INTRODUCTION

How to Use This Manual

This supplement contains information for the 1990 CIVIC. Refer to following shop manuals for service procedures.

Description	Code No.
CIVIC CHASSIS Maintenance and Repair	62SH300
CIVIC SHUTTLE/WAGON Supplement	62SH520
'89 CIVIC Supplement	62SH320
D12B/D13B/D14A/D15B/D16A ENGINE Maintenance and Repair	62PM100
L3 MANUAL TRANSMISSION Maintenance and Repair	62PL300
L3 (4WD) MANUAL TRANSMISSION Maintenance and Repair	62PH800
L4 AUTOMATIC TRANSMISSION Maintenance and Repair	62PL400
S5 AUTOMATIC TRANSMISSION Maintenance and Repair	62PS500

The first page of each section is marked with a black tab that lines up with one of the thumb index tabs on this page. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.

Special information

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

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

NOTE: Gives helpful information.

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

*(Asterisk) marked sections are not included in this manual.

HONDA MOTOR CO., LTD.
Service Publication Office

First Edition 10/89 550 pages

General Info
Special Tools
Specifications
Maintenance
Engine
Fuel and Emissions
Transaxle
Steering*
Suspension*
Brakes
Body
Heater and Air Conditioner
Electrical

Outline of Model Changes

ITEM	DESCRIPTION	89 MODEL	90 MODEL	REFERENCE SECTION
Engine	Medified • Oil filter • Crankshaft pulley bolt • Engine mounting bolts • Exhaustpipe	○		—
	D13B engine (1.3ℓ SOHC PGM-CARB) adopted for KG, KS models		○	5
	Oil filter modified		○	5
Carburetion	Vacuum connections modified	○		—
	D13B engine (1.3ℓ SOHC PGM-CARB) adopted for KG, KS models		○	6
PGM-FI	Fast idle control solenoid valve adopted Throttle body modified	○		—
	Adopted • Fuel sub pump • Fuel cut-off relay		○	6
Manual Transmission	Modified • Spring pin added • Mainshaft thrust shim • Countershaft ball bearing	○		—
Automatic Transmission	Modified • Servo valve body • Parking brake stoppers	○		—
	4WD automatic transmission adopted		○	8
Rear Suspension	Modified	○		—
Brake System	3-channel ALB with 4WD for some types		○	13
Instrument Panel	Medified		○	14
Air Conditioner	Pipe routing modified	○		—
	SANDEN Compressor adopted for some types		○	15
	Compressor pressure plate modifid		○	15
Lighting System	Modified	○		—
High Mount Brake Light	Adopted for some types	○		—
Lighting System	Modified		○	—
Gauge Assembly	Modified		○	16
Shift Lever Position Indicator	Modified		○	16

General Information

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Chassis and Engine Numbers

Vehicle Identification Number (2-door Hatchback)

JHM EC7 3200S200001

Manufacturer, Make and Type of vehicle
- JHM: HONDA MOTOR CO., LTD., JAPAN
  HONDA, Passenger car

Line/Body and Engine type
- EC7: CIVIC 1200 Hatchback
- EC8: CIVIC 1300 Hatchback
- EC9: CIVIC 1400 Hatchback
- ED6: CIVIC 1500 Hatchback
- ED7: CIVIC 1600 Hatchback

Transmission and Body type
- 3: 5-speed manual/2-door Hatchback
- 4: 4-speed automatic/2-door Hatchback

Vehicle Grade
- 2: DX (EC7, EC8, ED6: KQ)
  GL (EC9, ED6: KY)
- 3: GL (ED6: KQ)
- 4: DX (ED6: KX, KS, KW)
- 5: GL (ED6: KX, KS, KW)
- 6: 1.6i (ED7: SOHC)
- 7: 1.6i-16 (ED7: DOHC)

Fixed Code

Auxiliary Number

Factory
- S: Suzuka Factory

Model Year
- 2 : 1990

Serial Number

Vehicle Identification Number (4-door Sedan)

JHM ED1 5200S200001

Manufacturer, Make and Type of vehicle
- JHM: HONDA MOTOR CO., LTD., JAPAN
  HONDA, Passenger car

Line/Body and Engine type
- ED1: CIVIC 1200 Sedan
- ED2: CIVIC 1400 Sedan
- ED3: CIVIC 1500 Sedan
- ED4: CIVIC 1600 Sedan
- ED5: CIVIC 1300 Sedan
- EE5: CIVIC 1600 4WD Sedan

Transmission and Body type
- 5: 5-speed manual/4-door Sedan
  5-speed+SL* manual/4-door Sedan
- 6: 4-speed automatic/4-door Sedan

Vehicle Grade
- 1 : DX (ED 3 : KY)
- 2: DX (ED1, ED5, ED3: KQ)
  GL (ED2, ED3: KP, KT, KY)
- 3: EX (ED3: KY)
  GL (ED3: KQ)
- 4: DX (ED3: KS, KW)
- 5: GL (ED3: KX, KS, KW)
- 6: 1.6i (ED4)
  1.6i 4WD (EE5)

Fixed Code

Auxiliary Number

Factory
- S: Suzuka Factory

Model Year
- 2 : 1990

Serial Number

SL*: Super Low Gear

Vehicle Identification Number (4-door Hatchback)

JHM EE1 7200S200001

Manufacturer, Make and Type of vehicle
- JHM: HONDA MOTOR CO., LTD., JAPAN HONDA, Passenger car

Line/Body and Engine type
- EE1: CIVIC 1400 4-door Hatchback
- EE2: CIVIC 1500 4-door Hatchback
- EE3: CIVIC 1500 4WD 4-door Hatchback
- EE4: CIVIC 1600 4WD 4-door Hatchback

Transmission and Body type
- 7: 5-speed manual/4-door Hatchback 5-speed+SL* manual/4-door Hatchback
- 8: 4-speed automatic/4-door Hatchback

Vehicle Grade
- 2: GL (except KX, KS) RTX
- 5: GL (KX, KS)
- 6: 1.6i-4WD

Fixed Code

Auxiliary Number

Factory
- S: Suzuka Factory

Model Year
- 2: 1990

Serial Number

SL*: Super Low Gear

Engine Serial Number (except KQ model)

D12B1-14 00001

Engine Type
- D12B1: 1.2 ℓ SOHC 1-Carbureted Engine
- D13B1: 1.3 ℓ SOHC 1-Carbureted Engine
- D13B2: 1.3 ℓ SOHC 1-Carbureted Engine with catalytic converter
- D14A1: 1.4 ℓ SOHC 2-Carbureted Engine
- D15B1: 1.5 ℓ SOHC PGM-FI Engine for DX models of KS, KW
- D15B2: 1.5 ℓ SOHC PGM-FI Engine for GL models of KG, KS, KX, KW
- D15B3: 1.5 ℓ SOHC 1-Carbureted Engine
- D16Z2: 1.6 ℓ SOHC PGM-FI Engine with catalytic converter
- D16A7: 1.6 ℓ SOHC PGM-FI Engine without catalytic converter
- D16A9: 1.6 ℓ DOHC PGM-FI Engine

Emission Group
- 10: D13B2 Engine with catalytic converter
- 14: without catalytic converter except D16A7 Engine
- 30: D16A7 Engine without catalytic converter
- 37: with catalytic converter DX models of KS, KW and GL models of KS,
- 38: with catalytic converter GL models of KG, KW

Serial Number

Engine Serial Number (KQ model)

D15B4-1400001

Engine Type
- D15B4: 1.5 ℓ SOHC 2-Carbureted Engine with catalytic converter

Serial Number

Transmission Number

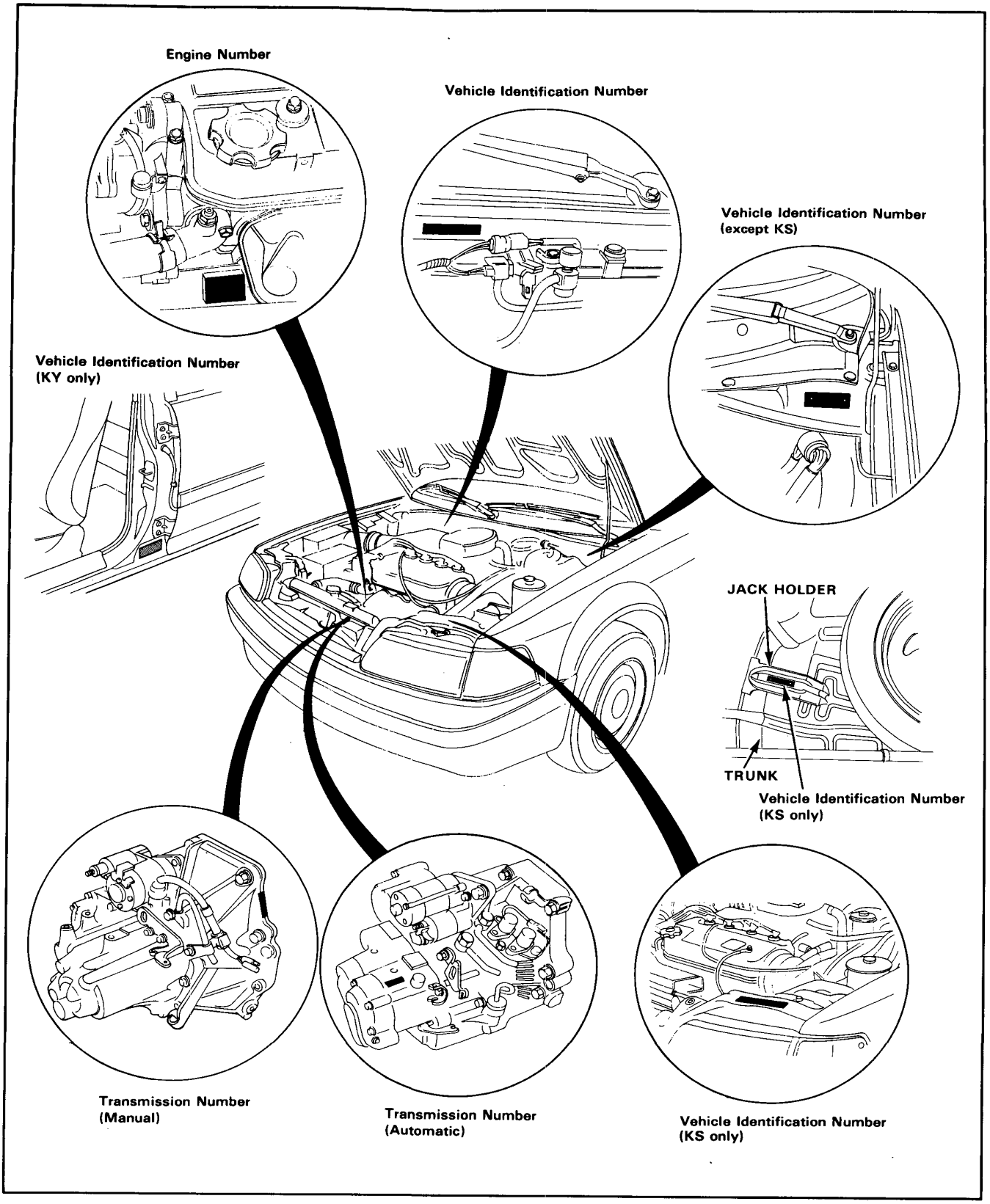
L3-2000001

Transmission Type
- L3: 5-speed Manual Transmission and 5-speed+SL* Manual Transmission for 4WD
- L4: Automatic Transmission
- S5: Automatic Transmission for 4WD

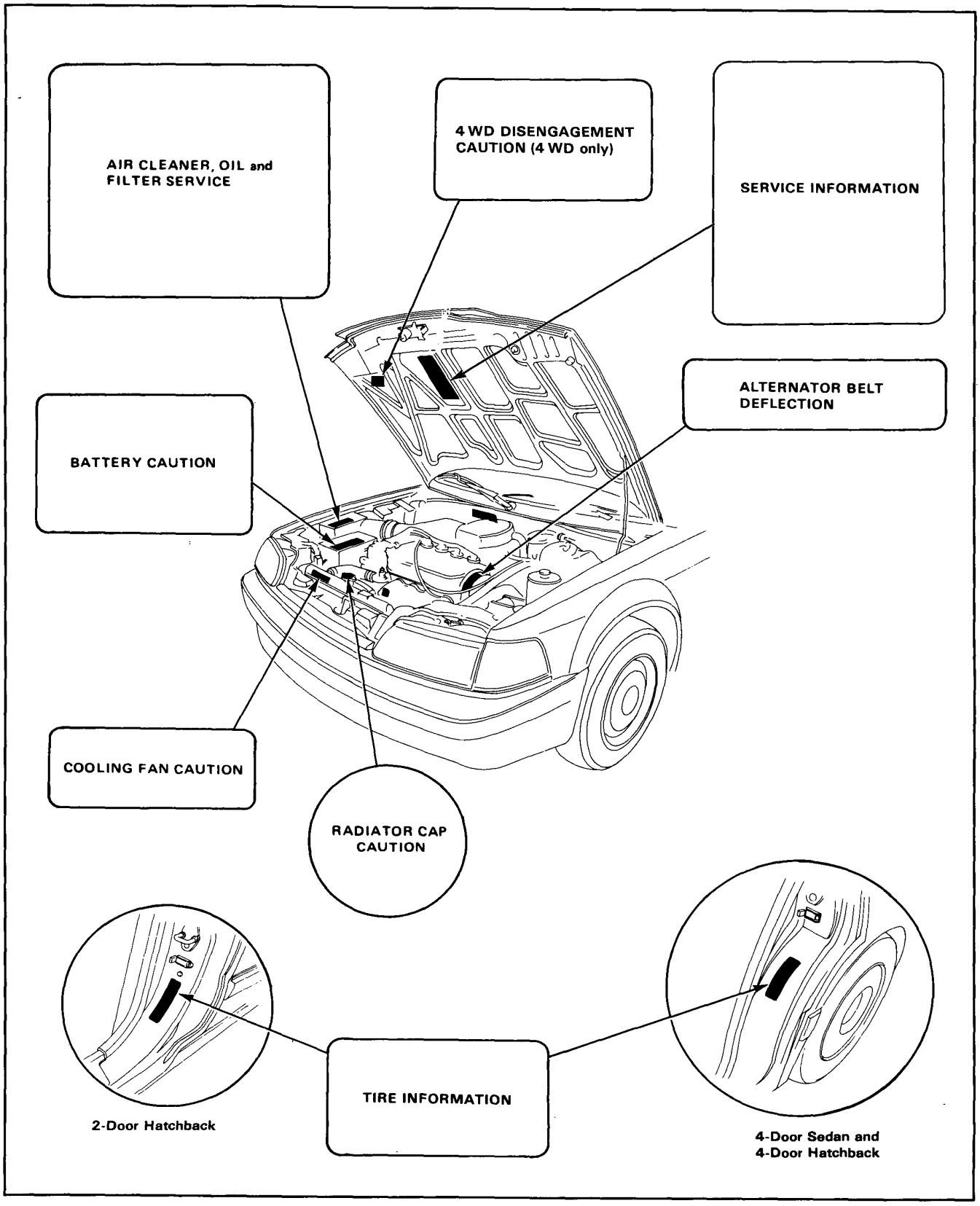
Serial Number
- L3: 2000001~
- L3(4WD): 9100001~
- L4: 5000001~
- S5: 2000001~

SL*: Super Low Gear

Identification Number Locations



Label Locations



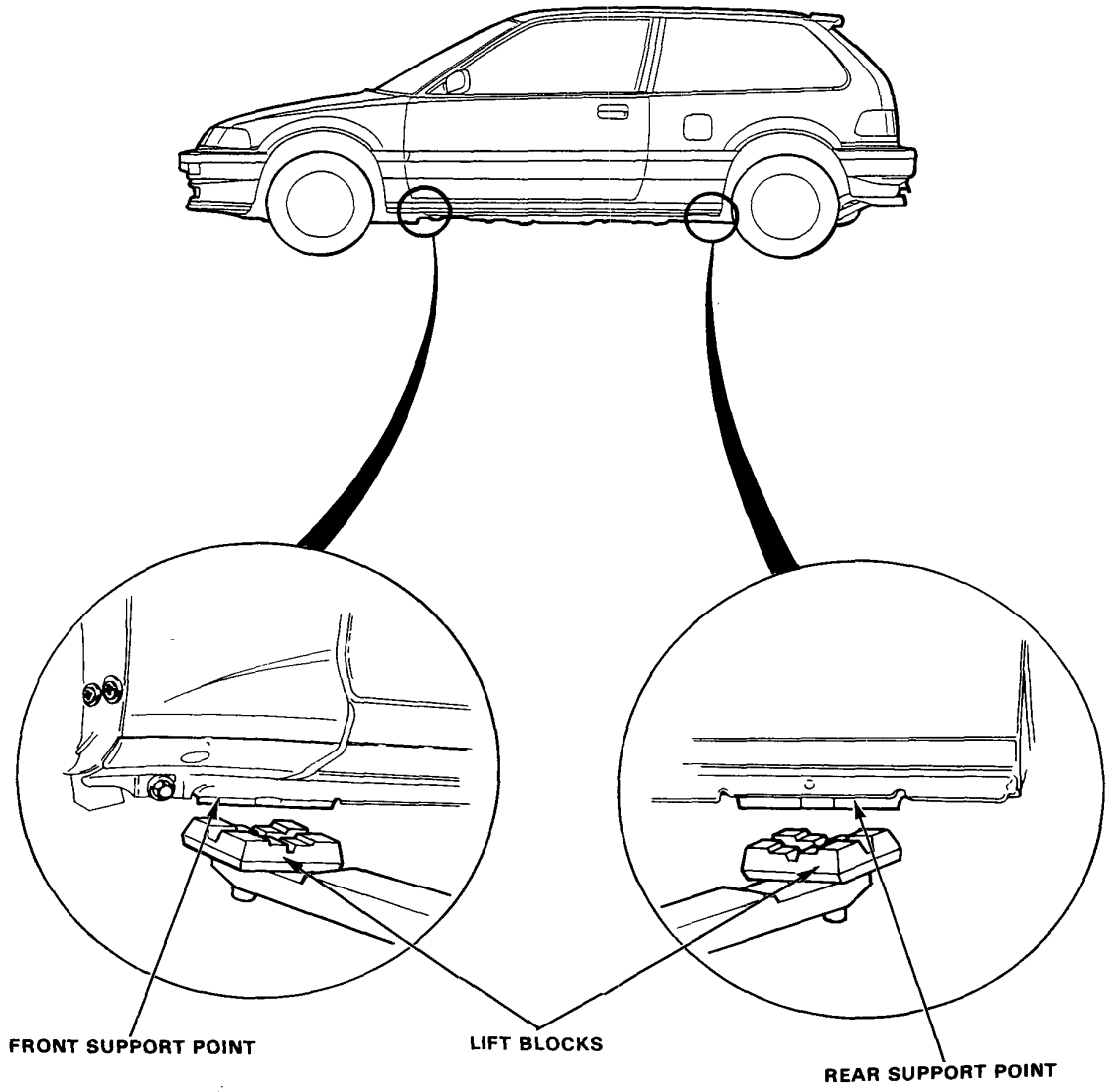
Lift and Support Points

Hoist

1. Place the lift blocks as shown.
2. Raise the hoist a few inches 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.

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

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



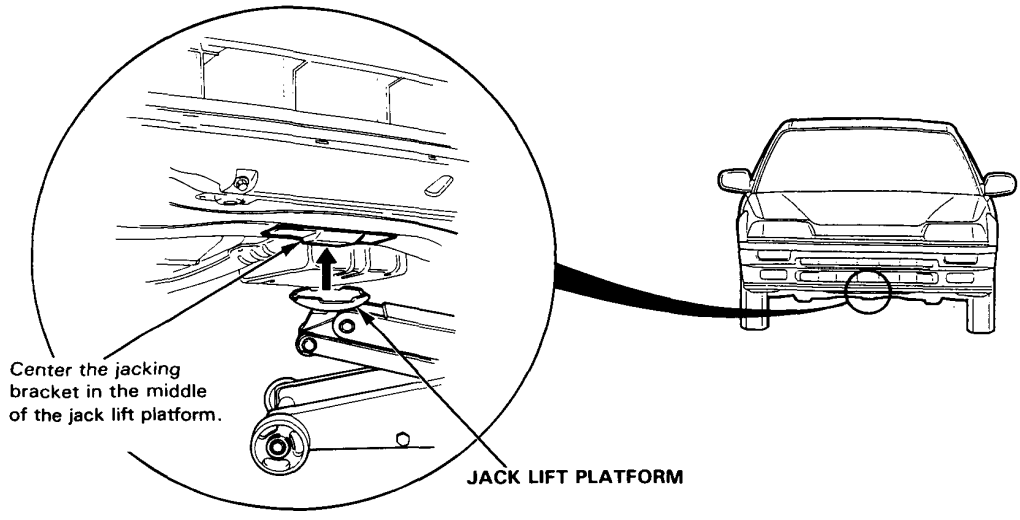
Floor Jack

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 PARK).
3. Raise the car high enough to insert the safety stands.
4. Adjust and place the safety stands as shown on page 1-7 so the car will be approximately level, then lower the car onto the stands.

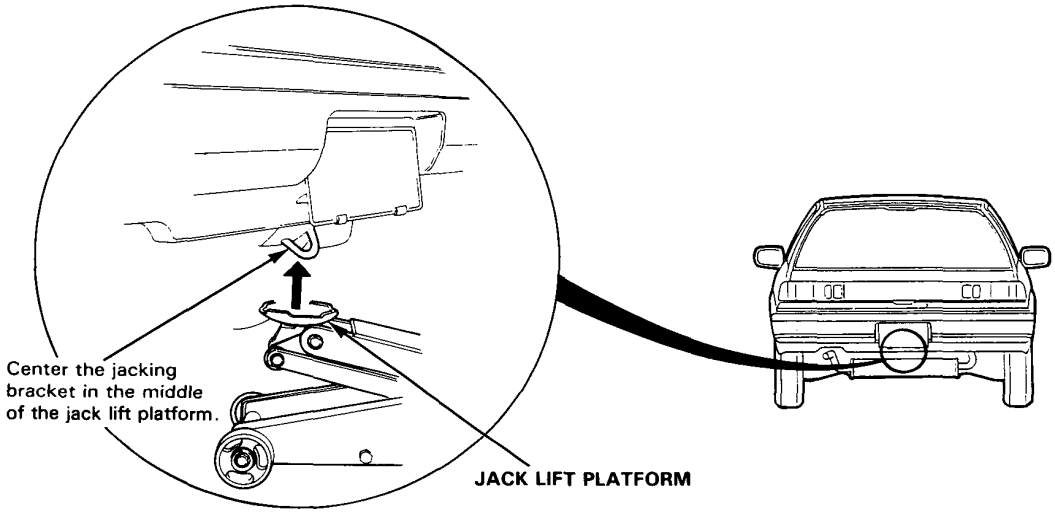
⚠WARNING

- **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



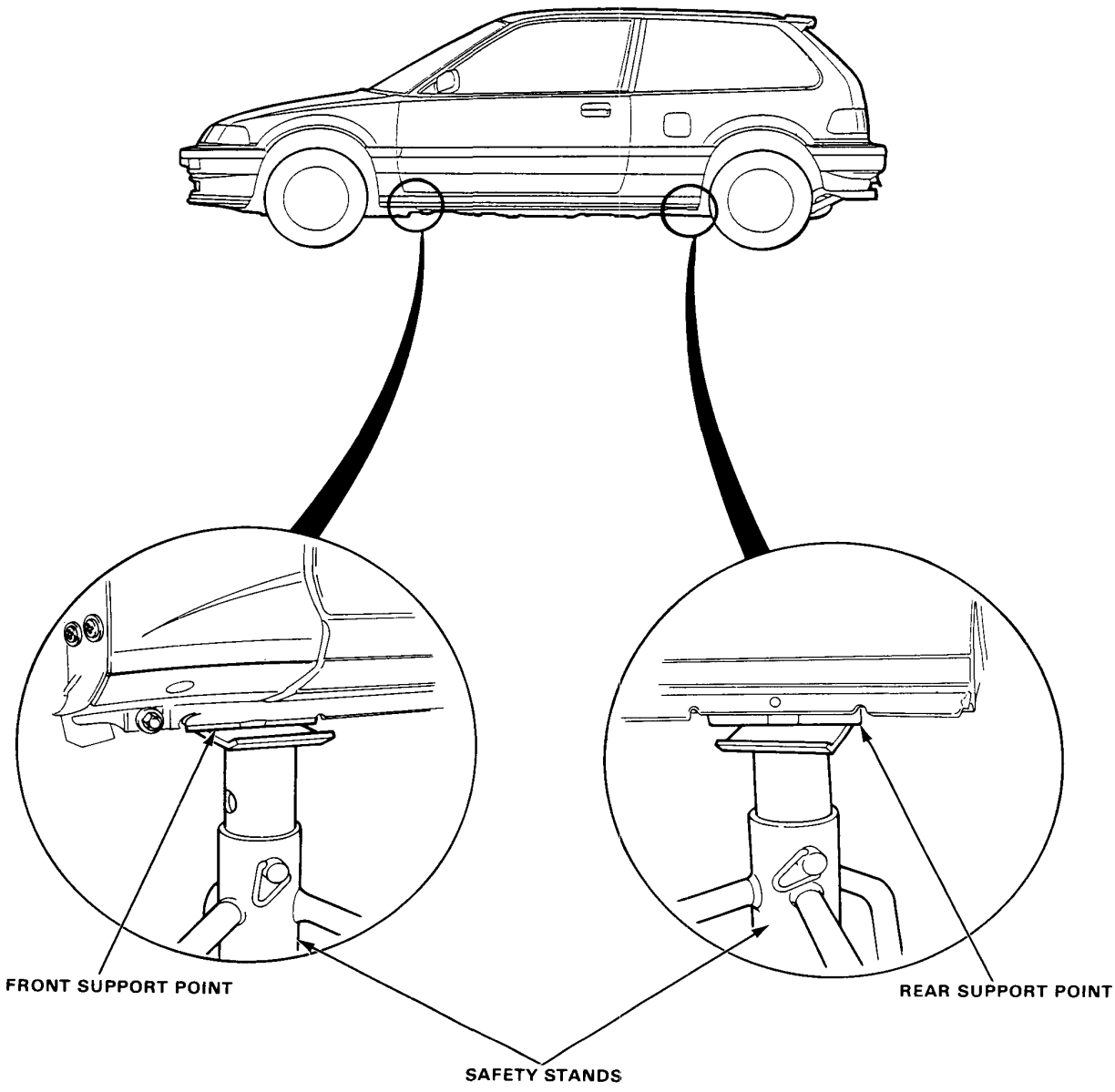
Rear



(cont'd)

Lift and Support Points (cont'd)

Safety Stands



Towing

For 4WD see also "4WD Disengagement,"

If possible, always tow the car with the front wheels off the ground. The tow truck driver should position wood spacer blocks between the car's frame and the chains and lift straps, to avoid damaging the bumper and the body.
Do not use the bumpers to lift the car or to support the car's weight while towing. Check local regulations for towing. A rope may be attached to the hook shown in the illustration. Do not attach a tow bar to either bumper.

⚠WARNING

- Do not or tow a car to start it. The fotward surge when the engine starts could cause a collision. (On some types) Also, under some conditions, the catalytic converter could be damaged. A car equipped with an automatic transmission cannot be started by pushing or towing.
- (4WD) Before towing the car with either the front or rear wheels raised off the ground, place the transmission in neutral and manually disengage the 4WD system to prevent the raised wheels from turning.

If the car to be towed with the front wheels on the ground observe the following precautions :

Manual Transmission

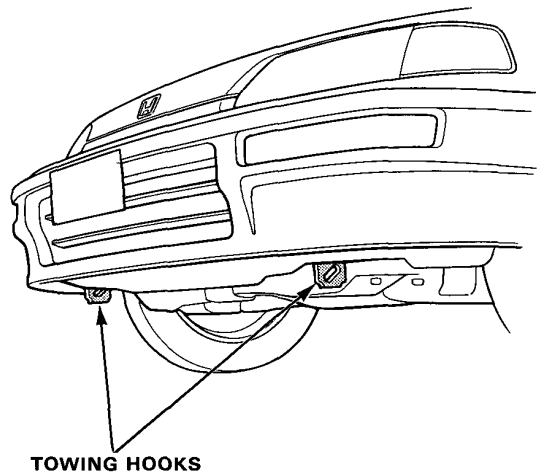
Shift the transmission to Neutral and turn the ignition key to the "I" position.

Automatic Transmission

First, check the automatic transmission fluid level (see Section 9). Start the engine and shift to D4, then to N. Return the ignition key to the 9 position.

CAUTION :

- Do not tow with front wheels on the ground when the automatic transmission fluid level is low or the transmission cannot be shifted with the engine running.
- Do not exceed 55 km/h (35 mph) or tow for distances of more than 80 km (50 miles).



TOWING HOOKS

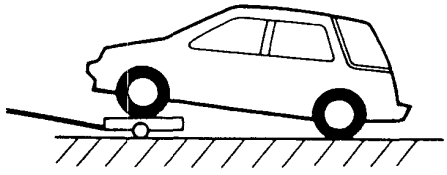
4 WD Disengagement

The 4WD System shifts instantaneously and automatically from front wheel drive to four wheel drive when greater traction is needed.

⚠WARNING The 4WD system must be manually disengaged before performing service that requires only the front wheels or only the rear wheels to be turning. Disengaging the system will prevent sudden movement of the car, which may result in personal injury.

TOWING:

CAUTION: Before towing the car with either the front or rear wheels raised off the ground, place the transmission in neutral and manually disengage the 4WD system to prevent the raised wheels from turning.



If possible, always tow the car with the front wheels off the ground, and 4WD disengaged. Do not use the bumpers to lift the car or to support the car's weight while towing. Check local regulations for towing with a chain or frame-mounted tow bar. A chain may be attached to the hooks shown in the illustration. Do not attach a tow bar to either bumper.

If the car is to be towed with front wheels on the ground, observe the following precautions;

Manual Transmission

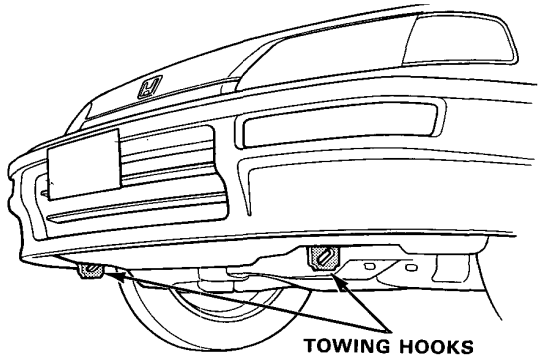
Shift the transmission to Neutral and turn the ignition key to the "I" position.

Automatic Transmission

First, check the automatic transmission fluid level (see section 9). Start the engine and shift to D4, then to N. Return the ignition key to the "I" position.

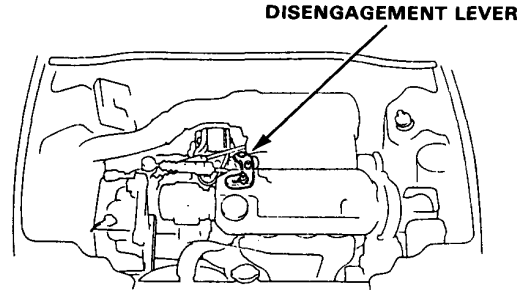
CAUTION

- Do not tow with front wheels on the ground when the automatic transmission fluid level is low or the transmission cannot be shifted with the engine running.
- Do not exceed 55 km/h (35 mph) or tow for distances of more than 80 km (50 miles).



4WD Disengagement
(For cars not equipped ALB)
Manual Transmission :

1. Locate the orange dinengagement lever at the rear of the engine compartment.

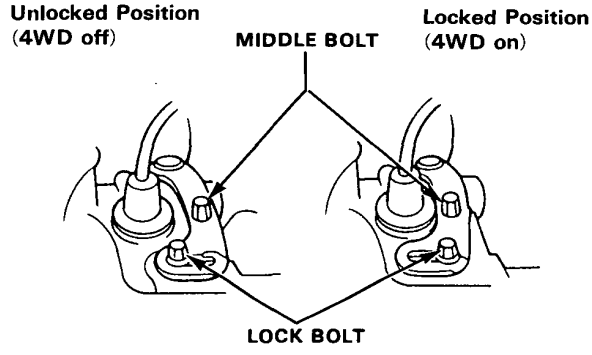


2. Loosen the lock at the slotted end of the lever.

NOTE : For better accessibility, use a socket and a long extension bar.

CAUTION : Do not loosen the lock bolt more than 5 — 7 turns.

Replacement is extremely difficult.

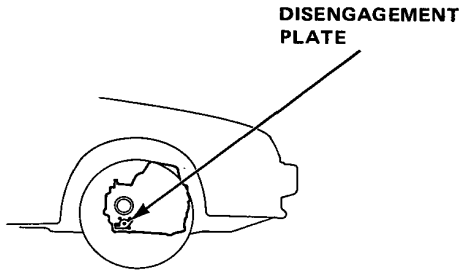


3. Move the lever by turning the middle bolt counterclockwise.
4. Tighten the lock bolt.

NOTE : After service or towing is completed return the lever to the normal (4WD on) position and tighten the lock bolt.

Automatic transmission :

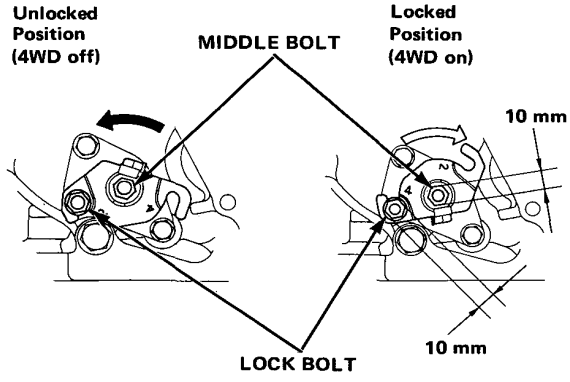
1. Locate the disengagement plate at the rear of the transmission case behind the right front wheel.



2. Loosen the lock bolt in the notch on the plate.

NOTE : For better accessibility, use a socket and a long extension bar.

CAUTION : Do not loosen the middle bolt more than 5 — 7 turns. Replacement is extermely difficult.

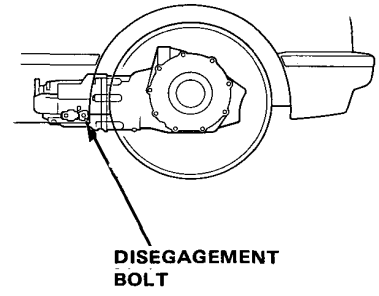


3. Turn the middle bolt counterclockwise until the plate rotates about 150° and is stopped by the lock bolt.
4. Tighten the lock bolt.

NOTE : After service or towing is completed, return the plate to the normal (4WD on) position and tighten the lock bolt.

4WD Disengagement (For cars equipped with ALB)

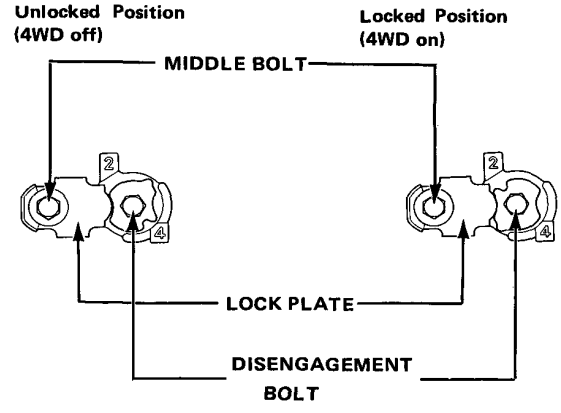
1. Locate the orange disengagement bolt at the front of the rear differential behind the left rear wheel.



2. Loosen the middle bolt fixing the lock plate.

NOTE : For better accessibility, use a socket and a long extension bar.

CAUTION : Do not loosen the middle bolt more than 5 — 7 turns. Replacement is extremely difficult.

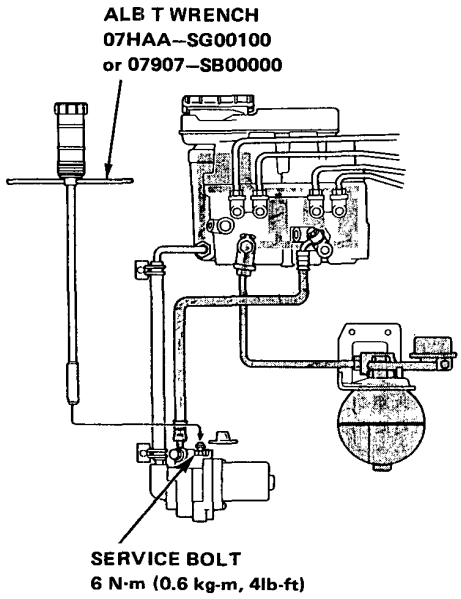


3. Turn the disengagement bolt counterclockwise until the disengagement bolt rotates about 180° and is stopped by the lock plate.
4. Tighten the middle bolt.

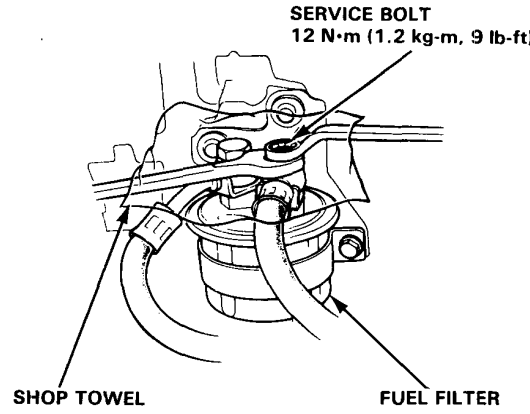
NOTE : After service or towing is completed, return the plate to the normal (4WD on) position and tighten the middle bolt.

Special Caution Items for This Car

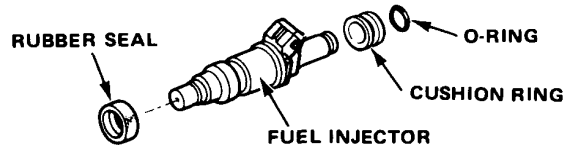
1. ALB piping system servicing
   - Dissassemble the ALB piping after relieve the high-pressured brake fluid.
   - Otherwise, the high-pressured brake fluid will burst out and it is very dangerous.
   - See section 13 how to relieve the high-pressured brake fluid.



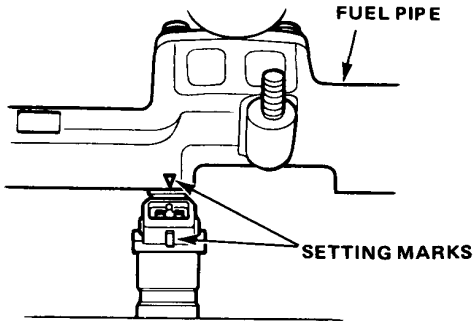
2. Fuel Line Servicing
   - Relieve fuel pressure by loosening the service bolt provided on the top of the fuel filter before disconnecting a fuel hose or a fuel pipe.



- Be sure to replace washers, O-rings, and rubber seals with new ones when servicing fuel line parts.
- Always apply oil to the surfaces of O-rings and seal rings before installation. Never use brake fluid, radiator fluid, vegetable oils or alcohol-based oils.



- When assembling the flare joint of the high-pressure fuel line, clean the joint and coat with new engine oil.
- When installing an injector, check the angle of the connector. The center line of the coupler should align with the setting mark on the injector holder.



3. Inspection for fuel leakage
   - After assembling fuel line parts, turn ON the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred in any of the various points in the fuel line.

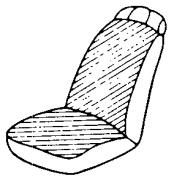
4. Installation of an amateur radio for cars equipped with PGM-F1 and ALB.
   Care has been taken for the control units of the Fuel-Injection, Carburetor, and its wiring to prevent erroneous operation from external interference, but erroneous operation of the control unit may be caused by extremely strong radio waves. Attention must be paid to the following items to prevent erroneous operation of the control units.
   - The antenna and the body of the radio must be PGM-FI at least 200 mm (7.9 in.) away from the control units.

   The control unit locations:
   - Fuel-Injection, Carburetor: Passenger's side front floor panel.
   - ALB : Right side panel of laggage area.
   - Do not lead the antenna feeder and the coaxial cable over a long distance parallel to the car's wiring. When crossing with the wiring is required, execute crossing at a right angle.
   - Do not install a radio with a large output (max. 10 W).

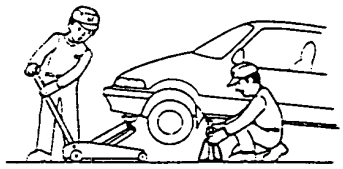
5. Apply liquid gasket to the transmission, oil pump cover, right side cover and water outlet. Use Honda genuine liquid gasket, Part NO. 0Y740 —99986.
   - Check that the mating surfaces are clean and dry before applying liquid gasket. Degrease the mating surfaces if necessary.
   - Apply liquid gasket 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 20 minutes or more have elapsed since applying liquid gasket. Instead reapply liquid gasket after removing the old residue.
   - After assembly, wait at least 30 minutes before filling the appropriate liquid (engine oil, coolant and other similar fluid).

CAUTION: Observe all safety precautions and notes while working.

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

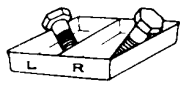


2. Work safely and give your work your undivided attention. When either the front or rear wheels are to be raised, block the remaining wheels securely. Communicate as frequently as possible when a work involves two or more workers. Do not run the engine unless the shop or working area is well ventilated.

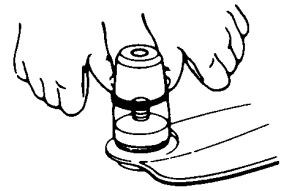


3. Prior to removing or disassembling parts, they must be inspected carefully to isolate the cause for which service is necessary. Observe all safety notes and precautions and follow the proper procedures as described in this manual.

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

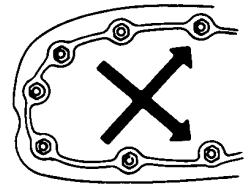


5. Use the special tools when use of such a tool is specified.

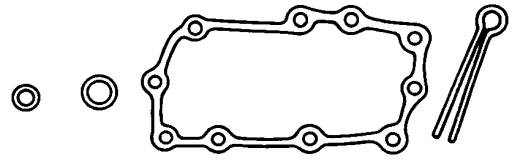


6. Parts must be assembled with the proper torgue according to the maintenance standards established.

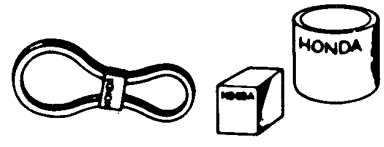
7. When tightening a series bolts or nuts, begin with the center or larger diameter bolts and tighten them in crisscross pattern in two or more steps.



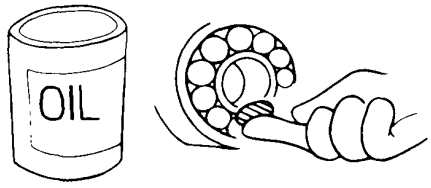
8. Use new packings, gaskets, O-rings and cotter pins whenever reassembling.



9. Use genuine HONDA parts and lubricants or those equivalent. When parts are to be reused, they must be inspected carefully to make sure they are not damaged or deteriorated and are in good usable condition.



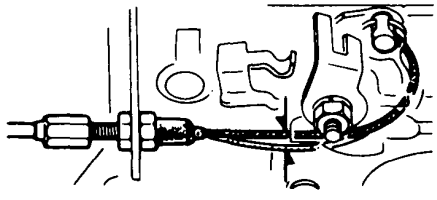
10. Coat or fill parts with specified grease as specified (Page 4-2). Clean all removed parts with solvent upon disassembly.



11. Brake fluid and hydraulic components
    - When replenishing the system, use extreme care prevent dust and dirt from entering the system.
    - Do not mix different brands of fluid as they may not be compatible.
    - Do not reuse drained brake fluid.
    - Brake fluid can cause damage to painted surfaces. Wipe up spilled fluid at once.
    - After disconnecting brake hoses or pipes, be sure to plug the openings to prevent loss of brake fluid.
    - Clean all disassembled parts only in clean BRAKE FLUID. Blow open all holes and passages with compressed air.

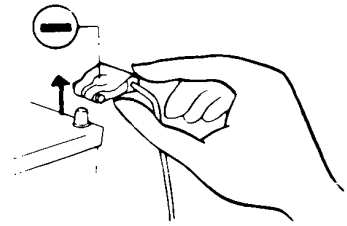
    - Keep disassembled parts from air-borne dust and abrasives.
    - Check that parts are clean before assembly.

12. Avoid oil or grease getting on rubber parts and tubes, unless, specified.
13. Upon assembling, check every part for proper installation and operation.

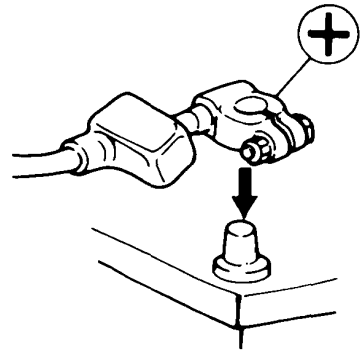


Electrical

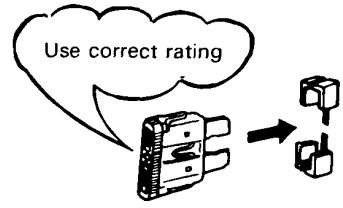
- Before making any repairs on electric wires or parts, disconnect the battery cables from the battery starting with the negative (−) terminal.



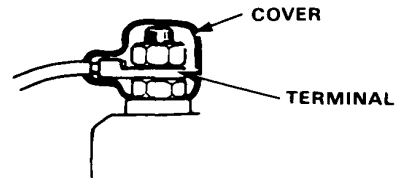
- After making repairs, check each wire or part for proper routing and installation. Also check to see that they are connected properly.
- Always connect the battery positive (+) cable first, then connect the negative (−) cable.



- Coat the terminals with clean grease after connecting the battery cables.
- Don't forget to install the terminal cover over the positive battery terminal after connecting.
- Before installing a new fuse, isolate the cause and take corrective measures, particularly when frequent fuse failure occurs.



- Be sure to install the terminal cover over the connections after a wire or wire harness has been connected.

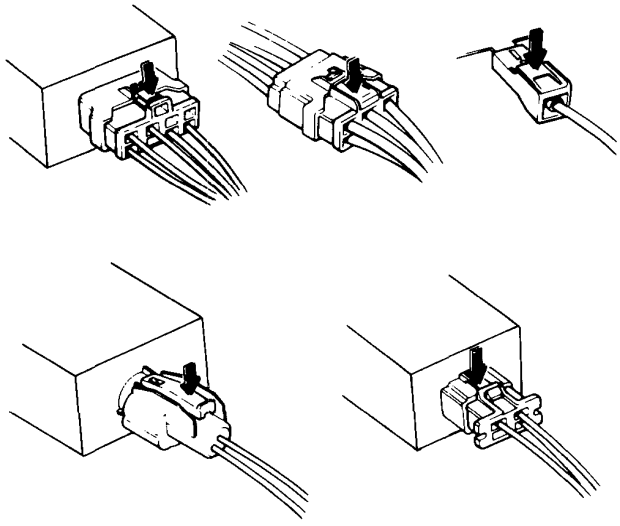


(cont'd)

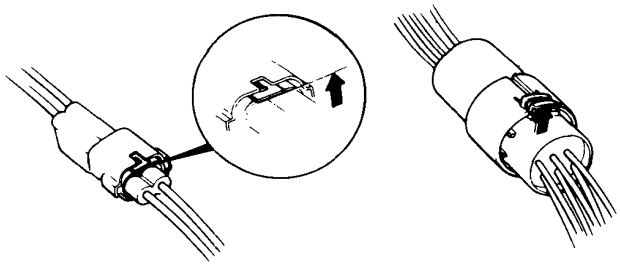
Electrical (cont'd)

- When removing locking couplers, be sure to disengage the lock before disconnecting.
- Couplers may be of two types, those in which the lock is pressed to remove, and those in which the lock is pulled up to remove. Be sure to ascertain the type of locking device before beginning work. The following is a depiction of the means of disconnecting various typical couplers.

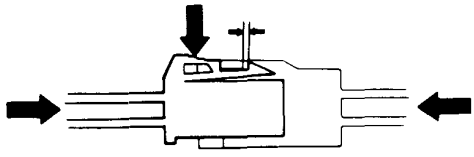
Press to disengage:



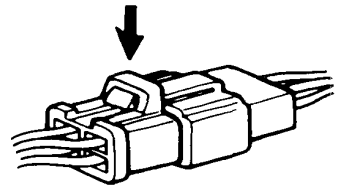
Pull up to disengage:



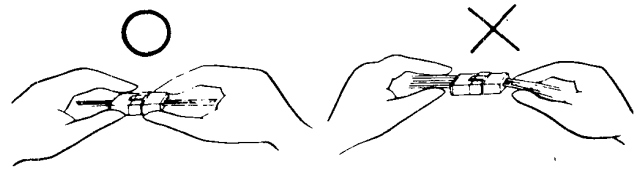
- When disconnecting locks, first press in the coupler tightly (to provide clearance to the locking device), then operate the tab fully and remove the coupler in the designated manner.



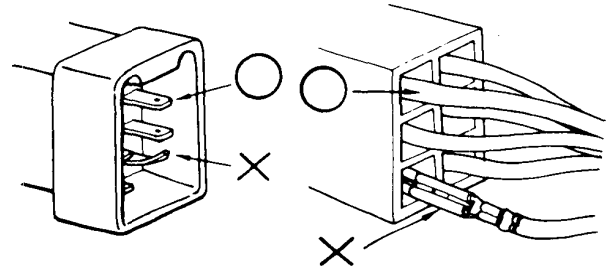
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.



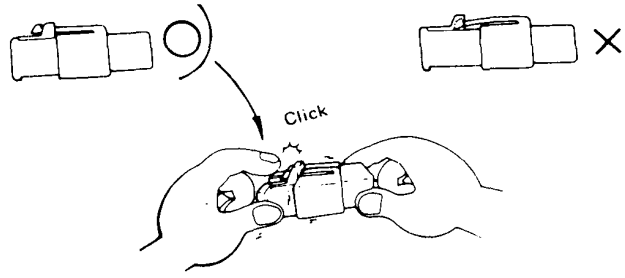
- When disconnecting a coupler, pull it off from the mating coupler by holding on both couplers.
- Never try to disconnect couplers by pulling on their wires.



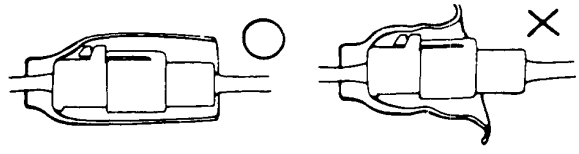
- Before connecting couplers, check to see that the terminals are in place and are not bent or distorted.



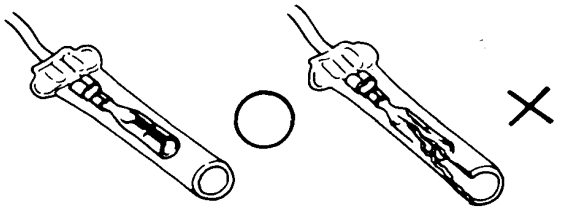
- Insert couplers fully until they will no longer go.
- Some couplers have locking tabs that must be aligned and engaged securely.
- Don't use wire harnesses with a loose wire or coupler.



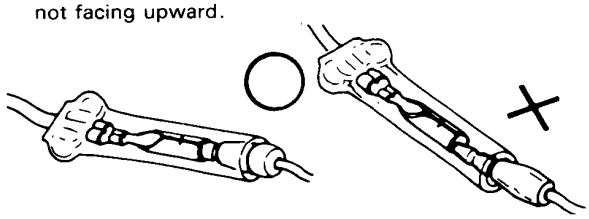
- Place the plastic cover over the mating coupler after reconnecting. Also check that the cover is not distorted.



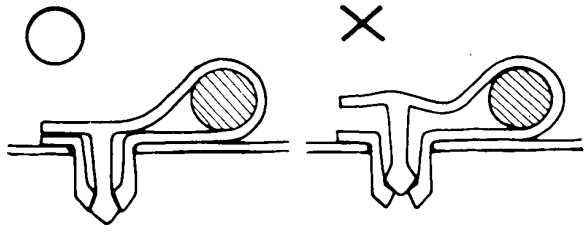
- Before connecting, check each connector cover for damage. Also make sure that the female connector is tight and not loosened from the previous use.



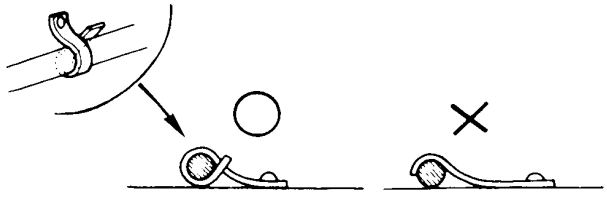
- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Position the wires so that the open end of the cover is not facing upward.



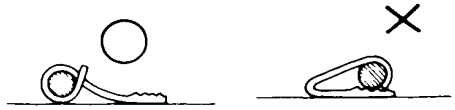
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Position the wiring in the bands so that only the insulated surfaces contact the wires or wire harnesses.



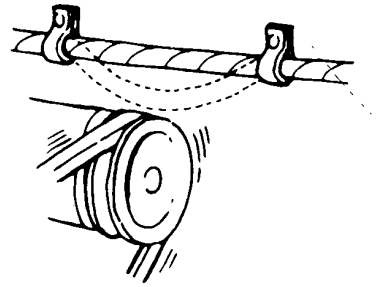
- A loose wire harness or cable can be a hazard to safety. After clamping, check each wire for security in its clamp.



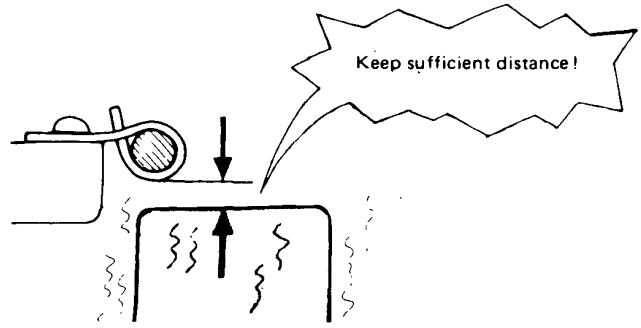
- Do not squeeze wires against the weld when a weld-on clamp is used.



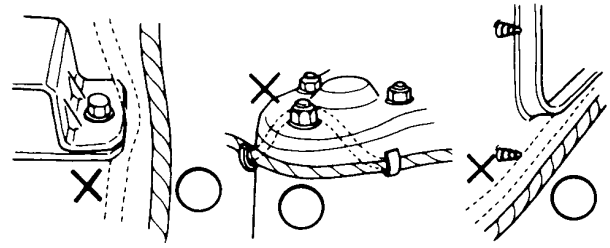
- After calmping, check each harness to be certain that it is not interferring with any moving or sliding parts of the vehicle.
- Keep wire harnesses away from the exhaust pipes and other hot parts.



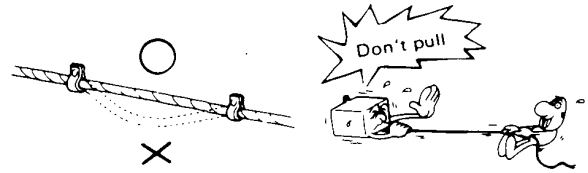
- Always keep a safe distance between wire harnesses and any heated parts.



- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends of bolts, screws and other fasteners.



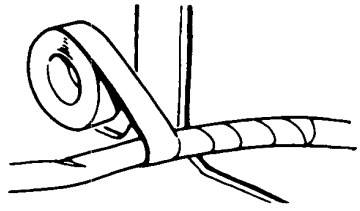
- Route harnesses so they are not pulled taut or slackened excessively.



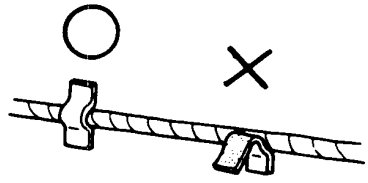
(cont'd)

Electrical (cont'd)

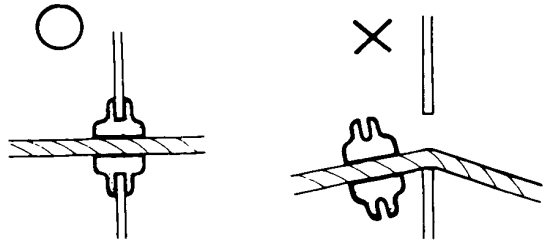
- Protect wires and harnesses with a tape or a tube if they are in contact with a sharp edge or corner.



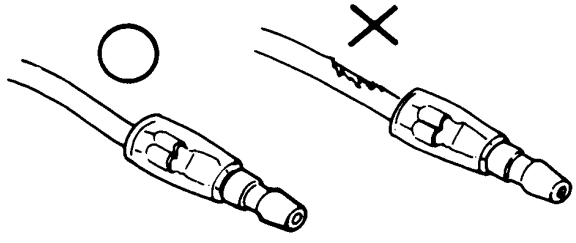
- Clean the attaching surface thoroughly if an addhesive is used. First, wipe with solvent or alcohol in necessary.



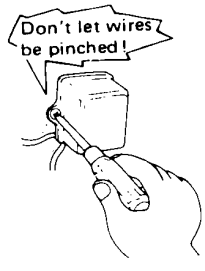
- Seat grommets in their grooves properly.



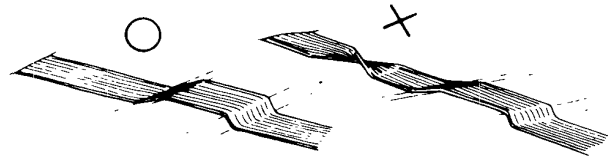
- Do not damage the insulation when connecting a wire.
- Do not use wires or harnesses with a broken insulation. Repair by wrapping with a protective tape or replace with new ones if necessary.



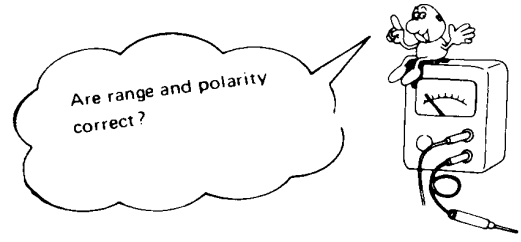
- After installing parts, make sure that wire harnesses are not pinched.



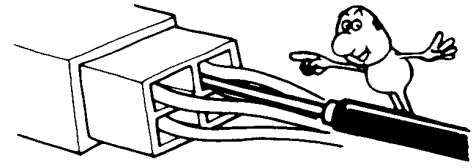
- After routing, check that the wire harnesses are not twisted or kinked.



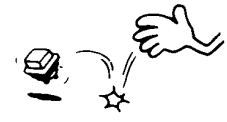
- Wire harnesses should be routed so that they are not pulled taut, slackened excessively, pinched, or interfering with adjacent or surrounding parts in all steering positions.



- When using the Service Tester, follow the manufacturer's instructions and those described in the Shop Manual.



- Do not drop parts.



- Rust is the enemy of all finished surfaces. Before connecting connectors and couplers, check the terminals and remove, if any, rust using a fine sand paper or emery cloth.

Symbol Marks

The following symbols stand for:

:Apply engine oil.

:Apply brake fluid.

:Apply grease.

:Apply Automatic Transmission Fluid

: Apply Power Steering Fluid.

:Apply or check vacuum.

①, ②, ③, ·····
❶, ❷, ❸, ····· : Sequence for removal or installation.

Abbreviation

2D H/B	2-door Hatchback
4D	4-door Sedan
4D H/B	4-door Hatchback
A/C	Air Conditioner
A/T	Automatic Transmission
ATF	Automatic Transmission Fluid
Bor BAT	Battery
CATA	*Catalytic Converter*
EACV	Electronic Air Control Valve
ECU	PGM-FI Electronic Control Unit
EGR	Exhaust Gas Recirculation
EX	Exhaust
GND	Ground
IG	Ignition
IN	Intake
INT	Intermittent
L.	Left
LHD	Left Hand Drive
M/T	Manual Transmission
PCV	Positive Crankcase Ventilation
PGM-CARB	Programmed Carburetor
PGM-FI	Programmed Fuel-Injection
P/S	Power Steering
R.	Right
RHD	Right Hand Drive
SW	Switch
SOL. V	Solenoid Valve
TDC	Top Dead Center
P	Parking
R	Reverse
N	Neutral
D_4	Drive Position (1st~4th)
D_3	Drive Position (1st~3rd)
2	2nd Position

Special Tools

Engine ..... 2 — 2
Fuel and Emissions ..... 2 — 2
Clutch ..... 2 — 2
Manual Transmission ..... 2 — 3
Automatic Transmission ..... 2 — 4
Driveshafts ..... 2 — 5
Rear Differential (4WD) ..... 2 — 5
Manual Steering ..... 2 — 5
Power Steering ..... 2 — 6
Suspension ..... 2 — 6
Brakes ..... 2 — 7
Body ..... 2 — 7
Heater and Air Conditioner ..... 2 — 7
Electrical ..... 2 — 7

Special Tools

5. Engine

Number	Tool Number	Description	Q'ty	Remarks
①	07GAD-PH70200	Valve Guide Seal Installer	1	For DOHC engine
②	07HAD-PJ70100	Oil Seal Driver	1	Crankshaft (Clutch side)
③	07HAD-PJ70200	Valve Guide Seal Installer	1	
④	07HAH-PJ70100	Valve Guide Reamer, 5.5mm	1	
⑤	07JAB-0010000	Crank Pulley Holder Set	1	
⑤-1	07JAA-0010100	Socket Wrench 17mm	(1)	]-Component tools
⑤-2	07JAB-0010100	Pulley Holder Attachment	(1)	
⑤-3	07JAB-0010200	Handle	(1)	
⑥	07JAZ-SH20100	PRM Connecting Adaptor	1	
⑦	07JGG-0010100	Belt Tension Gauge	1	
⑧	07KAK-SJ40100	Engine Tilt Hanger Set	1	
⑨	07406-0030000	Oil Pressure Gauge Adaptor	1	For presure measurement
⑩	07742-0010100	Valve Guide Driver, 5.5mm	1	
⑪	07742-0010200	Valve Guide Driver, 6.6mm	1	For DOHC engine
⑫	07743-0020000	Adjustable Valve Guide Driver	1	
⑬	07744-0010400	Pin Driver, 5mm	2	Used to set the camshaft at TDC (DOHC engine)
⑭	07749-0010000	Driver	1	07949-6110000 may also be used
⑮	07757-0010001	Valve Spring Compressor	1	07957-3290001 may also be used
⑯	07912-6110001	Oil Filter Socket	1	Used for Japan-made oil filter
⑰	———	Oil Filter Wrench (Apply from LABINAL S.A.)	1	Used for France-made oil filter
⑱	07924-PD20003	Ring Gear Holder	1	07924-PD20002 may also be used
⑲	07944-6110200	Pin Driver, 8mm	2	
⑳	07947-SB00100	Oil Seal Driver	1	
㉑	07948-SB00101	Driver Attachment	1	except 1.6ℓ crankshaft oil seal (Clutch side)
㉒	07948-SB00800	Driver Attachment	1	1.6ℓ crankshaft oil seal (Clutch side)
㉓	07973-PE00200	Pilot Collar	1	
㉔	07973-PE00310	Pistos Pin Driver Shaft	1	07973-PE00301 may also be used
㉕	07973-PE00320	Piston Pin Driver Head	1	
㉖	07973-PE00400	Piston Pin Base Insert	1	
㉗	07973-SB00100	Piston Base Head	1	
㉘	07973-6570002	Piston Pin Dis/Assembly Tool Set	1	
㉘-1	07973-6570500	Piston Base	(1)	]-Component tools
㉘-2	07973-6570600	Piston Base Spring	(1)	
㉙	07984-6570101	Valve Guide Reamer, 6.6mm	1	For DOHC engine

6. Fuel and Emissions

Number	Tool Number	Description	Q'ty	Remarks
①	07GMJ-ML80100	Test Harness	1	
②	07HAZ-PJ70000	ECU Test Harness A	1	
③	07HAZ-PJ70100	ECU Test Harness B	1	
④	07JAZ-SH20100	RPM Connecting adaptor	1	
⑤	07401-0010000	Float Level Gauge	1	
⑥	07406-0040001	Fuel Pressure Gauge Set	1	
⑥-1	07406-0040100	Pressure Gauge	(1)	]-Component tools
⑥-2	07406-0040201	Hose Assy	(1)	
⑦	07411-0020000	Digital Circuit Tester	1	
⑧	07614-0050100	Fuel Line Clip	1	
⑨	07999-PD6000A	PGM-FI Test Harness	1	

7. Clutch

Number	Tool Number	Description	Q'ty	Remarks
①	07JAF-PM70100	Clutch Disc Alignment Tool	1	
②	07746-0010100	Attachment, 32×35mm	1	
③	07749-0010000	Driver	1	
④	07924-PD20003	Ping Gear Holder	1	07924-PD20002 may also be used

8. Manual Transmission (2WD)

Number	Tool Number	Description	Q'ty	Remarks
①	07GAJ-PG20102	Mainshaft Clearance Inspection Tool Set	1	
①-1	07GAJ-PG20110	Mainshaft Holder	1	
①-2	07GAJ-PG20120	Collar	1	
①-3	07GAJ-PG20130	Mainshaft Base	1	
②	07744-0010200	Pin Driver 3.0mm	1	
③	07744-0010400	Pin Driver, 5mm	1	07944-6110100 may also be used
④	07746-0010300	Attachment, 42×47mm	1	07974-6110100 may also be used
⑤	07746-0010400	Attachment, 52×55mm	1	07947-6340200 may also be used
⑥	07746-0030100	Driver	1	
⑦	07746-0030400	Driver, 35mm	1	
⑧	07749-0010000	Driver	1	07949-6110000 may also be used
⑨	07936-6340000	Bearing Remover Tet	1	
⑩	07944-SA00000	Pin Driver 4.0mm	1	
⑪	07947-6110500	Oil Seal Driver	1	
⑫	07947-6340500	Oil Seal Driver Attachment E	1	
⑬	07948-SC20200	Oil Seal Driver	1	
⑭	07979-PJ40000	Magnet Stand Base	1	

8. Manual Transmission (4WD)

Number	Tool Number	Description	Q'ty	Remarks
①	07GAJ-PG20101	Mainshaft Clearance Inspection Tool	1	
②	07JAC-PH80000	Adjustable Bearing Remover Set	1	
②-1	07JAC-PH80100	Bearing Pemover Attachment	(1)	┐
②-2	07JAC-PH80200	Remover Handle Assy	(1)	├ Component tools
②-3	07741-0010201	Remover Weight	(1)	┘
③	07JAD-PH80100	Oil Seal Driver Attachment	1	
④	07JAJ-PH80100	Drive Gear Gauge	1	
⑤	07JAJ-PH80200	Driven Gear Dummy Shaft	1	
⑥	07746-0010200	Attachment, 37×40mm	1	
⑦	07746-0010300	Attachment, 42×47mm	1	
⑧	07746-0010400	Attachment, 52×55mm	1	
⑨	07746-0010500	Attachment, 62×68mm	1	
⑩	07746-0010600	Attachment, 72×75mm	1	
⑪	07746-0030100	Driver C	1	
⑫	07746-0030400	Driver, 35mm	1	
⑬	07749-0010000	Driver	1	07949-6110000 may also be used
⑭	07907-6010300	Socket Wrench Handle	1	
⑮	07926-SD90000	Companion Flange Holder	1	
⑯	07936-8890101	Bearing Remover Set	1	
⑰	07944-SA00000	Pin Driver, 4.0mm	1	
⑱	07946-MB00000	Bearing Driver	1	
⑲	07947-SD90100	Oil Seal Driver Attachment	1	
⑳	07947-6110500	Oil Seal Driver Attachment	1	
㉑	07947-6340500	Driver Attachment E	1	
㉒	07948-SC20200	Oil Seal Driver	1	
㉓	07960-1870100	Spring Compressor Attachment	1	
㉔	07965-SB00200	Dis/Assembly Tool B	1	
㉕	07966-SD90000	Differential Carrier Stand	1	
㉖	07973-SD90100	Pinion Dummy Shaft	1	
㉗	07973-SD90200	Pinion Height Block	1	
㉘	07973-SD90300	Differential Pinion Center Pin	1	
㉙	07979-PJ40000	Base Stand	1	

Special Tools

9. Automatic Transmission (2WD)

Number	Tool Number	Description	Q'ty	Remarks
①	07GAC-PF40210	Bearing Remover Attachment	1	Use in place of 07936-634000 attachmens
②	07GAE-PG40001	Clutch Spring Compressor Set	1	
②-1	07GAE-PG40200	Compressor Bolt Assembly	(1)	┐
②-2	07HAE-PG40200	Compressor Attachment	(1)	├Component tools
②-3	07960-6120100	Compressor Attachment	(1)	┘
③	07HAC-PK40100	Transmission Housing Puller	1	
④	07406-0020003	Oil Pressure Gauge Set	1	
④-1	07406-0010201	Oil Pressure Gauge Hose Attachment	(1)	Component tool
⑤	07406-0070000	Low Pressure Gauge	1	
⑥	07746-0010500	Attachment, 62×68mm	1	07947-6340400 may also be used
⑦	07746-0030100	Inner Handle C	1	
⑧	07749-0010000	Driver	1	07949-6110000 may also be used
⑨	07923-6890202	Mainshaft Holder	1	
⑩	07936-6340000	Bearing Remover Set	1	
⑪	07944-SA00000	Pin Driver, 4.0mm	1	
⑫	07947-6110500	Driver Attachment E	1	
⑬	07947-6340201	Oil Seal Driver	1	
⑭	07947-6340500	Driver Attachment E	1	
⑮	07948-SC20200	Oil Seal Driver	1	

9. Automatic Transmission (4WD)

Number	Tool Number	Description	Q'ty	Remarks
①	07GAE-PG40002	Clutch Spring Compressor Set	1	
①-1	07HAE-PL50100	Clutch Spring Compressor Attachment	1	
①-2	07GAE-PG40200	Clutch Spring Compressor Bolt Assembly	1	
①-3	07960-6120101	Clutch Spring Compressor Attachment	1	
②	07HAC-PK40100	Housing puller	1	
③	07KAJ-PS50100	Driven Gear Dummy Shaft	1	
④	07JAC-PH80000	Adjustable Bearing Remover Set	1	
④-1	07JAC-PH80100	Bearing Remver Attachment	1	
④-2	07JAC-PH80200	Remover Handle Assembly	1	
④-3	07741-0010201	Remover Weight	1	
⑤	07JAJ-PH80100	Drive Gear Gauge	1	
⑥	07406-0020003	Gauge Set	1	
⑥-1	07406-0020201	Gauge Hose	1	
⑦	07746-0010200	Attachment, 37×40mm	1	
⑧	07746-0010400	Attachment, 52×55mm	1	
⑨	07746-0010500	Attachment, 62×68mm	1	
⑩	07746-0010600	Attachment, 72×75mm	1	
⑪	07746-0030100	Driver 40mm I.D.	1	
⑫	07746-0030400	Attachment 35mm I.D.	1	
⑬	07749-0010000	Driver	1	
⑭	07923-6890202	Mainshaft Holder	1	
⑮	07926-SD90000	Flange Holder	1	
⑯	07943-SG20200	Oil Seal Driver	1	
⑰	07944-SA00000	Pin Drlren 4.0mm	1	
⑱	07947-SD90100	Oil Seal Driver	1	
⑲	07947-6110500	Driver Attachment E	1	
⑳	07947-6340201	Oil Seal Driver	1	
㉑	07947-6340500	Attachment E	1	
㉒	07948-SC20200	Oil Seal Driver	1	
㉓	07960-1870100	Spring Compressor Attachment	1	

10. Driveshafts

Number	Tool Number	Description	Q'ty	Remarks
①	07GAD-SE00100	Oil Seal Driver Attachment	1	
②	07HAB-SD90101	Companion Flange Holder	1	
③	07JAD-SH30100	Oil Seal Driver Attachment	1	
④	07JAF-SH20400	Support Base Attachment	1	
⑤	07746-0010300	Attachment, 42×47mm	1	
⑥	07746-0010400	Attachment, 52×55mm	1	
⑦	07746-0010500	Attachment, 62×68mm	1	
⑧	07746-0030100	Inner Handle C	1	
⑨	07746-0040800	35mm Pilot	1	
⑩	07746-0040900	40mm Pilot	1	
⑪	07749-0010000	Driver	1	
⑫	07926-SE90000	Companion Flange Holder	1	
⑬	07947-6340201	Driver Attachment	1	
⑭	07947-SD90100	Oil Seal Driver Attachment	1	
⑮	07947-SD90200	Oil Seal Driver Attachment	1	
⑯	07965-SD90100	Support Base	1	
⑰	07965-SD90200	Support Collar	1	

10. Rear Differential(4WD)

Number	Tool Number	Description	Q'ty	Remarks
①	07JAD-PH80100	Oil Seal Driver Attachment	1	
②	07746-0010600	Attachment, 72×75mm	1	
③	07746-0030100	Inner Handle C	1	
④	07749-0010000	Driver	1	
⑤	07907-6010300	Socket Wrench Handle	1	07949-6110000may also be used.
⑥	07926-SD90000	Companion Flange Holder	1	
⑦	07944-SA00000	Pin Driver, 4mm	1	
⑧	07946-MB00000	Driver	1	
⑨	07947-SD90100	Oil Seal Driver Attachment	1	
⑩	07947-6110500	Driver Attachment E	1	
⑪	07947-6340500	Bearing Driver Attachment E	1	
⑫	07948-SC20200	Oil Seal Driver	1	
⑬	07965-SB00200	Dis/Assembly Tool B	1	
⑭	07973-SD90100	Dummy Pinion Shaft	1	
⑮	07973-SD90200	Pinion Height Block	1	
⑯	07973-SD90300	Pinion Center Pin	1	

11. Manual Steering

Number	Tool Number	Description	Q'ty	Remarks
①	07916-SA50001	Steering Gearbox Lock Nut Wrench	1	07916-6920100may also be used.
②	07941-6920003	Ball Joint Remover	1	
③	07974-SA50800	Ball Joint Boot Clip Guide B	1	

Special Tools

11. Power Steering

Number	Tool Number	Description	Q'ty	Remarks
①	07GAG-SD40000	P/S Tool Kit	1	
①-1	07GAG-SD40100	Piston Seal Ring Guide	(1)	┐
①-2	07GAG-SD40200	Piston Seal Ring Sizing Tool	(1)	│
①-3	07GAG-SD40300	Cylinder End Seal Slider	(1)	├ Component tools
①-4	97GAG-SD40400	Sylinder End Seal Guide	(1)	│
①-5	07GAG-SD40600	Tool Box	(1)	┘
②	07GAK-SE00100	P/S Pressure Adaptor Set	1	
②-1*	07GAK-SE00110	P/S Joint Adaptor(Pump)	(1)	07406-0011100may also be used.
②-2*	07GAK-SE00120	P/S Joint Adaptor(Hose)	(1)	07406-0011200may also be used.
③	07406-0010200	P/S Pressure Gauge Set	1	
③-1	07406-0010300	Pressure Control Valve	(1)	┐
③-2	07406-0010400	Pressure Gauge	(1)	┘ Component tools
④	07725-0030000	Universal Holder	1	07725-0010101may also be used.
⑤	07746-0010300	Attachment, 42×47mm	1	
⑥	07749-0010000	Driver	1	07949-6110000may also be used.
⑦	07916-SA50001	Steering Gearbox Lock Nut Wrench	1	
⑧	07941-6920003	Ball Joint Remover	1	
⑨	07947-6340300	Driver Attachment	1	
⑩	07974-SA50600	Pinion Seal Guide	1	

②-1* and ②-2* : Component tools

12. Suspension

Number	Tool Number	Description	Q'ty	Remarks
①	07GAE-SE00101	Shock Absorber Spring Compressor	1	07GAE-SE00100may also be used.
②	07GAF-SE00200	Hub Assembly Driver Attachment	1	
③	07GAF-SE00401	Front Hub Driver Base	1	
④	07HGK-0010100	Wheel Alignment Gauge Attachment	1	
⑤	07JAF-SH20110	Hub Dis/Assembly Pilot, 38mm	1	
⑥	07JAF-SH20120	Hub Dis/Assembly Shaft 22.4×25.4mm	1	
⑦	07JAF-SH20200	Ball Joint Remover Base	1	
⑧	07746-0010400	Attachment, 52×55mm	1	
⑨	07746-0010600	Attachment, 72×75mm	1	
⑩	07749-0010000	Driver	1	
⑪	07941-6920003	Ball Joint Remover	1	
⑫	07947-6340000	Driver	1	
⑬	07965-SA70100	Hub Dis/Assembly Tool A	1	
⑭	07965-SB00100	Ball Joint Remover/Installer	1	
⑮	07965-SB00200	Ball Joint Installer Base	1	
⑯	07965-6340301	Hub Dis/Assembly Base	1	
⑰	07965-6920201	Hub Dis/Assembly Base	1	
⑱	07965-6920500	Dis/Assembly Tool E	1	
⑲	07974-SA50700	Ball Joint Boot Clip Guide A	1	
⑳	07974-SA50800	Ball Joint Boot Clip Guide B	1	

13. Brakes

Number	Tool Number	Description	Q'ty	Remarks
①	07GAG-SE00100	Pushrod Adjustment Gauge	1	
②	07HAA-SG00100	ALB T wrench	1	
③	07HAE-SG00100	Brake Spring Compressor	1	
④	07HAJ-SG00601	ALB Checker	1	
	or			
	07508-SB00000		1	
	—07HAJ-SG00400	Adaptor	1	
⑤	07404-5790300	Vacuum Gauge	1	
⑥	07406-5790200	Oil Pressure Gauge	2	
⑦	07410-5790100	Pressure Gauge Attachment C	2	
⑧	07410-5790500	Tube Joint Adaptor	1	
⑨	07510-6340101	Pressure Gauge Joint Pipe	2	
⑩	07510-6340300	Vacuum Joint Tube A	1	
⑪	07747-6890300	Driver Attachment C	1	
⑫	07749-0010000	Driver	1	07949-6110000may also be used.
⑬	07914-SA50000	Snap Ring Pliers	1	
⑭	07921-0010001	Flare Nut Wrench	1	

14. Body

Number	Tool Number	Description	Q'ty	Remarks
①	07GAZ-SE30100	Torsion Rod Assmbly Tool	1	

15. Heater and Air Conditioner

Number	Tool Number	Description	Q'ty	Remarks
①	07HAF-SF10300	Seal Seat Remover	1	Cover plate removal
②	07HAF-SF10400	Seal Remover/Installer	1	Shaft seal removal/installation
③	07JAC-SH20100	A/C Pulley Puller	1	
④	07JAC-SH20300	Shaft Ring Remover	1	
⑤	07746-0030100	Inner Handle C	1	Pulley installation
⑥	07925-6920001	A/C Clutch Holder	1	
⑦	07935-8050003	Fly Wheel Puller	1	
⑧	07947-6340500	Driver Attachment	1	
⑨	07965-6340100	Bearing Driver	1	

16. Electrical

Number	Tool Number	Description	Q'ty	Remarks
①	07920-SB20000	Fuel Sender Wrench	1	

Specifications

specs

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Standards and Service Limits

5. Engine/Cylinder Head, Valve Train (SOHC Engine)

Unit: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 min^{-1} (rpm) and wide-open throttle		Normal Minimum Maximum variation	1,275 kPa (13.0 kg/cm², 185 psi) 932 kPa (9.5 kg/cm², 135 psi) 196 kPa (2 kg/cm², 28 psi)
Cylinder head	Warpage Height		— 94.95—95.05 (3.7381—3.7421)	0.05 (0.002) —
Camshaft	End play Oil clearance Runout Cam lobe height IN 1.2ℓ, 1.3ℓ 1.4ℓ, 1.5ℓ (2-Carb. KQ) 1.5ℓ (PGM-FI except KR) 1.6ℓ (except KB, KW, KF, KE) 1.5ℓ (1-Carb.) 1.5ℓ (PGM-FI KR) 1.6ℓ (KB, KW, KF, KE) EX 1.2ℓ, 1.3ℓ 1.4ℓ (A/T) 1.5ℓ (2-Carb. A/T KQ) 1.5ℓ (PGM-FI A/T except KR) 1.4ℓ (M/T) 1.5ℓ (2-Carb. M/T KQ) 1.5ℓ (PGM-FI M/T) 1.6ℓ (except KB, KW, KF, KE) 1.5ℓ (1-Carb.) 1.6ℓ (KB, KW, KF, KE) 1.5ℓ (PGM-FI KR)		0.05—0.15 (0.002—0.006) 0.050—0.089 (0.002—0.004) 0—0.03 (0—0.001) max. 35.472 (1.3965) 36.603 (1.4411) 36.057 (1.4196) 34.868 (1.3728) 36.957 (1.4550) 35.693 (1.4052) 36.750 (1.4468) 36.747 (1.4467) 36.198 (1.4251) 36.996 (1.4565) 36.435 (1.4344)	0.5 (0.02) 0.15 (0.006) 0.06 (0.002) — — — — — — — — — — —
Valve	Valve clearance Valve stem O.D. Stem-to-guide clearance Stem installed height	IN EX IN EX IN EX IN EX	0.17—0.22 (0.007—0.009) 0.22—0.27 (0.009—0.011) 5.48—5.49 (0.2157—0.2161) 5.45—5.46 (0.2147—0.2150) 0.02—0.05 (0.001—0.002) 0.05—0.08 (0.002—0.003) 46.985—47.455 (1.8498—1.8683) 48.965—49.435 (1.9278—1.9562)	— — 5.45 (0.2146) 5.42 (0.2134) 0.08 (0.003) 0.11 (0.004) 47.705 (1.8781) 49.685 (1.9561)
Valve seat	Width	IN EX	0.85—1.15 (0.033—0.045) 1.25—1.55 (0.049—0.061)	1.6 (0.06) 2.0 (0.08)
Valve spring	Free length IN 1.2ℓ, 1.3ℓ 1.4ℓ, 1.5ℓ, 1.6ℓ EX 1.2ℓ, 1.3ℓ, 1.5ℓ, 1.6ℓ 1.4ℓ Squareness IN 1.2ℓ, 1.3ℓ 1.4ℓ, 1.5ℓ, 1.6ℓ EX 1.2ℓ, 1.3ℓ, 1.5ℓ, 1.6ℓ 1.4ℓ		47.66 (1.8764) 48.58 (1.9126) 49.19 (1.9366) 48.49 (1.9091) — — — —	46.78 (1.8417) 47.64 (1.8756) 48.32 (1.9024) 47.68 (1.8772) 1.66 (0.0654) 1.70 (0.0669) 1.72 (0.0677) 1.69 (0.0665)
Valve guide	I.D.	IN and EX	5.51—5.53 (0.2169—0.2177)	5.55 (0.2185)
Rocker arm	Arm-to-shaft clearance	IN EX	0.017—0.050 (0.0007—0.0020) 0.018—0.054 (0.0007—0.0021)	0.08 (0.003) 0.08 (0.003)

Unit: mm (in.)

5. Engine/Cylinder Head, Valve Train (DOHC Engine)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 min⁻¹ (rpm) and wide-open throttle		Nominal Minimum Maximum variation	1,324 kPa (13.5 kg/cm², 192 psi) 932 kPa (9.5 kg/cm², 135 psi) 196 kPa (2 kg/cm², 28 psi)
Cylinder head	Warpage Height		— 131.95—132.05 (5.1949—5.1988)	0.05 (0.002) —
Camshaft	End play Oil clearance Runout Cam lobe height	 IN EX	0.05—0.15 (0.002—0.006) 0.050—0.089 (0.002—0.004) 0—0.03 (0—0.001) max. 33.021 (1.3000) 32.382 (1.2749)	0.5 (0.02) 0.15 (0.006) 0.06 (0.002) — —
Valve	Valve clearance Valve stem O.D. Stem-to-guide clearance Stem installed height	IN EX IN EX IN EX IN EX	0.12—0.17 (0.005—0.007) 0.14—0.19 (0.006—0.008) 6.58—6.59 (0.2591—0.2595) 6.55—6.56 (0.2579—0.2583) 0.02—0.05 (0.001—0.002) 0.05—0.08 (0.002—0.003) 45.545—46.015 (1.7931—1.8116) 44.735—45.205 (1.7612—1.7797)	— — 6.55 (0.2579) 6.52 (0.2567) 0.08 (0.003) 0.11 (0.005) 46.265 (1.8215) 45.455 (1.7896)
Valve seat	Width	IN and EX	1.25—1.55 (0.049—0.061)	2.0 (0.08)
Valve spring	Free length Squareness	IN EX IN/EX	47.49 (1.8697) 46.89 (1.8461) —	46.46 (1.8291) 45.93 (1.8083) 1.66/1.64 (0.065/0.065)
Valve guide	I.D.	IN and EX	6.61—6.63 (0.2602—0.2610)	6.55 (0.2579)

5. Engine/Engine Block

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface Bore diameter Bore taper Reboring limit		— 75.00—75.02 (2.9528—2.9535) — —	0.10 (0.004) 75.07 (2.9555) 0.05 (0.002) 0.5 (0.02)
Piston	Skirt O.D. At 16 mm (0.63 in) from bottom of skirt Clearance in cylinder Piston-to-ring clearance	 Top 2nd	74.98—74.99 (2.9520—2.9524) 0.01—0.04 (0.0004—0.0016) 0.03—0.06 (0.0012—0.0024) 0.030—0.055 (0.0012—0.0022)	74.97 (2.9516) 0.05 (0.002) 0.13 (0.005) 0.13 (0.005)
Piston ring	Ring end gap	Top 2nd Oil	0.15—0.30 (0.006—0.012) 0.30—0.45 (0.012—0.018) 0.20—0.80 (0.008—0.031)	0.6 (0.02) 0.6 (0.02) 0.9 (0.04)
Connecting rod	Pin-to-rod interference Large end bore diameter End play installed on crankshaft	 1.2ℓ, 1.3ℓ, 1.4ℓ 1.5ℓ 1.6ℓ	0.014—0.040 (0.0006—0.0016) Nominal 43.0 (1.69) Nominal 45.0 (1.77) Nominal 48.0 (1.89) 0.15—0.30 (0.006—0.012)	— — — — 0.40 (0.016)
Crankshaft	Main journal diameter Taper/out-of-round, main journal Rod journal diameter Taper/out-of-round, rod journal End play Runout	1.6ℓ except 1.6ℓ 1.2ℓ, 1.3ℓ, 1.4ℓ 1.5ℓ 1.6ℓ	54.976-55.000 (2.1644-2.1654) 44.976-45.000 (1.7707-1.7716) 0.0025 (0.0001) max. 39.976—40.000 (1.5739—1.5748) 41.976—42.000 (1.6526—1.6535) 44.976—45.000 (1.7707—1.7765) 0.0025 (0.0001) max. 0.10—0.35 (0.004—0.014) 0.015 (0.0006) max.	— — 0.010 (0.004) — — — 0.010 (0.004) 0.45 (0.018) 0.03 (0.002)
Bearings	Main bearing-to-journal oil clearance except 1.6ℓ (No. 1, 5 journals) (No. 2, 3, 4 journals) 1.6ℓ (No. 1, 5 journals) (No. 2, 4 journals) (No. 3 journal) Rod bearing-to-journal oil clearance		 0.018—0.036 (0.0007—0.0014) 0.024—0.042 (0.0010—0.0017) 0.018—0.036 (0.0007—0.0014) 0.024—0.042 (0.0010—0.0017) 0.030—0.048 (0.0012—0.0019) 0.020—0.038 (0.0008—0.0015)	 0.05 (0.002) 0.05 (0.002) 0.05 (0.002) 0.05 (0.002) 0.05 (0.002) 0.05 (0.002)

Standards and Service Limits

Unit: mm (in.)

5. Engine/Engine Lubrication

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)	SOHC	4.0 (4.2, 3.5) for engine disassembly 3.5 (3.7, 3.1) for oil change	
		DOHC	4.3 (4.5, 3.8) for engine disassembly 3.8 (4.0, 3.3) for oil change	
Oil pump	Displacement	SOHC	44 ℓ (11.6 U.S. gal., 9.7 Imp. gal.) 6,250 min⁻¹ (rpm)	
		DOHC	62 ℓ (16.3 U.S. gal., 13.6 Imp. gal.) 6,750 min⁻¹ (rpm)	
	Inner-to-outer rotor radial clearance		0.14 (0.006)	0.2 (0.008)
	Pump body-to-rotor radial clearance		0.10—0.175 (0.004—0.007)	0.2 (0.008)
	Pump body-to rotor side clearance		0.03—0.08 (0.001—0.003)	0.15 (0.006)
Relief valve	Pressure setting 80°C (176°F)	Idle	69 kPa (0.7 kg/cm², 10 psi) min.	
		3,000 min⁻¹ (rpm)	343 kPa (3.5 kg/cm², 50 psi) min.	

5. Engine/Cooling

	MEASUREMENT	STANDARD (NEW)		
Radiator	Capacity (incl.heater) ℓ (U.S.qt.,Imp.qt.) (Includes reservoir tank 0.4 (0.42, 0.35))	M/T	1.2 ℓ, 1.3 ℓ, 1.4 ℓ 1.5 ℓ 1-carb, 1.5 ℓ PGM-FI (70ps) 1.6 ℓ SOHC	5.4 (5.7, 4.8)
		M/T	1.5 ℓ 2-carb, 1.5 ℓ PGM-FI (90PS) 1.6 ℓ DOHC	5.5(5.8, 4.8)
		A/T	1.3 ℓ, 1.4 ℓ	5.3 (5.6, 4.7)
		A/T	1.5 ℓ	5.4 (5.7, 4.8)
		A/T	1.6 ℓ	5.9 (6.2, 5.2)
Radiator cap	Pressure cap opening pressure	74—103 kPa (0.75—1.05 kg/cm², 11—15 psi)		
Thermostat	Starts to open Full open Valve lift at full open	76—80°C (169—176°F) 90°C (194°F) 8 (0.31) min.		
Water pump	Pulley ratio (crankshaft) Capacity: ℓ per min/at min⁻¹ (rpm) SOHC DOHC	1 : 1 85 (22.4 U.S. gal., 18.7 Imp. gal.) 4,000 min⁻¹ (rpm) 76 (20.0 U.S. gal., 16.7 Imp. gal.) 4,000 min⁻¹ (rpm)		
Cooling fan	Fan-to-core clearance Thermoswitch "ON" temperature Thermoswitch "OFF" temperature	28.0 (1.10) 88.5—91.5°C (191—197°F) Subtract 5±1.5°C (9±2.7°F) from actual "ON" temperature.		

6. Fuel and Emission (PGM-FI)

	MEASUREMENT	STANDARD (NEW)
Fuel pump	Delivery pressure Displacement Relief valve opening pressure	250 kPa (2.55 kg/cm², 36psi) 236 cc /minutes in 10 seconds min. 441—588 kPa (4.5—6.0 kg/cm², 64—85 psi)
Pressure regulator	Pressure	245—255 kPa (2.5—2.6 kg/cm², 36—37 psi)
Fuel Tank	Capacity	45 ℓ (11.9 U.S. gal., 9.9 Imp. U.S.gal.)
Fast idle		M/T 1,000—2,000 min⁻¹ (rpm) A/T 1,000—2,000 min⁻¹ (rpm)
Idle speed	with headlights and cooling fan off 1.5ℓ 1.6ℓ, with CATA 1.6 SOHC without CATA 1.6ℓ DOHC	800 ± 50 min⁻¹ (rpm) 800 ± 50 min⁻¹ (rpm) 780 ± 50 min⁻¹ (rpm) 800 ± 50 min⁻¹ (rpm)
Idle CO	With CATA Without CATA	0.1% Max. 1.0 ±1.0%

Unit: mm (in.)

6. Fuel and Emissions (Carbureted Engine)

	MEASUREMENT	STANDARD (NEW)
Fuel pump	Delivery pressure Displacement	6.8—22.6 kPa (0.07—0.23 kg/cm², 1.0—3.2 psi) 833.3 cc/minutes in 10 seconds min.
Fuel Tank	Capacity	45 ℓ (11.9 U.S. gal., 9.9 Imp. U.S. gal.)
Fast idle	1.3ℓ PGM-1 Carb (KS,KG only) KQ/except KQ.	2,700—3,700 min⁻¹ (rpm). 1,350—2,000 min⁻¹ (rpm)/1,500—2,500 min⁻¹ (rpm)
Idle speed	with headlights and cooling fan off	M/T 800 ± 50 min⁻¹ (rpm) : 1.3ℓ PGM-1 Carb (KS,KG only) M/T 750 ± 50 min⁻¹ (rpm) A/T (except "N" or "P") 700 ± 50 min⁻¹ (rpm)
Idle CO	KQ/except KQ	0.5% max./1.0% max.

7. Clutch

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height 2D H/B, 4D LHD RHD 4D H/B LHD RHD Stroke LHD RHD Pedal play Disengagement height 2D H/B, 4D LHD RHD 4D H/B LHD RHD	 213 (8.39) to floor 208 (8.19) to floor 210 (8.27) to floor 205 (8.07) to floor 140—150 (5.5—5.9) 135—145 (5.3—5.7) 15—20 (0.59—0.79) 70 (2.76) min. to floor 62 (2.44) min. to floor 61 (2.40) min. to floor 52 (2.05) min. to floor	 — — — — — — — — — — —
Clutch release arm	Free play at arm	3.0—4.0 (0.12—0.16)	—
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth Surface runout Radial play in spline at circumference (200ϕ) Thickness	1.3 (0.05) min. 0.8 (0.03) max. 0.1—0.5 (0.004—0.020) 8.1—8.8 (0.32—0.35)	0.2 (0.008) 1.0 (0.04) 3.4 (0.134) 5.7 (0.224)
Clutch release bearing holder	I.D. 2WD 4WD Holder-to-guide sleeve clearance 2WD 4WD	31.00—31.15 (1.220—1.226) 35.040—35.079 (1.3795—1.3811) 0.050—0.239 (0.002—0.009) 0.090—0.168 (0.0035—0.0066)	31.2 (1.228) 35.11 (1.382) 0.28 (0.011) 0.24 (0.009)
Clutch cover	Uneveness of diaphragm spring	0.8 (0.03) max.	1.0 (0.04)

8. Manual Transmission (2WD)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US.qt., Imp.qt.)	1.8 (1.9, 1.6) at oil change 1.9 (2.0, 1.7) at assembly	
Mainshaft	End play Diameter of ball bearing contact area Diameter of third gear contact area Diameter of 4th, 5th gear contact area Diameter of ball bearing contact area Runout	0.11—0.18 (0.004—0.007) 25.977—25.990 (1.0227—1.0232) 33.984—34.000 (1.3380—1.3386) 26.980—26.993 (1.0622—1.0627) 21.987—22.000 (0.8656—0.8661) 0.02 (0.0008) max.	Adjust with a shim 25.92 (1.020) 33.93 (1.336) 26.93 (1.060) 21.93 (0.863) 0.05 (0.002)
Mainshaft thrid and fourth gears	I.D. End play 3rd 4th Thickness 3rd 4th	39.009—39.025 (1.5358—1.5364) 0.06—0.21 (0.0024—0.0083) 0.06—0.19 (0.0024—0.0075) 30.22—30.27 (1.1898—1.1917) 30.12—30.17 (1.1858—1.1878)	39.07 (1.538) 0.33 (0.013) 0.31 (0.012) 30.15 (1.187) 30.05 (1.183)
Mainshaft fifth gear	I.D. End play Thickness	37.009—37.025 (1.4570—1.4577) 0.06—0.19 (0.0024—0.0075) 28.42—28.47 (1.1189—1.1209)	37.07 (1.459) 0.31 (0.012) 28.35 (1.116)
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of low gear contact area Runout	0.17—0.38 (0.0067—0.0150) 30.000—30.015 (1.1811—1.817) 24.980—24.993 (0.9835—0.9840) 35.984—36.000 (1.4167—1.4173) 0.02 (0.0008) max.	0.53 (0.021) 29.95 (1.179) 24.93 (0.981) 35.93 (1.415) 0.05 (0.002)
Countershaft low gear	I.D. End play Thickness	41.009—41.025 (1.6145—1.6152) 0.03—0.10 (0.0012—0.0039) 29.41—29.44 (1.1579—1.1591)	41.07 (1.617) 0.22 (0.009) 29.36 (1.156)

(cont'd)

Standard and Service Limits

8. Manual Transmission (2WD) (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Countershaft second gear	I.D. End play Thickness	44.009—44.025 (1.7326—1.7333) 0.03—0.11 (0.0012—0.0043) 29.92—29.97 (1.1780—1.1799)	44.07 (1.735) 0.23 (0.009) 29.85 (1.175)
Spacer collar (Countershaft second gear)	I.D. O.D. Length	32.975—32.985 (1.2982—1.2986) 38.989—39.000 (1.5350—1.5354) 30.03—30.06 (1.1823—1.1835)	33.03 (1.300) 38.93 (1.533) 30.01 (1.181)
Spacer collar (Mainshaft fourth and fifth gears)	I.D. O.D. 4th 5th Length 4th 5th	27.002—27.012 (1.0631—1.0635) 33.989—34.000 (1.3381—1.3386) 31.989—32.000 (1.2594—1.2598) 27.43—27.46 (1.0799—1.0811) 23.53—23.56 (0.9264—0.9276)	27.06 (1.065) 33.93 (1.336) 31.93 (1.257) 27.41 (1.079) 23.51 (0.926)
Reverse Idler gear	I.D. Gear-to-reverse gear shaft clearance	15.016—15.043 (0.5911—0.5922) 0.032—0.077 (0.0013—0.0030)	15.08 (0.594) 0.14 (0.006)
Synchro ring	Ring-to-gear clearance (ring pushed against gear)	0.73—1.18 (0.029—0.046)	0.4 (0.016)
Shift fork	Shift fork finger thickness Fork-to-synchro sleeve clearance	6.4—6.5 (0.252—0.255) 0.25—0.45 (0.0098—0.0177)	— 0.8 (0.03)
Reverse shift fork	Shift fork paul groove width Fork-to-reverse idler gear clearance Groove width Fork-to-fifth/reverse shift piece pin clearance	12.7—13.0 (0.500—0.512) 0.5—1.1 (0.020—0.043) 7.05—7.25 (0.278—0.285) 0.05—0.35 (0.002—0.014)	— 1.8 (0.071) — 0.5 (0.02)
Shift arm A	Diameter of shift rod contact area Shift arm A-to-shift rod clearance	13.005—13.130 (0.5120—0.5169) 0.005—0.230 (0.0002—0.0091)	— 0.35 (0.0138)
Shift arm B	Diameter of shift arm shaft contact area Shift arm B-to-shift arm shaft clearance Shift arm B-to-shift piece clearance Shift piece diameter of shift fork shaft contact area	13.973—14.000 (0.5501—0.5512) 0.013—0.070 (0.0005—0.0028) 0.2—0.5 (0.0079—0.0197) 12.9—13.0 (0.5079—0.5118)	— 0.16 (0.0063) 0.62 (0.0244) 12.78 (0.5031)
Ring gear	Backlash	0.070—0.130 (0.0028—0.0051)	0.18 (0.007)
Differential carrier	Pinionshaft bore diameter Carrier-to-pinionshaft clearance Driveshaft bore diameter Carrier-to-driveshaft clearance Carrier-to-intermediate shaft clearance Side clearance	18.000—18.018 (0.7087—0.7094) 0.017—0.047 (0.0007—0.0019) 26.025—26.045 (1.0246—1.0254) 0.045—0.086 (0.0017—0.0034) 0.075—0.111 (0.0030—0.0044) 0.15 max.	— 0.095 (0.004) — 0.14 (0.006) 0.16 (0.006)
Differential pinion gear	Backlash Pinion gear bore diameter Pinion gear-to-pinionshaft clearance	0.05—0.15 (0.002—0.006) 18.042—18.066 (0.7103—0.7113) 0.059—0.095 (0.0023—0.0037)	Adjust with a washer — 0.15 (0.006)

8. Manual Transmission (4WD)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US. qt., Imp. qt.)	2.4 (2.5, 2.1) at assembly 2.3 (2.4, 2.0) at oil change	
Mainshaft	End play Diameter of needle bearing contact area Diameter of 3rd gear contact area Diameter of 63/28C ball bearing contact area Diameter of 6306/25 ball bearing contact area Runout	0.08—0.15 (0.0031—0.0059) 27.987—28.000 (1.1018—1.1024) 34.984—35.000 (1.3773—1.3780) 27.977—27.990 (1.100—1.102) 24.987—25.000 (0.9837—0.9843) 0.02 (0.0008) max.	Adjust with a shim 27.93 (1.100) 34.93 (1.375) 27.92 (1.099) 24.93 (0.981) 0.05 (0.002)
Main 3rd gear	I.D. End play Thickness	40.009—40.025 (1.5752—1.5758) 0.06—0.21 (0.002—0.008) 32.42—32.47 (1.276—1.278)	40.07 (1.578) 0.3 (0.01) 32.3 (1.27)
Main 4th gear	I.D. End play Thickness	40.009—40.025 (1.5752—1.5758) 0.06—0.21 (0.002—0.008) 30.92—30.97 (1.217—1.219)	40.07 (1.578) 0.3 (0.01) 30.8 (1.21)
Main 5th gear	I.D. End play Thickness	40.009—40.025 (1.5752—1.5758) 0.06—0.21 (0.002—0.008) 30.42—30.47 (1.198—1.200)	40.07 (1.578) 0.3 (0.01) 30.3 (1.19)
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of SL3 gear contact area Runout	0.05—0.30 (0.002—0.012) 29.000—29.015 (1.1417—1.1423) 24.987—25.000 (0.9837—0.9843) 30.464—30.480 (1.1994—1.2000) 0.02 (0.0008) max.	0.5 (0.02) 28.94 (1.139) 24.93 (0.981) 30.41 (1.197) 0.05 (0.002)
Counter 1st gear	I.D. End play Thickness	50.009—50.025 (1.9689—1.9695) 0.03—0.08 (0.001—0.003) 32.95—33.00 (1.297—1.299)	50.07 (1.971) 0.18 (0.007) 32.83 (1.293)

Unit: mm (in.)

8. Manual Transmission (4WD)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Counter 2nd gear	I.D. End play Thickness	50.009—50.025 (1.9689—1.9695) 0.03—0.08 (0.001—0.003) 32.92—32.97 (1.296—1.298)	50.07 (1.971) 0.18 (0.007) 32.8 (1.29)
Main 4th gear & 5th gear distance collar	I.D. O.D. Width	28.002—28.012 (1.1024—1.1028) 34.989—35.000 (1.3775—1.3780) 26.03—26.08 (1.025—1.027)	28.06 (1.105) 34.93 (1.375) 26.01 (1.024)
Countershaft 2nd gear distance collar	I.D. O.D. Width	36.48—36.49 (1.436—1.437) 43.989—44.000 (1.7318—1.7323) 28.98—29.05 (1.140—1.144)	36.54 (1.439) 43.93 (1.730) Adjust with a collar
Reverse idle gear	I.D. Gear-to-shaft clearance	20.016—20.043 (0.7880—0.7890) 0.036—0.084 (0.0014—0.0033)	20.08 (0.791) 0.14 (0.006)
SL 1 shaft	Clearance of needle bearing contact area	23.984—23.993 (0.9443—0.9446)	23.93 (0.942)
SL 1 gear	I.D. Thickness	30.000—30.013 (1.1811—1.1816) 62.95—63.00 (2.478—2.480)	29.94 (1.179) 62.83 (2.474)
SL2 shaft	End play *Diameter of needle bearing contact area* Diameter of ball bearing contact area 62/28 (Clutch housing side) 6204U (Transmission housing side) Runout	0.07—0.20 (0.0028—0.0079) 22.987—23.000 (0.9050—0.9055) 27.987—28.000 (1.1018—1.1024) 19.987—20.000 (0.7869—0.7874) 0.02 (0.0008) max.	Adjust with a shim 22.93 (0.903) 27.93 (1.100) 19.93 (0.785) 0.05 (0.002)
SL2 gear	I.D. End play Thickness	37.009—37.025 (1.4570—1.4577) 0.03—0.16 (0.001—0.006) 34.42—34.47 (1.355—1.357)	37.07 (1.459) 0.24 (0.009) 34.3 (1.35)
SL3 gear	Diameter of needle bearing contact area Width of needle bearing contact area	43.984—44.000 (1.7318—1.7323) 31.03—31.08 (1.222—1.224)	43.93 (1.730) 31.01 (1.221)
SL2 gear distance collar	I.D. O.D. Width	23.000—23.013 (0.9055—0.9060) 31.989—32.000 (1.2594—1.2598) 31.00—31.03 (1.220—1.222)	23.060 (0.9079) 31.93 (1.257) 30.98 (1.220)
Transfer shaft	Diameter of needle bearing contact area Diameter of taper bearing contact area Width of transfer driven gear contact area Width of transfer drive bevel gear contact area Runout	27.987—28.000 (1.1018—1.1024) 16.989—17.000 (0.6689—0.6693) 45.01—45.05 (1.772—1.774) 35.002—35.018 (1.3780—1.3787) 0.02 (0.0008) max.	27.93 (1.100) 16.93 (0.6665) 45.17 (1.778) 34.95 (1.376) 0.05 (0.002)
Transfer driven gear	I.D. Diameter of needle bearing contact area End play Thickness	34.009—34.025 (1.3389—1.3396) 54.000—54.015 (2.1260—2.1266) 0.04—0.13 (0.002—0.005) 44.92—44.97 (1.769—1.770)	34.07 (1.341) 53.94 (2.124) 0.21 (0.008) 44.8 (1.76)
Transfer drive bevel gear	I.D. Diameter of taper bearing contact area	25.000—25.021 (0.9843—0.9851) 35.002—35.018 (1.3780—1.3787)	25.06 (0.987) 34.95 (1.376)
Transfer driven bevel gear	Backlash Diameter of taper bearing contact area *Inner driven gear bearing race* Outer driven gear bearing race	0.10—0.15 (0.004—0.006) 35.002—35.018 (1.3780—1.3787) 27.987—28.000 (1.1018—1.1024)	Adjust with a shim 34.95 (1.376) 27.93 (1.100)
Blocking ring	Ring-to-gear clearance	0.85—1.1 (0.033—0.043)	0.4 (0.02)
1—2 shift fork & 3—4 shift fork	Synchro sleeve groove width Shift fork-to synchro sleeve clearance Thrust Radial Forkshaft-to-shift fork clearance	7.95—8.05 (0.313—0.317) 0.45—0.65 (0.018—0.026) 0.05—0.45 (0.002—0.018) 0.040—0.138 (0.0016—0.0054)	— 1.0 (0.04) 0.8 (0.03) —
5th shift fork	Synchro sleeve groove width Shift fork-to-synchro sleeve clearance Thrust Radial Fork shaft-to-shift fork clearance 5—R shift fork shaft 1—2 shift fork shaft	5.75—5.85 (0.226—0.230) 0.25—0.45 (0.010—0.018) 0.05—0.45 (0.002—0.018) 0.005—0.070 (0.0002—0.0028) 0.440—0.670 (0.0173—0.0264)	— 0.8 (0.03) 0.8 (0.03) — —
Reverse shift fork	Nail width Shift fork-to-reverse idle gear clearance L-groove width Shift fork-to-5-R shift piece clearance	13.0—13.3 (0.51—0.52) 0.5—1.1 (0.02—0.04) 7.05—7.25 (0.278—0.285) 0.05—0.35 (0.002—0.014)	— 1.8 (0.07) — 0.5 (0.02)

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Standard and Service Limits

8. Manual Transmission (4WD) (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Shift arm A	Diameter of shift piece contact area	12.9—13.0 (0.508—0.512)	—
	Shift arm-to-shift piece clearance	0.2—0.5 (0.01—0.02)	0.7 (0.03)
	Shift arm-to-interlock clearance I.D.	16.000—16.068 (0.6299—0.6326)	—
	Shift arm-to-shaft clearance	0.011—0.092 (0.0004—0.0036)	—
Shift arm	Diameter of shift arm A contact area	11.9—12.0 (0.469—0.472)	—
	Shift arm-to-shift arm A clearance	0.05—0.25 (0.002—0.010)	0.5 (0.02)
Select arm	Diameter of shift arm A contact area	7.95—8.00 (0.313—0.315)	—
	Select arm-to-shift arm A clearance	0.10—0.25 (0.004—0.010)	0.5 (0.02)
SL shift fork	Synchro sleeve groove width	5.75—5.85 (0.226—0.230)	—
	Shift fork-to-synchro sleeve clearance Thrust	0.25—0.45 (0.010—0.018)	0.8 (0.03)
	Radial	0.05—0.45 (0.002—0.018)	0.8 (0.03)
SL shift piece A	Shift piece-to-fork shaft clearance	0.040—0.138 (0.0016—0.0054)	—
	Diameter of SL shift lever contact area	10.1—10.2 (0.398—0.402)	—
	Shift piece-to-SL shift lever clearance	0.1—0.3 (0.004—0.012)	—
SL shift piece B	Diameter of SL shift lever contact area	7.9—8.0 (0.311—0.315)	—
	Shift piece-to-SL shift lever clearance	0.05—0.25 (0.002—0.010)	0.5 (0.02)
Selector fork	Sleeve groove width	8.45—8.55 (0.333—0.337)	—
	Fork-to-sleeve clearance Thrust	0.45—0.65 (0.018—0.026)	1.0 (0.04)
	Radial	0.2—1.1 (0.01—0.04)	1.5 (0.06)
Ring gear	Backlash	0.071—0.129 (0.0028—0.0051)	—
Differential carrier	Pinion shaft bore diameter	18.000—18.018 (0.7087—0.7094)	—
	Carrier-to-pinion shaft clearance	0.016—0.052 (0.0006—0.0020)	0.12 (0.005)
	Driveshaft bore diameter	28.005—28.025 (1.1026—1.1033)	—
	Carrier-to-driveshaft clearance	0.025—0.066 (0.0010—0.0026)	0.12 (0.005)
	Ball bearing bore diameter	40.002—40.018 (1.5749—1.5755)	—
Differential pinion gear	Backlash	0.05—0.15 (0.002—0.006)	Adjust with a washer
	Pinion gear bore diameter	18.042—18.066 (0.710—0.713)	—
	Pinion gear-to-pinion shaft clearance	0.057—0.095 (0.0022—0.0037)	0.15 (0.006)

Unit: mm (in.)

