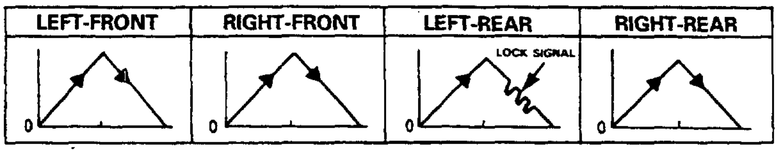
Mode 1: Sends the simulated driving signal 0 mph (0 km/h) → 113 mph (180 km/h) → 0 mph (0 km/h) of each wheel to the ABS control unit to check the system under the normal driving. There should be no kickback.

SIMULATED DRIVING SIGNAL



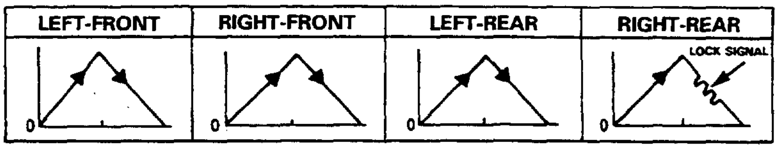
Mode 2: Sends the driving signal of each wheel, then sends the lock signal of the left-rear wheel to the ABS control unit to check the system under left-rear wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



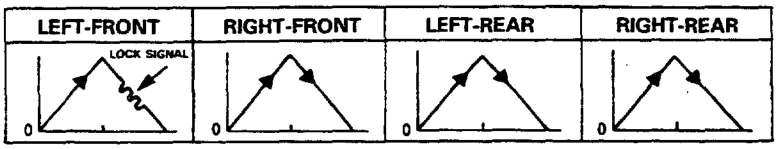
Mode 3: Sends the driving signal of each wheel, then sends the lock signal of the right-rear wheel to the ABS control unit to check the system under right-rear wheel lock. There should be kickback.

SIMULATED DRIVING SIGNAL



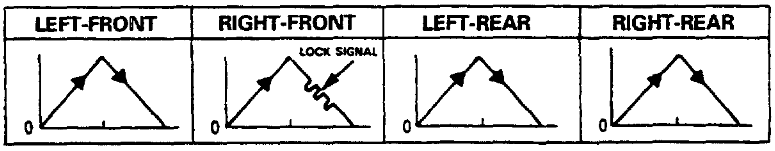
Mode 4: Sends the driving signal of each wheel, then sends the lock signal of the left-front wheel to the ABS control unit to check the system under left-front wheel lock. There should be kickback.

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

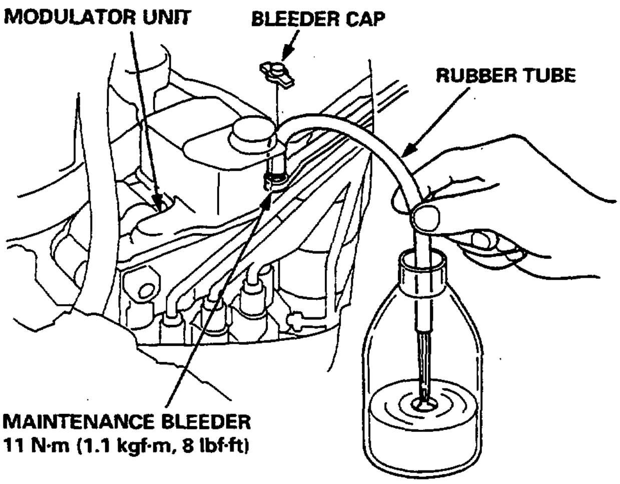
Modulator Function Check

NOTE: This inspection determines whether the basic brake system continues to operate normally when the modulator unit fluid pressure is low.

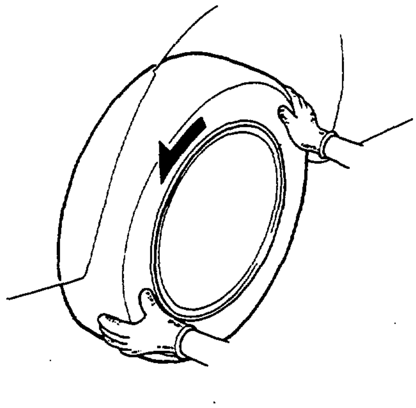
CAUTION:
- **This inspection is made by relieving the high-pressure fluid in the modulator unit and checking for brake operation. After inspection, be sure to add fresh brake fluid to the specified level of the reservoir, and start the engine to restore the ABS to its normal operating condition.**
- **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.

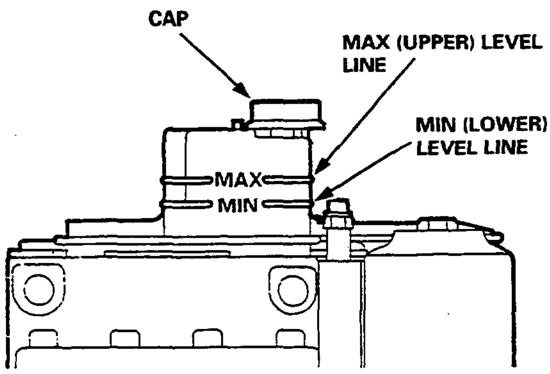


7. Raise the car off the ground and support with safety stands (see section 1).
8. Have an assistant depress the brake pedal firmly, and check that the wheels do not rotate.



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

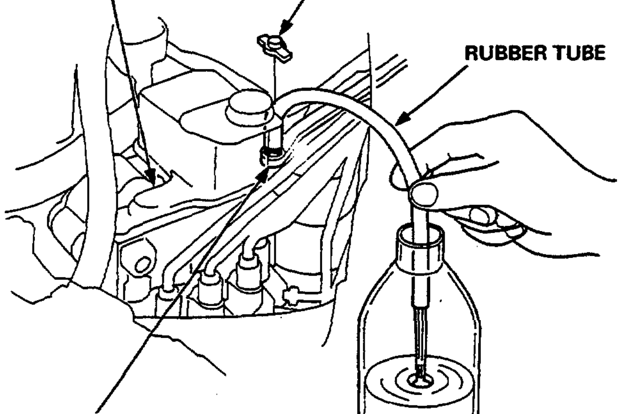
Relieving System Pressure

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/Bleeding

CAUTION:

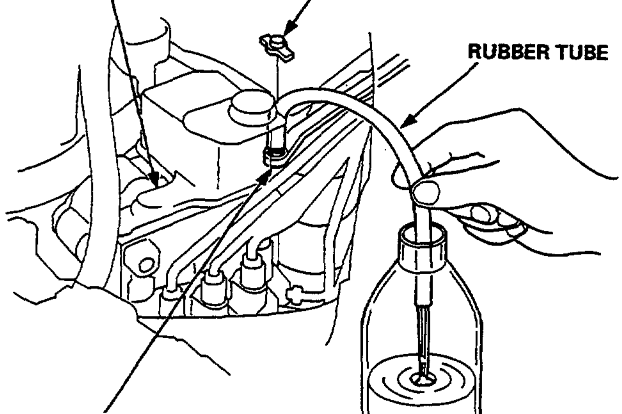
- **Do not loosen the relief plug on the accumulator.**

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.

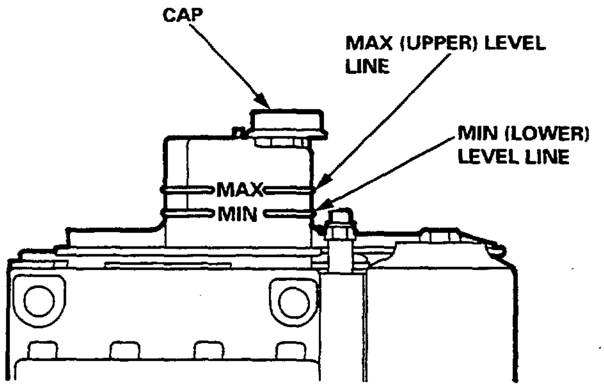
   NOTE: Do not remove the rubber tube and wrench yet.



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 cc (5.1 fl·oz, 5.3 Imp·oz). Approximately 40 – 45 cc (1.3 – 1.5 fl·oz, 1.4 – 1.6 Imp·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, restart the engine and repeat steps 3 through 5 above.

Modulator Unit

Removal/Installation

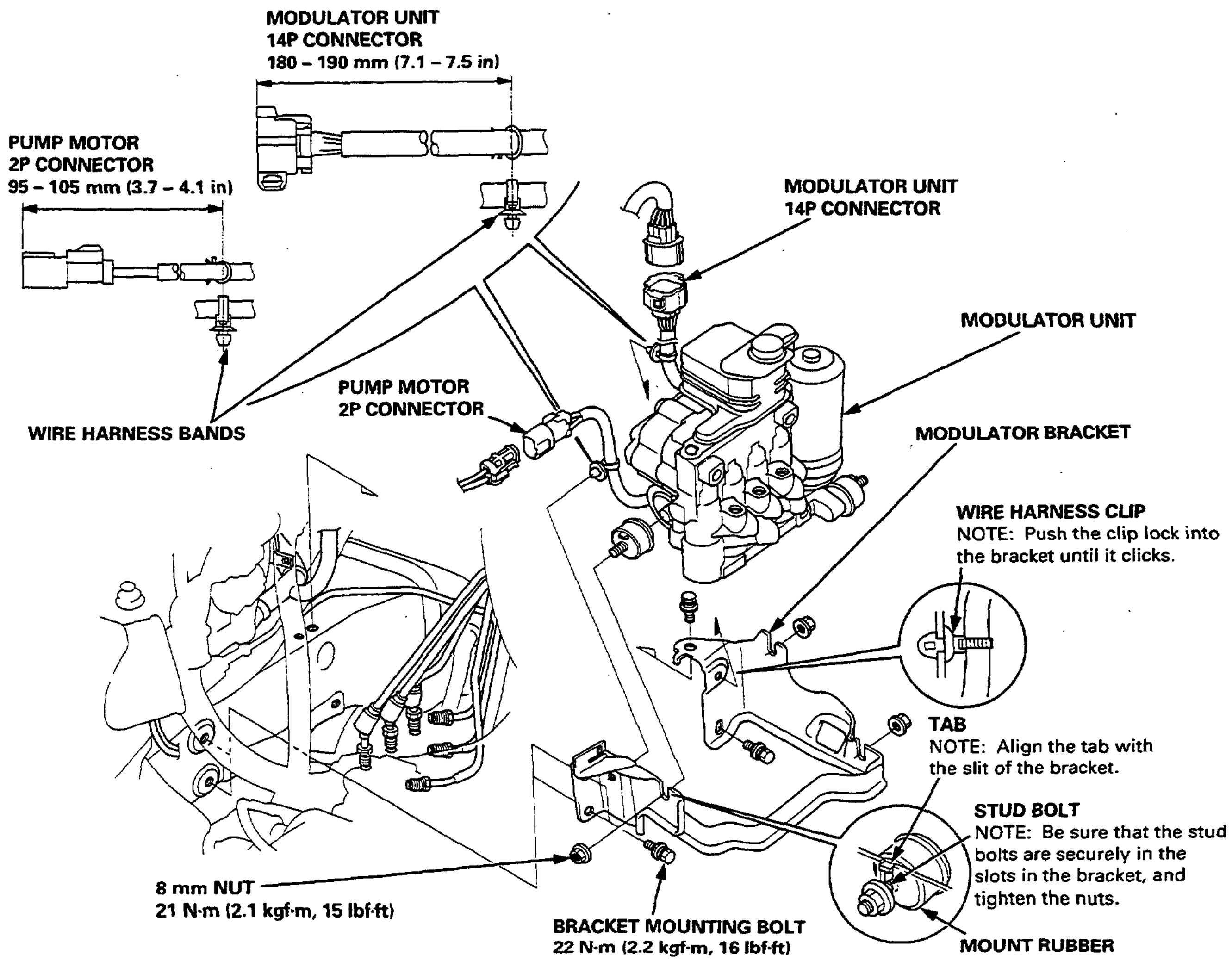
Removal:

CAUTION:
- **When removing the modulator unit or after removing it, be careful not to turn it upside-down or lean excessively.**
- **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.**

NOTE: LHD type is shown, RHD type is symmetrical.

WIRE HARNESS CLIP/BAND

NOTE: When a new clip and band are installed, adjust them to the dimensions as shown below.

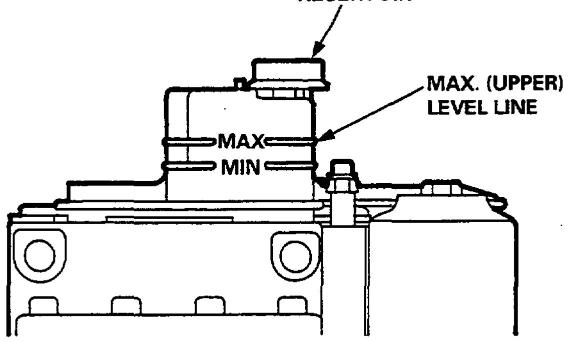


1. Remove the intake air duct.
2. Remove the battery and battery setting base.
3. Disconnect the modulator unit 14P connector and pump motor 2P connector.
4. Remove the wire harness clip from modulator bracket.
5. Remove the three 8 mm nuts, and remove modulator unit from the bracket.

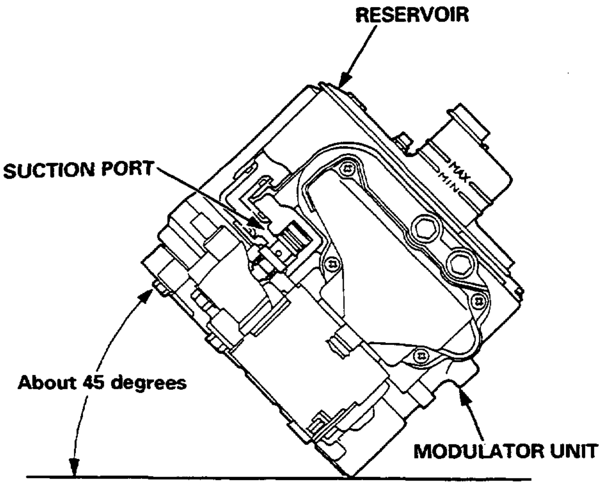
NOTE: When the pump motor or the modulator unit is replaced, bleed the high-pressure brake fluid first (see page 19-132).

Installation:

1. Check whether the brake fluid level in the reservoir is at the MAX (upper) level.
   If level is low, add fresh brake fluid to the MAX (upper) level.



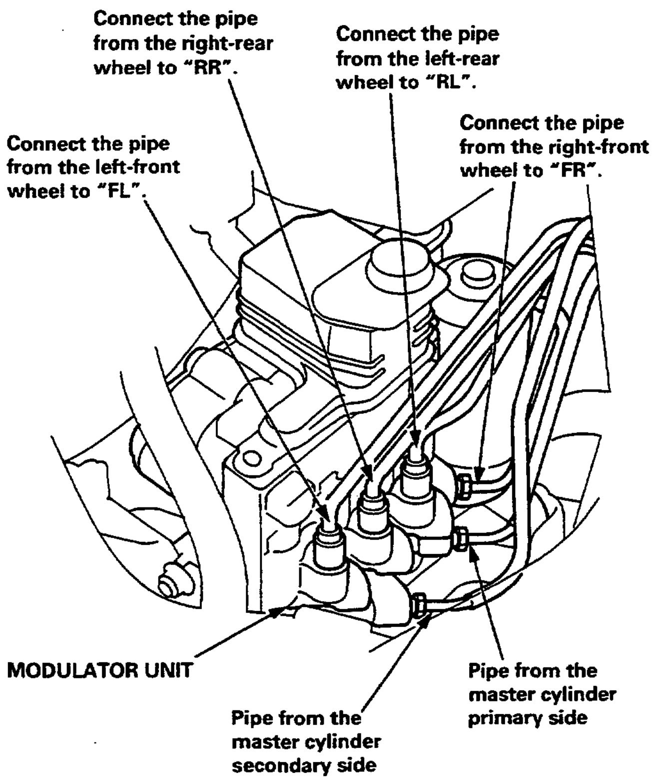
2. Before installing the modulator unit on the car, be sure to bleed the air from the suction port in the modulator unit by leaning the modulator unit to one side slowly (about 45 degrees) as shown.



CAUTION: When installing the modulator unit, be careful not to turn it upside-down or lean excessively.

3. 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).



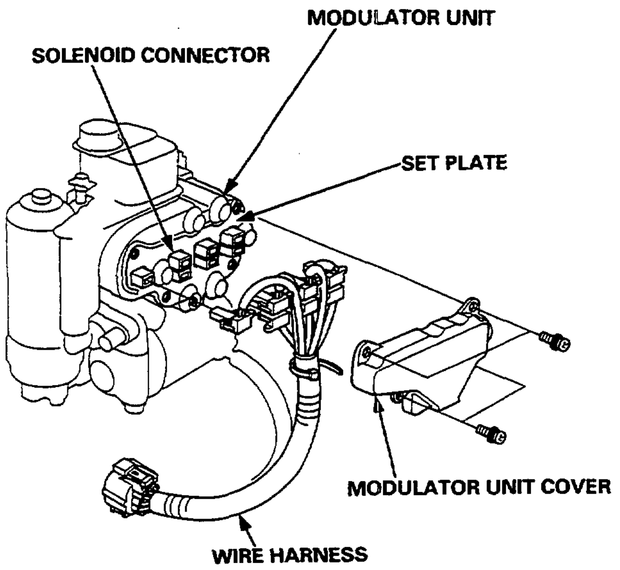
4. Start the engine and let it idle for a minute.
   Check that:
   - ABS indicator light is off.
   - Brake fluid is not leaking from the brake pipe joints.
5. Stop the engine.
6. Check whether the brake fluid level in the reservoir is at the MAX (upper) level.
   If level is low, add fresh fluid until the reservoir is refilled to the MAX (upper) level.
7. Bleed air from the brake system (see page 19-6).
8. Check the ABS function using the ALB checker (see page 19-129).

Modulator Unit

Wire Harness Replacement

1. Remove the modulator unit from the car (see page 19-134).

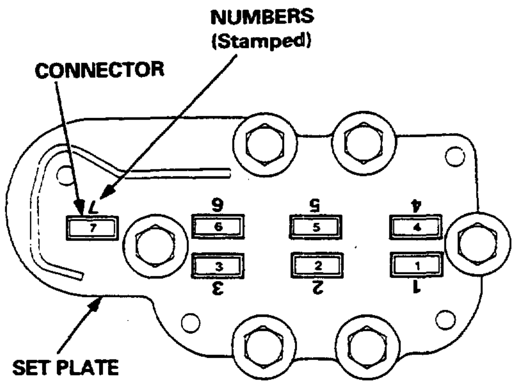
2. Remove the modulator unit cover, and remove the wire harness.



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.



5. Check the ABS function using the ALB checker (see page 19-129).

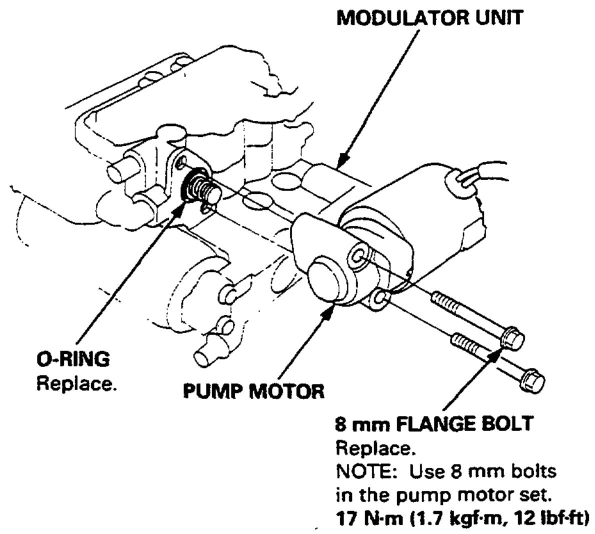
Pump Moor Replacement

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 19-132).

2. Remove the modulator unit from the car (see page 19-134).

3. Remove the 8 mm flange bolts from the modulator unit, and remove the pump motor.



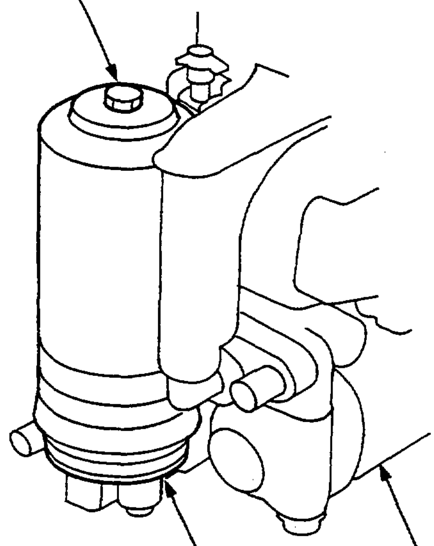
4. Install the pump motor in the reverse order of removal.

   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 19-132).
   - 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.

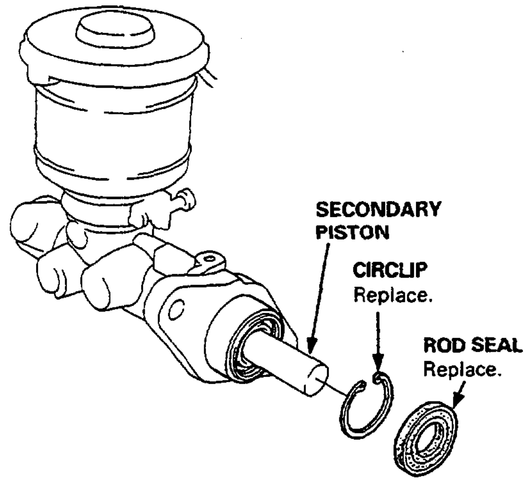
1. Drain the high-pressure brake fluid from the modulator unit (see page 19-132).
2. Secure the modulator unit in a vise so that the relief plug points straight up.
3. Loosen the relief plug three and a half turns slowly, and wait for three minutes for all pressure to escape.
4. Remove the accumulator from the modulator unit.
5. Remove the relief plug completely and dispose of the accumulator.



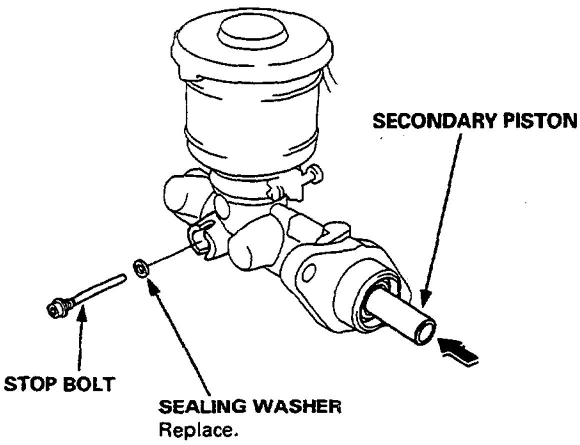
Disassembly

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.



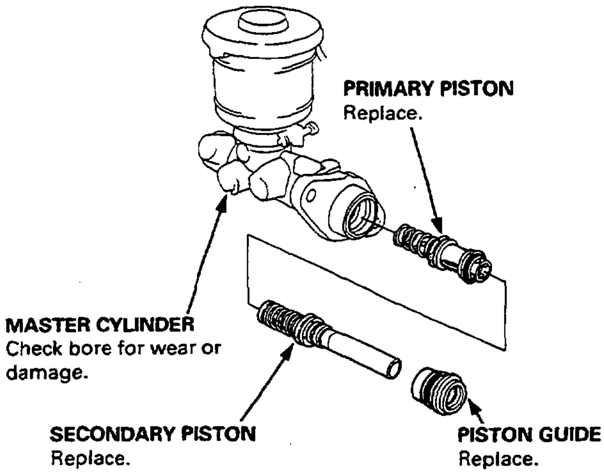
4. Remove the stop bolt while pushing in the secondary piston.



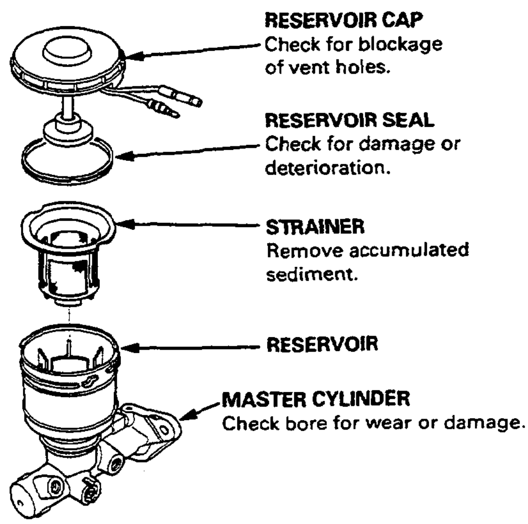
5. Remove the piston guide, secondary piston and primary piston.

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.**



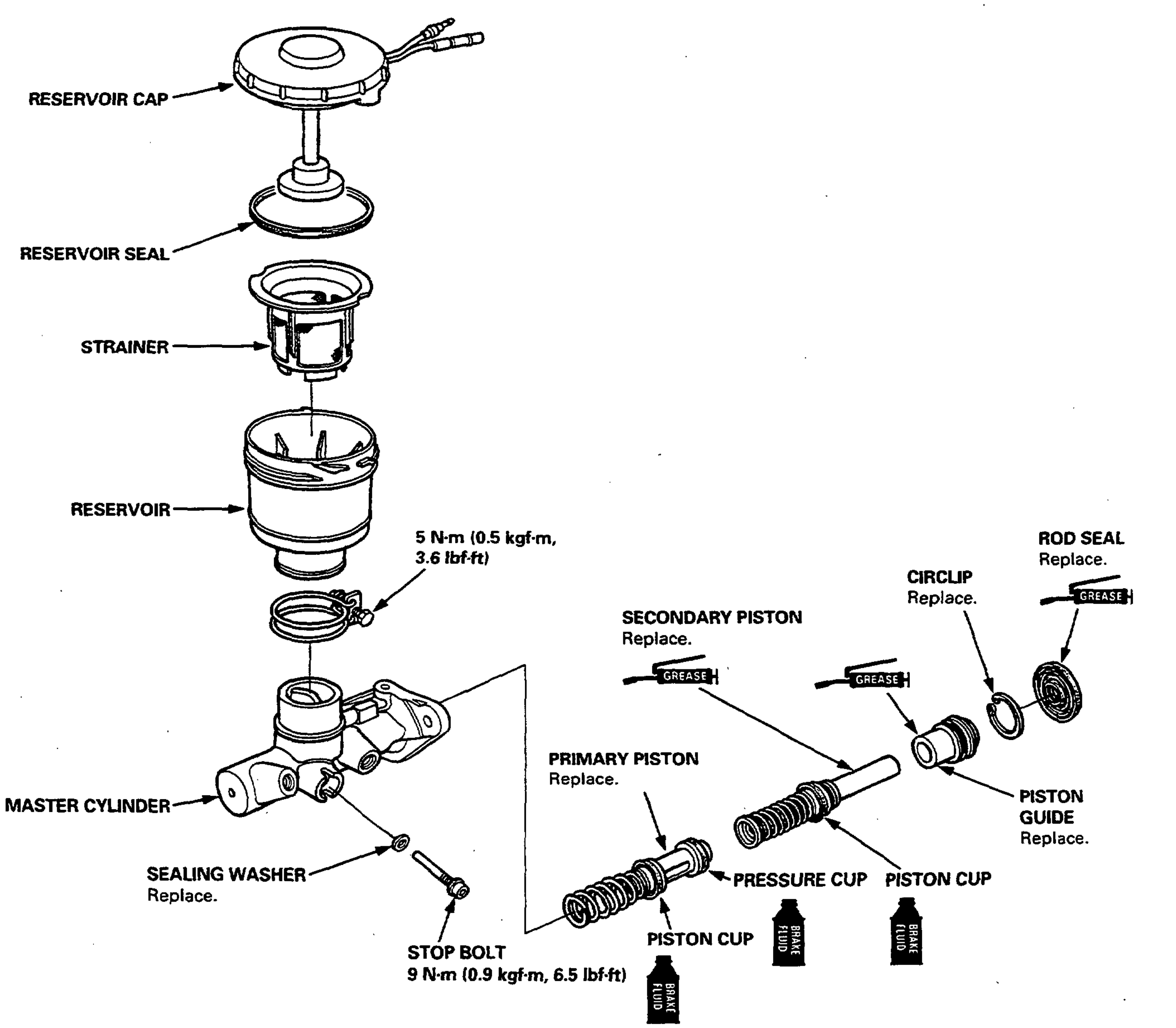
6. Remove the reservoir cap, strainer and reservoir from the master cylinder.
7. Remove the reservoir seal from the reservoir cap.



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.

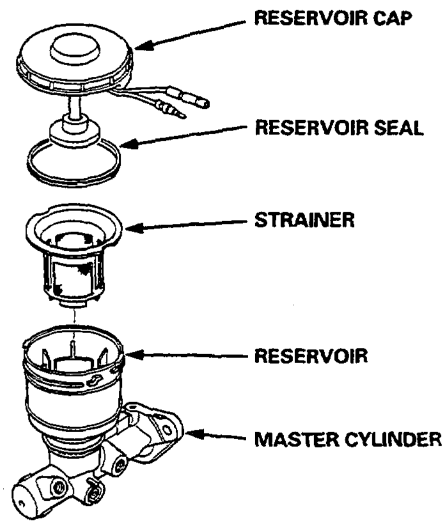


Reassembly (cont'd)

1. Install the reservoir on the master cylinder with a clamp as shown.

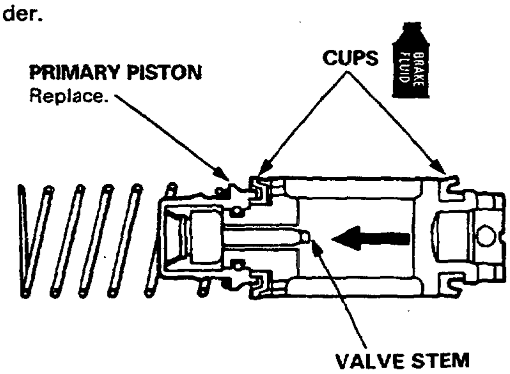
2. Install the reservoir seal in the groove of the reservoir cap.

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.

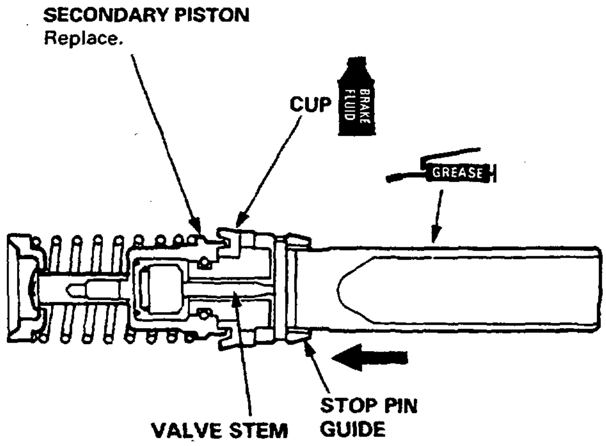
NOTE:
- Before installation, check that the valve stem moves smoothly by lightly pushing it through the slot in the piston.
- Install the piston so that the slot in the piston aligns with the stop bolt hole in the master cylinder.



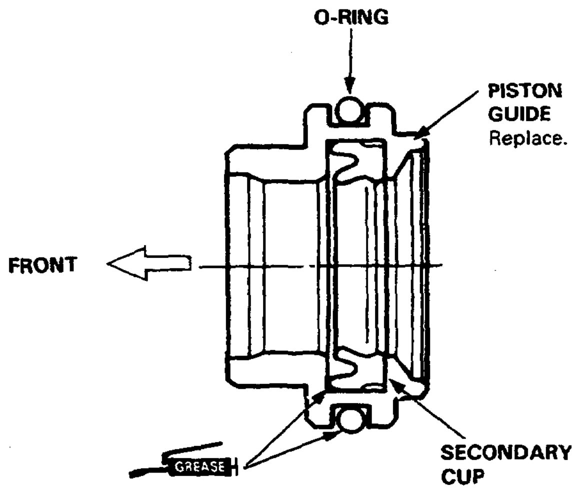
5. Coat the cup of a new secondary piston with clean brake fluid.

6. Apply recommended grease in the master cylinder seal set to the piston, and install the piston into the master cylinder.

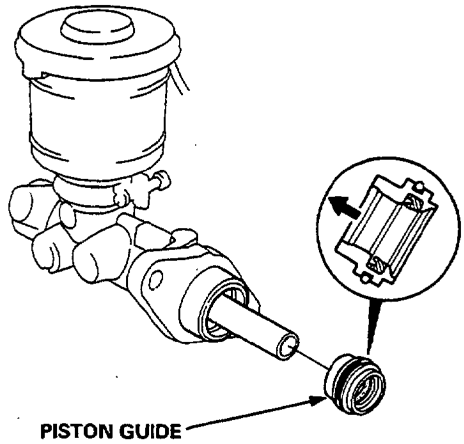
NOTE: Check that the valve stem moves smoothly by pushing the stop pin guide.



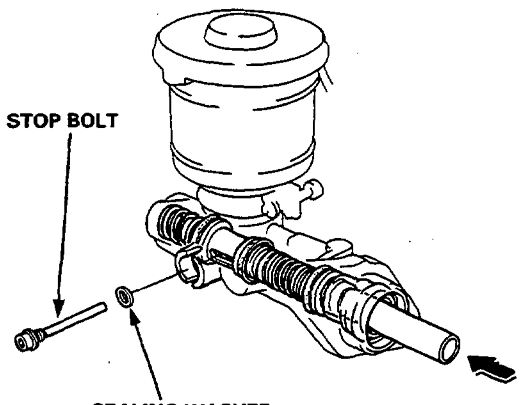
7. Apply recommended grease in the master cylinder seal set to a new O-ring and the secondary cup in a new piston guide.



8. Install the piston guide into the master cylinder.

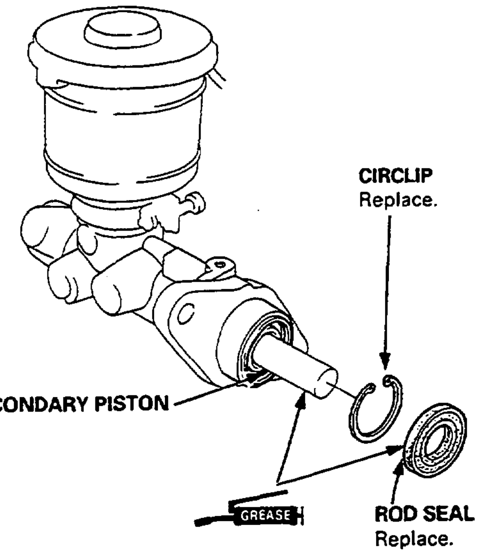


9. Align the slot in the primary piston with the stop bolt hole by pushing the secondary piston in, and install the stop bolt with a new sealing washer.



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 cylinder.

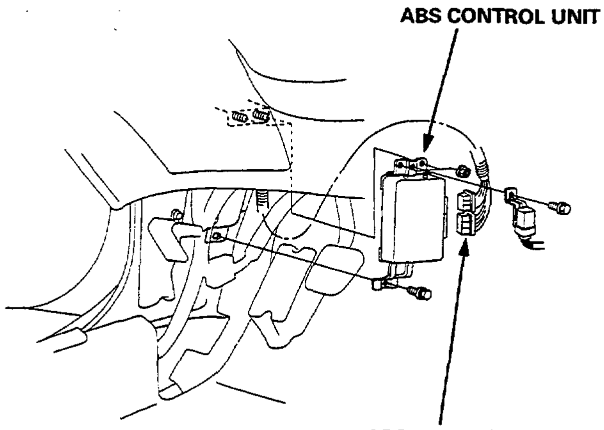


12. Adjust the pushrod clearance (see page 19-18).

13. Install the master cylinder (see page 19-19).

ABS Control Unit Replacement

1. Remove the driver's side kick panel.
2. Disconnect the ABS control unit connectors.
3. Remove the ABS control unit mounting bolts, then remove the control unit.

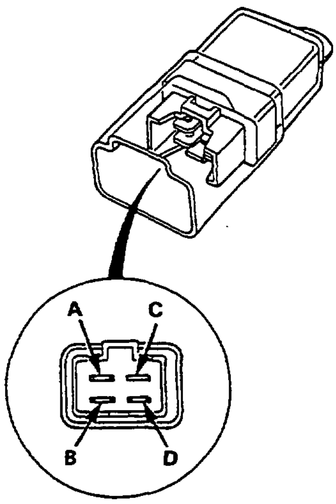


4. Install the ABS control unit in the reverse order of removal.

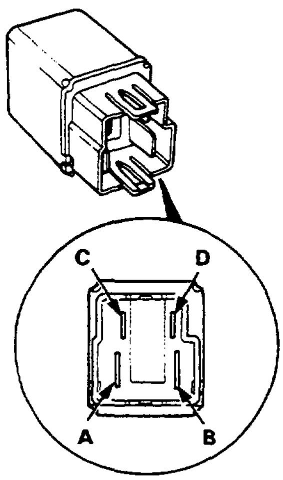
Relay Inspection

1. Remove the fail-safe relays and motor relay (location: see page 19-43).
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.

<Fail-safe Relay:>



<Motor Relay:>

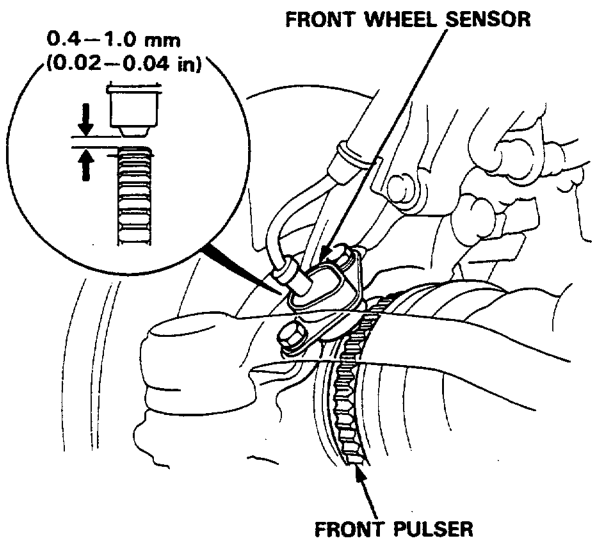


Pulsers/Wheel Sensors

Inspection

Front:

1. Check the front pulser for chipped or damaged teeth.



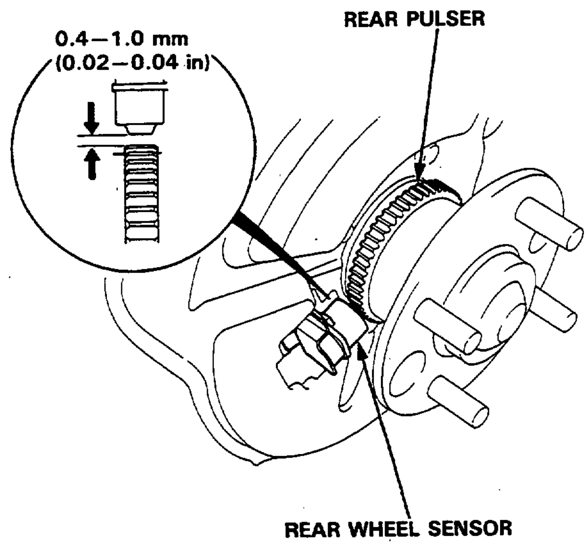
2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the driveshaft by hand.

   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.

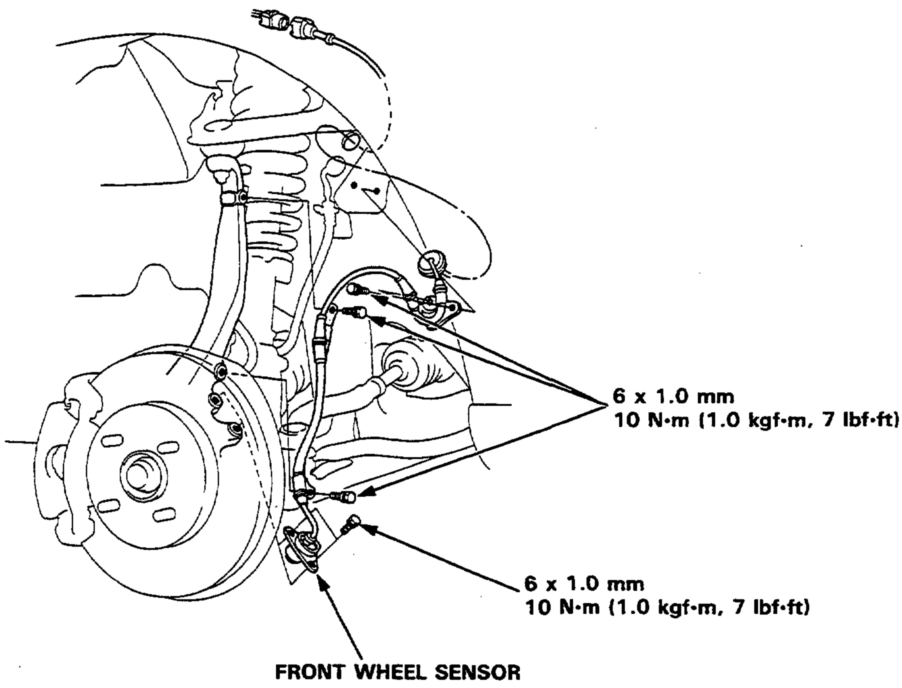
   Standard: 0.4–1.0 mm (0.02–0.04 in)

   NOTE: If the gap exceeds 1.0 mm (0.04 in), the probability is a distorted knuckle which should be replaced.

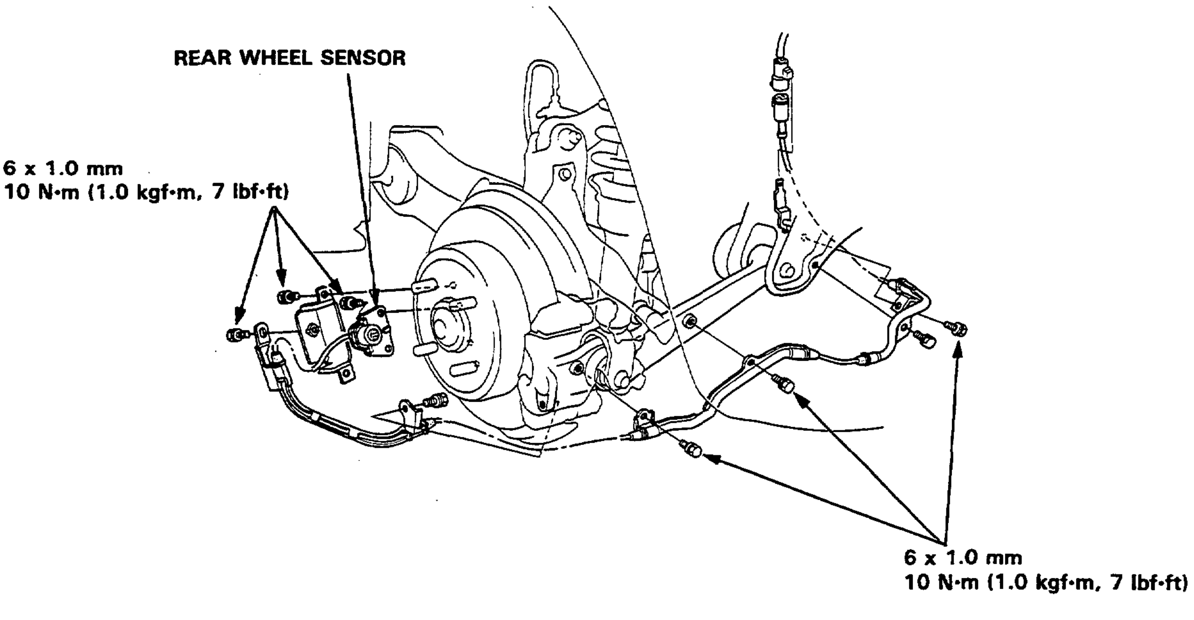
Wheel Sensor Replacement

NOTE:
- Be careful when installing the sensors to avoid twisting the wires.
- After sensor replacement, confirm proper operation (see page 19-129).

<Front:>



<Rear:>



SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (If body maintenance is required)

Some versions of the KE and KG Civic 5D models 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. The SRS unit of these model versions is not part of the airbag assembly and has built-in sensors (SRS Type III). 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.

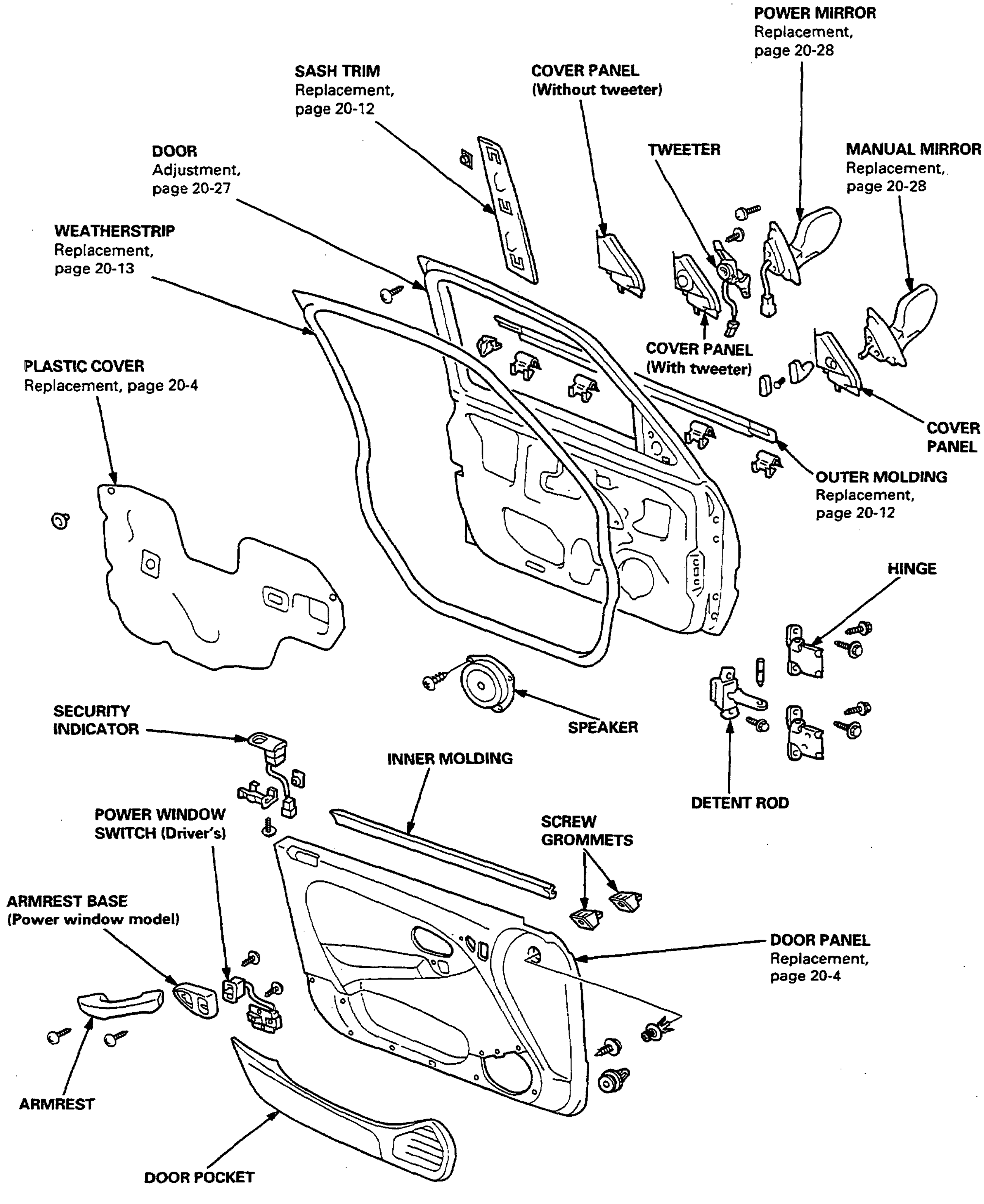
⚠ WARNING

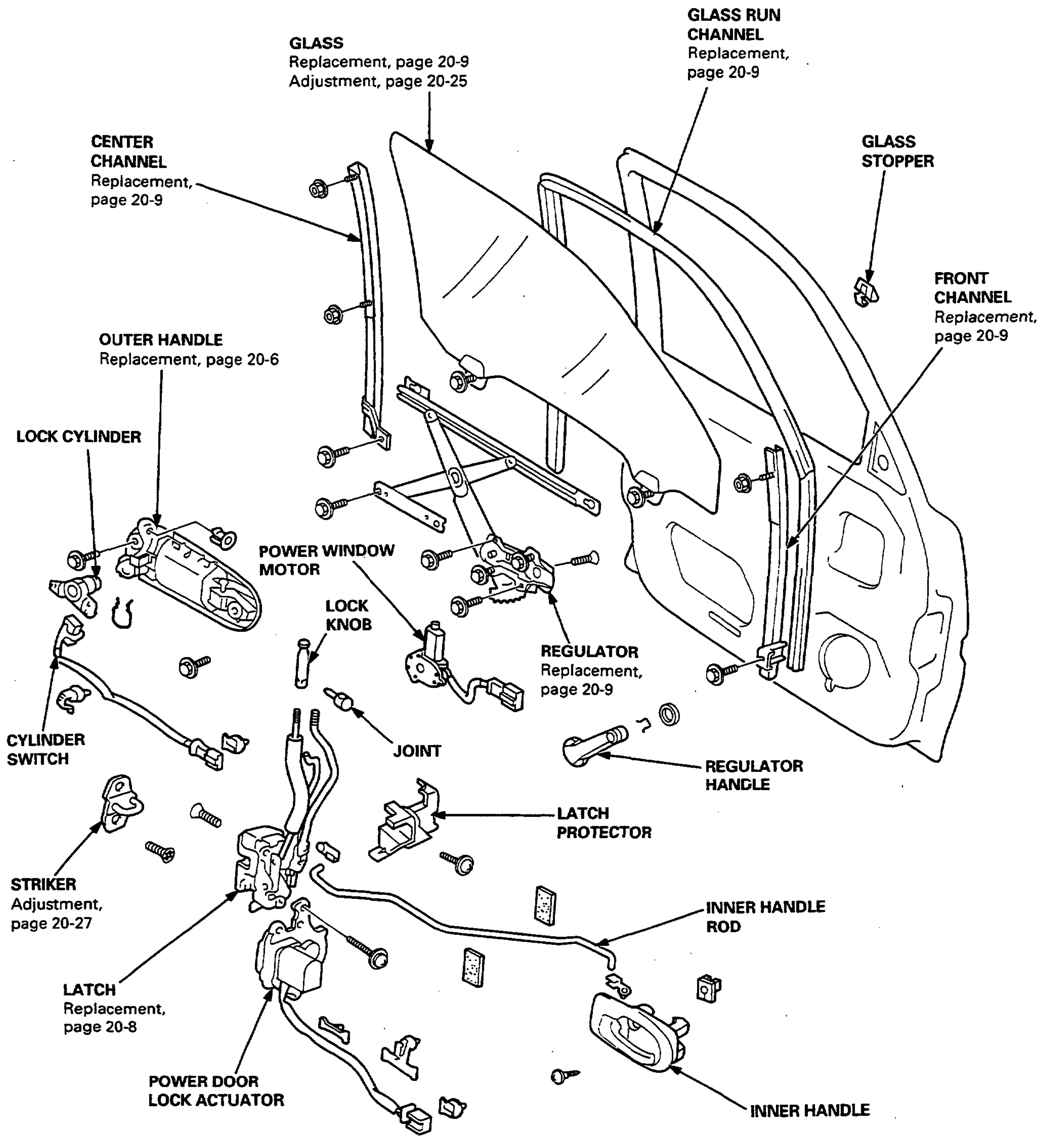
- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.**
- **Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional activation of the airbags.**
- **Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).**
- **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.**
- **Service work nearby and in the areas listed below may affect the SRS and must therefore be performed by an authorized Honda dealer.**

- Steering wheel
- Behind the dashboard
- Under-dash fuse/relay box
- Front console
- Car stereo unit and other accessories
- A/C heater

Doors

Front Door Index

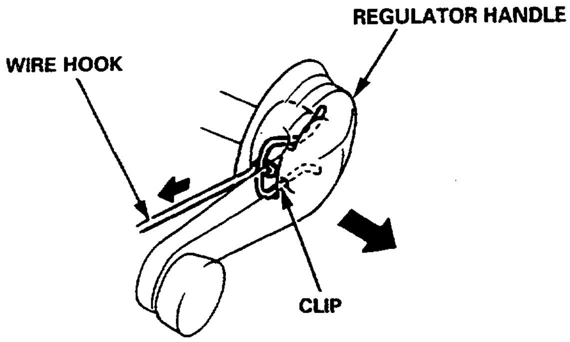



GLASS RUN
CHANNEL
Replacement,
page 20-9
GLASS
Replacement, page 20-9
Adjustment, page 20-25
CENTER
CHANNEL
Replacement,
page 20-9
GLASS
STOPPER
FRONT
CHANNEL
Replacement,
page 20-9
OUTER HANDLE
Replacement, page 20-6
LOCK CYLINDER
POWER WINDOW
MOTOR
LOCK
KNOB
REGULATOR
Replacement,
page 20-9
JOINT
CYLINDER
SWITCH
REGULATOR
HANDLE
LATCH
PROTECTOR
STRIKER
Adjustment,
page 20-27
INNER HANDLE
ROD
LATCH
Replacement,
page 20-8
POWER DOOR
LOCK ACTUATOR
INNER HANDLE

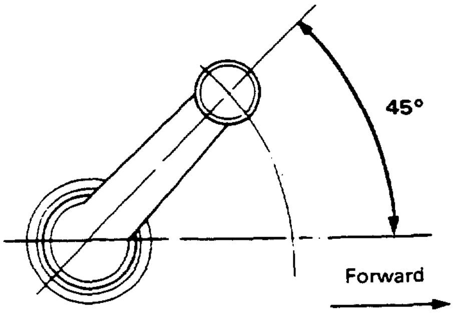
Doors

Door Panel/Plastic Cover Replacement

1. If applicable, remove the regulator handle by pulling the clip out a wire hook.

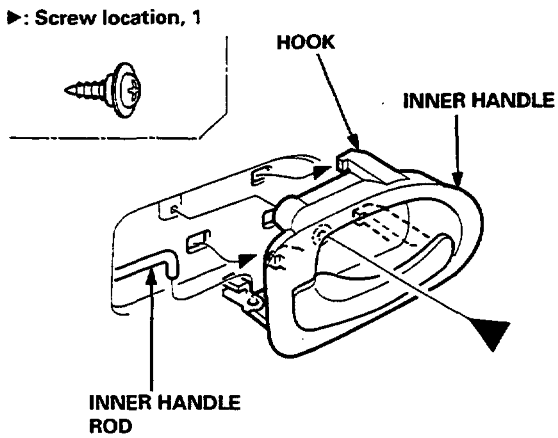


NOTE: Install the regulator handle so it points forward and up at a 45 degree angle with the glass closed.



2. Remove the screw, then pull the inner handle forward and out half-way, and disconnect the inner handle rod.

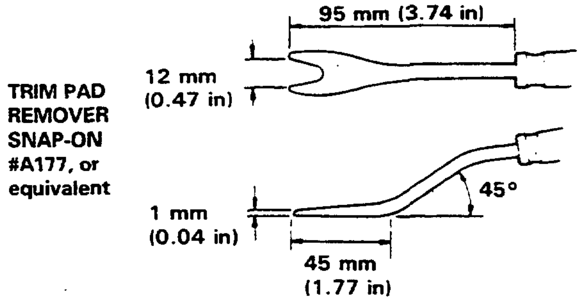
   NOTE: Take care not to bend the inner handle rod.

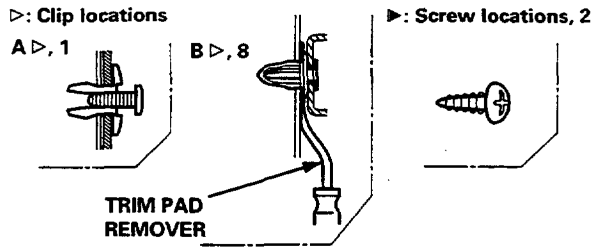


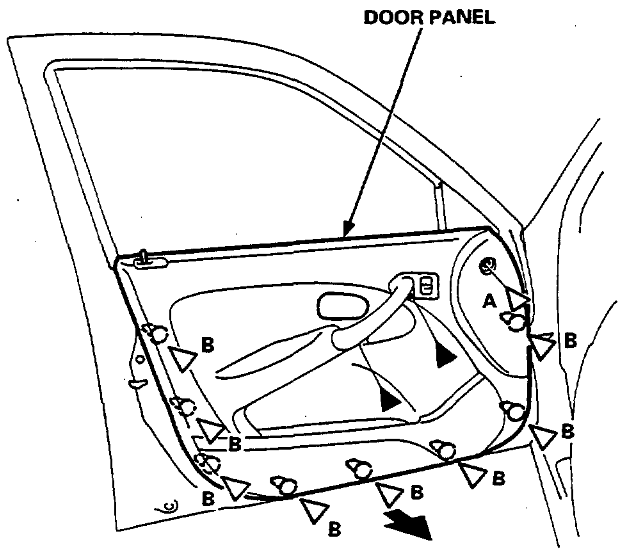
3. Remove the mirror cover panel (see page 20-28).

4. Remove the screw, then release the clips that hold the door panel.

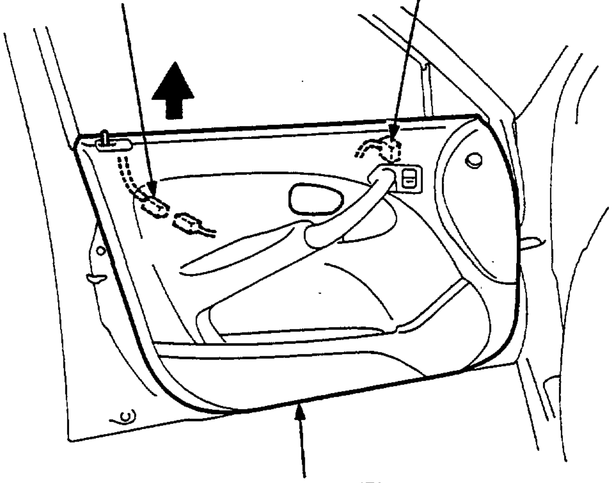
   NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.





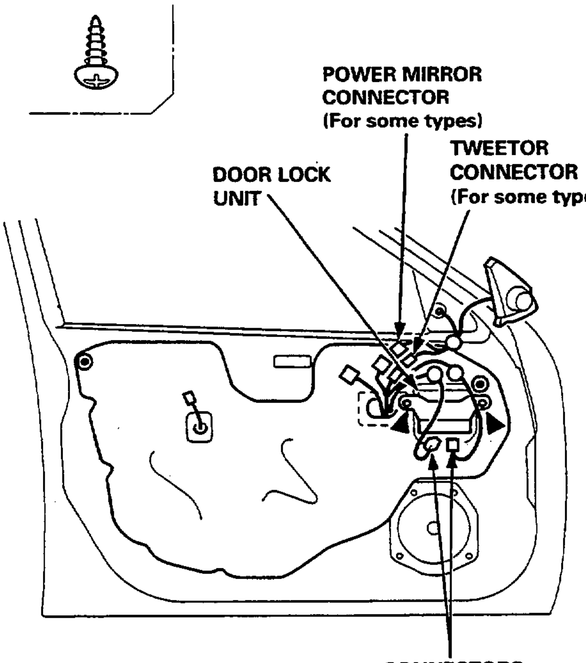


5. Remove the door panel by pulling it upward.
If applicable, disconnect the following.
   - Power window switch connector
   - Security indicator connector



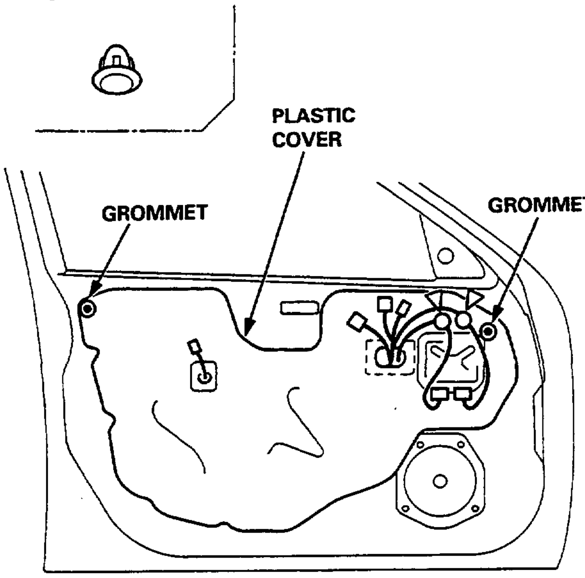
6. Remove the door lock unit, and disconnect the connectors.

▶: Screw locations, 2



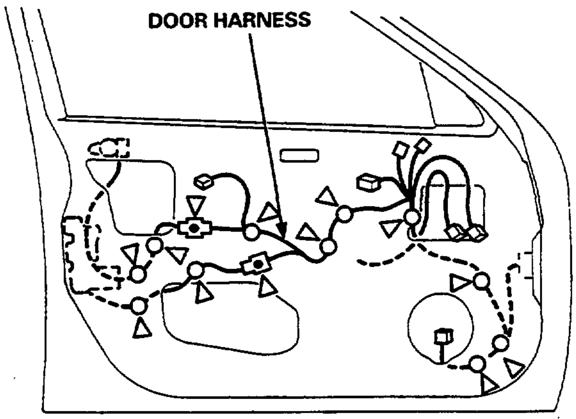
7. Detach the grommets and harness clips, then carefully remove the plastic cover.

◉: Grommet locations, 2   ▷: Clip locations, 2



8. Before installing the plastic cover, make sure the door harness and connectors are fastened correctly on the door.

▷: Clip locations, 11

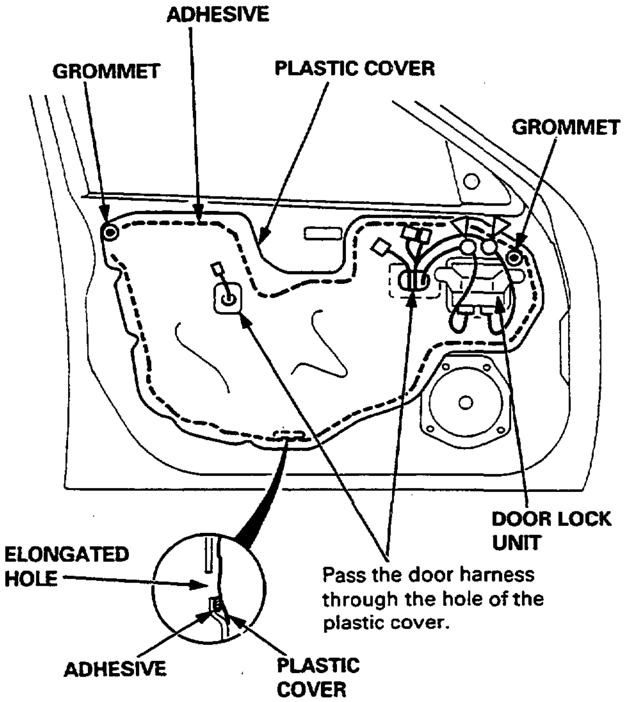


(cont'd)

Door Panel/Plastic Cover Replacement (cont'd)

9. 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.



10. Install the door panel (see pages 20-4,5).

    NOTE:
    - Make sure the door harness is not pinched.
    - If necessary, replace any damaged clips.
    - Make sure the connectors are connected properly.

11. Install the inner handle (see page 20-4). If applicable, install the regulator handle (see page 20-4).

    NOTE: Make sure the connector is connected properly.

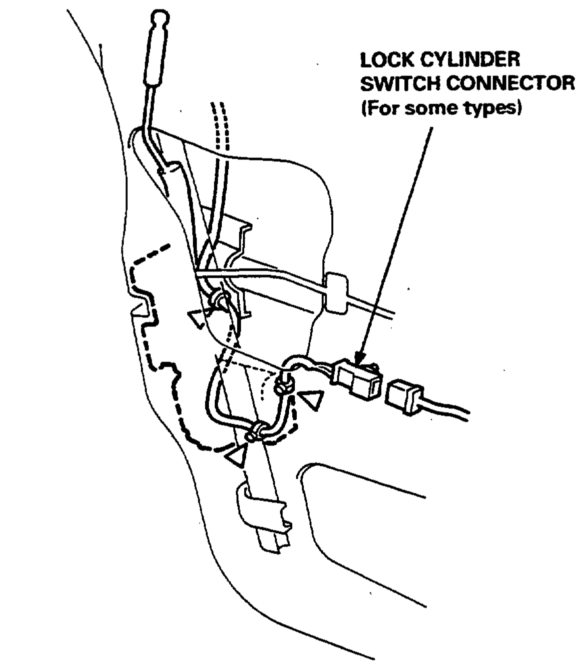
Outer Handle Replacement

NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-4)

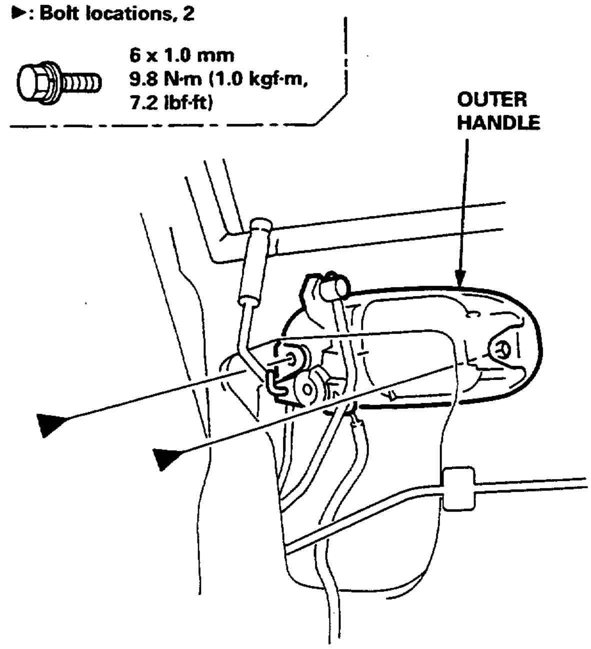
2. Disconnect the connector, and remove the harness clips.

   ▷: Clip locations, 3



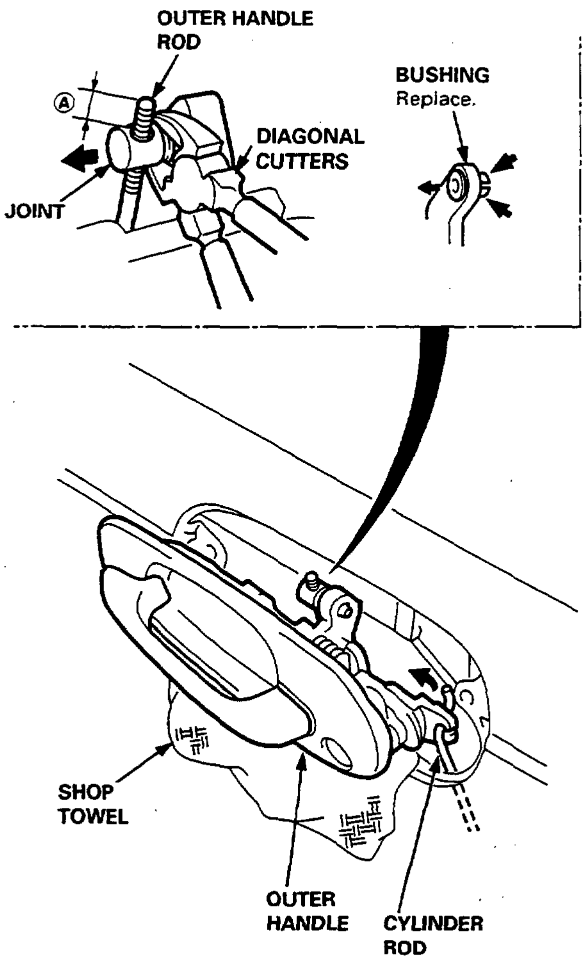
3. Remove the bolts.

   ►: Bolt locations, 2

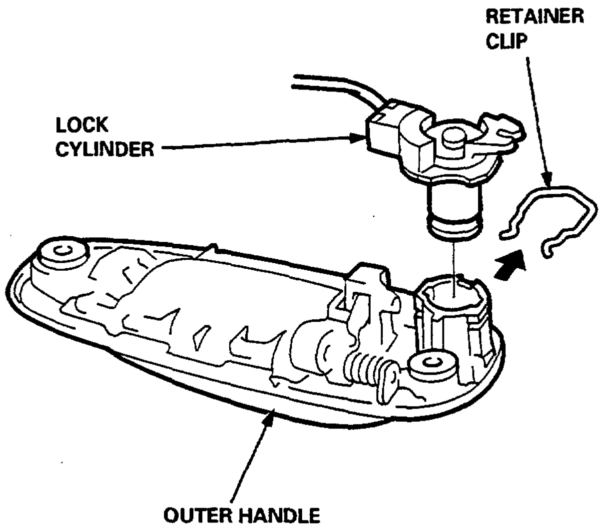


4. Pull out the outer handle.
   Pry the outer handle rod out of its joint using diagonal cutters.
   Disconnect the cylinder rod as shown.

   NOTE:
   - To ease reassembly, note 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.
   - Take care not to damage the lock cylinder joint.



5. Pull out the retainer clip, then remove the lock cylinder.



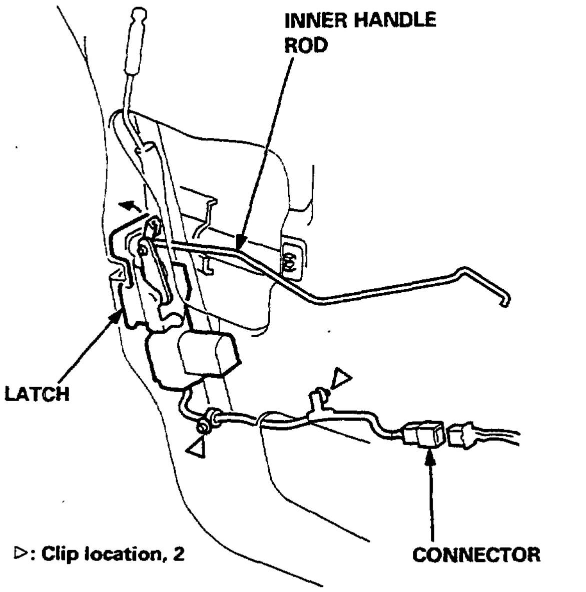
6. Installation is the reverse of the removal procedure.

   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.

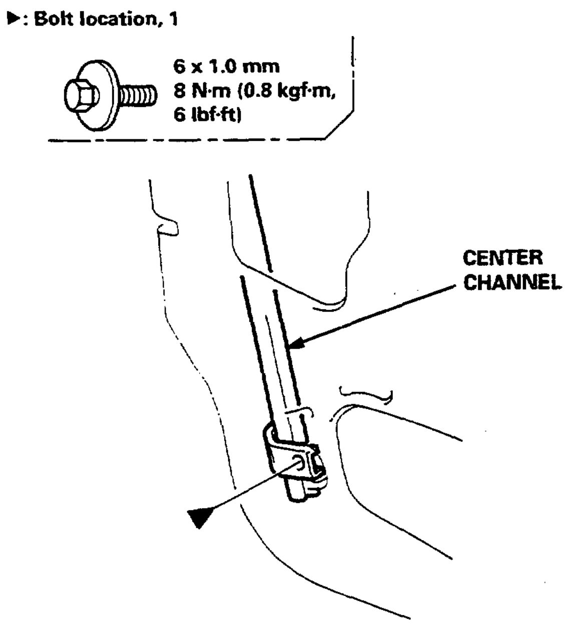
Latch Replacement

NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-4)
   - Outer handle (see page 20-6)
2. Disconnect the inner handle rod from the latch. Disconnect the connector, and detach the harness clip from the door.

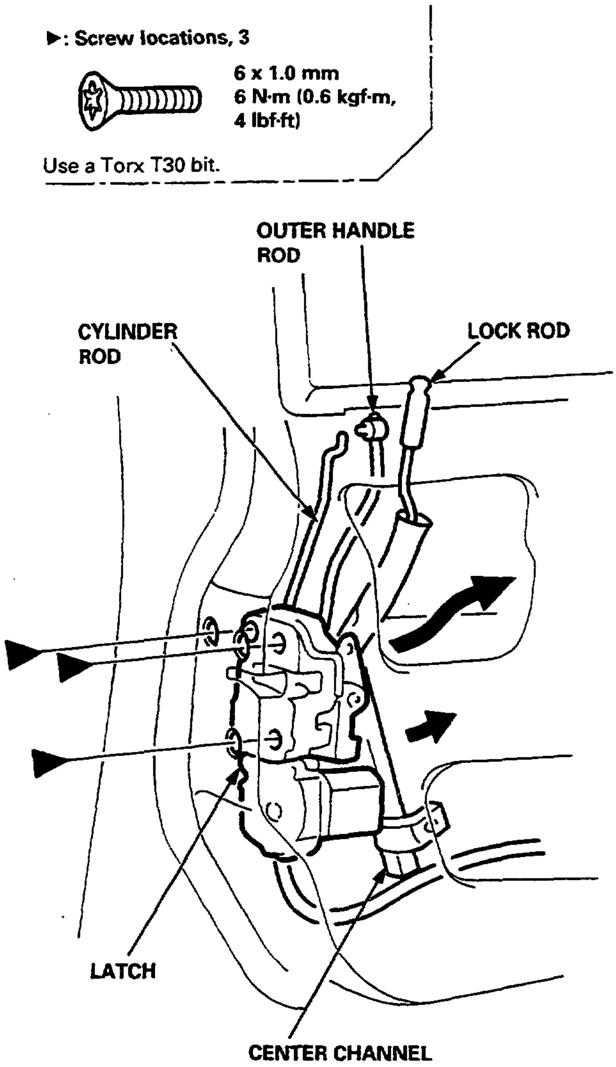


3. Remove the bolt, then move the center channel forward.



4. Remove the latch through the hole in the door.

   NOTE: Take care not to bend the outer handle rod, cylinder rod, lock rod and center channel.



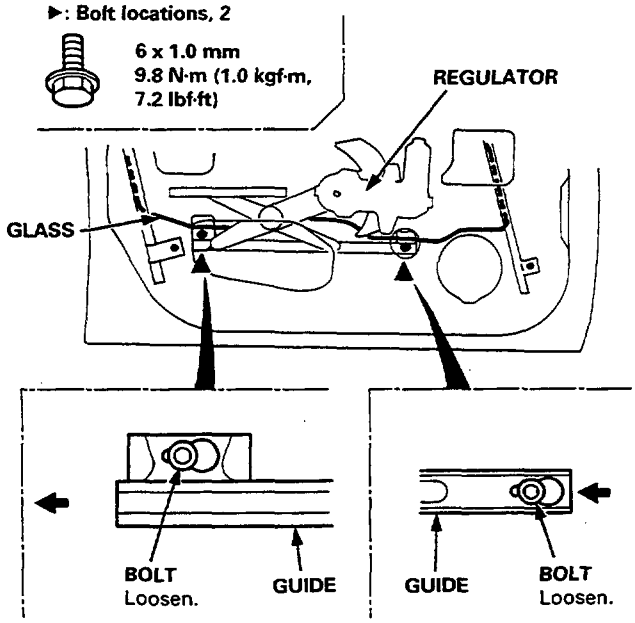
5. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure the inner handle rod and connector are connected properly.
   - Make sure the door locks and opens properly.

Glass/Regulator/Glass Run Channel Replacement

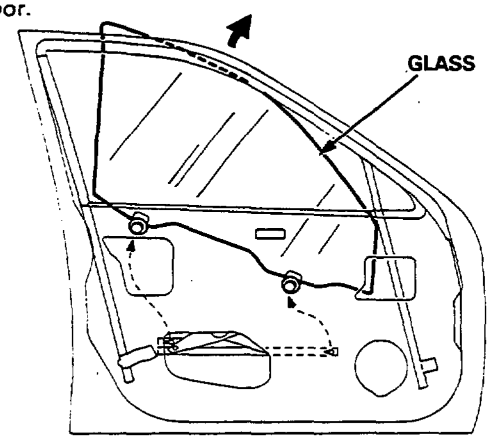
1. Remove:
   - Door panel (see page 20-4)
   - Plastic cover (see page 20-4)
   - Mirror cover panel (see page 20-28)
2. Power window model:
   Remove the power window switch from the door panel, then connect it to the door harness (driver's, see page 20-25).

   Manual window model:
   Install the regulator handle on the regulator.
3. Carefully move the glass until you can see the bolts, then loosen them.
   Slide the guide to the rear, then remove the glass.



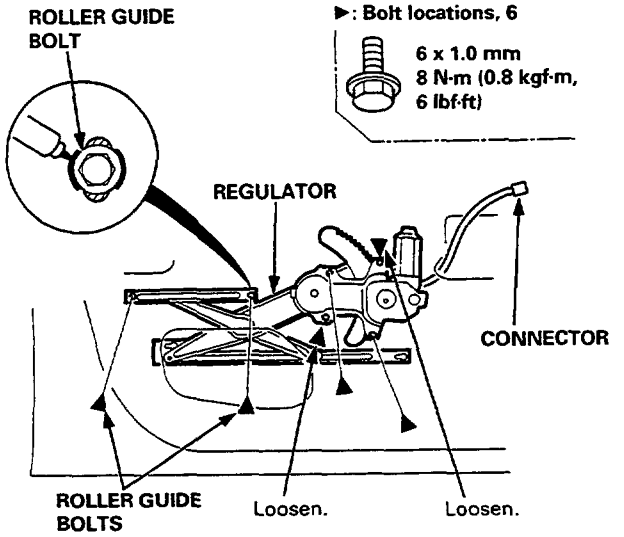
4. Carefully pull the glass out through the window slot.

   NOTE: Take care not to drop the glass inside the door.



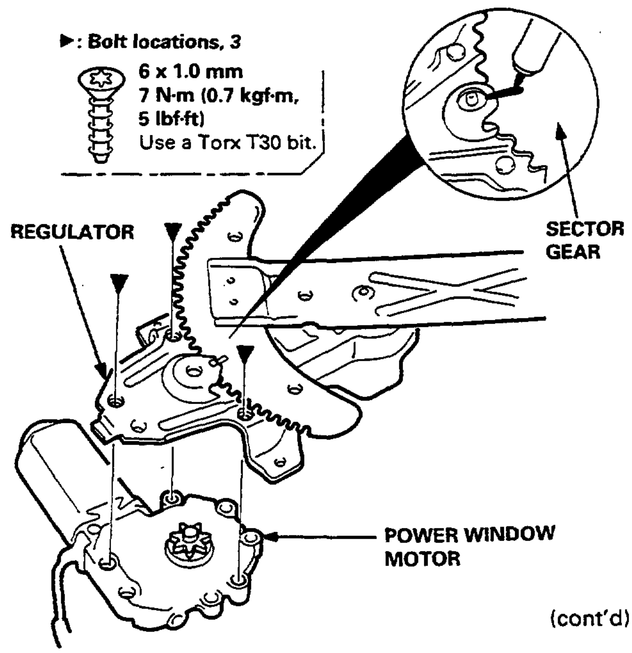
5. Remove the two bolts and loosen the two bolts.
   Remove the roller guide bolts and disconnect the connector.
   Remove the regulator through the center hole in the door.

   NOTE: Scribe a line around the roller guide bolt to show the original adjustment.



6. Remove the power window motor from the regulator.

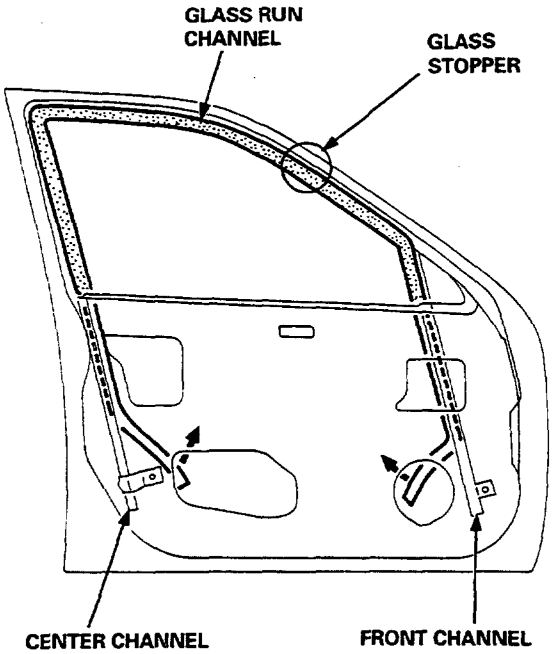
   NOTE: Before removing the power window motor, mark the location by scribing a line across the sector gear and regulator.



(cont'd)

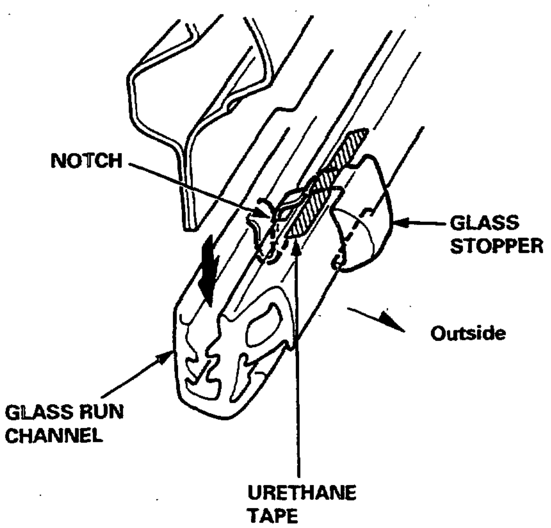
Glass/Regulator/Glass Run Channel Replacement (cont'd)

7. Remove the glass run channel.



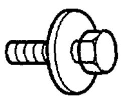
NOTE: If necessary, remove the glass stopper.

When installing the glass stopper, align it with the notch in the glass run channel, then install it with a urethane tape, or equivalent.



8. Remove the front and center channels.

▶: Bolt locations

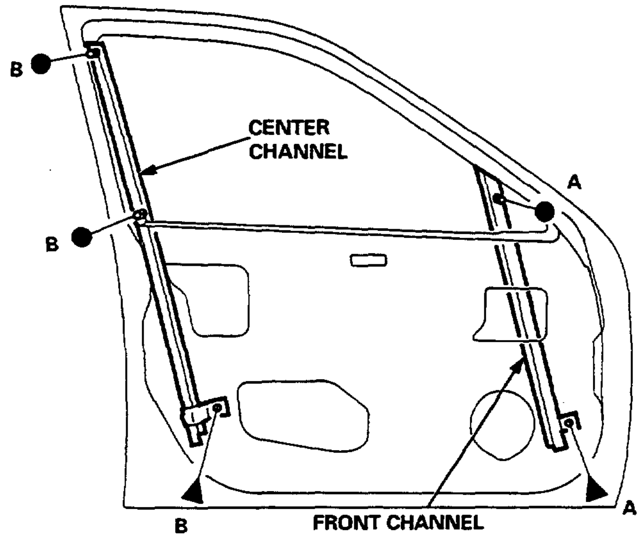


A ▶, 1
6 x 1.0 mm
8 N·m (0.8 kgf·m, 6 lbf·ft)
B ▶, 1
6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

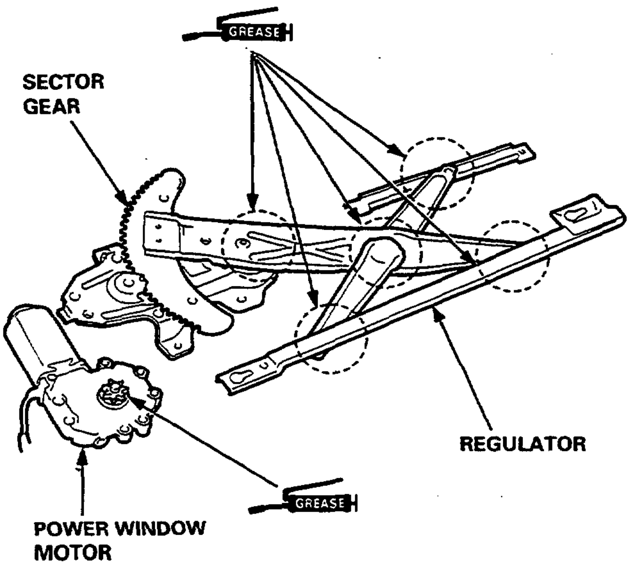
●: Nut locations

A ●, 1
6 x 1.0 mm
8 N·m (0.8 kgf·m, 6 lbf·ft)

B ●, 2
5 x 0.8 mm
4 N·m (0.4 kgf·m, 3 lbf·ft)



9. Grease all the sliding surfaces of the regulator where shown. Install the power window motor on the regulator.
Check that the regulator moves smoothly by connecting a 12 V battery to the power window motor (see section 23).

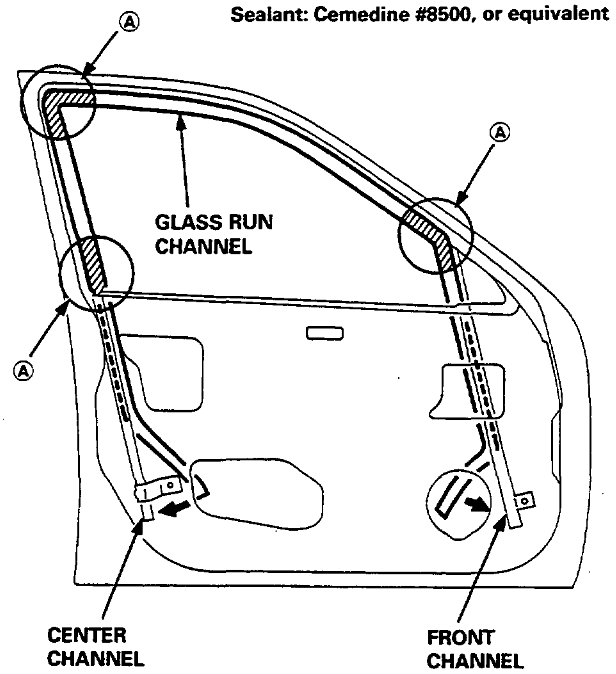


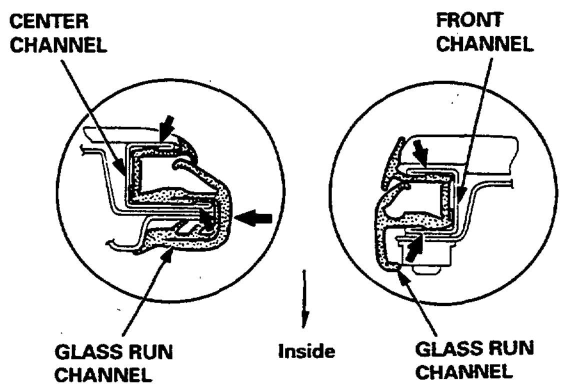
10. Install the front and center channels.

11. Apply clear sealant to location Ⓐ on the channels as shown, then install the glass run channel.

    NOTE: Fit the glass run channel into the front and center channels, and on the door as shown.

Sealant: Cemedine #8500, or equivalent



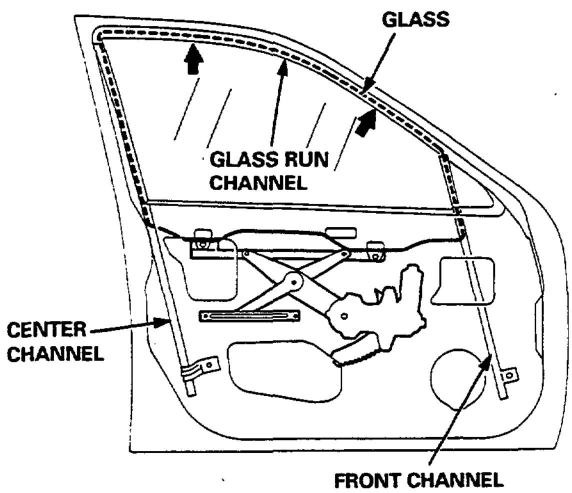


12. Install the regulator (see page 20-9).

    NOTE: Make sure the connector is connected properly.

13. Install the glass (see page 20-9).

14. 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 (see page 20-25).



15. Attach the door harness to the door correctly (see page 20-5).

16. Power window model: Disconnect the power window switch from the door harness, then install the power window switch on the door panel (driver's, see page 20-25).

17. 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).

18. Install the mirror cover panel (see page 20-28) and door panel (see pages 20-4,5).

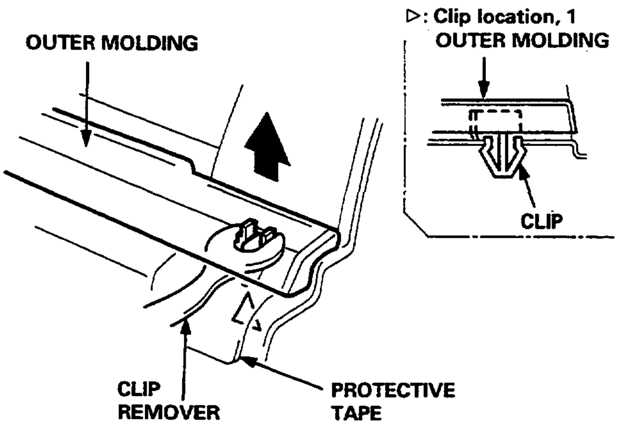
Outer Molding Replacement

CAUTION: Wear gloves to remove the outer molding.

NOTE: Lower the glass.

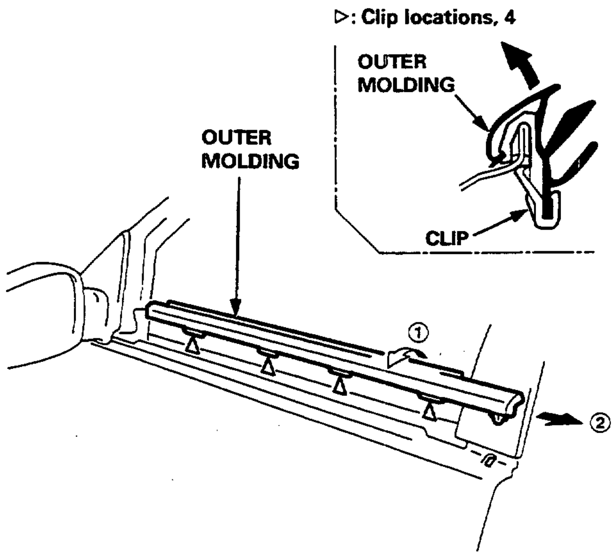
1. Detach the clip at the rear edge of the outer molding, then pull up the outer molding.

   NOTE: To prevent damage to the door, use protective tape on the door.



2. Starting at the rear, pry the outer molding up and detach the clips, then remove the outer molding by sliding it backward.

   NOTE: Take care not to twist or scratch the outer molding.



3. Installation is the reverse of the removal procedure.

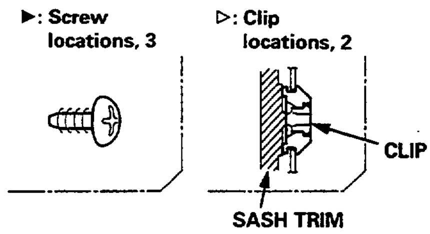
   NOTE: If necessary, replace any damaged clips.

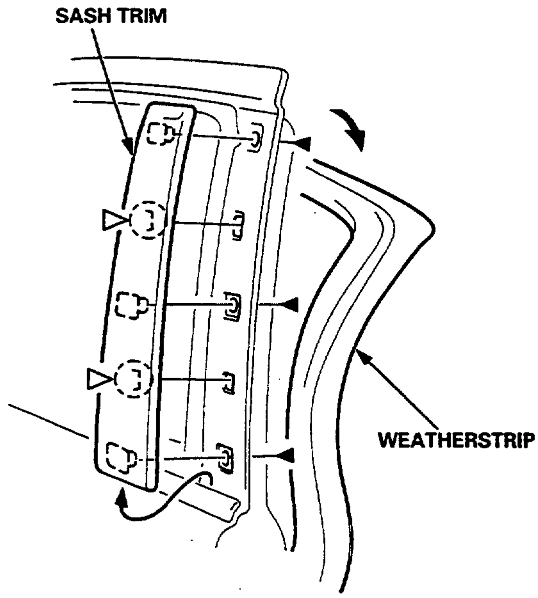
Sash Trim Replacement

NOTE: Take care not to scratch the sash trim.

1. Peel away the weatherstrip as necessary (see page 20-13).

2. Remove the screws, and detach the clips, then remove the sash trim.





3. Installation is the reverse of the removal procedure.

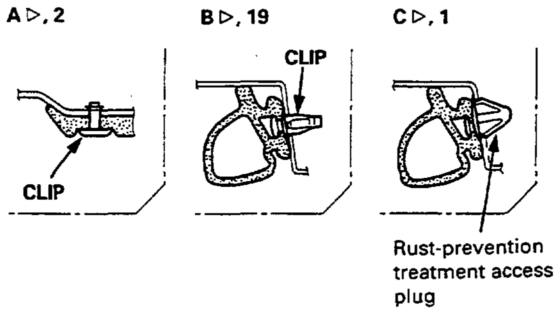
   NOTE: Insert the bottom edge of the sash trim between the door and outer molding.

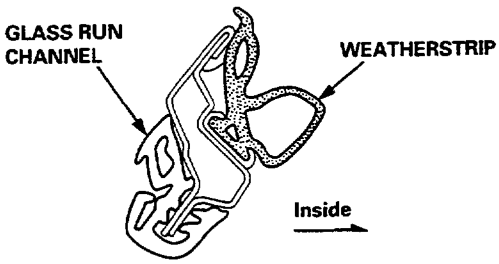
Weatherstrip Replacement

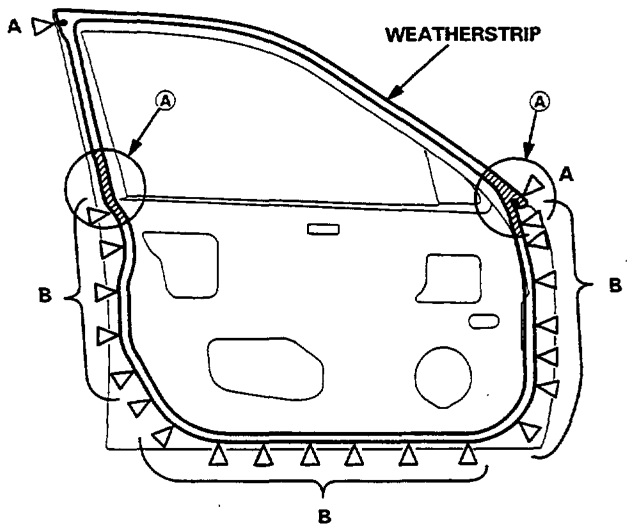
NOTE:
- Before installing the inner weatherstrip, apply clear sealant to locations Ⓐ on the door as shown.
- If necessary, replace any damaged clips.

Sealant: Cemedine #8500, or equivalent

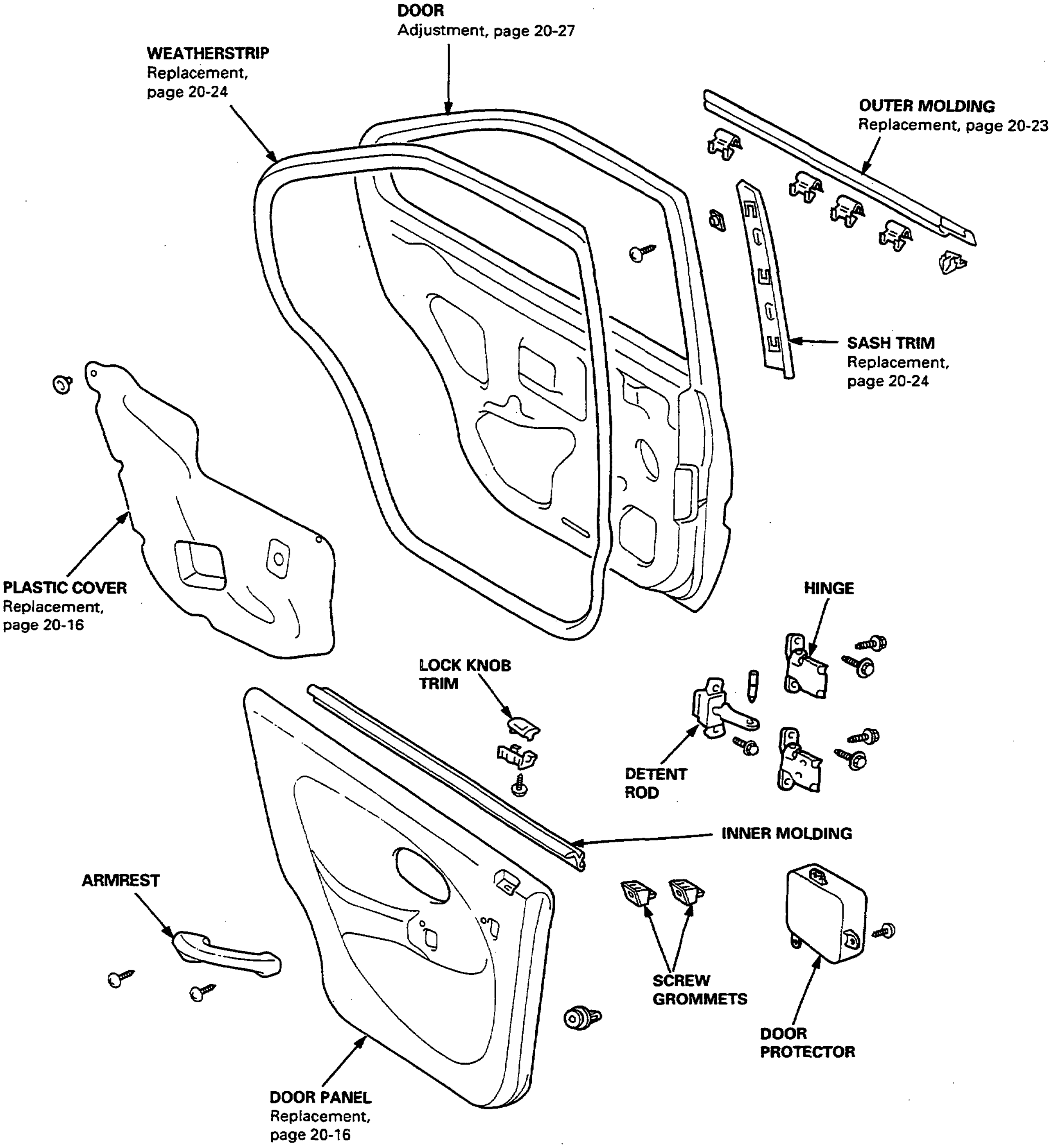
▷: Clip locations

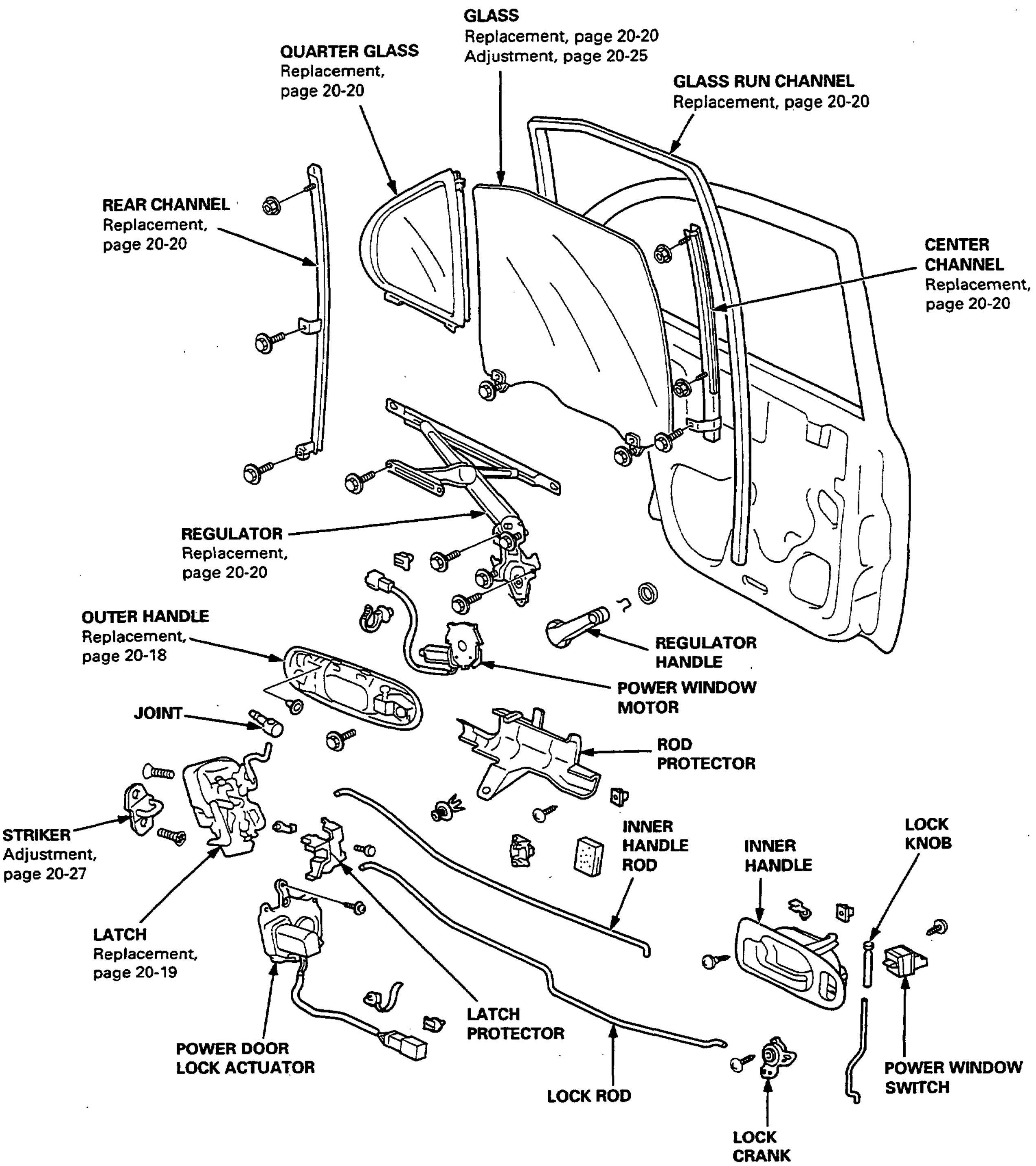






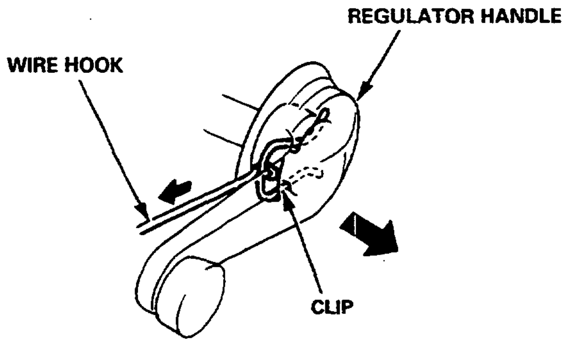
Rear Door Index



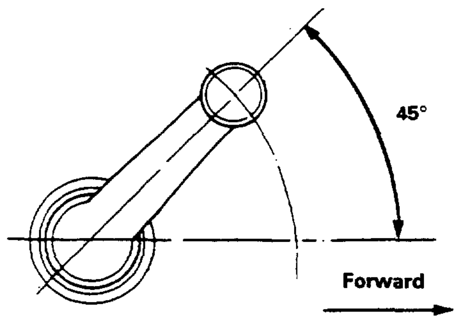

GLASS
Replacement, page 20-20
Adjustment, page 20-25
QUARTER GLASS
Replacement,
page 20-20
GLASS RUN CHANNEL
Replacement, page 20-20
REAR CHANNEL
Replacement,
page 20-20
CENTER
CHANNEL
Replacement,
page 20-20
REGULATOR
Replacement,
page 20-20
OUTER HANDLE
Replacement,
page 20-18
REGULATOR
HANDLE
POWER WINDOW
MOTOR
JOINT
ROD
PROTECTOR
STRIKER
Adjustment,
page 20-27
INNER
HANDLE
ROD
INNER
HANDLE
LOCK
KNOB
LATCH
Replacement,
page 20-19
LATCH
PROTECTOR
POWER DOOR
LOCK ACTUATOR
LOCK ROD
POWER WINDOW
SWITCH
LOCK
CRANK

Door Panel/Plastic Cover Replacement

1. If applicable, remove the regulator handle by pulling the clip out a wire hook.

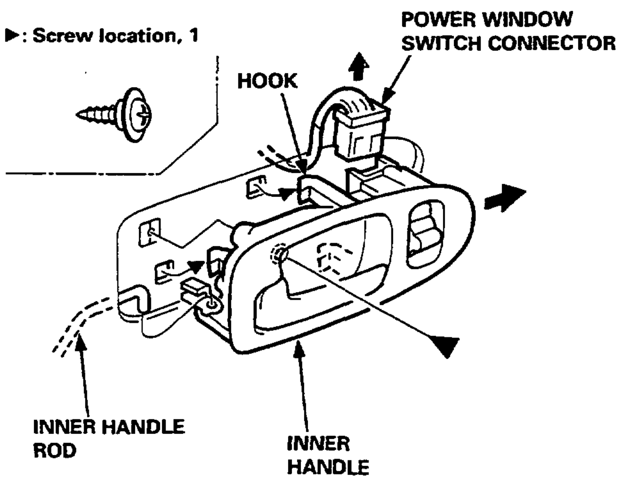


NOTE: Install the regulator handle so it points forward and up at a 45 degree angle with the glass closed.



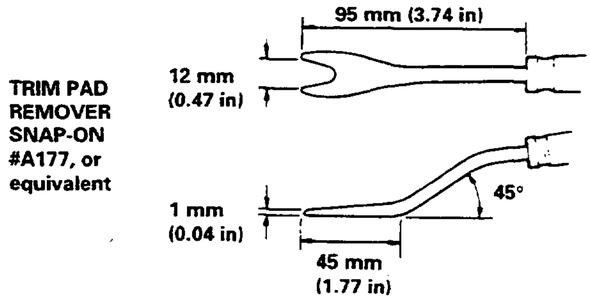
2. Remove the screw, then pull the inner handle forward and out half-way, and disconnect the inner handle rod and power window switch connector.

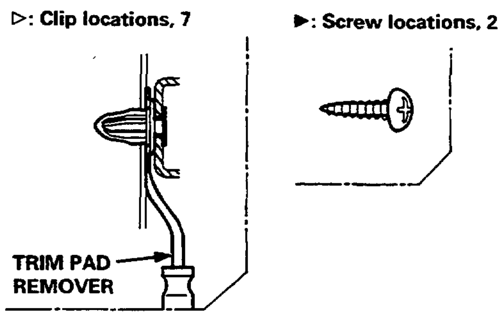
NOTE: Take care not to bend the inner handle rod.

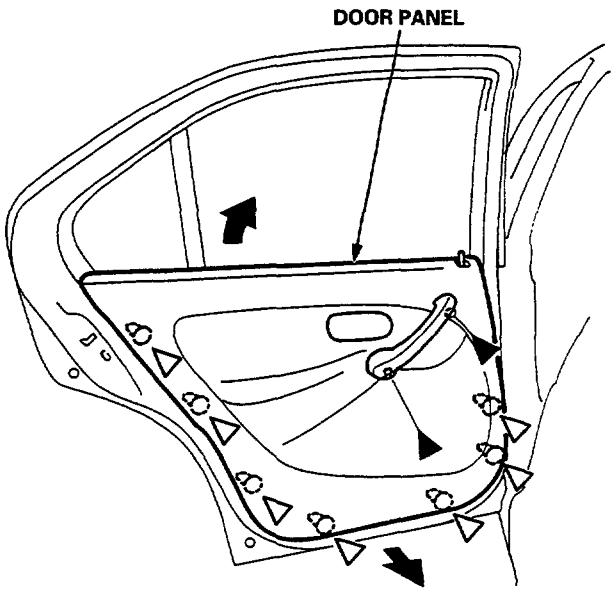


3. Remove the screw, then release the clips that hold the door panel.
   Remove the door panel by pulling it upward.

   NOTE: Remove the door panel with as little bending as possible to avoid creasing or breaking it.

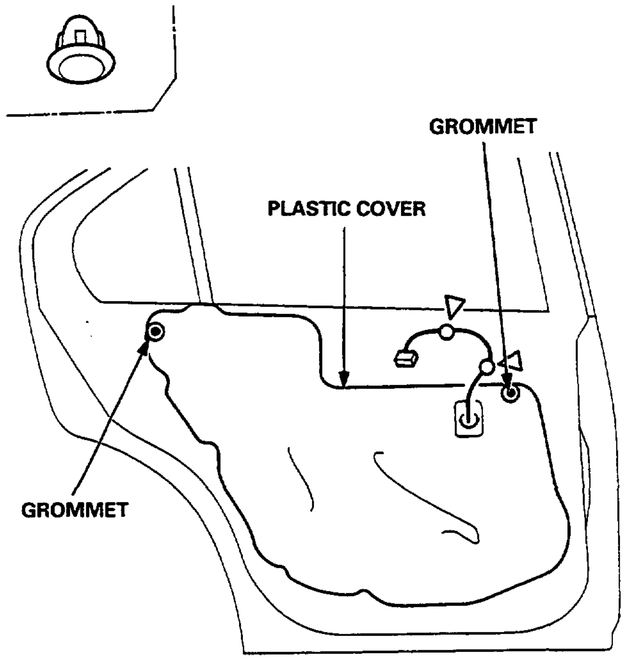






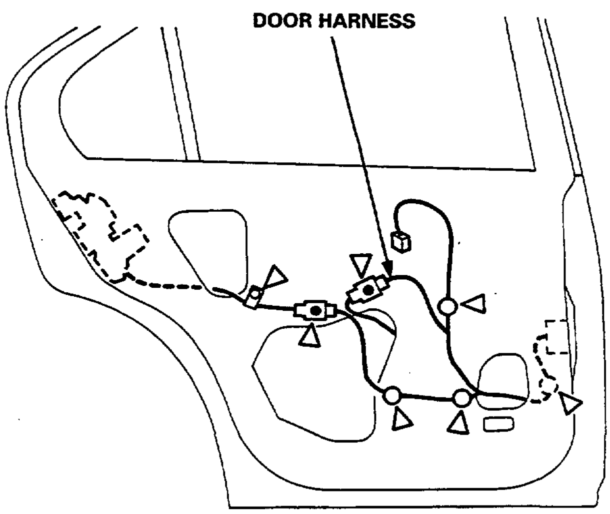
4. Detach the grommets and harness clips, then carefully remove the plastic cover.

◉: Grommet locations, 2 ▷: Clip locations, 2



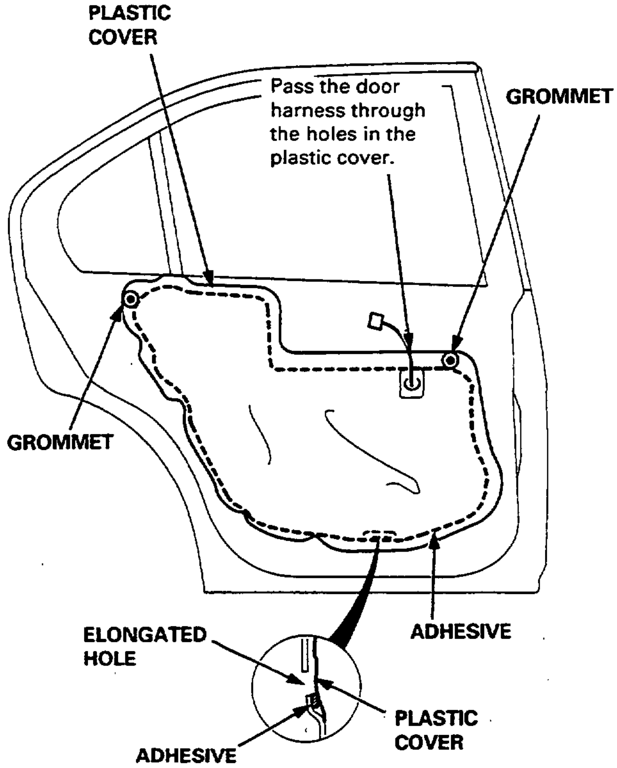
5. Before installing the plastic cover, make sure the door harness and connectors are fastened correctly on the door.

▷: Clip locations, 7



6. Install the plastic cover.

   NOTE:
   - Apply adhesive along the edge where necessary to maintain a continuous seal and prevent water leaks.
   - Do not plug the elongated hole.



7. Install the door panel (see page 20-16).

   NOTE:
   - Make sure the door harness is not pinched.
   - If necessary, replace any damaged clips.

8. Install the inner handle (see page 20-16). If applicable, install the regulator handle (see page 20-16).

   NOTE: Make sure the connector is connected properly.

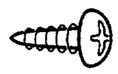
Outer Handle Replacement

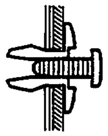
NOTE: Raise the glass fully.

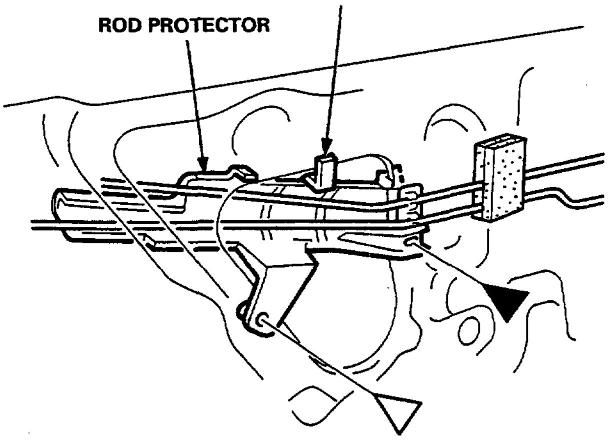
1. Remove:
   - Door panel (see page 20-16)
   - Plastic cover (see page 20-16)

2. Remove the rod protector.

▶: Screw location, 1 ▷: Clip location, 1

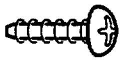


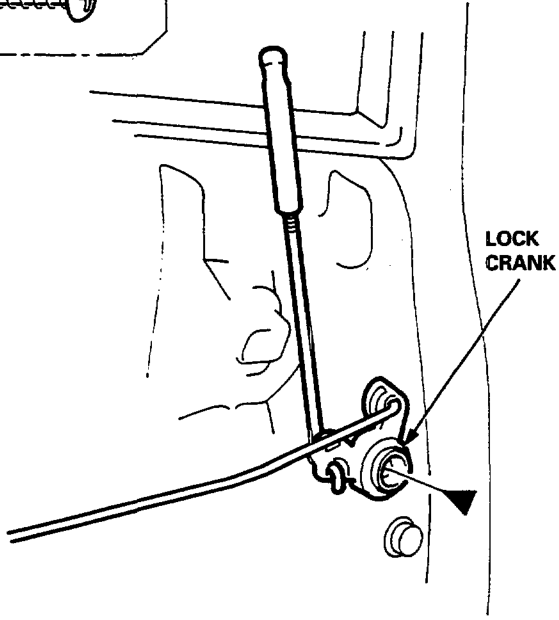




3. Remove the lock crank.

▶: Screw location, 1



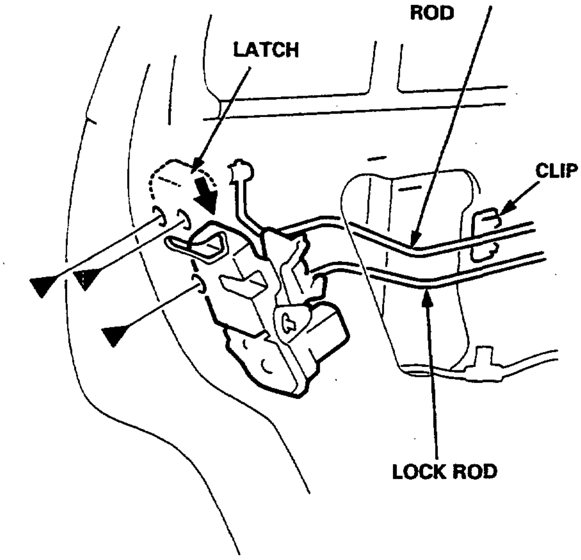


4. Detach the inner handle rod and lock rod from the clip.
   Remove the screws then move the latch down.

▶: Screw locations, 3

6 x 1.0 mm
6 N·m (0.6 kgf·m, 4 lbf·ft)

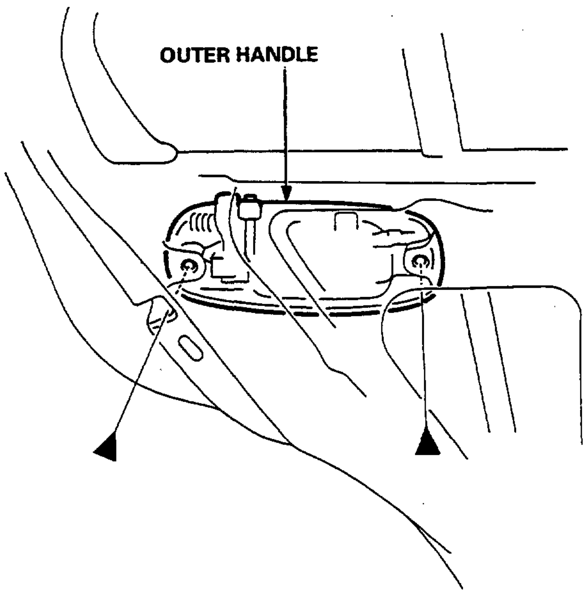
Use a Torx T30 bit.



5. Remove the bolts.

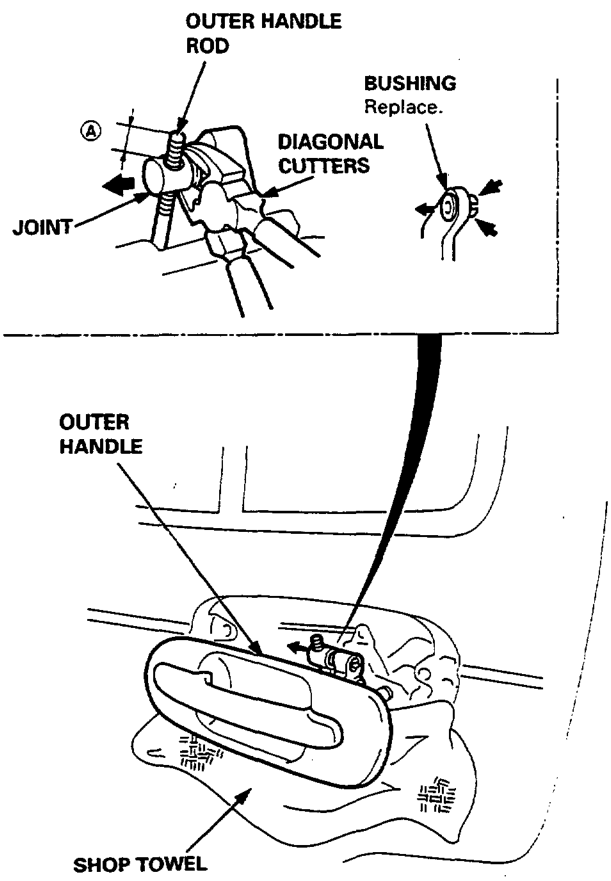
▶: Bolt locations, 2

6 x 1.0 mm
9.8 N·m
(1.0 kgf·m, 7.2 lbf·ft)



6. Pull out the outer handle.
   Pry the outer handle rod out of its joint using diagonal cutters, then remove the outer handle.

   NOTE:
   - To ease reassembly, note 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.



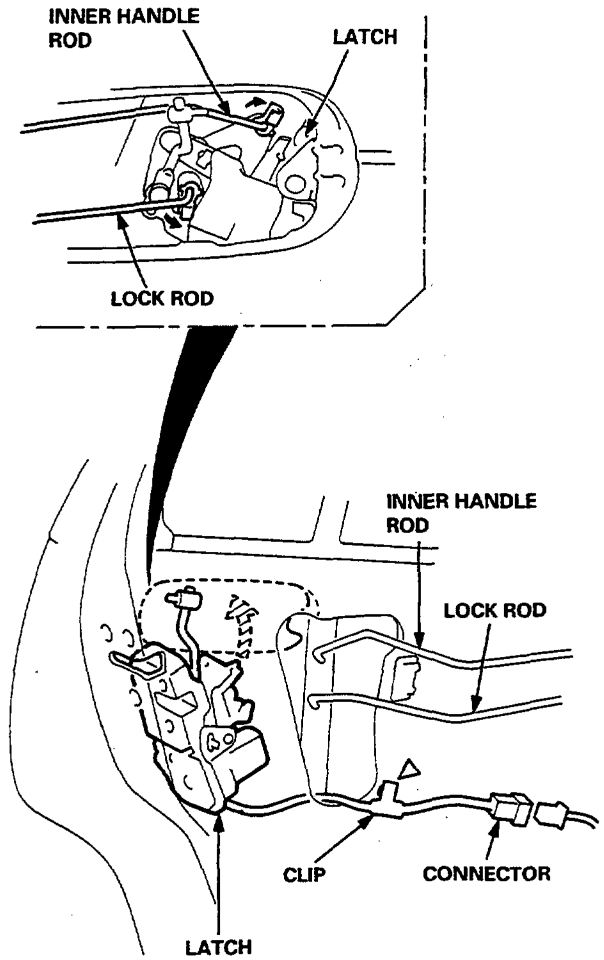
7. Installation is the reverse of the removal procedure.

   NOTE:
   - Make sure the outer handle rod is connected properly.
   - Make sure the door locks and opens properly.

Latch Replacement

NOTE: Raise the glass fully.

1. Remove:
   - Door panel (see page 20-16)
   - Plastic cover (see page 20-16)
   - Outer handle (see page 20-18)
2. Disconnect the inner handle rod and lock rod from the latch, then remove them.
3. Disconnect the connector, then remove the latch through the outer handle opening.



4. Installation is the reverse of the removal procedure.

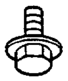
   NOTE:
   - Make sure the inner handle rod, lock rod and connector are connected properly.
   - Make sure the door locks and opens properly.

Glass/Regulator/Glass Run Channel Replacement

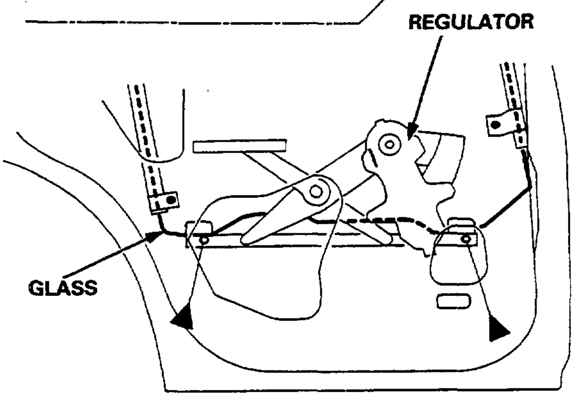
1. Remove:
   - Door panel (see page 20-16).
   - Plastic cover (see page 20-16).
2. Connect the power window switch to the door harness.
3. Carefully move the glass until you can see the bolts, then remove them.

   NOTE: *Take care not to drop the glass inside the door.*

▶: Bolt locations, 2

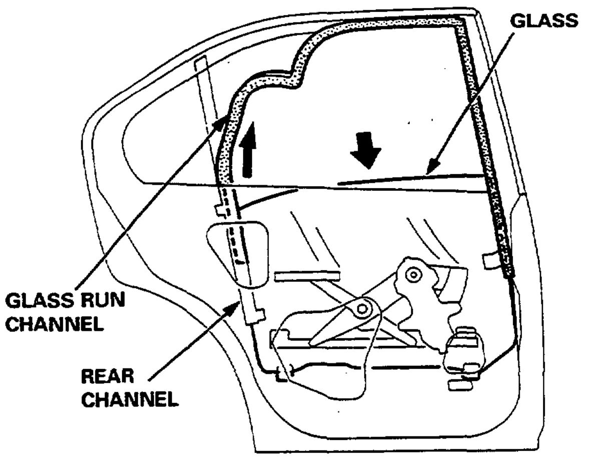


6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



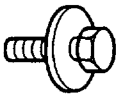
4. Carefully lower the glass, then peel the glass run channel out of the rear channel.

   NOTE: Take care not to drop the glass inside the door.



5. Remove the rear channel.

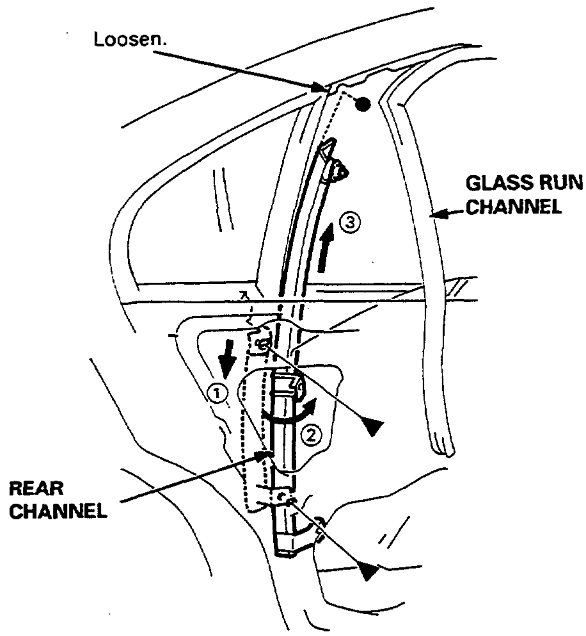
▶: Bolt locations, 2



6 x 1.0 mm
8 N·m (0.8 kgf·m, 6 lbf·ft)

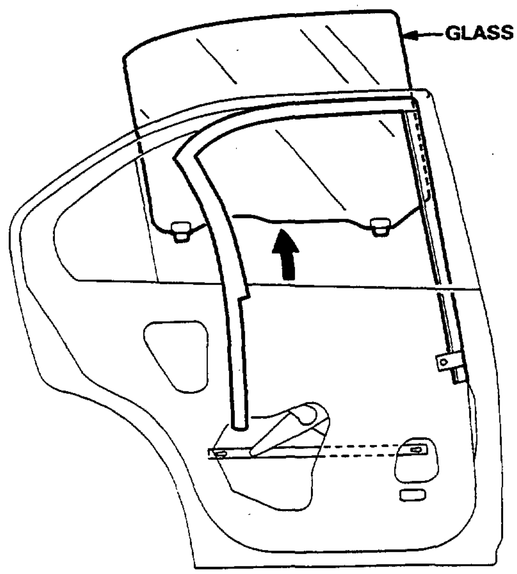
●: Nut location, 1

5 x 0.8 mm
4 N·m (0.4 kgf·m, 3 lbf·ft)

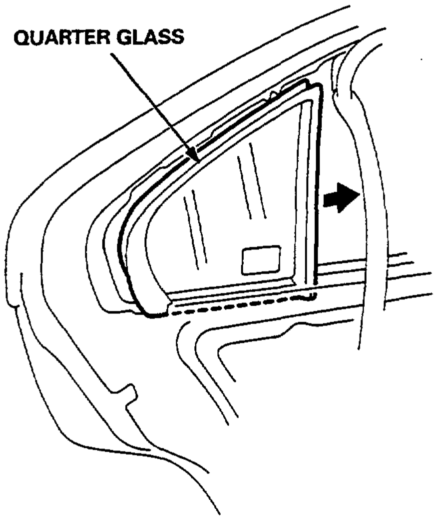


6. Carefully remove the glass from the window slot as shown.

   NOTE: Take care not to drop the glass inside the door.

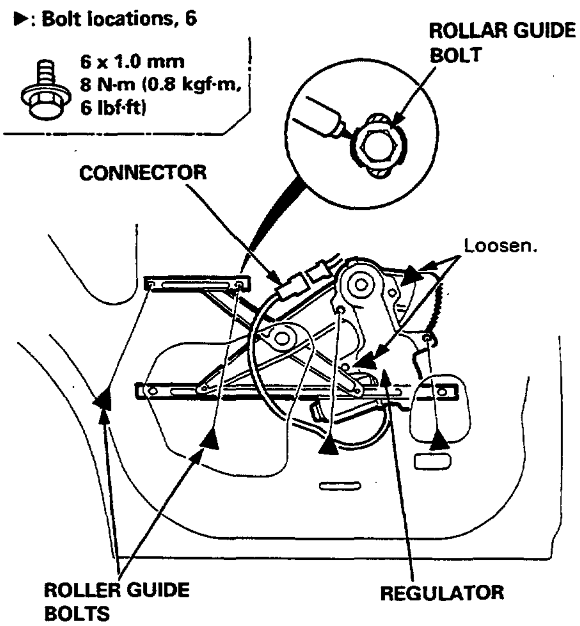


7. Remove the quarter glass.



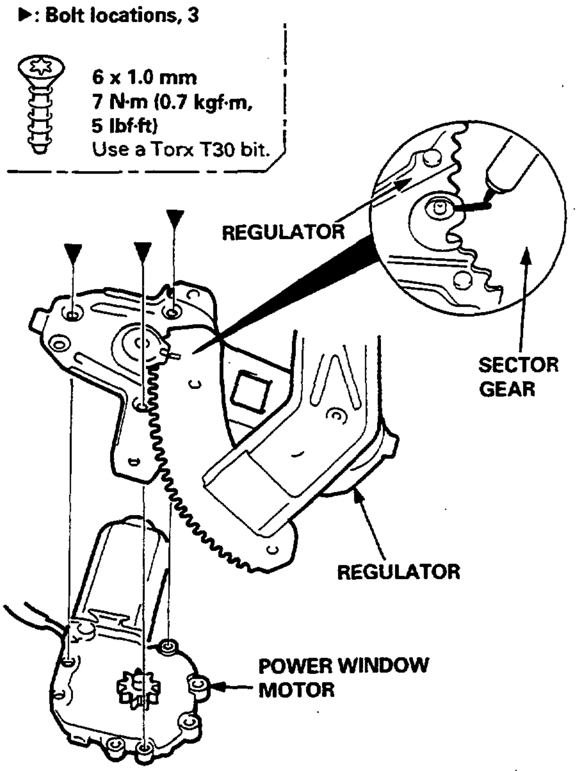
8. Remove the two bolts and loosen the two bolts. Remove the roller guide bolts and disconnect the connector. Remove the regulator through the center hole in the door.

NOTE: Scribe a line around the roller guide bolt to show the original adjustment.

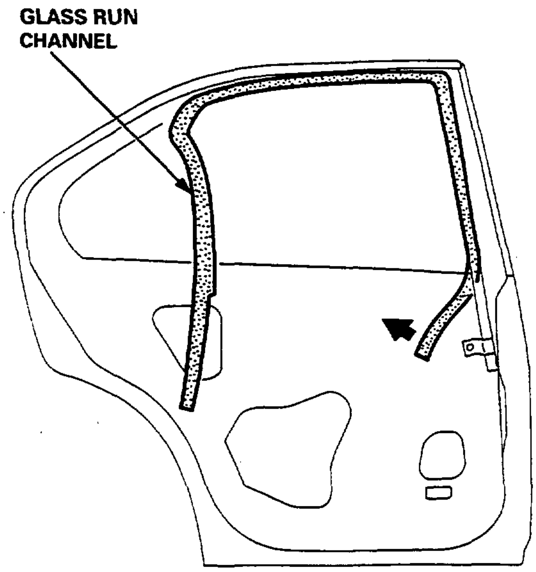


9. Remove the power window motor from the regulator.

NOTE: Before removing the power window motor, mark the location by scribing a line across the sector gear and regulator.



10. Remove the glass run channel.

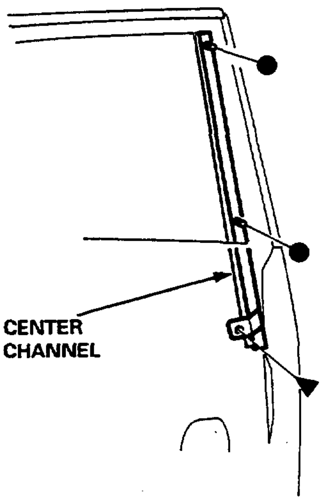


(cont'd)

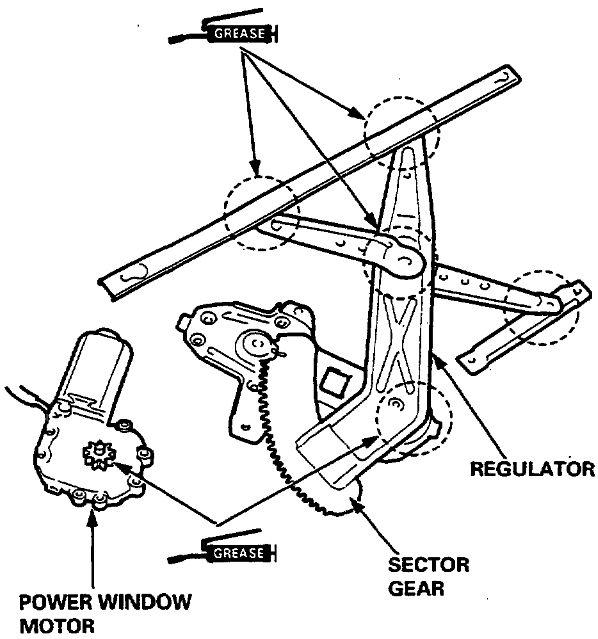
Glass/Regulator/Glass Run Channel Replacement (cont'd)

11. Remove the center channel.

▶: Bolt location, 1	●: Nut locations, 2
6 x 1.0 mm 8 N·m (0.8 kgf·m, 6 lbf·ft)	5 x 0.8 mm 4 N·m (0.4 kgf·m, 3 lbf·ft)



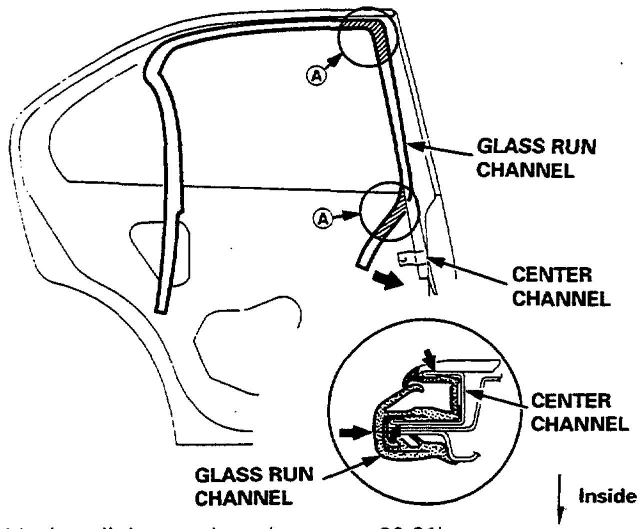
12. Grease all the sliding surfaces of the regulator where shown. Install the power window motor on the regulator.
Check that the regulator moves smoothly by connecting a 12 V battery to the power window motor (see section 23).



13. Install the center channel and glass run channel.

NOTE:
- Apply clear sealant to location Ⓐ on the center channel as shown.
- Fit the glass run channel into the center channel, and on the door as shown.

Sealant: Cemedine #8500, or equivalent



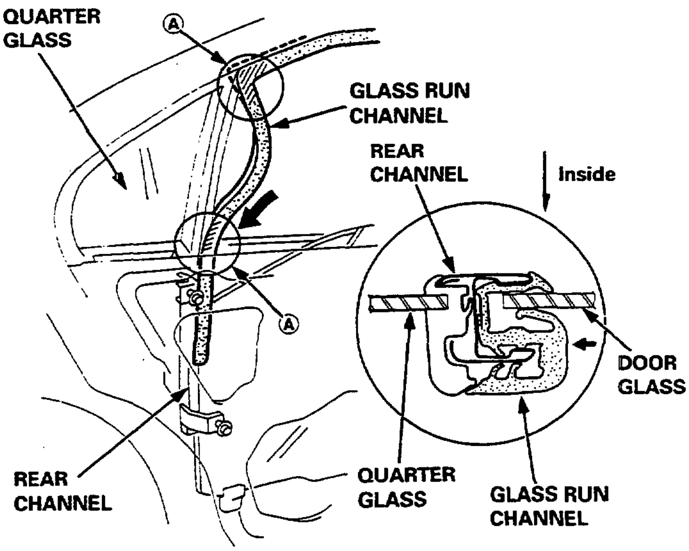
14. Install the regulator (see page 20-21).

NOTE: Make sure the connector is connected properly.

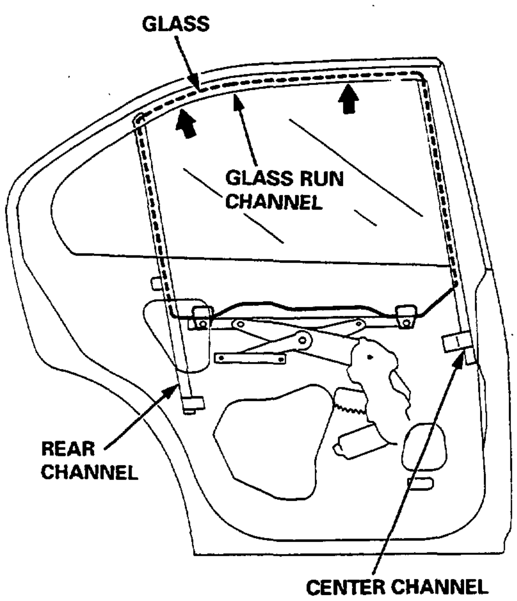
15. Install the quarter glass, glass and rear channel, and fit the glass run channel into the rear channel.

NOTE: Apply clear sealant to location Ⓐ on the rear channel as shown.

Sealant: Cemedine #8500, or equivalent



16. 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 (see page 20-25).



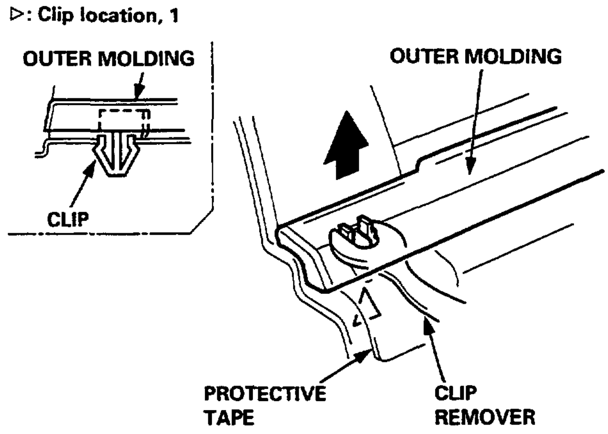
17. Attach the door harness to the door correctly (see page 20-17).
18. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent water leaks (see page 20-17).
19. Install the door panel (see page 20-16).

Outer Molding Replacement

CAUTION: Wear gloves to remove the outer molding.

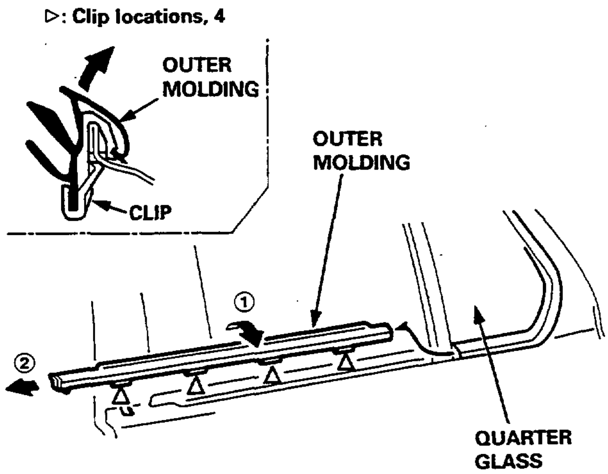
1. Detach the clip at the front edge of the outer molding, then pull up the outer molding.

   NOTE: To prevent damage to the door, use protective tape on the door.



2. Starting at the front, pry the outer molding up and detach the clips, then remove the outer molding by sliding it forward.

   NOTE: Take care not to twist or scratch the outer molding.



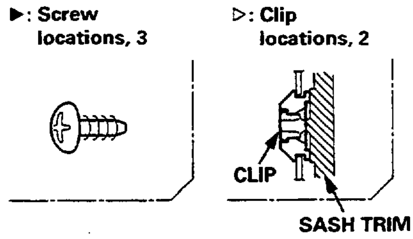
3. Installation is the reverse of the removal procedure.

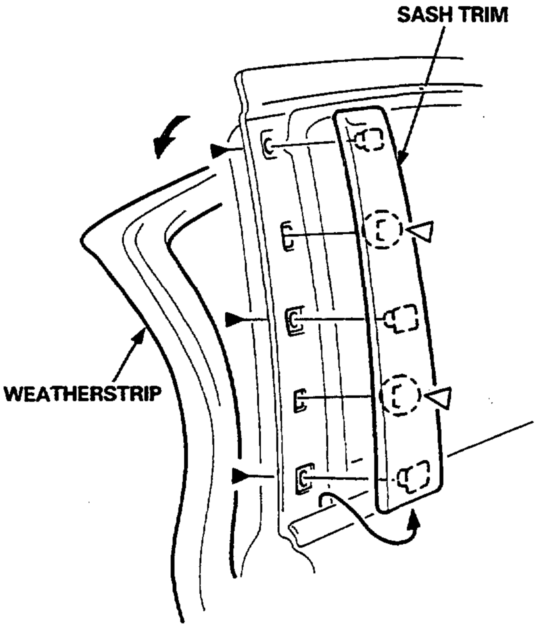
   NOTE: If necessary, replace any damaged clips.

Sash Trim Replacement

NOTE: Take care not to scratch the sash trim.

1. Peel away the weatherstrip as necessary.
2. Remove the screws, and detach the clips, then remove the sash trim.





3. Installation is the reverse of the removal procedure.

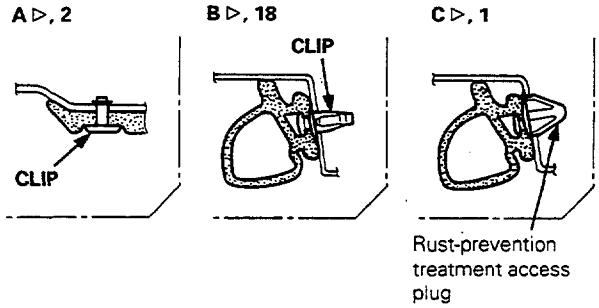
   NOTE: Insert the bottom edge of the sash trim between the door and outer molding.

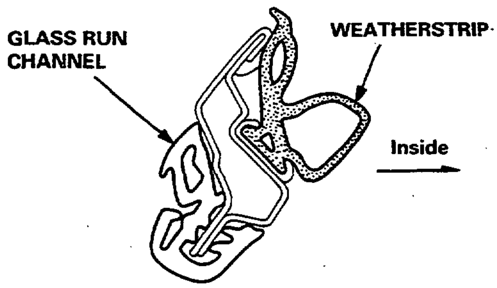
Weatherstrip Replacement

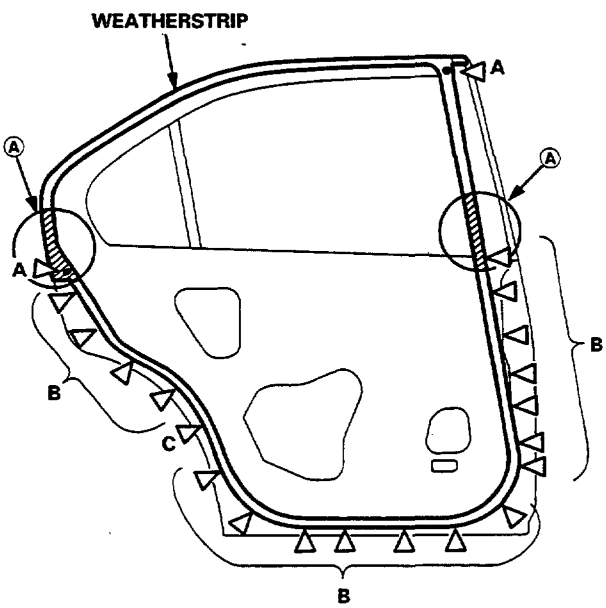
NOTE:
- Before installing the inner weatherstrip, apply clear sealant to locations Ⓐ on the door as shown.
- If necessary, replace any damaged clips.

Sealant: Cemedine #8500, or equivalent

▷: Clip locations





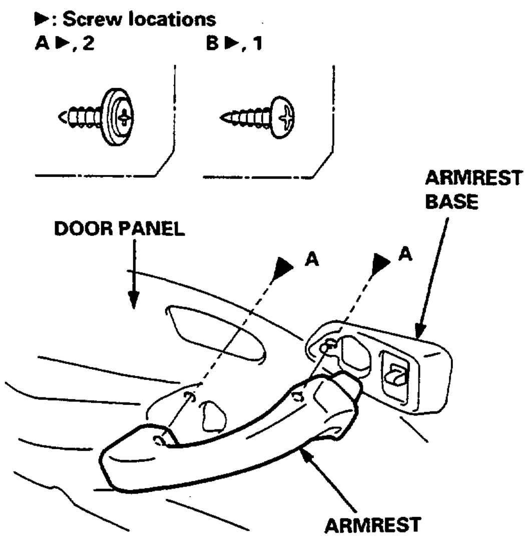


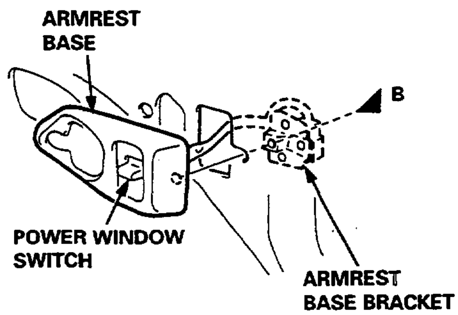
Glass Adjustment

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 pages 20-4, 16).

2. Front Door (Driver's):
   Remove the armrest, then remove the power window switch from the door panel (power window model).



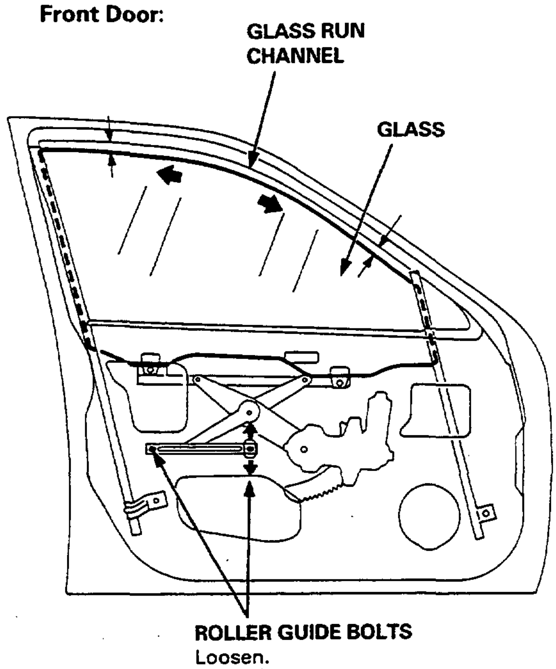


3. Connect the power window switch to the power window motor connector (power window model). Install the regulator handle on the regulator (manual window model).

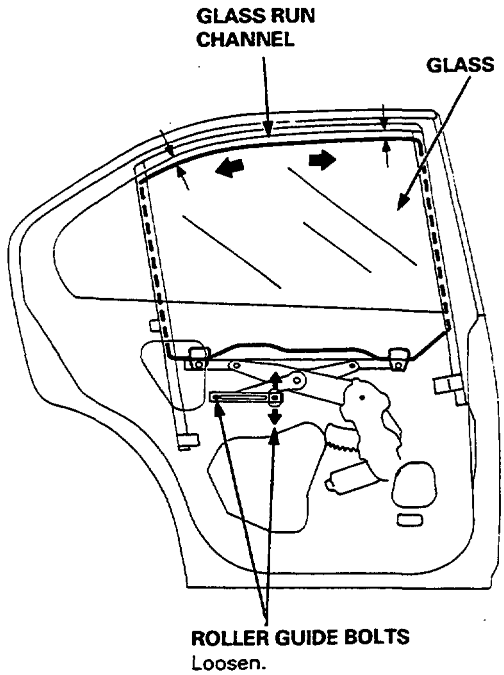
4. Raise the glass as far up as possible, and hold it *against the glass run channel.*

5. Loosen the roller guide bolts, and adjust the glass so it is parallel with the glass run channel.

Front Door:



Rear Door:



(cont'd)

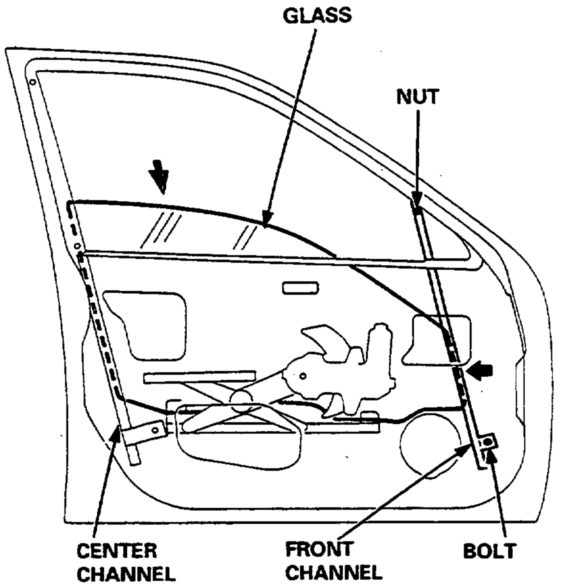
Glass Adjustment (cont'd)

6. Tighten the roller guide bolts.

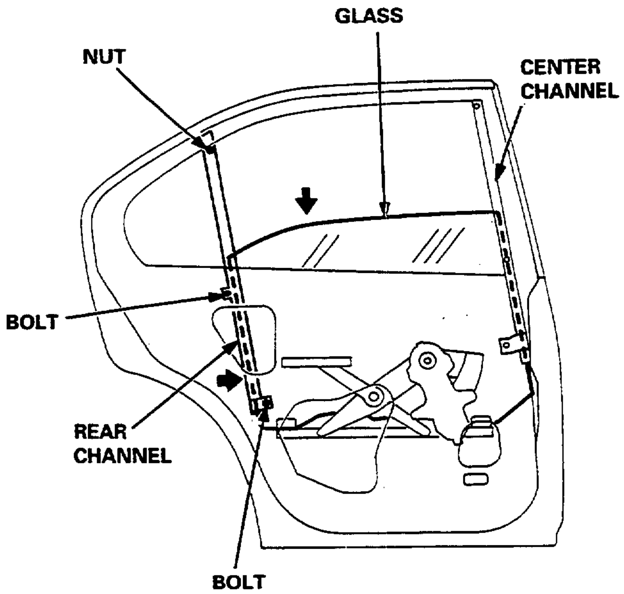
7. Check that the glass moves smoothly.

8. If necessary, lower the glass, then adjust the front and center channels.

Front Door:



Rear Door:

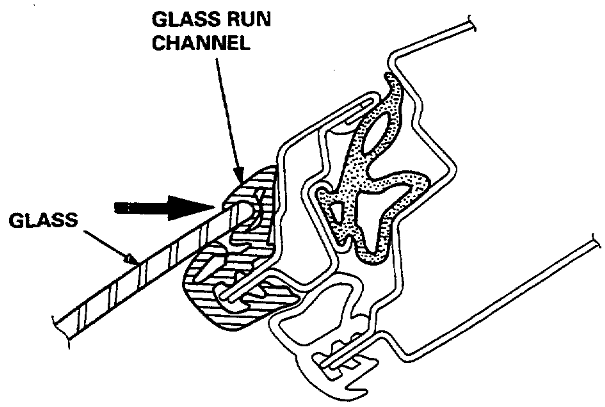


9. Check that the glass moves smoothly.

10. Raise the glass fully and check for gaps.

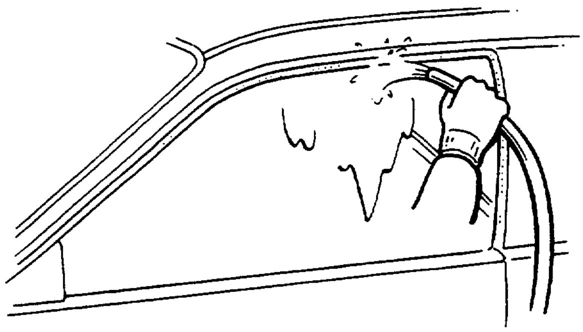
11. Check the glass operation.

    NOTE: Check that the glass contacts the glass run channel evenly.



12. Check for water leaks.

    NOTE: Do not use high-pressure water.



13. Route the door harness and connectors, and fasten them to the door (see pages 20-5, 17).

14. Front Door (Driver's): Disconnect the power window switch from the door harness, then install the power window switch on the door panel (see page 20-25).

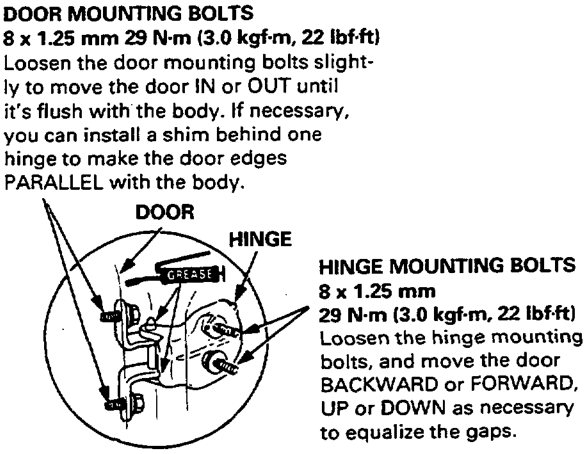
15. Attach the plastic cover, then install the door panel (see pages 20-6, 16).

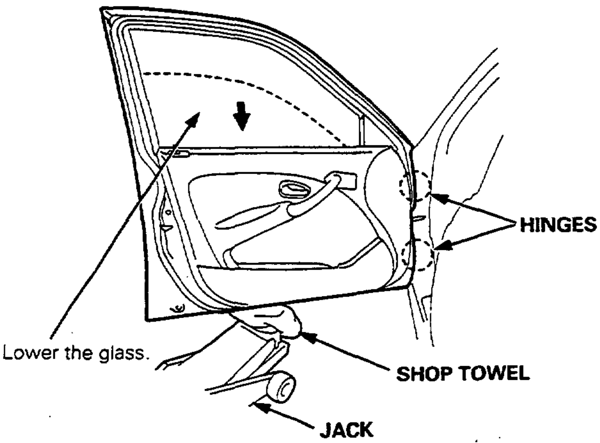
Position Adjustment

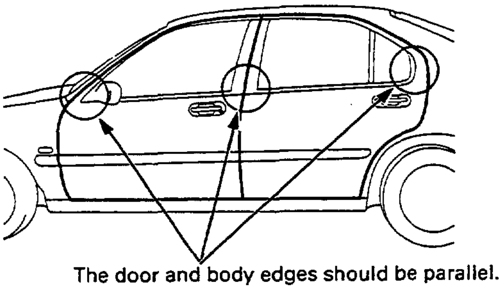
NOTE: Place the vehicle on a firm, level surface when adjusting the doors.

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.







NOTE: Check for water leaks.

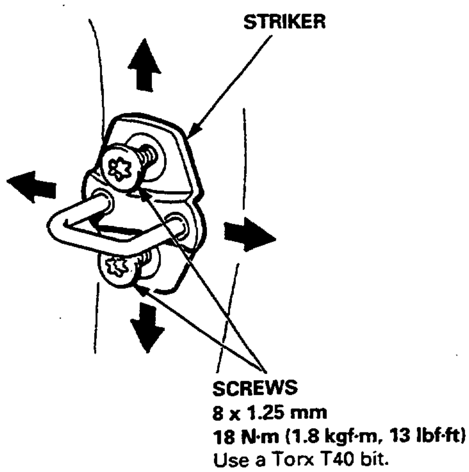
Striker Adjustment

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.



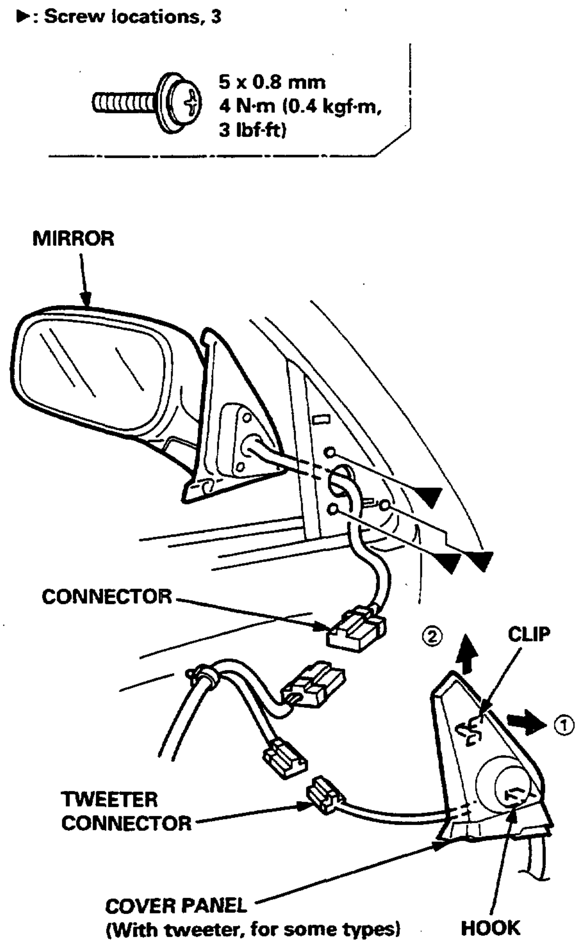
Mirrors

Power Mirror Replacement

1. Remove the door panel (see page 20-4).
2. Pry out the cover panel with a flat tip screwdriver, then remove it.
   Disconnect the connector(s).

   CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

3. Remove the screws, then remove the mirror while holding it.



4. Installation is the reverse of the removal procedure.
5. Check for water leaks.

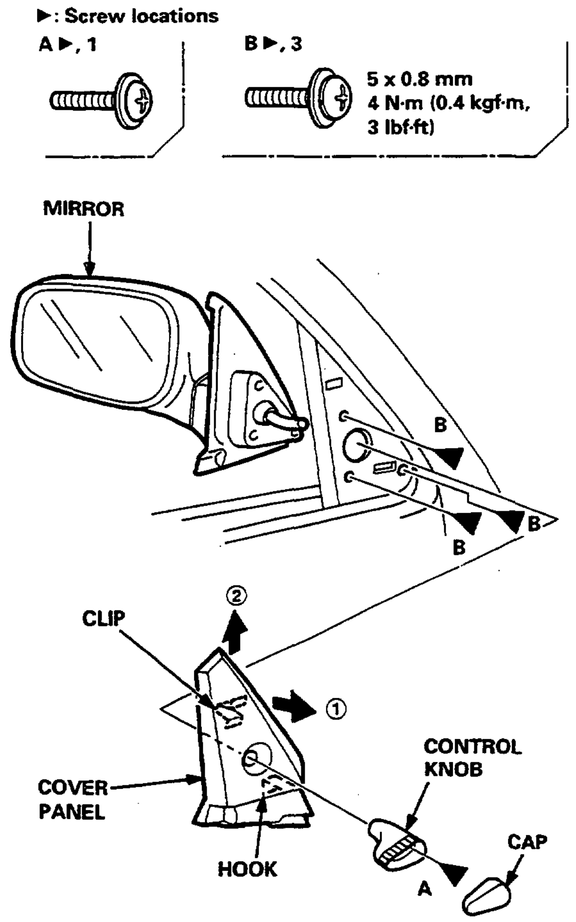
   NOTE: Do not use high-pressure water.

Manual Mirror Replacement

1. Remove the cap and screw, then remove the control knob.
2. Pry out the 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 screws, then remove the mirror while holding it.



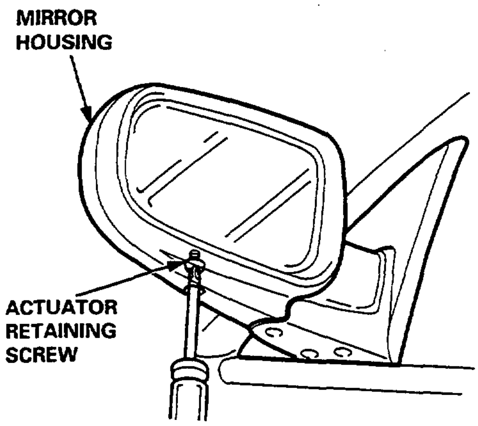
4. Installation is the reverse of the removal procedure.
5. Check for water leaks.

   NOTE: Do not use high-pressure water.

Mirror Holder Replacement

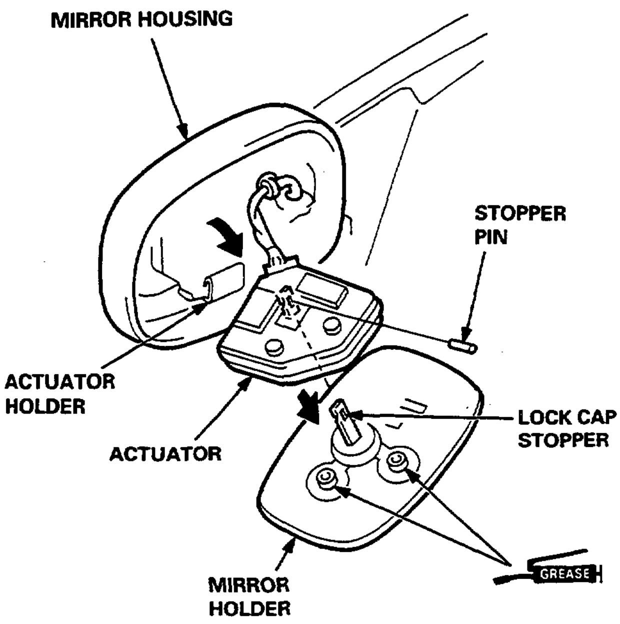
Power mirror (except heated type):

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: If the mirror is equipped with a defogger, you cannot separate the actuator and mirror holder.

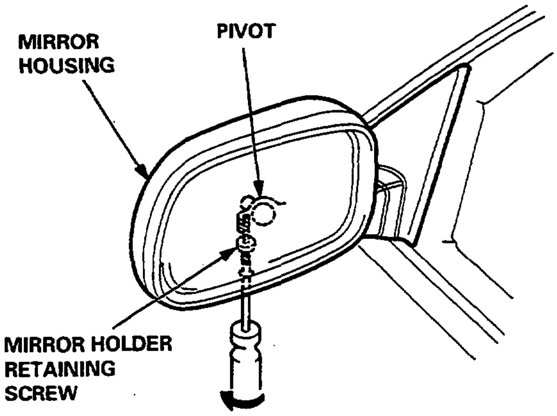


4. Installation is the reverse of the removal procedure.

   NOTE: Apply grease to the locations indicated by the arrows.

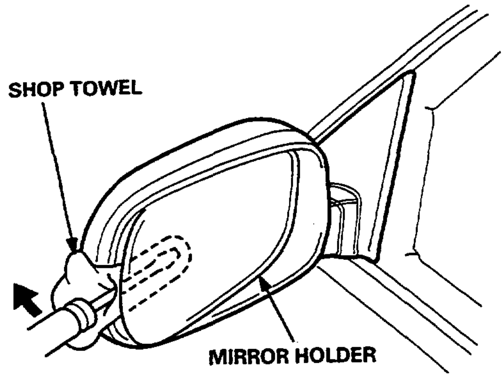
Manual mirror:

1. Insert a screwdriver in the mirror housing through the service hole, and loosen the mirror holder retaining screw.



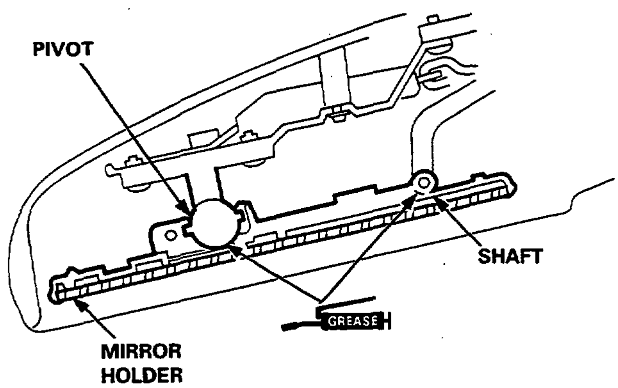
2. Carefully pry out the mirror holder with a flat tip screwdriver as shown.

   CAUTION: To prevent damage to the mirror, wrap the end of the screwdriver with a shop towel.



3. Installation is the reverse of the removal procedure.

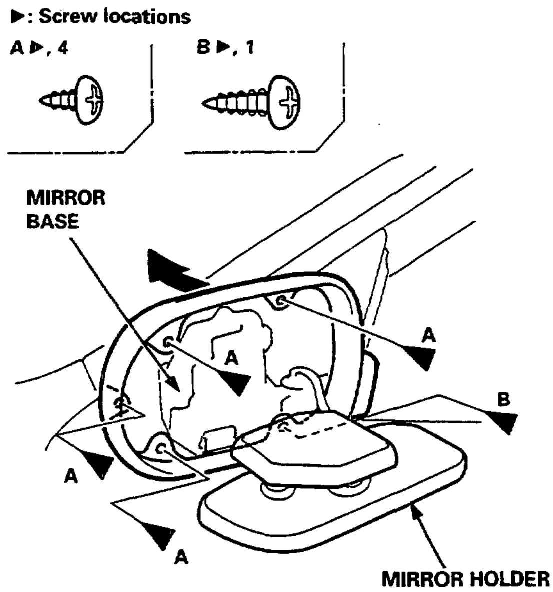
   NOTE: Apply grease to the location indicated by the arrows.



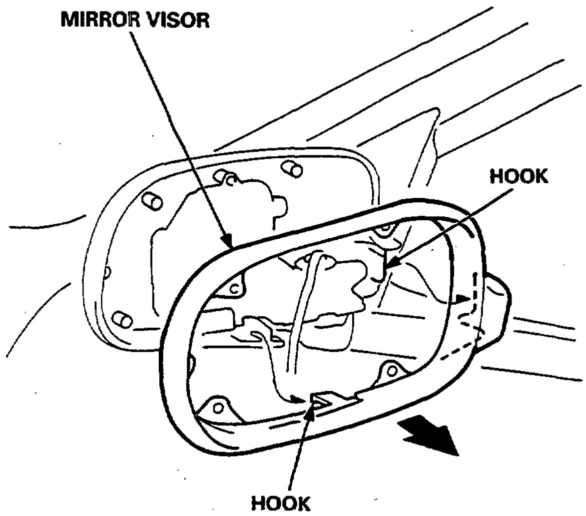
Mirror Visor and Mirror Cover Replacement

Power mirror:

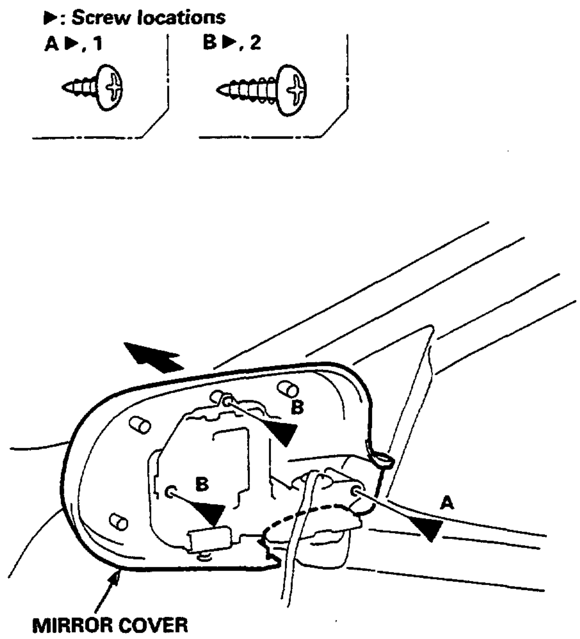
1. Remove the mirror holder (see page 20-29).
2. Turn the mirror base forward, then remove the screws.



3. Detach the hooks, then remove the mirror visor.



4. Remove the screws, then remove the mirror cover.

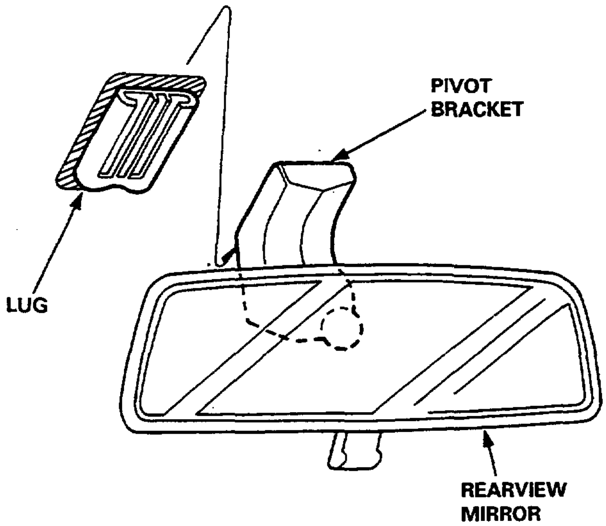


5. Installation is the reverse of the removal procedure.

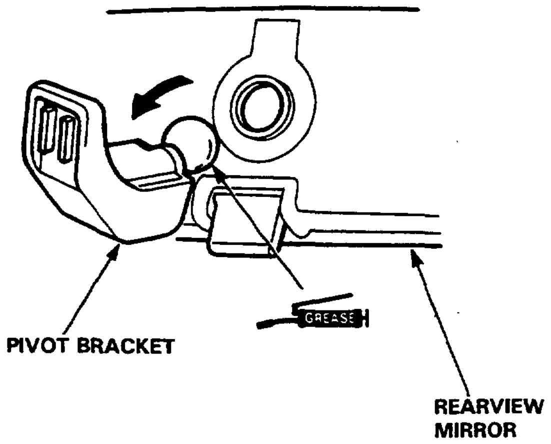
Rearview Mirror Replacement

1. Carefully slide up the pivot bracket from the lug.

   NOTE: *Take care not to scratch the windshield.*



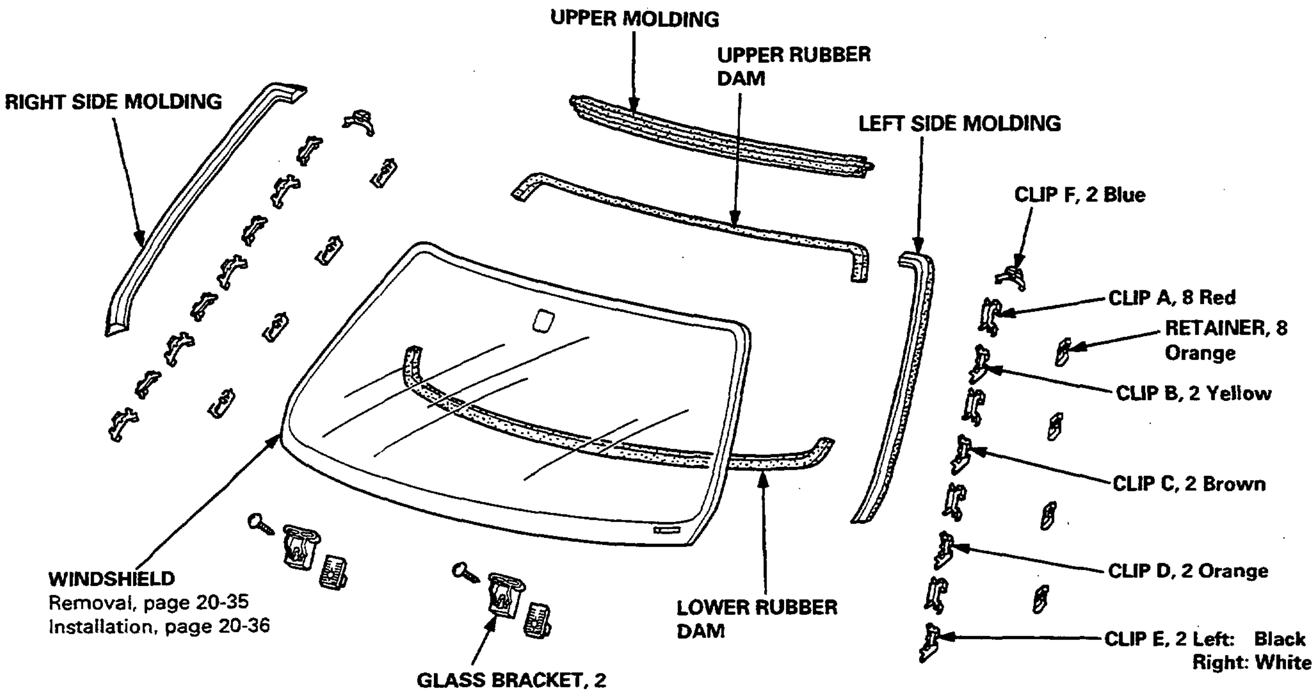
2. Install the rearview mirror, heat the pivot and mirror side with a low powered heater gun for several minutes.

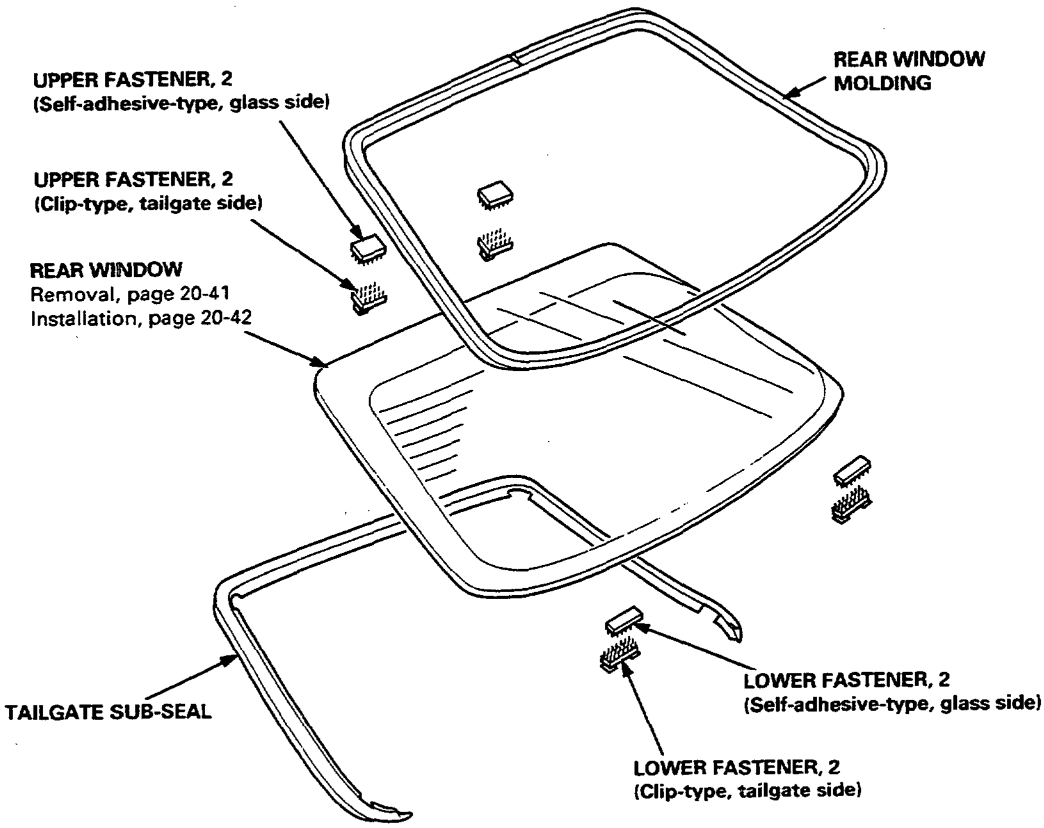


Windshield, Rear Window

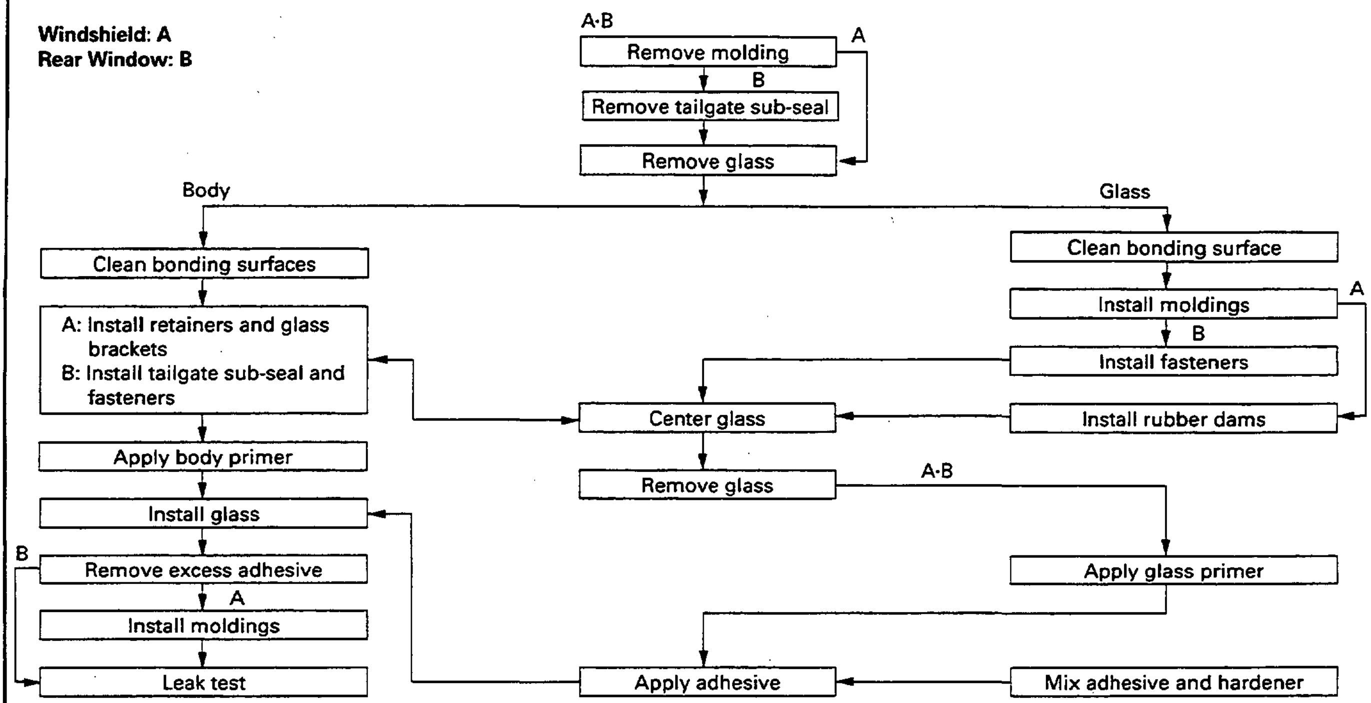
Index

NOTE: The numbers after the part names show the quantities of the parts used.





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	For adhesive
		Sponge	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.

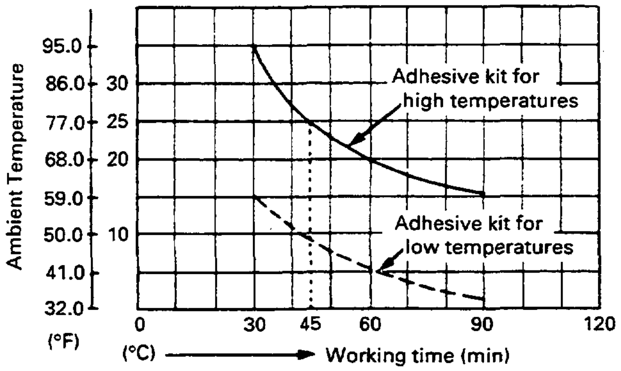
Tools

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.

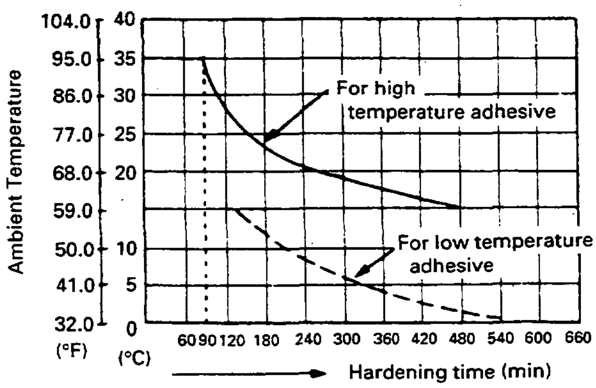
For example, when the ambient temperature is 25°C (77°F), the glass should be installed within 45 minutes using the high temperatue type adhesive.
Kit part numbers and contents are listed on the page before.



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

SRS wire harnesses are routed near the dashboard and steering column.

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

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 dial.
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 20-61).

Windshield

Removal

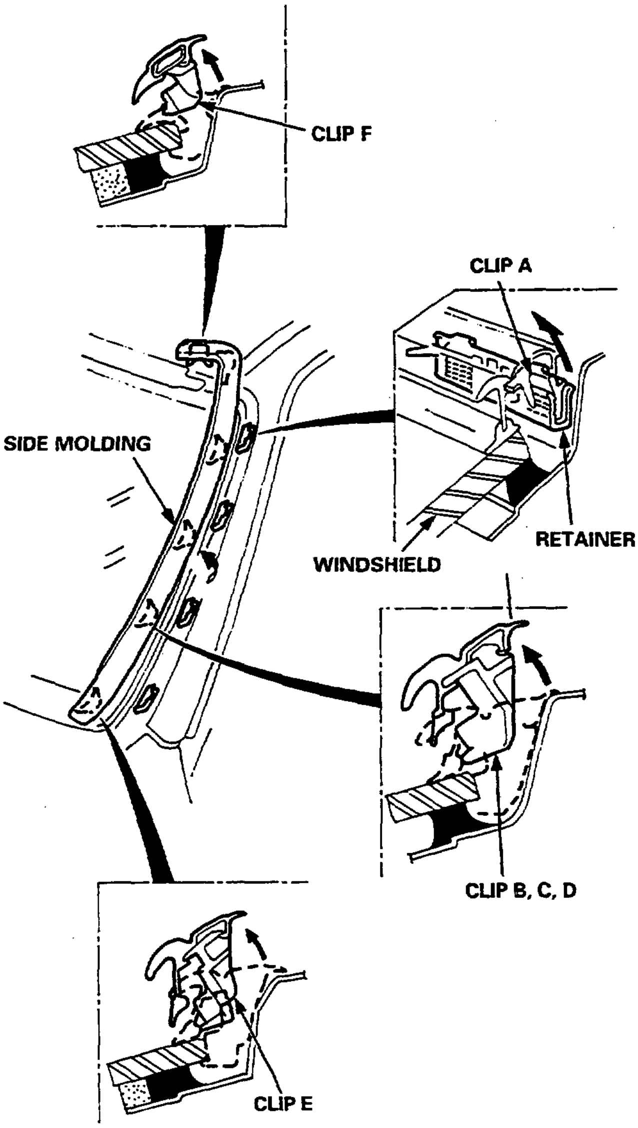
CAUTION:

- **Wear gloves to remove and install the windshield.**
- **Use seat covers to avoid damaging any surfaces.**

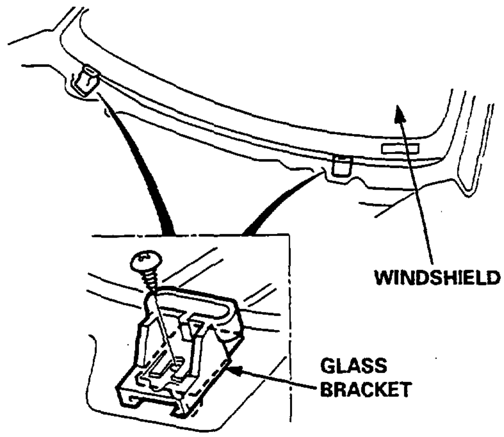
1. To remove the windshield, first remove the:
   - Front pillar trim (see page 20-55)
   - Rearview mirror (see page 20-31)
   - Headliner (see page 20-59)
   - Windshield wiper arms and air scoop (see page 20-99)

2. Detach the clips from the retainers, then remove both side moldings as shown.

   NOTE: If necessary, replace any damaged clips.

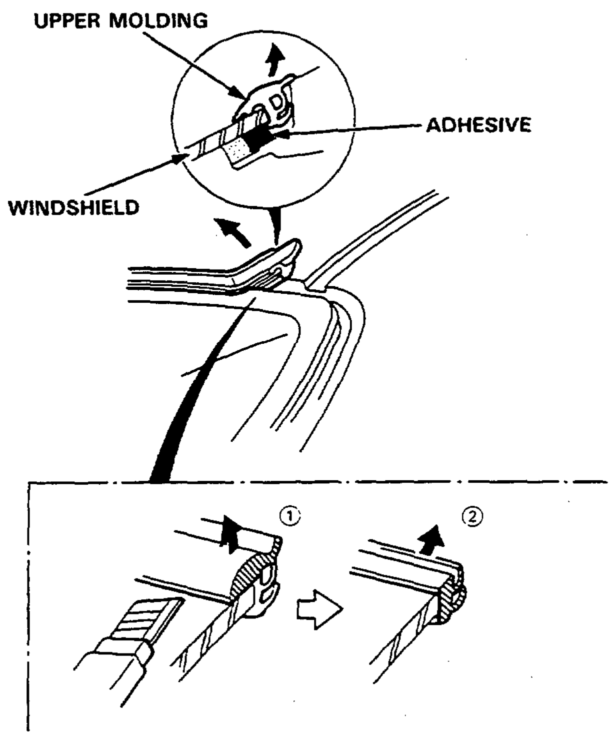


3. Remove the right and left glass brackets.



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.



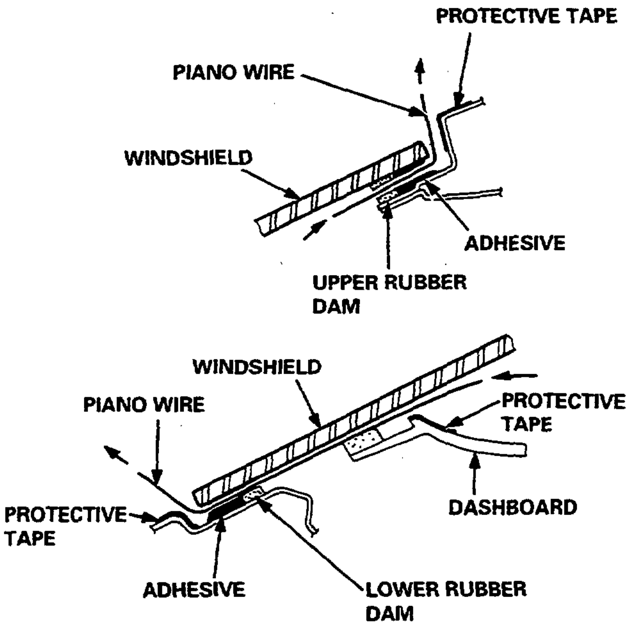
5. Remove the other retainers from the body.

(cont'd)

Windshield

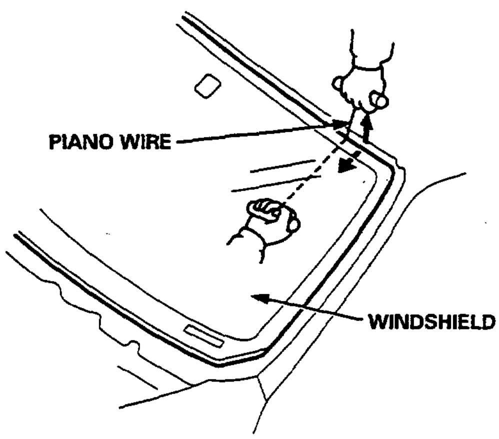
Removal (cont'd)

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 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 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.

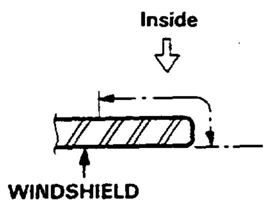
   NOTE: After cleaning, keep oil, grease and water from getting on the surface.

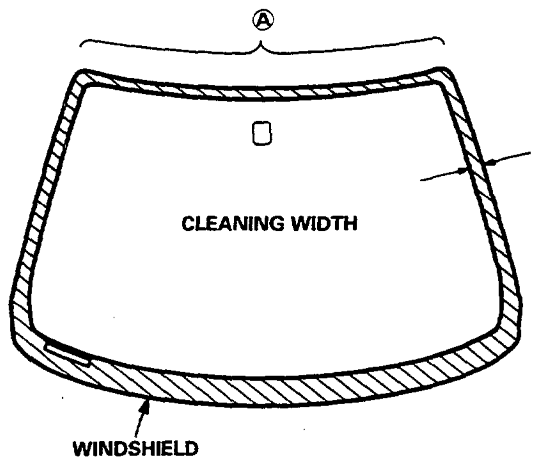
3. If the old windshield is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the windshield surface with alcohol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

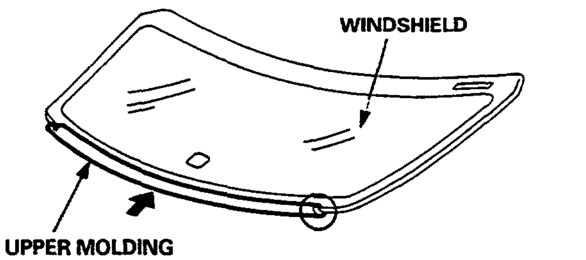
   CAUTION: Avoid setting the windshield on its edges; small chips may later develop into cracks.

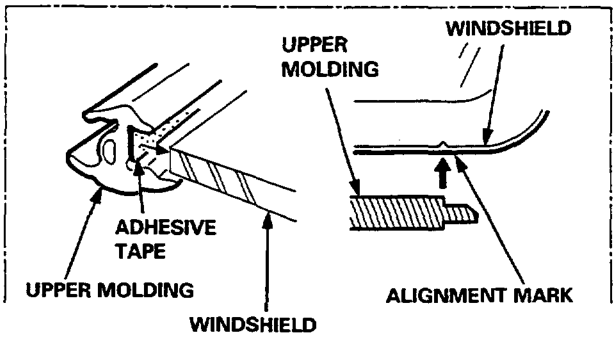
   NOTE:
   - Clean the shadowed area.
   - Clean area Ⓐ as shown.





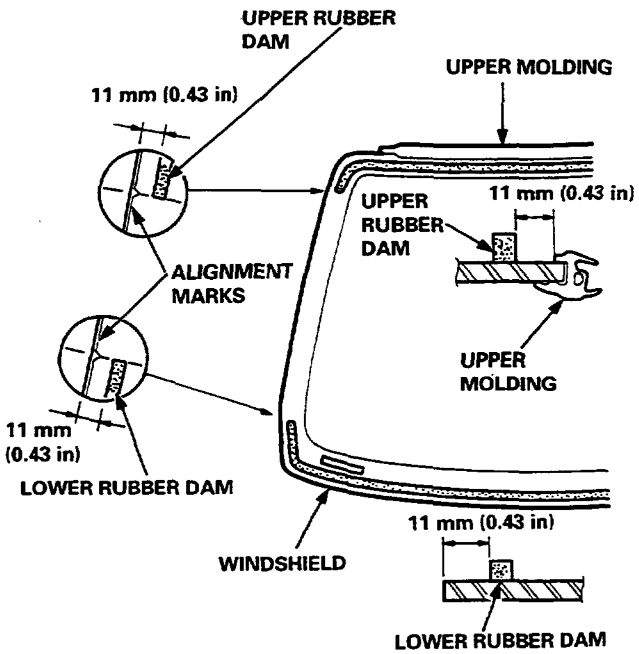
4. Center and glue the upper molding to the upper edge of the windshield.





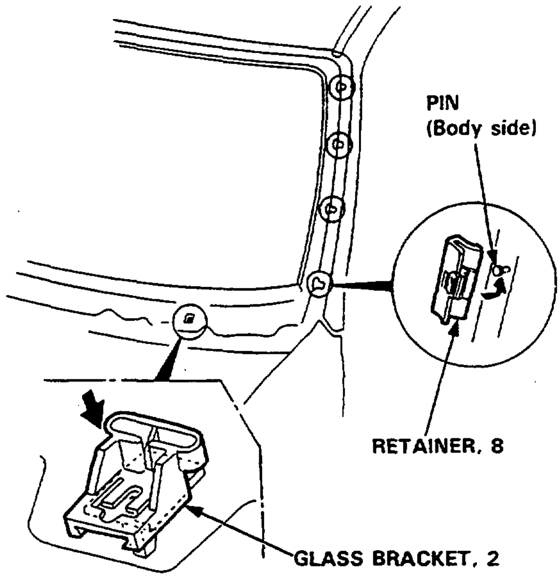
5. Glue the upper and lower rubber dams to the inside face of the windshield, as shown, to contain the adhesive during installation.

   NOTE: Be careful not to touch the windshield where adhesive will be applied.

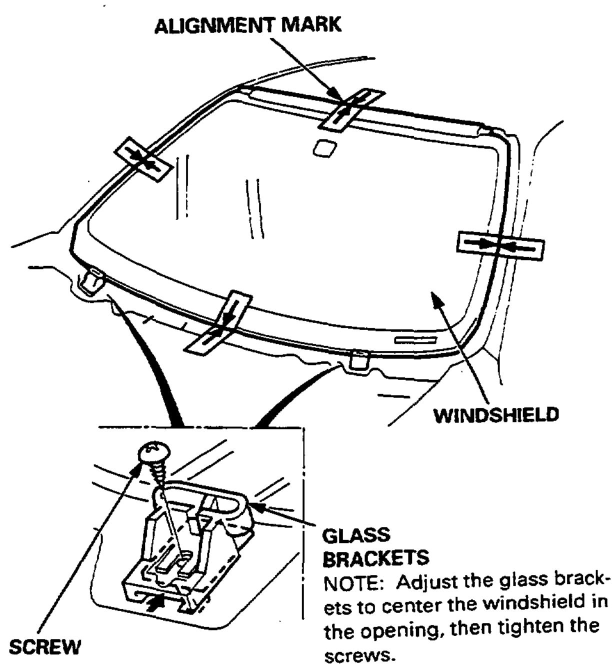


6. Install the glass brackets and retainers as shown.

   NOTE: The numbers after the part names show the quantities of the parts used.



7. 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.



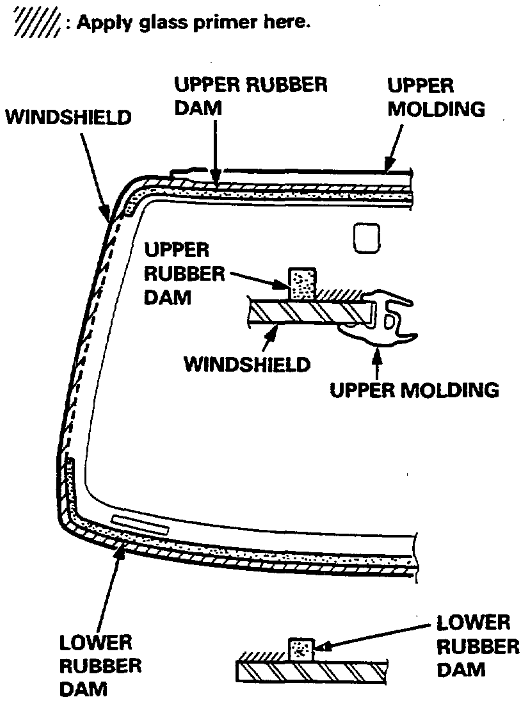
8. Remove the windshield.

(cont'd)

Installation (cont'd)

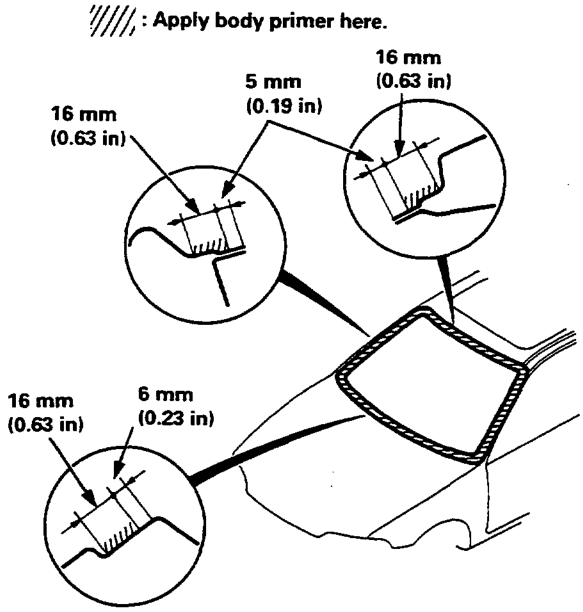
9. With a sponge, apply a light coat of glass primer around the edge of the windshield as shown, then lightly wipe it off with gauze or cheesecloth.

   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.



10. 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.

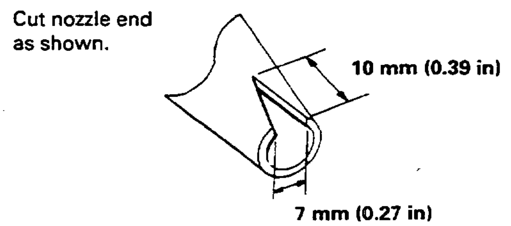
    NOTE:
    - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
    - Never touch the primed surfaces with your hands.
    - Mask off the dashboard before painting the flange.



11. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

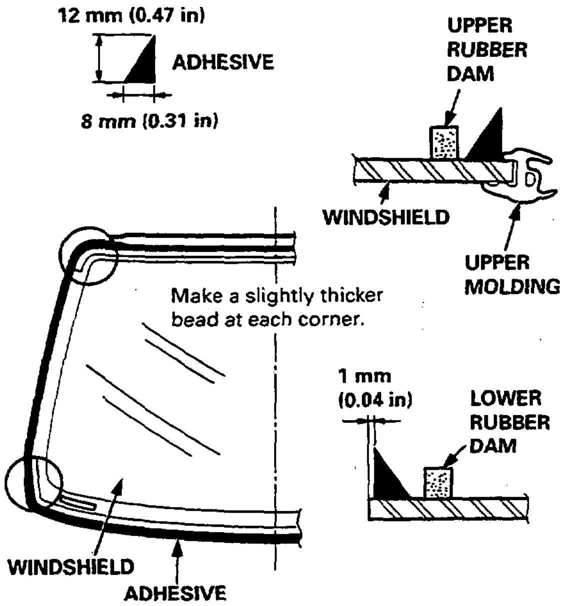
    NOTE:
    - Clean the plate with a sponge and alcohol before mixing.
    - Follow the instructions that come with the adhesive.

12. Before filling a cartridge, cut the end of the nozzle as shown.



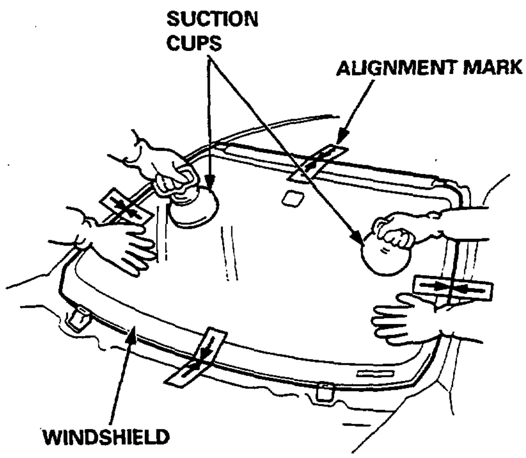
13. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the windshield as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.

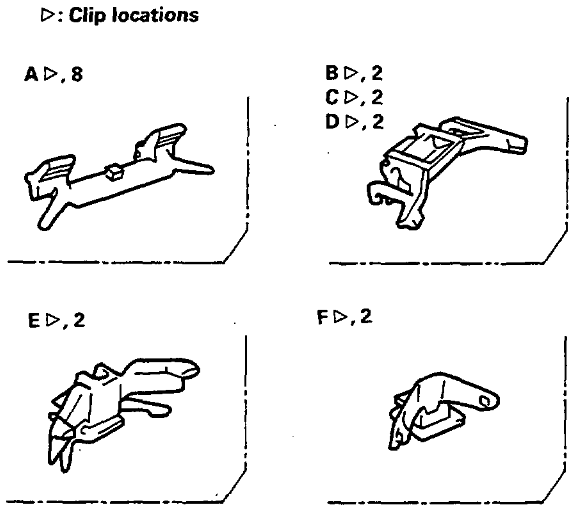


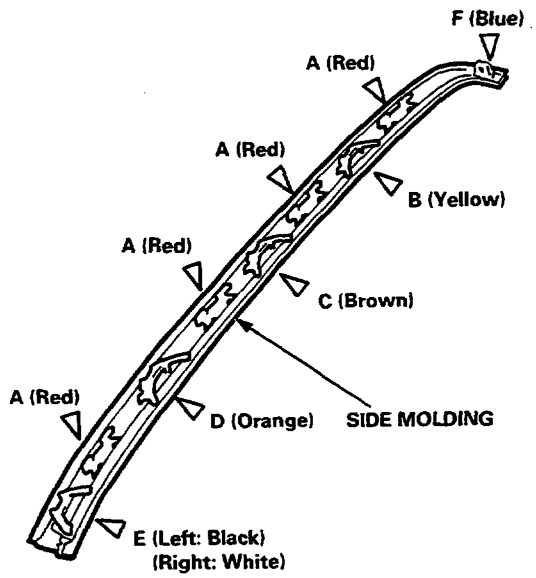
14. Use suction cups to hold the windshield over the opening, align it with the alignment marks made in step 7, and set it down on the adhesive. Lightly push on the windshield until its edge is fully seated on the adhesive all the way around.

NOTE: Do not open or close the doors until adhesive is dry.



15. Install the clips on both side moldings.





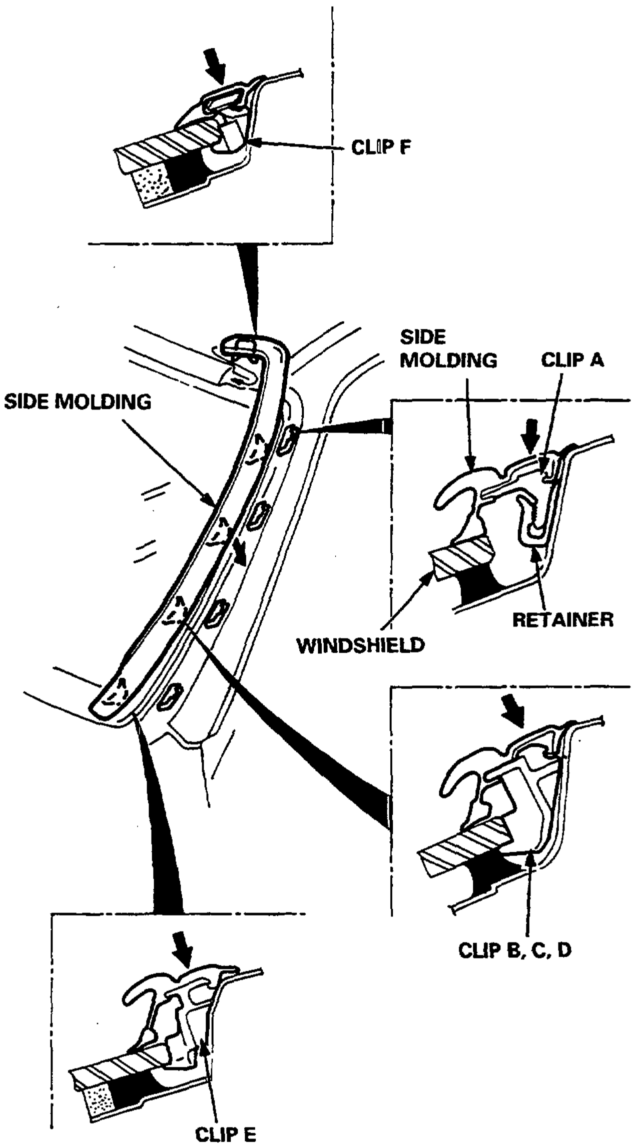
16. Scrape or wipe the excess adhesive off with a putty knife or towel.

NOTE: To remove adhesive from a painted surface or the windshield, wipe with a soft shop towel dampened with alcohol.

(cont'd)

Installation (cont'd)

17. Install both side moldings.



18. 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.

19. Reinstall all remaining removed parts.

    NOTE: Advise the customer not to do the following things for two to three days:

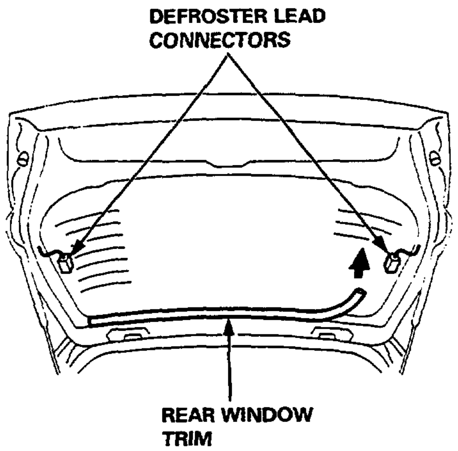
    - Slam the doors with all the windows rolled up.
    - Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Rear Window

Removal

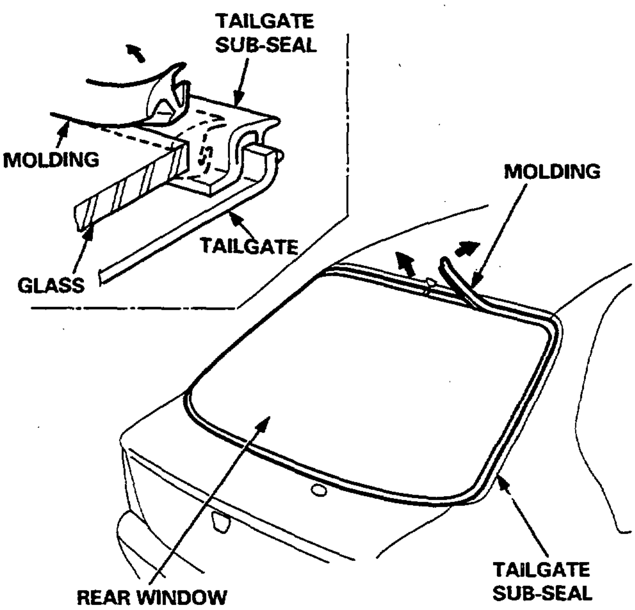
CAUTION:
- **Use covers to avoid damaging the interior.**
- **Wear gloves to remove and install the glass.**
- **Do not damage the defroster grid lines.**

1. To remove the rear window, first remove the:
   - Rear shelf (see page 20-56)
   - Tailgate side trims and tailgate trim panel (see page 20-91)
   - Rear window wiper arm and rear window wiper motor (see page 20-100)
2. Remove the rear window trim and disconnect the connectors.



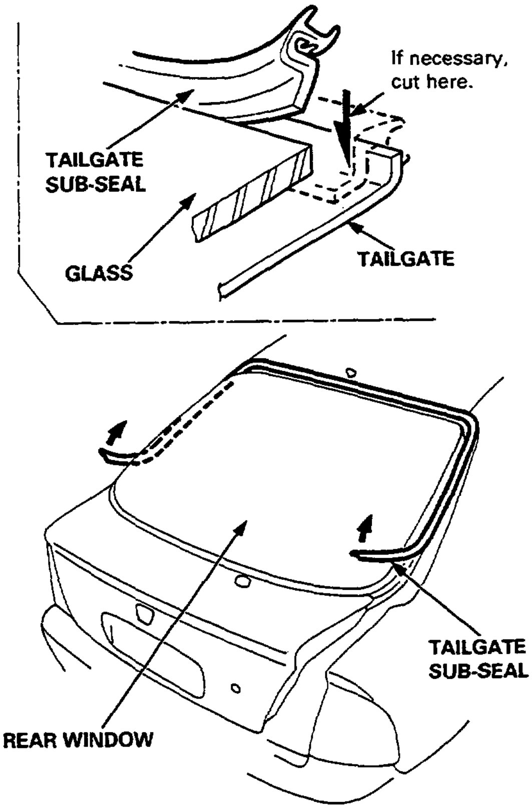
3. Peel off the molding.

   NOTE: When molding removal is difficult, cut the molding with a knife.