9. Automatic Transmission (2 WD)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (U.S. qt., Imp. qt.)		2.4 (2.5, 2.1) at oil change 5.4 (5.7, 4.8) at assembly	
Hydraulic pressure	Line pressure at 2,000 min⁻¹ (rpm)	1.2 ℓ	735—785 kPa (7.5—8.0 kg/cm², 107—114 psi)	686 kPa (7.0 kg/cm², 100 psi)
		others	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5kg/cm², 107 psi)
	2nd, 3rd, 4th clutch pressure at 2,000 rpm in D3 and D4		412 kPa (4.2 kg/cm², 60 psi) Throttle control lever full closed 785—834 kPa (8.0—8.5kg/cm², 114—121 psi) Throttle control lever opened 2/8 or more	363 kPa (3.7 kg/cm², 53 psi) (closed) 736 kPa (7.5 kg/cm² 107 psi) (2/8 opened)
	2nd clutch pressure at 2,000 min⁻¹ (rpm) in 2	1.2 ℓ	735—785 kPa (7.5—8.0 kg/cm², 107—114 psi)	686 kPa (7.0 kg/cm², 100 psi)
	1st clutch pressure at 2,000 min⁻¹ (rpm)	others	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5 kg/cm² 107 psi)
	Governor pressure at 60 km/h (37.5 mph)	1.5 ℓ PGM-FI except KG	206—216 kPa (2.10—2.20 kg/cm², 30—31 psi)	201 kPa (2.05 kg/cm² 29 psi)
		1.5 ℓ PGM-FI KG	223-232 Kpa (2.27-237 kg/cm², 32-34 psi)	218 Kpa (2.22 kg/cm², 32 psi)
		others	151—162 kPa (1.54—1.64 kg/cm², 22—23 psi)	146 kPa (1.49 kg/cm², 21 psi)
	Throttle pressure B	Full closed	0	—
		Full opened 1.2 ℓ	735—785 kPa (7.5—8.0 kg/cm², 107—114 psi)	686 kPa (7.0 kg/cm², 100 psi)
		others	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	736 kPa (7.5 kg/cm², 107 psi)
	Throttle pressure A	Full closed	0—4.9 kPa (0—0.05 kg/cm², 0—0.7 psi)	—
		Full opened 1.5 ℓ KG (4 D, 4 D H/B)	456—471 (4.65—4.8 kg/cm², 66—68 psi)	451 kPa (4.6 kg/cm², 65 psi)
		others	505—520 kPa (5.15—5.30 kg/cm², 73—75 psi)	500 kPa (5.1 kg/cm², 73 psi)

(cont'd)

Standard and Service Limits

9. Automatic Transmission (2 WD)(cont'd)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Stall speed			2,300–2,900 min⁻¹ (rpm)	—
Clutch	Clutch inital clearance	1st	0.65–0.85 (0.026–0.033)	—
		2nd	0.65–0.85 (0.026–0.033)	—
		3rd, 4th	0.40–0.60 (0.016–0.024)	—
	Clutch return spring free length	1st	31.0 (1.22)	29.0 (1.14)
		Except 1st	30.5 (1.20)	28.5 (1.12)
	Clutch disc thickness		1.88–2.00 (0.074–0.079)	Until grooves worn out
	Clutch plate thickness	1st	1.55–1.65 (0.061–0.065)	Discoloration
	Clutch plate thickness	Except 1st	1.95–2.05 (0.077–0.079)	↑
	Clutch end plate thickness (1.6ℓ, 1.5 ℓ PGM-FI and 1.5 ℓ 2-Carbureted engine)	Mark 1	2.3–2.4 (0.091–0.094)	↑
		Mark 2	2.4–2.5 (0.094–0.098)	↑
		Mark 3	2.5–2.6 (0.098–0.102)	↑
		Mark 4	2.6–2.7 (0.102–0.106	↑
		Mark 5	2.7–2.8 (0.106–0.110)	↑
		Mark 6	2.8–2.9 (0.110–0.114)	↑
		Mark 7	2.9–3.0 (0.114–0.118)	↑
		Mark 8	3.0–3.1 (0.118–0.122)	↑
		Mark 9	3.1–3.2 (0.122–0.126)	↑
		Mark 10	3.2–3.3 (0.126–0.130)	↑
	Clutch end plate thickness (1.2 ℓ, 1.3 ℓ, 1.4 ℓ and 1.5 ℓ 1-Carbureted engine)	Mark 1	2.2–2.3 (0.087–0.091)	↑
		Mark 2	2.5–2.6 (0.098–0.102)	↑
		Mark 3	2.8–2.9 (0.110–0.114)	↑
		Mark 4	3.1–3.2 (0.122–0.126)	↑
		Mark 5	3.4–3.5 (0.134–0.138)	↑
		Mark 11	2.05–2.15 (0.081–0.085)	↑
		Mark 12	2.35–2.45 (0.093–0.096)	↑
		Mark 13	2.65–2.75 (0.104–0.108)	↑
		Mark 14	2.95–3.05 (0.116–0.120)	↑
		Mark 15	3.25–3.35 (0.128–0.132)	Discoloration
Transmission	Diameter of needle bearing contact area on main and stator shaft		19.980–19.993 (0.7866–0.7871)	Wear or damage
	Diameter of needle bearing contact area on mainshaft 2nd gear		35.975–35.991 (1.4163–1.4169)	↑
	Diameter of needle bearing contact area on mainshaft 4th gear collar		31.975–31.991 (1.2588–1.2594)	↑
	Diameter of needle bearing contact area on mainshaft 1st gear coller		27.975–27.995 (1.1014–1.1022)	↑
	Diameter of needle bearing contact area on countershaft (L side)		36.004–36.017 (1.4175–1.4180)	↑
	Diameter of needle bearing contact area on countershaft 3rd gear		31.975–31.991 (1.2589–1.2595)	↑
	Diameter of needle bearing contact area on countershaft 4th gear		27.980–27.993 (1.1016–1.1021)	↑
	Diameter of needle bearing contact area on countershaft reverse gear collar		29.980–29.993 (1.1803–1.1808)	↑
	Diameter of needle bearing contact area on countershaft 1st gear collar		29.980–29.993 (1.1803–1.1808)	↑
	Diameter of needle bearing contact area on reverse idle gear		13.990–14.000 (0.5508–0.5512)	↑
	Mainshaft 2nd gear I.D.		41.000–41.016 (1.6142–1.6148)	↑
	Mainshaft 1st gear I.D.		33.000–33.016 (1.2992–1.2998)	↑
	Mainshaft 4th gear I.D.		38.000–38.016 (1.4961–1.4967)	↑
	Countershaft 4th gear I.D.		33.000–33.016 (1.2992–1.2998)	↑
	Countershaft 3rd gear I.D.		38.000–38.016 (1.4961–1.4967)	↑
	Countershaft 1st gear I.D.		35.000–35.016 (1.3780–1.3786)	↑
	Countershaft reverse gear I.D.		36.000–36.016 (1.4173–1.4179)	↑
	Reverse idle gear I.D.		18.007–18.020 (0.7089–0.7094)	↑
	Reverse idler shaft holder I.D.		14.416–14.434 (0.5676–0.5683)	Wear or damage
	Mainshaft 4th gear end play		0.10–0.22 (0.0039–0.0087)	—
	Mainshaft 2nd gear end play		0.07–0.15 (0.0028–0.0059)	—
	Mainshaft 1st gear end play		0.08–0.24 (0.0031–0.0094)	—
	Countershaft 4th gear end play		0.07–0.15 (0.0028–0.0059)	—
	Countershaft 3rd gear end play		0.07–0.15 (0.0028–0.0059)	—
	Countershaft 1st gear end play		0.10–0.45 (0.0039–0.0177)	—
	Reverse idler gear end play		0.05–0.18 (0.0020–0.0071)	—
	Countershaft reverse gear play		0.10–0.45 (0.0039–0.0177).	—
	Selector hub O.D.		51.87–51.90 (2.0421–2.0433)	Wear or damage

Unit: mm (in.)

9. Automatic Transmission (2 WD)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Thrust washer thickness		
	Mainshaft 2nd gear A	3.47—3.50 (0.1366—0.1378)	Wear or damage
	B	3.52—3.55 (0.1386—0.1398)	↑
	C	3.57—3.60 (0.1406—0.1417)	↑
	D	3.62—3.65 (0.1425—0.1437)	↑
	E	3.67—3.70 (0.1445—0.1457)	↑
	F	3.72—3.75 (0.1465—0.1476)	↑
	G	3.77—3.80 (0.1484—0.1496)	↑
	H	3.82—3.85 (0.1504—0.1516)	↑
	I	3.87—3.90 (0.1524—0.1535)	↑
	Mainshaft L side bearing	2.95—3.05 (0.1161—0.1201)	↑
	Mainshaft 4th gear	4.45—4.55 (0.1752—0.1791)	↑
	Mainshaft R side 1st gear	2.43—2.50 (0.0957—0.0984)	↑
	Mainshaft L side 1 st gear	1.45—1.50 (0.0571—0.0591)	↑
	Countershaft 3rd gear A	2.97—3.00 (0.1169—0.1181)	↑
	B	3.02—3.05 (0.1189—0.1201)	↑
	C	3.07—3.10 (0.1209—0.1220)	↑
	D	3.12—3.15 (0.1228—0.1240)	↑
	E	3.17—3.20 (0.1248—0.1260)	↑
	F	3.22—3.25 (0.1268—0.1280)	↑
	G	3.27—3.30 (0.1287—0.1299)	↑
	H	3.32—3.35 (0.1307—0.1319)	↑
	I	3.37—3.40 (0.1327—0.1339)	Wear or damage
	Countershaft distance collar length	38.97—39.00 (1.5342—1.5354)	—
		39.02—39.05 (1.5362—1.5374)	—
		39.07—39.10 (1.5382—1.5394)	—
		39.12—39.15 (1.5402—1.5413)	—
		39.17—39.20 (1.5421—1.5433)	—
		39.22—39.25 (1.5441—1.5453)	—
		39.27—39.30 (1.5461—1.5472)	—
	Mainshaft 4th gear collar length	40.00—40.05 (1.5748—1.5768)	—
	Mainshaft 1st gear collar length	25.00—25.15 (0.9843—0.9902)	—
	Mainshaft 1st gear collar flange thickness	2.5—2.6 (0.098—0.102)	Wear or damage
	Countershaft reverse gear collar length	14.50—14.55 (0.5709—0.5728)	—
	Countershaft reverse gear collar flange thickness	2.45—2.55 (0.0965—0.1004)	Wear or damage
	Countershaft 1st gear collar length	14.50—14.55 (0.5709—0.5728)	—
	Countershaft 1st gear collar flange thickness	2.45—2.55 (0.0965—0.1004)	Wear or damage
	Diameter of countershaft one-way clutch contact area	74.414—74.440 (2.9297—2.9307)	Wear or damage
	Diameter of parking gear one-way clutch contact area	57.755—57.768 (2.2738—2.2743)	Wear or damage
	Mainshaft feed pipe A O.D. (at 15 mm from end)	8.97—8.98 (0.353—0.354)	8.95 (0.3524)
	Mainshaft feed pipe B O.D. (at 12 mm from end)	5.97—5.98 (0.2351—0.2354)	5.95 (0.2343)
	Countershaft feed pipe O.D. (at 20 mm from end)	7.97—7.98 (0.3138—0.3142)	7.95 (0.3130)
	Mainshaft sealing ring 32 mm thickness	1.980—1.995 (0.0780—0.0785)	1.800 (0.0709)
	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 (0.3555)
	Countershaft bushing I.D.	8.000—8.015 (0.3150—0.3156)	8.030 (0.3161)
	Mainshaft sealing ring groove width	2.025—2.060 (0.0797—0.0811)	2.080 (0.0819)
	Statorshaft distance collar 20 mm I.D.	26.000—26.013 (1.0236—1.0241)	26.030 (1.0248)
Regulator valve body	Sealing ring contact area diameter	32.000—32.025 (1.2598—1.2608)	32.050 (1.2618)
Shifting device and parking brake control	Reverse shift fork thickness	5.90—6.00 (0.2323—0.2362)	5.40 (0.2126)
	Parking brake ratchet pawl	—	Wear or other defect
	Parking gear	—	Wear or other defect
	Throttle cam stopper	18.5—18.6 (0.728—0.732)	—
Servo body	Shift fork shaft bore. I.D. A	14.000—14.005 (0.5512—0.5514)	—
	B	14.006—14.010 (0.5514—0.5516)	—
	C	14.011—14.015 (0.5516—0.5518)	—
	Shift fork shaft valve bore I.D.	37.000—37.039 (1.4567—1.4582)	37.045 (1.4585)
Valve body	Oil pump gear side clearance	0.03—0.05 (0.0012—0.0020)	0.07 (0.0028)
	Oil pump gear-to-body clearance	Drive: 0.240—0.266 (0.0094—0.0105)	—
		Driven: 0.063—0.088 (0.0025—0.0035)	—
	Stator camshaft needle bearing bore I.D. (R side)	26.000—26.013 (1.0236—1.0241)	Wear or damage
	Stator camshaft needle bearing contact and I.D. (Stator side)	24.000—24.021 (0.9449—0.9457)	Wear or damage
	Oil pump driven gear I.D.	14.016—14.034 (0.5518—0.5525)	Wear or damage
	Oil pump shaft O.D.	13.980—13.990 (0.5504—0.5508)	Wear or damage

(cont'd)

Standards and Service Limits

9. Automatic Transmission (2 WD)(cont'd)

	MEASUREMENT		STANDARD (NEW)			
			Wire Diameter	O.D.	Free Length	No. of Coils
Springs	Regulator valve spring A	1.2 ℓ	1.8 (0.07)	14.7 (0.58)	83.8 (3.30)	17
		others	1.58 x 2.00 (0.06 x 0.08)	14.7 (0.58)	86.5 (3.41)	20.9
	Regulator valve spring B	1.2 ℓ	1.8 (0.07)	9.6 (0.38)	44 (1.73)	9
		others	1.8 (0.07)	9.6 (0.38)	44 (1.73)	7.5
	Stator reaction spring		6 (0.24)	38.4 (1.51)	30.3 (1.20)	2
	Throttle modulator spring	*1	1.2 (0.05)	9.4 (0.37)	{27.2 (1.07) / 26.3 (1.04)}	8
		*2	1.2 (0.05)	9.4 (0.37)	{26.3 (1.04) / 26.4 (1.04)}	8
	Torque converter check valve spring		1.1 (0.04)	8.4 (0.33)	36.4 (1.43)	12
	Cooler releaf valve spring		1.1 (0.04)	8.4 (0.33)	36.4 (1.43)	12
	Releaf valve spring		1.0 (0.04)	8.4 (0.33)	52 (2.05)	23
	Governer spring A	*3	1.0 (0.04)	18.8 (0.74)	38.1 (1.50)	4
		*4	1.0 (0.04)	18.8 (0.74)	20.4 (0.80)	4
	Governer spring B	*3	0.9 (0.04)	11.8 (0.46)	27.8 (1.09)	6
		*4	0.9 (0.04)	11.8 (0.46)	26.7 (1.05)	6
	2nd orifice control spring		0.8 (0.03)	6.6 (0.26)	43.8 (1.72)	27.6
	Servo orifice control spring		0.9 (0.04)	6.1 (0.24)	35.9 (1.41)	20
	Throttle spring A		1.0 (0.04)	8.5 (0.33)	22.2 (0.87) 22.1 (0.87)	6 5.5
	Throttle adjust spring A (throttle B pressure)		0.8 (0.03)	6.2 (0.24)	30 (1.18)	8
	Throttle adjust spring A		0.8 (0.03)	6.2 (0.24)	27 (1.06)	8.5
	Throttle spring B		1.6 (0.06)	8.5 (0.33)	41.3 (1.63)	13.9
			1.4 (0.06)	8.5 (0.33)	41.4 (1.63)	8.4
	1—2 shift spring	*3	0.5 (0.02)	4.4 (0.17)	47.2 (1.86)	38
		*2	0.5 (0.02)	4.5 (0.18)	42.5 (1.67)	21.1
		*5	0.5 (0.02)	4.5 (0.18)	44.5 (1.75)	35.1
	1—2 shift ball spring	Main *3	0.45 (0.02)	4.5 (0.18)	12.7 (0.50)	11
		*2	0.4 (0.02)	4.5 (0.18)	14.4 (0.57)	8.2
		*5	0.4 (0.02)	4.5 (0.18)	11.3 (0.44)	8
		2nd	0.45 (0.02)	4.5 (0.18)	12.7 (0.50)	11
	2—3 shift spring	*3	0.9 (0.04)	7.6 (0.23)	44.6 (1.76)	20.7
		*2	0.7 (0.03)	7.6 (0.23)	48 (1.89)	12.7
		*5	0.7 (0.03)	7.6 (0.23)	43 (1.69)	12.7
	2—3 shift ball spring	*3	0.4 (0.02)	4.5 (0.18)	14.4 (0.57)	8.2
		*5	0.4 (0.02)	4.5 (0.18)	14.7 (0.58)	7.3
		*2	0.45 (0.02)	4.5 (0.18)	17.1 (0.67)	11.1
	3—4 shift spring	*3	0.9 (0.04)	9.6 (0.38)	32.5 (1.28)	10
		*2	0.9 (0.04)	9.6 (0.38)	27 (1.06)	10
		*5	0.7 (0.03)	9.6 (0.38)	32.9 (1.30)	6.4
	3—4 shift ball spring	*3	0.5 (0.02)	4.5 (0.18)	11.3 (0.44)	7
		*2	0.5 (0.02)	4.5 (0.18)	10.8 (0.43)	7.4
		*5	0.45 (0.02)	4.5 (0.18)	12.0 (0.47)	6.7
	Low accumulator spring A		2.34 x 2.9 (0.09 x 0.1)	21.5 (0.85)	66.7 (2.63)	10.2
	Low accumulator spring B		2.8 (0.11)	13.1 (0.52)	40 (1.57)	8.8
	Top accumulator spring		3.2 (0.13)	18.6 (0.73)	78.3 (3.08)	10
	2nd accumulator spring		3.5 (0.14)	20.2 (0.80)	76.7 (3.02)	9.6
	3rd accumulator spring		2.7 (0.10)	15.5 (0.61)	80.0 (3.15)	14.8
	L/C shift spring	*6	1.1 (0.04)	8.1 (0.32)	51.8 (2.04)	22.3
	L/C shift spring	*4	0.7 (0.03)	8.1 (0.32)	39.0 (1.54)	15.4
		*8	0.9 (0.04)	8.1 (0.32)	44.5 (1.75)	18.3
	L/C timing spring B	*3	1.0 (0.04)	6.6 (0.26)	55.6 (2.19)	30
		*4	1.0 (0.04)	6.6 (0.26)	52.3 (2.06)	30.1
	L/C control valve spring	*6	0.7 (0.03)	6.6 (0.26)	35.3 (1.39)	15.8
		*7	0.7 (0.03)	6.6 (0.26)	32.5 (1.28)	14
	CPC valve spring		1.4 (0.06)	9.4 (0.37)	31.6 (1.24)	10.9

*1 : except KG 1.5 ℓ (4 D, 4 D H/B) *2 : KG 1.5 ℓ (4 D, 4 D H/B)
*3 : KX, KS, KZ, KQ, KG (1.5 ℓ) *4 : except KX, KS, KZ, KQ, KG (1.5 ℓ) *5 : except KX, KS, KZ, KG 1.5 ℓ (4 D, 4 D H/B)
*6 : KX, KS, KZ, KG (1.5 ℓ) *7 : except KX, KS, KZ, KG (1.5 ℓ) *8 : KQ

9. Automatic Transmission (2 WD)(cont'd)

unit: mm (in.)

	MEASUREMENT	STANDARD (NEW)		SERVICE LIMIT	
		Wire Diameter	O.D.	Free Length	No. of Coils
Springs	Shift timing valve spring	0.9 (0.04)	8.6 (0.34)	42.9 (1.69)	21.4
	Kick down valve spring	0.9 (0.04)	10.1 (0.40)	40.8 (1.61)	14.5
	Reverse control spring	0.7 (0.03)	7.6 (0.30)	37.2 (1.46)	15.3
	L/C cut spring	0.7 (0.03)	7.6 (0.30)	29 (1.14)	18
	3—2 timing valve spring	1.2 (0.05)	7.7 (0.30)	45.1 (1.78)	19.8
	Low oneway ball spring	0.29 (0.01)	4.0 (0.16)	14 (0.55)	13
	4th exhaust spring	0.9 (0.04)	6.1 (0.24)	43.7 (1.72)	20.3
	Servo control valve spring	1.1 (0.04)	6.6 (0.26)	44 (1.73)	20
	Reverse timing spring	0.7 (0.03)	5.6 (0.22)	43.8 (1.72)	21.7
Ring gear	Backlash	0.086—0.143 (0.0034—0.0056)		0.25 (0.01)	
Differential carrier	Pinionshaft bore diamater	18.000—18.018 (0.7087—0.7094)		—	
	Carrier-to-pinionshaft clearance	0.017—0.047 (0.0007—0.0019)		0.095 (0.004)	
	Driveshaft bore diameter	26.005—26.025 (1.0238—1.0246)		—	
	Carrier-to-driveshaft clearance	0.045—0.086 (0.0017—0.0034)		0.14 (0.006)	
	Carrier-to-intermediate shaft clearance	0.075—0.111 (0.0030—0.0044)		0.16 (0.006)	
	Side clearance	0.15 max.			
Differential pinion gear	Backlash	0.05—0.15 (0.002—0.006)		Adjust with a washer	
	Pinion gear bore diameter	18.042—18.066 (0.7103—0.7113)		—	
	Pinion gear to pinionshaft clearance	0.059—0.095 (0.0023—0.0037)		0.15 (0.006)	

Standards and Service Limits

9. Automatic Transmission (4 WD)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	2.7 (2.9 , 2.4) at oil change 5.8 (6.1 , 5.1) at assembly	
Hydraulic pressure	Line pressure at 2,000 rpm	800—850 kPa (8.0—8.5 kg/cm², 114—121 psi)	750 kPa (7.5 kg/cm², 107 psi)
	2nd, 3rd, 4th clutch pressure at 2,000 rpm in [S] or [D]	500 kPa (5.0 kg/cm², 71 psi) Throttle control lever full closed ↓ 850 kPa (8.5 kg/cm², 121 psi) Throttle control lever opened 3/8 or more	450 kPa (4.5 kg/cm², 64 psi) (closed) ↓ 750 kPa (7.5 kg/cm², 107 psi) (2/8 opened)
	Low hold clutch pressure at 2,000 rpm in [2]	800—850 kPa (8.0—8.5 kg/cm², 114—121 psi)	750 kPa (7.5 kg/cm², 107 psi)
	1st clutch pressure at 2,000 rpm in [S] or [D]		

Unit: mm (in)

9. Automatic Transmission (4 WD)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Hydraulic pressure	Throttle pressure B	Full closed	0	—
		Full opened	800—850 kPa (8.0—8.5 kg/cm², 114—121 psi)	750 kPa (7.5 kg/cm², 107 psi)
Stall speed			2,300—2,900 rpm	2,750 rpm
Clutch	Clutch initial clearance	1st	0.65—0.85 (0.026—0.033)	—
		2nd	0.65—0.80 (0.026—0.031)	—
		3rd, 4th	0.40—0.60 (0.016—0.024)	—
	Clutch return spring free length	1st	31.0 (1.22)	29.0 (1.14)
		Except 1st	30.5 (1.20)	28.5 (1.12)
	Clutch disc thickness		1.88—2.0 (0.074—0.08)	Until grooves worn out
	Clutch plate thickness	1st	1.55—1.65 (0.061—0.065)	Discoloration
		Except 1st	1.95—2.05 (0.077—0.081)	↑
	Clutch end plate thickness			↑
	Except lowhold clutch	Mark 1	2.3—2.4 (0.09—0.09)	↑
		Mark 2	2.4—2.5 (0.09—0.10)	↑
		Mark 3	2.5—2.6 (0.10—0.10)	↑
		Mark 4	2.6—2.7 (0.10—0.11)	↑
		Mark 5	2.7—2.8 (0.11—0.11)	↑
		Mark 6	2.8—2.9 (0.11—0.11)	↑
		Mark 7	2.9—3.0 (0.11—0.12)	↑
		Mark 8	3.0—3.1 (0.12—0.12)	↑
		Mark 9	3.1—3.2 (0.12—0.13)	↑
		Mark 10	3.2—3.3 (0.13—0.13)	↑
		Mark 11	2.0—2.1 (0.08—0.08)	↑
		Mark 12	2.1—2.2 (0.08—0.09)	↑
		Mark 13	2.2—2.3 (0.09—0.09)	↑
	Low hold clutch	Mark 1	2.05—2.10 (0.081—0.083)	↑
		Mark 2	2.15—2.20 (0.085—0.087)	↑
		Mark 3	2.25—2.30 (0.089—0.091)	↑
		Mark 4	2.35—2.40 (0.093—0.094)	↑
		Non mark	2.45—2.50 (0.096—0.098)	↑
		Mark 6	2.55—2.60 (0.100—0.102)	↑
		Mark 7	2.65—2.70 (0.104—0.106)	Discoloration
Transmission	Diameter of needle bearing contact area on main shaft and statorshaft		19.980—19.993 (0.7866—0.7871)	Wear or damage
	Diameter of needle bearing contact area on mainshaft 2nd gear		35.975—35.991 (1.4163—1.4170)	↑
	Diameter of needle bearing contact area on mainshaft 4th gear collar		31.975—31.991 (1.2589—1.2595)	↑
	Diameter of needle bearing contact area on maishaft 1st gear collar		30.975—30.995 (1.2195—1.2203)	↑
	Diameter of needle bearing contact area on countershaft (L side)		36.004—36.017 (1.4175—1.4180)	↑
	Diameter of needle bearing contact area on countershaft 3rd gear		31.975—31.991 (1.2589—1.2595)	↑
	Diameter of needle bearing contact area on countershaft 4th gear		27.980—27.993 (1.1016—1.1021)	↑
	Diameter of needle bearing contact area on countershaft reverse gear collar		29.980—29.993 (1.1803—1.1808)	↑
	Diameter of needle bearing contact area on countershaft 1st gear collar		31.975—31.991 (1.2589—1.2595)	Wear or damage

(cont'd)

Standards and Service Limits

9. Automatic Transmission (4 WD)(cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Diameter of needle bearing contact area on subshaft (L side)	27.991—28.000 (1.1020—1.1024)	Wear or damage
	Diameter of needle bearing contact area on subshaft S-4 gear collar	29.980—29.993 (1.1803—1.1808)	↕
	Diameter of needle bearing contact area on reverse idle gear	13.990—14.000 (0.5508—0.5512)	
	Mainshaft 2nd gear I.D.	41.000—41.016 (1.6142—1.6148)	
	Mainshaft 1st gear I.D.	36.000—36.016 (1.4173—1.4179)	
	Mainshaft 4th gear I.D.	38.000—38.016 (1.4961—1.4967)	
	Countershaft 4th gear I.D.	33.000—33.016 (1.2992—1.2998)	
	Countershaft 3rd gear I.D.	38.000—38.016 (1.4961—1.4967)	
	Countershaft 1st gear I.D.	35.000—35.016 (1.3780—1.3786)	
	Countershaft reverse gear I.D.	36.000—36.016 (1.4173—1.4179)	
	Subshaft S-4 gear I.D.	35.000—35.016 (1.3780—1.3786)	
	Reverse idle gear I.D.	18.007—18.020 (0.7089—0.7094)	
	Reverse idler shaft holder I.D.	14.416—14.434 (0.5676—0.5683)	Wear or damage
	Mainshaft 4th gear end play	0—0.08 (0.003)	—
	Mainshaft 2nd gear end play	0.07—0.15 (0.003—0.006)	—
	Mainshaft 1st gear end play	0.08—0.24 (0.003—0.009)	—
	Countershaft 4th gear end play	0.07—0.15 (0.003—0.006)	—
	Countershaft 3rd gear end play	0.07—0.15 (0.003—0.006)	—
	Countershaft 1st gear end play	0.10—0.45 (0.004—0.018)	—
	Reverse idler gear end play	0.05—0.18 (0.002—0.007)	—
	Countershaft reverse gear play	0.10—0.45 (0.004—0.018)	—
	Selector hub O.D.	51.87—51.90 (2.042—2.043)	Wear or damage
	Thrust washer thickness		
	Mainshaft 2nd gear A	3.47—3.50 (0.137—0.138)	Wear or damage
	B	3.52—3.55 (0.139—0.140)	↕
	C	3.57—3.60 (0.141—0.142)	
	D	3.62—3.65 (0.143—0.144)	
	E	3.67—3.70 (0.144—0.146)	
	F	3.72—3.75 (0.146—0.148)	
	G	3.77—3.80 (0.148—0.150)	
	H	3.82—3.85 (0.150—0.152)	
	I	3.87—3.90 (0.152—0.154)	
	Mainshaft L side bearing	2.95—3.05 (0.116—0.120)	
	Mainshaft 4th gear	4.45—4.55 (0.175—0.179)	
	Mainshaft R side 1st gear	2.43—2.50 (0.096—0.098)	
	Mainshaft L side 1st gear	1.45—1.50 (0.057—0.059)	
	Countershaft 3rd gear A	2.97—3.00 (0.117—0.118)	
	B	3.02—3.05 (0.119—0.120)	
	C	3.07—3.10 (0.121—0.122)	
	D	3.12—3.15 (0.123—0.124)	
	E	3.17—3.20 (0.125—0.126)	
	F	3.22—3.25 (0.127—0.128)	
	G	3.27—3.30 (0.129—0.130)	
	H	3.32—3.35 (0.131—0.132)	
	I	3.37—3.40 (0.133—0.134)	Wear or damage
	Countershaft distance collar length	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)	—
	Mainshaft 4th gear collar length	46.50—46.53 (1.831—1.832)	—
	Mainshaft 1st gear collar length	24.50—24.55 (0.965—0.967)	—
	Mainshaft 1st gear collar flange thickness	2.5—2.6 (0.10—0.10)	Wear or damage

Unit: mm (in)

Automatic Transmission (4WD) — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Countershaft reverse gear collar length	14.50—14.55 (0.571—0.573)	—
	Countershaft reverse gear collar flange thickness	2.45—2.55 (0.096—0.100)	Wear or damage
	Countershaft 1st gear collar length	14.50—14.55 (0.571—0.573)	—
	Countershaft 1st gear collar flange thickness	2.45—2.55 (0.096—0.100)	Wear or damage
	Subshaft S-4 gear collar length	24.000—24.100 (0.9449—0.9488)	Wear or damage
	Length of needle bearing contact area on subshaft S-4 gear collar	21.000—21.100 (0.8268—0.8307)	Wear or damage
	Diameter of countershaft one-way clutch contact area	83.339—83.365 (3.2811—3.2821)	Wear or damage
	Diameter of parking gear one-way clutch contact area	66.685—66.698 (2.6254—2.6259)	Wear or damage
	Mainshaft feed pipe A O.D. (at 15 mm from end)	8.970—8.980 (0.3531—0.3535)	8.950 (0.3524)
	Mainshaft feed pipe B O.D. (at 12 mm from end)	5.970—5.980 (0.2350—0.2354)	5.950 (0.2343)
	Countershaft feed pipe O.D. (at 20 mm from end)	7.970—7.980 (0.3138—0.3142)	7.950 (0.3130)
	Subshaft feed pipe O.D.	7.970—7.980 (0.3138—0.3142)	7.950 (0.3130)
	Mainshaft sealing ring 32 mm thickness	1.980—1.995 (0.0780—0.0785)	1.800 (0.0709)
	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 (0.3555)
	Countershaft bushing I.D.	8.000—8.015 (0.3150—0.3156)	8.030 (0.3161)
	Subshaft bushing I.D.	8.000—8.015 (0.3150—0.3156)	8.030 (0.3161)
	Mainshaft sealing ring groove width	2.025—2.060 (0.0797—0.0811)	2.080 (0.0819)
	Statorshaft distance collar 20 mm I.D.	26.000—26.013 (1.0236—1.0241)	26.030 (1.0248)
Regulator valve body	Sealing ring contact area diameter	32.000—32.025 (1.2598—1.2608)	32.050 (1.2618)
Shifting device and parking brake control	Reverse shift fork thickness	5.90—6.00 (0.232—0.236)	5.40 (0.213)
	Parking brake ratchet pawl	—	Wear or other defect
	Parking gear	—	Wear or other defect
	Throttle cam stopper height	27.0—27.1 (1.06—1.07)	—
Servo body	Shift fork shaft bore I.D. A	14.000—14.005 (0.5512—0.5514)	—
	B	14.006—14.010 (0.5514—0.5516)	—
	C	14.011—14.015 (0.5516—0.5518)	—
	Shift fork shaft valve bore I.D.	37.000—37.039 (1.4567—1.4582)	37.045 (1.4585)
Valve body	Oil pump gear side clearance	0.03—0.05 (0.001—0.002)	0.07 (0.003)
	Oil pump gear-to-body clearance Drive	0.240—0.266 (0.0094—0.0105)	—
	Driven	0.063—0.088 (0.0025—0.0035)	—
	Stator camshaft needle bearing bore I.D. (R side)	26.000—26.013 (1.0236—1.0241)	Wear or damage
	Stator camshaft needle bearing contact and I.D. (Stator side)	24.000—24.021 (0.9449—0.9457)	Wear or damage
	Oil pump driven gear I.D.	14.016—14.034 (0.5518—0.5525)	Wear or damage
	Oil pump shaft O.D.	13.980—13.990 (0.5504—0.5508)	Wear or damage

(cont'd)

Standards and Service Limits

9. Automatic Transmission (4 WD)(cont'd)

	MEASUREMENT	Wire Dia.	O.D.	Free Length	No. of Coils
Springs	Regulator valve spring A	1.8 (0.07)	14.7 (0.58)	86.5 (3.41)	16.5
	Regulator valve spring B	1.8 (0.07)	9.6 (0.38)	44.0 (1.73)	7.5
	Stator reaction spring	6.0 (0.24)	38.4 (1.51)	30.3 (1.19)	2
	Torque converter check valve spring	1.1 (0.04)	8.4 (0.33)	36.4 (1.43)	12
	Relief valve spring	1.0 (0.04)	8.4 (0.33)	52.0 (2.05)	23
	2nd orifice control valve spring	0.8 (0.03)	6.6 (0.26)	38.5 (1.52)	28
	Servo orifice control valve spring	0.9 (0.04)	6.1 (0.24)	35.9 (1.41)	20
	Throttle control valve B spring	1.6 (0.06)	8.5 (0.33)	41.3 (1.63)	13.9
	Throttle control valve B adjuster spring	0.8 (0.03)	6.2 (0.24)	30.0 (1.18)	8
	1—2 shift spring	0.9 (0.04)	8.6 (0.34)	40.4 (1.59)	14.5
	2—3 shift spring	0.8 (0.03)	8.6 (0.34)	35.8 (1.41)	10.6
	3—4 shift spring	0.8 (0.03)	7.6 (0.30)	59.7 (2.35)	22.7
	Low accumulator A spring	2.0 (0.08)	13.7 (0.54)	71.3 (2.81)	11.0 and 8.0
	Low accumulator B spring	3.2 (0.13)	24.3 (0.96)	59.5 (2.34)	5.8
	4th accumulator spring	3.2 (0.13)	18.6 (0.73)	78.3 (3.08)	10
	2nd accumulator spring	2.7 (0.11)	16.1 (0.63)	88.4 (3.48)	16.0
	3rd accumulator spring	2.7 (0.11)	15.5 (0.61)	78.3 (3.08)	15.6
	L/C control springs	0.6 (0.02)	6.6 (0.26)	42.0 (1.65)	31.6
	L/C timing valve B spring	0.9 (0.04)	5.6 (0.22)	40.7 (1.60)	30
	CPC valve spring	1.4 (0.06)	9.4 (0.37)	31.6 (1.24)	10.9
	Servo return springs A and B	2.6 (0.10)	29.8 (1.17)	40.3 (1.59)	3.3
	L/C shift valve spring	1.1 (0.04)	8.6 (0.34)	51.0 (2.01)	18.6
	4—2 kick down valve spring	0.9 (0.04)	6.4 (0.25)	42.7 (1.68)	20.8
	Cooler relief valve spring	1.1 (0.04)	8.4 (0.33)	36.4 (1.43)	12
	Modulator valve springs A and B	1.4 (0.06)	9.4 (0.37)	33.0 (1.30)	10.5
	Servo control valve spring	1.1 (0.04)	8.1 (0.32)	47.8 (1.88)	18.8
	4th exhaust valve spring	0.9 (0.04)	6.6 (0.26)	37.0 (1.46)	18.7
	4—3 kick down valve spring	0.9 (0.04)	6.4 (0.25)	42.7 (1.68)	20.8

Unit: mm (in)

10. Driveshaft

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Driveshaft	Right: boot as installed		
	with intermediate shaft	485—490 (19.09—19.29)	—
	without intermediate shaft	481.5—486.5 (18.96—19.15)	—
	Left: boot as installed		
	with intermediate shaft*	485—490 (19.09—19.29)	—
	without intermediate shaft	774.5—779.5 (30.49—30.69)	—
Rear driveshaft	Right boot as installed	595.6—600.6 (23.45—23.65)	—
	Left boot as installed	641.6—646.6 (25.26—25.46)	—
Propeller shafts	Runout No.1, No.3	—	1.5 (0.06)

* includes 4WD

10. Rear Differential (4 WD without ALB)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Differential carrier assembly	Oil capacity Replace	0.65 ℓ (0.69US. qt.,0.57Imp. qt)	—
	Disassemble	0.70 ℓ (0.74US. qt.,0.62Imp. qt)	—
Differential carrier	Diameter of taper bearing contact area		
	Front drive pinion bearing	57.979—58.009 (2.2826—2.2838)	58.06 (2.286)
	Rear drive pinion bearing	71.979—72.009 (2.8338—2.8350)	72.06 (2.837)
	Side bearing	68.000—68.030 (2.6772—2.6783)	68.08 (2.680)
Differential case	Diameter of diff. pinion shaft contact area	18.000—18.018 (0.7087—0.7094)	—
	Case-to-diff. pinion shaft	0.016—0.052 (0.0006—0.0020)	0.1 (0.004)
	Diameter of drive shaft contact area	26.005—26.025 (1.0236—1.0246)	—
	Case-to-drive shaft clearance	0.025—0.066 (0.0010—0.0026)	0.12 (0.005)
	Diameter of taper bearing contact area	40.002—40.018 (1.5749—1.5755)	39.95 (1.573)
Differential pinion gear	Backlash	0.05—0.15 (0.002—0.006)	Adjust with a washer
	I.D.	18.042—18.066 (0.7103—0.7113)	—
	Gear-to-pinion shaft clearance	0.059—0.095 (0.0022—0.0037)	0.15 (0.006)
Hypoid drive pinion gear	Backlash	0.11—0.16 (0.004—0.006)	Adjust with a shim
	Diameter of taper bearing contact area		
	Front pinion bearing	27.987—28.000 (1.1018—1.1024)	27.93 (1.100)
	Rear pinion bearing	30.002—30.018 (1.1812—1.1818)	29.95 (1.179)

10. Rear Differential (4 WD with ALB)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch housing	Fluide Capasity Disassembly	0.31ℓ (0.33 US. gt., 0.27 Imp.gt)	
Differential carrier assembly	Oil capacity Replace	0.93ℓ (0.98 US. gt., 0.82 Imp.gt)	—
	Disassembly	1.00ℓ (1.06 US. gt., 0.88 Imp.gt)	—
Hypoid drive pinion gear	Backlash	0.10-0.15 (0.004-0.006)	**Adjust with a shim**
2-4 shift fork	Fork projection width for 2-4 sleeve groove	6.8-6.9 (0.268-0.272)	—
Clearance of clutch hub to clutch peace		0.05-0.25 (0.002-0.100) max	—
Preroad of hypoid drive pinion N·m (kg-cm, lb)		98-160 (10.0-16.3, 22-36)	—
Total preroad of hyoid drive pinion and bisccous coupling unit N·m (kg-cm, lb)		109-175 (11.1-17.8, 25-39)	—

Standards and Service Limits

11. Steering

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play	10 (0.39) max.	—
Gear box	Pinion starting torque N·m (kg-m, lb-ft)	○0.49—1.67 (0.05—0.17, 0.36—1.27) ●0.39—1.37 (0.04—0.14, 0.29—1.01)	— —
	with P/S	0.98 (0.1, 0.72) max.	—
	Angle of rack-guide-screw loosened from locked position	○40°—60° ●10°—20°	— —
	with P/S	20°—25°	—
Pump	Pump pressure with valve closed (Oil temp./ speed: 40°C (104°F) min/idle. Do not run for more than 5 seconds) kPa (kg/cm², psi)	7,845—8,826 (80—90, 1,138—1,280)	
Power steering fluid	Fluid capacity	Reservoir ·····0.4 ℓ (0.42 U.S.qt., 0.35 Imp. qt.) At change ·····approx. 1.2 ℓ (1.3 U.S. qt., 1.1 Imp. qt.)	
Power steering belt	Deflection when 98 N (10 kg, 22 lb) between the pulleys	9—12 (0.35—0.47) for used belt 7—10 (0.28—0.39) after replacement of belt	
	Belt tension between the pulleys N (kg, lb) (Measured with the belt tension gauge)	343-490 (35-50, 77-110) 441 - 686 (45 - 70, 99 - 154)	
Rack end	Pivoting resistance N·m (kg-m, lb-ft)	0.49—1.96 (0.05—0.2, 0.36—1.45)	—

○ : Normal ratio, ● : Variable ratio (Si)

12. Suspension

	MEASUREMENT		STANDARD (NEW)		SERVICE LIMIT	
Wheel alignment			Front	Rear		
	Toe-in		0±2 (0±0.08)	2^{+2}_{-1} ($0.08^{+0.08}_{-0.04}$)	—	—
	Camber	2D H/B, 4D	0°00′±1°	−0°26′±1°	—	—
		4D 4WD, 4WD H/B	0°19′±1°	−0°23′±1°	—	—
		4D H/B 4WD	0°35′±1°	0°00′±1°	—	—
	Caster	2D H/B	2°59′±1°		—	
		4D H/B	2°58′±1°		—	
		4D H/B 4WD	2°56′±1°		—	
	Side slip		0±3 (0±0.12)		—	
	Turning angle (max.)					
	Inward wheel	except 4D H/B 4WD	41°30′±2°		—	
		4D H/B 4WD	42°00′±2°		—	
	Outward wheel	except 4D H/B 4WD	33°30′±2°		—	
		4D H/B 4WD	33°50′±2°		—	
Wheel	Rim runout	Steel	0—1.0 (0—0.039)		2.0 (0.08)	
		Aluminum	0—0.7 (0—0.028)		1.5 (0.06)	
Wheel bearing	End play	Front	0		0.05	
		Rear	0		0.05	

Unit: mm (in)

13. Brake

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	*Play in stroke 200N (20 kg, 44 lbs)*		To be locked when pulled 6—10 notches	
Foot brake pedal	Pedal height	RHD	161 (6.3) from floor	—
		LHD	153 (6.0) from floor	—
	Free play		1—5 (0.04—0.20)	5 (0.20)
Master cylinder	Piston-to-push rod clearance		0—0.4 (0—0.016)	—
Disc brake	Disc thickness	Front *1	12.0 (0.47)	10.0 (0.39)
		*2	17.0 (0.67)	15.0 (0.59)
		*3	19.0 (0.75)	17.0 (0.67)
		*8	21.0 (0.83)	19.0 (0.75)
		Rear	10.0 (0.39)	8.0 (0.32)
	Disc runout	Front/Rear	—	0.1 (0.004)/0.15 (0.006)
	Disc parallelism		—	0.015 (0.006)
	Pad thickness	Front *4	9.5 (0.37)	3.0 (0.12)
		*5	9.5 (0.37)	1.6 (0.06)
		*6	10.5 (0.41)	1.6 (0.06)
		*7	9.0 (0.35)	3.0 (0.12)
		*8	10.0 (0.39)	1.6 (0.06)
		Rear	8.0 (0.32)	1.6 (0.06)
Brake Drum	I.D.	except 4D H/B	180 (7.09)	181 (7.13)
		4D H/B	200 (7.87)	201 (7.91)
	Lining thickness		4.5 (0.18)	2.0 (0.08)

Brake booster	Characteristics		Vacuum (mm Hg)	Pedal Pressure kg (lbs)	Line Pressure kPa (kg/cm², psi)
	7"	1.2ℓ, 1.3ℓ DX GL (KP, KT except 4D H/B)	0 300 500	20 (44) 20 (44) 20 (44)	1.577 (16.1, 229) 4.292 (43.8, 623) 6.096 (62.2, 885)
	8"	GL (EC except KS, KQ, KY), 4D H/B General models	0 300 500	20 (44) 20 (44) 20 (44)	1.577 (16.1, 229) 5.194 (53.0, 754) 7.595 (77.5, 1102)
		Others	0 300 500	20 (44) 20 (44) 20 (44)	1.362 (13.9, 198) 4.508 (46.0, 654) 6.605 (67.4, 960)

*1: 1.2ℓ, 1.3ℓ
*2: 2D H/B (1.4ℓ), 4D (1.4ℓ, 1.5ℓ 1-carb. except KY), 4D H/B (KP, KT)
*3: 2D H/B (1.5ℓ, 1.6ℓ), 4D (KY, 1.5ℓ 2-carb., 1.5ℓ PGM-FI, 1.6ℓ), 4D H/B (except KP, KT)
*4: 2D H/B, 4D EC model (1.2ℓ DX, 1.3ℓ DX and GL except KX, KS)
*5: 2D H/B, 4D General Model (except KQ, KY)
*6: 2D H/B, 4D GL-KX and 4D H/B EC model (except KG, KS)
*7: 2D H/B, 4D GL-KS, 1.6ℓ, 4D H/B KG, KS model and 4WD model
*8: KQ, KY model

15. Air Conditioner

	MEASUREMENT	STANDARD (NEW)
Compressor		MATSUSHITA
	Cooling capacity	3,850 kcal/h
	Refrigerant quantity	0.9 ± 0.05 kg (1.98 ± 0.11lb,)
	Lubricant capacity	130 cc
	Clutch resistance	3.33 ± 0.17 ohm at 20°C (68°F)
	Clutch clearance	0.4-0.6
Compressor belt	Deflection when 98 N (10kg, 22 lb) between the pulleys	9-11 (0.35-0.43) with used belt 7-9 (0.28-0.35) with new belt
	Belt tension between the pulleys N (kg, lb) (Measure with belt tension gauge)	343-442 (35-45, 77-99) with used belt 442-686 (45-70, 99-154) with new belt

Standards and Service Limits

16. Electrical

	MEASUREMENT	STANDARD (NEW)			
Ignition coil	Rated voltage	12 Volts			
	Primary winding resistance	0.3—0.5 ohms			
	Secondary winding resistance	9,440—14,160 ohms			
Ignition wire	Resistance	25,000 ohms max.			
Spark plug				Standard	Optional
	Type	Unleaded gasoline	NGK	BCPR6E-11	BCPR6EY-N11 BCPR7E-11 BCPR7EY-N11
			ND	Q20PR-U11	Q22PR-U11
		Leaded gasoline	NGK	BCPR6E-11	BCPR7E-11
			ND	20PR-U11 20PR-UL11 (*)	20PR-U11 (*) 22PR-U11 22PR-UL11 (*)
	(*): 1.6 ℓ DOHC only				
	Gap	1.0—1.1 (0.039—0.043)			
Ignition timing	At idling PGM-FI SOHC	18° ± 2° (Red) BTDC			
	DOHC	16° ± 2° (Red) BTDC			
	1-Carbureted Engine				
	KT (1.2 ℓ)	16° ± 2° (Red) BTDC			
	KG (1.3 ℓ M/T), KY (1.5 ℓ A/T)	12° ± 2° (Red) BTDC			
	KG (1.3 ℓ A/T)	2° ± 2° (Red) BTDC			
	Others (1.2 ℓ)	20° ± 2° (Red) BTDC			
	Others (1.3 ℓ, 1.5 ℓ)	18° ± 2° (Red) BTDC			
	2-Carbureted Engine				
	KQ	20° ± 2° (Red) BTDC			
	KG (A/T)	2° ± 2° (Red) BTDC			
	KG (M/T)	12° ± 2° (Red) BTDC			
	Others	18° ± 2° (Red) BTDC			
Battery	Lighting capacity (20-hour rate)	47 (European), 45 (General) Ampere Hours			
	Starting capacity (Voltege after 5 see.)	8.6 V min. at 300 Ampere draw/–15°C			
Alternator belt	Deflection when 98 N (10 kg, 22 lb) between the pulleys	9-11 (0.35-0.43) with used belt 7-9 (0.28-0.35) with new belt			
	Belt tension between the pulleys N (kg, lb) (Measure with belt tension gauge)	294-392 (30-40, 66-88) with used belt 392-588 (40-60, 88-132) with new belt			

Alternator		ND		MITSUBISHI	
	Output	13.5V / 60A			
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Coil resistance (rotor)	2.8—3.0 ohm	±0.1 ohm	3.4—3.8 ohm	±0.2 ohm
	Slip ring O.D.	32.5 (1.28)	32.1 (1.26)	22.7 (0.89)	22.2 (0.87)
	Brush length	13.5 (0.53)	4.5 (0.18)	22 (0.87)	8 (0.31)
	Brush Spring tension	300—500g (10.6—17.6 oz)	—	300—450g (10.6—15.9 oz)	—

Starting motor		HITACHI 0.8 kw		ND 0.8 kw		ND 1.0 kw, 1.2 kw		MITSUBA 1.0 kw, 1.4 kw	
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Mica depth	0.5—0.8 ($^{0.020}_{-0.031}$)	0.2 (0.008)	0.5—0.8 ($^{0.020}_{-0.031}$)	0.2 (0.008)	0.5—0.8 ($^{0.020}_{-0.031}$)	0.2 (0.008)	0.4—0.5 ($^{0.016}_{-0.020}$)	0.15 (0.006)
	Commutator	0—0.1 (0.004)	0.4 (0.016)	0.05 (0.002)	0.4 (0.016)	0—0.02 (0.0008)	0.05 (0.002)	0—0.02 (0.0008)	0.05 (0.002)
	Commutator O.D.	40.0 (1.57)	39.0 (1.54)	28.0 (1.10)	27.0 (1.06)	29.9—30.0 (1.18)	29.0 (1.14)	28.0—28.1 (1.10—1.11)	27.5 (1.08)
	Brush length	14.5—15.5 (0.57—0.61)	11.0 (0.43)	15.5—16.5 (0.61—0.65)	10.0 (0.39)	12.5—13.5 (0.49—0.53)	8.5 (0.33)	14.3—14.7 (0.56—0.58)	9.3 (0.37)
	Spring Pressure (new)	15.7 N (1.6 kg, 3.5 lb)	—	15.7 N (1.6 kg, 3.5 lb)	—	18.1—23.9 N (1.85—2.4 kg, 4.1—5.4 lb)	—	20.1—26.5 N (2.05—2.7 kg, 4.5—6.0 lb)	—

Design Specifications

2D H/B

specs

	ITEMS		METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length		3,995 mm	157.3 in.	
			4,005 mm	157.7 in.	with registration plate guard
			3,990 mm	157.1 in.	KQ, KY
	Overall Width		1,680 mm	66.1 in.	
			1,670 mm	65.7 in.	1.2 ℓ, 1.3 ℓ
	Overall Height		1,330 mm	52.4 in.	
			1,360 mm	53.5 in.	KY
	Wheelbase		2,500 mm	98.4 in.	
	Track, Front/Rear		1,450/1,455 mm	57.1/57.3 in.	
			1,445/1,450 mm	56.9/57.1 in.	KY
	Ground Clearance		160 mm	6.3 in.	
			150 mm	5.9 in.	cars with CATA
	Seating Capacity		5		
	Overhang, Front/Rear		795/700 mm	31.3/27.6 in.	
			805/700 mm	31.7/27.6 in.	with registration plate guard
WEIGHTS	Engine Weight (Wet)				
		1.2 ℓ	93 kg	205 lb.	
		1.3 ℓ	95 kg	209 lb.	
		1.4 ℓ	98 kg	216 lb.	
		1.5 ℓ 1-Carbureted	94 kg	207 lb.	
		1.5 ℓ 2-Carbureted	101 kg	222 lb.	
		1.5 ℓ PGM-FI	100 kg	220 lb.	
		1.6 ℓ SOHC	107 kg	236 lb.	
		1.6 ℓ DOHC	113 kg	249 lb.	
	Curb weight	1.2 ℓ M/T	845 kg	1,862 lb.	KB
		1.3 ℓ M/T	860 kg	1,896 lb.	KB, KF, KE, KW, KG
			865 kg	1,907 lb.	KW (SF)
			875 kg	1,929 lb.	KG
			880 kg	1,940 lb.	KS
		1.3 ℓ A/T	880 kg	1,940 lb.	KB, KE, KF, KW
			885 kg	1,951 lb.	KW(SF)
		1.4 ℓ M/T	875 kg	1,929 lb.	KB, KF, KW
			880 kg	1,940 lb.	KW(SF)
			890 kg	1,962 lb.	KE
		1.4 ℓ A/T	895 kg	1,973 lb.	KB, KF, KW
			900 kg	1,984 lb.	KW(SF)
			910 kg	2,006 lb.	KE
		1.5 ℓ M/T (DX)	900 kg	1,984 lb.	KW, KX
		1.5 ℓ M/T (GL)	905 kg	1,995 lb.	KS
			915 kg	2,017 lb.	KX
			900 kg	1,984 lb.	KW
			910 kg	2,006 lb.	KG
		1.5 ℓ A/T (DX)	920 kg	2,028 lb.	KX
		1.5 ℓ A/T (GL)	925 kg	2,039 lb.	KS
			935 kg	2,061 lb.	KX
			920 kg	2,028 lb.	KW
		1.3 ℓ M/T	874 kg	1,927 lb.	KT
		1.3 ℓ A/T	894 kg	1,971 lb.	KT
		1.5 ℓ M/T (DX)	901 kg	1,986 lb.	KQ
		1.5 ℓ M/T (GL)	925 kg	2,039 lb.	KQ
			945 kg	2,083 lb.	KY
		1.5 ℓ A/T (GL)	946 kg	2,086 lb.	KQ
			965 kg	2,127 lb.	KY

SF : Finland

(cont'd)

Design Specifications

2 D H/B (cont'd)

	ITEMS	METRIC	ENGLISH	NOTES
WEIGHTS	weight Distribution (Front/Rear)			
	1.3 ℓ A/T	545/335 kg	1,202/739 lb.	KB, KE, KF, KW
		550/335 kg	1,216/739 lb.	KW (SF)
	1.4 ℓ M/T	535/340 kg	1,179/750 lb.	KB
		540/340 kg	1,190/750 lb.	KW (SF)
		550/340 kg	1,213/750 lb.	KE
	1.4 ℓ A/T	555/340 kg	1,224/750 lb.	KB, KF, KW
		560/340 kg	1,235/750 lb.	KW (SF)
		570/340 kg	1,257/750 lb.	KE
	1.5 ℓ M/T (DX)	550/350 kg	1,213/750 lb.	KW, KX
	1.5 ℓ M/T (GL)	555/350 kg	1,224/772 lb.	KS
		565/350 kg	1,246/772 lb.	KX
		550/350 kg	1,213/772 lb.	KW
		560/350 kg	1,235/772 lb.	KG
	1.5 ℓ A/T (DX)	570/350 kg	1,257/772 lb.	KX
	1.5 ℓ A/T (GL)	575/350 kg	1,268/772 lb.	KS
		585/350 kg	1,290/772 lb.	KX
		570/350 kg	1,257/772 lb.	KW
		580/350 kg	1,279/772 lb.	KG
	1.6 ℓ SOHC	570/365 kg	1,257/805 lb.	KG, KX, KW (A)
		575/365 kg	1,268/805 lb.	KW, KS
	1.6 ℓ DOHC	580/365 kg	1,257/805 lb.	KB, KF, KW
		590/365 kg	1,301/805 lb.	KR (SF)
		595/375 kg	1,312/827 lb.	KE
		585/365 kg	1,290/805 lb.	KF, KR
	1.3 ℓ M/T	536/338 kg	1,182/745 lb.	KT
	1.3 ℓ A/T	556/338 kg	1,226/745 lb.	KT
	1.5 ℓ M/T (DX)	554/347 kg	1,221/765 lb.	KQ
	1.5 ℓ M/T (GL)	571/354 kg	1,259/780 lb.	KQ
		586/359 kg	1,292/791 lb.	KY
	1.5 ℓ A/T (GL)	595/351 kg	1,312/774 lb.	KQ
		607/358 kg	1,338/789 lb.	KY
	Max. Permissible weight (EC)			
	1.2 ℓ	1,310 kg	2,888 lb.	
	1.3 ℓ	1,310 kg	2,888 lb.	except "S"
		1,270 kg	2,800 lb.	"S" only
	1.4 ℓ	1,340 kg	2,954 lb.	
	1.5 ℓ	1,370 kg	3,020 lb.	except "S"
		1,300 kg	2,866 lb.	"S" M/T
		1,320 kg	2,910 lb.	"S" A/T
	1.6 ℓ	1,380 kg	3,042 lb.	except "S"
		1,320 kg	2,910 lb.	"S" only
	Maximum Loaded Vehicle Weight	1,390 kg	3,064 lb.	KY
ENGINE	Type	Water cooled 4-stroke S.O.H.C.		
	1.6 ℓ without CATA	Water cooled 4-stroke D.O.H.C.		
	Cylinder arrangement	4-cylinder in-line, transverse		
	Bore and Stroke 1.2 ℓ	75×67.5 mm	2.95×2.66 in.	
	1.3 ℓ	75×76 mm	2.95×2.99 in.	
	1.4 ℓ	75×79 mm	2.95×3.11 in.	
	1.5 ℓ	75×84.5 mm	2.95×3.33 in.	
	1.6 ℓ	75×90 mm	2.95×3.54 in.	
	Displacement 1.2 ℓ	1,193 cm³ (cc)	73 cu. in.	
	1.3 ℓ	1,343 cm³ (cc)	82 cu. in.	
	1.4 ℓ	1,396 cm³ (cc)	85 cu. in.	
	1.5 ℓ	1,493 cm³ (cc)	91 cu. in.	
	1.6 ℓ	1,590 cm³ (cc)	97 cu. in.	
	Compression Ratio			
	1.2 ℓ	8.6		
	1.3 ℓ	9.0		
	1.4 ℓ	9.3		
	1.5 ℓ	9.2		
	1.6 ℓ with CATA	9.1		
	1.6 ℓ without CATA	9.5		
	Valve Train 1.6 ℓ without CATA	4-valves per cylinder, double overhead camshafts		
	Others	4-valves per cylinder, single overhead camshaft		
	Lubrication System	Forced and wet sump		
	Fuel Required			
	Engine with CATA	Unleaded gasoline with 91 R.O.N or higher		* Both leaded and unleaded gasoline can be used.
	Carbureted engines without CATA	*Gasoline with 91 R.O.N or higer		
	PGM-FI DOHC without CATA	Leaded gasoline with 97 R.O.N or higher		
	PGM-F I without CATA	eadedgasoline with 97 R.O.N. or higher		
		or unleaded gasoline with 95 R.O.N. or higher		

SF : Finland A : Austria "S" : Sweden

	ITEMS	METRIC	ENGLISH	NOTES
STARTER	Type 0.8 kW 1.0 kW, 1.2 kW, 1.4kW	Direct *Gear reduction*		
	Normal Output	0.8 kW, 1.0 kW, 1.2 kW, 1.4 kW		
	Normal Voltage	12V		
	Hour Rating	30 seconds		
	Direction of Rotation	Clockwise as viewed from gear end		
	Weight 0.8 kW HITACHI/ND	4.4 kg	9.7 lb.	
	1.0 kW MITSUBA	3.4 kg	7.5 lb.	
	ND	3.85 kg	8.5 lb.	
	1.2 kW ND	3.85 kg	8.5 lb.	
	1.4 kW MITSUBA	3.7 kg	8.2 lb.	
TRANSMISSION	Clutch M/T A/T	Single plate dry, diaphragm spring Torque converter		
	Transmission Type M/T	5 speeds forward, synchromesh, 1 speed reverse, constant mesh		
	A/T	4 speeds forward, with lock-up clutch, 1 speed reverse		
	Primary Reduction	1.000		
	Gear Ratio	M/T | 1.6 DOHC M/T | A/T		
	1st	3.250 | 3.250 | 2.705		
	2nd	1.894 | 1.944 | 1.560		
	3rd	1.259 | 1.346 | 1.027		
	4th	0.937 | 1.033 | 0.780		
	5th	0.771 | 0.878 | —		
	Reverse	3.153 | — | 1.954		
	Final Reduction M/T 1.2 ℓ	Single helical gear, 4.058		KB
	1.3 ℓ	Single helical gear, 4.250		KP, KT, KU
	1.4 ℓ	Single helical gear, 4.058		
	1.5 ℓ	Single helical gear, 4.250		
		Single helical gear, 4.058		KX, KW, KS
		Single helical gear, 4.214 (A/T)		KG
	1.6 ℓ SOHC	Single helical gear, 4.250		KQ
	1.6 ℓ DOHC	Single hlhical gear, 4.250		
	A/T	Single helical gear, 3.888		
		Single helical gear, 3.933		
	Clutch Facing Area	160 cm^2	24.8 sq. in.	
AIR CONDI-TIONER	Compressor	MASTUSHITA		
	Cooling Capacity —Conditions:	3,850 Kcal/h		
	Compression min^{-1} (rpm)	1,800 min^{-1} (rpm)		
	Outside Air Temperature	27.0°C	81°F	
	Outside Air Humidity	50%		
	Condenser Air Temperature	35°C	95°F	
	Condenser Air Velocity	4.5 m/sec.	14.8 ft/sec.	
	Blower Capacity	440 m^3/h	15,118 cu. ft/h	
	Compressor Type	Vane rotary type		
	Number of Vane	3		
	Displacement	130cc/rev.	7.93 cu. in. /rev	
	Max. min^{-1} (rpm)	7,500 min^{-1} (rpm)		
	Lubricant Capacity	130 cc	7.93 cu. in.	
	Receiver Dryer With Desiccant	Includes fusible safety plug.		
	Condenser	Corrugated fin type		
	Evaporator	Corrugated fin type		

(cont'd)

Design Specifications

2D H/B (cont'd)

	ITEMS		METRIC	ENGLISH	NOTES
AIR CONDITIONER	Blower	Type	Sirocco fan		
		Motor Input	170 W (12 V)		
		Speed Control	4 speeds		
		Max. Capacity	390 m³/h	13,773 cu. ft/h	
	Temp. Control		Air-mix type		
	Comp. Clutch	Type	Dry, single plate, V-belt		
		Power Consumption	32 W max. 12 V		
	Refrigerant	Type	R-12		
		Quantity	0.9±0.05 kg	1.98±0.11 lb	
STEERING SYSTEM	Type		Rack and pinion		
	Overall Ratio	Manual	18.6: 1		
		Variable ratio	19.8 (18—20.4): 1		1.6 ℓ only
		Power	17.7: 1		
	Turns, Lock-to-lock	Manual	3.8		
		Variable ratio	4.1		1.6 ℓ only
		Power	3.6		
	Steering Wheel Diameter	Dx	377 mm	14.8 in.	
		Others	370 mm	14.6 in.	
SUSPENSION SYSTEM	Type	Front/Rear	Independent by double wishbones, coil springs		
	Shock Absorber	Front	Telescopic, nitrogen gas-filled		
		Rear	Telescopic, nitrogen gas-filled		
WHEEL ALIGNMENT	Wheel Alignment				
	Camber	Front	0°00′ ± 1°		
		Rear	−0°30′ ± 1°		
	Caster	Front	2°59′ ± 1°		
	Toe-in	Front	0±2 mm	0±0.08 in.	
		Rear	2^{+3}_{-1} mm	$0.08^{+0.08}_{-0.04}$ in.	
	Kingpin Inclination		7°34′		
BRAKE SYSTEM	Type Front 1.2 ℓ, 1.3 ℓ		Power assisted self-adjusting disc		
	1.4 ℓ, 1.5 ℓ, 1.6 ℓ		Power assisted self-adjusting ventilated disc		
	Rear 1.6 ℓ		Power assisted self-adjusting disc		
	Others		drum		
	Pad Surface Area				
	Front 1.2 ℓ, 1.3 ℓ, 1.4 ℓ,		36.8 mm²	5.70 sq. in.	Carbureted engine
	1.5 ℓ, 1.6 ℓ		44.1 mm²	6.84 sq. in.	PGM-FI
	Rear 1.2 ℓ, 1.3 ℓ, 1.4 ℓ, 1.5 ℓ		50.2 mm²	7.78 sq. in.	Drum
	1.6 ℓ		21.0 mm²	3.25 sq. in.	Disc (1.6 ℓ)
	Effective Disc Diameter				
	Front 1.2 ℓ, 1.3 ℓ, 1.4 ℓ		190 mm	7.48 in.	Carbureted engine
	1.5 ℓ, 1.6 ℓ		194 mm	7.64 in.	PGM-FI
	Rear		208 mm	8.19 in.	
	Brake Drum I.D. Rear		180 mm	7.09 in.	
	Parking Brake Kind and Type		Mechanically actuating, rear two wheel brakes		
TIRES	Front/Rear	1.2 ℓ, 1.3 ℓ	155SR13, 155R13 78S		KB, KG KF, KE, KW, KS
			155SR13, 165SR13 (rough road type only)		KP, KT, KU
		1.4 ℓ, 1.5 ℓ	165/80R13 82S		KY
			165/70R13 79S		KQ
			165/70R13 79S or 175/70R13 82H		KB, KG, KX, KW, KS
					KF, KE, KW (1.4 ℓ)
		1.6 ℓ	185/60R14 82H		
	Spare		T105/80D 13		Standard for some types.

	ITEMS	METRIC	ENGLISH	NOTES
ELECTRICAL	Battery	12V-47 AH (European), 12V-45AH (General)		
	Starter	12V-0.8 kW, 1.0 kW, 1.2 kW, 1.4 kW		
	Alternator	12V-60 amps		
	Fuses In the dash fuse box	10A, 15A, 20A*, 30A		20A*: Finland only
	In the main fuse box	10A, 15A, 20A, 50A, 60A		
	Headlights High/Low	12V-60/55W		
	Front Turn Signal Lights	12V-21W		
	Rear Turn Signal Lights	12V-21W		
	Side Turn Signal Lights	12V-5W		
	Stop/Taillights	12V-21/5W		
	Side Marker Lights	12V-5W		
	Back-up Lights	12V-21W		
	License Plate Lights	12V-5W		
	Gauge Lights	12V-3.4W, 3.0W, 1.4W		
	Indicator Lights	12V-1.4W		
	Warning Lights	12V-5W		
	Dome Light	12V-3.4W		
	Trunk Light	12V-1.4W		
	Illumination and Pilot Lights	12V-1.4W 0.91W, 0.84W, LED		
	Heater Illumination Lights	12V-1.4W		

Design Specifications

4D

	ITEMS	METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length	4,295 mm	169.1 in.	
		4,285 mm	168.7 in.	KQ
	with registration plate guard	4,305 mm	169.5 in.	SF
		1,695 mm	66.7 in.	with door protector
	Overall Width	1,690 mm	66.5 in.	without door protector
	Overall Height	1,360 mm	53.5 in.	
		1,385 mm	54.5 in.	KY
		1,380 mm	54.3 in.	4WD
	Wheelbase	2,500 mm	98.4 in.	
	Track, Front/Rear	1,450/1,455 mm	57.1/57.3 in.	
		1,445/1,450 mm	56.9/57.1 in.	KY
	Ground Clearance	160 mm	6.3 in.	
		150 mm	5.9 in.	cars with CATA
	Seating Capacity	5		
	Overhang, Front/Rear	815/980 mm	32.1/38.6 in.	includes bumper
	with registration plate guard	825/980 mm	32.5/38.6 in.	includes bumper
WEIGHTS	Engine Weight (Wet)			
	1.2 ℓ	93 kg	205 lb.	
	1.3 ℓ	95 kg	209 lb.	
	1.4 ℓ	98 kg	216 lb.	
	1.5 ℓ 1-Carbureted	94 kg	207 lb.	
	1.5 ℓ 2-Carbureted	101 kg	222 lb.	
	1.5 ℓ PGM-FI	100 kg	220 lb.	
	1.6 ℓ SOHC	107 kg	236 lb.	
	Curb weight 1.2 ℓ M/T	880 kg	1,940 lb.	KB, KW
		885 kg	1,951 lb.	KW (SF)
	1.4 ℓ M/T	915 kg	2,017 lb.	KB, KE, KW
		920 kg	2,028 lb.	KW (SF)
	1.4 ℓ A/T	935 kg	2,061 lb.	KB, KE, KW
		940 kg	2,072 lb.	KW (SF)
	1.5 ℓ M/T (DX)	920 kg	2,028 lb.	KW
		935 kg	2,061 lb.	KS
	1.5 ℓ M/T (GL)	930 kg	2,050 lb.	KW, KX
		950 kg	2,094 lb.	KG
		935 kg	2,061 lb.	KG (NL, DK), KS
	1.5 ℓ A/T (GL)	950 kg	2,094 lb.	KW, KX
		970 kg	2,138 lb.	KG
		955 kg	2,105 lb.	KG (NL, DK), KS
	1.6 ℓ	975 kg	2,149 lb.	KB, KG, KX
		980 kg	2,161 lb.	KW, KS
		985 kg	2,171 lb.	KW (SF)
	1.6 ℓ M/T 4WD	1,070 kg	2,359 lb.	KX
		1,075 kg	2,370 lb.	KS
		1,065 kg	2,349 lb.	KW (A)
	1.6 ℓ A/T 4WD	1,090 kg	2,403 lb.	KX
	1.3 ℓ M/T	895 kg	1,973 lb.	Singapore
	1.3 ℓ A/T	915 kg	2,017 lb.	Singapore
	1.5 ℓ M/T (DX)	946 kg	2,086 lb.	KQ
	1.5 ℓ M/T (GL)	977 kg	2,154 lb.	KQ
		985 kg	2,171 lb.	KY
		935 kg	2,061 lb.	Singapore
	1.5 ℓ M/T (EX)	1,005 kg	2,216 lb.	KY
	1.5 ℓ A/T (GL)	997 kg	2,198 lb.	KQ
		1,005 kg	2,216 lb.	KY
		955 kg	2,105 lb.	Singapore
	1.5 ℓ A/T (EX)	1,025 kg	2,260 lb.	KY
	Weight Dstribution (Frort/Rear)			
	1.2 ℓ M/T	525/355 kg	1,157/783 lb.	KB, KW
		530/355 kg	1,168/783 lb.	KW (SF)
	1.4 ℓ M/T	545/370 kg	1,202/816 lb.	KB, KE, KW
		550/370 kg	1,213/816 lb.	KW (SF)
	1.4 ℓ A/T	565/370 kg	1,246/816 lb.	KB, KE, KW
		570/370 kg	1,257/816 lb.	KW (SF)
	1.5 ℓ M/T (DX)	550/370 kg	1,213/816 lb.	KW
		565/370 kg	1,246/816 lb.	KS
	1.5 ℓ M/T (GL)	560/370 kg	1,235/816 lb.	KW, KX
		580/370 kg	1,279/816 lb.	KG
		565/370 kg	1,246/816 lb.	KG (NL, DK), KS
	1.5 ℓ A/T (GL)	580/370 kg	1,279/816 lb.	KW, KX
		600/370 kg	1,323/816 lb.	KG
		585/370 kg	1,290/816 lb.	KG (NL, DK), KS
	1.6 ℓ	585/390 kg	1,290/860 lb.	KB, KG, KX

SF : Finland NL:Netherlands DK:DenmarK A : Austria

	ITEMS	METRIC	ENGLISH	NOTES
WEIGHTS	1.6ℓ	590/390 kg	1,301/860 lb.	KW, KS
		595/390 kg	1,312/860 lb.	KW (SF)
	1.6 ℓ M/T 4WD	625/445 kg	1,379/981 lb.	KX
		630/445 kg	1,389/981 lb.	KS
		620/445 kg	1,367/981 lb.	KW (A)
	1.6 ℓ A/T 4WD	645/445 kg	1,422/981 lb.	KX
	1.3 ℓ M/T	527/368 kg	1,162/811 lb.	Singapore
	1.3 ℓ A/T	547/368 kg	1,206/811 lb.	Singapore
	1.5 ℓ M/T (DX)	567/379 kg	1,250/836 lb.	KQ
	1.5 ℓ M/T (GL)	586/391 kg	1,292/862 lb.	KQ
		591/394 kg	1,303/869 lb.	KY
		571/364 kg	1,259/802 lb.	Singapore
	1.5 ℓ M/T (EX)	603/402 kg	1,329/886 lb.	KY
	1.5 ℓ A/T (GL)	607/390 kg	1,338/860 lb.	KQ
		613/392 kg	1,351/864 lb.	KY
		591/364 kg	1,303/802 lb.	Singapore
	1.5 ℓ A/T (EX)	625/400 kg	1,378/882 lb.	KY
	Max. Permissible Weight (EC)			
	1.2 ℓ	1,340 kg	2,954 lb.	KB, KW
	1.4 ℓ	1,370 kg	3,020 lb.	KB, KF, KE, KW
	1.5 ℓ	1,400 kg	3,086 lb.	KG, KS, KX, KW
	1.6 ℓ	1,410 kg	3,108 lb	KB, KG, KS, KX, KW
	1.6 ℓ 4WD	1,540 kg	3,395 lb	KX, KS, KW
	Maximum Loaded Vehicle Weight	1,440 kg	3,175 lb.	KY
ENGINE	Type	Water cooled 4-cycle S.O.H.C.		
	Cylinder arrangement	4-cylinder in-line, transverse		
	Bore and stroke 1.2 ℓ	75×67.5 mm	2.95×2.66 in.	
	1.3 ℓ	75×76 mm	2.95×2.99 in.	
	1.4 ℓ	75×79 mm	2.95×3.11 in.	
	1.5 ℓ	75×84.5 mm	2.95×3.33 in.	
	1.6 ℓ	75×90 mm	2.95×3.54 in.	
	Displacement 1.2 ℓ	1,193 cm³ (cc)	73 cu. in.	
	1.3 ℓ	1,343 cm³ (cc)	82 cu. in.	
	1.4 ℓ	1,396 cm³ (cc)	85 cu. in.	
	1.5 ℓ	1,493 cm³ (cc)	91 cu. in.	
	1.6 ℓ	1,590 cm³ (cc)	97 cu. in.	
	Compression Ratio			
	1.2 ℓ	8.6		
	1.3 ℓ	9.0		
	1.4 ℓ	9.3		
	1.5 ℓ	9.2		
	1.6 ℓ	9.1		
	Valve Train	4-valves per cylinder, single overhead camshaft		
	Lubrication System	Forced and wet sump		
	Fuel Required			
	Engines with cata.	Unleaded gasoline with 91 R.O.N or higher		* Both leaded and unleaded gasoline can be used.
	Carbureted engines without cata.	*Gasoline with 91 R.O.N or higer		
	PGM-FI without cata.	Leaded gasoline with 97 R.O.N or higher or unleaded gasoline with 95 R.O.N. or higher		
STARTER	Type 0.8 kW	Direct		
	1.0 kW, 1.2 kW, 1.4kW	Gear reduction		
	Normal Output	0.8 kW, 1.0 kW, 1.2 kW, 1.4 kW		
	Normal Voltage	12V		
	Hour Rating	30 seconds		
	Direction of Rotation	*Clockwise as viewed from gear end*		
	Weight 0.8 kW HITACHI/ND	4.4 kg	9.7 lb.	
	1.0 kW MITSUBA	3.4 kg	7.5 lb.	
	ND	3.85 kg	8.5 lb.	
	1.2 kW ND	3.85 kg	8.5 lb.	
	1.4 kW MITSUBA	3.7 kg	8.2 lb.	
TRANSMISSION	Clutch M/T	Single plate dry, diaphragm spring		
	A/T	Torque converter		
	Transmission Type M/T	5-speed forward, synchromesh, 1-speed reverse		
	M/T + Super Low Gear	6-speed forward, synchromesh, 1-speed reverse		
	A/T	*4-speed forward, with lock-up clutch, 1 speed reverse*		
	Primary Reduction	1.000		

		5-M/T	4-A/T	4WD 5-M/T	4WD 4-A/T
Gear Ratio	Super low	—	—	4.512	—
	I	3.250	2.705	3.384	2.529
	II	1.894	1.560	1.950	1.428
	III	1.259	1.027	1.275	0.974
	IV	0.937	0.780	0.941	0.733
	V	0.771	—	0.783	—
	Reverse	3.153	1.954	3.000	1.954

(cont'd)

Design Specifications

4D (cont'd)

	ITEMS		METRIC	ENGLISH	NOTES
TRANSMISSION	Final Reduction	M/T 1.2 ℓ	Single helical gear, 4.058		KB, KW
		1.3 ℓ	Single helical gear, 4.250		KP, KT, KU
		1.4 ℓ	Single helical gear, 4.058		KP, KT, KU
		1.5 ℓ	Single helical gear, 4.250		KB, KF, KG, KE, KW
			Single hehical gear, 4.058		KX, KS, KP, KT, KU, KY
		1.6 ℓ	Single helical gear, 4.214 (A/T)		KG
		1.6 ℓ 4WD	Single helical gear, 4.250		KQ, KW
		A/T	Single helical gear, 4.250		KB, KG, KW, KS, KX
			Single helical gear, 4.428		
		4WD A/T	Single helical gear, 3.933		
			Single helical gear, 4.333		
	Clutch Facing Area		160 cm²	24.8 sq. in.	
AIR CONDITIONER	Compressor		MATSUSHITA		
	Cooling Capacity		3,850 Kcal/h		
	—Conditions:				
	Compression min^{-1} (rpm)		1,800 min^{-1} (rpm)		
	Outside Air Temperature		27.0°C	81°F	
	Outside Air Humidity		50%		
	Condenser Air Temperature		35°C	95°F	
	Condenser Air Velocity		4.5 m/sec.	14.8 ft/sec.	
	Blower Capacity		440 m³/h	15,118 cu. ft/h	
	Compressor	Type	Vane rotary type		
		Number of Vane	3		
		Displacement	130cc/rev.	7.93 cu. in. /rev	
		Max. min^{-1} (rpm)	7,500 min^{-1} (rpm)		
		Lubricant Capacity	130 cc	7.93 cu. in.	
	Receiver Dryer With Desiccant		Includes fusible safety plug.		
	Condenser		Corrugated fin type		
	Evaporator		Corrugated fin type		
	Blower	Type	Sirocco fan		
		Motor Input	170 W (12 V)		
		Speed Control	4 speeds		
		Max. Capacity	390 m³/h	13,773 cu. ft/h	
	Temp. Control		Air-mix type		
	Comp. Clutch	Type	Dry, single plate, V-belt		
		Power Consumption	32 W max. 12 V		
	Refrigerant	Type	R-12		
		Quantity	0.9±0.05 kg	1.98±0.11 lb	
STEERING SYSTEM	Type		Rack and pinion		
	Overall Ratio	Manual	18.6: 1		
		Power	17.7: 1		
	Turns, Lock-to-lock	Manual	3.8		
		Power	3.6		
	Steering Wheel Diameter	except 1.6 ℓ	377 mm	14.8 in.	
		1.6 ℓ	370 mm	14.6 in.	
SUSPENSION SYSTEM	Type	Front/Rear	Independent by double wishbones, coil springs		
	Shock Absorber	Front	Telescopic, hydraulic		
		Rear	Telescopic, nitrogen gas-filled		

	ITEMS	METRIC	ENGLISH	NOTES
WHEEL ALIGNMENT	Wheel Alignment			
	Camber Front	0°00′ ± 1°		
	Rear	−0°30′ ± 1°		
	Caster Front	2°59′ ± 1°		
	Toe-in Front	0 ± 2 mm	0 ± 0.08 in.	
	Rear	2^{+2}_{-1} mm	$0.08^{+0.08}_{-0.04}$ in.	
	Kingpin Inclination	7°34′		
BRAKE SYSTEM	Type Front 1.2 ℓ, 1.3 ℓ	Power assisted self-adjusting disc		
	1.4 ℓ, 1.5 ℓ, 1.6 ℓ	Power assisted self-adjusting ventilated disc		
	Rear 1.6 ℓ	Power assisted self-adjusting disc		
	Others	drum		
	Lining Surface Area			
	Front 1.2 ℓ, 1.3 ℓ, 1.4 ℓ	36.8 mm²	5.70 sq. in.	
	1.5 ℓ, 1.6 ℓ	44.1 mm²	6.84 sq. in.	
	Rear	50.2 mm²	7.78 sq. in.	Drum
		21.0 mm²	3.25 sq. in.	Disc (1.6 ℓ)
	Effective Disc Diameter			
	Front 1.2 ℓ, 1.3 ℓ, 1.4 ℓ, 1.5 ℓ	190 mm	7.48 in.	Carbureted engine
	1.5 ℓ, 1.6 ℓ	194 mm	7.64 in.	*PGM-FI*
	Rear	208 mm	8.19 in.	
	Brake Drum I.D. Rear	180 mm	7.09 in.	
	Parking Brake Kind and Type	Mechanically actuating, rear two wheel brakes		
TIRES	Front/Rear 1.2 ℓ, 1.3 ℓ	155SR13, 155R13 78S		KB, KW
		155SR13, 165SR13 (rough road type only)		KP, KT, KU
	1.4 ℓ, 1.5 ℓ	165/80R13 82S		KY
		165/70R13 79S		KQ
		165/70R13 79S or 175/70R13 82H		KB, KG, KX, KW, KS
				KF, KE, KW (1.4 ℓ)
	1.6 ℓ	175/70R13 82H or 175/65R14 82H		
	Spare except 4WD	T105/80D 13		] Standard for some types
	4WD	*T135/70D15*		
ELECTRICAL	Battery	12V -47 AH(European), 12V -45 AH (General)		
	Starter	12V-0.8 kW, 1.0 kW, 1.2 kW, 1.4 kW		
	Alternator	12V-60 amps		
	Fuses In the dash fuse box	10A, 15A, 20A, 30A		
	In the main fuse box	10A, 15A, 20A, 50A, 60A		
	Headlights High/Low	12V-60/55W		
	Front Turn Signal Lights	12V-21W		
	Rear Turn Signal Lights	12V-21W		
	Side Turn Signal Lights	12V-5W		
	Stop/Taillights	12V-21/5W		
	Side Marker Lights	12V-5W		
	Back-up Lights	12V-21W		
	License Plate Lights	12V-5W		
	Gauge Lights	12V-3.4W, 3.0W, 1.4W		
	Indicator Lights	12V-1.4W		
	Warning Lights	12V-5W		
	Dome Light	12V-3.4W		
	Trunk Light	12V-1.4W		
	Illumination and Pilot Lights	12V-1.4W		
		0.91W, 0.84W, LED		
	Heater Illumination Lights	12V-1.4W		

Design Specifications

4D H/B

	ITEMS	METRIC	ENGLISH	NOTES
DIMENSIONS				
	Overall Length	4,105 mm	161.6 in.	
	Overall Width	1,690 mm	66.5 in.	
		1,695 mm	66.7 in	KY
	Overall Height	1,470 mm	57.9 in.	2WD except KY
		1,490 mm	58.7 in	2WD KY
		1,495 mm	58.9 in.	2WD with roof rail
		1,490 mm	58.6 in.	4WD
		1.515 mm	59.6 in.	4WD with roof rail
	Wheelbase	2,500 mm	98.4 in.	
	Track, Front/Rear	1,445/1,455 mm	56.9/57.3 in.	
		1,440/1,450 mm	56.7/57.1 in.	4WD, KY 2WD
	Ground Clearance KX, KS	155 mm	6.1 in.	1.5 ℓ PGM-FI
	KF, KW, KB, KE	165 mm	6.5 in.	1.4 ℓ
	KG, KS, KW	175 mm	6.9 in.	1.6 ℓ with CATA
	KF, KW, KB, KE	185 mm	7.3 in.	1.6 ℓ without CATA
	KQ	190 mm	7.5 in.	
	KX	160 mm	6.3 in.	
	Seating Capacity	5		
	Overhang, Front/Rear	770/835 mm	30.3/32.9 in.	Includes bumper
WEIGHTS	Engine Weight (Wet)			
	1.4 ℓ	98 kg	216 lb.	
	1.5 ℓ 1-Carbureted	94 kg	207 lb.	
	1.5 ℓ 2-Carbureted	101 kg	222 lb.	
	1.5 ℓ PGM-FI	100 kg	220 lb.	
	1.6 ℓ	107 kg	236 lb.	
	Curb Weight			
	1.4 ℓ M/T	965 kg	2,127 lb	KB, KE, KF
	1.4 ℓ A/T	985 kg	2,172 lb	KB, KE, KF
	1.5 ℓ M/T	990 kg	2,183 lb	KS, KX
	1.5 ℓ A/T	1,010 kg	2,227 lb	KS, KX
	1.6 ℓ M/T	1,095 kg	2,414 lb	KG, KW, KB, KE, KF
		1,105 kg	2,436 lb	KX
		1,100 kg	2,425 lb	KS
	1.6 ℓ A/T	1,125 kg	2,480 lb	KX
	1.5 ℓ M/T	1,127 kg	2,486 lb	KQ
		1,015 kg	2,238 lb	KY
	1.5 ℓ A/T	1,035 kg	2,281 lb	KY
	Weight Distribution (Front/Rear)			
	1.4 ℓ M/T	555/410 kg	1,224/904 lb	KB, KE, KF
	1.4 ℓ A/T	575/410 kg	1,268/904 lb	KB, KE, KF
	1.5 ℓ M/T	575/415 kg	1,268/915 lb	KS, KX
	1.5 ℓ A/T	595/415 kg	1,312/915 lb	KS,KX
	1.6 ℓ M/T	620/475 kg	1,367/1,047 lb	KG, KW
		625/470 kg	1,379/1,036 lb	KB, KE, KF
		630/475 kg	1,389/1,047 lb	KX
		625/475 kg	1,379/1,047 lb	KS
	1.6 ℓ A/T	650/475 kg	1,433/1,047 lb	KX
	1.5 ℓ M/T	636/491 kg	1,402/1,082 lb	KQ
		592/423 kg	1,305/933 lb	KY
	1.5 ℓ A/T	621/414 kg	1,369/913 lb	KY
	Max. Permissible Weight (EC)			
	1.4 ℓ	1,440 kg	3,175 lb	
	1.5 ℓ	1,440 kg	3,175 lb	except "S"
	1.5 ℓ	1,440 kg	3,108 lb	"S" only
	1.6 ℓ	1,560 kg	3,439 lb	except "S"
	1.6 ℓ	1,520 kg	3,351 lb	"S" only
	Max. Vehicle Weight	1,470 kg	3,241 lb.	KY
	Gross Vehicle Mass (ADR)	1,540 kg	3,395 lb.	KQ
ENGINE	Type	Water cooled 4-cycle S.O.H.C.		
	Cylinder arrangement	4-cylinder in-line, transverse		
	Bore and Stroke 1.4 ℓ	75 x 79 mm	2.95 x 3.11 in.	
	1.5 ℓ	75 x 84.5 mm	7.95 x 3.33 in.	
	1.6 ℓ	75 x 90 mm	2.95 x 3.54 in.	
	Displacement 1.4 ℓ	1,396 cm³ (cc)	85 cu. in.	
	1.5 ℓ	1,493 cm³ (cc)	91 cu. in.	
	1.6 ℓ	1,590 cm³ (cc)	97 cu. in.	
	Compression Ratio			
	1.4 ℓ	9.3		
	1.5 ℓ	9.2		
	1.6 ℓ	9.1		
	Valve Train	4-valves per cylinder, single overhead camshaft		
	Lubrication System	Forced and wet sumP		
	Fuel Required			
	Engine with CATA	Unleaded gasoline with 91 R.O.N. or higher		* Both leaded and unleaded gasoline can be used.
	Carbureted engine without CATA	*Gasoline with 91 R.O.N. or higer		
	PGM-FI without CATA	Leaded gasoline with R.O.N. or higher or unleaded gasoline 95 R.O.N. or higher		

	ITEMS	METRIC	ENGLISH	NOTES
STARTER	Type 0.8 kW 1.0 kW, 1.2 kW, 1.4kW	Direct Gear reduction		
	Normal Output	0.8 kW, 1.0 kW, 1.2 kW, 1.4 kW		
	Normal Voltage	12V		
	Hour Rating	30 seconds		
	Direction of Rotation	Clockwise as viewed from gear end		
	Weight 0.8 kW HITACHI/ND	4.4 kg	9.7 lb.	
	1.0 kW MITSUBA	3.4 kg	7.5 lb.	
	ND	3.85 kg	8.5 lb.	
	1.2 kW ND	3.85 kg	8.5 lb.	
	1.4 kW MITSUBA	3.7 kg	8.2 lb.	
TRANSMISSION	Clutch M/T	Single plate dry, diaphragm spring		
	A/T	Torque converter		
	Transmission Type M/T	5 speeds forward, synchromesh, 1 speed reverse,		
	M/T + Super Low Gear	6 speeds forward, synchromesh, 1 speed reverse		
	A/T	4 speeds forward, with lock-up clutch, 1 speed reverse		
	Primary Reduction	1.000		

		5-M/T	4-A/T	4WD	4WD 4-A/T
Gear Ratio	Super low	—	—	4.512	—
	I	3.250	2.705	3.384	2.529
	II	1.894	1.560	1.857*1 1.950*2	1.428
	III	1.259	1.027	1.275	0.974
	IV	0.937	0.780	0.941	0.733
	V	0.771	—	0.783	—
	Reverse	3.153	1.954	3.000	1.954

			NOTES
Final Reduction	M/T 1.4 ℓ	Single helical gear, 4.250	
	1.5 ℓ	Single helical gear, 4.058	KX, KS KE
		Single helical gear, 4.214	KG
	4WD M/T	Single helical gear, 4.428	
	A/T	Single helical gear, 3.933	
	4WD A/T	Single helical gear, 4.333	
Clutch Facing Area		160 cm² | 24.8 sq. in.	

*1:KB, KF, *2:KG, KX

				NOTES
AIR CONDITIONER	Compressor	MASTUSHITA		
	Cooling Capacity	3,850 Kcal/h		
	—Conditions:			
	Compression min^{-1} (rpm)	1,800 min^{-1} (rpm)		
	Outside Air Temperature	27.0°C	81°F	
	Outside Air Humidity	50%		
	Condenser Air Temperature	35°C	95°F	
	Condenser Air Velocity	4.5 m/sec.	14.8 ft/sec.	
	Blower Capacity	440 m³/h	15,118 cu. ft/h	
	Compressor Type	Vane rotary type		
	Number of Vane	3		
	Displacement	130cc/rev.	7.93 cu. in. /rev	
	Max. min^{-1} (rpm)	7,500 min^{-1} (rpm)		
	Lubricant Capacity	130 cc	7.93 cu. in.	
	Receiver Dryer With Desiccant	Includes fusible safety plug.		
	Condenser	Corrugated fin type		
	Evaporator	Corrugated fin type		
	Blower Type	Sirocco fan		
	Motor input	170 W (12V)		
	Speed control	4 speeds		
	Max. capacity	390 m³/h	13,773 cu ft/h	
	Temp. Control	Air-mix type		
	Comp. Clutch Type	Dry, single plate, V-belt		
	Power consumption	32 W max. 12V		
	Refrigerant Type	R-12		
	Quantity	0.90 ± 0.05 kg	1.98 ± 0.11 lbs	
STEERING SYSTEM	Type	Rack and Pinion		
	Overall Ratio Manual/Variable/Power	18.6 : 1/19.8 (18—20.4): 1/17.7 :1		
	Turn, lock-to-lock Manual/Variable/Power	3.8/4.1/3.6		
	Steering Wheel Dia	377 mm	14.8 in	
	Power Steering Oil Capacity	1.2 lit.	13 U.S. qt., 1.1 Imp. qt.	
	Power Steering Oil	HONDA Genuine Power Steering Fluid P/N 08208—99961		
SUSPENSION SYSTEM	Type, Front/Rear	Independent by double wishbones coil springs		
	Shock Absorber Front and Rear	Telescopic, Nitrogen gas-filled		

(cont'd)

Design Specifications

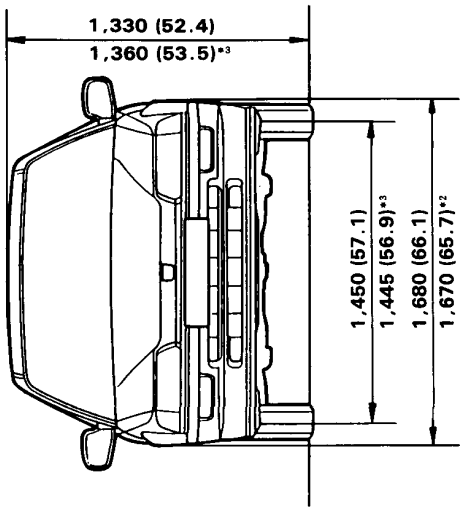
4D H/B (cont'd)

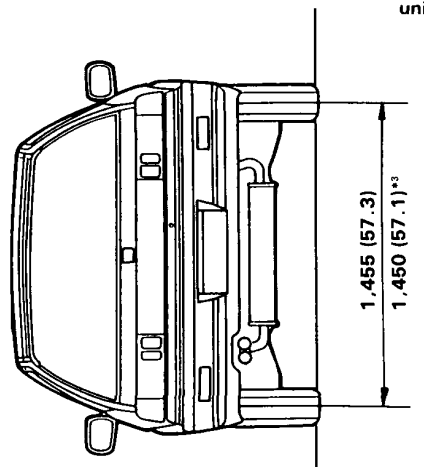
	ITEMS			METRIC	ENGLISH	NOTES
WHEEL ALIGNMENT	Wheel alignment					
	Camber	Front	2WD	0° ± 1°		
			4WD	0°35′ ± 1°		
		Rear	2WD	−0°30′ ± 1°		
			4WD	0° ± 1°		
	Caster	Front	2WD	2°59′ ± 1°		
			4WD	2°59′ ± 1°		
	Toe-in	Front		0 ± 2 mm	0 ± 0.08 in.	
		Rear		2^{+2}_{-1} mm	$0.08^{+0.08}_{-0.04}$ in.	
	Kingpin Inclination		2WD	7°34′		
			4WD	6°58′		
BRAKE SYSTEM	Type	Front		Power assisted self-adjusting disc		
		Rear		drum		
	Lining Surface Area					
	Front 1.4ℓ, 1.5ℓ, 1.6ℓ			44.1 mm²	6.84 sq. in.	
	Rear			50.2 mm²	7.78 sq. in.	
	Effective Disc Diameter					
	1.4ℓ, 1.5ℓ, 1.6ℓ			194 mm	7.64 in.	
	Brake Drum I.D.			200 mm	7.87 in.	
	Parking Brake Kind and Type			Mechanically actuating, rear two wheel brakes		
TIRES	Size	KY		165/80R13 82S		
		4WD		175/65R14 82H or 165SR13		
		Others		165/70R13 79S or 175/70R13 82H		
	Spare	2WD		T105/80 D13		] Standard for some types
		4WD		T135/70 D15		
ELECTRICAL	Battery			12 V-47 AH (European), 12 V-45 AH (General)		
	Starter			12V-0.8 kW, 1.0 kW, 1.2 kW, 1.4 kW		
	Alternator			12V-60 amps		
	Fuses	In the dash fuse box		10A, 15A, 20A, 30A		
		In the main fuse box		10A, 15A, 20A, 50A, 60A		
	Headlights High/Low			12V-60/55W		
	Front Turn Signal Lights			12V-21W		
	Rear Turn Signal Lights			12V-21W		
	Side Turn Signal Lights			12V-5W		
	Stop/Taillights			12V-21/5W		
	Side Marker Lights			12V-5W		
	Back-up Lights			12V-21W		
	License Plate Lights			12V-5W		
	Gauge Lights			12V-3.4W, 3.0W, 1.4W		
	Indicator Lights			12V-1.4W		
	Warning Lights			12V-3.4W		
	Dome Light			12V-3.4W		
	Laggage Area Light			12V-21W		
	Illumination and Pilot Lights			12V-1.4W		
				0.91W, 0.84W, LED		
	Heater Illumination Lights			12V-1.4W		
	Rear Fog Lights			12V-21W		

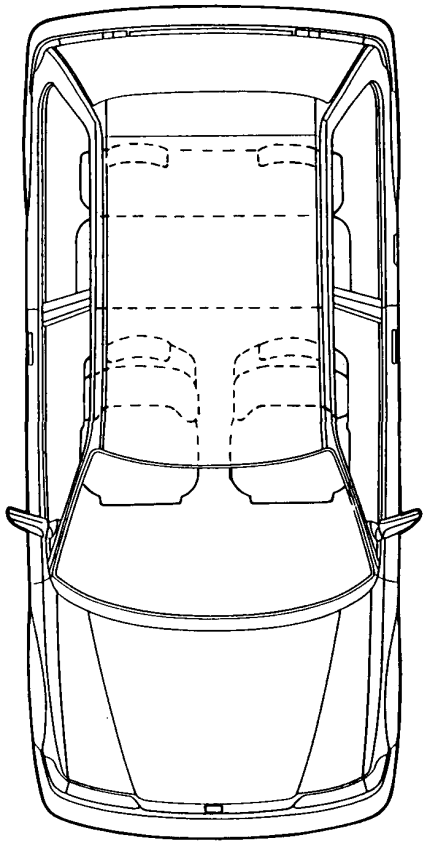
Body Specifications

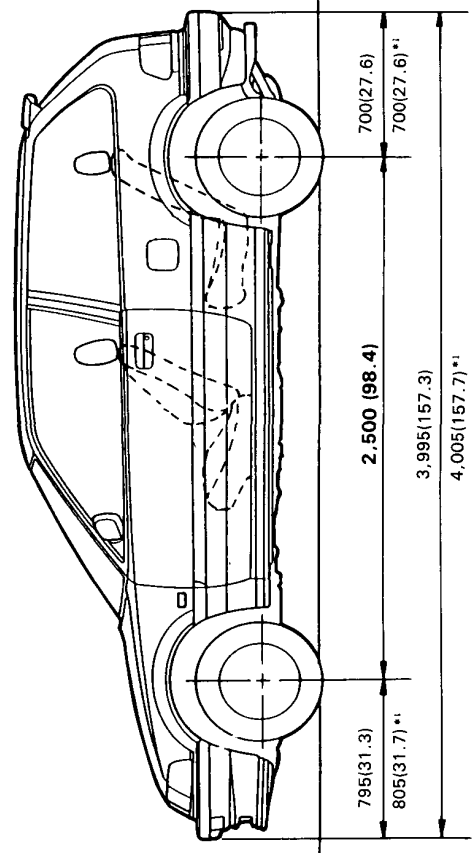
2D H/B

unit: mm (in)









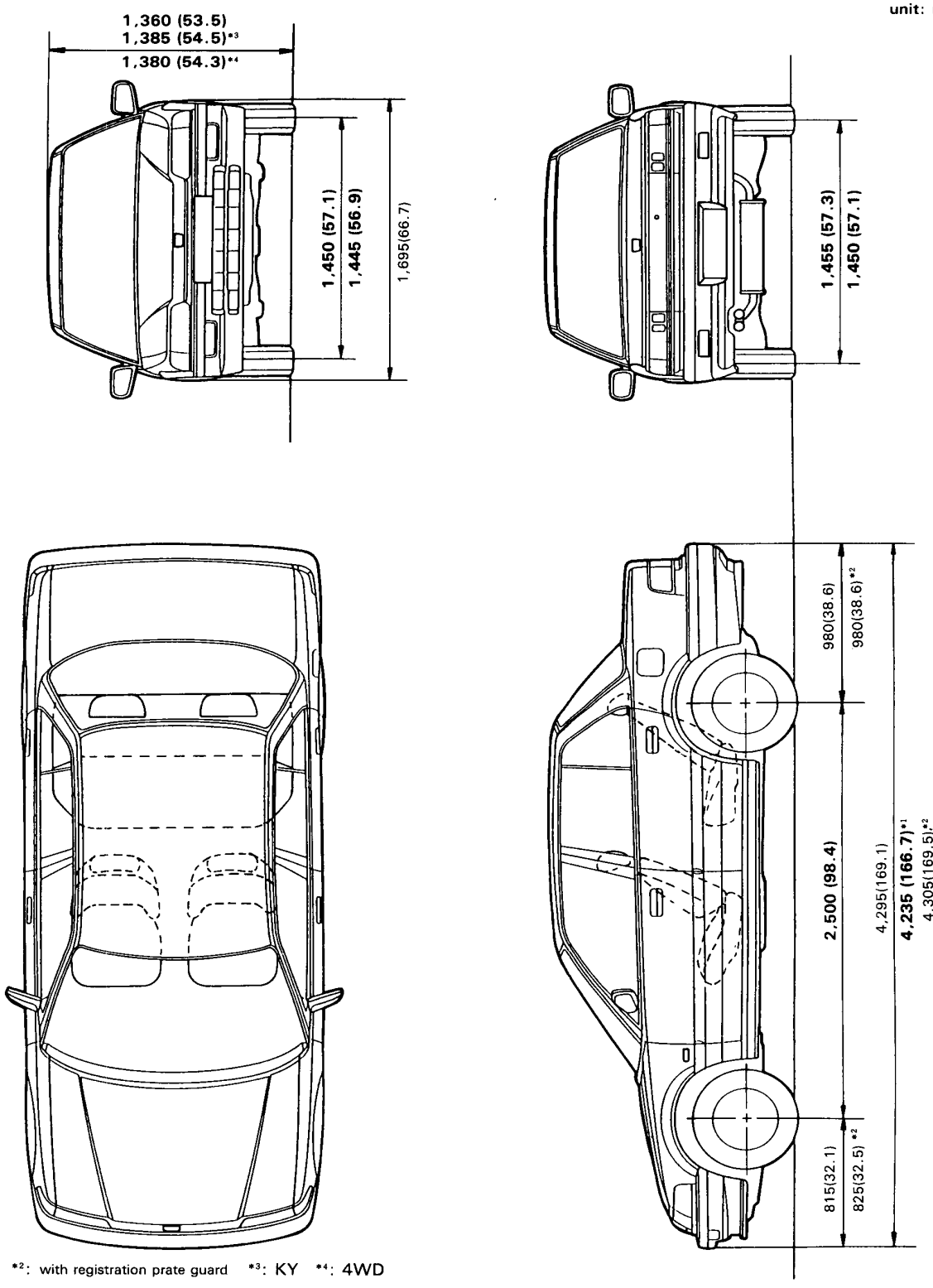
*1: with registration plate guard *2: 1.2 ℓ, 1.3 ℓ *3: KY

(cont'd)

Body Specifications

4D, 4D 4WD

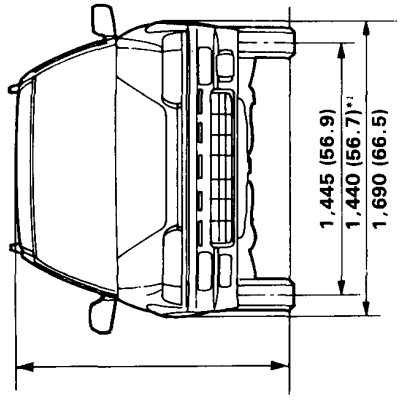
unit: mm (in)

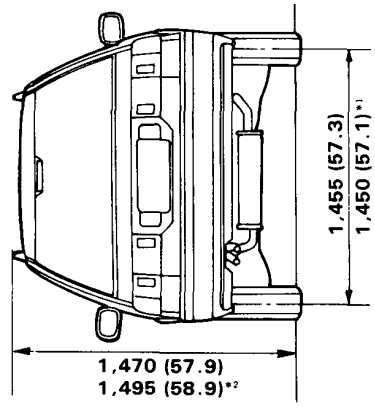


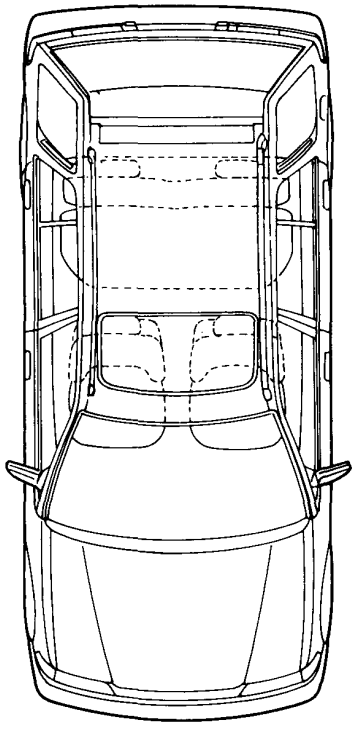
*1: KQ *2: with registration prate guard *3: KY *4: 4WD

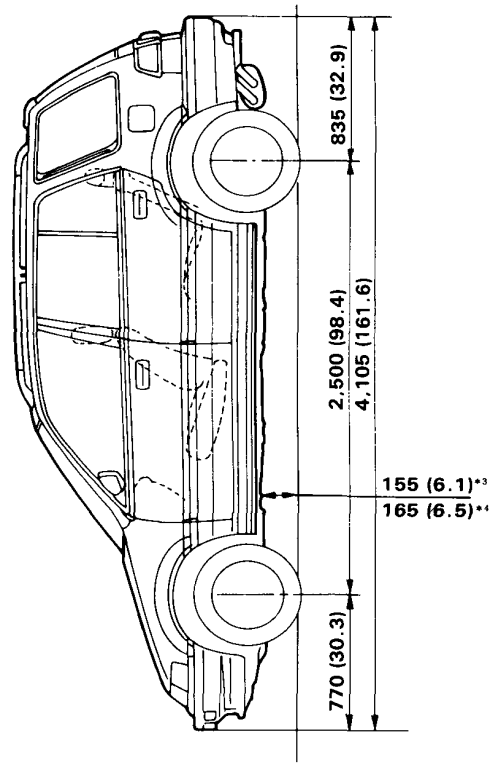
4D H/B

Unit: mm (in.)









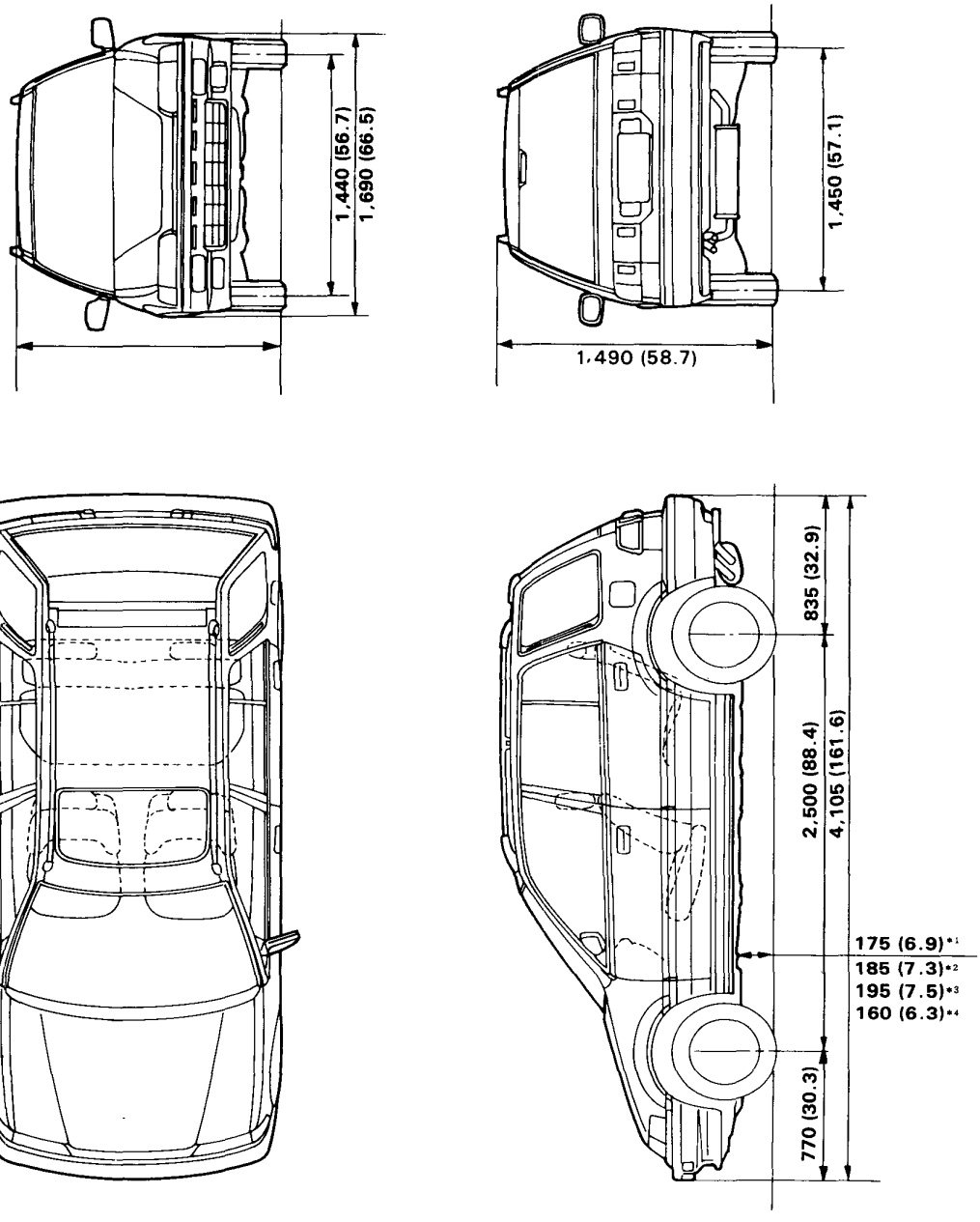
*1: KY *2: with roof rail *3: KX, KS *4: KF, KW, KB, KE

(cont'd)

Body Specifications

4D H/B 4WD

Unit: mm (in.)

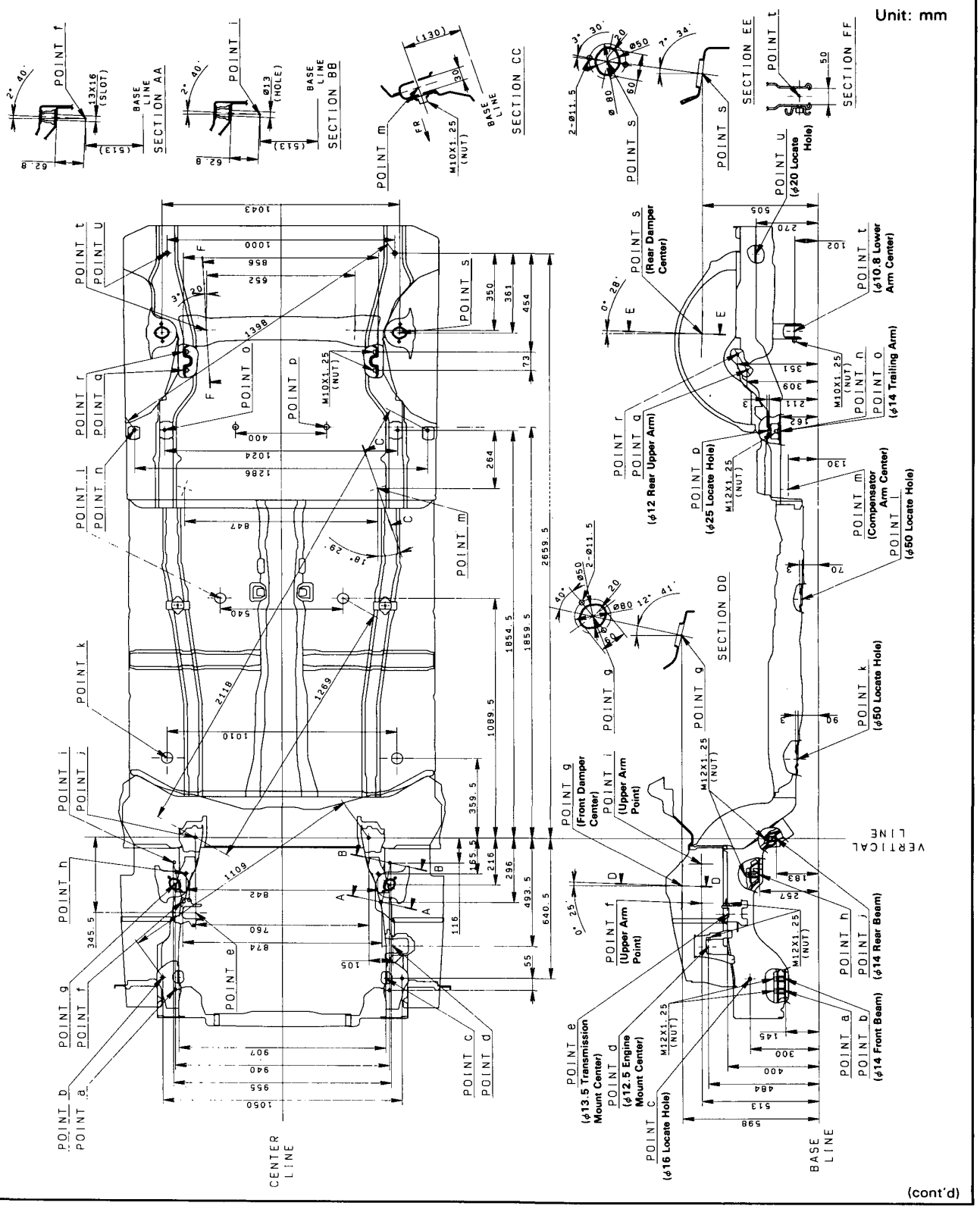


*1: with CATA *2: without CATA *3: KQ *4: KX

Frame Repair Chart

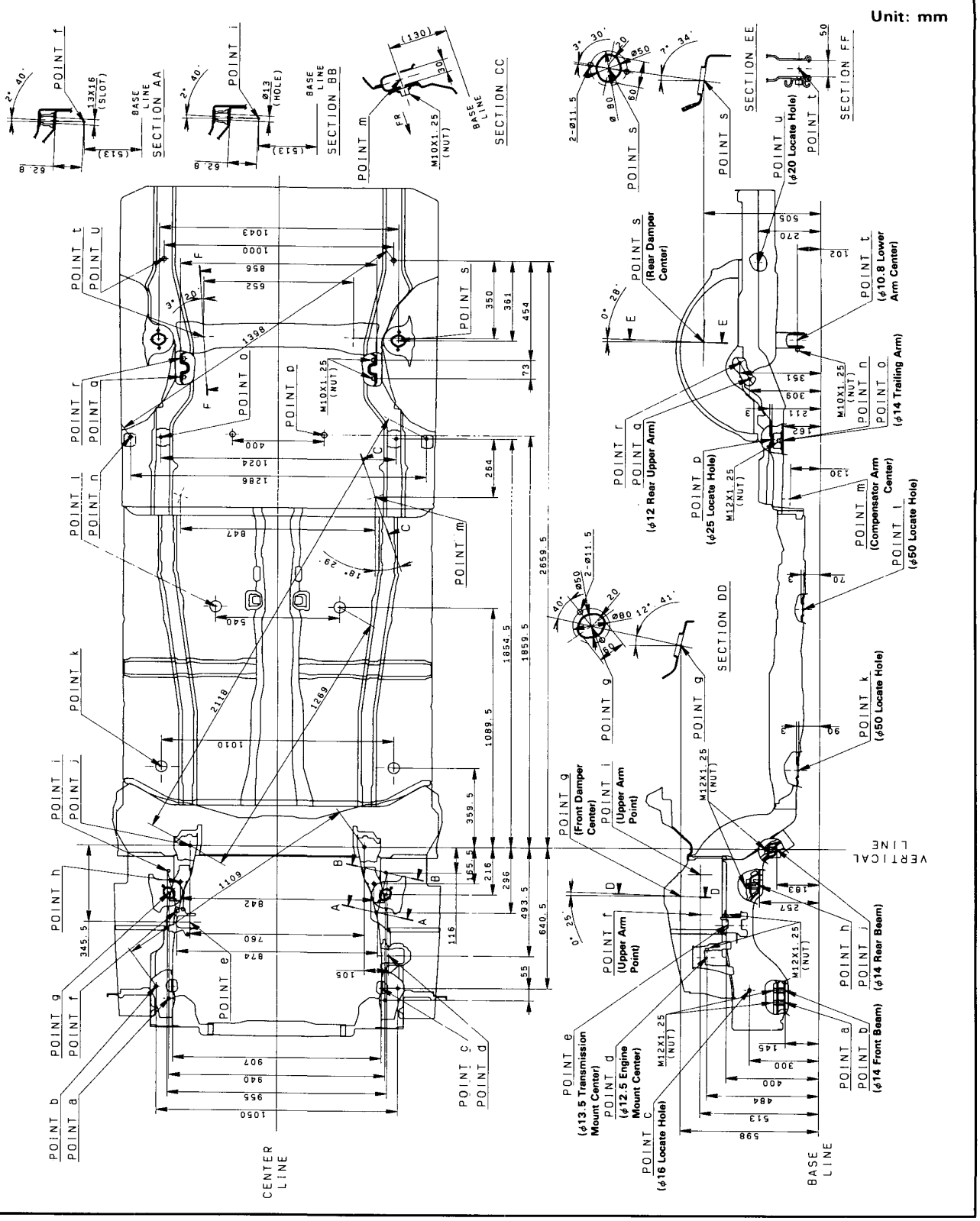
2D H/B

Unit: mm



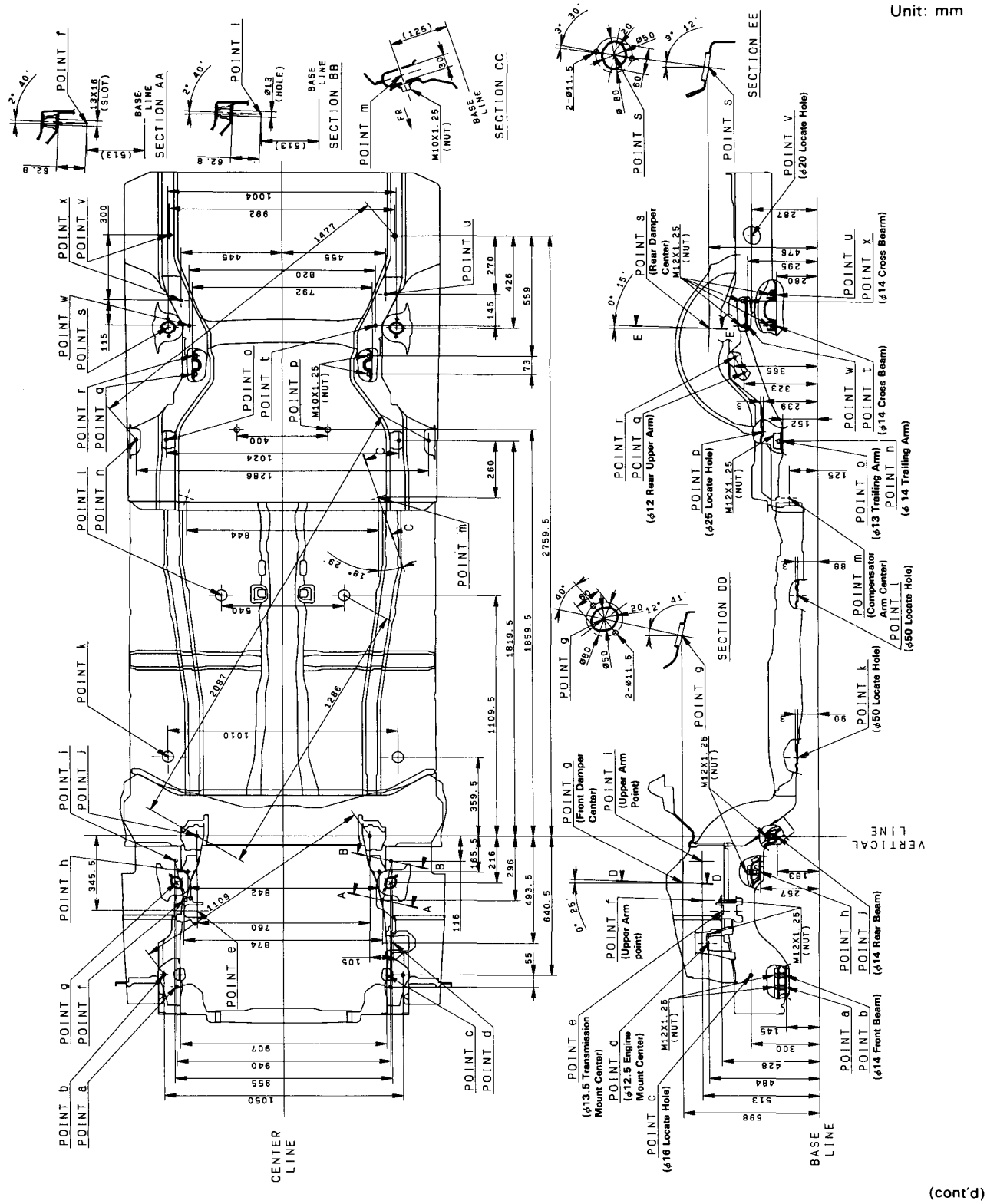
Frame Repair Chart

4D



4D 4WD

Unit: mm

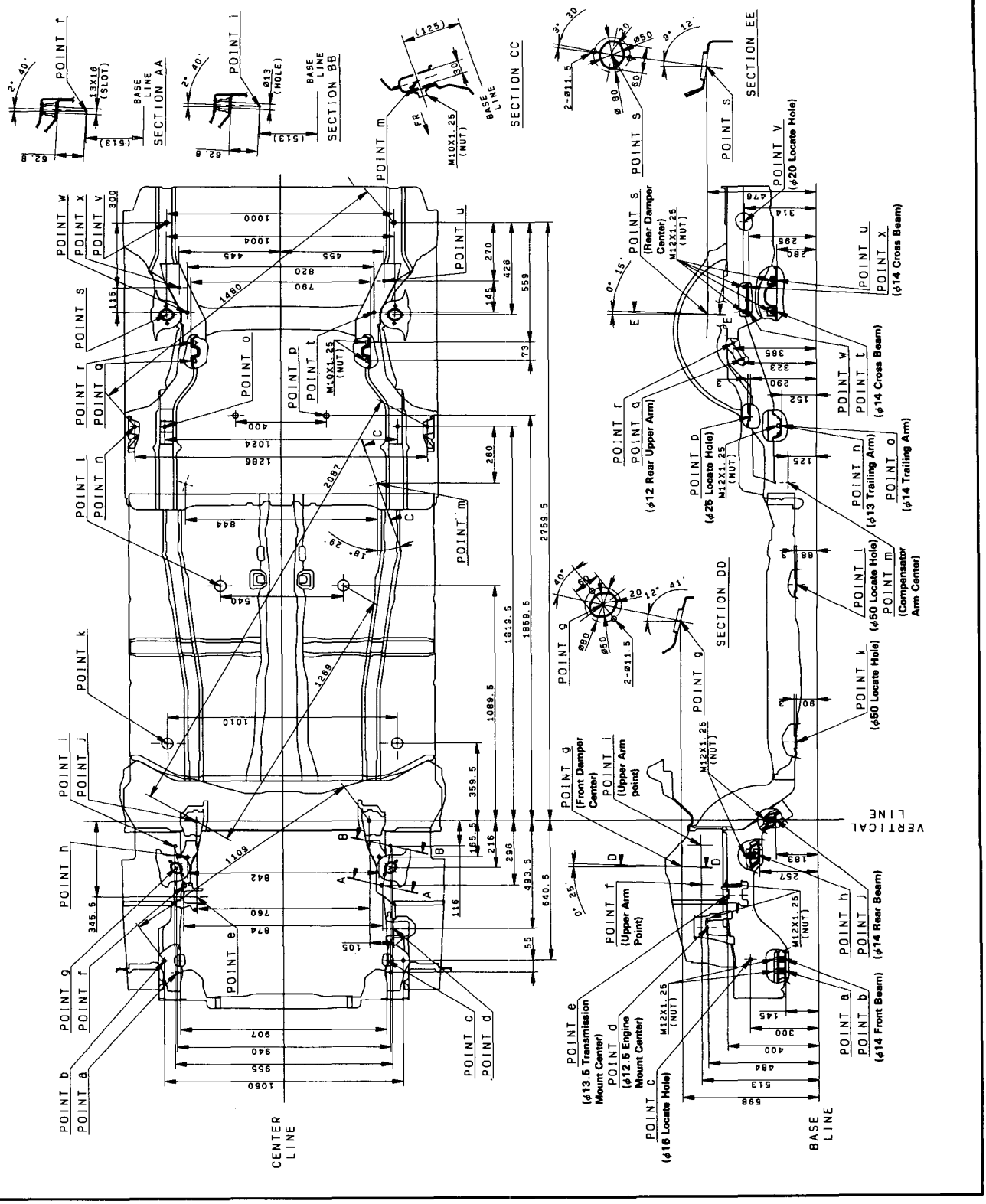


(cont'd)

Frame Repair Chart

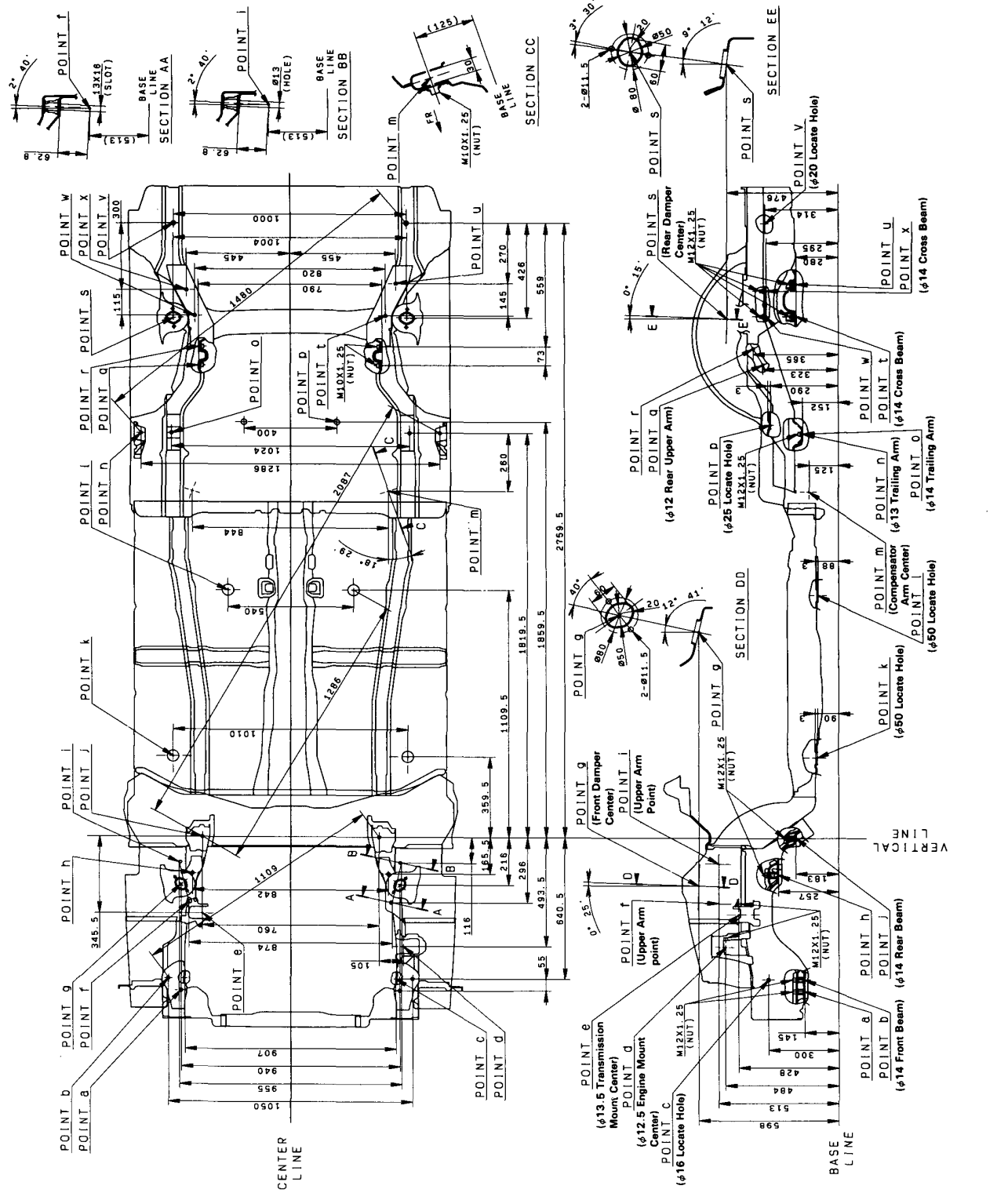
4D H/B

Unit: mm



4D H/B 4WD

Unit: mm



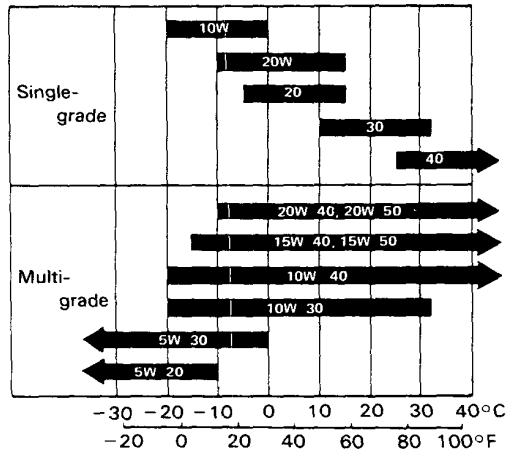
Maintenance

Lubrication Points.....4–2
Maintenance Schedule 4–4

Lubrication Points

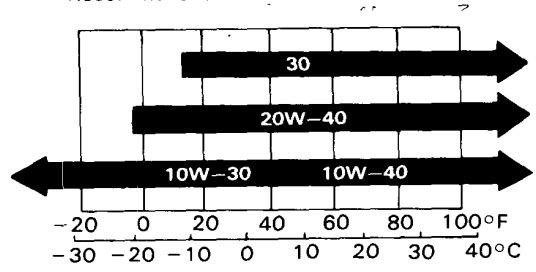
No.	LUBRICATION POINTS	LUBRICANT
1	Engine	API Service Grade: SE, SF or SG SAE Viscosity: See chart below
2	Transmission Manual Automatic	API Service: SE or SF SAE Viscosity: See chart below DEXRON® or DEXRON®II Automatic transmission fluid
3	Brake line (ALB line for ALB models)	Brake fluid DOT 3 or DOT 4
4	Power steering system	Honda power steering fluid P/N 08208—99961
5	Power steering gearbox	Honda steering grease P/N 08733—B070E
6	Shift lever pivot (Manual transmission)	Silicone grease with molybdenum disulfide
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	Tilt steering Steering ball joints Suspension ball joints Steering boots Steering gearbox (Manual steering) Steering column bushings Select lever (Automatic transmission) Pedal linkage Brake master cylinder push rod Tailgate hinges and Trunk hinges Door hinges upper and lower Door opening detents Fuel filler lid Engine hood hinges Engine hood latch Rear brake shoe linkage	Multi-purpose Grease
23	Caliper: Piston seal, Dust seal, Caliper pin, Piston	Silicone Grease
24	Rear Differential (4WD only)	Hypoid Gear oil (API GL4 or GL5) above 5°C (41°F) SAE 90, below 5°C (41°F) SAE 80

Recommended Engine Oil
(SE, SF or SG Grade oil)



Engine oil viscosity for
ambient temperature ranges

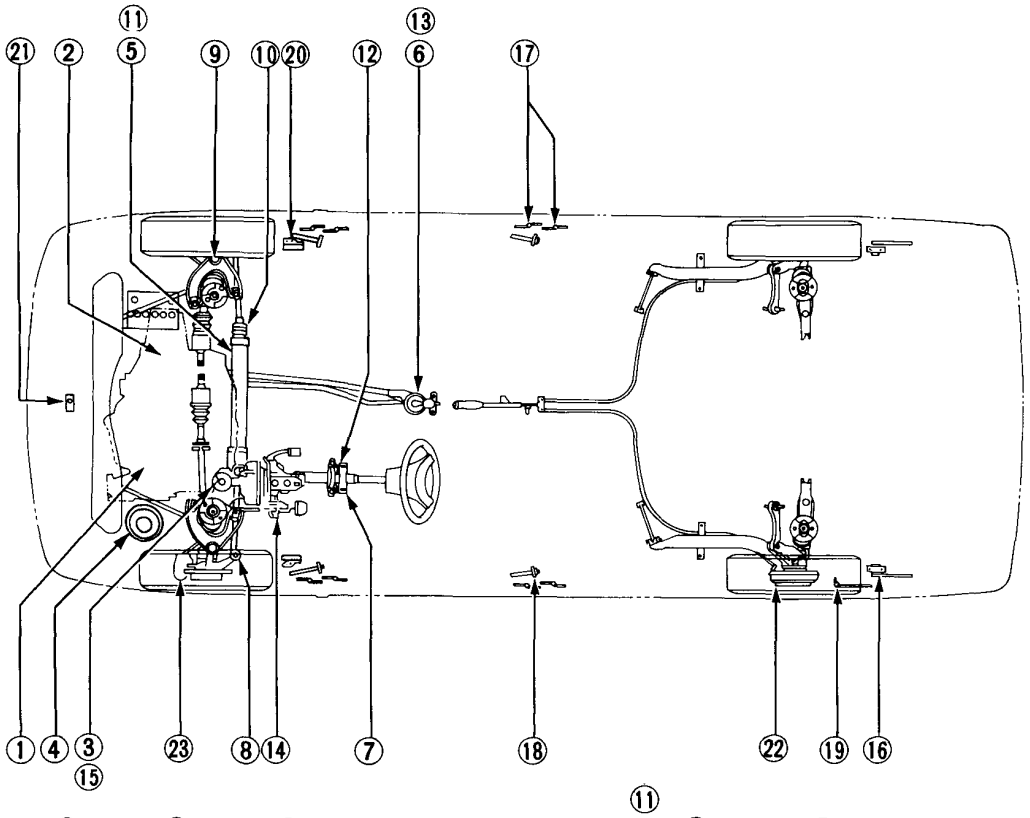
Recommended Manual Transmission Oil



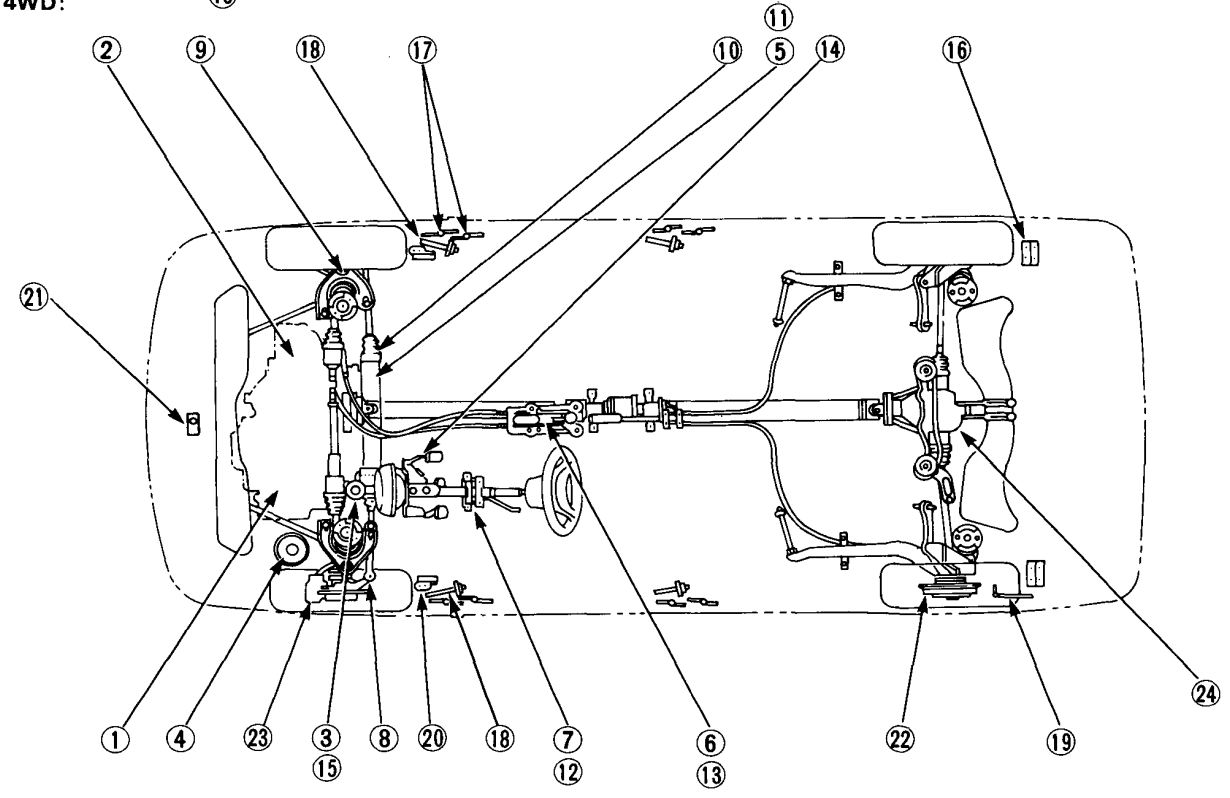
Transmission oil viscosity for
ambient temperature ranges

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.

2WD:


11
13
21
2
5
9
10
20
12
6
17
1
4
3
15
23
8
14
7
18
22
19
16

4WD:


11
2
9
18
17
10
5
14
16
21
1
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23
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22
19
24

Maintenance Schedule

Service at the interval listed x 1,000 km (or miles) or after that number of months, whichever comes first.	R—Replace C—Clean	I—Inspect. After inspection, clean, adjust, repair or replace if necessary.				
ITEM	x 1,000 km x 1,000 miles months	20 12 12	40 24 24	60 36 36	80 48 48	100 60 60
Idle speed and idle CO*3		I	I	I	I	I
Idle speed and idle CO*4						I
Valve clearance		I	I	I	I	I
Alternator drive belt			I		I	
Timing belt						R
Water pump						I
■Engine oil and oil filter		Replace every 10,000 km (6,000 miles) or 6 months				
■Transmission oil			R		R	
■Radiator coolant					R*1	
Cooling system hoses and connections			I		I	
Air cleaner element (Viscous type for European and KQ models)			R		R	
Air cleaner element (Dry type except European and KQ models)		R	R	R	R	R
Fuel filter			R		R	
Tank, fuel line and connections			I		I	
Intake air temp. control system*5						I
Throttle control system*5			I		I	
Choke mechanism*5			I		I	
Choke mechanism*6				C*7		I
Evaporative emission control system (for cars using unleaded gasoline and KY model)						I
Ignition timing and control system*3			I		I	
Ignition timing and control system*4						I
Spark plugs (for cars using unleaded gasoline)			R*2		R*2	
Spark plugs (for cars using leaded gasoline)		R	R	R	R	R
Distributor cap and rotor*3			I		I	
Distributor cap and rotor*4						I
Ignition wiring*3			I		I	
Ignition wiring*4						I
Positive crankcase ventilation valve*3			I		I	
Positive crankcase ventilation valve*4						I
Blow-by filter*5			I		I	

■: These service intervals assume routine checking and replenishment has been done, as needed, by the customer.
*1 Thereafter, replace every 2 years or 40,000 km (24,000 miles), whichever comes first.
*2 For KS type, replace every 2 years or 40,000 km (24,000 miles) whichever comes first after 30,000 km (18,000 miles).
*3 Except KS, KX models
*4 KS, KX models
*5 Only for carbureted types (except KS model)
*6 Only for carbureted type (KS model)
*7 Recommended by manufacturer only

Service at the interval listed x 1,000 km (or miles) or after that number of months, whichever comes first.	R—Replace	I—Inspect. After inspection, clean, adjust, repair or replace if necessary.				
ITEM	x 1,000 km x 1,000 miles months	20 12 12	40 24 24	60 36 36	80 48 48	100 60 60
Brake hoses and lines (Including ALB hoses and pipes for ALB models)		I	I	I	I	I
Brake fluid (Including ALB fluid for ALB models)			R		R	
Front brake discs and calipers		I	I	I	I	I
Front brake pads		Inspect every 10,000 km (6,000 miles) or 6 months				
Rear brake discs, calipers and pads (for disc brake type)			I		I	
Rear brake drums, wheel cylinders and linings (for drum brake type)			I		I	
Parking brake		I	I		I	
Clutch release arm travel		I	I	I	I	I
Exhaust pipe and muffler		I	I	I	I	I
Suspension mounting bolts		I	I	I	I	I
Front wheel alignment		I	I	I	I	I
Steering operation, tie rod ends, steering gear box and boots		I	I		I	
ALB high pressure hose (for ALB models)					R	
ALB operation (for ALB models)		I	I		I	
Rear differential clutch operation (for ALB models)		I	I		I	
Power steering system (Standard for some types)		I	I	I	I	I
Power steering pump belt (Standard for some types)			I		I	
Catalytic converter heat shield (Standard for some types)					I	

CAUTION: 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 on rough and/or muddy roads
F : Towing a trailer
R—Replace.
I— Inspect. After inspection, clean, adjust, repair or replace if necessary.

Condition	Maintenance item	Maintenance operation	Interval
A B • • • F	Engine oil and oil filter	R	Every 5,000 km (3,000 miles) or 3 months
• • • • • F	Transmission oil	R	Every 20,000 km (12,000 miles) or 12 months
A B • D E F	Front brake discs and calipers	I	Every 10,000 km (6,000 miles) or 6 months
A B • D E F	Rear brake discs, calipers and pads	I	Every 20,000 km (12,000 miles) or 12 months
A B C • E F	Clutch release arm travel	I	Every 10,000 km (6,000 miles) or 6 months
• B C • E •	Power steering system	I	Every 10,000 km (6,000 miles) or 6 months

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.

Engine

This section contains only on-frame servicing and removal/installation. For detail, refer to the D12B/D13B/D14A/D15B/D16A Engine Maintenance and Repair (62 PM100).

Engine Tune-up ..... 5 — 1
Timing Belt ..... 5 — 15
Engine Removal/Installation ..... 5 — 19
Oil Pan ..... 5 — 23
Exhaust Pipe and Muffler ..... 5 — 27
Radiator ..... 5 — 29

Engine Tune-up

Special Tools ..... 5 — 2
Coolant Level Inspection ..... 5 — 3
Engine Oil Replacement ..... 5 — 3
Oil Filter Replacement ..... 5 — 4
Alternator Belt Adjustment ..... 5 — 7
A/C Compressor Belt Adjustment .... 5 — 8
P/S Pump Belt Adjustment ..... 5 — 9
Idle Speed Inspection/Adjustment .... 5 — 10

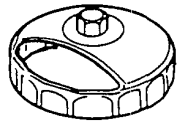
Outline of Model Changes

- The coolant refill capacity has been changed.
- The grade of the recommended engine oil has been changed.
- The oil filter has been changed.
- The inspection of the belt tension has been added.
- The idle speed has been changed.

Special Tools

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07912–6110001	Oil Filter Socket	1	
②	07JAZ–SH20100	R.P.M. Connecting Adaptor	1	
③	07JGG–0010100	Belt Tension Gauge	1	



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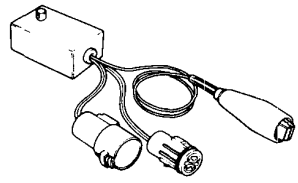

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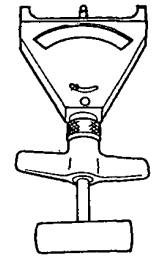
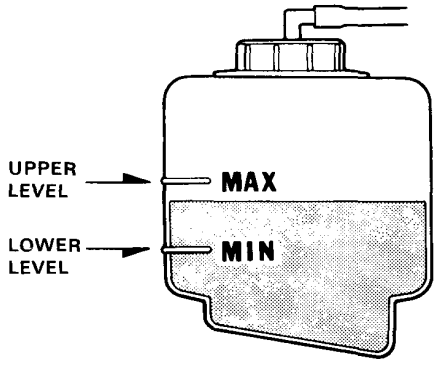


③

Coolant Level Inspection

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

1. Check whether the coolant level in the coolant reservoir tank is between "MAX" and "MIN".



2. Supply the coolant reservoir tank with coolant to "MAX", if the coolant level is lower than "MIN" or near to "MIX".

NOTE:

- Use only HONDA-RECOMMENDED anti-freeze/coolant.
- For best corrosion protection, the coolant concentration must be maintained year-round at 50% MINIMUM. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
- Coolant concentrations greater than 60% will impair cooling efficiency and are not recommended.

CAUTION:

- **Do not mix different brand anti-freeze/coolants.**
- **Do not use a additional rust inhibitors or antirust products; they may not be compatible with the recommended coolant.**

Radiator Coolant Refill Capacity:

	M/T	A/T
	ℓ (US qt, Imp qt)	
1.2 ℓ, 1.3 ℓ, 1.4 ℓ	4.4 (4.6, 3.9)	4.3 (4.5, 3.8)
1.5 ℓ (Cabureted)	4.5 (4.7, 4.0)	4.4 (4.6, 3.9)
1.5 ℓ (PGM-FI) 70 ps	4.4 (4.6, 3.9)	4.3 (4.5, 3.8)
1.5 ℓ (PGM-FI)	4.5 (4.7, 4.0)	4.4 (4.6, 3.9)
1.6 ℓ DOHC	4.5 (4.7, 4.0)	
1.6 ℓ SOHC (2WD)	4.4 (4.6, 3.9)	
1.6 ℓ SOHC (4WD)	4.4 (4.6, 3.9)	4.9 (5.2, 4.3)

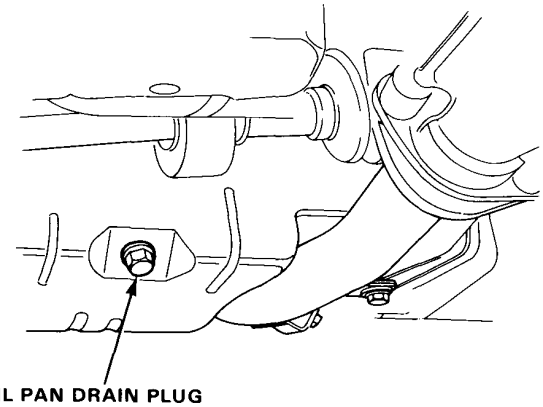
(including the reservoir capacity : 0.4ℓ (0.42 US qt, 0.35 Imp qt))

Engine Oil Replacement

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

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.

NOTE: Remove the filler cap to speed draining.



OIL PAN DRAIN PLUG
45 N·m (4.5 kg-m, 33 lb-ft)

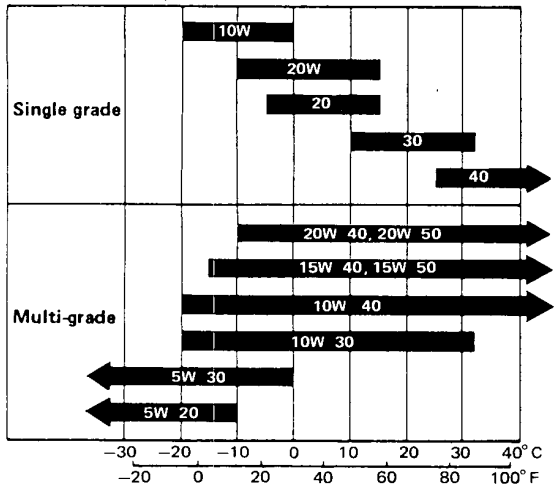
3. Reinstall the drain plug with a new washer, and refill with the recommended oil.

(cont'd)

Engine Oil Replacement (cont'd)

Capacity	SOHC: 3.0 lit (3.2 US qt, 2.7 Imp. qt) DOHC: 3.3 lit (3.5 US qt, 2.9 Imp. qt) excluding oil filter SOHC: 3.5 lit (3.7 US qt, 3.1 Imp. qt) DOHC: 3.8 lit (4.0 US qt, 3.4 Imp. qt) at change, including filter SOHC: 4.0 lit (4.2 US qt, 3.5 Imp. qt) DOHC: 4.3 lit (4.6 US qt, 3.8 Imp. qt)
Change	Every 10,000 km (6,000 miles) or 6 months

Recommended Engine Oil SF or SG (also SE for DOHC)



Engine oil viscosity for ambient temperature ranges.

NOTE: Oil filter should be replaced at each oil change.

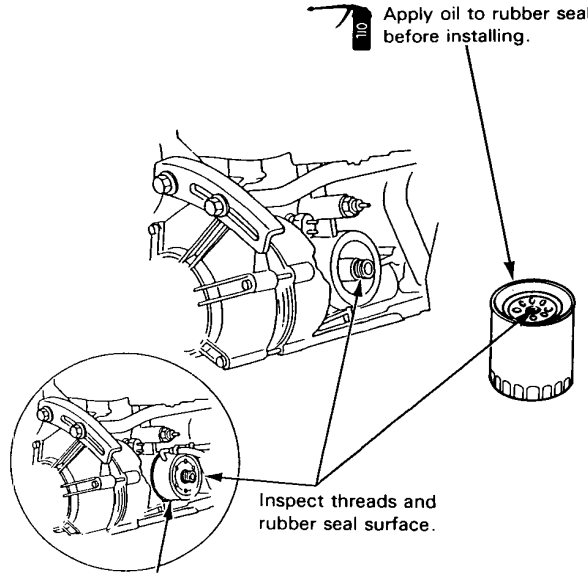
Oil Filter Replacement

⚠WARNING After the engine has been run, the exhaust pipes will be hot; be careful when working around the exhaust manifold.

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.

1. Remove the oil filter with the special oil filter socket.
2. Inspect the threads and rubber seal on the new filter. Wipe off the filter seat on the engine block and apply a light coat of oil to the filter rubber seal.

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

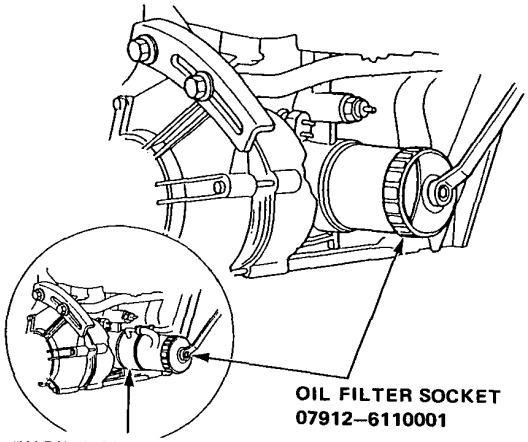


ENGINE OIL COOLER
(Standard for some types)

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

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

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

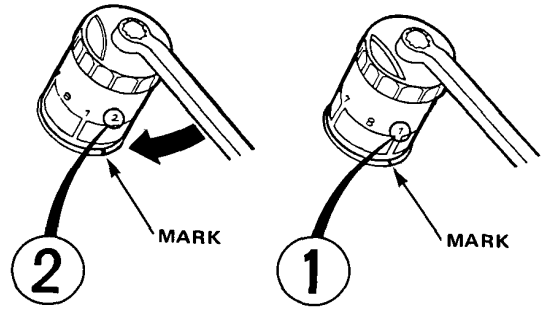


Eight numbers (1 to 8) are printed on the surface of the filter.

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

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

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



Number when rubber seal is seated.

Number after tightening.

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

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.

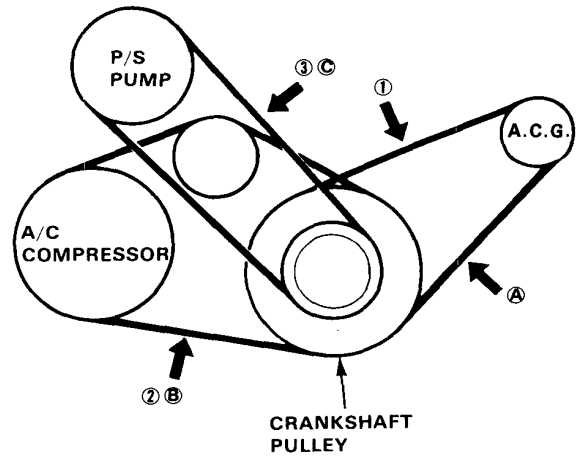
Drive Belts Inspection

Drive Belts Deflection:
(When applying a force of 98 N (10 kg, 22 lb))

	Used Belt	New Belt
①Alternator Belt	9.0—11.0 mm (0.35—0.43in.)	7.0—9.0 mm (0.28—0.35 in.)
②A/C Compressor Belt	9.0—11.0 mm (0.35—0.43in.)	7.0—9.0 mm (0.28—0.35 in.)
③P/S Pump Belt	9.0—12.0 mm (0.35—0.47 in.)	7.0—10.0 mm (0.28—0.39 in.)

Measure with the belt tension gauge:

	Used Belt	New Belt
ⒶAlternator Belt	294—392 N (30—40 kg, 66—88 lb)	392—588 N (40—60kg, 88—132 lb)
ⒷA/C Compressor Belt	343—441 N (35—45 kg, 77—99 lb)	441—686 N (45—70kg, 99—154 lb)
ⒸP/S Pump Belt	343—490 N (35—50 kg, 77—110 lb)	441—686 N (45—70 kg, 99—154 lb)

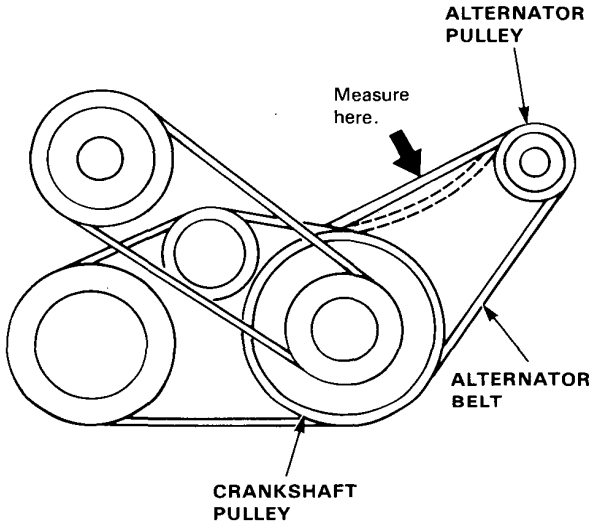


Alternator Belt Adjustment

1. Apply a force of 98 N (10 kg, 22 lb) and measure the deflection between the alternator and the crankshaft pulley.

   Deflection : 9.0—11.0 mm (0.35—0.43 in.)

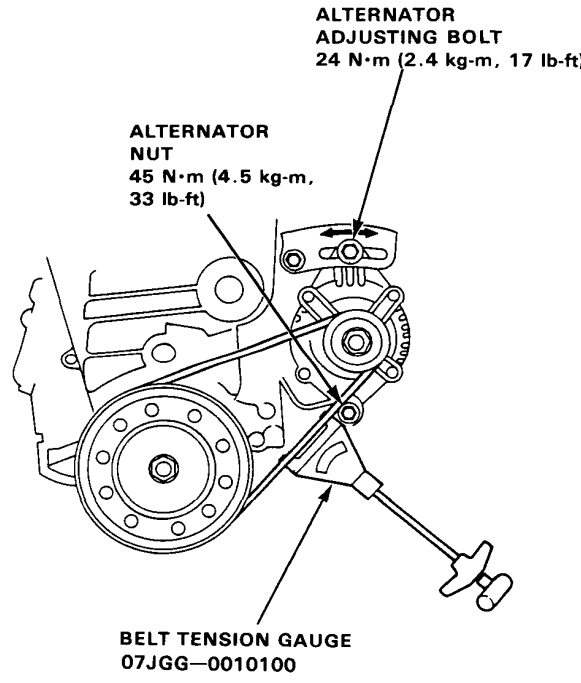
   NOTE :
   - On a brand-new belt, the deflection should be 7.0—9.0 mm (0.28—0.35 in.) when first measured.
   - If there are cracks or any damage evident on the belt, replace it with a new one.



Measure with the belt tension gauge:
Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension : 294—392 N (30—40 kg, 66—88 lb)

NOTE :
- On a brand-new belt, the tension should be 392—588 N (40—60 kg, 88~132 lb) when first measured.
- See the instruction for the belt tension gauge.
- If there are cracks or any damage evident on the belt, replace it with a new one.



2. Loosen the alternator adjusting bolt and alternator nut.
3. Move the alternator to obtain the proper belt tension, then retighten the adjusting bolt and alternator nut.
4. Recheck the deflection of the belt.
5. After adjusting, if necessary, adjust the A/C compressor belt (See page 5 — 8) and P/S pump belt (See page 5 — 9).

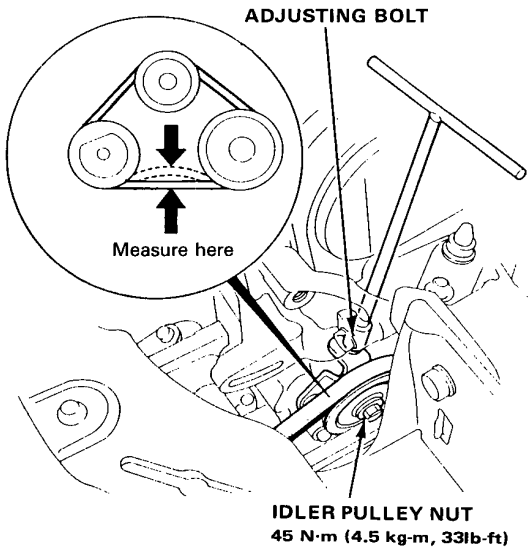
A/C Compressor Belt Adjustment

NOTE: If there are cracks or any damage evident on the belt, replace it with a new one.

1. Apply a force of 98 N (10 kg, 22 lb) and measure the deflection, between the A/C compressor idler pulley and the crankshaft pulley.

   Deflection : 9.0—11.0 mm (0.35—0.43 in.)

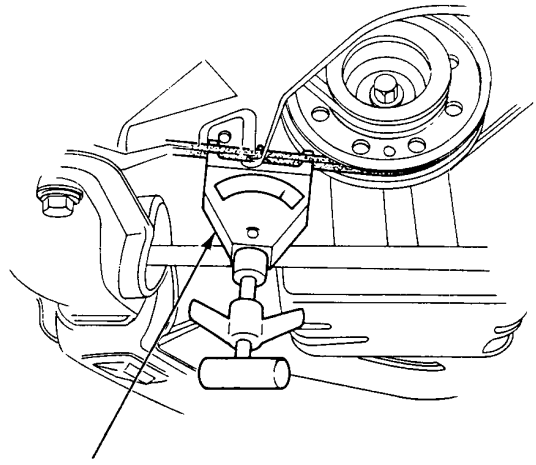
   NOTE : On a brand-new belt, the deflection should be 7.0—9.0 mm (0.28—0.35 in.) when first measured.



Measure with the belt tension gauge:
Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension : 343—441 IN (35—45 kg, 77—99 lb)

NOTE :
- On a brand-new belt, the tension should be 441—686 N (45—70 kg, 99-154 lb) when first measured.
- See the instruction for the belt tension gauge.



2. Loosen the idler pulley nut.
3. Turn the adjusting bolt to get the proper belt tension, then retighten the bolt.
4. Recheck the deflection of the belt.

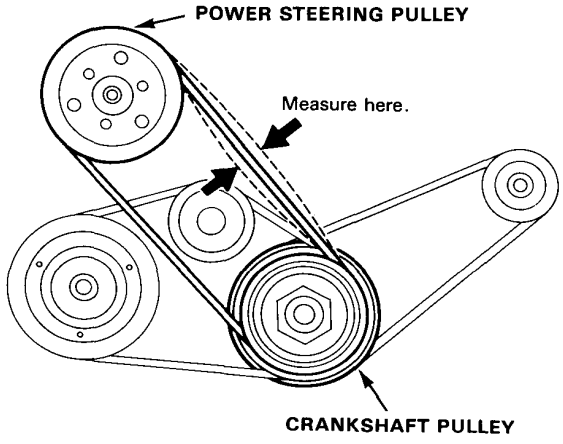
P/S Pump Belt Adjustment

NOTE: If there are cracks or any damage evident on the belt, replace it with a new one.

1. Apply a force of 98 N (10 kg, 22 lb) and measure the deflection, between the P/S pump pulley and the crankshaft pulley.

   Deflection : 9.0—12.0 mm (0.35—0.47 in.)

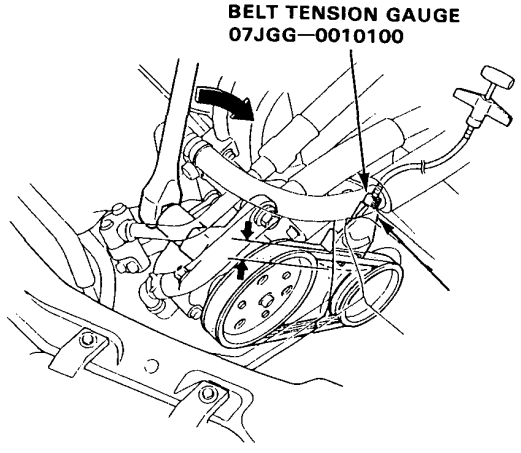
   NOTE : On a brand-new belt, the deflection should be 7.0—10.0 mm (0.28—0.39 in.) when first measured.



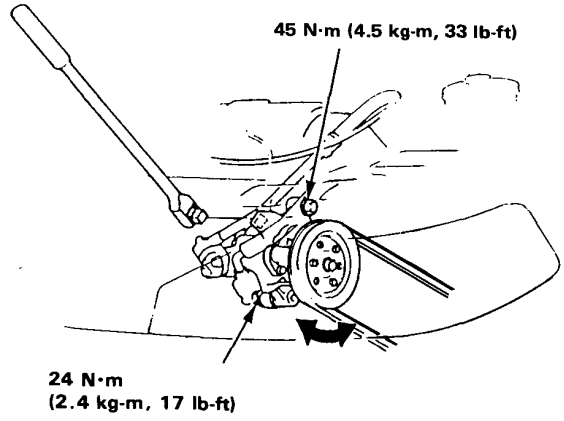
Measure with the belt tension gauge:
Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension : 343—490 N (35—50 kg, 77-110 lb)

NOTE:
- On a brand-new belt, the tension should be 441-686 N (45—70 kg, 99-154 lb) when first measured.
- See the instruction for the belt tension gauge.



2. Loosen the bolts and move the power steering pump to get proper tension, then retighten the special bolts.



3. Start the engine and turn the steering wheel from lock to lock several times, then recheck the belt tension.

Idle speed Inspection/Adjustment

Carbureted Engine :

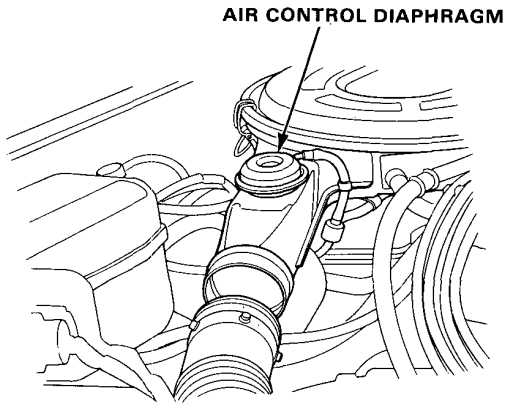
Inspection/Adjustment
Propane Enrichment Method

⚠WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

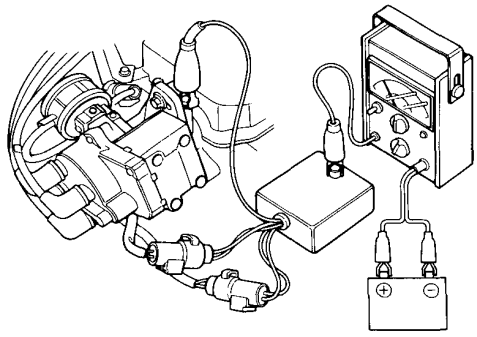
NOTE :
- This procedure requires a propane enrichment kit.
- Check that the warning light and self diagnosis indicator before making idle speed and mixture inspections.

1. Start the engine and warm up to normal operating temperture (the cooling fan comes on). Turn the ignition switch OFF. Start the engine with idle for two minutes and keep the engine speed 2,500-3,000 min^{-1} (rpm) for a one minute.

2. Disconnect the #8 vacuum hose from the intake air control diaphragm and clamp the hose end.



3. Connect a tachometer.



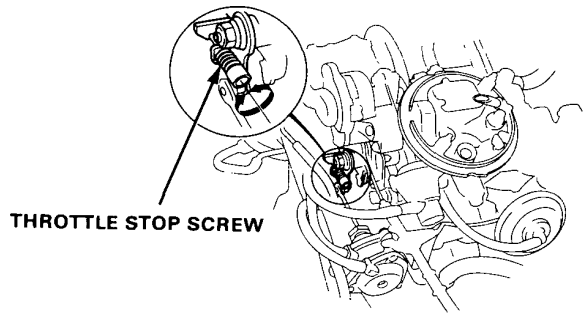
4. Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

   Idle speed should be :

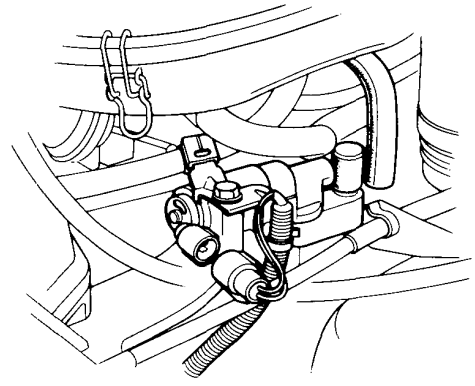
   Manual : 800±50 min^{-1} (rpm)

   Adjust the dile speed, if necessary, by turning the throttle stop screw.

   NOTE : If the idle speed is excessively high, check the throttle control (page 6-39).



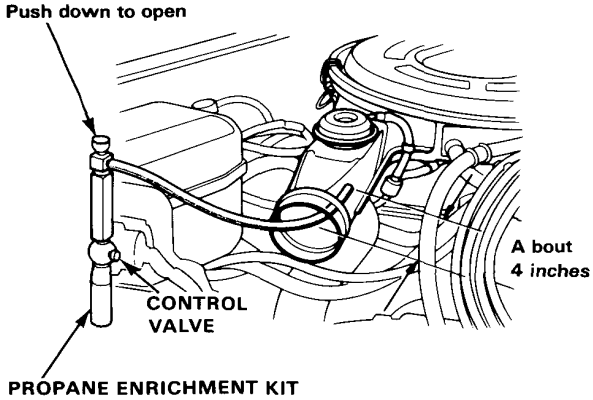
5. Disconnect the 2P connector from the EACV and disconnect the hose from vacuum hose mainfold, then cap the hose end.



6. Disconnect air cleaner intake tube from air intake duct.

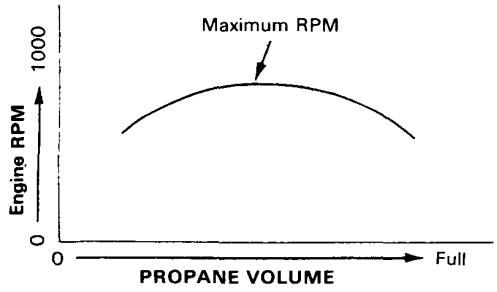
7. Insert the hose of the propane enrichment kit into the intake tube about 4-inches.

   NOTE : Check that propane bottle has adequate gas before beginning test.



8. With engine idling, depress push button on top of propane device, then slowly open the propane control valve to obtain maximum engine speed. Engine speed should increase as percentage of propane injectede goes up.

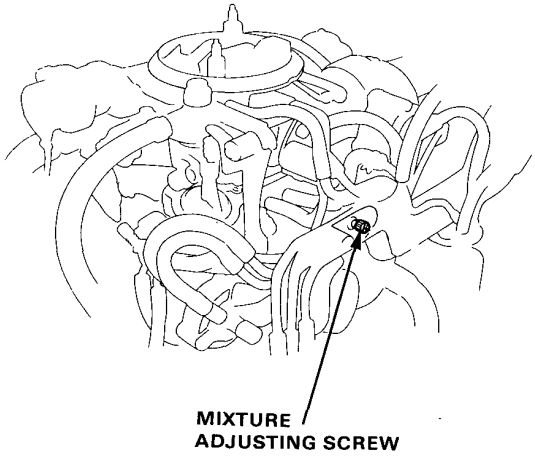
   NOTE : Open the propane control valve slowly ; a sudden burst of propane may stall the engine.



RPM increase should be :
Manual : 40±20 min^{-1} (rpm)

- If engine speed does not increase per specdification, mixture is improperly adjusted. Go to step 9.
- If engine speed increose per specification, go to step 10.

9. Remove the mixture adjusting screw hole caps, and recheck maximum propane enriched rpm.



- If the propane enriched speed is too low, mixture is too rich :
  turn both mixture screws 1/4 turn clockwise and recheck.
- If the propane enriched speed is too high, mixture is too lean :
  turn both mixtumre screws 1/4turn counterclockwise and recheck.

10. Reconnect the connector and hose. Close the propane control valve.

11. Remove the ECU fuse for 10 seconds to reset control unit and recheck idle speed. Turn the ignition switch OFF. Start the engine with idle for two minuites and keep the engine speed should be :

    Manual : 800±50 min^{-1} (rpm)

    - If idle speed is as specified (Step 4), go to step 12.
    - If idle speed is not as specified, adjust by turning throttle stop screws, then repeat step 9.

12. Remove propane enrichment kit and reconnect air cleaner intake tube on the air intake duct.

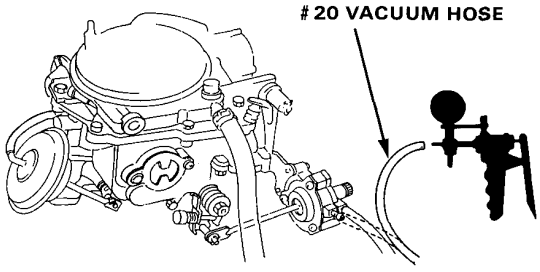
(cont'd)

Idle Speed Inspection/Adjustment (cont'd)

Carbureted Engine (cont'd) :

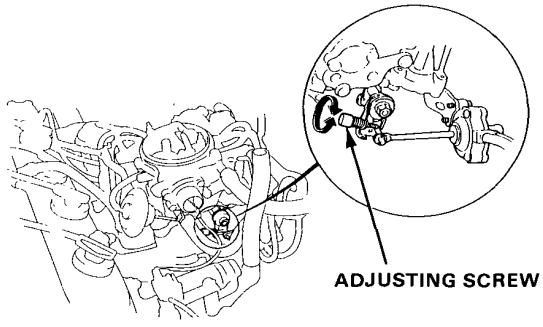
13. Reinstall the mixture adjusting screw hole cap.

14. Disconnect the # 20 vacuum hose from the idle boost throttle controller and connect a vacuum pump.



15. Apply vacuum, then check the idle speed with the headlight, heater blower, rear windaw deffogger and cooling fan on.

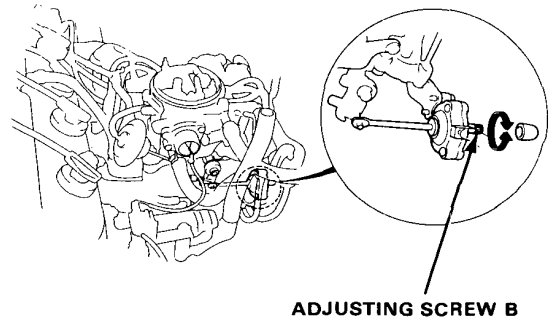
    Idle speed should be : 800±50 min^{-1} (rpm)



    Adjust the idle speed, if necessary, by turning the adjusting screw A.

16. Disconnect the vacuum pump and connect the # 20 vacuum hose, then check the idle speed with the headlight, heater blouer, rear window deffogger and cooling fan OFF.

17. If equipped with air conditioner, check the idle speed with the A/C on.
    Idle speed should be : 800±50 min^{-1} (rpm)



    Adjusting the idle speed, if necessary, by turning the adjusting screw B.

18. If the idle speed does not reach the specified idle speeds in steps 14 though 17, go to idle control system testing (page 6-12).

CO Meter Method

⚠WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

1. Follows steps 1 through 5 of the propane enrichment method.

2. Warm up and calibrate the CO meter according to the meter manufacture instructions.

3. Turn the engine off, restart the engine and complete the idle CO check within three minuites of restarting, with the headlights, heater blower, window defogger, cooling fan and air conditioner off.

   CO meter should indicate 0.1% maximum.

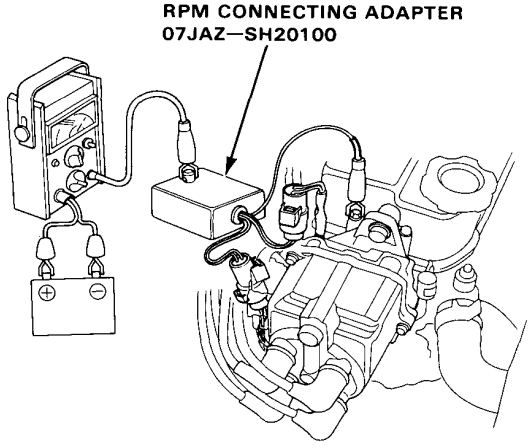
   If the idle CO is not within the specdification, check the engine tune-up condition.

1.5ℓ Fuel Injected Engine :

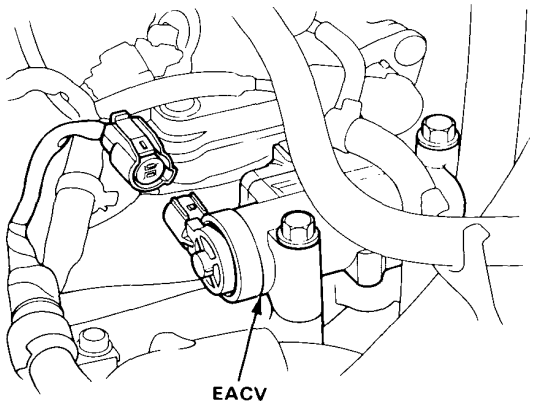
Inspection/Adjustment

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

2. Connect a tachometer.



3. Disconnect the 2P connector from the EACV.



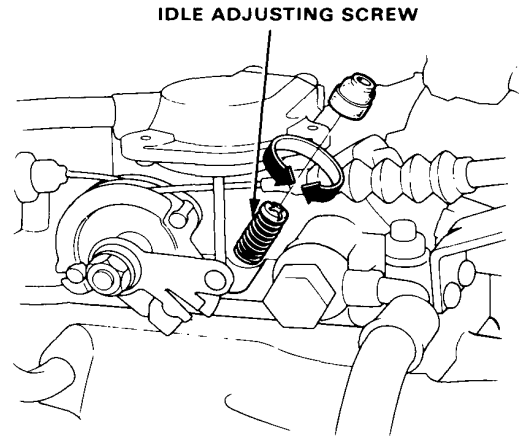
4. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

Idle speed should be:

Manual	625±50 min^{-1} (rpm)
Automatic	625±50 min^{-1} (rpm) (in N or P)

Adjust the idle speed, if necessary, by turning the idle adjusting screw.

NOTE: If the idle speed is excessively high, check the throttle control system.



5. Turn the ignition switch OFF.
6. Reconnect the 2P connector on the EACV, then remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

7. Restart and idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

Idle speed should be:

Manual	800±50 min^{-1} (rpm)
Automatic	800±50 min^{-1} (rpm) (in N or P)

8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.
If applicable, with Automatic transmission models, idle the engine for one minute in gear (except N or P) and check the idle speed.
Idle speed should be: 800±50 min^{-1} (rpm)

9. Idle the engine for one minute with heater fan switch at HI (right end) and air conditioner on, then check the idle speed.

Idle speed should be: 800±50 min^{-1} (rpm)

NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-60.

Timing Belt

Special Tools ..... 5 — 16
Illustrated Index ..... 5 — 17

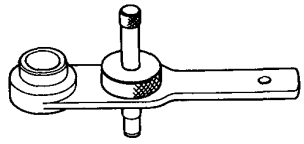
Outline of Model Change

The service interval for the timing belt has been added.

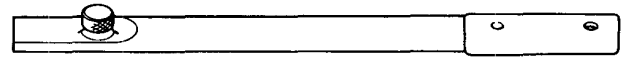
Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07JAB-0010000	Crank Pulley Holder Set	1	for Crankshaft pulley bolt
①-1	07JAA-0010100	Socket wrench 17 mm	(1)	
①-2	07JAB-0010100	Pulley Holder Attachment	(1)	
①-3	07JAB-0010200	Handle	(1)	

①-1



①-2



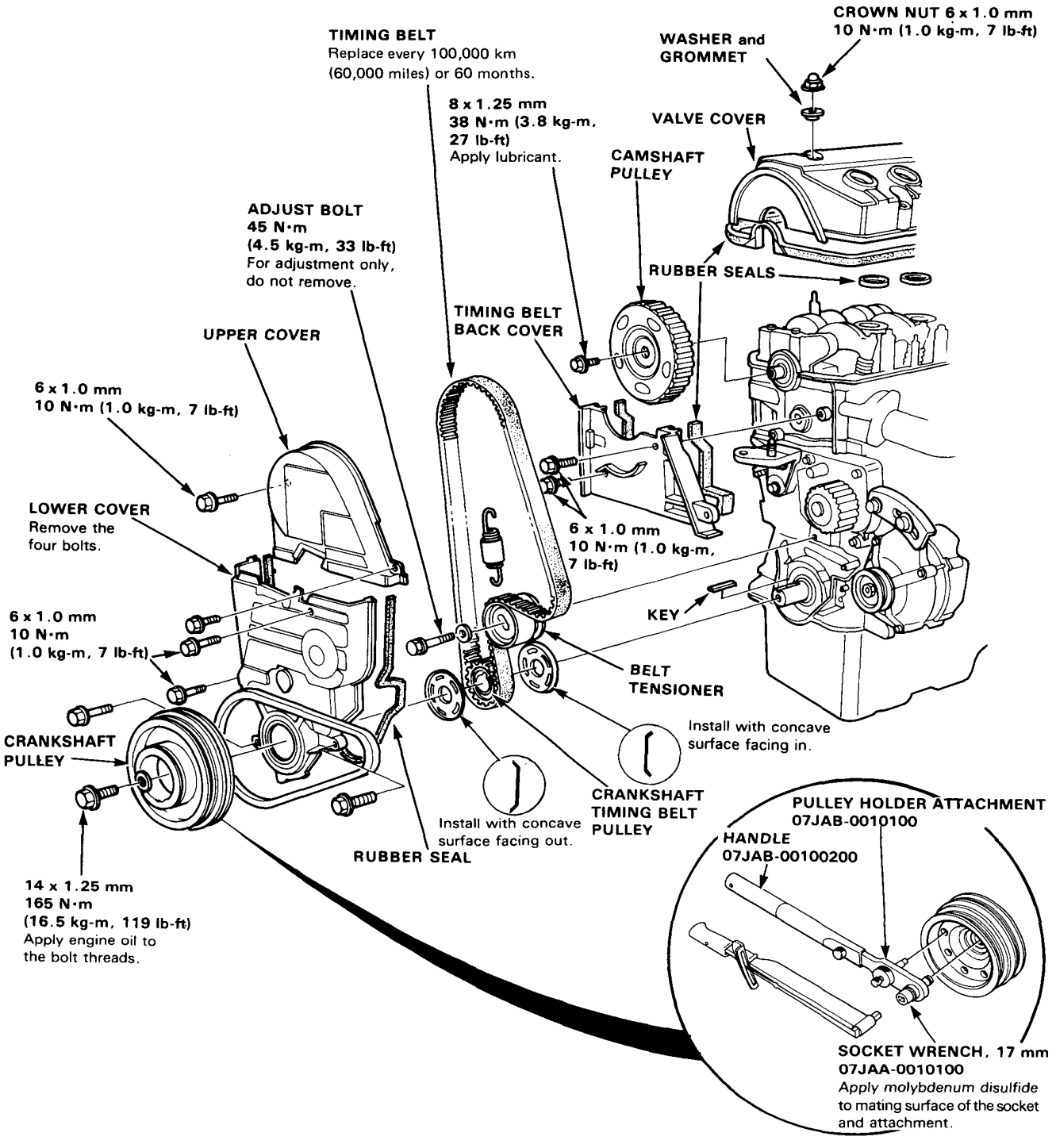
①-3

Timing Belt

Illustrated Index

NOTE :

- Refer to page 5-7, for alternator belt adjustment.
- Refer to page 5-8, for A/C compressor belt adjustment.
- Refer to page 5-9, for P/S pump belt adjustment.
- Before removing, mark direction of rotation.



Engine Removal/Installation

Outline of Model Change

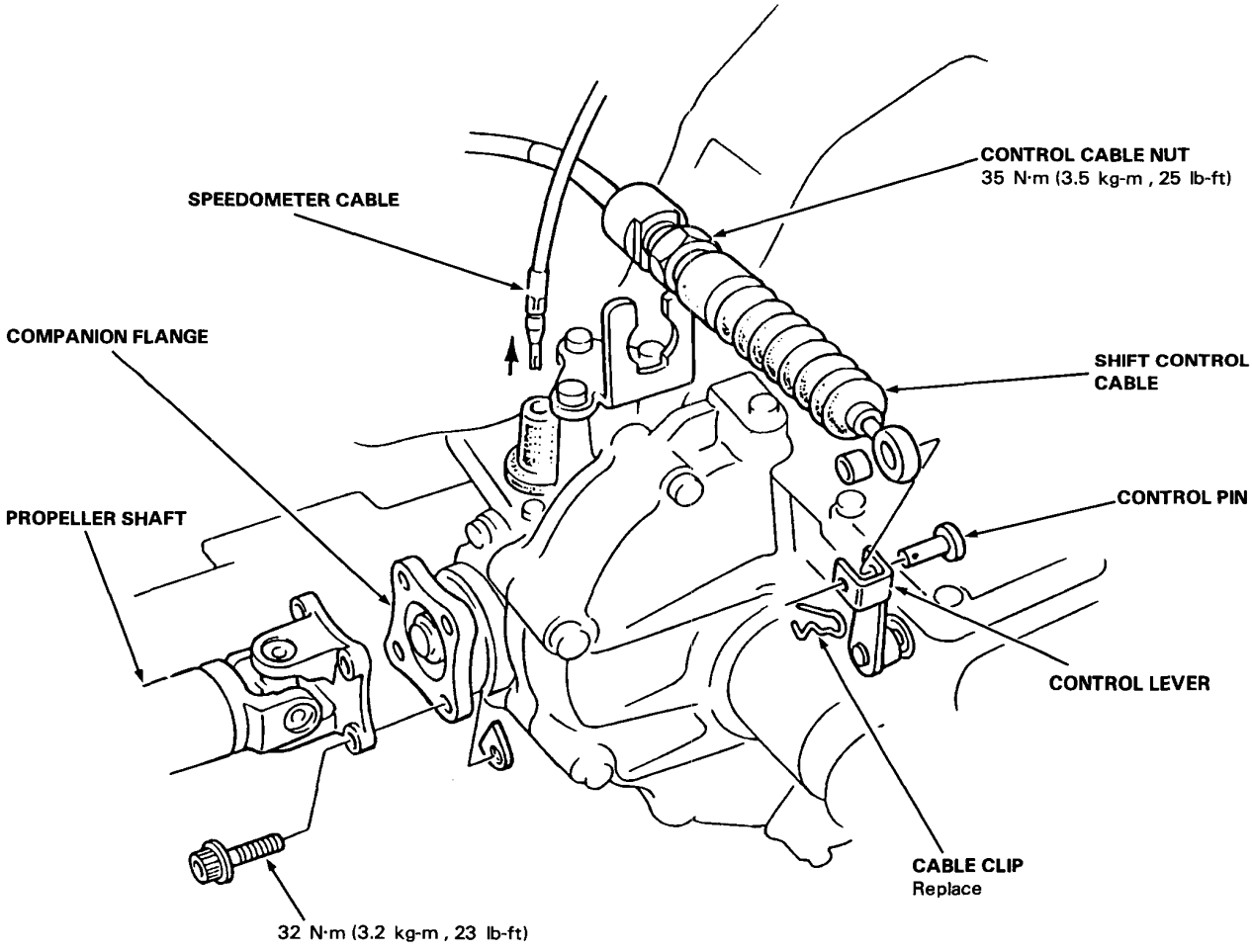
The automatic transmission (4WD) has been adopted.

4WD A/T only:

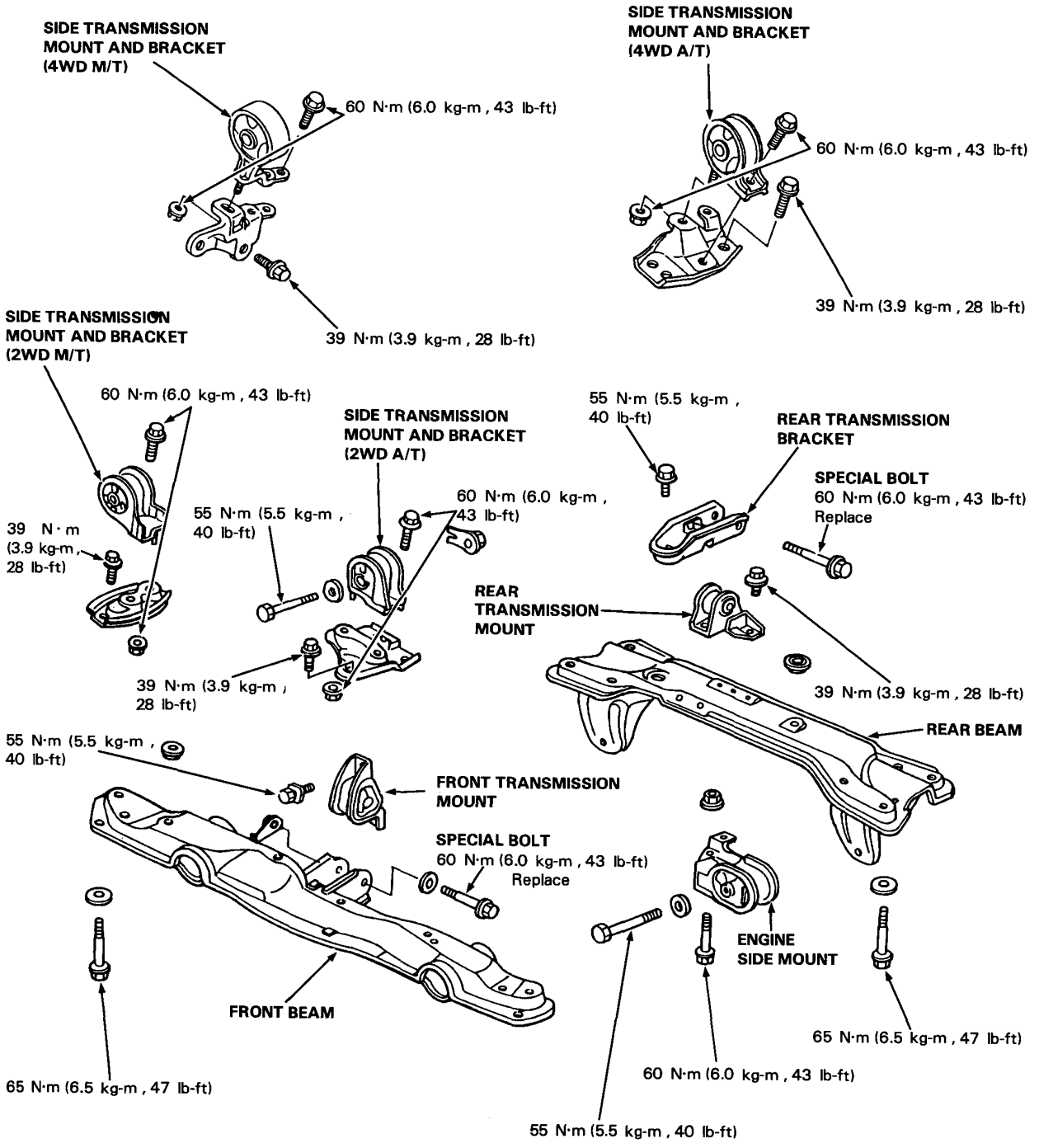
— Remove the cable clip and the control pin.

— Loosen the shift control cable nut, then remove the control cable.

NOTE:
- Take care not to bend the cable when removing it and lift the cable hanging by wire up to the body.
- On assembly, check the cable adjustment.



Additional Torque Specifications:



Oil Pan

Replacement ..... 5 — 24

Outline of Model Change

The automatic transmission (4WD) has been adopted.

Oil Pan

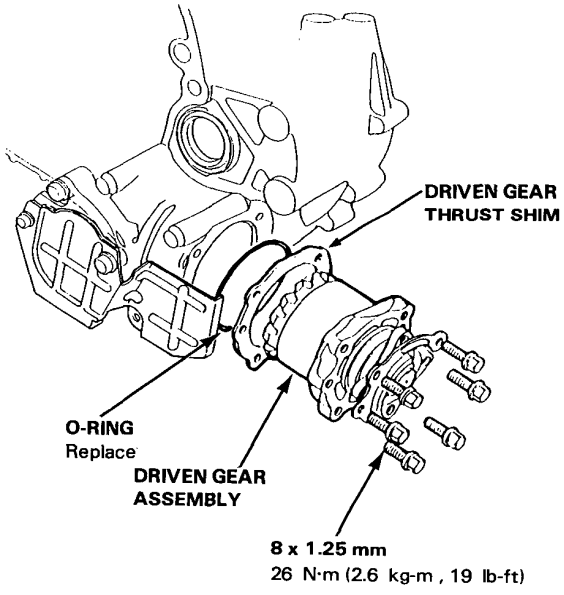
Replacement (4WD A/T)

⚠WARNING

- **Make sure jacks and safety stands are placed properly and hoist brackets are attached to correct positions 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.**

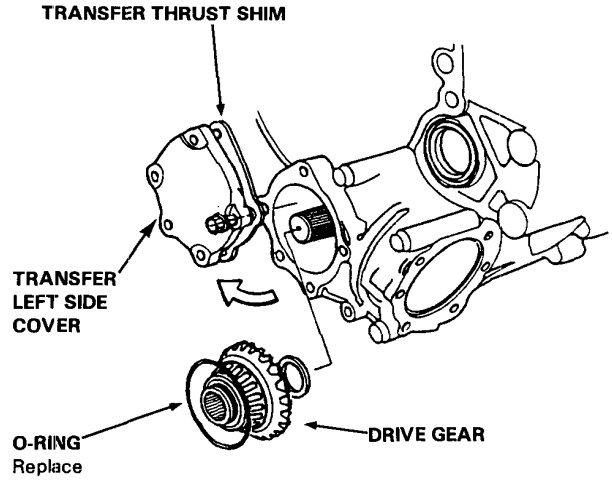
Removal:

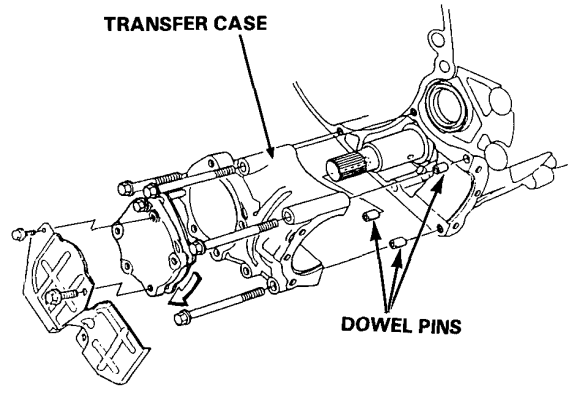
1. Remove the engine splash shield.
2. Drain the engine oil.
3. Drain the transmission oil.
4. Remove the exhaust pipe A.
5. Disconnect the propeller shaft at the transmission (page 5-8).
6. Remove the transmission splash shield.
7. Remove the driven gear assembly from the transfer case.



8. Remove the transfer left side cover and then the drive gear from the transfer case. In this procedure, rotate the cover using the bolt as the axis, which bolt is unable to be removed from the cover.

NOTE:
Be careful not to damage the thrust sim and mating surface.



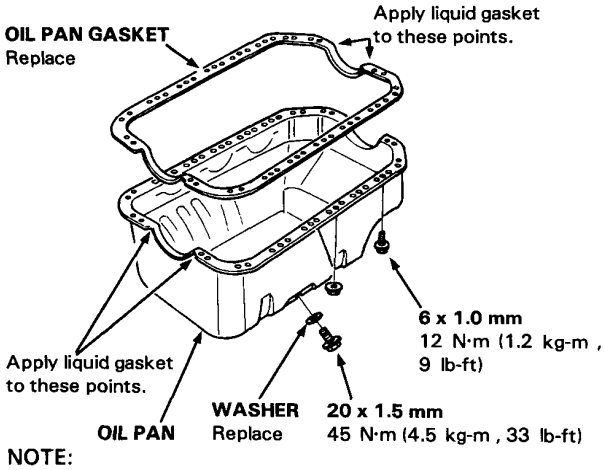


9. Remove the transfer case from the clutch housing.
10. Remove the clutch case cover.
11. Remove the oil pan by removing the bolts and nuts.

Installation:

Installation in the reverse order of removal.

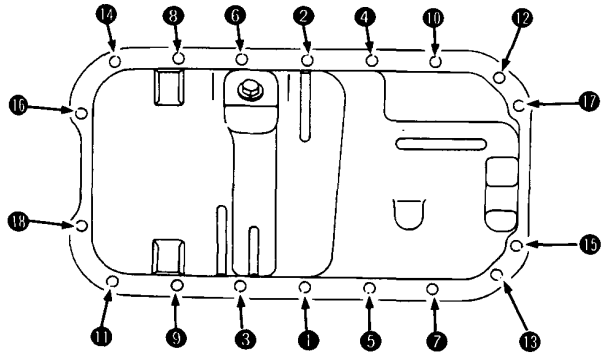
1. Thoroughly clean the mating surface of the oil pan and engine case. Apply liquid gasket to both surface of the gasket.



NOTE:

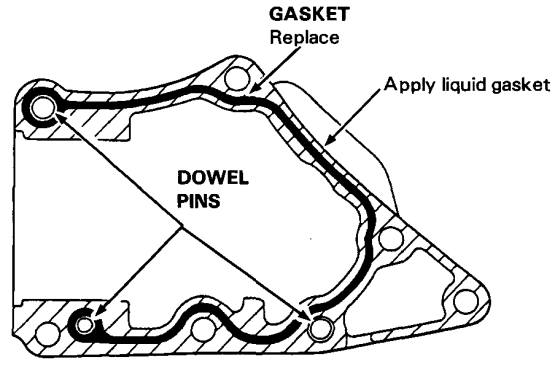
- Replace gaskets and O-rings at disassembly.
- Use Honda genuine liquid gasket, Part NO. OY740-99986.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. In that case, reapply liquid gasket after removing old residue.
- Fill the case with clean engine oil 30 minutes after assembly.

2. Tighte the bolts as shown below.
   Torque: 12 N·m (1.2 kg-m , 9 lb-ft)

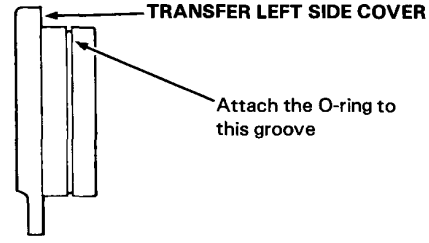


NOTE:
Tighten bolts and nuts in two steps and torque the bolts in a criss-cross pattern.

3. Apply liquid gasket to the clutch housing mating surface of the transfer case.

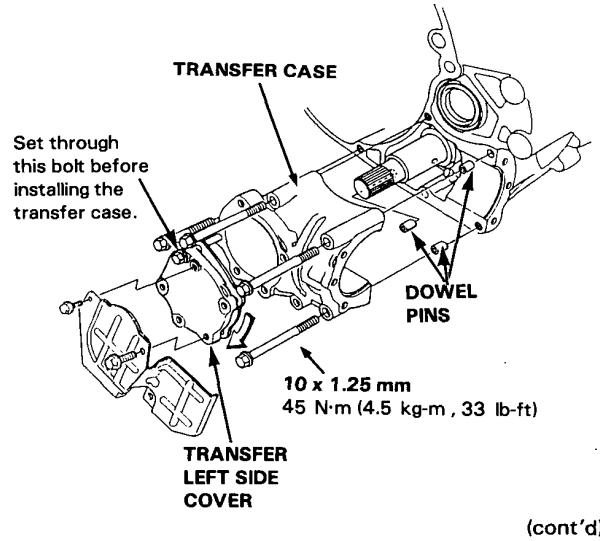


4. Attach the O-ring to transfer left side cover as shown below.



5. Install the transfer case on the clutch housing. Set the bolt through the transfer case and clutch housing as shown below.

NOTE:
Be careful not to damage the thrust shim and mating surface, and keep them clean.

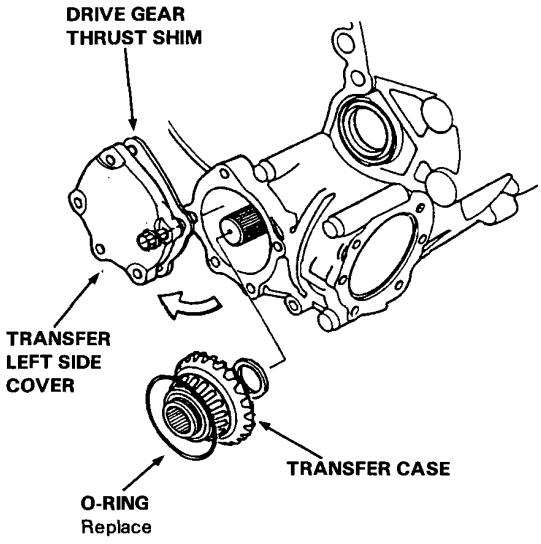


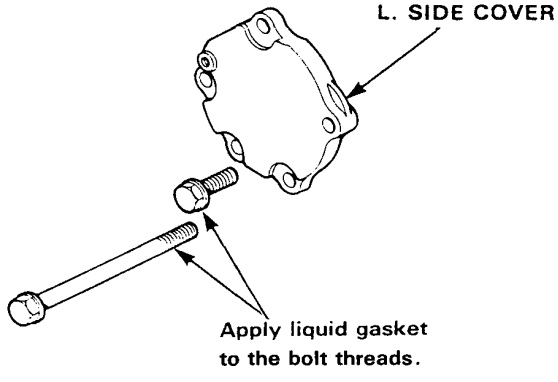
(cont'd)

Replacement (4WD A/T) (cont'd)

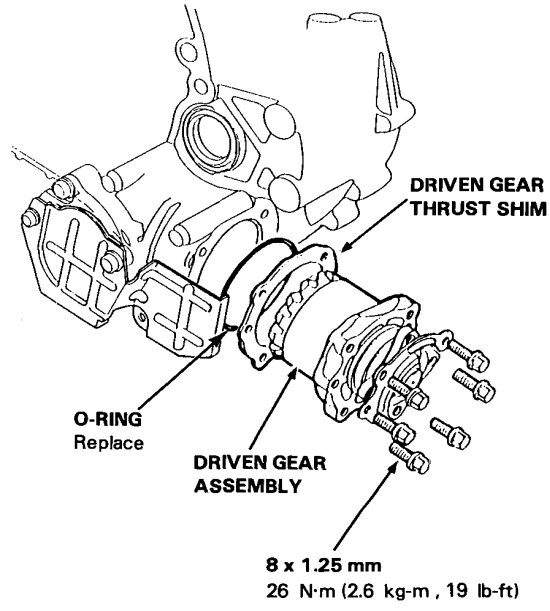
6. Install the following parts on and in the transfer shaft and transfer case.
   - Drive gear thrust shim
   - Drive gear (lubricate with oil)
   - Transfer thrust shim
   - Transfer left side cover

NOTE:
Be careful not to damage the thrust shim and mating surface, and keep them clean.





7. Install the following parts in the transfer case.
   - Driven gear thrust shim
   - Driven gear



8. If necessary, perform the following inspections
   - Tooth contact between the transfer the driven and drive gears
   - The backlash at the companion flange
   - The backlash at the transfer frange
   - The transfer driven gear preload
   - The total preload

Exhaust Pipe and Muffler

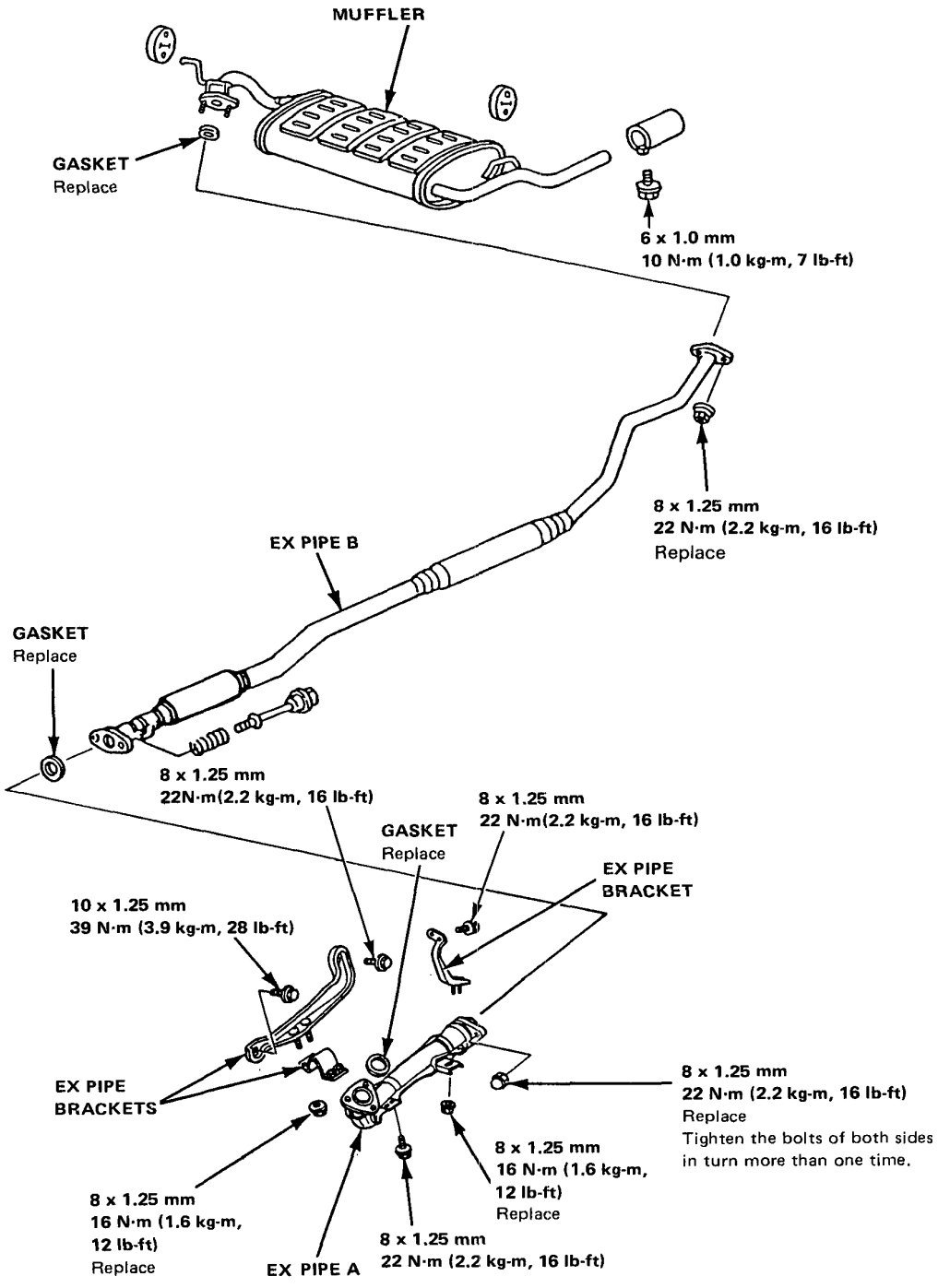
Outline of Model Change

The exhaust pipe has been changed.

Exhaust Pipe and Muffler

Replacement (4-door hatchback)

Carbureted engine without CATA:



Radiator

Water Pump Inspection .....5 — 30

Outline of Model Change

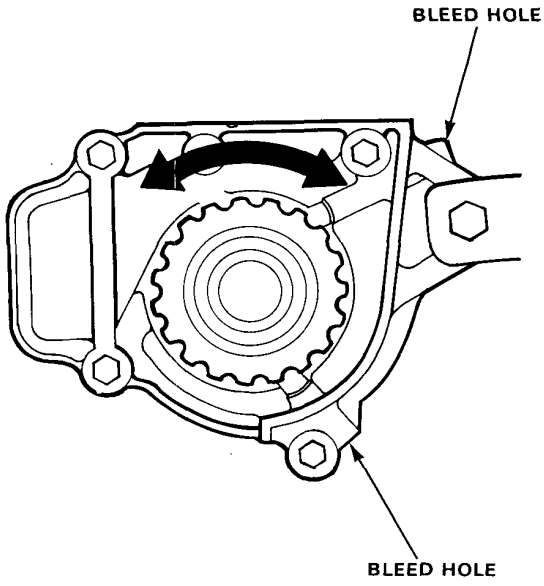
The inspection of the water pump has been added.

Water Pump

Inspection

1. Remove the timing belt.
2. Check the water pump pulley turns freely.
3. Check the signs of seal leakage.

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



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Fuel and Emissions (Carbureted Engine)

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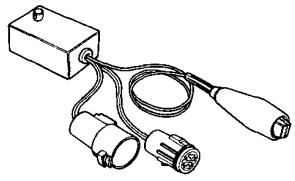
Outline of Model Change

- The D13B engine (1.3 ℓ SOHC 1-Carbureted PGM-CARB Engine) has been adopted. [KG, KS model]

Special Tools

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07JAZ—SH20100	R.P.M. Connecting Adaptor	1	
②	07614—0050100	Fuel Line Clamp	1	
③	07HAZ—PJ70000	ECU Test Harness A	1	
④	07HAZ—PJ70100	ECU Test Harness B	1	
⑤	07411—0020000	Digital Circuit Tester	1	
⑥	07GMJ—ML80100	Test Harness	1	



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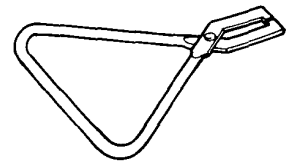

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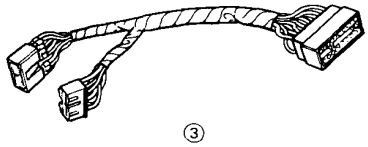

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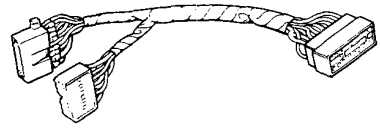
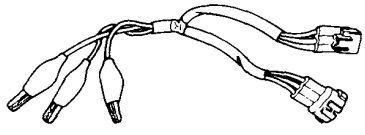


④

⑤



⑥

Component Locations

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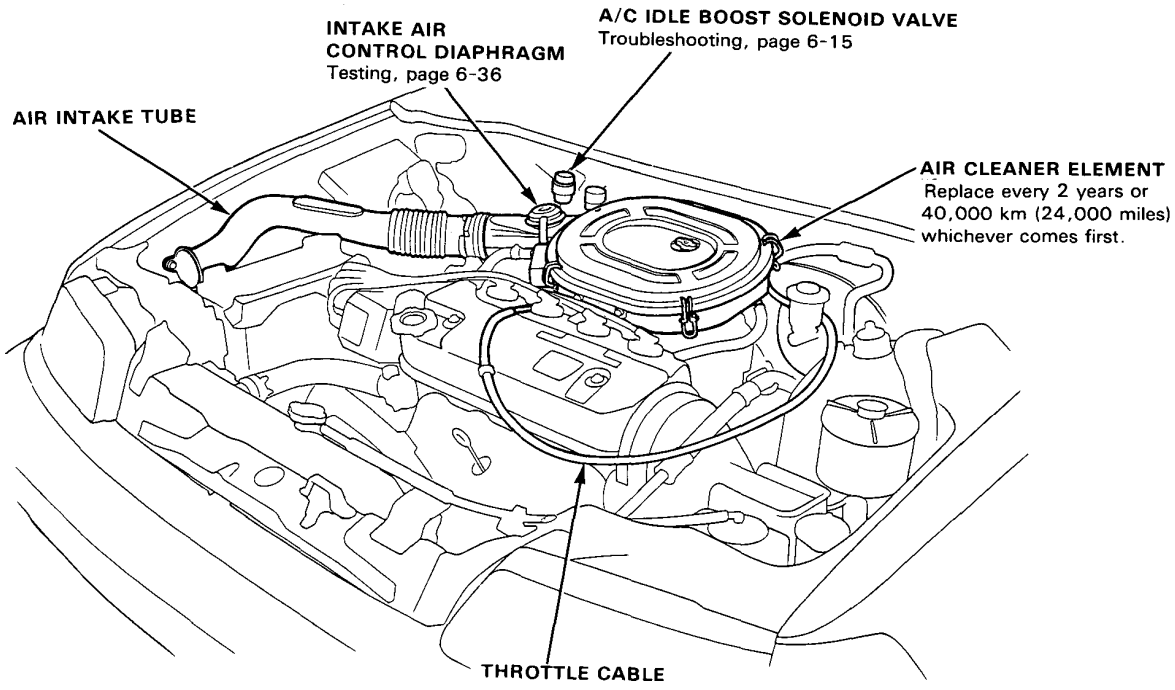
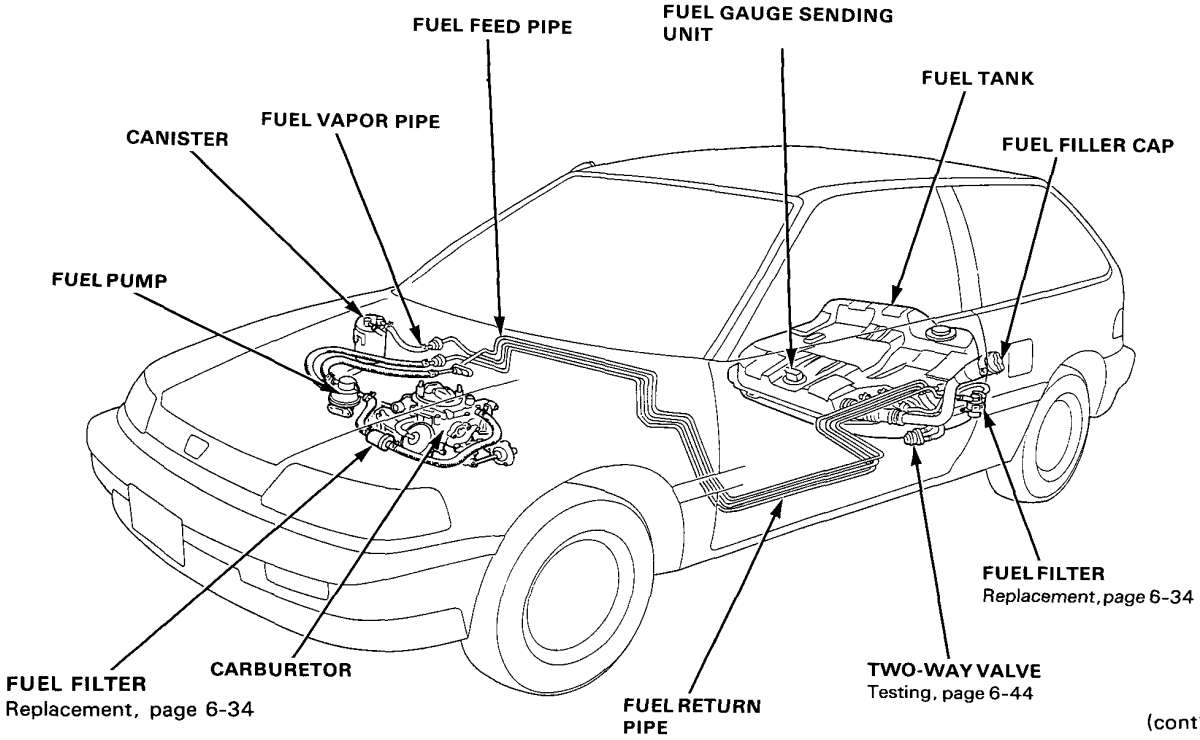
[1-Carbureted Engine, KG, KS]

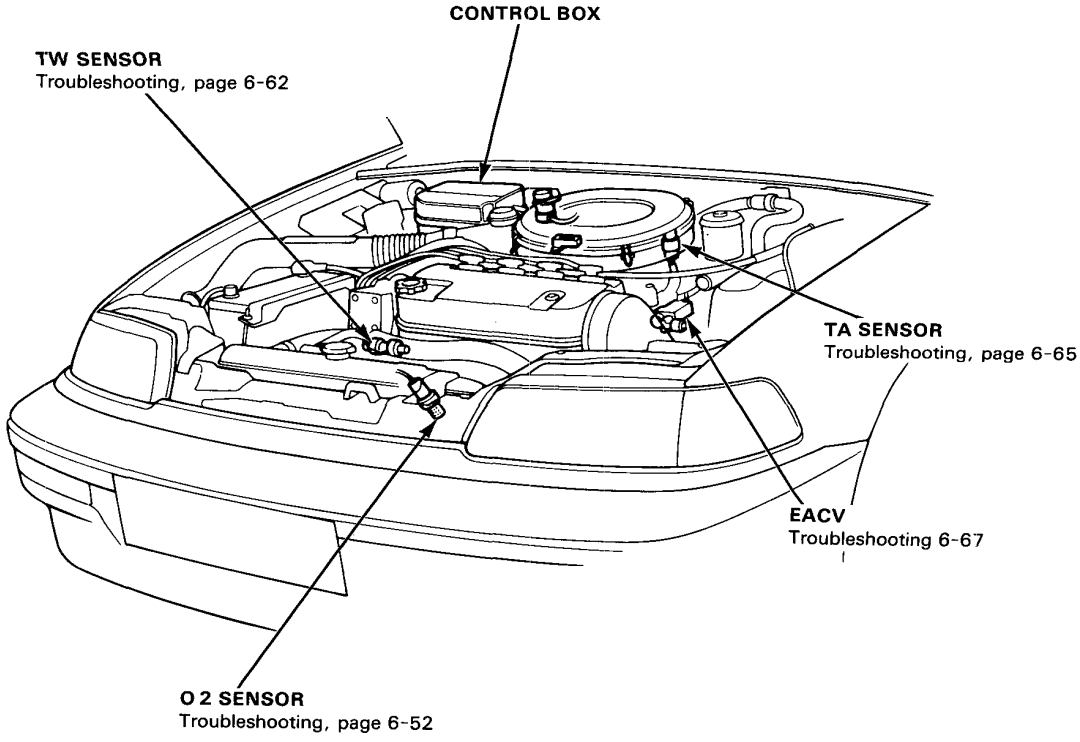


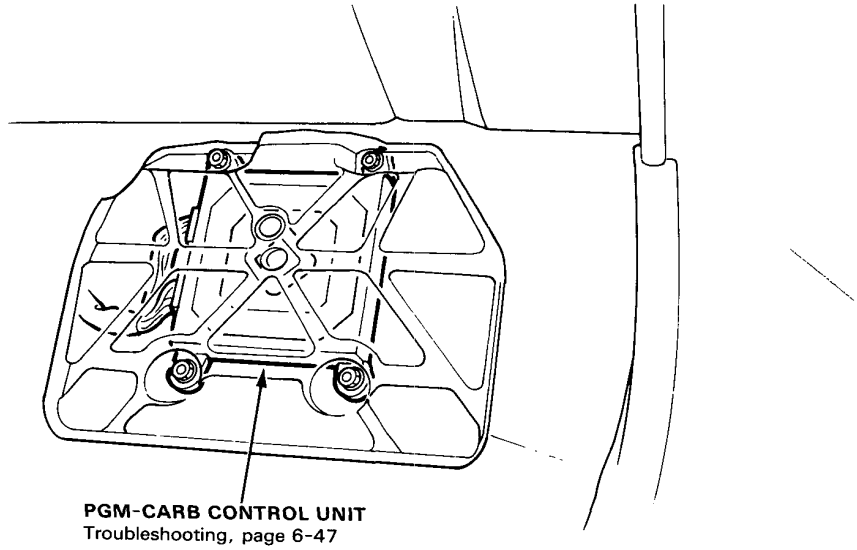


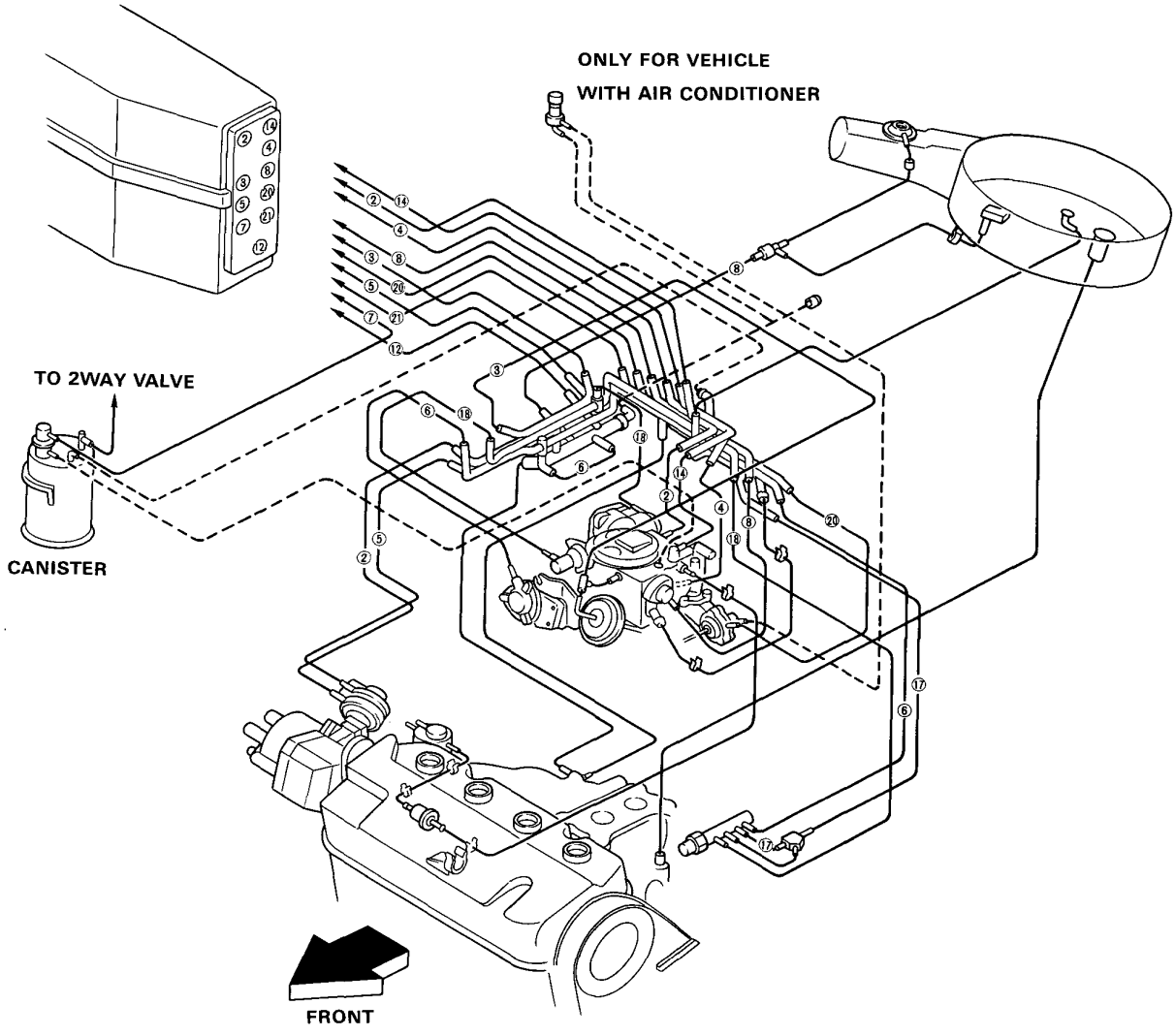
(cont'd)

Component Locations

Index (cont'd)

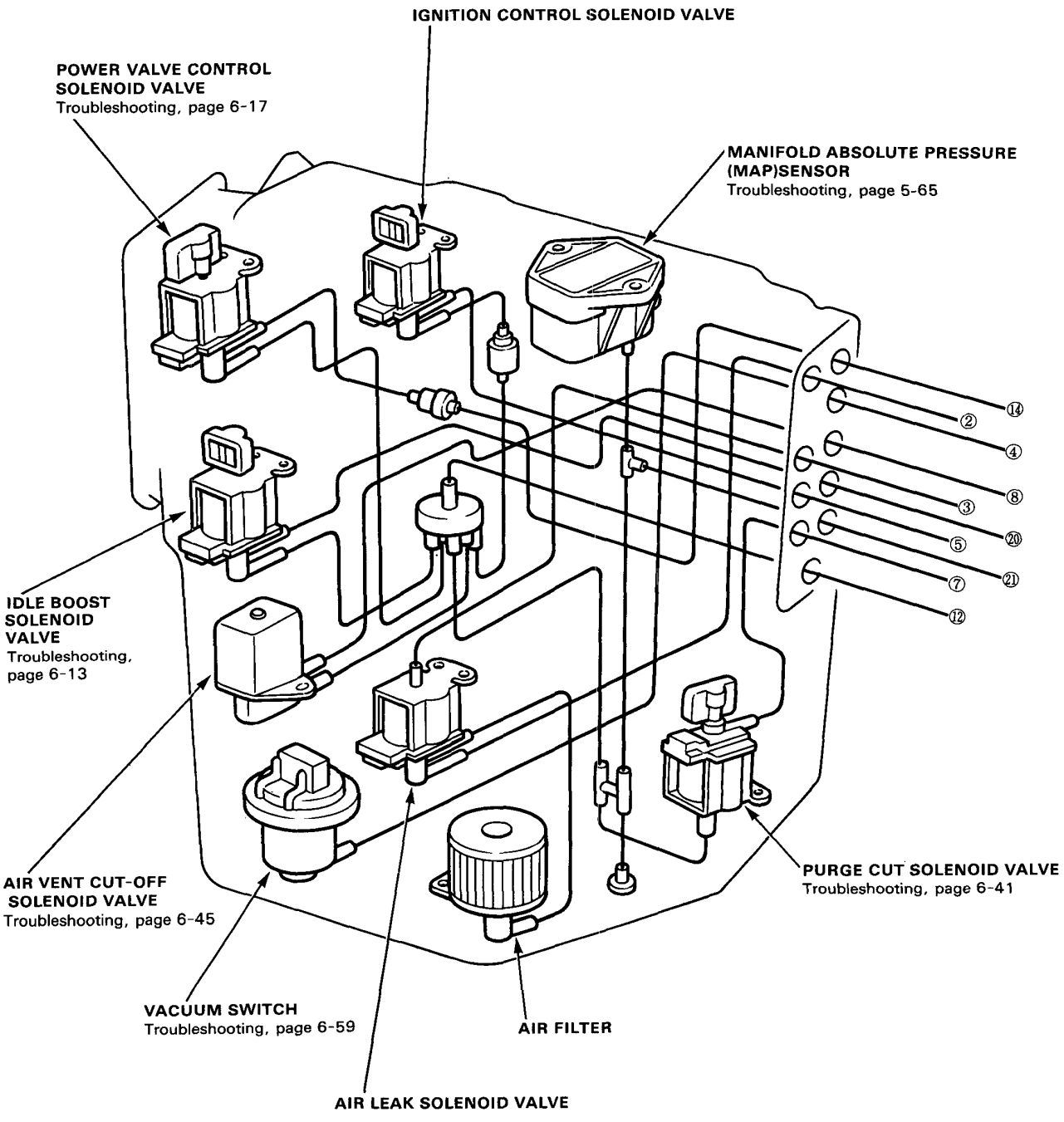


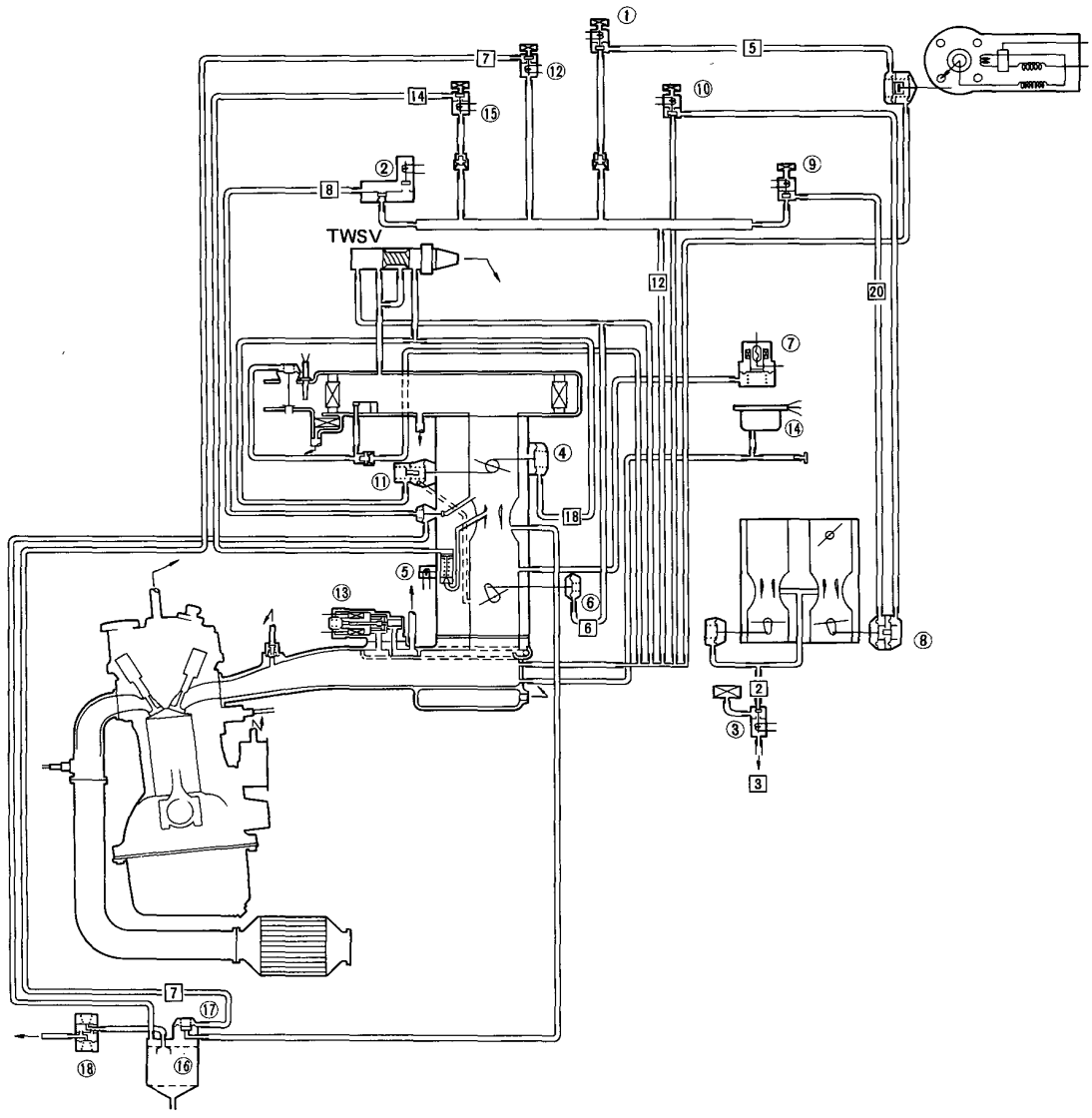



ONLY FOR VEHICLE
WITH AIR CONDITIONER
TO 2WAY VALVE
CANISTER
FRONT

System Description

Vacuum Connections (cont'd)

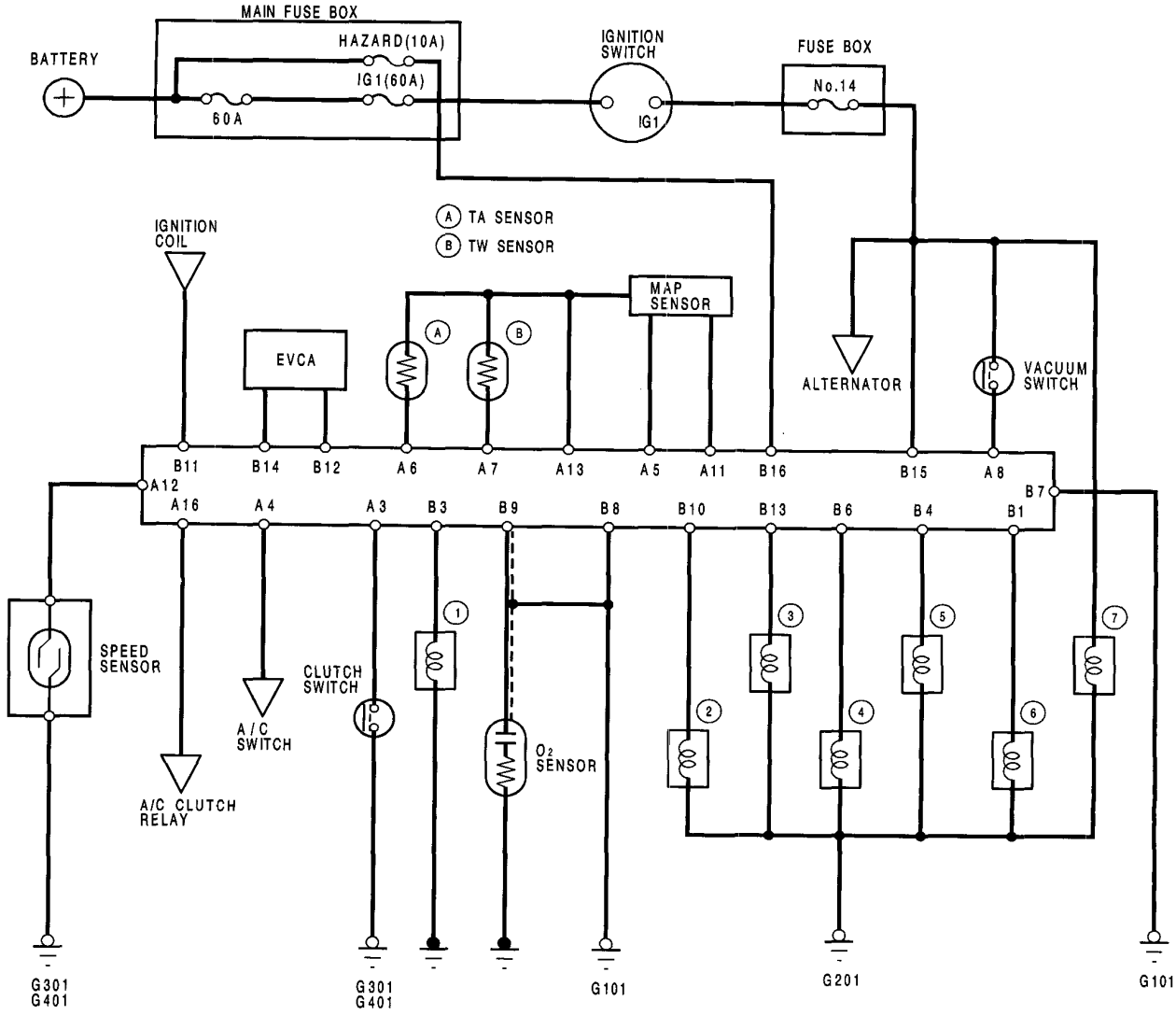




① IGNITION CONTROL SOLENOID VALVE
② AIR VENT CUT-OFF SOLENOID VALVE
③ AIR LEAK SOLENOID VALVE
④ FAST IDLE UNLOADER
⑤ PRIMRY SLOW MIXTURE CUT-OFF SOLENOID VALVE
⑥ THROTTLE CONTROLLER
⑦ VACUUM SWITCH
⑧ IDLE BOOST THROTTLE CONTROLLER
⑨ IDLE BOOST SOLENOID VALVE
⑩ A/C IDLE BOOST SOLENOID VALVE
⑪ CHOKE OPENER
⑫ PURGE CUT SOLENOID VALVE
⑬ ELECTRONIC AIR CONTROL VALVE (E. A. C. V)
⑭ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
⑮ POWER VALVE CONTROL SOLENOID VALVE
⑯ CHARCOAL CANISTER
⑰ PURGE CONTROL VALVE
⑱ TWO-WAY VALVE

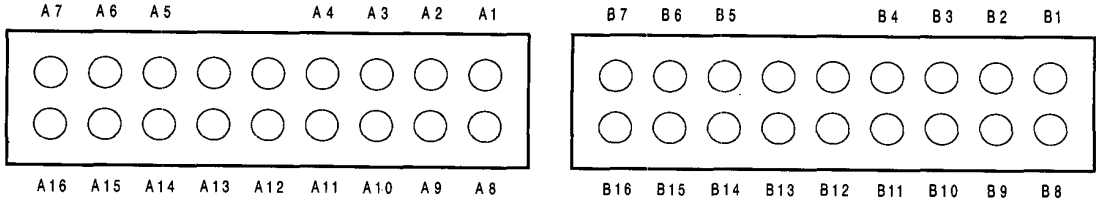
System Description

Electrical Connections



1. PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE
2. POWER VALVE CONTROL SOLENOID VALVE
3. PURGE CUT SOLENOID VALVE
4. AIR LEAK SOLENOID VALVE
5. IDLE BOOST SOLENOID VALVE
6. IGNITION CONTROL SOLENOID VALVE
7. AIR VENT CUT-OFF SOLENOID VALVE

TERMINAL LOCATION



Carburetor

Symptom-to-System Chart

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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in pages 6-26 and 6-27.