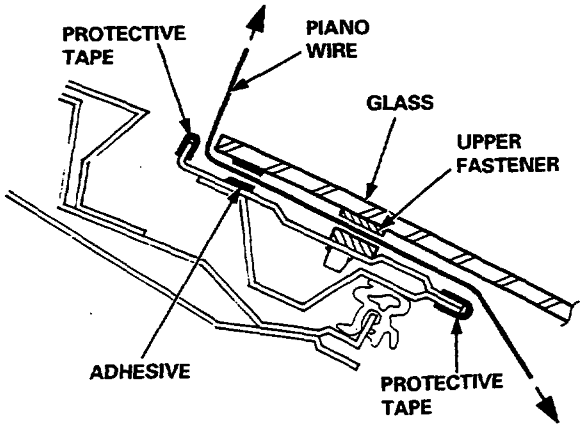


4. Peel off the tailgate sub-seal.

   NOTE:
   - When tailgate sub-seal removal is difficult, cut the sub-seal lip with a knife.
   - Do not damage the painted surface of the body.



5. Apply protective tape to the inner and outer edges of the tailgate.
   Using an awl, make a hole through the adhesive from the inside, at the top of the tailgate. Push piano wire through the hole, and wrap each end around a piece of wood.



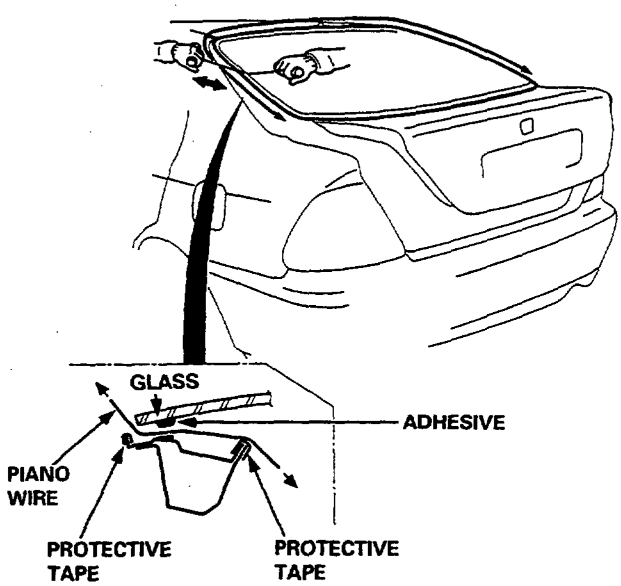
(cont'd)

Rear Window

Removal (cont'd)

6. With a helper on the outside, pull the piano wire back and forth in a sawing motion, and carefully cut through the adhesive the along the top and the sides of the rear window.

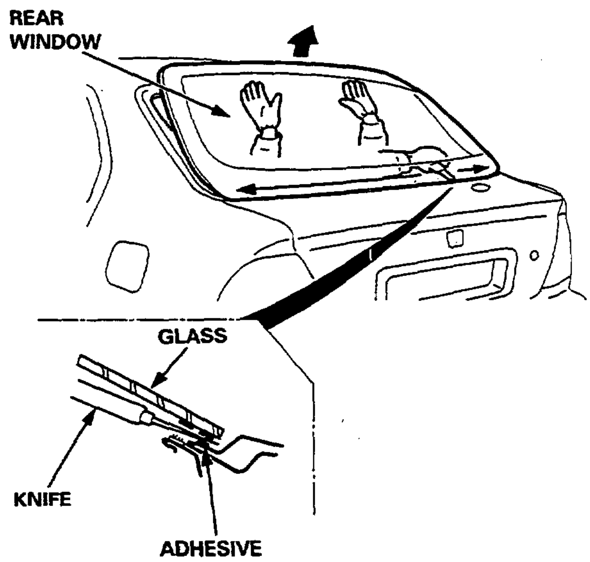
   CAUTION: Hold the piano wire as close to the rear window as possible to prevent damage to the body.



7. Cut the adhesive with a knife at the bottom of the rear window.

8. Carefully remove the rear window.

   NOTE: Replace the fasteners with new ones whenever the rear window has been removed.



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 tailgate.
   - Mask off surrounding surfaces before applying primer.

2. Clean the tailgate bonding surface with a sponge dampened in alcohol.

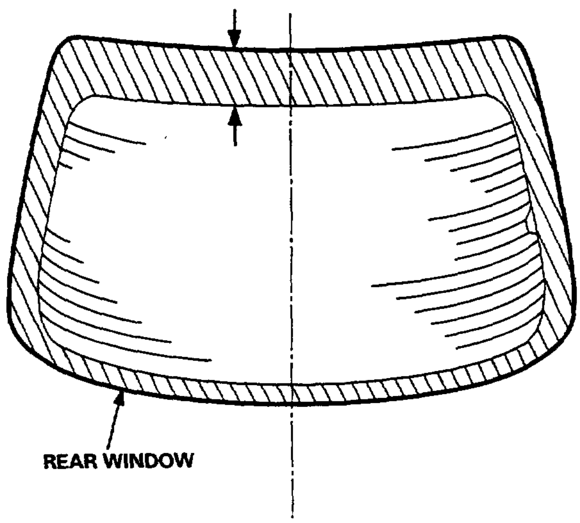
   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

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.

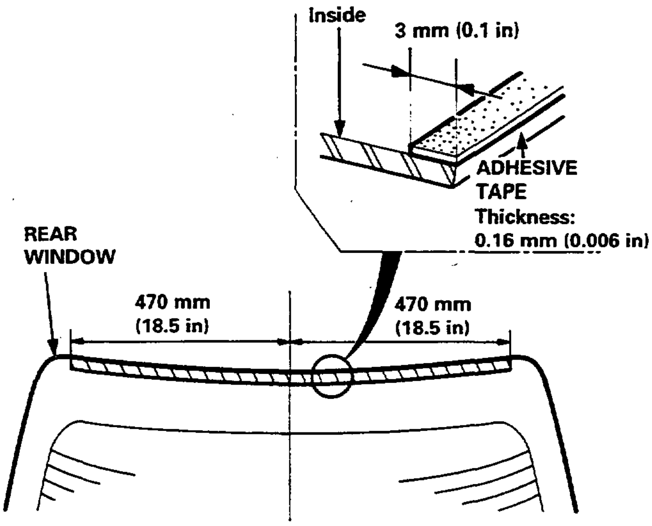
   NOTE: Make sure the bonding surface is kept free of water, oil and grease.

   CAUTION: Avoid setting the rear window on its edges; small chips may later develop into cracks.

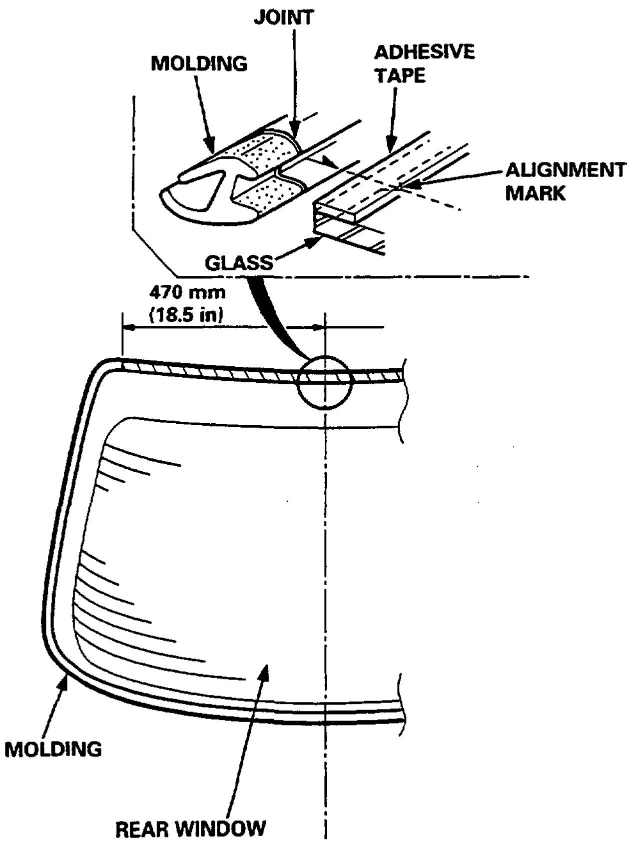
   NOTE: Clean the shadowed area.



4. Apply the double-faced adhesive tape to the inside of the rear window as shown.

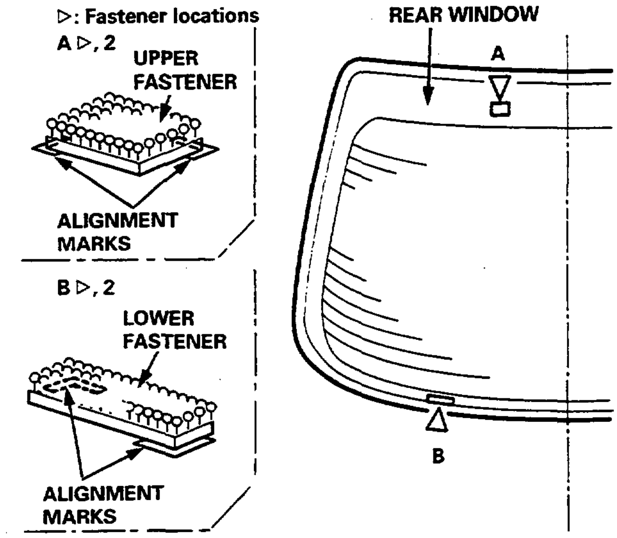


5. Glue the molding around the edge of the rear window as shown.



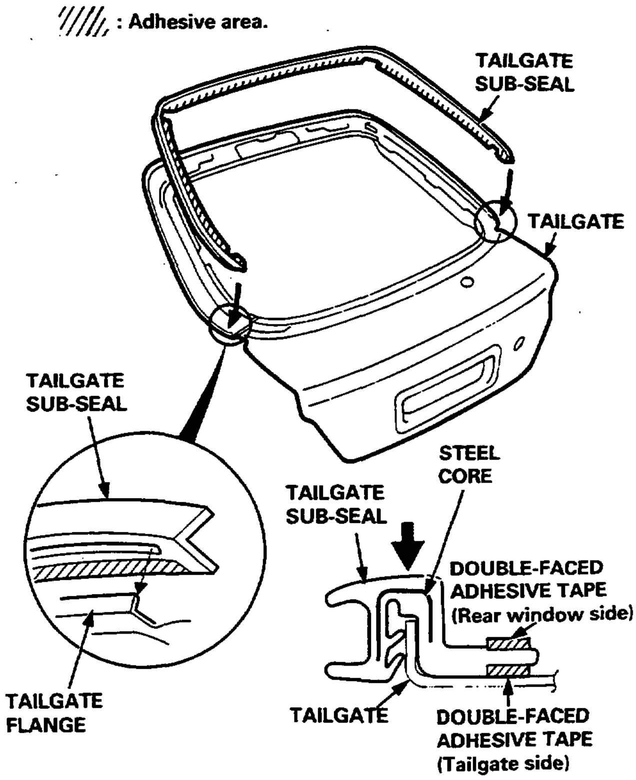
6. Glue the upper and lower fasteners to the inside face of the rear window on each side as shown.

NOTE: The numbers after the part names show the quantities of the parts used.



7. Install the tailgate sub-seal around the flange of the tailgate as shown.

NOTE: Do not peel the rear window side separater of the double-faced adhesive tape off.

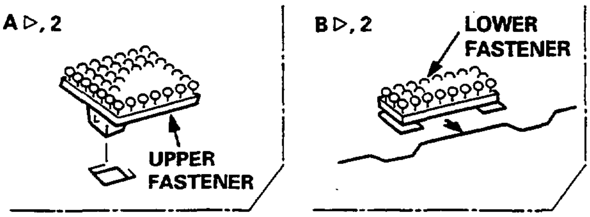


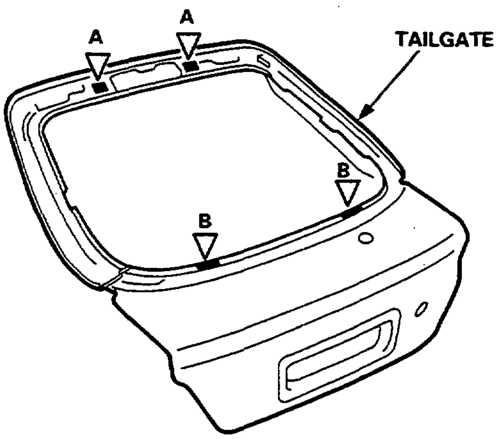
(cont'd)

Installation (cont'd)

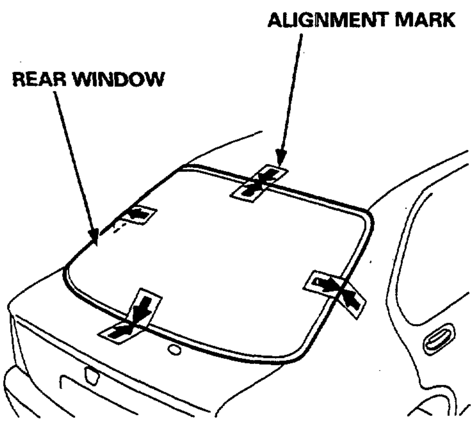
8. Install the upper and lower fastener to the tailgate as shown.

▷: Clip locations





9. Set the rear window upright on the tailgate, then center it in the opening. Make alignment marks across the rear window and body with a grease pencil at the four points shown.

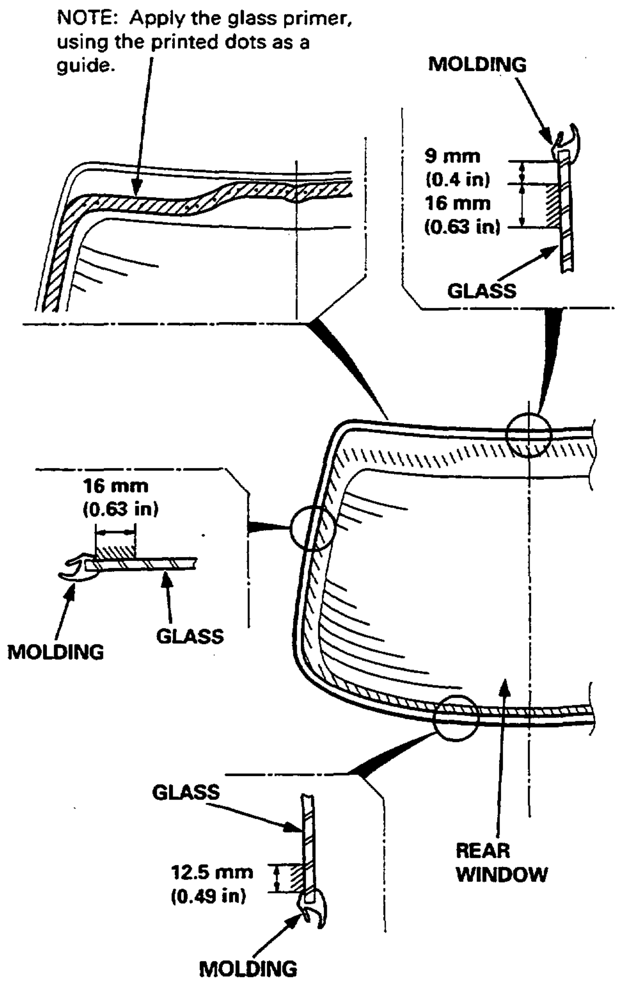


10. Remove the rear window.

11. With a sponge, apply a light coat of glass primer around the edge of the rear window, 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.

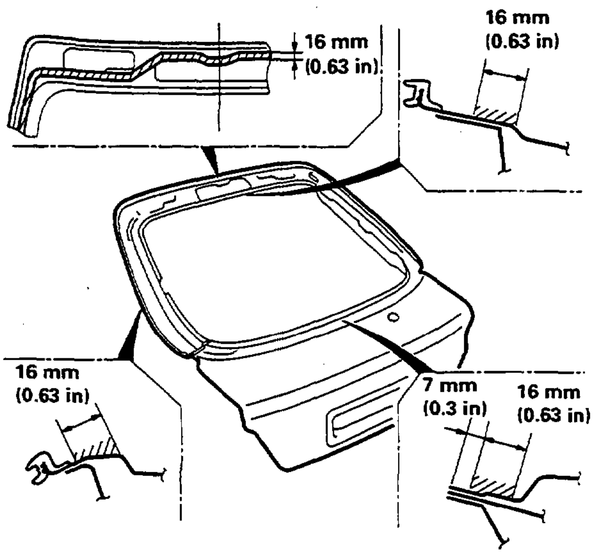
▨ : Apply glass primer here.



12. 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.

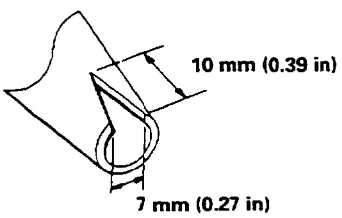
: Apply body primer here.



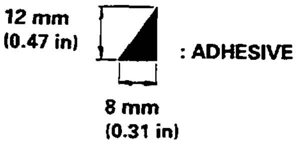
13. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

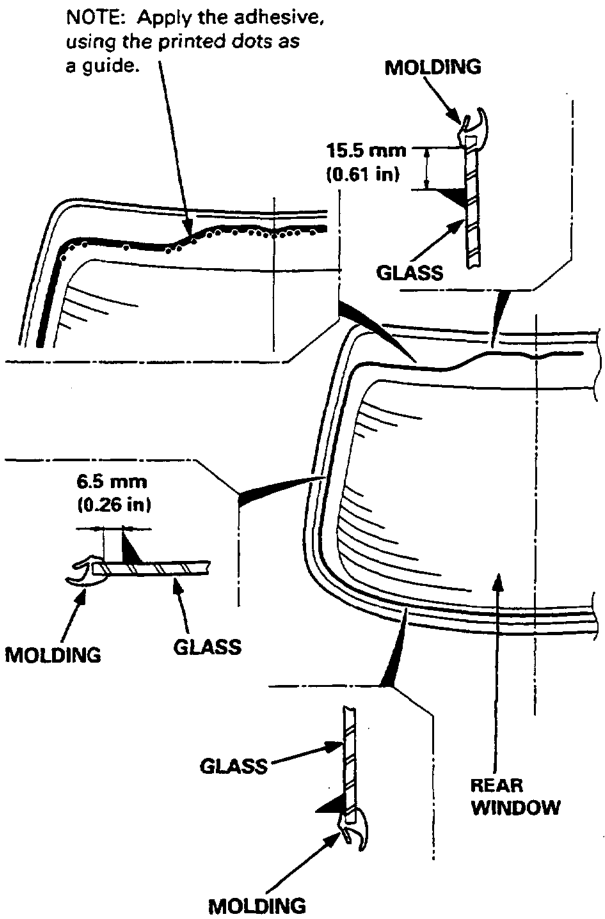
NOTE:
- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.

14. Before filling a cartridge, cut the end of the nozzle as shown.



15. Pack adhesive into the cartridge without air pockets to ensure continuos delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the rear window as shown.





16. Peel the separater of the tailgate sub-seal off (see page 20-43).

NOTE: Never touch the primed surfaces of the tailgate with your hands.

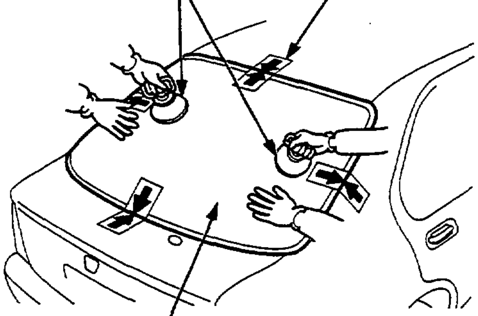
(cont'd)

Rear Window

Installation (cont'd)

17. Use suction cups to hold the rear window over the opening, align it with the alignment marks made in step 9, 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 open or close the doors until the adhesive is dry.



18. 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.

19. Let the adhesive dry for at least one hour, then spray water over the rear window and check for leaks. Mark leaking areas and let the rear window dry, then seal with sealant.

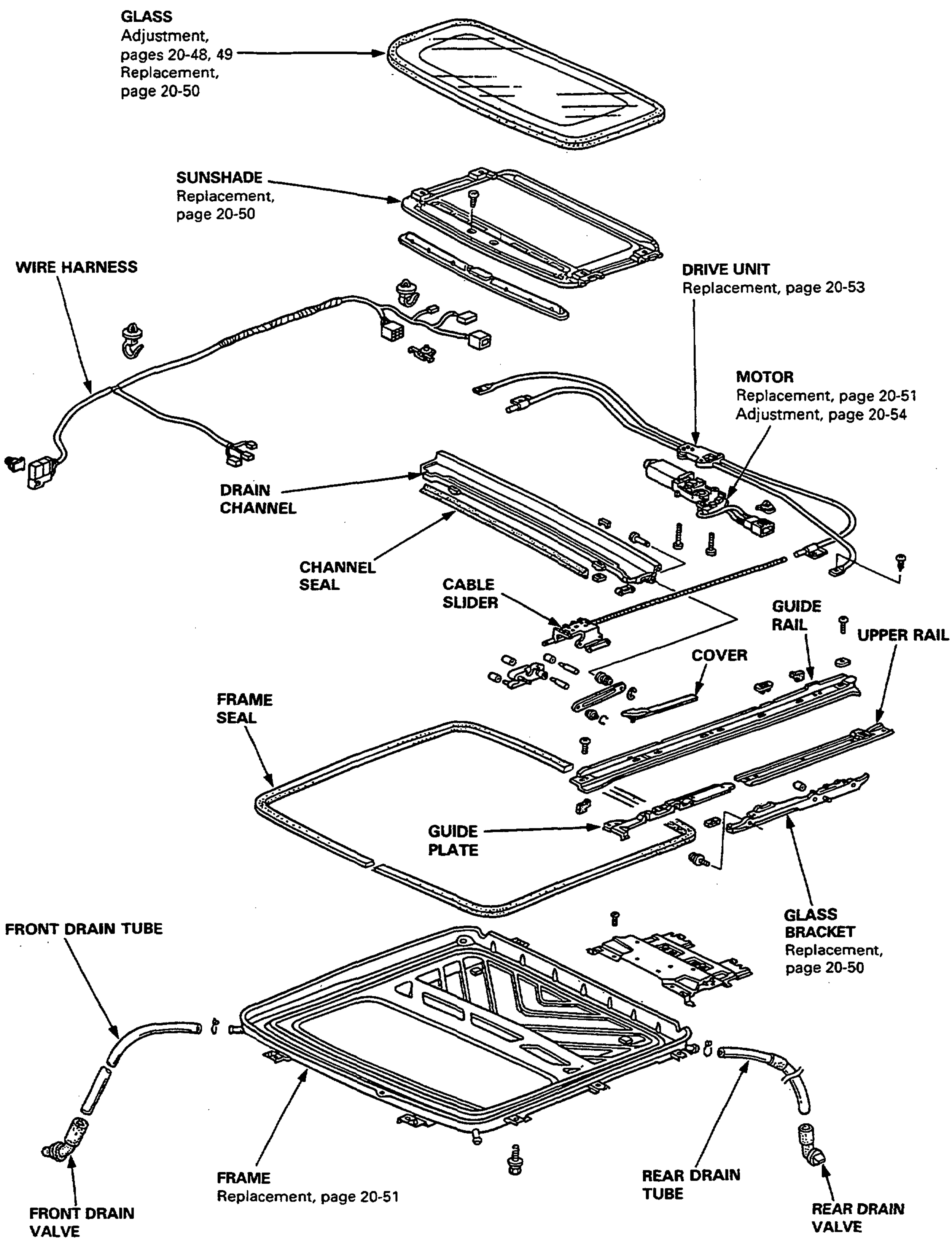
    NOTE: Let the car stand for at least four hours after rear window installation. If the car has to be used within the first four hours, it must be driven slowly.

20. Reinstall all remaining removed parts.

    NOTE: Advise the customer not to do the following things for two to three days:

    - Slam the doors with all the windows rolled up.
    - Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

Index


GLASS
Adjustment, pages 20-48, 49
Replacement, page 20-50
SUNSHADE
Replacement, page 20-50
WIRE HARNESS
DRIVE UNIT
Replacement, page 20-53
MOTOR
Replacement, page 20-51
Adjustment, page 20-54
DRAIN CHANNEL
CHANNEL SEAL
CABLE SLIDER
GUIDE RAIL
UPPER RAIL
COVER
FRAME SEAL
GUIDE PLATE
GLASS BRACKET
Replacement, page 20-50
FRONT DRAIN TUBE
FRAME
Replacement, page 20-51
REAR DRAIN TUBE
FRONT DRAIN VALVE
REAR DRAIN VALVE

Sunroof

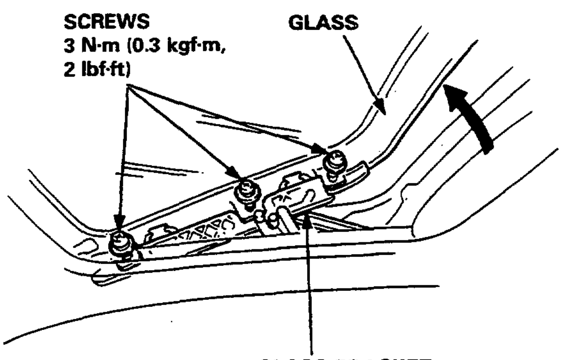
Troubleshooting

Symptom	Probable Cause
Water leak	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.
Motor noise	1. Loose motor. 2. Worn gear or bearing. 3. Drive unit 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. Outer cable 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.

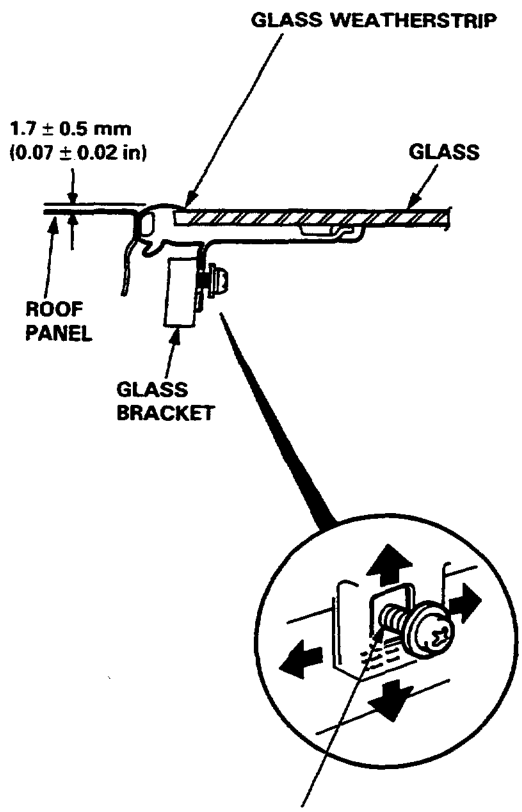
Glass Height Adjustment

The roof panel should be even with the glass weatherstrip, to within 1.7 ± 0.5 mm (0.07 ± 0.02 in) all the way around. If not, slide the sunshade back, and:

1. Tilt-up the glass.
2. Loosen the screws and adjust the glass.
3. Repeat on opposite side if necessary.



4. Side-to-side fit of glass weatherstrip can be adjusted by loosening the frame bolts and moving the frame right or left by hand (see page 20-52).

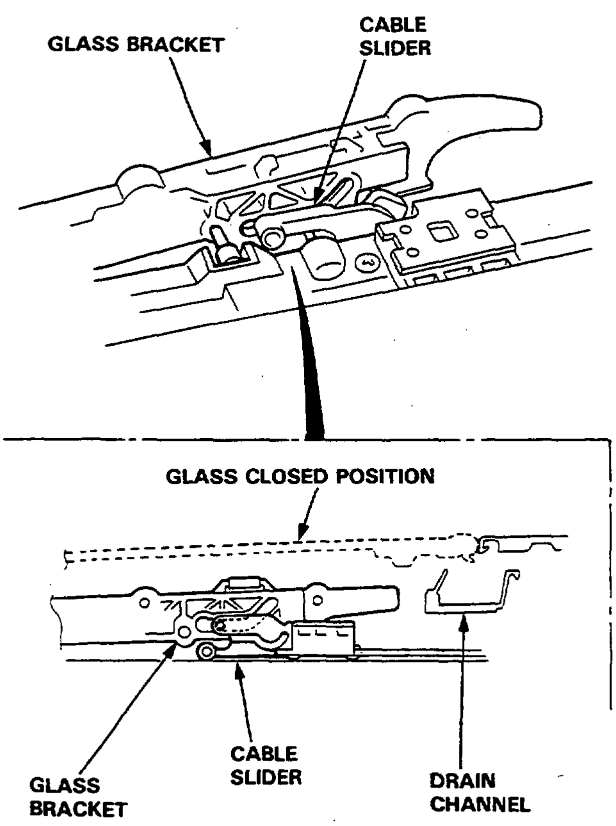


NOTE: Apply liquid thread lock to the screw.

Glass Closing Adjustment

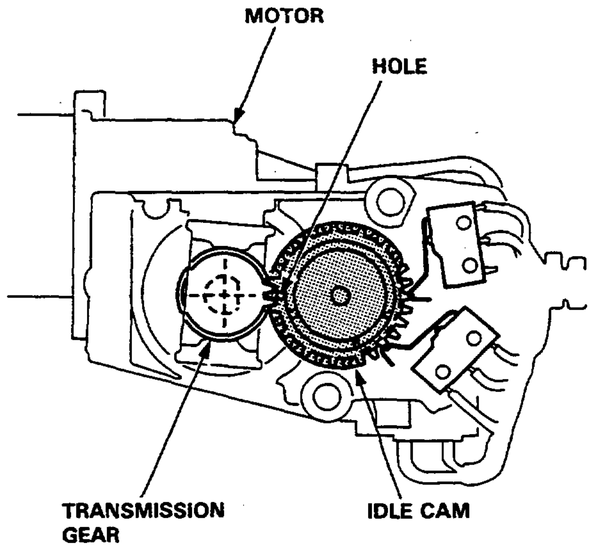
Open the glass about a foot, then close it to check where rear edge begins to rise. If it rises too soon and seats too tightly against the roof panel, or too late and does not seat tightly enough adjust it.

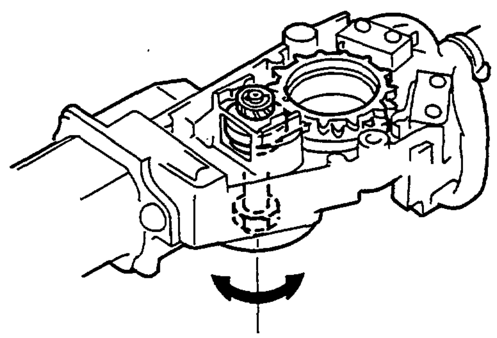
1. Remove the headliner (see page 20-59).
2. Remove the motor (see page 20-51).
3. Align the fully closed position of the glass bracket and cable slider on each side.



4. Check the fully closed position of the motor (idle cam) as shown.

   NOTE: If necessary, adjust position of the idle cam by turning the motor (transmission gear) with the sunroof wrench.





5. Install the motor, check the operation of the glass (from tilt-up position to fully closed position, from fully open position to fully closed position) by operating the sunroof switch.

   NOTE: Check the height of the glass (see page 20-48).

6. Close the glass fully, then check for water leaks.

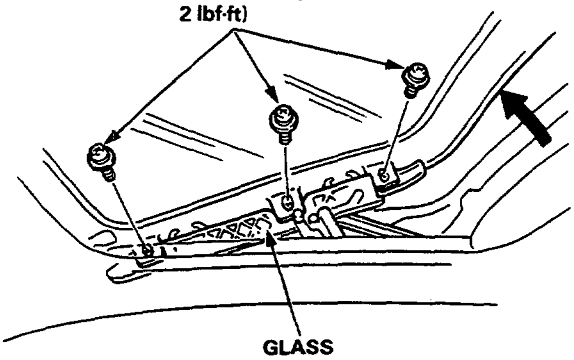
   NOTE: Do not use high-pressure water.

Sunroof

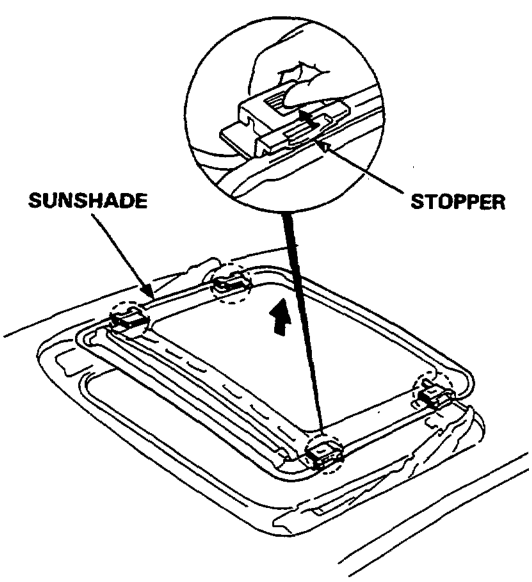
Glass and Sunshade Replacement

1. Open the sunshade.
2. Tilt-up the glass.
3. Remove the screws, then lift and remove the glass from the glass bracket.

   NOTE: Apply liquid thread lock to the screws.



4. Slide the sunshade forward.
5. Detach the stoppers, then remove the sunshade from the guide rails.

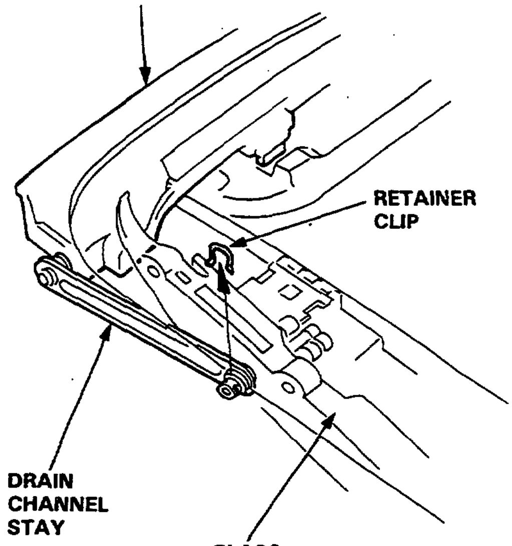


6. Installation is the reverse of the removal procedure.
7. Check for water leaks.

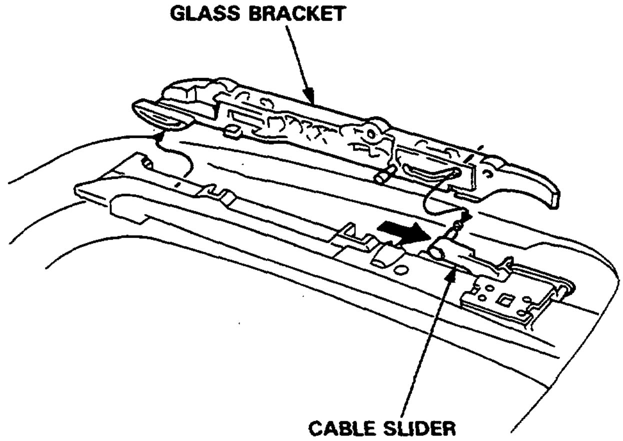
   NOTE: Do not use high-pressure water.

Glass Bracket Replacement

1. Remove the glass.
2. Pull out the retainer clip, then remove the drain channel stay from the glass bracket on each side.



3. Using the sunroof wrench, move the cable slider. Pull out the glass bracket from the cable slider, then remove the glass bracket.



4. Installation is the reverse of the removal procedure.

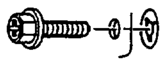
Motor, Drain Tube and Frame Replacement

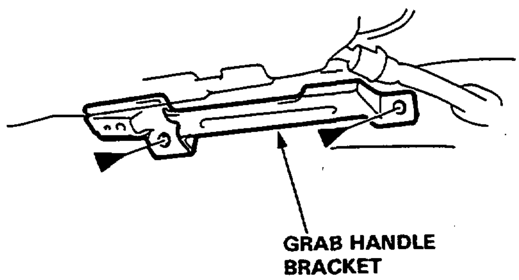
CAUTION: Be careful not to damage the seats, dashboard and other interior trim.

1. Remove the glass (see page 20-50) and headliner (see page 20-59).

2. Remove the grab handle brackets.

▶: Bolt locations ,2





3. Disconnect the motor connector, harness clips and remove the relays.

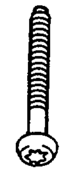
4. Disconnect the drain tubes.

   NOTE: Install the tube clips with the ends facing the side to ease installation of the headliner.

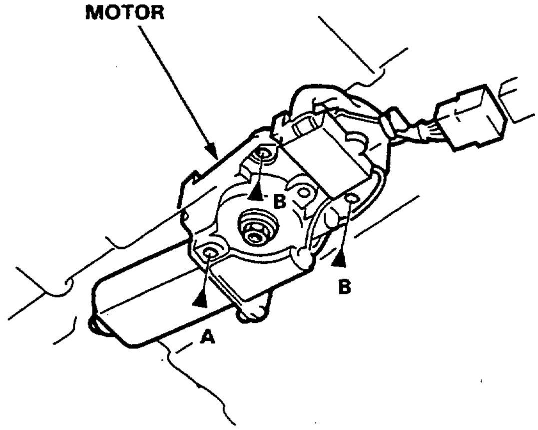
5. To remove the motor, remove the three screws.

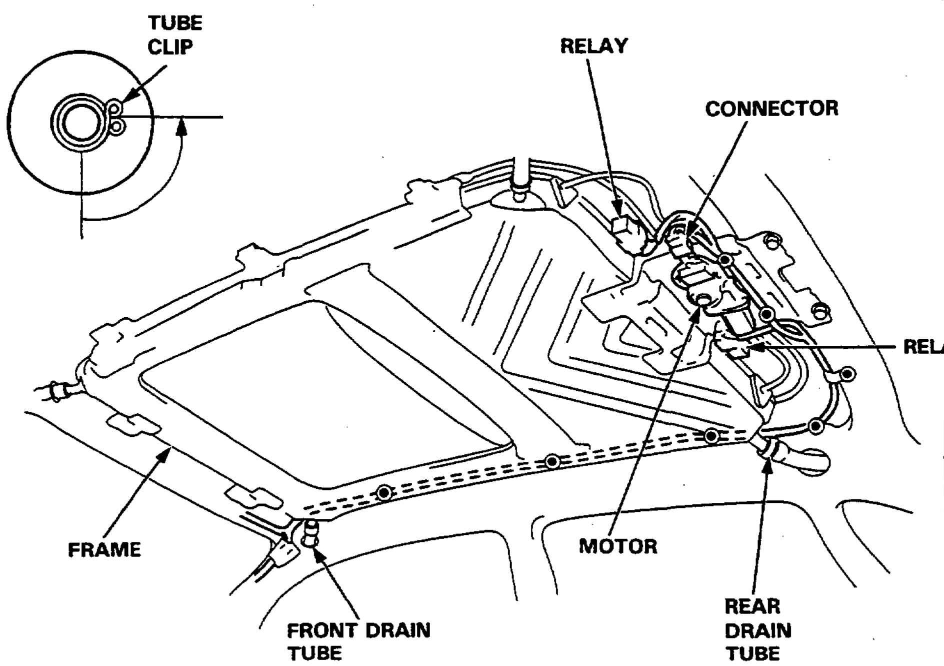
   NOTE: Make sure the cable sliders are parallel when installing the motor.

Use a Torx T20 bit.
A ▶: Screw location, 1

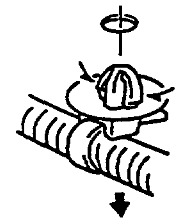


B ▶: Screw location, 2





◉: Clip locations ,7

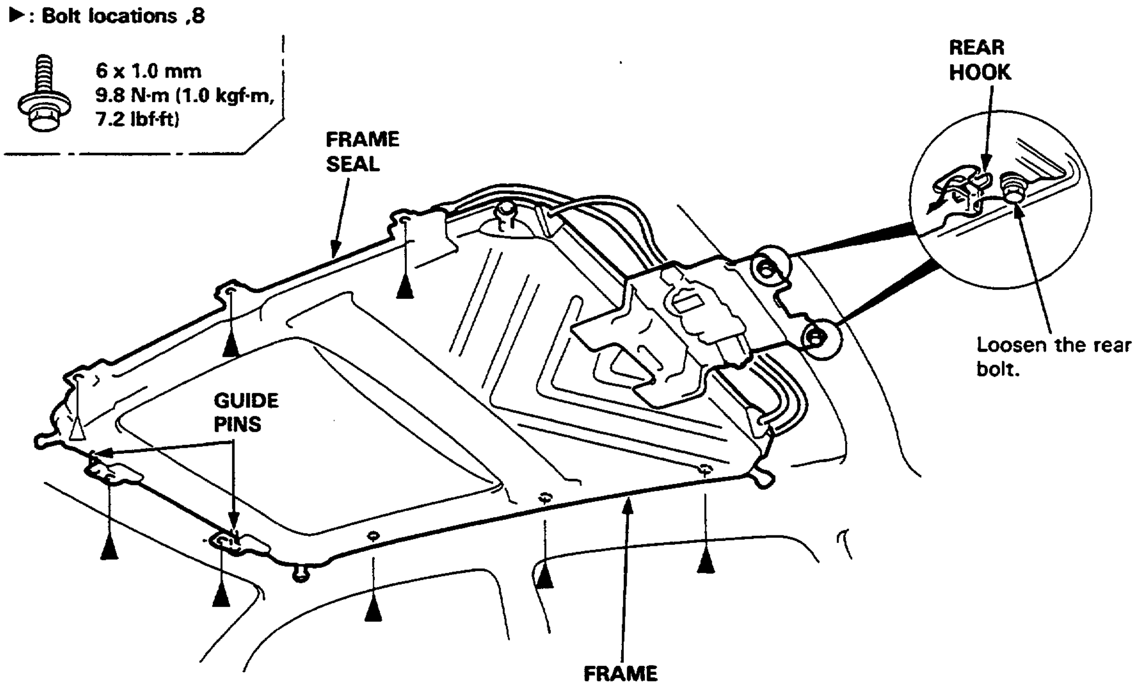


(cont'd)

Motor, Drain Tube and Frame Replacement (cont'd)

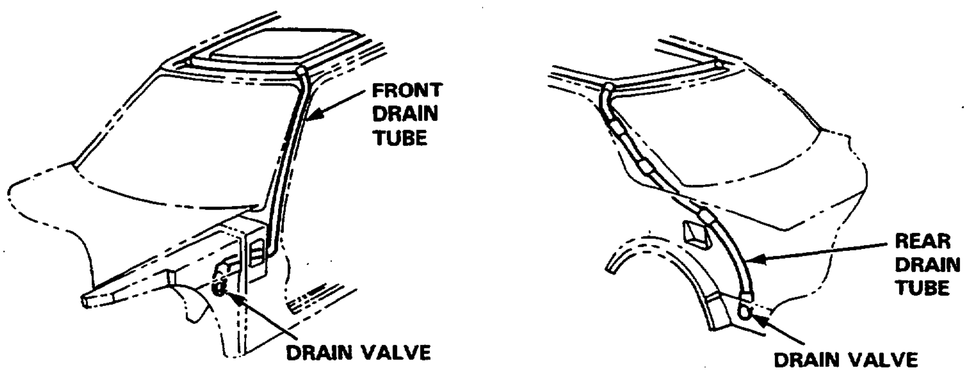
6. Loosen the rear bolts.
7. Remove the eight bolts and detach the rear hooks, then remove the frame from the car.

   NOTE: You may require assistance when removing the frame.



8. 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.

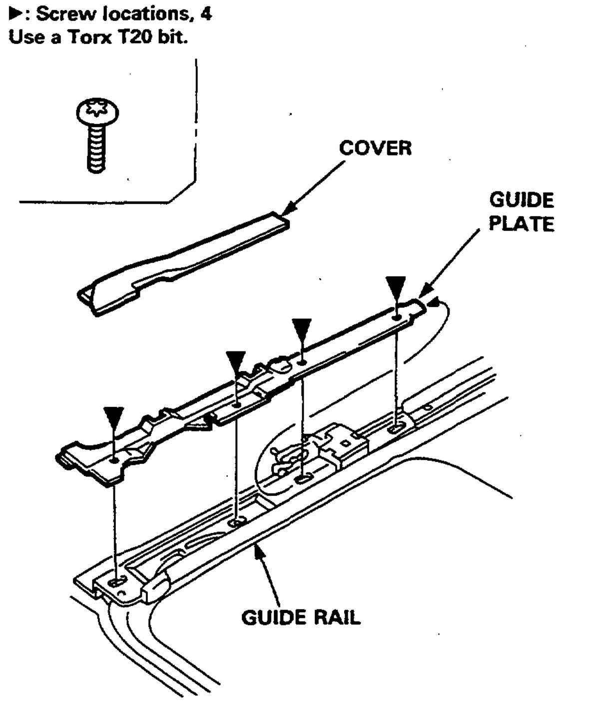


9. Installation is the reverse of the removal procedure.

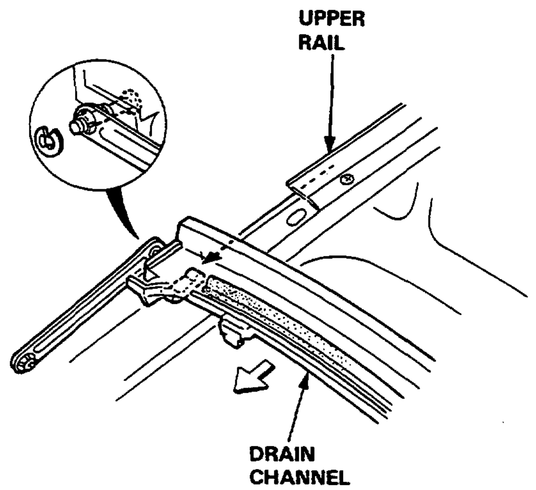
   NOTE:
   - Clean the surface of the frame.
   - Check the frame seal.
   - Check for water leaks.

Guide Rails and Drive Unit Replacement

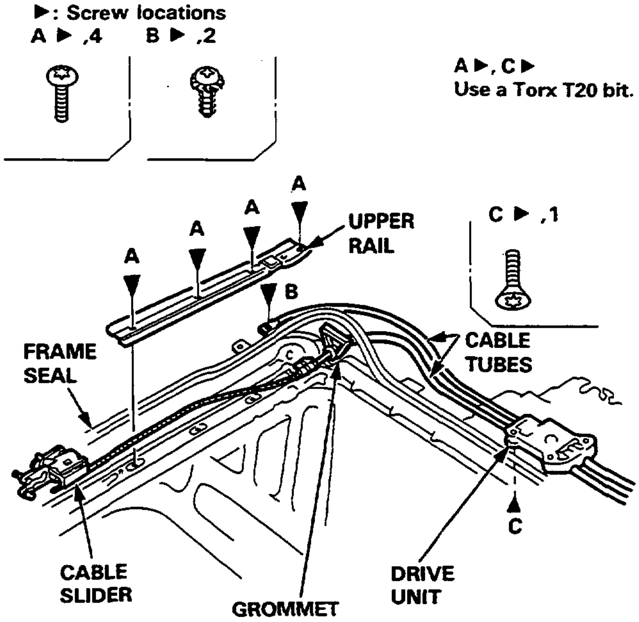
1. Remove the frame from the car (see page 20-51).
2. Remove the motor (see page 20-51).
3. Remove the glass brackets (see page 20-50).
4. Remove the covers and screws, then remove the guide plates.



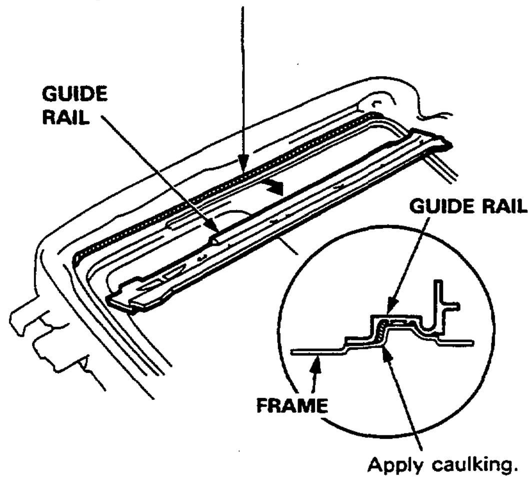
5. Slide the drain channel forward, then remove it.



6. Remove the upper rails.
7. Remove the screws, then remove the drive unit with cable sliders attached.
   NOTE:
   - Take care not to bend the cable tubes.
   - When installing the drive unit, fill the groove in each grommet with sealant, then install the grommet to the frame.



8. Remove the guide rails.
   NOTE: To install, apply caulking to the guide rail mounting surface on the frame.



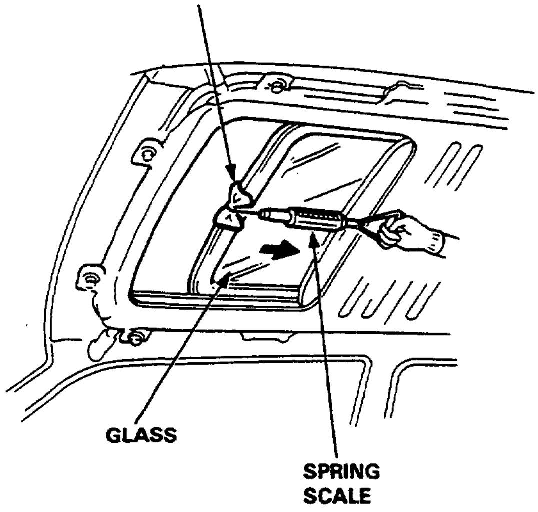
9. Installation is the reverse of the removal procedure.
   NOTE:
   - Damaged parts should be replaced.
   - Apply grease to the sliding portion.

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 20-48).

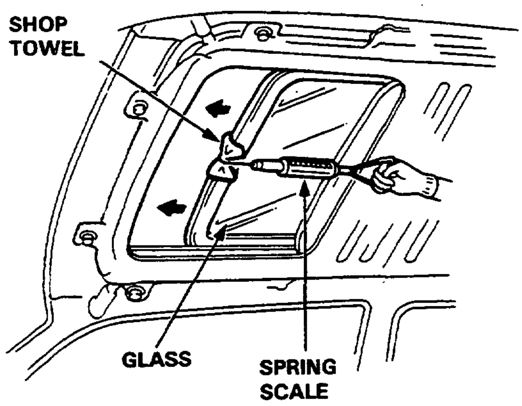


Closing Force Check (Motor Installed)

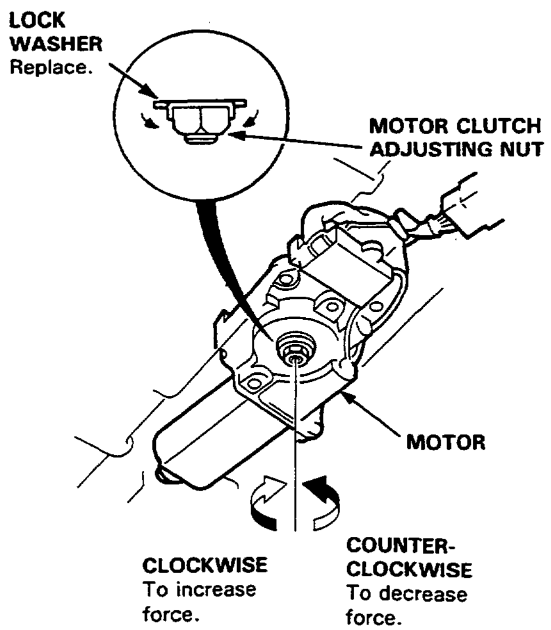
1. After installing all removed parts, have a helper hold the switch to close the glass while you measure force required to stop it. Attach a spring scale as shown. Read the force as soon as the glass stops moving, then immediately release the switch and spring scale.

   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 in 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.



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.**

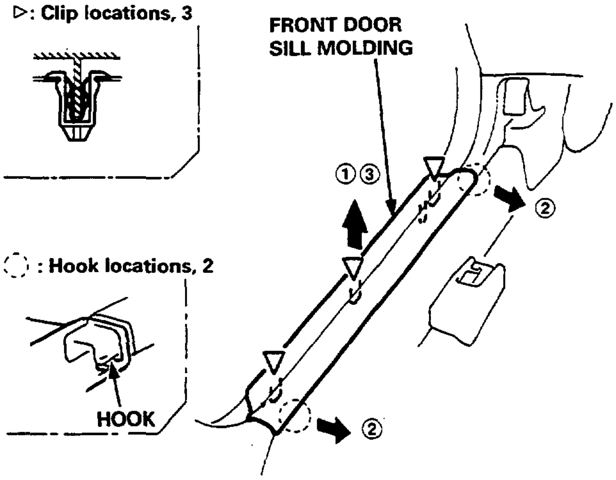
NOTE: Take care not to bend or scratch the trim and panels.

Front door sill molding/Kick panel/Front pillar trim removal:

NOTE: LHD is shown, RHD is symmetrical.

1. Remove the front door sill molding.

▷: Clip locations, 3

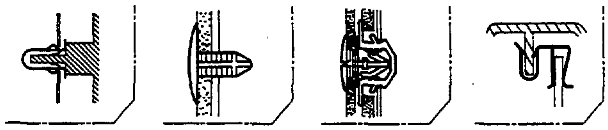


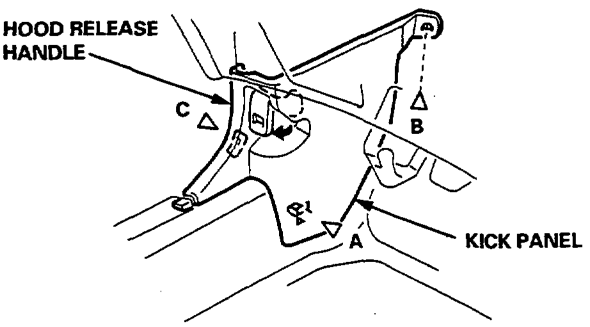
2. Remove the kick panel.

   NOTE: Remove the driver's kick panel while pulling the hood release handle.

▷: Clip locations
A▷, 1

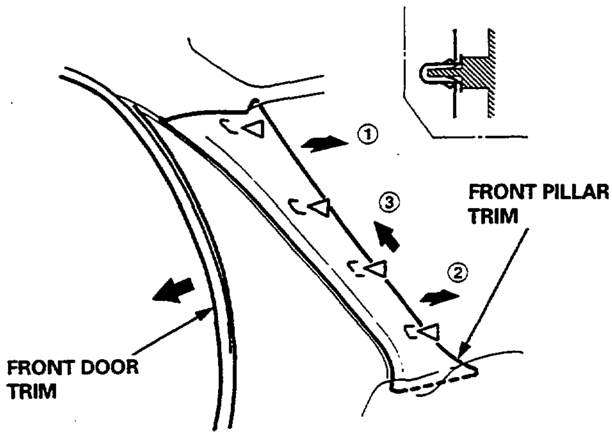
Driver's: Passenger's: B▷, 1 C▷, 1





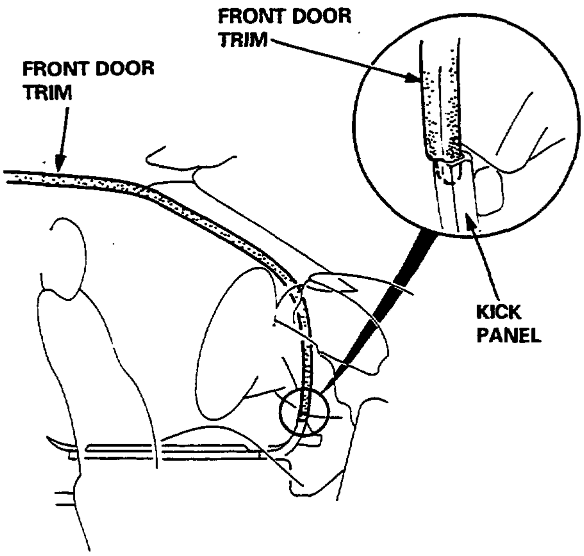
3. Pull the front door trim away, then remove the front pillar trim.

▷: Clip locations, 4



4. Installation is the reverse of the removal procedure.

   NOTE:
   - If necessary, replace any damaged clips.
   - Make sure the front door trim is installed securely.

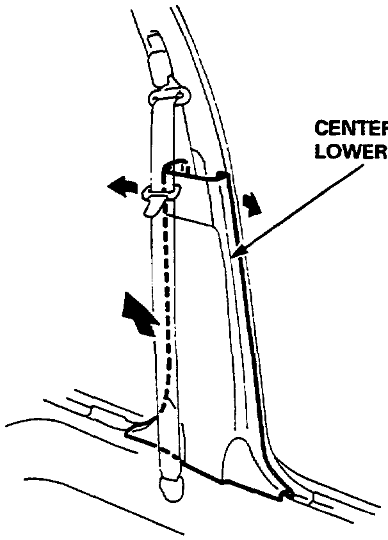


(cont'd)

Replacement (cont'd)

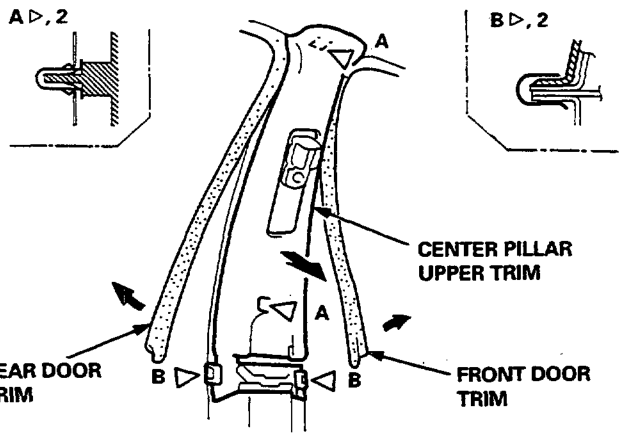
Center pillar lower trim/Center pillar upper trim removal:

1. Remove the front door sill molding (see page 20-55) and rear door sill molding (see page 20-57).
2. Remove the center pillar lower trim.



3. Remove the upper anchor bolt from the front seat belt (see page 20-70).
4. Pull the front and rear door trim back, then remove the center pillar upper trim.

▷: **Clip locations**

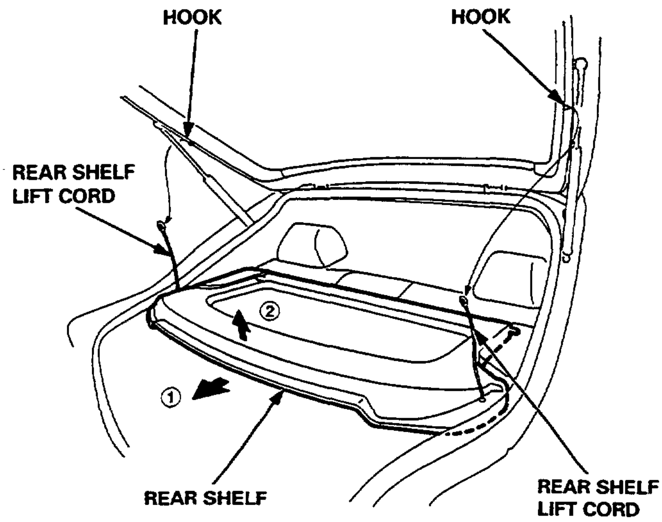


5. Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- Before attaching the center pillar lower trim, make sure there are no twists or kinks in the front seat belt.
- Make sure the front and rear door trim is installed securely.

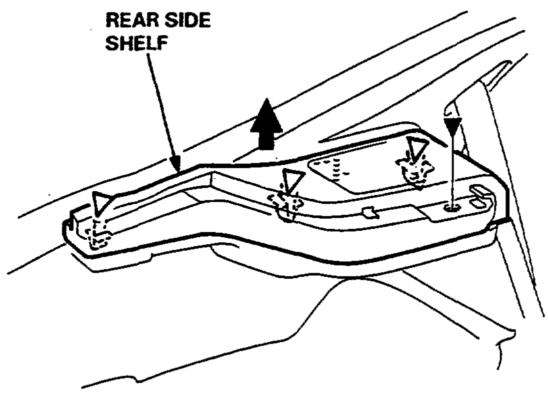
Rear shelf/Rear side shelf/Rear door sill molding/Rear seat side trim/Rear pillar trim panel removal:

1. Remove the rear shelf.

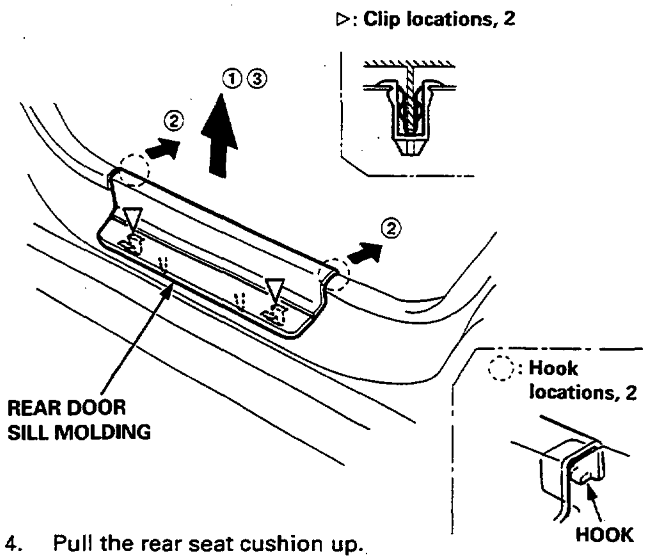


2. Remove the rear side shelf.

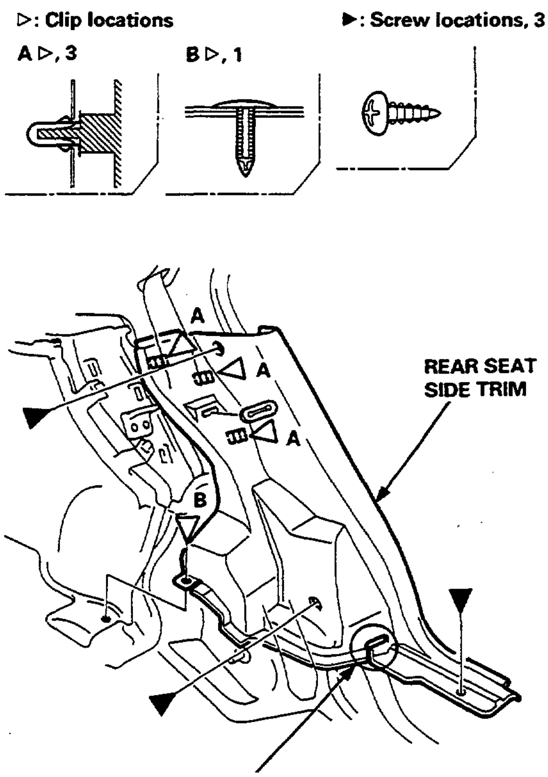
►: **Screw location, 1** ▷: **Clip locations, 3**



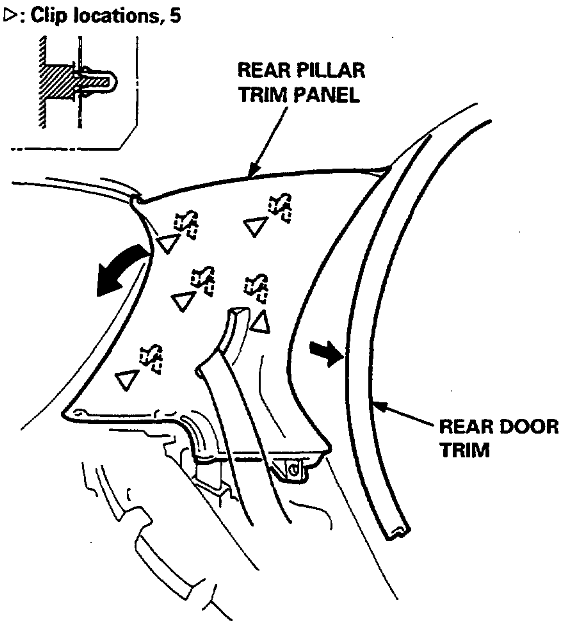
3. Remove the rear door sill molding.



4. Pull the rear seat cushion up.
5. Remove the rear seat-back (see page 20-67).
6. Remove the rear seat side trim.

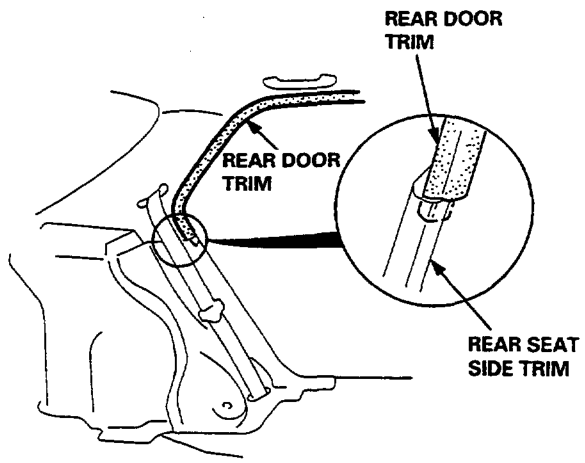


7. Pull the rear door trim away, then remove the rear pillar trim panel.



8. Remove the lower anchor bolt from the rear seat belt, then slip the rear seat belt through the slit in the rear pillar trim panel (see page 20-72).
9. Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- When installing the rear pillar trim panel and rear seat side trim, make sure there are no twists or kinks in the rear seat belt.
- Make sure the rear door trim is installed securely.



Trunk Trim

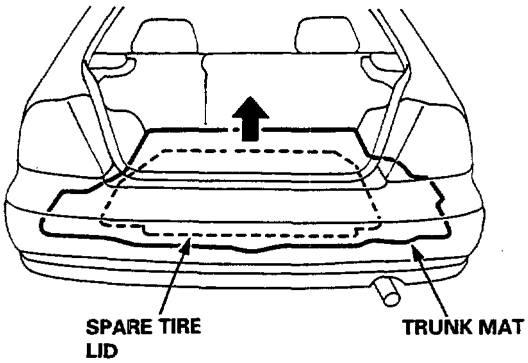
Replacement

CAUTION: Wear gloves to remove and install the panels.

NOTE: Take care not to bend or scratch the panels.

1. Remove:
   - Rear shelf and rear side shelf (see page 20-56)
   - Rear door sill molding (see page 20-57)
   - Rear seat-back (see page 20-66)
   - Rear seat side trim (see page 20-57)

2. Remove the trunk mat and spare tire lid.

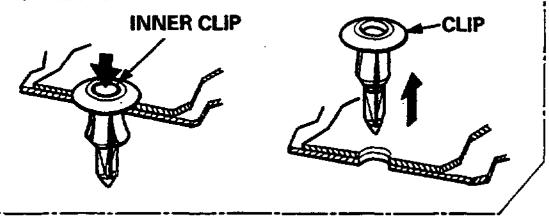


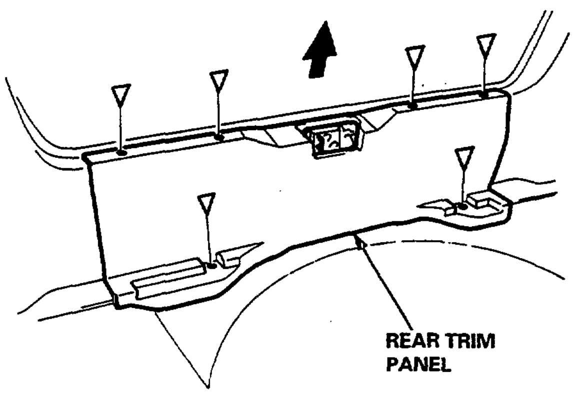
3. Remove the rear trim panel.

   ▷: **Clip locations, 6**

   -1) Push the inner clip.
   NOTE: Do not push it in too far.

   -2) Detach the clip by pulling it.





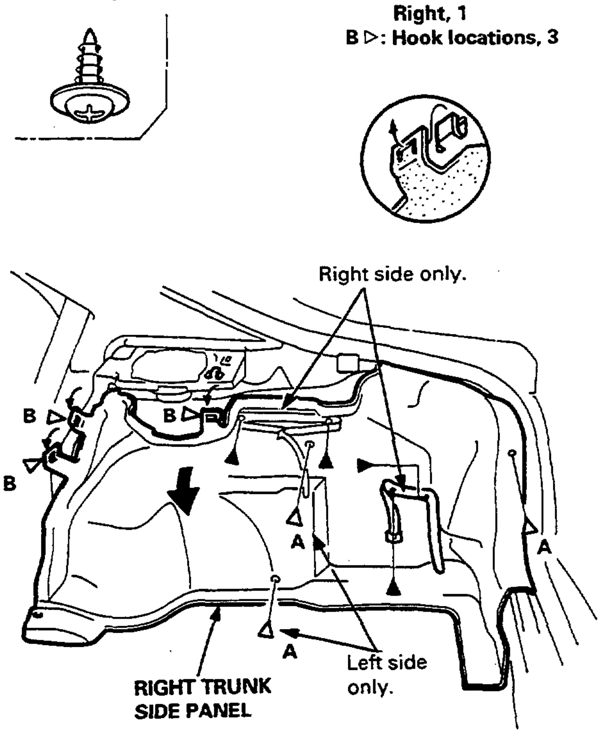
4. Remove the trunk side panel.
   Disconnect the trunk area light connector (left side only).

   NOTE: A clips on the trunk side panel can be removed in the same way as those on the rear trim panel.

   ▶: Screw locations, 4 (Right side only)

   A ▷: Clip locations Left, 3 Right, 1

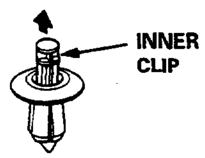
   B ▷: Hook locations, 3



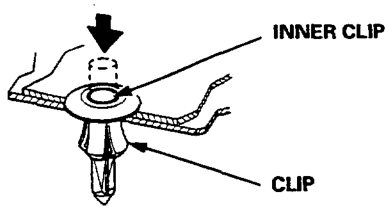
5. Installation is the reverse of the removal procedure.

   NOTE:
   - If necessary, replace any damaged clips.
   - When installing the rear trim panel and trunk side panel, install the clips as follows.

   -1) Pull the inner clip up as shown.



   -2) Install the clip in the rear trim panel, then push the inner clip until it's flush.



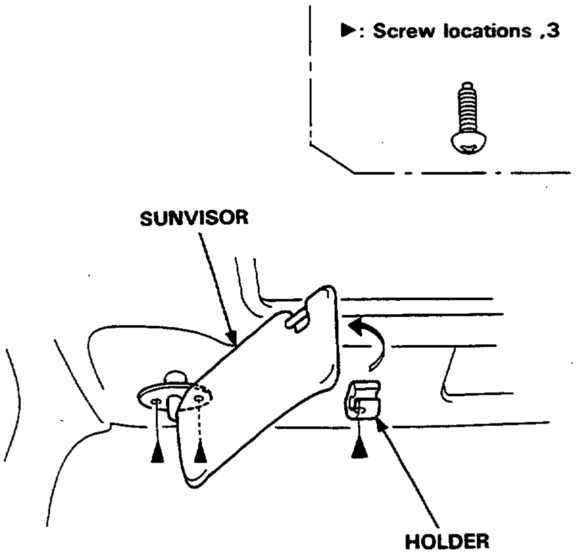
Replacement

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

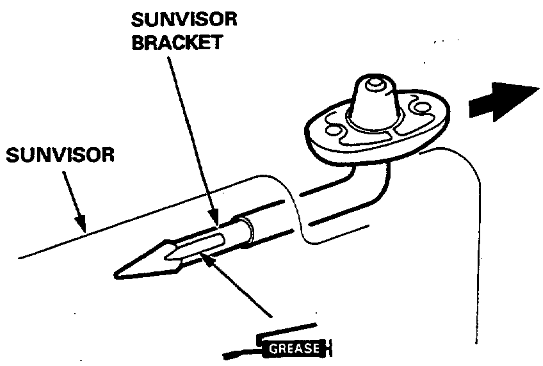
NOTE:
- Take care not to bend and scratch the headliner.
- Be careful not to damage the dashboard and other interior trim.
- Fold the front seat-back backward.

1. Remove:
   - Front and rear door trim (see pages 20-55, 56, 57)
   - Front pillar trim (see page 20-55)
   - Front ceiling light (see section 23)

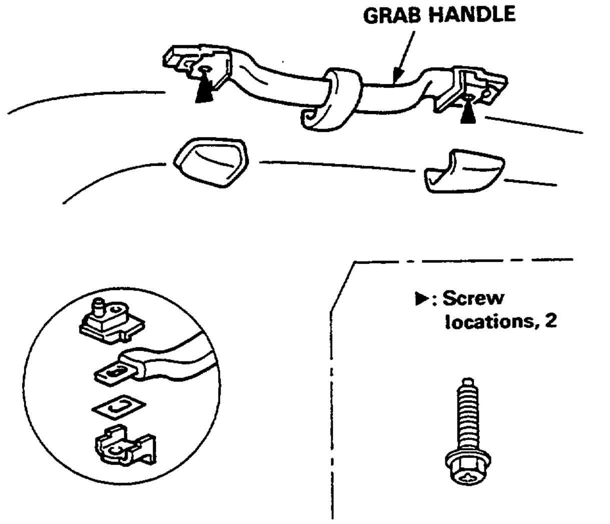
2. Remove the sunvisor and holder from each side.

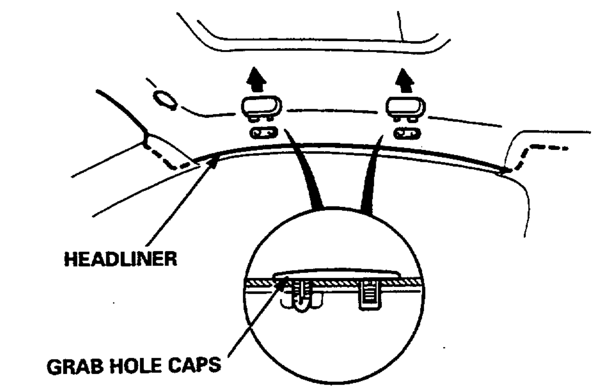


NOTE:
- If necessary, remove the sunvisor bracket as shown.
- When installing the sunvisor bracket, apply grease and make sure it's installed properly.

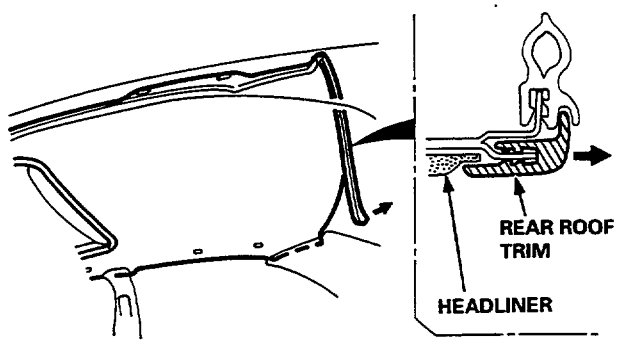


3. Remove the grab handles (front and rear passenger's) and grab hole caps (driver's).





4. Open the tailgate, then remove the rear roof trim.



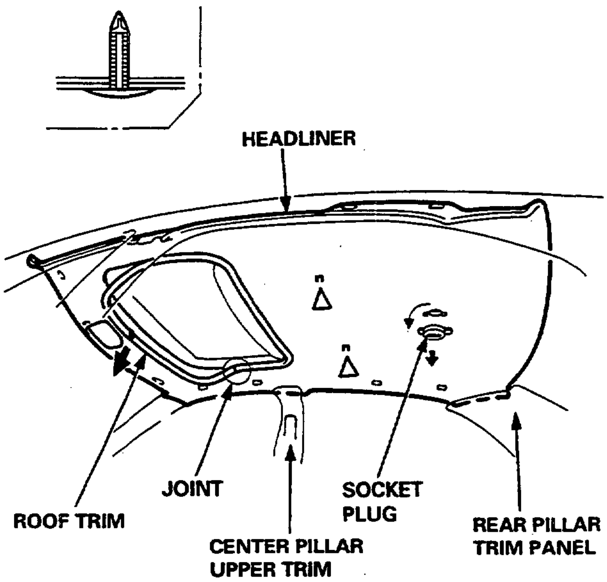
(cont'd)

Replacement (cont'd)

5. Remove the upper portion of the center pillar upper trim and rear pillar trim panel on each side (see pages 20-56, 57).

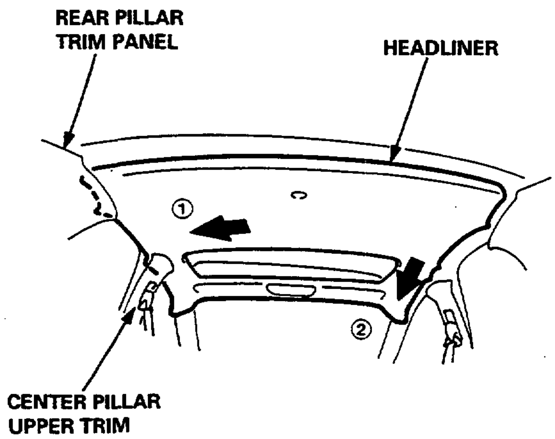
6. Remove the roof trim and socket plug (sunroof model). Remove the headliner.

▷: Clip locations, 2

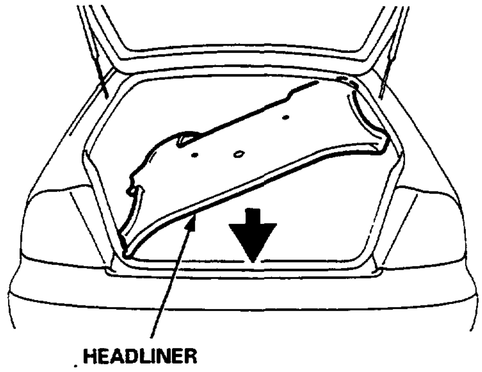


7. Lower the headliner as shown.

   NOTE: Take care not to bend and scratch the headliner.



8. Remove the headliner through the tailgate opening.



9. Installation is the reverse of the removal procedure.

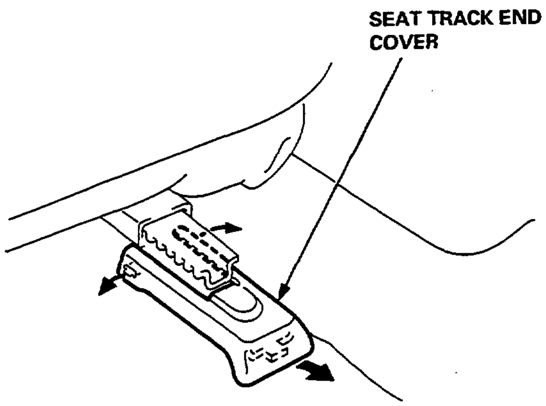
   NOTE:
   - When inserting the headliner through the tailgate opening, be careful not to fold or bend it. Also, be careful not to scratch the body.
   - Check that both sides of the headliner are securely attached to the trim and panels.
   - When installing the roof trim, install the joint toward the right side center.

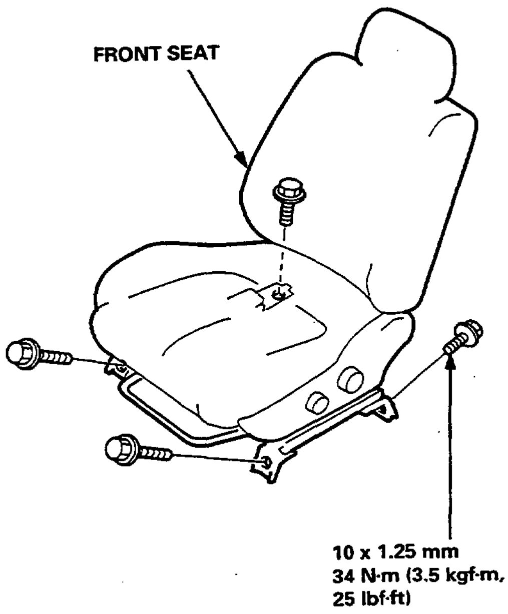
Front Seat Removal

NOTE: Take care not to scratch the seat covers and body.

1. Remove the seat track end cover.

2. Remove the bolts, then remove the front seat.





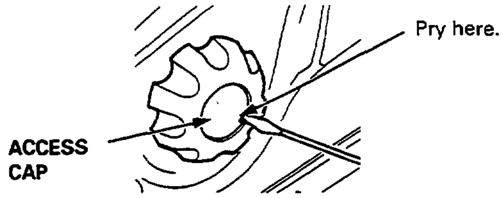
3. Installation is the reverse of the removal procedure.

Front Seat Replacement

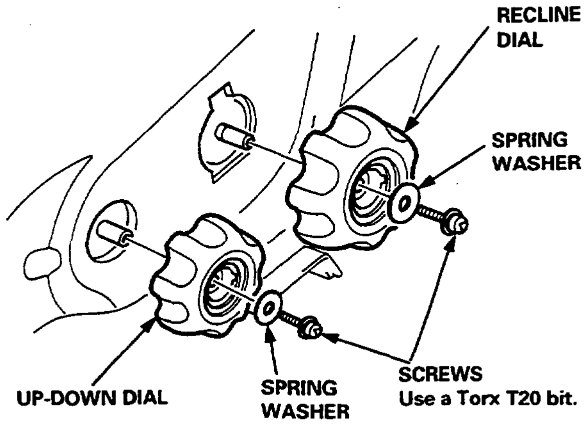
NOTE: Take care not to scratch the seat covers and body.

1. Remove the front seat through the door opening.

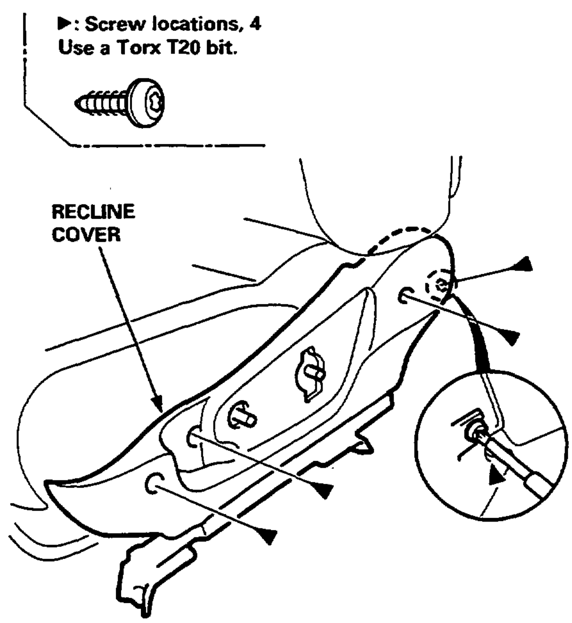
2. Remove the access cap.



3. Remove the screws, then remove the recline dial and up-down dial.



4. Remove the recline cover.



(cont'd)

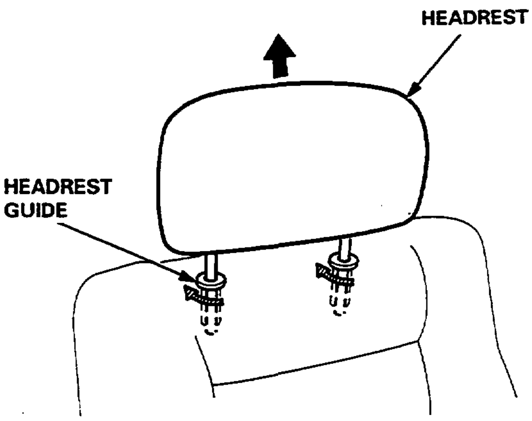
Front Seat Cover Replacement

CAUTION: Wear gloves to remove and install the seat cover.

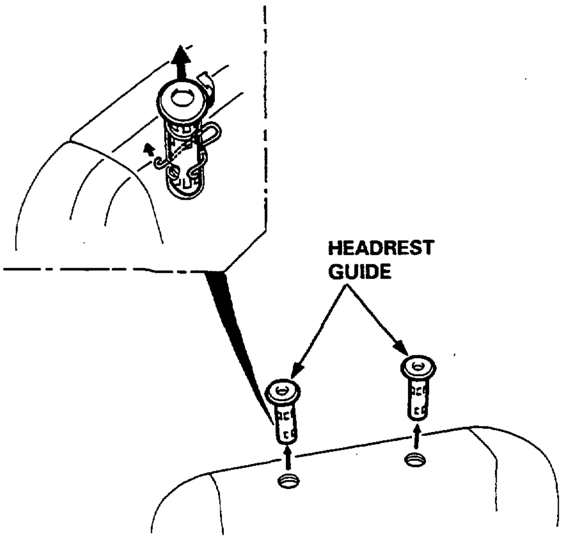
NOTE: Take care not to tear the seams or damage the cover.

Seat-back cover removal:

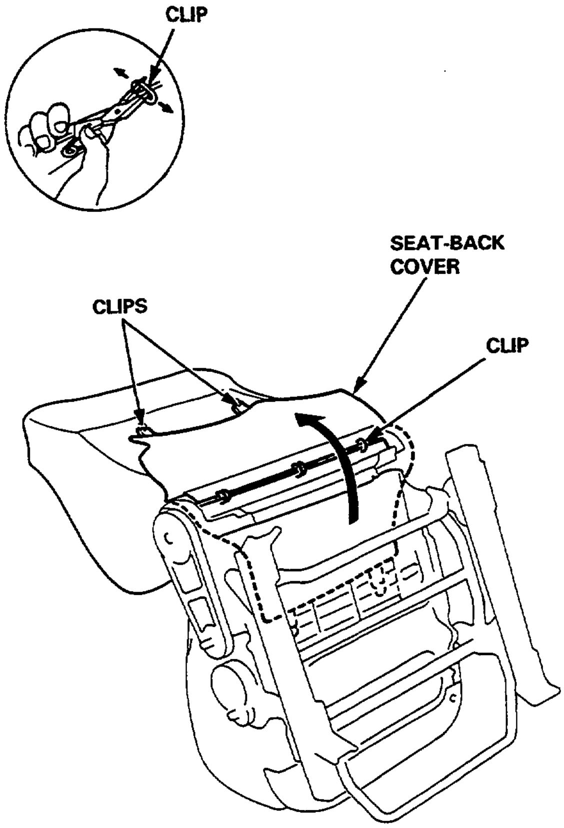
1. Remove the recline cover and inner cover (see pages 20-61, 62).
2. Remove the headrest by turning the headrest guides.



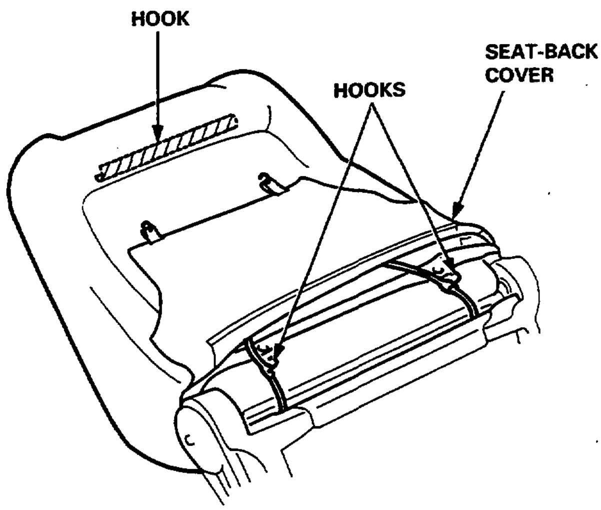
3. Remove the headrest guides by turning it.



4. Remove the all clips from the seat cushion.



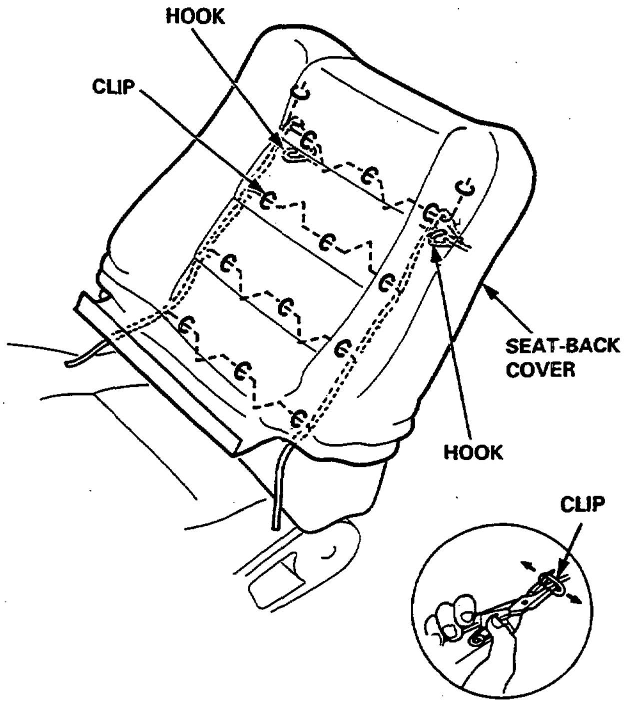
5. Detach the hooks.



(cont'd)

Front Seat Cover Replacement (cont'd)

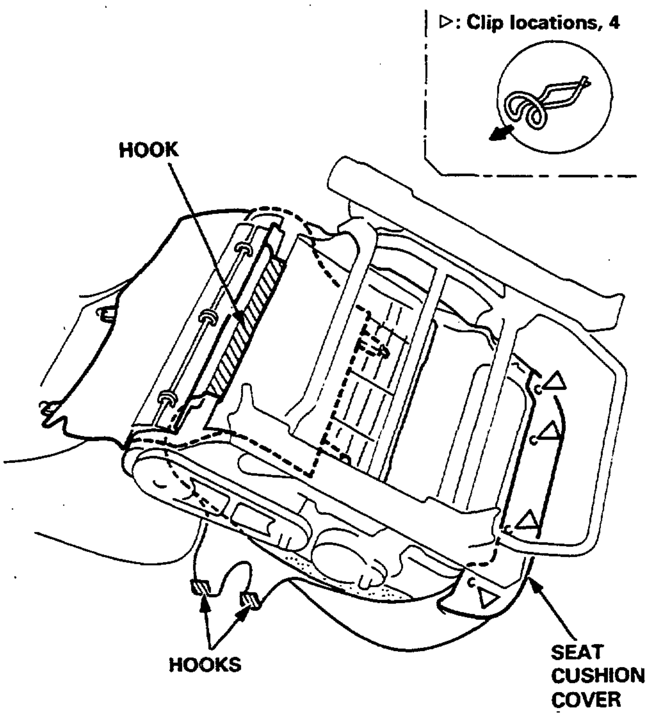
6. Pull back the edge of the seat-back cover all the way around, then remove the clips and hooks.



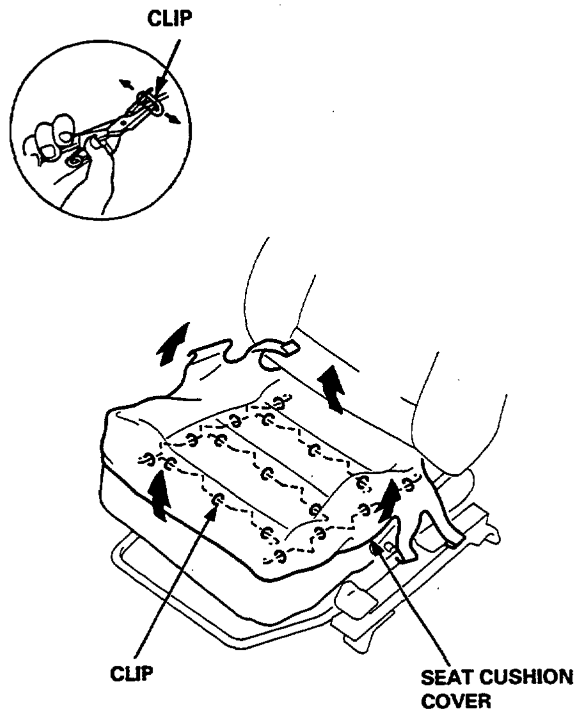
Seat cushion cover removal:

1. Remove the recline cover and inner cover (see pages 20-61, 62).

2. Remove the hooks and clips from under the seat cushion.

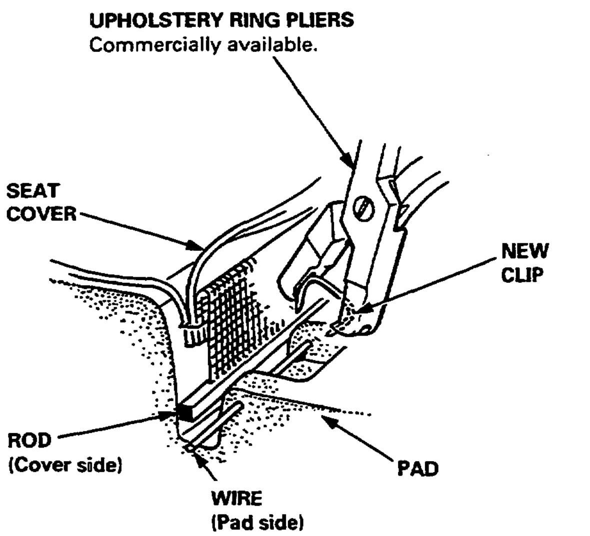


3. Pull back the edge of the seat cushion cover all the way around, then release the clips.



4. Installation is the reverse of the removal procedure.

NOTE:
- To prevent wrinkles when installing a seat covers, make sure the material is stretched evenly over the pad before securing all the clips.
- Replace the released clips with new ones.



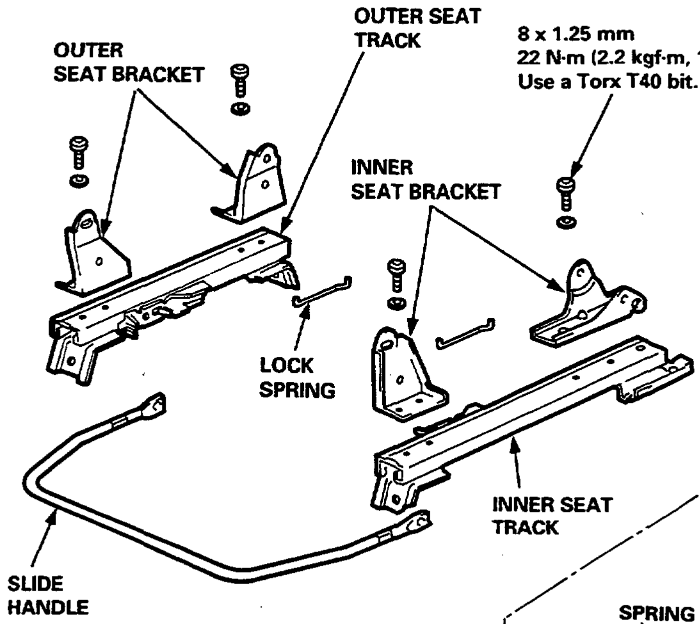
Front Seat Linkage Disassembly

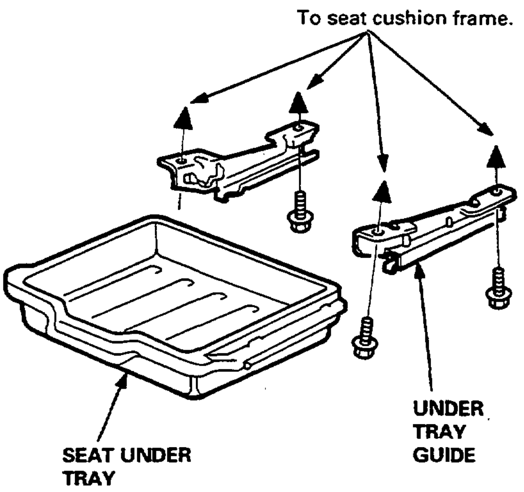
CAUTION: Wear gloves to remove and install the seat track and up-down adjuster.

1. Remove the front seat linkage from the front seat (see page 20-62).

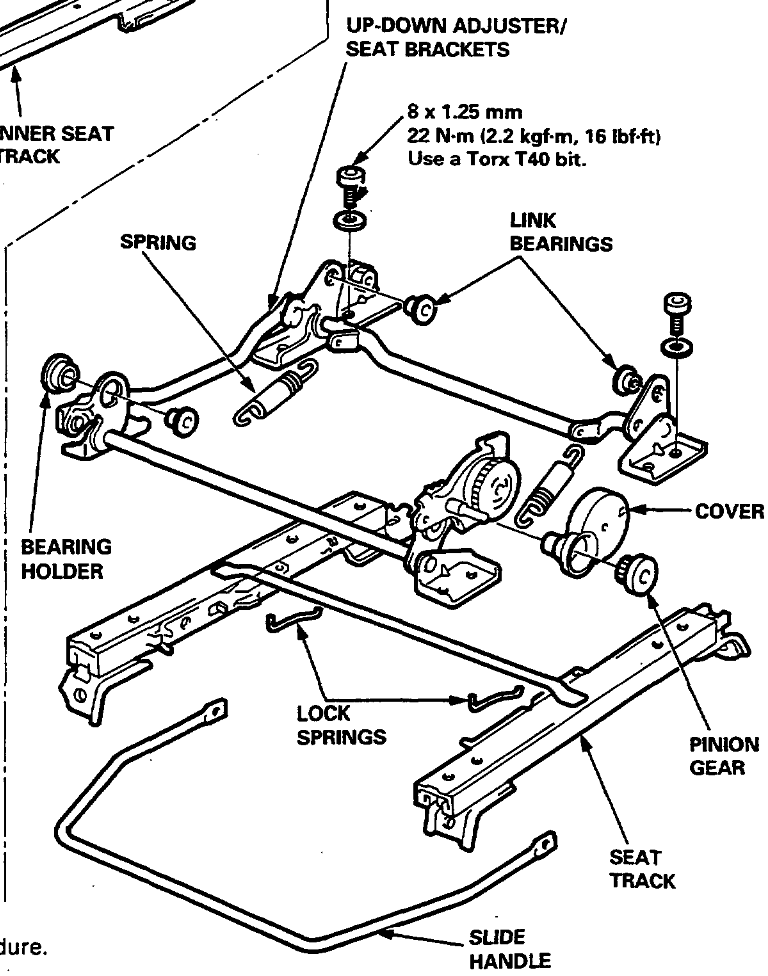
2. Disassemble the front seat linkage as shown.

Slide adjustable:





Slide/Up-down adjustable:



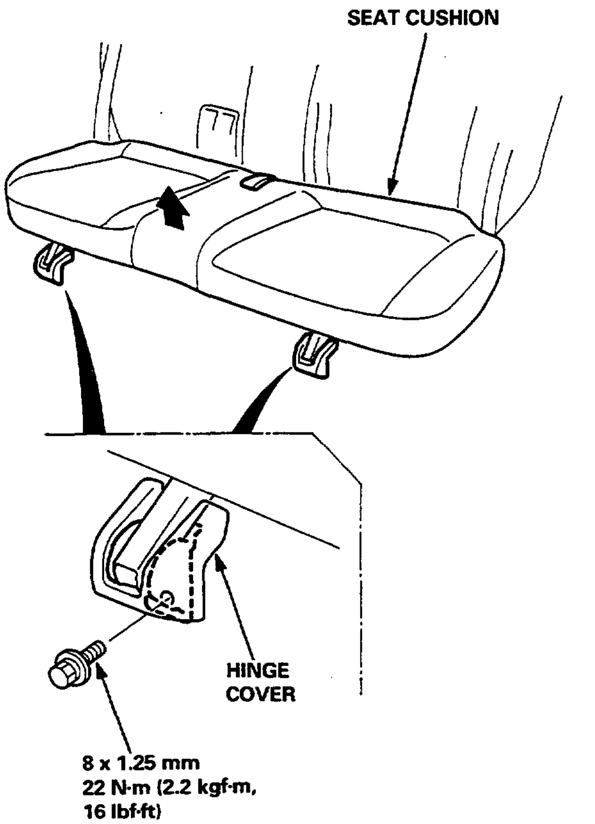
3. Installation is the reverse of the removal procedure.

NOTE:
- Apply grease (aeroshell grease 6) to the moving surface.
- Check the slide and height operations.

Rear seat Replacement

Rear seat cushion removal:

1. Remove the bolts.
2. Remove the seat cushion by lifting it upward.

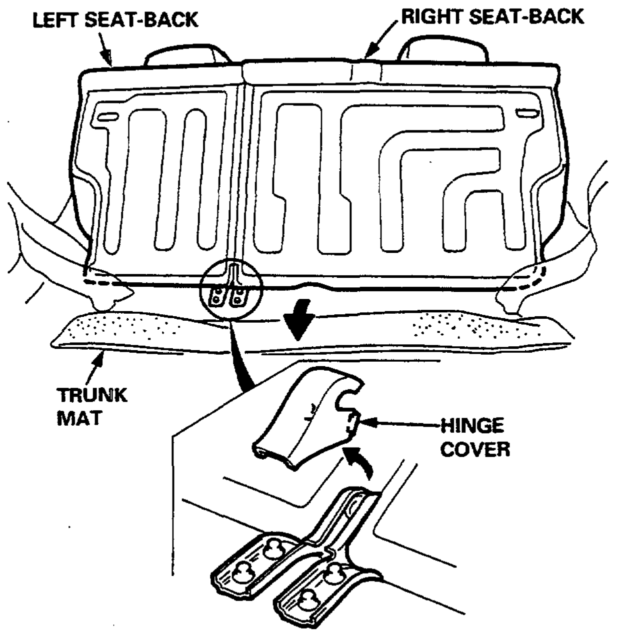


3. Installation is the reverse of the removal procedure.

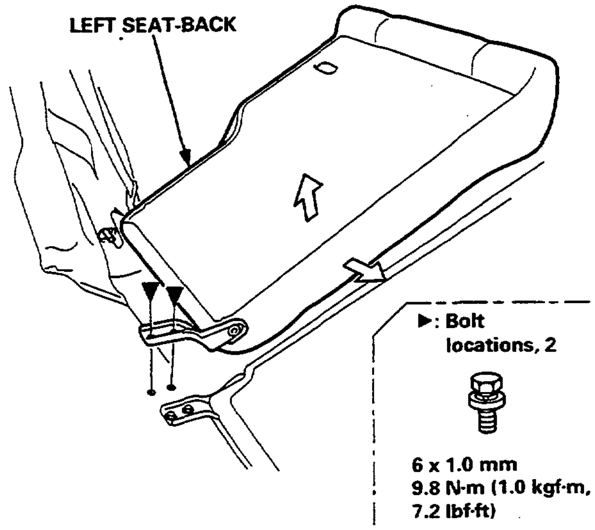
   NOTE: Before attaching the seat cushion, make sure there are no twists in the rear seat belt.

Rear seat-back removal:

1. Fold the seat-back forward.
2. Fold the trunk mat back, then remove the pivot cover.



3. Remove the bolts, then remove the rear seat-back as shown.



4. Installation is the reverse of the removal procedure.

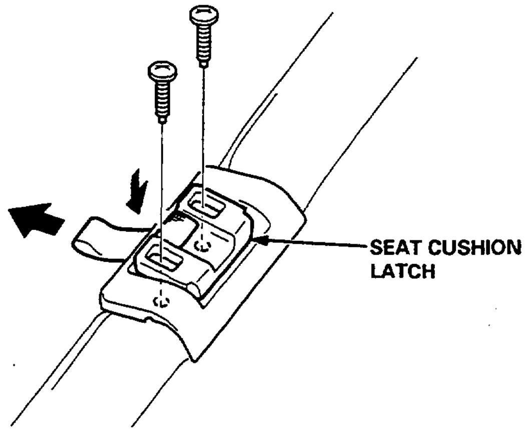
   NOTE: Before attaching the seat-back, make sure there are no twists in the rear seat belt.

Rear Seat Cover Replacement

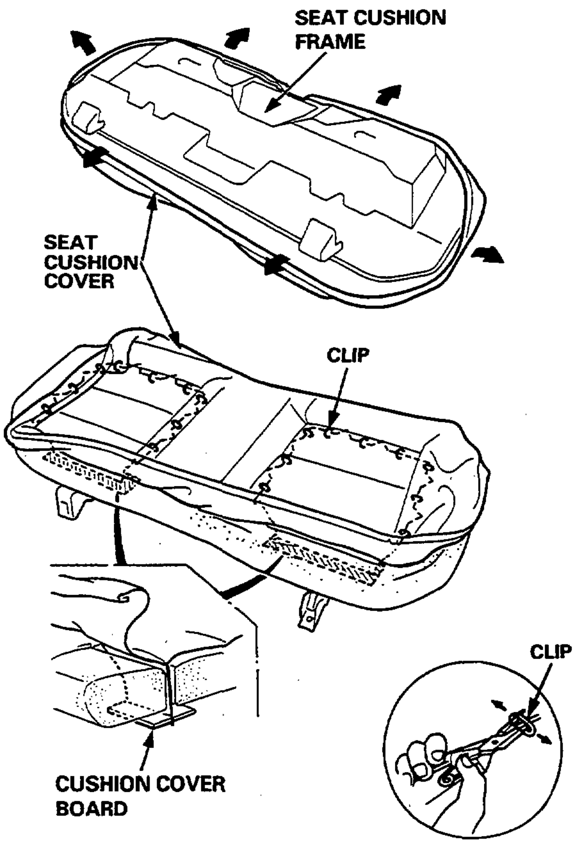
CAUTION: Wear gloves to remove and install the seat cover.

Seat cushion cover removal:

1. Remove the seat cushion (see page 20-66).
2. Remove the seat cushion latch.

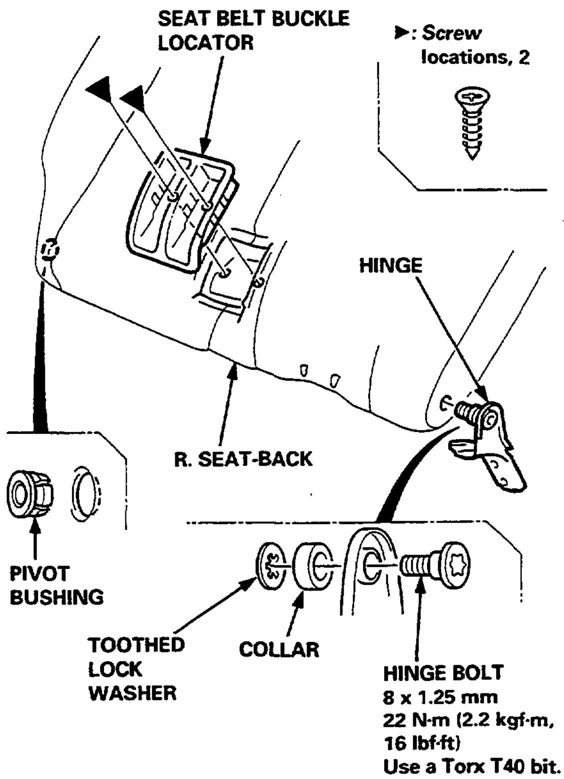


3. Pull back the edge of the seat covers all the way around, then release the clips and cushion cover board.

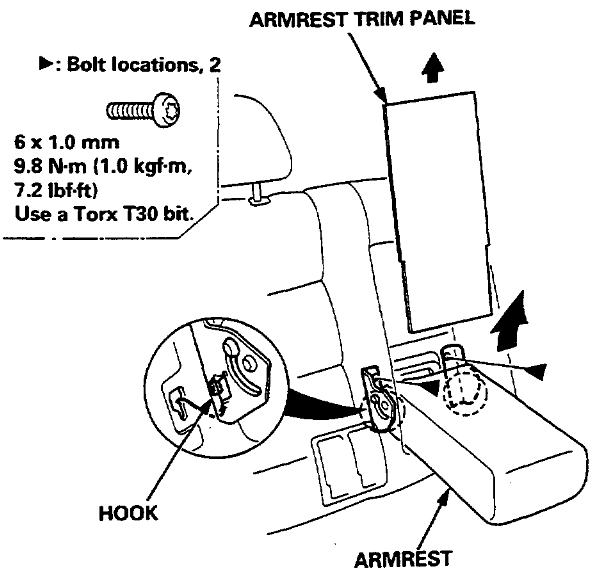


Seat-back cover removal:

1. Remove the seat-back (see page 20-66).
2. Remove the seat belt buckle locator, pivot busing and hinge.



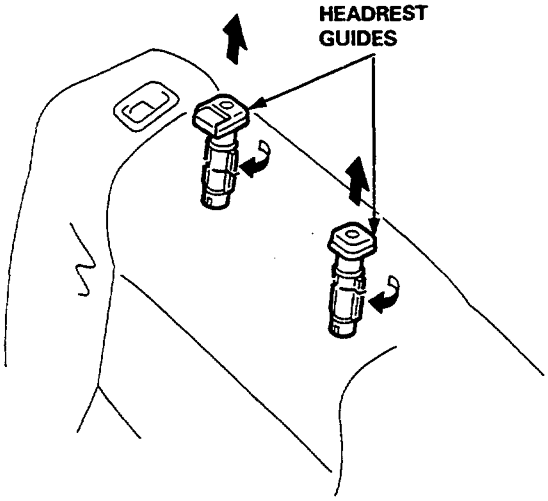
3. If so equipped, remove the armrest.



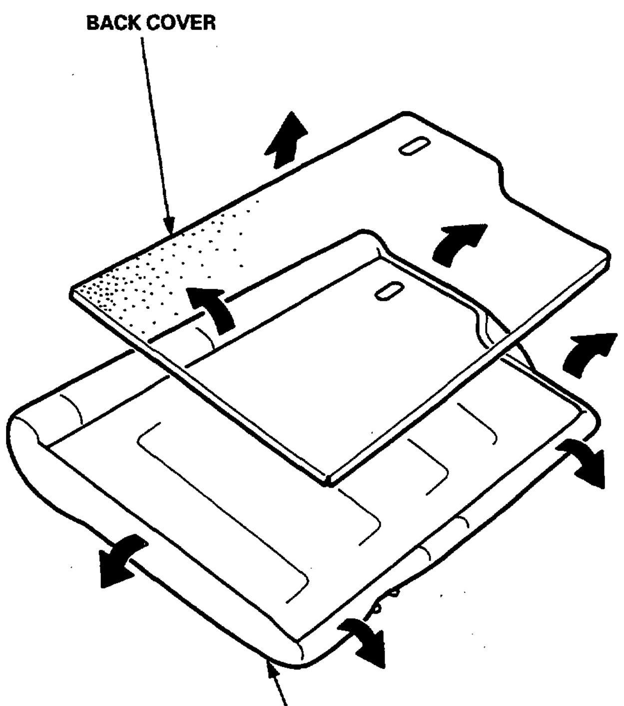
(cont'd)

Rear Seat Cover Replacement (cont'd)

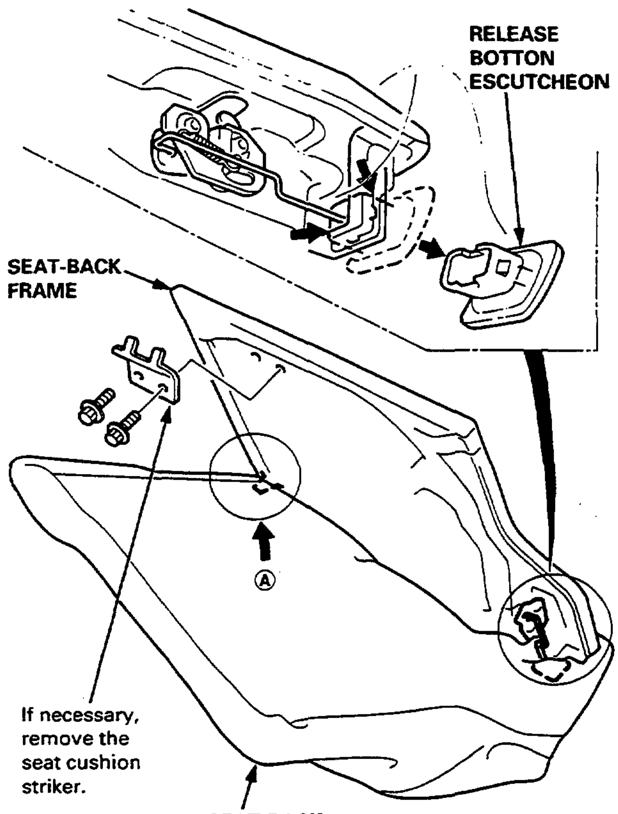
4. Remove the headrest and headrest guides.



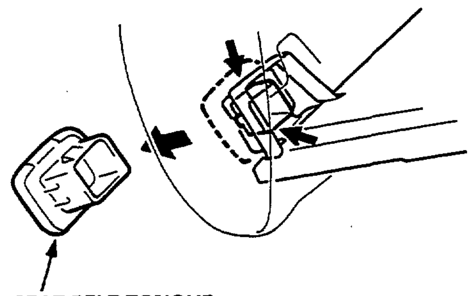
5. Remove the back cover, then pull back the seat-back cover all the way around.



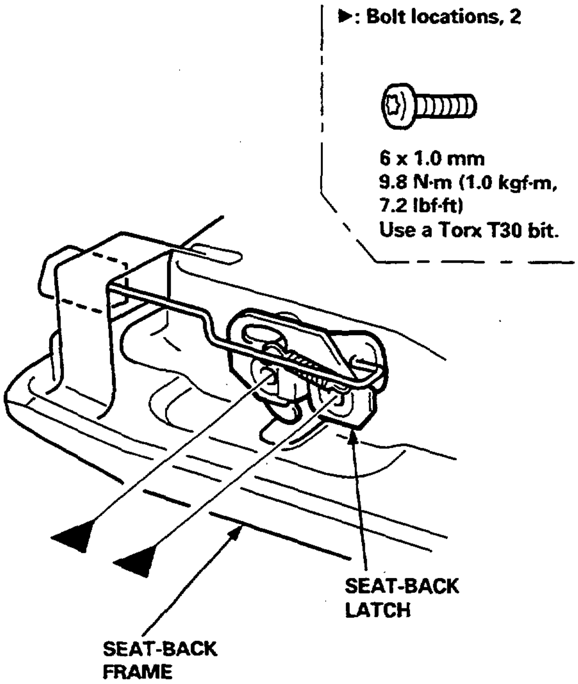
6. Remove the release botton escutcheon and seat belt tongue locator, then remove the seat-back frame.



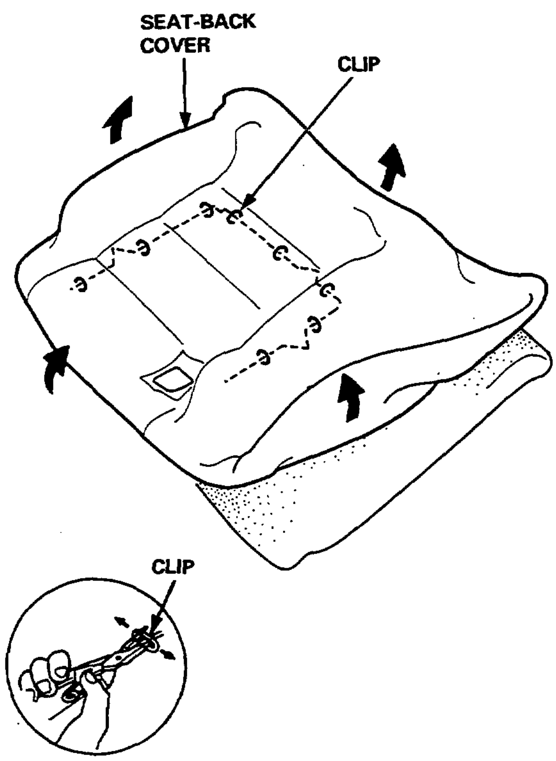
Location Ⓐ:



7. If necessary, remove the seat-back latch from the seat-back frame.

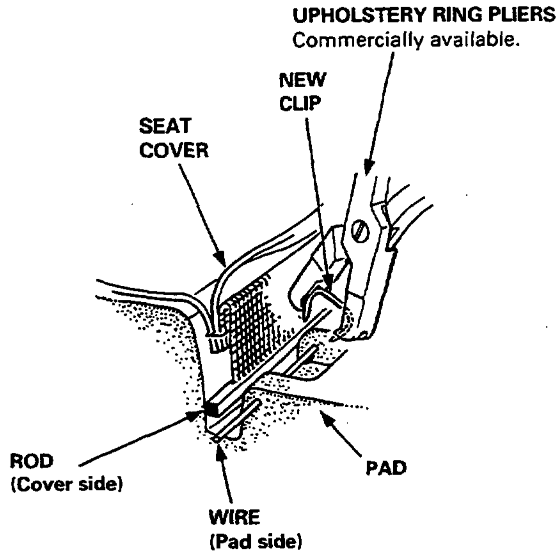


8. Pull back the seat-back cover all the way around, then release the clips.



9. Installation is the reverse of the removal procedure.

NOTE:
- To prevent wrinkles when installing a seat covers, make sure the material is stretched evenly over the pad before securing all the clips.
- Replace the released clips with new ones.



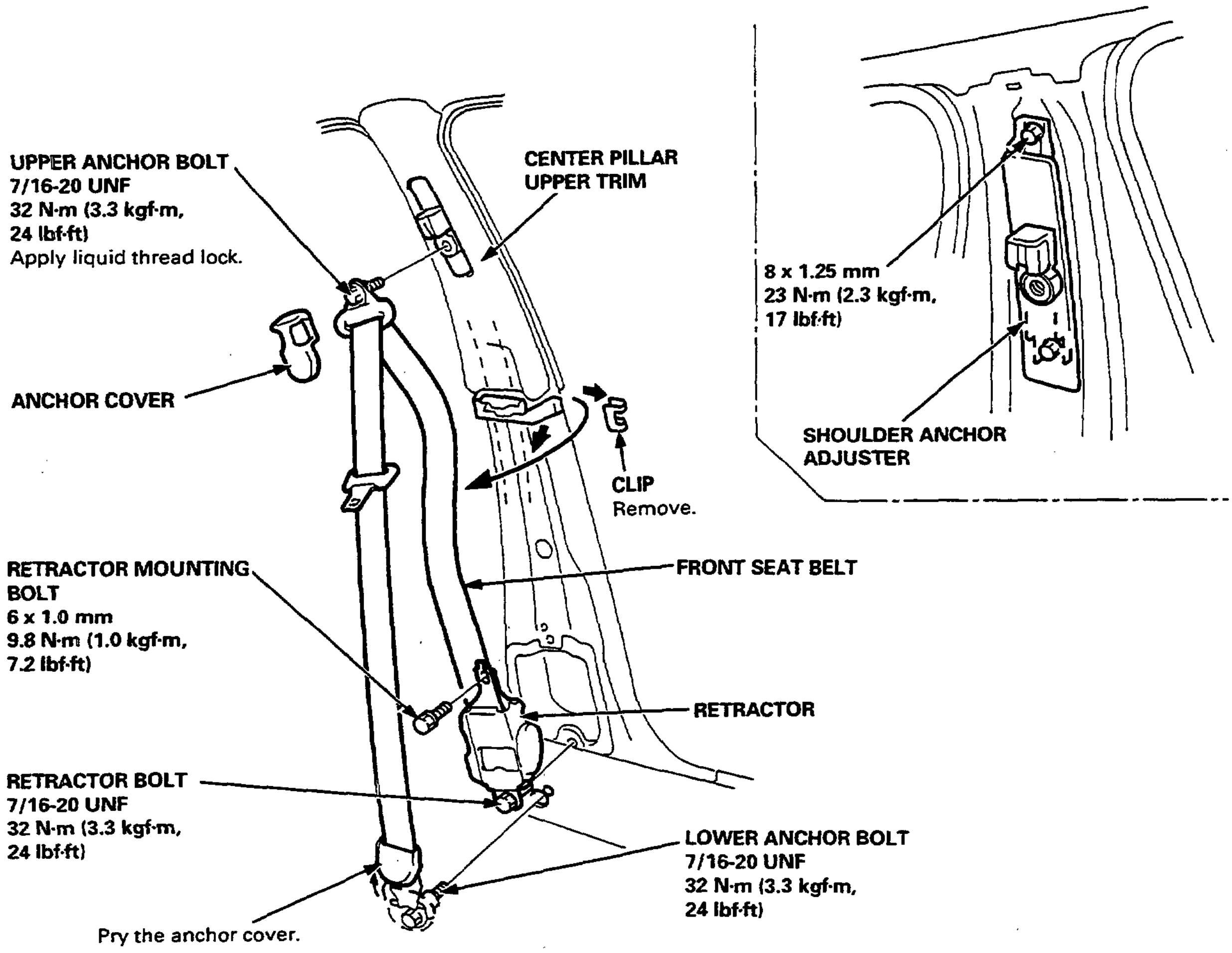
Seat Belts

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:

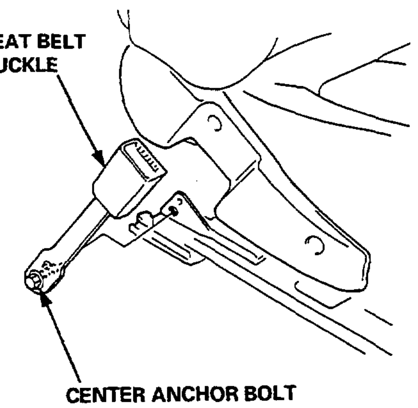
1. Remove the following parts, and slide the front seat forward fully.
   - Front door sill molding (see page 20-55)
   - Center pillar lower trim (see page 20-56)
   - Rear door sill molding (see page 20-57)
2. Remove all the anchor bolts, the retractor bolt and the retractor mounting bolt, then remove the front seat belt.
   NOTE: When removing the anchor bolts and the retractor bolt, use a 17 mm socket or box-end wrench.
3. Remove the center pillar upper trim (see page 20-56), then remove the shoulder anchor adjuster.
4. Check that the retractor locking mechanism functions as described on page 20-74.
5. Installation is the reverse of the removal procedure.
   NOTE:
   - Make sure you assemble the washers and collars on the upper and lower anchor bolts (see page 20-71).
   - Before attaching the center pillar lower trim, make sure there are no twists or kinks in the front seat belt.



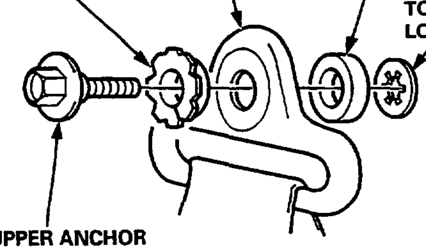
Seat belt buckle removal:

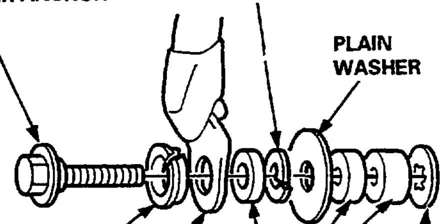
1. Remove the rear console (see page 20-77).
2. Slide the front seat until you can remove the center anchor bolt, then remove the seat belt buckle.
3. Installation is the reverse of the removal procedure.

   NOTE: Make sure you assemble the washers and bearing on the center anchor bolt as shown.

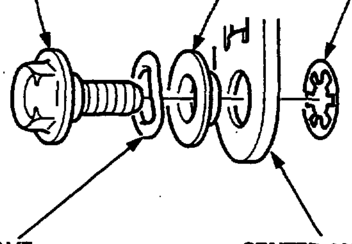


Upper and lower anchor bolt construction:

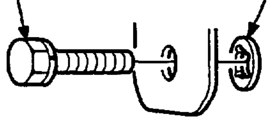




Center anchor bolt construction:



Retractor bolt construction:



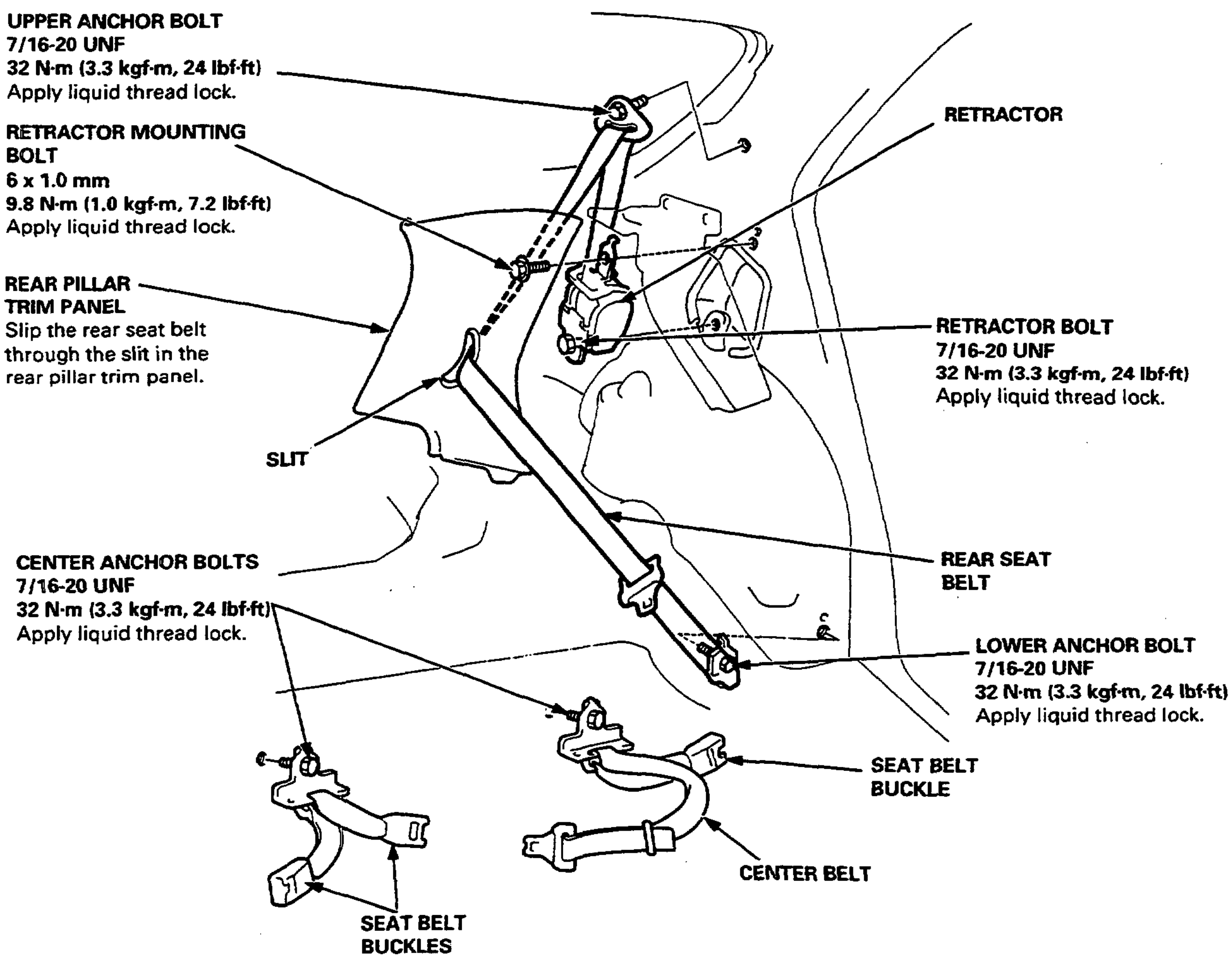
Rear Seat Belt Replacement

CAUTION: Check the rear seat belts for damage, and replace them if necessary. Be careful not to damage them during removal and installation.

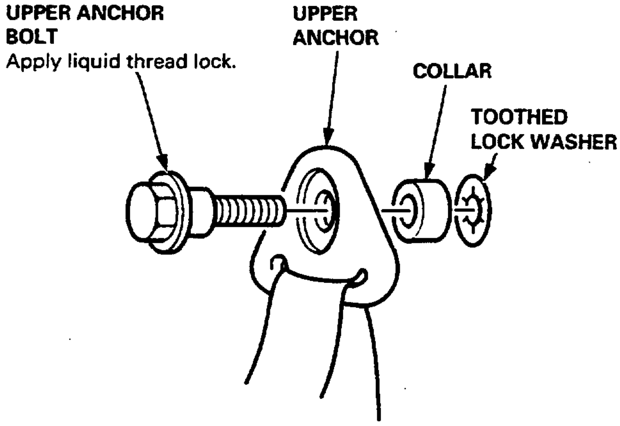
1. Remove:
   - Rear door sill molding (see page 20-57)
   - Rear shelf and rear side shelf (see page 20-56)
   - Rear seat-back (see page 20-66)
   - Rear seat side trim (see page 20-57)
   - Trunk mat (see page 20-58)
   - Rear trim panel (see page 20-58)
   - Trunk side panel (see page 20-58)
2. Remove 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 20-74.
4. Installation is the reverse of the removal procedure.

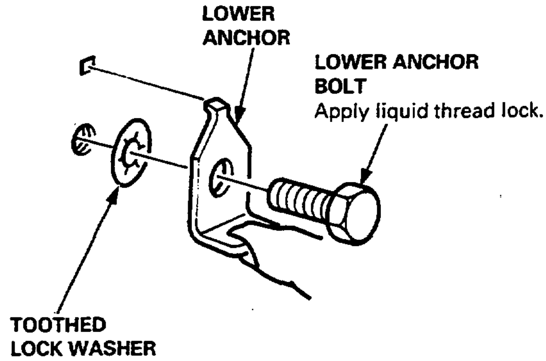
   NOTE:
   - Make sure you assemble the washers and collars on the upper anchor bolt (see page 20-73).
   - Before attaching the rear pillar trim panel and rear seat side trim, make sure there are no twists or kinks in the rear seat belt.
   - Before attaching the seat-back, make sure there are no twists or kinks in the rear seat belts and center belts.



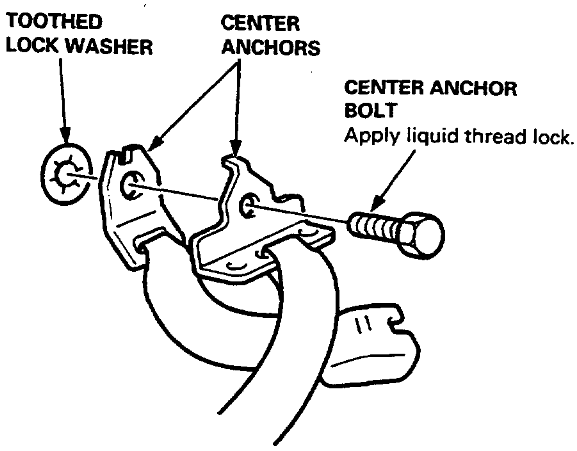
Upper anchor bolt construction:



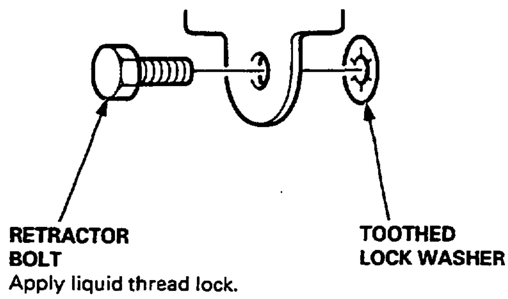
Lower anchor bolt construction:



Center anchor bolt construction:



Retractor bolt construction:



Inspection

Retractor Inspection

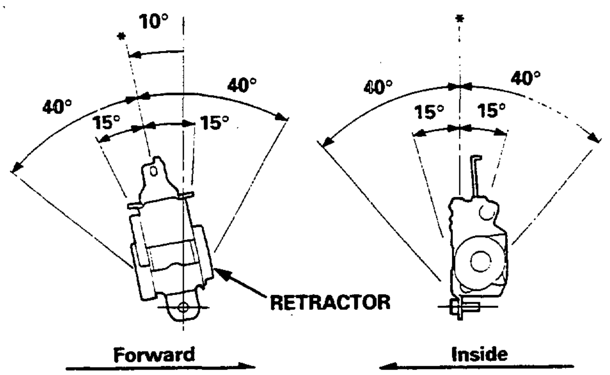
1. Before installing the retractor, check that the seat belt can be pulled out freely.

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°.

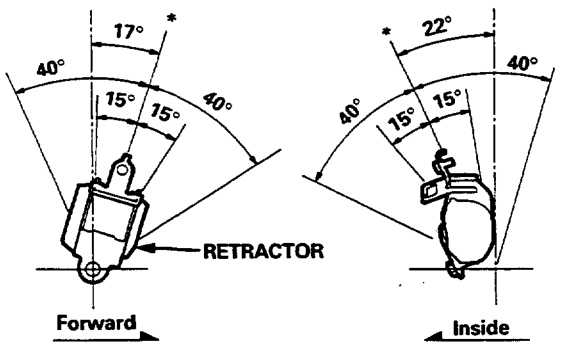
   CAUTION: Do not attempt to disassemble the retractor.

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.

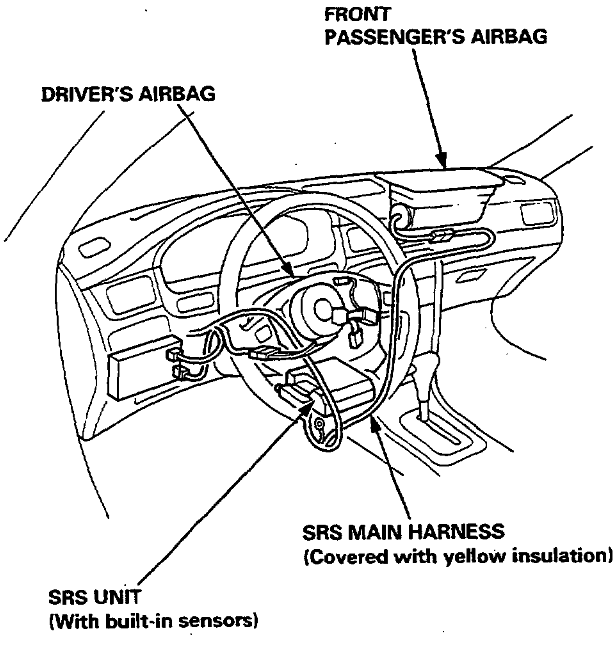
Carpet

Replacement

SRS wire harnesses are routed near the carpet.

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

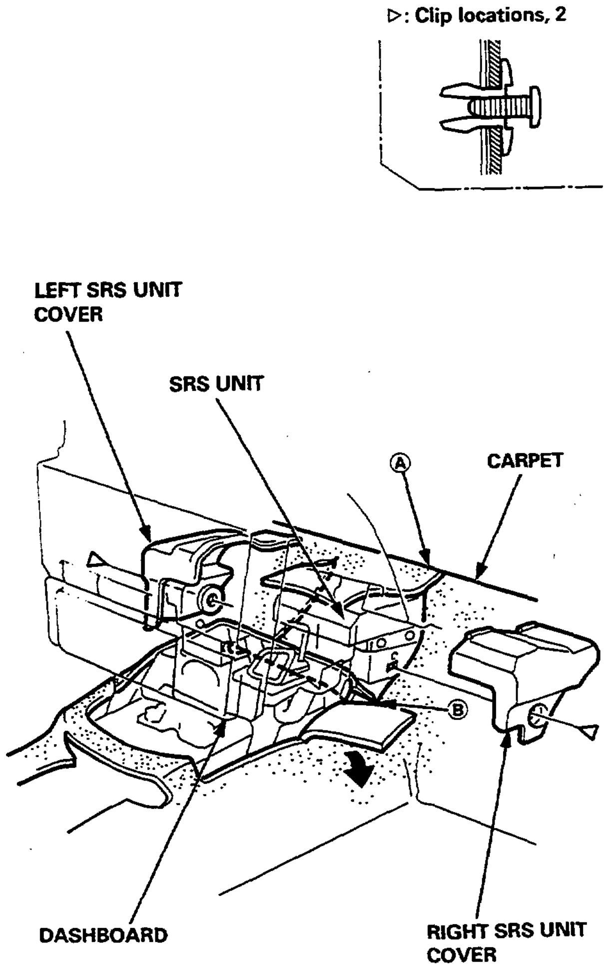
NOTE: The illustration shows the KG model. The KE model is symmetrical to the KG model.



1. Remove:
   - Front seat (see page 20-61)
   - Rear seat cushion (see page 20-66)
   - Front door sill molding (see page 20-55)
   - Rear door sill molding (see page 20-57)
   - Center pillar lower trim (see page 20-56)
   - Front seat belt lower anchor (see page 20-70)
   - Front and rear consoles (see page 20-77)
   - Kick panel (see page 20-55)
   - Opener cover (see page 20-96)

2. Remove the SRS unit covers.

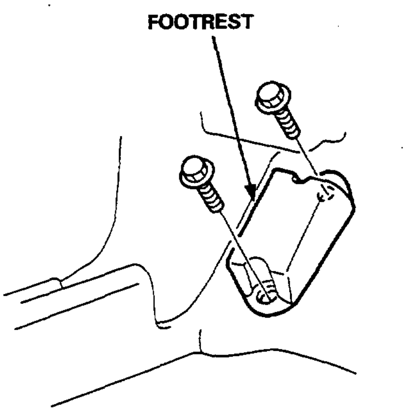
3. Cut areas Ⓐ and Ⓑ in the carpet, then pull it back as shown.



(cont'd)

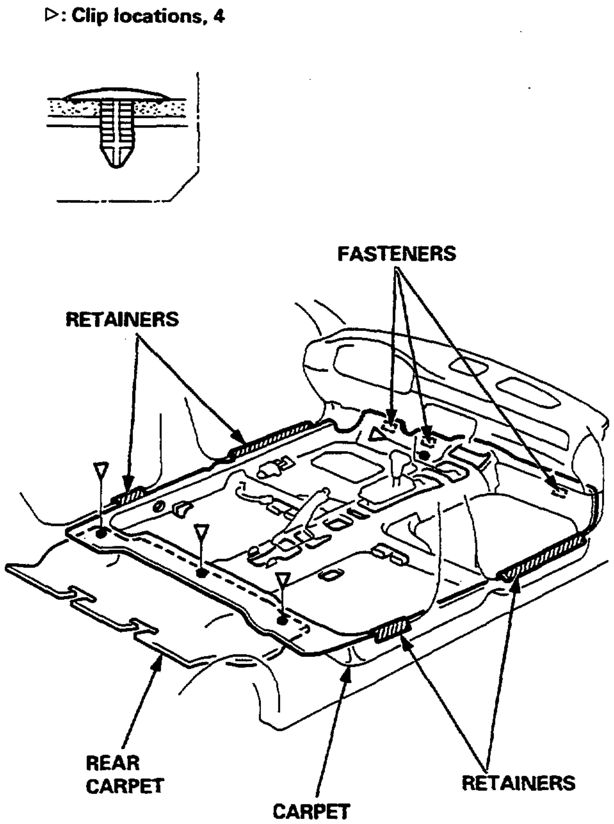
Replacement (cont'd)

4. Remove the footrest.



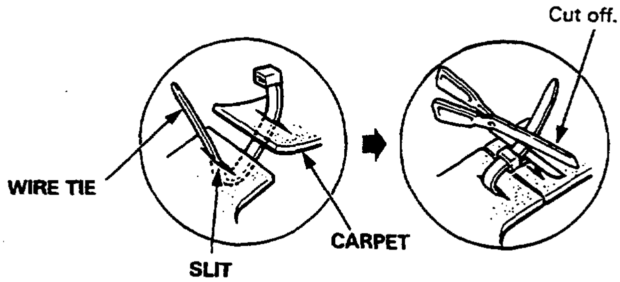
5. Remove the carpet by sliding it rearward.

NOTE: LHD is shown, RHD is symmetrical.

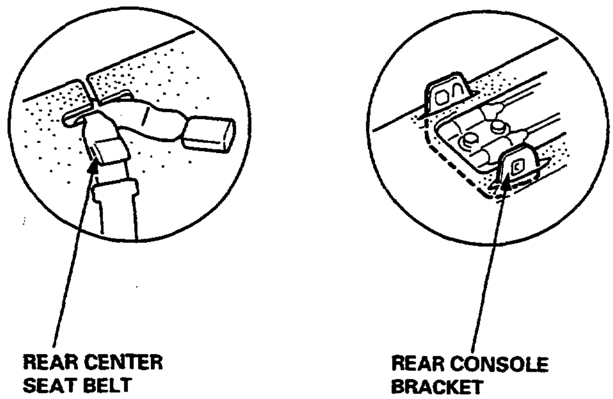


6. Installation is the reverse of the removal procedure.

NOTE:
- Take care not to damage, wrinkle or twist the carpet.
- Reattach the cut areas Ⓐ and Ⓑ in the carpet (see page 20-95) with a wire tie as shown.



- If necessary, replace any damaged clips.
- Slip the slits in the carpet over the rear console bracket and rear center seat belts.



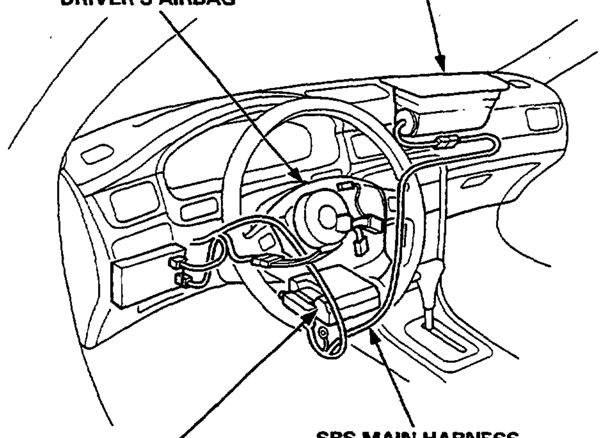
Consoles, Front and Rear

Replacement

SRS wire harnesses are routed near the front console.

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

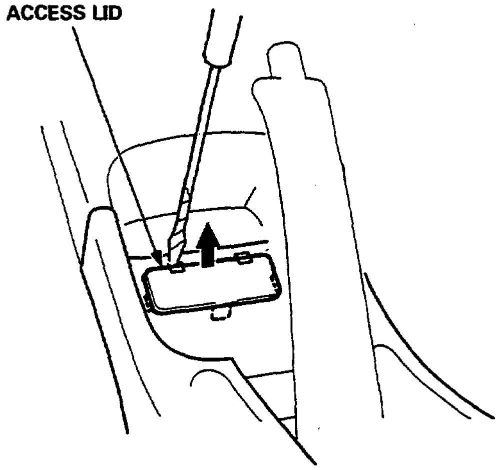
NOTE: The illustration shows the KG model. The KE model is symmetrical to the KG model.



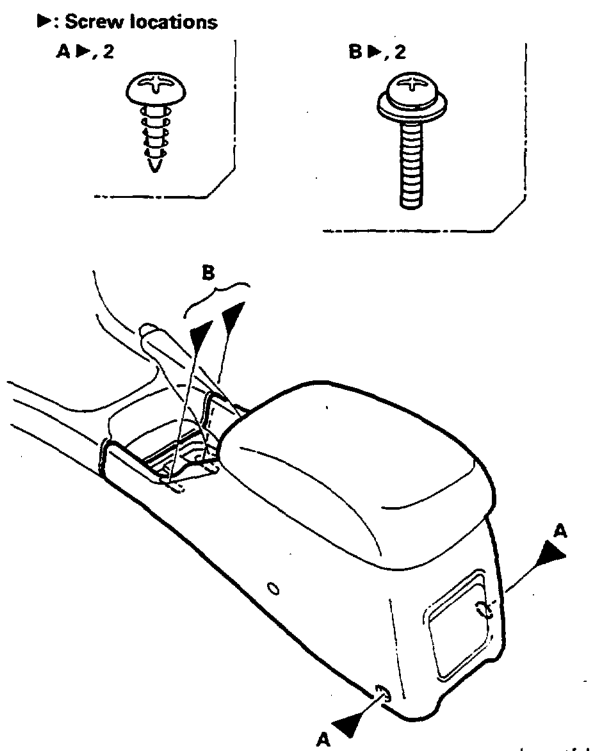
NOTE:
- Take care not to scratch the front and rear consoles, front seats and dashboard.
- LHD is shown, RHD is symmetrical.

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

1. Remove the access lid.



2. Remove the screws.



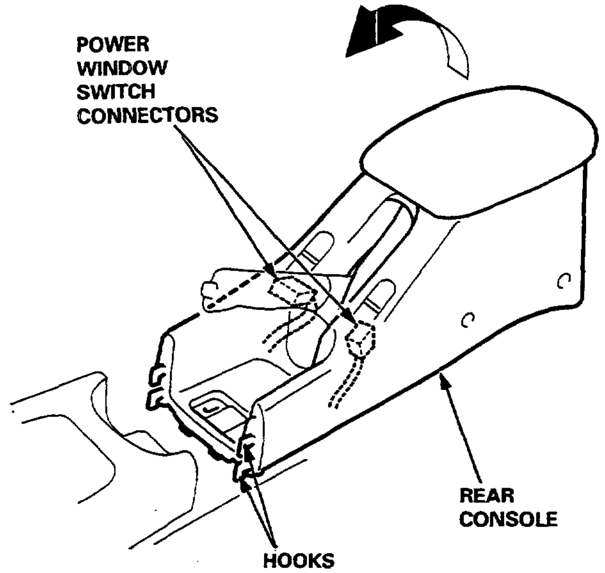
(cont'd)

Consoles, Front and Rear

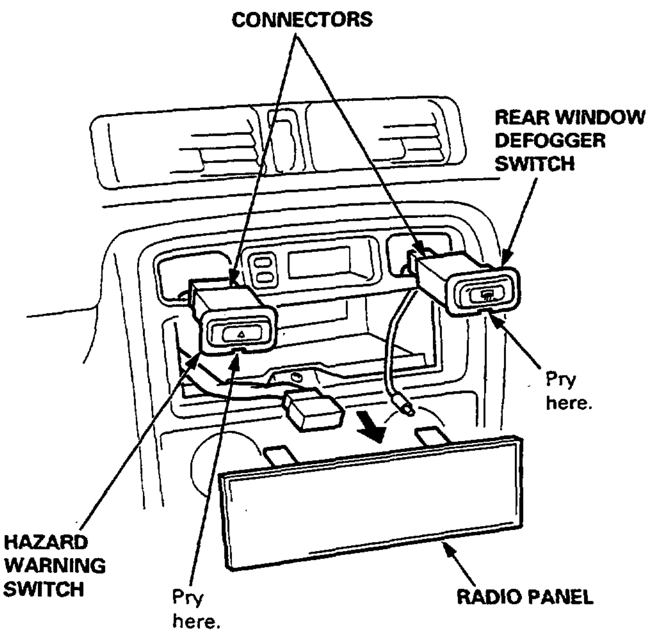
Replacement (cont'd)

3. Remove the rear console.

   NOTE:
   - Lift up the parking brake lever.
   - Detach the hooks, lift the rear of the rear console, and disconnect the power window switch connectors.

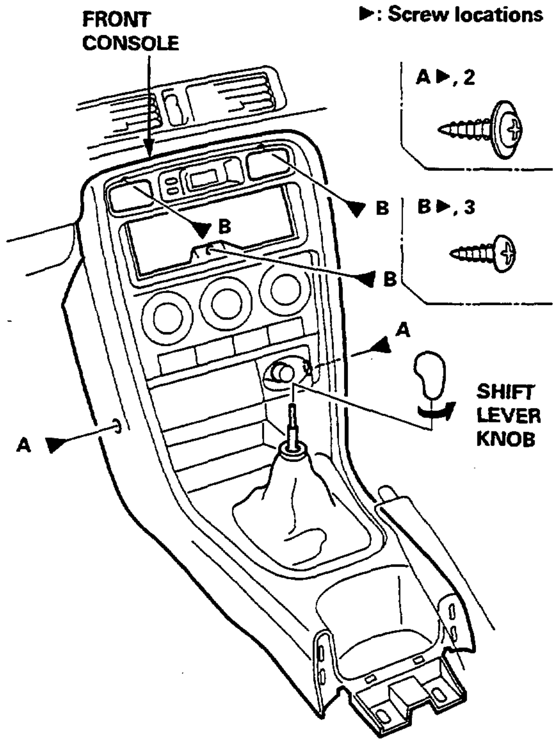


4. Remove the switches and stereo radio/cassette (see section 23) or radio panel.

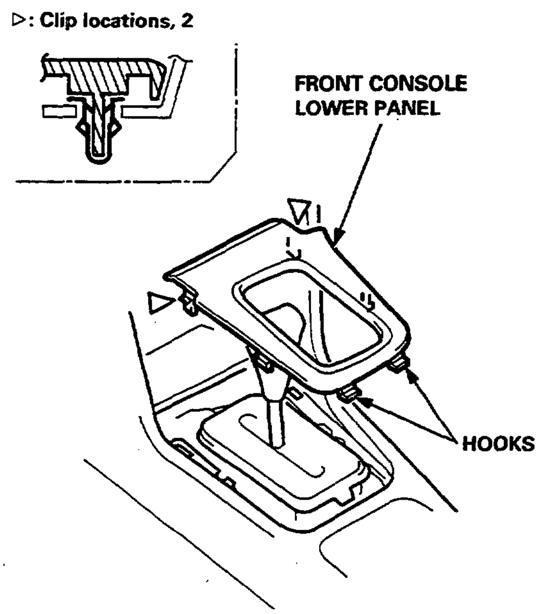


5. Remove the screws.

6. M/T model: Remove the shift lever knob.

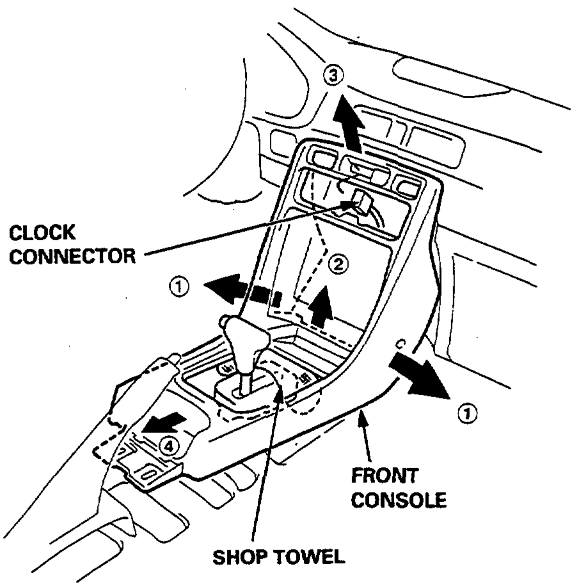


7. A/T model: Remove the front console lower panel.

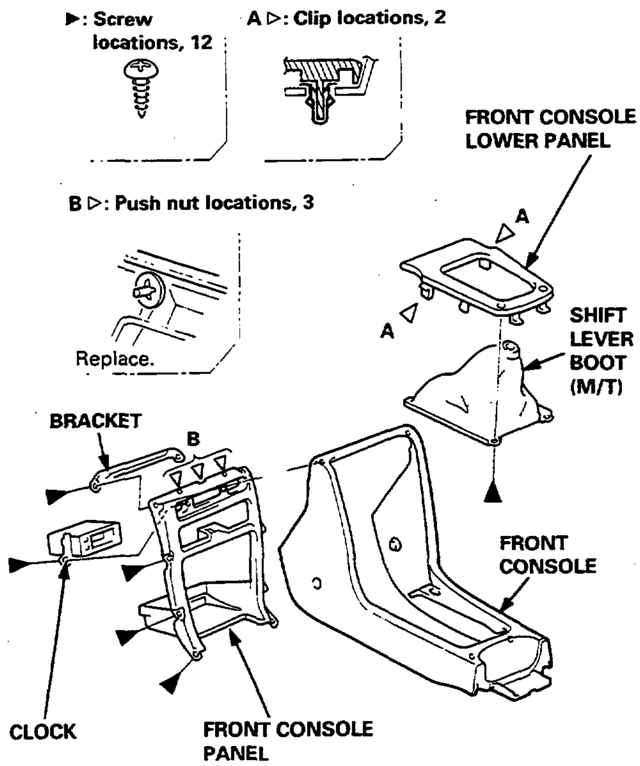


8. Remove the front console and disconnect the connector.

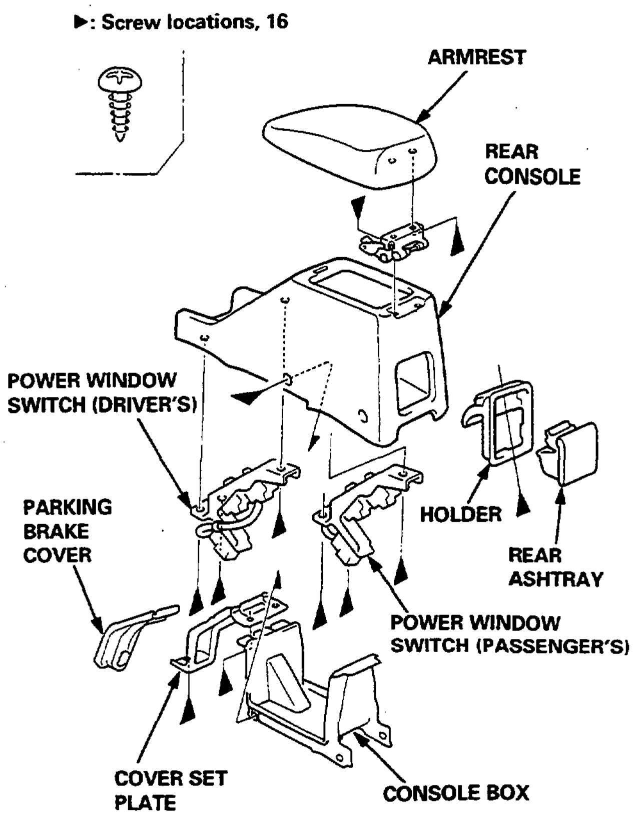
   NOTE: Wrap the shift lever and A/T gear position indicator panel with a shop towel to prevent damage.



9. If necessary, disassemble the front console.



10. If necessary, disassemble the rear console.



11. Installation is the reverse of the removal procedure.

Dashboard

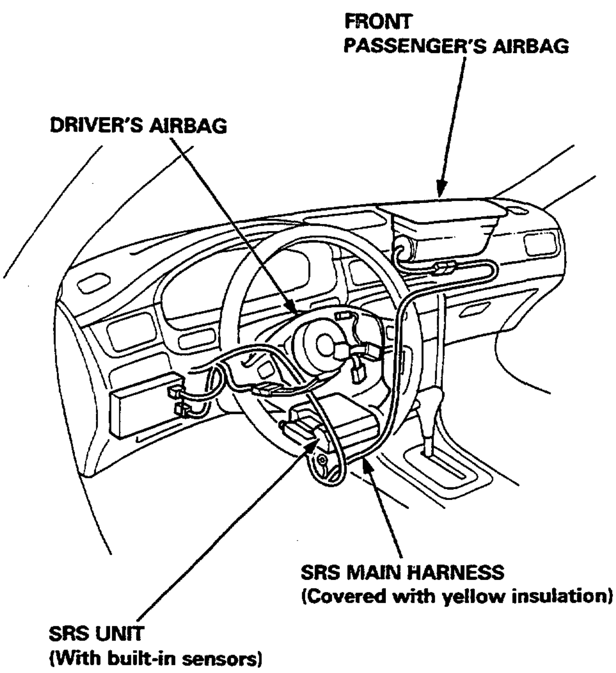
Component Removal/Installation

SRS wire harnesses are routed near the dashboard and steering column.

CAUTION:

- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

NOTE: The illustration shows the KG model. The KE model is symmetrical to the KG model.

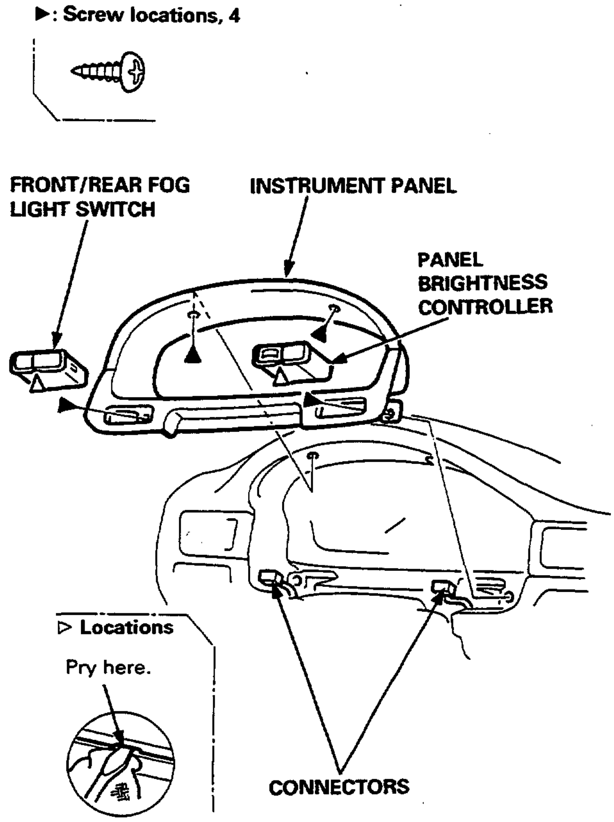


CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.

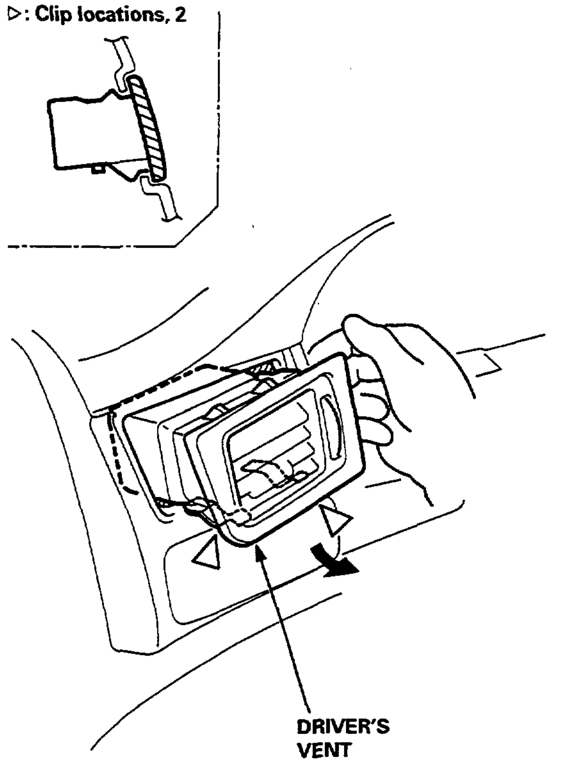
Side air vent/center air vent removal:

NOTE: LHD is shown, RHD is symmetrical (except switches).

1. Remove the front console (see page 20-77).
2. Remove the switches and disconnect the connectors.
3. Lower the steering column and remove the screws. Carefully pull out the instrument panel.

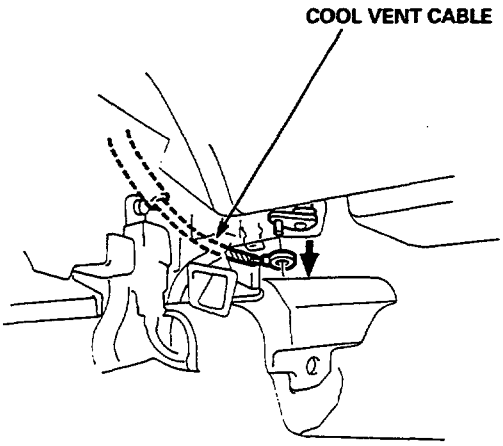


4. Carefully pry the side air vent at the side edge, then pull it out.

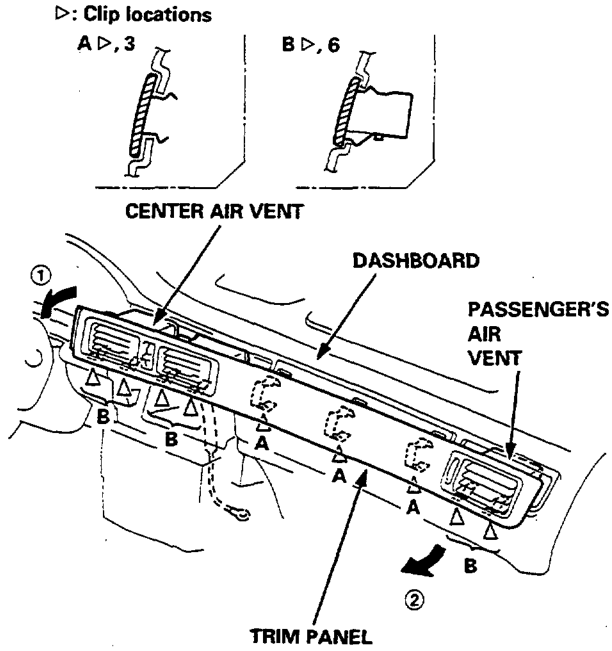


5. Disconnect the cool vent cable.

   NOTE: Adjust the cool vent cable (see section 21).



6. Carefully pry the trim panel at the side edge, then pull it out, and disassemble the center air vent and side air vent.

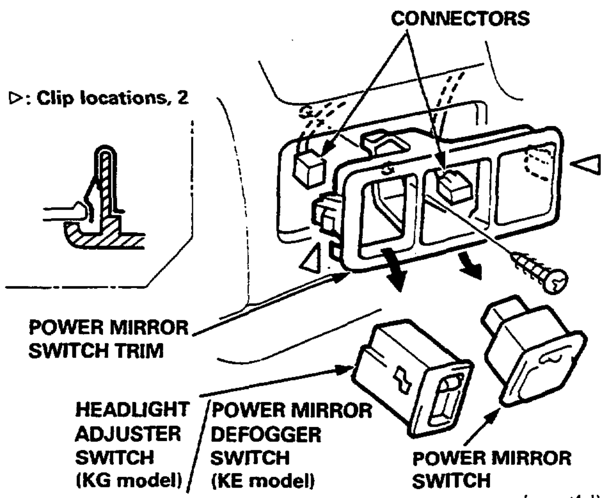


7. Installation is the reverse of the removal procedure.

Power mirror trim removal:

NOTE: LHD is shown, RHD is symmetrical.

1. Remove the switches and disconnect the connectors.
2. Remove the screw.



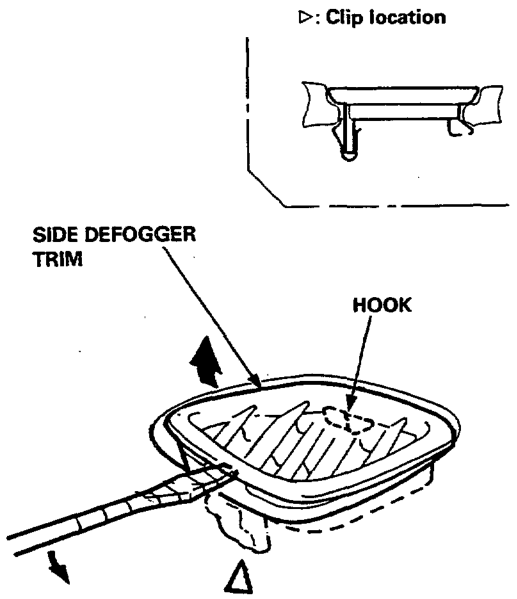
(cont'd)

Component Removal/Installation (cont'd)

Side defogger trim removal:

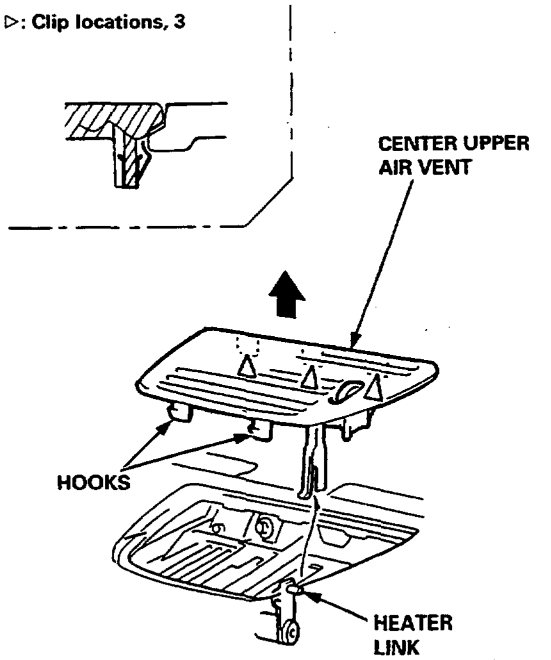
NOTE: LHD is shown, RHD is symmetrical.

Carefully pry the side defogger trim at the rear edge, then remove it.



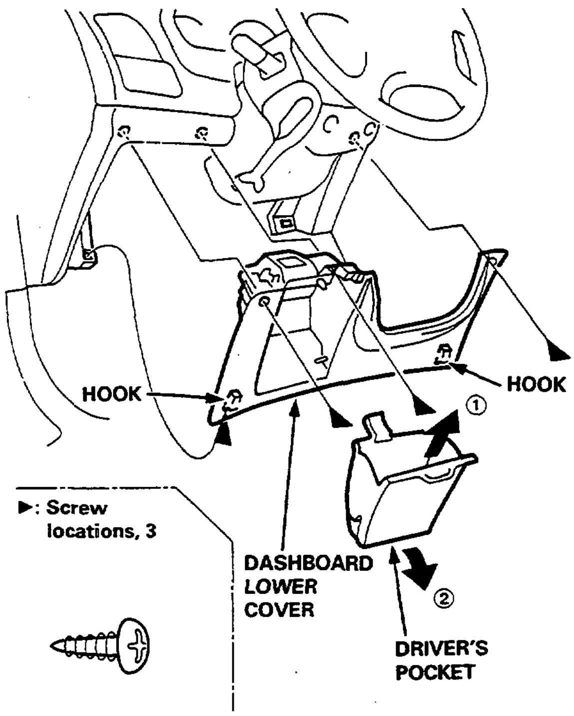
Center upper air vent removal:

Carefully pry the center upper air vent at the rear edge, then remove it.



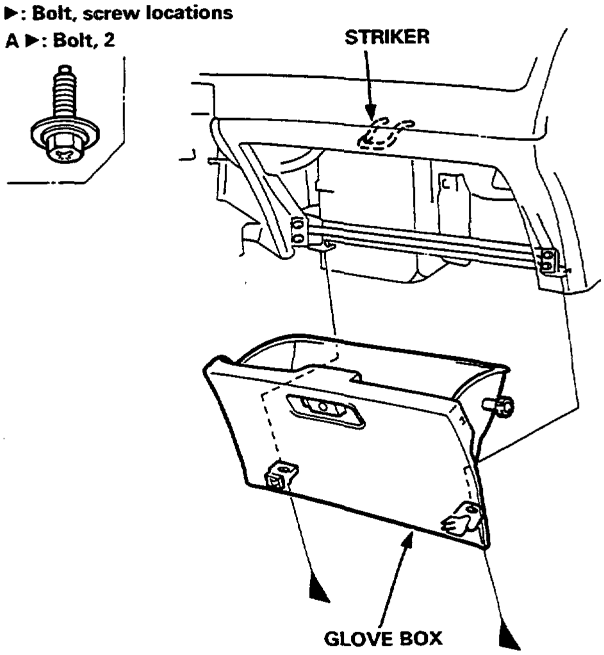
Dashboard lower cover removal:

Remove the driver's pocket and screws.



Glove box removal:

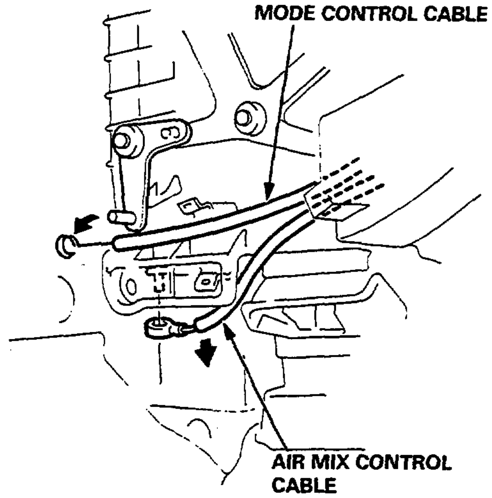
Remove the screws.



Heater control panel removal:

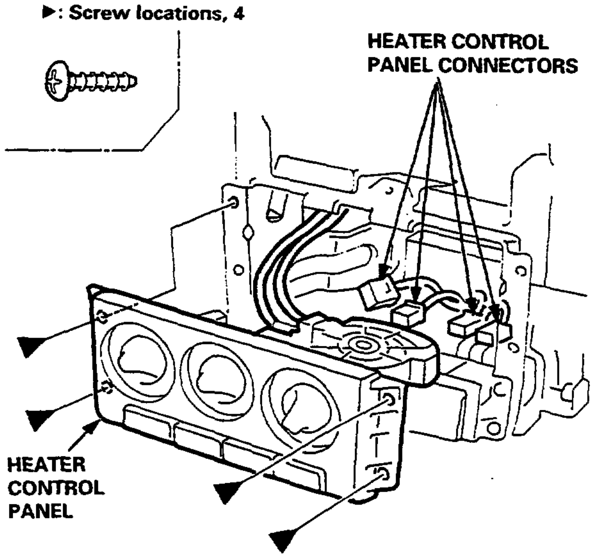
1. Remove the front console (see page 20-77).
2. Disconnect the mode control cable and air mix control cable.

   NOTE: Adjust the mode control cable and air mix control cable (see section 21).



3. Remove the screws and disconnect the connectors.

►: Screw locations, 4

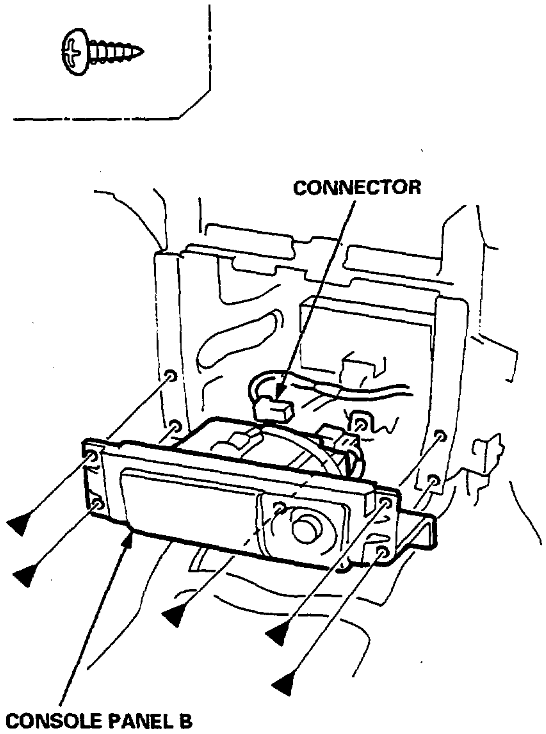


4. Installation is the reverse of the removal procedure.

Console panel B removal:

1. Remove the front console (see page 20-77).
2. Remove the screws and disconnect the connector.

►: Screw locations, 5



3. Installation is the reverse of the removal procedure.

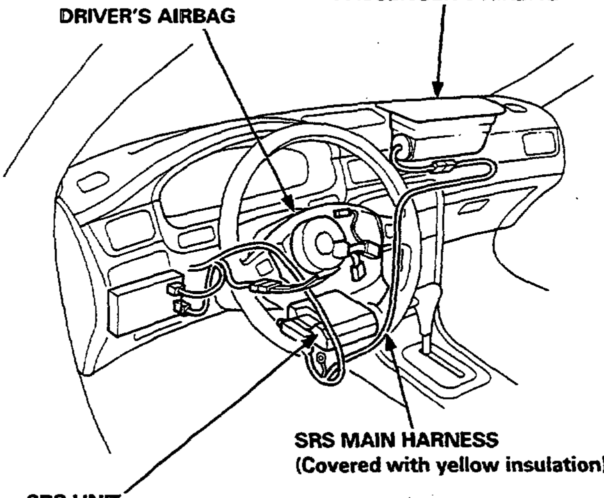
Dashboard

Replacement Precautions

SRS wire harnesses are routed near the dashboard and steering column.

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-86 in the SRS sub-section.**

NOTE: The illustration shows the KG model. The KE model is symmetrical to the KG model.

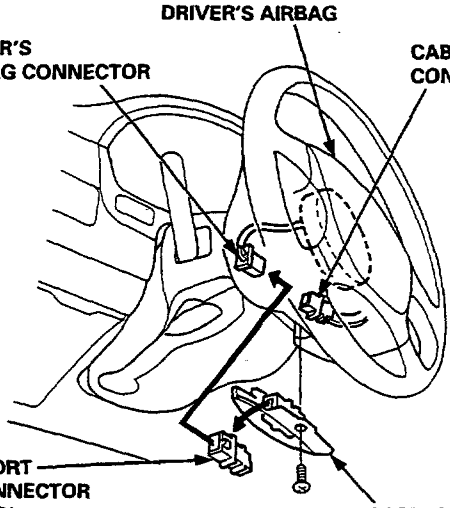


Before removing the dashboard:

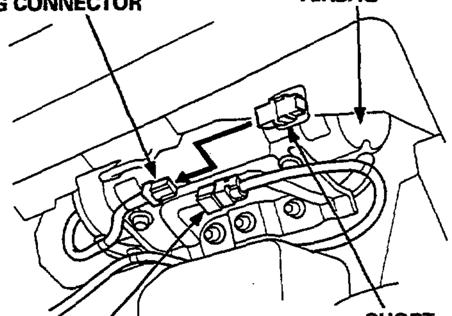
⚠WARNING To avoid accidental deployment and possible injury, always install the protective short connectors on the driver's and front passenger's airbag connectors before working near any SRS wiring.

1. Disconnect the battery negative cable, the 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 20-103), 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

1. To remove the dashboard, first remove the:

   - *Front and rear consoles* (see page 20-77)
   - Dashboard lower cover (see page 20-82)
   - Glove box (see page 20-82)
   - Disconnect the cool vent cable (see page 20-81)
   - Heater control panel (see page 20-83)
   - Console panel B (see page 20-83)

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 20-84).

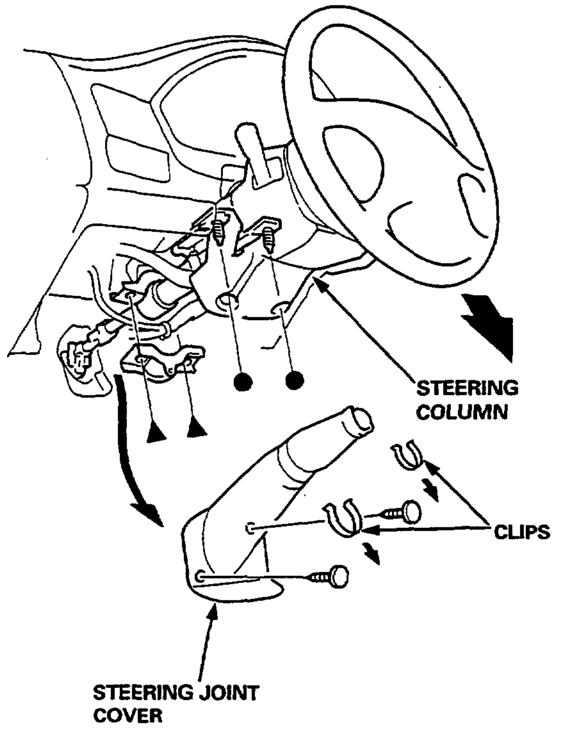
NOTE: To prevent damage to the steering column, wrap it with a shop towel.

►: Bolt locations, 2

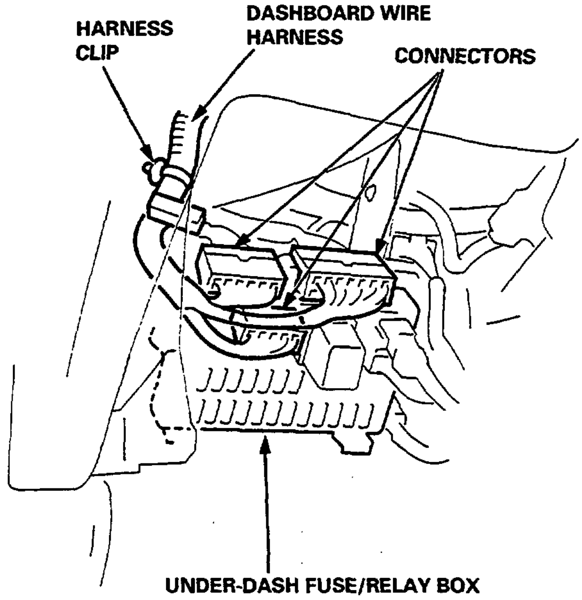
8 x 1.25 mm
22 N·m (2.2 kgf·m, 16 lbf·ft)

●: Nut locations, 2

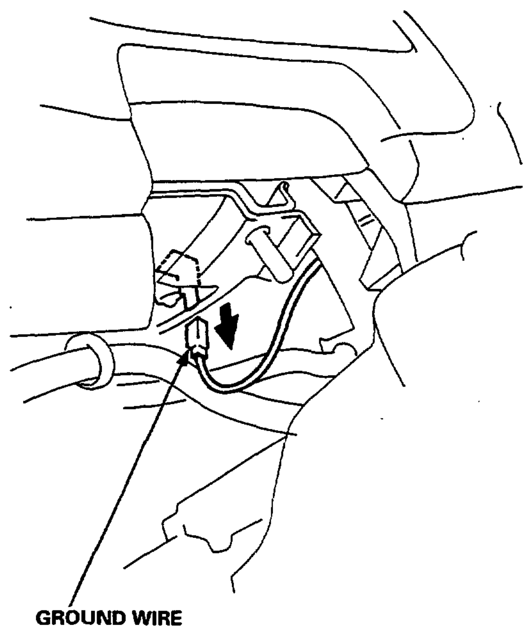
8 x 1.25 mm
16 N·m (1.6 kgf·m, 12 lbf·ft)
Replace.



3. Disconnect the dashboard wire harness connectors. Detach the harness clips.



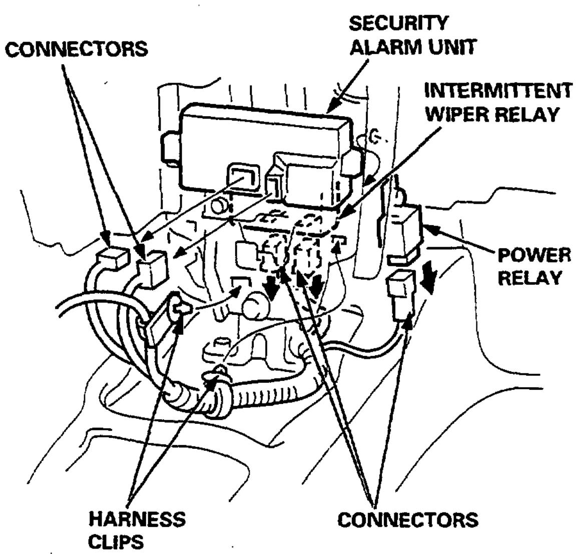
4. Disconnect the ground wire.



(cont'd)

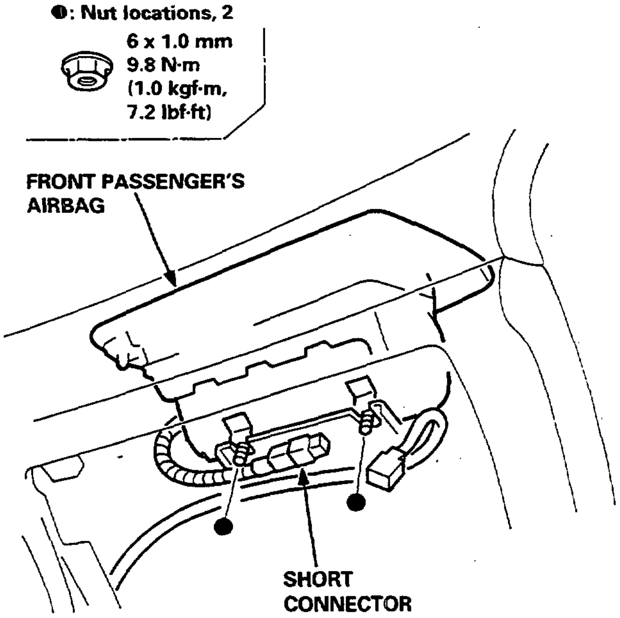
Replacement (cont'd)

5. Disconnect the connectors and harness clips.



6. Remove the nuts from the front passenger's airbag.

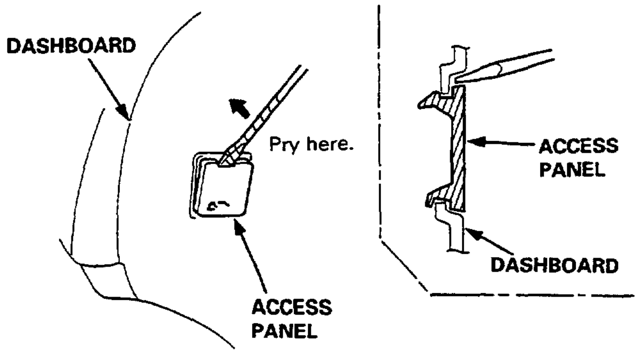
●: Nut locations, 2



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 20-84).**

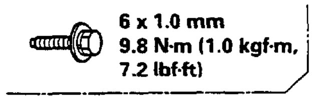
7. Remove the center upper air vent (see page 20-82).

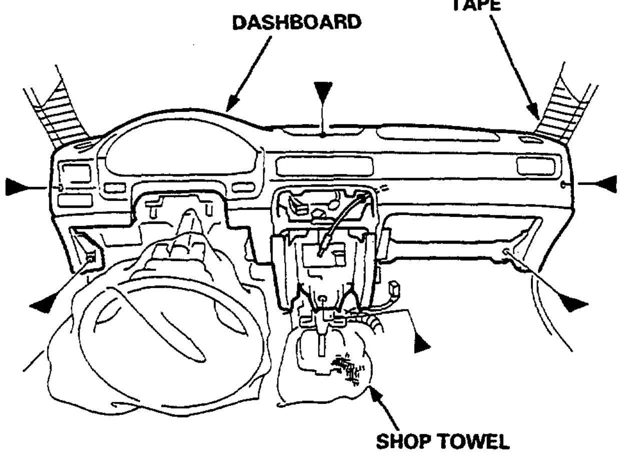
8. Remove the access panels on both sides.



9. Remove the bolts, then remove the dashboard.

▶: Bolt locations, 6





CAUTION: Use protective tape on the bottom of the front pillar trim.

NOTE: To prevent damage to the shift lever and A/T gear position indicator panel, wrap them with a shop towel.

10. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the dashboard fits onto the body correctly.
- Before tightening the bolts, make sure the dashboard wire harnesses are not pinched, and that the dashboard is not interfering with the cool vent cable.

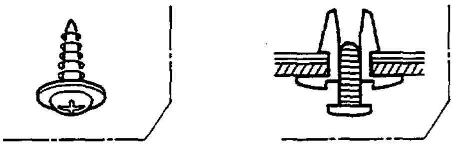
Front Bumper Replacement

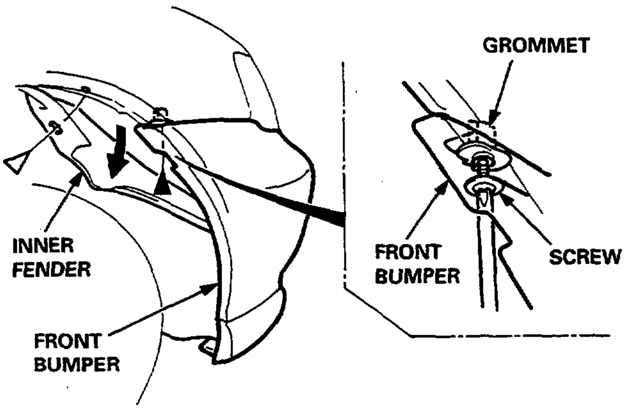
CAUTION: Wear gloves to remove and install the front bumper.

NOTE:
- An assistant is helpful when removing the front bumper.
- Take care not to scratch the front bumper.
- Open the hood.

1. Pull the inner fender down, then remove the screws from the front bumper on each side.

▶: Screw location, 2 **▷: Clip locations, 2**

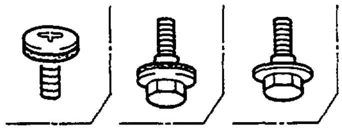


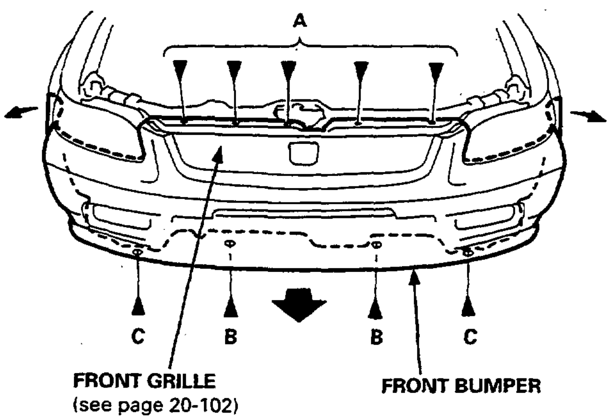


2. Remove the bolts, then remove the front bumper.

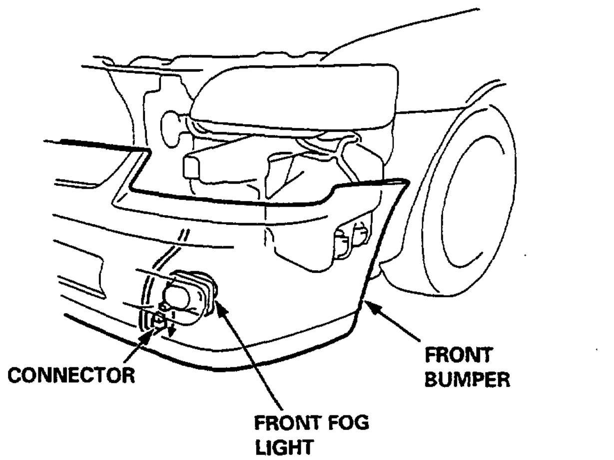
▶: Bolt locations **A ▶, 5** **B ▶, 2** **C ▶, 2**

6 x 1.0 mm
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



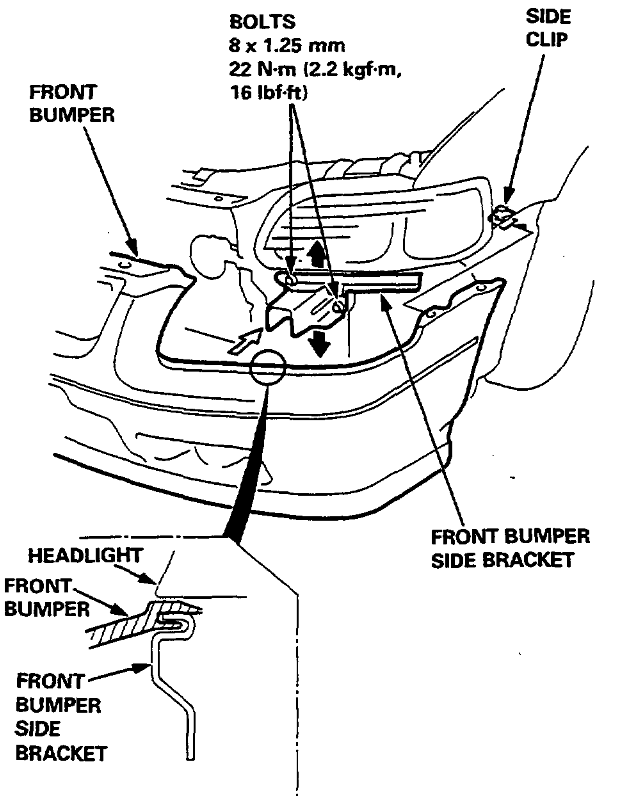


3. If so equipped, disconnect the front fog light connector.



4. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the front bumper engages the front bumper side bracket and side clip on each side securely.
- If necessary, adjust the front bumper side bracket to obtain the proper gap.



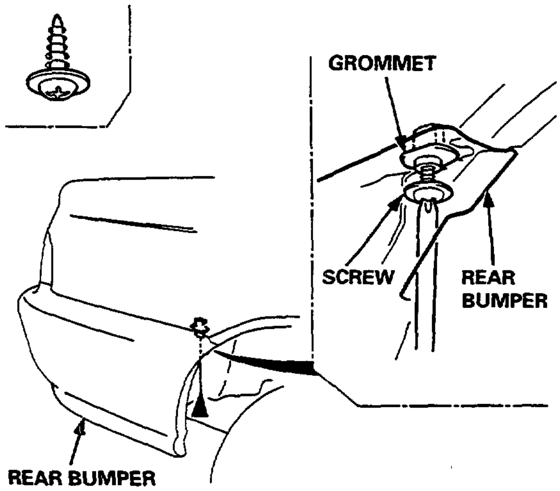
Rear Bumper Replacement

CAUTION: Wear gloves to remove and install the rear bumper.

NOTE:
- An assistant is helpful when removing the rear bumper.
- Take care not to scratch the rear bumper.
- Open the tailgate.

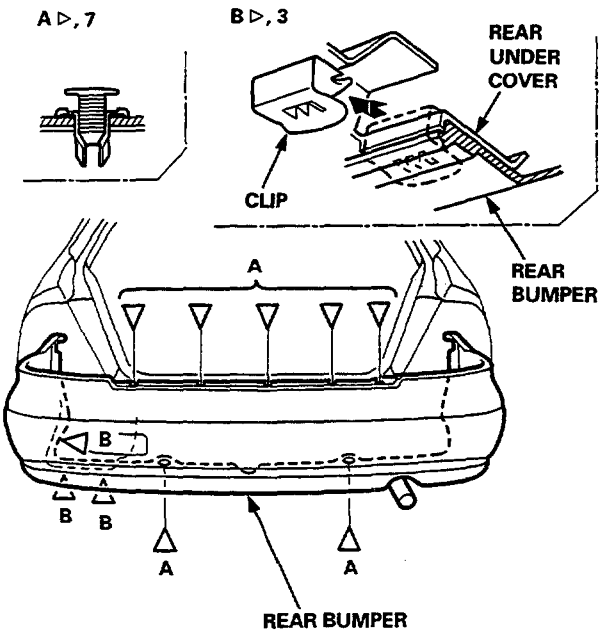
1. Remove the screw from each side.

▶: Screw locations, 2



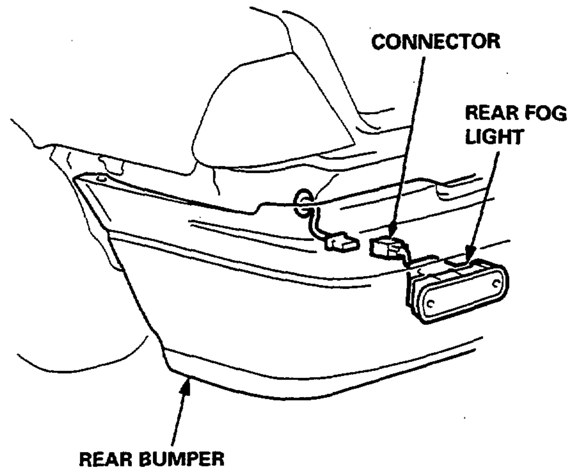
2. Remove the clips, then remove the rear bumper.

▷: Clip locations



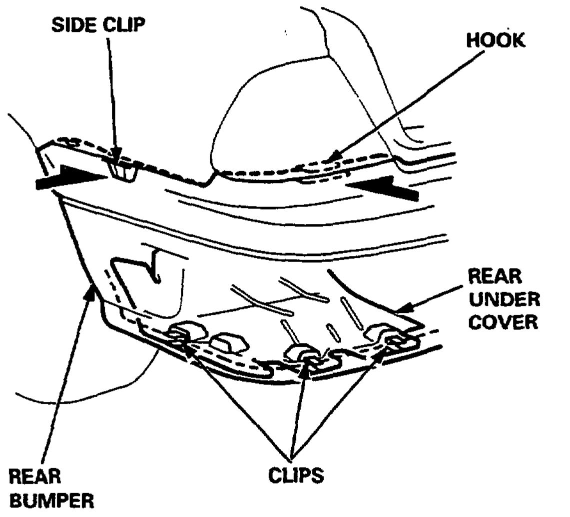
3. Disconnect the rear fog light connector.

NOTE: LHD is shown, RHD is symmetrical.



4. Installation is the reverse of the removal procedure.

NOTE:
- If necessary, replace any damaged clips.
- Make sure the rear bumper engages the side clip and hook on each side securely.
- Install the rear under cover clip securely.

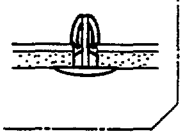


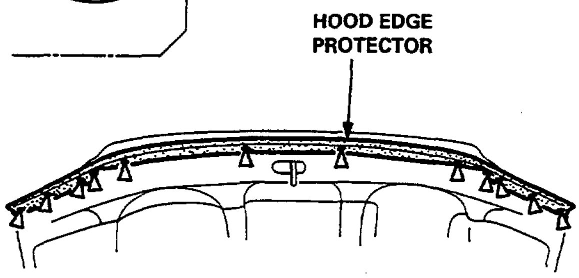
Replacement

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.

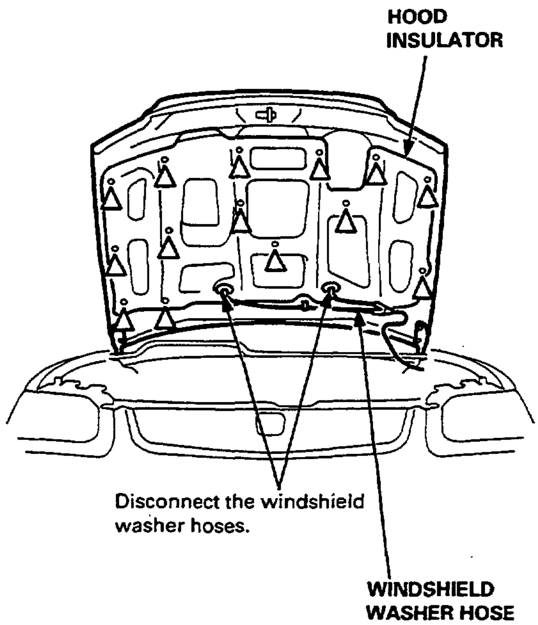
1. If necessary, remove the hood edge protector and hood insulator (for some types).

▷: Clip locations, 12



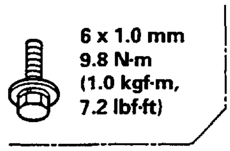


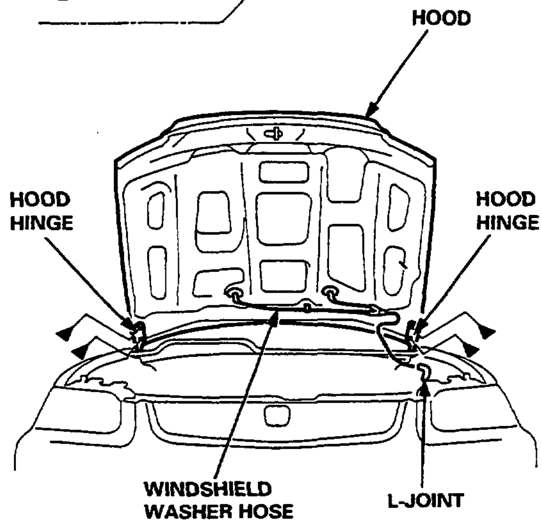
▷: Clip locations, 15



2. Disconnect the windshield washer hose, then remove the hood.

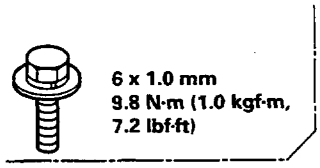
▶: Bolt locations, 4

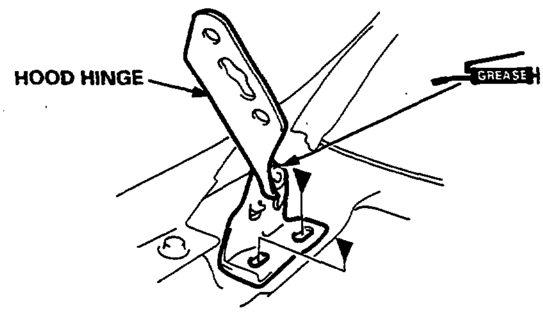




NOTE: If necessary, remove the hood hinge.

▶: Bolt locations, 4





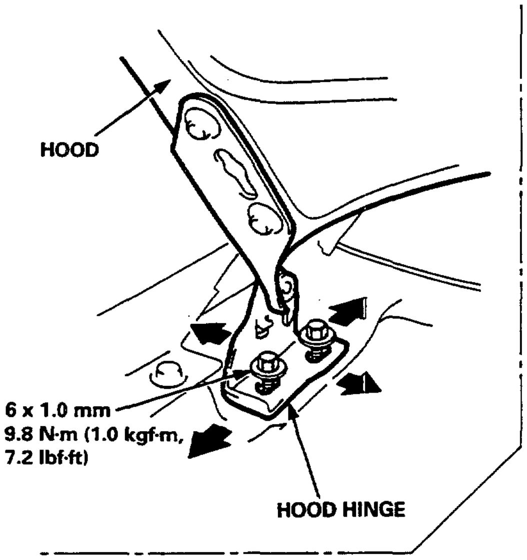
3. Installation is the reverse of the removal procedure.

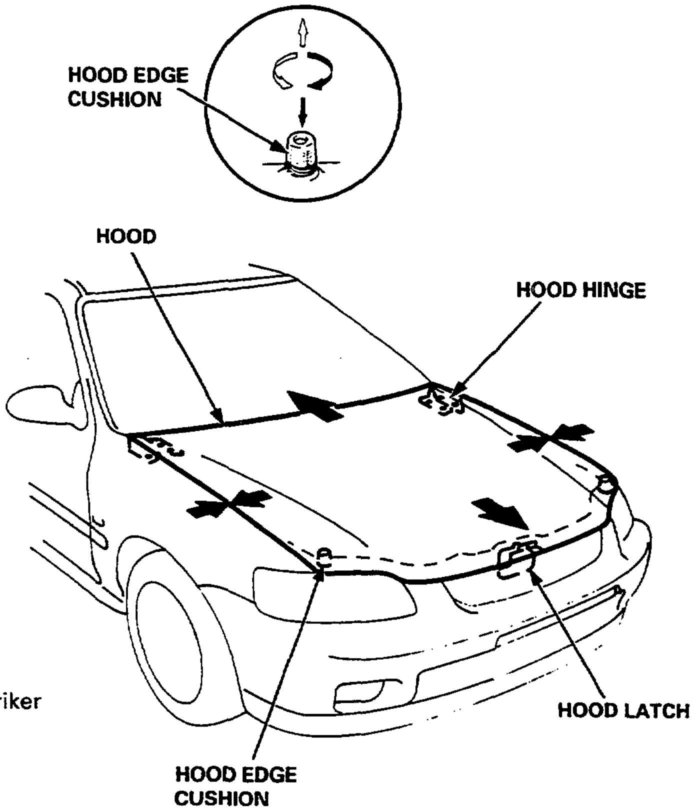
NOTE:
- If necessary, replace any damaged clips.
- Make sure the hood locks securely.
- Make sure the hood opens properly.
- Adjust the hood alignment (see page 20-90).

Adjustment

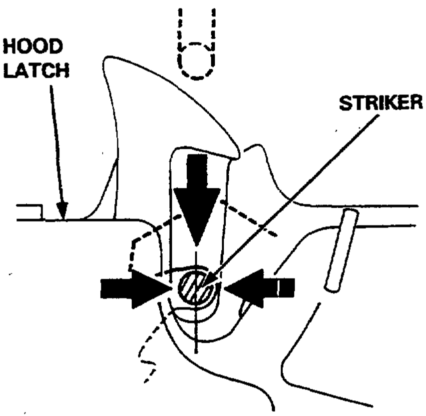
NOTE: Before adjusting the hood, loosen each bolt slightly.

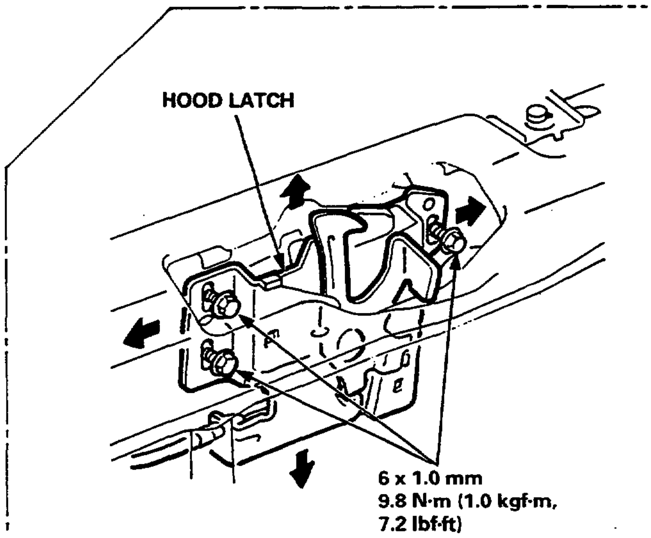
1. Adjust the hood hinges right and left, as well as fore and aft, by using the elongated holes.
2. Turn the hood edge cushions, as necessary, to make the hood fit flush with the body at front and side edges.
3. Adjust the hood latch to obtain the proper height at the forward edge.
4. After adjustment, tighten each bolt securely.





NOTE: Move the hood latch right or left until the striker is centered in the hood latch as shown.





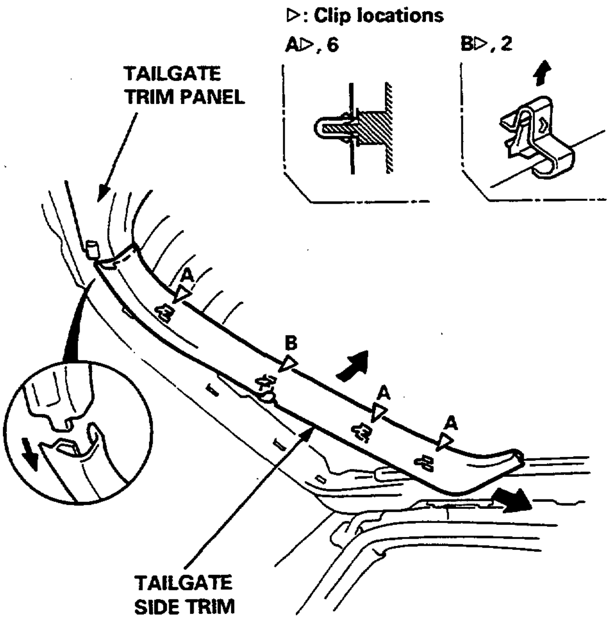
Tailgate

Replacement

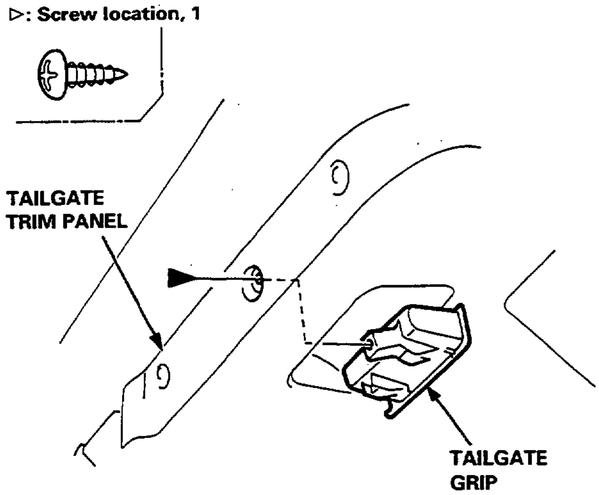
NOTE:

- An assistant is helpful when removing the tailgate.
- Take care not to damage the tailgate and body.
- Take care not to scratch the tailgate side trim and tailgate trim panel.
- Open the tailgate, then remove the rear shelf (see page 20-56).
- If so equipped, remove the tailgate spoiler (see page 20-102).

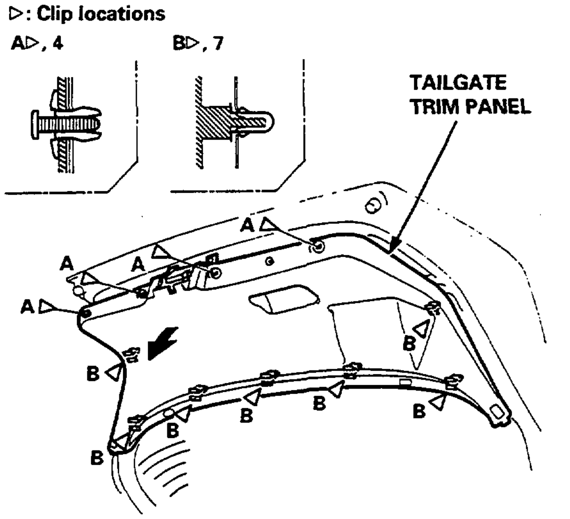
1. Remove the tailgate side trim on each side.



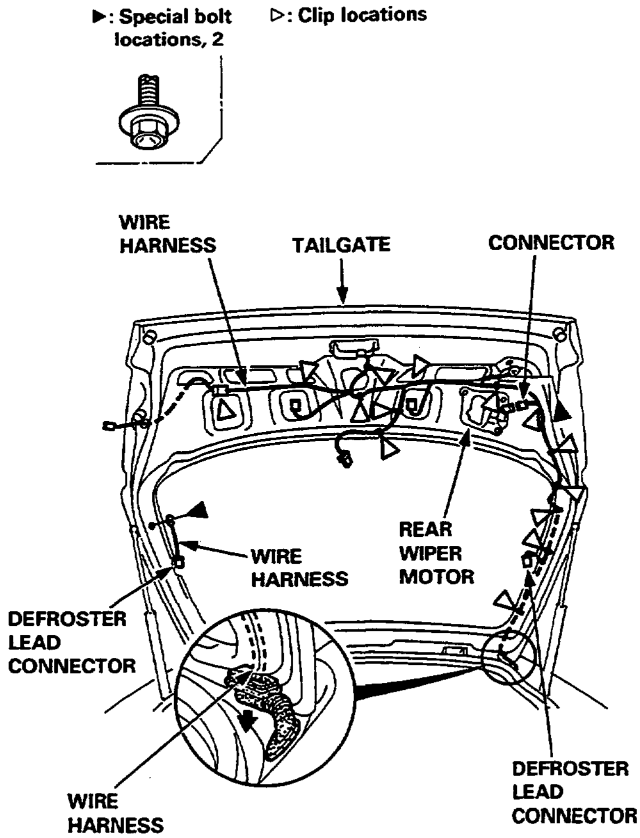
2. Remove the tailgate grip.



3. Remove the tailgate trim panel.



4. Disconnect the defroster lead connectors and rear wiper motor connector, then remove the wire harnesses from the tailgate.



5. Remove the rear window wiper motor (see page 20-100).

(cont'd)

Tailgate

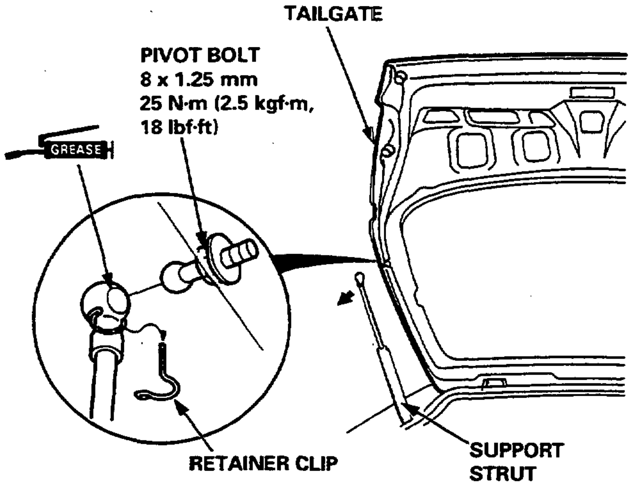
Replacement (cont'd)

6. Remove the upper portion of the rear pillar trim panel (see page 20-57).

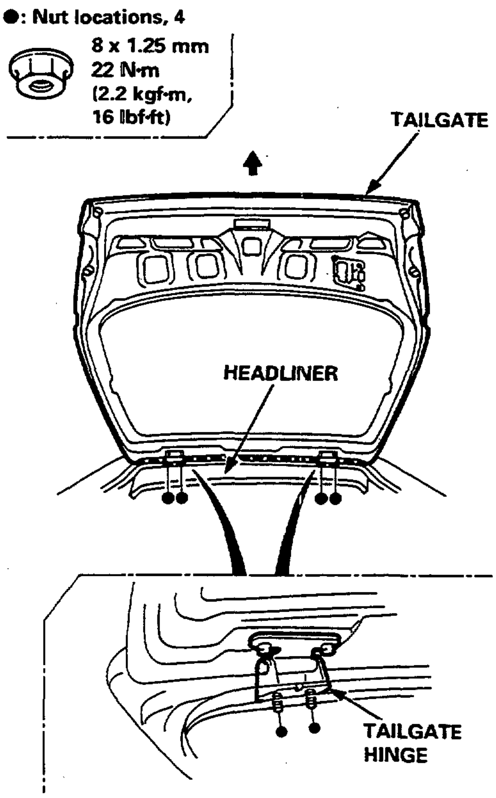
7. Remove the rear roof trim, then pull the rear of the headliner down (see page 20-59).