PAGE / SYSTEM / SYMPTOM		CARBURETOR			
		IDLE SPEED/ MIXTURE	IDLE CONTROL	AUTOMATIC CHOKE/ FAST IDLE SYSTEM	AIR VENT CUT-OFF SOLENOID VALVE
		24	12	28	45
ENGINE WON'T START					①
DIFFICULT TO START ENGINE WHEN COLD	WHEN COLD			①	②
	WHEN WARM				②
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION			①	
	WHEN WARM ENGINE SPEED TOO HIGH	①	②	③	
	WHEN WARM ENGINE SPEED TOO LOW	①	①		
	ROUGH IDLE/ FLUCTUATION	①	③		②
FREQUENT STALLING	WHILE WARMING UP		②	①	
	AFTER WARMING UP	①	②		②
POOR PERFORM-ANCE	MISFIRE OR ROUGH RUNNING			②	①
	LOSS OF POWER				②
	AFTERBURN	②			
	HESITATION/ SURGE				

CARBURETOR				FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL
POWER VALVE	PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE	SLOW AIR JET CONTROL	ACCELE-RATOR PUMP			
17	22	20	—	33	35	47
	②	②		①		③
	①		②			③
	①	②				③
	②					③
						③
		②				②
		③				②
	①					③
	①	①				③
				③		③
③			③	②	①	①
					②	①
			②		②	①

Idle Control System

Testing

NOTE: Snap the accelerator pedal several times and check the idle speed with the accelerator pedal fully returned.

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Check the idle speed with headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

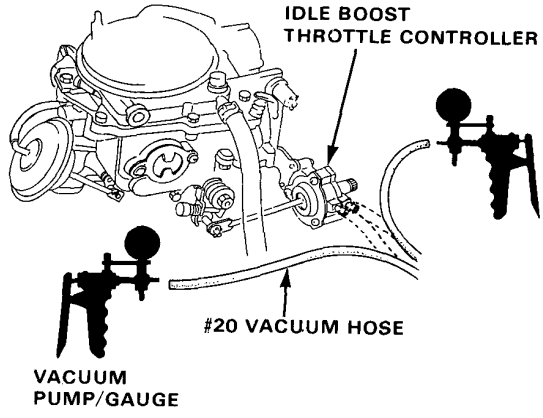
   Idle speed should be:

   Manual 800 ± 50 min^{-1} (rpm)

   - If OK, go to step 4.
   - If not, go to step 3.

3. Disconnect the two vacuum hoses at idle boost throttle controller and check each for vacuum.

   There should be no vacuum in both hoses.

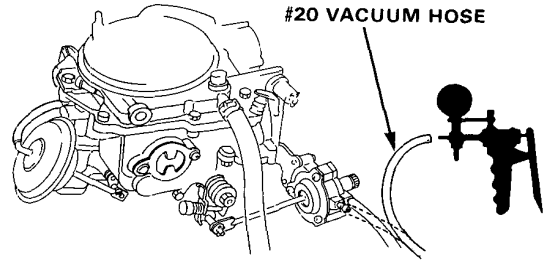


   - If there is no vacuum, check the throttle valve shaft for binding or sticking and replace the idle boost throttle controller.
   - If there is vacuum at the #20 vacuum hose, go to idle boost solenoid valve troubleshooting (page 6-13).
   - If there is vacuum at the outside vacuum hose, go to A/C idle boost solenoid valve troubleshooting (page 6-15).

4. Disconnect the #20 vacuum hose at idle boost throttle controller and check vacuum.

   NOTE: The engine coolant temperature must be below 80°C (176°F).

   There should be vacuum.

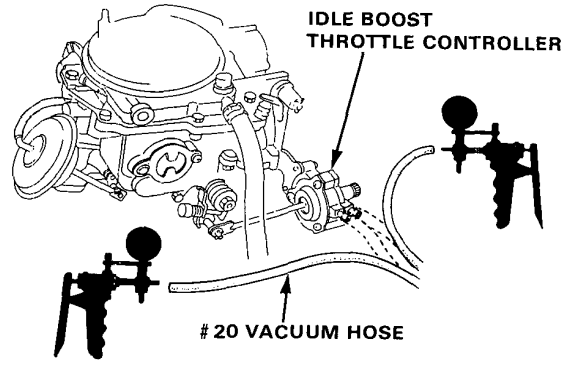


   - If there is vacuum, check the throttle valve shaft for binding or sticking and replace the idle boost throttle controller.
   - If there is no vacuum, go to the idle boost solenoid valve troubleshooting (page 6-13).

5. Check the idle speed with the A/C on.

   Idle speed should be: 800 ± 50 min^{-1} (rpm)

   - If not, disconnect the two vacuum hose at idle boost throttle controller and check each for vacuum. There should be vacuum in both hoses.



   - If there is vacuum in both hoses, replace the idle boost throttle controller.
   - If there is no vacuum at the #20 vacuum hose, go to idle boost solenoid valve troubleshooting (page 6-35).
   - If there is no vacuum at the outside vacuum hose, go to A/C idle boost solenoid valve troubleshooting (page 6-15).

Troubleshooting Flow Chart **Idle Boost Solenoid Valve**

Inspection of Idle Boost Solenoid Valve.

Open the control box.

Disconnect the lower vacuum hose of the solenoid valve from the 6 way joint and connect a vacuum pump.

Disconnect #20 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start the engine.

NOTE: Engine coolant temperature must be below 80°C (176°F).

Apply vacuum.

Is vacuum indicated on the gauge?

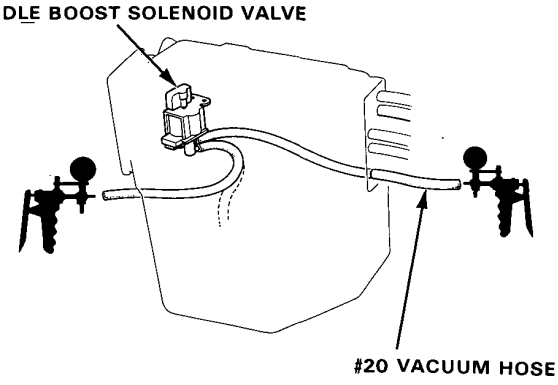
NO

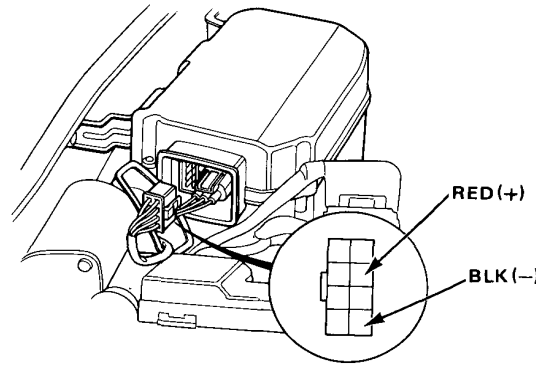
Measure voltage between RED (+) terminal and BLK (−) terminal on the control box.

YES

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

Apply vacuum.





Is there battery voltage?

YES

Replace the solenoid valve.

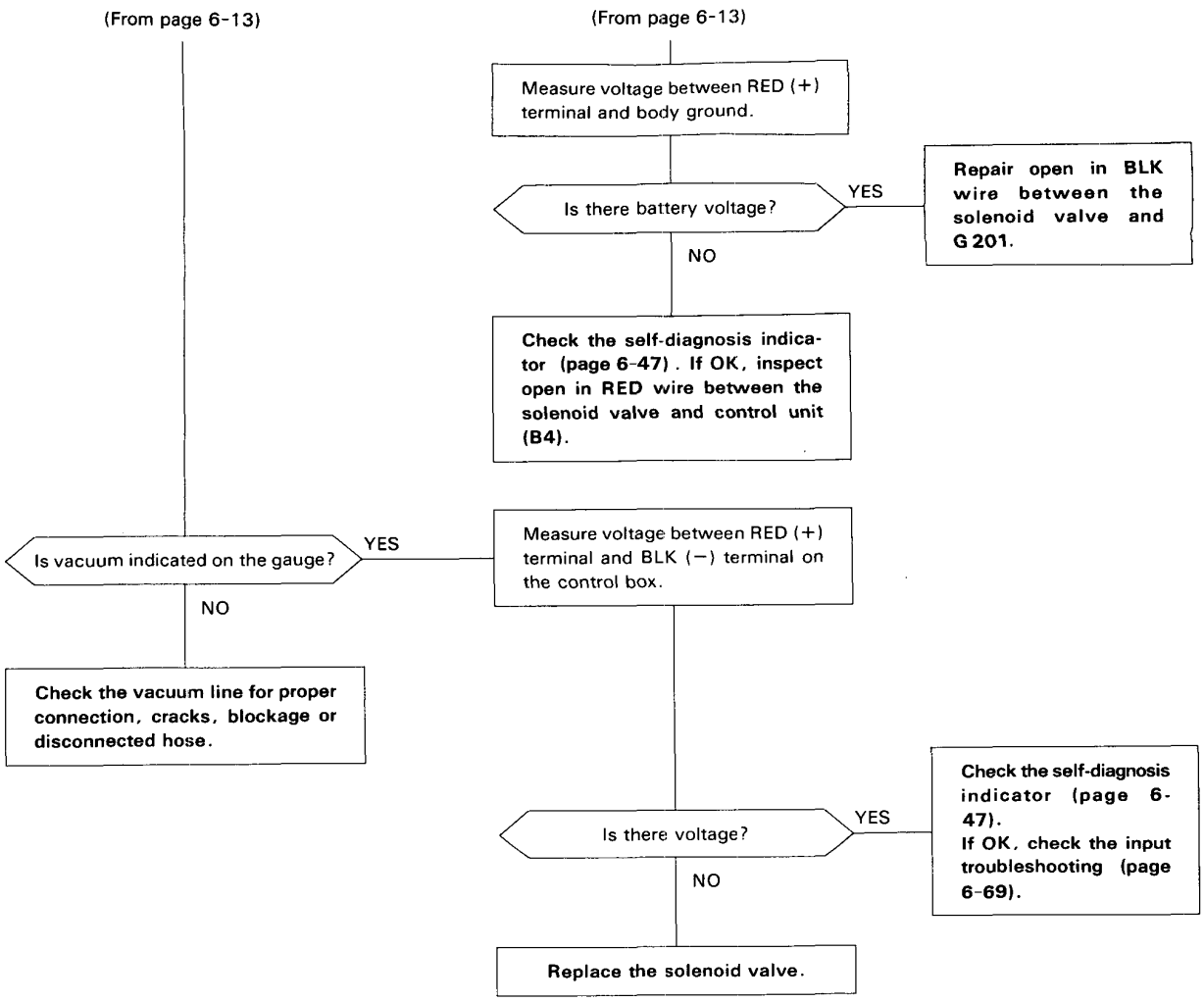
NO

(To page 6-14)

(To page 6-14)

(cont'd)

Idle Control System (cont'd)



Troubleshooting Flow Chart A/C Idle Boost Solenoid Valve

Inspection of A/C Idle Boost Solenoid Valve.

Disconnect the lower vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum pump.

Disconnect the upper vacuum hose of the solenoid valve from the idle boost throttle controller and connect a vacuum gauge.

Start the engine.

Apply vacuum.

Does solenoid valve hold vacuum?

NO

Disconnect the connectors near the solenoid valve.

Measure voltage between BLK/YEL (+) connector and BLU/RED (−) connector on the wire harness.

YES

Turn the A/C switch ON.

Apply vacuum.

(To page 6-16)

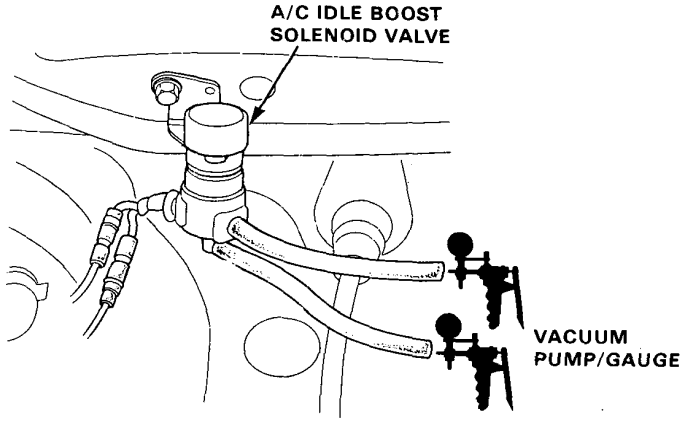
Is there voltage?

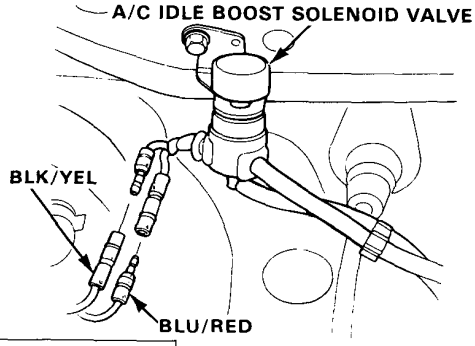
YES

Inspect short in BLU/RED wire between the solenoid valve and A/C switch.

NO

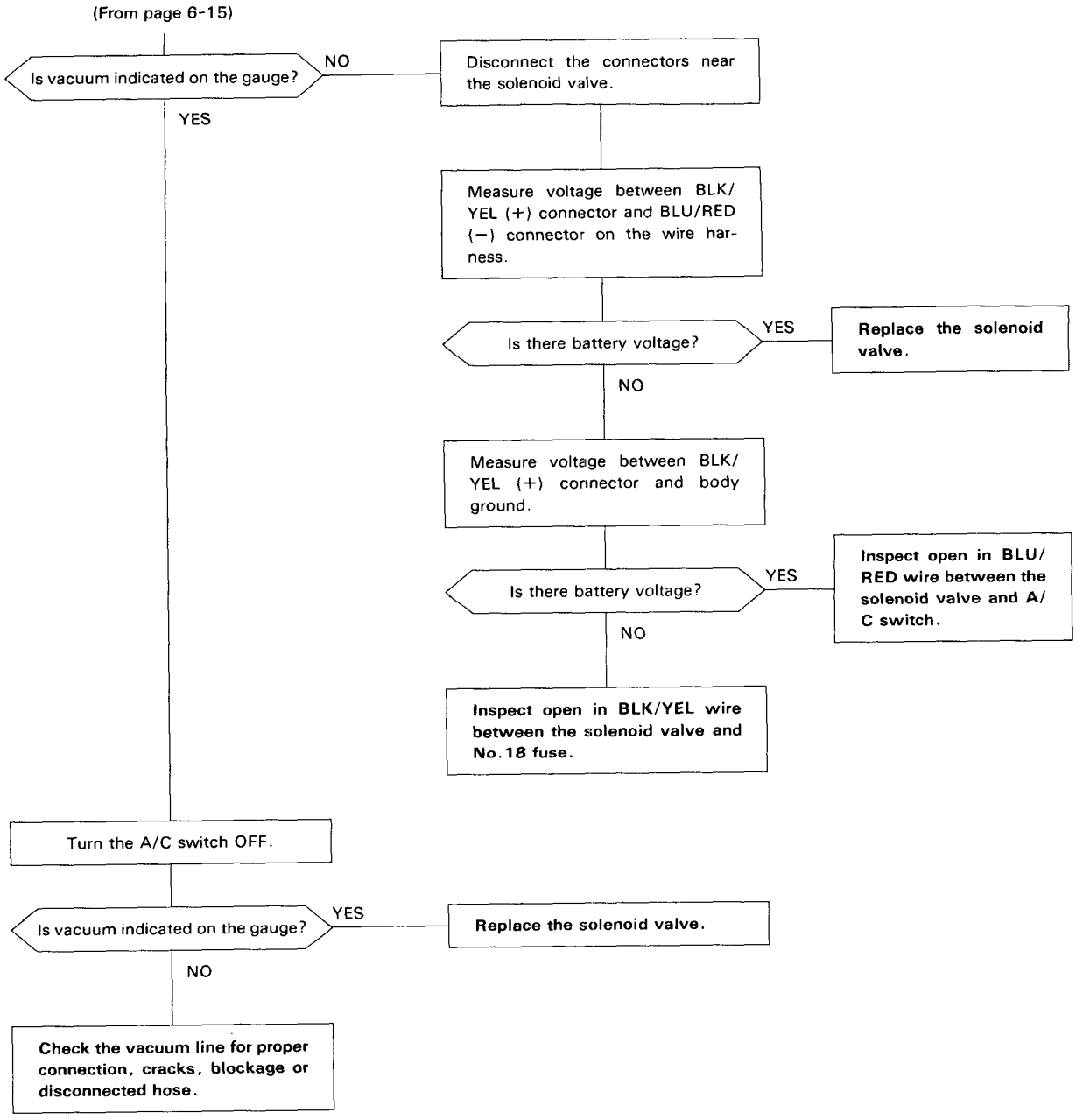
Replace the solenoid valve.





(cont'd)

Idle Control System (cont'd)

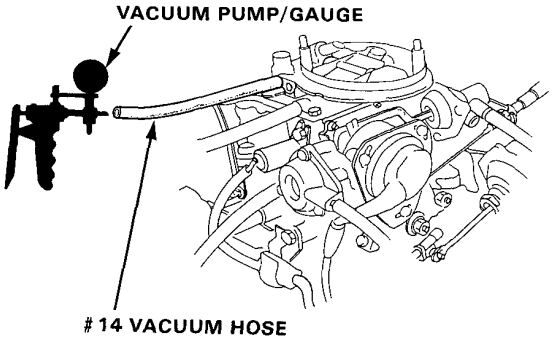


Power Valve

Testing

1. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump. Apply vacuum.

   It should hold vacuum.

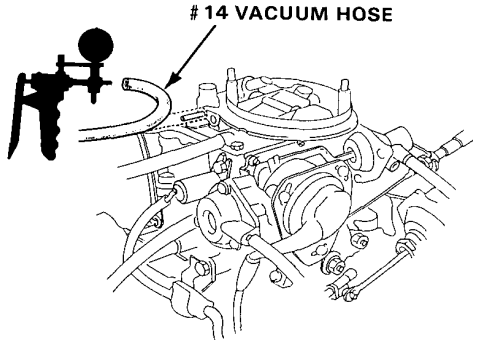


   - If it does not hold vacuum, replace the diaphragm and retest.

2. Start the engine and disconnect the #14 vacuum hose from the vacuum hose manifold, and connect a vacuum pump.
   There should be no vacuum for about 10 seconds after the engine is started.

   And there should be vacuum within 15 seconds after the engine is started.

   NOTE: The engine coolant temperature must be below 30°C (86°F).



   - If not: *go to troubleshooting (page 6-18).*

3. Warm up the engine (the cooling fan comes on), and check the vacuum.
   There should be vacuum.
   - If not, go to troubleshooting (page 6-18).

(cont'd)

Power Valve (cont'd)

Troubleshooting Flow Chart Power Valve Control Solenoid Valve

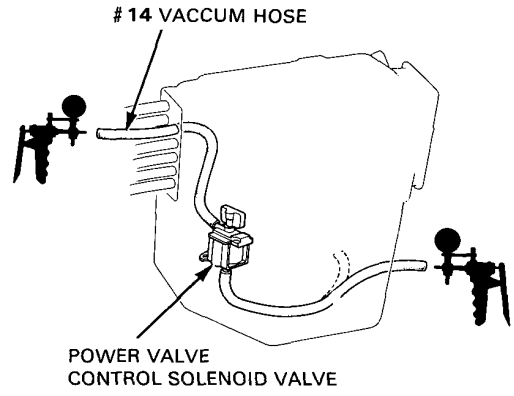
Inspection of Power Valve Control Solenoid Valve.

Open the control box.

Disconnect the lower vacuum hose of the solenoid valve from the **6** way joint and connect a vacuum pump.

Disconnect #14 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

NOTE: The engine coolant temperature must be below 30°C (86°F)



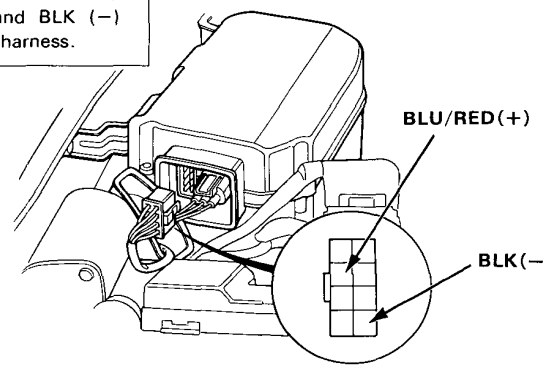
Start engine.

Apply vacuum for about 10 seconds after the engine is started.

Is vacuum indicated on the gauge?

YES

Measure voltage between BLU/RED (+) terminal and BLK (−) terminal on the wire harness.



NO

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

Is there battery voltage?

YES

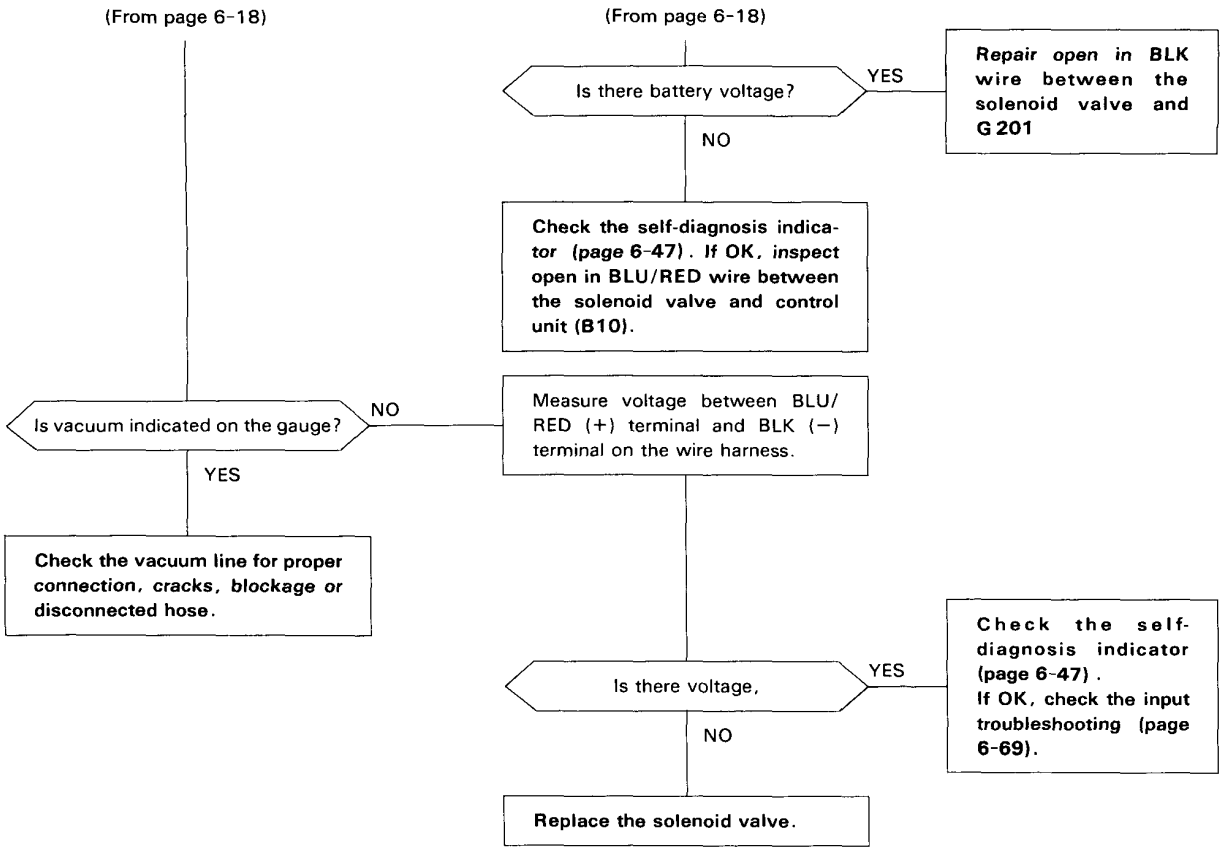
Replace the solenoid valve.

NO

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

(To page 6-19)

(To page 6-19)


(From page 6-18)
(From page 6-18)
Is there battery voltage?
YES
Repair open in BLK wire between the solenoid valve and G201
NO
Check the self-diagnosis indicator (page 6-47). If OK, inspect open in BLU/RED wire between the solenoid valve and control unit (B10).
Is vacuum indicated on the gauge?
NO
Measure voltage between BLU/RED (+) terminal and BLK (−) terminal on the wire harness.
YES
Check the vacuum line for proper connection, cracks, blockage or disconnected hose.
Is there voltage,
YES
Check the self-diagnosis indicator (page 6-47).
If OK, check the input troubleshooting (page 6-69).
NO
Replace the solenoid valve.

Slow Air Jet Control System

Troubleshooting Flow Chart Air Leak Solenoid Valve

Inspection of Air Leak Solenoid Valve.

Disconnect the #2 vacuum hose from the vacuum hose manifold and connect a vacuum pump.

Start the engine.

Apply 100 mmHg (4 in.Hg) vacuum to the hose.

Does solenoid valve hold vacuum?

NO

Turn the ignition switch OFF.

Disconnect the BLU/YEL connector near the air cleaner.

Start the engine.

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

Is there battery voltage?

NO

Check the self-diagnosis indicator (page 6-47). If OK, repair open in BLU/YEL wire between the solenoid valve and control unit (B6).

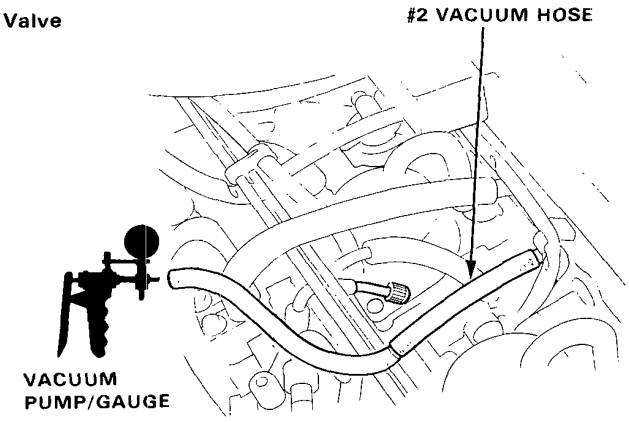
YES

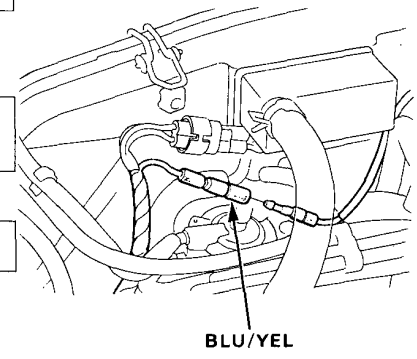
Replace the solenoid valve.

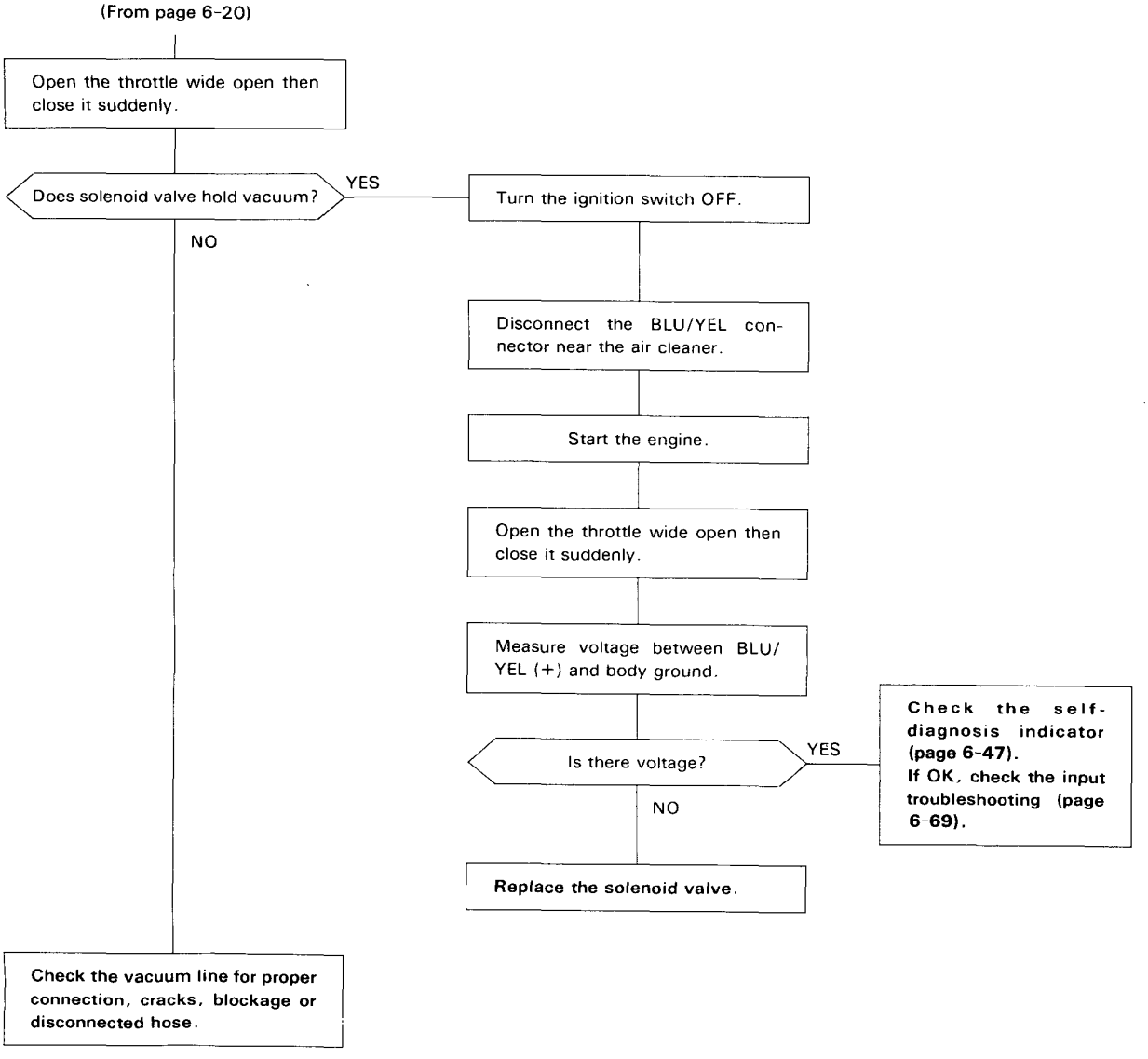
YES

Warm up the engine.

(To page 6-21)






(From page 6-20)
Open the throttle wide open then close it suddenly.
Does solenoid valve hold vacuum?
YES
NO
Turn the ignition switch OFF.
Disconnect the BLU/YEL connector near the air cleaner.
Start the engine.
Open the throttle wide open then close it suddenly.
Measure voltage between BLU/YEL (+) and body ground.
Is there voltage?
YES
NO
Check the self-diagnosis indicator (page 6-47).
If OK, check the input troubleshooting (page 6-69).
Replace the solenoid valve.
Check the vacuum line for proper connection, cracks, blockage or disconnected hose.

Primary Slow Mixture Cut-off Solenoid Valve

Troubleshooting Flow Chart **Primary Slow Mixture Cut-off Solenoid Valve**

Inspection of Primary Slow Mixture Cut-off Solenoid Valve.

Turn the ignition switch ON.

Check the clicking sound of each solenoid valve by means of a stethoscope.

Does the solenoid valve click?

NO

Turn the ignition switch OFF.

Connect the ECU test harness B between the control unit and connector (page 6-99).

Turn the ignition switch ON.

Measure voltage between B 3 (+) terminal and B 8 (–) terminal.

Is there battery voltage?

YES

Repair open or short in YEL wire between the solenoid valve and control unit (B3). If OK, replace the solenoid valve.

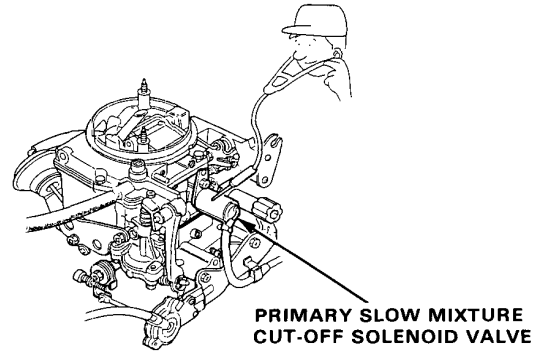
NO

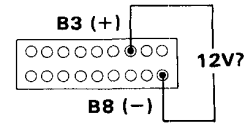
Check the self-diagnosis indicator (page 6-47). If OK, check the input troubleshooting (page 6-69).

YES

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

(To page 6-23)





(From page 6-22)

Raise engine speed to 5,000 min^{-1} (rpm) and close the throttle suddenly.

Does the solenoid valve click?

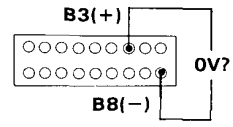
NO

Turn the ignition switch OFF.

YES

Connect the ECU test harness B between the control unit and connector (page 6-48).

Start the engine.



Raise engine speed to 5,000 min^{-1} (rpm) and close the throttle suddenly.

Measure voltage between B 3 (+) terminal and B 8 (−) terminal.

Is there no voltage for a moment?

NO

Check the self-diagnosis indicator (page 6-47). If OK, check the input troubleshooting (page 6-69).

YES

Solenoid valve is OK.

Replace the solenoid valve.

(cont'd)

Idle Speed/Mixture

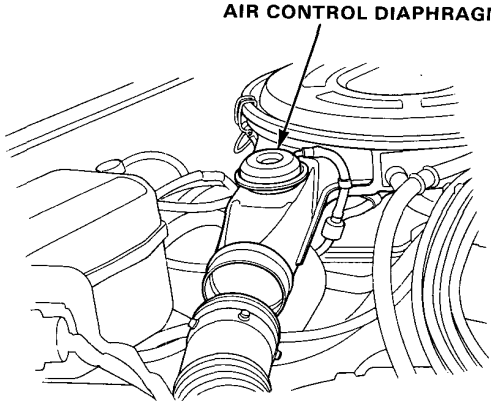
Inspection/Adjustment
Propane Enrichment Method

⚠WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

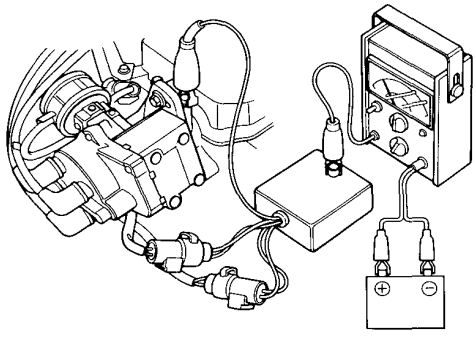
NOTE :
- This procedure requires a propane enrichment kit.
- Check that the warning light and self diagnosis indicator before making idle speed and mixture inspections.

1. Start the engine and warm up to normal operating temperture (the cooling fan comes on). Turn the ignition switch OFF. Start the engine with idle for two minutes and keep the engine speed 2,500-3,000 min^{-1} (rpm) for a one minute.

2. Disconnect the #8 vacuum hose from the intake air control diaphragm and clamp the hose end.



3. Connect a tachometer.



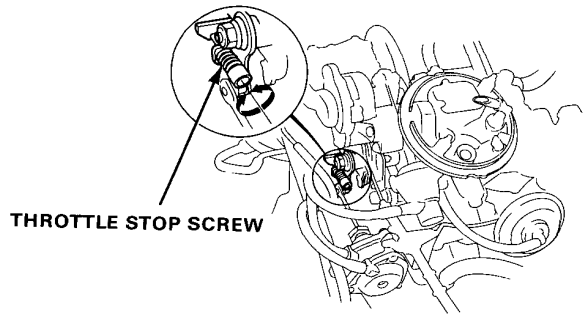
4. Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.

   Idle speed should be :

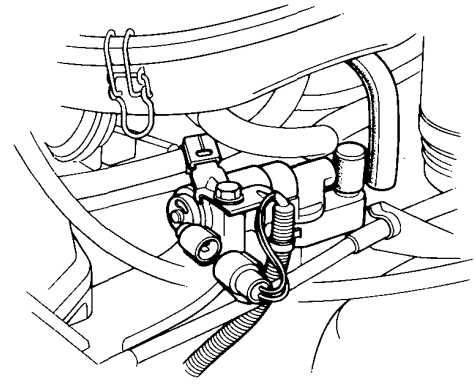
   Manual : 800±50 min^{-1} (rpm)

   Adjust the dile speed, if necessary, by turning the throttle stop screw.

   NOTE : If the idle speed is excessively high, check the throttle control (page 6-39).



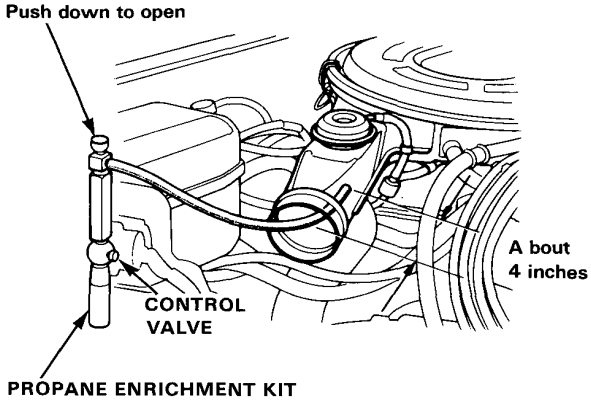
5. Disconnect the 2P connector from the EACV and disconnect the hose from vacuum hose mainfold, then cap the hose end.



6. Disconnect air cleaner intake tube from air intake duct.

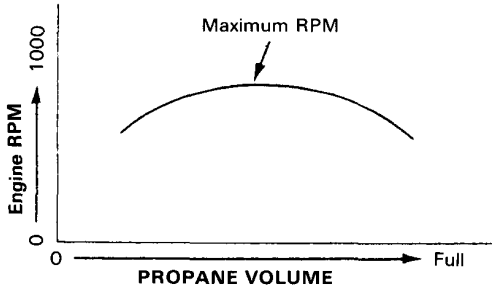
7. Insert the hose of the propane enrichment kit into the intake tube about 4-inches.

   NOTE : Check that propane bottle has adequate gas before beginning test.



8. With engine idling, depress push button on top of propane device, then slowly open the propane control valve to obtain maximum engine speed. Engine speed should increase as percentage of propane injectede goes up.

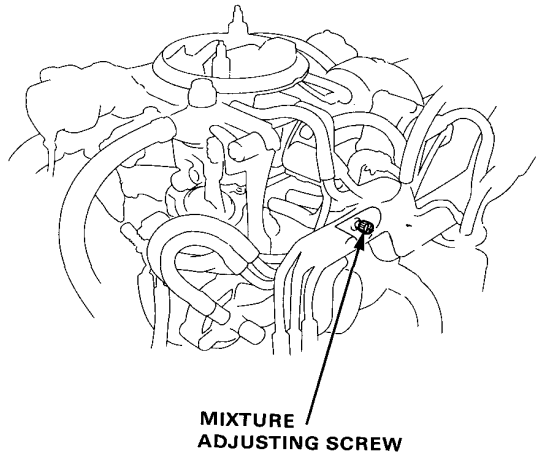
   NOTE : Open the propane control valve slowly ; a sudden burst of propane may stall the engine.



RPM increase should be :
Manual : 40±20 min^{-1} (rpm)

- If engine speed does not increase per specdification, mixture is improperly adjusted. Go to step 9.
- If engine speed increose per specification, go to step 10.

9. Remove the mixture adjusting screw hole caps, and recheck maximum propane enriched rpm.



- If the propane enriched speed is too low, mixture is too rich :
  turn both mixture screws 1/4 turn clockwise and recheck.
- If the propane enriched speed is too high, mixture is too lean :
  turn both mixtumre screws 1/4turn counterclockwise and recheck.

10. Reconnect the connector and hose. Close the propane control valve.

11. Remove the ECU fuse for 10 seconds to reset control unit and recheck idle speed. Turn the ignition switch OFF. Start the engine with idle for two minuites and keep the engine speed should be :

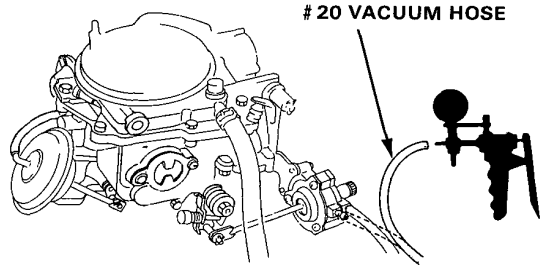
    Manual : 800±50 min^{-1} (rpm)

    - If idle speed is as specified (Step 4), go to step 12.
    - If idle speed is not as specified, adjust by turning throttle stop screws, then repeat step 9.

12. Remove propane enrichment kit and reconnect air cleaner intake tube on the air intake duct.

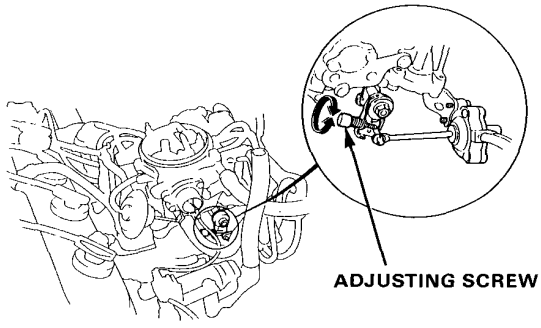
13. Reinstall the mixture adjusting screw hole cap.

14. Disconnect the # 20 vacuum hose from the idle boost throttle controller and connect a vacuum pump.



15. Apply vacuum, then check the idle speed with the headlight, heater blower, rear windaw deffogger and cooling fan on.

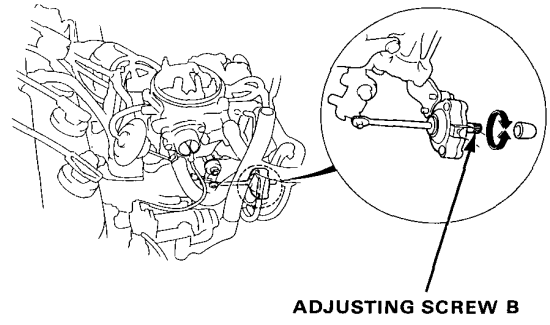
    Idle speed should be : 800±50 min^{-1} (rpm)



    Adjust the idle speed, if necessary, by turning the adjusting screw A.

16. Disconnect the vacuum pump and connect the # 20 vacuum hose, then check the idle speed with the headlight, heater blouer, rear window deffogger and cooling fan OFF.

17. If equipped with air conditioner, check the idle speed with the A/C on.
    Idle speed should be : 800±50 min^{-1} (rpm)



    Adjusting the idle speed, if necessary, by turning the adjusting screw B.

18. If the idle speed does not reach the specified idle speeds in steps 14 though 17, go to idle control system testing (page 6-12).

CO Meter Method

⚠WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

1. Follows steps 1 through 5 of the propane enrichment method.
2. Warm up and calibrate the CO meter according to the meter manufacture instructions.
3. Turn the engine off, restart the engine and complete the idle CO check within three minuites of restarting, with the headlights, heater blower, window defogger, cooling fan and air conditioner off.

   CO meter should indicate 0.1% maximum.

   If the idle CO is not within the specdification, check the engine tune-up condition.

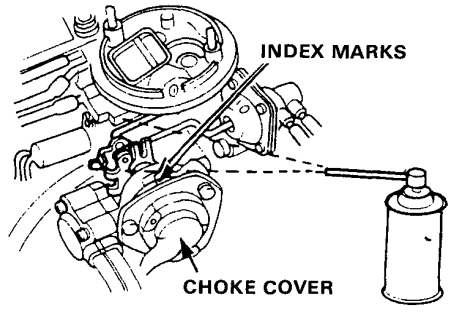
Choke Coil Tension and Linkage

Testing (COLD ENGINE)

1. Remove the air cleaner.
2. Open and close the throttle fully to let the choke close. The choke valve should close completely.

   • If the choke closes properly, go on to the fast idle unloader test (page 6-28).

   • If the choke does not close properly, spray linkage with carbulater cleaner, and check the linkage for signs of mechanical binding (use a spray can with an extension on the nozzle to reach the linkage).



—If the choke still does not close properly, remove the choke cover and inspect the linkage for free movement. Repair or replace parts as necessary, then reinstall the cover and adjust it so the index marks line up, and retest.
If the choke still does not close properly, replace the cover.

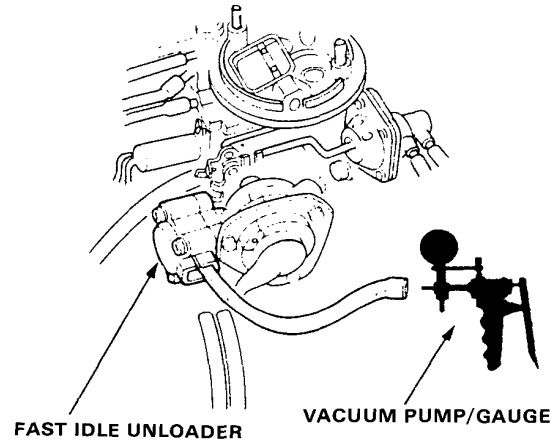
Fast Unloader

Testing

1. Disconnect the # 18 vacuum hose from the fast idle unloader.
2. Open and close the throttle fully to engage the fast idle cam.
3. Start the engine.
   The engine should run at fast idle.

   • If the engine has fast idle, go on step 4.
   • If the engine does not run at fast idle, remove the choke cover and check the operation of the fast idle cam.

4. Connect a vacuum pump to the fitting of the unloader and apply vacuum.



The fast idle speed should drop.
• If idle speed does not drop, check the unloader for leaks, blockage or damaged diaphragm. Remove the choke cover and check the unloader rod for free movement. Repair of replace as necessary.
• If idle speed drops, go on to step 5.

5. Reconnect the hose.

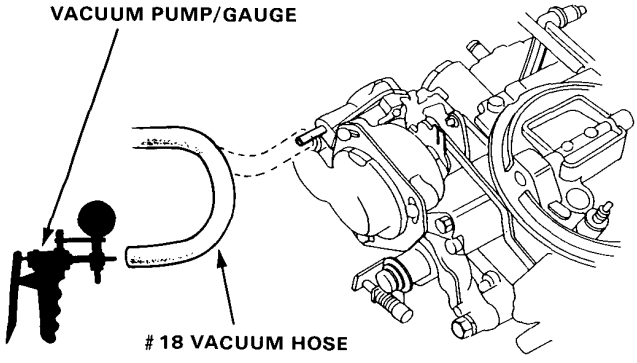
6. Wait for the engine to warm up (coolding fan comes on).

   • If fast idle drops below 1,400 rpm. go on to the fast idle check.
   • If fast idle does not drop below 1,400 rpm, disconnect the # 18 vacuum hose, and check that vacuum is present.

   —If vacuum is present, check the unloader for leaks or blockage.
   Remove the chockcover, and check the unloader rod for free movement. Repair or replace parts as necessary, and retest.

   —If there is no vacuum at fitting, check for vacuum at the choke opener, and TWSV.

   —Repair or replace as necessary.



Choke Opener

NOTE : Engine coolant temperature must be blow TWSV set temperature 15°C (59°F).

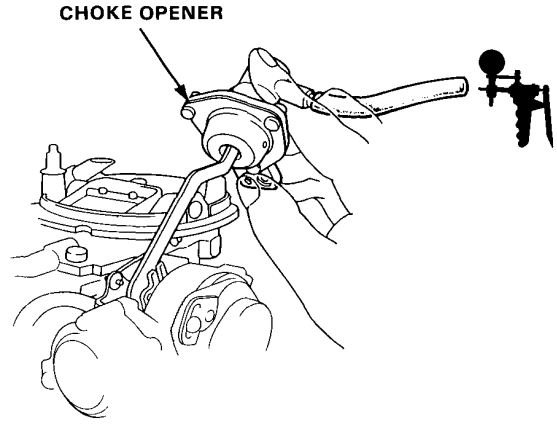
1. Disconnect the choke heater wire.

2. Open and close the throttle fully to let the choke close.

3. Start the engine.
   The choke valve should partially open.

   • If the choke does not partially open, check the lincage for free movement, repair as recessary, and retest.
   • If the choke still does not partially open, check the choke opener diaphragm.

   Remove diaphragmns two botts, and attach a vacuum pump to the hose fitting. Block the orifice in the opener while you apply enough vacuum to pull the opener rod all the wayin, then stop.



—If the rod will not stay in, replace the opener.
—If the rod stays in, check the vacuum port in the cfrburetor for blockoge.

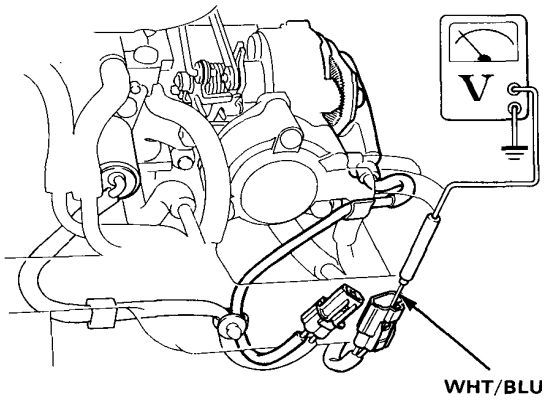
After replacing or re-installing the choke opener, retest it, then adjust it if neceary.

Chak coil Heater

Start the engine and let in run. As the engine reaches normal operating temperature the choke valve should fully open.

- If it does, test is complete.
- If it does not, inspect the linkage, and clean or repair it as necessary.
- If the choke still does not open all the way, disconnect the WHT/BLU choke cover wire from the engine compartment wire harness and check for voltage.

There should be battery voltage with the engine running.

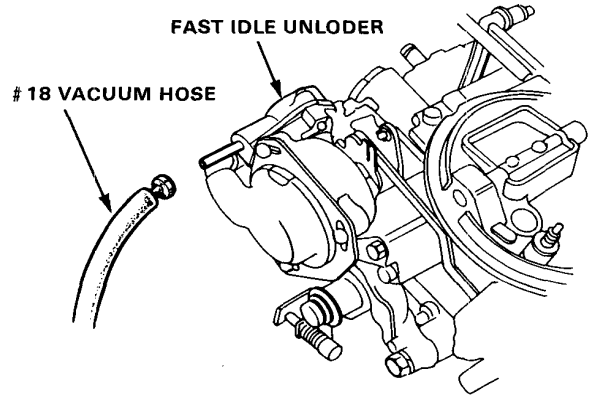


—If the voltmeter reads 0 volts, check for an open circuit in the WHT/BLU wire between the choke cover connector and voltage regulator connector, then check the charge warning light circuit and alternator.

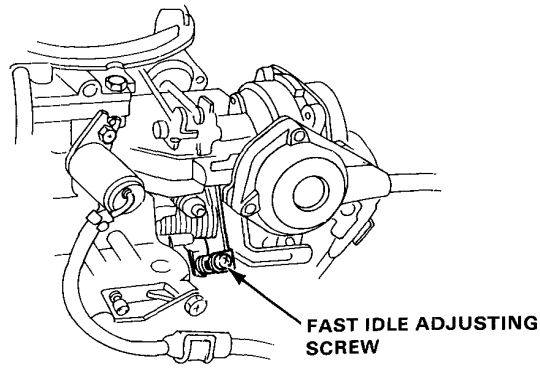
Fast Idle

Adjustment

1. Start the engine and wait for the engine to warm up (cooling fan comes on), then stop it and connect a tachometer.
2. Disconnect and plug the # 18 vacuum hose of the fast idle unloader.



3. Whiile htolding the choke valve closed, open and close the throttle fully to engage the choke and fast idle linkage.
4. Re-start the engine.
   Fast idle should be 3200±500 (rpm) If not OK, reset the fast idle speed by turning the fast idle adjusting screw.



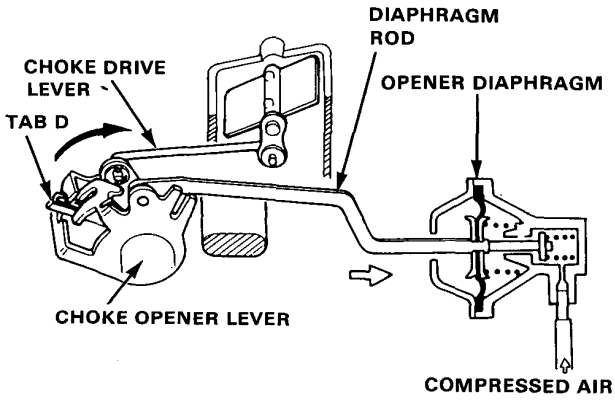
Linkage Adjustment

NOTE : This check is not necessary unless the linkage has been bent, choke opener has been replaced, or the car has poor cold starting.
This check can be made with the engine HOT or COLD.

1. Remove the choke cover.

2. While holding the choke valve closed, open and close the throttle fully to engage the choke and fast idle linkage.

3. Disconnect the choke opener hose from the vacuum manifold, and attach a check valve to it as shown. Then pressurize the choke opener with compressed air, 103-586 kPa (15-85 psi) is OK, to hold the bleed valve in it closed.

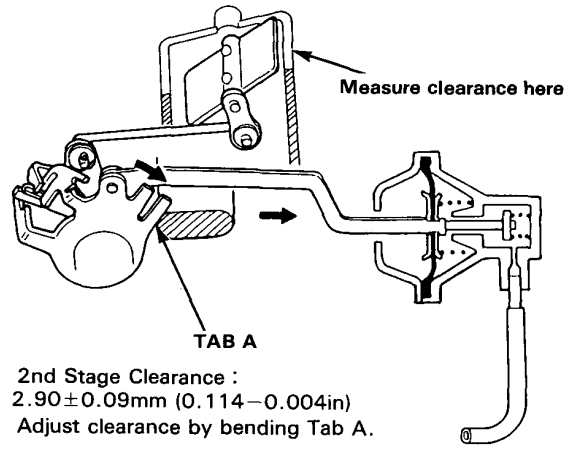


4. Gently push the choke opener lever towards the opener unit it stops until you feel (the opener rod seats against the pressurized bleed valve), then pull the choke drive lever down against the opener lever (to take all free play out of the linkoge) and measure the clearance between the choke blade and casting.

   1st stage Clearance :
   18°±1°
   Adjust clearance by bending Tab D.

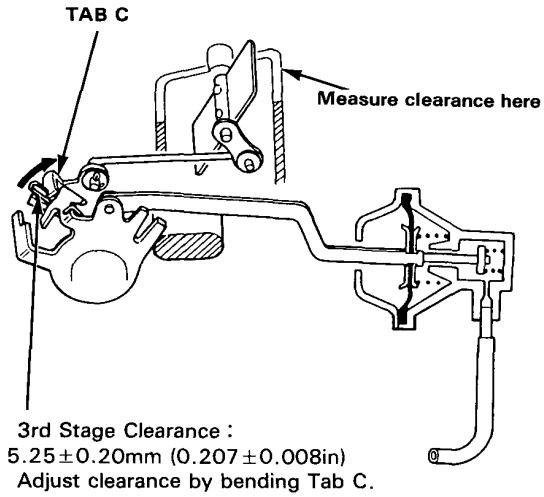
5. Remove the check valve, and reconnect the choke opener hose.

6. Hold both levers together, then push them toward the diaphragm again until they stop (Tab A on the opener lever seats against the carburetor), and measure the clearance at the choke valve.



   2nd Stage Clearance :
   2.90±0.09mm (0.114−0.004in)
   Adjust clearance by bending Tab A.

7. While still holing opener lever Tab A against its seat, release the choke drive lever, and measure the clearance at thhe chokke valve (Tab C on the drive lever should stay seated against the spring loop ; if not, repeat step 2 and re-check) :



   3rd Stage Clearance :
   5.25±0.20mm (0.207±0.008in)
   Adjust clearance by bending Tab C.

Carburetor

Choke Cover

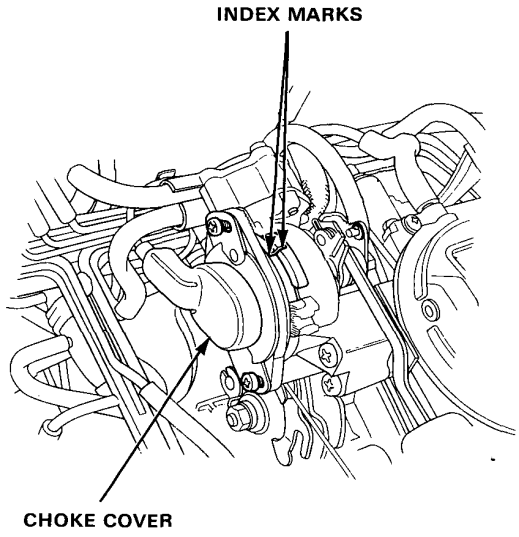
Replacement

Removal :

1. Remove the air cleaner.
2. Remove the choke cover.

Installation :

1. Reinstall the cover and adjust it so that index marks align, then secure it with screws.
2. Reinstall the air clearer.



Fuel Supply System

Sympom-to-sub System Chart

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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in this page.

PAGE / SYSTEM / SYMPTOM		FUEL FILTERS	FUEL PUMP	FUEL TANK	CONTAMI-NATED FUEL
		34	—	—	*
ENGINE WON'T START		③	①		②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	①			①
	LOSS OF POWER	①			①

* Fuel with dirt, water or a high percentage of alcohol is considered contaminated.

Fuel Filters

Replacement

Replace both front and rear filters at every 2 years or 40, 000 km (24,000 miles) whichever comes first.

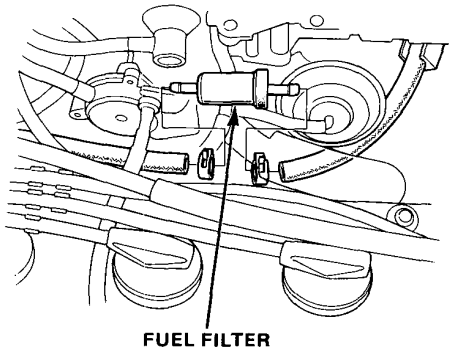
⚠WARNING Do not smoke while working on the fuel system. Keep open flame away from work area.

Front

1. Use fuel line clamps to pinch off the fuel lines.
2. Disconnect the fuel lines and remove the fuel filter.

CAUTION: When disconnecting the fuel lines, slide back the clamps then twist the lines as you pull, to avoid damaging them.

3. Install the new fuel filter.
4. Remove the fuel line clamps.

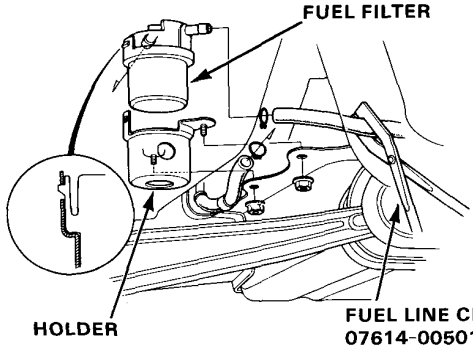


Rear

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Push in the tab of the fuel filter to release the holder, then remove the filter from its bracket.
3. Attach fuel line clamps to the fuel lines and disconnect the lines from the fillter.

CAUTION: To avoid damaging the fuel lines when disconnecting, slide back the clamps then twist the lines as you pull.

4. Install in the reverse order of removal.



Air Intake System

Symptom-to-sub System Chart

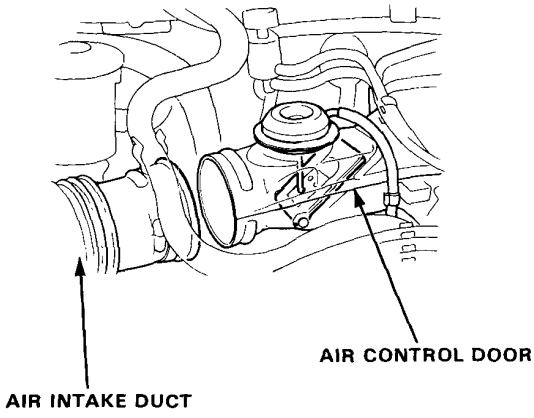
NOTE:

- 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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begiin with the trouble-shooting listed in this page.

PAGE / SYSTEM / SYMPTOM	THROTTLE CABLE	AIR INTAKE CONTROL
	—	36
LOSS OF POWER		①
AFTERBURN		①
HESITATION/SURGE		①

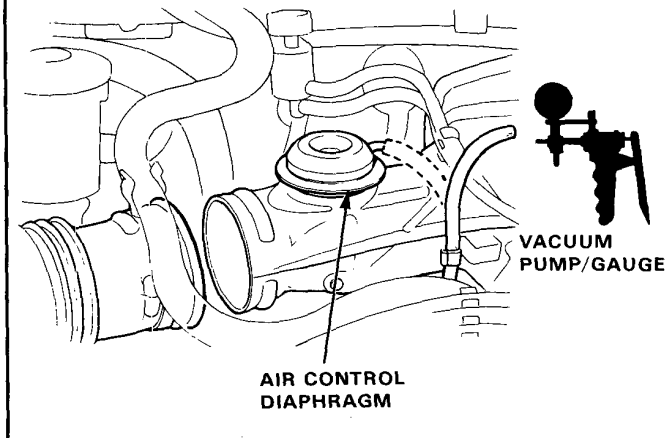
Testing (COLD ENGINE)

1. Disconnect the air intake duct.
2. With the engine cold, start the engine and let it run for about 5 seconds and stop. The air control door should rise on startup and remain fully open for at least 3 seconds after stopping the engine.



- If the door rises, the intake air control is OK, reconnect the air intake duct. If performing the inspection on intake air controls only, go on to hot engine inspection.
- If the door does not rise, check to see if the door is binding. If the door is not binding but fails to rise, or it rises but fails to stay up for 3 seconds after the cold cranking test, go to step 3.

3. Disconnect and plug the hose leacing to the air bleed valve.
4. Crank the engine for appoximately 5 seconds.
   - If the air control door does not rise or stay open for at least 3 seconds, proceed to step 5.
   - If the door rises and stays up for at least 3 seconds, replace the air bleed valve and re-test (step 2).
5. Disconnect the vacuum hose from the air control diaphragm, connect a vacuum pump to the diaphragm inlet pipe and apply vacuum.
   The air control door should rise and stay up.



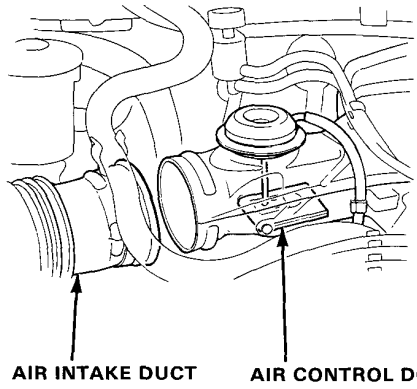
- If the door stays up, replace the check valve and re-test.
- If the door does not rise or stay up, replace the air contrd diaphragm and re-test.

6. Reconnect the air intake duct.

Testing (HOT ENGINE)

NOTE : As the outside air temprature drops, the bimetal spring in the bleed valve closes, causing the air control door to rise and allowing pre-heated air into the air cleaner ; consistent intake air temperature is maintained in this way.

1. With the engine running and the cooling fan ON, disconnect the air intfke duct from the air cleaner and immediately check the control door position.
   The air control door should be down.



   - If the control door has dropped down to fully close the hot air intake duct, stop the engine and reconnect the air intake duct. Test is complete.
   - If the control door has not dropped to the fully closed position, go on to step 2.

2. Disconnect the vacuum hose from the air control diaphragm.

   - If the control door now closes, replace the air bleed valve and re-test.
   - If the control door does not close, correct whatever is causing the door to bind, and/or replace the air control diaphragm. Re-test.

3. Stop the engine and reconnect the air intake duct. Test is complete.

Emission Control System

Sympton-to-sub System Chart

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.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in this page.

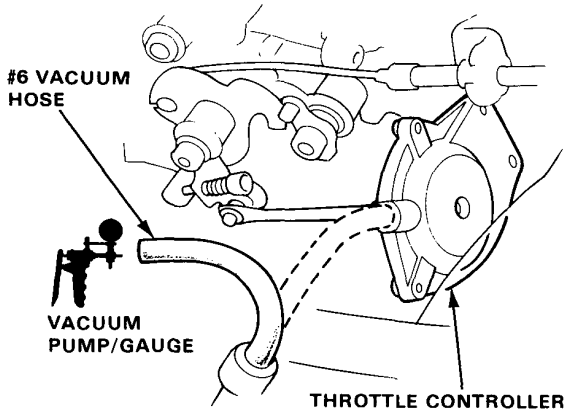
PAGE / SYSTEM / SYMPTOM		FEEDBACK CONTROL	THROTTLE CONTROL	EVAPORATIVE CONTROL
		—	39	41
ENGINE WON'T START		①		
DIFFICULT TO START ENGINE	WHEN COLD	①		
	WHEN WARM	①	②	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION	①	②	
	WHEN WARM ENGINE SPEED TOO HIGH		①	
	WHEN WARM ENGINE SPEED TOO LOW	①		
	ROUGH IDLE/ FLUCTUATION	①		
FREQUENT STALLING	WHILE WARMING UP	①		
	AFTER WARMING UP	①		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING			
	LOSS OFF POWER	①		
	AFTERBURN	①	②	
	HESITATION/SURGE	①		

Testing (HOT ENGINE)

NOTE : If the dashpot diaphragm in the throttle controller is damaged or vacuum to the dashpot diaphragm is blocked or leaks, correct idle speed will not be obtained. The idle speed will be excessively high after warming up the engine.

1. Connect a tachometer, start the engine and allow it to reach normal operating temperature (cooling fan comes on).

2. Check that the idle speed is not excessively high.
   - If the dile speed is within specification, go on to step 3.
   - If the dile speed is excessively high, disconnect vacuum hose # 6 from the throttle controller and check for vacuum at the hose.

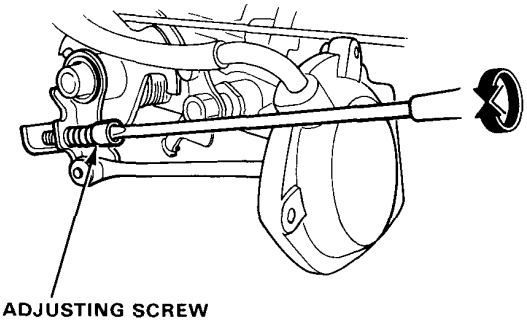


—If there is no vacuum, check vacuum line # 6 for leaks or blockade. Repair, clean or replace as necessary and re-test.
—If there is vacuum, replace the throttle controller and re-test.

3. With the engine didling, disconnect vacuum hose # 6 from the throttle controller.

   Engine speed should rise to :
   1800 ± 300 min^{-1} (rpm)

   - If the min^{-1} (rpm) is not within specification, adjust the engine speed by adjusting screw.

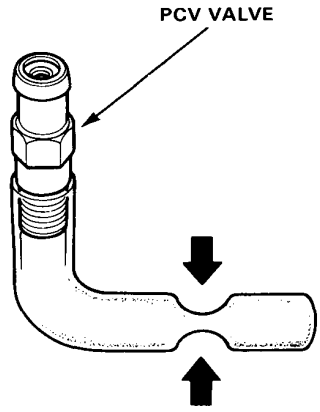


   - If the min^{-1} (rpm) does not change, check the throttle controller linkage for free movement. If there is no problem, replace the throttle controller and re-test.

Positive Crankcase Ventilation

PCV Valve Test

1. Check the crankcase ventilation hoses and connections for leaks, crack or clogging.
2. Start the engine and allow it to idle.
3. Lightly kinch the breather hose between the PCV valve and intake manifold with your fingers or pliers.
   There should be 2 clicking sound from the PCV valve.



- If no should is heard, replace the PCV valve and re-test.

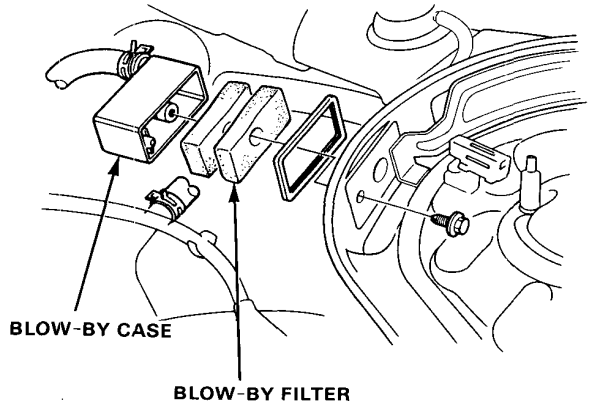
Blow-by Filoter Test

Inspect the condition of the blow-by filter.

- Replace the filter in the following instances :

—When the filter is stuck fast and oil is dripping or seeping through.

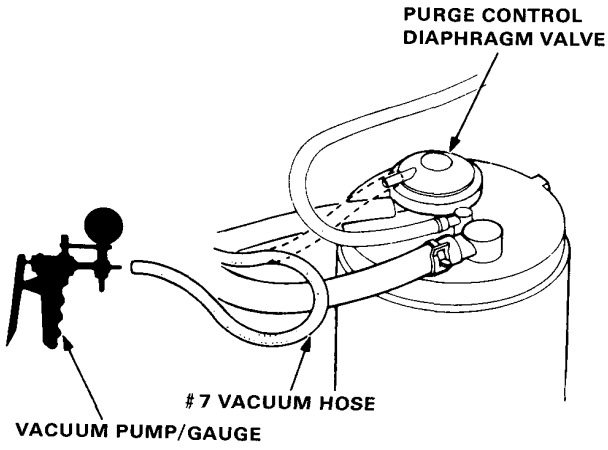
—When the filter is covered with dust and *dirt* so that clogging is evident.



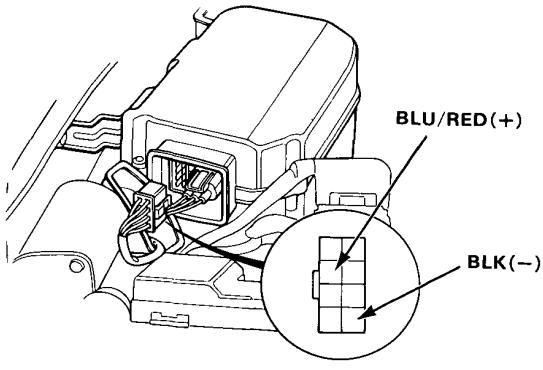
Testing (COLD ENGINE)

NOTE : Engine coolant temperature most be below 75°C (167°F)

1. Disconnect the #7 vacuum hose at purge control diaphragm valve and connect vacuum pump/gauge to the hose.



2. Start the engine and allow to idle. Vacuum should not be available.
   - If there is no vacuum, disconnect the vacuum gauge and reconnect hose.
   - If there is vacuum, check for voltage at the purge cut-off solenoid valve.

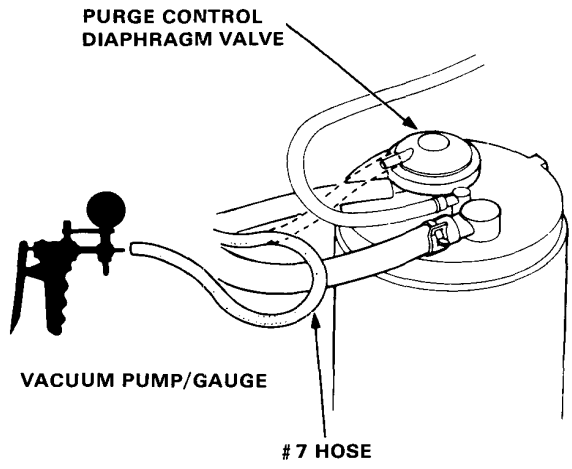


—If no voltage, check the vacuum line for proper connection, cracks, blockage or disconnected hose.
If OK, replace the solenoid valve.
—If there is voltage, check the self diagnosis indicator.
If OK, substitude a known-good control unit and retest.
If symptom goes away, replace the origihal control unit.

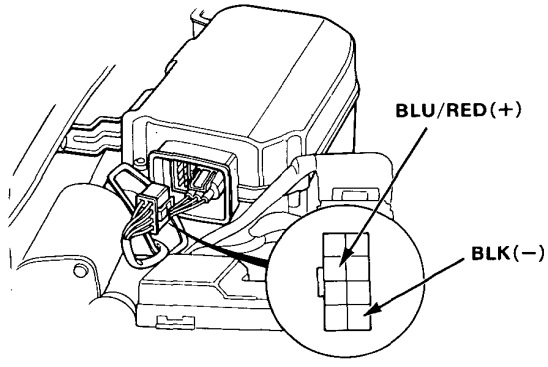
Evaporative Emission Controls

Testing **(HOT ENGINE)**

1. Disconnect the # 7 vacuum hose at the pumrge control diaphragm valve and connect a vacuum pump/gauge to the hose.



2. Wait for the engine to warm up and raise engine speed to 3,500 min^{-1} (rpm).
   There should be vacuum.
   - If vacuum is available, go on to step 3.
   - If no vacuum, check for voltage at the purge cut-off solenoid valve.

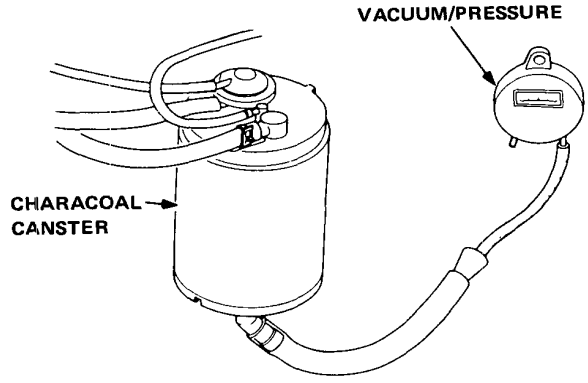


—If there is voltoge, check the vacuum line for proper connection, cracks, blockage or disconnected hose.
If OK, replace the solenoid valve.

—If there is no voltage, measure between BLU/BLK (+) terminal and body ground.

- If there is volotage, check open in BLK wire.
  If OK, replace the solenoid valve.
- If there is no voltage, check open in BLU/BLK wire between the control box and control unit.
  If OK, check the Self diagnosis indicator.

3. Disconnect vacuum pump/gauge and reconnect the hose.
4. Remove fuel filler cap.
5. Remove the canister purge air hose from frame and connect hose to a vacuum gauge as shown.



6. Raise engine speed to 3,500 min^{-1} (rpm).

   Vacuum should appear on the gauge within 1 minute.

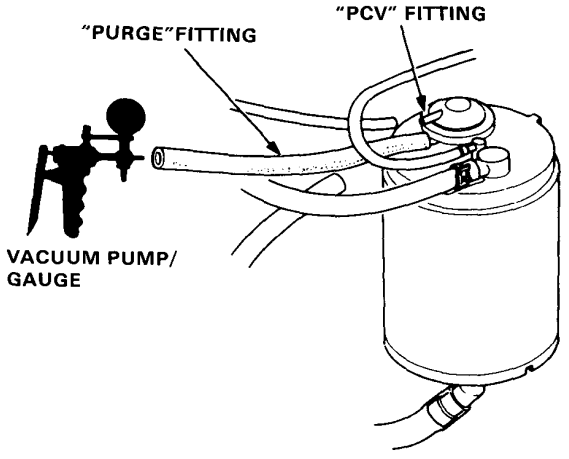
   - If vacuum appears on the gauge in 1 minute, remove the gauge and go on to step 8.
   - If no vacuum, disconnect the vacuum gauge and reinstall the fuel filler cap.

7. Remove the charcoal canister and check for signs of damage.

   - If damaged, replace the canister.
   - If OK, go on to step 8.

8. Stop the engine. Disconnect the hose from the canister PCV fitting.
   Connect a vacuum pump to the canister PURGE fitting as shown, and apply vacuum.

   Vacuum should remain steady.



   - If vacuum remains steady, go on to step 7.
   - If vacuum drops, replace the canister and retest.

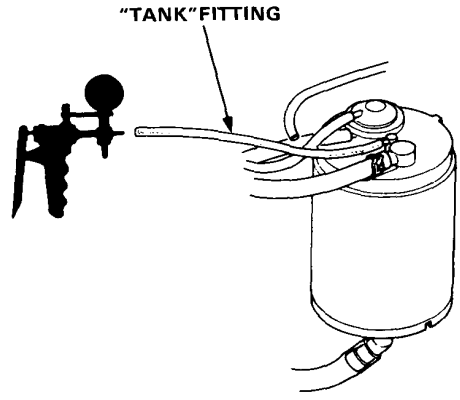
9. Restart the engine. Reconnect the hose to the canister PCV fitting.

   PURGE side vacuum should drop to zero.

   - If PURGE side vacuum does not drop to zero, replace the canister and retest.
   - If PURGE side vacuum drops to zero, connect a vacuum pump to canister PCV fitting, and apply vacuum. Vacuum should remain steady.
     —If vacuum remains steady, disconnect the vacuum pump. Re-check thermovalve operation on previous page.
     —If vacuum drops, replace canister and retest.

10. Connect a vacuum pump to TANK fitting as shown, and apply vacuum.

    If should not hold vacuum.

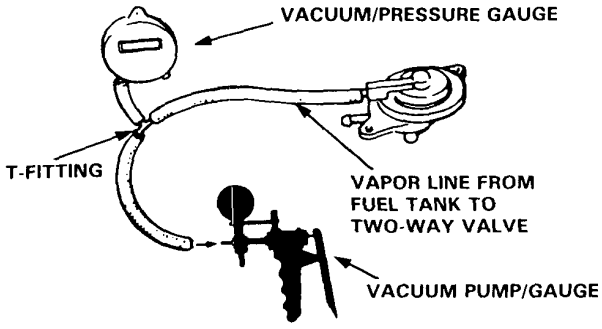


    - If it does not hold vacuum, reinstall fuel filler cap and canister; test is complete.
    - If it holds vacuum, replace canister and retest.

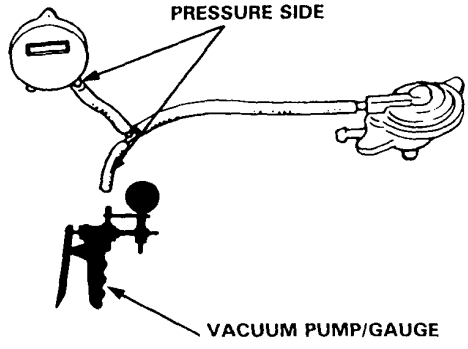
Evaporative Emission Controls (cont'd)

Two-Way Valve

1. Remove the filler cap.
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.



3. Slowly draw a vacuum while watching the gauge. Vacuum should stabdilize at 5 to 15 mmHg (0.2 to 0.6 in. Hg).
   - If vacuum stabilizes momentanily (two-way valve opens) between 5 and 15 mmHg (0.2 and 0.6 in. Hg), go on to Step 4.
   - If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install new valve and re-test.
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.
   Pressare should stabilize at 10 to 35 mmHg (0.4 to 1.4 in. Hg).
   - If pressure momentarily stabilizes (valve opens) at 10 to 35 mmHg (0.4 to 1.4 in. Hg), the valve is OK.
   - If pressure stabilizes below 10 mmHg (0.4 in. Hg) or above 35 mmHg (1.4 in. Hg), install a new valve and retest.

(cont'd)

Troubleshooting Flow Chart Air Vent Cut-off Solenoid Valve

Inspection of Air Vent Cut-off Solenoid Valve.

Disconnect the #8 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum pump.

Disconnect the lower hose of the solenoid valve.

Apply vacuum.

Does solenoid valve hole vacuum? NO → **Replace the solenoid valve.**

YES

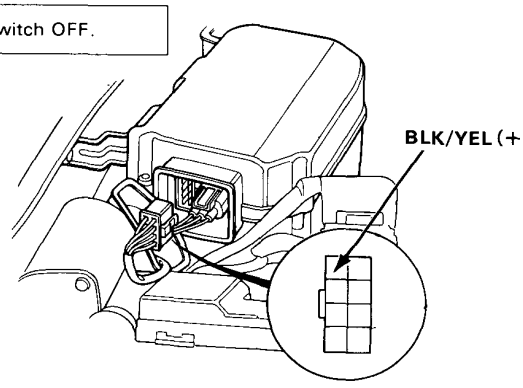
Start the engine.

Apply vacuum.

Does solenoid valve hold vacuum? YES → Turn the ignition switch OFF.

NO

Solenoid valve is OK.



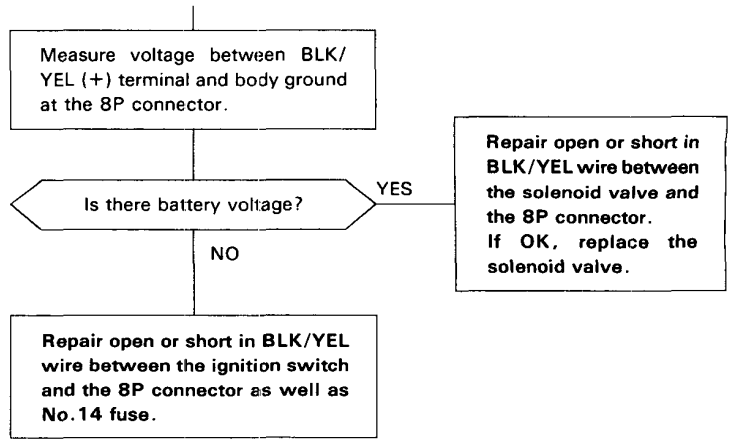
Disconnect the 8P connector on the control box.

Start the engine.

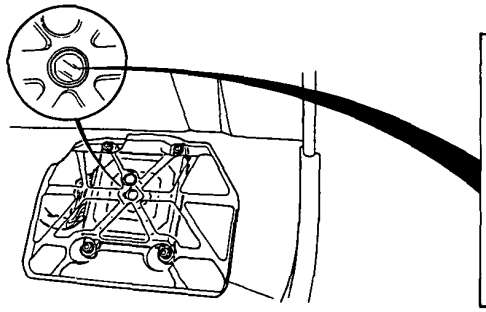
(To page 6-46)

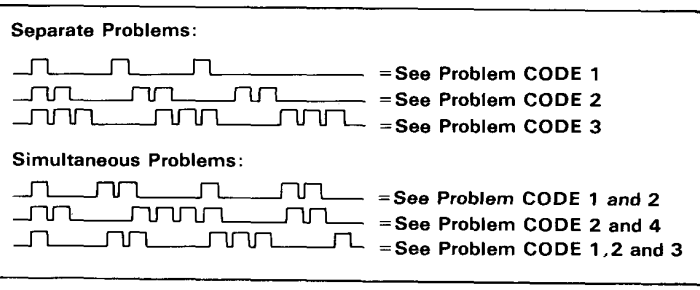
Evaporative Emission Control (cont'd)

(page 6-45).



Turn the ignition on, pull down the passenger's side carpet inspection flap from under the dashboard and observe the LED on the top of the control unit. The LED indicates a system failure code by its blinking frequency.
The control unit LED can indicate any number of simultaneous component problems by blinking separate codes, one after another.

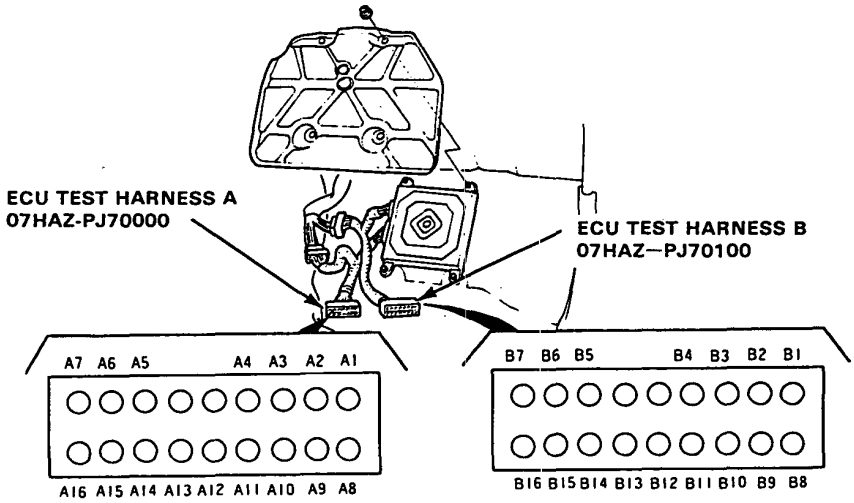




SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
1	OXYGEN CONTENT	6-52
2	VEHICLE SPEED PULSER	6-54
3	MANIFOLD ABSOLUTE PRESSURE	6-55
4	VACUUM SWITCH SIGNAL	6-59
5	MANIFOLD ABSOLUTE PRESSURE	6-57
6	COOLANT TEMPERATURE	6-62
8	IGNITION COIL SIGNAL	6-64
10	INTAKE AIR TEMPERATURE	6-65
14	ELECTRONIC AIR CONTROL	6-67

If CODE 7, 9, 11, 12, 13 (or more than 14), count the number of blinks again; if the indicator is in fact blinking these codes, substitute a known-good control unit and recheck. If the indication goes away, replace the original control unit.
The Check Engine dash warning light and control unit LED may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.

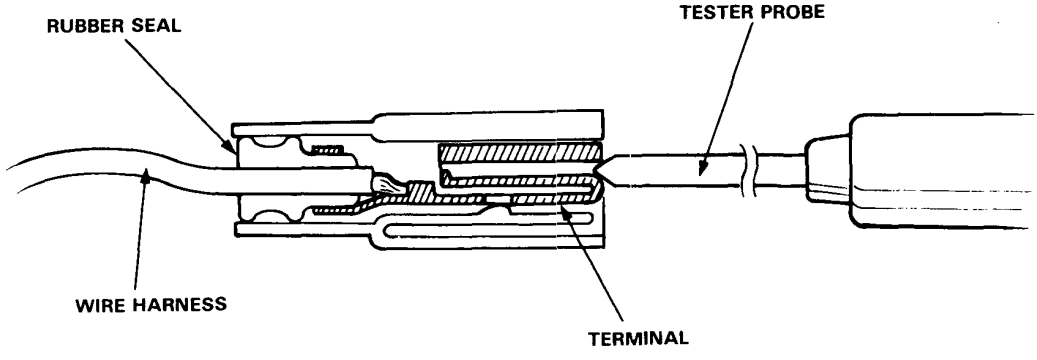
If the inspection for a particular failure code requires the ECU test harness, remove the right door sill molding, the small cover on the right kick panel, and pull the carpet back to expose the control unit. Unbolt the control unit bracket. Remove the control unit from the bracket. Connect the ECU test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



TERMINAL LOCATION

CAUTION:

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



How to Read Flow Charts

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

START (bold type) — Describes the conditions or situation to start a troubleshooting flow chart.

ACTION — Asks you to do something; perform a test, set up a condition, etc.

DECISION — Asks you about the result of an action by giving an "answer" and asking did you get the same answer: Yes or No.

STOP (bold type) — The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flow to confirm your repair.

NOTE:

- The term "Intermittent Failure" is used several times in these charts. It simply means a system may have had a failure, but it checks out OK through all your tests. You may need to road test the car to reproduce the failure or if the problem was a loose connection, you may have unknowingly solved it while doing the tests.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground. In simple electronics, this usually means something won't work at all. In complex electronics (like electronic control units), this can sometimes mean something works, but not the way it's supposed to.
- If the electrical readings are not as specified when using the ECU test harness, check the ECU test harness connections before proceeding.

Symptom-to-System Chart

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

PAGE / SYSTEM / SYMPTOM		PGM-CARB CONTROL SYSTEM						
		PGM-CARB CONTROL UNIT	OXYGEN SENSOR	VECHICLE SPEED PULSER	MANIFOLD ABSOLUTE PRESSURE SENSOR	VACUUM SWITCH	COOLANT TEMPERATURE SENSOR	IGCITION COIL SIGNAL
		69	52	54	55, 57	59	62	64
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		⓪ or ✱	①	②	③ or ⑤	④	⑥	⑧
ENGINE WON'T START								
DIFFICULT TO START ENGINE WHEN COLD		(BU)					②	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFIC	(BU)					②	
	ROUGH IDLE	(BU)	③		②			
	WHEN WARM RPM TOO HIGH	(BU)						
	WHEN WARM RPM TOO LOW	(BU)						
FREQUENT STALLING	WHILE WARMING UP	(BU)			②		③	
	AFTER WARMING UP	(BU)			②			
POOR PERFORM-ANCE	MISFIRE OR ROUGH RUNNING	(BU)	③	③	②			
	FAILS EMISSION TEST	(BU)	②		①			
	LOSS OF POWER	(BU)			③			

* CODE 7, 9, 11, 12, 13, or exceeds 14: count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good control unit and recheck. If the indication goes away, replace the original ECU.

(BU): When the self-diagnosis indicator are on, the back-up system is in operation.
Substitute a known-good control unit and recheck. If the indication goes away, replace the original ECU.

PGM-CARB CONTROL SYSTEM			CARBURETOR	FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL	
INTAKE AIR TEMPERATURE SENSOR	CLUTCH SWITCH SIGNAL	A/C SIGNAL				ELECTRONIC AIR CONTROL VALVE	OTHER EMISSION CONTROL
65	70	72				67	
⑩						⑭	
				①			
			①				
③			①				③
③			①			③	③
	②	②	①				
			①				
			①			③	
			①			①	
			①	②			
			②		③	③	③
			③	②	①		②

Troubleshooting Flow Chart —— Oxygen Sensor

Self-diagnosis LED blinks once: A problem in the Oxygen (O_2) Sensor circuit.

LED indicates CODE 1

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

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

Does LED indicate CODE 1?

NO → **Intermittent failure (test drive may be necessary.)**

YES

Inspect fuel pressure at the fuel filter (page 6-52).

Is pressure as specified ?

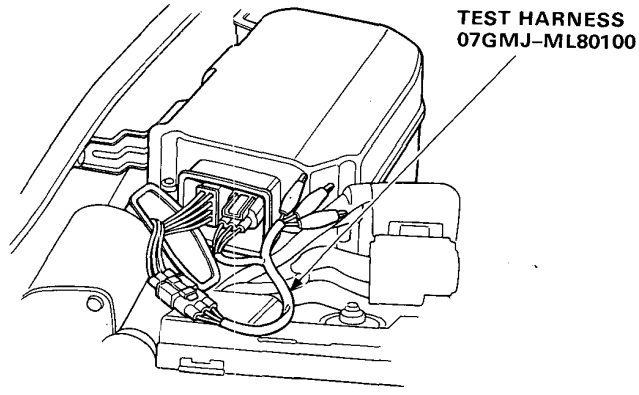
NO → **Repair fuel supply system**

YES

Disconnect wire harness from indicated O_2 sensor.

Warm up engine to normal operating temperature again, then open the throttle wide open then close 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 O_2 sensor.**

YES

(To page 6-53)

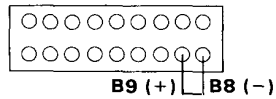
(From page 6-52)

Stop engine.

Connect the ECU test harness B between the control unit and connector.

Restart and warm up engine to normal operating temperature, then open the throttle wide open then close it.

Measure voltage between B9 (+) terminal and B8 (−) terminal.



0.4–0.6V?

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

NO → **Repair open or short in WHT wire between control unit (B9) and the O_2 sensor.**

YES

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

Troubleshooting Flow Chart —— Vehicle Speed Sensor

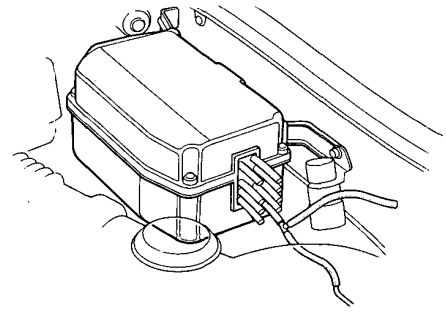
(2) Self-diagnosis LED indicator blinks two times: A problem in the Vehicle Speed Sensor circuit.

LED indicates CODE 2.

Connect the ECU test harness A and B between the control unit and connector.

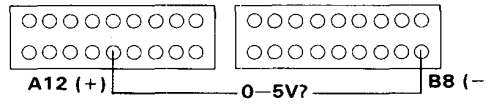
Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

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



Turn the ignition switch ON.

Slowly rotate left front wheel and measure voltage between A12 (+) terminal and B8 (−)terminal.



Does voltage pulse 0V and 3V?

NO

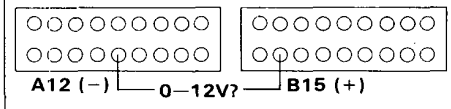
Turn the ignition switch OFF.

Disconnect A and B connector from the control unit only, not the wire harness.

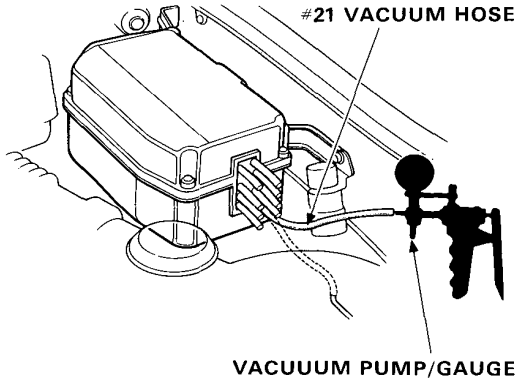
Turn the ignition switch ON.

YES

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



Slowly rotate left front wheel and measure voltage between B15 (+) terminal and A12 (−) terminal.



Does voltage pulse 0V and 12V ?

NO

- **Repair open or short in BLK/YEL wire between control unit (A12) and the speed sensor.**
- **Faulty speed sensor.**

YES

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

Troubleshooting Flow Chart —— MAP Sensor

③ Self-diagnosis LED indicator blinks three times: Most likely an electrical problem in the Manifold Absolute Pressure (MAP) Sensor system.

⑤ Self-diagnosis LED indicator blinks five times: Most likely a mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor system.

③

—Engine is warm and running.
—LED indicates CODE 3.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset control unit.

Start the engine and allow to idle.

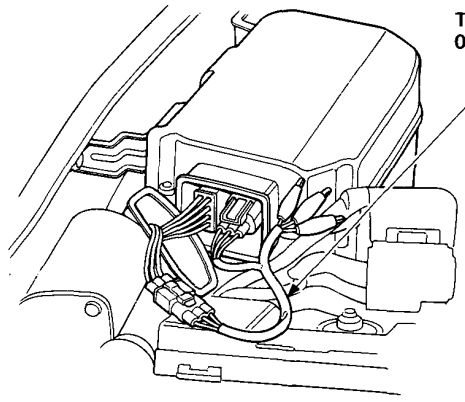
Does LED indicate CODE 3 ?

NO → **Intermittent failure (test drive may be necessary.)**

YES

Turn the ignition switch OFF.

Connect the test harness between the MAP sensor and wire harness.



Turn the ignition switch ON.

Measure voltage between RED (+) terminal and GRN (–) terminal.

Is there approx. 5V ?

NO → Measure voltage between RED (+) terminal and body ground.

Is there approx. 5V ?

YES → **Repair open in GRN wire between control unit (A13) and MAP sensor.**

NO → Turn the ignition switch OFF.

(To page 6-56)

YES

Measure voltage between WHT (+) terminal and GRN (–) terminal.

(To page 6-56)

(cont'd)

Troubleshooting Flow Chart — MAP Sensor (cont'd)

(From page 6-55)

Is there approx. 3 V ?

NO

- **Replace MAP sensor.**
- **Repair short in WHT wire between control unit (A5) and MAP sensor.**

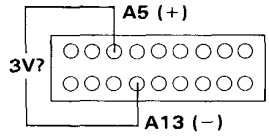
YES

Turn the ignition switch OFF.

Connect the ECU test harness A between the control unit and connector.

Turn the ignition switch ON.

Measure voltage between A5 (+) terminal and A13 (−) terminal.



Is there approx. 3V ?

NO

Repair open in WHT wire between control unit (A5) and MAP sensor.

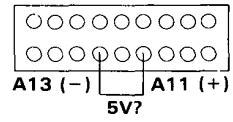
YES

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

(From page 6-55)

Connect the ECU test harness A between the control unit and connector.

Measure voltage between A11 (+) terminal and A13 (−) terminal with the ignition switch on.



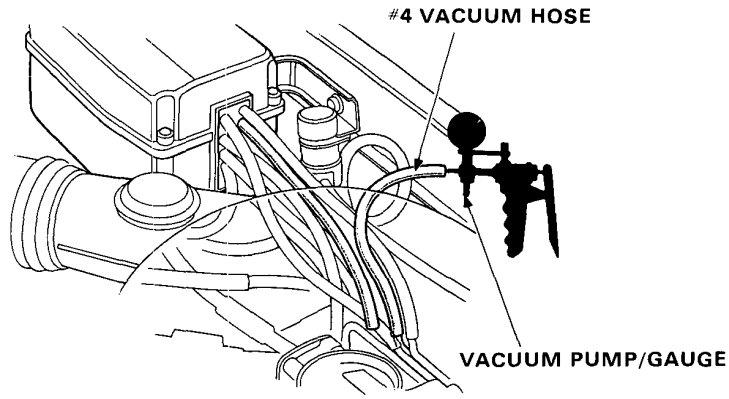
Is there approx. 5V ?

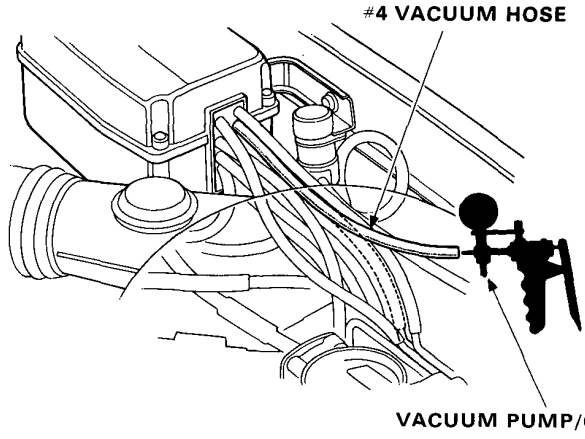
YES

Repair open in RED wire between control unit (A11) and MAP sensor.

NO

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





⑤

LED indicates CODE 5.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset control unit.

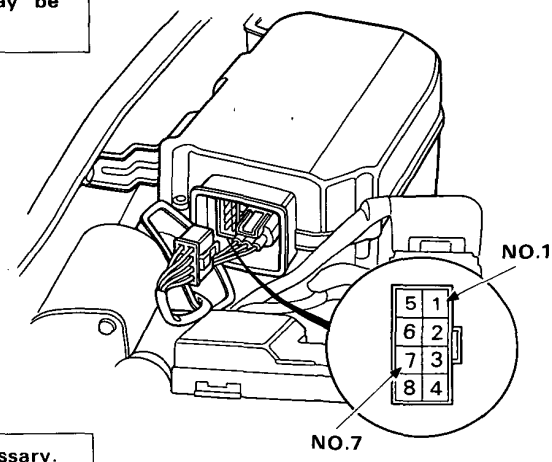
Start engine and keep engine speed at idle.

Does LED indicate CODE 5 ? NO → **Intermittent failure (test drive may be necessary.)**

YES

Stop engine.

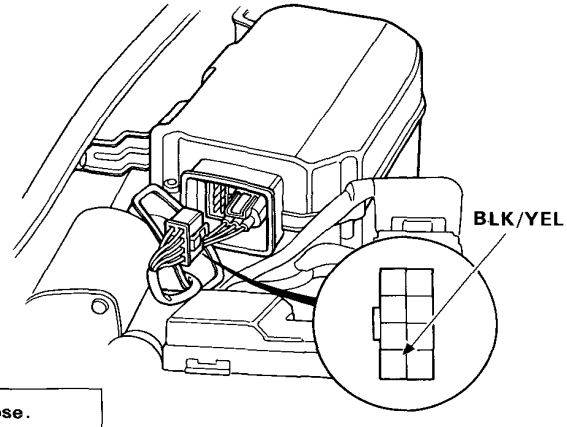
Remove #21 hose from the vacuum hose manifold and connect a T. fitting from a vacuum gauge between the vacuum hose manifold and the MAP sensor.



Start engine.

Is there vacuum ? NO → **Repair as necessary.**

YES



Connect a vacuum pump to #21 hose and apply vacuum.

Does it hold vacuum ? NO → **Replace #21 hose.**

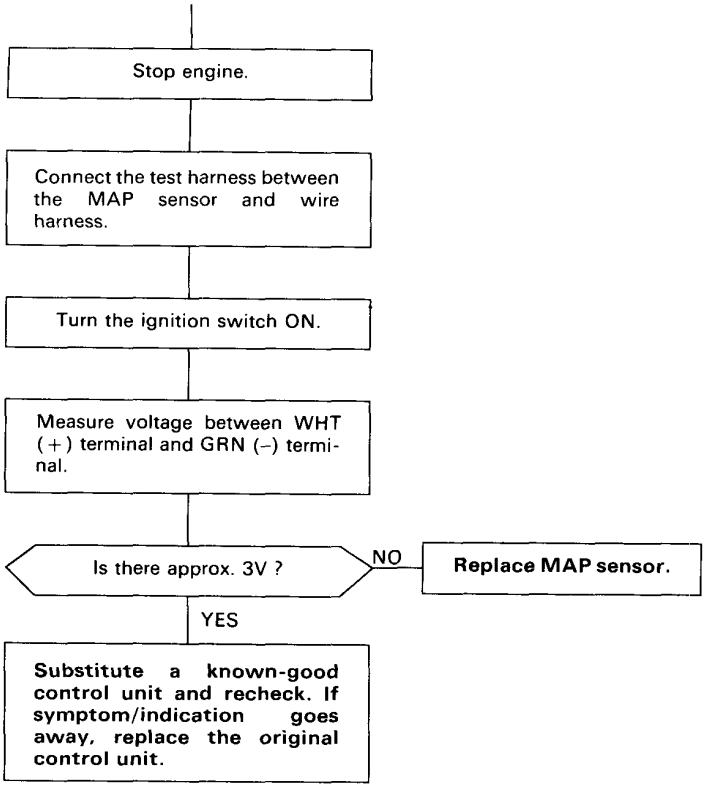
YES

(To page 6-58)

(cont'd)

Troubleshooting Flow Chart —— MAP Sensor (cont'd)

(From page 6-57)



Troubleshooting Flow Chart —— Vacuum Switch

④ Self-diagnosis LED indicator blinks four times: A problem in the vacuum switch.

– Engine is warm and running.
– LED indicates CODE 4.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset control unit.

Start the engine and allow to idle.

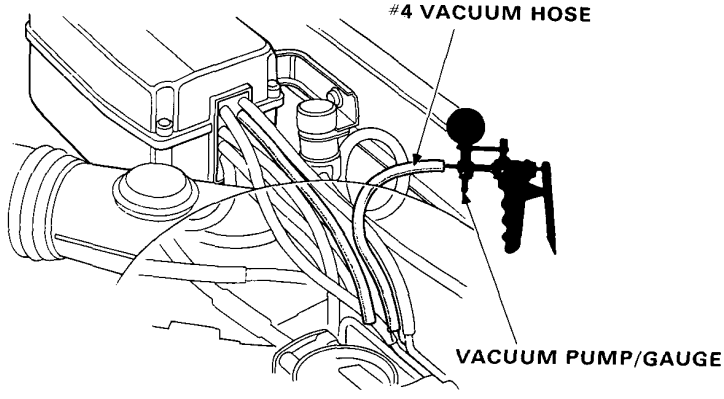
Does LED indicates CODE 4 ?

NO → **Intermittent failure (test drive may be necessary.)**

YES

Turn the ignition switch OFF.

Remove #4 hose from the vacuum hose manifold and connect a vacuum gauge.



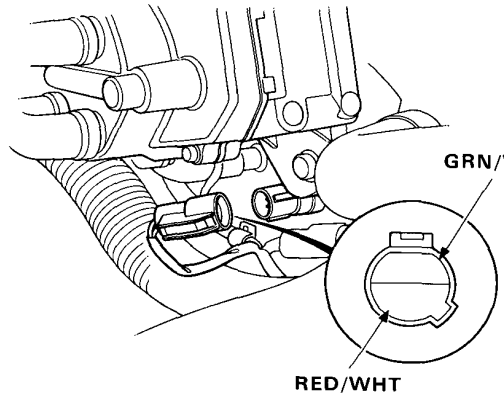
Start engine and raise engine speed to 3,500 min^{-1} (rpm).

Is there vacuum ?

NO → **Repair as necessary.**

YES

Start engine.



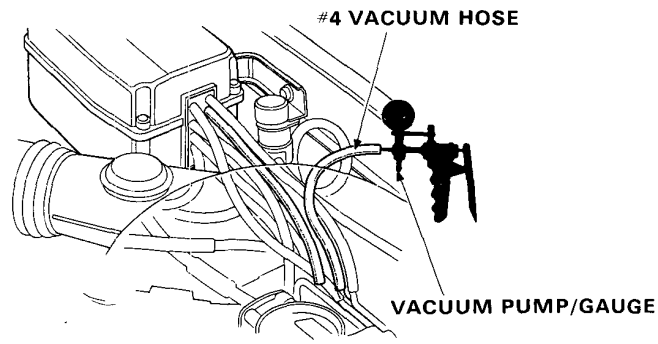
(To page 6-60)

(cont'd)

Troubleshooting Flow Chat —— Vacuum Switch (cont'd)

(From page 6-59)

Connect a vacuum pump to #4 hose and apply vacuum.



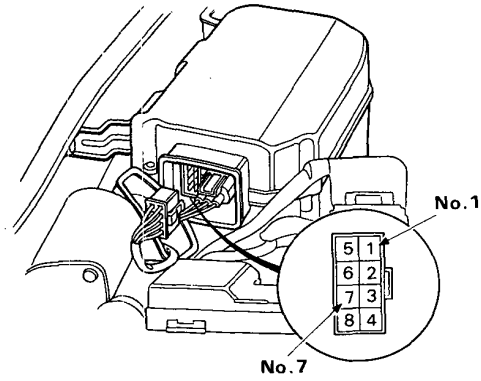
Does it hold vacuum ?

NO → **Replace #4 hose.**

YES

Disconnect the 8p connector on the control box.

Measure resistance between No.1 terminal and No.7 terminal on the control box.



Does continuity exist ?

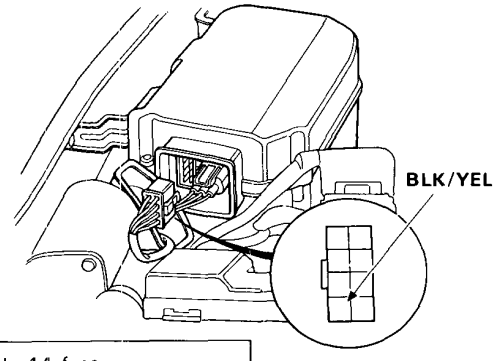
NO → **Replace vacuum switch.**

YES

Reconnect the vacuum hose.

Turn the ignition switch ON.

Measure voltage between BLK/YEL terminal and body ground on the wire harness.



Is there battery voltage ?

NO → Inspect No.14 fuse.

YES

Turn the ignition switch OFF.

Reconnect the 8p connector to the control box.

(To page 6-61)

Is No.14 fuse OK ?

NO → **Replace fuse.**

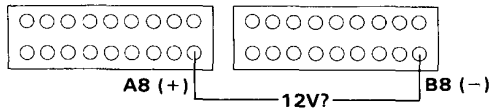
YES

Repair open BLK/YEL wire between No.14 fuse and control box.

(From page 6 - 60)

Connect the ECU test harness A and B between the control unit and connector (page 6-99).

Turn the ignition switch ON.



Measure voltage between A8 (+) terminal and B8 (−) terminal.

Is there battery voltage ?

NO

Repair open in BRN wire between control unit (A8) and vacuum switch.

YES

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

Troubleshooting Flow Chart —— TW Sensor

Self-diagnosis LED indicator blinks six times: Most likely a problem in the Coolant Temperature (TW) Sensor circuit.

LED indicates CODE 6.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset control unit.

Turn the ignition switch ON.

Does LED indicates CODE 6 ?

NO → **Intermittent failure. (test drive may be necessary.)**

YES

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

Disconnect the C-6 and C-24 connectors.

Measure resistance between GRN/WHT terminal and RED/WHT terminal at C-24 connector.

Is there 200—400Ω ?

NO → **Inspect for open or short in RED/WHT or GRN/WHT wire between C-24 connector and TW sensor. If wires are OK, replace the TW sensor.**

YES

Reconnect C-6 and C-24 connectors, then disconnect the 2P connector from TW sensor.

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

Is there approx. 5V ?

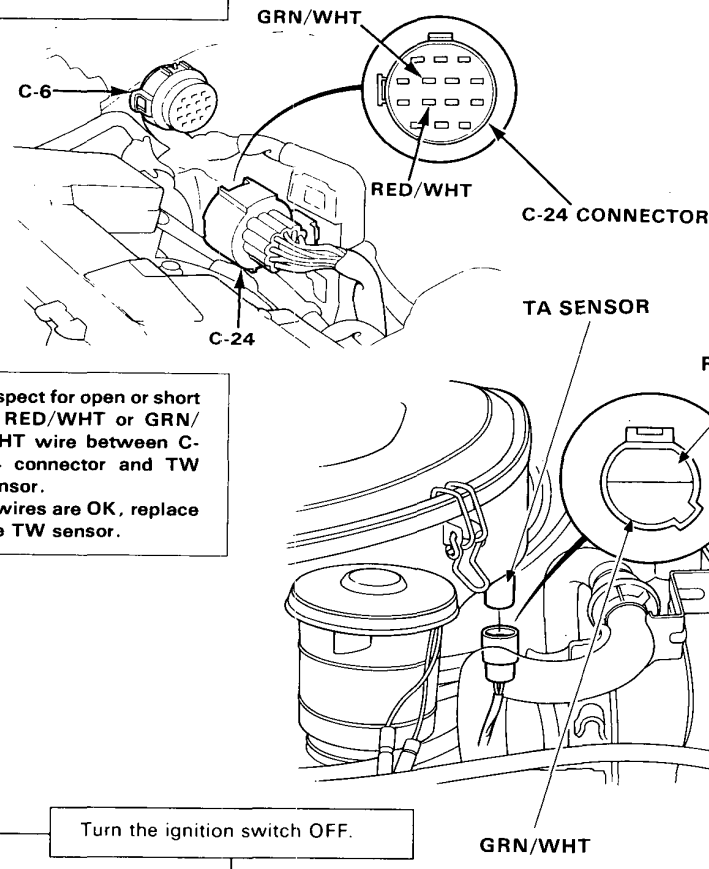
NO → Turn the ignition switch OFF.

Connect the ECU test harness A between the control unit and connector.

(To page 6 - 63)

YES

(To page 6 - 63)



(From page 6 - 62)

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

Is there approx. 5V ?

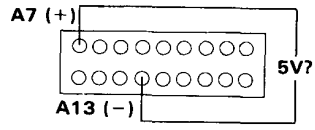
NO → **Repair open in GRN wire between control unit (A13) and C-6 connector.**

YES

Substitute a known-good control unit and recheck. If symptom/indiction goes away, replace the original control unit.

(From page 6 - 62)

Turn the ignition switch ON.



Measure voltage between A7 (+) terminal and A13 (−) terminal.

Is there approx. 5 V ?

YES → **Repair open in RED/WHT wire between control unit (A7) and TW sensor.**

NO

Disconnect A connector from the wire harness only, not the control unit.

Measure voltage between A7 (+) terminal and A13 (−) terminal.

Is there approx. 5V ?

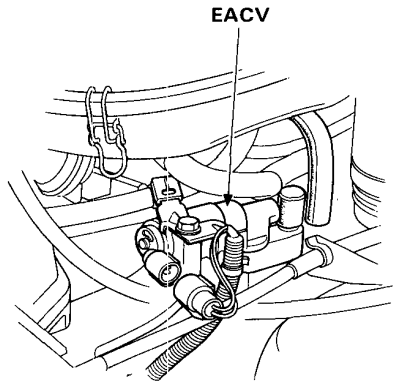
YES → **Repair short in RED/WHT wire between control unit (A7) and TW sensor.**

NO

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

Troubleshooting Flow Chart —— Ignition Coil Signal

Self-diagnosis LED indicator blinks eight times: A problem in the ignition coil signal circuit.



LED indicates CODE 8.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset control unit.

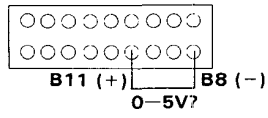
Turn the ignition switch ON.

Does LED indicates CODE 8 ? — NO → **Intermittent failure (test drive may be necessary.)**

YES

Start the engine.

Connect the ECU test harness B between the control unit and connector.



Measure voltage between B11 (+) terminal and B8 (−) terminal.

Does voltage pulse 0V and 5V? — NO → **Repair short or open BLU wire between control unit (B11) and ignition coil.**

YES

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

Troubleshooting Flow Chart —— TA Sensor

Self-diagnosis LED indicator blinks ten times: Most likely a problem in the Intake Air Temperature (TA) Sensor circuit.

LED indicates CODE 10.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset control unit.

Turn the ignition switch ON.

Does LED indicates CODE 10?

NO → **Intermittent failure. (test drive may be necessary.)**

YES

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

Disconnect the C-6 and C-24 connectors.

Measure resistance between GRN/WHT terminal and RED/YEL terminal at C-24 connector.

Is there 1 — 4 kΩ?

NO → **Inspect for open or short in RED/YEL or GRN/WHT wire between C-24 connector and TA sensor. If wires are OK, replace the TA sensor.**

YES

Reconnect C-6 and C-24 connectors, then disconnect the 2P connector from TA sensor.

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

Is there approx. 5V ?

NO → Turn the ignition switch OFF.

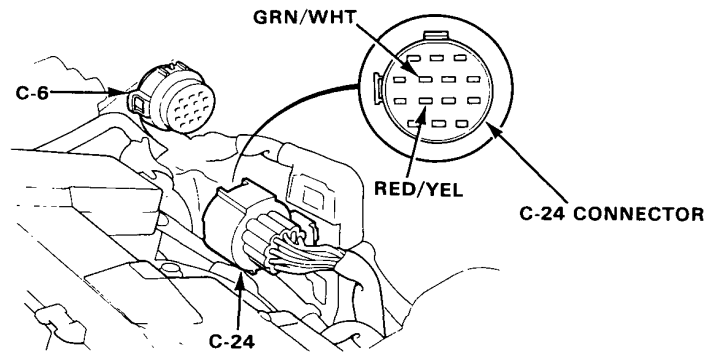
Connect the ECU test harness A between the control unit and connector.

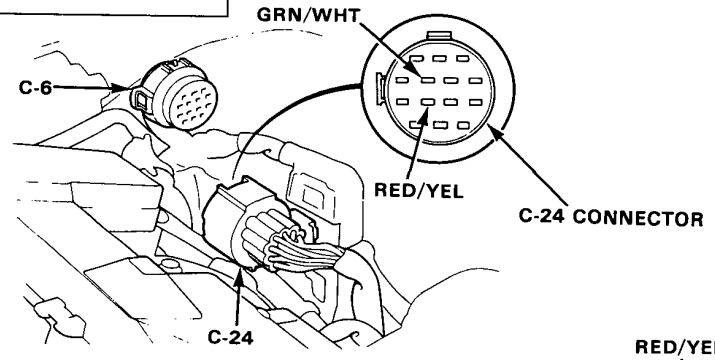
(To page 6 - 66)

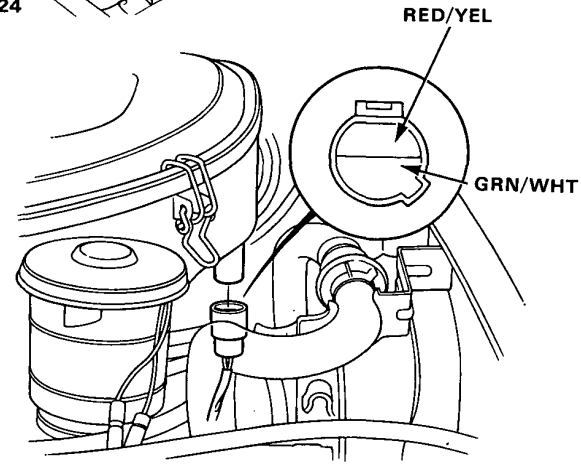
YES

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

(To page 6 - 66)







(cont'd)

Troubleshooting Flow Chart — TA Sensor (cont'd)

(From page 6 - 65)

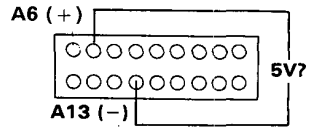
Is there approx. 5V ?

NO → **Repair open in GRN wire between control unit (A13) and C-6 connector.**

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

(From page 6 - 65)

Turn the ignition switch ON.



Measure voltage between A6 (+) terminal and A13 (–) terminal.

Is there approx. 5 V ?

YES → **Repair open in RED/YEL wire between control unit (A) and TA sensor.**

NO

Disconnect A connector from the wire harness only, not the control unit.

Measure voltage between A6 (+) terminal and A13 (–) terminal.

Is there approx. 5V ?

YES → **Repair short in RED/WHT wire between control unit (A) and TA sensor.**

NO

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

Troubleshooting Flow Chart —— EACV

(14) Self-diagnosis LED indicator blinks fourteen times: A problem in the Electronic Air Control Valve (EACV) circuit.

- **Engine is running.**
- **LED indicates CODE 14.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset control unit.

Start engine.

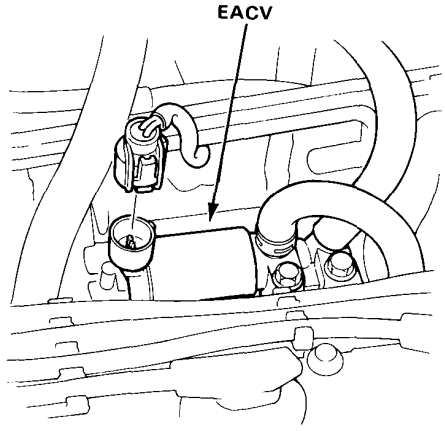
Does LED indicates CODE 14 ?

NO → **Intermittent failure (test driving may be necessary.)**

YES

Stop engine.

Disconnect the 2P connector on the EACV.



Measure resistance between the 2 terminals on the EACV.

Is there 8—15Ω ?

NO → **Replace EACV.**

YES

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

Does continuity exist ?

YES → **Replace EACV.**

NO

(To page 6 - 68)

(cont'd)

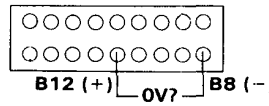
Troubleshooting Flow Chart —— EACV (cont'd)

(From page 6 - 67)

Reconnect the 2P connector to EACV.

Connect the ECU test harness B between the control unit and connector.

Start the engine.



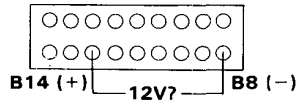
Measure voltage between B12 (+) terminal and B8 (-) terminal.

Is there battery voltage?

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

YES

Measure voltage between B14 (+) terminal and B8 (-) terminal.



Is there voltage?

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

YES

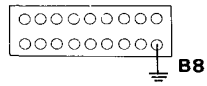
Repair open in BLU/YEL wire between control unit (B12) and EACV or BLU wire between control unit (B14) and EACV.

Input Troubleshooting Flow Chart — Power Source (IG1, Bat) and Ground

Inspection of Power Source (IG1, Bat) and Ground.

Connect the ECU test harness A and B between the control unit and connector.

Check for continuity between the body ground and B8 terminal.

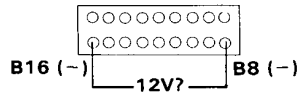


Does continuity exist?

NO → **Repair open in BLK wire between control unit (B8) and body ground.**

YES

Measure voltage between B16 (+) terminal and B8 (−) terminal.



Is there battery voltage?

NO → Inspect HAZARD fuse.

Is HAZARD fuse OK?

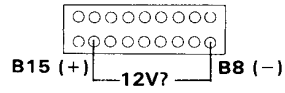
NO → **Replace fuse.**

Repair open in WHT/GRN wire between HAZARD fuse and control unit (B16).

YES

Turn the ignition switch ON.

Measure voltage between B15 (+) terminal and B8 (−) terminal.



Is there battery voltage?

NO → Turn the ignition switch OFF.

Inspect No.14 fuse.

Is No.14 fuse OK?

NO → **Replace fuse.**

YES

Repair open in BLK/YEL wire between No. 14 fuse and control unit (B15).

Power source (IG1, Bat) and ground are OK.

Input Troubleshooting Flow Chart — Clutch Switch Signal

Inspection of clutch switch signal

Connect the ECU test harness A and B between the control unit and connector.

Turn the ignition switch ON.

Measure voltage between A3 (+) terminal and B8 (–) terminal.

Is there 3 — 7V?

NO

Turn the ignition switch OFF.

Disconnect the 2P connector on the clutch switch.

Check for continuity between the 2 terminals on the clutch switch.

Does continuity exist ?

YES

—Adjust the clutch pedal.
—Replace the clutch switch.

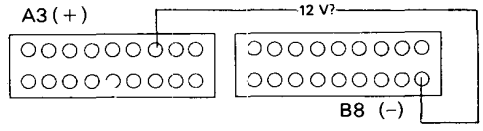
NO

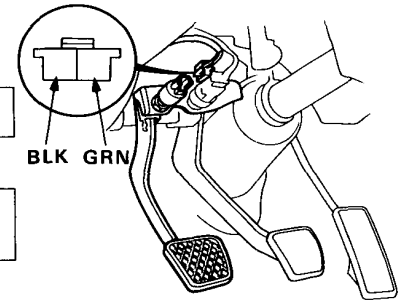
- Repair short in GRN wire between control unit (A3) and clutch switch.
- Substitute a known-good ECU and recheck. If prescribed volt-age is now availabe, replace the original ECU.

YES

Depress the clutch pedal.

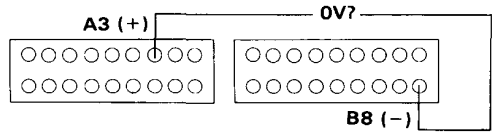
(To page 6 - 71)





(From page 6 - 70)

Measure voltage between A3 (+) terminal and B8 (−) terminal.



Is there voltage ?

YES

Turn the ignition switch OFF.

Disconnect the 2P connector on the clutch switch.

Connect GRN terminal to BLK terminal.

Turn the ignition switch ON.

Is there voltage?

NO

—**Adjust the clutch pedal.**
—**Replace the clutch switch.**

YES

- **Repair open in GRN wire between control unit (A3) and clutch switch.**
- **Repair open in BLK wire between clutch switch and body ground.**

NO

Clutch switch signal is OK.

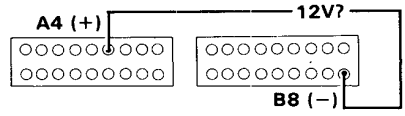
Input Troubleshooting Flow Chart —— Air Conditioning Signal

Inspection of Air Conditioning Signal

Connect the ECU test harness A and B between the control unit and connector.

Start the engine.

Measure voltage between A4 (+) terminal and B8 (−) terminal.



Is there battery voltage?

NO → **Repair short in BLU/RED wire between control unit (A4) and A/C switch.**

YES

Blower switch ON.

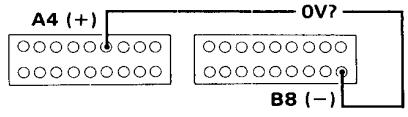
Turn the A/C switch ON.

Does A/C operate?

NO → **See Air Conditioner Inspection.**

YES

Measure voltage between A4 (+) terminal and B8 (−) terminal.



Is there voltage?

NO → **Repair open in BLU/RED wire between control unit (A4) and A/C switch.**

YES

Air Conditioning Signal is OK.

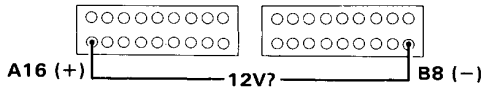
Troubleshooting Flow Chart —— A/C Clutch Relay

Inspection of A/C Clutch Relay.

Connect the ECU test harness A and B between the control unit and connector.

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

Measure voltage between A16 (+) terminal and B8 (−) terminal.



Is there battery voltage?

NO

- **Repair open or short in YEL wire between control unit (A16) and A/C clutch relay.**
- **Check the self-diagnosis indicator. If OK, check the input troubleshooting.**

YES

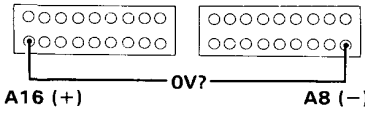
Blower switch ON.

Turn the A/C switch ON.

Does A/C operate?

NO

Measure voltage between A16 (+) terminal and B8 (−) terminal.



Is there voltage?

NO

Inspect A/C clutch relay.

YES

Check the self-diagnosis indicator.
If OK, check the input troubleshooting.

Fuel and Emissions(Fuel Injected Engine)

Idle Control System
Idle speed Setting ·····6 — 76
Fuel Supply System
Index ·····6 — 77
Fuel Sub Pump ·····6 — 78
Fuel Cut-off Relay ·····6 — 80
Fuel Tank ·····6 — 83

Outline of Model Changes

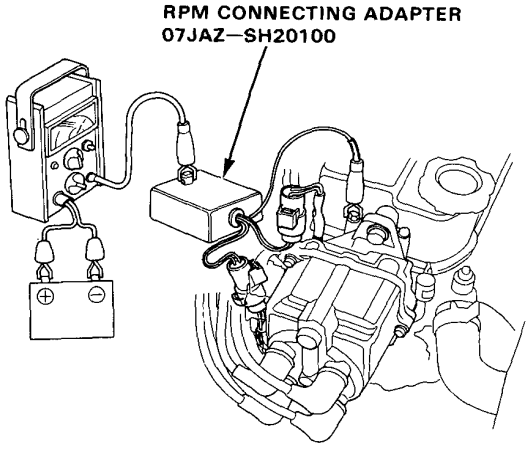
- The inspection/adjustment of idle speed has been modified. [1.5 ℓ]
- The fuel sub pump and the fuel cut-off relay has been adopted. [4D-4WD]

Idle Control System

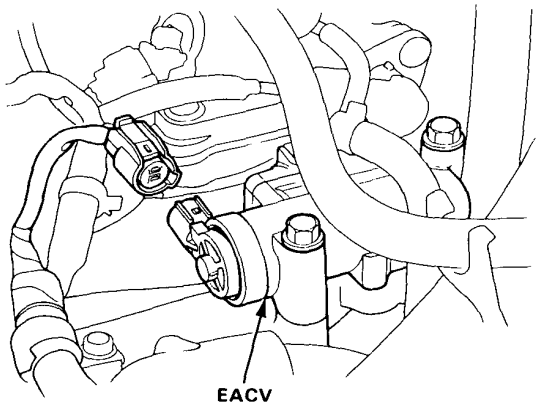
Idle Speed Setting [1.5 ℓ]

Inspection/Adjustment

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Connect a tachometer.



3. Disconnect the 2P connector from the EACV.



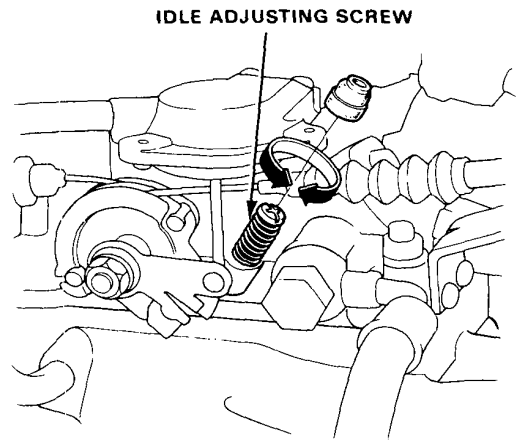
4. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

Idle speed should be:

Manual	625±50 min⁻¹ (rpm)
Automatic	625±50 min⁻¹ (rpm) (in N or P)

Adjust the idle speed, if necessary, by turning the idle adjusting screw.

NOTE: If the idle speed is excessively high, check the throttle control system.



5. Turn the ignition switch OFF.
6. Reconnect the 2P connector on the EACV, then remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.
7. Restart and idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

Idle speed should be:

Manual	800±50 min⁻¹ (rpm)
Automatic	800±50 min⁻¹ (rpm) (in N or P)

8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.
   If applicable, with Automatic transmission models, idle the engine for one minute in gear (except N or P) and check the idle speed.
   Idle speed should be: 800±50 min⁻¹ (rpm)
9. Idle the engine for one minute with heater fan switch at HI (right end) and air conditioner on, then check the idle speed.

Idle speed should be: 800±50 min⁻¹ (rpm)

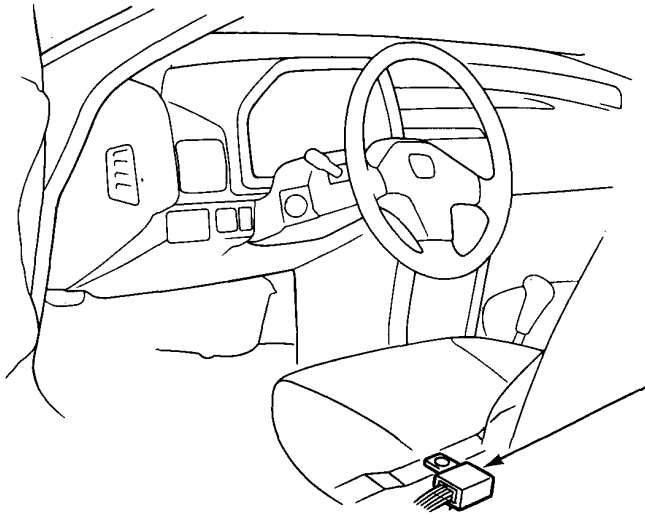
NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-60.

Fuel Supply System

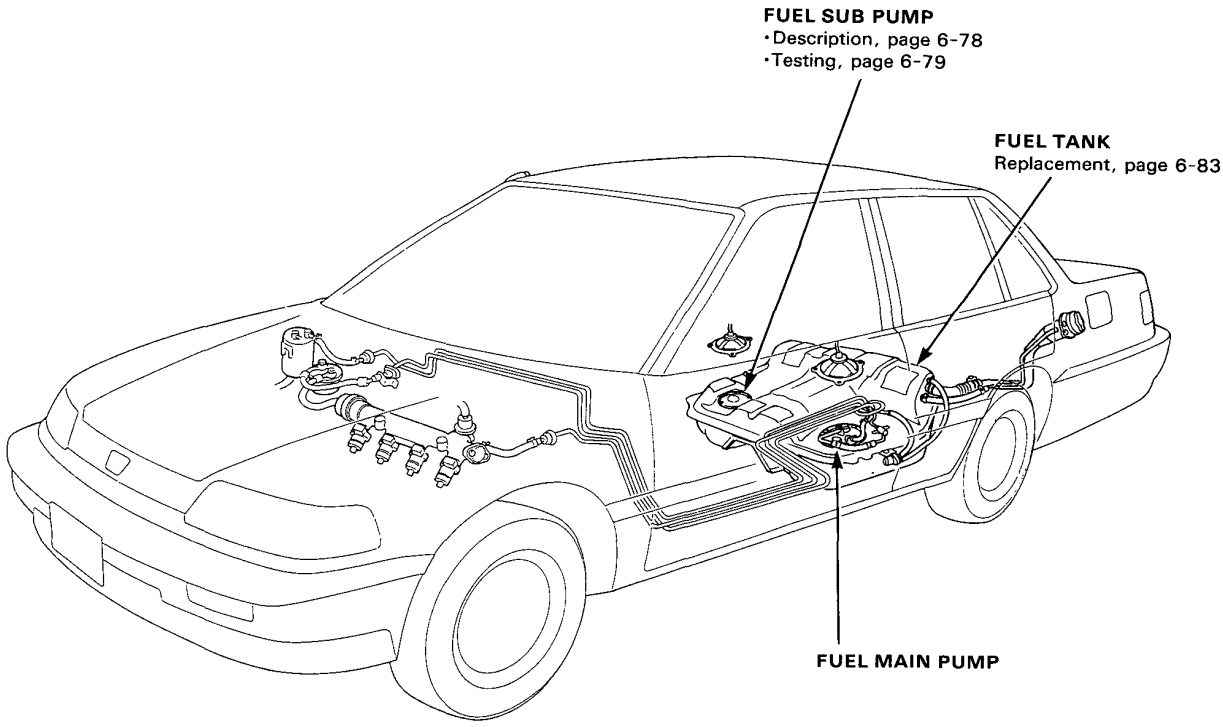
Index [KS, KW, KX 4D-4WD]

Description

Four-wheel drive vehicles use a propellor shaft. With four-door, four-wheel drive vehicles, the fuel tank is divied into left and right halves which straddle the propellor shaft. Because of that, there is a fuel sub pump to feed the fuel from the right to the left tank and a fuel cut-off relay for control.



FUEL CUT-OFF RELAY
- Opereation 6-80
- Testing 6-81



FUEL SUB PUMP
- Description, page 6-78
- Testing, page 6-79

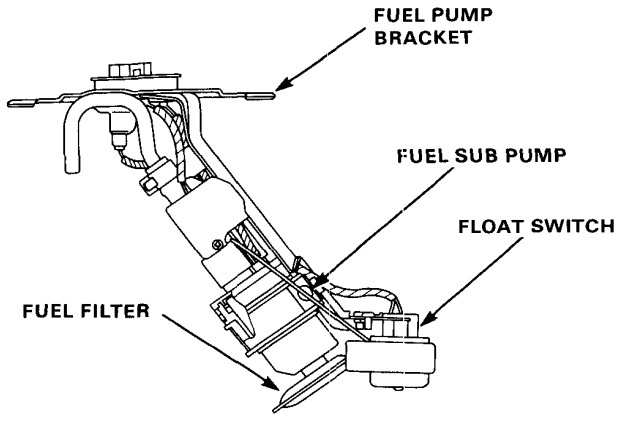
FUEL TANK
Replacement, page 6-83

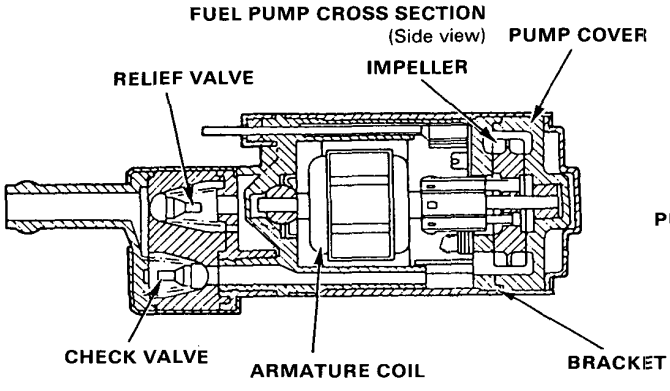
FUEL MAIN PUMP

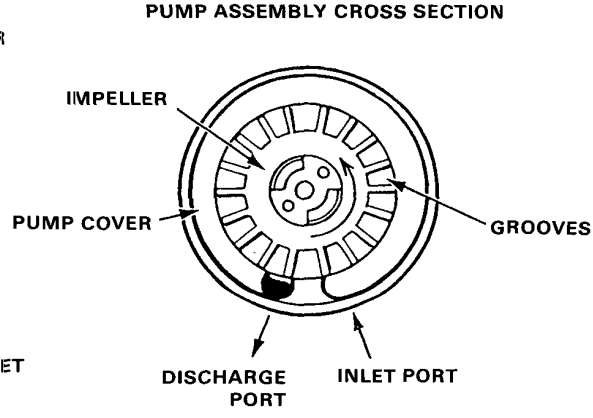
Fuel Sub Pump

Description

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







The fuel sub pump in 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 pump assembly consists of the impeller(driven by the motor), the pump casing(which forms the pumping chamber), and the pump cover.

Operation

1. When the engine is started, the fuel cut-off relay actuates the pump, and the motor turns together with the impeller. Differential pressure is generated by the numerous grooves around the impeller.

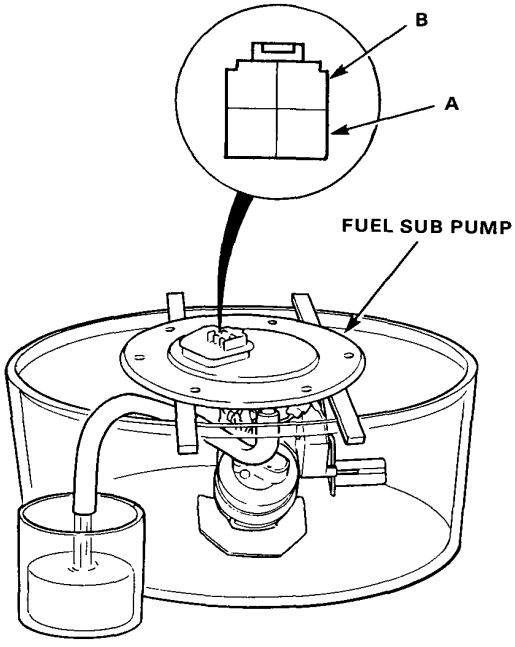
2. Fuel entering the inlet port flows insine the motor from the pumping chamber and is forced through the discharge port via the check valve.
   If fuel flow is obstructed at the discharge side of the fuel line, the relief valve will open to bypass the fuel to the inlet port and prevent excessive fuel pressure.

3. When the engine stops, the pump stops automatically. However, a check valve closes by spring action to retain the residual pressure in the line, helping the engine to restart more easily.

Testing

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

1. Remove the fuel sub pump.
2. Measure the amount of fuel flow for a minute by connecting battery positive to the A terminal, and negative to the B terminal.



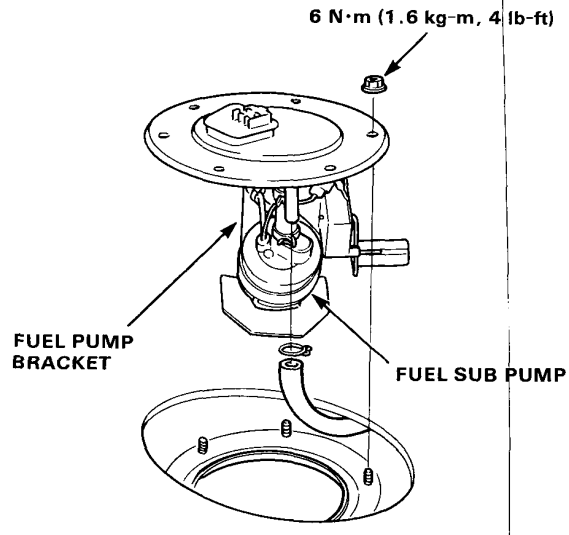
Amount should be :
760 cm³ (25.7oz)min. in a minute at 12V

- If the fuel sub pump is OK, check for :
  - Clogged fuel filter.
  - Clogged fuel line.
  - Fuel cut-off relay failure(page 6-80).

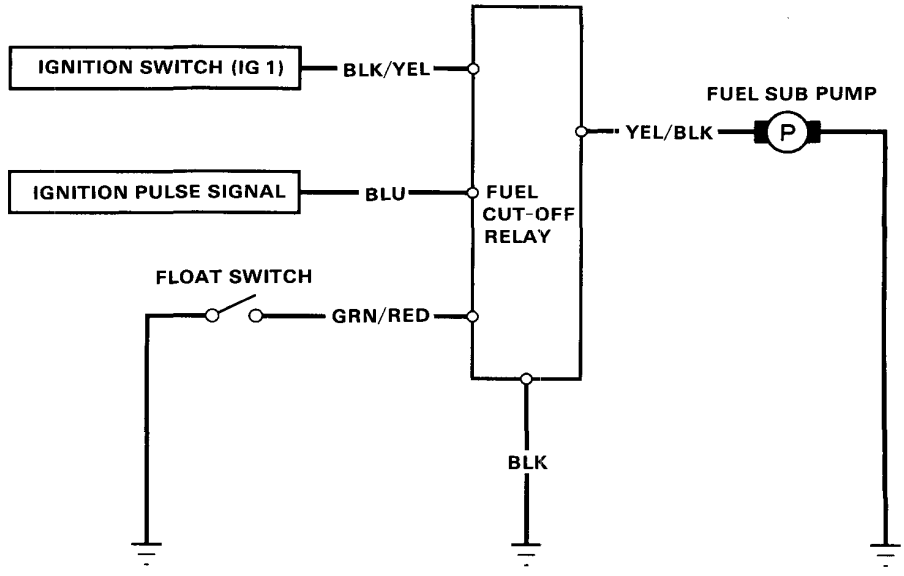
Replacement

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

1. Remove the rear seat, then remove the maintenance access cover.
2. Remove the fuel pump mounting nuts.
3. Remove the fuel sub pump from the fuel tank.



Fuel Cut-off Relay

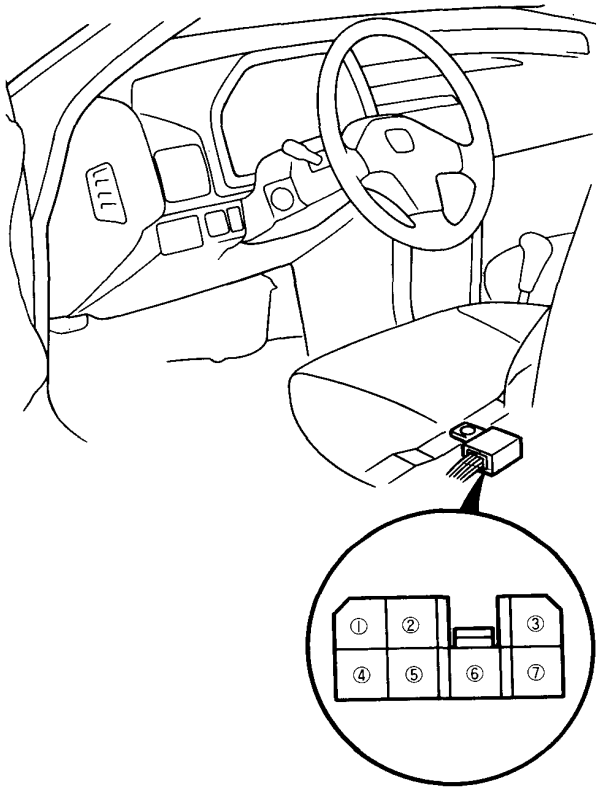


Operation

The switch is on when the right side fuel tank contains fuel. When power from the battery is supplied to the fuel cut-off relay and the engine is started by turning the ignition switch on, the ignition pulse signal is imput to the relay from the primary side of the ignition coil, the fuel sub pump operates and fuel is fed from the right to the left side.
The ignition pulse signal is not generated by the primary side of the ignition coil when the engine stops ;
therefore, the fuel sub pump does not operate. Also, the float switch turns off when there is no fuel in the right side tank, so the sub fuel pump does not operate.

Testing

1. Keep the ignition switch in the OFF position.
2. Disconnect the 7P connector.
3. Check for continuity between the BLK wire ④ in the connector and body ground.



4. Attach the positive probe of voltmeter to the BLK/YEL wire ⑦ and the negative probe to the BLK wire ④.
5. Turn the ignition switch ON.

   Battery voltage should be available.
   • If there is no voltage, check the wiring from the ignition switch and the fuel cut-off relay as well as No. 14(10A) fuse.
6. Turn the ignition switch OFF.
   Attach the positive probe of woltmeter to the BLU wire ② and the negative probe to the BLK wire ④.
7. Turn the ignition switch ON.

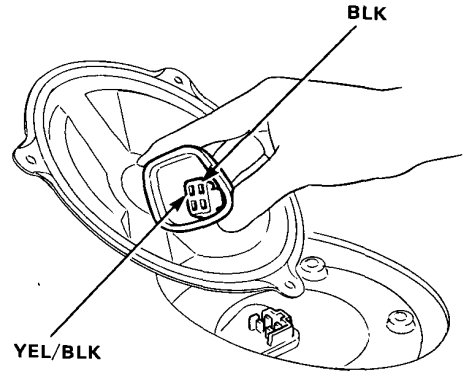
Battery voltage should be available.

   • If there is no voltage, check the wiring between the ignition coil and the fuel cut-off relay.

8. Turn the ignition switch OFF.
   Connect a jumper wire between the YEL/BLK wire ③ and BLK/YEL wire ⑦.
9. Turn the ignition switch ON.

   The fuel sub pump should work.

   • If the fuel sub pump does not work, remove the maintenance access cover. Check that battery voltage is avaiable at the fuel sub pump connector when the ignition switch is turned ON (positive probe to the YEL/BLK wire, negative probe to the BLK wire).

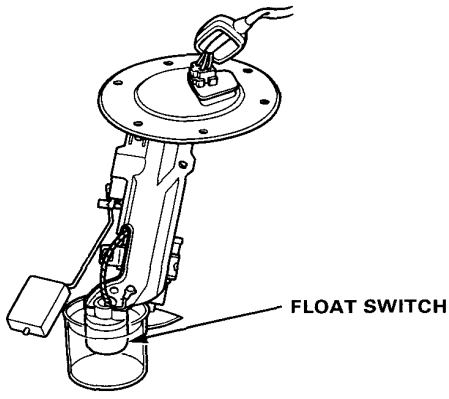


—If battery voltage is available, replace the fuel pump.

—If there is no voltage, check for continuity between the GRN/RED wire in the connector and the fuel sub realy.

Fuel Cut-Off Relay (cont'd)

10. Remove the fuel sub pump from the fuel tank.
11. Attach the positive probe of voltmeter to the GRN/RED wire ① and the negative probe to the BLK wire ④.
12. Suspend the float switch in a container of water as shown.



13. Check for continuity between the GRN/RED wire ① and the BLK wire ④.
    - If there is no continuity, replace the float switch.

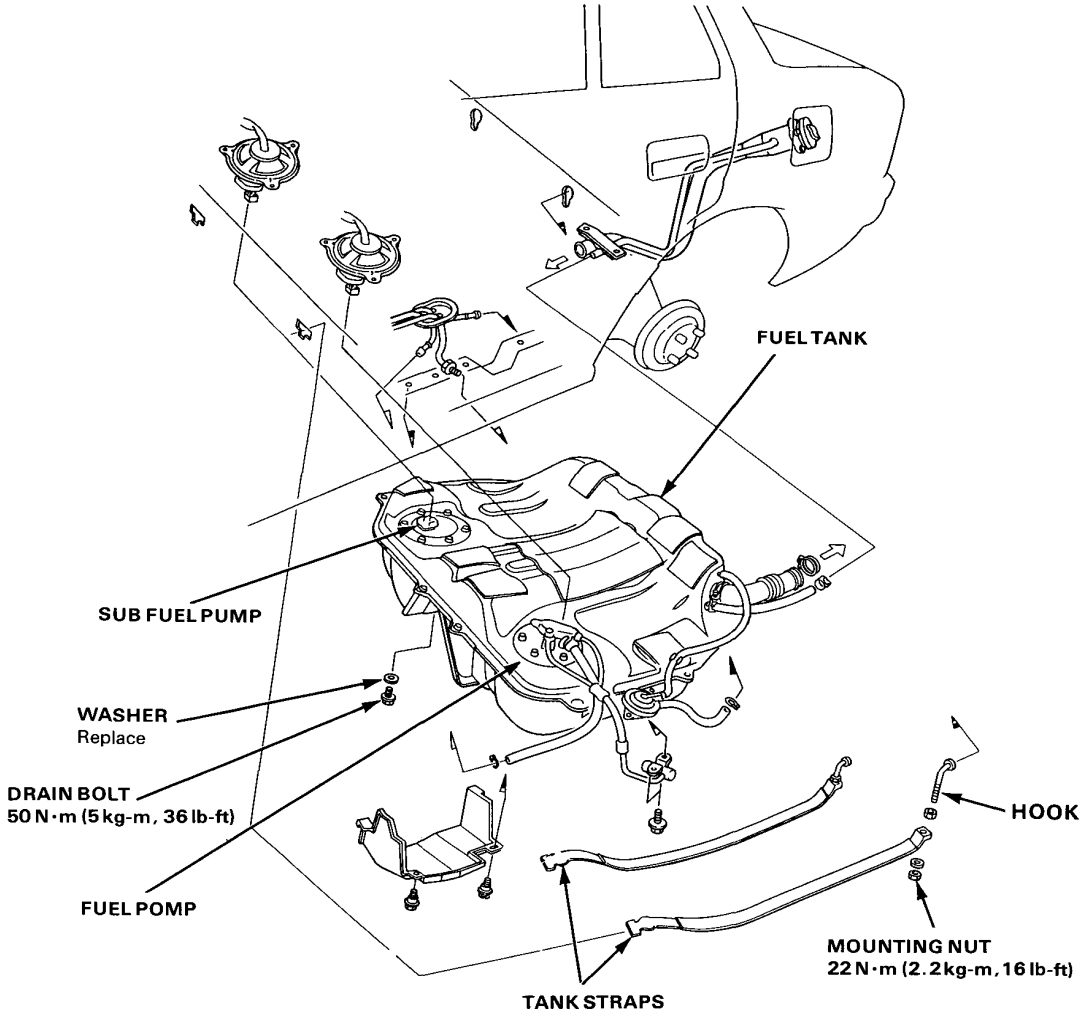
If all the testes are OK, replace the fuel cut-off relay and retest.

Fuel Tank

Replacement

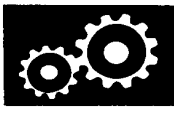
⚠WARNING **Do not smoke while working on fuel system. Keep open flame away from work area.**

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Remove the exhaust pipe B and muffler.
4. Remove the No.3 propeller shaft from the rear differential.
5. Remove the rear seat and disconnect the fuel gauge sending unit connector.
6. Remove the two-way valve cover and fuel hose protector.
7. Disconnect the hoses.
   CAUTION:
   - **When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.**
   - **Clean the flared joint of high pressure hoses thoroughly before reconnecting them.**
8. Place a jack, or other support, under the tank.
9. Remove the strap nuts and let the straps fall free.
10. Remove the fuel tank.
    NOTE: The tank may have stuck on the undercoat applied to its mount. To remove, carefully pry it off the mount.
11. Install a new washer on the drain bolt, then install parts in the reverse order of removal.



Manual Transmission

L3 (2WD) ..... 8 — 1
L3 (4WD) ..... 8 — 13



L3 (2WD)

Special Tools ..... 8 — 2
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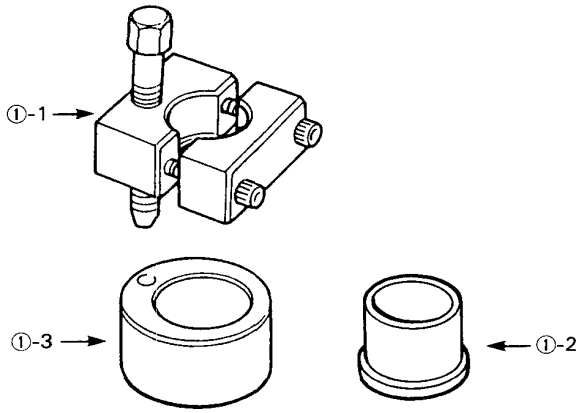
Shift Fork
  Disassembly ..... 8 — 6
  Reassembly ..... 8 — 6
Mainshaft Thrust Shim
  Adjustment ..... 8 — 7
Countershaft
  Disassembly ..... 8 — 10
  Reassembly ..... 8 — 11

Outline of Model Changes

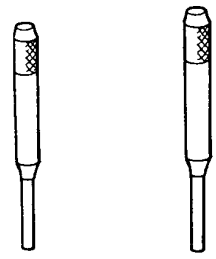
- The spring pin has been added to the shift fork shaft.
- The mainshaft thrust shim has been changed.
- The countershaft ball bearing has been changed.

Special Tools

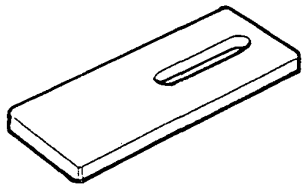
Ref. No	Tool Number	Description	Q'ty	Remarks
①	07GAJ–PG20102	Mainshaft Clearance Inspection Tool Set	1	
①-1	07GAJ–PG20110	Mainshaft Holder	1	
①-2	07GAJ–PG20120	Collar	1	
①-3	07GAJ–PG20130	Mainshaft Base	1	
②	07744–0010200	Pin Driver 3.0 mm	1	
③	07744–0010400	Pin Driver 5.0 mm	1	
④	07979–PJ40001	Magnet Stand Base	1	



①



② ③

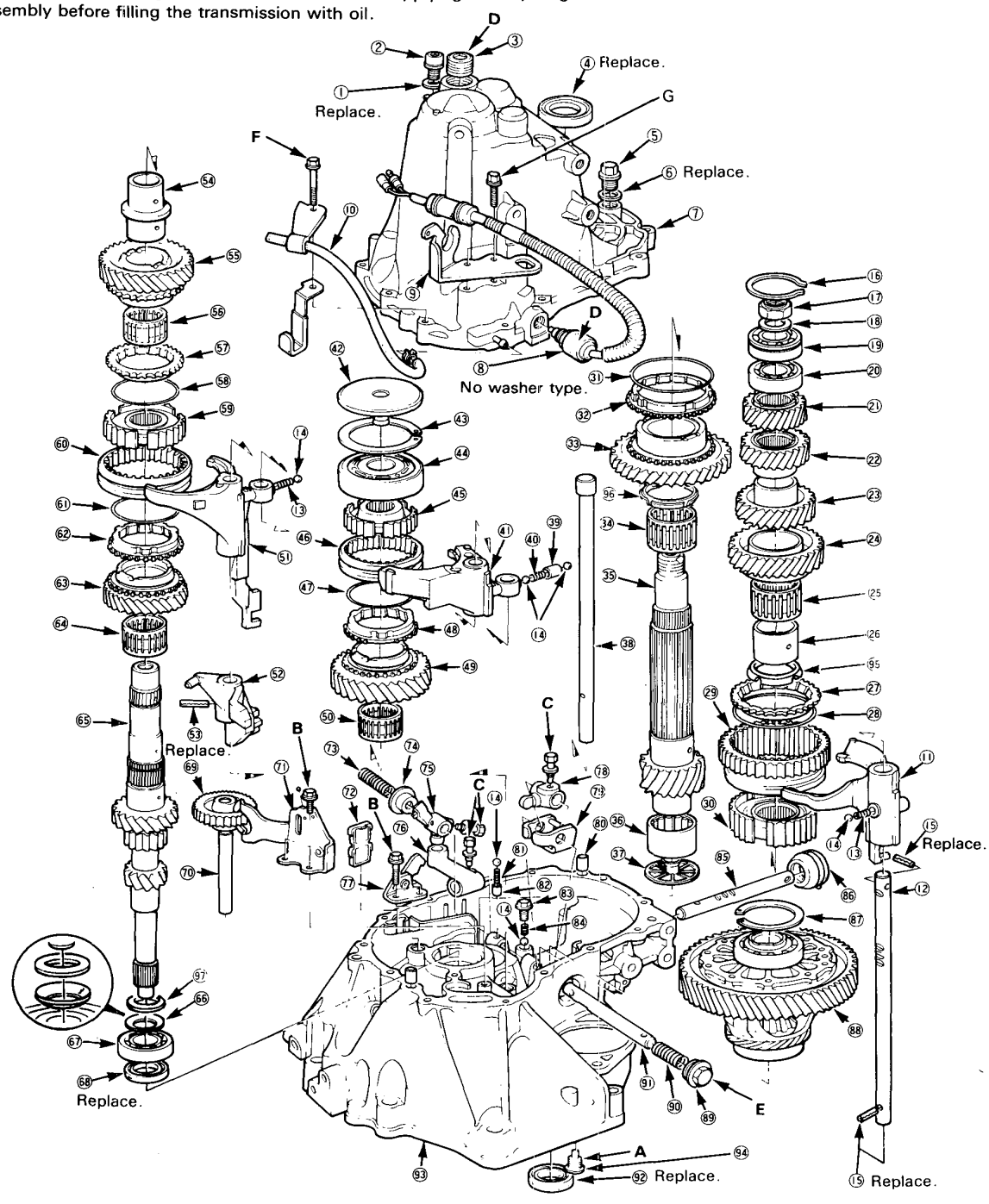


④

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 PART NO. ŌY746-99986 for the liquid gasket. Assemble the housings within 20 minutes after applying the liquid gasket and allow it to cure at least 30 minutes after assembly before filling the transmission with oil.



Torque Value
A —40 N·m (4.0 kg-m, 29 lb-ft)
B —15 N·m (1.5 kg-m, 11 lb-ft)
C —29 N·m (2.9 kg-m, 21 lb-ft)
D —25 N·m (2.5 kg-m, 18 lb-ft)
E —55 N·m (5.5 kg-m, 40 lb-ft)
F —28 N·m (2.8 kg-m, 21 lb-ft)
G —26 N·m (2.6 kg-m, 19 lb-ft)

NOTE: Always clean the magnet ⑫ whenever the transmission housing is disassembled.

① SEALING WASHER
② OIL DRAIN PLUG
40 N·m (4.0 kg-m, 29 lb-ft)
③ 32 mm SEALING BOLT
④ OIL SEAL
⑤ OIL FILLER PLUG
45 N·m (4.5 kg-m, 33 lb-ft)
⑥ SEALING WASHER
⑦ TRANSMISSION HOUSING
⑧ BACK-UP LIGHT SWITCH
25 N·m (2.5 kg-m, 18 lb-ft)
⑨ CLUTCH CABLE BRACKET
⑩ BREATHER TUBE
⑪ 1st/2nd SHIFT FORK
⑫ 1st/2nd SHIFT FORK SHAFT
⑬ SHIFT FORK SPRING
⑭ STEEL BALL
⑮ SPRING PIN
⑯ SNAP RING
⑰ COUNTERSHAFT LOCKNUT
110→0→110 N·m (11.0→0→11.0 kg-m, 80→0→80 lb-ft)
⑱ WASHER
⑲ BALL BEARING
Disassembly, page 8-10
Reassembly, page 8-11
⑳ NEEDLE BEARING
㉑ COUNTERSHAFT 5th GEAR
㉒ COUNTERSHAFT 4th GEAR
㉓ COUNTERSHAFT 3rd GEAR
㉔ COUNTERSHAFT 2nd GEAR
㉕ NEEDLE BEARING
㉖ DISTANCE COLLAR
㉗ SYNCHRO RING
㉘ SYNCHRO SPRING
㉙ REVERSE GEAR
㉚ SYNCHRO HUB
㉛ SYNCHRO SPRING
㉜ SYNCHRO RING
㉝ COUNTERSHAFT 1st GEAR
㉞ NEEDLE BEARING
㉟ COUNTERSHAFT
㊱ NEEDLE BEARING
㊲ OIL GUIDE PLATE
㊳ 5th/REVERSE SHIFT FORK SHAFT
㊴ ROLLER
㊵ 5th DETENT SPRING
㊶ 5th SHIFT FORK
㊷ OIL GUIDE PLATE
㊸ THRUST SHIM
Selection, page 8-7
㊹ BALL BEARING
㊺ SYNCHRO HUB
㊻ SYNCHRO SLEEVE
㊼ SYNCHRO SPRING
㊽ SYNCHRO RING
㊾ 5th GEAR
㊿ NEEDLE BEARING
(51) 3rd/4th SHIFT FORK
(52) SHIFT PIECE
(53) SPRING PIN
(54) SPACER COLLAR
(55) 4th GEAR
(56) NEEDLE BEARING
(57) SYNCHRO RING
(58) SYNCHRO SPRING
(59) SYNCHRO HUB
(60) SYNCHRO SLEEVE
(61) SYNCHRO SPRING
(62) SYNCHRO RING
(63) 3rd GEAR
(64) NEEDLE BEARING
(65) MAINSHAFT
(66) SPRING WASHER
(67) BALL BEARING
(68) OIL SEAL
(69) REVERSE IDLER GEAR
(70) REVERSE IDLER SHAFT
(71) REVERSE SHIFT HOLDER
(72) MAGNET
(73) REVERSE SELECT SPRING
(74) REVERSE RETURN SELECT
(75) SHIFT ARM C
(76) SHIFT ARM A
(77) REVERSE LOCK CAM
(78) SHIFT ARM B
(79) INTERLOCK
(80) DOWEL PIN
(81) SPRING
(82) SPRING COLLAR
(83) SPRING BOLT
(84) SPRING
(85) SHIFT ROD
(86) BOOT
(87) SHIM
(88) DIFFERENTIAL ASSEMBLY
(89) 28 mm PLUG
(90) 1st/2nd SELECT SPRING
(91) SHIFT ARM SHAFT
(92) OIL SEAL
(93) CLUTCH HOUSING
(94) INTERLOCK GUIDE BOLT
(95) FRICTION DAMPER (2nd gear side)
Disassembly, page 8-10
Reassembly, page 8-11
(96) FRICTION DAMPER (1st gear side)
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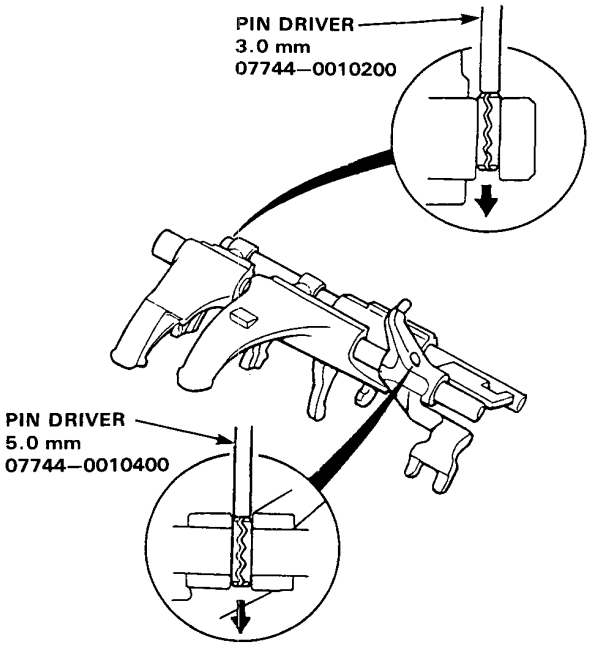
Reassembly, page 8-11
(97) THRUST WASHER

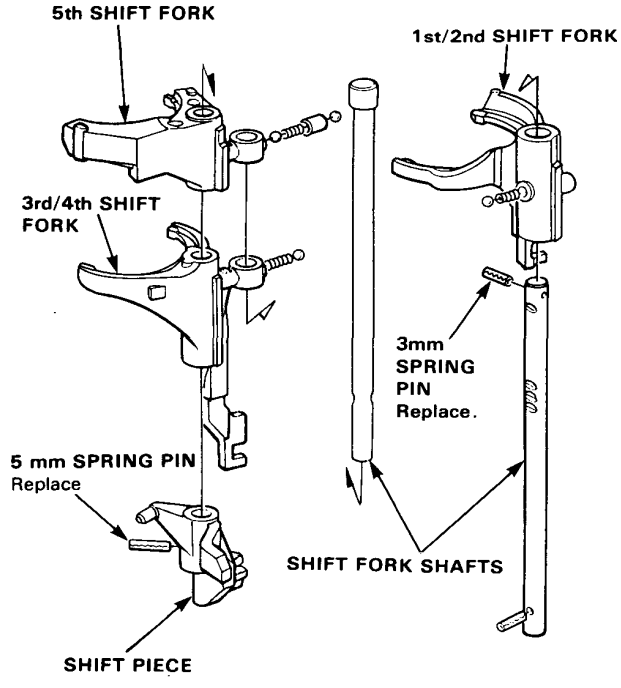
Shift Fork

Disassembly

1. Remove the shift fork shaft by removing the spring pins from the shift forks.



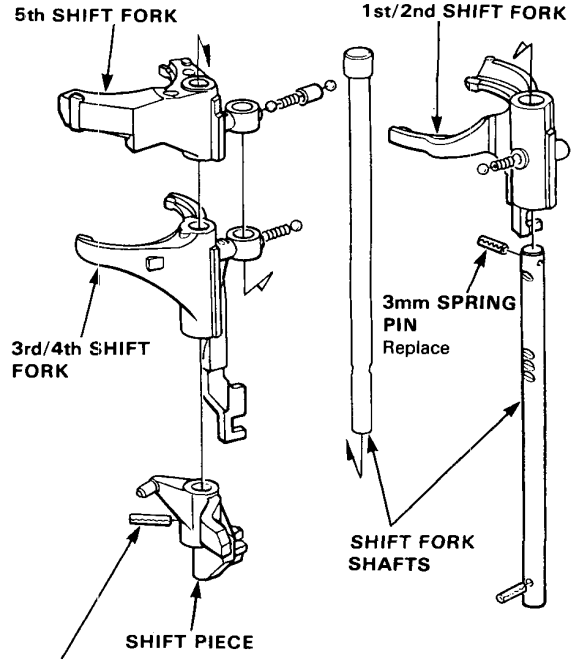
CAUTION: Do not lose the spring-loaded detent while disassembling the shift forks and shift fork shafts.

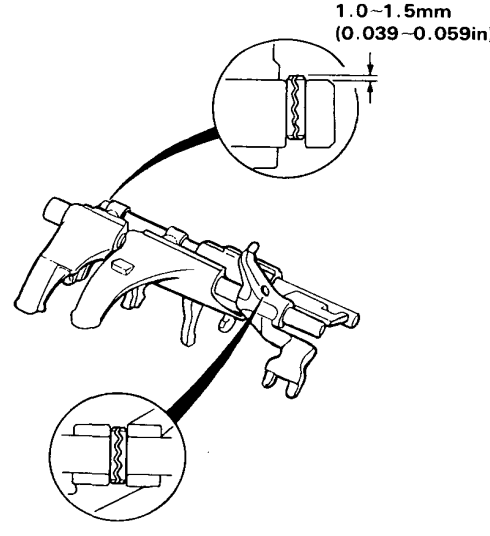


Reassembly

1. Insert the shift fork shaft into the shift forks and drive in the spring pins.

NOTE: Do not lose the steel balls and spring when rsassembling.

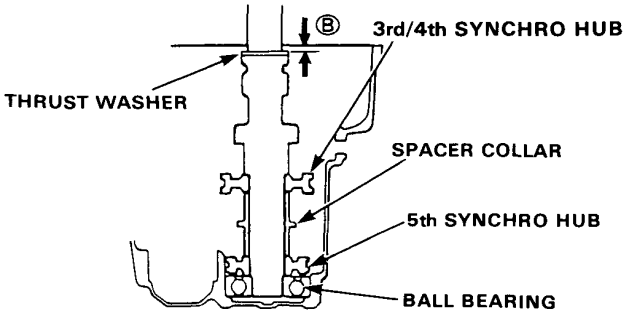




Mainshaft Thrust Shim

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.

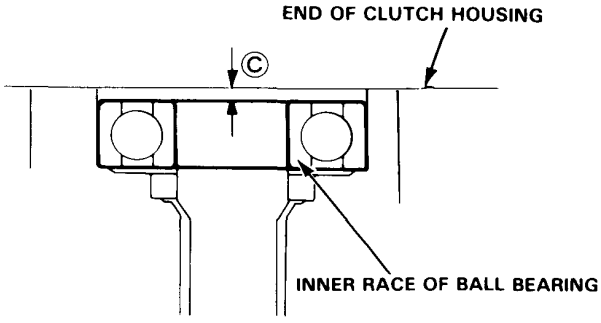


3 Measure the distance B between the end of the transmission housing and thrust washer.

NOTE:
- Use a straight edge and feeler gauge.
- Measure at three locations and average the readings.

4. Measure the distance C between the surfaces of the clutch housing and bearing inner race.

NOTE:
- Use a straight edge and feeler gauge.
- Measure at three locations and average the readings.



5. Select the proper shim (or shim pair) on the basis of the following calculations:

NOTE: *Do not use more than two shims.*

(Basic Formula)
(B) + (C) − 0.95 = shim thickness

Example of calculation:
Distance B (2.00mm) + Distance C (0.09mm) = 2.09 mm
subtract the spring washer height (0.95mm) = the required thrust shim (1.14mm)

D12B, D13B, D14A, D15B : 65 mm Thrust Shim

	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.)

(cont'd)

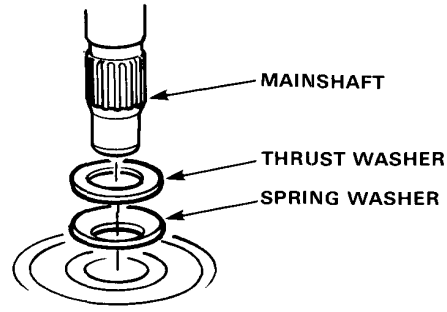
Mainshaft Thrust Shim

Adjustment (cont'd)

D16A: 70 mm Thrust Shim

	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.)
A M	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. Check the thrust clearance in the manner described below.
   a. Install the shims selected *in the transmission* housing.
   b. Install the thrust washer and spring washer in the mainshaft.



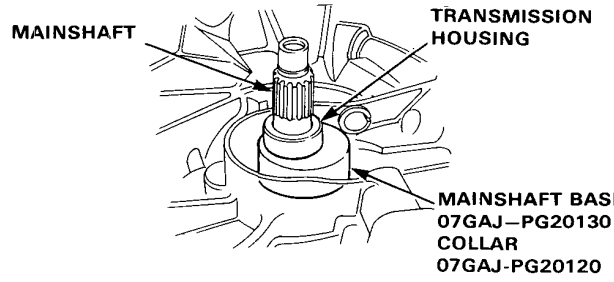
NOTE:
- Clean the thrust washer, spring washer and shim *thoroughly before installation.*
- Install the thrust washer, spring washer and shim properly.

   c. Install the mainshaft in the clutch housing.
   d. Place the transmission housing over the mainshaft and onto the clutch housing.
   e. Tighten the clutch and transmission housings with several 10mm bolts.
   f. Tap the mainshaft with a plastic hammer.

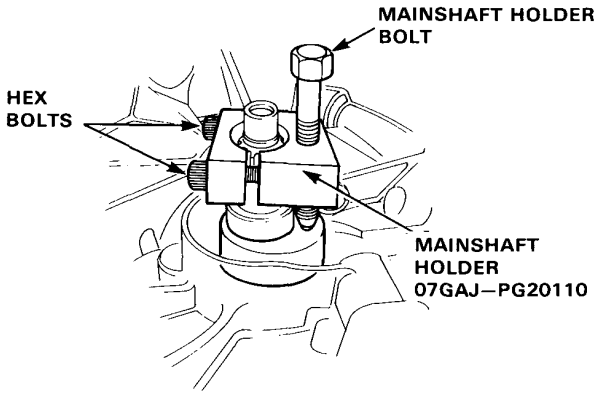
7. Check the thrust clearance in the manner described below.

CAUTION: Mesurement should be made at room temperature.

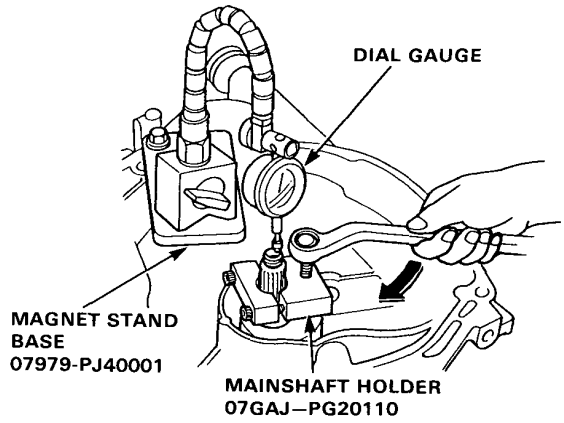
   a. Slide the mainshaft base and the collar over the mainshaft.



b. Attach the mainshaft holder to the mainshaft as follows:
   - 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.



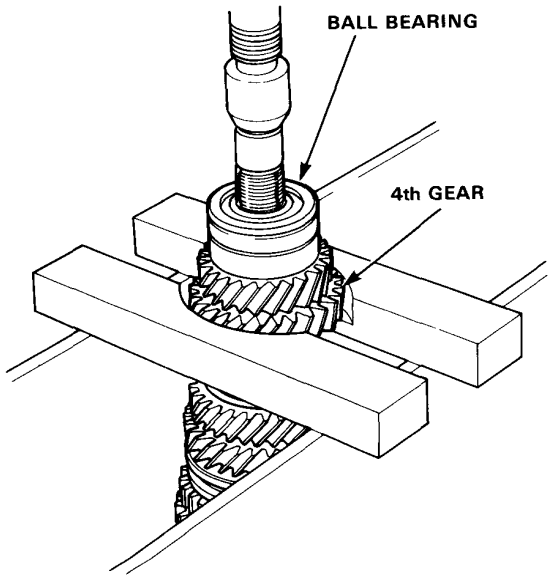
f. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.
   CAUTION: Turning the shaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.
g. Clearance is correct if reading is between 0.13—0.20mm (0.0051—0.0079 in).
   If not, recheck necessary shim thickness.

Countershaft

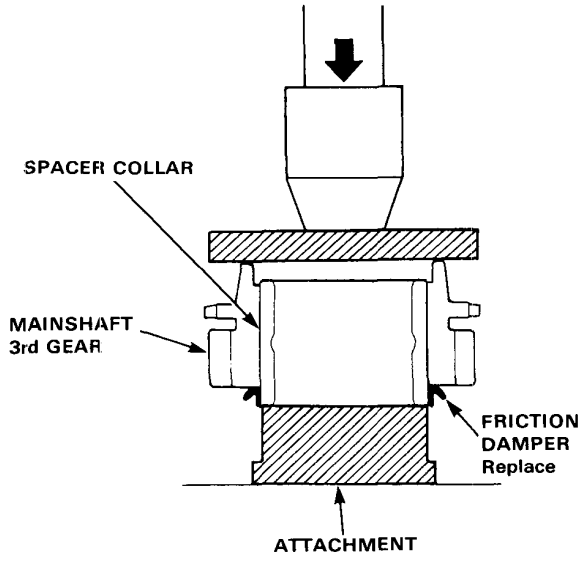
Disassembly

1. Raise the locknut tab from the groove of the shaft and remove the locknut and the spring washer.

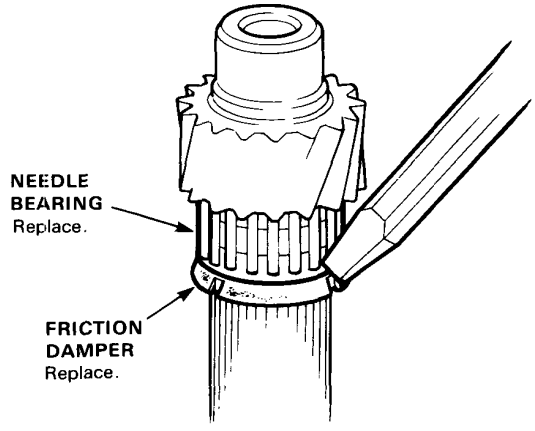
2. Support 4th gear on steel blocks as shown and press the shaft out of ball bearing.
CAUTION: Remove the ball bearing using a press and steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.



3. Using a press as shown, remove the friction damper (2nd gear side) from the spacer collar.

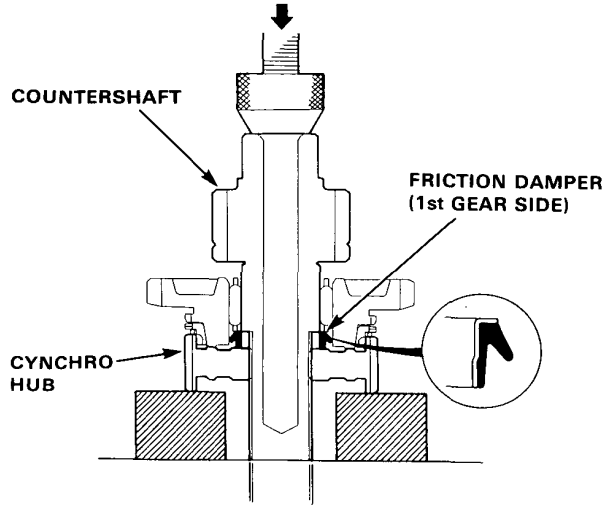


4. Remove the friction damper (1st gear side) and needle bearing from the countershaft.

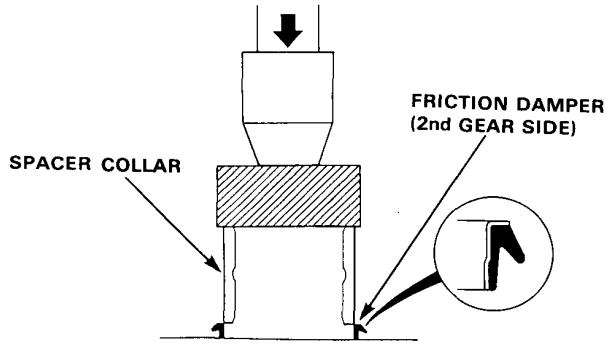


Reassembly

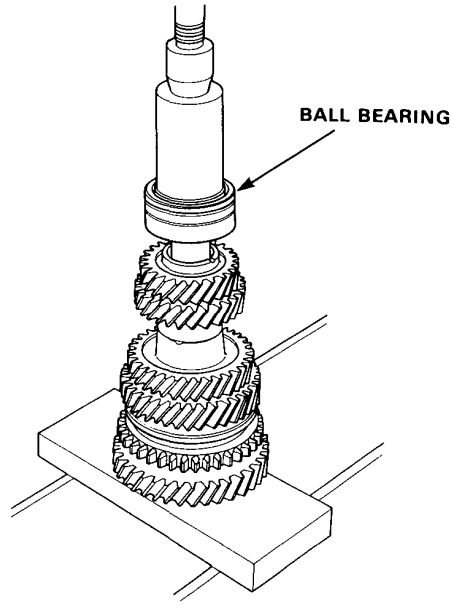
1. Using a press, install the friction damper (1st gear side) to the countershaft as shown.



2. Using a press, install the friction damper (2nd gear side) to the spacer collar.



3. Install the ball bearing using a press as shown.



4. Install the spring washer, tighten the locknut and then stake the locknut tab into the groove.

LOCKNUT
110 → 0 → 110 N·m (11.0 → 0 → 11.0kg-m, 80 → 0 → 80 lb-ft)

L3 (4WD)

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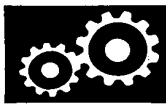
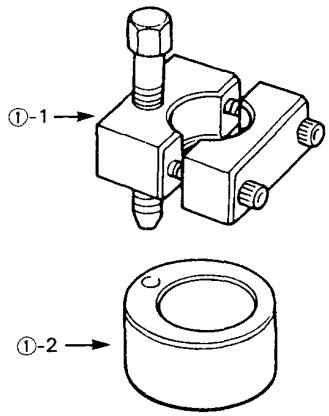


Outline of Model Changes

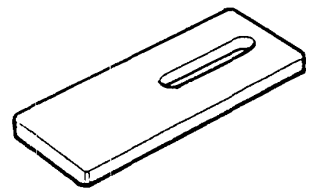
- The mainshaft thrust shim has been changed.
- The countershaft ball bearing has been changed.
- The countershaft thrust washer has been changed.

Special Tools

Ref. No	Tool Number	Description	Q'ty	Remarks
①	07GAJ—PG20102	Mainshaft Clearance Inspection Tool Set	1	
①-1	07GAJ—PG20110	Mainshaft Holder	1	
①-2	07GAJ—PG20130	Mainshaft Base	1	
②	07979—PJ40001	Magnet Stand Base	1	



①

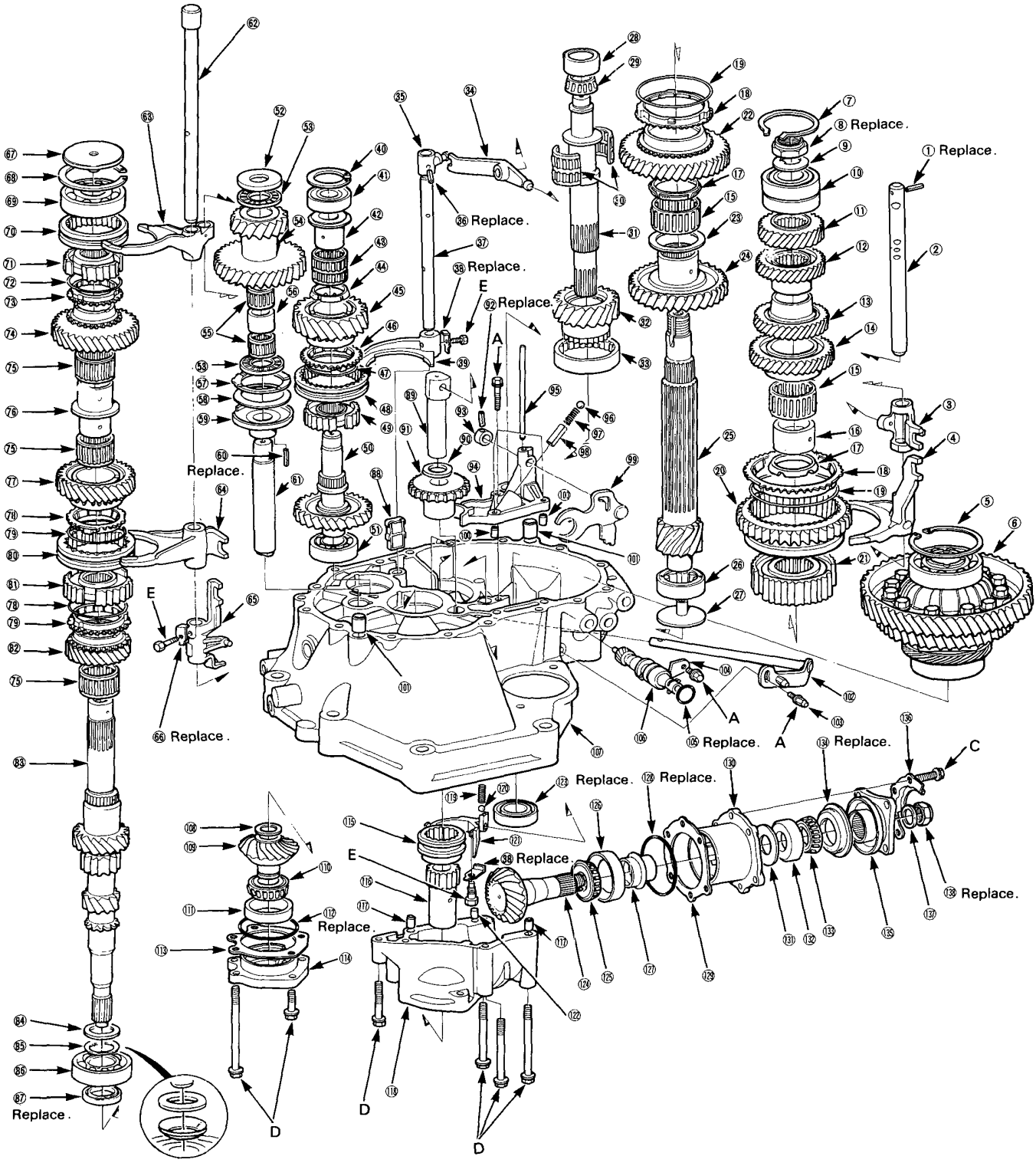


②

Illustrated Index

NOTE :

- Clean all parts thoroughly in solvent and dry with compressed air.
- Lubricate all parts with oil before reassembly.



NOTE : Remove and clean the magnet ⑱ whenever the transmission is disassembled.

Torque Value	
A: 6mm Bolt	12 N·m (1.2 kg-m, 9 lb-ft)
B: 6mm Special bolt A	15 N·m (1.5 kg-m, 11 lb-ft)
C: 8mm Bolt	26 N·m (2.6 kg-m, 19 lb-ft)
D: 10mm Bolt	45 N·m (4.5 kg-m, 33 lb-ft)
E: 6mm Special bolt B	17 N·m (1.7 kg-m, 12 lb-ft)

① SPRING PIN
② 1st/2nd SHIFT FORK SHAFT
③ SUPER-LOW SHIFT PIECE
④ 1st/2nd SHIFT FORK
⑤ SNAP RING
⑥ FLONT DIFFERENTIAL ASSEMBLY
⑦ SNAP RING
⑧ LOCKNUT
110 → 0 → 110N·m (11.0 → 0 → 11.0 kg-m, 80 → 0 → 80lb-ft)
⑨ SPRING WASHER
⑩ BALL BEARING
⑪ 5th GEAR
⑫ 4th GEAR
⑬ 3rd GEAR
⑭ 2nd GEAR
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㉖ NEEDLE BEARING
㉗ OIL GUIDE PLATE
㉘ BEARING OUTER RACE
㉙ TAPER ROLLER BEARING INNER
㉚ NEEDLE BEARING
㉛ TRANSFER SHAFT
㉜ TRANSFER DRIVEN GEAR
㉝ NEEDLE BEARING
㉞ SUPER-LOW SHIFT LEVER
㉟ SUPER-LOW SHIFT PIECE B
㊱ SPRING PIN
㊲ SUPER-LOW SHIFT FORK SHAFT
㊳ LOCK WASHER
㊴ SUPER-LOW SHIFT FORK
㊵ THRUST SHIM
㊶ BALL BEARING
㊷ DISTANCE COLLAR
㊸ NEEDLE BEARING
㊹ FRICTION DAMPER
㊺ SUPER-LOW 2nd GEAR
㊻ SYNCHRO RING
㊼ SYNCHRO SPRING
㊽ SYNCHRO SLEEVE
㊾ SYNCHRO HUB
㊿ SUPER-LOW 2nd SHAFT
(51) BALL BEARING
(52) THRUST WASHER
(53) THRUST NEEDLE BEARING
(54) SUPER-LOW 1st GEAR
(55) NEEDLE BEARING
(56) DISTANCE COLLAR
(57) THRUST WASHER
(58) SPRING WASHER
(59) DISTANCE COLLAR
(60) SPRING PIN
(61) SUPER-LOW 1st SHAFT
(62) 5th/REVERSE SHIFT FORK SHAFT
(63) 5th SHIFT FORK
(64) 3rd/4th SHIFT FORK
(65) 5th/REVERSE SHIFT PIECE
(66) LOCK WASHER
(67) OIL GUIDE PLATE
(68) THRUST SHIM
(69) BALL BEARING
(70) SYNCHRO SLEEVE
(71) SYNCHRO HUB
(72) SYNCHRO SPRING
(73) SYNCHRO RING
(74) 5th GEAR
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(77) 4th GEAR
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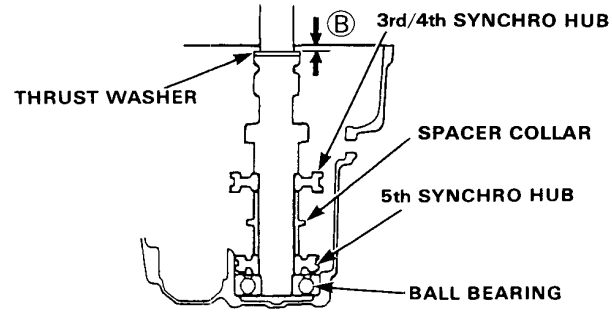
(80) SYNCHRO SLEEVE
(81) SYNCHRO HUB
(82) 3rd GEAR
(83) MAINSHAFT
(84) THRUST WASHER
(85) SPRING WASHER
(86) BALL BEARING
(87) OIL SEAL
(88) MAGNET
(89) REVERSE IDLER SHAFT
(90) WASHER
(91) REVERSE IDLER GEAR
(92) SPRING PIN
(93) LOCK COLLAR
(94) REVERSE SHIFT HOLDER
(95) SUPER-LOW SHIFT PIECE BAR
(96) DETENT BALL
(97) BALL SPRING
(98) SPRING COLLAR
(99) REVERSE SHIFT FORK
(100) DOWEL PIN
(101) DOWEL PIN
(102) 2-4WD SELECTOR
(103) STOPPER BOLT
(104) LOCK PLATE
(105) O-RING
(106) SPEEDOMETER GEAR
(107) CLUTCH HOUSING
(108) THRUST SHIM
Selection, page 8-18
(109) TRANSFER DRIVE GEAR
(110) TAPER ROLLER BERING INNER
(111) BEARING OUTER RACE
(112) O-RING
(113) TRANSFER THRUST SHIM
(114) TRANSFER L.SIDE COVER
(115) SELECTOR SLEEVE
(116) TRANSFER DISTANCE COLLAR
(117) DOWEL PIN A
(118) TRANSFER CASE
(119) SPRING
(120) DETENT BALL
(121) SELECTOR FORK
(122) DOWEL PIN B
(123) OIL SEAL
(124) TRANSFER DRIVEN GEAR
(125) TAPER ROLLER BEARING INNER
(126) BEARING OUTER RACE
(127) TRANSFER SPACER
(128) O-RING
(129) DRIVEN GEAR THRUST SHIM
(130) TRANSFER REAR COVER
(131) THRUST WASHER
(132) BEARING OUTER RACE
(133) TAPER ROLLER BEARING INNER
(134) OIL SEAL
(135) COMPANION FLANGE
(136) TRANSFER DUST COVER
(137) SPRING WASHER
(138) LOCKNUT
120 N·m (12 kg-m, 87 lb-ft)

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.

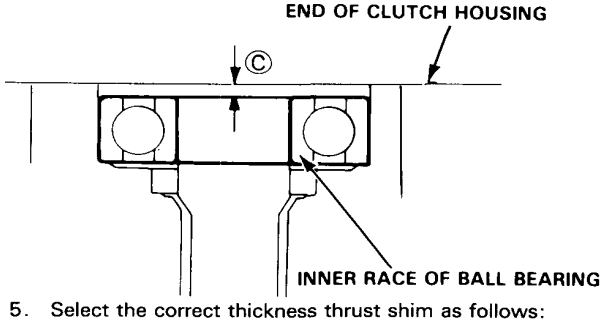


3. Measure the distance B between the end of the transmission housing and thrust washer.

   NOTE:
   - Use a straight edge and feeler gauge.
   - Measure at three locations and average the readings.

4. Measure the distance C between the surfaces of the clutch housing and bearing inner race.

   NOTE:
   - Use a straight edge and feeler gauge.
   - Measure at three locations and average the readings.



5. Select the correct thickness thrust shim as follows:
   a. Add the height Ⓒ of clutch housing ball bearing inner race surface and clutch housing seal surface determined in (step 4) to the measurement Ⓑ of manishaft and transmission housing end in (step 3).
   b. Substract the standard clearance 0.94 mm (0.0370 in.) from the dimension determined in step 5a.

Example

Distance B:	2.64 mm (0.1039 in.)
Distance C :	+0.04 mm (0.0016 in.)
	2.68 mm (0.1055 in.)
Thrust shim height: (minimum)	2.68 mm (0.1055 in.)
	−0.94 mm (0.0370 in.)
	1.74 (0.0685 in.)

Select the thrust shim in the range between 1.74 mm (0.0685 in.) from the part list.

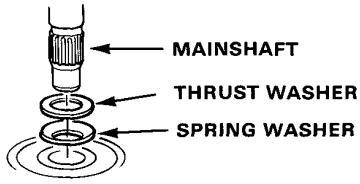
Part No.	Thickness
23941--PH8-900	1.20 mm (0.0472 in)
23942--PH8-900	1.23 mm (0.0484 in)
23943--PH8-900	1.26 mm (0.0496 in)
23944--PH8-900	1.29 mm (0.0509 in)
23945--PH8-900	1.32 mm (0.0520 in)
23946--PH8-900	1.35 mm (0.0531 in)
23947--PH8-900	1.38 mm (0.0543 in)
23948--PH8-900	1.41 mm (0.0555 in)
23949--PH8-900	1.44 mm (0.0567 in)
23950--PH8-900	1.47 mm (0.0579 in)
23951--PH8-900	1.50 mm (0.0591 in)
23952--PH8-900	1.53 mm (0.0602 in)
23953--PH8-900	1.56 mm (0.0614 in)
23954--PH8-900	1.59 mm (0.0626 in)
23955--PH8-900	1.62 mm (0.0638 in)
23956--PH8-900	1.65 mm (0.0649 in)
23957--PH8-900	1.68 mm (0.0661 in)
23958--PH8-900	1.71 mm (0.0673 in)
23959--PH8-900	1.74 mm (0.0685 in)
23960--PH8-900	1.77 mm (0.0697 in)
23961--PH8-900	1.80 mm (0.0709 in)
23962--PH8-900	1.83 mm (0.0720 in)
23963--PH8-900	1.86 mm (0.0732 in)
23964--PH8-900	1.89 mm (0.0744 in)
23965--PH8-900	1.92 mm (0.0756 in)
23966--PH8-900	1.95 mm (0.0768 in)
23967--PH8-900	1.98 mm (0.0780 in)
23968--PH8-900	2.01 mm (0.0791 in)
23969--PH8-900	2.04 mm (0.0803 in)
23970--PH8-900	2.07 mm (0.0815 in)
23971--PH8-900	2.10 mm (0.0827 in)
23972--PH8-900	2.13 mm (0.0839 in)
23973--PH8-900	2.16 mm (0.0850 in)
23974--PH8-900	2.19 mm (0.0862 in)
23975--PH8-900	2.22 mm (0.0874 in)
23976--PH8-900	2.25 mm (0.0886 in)
23977--PH8-900	2.28 mm (0.0898 in)
23978--PH8-900	2.31 mm (0.0909 in)
23979--PH8-900	2.34 mm (0.0921 in)
23980--PH8-900	2.37 mm (0.0933 in)

6. Check the thrust clearance in the manner described below.

   a. Install the shims selected in the transmission housing.

   b. Install the thrust washer and spring washer in the mainshaft.

NOTE:
- Clean the thrust washer, spring washer and shim thoroughly before installation.
- Install the thrust washer, spring washer and shim properly.



   c. Install the mainshaft in the clutch housing.

   d. Place the transmission housing over the mainshaft and onto the clutch housing.

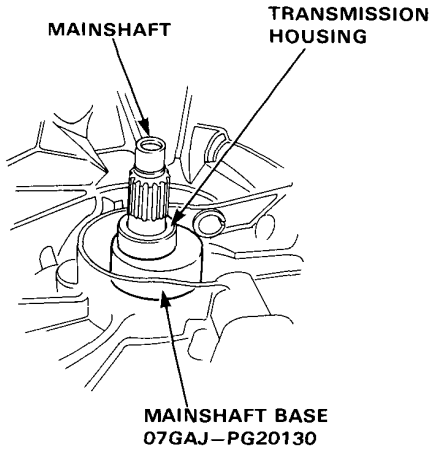
   e. Tighten the clutch and transmission housings with several 10 mm bolts.

   f. Tap the mainshaft with a plastic hammer.

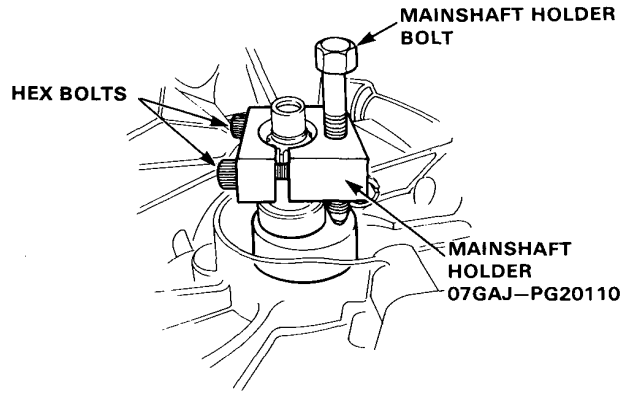
7. Check the thrust clearance in the manner described below.

CAUTION: Measurement should be made at room temperature.

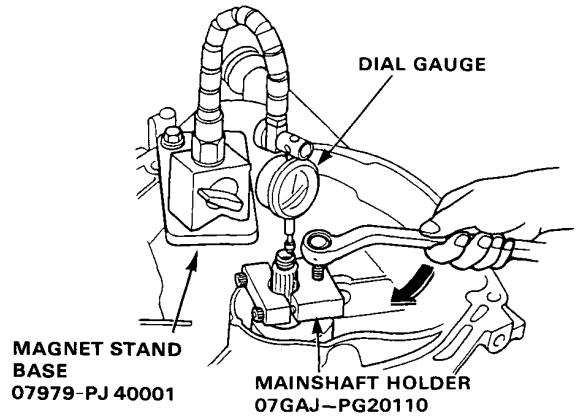
   a. Slide the mainshaft base over the mainshaft.



   b. Attach the mainshaft holder to the mainshaft as follows:
      - 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 shaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.

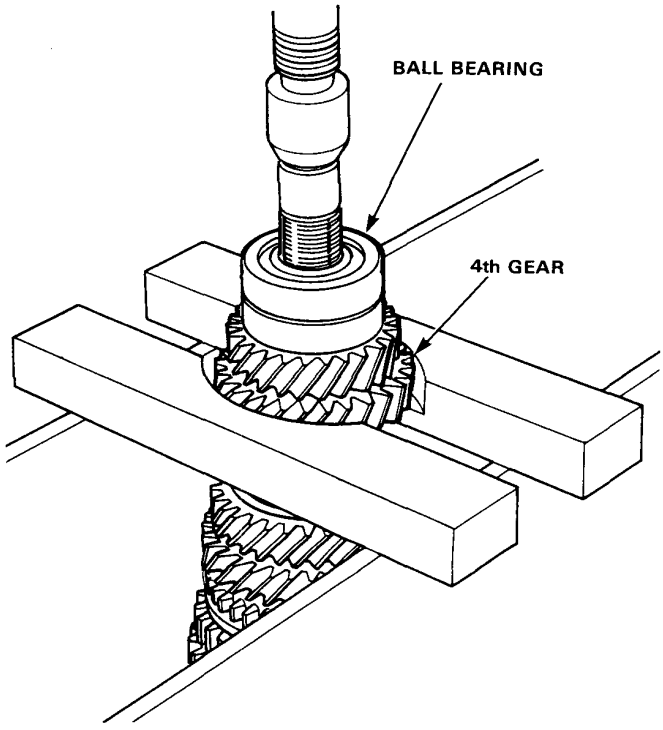
   g. Clearance is correct if reading is between 0.08–0.15 mm (0.0031–0.0059 in.).
   If not, recheck necessary shim thickness.

Countershaft

Disassembly

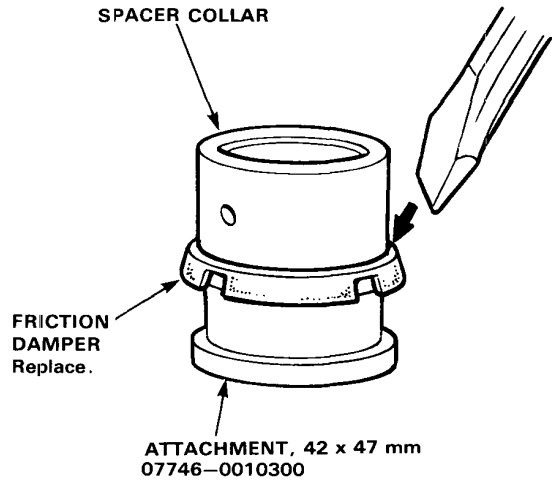
1. Raise the locknut tab from the groove of the shaft and remove the locknut and spring washer.
2. Support 4th gear on steel blocks as shown and press the shaft out of ball bearing.

   CAUTION: Remove the ball bearing using a press and steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.

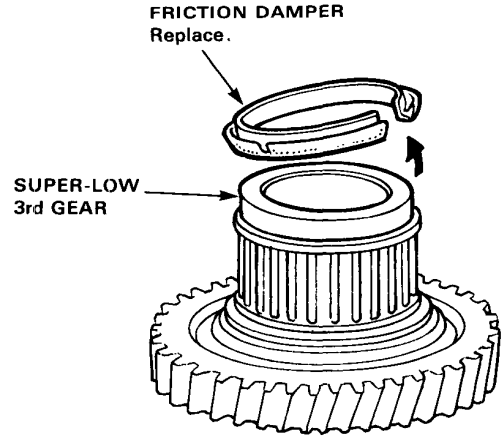


3. Remove the friction damper (2nd gear side) from the spacer collar.

   NOTE: Disregard the steps 3 and 4 except when selecting a thrust washer or replacing parts.



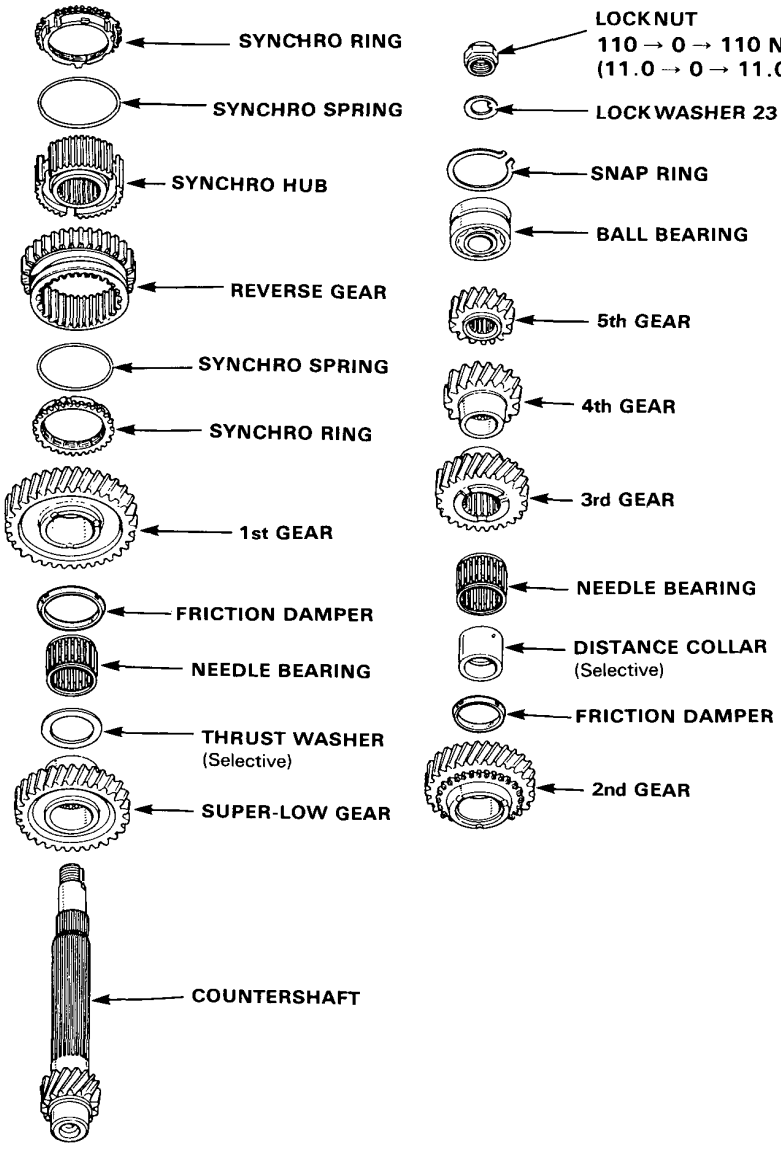
4. Remove the friction damper (1st gear side) from the Super-Low 3rd gear.



Countershaft

Clearance Inspection

1. Assemble the gears, distance collar, thrust washer, synchro hub, synchro ring, etc. as per the instructions shown below.
2. 4th gear, 5th gear and ball bearing are press fit.



Thrust washer

Part Number	Thickness
23921-PH8-900	1.95 mm (0.07677 in)
23922-PH8-900	1.96 mm (0.07717 in)
23923-PH8-900	1.97 mm (0.07556 in)
23924-PH8-900	1.98 mm (0.07795 in)
23925-PH8-900	1.99 mm (0.07835 in)
23926-PH8-900	2.00 mm (0.07874 in)
23927-PH8-900	2.01 mm (0.07913 in)
23928-PH8-900	2.02 mm (0.07953 in)
23929-PH8-900	2.03 mm (0.07992 in)
23930-PH8-900	2.04 mm (0.08031 in)
23931-PH8-900	2.05 mm (0.08071 in)
23932-PH8-900	2.06 mm (0.08110 in)
23933-PH8-900	2.07 mm (0.08150 in)
23934-PH8-900	2.08 mm (0.08189 in)
23935-PH8-900	2.09 mm (0.08228 in)
23936-PH8-900	2.10 mm (0.08268 in)

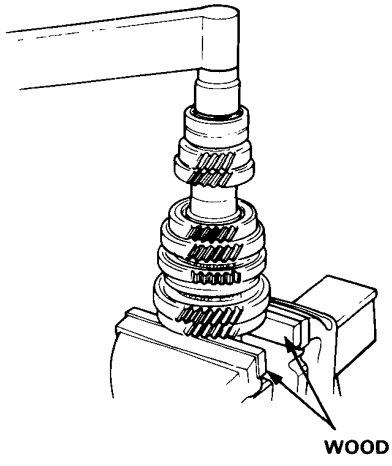
Distance collar

Part Number	Thickness
23911-PK5-000	29.03-29.05 mm (1.1429-1.1435 in)
23912-PK5-000	29.01-29.03 mm (1.1421-1.1429 in)
23913-PK5-000	28.99-29.01 mm (1.1413-1.1421 in)
23914-PK5-000	28.97-28.99 mm (1.1405-1.1431 in)
23915-PK5-000	28.95-28.97mm (1.1398-1.1405 in)

3. Tighten the countershaft locknut to the correct torque.

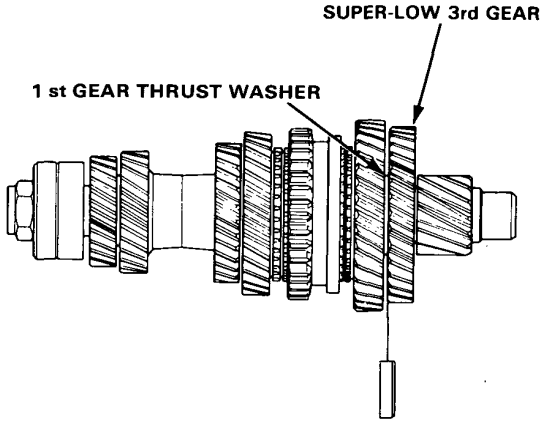
NOTE: Place the shaft in a vice with soft jaws.

110 → 0 → 110 N · m
(11.0 → 0 → 11.0 kg-m, 80 → 0 → 80 lb-ft)



4. Measure and record the clearance between the super-low gear and thrust washer.

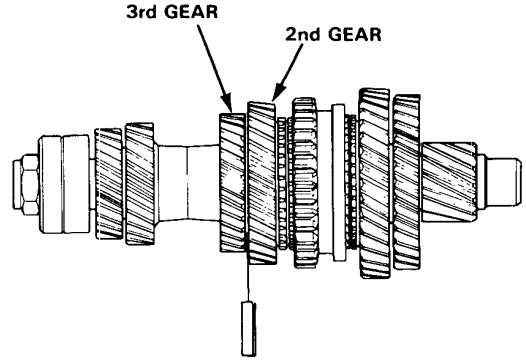
Super-low Gear Clearance:
Standard : 0.03—0.08 mm
(0.001—0.003 in.)
Service Limit: 0.18 mm (0.007 in.)



5. If the clearance is out of tolerance, select the appropriate thrust washer for the correct clearance from the charts on page 8-21

6. Measure the clearance between the 2nd gear and 3rd gear.

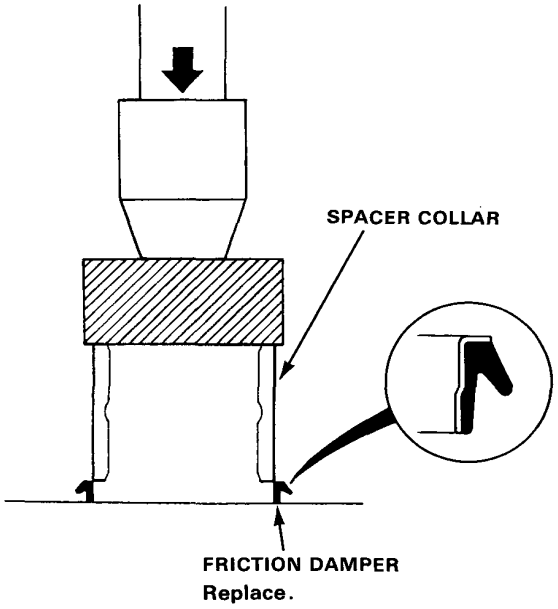
2nd and 3rd Gear Clearance:
Standard : 0.03—0.08 mm
(0.001—0.003 in.)
Service Limit: 0.18 mm (0.007 in.)



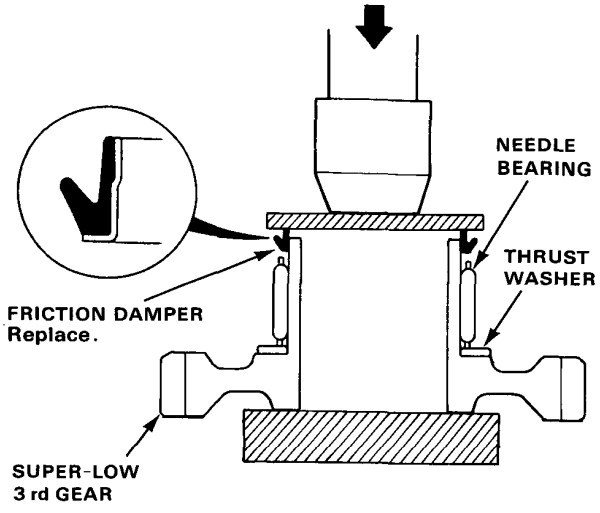
7. If the clearance is out tolerance, select the appropriate distance collar for the correct clearance from the charts on page 8-21.

Reassembly

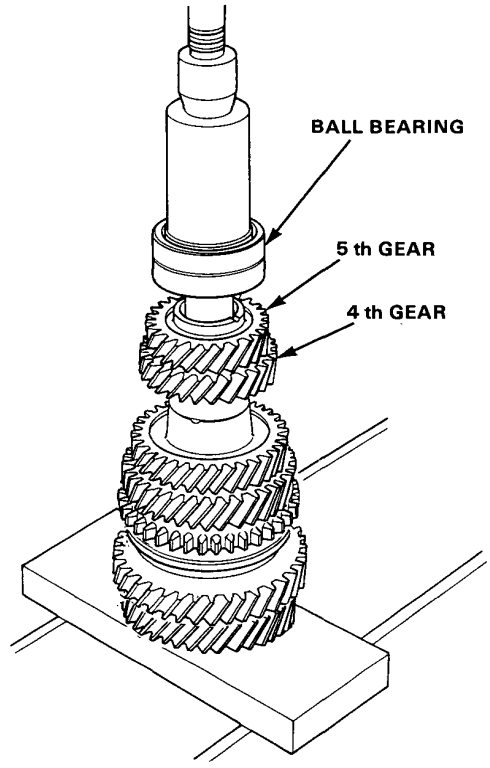
1. Using a press, install the friction damper (2nd gear side) to the spacer collar.



2. Using a press install the friction damper (1st. gear side) to the Super-Low 3rd gear.



3. Install the 4th gear, 5th gear and ball bearing using a press as shown.



4. Install the spring washer, tighten the locknut and then stake the locknut tab into the groove.

LOCKNUT
110 → 0 → 110N·m (11.0 → 0 → 11.0 kg-m, 80 → 0 → 80 lb-ft)

Automatic Transmission

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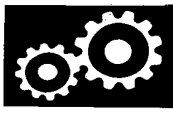
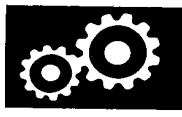
4WD Automatic Transmission .....9 — 5



2WD Automatic Transmission

Shift Cable
Adjustment ..... 9 — 2
Throttle Control Cable
Adjustment/Inspection ..... 9 — 3



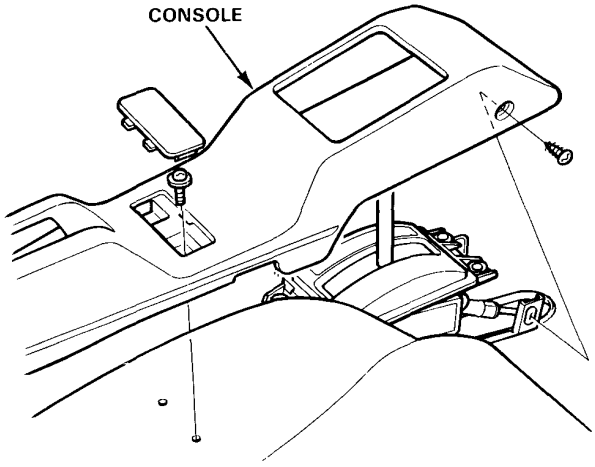
Outline of Model Changes

Shift cable adjustment and throttle control cable adjustment/inspection have been changed.

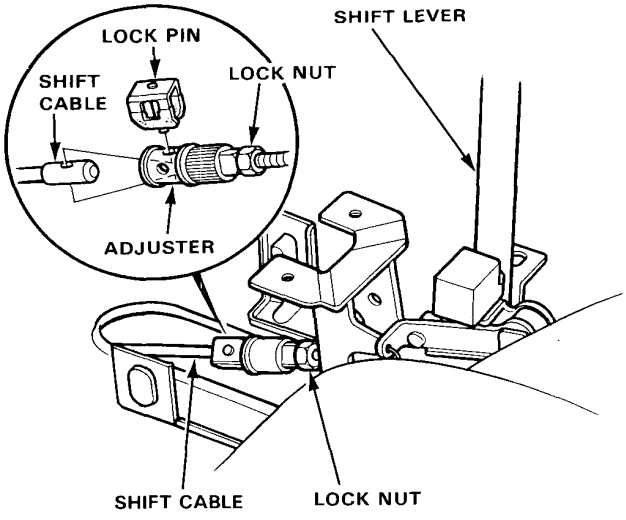
Shift Cable

Adjustment

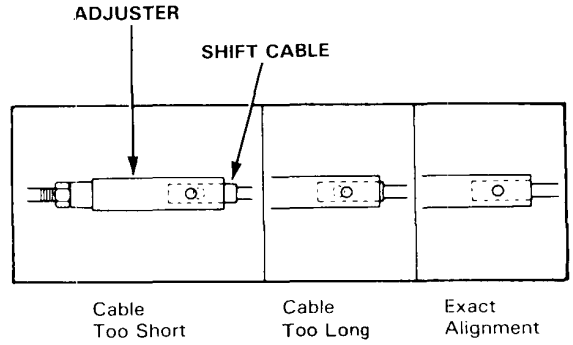
1. Start the engine. Shift to reverse to see if the reverse gear engages.
2. With the engine off, remove the console.



3. Shift to Neutral, then remove the lock pin from the cable adjuster.



4. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable.



NOTE: There are two holes in the end of the shift cable. They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.

5. If not perfectly aligned, loosen the locknut on shift cable and adjust as required.
6. Tighten the locknut.
7. Install the lock pin on the adjuster.

NOTE: If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted again.

8. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to Troubleshooting.

Throttle Control Cable

Adjustment/Inspection

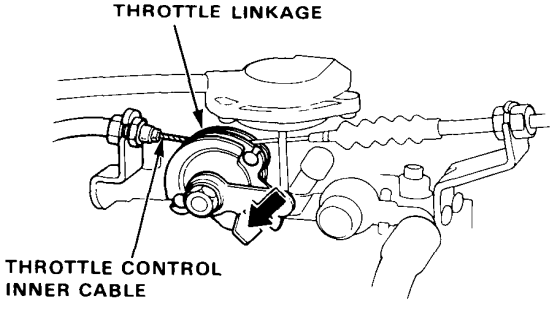
NOTE: Before adjusting the throttle control cable, make sure:

- The throttle cable free play is correct.
- The engine is at normal operating temperature (cooling fan comes on).
- The idle speed is correct.

Inspection :

NOTE: You can work the throttle linkage body with your hand.

1. Remove the throttle cable free play.
2. • **Carburetor Engine**
   Make sure that the choke is released.
   • **PGM-FI Engine**
   Disconnect the vacuum hose from the dashpot diaphragm. Connect the vacuum pump and keep vacuum applied.
3. Apply light thumb pressure to the throttle control lever, then work the accelerator or throttle linkage. The lever should move just as the engine speed increases above idle. If not, proceed to Adjustment.



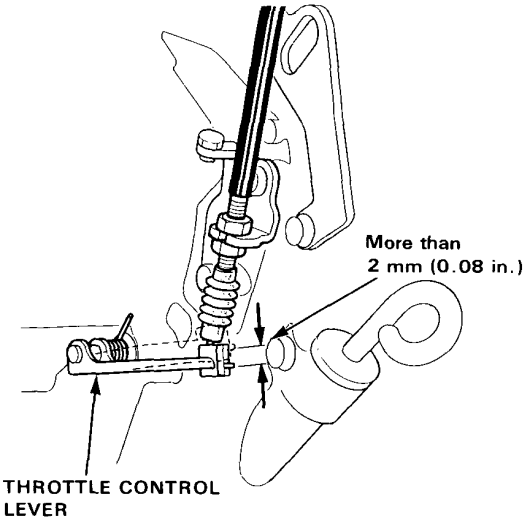
Adjustment :

1. Loosen the nuts on the control cable at the transmission end and synchronize the control lever to the throttle.

   NOTE :
   • While continuing to press down the throttle control lever, the throttle linkage is open. The control lever should begin to move at precisely the same time as the linkage.
   • Correct "Fine Tune" adjustment of the throttle control cable is critical for proper operation of the transmission and lock-up torque convertor.

2. Check the following items before starting the engine:

   Depress the accelerator to the floor. While depressed, check that there is play in the throttle control lever.



- Check that the cable moves freely by depressing the accelerator.

4WD Automatic Transmission

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NOTE :

- This section covers the on-car service of the automatic transmission.
- For automatic transmission service, refer to the S5 Automatic Transmission Maintenance and Repair (No. 62PS500).

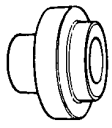
Outline of Model Change

The 4WD automatic transmission has been adopted.

Special Tools

Special Tools

Ref. No.	Tool Number	Description	Qty	Remarks
①	07JAJ-PH80100	Drive Gear Gauge	1	
②	07KAJ-PS50100	Driven Gear Dummy Shaft	1	
③	07406-0020003	Gauge Set	1	
③-1	07406-0020201	Gauge Hose	1	
④	07746-0010400	Attachment 52x55mm	1	
⑤	07746-0010500	Attachment 62x68mm	1	
⑥	07746-0030100	Driver 40mm I.D.	1	
⑦	07746-0030400	Attachment 35mm I.D.	1	
⑧	07749-0010000	Driver	1	
⑨	07907-6010300	Socket Wrench Handle	1	
⑩	07926-SD90000	Flange Holder	1	
⑪	07948-SG20200	Oil Seal Driver	1	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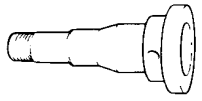
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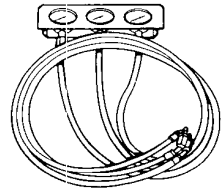
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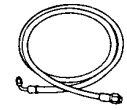
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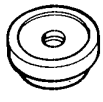
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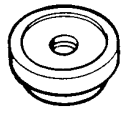
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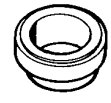
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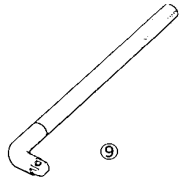
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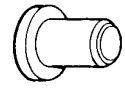

⑪

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 speed reverse. The entire unit is positioned in line with the engine.

Torque Converter, Gears and Clutches

The torque converter consists of a pump, turbine and stator, assembled in a single unit.
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 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 clutches for 1st, and 2nd/4th, and gears for 3rd, 2nd, 4th, Reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with 4th gear).
The countershaft includes 3rd clutch and gears for 2nd, 3rd, and 4th, Reverse and 1st.
4th and reverse gears can be locked to the countershaft at its center, providing 4th gear or Reverse, depending on which way the selector is moved.
The sub-shaft includes the low hold clutch.
The gears on the mainshaft are in constant mesh with those on the countershaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft to the countershaft to provide [S], [D], [2] and [R].