   NOTE: Take care not to bend the headliner.

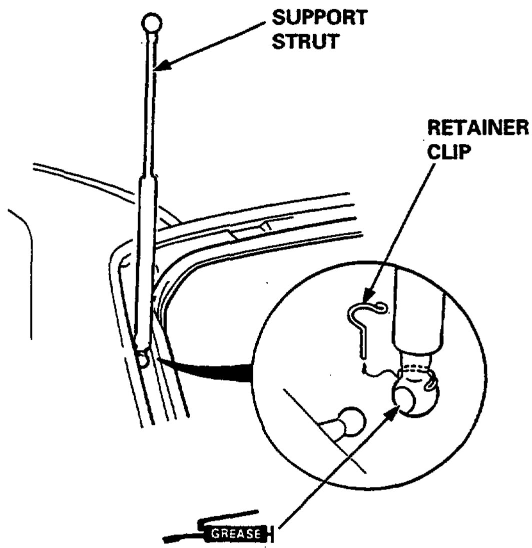
8. Remove the support strut on each side while holding the tailgate.



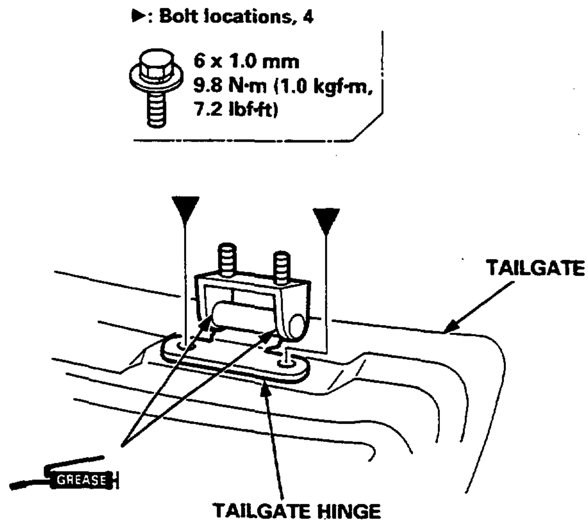
9. Remove the nuts, then remove the tailgate.



NOTE:
- If necessary, remove the support strut.



- If necessary, remove the tailgate hinge.



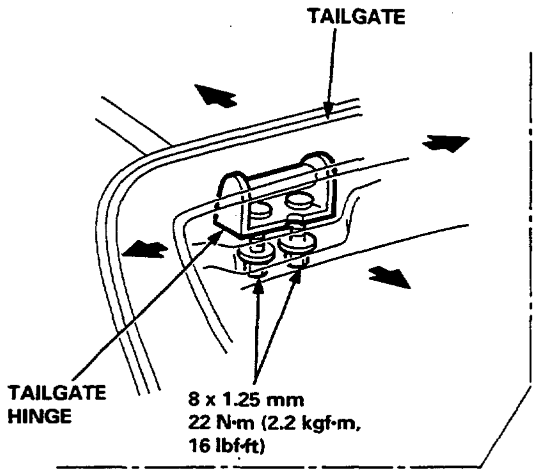
10. Installation is the reverse of the removal procedure.

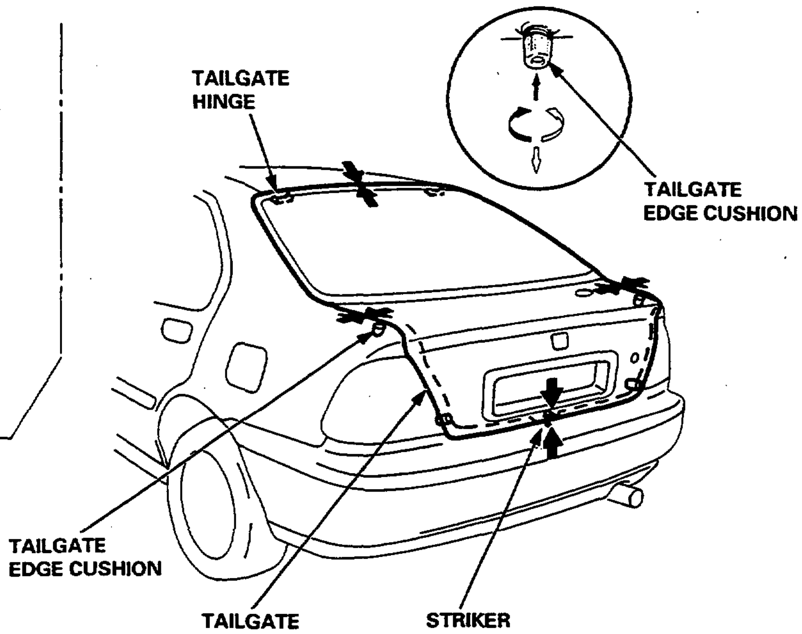
    NOTE:
    - If necessary, replace any damaged clips.
    - Make sure the connectors are connected properly.
    - Make sure the tailgate locks securely.
    - Make sure the tailgate opens properly.
    - Adjust the tailgate alignment (see page 20-93).

Adjustment

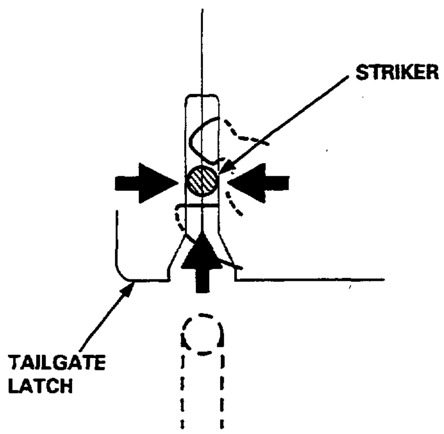
NOTE:
- Before adjusting the tailgate, loosen each bolt and nut slightly.
- Do not install the support struts.

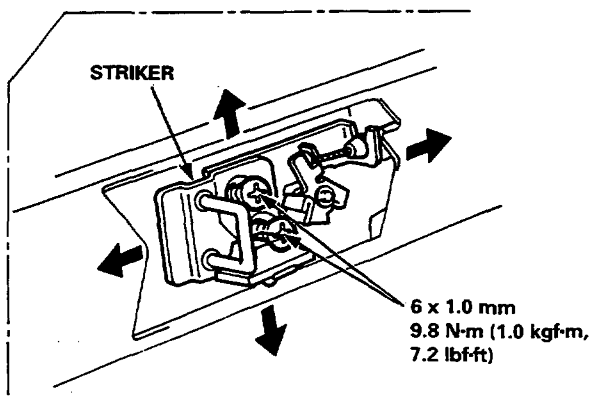
1. Adjust the tailgate hinges right and left, as well as fore and aft, by using the elongated holes.
2. Turn the tailgate edge cushions, as necessary, to make the tailgate fit flush with the body at each side.
3. Adjust the tailgate fit to the tailgate opening by moving the striker.
4. After adjustment, tighten each bolt and nut securely.





NOTE: Move the striker right or left until it's centered in the tailgate latch, as shown.





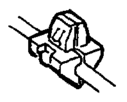
Opener Cables

Replacement

NOTE:
- When removing the clips, use a clip remover.
- Take care not to bend the opener cables.

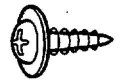
Hood Opener Cable:

A▷, LHD: 7
RHD: 5

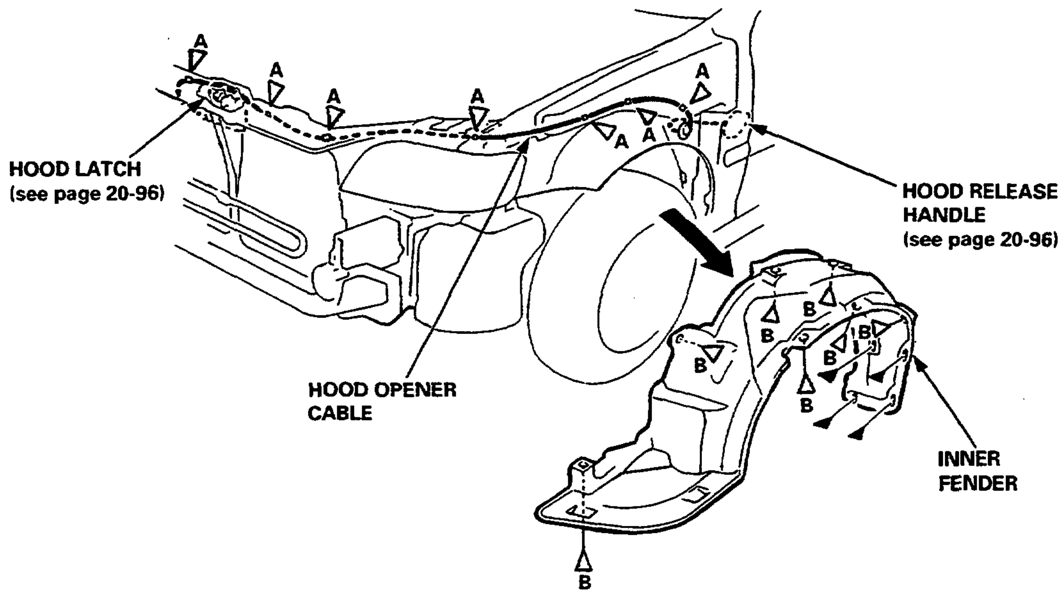


B▷, 7

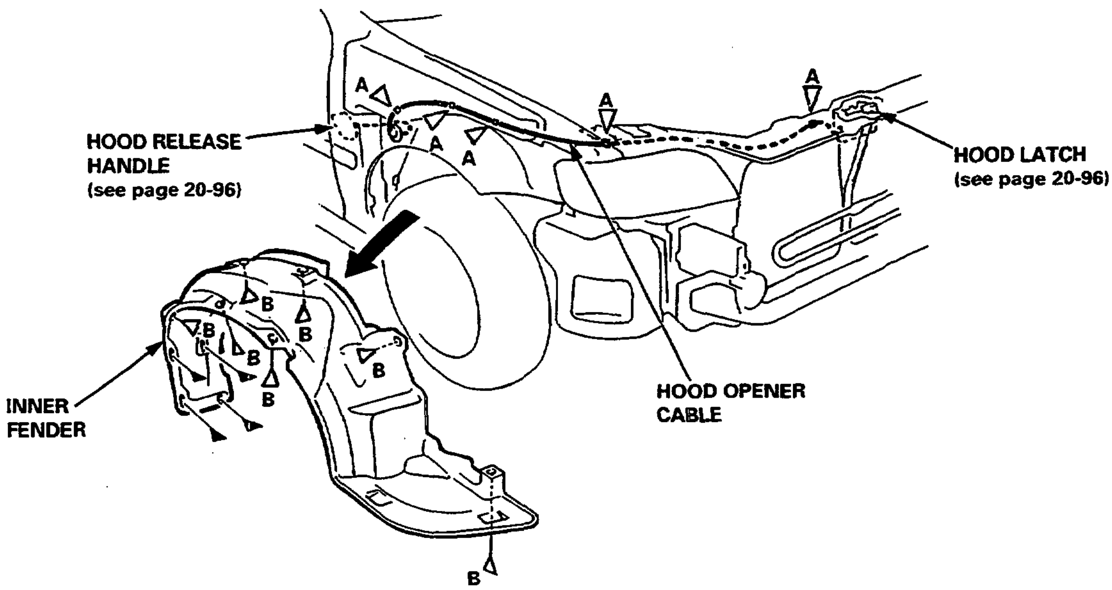
▶: Screw locations, 4



LHD:



RHD:



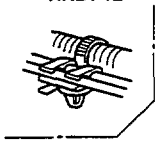
Tailgate/Fuel Lid Opener Cables:

Remove the following parts:

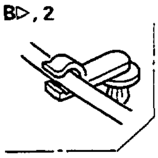
- Rear Seat-back and rear seat cushion (see page 20-66)
- Front and rear door sill moldings (see pages 20-55, 57)
- Center pillar lower trim (see page 20-56)
- Rear carpet (see page 20-76) and trunk mat (see page 20-58)
- Rear shelf, rear side shelf and rear seat side trim (see pages 20-56, 57)
- Rear trim panel and trunk side panel (see page 20-58)
- Pull the carpet back, as necessary (see page 20-75)

▷: Clip, cable cushion locations

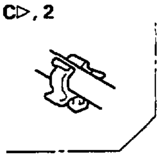
A▷, LHD: 9
RHD: 12



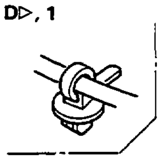
B▷, 2



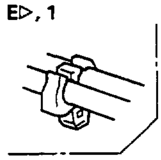
C▷, 2



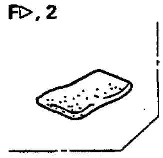
D▷, 1



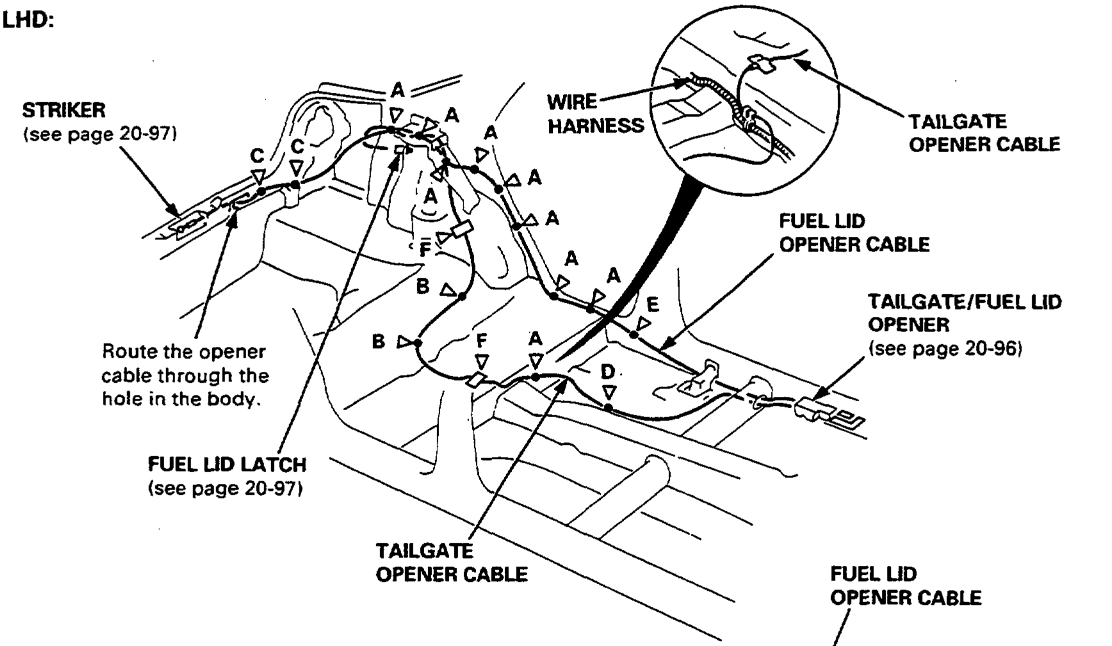
E▷, 1



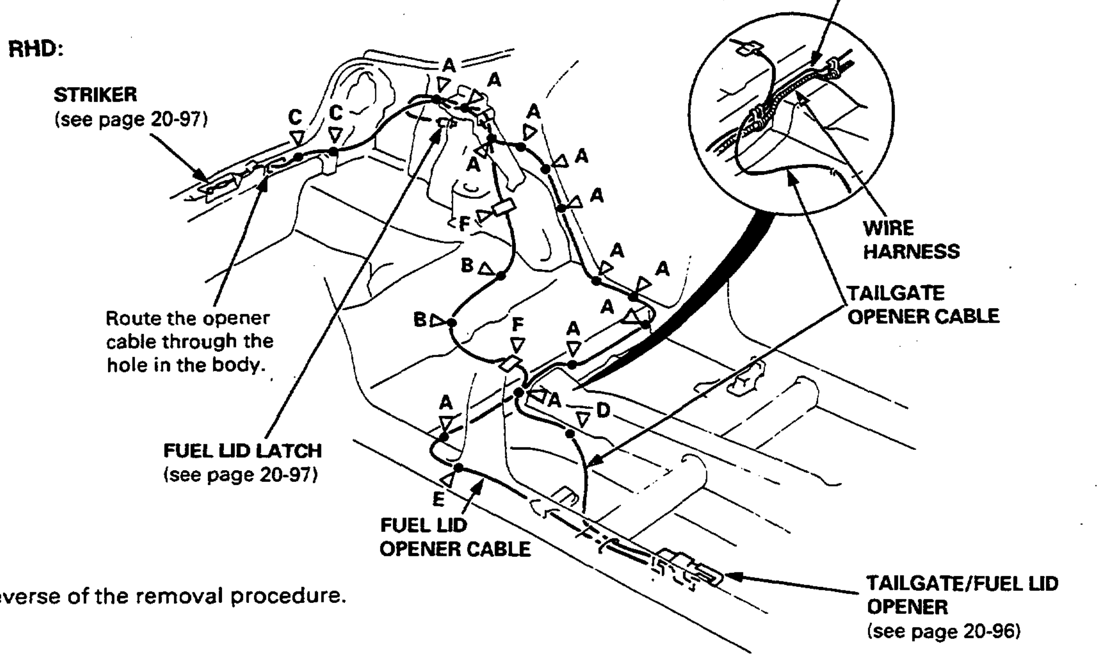
F▷, 2



LHD:



RHD:



Installation is the reverse of the removal procedure.

NOTE:

- Make sure each opener cable is routed and connected properly.
- Make sure the hood, tailgate and fuel lid open properly.

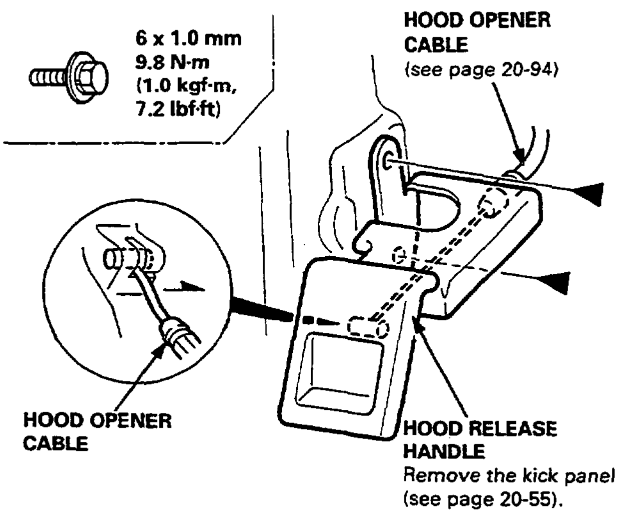
Opener and Latch

Replacement

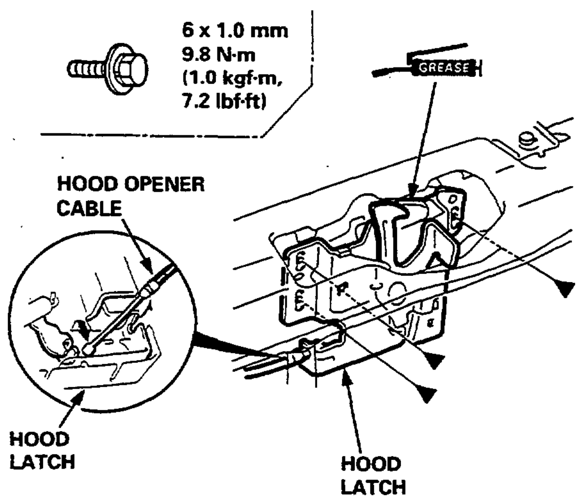
NOTE: Take care not to bend the opener cables.

Hood Release Handle:

NOTE: LHD is shown, RHD is symmetrical.

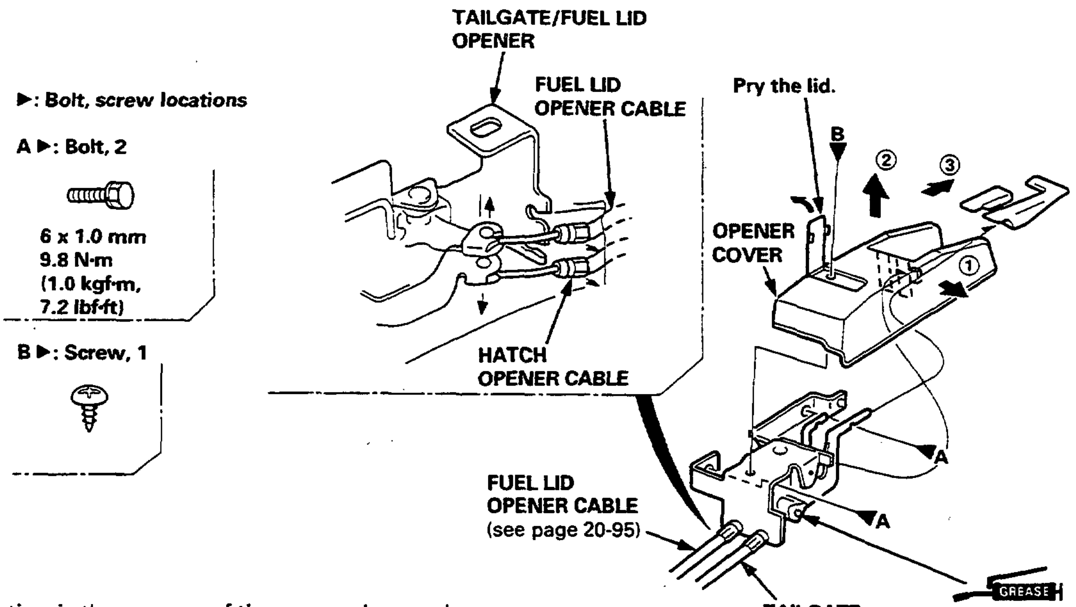


Hood Latch:



Tailgate/Fuel Lid Opener:

NOTE: LHD is shown, RHD is symmetrical.



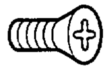
Installation is the reverse of the removal procedure.

NOTE:
- Make sure each opener cable is connected properly.
- Make sure the hood locks securely.
- Make sure the hood, tailgate and fuel lid open properly.

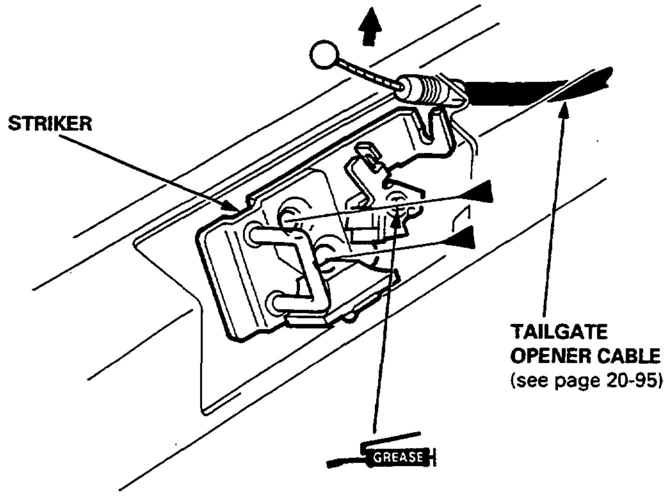
NOTE: Take care not to bend the opener cables.

Striker:

▶: Screw locations, 2

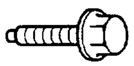


6 x 1.0 mm
9.8 N·m
(1.0 kgf·m,
7.2 lbf·ft)

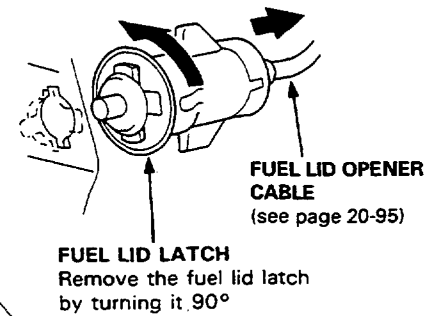


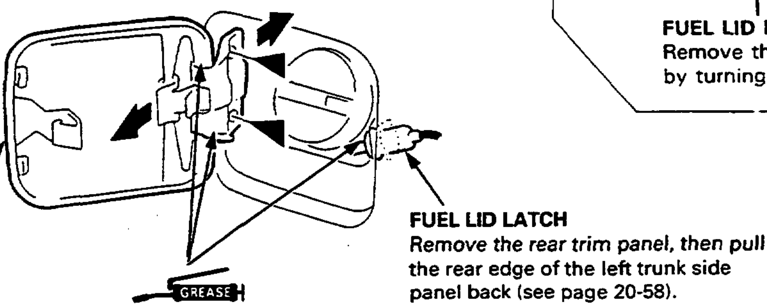
Fuel Lid Latch:

▶: Bolt locations, 2



6 x 1.0 mm
9.8 N·m (1.0 kgf·m,
7.2 lbf·ft)





Installation is the reverse of the removal procedure.

NOTE:
- Make sure each opener cable is connected properly.
- Make sure the tailgate and fuel lid lock securely.
- Make sure the tailgate and fuel lid open properly.

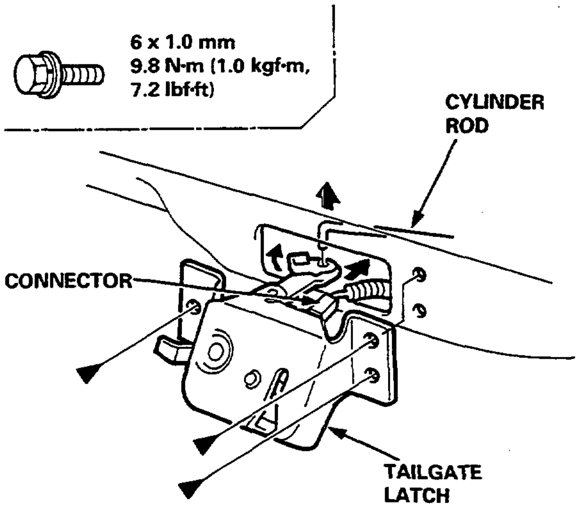
Tailgate Latch and Lock Cylinder

Replacement

NOTE: Take care not to bend the cylinder rod.

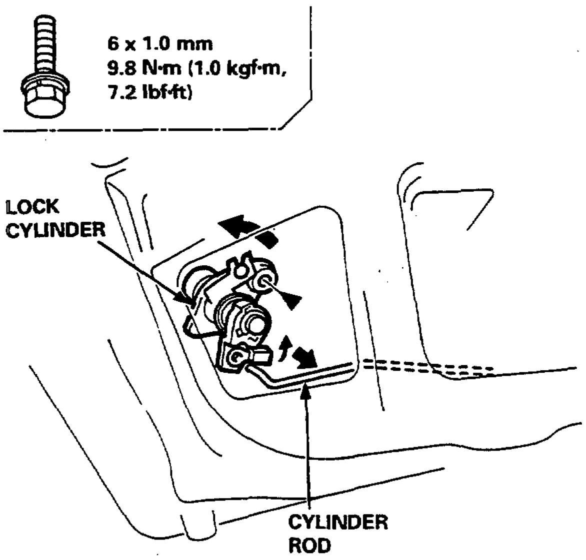
1. Remove the tailgate side trim on each side and tailgate trim panel (see page 20-91).
2. Remove the bolts, then pull the tailgate latch. Disconnect the cylinder rod and connector.

▶: **Bolt locations, 3**

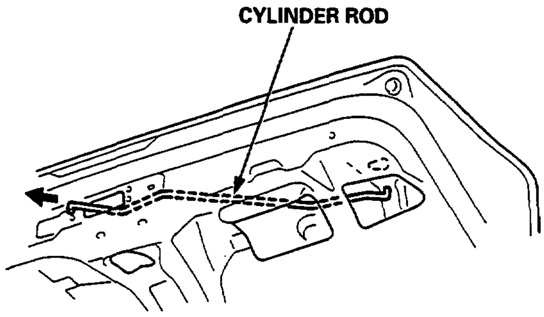


3. Disconnect the cylinder rod from the lock cylinder.
4. Remove the bolt, then pull the lock cylinder out.

▶: **Bolt location, 1**

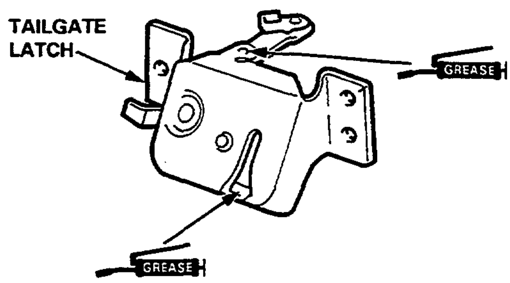


5. Pull the cylinder rod out.



6. Installation is the reverse of the removal procedure.

NOTE:
- Apply grease to the tailgate latch.



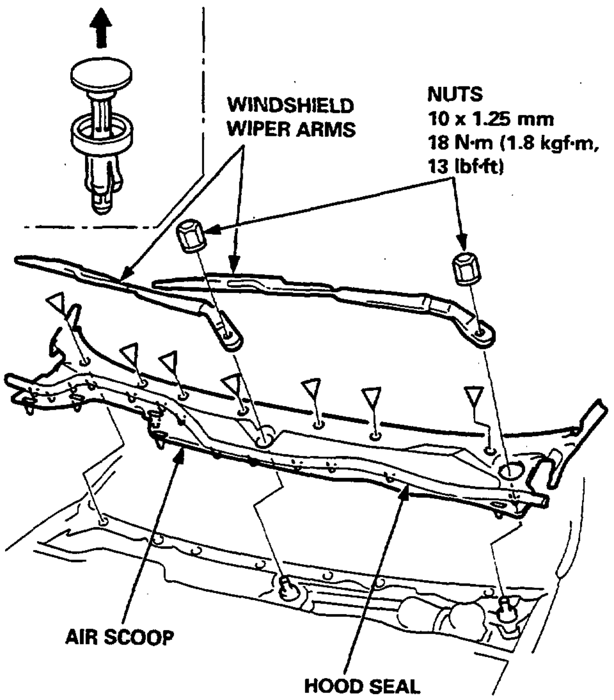
- Make sure the tailgate locks securely.
- Make sure the tailgate opens properly.
- Make sure the connector is connected properly.

Windshield Wiper Motor Replacement

NOTE:
- Take care not to damage the hood.
- Open the hood.

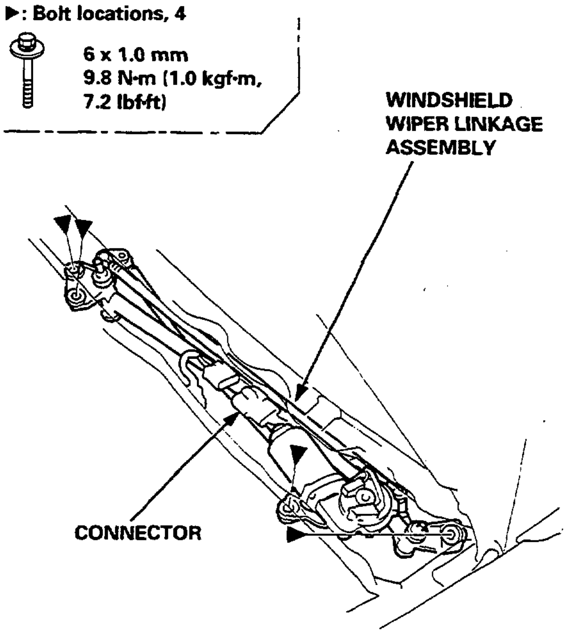
1. Remove the windshield wiper arms, then remove the hood seal and air scoop.

▷: Clip locations, 7



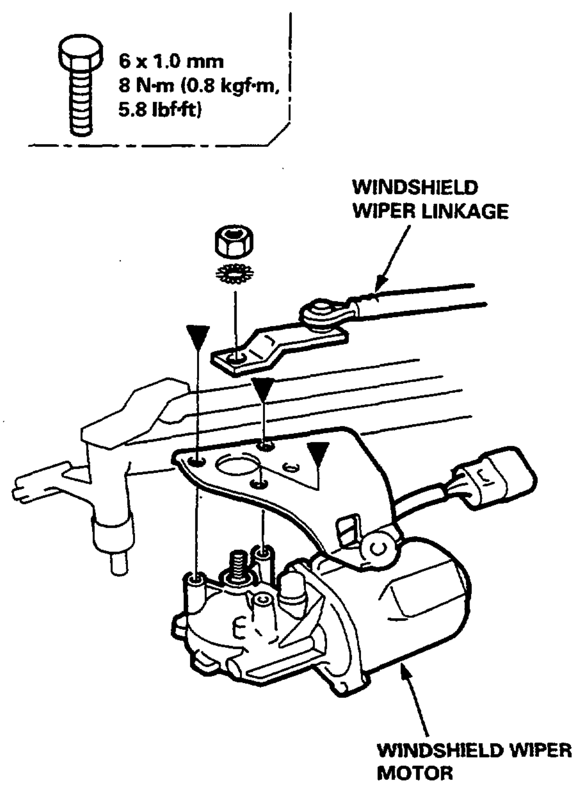
2. Disconnect the connector, then remove the windshield wiper linkage assembly.

▶: Bolt locations, 4



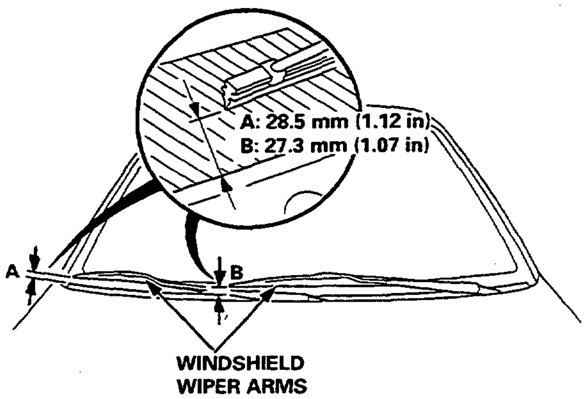
3. Separate the windshield wiper linkage and windshield wiper motor.

▶: Bolt locations, 3



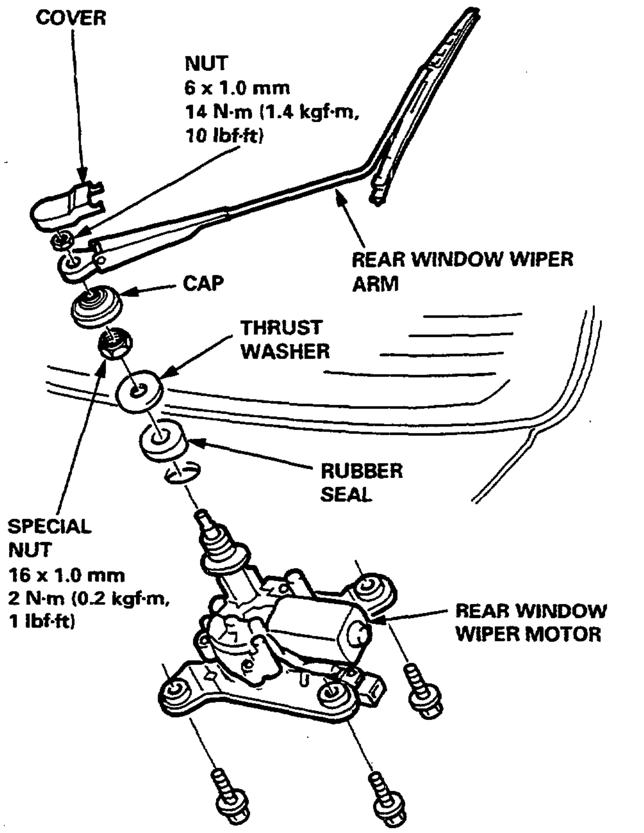
4. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the connector is connected properly.
- If necessary, replace any damaged clips.
- Install the windshield wiper arms as shown below.
- Check the windshield wiper motor operation.



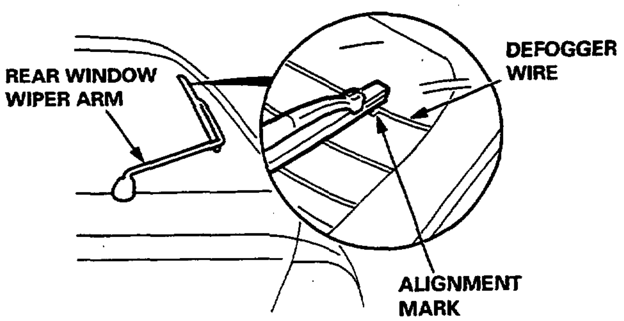
Rear Window Wiper Motor Replacement

1. Remove the tailgate trim panel (see page 20-91).
2. Remove the rear window wiper arm and wiper motor as shown.



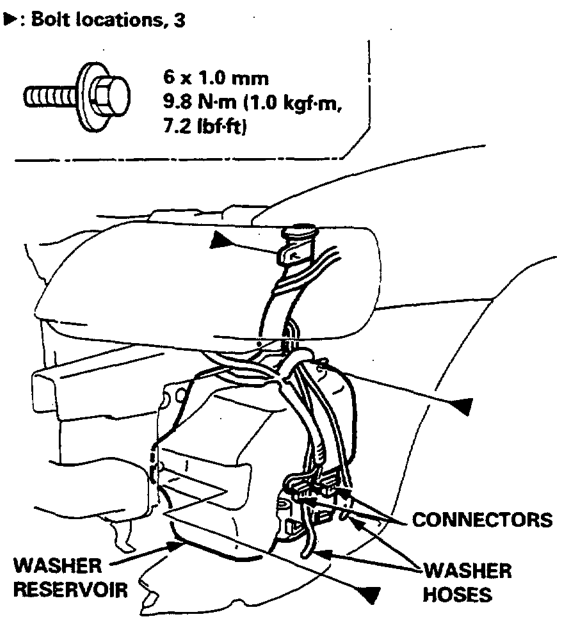
3. Installation is the reverse of the removal procedure.

NOTE:
- Make sure the connector is connected properly.
- Install the rear window wiper arm as shown below.
- Check the rear window wiper motor operation.



Washer Reservoir Replacement

1. Remove the front bumper (see page 20-87).
2. Disconnect the connectors and washer hoses from the washer motors.
3. Remove the bolts, then remove the washer reservoir.

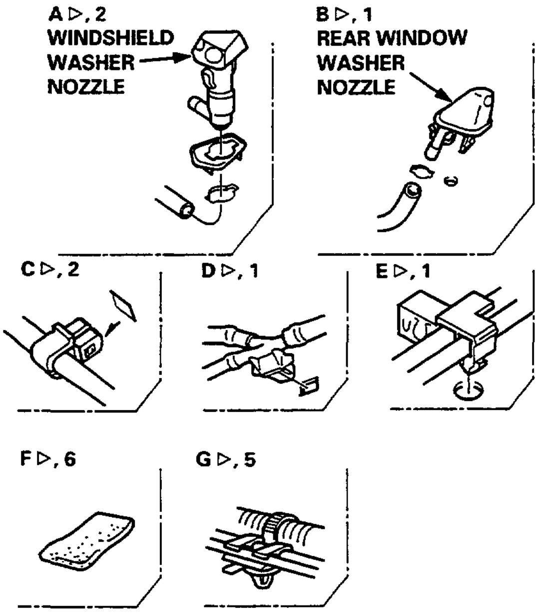


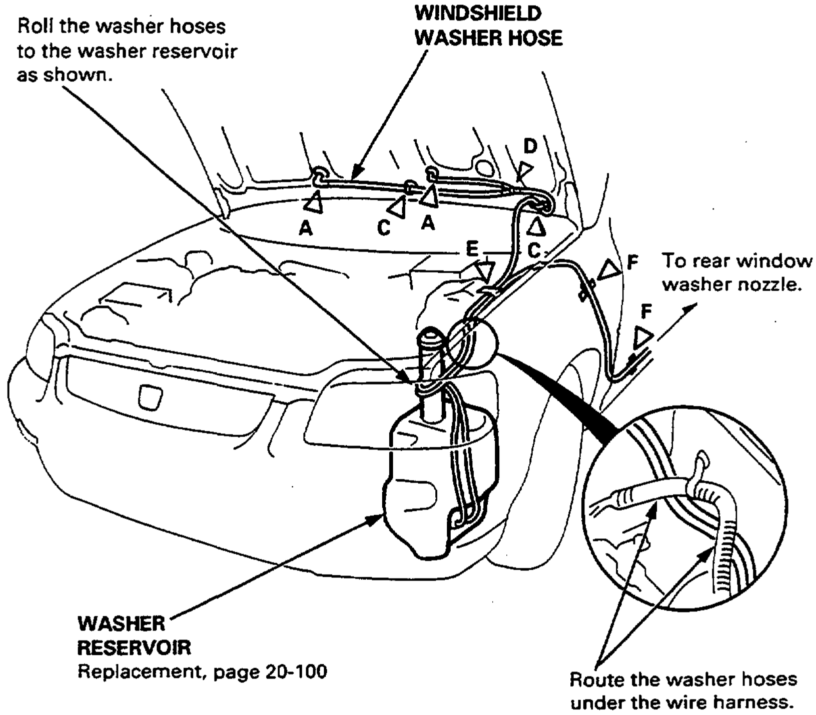
4. Installation is the reverse of the removal procedure.

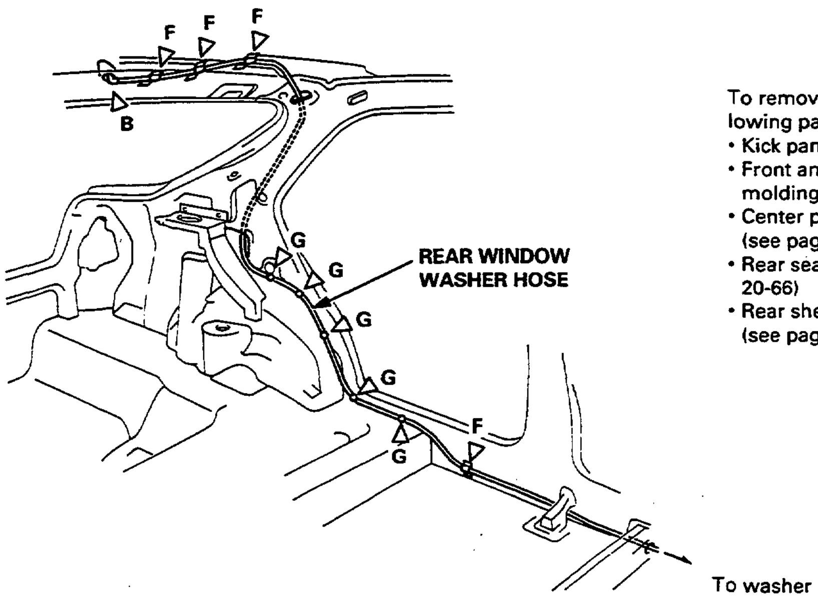
NOTE:
- Make sure the connectors and washer hoses are connected properly.
- Check the washer motor operation.

Washer Hose Replacement

▷: Washer nozzle, clip and hose cushion locations







To remove the rear window washer hose, frirst remove the following parts.

- Kick panel (see page 20-55)
- Front and rear door sill molding (see pages 20-55, 57)
- Center pillar lower trim (see page 20-56)
- Rear seat-back (see page 20-66)
- Rear shelf and rear side shelf (see page 20-56)
- Rear seat side trim (see page 20-57)
- Rear pillar trim panel (see page 20-57)
- Rear edge of the headliner (see page 20-59)
- Carpet as necessary (see page 20-75)

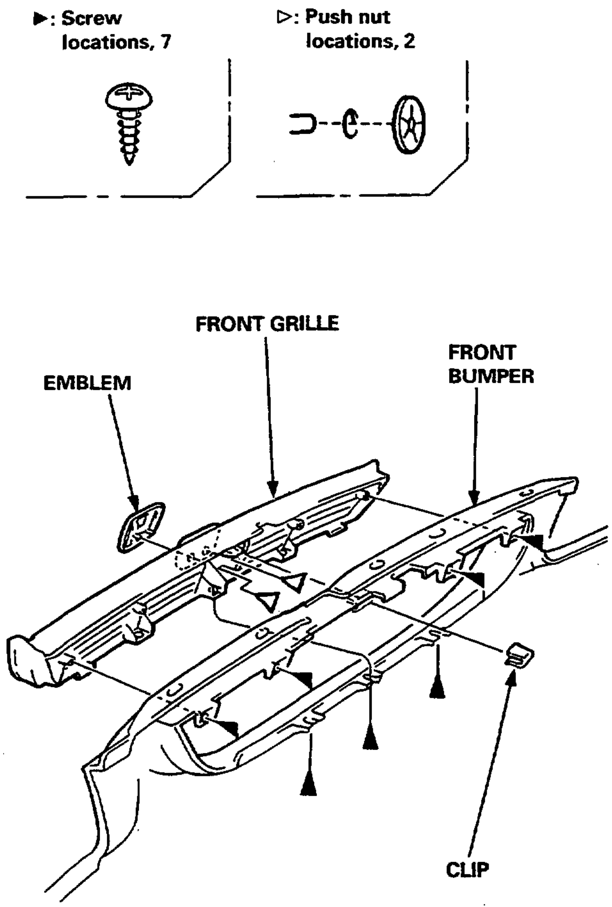
Installation is the reverse of the removal procedure.

NOTE:
- Take care not to pinch the washer hoses.
- If necessary, replace any damaged clips.
- After installing, adjust the aim of the washer nozzles.

Front Grille

Replacement

NOTE:
- Take care not to scratch the front bumper.
- Remove the front bumper (see page 20-87).



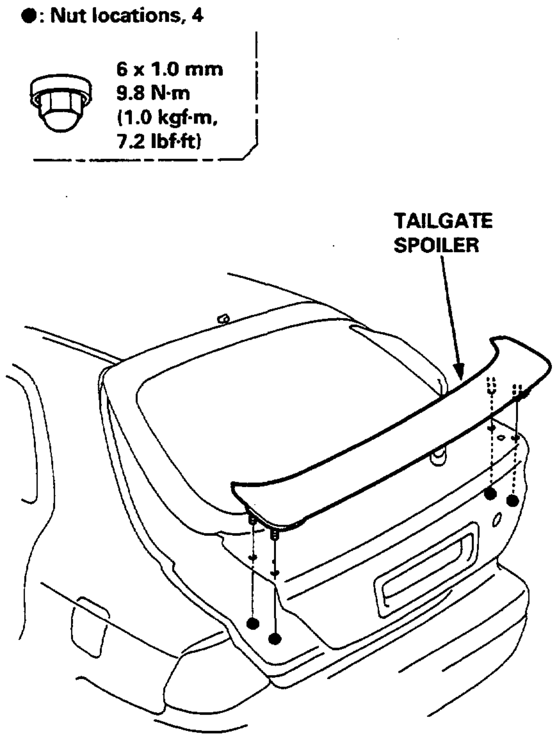
Installation is the reverse of the removal procedure.

Tailgate Spoiler

Replacement

NOTE:
- Take care not to scratch the tailgate.
- An assistant is helpful when removing the tailgate spoiler.

1. Open the tailgate, then remove the nuts while holding the tailgate spoiler.
2. Remove the tailgate spoiler by lifting it up.



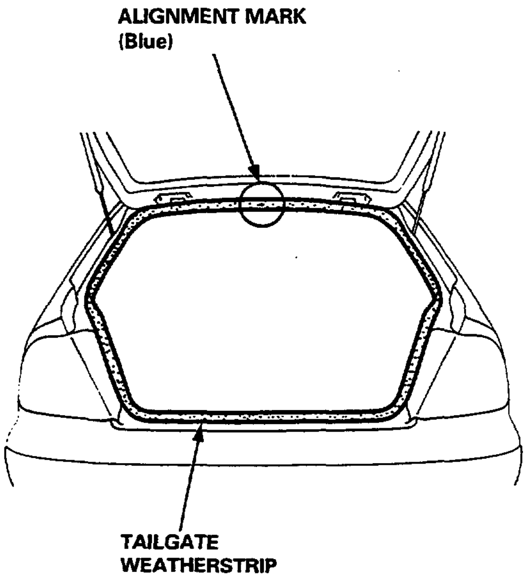
3. Installation is the reverse of the removal procedure.

Tailgate Weatherstrip

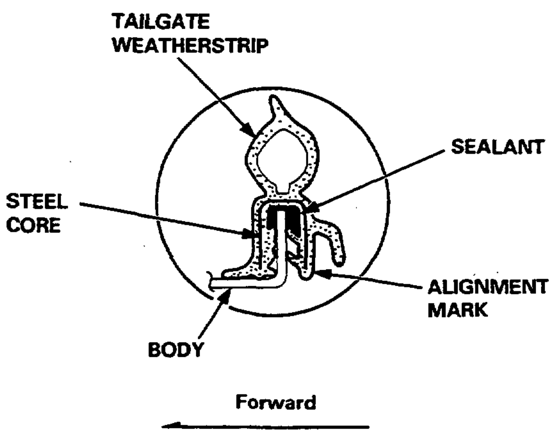
Replacement

When installing the tailgate weatherstrip, align it with the alignment mark on the tailgate opening.

NOTE:
- Before installing the tailgate weatherstrip, apply clear sealant in its channel at all around.
- Make sure there are no wrinkles in the weatherstrip.
- Check for water leaks.



Sealant: Cemedine #8500, or equivalent



License Plate Trim

Replacement

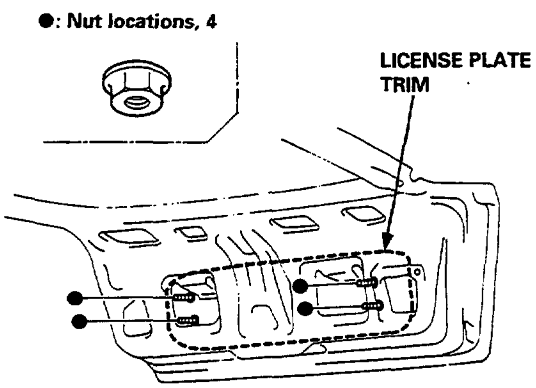
CAUTION: Wear gloves to remove and install the license plate trim.

NOTE: Take care not to scratch the tailgate.

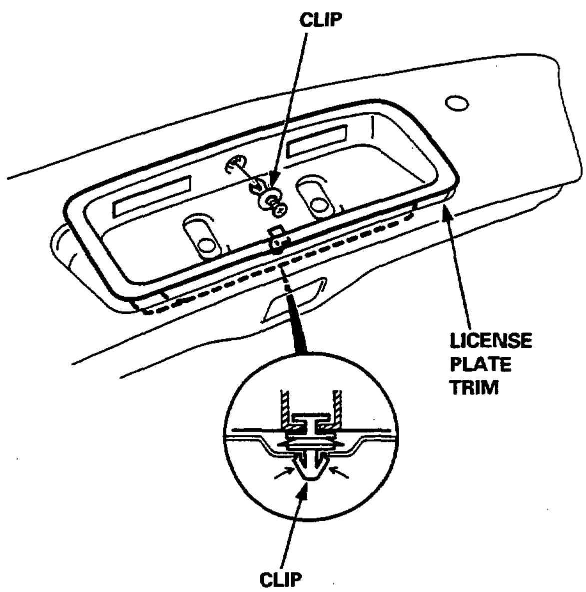
1. Remove:
   - Tailgate side trims (see page 20-91)
   - Tailgate trim panel (see page 20-91)
   - Tailgate latch (see page 20-98)

2. Remove the nuts.

   NOTE: Take care not to drop the nuts inside the trunk lid.



3. Detach the clips, then remove the license plate trim.



4. Installation is the reverse of the removal procedure.

   NOTE: If damaged, replace the clip.

Roof Molding

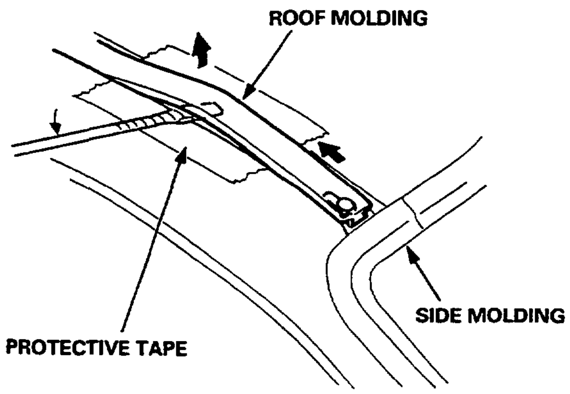
Replacement

CAUTION: When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.

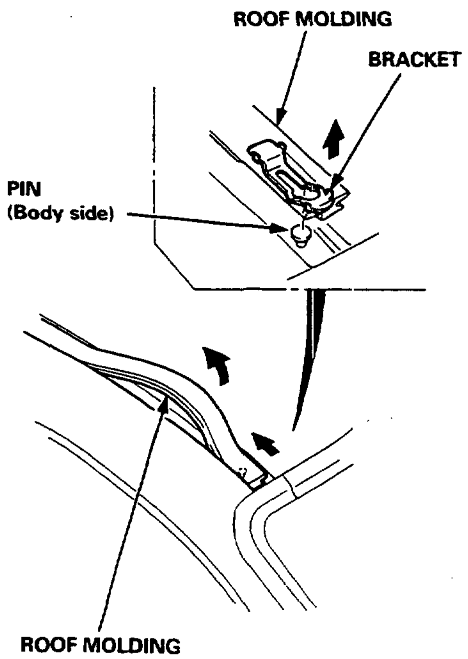
NOTE: Take care not to scratch the body and roof molding.

1. Pry the roof molding with a flat tip screwdriver as shown.

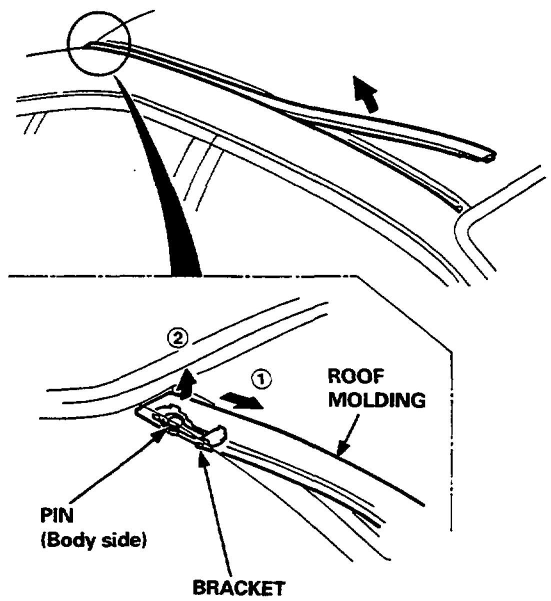
   CAUTION: Use protective tape on the body.



2. Pull and slide the roof molding, then detach the bracket on the end of the roof molding from the pin.

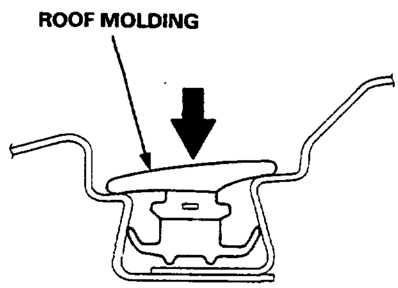


3. Pull the roof molding up, detach the bracket from the pin, then remove the roof molding.



4. Installation is the reverse of the removal procedure.

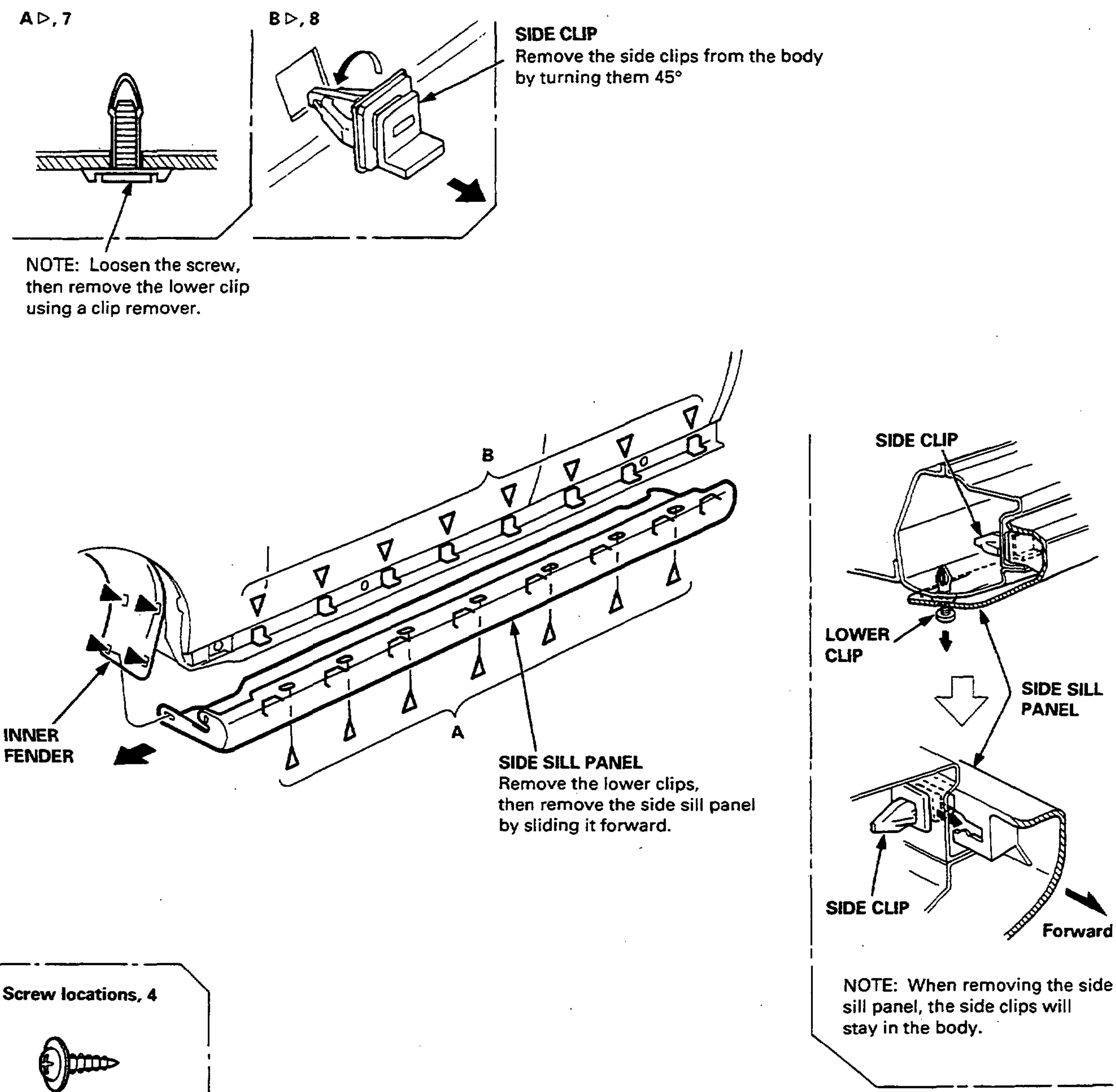
   NOTE:
   - Take care not to damage the windshield side molding.
   - Make sure the roof molding is installed securely.



Side Sill Panel

Replacement

▷: Clip locations



▶: Screw locations, 4

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.

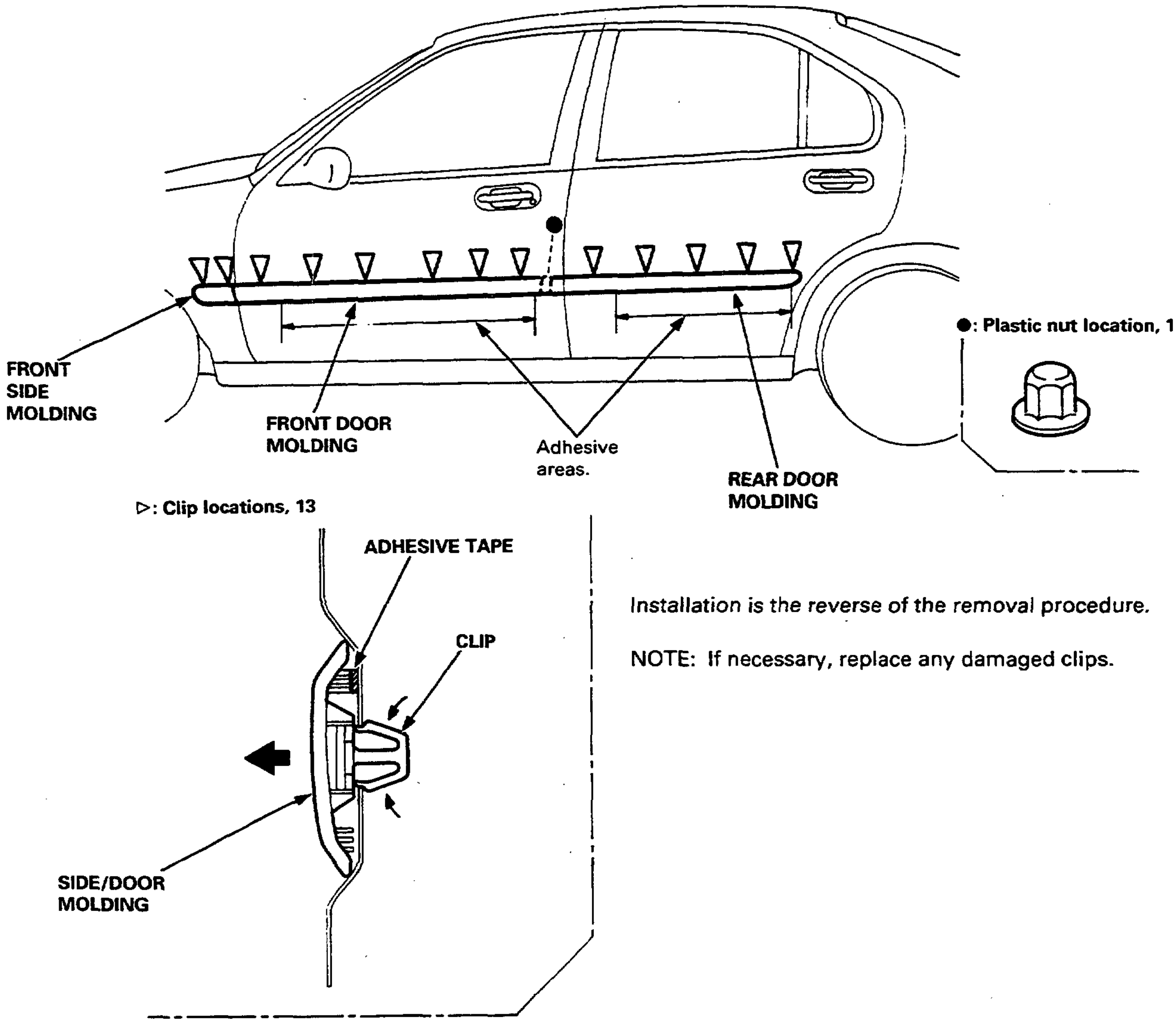
NOTE:
- Take care not to twist the side sill panel.
- If necessary, replace any damaged side and lower clips.

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 front side molding, remove the inner fender (see page 20-94).
- To remove the door molding, remove the door panel and plastic cover (see pages 20-4, 16).
- Take care not to bend the door moldings.
- 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.



Installation is the reverse of the removal procedure.

NOTE: If necessary, replace any damaged clips.

Door Moldings

Removal

The following materials and tools are required to repair the door moldings.

NOTE: Follow the manufacturer's instructions.

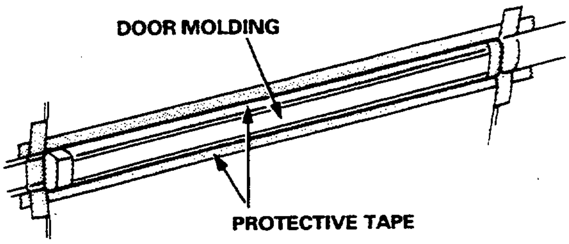
Materials: (Reference)
- Stripe remover
  3M 08907
- Stripe adhesive remover
  3M 08908
- Adhesive tape
  3M Super Automotive Attachment Tape

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 moldings.

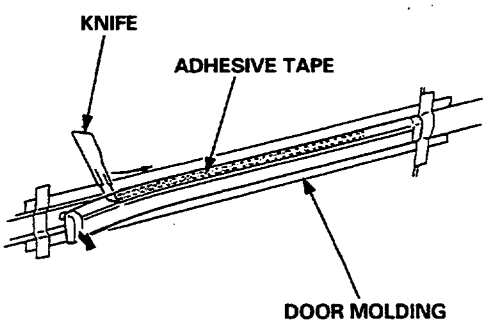
1. Remove the door panel and pull back the plastic cover (see pages 20-4, 16).

2. Apply protective tape on and around the molding.

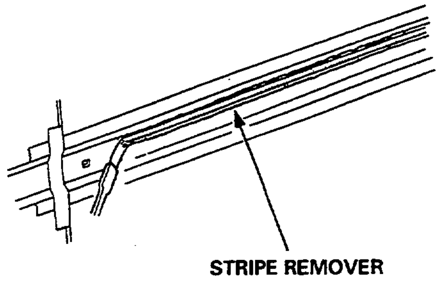


3. Release the clips from inside of the door.
   Carefully cut the adhesive tape with a knife or cutter while pulling the edge of the molding away from the door as shown.

   NOTE: Take care not to scratch or bend the molding.

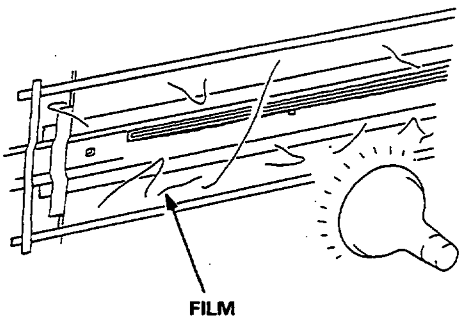


4. Apply the stripe remover evenly to the bonding surface of the door.

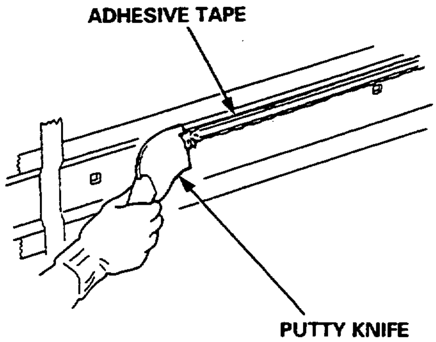


5. Cover the bonding surface of the door with a film, then heat to 40 – 50°C (104 – 122°F) for 5 – 10 minutes with an infrared dryer.

   NOTE: Use care when heating to prevent deformation of the door.



6. Scrape the adhesive tape with a putty knife.



(cont'd)

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.

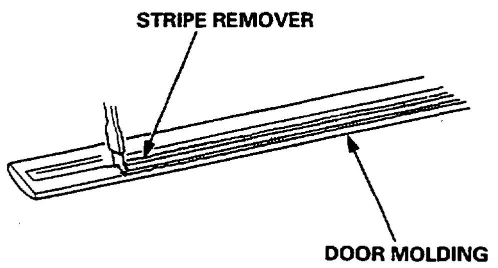
8. Peel off the protective tape, then clean the bonding surface with a sponge dampened in alcohol.

   NOTE: Make sure the bonding surface is kept free or water, oil and grease.

9. Remove the clips from the molding.

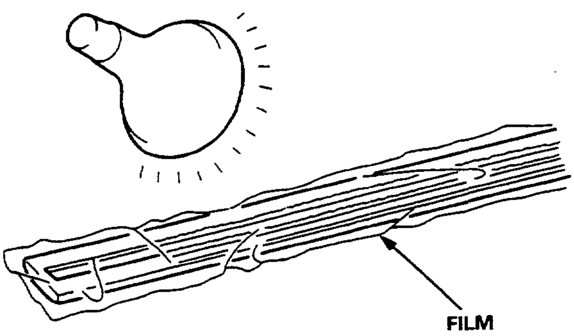
   NOTE: If necessary, replace any damaged clips.

10. Apply the stripe remover evenly to the bonding surface of the molding.

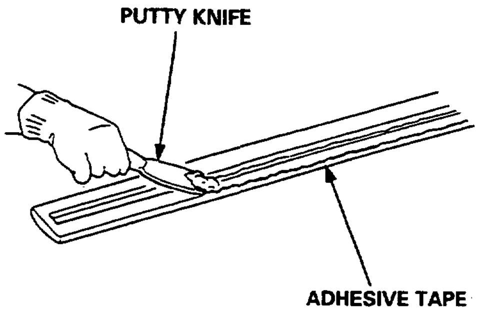


11. Wrap the molding with film, then heat to 40 – 50°C (104 – 122°F) for 5 – 10 minutes with an infrared dryer.

    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.

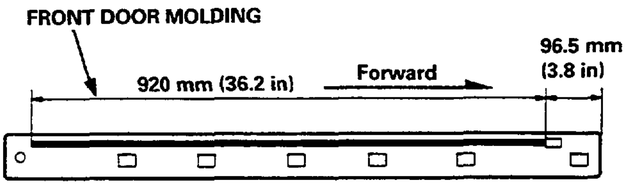
14. Peel off the protective tape, then clean the molding with a sponge dampened in alcohol.

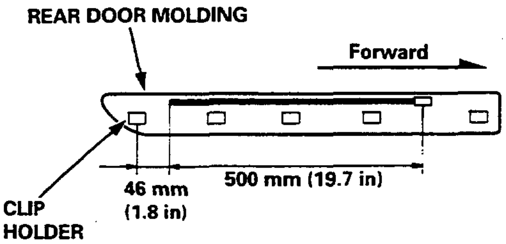
    NOTE: Make sure the bonding surface is kept free of water, oil and grease.

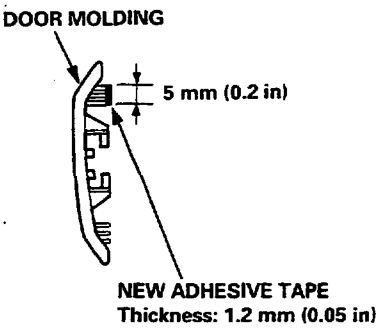
Installation

1. Glue the new adhesive tape to the moldings 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

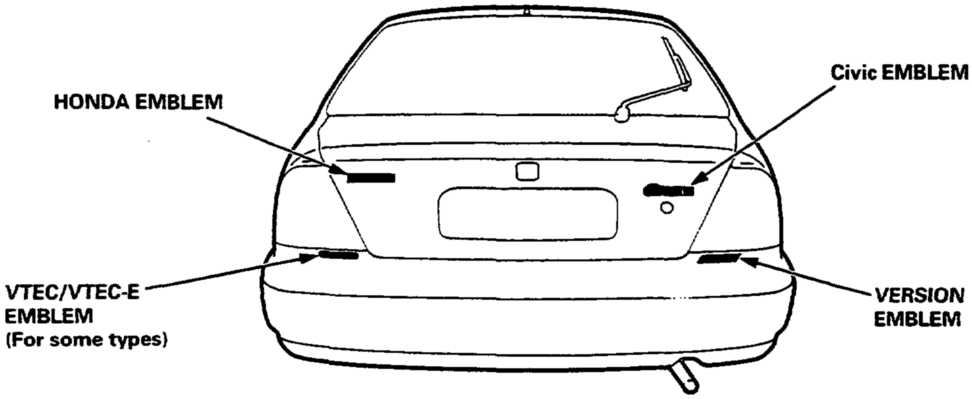
Installation

Apply the rear emblems where shown.

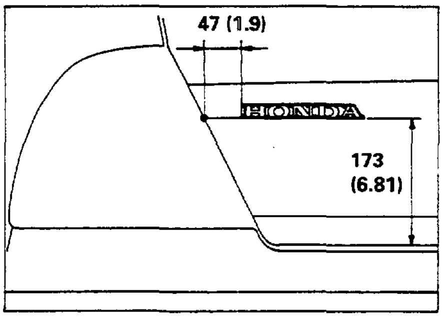
NOTE:
- Before applying, clean the body surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.
- When applying, make sure there are no wrinkles in the rear emblems.

Attachment Points (Reference):

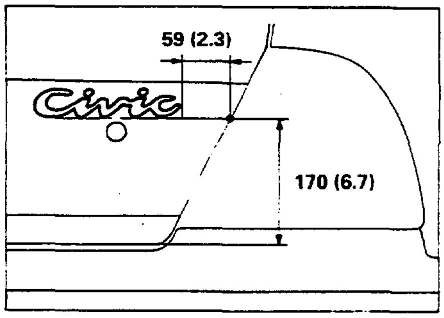
Unit: mm (in)



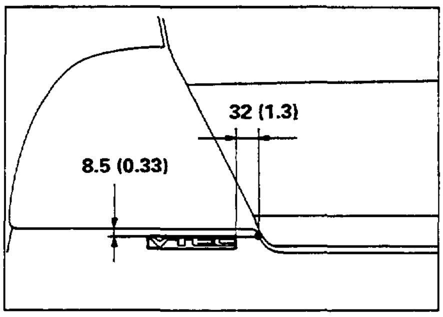
HONDA Emblem



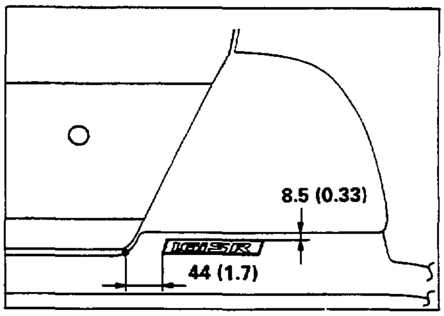
Civic Emblem



VTEC/VTEC-E Emblem

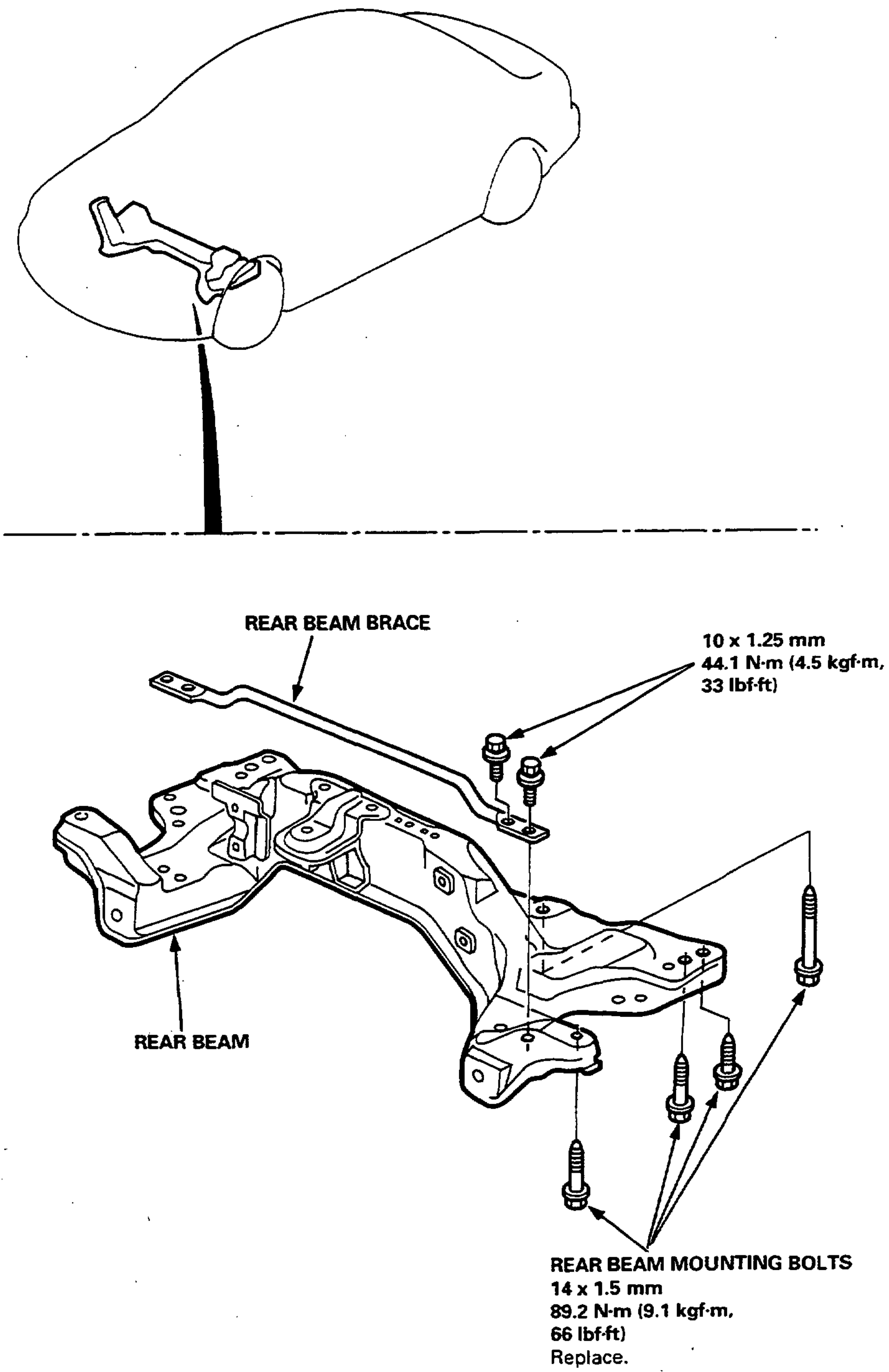


Version Emblem



Sub-frame Torque Sequence:

CAUTION: After loosening the rear beam mounting bolts, be sure to replace them with new ones.

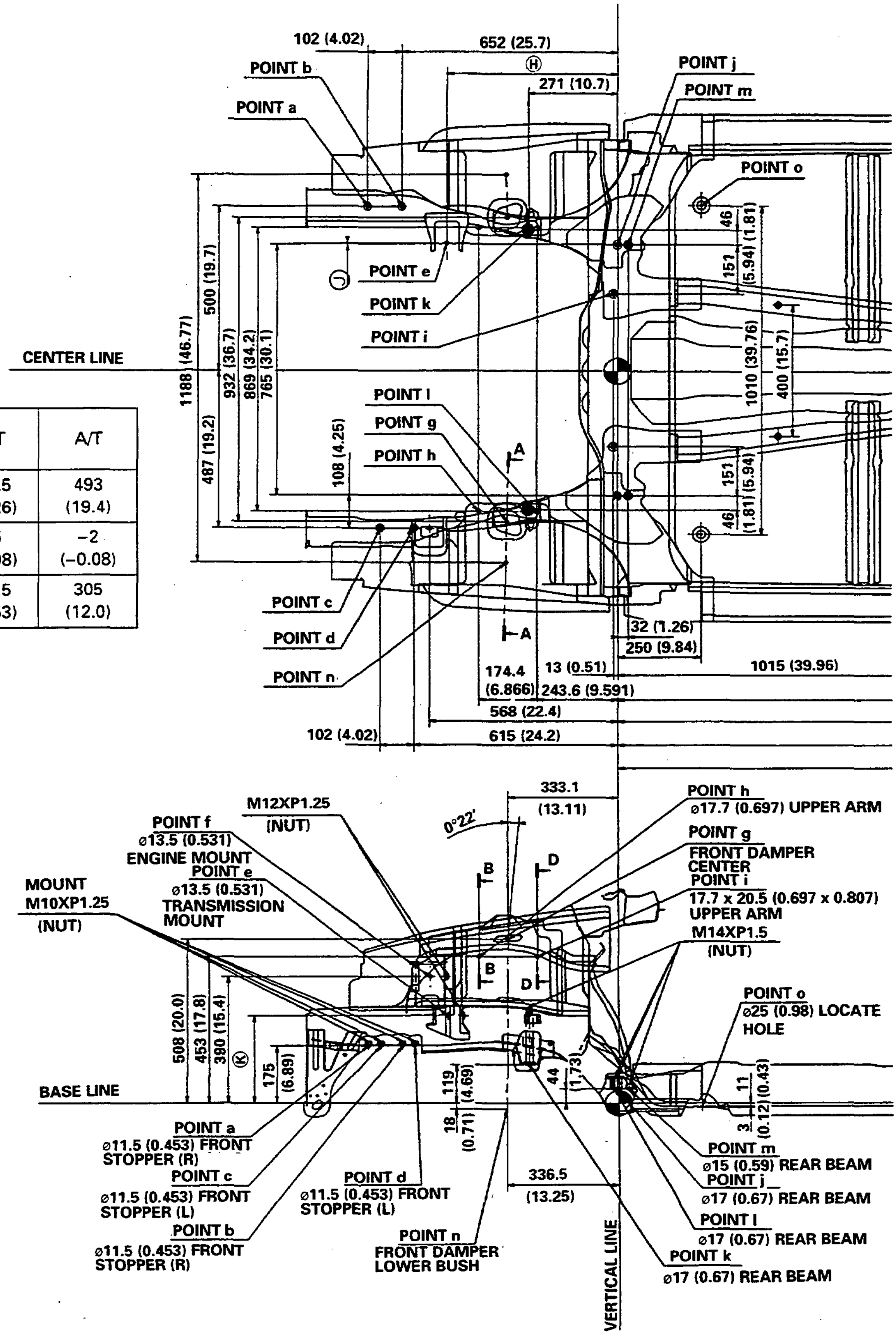


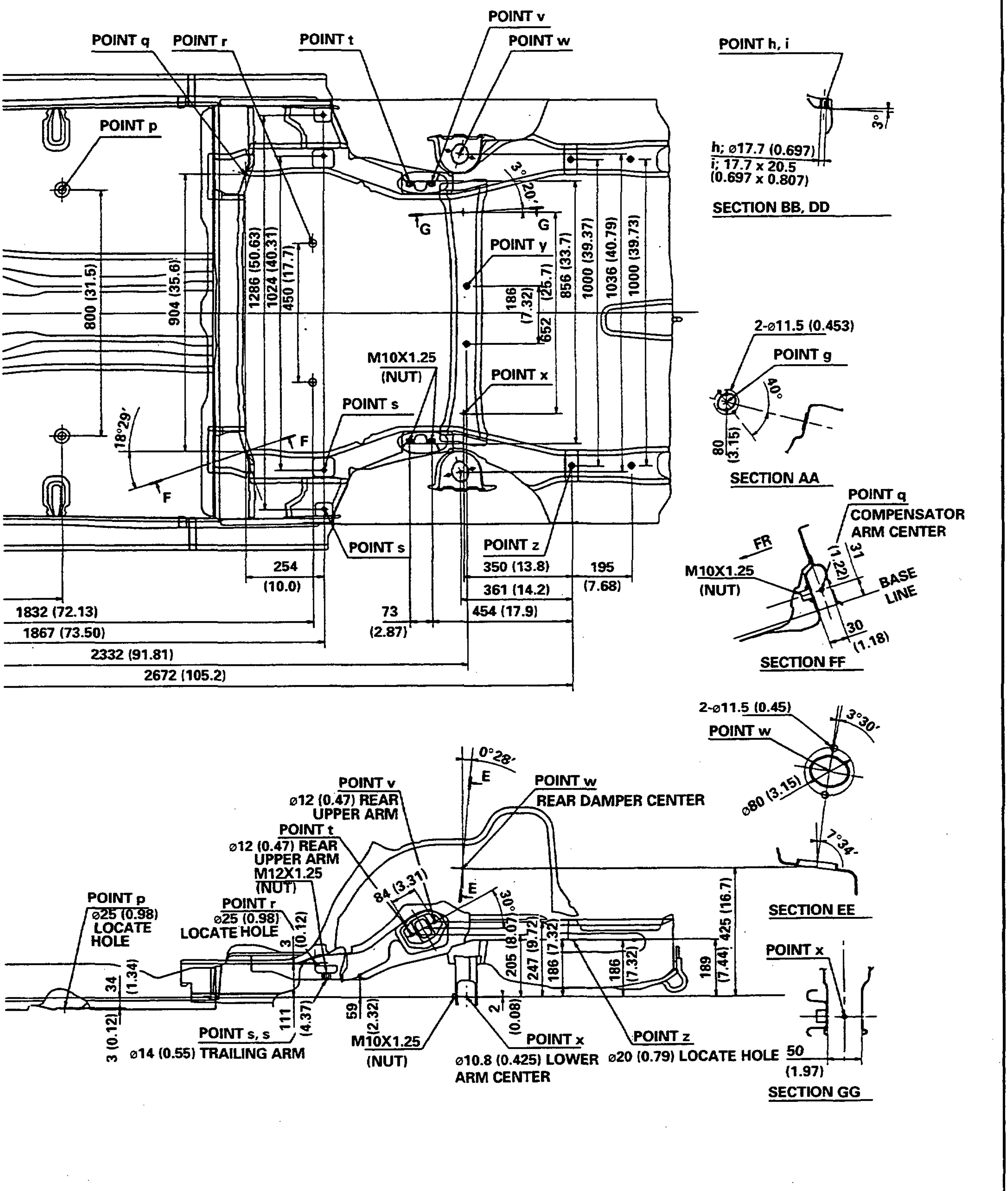
Frame Repair Chart

Unit: mm (in)

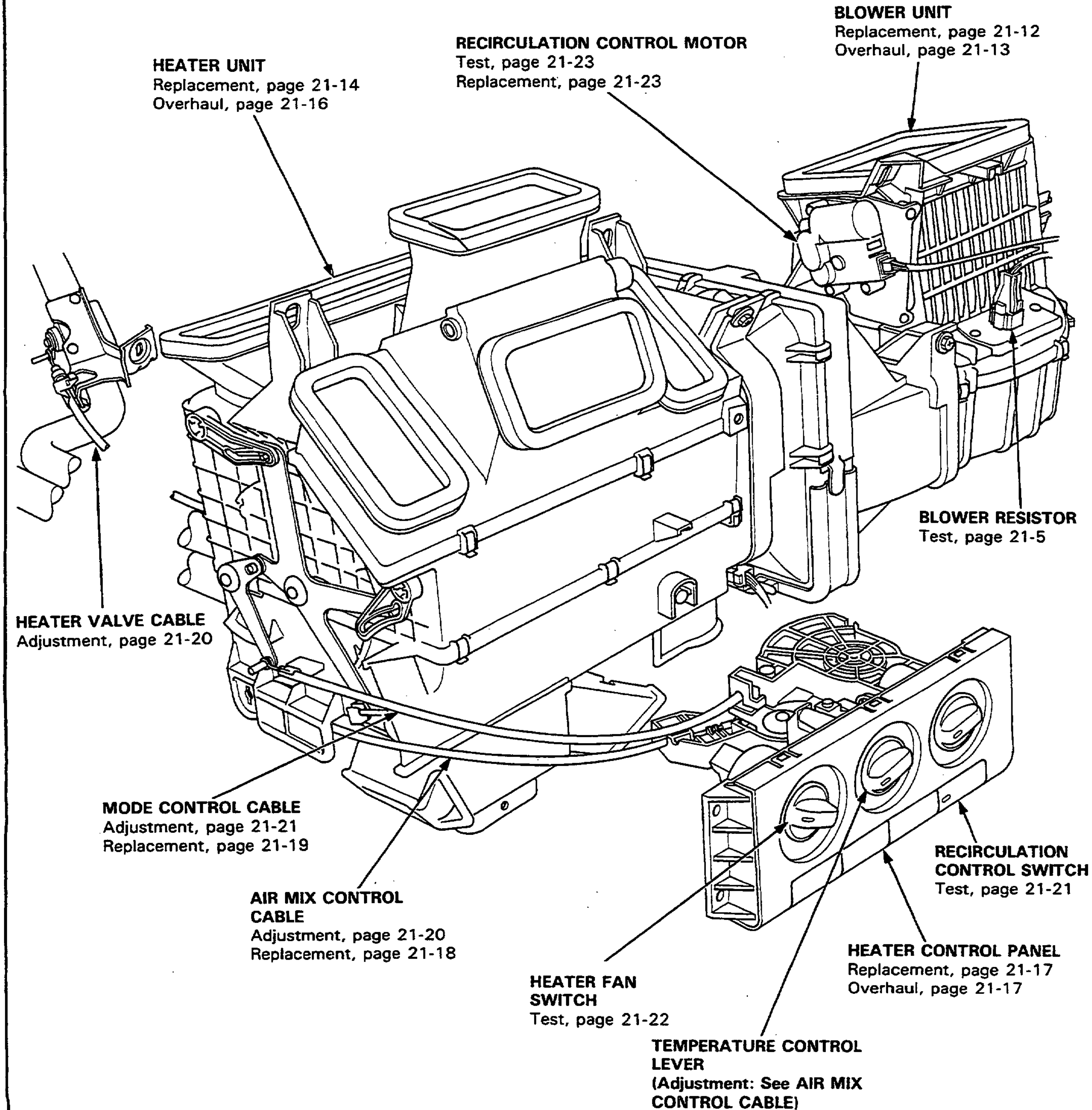
ø: Inner diameter

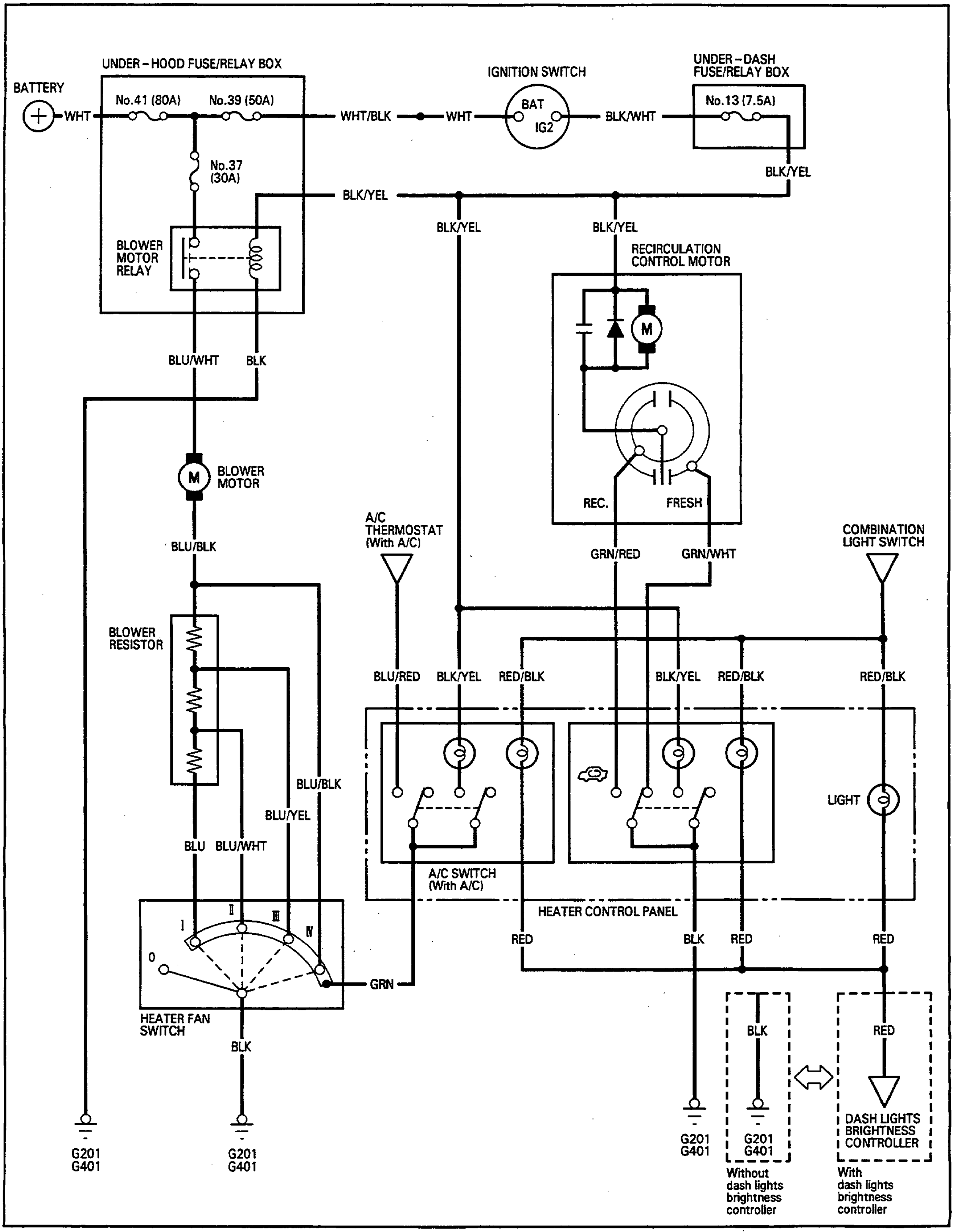
Type / Distance	M/T	A/T
Ⓗ	514.5 (20.26)	493 (19.4)
Ⓙ	2.5 (0.098)	−2 (−0.08)
Ⓚ	267.5 (10.53)	305 (12.0)





POINT q
POINT r
POINT t
POINT v
POINT w
POINT p
POINT y
POINT x
POINT s
POINT z
M10X1.25
(NUT)
800 (31.5)
904 (35.6)
1286 (50.63)
1024 (40.31)
450 (17.7)
186 (7.32)
652 (25.7)
856 (33.7)
1000 (39.37)
1036 (40.79)
1000 (39.73)
3°20'
18°29'
254
(10.0)
1832 (72.13)
1867 (73.50)
2332 (91.81)
2672 (105.2)
73
(2.87)
350 (13.8)
361 (14.2)
454 (17.9)
195
(7.68)
POINT h, i
3°
h; ø17.7 (0.697)
i; 17.7 x 20.5
(0.697 x 0.807)
SECTION BB, DD
2-ø11.5 (0.453)
POINT g
40°
80
(3.15)
SECTION AA
POINT q
COMPENSATOR
ARM CENTER
FR
M10X1.25
(NUT)
31
(1.22)
BASE
LINE
30
(1.18)
SECTION FF
2-ø11.5 (0.45)
POINT w
3°30'
ø80 (3.15)
7°34'
SECTION EE
0°28'
POINT v
ø12 (0.47) REAR
UPPER ARM
POINT t
ø12 (0.47) REAR
UPPER ARM
M12X1.25
(NUT)
POINT w
REAR DAMPER CENTER
84 (3.31)
30°
POINT p
ø25 (0.98)
LOCATE
HOLE
POINT r
ø25 (0.98)
LOCATE HOLE
3 (0.12)
34 (1.34)
3 (0.12)
111 (4.37)
59 (2.32)
205 (8.07)
247 (9.72)
186 (7.32)
2 (0.08)
186 (7.32)
425 (16.7)
189 (7.44)
POINT s, s
ø14 (0.55) TRAILING ARM
M10X1.25
(NUT)
POINT x
ø10.8 (0.425) LOWER
ARM CENTER
POINT z
ø20 (0.79) LOCATE HOLE
POINT x
50
(1.97)
SECTION GG


BLOWER UNIT
Replacement, page 21-12
Overhaul, page 21-13
RECIRCULATION CONTROL MOTOR
Test, page 21-23
Replacement, page 21-23
HEATER UNIT
Replacement, page 21-14
Overhaul, page 21-16
BLOWER RESISTOR
Test, page 21-5
HEATER VALVE CABLE
Adjustment, page 21-20
MODE CONTROL CABLE
Adjustment, page 21-21
Replacement, page 21-19
RECIRCULATION CONTROL SWITCH
Test, page 21-21
AIR MIX CONTROL CABLE
Adjustment, page 21-20
Replacement, page 21-18
HEATER CONTROL PANEL
Replacement, page 21-17
Overhaul, page 21-17
HEATER FAN SWITCH
Test, page 21-22
TEMPERATURE CONTROL LEVER
(Adjustment: See AIR MIX CONTROL CABLE)


UNDER-HOOD FUSE/RELAY BOX
BATTERY
WHT
No.41 (80A)
No.39 (50A)
No.37 (30A)
BLOWER MOTOR RELAY
WHT/BLK
IGNITION SWITCH
BAT
IG2
BLK/WHT
UNDER-DASH FUSE/RELAY BOX
No.13 (7.5A)
BLK/YEL
RECIRCULATION CONTROL MOTOR
REC.
FRESH
BLU/WHT
BLK
BLOWER MOTOR
BLU/BLK
BLOWER RESISTOR
BLU/YEL
BLU
A/C THERMOSTAT (With A/C)
GRN/RED
GRN/WHT
COMBINATION LIGHT SWITCH
BLU/RED
RED/BLK
LIGHT
A/C SWITCH (With A/C)
HEATER CONTROL PANEL
RED
GRN
HEATER FAN SWITCH
G201 G401
DASH LIGHTS BRIGHTNESS CONTROLLER
Without dash lights brightness controller
With dash lights brightness controller

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 21-5).
	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 21-7).
	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 21-20) • Air mix control cable adjustment (see page 21-20) • Faulty thermostat (see section 10) • Clogged evaporator (with air conditioning) • Frozen evaporator (with air conditioning)
Recirculation control door does not change between FRESH and RECIRCULATE.		Follow the flowchart (see page 21-10).

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 21-6

NO

Turn the ignition switch OFF.

Disconnect the blower resistor 4P connector.

Measure the resistance between the No. 2 and No. 4 terminals of the blower resistor.

Is there approx. 2–3 ohms?

NO — **Replace the blower resistor.**

YES

Reconnect the blower resistor 4P connector.

Remove the heater control panel (see page 21-17).

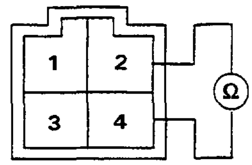
Disconnect the heater fan switch 8P connector.

Turn the ignition switch ON (II).

At the heater fan switch 8P connector, ground each of these terminals individually in the following order:
- No. 5 terminal
- No. 6 terminal
- No. 7 terminal
- No. 8 terminal

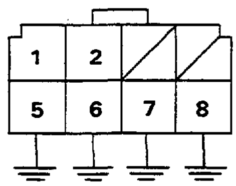
A
To page 21-6

BLOWER RESISTOR



TERMINAL SIDE OF MALE TERMINALS

HEATER FAN SWITCH 8P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Blower Motor Speed (cont'd)

From page 21-5

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 21-5

B

Turn the ignition switch OFF.

↓

Remove the heater control panel (see page 21-17).

↓

Disconnect the heater fan switch 8P connector.

↓

Disconnect the blower resistor 4P connector.

↓

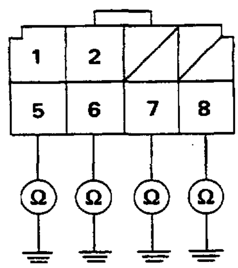
Check each terminal for continuity between the heater fan switch 8P connector and body ground.
• No. 5 terminal
• No. 6 terminal
• No. 7 terminal
• No. 8 terminal

↓

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.**

HEATER FAN SWITCH 8P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Blower Motor

Blower motor does not run at all.

Check the No. 37 (30 A) fuse in the under-hood fuse/relay box.

Is the fuse OK?

NO → **Replace the fuse.**

YES ↓

At the blower motor 2P connector, connect the No. 2 terminal to body ground with a jumper wire.

Turn the ignition switch ON (II).

Does the blower motor run?

YES → To page 21-8

NO ↓

Disconnect the blower motor 2P connector, and measure the voltage between the No. 1 terminal (+) and body ground (−).

Is there battery voltage?

YES → **Replace the blower motor.**

NO ↓

Turn the ignition switch OFF.

Remove the blower motor relay from the under-hood fuse/relay box and test it (see page 21-22).

Is the relay OK?

NO → **Replace the blower motor relay.**

YES ↓

Measure the voltage between the No. 4 terminal (+) and body ground (−).

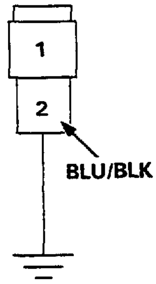
Is there battery voltage?

NO → **Replace the under-hood fuse/relay box.**

YES ↓

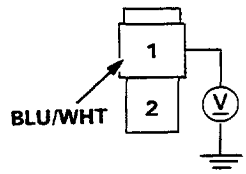
To page 21-9

BLOWER MOTOR 2P CONNECTOR



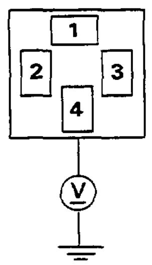
WIRE SIDE FEMALE TERMINALS

BLOWER MOTOR 2P CONNECTOR



WIRE SIDE FEMALE TERMINALS

UNDER-HOOD FUSE/RELAY BOX



(cont'd)

Troubleshooting

Blower Motor (cont'd)

From page 21-7

Turn the ignition switch OFF.

Remove the heater control panel (see page 21-17).

Disconnect the heater fan switch 8P connector.

Turn the ignition switch ON (II).

Measure the voltage between the No. 8 terminal (+) and body ground (−).

Is there battery voltage?

NO → **Repair open in the BLU/BLK wire between the blower motor and the heater fan switch.**

YES

Turn the ignition switch OFF.

Check for continuity between the No. 2 terminal of the heater fan switch 8P connector and body ground.

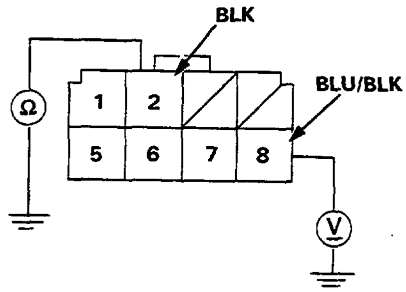
Is there continuity?

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 G201, G401.**

YES

Replace the heater fan switch.

HEATER FAN SWITCH 8P CONNECTOR



WIRE SIDE FEMALE TERMINALS

From page 21-7

Turn the ignition switch ON (II).

Measure the voltage between the No. 3 terminal (+) and body ground (−).

Is there battery voltage?

NO — **Repair open in the BLK/YEL wire between the under-hood fuse/relay box and the under-dash fuse/relay box.**

YES

Turn the ignition switch OFF.

Check for continuity between the No. 2 terminal of the under-hood fuse/relay box and body ground.

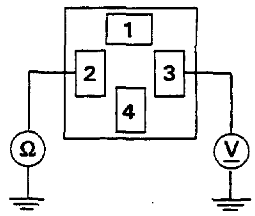
Is there continuity?

NO — **Check for an open in the BLK wire between the under-hood fuse/relay box and body ground. If the wire is OK, check for poor ground at G201, G401.**

YES

Repair open in the BLU/WHT wire between the under-hood fuse/relay box and the blower motor.

UNDER-HOOD FUSE/RELAY BOX



Recirculation Control Motor

Recirculation control door does not change between FRESH and RECIRCULATE.

Disconnect the recirculation control motor 5P connector.

Turn the ignition switch ON (II).

Measure the voltage between the No. 1 terminal (+) and body ground (−).

Is there battery voltage?

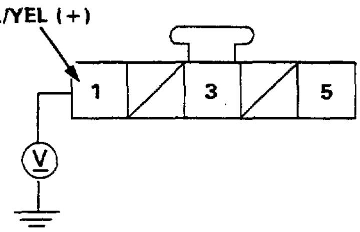
NO → **Repair open in the BLK/YEL wire between the under-dash fuse/relay box and the recirculation control motor.**

YES ↓

Turn the ignition switch OFF.

To page 21-11

RECIRCULATION CONTROL MOTOR 5P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

From page 21-10

Test the recirculation control motor (see page 21-23).

Is the recirculation control motor OK?

- NO → Remove the recirculation control motor (see page 21-23).
  - Check the recirculation control linkage and door for smooth movement.
  - Do the recirculation control linkage and door move smoothly?
    - NO → **Repair the recirculation control linkage or door.**
    - YES → **Replace the recirculation control motor.**
- YES → Remove the recirculation control switch.

Disconnect the recirculation control switch 6P connector.

Check for continuity between the No. 1 and No. 3 terminals of the recirculation control switch 6P connector 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 recirculation control switch.**
- NO → Check the same wires for voltage.

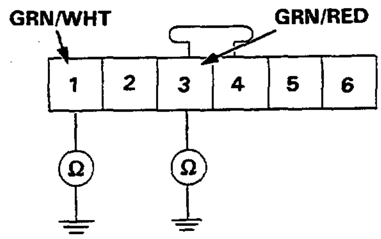
Is there any voltage?

- YES → **Repair short to power in the BLK/YEL wire between the recirculation control motor and the recirculation control switch.**
- NO → Check for continuity between the No. 1 and No. 3 terminals of the recirculation control switch 6P connector and the No. 3 and No. 5 terminals of the recirculation control motor 5P connector.

Is there continuity?

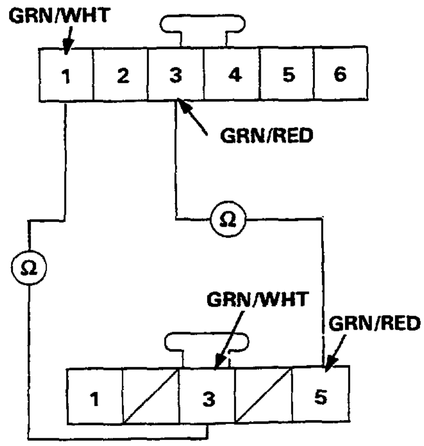
- NO → **Repair open in the GRN/WHT and/or GRN/RED wire(s) between the recirculation control motor and the recirculation control switch.**
- YES → **Replace the recirculation control switch.**

RECIRCULATION CONTROL SWITCH 6P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

RECIRCULATION CONTROL SWITCH 6P CONNECTOR



RECIRCULATION CONTROL MOTOR 5P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS

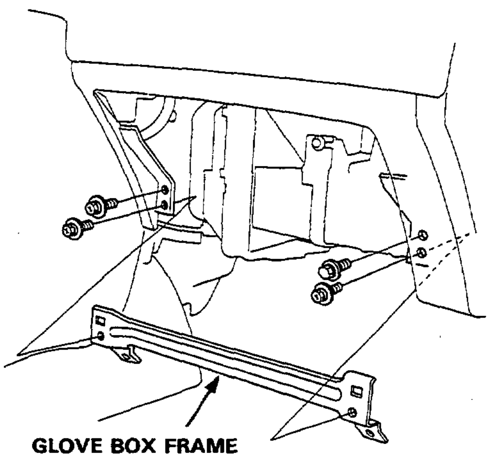
Blower Unit

Replacement

NOTE: The blower motor, recirculation control motor and blower resistor can be replaced without removing the blower unit (see page 21-13).

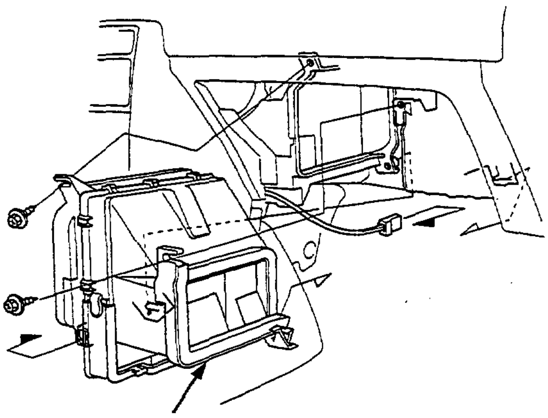
1. Remove the glove box (see section 20).

2. Remove the four bolts and the glove box frame.



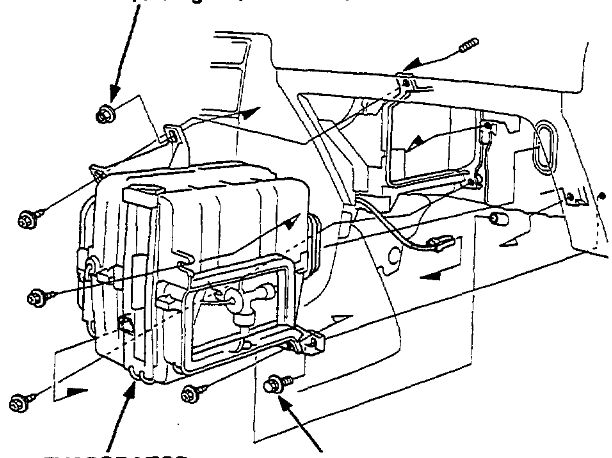
Without Air Conditioning

3-a. Remove the two self-tapping screws and the heater duct.



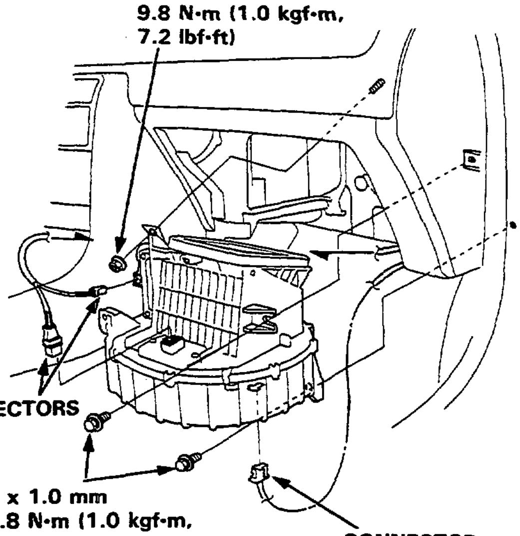
With Air Conditioning

3-b. Remove the evaporator (see page 22-23).



4. Disconnect the connectors from the blower motor, blower resistor and the recirculation control motor.

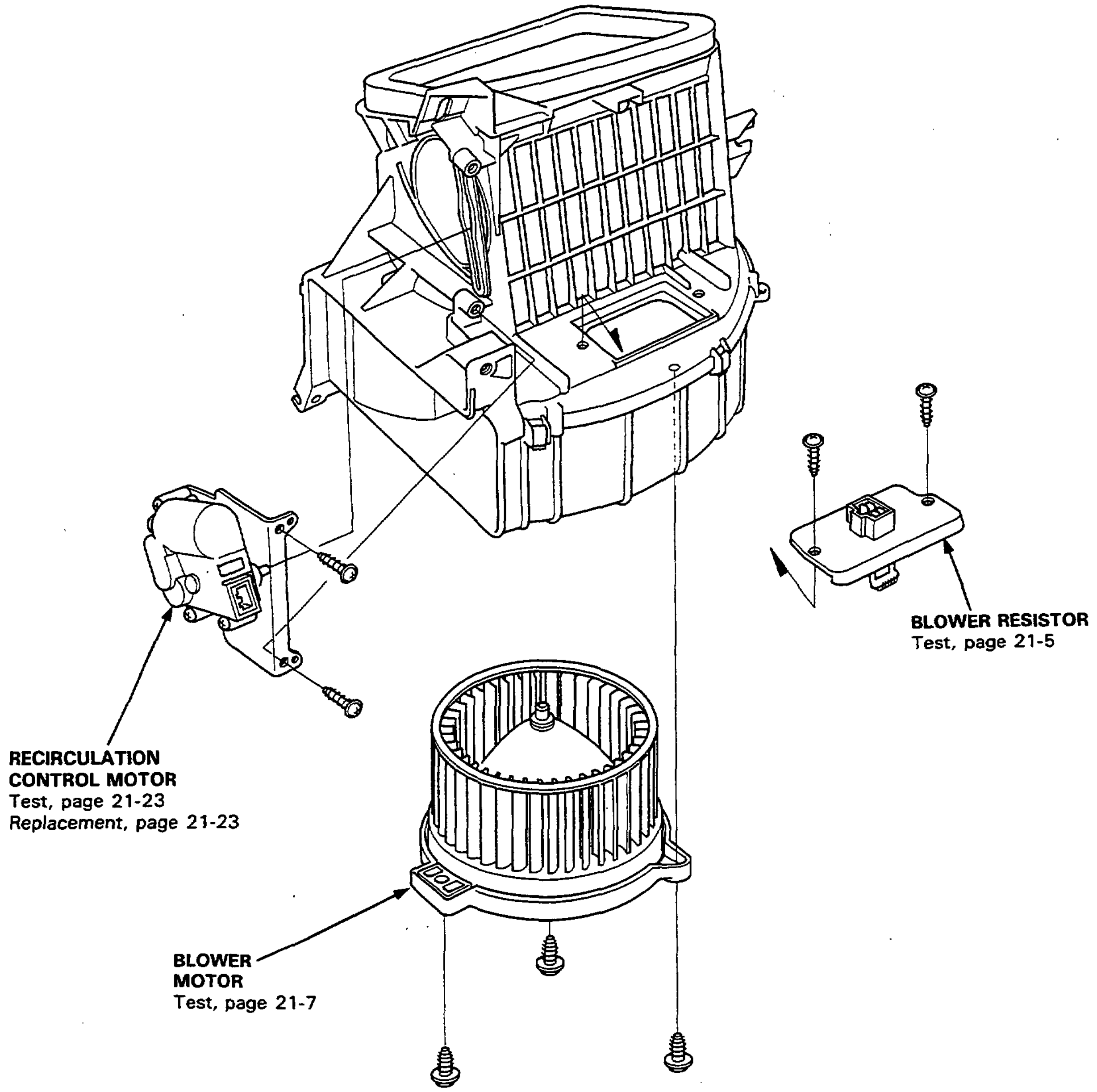
5. Remove the two mounting bolts, mounting nut and the blower unit.



6. Install in the reverse order of removal, and make sure there are no air leaks.

Overhaul

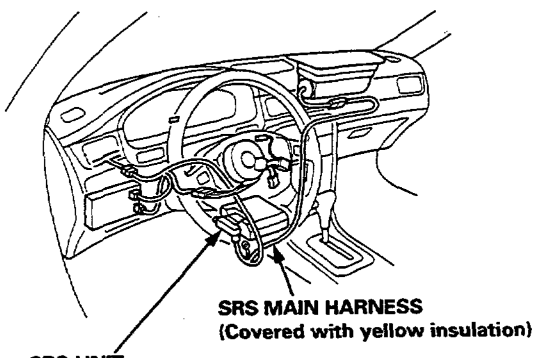
NOTE:
- Before reassembly, make sure that the recirculation control door and linkage move smoothly without binding.
- When reattaching the recirculation control motor, make sure its positioning will not allow the recirculation control door to be pulled too far. Attach the recirculation control motor and all links, then connect power and ground, and watch the movement of the recirculation control door.



Heater Unit

Replacement

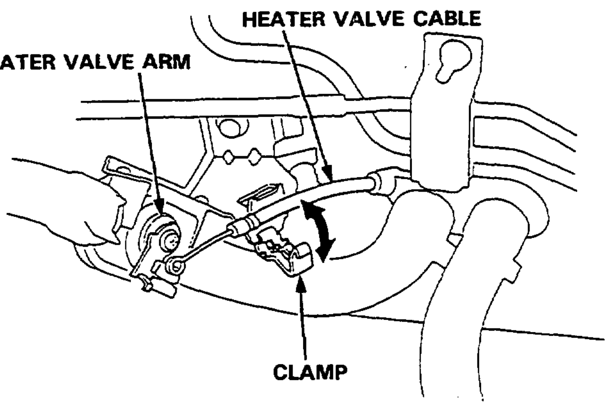
CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



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.

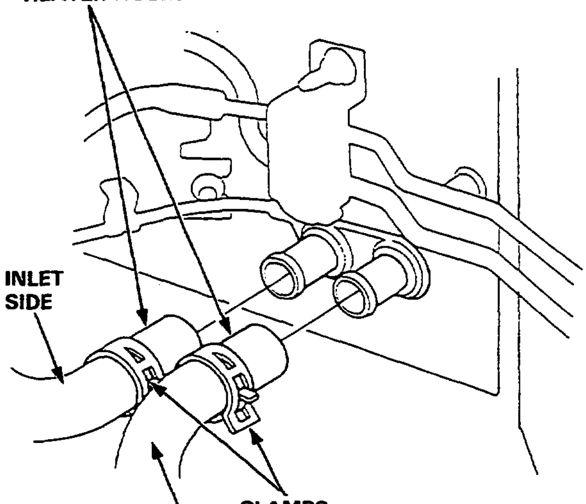
2. Snap open the clamp and disconnect the heater valve cable from the heater valve arm.



3. Disconnect the heater hoses from the heater unit.

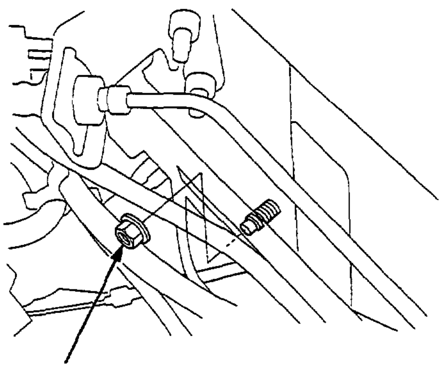
   CAUTION: Engine coolant will damage paint. Quickly rinse any spilled engine coolant from painted surfaces.

   NOTE: Engine coolant will run out when the hoses are disconnected, drain it into a clean drip pan.



4. Remove the mounting nut from the heater unit.

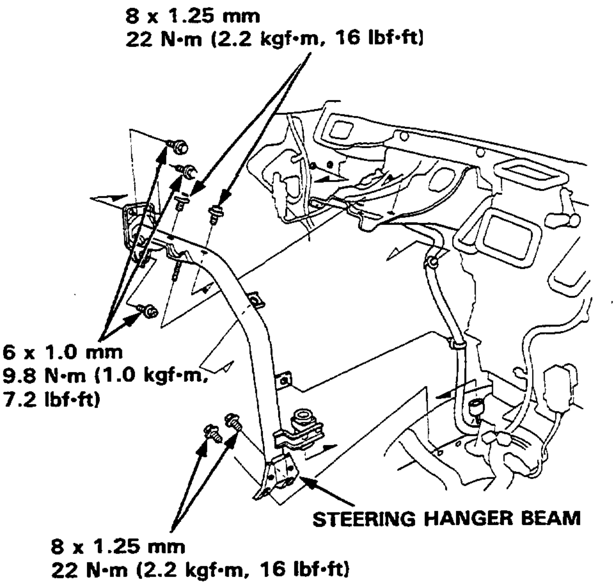
   NOTE: When removing the mounting nut, take care not to damage or bend the fuel pipes, brake pipes, etc.



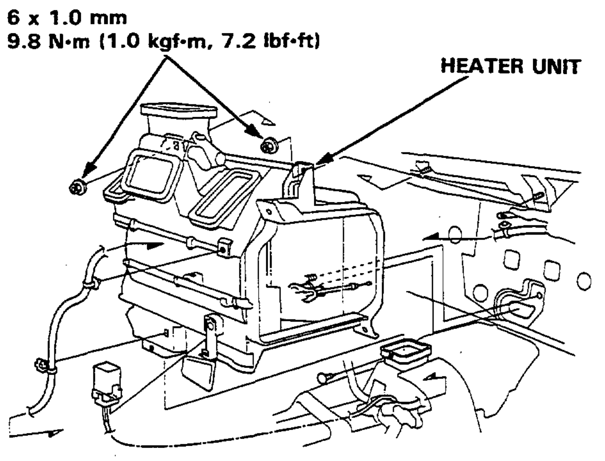
5. Remove the dashboard (see section 20).

6. Remove the heater duct (see page 21-12) or the evaporator (see page 22-21).

7. Remove the mounting bolts and the steering hanger beam.



8. Remove the two mounting nuts and the heater unit.



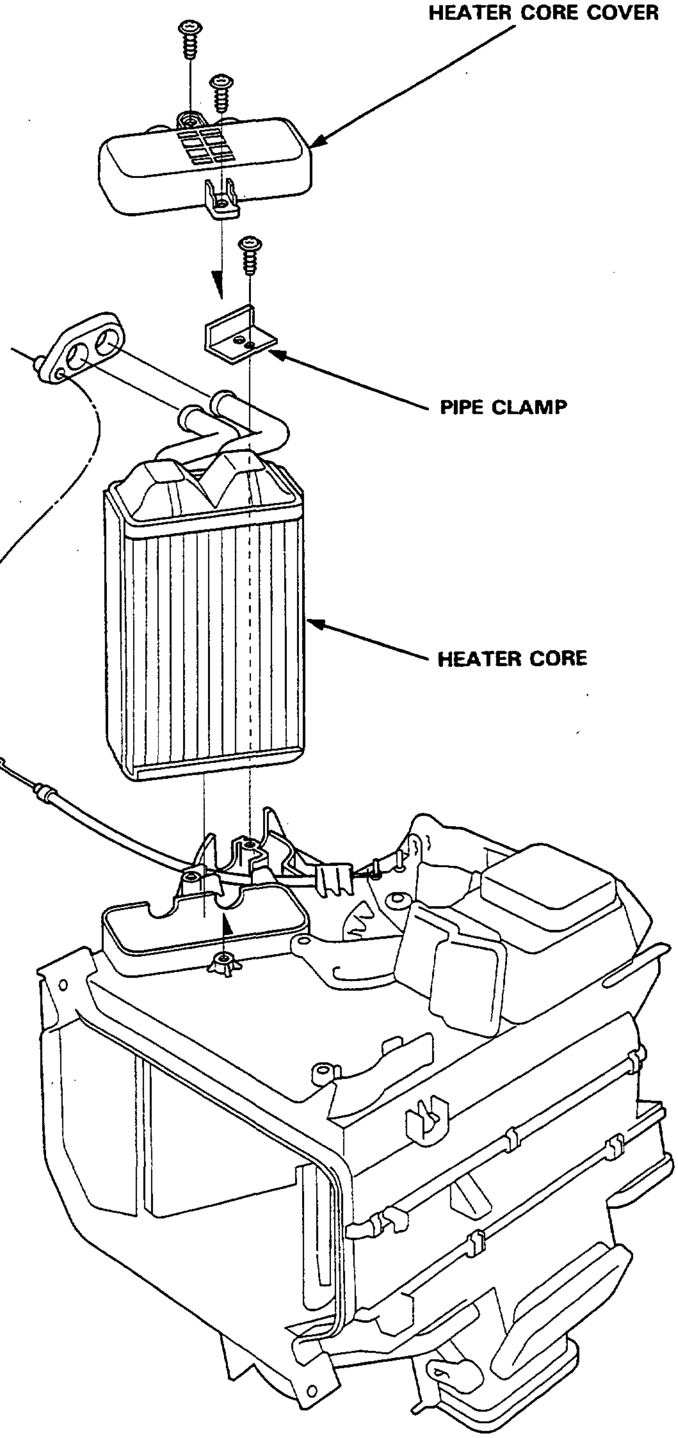
9. Install in the reverse order of removal, and:
   - apply sealant to the grommets.
   - do not interchange the inlet and outlet hoses. Make sure that the hose clamps are secure.
   - loosen the bleed bolt on the engine and refill the radiator and coolant reservoir with the proper engine coolant mixture (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 21-20, 21).

Heater Unit

Overhaul

1. Remove the two screws and the heater core cover.
2. Remove the screw and the pipe clamp.
3. Pull out the heater core.

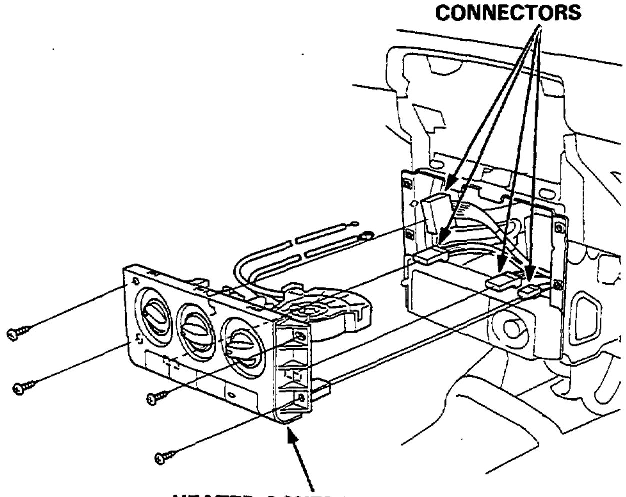
   NOTE: Be careful not to bend the inlet and outlet pipes during heater core removal.
4. Assemble in the reverse order of disassembly.



Heater Control Panel

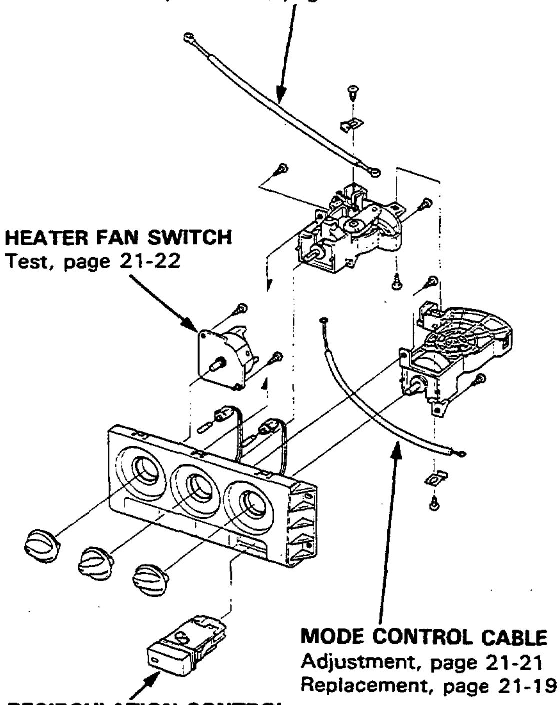
Replacement

1. Disconnect the air mix control cable and the mode control cable from the heater unit (see page 21-20).
2. Remove the front console panel (see section 20).
3. Remove the four self-tapping screws then pull out the heater control panel. Disconnect the connectors.



4. Install in the reverse order of removal, and adjust the mode control cable and air mix control cable at the heater unit (see page 21-20). If necessary, adjust the heater valve cable (see page 21-20).

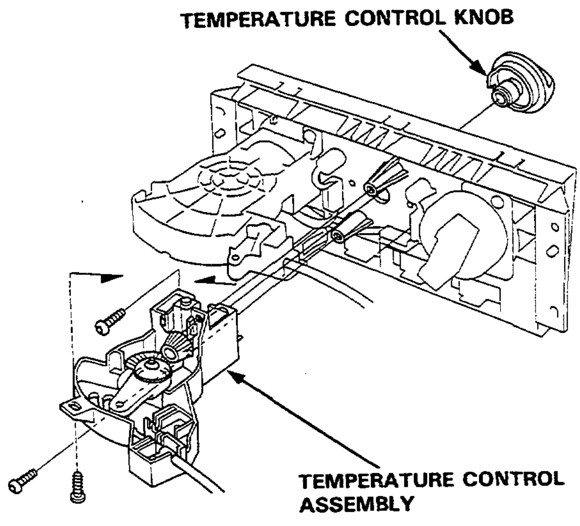
Overhaul



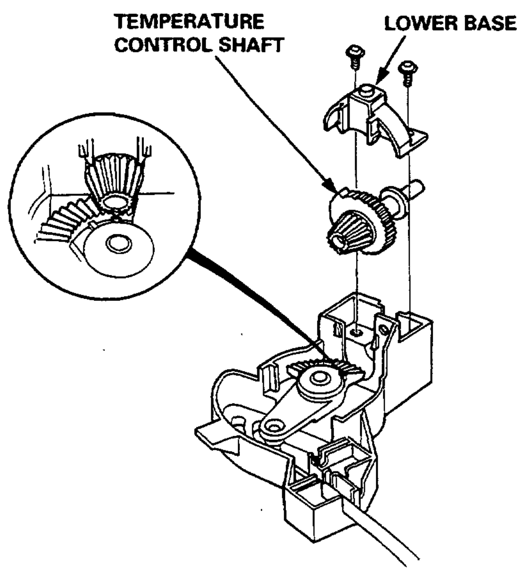
Heater Control Panel

Air Mix Control Cable Replacement

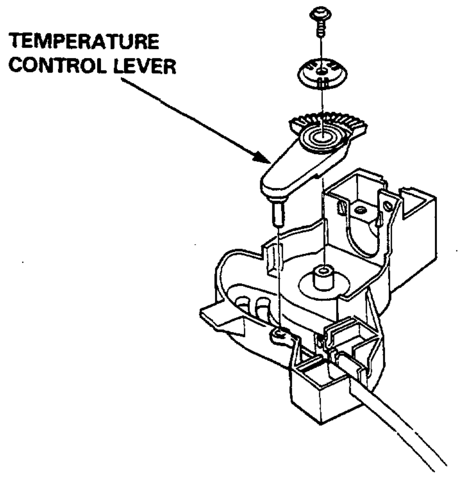
1. Pull out the temperature control knob.
2. Remove the three self-tapping (TORX) screws and remove the temperature control assembly.



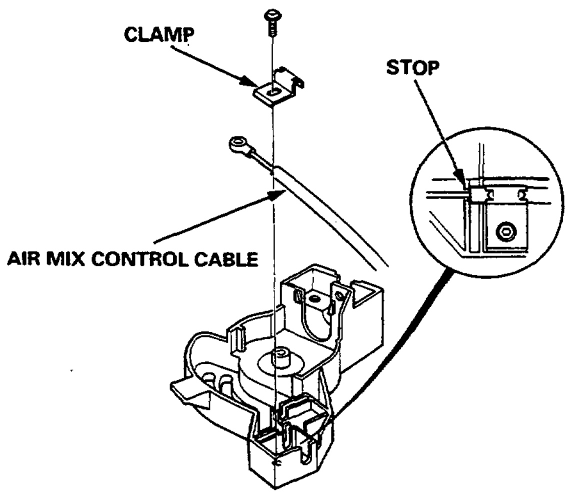
3. Remove the two self-tapping (TORX) screws and remove the lower base.
4. Remove the temperature control shaft.



5. Remove the self-tapping (TORX) screw and remove the temperature control lever.



6. Remove the self-tapping (TORX) screw and the clamp, and remove the air mix control cable.

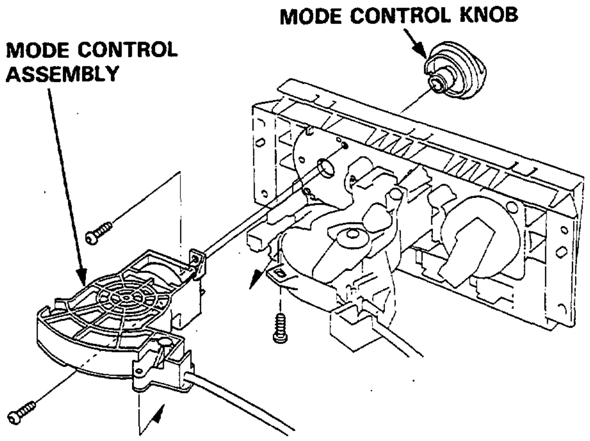


7. Install in the reverse order of removal, and:
   - hold the end of the cable against the stop.
   - apply grease to the sliding surfaces.
   - when installing the temperature control shaft, make sure that the marks on the temperature control shaft and temperature control lever are aligned.
   - after installing, make sure that the temperature control knob moves smoothly without binding.

Mode Control Cable Replacement

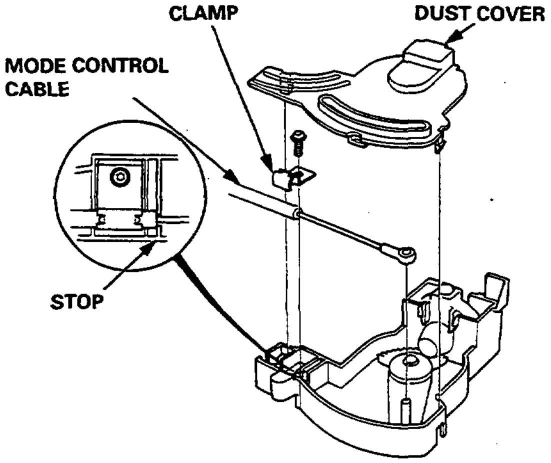
1. Pull out the mode control knob.

2. Remove the three self-tapping (TORX) screws and remove the mode control assembly.



3. Remove the dust cover.

4. Remove the self-tapping (TORX) screw and the clamp, and remove the mode control cable.



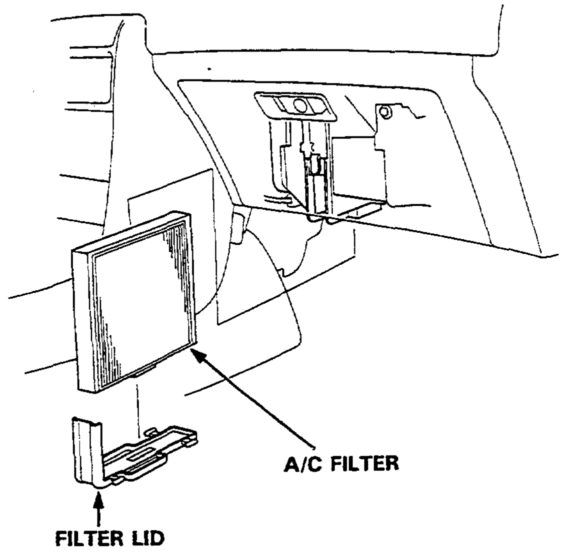
5. Install in the reverse order of removal, and:

- hold the end of the cable against the stop.
- after installing, make sure that the temperature control knob moves smoothly without binding.

Replacement

1. Remove the filter lid and pull out the A/C filter.

   - Replace the A/C filter every 30,000 km (18,000 miles) or 12 months whichever comes first.

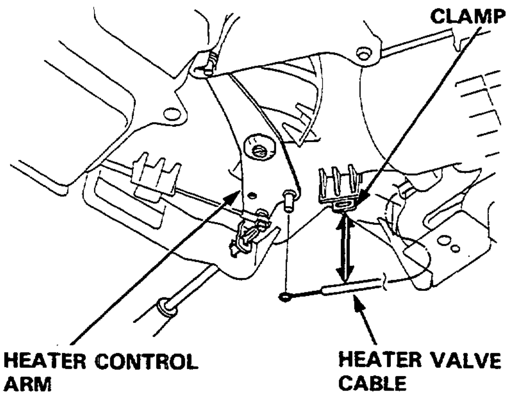


2. Install the A/C filter in the reverse order of removal, then doesn't leak any air.

Heater Valve Cable

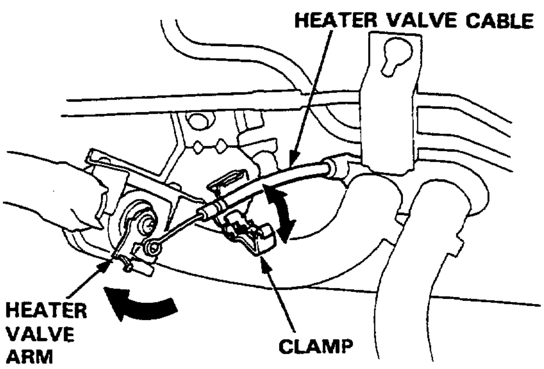
Adjustment

1. Disconnect the heater valve cable from the heater valve arm and the clamp, and from the heater control arm and the clamp.
2. Set the temperature control lever to MAX. COOL.
3. Turn the heater control arm as shown, and 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 lever 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, and 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 lever 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.

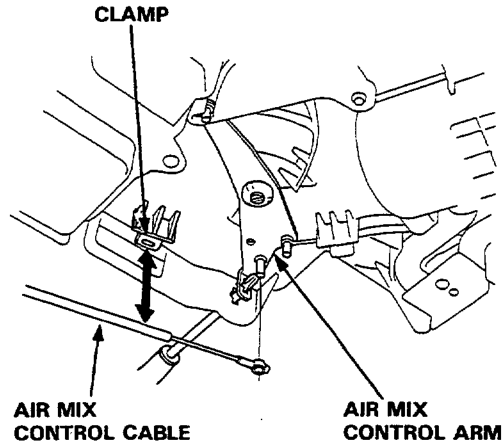


Air Mix Control Cable

Adjustment

1. Disconnect the air mix control cable from the air mix control arm and the clamp.
2. Set the temperature control lever to MAX. COOL.
3. Turn the air mix control arm as shown, and 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 lever move, then snap the air mix control cable housing into the clamp.

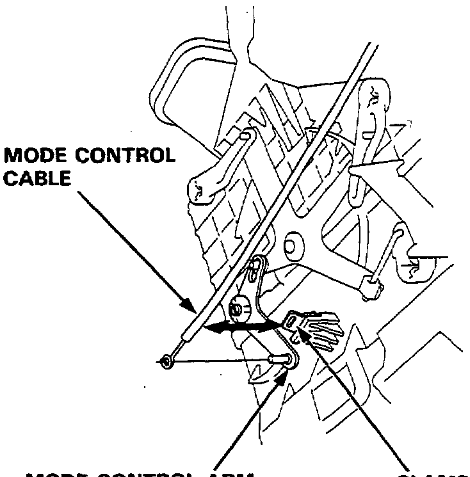
   NOTE: The heater valve cable should always be adjusted whenever the air mix control cable has been disconnected.



Mode Control Cable

Adjustment

1. Disconnect the mode control cable from the mode control arm and the clamp.
2. Set the mode control knob to VENT.
3. Turn the mode control arm as shown and connect the end of the mode control cable to the mode control arm.
4. Gently slide the mode control cable outer housing back from the end enough to take up any slack in the mode control cable, but not enough to make the mode control cable knob move, then snap the mode control cable housing into the clamp.

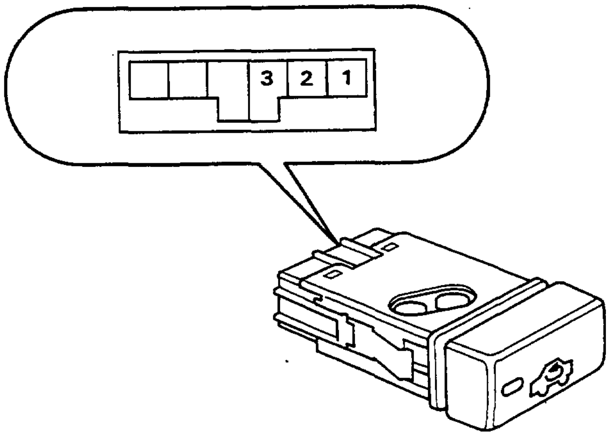


Recirculation Control Switch

Test

Check for continuity between the terminals according to the table below.

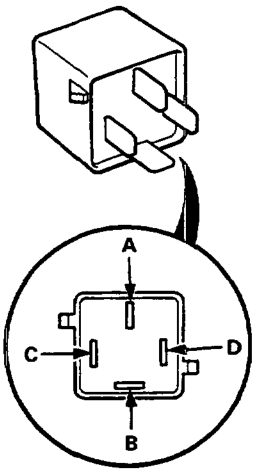
Position \ Terminal	1	2	3
Fresh	O	O	
Recirculate		O	O

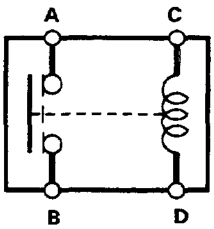


Relay

Test

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 when power is disconnected.





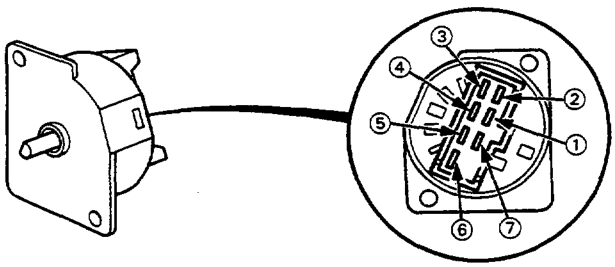
Heater Fan Switch

Test

Check for continuity between the terminals according to the table below.

SWITCH CONNECTION

Position \ Terminal	①	②	③	④	⑤	⑥	⑦
O							
I	O	O	O				
II	O	O		O			
III	O	O			O		
IV	O	O				O	
V	O	O					O



Recirculation Control Motor

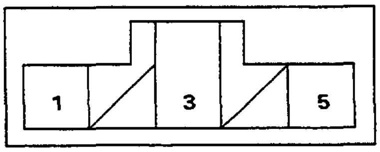
Test

1. Connect battery power to the No. 1 terminal of the recirculation control motor, and connect ground to the No. 3 and No. 5 terminals; the recirculation control motor should run smoothly.

2. Disconnect the ground from the No. 3 or No. 5 terminals; the recirculation control motor should stop at FRESH or RECIRCULATE.

   CAUTION: Never connect the battery in the opposite direction.

   NOTE: Don't cycle the recirculation control motor for a long time.

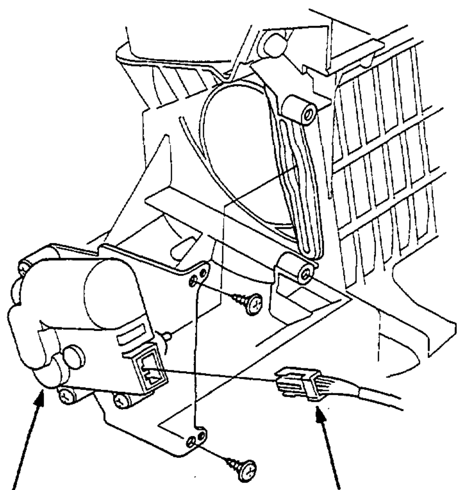


3. If the recirculation control motor does not run in step 1, remove it, and check the recirculation control linkage and door for smooth movement. If the recirculation control linkage and door move smoothly, replace the recirculation control motor.

Replacement

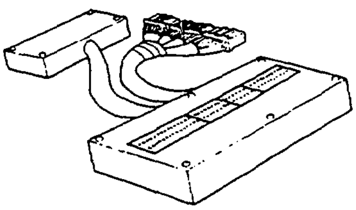
1. Disconnect the 5P connector from the recirculation control motor, and remove the wire harness clip from it.

2. Remove the two screws, recirculation control motor and flange collar.

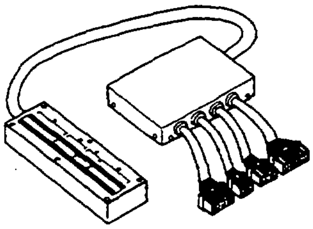


3. Install in the reverse order of removal. After installation, make sure the recirculation control motor runs smoothly.

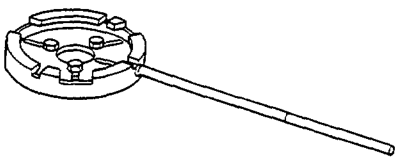
Ref. No.	Tool Number	Description	Qty	Remark
①	07LAJ – PT30100 or 07LAJ – PT3010A	Test Harness	1	
②	07NAB – HAC0100	A/C Clutch Holder	1	
③	07JAC – SH20300	Shaft Ring Remover	1	
④	07JGG – 0010100	Belt Tension Gauge	1	
⑤	07945 – 4150200	Seal Driver	1	



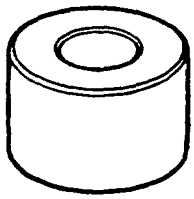
①



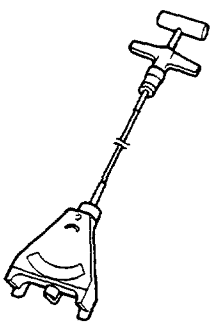
①



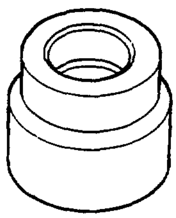
②



③

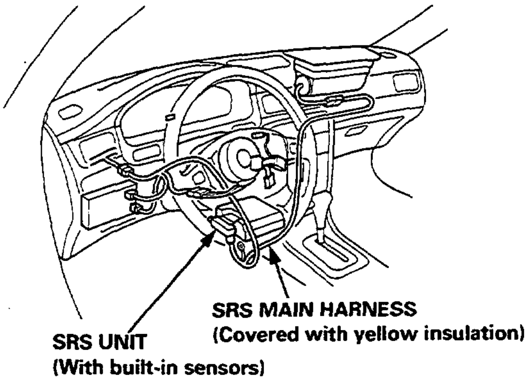


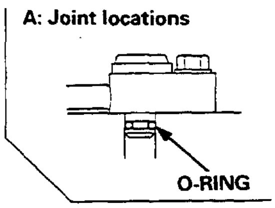
④

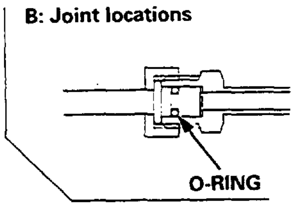


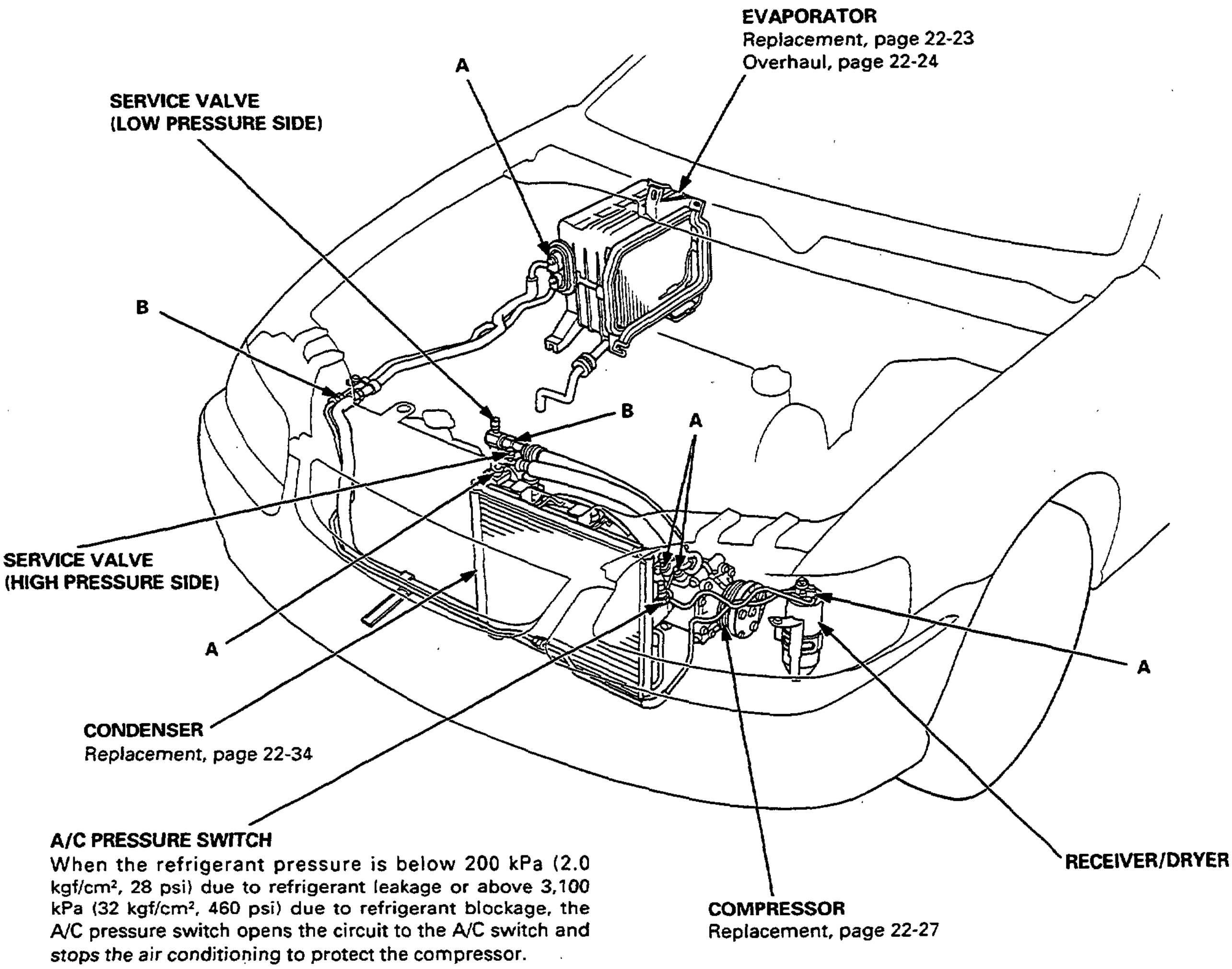
⑤

CAUTION:
- All SRS wire harnesses are covered with yellow insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.
- Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.
- For additional precautions, refer to page 23-B6 in the SRS sub-section.

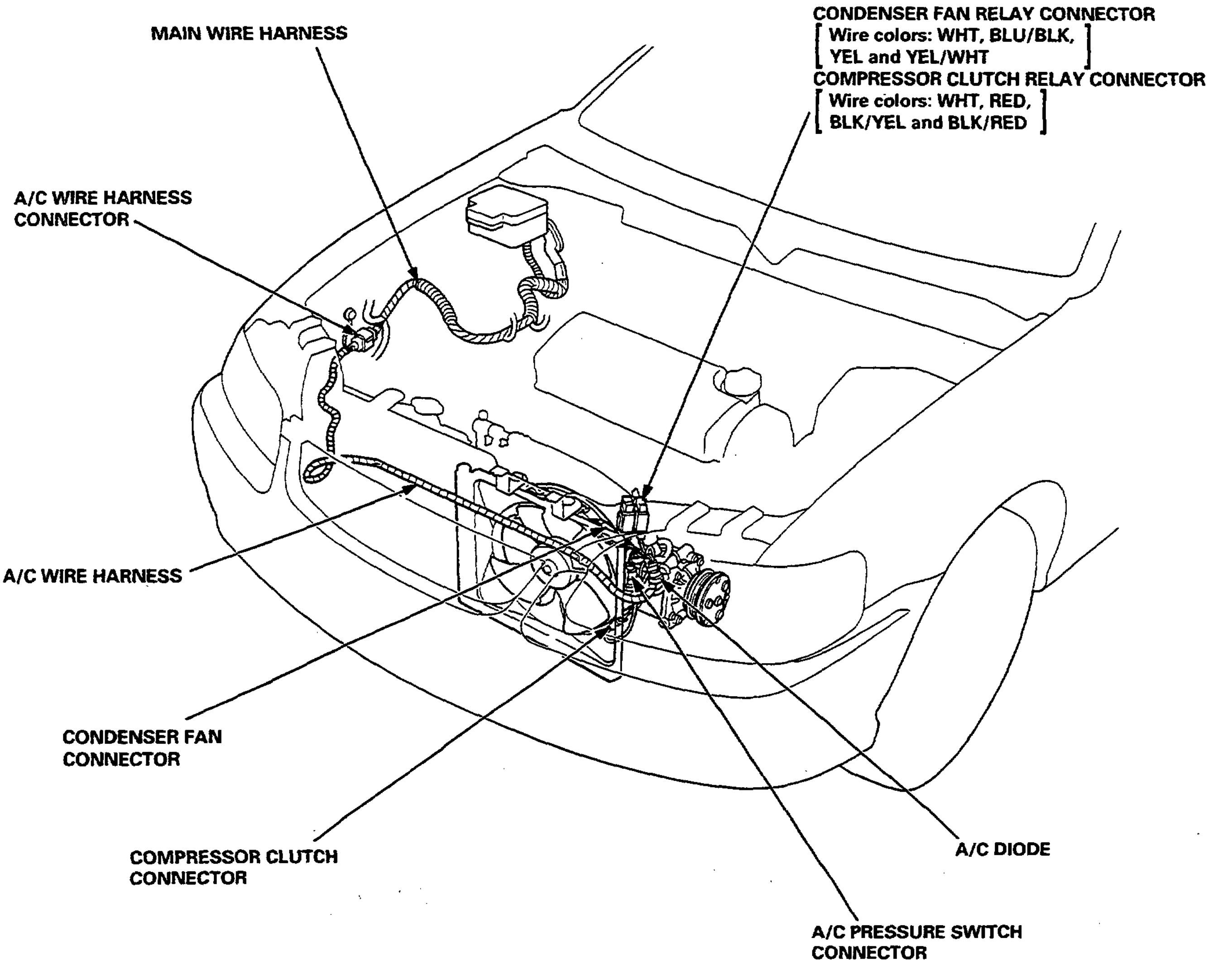








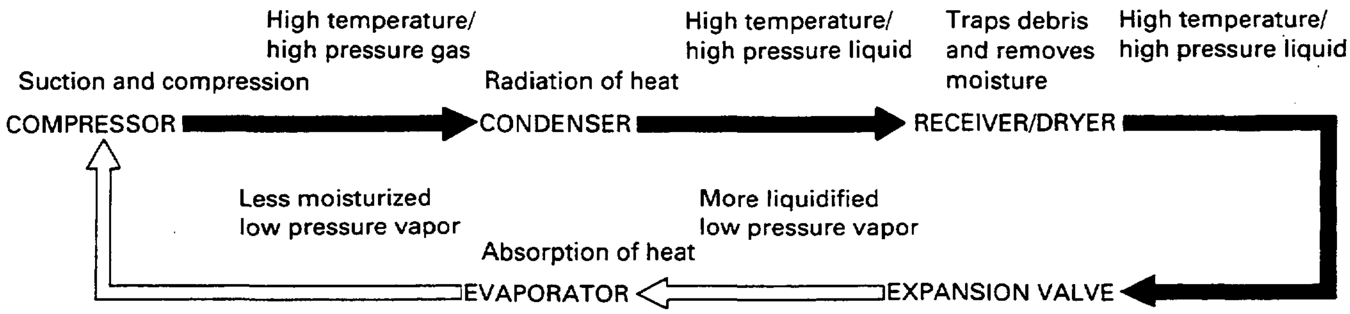
Wiring/Connector Locations

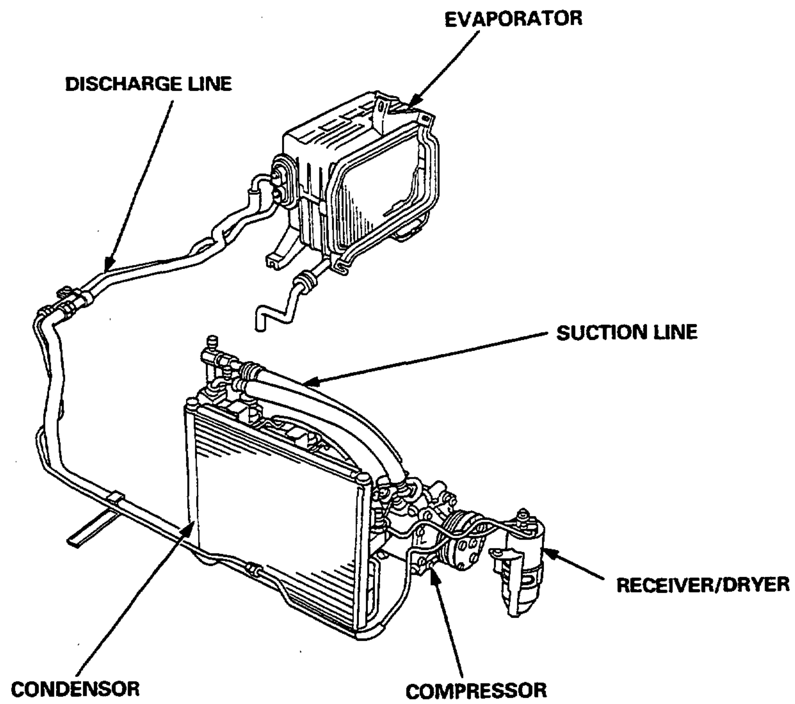


Description

Outline

The air conditioner system delivers cooled air into the passenger compartment by circulating refrigerant through the system as shown below.

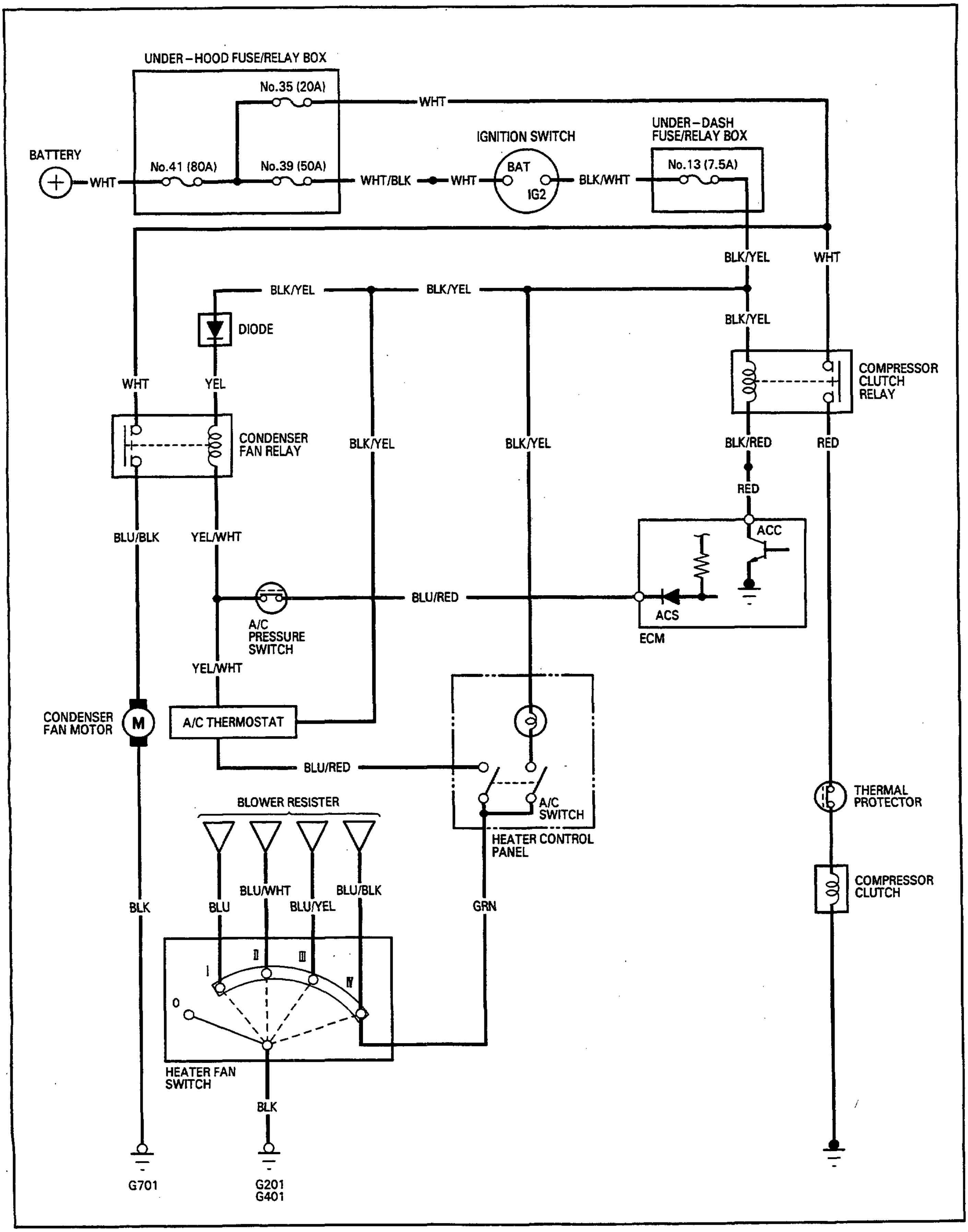




This car uses HFC-134a (R-134a) refrigerant which does not contain chlorofluorocarbons. Pay attention to the following service items:

- 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 (SP-10: P/N 38899-P13-003) 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.

Circuit Diagram



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 No. 41 (80 A), No. 39 (50 A), No. 13 (7.5 A), No. 35 (20 A)
- Grounds No. G701, G201, G401
- Cleanliness and tightness of all connectors.

SYMPTOM	REMEDY
Condenser fan does not run at all.	Perform the procedures in the flowchart (see page 22-8).
Compressor clutch does not engage.	Perform the procedures in the flowchart (see page 22-10).
A/C system does not come on (compressor and fan).	Perform the procedures in the flowchart (see page 22-13).

Troubleshooting

Condenser Fan

Condenser fan does not run at all.

Check the No. 13 (7.5 A) fuse in the under-dash fuse/relay box and No. 35 (20 A) fuse in the under-hood fuse/relay box.

Are the fuses OK?

NO — **Replace the blown fuse(s).**

YES

Remove the condenser fan relay and test it (see page 22-15).

Is the relay OK?

NO — **Replace the condenser fan relay.**

YES

Connect the No. 1 and No. 3 terminals with a jumper wire.

Does the condenser fan run?

YES — To page 22-9

NO

Disconnect the jumper wire.

Measure voltage between the No. 1 terminal (+) and body ground (−).

Is there battery voltage?

NO — **Repair open in the WHT wire between the under-hood fuse/relay box and condenser fan relay.**

YES

Disconnect the condenser fan 2P connector.

Check for continuity between the No. 3 terminal of the condenser fan relay 4P connector and the No. 1 terminal of the condenser fan 2P connector.

Is there continuity?

NO — **Repair open in the BLU/BLK wire between the condenser fan relay and condenser fan.**

YES

Check for continuity between the No. 2 terminal of the condenser fan 2P connector and body ground.

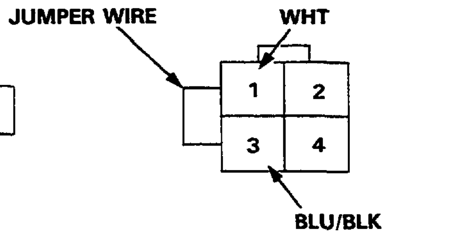
Is there continuity?

NO — **Repair open in the BLK wire between the condenser fan and body ground. If the wire is OK, check for poor ground at G701.**

YES

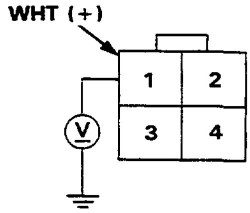
Replace the condenser fan motor.

CONDENSER FAN RELAY 4P CONNECTOR

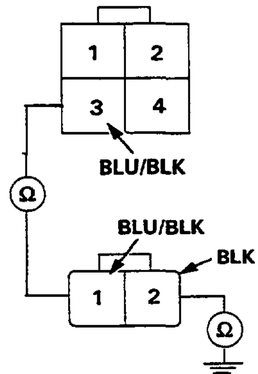


WIRE SIDE OF FEMALE TERMINALS

CONDENSER FAN RELAY 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS



CONDENSER FAN MOTOR 2P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS

From page 22-8

Disconnect the jumper wire.

Turn the ignition switch ON.

Measure voltage between the No. 2 terminal (+) and body ground (−).

Is there battery voltage?

- YES → **Repair open in the YEL/WHT wire between the condenser fan relay and A/C thermostat.**
- NO ↓

Remove the diode and test it (see page 22-16).

Is the A/C diode OK?

- NO → **Replace the A/C diode.**
- YES ↓

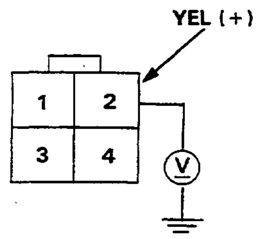
Measure voltage between the No. 3 terminal (+) and body ground (−).

Is there battery voltage?

- NO → **Repair open in the BLK/YEL wire between the under-dash fuse/relay box and A/C diode.**
- YES ↓

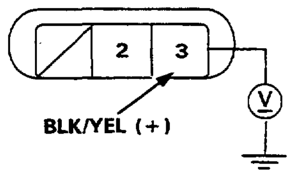
Repair open in the YEL wire between the diode and condenser fan relay.

CONDENSER FAN RELAY 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

DIODE 3P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

Compressor

NOTE: First, check for refrigerant pressure.

Compressor clutch does not engage.

↓

Disconnect the compressor clutch 4P connecttor.

↓

Measure voltage between the No. 1 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 ↓

Turn the ignition switch ON.

↓

Measure voltage between the No. 2 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.

↓

Remove the compressor clutch relay and test it (see page 22-15).

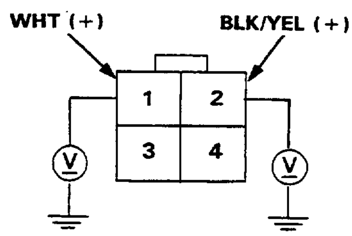
↓

Is the relay OK?

- NO → **Replace the compressor clutch relay.**
- YES ↓

To page 22-11

COMPRESSOR CLUTCH RELAY 4P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

From page 22-10

Disconnect the compressor clutch 1P connector.

↓

Check for continuity between the No. 3 terminal of the compressor clutch relay 4P connector and compressor clutch connector.

↓

Is there continuity?

- NO → **Repair open in the RED wire between the compressor clutch relay and compressor clutch.**
- YES ↓

Test the compressor clutch coil (see page 22-29).

↓

Is the compressor clutch coil?

- NO → **Replace the compressor clutch coil.**
- YES ↓

Reconnect the compressor clutch relay 4P connector.

↓

Disconnect the A/C pressure switch 2P connector.

↓

Turn the ignition switch, A/C switch, and heater fan switch ON.

↓

Connect the No. 1 and No. 2 terminals with a jumper wire.

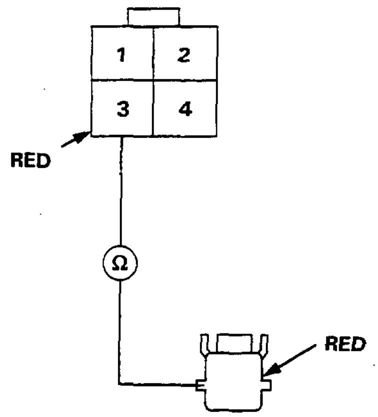
↓

Does the compressor clutch engage?

- YES → **Replace the A/C pressure switch.**
- NO ↓

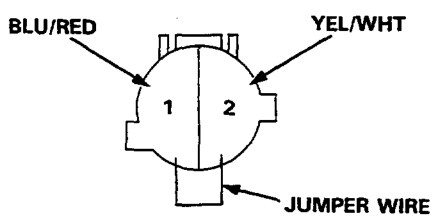
To page 22-12

COMPRESSOR CLUTCH 4P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS



COMPRESSOR CLUTCH CONNECTOR

PRESSURE SWITCH 2P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

Compressor (cont'd)

From page 22-11

Connect the No. 2 terminal to body ground with a jumper wire.

Does the compressor clutch engage?

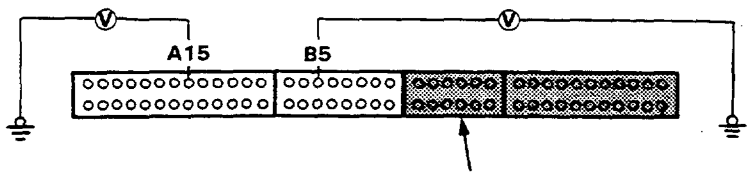
- YES → **Repair open in the YEL/WHT wire between the A/C thermostat and A/C pressure switch.**
- NO ↓

Turn the ignition switch, A/C switch, and heater fan switch OFF.

Reconnect the A/C pressure switch 2P connector.

Connect the test harness "A" and "B" connectors to the wire harness only, not the ECM (see section 11).

Turn the ignition switch ON and the A/C switch OFF.



Measure voltage between the A15 terminal (+) and body ground (−).

Is there battery voltage?

- NO → **Repair open in the BLK/RED wire between the compressor clutch relay and ECM.**
- YES ↓

Measure voltage between the B5 terminal (+) and body ground (−).

Is there battery voltage?

- NO → **Repair open in the BLU/RED wire between the A/C pressure switch and 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 fan).

Check the No. 13 (7.5 A) in the under-dash fuse/relay box and No. 35 (20 A) fuse in the under-hood fuse/relay box.

Are the fuses OK?

- NO → **Replace the blown fuse(s).**
- YES ↓

Disconnect the A/C thermostat 3P connector.

Turn the ignition switch ON.

Measure voltage between the No. 3 terminal (+) and body ground (−).

Is there battery voltage?

- NO → **Repair open in the BLK/YEL wire between the under-dash fuse/relay box and A/C thermostat.**
- YES ↓

Measure voltage between the No. 1 terminal (+) and body ground (−).

Is there battery voltage?

- NO → **Repair open in the YEL/WHT wire between the condenser fan relay and A/C thermostat.**
- YES ↓

Reconnect the A/C thermostat 3P connector and connect the No. 2 terminal to ground with a jumper wire.

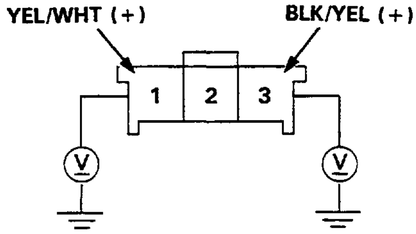
Does the condenser fan run and the compressor clutch engage?

- NO → **Replace the A/C thermostat.**
- YES ↓

Turn the ignition switch OFF.

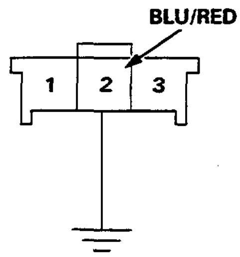
To page 22-14

THERMOSTAT 3P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

THERMOSTAT 3P CONNECTOR



WIRE SIDE OF FEMALE TERMINALS

(cont'd)

A/C System (cont'd)

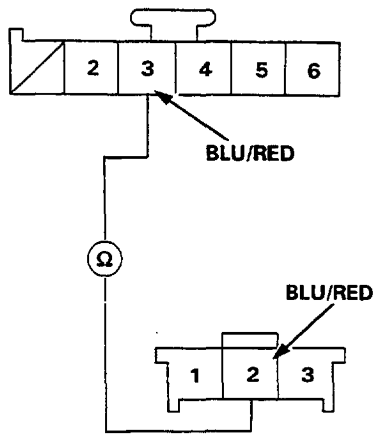
From page 22-13

Remove the A/C switch (see page 21-25).

Disconnect the A/C switch 6P connector.

Check for continuity between the No. 3 terminal of the A/C switch 6P connector and No. 2 terminal of the thermostat 3P connector.

A/C SWITCH 6P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS



THERMOSTAT 3P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS

Is there continuity?

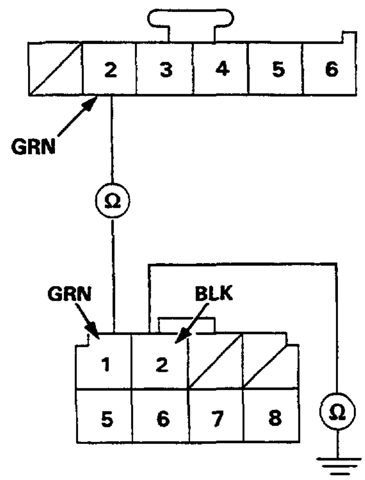
NO → **Repair open in the BLU/RED wire between the A/C thermostat and A/C switch.**

YES ↓

Remove the heater control panel (see page 21-17).
Disconnect the heater fan switch 8P connector.

Check for continuity between the No. 2 terminal of the A/C switch 6P connector and No. 1 terminal of the heater fan switch 8P connector.

A/C SWITCH 6P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS



HEATER FAN SWITCH 8P CONNECTOR
WIRE SIDE OF FEMALE TERMINALS

Is there continuity?

NO → **Repair open in the GRN wire between the A/C switch and heater fan switch.**

YES ↓

Check for continuity between the No. 2 terminal of the heater fan switch 8P connector and body ground.

Is there continuity?

NO → **Repair open in the BLK wire between the heater fan switch and body ground. If the wire is OK, check for proper ground at G201 and G401.**

YES ↓

Replace the A/C switch.

A/C Thermostat

Test

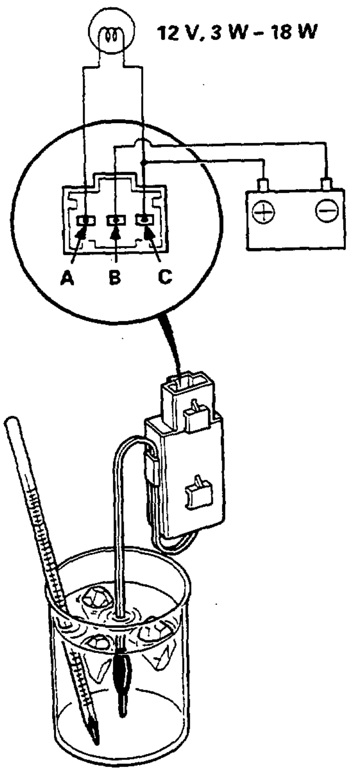
Connect battery power to terminal C and ground terminal B, and connect a test light between terminals A and C.

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 (35 – 39°F) or less, and should come on at 3 – 5°C (37 – 41°F) or more.

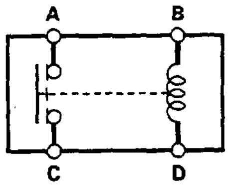
If the light doesn't come on and go off as specified, replace the A/C thermostat.



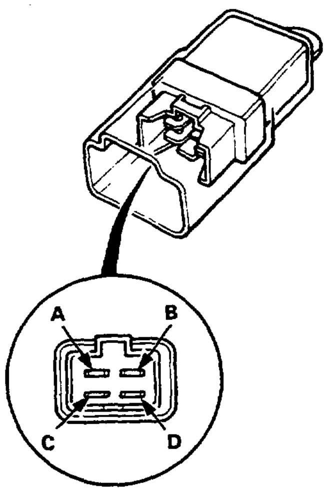
Relays

Test

There should be continuity between the A and C terminals when power and ground are connected to the B and D terminals.
There should be no continuity when power is disconnected.



- Condenser fan relay
- Compressor clutch relay

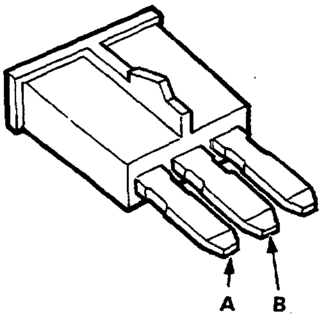


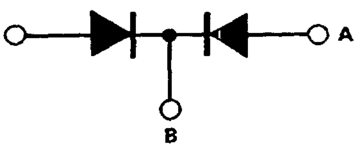
Diode

Test

NOTE: The diodes are designed to pass current in one direction while blocking it in the opposite direction. Most ohmmeters, unless equipped with a diode tester, should not be used to test diodes.

Check for continuity in both directions between the A and B terminals. There should be continuity in only one direction.



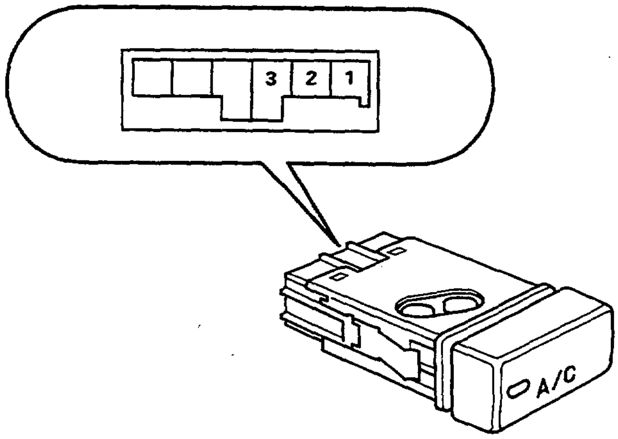


A/C Switch

Test

Check for continuity between the terminals according to the table below.

Position \ Terminal	1	2	3
ON		O	O
OFF	O	O	



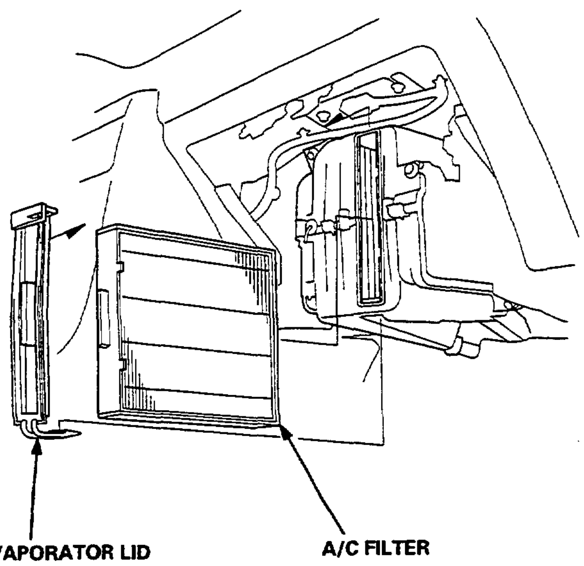
A/C Filter

Replacement

1. Remove the glove box (see section 20) and the glove box frame (see page 22-23).

2. Remove the evaporator lid and pull out the A/C filter.

   - Replace the A/C filter every 30.000 km (18.000 miles) or 12 months whichever comes first.



3. Install the A/C filter in the reverse order of removal, then doesn't leak any air.

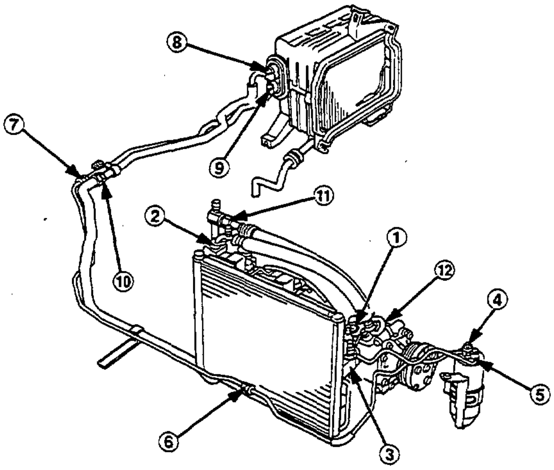
A/C Service Tips and Precautions

The air conditioner system uses HFC-134a (R-134a) refrigerant and polyalkyleneglycol (PAG) refrigerant oil (SP-10: P/N 38899 – P13 – 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 (SP-10: P/N 38899 – P13 – 003) to the O-ring.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When recovering the system, don't let refrigerant escape too fast; it will draw the compressor oil out of the system.
6. Add refrigerant oil (SP-10: P/N 38899 – P13 – 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 .... **15 mℓ (1/2 fl·oz, 0.5 Imp·oz)**
   Evaporator .... **25 mℓ (5/6 fl·oz, 0.9 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 120 mℓ (3 fl·oz, 4.2 imp·oz), and drain the calculated volume of oil from the new compressor: 120 mℓ (3 fl·oz, 4.2 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.



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 (6 x 1.0 mm)** .... **9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)**
⑤ **Receiver pipe A to the receiver/dryer (6 x 1.0 mm)** .... **9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)**
⑥ **Receiver pipe A to the receiver pipe B** .... **13 N·m (1.3 kgf·m, 9.4 lbf·ft)**
⑦ **Receiver pipe B to the receiver pipe C** .... **13 N·m (1.3 kgf·m, 9.4 lbf·ft)**
⑧ **Receiver pipe C to the evaporator (6 x 1.0 mm)** .... **9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)**
⑨ **Suction pipe B to the evaporator (6 x 1.0 mm)** .... **9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)**
⑩ **Suction pipe A to the suction pipe B** .... **31 N·m (3.2 kgf·m, 23 lbf·ft)**
⑪ **Suction hose to the suction pipe A** .... **31 N·m (3.2 kgf·m, 23 lbf·ft)**
⑫ **Suction hose to the compressor (6 x 1.0 mm)** .... **9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)**

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.**

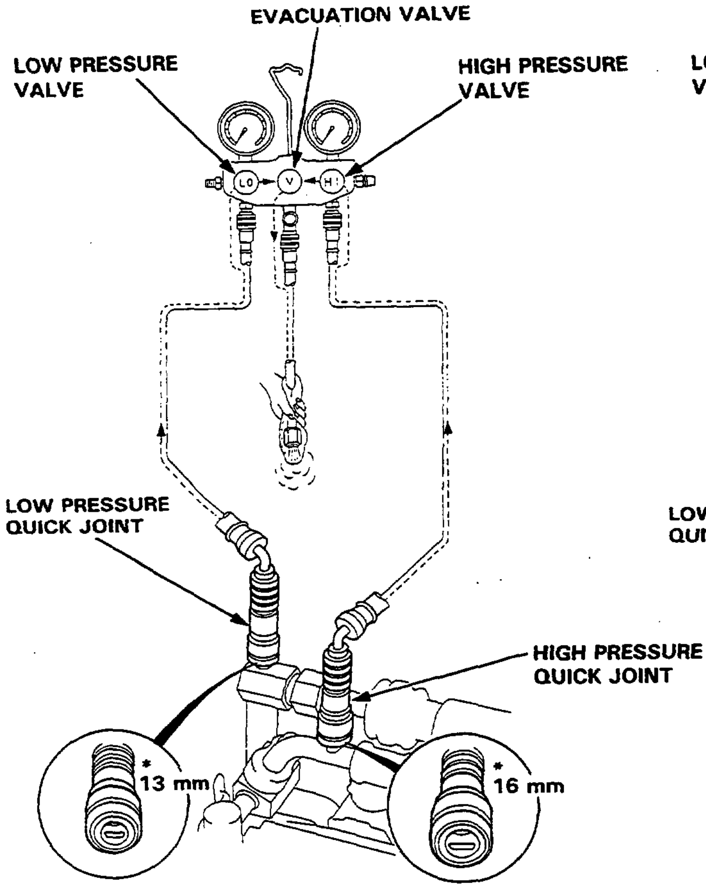
NOTE: Only use a gauge set for refrigerant HFC-134a (R-134a).

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 (in case of two valve gauge: open the evacuation 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.

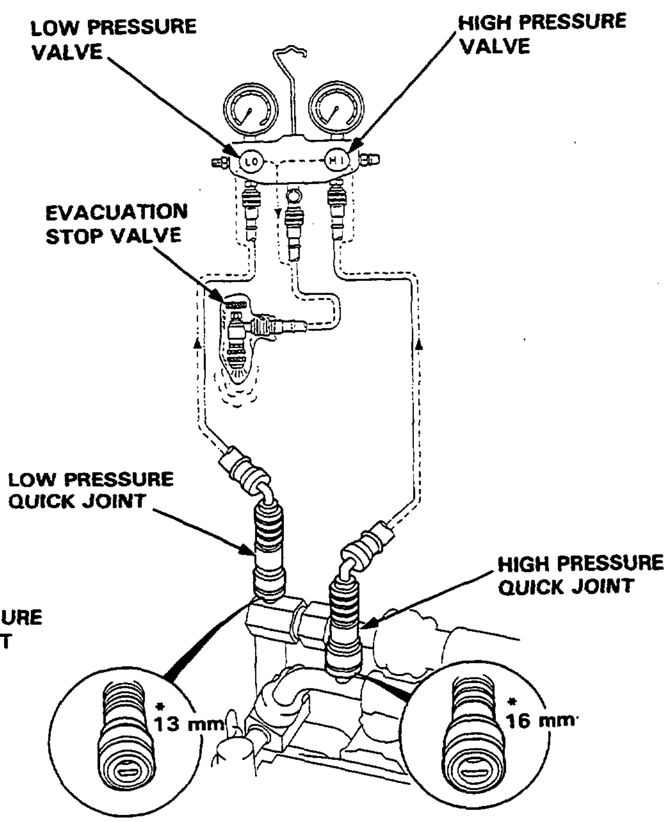
   CAUTION: If you allow refrigerant to escape too fast, compressor oil will be drawn out of the system.

5. After the high pressure gauge reading has dropped below 1,000 kPa (10 kgf/cm², 142 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



* INNER DIAMETER (mm)

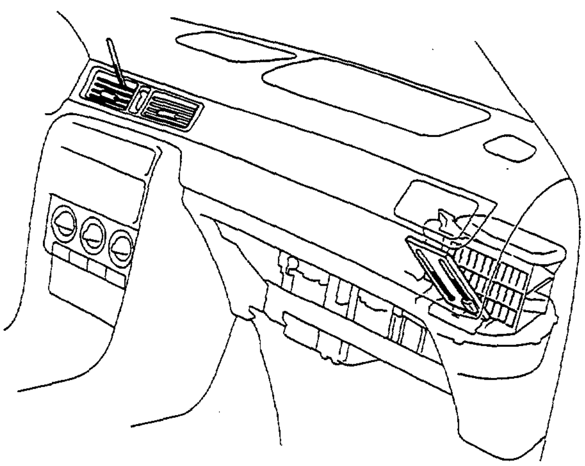
A/C System Service

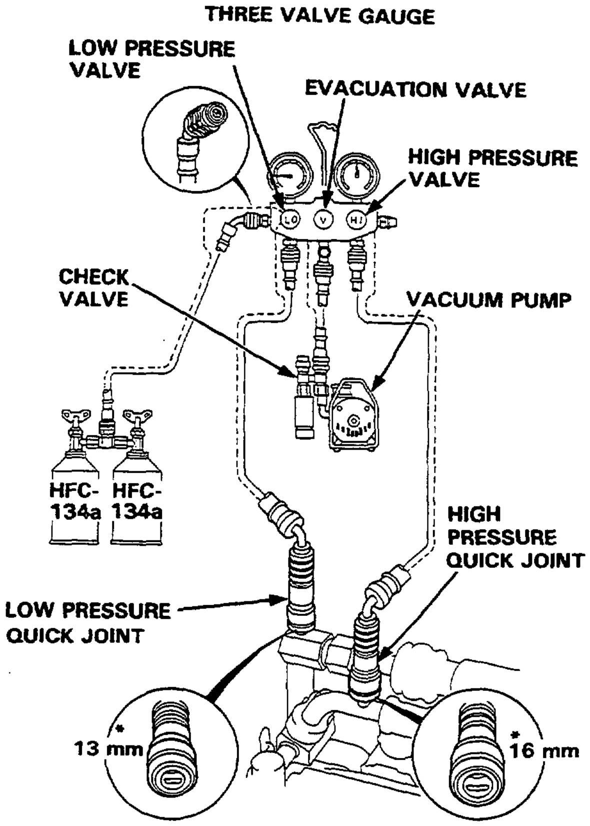
Performance Test

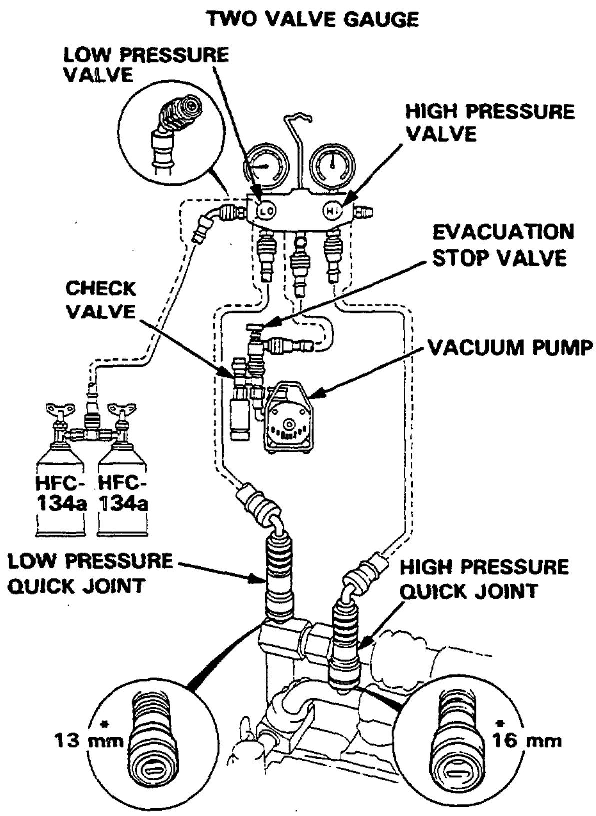
The performance test will help determine if the air conditioner system is operating within specifications.

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.

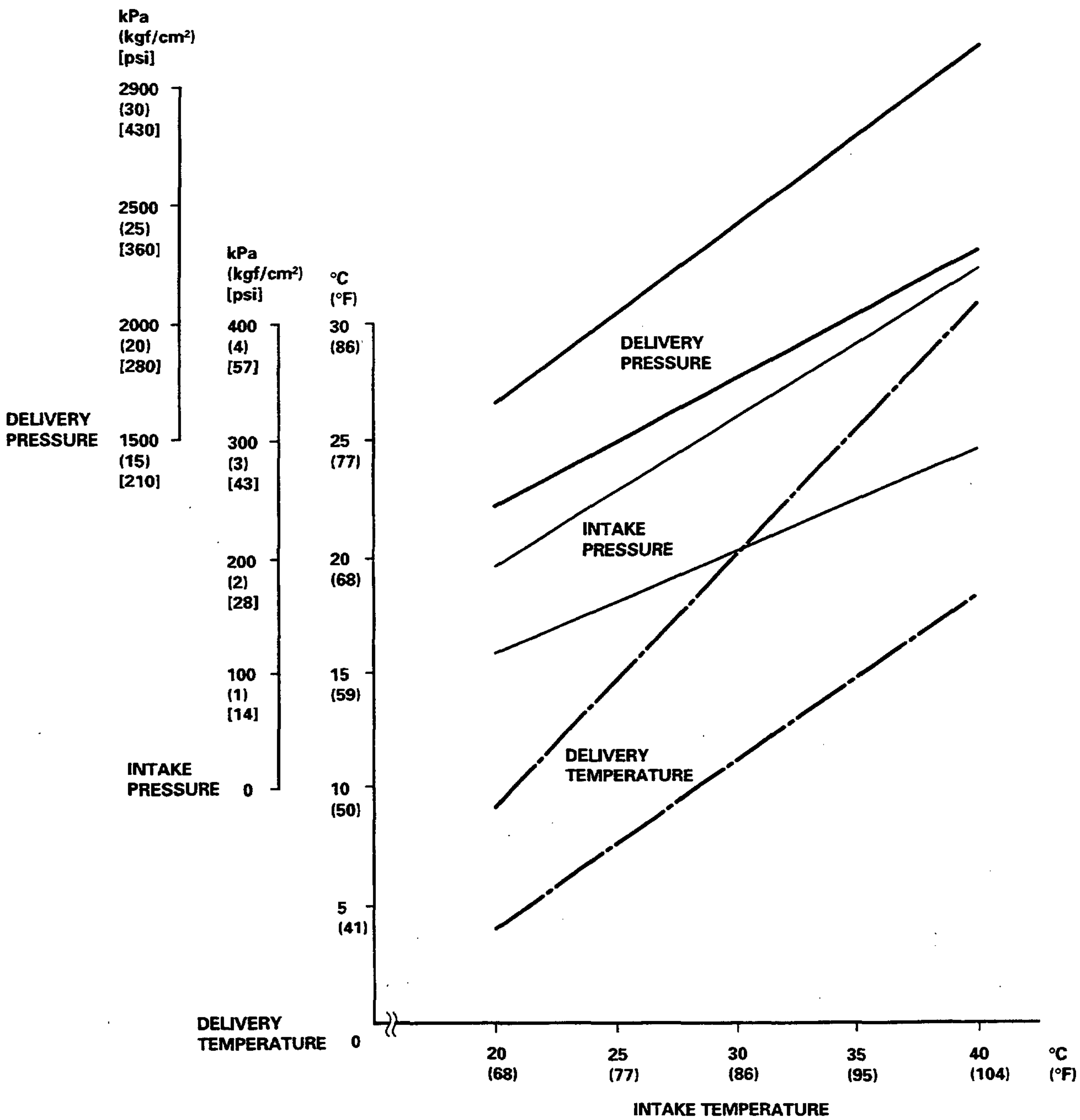
1. Connect the R-134a gauges as shown.
2. Insert a thermometer in the center vent outlet. Determine the relative humidity and ambient air temperature by a portable weather station or calling the local weather station.
3. Test conditioins:
   - Avoid direct sunlight.
   - Open hood.
   - Open front doors.
   - Set the temperature control lever to MAX. COOL, push the mode control button to VENT, and push the recirculation button.
   - 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-mentioned test conditions, read the delivery temperature from the thermometer in the dash vent, and the high and low system pressures from the A/C gauges.







* INNER DIAMETER (mm)



kPa
(kgf/cm²)
[psi]
2900
(30)
[430]
2500
(25)
[360]
2000
(20)
[280]
1500
(15)
[210]
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
DELIVERY PRESSURE
INTAKE PRESSURE
DELIVERY TEMPERATURE
20
(68)
25
(77)
30
(86)
35
(95)
40
(104)
°C
(°F)
INTAKE TEMPERATURE

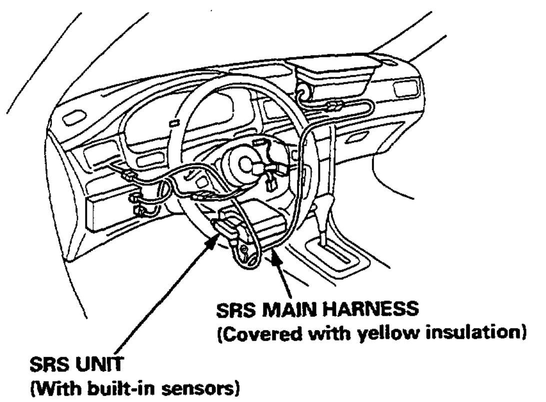
Pressure Test Chart

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	Discharge, evacuate and recharge the system. Evacuation: see page 22-35 Recharging: see page 22-36
	No bubbles in sight glass when condenser is cooled by water.	Excessive refrigerant in system	Discharge, evacuate and recharge the system.
	Reduced or on air flow through condenser.	• Clogged condenser or radiator fins • Condenser or radiator fan not working properly	• Clean. • Check voltage and fan speed. • Check fan direction.
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system	• Expansion valve • 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 or inlet valve • Faulty compressor seal	Replace compressor.
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum.	• Faulty expansion valve • Moisture in system	• Replace. • Flush and discharge, evacuate and recharge the system.
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigerant	• Check for leaks. • Discharge, evacuate and recharge the system. • 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 is cool (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 valve	Repair or replace.
	Suction pressure is lowered when condenser is cooled by water.	Excessive refrigerant in system	Discharge, evacuate and recharge the system.
	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 pressure abnormally high	Reduced air flow through condenser.	• Clogged condenser and/or radiator fins • Condenser or radiator fan not working properly	• Clean condenser and/or radiator. • Check voltage and fan speed. • Check fan direction.
	No bubbles in sight glass when condenser is cooled by water.	Excessive refrigerant in system	Discharge, evacuate and recharge the system.
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 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 compressor.
Compressor heat damage	Black soot inside compressor and hoses.	Restriction or leak in system.	Flush entire system, replace rubber lines or hoses.

Evaporator

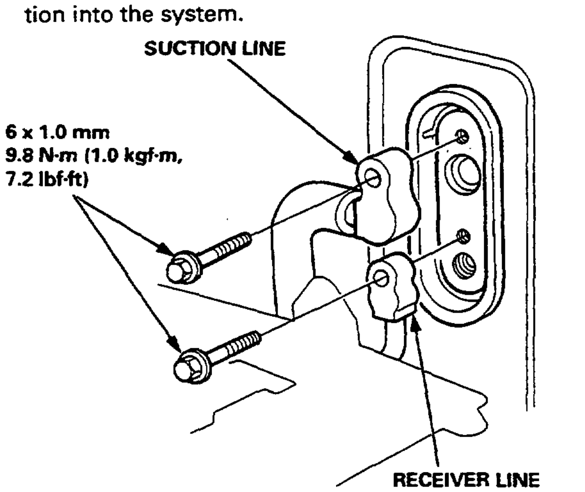
Replacement

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

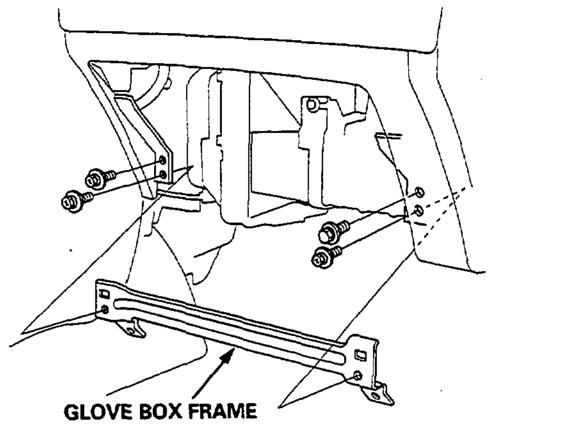


1. Discharge the refrigerant (see page 22-19).
2. Remove the bolts, and disconnect the receiver line and the suction line from the evaporator.

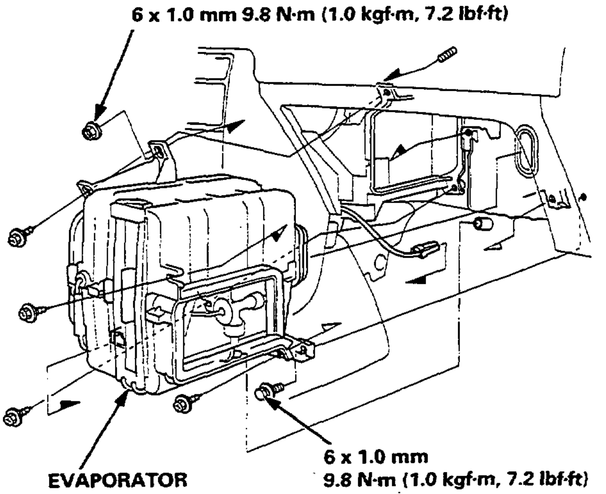
   NOTE: Plug or cap the lines immediately after disconnecting to avoid moisture and dust contamination into the system.



3. Remove the glove box (see section 20).
4. Remove the four bolts and the glove box frame.



5. Disconnect the connector from the A/C thermostat.
6. Remove the four self-tapping screws, mounting bolt and the mounting nut.
7. Disconnect the drain hose, and remove the evaporator.



8. Install in the reverse order of removal, and:
   - if you're installing a new evaporator, add refrigerant oil (SP-10: P/N 38899 – P13 – 003) (see page 22-18).
   - replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (SP-10: P/N 38899 – P13 – 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 22-36), and test its performance (see page 22-20).

Evaporator

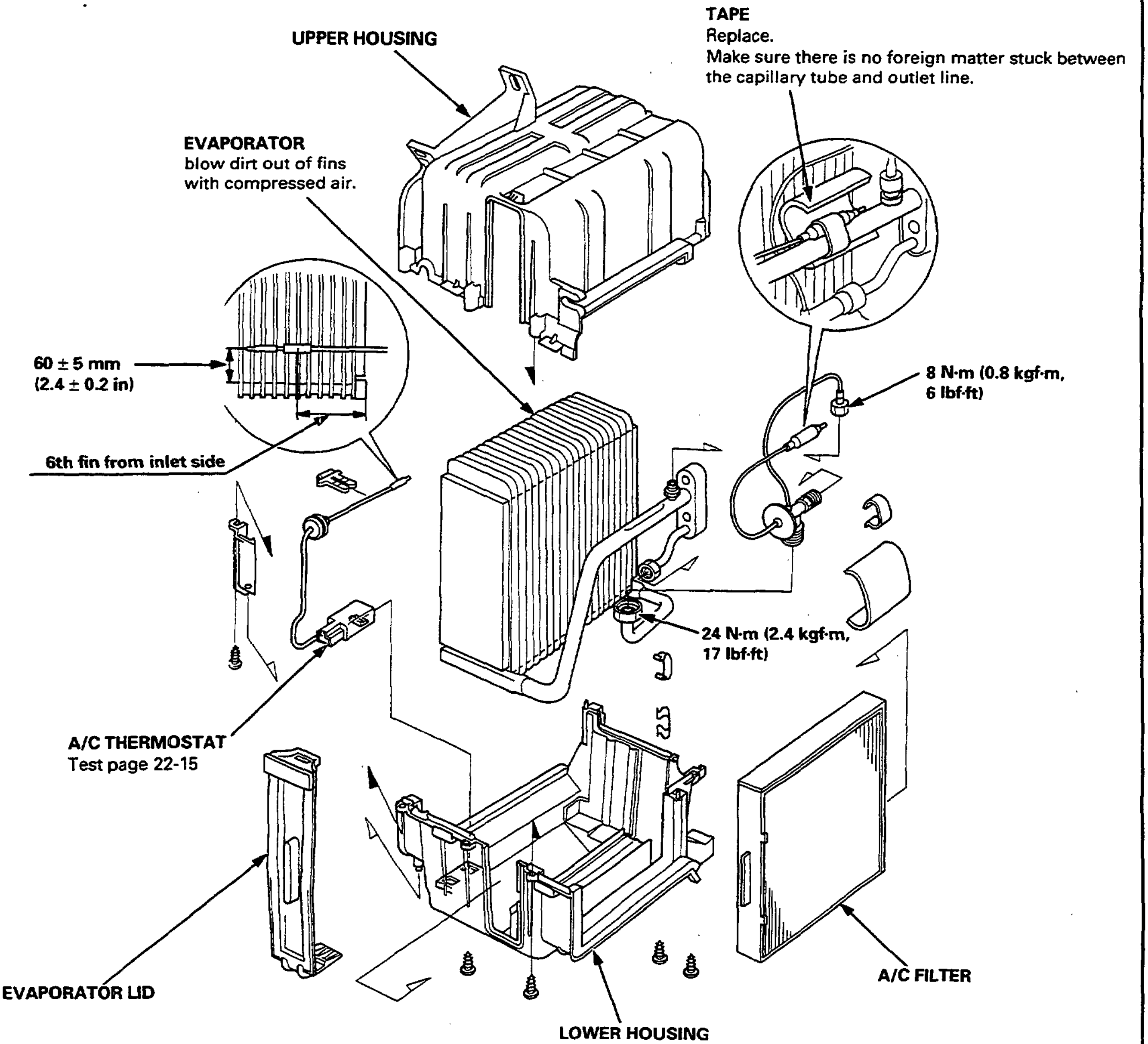
Overhaul

1. Pull out the A/C thermostat sensor from the evaporator fins.
2. Remove the self-tapping screws and clamps from the housing.
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, and:

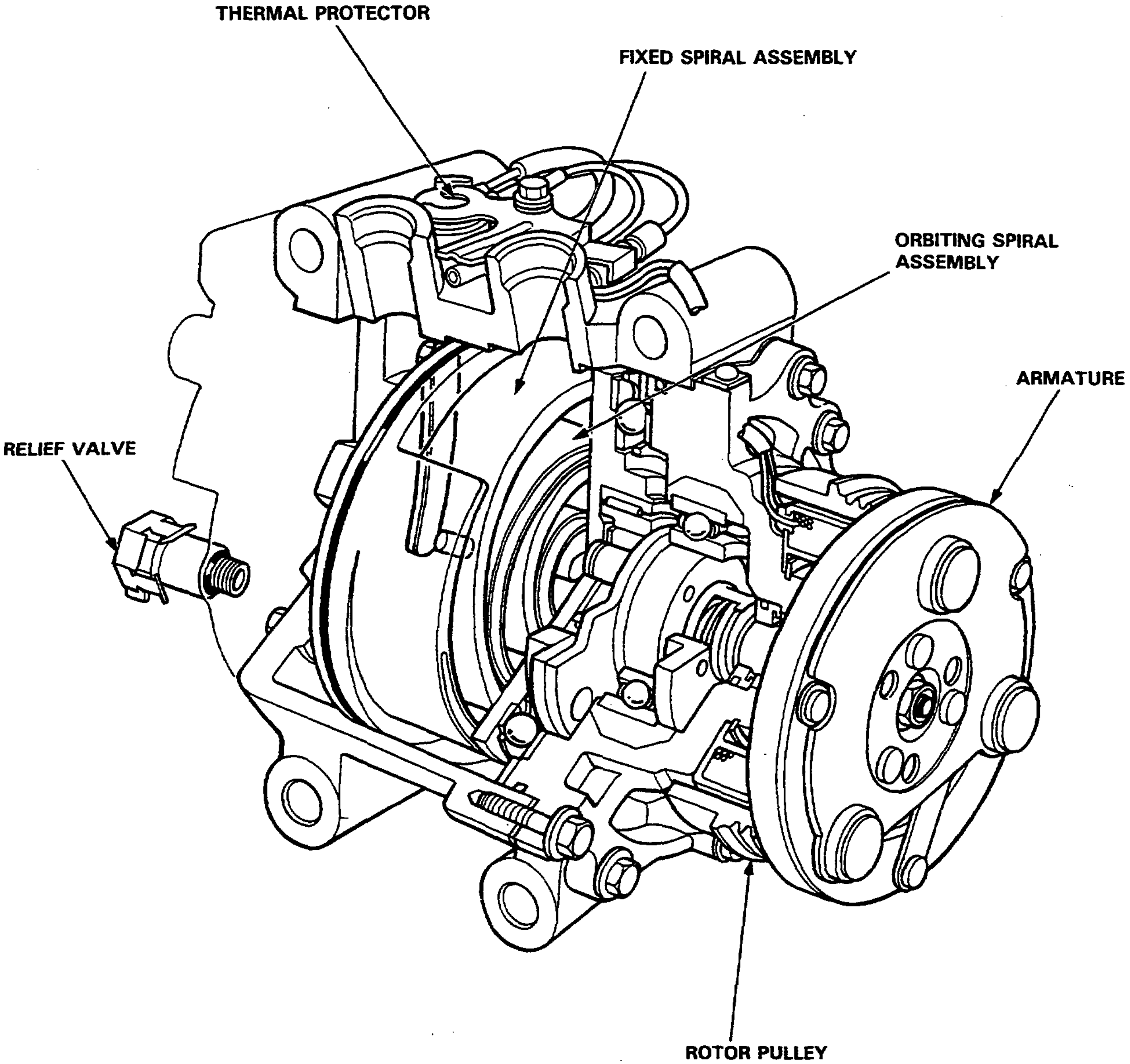
   - replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (SP-10: P/N 38899 – P13 – 003) before installing them.
     NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
   - install the expansion valve capillary tube with the capillary tube in contact with the suction line cirectly, and wrap it with tape.
   - reinstall the A/C thermostat sensor to its original location.



Compressor

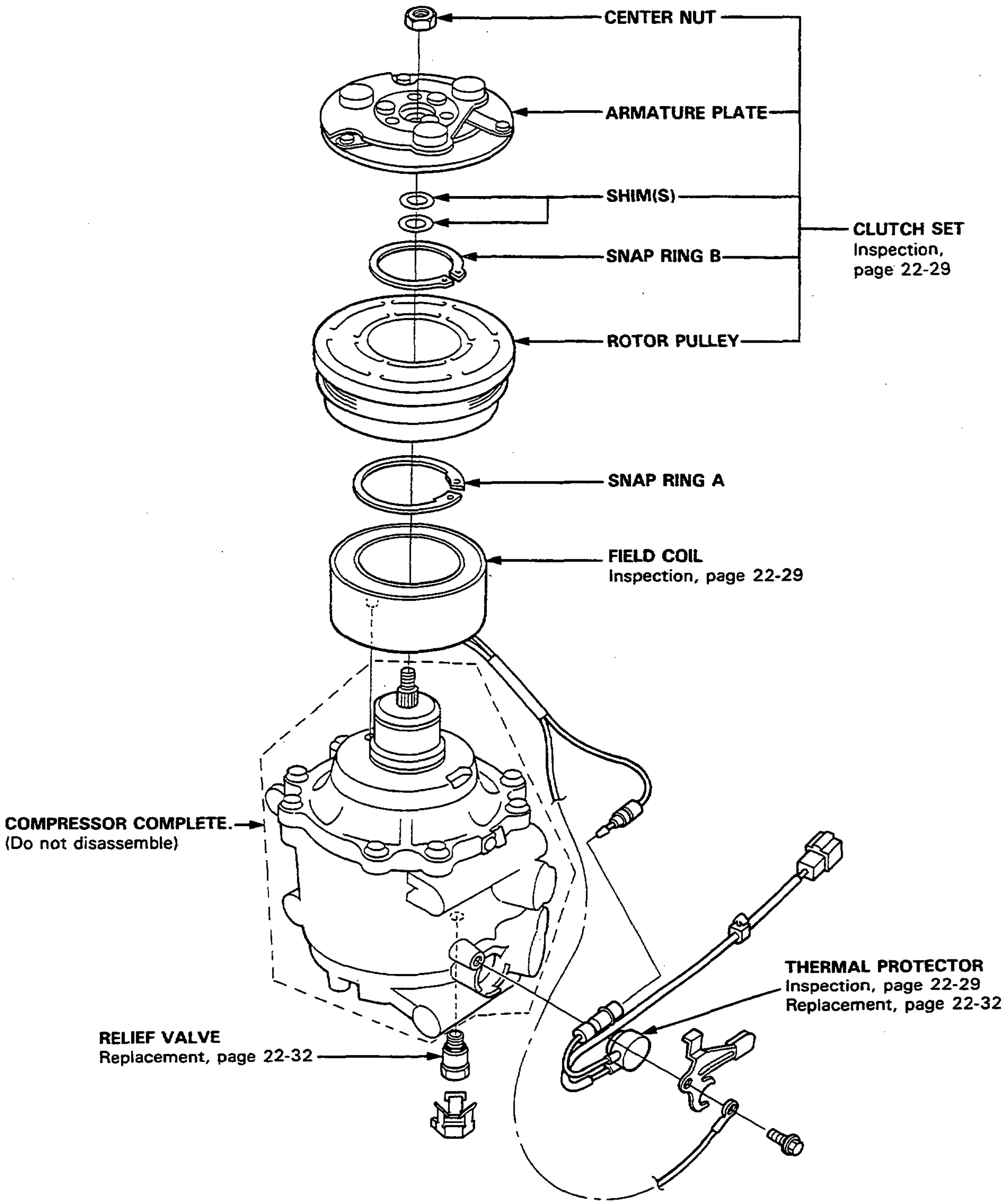
Description

This compressor is a Hadsys spiral type compressor for HFC-134a (R-134a). Refrigerant is compressed between a fixed spiral assembly and an orbiting spiral assembly. A thermal protector is installed on this compressor.