Electronic Control

The electronic control system consists of an automatic control unit, sensors, and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.
The A/T control unit is located under the driver's seat.

Hydraulic Control

The valve assembly includes the main valve body, secondary valve body, servo valve body, regulator valve body and lock-up valve body, through the respective separator plates.
They are bolted to the torque converter case as an assembly.
The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, pressure relief valve, 3rd orifice control valve, and oil pump gear.
The secondary valve body includes the CPC valve, servo control valve, modulator valve, kickdown valves, 4th relief valve and 2nd orifice control valve.
The servo valve body contains the accumulator pistons, throttle B valve, and the servo valve..
The regulator valve boby contains the torque converter check valve, pressure regulator valve and lock-up control valve. Fluid from the regulator passes through the manual valve to the various control valves.
The lock-up shift valve body contains a lock-up timing valve B and lock-up shift valve.

Shift Control Mechanism

Input from various sensors located throughout the car determines which shift control solenoid valve the A/T control unit will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging that clutch and its corresponding gear.

Lock-up Mechanism

In [S] or [D] , in 2nd, 3rd and 4th, 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, an electronic control unit optimizes the timing of the lock-up mechanism.
The lock-up shift valve body controls the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve B. When lock-up control solenoid valves A and B activate, modulator pressure changes. Lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the A/T control unit.

(cont'd)

Gear Selection

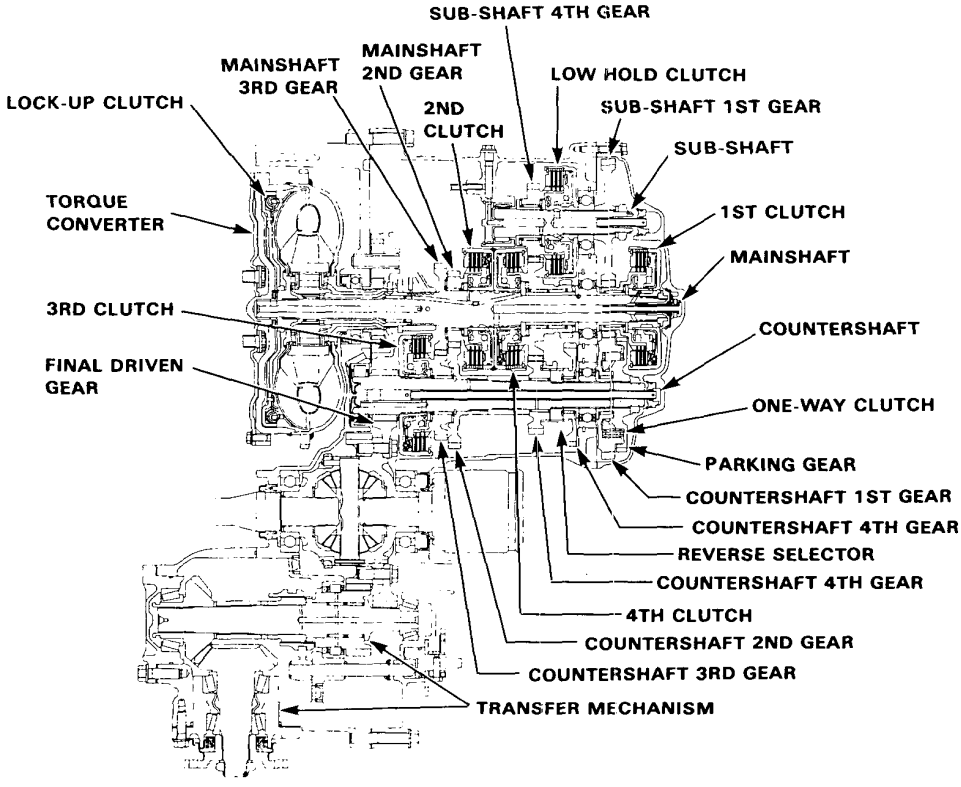
The selector lever has six positions: [P] PARK, [R] REVERSE, [N] NEUTRAL, [D] 1st through 4th gear ranges, [S] 1st through 3rd gear ranges, and [2] 2nd gear.

Position	Description
[P] PARK	Front wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.
[R] REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th gear clutch locked.
[N] NEUTRAL	All clutches released.
[D] DRIVE (1 through 4)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshift through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism comes into operation in [D].
[S] DRIVE (1 through 3)	For rapid acceleration at highway speeds and general driving; starts off in 1st, shifts automatically to 2nd, then 3rd (S4 switch: OFF), and then 4th (S4 switch: ON) depending on vehicle speed and throttle position. Downshifts through 2nd to 1st on deceleration to stop.
[2] SECOND	For engine braking or better traction starting off on loose or slippery surfaces. LOW switch: OFF; stays in 2nd gear LOW switch: ON and below 30 mph (50 km/h approx.); in 1st gear LOW switch: ON and above 30 mph (50 km/h approx.); in 2nd gear

Starting is possible only in [P] and [N] through the use of a slide-type, neutral-safety switch.

Position Indicator

A position indicator in the instrument panel shows what gear has been selected without having to look down at the console.



Clutches

1st Clutch

The 1st clutch is on the right end of the mainshaft. In the [2], [S] or [D] position, constant hydraulic pressure is applied to the mainshaft through the 1st clutch to the mainshaft 1st gear.

The clutch plate is mounted on the clutch drum, while the clutch disc is fitted to the mainshaft 1st gear.

The 1st gears are attached to the mainshaft and countershaft through needle bearings, one for each gear.

When select lever is placed in the [2], [S] or [D] position, hydraulic pressure is applied from the right side cover through the mainshaft, and thus to the clutch drum; as the pressure rises, the clutch piston presses the clutch plate and clutch disc, thus causing the clutch to engage.

Power is transmitted from the mainshaft 1st gear, through the countershaft 1st gear, to the one-way clutch, parking gear, and finally to the countershaft. The one-way clutch locks in the forward direction when in 1st gear. In the [2], [S] or [D] position, all others beside 1st gear are not engaged, thus transmitting no power.

Low Hold Clutch

The low hold clutch is on the sub-shaft paralleled with the mainshaft, to transmit the power without affecting the one-way clutch.

2nd Clutch

The 2nd clutch is right of center on the mainshaft and is the same construction as the 1st clutch;

The 2nd clutch is joined back-to-back to the 4th clutch. The mainshaft 2nd gear uses a needle bearing. The countershaft 2nd gear is splined on the countershaft.

In 2nd gear of [2], [S] or [D], hydraulic pressure is applied to the clutch drum from the mainshaft, thus transmitting power from the mainshaft 2nd gear to the countershaft 2nd gear.

3rd Clutch

The 3rd clutch is on the right end of the countershaft.

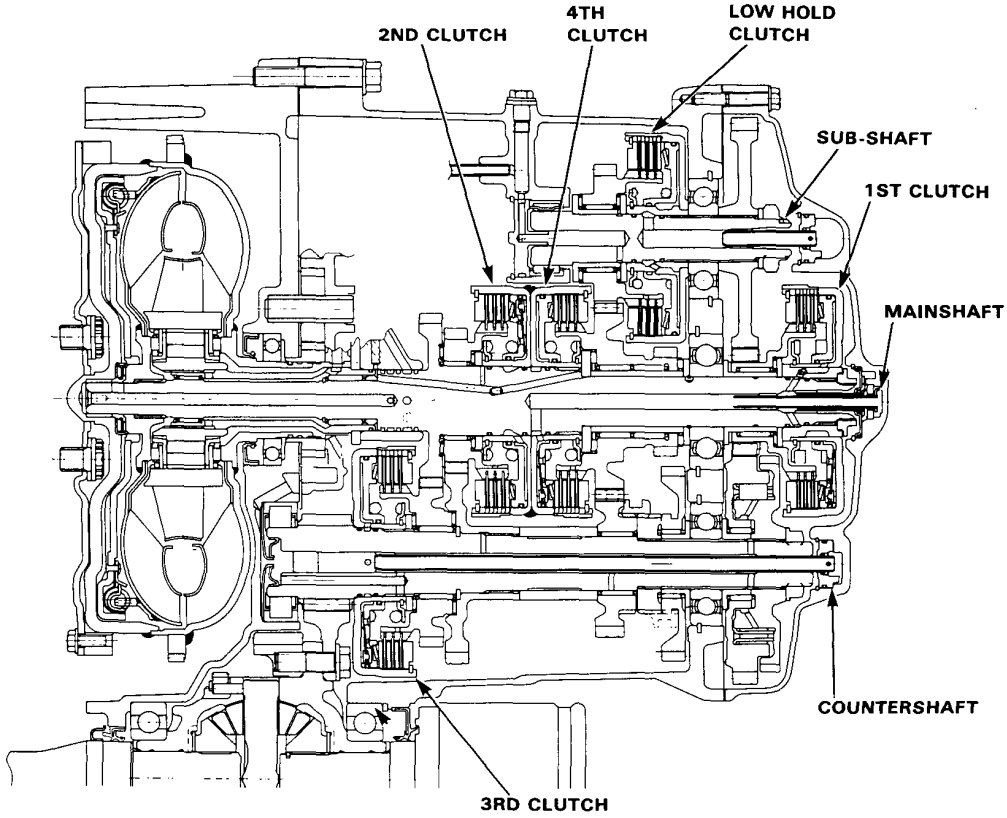
The clutch hub is joined to the countershaft 3rd gear, on the countershaft, supported by a single needle bearing.

In 3rd gear of [S] or [D], hydraulic pressure is applied to the 3rd clutch on the countershaft, thus causing the clutch to engage, and transmitting power.

4th Clutch

The 4th clutch is identical to the 2nd clutch, to which it is joined on the mainshaft. The clutch hub is joined to the mainshaft 4th gear and reverse gear, supported by two needle bearings.

In 4th gear of [D] or [S] with S4 switch turned on, hydraulic pressure is generated within the mainshaft, applying pressure to the 4th clutch on the mainshaft.



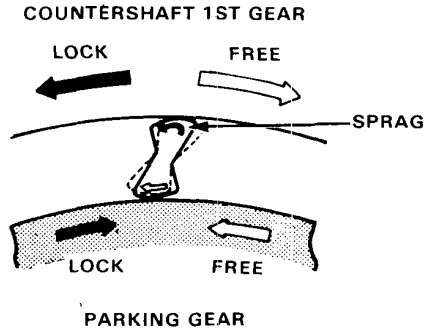
(cont'd)

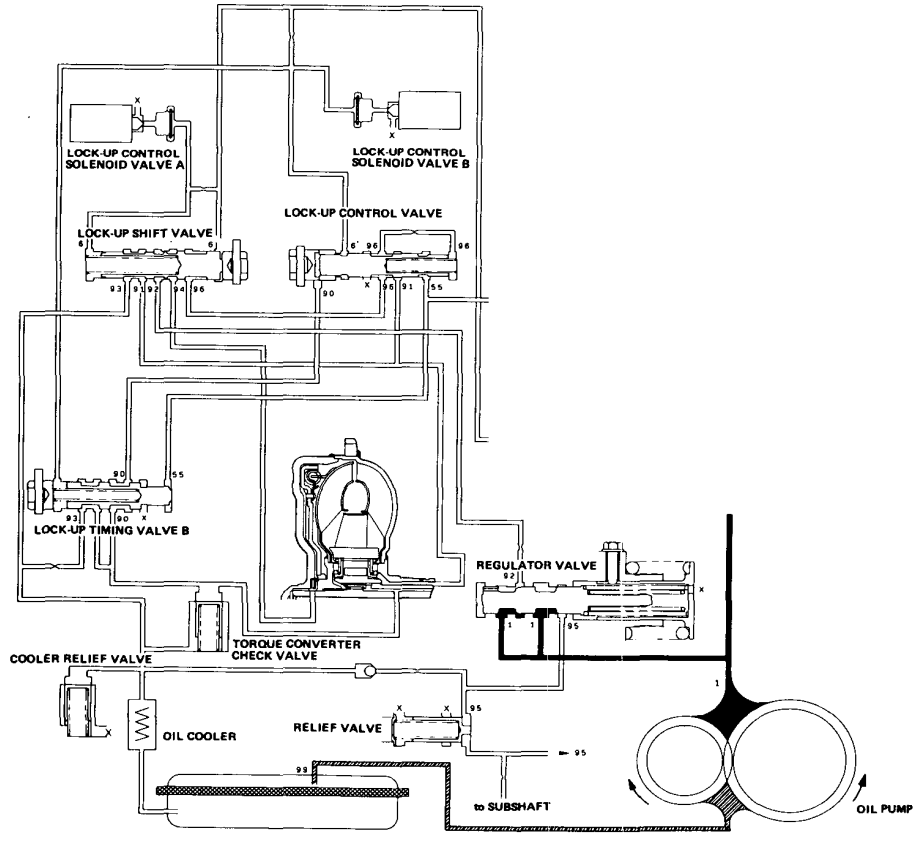
Clutches (cont'd)

One-way Clutch

A one-way sprag clutch disengages 1st gear when in the 2nd, 3rd and 4th gear ranges. The clutch is splined to the countershaft between the 1st gear and the parking gear. It is composed of sprag elements and the retainer which supports the central section of the sprags. When the respective gears move in the ➡ directions, the sprags incline to the left, with the result that they lock the gears together.

When shifting from 1st to 2nd in the [2] position with LOW switch ON, or in the [S] or [D] position, the different ratio of the two gears causes the countershaft to rotate (via 2nd gear) at a speed greater than that of 1st gear. As a result, the parking gear is rotated in the ⇨ direction, and the sprags move away from their locking position. In the 3rd or 4th gear of [S] or [D] the same difference of ratio keeps the sprags from locking and keeps 1st gear disengaged.





Lock-up Clutch

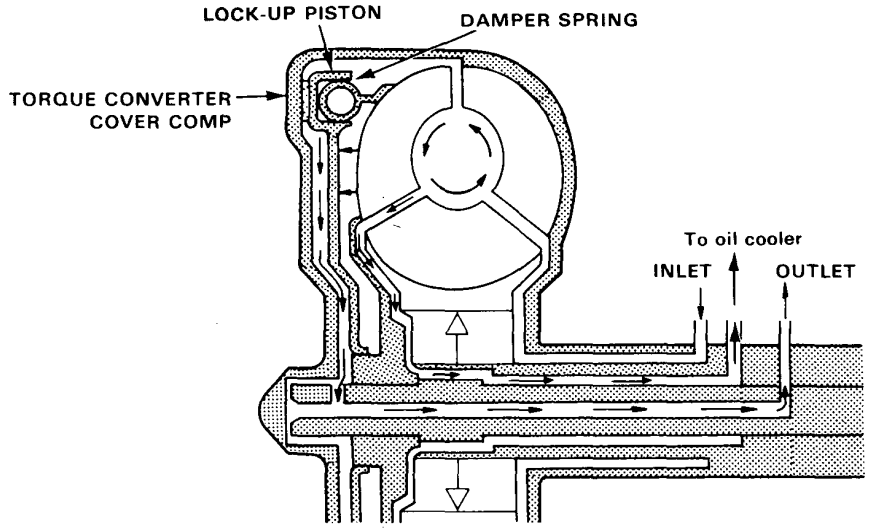
1. Operation (clutch on)

With the lock-up clutch on, the oil in the chamber between the 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

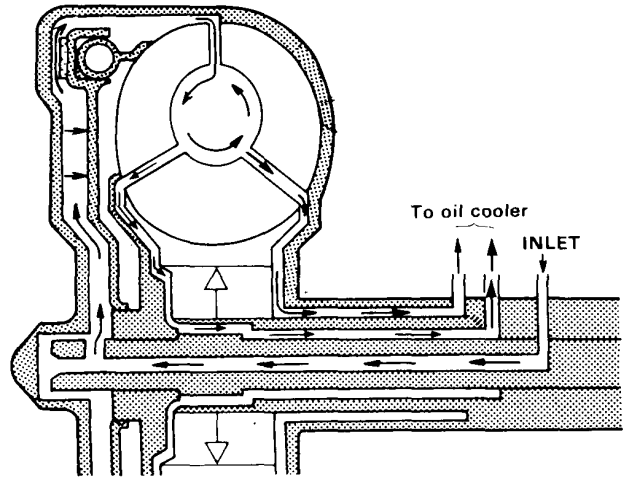


2. Operation (clutch off)

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

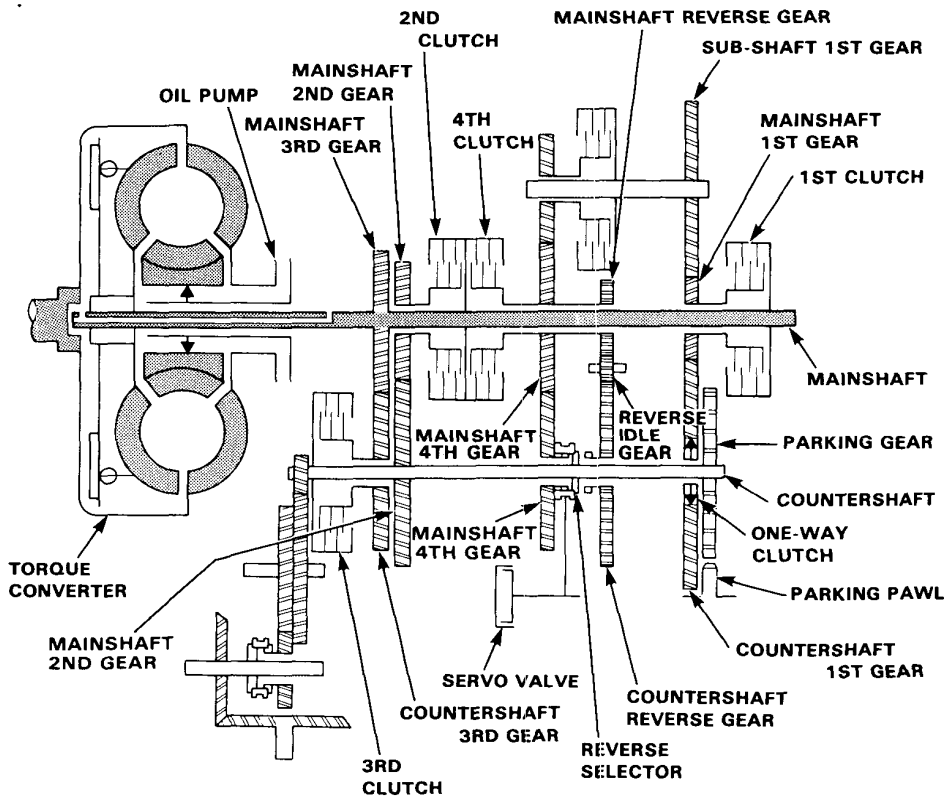


Description

Power Flow

Position \ Part		Torque Converter	Sub-shaft 1st Gear, Low Hold Clutch	1st Gear 1st Clutch	1st Gear One-way Clutch	2nd Gear 2nd Clutch	3rd Gear 3rd Clutch	4th Clutch	4th Gear	Reverse Gear	Parking Gear
P		○	×	×	×	×	×	×	×	×	○
R		○	×	×	×	×	×	○	×	○	×
N		○	×	×	×	×	×	×	×	×	×
S	1st	○	×	○	○	×	×	×	×	×	×
	2nd	○	×	※○	×	○	×	×	×	×	×
	3rd	○	×	※○	×	×	○	×	×	×	×
	4th (S4 : ON)	○	×	※○	×	×	×	○	○	×	×
D	1st	○	×	○	○	×	×	×	×	×	×
	2nd	○	×	※○	×	○	×	×	×	×	×
	3rd	○	×	※○	×	×	○	×	×	×	×
	4th	○	×	※○	×	×	×	○	○	×	×
2	2nd	○	×	※○	×	○	×	×	×	×	×
	1st Acceleration	○	○	○	○	×	×	×	×	×	×
	1st Deceleration	○	○	※○	×	×	×	×	×	×	×

○ : Engaged
× : Not engaged
※ : Also the 1st clutch engaged, power in not transmitted by means of one-way clutch.



Electronic Control System

The electronic control system consists of the automatic control unit, sensors, and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.
The automatic control unit is located under the driver's seat.

Shift control
Getting a signal from each sensor, the automatic control unit detects the appropriate gear shifting and activates shift control solenoid valves A and/or B.
The combination of driving signals to shift control solenoid valves A and B is shown in the table below.

Shift control sol. valve / Position (gear)	A	B
D S (1st)	OFF	ON
D S (2nd)	ON	ON
D S (3rd)	ON	OFF
D S with S4 ON (4th)	OFF	OFF
2 (1st)	ON	ON
2 (2nd)	ON	OFF

Lock-up control
From sensor input signals, the automatic control unit detects wheter 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-uq condition	A	B
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	OFF
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up *during deceleration*	ON	Duty operation OFF ⟷ ON

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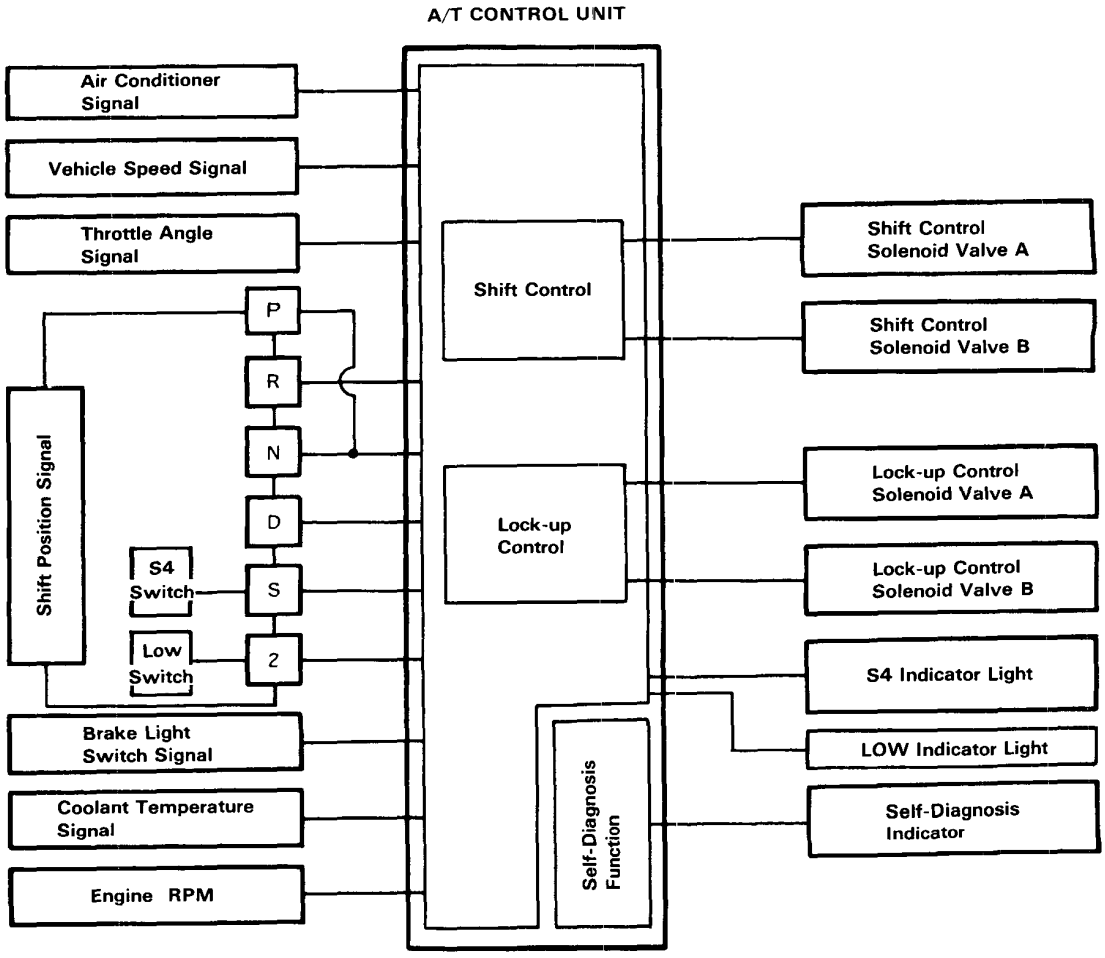
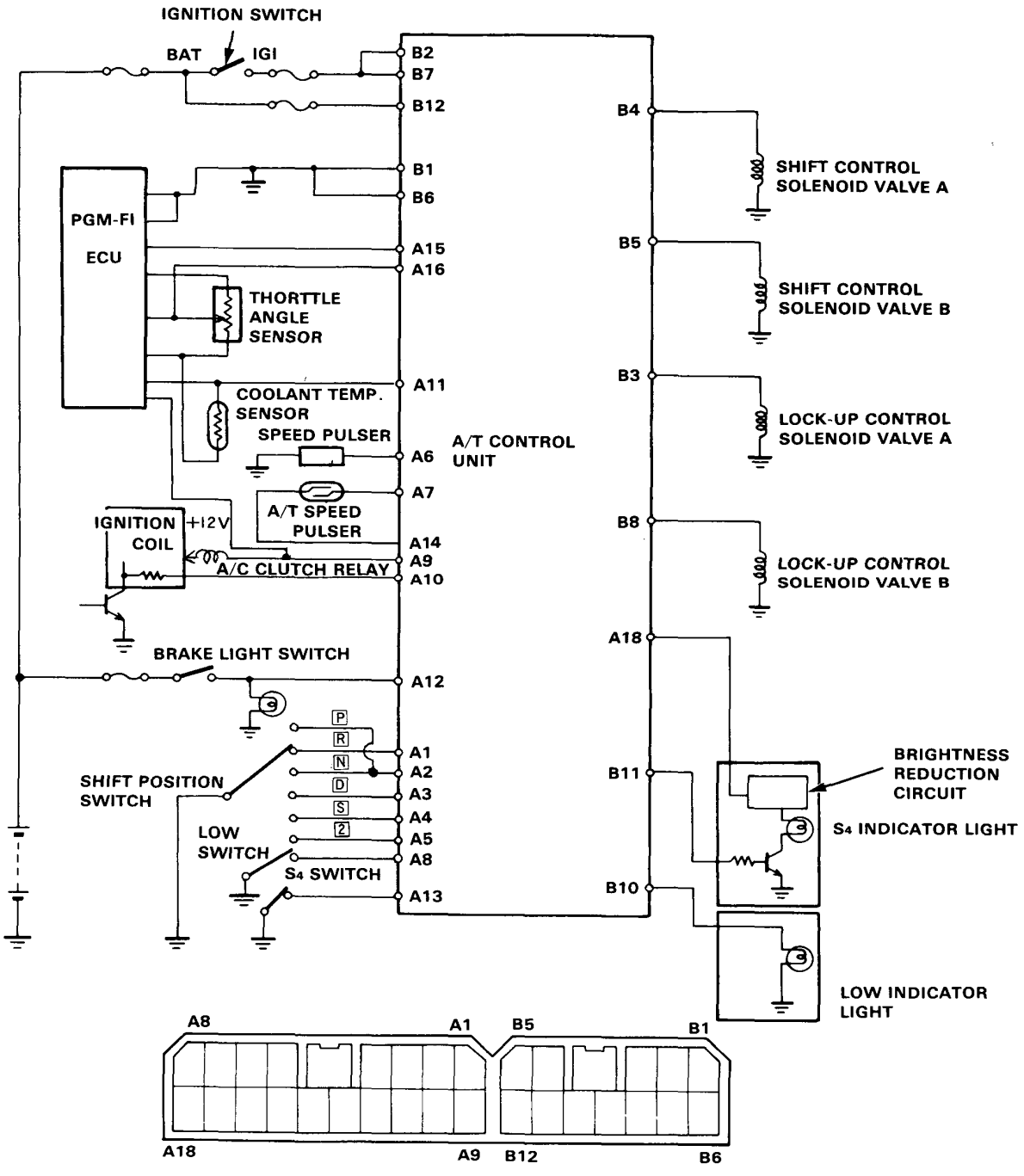
Electronic Control System (cont'd)



Circuit Diagram and Terminal Location



Description

Hydraulic Flow

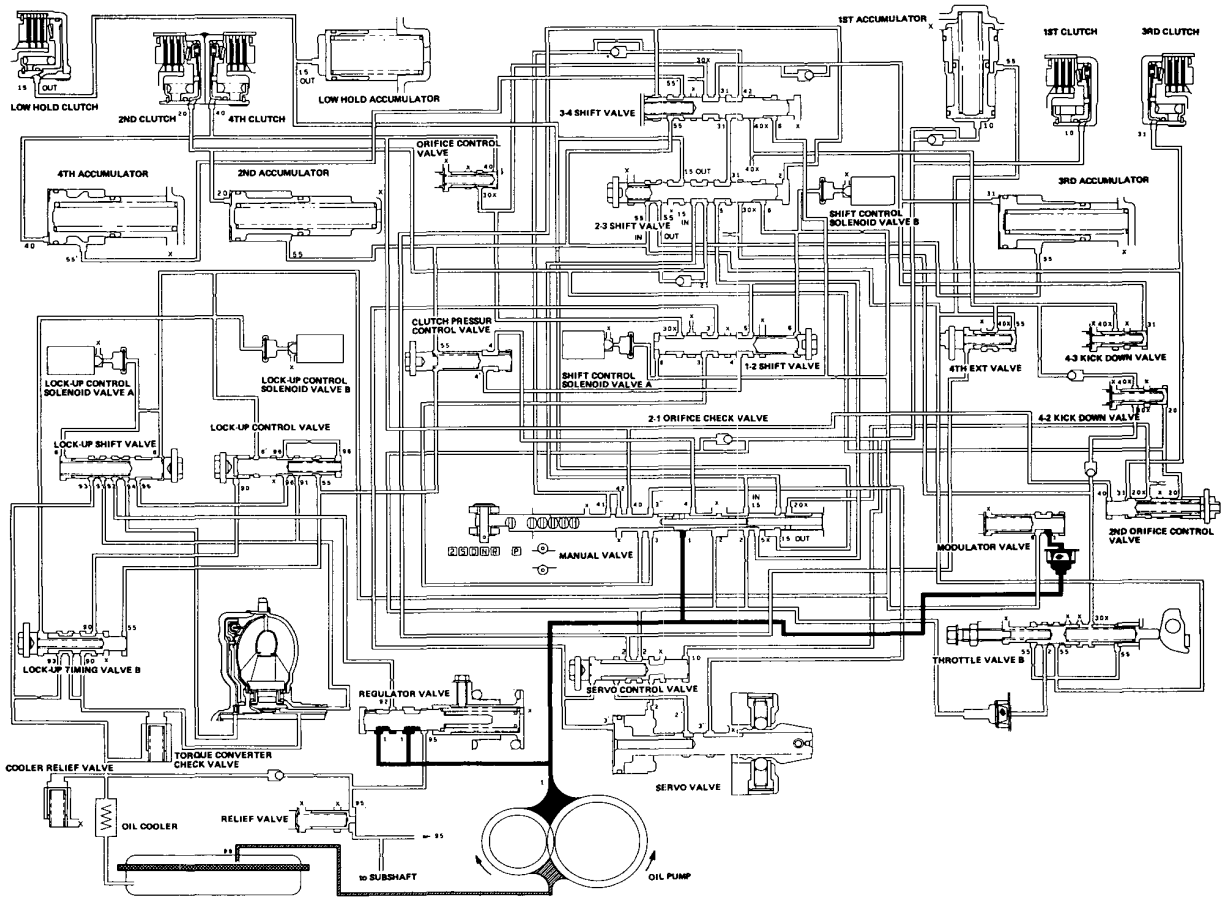
No.	DESCRIPTION OF PRESSURE	No.	DESCRIPTION OF PRESSURE	No.	DESCRIPTION OF PRESSURE	No.	DESCRIPTION OF PRESSURE
1	LINE	5	CPC	30	3RD CLUTCH	91	TORQUE CONVERTER
2	LINE	6	MODULATE	31	3RD CLUTCH	92	TORQUE CONVERTER
2'	LINE	6'	MODULATE (DUTY CONTROL)	40	4TH CLUTCH	93	OIL COOLER
3	LINE	10	IST CLUTCH	41	4TH CLUTCH	94	TORQUE CONVERTER
3'	LINE	15	LOW HOLD CLUTCH	42	4TH CLUTCH	95	LUBRICATION
3''	LINE	20	2ND CLUTCH	55	THROTTLE B	96	TORQUE CONVERTER
4	LINE	21	2ND CLUTCH	55'	THROTTLE B	99	SUCTION
4'	CPC	22	2ND CLUTCH	90	TORQUE CONVERTER	X	BLEED

[N] Position

As the engine turns, the oil pump also starts to operate. Automatic Transmission Fluid is drained from (99) and discharged into (1). Then, ATF pressure is controlled by the regulator valve and becomes the line pressure (1). The torque converter inlet pressure (1) enters (94) of torque converter through the orifice and discharges into (90).

The torque converter check valve prevents the torque converter pressure from falling.

Under this condition, the hydraulic pressure is not applied to the clutches as the manual valve stops line pressure (1).



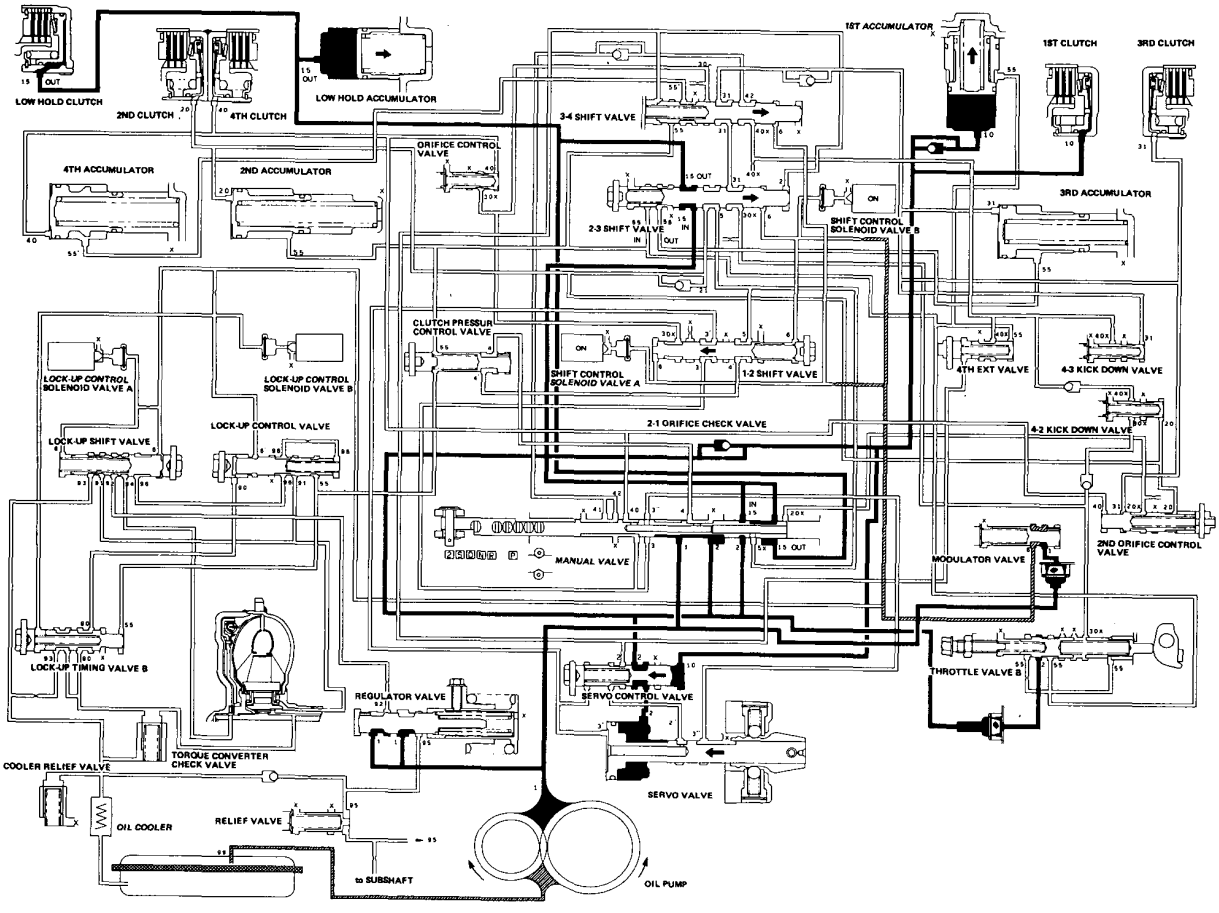
NOTE: When used, "left" or "right" indicates direction on the flow chart.

1st Gear in [2] Position

The line pressure (1) becomes the line pressure (2) at the manual valve and passes to the 1st clutch and 1st accumulator. The line pressure (2) goes to the 2-3 shift valve. The 2-3 shift valve is moved to the right by the spring force because the shift control solenoid valves A and B are switched on by the A/T control unit. The valve opens the oil port leading to the low hold clutch and the line pressure (2) passes to the low hold clutch. However the power is transmitted only during deceleration.
Power flows by way of:

Axle Shaft → Front Differential → Countershaft → Countershaft 4th Gear → Mainshaft 4th Gear → Sub Shaft 4th Gear → Low Hold Clutch → Sub Shaft → Sub Shaft 1st Gear → Mainshaft 1st Gear → Mainshaft → Torque Converter

The modulator pressure (6) is supplied to the 1-2, 2-3 and 3-4 shift valves.
The line pressure (2) also flows to the throttle valve B.



NOTE: When used, "left" or "right" indicates direction on the flow chart.

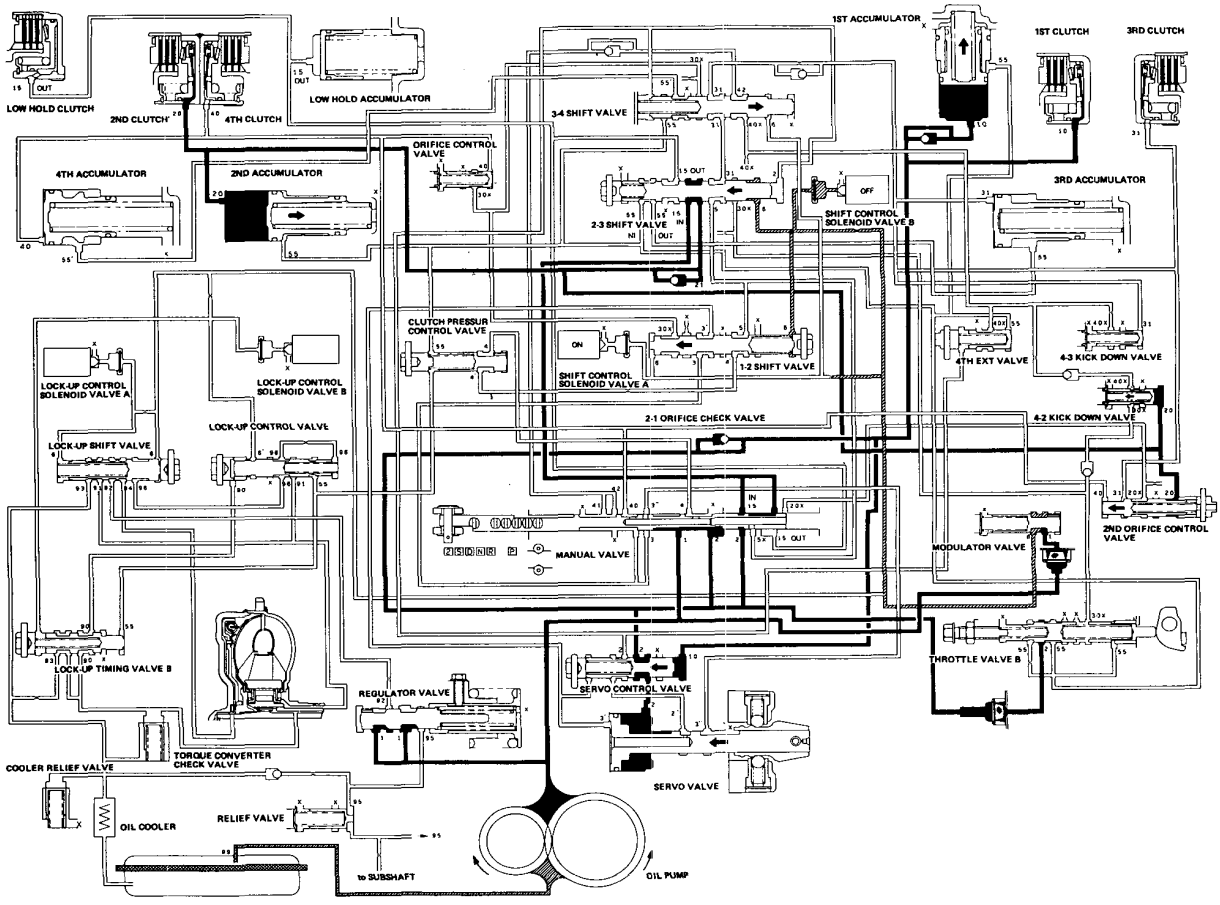
(cont'd)

Hydraulic Flow (cont'd)

2nd Gear in [2] Position

The flow of fluid up to the 2-3 shift valve is same as in the 1st gear. As the speed of the vehicle reaches the prescribed value, the shift control solenoid valve B is turned off (shift control solenoid valve A remains on). The 2-3 shift valve is moved to the left, consequently the low hold clutch pressure (15) becomes the 2nd clutch pressure (20) as it passes through the 2-3 shft valve, and passes to the 2nd clutch.

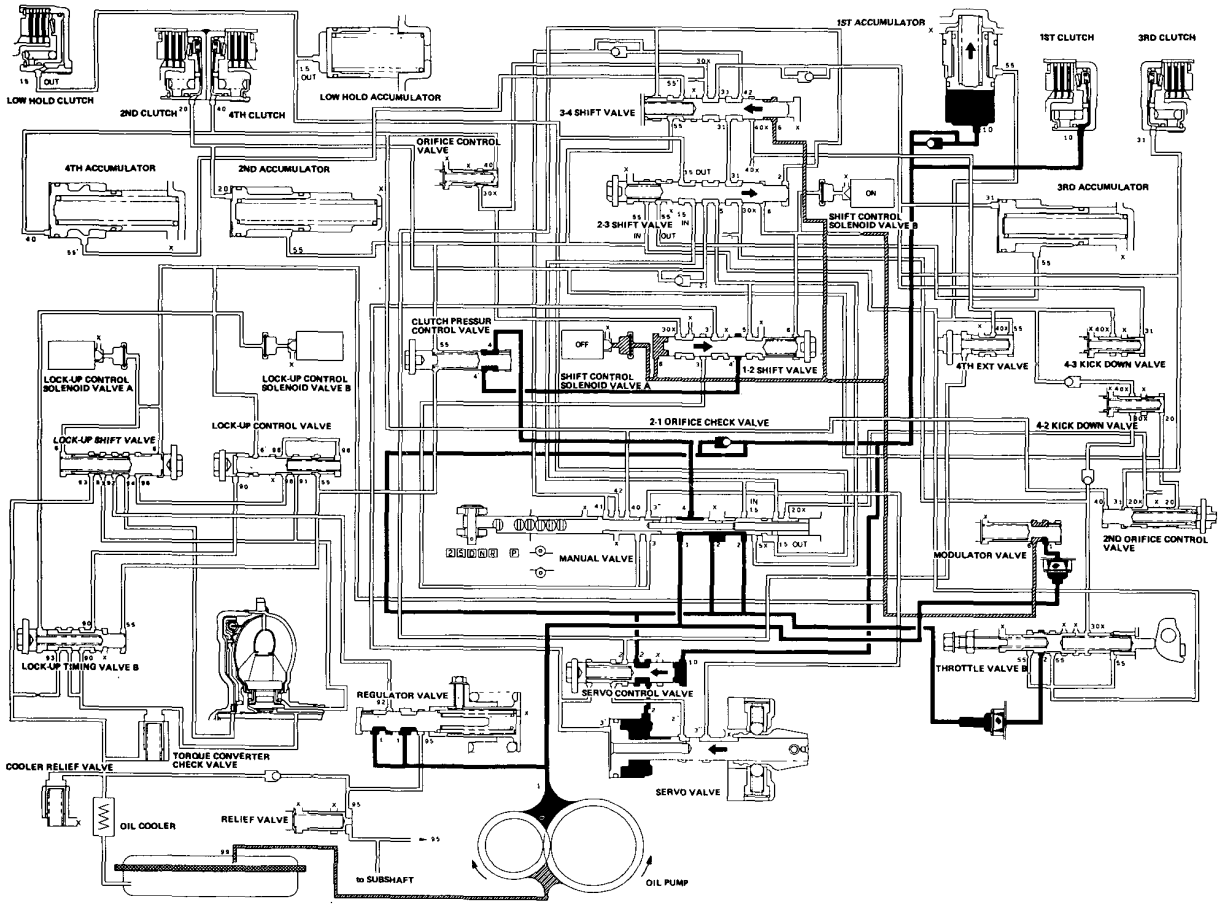
The hydraulic pressure also flows to the 1st clutch. However no power will transmit by means of the one way clutch.



NOTE: When used, "left" or "right" indicates direction of the flow chart.

1st Gear in [S] or [D] Position

The flow of fluid through the torque converter is the same as in [N] position.
The line pressure (1) becomes the line pressure (4) and it becomes the 1st clutch pressure (10) through the clutch pressure control valve. The 1st clutch pressure is applied to the 1st clutch and 1st accumulator, consequently the vehicle will move as the engine power is transmitted.
The line pressure (1) becomes the modulator pressure (6) by the modulator valve and it goes to each shift valve. The 1-2 shift valve is moved to the right side because the shift control solenoid valve A is turned off and B is on by the A/T control unit. This valve stops 2nd clutch pressure and the power is not transmitted to the 2nd clutch.
The line pressure (2) also flows to the servo valve and throttle valve B.



NOTE: When used, "left" or "right" indicates direction on the flow chart.

(cont'd)

Description

Hydraulic Flow (cont'd)

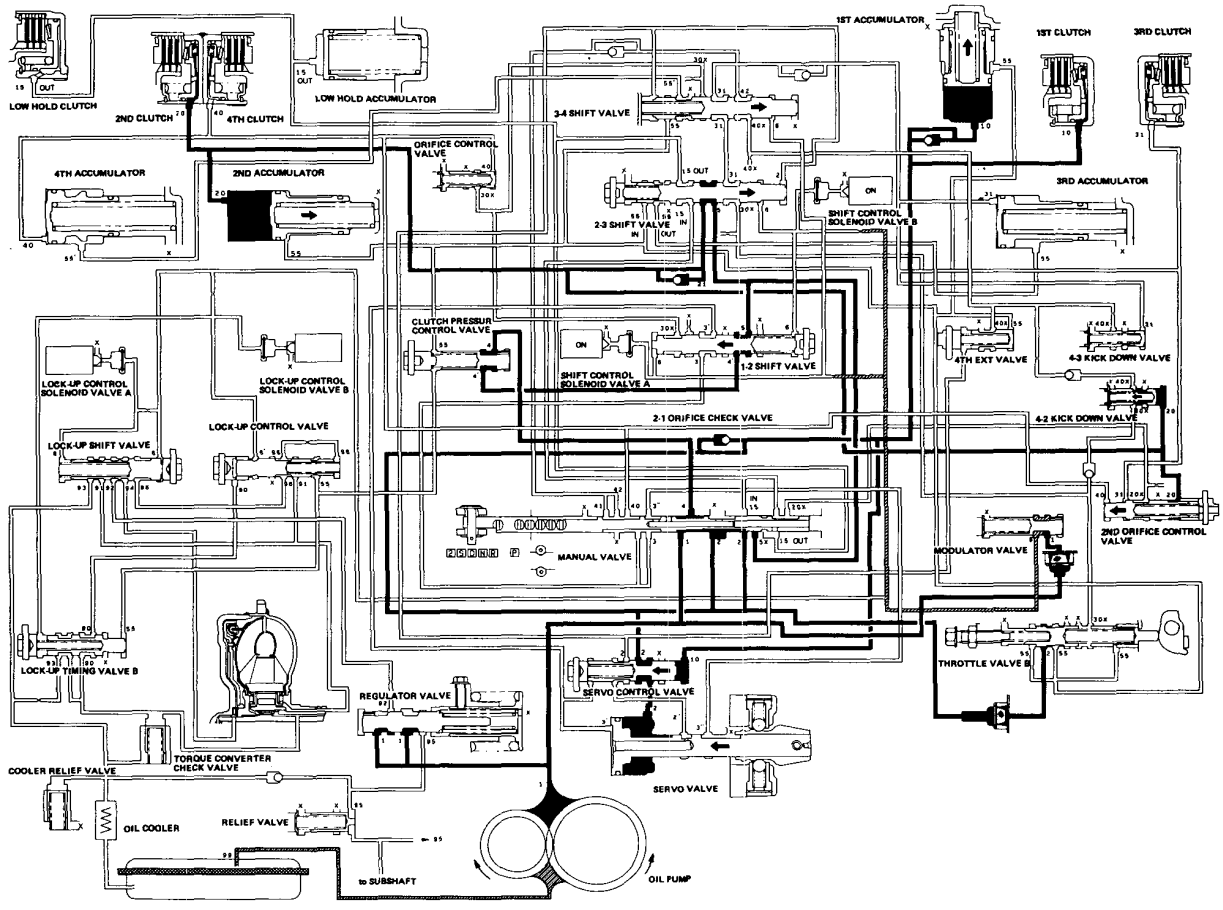
2nd Gear in [S] or [D] Position

The flow of fluid up to the 1-2 and 2-3 shift valves is the same as in the 1st speed. When the vehicle speed is increased and reaches the prescribed value, the solenoid valve A is turned on by means of the control unit. As a result, the 1-2 shift valve is moved to the left and uncovers the port leading to the 2nd clutch; the 2nd clutch is engaged.

The fluid flows by way of:

—Line Pressure (4) → Clutch Pressure Control Valve—Clutch Pressure Control Pressure (4') → 1-2 Shift Valve—Clutch Pressure Control Pressure (5) → 2-3 Shift Valve—2nd Clutch Pressure (22) → Oriffice—2nd Clutch Pressure (20) → 2nd Clutch.

The hydraulic pressure also flows to the 1st clutch. However no power will transmit by means of the one-way clutch.



NOTE: When used, "left" or "right" indicates direction on the flow chart.

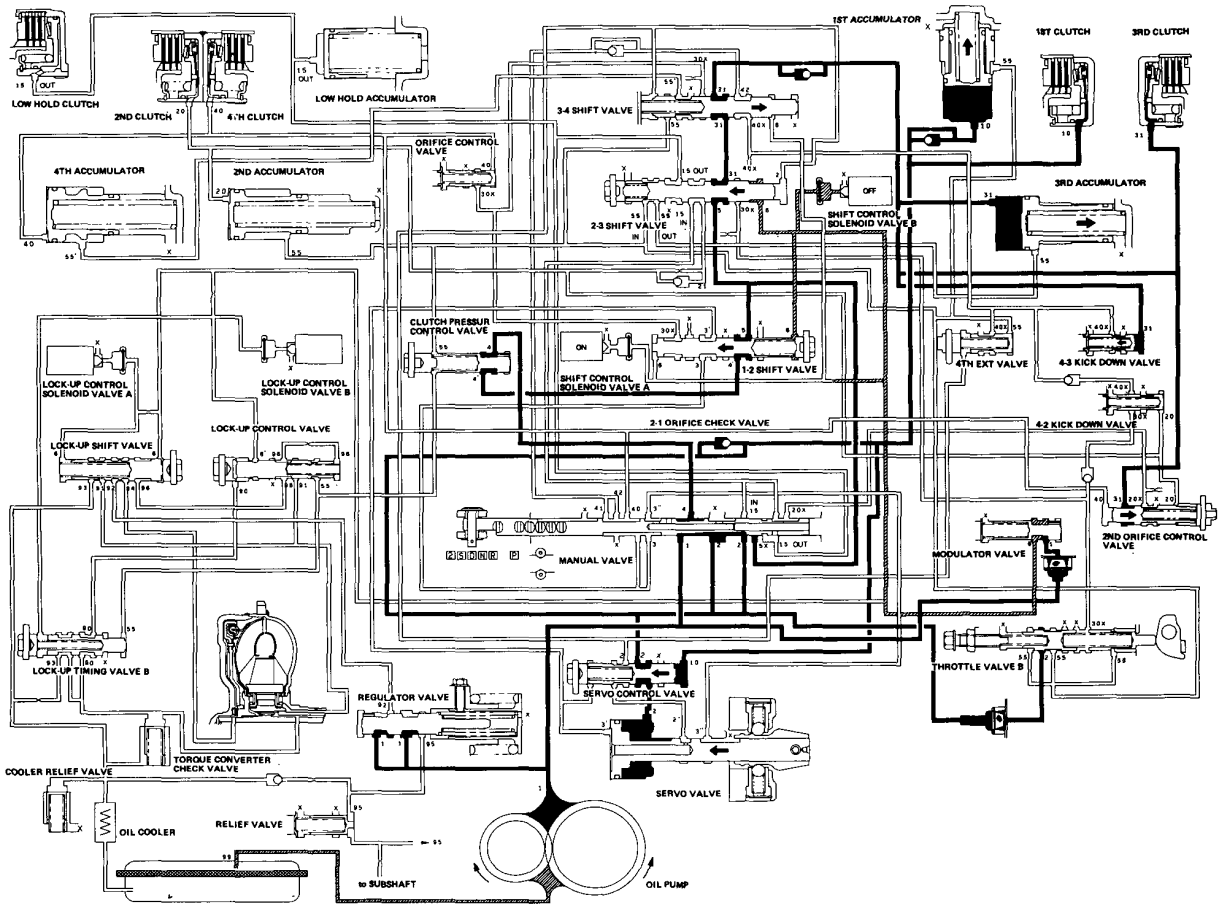
3rd Gear in [S] or [D] Position

The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as in the 2nd speed. As the speed of the car reaches the prescribed value, the shift control solenoid valve B is turned off (shift control valve A remains on). The 2-3 shift valve is then moved to the left, uncovering the oil port leading to the 3rd clutch. Since the 3-4 shift valve is moved to the right to cover the oil port to the 4th clutch, the 3rd clutch is turned on.

Fluid flows by way of:

—Line Pressure (4) → Clutch Pressure Control Valve—Clutch Pressure Control Pressure (4') → 1-2 Shift Valve—Clutch Pressure Control Pressure (5) → 2-3 Shift Valve—3rd Clutch Pressure (31) → 3-4 Shift Valve (not controlled)—3rd Clutch Pressure (31) → 3rd Clutch

The hydraulic pressure also flows to the 1st clutch. However no power will transmit by means of the one-way clutch as in the 2nd gear.



NOTE: When used, "left" or "right" indicates direction on the flow chart.

(cont'd)

Hydraulic Flow (cont'd)

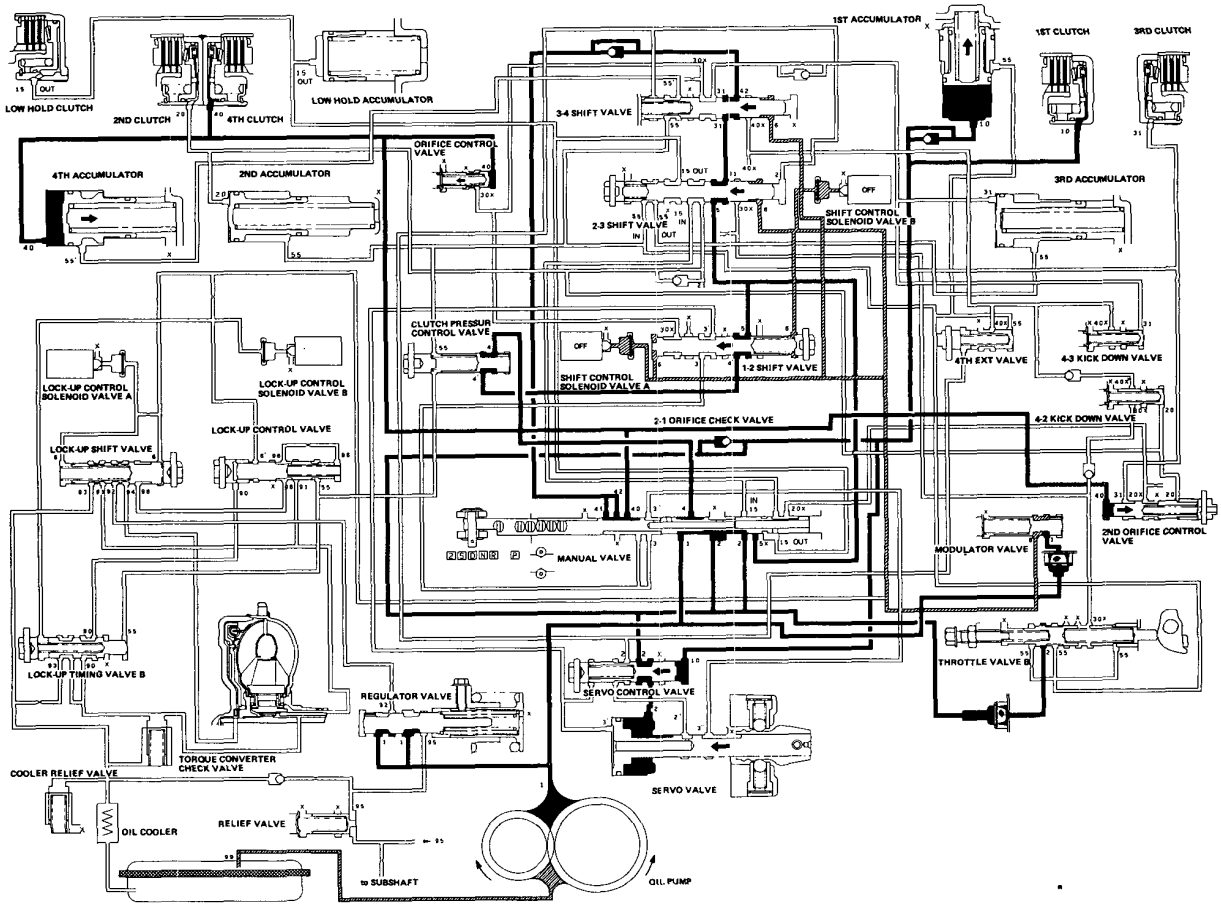
4th Gear in [S] Position with S4 Switch Turned On, or [D] Position

The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as in the 3rd speed. When the speed of the car reaches the prescribed value, the shift control solenoid valve A is turned off (shift control solenoid valve B remains off). As this takes place, 3-4 shift valve is moved to the left and uncovers the oil port leading to the 4th clutch. Since the 1-2 and 2-3 shift valves are kept on the left side, the fluid flows through the 4th clutch; the power is transmitted through the 4th clutch.

Fluid flows by ways of:

—Line Pressure (4) → Clutch Pressure Control Valve—Clutch Pressure Control Pressure (4') → 1-2 Shift Valve—Clutch Pressure Control Pressure (5) → 2-3 Shift Valve—3rd Clutch Pressure (31) → 3-4 Shift Valve—3rd Clutch Pressure (31) → 3-4 Shift Valve—4th Clutch Pressure (42) → Manual Valve—4th Clutch Pressure (40) → 4th Clutch

The hydraulic pressure also flows to the 1st clutch. However no power will transmit by means of the one-way clutch as in 2nd and 3rd gears.



NOTE: When used, "left" or "right" indicates direction on the flow chart.

[R] Position

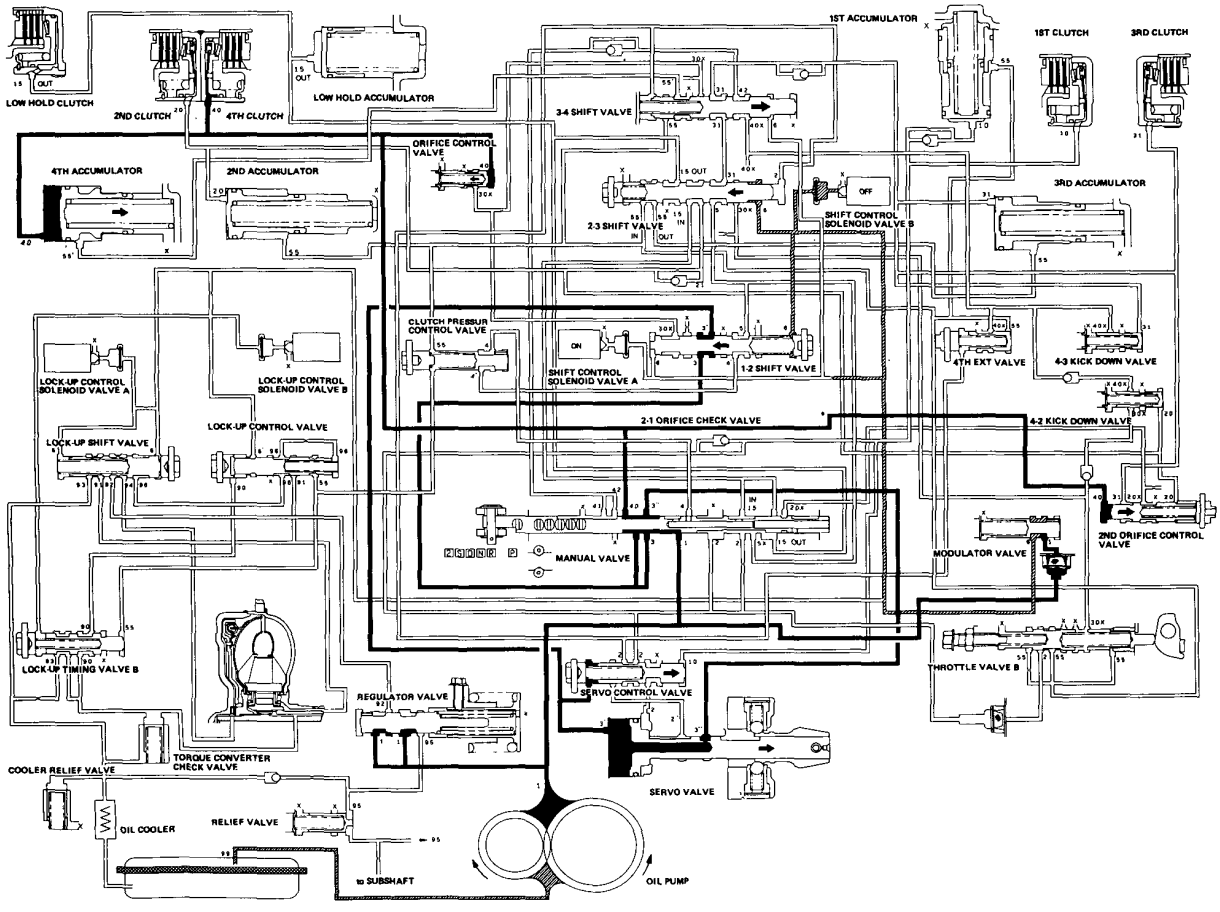
The flow of fluid through the torque converter circuit is the same as in the [N]. The fluid (1) from the oil pump flows through the manual valve and becomes the line pressure(3). It then flows through the 1-2 shift valve to the servo valve (3), causing the shift fork shaft to be moved in the reverse direction.

Under this condition, the shift control solenoid valve A on whereas the valve B is turned off as in 3rd. As a result, the 1-2 shift valve is also moved to the left. The fluid (3)' will flow through the servo valve and manual valve to the 4th clutch; power is transmitted through the 4th clutch.

Reverse Inhibitor Control

When the [R] position is selected while the vehicle is moving forward at a speed over 10 km/h, the control unit outputs 1st signal (A: OFF, B: ON), the 1-2 shift valve is moved to the right. The line pressure (3) is intercepted by the 1-2 shift valve, consequently the power is not transmitted as the 4th clutch and servo valve are not operated.

When the select lever is moved from the [R] position to the [D], [S] or [2] position, the servo control valve is moved to the left by the 1st or 2nd pressure to move the servo valve.



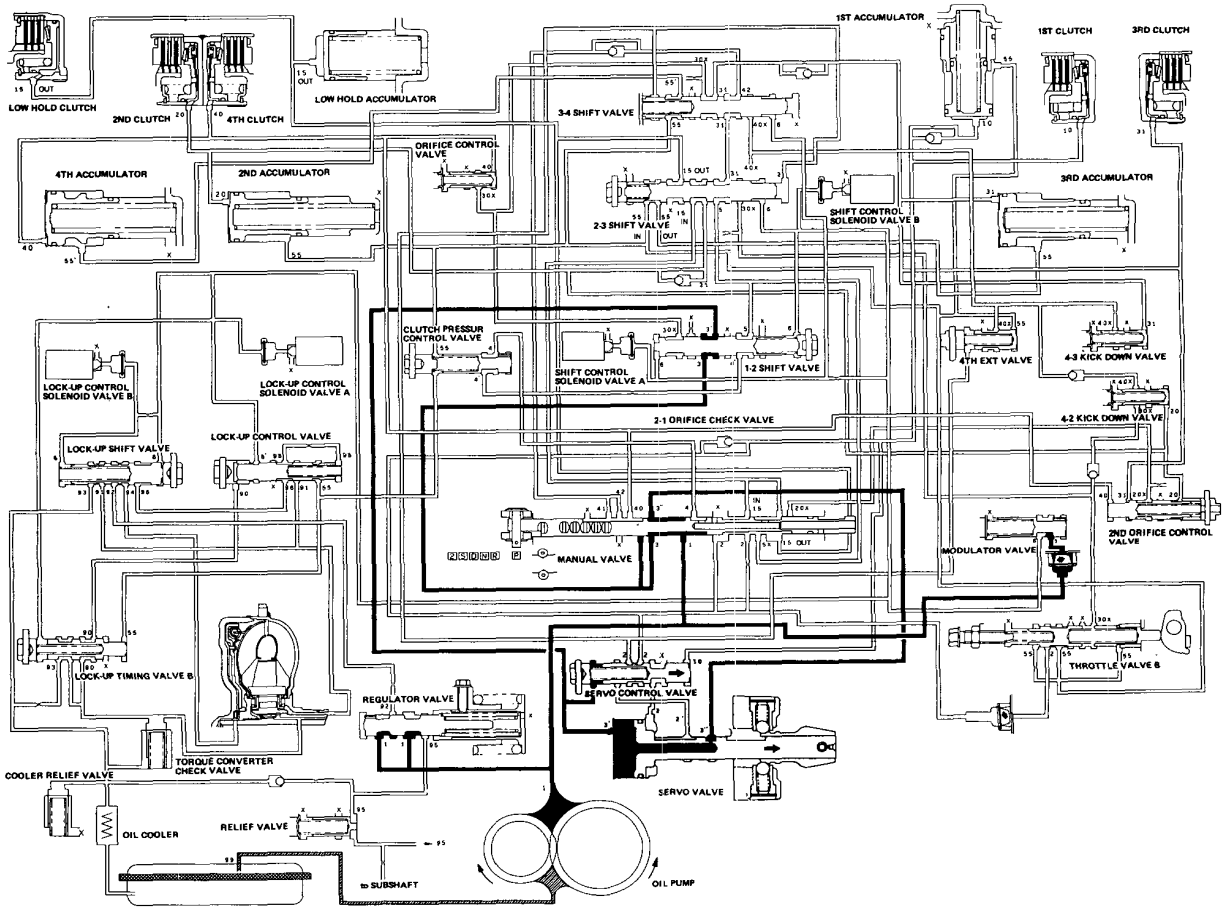
NOTE: When used, "left" or "right" indicates direction on the flow chart.

(cont'd)

Hydraulic Flow (cont'd)

P Position

The flow of fluid through the torque converter is the same in N position.
The line pressure (1) is intercepted by the manual valve, and is not supplied to the clutches. The power is not transmitted.

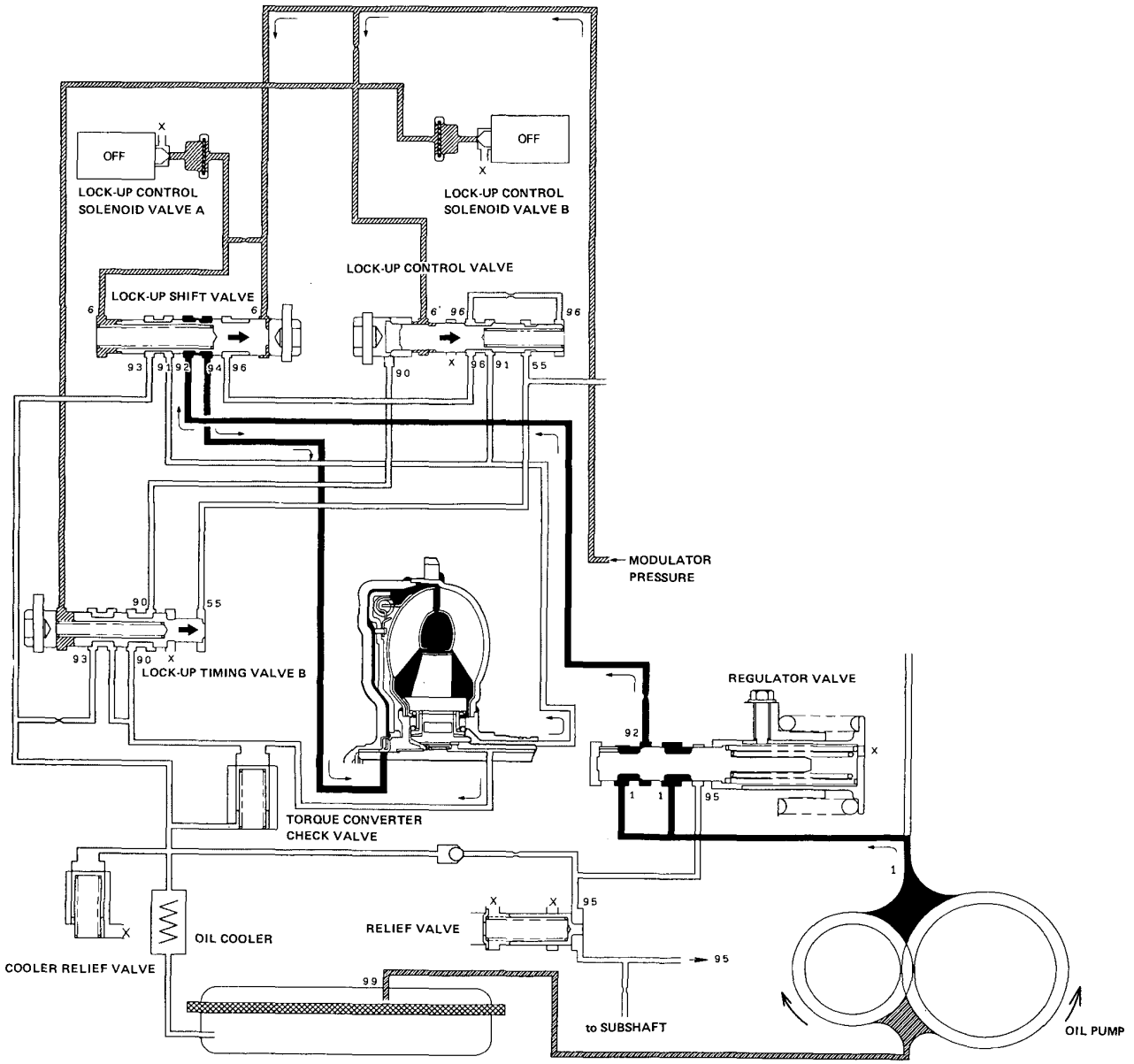


NOTE: When used, "left" or "right" indicates direction on the flow chart.

Lock-Up Operation

1. No Lock-Up

The pressurized fluid regulated by the modulator works on both ends of the lock-up shift valve and on the left side of the lock-up control valve. Since, under this condition, the pressures working on both ends of the lock-up shift valve are equal, the shift valve is moved to the right by the tension of the valve spring alone. The fluid from the oil pump will flows through the left side of the lock-up clutch to the torque converter; i. e., the lock up clutch is in OFF condition.



NOTE: When used, "left" or "right" indicates direction on the flow chart.

(cont'd)

Description

Hydraulic Flow (cont'd)

2. Partial Lock-Up

Lock-Up Control Solenoid Valve A: ON Lock-Up Control Solenoid Valve B: OFF

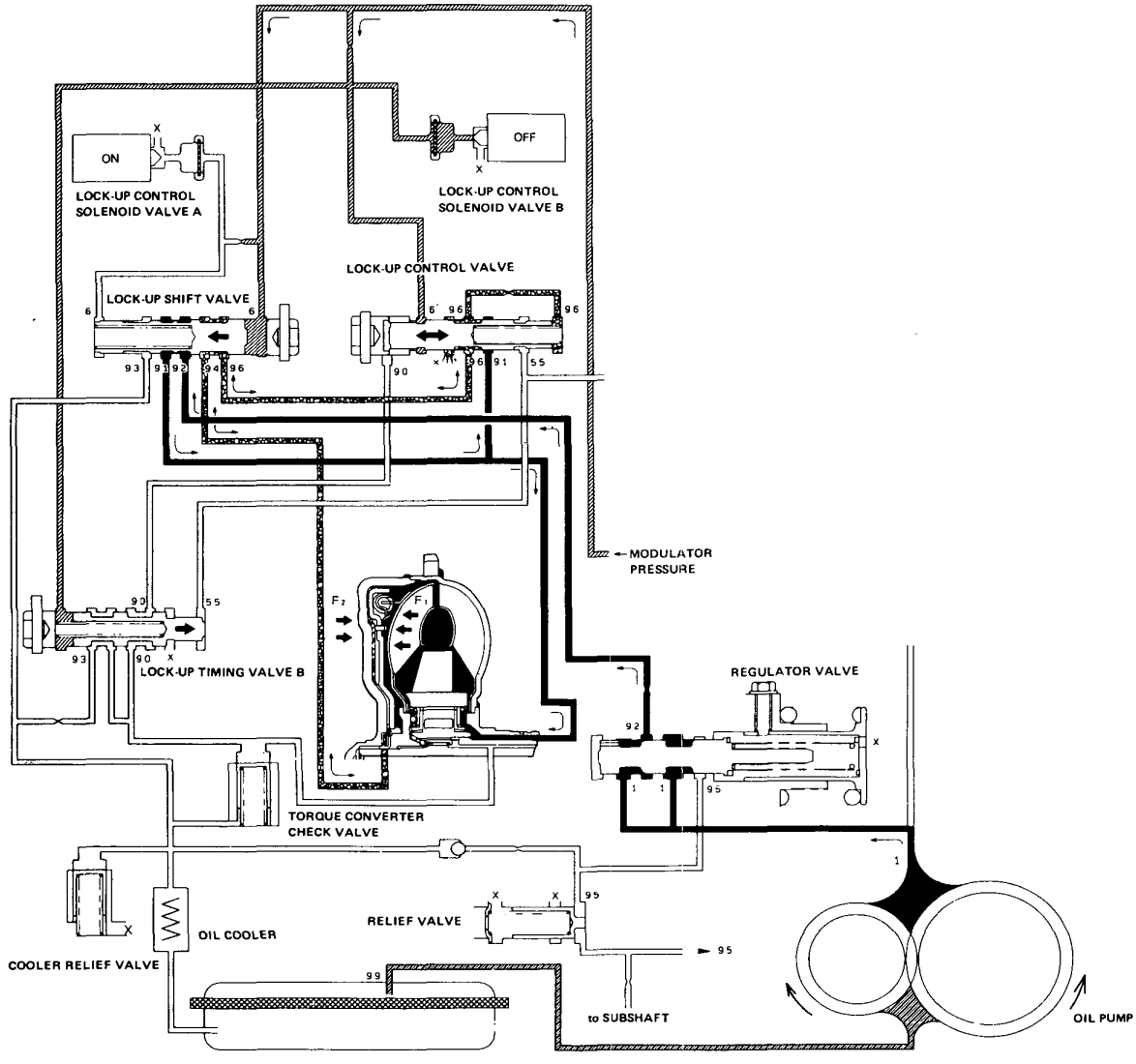
The control unit switches the solenoid valve A to on to release the modulator pressure in the left cavity of the lock-up shift valve. The modulator pressure in the right cavity of the lock-up shift valve overcomes the spring force, thus the lock-up shift valve is moved to the left side.

The modulator pressure is separated to the two passages:

Torque Converter Inner Pressure: entered into right side -- to engage lock-up clutch

Torque Converter Back Pressure: entered into left side — to disengage lock-up clutch

The back pressure (F2) is regulated by the lock-up control valve whereas the position of the lock-up timing valve B is determined by the throttle B pressure, tension of the valve spring and pressure regulated by the modulator. Also the position of the lock-up control valve is determined by the throttle valve B pressure, back pressure of the lock-up control valve 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. With the lock-up control solenoid valve B kept off, the modulator pressure is maintained in the left end of the lock-up control valve; in other words, the lock-up control valve is moved but slightly to the left side. This slight movement of the lock-up control valve causes the back pressure to be lowered slightly, resulting in partial.



NOTE: When used, "left" or "right" indicates direction on the flow chart.

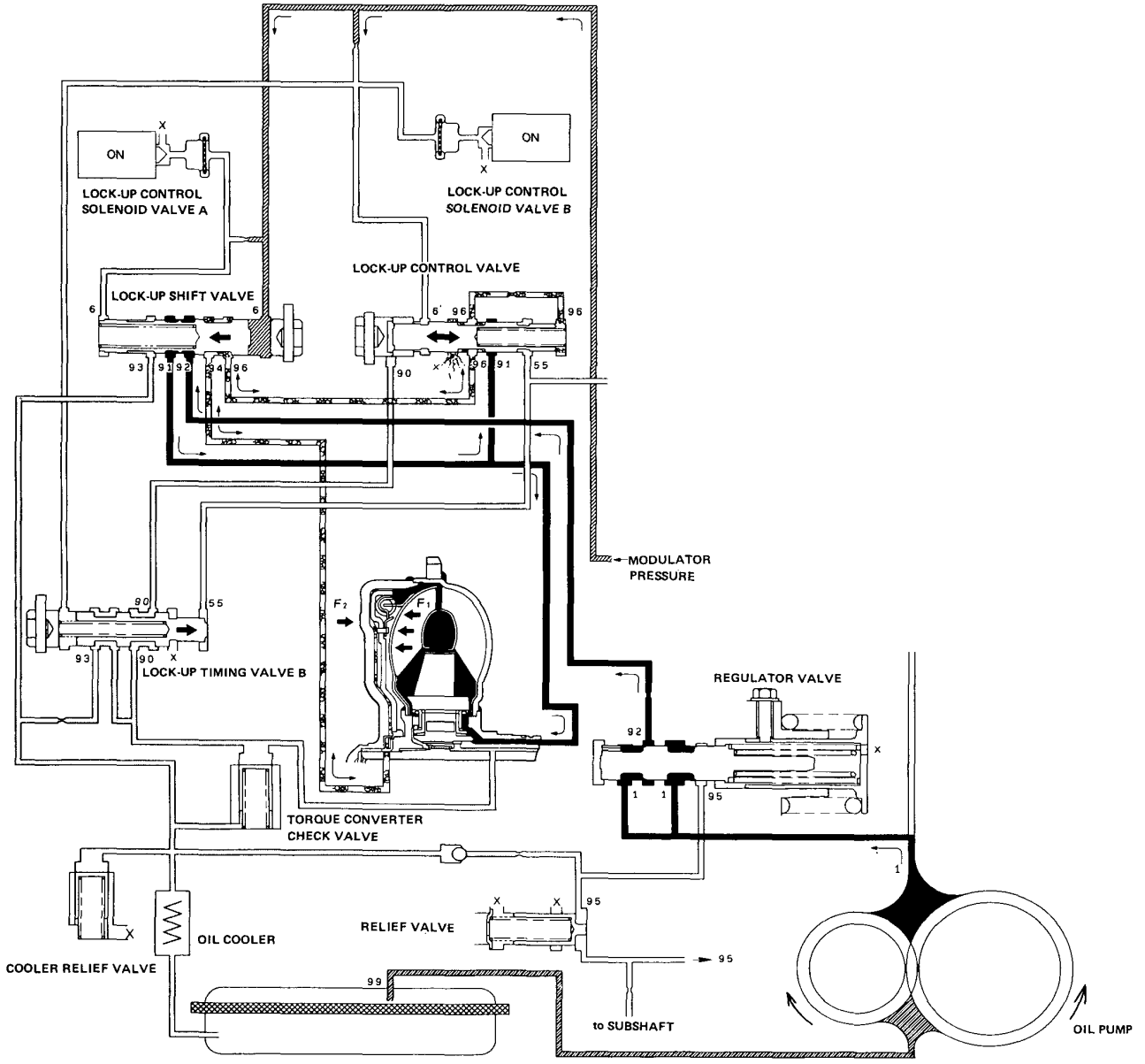
3. Half Lock-Up

Lock-Up Control Solenoid Valve A: ON Lock-Up Control Solenoid Valve B: ON

The modulator pressure is released by the solenoid valve B, causing the modulator pressure in the left cavity of the lock-up control valve to lower.

Also the modulator pressure in the left cavity of the lock-up timing valve B is low. However the throttle B pressure is still low at this time, consequently the lock-up timing valve B 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 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 to be engaged fully.



NOTE: When used, "left" or "right" indicates direction on the flow chart.

(cont'd)

Description

Hydraulic Flow (cont'd)

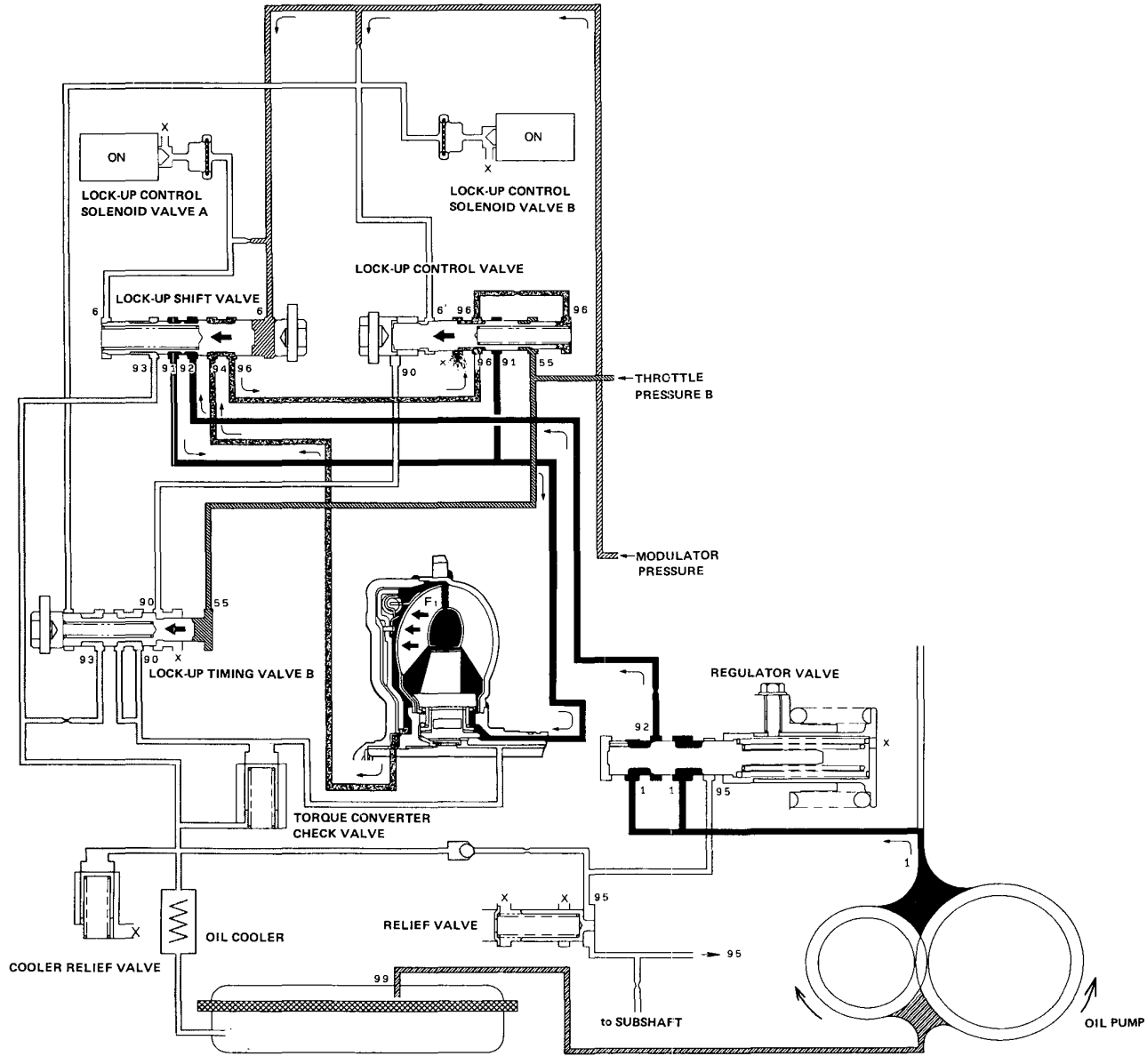
4. Full Lock-Up

Lock-Up Control Solenoid Valve A : ON Lock-Up Control Solenoid Valve B : ON

When the vehicle speed further increases, the throttle valve B pressure is increased in accordance with the throttle opening.

The lock-up timing valve B overcomes the spring force and moves to the left side. Also this valve closes the oil port leading to the torque converter check valve.

Under this condition, the throttle B pressure working on the right end of the lock-up control valve becomes greater than that on the left end (modulator pressure in the left end has already been released by the solenoid valve B); i. e., the lock-up control valve is moved to the left. As this happens, the torque converter back pressure is released fully, causing the lock-up clutch to be engaged fully.

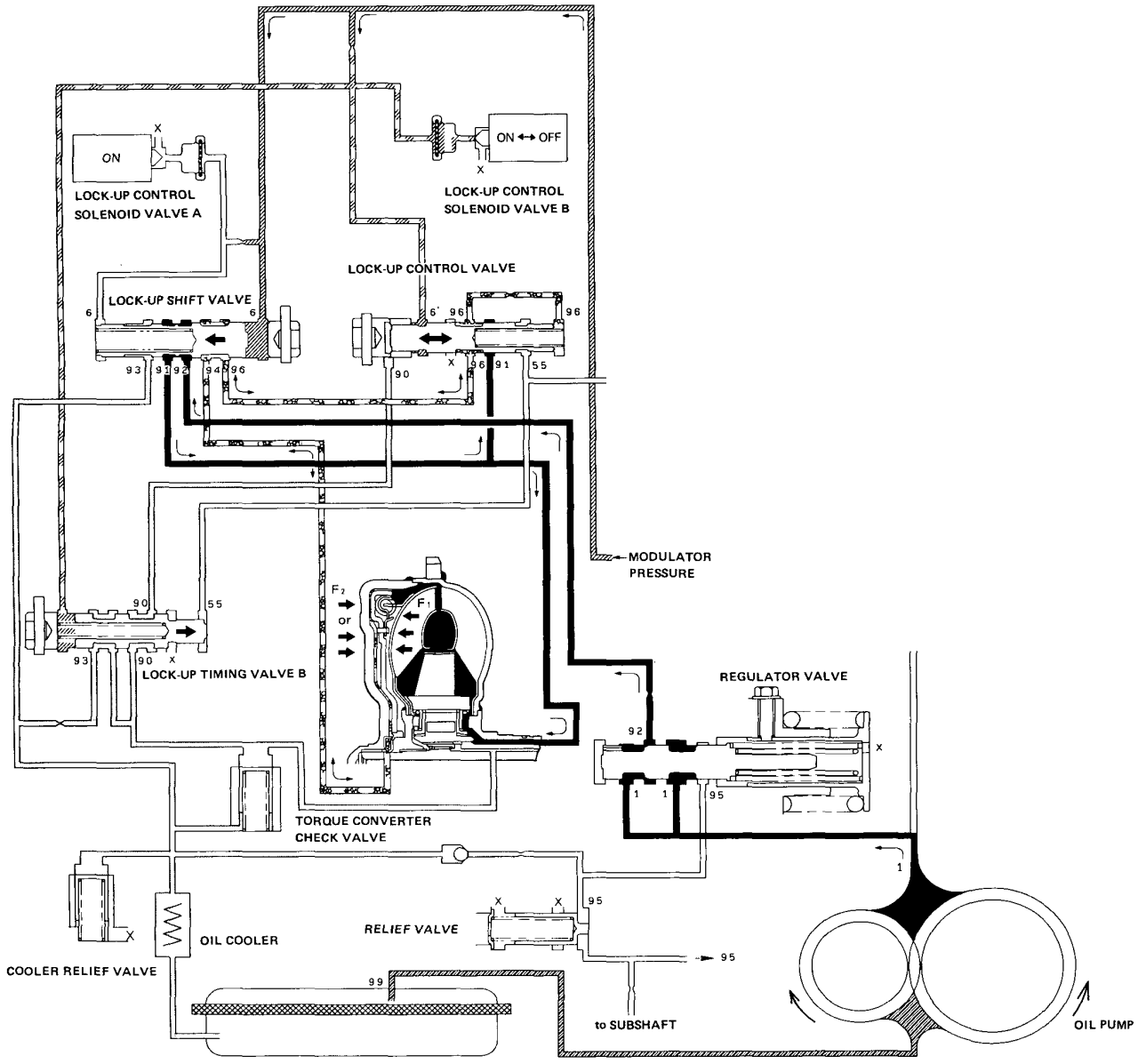


NOTE: When used, "left" or "right" indicates direction on the flow chart.

5. Deceleration Lock-Up

Lock-Up Control Solenoid Valve A: ON Lock-Up Control Solenoid Valve B: Duty Operation (ON ↔ OFF)

The A/T control unit switches the solenoid valve B to on and off alternately in high speed under certain condition. The slight lock-up and half lock-up regions are maintained so as to lock the torque converter properly.

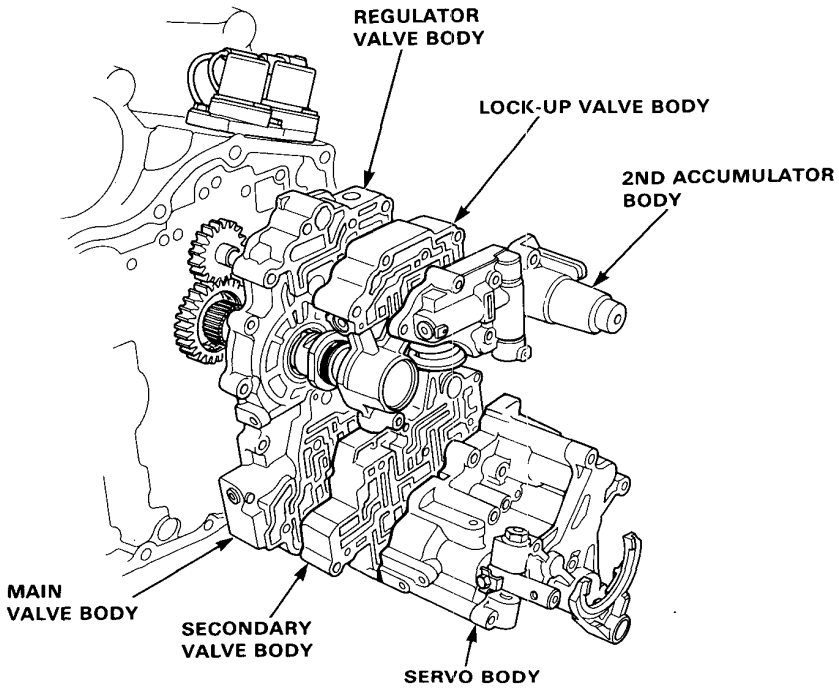


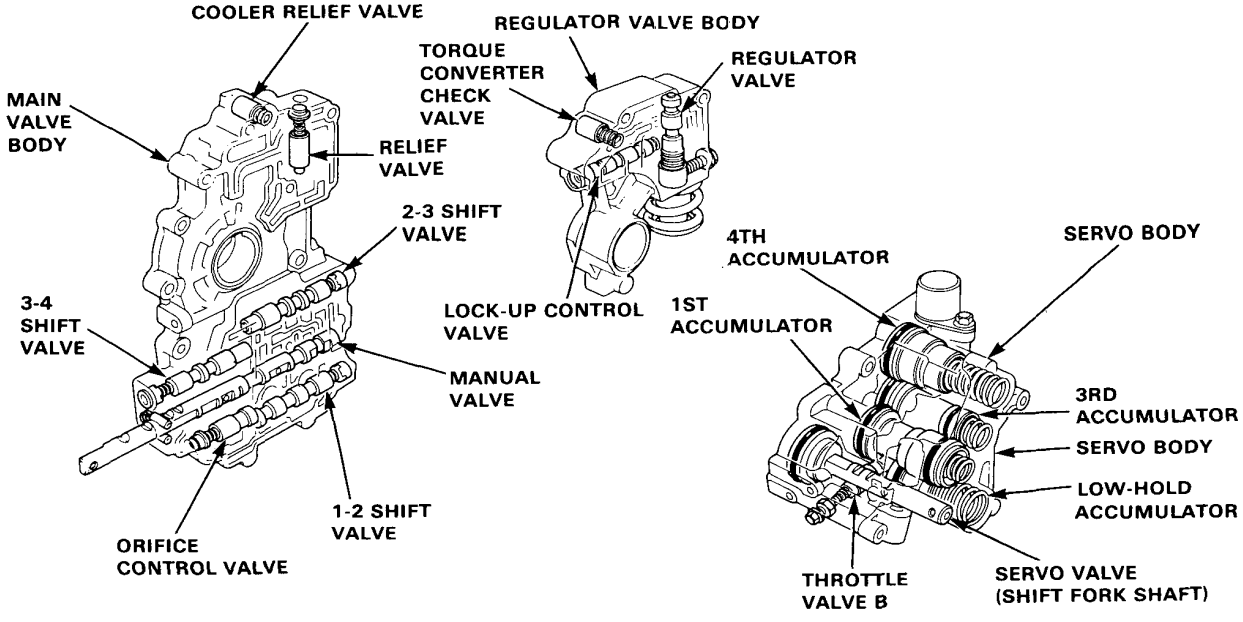
NOTE: When used, "left" or "right" indicates direction on the flow chart.

Description

Hydraulic Control

The valve body includes the main valve body, the second accumulator body, the regulator valve body, the secondary valve body, the servo body, and the lock-up valve body.
The oil pump is driven by splines on the right end of the torque converter which is attached to the engine. Oil flows through the regulator valve, to maintain specified pressure through the main valve body to the manual valve, governor valve, and servo body, directing pressure to each of the clutches.





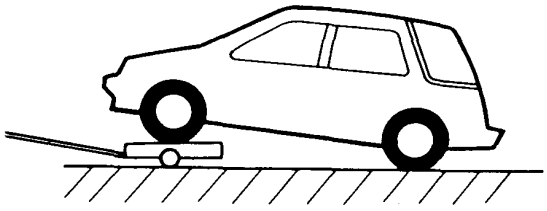
4WD Disengagement Precautions

The 4WD System shifts instantaneously and automatically from front wheel drive to four wheel drive when greater traction is needed.

⚠WARNING The 4WD system must be manually disengaged before performing service that requires only the front wheels or only the rear wheels to be turning. Disengaging the system will prevent sudden movement of the car, which may result in personal injury.

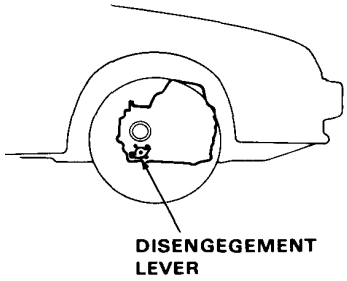
Towing:

CAUTION: Before towing the car with either the front or rear wheels raised off the ground, place the transmission in neutral and manually disengage the 4WD system to prevent the raised wheels from turning.

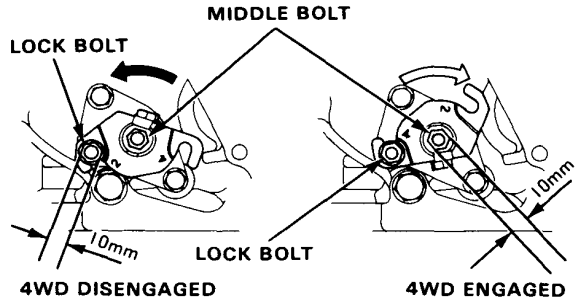


4WD Disengagement:

1. With the car on the ground, locate the orange disengagement lever on the transmission.

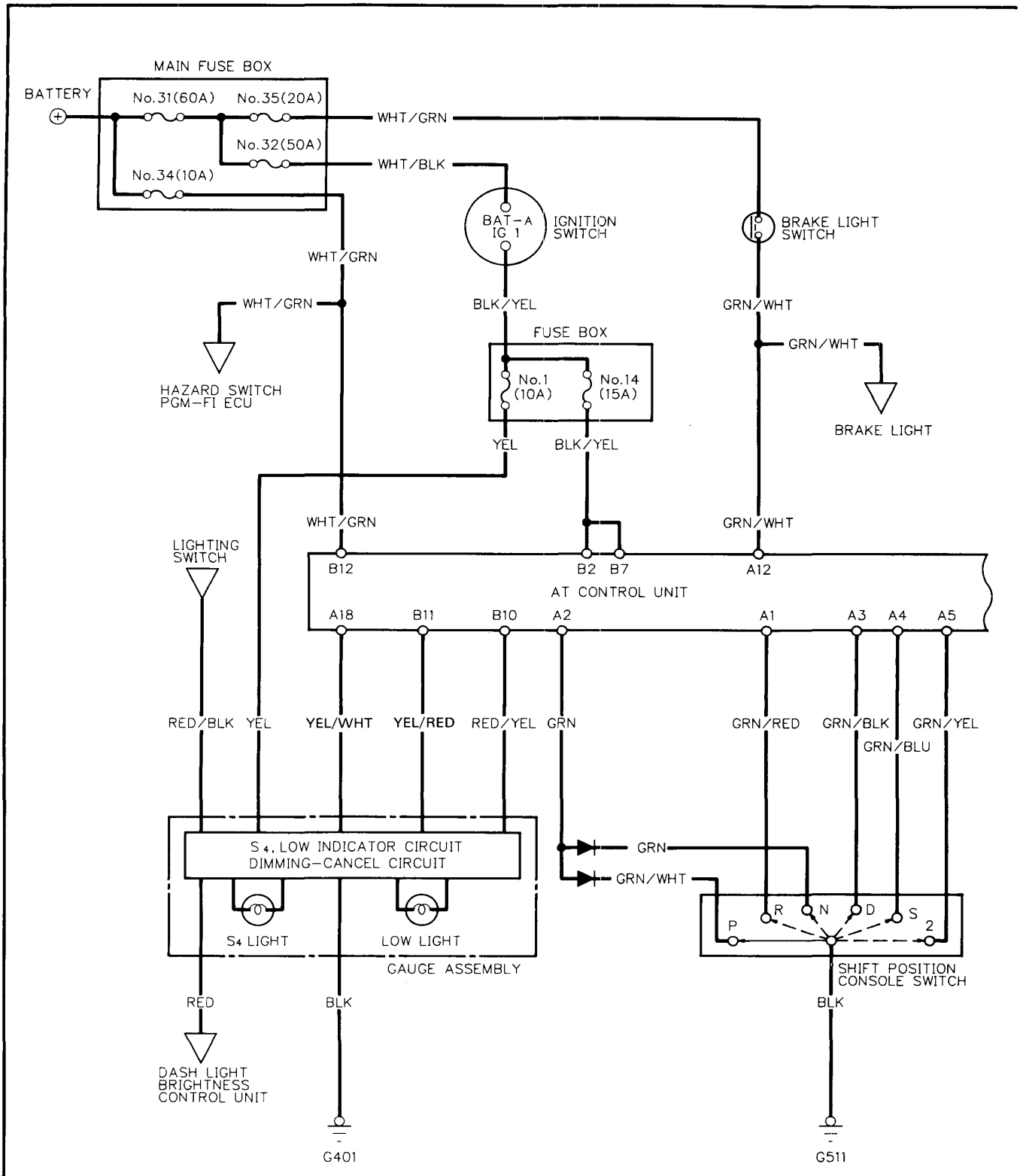


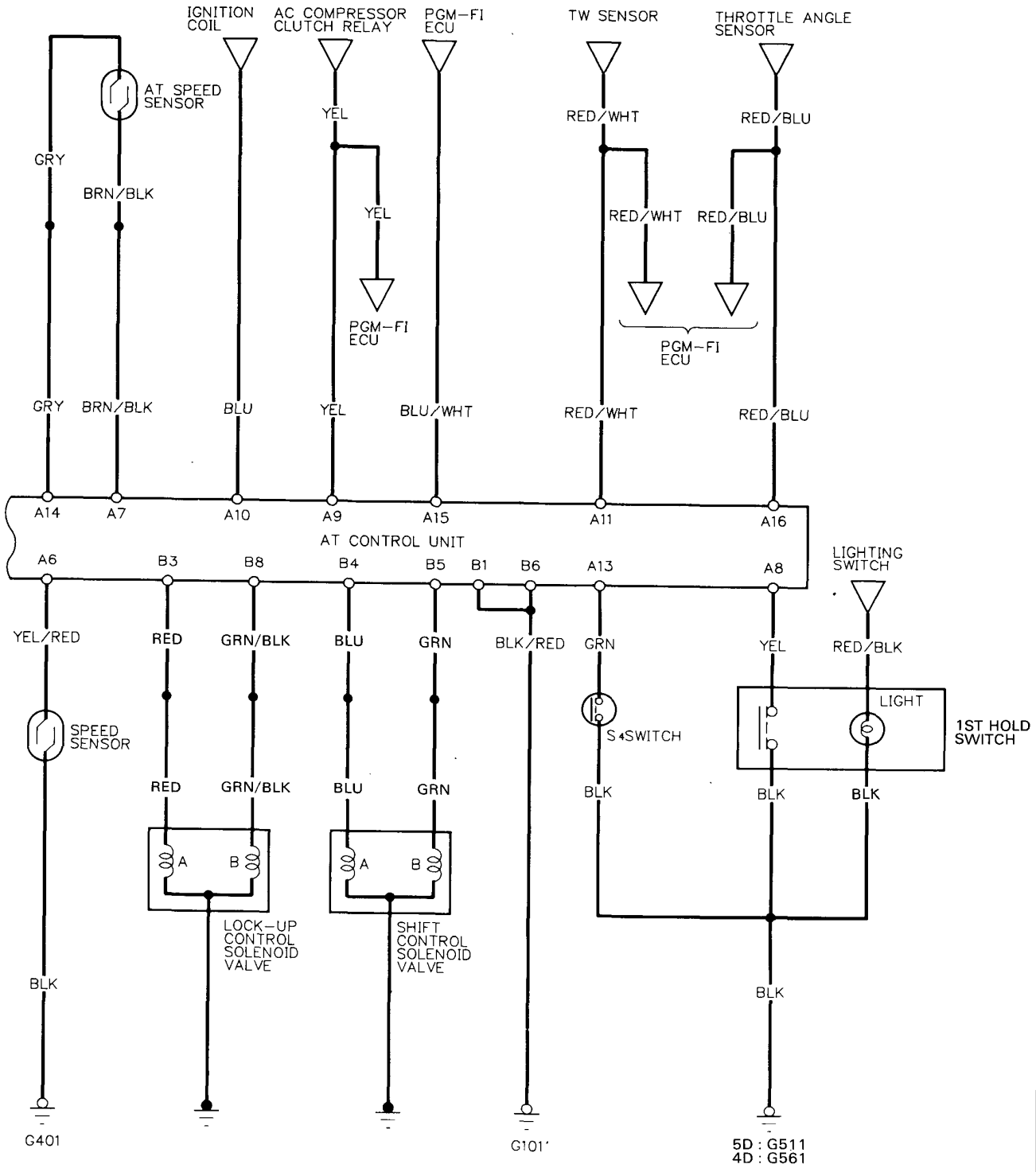
2. Loosen the lock bolt at the slotted end of the lever.



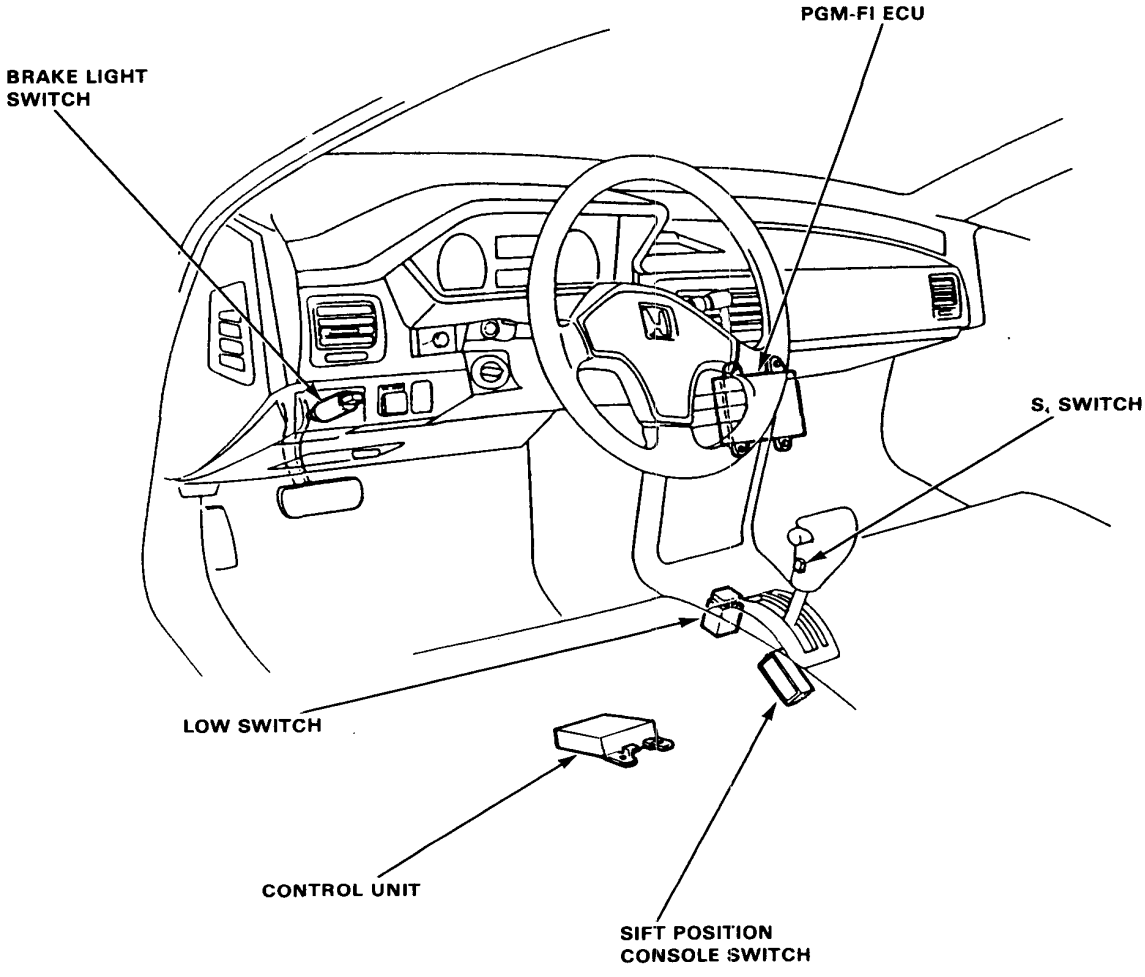
3. Move the lever by turning the middle bolt counterclockwise.
4. Confirm that the lever is in the fully disengaged position by rocking the car back and forth while placing slight counterclockwise pressure on the middle bolt. Tighten lock bolt to 14 N·m (1.4 kg-m, 11 lb-ft).
5. After service or towing is complete, return the lever to the normal engaged position.

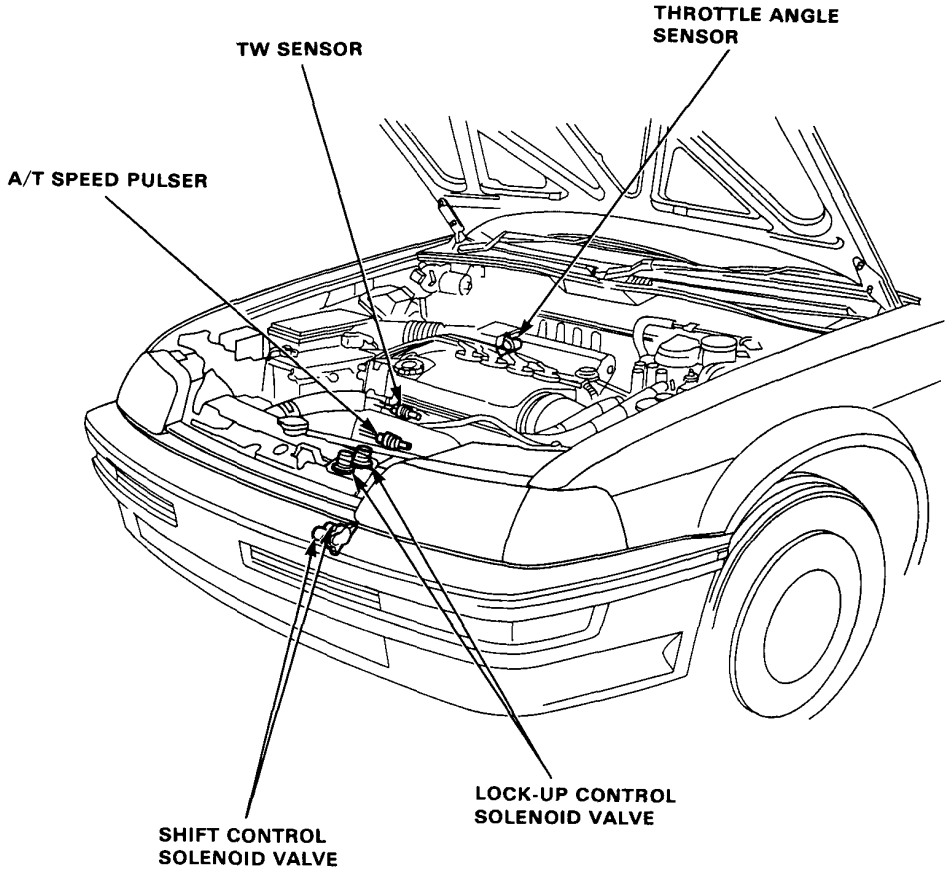
Circuit Diagram




IGNITION COIL
AC COMPRESSOR CLUTCH RELAY
PGM-FI ECU
TW SENSOR
THROTTLE ANGLE SENSOR
AT SPEED SENSOR
GRY
BRN/BLK
YEL
PGM-FI ECU
RED/WHT
RED/BLU
PGM-FI ECU
GRY
BRN/BLK
BLU
YEL
BLU/WHT
RED/WHT
RED/BLU
A14
A7
A10
A9
A15
A11
A16
AT CONTROL UNIT
A6
B3
B8
B4
B5
B1
B6
A13
A8
LIGHTING SWITCH
YEL/RED
RED
GRN/BLK
BLU
GRN
BLK/RED
GRN
YEL
RED/BLK
SPEED SENSOR
S4 SWITCH
LIGHT
1ST HOLD SWITCH
RED
GRN/BLK
BLU
GRN
BLK
BLK
BLK
A
B
A
B
LOCK-UP CONTROL SOLENOID VALVE
SHIFT CONTROL SOLENOID VALVE
BLK
BLK
G401
G101
5D : G511
4D : G561

Component Location

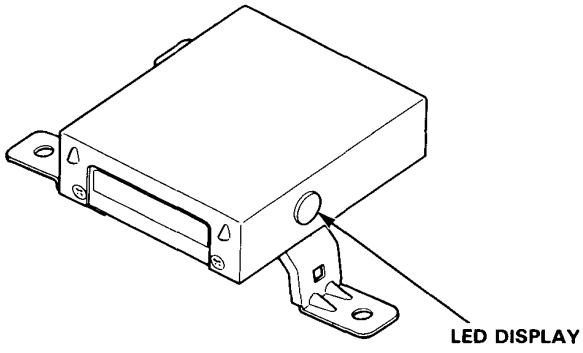


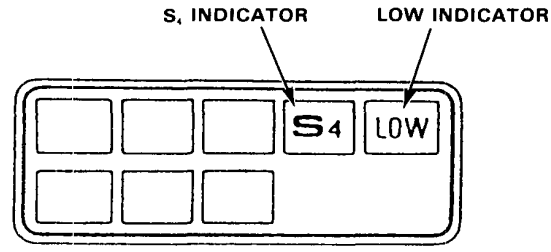

THROTTLE ANGLE SENSOR
TW SENSOR
A/T SPEED PULSER
LOCK-UP CONTROL SOLENOID VALVE
SHIFT CONTROL SOLENOID VALVE

Troubleshooting Procedures

The A/T Control Unit has a built-in self-diagnosis function. The S_4 indicator light in the gauge assembly and LED display on the A/T control unit blink when the A/T control unit senses an abnormality in the input or output systems. The number of blinks from the LED display varies according to the problem, which can be diagnosed by counting the number of blinks.

For problem diagnosis count the number of blinks from the LED display as shown on the Symptom-to-Component Chart. If no abnormality is found from your inspection, refer to the hydraulic system Symptom-to-Component Chart.





When the ignition switch is turned ON, the S_4 indicator light comes on for about two seconds regardless of whether there is a problem. The S_4 indicator light will also come on when in S_4 mode.

If there is a system problem, the S_4 indicator light will come on and continue to blink until the ignition key is turned OFF. When the ignition key is turned ON again, the S_4 indicator light will not blink again for the original problem. But if the A/T control unit senses the original abnormality again with ignition switch ON, the S_4 indicator light will blink again for the original problem. Therefore, even though the S_4 indicator light does not come on when turning the ignition key ON, check the LED display for automatic transmission problem diagnosis.

Since the LED problem code is retained in memory, it will blink again whenever the ignition key is turned on. If the LED problem code is not memorized, check the following causes:

- Check the Hazard fuse (10A) in the main fuse box.
- Check for an open circuit in the WHT/GRN wire between the Hazard fuse (10A) and A/T control unit B12 terminal.

After making repair, disconnect the Hazard fuse (10A) in the main fuse box for more than ten seconds to reset LED display memory.

Symptom-to-Component Chart

Electrical System

Number of LED display blinks	S_4 indicator light	Symptom	Probable Cause	Ref. page
1	Blinks	• Lock-up clutch does not engage. • Lock-up clutch does not disengage. • Frequent engine stalling. • Low light does not blink.	• Disconnected lock-up control solenoid valve A connector • Open or short in lock-up control solenoid valve A wire. • Faulty lock-up control solenoid valve A	9 — 43
2	Blinks	• Lock-up clutch does not engage. • Low light does not blink.	• Disconnected lock-up control solenoid valve B connector • Open or short in lock-up control solenoid valve B wire. • Faulty lock-up control solenoid valve B	9 — 44
3	Blinks *or* OFF	• Lock-up clutch does not engage. • Low light does not blink.	• Disconnected throttle angle sensor connector • Open short in throttle angle sensor wire • Faulty throttle angle sensor	9 — 45
4	Blinks	• Lock-up clutch does not engage. • Low light does not blink.	• Disconnected speed pulser connector • Open or short in speed pulser wire • Faulty speed pulser	9 — 46
5	Blinks	• Fails to shift other than 2nd↔4th gear. • Lock-up clutch does not engage. • Low light does not blink.	• Short in shift Position console switch wire. • Faulty shift position console switch	9 — 47
6	OFF	• Fails to shift other than 2nd↔4th gear. • Lock-up clutch does not engage. • Lock-up clutch engages and disengages alternately. • Low light does not blink.	• Disconnect shift position console switch connector • Open in shift position console switch wire • Faulty shift position console switch.	9 — 49
7	Blinks	• Fails to shft other than 1st↔4th, 2nd ↔4th, or 2nd↔3rd gears. • Fails to shift (stuck in 4th gear). • Low light does not blink.	• Disconnected shift control solenoid valve A connector • Open or short in shift control solenoid valve A wire • Faulty shift control solenoid valve A	9 — 51
8	Blinks	• Fails to shift (stuck in 1st gear or 4th gear). • Low light does not blink.	• Disconnected shift control solenoid valve B connector • Open or short in shift control solenoid valve B wire • Faulty shift control solenoid valve B	9 — 52
9	Blinks	• Lock-up clutch does not engage. • Low light does not blink.	• Disconnected A/T speed pulser • Open or short in A/T speed pulser wire • Faulty A/T speed pulser	9 — 53
10	Blinks	• Lock-up clutch does not engage. • Lock light does not blink.	• Disconnected coolant temperature sensor connector • Open or short in coolant temperature sensor wire • Faulty coolant temperature sensor	9 — 54
11	OFF	• Lock-up clutch does not engage. • Low light does not blink.	• Disconnected ignition coil connector • Open or short in ignition coil wire • Faulty ignition coil	9 — 55

NOTE:

- If a customer describes the symptoms for codes 3, 6 or 11, yet the LED is not blinking, it will be necessary to recreate the symptom by test driving, and then checking the LED with the ignition STILL ON.
- If the LED display blink 12 or more times, the control unit is faulty.

(cont'd)

Symptom-to-Component Chart

Electrical System (cont'd)

If the self-diagnosis LED indicator does not blink, perform an inspection according to the table listed below.

Symptom	Probable Cause	Ref. page
S_4 light is not on for 2 seconds after ignition is first turned on.	———	9 — 39
Low light is not on for 2 seconds after ignition is first turned on.	———	9 — 40
Do not change S_4 mode.	Check S_4 switch signal	9 — 41
Do not change Low mode.	Check Low switch signal	9 — 56
Lock-up clutch does not dusty operation (ON↔OFF)	Check A/C signal with operation A/C.	9 — 57
Lock-up clutch does not engage		
Fails to shift from 2nd to 1st gear when shift up to [S] or [D] range from releasing brakepetal with shift lever in [N] range	Check brake light switch signal.	9 — 58

Troubleshooting Flow Chart

S_4 indicator light does not come on with the ignition switch ON.(It should come on for about 2 sec.)

Disconnect the 12 P connector from the control unit.

Check for continuity between the B1 (BLK/RED) terminal and body ground, and between the B6 (BLK/RED) terminal and body ground.

Is there continuity?

NO → **Repair open in BLK/RED wire between the B1 terminal and G101 and/or between the B6 terminal and G101.**

YES

Turn the ignition switch ON.

Measure voltage between the B2 (BLK / YEL) and B1 (BLK / RED) terminals, and between the B7 (BLK/YEL) and B1 terminals.

Is there battery voltage?

NO → **Repair open or short in BLK/YEL wire between the B2/B7 terminal and the dash fuse box.**

YES

Turn the ignition switch OFF.

Measure resistance between the B11 (YEL/RED) and B1 BLK/RED terminals.

Is the resistance more than 100 Ω?

NO → **Repair Short in YEL/-RED wire between the B11 terminal and the gauge assembly.**

YES

Connect the 12P connector to the control unit.

Turn the ignition switch ON. Be sure that the voltage is available for 2 sec. between the B11 (YEL/RED) terminal and B1 BLK/RED terminals.

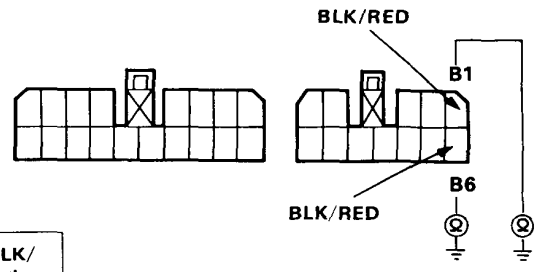
Is the voltage 6-12 V?

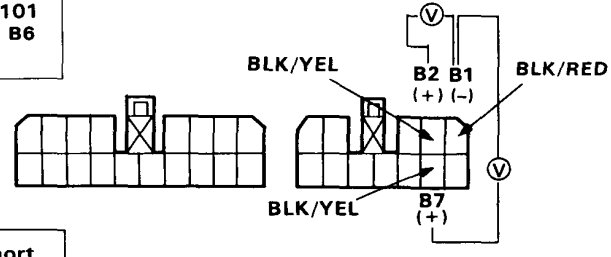
YES → **Check for open or short in YEL/RED wire between the B11 terminal and the gauge assembly. If wire is OK, check the S_4 Indicator Light Bulb and the Safety Indicator Circuit.**

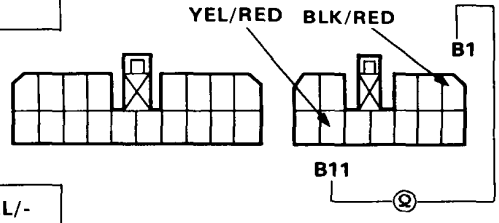
NO

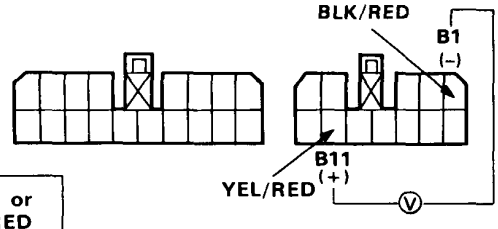
Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.









Troubleshooting Flow Chart

Low indicator light does not come on with the ignition switch ON.(It should come on for about 2 sec.)

Disconnect the 12 P connector from the control unit.

Check for continuity between the B1 (BLK/RED) terminal and body ground, and between the B6 (BLK/RED) terminal and body ground.

Is there continuity?

NO — **Repair open in BLK/RED wire between the B1 terminal and G101 and/or between the B6 terminal and G101.**

YES

Turn the ignition switch ON.

Measure voltage between the B2 (BLK/YEL) and B1 (BLK/RED) terminals, and between the B7 (BLK/YEL) and B1 terminals.

Is there battery voltage?

NO — **Repair open or short in BLK/YEL wire between the B2/B7 terminal and the dash fuse box.**

YES

Turn the ignition switch OFF.

Measure resistance between the B10 (RED/YEL) and B1 (BLK/RED) terminals.

Is the resistance more than 100 Ω?

NO — **Repair Short in RED/YEL wire between the B10 terminal and the gauge assembly.**

YES

Connect the 12P connector to the control unit.

Turn the ignition switch ON. Be sure that the voltage is available for 2 sec. between the B10 (RED/YEL) terminal and B1 (BLK/RED) terminals.

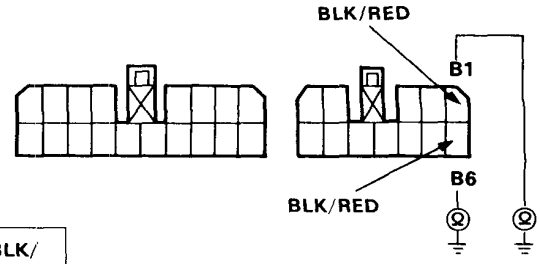
Is the voltage 6-12 V?

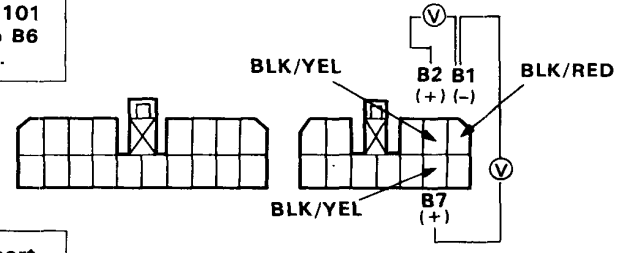
YES — **Check for open or short in RED/YEL wire between the B10 terminal and the gauge assembly. If wire is OK, check the Low Indicator Light Bulb and the Safety Indicator Circuit.**

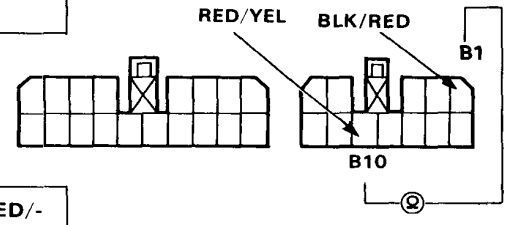
NO

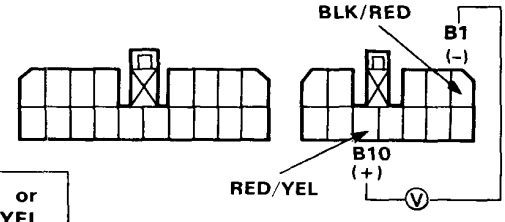
Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.









S_4 won't engage.

Disconnect the 18P and 12P connectors from the control unit.

Check for continuity between the A13 (GRN) and B1 (BLK/RED) terminals.

Is there continuity?

YES

Check for short in GRN wire between the A13 terminal and the S_4 switch. If wire is OK, check the S_4 Switch (page 9-62).

NO

Check for continuity between the A13 (GRN) and B1 (BLK/RED) terminals while pressing the S_4 switch.

Is there continuity?

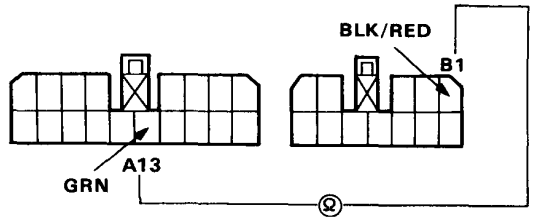
NO

Check for open in GRN wire between the A13 terminal and the S_4 switch. If wire is OK, check the S_4 Switch (page 9-62).

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.



Troubleshooting Flow Chart

Fails to shift from 2nd to first on releasing the brake pedal when stopped in D or S.

Depress the brake pedal and check that the brake lights come on.

Do the lights come on? NO → **Repair the Brake Light Circuit.**

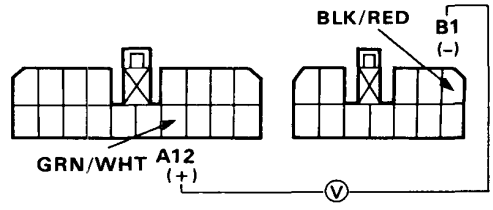
YES

Disconnect the 18P and 12P connectors from the control unit.

Depress the brake pedal.

Measure the voltage between the A12 (GRN/WHT) and B1 (BLK/RED) minals.

View from wire side.



Is there battery voltage? NO → **Repair open in GRN/WHT wire between the A12 and the brake light switch.**

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck

Self-diagnosis LED indicator blinks once.

Disconnect the 12P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the B3 (RED) and B1 (BLK/RED) terminals.

Is there voltage? YES → **Repair short to power source in RED wire between the B3 terminal and the lock-up control solenoid valve A.**

NO

Turn the ignition switch OFF.

Measure the resistance between the B3 (RED) and B1 (BLK/RED) terminals.

Is the resistance 14-30Ω? NO → **Check for open in RED wire between the B3 terminal and the lock-up control solenoid valve A. If wire is OK, check the Lock-up Control Solenoid valve A.**

YES

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

Check for continuity between the B3 (RED) and B1 (BLK/RED) terminals.

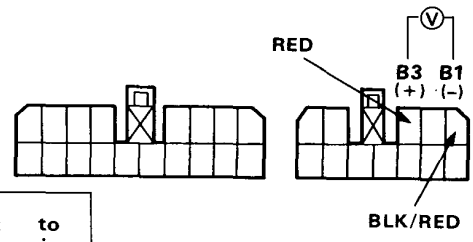
Is there continuity? YES → **Repair short to ground in RED wire between the B3 terminal and the lock-up control solenoid valve A.**

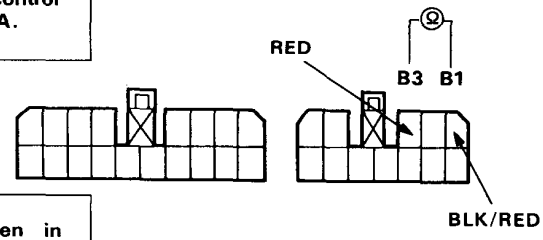
NO

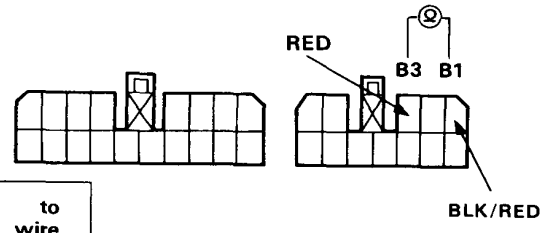
Connect the 2P connector to the lock-up control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.







Troubleshooting Flow Chart

Self-diagnosis LED indicator blinks twice.

Disconnect the 12P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the B8 (GRN/BLK) and B1 (BLK/RED) terminals.

Is there voltage? YES → **Repair short to power source in GRN/BLK wire between the B8 terminal and the lock-up control solenoid valve B.**

NO

Turn the ignition switch OFF.

Measure the resistance between the B8 (GRN/BLK) and B1 (BLK/RED) terminals.

Is the resistance 14-30 Ω? NO → **Check for open in GRN/BLK wire between the B8 terminal and the lock-up control solenoid valve B. If wire is OK, check the Lock-up Control Solenoid Valve B.**

YES

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

Check for continuity between the B8 (GRN/BLK) and B1 (BLK/RED) terminals.

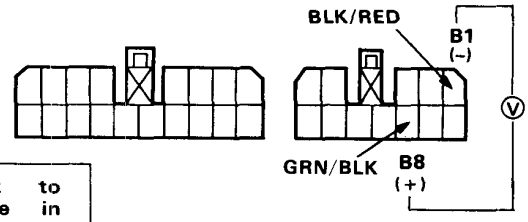
Is there continuity? YES → **Repair short to ground in GRN/BLK wire between the B8 terminal and the lock-up control solenoid valve B.**

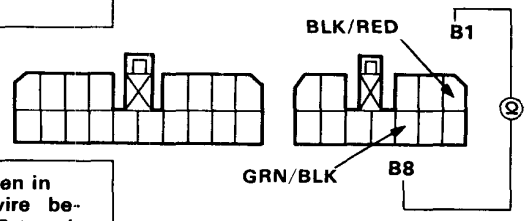
NO

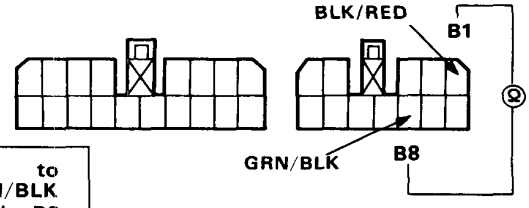
Connect the 2P connector to the lock-up control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.







Self-diagnosis LED indicator blinks three times.

Turn the ignition switch ON.

Check whether the PGM-FI LED display blinks.

Does the LED blink? YES → **Repair the PGM-FI System.**

NO

Turn the ignition switch OFF.

Disconnect the 18P and 12P connectors from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A15 (BLU/WHT) and B1 (BLK/RED) terminals.

Is the voltage 4.75 — 5.25 V? NO → **Repair open or short in BLU/WHT wire between the A15 terminal and the A32 terminal of the PGM-FI ECU.**

YES

Turn the ignition switch OFF.

Connect the 18P and 12P connectors to the control unit.

Turn the ignition switch ON.

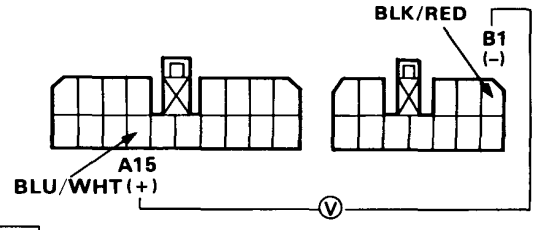
Measure the voltage between the A16 (RED/BLU) and B1 (BLK/RED) terminals.

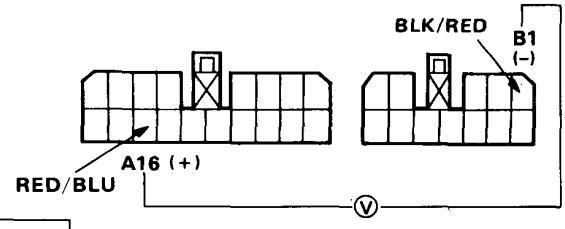
Is the voltage 0.44—0.56 V? * NO → **Repair open or short in RED/BLU wire between the A16 terminal and the throttle angle sensor.**

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.





* ±10%

Troubleshooting Flow Chart

Self-diagnosis LED indicator blinks four times.

Jack up the front of the car and block one wheel.

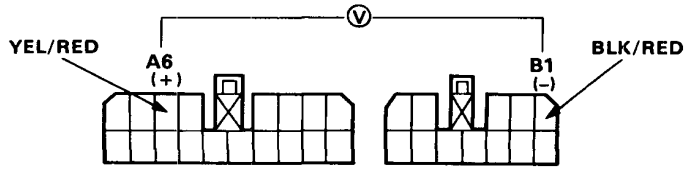
⚠WARNING

- **Set the parking brake securely and block the rear wheels.**
- **Jack up the front of the car and support with a rigid rack.**

Turn the ignition switch ON and shift transmission to N

Rotate the front wheel and measure the voltage between the A6 (YEL / RED) and B1 (BLK / RED) terminals.

View from wire side.



Does the voltage 0 — 5 V appear alternately?

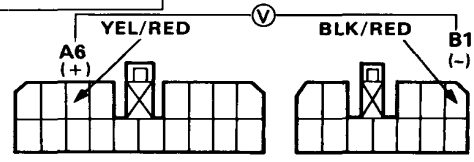
NO

Turn the ignition switch OFF.

Disconnect the 18P and 12P connectors from the control unit.

Turn the ignition switch ON.

Rotate the front wheel and check for voltage between the B1 (BLK / RED) and A6 (YEL / RED) terminals.



Does the voltage 0 — 5 V appear alternately?

NO

Check for short or open in YEL/RED wire between the A6 terminal and the gauge assembly. If wire is OK, check the Speed Pulser.

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

YES

Substitute a known good control unit and recheck.

Self-diagnosis LED indicator blinks five times.

Turn the ignition switch ON.

Shift to other than R position.

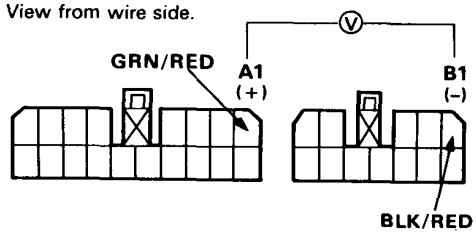
Measure the voltage between the A1 (GRN/RED) and B1 (BLK/RED) terminals.

Is there battery voltage?

NO

Check for short in GRN/RED wire between the A1 terminal and the shift position console switch.
If wire is OK, check for loose connectors.
If necessary, substitute a known good control unit and recheck.

View from wire side.



YES

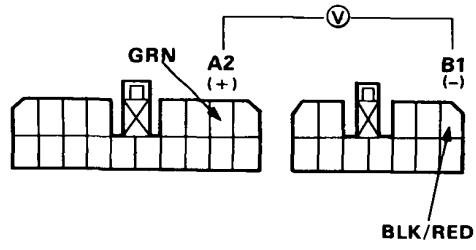
Shift to other than N position.

Measure the voltage between the A2 (GRN) and B1 (BLK/RED) terminals.

Is there battery voltage?

NO

Check for short in GRN wire between the A2 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.



YES

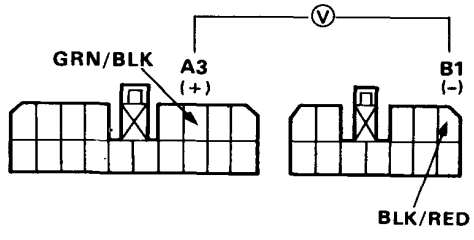
Shift to other than D position.

Measure the voltage between the A3 (GRN/BLK) and B1 (BLK/RED) terminals.

Is there battery voltage?

NO

Check for short in GRN/BLK wire between the A3 terminal and the shift position console switch.
If wire is OK, check for loose controlunit connectors.
If necessary, substitute a known good control unit and recheck.



YES

(To page 9-48).

(cont'd)

Troubleshooting Flow Chart (cont'd)

(From page 9-47)

Shift to other than S position.

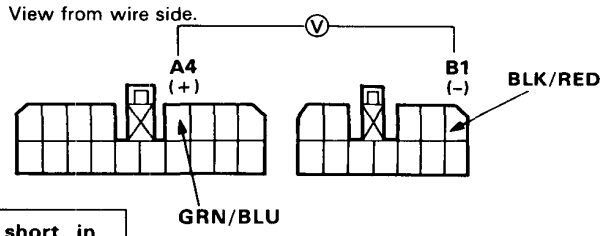
Measure the voltage between the A4 (GRN/BLU) and B1 (BLK/RED) terminals.

Is there battery voltage?

NO

Check for short in GRN/BLU wire between the A4 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

YES



Shift to other than 2 position.

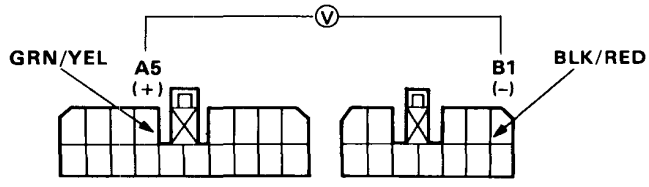
Measure the voltage between the A5 (GRN/YEL) and B1 (BLK/RED) terminals.

Is there battery voltage?

NO

Check for short in GRN/YEL wire between the A5 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

YES



Substitute a known good control unit and recheck.

Self-diagnosis LED indicator blinks six times.

Turn the ignition switch ON.

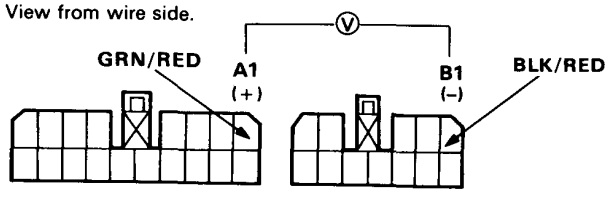
Shift to R position.

Measure the voltage between the A1 (GRN/RED) and B1 (BLK/RED) terminals.

Is there voltage? YES → **Repair open in GRN/RED wire between the A1 terminal and the shift position console switch.**

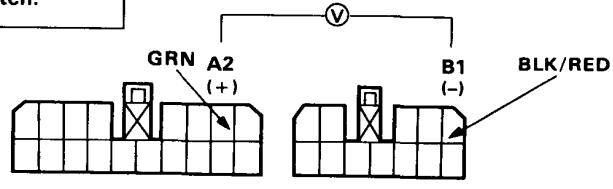
NO

View from wire side.



Shift to N position.

Measure the voltage between the A2 (GRN) and B1 (BLK/RED) terminals.

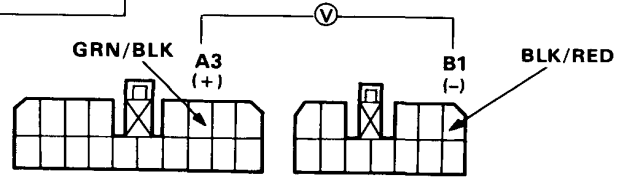


Is there voltage? YES → **Repair open in GRN wire between the A2 terminal and the shift position console switch.**

NO

Shift to D position.

Measure the voltage between the A3 (GRN/BLK) and B1 (BLK/RED) terminals.



Is there voltage? YES → **Repair open in GRN/BLK wire between the A3 terminal and the shift position console switch.**

NO

(To page 9-50)

(cont'd)

Troubleshooting Flow Chart (cont'd)

(From page 9-49)

Shift to S position.

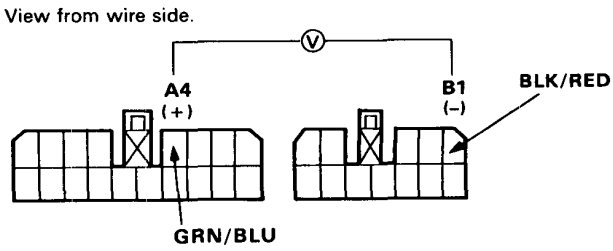
Measure the voltage between the A4 (GRN/BLU) and B1 (BLK/RED) terminals.

Is there voltage?

YES → **Repair open in GRN/BLU wire between the A4 terminal and the shift position console switch.**

NO

View from wire side.



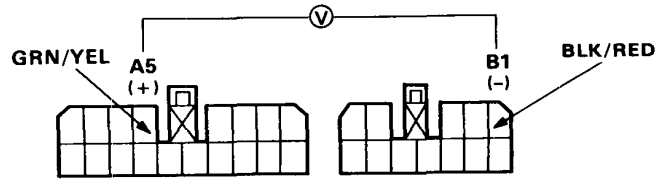
Shift to 2 position.

Measure the voltage between the A5 (GRN/YEL) and B1 (BLK/RED) terminals.

Is there voltage?

YES → **Repair open in GRN/YEL wire between the A5 terminal and the shift position console switch.**

NO



Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

Self-diagnosis LED indicator blinks seven times.

Disconnect the 12P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the B4 (BLU) and B1 (BLK/RED) terminals.

Is there voltage? YES → **Repair short to power source in BLU wire between the B4 terminal and the shift control *solenoid* valve A.**

NO

Turn the ignition switch OFF.

Measure the resistance between the B4 (BLU) and B1 (BLK/RED) terminals.

Is the resistance 12-24 Ω? NO → **Check for open in BLU wire between the B4 terminal and the shift control solenoid valve A. If wire is OK, check the Shift Control Solenoid Valve A.**

YES

Disconnect the 2P connector from the shift control solenoid valves assembly.

Check for continuity between the B4 (BLU) and B1 (BLK/RED) terminals.

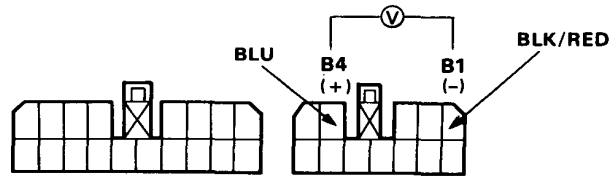
Is there continuity? YES → **Repair short to ground in BLU wire between the B4 terminal and the shift control solenoid valve A.**

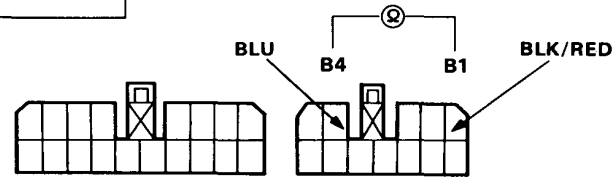
NO

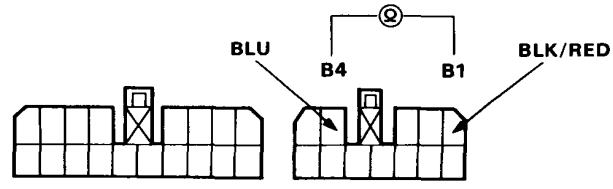
Connect the 2P connector to the shift control solenoid valves assembly.

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.







Troubleshooting Flow Chart

Self-diagnosis LED indicator blinks eight times.

Disconnect the 12P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the B5 (GRN) and B1 (BLK/RED) terminals.

Is there voltage? YES → **Repair short to power source in GRN wire between the B5 terminal and the shift control solenoid valve B.**

NO

Turn the ignition switch OFF.

Measure the resistance between the B5 (GRN) and B1 (BLK/RED) terminals.

Is the resistance 12-24 Ω? NO → **Check for open in GRN wire between the B5 terminal and the shift control solenoid valve B. If wire is OK, check the Shift Control Solenoid Valve B.**

YES

Disconnect the 2P connector from the shift control solenoid valves assembly.

Check for continuity between the B5 (GRN) and B1 (BLK/RED) terminals.

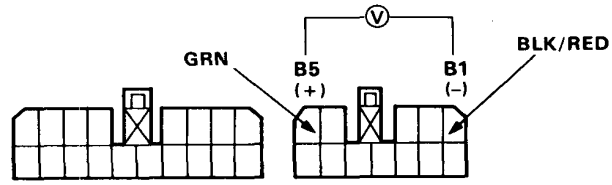
Is there continuity? YES → **Repair short to ground in GRN wire between the B5 terminal and the shift control solenoid valve B.**

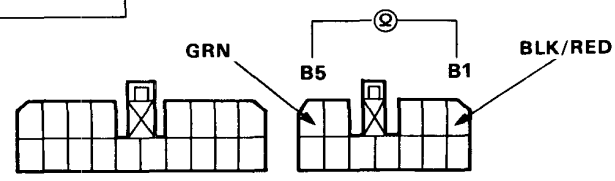
NO

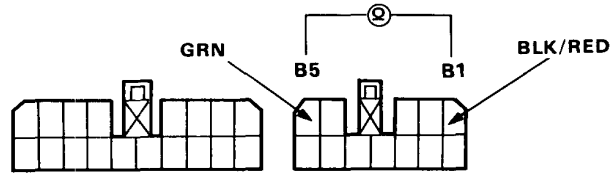
Connect the 2P connector to the shift control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.







Self-diagnosis LED indicator blinks nine times.

Jack up the front of the car.

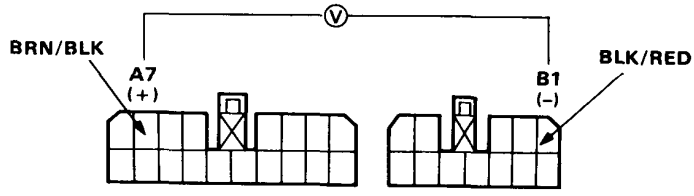
⚠WARNING

- **Set the parking brake securely and block the rear wheels.**
- **Jack up the front of the car and support with a rigid rack.**

Turn the ignition switch ON.

Rotate the front wheels and measure the voltage between the A7 (BRN/BLK) and B1 (BLK/RED) terminals.

View from wire side.



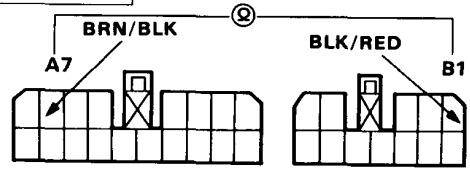
Do 0 and approx. 5 V appear alternately?

NO

Turn the ignition switch OFF.

Disconnect the 18P and 12P connectors from the control unit.

Rotate the front wheels and check for continuity between the A7 (BRN/BLK) and B1 (BLK/RED) terminals.



Do continuity and infinity alternately appear?

NO

Check for open or short in BRN/BLK wire between the A7 terminal and the A/T speed pulser. If wire is OK, *check the A/T Speed* Pulser.

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

YES

Substitute a known good control unit and recheck.

Troubleshooting Flow Chart

Self-diagnosis LED indicator blinks ten times.

Turn the ignition switch ON.

Check whether the PGM-FI LED display blinks.

Does the LED blink? NO → **Repair the PGM-FI System.**

YES

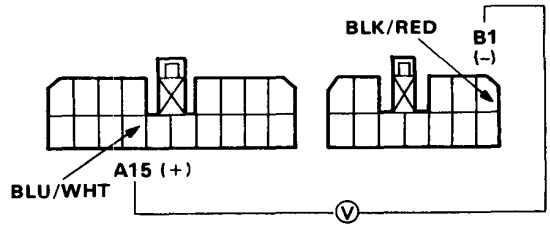
Turn the ignition switch OFF.

Disconnect the 18P and 12P connectors from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A15 (BLU/WHT) and B1 (BLK/RED) terminals.

View from wire side.



Is the voltage 4.75 — 5.25 V? NO → **Repair open or short in BLU/WHT wire between the A15 terminal and the A32 terminal of the PGM-FI ECU.**

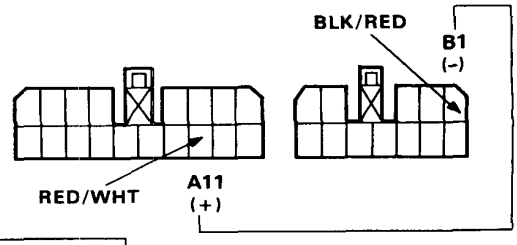
YES

Turn the ignition switch OFF.

Connect the 18P and 12P connectors to the control unit.

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

Measure the voltage between the A11 (RED/WHT) and B1 (BLK/RED) terminals.



Is the voltage 0.50 — 1.20 V? NO → **Repair open or short in RED/WHT wire between the A11 terminal and the coolant temperature sensor.**

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit.

Self-diagnosis LED indicator blinks eleven times.

Disconnect the 18P and 12P connectors from the control unit.

Start the engine.

Measure the voltage between the A10 (BLU) and B1 (BLK/RED) terminals.

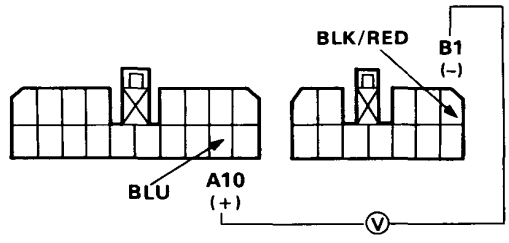
Is there battery voltage?

NO → **Repair open or short in BLU wire between the A10 terminal and the ignition coil.**

YES

Check for loose control unit connectors. If necessary, substitute a known good control unit and recheck.

View from wire side.



Troubleshooting Flow Chart

Low switch signal test.

Check the Low indicator light comes on with the ignition switch ON. (It should come on for about 2 second.)

Is Low indicator light ON?

NO → **See page 9-40.**

YES

Shift to 2 position and push Low hold switch.

Is Low indicator light ON?

NO → **Turn the ignition switch OFF.**

YES

Check for loose control unit connectors.
If necessary, substitute a known-good control unit and recheck.

Disconnect the 12P and 18P connector.

Check for continuity between A8 (YEL) and B1 (BLK/RED) terminals.

Is there continuity?

YES → **Repair short to *ground* in YEL wire between the A8 terminal and Low hold switch.**

NO

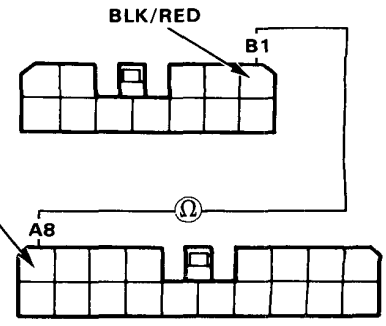
Push Low hold switch

Is there continuity?

NO → **Check for open in YEL wire between A8 terminal and Low hold switch. If wire is OK, check the LOW hold switch.**

YES

Check for loose control unit connectors If necessary, substitute a known-good control unit and recheck.



Inspection A/C signal.

Push the A/C switch.

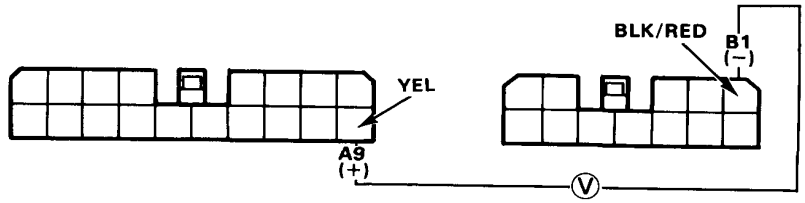
Does A/C compressor clutch engage? NO → **See Air Conditioner inspection.**

YES

Disconect 12P and 18P conector from the control unit.

Start the engine.

Measure the voltage between A9 (YEL) and B1 (BLK/RED) terminals. (A/C compressor OFF)



Is there battery voltage? NO → **Repair open in YEL wire between A9 terminal and A/C clutch relay.**

YES

A/C signal is OK.

Troubleshooting Flow Chart

Inspection brake light signal.

Check the brake lights come on with the brake pedal pushed.

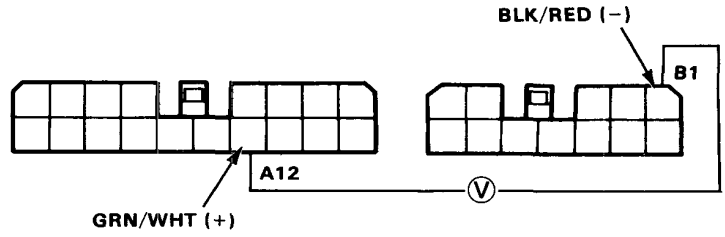
Are brake lights ON?

NO → **Faulty brake light circuit.**

YES

Disconnect the 12P and 18P connectors from the control unit.

Measure the voltage between A12 (GRN/WHT) and B1 (BLK/RED) terminals with the brake pedal pushed.



Is there battery voltage?

NO → **Repair open in GRN/WHT wire between A12 terminal and brake light switch.**

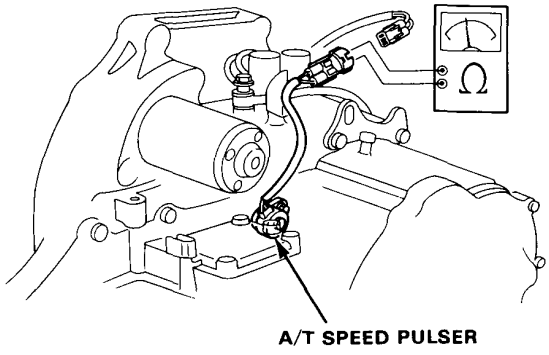
YES

Brake light signal is OK.

A/T Speed Pulser

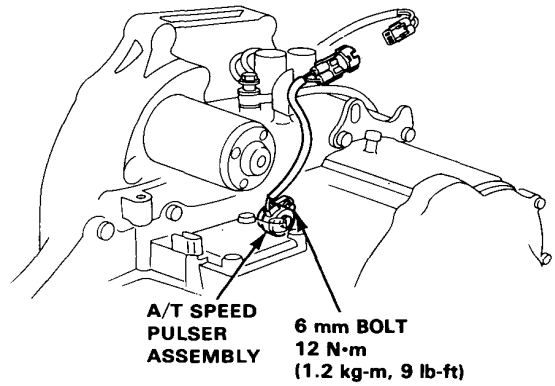
Test

1. Apply the parking brake, jack up the front and rear of the car.
2. Disconnect the A/T speed pulser 2P connector.
3. Rotate the front wheels and be sure that continuity and no continuity appear alternately between the two terminals.

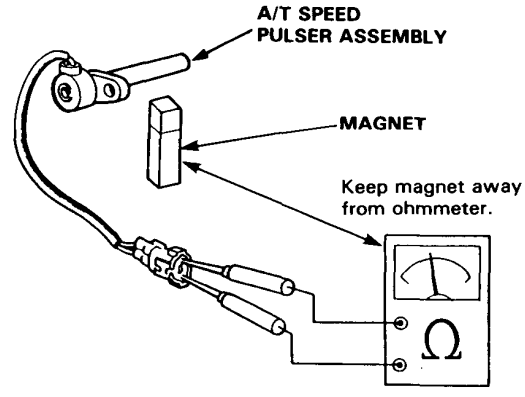


Removal/Inspection

1. Remove the 6 mm bolt from the transmission housing and remove the A/T speed pulser assembly.



2. Bring a magnet close to the A/T speed pulser assembly and check for continuity.



A/T speed pulser assembly is in good condition if there is:

- Continuity with a magnet close to the pulser assembly.
- No continuity with a magnet away from the pulser assembly.

If the A/T speed pulser is normal, go to Rotor Disassembly/Inspection.

3. Replace the O-ring with a new one before reassembling the A/T speed pulser.

CAUTION: Carefully inspect the A/T speed pulser before installing. Do not install it that shows signs of being dropped or improperly handled.

Lock-up Control Solenoid Valve A/B

Test

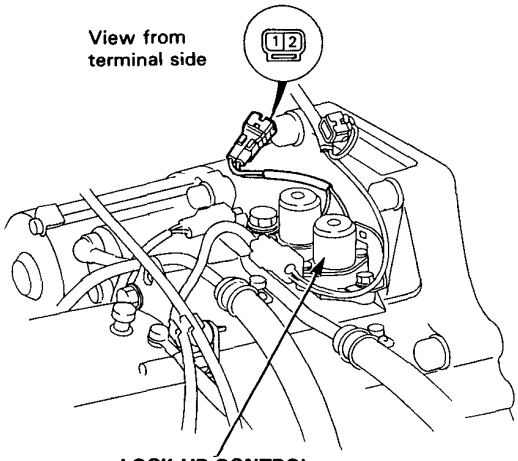
NOTE: Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the connector from the lock-up control solenoid valve A/B.

   NOTE: Do not remove the lock-up control solenoid valve A/B stay.

2. Measure the resistance between the No.1 terminal (SOL. V A) of the lock-up control solenoid valve connector and body ground and between the No. 2 terminal (SOL. V B) and body ground.

   STANDARD: 14—30 Ω



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. Connect the No.2 terminal to the battery positive terminal and body ground. A clicking sound should be heard each time the connection is made.

5. If not, check for continuity between the A/T control unit B3 or B8 harness and body ground. (page 9 — 43, 44)

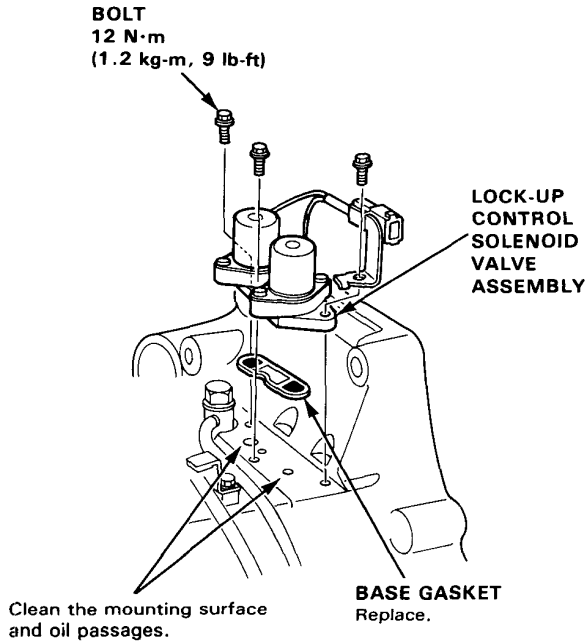
6. Replace the lock-up control solenoid valve assembly if there is continuity between the A/T control unit B3 or B8 harness and body ground. (page 9 — 43, 44)

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 base gasket.

4. Check the connector for rust, dirt or oil and reconnect it securely.

Shift Control Solenoid Valve A/B

Test

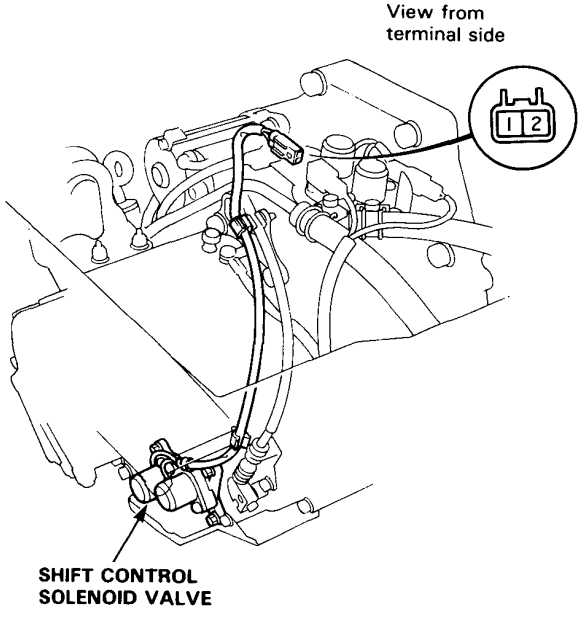
NOTE: Shift control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the connector from the shift control solenoid valve A/B.

   NOTE: Do not remove the shift control solenoid valve A/B stay.

2. Measure the resistance between the No.1 terminal (SOL. V A) of the solenoid valve connector and body ground and between the No.2 terminal (SOL. V B) and body ground.

   STANDARD: 12–24 Ω



3. Replace the shift control solenoid valve assembly if the resistance is out of specification.

4. Connect the No.1 terminal of the solenoid valve connector to the battery positive terminal and the No.2 terminal to the battery positive terminal.
   A clicking sound should be heard each time the connection is made.

5. If not check for continuity between the harness and body ground.

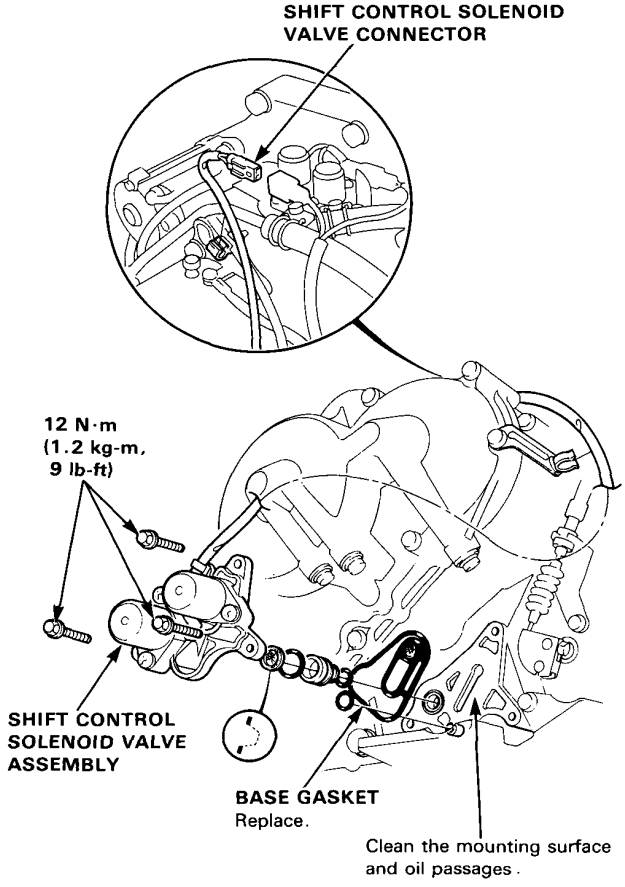
6. Replace the shift control solenoid valve assembly if there is continuity between the harness and body ground.

Replacement

1. Remove the mounting bolts and shift control solenoid valve assembly.

   NOTE: Be sure to remove or replace the shift control solenoid valves A and B as an assembly.

2. Check the shift control solenoid valve oil passages for dust or dirt and replace as an assembly, if necessary.



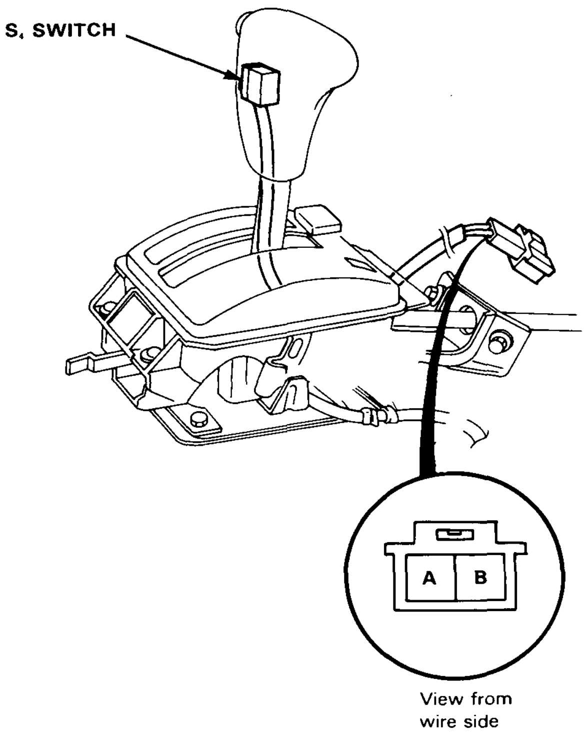
3. Clean the mounting surface and oil passages of the shift control solenoid valve assembly and install a new base gasket.

4. Check the connector for rust, dirt or oil and reconnect it securely.

S4 Switch

Test

1. Remove the center console.
2. Disconnect the switch connector.
3. Check for continuity between A and B terminals. There should be continuity when the switch is pressed.

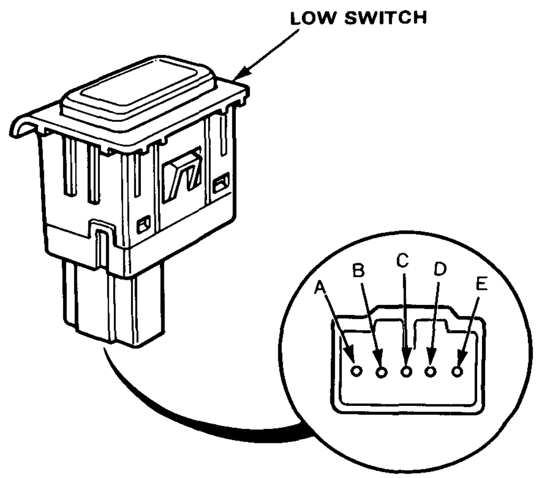


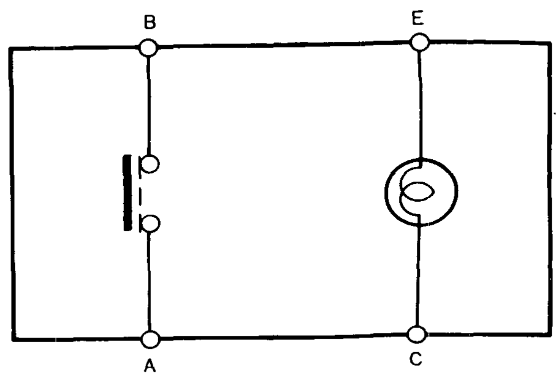
LOW (1st) Switch

Test

1. Remove the console.
2. Disconnect the switch connector and remove the LOW switch.
3. Check for continuity between the terminals by pressing and releasing the switch button according to the table below.

TERMINAL / POSITION	B	A	C	D		E
PRESS	O—	—O		O—	(bulb)	—O
RELEASE				O—	(bulb)	—O





Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on PROBABLE CAUSE LIST	Check these items on NOTES PAGE
Engine runs, but car does not move in any gear.	1,2,3,6,7,8, 39,44	K,L,R, S
Car moves in 2, but not in S or D	7,9,10,11	C,M,O
Car moves in S or D, but not in 2	7,12,13	C
Car moves S, D or 2, but not in R	4,7,14,23, 36,59	C,N,Q
Poor acceleration Engine races when starting off in S: —Stall rpm high in S, D and 2 —Stall rpm high in S and D —Stall rpm high in 2 —Stall rpm normal —Stall rpm low	 1,2,3,7, 44,47 7,9,11 7,13, 16 17,35, 50,51	 C K,L M,N O
Excessive idle vibration	2,35,39, 50,51	B,K,L
No up shift	57,46	J,L
Jumps from 1st to 3rd in S	57	
Jumps from 1st to 4th in D	54,57	
Shift-up point too early/late: —1st to 2nd, 2nd to 3rd, 3rd to 4th —1st to 2nd —2nd to 3rd —3rd to 4th	 57 23,53,57 24,54,57 25,53,57	
Harsh upshift from 1st to 2nd	13,19,20,18, 23,29	A,C,D, E,V
Harsh upshift from 2nd to 3rd	19,21,23,18, 24,26,29, 30,33	A,C,D, E,H,V
Harsh upshift from 3rd to 4th	19,22,24,18, 25,30,31,32, 34	A,C,D, E,V
Harsh downshift from 2nd to 1st	19,20,23,18, 26,29,40,62	A,C,D, E,H,V
Harsh downshift from 3rd to 2nd	19,21,23,18, 24,31,41,61	A,C,D, E,I,T,V
Harsh downshift from 4th to 3rd	19,22,24,18, 25,32,42,58, 60	A,C,D, E,V
Engine races when shifting from 2nd to 3rd. (Shift point OK)	19,21,23,18, 24,26,27,31, 33	C,D,E, H,U,V
Engine races when shifting from 3rd to 4th. (Shift point OK)	19,22,24,18, 25,27,30,32, 34	C,D,E I,U,V
Excessive shock when shifting from 2nd to 3rd (Shift point OK)	19,23,24,18, 29,41,48	E,V
Excessive shock when shifting from 3rd to 4th (Shift point OK)	19,24,25,18, 30,31,42,48	E,I,V
Car creeps forward in N (Shift cable adjusted properly).	11,13,33,34, 36,37,38	C,D
Excessive time lag from N to S/D (Shift cable adjusted properly).	11,28	C

PROBABLE CAUSE

1. ATF level too low
2. Oil pump seized, gear damaged, foreign matter stuck in gear
3. Regulator valve stuck or spring weak/damaged
4. Servo shaft stuck
5. 3rd gears worn/damaged
6. Mainshaft damaged
7. Shift cable misadjusted or cut; end pin disconnected
8. Final gear worn/damaged
9. Countershaft and one-way clutch seized/damaged
10. 1st gear worn/damaged
11. 1st clutch faulty
    a. Clutch piston stuck
    b. Foreign matter stuck in clutch check valve
    c. Clutch O-ring worn/damaged
    d. Clutch disc worn
    e. Clutch feed pipe/O-ring worn/damaged
12. 2nd gear worn damaged
13. 2nd clutch faulty
    a. Clutch piston stuck
    b. Foreign matter stuck in clutch check valve
    c. Clutch O-ring worn/damaged
    d. Clutch disc worn
    e. Clutch seal ring seized/damaged
14. Reverse gears worn/damaged
15. ATF level too high
16. Torque converter one-way clutch seized
17. Engine throttle cable misadjusted
18. Intake manifold vacuum tube broken
19. Vacuum modulator valve (Throttle valve B) faulty
20. 1-2 shift valve faulty
21. 2-3 shift valve faulty
22. 3-4 shift valve faulty
23. 2nd accumulator faulty
24. 3rd accumulator faulty
25. 4th accumulator faulty
26. 2nd orifice control valve faulty
27. Foreign material in main orifice
28. Foreign material in 1st orifice
29. Foreign material in 2nd orifice
30. 3rd orifice control valve faulty
31. Foreign material in 3rd orifice
32. Foreign material in 4th orifice
33. 3rd clutch faulty
    a. Clutch piston stuck
    b. Foreign material stuck in clutch check valve
    c. Clutch O-ring worn/damaged
    d. Clutch disc worn
    e. Clutch feed pipe/O-ring worn/damaged
34. 4th clutch faulty
    a. Clutch piston stuck
    b. Foreign material stuck in clutch check valve
    c. Clutch O-ring worn/damaged
    d. Clutch disc worn
    e. Clutch feed pipe/O-ring worn/damaged
35. Engine power low
36. Needle bearing seized
37. Thrust washer seized

(cont'd)

Symptom-to-Component Chart

Hydraulic System (cont'd)

SYMPTOM	Check these items on PROBABLE CAUSE LIST	Check these items on NOTES PAGE
Excessive time lag from N to R (Shift cable adjusted properly).	4,20,34,59	C
Abnormal noise in all gears, neutral and park	2,5,43	K,L,Q
Engine accelerates up to 31 mph (50 km/h), but not more	16	
Vibration in all gears	39	
Hard to shift	7,45	P
Car has only 4th gear	57	L
Transmission has no parking	7,45	P
Stall rpm is high, but clutch pressure OK in all positions	47	
Lock-up clutch disengagement —Engine stalls easily —No power in low/middle speed —Noise/vibration in low/middle speed —Excessive shock while shifting	18,19,49,50, 51,52,55,56, 57	E,V
Lock-up clutch hunts ON-OFF —Engine RPM goes up and down while holding throttle steady. —Car surges back and forth while driving.	18,19,51,55, 56,57	E,V
Lock-up clutch does not engage	18,19,47,49, 50,51,55,57	E,V

PROBABLE CAUSE
38. Clutch clearance incorrect
39. Drive plate faulty or transmission assembly improperly installed.
40. 2nd check ball stuck
41. 3rd check ball stuck
42. 4th check ball stuck
43. Mainshaft/countershaft bearing damaged
44. Oil filter clogged
45. Body/case shift cable joint damaged
46. Modulator valve faulty
47. Torque converter check valve faulty
48. Foreign material in separator orifice
49. Lock-up timing valve B faulty
50. Lock-up shift valve faulty
51. Lock-up piston in torque converter faulty
52. Lock-up control valve faulty
53. Shift control solenoid valve A faulty
54. Shift control solenoid valve B faulty
55. Lock-up control solenoid valve A faulty
56. Lock-up control solenoid valve B faulty
57. Automatic transmission control unit faulty
58. 4th exhaust valve faulty
59. Servo control valve faulty
60. 4-3 kickdown valve faulty
61. 3-2 kickdown valve faulty
62. 2-1 orifice control valve faulty

The following symptoms can be caused by improper repair or assembly.	Check theses items on PROBABLE CAUSE DUE TO IMPROPER REPAIR	Check these ITEMS ON NOTES PAGE
Car creeps in N.	R1, R2	
Car does not move in S or D.	R5	
Trans lock up in R.	R4	
Trans has no park.	R3	
Excessive drag in trans.	R8	R, K
Excessive vibration, rpm related.	R9	
Noise with wheels moving only.	R7	
Main seal pops out.	R10	S
Various shifting problems.	R11, R12	
Harsh upshifts.	R13	

PROBABLE CAUSES DUE TO IMPROPER REPAIR	
R1	Improper clutch clearance
R2	Improper gear clearance
R3	Parking pawl installed upside down
R4	Parking shift arm installed upside down
R5	Sprag clutch installed upside down
R6	Feed pipe missing in governor shaft
R7	Reverse hub installed upside down
R8	Oil pump binding
R9	Torque converter not fully seated in oil pump
R10	Main seal improperly installed
R11	Springs improperly installed
R12	Valves improperly installed
R13	Ball check valves not installed
R14	Shift fork bolt not installed

NOTES	
A	Flushing procedure (repeat 3 times): 1. Drain the trans. 2. Refill with 3 qts. of Dexron recommended type ATF. 3. Start the engine and shift trans to D. 4. Let trans shift through gears at least 5 times. 5. Shift to reverse and neutral at least 5 times. 6. Drain and refill.
B	Set idle rpm in gear to specified idle speed. If still no good, adjust the motor mounts as outlined in engine section of service manual.
C	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D	If the clutch pack is seized, or is excessively worn, inspect the other clutches for wear, and check the orifice control valves and throttle valves for free movement.
E	If throttle valve B is stuck, inspect the clutches for wear.
G	If the 1—2 valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no low gear.
H	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I	If the 3rd orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J	If the clutch pressure control valve is stuck closed, the transmission will not shift out of low gear.

NOTES	
K	Improper alignment of main valve body and torque converter case may cause oil pump seizure. The symptoms are mostly an rpm-related ticking noise high pitched squeak. In severe instances, it may stall the engine. Follow instruction procedure.
L	If the oil screen 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 low clutch feedpipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the end cover as it is dented. The O-ring under the guide is probably broken.
N	Replace the mainshaft if the bushings for the low and 4th feedpipe are loose or damaged. If the low feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the end cover.
O	A worn or damaged sprag clutch is mostly a result of shifting the trans in S or D 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. ATV Sensor shaft woodruff key 2. Reverse selector gear teeth chamfers 3. Engagement teeth chamfers of countershaft 4th & reverse gear 4. Shift fork, for scuff marks in center 5. Differential pinion shaft for wear under pinion gears 6. Bottom of 3rd clutch for swirl marks Replace items 1, 2, 3 and 4 if worn or damaged. If trans makes clicking, grinding or whirring noise, also replace mainshaft 4th gear and reverse idler gear and counter 4th gear in addition to 1, 2, 3, or 4. If differential pinion shaft is worn, overhaul differential assy and replace oil screen and thoroughly clean trans, flush torque converter and cooler and lines. If bottom of 3rd clutch is swirled and trans makes gear noise, replace countershaft and ring gear.
R	Be very careful not to damage the torque converter case 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 case. If you push it into the torque converter case 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 B (vacuum modulator valve).
U	Check if servo valve check valve stopper cap is installed. If it was not installed, the check valve may have been pushed out by hydraulic pressure causing a leak (internal) affecting all forward gears.
V	Throttle cable adjustment is essential for proper operation of the transmission. Not only does it affect the shift points if misadjusted but also the shift quality and lockup clutch operation. A too long adjusted cable will result in throttle pressure being too low for the amount of engine torque input into the transmission, and may cause clutch slippage. A too short adjusted cable will result in too high throttle pressures which may cause harsh shifts, erratic shifts and torque converter hunting.

NOTE: After transmission is installed:
- Make sure the floor mat does not interfere with accelerator pedal travel. Fully depress accelerator pedal and check to make sure the throttle lever is fully opened.
- Release the accelerator pedal and check both inner control cables to be sure they have slight play.

Warm up the engine to operating temperature.

[D] and [S] Range

1. Apply parking brake and block the wheels. Start the engine, then move the slector to [D] while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.
2. Check that shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.
3. Apply parking brake and block the wheels. Start the engine, then move the selector [S] while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.

• **Upshift**

[D]		1st—2nd	2nd—3rd	3rd—4th	LC.ON
1/12 throttle	km/h	14—18	27—33	45—52	21—25
Coasting down-hill from a stop	mph	8.7—11.2	16.7—20.6	28.1—32.5	13.1—15.6
1/2 throttle	km/h	33—39	62—70	95—105	108—112
Acceleration from a stop	mph	20.5—24.3	38.5—43.6	59.0—65.3	67.1—69.7
Full-throttle	km/h	55—63	102—110	152—160	143—147
Acceleration from a stop	mph	34.1—39.2	63.3—68.4	94.4—99.5	88.8—91.4

[S] (with S4 switch in operation)		1st—2nd	2nd—3rd	3rd—4th	LC.ON
1/12 throttle	km/h	20—24	32—38	49—55	38—42
Coasting down-hill from a stop	mph	12.4—15.0	19.8—23.7	30.4—34.2	23.6—26.2
7/16 throttle	km/h	33—39	64—72	95—105	112—116
Acceleration from a stop	mph	20.5—24.3	39.7—44.8	59.0—65.3	69.6—72.1
Full-throttle	km/h	55—63	102—110	152—160	143—147
Acceleration from a stop	mph	34.1—39.2	63.3—68.4	94.4—99.5	88.8—91.4

[2] (LOW switch OFF)		1st—2nd
1/12 throttle	km/h	13—17
Coasting down-hill from a stop	mph	8.0—10.6
7/16 throttle	km/h	24—30
Acceleration from a stop	mph	14.9—18.7
Full-throttle	km/h	50—58
Acceleration from a stop	mph	31.0—36.1

- **Downshift**

D		LC.OFF	4th—3rd	3rd—2nd	2nd—1st
1/12 throttle	km/h	17—21	27—33	—	9—15
Coasting or braking to a stop	mph	10.5—13.1	16.7—20.6	—	5.5—9.4
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	81—85	—	—	—
	mph	50.3—52.9	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	138—142	130—140	85—95	42—50
	mph	85.7—88.3	80.7—87.1	52.8—59.1	26.1—31.1

S (with S4 switch in operation)		LC.OFF	4th—3rd	3rd—2nd	2nd—1st
1/12 throttle	km/h	37—41	27—33	—	9—15
Coasting or braking to a stop	mph	22.9—25.5	16.7—20.6	—	5.5—9.4
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	92—96	—	—	—
	mph	57.1—59.7	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	138—142	130—140	85—95	46—54
	mph	85.7—88.3	80.7—87.1	52.8—59.1	28.5—33.6

CAUTION: Do not shift from D or S to 2 (LOW switch OFF) at speeds over 100 km/h (62.5 mph); you may damage the transmission.

2 (LOW switch OFF)		2nd—1st
1/12 throttle	km/h	7—13
Cooasting or braking to a stop	mph	4.3—8.1
7/16 throttle When car is slowed by increased grade, wind, etc.	km/h	—
	mph	—
Full-throttle When caris slowed by increased grade, wind, etc.	km/h	44—54
	mph	27.3—33.6

CAUTION: Do not shift from D or S to 2 (LOW switch ON) at speeds over 55 km/h (34.2 mph); you may damage the transmission.

2 (2nd Gear)

1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this range.

R (Reverse)

Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

P (Park)

Park car on a slope (approx. 16°), apply the parking brake, and shift into Park. Release the brake; the car should not move.

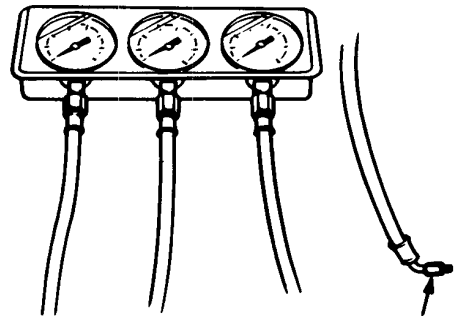
Pressure

Testing

CAUTION: Before testing, be sure transmission is filled to proper level.

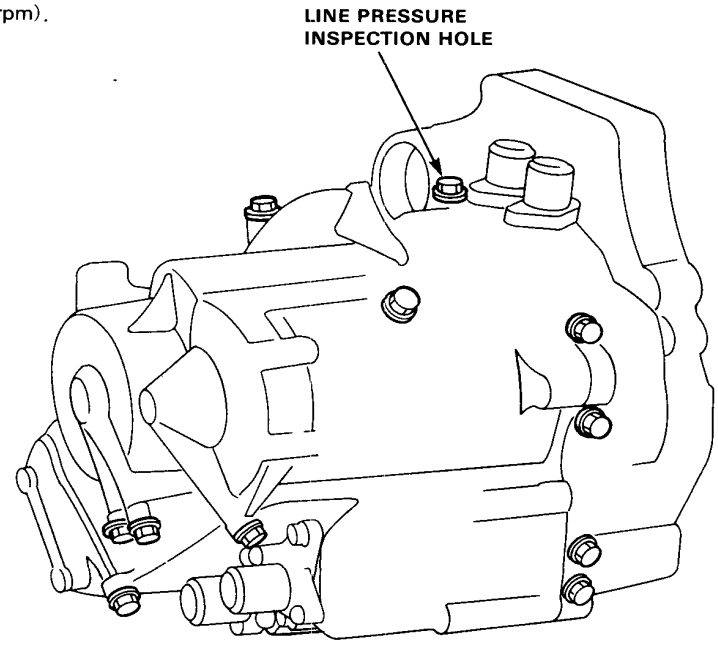
NOTE:
- Stop engine when attaching hoses for pressure tests. Torque hose fitting to 18 N·m (1.8 kg-m, 12 lb-ft).
- Do not reuse aluminum washers.

GAUGE SET 07406–0020003
(includes pressure hose set 07406–0020201)



HOSE FITTING

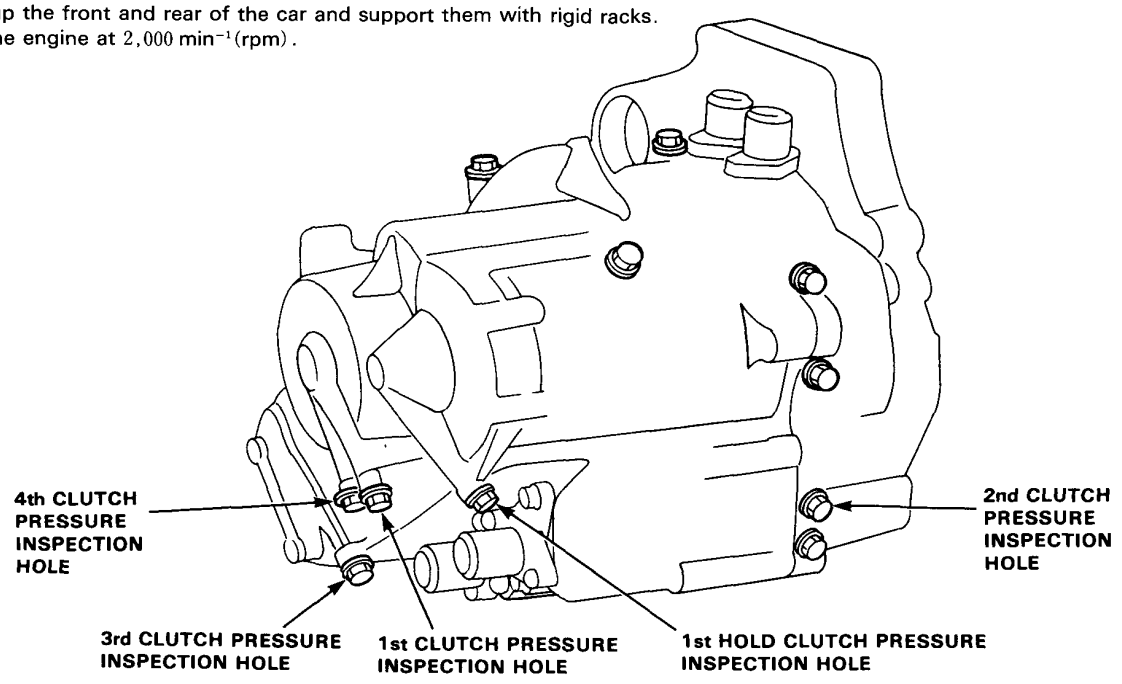
Line Pressure Measurement
1. Set the parking brake securely.
2. Run the engine at 2,000 min^{-1} (rpm).



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	[N] or [P]	No (or low) Line pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	785–834 kPa (8.0–8.5 kg/cm^2, 114–121 psi)	735 kPa (7.5 kg/cm^2, 107 psi)

Clutch Pressure Measurement

1. Jack up the front and rear of the car and support them with rigid racks.
2. Run the engine at 2,000 min^{-1}(rpm).



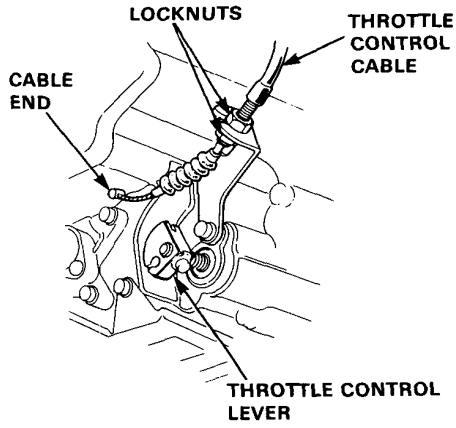
PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st Clutch	[S] or [D]	No or low 1st pressure	1st Clutch	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	735kPa (7.5 kg/cm², 107 psi)
1st Hold Clutch	[2] (With S_4 switch in operation)	No or low 1st hold ressure	1st Hold Clutch	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	735 kPa (7.5 kg/cm², 107 psi)
2nd Clutch	[2] (With S_4 switch OFF.)	No or low 2nd pressure	2nd Clutch	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	735 kPa (7.5 kg/cm², 107 psi)
2nd Clutch	[S] or [D]	No or low 2nd pressure	2nd Clutch	490 kPa (5.0 kg/cm², 71 psi) (throttle fully closed)	441 kPa (4.5 kg/cm², 64 psi) (throttle fully closed)
3rd clutch	[S] (With S_4 switch OFF.)	No or low 3rd pressure	3rd Clutch		
4th Clutch	[S] (With S4 switch in operation) or [D]	No or low 4th pressure	4th Clutch	834 kPa (8.5 kg/cm², 121 psi) (throttle more than 3/8 opened)	735 kPa (7.5 kg/cm², 107 psi) (throttle more than 3/8 opened)
	[R]		Servo valve or 4th Clutch	735—834 kPa (8.0—8.5kg/cm², 114—121 psi)	735 kPa (7.5 kg/cm², 107 psi)

(cont'd)

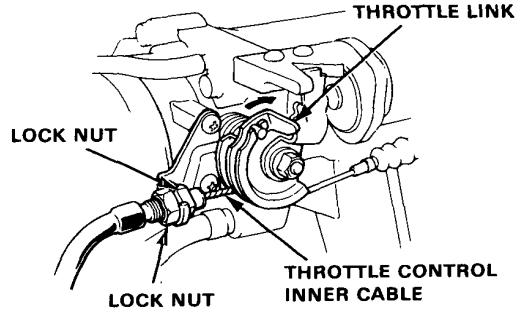
Testing (cont'd)

Low/High Pressure Test

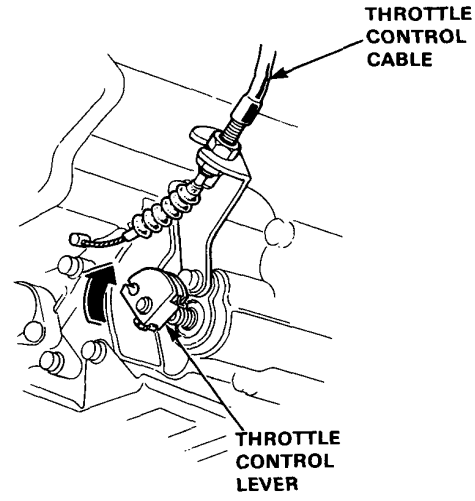
1. Raise car and support with safety stands.
2. Attach the gauge set to the appropriate pressure test port.
3. Remove the cable end of the throttle control cable from the throttle control lever.
   NOTE: Do not loosen the locknuts, simply unhook the cable end.



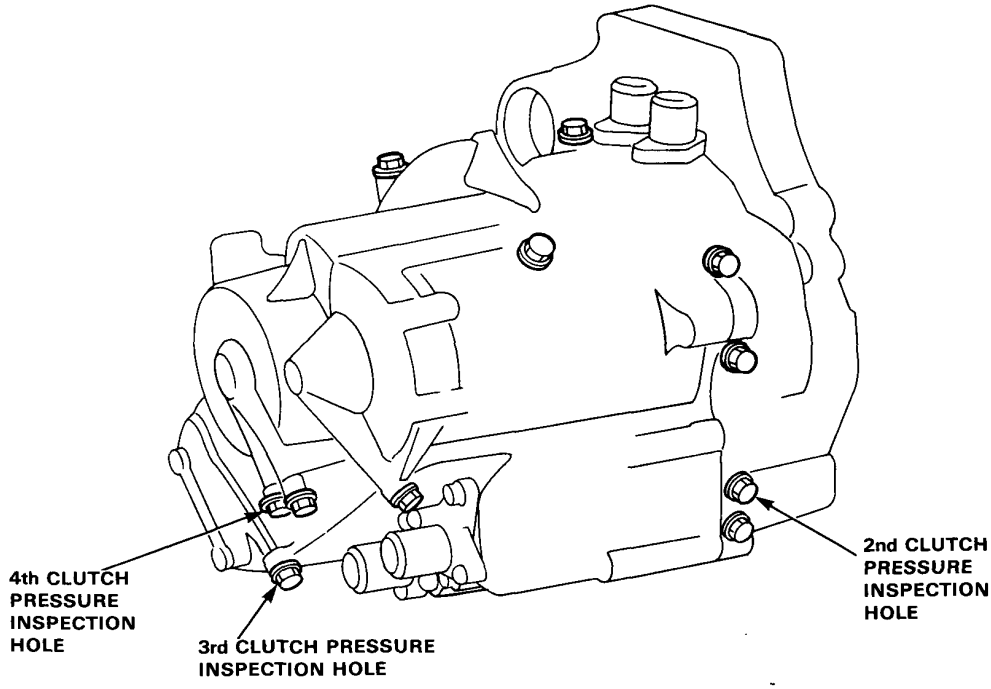
4. Warm up engine to normal operating temperature (cooling fan comes on).
5. With the engine idling, move the selector lever to D3 or D4.
6. Slowly move the throttle linkage to increace engine rpm until pressure is indicaded on the appropriate gauge. Then release the throttle linkage, allowing the engine to return to an idle, and record the pressure reading.
7. Repeat step 6 for each clutch pressure being inspected.



8. With the engine idling, lift the throttle control lever up approximately 1/2 of its possible travel and increase the engine rpm until pressure is indicaded on the appropriate gauge. Record the highest pressure reading obtained.



9. Repeat step 8 for each clutch pressure being inspected.

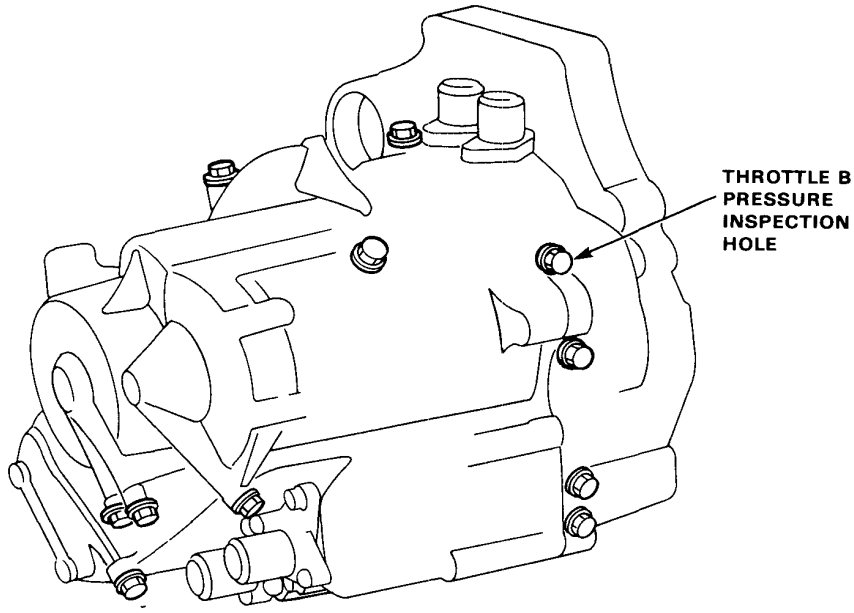


PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE kPa (kg/cm², psi)	
				Standard	Service Limit
2nd clutch	[S] or [D]	No or low 2nd pressure	2nd clutch	490—834 (5.0—8.5, 71—121) Variable engine throttle valve opening.	441—735 (4.5—7.5, 64—107) Variable engine throttle valve opening.
3rd clutch	[S] (With S_4 switch OFF)	No or low 3rd pressure	3rd clutch		
4th clutch	[S] (With S_4 switch in operation) or [D]	No or low 4th pressure	4th clutch		

Testing (cont'd)

Throttle B Pressure Measurement

1. Jack up the front and rear of the car and support them with rigid racks.
2. Run the engine at 1,000 min^{-1}(rpm).
3. Disconnect the throttle control cable from the throttle lever and set the control lever in full throttle position.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Throttle B	[S] or [D]	No (or low) Throttle B pressure	Throttle valve B	785—834 kPa (8.0—8.5 kg/cm^2, 114—121 psi)	735 kPa (7.5 kg/cm^2, 107 psi)

Stall Speed

Test

CAUTION:

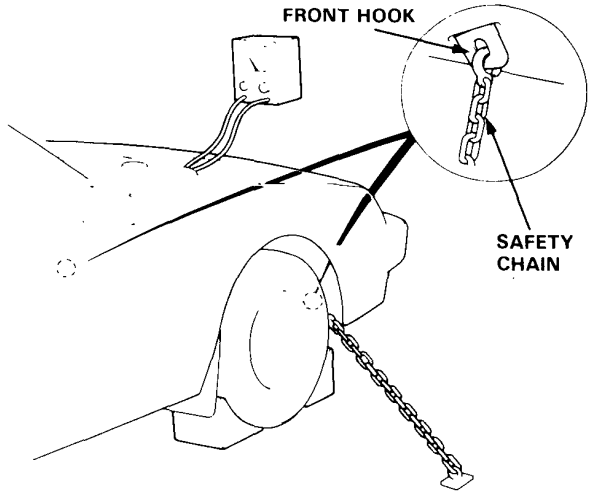
- **To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.**
- **Do not shift the lever while rising the engine speed.**
- **Be sure to remove the pressure gauge before testing stall speed.**

1. Engage parking brake and block the front wheels.
2. Connect safety chains to both front two hooks and attach, with minimum slack, to some strong stationary object.
3. Connect tachometer, and start the engine.
4. After the engine has warmed up to normal operating temperature, shift into [D4].
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 same test in [2], and [R].

NOTE: Stall speed in [D4], [2] and [R] must be the same, and must also be within limits:

Stall Speed RPM:
Specification: 2,750 min^{-1} (rpm)
Service Limit: 2,300—2,900 min^{-1} (rpm)

TROUBLE	PROBABLE CAUSE
Stall rpm high in [2], [D4], and [R]	· Low fluid level or oil pump output. · Clogged oil strainer. · Pressure regulator valve stuck closed. · Slipping clutch.
Stall rpm high in [D4] only	· Slippage of 1st clutch.
Stall rpm low in [2], [D4], and [R]	· Engine output low, throttle cable misadjusted. · Oil pump seized. · Torque converter one-way clutch slipping.



Fluid Level

Checking/Changing

Checking

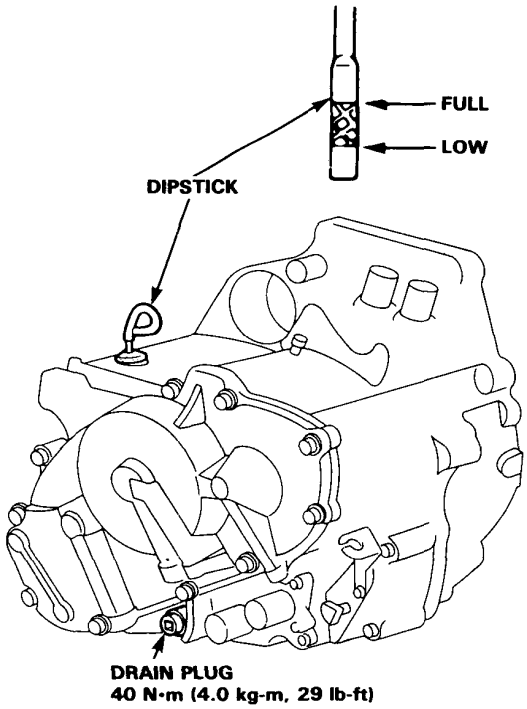
With the car on level ground, pull the transmission dipstick and check the level of fluid immediately after the engine is shut off (within one minute). The fluid level should be between the full and low marks. Push the dipstick all the way in to check the fluid level. If the level is at, or below, the low mark, add DEXRON-II type automatic transmission fluid.

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 full mark on the dipstick.

   Automatic transmission Capacity:
   3.2 ℓ (3.4 U.S. qts., 2.8 Imp. qt) at change
   6.4 ℓ (6.8 U.S. qts, 5.8 Imp. qt) after overhaul



Removal

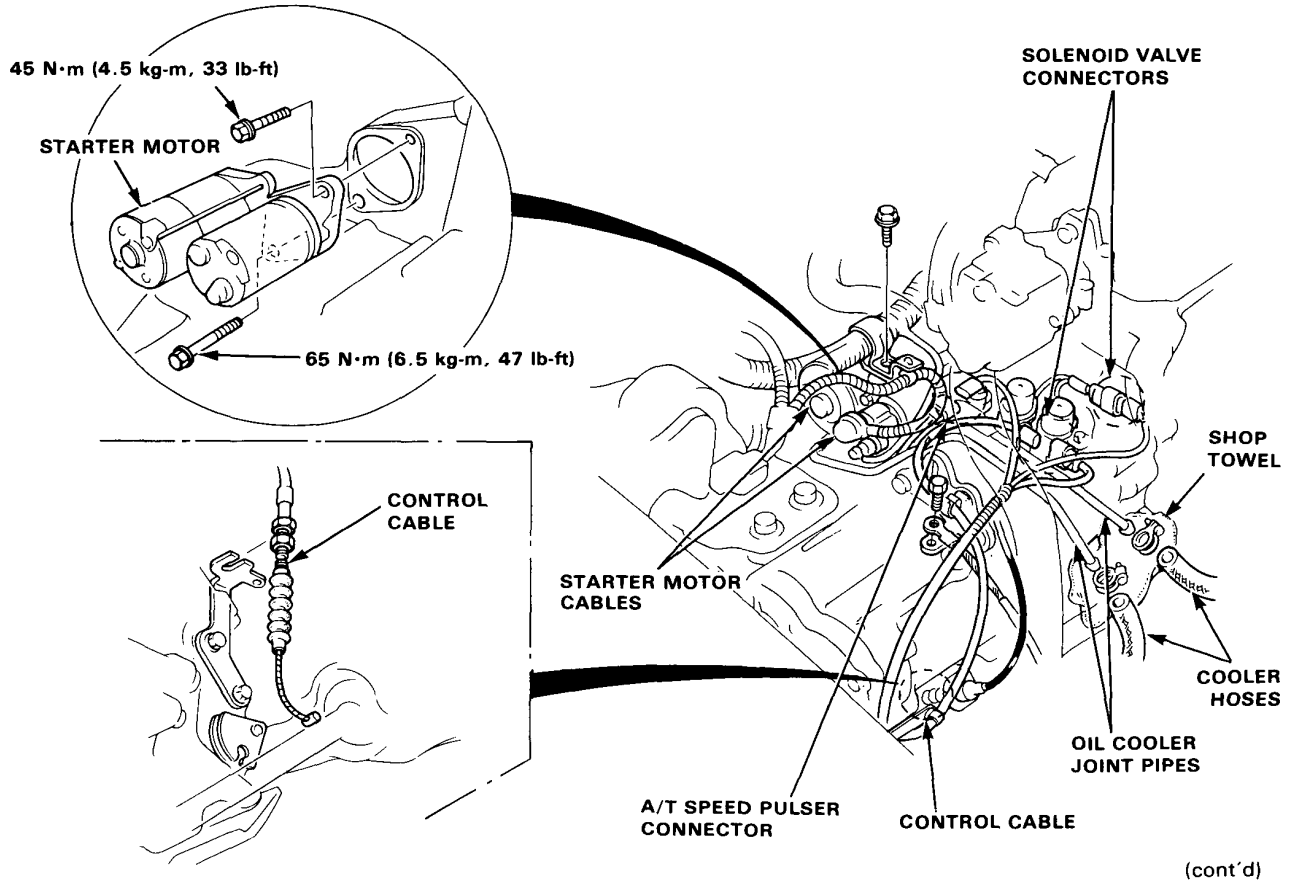
⚠WARNING

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

CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative (−) and positive (+) cables from the battery.
2. Remove the 3 mounting bolts and loosen the 1 bolt located at the side of the battery base, and intake hose base, and intake hose band of the throttle body.
3. Remove the air cleaner case complete with the intake hose.
4. Remove the starter motor and transmission ground cables.
5. Disconnect the lock-up control solenoid valve and shift control solenoid valve wire connectors and A/T speed pulser connector.
6. Disconnect the control cable at the control lever.
7. Drain transmission oil/fluid. Use a drive socket wrench to remove the drain plug. Remove the oil filler plug to speed draining. Reinstall the drain plug with a new washer.
8. Disconnect the cooler hoses at the joint pipes. Turn the ends up to prevent ATF from flowing out.

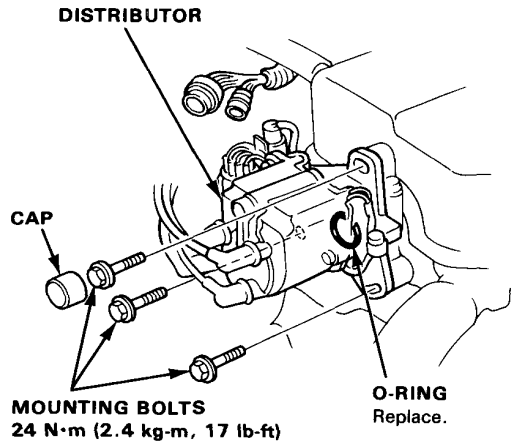
   NOTE: Check for any signs of leak at the hose joints.



(cont'd)

Removal (cont'd)

9. Disconnect the connectors and remove the mounting bolts, then remove the distributor from the cylinder head.



10. Remove the shift cable by removing the cotter pin, control pin, control lever roller and loosening the locking nut.

CAUTION: Take care not to bend the cable when removing it and lift the cable hanging by wire it up to the body.

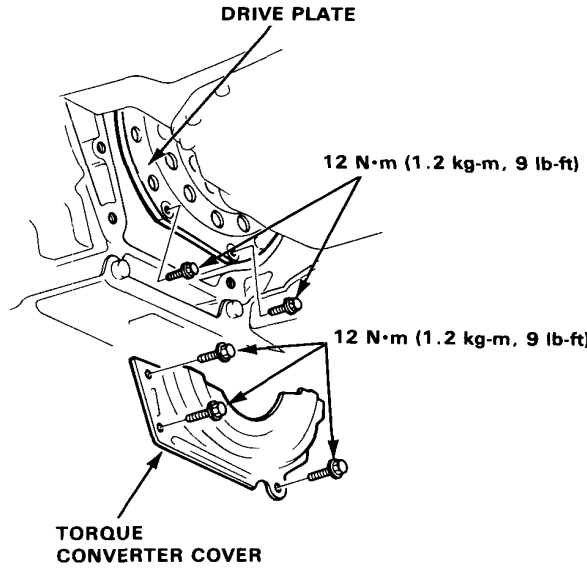
11. Disconnect the speedometer cable.

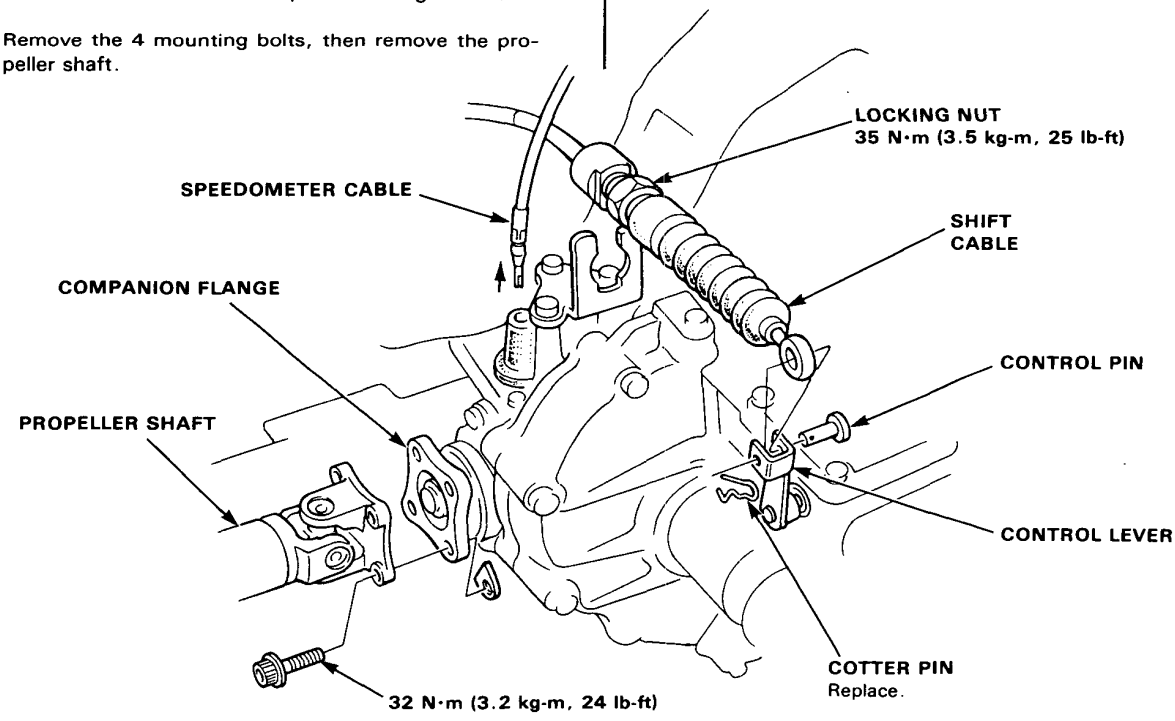
NOTE: Do not disassemble speedometer gear holder.

12. Remove the 4 mounting bolts, then remove the propeller shaft.

13. Remove the torque converter cover.

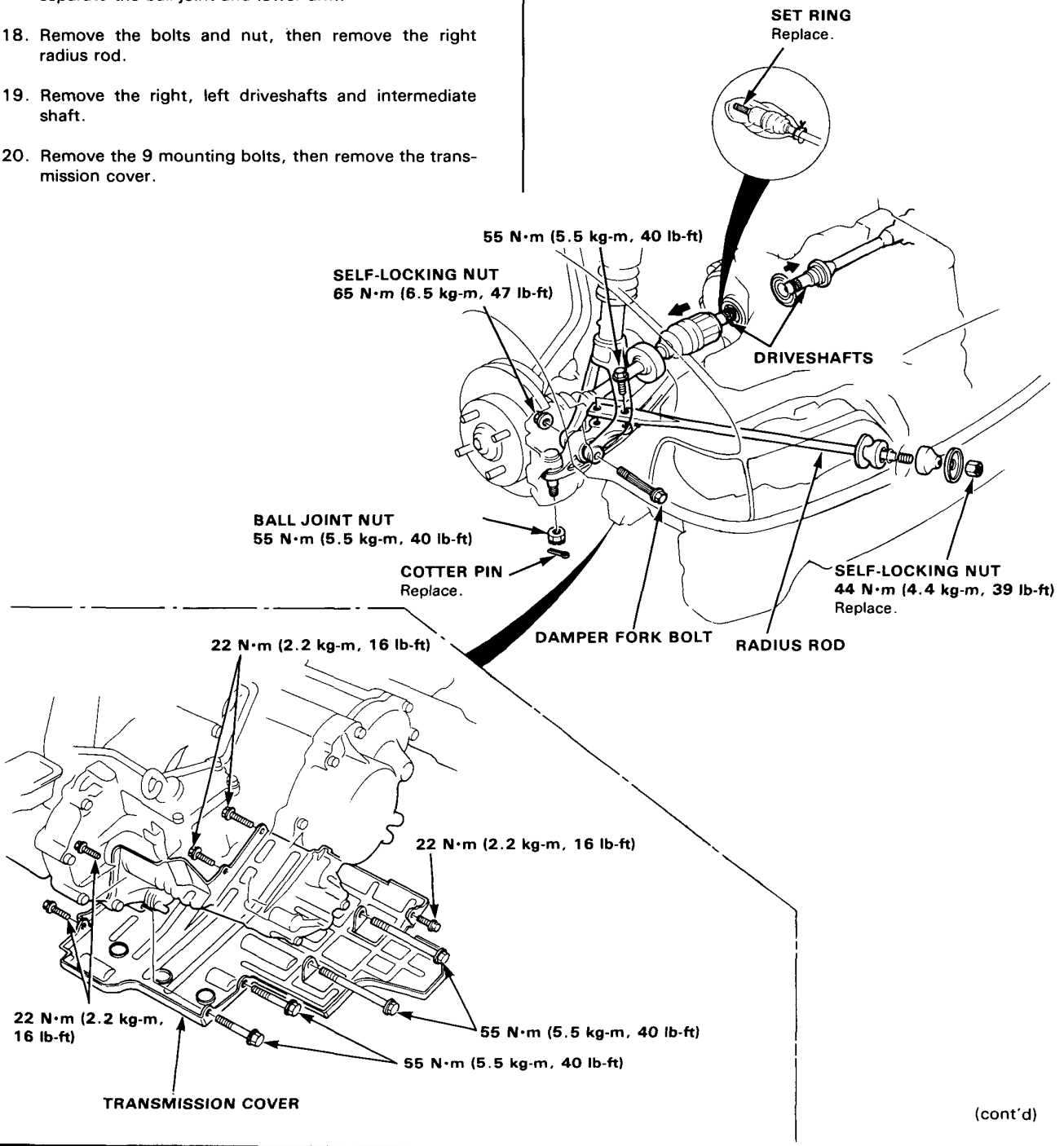
14. Remove the plug, then remove the drive plate bolts one at a time while rotating the crankshaft pulley.





15. Remove the engine splash shield and the right wheel well splash shield.
16. Remove the header pipe.
17. Remove the cotter pin and lower arm ball joint nut, separate the ball joint and lower arm.
18. Remove the bolts and nut, then remove the right radius rod.
19. Remove the right, left driveshafts and intermediate shaft.
20. Remove the 9 mounting bolts, then remove the transmission cover.

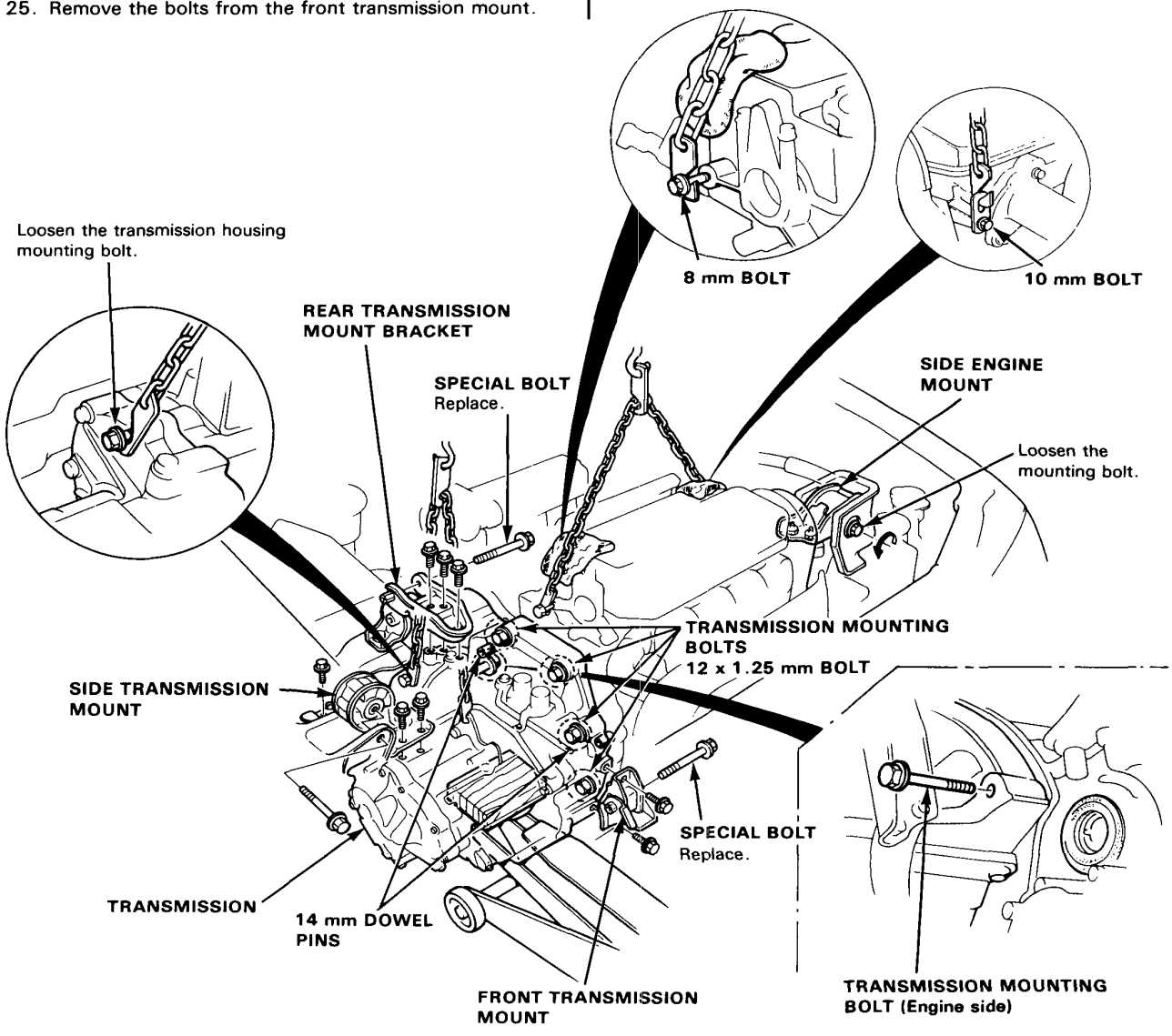
NOTE: Coat all precision finished surfaces with clean engine oil or grease.
Tie plastic bags over the driveshaft ends.



(cont'd)

Removal (cont'd)

21. Install the bolts at the cylinder head and attach a hoist chain to the bolt and the other end to the engine hanger plates, then lift the engine slightly to unload the mounts.
22. Attach a chain hoist to the transmission hoist bracket and transmission housing mounting bolt. Raise the hoist just enough to remove slack from the chain.
23. Place a jack under the transmission and raise transmission just enough to take weight off mounts.
24. Remove the transmission mounting bolt of the engine side.
25. Remove the bolts from the front transmission mount.
26. Remove the rear transmission mount bracket by removing the 4 mounting bolts.
27. Remove the 4 mounting bolts, then remove the side transmission mount.
28. Remove the 4 transmission mounting bolts.
29. Loosen the side engine mounting bolt, tilt the engine and pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower or the transmission jack.



Installation

Install the transmission in the reverse order of removal. After the transmission is in place:

CAUTION: Take care not to bend the cable when installing it.

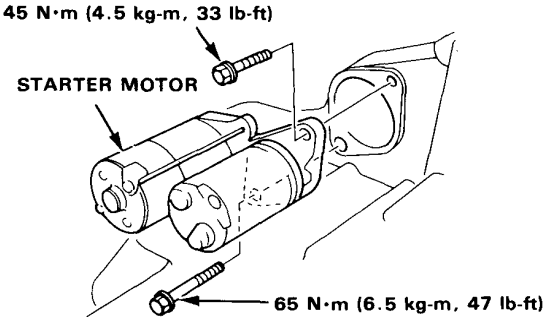
- Torque engine and transmission mounting bolts in sequence shown.

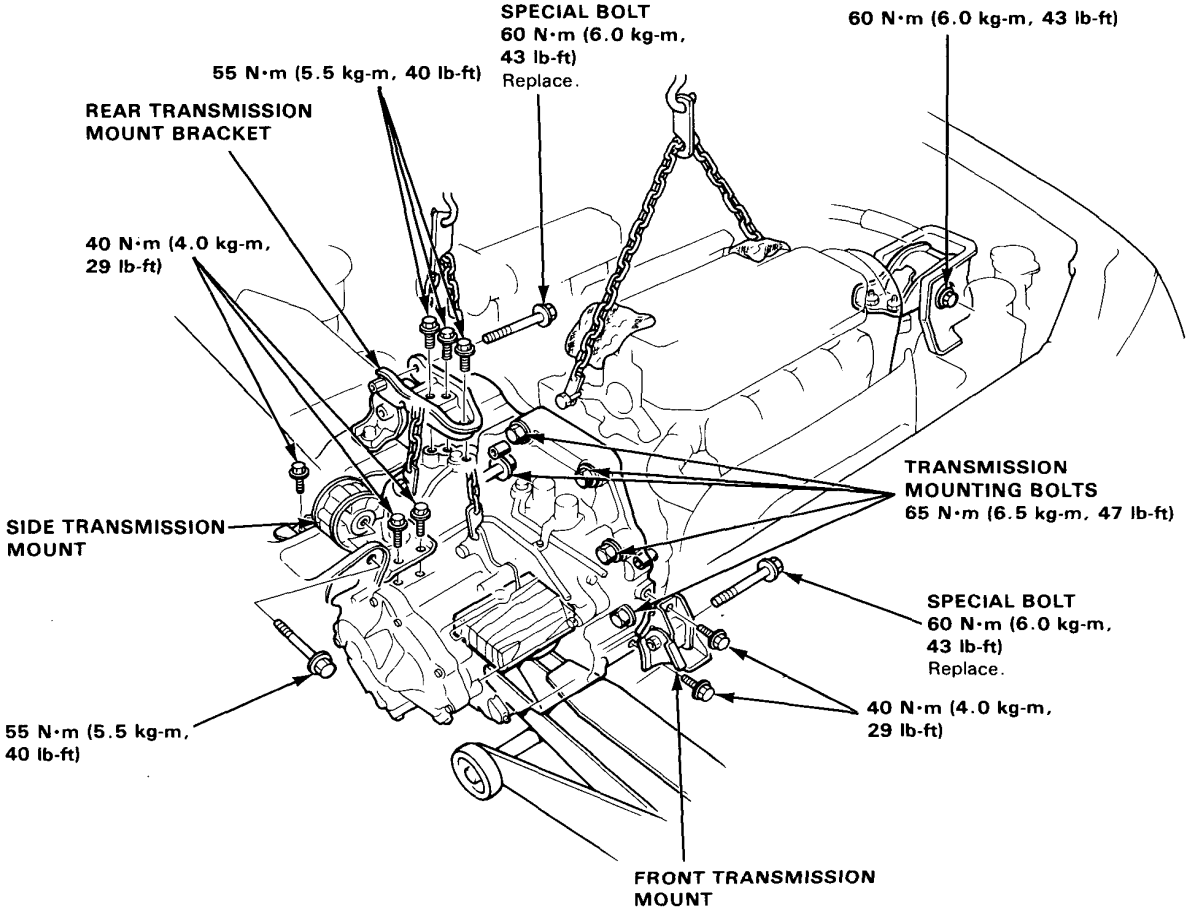
CAUTION: Failure to tighten the bolts in the proper sequence can cause excessive noise and vibration, and reduce bushing life: check that the bushings are not twisted or offset.

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

CAUTION: Use new spring clips on installation.

- Refill the transmission with ATF.
- Check the ignition timing.
- Start the engine, set the parking brake, and shift the transmission through all gears three times. Check for proper control cable adjustment.
- Let the engine reach operating temperature with the transmission in Neutral or Park, then turn it off and check the fluid level.
- Road test as described on page 9 — 66.





Shift Cable

Removal/Installation

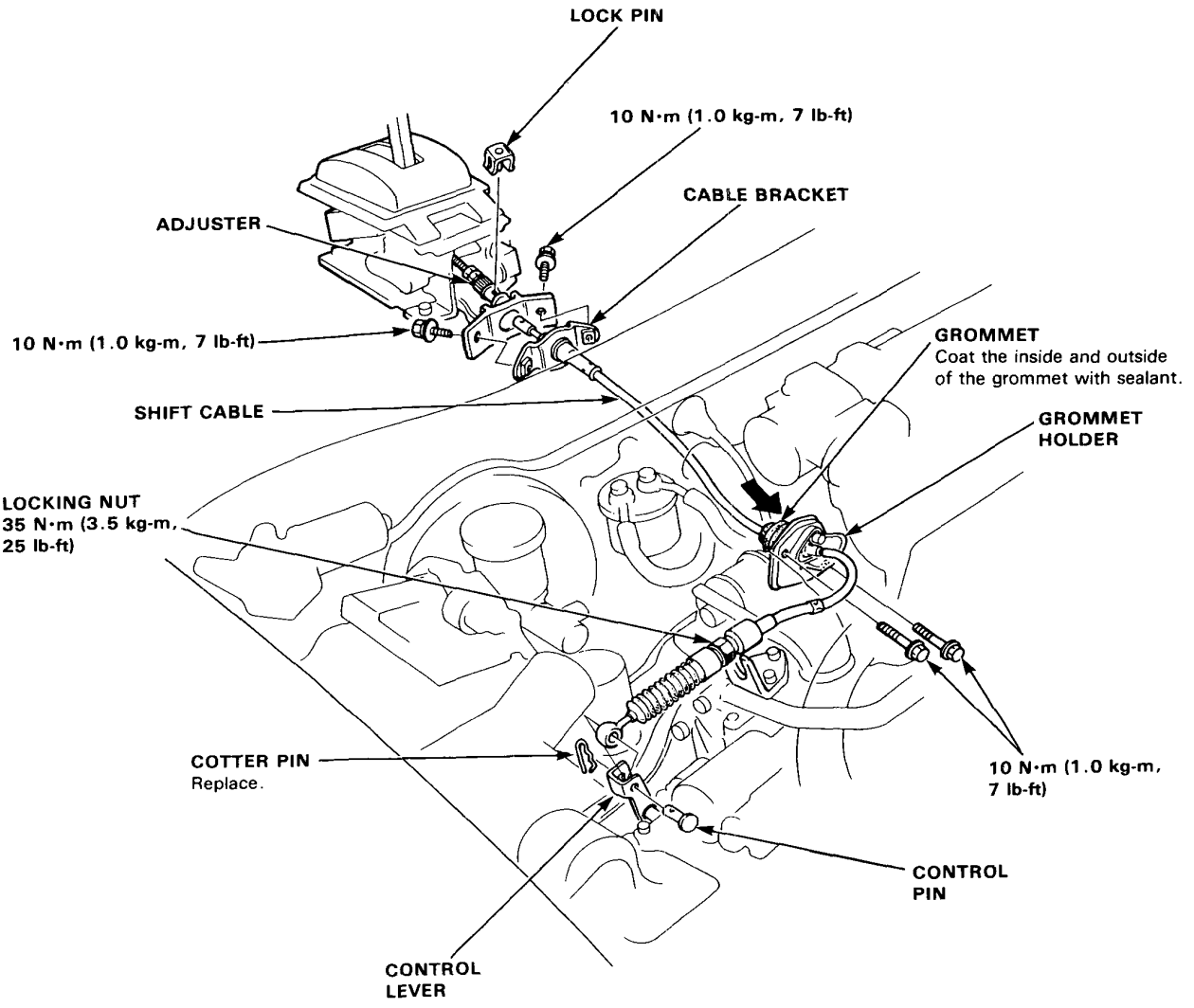
⚠WARNING

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

1. Remove the shift cable by removing the cotter pin, control pin, control lever roller and loosening the locking nut.
2. Remove the front console.
3. Remove the lock pin from the cable adjuster, then remove the shift cable.
4. Remove the header pipe.
5. Remove the propeller shaft and front stabilizer.
6. Remove the bolts, then remove the cable grommet holder and grommet.
7. Pull the shift cable out from the engine compartment.

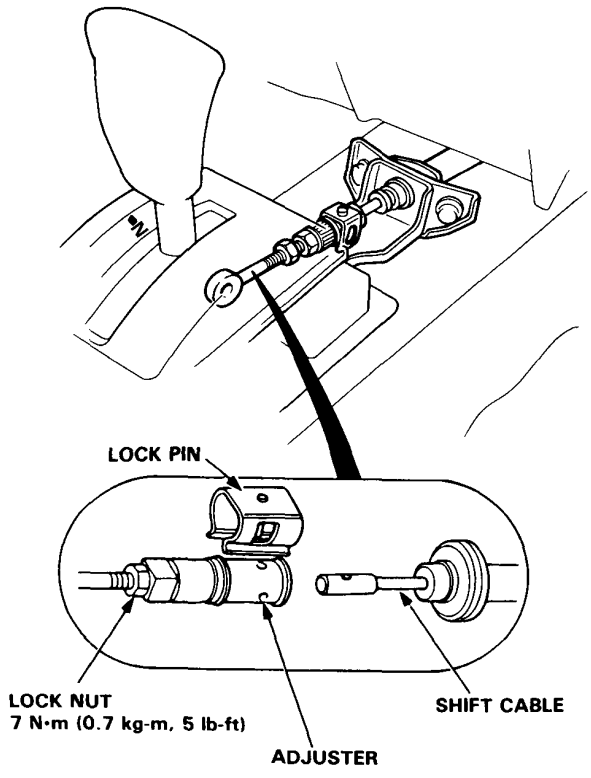
   CAUTION: Take care not to bend the cable when removing it.