Compressor

Illustrated Index



Replacement

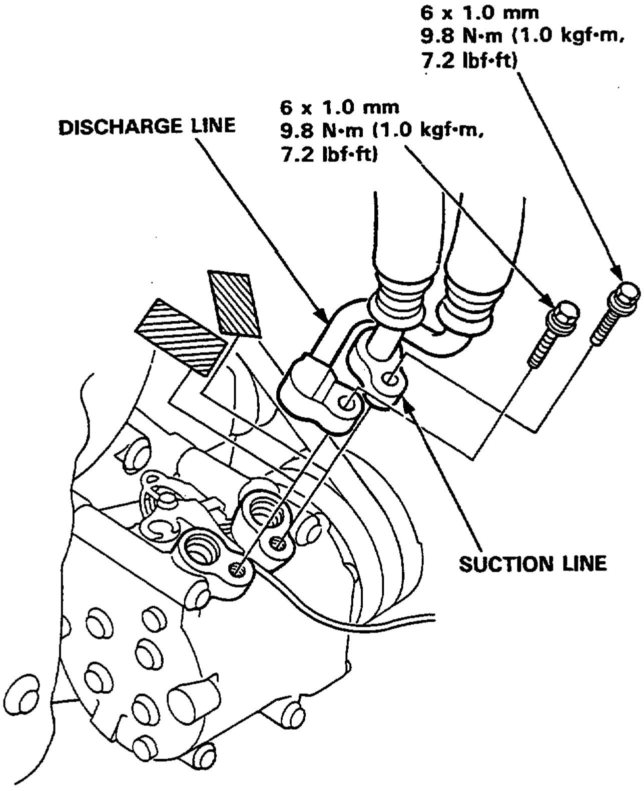
1. If the compressor is marginally operable, run the engine at idle speed and let the air conditioning work a few minutes, then shut the engine off and disconnect the battery negative cable.

2. Discharge the refrigerant (see page 22-19).

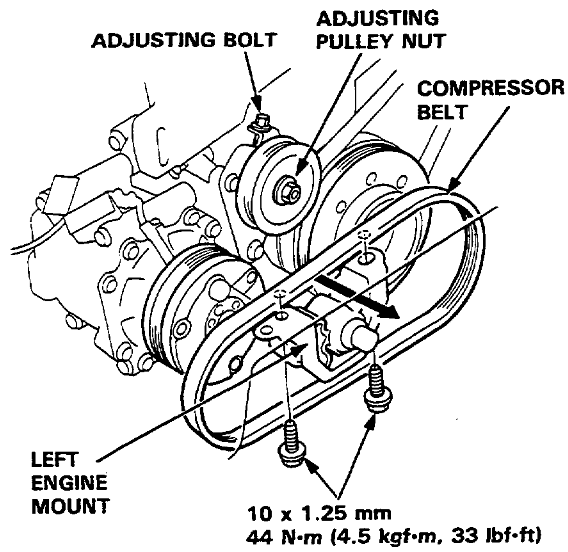
3. Remove the power steering pump (see section 17).

4. Remove the two bolts and disconnect the suction line and discharge line from the compressor.

   CAUTION: Cap the open fittings immediately to keep moisture out of the system.

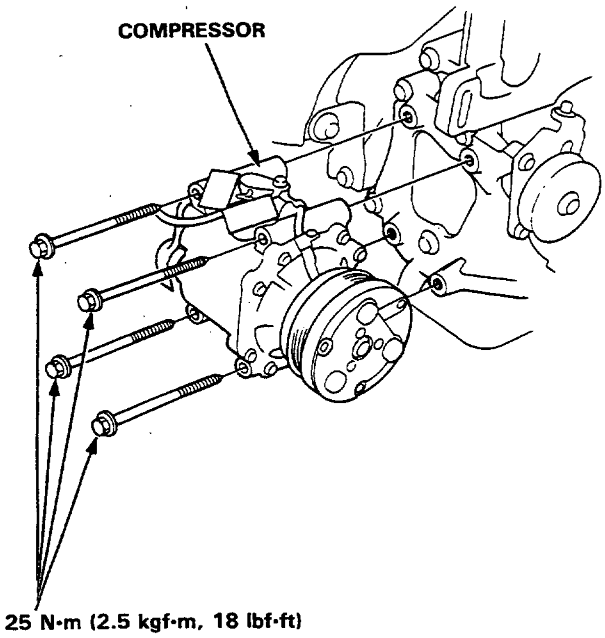


5. Loosen the adjusting pulley nut and adjusting bolt, and remove the compressor belt.
   Remove the two left engine mount bolts, and pass the belt through the gap between the body and left engine mount.



6. Disconnect the compressor clutch 1P connector.

7. Remove the four compressor mounting bolts and compressor.



(cont'd)

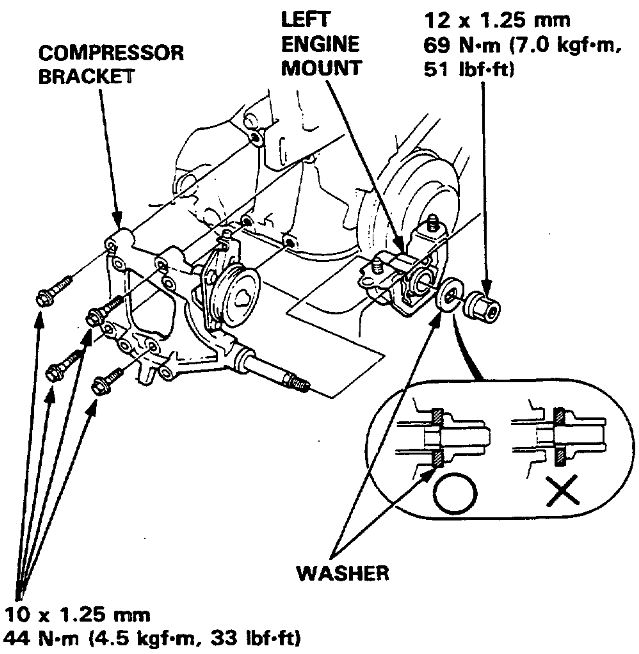
Replacement (cont'd)

8. If necessary, remove the compressor bracket as follows:

   – Remove the nut, washer and left engine mount.

   NOTE: When tightening the nut of the left engine mount, make sure the washer is set properly on the left engine mount as shown.

   – Remove the four compressor bracket mounting bolts and bracket.

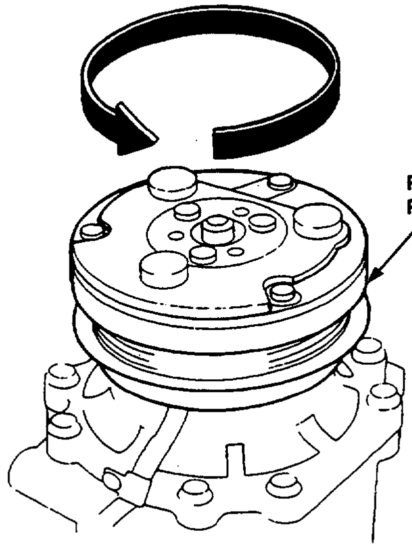


9. Install in the reverse order of removal, and:

   - 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 120 mℓ (4 fl·oz, 4.2 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 leakege.
   - Use refrigerant oil (SP-10: P/N 38899-P13-003) for R-134a Hadsys spiral 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.
   - Adjust the A/C compressor belt (see page 22-33).
   - Adjust the power steering pump belt (see section 17).
   - Charge the system (see page 22-36) and test its performance (see page 22-20).

Clutch Inspection

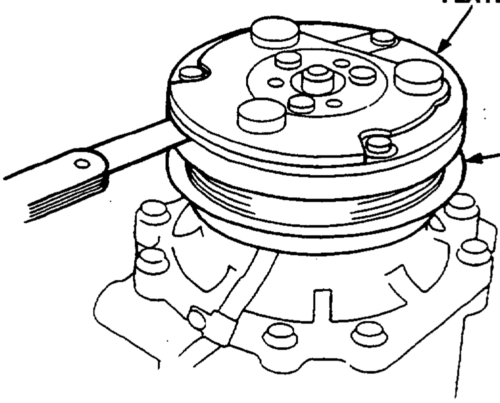
- Check the plated parts of the pressure plate for color changes, peeling or other damage. If there is damage, replace the clutch set.
- Check the pulley bearing play and drag by rotating the pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



- 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 22-30.

Clearance: 0.5 ± 0.15 mm (0.02 ± 0.006 in)

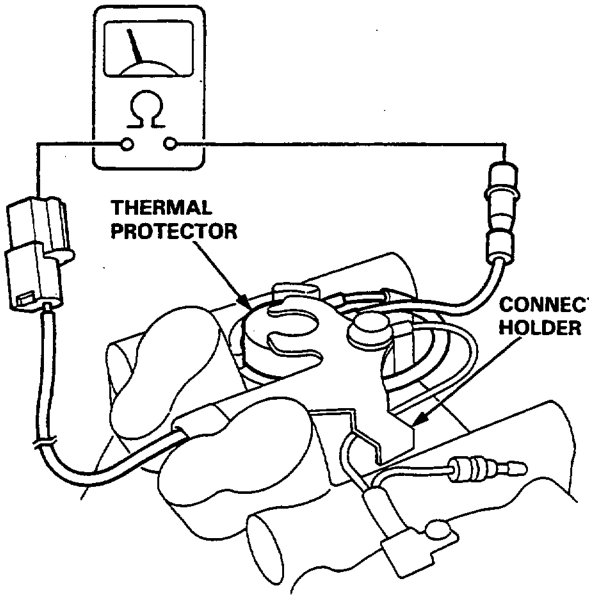
NOTE: The shims are available in three thicknesses: 0.1 mm, 0.2 mm, 0.4 mm and 0.5 mm



- Release the compressor clutch connector from the connector holder.

Check the thermal protector for continuity.

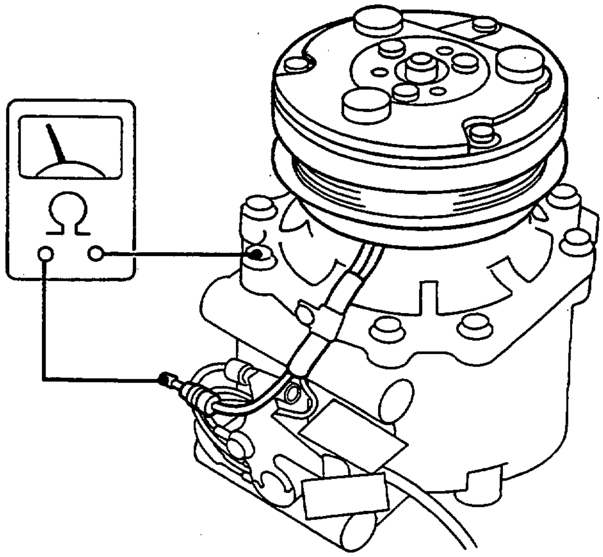
If there is no continuity, replace the thermal protector.



- Check resistance of the field coil.

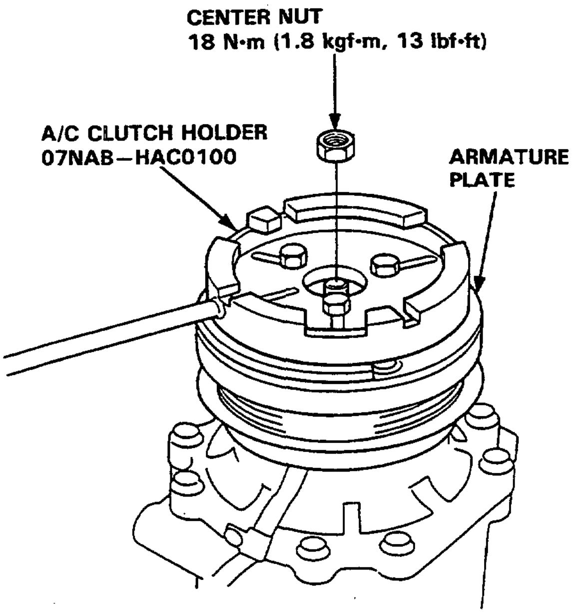
Field Coil Resistance: 3.2 ± 0.15 ohms at 20°C (68°F)

If resistance is not within specifications, replace the field coil.

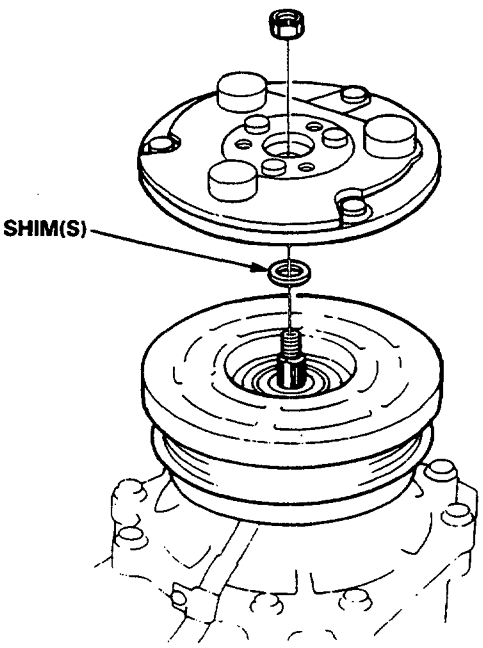


Clutch Overhaul

1. Remove the center nut while holding the armature plate.

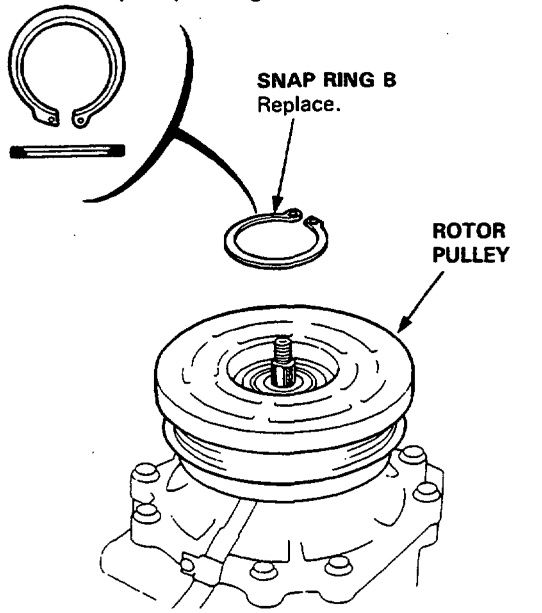


2. Remove the armature plate by pulling it up by hand.



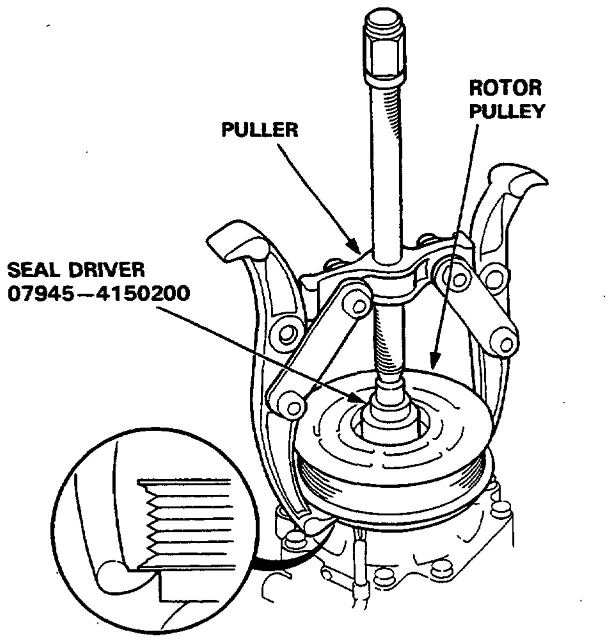
3. Remove the snap ring B with a snap ring pliers.

NOTE:
- Once the snap ring B was removed, replace it with a new one.
- Be careful not to damage the compressor body and rotor pulley during removal/installation.



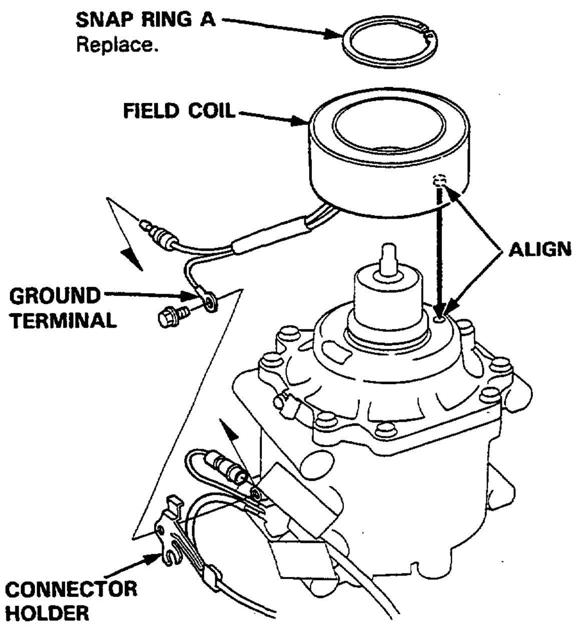
4. Remove the rotor pulley from the shaft with a puller and the special tool.

NOTE: Put the claws of the puller on the back of the rotor pulley, not on the belt area; otherwise the rotor pulley can be damaged.



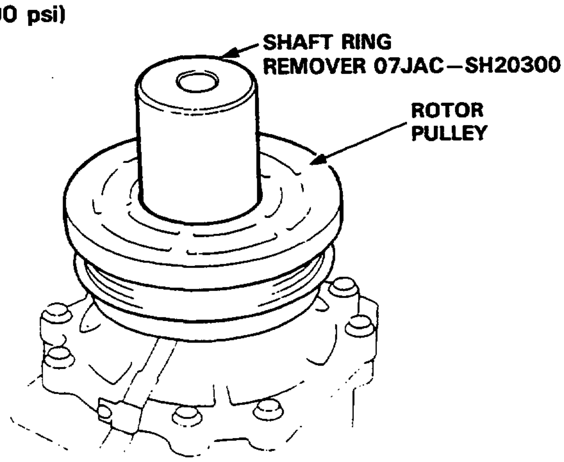
5. Remove the snap ring A with a snap ring pliers. Release the field coil connector from the connector holder, and disconnect the connector and field coil ground terminal.
   Remove the field coil from the compressor.

   NOTE:
   - Once the snap ring A is removed, replace it with a new one.
   - When installing the field coil, align the boss on the field coil with the hole in the compressor.



6. Position the rotor pulley squarely over field coil. Press the rotor pulley onto the compressor boss with the special tool.
   If the rotor pulley does not press on straight, remove it and check the rotor pulley and compressor boss for burrs or damage.

   CAUTION:
   Maximum press load: 39200 kPa (400 kgf/cm^2, 5690 psi)



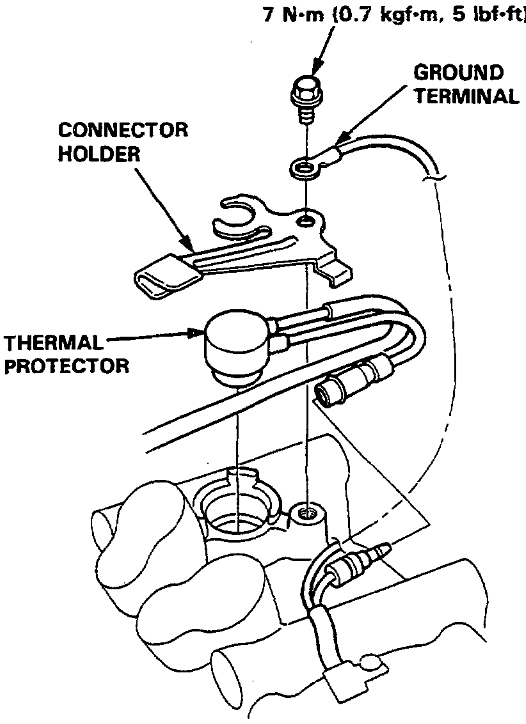
7. Install in the reverse order of removal, and:
   - Clean the rotor pulley and compressor sliding surfaces with non-petroleum solvent.
   - Install the snap rings with the chamfered side facing out and make sure the snap rings are in the groove completely.
   - After installing, make sure that the rotor pulley turns smoothly.
   - Route and clamp the wires properly or they can be damaged by the rotor pulley.

Compressor

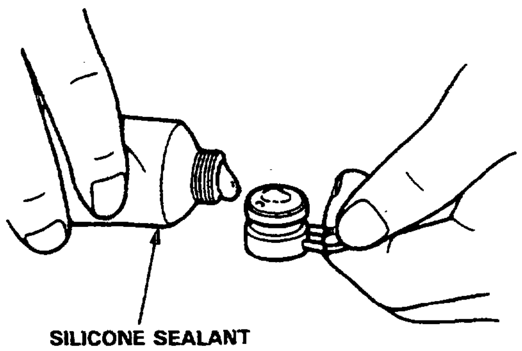
Thermal Protector Replacement

1. Remove the bolt, ground terminal, and retainer.

2. Remove the thermal protector.
   Remove the residue of silicone sealant from the top of the thermal protector.



3. Apply silicone sealant to the top of the thermal protector.



4. Install in the reverse order of removal.

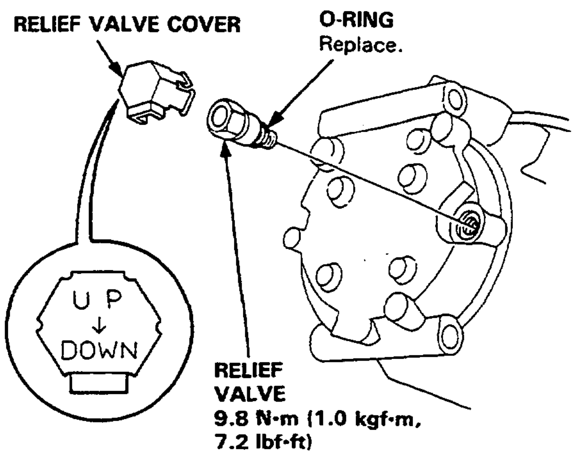
Relief Valve Replacement

NOTE: A relief valve, through which refrigerant has escaped once, must be replaced with a new one.

1. Discharge the refrigerant (see page 22-19).

2. Remove the relief valve cover, 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.



3. Clean the mating surfaces.

4. Replace the relief valve O-ring with a new one and apply a thin coat of refrigerant oil (SP-10: P/N 38899-P13-003) 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.

5. Install and tighten the relief valve.

6. Put the cover so on the relief valve that the arrow directs downwards as shown in the illustration above.

7. Charge the system, and test its performance.

Adjustment

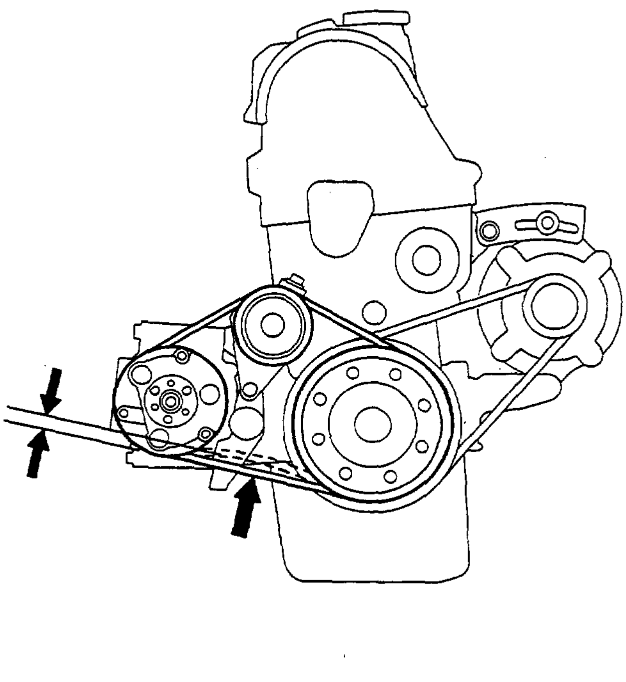
Deflection Method

1. Apply a force of 98 N (10 kgf, 22 lbf), and measure the deflection between the A/C compressor and the crankshaft pulley.

   Compressor Belt
   Deflection:
   Used Belt: 6.5 – 10.5 mm (0.26 – 0.41 in)
   New Belt: 5.0 – 7.0 mm (0.20 – 0.28 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 adjust pulley bracket pivot bolt and the adjusting bolt lock nut of the A/C compressor belt.
3. Turn the adjusting bolt to get proper belt tension, then retighten the adjust pulley bracket pivot bolt and the adjusting bolt lock nut.
4. Recheck the deflection of the A/C compressor belt.



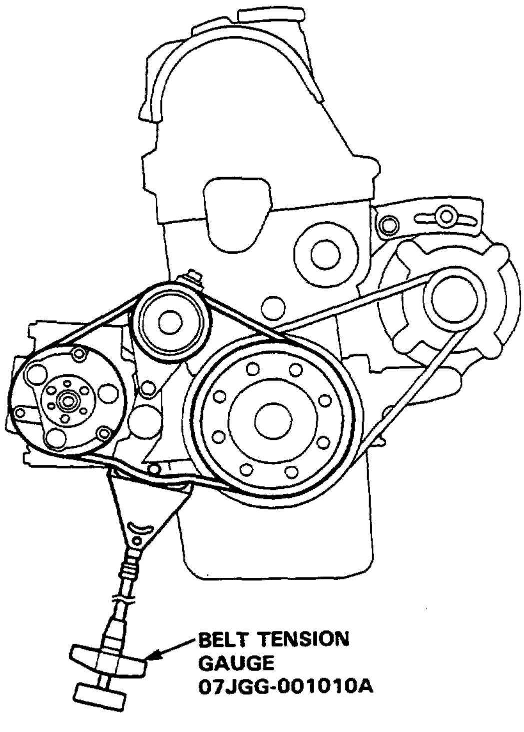
Tension Gauge Method

1. Attach the belt tension gauge to the A/C compressor belt as shown below, and measure the tension of the belt.

   Compressor Belt
   Tension:
   Used Belt: 340 – 490 N (35 – 50 kgf, 77 – 110 lbf)
   New Belt: 590 – 785 N (60 – 80 kgf, 132 – 176 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 adjust pulley bracket pivot bolt and the adjusting bolt lock nut of the A/C compressor belt.
3. Turn the adjusting bolt to get proper belt tension, then retighten the adjust pulley bracket pivot bolt and the adjusting bolt lock nut.
4. Recheck the tension of the A/C compressor belt.



Condenser

Replacement

1. Discharge the refrigerant (see page 22-19).

2. Disconnect the A/C pressure switch connector and condenser fan connector.

3. Remove the compressor clutch connector from the condenser fan shroud.

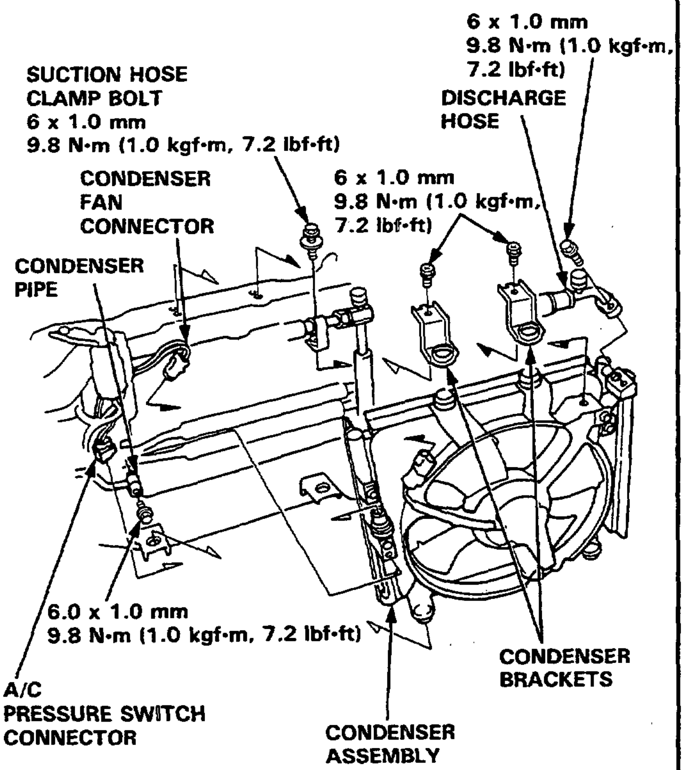
4. Disconnect the discharge hose and condenser pipe.

   CAUTION: Cap the open fittings immediately to keep moisture and dirt out of the system.

5. Remove the suction hose clamp bolt and condenser brackets.

6. Remove the condenser assembly by pulling it up.

   NOTE:
   - Be careful not to damage the condenser fins when removing/installing the condenser.
   - Be careful not to hit the side of the rediator during removal/installation.



7. Install in the reverse order of removal, and:

   - If you're installing a new condenser, add refrigerant oil (SP-10: P/N 38899-P13-003) (see page 22-18).
   - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil (SP-10: P/N 38899-P13-003) before installing them.
     NOTE: Be sure to use the right O-rings for HFC-134a (R-134a) a to avoid leakage.
   - Charge the system (see page 22-36) and test its performance (see page 22-20).

Evacuation

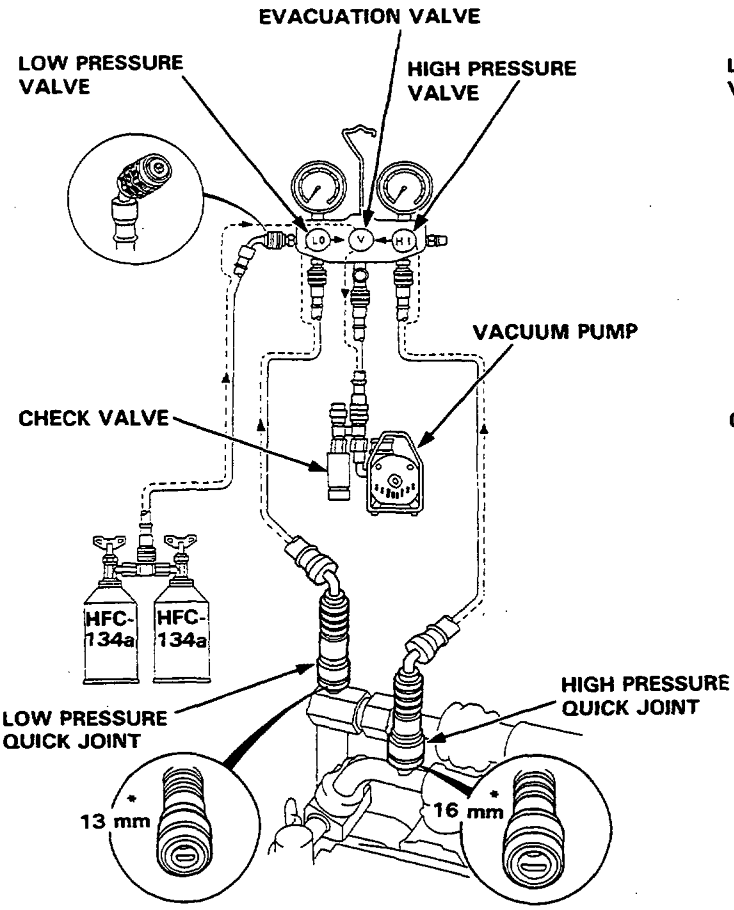
NOTE:
- Only use a gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

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 reciever/dryer should be replaced.)
2. Connect a R-134a refrigerant gauge, pump and refrigerant containers (cans of R-134a) as shown.

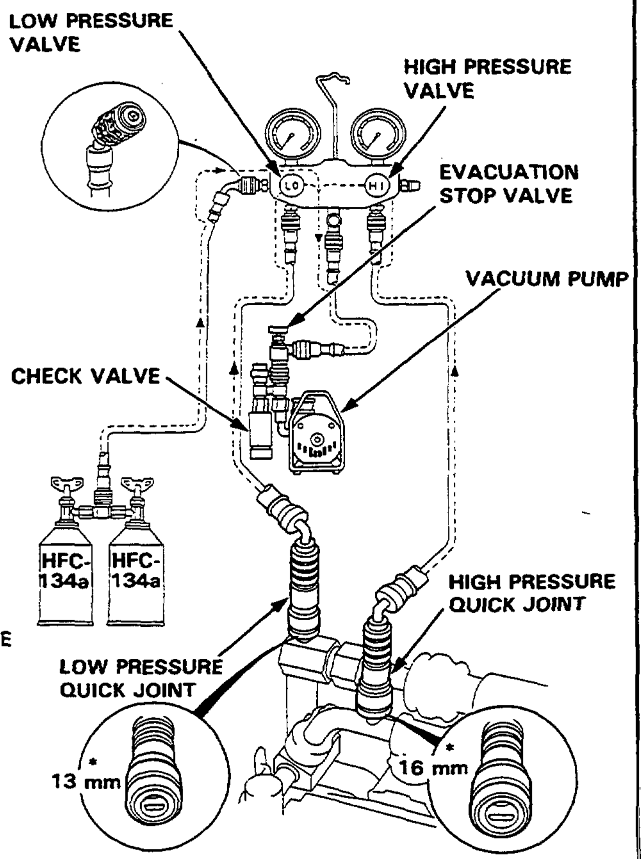
   NOTE: Do not open the cans.
3. Start the pump, then open both pressure valves, and the evacuation valve (in case of two valve gauge: open the evacuation stop valve). Run the pump for about 15 minutes. Close both pressure valves and the evacuation valve (in case of two valve gauge: close the evacuation 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



* INNER DIAMETER (mm)

A/C System Service

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 into 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.
   Push the mode control button to 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: 550 $^{+0}_{-50}$ g (19.4 $^{+0}_{-1.8}$ oz)

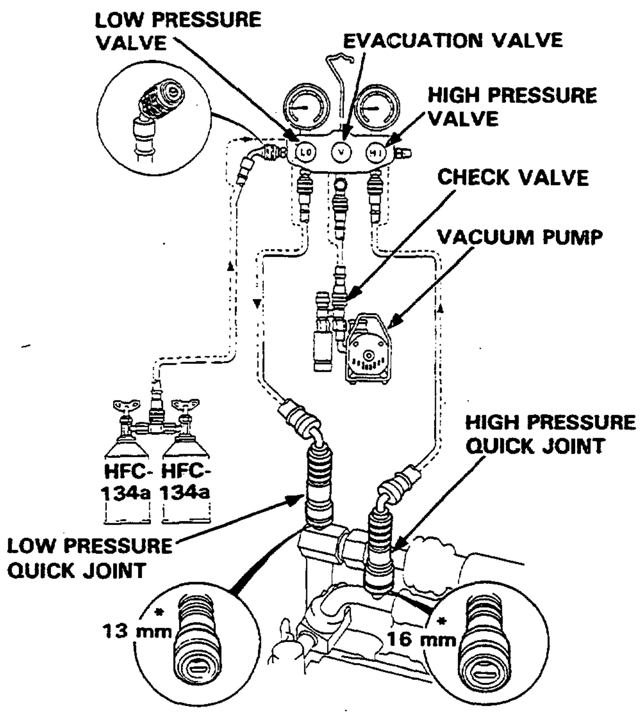
5. When fully charged, close the low pressure valve and the refrigerant cans. Check the system.

6. Stop the engine and disconnect the charge hose quickly.

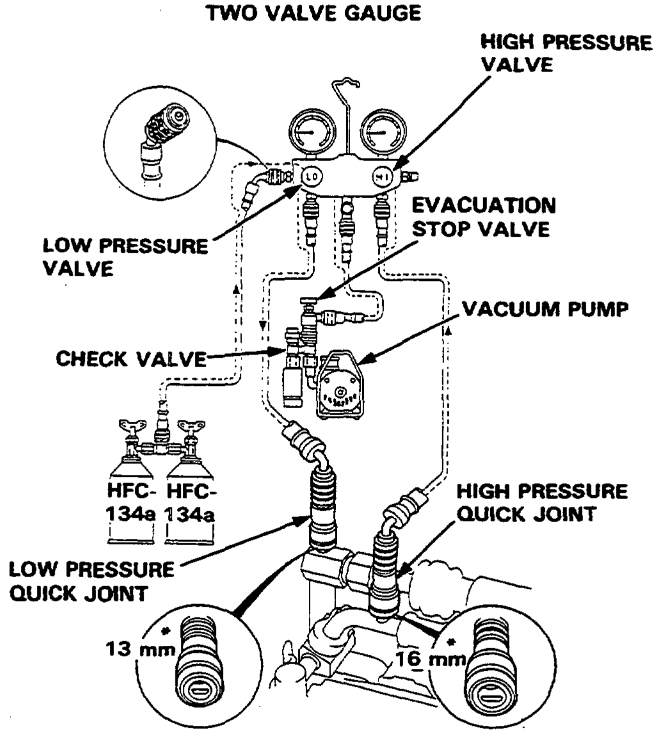
7. Check the system for leaks using a leak detector proper to refrigerant R-134a.

   NOTE: Particularly check for leaks around the compressor, condenser, and receiver/dryer.

THREE VALVE GAUGE



TWO VALVE GAUGE



* INNER DIAMETER (mm)

Leak Test

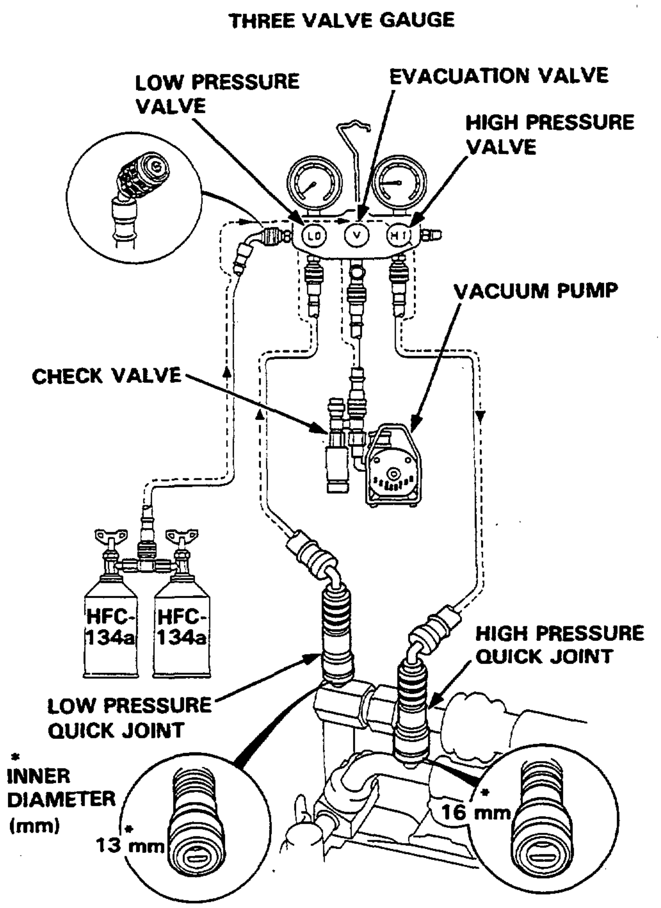
NOTE:
- Only use a gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

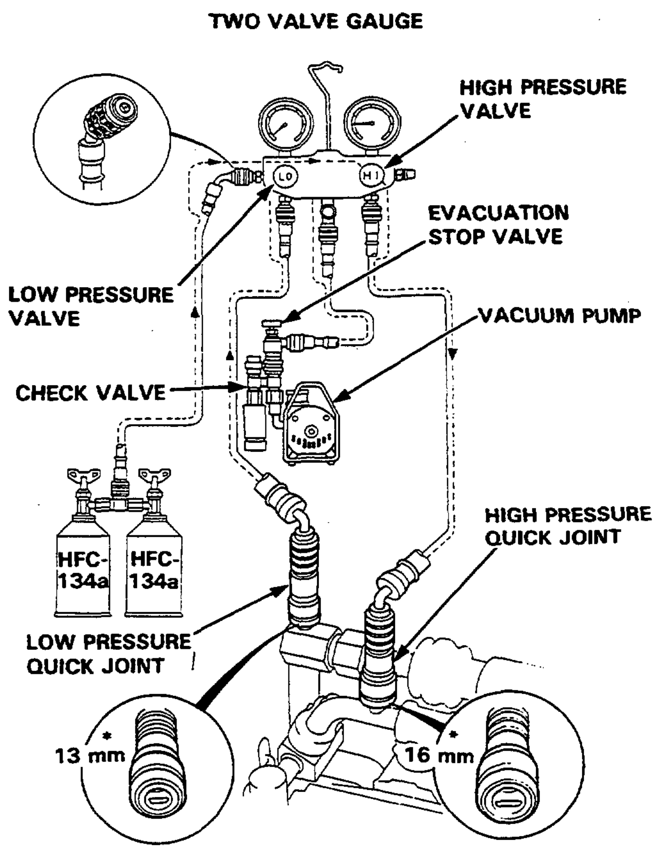
⚠ WARNING When handling refrigerant (R-134a):
- **always wear eye protection.**
- **do not let refrigerant get on your skin or in your eyes. If it does:**
  - **do not rub your eyes or skin.**
  - **splash large quantities of cool water into your eyes or on your skin.**
  - **rush to a physician or hospital 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 (in case of two valve gauge: close the evacuation stop valve).
2. Open the cans.
3. Open the high pressure valve to charge the system to about 98 kPa (1.0 kgf/cm², 14 psi), then close it.

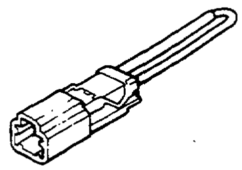
   NOTE: Close the low pressure valve.
4. Check the system for leaks using a leak detector proper to refrigerant R-134a.

   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).





Ref. No.	Tool Number	Description	Qty.	Remark
①	07PAZ - 0010100	SCS Short Connector	1	
②	07HAZ - SG00500	Deployment Tool	1	
③	07MAZ - SP00100	Short Connector A Set	1	
④	07MAZ - SP00500	Test Harness B	1	
⑤	07LAZ - SL40300	Test Harness C	1	
⑥	07QAZ - SR30100	Jumper Wire	4	
⑦	07MAJ - SP00200	Keyless Entry Checker	1	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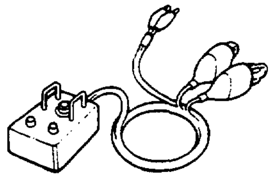
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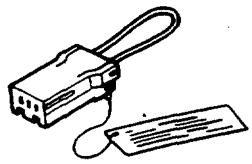
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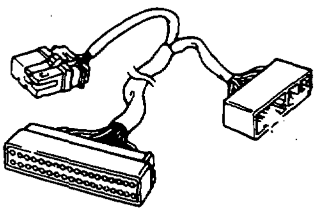
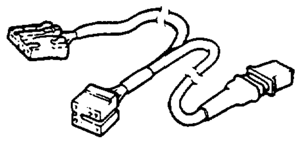

④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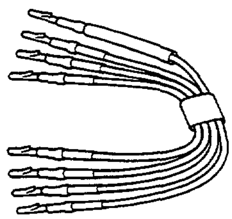
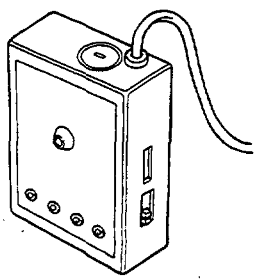

⑥


⑦

Troubleshooting

Tips and Precautions

Before Troubleshooting

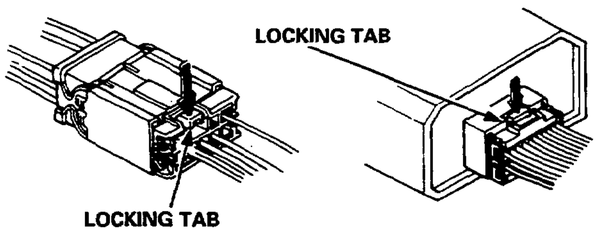
- Check applicable fuses in the appropriate fuse/relay box.
- Check the battery for damage, state of charge, and clean and tight connections.
- Check the alternator belt tension.

CAUTION:

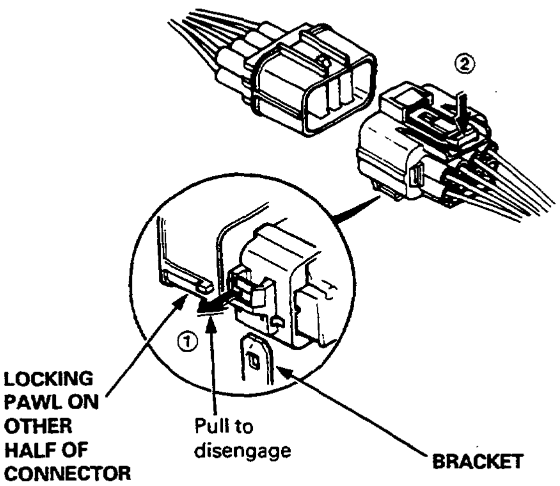
- **Do not quick-charge a battery unless the battery ground cable has been disconnected, otherwise you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the battery ground cable loosely connected or you will severely damage the wiring.**

Handling Connectors

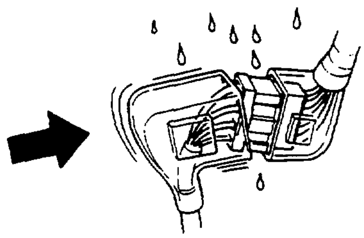
- Make sure the connectors are clean and have no loose wire terminals.
- Make sure multiple cavity connectors are packed with grease (except watertight connectors).
- All connectors have push-down release type locks.



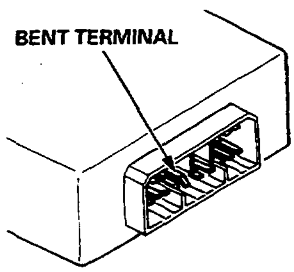
- Some connectors have a clip on their side used to attach them to a mount bracket on the body or on another component. This clip has a pull type lock.
- Some mounted connectors cannot be disconnected unless you first release the lock and remove the connector from its mount bracket.



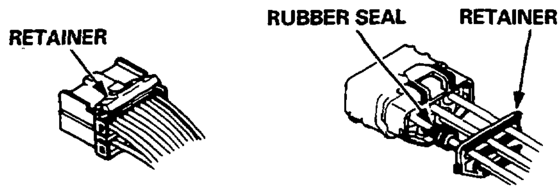
- Never try to disconnect connectors by pulling on their wires; pull on the connector halves instead.
- Always reinstall plastic covers.



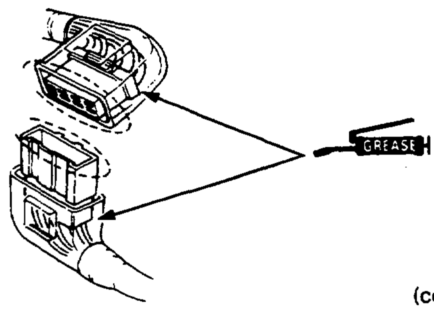
- Before connecting connectors, make sure the terminals are in place and not bent.



- 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.

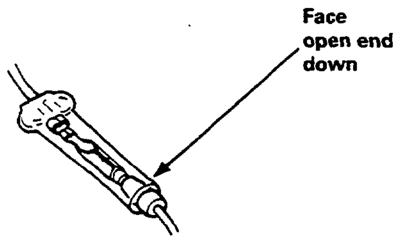


(cont'd)

Troubleshooting

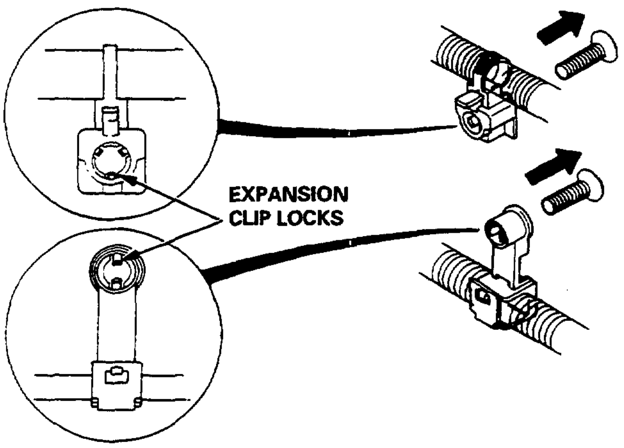
Tips and Precautions (cont'd)

- 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.

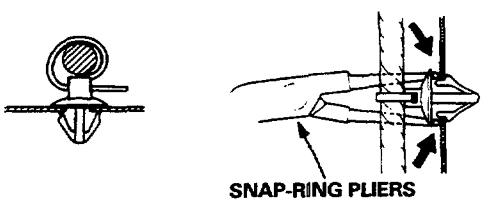


Handling Wires and Harnesses

- 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.

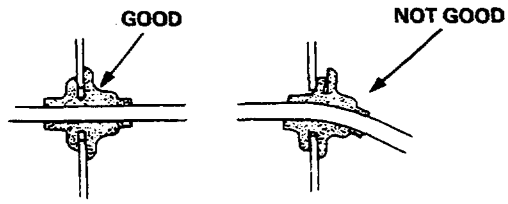


Slip pliers under the clip base and through the hole at an angle, then squeeze the expansion tabs to release the clip.



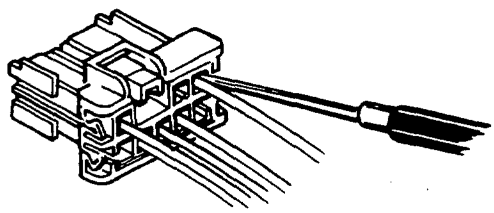
- After installing harness clips, make sure the harness doesn't interfere with any moving parts.
- Keep wire harnesses away from exhaust pipes and other hot parts, from sharp edges of brackets and holes, and from exposed screws and bolts.

- Seat grommets in their grooves properly.

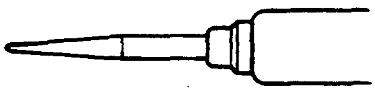


Testing and Repairs

- 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.

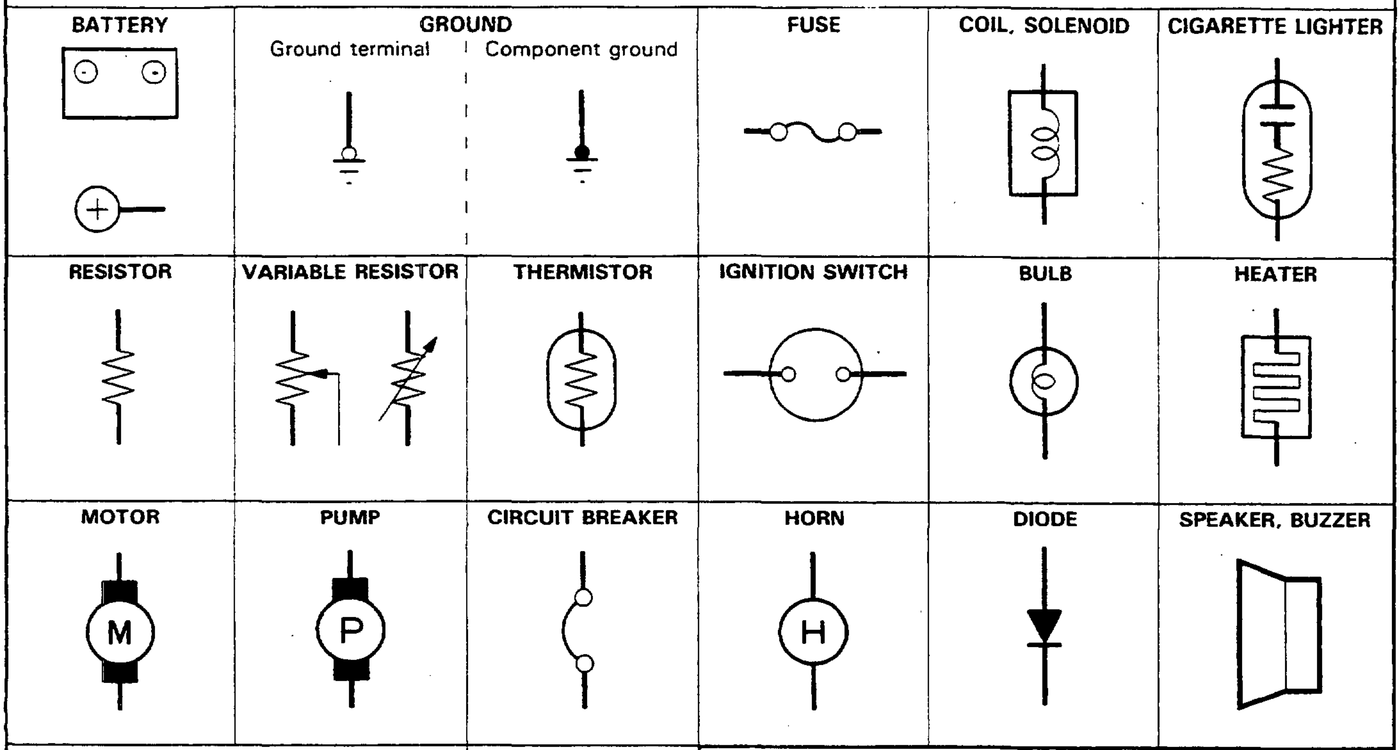
3. Isolate The Problem By Testing The Circuit
   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

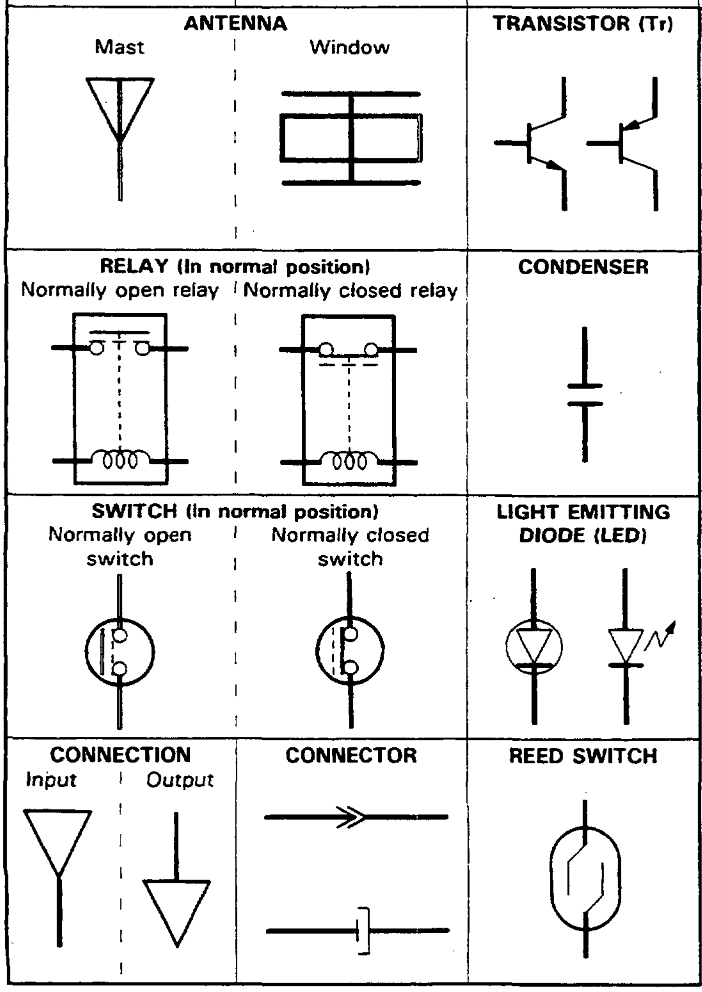
4. Fix The Problem
   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

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



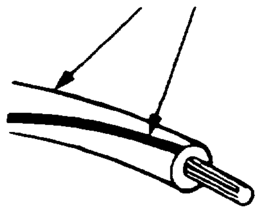


Wire Color Codes

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

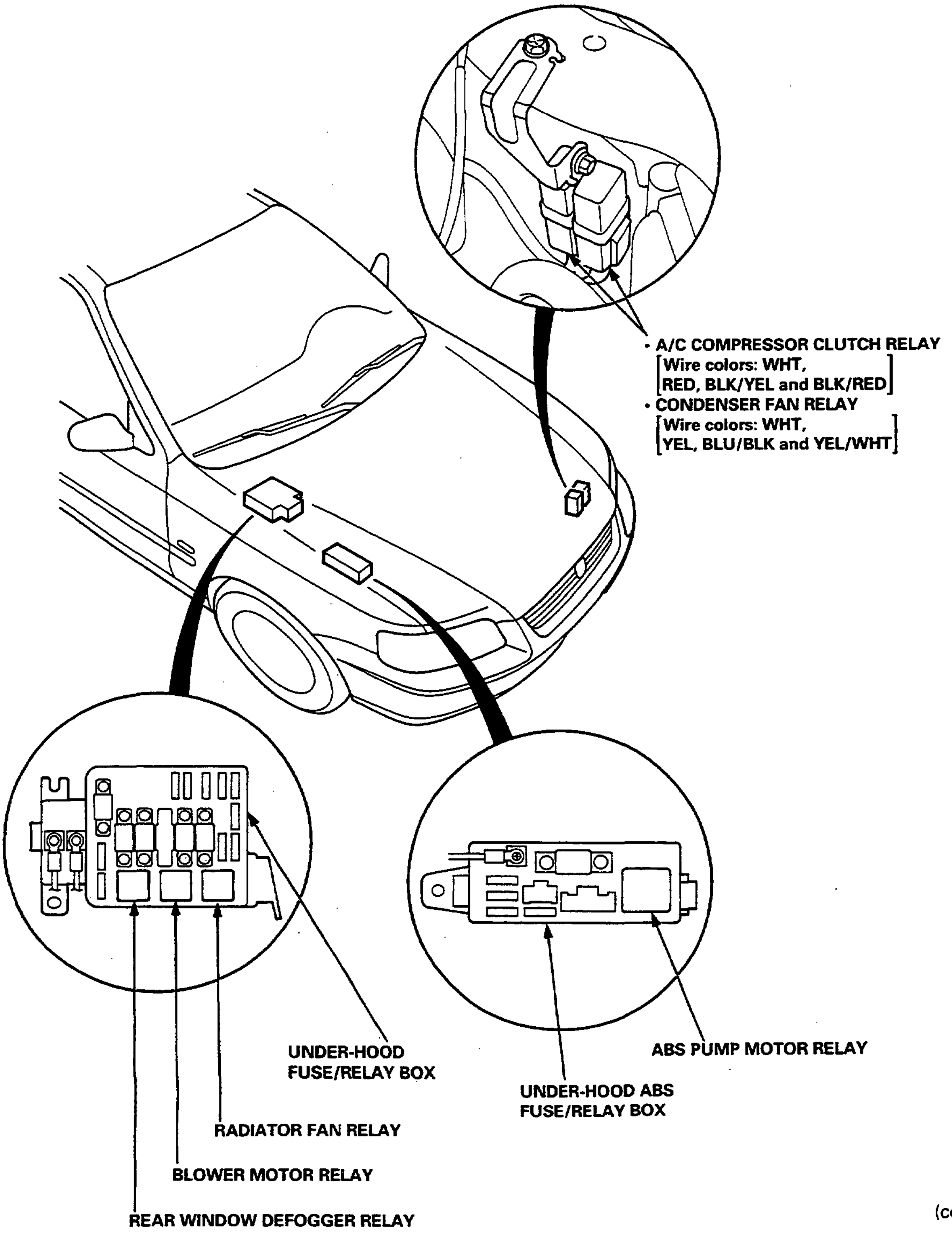
The wire insulation has one color or one color with another color stripe. The second color is the stripe.



Relay and Control Unit Locations

Engine Compartment

LHD type:



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Relay and Control Unit Locations

Engine Compartment (cont'd)

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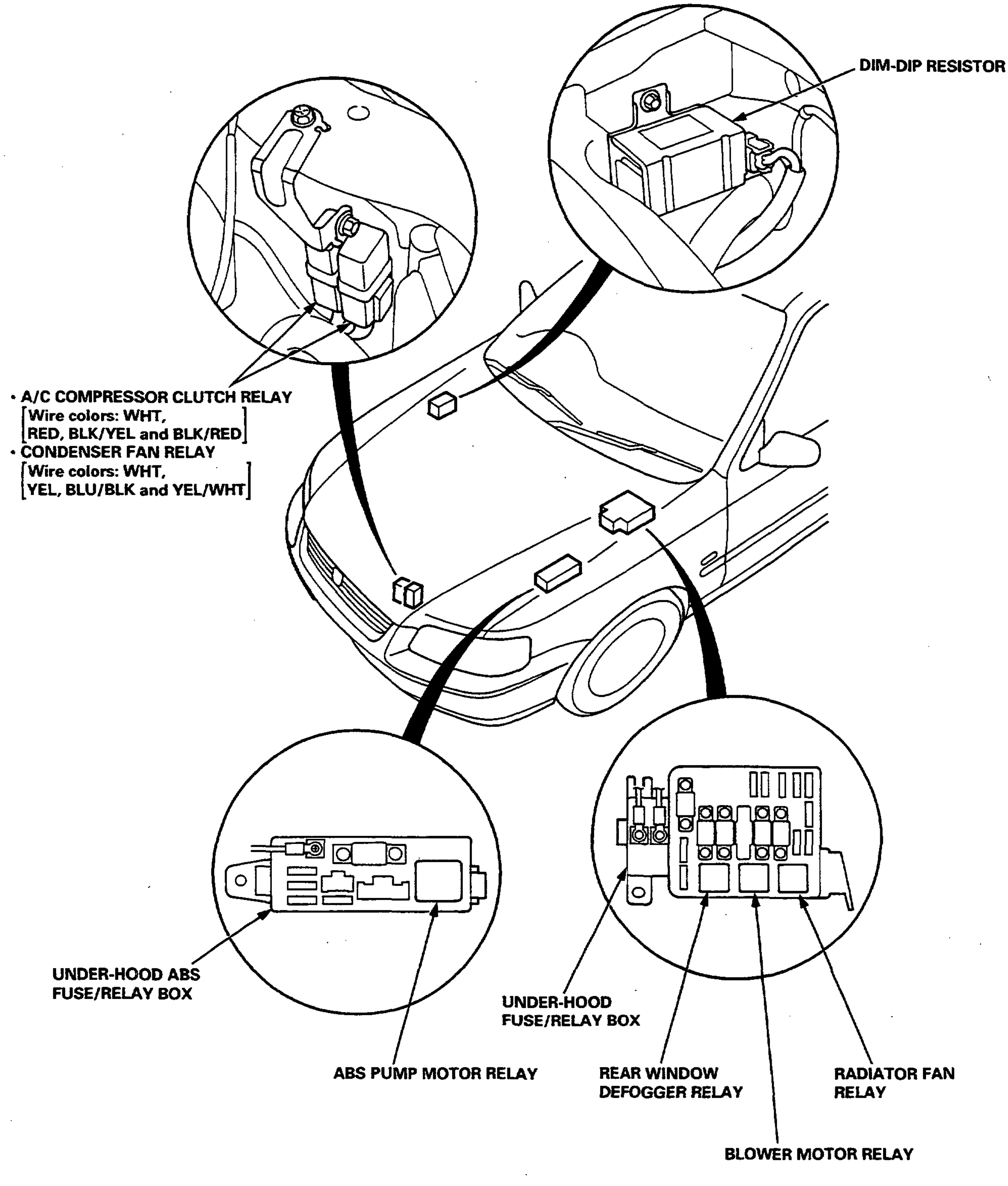
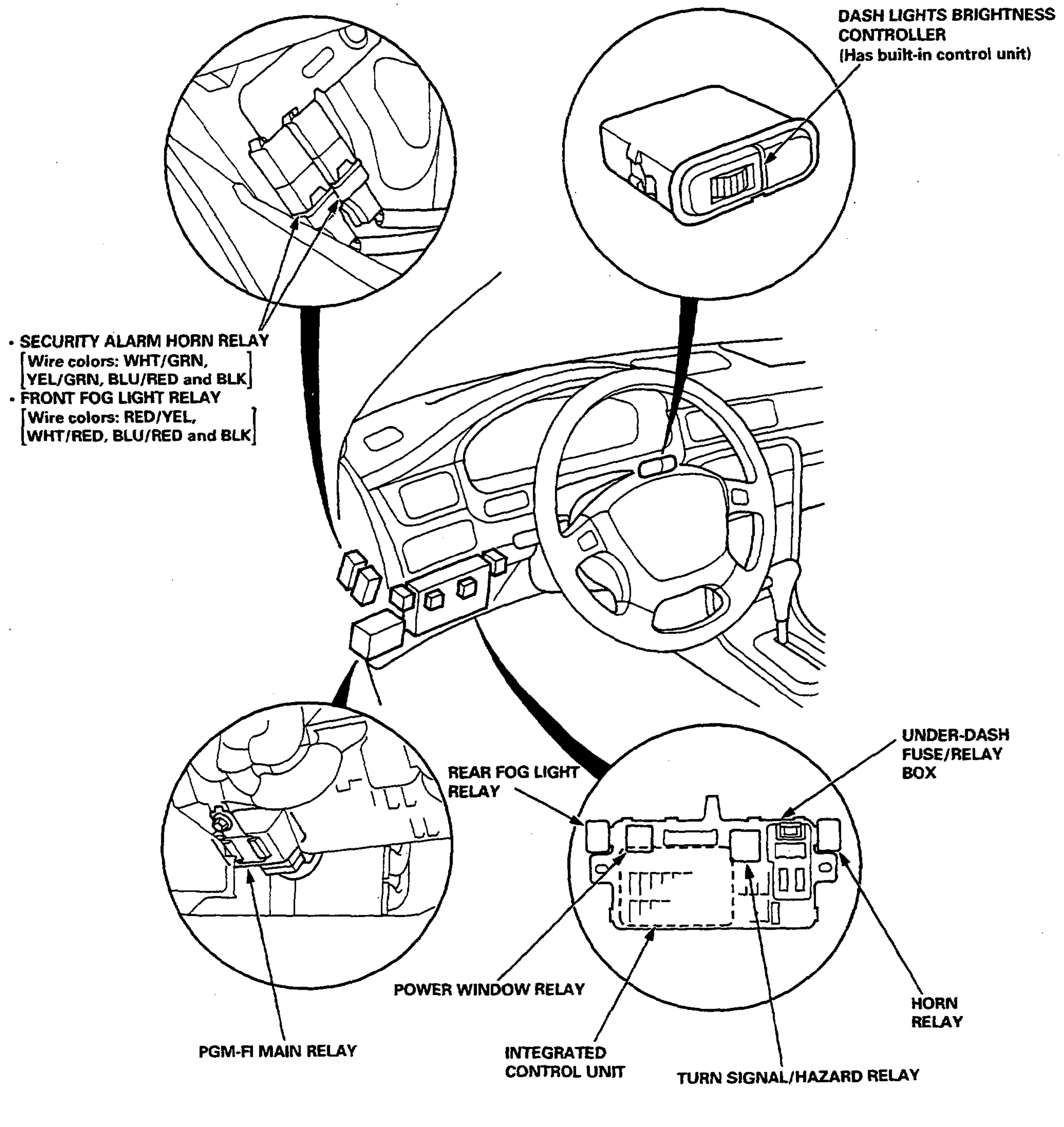


Dashboard

LHD type:



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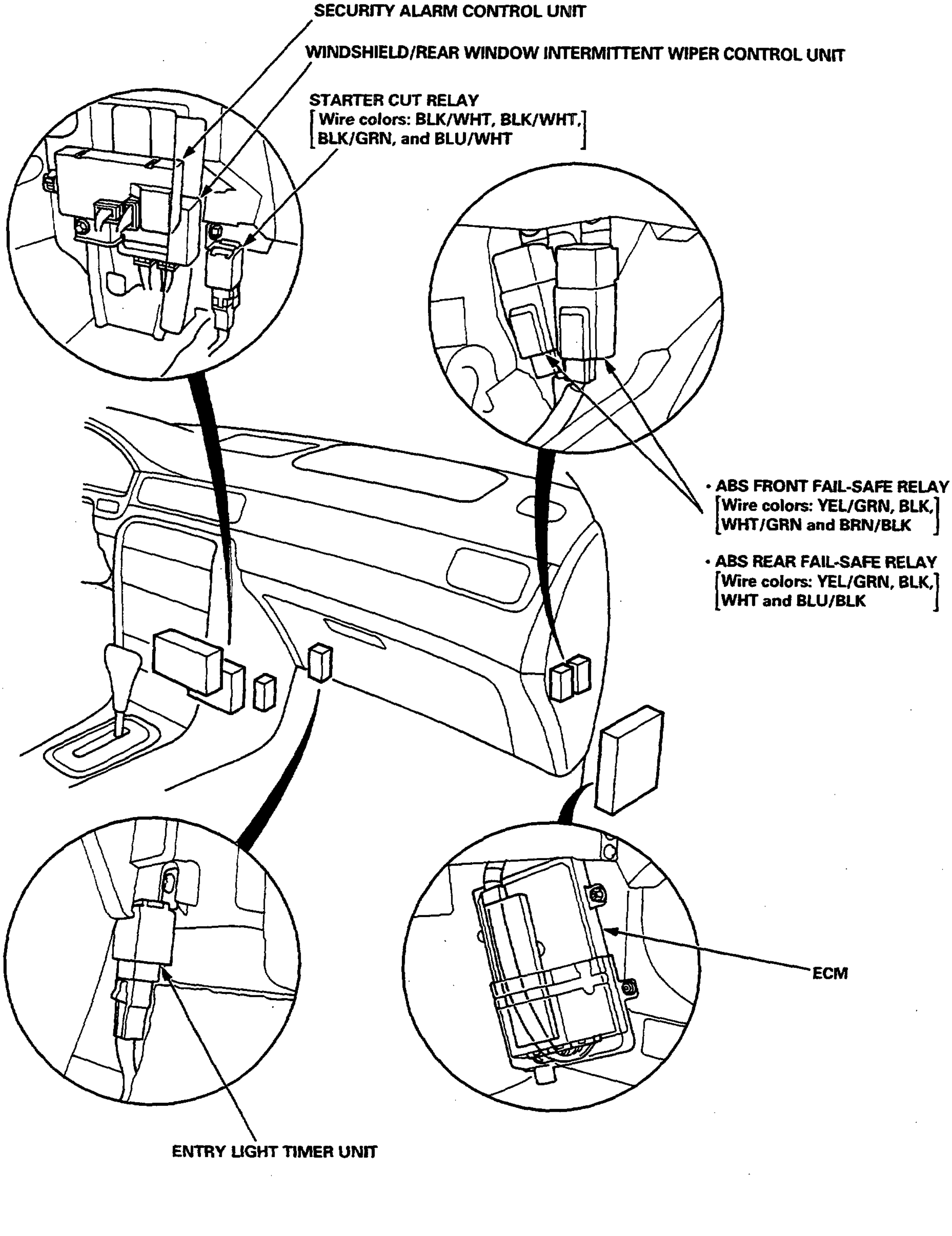
Dashboard (cont'd)

LHD type:



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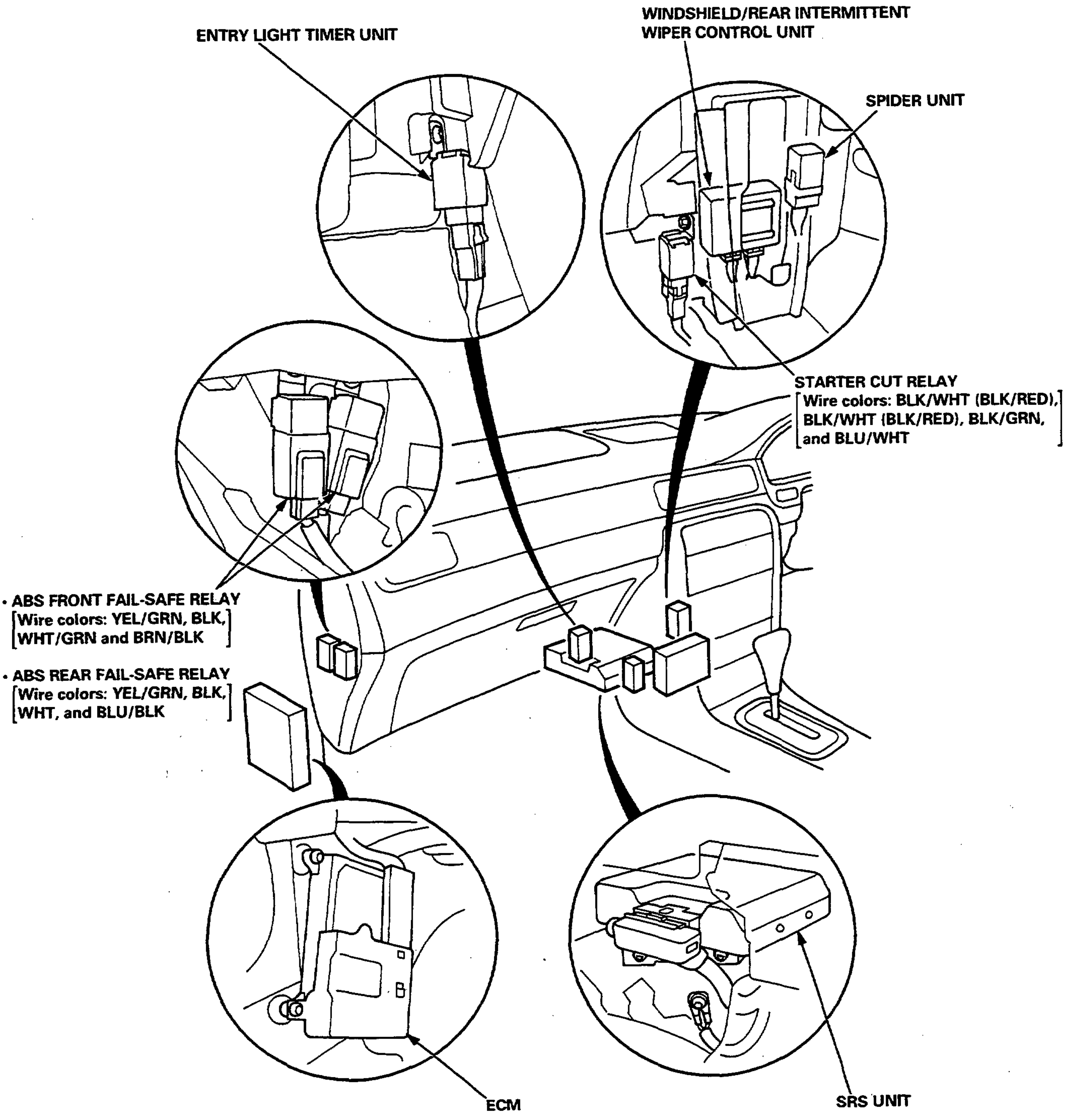

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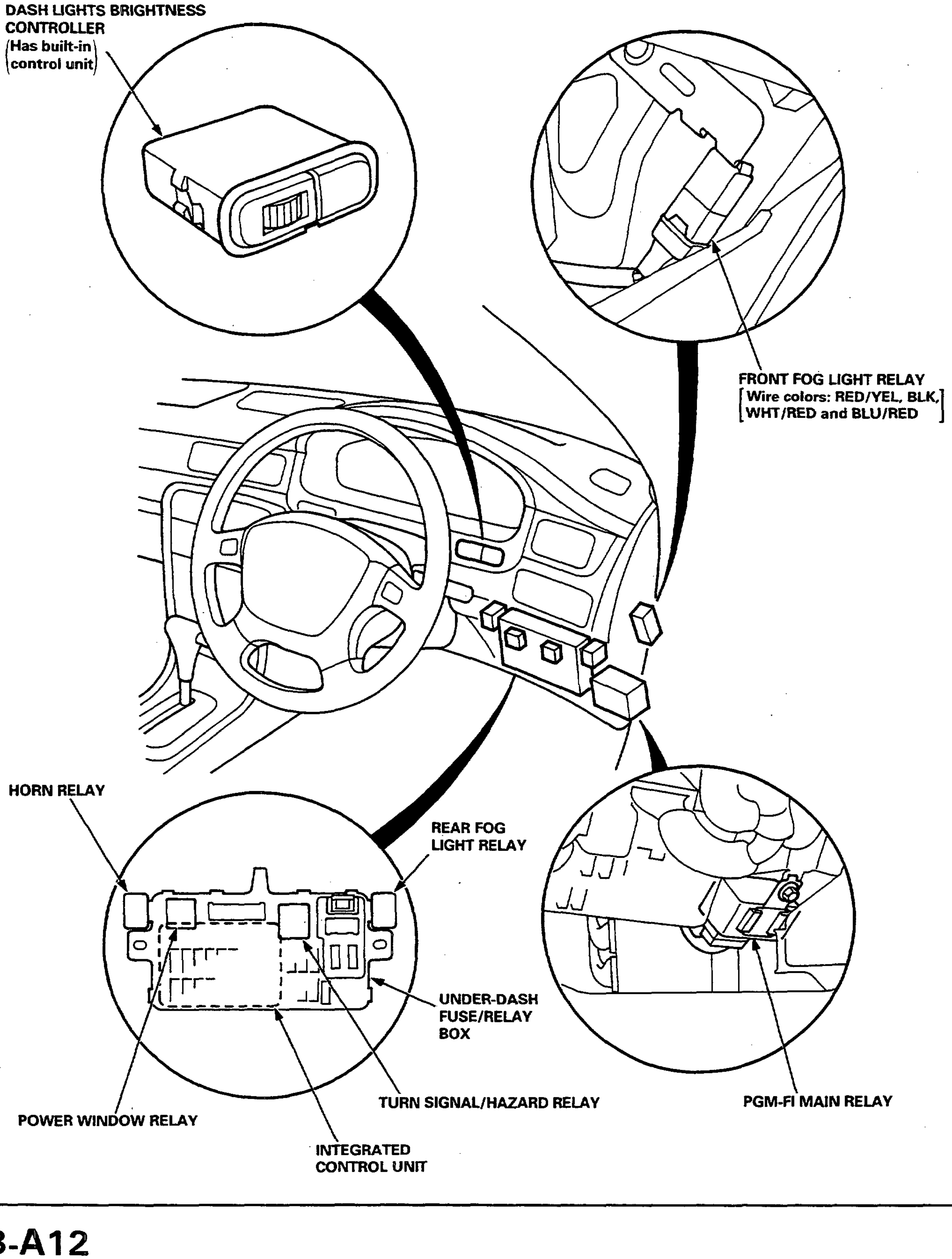
Relay and Control Unit Locations

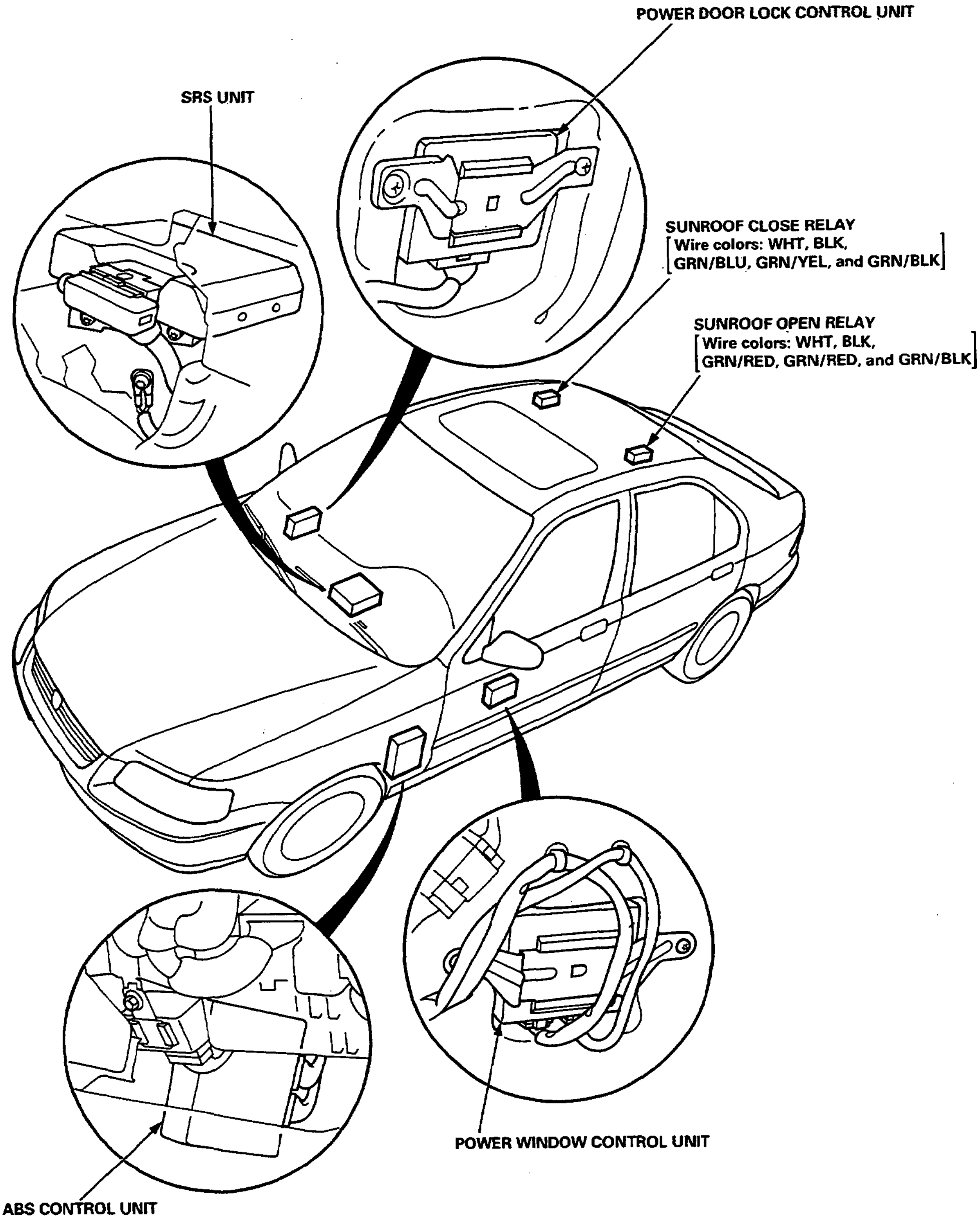
Dashboard (cont'd)

RHD type:



Floor/Door/Roof

LHD type:



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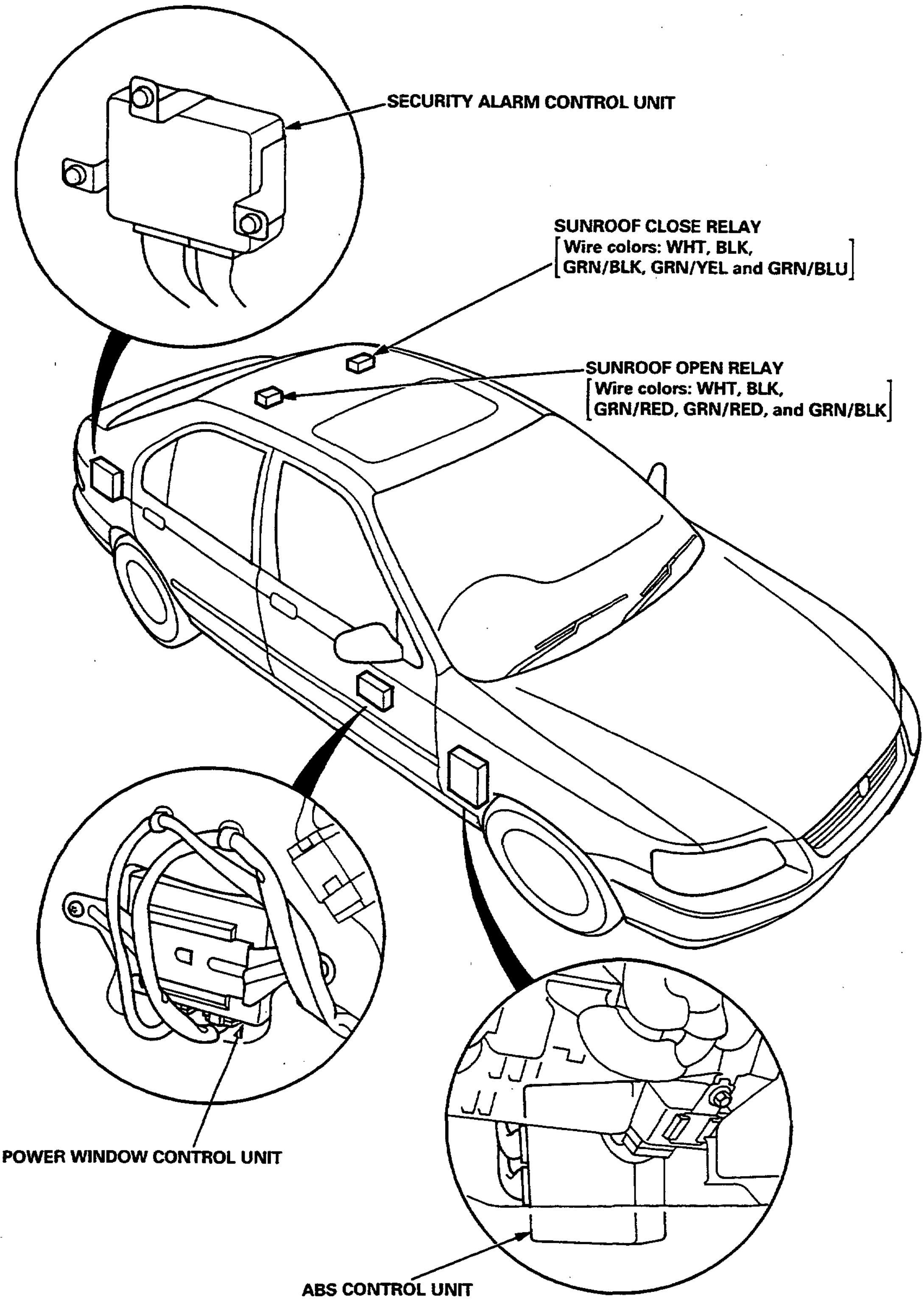
Relay and Control Unit Locations

Floor/Door/Roof (cont'd)

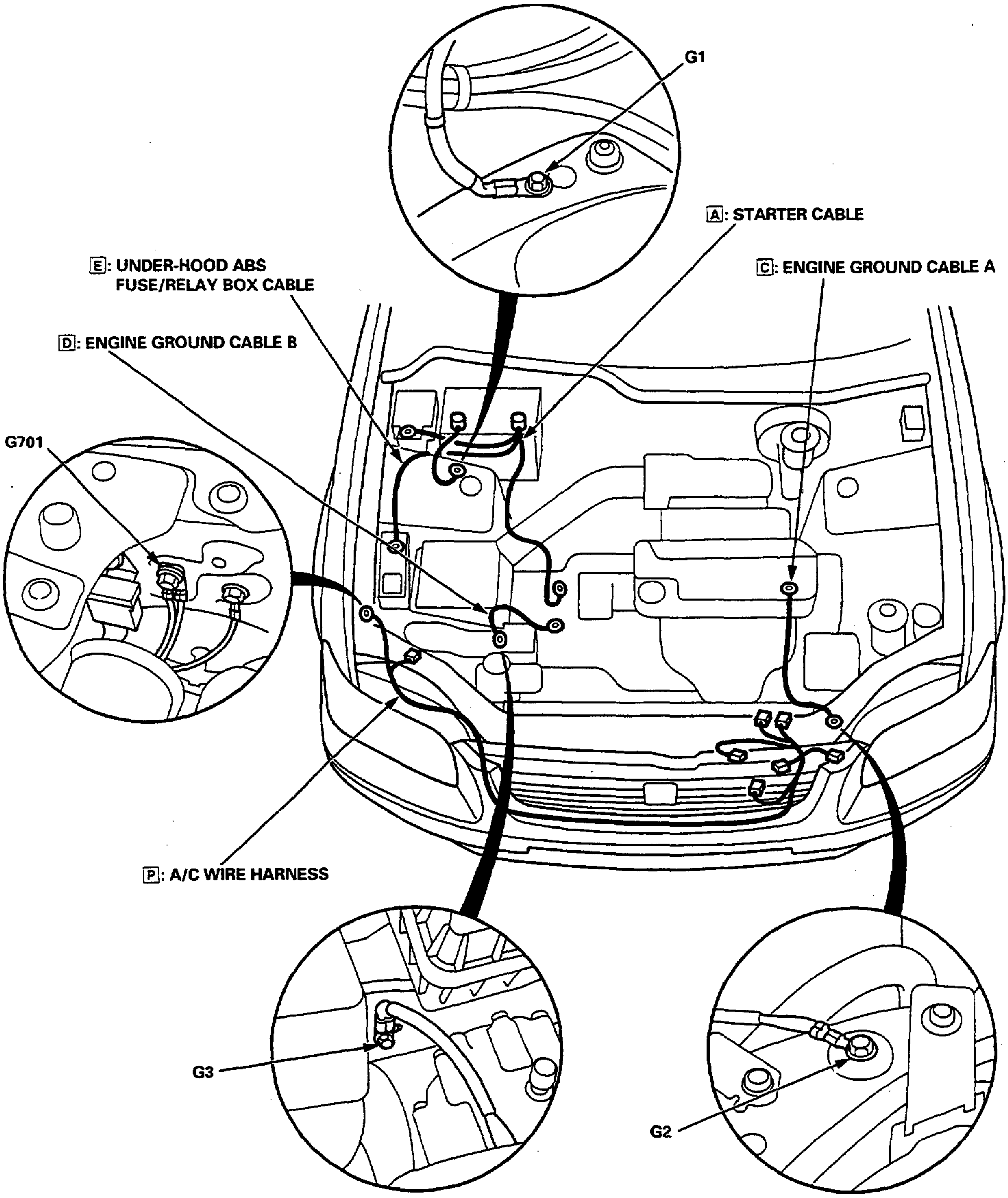
RHD type:



Wire Harness and Ground Locations

Engine Compartment

LHD type:



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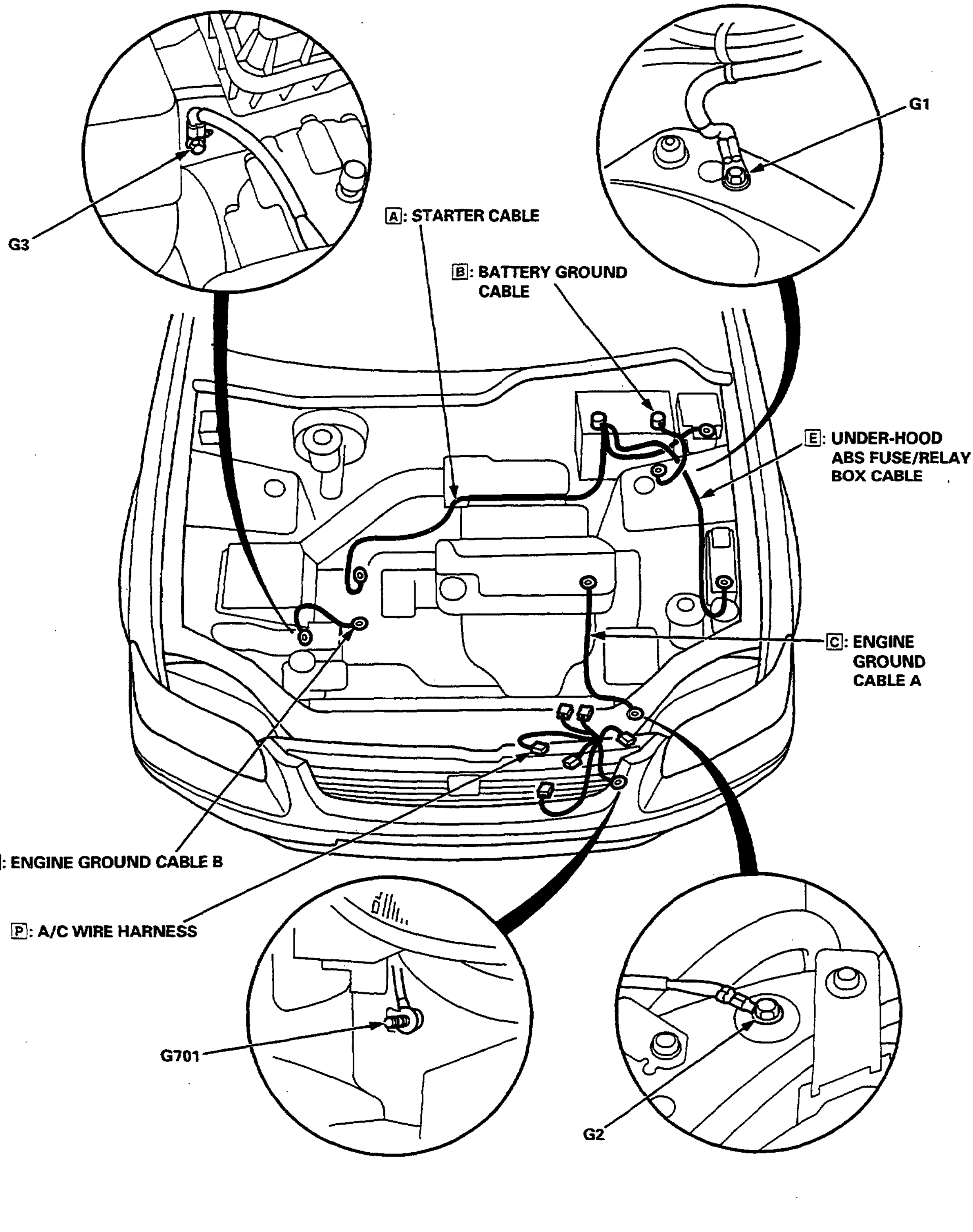
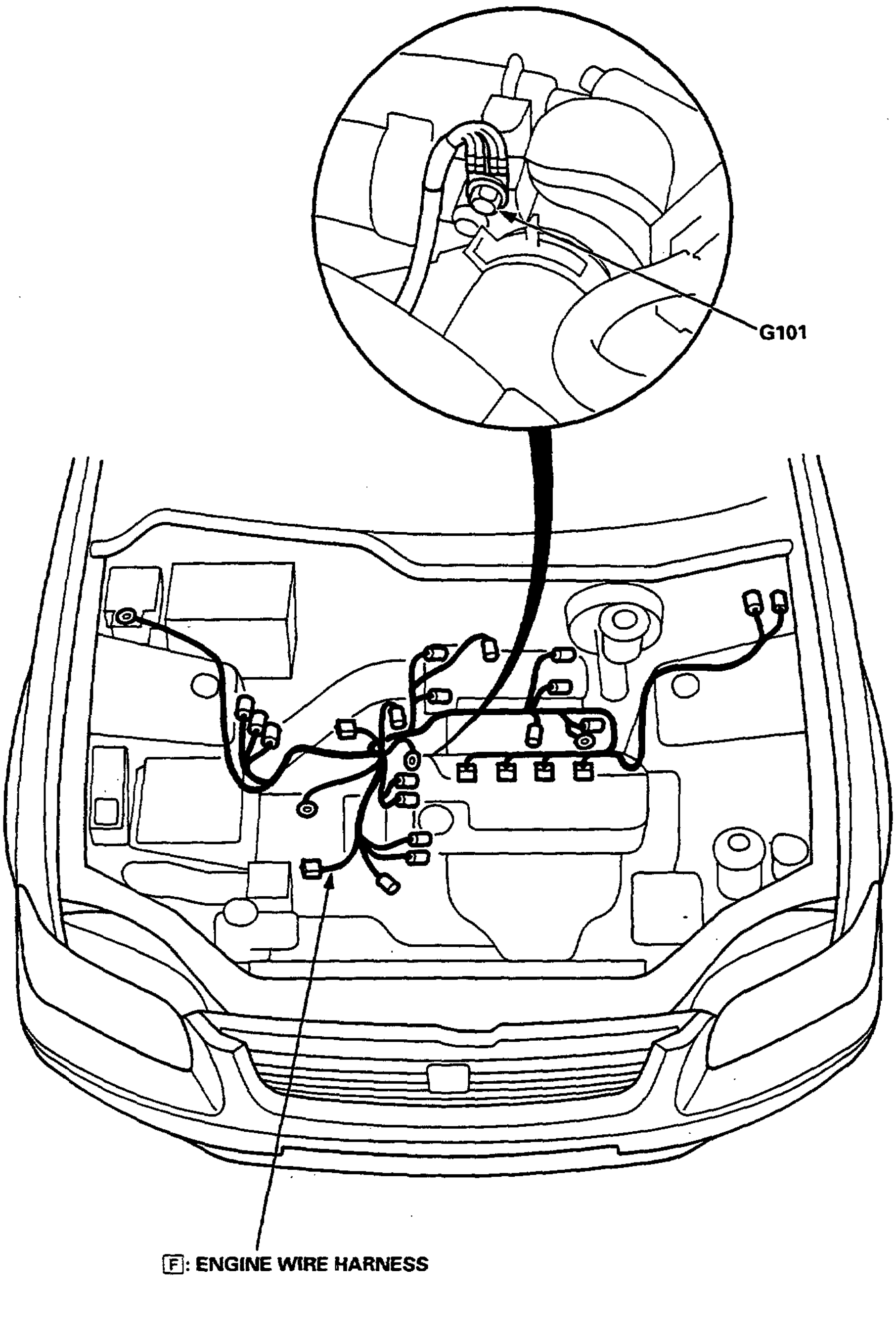
Wire Harness and Ground Locations

Engine Compartment (cont'd)

RHD type:



NOTE: LHD type is shown, RHD type is similar.



Wire Harness and Ground Locations

Engine Compartment (cont'd)

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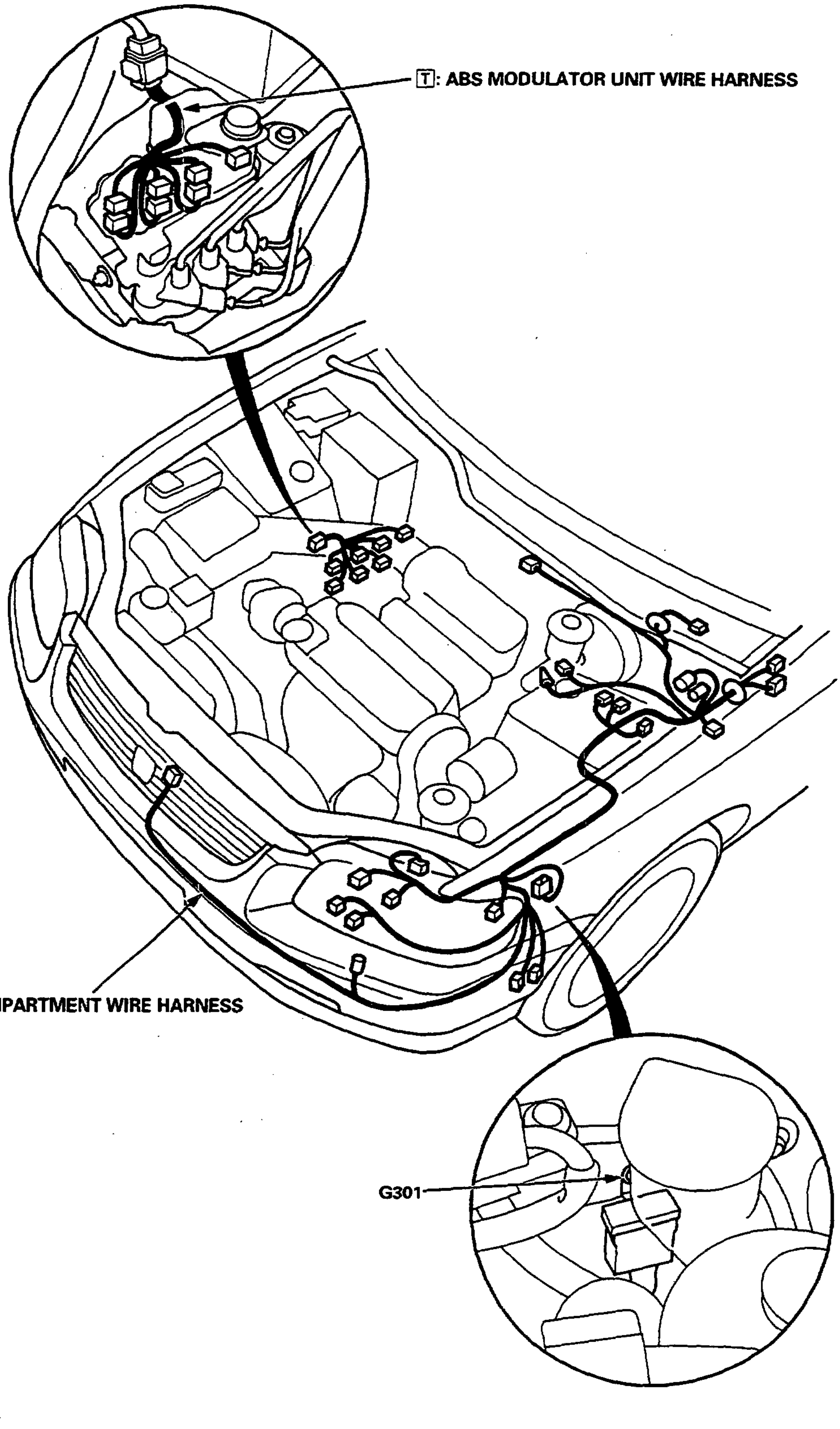
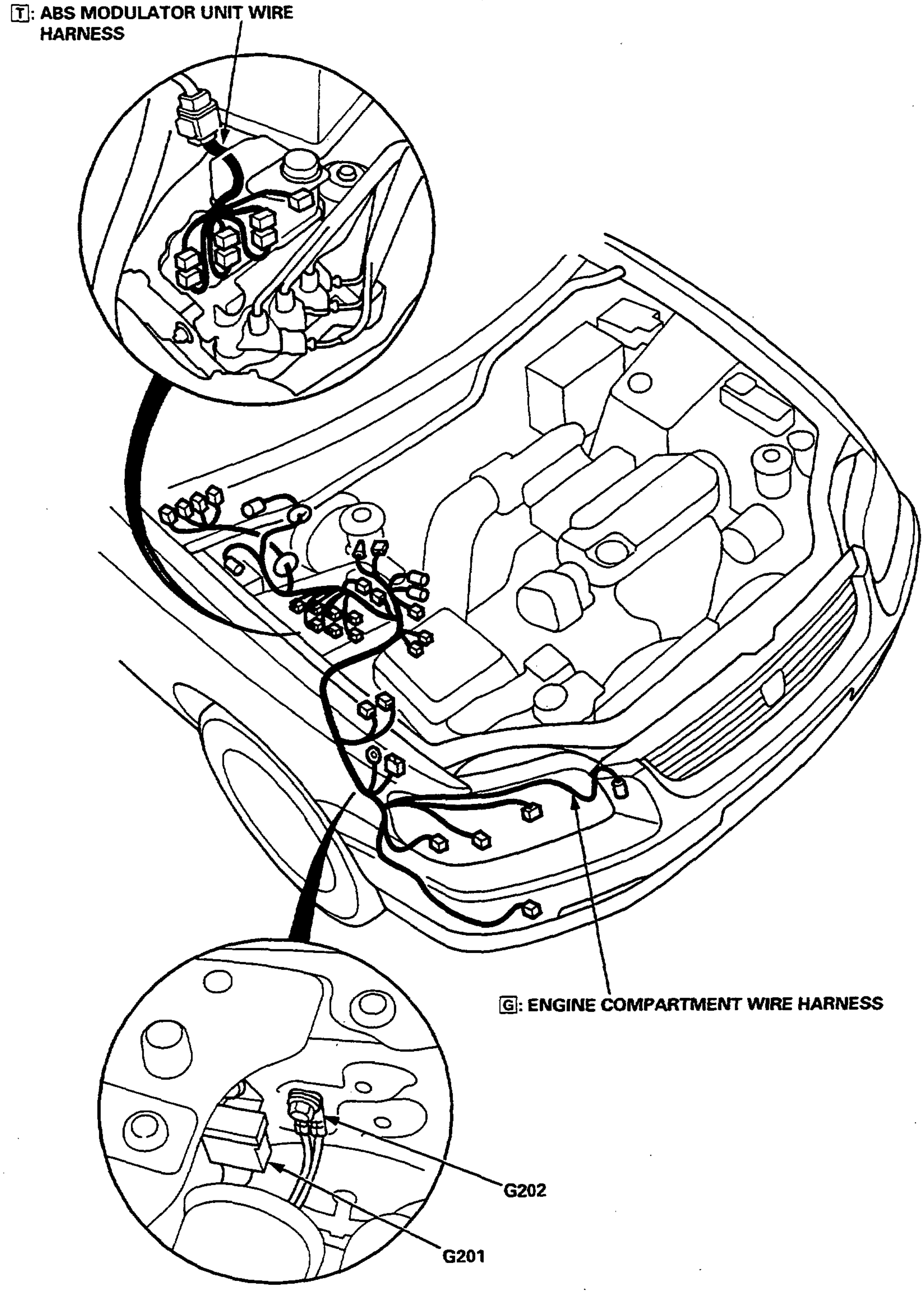
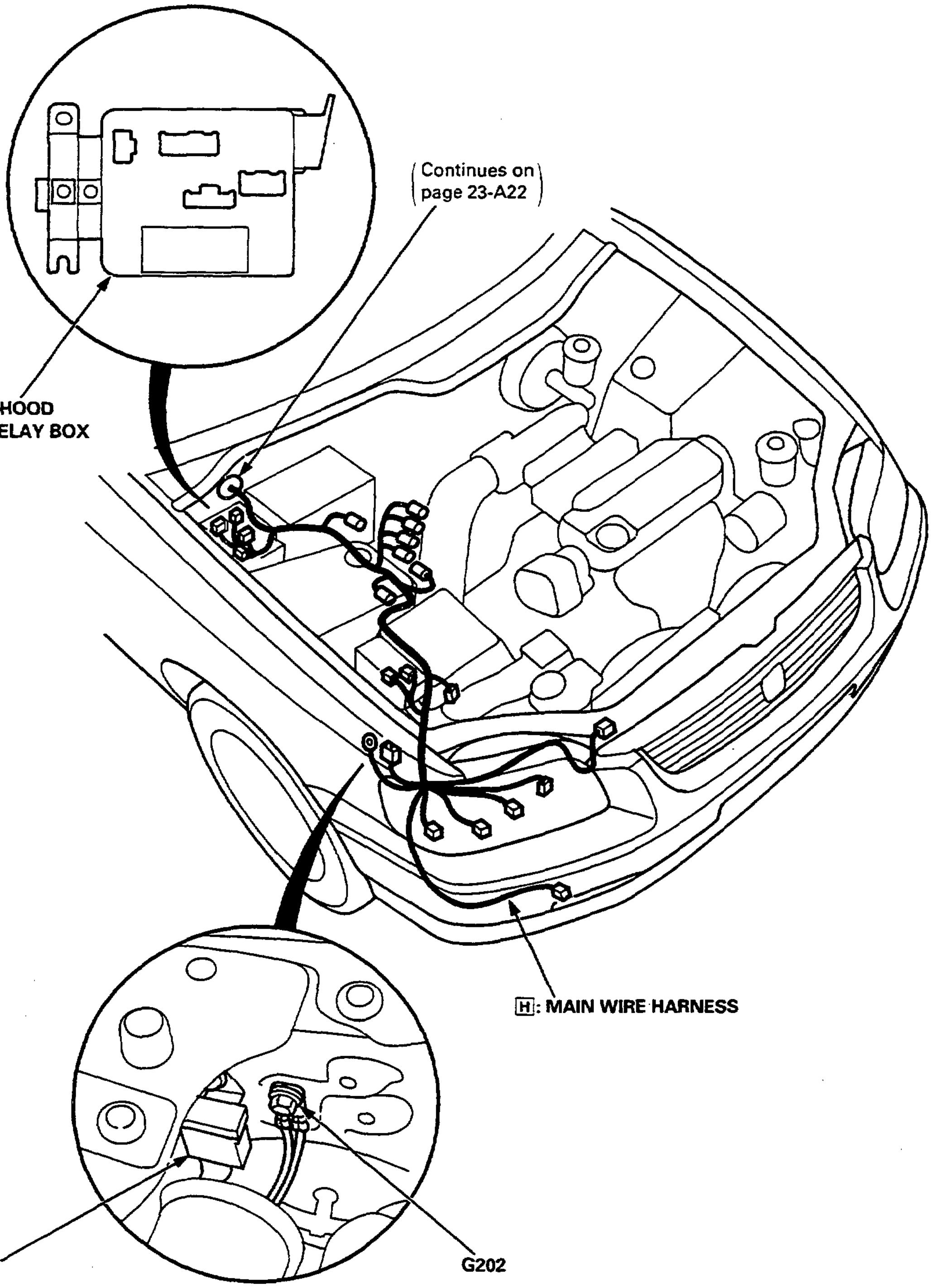


RHD type:

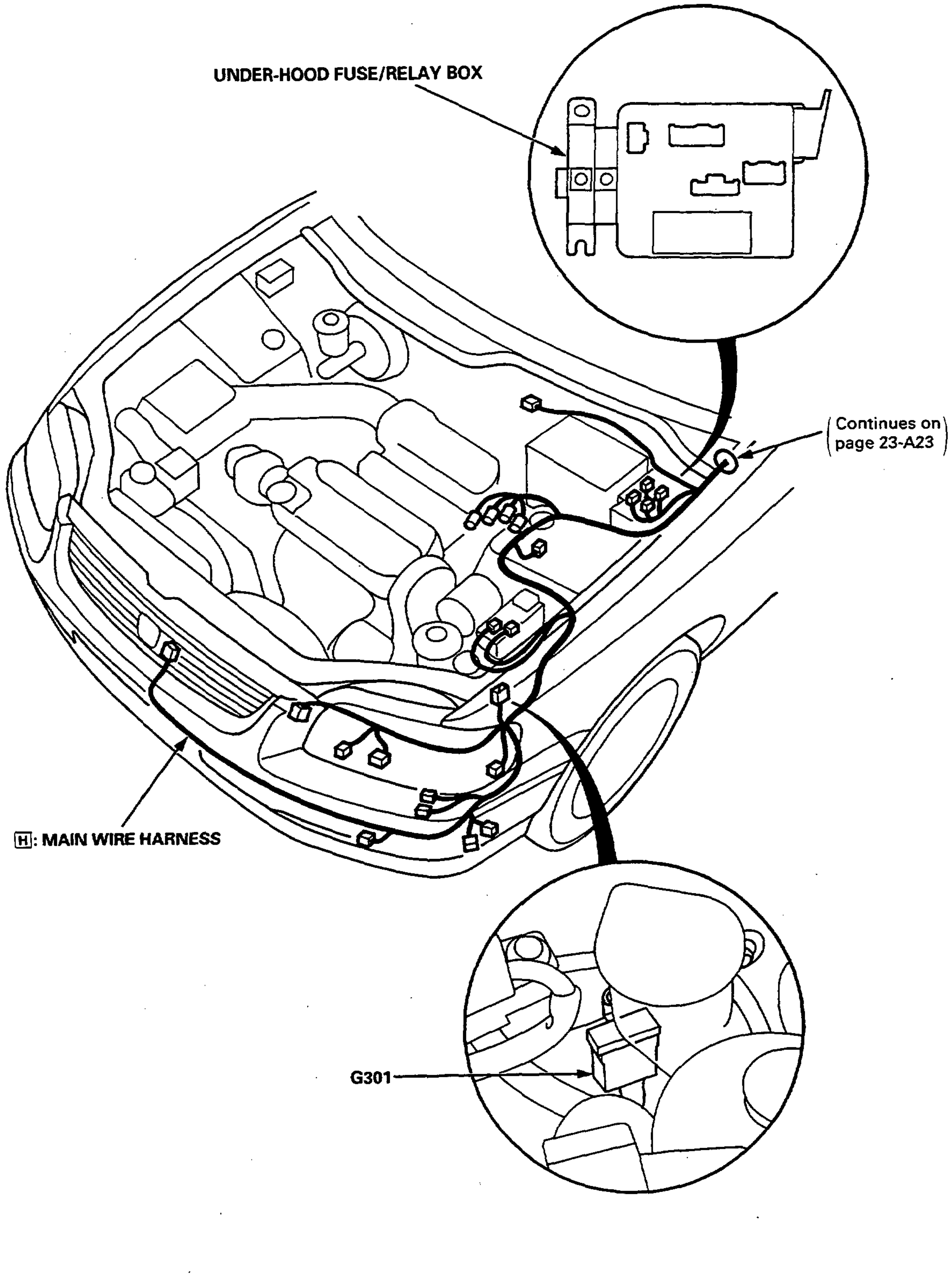

T: ABS MODULATOR UNIT WIRE HARNESS
G: ENGINE COMPARTMENT WIRE HARNESS
G202
G201

Engine Compartment (cont'd)

LHD type:



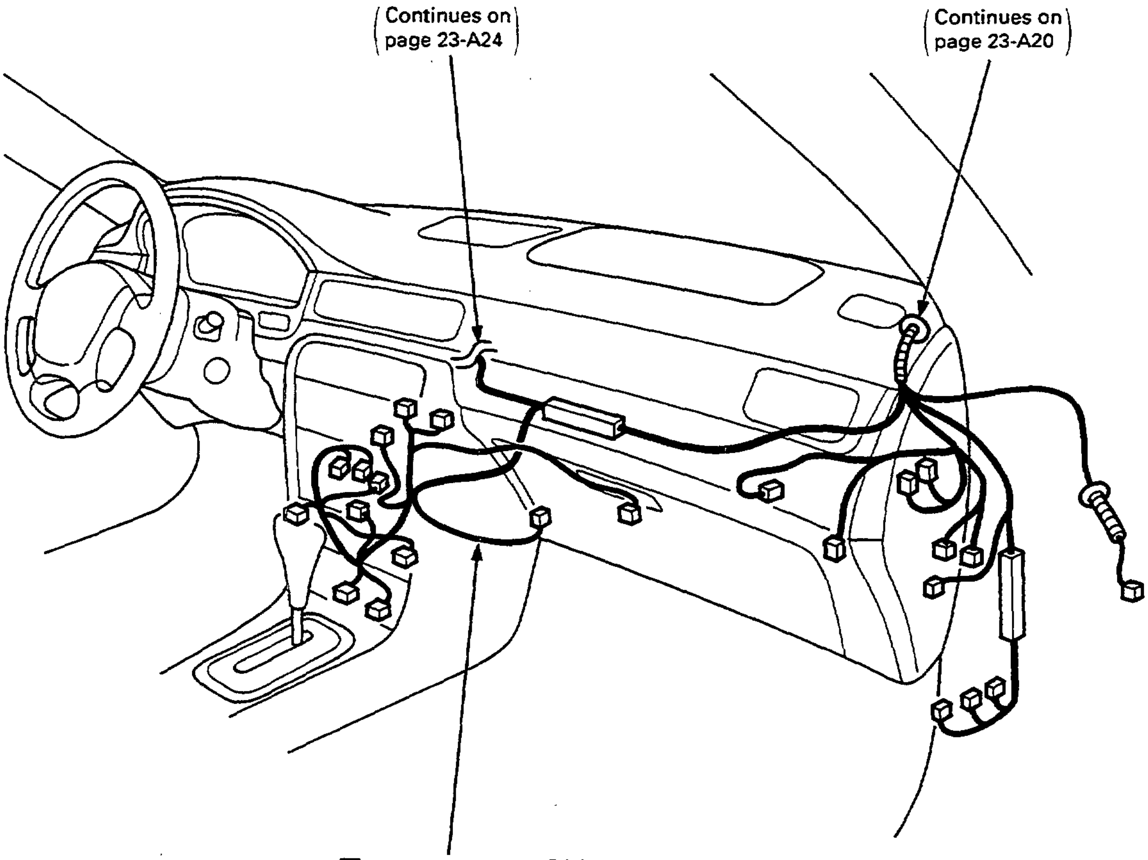
RHD type:


UNDER-HOOD FUSE/RELAY BOX
Continues on page 23-A23
H: MAIN WIRE HARNESS
G301

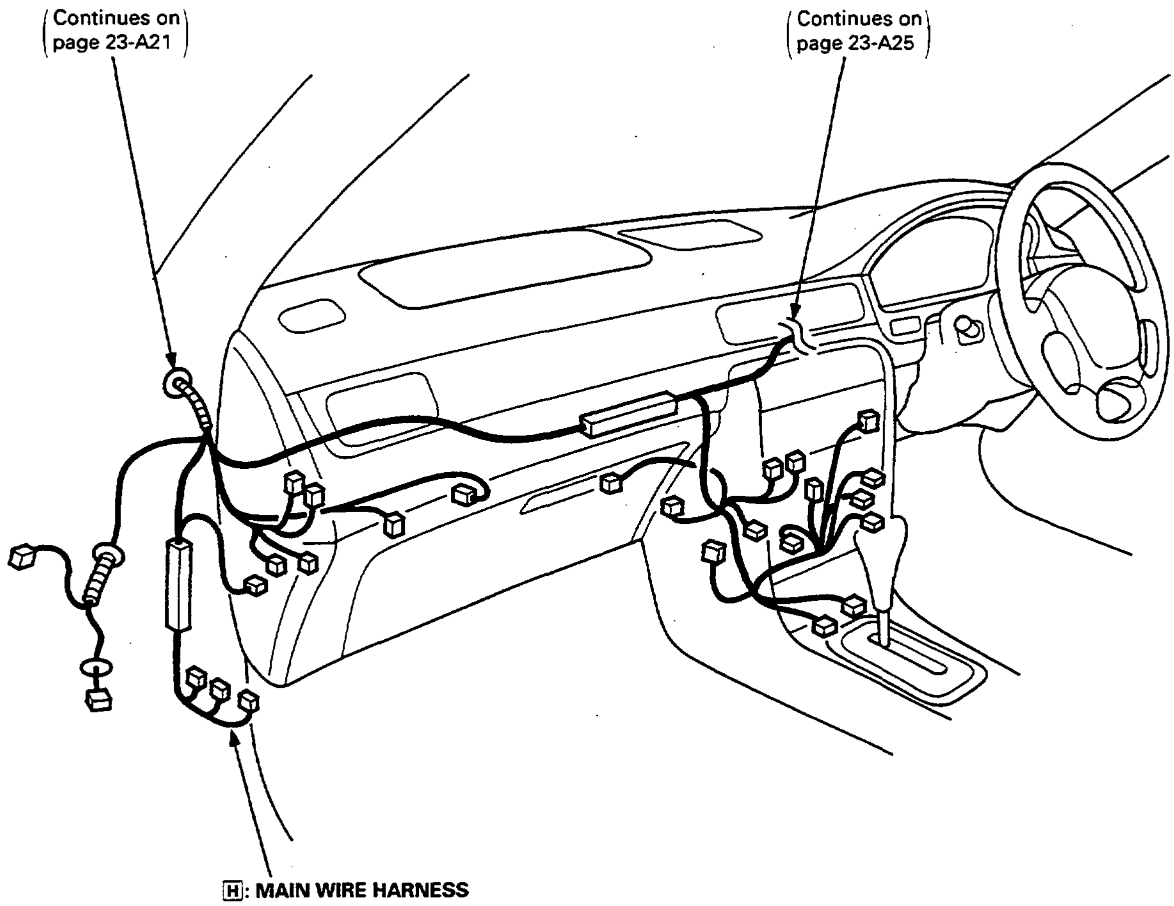
Wire Harness and Ground Locations

Dashboard

LHD type:



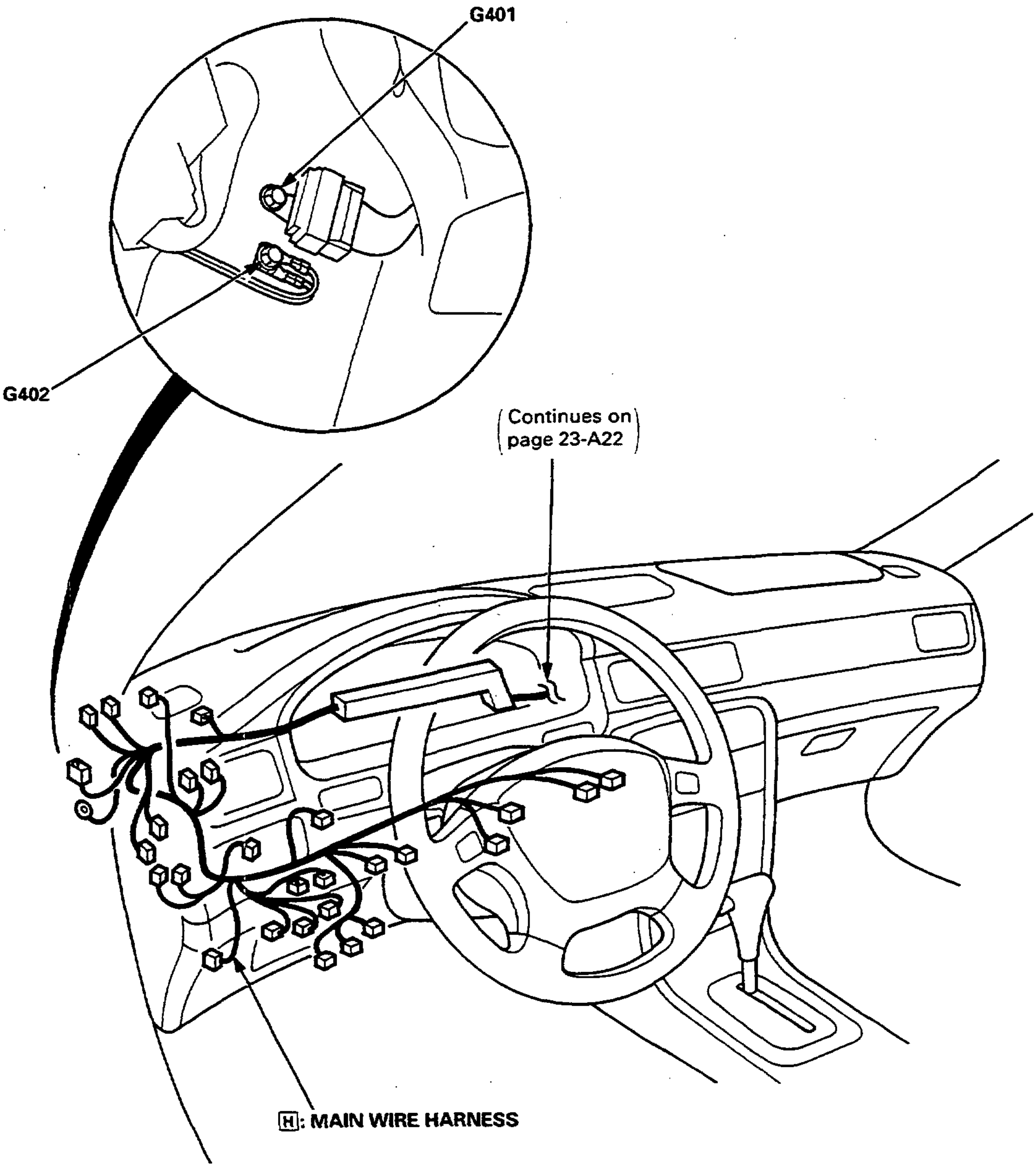
RHD type:



(cont'd)

Dashboard (cont'd)

LHD type:



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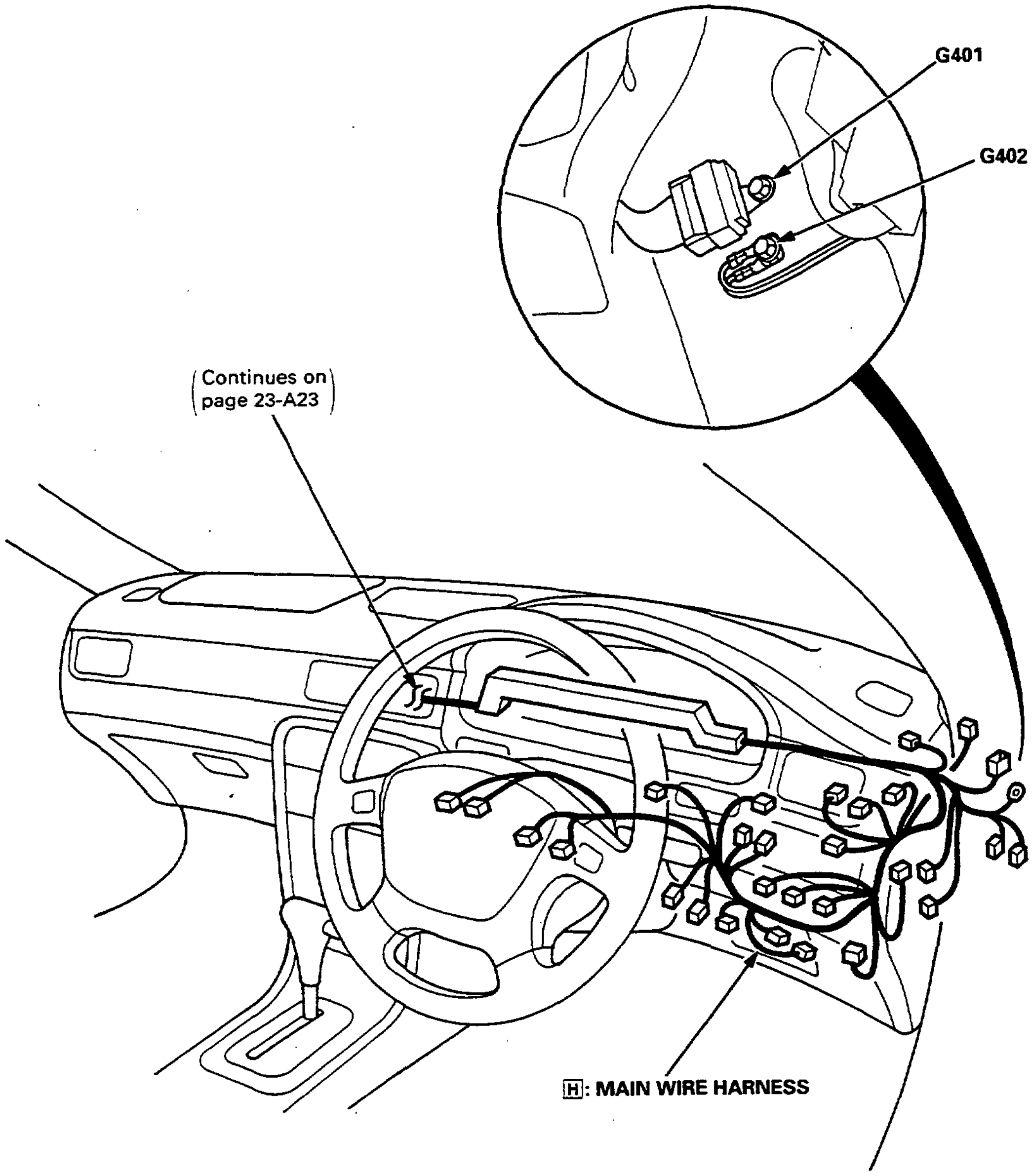

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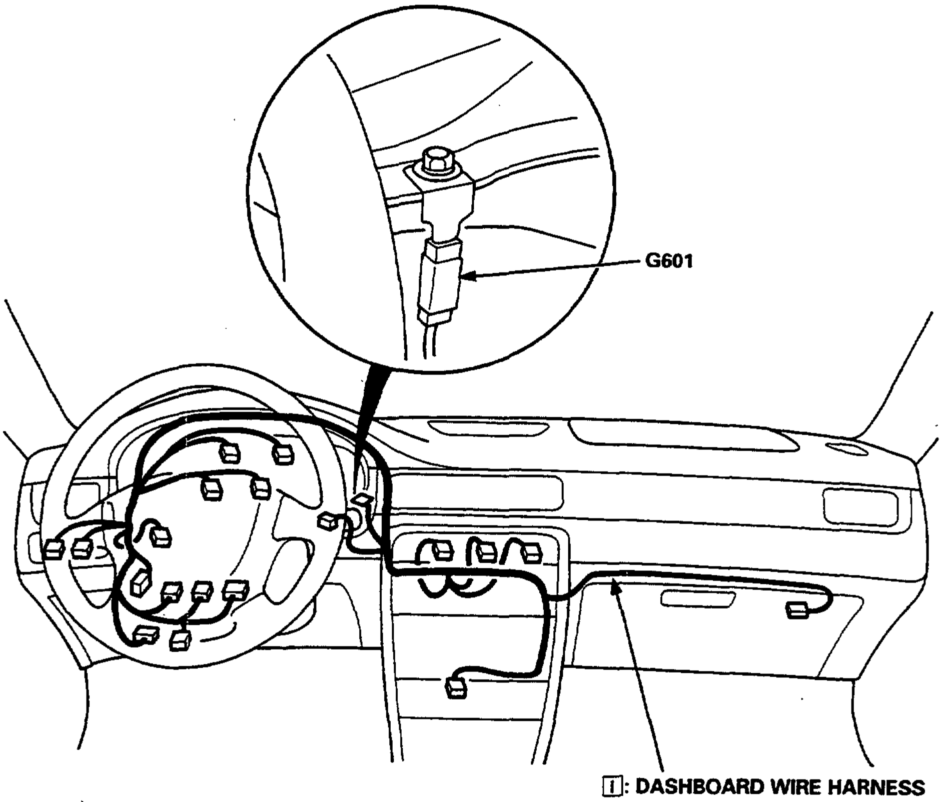
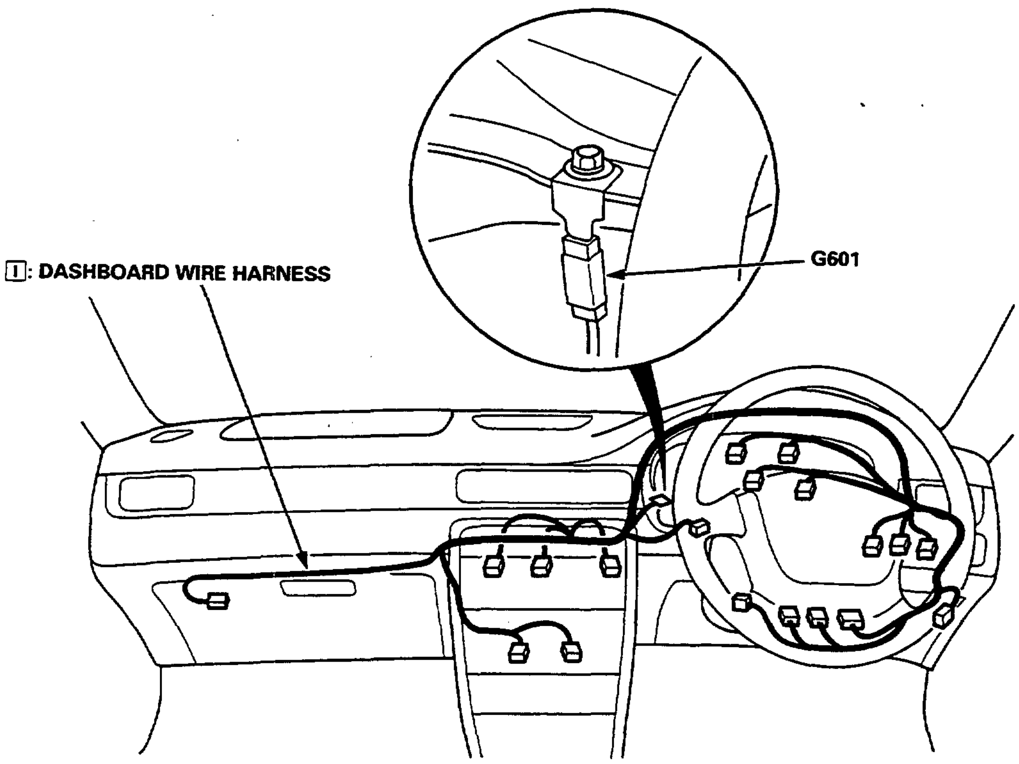
Wire Harness and Ground Locations

Dashboard (cont'd)

LHD type:



RHD type:



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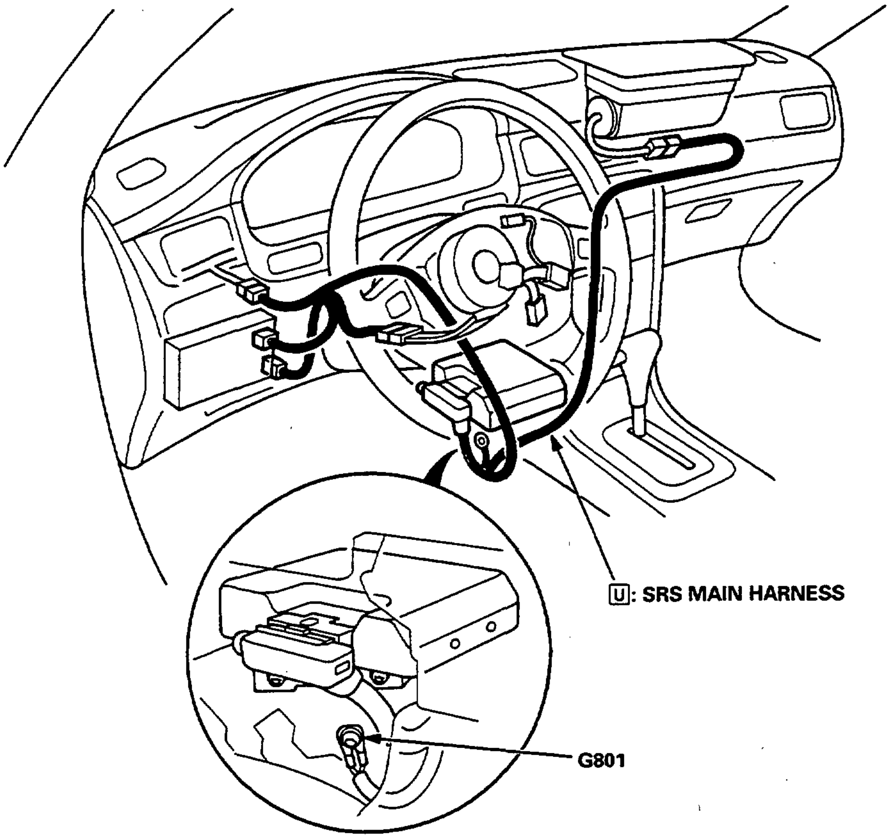
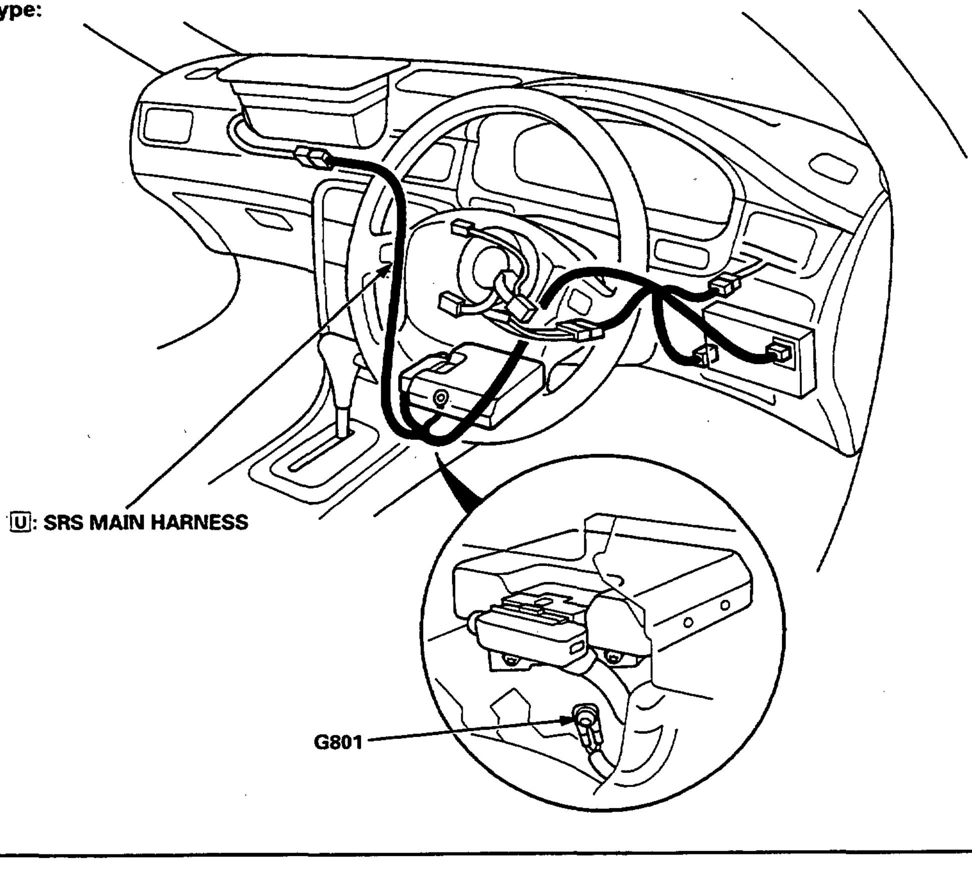


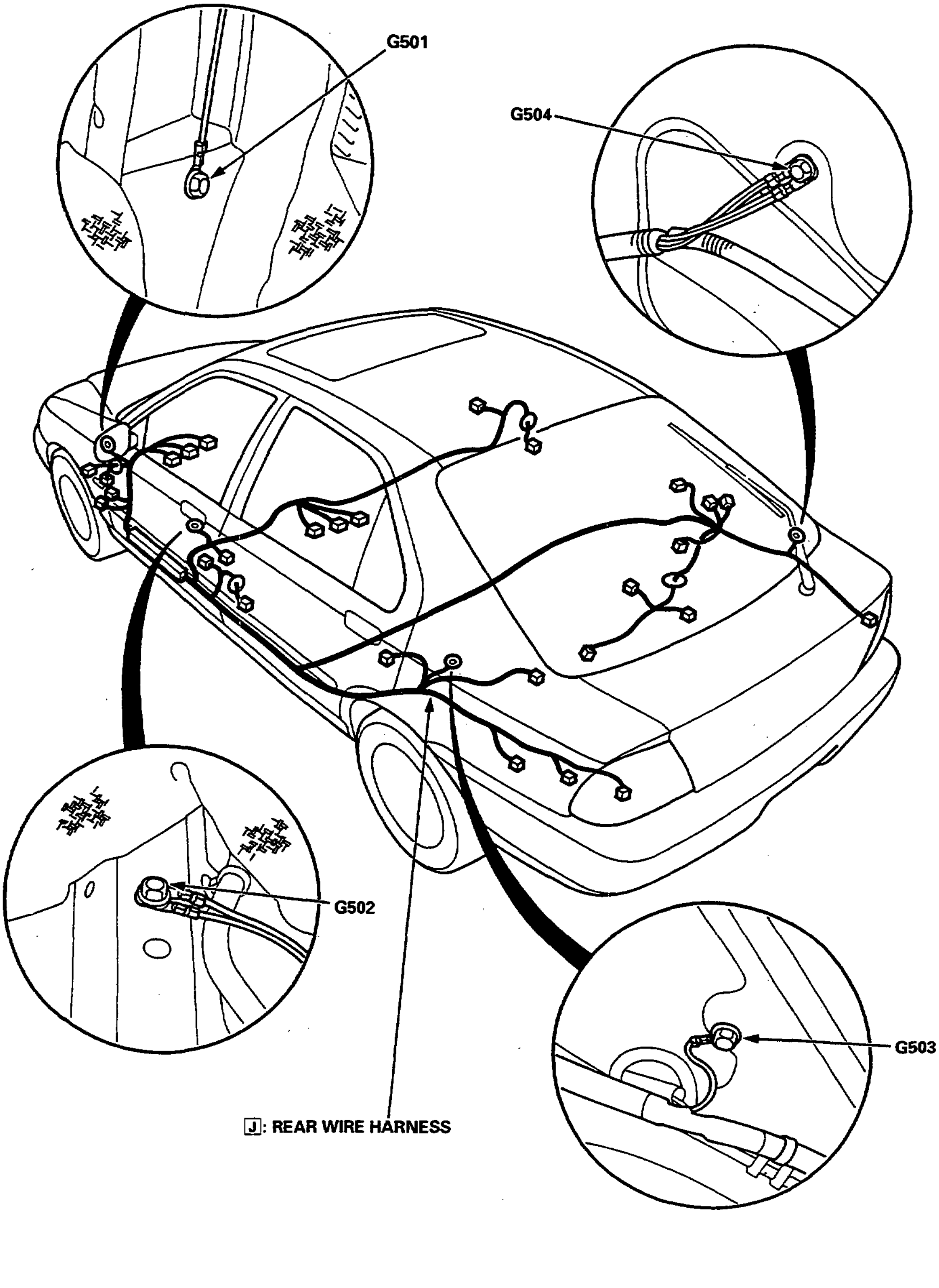
RHD type:



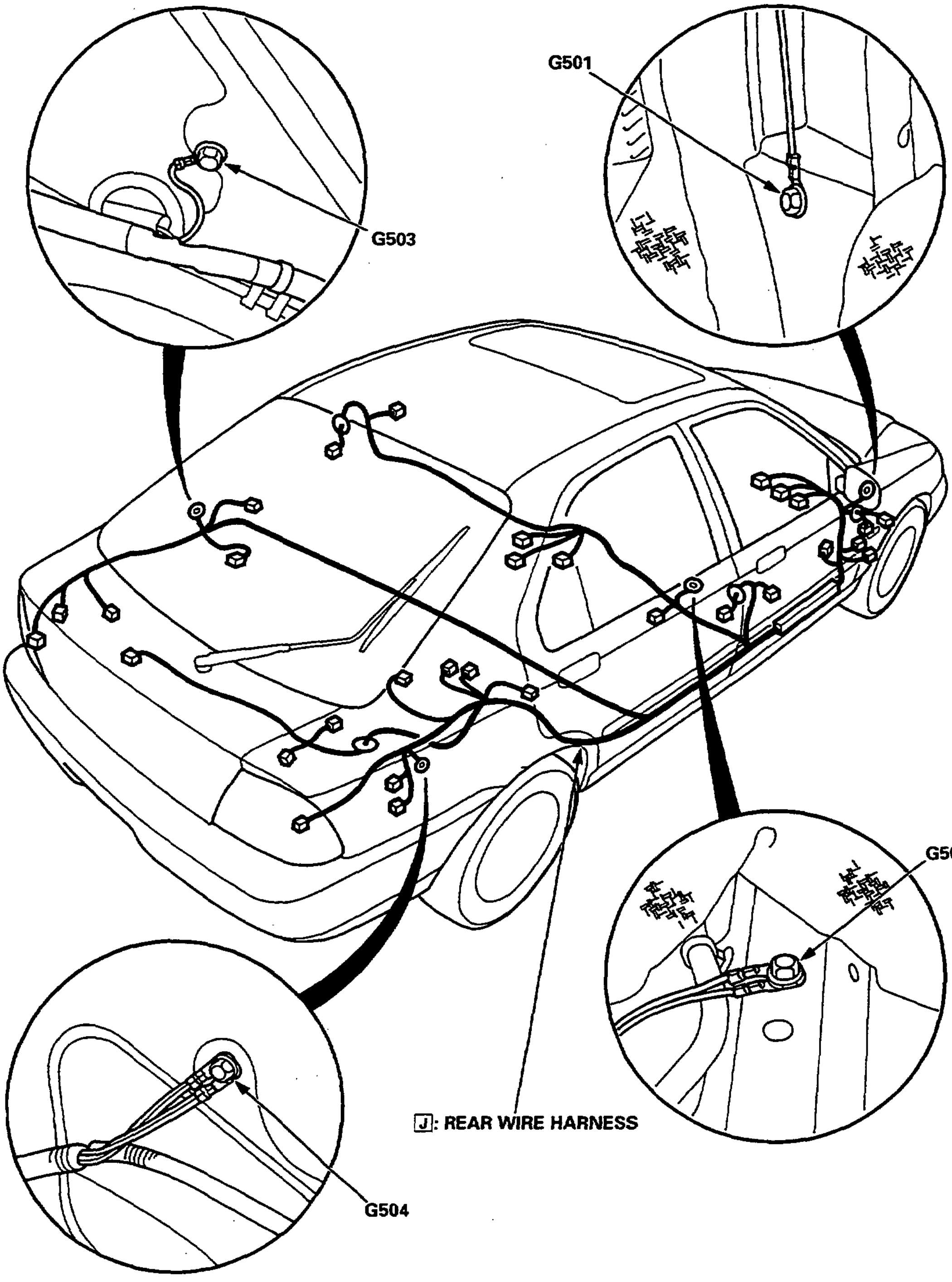
Wire Harness and Ground Locations

Floor/Rear

LHD type:

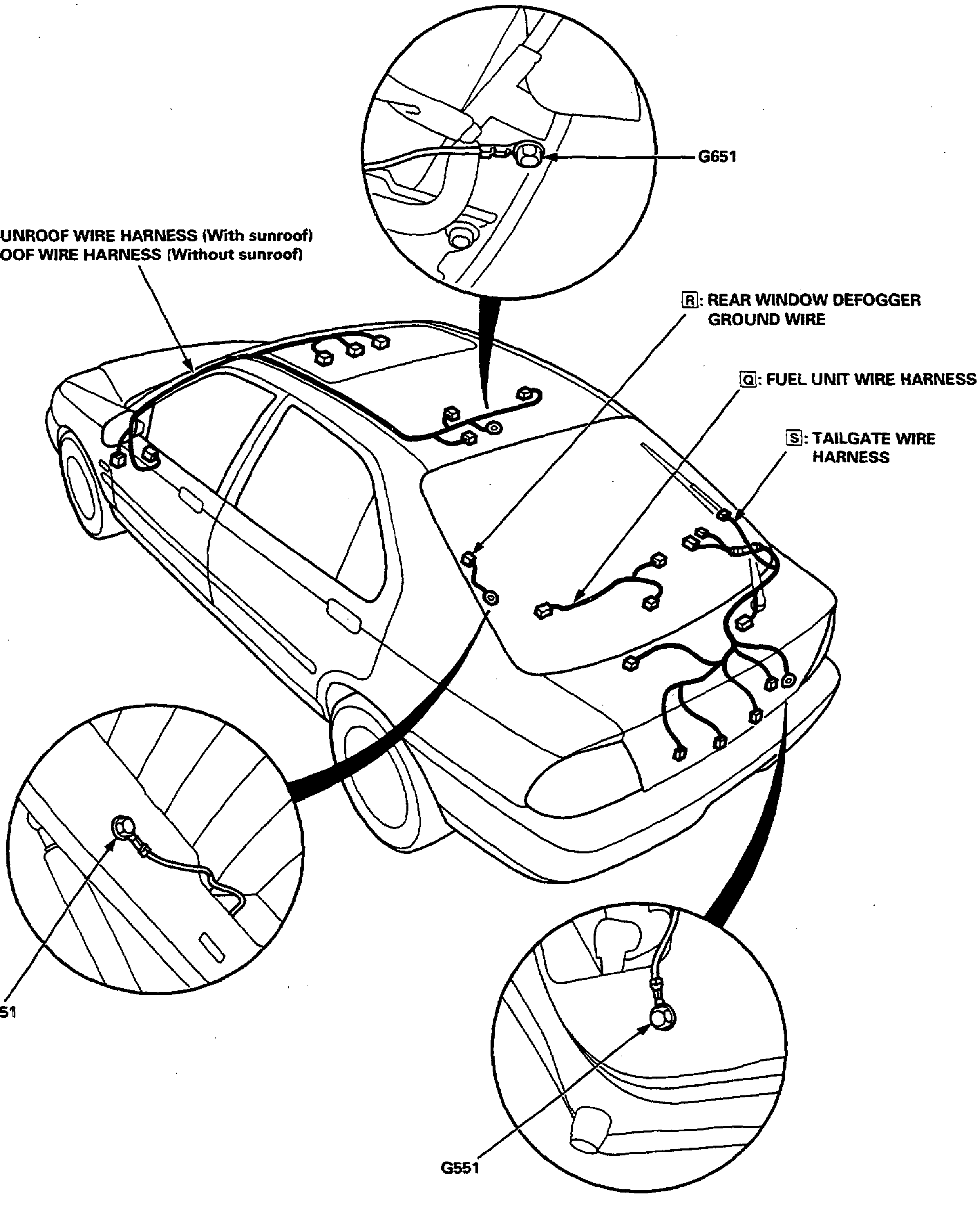


RHD type:

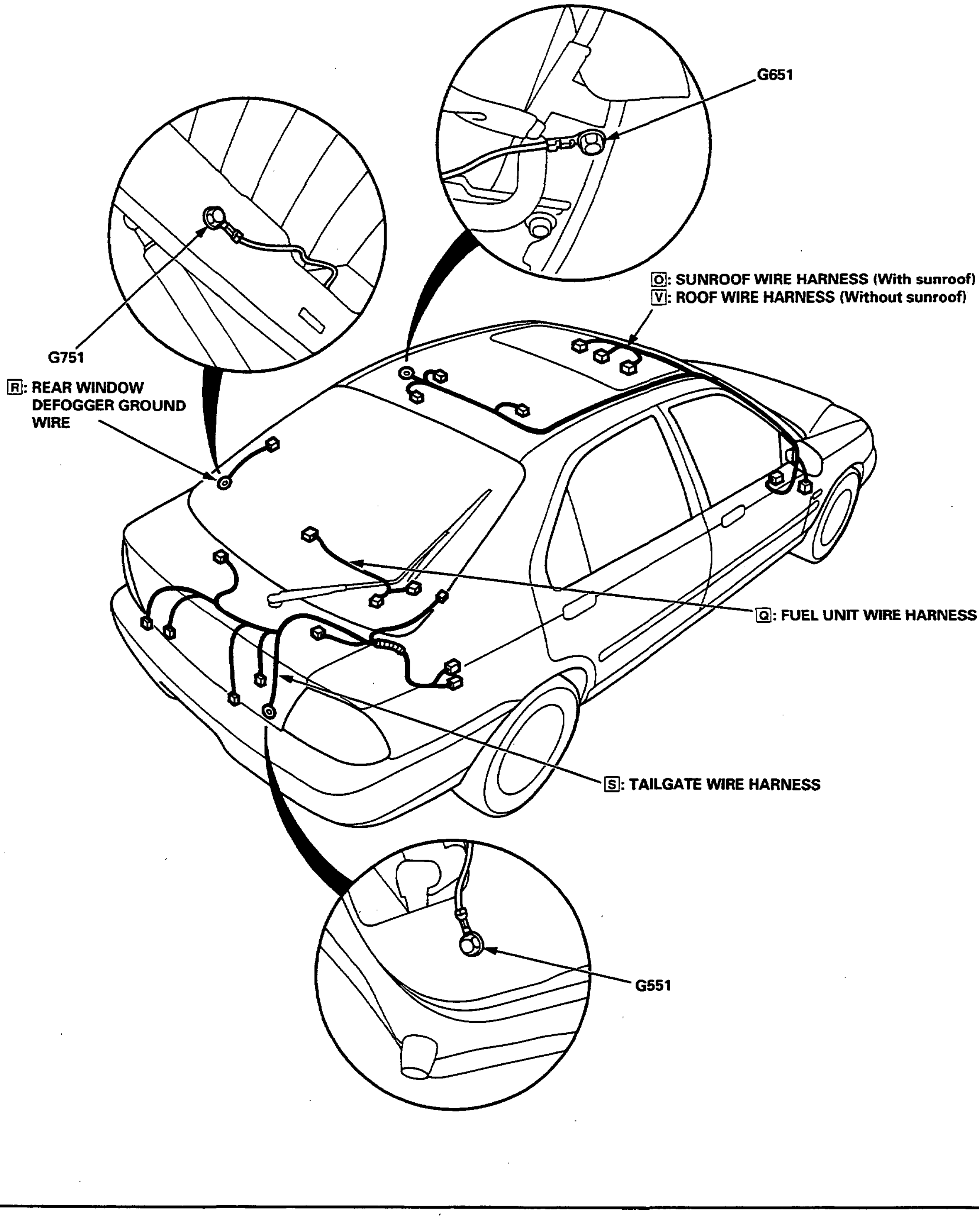


Roof/Rear/Trunk

LHD type:



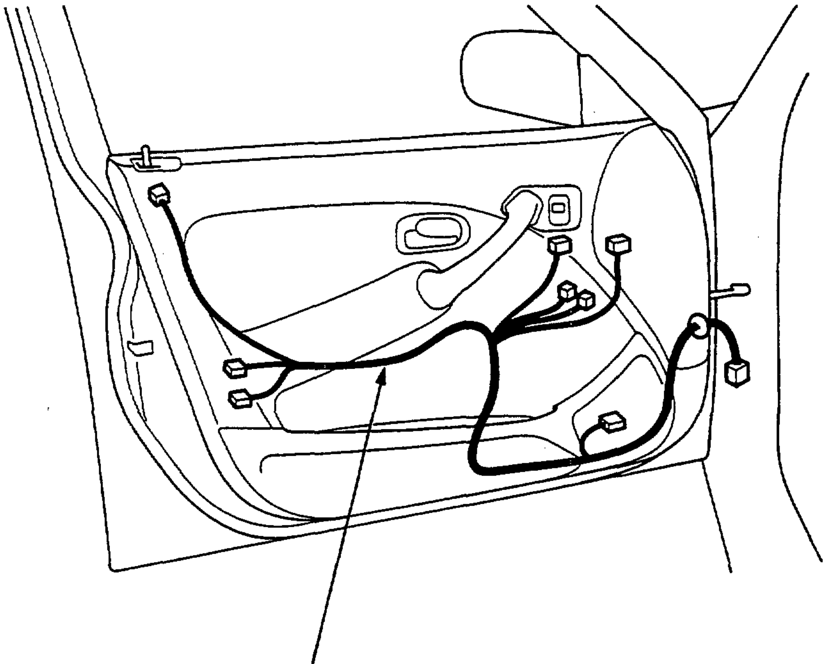
RHD type:



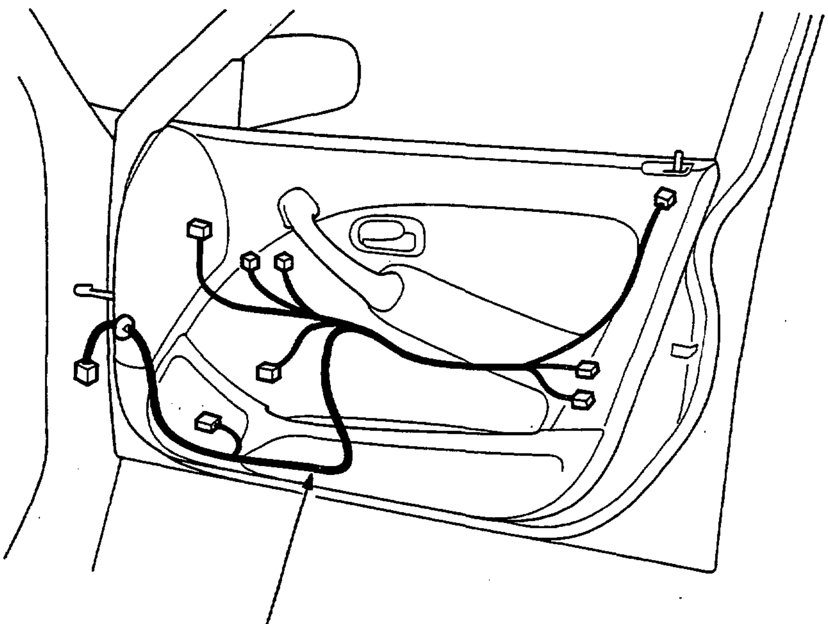
G651
G751
O: SUNROOF WIRE HARNESS (With sunroof)
V: ROOF WIRE HARNESS (Without sunroof)
R: REAR WINDOW DEFOGGER GROUND WIRE
Q: FUEL UNIT WIRE HARNESS
S: TAILGATE WIRE HARNESS
G551

Door

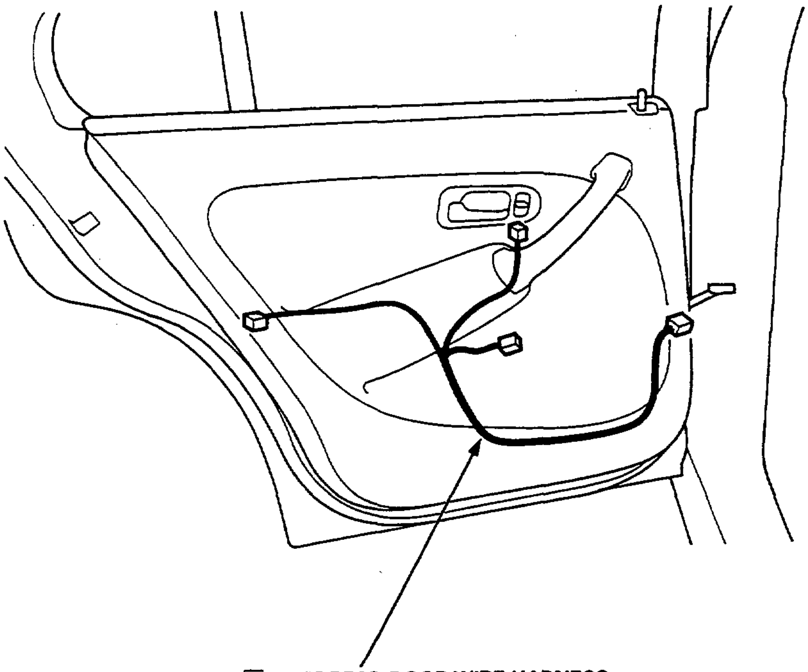
NOTE: LHD type is shown, RHD type is symmetrical.



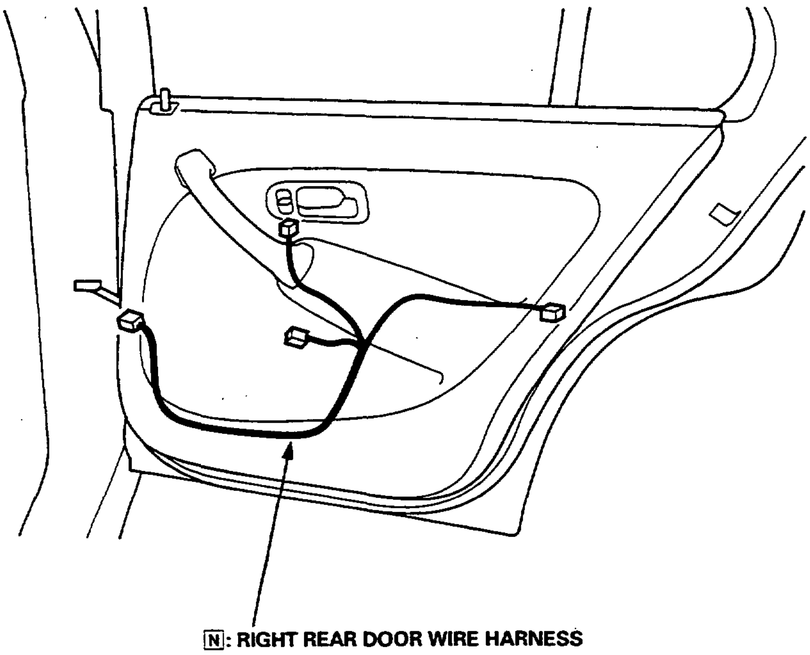
K: DRIVER'S DOOR WIRE HARNESS



L: FRONT PASSENGER'S DOOR WIRE HARNESS



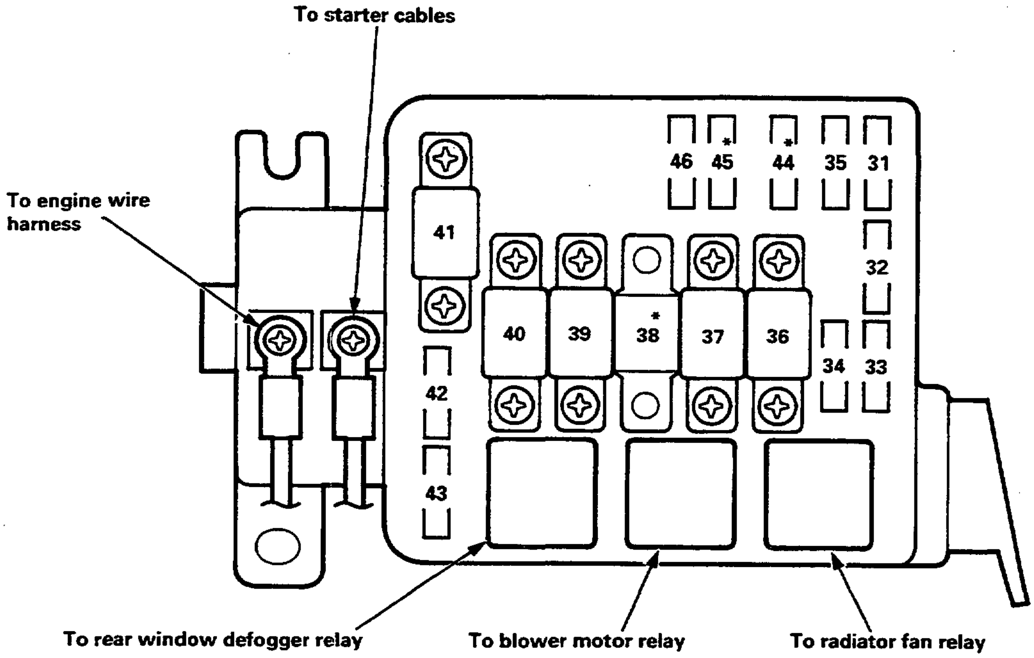
M: LEFT REAR DOOR WIRE HARNESS



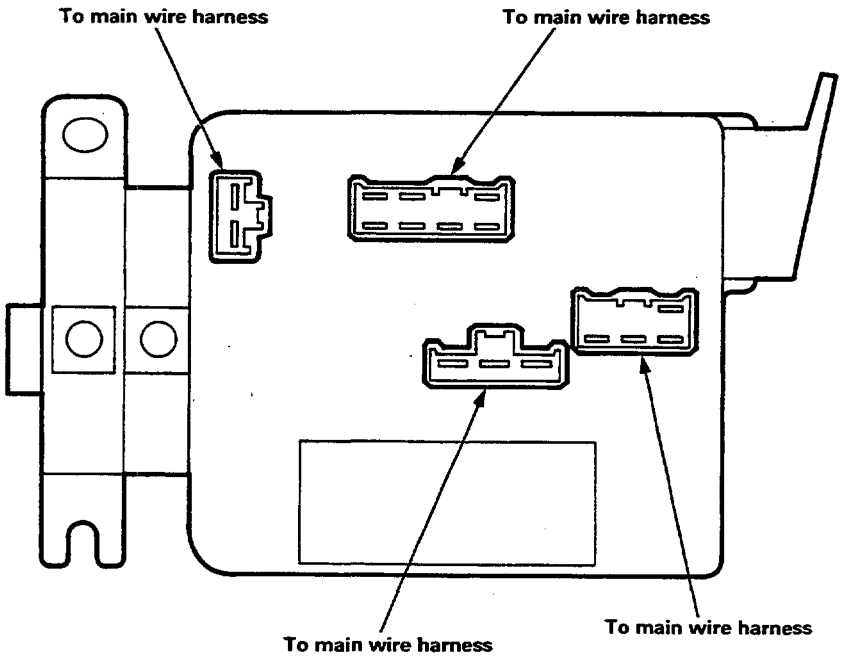
N: RIGHT REAR DOOR WIRE HARNESS

Under-hood Fuse/Relay Box

*: Not used



NOTE: View from back side of the under-hood fuse/relay box.

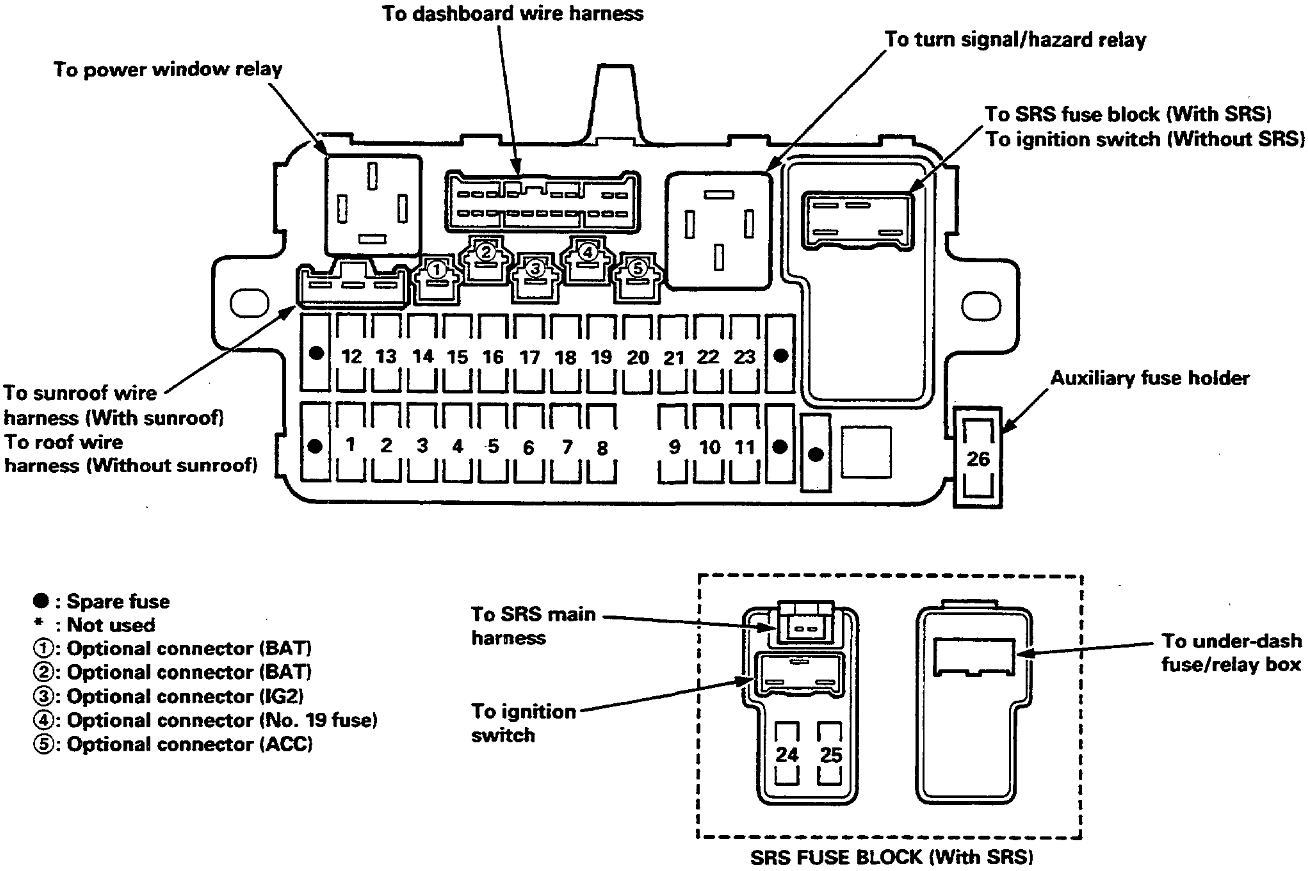


Fuse Number	Amps	Wire Color	Component(s) or Circuit(s) Protected
31	15 A	YEL/WHT	PGM-FI main relay (+B)
32	30 A	WHT/BLU	ECM, Clock, Stereo radio/cassette player
33	30 A	BLK/GRN	Rear window defogger (Via relay)
34	15 A	BLK/RED	Radiator fan motor (Via relay)
35	20 A	WHT	Condenser fan motor, A/C compressor clutch
36	50 A	WHT/RED	(To under-dash fuse/relay box)
37	30 A	BLU/WHT	Blower motor (Via relay)
38	——	——	Not used
39	50 A	WHT/BLK	Ignition switch (BAT)
40	40 A	WHT	Combination light switch, Integrated control unit, Rear fog light
41	80 A	——	Power distribution
42	20 A	WHT/GRN	Horn, Brake system, Horn relay (with SRS), Security alarm horn relay
43	10 A	WHT/GRN	Turn signal/hazard system
44	——	——	Not used
45	——	——	Not used
46	——	——	Not used

Fuses

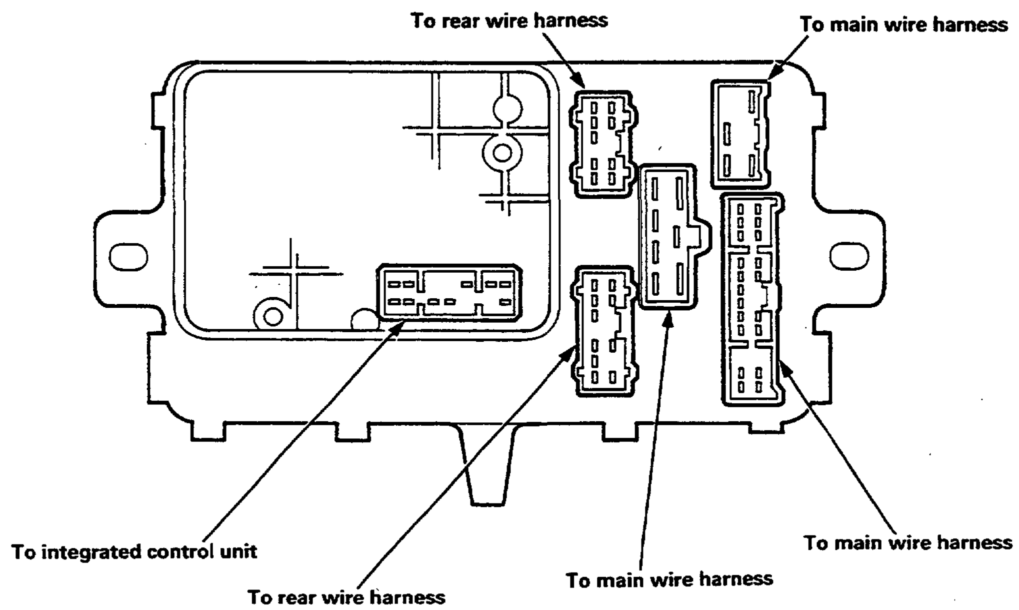
Under-dash Fuse/Relay Box

NOTE: LHD type is shown, RHD type is similar.



● : Spare fuse
* : Not used
①: Optional connector (BAT)
②: Optional connector (BAT)
③: Optional connector (IG2)
④: Optional connector (No. 19 fuse)
⑤: Optional connector (ACC)

NOTE: View from back side of the under-dash fuse/relay box.

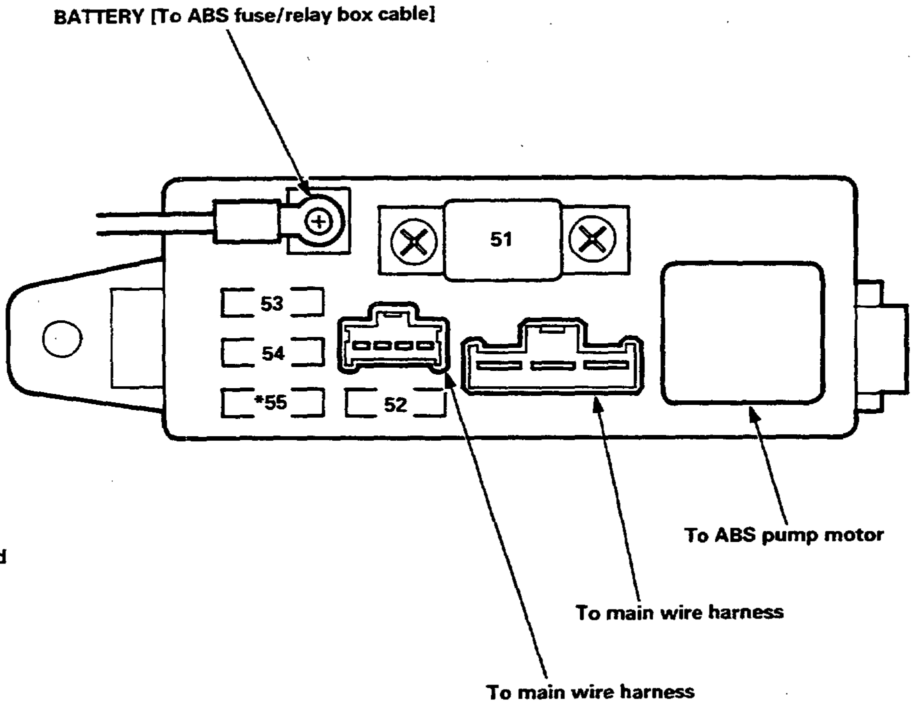


Fuse Number	Amps	Wire Color	Component(s) or Circuit(s) Protected
1	30 A	WHT	Sunroof motor
2	——	——	Not used
3	7.5 A	WHT/RED	Ceiling light, Data link connector, Ignition key light, Entry light timer unit, Keyless receiver unit, Luggage area light
4	20 A	YEL/BLK	Right rear power window motor
5	20 A	WHT/YEL	Driver's power window motor, Power window control unit
6	20 A	WHT/YEL	Power door lock control unit Security alarm control unit
7	20 A	GRN/BLK	Left rear power window motor
8	20 A	BLU/BLK	Front passenger's power window motor
9	10 A	RED/BLU	Right headlight (High beam), Integrated control unit (KE)
10	10 A	RED/GRN	Left headlight (High beam), High beam indicator light
11	15 A	WHT/RED	Front fog lights
12 (Without SRS)	15 A	BLK/YEL	Vehicle speed sensor (VSS), Alternator, EGR control solenoid valve, Gauge assembly
13	7.5 A	BLK/YEL	ABS control unit (IG2), ABS pump motor relay, Power mirror actuators, Rear window defogger relay, Radiator fan relay, Blower motor relay, Condenser fan relay, A/C compressor clutch relay, A/C thermostat, Recirculation control motor, A/C switch light
14	20 A	GRN/BLK	Sunroof open relay, Sunroof close relay, Rear window wiper motor, Windshield wiper motor, Integrated control unit, Windshield/rear window intermittent wiper control unit
15	10 A	YEL	Clock, Turn signal/hazard relay, Gauge assembly, Security alarm control unit, Back-up lights, Headlight adjuster units
16	——	——	Not used
17	10 A	RED/BLU	Left taillight, Trailer lighting connector (KG)
		WHT/YEL	Integrated control unit (KE)
18	7.5 A	BLK/WHT	ECM, PGM-FI main relay
19	10 A	RED/BLK	Dash lights, Parking lights, License plate lights, Front/rear fog light relay
20	7.5 A	RED/WHT	Rear fog lights
21	10 A	RED/WHT	Right headlight (Low beam)
22	10 A	RED/YEL	Left headlight (Low beam)
23	15 A	YEL/RED	Stereo radio/cassette player, Cigarette lighter
24 (With SRS)	15 A	RED	SRS unit (VA)
		BLK/YEL	VSS, Alternator, EGR control solenoid valve, Gauge assembly
25 (With SRS)	10 A	PNK	SRS unit (VB)
26 (Auxiliary fuse holder)	15 A	BLK/YEL	PGM-FI main relay (Via inertia switch)

Fuses

Under-hood ABS Fuse/Relay Box

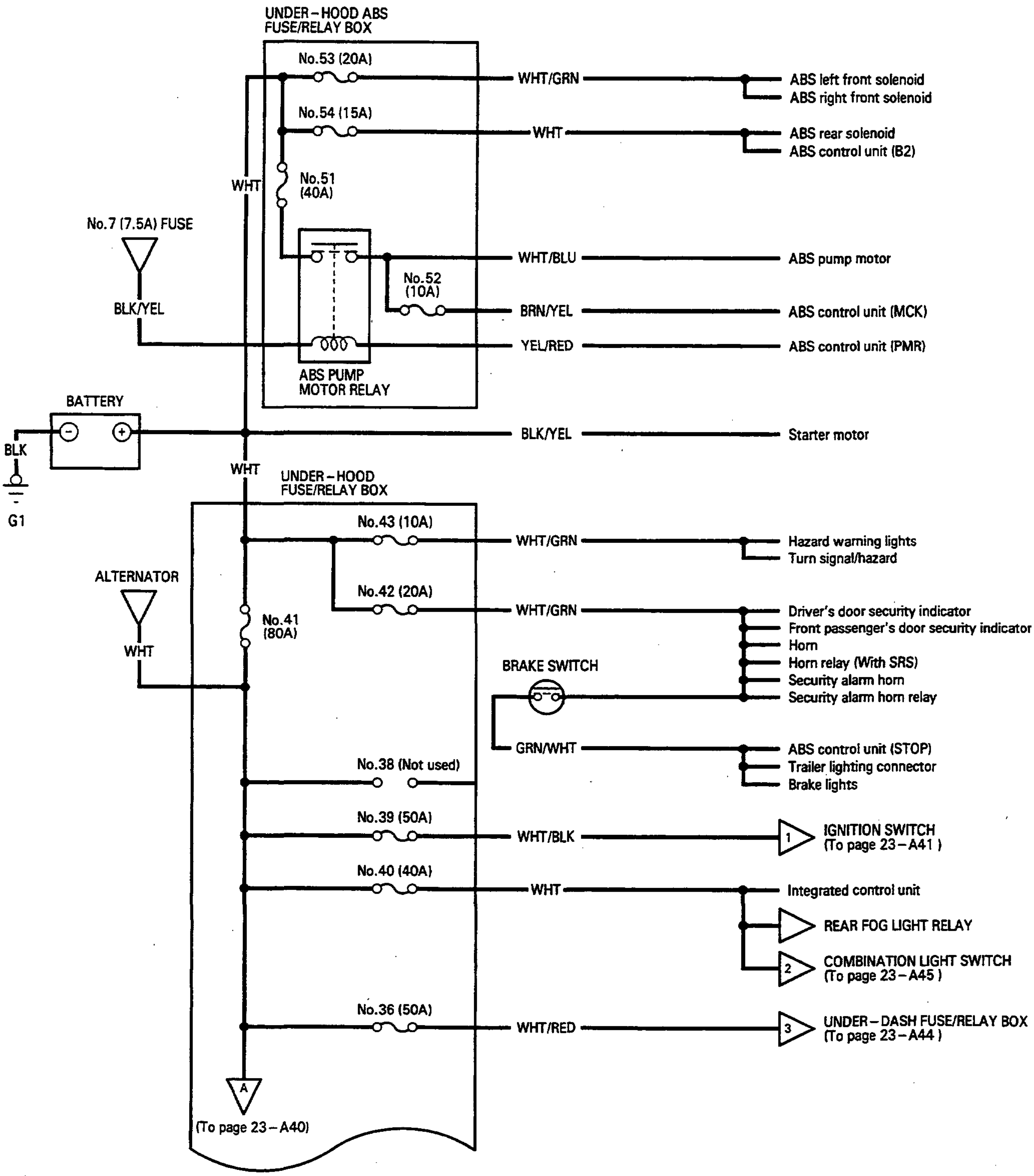
NOTE: LHD type is shown, RHD type is similar.



*: Not used

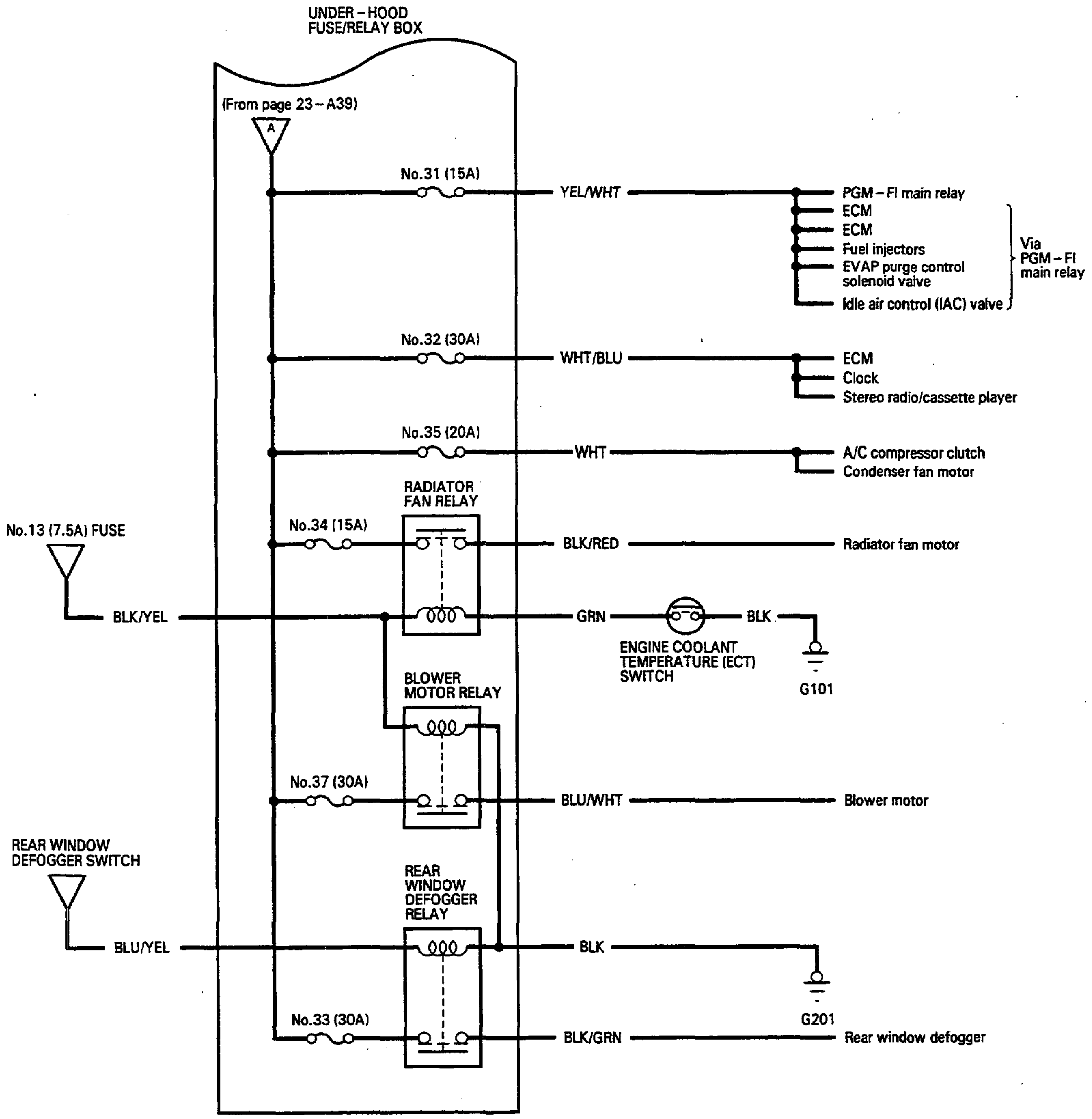
Fuse Number	Amps	Wire Color	Component(s) or Circuit(s) Protected
51	40 A	——	ABS pump motor relay (contacts)
52	10 A	BRN/YEL	ABS control unit (MCK)
53	20 A	WHT/GRN	ABS front solenoids
54	15 A	WHT	ABS rear solenoids, ABS control unit (B2)
55	——	——	Not used

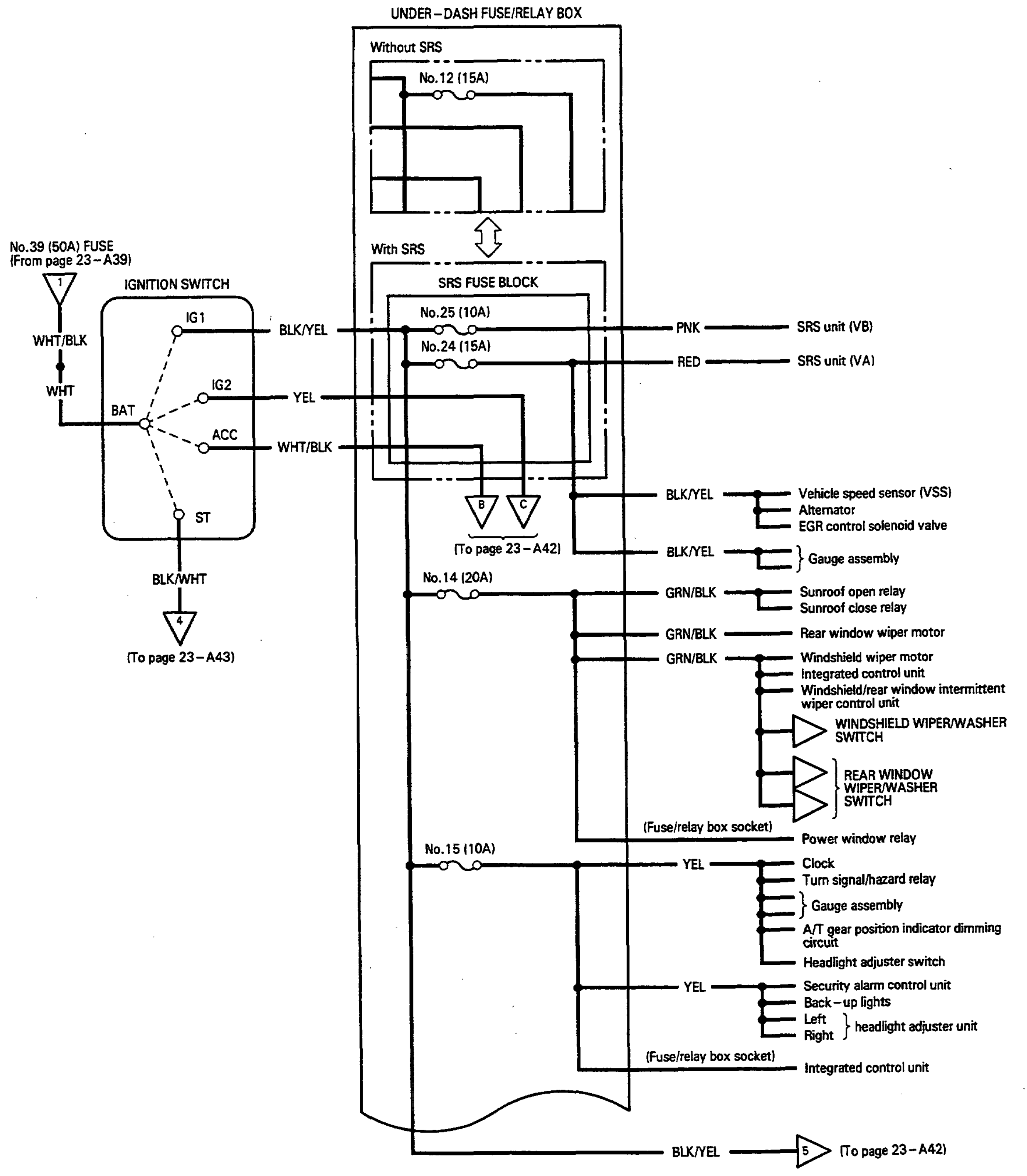
Circuit Identification (LHD type)



(cont'd)

Circuit Identification (LHD type cont'd)



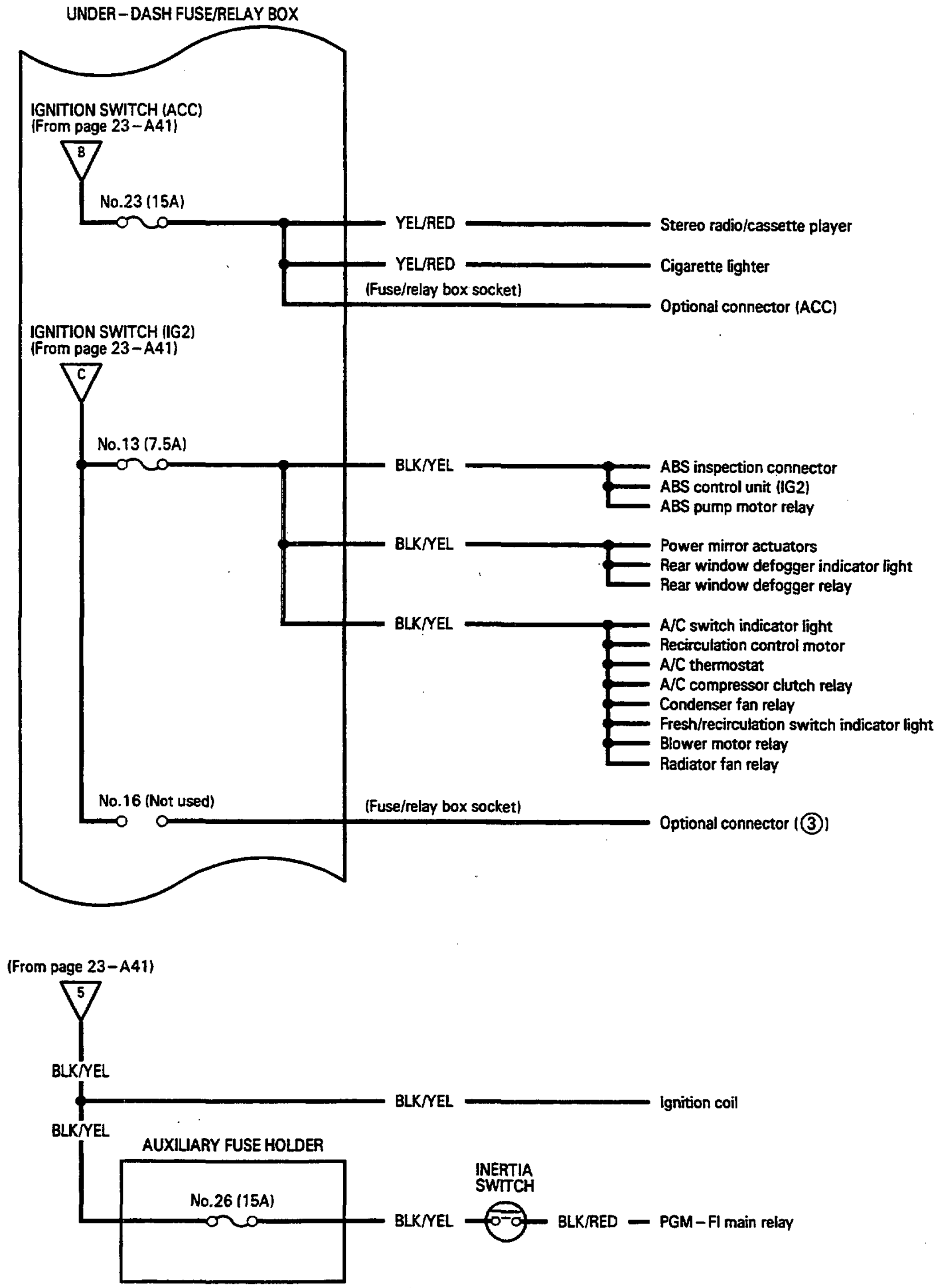


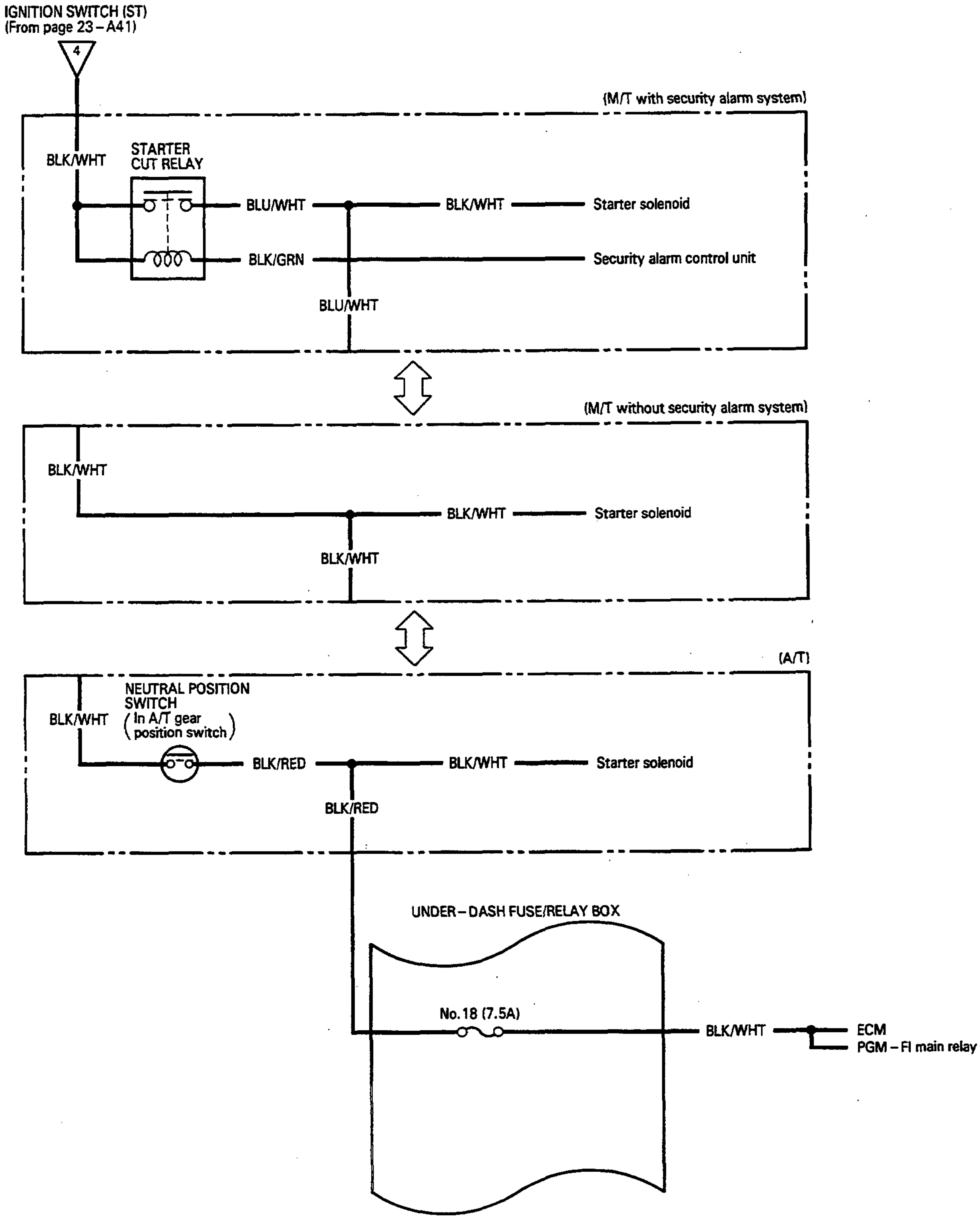
UNDER-DASH FUSE/RELAY BOX
Without SRS
No.12 (15A)
With SRS
SRS FUSE BLOCK
No.25 (10A)
No.24 (15A)
No.39 (50A) FUSE
(From page 23-A39)
1
IGNITION SWITCH
IG1
BLK/YEL
WHT/BLK
WHT
BAT
IG2
YEL
ACC
WHT/BLK
ST
BLK/WHT
4
(To page 23-A43)
PNK
SRS unit (VB)
RED
SRS unit (VA)
B
C
(To page 23-A42)
BLK/YEL
Vehicle speed sensor (VSS)
Alternator
EGR control solenoid valve
BLK/YEL
Gauge assembly
No.14 (20A)
GRN/BLK
Sunroof open relay
Sunroof close relay
GRN/BLK
Rear window wiper motor
GRN/BLK
Windshield wiper motor
Integrated control unit
Windshield/rear window intermittent wiper control unit
WINDSHIELD WIPER/WASHER SWITCH
REAR WINDOW WIPER/WASHER SWITCH
(Fuse/relay box socket)
Power window relay
No.15 (10A)
YEL
Clock
Turn signal/hazard relay
Gauge assembly
A/T gear position indicator dimming circuit
Headlight adjuster switch
YEL
Security alarm control unit
Back-up lights
Left
Right
headlight adjuster unit
(Fuse/relay box socket)
Integrated control unit
BLK/YEL
5
(To page 23-A42)

(cont'd)

Power Distribution

Circuit Identification (LHD type cont'd)

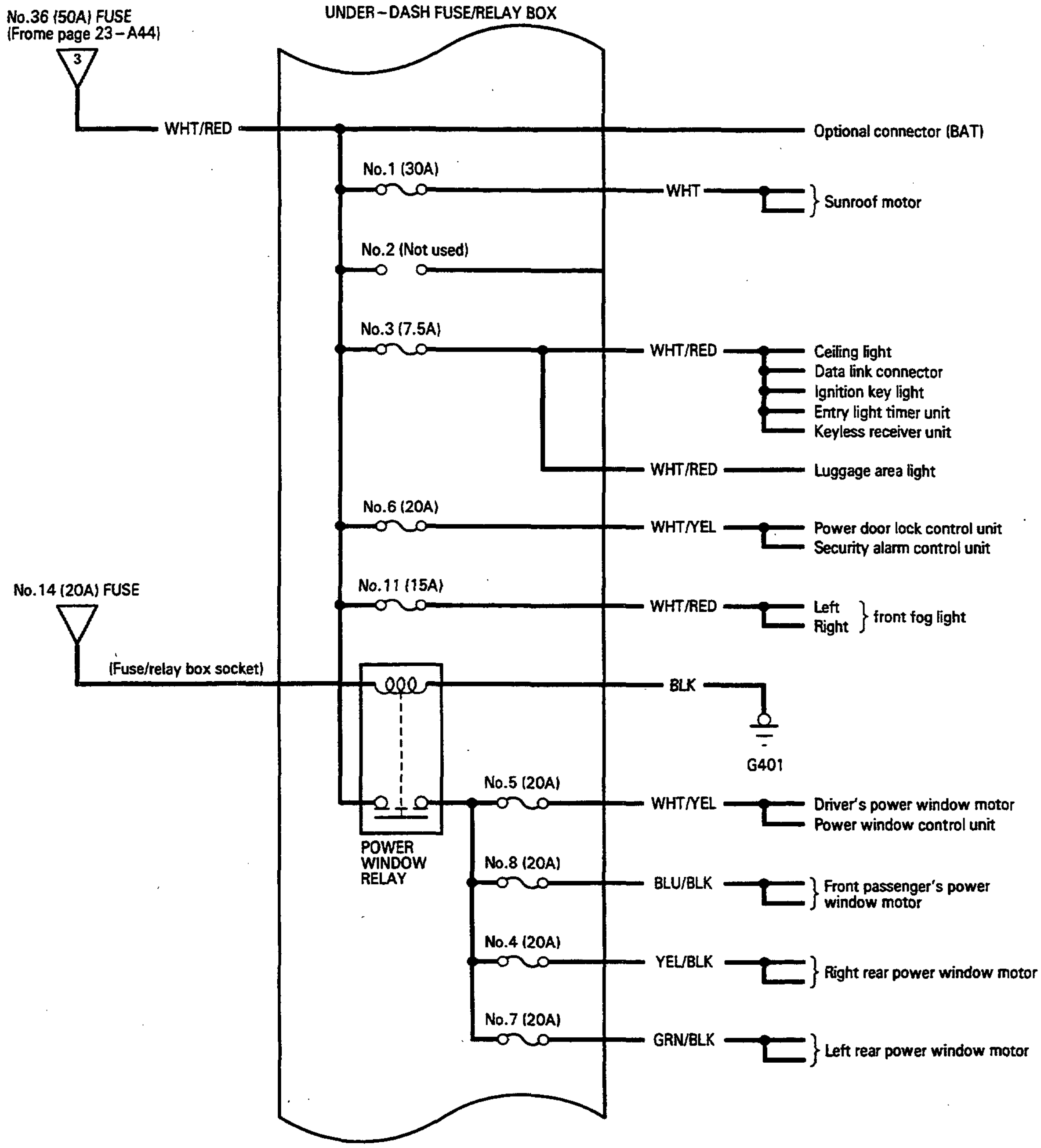


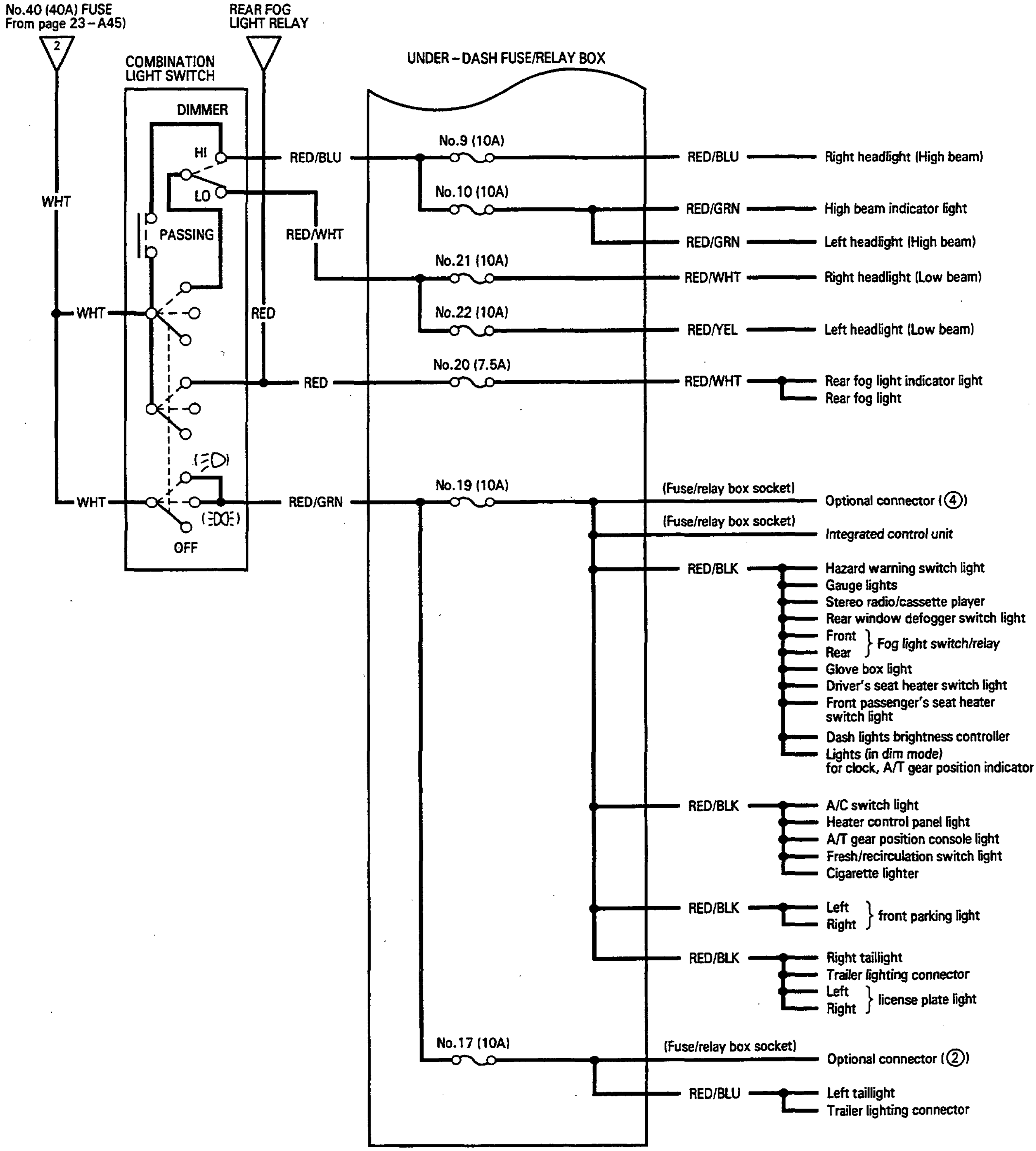


IGNITION SWITCH (ST)
(From page 23-A41)
4
(M/T with security alarm system)
BLK/WHT
STARTER
CUT RELAY
BLU/WHT
BLK/WHT
Starter solenoid
BLK/GRN
Security alarm control unit
BLU/WHT
(M/T without security alarm system)
BLK/WHT
BLK/WHT
Starter solenoid
BLK/WHT
(A/T)
NEUTRAL POSITION
SWITCH
(In A/T gear position switch)
BLK/WHT
BLK/RED
BLK/WHT
Starter solenoid
BLK/RED
UNDER-DASH FUSE/RELAY BOX
No. 18 (7.5A)
BLK/WHT
ECM
PGM-FI main relay

(cont'd)

Circuit Identification (LHD type cont'd)

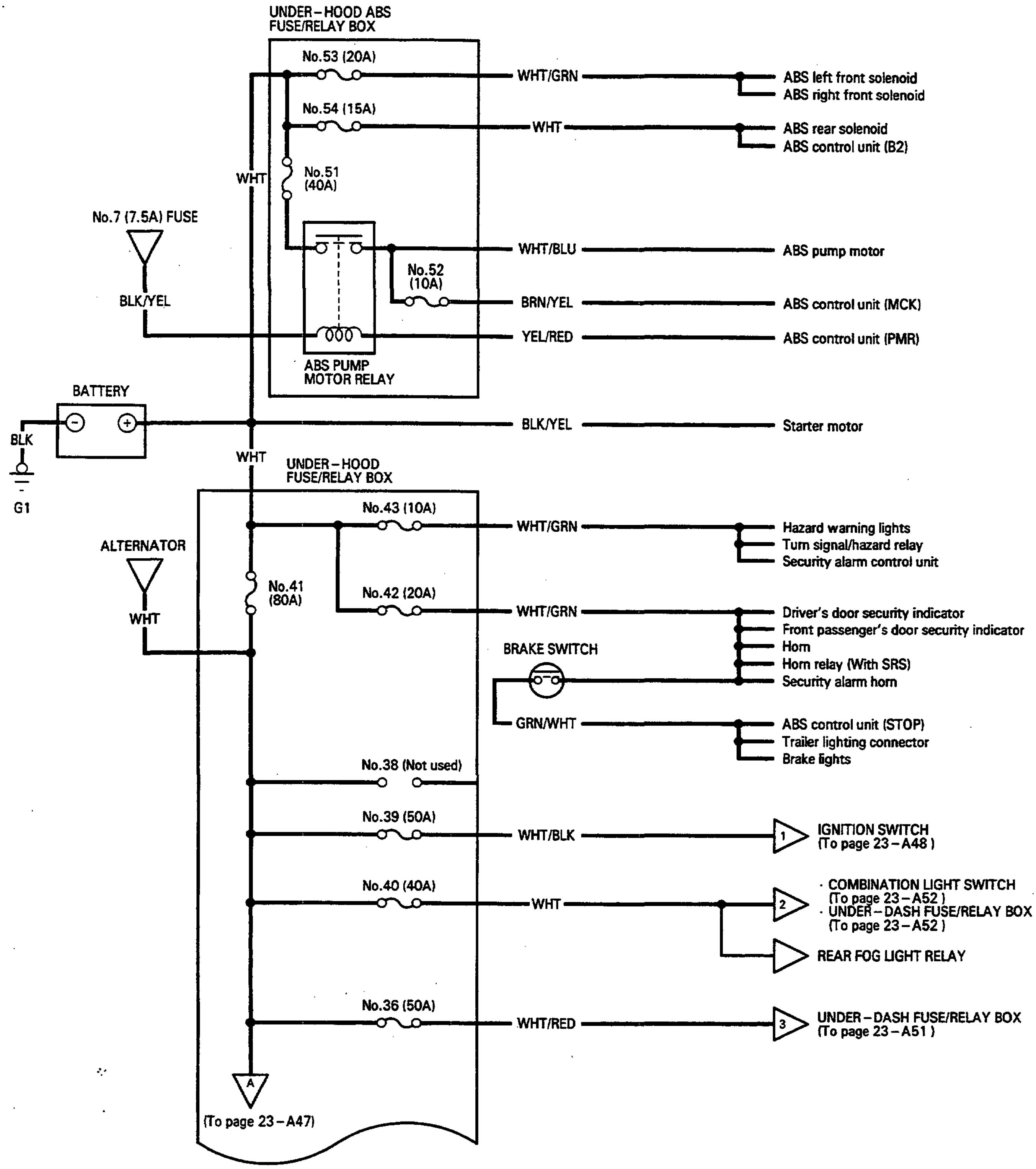


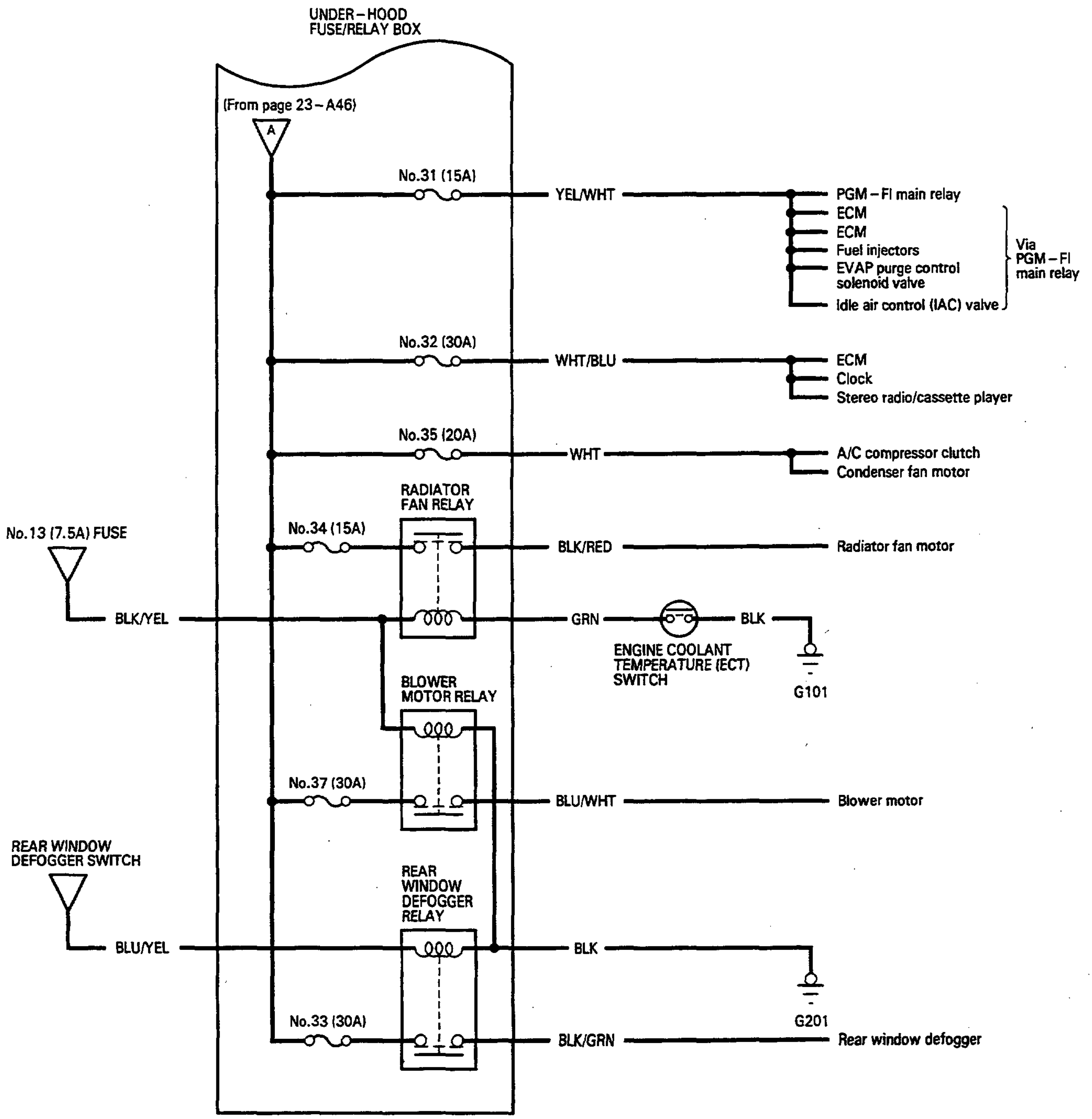


No.40 (40A) FUSE
From page 23-A45)
2
REAR FOG
LIGHT RELAY
COMBINATION
LIGHT SWITCH
UNDER-DASH FUSE/RELAY BOX
DIMMER
HI
LO
PASSING
WHT
WHT
WHT
RED
OFF
RED/BLU
RED/WHT
RED
RED/GRN
No.9 (10A)
No.10 (10A)
No.21 (10A)
No.22 (10A)
No.20 (7.5A)
No.19 (10A)
No.17 (10A)
RED/BLU
Right headlight (High beam)
RED/GRN
High beam indicator light
RED/GRN
Left headlight (High beam)
RED/WHT
Right headlight (Low beam)
RED/YEL
Left headlight (Low beam)
RED/WHT
Rear fog light indicator light
Rear fog light
(Fuse/relay box socket)
Optional connector (4)
(Fuse/relay box socket)
Integrated control unit
RED/BLK
Hazard warning switch light
Gauge lights
Stereo radio/cassette player
Rear window defogger switch light
Front
Rear
Fog light switch/relay
Glove box light
Driver's seat heater switch light
Front passenger's seat heater switch light
Dash lights brightness controller
Lights (in dim mode) for clock, A/T gear position indicator
RED/BLK
A/C switch light
Heater control panel light
A/T gear position console light
Fresh/recirculation switch light
Cigarette lighter
RED/BLK
Left
Right
front parking light
RED/BLK
Right taillight
Trailer lighting connector
Left
Right
license plate light
(Fuse/relay box socket)
Optional connector (2)
RED/BLU
Left taillight
Trailer lighting connector

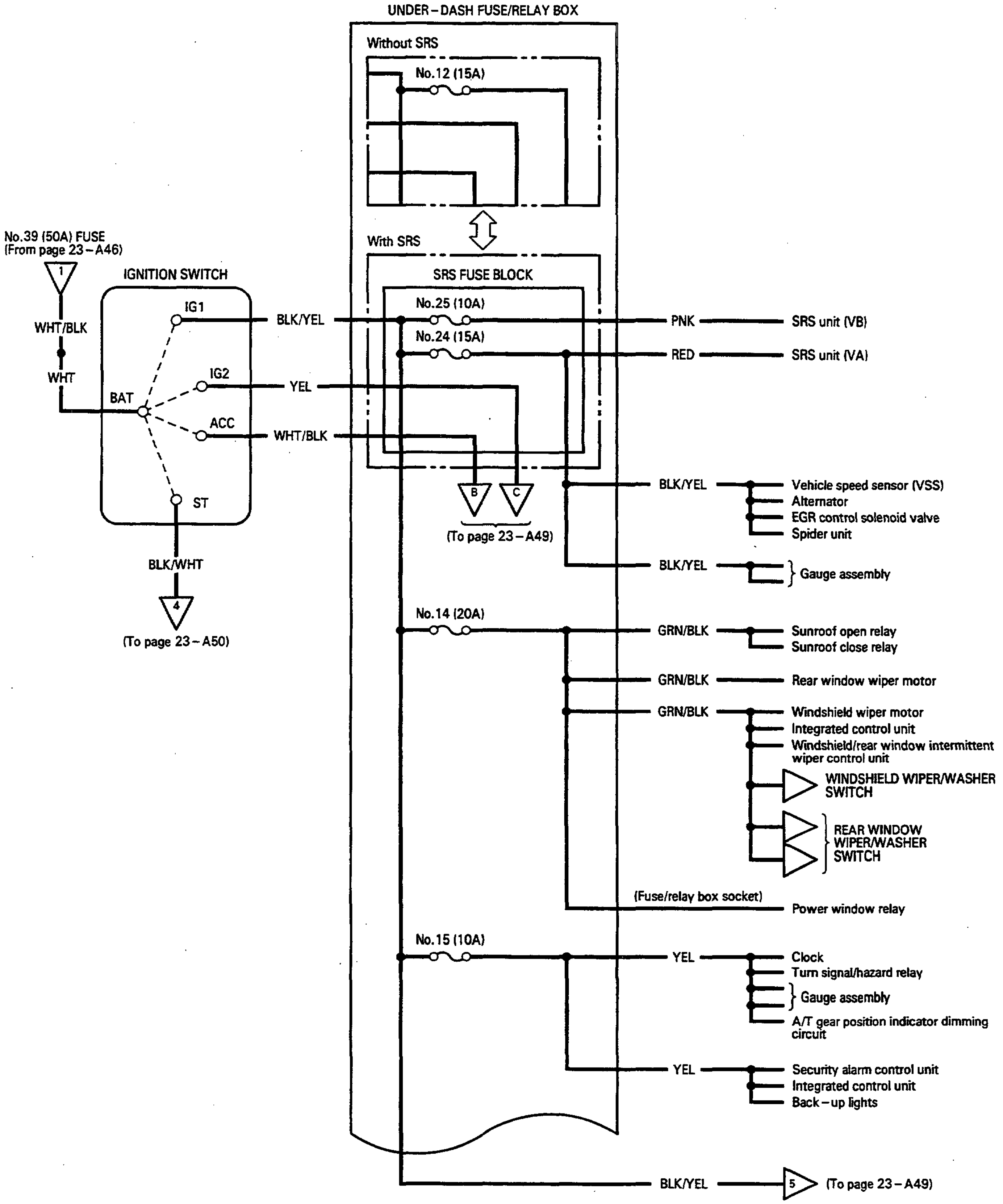
Power Distribution

Circuit Identification (RHD type)

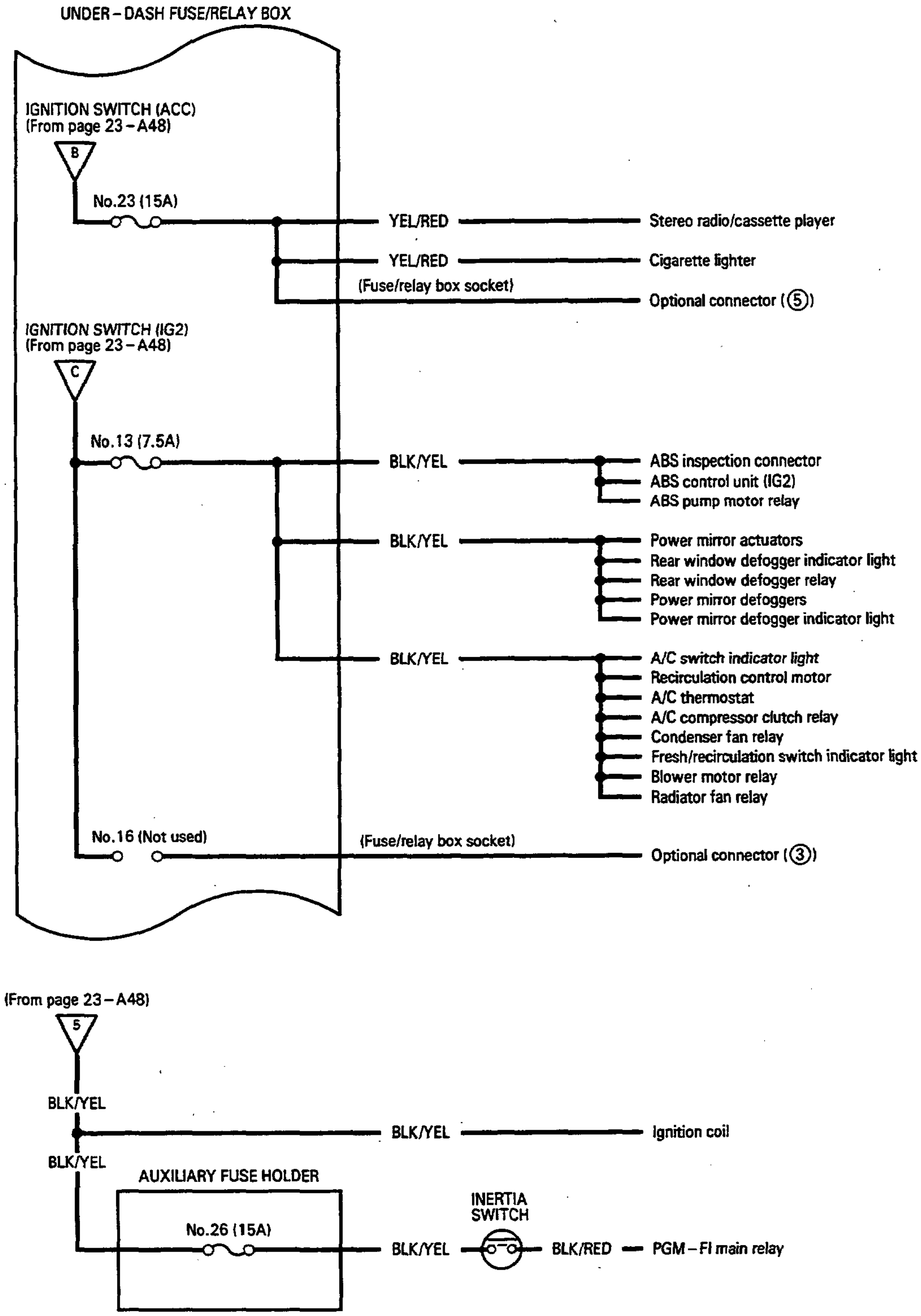



UNDER-HOOD
FUSE/RELAY BOX
(From page 23-A46)
A
No.31 (15A)
YEL/WHT
PGM-FI main relay
ECM
ECM
Fuel injectors
EVAP purge control solenoid valve
Idle air control (IAC) valve
Via PGM-FI main relay
No.32 (30A)
WHT/BLU
ECM
Clock
Stereo radio/cassette player
No.35 (20A)
WHT
A/C compressor clutch
Condenser fan motor
RADIATOR FAN RELAY
No.13 (7.5A) FUSE
No.34 (15A)
BLK/RED
Radiator fan motor
BLK/YEL
GRN
BLK
ENGINE COOLANT TEMPERATURE (ECT) SWITCH
G101
BLOWER MOTOR RELAY
No.37 (30A)
BLU/WHT
Blower motor
REAR WINDOW DEFOGGER SWITCH
REAR WINDOW DEFOGGER RELAY
BLU/YEL
BLK
G201
No.33 (30A)
BLK/GRN
Rear window defogger

(cont'd)



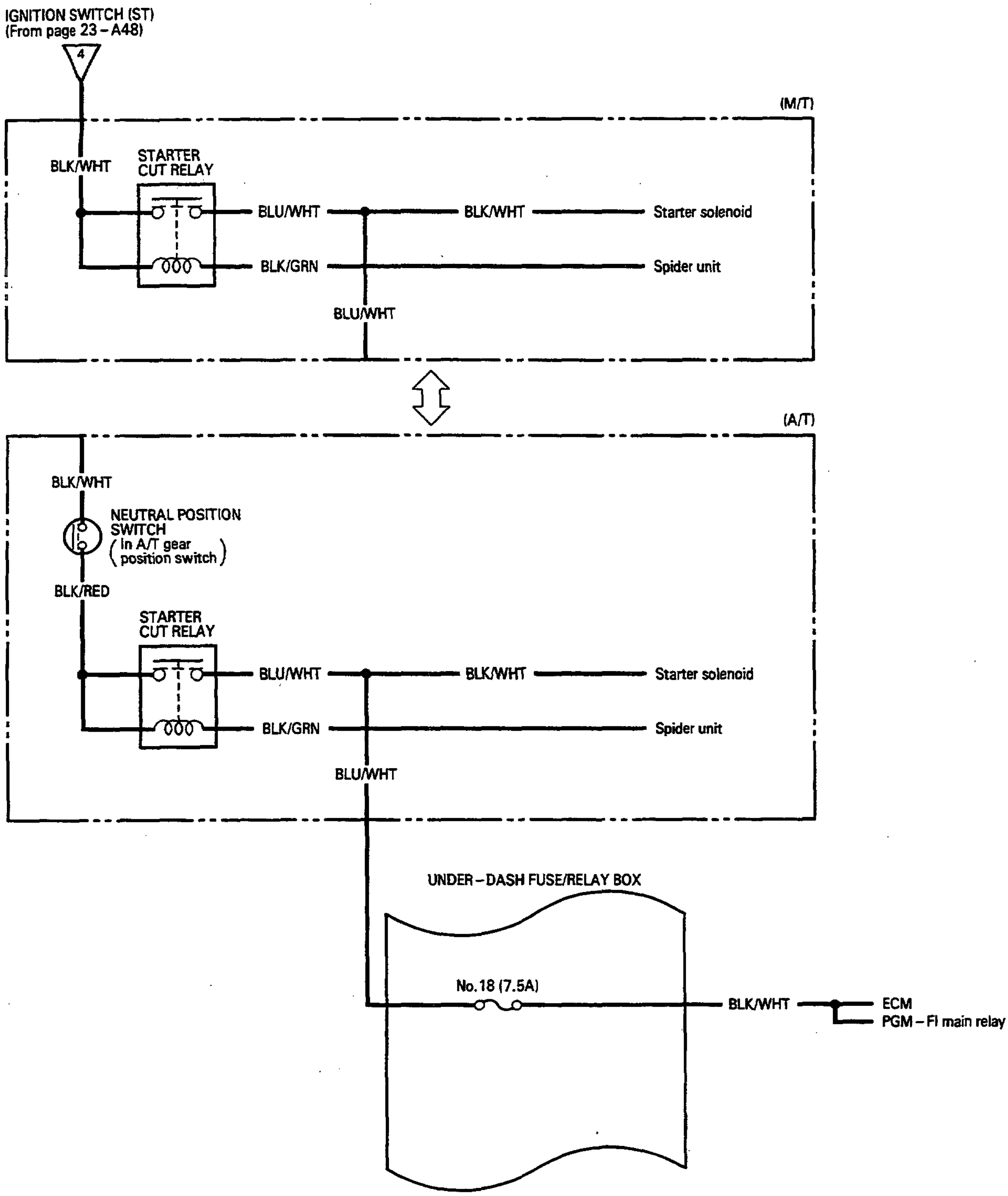
UNDER-DASH FUSE/RELAY BOX
Without SRS
No.12 (15A)
With SRS
SRS FUSE BLOCK
No.25 (10A)
No.24 (15A)
No.39 (50A) FUSE
(From page 23-A46)
1
IGNITION SWITCH
IG1
WHT/BLK
WHT
IG2
BAT
ACC
ST
BLK/YEL
YEL
WHT/BLK
PNK
SRS unit (VB)
RED
SRS unit (VA)
B
C
(To page 23-A49)
BLK/YEL
Vehicle speed sensor (VSS)
Alternator
EGR control solenoid valve
Spider unit
BLK/WHT
BLK/YEL
Gauge assembly
4
(To page 23-A50)
No.14 (20A)
GRN/BLK
Sunroof open relay
Sunroof close relay
GRN/BLK
Rear window wiper motor
GRN/BLK
Windshield wiper motor
Integrated control unit
Windshield/rear window intermittent wiper control unit
WINDSHIELD WIPER/WASHER SWITCH
REAR WINDOW WIPER/WASHER SWITCH
(Fuse/relay box socket)
Power window relay
No.15 (10A)
YEL
Clock
Turn signal/hazard relay
Gauge assembly
A/T gear position indicator dimming circuit
YEL
Security alarm control unit
Integrated control unit
Back-up lights
BLK/YEL
5
(To page 23-A49)

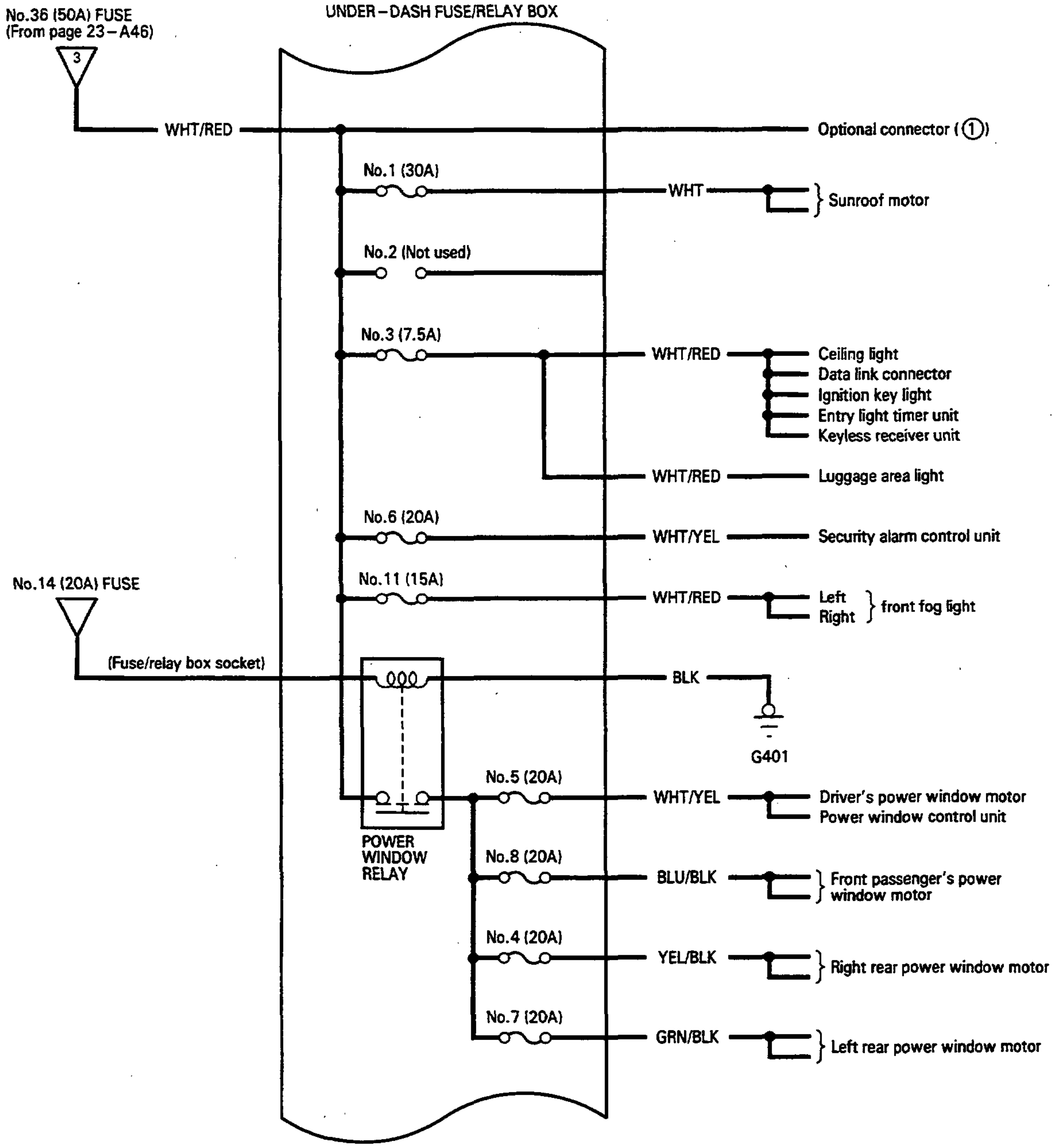


UNDER-DASH FUSE/RELAY BOX
IGNITION SWITCH (ACC)
(From page 23-A48)
B
No.23 (15A)
YEL/RED
Stereo radio/cassette player
YEL/RED
Cigarette lighter
(Fuse/relay box socket)
Optional connector (⑤)
IGNITION SWITCH (IG2)
(From page 23-A48)
C
No.13 (7.5A)
BLK/YEL
ABS inspection connector
ABS control unit (IG2)
ABS pump motor relay
BLK/YEL
Power mirror actuators
Rear window defogger indicator light
Rear window defogger relay
Power mirror defoggers
Power mirror defogger indicator light
BLK/YEL
A/C switch indicator light
Recirculation control motor
A/C thermostat
A/C compressor clutch relay
Condenser fan relay
Fresh/recirculation switch indicator light
Blower motor relay
Radiator fan relay
No.16 (Not used)
(Fuse/relay box socket)
Optional connector (③)
(From page 23-A48)
5
BLK/YEL
BLK/YEL
Ignition coil
BLK/YEL
AUXILIARY FUSE HOLDER
No.26 (15A)
BLK/YEL
INERTIA SWITCH
BLK/RED
PGM-FI main relay

(cont'd)

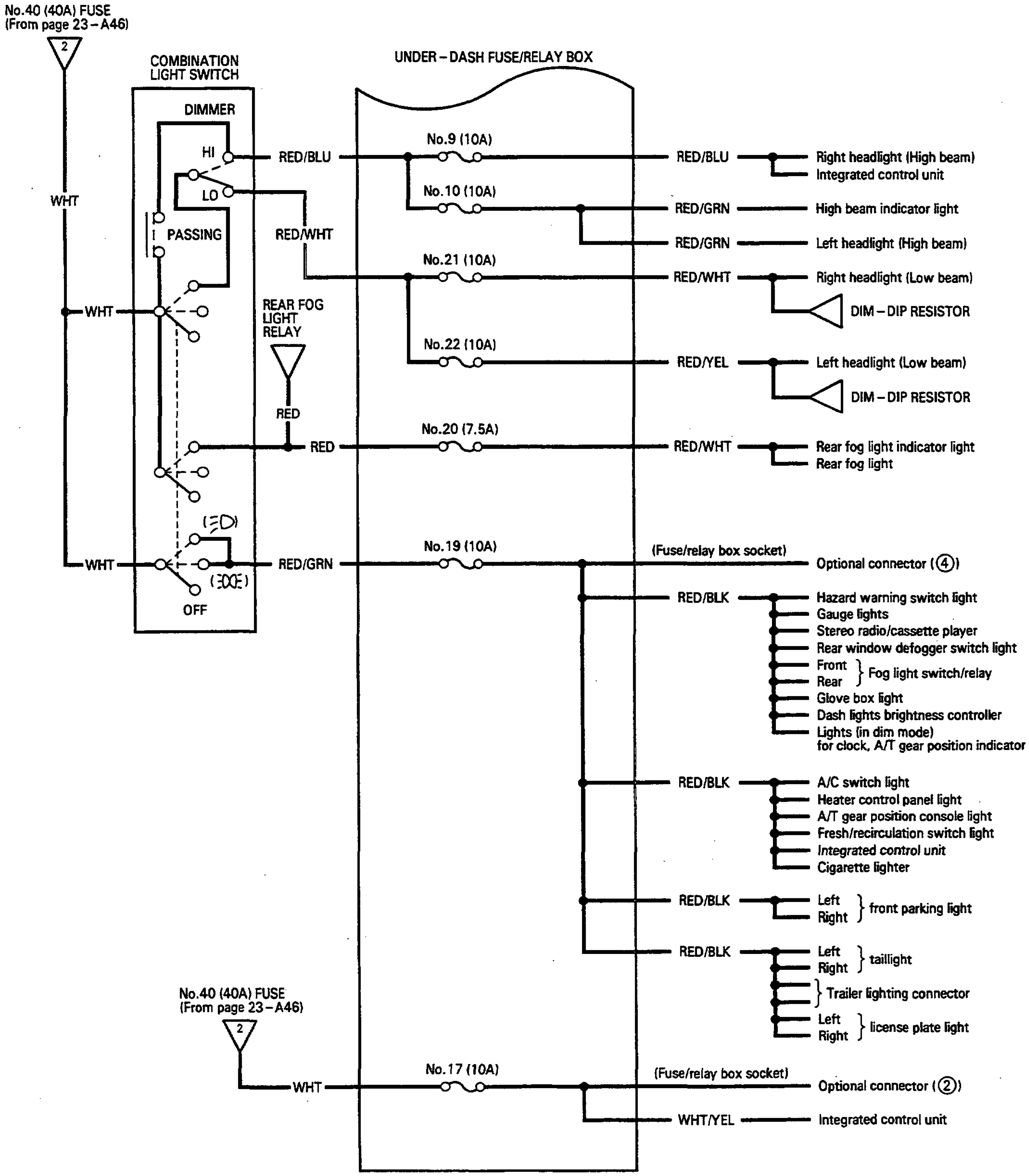
Circuit Identification (RHD type cont'd)




No.36 (50A) FUSE
(From page 23–A46)
3
UNDER–DASH FUSE/RELAY BOX
WHT/RED
Optional connector (①)
No.1 (30A)
WHT
Sunroof motor
No.2 (Not used)
No.3 (7.5A)
WHT/RED
Ceiling light
Data link connector
Ignition key light
Entry light timer unit
Keyless receiver unit
WHT/RED
Luggage area light
No.6 (20A)
WHT/YEL
Security alarm control unit
No.14 (20A) FUSE
No.11 (15A)
WHT/RED
Left
Right
front fog light
(Fuse/relay box socket)
BLK
G401
No.5 (20A)
WHT/YEL
Driver's power window motor
Power window control unit
POWER
WINDOW
RELAY
No.8 (20A)
BLU/BLK
Front passenger's power window motor
No.4 (20A)
YEL/BLK
Right rear power window motor
No.7 (20A)
GRN/BLK
Left rear power window motor

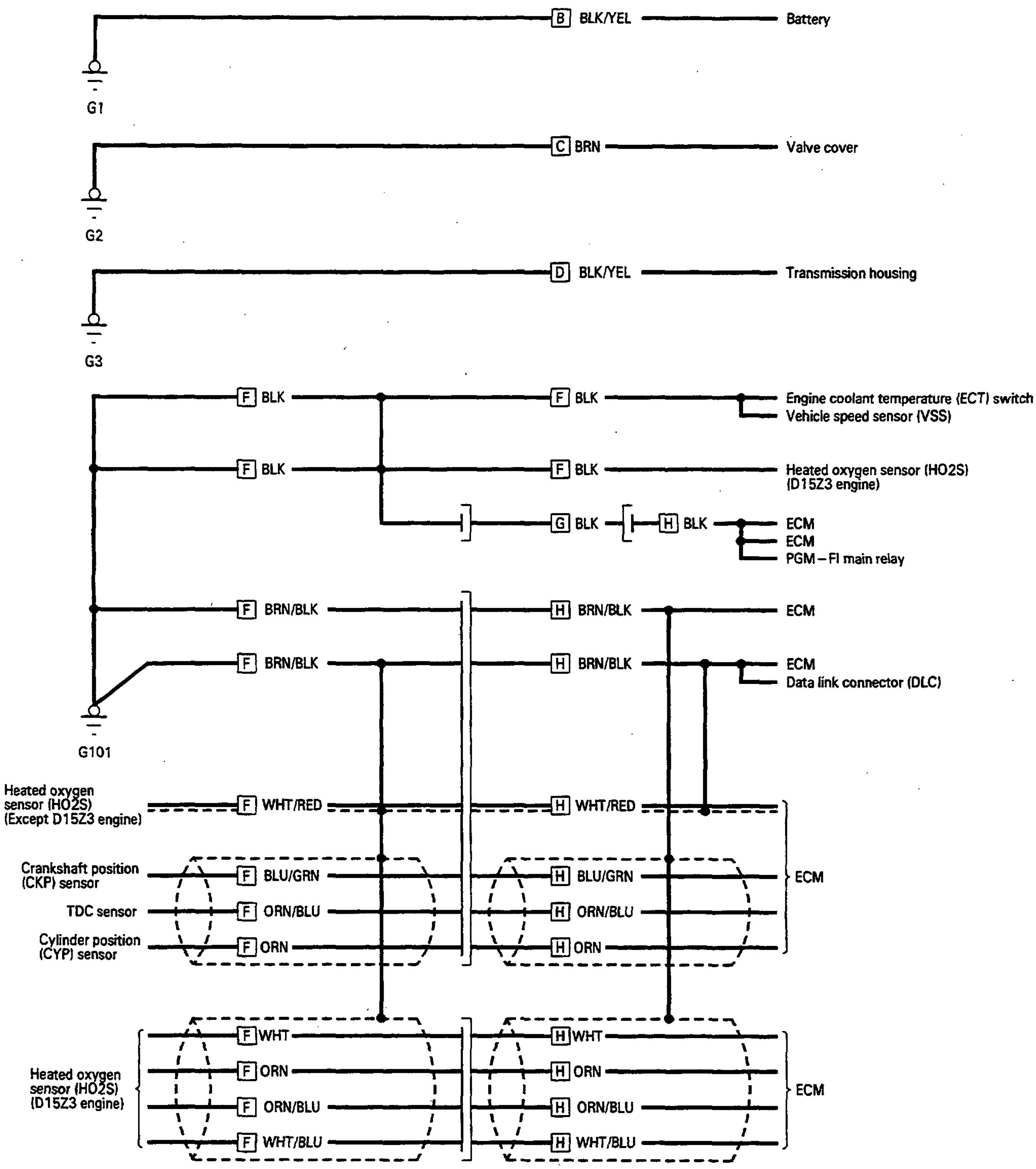
(cont'd)

Circuit Identification (RHD type cont'd)



Ground Distribution

Circuit Identification (LHD type)

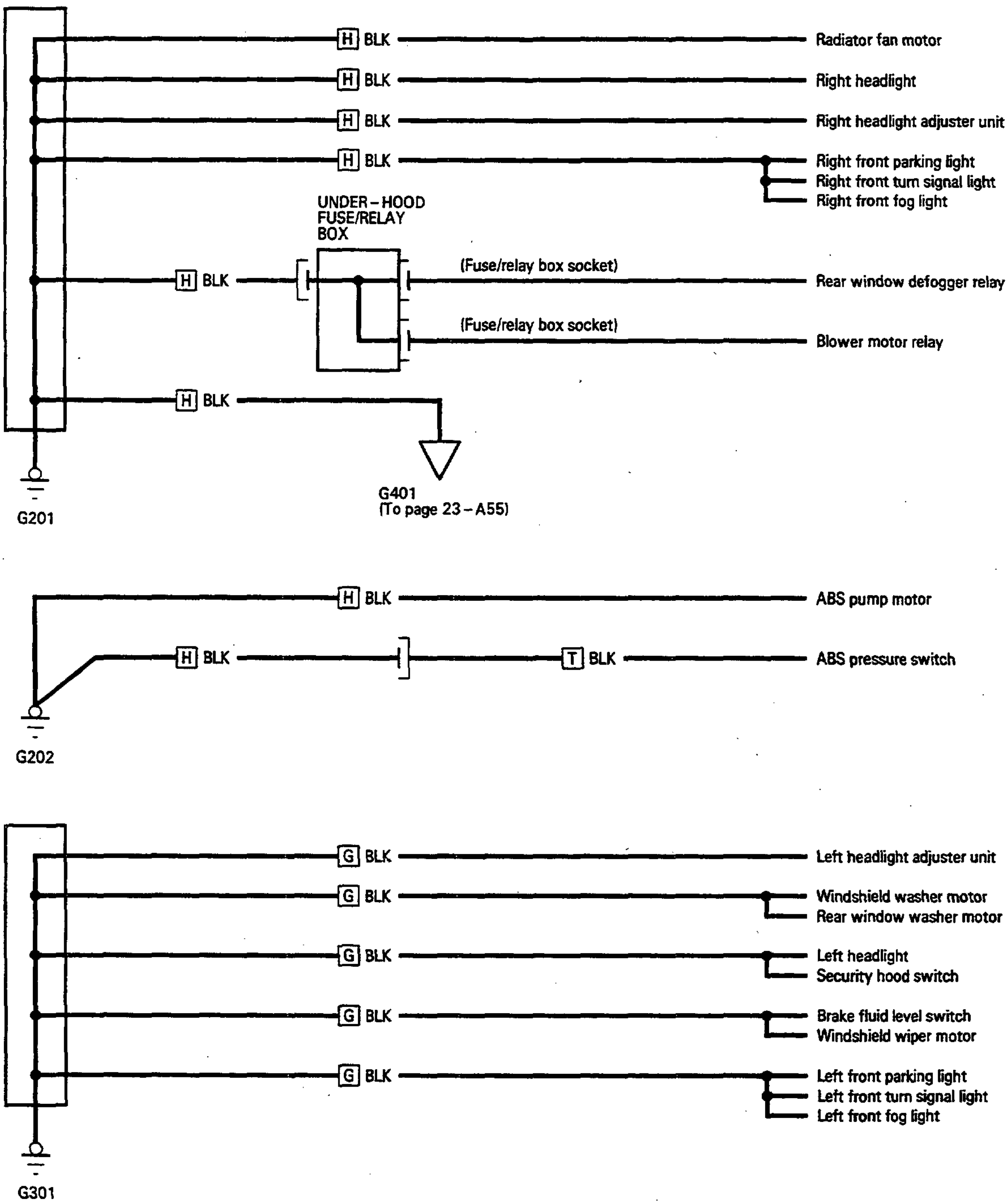


B : Battery ground cable
C : Engine ground cable A
D : Engine ground cable B
F : Engine wire harness
G : Engine compartment wire harness
H : Main wire harness
------ : Shielding

(cont'd)

Ground Distribution

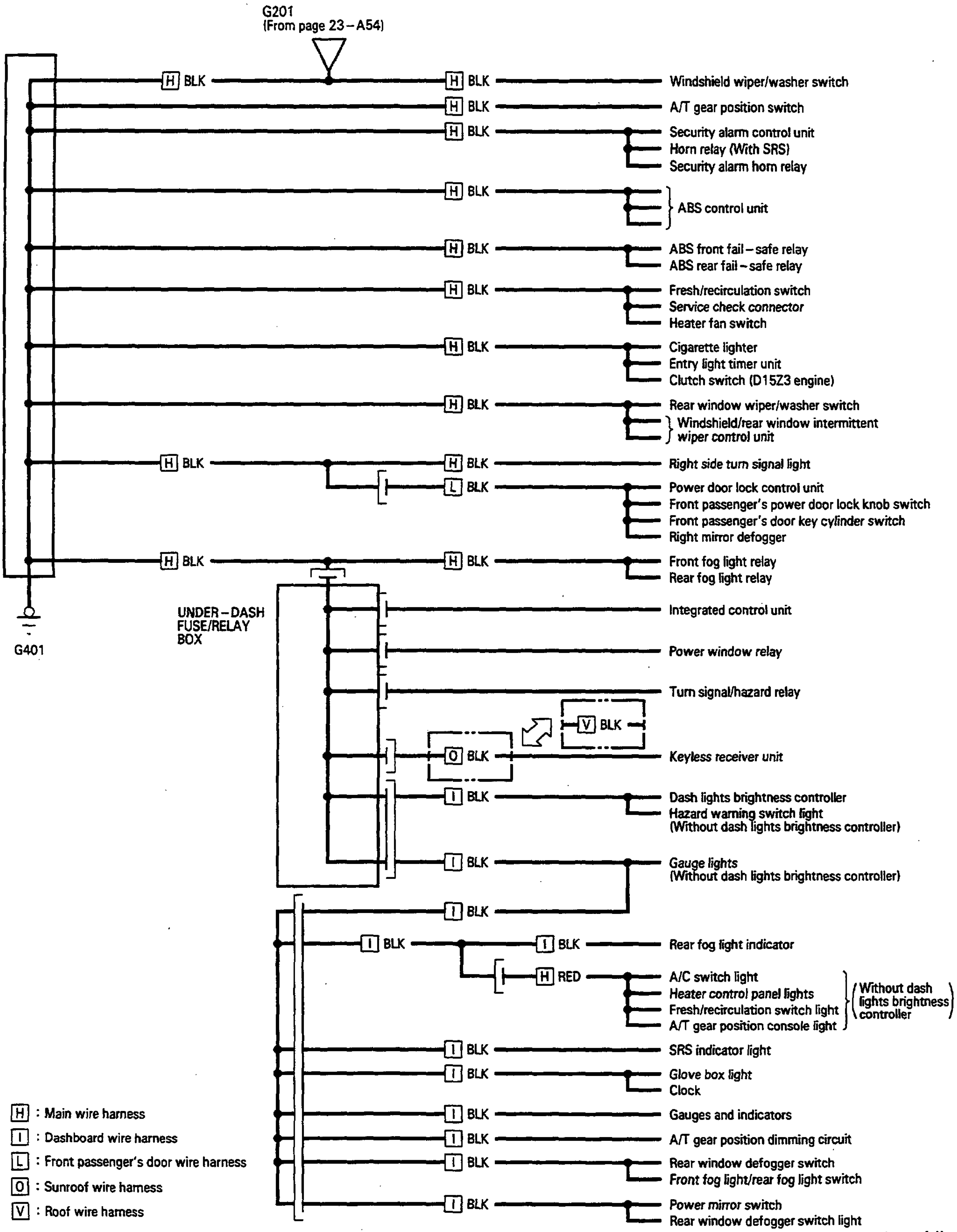
Circuit Identification (LHD type cont'd)



G : Engine compartment wire harness

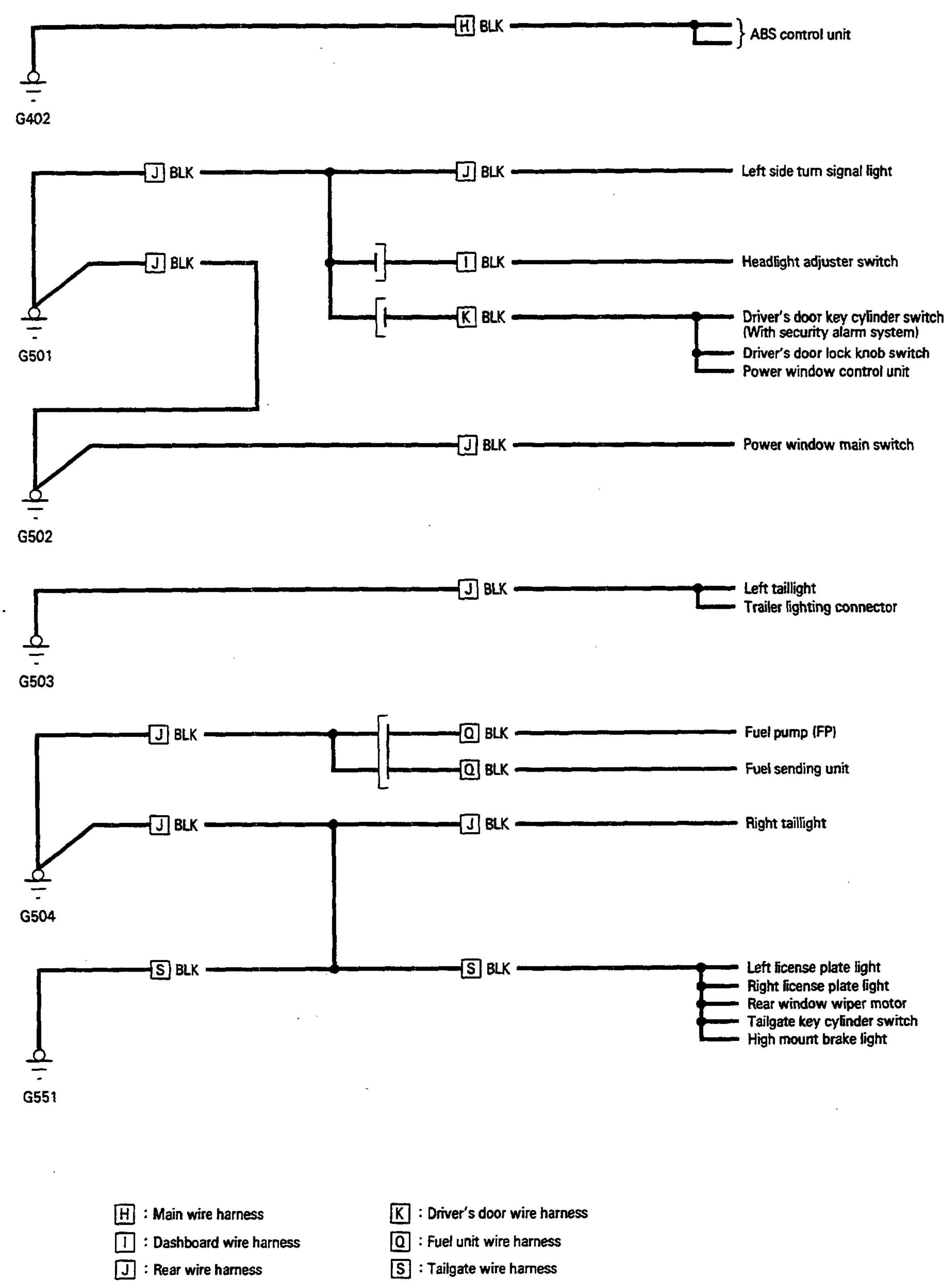
T : ABS modulator unit wire harness

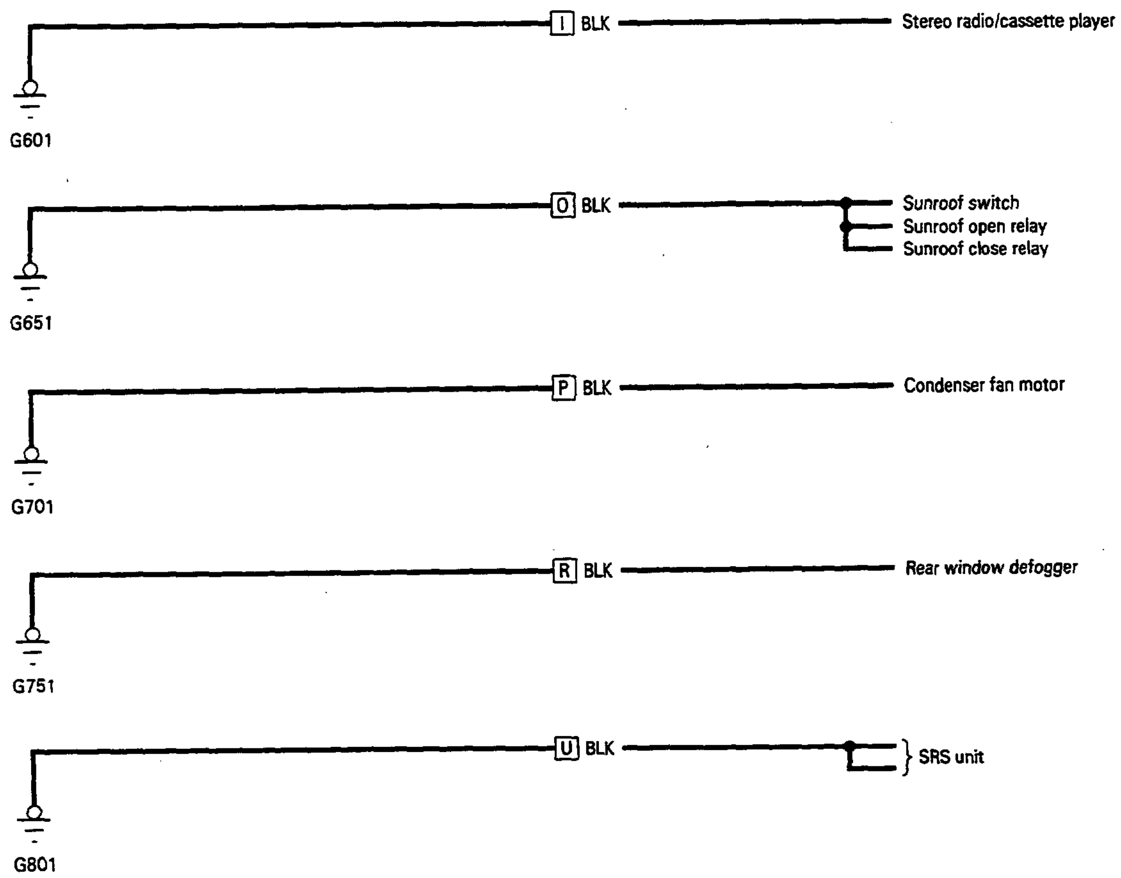
H : Main wire harness


G201
(From page 23-A54)
H BLK
H BLK
Windshield wiper/washer switch
H BLK
A/T gear position switch
H BLK
Security alarm control unit
Horn relay (With SRS)
Security alarm horn relay
H BLK
ABS control unit
H BLK
ABS front fail-safe relay
ABS rear fail-safe relay
H BLK
Fresh/recirculation switch
Service check connector
Heater fan switch
H BLK
Cigarette lighter
Entry light timer unit
Clutch switch (D15Z3 engine)
H BLK
Rear window wiper/washer switch
Windshield/rear window intermittent wiper control unit
H BLK
H BLK
Right side turn signal light
L BLK
Power door lock control unit
Front passenger's power door lock knob switch
Front passenger's door key cylinder switch
Right mirror defogger
H BLK
H BLK
Front fog light relay
Rear fog light relay
G401
UNDER-DASH FUSE/RELAY BOX
Integrated control unit
Power window relay
Turn signal/hazard relay
V BLK
O BLK
Keyless receiver unit
I BLK
Dash lights brightness controller
Hazard warning switch light
(Without dash lights brightness controller)
I BLK
Gauge lights
(Without dash lights brightness controller)
I BLK
I BLK
I BLK
Rear fog light indicator
H RED
A/C switch light
Heater control panel lights
Fresh/recirculation switch light
A/T gear position console light
(Without dash lights brightness controller)
I BLK
SRS indicator light
I BLK
Glove box light
Clock
I BLK
Gauges and indicators
I BLK
A/T gear position dimming circuit
I BLK
Rear window defogger switch
Front fog light/rear fog light switch
I BLK
Power mirror switch
Rear window defogger switch light
H : Main wire harness
I : Dashboard wire harness
L : Front passenger's door wire harness
O : Sunroof wire harness
V : Roof wire harness

(cont'd)

Ground Distribution
Circuit Identification (LHD type cont'd)

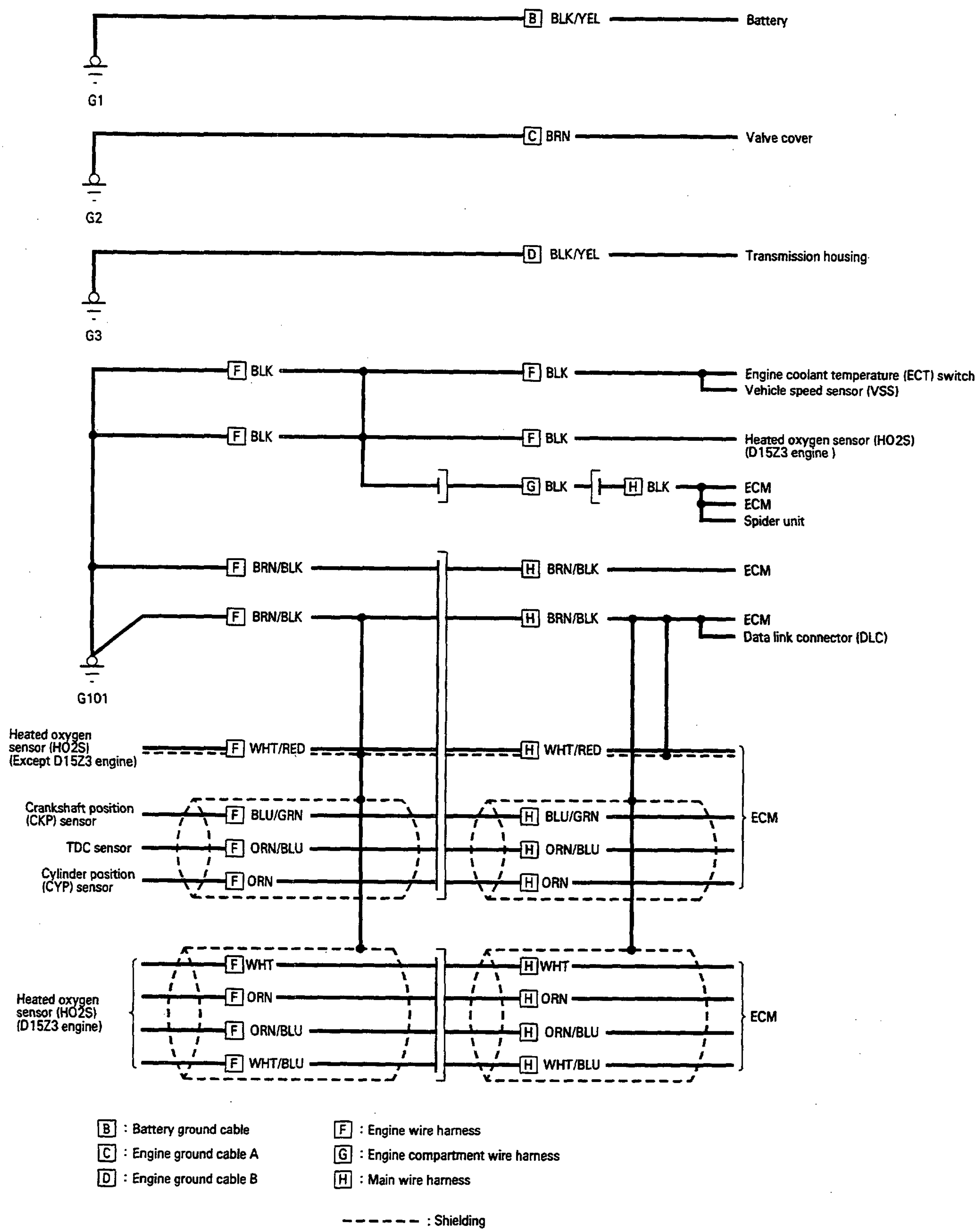


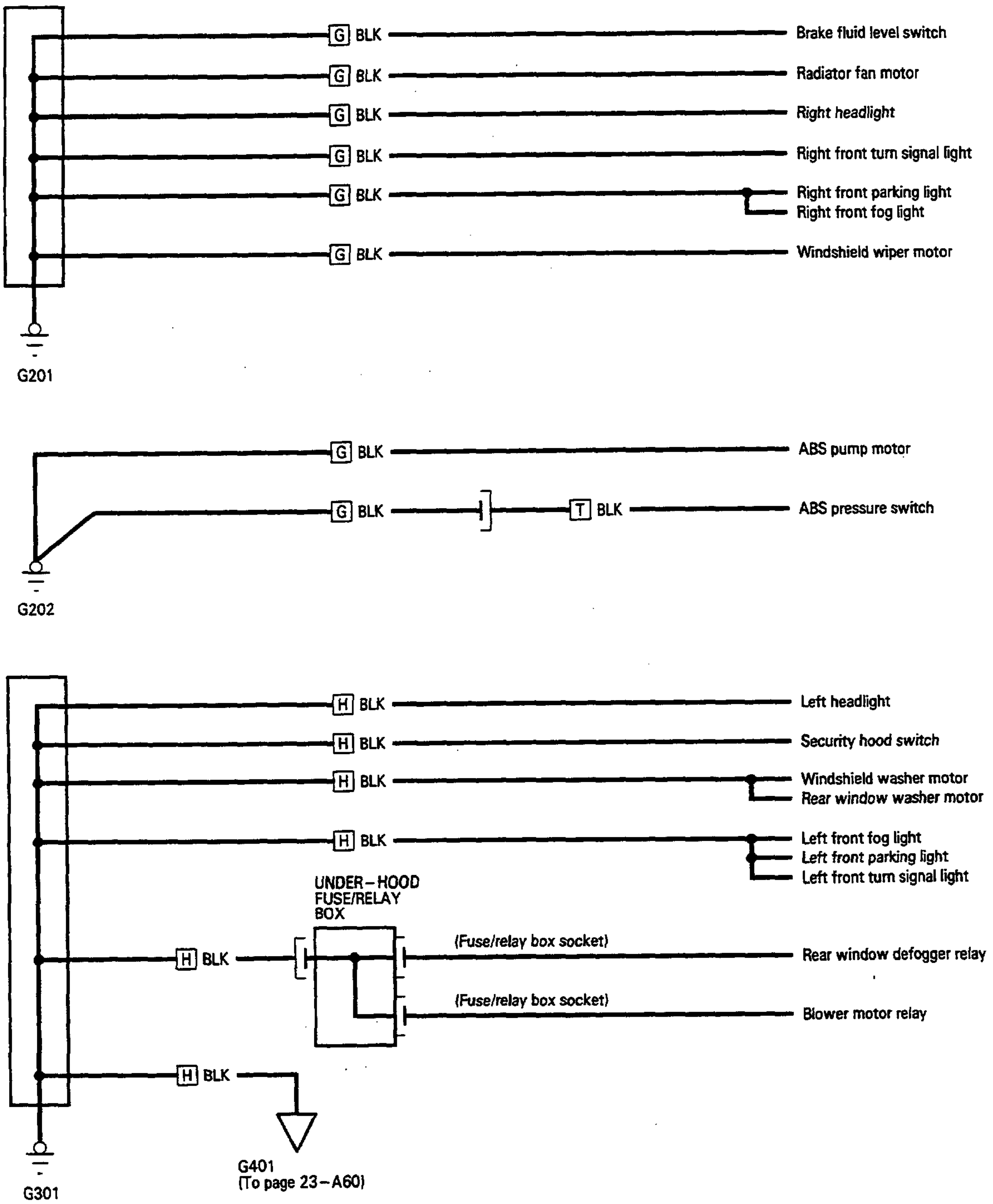


I : Dashboard wire harness
O : Sunroof wire harness
P : A/C wire harness
R : Rear window defogger ground wire
U : SRS main harness

Ground Distribution

Circuit Identification (RHD type)





G : Engine compartment wire harness

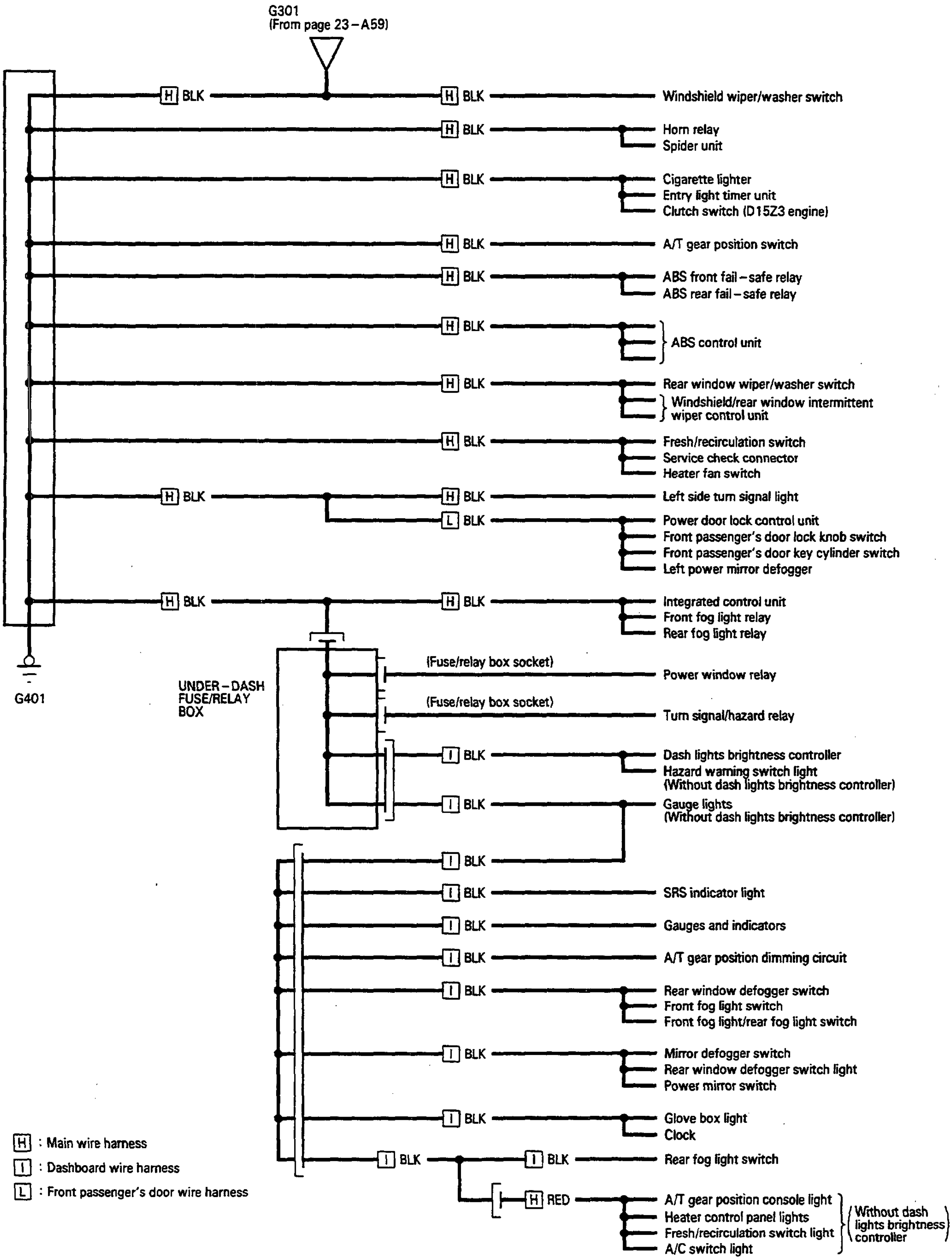
T : ABS modulator unit wire harness

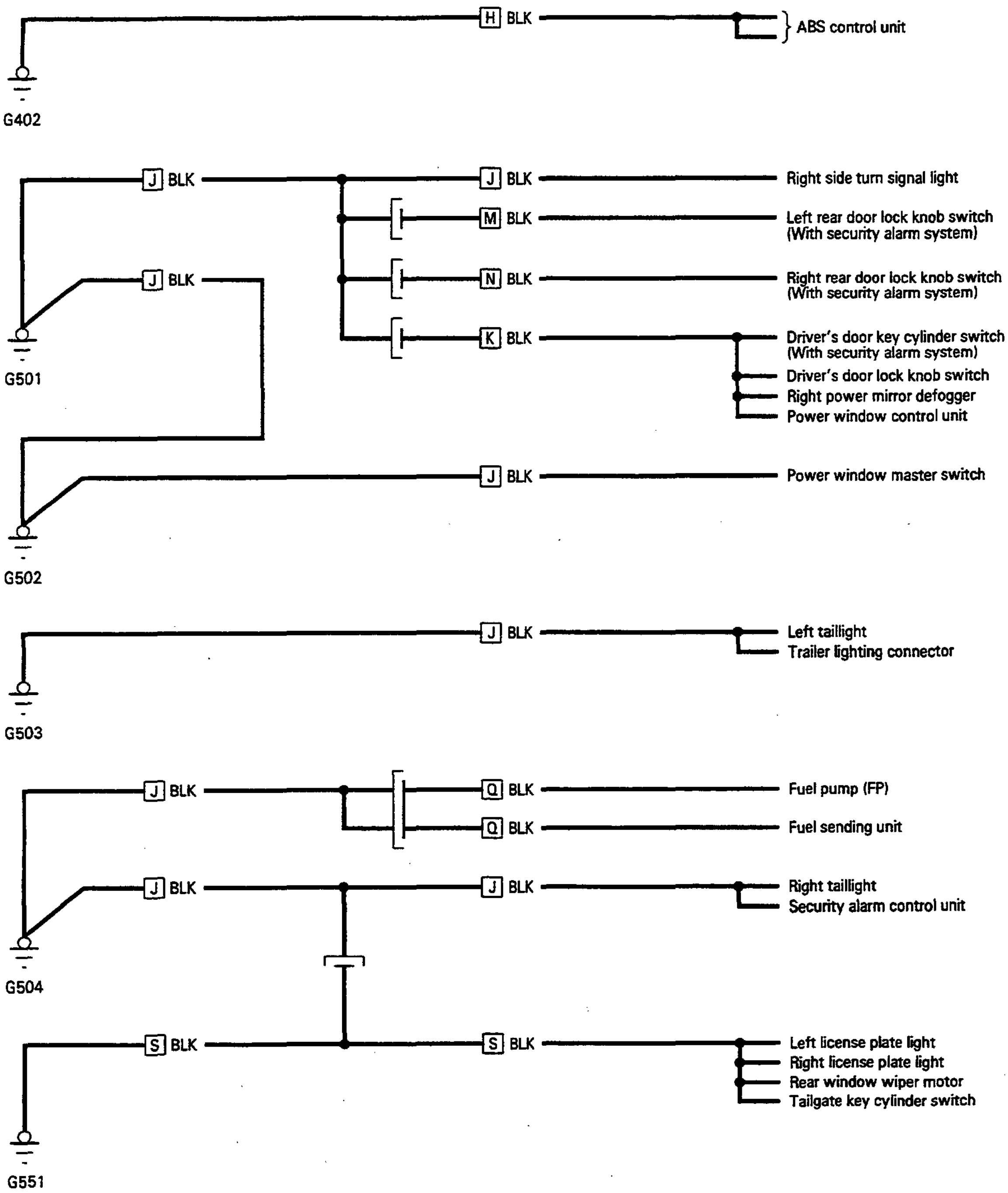
H : Main wire harness

(cont'd)

Ground Distribution

Circuit Identification (RHD type cont'd)



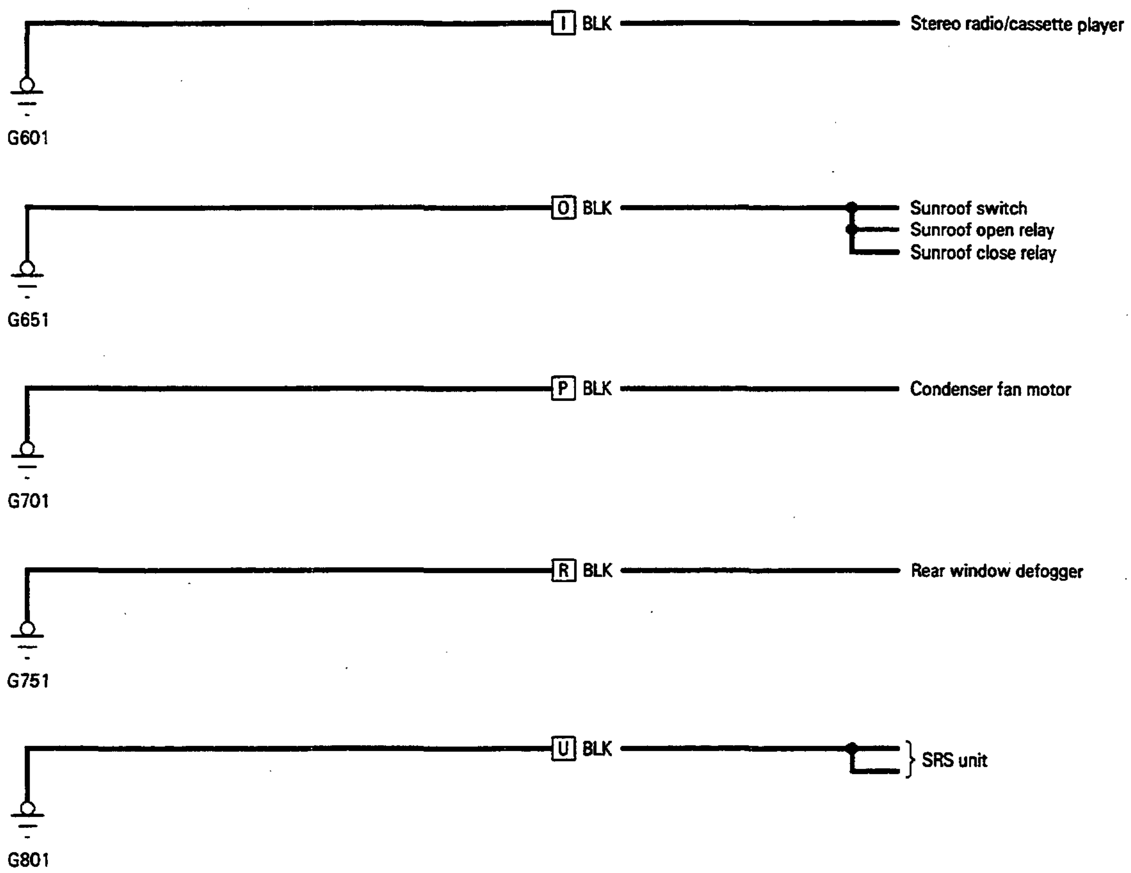


H : Main wire harness
J : Rear wire harness
K : Driver's door wire harness
M : Left rear door wire harness
N : Right rear door wire harness
Q : Fuel unit wire harness
S : Tailgate wire harness

(cont'd)

Ground Distribution

Circuit Identification (RHD type cont'd)



I : Dashboard wire harness
O : Sunroof wire harness
P : A/C wire harness
R : Rear window defogger ground wire
U : SRS main harness

Test

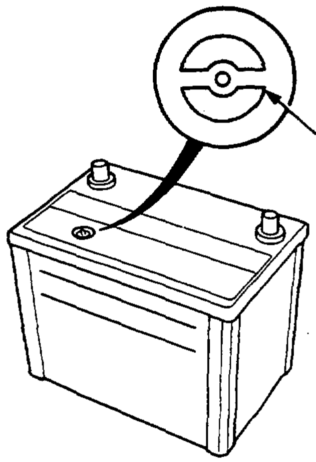
WARNING

- **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.

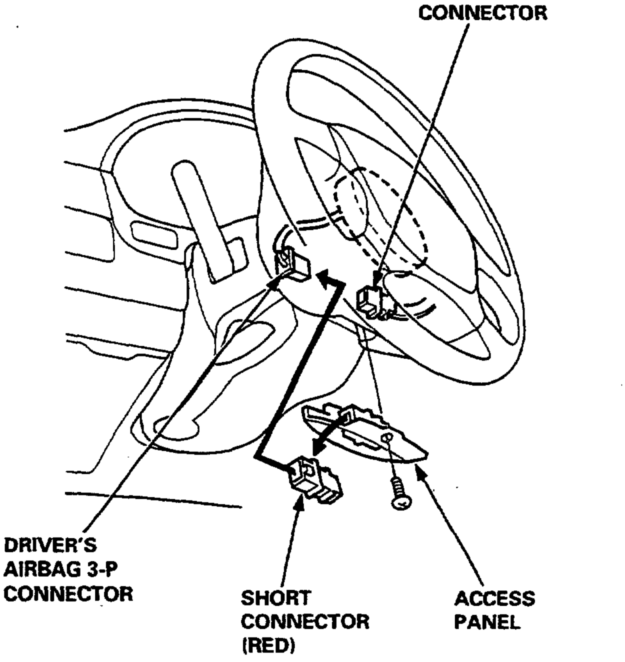
Under-dash Fuse/Relay Box

Removal/Installation

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

Removal:
1. Disconnect both the negative cable and positive cable from the battery, and wait at least three minutes.

2. Remove the access panel from the steering wheel, then remove the short connector (RED).

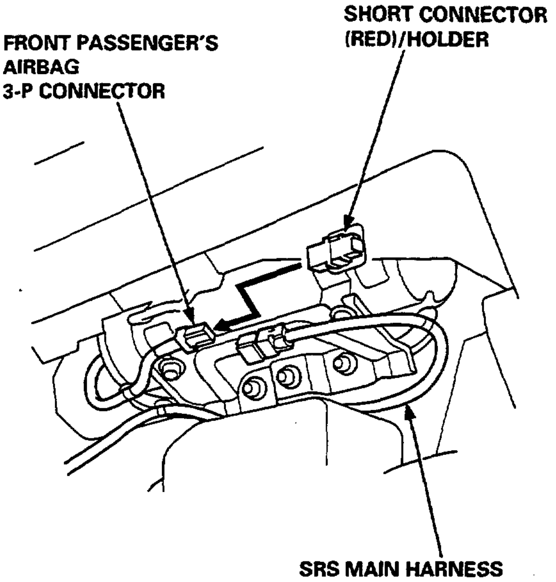


3. Disconnect the connector between the airbag and cable reel.

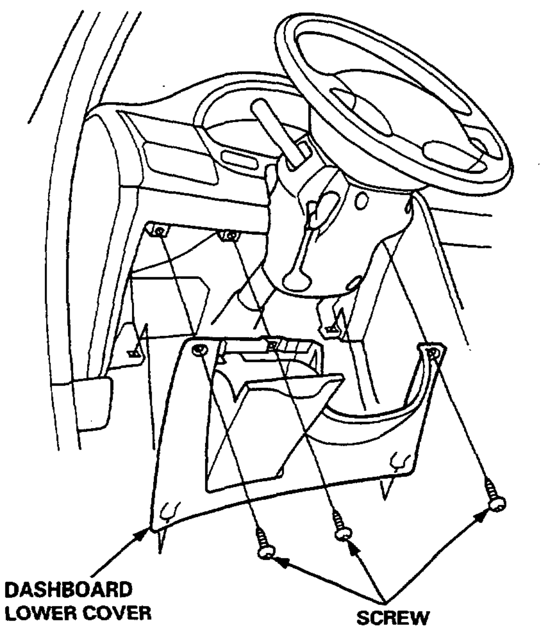
4. Connect the short connector (RED) to the airbag side of the connector.

5. Remove the glove box, then remove the short connector (RED) from its holder.

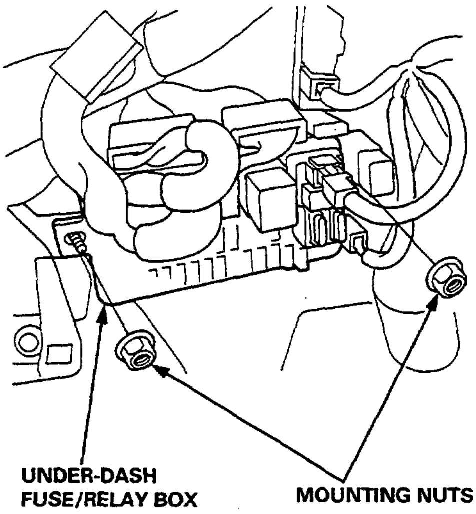
6. Disconnect the 3-P connector between the front passenger's airbag and the SRS main harness, then connect the short connector (RED) to the airbag side of the connector.



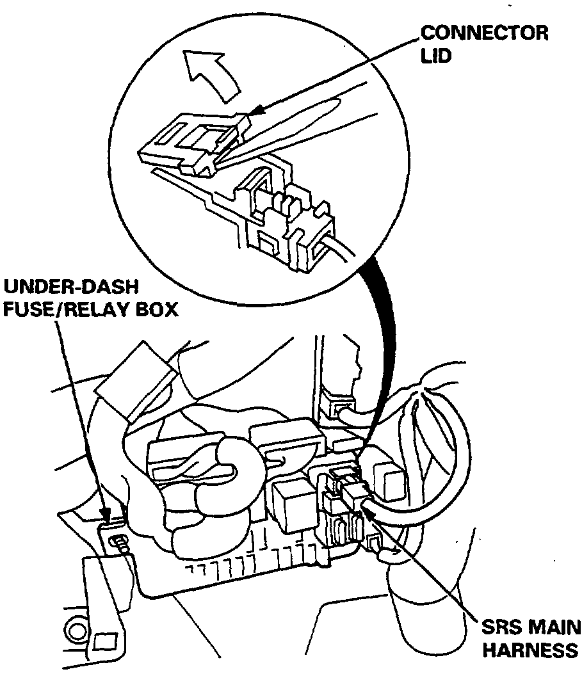
7. Remove the dashboard lower cover.



8. Remove the mounting nuts, and pull the under-dash fuse/relay box out from under the dash.



9. Disconnect the under-dash fuse/relay box connectors, and take out the under-dash fuse/relay box.



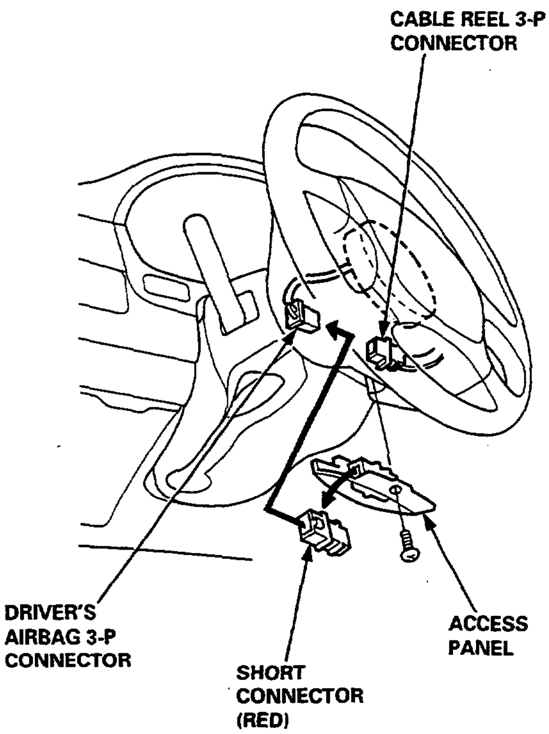
NOTE: The SRS main harness connector is double-locked. To remove it, first lift the connector lid, then press the connector tab down and pull the connector out.

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. Reinstall the dashboard lower cover.
4. Disconnect the short connectors (RED) from the airbags.
5. Reconnect the airbag 2-P connectors.
6. Attach the short connector (RED) to the access panel, and reinstall the panel.



7. Attach the passenger's airbag short connector (RED) to its holder. Reinstall the access panel and glove box.
8. Connect both the negative cable and positive cable to the battery.
9. Confirm that all systems work properly.

Power Relays

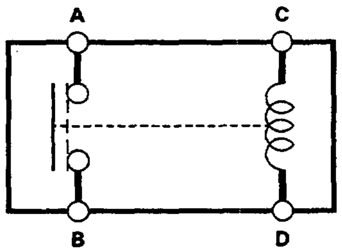
Relay Test

NOTE: See page 23-A173 for the turn signal/hazard relay input test.

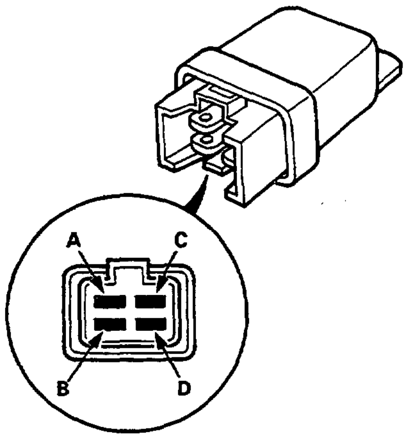
NORMALLY-OPEN Type:

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.

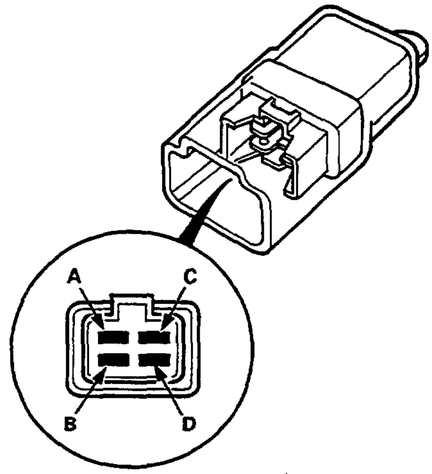
Terminal / Power (C – D)	A	B
Disconnected		
Connected	O—	—O



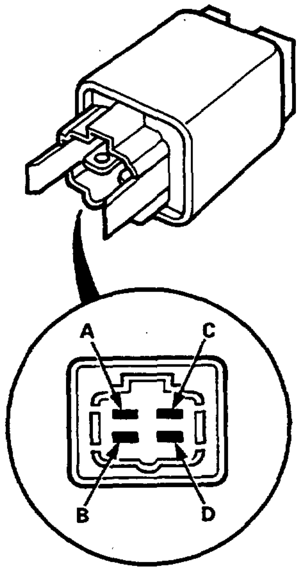
- Horn relay
- Security horn relay
- Front fog light relay
- Cigarette lighter relay



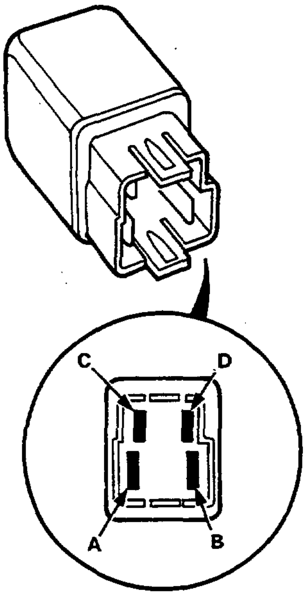
- Condenser fan relay
- A/C compressor clutch relay
- ABS front fail-safe relay
- ABS rear fail-safe relay



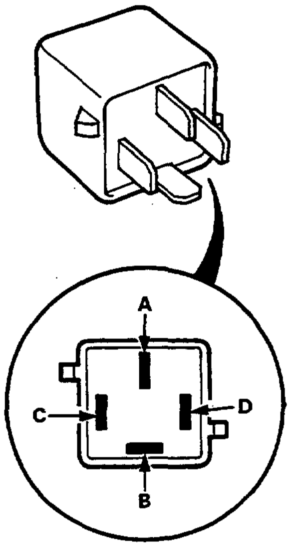
- Starter cut relay



- ABS motor relay



- Blower motor relay
- Power window relay
- Radiator fan relay
- Rear window defogger relay



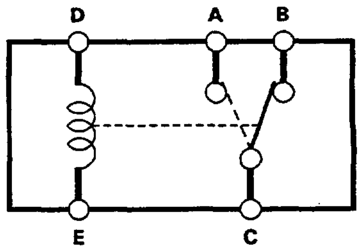
FIVE-TERMINAL Type:

1. Remove the power relay from its socket.

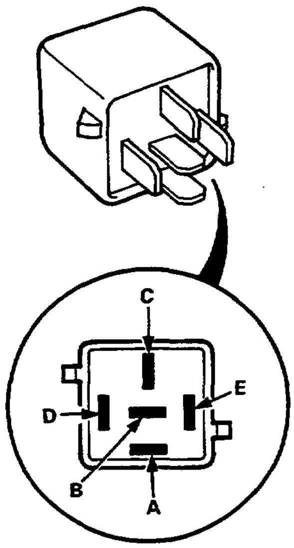
2. Check for continuity between the terminals.

    - 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	○—	—	—○



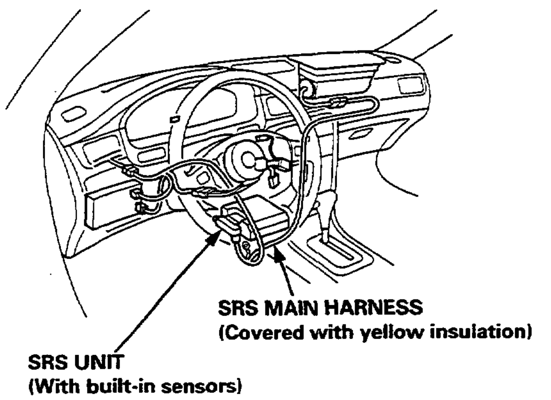
- Sunroof open relay
- Sunroof close relay



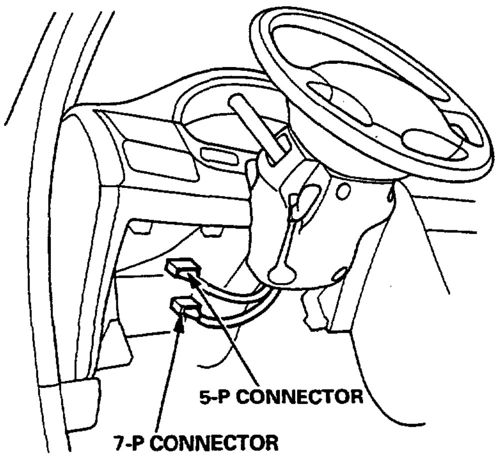
Ignition Switch

Test

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



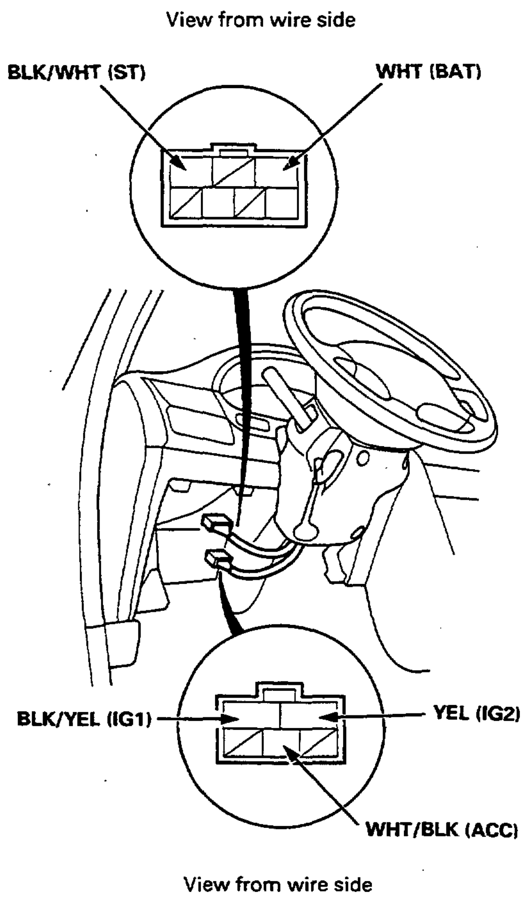
1. Disconnect both the negative cable and positive cable from the battery.
2. Remove the dashboard lower cover (see page 23-A64).
3. Disconnect the 5-P connector from the under-dash fuse/relay box, and disconnect the 7-P connector from the main wire harness.



4. 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 (LOCK)					
I (ACC)	○	○			
II (ON)	○	○	○	○	
III (ST)		○	○		○

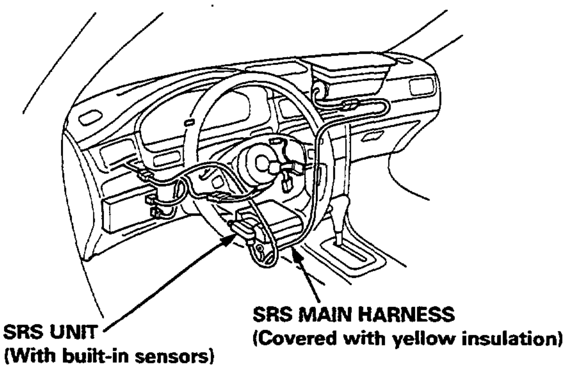
5. If continuity checks do not agree with the table, replace the electrical switch.



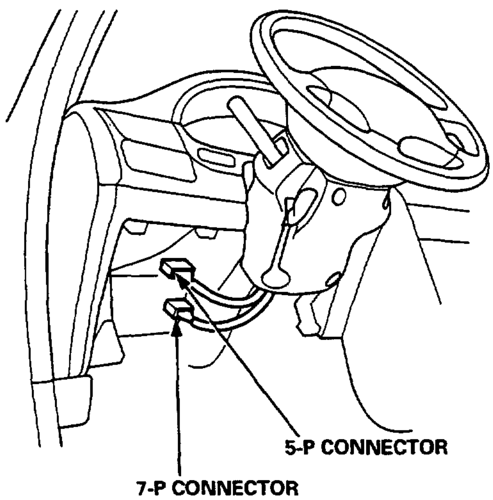
Electrical Switch Replacement

CAUTION:

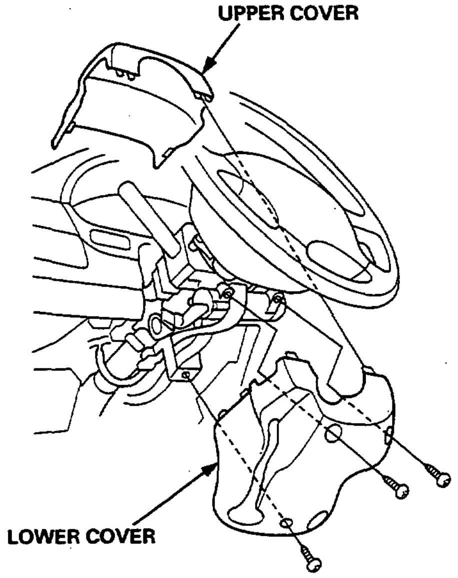
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



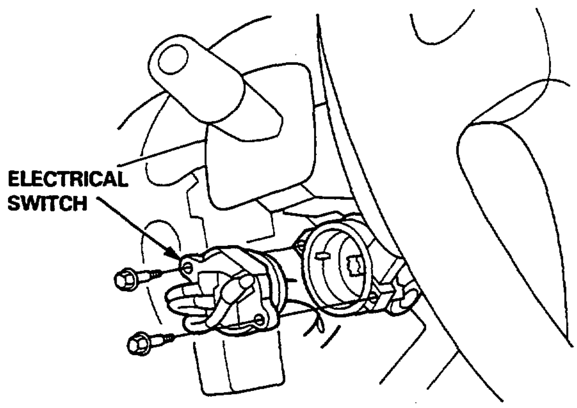
1. Disconnect both the negative cable and positive cable from the battery.
2. Remove the dashboard lower cover (see page 23-A64).
3. Disconnect the 5-P connector from the under-dash fuse/relay box, and disconnect the 7-P connector from the main wire harness.



4. Remove the steering column covers.



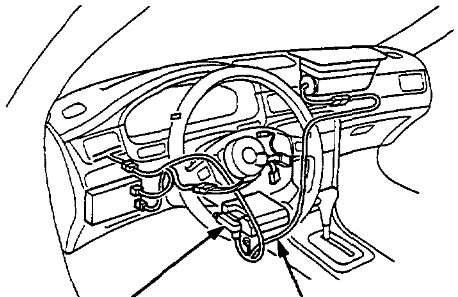
5. Insert the key, and turn it to "0".
6. Remove the two screws, and replace the switch.



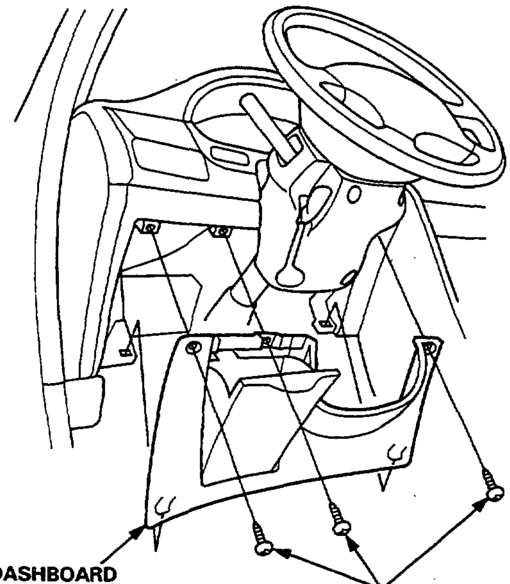
Steering Lock Replacement

CAUTION:

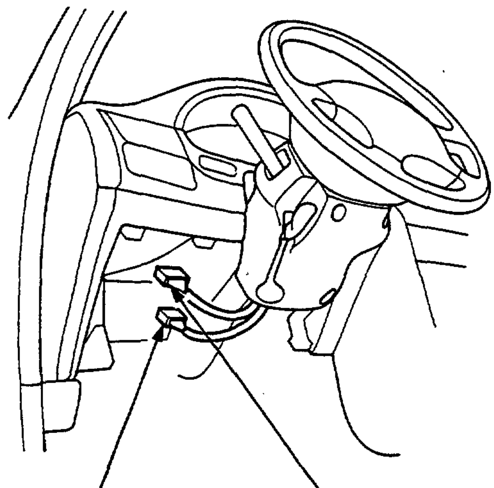
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



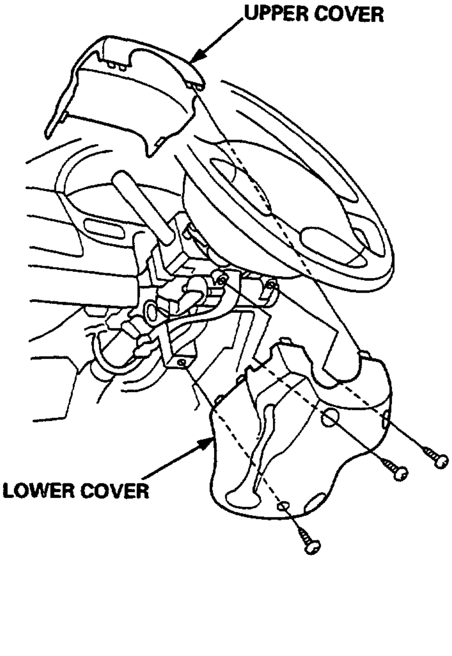
1. Disconnect both the negative cable and positive cable from the battery.
2. Remove the dashboard lower cover.



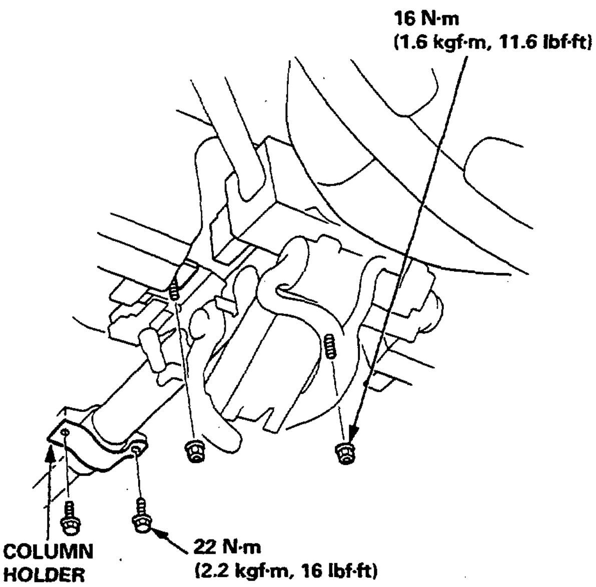
3. Disconnect the 5-P connector from the under-dash fuse/relay box, and disconnect the 7-P connector from the main wire harness.



4. Remove the steering column covers.

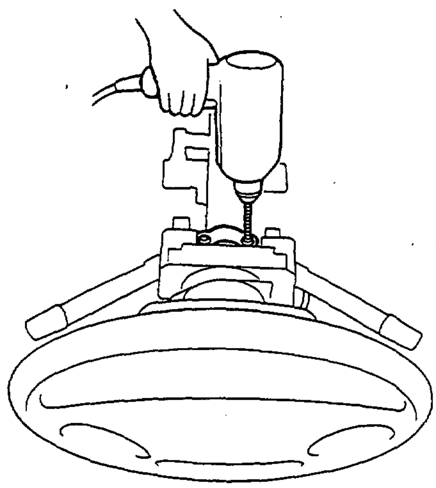


5. Remove the column holder mounting bolts and nuts.

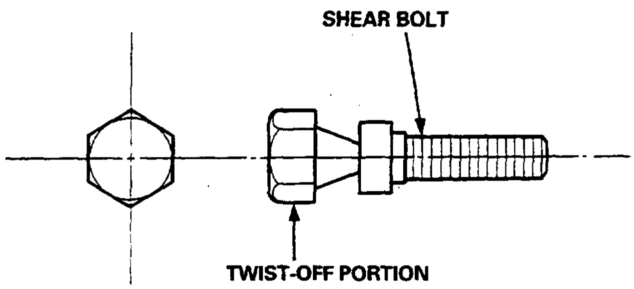


6. Lower the steering column assembly.
7. Center-punch each of the two shear bolts, and drill their heads off with a 5 mm (3/16 in) drill bit.

CAUTION: Do not damage the switch body when removing the shear bolts.

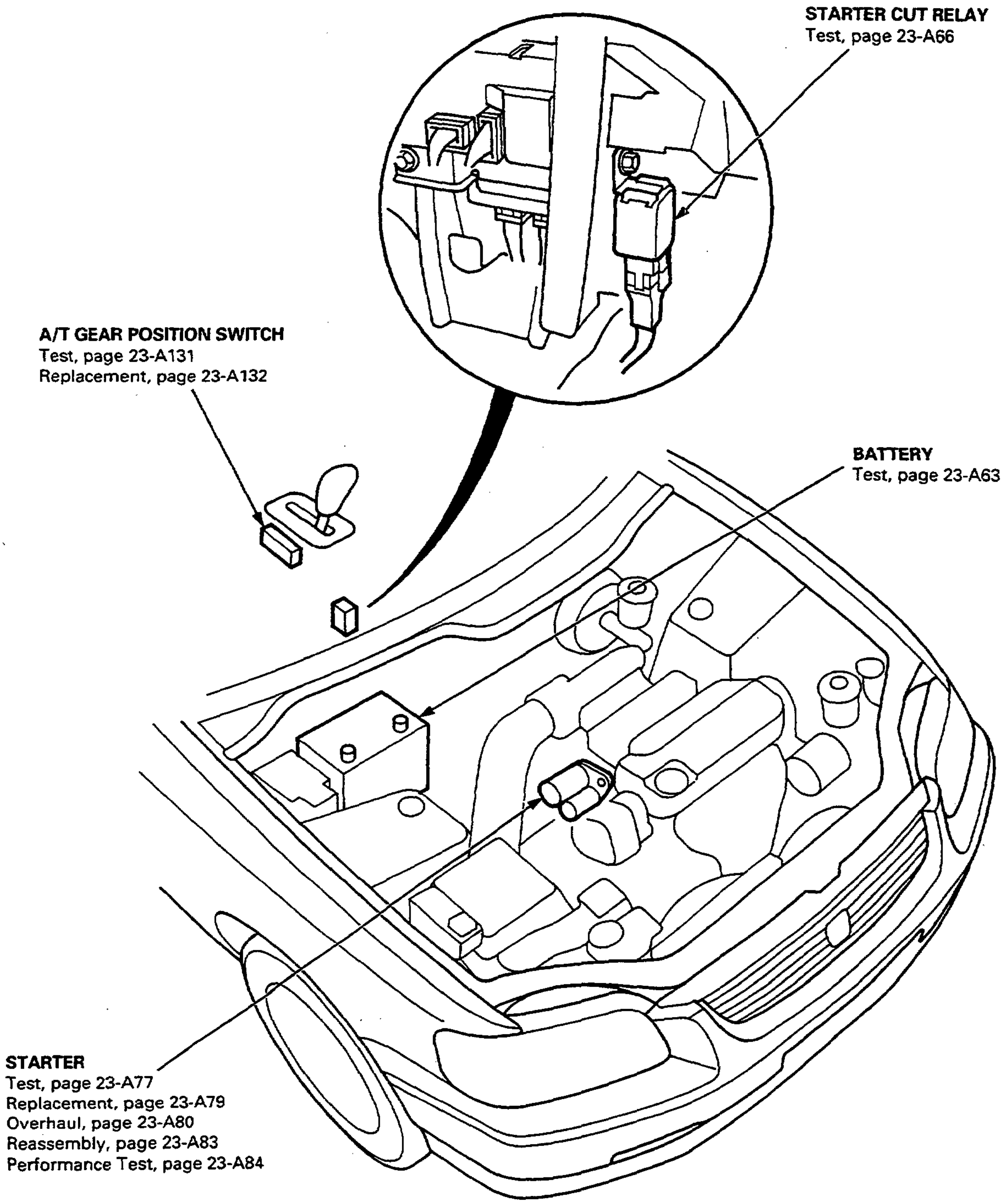


8. Remove the shear bolts from the switch body.
9. Install the new ignition switch without the key inserted.
10. Loosely tighten the new shear bolts.
11. Insert the ignition key, and check for proper operation of the steering wheel lock and that the ignition key turns freely.
12. Tighten the shear bolts until the hex heads twist off.

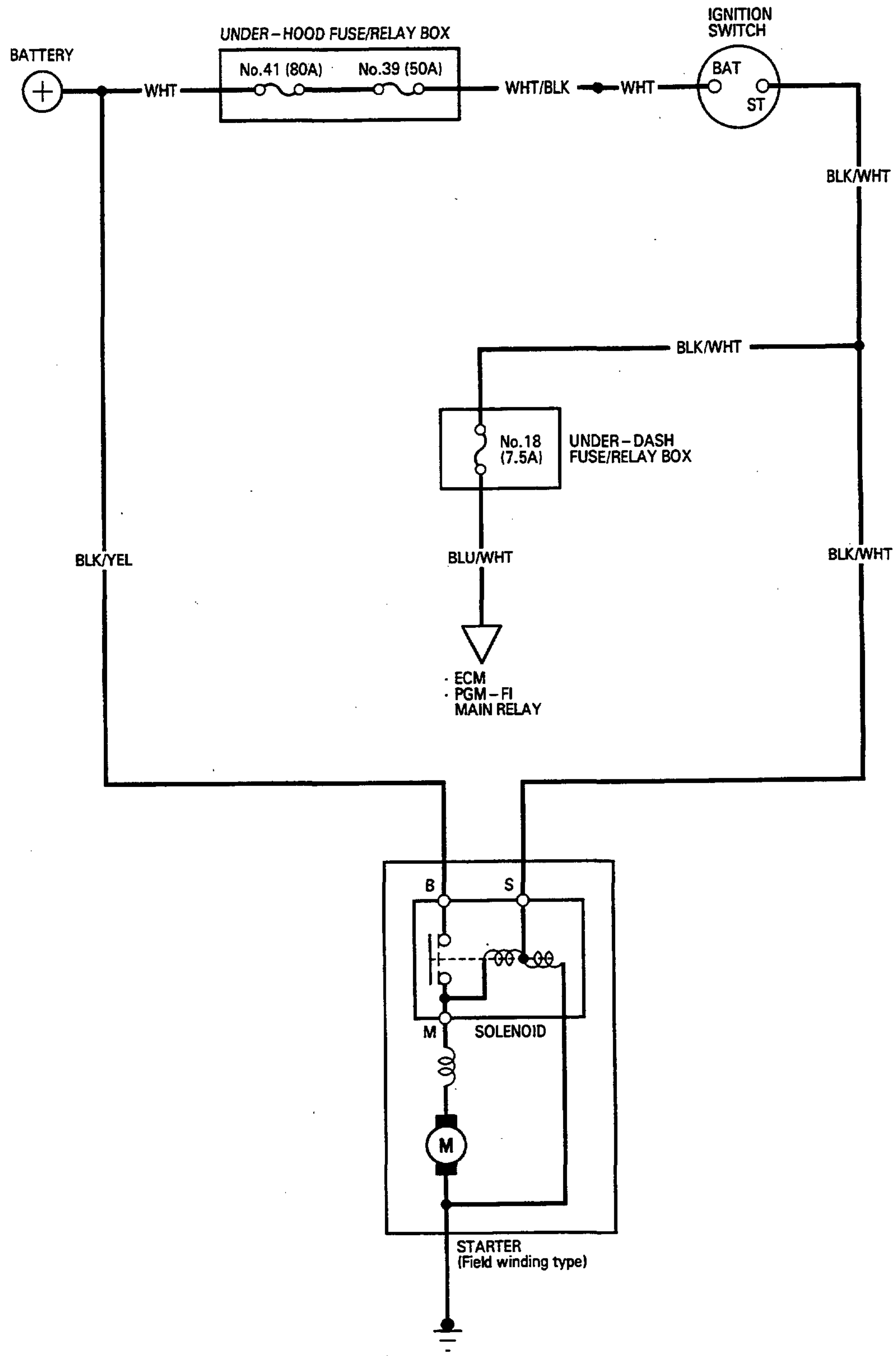


Component Location Index

NOTE: LHD type is shown, RHD type is similar.

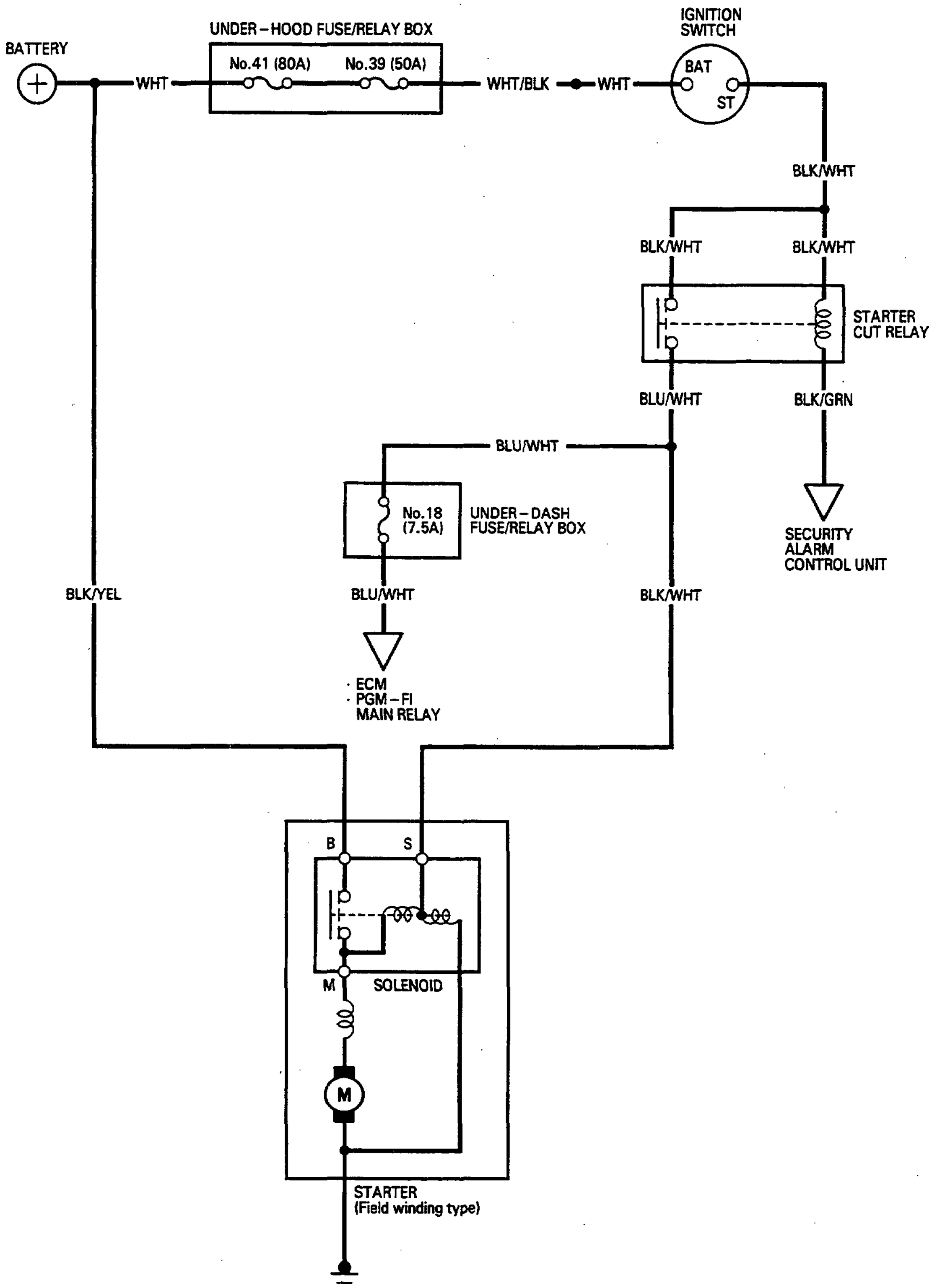


Circuit Diagram (KG: M/T without Security Alarm System)

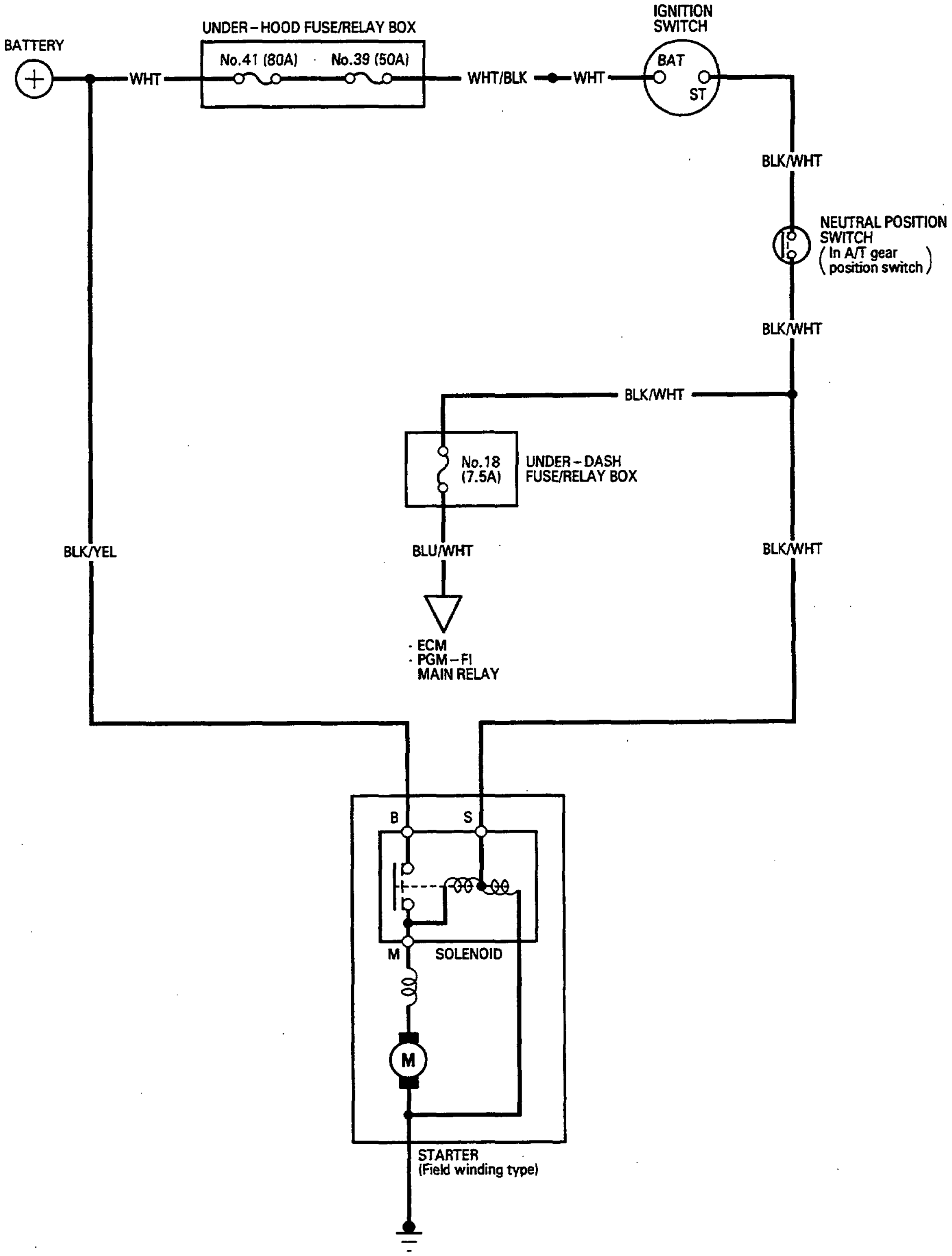


Starting System

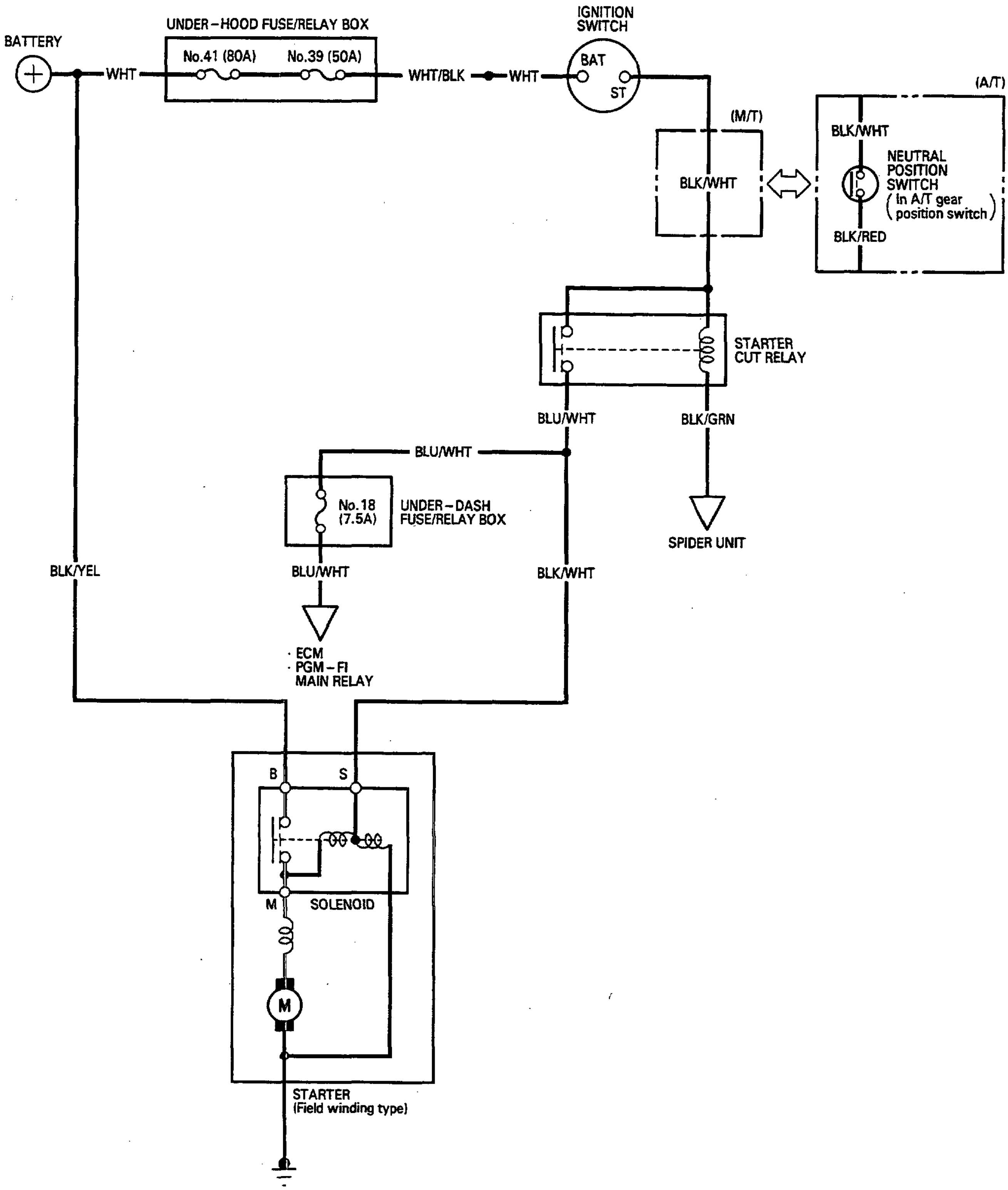
Circuit Diagram (KG: M/T with Security Alarm System)



Circuit Diagram (KG: A/T)



Circuit Diagram (KE)



Starter Test

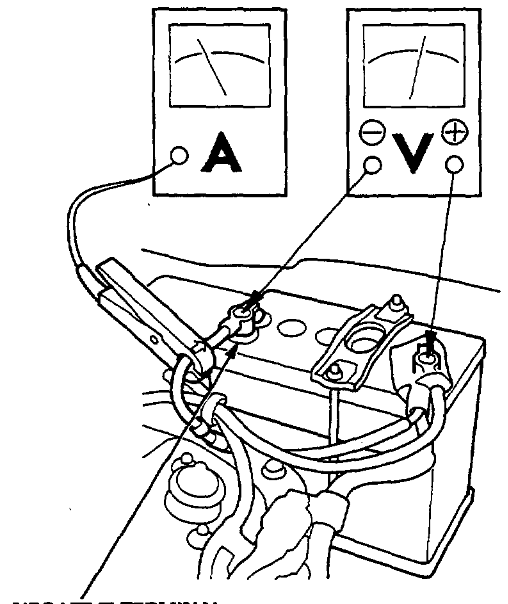
NOTE: The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

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:

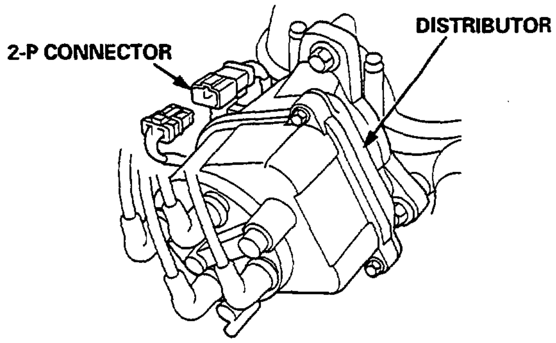
- Use the following equipment:
  - — Ammeter, 0 – 400 A
  - — Voltmeter, 0 – 20 V (accurate within 0.1 volt)
  - — Tachometer, 0 – 1200 rpm (min^{-1})
- Hook up voltmeter and ammeter as shown.



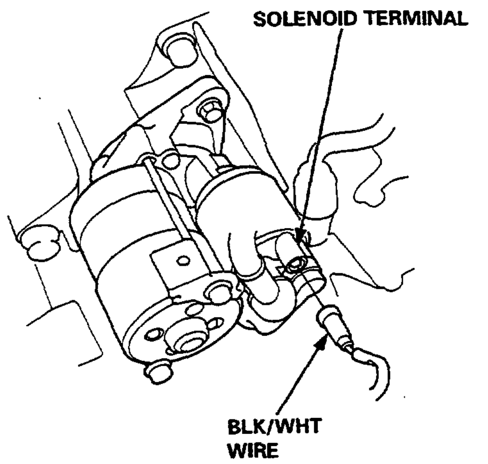
NOTE: After this test, or any subsequent repair, reset the ECM to clear any codes (see section 11).

Check Starter Engagement:

1. Disconnect the 2-P connector (ignition coil primary lead) from the distributor.



2. Turn the ignition switch to "III"(ST), the starter should crank the engine. If the starter does not crank the engine, go to step 3.
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, replace it, and diagnose its internal problems.
   - If the starter cranks the engine, go to step 5.



(cont'd)

Starter Test (cont'd)

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-A68).

7. On cars with automatic transmission, check the A/T gear position switch (neutral position switch), starter cut relay (KE) and connector. On cars with manual transmission, check the starter cut relay (with security alarm system), and connectors.

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 8.0 volts.
Current draw should be no more than 230 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.

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" (ST), and release to "II" (ON). The starter drive gear should disengage from the flywheel ring gear when you release the key.

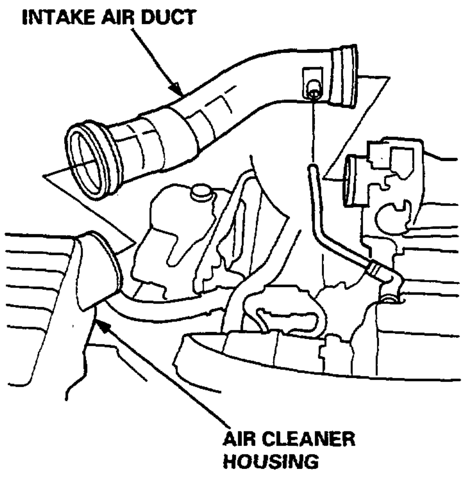
If the drive gear hangs up on the flywheel ring gear, check for:

- Solenoid plunger and switch malfunction
- Dirty drive gear assembly or damaged overrunning clutch

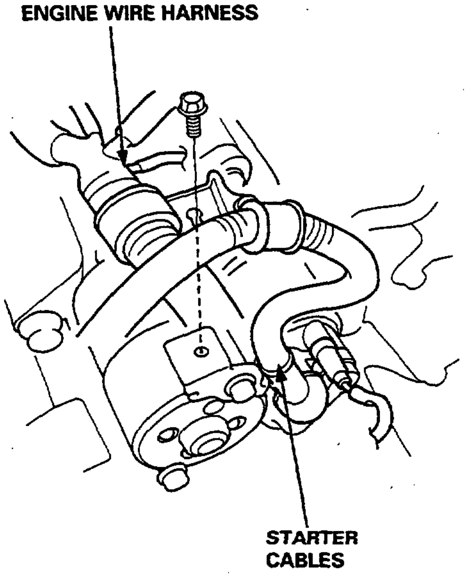
Starter Replacement

1. Disconnect the negative cable from the battery.

2. Remove the intake air duct.

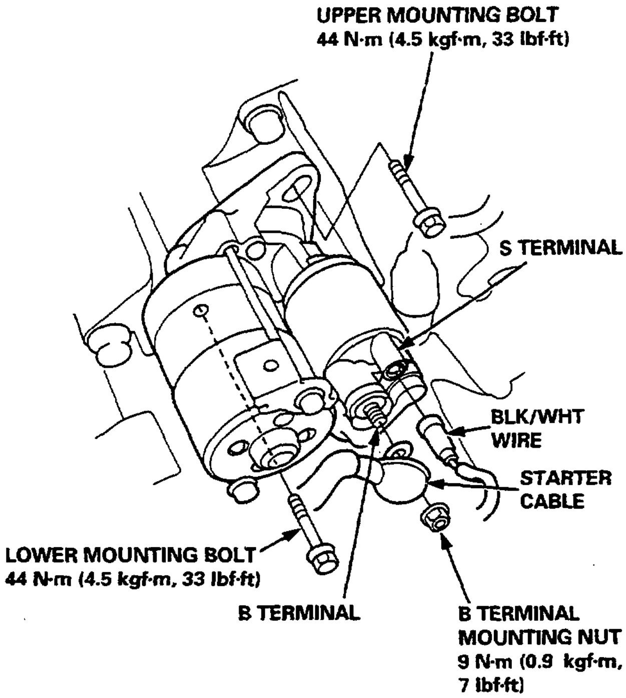


3. Remove the engine wire harness and starter cables from their brackets.



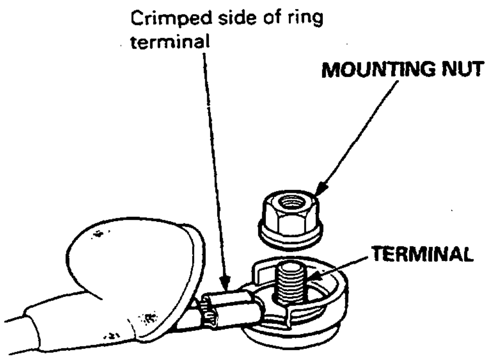
4. Disconnect the starter cable from the B terminal on the solenoid, then disconnect the BLK/WHT wire from the S terminal.

5. Remove the two bolts holding the starter, then remove the starter.



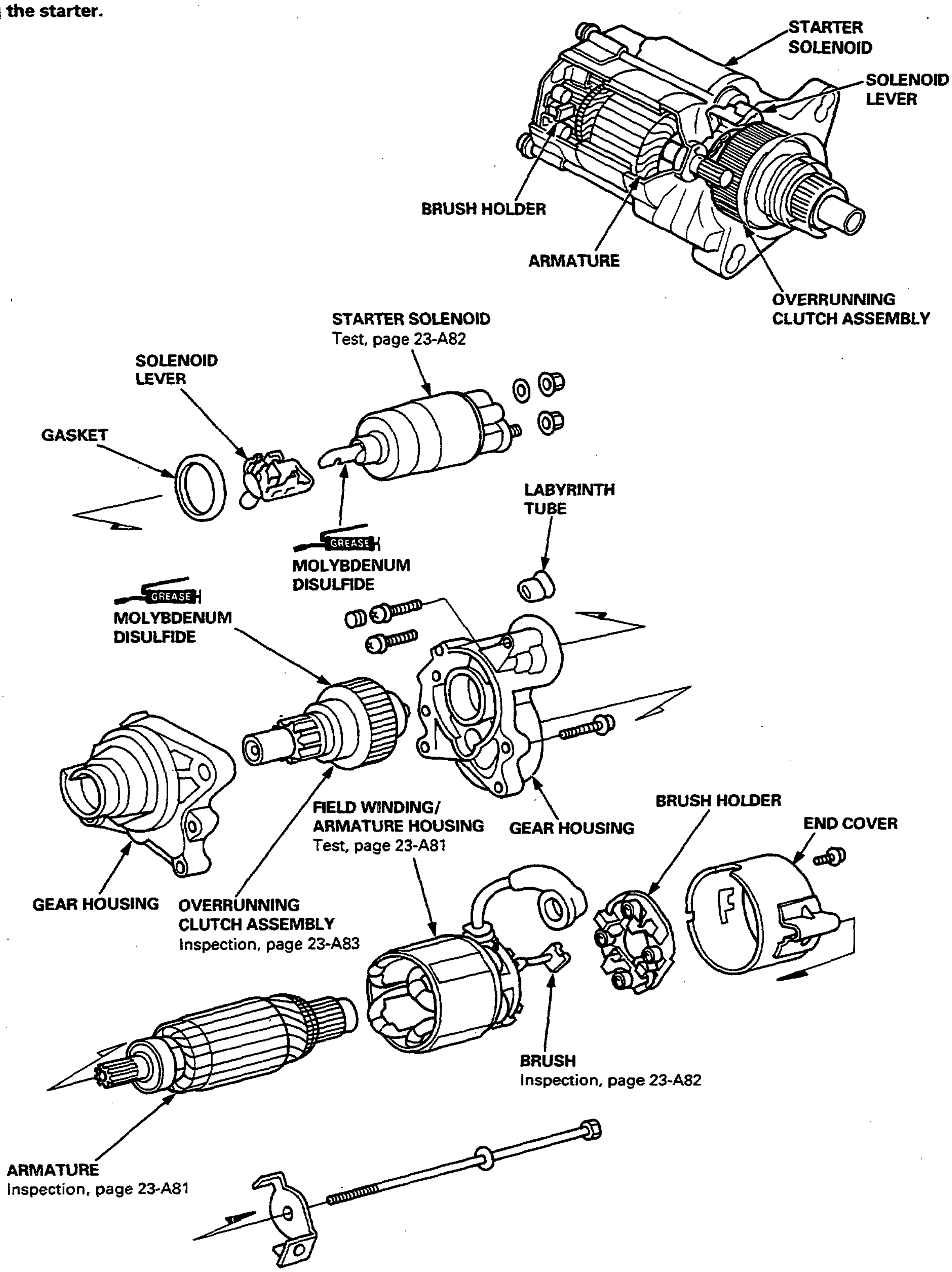
6. Install in the reverse order of removal.

   NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out.



Starter Overhaul (Valeo)

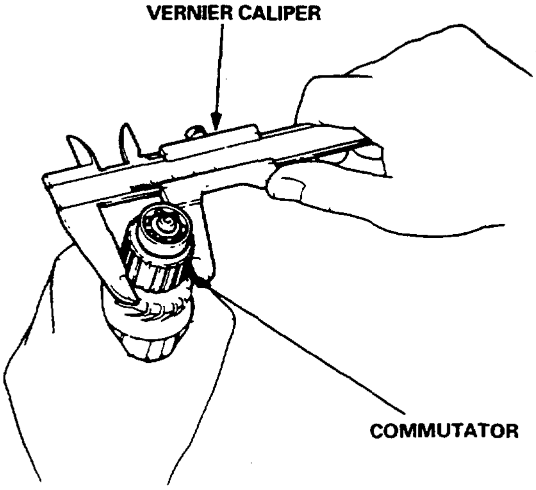
CAUTION: Disconnect the battery negative cable before removing the starter.



Armature Inspection

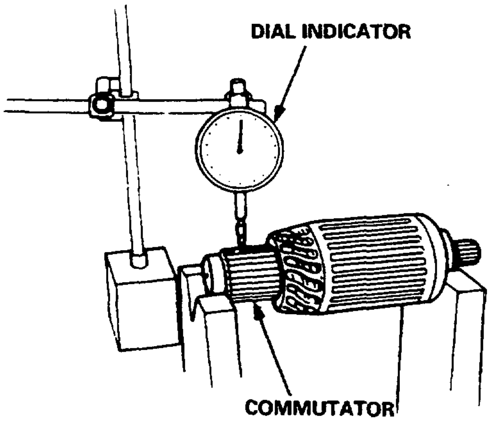
Commutator Diameter:

Manufacturer	Standard (NEW)	Service Limit
Valeo	28.0 – 28.1 mm (1.102 – 1.106 in)	27.5 mm (1.083 in)



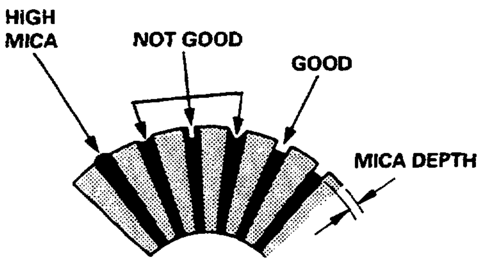
Commutator Runout:

Manufacturer	Standard (NEW)	Service Limit
Valeo	0 – 0.02 mm (0.0008 in)	0.05 mm (0.002 in)



Commutator Mica Depth:

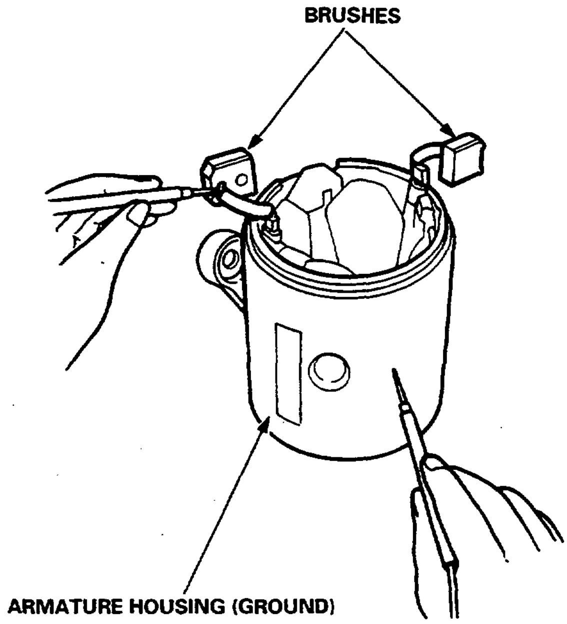
Manufacturer	Standard (NEW)	Service Limit
Valeo	0.4 – 0.5 mm (0.016 – 0.02 in)	0.15 mm (0.006 in)



Starter Field Winding Test

1. Check for continuity between the brushes. If there's no continuity, replace the armature housing.

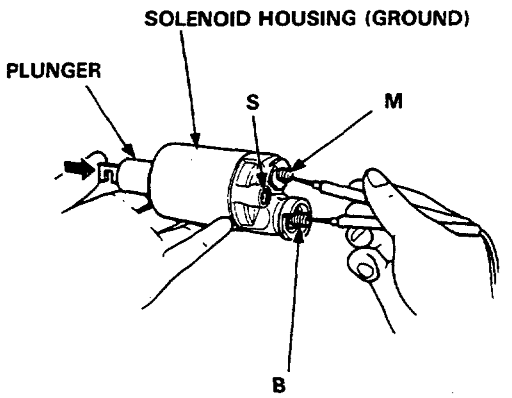
2. Check for continuity between each brush and the armature housing (ground).
   If continuity exists, replace the armature housing.

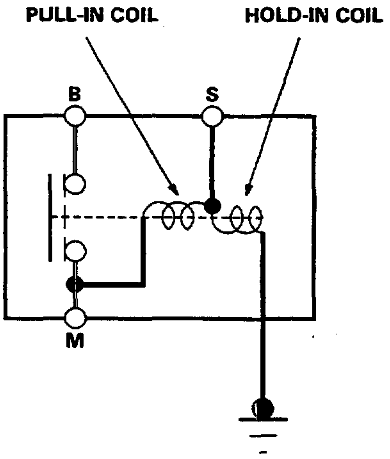


Starter Solenoid Test

1. Remove the starter solenoid.
2. Check for continuity between the terminals in each solenoid plunger position according to the table.

Position \ Terminal	B	M	S	Housing
RELEASED		O	O	O
PUSHED	O	O	O	O



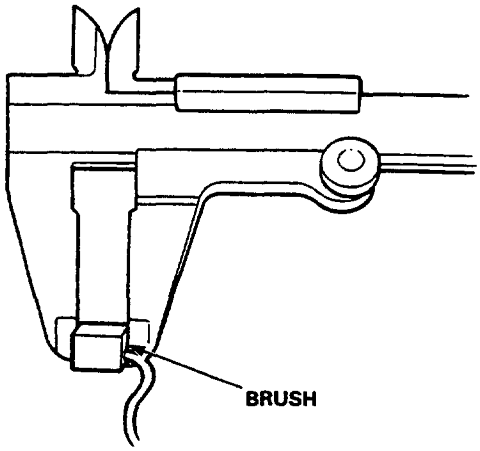


Starter Brush Inspection

Measure the brush length. If it is less than the service limit, replace the armature housing and brush holder assembly.

Brush Length

Manufacturer	Standard (NEW)	Service Limit
Valeo	14.3 – 14.7 mm (0.56 – 0.58 in)	9.5 mm (0.37 in)

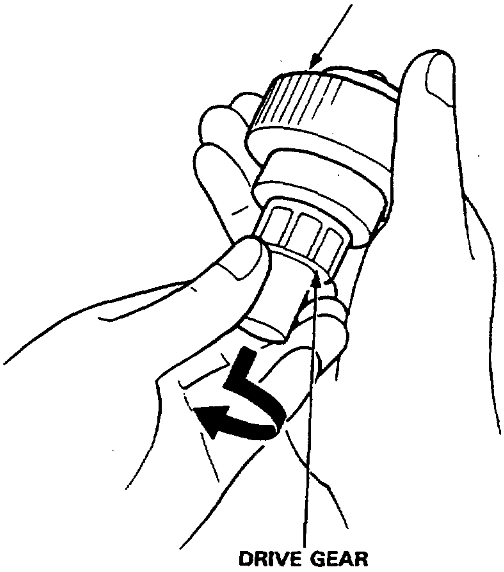


NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

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.
   Dose 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.



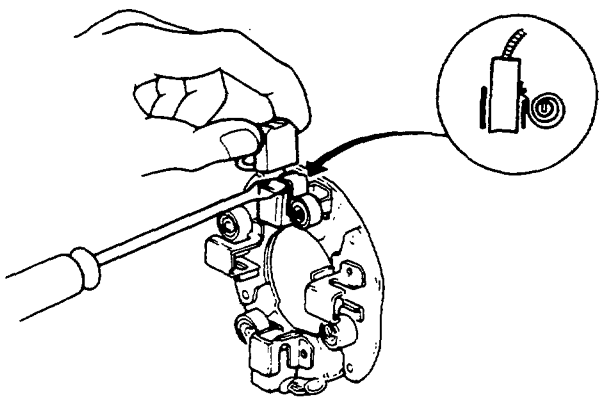
3. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

4. Check the condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

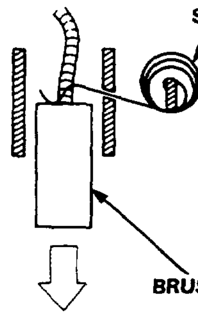
Starter Reassembly

Reassemble the starter in the reverse order of disassembly.

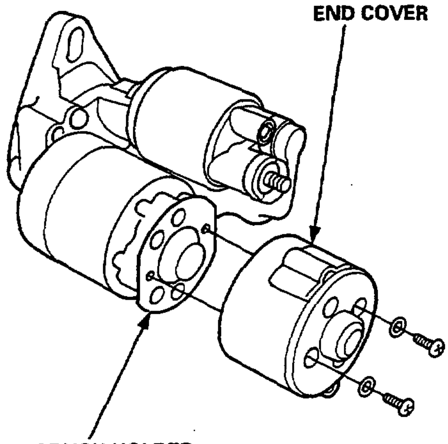
1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



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.



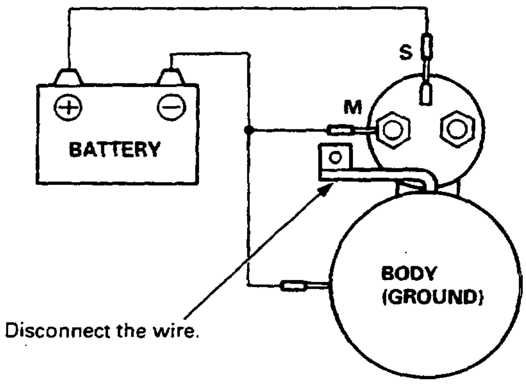
Performance Test

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.

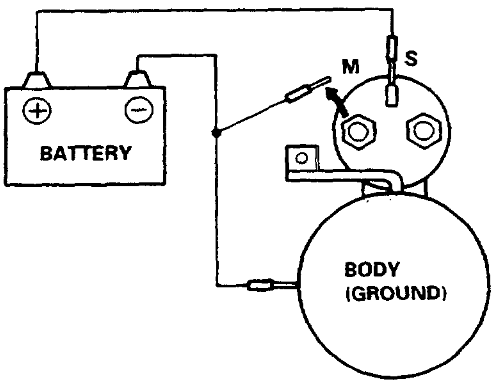
CAUTION: Do not leave the battery connected for more than 10 seconds.



Hold-in Coil Test:

Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil is working properly.

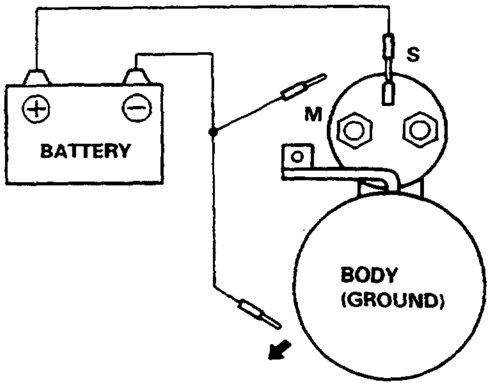
CAUTION: Do not leave the battery connected for more than 10 seconds.



Retracting Test:

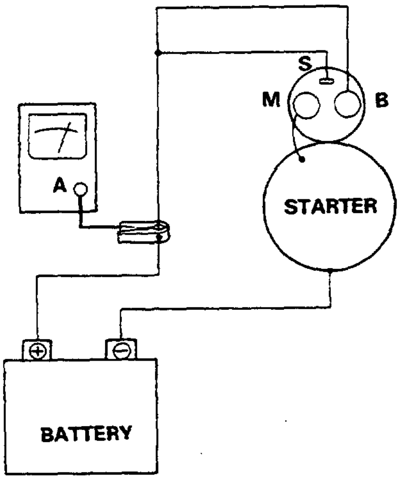
Disconnect the battery also from the body. If the pinion retracts immediately, it is working properly.

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:

Valeo (1.0 kW)	100 A or less (Electric current), 3000 rpm (min^{-1}) or more (Motor speed)

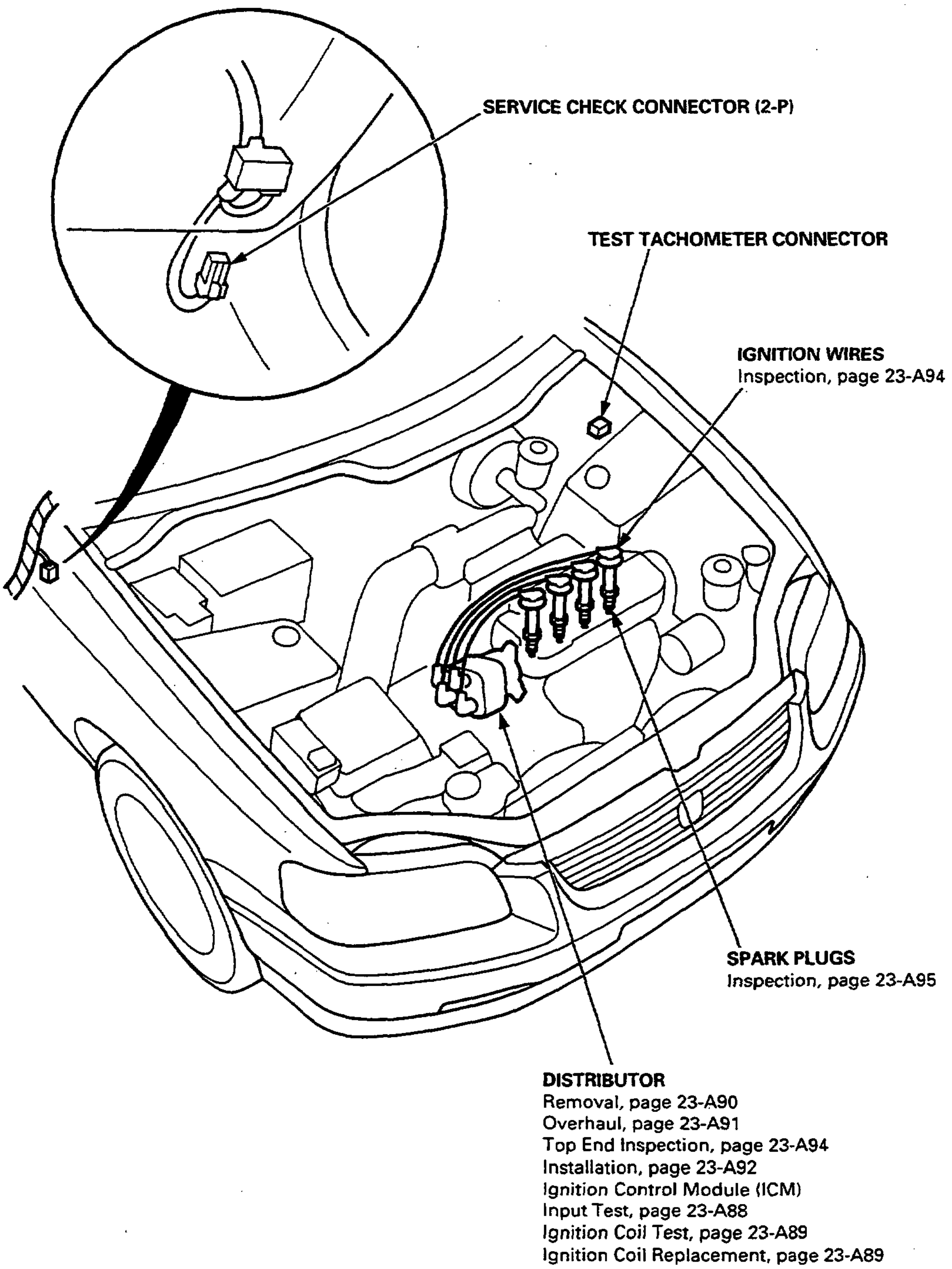
Ignition System

Component Location Index

IGNITION TIMING CONTROL SYSTEM

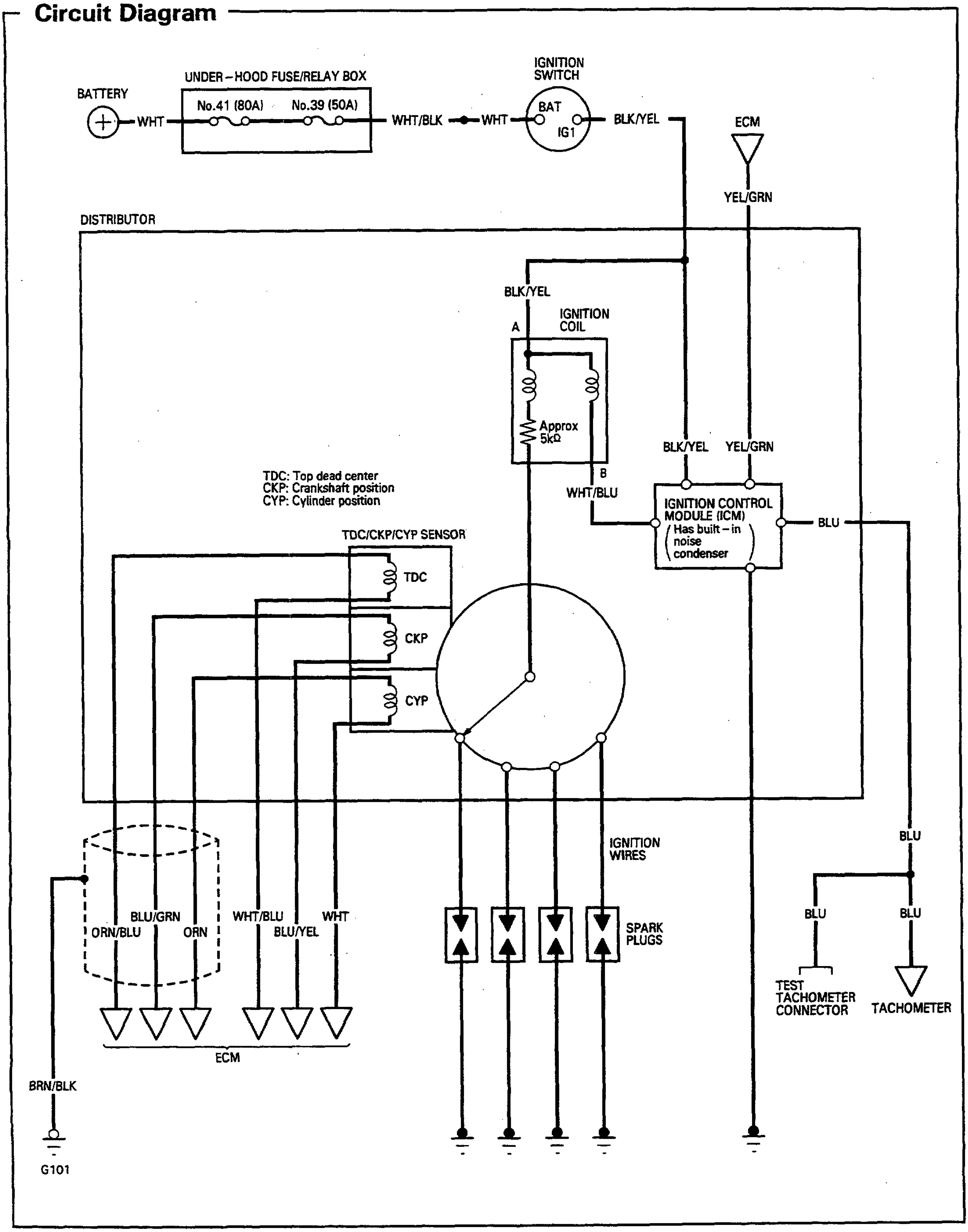
- Troubleshooting, section 11.
- Inspection and setting, page 23-A87

NOTE: LHD type is shown, RHD type is similar.



Ignition System

Circuit Diagram

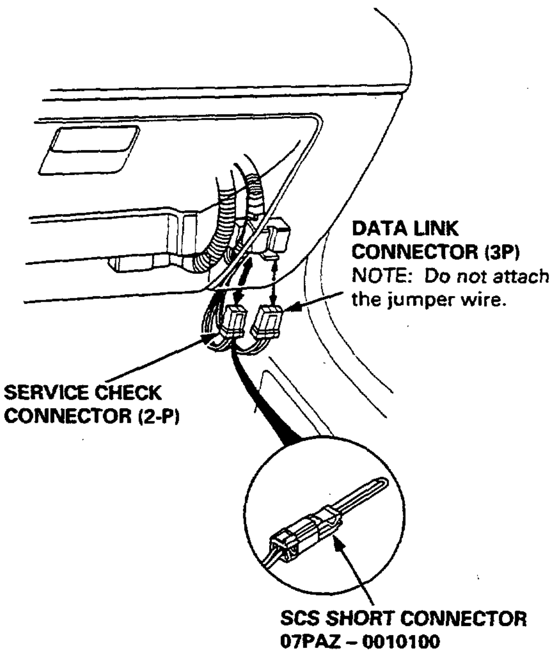


Ignition Timing Inspection and Setting

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.

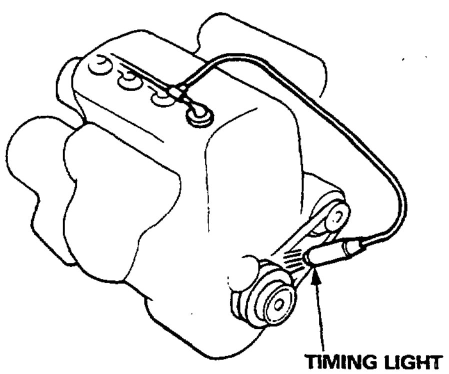
2. Pull out the service check connector located behind the glove box. Connect the BRN and BLK terminals with the SCS short connector.

   NOTE: LHD type is shown, RHD type is symmetrical.



3. Check the idle speed (see section 11).

4. Connect a timing light to the No. 1 ignition wire.
   - Point the light toward the pointer on the timing belt corner.



5. Adjust ignition timing, if necessary, to the following specifications:

   Ignition Timing:

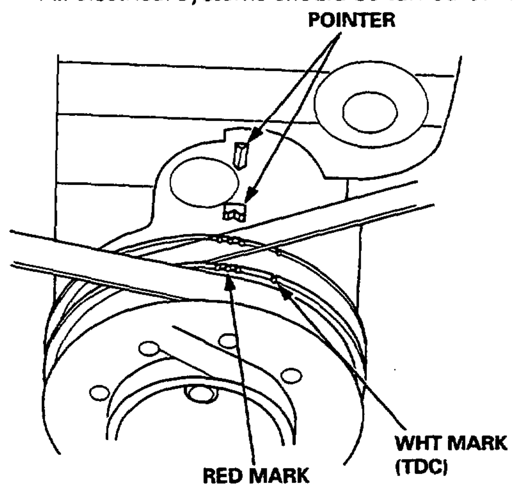
   D14A2 engine, D16Y3 engine

M/T	16° ± 2° BTDC (RED) at 750 ± 50 rpm (min^{-1}) in neutral
A/T	16° ± 2° BTDC (RED) at 750 ± 50 rpm (min^{-1}) in [N] or [P] position

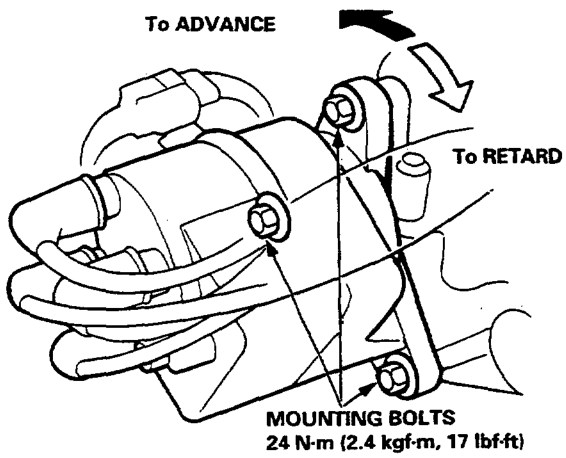
   D15Z3 engine, D16Y2 engine

M/T	16° ± 2° BTDC (RED) at 750 ± 50 rpm (min^{-1}) in neutral

   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 ignition housing counterclockwise to advance the timing, or clockwise to retard the timing.



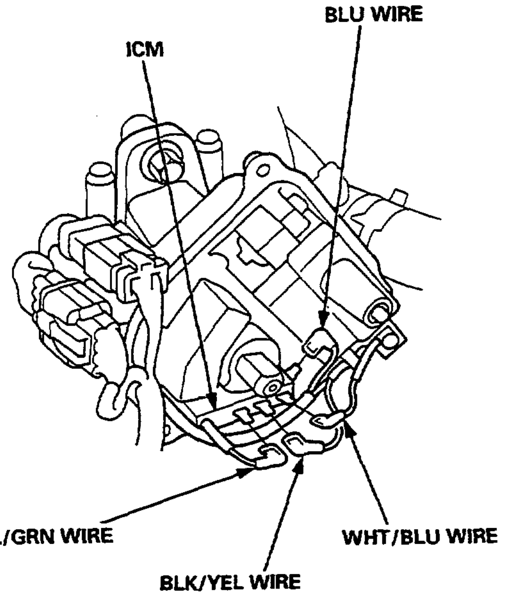
7. Tighten the distributor mounting bolts, and recheck the timing.
8. Remove the SCS short connector from the service check connector.

Ignition Control Module (ICM) Input Test

NOTE:
- See section 11 when the malfunction indicator lamp (MIL) blinks.
- Perform an input test for the ignition control module (ICM) after finishing the fundamental tests for the ignition system and the fuel and emissions system.

1. Remove the distributor ignition cap, the distributor ignition rotor, and the inner cover.

2. Disconnect the BLK/YEL, WHT/BLU, YEL/GRN, and BLU wires from the ignition control module (ICM).



3. Turn the ignition switch "II" (ON). 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. Check for voltage between the WHT/BLU wire and body ground. There should be battery voltage.

   - If there is no battery voltage, check the:
     — Ignition coil.
     — WHT/BLU 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 engine control module (ECM) and the ICM (see section 11).

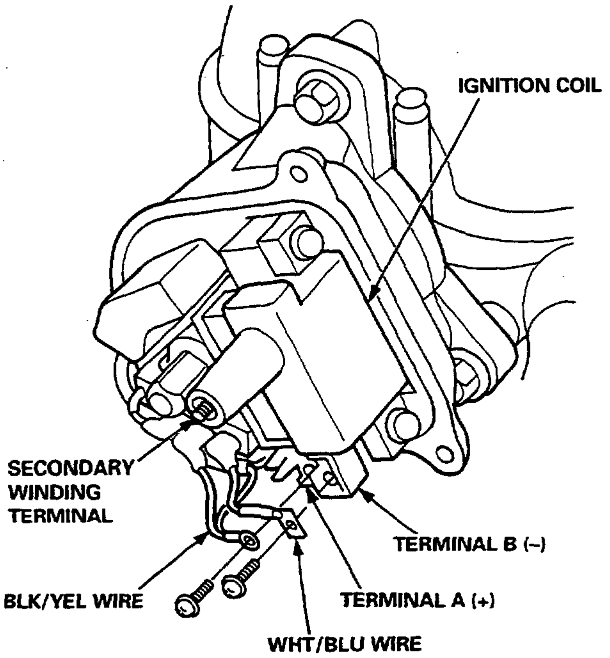
6. Check the BLU wire between the tachometer and the ICM.

7. If all tests are normal, replace the ICM.

Ignition Coil Test

1. With the ignition switch OFF, remove the distributor ignition cap.

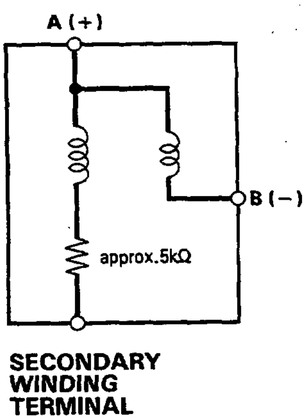
2. Remove the two screws to disconnect the BLK/YEL and WHT/BLU wires from the terminals A (+) and B (–) respectively.



3. Using an ohmmeter, measure resistance between the terminals. If resistance is not within specifications, replace the coil.

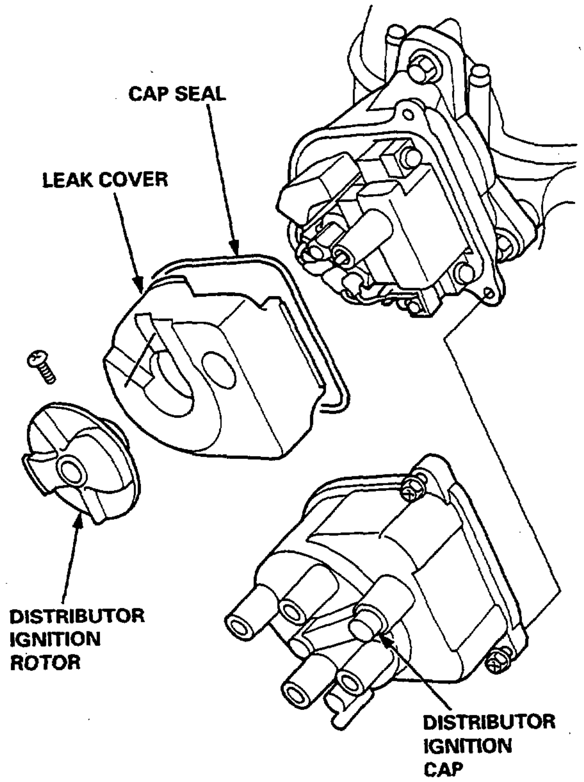
   NOTE: Resistance will vary with coil temperature; specifications are at 20°C (68°F).

   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

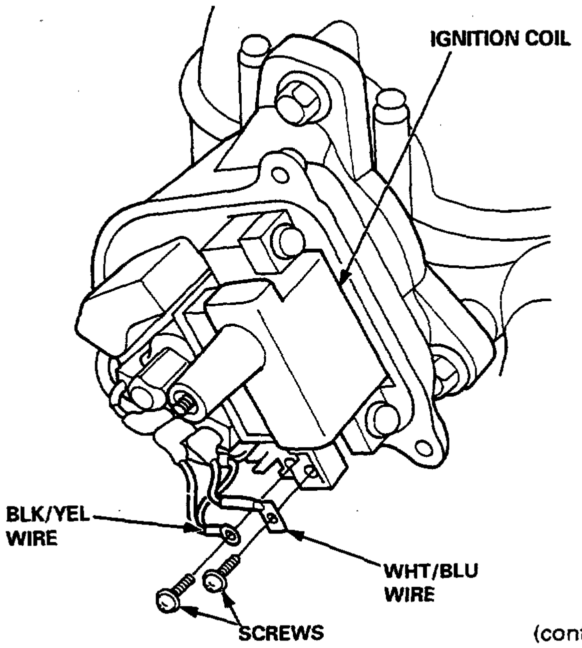


Ignition Coil Replacement

1. With the ignition switch OFF, remove the distributor ignition cap, distributor ignition rotor and cap seal, then remove the leak cover.



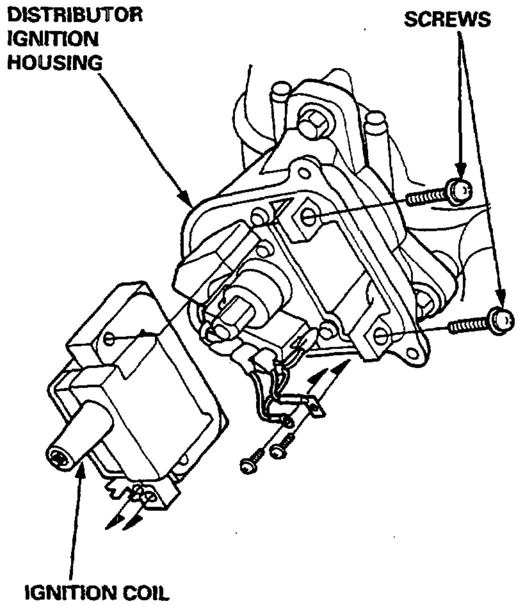
2. Disconnect the BLK/YEL and WHT/BLU wires from the terminals by removing the two screws.



(cont'd)

Ignition Coil Replacement (cont'd)

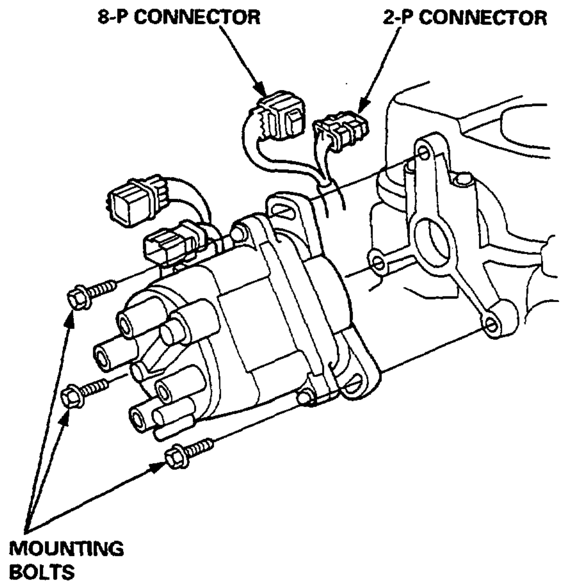
3. Remove the two screws, and slide the ignition coil out of the distributor ignition housing.



Distributor Removal

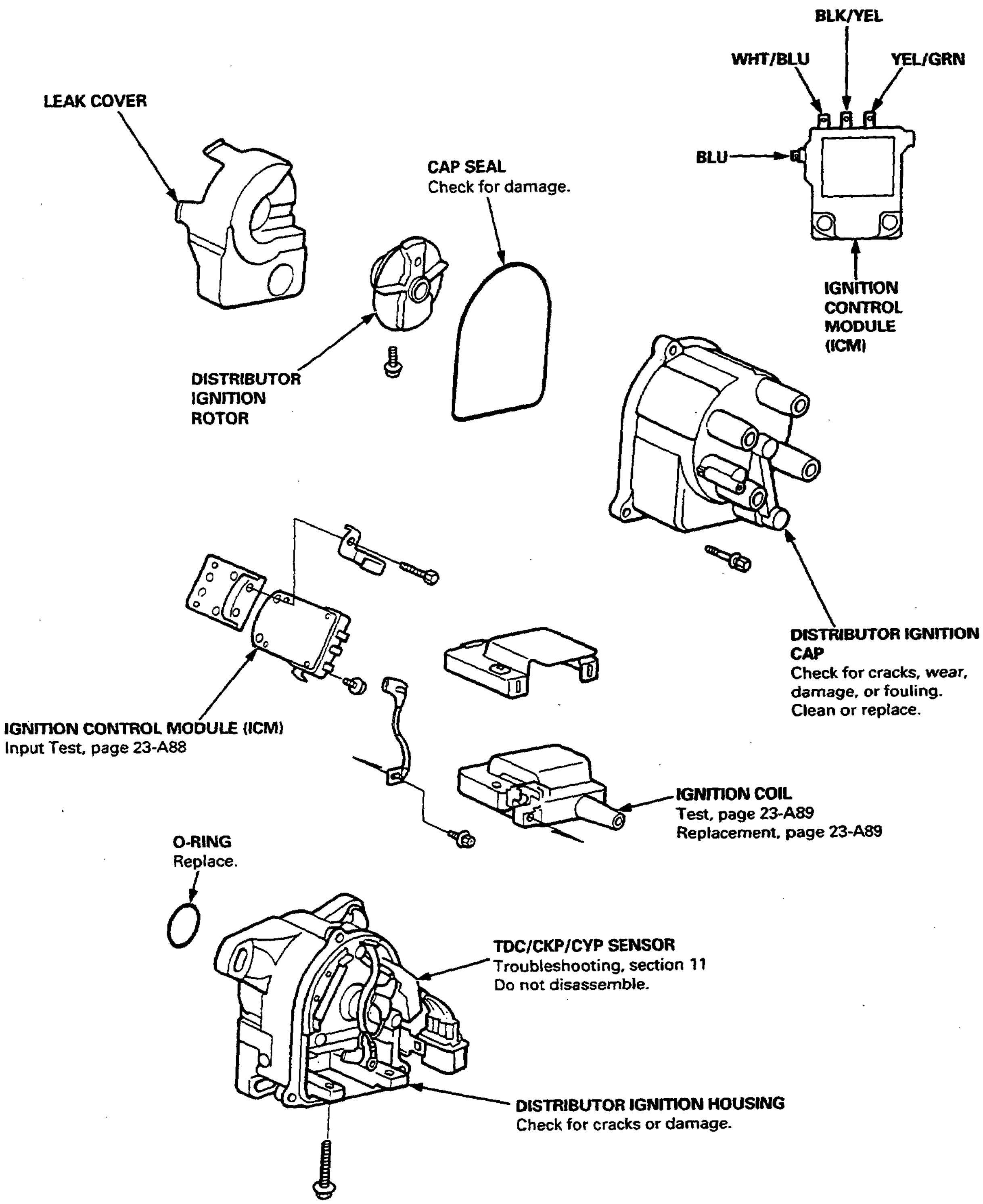
1. Remove the 2-P and 8-P connectors from their brackets, and disconnect them.

2. Disconnect the ignition wires from the distributor ignition cap.



3. Remove the distributor mounting bolts, then remove the distributor from the cylinder head.

Distributor Overhaul



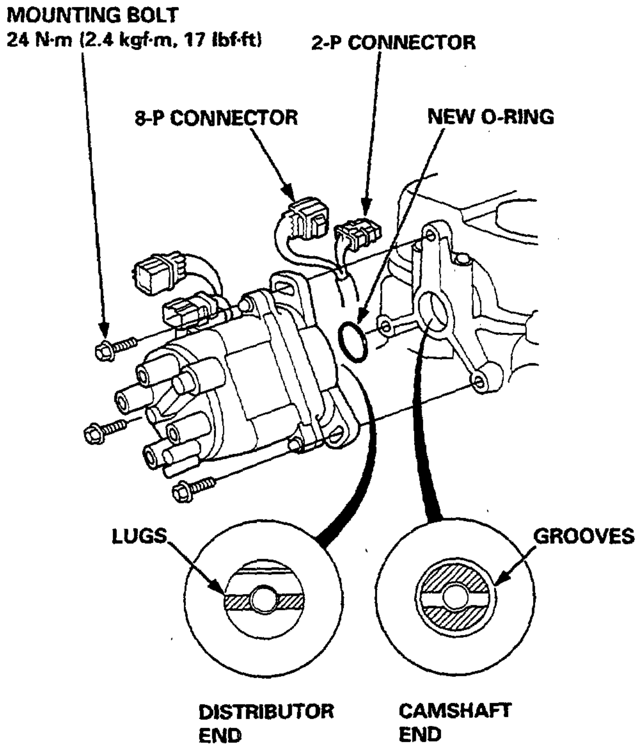
Ignition System

Distributor Installation

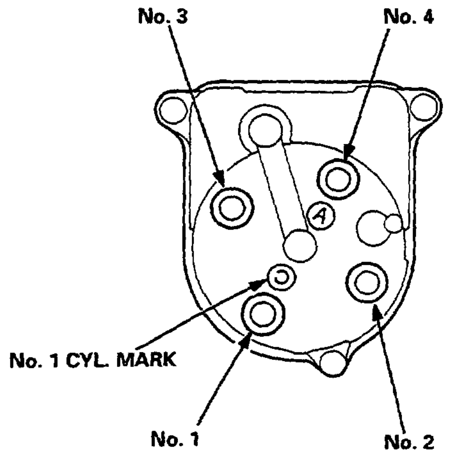
NOTE: Before you install the distributor, bring the No. 1 piston to compression stroke TDC.

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 the 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 temporarily.
4. Connect the 2-P and 8-P connectors to the distributor.
5. Connect the ignition wires as shown.

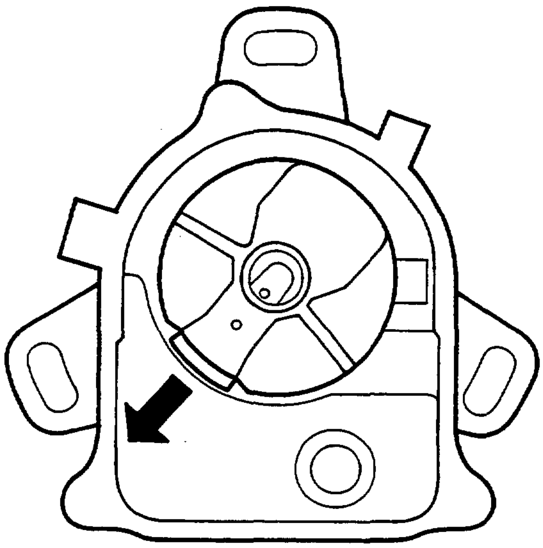


6. Set the ignition timing with a timing light (see page 23-A87).
7. After setting the ignition timing, tighten the mounting bolts.

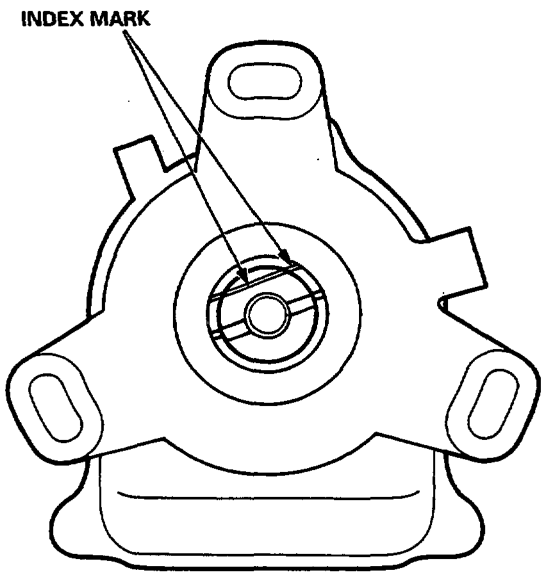
Distributor Reassembly

Reassemble the distributor in the reverse order of disassembly.

1. Install the distributor ignition rotor, then turn it so that it faces in the direction shown (toward the No. 1 cylinder).

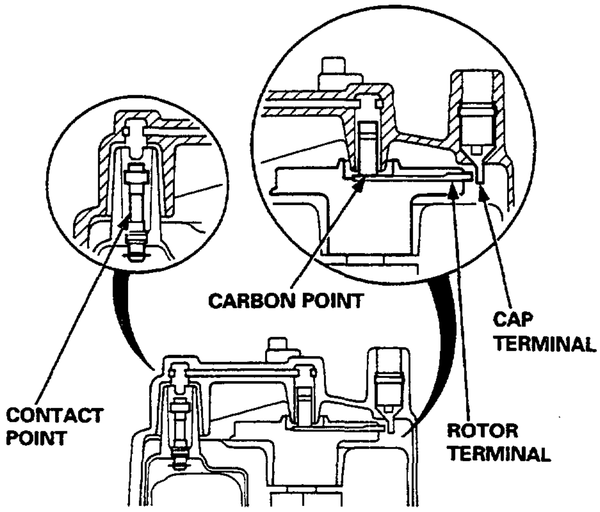


2. Align the index mark on the distributor ignition housing with the index mark on the coupling.



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.

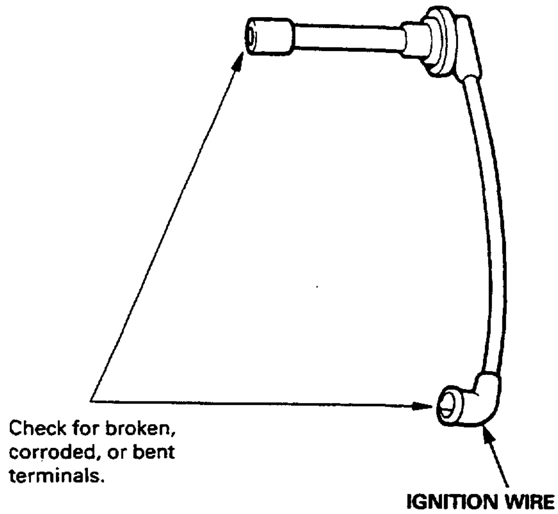


3. Check the distributor ignition cap for cracks, wear and damage. If necessary, clean or replace it.

Ignition Wire Inspection and Test

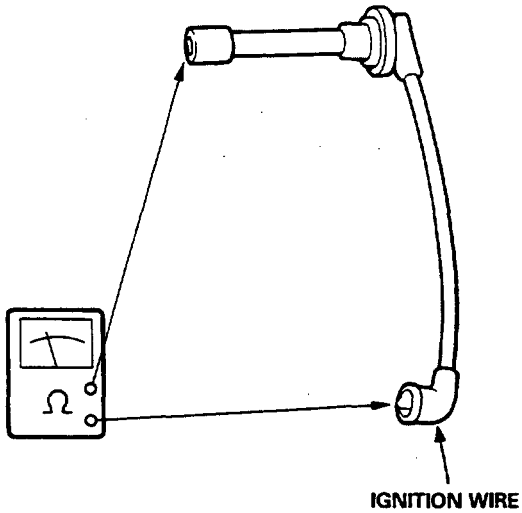
CAUTION: Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wires; you might break them inside.

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.



2. Connect ohmmeter probes and measure resistance.

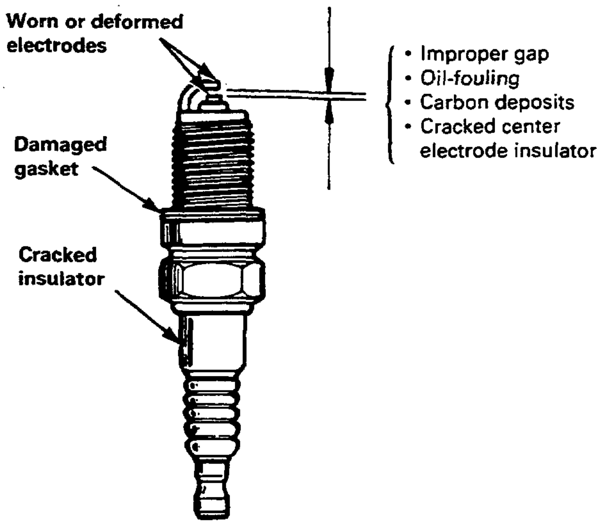
   Ignition Wire Resistance:
   25 kΩ max. at 20°C (68°F)



3. If resistance exceeds 25 kΩ, replace the ignition wire.

Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



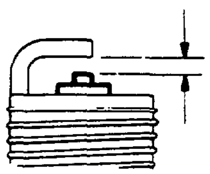
Burned or worn electrodes may be caused by:
- Advanced ignition timing
- Loose spark plug
- Plug heat range too low
- Insufficient cooling

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

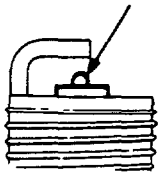
2. Adjust the gap with a suitable gapping tool.

Electrode Gap:

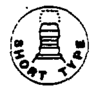
Standard	1.1 $^{0}_{-0.1}$ mm (0.043 $^{0}_{-0.004}$ in)



3. Replace the plug if the center electrode is rounded as shown below:



NOTE: Do not use spark plugs other than those listed below, because these plugs are a new type (ISO standard).



These marks are sealed on the timing belt cover.

Spark Plug

D15Z3 engine:

ZFR5F-11 (NGK)	For all normal driving.
ZFR6F-11 (NGK)	For hot climates or continuous high speed driving.

D14A2 engine, D16Y2 engine, D16Y3 engine:

BKR6E-11 (NGK)	For all normal driving.
BKR7E-11 (NGK)	For hot climates or continuous high speed driving.

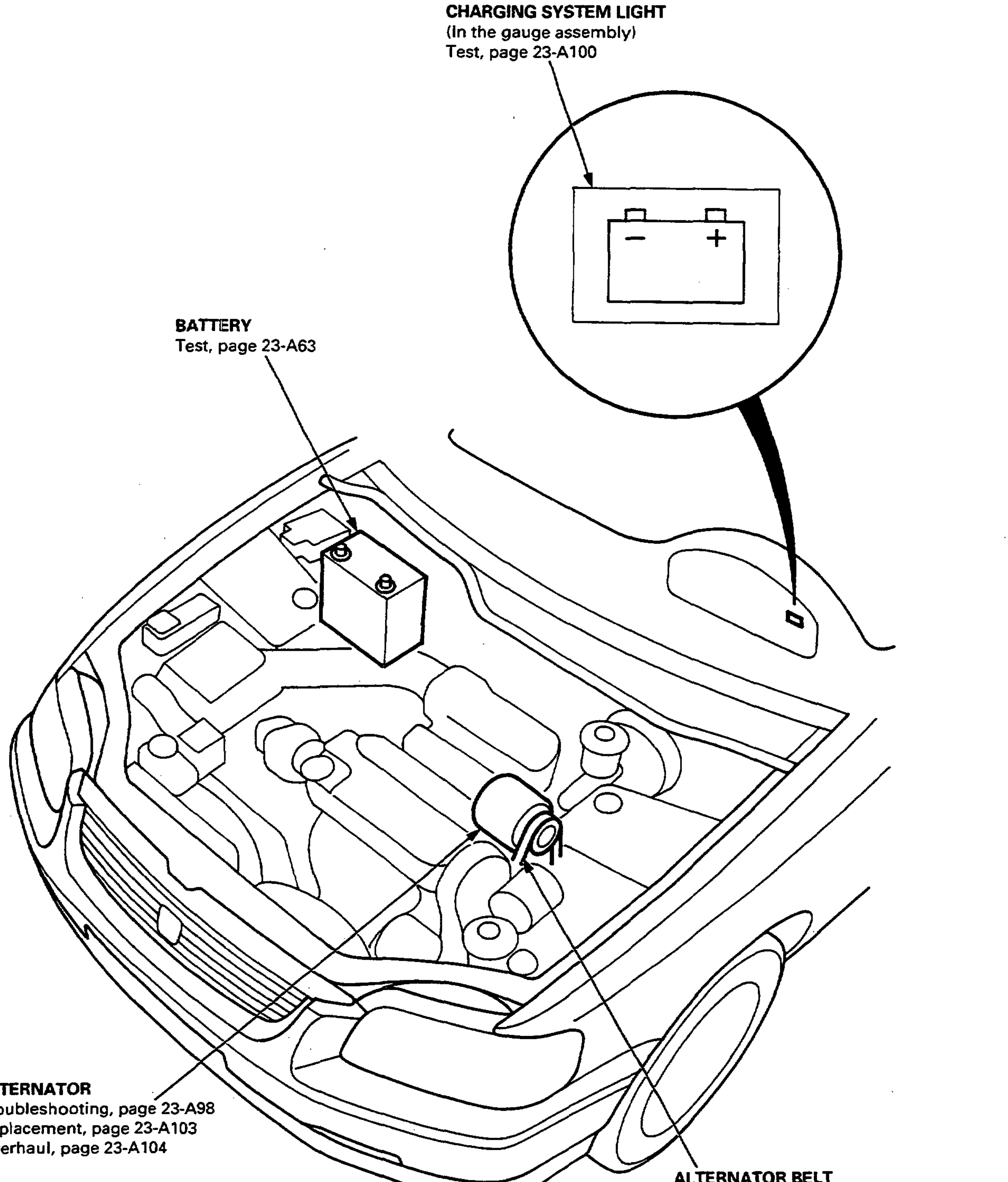
4. Screw the plugs into the cylinder head finger tight, then torque them to 18 N·m (1.8 kgf·m, 13 lbf·ft).

   NOTE: Apply a small quantity of anti-seize compound to the plug threads before installing.

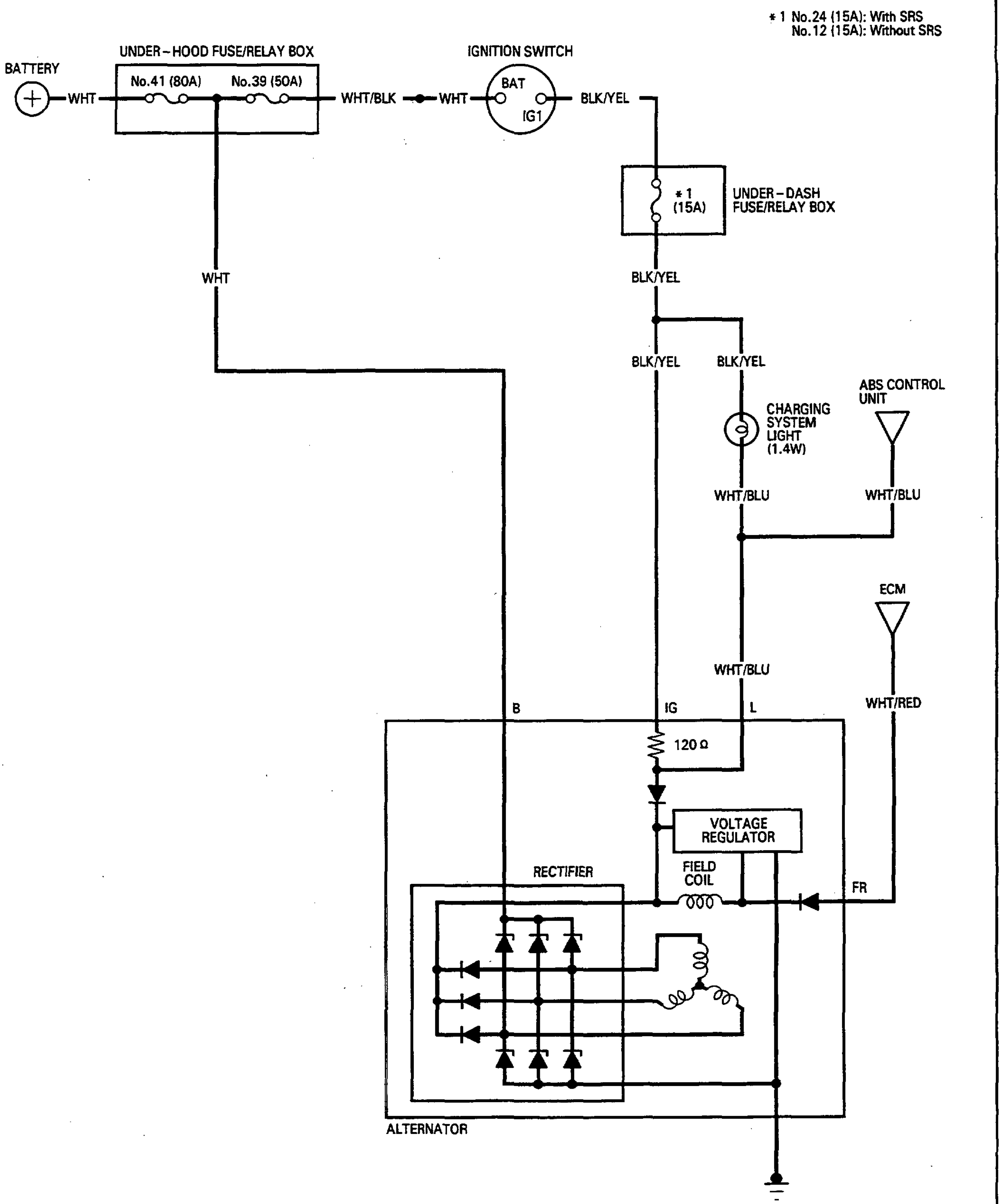
Charging System

Component Location Index

NOTE: LHD type is shown, RHD type is similar.



Circuit Diagram



Charging System

Troubleshooting

NOTE:

- Before troubleshooting check:
  — Tightness of the alternator belt (see page 23-A107).
  — 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 alternator/regulator on the car (see page 23-A99).

↓

2. Test the charging system light (see page 23-A100).

↓

3. Check voltage at the IG terminal of the alternator connector (see page 23-A101).

↓

Charging system light does not go off, because the engine idle speed is too low:
— Check the idle speed.

Alternator/Regulator On-car Test:

1. Be sure to use a good battery (see page 23-A63). Connect an ammeter and a voltmeter as shown.
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. 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 13.6 and 15.4 V?

YES — NO: **Test the alternator (see page 23-A102).**

1. Turn the blower motor and the rear window defogger on, and check the battery voltage.

Is the battery voltage less than 13.0 V?

YES — NO: Turn also the stereo radio/cassette player, brake lights, etc. on.

Is the battery voltage less than 13.0 V?

YES — NO: **Test the alternator (see page 23-A102).**

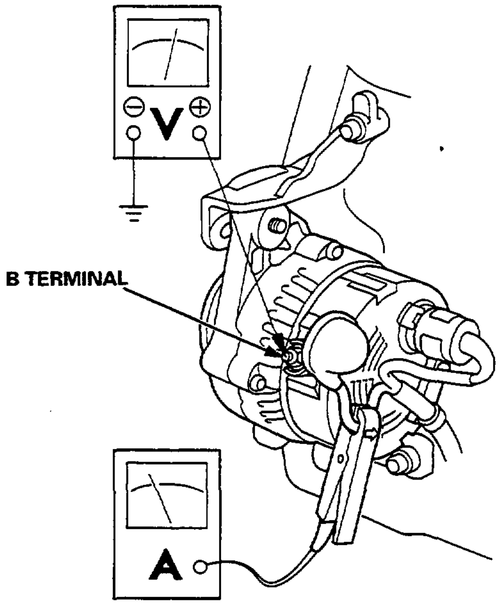
1. Read the amperage.

Are there more than 60 A?

YES — NO: **Test the alternator (see page 23-A102).**

Alternator/Regulator work normally. Test the charging system light (see page 23-A100).

CAUTION: As the headlights warm up considerably, do not cover them.



Troubleshooting (cont'd)

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 voltage at the IG terminal (see page 23-A101).**
- **NO** →
  1. Turn the ignition switch off.
  2. Disconnect the 4-P connector.
  3. Turn the ignition switch on (II).

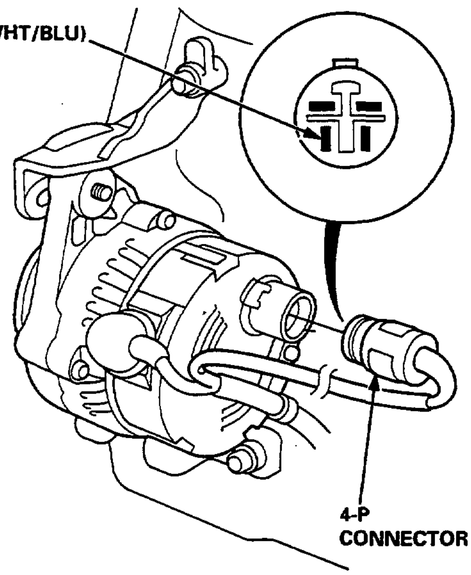
  Does the charging system light come off?

  - **YES** → **Check voltage at the IG terminal (see page 23-A101).**
  - **NO** → **Disconnect the ABS control unit. If the charging system light stays on, there must be a short in the WHT/BLU terminal wire.**

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 voltage at the IG terminal (see page 23-A101).**
- **NO** →
  - **— Blown bulb**
  - **— An open in the WHT/BLU wire**
  - **— Loose/disconnected terminal**



IG Terminal Voltage Check:
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.

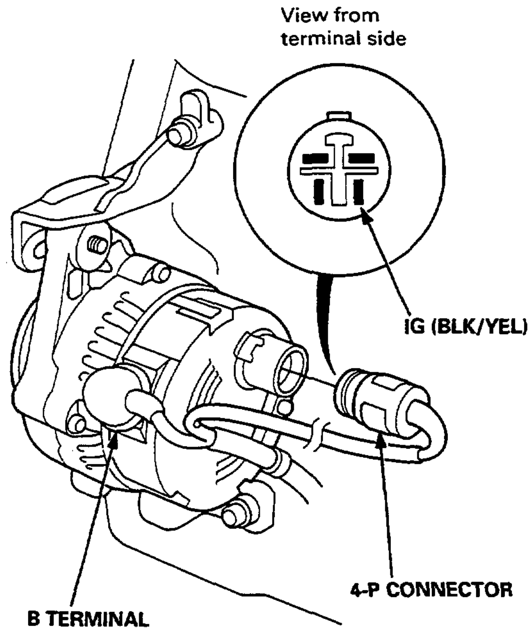
1. Disconnect the 4-P connector, and turn the ignition switch on (II).
2. Measure the voltage between body ground and the IG terminal of the 4-P connector.

Is there battery voltage?

YES | NO

- **Blown No. 12 (15 A) fuse in the under-dash fuse/relay box: Without SRS**
- **Blown No. 24 (15 A) fuse in the under-dash fuse/relay box: With SRS**
- **An open in the BLK/YEL wire**

Check the battery (see page 23-A63)



Charging System

Troubleshooting

Alternator Test:

NOTE: Because an overall check is necessary to avoid misleading conclusions, test the alternator in the order described below.

Alternator Test Procedure

Is battery terminal voltage less than 16 V with the high beams on and the engine running at 2,000 rpm?

NO

YES

1. Inspect the brushes (see page 23-A105).

2. Test the rectifier (see page 23-A106).

3. Test the rotor (see page 23-A106).

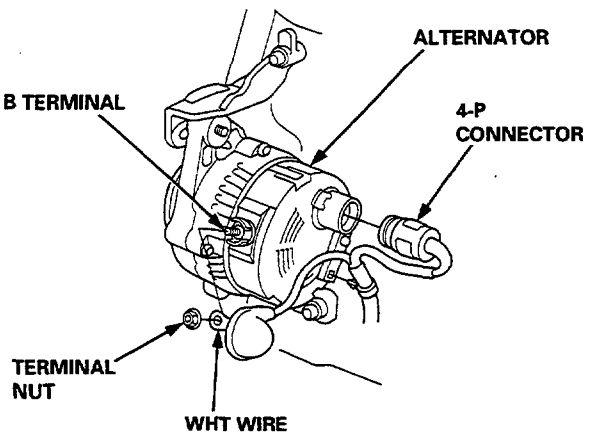
Regulator is faulty.
Replace the regulator.

Alternator Replacement

1. Disconnect both the negative cable and positive cable from the battery.

2. Disconnect the 4-P connector from the alternator.

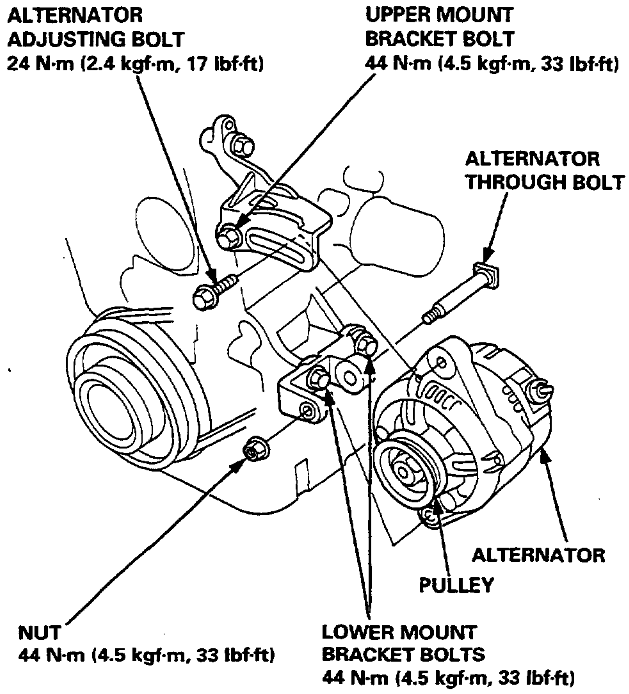
3. Remove the terminal nut and the WHT wire from the B terminal.



4. Remove the upper mount bracket nut and the engine wire harness.

5. Remove the alternator adjusting bolt and through bolt nut, then remove the alternator belt from the pulley.

6. Pull out the alternator through bolt, then remove the alternator.



7. If necessary, remove the mount bracket bolts, and the upper and lower mount brackets.

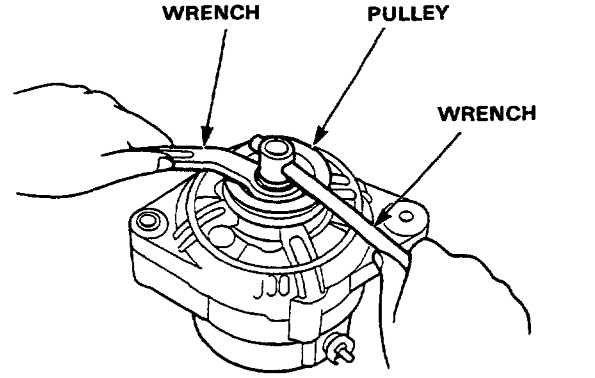
8. Adjust the alternator belt tension after installation.

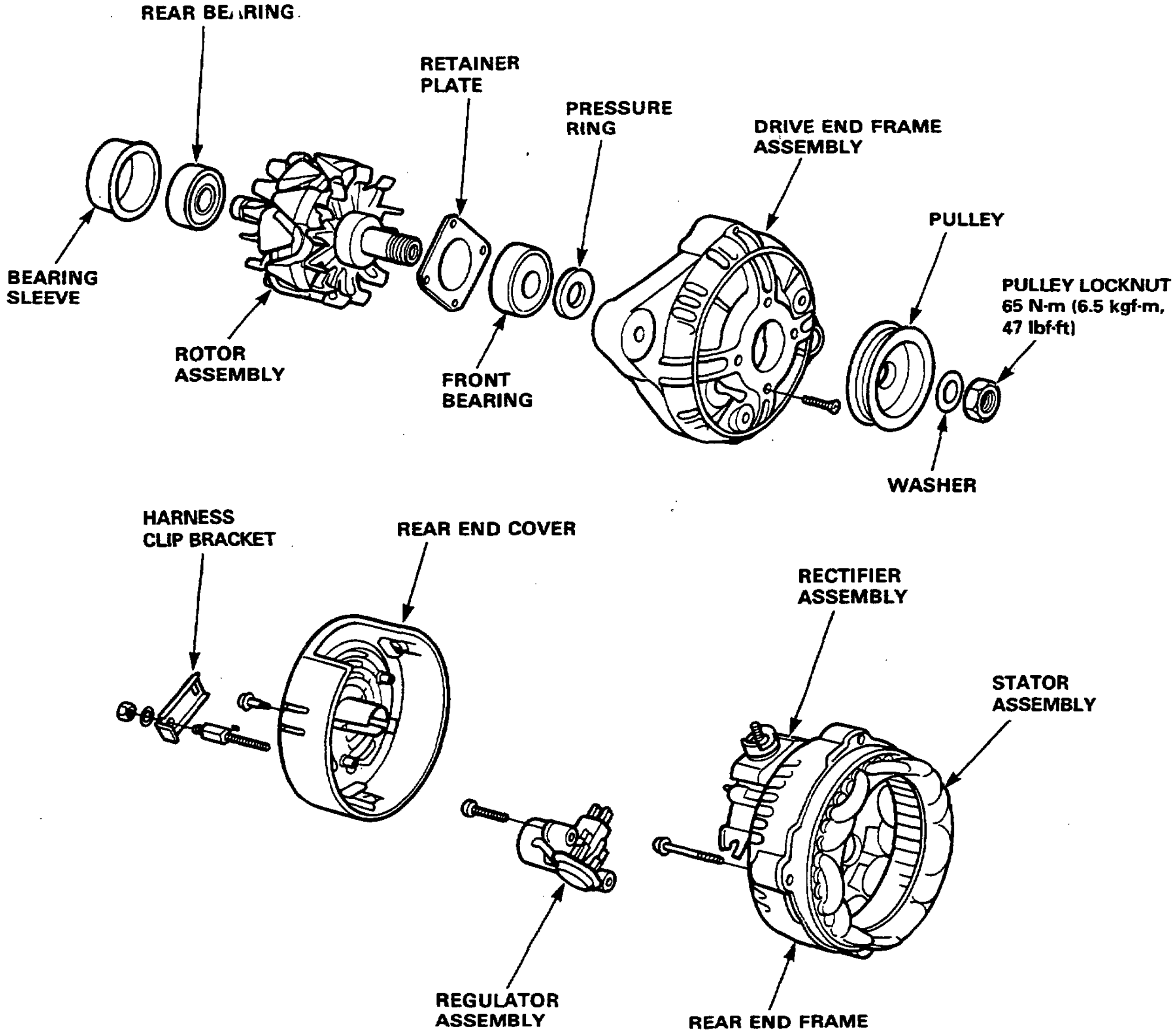
Charging System

Alternator Overhaul

NOTE: It is necessary to separate the pulley, drive end housing and rotor only when the front bearing needs replacement.

Loosen the locknut with wrenches to remove the pulley from the rotor. If necessary, use an impact wrench.

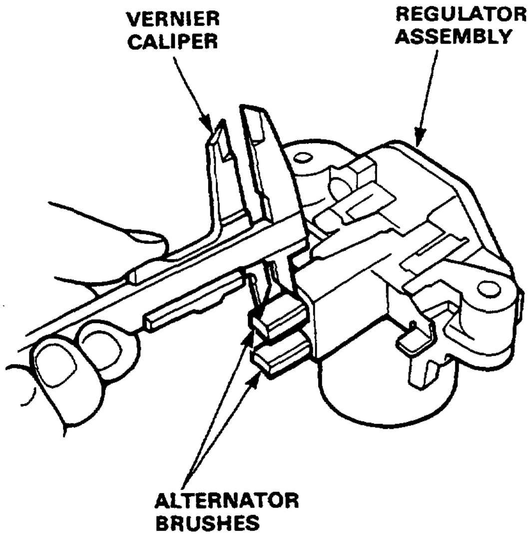




Alternator Brush Inspection

1. Remove the end cover, then take out the regulator assembly by removing the two screws.
2. Measure the length of the alternator brushes with a vernier caliper.

Alternator Brush Length:
Standard: 12.5 mm (0.49 in)
Service Limit: 2.5 mm (0.10 in)

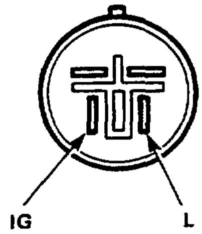


If the brushes are not within the service limit, replace the regulator assembly.

Regulator Assembly Inspection

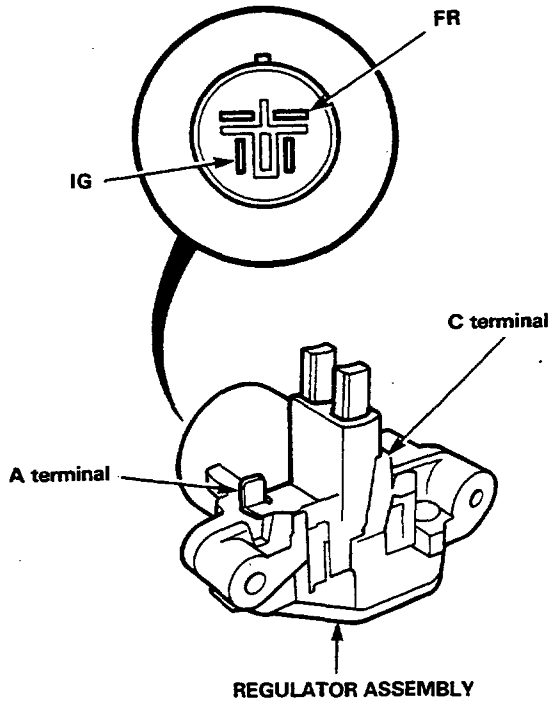
1. Measure the resistance between the L and IG terminals.

Standard: 120 Ω (about)



If the resistance is not within the standard, replace the regulator assembly.

2. Check for continuity between the IG and A, FR and C terminals. There should be continuity in only one direction.

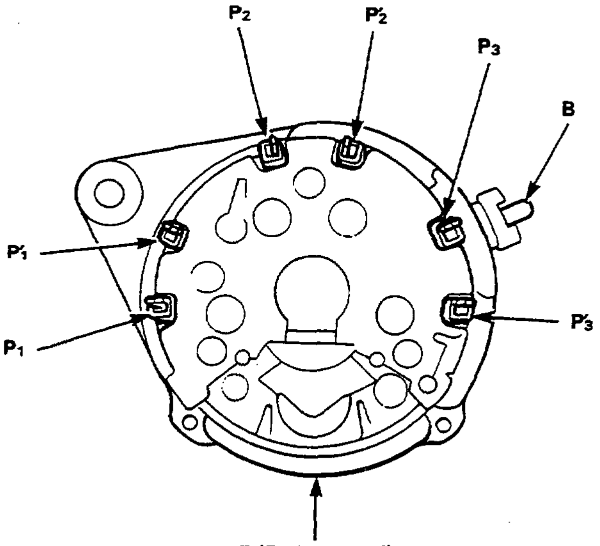


If there is continuity in both directions, replace the regulator assembly.

Rectifier Test

NOTE:
- The diodes are designed to allow current to pass in one direction while blocking the opposite direction. Each diode must be tested for continuity in both directions.
- Use an ohmmeter capable of checking diodes.

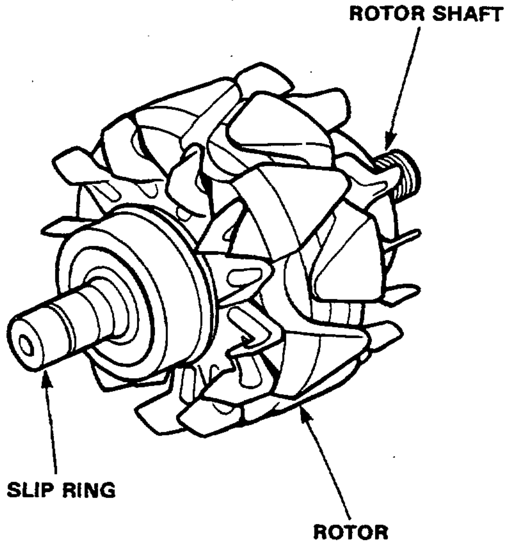
1. Check for continuity in each direction between the B and P terminals, and between the E (Body ground) and P terminals of each diode pair. All diodes should have continuity in only one direction.



2. If any of the diodes fails, replace the rectifier and stator assembly (diodes are not available separately).

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 rotor assembly.

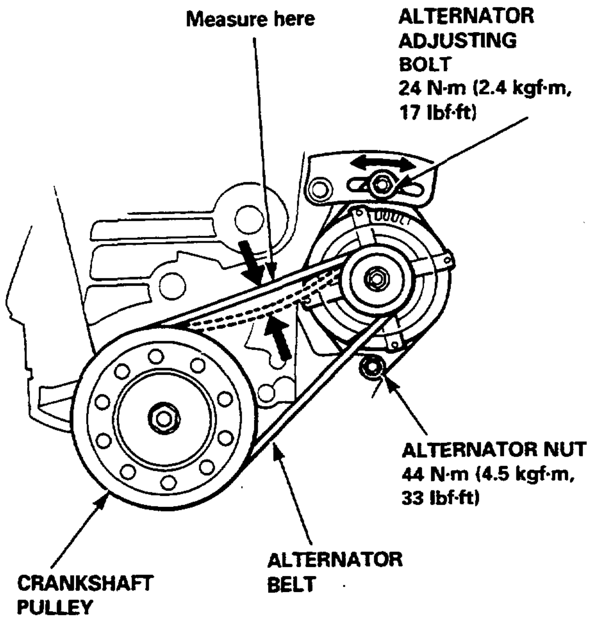
Alternator Belt Inspection and Adjustment

Deflection method:

Apply a force of 98 N (10 kgf, 22 lbf) and measure the belt deflection between the alternator and the crankshaft pulley.

Deflection: 7.0 – 10.5 mm (0.28 – 0.41 in)

NOTE:
- On a brand-new belt (one that has been run for less than five minutes), the deflection should be 5.0 – 7.0 mm (0.19 – 0.28 in) when first measured.
- If there are cracks and any damage evident in the belt, replace it with a new one.



If adjustment is necessary:

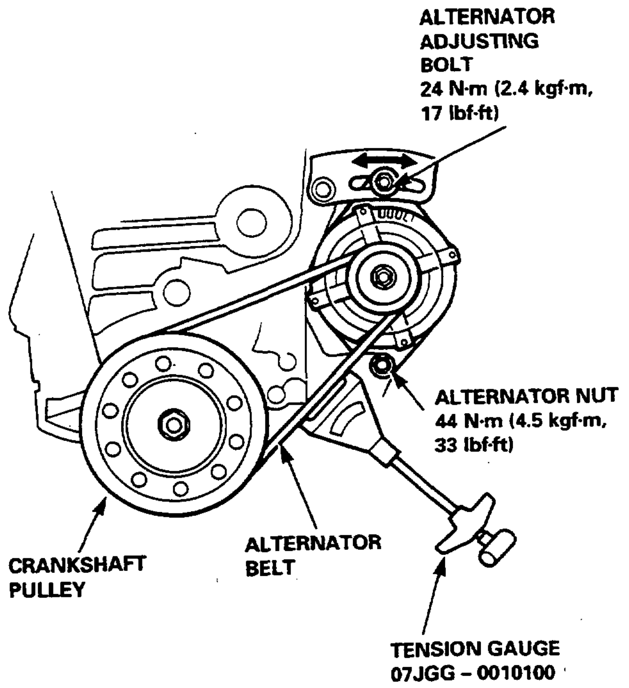
1. Loosen the alternator adjusting belt and the alternator nut.
2. Move the alternator to obtain the proper belt tension, then retighten the adjusting bolt and the alternator nut to the specified torques.
3. Recheck the deflection of the belt.

Tension gauge method:

Attach the belt tension gauge to the belt and measure the belt tension.

Tension: 340 – 490 N (35 – 50 kgf, 77 – 110 lbf)

NOTE:
- On a brand-new belt (one that has been run for less than five minutes), the tension should be 640 – 785 N (65 – 80 kgf, 143 – 176 lbf) when first measured.
- Follow the manufacturer's instructions for the belt tension gauge.
- If there are cracks and any damage evident in the belt, replace it with a new one.



If adjustment is necessary:

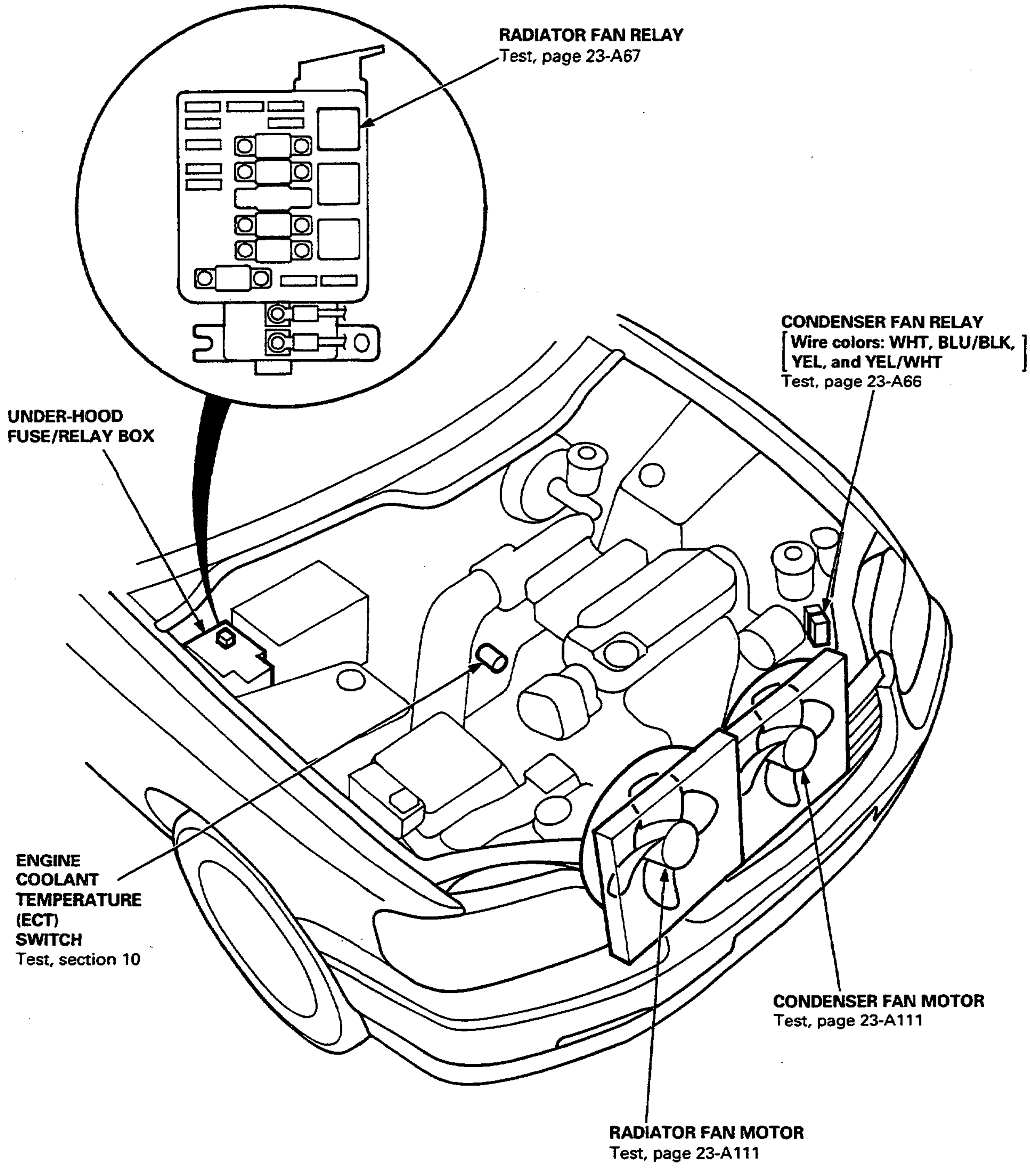
1. Loosen the alternator adjusting belt and the alternator nut.
2. Move the alternator to obtain the proper belt tension, then retighten the adjusting bolt and the alternator nut to the specified torques.
3. Recheck the tension of the belt.

Fan Controls

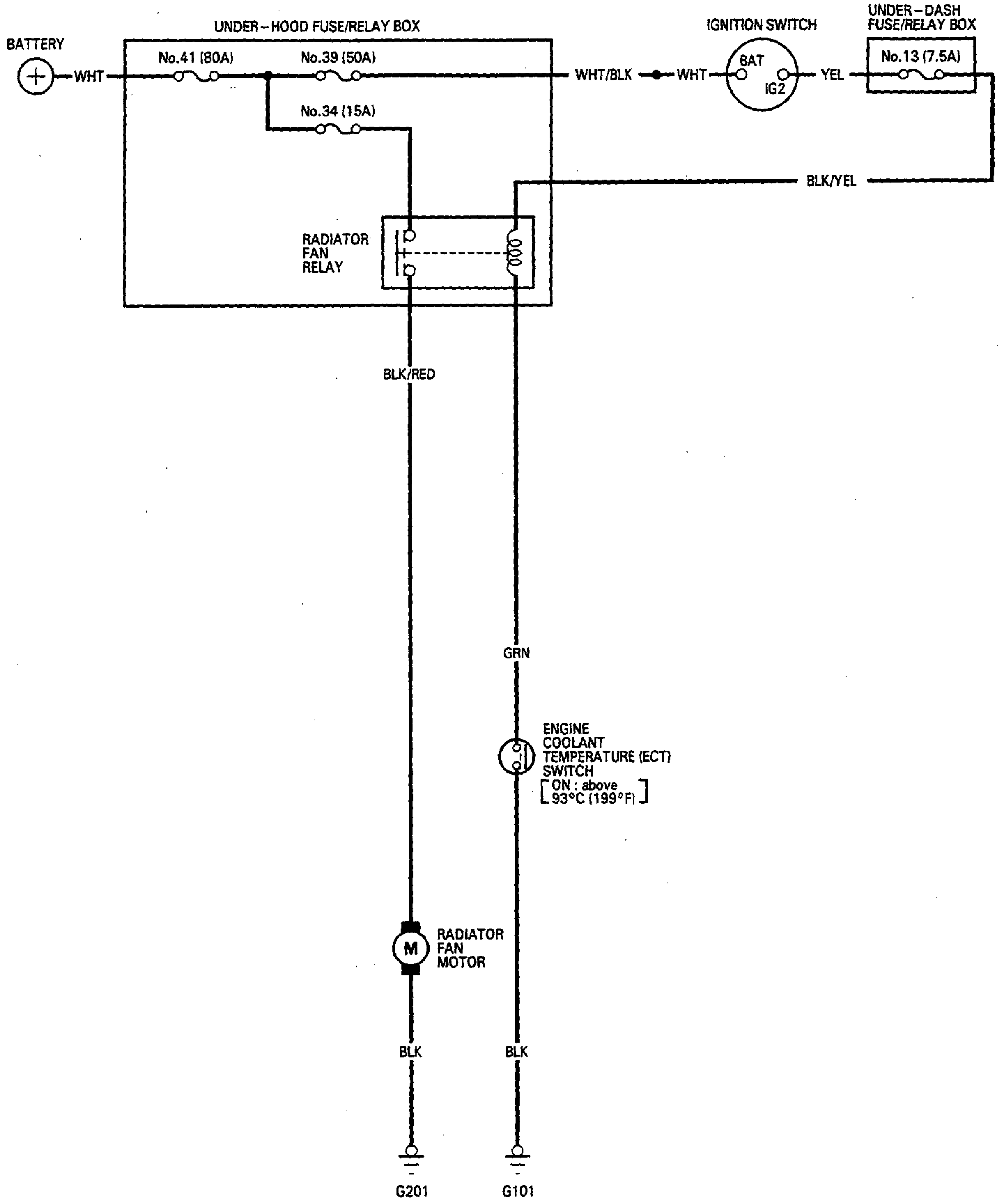
Component Location Index

For the A/C system, see section 22.

NOTE: LHD type is shown, RHD type is similar.

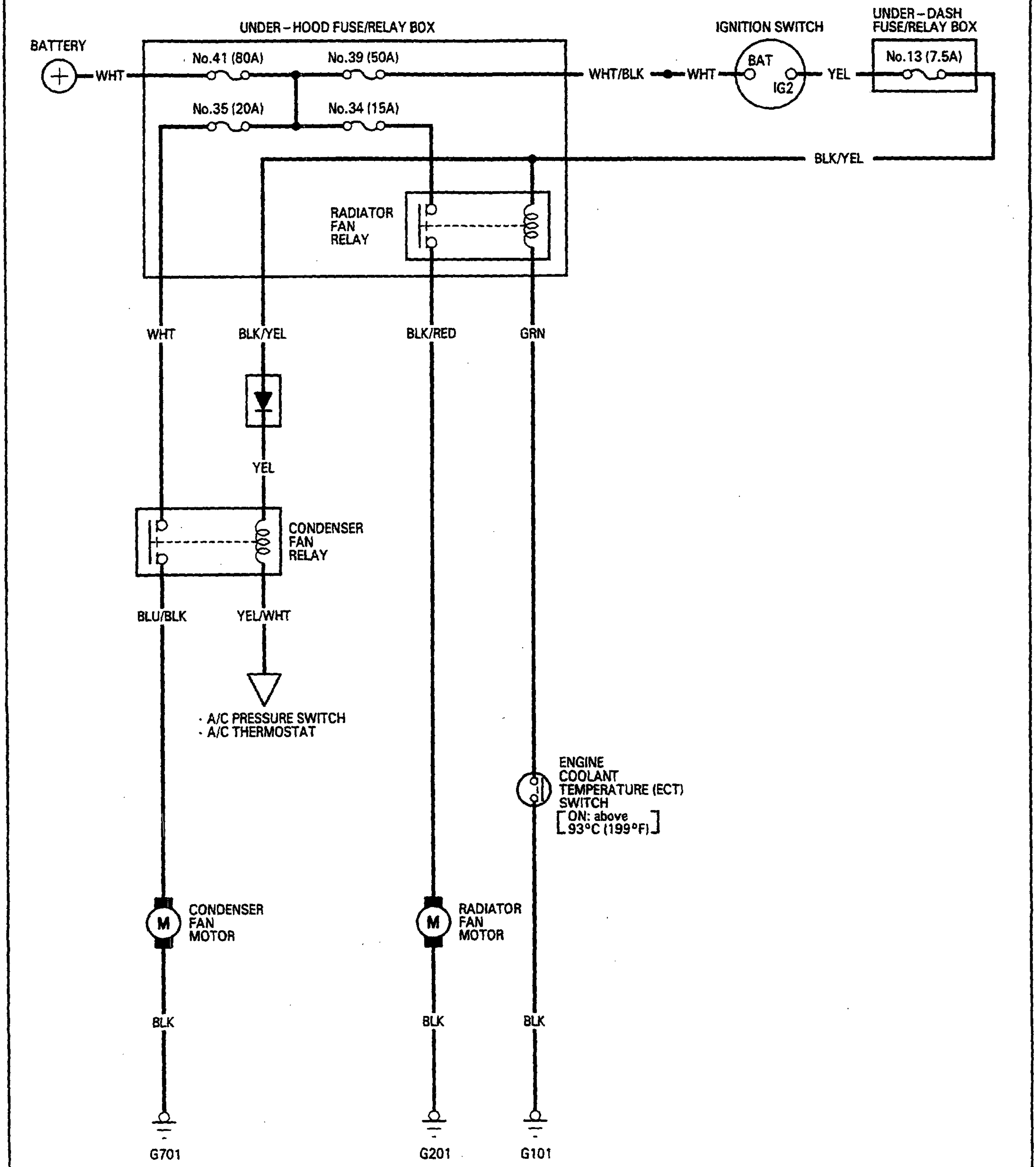


Circuit Diagram (Without A/C)



Fan Controls

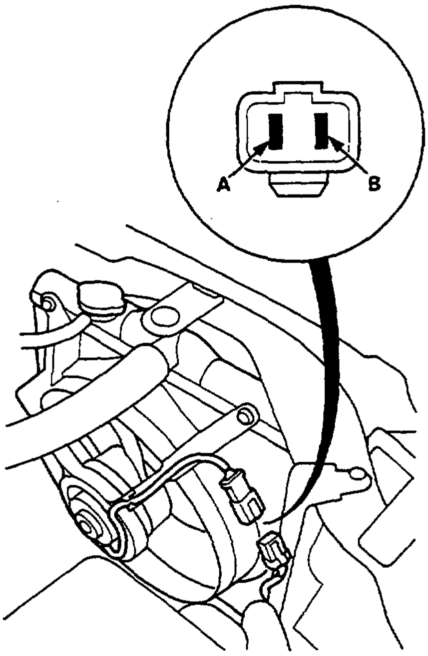
Circuit Diagram (With A/C)



Fan Motor Test

1. Disconnect the 2-P connector from the fan motor.
2. Test the motor by connecting battery power to the B terminal, and connecting ground to the A terminal.
3. If the fan motor fails to run or doesn't run smoothly, replace it.

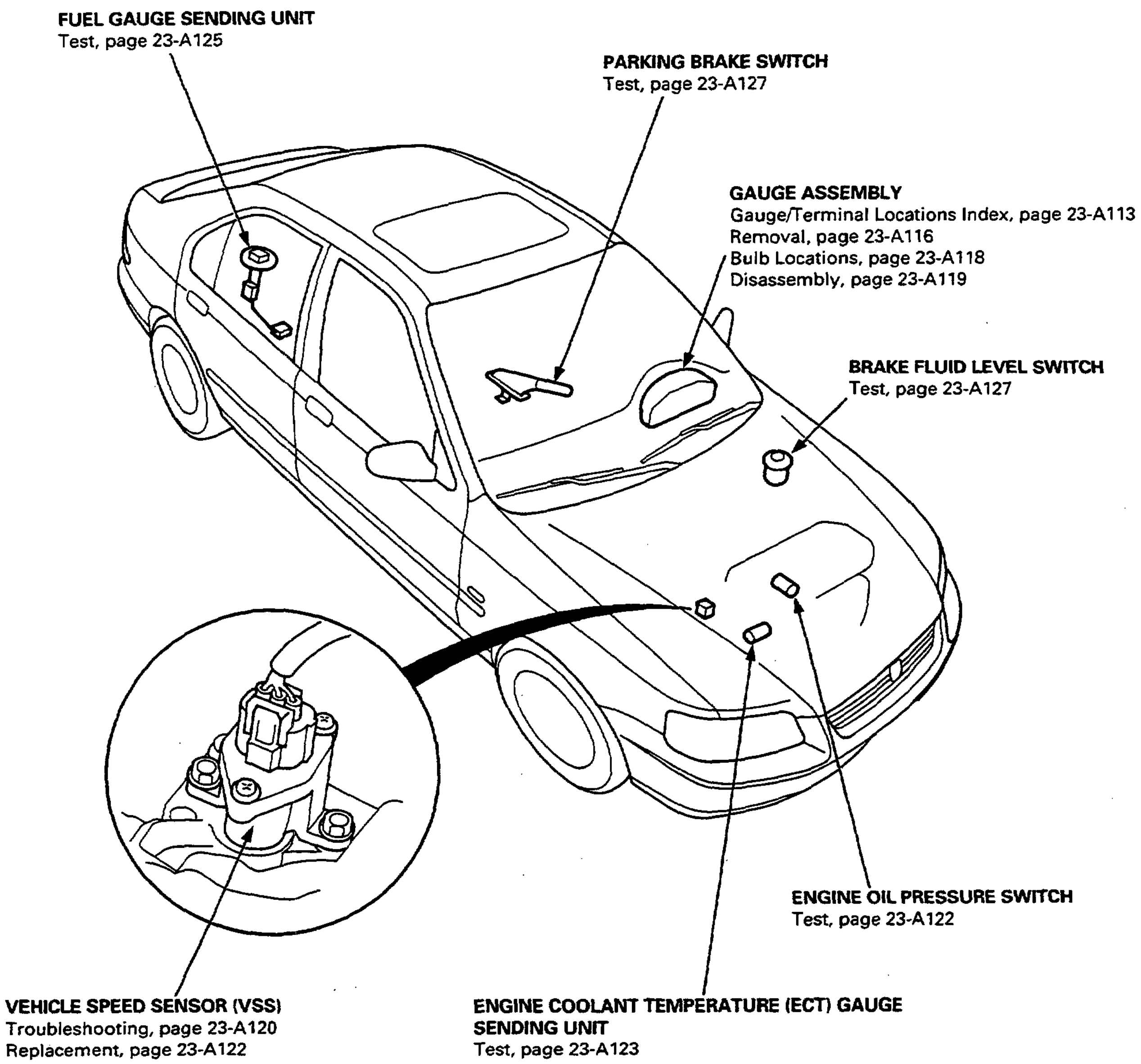
   NOTE: The illustration shows the radiator fan.



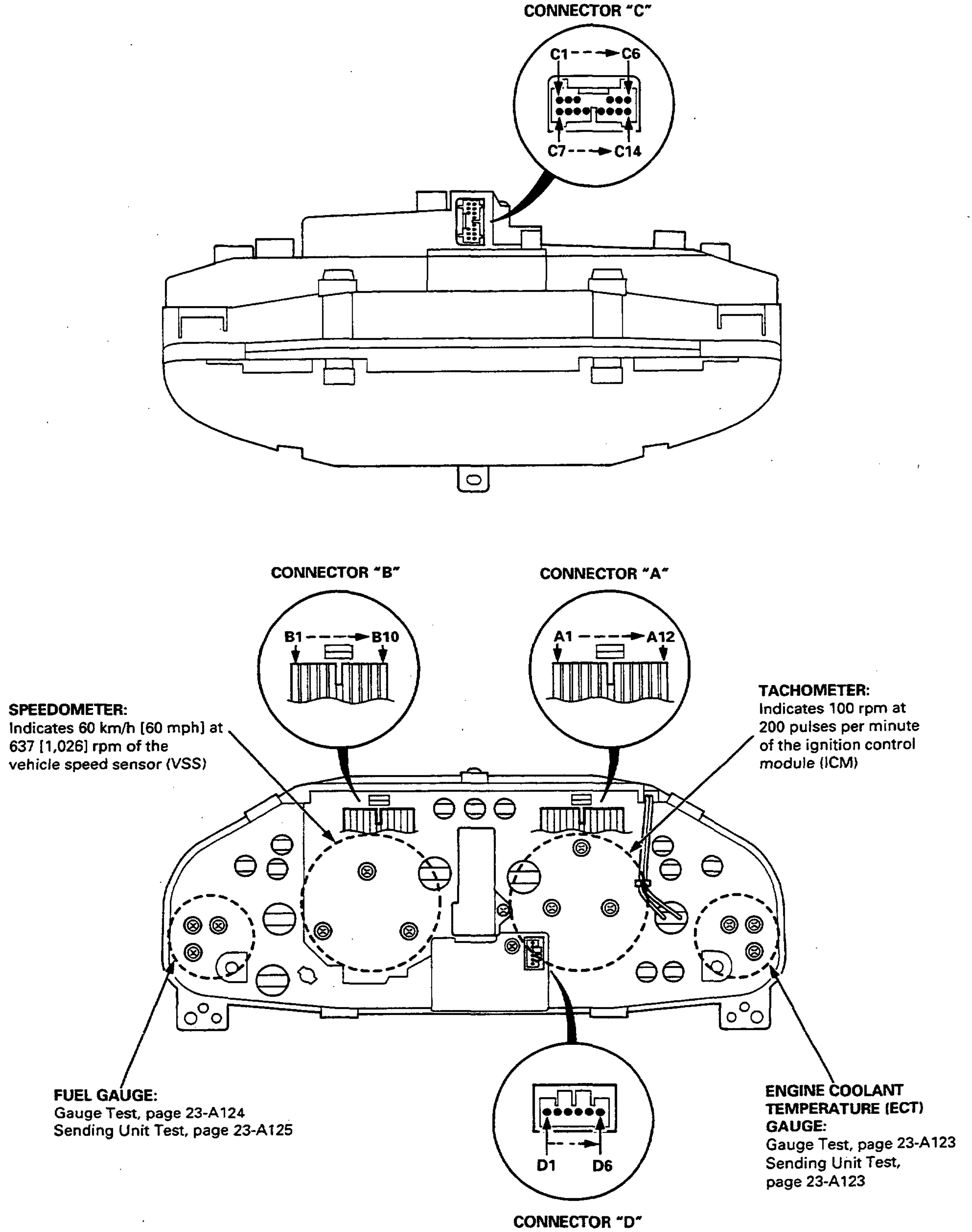
Gauge Assembly

Component Location Index

NOTE: LHD type is shown, RHD type is similar.

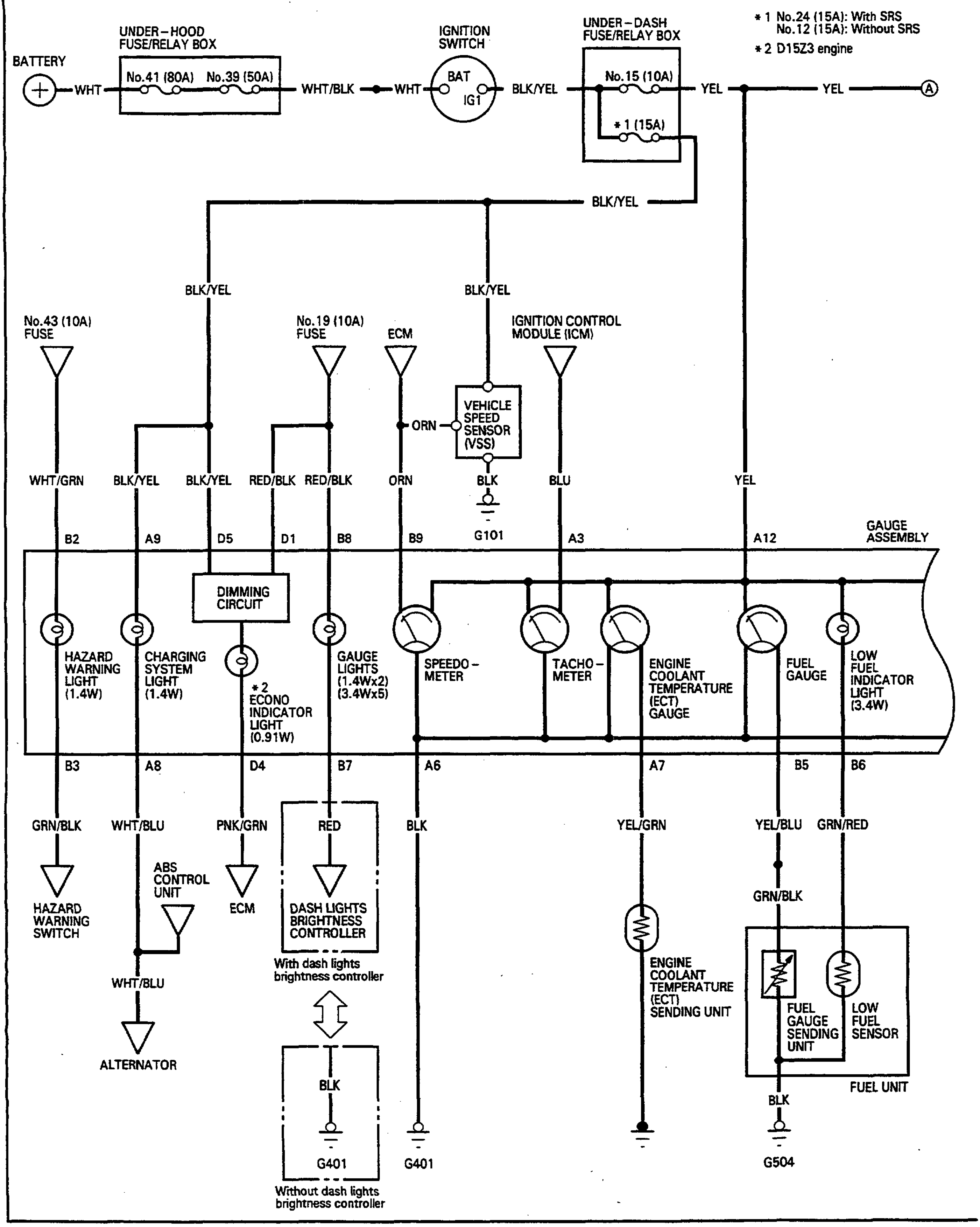


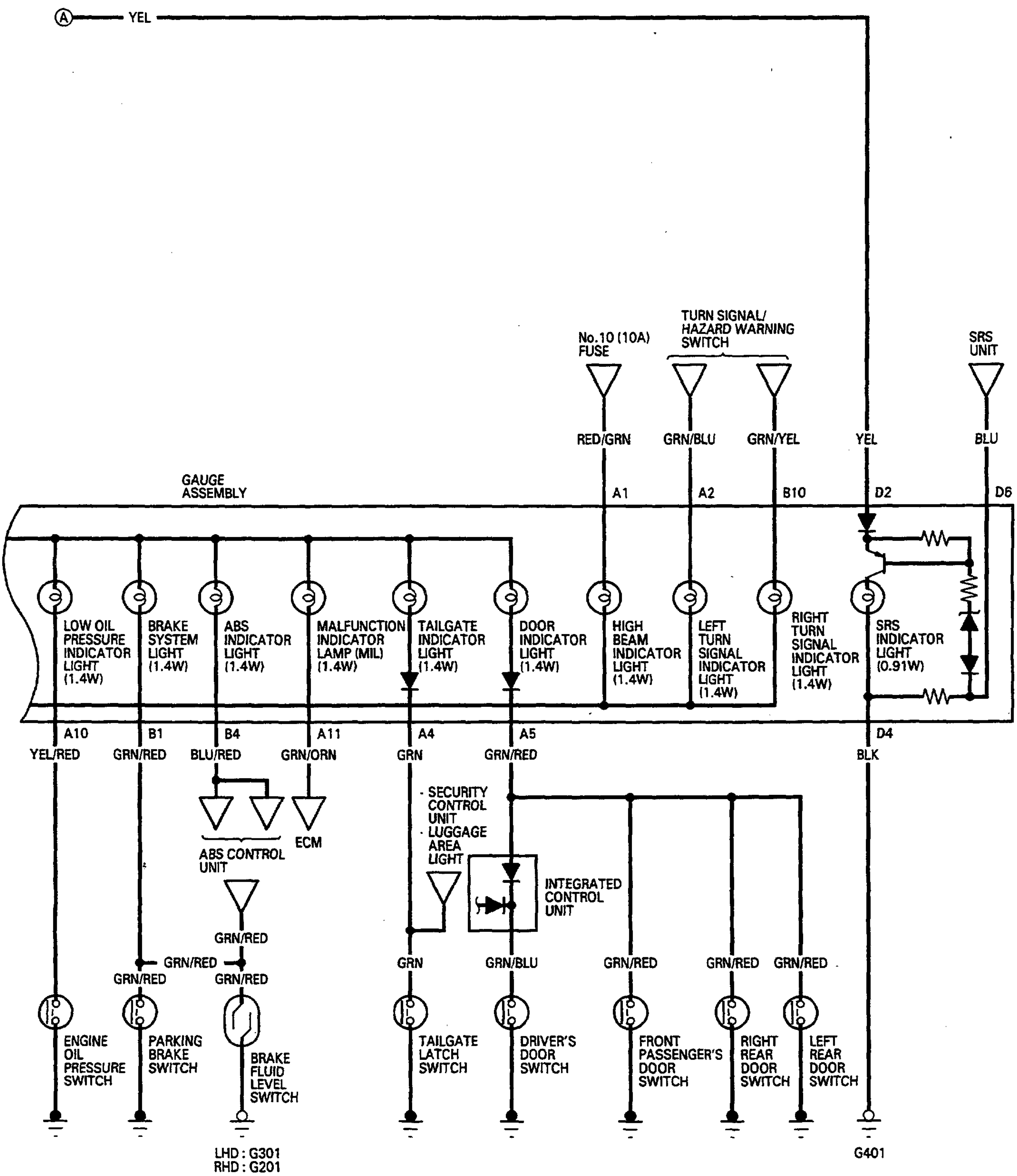
Gauge/Terminal Location Index



Gauge Assembly

Circuit Diagram



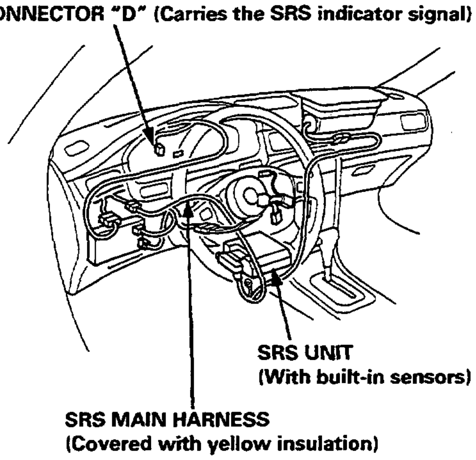


YEL
GAUGE ASSEMBLY
No.10 (10A) FUSE
TURN SIGNAL/ HAZARD WARNING SWITCH
SRS UNIT
RED/GRN
GRN/BLU
GRN/YEL
YEL
BLU
A1
A2
B10
D2
D6
LOW OIL PRESSURE INDICATOR LIGHT (1.4W)
BRAKE SYSTEM LIGHT (1.4W)
ABS INDICATOR LIGHT (1.4W)
MALFUNCTION INDICATOR LAMP (MIL) (1.4W)
TAILGATE INDICATOR LIGHT (1.4W)
DOOR INDICATOR LIGHT (1.4W)
HIGH BEAM INDICATOR LIGHT (1.4W)
LEFT TURN SIGNAL INDICATOR LIGHT (1.4W)
RIGHT TURN SIGNAL INDICATOR LIGHT (1.4W)
SRS INDICATOR LIGHT (0.91W)
A10
B1
B4
A11
A4
A5
D4
YEL/RED
GRN/RED
BLU/RED
GRN/ORN
GRN
GRN/RED
BLK
ABS CONTROL UNIT
ECM
· SECURITY CONTROL UNIT
· LUGGAGE AREA LIGHT
INTEGRATED CONTROL UNIT
GRN/RED
GRN/RED
GRN/RED
GRN/RED
GRN
GRN/BLU
GRN/RED
GRN/RED
GRN/RED
ENGINE OIL PRESSURE SWITCH
PARKING BRAKE SWITCH
BRAKE FLUID LEVEL SWITCH
TAILGATE LATCH SWITCH
DRIVER'S DOOR SWITCH
FRONT PASSENGER'S DOOR SWITCH
RIGHT REAR DOOR SWITCH
LEFT REAR DOOR SWITCH
LHD : G301
RHD : G201
G401

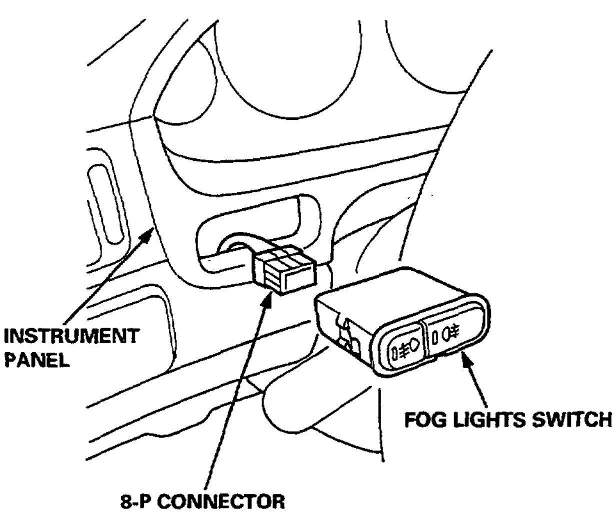
Gauge Assembly

Removal

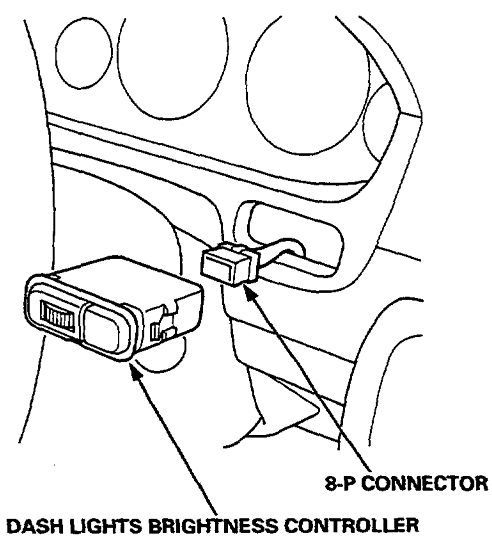
CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



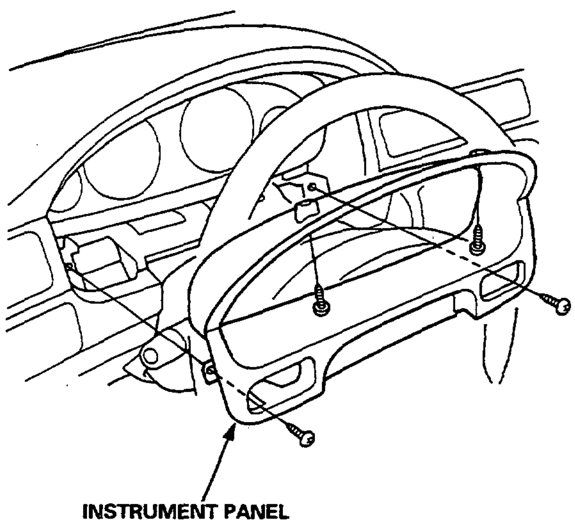
1. Remove the fog lights switch from the instrument panel.



2. Remove the dash lights brightness controller from the instrument panel.

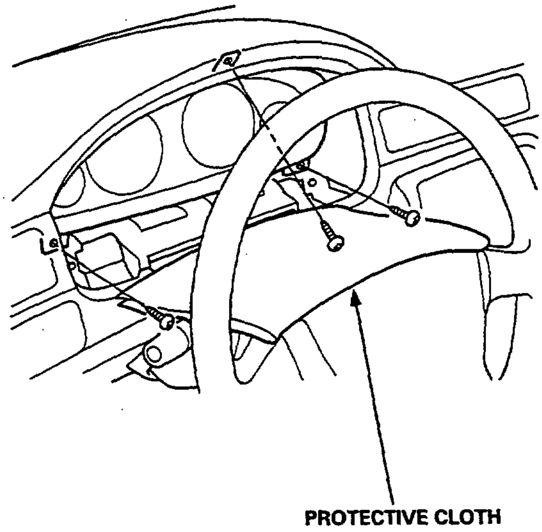


3. Remove the instrument panel.

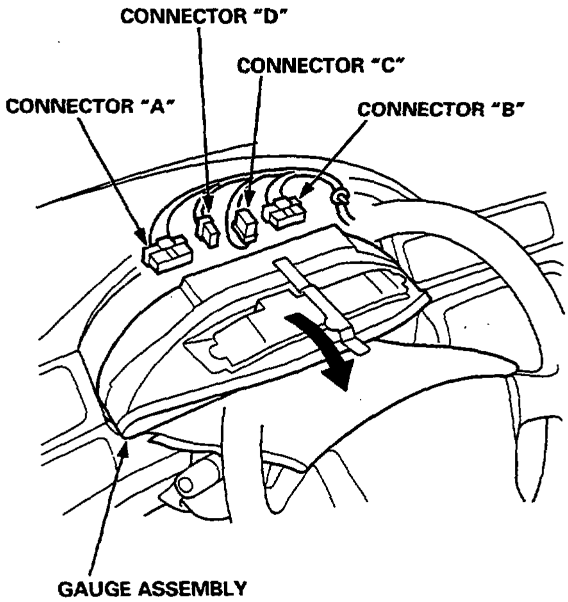


4. Remove the three screws, and spread a protective cloth on the upper column cover.

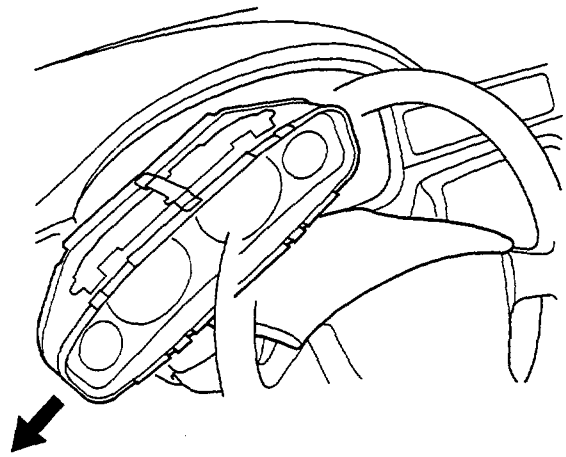
5. Tilt the steering wheel down with the tilt adjustment lever.



6. Pry the gauge assembly out, and disconnect the connectors.



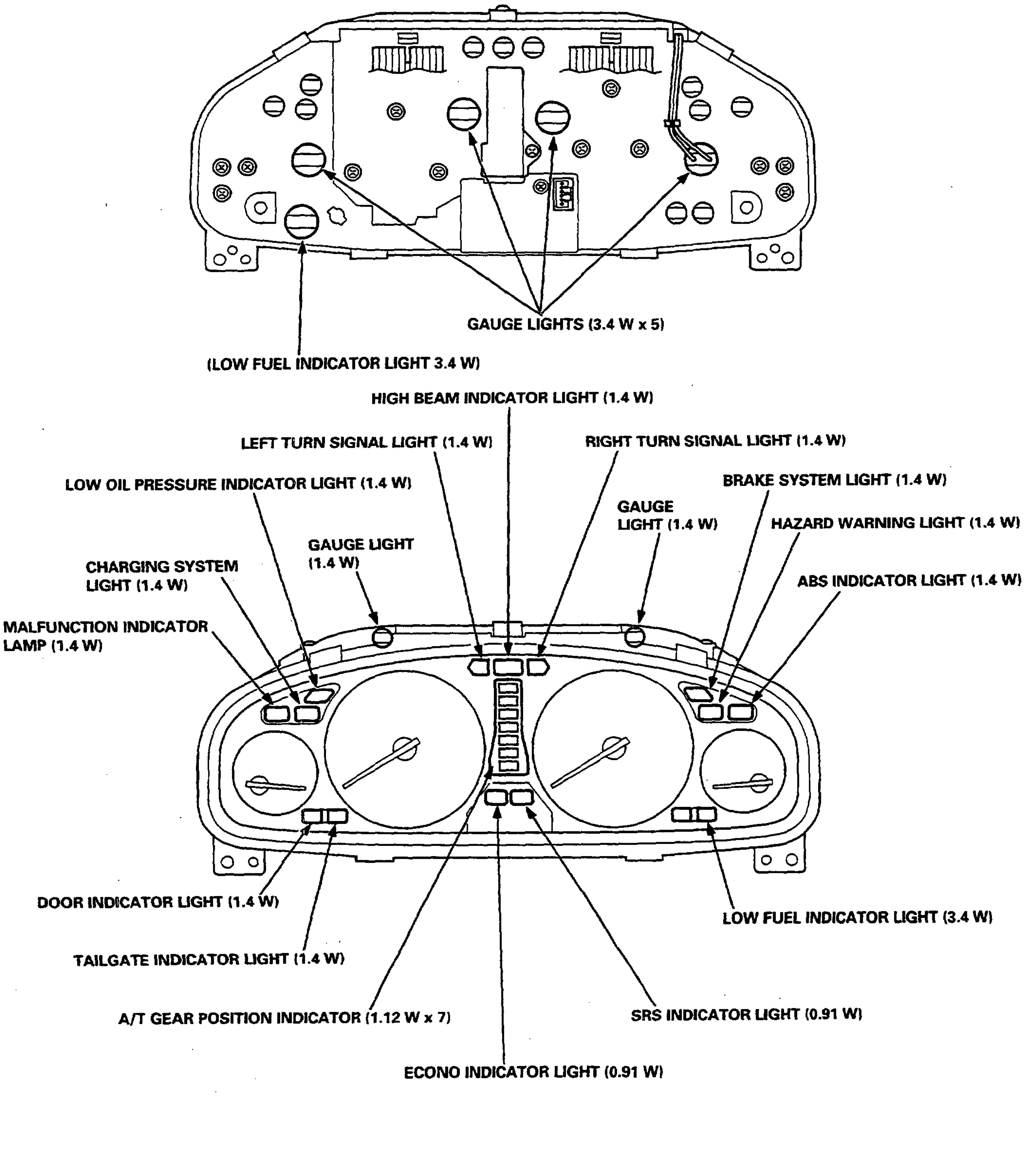
7. Carefully remove the gauge assembly.



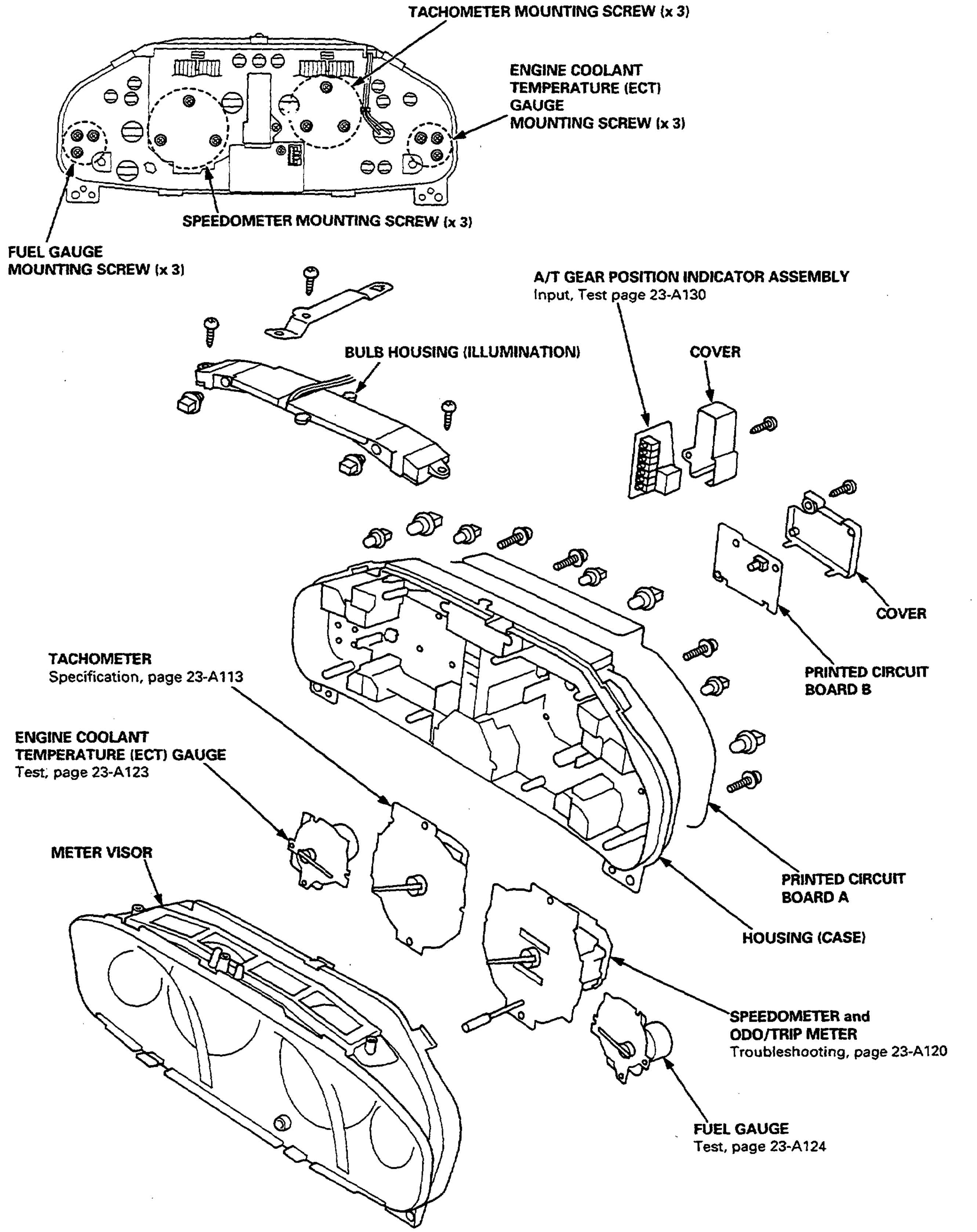
8. Install in the reverse order of removal.

Gauge Assembly

Bulb Locations



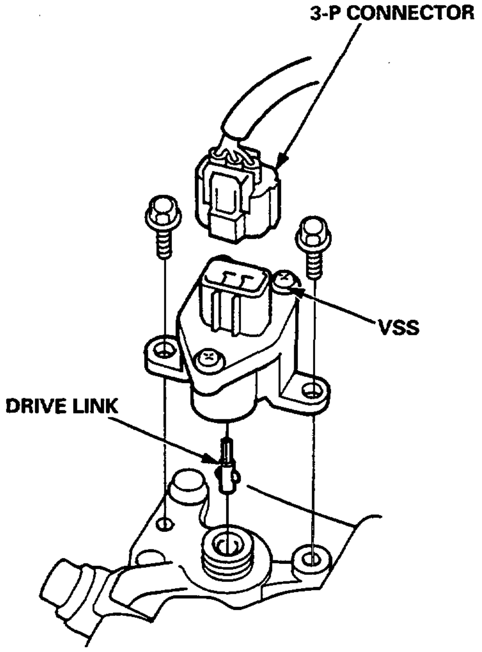
Disassembly



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.



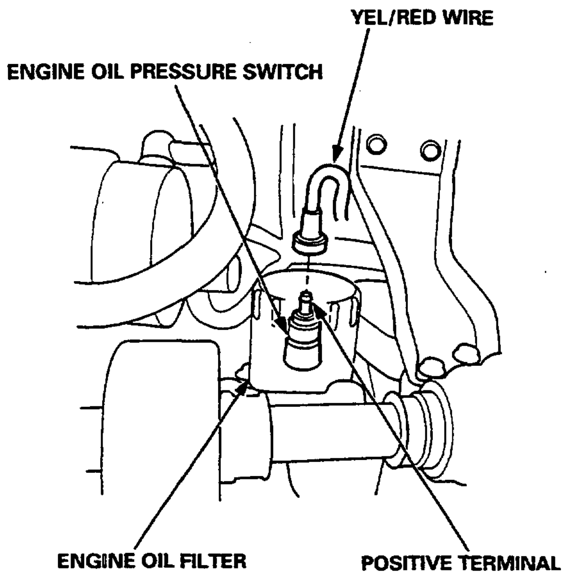
3. Install in the reverse order of removal.

   NOTE: The VSS drive link is a very small part; be careful not to lose it.

Engine Low Oil Pressure Indicator System

Engine Oil Pressure Switch Test

1. Remove the YEL/RED wire from the engine oil pressure switch.



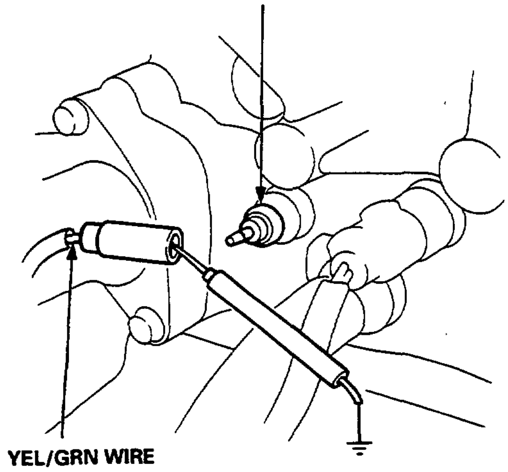
2. Check for continuity between the positive terminal and the engine (ground) with the engine OFF.
   - If there is continuity, go on to step 3.
   - If there is no continuity, replace the switch.
3. Check for continuity again, this time with the engine running.
   - If there is no continuity, the switch is OK.
   - If there is continuity, do not replace the switch; first check other possible causes in step 4.
4. Make sure engine oil level is OK, then check engine oil pressure (see section 8).
   - If engine oil pressure is OK, replace the switch.
   - If engine oil pressure is low, remove, inspect, and, if necessary, replace the engine oil pump (see section 8).

Engine Coolant Temperature (ECT) Gauge

Gauge Test

NOTE: Refer to page 23-A114 for the circuit diagram of the engine coolant temperature (ECT) gauge.

1. Check the No. 15 (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.



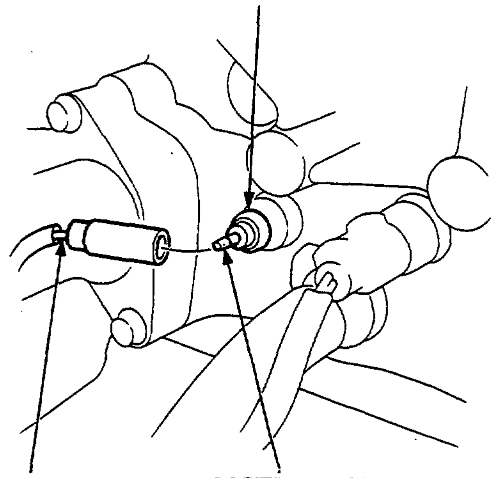
3. Turn the ignition switch ON (II).
   Check that the pointer of the ECT gauge starts moving toward the "H" mark.

   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 or 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 the 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 ECT sending unit.

Fuel Gauge

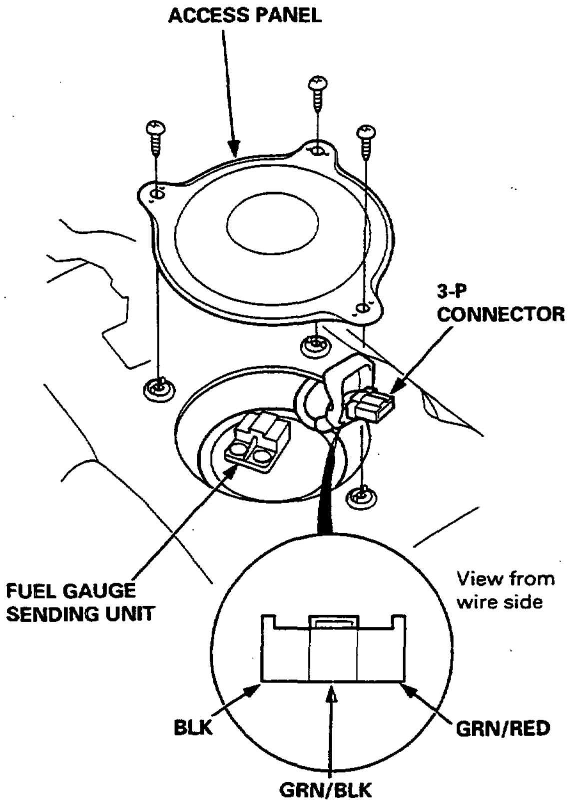
Gauge Test

NOTE: Refer to page 23-A114 for the fuel gauge system circuit.

1. Check the No. 15 (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.



4. Connect the voltmeter positive probe to the GRN/BLK 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 GRN/BLK or BLK wire.
     — poor ground (G504).

5. Turn the ignition switch OFF. Attach a jumper wire between the GRN/BLK 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.

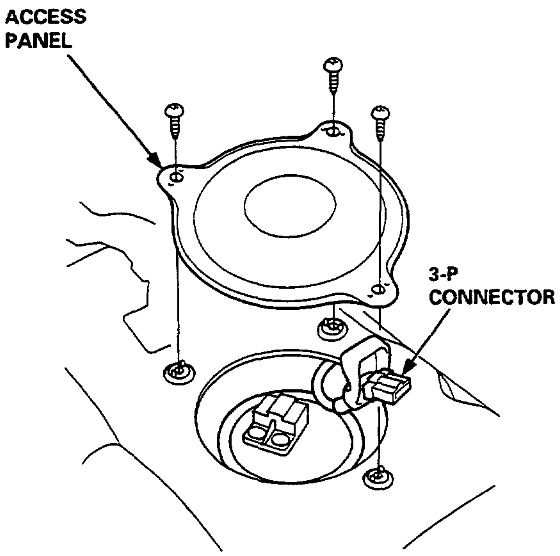
   NOTE: The fuel gauge is a bobbin (cross-coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

   - 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.

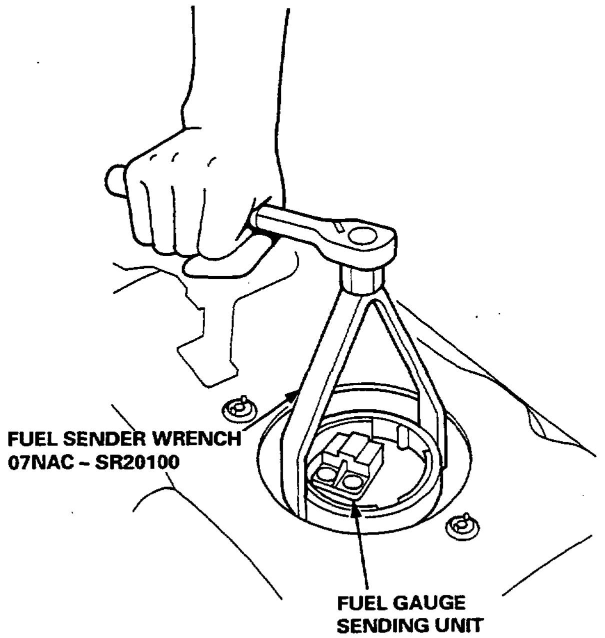
Sending Unit Test

⚠WARNING Do not smoke while working on the fuel system. Keep open flames away from your work area.

1. Open the tailgate.
2. Remove the fuel tank access panel.
3. With the ignition switch OFF, disconnect the 3-P connector from the fuel gauge sending unit.

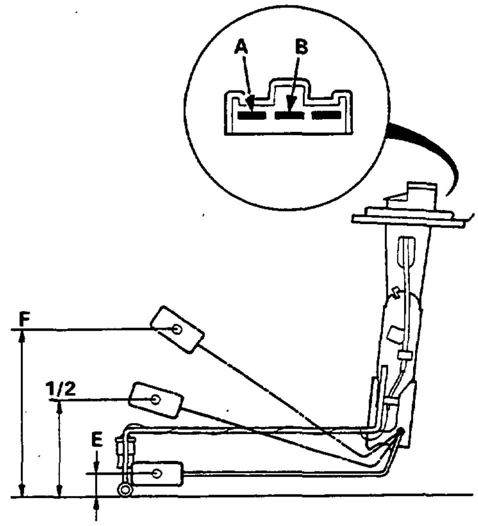


4. Take the fuel gauge sending unit out of the fuel tank.



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



Top of the workbench (Bottom of the fuel tank)

If unable to obtain the above readings, replace the fuel gauge sending unit.

Low Fuel Indicator System

Indicator Light Test

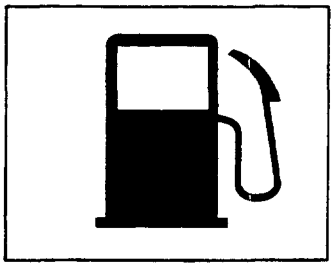
NOTE: Refer to page 23-A114 for the diagram of the low fuel indicator circuit.

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 ℓ (1.8 Imp. Gal, 2.1 U.S. Gal) of fuel, and turn the ignition switch ON (II). The low fuel indicator light should come on within four minutes.

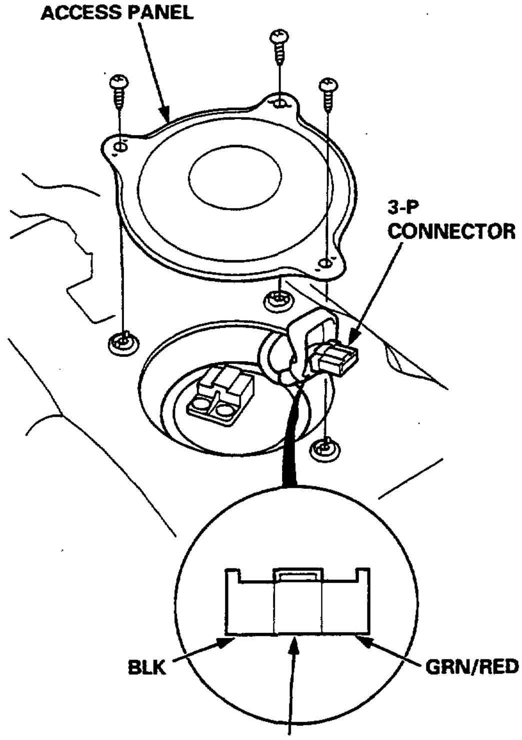


LOW FUEL INDICATOR LIGHT

- 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 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 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.

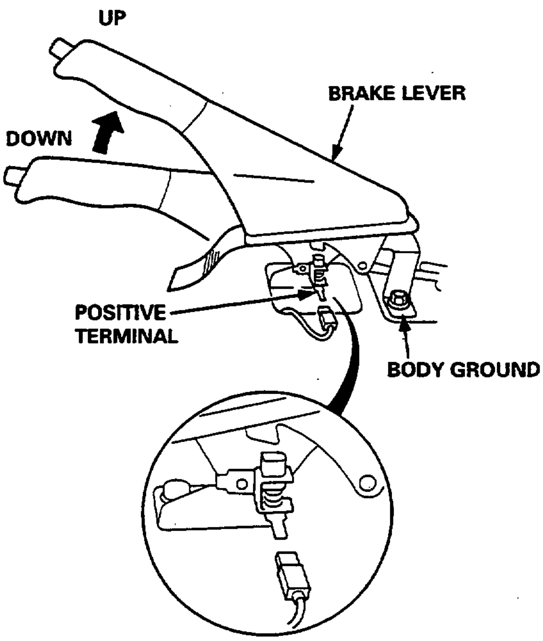
Brake System Indicator

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.

Terminal / Position	Positive Terminal	Body Ground
BRAKE LEVER UP	O	O
BRAKE LEVER DOWN		

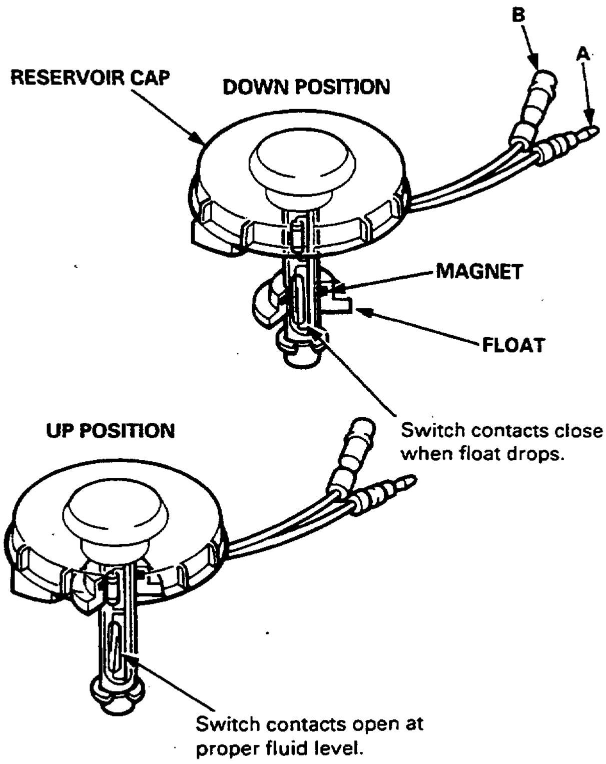


Brake Fluid Level Switch Test

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.

Terminal / Position	A	B
FLOAT UP		
FLOAT DOWN	O	O

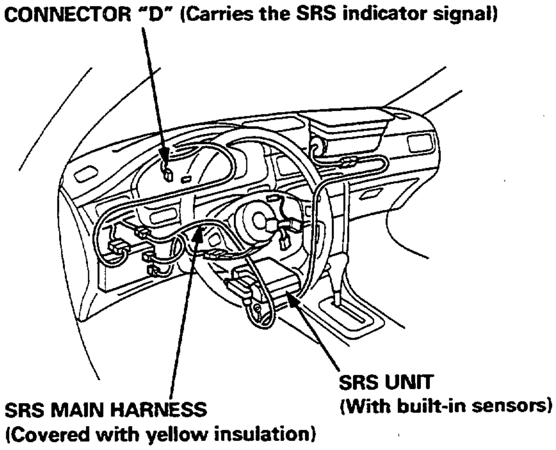


A/T Gear Position Indicator

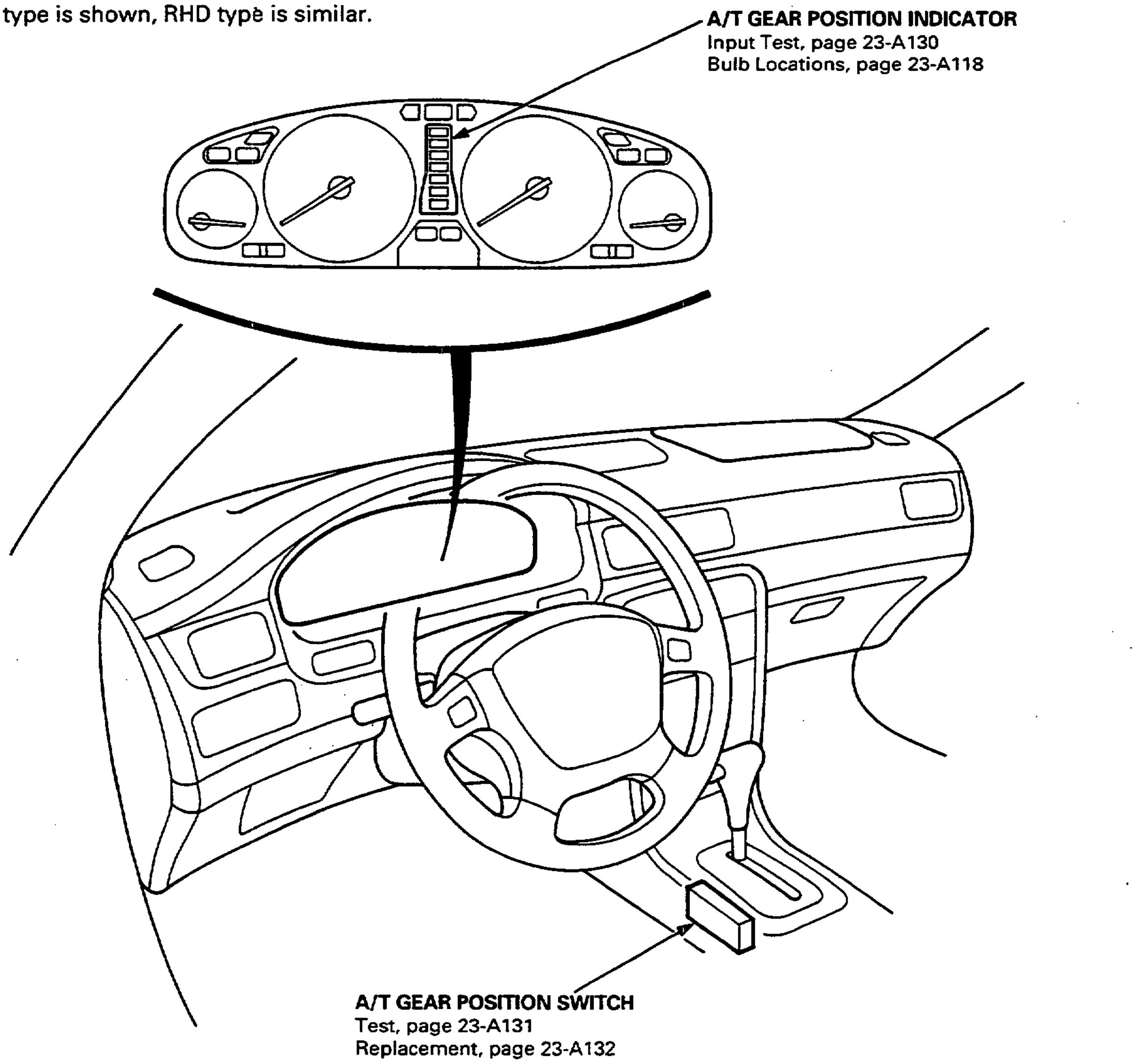
Component Location Index

CAUTION:

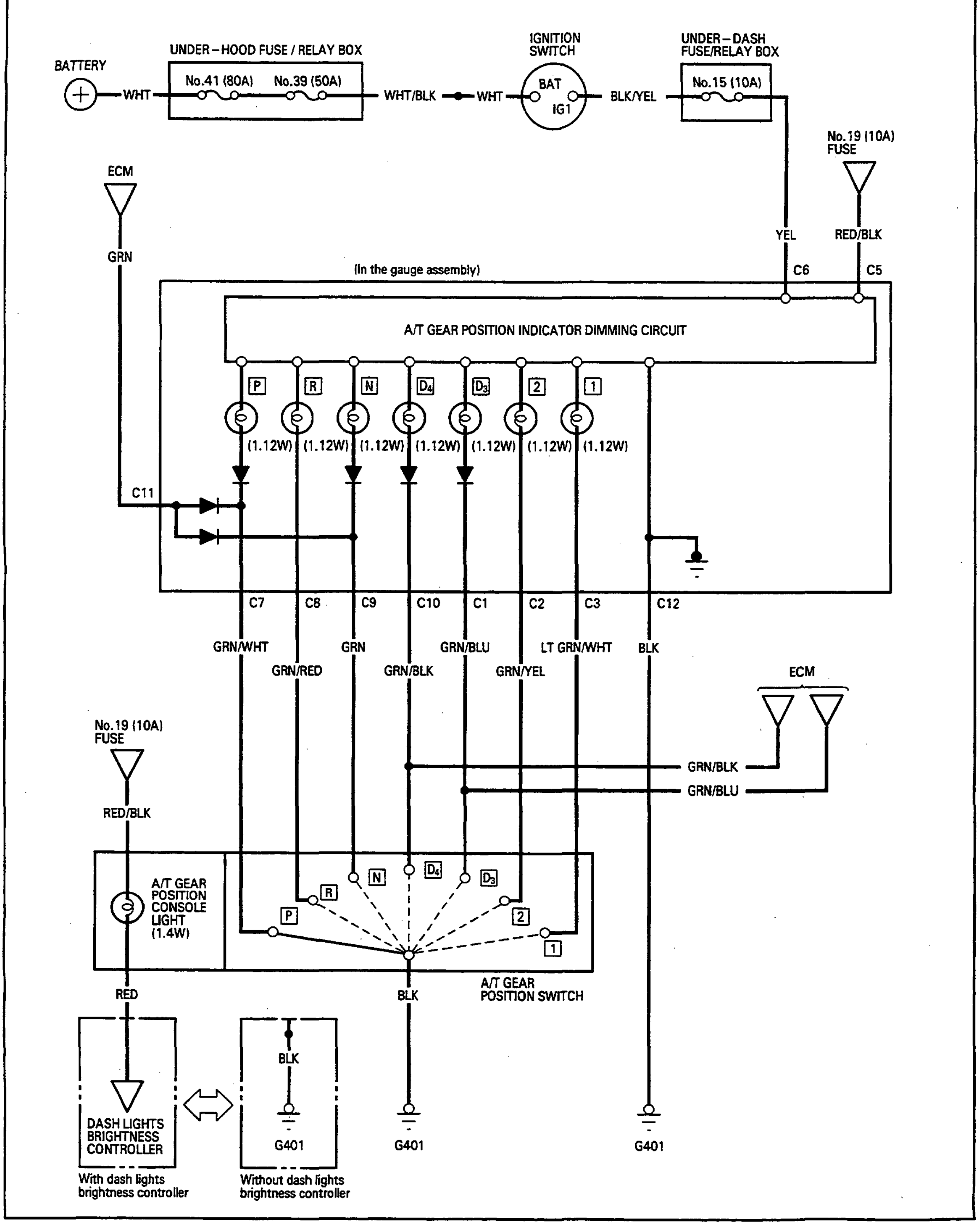
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



NOTE: LHD type is shown, RHD type is similar.



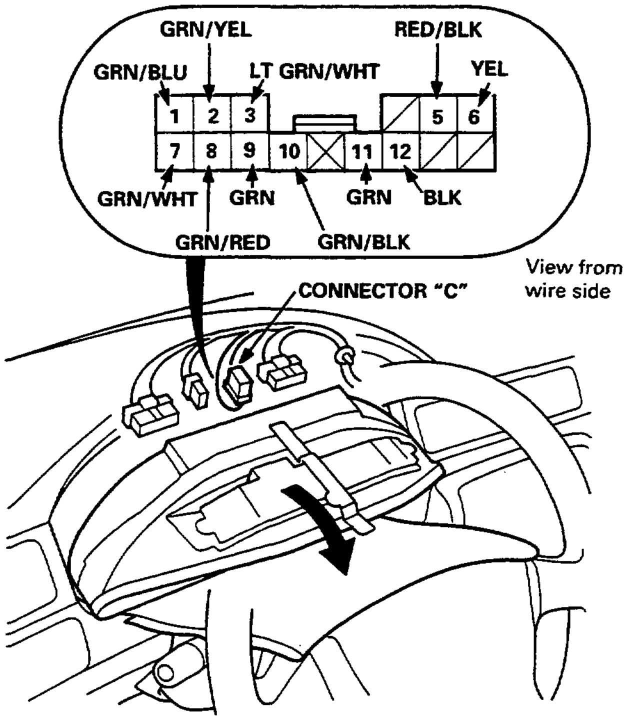
Circuit Diagram



A/T Gear Position Indicator

Indicator Input Test

1. Remove the gauge assembly (see page 23-A116), 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 14-P connector.
     - — 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 A/T gear position indicator.



Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
12	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
6	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
7	GRN/WHT	Shift lever in position P	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other position.	• Faulty A/T gear position switch • Poor ground (G401) • An open in the wire
8	GRN/RED	Shift lever in position R		
9	GRN	Shift lever in position N		
10	GRN/BLK	Shift lever in position D4		
1	GRN/BLU	Shift lever in position D3		
2	GRN/YEL	Shift lever in position 2		
3	LT-GRN/WHT	Shift lever in position 1		
5	RED/BLK	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 19 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
11	GRN	Ignition switch ON (II)	Check for voltage to ground: There should be more than 5 V.	• Faulty ECM • An open in the wire

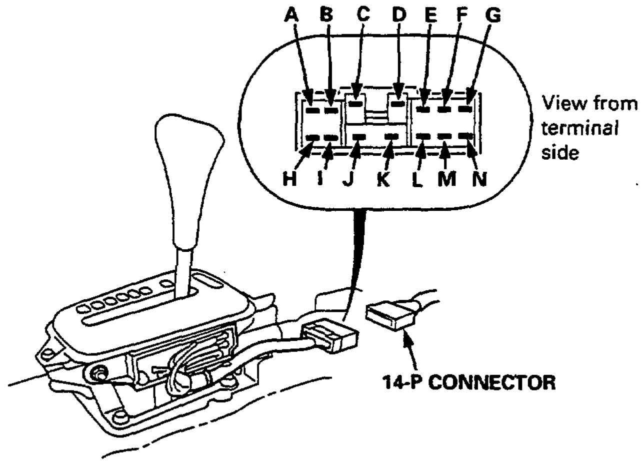
A/T Gear Position Switch Test/Adjustment

Test:

1. Remove the front console, then disconnect the 14-P connector from the A/T gear position switch.

2. Check for continuity between the terminals in each 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 installing position of the switch as described on the next page.



A/T Gear Position Switch — **Back-up Light Switch** — **Neutral Position Switch**

Position \ Terminal	A	B	E	F	G	N	M	L	C	D	J	K
$\boxed{1}$	○	○										
$\boxed{2}$	○	—	○									
$\boxed{D_3}$	○	—	—	○								
$\boxed{D_4}$	○	—	—	—	○							
$\boxed{N}$	○	—	—	—	—	○					○	○
$\boxed{R}$	○	—	—	—	—	—	○		○	○		
$\boxed{P}$	○	—	—	—	—	—	—	○			○	○

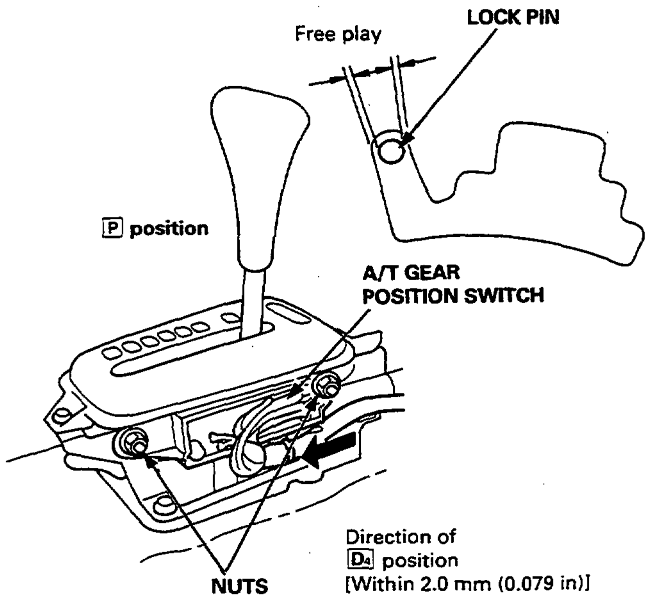
Adjustment:

1. Shift to the $\boxed{P}$ position, and loosen the nuts.

2. Slide the switch in the direction of $\boxed{D_4}$ position [within 2.0 mm (0.079 in.)] so that there is continuity between the "A" and "L" terminals in the range of free play of the shift lever.

3. Recheck for continuity between each of the terminals.

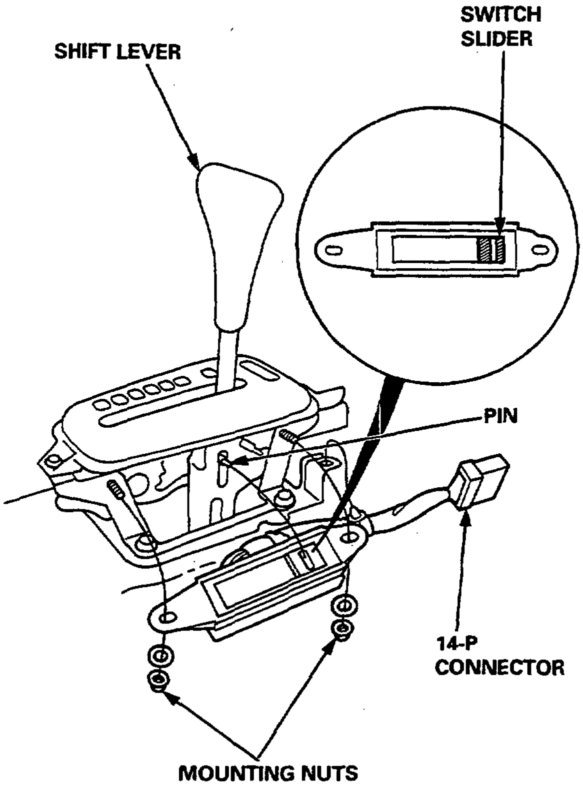
   NOTE:
   - If adjustment is not possible, check for damage to the shift lever detent and/or the bracket. If there is no damage, replace the console switch.
   - The engine should start when the shift lever is in position $\boxed{N}$ in the range of free play.



A/T Gear Position Indicator

A/T Gear Position Switch Replacement

1. Remove the front console, then disconnect the 14-P connector from the A/T gear position switch.
2. Remove the two mounting nuts.

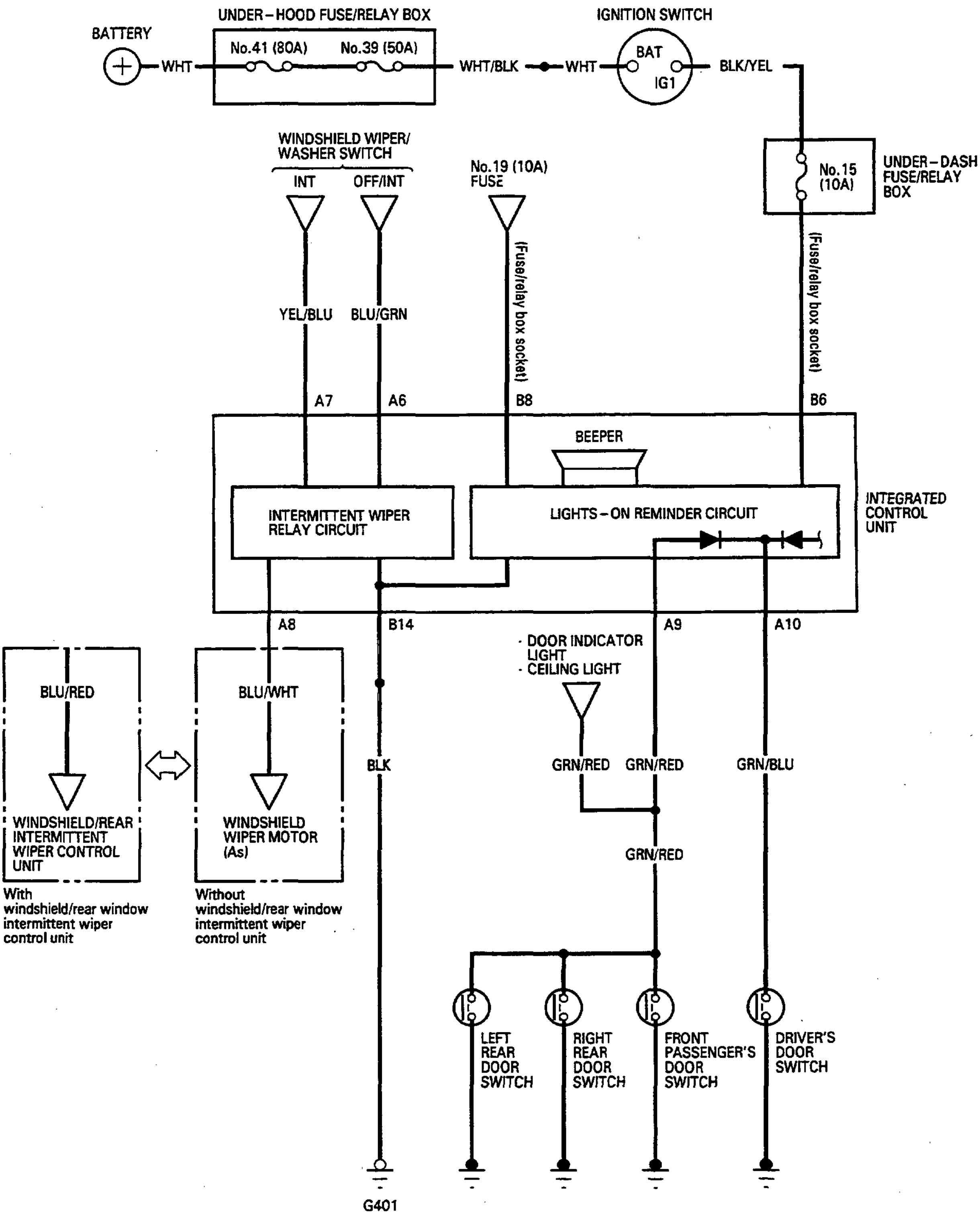


3. Position the switch slider to "Neutral" as shown above.
4. Move the shift lever to "Neutral", then slip the switch into position.
5. Attach the switch with the two mounting nuts.
6. Test the switch in the [P] and [N] position of the shift lever. The engine should start when the shift lever is in position [P] anywhere in the range of free play.
7. Connect the 14-P connector, clamp the harness, and install the front console.

Integrated Control Unit

Circuit Diagram (KG model)

Description
An integrated control unit, located behind the dashboard lower cover, integrates the functions of the lights-on reminder circuit, and the intermittent wiper circuit onto one circuit board, sharing common circuit functions.

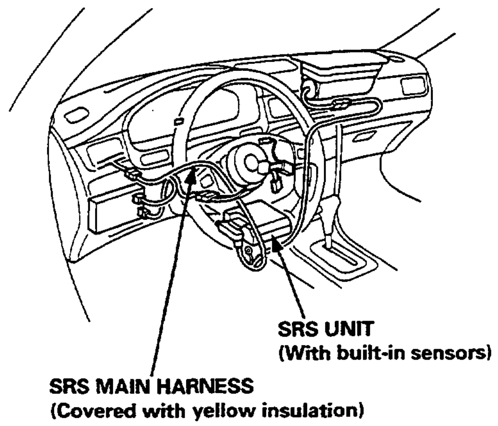


Integrated Control Unit

Input Test (KG model)

CAUTION:

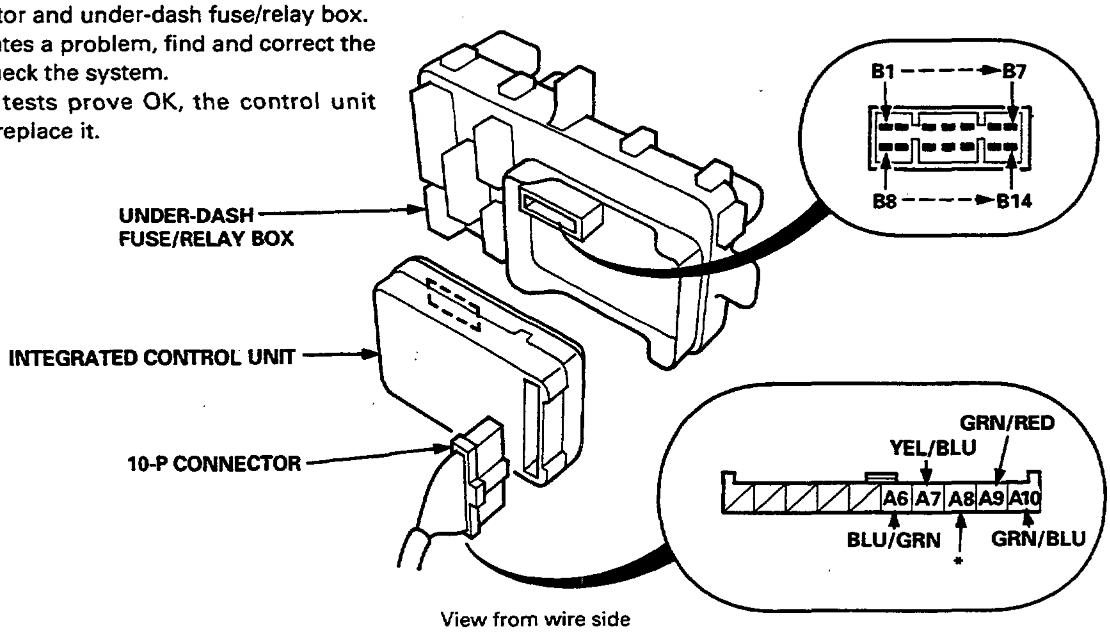
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



Remove the dashboard lower cover (see page 23-A64), then disconnect the 10-P connector from the integrated control unit.
Remove the integrated control unit from the under-dash fuse/relay box.

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 and under-dash fuse/relay box.
  - — 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

* BLU/WHT: Without windshield/rear window intermittent wiper control unit.
BLU/RED: With windshield/rear window intermittent wiper control unit.

Intermittent Wiper Relay System:

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B14	——	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
A7	YEL/BLU	Ignition switch ON (II), and windshield wiper switch at INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper switch • An open in the wire
A6	BLU/GRN	Ignition switch ON (II), and windshield wiper switch at OFF or INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box. • Faulty windshield wiper switch • An open in the wire • Faulty windshield wiper motor
A8	*1 BLU/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper motor • An open in the wire
	*2 BLU/RED	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper motor • Faulty windshield/rear window intermittent wiper control unit • An open in the wire

*1: Without windshield/rear window intermittent wiper control unit
*2: With windshield/rear window intermittent wiper control unit

Lights-on Reminder System:

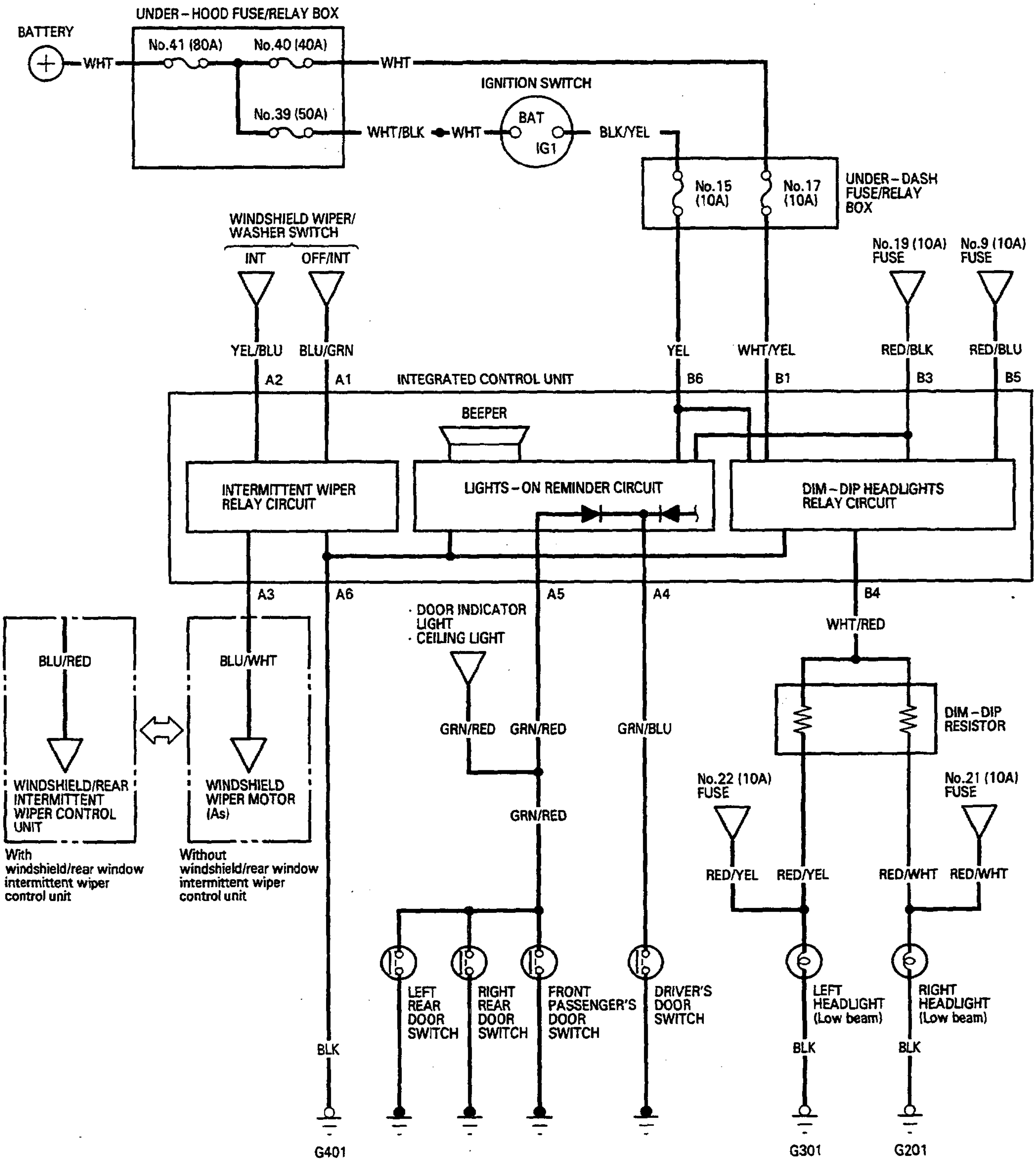
Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B14	——	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
B8	——	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 19 (20 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • An open in the wire
B6	——	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
A10	GRN/BLU	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
A9	GRN/RED	Passenger's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty passenger's door switch • An open in the wire • Poor ground

Integrated Control Unit

Circuit Diagram (KE model)

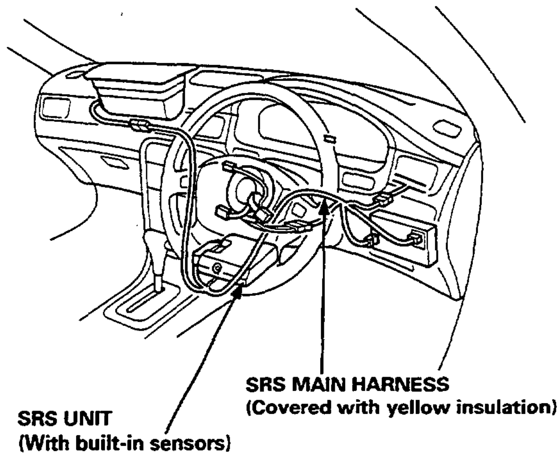
Description

An integrated control unit, located behind the dashboard lower cover, integrates the functions of the dim-dip headlights relay circuit, lights-on reminder circuit, and the intermittent wiper relay circuit onto one circuit board, sharing common circuit functions.



Input Test (KE model)

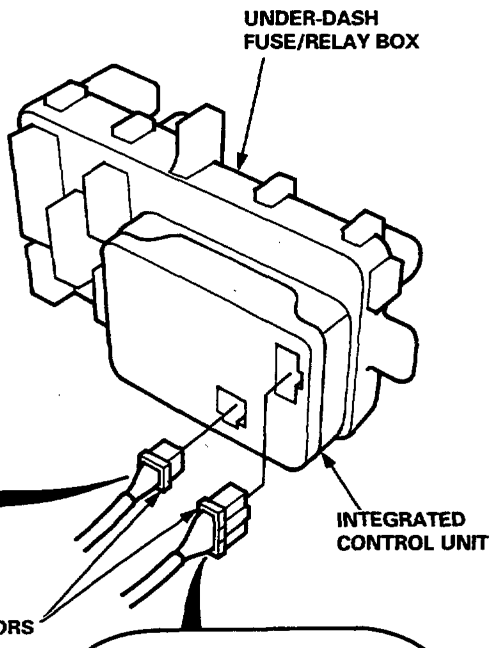
CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

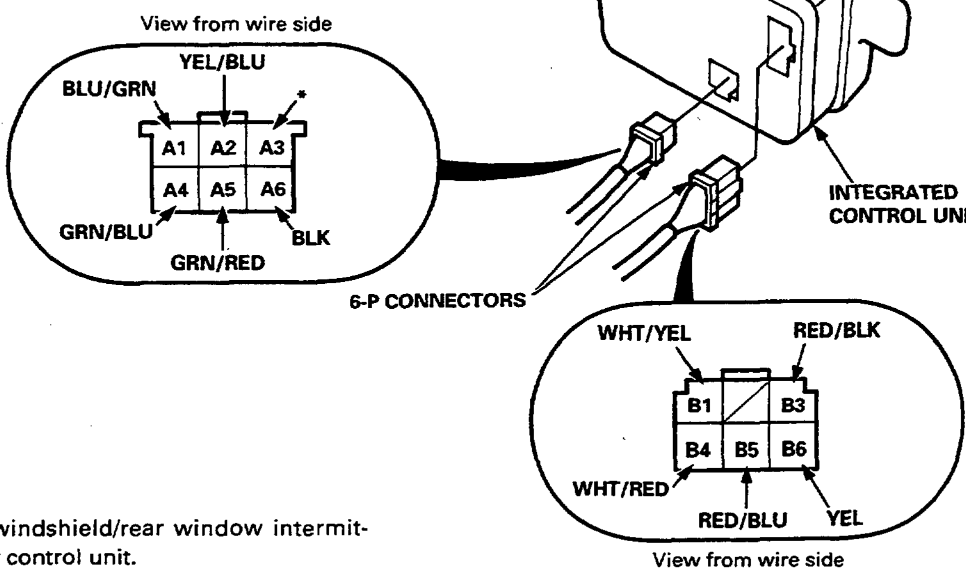


Remove the dashboard lower cover (see page 23-A64), then disconnect the 6-P connectors from the integrated control unit.

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 and under-dash fuse/relay box.
  - — 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.





*BLU/WHT: Without windshield/rear window intermittent wiper control unit.
BLU/RED: With windshield/rear window intermittent wiper control unit.

(cont'd)

Integrated Control Unit

Input Test (KE model cont'd)

Intermittent Wiper Relay System:

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A6	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
A2	YEL/BLU	Ignition switch ON (II) and windshield wiper switch at INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper switch • An open in the wire
A1	BLU/GRN	Ignition switch ON (II) and windshield wiper switch at OFF or INT	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper switch • An open in the wire • Faulty windshield wiper motor
A3	*1 BLU/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper motor • An open in the wire
	*2 BLU/RED	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper motor • Faulty windshield/rear window intermittent wiper control unit • An open in the wire

*1: Without windshield/rear window intermittent wiper control unit
*2: With windshield/rear window intermittent wiper control unit

Lights-on Reminder System:

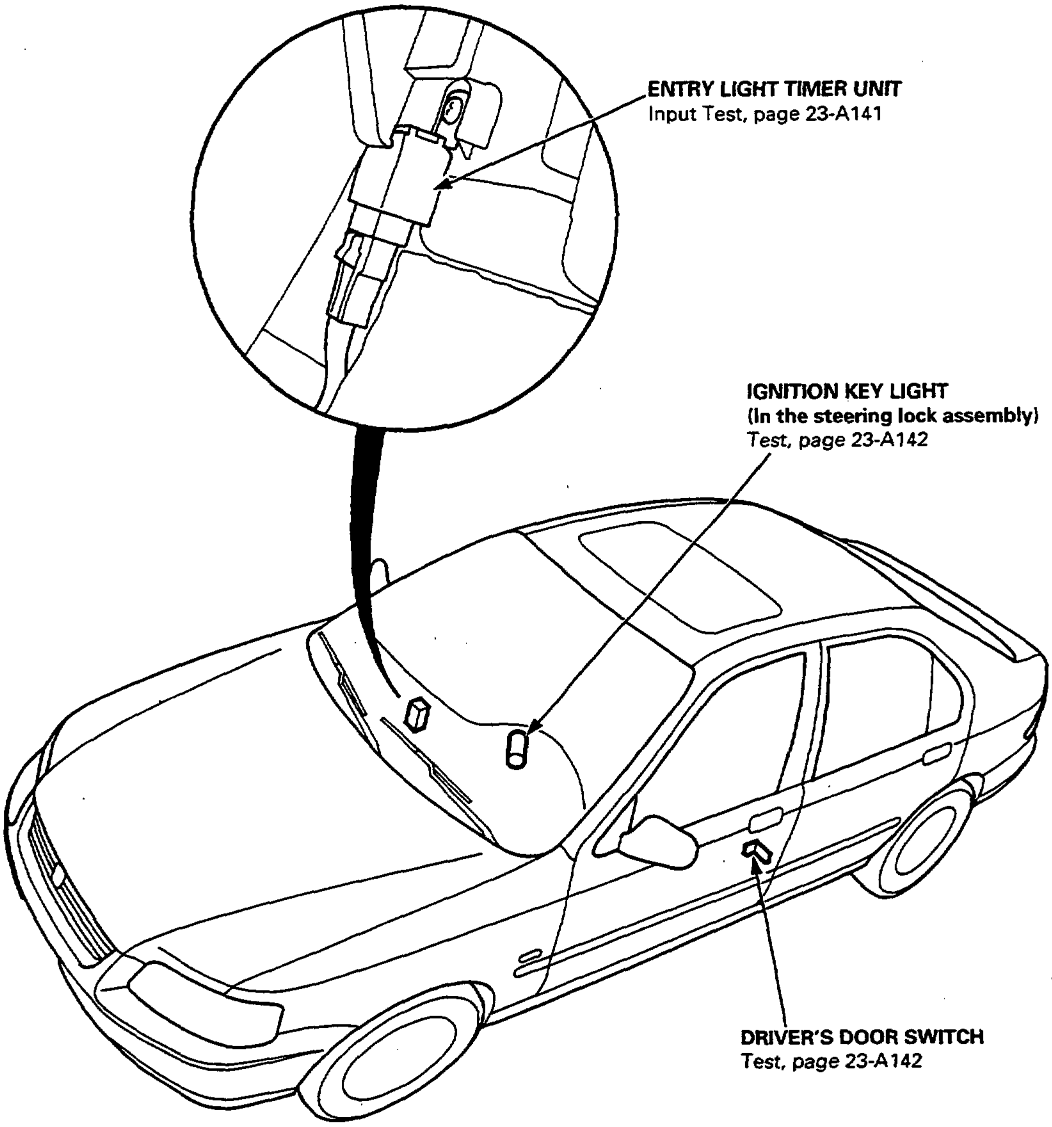
Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A6	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
B3	RED/BLK	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 19 (20 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • An open in the wire
B6	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
A4	GRN/BLU	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
A5	GRN/RED	Passenger's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty passenger's door switch • An open in the wire • Poor ground

Dim-Dip Headlights Relay System:

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A6	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
B1	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 17 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
B6	YEL	Ignition switch to ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
B3	RED/BLK	Headlight switch at "≶D " position	Check for voltage to ground: There should be battery voltage.	• Blown No. 19 (10 A) fuse in the under-dash fuse/relay box • Faulty headlight switch • An open in the wire
B5	RED/BLU	Headlight switch at "≶D " position, and dimmer switch at "HI"	Check for voltage to ground: There should be battery voltage.	• Blown No. 9 (10 A) fuse in the under-dash fuse/relay box • Faulty headlight switch • An open in the wire
B4	WHT/RED	Connect a jumper wire between the WHT/YEL and WHT/RED terminals.	Left and right headlight (LOW) should be dim light.	• Poor ground (G201, G301) • Blown bulbs • Faulty dim-dip resistor • An open in the wire

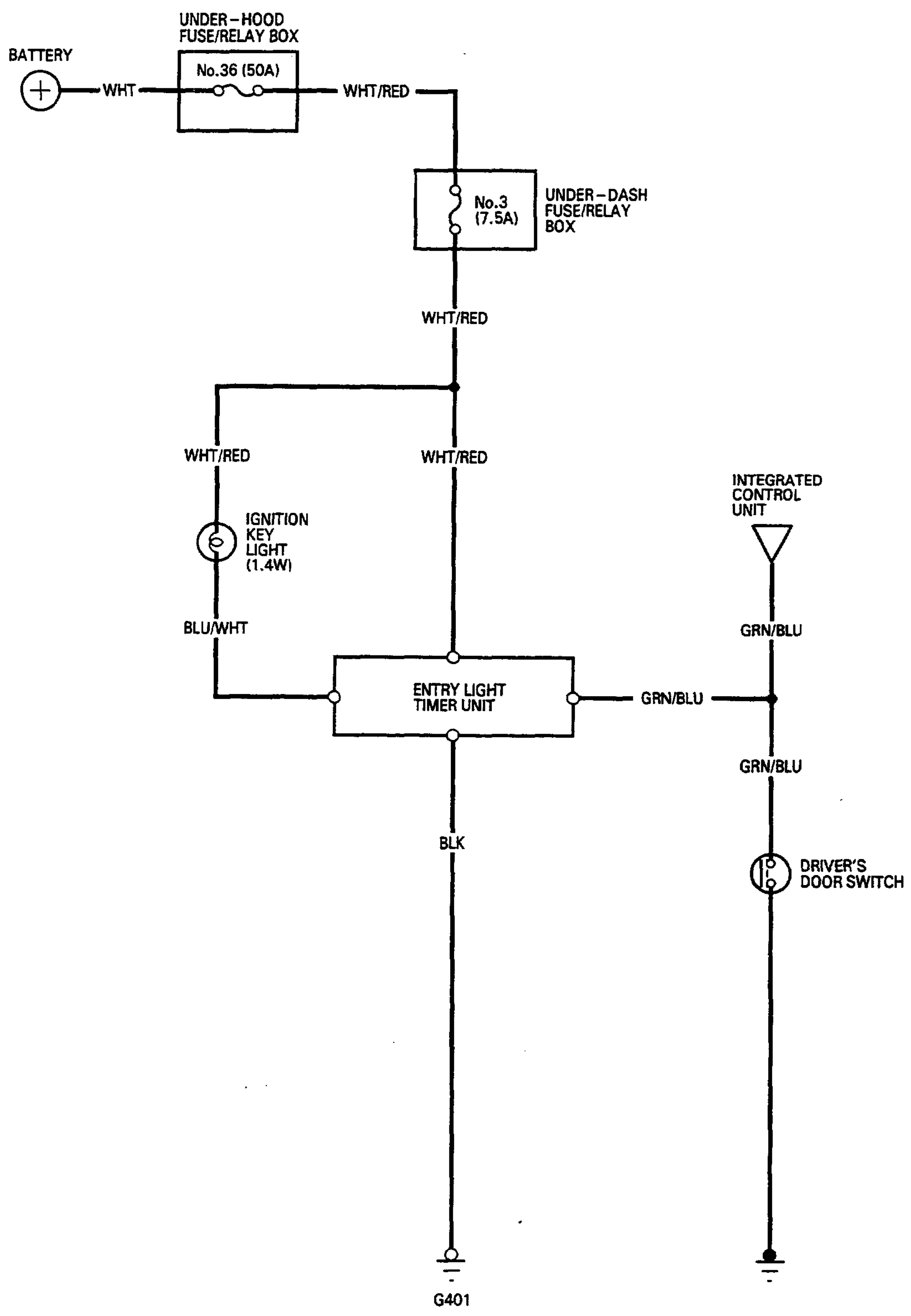
Entry Light Timer System

Component Location Index



Entry Light Timer System

Circuit Diagram

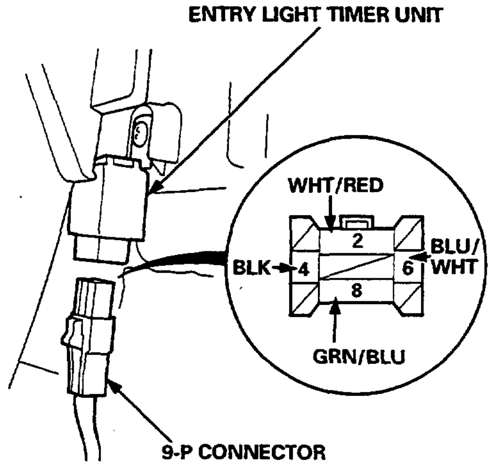


Input Test

1. Disconnect the 9-P connector from the entry light timer 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 connectors.
     — If any test indicates a problem, find and correct the cause, then recheck the system.
     — If all the input tests prove OK, the timer unit must be faulty; replace it.

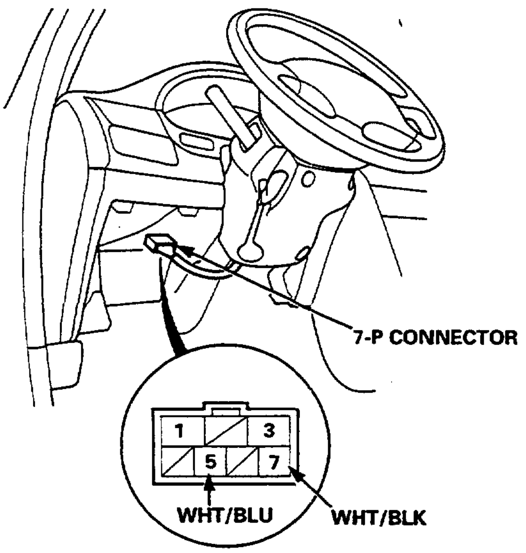


Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
2	WHT/RED	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 3 (7.5 A) fuse in the under-dash fuse/relay box • An open in the wire
4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
6	BLU/WHT	Under all conditions	Attach to ground: Ignition key light should come on.	• Blown bulb • An open in the wire
8	GRN/BLU	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

Entry Light Timer System

Ignition Key Light Test

1. Remove the dashboard lower cover.
2. Disconnect the 7-P connector from the main wire harness.

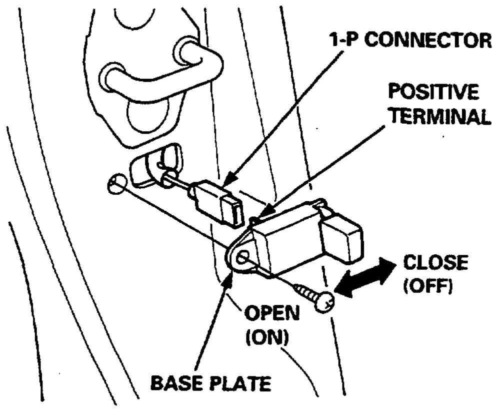


View from wire side

3. The ignition key light should come on when power is connected to terminal No. 5 (WHT/BLU) and ground is connected to terminal No. 7 (WHT/BLK).
   - If the ignition key light does not come on, replace the bulb.

Door Switch Test

1. Open the door.
2. Remove the screw, and pull out the door switch.
3. Disconnect the 1-P connector from the door switch.

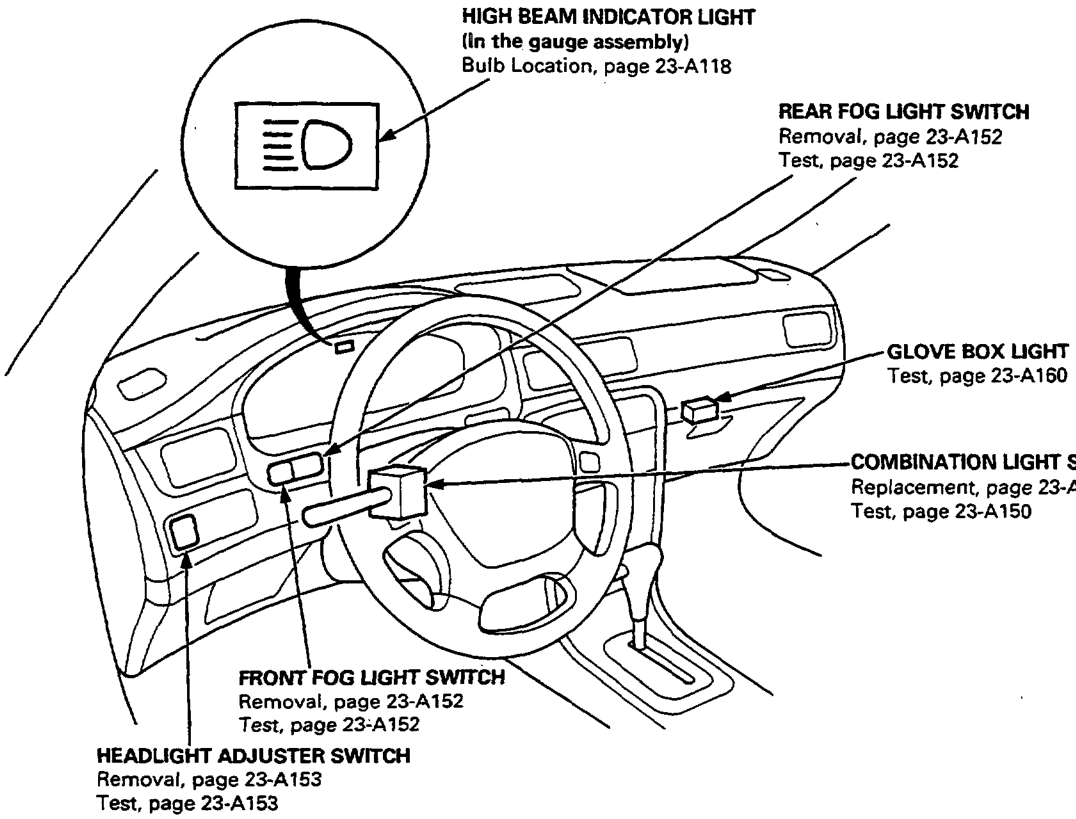


4. Check for continuity between the terminals in each switch position according to the table.

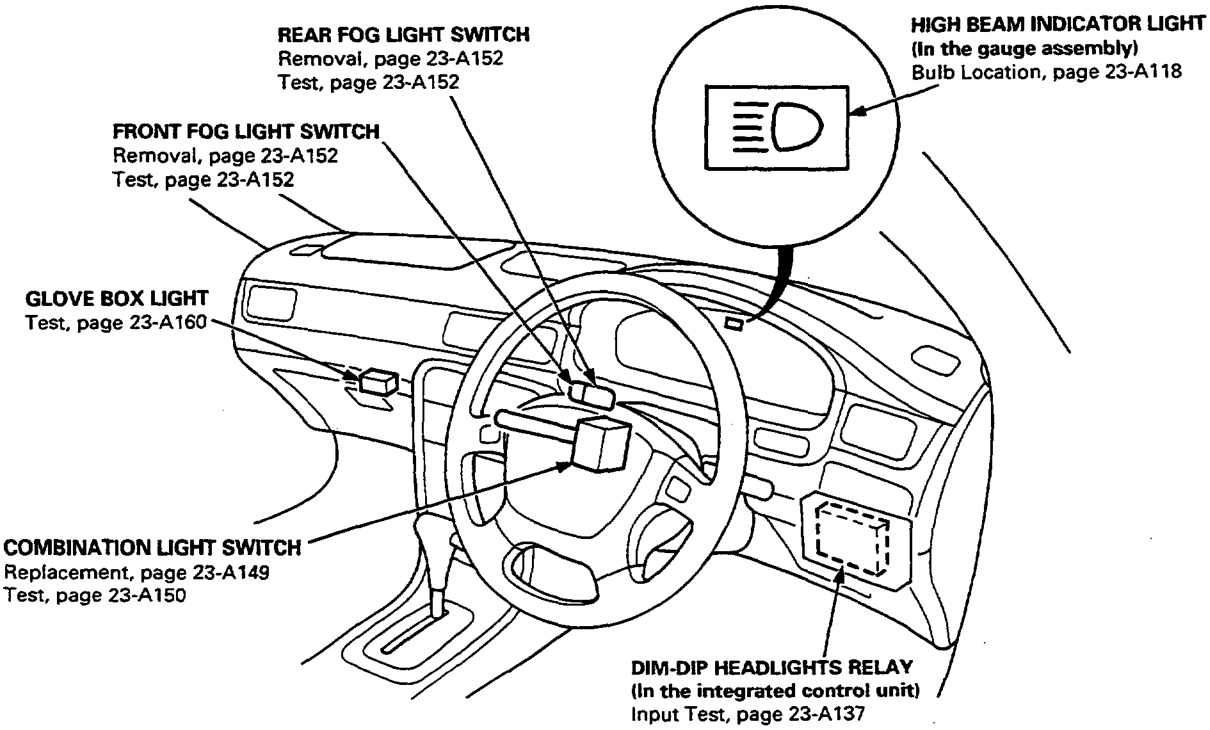
Position \ Terminal	POSITIVE TERMINAL	BASE PLATE
CLOSE (OFF)		
OPEN (ON)	O—	—O

Component Location Index

LHD type:

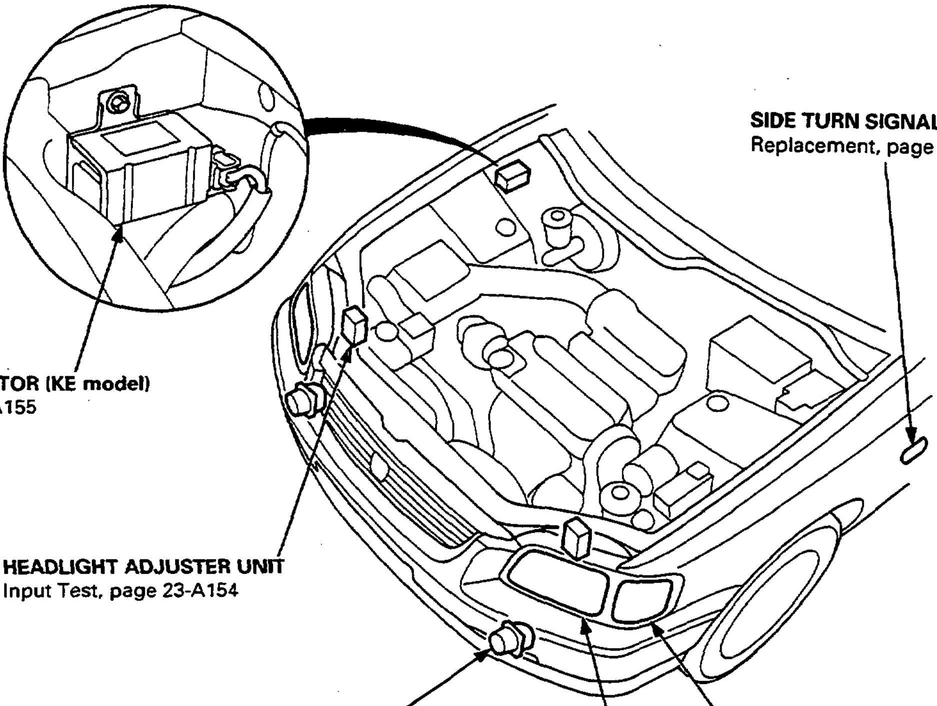


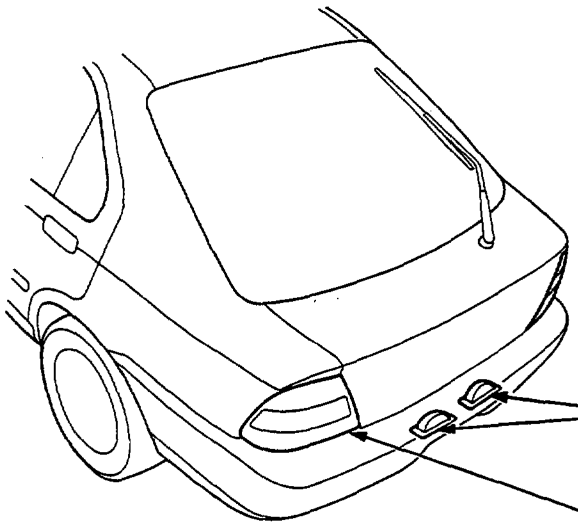
RHD type:



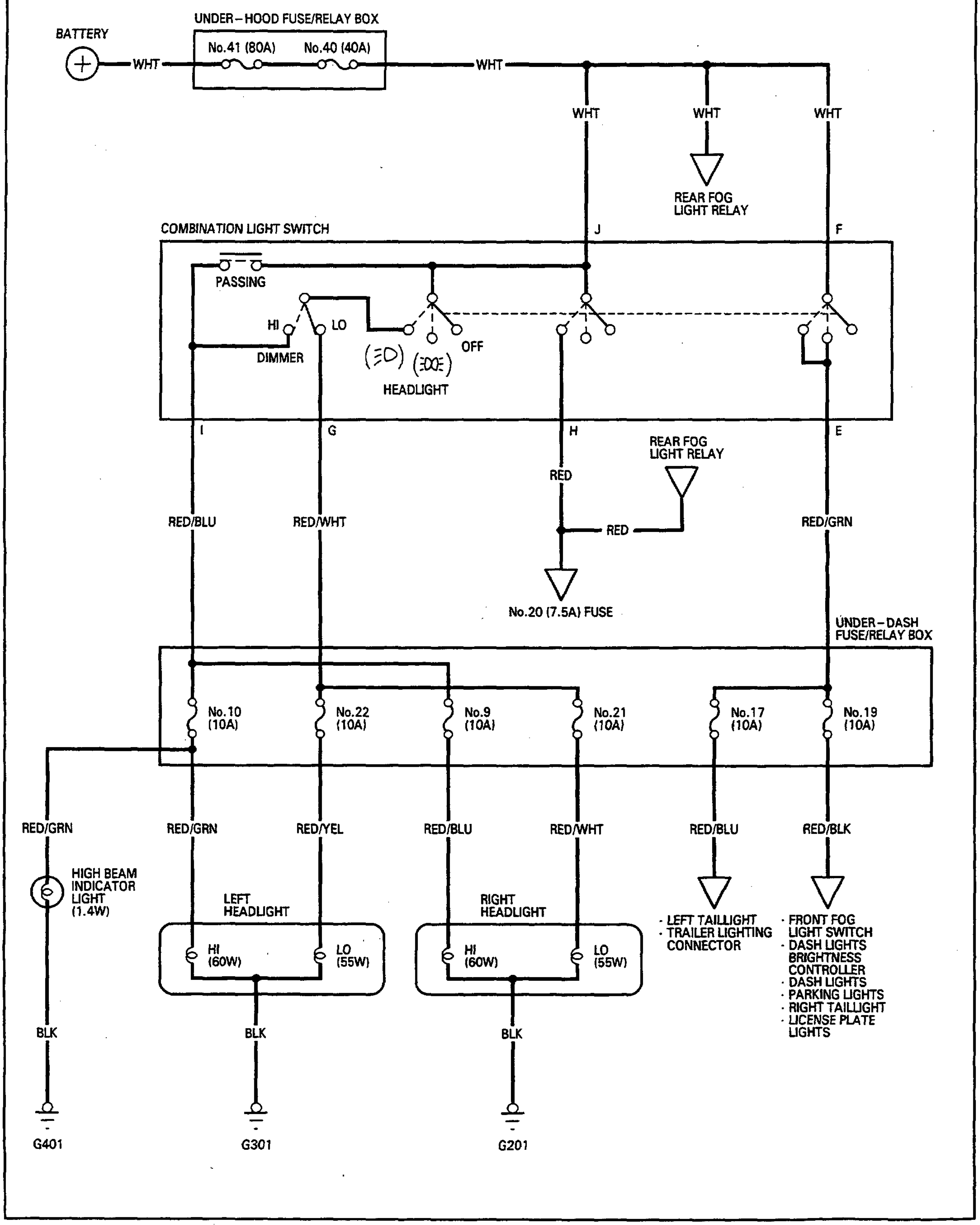
(cont'd)

Component Location Index (cont'd)



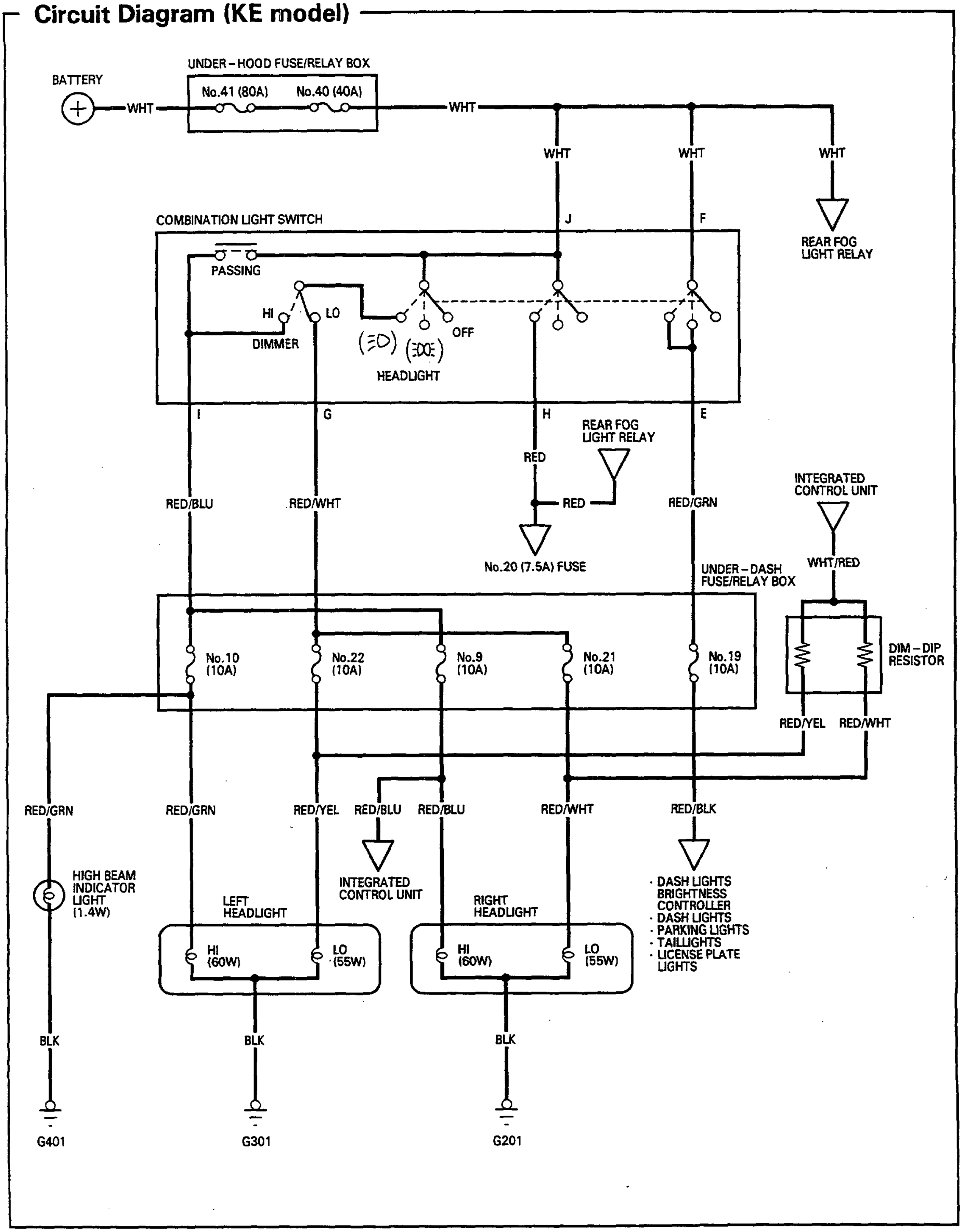


Circuit Diagram (KG model)

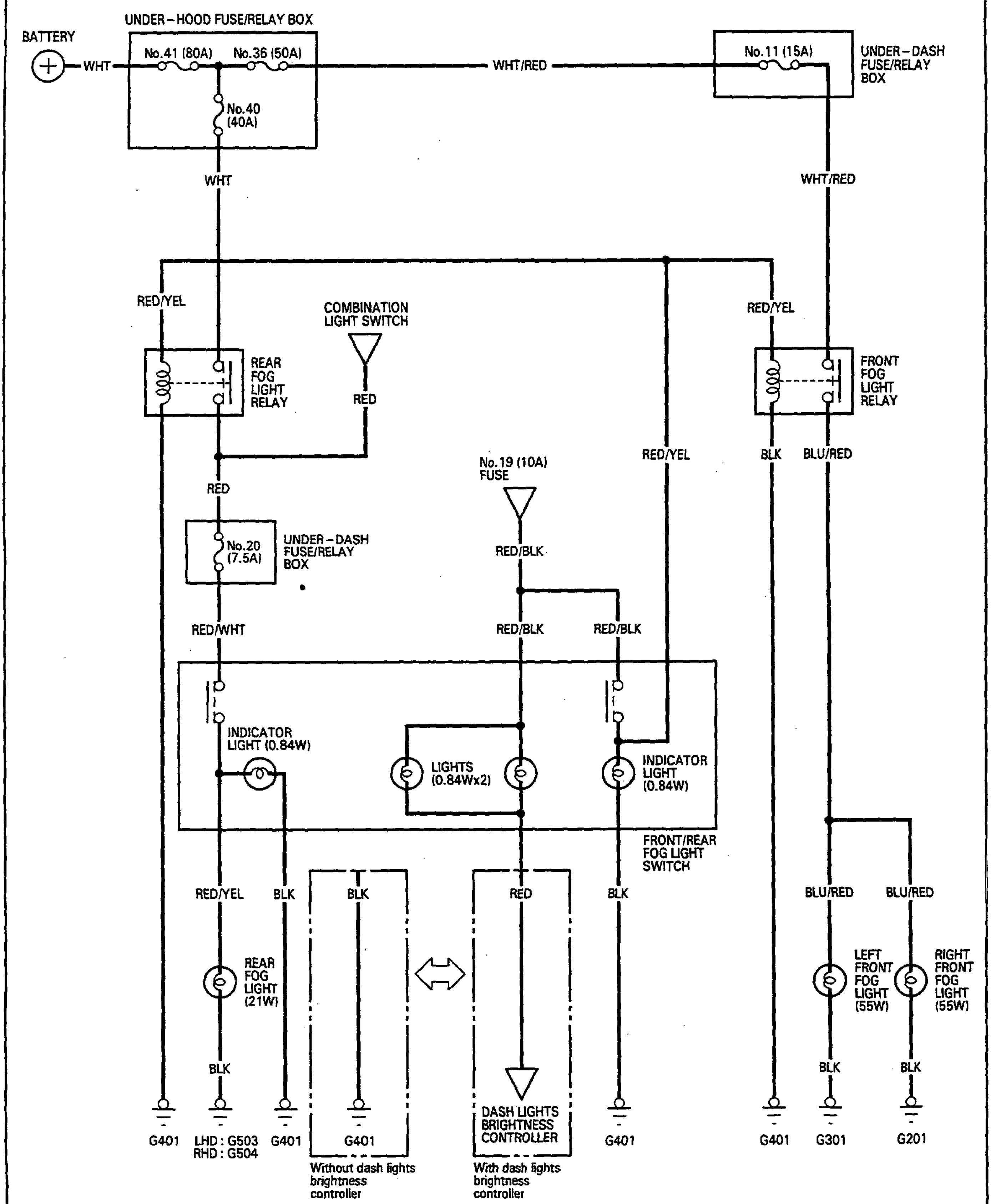


Lighting System

Circuit Diagram (KE model)

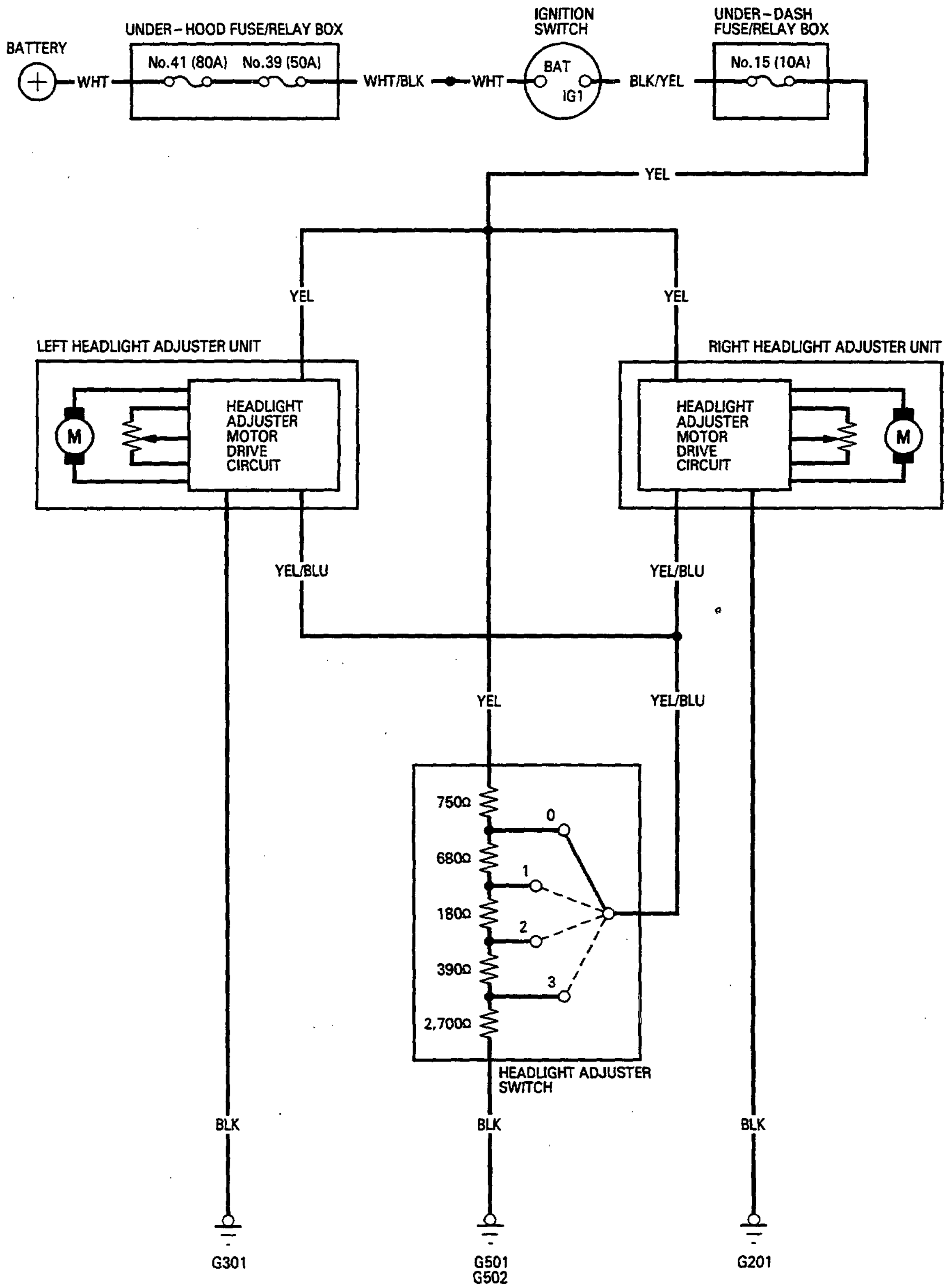


Circuit Diagram



Lighting System

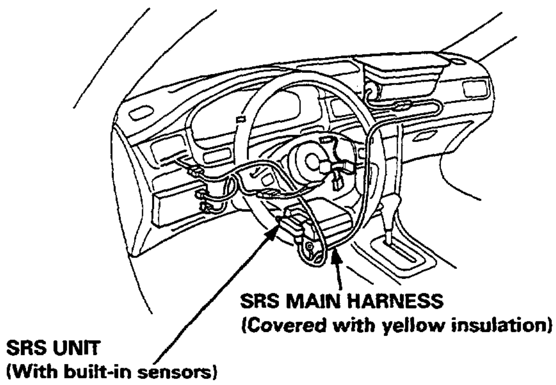
Circuit Diagram (KG model)



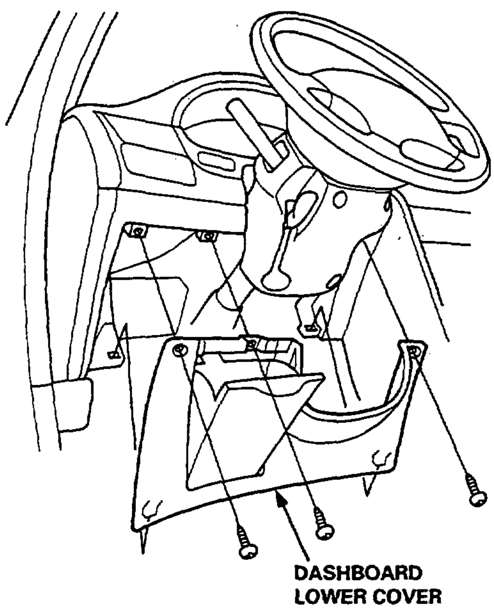
Combination Light Switch Replacement

CAUTION:

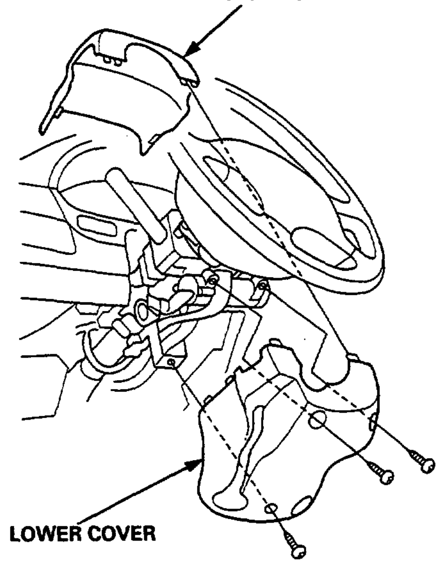
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



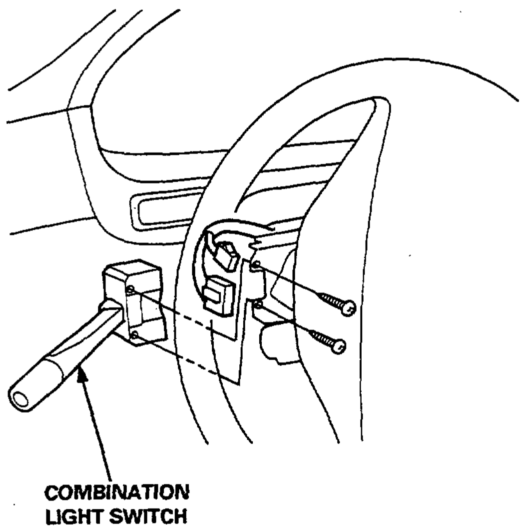
1. Remove the dashboard lower cover.



2. Remove the steering column covers.

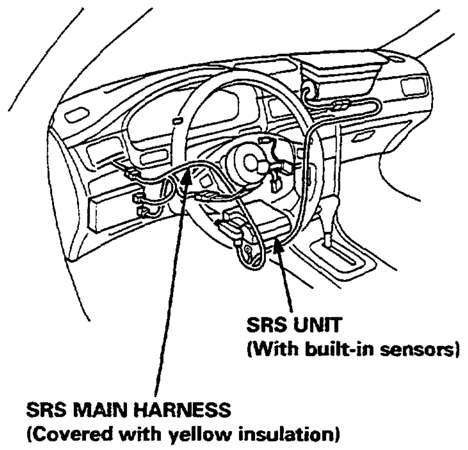


3. Disconnect the 4-P and 7-P connectors from the combination light switch, then remove the two screws and lift out the switch.



Combination Light Switch Test

CAUTION:
- All SRS wire harnesses are covered with yellow insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.
- Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.
- For additional precautions, refer to page 23-B6 in the SRS sub-section.

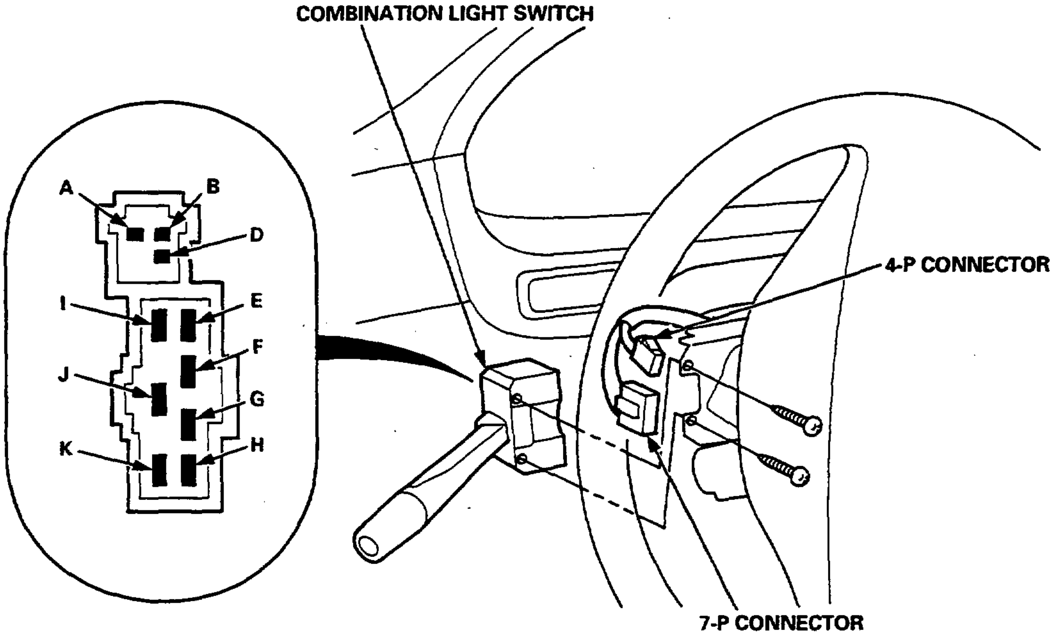


1. Remove the dashboard lower cover and steering column covers.

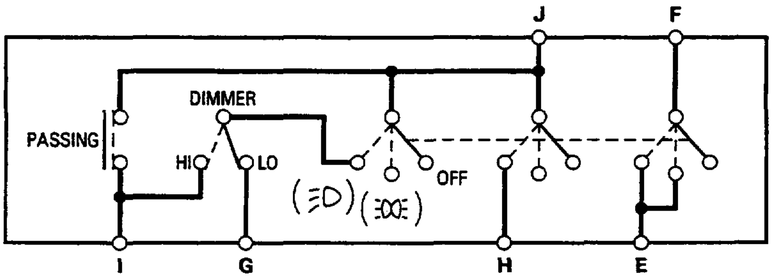
2. Disconnect the 4-P and 7-P connectors from the combination light switch.

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.

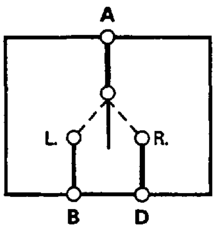


Combination Light Switch:



Position \ Terminal			E	F	G	H	J	I
Headlight switch	OFF							
			○	○				
		LOW	○	○	○	○	○	
		HIGH	○	○		○	○	○
Passing switch	OFF							
	ON						○	○

Turn Signal Switch:



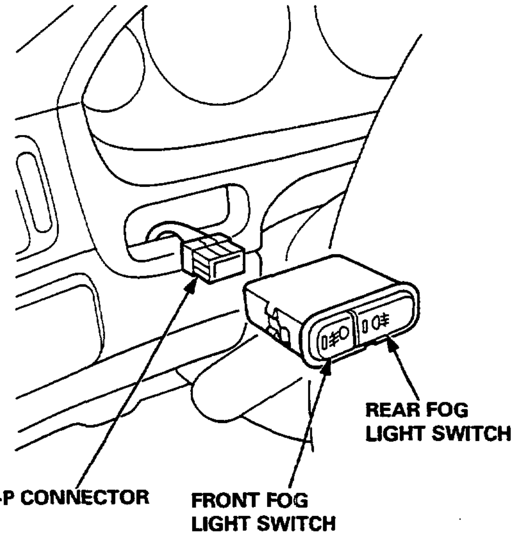
Position \ Terminal	A	B	D
RIGHT	○		○
NEUTRAL			
LEFT	○	○	

Lighting System

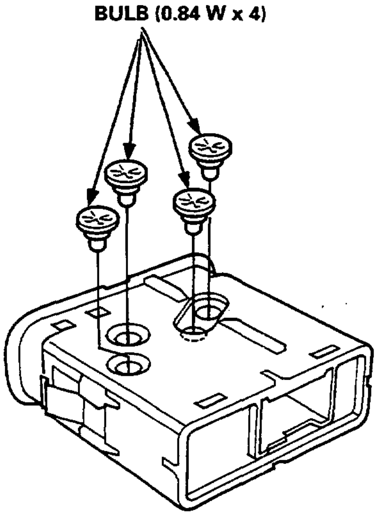
Front Fog and Rear Fog Light Switch Removal/Test

NOTE: Be careful not to damage the instrument panel.

1. Carefully pry the switch out of the instrument panel.
2. Disconnect the 8-P connector from the switch.

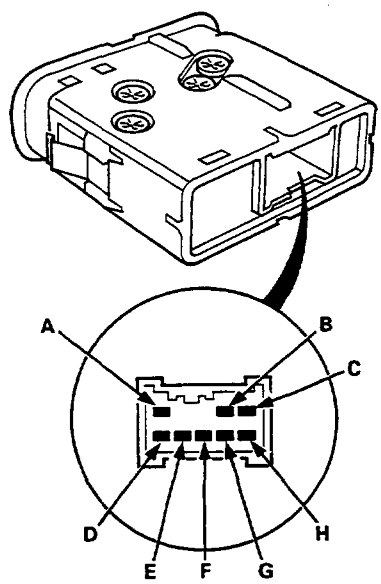


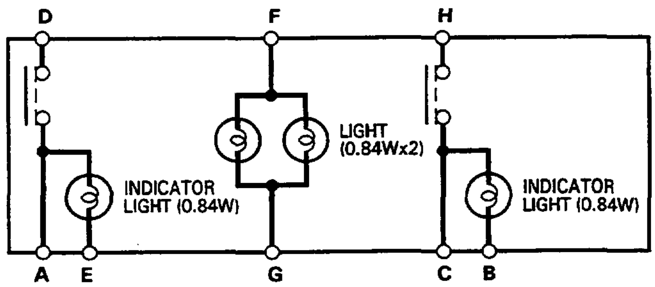
3. Turn the socket 45° counterclockwise to remove the bulbs.
4. Check the bulbs.



5. If the bulbs are OK, go to step 6.
6. Check for continuity between the terminals according to the table.

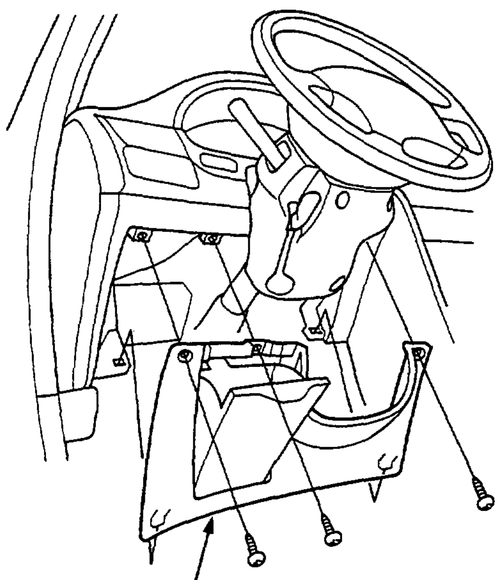
Terminal / Position	A	D	C	H		B	E	F		G
OFF								○	⊗ ⊗	○
FRONT FOG LIGHT SWITCH "ON"			○	○	⊗	○				
REAR FOG LIGHT SWITCH "ON"	○	○			⊗		○			



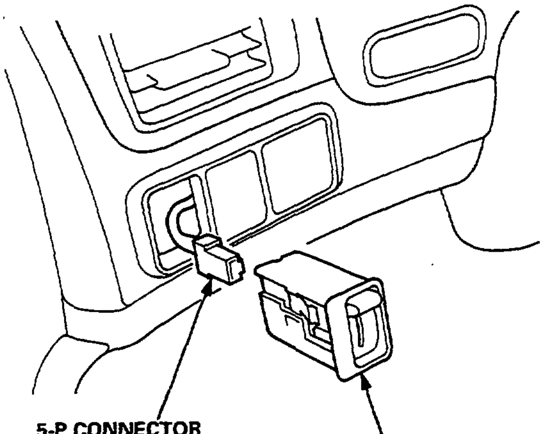


Headlight Adjuster Switch Removal

1. Remove the dashboard lower cover.

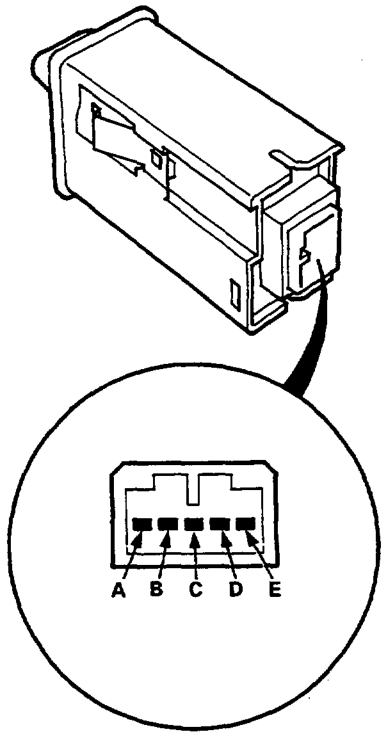


2. Disconnect the 5-P connector from the switch.
3. Push the switch out from behind the dashboard.



Headlight Adjuster Switch Test

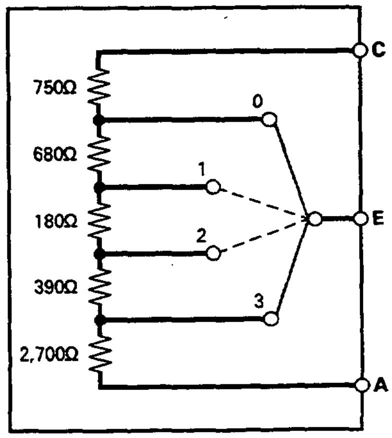
1. Remove the switch, and disconnect the connector from it.
2. Measure the resistance between the A and C terminals, and then measure the resistance between the C and E terminals at positions 0, 1, 2, and 3.



Between A and C: Approx. 4,700 Ω

Between C and E:

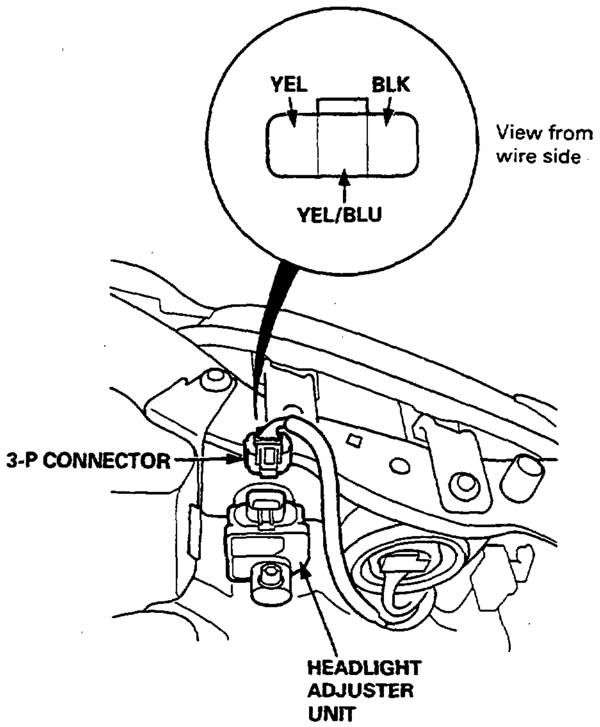
Dial Position	0	1	2	3
Approx. Resistance (Ω)	750	1,430	1,610	2,000



Headlight Adjuster Unit Input Test

NOTE: Before testing, check for:
- — blown No. 15 (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.



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 (G201, G301).
   - If there is continuity, go to step 3.

3. Check for voltage between the YEL terminal and body ground with the ignition switch ON (II).
   There should be battery voltage.
   - If there is no battery voltage, check for an open in the YEL wire.
   - If there is battery voltage, go to step 4.

4. Check for continuity between the YEL/BLU terminal and body ground in any switch position.
   There should be continuity.
   - If there is no continuity, check for:
     — an open in the YEL/BLU wire.
     — faulty headlight adjuster switch.
   - If there is continuity, go to step 5.

5. If all input tests prove OK, but the headlight adjuster does not work, 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.

Dim-Dip Resistor Test (KE model)

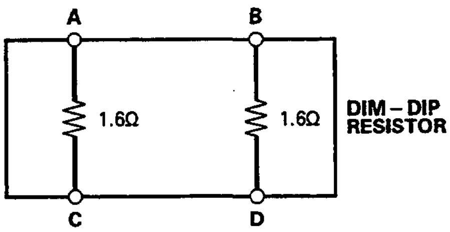
CAUTION: The dim-dip resistor becomes very hot when using the dim-dip headlights. Do not touch it or the attaching hardware immediately after they have been turned off.

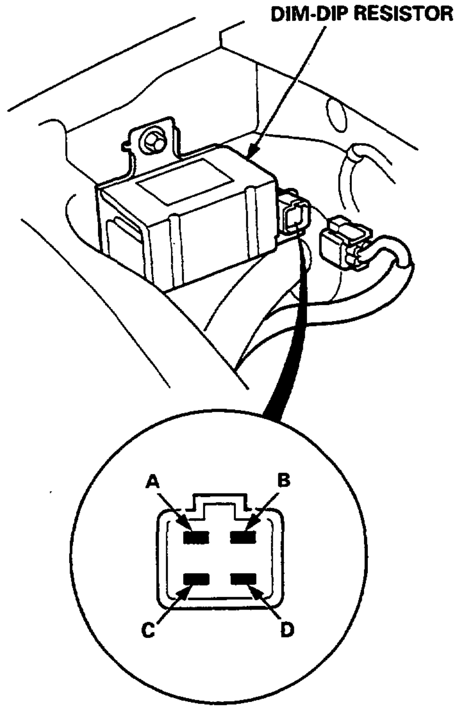
1. Disconnect the 4-P connector from the resistor.

2. Using an ohmmeter, measure resistance between the terminals.

   NOTE: Resistance will vary with the resistor temperature before and after use.

Terminals	Resistance
A – C	1.6 ± 0.08 Ω
B – D	





View from terminal side

3. If it is not within specifications, replace the dim-dip resistor.

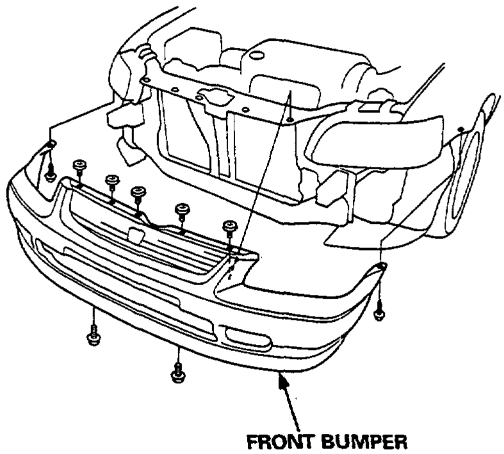
Headlights

Replacement

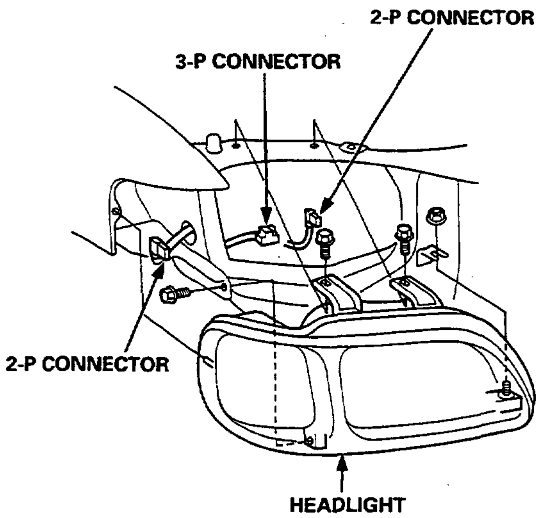
CAUTION:

- **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 bumper.



2. Disconnect the connectors from the headlight.
3. Remove the mounting bolts and nut, then pull out the headlight.



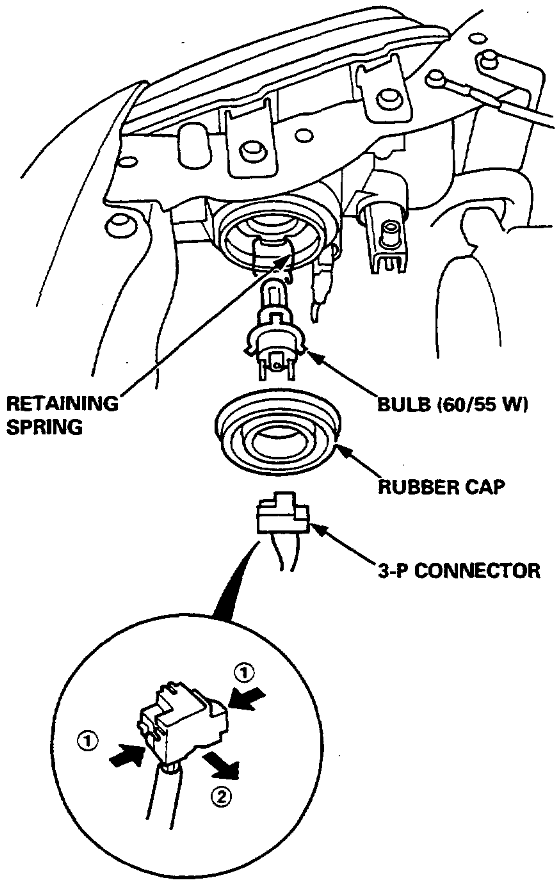
4. After replacement, adjust the headlight to local requirements.

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 3-P connector from the bulb.
2. Turn the retaining spring out, and remove the bulb.



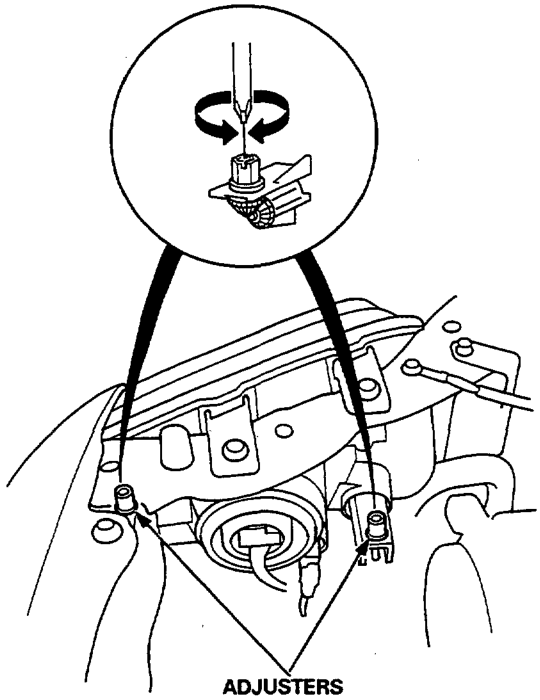
Headlights

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.

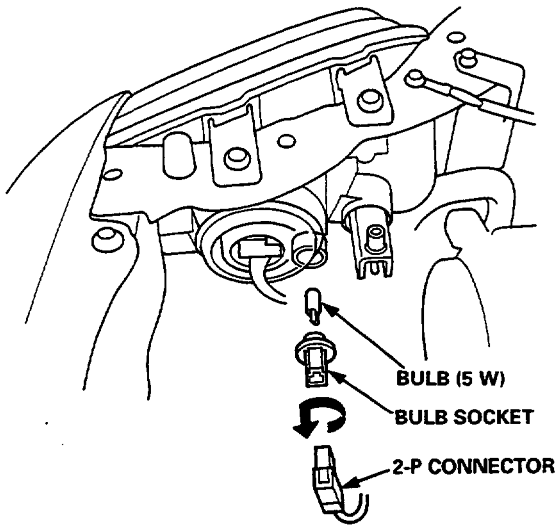


Front Parking Lights

Bulb Replacement

1. Disconnect the 2-P connector from the front parking light.

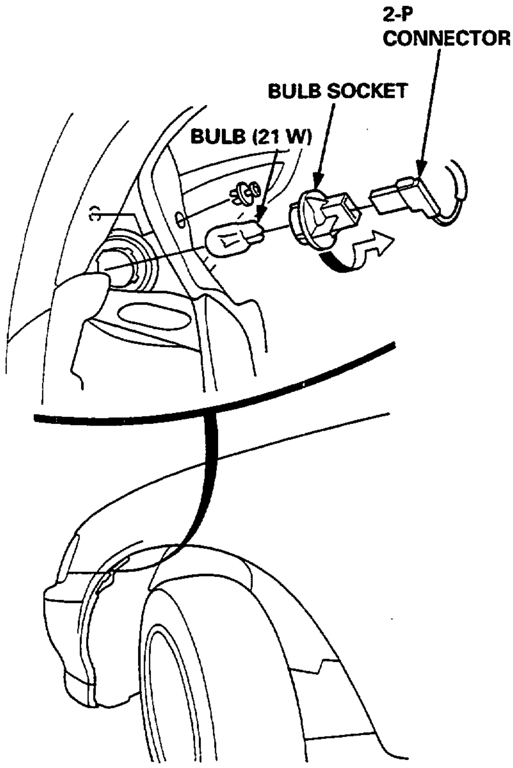
2. To replace the bulb, turn the bulb socket 45° counterclockwise, and remove it from the front parking light.



Front Turn Signal Lights

Bulb Replacement

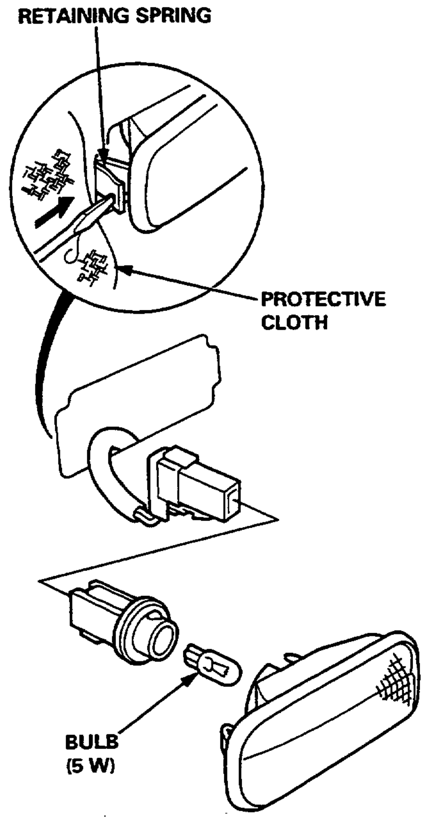
1. Remove the inner fender.
2. To replace the bulb, turn the bulb socket 45° counterclockwise, and remove it from the front turn signal light.



Side Turn Signal Lights

Replacement

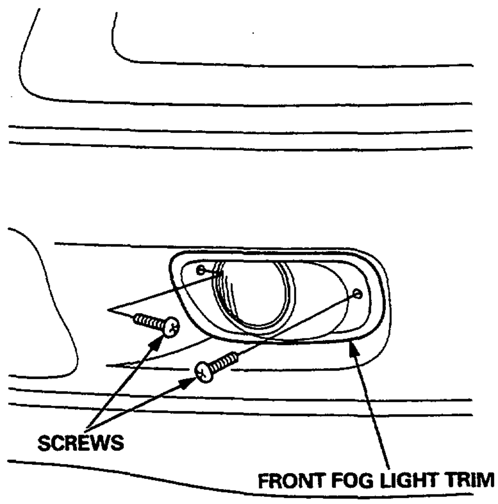
1. Push the retaining spring, and remove the side turn signal light.
2. Remove the bulb socket from the light housing, the replace the bulb.



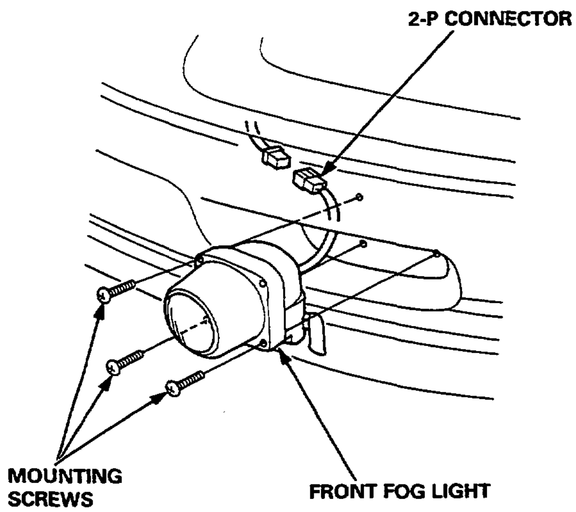
Front Fog Lights

Replacement

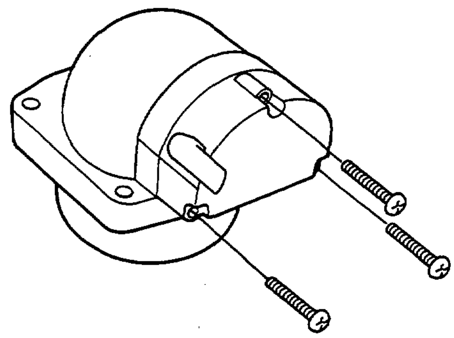
1. Remove the two screws.
2. Remove the front fog light trim.



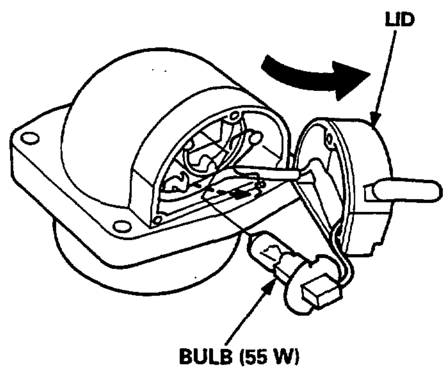
3. Remove the three mounting screws.
4. Pull out the front fog light.
5. Disconnect the 2-P connector.



6. Remove the screws.



7. Open the lid.
8. Turn the retaining spring out, and remove the bulb.

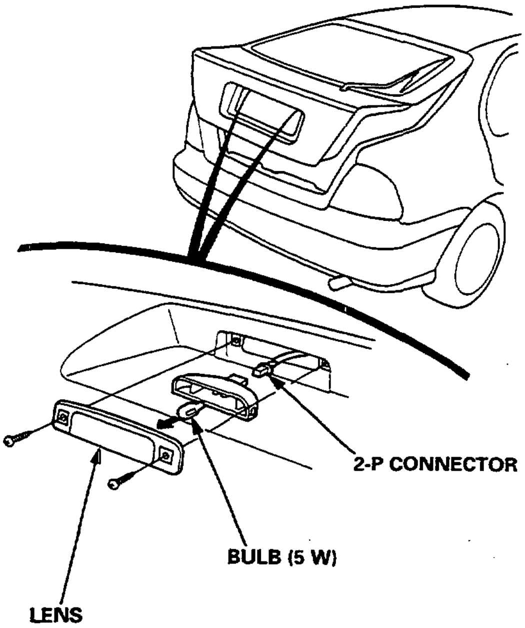


9. Install in the reverse order of removal.

License Plate Lights

Replacement

1. Remove the two screws from the license plate light, and pull the light out part of the way.
2. Disconnect the 2-P connector from the light.
3. Take the lens off, then replace the bulb.



4. Install in the reverse order of removal.

Glove Box Light

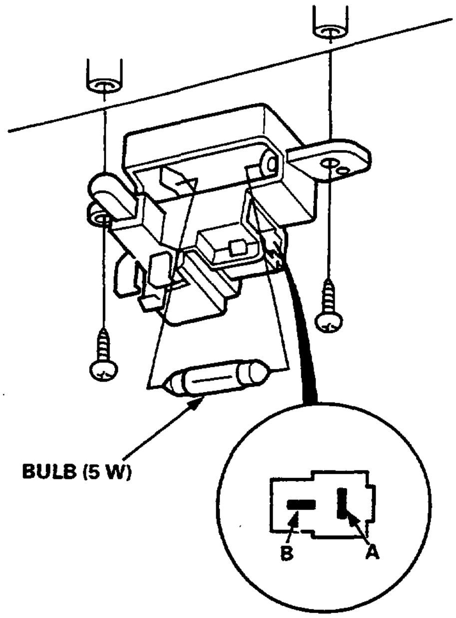
Test

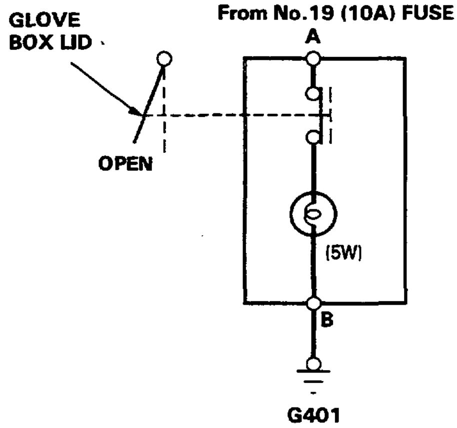
1. Open the glove box, and disconnect the 2-P connector.

   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)	O	⊗	O

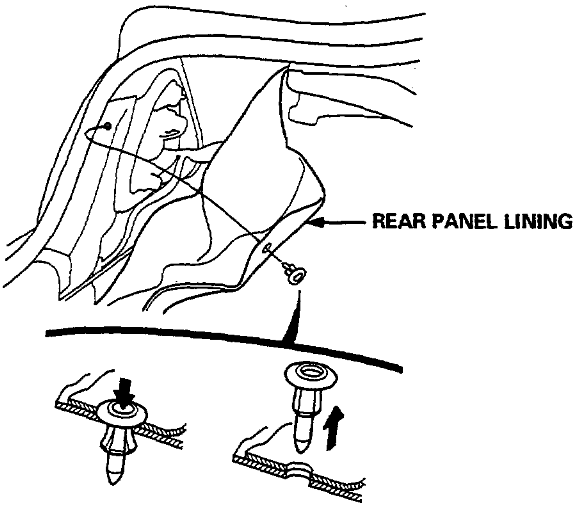




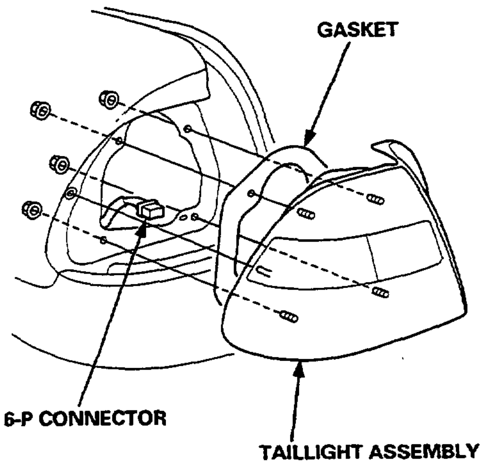
Taillights

Replacement

1. Open the tailgate, and remove the rear panel lining.



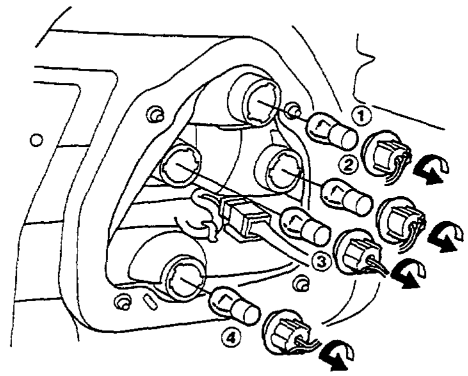
2. Disconnect the 6-P connector from the taillight assembly.
3. Remove the four mounting nuts and the taillight assembly.



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 tailgate, and remove the rear panel lining.
2. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.



BULBS:

① REAR FOR LIGHT BULB (21 W)

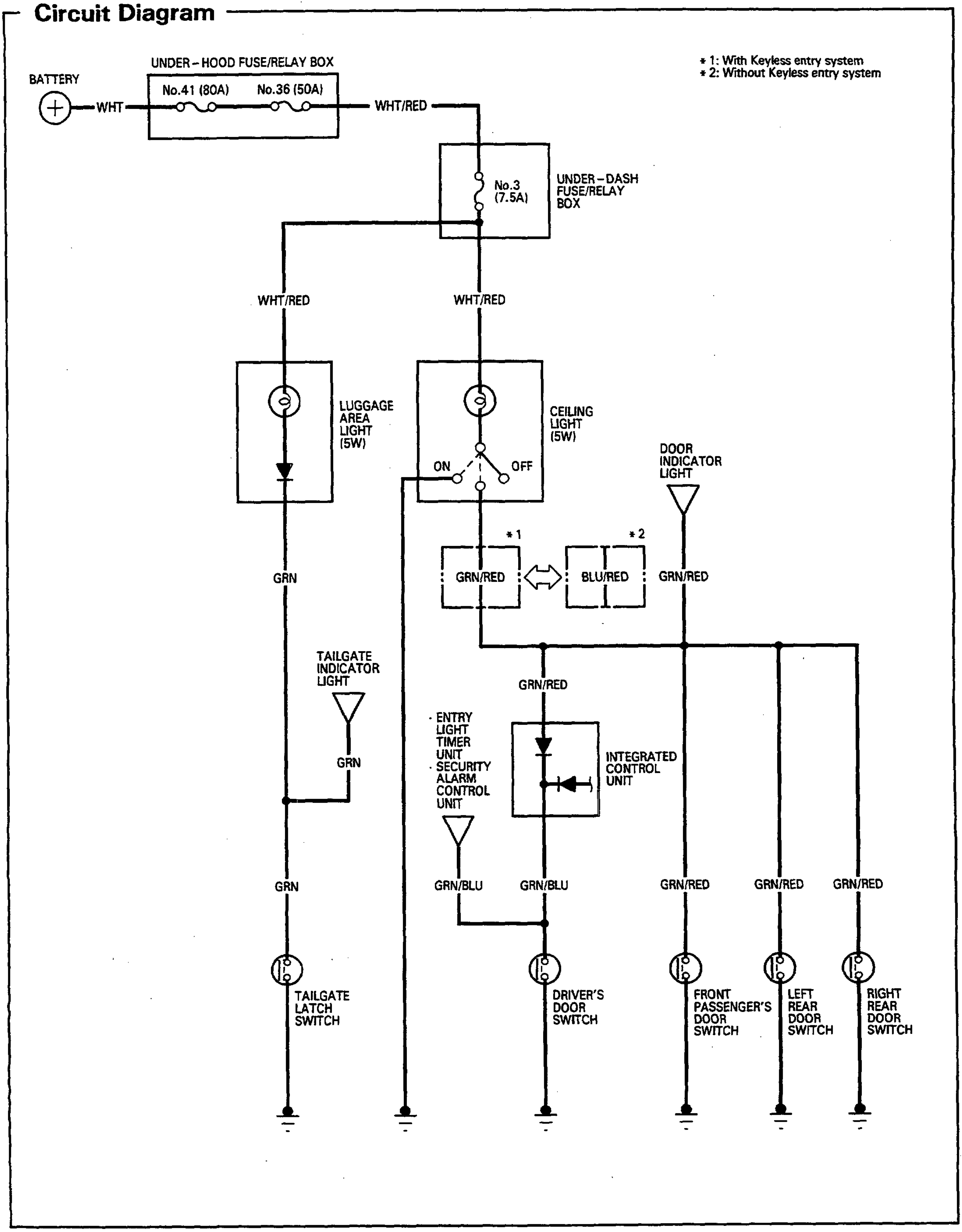
② TURN SIGNAL LIGHT BULB (21 W)

③ BACK-UP LIGHT BULB (21 W)

④ BRAKE LIGHT/TAILLIGHT BULB (21/5 W)

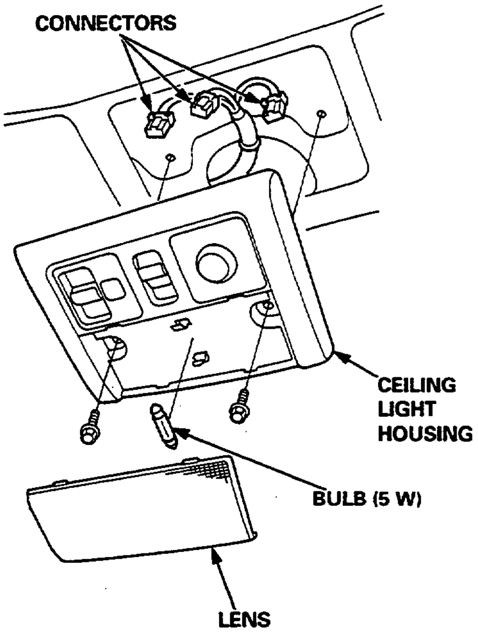
Ceiling/Luggage Area Lights

Circuit Diagram



Ceiling Light Test/Replacement

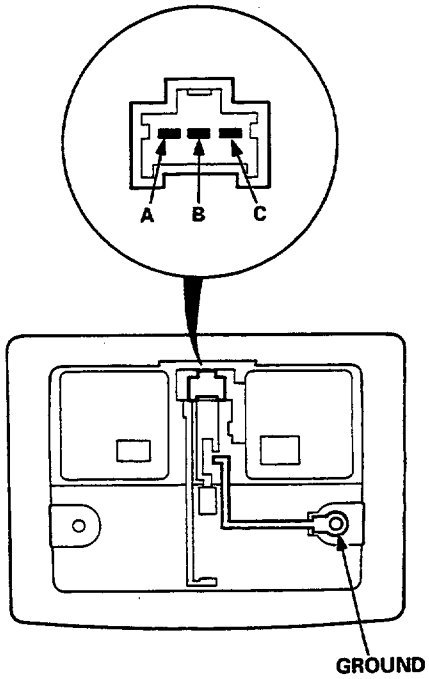
1. Turn the ceiling light switch OFF.
2. Pry off the lens.
3. Remove the two mounting bolts and the ceiling light housing.
4. Disconnect the connectors.

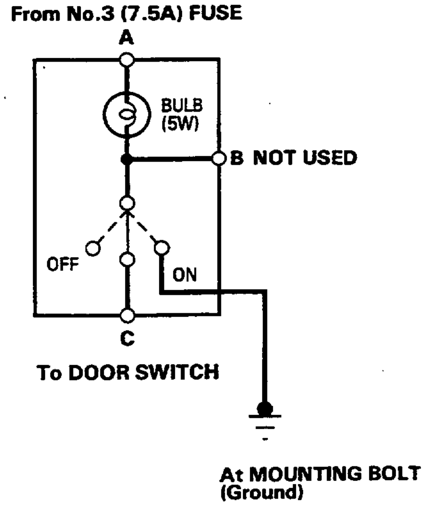


NOTE: LHD type is shown, RHD type is similar.

5. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A		B	C	Ground
OFF	○	bulb	○		
MIDDLE	○	bulb	○	○	
ON	○	bulb	○		○

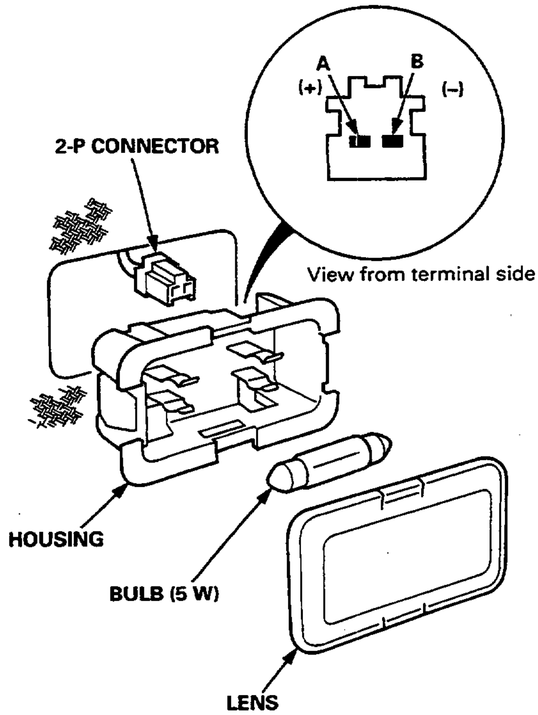


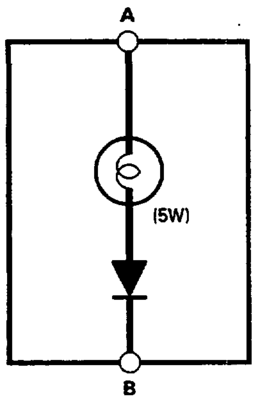


Ceiling/Luggage Area Lights

Luggage Area Light Test

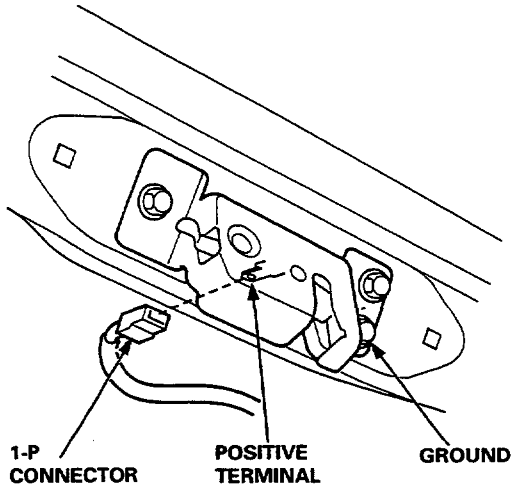
1. Pry the luggage area light lens out of its housing.
2. Pry out the housing.
3. Disconnect the 2-P connector from the housing.
4. Make sure that the bulb is OK. Check for continuity between the A (+) and B (–) terminals.





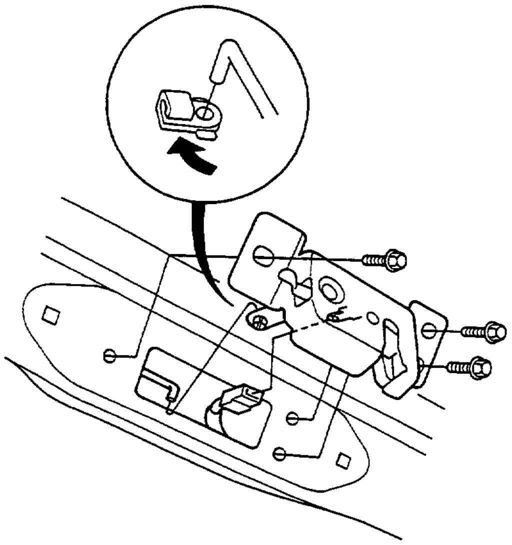
Latch Switch Test/Replacement

1. Open the tailgate, and remove the tailgate trim panel.
2. Disconnect the 1-P connector from the tailgate latch.
3. Check for continuity between the terminals in each switch position according to the table.



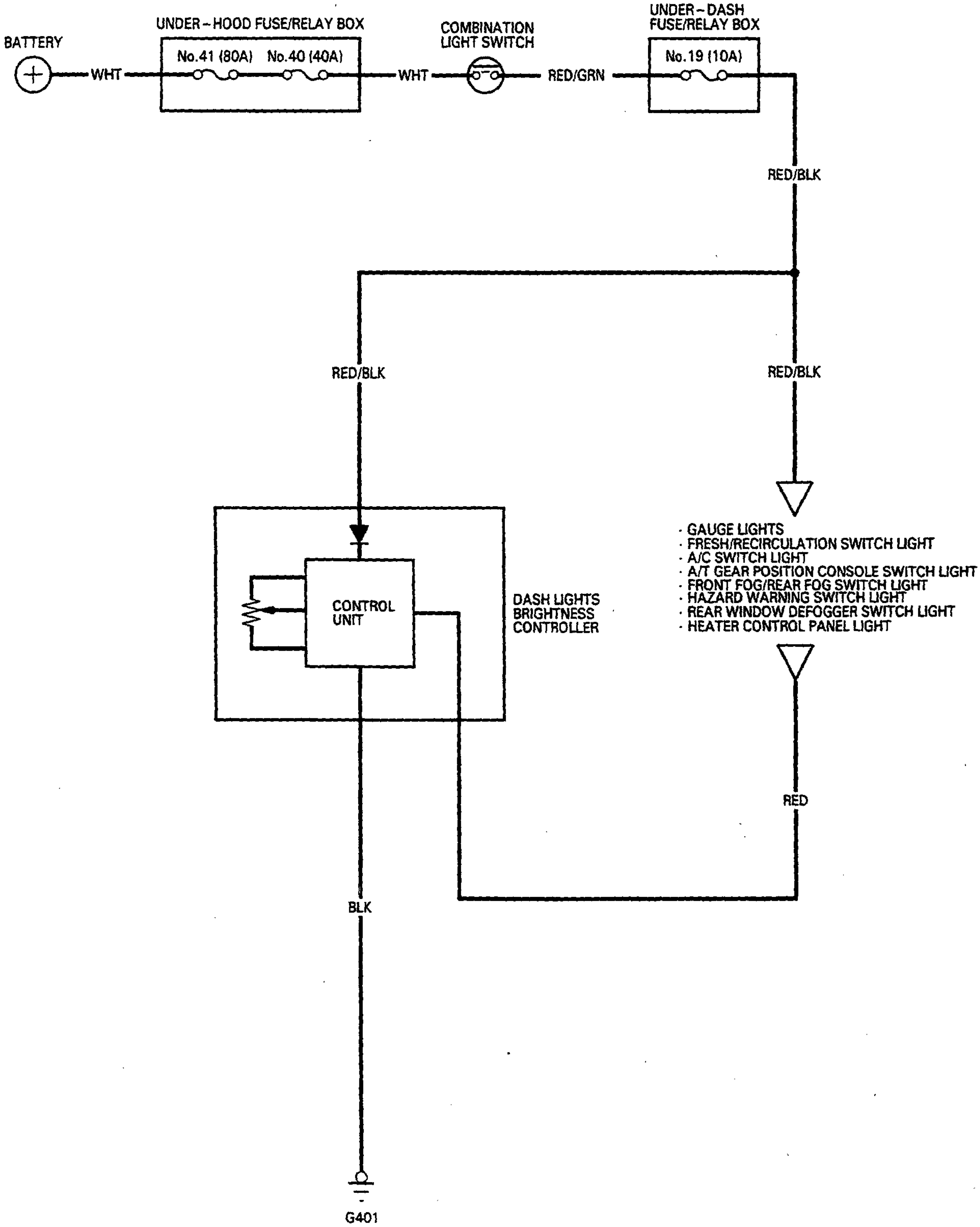
Terminal / Position	POSITIVE TERMINAL	GROUND
OPEN	○	○
CLOSE		

4. If necessary, remove the three bolts from the trunk lid, then remove the trunk latch assembly. The switch cannot be replaced separately.



Dash Lights Brightness Controller

Circuit Diagram



Dash Lights Brightness Controller

Controller Input Test

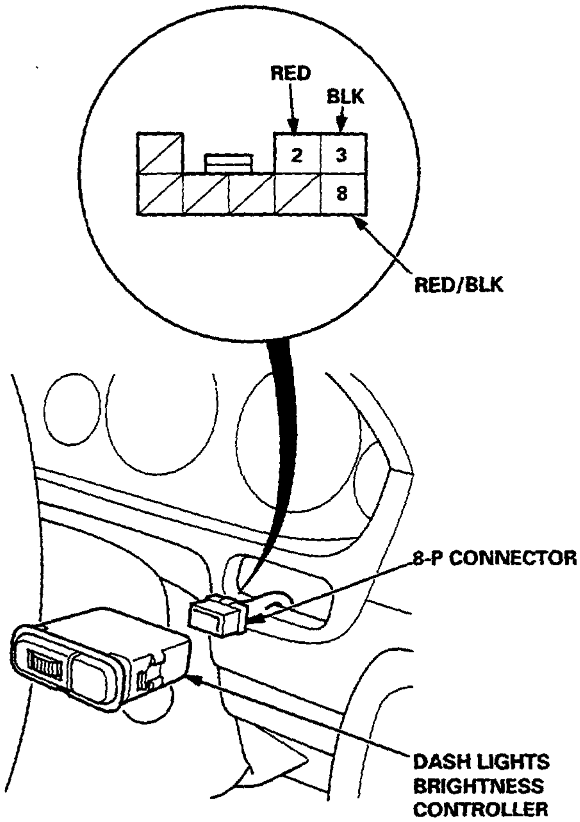
NOTE: The control unit is built into the dash lights brightness controller.

1. Carefully pry the controller out of the dashboard, then disconnect the 8-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.

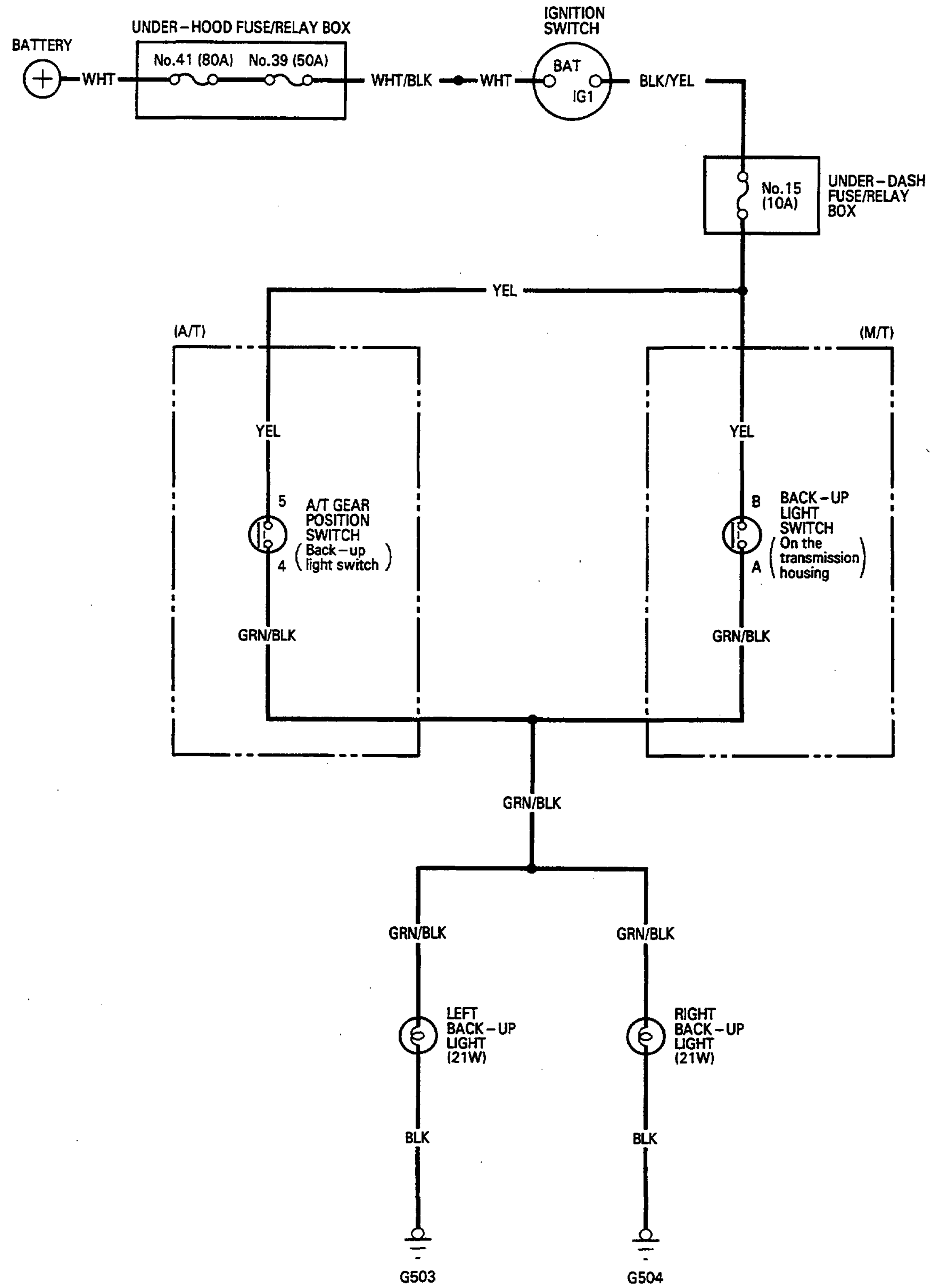
   NOTE: LHD type is shown, RHD type is similar.



Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
3	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
8	RED/BLK	Headlight switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 19 (10 A) fuse in the under-dash fuse/relay box • Faulty combination light switch • An open in the wire
2	RED	Headlight switch ON	Connect to ground: Dash lights should come on full bright.	• An open in the wire

Back-up Lights

Circuit Diagram



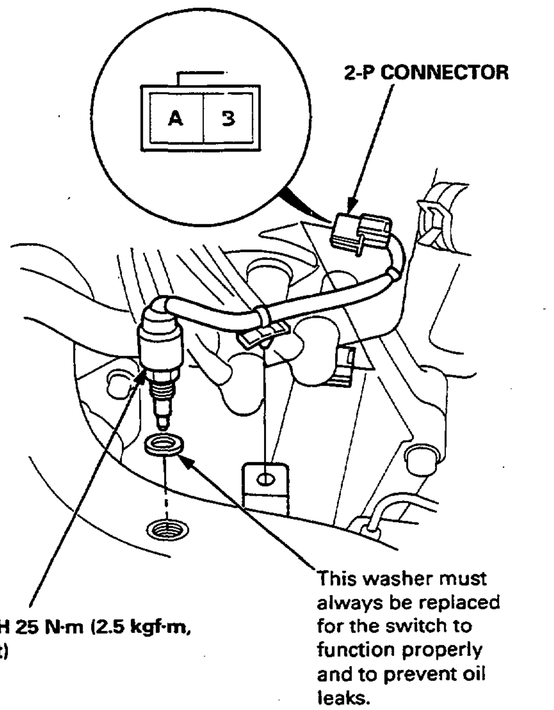
Back-up Lights

Test

Manual Transmission:

NOTE: Check the No. 15 (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.

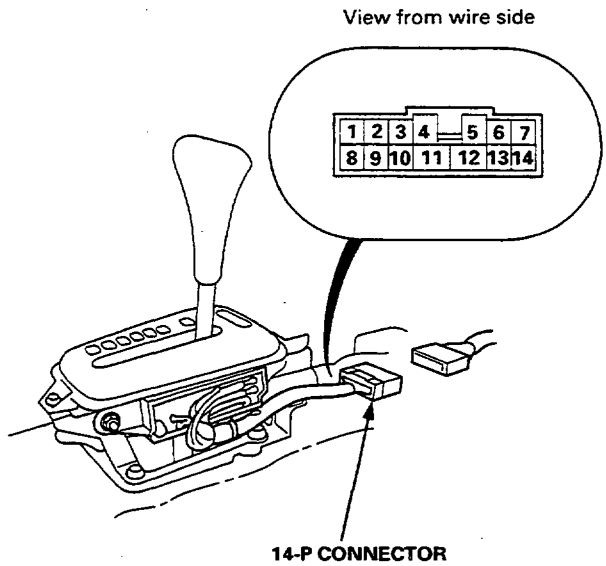
Terminal / Position	A	B
REVERSE	O—	—O
ALL EXCEPT REVERSE		

- 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 (G503, G504).
  — an open in the YEL or GRN/BLK wire.

Automatic Transmission:

NOTE: Check the No. 15 (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 14-P connector from the A/T gear position switch (back-up light switch).

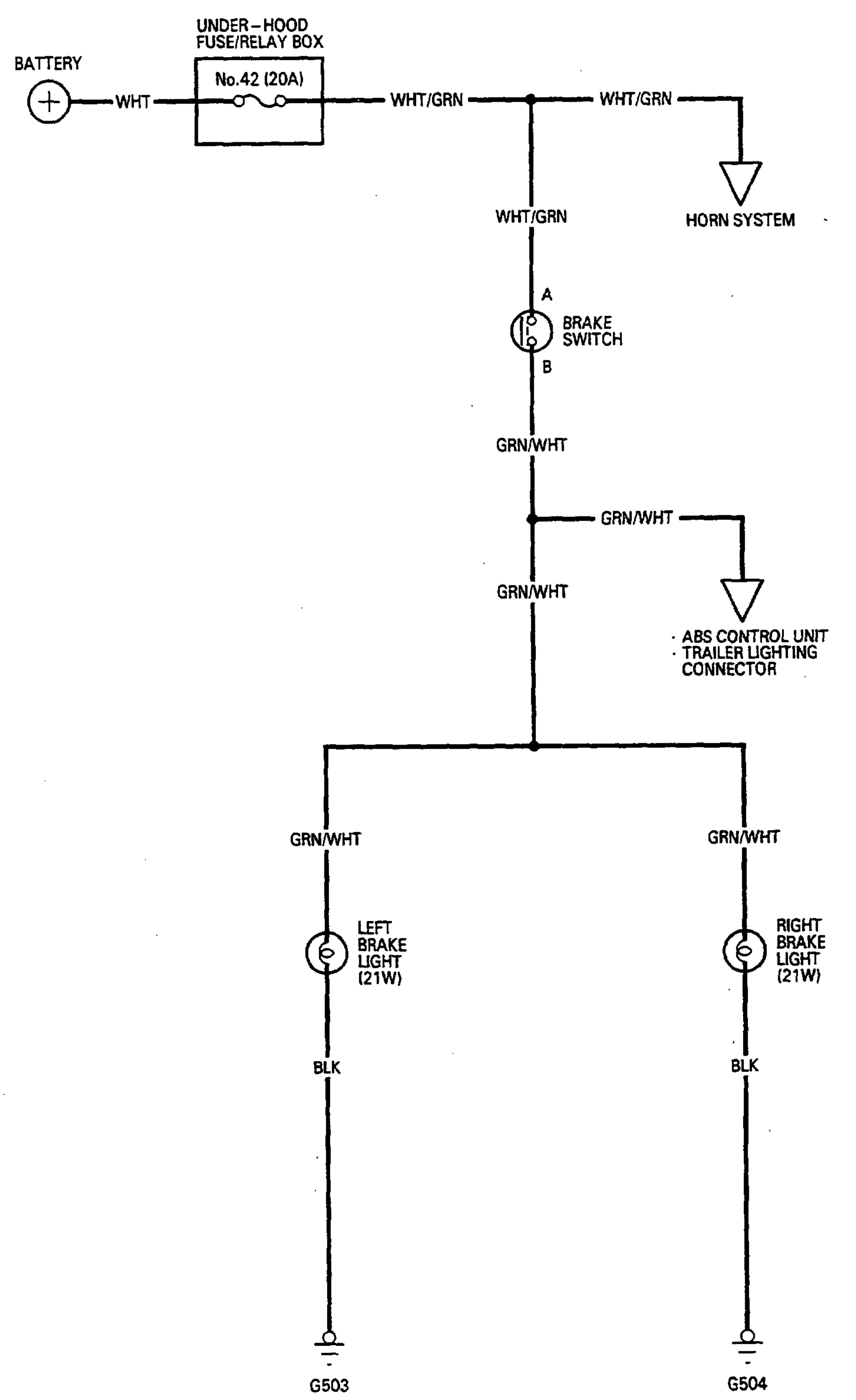


4. Check for continuity between the "4" and "5" terminals. Move the lever back and forth at the R position without touching the push button, and check for continuity within the range of free play of the shift lever.

   - If there is no continuity within the range of free play, adjust the A/T gear position switch (see page 23-A131).
   - If there is continuity, but the back-up lights do not go on, check for:
     — poor ground (G503, G504).
     — an open in the YEL or GRN/BLK wire.

Brake Lights

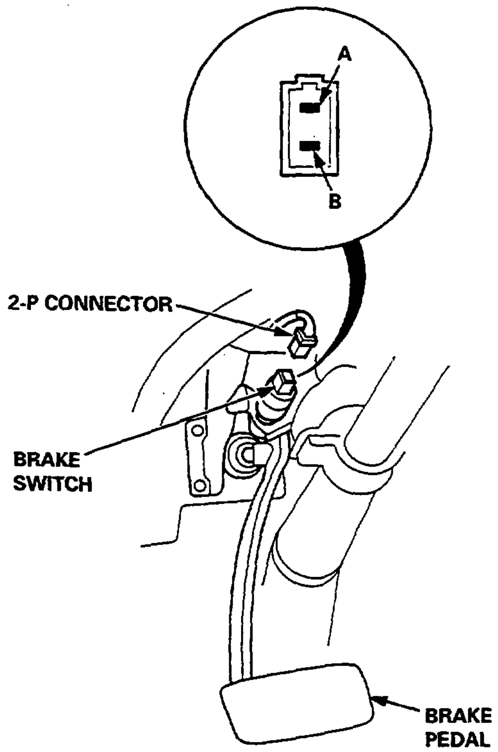
Circuit Diagram



Brake Lights

Brake Switch Test

1. If one of the brake lights does not go on, check the bulb in the taillight.
2. If none of the brake lights go on, check the No. 42 (20 A) fuse in the under-hood fuse/relay box.
3. If the fuse and bulbs are OK, disconnect the 2-P connector from the brake switch.



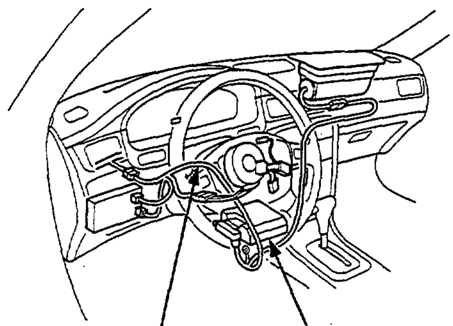
4. Check for continuity between the terminals in each switch position according to the table.

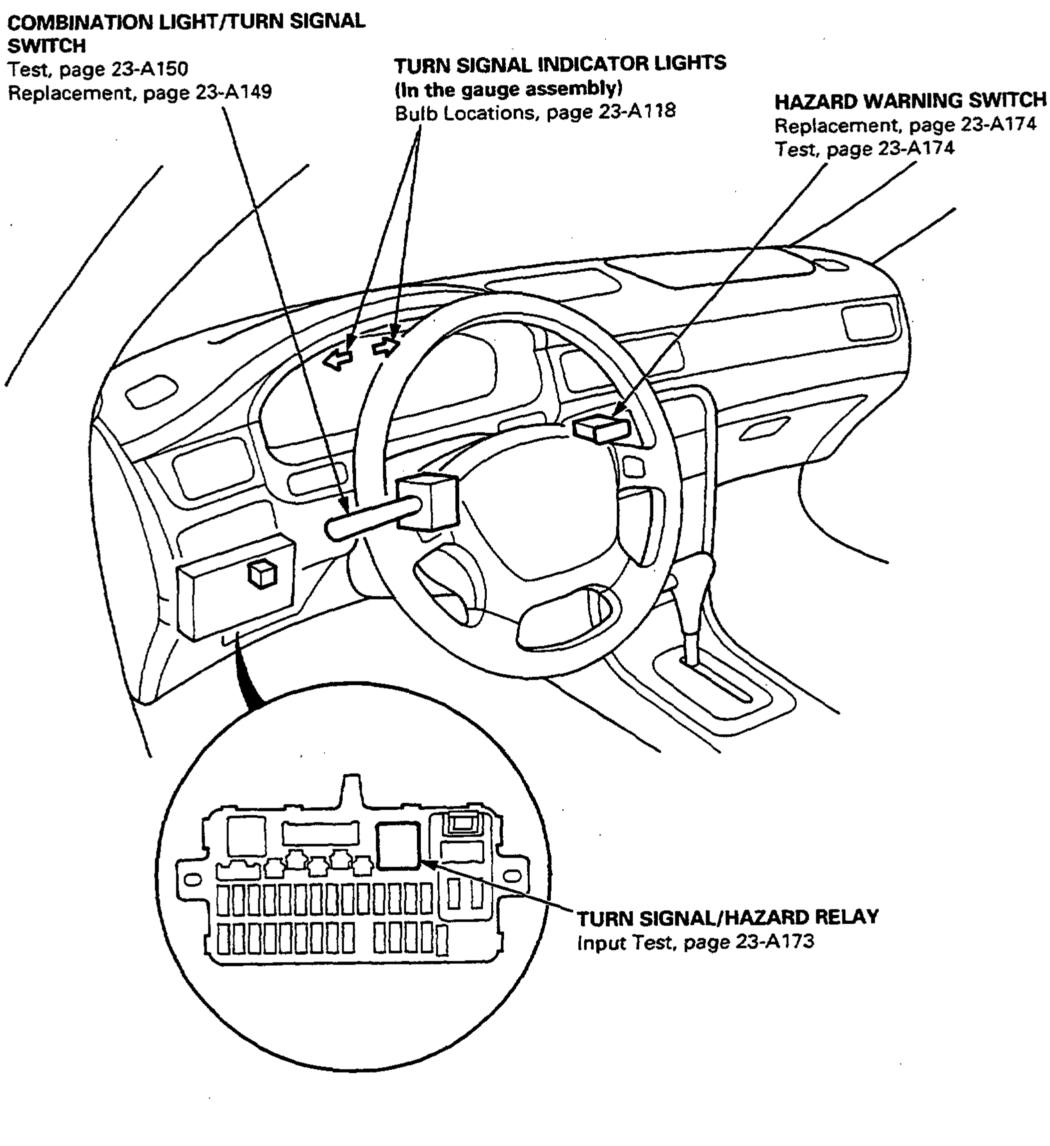
Position \ Terminal	A	B
RELEASED		
PUSHED	O—	—O

- 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 (G503, G504).
  — an open in the WHT/GRN or GRN/WHT wire.

Component Location Index

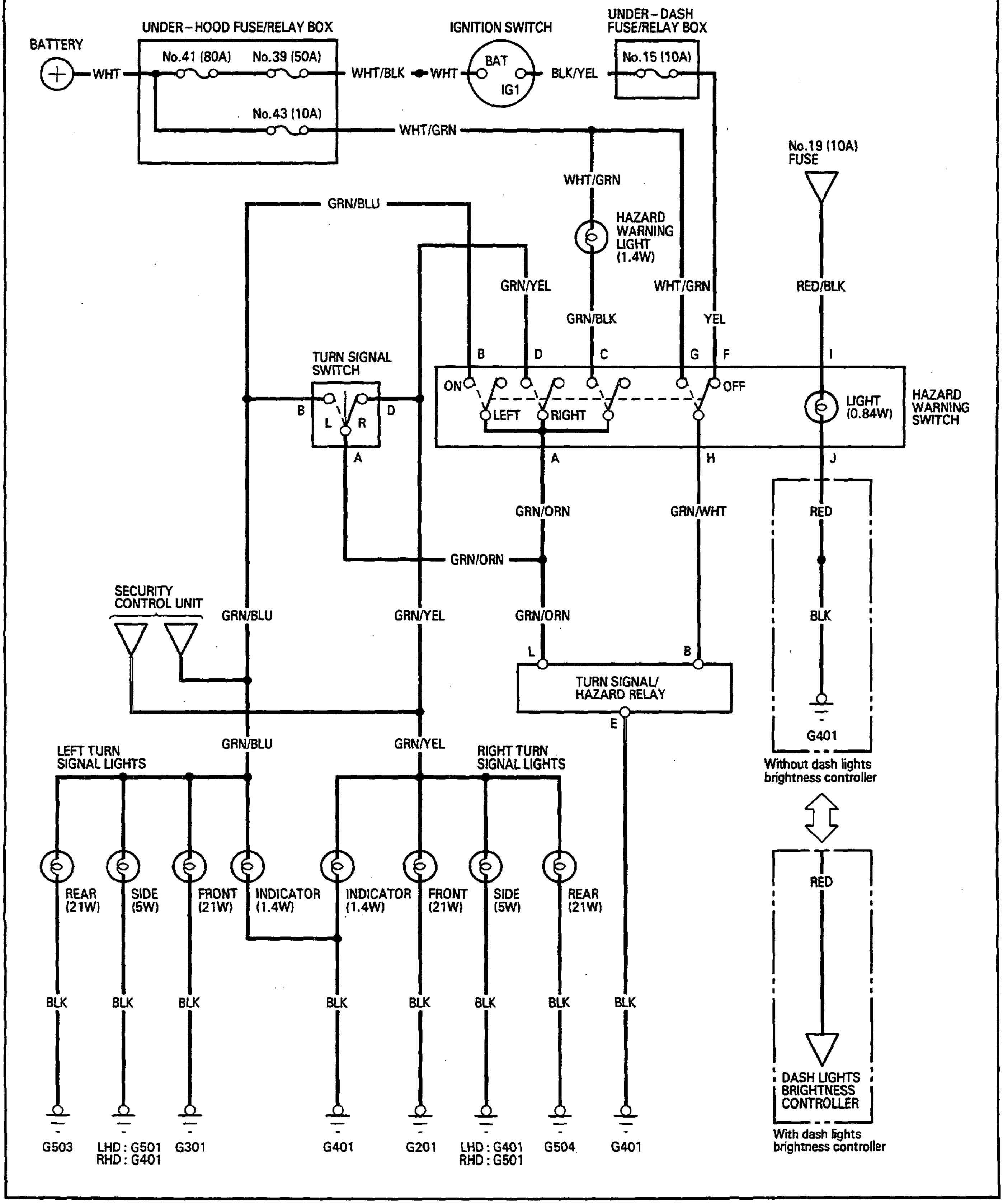
CAUTION:
- All SRS wire harnesses are covered with yellow insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.
- Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.
- For additional precautions, refer to page 23-B-6 in the SRS sub-section.





Turn Signal/Hazard Flasher System

Circuit Diagram

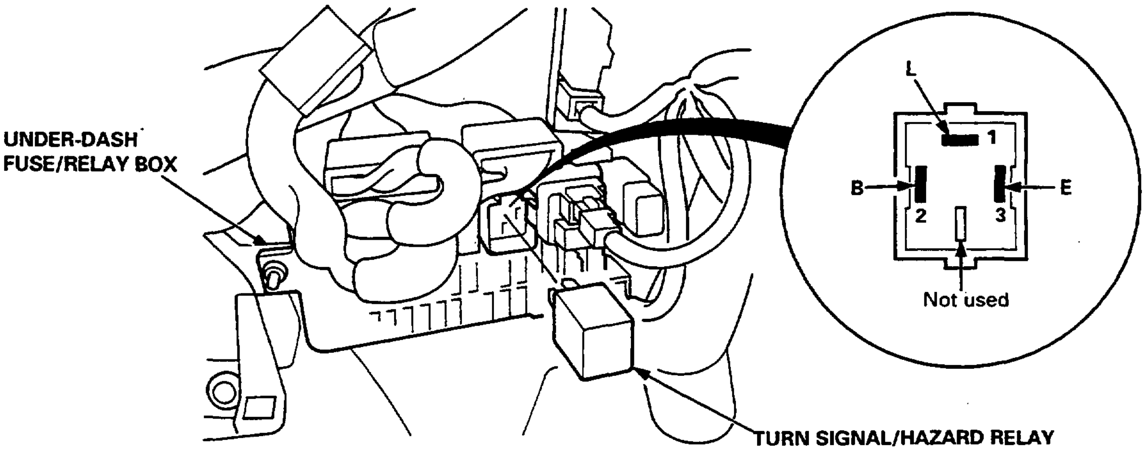


Turn Signal/Hazard Relay Input Test

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.



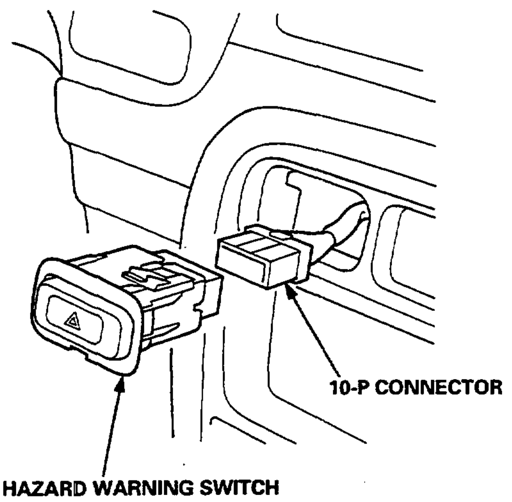
Terminal No.	Terminal	Test condition	Test: Desired result	Possible cause if result is not obtained
3	E	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
2	B	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box • 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. 43 (10 A) fuse in the under-hood fuse/relay box • An open in the wire • Faulty hazard warning switch
1	L	Hazard warning switch ON; connect the B terminal to the L terminal.	Hazard lights should come on.	• Poor ground (G201, G301, G401, G501, G503, G504) • Faulty hazard warning switch • 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

Turn Signal/Hazard Flasher System

Hazard Warning Switch Replacement

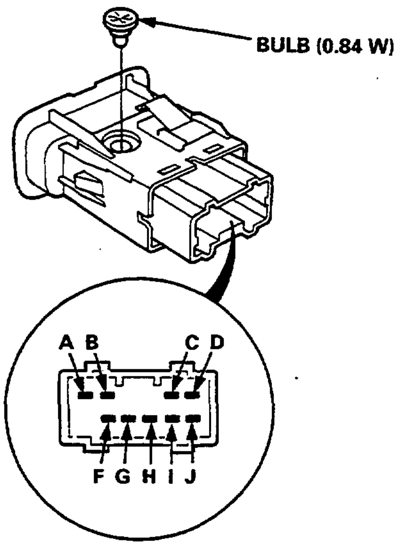
CAUTION: Be careful not to damage the front console panel.

1. Carefully pry the hazard warning switch out of the front console panel.

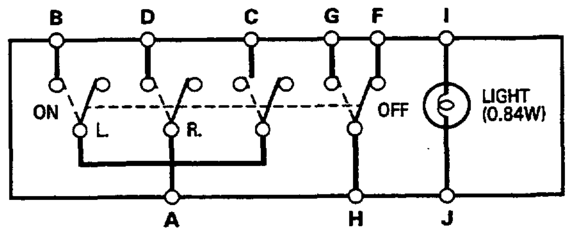


Hazard Warning Switch Test

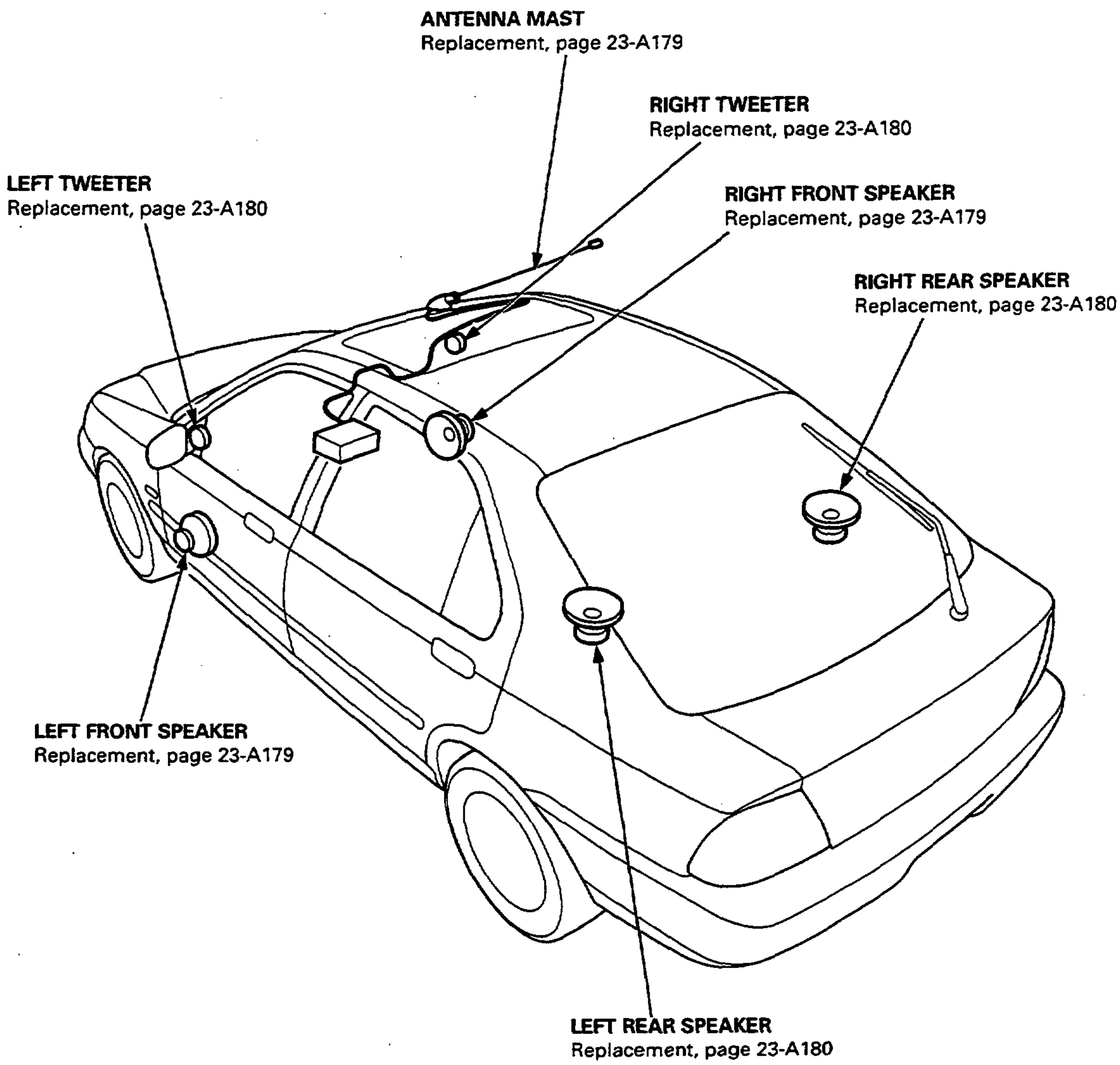
1. Carefully pry the hazard warning switch out of the front console panel.
2. Check for continuity between the terminals in each switch position according to the table.



Terminal / Position	A	B	C	D	F	G	H	I		J
OFF					O		O	O		O
ON	O	O	O	O		O	O	O		O



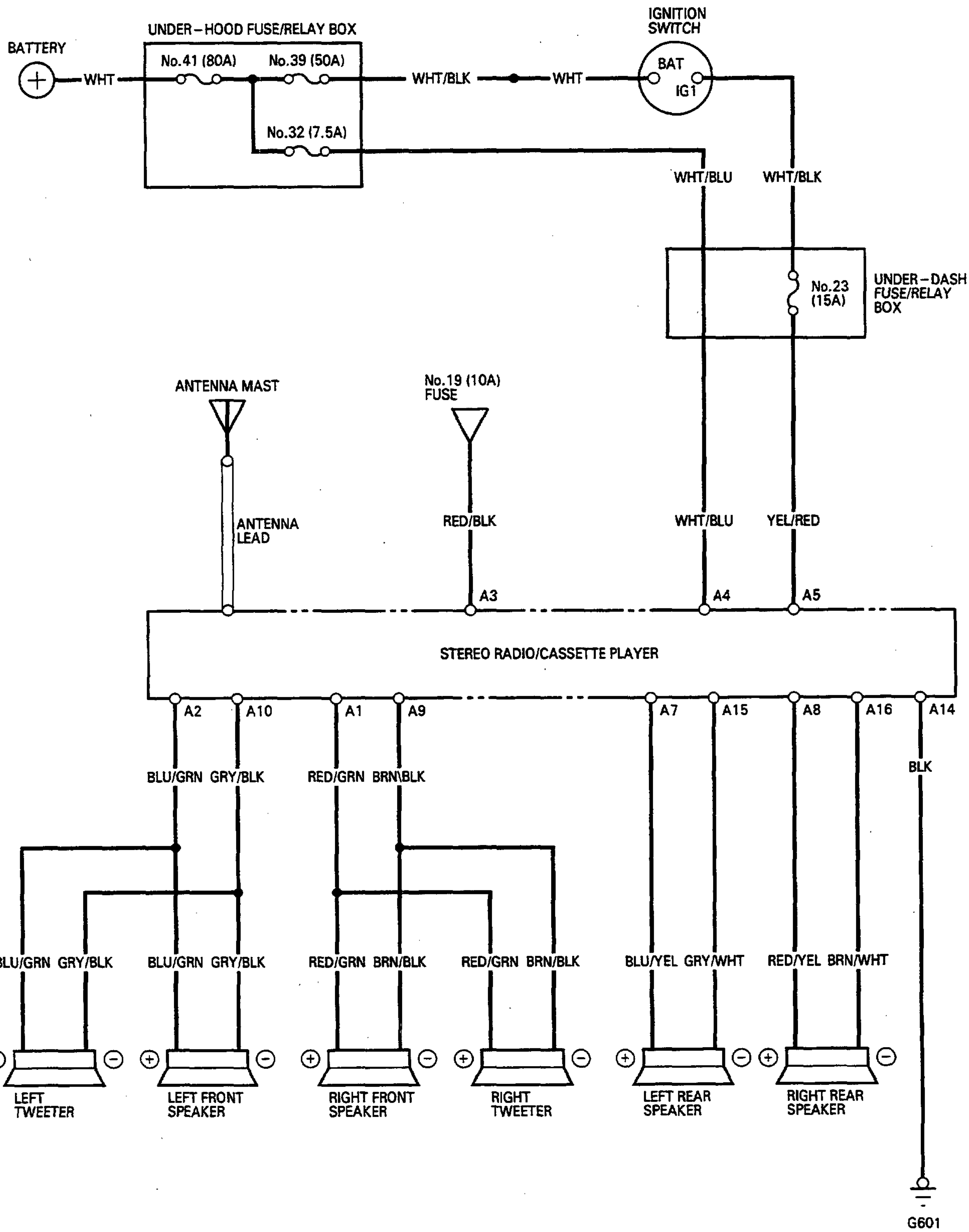
Component Location Index



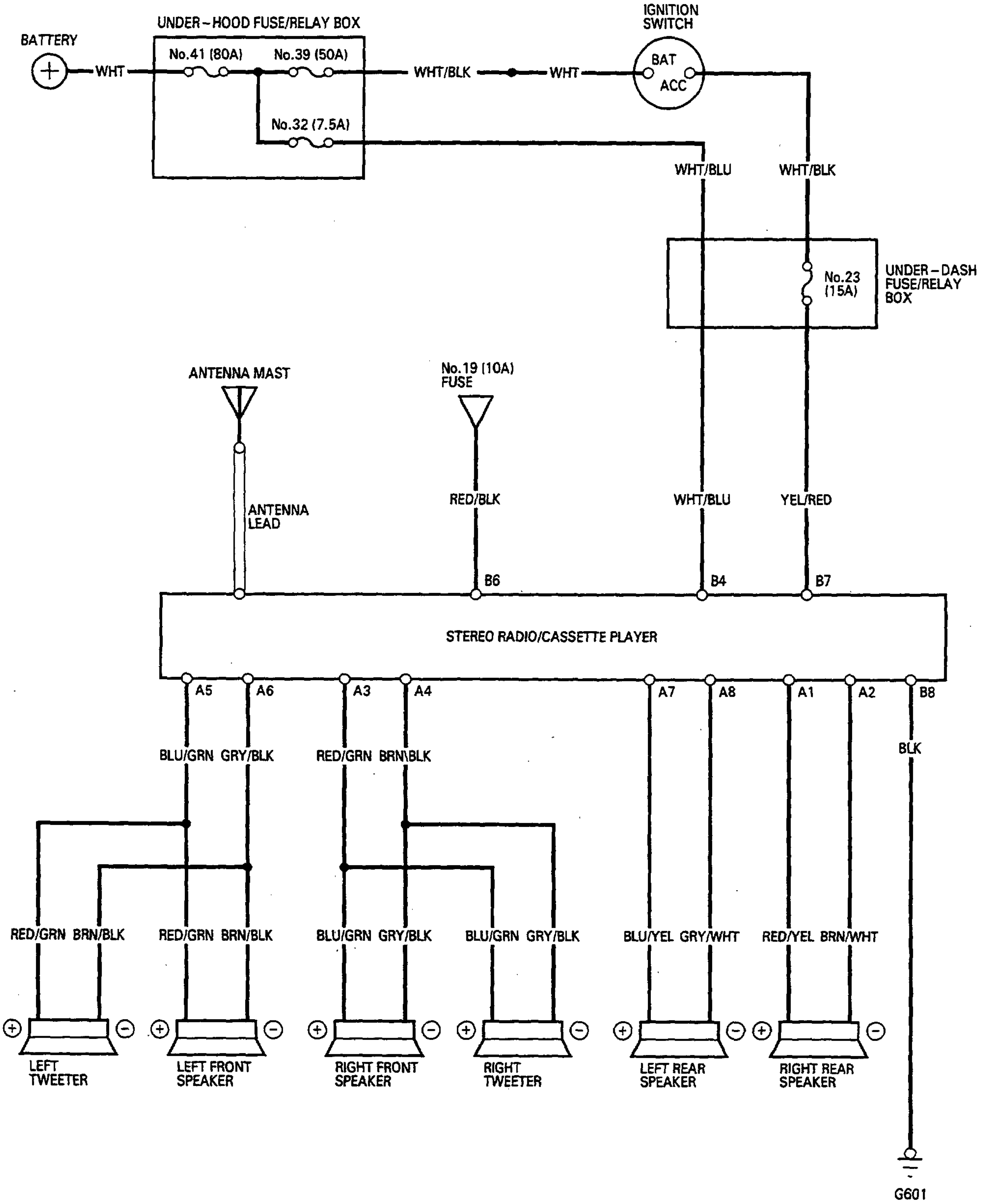
Stereo Sound System

Circuit Diagram (KG model)

NOTE: In case of the KG model, the stereo radio/cassette player is YOP.

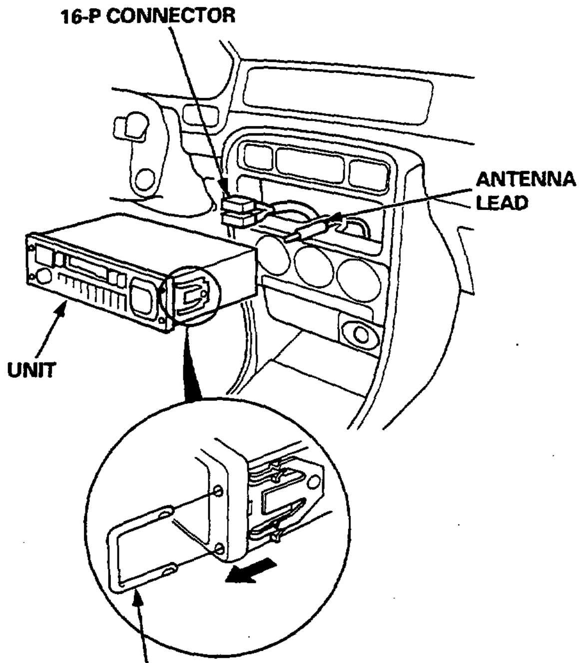


Circuit Diagram (KE model)

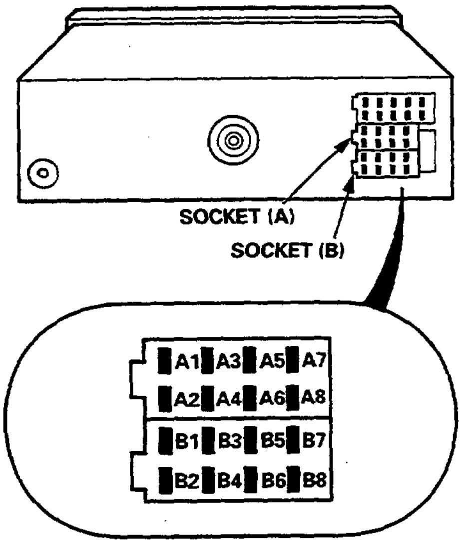


Stereo Radio/Cassette Player Removal (KE model)

1. Insert the puller hooks, and pull out the stereo radio/cassette player.



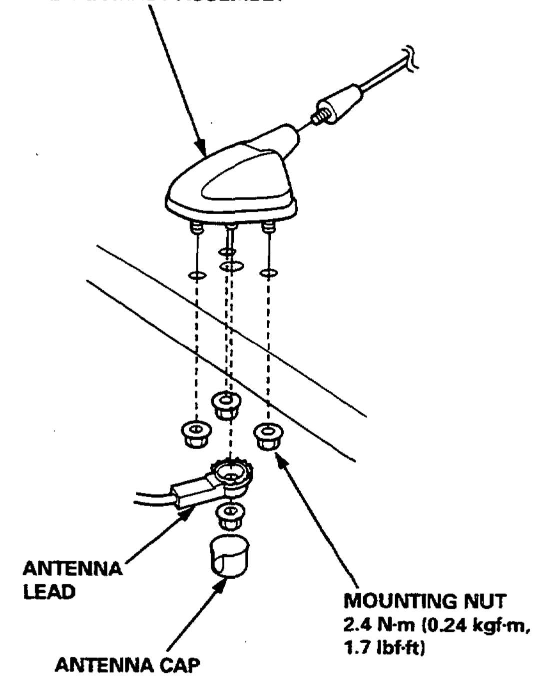
Stereo Radio/Cassette Player Terminals (KE model)



Terminal	Wire	Connects to
B1	—	(not used)
B2	—	(not used)
B3	—	(not used)
B4	WHT/BLU	Constant power (Tuning memory)
B5	—	(not used)
B6	RED/BLK	Lights-on signal
B7	YEL/RED	ACC (Main stereo power supply)
B8	BLK	Ground (G601)
A1	RED/YEL	Right rear speaker ⊕
A2	BRN/WHT	Right rear speaker ⊖
A3	RED/GRN	Right front speaker ⊕
A4	BRN/BLK	Right front speaker ⊖
A5	BLU/GRN	Left front speaker ⊕
A6	GRY/BLK	Left front speaker ⊖
A7	BLU/YEL	Left rear speaker ⊕
A8	GRY/WHT	Left rear speaker ⊖

Antenna Mast Replacement

1. Remove the ceiling light (see page 23-A163).
2. Remove the antenna cap.
3. Remove the four mounting nuts.
4. Remove the antenna mast assembly.

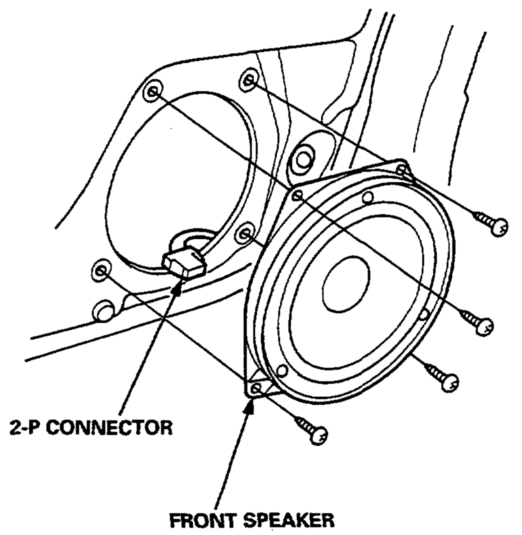


5. Install in the reverse order of removal.

NOTE:
- Inspect the gasket; replace it if it is distorted or stays compressed.
- After installing it, run water over the antenna mast to make sure there is no leak.

Front Speaker Replacement

1. Remove the door panel.
2. Remove the four screws, then disconnect the 2-P connector from the front speaker.

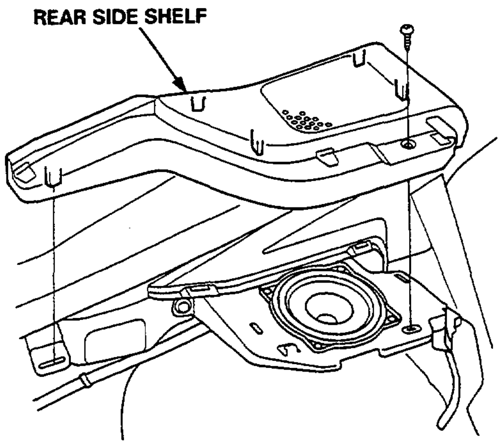


3. Install in the reverse order of removal.

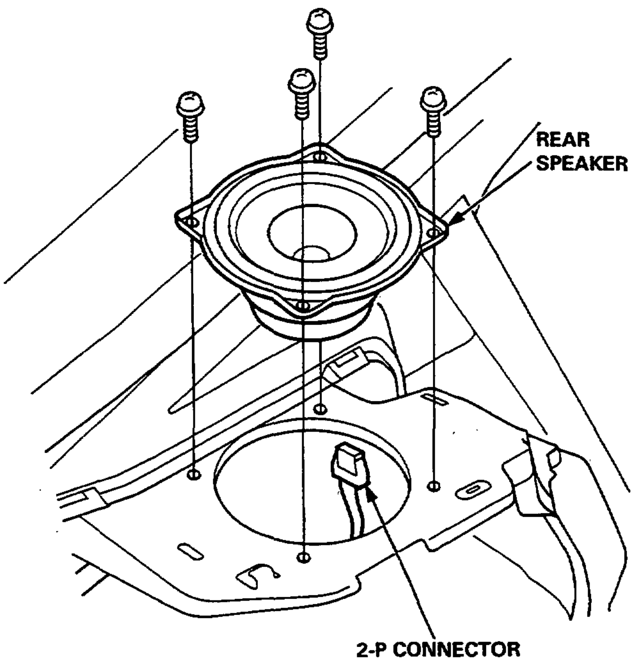
Stereo Sound System

Rear Speaker Replacement

1. Remove the rear side shelf.



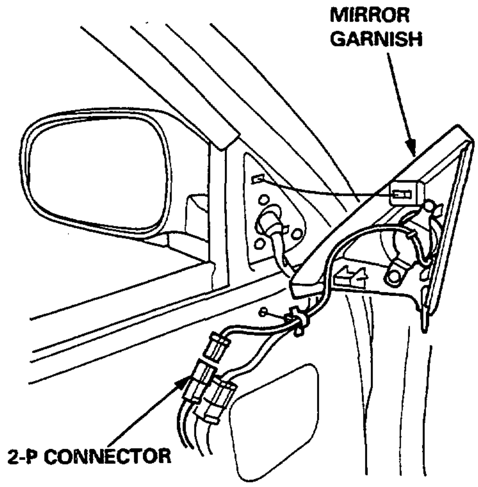
2. Remove the four screws, disconnect the 2-P connector from the rear speaker, and remove the speaker.



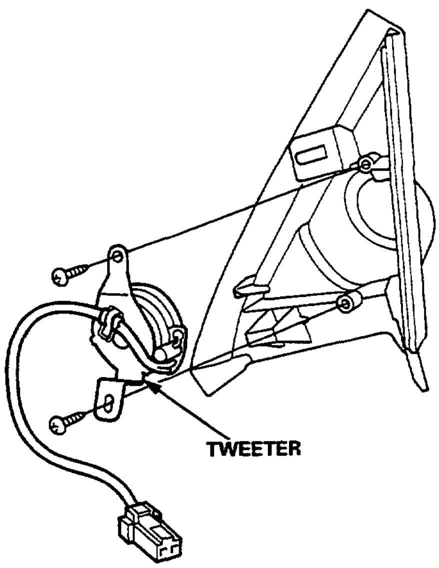
3. Install in the reverse order of removal.

Tweeter Replacement

1. Remove the door panel (see section 20).
2. Disconnect the 2-P connector from the tweeter.
3. Remove the mirror garnish.

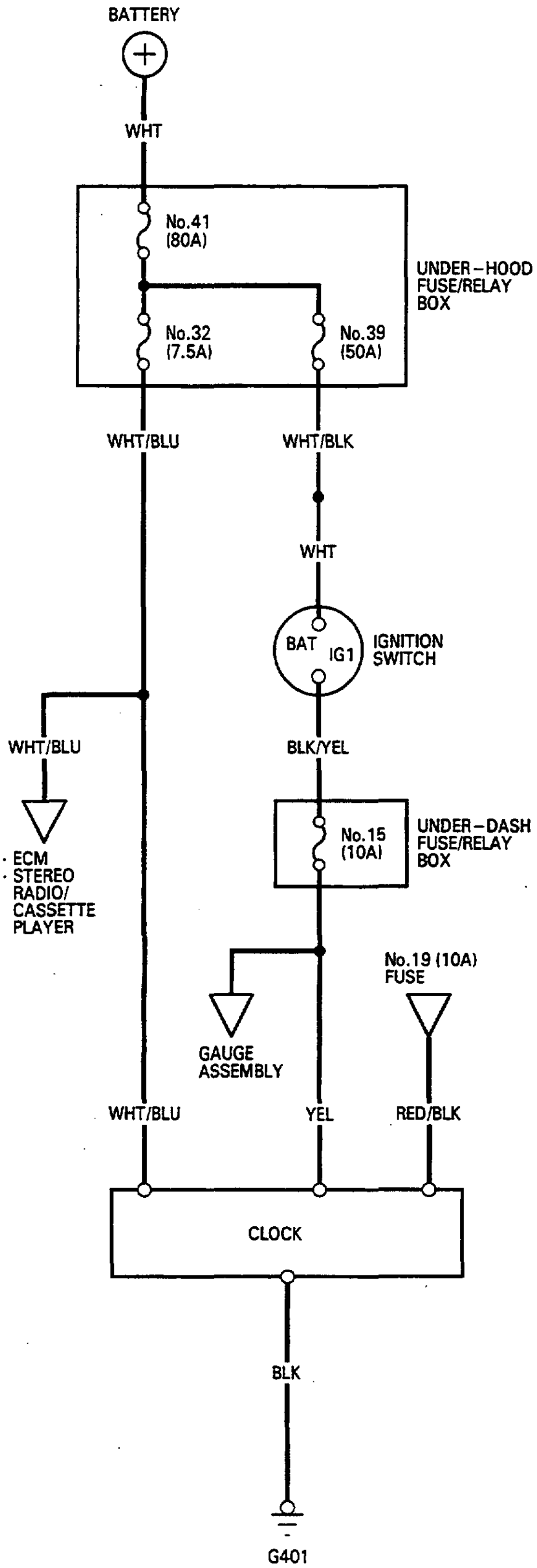


4. Remove the two screws, then remove the tweeter.



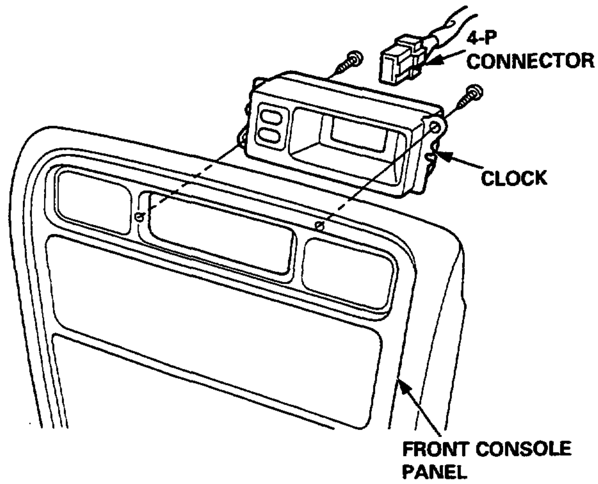
Clock

Circuit Diagram

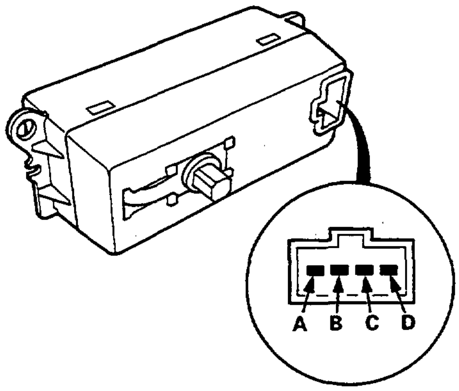


Removal

1. Remove the rear console (see section 20).
2. Remove the front console (see section 20).
3. Disconnect the 4-P connector from the clock.
4. Remove the two screws.



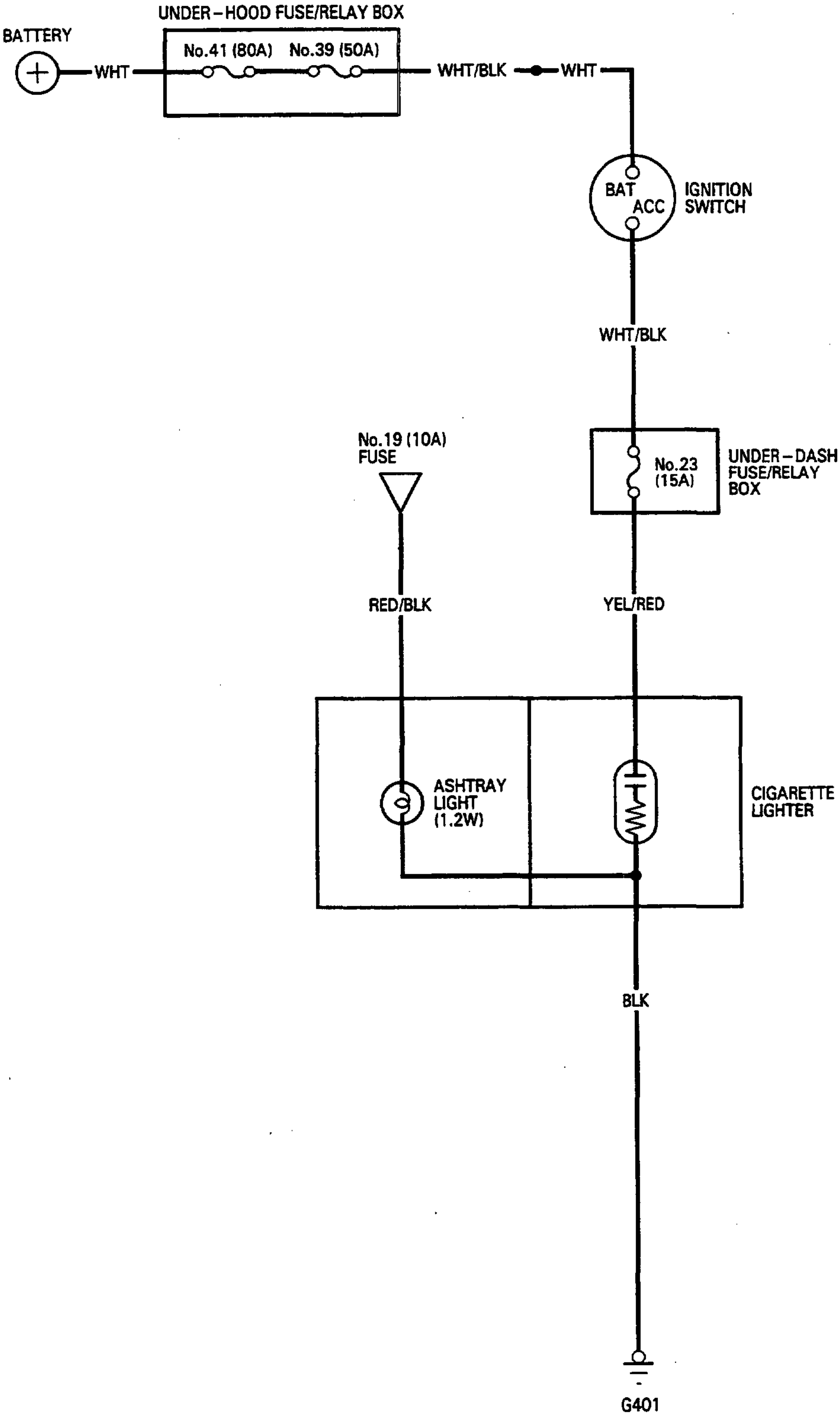
Terminal



Terminal	Wire	Connects to
A	BLK	Ground (G401)
B	RED/BLK	Lights-on signal
C	YEL	IG1 (Main clock power supply)
D	WHT/BLU	Constant power (Time memory)

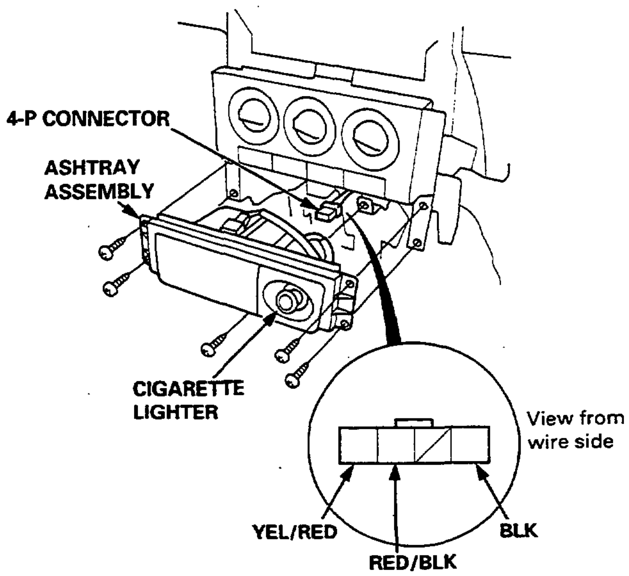
Cigarette Lighter

Circuit Diagram

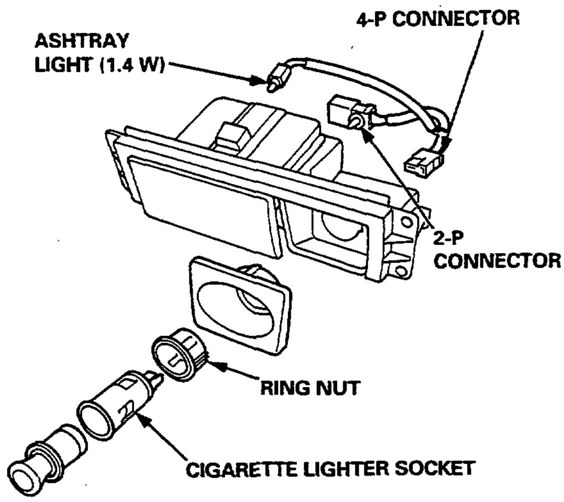


Test/Replacement

1. Remove the rear console (see section 20).
2. Remove the front console (see section 20).
3. Remove the five screws, then pull out the ashtray assembly.
4. Disconnect the 4-P connector from the cigarette lighter.



5. 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 6.
6. Turn the ignition switch ON (II).
7. Check for voltage between the YEL/RED and the BLK wires.
   There should be battery voltage.
   - If there is battery voltage, go to step 8.
   - If there is no battery voltage, check for
     — blown No. 23 (15 A) fuse in the under-dash fuse/relay box.
     — poor ground (G401).
     — an open in the wire.
8. Turn the headlight switch ON, and check for voltage between the RED/BLK and the BLK wires.
   There should be battery voltage.
   - If there is battery voltage, go to step 9.
   - If there is no battery voltage, check for
     — blown No. 19 (10 A) fuse in the under-dash fuse/relay box.
     — faulty combination light switch.
     — an open in the wire.
9. If all tests prove OK, replace the cigarette lighter.
10. Disconnect the 2-P connector and ashtray light.

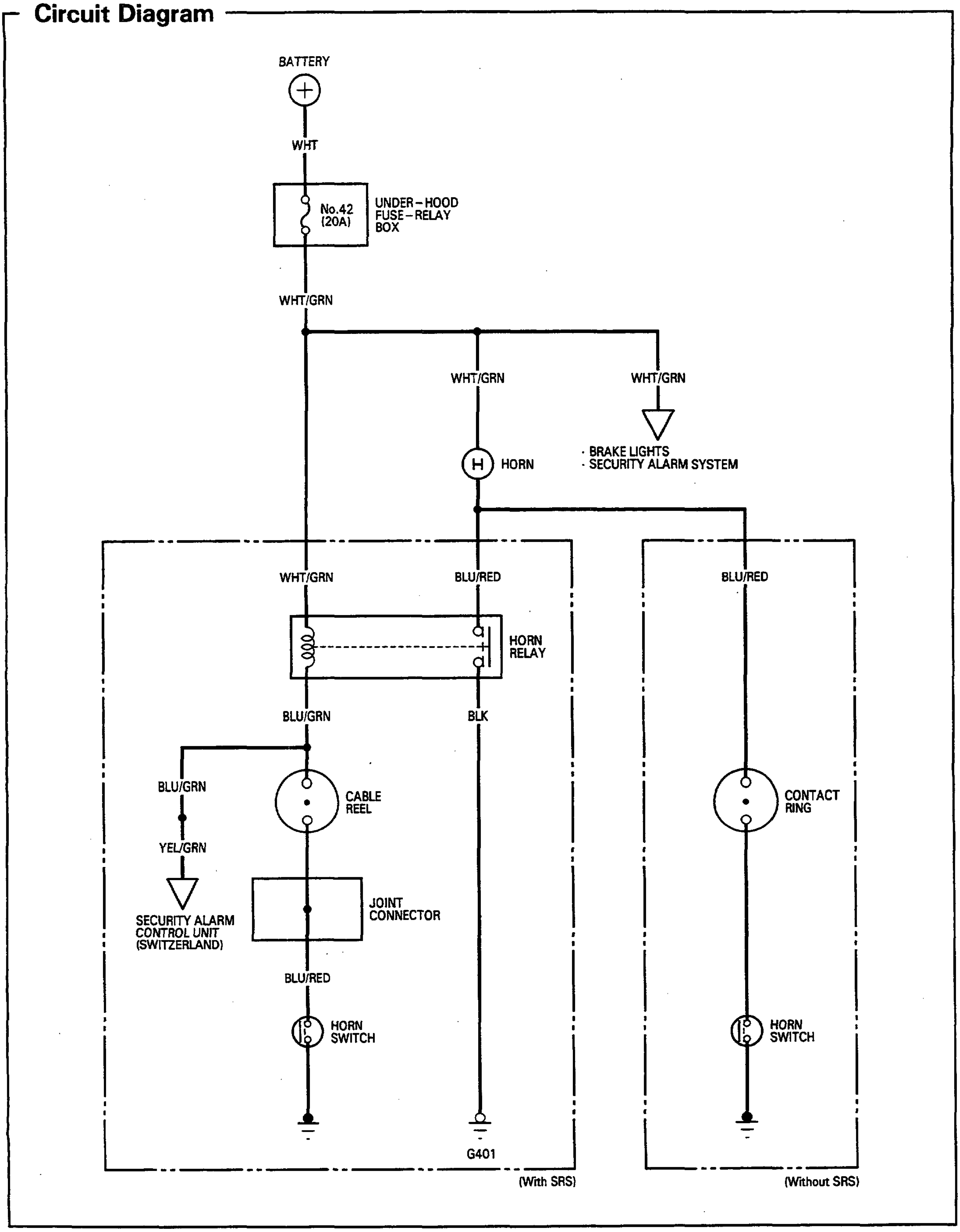


11. Remove the ring nut and separate the cigarette lighter socket.

    NOTE: When installing the cigarette lighter, align the lug on the cigarette lighter socket with the slot in the panel.

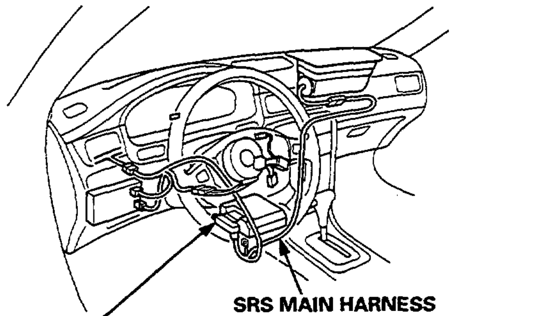
Horn

Circuit Diagram



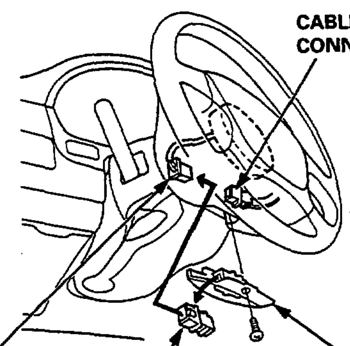
Switch Test (With SRS)

CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**

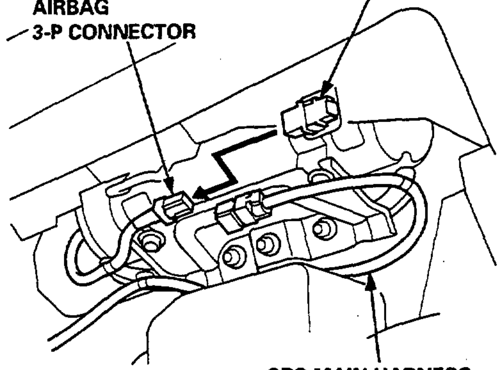


Removal:

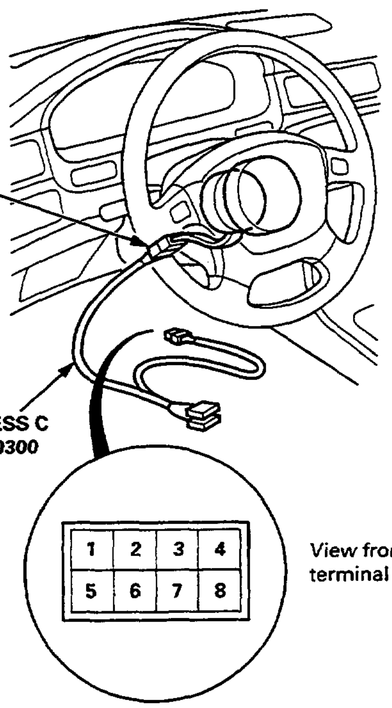
1. Disconnect both the negative cable and positive cable from the battery, and wait at least three minutes.
2. Remove the access panel from the steering wheel, then remove the short connector (RED).



3. Disconnect the connector between the airbag and cable reel.
4. Connect the short connector (RED) to the airbag side of the connector.
5. Remove the glove box, then remove the short connector (RED) from its holder.
6. Disconnect the 3-P connector between the front passenger's airbag and the SRS main harness, then connect the short connector (RED) to the airbag side of the connector.



7. Remove the dashboard lower cover.
8. Disconnect the cable reel harness 6-P connector from the SRS main harness, then connect Test Harness C only to the cable reel harness.

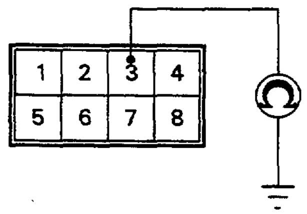


(cont'd)

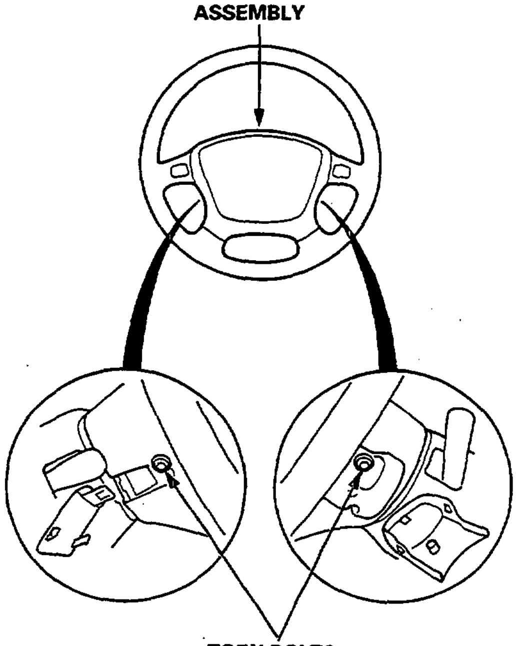
Switch Test (With SRS cont'd)

9. Check for continuity between the No. 3 terminal and body ground with the horn switch pressed.

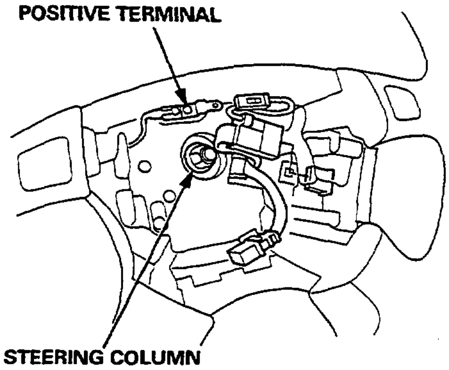
Terminal / Position	No.3 TERMINAL	BODY GROUND
PRESSED	○	○
RELEASED		



10. Remove the two Torx bolts using a Torx T30 bit, then remove the driver's airbag assembly.



11. Check for continuity between the horn switch positive terminal and the steering column shaft with the horn switch pressed.



- If there is continuity, replace the cable reel.
- If there is no continuity, replace the horn switch.

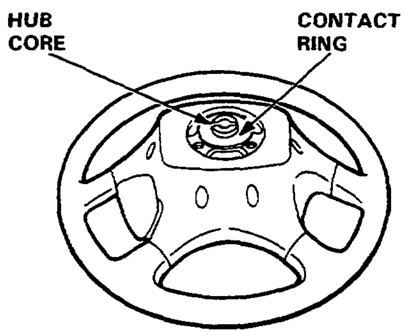
12. Reinstall the steering wheel (see section 17).

Switch Test (Without SRS)

1. Remove the steering wheel, then turn it over.

2. Check for continuity between the hub core and the contact ring with the horn switch pressed.

Terminal / Position	HUB CORE	CONTACT RING
PRESSED	O	O
RELEASED		



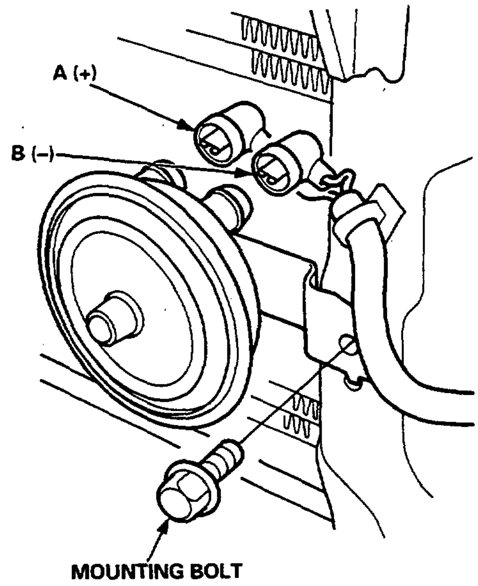
3. If there is continuity, reinstall the steering wheel, then test the combination light switch.

Horn Test

1. Remove the front bumper.

2. Disconnect the connectors from the horn.

3. Remove the horn.

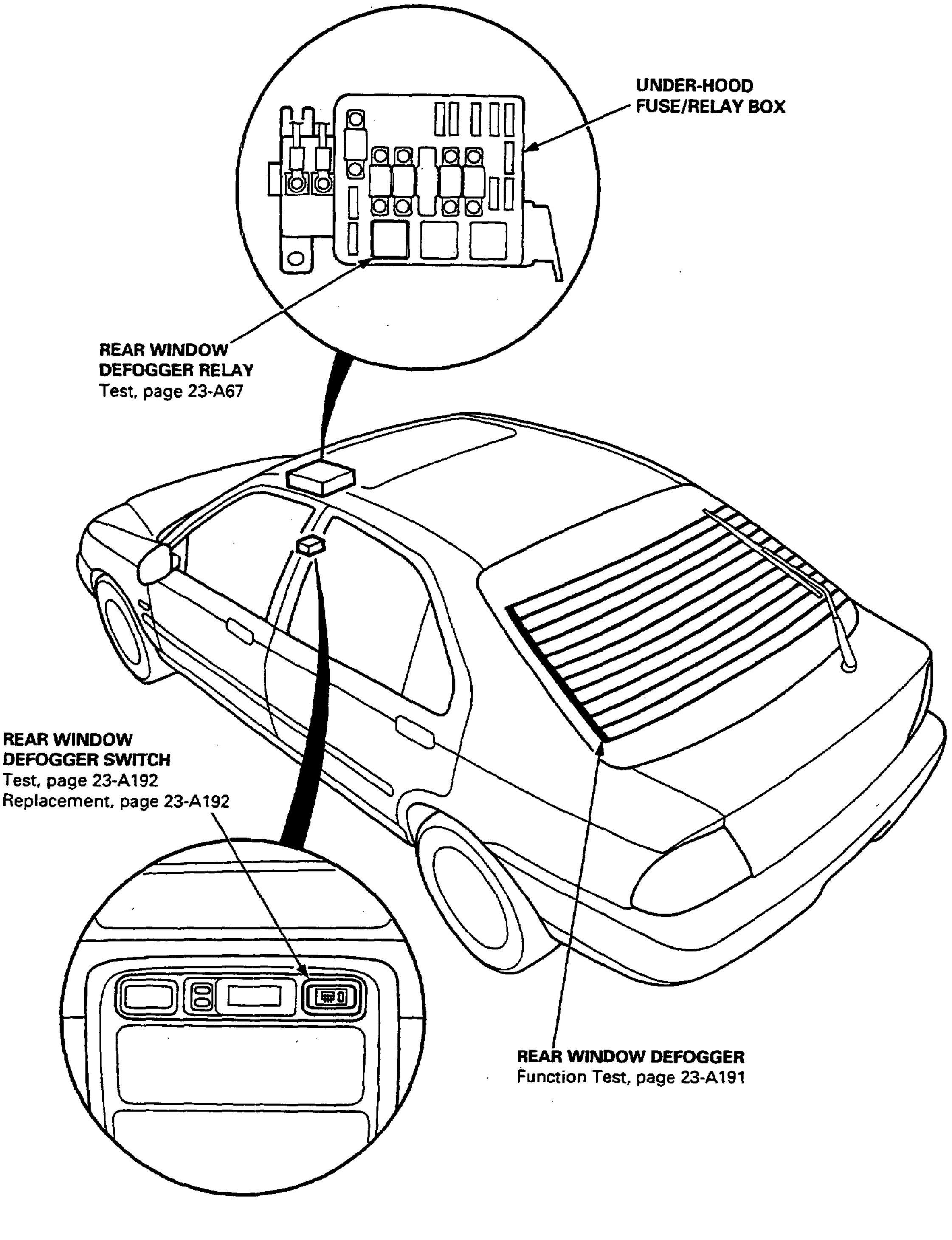


4. Test the horn by connecting battery power to one terminal and grounding the other. The horn should sound.

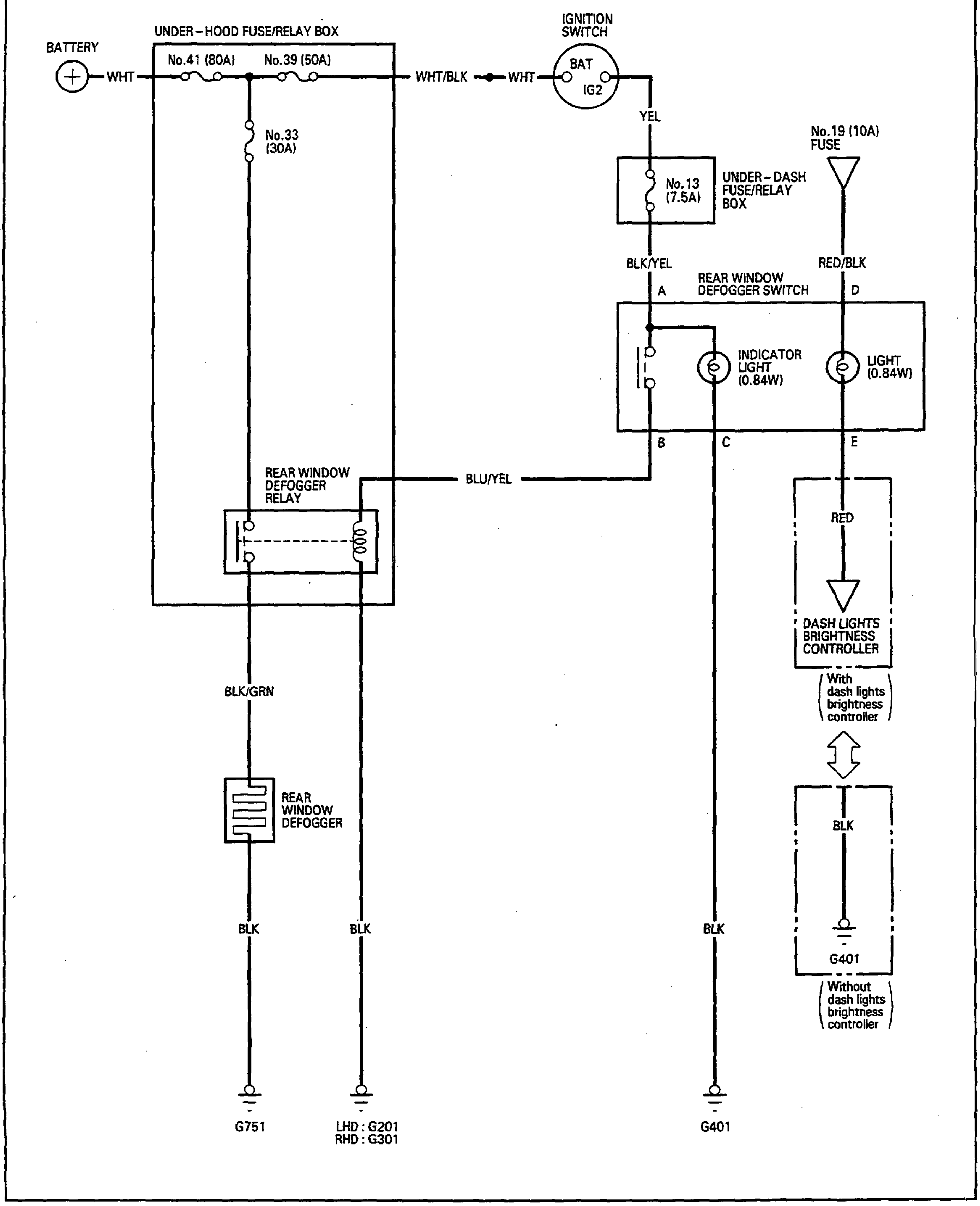
5. Replace the horn if it fails to sound.

Rear Window Defogger

Component Location Index



Circuit Diagram



Rear Window Defogger

Troubleshooting

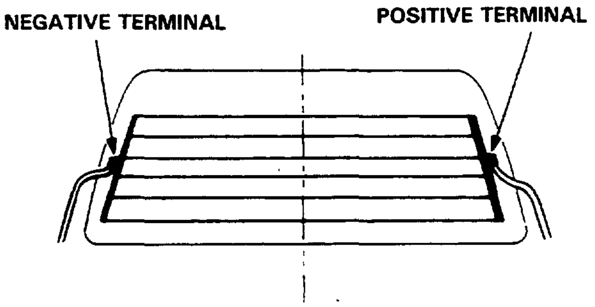
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected	Blown indicator light bulb	Blown No. 13 (7.5 A) fuse (in the under-dash fuse/relay box)	Blown No. 33 (30 A) fuse (in the under-hood fuse/relay box)	Function test	Defogger relay	Defogger switch	Poor ground	Open circuit, loose or disconnected terminals.
Defogger works, but indicator light does not go on.	1						G401	BLK/YEL
Defogger does not work and indicator light does not go on.		1				2	G401	YEL, BLU/YEL, or BLK/YEL
Defogger does not work, but indicator light goes on.			1	4	2	3	G201 G301 G751	BLU/YEL, BLK/YEL or BLK/GRN

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 the defogger switch ON. There should be battery voltage.
   - If there is no voltage, check for:
     — Faulty defogger relay.
     — Faulty defogger switch.
     — An open in the BLK/GRN wire.
   - If there is battery voltage, go to step 2.

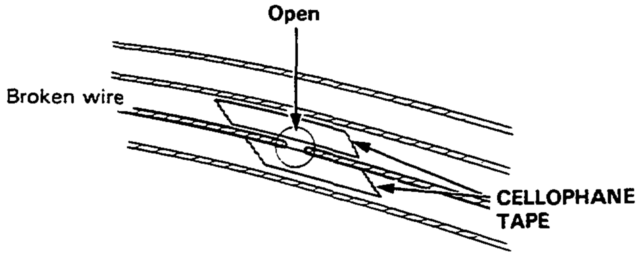


2. Check for continuity between the negative terminal and body ground.
   If there is no continuity, check for an open in the defogger ground wire.
3. Touch the voltmeter positive probe to the middle of each defogger wire, and the negative probe to the negative terminal.
   There should be approximately 6 V with the ignition switch and the defogger switch ON.
   - If the voltage is as specified, the defogger wire is OK.
   - If there is battery voltage, the defogger wire is broken on the negative side.
   - If there is no voltage, the defogger wire is broken on the positive side.

Defogger Wire Repair

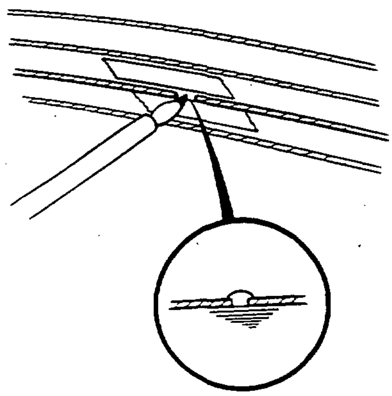
NOTE: Repair section must be no longer than 25 mm (1.0 in).

1. Lightly scour area around the break with fine steel wool, then clean with alcohol.
2. Carefully mask both edges of 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 paint before use.



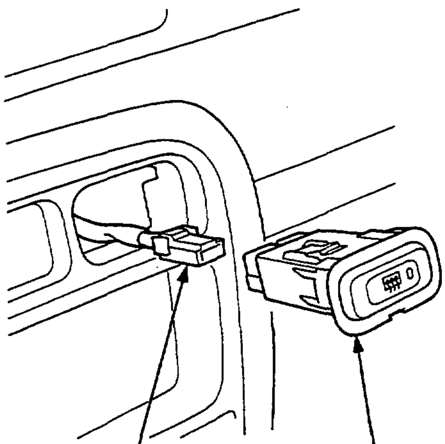
4. Check for proper operation with a voltmeter (approximately 6 V at the mid-point).
5. Apply a second coat of paint in the same manner. Let it dry three hours before you remove the tape.

Rear Window Defogger

Switch Replacement

CAUTION: Be careful not to damage the rear window defogger switch or the front console panel when prying the switch out.

1. Carefully pry the switch out of the front console panel.
2. Disconnect the 5-P connector from the switch.

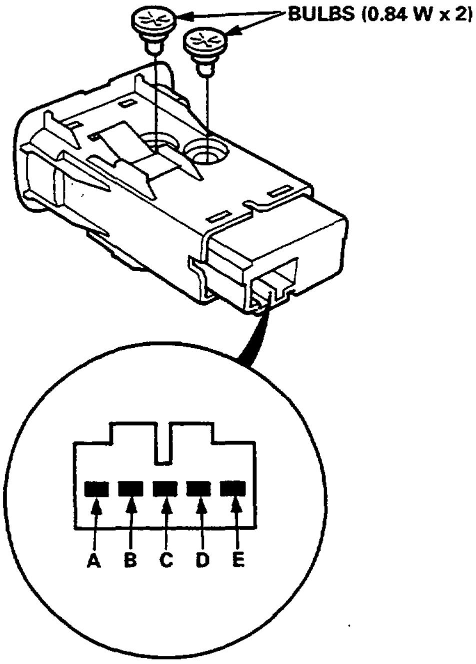


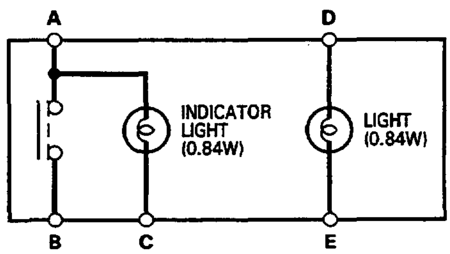
3. Install in the reverse order of removal.

Switch Test

1. Remove the rear window defogger switch from the front console panel.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A	B		C	D		E
OFF	O		⊗	O	O	⊗	O
ON	O	O	⊗	O	O	⊗	O





Switch Input Test

NOTE: Before testing, check for blown No. 13 (7.5 A) fuse in the under-dash fuse/relay box.

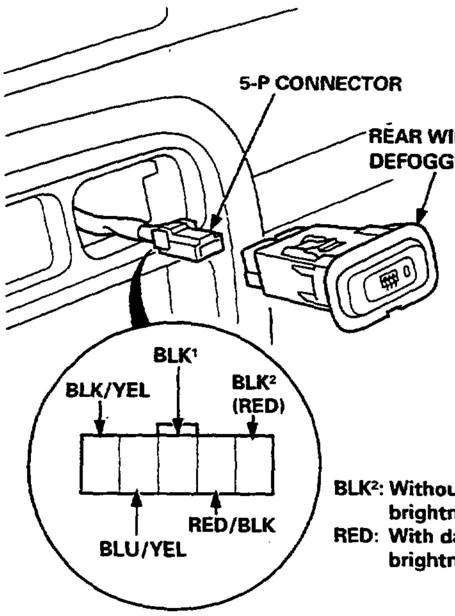
1. Remove the switch from the front console.

2. Check for continuity between the BLK[1] (BLK[2]) terminal and body ground.
   There should be continuity.

   - If there is continuity, go to step 3.
   - If there is no continuity, check for
     — an open in the wire.
     — poor ground (G401).

3. Turn the ignition switch ON (II) and check the voltage between the BLK/YEL (+) and the BLK (–) terminals.
   There should be battery voltage.

   - If there is no battery voltage, check for an open in the BLK/YEL wire.
   - If there is battery voltage, go to step 4.



BLK[2]: Without dash lights brightness controller
RED: With dash lights brightness controller

4. Headlight switch ON.

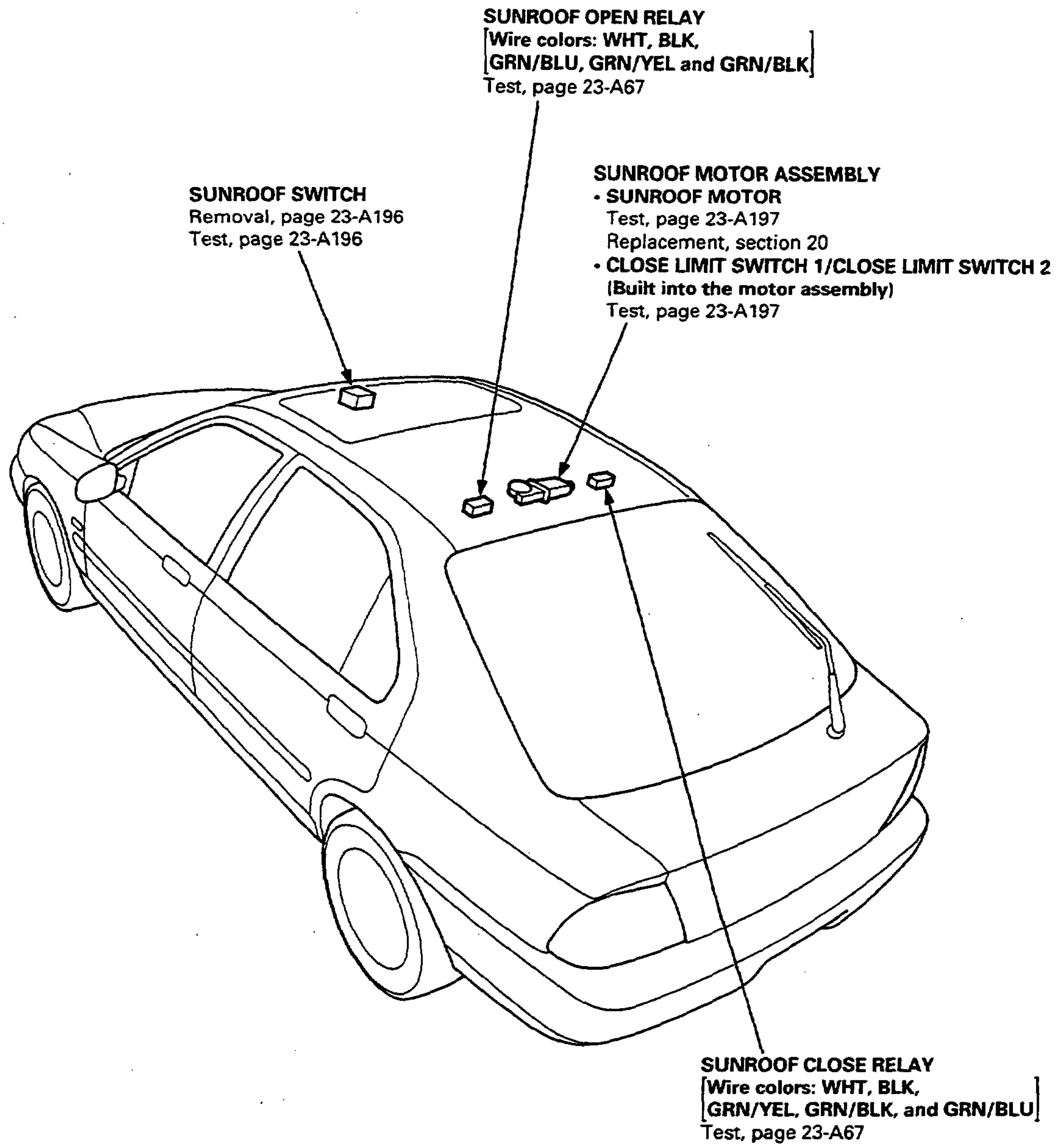
5. Check for voltage between the RED/BLK terminal and BLK[2] (RED) terminal.
   There should be battery voltage.

   - If there is battery voltage, go to step 6.
   - If there is no voltage, check for
     — blown No.19 (10 A) fuse in the under-dash fuse/relay box.
     — an open in the wire.
     — faulty dash lights brightness controller. (With dash lights brightness controller)

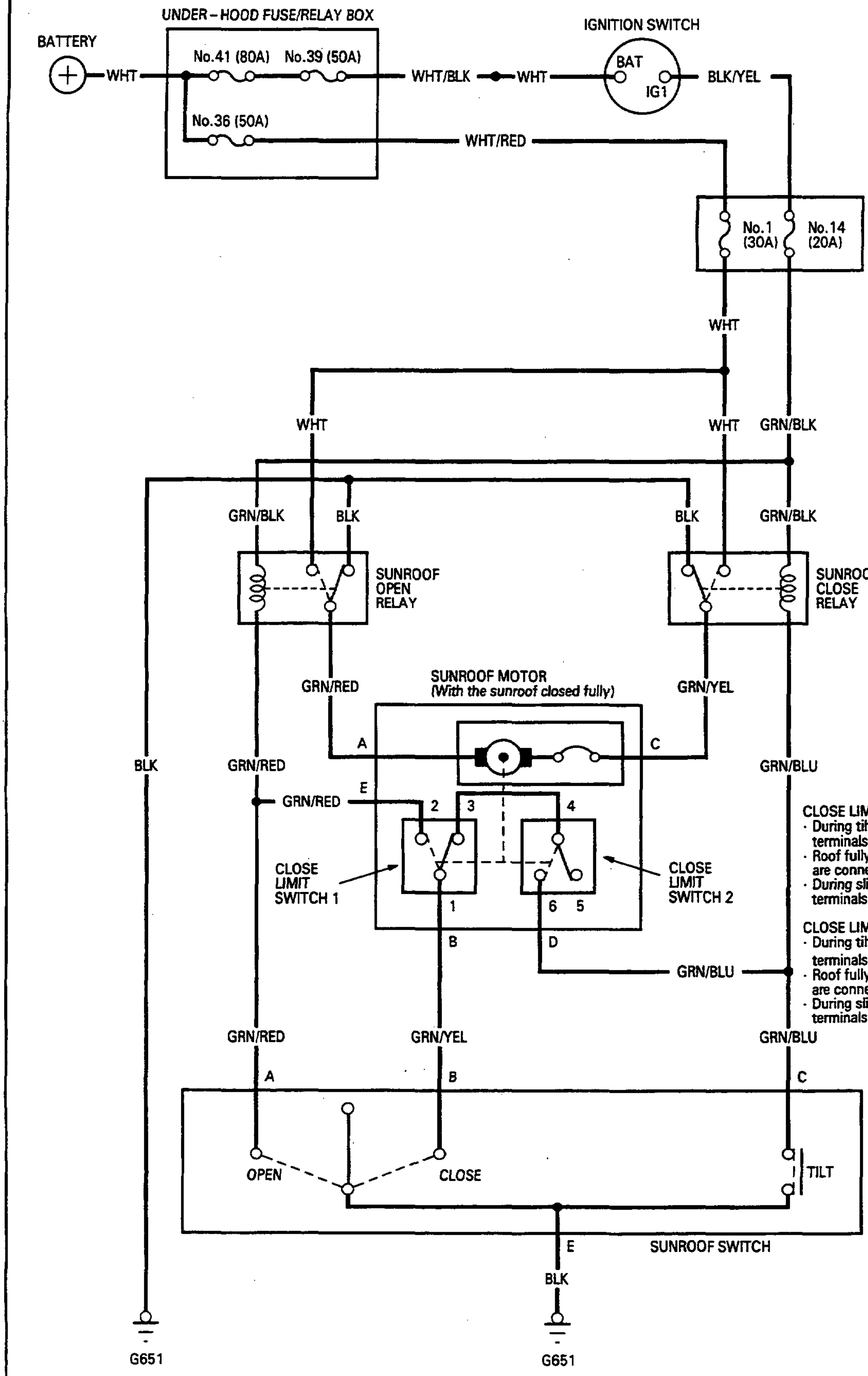
6. Connect a jumper wire between the BLK/YEL and the BLU/YEL terminals.
   Turn the ignition switch ON, and check that the rear window defogger works normally.

   - If the rear window defogger works normally, replace the rear window defogger switch.
   - If the rear window defogger does not work, check for
     — faulty rear window defogger relay.
     — an open in the wire.

Component Location Index



Circuit Diagram



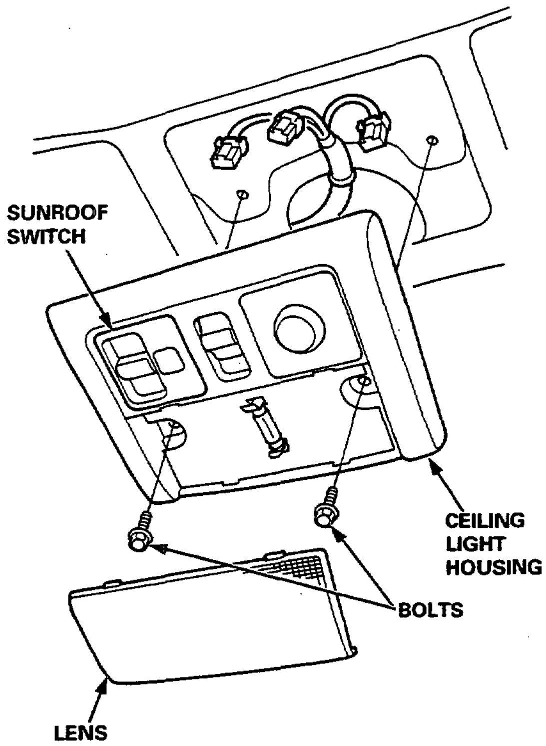
CLOSE LIMIT SWITCH 1:
- During tilting (Tilt up ◄–► Fully closed): terminals 1and 2 are connected.
- Roof fully closed: terminals 1 and 3 are connected.
- During sliding (Fully closed ◄–► Fully open): terminals 1 and 3 are connected.

CLOSE LIMIT SWITCH 2:
- During tilting (Tilt up ◄–► Fully closed): terminals 4 and 5 are connected.
- Roof fully closed: terminals 4 and 5 are connected.
- During sliding (Fully closed ◄–► Fully open): terminals 4 and 6 are connected.

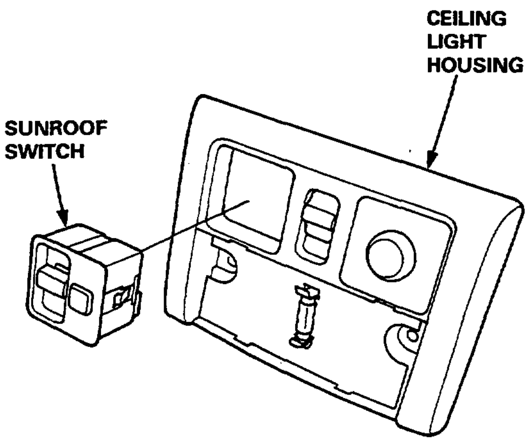
Sunroof

Switch Removal

1. Turn the front ceiling light switch OFF.
2. Pry the ceiling light lens off from the light housing.
3. Remove the two bolts and the light housing.
4. Disconnect the connectors from the light housing.

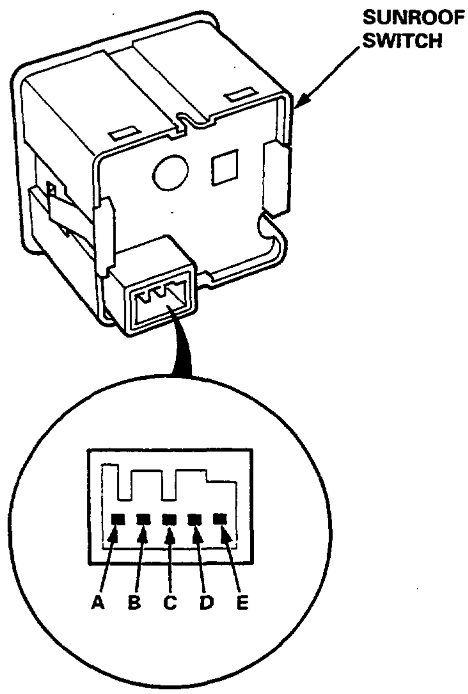


5. Separate the sunroof switch from the ceiling light housing.

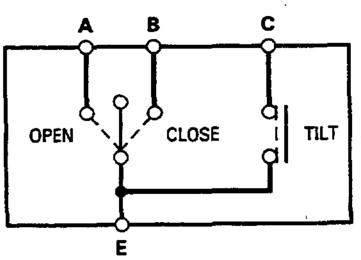


Switch Test

1. Check for continuity between the terminals in each switch position according to the table.



Position \ Terminal	A	B	C	E
TILT			O	O
CLOSE		O		O
OPEN	O			O

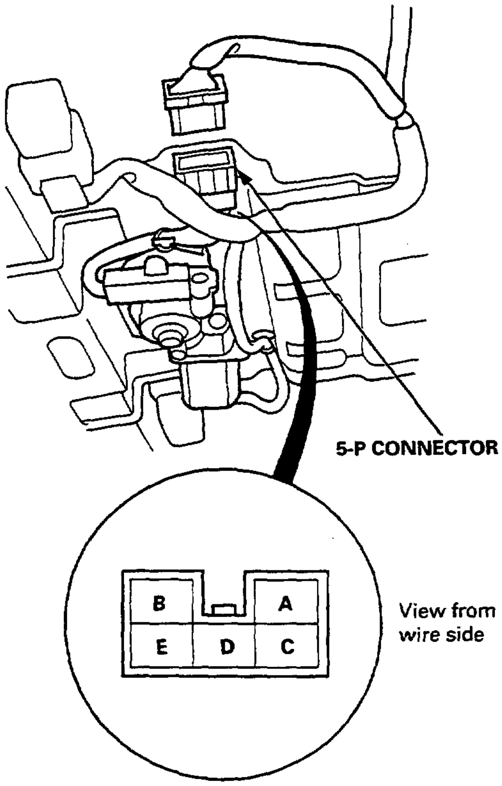


Motor Test

1. Remove the roof lining (see section 20).
2. Disconnect the 5-P connector from the sunroof motor.
3. Test the motor:

Position \ Terminal	A	C
OPEN	⊕	⊖
CLOSE	⊖	⊕

NOTE: The motor clutch test is in section 20.



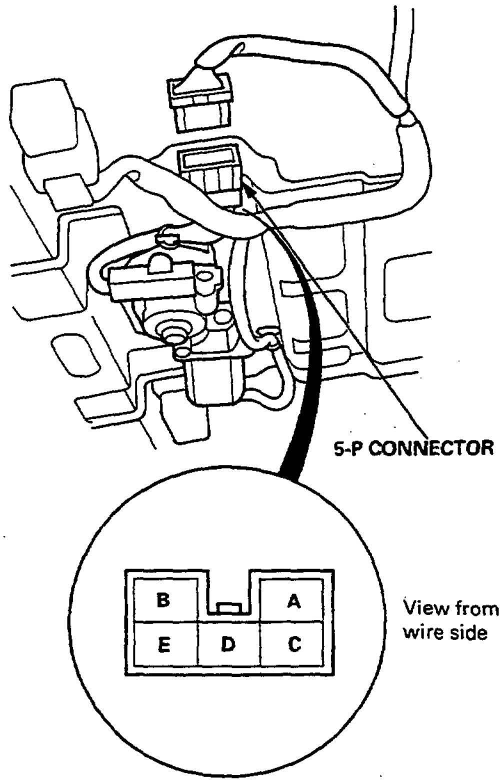
4. If the motor does not run or fails to run smoothly, replace it.

Limit Switch Test

1. Remove the roof lining (see section 20).
2. Disconnect the 5-P connector from the motor.
3. Check for continuity between the terminals in each switch position according to the table.

   NOTE: Turn the motor by hand with the wrench.

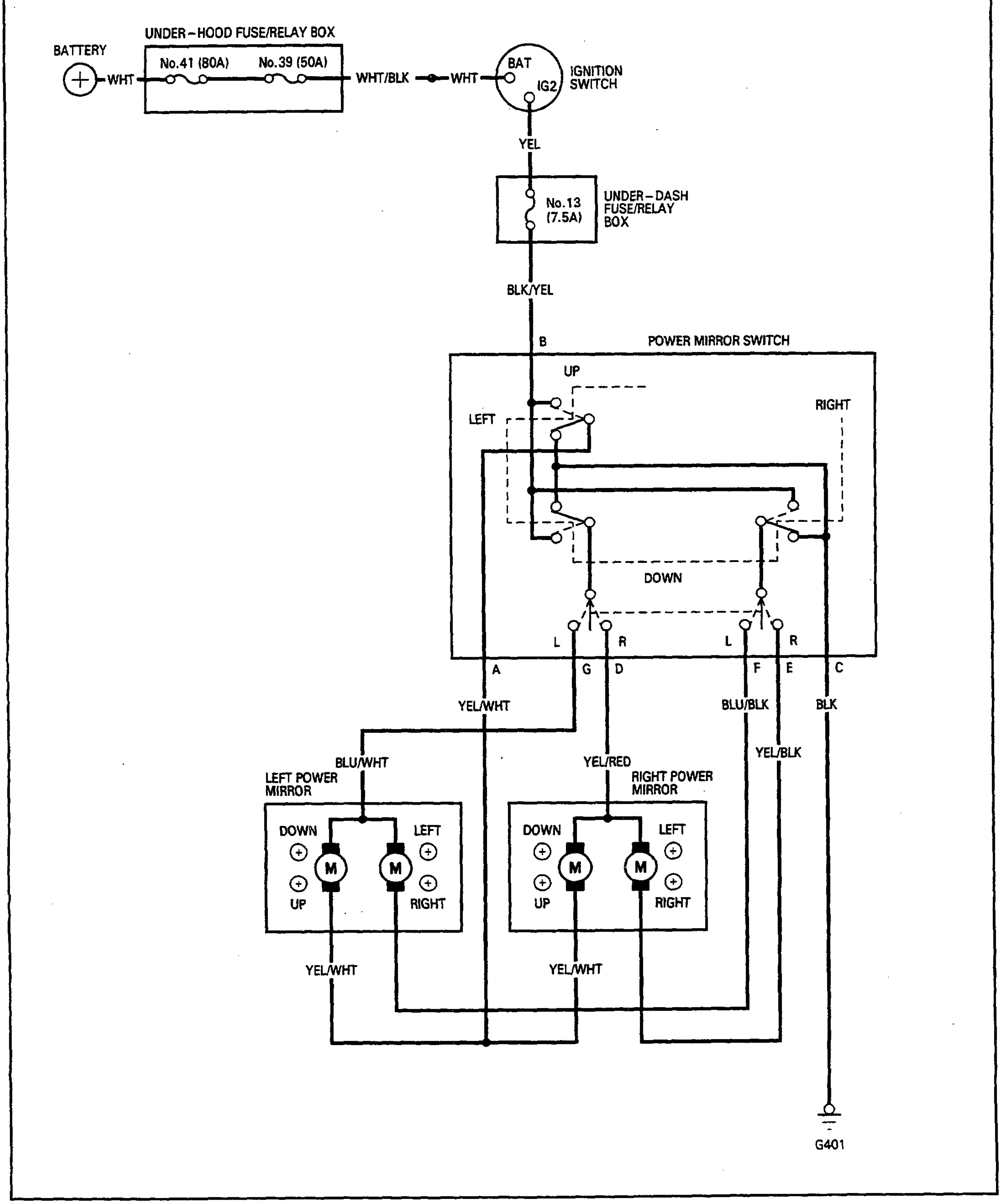
Sunroof Position \ Terminal	B	E	D
Tilted up ◄─► Fully closed	O	O	
Fully closed			
Fully open ◄─► Fully closed	O		O



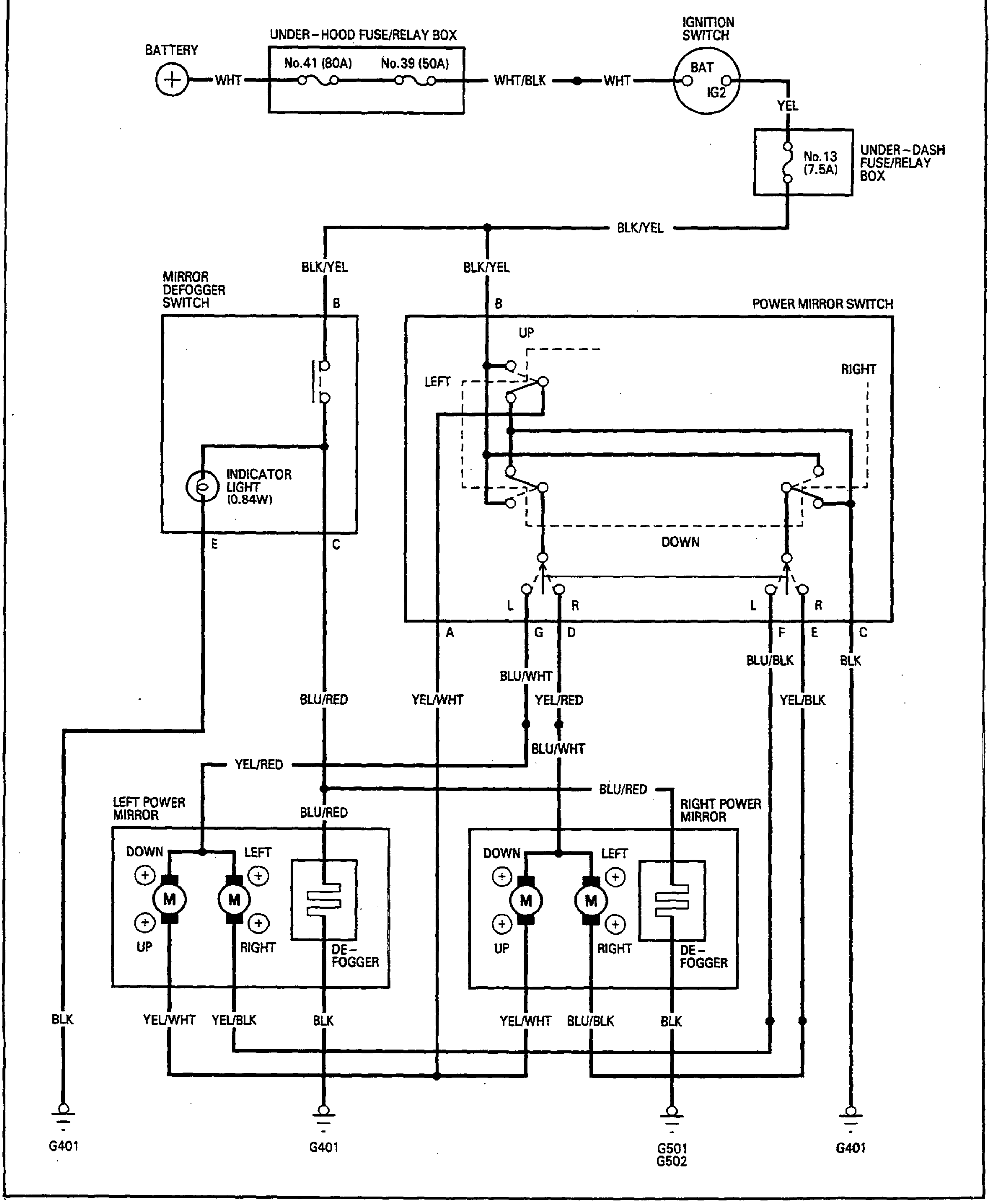
4. If there is no continuity, replace the sunroof motor assembly.

Power Mirrors

Circuit Diagram (KG model)



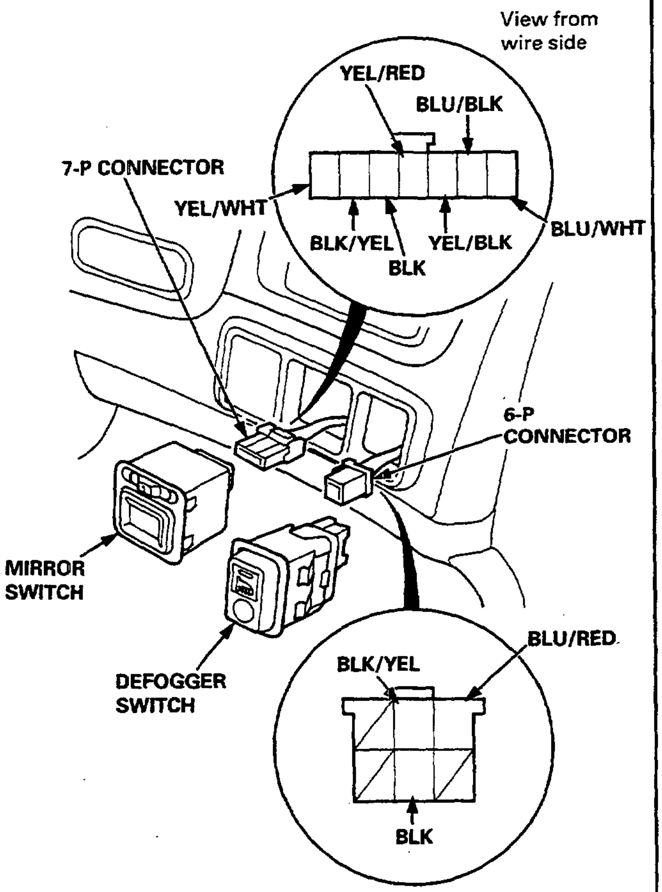
Circuit Diagram (KE model)



Function Test

NOTE:

- Before testing, check the No.13 (7.5 A) fuse in the under-dash fuse/relay box.
- To test, remove the dashboard lower cover, and push out the switches from behind the dashboard.
- RHD type is shown, LHD type is similar.



(With defogger)

Mirror Actuator Test

One or both inoperative:

1. Check for voltage between the BLK/YEL terminal of the 7-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 BLK/YEL 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).

Left mirror inoperative:

Connect the BLK/YEL terminal of the 7-P connector to the BLU/WHT terminal, and the YEL/WHT (or BLU/BLK) terminal to body ground with jumper wires.
The left mirror should tilt down (or swing left) with the ignition switch ON (II).

- If the mirror does not tilt down (or does not swing left), check for an open in the YEL/WHT (or BLU/BLK) wire between the left mirror and the 7-P connector.
  If the wire is OK, check the left mirror actuator.
- If the mirror neither tilts down nor swings left, repair the BLU/WHT wire.
- If the mirror operates properly, check the mirror switch.

Right mirror inoperative:

Connect the BLK/YEL terminal of the 7-P connector to the YEL/RED terminal, and the YEL/WHT (or YEL/BLK) terminal to body ground with jumper wires.
The right mirror should tilt down (or swing left) with the ignition switch ON.

- If the mirror does not tilt down (or does not swing left), check for an open in the YEL/WHT (or YEL/BLK) wire between the right mirror and the 10-P connector.
  If the wire is OK, check the right mirror actuator.
- If the mirror neither tilts down nor swings left, repair the YEL/RED wire.
- If the mirror works properly, check the mirror switch.

Defogger Test (With defogger)

1. Check for voltage between the BLK/YEL terminal of the 6-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 BLK/YEL wire between the under-dash fuse/relay box and the 6-P connector.
   - If there is battery voltage, go to step 2.

2. Connect the BLK/YEL terminal of the 6-P connector to the BLU/RED terminal with a jumper wire.
   Both the right and left mirrors should gradually warm up with the ignition switch ON (II).
   - If neither warms up, repair the BLU/RED wire.
   - If only one fails to warm up, check its mirror defogger element.
   - If both warm up, check the switch.

Switch Tests

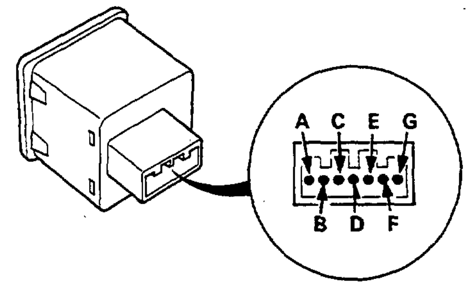
1. Remove the dashboard lower cover.
2. *Push out the switches* from behind the dashboard.
3. Disconnect the connectors, and check for continuity between the terminals in each switch position according to the table.

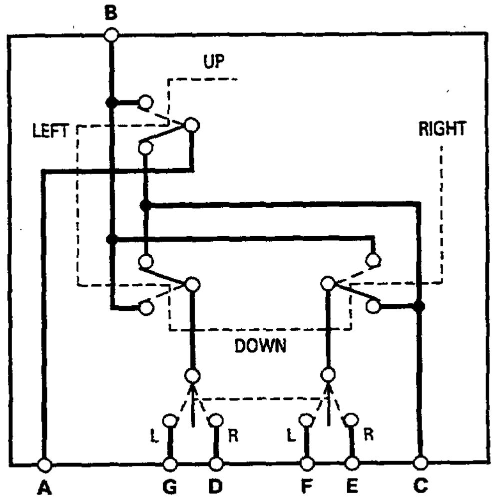
Mirror Switch:

Position		B	C	A	F	G	E	D
R	ON		○	○			○	○
R	UP	○		○				
			○				○	○
R	DOWN	○					○	○
			○	○				
R	LEFT	○		○				○
			○				○	
R	RIGHT	○					○	
			○	○				○
L	OFF		○	○	○	○		
L	UP	○		○				
			○		○	○		
L	DOWN	○			○	○		
			○	○				
L	LEFT	○		○		○		
			○		○			
L	RIGHT	○			○			
			○	○		○		

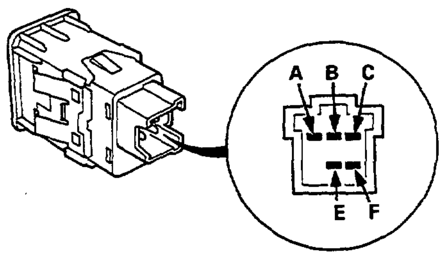
Defogger Switch:

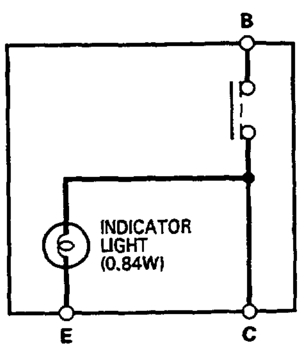
Position	B	C		E
ON	○	○	○	○
OFF		○	○	○





With defogger:

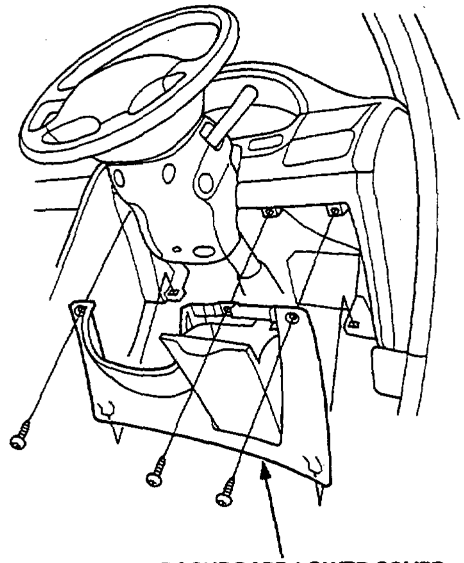




Power Mirrors

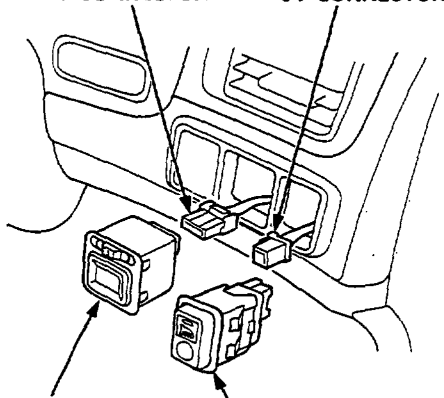
Switch Removal

1. Remove the dashboard lower cover.



2. Push out the switches from behind the dashboard.

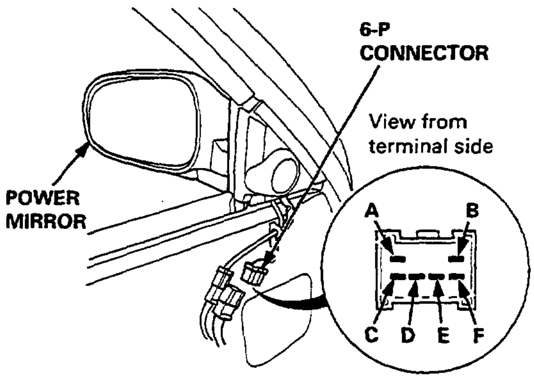
3. Disconnect the connectors.



Power Mirror Test

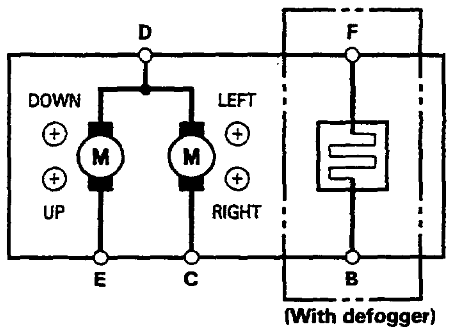
1. Remove the door panel (see section 20).

2. Disconnect the 6-P connector from the power mirror actuator.



3. Check mirror actuator operation by connecting power and ground according to the table.

Terminal / Position	C	D	E
TILT UP		⊖	⊕
TILT DOWN		⊕	⊖
SWING LEFT	⊖	⊕	
SWING RIGHT	⊕	⊖	



With defogger

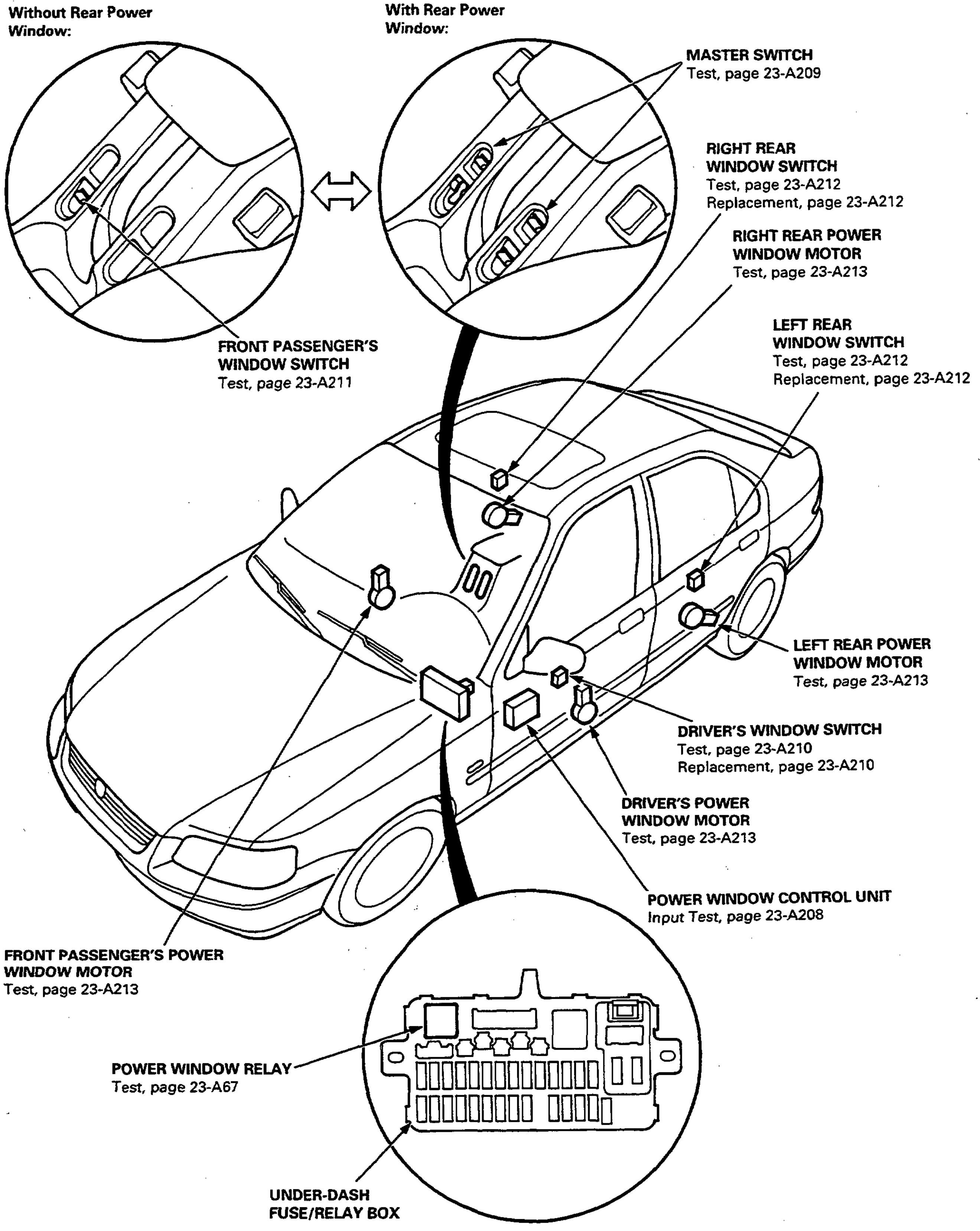
4. Check for continuity between the B and F terminals (R x 10^3 scale).
   There should be continuity.

5. If the power mirror fails to operate properly, replace it.

Power Windows

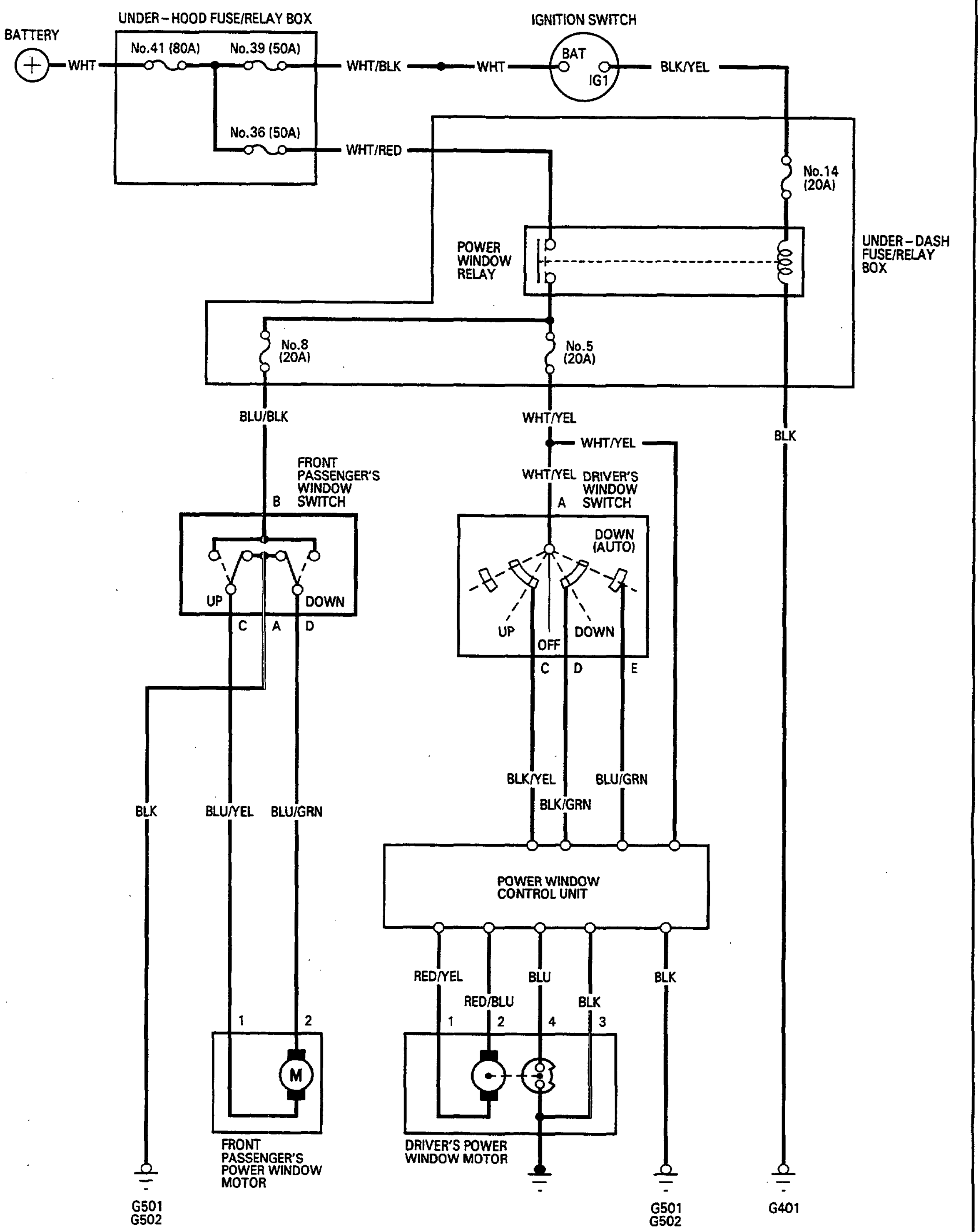
Component Location Index

NOTE: LHD type is shown; RHD type is symmetrical.

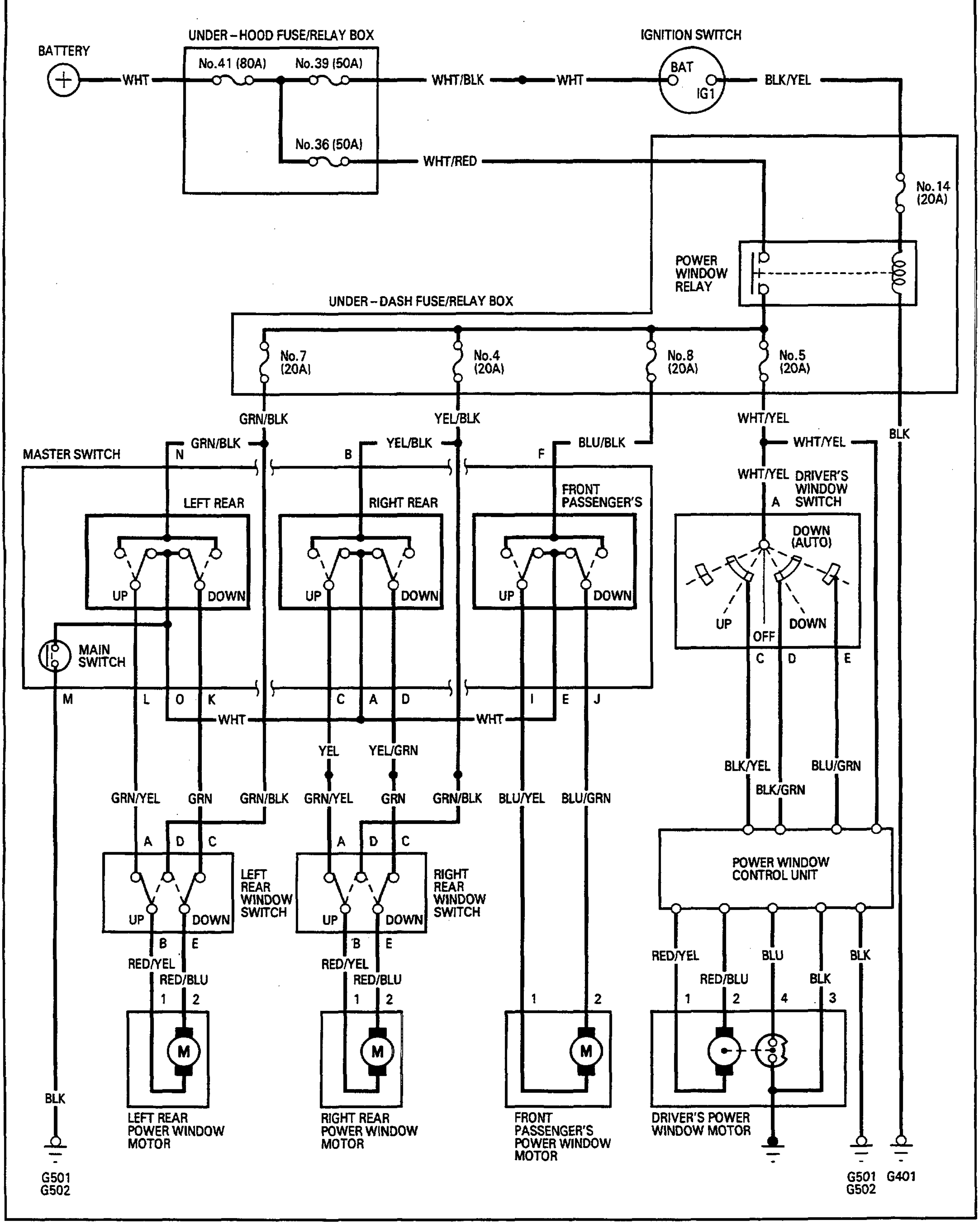


Power Windows

Circuit Diagram (KG and KE models Without Rear Power Windows)

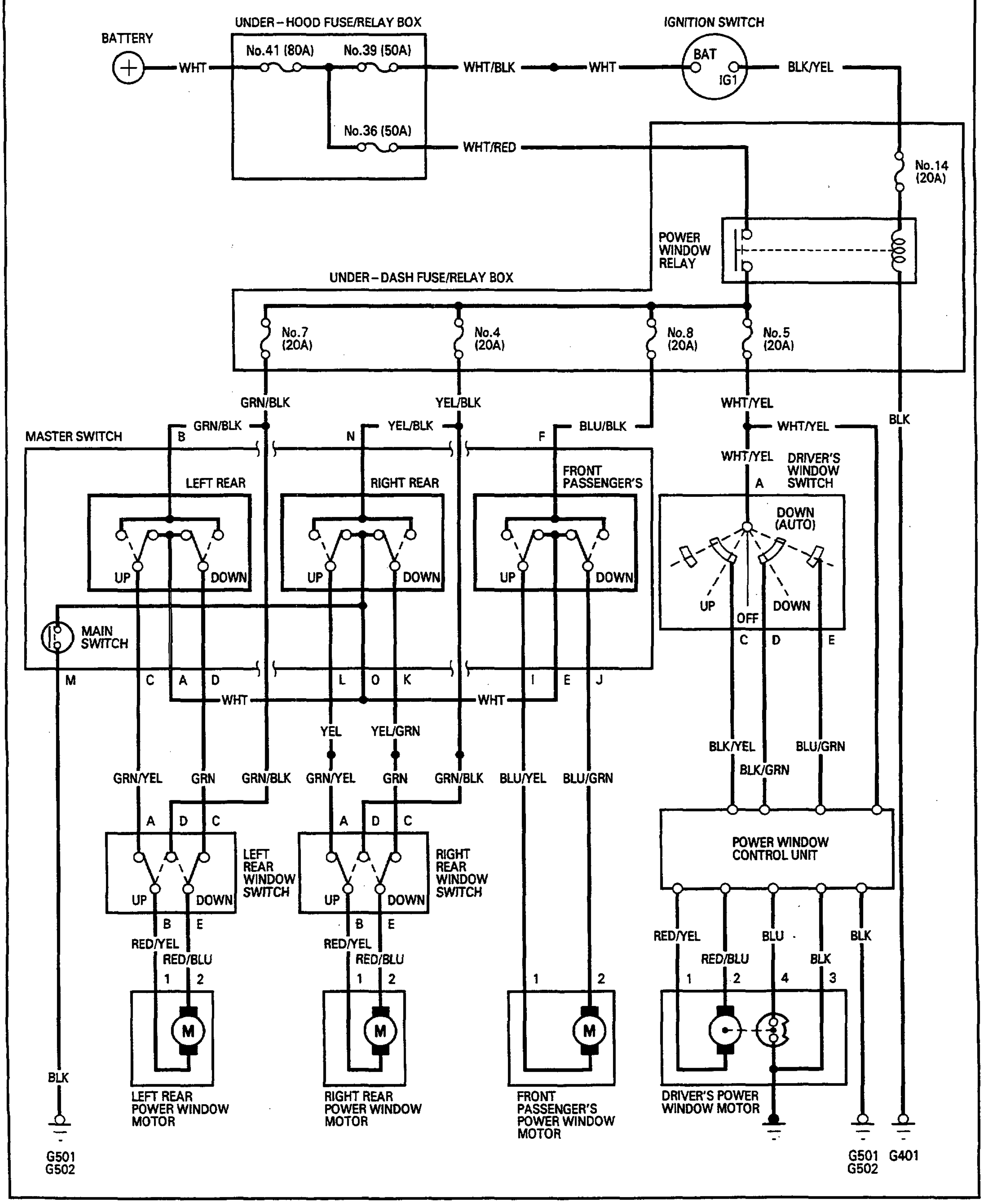


Circuit Diagram (KG model With Rear Power Windows)



Power Windows

Circuit Diagram (KE model With Rear Power Window)



Troubleshooting

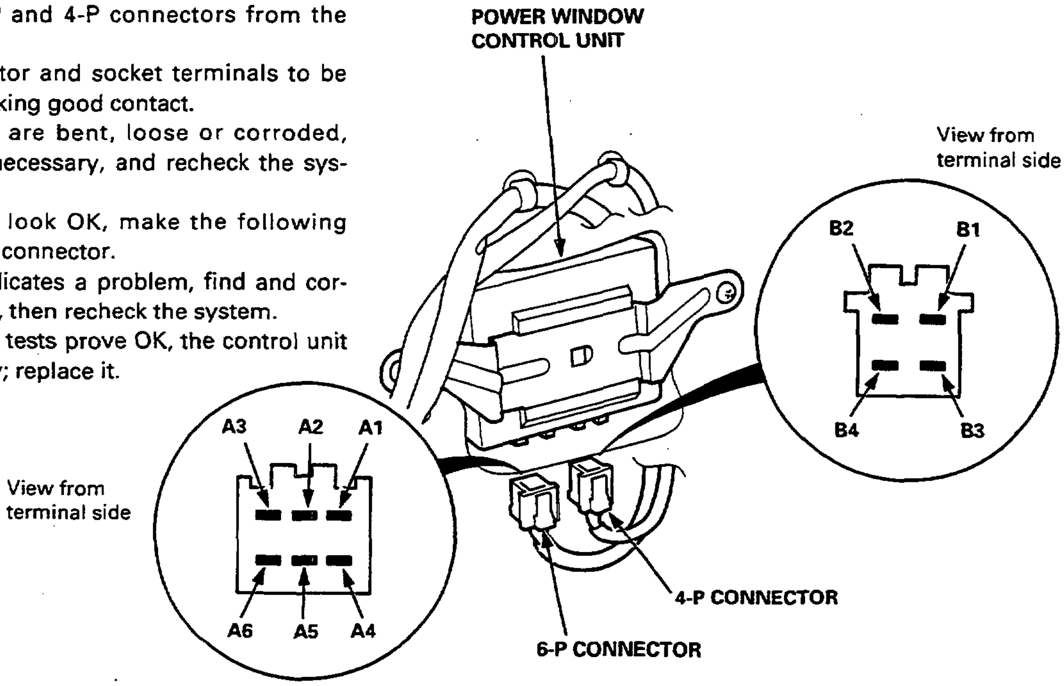
NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom		State of charge, and clean and tight connections of battery	Blown No.14 (20 A) fuse (In the under-dash fuse/relay box)	Power window relay	In the under-dash fuse/relay box				Master switch	Driver's window switch	Passenger's window switch	Driver's motor	Pulser (In driver's motor)	Passenger's motor	Window regulator	Power window control unit input test	Poor ground	Open circuit in the wires, loose or disconnected terminals
					Blown No. 5 (20 A) fuse	Blown No. 8 (20 A) fuse	Blown No. 4 (20 A) fuse	Blown No. 7 (20 A) fuse										
All windows do not work.		1	2	3													G401	BLK/YEL
Driver's window does not work.					1					3		2					G501 G502	WHT/YEL
Driver's window does not work in AUTO.										1			2			3		BLU
Passenger's windows do not work.	Front Passenger's					1			2		3			4	5			BLU/BLK
	Left rear							1	2		3			4	5			GRN/BLK
	Right rear						1		2		3			4	5			YEL/BLK

Power Windows

Control Unit Input Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 6-P and 4-P connectors 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.

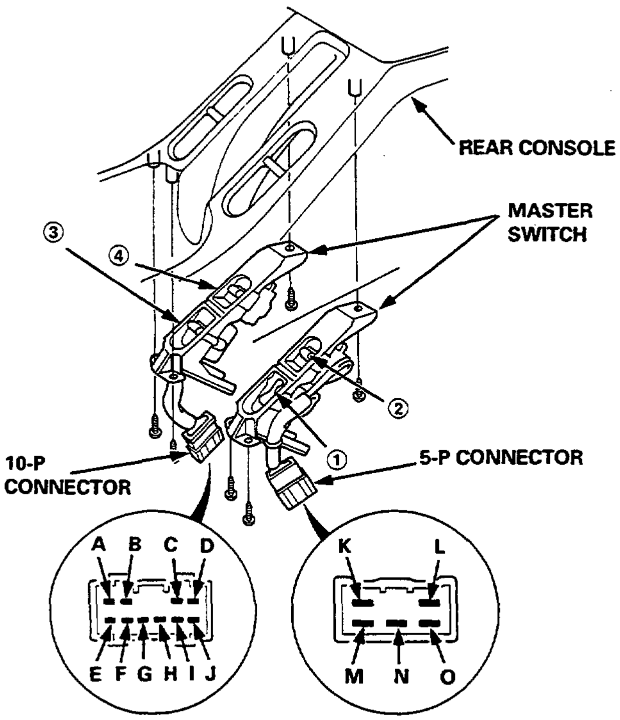


Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G501,G502) • An open in the wire
A3	WHT/YEL	Ignition switch "ON"	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Blown No. 5 (20 A) fuse in the under-dash fuse/relay box • Faulty power window relay
A5	BLK/YEL	Ignition switch ON (II), driver's window switch UP	Check for voltage to ground: There should be battery voltage.	• Faulty driver's window switch • An open in the wire
A6	BLK/GRN	Ignition switch ON (II), driver's window switch DOWN		
A2	BLU/GRN	Ignition switch ON (II), driver's window switch DOWN (AUTO)		
B1	RED/BLU	Connect the A3 terminal to the B1 terminal and the A4 terminal to the B2 terminal, then turn the ignition switch ON (II).	Check the driver's power window motor: It should run (the window moves down).	• Faulty driver's power window motor • An open in the wire
B2	RED/YEL			
B3	BLU	Connect the A3 terminal to the B2 terminal and the A4 terminal to the B1 terminal, then turn the ignition switch ON (II).	Check for resistance between the B3 and B4 terminals: Between 20 – 50 ohms should be indicated as the driver's motor runs.	• Faulty pulser • Faulty driver's power window motor • An open in the wire
B4	BLK			

Master Switch Test/Replacement (With Rear Power Window)

1. Remove the rear console (see section 20).
2. Disconnect the 10-P and 5-P connectors from the master switch.
3. Remove the master switch from the rear console.

   NOTE: LHD type is shown, RHD type is symmetrical.



①: Main switch
②: Left rear switch
③: Front passenger's switch
④: Right rear switch

4. Check for continuity between the terminals in each switch position according to the tables.

FRONT PASSENGER'S SWITCH

Position \ Terminal	E	F	I	J
OFF	○		○	○
UP		○	○	
	○			○
DOWN		○		○
	○		○	

LEFT (∗ RIGHT) REAR SWITCH

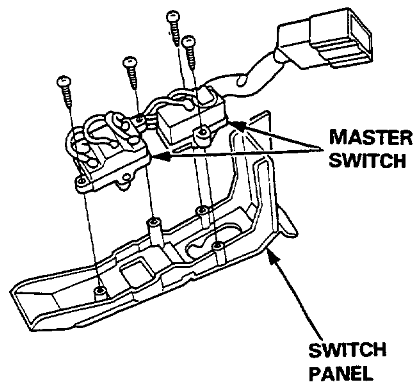
Position	Main switch \ Terminal	K	L	M	N	O
OFF	ON	○	○	○		○
	OFF	○	○			○
UP	ON		○		○	
		○		○		○
	OFF		○		○	
		○				○
DOWN	ON	○			○	
			○	○		○
	OFF	○			○	
			○			○

RIGHT (∗ LEFT) REAR SWITCH

Position \ Terminal	A	B	C	D
OFF	○		○	○
UP		○	○	
	○			○
DOWN		○		○
	○		○	

∗ : KE model

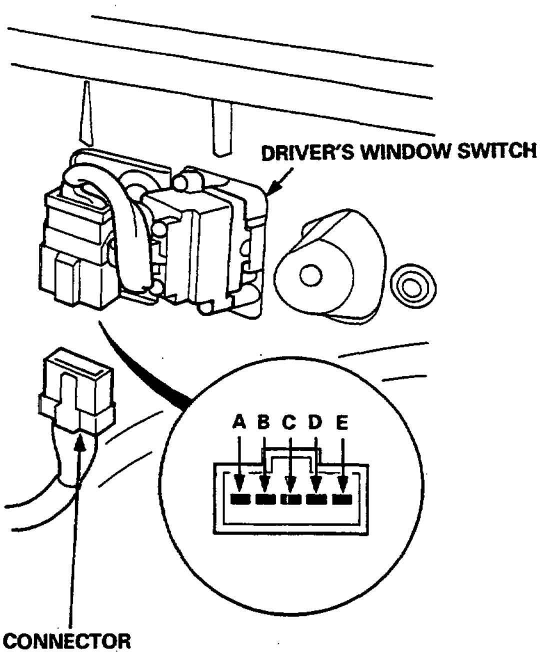
5. Remove the screws, then remove the master switch from the switch panel.



Power Windows

Driver's Window Switch Test

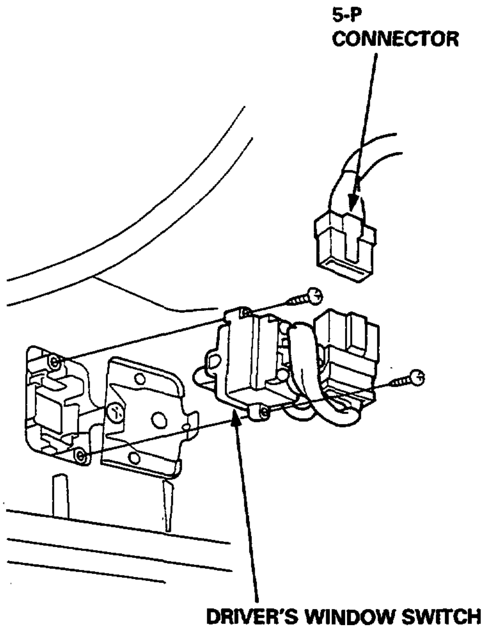
1. Remove the driver's door panel (see section 20).
2. Disconnect the 5-P connector from the switch.
3. Check for continuity between the terminals in each switch position according to the table.



Terminal / Position	A	C	D	E
UP	○	○		
OFF				
DOWN	○		○	
DOWN (AUTO)	○			○

Driver's Window Switch Replacement

1. Remove the driver's door panel (see section 20).
2. Disconnect the 5-P connector from the switch.
3. Remove the switch from the door panel by removing the two screws.

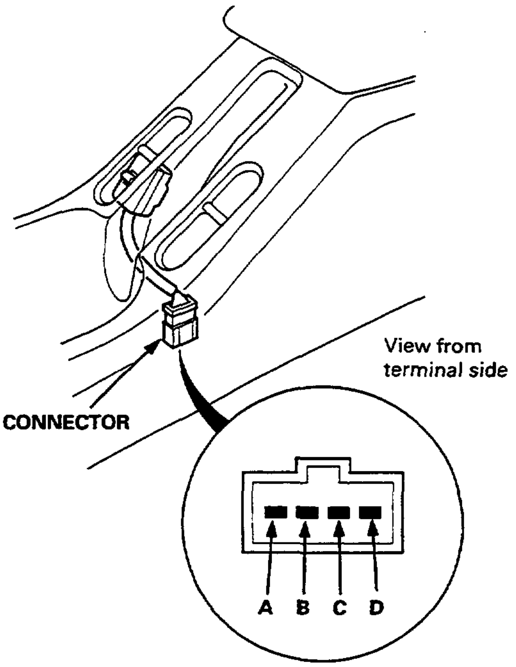


Front Passenger's Window Switch Test (Without Rear Power Window)

1. Remove the rear console (see section 20).

2. Disconnect the 4-P connector.

   NOTE: LHD type is shown, RHD type is symmetrical.



3. Check for continuity between the terminals in each switch position according to the table.

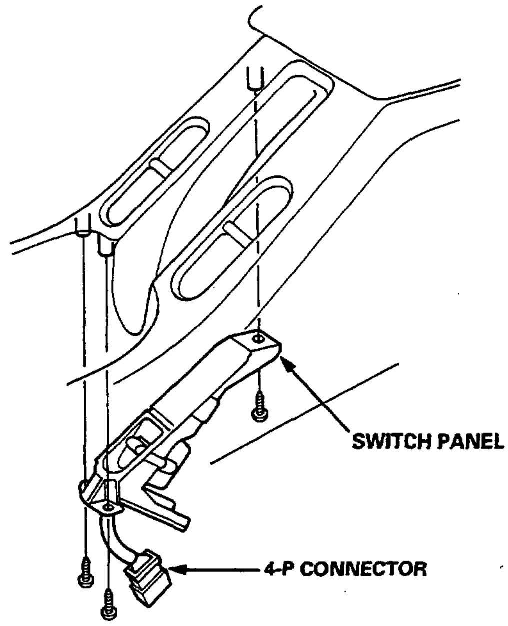
Terminal / Position	A	B	C	D
UP		○	○	
	○			○
OFF	○		○	○
DOWN		○		○
	○		○	

Front Passenger's Window Switch Replacement (Without Rear Power Window)

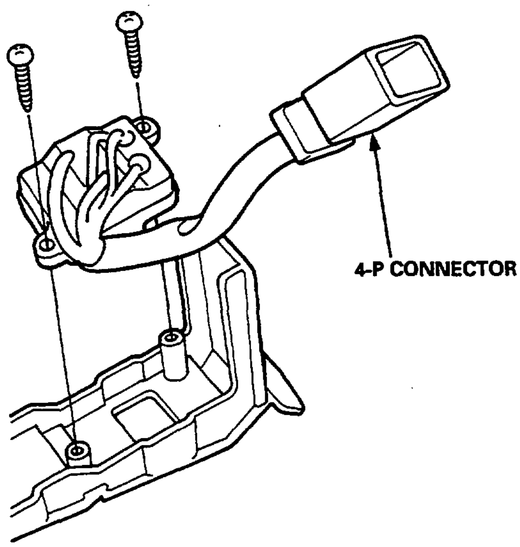
1. Remove the rear console (see section 20).

2. Disconnect the 4-P connector from the switch.

3. Remove the three screws, then remove the switch panel.



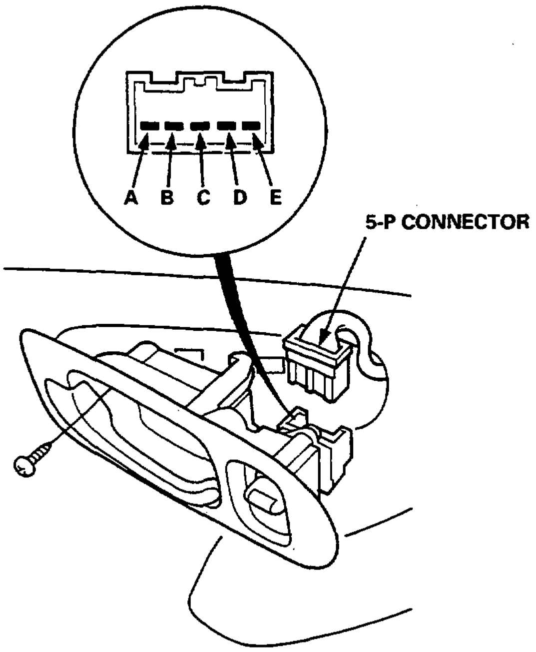
4. Remove the two screws and the switch.



Power Windows

Rear Window Switch Test

1. Remove the door inside handle.
2. Disconnect the 5-P connector.

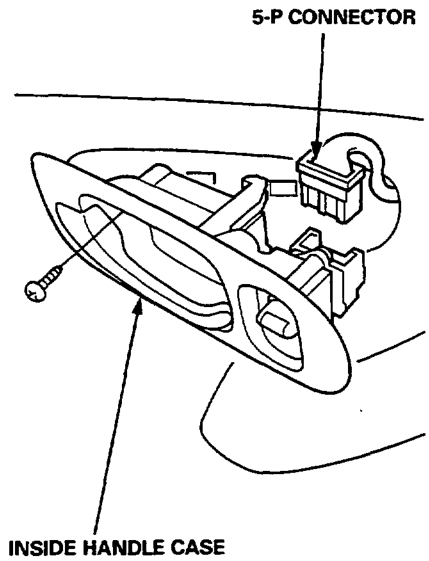


3. Check for continuity between the terminals in each switch position according to the table.

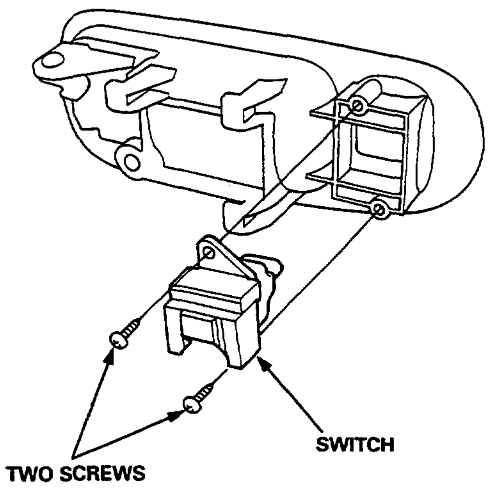
Terminal / Position	A	B	C	D	E
UP		○	○	○	○
OFF	○	○	○		○
DOWN	○	○		○	○

Rear Window Switch Replacement

1. Remove the door inside handle.
2. Disconnect the 5-P connector.



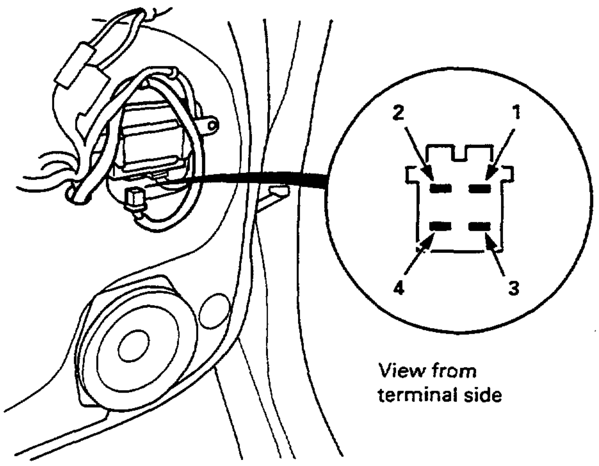
3. Remove the two screws from the switch.



Driver's Power Window Motor Test

Motor Test:

1. Remove the driver's door panel (see section 20).
2. Disconnect the 4-P connector from the motor.



3. Test the motor in each direction by connecting battery power and ground according to the table.

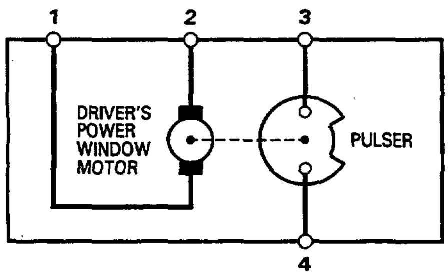
Direction \ Terminal	1	2
UP	⊖	⊕
DOWN	⊕	⊖

CAUTION: When the motor stops running, disconnect one lead immediately.

4. If the motor does not run or fails to run smoothly, replace it.

Pulser Test:

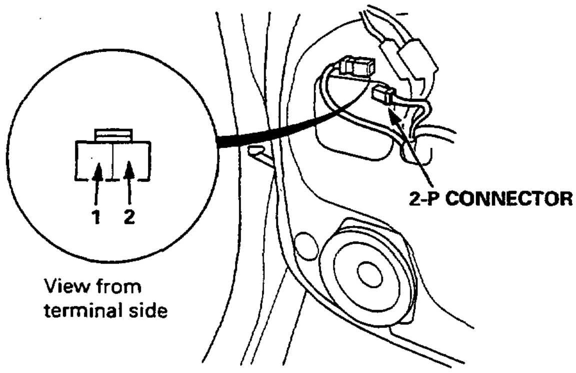
5. Connect the test leads of an analog ohmmeter to the No. 3 and No. 4 terminals.
6. Run the motor by connecting power and ground to the No. 1 and No. 2 terminals. The ohmmeter needle should move back and forth alternately.



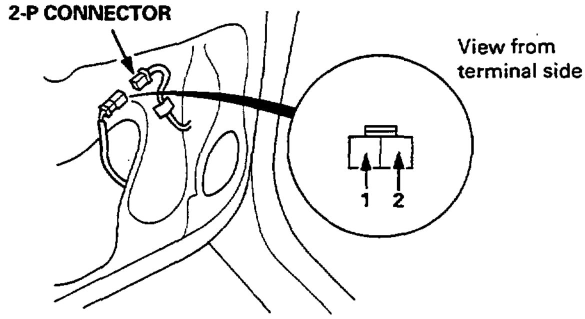
Passenger's Power Window Motor Test

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.

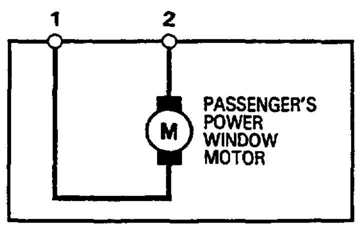


NOTE: The illustration shows the left rear window motor; the right rear window motor is symmetrical.



3. Check window motor operation by connecting power and ground according to the table.

Direction \ Terminal	1	2
UP	⊕	⊖
DOWN	⊖	⊕

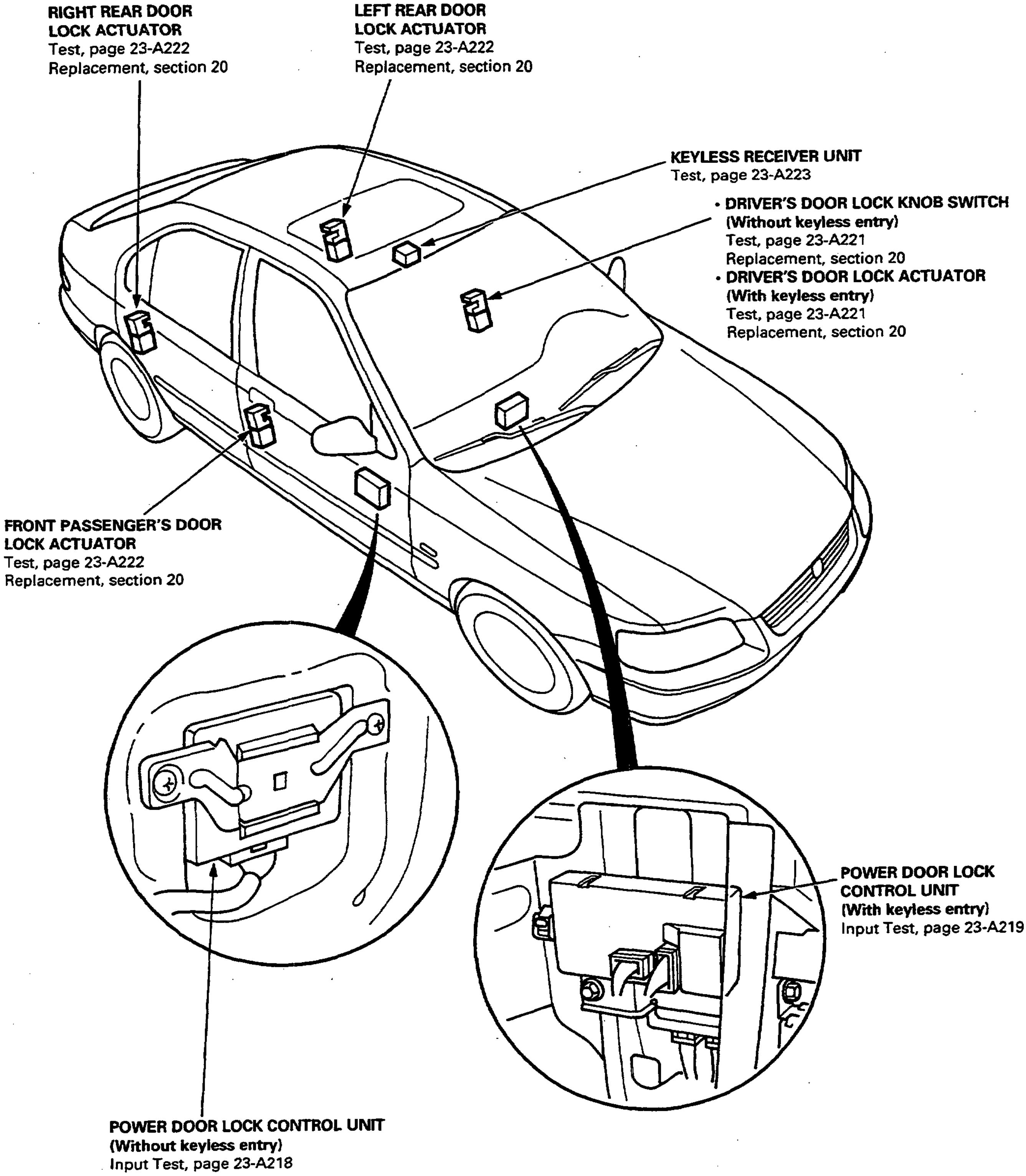


CAUTION: When the motor stops running, disconnect one lead immediately.

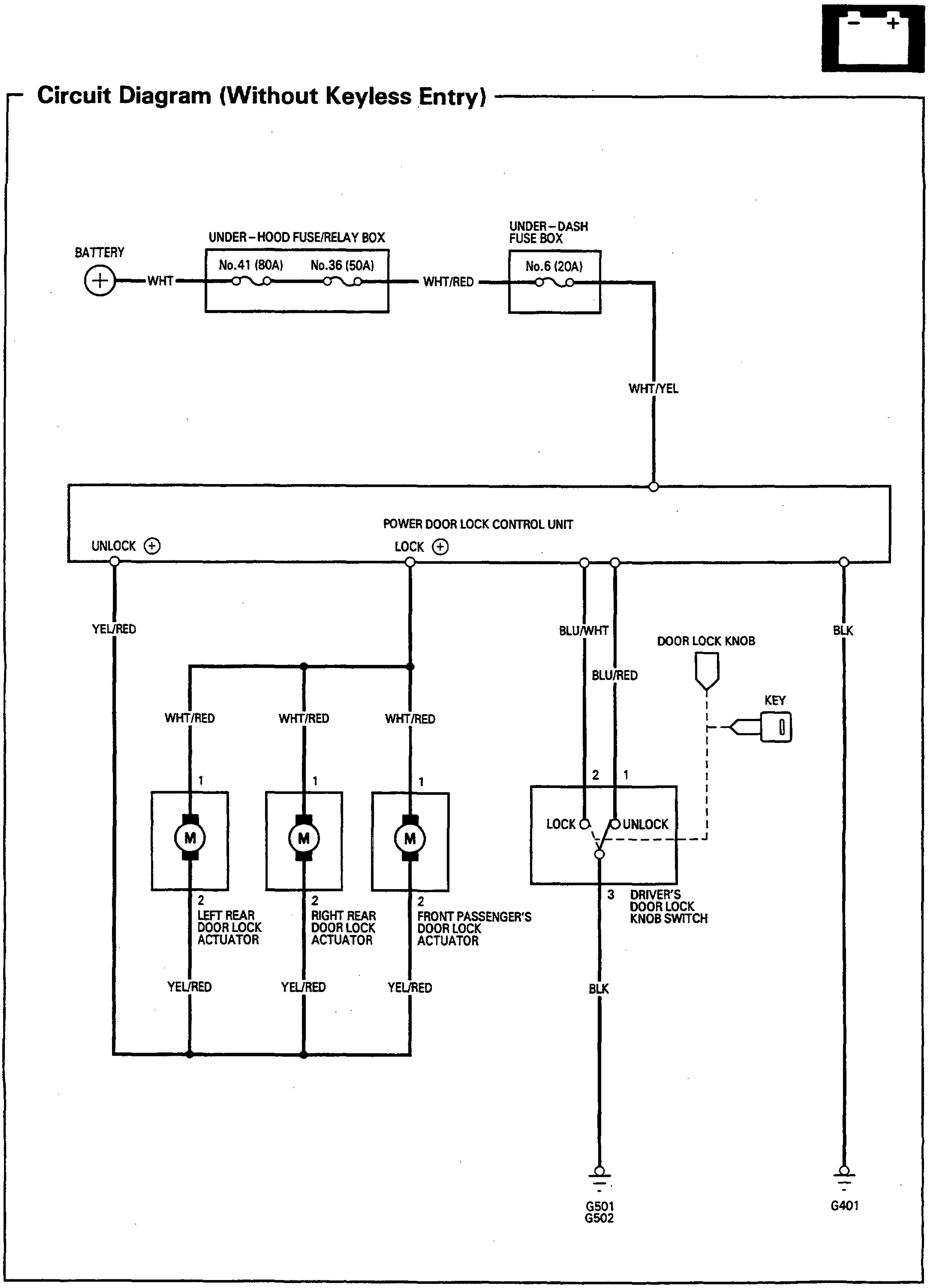
4. If the motor does not run or fails to run smoothly, replace it.

Power Door Locks

Component Location Index



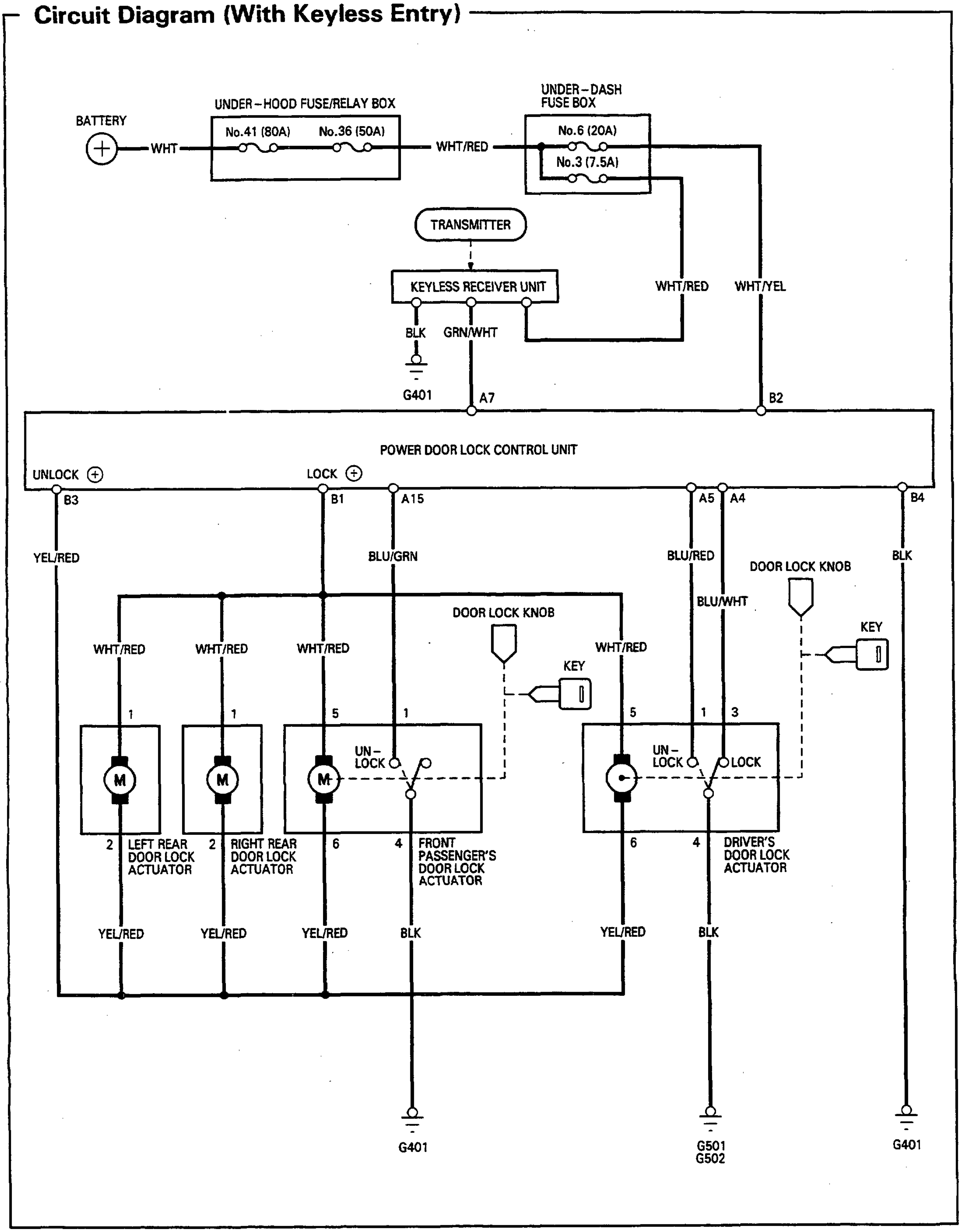
Circuit Diagram (Without Keyless Entry)



23-A215

Power Door Locks

Circuit Diagram (With Keyless Entry)



Troubleshooting

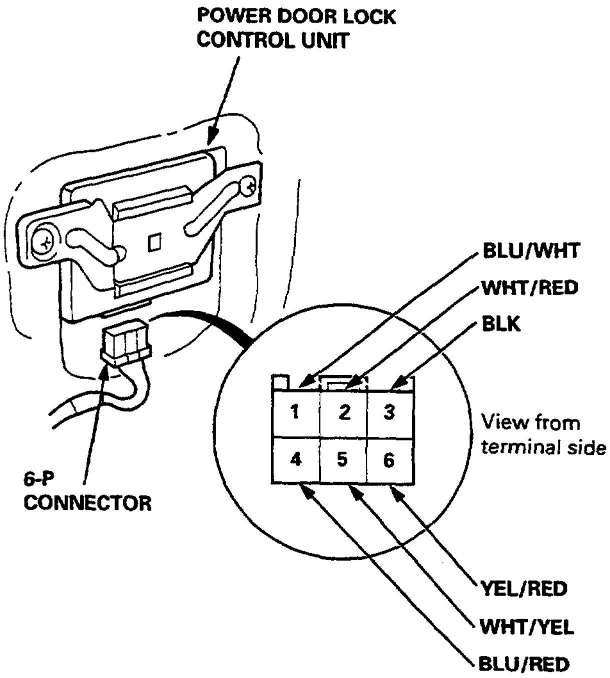
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 6 (20 A) fuse (In the under-dash fuse/relay box)	Blown No. 3 (7.5 A) fuse (In the under-dash fuse/relay box)	Driver's door lock knob switch	Driver's door lock actuator	Passenger's door lock actuator	Keyless receiver unit	Disconnected or obstructed door lock rod/linkage	Power door lock control unit input test	Poor ground	Open circuit, loose or disconnected terminals
Power door lock system does not operate at all.		1							2	G401	WHT/YEL, WHT/RED, YEL/RED
Doors do not lock or unlock with driver's door lock knob switch	All doors			1					2	G501 G502	BLU/RED, BLU/WHT
	One or more doors				1	2		3			WHT/RED, YEL/RED
Doors do not unlock with the front passenger's door lock knob switch.	All doors					1			2	G401	WHT/RED, YEL/RED, BLU/GRN
	One or more doors				2	1		3			WHT/RED, YEL/RED
The power door lock system works properly but the keyless entry system does not work.			1				2		3	G401	GRN/WHT, WHT/RED

Power Door Locks

Control Unit Input Test (Without Keyless Entry)

1. Remove the front passenger's door panel (see section 20).
2. Disconnect the 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 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.



Disconnect the 6-P connector from the power door lock control unit.

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
3	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
2 and 6	WHT/RED and YEL/RED	Connect the YEL/RED terminal to the WHT/YEL terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door lock operation: All doors should unlock.	• Faulty actuator • An open in the wire • Blown No. 6 (20 A) fuse in the under-dash fuse/relay box
		Connect the WHT/RED terminal to the WHT/YEL terminal, and the YEL/RED terminal to the BLK terminal momentarily.	Check door lock operation: All doors should lock.	

Reconnect the 6-P connector to the power door lock control unit.

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
5	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box • An open in the wire
1	BLU/WHT	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 (G501, G502) • An open in the wire
4	BLU/RED	Driver's door lock knob in UNLOCK		

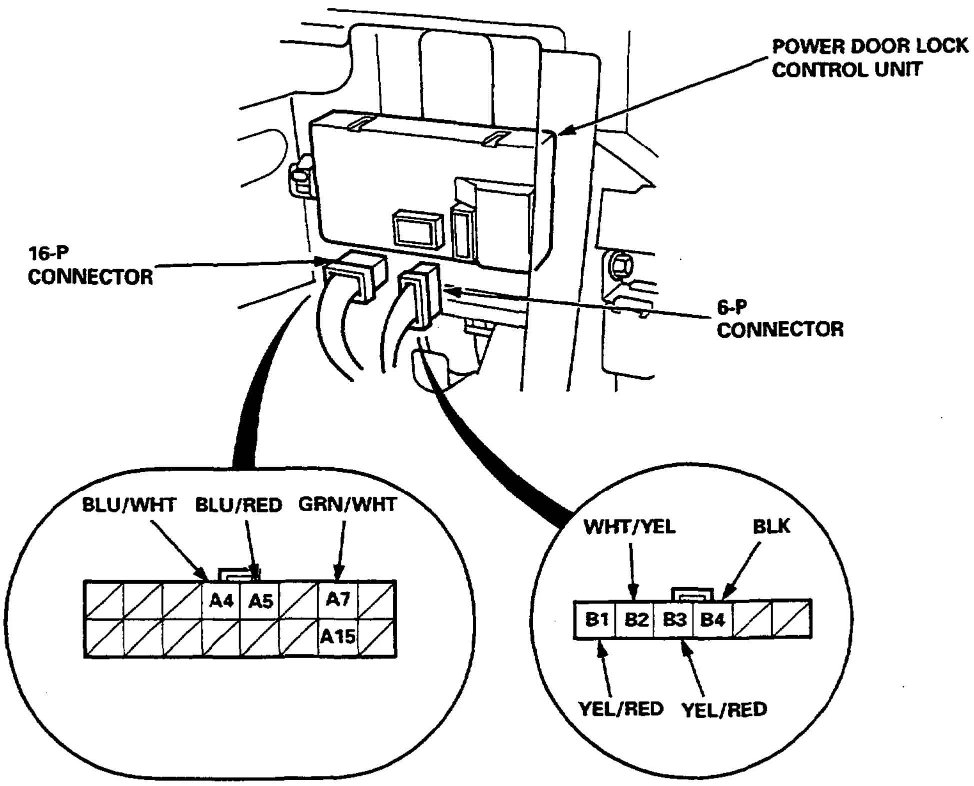
CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

Control Unit Input Test (With Keyless Entry)

1. Disconnect the 6-P and 16-P connector from the 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 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.



(cont'd)

Power Door Locks

Control Unit Input Test (With Keyless Entry cont'd)

Disconnect the 6-P and 16-P connectors from the power door lock control unit.

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
B1 and B3	WHT/RED and YEL/RED	Connect the YEL/RED terminal to the WHT/YEL terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door lock operation: All doors should unlock.	• Faulty actuator • An open in the wire • Blown No. 6 (20 A) fuse in the under-dash fuse/relay box
		Connect the WHT/RED terminal to the WHT/YEL terminal, and the YEL/RED terminal to the BLK terminal momentarily.	Check door lock operation: All doors should lock.	

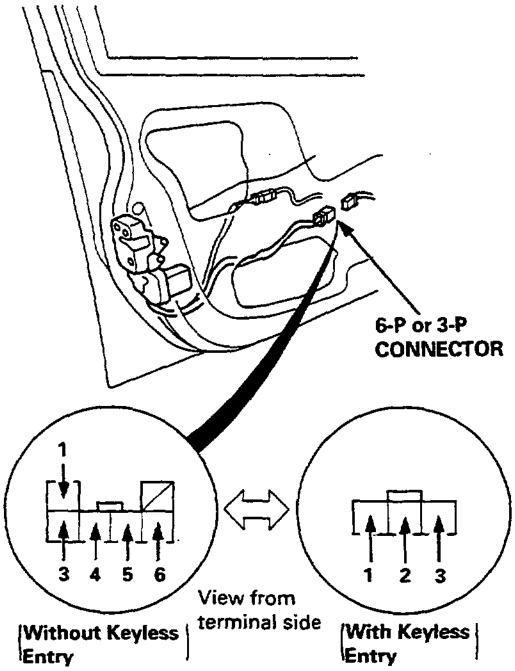
Reconnect the 6-P and 16-P connectors to the power door lock control unit.

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B2	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box • An open in the wire
A4	BLU/WHT	Driver's door lock knob in LOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty driver's door lock actuator • Poor ground (G501, G502) • An open in the wire
A5	BLU/RED	Driver's door lock knob in UNLOCK		
A15	BLU/GRN	Front passenger's door lock knob in UNLOCK	Check for voltage to ground: There should be 1 V or less.	• Faulty front passenger's door lock actuator • Poor ground (G401) • An open in the wire

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

Driver's Door Lock Actuator and Knob Switch Test

1. Remove the door panel (see section 20).
2. Disconnect the 6-P or 3-P connector from the actuator.



3. Check actuator operation by connecting power and ground according to the table (with keyless entry).

Terminal / Position	5	6
LOCK	⊕	⊖
UNLOCK	⊖	⊕

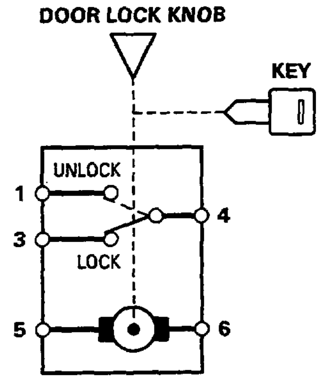
CAUTION: To prevent damage to the actuator, apply battery voltage only momentarily.

4. Check for continuity between the terminals in each switch position according to the table.

With Keyless Entry:

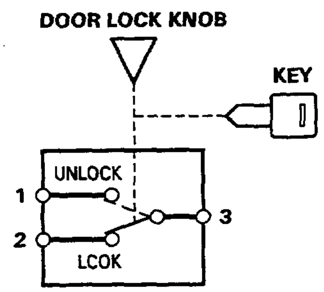
Terminal / Position	3	4	1
* LOCK	○	○	
UNLOCK		○	○

*: Driver's only



Without Keyless Entry:

Terminal / Position	1	3	2
LOCK		○	○
UNLOCK	○	○	



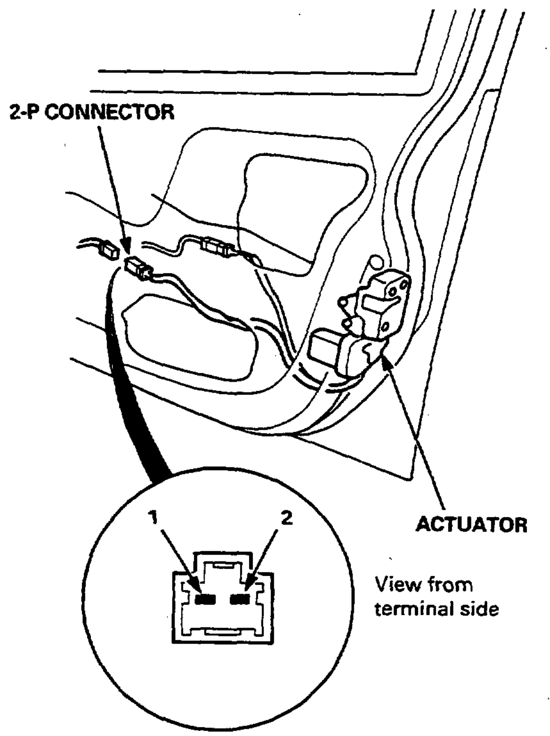
5. If the actuator or knob switch fails to work properly, replace it.

Passenger's Door Lock Actuator Test

1. Remove the door panel (see section 20).

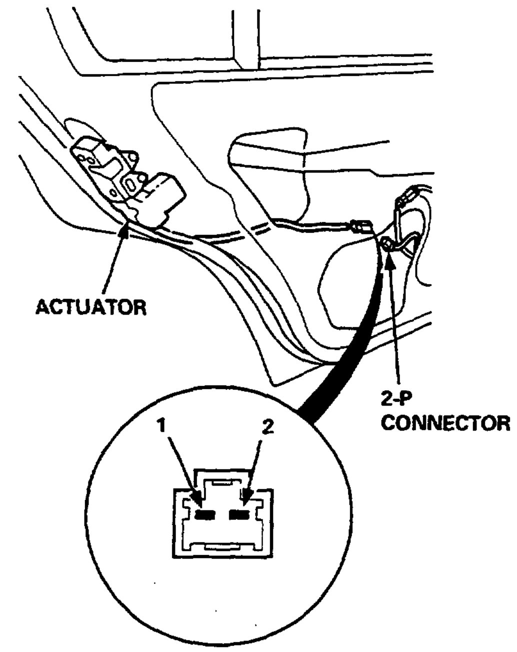
2. Disconnect the 2-P connector from the actuator.

Front Passenger's Door:



Rear Passenger's Door:

NOTE: Left rear actuator is shown, right rear actuator is similar.

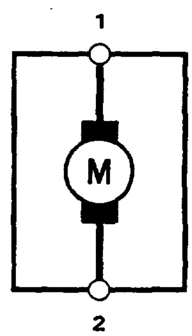


View from terminal side

3. Check actuator operation by connecting power and ground according to the table.

Terminal / Position	2	1
LOCK	⊖	⊕
UNLOCK	⊕	⊖

CAUTION: To prevent damage to the actuator, apply battery voltage only momentarily.



4. If the actuator fails to work properly, replace it.

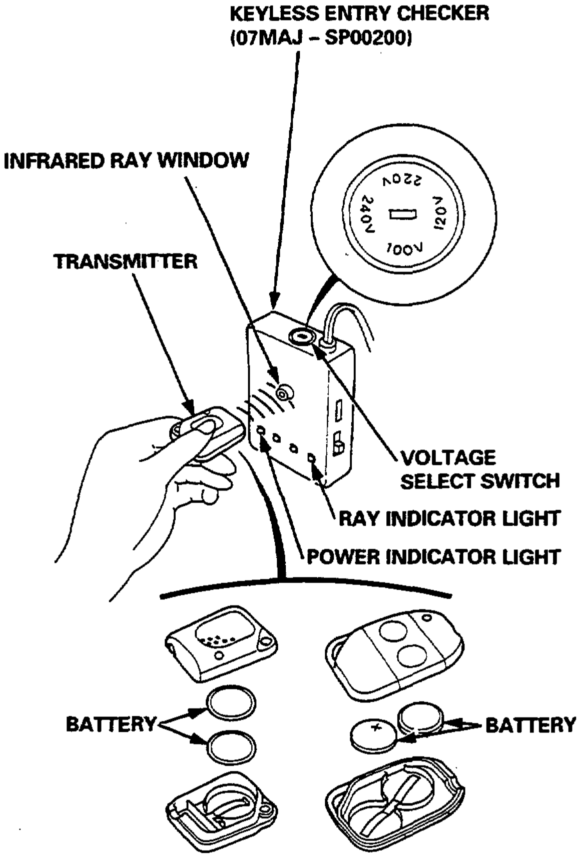
Keyless Entry System Test

NOTE: Before testing, make sure that the power door lock system works properly.

1. Turn the voltage select switch to the proper voltage, and connect the Keyless Entry Checker to an AC power outlet.
   The power indicator light should go on.

2. Hold the transmitter within 500 mm (19.7 in) from the front of the infrared ray window, and press the button.

   - If the ray indicator light does not go on:
     — Dead or low battery
     — Faulty transmitter
   - If the ray indicator light goes on, go to step 3.

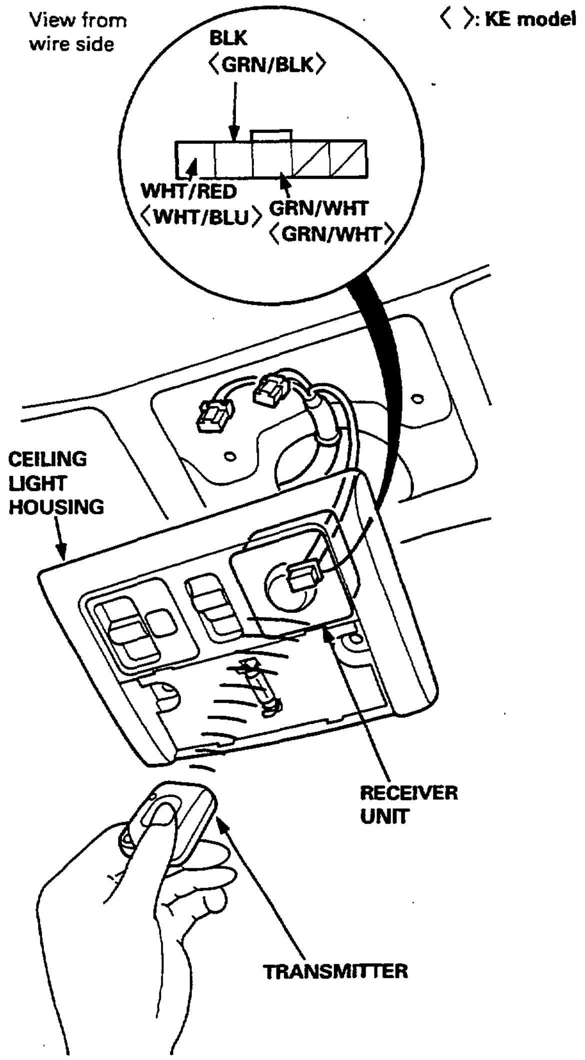


3. Pry the front ceiling light lens off, and remove the two bolts from the front ceiling light housing.

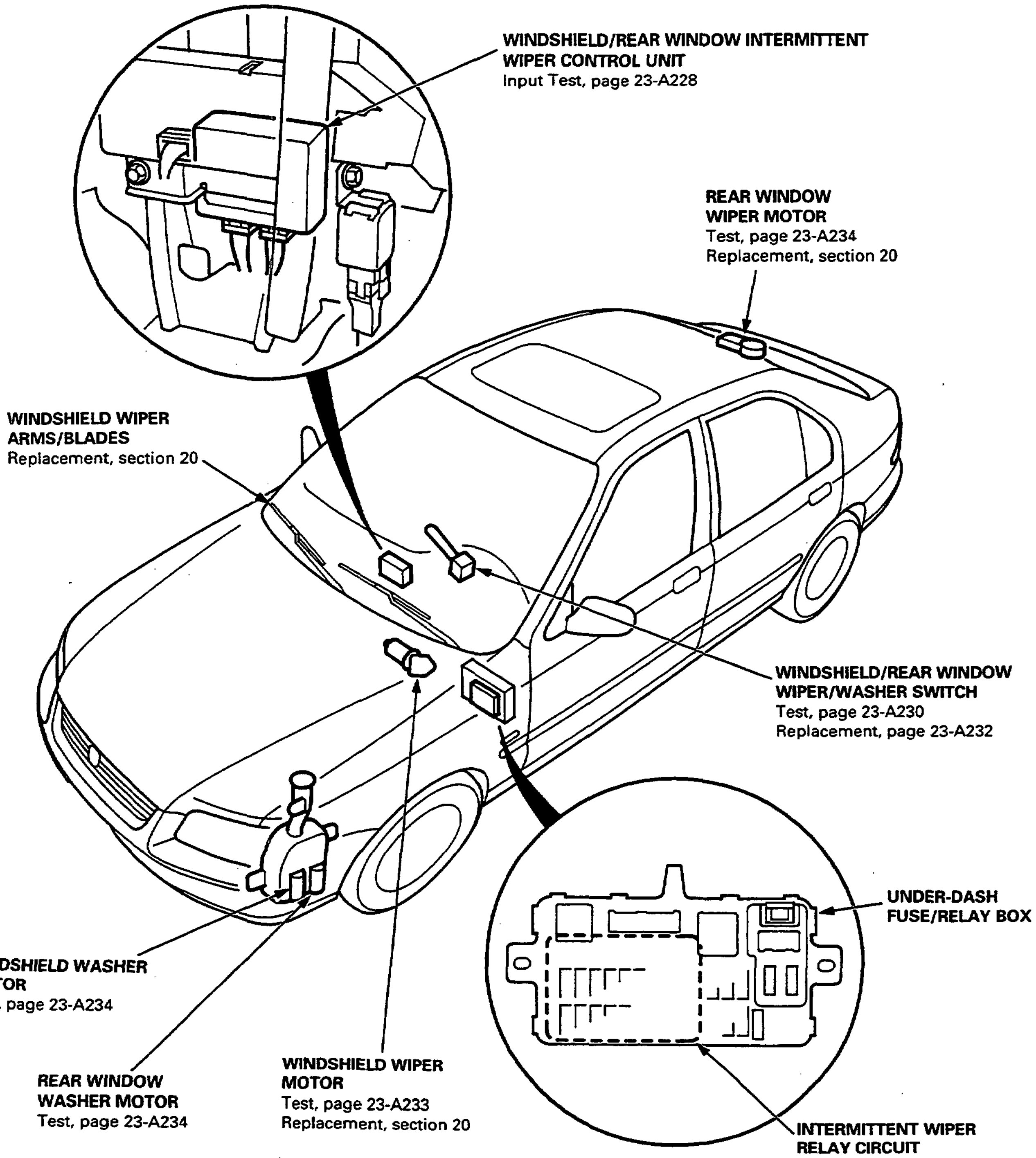
4. Check if there is receiver output when the transmitter button is pressed.

   Test method:
   — Use a digital multimeter.
   — Do not disconnect the 5-P connector.
   — Connect the positive (+) probe to the GRN/WHT terminal and the negative (–) probe to the BLK 〈GRN/BLK〉 terminal.

   - If there is a momentary output voltage of about 3.5 mV – 1 V, the receiver is OK.
   - If there is no voltage, check for an open in the GRN/WHT, WHT/RED 〈WHT/BLU〉 and BLK 〈GRN/BLK〉 wires. If the wires are OK, replace the receiver unit.



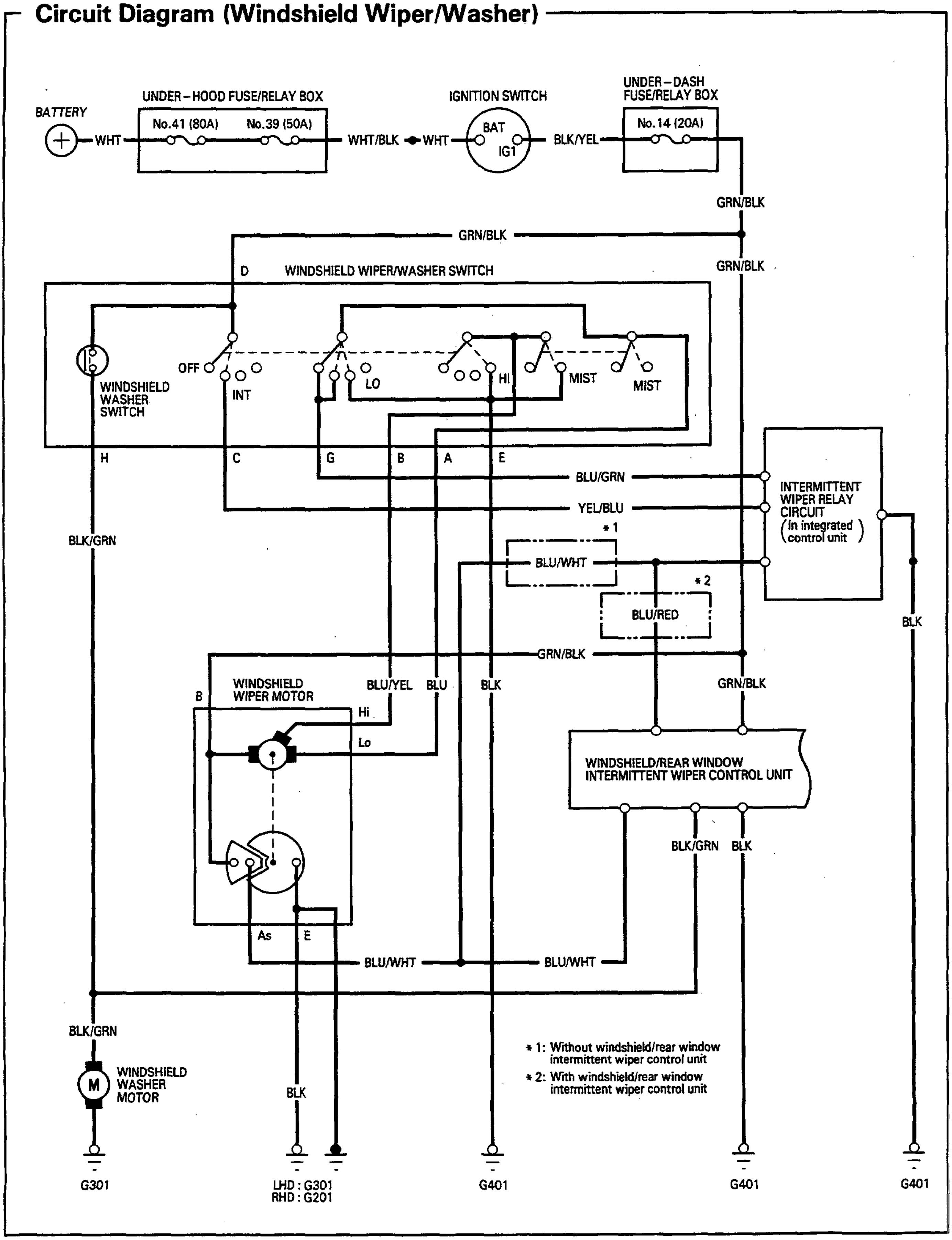
Component Location Index



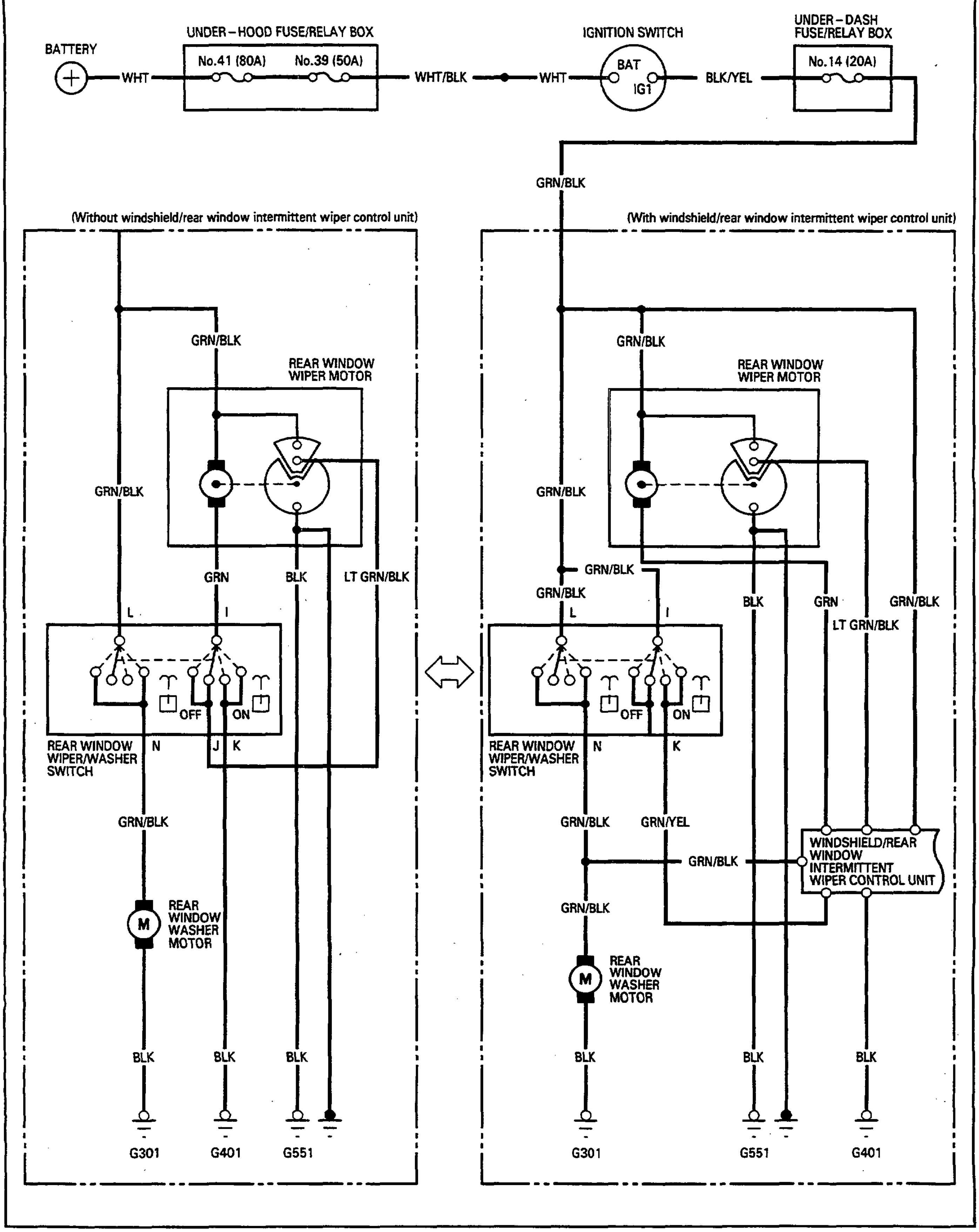
Description

- Rear Window Wiper Intermittent Operation:
  After the rear window wiper switch has been turned ON, the rear wiper will work continuously for about three to five times, then it will work intermittently.
- Combined Washer/Wiper Operation:
  When the washer switch is turned ON, the wipers too will work.

Circuit Diagram (Windshield Wiper/Washer)



Circuit Diagram (Rear Window Wiper/Washer)



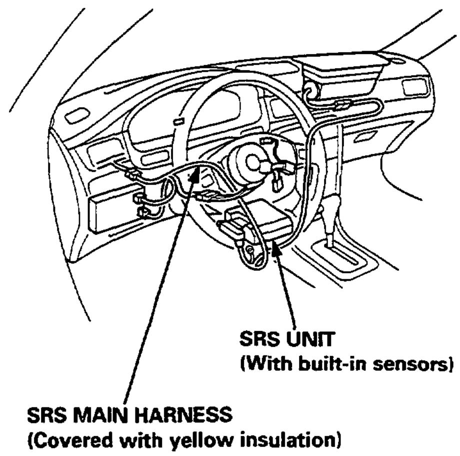
Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No. 14 (20 A) fuse (In the under-dash fuse/relay box)	Wiper switch	Wiper motor	Washer switch	Washer motor	Intermittent wiper relay circuit (In the integrated control unit)	Windshield/rear window intermittent wiper control unit	Not enough washer fluid in reservoir	Disconnected, blocked washer hose or clogged outlet	Disconnected wiper linkages	Poor ground	Open circuit, loose or disconnected terminals
Wipers do not work.	In all positions	1	4	2							3	G201, G301, G401	GRN/BLK
	In INT		1	3			2						YEL/BLU, BLU/GRN
	In LO or HI		1	2									BLU, BLU/YEL
	In MIST		1	2									BLU/YEL
Rear window wiper does not work.		1	3	2								G301, G401 G504, G551	GRN/BLK, GRN LT GRN/BLK
Blades do not return to park position when the switch is turned OFF.			2	1									BLU/WHT, LT GRN/BLK
Intermittent cycle is erratic or wipers do not work intermittently.			1				2						YEL/BLU, BLU/GRN
Little or no washer fluid is pumped.					4	3			1	2		G301, G401	BLK/GRN, BLU/BLK
Wiper and washer do not work at the same time.				2		3		1					

Windshield/Rear Intermittent Wiper Control Unit Input Test

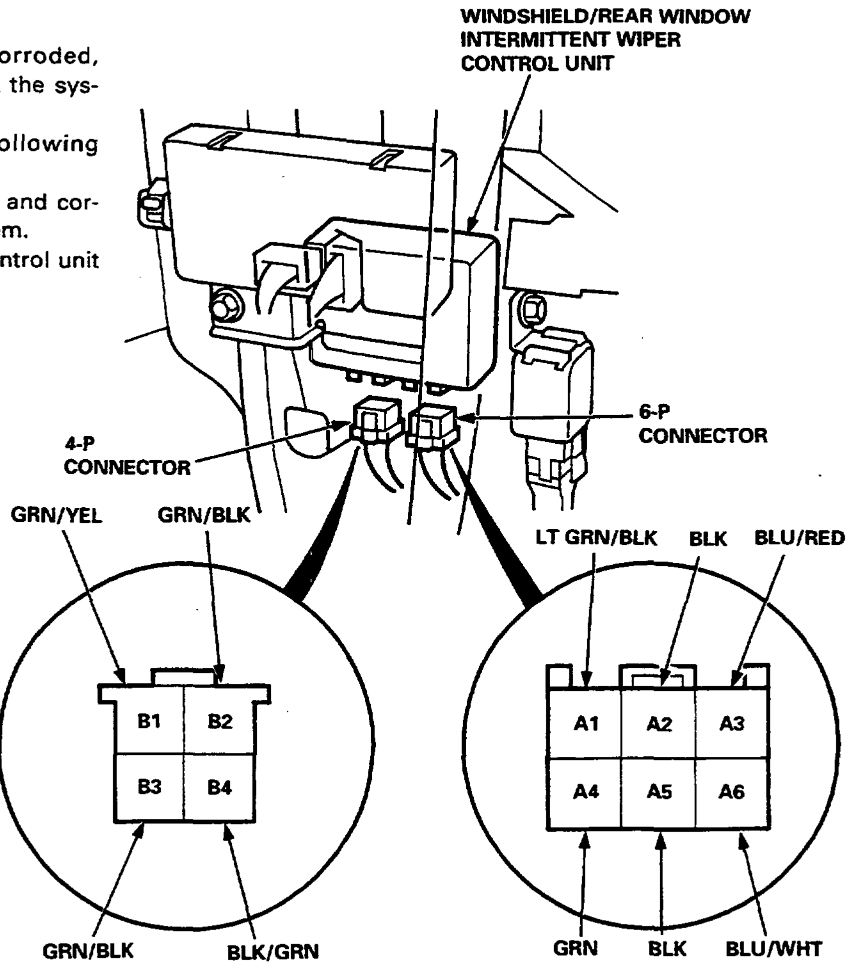
CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



1. Disconnect the 6-P and 4-P connectors from the 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 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.



Windshield Wiper:

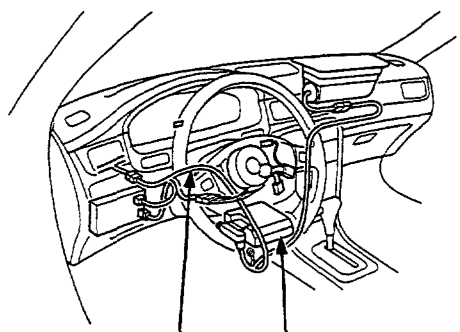
Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B2	GRN/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • An open in the wire
A5	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
A2	BLK			
B4	BLK/GRN	Ignition switch ON (II), windshield washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper/washer switch • An open in the wire
A3	BLU/RED	Under all conditions	Check for continuity in the wire between the windshield/rear window intermittent wiper control unit and integrated control unit.	• An open in the wire
A6	BLU/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty windshield wiper motor • An open in the wire

Rear Window Wiper:

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B2	GRN/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • An open in the wire
A5	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
A4	GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty rear wiper motor • An open in the wire
B3	GRN/BLK	Ignition switch ON (II), rear window washer switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty rear window washer switch • An open in the wire
A1	LT GRN/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper • An open in the wire
B1	GRN/YEL	Ignition switch ON (II), rear window wiper switch ON	Check for voltage to ground: There should be battery voltage.	• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box • Faulty rear window wiper switch • An open in the wire

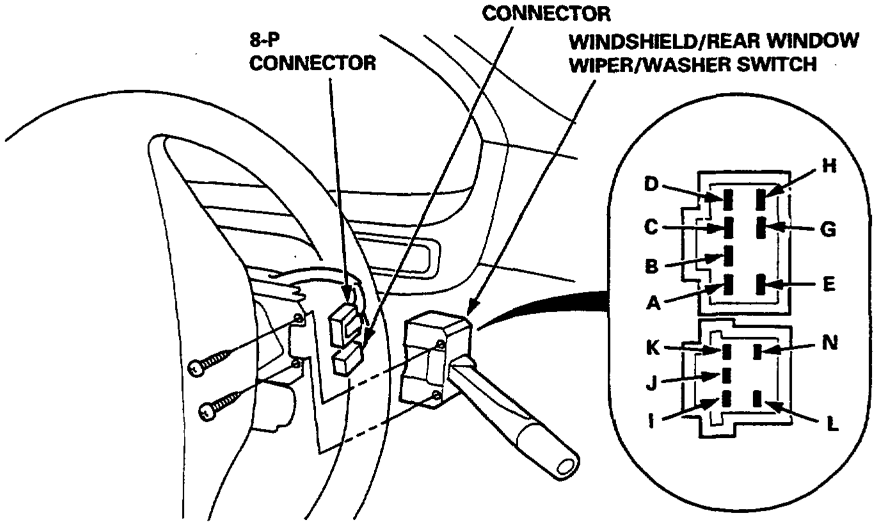
Wipers/Washers Switch Test

CAUTION:
- All SRS wire harnesses are covered with yellow insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.
- Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.
- For additional precautions, refer to page 23-B6 in the SRS sub-section.

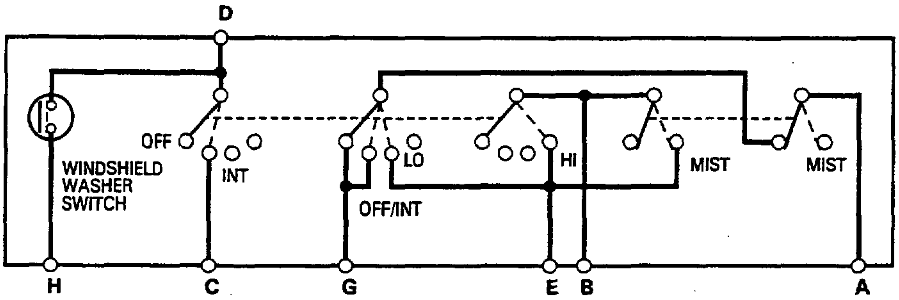


NOTE: LHD type is shown; RHD type is similar.

1. Remove the dashboard lower cover.
2. Remove the steering column covers.
3. Disconnect the 8-P and 6-P connectors from the switch, remove the two screws, and pull out the switch.
4. Check for continuity between the terminals in each switch position according to the table.



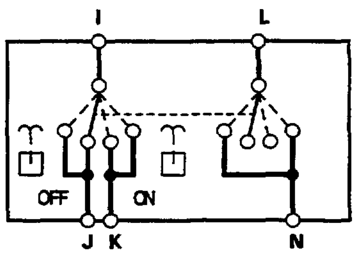
Windshield Wiper/Washer Switch



Position \ Terminal	A	B	C	D	H	G	E
OFF	○					○	
INT	○					○	
			○	○			
LO	○						○
HI		○					○
Mist switch "ON"		○					○
Washer switch "ON"				○	○		

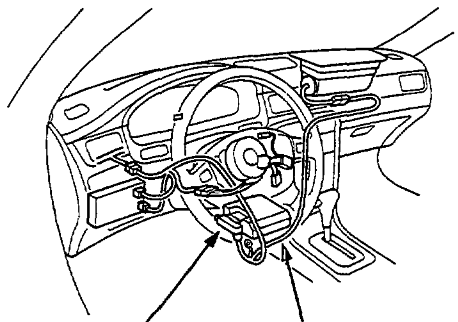
Rear Window Wiper/Washer Switch

Position \ Terminal	N	L	I	J	K
OFF			○	○	
Washer switch "ON"	○	○	○	○	
ON			○		○
Washer switch "ON"	○	○	○		○

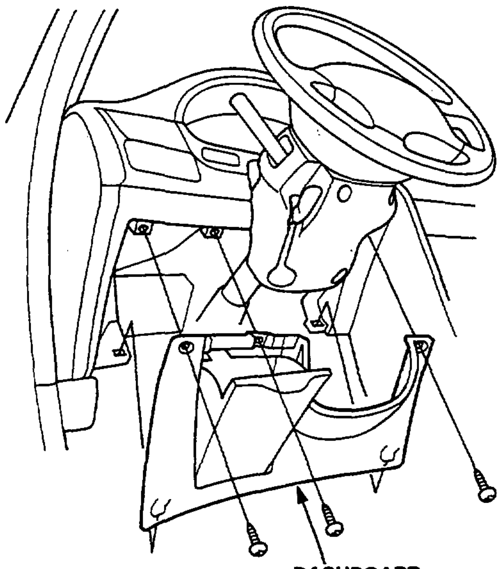


Windshield/Rear Window Wiper/Washer Switch Replacement

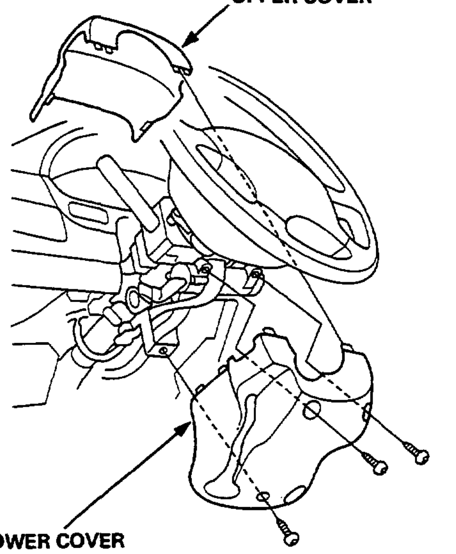
CAUTION:
- **All SRS wire harnesses are covered with yellow insulation.**
- **Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.**
- **Before disconnecting the SRS wire harness, turn the ignition switch OFF, disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.**
- **Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.**
- **Before you disconnect any part of an SRS wire harness, connect the short connectors (RED) to the airbags.**
- **For additional precautions, refer to page 23-B6 in the SRS sub-section.**



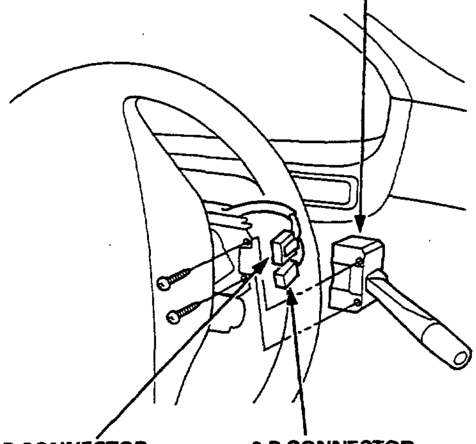
1. Remove the dashboard lower cover.



2. Remove the steering column covers.



3. Disconnect the 8-P and 6-P connectors from the switch, remove the two screws, and pull out the switch.



Windshield Wiper Motor Test

1. Open the hood, and remove the cap nuts and the wiper arms (see section 20).

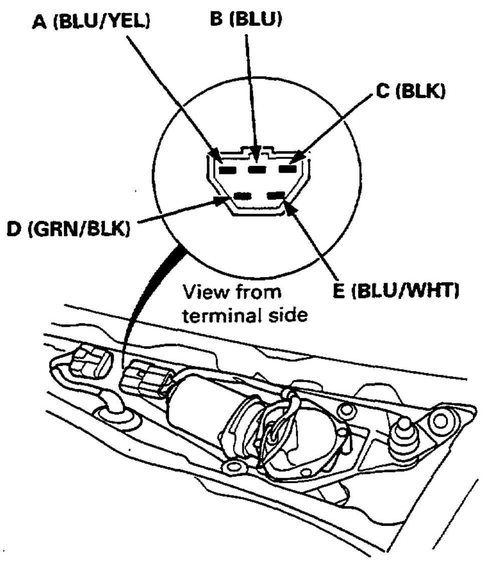
   NOTE: Remove the wiper arms carefully without damaging the hood.

2. Remove the hood seal and air scoop by prying out their trim clips.

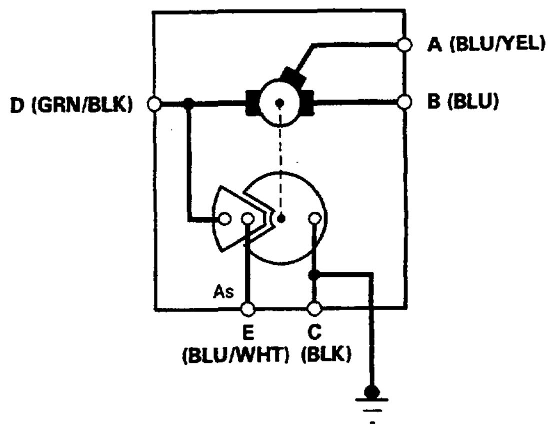
3. Disconnect the 5-P connector from the windshield wiper motor.

4. Test the motor by connecting battery power and ground according to the table.

Position \ Terminal	D (GRN/BLK)	B (BLU)	A (BLU/YEL)
LOW SPEED	⊕	⊖	
HIGH SPEED	⊕		⊖



5. If the motor does not run or fails to run smoothly, replace it.



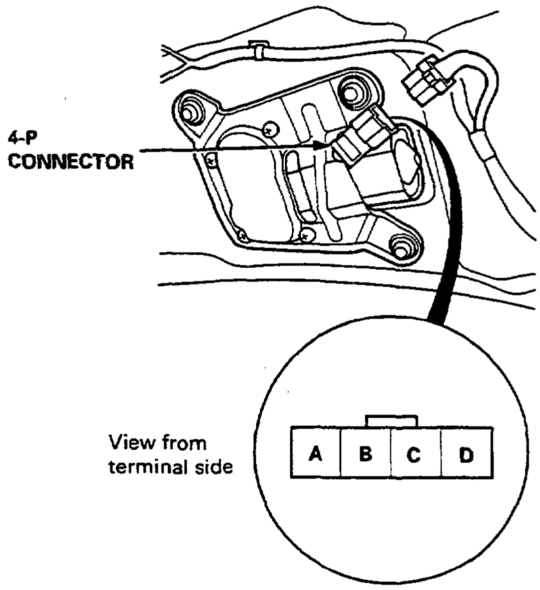
6. Reconnect the 5-P connector to the wiper motor assembly.

7. Connect an analog voltmeter between the E (BLU/WHT) and the C (BLK) terminals. Run the motor by turning the wiper switch ON (LO or HI position).
   The voltmeter should alternately indicate 0 V and more than 4 V.

   NOTE:
   - Use an analog tester.
   - Use the car battery.

Rear Window Wiper Motor Test

1. Disconnect the 4-P connector from the rear window wiper motor.



2. Test the rear window motor by connecting battery power and ground according to the table.

Battery \ Terminal	A	B
Disconnected		
Connected	⊕	⊖

- If the motor does not run or fails to run smoothly, replace it.
- If the motor runs smoothly, go to step 3.

3. Reconnect the 4-P connector to the wiper motor.

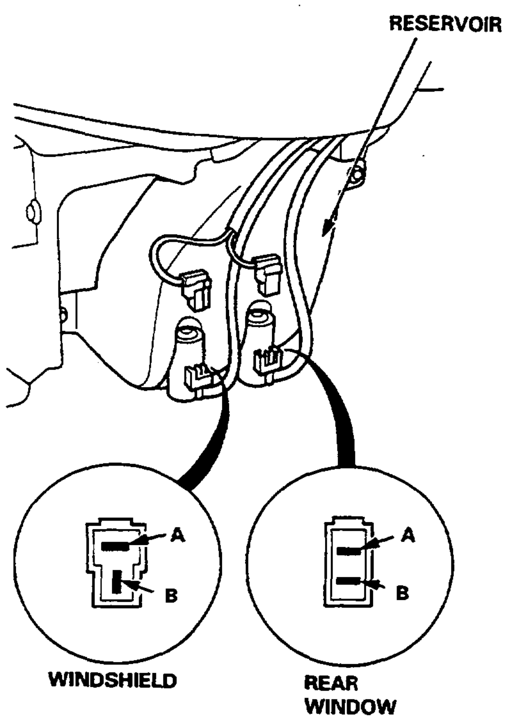
4. Connect an analog voltmeter between the C and D terminals. Run the motor by turning the wiper switch ON. The voltmeter should alternately indicate 0 V and more than 4 V.

NOTE:
- Use an analog tester.
- Use the car battery.

Washer Motor Test

1. Remove the front bumper (see section 20).

2. Disconnect the 2-P connector from the washer motor.



3. Test the washer motor operation by connecting battery power and ground according to the table.

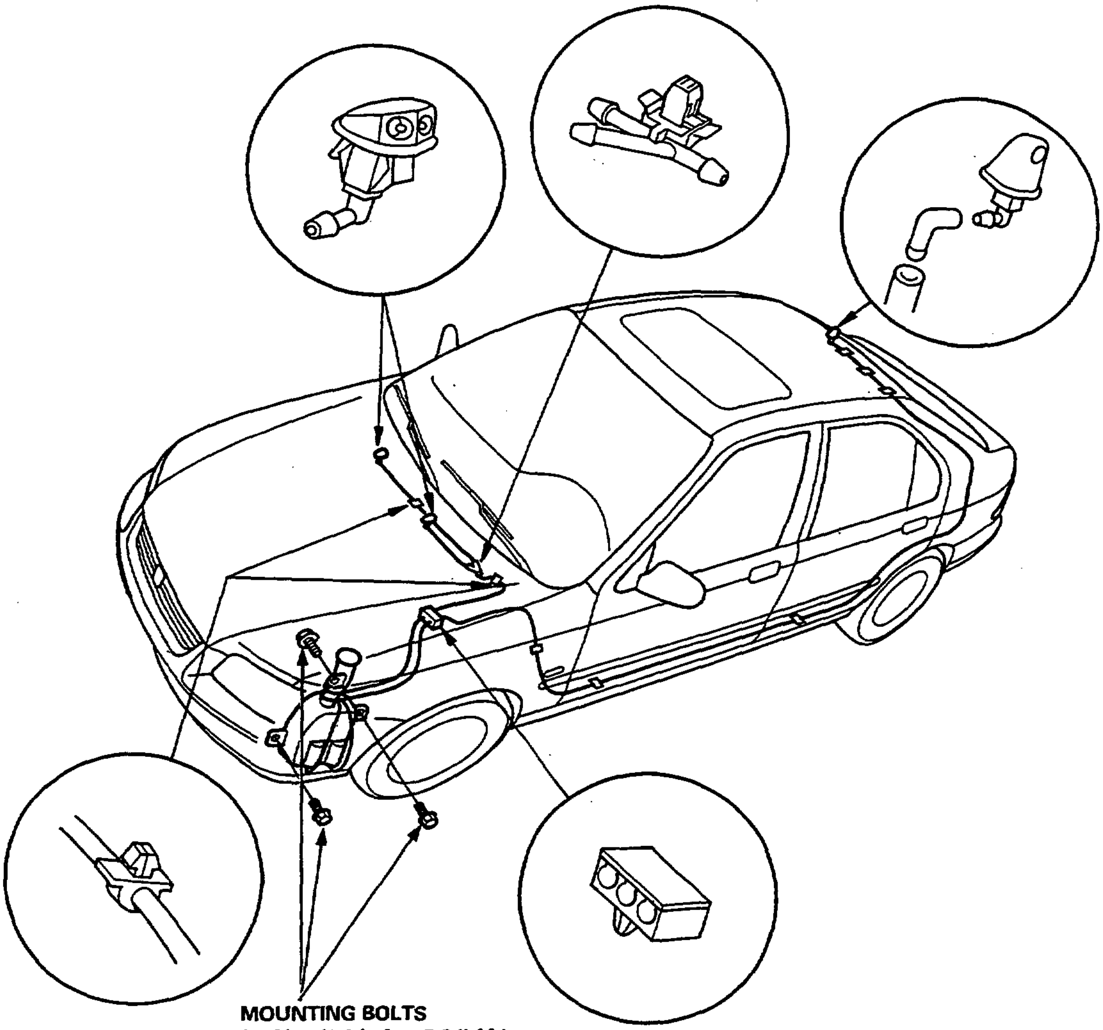
Battery \ Terminal	A	B
Disconnected		
Connected	⊕	⊖

- If the motor does not run or 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.

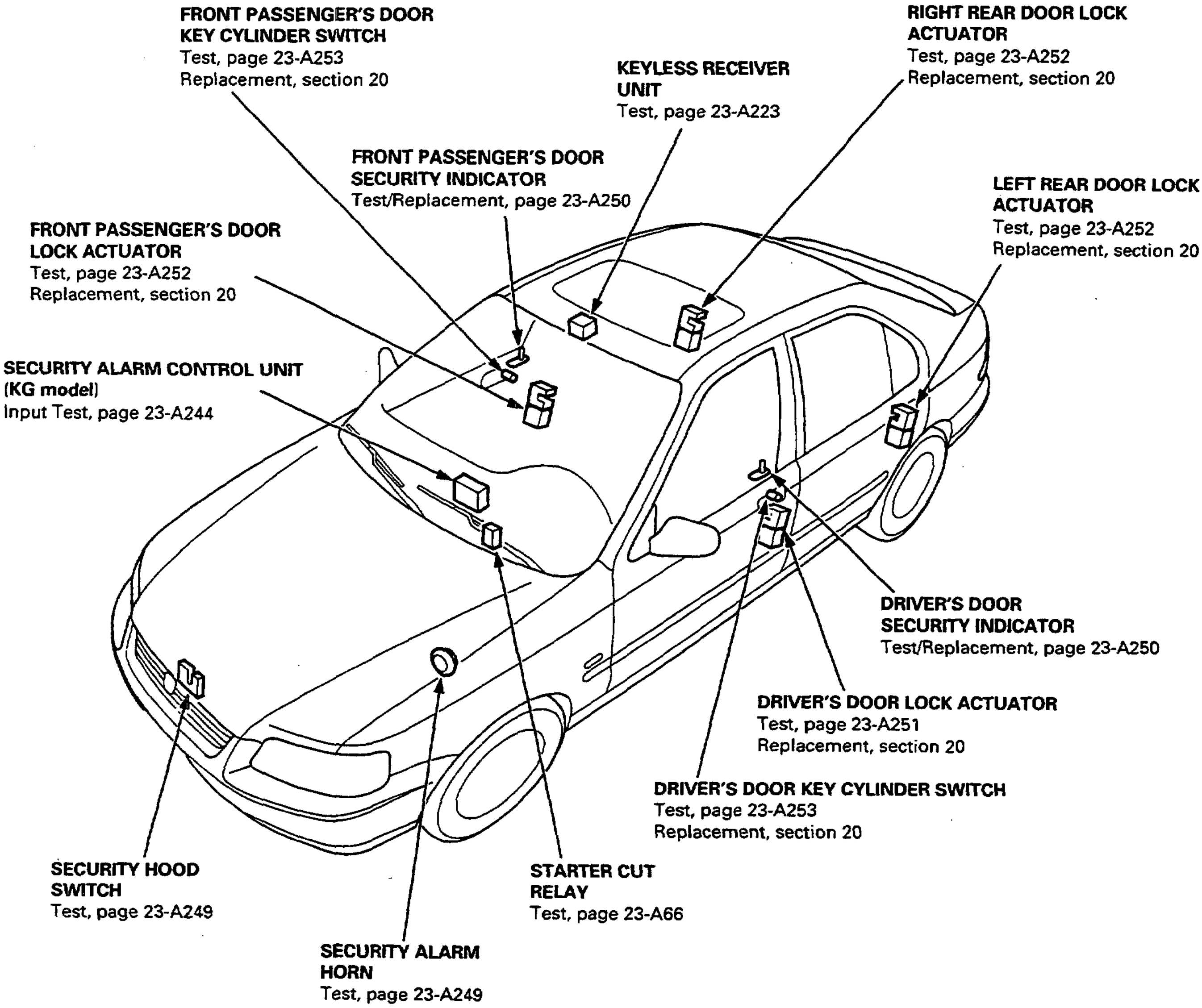
Washers Replacement

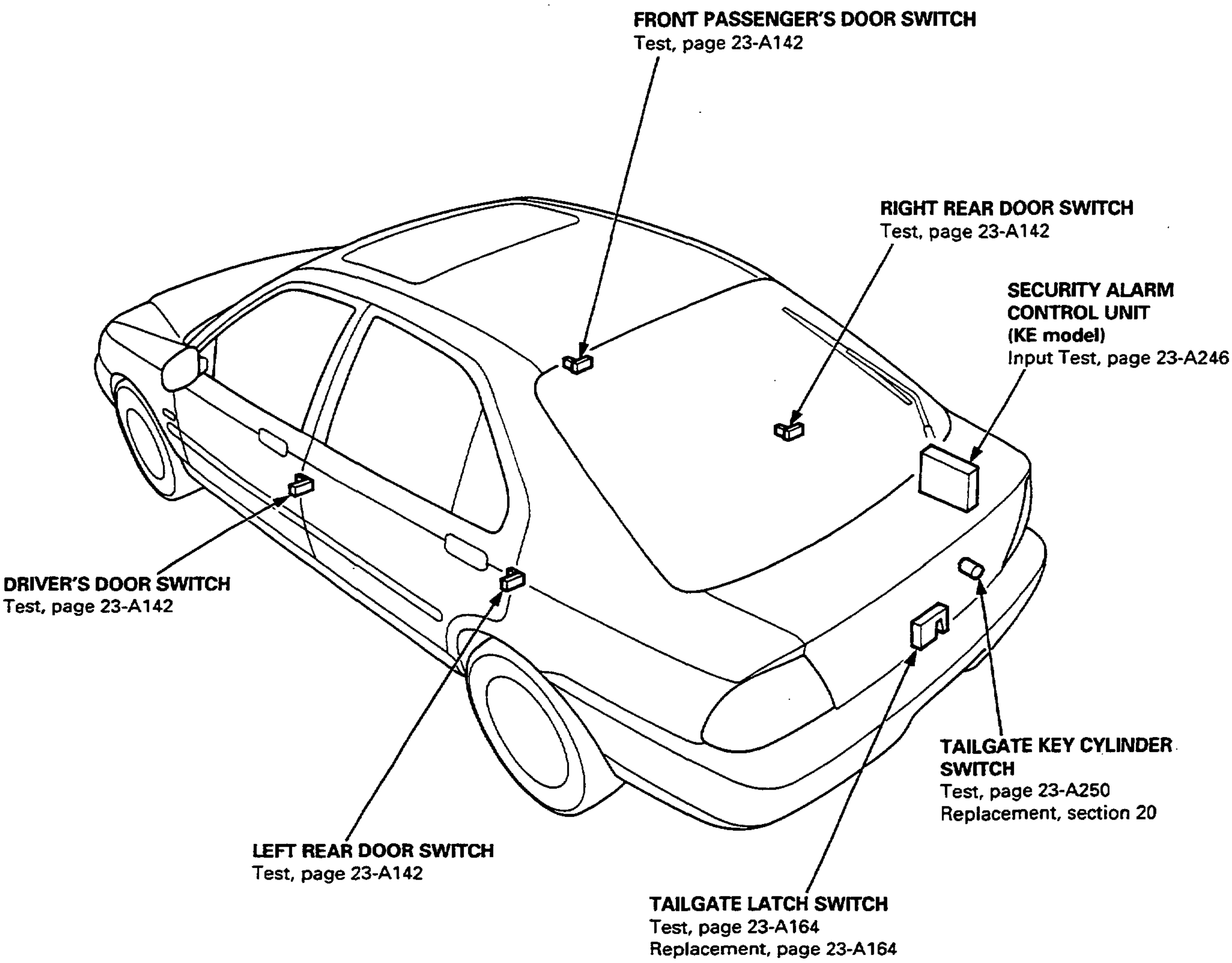
1. Remove the front bumper (see section 20).
2. Remove the left front inner fender.
3. Disconnect the 2-P connectors and washer hose from the washer motors.
4. Remove the three mounting bolts and the washer reservoir.
5. Remove the washer nozzles and washer hoses.
6. Install in the reverse order of removal.

   NOTE:
   - Take care not to pinch the hoses during installation.
   - Install the clips firmly.
   - After installing, adjust the aim of the washer nozzles.



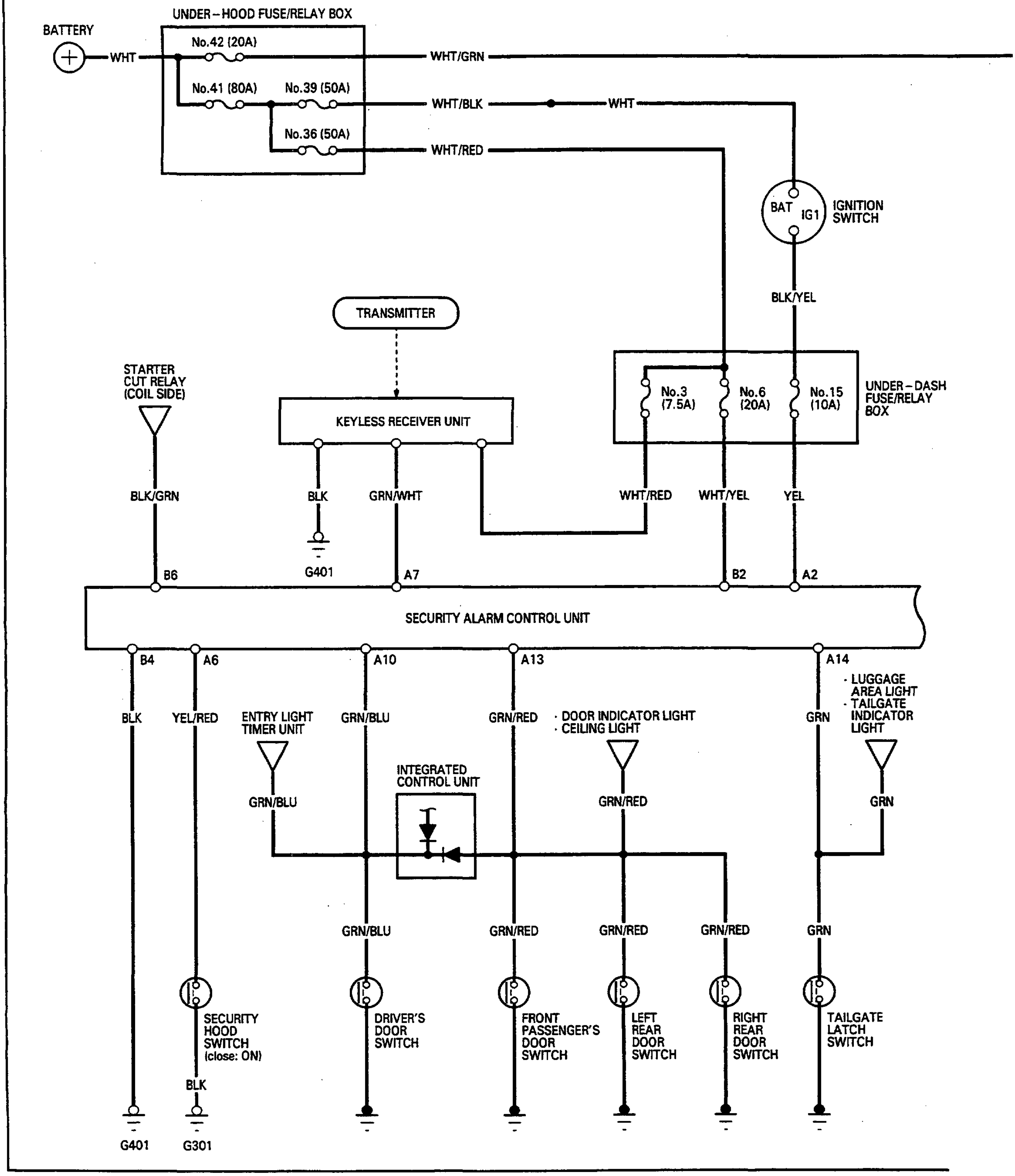
Component Location Index

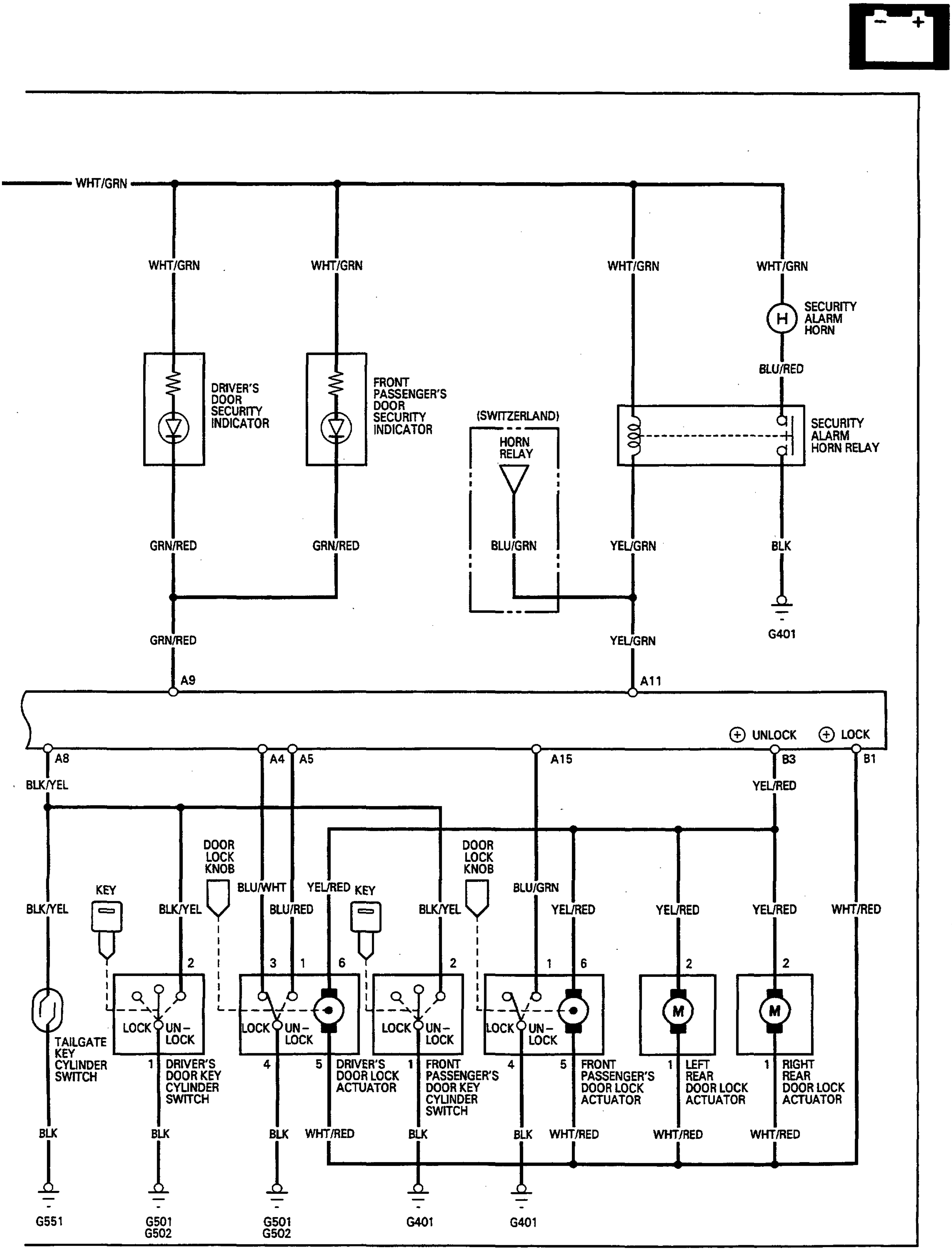



FRONT PASSENGER'S DOOR SWITCH
Test, page 23-A142
RIGHT REAR DOOR SWITCH
Test, page 23-A142
SECURITY ALARM CONTROL UNIT (KE model)
Input Test, page 23-A246
DRIVER'S DOOR SWITCH
Test, page 23-A142
TAILGATE KEY CYLINDER SWITCH
Test, page 23-A250
Replacement, section 20
LEFT REAR DOOR SWITCH
Test, page 23-A142
TAILGATE LATCH SWITCH
Test, page 23-A164
Replacement, page 23-A164

Security Alarm System

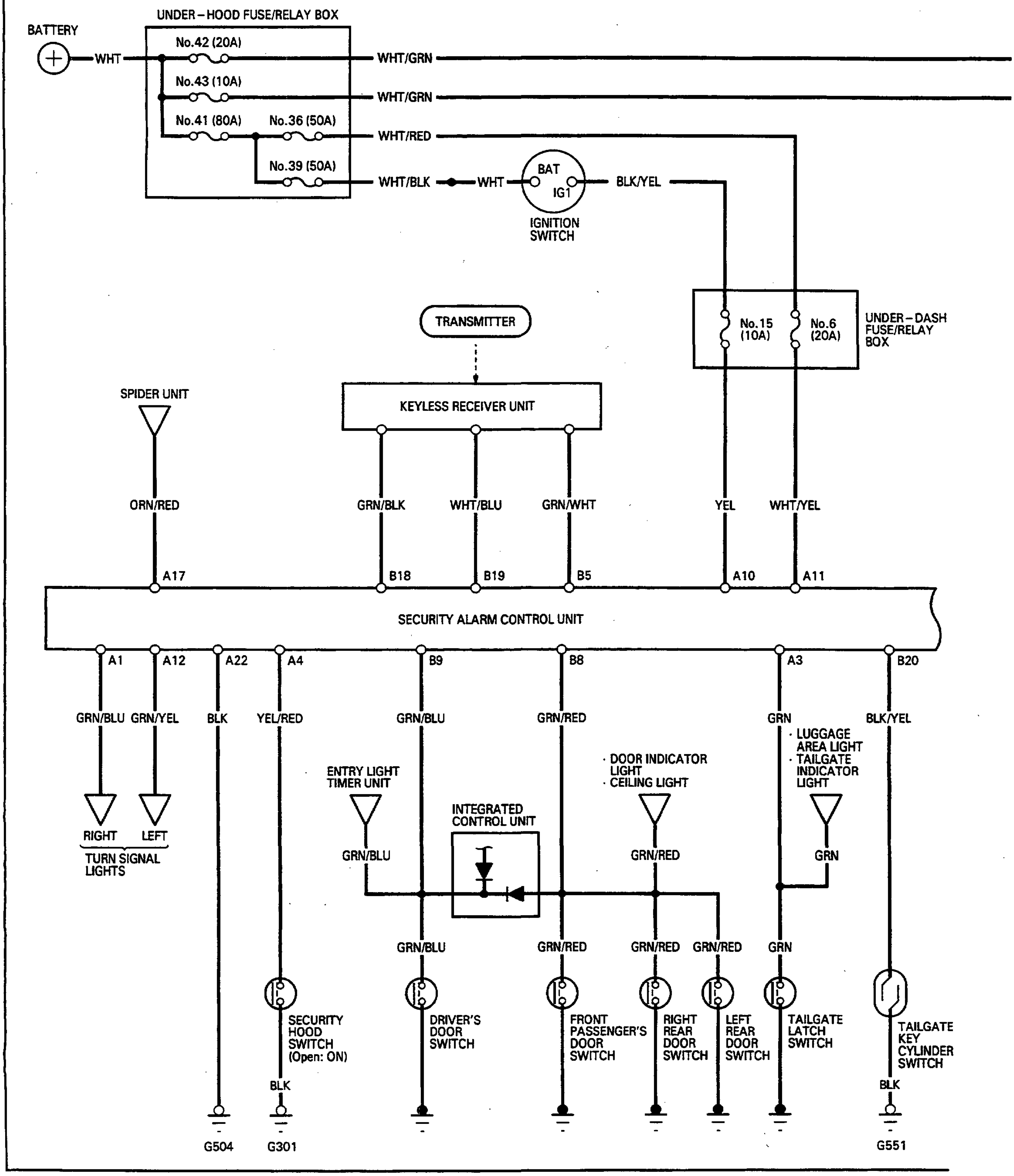
Circuit Diagram (KG model)

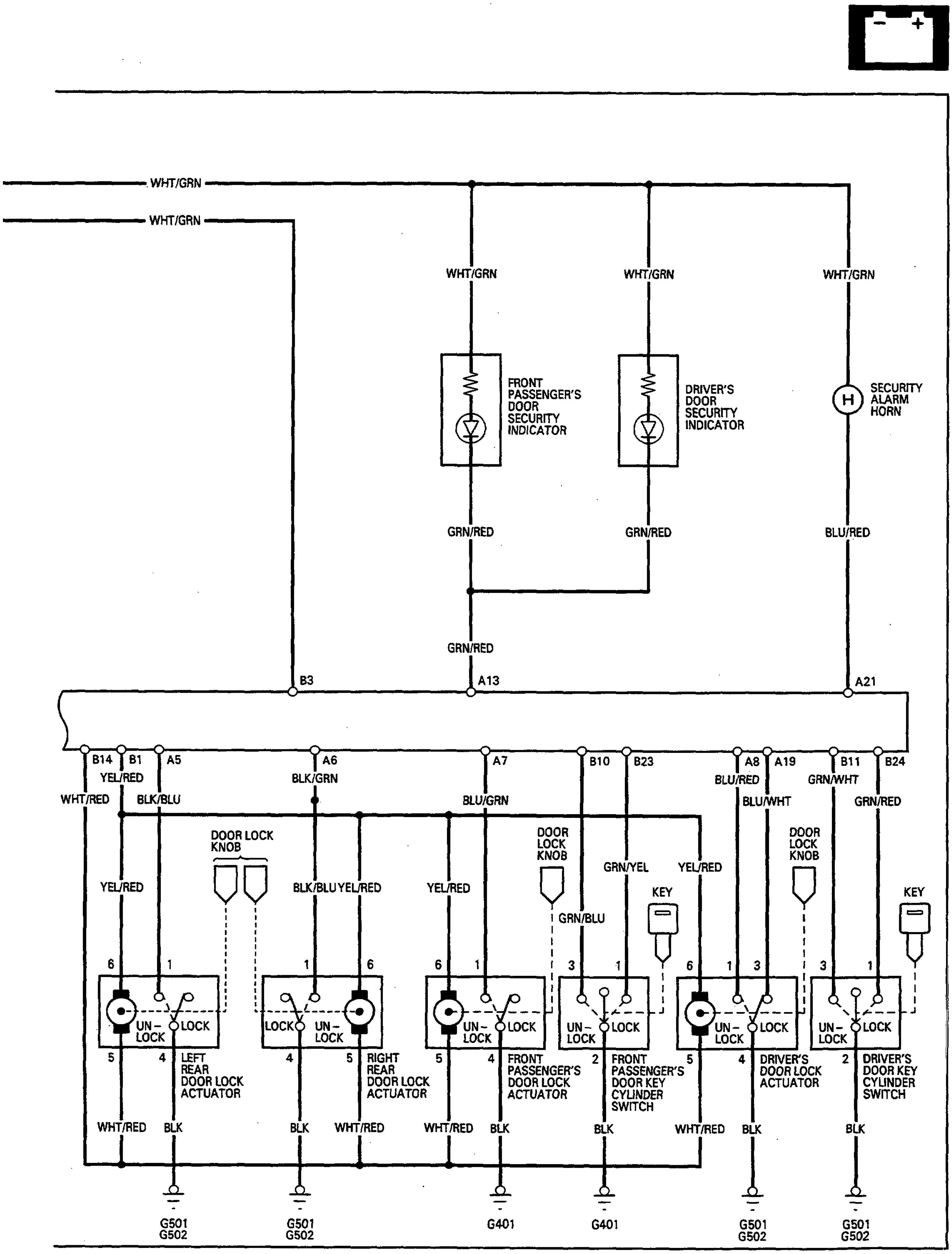



WHT/GRN
WHT/GRN
WHT/GRN
WHT/GRN
WHT/GRN
SECURITY ALARM HORN
BLU/RED
DRIVER'S DOOR SECURITY INDICATOR
FRONT PASSENGER'S DOOR SECURITY INDICATOR
(SWITZERLAND)
HORN RELAY
SECURITY ALARM HORN RELAY
GRN/RED
GRN/RED
BLU/GRN
YEL/GRN
BLK
G401
GRN/RED
YEL/GRN
A9
A11
UNLOCK
LOCK
A8
A4
A5
A15
B3
B1
BLK/YEL
YEL/RED
DOOR LOCK KNOB
DOOR LOCK KNOB
KEY
KEY
BLU/WHT
YEL/RED
BLU/GRN
BLK/YEL
BLK/YEL
BLU/RED
BLK/YEL
YEL/RED
YEL/RED
YEL/RED
WHT/RED
LOCK
UN-LOCK
TAILGATE KEY CYLINDER SWITCH
DRIVER'S DOOR KEY CYLINDER SWITCH
DRIVER'S DOOR LOCK ACTUATOR
FRONT PASSENGER'S DOOR KEY CYLINDER SWITCH
FRONT PASSENGER'S DOOR LOCK ACTUATOR
LEFT REAR DOOR LOCK ACTUATOR
RIGHT REAR DOOR LOCK ACTUATOR
BLK
BLK
BLK
WHT/RED
BLK
BLK
WHT/RED
WHT/RED
WHT/RED
G551
G501
G502
G501
G502
G401
G401

Security Alarm System

Circuit Diagram (KE model)





WHT/GRN
WHT/GRN
WHT/GRN
WHT/GRN
WHT/GRN
FRONT PASSENGER'S DOOR SECURITY INDICATOR
DRIVER'S DOOR SECURITY INDICATOR
SECURITY ALARM HORN
GRN/RED
GRN/RED
BLU/RED
GRN/RED
B3
A13
A21
B14
B1
A5
A6
A7
B10
B23
A8
A19
B11
B24
YEL/RED
WHT/RED
BLK/BLU
BLK/GRN
BLU/GRN
BLU/RED
BLU/WHT
GRN/WHT
GRN/RED
DOOR LOCK KNOB
DOOR LOCK KNOB
DOOR LOCK KNOB
GRN/YEL
YEL/RED
YEL/RED
BLK/BLU
YEL/RED
YEL/RED
GRN/BLU
KEY
KEY
UN-LOCK
LOCK
LEFT REAR DOOR LOCK ACTUATOR
RIGHT REAR DOOR LOCK ACTUATOR
FRONT PASSENGER'S DOOR LOCK ACTUATOR
FRONT PASSENGER'S DOOR KEY CYLINDER SWITCH
DRIVER'S DOOR LOCK ACTUATOR
DRIVER'S DOOR KEY CYLINDER SWITCH
WHT/RED
BLK
G501
G502
G401

Security Alarm System

Troubleshooting

Security Alarm System:

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	In the under-dash fuse/relay box																	
	Blown No. 6 (20 A) fuse	Blown No. 15 (10 A) fuse	Blown No. 41 (80 A) fuse in the under-hood fuse/relay box	Faulty indicator light (LED)	Horn circuit	Starting system	Spider unit	Starter cut relay	A/T gear position switch: (A/T)	Receiver unit/transmitter	Door key cylinder switch	Tailgate key cylinder switch	Tailgate switch	Hood switch	Door switch	Control unit input	Poor ground	Open circuit, loose or disconnected terminals
Security alarm cannot be set and indicator light does not flash.	1	2	3	4												5	G401	WHT/YEL, YEL
Starting system does not operate.						1	5	2	3							4		BLK/GRN, ORN/RED
Security alarm can be set, but alarm does not operate when the trunk, hood or a door is opened without the key. — Horn alarm			1		2											3	G401	*1YEL/GRN, WHT/GRN *2BLU/RED
Alarm is not cancelled when the driver's or front passenger's door is unlocked with the key or transmitter.										2	1					3	G401	GRN/WHT, *2GRN/BLU, *2GRN/BLK, *2WHT/BLU, *1BLK/YEL GRN/WHT
Alarm does not operate when the hood is opened without the key.														1		2	G301	YEL/RED
Alarm does not operate when the tailgate is opened without the key.												2	1			3	G551	BLK/YEL, GRN
Alarm does not operate when a door is opened without the key.															1	2		GRN/BLU, GRN/RED

*1: KG model
*2: KE model

Keyless Entry System:

NOTE: *The numbers in the table show the troubleshooting sequence.*

Symptom \ Item to be inspected		In the under-dash fuse/relay box												
		Blown No. 6 (20 A) fuse	Blown No. 15 (10 A) fuse	Blown No. 3 (7.5 A) in the under-dash *fuse/relay box (KG model)*	Door lock knob switch	Driver's door lock key cylinder switch	Passenger's door lock key cylinder switch	Driver's door lock actuator	Passenger's door lock actuator	Receiver unit/transmitter	Control unit input	Disconnected or obstructed door lock rod/linkage	Poor ground	Open circuit, loose or disconnected terminals
Power door lock system does not work at all.		1	2								3		G401	YEL/RED, WHT/RED
Doors do not lock or unlock with the driver's door key cylinder switch.	All doors					1					2		G501 G502	*GRN/RED, *GRN/WHT
	One or more doors								1		3	2		YEL/RED, WHT/RED
Doors do not lock or unlock with the passenger's door key cylinder switch.	All doors						1				2		G401	*GRN/BLU, *GRN/YEL
	One or more doors								1		3	2		YEL/RED, WHT/RED
Doors do not lock or unlock with the door lock knob.	All doors				1						2		G401 G501 G502	*GRN/BLU, *GRN/YEL, *BLU/RED, *BLU/WHT, BLK/YEL, BLU/WHT
	One or more doors							1	2		4	3	G501 G502	YEL/RED, WHT/RED
The power door lock system works properly but the keyless entry system does not work.				3						1	2			*WHT/BLU, *GRN/WHT, *GRN/BLK, BLK, WHT/RED

*: KE model

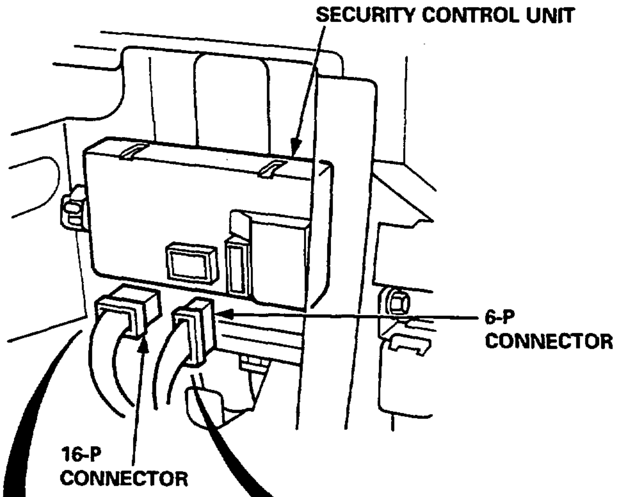
Security Alarm System

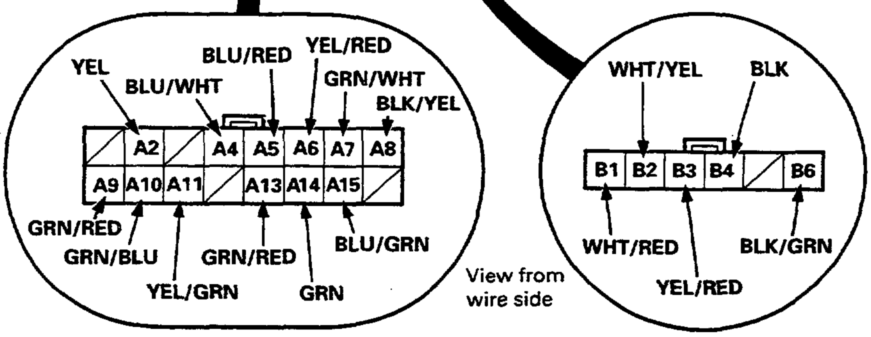
Security Alarm Control Unit Input Test (KG model)

1. Disconnect the 16-P and 6-P connector from the 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 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.





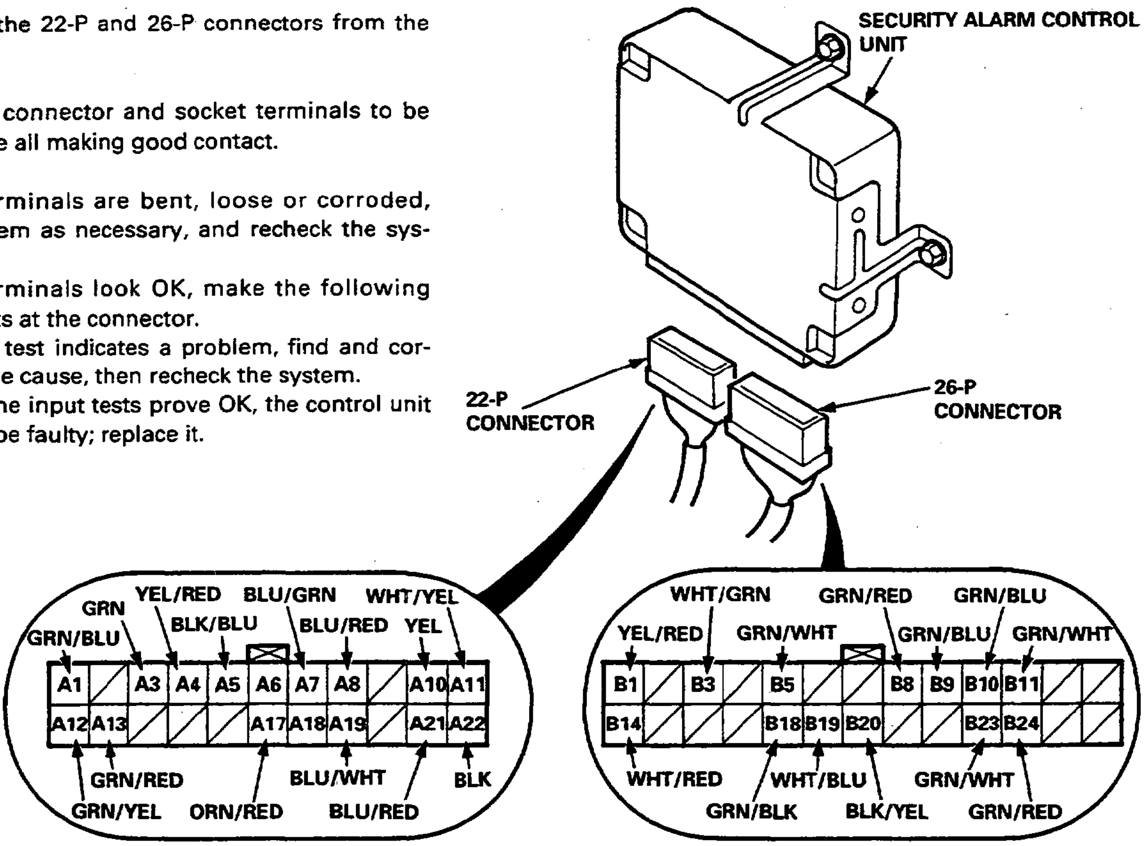
Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G401) • An open in the wire
B2	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box • An open in the wire
A2	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
A9	GRN/RED	Under all conditions	Connect to ground: Security indicators should come on.	• Blown No. 42 (20 A) fuse in the under-hood fuse/relay box • Faulty security indicator • An open in the wire
A11	YEL/GRN	Under all conditions	Connect to ground: Security alarm horn should sound.	• Blown No. 42 (20 A) fuse in the under-hood fuse/relay box • Faulty security alarm horn relay • Faulty security alarm horn • An open in the wire
B6	BLK/GRN	Ignition switch ST (III)	Check for voltage to ground: There should be battery voltage.	• Faulty starter cut relay • An open in the wire

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A6	YEL/RED	Hood closed	Check for continuity to ground: There should be continuity.	• Faulty security hood switch • Poor ground (G301) • An open in the wire
A10	GRN/BLU	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
A13	GRN/RED	Passenger's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty passenger's door switch • An open in the wire
A14	GRN	Tailgate open	Check for voltage to ground: There should be 1 V or less.	• Faulty tailgate latch switch • An open in the wire
A8	BLK/YEL	Tailgate key cylinder switch in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty tailgate key cylinder switch • An open in the wire
		Driver's door key cylinder switch in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty driver's door key cylinder switch • An open in the wire
		Front passenger's door key cylinder switch in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty front passenger's door key cylinder switch • An open in the wire
A4	BLU/WHT	Driver's door lock knob in LOCK	Check for continuity to ground: There should be continuity.	• Faulty driver's door lock knob switch (built into the actuator) • Poor ground (G501, G502) • An open in the wire
A5	BLU/RED	Driver's door lock knob in UNLOCK		
A15	BLU/GRN	Front passenger's door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty front passenger's door lock knob switch (built into the actuator) • Poor ground (G401) • An open in the wire
B1 and B3	WHT/RED and YEL/RED	Connect the WHT/RED and WHT/YEL (B2) terminals and the YEL/RED and BLK (B4) terminals momentarily.	Check the door lock operation: All doors should lock.	• Faulty door lock actuator • An open in the wire • Disconnected or obstructed door lock rod/linkage
		Connect the YEL/RED and WHT/YEL (B2) terminals and the WHT/RED and BLK (B4) terminals momentarily.	Check the door lock operation: All doors should unlock.	
A7	GRN/WHT	Under all conditions	Check for continuity in the wire between the keyless receiver unit and security alarm control unit.	• An open in the wire

Security Alarm System

Security Alarm Control Unit Input Test (KE model)

1. Disconnect the 22-P and 26-P connectors from the 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 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.



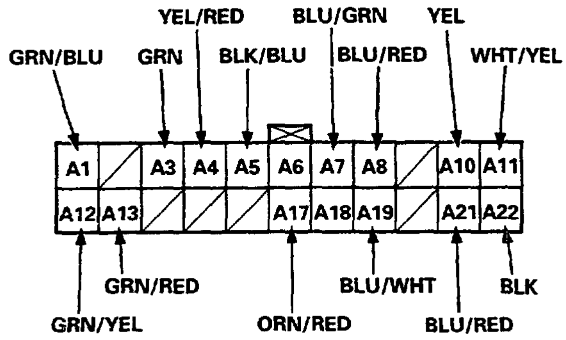
Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A22	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	• Poor ground (G504) • An open in the wire
A11	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box • An open in the wire
A10	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box • An open in the wire
B3	WHT/GRN	Under all conditions	Check for voltage to ground: There should be battery voltage.	• Blown No. 43 (10 A) fuse in the under-hood fuse/relay box • An open in the wire
A13	GRN/RED	Under all conditions	Connect to ground: Security indicators should come on.	• Blown No. 42 (20 A) fuse in the under-hood fuse/relay box • Faulty security indicator • An open in the wire
A21	BLU/RED	Under all conditions	Connect to ground: Security alarm horn should sound.	• Blown No. 42 (20 A) fuse in the under-hood fuse/relay box • Faulty security alarm horn • An open in the wire

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A12	GRN/YEL	Connect battery power to the GRN/YEL terminal.	Right turn signal light should come on as the battery is connected.	• Poor ground (G201, G401, G501, G504) • An open in the wire
A1	GRN/BLU	Connect battery power to the GRN/BLU terminal.	Left turn signal light should come on as the battery is connected.	• Poor ground (G301, G401, G501, G503) • An open in the wire
A17	ORN/RED	Under all conditions	Check for continuity in the wire between the spider unit and security alarm control unit.	• An open in the wire
B18	GRN/BLK	Under all conditions	Check for continuity in the wire between the keyless receiver unit and security alarm control unit.	• An open in the wire
B19	WHT/BLU	Under all conditions		
B5	GRN/WHT	Under all conditions		
A4	YEL/RED	Hood open	Check for continuity to ground: There should be continuity.	• Faulty security hood switch • Poor ground (G301) • An open in the wire
B9	GRN/BLU	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
B8	GRN/RED	Passenger's door open	Check for voltage to ground: There should be 1 V or less.	• Faulty passenger's door switch • An open in the wire
A3	GRN	Tailgate open	Check for voltage to ground: There should be 1 V or less.	• Faulty tailgate latch switch • An open in the wire
B20	BLK/YEL	Tailgate key cylinder switch in UNLOCK	Check for continuity to ground: There should be 1 V or less.	• Faulty tailgate key cylinder switch • An open in the wire
B24	GRN/RED	Driver's door key cylinder switch in LOCK	Check for continuity to ground: There should be continuity.	• Faulty driver's door key cylinder switch • Poor ground (G501, G502) • An open in the wire
B11	GRN/WHT	Driver's door key cylinder switch in UNLOCK		

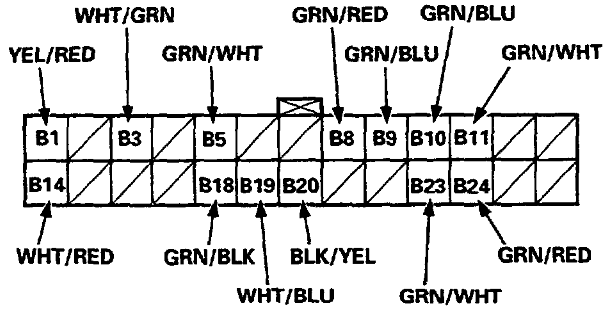
(cont'd)

Security Alarm Control Unit Input Test (KE model cont'd)

22-P CONNECTOR:



26-P CONNECTOR:

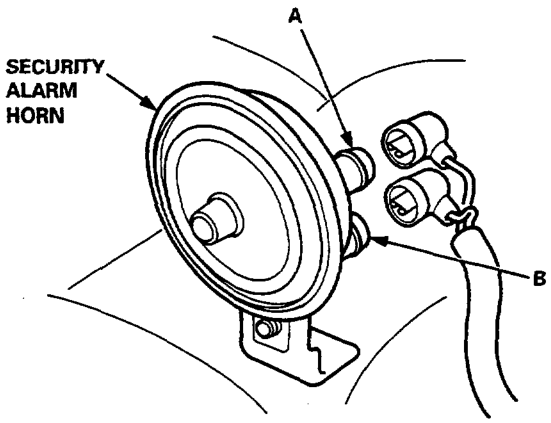


Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B23	GRN/YEL	Front passenger's door key cylinder switch in LOCK	Check for continuity to ground: There should be continuity.	• Faulty front passenger's door key cylinder switch • Poor ground (G401) • An open in the wire
B10	GRN/BLU	Front passenger's door key cylinder switch in UNLOCK		
A19	BLU/WHT	Driver's door lock knob in LOCK	Check for continuity to ground: There should be continuity.	• Faulty driver's door lock knob switch (built into the actuator) • Poor ground (G501, G502) • An open in the wire
A8	BLU/RED	Driver's door lock knob in UNLOCK		
A7	BLU/GRN	Front passenger's door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty front passenger's door lock knob switch (built into the actuator) • Poor ground (G401) • An open in the wire
A6	BLK/GRN	Right rear door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty right rear door lock knob switch (built into the actuator) • Poor ground (G501, G502) • An open in the wire
A5	BLK/BLU	Left rear door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	• Faulty left rear door lock knob switch (built into the actuator) • Poor ground (G501, G502) • An open in the wire
B14 and B1	WHT/RED and YEL/RED	Connect the WHT/RED and WHT/YEL (A11) terminals and the YEL/RED and BLK (A22) terminals momentarily.	Check the door lock operation: All doors should lock.	• Faulty door lock actuator • An open in the wire • Disconnected or obstructed door lock rod/linkage
		Connect the YEL/RED and WHT/YEL (A11) terminals and the WHT/RED and BLK (A22) terminals momentarily.	Check the door lock operation: All doors should unlock.	

Security Alarm Horn Test

1. Open the hood and disconnect the terminals from the security alarm horn.

2. Test the horn by connecting battery power to one terminal and grounding the other. The horn should sound.



3. Replace the horn if it fails to sound.

Hood Switch Test/Replacement

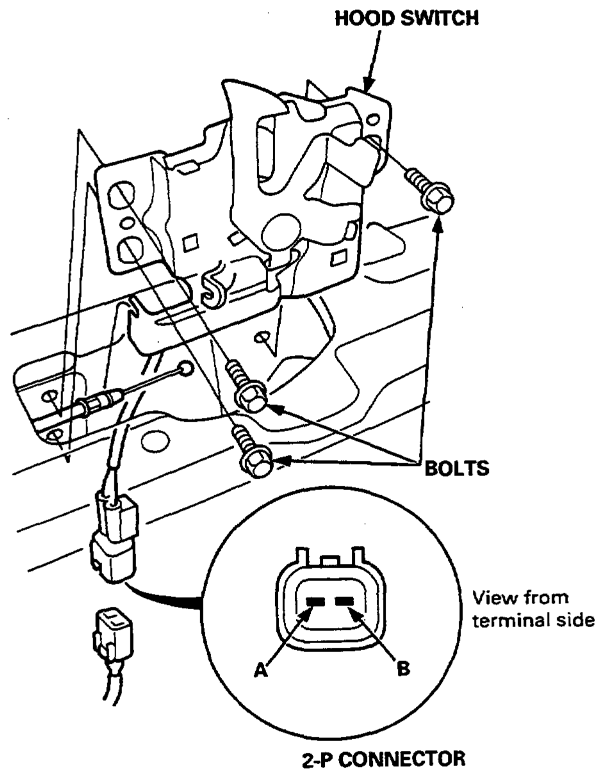
1. Open the hood.

2. Disconnect the 2-P connector from the hood switch.

3. Check for continuity between the terminals A and B in each switch position according to the table.

Position \ Terminal		A	B
LHD	Hood open		
	Hood closed	O	O
RHD	Hood open	O	O
	Hood close		

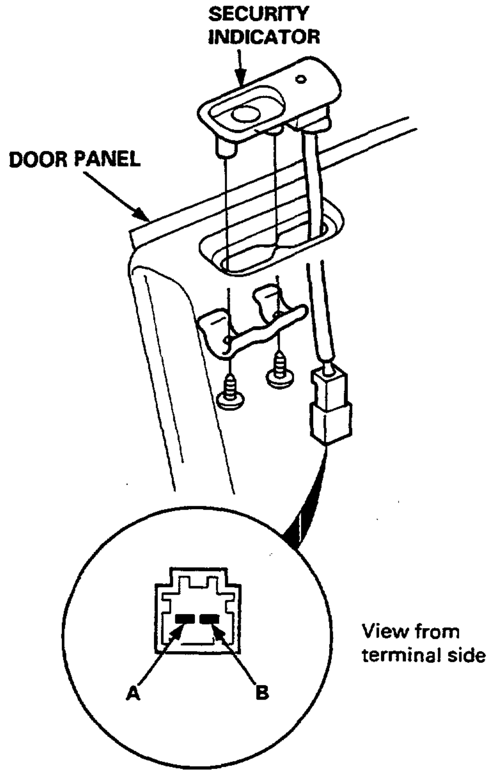
4. If the hood switch does not work properly, remove the two bolts and replace the switch.



Security Alarm System

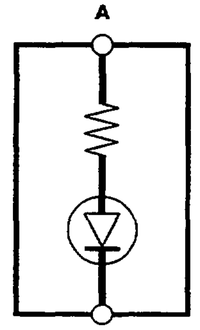
Security Indicator Test/ Replacement

1. Remove the front door panel (see section 20).
2. Remove the two screws, and disconnect the 2-P connector from the security indicator.
3. Remove the security indicator from the door panel.



2-P CONNECTOR

4. The LED should come on when power is connected to terminal A, and ground is connected to terminal B.
   If the LED does not come on, replace it.

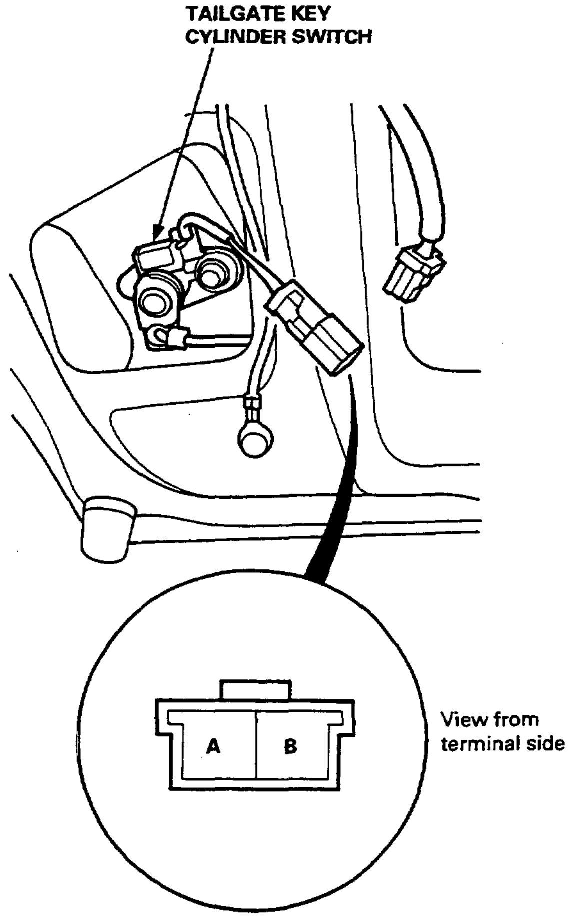


Tailgate Key Cylinder Switch Test

1. Open the trunk lid and disconnect the 2-P connector from the tailgate key cylinder switch.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A	B
LOCK (Closed)		
UNLOCK (Open)	○	○

3. If it fails to work, replace the trunk key cylinder switch (see section 20).

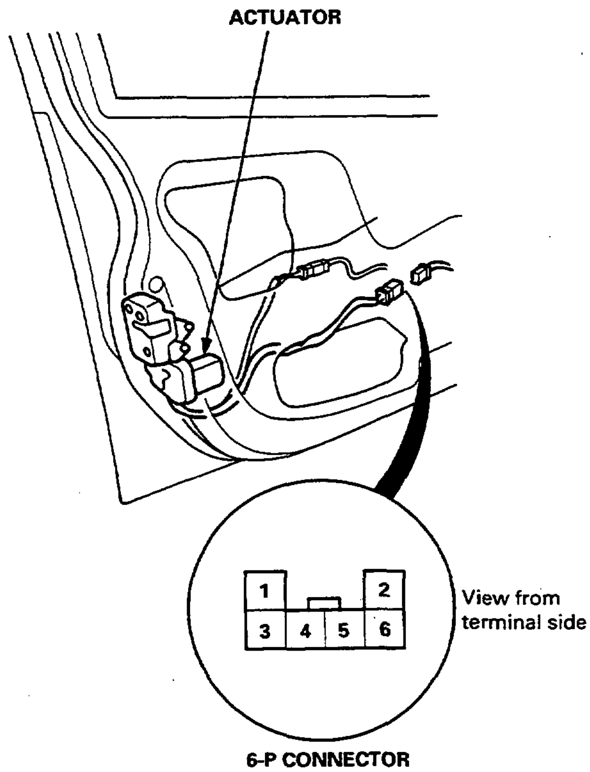


2-P CONNECTOR

Driver's Door Lock Actuator Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 6-P connector from the door lock actuator.

   NOTE: LHD type is shown, RHD type is symmetrical.



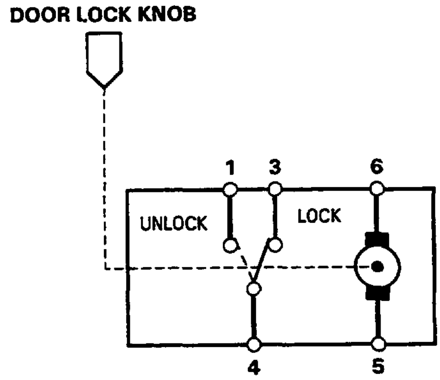
3. Test the actuator:

Position \ Terminal	6	5
LOCK	⊖	⊕
UNLOCK	⊕	⊖

CAUTION: To prevent damage to the actuator, connect battery power only momentarily.

4. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	1	4	3
LOCK		○	○
UNLOCK	○	○	



5. If the actuator does not work properly, replace it.

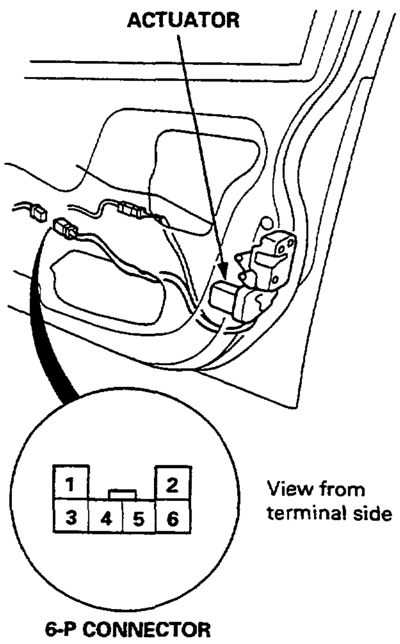
Security Alarm System

Passenger's Door Lock Actuator Teat

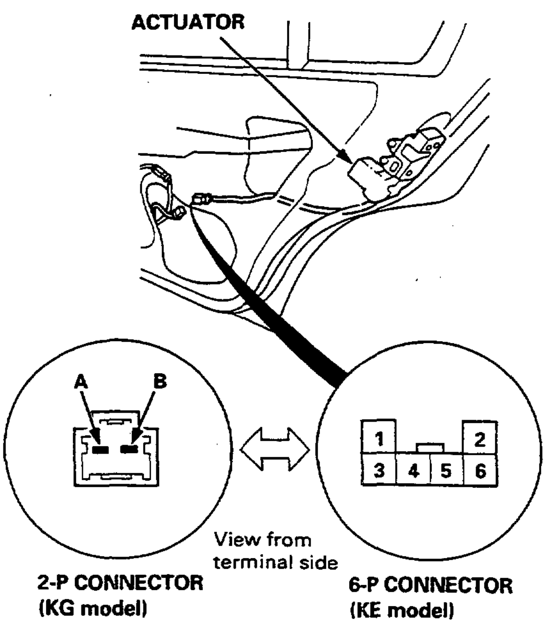
1. Remove the passenger's door panel (see section 20).
2. Disconnect the 6-P or 2-P connector from the door lock actuator.

Front Passenger's Door:

NOTE: LHD type is shown, RHD type is symmetrical.



Rear Passenger's Door:

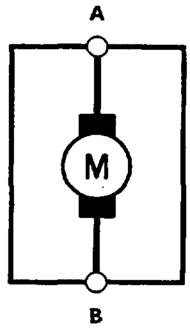


3. Test the actuator:

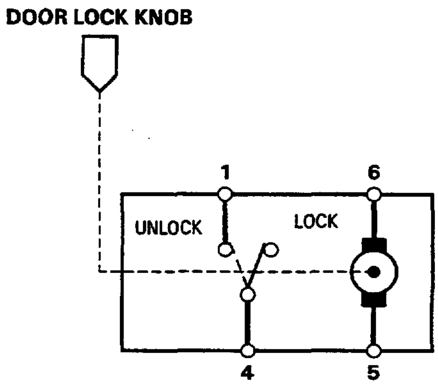
Terminal / Position	6 (B)	5 (A)
LOCK	⊖	⊕
UNLOCK	⊕	⊖

CAUTION: To prevent damage to the actuator, connect battery power only momentarily.

KG model:



KE model:



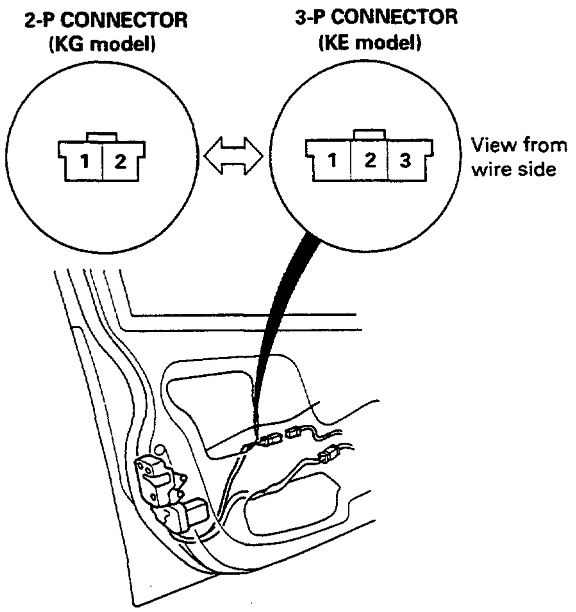
4. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	1	4
LOCK		
UNLOCK	○	○

5. If the actuator does not work properly, replace it.

Key Cylinder Switch Test

1. Remove the front door panel (see section 20).
2. Disconnect the 3-P or 2-P from the actuator.
3. Check for continuity between the terminals in each switch position according to the table.



KG model:

Terminal / Position	1	2
LOCK		
UNLOCK	○	○

KE model:

Terminal / Position	1	2	3
LOCK	○	○	
UNLOCK		○	○

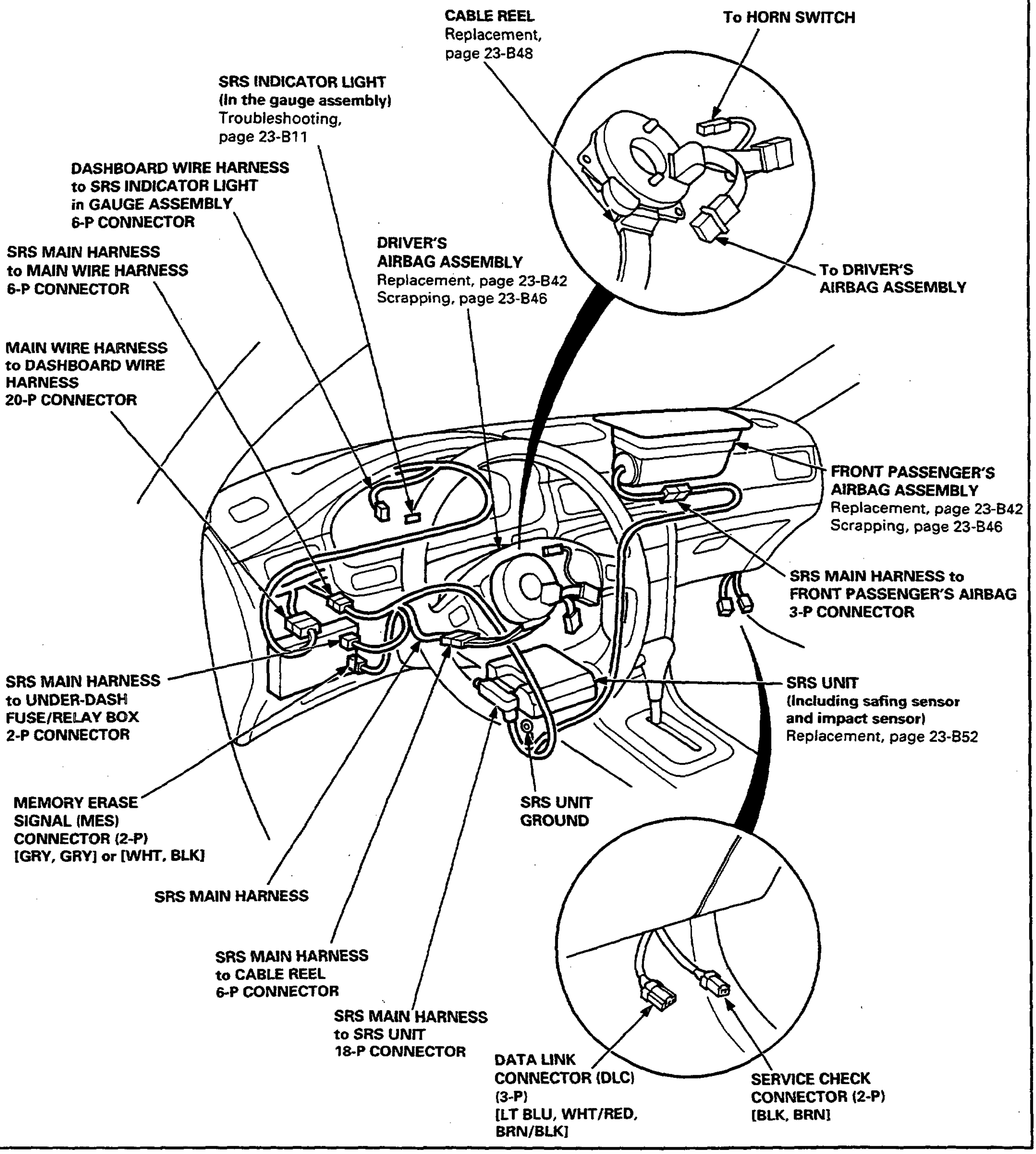
Component/Wiring Location Index (SRS-Type III)

LHD

CAUTION: Make sure all SRS ground locations are clean and grounds are securely attached.

NOTE:

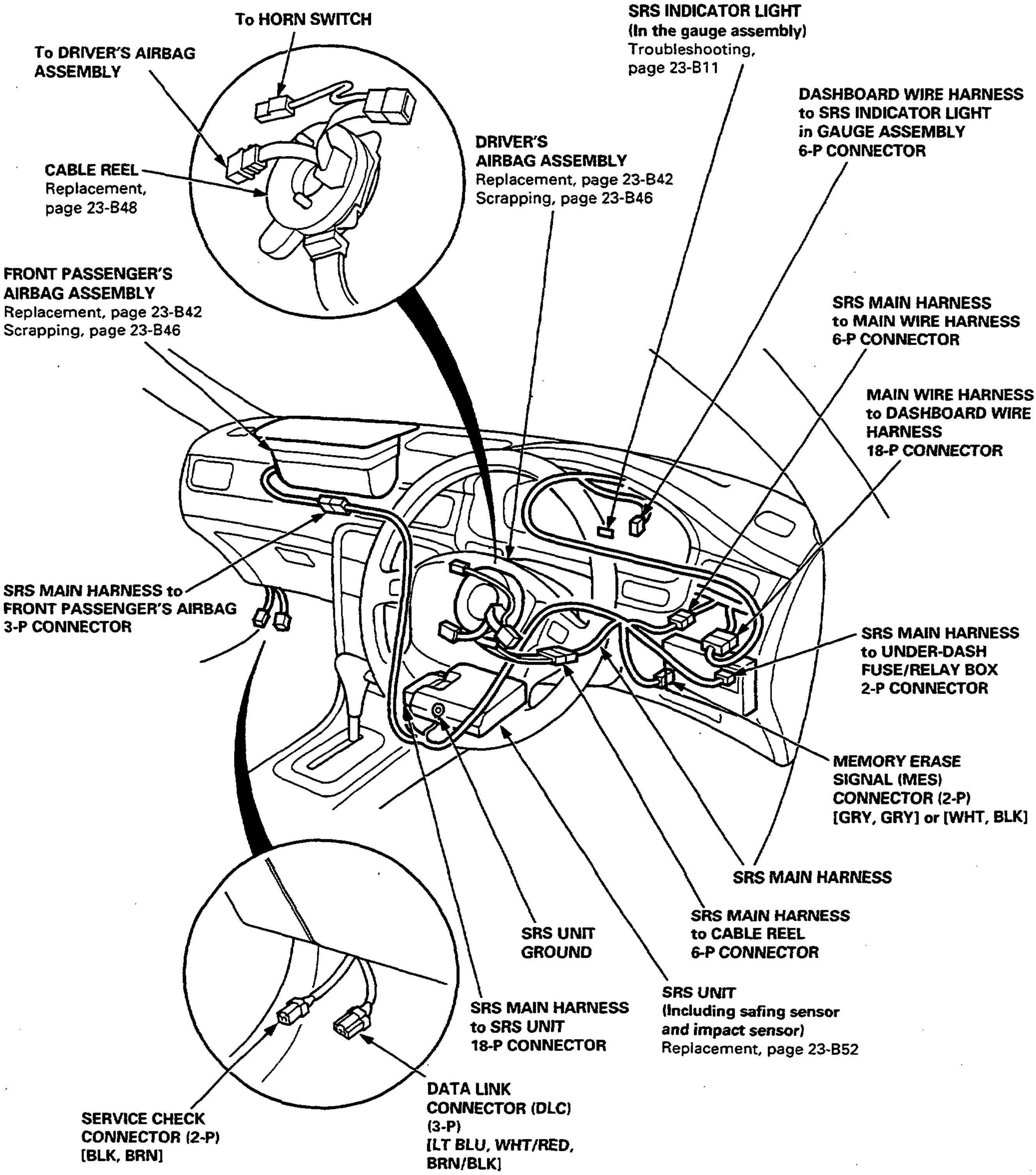
- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.



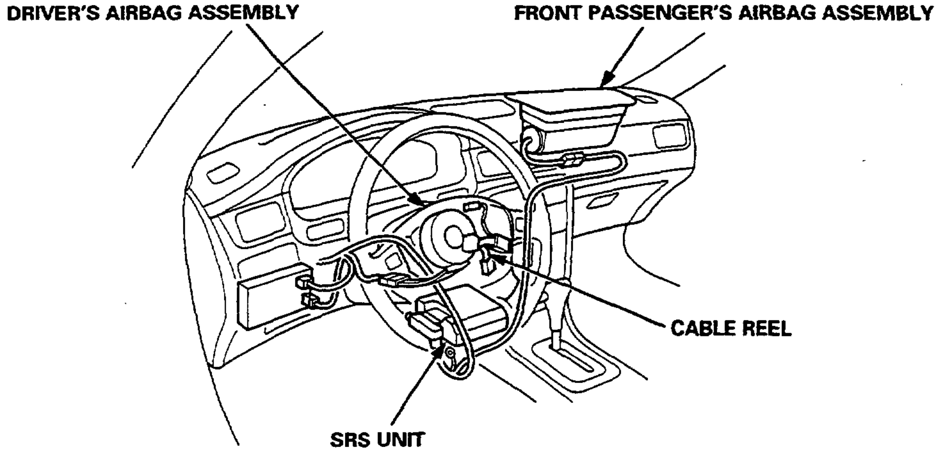
RHD

CAUTION: Make sure all SRS ground locations are clean and grounds are securely attached.

NOTE:
- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if it has an open circuit or damaged wiring.

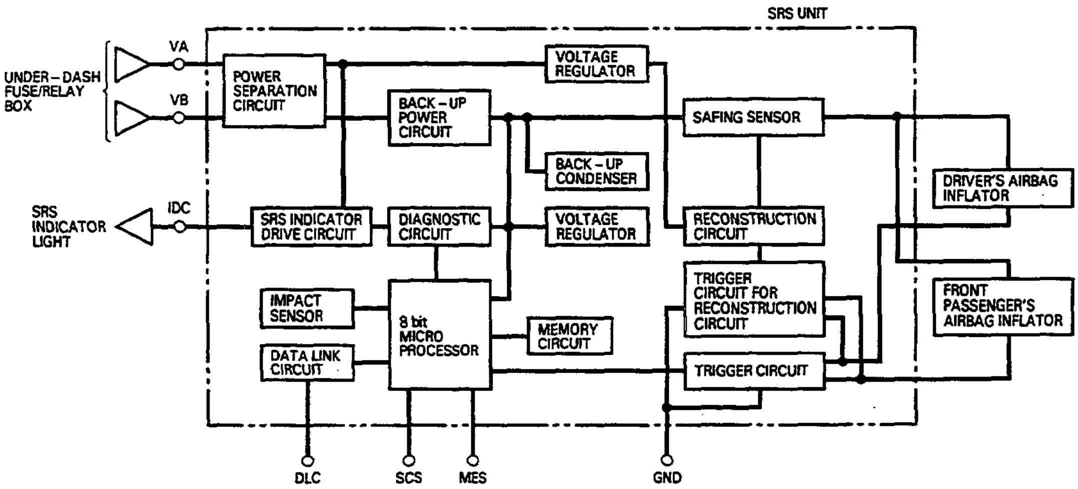


The SRS is a safety device which, when used in conjunction with the seat belt, is designed to help protect the driver and front passenger in a frontal impact exceeding a certain set limit. The system consists of the SRS unit (including safing sensor and impact sensor), the cable reel and driver's airbag, and front passenger's airbag.



Operation
The main circuit in the SRS unit senses and judges the force of impact and, if necessary, ignites the inflator charges. If battery voltage is too low or power is disconnected due to the impact, the back-up power circuit will keep voltage at a constant level.

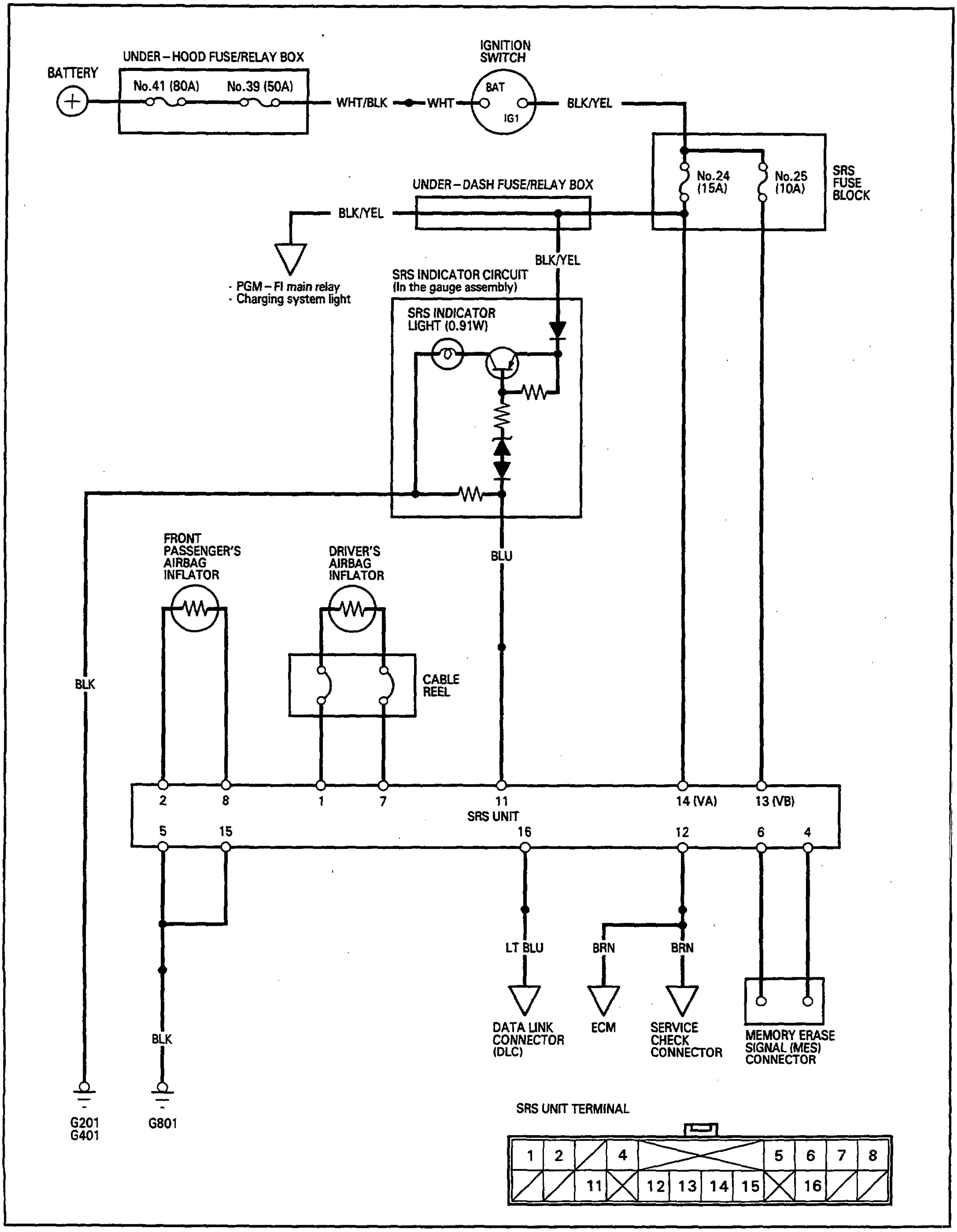
For the SRS to operate:
(1) The impact sensor and safing sensor must activate, and send electric signals to the micro processor.
(2) The micro processor must compute the signals, and must send signals to the airbag inflators.
(3) The inflators must ignite and deploy the airbags.



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. In case there is a system abnormality immediately after the ignition switch has been turned ON (II), the reconstruction circuit prevents malfunction. The system must be inspected and repaired as soon as possible.

For better serviceability, the memory will store the cause of the malfunction, and the data link circuit passes on the information from the memory to the data link connector.

Circuit Diagram (SRS-Type III)

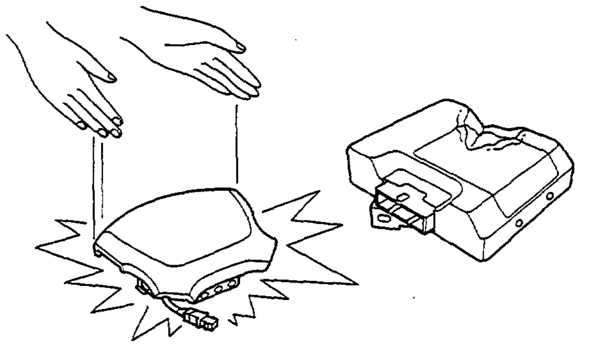


Precautions/Procedures (SRS-Type III)

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
  — Cable reel
  — SRS unit



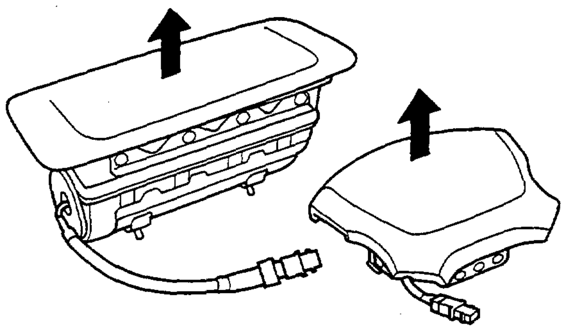
- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental deployment and possible injury.
- 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, and wait at least three minutes before beginning work.
- Replacement of the combination light and wiper/washer switches can be done without removing the steering wheel:
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Whenever the airbag has been activated, replace the SRS unit.

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.



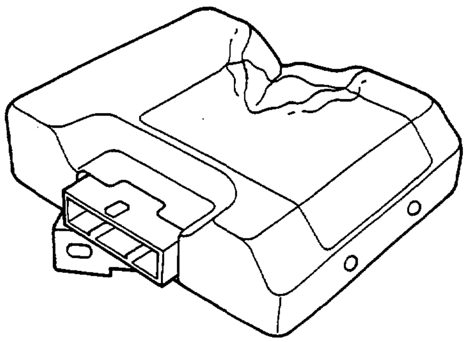
⚠WARNING If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

- 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.

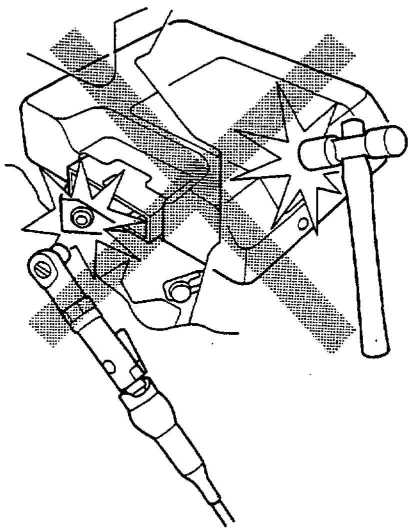
CAUTION: Improper handling or storage can internally damage the airbag assembly, making it inoperative.
If you suspect the airbag assembly has been damaged, install a new unit and refer to the Deployment/Scrapping Procedures for disposing of the damaged airbag.

SRS Unit Precautions

- Take extra care when painting or doing body work in the area below the dashboard. Avoid direct exposure of the SRS unit or wiring to heat guns, welding or spraying equipment.
- Connect the short connectors before working below the dashboard near the SRS unit.
- After any degree of frontal body damage, or after a collision without airbag deployment, inspect the SRS unit for physical damage. If it is dented, cracked, or deformed, replace it.



- Be sure the SRS unit is installed securely.
- During installation or replacement, be careful not to bump (impact wrench, hammer, etc.) the area around the SRS unit. The airbags could accidentally deploy and cause damage or injuries.



- Do not disassemble the SRS unit.
- Store the SRS unit in a cool (less than about 40°C) and dry (less than 80% humidity, no moisture) place. Do not spill water or oil on the SRS unit, and keep it from dust.

Inspection After Deployment

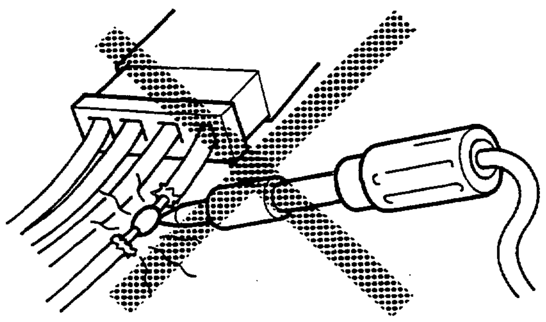
After a collision in which the airbags were deployed, replace the SRS unit and inspect the following:

1. Inspect all the SRS wire harnesses. Replace, don't repair, any damaged harnesses.
2. Inspect the cable reel for heat damage. If there is any damage, replace the cable reel.
3. After the car is completely repaired, turn the ignition switch on. 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.

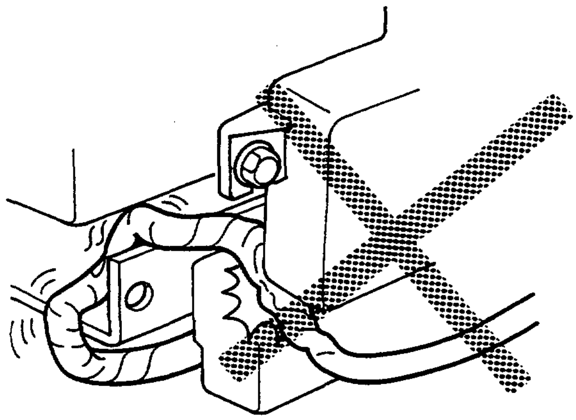
Wiring Precautions

- Never attempt to modify, splice or repair SRS wiring.

  NOTE: SRS wiring can be identified by special yellow outer protective covering.



- Be sure to install the harness wires so that they are not pinched or interfering with other car parts.

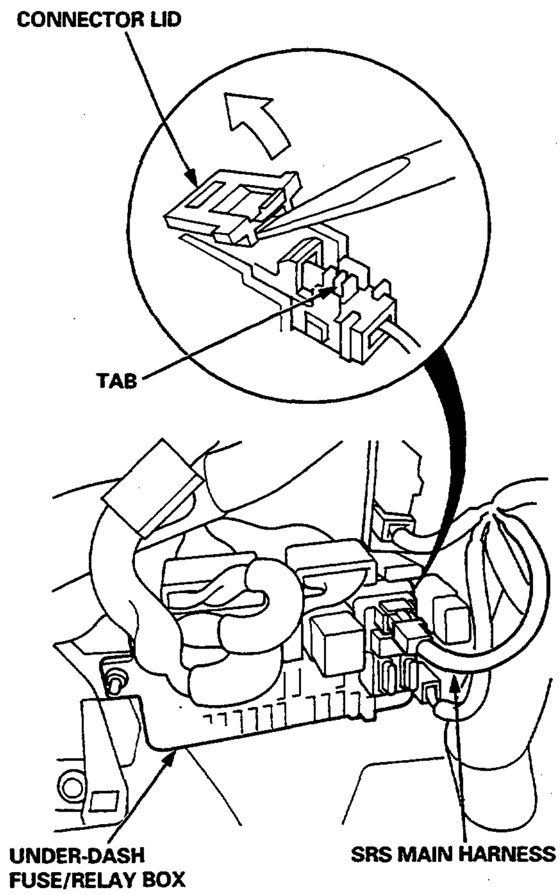


- Make sure all SRS ground locations are clean and grounds are securely fastened for optimum metal-to-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

Disconnecting the SRS Connector at 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.

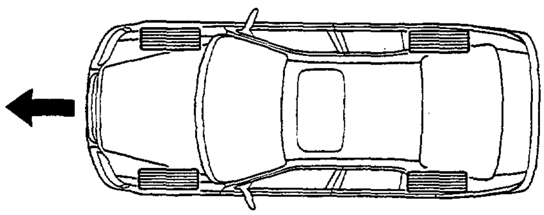


2. To reinstall the connector, push it into position until it clicks, then close its lid.

Steering-related Precautions

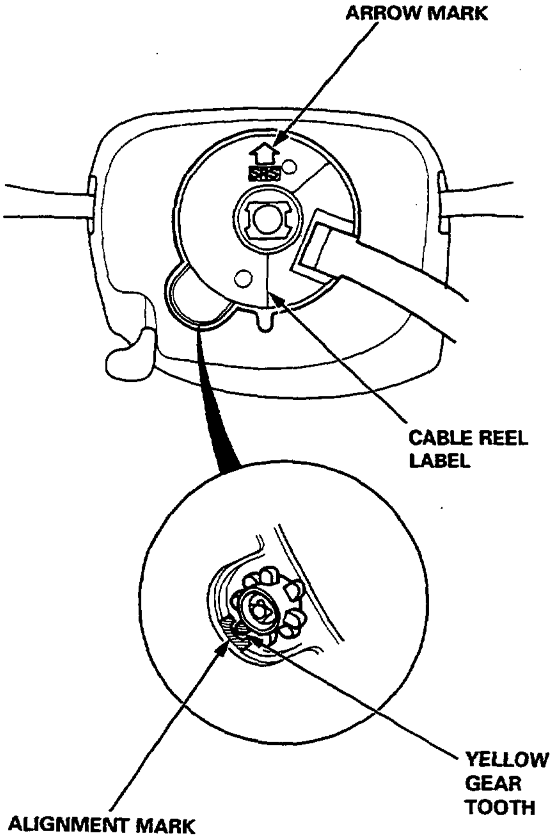
Steering Wheel and Cable Reel Alignment

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.

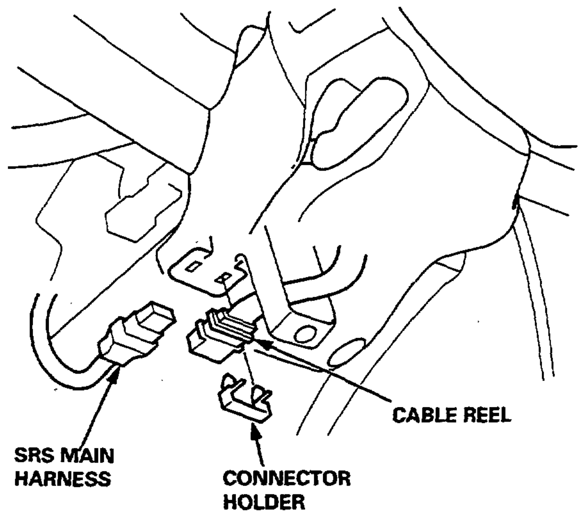


Steering Column Removal

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.**

NOTE: When service work requires the airbag assembly and cable reel to be disconnected with the battery connected, and the ignition switch is turned ON (II), the SRS unit will store this as an open in the driver's airbag inflator, and the SRS indicator light will go on.
In such a case, make sure to confirm the DTC, and to troubleshoot it.



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 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.

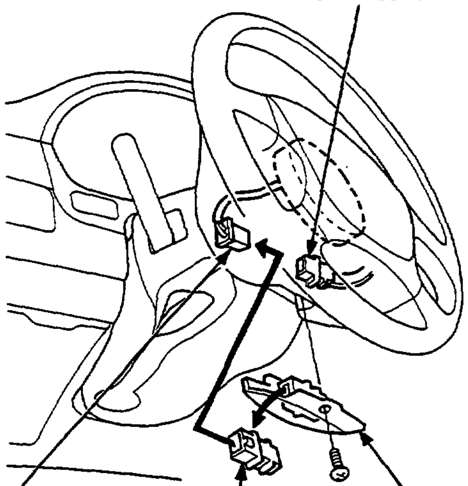
Connecting the Short Connectors

⚠ WARNING To avoid accidental deployment and possible injury, always connect the protective short connectors on the driver's and passenger's airbag connectors before working near any SRS wiring.

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
2. Connect the short connectors (RED):

Driver's Side:

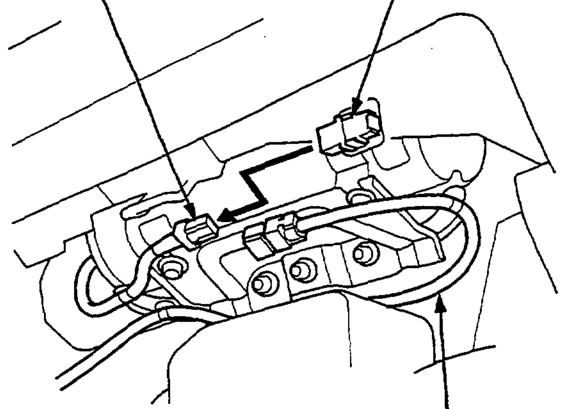
- Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.



- 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.

Front Passenger's Side:

- Remove the glove box, then remove the short connector (RED) from its holder.
- 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.



Troubleshooting (SRS-Type III)

Self-diagnostic Procedures

The self-diagnostic function of the SRS system allows it to locate the causes of system problems and to store this information in memory. For easier troubleshooting, this data can be retrieved via the data link circuit.

- When you turn the ignition switch ON (II), the SRS indicator will come on. If it goes off after six seconds, the system is normal.
- If there is an abnormality, the system locates and defines the problem, and stores this information in memory while the SRS indicator light turns on.
  NOTE: The data will remain in the memory even when the ignition switch is turned off, or if the battery is disconnected.
- When you connect the SCS short connector to the service check connector (2-P), and turn the ignition switch ON (II), the SRS indicator light will indicate the diagnostic trouble code (DTC) by the number of blinks.
- After reading and recording the DTC, proceed with the troubleshooting for this code.

Precautions

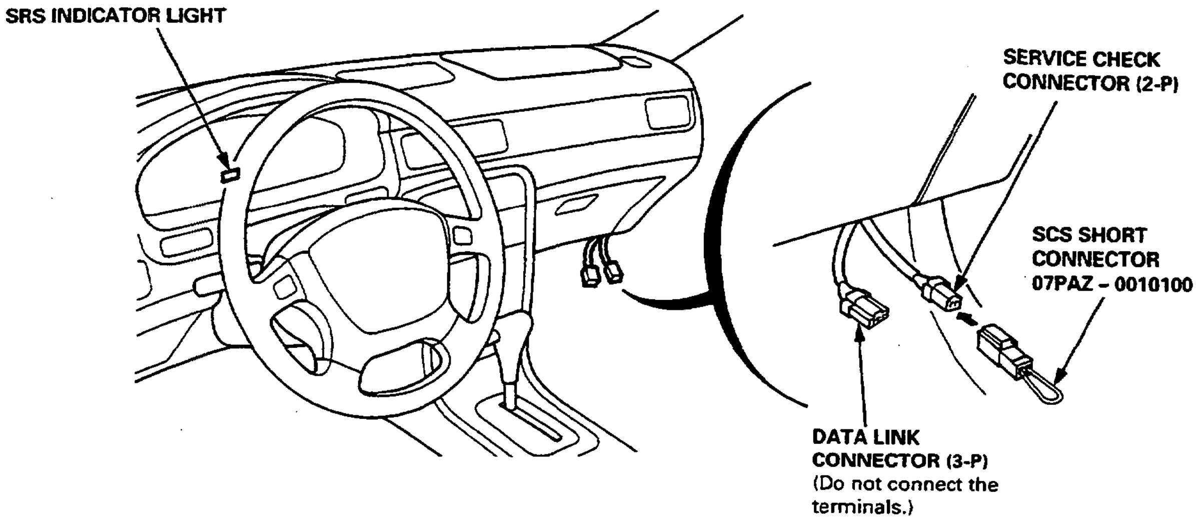
- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental airbag deployment and possible injury.
- Whenever the ignition switch is ON (II), be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you remove the SRS main harness, connect the short connectors (RED) to the airbag connectors.
- Do not touch a tester probe to the terminals in the SRS unit or harness connectors, and do not connect the terminals with a jumper wire. Use only the test harness and the SCS short connectors.
- Make sure the battery is sufficiently charged. If the battery is dead or low, or the back-up power circuit in the SRS unit is faulty, measuring values won't be correct.
- After replacing system components, erase the DTC from memory, and turn the ignition switch OFF. Wait two to three seconds, then turn the ignition switch ON (II); the SRS indicator light should come on and go off after about six seconds.
  Next, turn the steering wheel fully left, and keep it in this position for about 20 seconds. Then turn it fully right and repeat; the SRS indicator light should not come on during these 40 seconds.

Troubleshooting (SRS-Type III)

Diagnostic Trouble Code (DTC)

The SRS indicator light indicates the DTC by the number of blinks when the SCS short connector is connected to the service check connector.

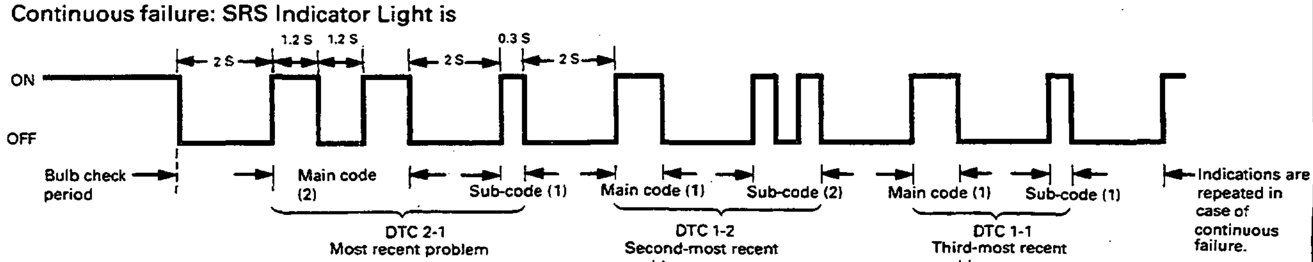
1. With the ignition switch OFF, connect the SCS short connector to the service check connector.



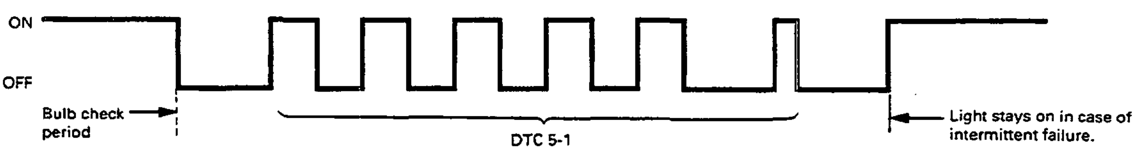
2. Turn the ignition switch ON (II). The SRS indicator light comes on for about six to thirty seconds and goes off. Shortly after (the time depends on which DTC is confirmed by the selfdiagnosis system), it will indicate the DTC: If the DTC is not indicated within one minute, do the troubleshooting for DTC 9-1 ("no code").
   — In case of continues failure(s), the DTC(s) will be indicated repeatedly (see example 1. below).
   — In case of intermittent failure(s), the SRS indicator light will indicate (each of) the DTC(s) one time, then it will stay on (see example 2.).
   — In case of both continuous and intermittent failures, the DTC of the continuous failure only will be indicated repeatedly. After troubleshooting it, first recheck to make sure that the problem disappeared and that there are no other codes. Then, erase the memory.
   — In case the system is normal (no DTC), the SRS indicator light will start blinking continuous short blinks (see example 3. below).

Example of DTC Indications:

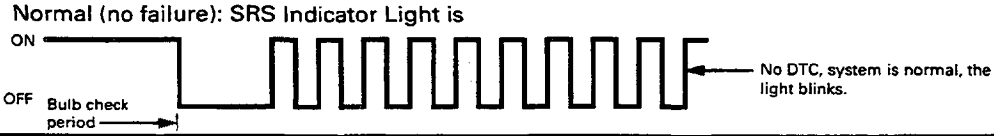
1. Continuous failure: SRS Indicator Light is



2. Intermittent failure: SRS Indicator Light is



3. Normal (no failure): SRS Indicator Light is



Troubleshooting of Intermittent Failures

If there was a malfunction, but it doesn't recur, it will be stored in the memory as an intermittent failure, and the SRS indicator light comes on.

NOTE: When a continuous failure is indicated, first do the troubleshooting for continuous failures. After repairing, recheck the DTC to make sure there are no intermittent failures, and to confirm that the repaired continuous failure has not changed to an intermittent failure. (Bear in mind that other codes will be recorded during troubleshooting.)

After checking the DTC, troubleshoot as follows:

1. Record the DTC. (If there is only DTC 5-1, replace the unit.)
2. Remove the SCS short connector from the service check connector.
3. Erase the DTC from memory (see "Erasing the DTC Memory"), turn the ignition switch OFF, and wait two to three seconds.
4. Connect the SCS short connector to the service check connector.
5. With the shift lever in neutral, turn the ignition switch ON (II), and let the engine idle. The SRS indicator light will blink continuous short blinks.

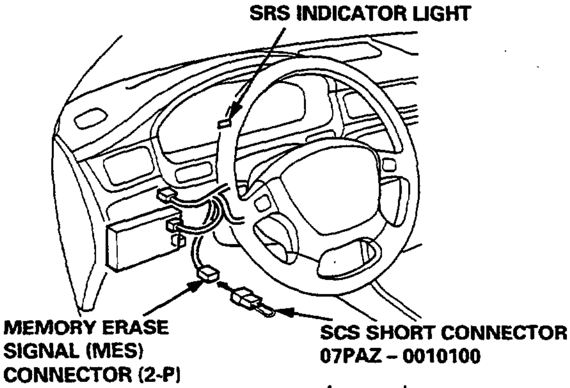
6. Shake the wire harness and the connector, and/or take a test drive (quick acceleration, quick braking, cornering), and/or turn the steering wheel fully left and right, and hold it there for 20 to 30 seconds, to find the cause of the intermittent failure. If the problem recurs, the SRS indicator light will stop blinking and stay on.

7. If you can't duplicate the intermittent failure, the system is OK at this time. Disconnect the SCS short connector.

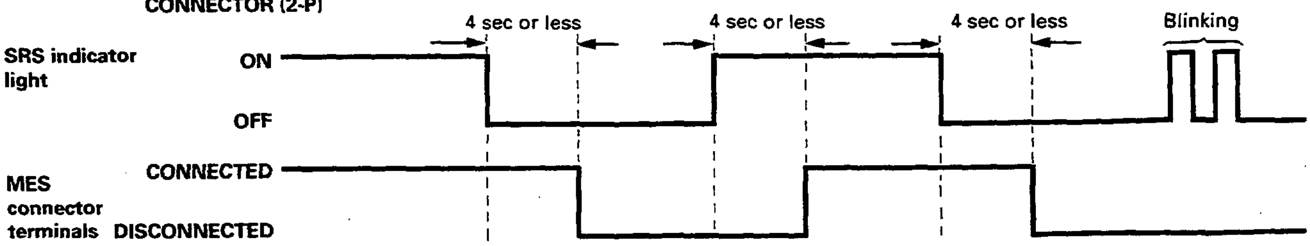
Erasing the DTC Memory

NOTE: Use only the SCS short connector. Otherwise, you may not erase the memory because it is akward to connect and disconnect a jumper wire quickly enough.

1. Turn the ignition switch OFF, and disconnect the SCS short connector from the service check connector.
2. Connect the SCS short connector to the MES connector.



3. Turn the ignition switch ON (II).
4. The SRS indicator light comes on for about six seconds and goes off. Remove the SCS short connector from the MES connector within four seconds after the SRS indicator light went off.
5. The SRS indicator light comes on again. Reconnect the SCS short connector to the MES connector within four seconds after the SRS indicator comes on.
6. The SRS indicator light goes off. Remove the SCS short connector from the MES connector within four seconds.
7. The SRS indicator light indicates that the memory is erased by blinking two times.
8. Turn the ignition switch OFF, and wait two to three seconds.
9. Turn the ignition switch ON (II) again; the SRS indicator light should come on and go off after about six seconds. Confirm that it does not come on again after further 30 seconds.
10. Turn the ignition switch OFF.



Diagnostic Trouble Code (DTC) Chart

TAKATA:

SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't come on	no code	Faulty SRS indicator light circuit	Troubleshooting	23-B16
comes on	1-1	Open in the driver's airbag inflator or increased resistance	Troubleshooting	23-B19
	1-2	Short to another wire in the driver's airbag inflator or decreased resistance		23-B21
	1-3	Short to power in the driver's airbag inflator		23-B23
	1-4	Short to ground in the driver's airbag inflator		23-B25
	2-1	Open in the passenger's airbag inflator or increased resistance	Troubleshooting	23-B28
	2-2	Short to another wire in the passenger's airbag inflator or decreased resistance		23-B30
	2-3	Short to power in the passenger's airbag inflator		23-B32
	2-4	Short to ground in the passenger's airbag inflator		23-B33
	5-1*1	Internal failure of the SRS unit	TRoubleshooting or SRS unit replacement	23-B40
	10-1	SRS unit replacement code (SRS unit must not be used any longer)		23-B52
	9-1*2 no code	Faulty SRS indicator light circuit	Troubleshooting	23-B36
	9-2	Faulty SRS power supply system		23-B40

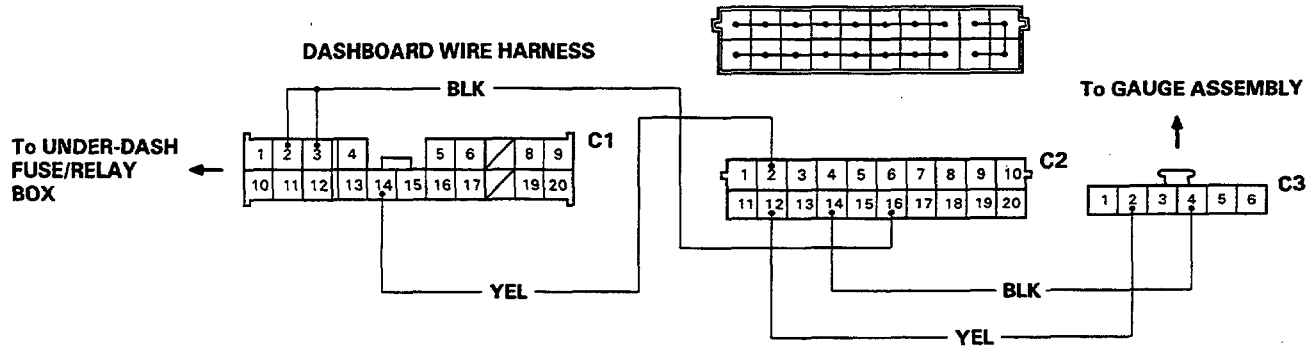
NOTE:
- If multiple DTCs including DTC 5-1 are indicated, first troubleshoot all DTCs except DTC 5-1, then recheck the DTC indication to make sure the repaired failures have not changed to intermittent failures, and to confirm that there are no other failures. Next, erase the memory, and check the DTC again. If DTC 5-1 doesn't reappear, the SRS unit is normal.
- When you return the SRS unit in case of a claim, do not erase the memory. The data will remain in the memory even when the ignition switch is turned off, or if the battery is disconnected.

*1 When you keep the ignition switch turned ON (II) or keep the engine cranking with battery voltage dropped (low battery), this may be self-diagnosed as a failure in the SRS system, and the SRS indicator light may indicate the multiple DTC 9-2, 5-1, 5-1. In this case troubleshoot DTC 9-2.

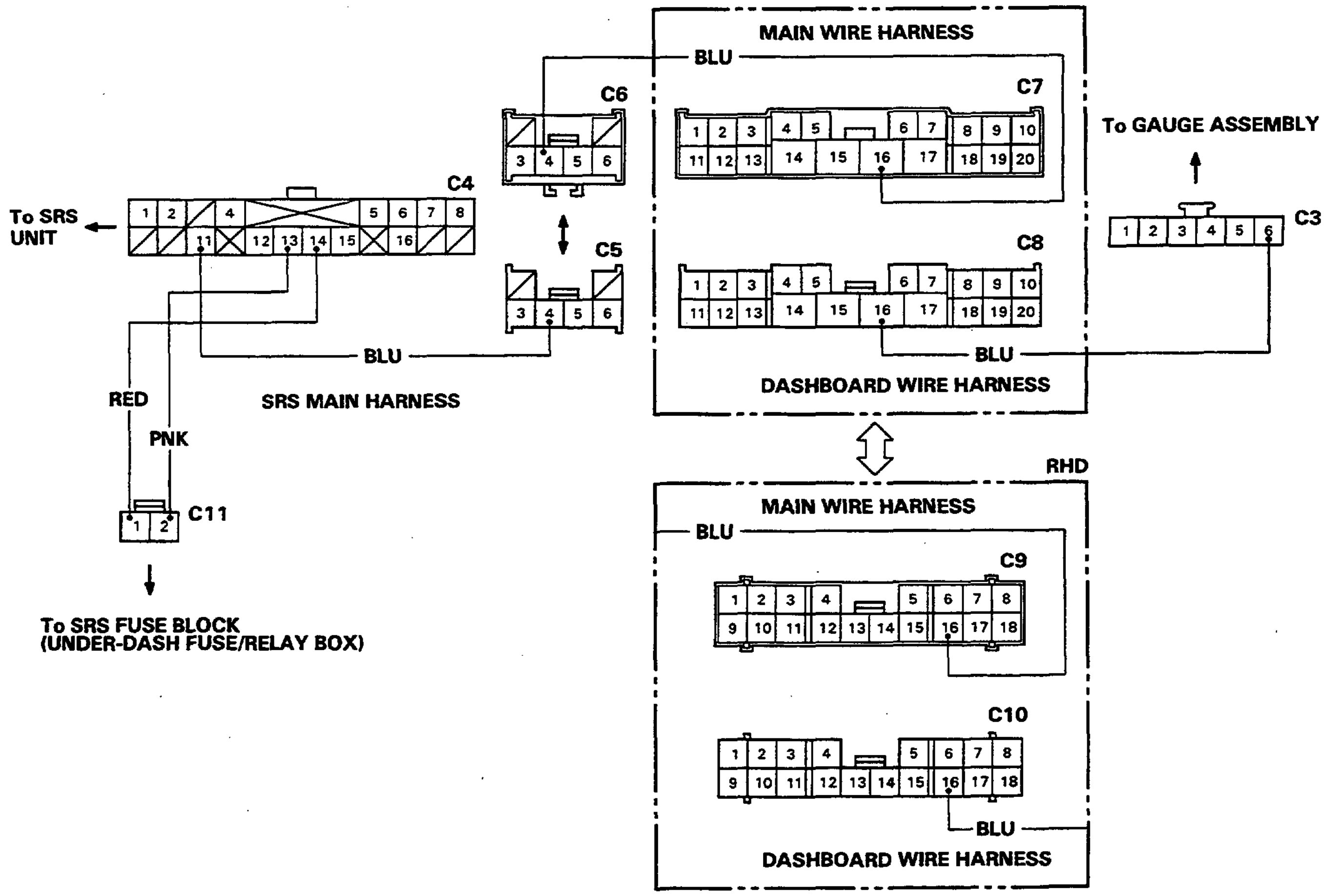
*2 If an intermittent failure occurs, DTC 9-1 will be indicated. In case of a continuous problem, there will be no DTC.

SRS Indicator Light Wire Connections

SRS Indicator Light Power Circuit



SRS Indicator Light Control Circuit



C1: DASHBOARD WIRE HARNESS 20-P CONNECTOR
C2: JOINT CONNECTOR
C3: DASHBOARD WIRE HARNESS 6-P CONNECTOR
C4: SRS MAIN HARNESS 18-P CONNECTOR
C5: SRS MAIN HARNESS 6-P CONNECTOR

C6: MAIN WIRE HARNESS 6-P CONNECTOR
C7: MAIN WIRE HARNESS 20-P CONNECTOR (LHD)
C8: DASHBOARD WIRE HARNESS 20-P CONNECTOR (LHD)
C9: MAIN WIRE HARNESS 18-P CONNECTOR (LHD)
C10: DASHBOARD WIRE HARNESS 18-P CONNECTOR (RHD)
C11: SRS MAIN HARNESS 2-P CONNECTOR

The SRS Indicator Light Doesn't Come On

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check the power supply (fuse):
Turn the ignition switch ON (II), and check whether the other indicator lights come on or not (brake system light, etc.).

Do the other indicator lights come on?

YES | NO

(NO) Check the No. 24 (15 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES | NO

(NO) Replace the No. 24 (15 A) fuse, and check that the SRS indicator light comes on.

Does the SRS indicator light come on?

YES | NO

(YES) END

(YES / NO) Check for an open in the wire harness between fuse No. 24 (15 A) and the gauge assembly, and repair. Check that the SRS indicator light comes on.

Does the SRS indicator light come on?

YES | NO

(YES) END

(YES / NO) Check the SRS unit:

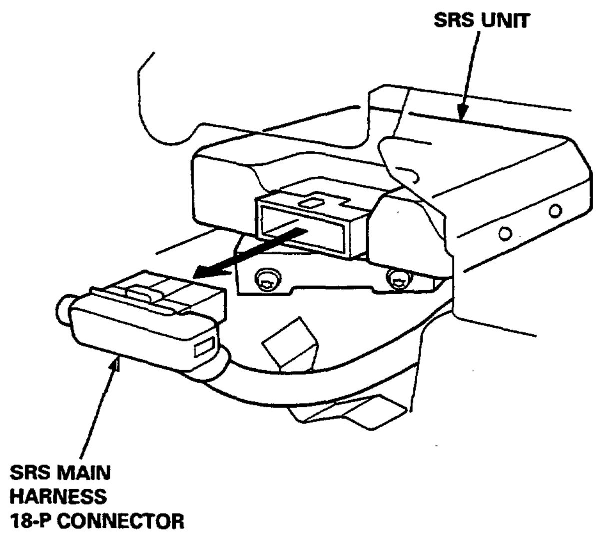
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then the positive cable, and wait for three minutes.
3. Connect the short connectors (RED) to the airbag connectors (see page 23-B10).
4. Disconnect the SRS main harness 18-P connector from the SRS unit.
5. Reconnect the battery positive cable, then the negative cable.
6. Turn the ignition switch ON (II), and check that the SRS indicator light comes on.

Does the SRS indicator light come on?

YES | NO

(YES) **Faulty SRS unit; replace the unit.**

(NO) To page 23-B17



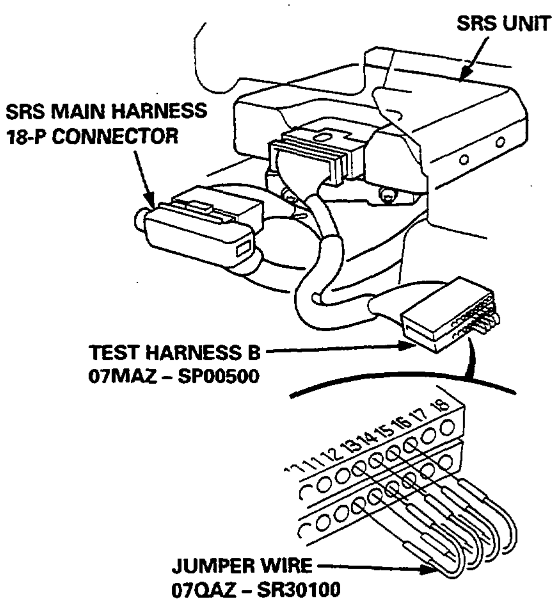
From page 23-B16

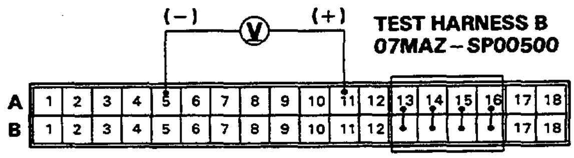
Check the SRS indicator circuit input voltage:
1. Turn the ignition switch OFF.
2. Connect Test Harness B between the SRS unit and the SRS main harness 18-P connector.
3. Connect jumper wires, as shown, to the No. 13, 14, 15, and 16 terminals on rows A (SRS unit end) and B (SRS main harness end) of Test Harness B.
   NOTE: Be careful not to connect the jumper wires to other terminals.
4. Connect a voltmeter between terminals A11 (+) and A5 (–).
5. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

YES NO

Faulty SRS unit; replace the SRS unit.





Check the SRS indicator light bulb:
1. Turn the ignition switch OFF, and disconnect Test Harness B.
2. Connect the SRS main harness 18-P connector to the SRS unit.
3. Remove the gauge assembly.
4. Check for blown SRS indicator light bulb.

Is the SRS indicator light bulb OK?

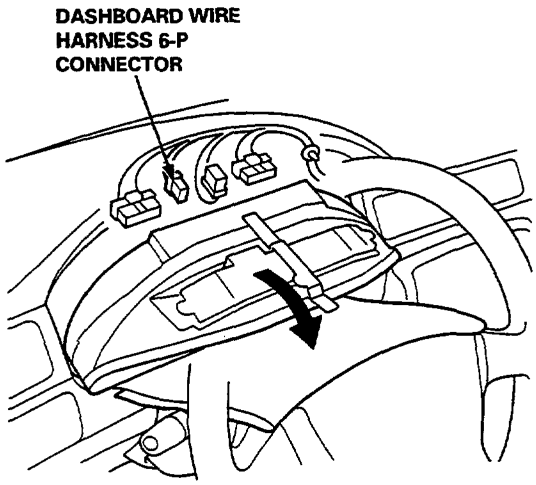
YES NO

Replace the bulb, and reconnect the gauge assembly connectors. Then turn the ignition switch ON (II).

Does the SRS indicator light come on?

YES NO

END

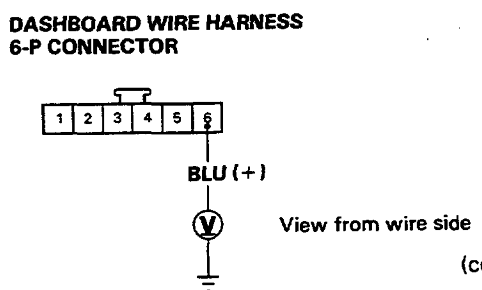


Check the SRS indicator light circuit:
1. Disconnect the dashboard wire harness 6-P connector from the gauge assembly.
2. Connect a voltmeter between the No. 6 terminal (+) of the 6-P connector and ground.
3. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

YES NO

Faulty SRS indicator light circuit in the gauge assembly; replace the gauge assembly.



To page 23-B18

(cont'd)

The SRS Indicator Light Doesn't Come On (cont'd)

From page 23-B17

Check the wire harness of the SRS indicator light circuit (1):
1. Turn the ignition switch OFF.
2. Disconnect the dashboard wire harness 20-P connector (LHD) or 18-P connector (RHD) from the main wire harness.
3. Connect a voltmeter between the No. 16 terminal (+) of the main wire harness 20-P (LHD) or 18-P (RHD) connector and ground.
4. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON?

YES → **Short to power in the BLU wire of the dashboard wire harness; replace the harness.**

NO ↓

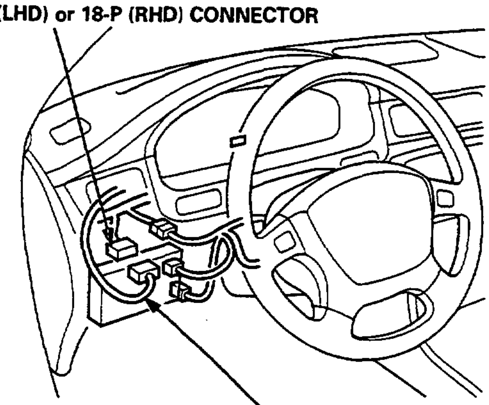
Check the wire harness of the SRS indicator light circuit (2):
1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 6-P connector from the main wire harness.
3. Connect a voltmeter between the No. 4 terminal (+) of the SRS main harness 6-P connector and ground.
4. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?

YES → **Short to power in the BLU wire of the main wire harness; replace the harness.**

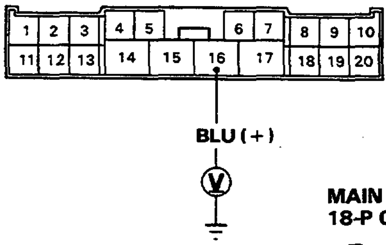
NO → **Short to power in the BLU wire of the SRS main harness; replace the harness.**

MAIN WIRE HARNESS
20-P (LHD) or 18-P (RHD) CONNECTOR

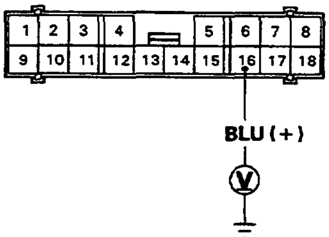


DASHBOARD WIRE HARNESS

MAIN WIRE HARNESS
20-P CONNECTOR (LHD)

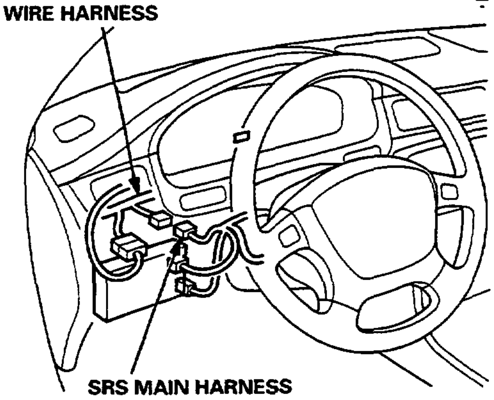


MAIN WIRE HARNESS
18-P CONNECTOR (RHD)

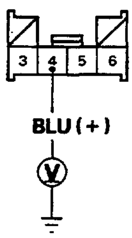


View from terminal side

MAIN WIRE HARNESS



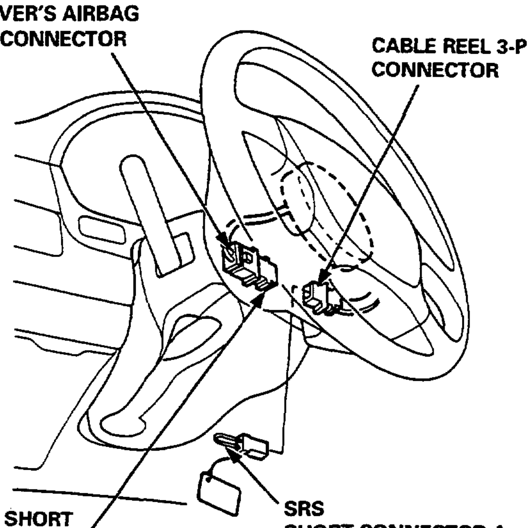
SRS MAIN HARNESS
6-P CONNECTOR



View from wire side

DTC 1-1

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

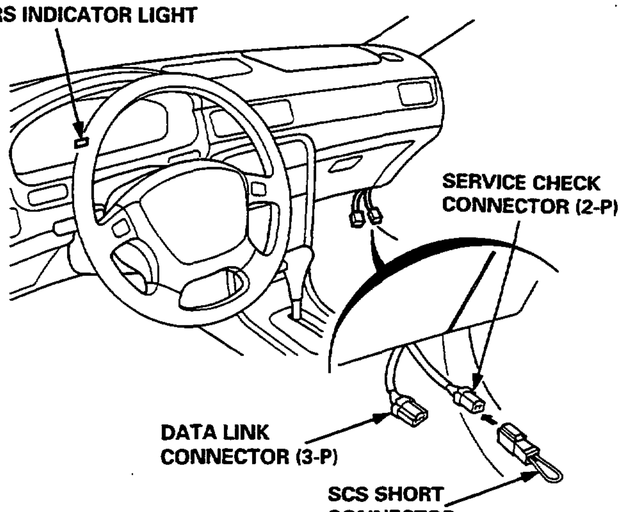


Check for an open in the driver's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the driver's airbag assembly.
   CAUTION: Do not disconnect the passenger's airbag connector.
4. Connect SRS short connector A to the cable reel 3-P connector.
5. Connect the SCS short connector to the service check connector.
6. Reconnect the battery positive cable, then reconnect the negative cable.
7. Turn the ignition switch ON (II), and record the most recent DTC.

Is DTC 1-1 or DTC 1-2 indicated?

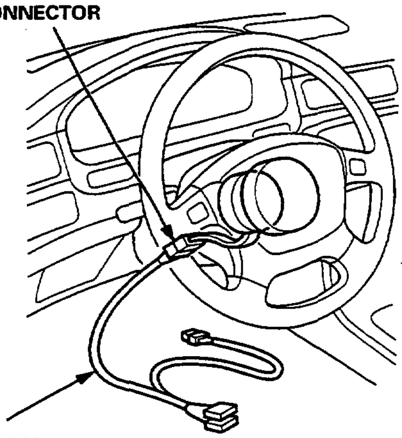
1-1 | 1-2

1-2: **Open in the driver's airbag inflator; replace the driver's airbag assembly (see page 23-B42).**



1-1: Check for an open in the cable reel:
1. Turn the ignition switch OFF, and remove the SCS short connector.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Remove the glove box, and connect the short connector (RED) to the passenger's airbag assembly (see page 23-B10).
4. Remove the dashboard lower cover, and disconnect the cable reel 6-P connector from the SRS main harness.
5. Connect Test Harness C to the cable reel 6-P connector.
   NOTE:
   - Do not connect the battery cables.
   - Disconnect only the SCS short connector. (cont'd)

To page 23-B20



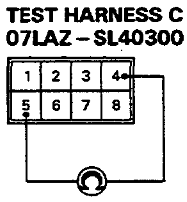
(cont'd)

DTC 1-1 (cont'd)

From page 23-B19

Check for an open in the cable reel (cont'd):
6. Check for continuity between the No. 4 and No. 5 terminals of Test Harness C.

Is there continuity?



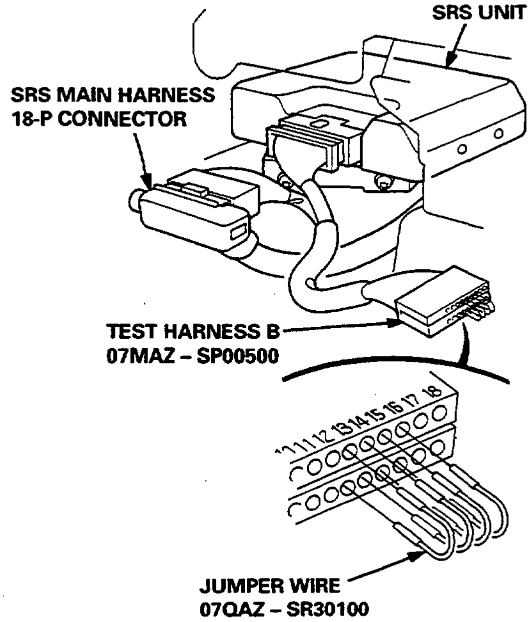
YES / NO

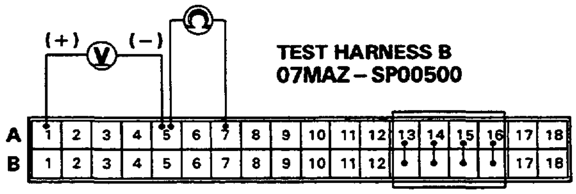
NO → **Open in the cable reel; replace the cable reel (see page 23-B48).**

YES ↓

Check the SRS Unit:
1. Connect the SRS main harness 6-P connector to the cable reel.
2. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B.
3. Connect jumper wires, as shown, to the No. 13, 14, 15, and 16 terminals on rows A (SRS unit end) and B (SRS main harness end) of Test Harness B.
   NOTE: Be careful not to connect jumper wires to the other terminals.
4. Connect the battery positive cable, then connect the negative cable.
5. Connect a voltmeter between terminals No. A1 (+) and No. A5 (–) of Test Harness B.
6. Turn the ignition switch ON (II), and measure voltage. There should be 8.0 – 10.5 V.
7. Turn the ignition switch OFF, and measure resistance between terminals No. A7 and A5. There should be 0.65 – 0.75 kΩ.
   NOTE: The resistance will be unstable if you measure immediately after you turn the ignition switch OFF. Allow it to settle, then take the reading.

Are voltage and resistance as specified?





YES / NO

NO → **Faulty SRS unit; replace the unit (see page 23-B52).**

YES ↓

Check for an open in the SRS main harness:
1. Turn the ignition switch OFF.
2. Check for continuity between terminals No. B1 and No. B7 of Test Harness B.

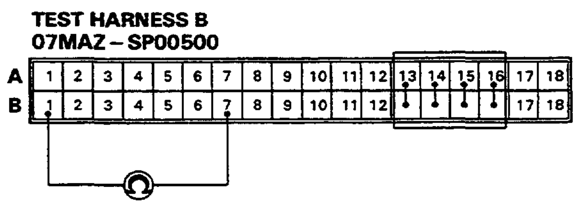
Is there continuity?

YES / NO

NO → **Open in the SRS main harness; replace the harness.**

YES ↓

The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting of Intermittent Failures on page 23-B13).



DTC 1-2

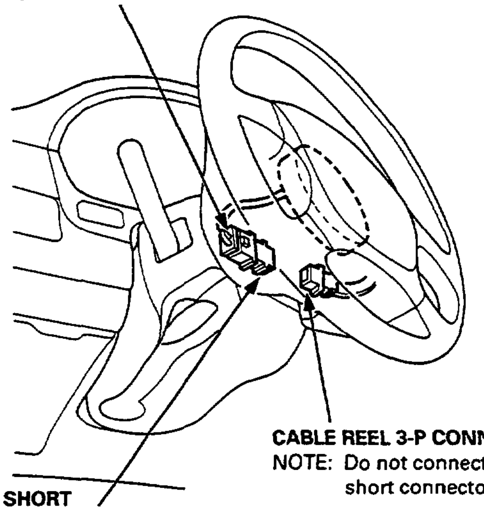
CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

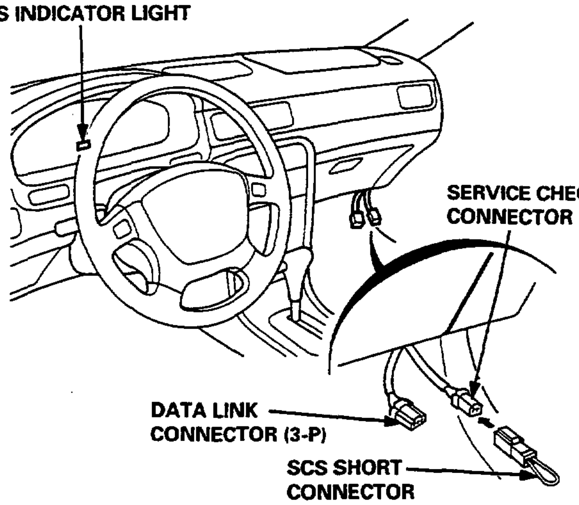
Check for a short to another wire in the driver's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the driver's airbag connector.
   CAUTION:
   - **Do not connect SRS short connector A to the cable reel 3-P connector.**
   - **Do not disconnect the passenger's airbag connector.**
4. Connect the SCS short connector to the service check connector (2-P).
5. Reconnect the battery positive cable, then connect the negative cable.
6. Turn the ignition switch ON (II), and record the most recent DTC.

Is DTC 1-2 or DTC 1-1 indicated?

1-2 | 1-1

1-1: **Short in the driver's airbag inflator; replace the driver's airbag assembly (see page 23-B42).**





1-2:

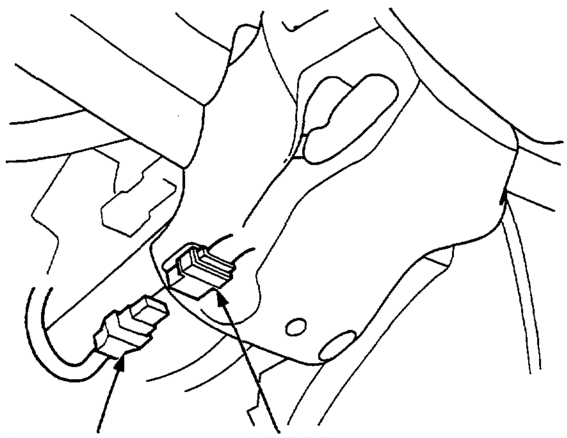
Check for a short in the cable reel:
1. Turn the ignition switch OFF.
   NOTE: Do not disconnect the SCS short connector.
2. Remove the dashboard lower cover, and disconnect the SRS main harness 6-P connector from the cable reel.
3. Turn the ignition switch ON (II), and record the most recent DTC.

Is DTC 1-2 or DTC 1-1 indicated?

1-2 | 1-1

1-1: **Short in the cable reel; replace the cable reel (see page 23-B48).**

1-2: To page 23-B22



(cont'd)

DTC 1-2 (cont'd)

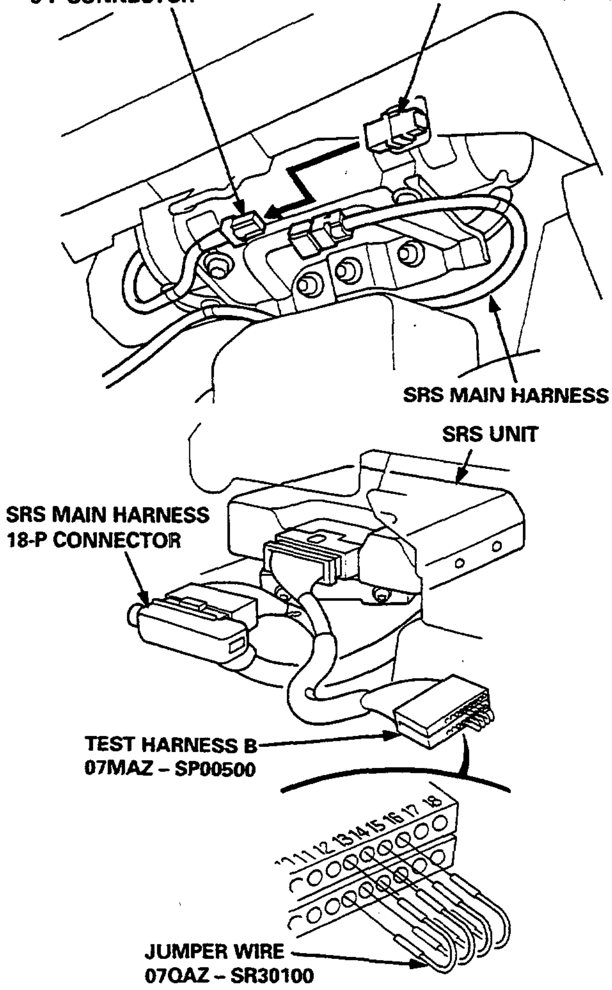
From page 23-B21

Check the SRS Unit:
1. Turn the ignition switch OFF, and disconnect the SCS short connector.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Remove the glove box, and connect the short connector (RED) to the passenger's airbag 3-P connector.
4. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the SRS unit and the 18-P connector.
5. Connect jumper wires, as shown, to the No. 13, 14, 15, and 16 terminals on rows A (SRS unit end) and B SRS main harness end) of Test Harness B.
   NOTE: Do not connect jumper wires to the other terminals.
6. Connect the battery positive cable, then connect the negative cable.
7. Connect a voltmeter between the No. A1 (+) and A5 (–) terminals of Test Harness B.
8. Turn the ignition switch ON (II), and measure voltage.
   There should be 8.0 – 10.5 V.
9. Connect the voltmeter between the No. A7 (+) and A5 (–) terminals of Test Harness B, and measure voltage.
   There should be 0.5 – 0.8 V.

Are the voltages as specified?

YES | NO

Faulty SRS unit; replace the unit (see page 23-B52).

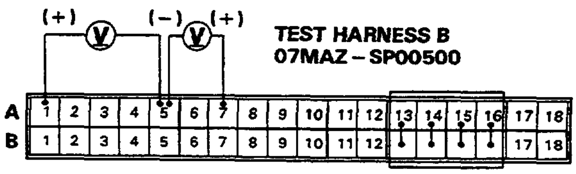


Check for a short in the SRS main harness:
1. Turn the ignition switch OFF.
2. Check for continuity between the No. B1 and B7 terminals of Test Harness B.
   NOTE: Do not connect the cable reel 6-P connector.

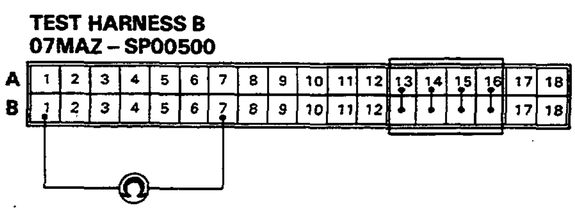
Is there continuity?

YES | NO

Short in the SRS main harness; replace the SRS main harness.



The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting of Intermittent Failures on page 23-B13).



DTC 1-3

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check for a short to power in the driver's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the driver's airbag connector.
4. Connect SRS short connector A to the cable reel 3-P connector.
   CAUTION: Do not disconnect the passenger's airbag connector.
5. Connect the SCS short connector to the service check connector.
6. Reconnect the battery positive cable, then connect the negative cable.
7. Turn the ignition switch ON (II), and record the most recent DTC.

Is DTC 1-3 or DTC 1-2 indicated?

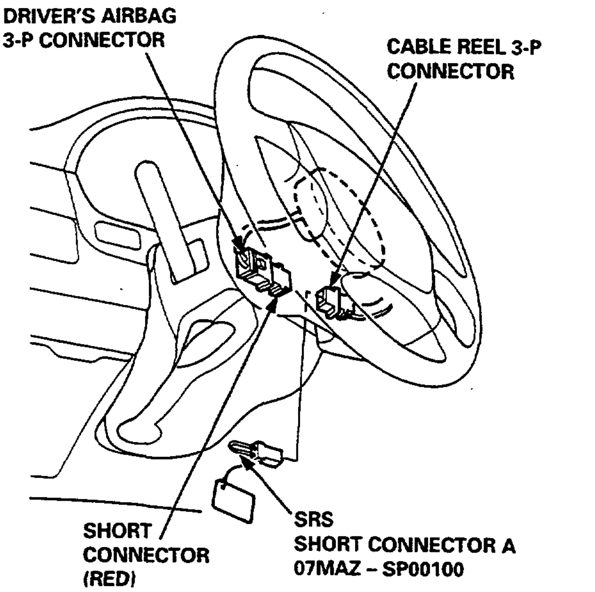
1-3 | 1-2

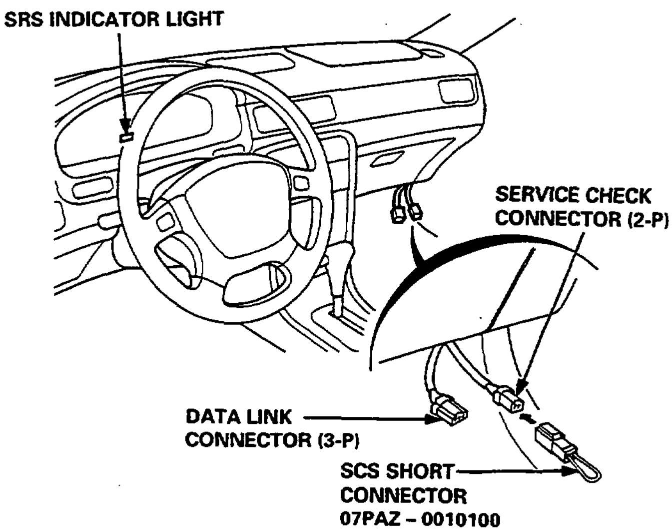
1-2: **Short to power in the driver's airbag inflator; replace the driver's airbag assembly (see page 23-B42).**

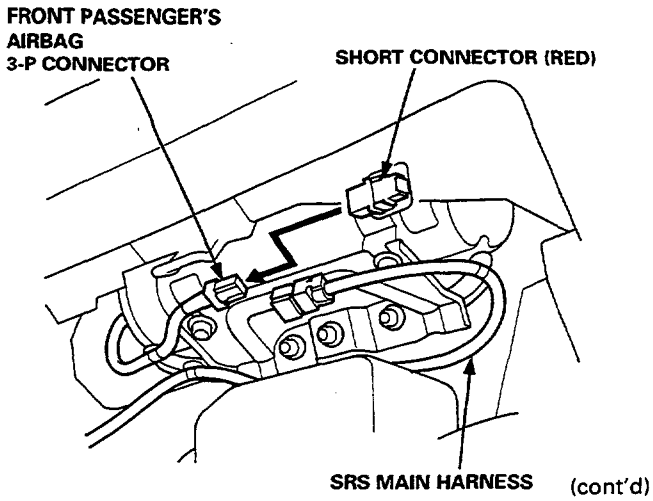
1-3:

Check the SRS unit
1. Turn the ignition switch OFF, and disconnect the SCS short connector.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Remove the glove box, and connect the short connector (RED) to the passenger's airbag connector.
4. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the SRS unit and the 18-P connector. (cont'd)

To page 23-B24







(cont'd)

DTC 1-3 (cont'd)

From page 23-B23

Check the SRS Unit (cont'd):
5. Connect the battery positive cable, then connect the negative cable.
6. Connect a voltmeter between the No. B1 and B5 terminals.
   NOTE: Do not connect any jumper wires to Test Harness B.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.
8. Connect the voltmeter between the terminals No. B5 and B7, and measure voltage. There should be 0.5 V or less.

Are the voltages as specified?

YES — **Faulty SRS unit; replace the unit (see page 23-B52).**

NO ↓

Check for a short to power in the cable reel:
1. Turn the ignition switch OFF.
2. Remove the dashboard lower cover, and disconnect the cable reel 6-P connector from the SRS main harness.
3. Connect Test Harness C to the cable reel 6-P connector.
4. Connect a voltmeter between the No. 4 terminal of Test Harness C and ground.
5. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.
6. Connect the voltmeter between the No. 5 terminal and ground, and measure voltage. There should be 0.5 V or less.

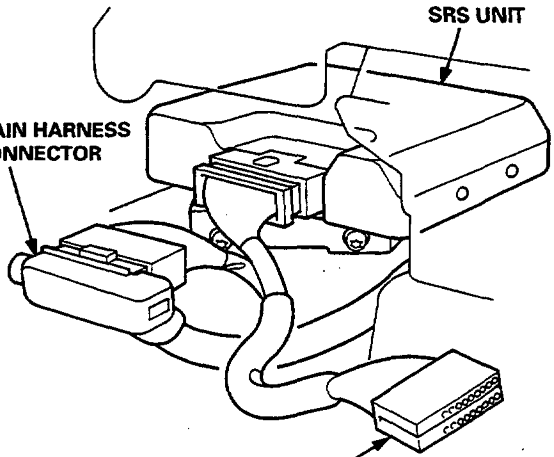
Are voltages as specified?

NO — **Short to power in the cable reel; replace the cable reel (see page 23-B48).**

YES — **Short to power in the SRS main harness; replace the harness.**

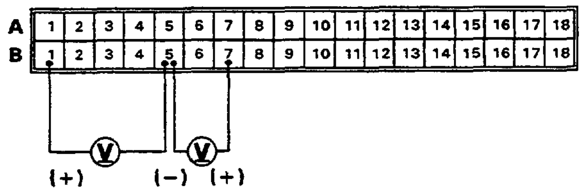
SRS UNIT

SRS MAIN HARNESS
18-P CONNECTOR

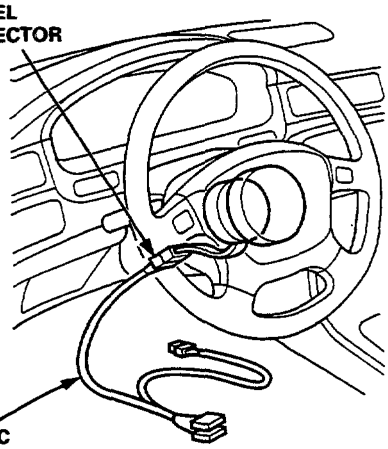


TEST HARNESS B
07MAZ - SP00500
NOTE: Do not connect the jumper wire.

TEST HARNESS B
07MAZ – SP00500

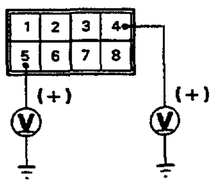


CABLE REEL
6-P CONNECTOR



TEST
HARNESS C
07LAZ - SL40300

TEST HARNESS C
07LAZ – SL40300



DTC 1-4

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check for a short to ground in the driver's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the driver's airbag connector.
4. Connect SRS short connector A to the cable reel 3-P connector.
   CAUTION: Do not disconnect the passenger's airbag connector.
5. Connect the SCS short connector to the service check connector.
6. Reconnect the battery positive cable, then connect the negative cable.
7. Turn the ignition switch ON (II), and record the most recent DTC.

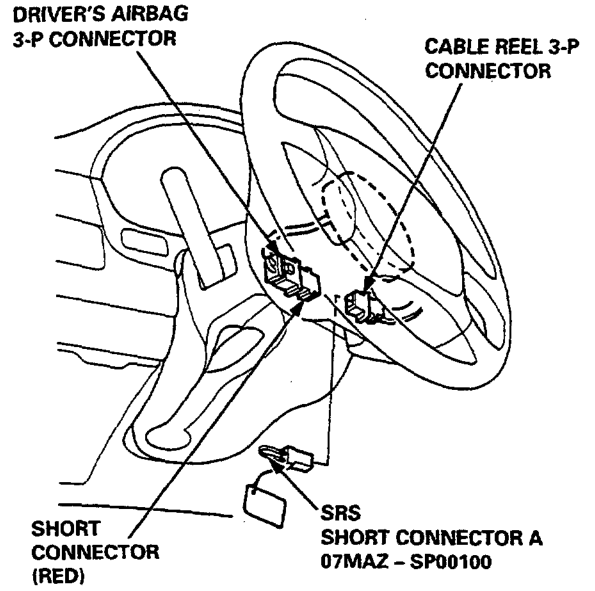
Is DTC 1-4 or DTC 1-2 indicated?

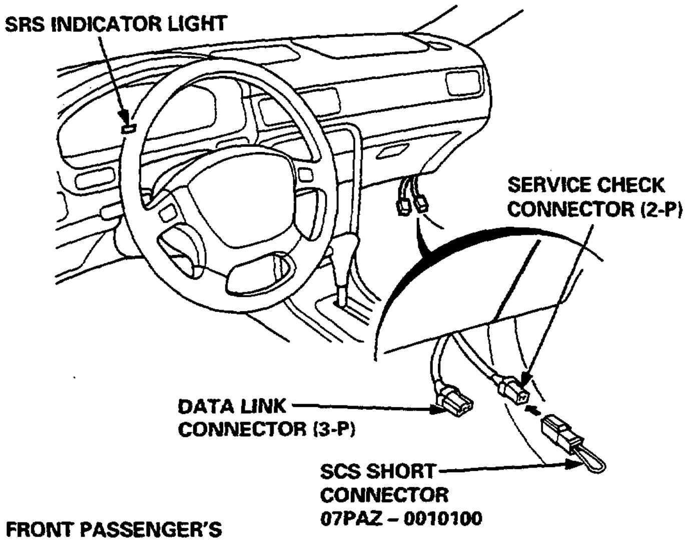
1-4 | 1-2

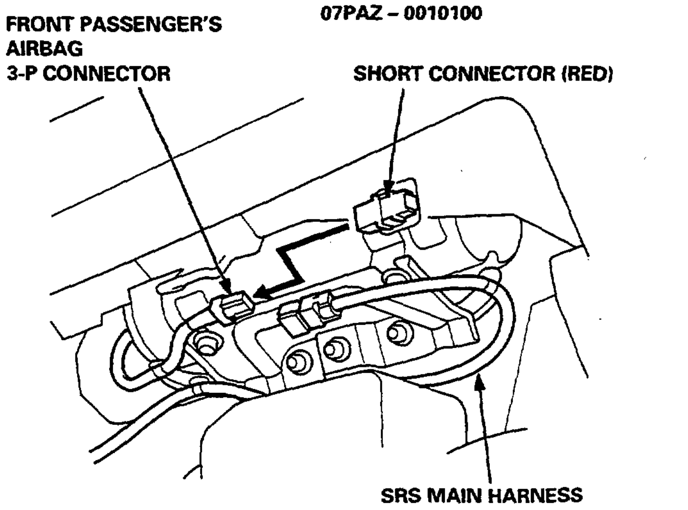
Short to ground in the driver's airbag inflator; replace the driver's airbag assembly (see page 23-B42).

Check the SRS unit:
1. Turn the ignition switch OFF, and disconnect the SCS short connector.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Remove the glove box, and connect the short connector (RED) to the passenger's airbag connector.
4. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the SRS unit and the 18-P connector. (cont'd)

To page 23-B26







(cont'd)

DTC 1-4 (cont'd)

From page 23-B25

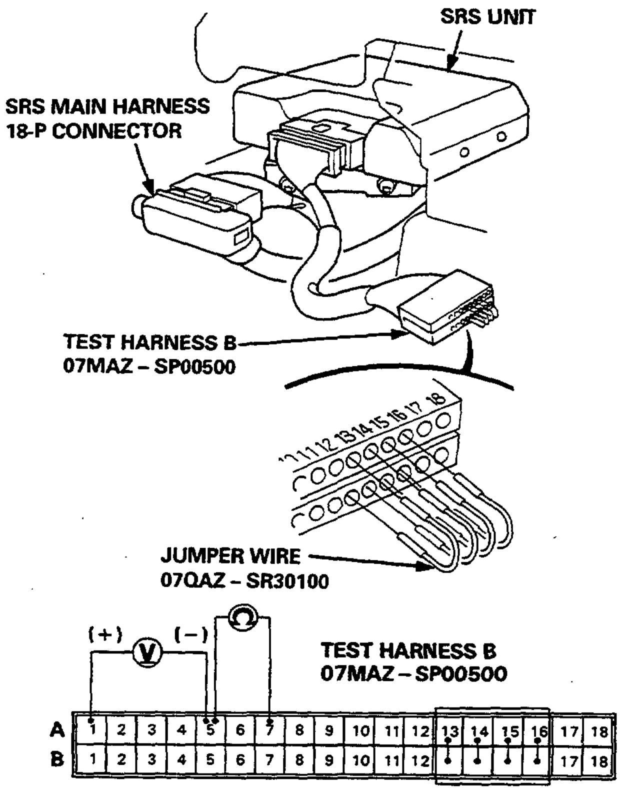
Check the SRS Unit (cont'd):

5. Connect jumper wires to the No. 13, 14, 15, and 16 terminals on rows A (SRS unit end) and B (SRS main harness end) of Test Harness B.
   NOTE: Do not connect jumper wires to the other terminals.
6. Connect the battery positive cable, then connect the negative cable.
7. Connect a voltmeter between the No. A1 (+) and A5 (–) terminals of Test Harness B.
8. Turn the ignition switch ON (II), and measure voltage. There should be 8.0 – 10.5 V.
9. Turn the ignition switch OFF, and measure resistance between the No. A7 and A5 terminals. There should be 0.65 – 0.75 kΩ.
   NOTE: The resistance will be unstable if you measure immediately after you turn the ignition switch OFF. Allow it to settle, then take the reading.

Are voltage and resistance as specified?

YES / NO

NO: **Faulty SRS unit; replace the unit (see page 23-B52).**



YES:

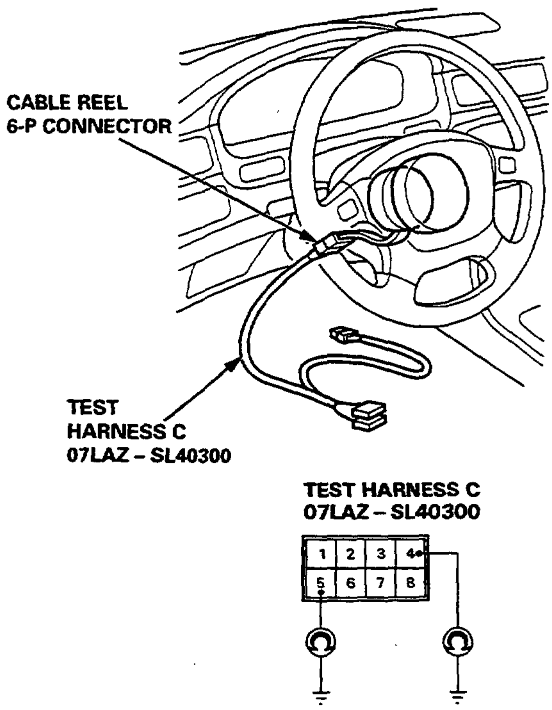
Check for a short to ground in the cable reel:

1. Turn the ignition switch OFF.
2. Remove the dashboard lower cover, and disconnect the cable reel 6-P connector from the SRS main harness.
3. Connect Test Harness C to the cable reel 6-P connector.
4. Check for continuity between the No. 4 terminal of Test Harness C and ground, and between the No. 5 terminal of Test Harness C and ground.

Is there continuity?

YES / NO

YES: **Short to ground in the cable reel; replace the cable reel (see page 23-B48).**



To page 23-B27

From page 23-B26

Check for a short to ground in the SRS main harness:

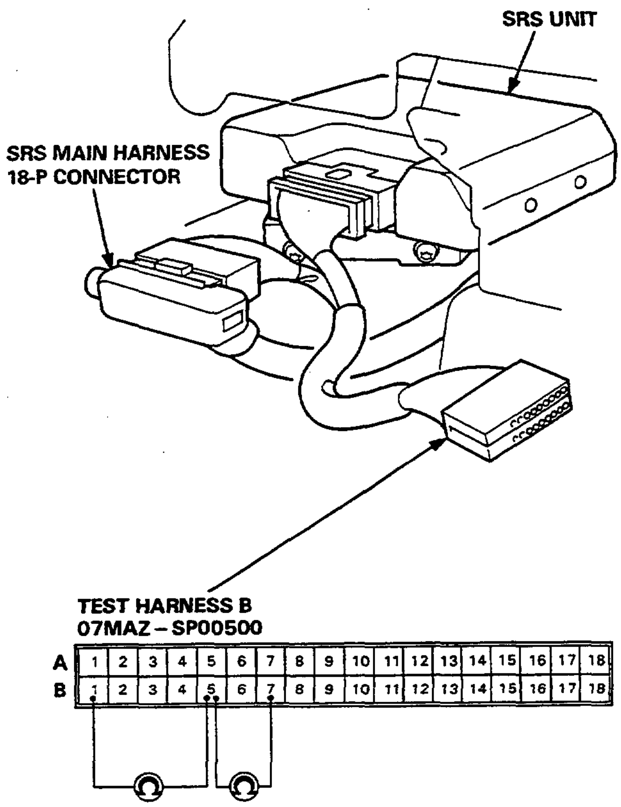
1. Disconnect Test Harness C from the cable reel 6-P connector, and reconnect the cable reel 6-P connector to the SRS main harness.
2. Check for continuity between the No. B1 and B5 terminals, and the No. B5 and B7 terminals of Test Harness B.
   CAUTION:
   - **Make sure the ignition switch is turned OFF.**
   - ***Do not disconnect the SRS short connector A from the cable reel 3-P connector.***

Is there continuity?

YES — NO

Short to ground in the SRS main harness; replace the harness.

The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting of Intermittent Failures on page 23-B13).



Troubleshooting (SRS-Type III)

DTC 2-1

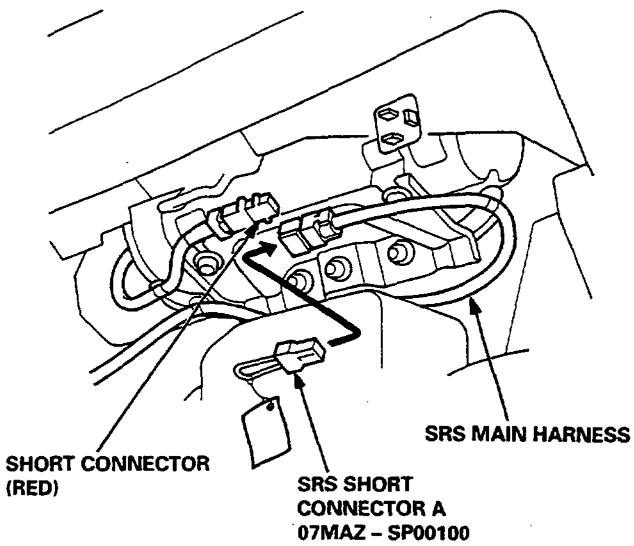
CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

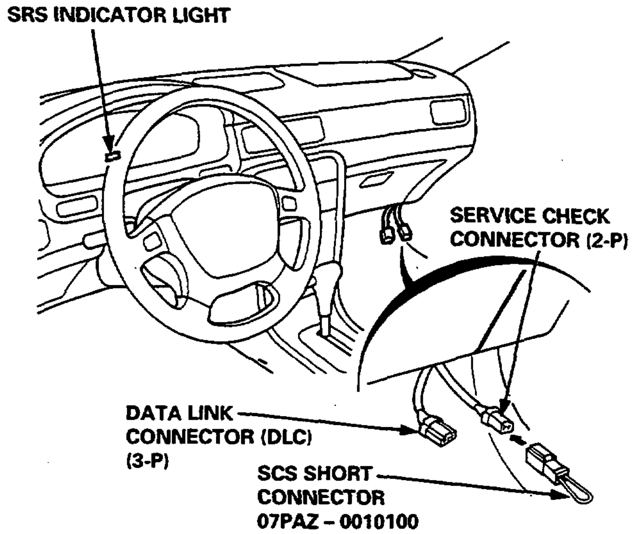
Check for an open in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the passenger's airbag connector.
4. Connect the SRS short connector A to the SRS main harness 3-P connector.
   CAUTION: Do not disconnect the driver's airbag connector.
5. Connect the SCS short connector to the service check connector.
6. Reconnect the battery positive cable, then connect the negative cable.
7. Turn the ignition switch ON (II), and record the most recent DTC.

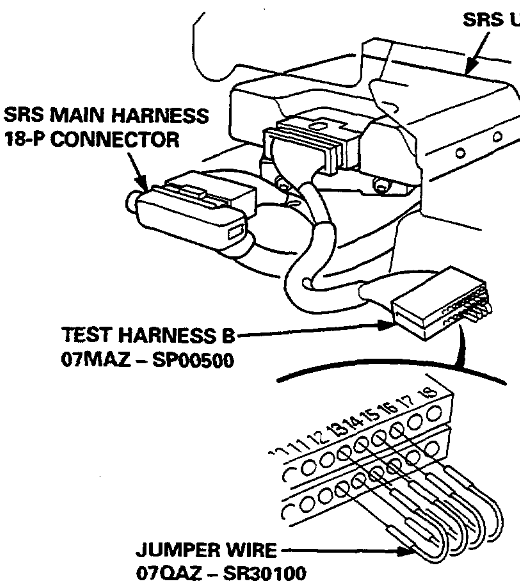
Is DTC 2-1 or DTC 2-2 indicated?

2-1 2-2

Open in the passenger's airbag inflator; replace the passenger's airbag assembly (see page 23-B42).







Check the SRS unit:
1. Turn the ignition switch OFF, and remove the SCS short connector.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the driver's airbag connector.
4. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the SRS unit and the 18-P connector.
5. Connect jumper wires to the No. 13, 14, 15, and 16 terminals on rows A (SRS unit end) and B (SRS main harness end) of Test Harness B.
   NOTE: Do not connect jumper wires to the other terminals. (cont'd)

To page 23-B29

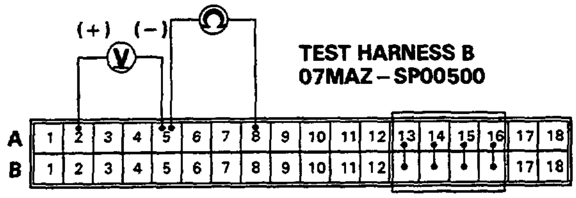
From page 23-B28

Check the SRS unit (cont'd):
6. Connect the battery positive cable, then connect the negative cable.
7. Connect a voltmeter between terminals No. A2 (+) and A5 (–) of Test Harness B.
8. Turn the ignition switch ON (II), and measure voltage. There should be 8.0 – 10.5 V.
9. Turn the ignition switch OFF, and measure resistance between terminals No. A8 and A5. There should be 0.65 – 0.75 kΩ.
   NOTE: The resistance will be unstable if you measure immediately after you turn the ignition switch OFF. Allow it to settle, then take the reading.

Are voltage and resistance as specified?

YES / NO

NO → **Faulty SRS unit; replace the SRS unit (see page 23-B52).**



YES ↓

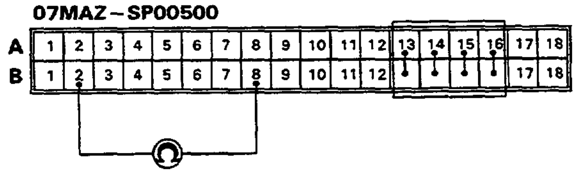
Check for an open in the SRS main harness:
1. Turn the ignition switch OFF.
2. Check for continuity between terminals No. B2 and B8 of Test Harness B.
   CAUTION: Do not disconnect SRS short connector A from the SRS main harness.

Is there continuity?

YES / NO

NO → **Open in the SRS main harness; replace the harness.**

TEST HARNESS B
07MAZ – SP00500



YES ↓

The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting of Intermittent Failures on page 23-B13).

DTC 2-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check for a short to another wire in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the passenger's airbag connector.
   CAUTION:
   - **Do not connect SRS short connector A to the SRS main harness connector.**
   - **Do not disconnect the driver's airbag connector.**
4. Connect the SCS short connector to the service check connector.
5. Reconnect the battery positive cable, then connect the negative cable.
6. Turn the ignition switch ON (II), and record the most recent DTC.

Is DTC 2-2 or DTC 2-1 indicated?

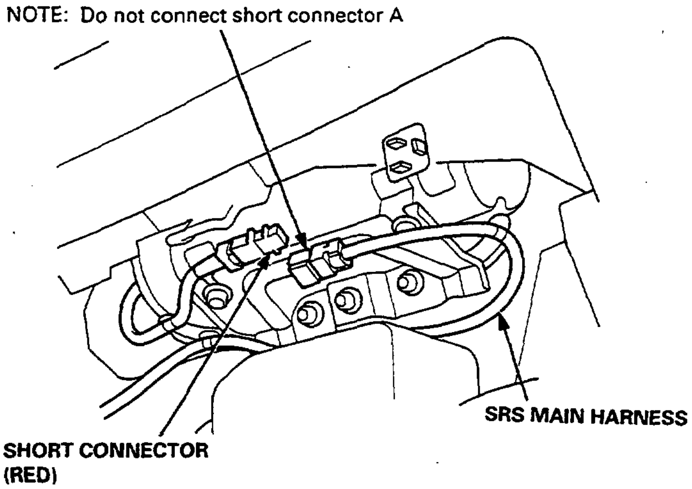
2-2 2-1

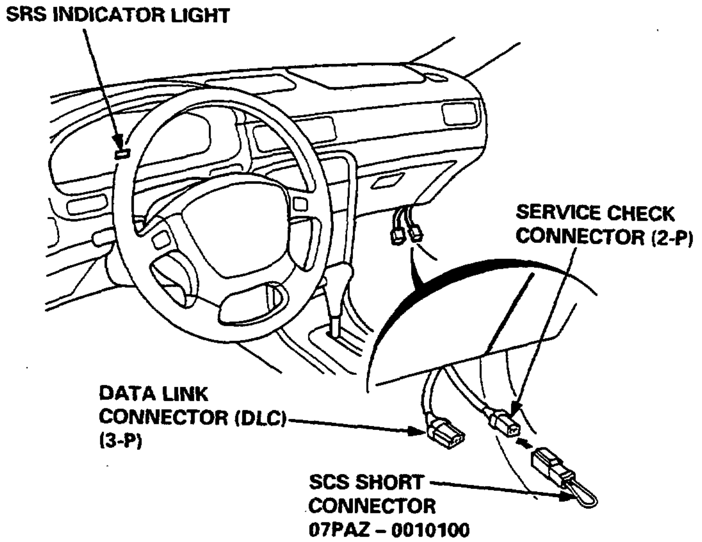
Short to another wire in the passenger's airbag inflator; replace the passenger's airbag assembly (see page 23-B42).

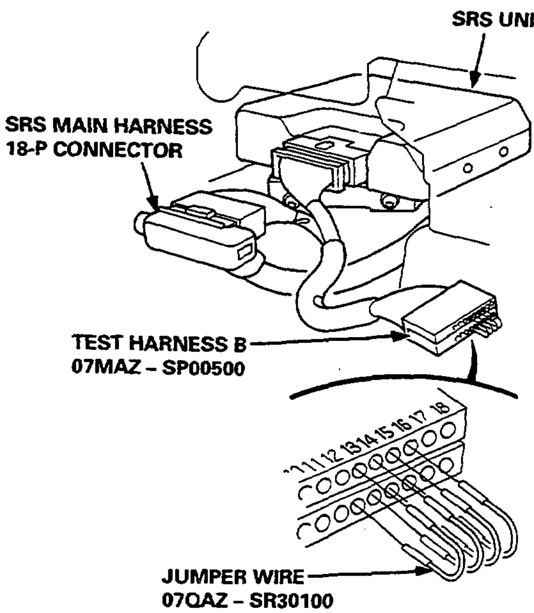
Check the SRS unit:
1. Turn the ignition switch OFF, and disconnect the SCS short connector.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the driver's airbag connector.
4. Disconnect the SRS main harness 18-P connector from the SRS unit.
5. Connect Test Harness B between the SRS unit and the 18-P connector.
6. Connect the No. 13, 14, 15, and 16 terminals on rows A (SRS unit end) and B (SRS main harness end) of Test Harness B with jumper wires.
   NOTE: Do not connect jumper wires to the other terminals.

(cont'd)

To page 23-B31







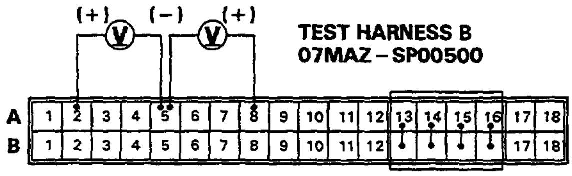
From page 23-B30

Check the SRS unit (cont'd):

7. Connect the battery positive cable, then connect the negative cable.
8. Connect a voltmeter between the No. A2 and A5 terminals of Test Harness B.
9. Turn the ignition switch ON (II), and measure voltage. There should be 8.0 – 10.5 V.
10. Connect the voltmeter between the No. A8 and A5 terminals of Test Harness B, and measure voltage. There should be 0.5 – 0.8 V.

Are voltages as specified?

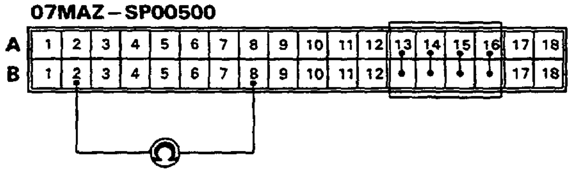
TEST HARNESS B
07MAZ – SP00500



YES — NO

Faulty SRS unit; replace the SRS unit (see page 23-B52).

TEST HARNESS B
07MAZ – SP00500



YES:

Check for short to another wire in the SRS main harness:

1. Turn the ignition switch OFF.
2. Check for continuity between the No. B2 and B8 terminals of Test Harness B.

Is there continuity?

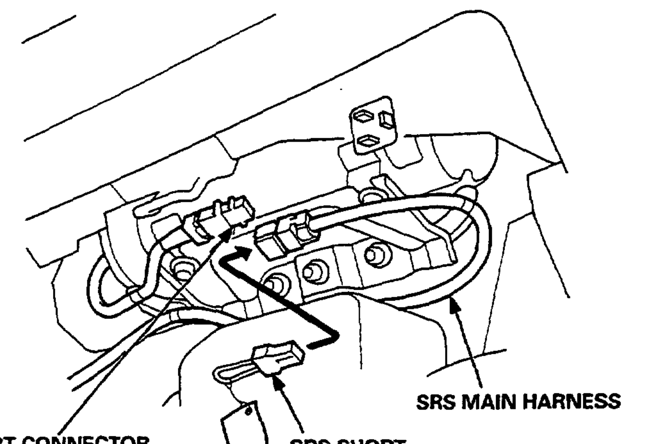
YES — NO

YES: **Short in the SRS main harness; replace the harness.**

NO: **The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting of Intermittent Failures on page 23-B13).**

DTC 2-3

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.



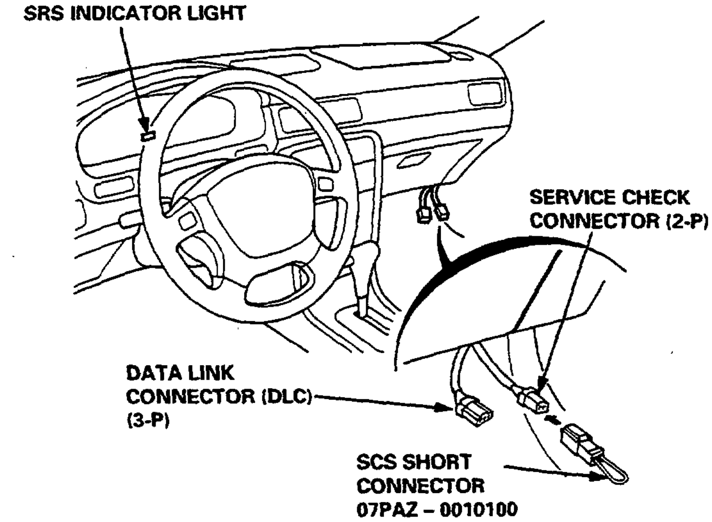
Check for short to power in the passenger's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the passenger's airbag connector.
4. Connect SRS short connector A to the SRS main harness 3-P connector.
   CAUTION: Do not disconnect the driver's airbag connector.
5. Connect the SCS short connector to the service check connector.
6. Reconnect the battery positive cable, then connect the negative cable.
7. Turn the ignition switch ON (II), and record the most recent DTC.

Is DTC 2-3 or DTC 2-2 indicated?

2-3 | 2-2

2-2: Short to power in the passenger's airbag inflator; replace the passenger's airbag assembly (see page 23-B42).



2-3: Check the SRS unit and the SRS main harness:

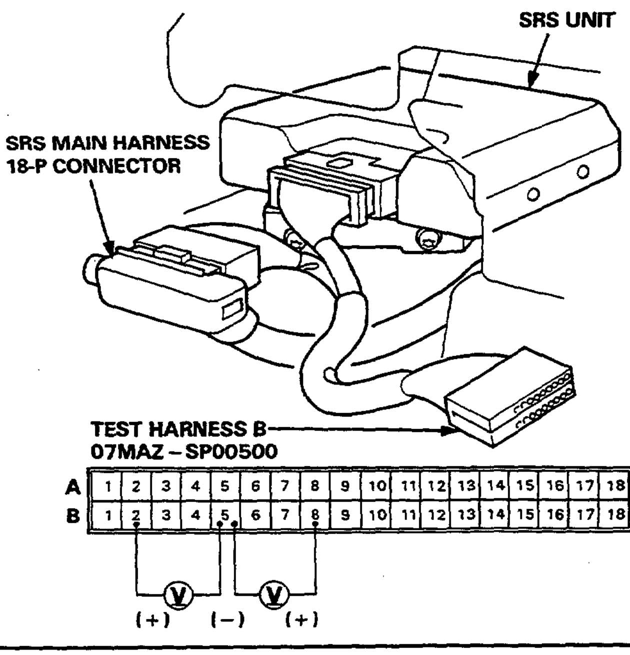
1. Turn the ignition switch OFF, and disconnect the SCS short connector.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the driver's airbag connector.
4. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the SRS unit and the 18-P connector.
5. Reconnect the battery positive cable, then connect the negative cable.
6. Connect a voltmeter between the No. B2 (+) and B5 (–) terminals of Test Harness B.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less
8. Connect the voltmeter between the No. B8 (+) and B5 (–) terminals of Test Harness B, and measure voltage. There should be 0.5 V or less.

Are voltages as specified?

YES | NO

NO: Short to power in the SRS main harness; replace the harness.

YES: Faulty SRS unit; replace the SRS unit (see page 23-B52).



DTC 2-4

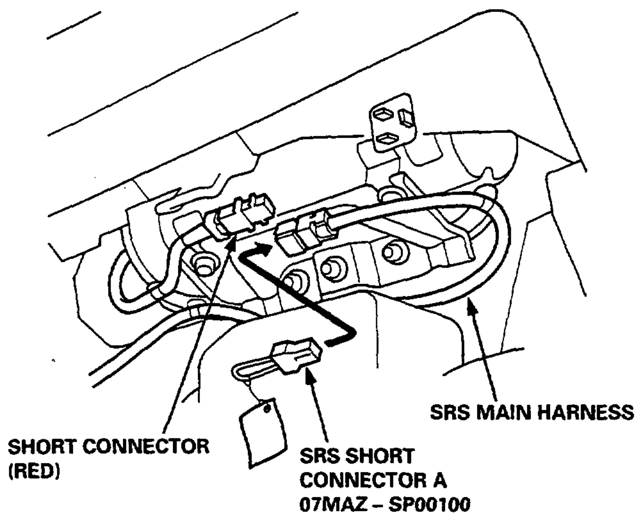
CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

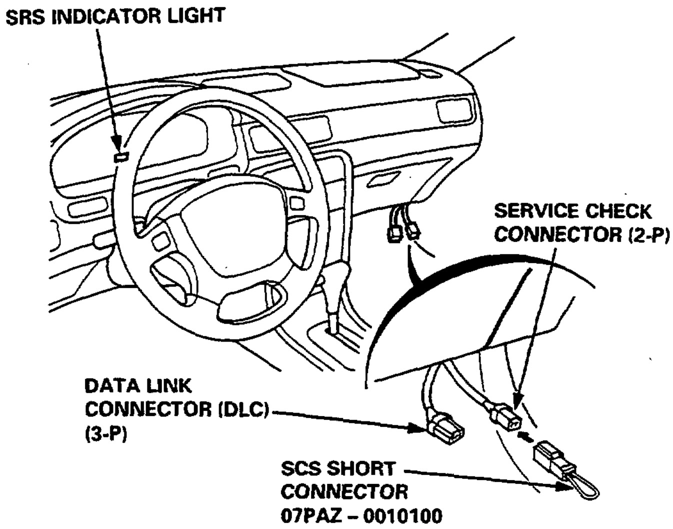
Check for short to ground in the passenger's airbag inflator:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the passenger's airbag connector.
4. Connect SRS short connector A to the SRS main harness 3-P connector.
   CAUTION: Do not disconnect the driver's airbag connector.
5. Connect the SCS short connector to the service check connector.
6. Reconnect the battery positive cable, then connect the negative cable.
7. Turn the ignition switch ON (II), and record the most recent DTC.

Is DTC 2-4 or DTC 2-2 indicated?

2-4 | 2-2

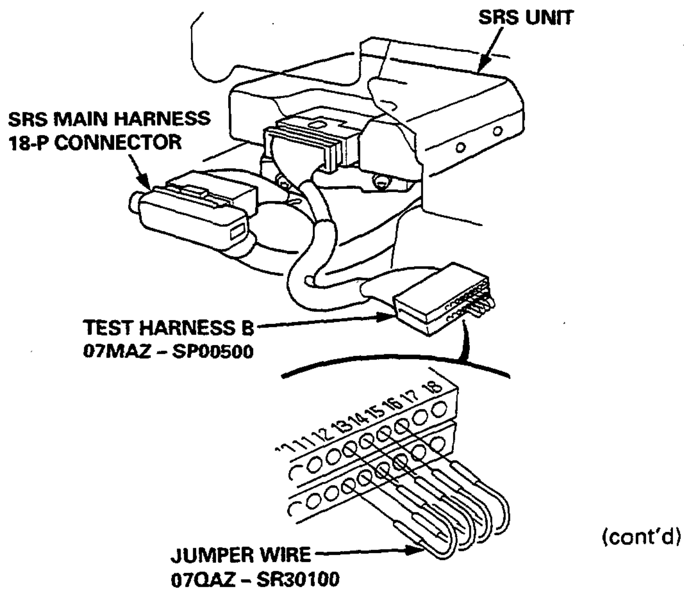
Short to ground in the passenger's airbag inflator; replace the passenger's airbag assembly (see page 23-B42).





Check the SRS unit:
1. Turn the ignition switch OFF, and disconnect the SCS short connector.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connector (RED) to the driver's airbag connector.
4. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the SRS unit and the 18-P connector.
5. Connect the No. 13, 14, 15, and 16 terminals on rows A (SRS unit end) and B (SRS main harness end) of Test Harness B with jumper wires.
   NOTE: Do not connect jumper wires to the other terminals.

(cont'd)



To page 23-B34

(cont'd)

DTC 2-4 (cont'd)

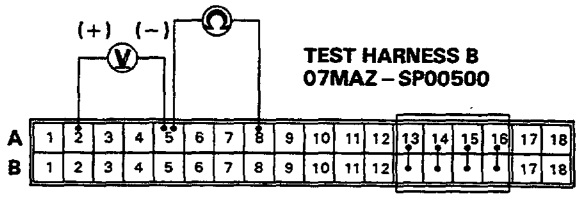
From page 23-B33

Check the SRS unit (cont'd):
6. Reconnect the battery positive cable, then connect the negative cable.
7. Connect a voltmeter between the No. A2 and A5 terminals of Test Harness B.
8. Turn the ignition switch ON (II), and measure voltage. There should be 8.0 – 10.5 V.
9. Turn the ignition switch OFF, and measure resistance between the No. A8 and A5 terminals of Test Harness B. There should be 0.65 – 0.75 kΩ
   NOTE: The resistance will be unstable if you measure immediately after you turn the ignition switch OFF. Allow it to settle, then take the reading.

Are voltage and resistance as specified?

YES — NO

NO: **Faulty SRS unit; replace the SRS unit (see page 23-B52).**



YES:

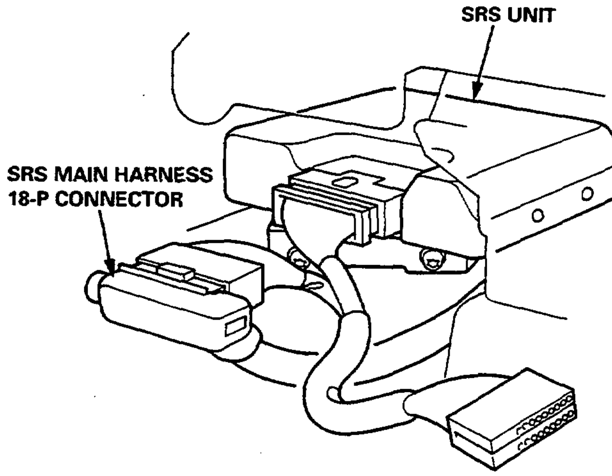
Check for short to ground in the SRS main harness:
Check for continuity between the No. B2 and B5 terminals, and the No. B8 and B5 terminals of Test Harness B.
CAUTION: Do not disconnect short connector A from the SRS main harness 3-P connector.

Is there continuity?

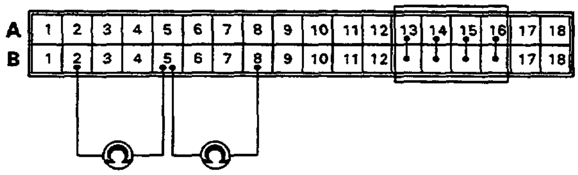
YES — NO

YES: **Short to ground in the SRS main harness; replace the harness.**

NO: **The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting of Intermittent Failures on page 23-B13).**

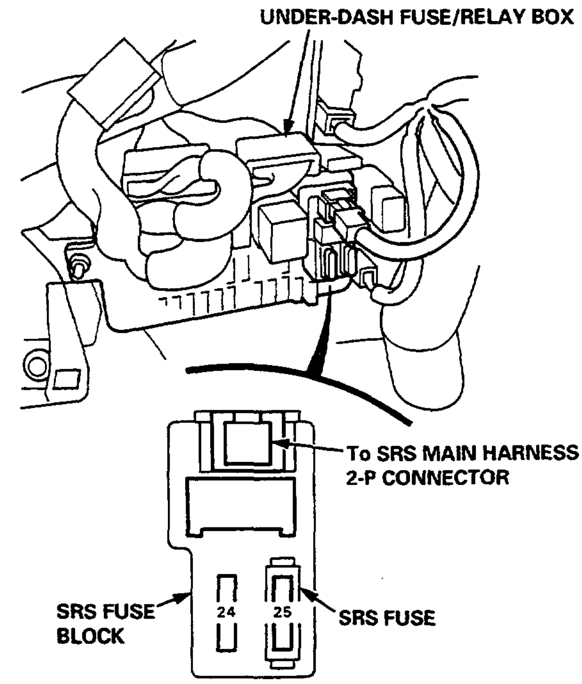


TEST HARNESS B
07MAZ – SP00500



DTC No Code

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.



Check the SRS fuse:
1. Turn the ignition switch OFF.
2. Check for blown No. 24 (15 A) and No. 25 (10 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES / NO

(NO) Replace the fuse. Turn the ignition switch ON (II), and check that the fuse doesn't blow.

Does the fuse blow?

YES / NO → END

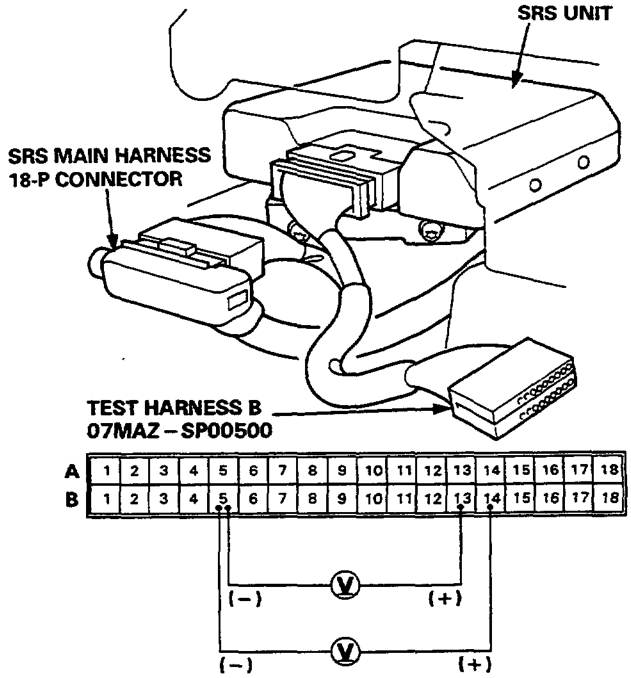
(YES) **Short to ground in the SRS main harness; replace the harness.**

(YES) Check for an open in the SRS main harness:
1. Disconnect the negative battery cable, then the positive cable, and wait for three minutes.
2. Connect the short connectors (RED) to the airbag connectors (see page 23-B10).
3. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the 18-P connector and the SRS unit.
4. Reconnect the battery positive cable, then the negative cable.
5. Connect a voltmeter between the B13 terminal (+) and B5 terminal (–) of Test Harness B, and between the B14 terminal (+) and B5 terminal (–) of the Test harness B.
6. Turn the ignition switch ON (II), and measure voltage.

Is there battery voltage?

YES / NO

(NO) **Open in the SRS main harness; replace the SRS main harness.**

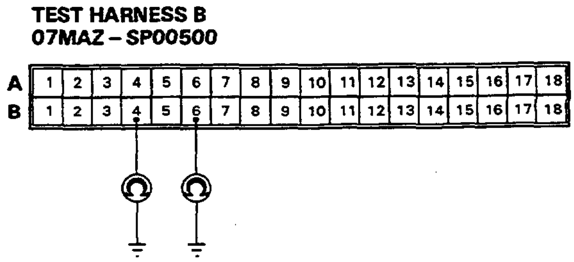


(YES) Check for short to ground in the Memory Erase Signal (MES) circuit.
1. Turn the ignition switch OFF.
2. Check for continuity between the B4 and B6 terminal of Test Harness B.

Is there continuity?

YES / NO

(YES) **Short to ground in the SRS main harness; replace the SRS main harness.**



(NO) To page 23-B36

DTC 9-1 or No Code

DTC 9-1 (Continuous failure):
- **If DTC 9-1 is indicated as continuous failure, replace the SRS unit (see page 23-B52).**

DTC 9-1 (Intermittent failure):
- **If DTC 9-1 is indicated as intermittent failure, follow the flowchart below starting with the SRS indicator circuit input voltage test. Make sure that all terminals make good contact.**
- **If no DTC is indicated (SRS indicator light stays on), start troubleshooting with the flowchart on page 23-B35.**

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

From page 23-B35 (DTC No code)

Check the SRS indicator circuit input voltage:
1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 6-P connector from the main wire harness.
3. Connect a voltmeter between the No. 4 terminal (+) of the SRS main harness 6-P connector and ground.
4. Turn the ignition switch ON (II), and measure voltage.

Is there 8.5 V or more six seconds after the ignition switch has been turned ON (II)?

YES — (A) To page 23-B38

NO ↓

Check for short to ground in the SRS indicator light circuit (1):
1. Turn the ignition switch OFF.
2. Check for continuity between the No. 4 terminal (+) of the main wire harness 6-P connector and ground.

Is there continuity (200 Ω or less)?

YES ↓

NO — (C) To page 23-B37

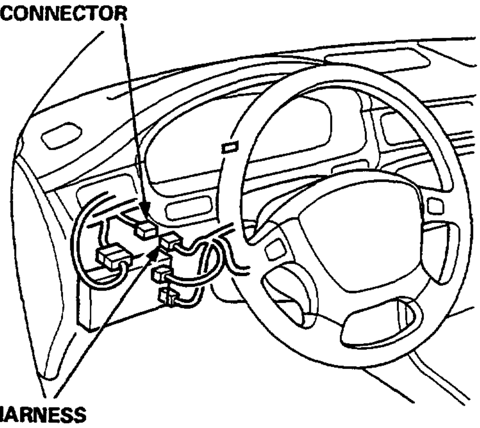
Check for short to ground in the SRS indicator light circuit (2):
1. Disconnect the dashboard wire harness 20-P connector (LHD) or 18-P connector (RHD) from the main wire harness.
2. Check for continuity between the No. 16 terminal of the dashboard wire harness 20-P connector and ground (LHD), and between the No. 16 terminal of the dashboard wire harness 18-P connector and ground (RHD).

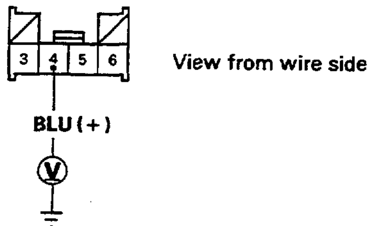
Is there continuity (200 Ω or less)?

YES — (B) To page 23-B37

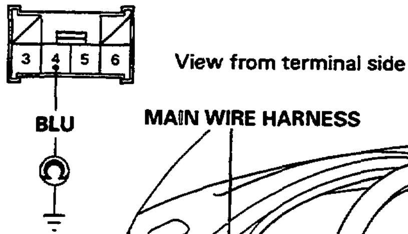
NO ↓

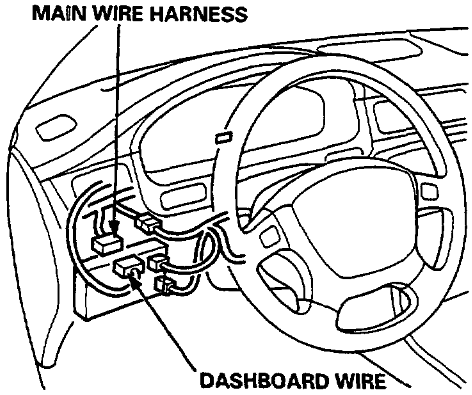
Failure in the SRS unit due to short to ground in the BLU wire of the main wire harness; replace the main wire harness and the SRS unit.



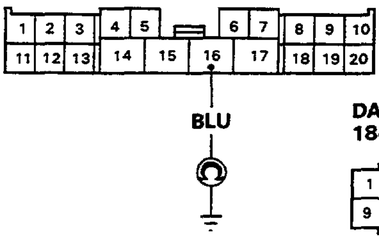


MAIN WIRE HARNESS
6-P CONNECTOR

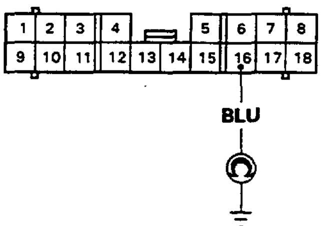




DASHBOARD WIRE HARNESS
20-P CONNECTOR (LHD)



DASHBOARD WIRE HARNESS
18-P CONNECTOR (RHD)



View from wire side

From page 23-B36
(B)

From page 23-B36
(C)

Check for short to ground in the SRS indicator light circuit (3):
1. Remove the gauge assembly.
2. Check for continuity between the D4 and D6 terminals of the gauge assembly 6-P connector.

Is there continuity (200 Ω or less)?

YES

Failure in the SRS unit due to short to ground in the SRS indicator light circuit in the gauge assembly; replace the gauge assembly and the SRS unit.

NO

Failure in the SRS unit due to short to ground in the BLU wire of the dashboard wire harness; replace the dashboard wire harness and the SRS unit.

(C)

Check for an open in the SRS main harness:
1. Turn the ignition switch OFF.
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connectors (RED) to the airbag connectors (see page 23-B10).
4. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the SRS unit and the 18-P connector.
5. Check for continuity between the No. B11 terminal of Test Harness B and the No. 4 terminal of the SRS main harness 6-P connector.

Is there continuity?

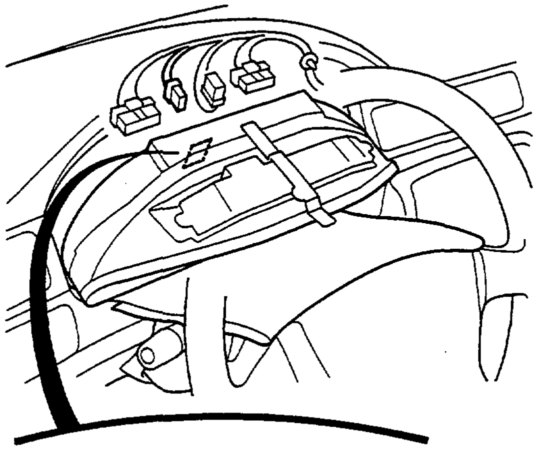
YES

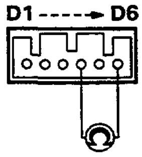
(E)

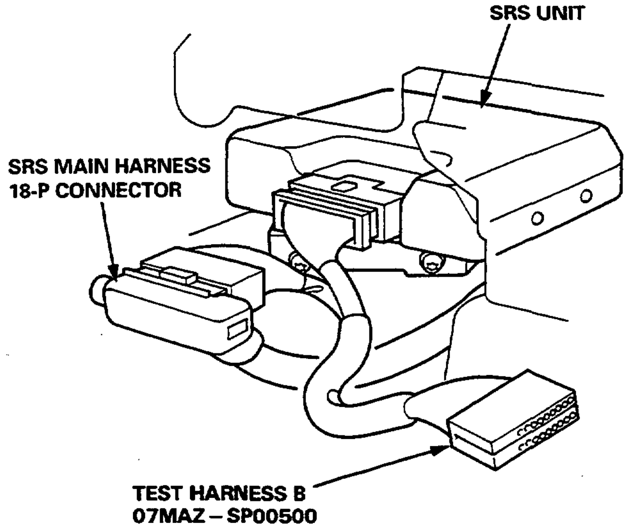
To page 23-B38

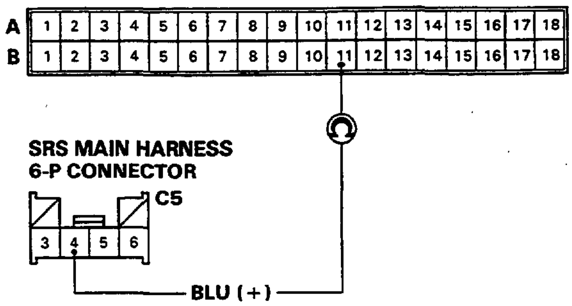
NO

Open in the SRS main harness; replace the harness.









View from wire side

(cont'd)

DTC 9-1 or No Code (cont'd)

From page 23-B37

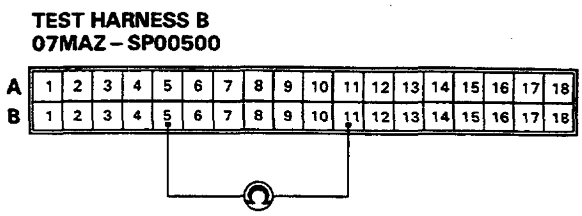
(E)

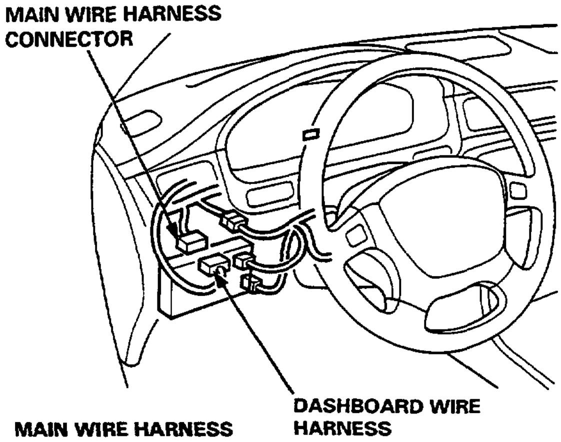
Check for short to ground in the SRS main harness:
1. Check for continuity between terminals No. B11 and No. B5 of Test Harness B.

Is there continuity?

YES — **Failure in the SRS unit due to short to ground in the SRS main harness; replace the SRS main harness and the SRS unit.**

NO — **Faulty SRS unit; replace the SRS unit.**





From page 23-B36

(A)

Check the SRS indicator light circuit:
1. Turn the ignition switch OFF.
2. Connect the SRS main harness 6-P connector to the main wire harness.
3. Disconnect the main wire harness 20-P connector (LHD) or 18-P connector (RHD) from the dashboard wire harness.
4. Connect a voltmeter between the No. 16 terminal (+) of the main wire harness 20-P connector and ground (LHD), and between the No. 16 terminal of the main wire harness 18-P connector (RHD).
5. Turn the ignition switch ON, and measure voltage.

Is there 8.5 V or more six seconds after the ignition switch has been turned ON (II)?

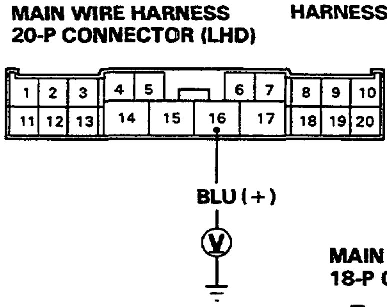
YES — To page 23-B39

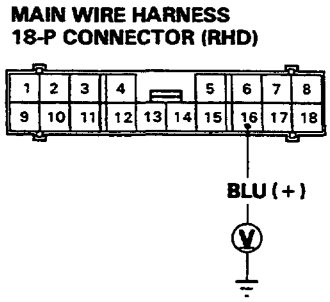
NO — Check the main wire harness:
1. Turn the ignition switch OFF.
2. Check for continuity between the No. 16 terminal of the main wire harness 20-P connector and body ground (LHD), and between the No. 16 terminal of the main harness 18-P connector and body ground (RHD).

Is there continuity?

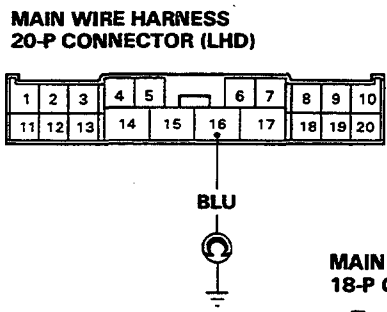
YES — **Failure in the SRS unit due to short to ground in the BLU wire of the SRS main harness; replace the SRS main harness and the SRS unit.**

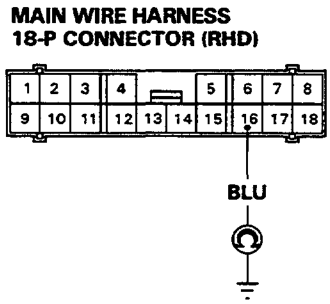
NO — **Open in the BLU wire of the SRS main harness; replace the SRS main harness.**





View from terminal side





View from terminal side

From page 23-B38

Check the SRS indicator light circuit:
1. Turn the ignition switch OFF.
2. Connect the main wire harness 20-P connector (LHD) or 18-P connector (RHD) to the dashboard wire harness.
3. Remove the gauge assembly.
4. Disconnect the dashboard wire harness 6-P connector from the gauge assembly.
5. Connect a voltmeter between the No. 6 terminal (+) of the dashboard wire harness 6-P connector and ground.
6. Turn the ignition ON (II), and measure voltage.

Is there 8.5 V or more six seconds after the ignition switch has been turned ON (II)?

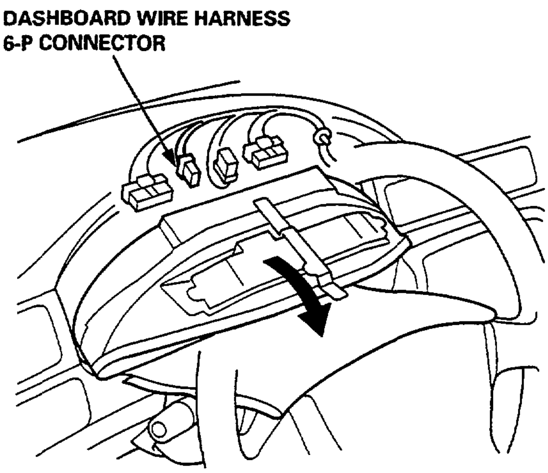
YES — **Faulty SRS indicator light circuit in the gauge assembly; replace the gauge assembly.**

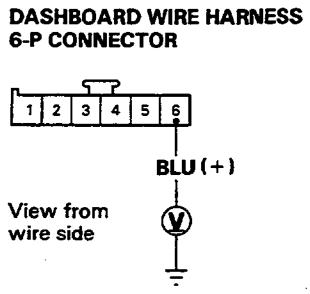
NO — Check the dashboard wire harness:
1. Turn the ignition switch OFF.
2. Check for continuity between the No. 6 terminal of the dashboard wire harness 6-P connector and body ground.

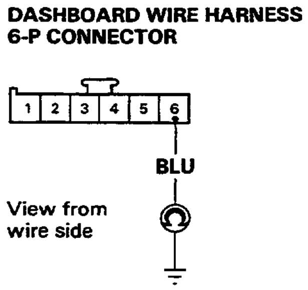
Is there continuity (200 Ω or less)?

YES — **Failure in the SRS unit due to short to ground in the BLU wire of the dashboard wire harness. Replace the dashboard wire harness and the SRS unit.**

NO — **Open in the BLU wire of the dashboard wire harness; Replace the dashboard wire harness.**







DTC 9-2

CAUTION: Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

Check the SRS fuse:
1. Turn the ignition switch OFF.
2. Check for blown No. 24 (15 A) and No. 25 (10 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES — NO

Replace the fuse. Turn the ignition switch ON (II), and check that the fuse doesn't blow.

Does the fuse blow?

YES — NO

END

Check for short to ground between the under-dash fuse/relay box and the SRS unit:
1. *Turn the ignition switch OFF.*
2. Disconnect the battery negative cable, then disconnect the positive cable, and wait for three minutes.
3. Connect the short connectors (RED) to the airbag connectors (see page 23-B10).
4. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the 18-P connector and the SRS unit.
5. Check for continuity between the B13 and B5 terminals of Test Harness B.

Is there continuity?

YES — NO

Check for short to ground in the SRS main harness:
1. Disconnect the SRS main harness 2-P connector from the under-dash fuse/relay box.
2. Check for continuity between the No. B13 and B5 terminals of Test Harness B.

Is there continuity?

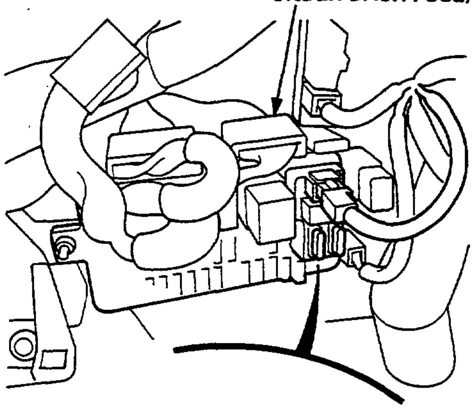
YES — NO

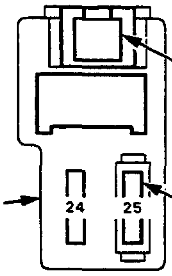
Short to ground in the SRS main harness; replace the harness.

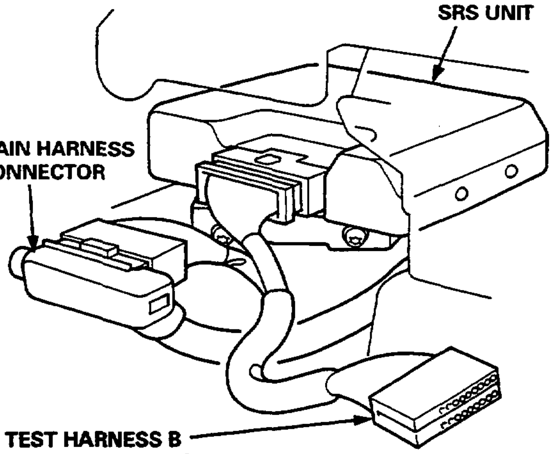
Short to ground in the SRS fuse block; replace the SRS fuse block.

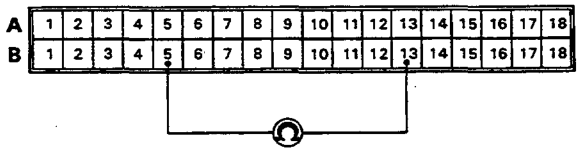
Faulty SRS unit; replace the SRS unit.

To page 23-B41



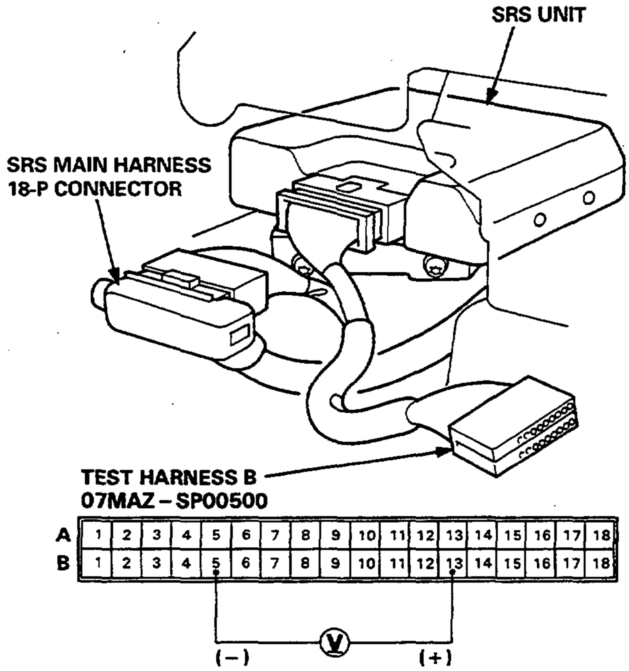






From page 23-B40

Connect Test Harness B:
1. Disconnect the negative battery cable, then the positive cable, and wait for three minutes.
2. Connect the short connectors (RED) to the airbag connectors (see page 23-B10).
3. Disconnect the SRS main harness 18-P connector from the SRS unit, and connect Test Harness B between the 18-P connector and the SRS unit.
4. Reconnect the battery positive cable, then the negative cable.



Check for an open in the SRS main harness:
1. Connect a voltmeter between the No. B13 and B5 terminals of Test Harness B.
2. Turn the ignition switch ON (II), and measure voltage.

Is there battery voltage?

YES — **Faulty SRS unit; replace the SRS unit.**

NO — **Open in the SRS main harness; replace the harness.**

Airbag Assembly (SRS-Type III)

Replacement

After a collision in which the airbags were deployed, the airbag assemblies and the SRS unit must be replaced.

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.**

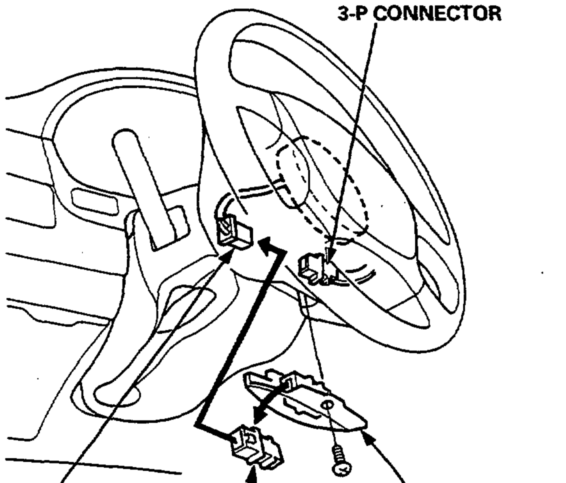
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.

2. Connect the short connectors (RED) to the airbag side of the connectors:

Driver's Side:

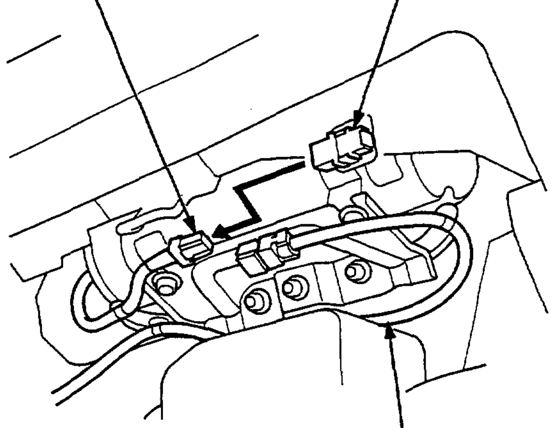
- Remove the access panel from the steering wheel, then remove the short connector (RED) from the panel.

- 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 Airbag:

- Remove the glove box, then remove the short connector (RED) from its holder.

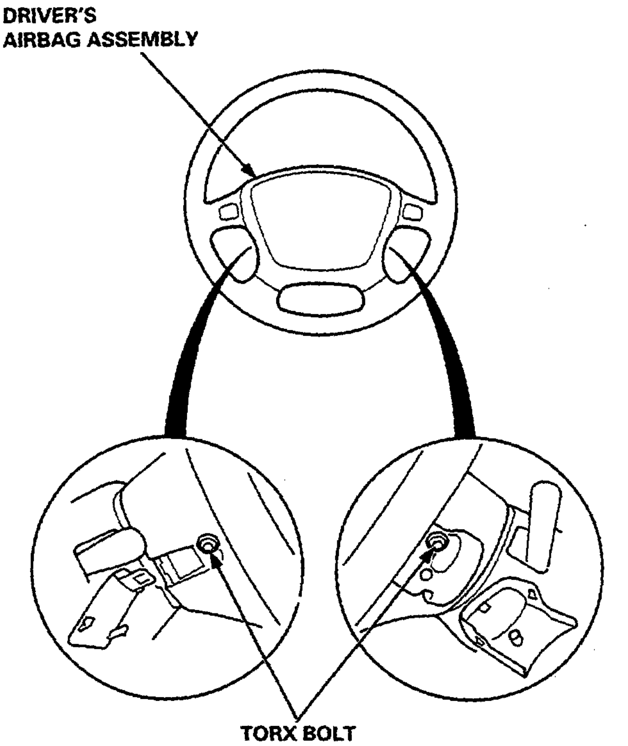


- Disconnect the front passenger's airbag 3-P connector from the SRS main harness, and connect the short connector (RED) to the front passenger's airbag 3-P connector.

3. Remove the airbags:

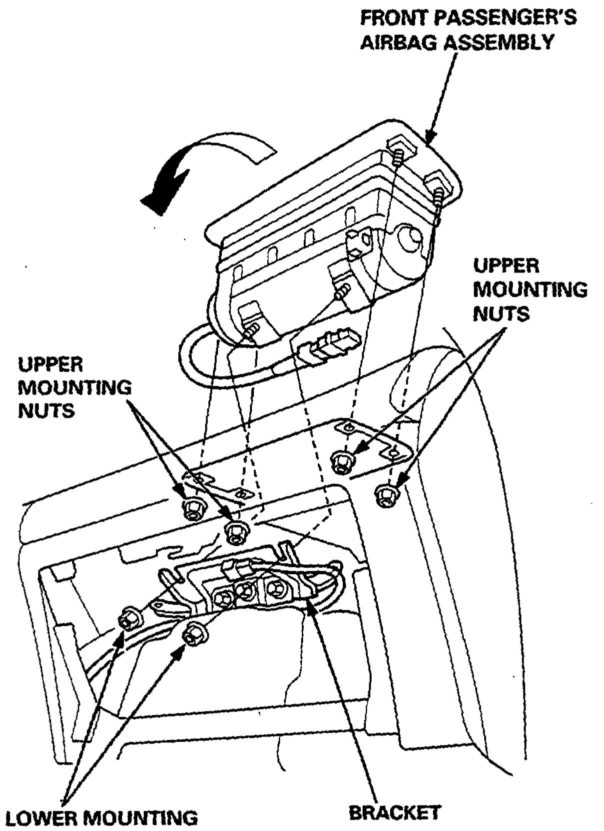
Driver's Side:

- Remove the two Torx bolts using a Torx T30 bit, then remove the driver's airbag assembly.



Front Passenger's Side:

- Remove the six mounting nuts, then carefully lift the front passenger's airbag out of the dashboard.



(cont'd)

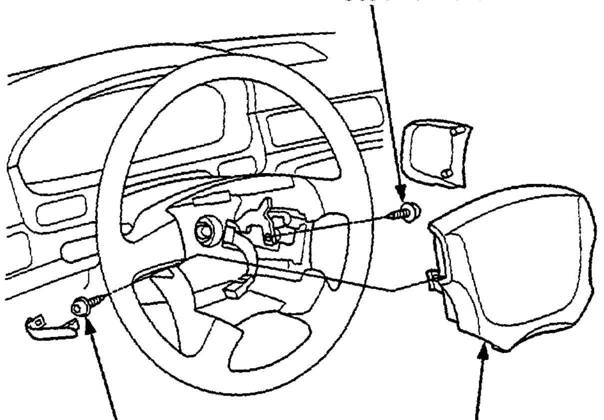
Replacement (cont'd)

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:

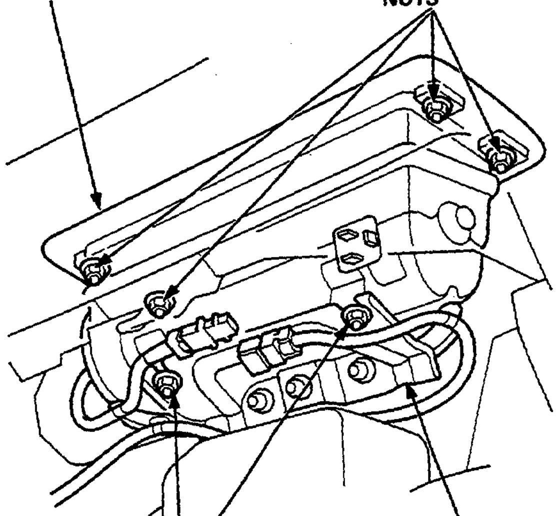
- Place the driver's airbag assembly in the steering wheel, and secure it with new Torx bolts.



Front Passenger's Side:

- Place the front passenger's airbag assembly into the dashboard.
- Loosely install all six mounting nuts.
- Tighten the upper four nuts first, then tighten the lower two nuts. The lower mounting brackets can be adjusted, if necessary.

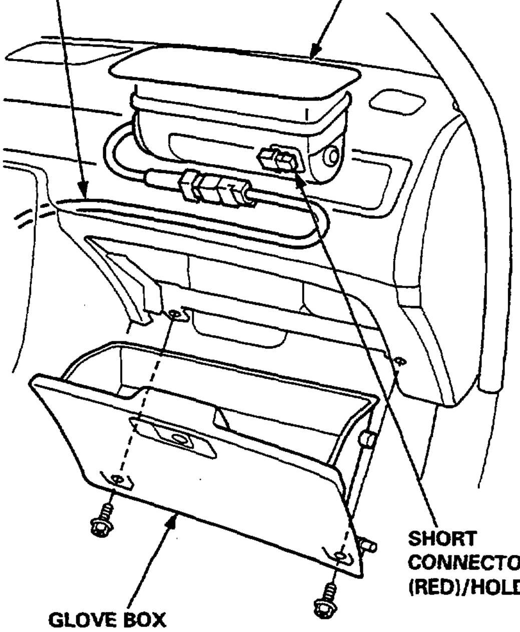
NOTE: If there is some space between the airbag assembly lid and the dashboard after tightening the nuts, loosen the lower mounting nuts, and lightly press down the airbag assembly. Then retighten the lower mounting nuts.



5. Remove and properly store the short connectors, then reconnect the airbag connectors.

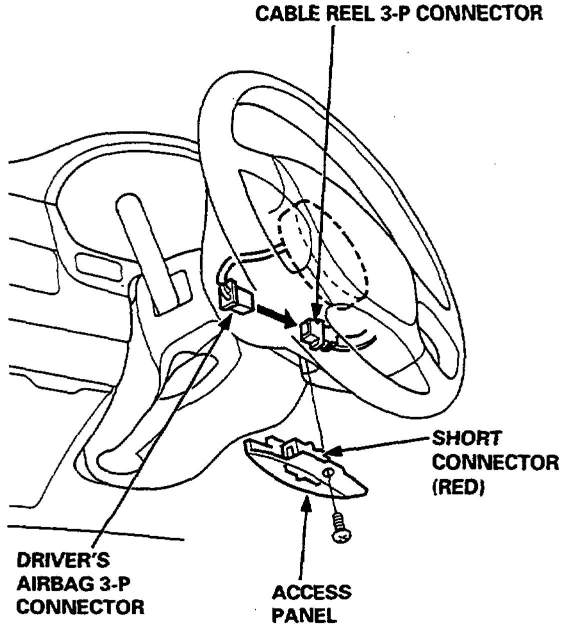
Front Passenger's Side:

- Attach the short connector (RED) 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 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.

Scrapping

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 local Honda Service Manager must give approval and/or special instructions. Only after the airbags have been deployed (as the result of vehicle collision, for example), can they be scrapped. If the airbags appear intact (not deployed) treat them with extreme caution.
Follow this procedure:

Deploying the Airbags: In-car

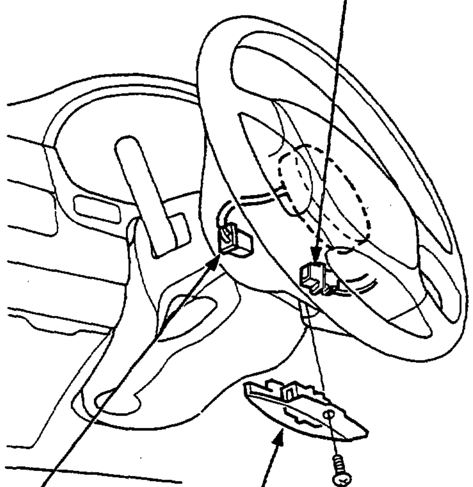
NOTE: If an SRS car is to be entirely scrapped, its airbags should be deployed while still in the car. The airbags should not be considered as salvageable parts and should never be installed in another car.

⚠WARNING Confirm that the airbag assemblies are securely mounted; otherwise, severe personal injury could result from deployment.

1. Disconnect the battery negative cable, then disconnect the positive cable and wait at least three minutes.
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-B47.

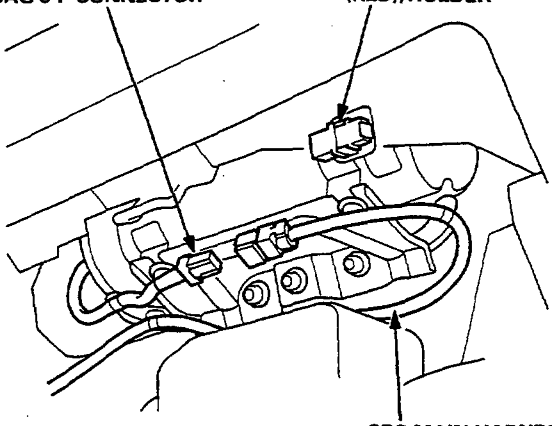
Driver's Airbag:

3. Remove the access panel, then disconnect the 3-P connector between the driver's airbag and the cable reel.

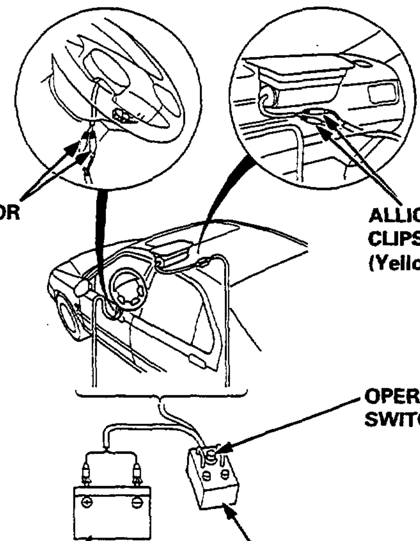


Front Passenger's Airbag:

4. Remove the glove box, 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 about 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.

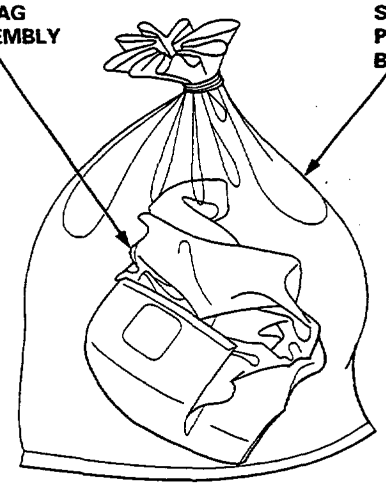
7. Push the tool's deployment switch. The airbag should deploy (deployment is both highly audible and visible-a loud noise and rapid inflation of the bag, followed by slow deflation).

   - If audible/visible deployment happens and the green light on the tool comes on, continue with this procedure.
   - If the airbags don't deploy, yet the green light comes ON, the igniters are 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.

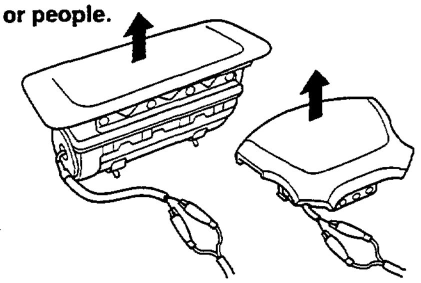
CAUTION:
- **Wear a face shield and gloves when handling a deployed airbag.**
- **Wash your hands and rinse them well with water after handling a deployed airbag.**



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 (30 ft) 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-B43.
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 local Honda 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.

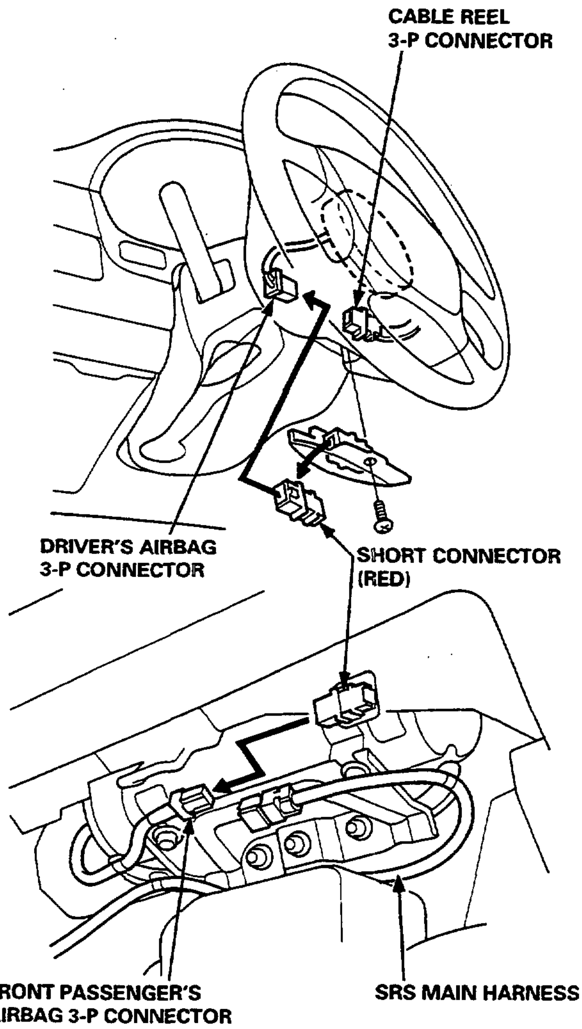
Replacement

⚠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.

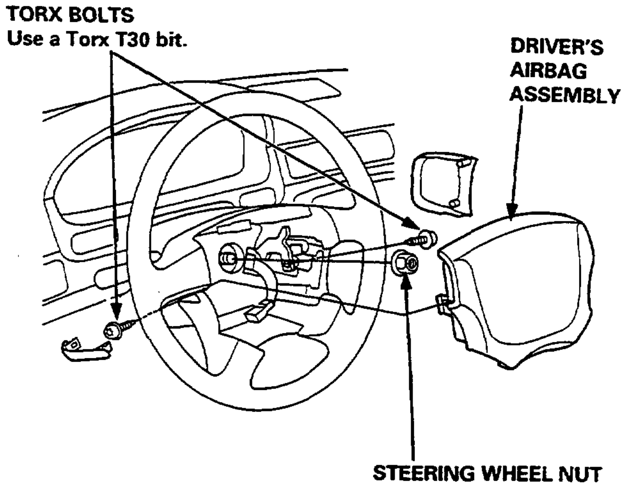
CAUTION:

- **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.**

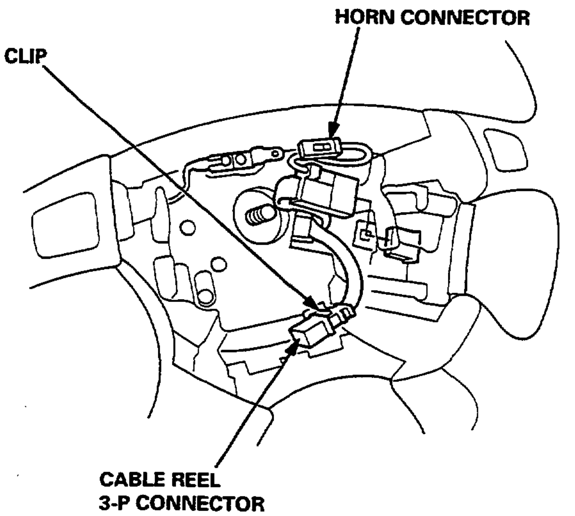
1. Disconnect the battery negative cable, then disconnect the positive cable and wait at least three minutes.
2. Make sure the wheels are aligned straight ahead.
3. Connect the short connectors (RED) to the airbags.



4. Remove the driver's airbag assembly from the steering wheel (two T30 Torx bolts), then remove the steering wheel nut.

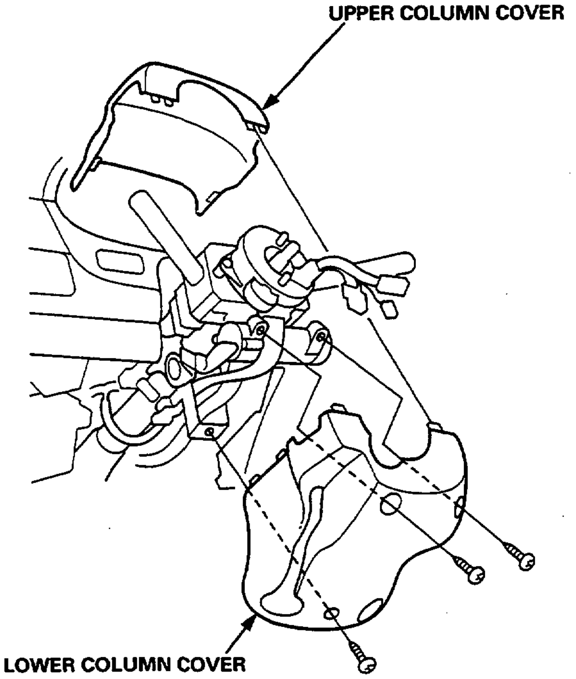


5. Disconnect the horn connector, then remove the cable reel 3-P connector from it's clip.

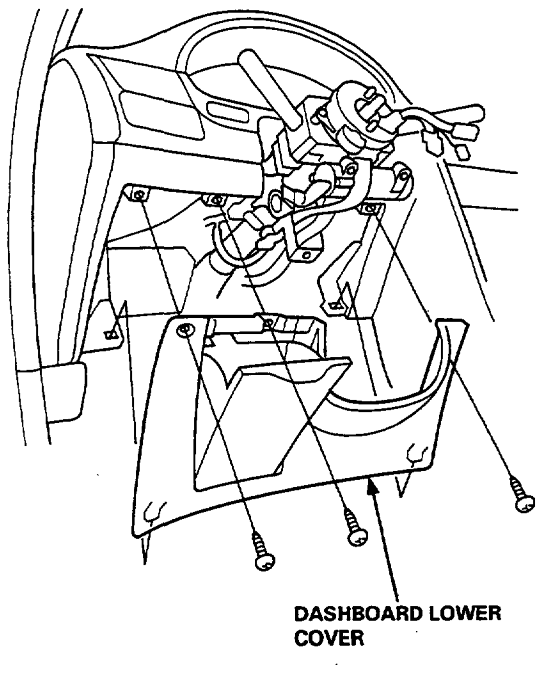


6. Remove the steering wheel from the column.

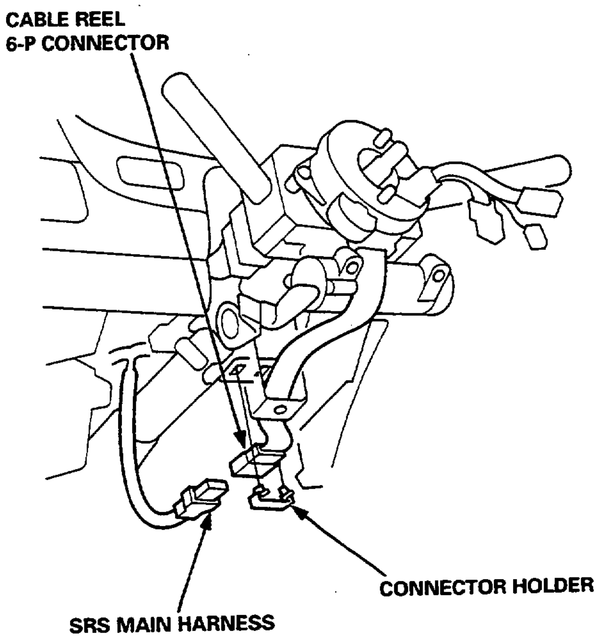
7. Remove the upper and lower column covers.



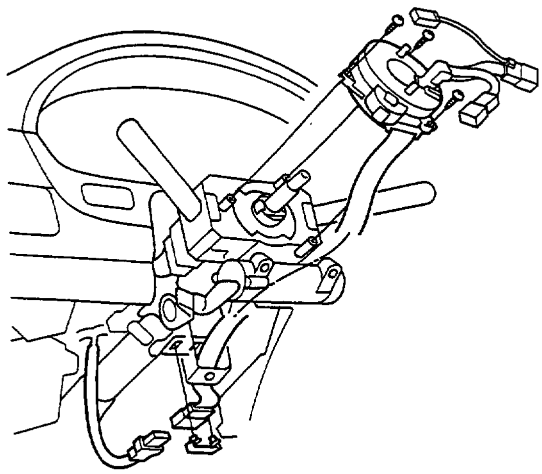
8. Remove the dashboard lower cover.



9. Disconnect the 6-P connector between the cable reel and SRS main harness, then remove the connector holder from the steering column.



10. Remove the cable reel from the column.



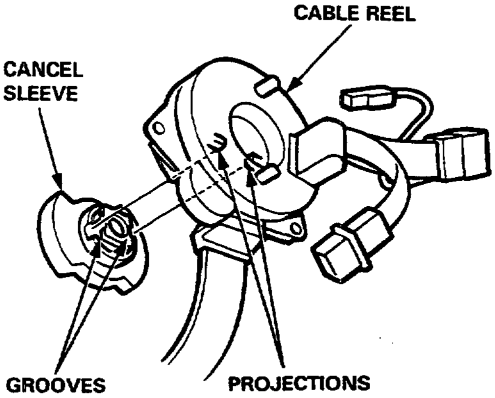
(cont'd)

Cable Reel (SRS-Type III)

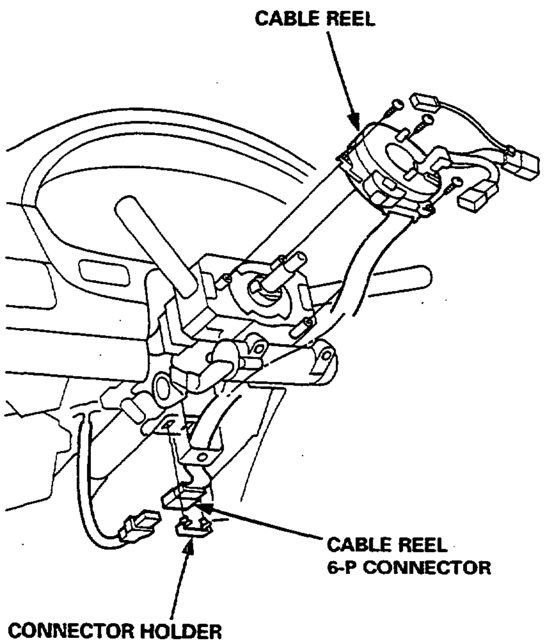
Replacement (cont'd)

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 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.**

11. Align the cancel sleeve grooves with the cable reel projections.



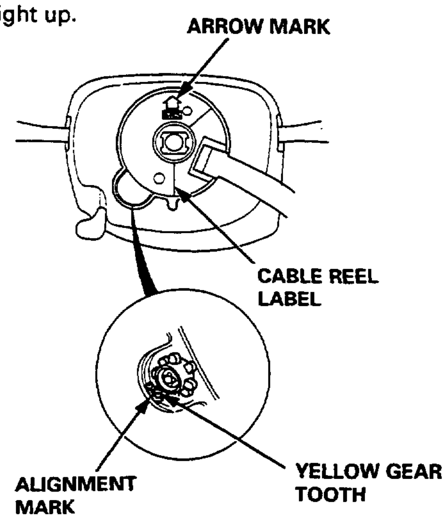
12. Carefully install the cable reel on the steering column shaft. Then attach the connector holder to the steering column.



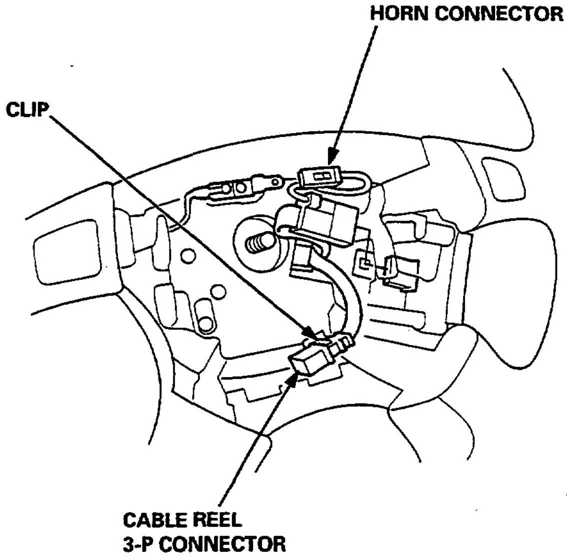
13. Install the steering column upper and lower covers.

14. 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.

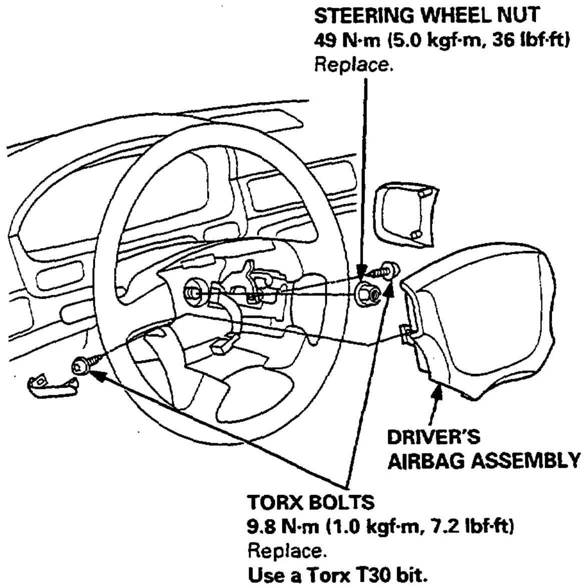


15. Install the steering wheel and attach the cable reel 3-P connector to the clip.



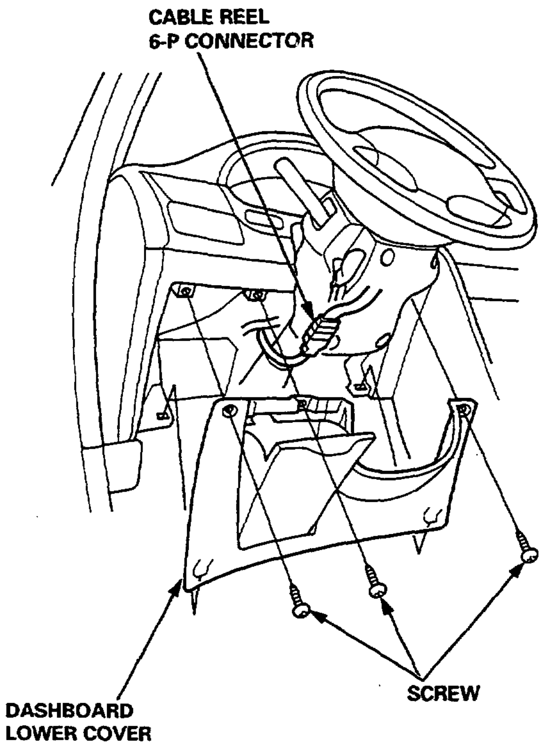
16. Connect the horn connector to the horn switch terminal.

17. Install the steering wheel nut.



18. Install the driver's airbag assembly.

19. Connect the cable reel 6-P connector to the SRS main harness, then install the dashboard lower cover.

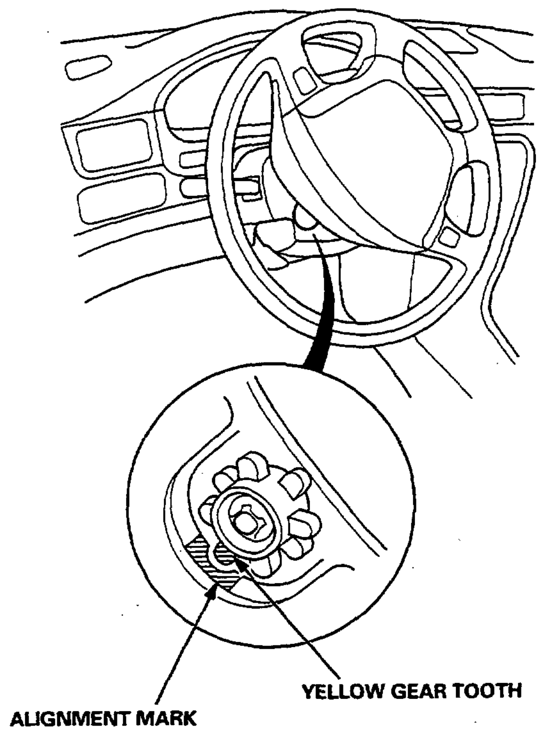


20. Remove and properly store the short connectors (RED), then reconnect the airbag connectors (and reinstall the glove box).

21. Reconnect the battery positive cable, then the negative cable.

22. 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.
- Rotate the steering wheel counterclockwise to make sure the yellow gear tooth lines up with the slot on the cover.



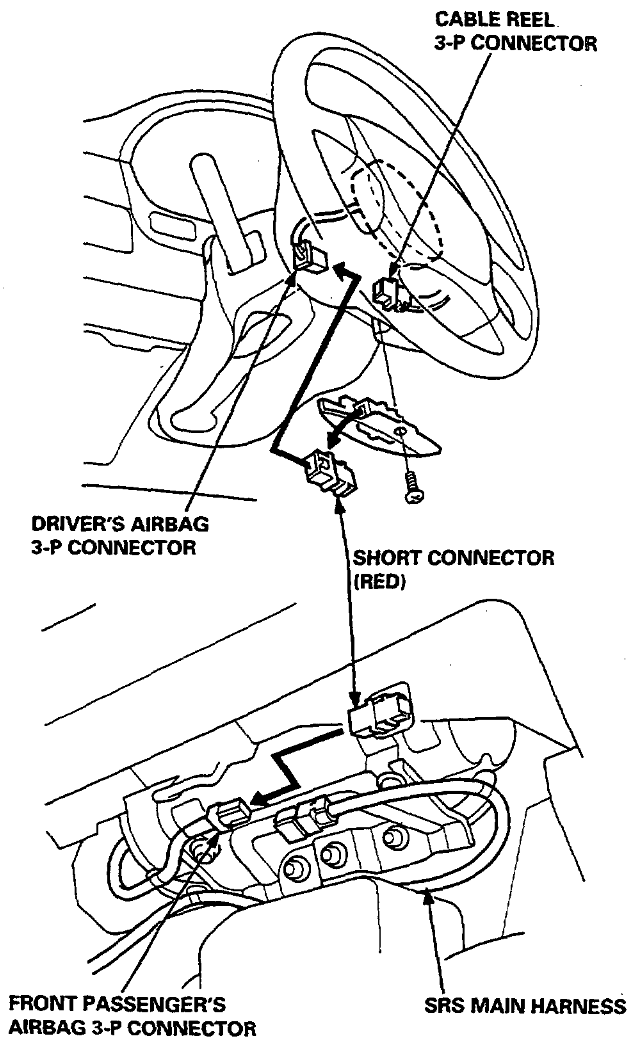
SRS Unit (SRS-Type III)

Replacement

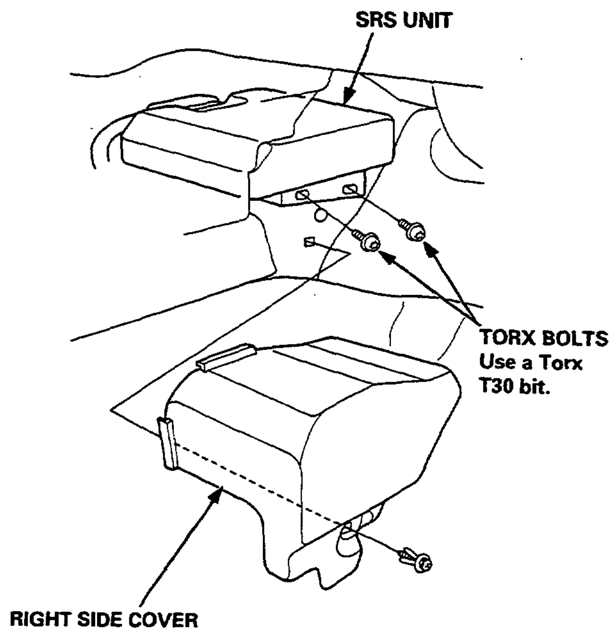
CAUTION:
- **Before disconnecting any part of the SRS wire harness, connect the short connectors (RED) to the airbags.**
- **During installation or replacement, do not bump (impact wrench, hummer etc.) the area near the SRS unit.**
- **Do not damage the SRS unit terminals or connectors.**
- **Do not 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 disconnect the positive cable and wait at least three minutes.

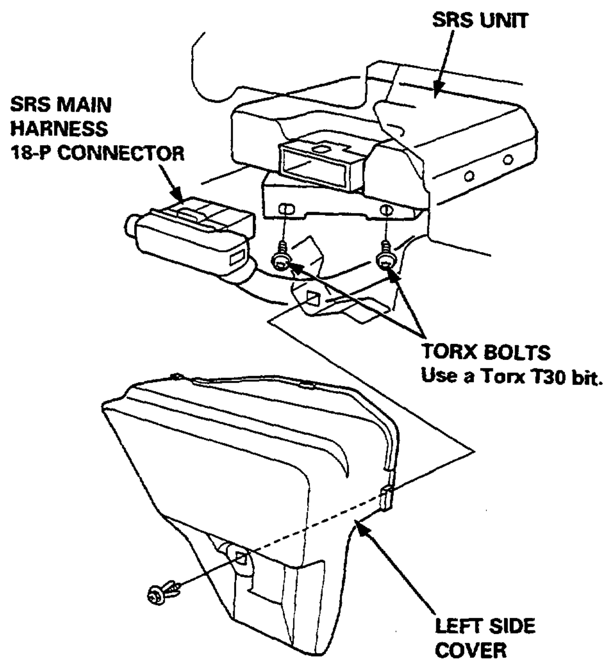
2. Connect the short connectors (RED) to the airbags.



3. Remove the right side cover from the SRS unit.



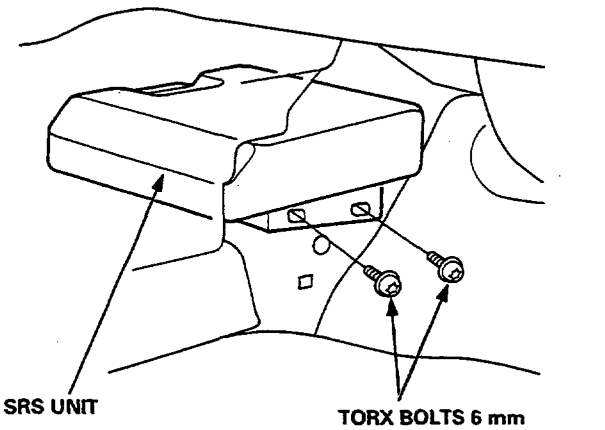
4. Remove the left side cover from the SRS unit, then disconnect the SRS main harness 18-P connector from the SRS unit.

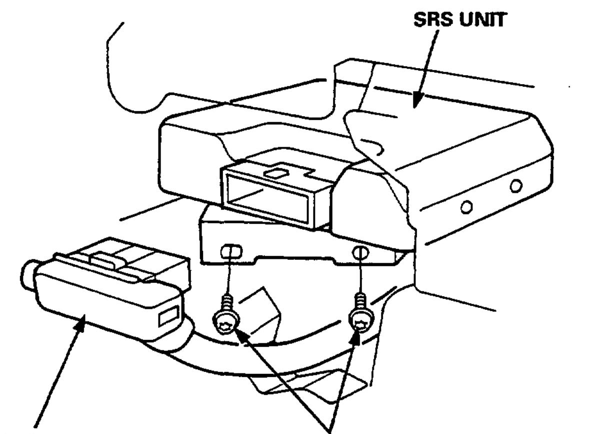


5. Remove the four Torx bolts from the SRS unit, then pull out the SRS unit from the left side.

CAUTION:
- **Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts.**
- **When tightening the Torx bolts to the specified torque after replacement, be careful to turn them in so that their heads rest squarely on the brackets.**

6. Install the new SRS unit.





7. Connect the SRS main harness 18-P connector to the SRS unit; push it into position until it clicks.

8. Install the SRS unit covers (right and left).

   NOTE: Make sure the covers snap together in the middle.

9. Remove and properly store the short connectors (RED), then reconnect the airbag connectors (and reinstall the access panel and 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 to ON (II); the instrument panel SRS indicator light should come on for about six seconds and then go off.