8. Install the shift cable in the reverse order of removal.
   NOTE : On reassembly, check the cable adjustment.

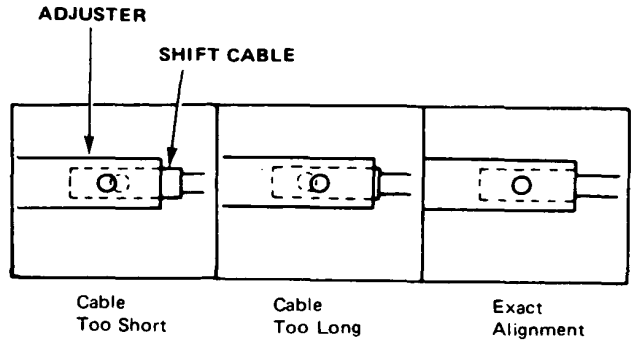


Adjustment

1. Start the engine. Shift to reverse to see if the reverse gear engages. If not, refer to Troubleshooting.
2. With the engine off, remove the console.
3. Shift to [N] position, then remove the lock pin from the cable adjuster.



4. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable.



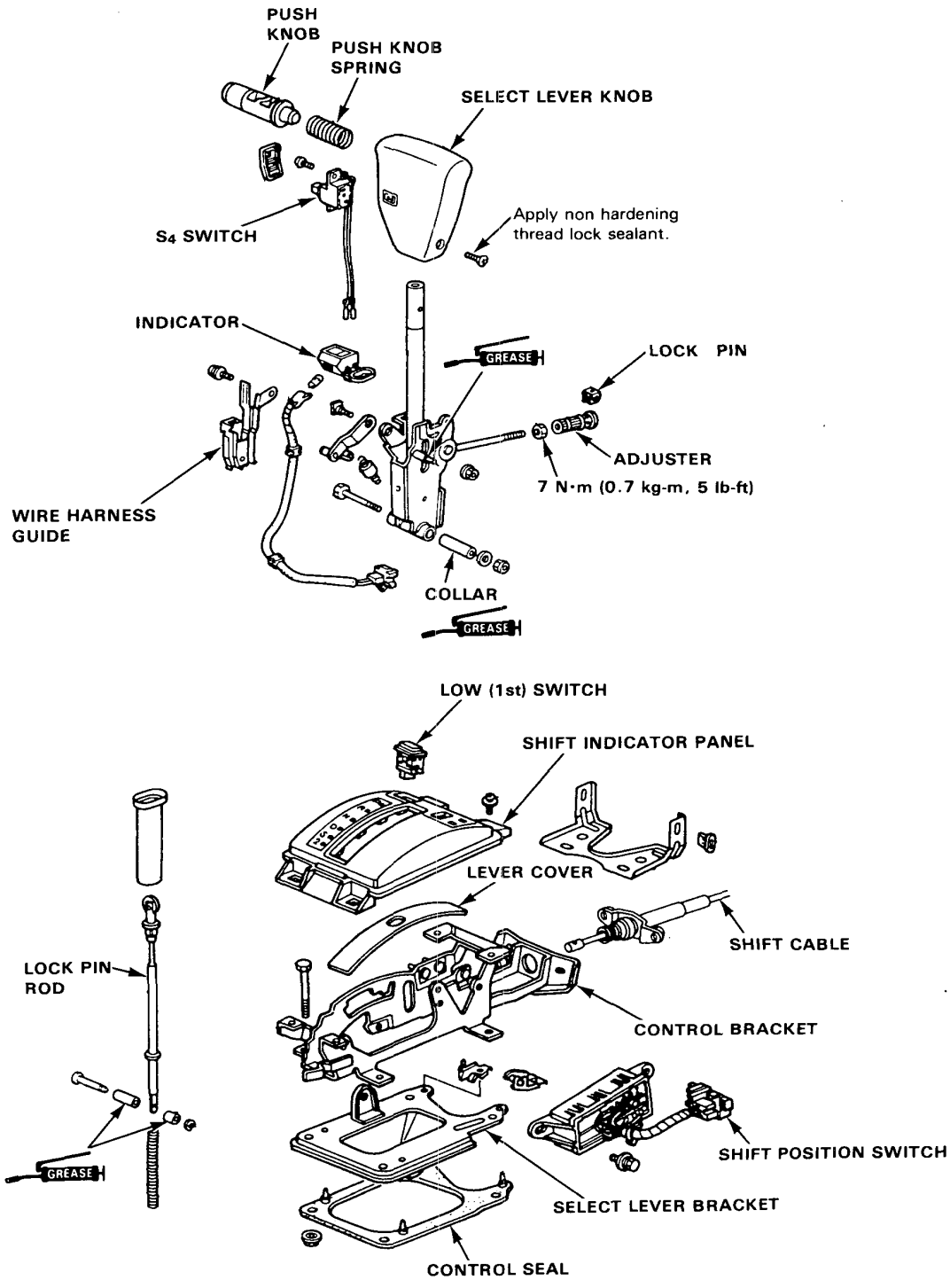
NOTE: There are two holes in the end of the shift cable. They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.

5. If not perfectly aligned, loosen the lock nut on shift cable and adjust as required.
6. Tighten the lock nut.
7. Install the lock pin on the adjuster.

NOTE: *If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.*

8. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting on page 9 — 63.

Gear Shift Selector



Throttle Control Cable

Adjustment/Inspection

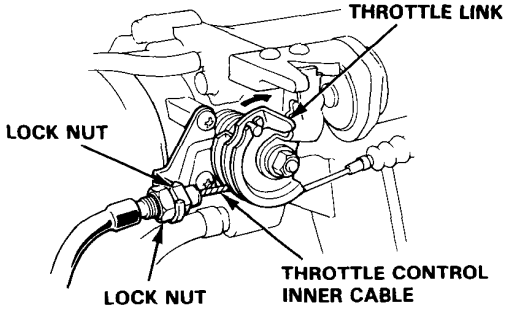
NOTE: Before adjusting the throttle control cable, make sure:

- The throttle cable free play is correct.
- The engine is at normal operating temperature (cooling fan comes on).
- The idle speed is correct.

Inspection:

NOTE: You can work the throttle linkage body with your hand.

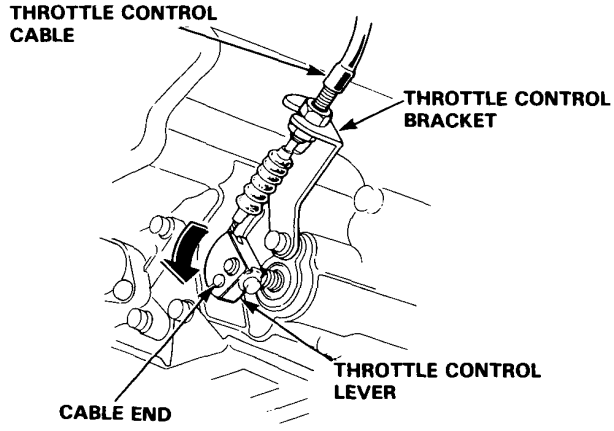
1. Disconnect the vacuum tube from the dash pot. connect the vacuum pump and keep vacuum applied.
   This simulates a normal operating amount of pull by the dash pot as if the engine were running.
2. Remove the throttle cable free play.
3. Apply light thumb pressure to the throttle control lever, then work the accelerator or throttle linkage. The lever should move just as the engine speed increases above idle. If not, proceed to Adjustment.



Adjustment:

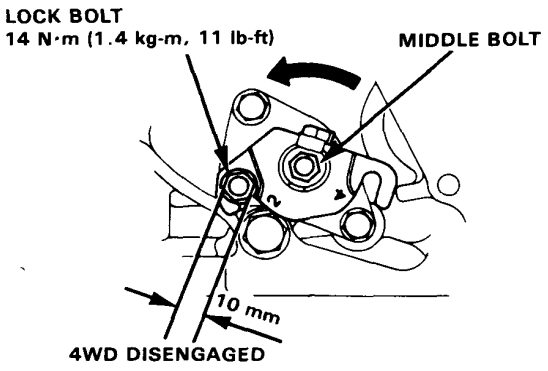
1. Loosen the nuts on the control cable at the transmission end and synchronize the control lever to the throttle.

NOTE: To tailor the shift/lock-up characteristics to a particular customers driving expectations, you can adjust the control cable up to 3 mm shorter than the "synchronized" point.



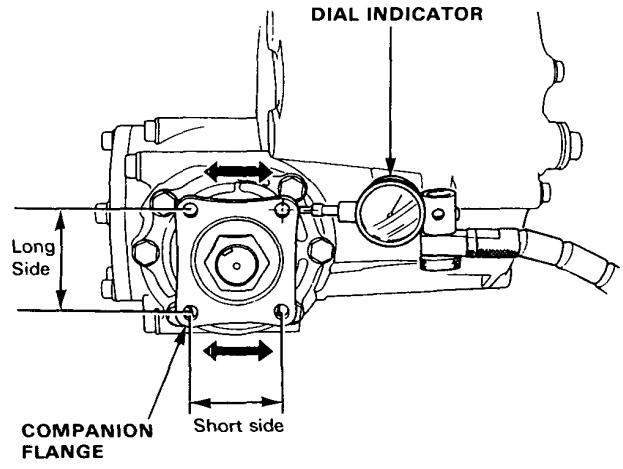
Inspection

1. Shift the disengagement lever to 2WD.



2. Check the backlash at the companion flange with a dial indicator; measure as shown, then rotate the flange 180° and measure again.

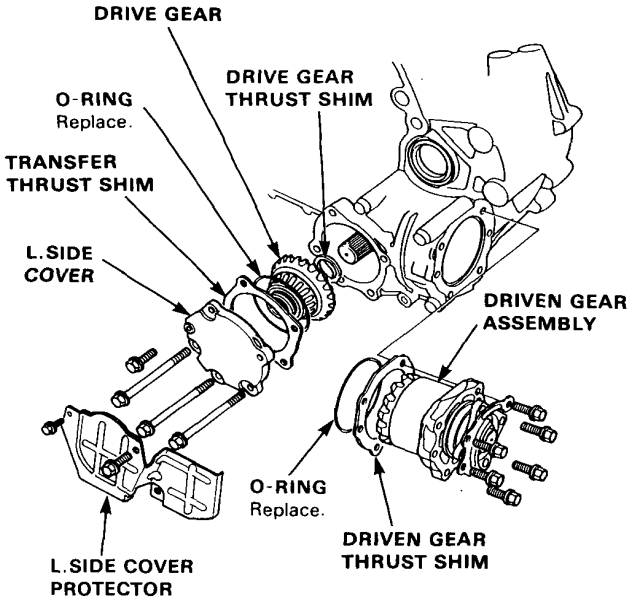
   Standard: 0.10—0.15 mm (0.004—0.006 in.)



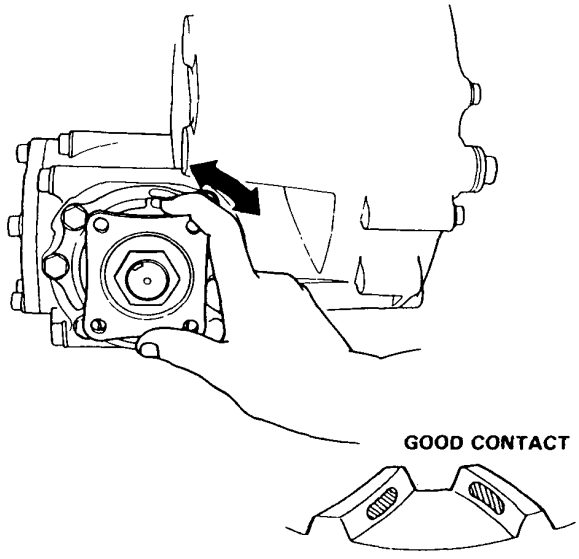
3. If the backlash is outside the specifications, adjust as per the instruction described on page 9 — 97.

Gear Tooth Contact

1. Shift the disengagement lever to 2WD.
2. Remove the transfer drive and driven gear assembly.

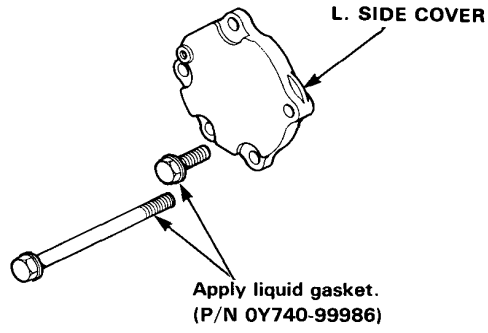


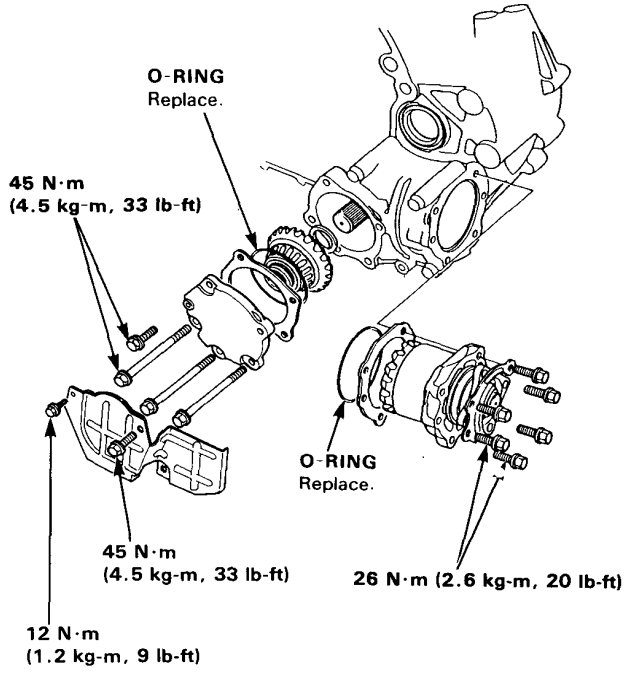
3. Apply Prussian Blue evenly to the driven gear teeth.
4. Reinstall the gear and tighten the mounting bolts to the correct torque.
5. Turn the companion flange back and forth several times, then remove the driven gear assembly and inspect the pattern on the gear's teeth.



6. If the contact pattern is not as shown, correct it according to the instructions on page 9 — 97.
7. If the tooth contact is correct, reassemble the drive and driven gears as follows.

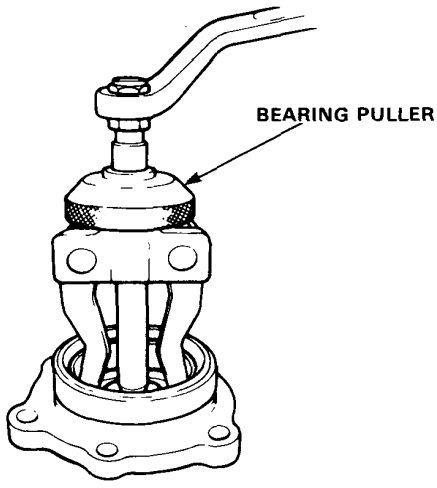
NOTE:
- Replace the O-ring with a new one.
- Coat the O-ring with oil.
- Apply liquid gasket (P/N OY740—99986) to threads of L. side cover attaching bolts.



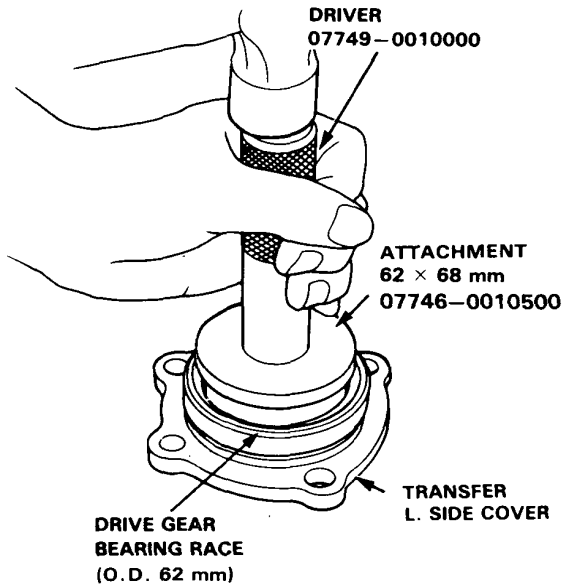


L. Side Cover Race Replacement

1. Remove the drive gear bearing race with a bearing puller as shown.

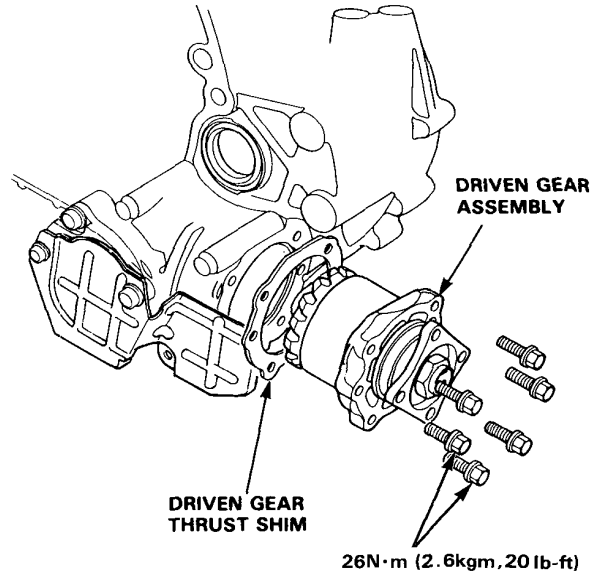


2. Install the new race with the special tools as shown.

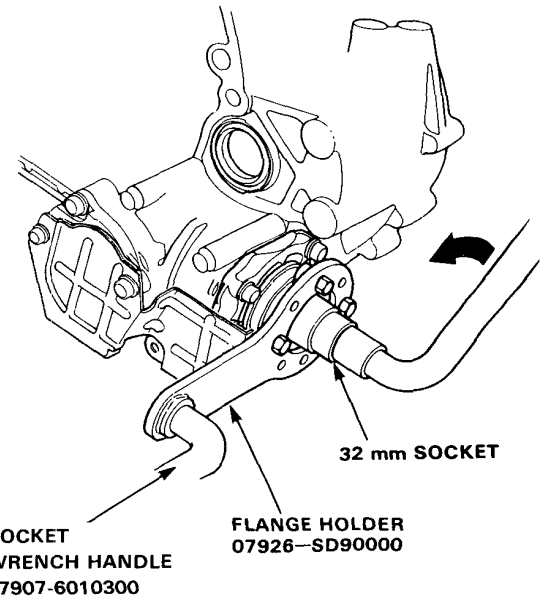


Transfer Driven Gear Disassembly

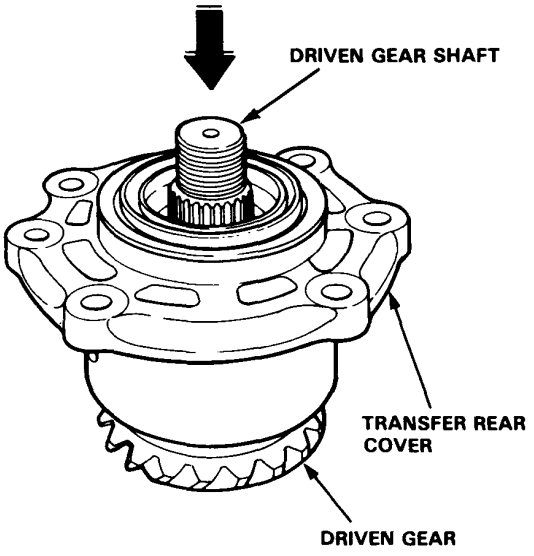
1. Slide the driven gear assembly into the torque converter housing and secure with the six bolts.



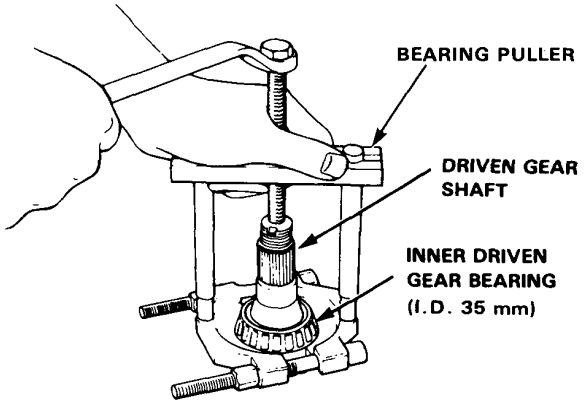
2. Raise the locknut tab from the groove of the driven gear shaft.
3. Hold the companion flange with the special tool and remove the lock nut with a 32 mm socket.



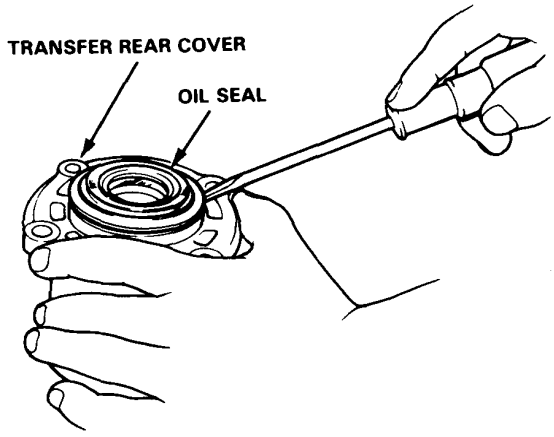
4. Remove the driven gear from the transfer rear cover by tapping the driven gear shaft.



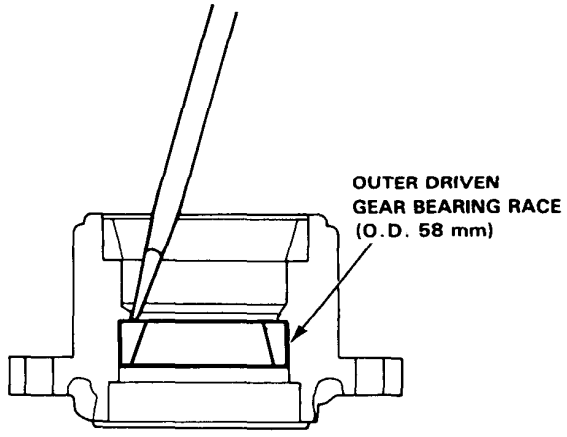
5. Remove the inner driven gear bearing from the driven gear shaft.



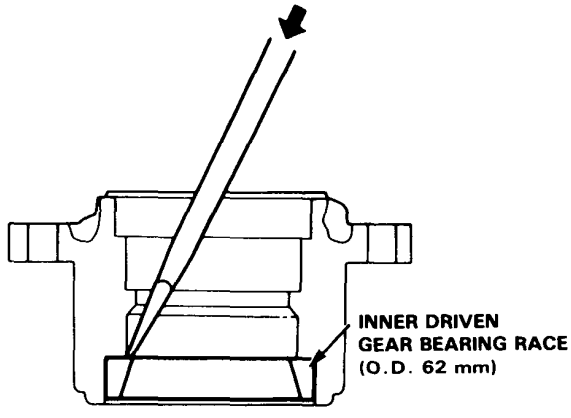
6. Pry the oil seal off the transfer rear cover.



7. Remove the bearing race from the transfer rear cover.



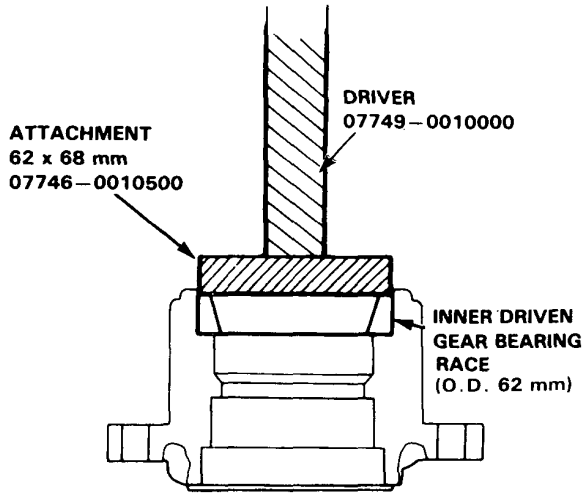
8. Remove the bearing race from the transfer rear cover.



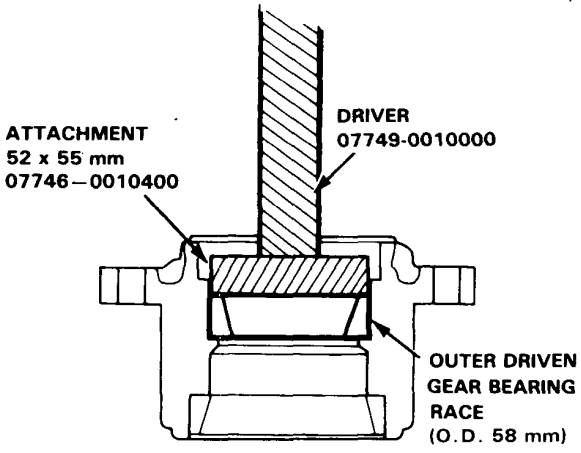
Driven Gear Pre-load

NOTE: Clean all tools and parts thoroughly in solvent and dry with compressed air.

1. Press the inner driven gear bearing race into the transfer rear cover with the special tools as shown.

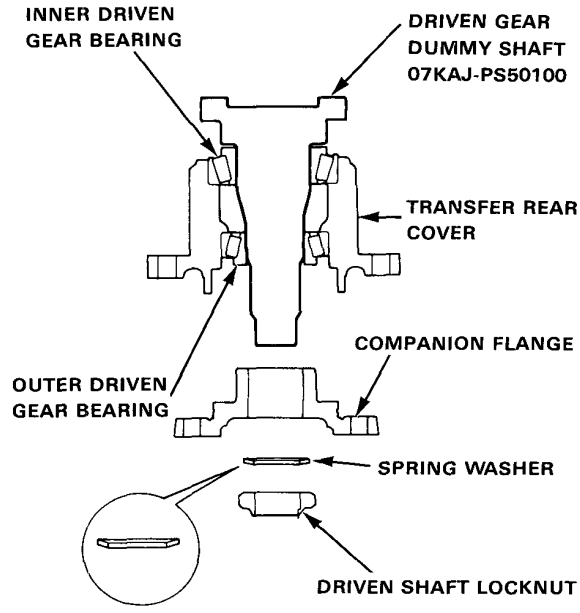


2. Press the outer driven gear bearing race into the transfer rear cover with the special tools as shown.



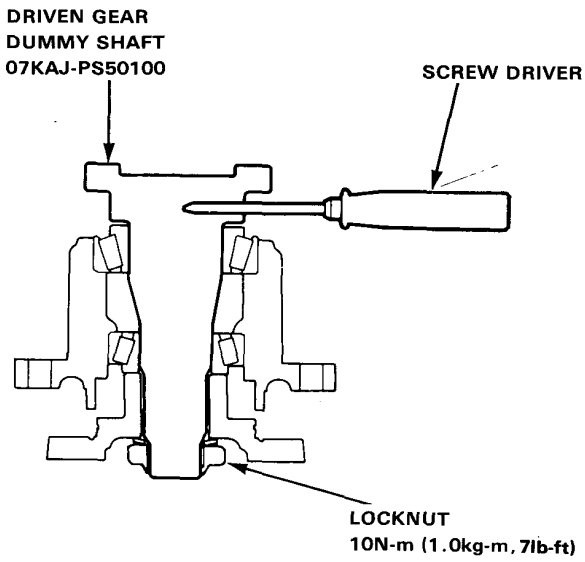
3. Coat the races with clean oil.

4. Slide the inner driven gear bearing onto the special tools.
Install the spesial tools with bearing into the rear cover.



5. Install the outer driven gear bearing, companion flange, spring washer and driven shaft locknut.
NOTE :
- Use a new driven shaft locknut.
- Do not assemble the oil seal.
- Take care the spring washer direction.

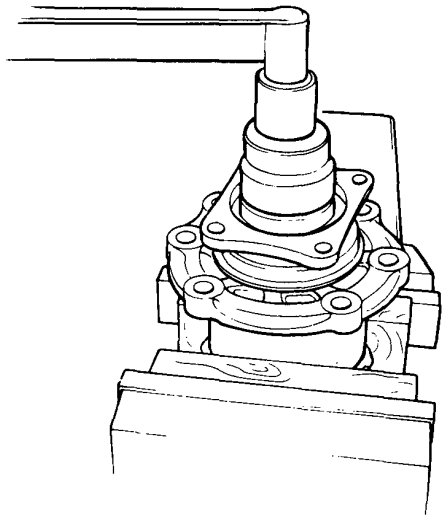
6. Install a screw driver into the special tool and then torque the locknut to 10 N·m (1.0kg-m, 7lb-ft).



7. Measure the driven pinion preload.

NOTE: Before measuring the preload, turn the threaded shaft several times to seat the bearing.

Standard: 0.5—0.8 N·m (5.0—8.0 kg-cm, 4.3—6.9 lb-in)



8. If the preload is outside the above limits, re-adjust by turning the locknut.

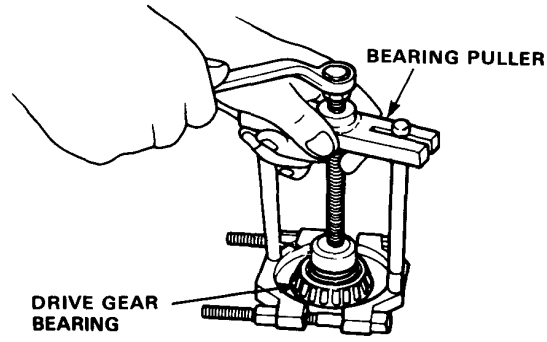
NOTE: Do not overtighten the locknut.

Adjustment/Reassembly, (Thrust Shim Selection)

1. Insert the threaded shaft/driven gear rear cover assembly into the transfer housing.

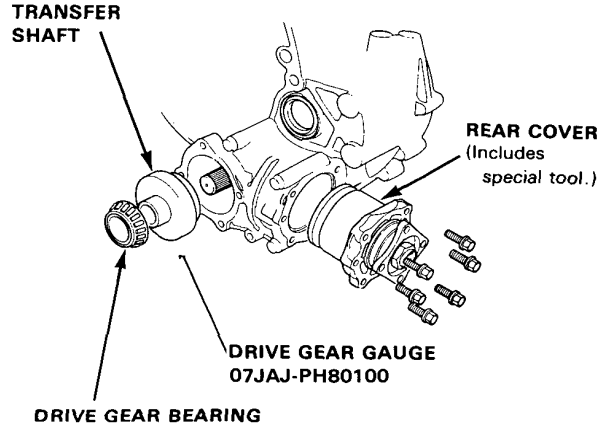
NOTE: The pre-load must be properly adjusted before selecting shims. See page 9 — 88.

2. Remove the drive gear bearing with a bearing puller.



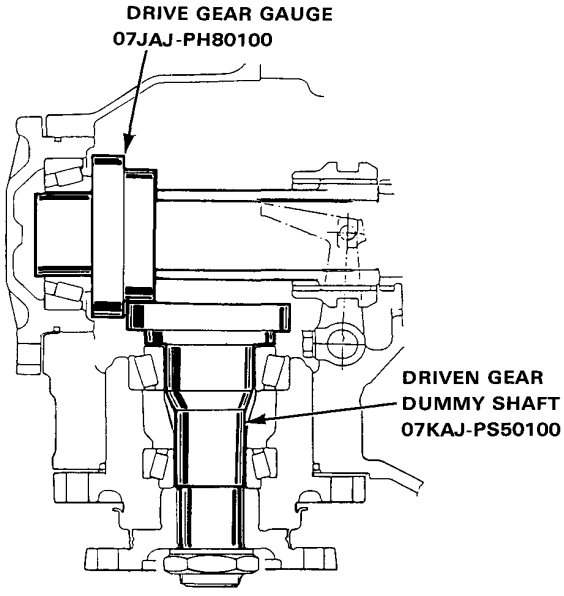
3. Lubricate the drive gear bearing with clean oil, then install it on the Drive Gear Gauge. Slide the bearing and gauge onto the transfer shaft.

NOTE:
- Do not install the drive gear thrust shim.
- Pull the Rear cover assembly out slightly to allow the drive gear gauge to seat.



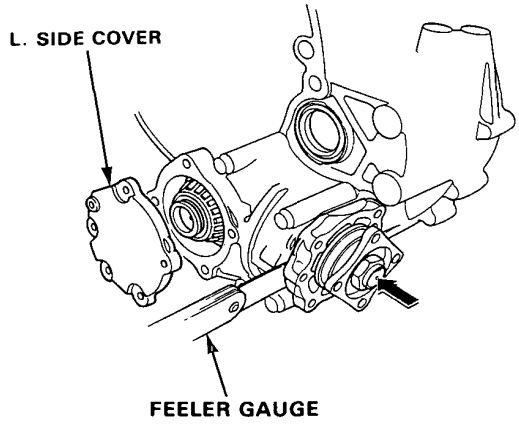
(cont'd)

Adjustment/Reassembly (Thrust Shim Selection) (cont'd)



4. Install L. side cover without the bolts.
5. To determine driven gear thrust shim thickness, measure the clearance between the tranafer rear cover and transfer case with a feeler gauge, then record the clearance.

NOTE: The clearance should be taken while pressing the dummy shaft all the way in.



6. The correct rear cover shim thickness is determined by recording the clearance between the transfer rear cover and the transfer case, then adding or sub tracting the machining tolerance, which is etched in to the driven gear.

NOTE: The plus (+) or minus (−) number given as machining tolerance represements hundredths of a millimeter.

Example:

- Clearance measured in Step 5: 1.08 mm
- Machining tolerance etched in the driven gear: (+2)

Corrected driven gear thrust shim thickness:

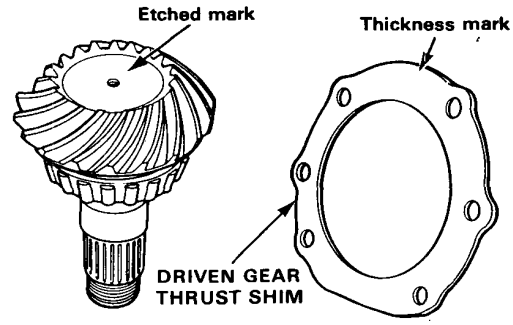
1.08 + 0.02 mm = 1.10 mm

Example:

- Clearance measured in Step 5: 1.08 mm
- Machining tolerance etched in the driven gear: (−3)

Corrected driven gear rear cover shim thickness:

1.08−0.03 mm=1.05 mm

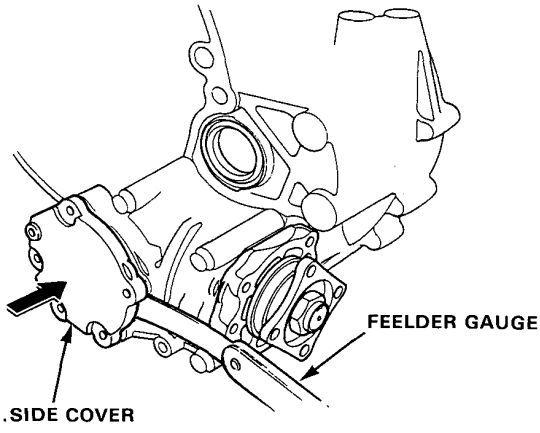


DRIVEN GEAR THRUST SHIM:

Part No.	Thickness
29481−PH8−000	0.50 mm (0.020 in.)
29482−PH8−000	0.85 mm (0.033 in.)
29483−PH8−000	0.90 mm (0.035 in.)
29484−PH8−000	0.95 mm (0.037 in.)
29485−PH8−000	1.00 mm (0.039 in.)
29486−PH8−000	1.05 mm (0.041 in.)
29487−PH8−000	1.10 mm (0.043 in.)
29488−PH8−000	1.15 mm (0.045 in.)
29489−PH8−000	1.20 mm (0.047 in.)
29491−PH8−000	1.25 mm (0.049 in.)
29492−PH8−000	1.30 mm (0.051 in.)

7. To determine the left side cover shim thickness measure the clearance between the transfer L. side cover and transfer case with a feeler gauge, and record the clearance.

NOTE: The clearance should be measured while pressing the L. side cover all the way against the transfer case.



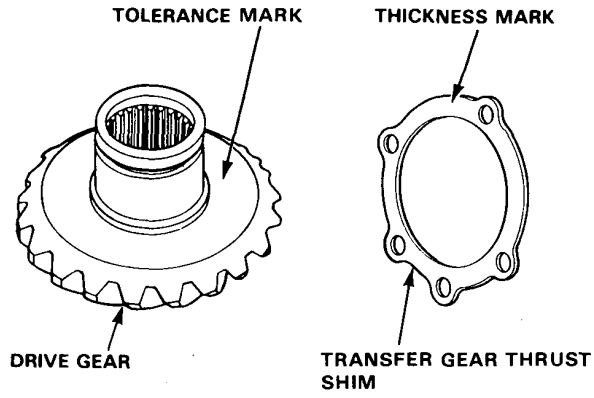
8. The correct shim thickness is determined by recording the clearance between the transfer case and the left side cover, then adding or subtracting the machining tolerance, which is etched into the drive gear.

Example:

- Clearance measured in Step 7: 1.04 mm
- Machining tolerance etched on drive gear: (+2)
  Corrected transfer thrust shim thickness:
  1.04+0.02 mm=1.06 mm

Example:

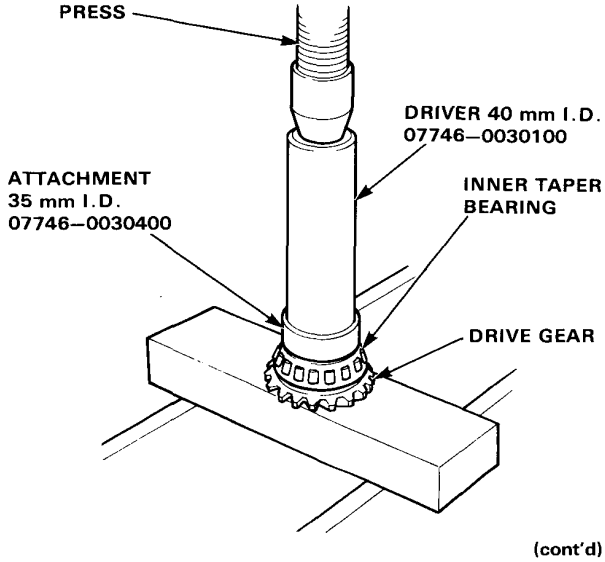
- Clearance measured in Step 7: 1.04 mm
- Machining tolerance etched on drive gear: (−1)
  Corrected transfer thrust shim thickness:
  1.04−0.01 mm=1.03 mm



TRANSFER GEAR THRUST SHIM:

Part No.	Thickness
29461—PS5—000	0.30 mm (0.012 in.)
29462—PS5—000	1.00 mm (0.039 in.)
29463—PS5—000	1.03 mm (0.041 in.)
29464—PS5—000	1.06 mm (0.042 in.)
29465—PS5—000	1.09 mm (0.043 in.)
29466—PS5—000	1.12 mm (0.044 in.)
29467—PS5—000	1.15 mm (0.045 in.)
29468—PS5—000	1.18 mm (0.046 in.)
29469—PS5—000	1.21 mm (0.048 in.)
29471—PS5—000	1.24 mm (0.049 in.)
29472—PS5—000	1.27 mm (0.050 in.)
29473—PS5—000	1.30 mm (0.051 in.)
29474—PS5—000	1.33 mm (0.052 in.)

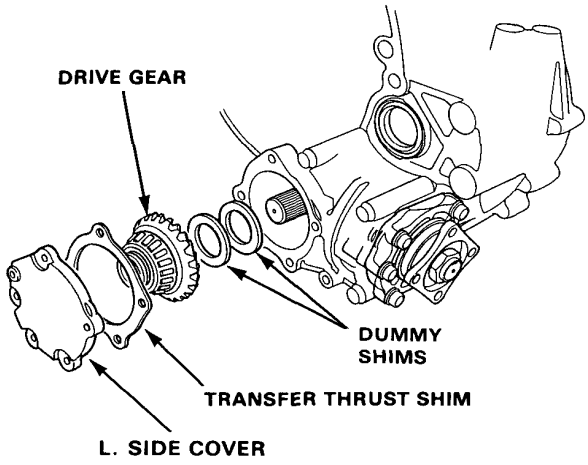
9. Press the drive gear bearing on the drive gear.



(cont'd)

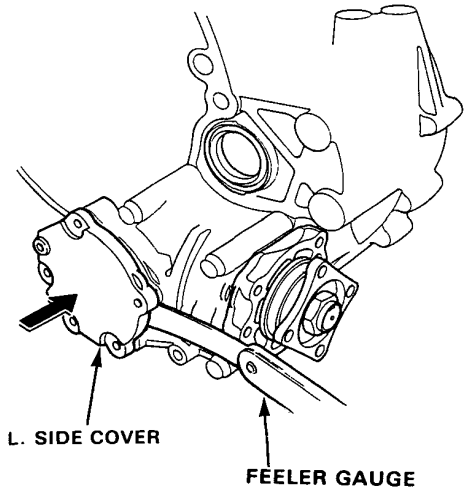
Adjustment/Reassembly (Thrust Shim Selection) (cont'd)

10. Install two 1.75 mm "dummy shim" (P/N 29415-PH8000) on the transfer shaft.
Slide the drive gear onto the transfer shaft.



11. Place the shim selected in Step 7 on the L. side cover, and install the cover on the transfer case without bolt.

12. Measure the clearance between the L. side cover and transfer case while pushing against the L. side cover, and record the clearance.



13. Subtract the elearance measured in Step 13 from 3.5 mm (2 dummy shims) to obtain the corrected shim thickness.

Example:
- Clearance measured in Step 13:
  1.57 mm
- Thickness of dummy shims:
  3.5 mm

Corrected drive gear thrust shim:
3.5–1.57 mm
Thickness: 1.93 mm

DRIVE GEAR THRUST SHIM:

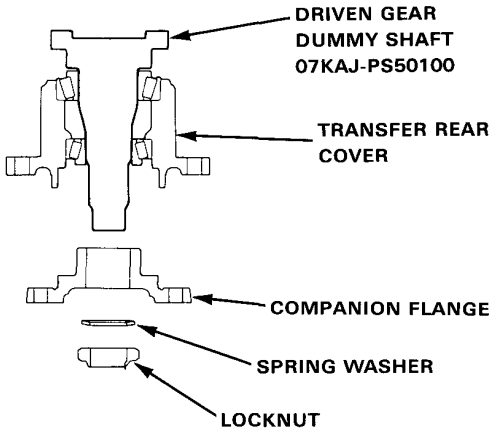
Part No.	Thickness
29411—PH8—000	0.48 mm (0.019 in.)
29412—PH8—000	1.57 mm (0.062 in.)
29413—PH8—000	1.63 mm (0.064 in.)
29414—PH8—000	1.69 mm (0.067 in.)
29415—PH8—000	1.75 mm (0.069 in.)
29416—PH8—000	1.81 mm (0.071 in.)
29417—PH8—000	1.87 mm (0.074 in.)
29418—PH8—000	1.93 mm (0.076 in.)
29419—PH8—000	1.99 mm (0.078 in.)

14. Remove "dummy shim" and install L. side cover.

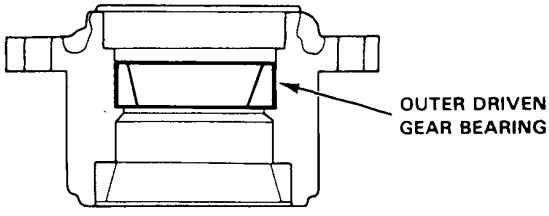
NOTE: After the thrust shim selection check the proper backlash and tooth contact pattern. See pages 9—96 through 9—98.

Driven Gear Reassmbly

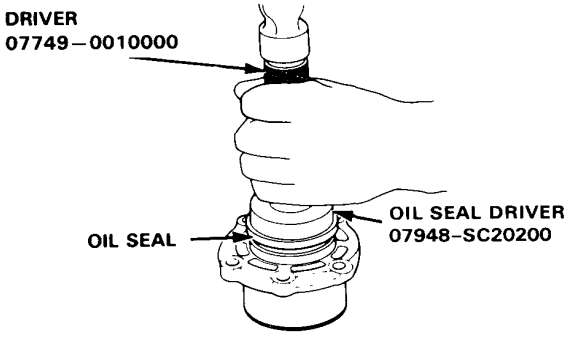
1. Remove the special tool from the transfer rear cover.



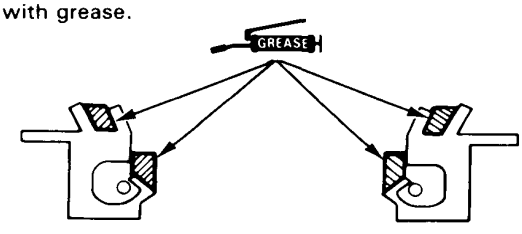
2. Install the outer driven gear bearing in the transfer rear cover.



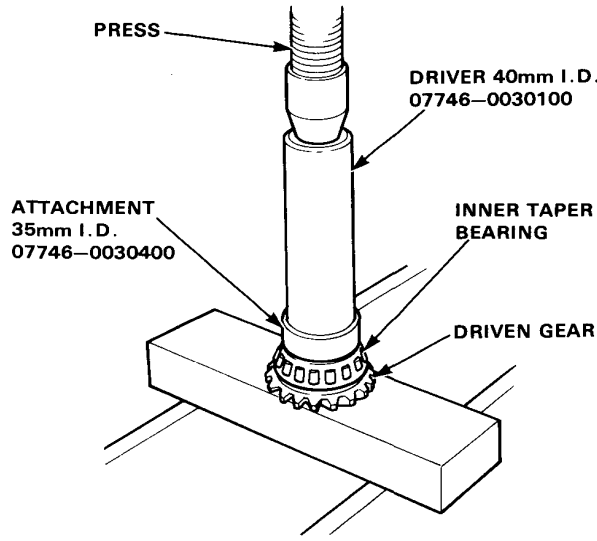
3. Press the oil seal into the transfer rear cover.



4. Coat the main and side sealing lips of the oil seal with grease.

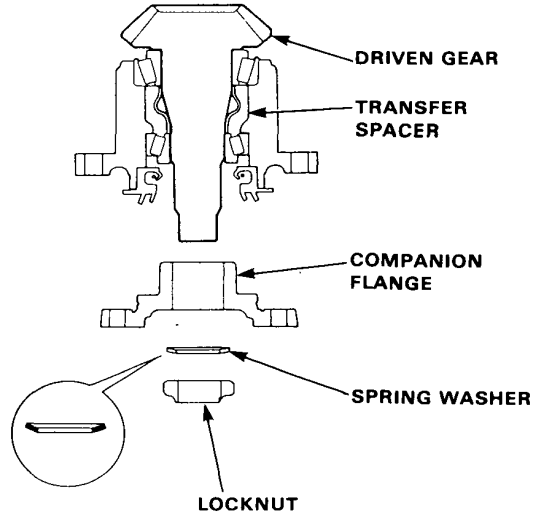


5. Press the inner driven gear bearing on the driven gear.



6. Install the following parts in the transfer rear cover:
   - Driven gear
   - *Transfer spacer (new spacer)*
   - Companion flange
   - Spring washer
   - Driven gear locknut

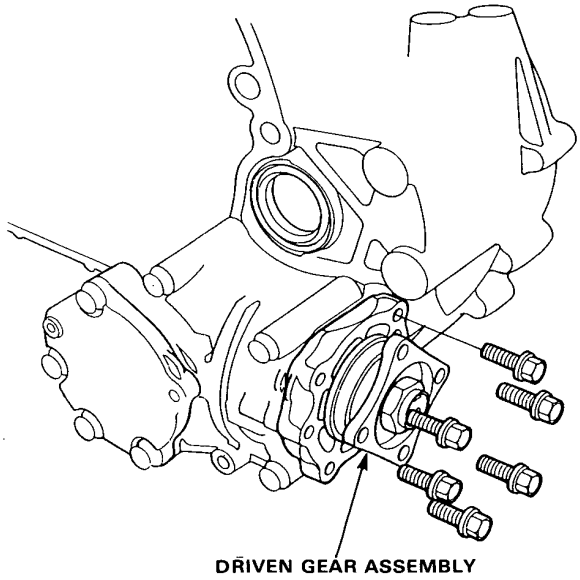
NOTE: Install the spring washer with the dished side toward the companion flange.



(cont'd)

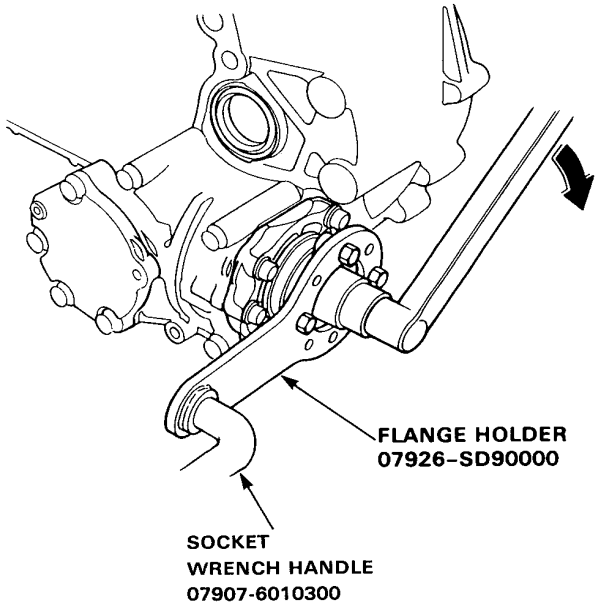
Driven Gear Reassembly (cont'd)

7. Temporarily install the driven gear assembly and mounting bolts in the transfer case.



8. To measure preload, tighten the locknut to the specified torque.

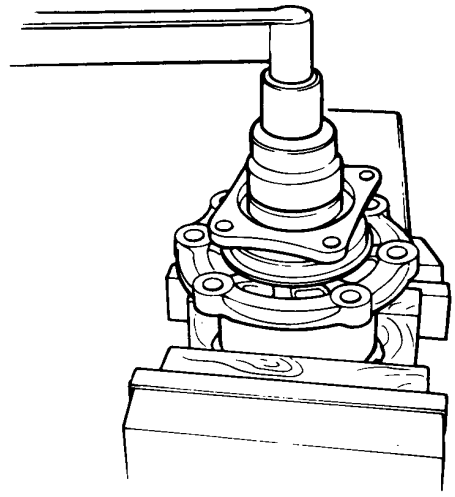
Torque: 120 N·m (12 kg-m, 87 lb-ft)



9. Remove the driven gear assembly from the transfer case, and measure the preload.

NOTE: Before measuring the preload, rotate the companion flange several times to assure normal bearing contact.

Preload: 0.8–1.1 N·m
(8.0–11.0 kg-cm, 6.9–9.5 lb-in)



NOTE: If the preload exceeds 1.1 N·m (11.0 kg-cm, 9.5 lb-in), replace the transfer spacer with a new one and readjust. Do not try to adjust the preload by loosening the locknut.

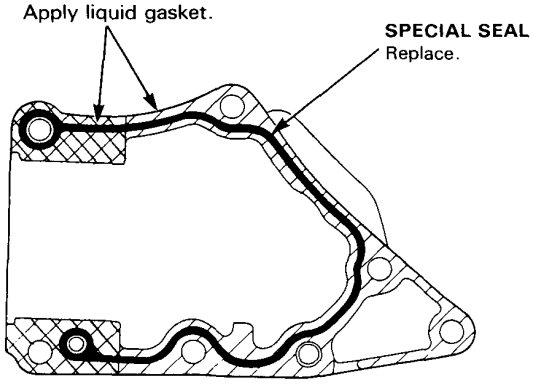
10. If the preload is less than 0.5 N·m (5 kg-cm, 4.3 lb-in), adjust by turning the lock nut in a little at a time.

NOTE: Replace the transfer spacer with a new one if the preload is still outside the above limits when the lock nut is tightened to 230 N·m (23 kg-m, 166 lb-ft)

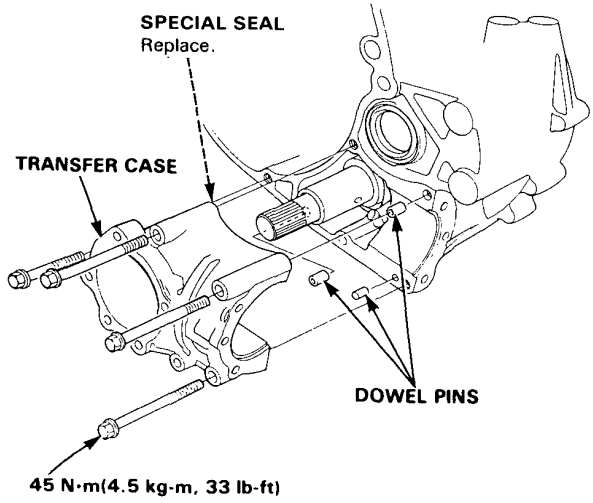
Driven/Drive Gear Reassembly

1. Apply liquid gasket to the torque converter housing mating surface of the transfer case and install the spesial seal as shown. Use liquid gasket Part No. OY740—99986.

NOTE:
- Check that the mating surface are clean and dry before applying liquid gasket.
  Degrease the mating surfaces if necessary.
- Apply liquid gasket evenly, being careful to cover all the mating surface.
- To prevent leakage of all, apply liquid gasket to inner threads of bolt holes.
- Do not install the parts 20 minutes or more have elapsed since applying gasket.
  In that case, reapply liquid gasket after removing the old residue.
- Wait at least 30 minutes before filling with oil.

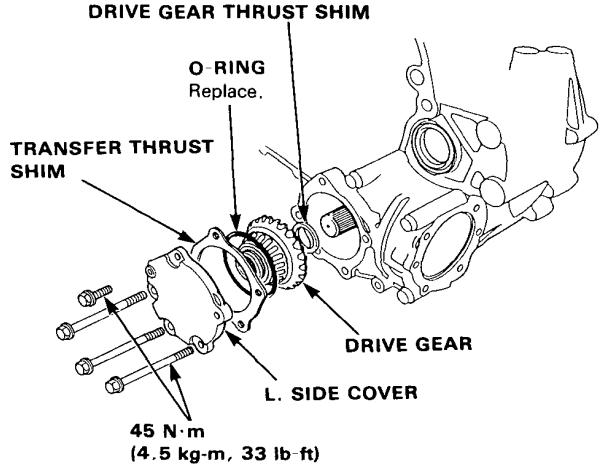


2. Install the transfer case on the torque converter housing.



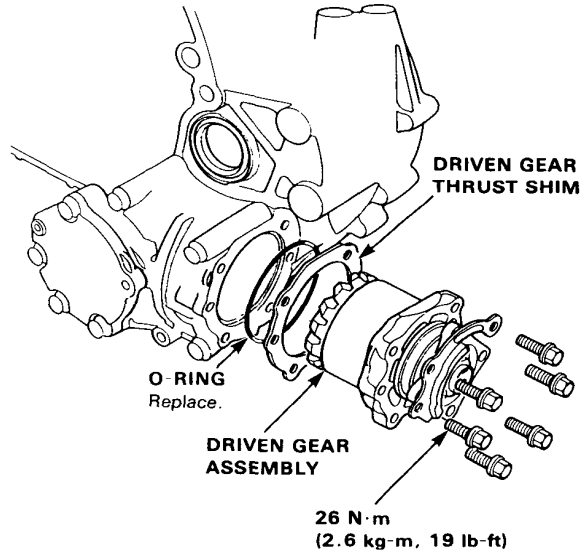
3. Install the following parts in and on the transfer case and shaft:

- Transfer thrust shim
- Drive gear (coat with clean oil)
- O-ring (replace)
- Drive gear thrust shim
- L. side cover bolts.



4. Install the following parts:

- Driven gear thrust shim
- Driven gear assembly
- Driven gear assembly bolts



(cont'd)

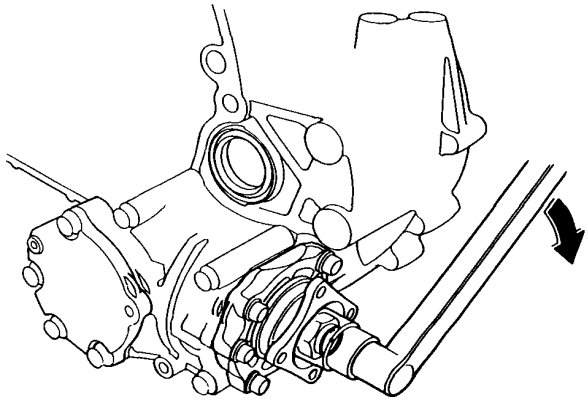
Driven/Drive Gear Reassembly (cont'd)

5. Measure the total bearing preload:
   - Rotate the companion flange several times to assure normal bearing contact.
   - Set the disengagement lever in 2WD position.
   - Measure the preload with a torque wrench.

   The total bearing preload should be 0.7–1.0 N·m (7.0–10.0 kg-cm, 6,1–8.75 lb-in) greater than the preload on the driven gear assembly alone (see page 9–94, step 9).

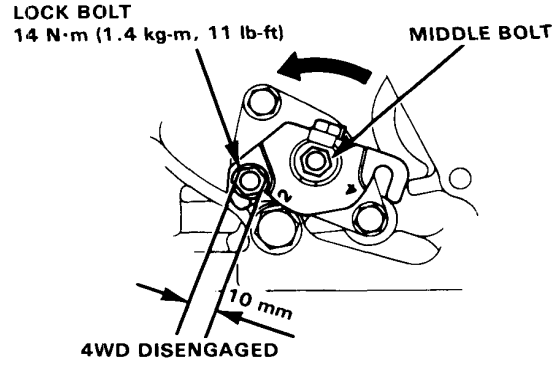
   Example:

   If the preload of the driven gear assembly alone was 0.9 N·m (9 kg-cm, 7.8 lb-in), the total bearing preload should be between 1.6 N · m (16 kg-cm, 13.9 lb-in), and 1.9 N·m (19 kg-cm, 16.5 lb-in).



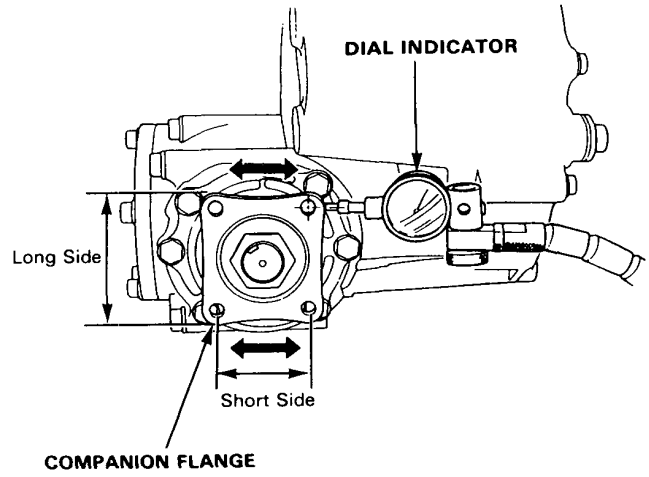
6. If the preload is outside the specifications, adjust it by replacing the transfer thrust shim.
   - If the total bearing preload is less than the specification, reduce the size of the transfer thrust shim.
   - If the total bearing preload is more than the specification, increase the size of the transfer thrust shim.

7. After the bearing preload has been adjusted properly, measure the gear backlash.
   - Place the disengagement lever in 2WD.

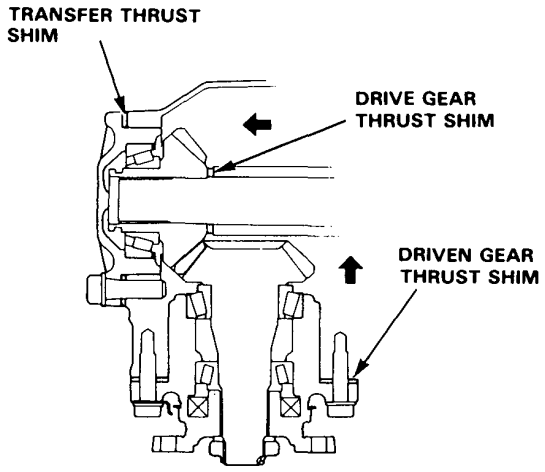


   - Using a dial indicator, measure the backlash at the top of the companion flange, then rotate the companion flange 180°and measure again.

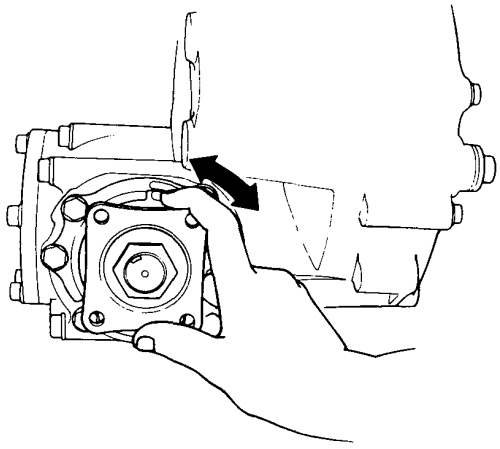
   Backlash: 0.09–0.14 mm (0.004–0.006 in.)



- If the backlash is outside the specifications, adjust by changing the driven gear thrust shim.

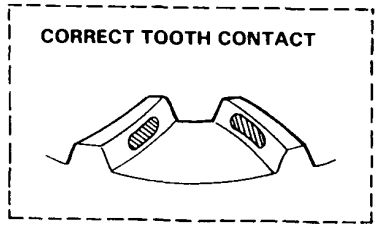


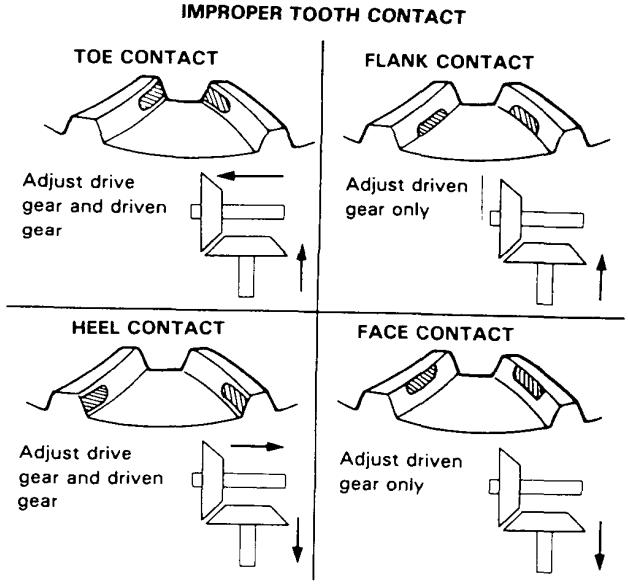
8. Check for proper tooth contact after the backlash adjustment has been completed.
   - Remove the driven gear assembly from the transfer case, and paint the driven gear teeth evenly with Prussian Blue.
   - Reinstall the driven gear assembly in the transfer case and tighten the bolts to the specified torque.
   - With the disengagement lever in 2WD, rotate the companion flange one full turn in both directions.



- Remove the driven gear assembly from the transfer case and note the tooth impression on the gear.

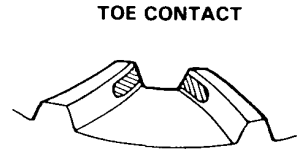
NOTE: Compare the tooth impression the gear with the examples below and follow the apropriate adjustment instructions.
Continue the check/adjustment procedure until the tooth contact is correct.





TOE CONTACT

If the pattern shows toe contact, use a thicker drive gear thrust shim for and increase the thickness of the transfer thrust shim an egual amount.



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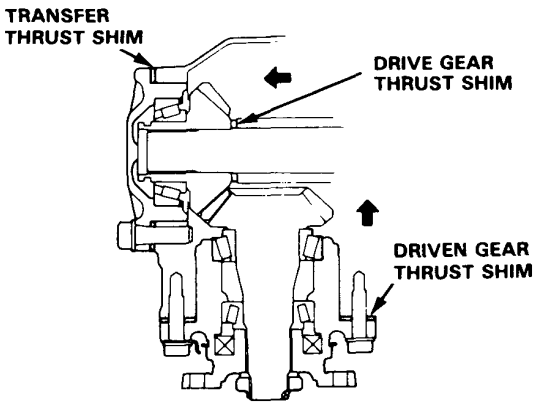
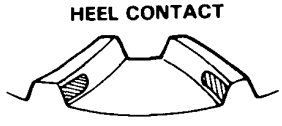
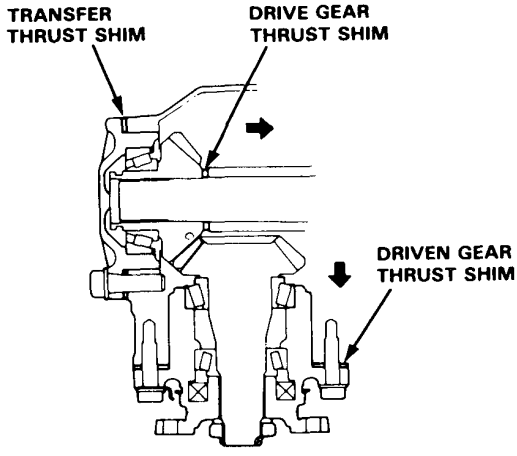


HEEL CONTACT

If the pattern shows heel contact, it indicates too much backlash. To correct, reduce the thickness of the drive gear thrust shim. The thickness of the transfer thrust shim must also be reduced by the amount by which the drive gear thrust shim thickness is reduced.

NOTE: The driven gear thrust shim will have to be changed also to compensate for the change in backlash.

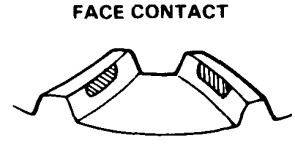


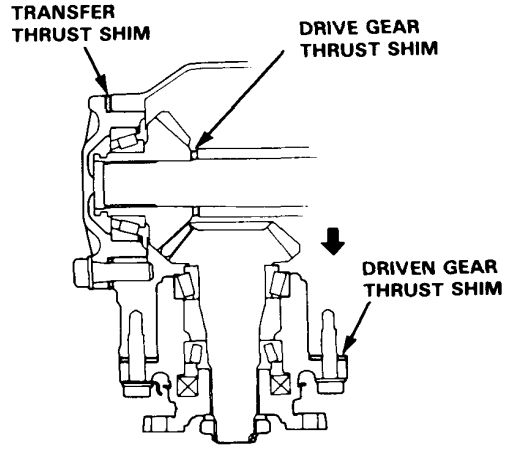


FACE CONTACT

To correct face contact, use a thicker driven gear thrust shim to move the driven gear away from the drive gear. The backlash should remain within the limits.

If the backlash cannot be held within the limits (page 9-96), make correction in the same manner as for HEEL CONTACT.

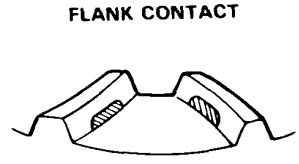


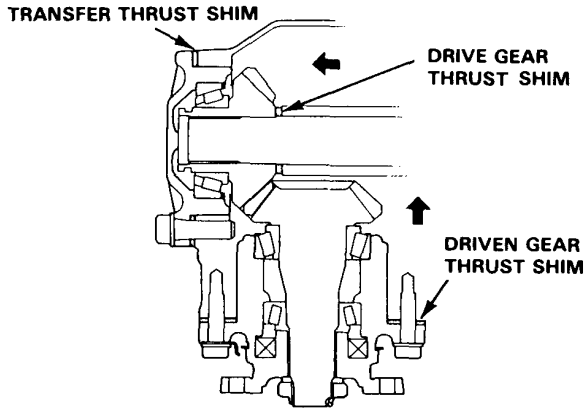


FLANK CONTACT

If the pattern shows flank contact, move the driven gear in toward the drive gear by using a thinner shim for the driven gear.
The backlash must remain within the limits.

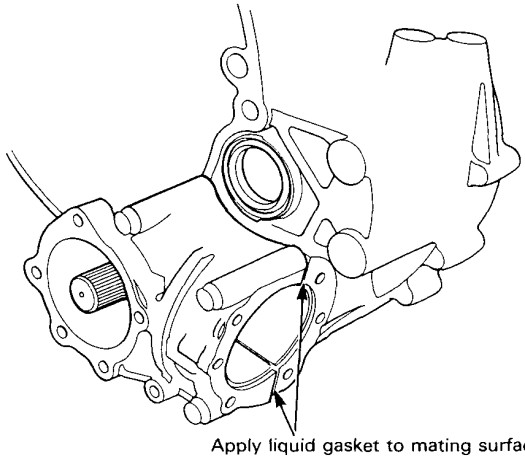
If the backlash exceeds the limits (page 9-96), make correction in the same maner as for TOE CONTACT.





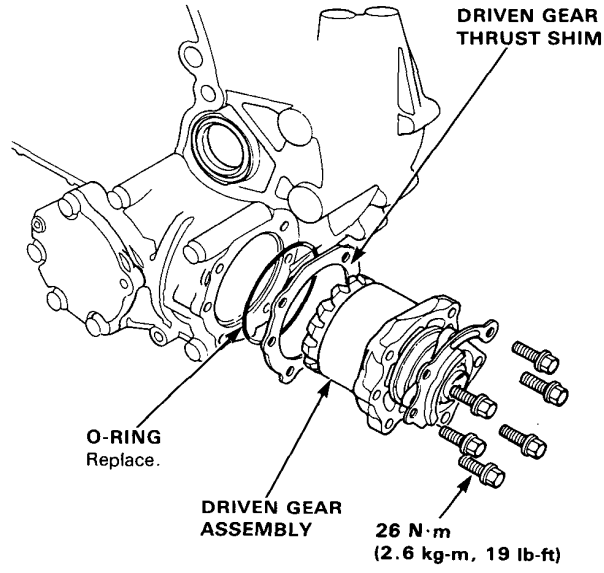
9. When gear tooth contact is correct, install the new special seal, apply liquid gasket to the mating surfaces of the torque converter and transfer housing. Use liquid gasket part No. OY740—99986.

NOTE:
- Check that the mating surface are clean and dry before applying liquid gasket.
  Degrease the mating surfaces if necessary.
- Apply liquid gasket evenly, being careful to cover all the mating surface.
- To prevent leakage of all, apply liquid gasket to inner threads of bolt holes.
- Do not install the parts 20 minutes or more have elapsed since applying gasket.
  In that case, reapply liquid gasket after removing the old residue.
- Wait at least 30 minutes before filling with oil.


Apply liquid gasket to mating surfaces of torque converter and transfer housing.

10. Stake the locknut into the driven gear shaft.

11. Install the thrust shim and O-ring on the driven gear assembly, then install the assembly in the transfer case.

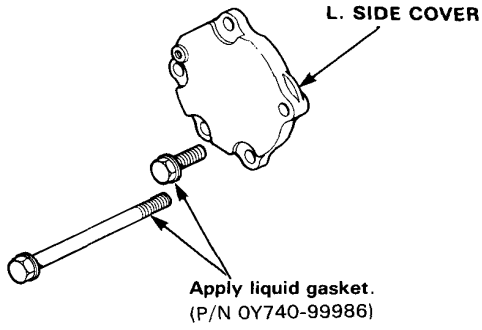


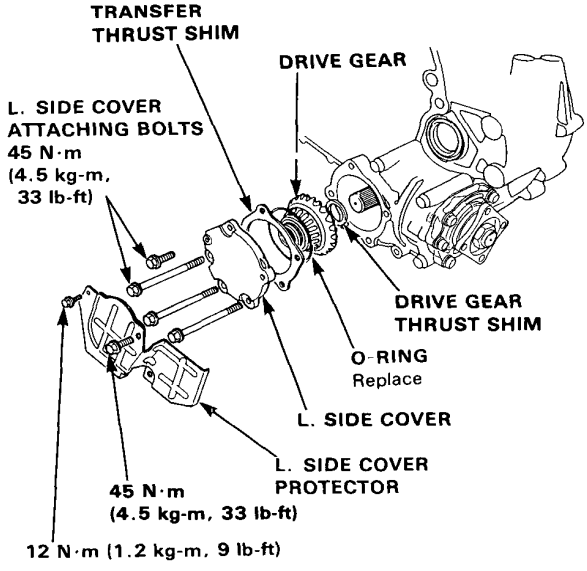
(cont'd)

Driven/Drive Gear Reassembly (cont'd)

12. Slide the drive gear thrust shim and drive gear onto the transfer shaft.
13. Place the transfer thrust shim and O-ring (74.5 × 2.5 mm) on the L. side cover and install the cover on the transfer case. Tighten the L. side cover attaching bolts, and then install the L. side cover protector.

    NOTE:
    - Coat the O-ring with oil.
    - Apply liquid gasket (P/N 0Y740—99986) to threads of L. side cover attaching bolts.





14. Measure the total bearing preload after assembly.

Brakes

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Differential with Viscous Coupling ..... 13 — 8
The Dog Clutch and Its Mechanism ..... 13 — 10
ALB System Function test ..... 13 — 11
Dog Clutch Inspection Using ALB Checker ..... 13 — 13
Dog Clutch Inspection Using Jumper Wires ..... 13 — 14
Circuit Diagram (4WD) ..... 13 — 15
Relation Between ALB Warning and Rear Differential Clutch Warning ..... 13 — 16
Troubleshooting ..... 13 — 17

NOTE : The following abbreviations are used to identify wire colors in this section.

WHT..White	ORN .....Orange	BLU....Blue	GRY.....Gray
YEL ..Yellow	PNK .....Pink	GRN..Green	LT BLU ..Light Blue
BLK ..Black	BRN.....Brown	RED ....Red	LT GRN..Light Green

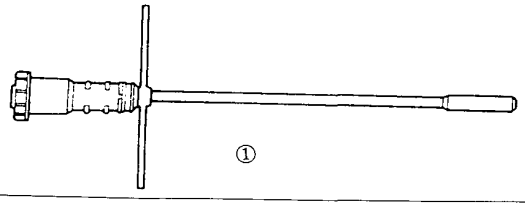
Outline of Model Changes

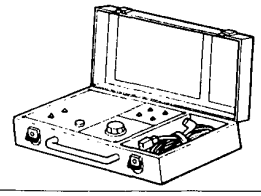
- The 4WD × 3 channel ALB system has been adopted

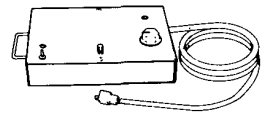
ALB

Special Tool

Ref.No	Tool Number	Description	Q'ty	Remarks
①	07HAA-SG00100	ALB T-wrench	1	
②	07HAJ-SG00601	ALB checker	1	
	or			
	07508-SB00000		1	
	-07HAJ-SG00400	Adaptor	1	







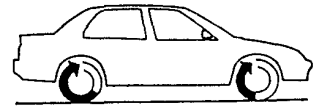
The ALB (Anti-Lock Braking) SYSTEM

The Real Time Intrac System

The Real Time INTRAC (INNOVATIVE TRACTION CONTROL) System was developed by combining a three channel digital controlled ALB (Anti-Lock Brake) system with the 4WD system. This ALB system utilizes a pair of split type viscous couplings in the rear differential which ensures improved acceleration, stearing and stopping.

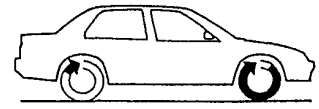
< Starting and Acceleration >

On snow or other slippery surfaces the front wheels of a front wheel drive vehicle tend to slip when fast acceleration or start is attempted. A vehicle which has the Real Time INTRAC system incorporated has the assurance that the moment the front wheels begin to slip or spin, the turning power of the engine is transmitted to the rear wheels which ensures positive traction with a minimum of drift or slippage.



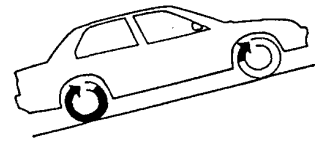
< Cruising and Driving at High Speeds >

On dry smooth surfaces the ALB system provides superior maneuverability as characterized by a front wheel drive vehicle. However when the front wheels begin to slip on wet or frozen surfaces the power from the engine is immediately transmitted to the rear wheels. This provides superior control/maneuverability regardless of the road's surface condition.



< On Slopes >

When on an incline the weight distributed to the front wheels is reduced. With the Real Time INTRAC system the corresponding power is transmitted to the rear wheels thereby providing traction for forward movement. On down grades front wheel drive and front wheel weight provide the traction for forward movement.



< Cornering on Slick Surfaces >

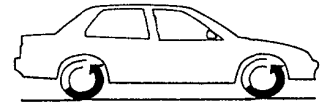
Front wheel cornering force is reduced when the front wheel drive vehicle is suddenly accelerated while going through a curved road. This phenomena is known as "under-steer". When this occurs the increased torque of the engine is transmitted to the rear wheels making it easier to negotiate curves. The amount of engine torque applied is dependent upon the accelerator pedal depression. The phenomena "over steer" occurs when a rear wheel drive vehicle is suddenly accelerated while going through a curved track. The Real Time INTRAC system distributes the required driving force to the rear wheels in relationship to the depression of the throttle pedal. This INTRAC system enables stable cornering free from sudden under-steering and/or over-steering.

< Tight Cornering at Low Speeds >

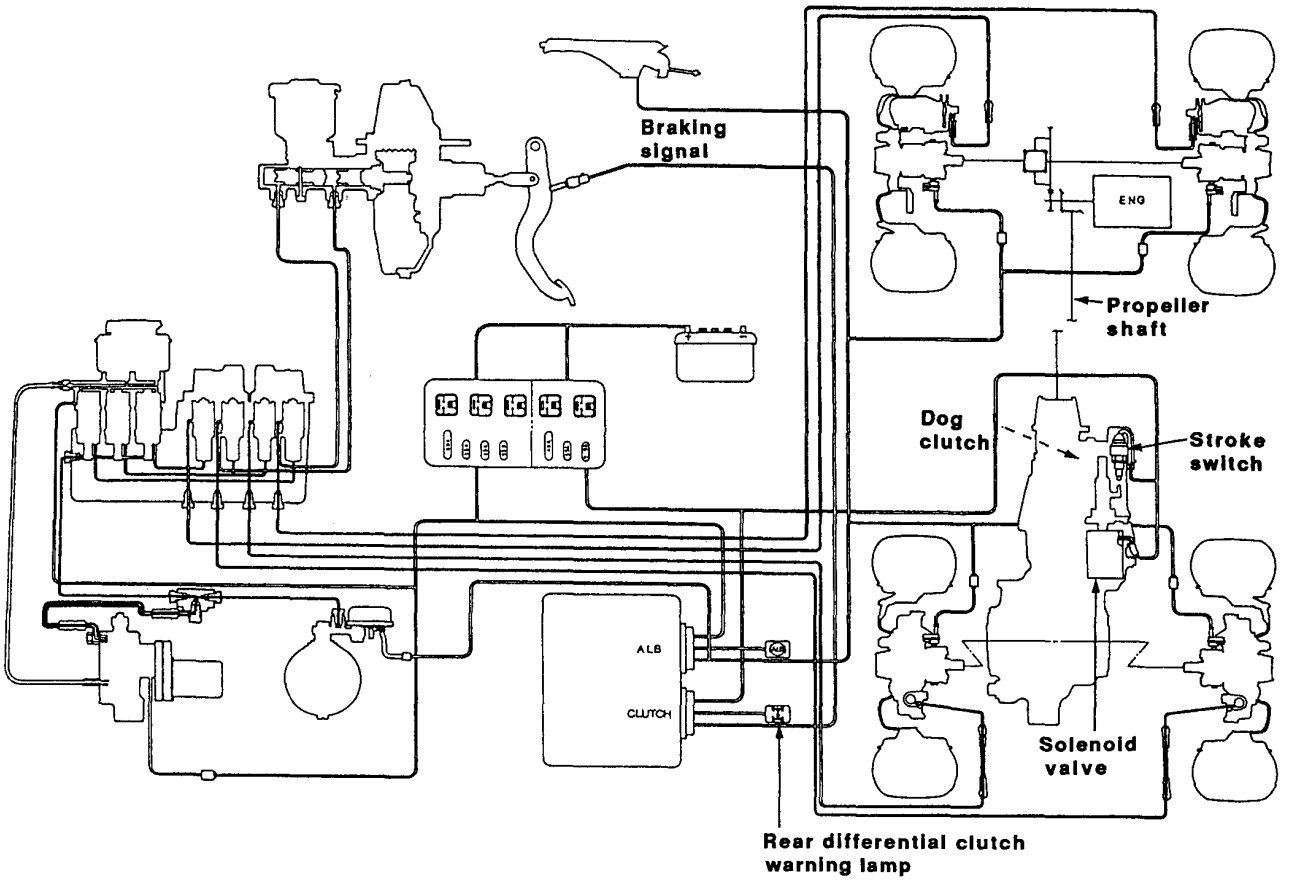
In part time and full time 4WD vehicles the drive trains of the front and rear wheels are connected when the center differential is locked. The locked condition makes it difficult to negotiate tight curves because the wheels are locked to turn at the same speed. In the worst case an engine stall may occur. This can be attributed to the resistance between the wheels/tires and the road surface. In the Real Time INTRAC system the viscous coupling of the rear differential eliminates such problems, and provides excellent controlability when rounding corners at medium and/or high speeds.

< Deceleration and Braking >

When a vehicle's forward speed is reduced through coasting and/or braking the power from the engine is transmitted to the rear wheels just before the wheels lock. This prevents rear wheel lock occurring before the front wheels lock. This procedure ensure a safe and positive controlled stop. This engine braking system is applied to all wheels to slow or stop the vehicle with less stress on the braking system.



< The ALB System Employed for this model >



The ALB (Anti-Lock Braking) SYSTEM

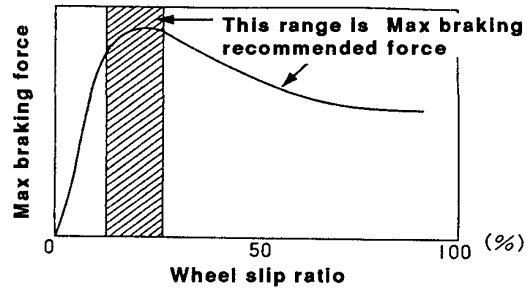
ALB (Anti-Lock Brake)

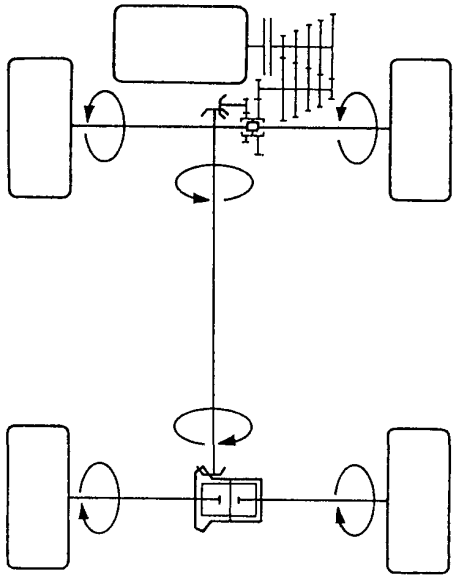
< Dog Clutch Actuation >

The dog clutch, which is not a component part of the ALB system, is positioned in front of the rear differential gear mechanism to prevent body vibrations peculiar to 4WD vehicles. (For the inner structure, see IV. transmission/differential drawing.) The ALB system is an automatic braking control unit which stabilizes the vehicle's ground travel during sudden braking operations. Prior to wheel lockage to ALB system automatically controls braking hydraulic pressure of each wheel which ensures a proper slip ratio of 10 to 25%. That is, if the wheels are about to lock, the ALB system senses this condition and reduces the braking hydraulic pressure to the front and rear wheels, hence locking is not likely to occur and automatically restores required braking hydraulic pressure. This operation is automatically repeated to prevent the wheels from locking. The ALB system, described above controls front wheel rotation and rear wheel rotation separately. This is accomplished by increased and decreased hydraulic pressure being alternately applied to the front and rear wheel braking systems. The front and rear wheels of a 4WD unit and connected by a propeller shaft. During the increasing/decreasing braking cycle the vibration mode occurs with the vibration being felt by the vehicle operator. Suppression/prevention of these vibrations is accomplished by the automatic input of braking signals to the ALB system. Actuation is automatic with the control unit switching the dog switch on/off via dual relays.

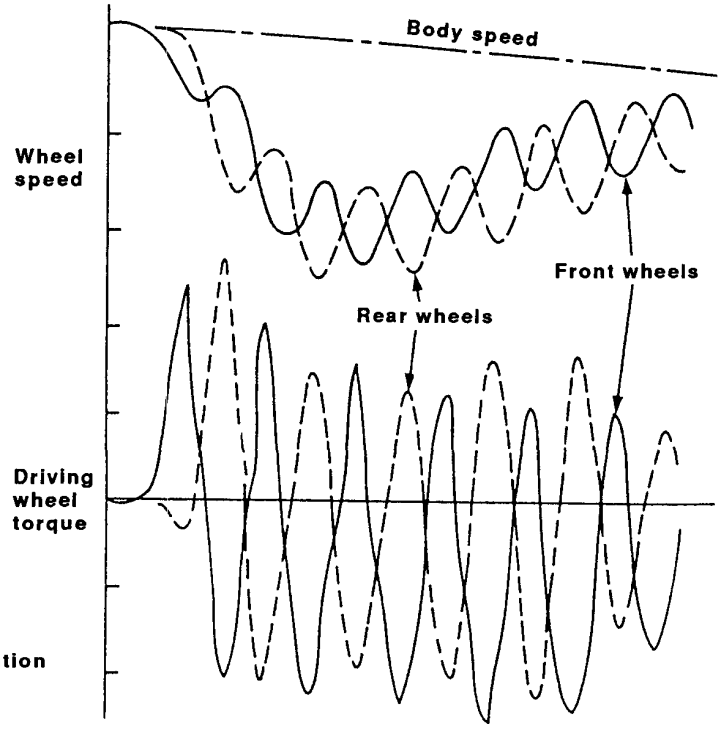
NOTE

The switching circuit and the two solenoids are also compared.





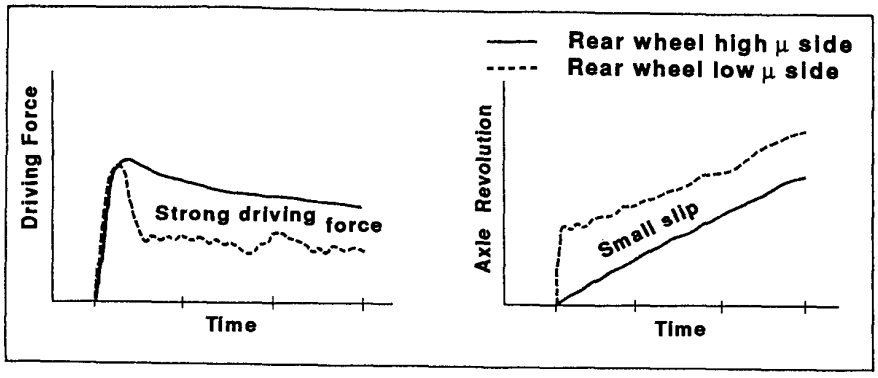
An example of resonace generated (when low μ)



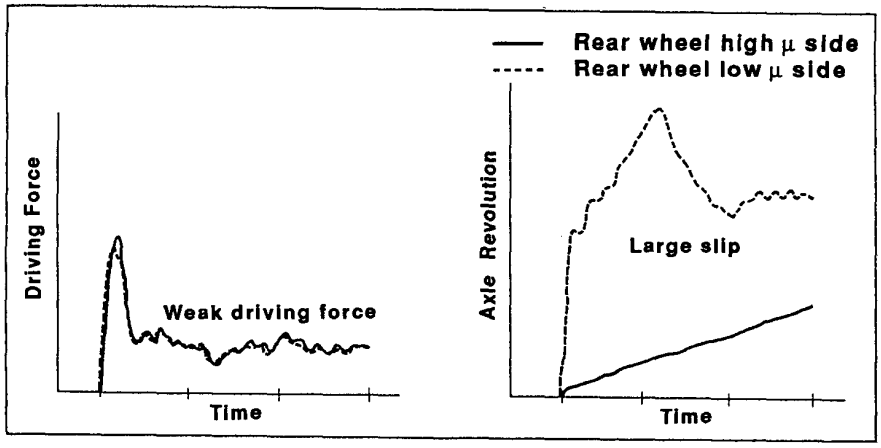
REAL TIME INTRAC OPERATION ON A SPLIT μ ROAD

Driving force and axle revolution on a split μ road.
(Right side : low μ) (Left side : hight μ)

The Real Time INTRAC System



A Normal differential gear



The ALB (Anti-Lock Braking) SYSTEM

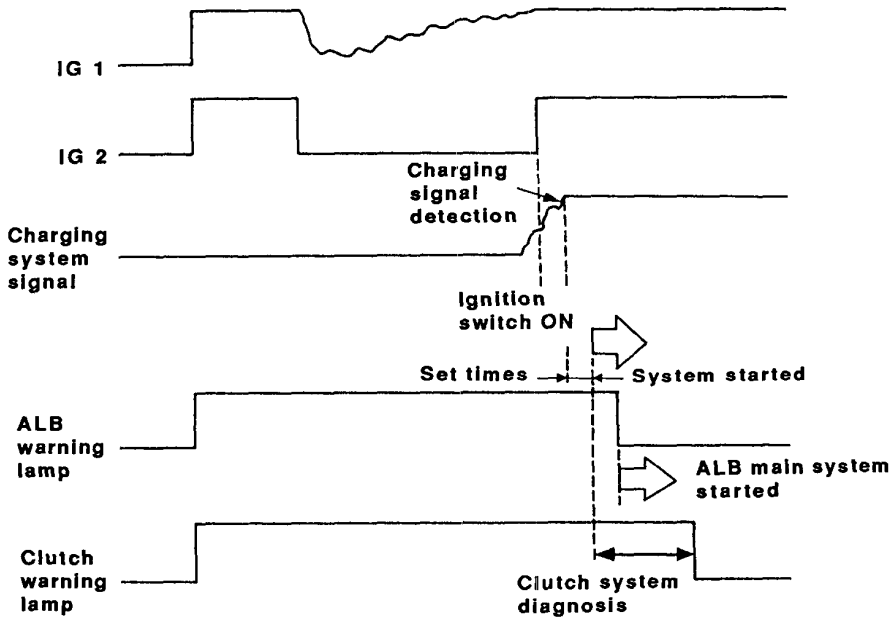
ALB (Anti-Lock Brake)

< Rear Differential Clutch Warning Lamp >

A rear differential clutch warning lamp is installed in vehicles which have the Real Time INTRAC system.

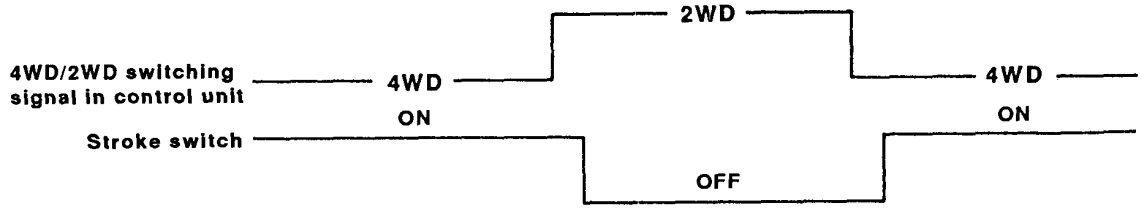
< Operational Checks During Engine Start >

1. When the ignition switch is placed to the "on" position the ALB warning light and the clutch warning lamps are visible.
2. At a preset time, after engine start, a charging system signal is transmitted to the control unit and the ALB system is activated.
3. In this state, depressing the brake pedal starts the lamp circuit check. If there is a broken wire the clutch warning lamp will not be visible. Therefore, the failure not being in the memory, it is not displayed.
4. When the stop lamp circuit is free of abnormalities the clutch system is diagnosed. When there is an abnormality the clutch warning lamp is displayed (lit) and the failure is memorized by the control unit. Diagnosis is performed by the control unit's stroke switch system and the solenoid system.



During Vehicle Operation

While driving the 4WD/2WD switching circuit of the control unit is being compared with the stroke switch operation. The comparison is performed as the stroke switch is mechanically turned on and off, corresponding with the dog clutch. If the comparison is abnormal then the clutch warning lamp remains illuminated.



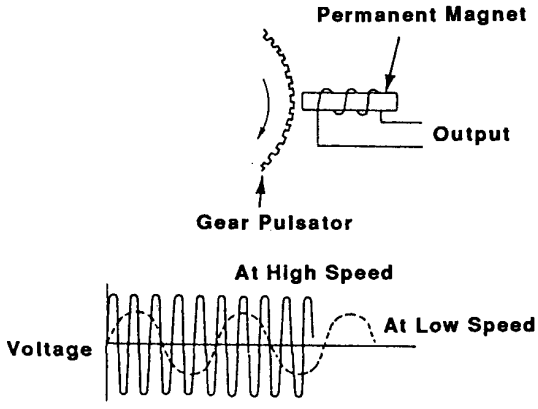
NOTE

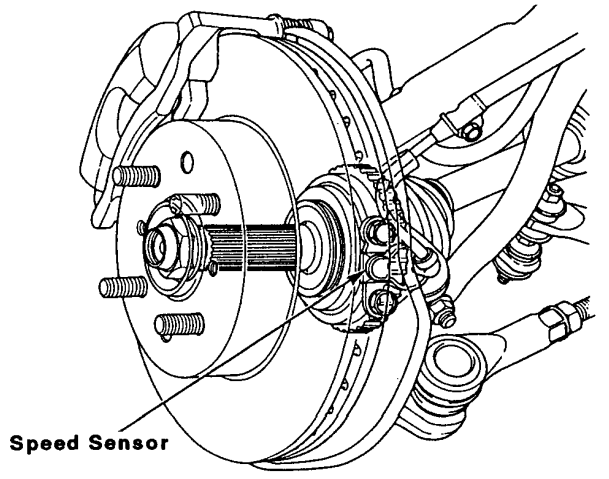
The switching circuit and the two solenoid terminals are also compared.

ALB (Anti-Lock Brake)

< Speed Sensor >

The speed sensor is of the contactless type which detects the rotational speed of the wheels. It is comprised of a permanent magnet and coil. When the gear pulsators turn the magnetic flux around the coil of the speed sensor alternates and generates voltage with a frequency in proportion to the rotational speed of the wheel. The gear pulsators are attached to the revolving portion of the wheel, (outboard joint of the drive shaft). These pulses are transmitted to the control unit which determines wheel speed.





< Control Unit >

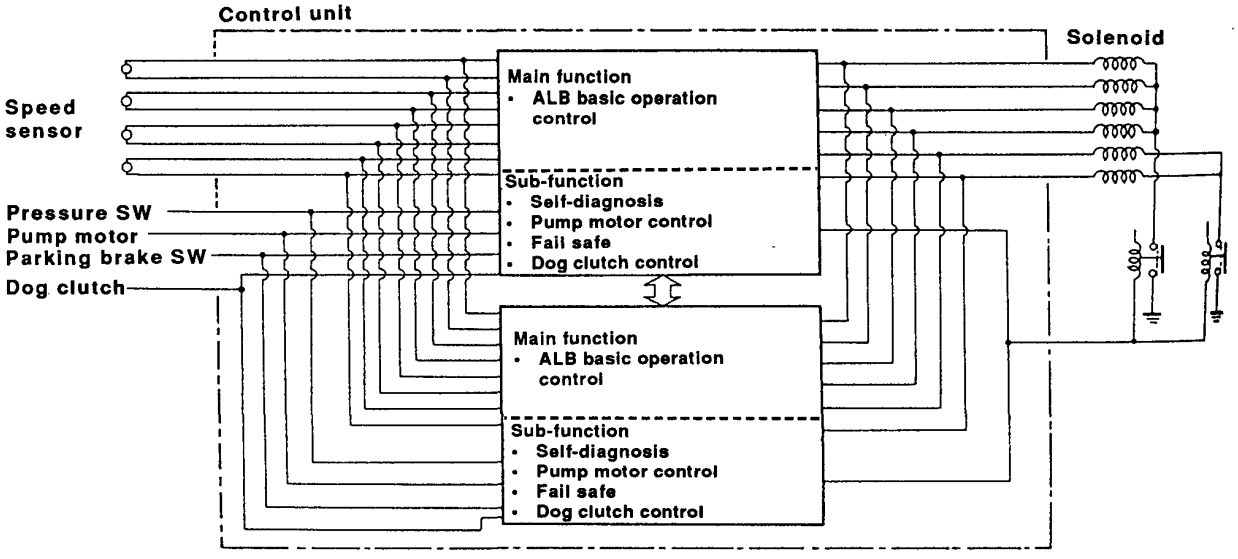
The control unit's primary function is to control the ALB operations. Its secondary function is pump motor control, self diagnosis, etc.

(1) Main Function

By computing the output signals from the speed sensor the control unit operates the solenoid valves in the modulator to control the ALB operation. The Honda ALB system controls the front brakes independently, with the rear brakes being controlled simultaneously. When either of the two wheels turns slower than the other it is given priority to initiate the ALB function. (This method is termed "Low Select".)

(2) Sub Function

The sub function includes pump motor control, self diagnosis, etc., which are necessary to support ALB operational functions.



Differential with Viscous Coupling

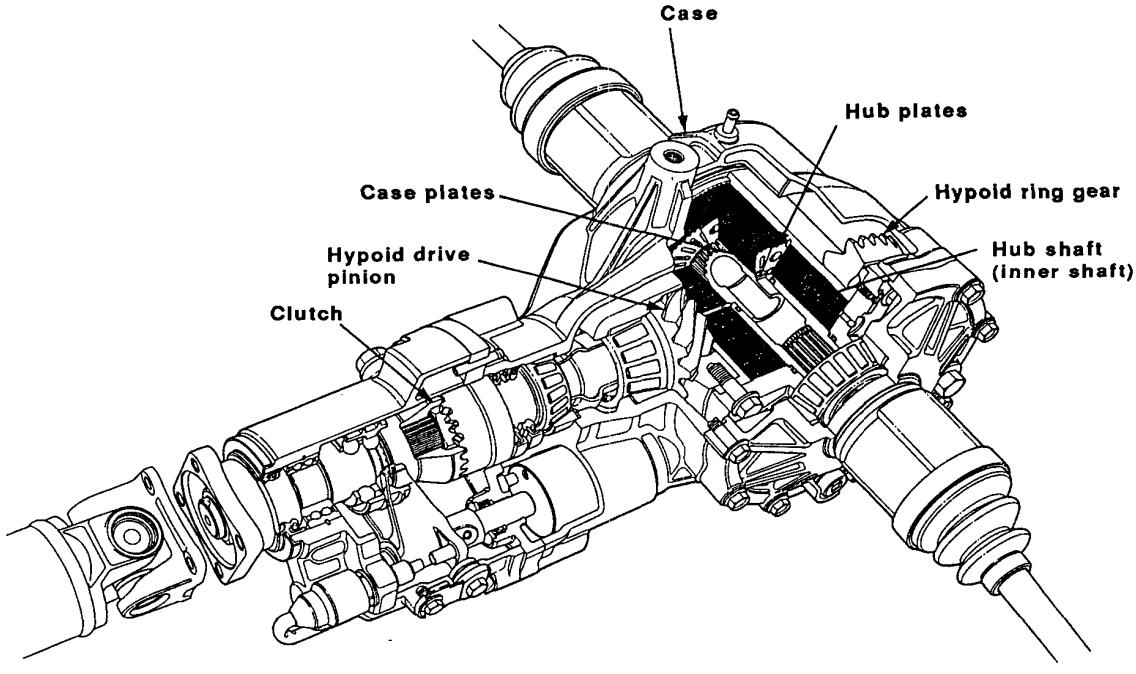
CONSTRUCTION

< General >

The Real Time INTRAC system is of the torque split 4WD type with two viscous couplings located in the rear differential. This feature is the most suitable driving force available without switching the from/to front drive to the to/from 4 wheel drive. This is accomplished immediately with power being transmitted to the rear wheels according to driving conditions, road surface, load, etc.

< Construction >

The differential consists of a case (carrier), hypoid drive pinion, hypoid ring gear and a viscous coupling unit affixed to the hypoid ring gear. Additionally it has a built in system for transmitting breaking power by a dog switch and the operation thereof. The viscous coupling unit consists of a case and case plates. The case plates are engaged with the inner bore splines. The Hub Shafts (inner shafts) are serration engaged with the drive shaft. Hub plates are engaged with the hub shaft outer bore splines. In addition the case contains a high viscosity silicon oil. The hub shafts (inner shafts) and the plates are separately arranged on the right and left sides, inside the case. When there is a difference in revolution speed between the case side and the hub side, power is transmitted to the hub shafts (inner shafts) by the shearing force (resistance) of the silicon oil.



Operation

< Differential Mechanism >

Center Viscous Coupling Mechanism

When driving at a constant speed on normal road surfaces the front and rear wheels revolve at the same speed. The same speed is present at the case side and the hub side of the viscous coupling unit. This allows minimum driving force to be transmitted to the rear wheels. When the front wheels cannot transmit the driving force to the road surface, because of surface conditions, a difference in speed is produced between the case side and the hub side. This immediately transmits the driving force to the rear wheels. The driving force transmitting order is; propeller shaft, hypoid ring gear (case), case plates, hub plates, hub shaft (inner) and the drive shaft. This mechanism also permits the vehicle to be free from breaking phenomena when cornering tight corners at low speeds.

Rear Differential Mechanism

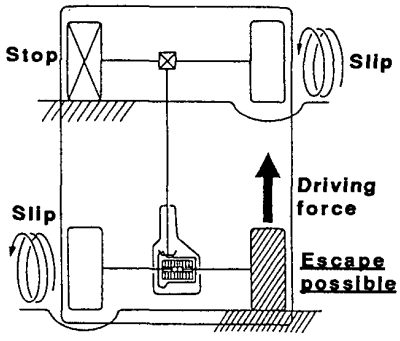
When cornering it is necessary to transmit power smoothly to allow for the difference in the speeds of the right and left wheels. The rear differential operational mechanism of the right and left hub shafts (inner shafts) permits smooth cornering characteristics, these are operated independently.

Limited Slip Differential Mechanism

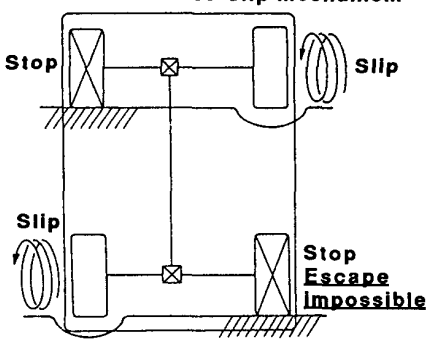
When a 4WD vehicle cannot move because of surface conditions the two built in viscous couplings enable a vehicle with this mechanism to transmit power to the rear wheel which is not slipping. Power can be transmitted to the rear wheel which is not slipping. Power can be transmitted to the right rear wheel and/or the left rear wheel independently. The right/left torque split type viscous coupling minimizes the difference in speed between the right rear and left rear wheels thereby reducing the slip of the wheels of the lower friction factor. This features ensures stability.

This diagram shows the advantage of the limited slip mechanism.

Vehicle with the Real Time INTRAC system



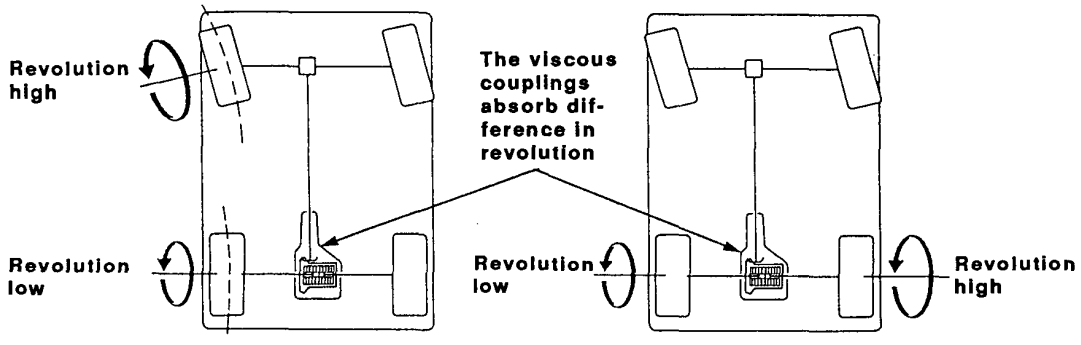
Vehicle without the Limited Slip mechanism



Freedom from breaking phenomena when cornering tight corners at low speeds

The viscous couplings transmits power from the higher revolution side to the lower when there is a great difference in speed between the case and the hub shafts (inner). When the difference in speed is minimal the silicon oil admits the slip, this occurs when cornering a tight corner at low speeds. Difference in wheel speeds, between the front and rear or between right and left, is absorbed without problems.

Absorption of difference in revolutions when cornering a tight corner at low speeds



The Dog Clutch and Its Mechanism

CONSTRUCTION

< General >

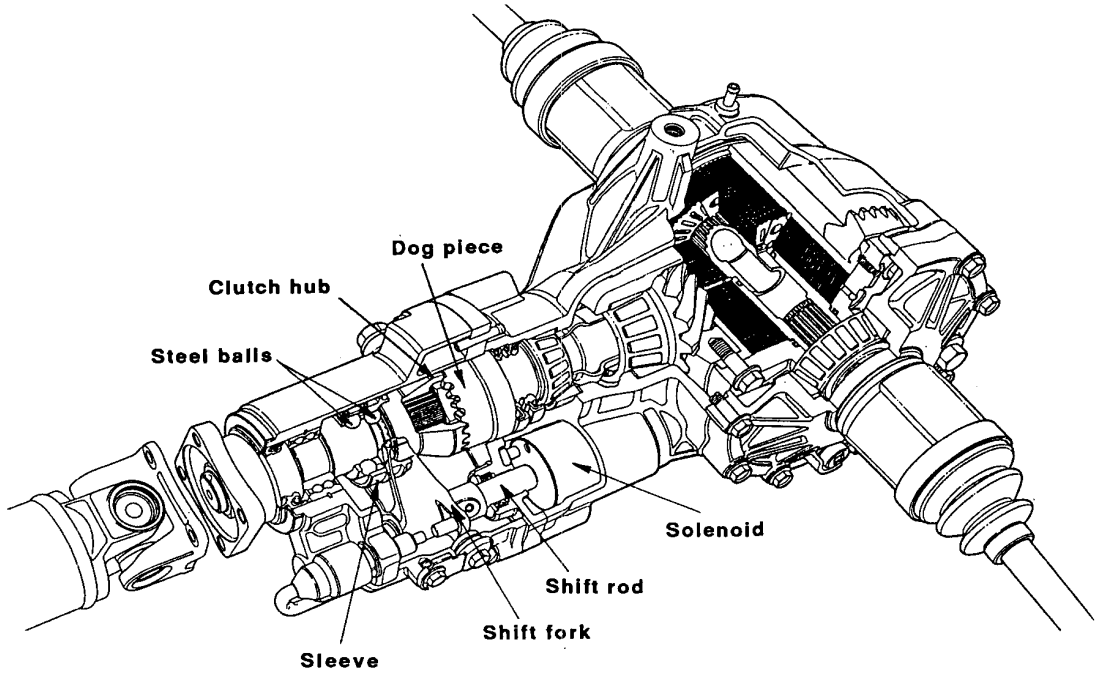
The dog clutch is synchronized with the ALB control unit. It is used for switching the from/to 4WD to the to/from 2WD during ALB operations. (For detailed information please refer to chapter V, Chassis) The dog clutch is comprised of a solenoid switch, shift mechanism, hub mechanism and a stroke switch. The solenoid is used to operate the shift mechanism. The stroke switch sends signals indicating the clutch operating condition to the control unit.

< Operations >

1. When the control unit determines the necessity to shift from 4WD to 2WD, it sends the appropriate signal to the solenoid.
2. The solenoid then shifts the shift rod.
3. The shift fork, which is attached to the shift rod, moves the sleeve forward.
4. The action of the sleeve removes the steel balls at the rear from the groove.
5. The sleeve is further moved so that the clutch hub is moved forward to full extent by the steel balls at the front. (This movement continues unit the clutch is dis-engaged.)
6. The shift fork pushes the stroke switch which sends a signal to the control unit indicating that the clutch is being dis-engaged.

NOTE

When the control unit elects to restore 4WD operation is stops the current to the solenoid so that the shift fork is pushed back by the spring.



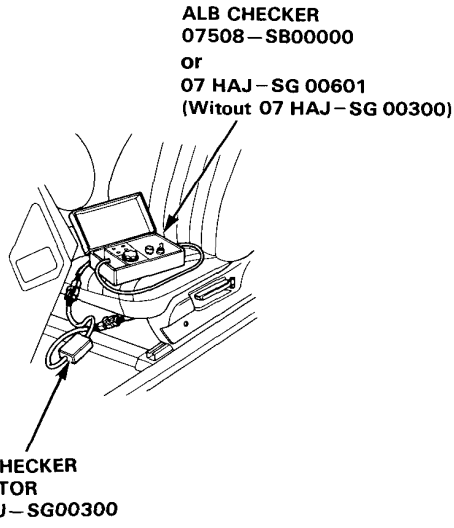
Function Test

NOTE:
- The ALB checker is designed to confirm proper operation of the ALB system by simulating each system function and operating condition. Before using the checker, confirm that the dash ALB warning light is not indicating some other problem with the system. The light should go on when the ignition is first turned on and then go off and stay off two seconds after the engine is started.
- The checker should be used through all modes, 1 to 5, to confirm proper operation of the system, in any one of the following situations:

— After replacing any ALB system component.
— After replacing or bleeding the system fluid.
— After any body or suspension repair that may have affected the sensors or their wiring.
— As part of P.D.I.

⚠WARNING Disconnect the ALB checker before driving the car. A collision can result from a reduction, or complete loss, of braking ability causing severe personal injury or death.

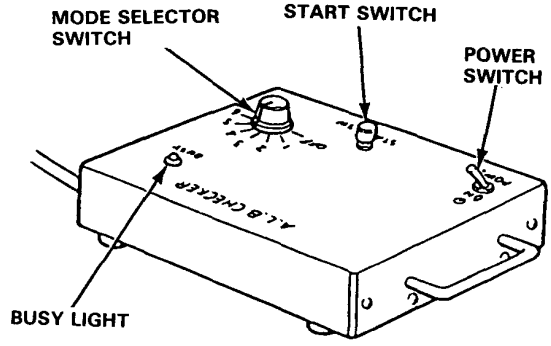
1. With the ignition switch off, disconnect the 6-P inspection connector from the connector cover under the driver seat and connect the 6-P inspection connector to the ALB checker and adaptor.



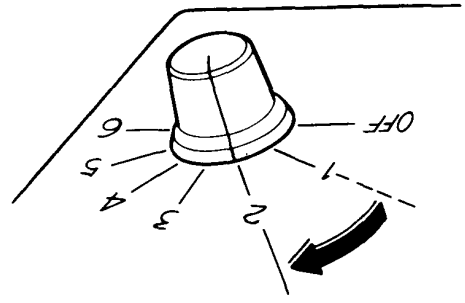
NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral for manual transmission models, and in P for Automatic transmission models.

2. Start the engine and release the parking brake,

3. Operate the ALB checker as follows,
   (1) Turn the Power Switch ON.
   (2) Turn the Mode Selector switch to "1."
   (3) Push the Start Test switch:
   — The Busy light should come ON.
   — The dash ALB warning light should not come ON (If it comes on, follow the troubleshooting on page 13-23)



4. Turn the Mode Selector Switch futher to "2".

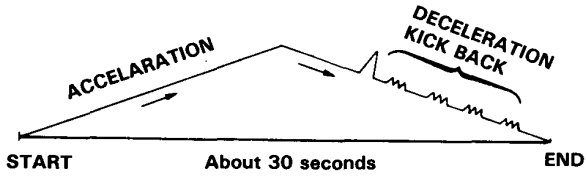


ALB System

Function Test (cont'd)

5. Depress the brake pedal and push the Start Test switch.
   The dash ALB warning light should not go on while the Busy light is ON. There should be kickback on the brake pedal. If not as described, go to troubleshooting, page 13-34.

   NOTE: The operation sequence simulated by Modes 2, 3, 4, and 5



6. Turn the Mode Selector switch to 3, 4,and 5.
   Perform step 5 for each of the test mode positions.

Mode 1:
Sends the simulated driving signal 0 km/h (0 mph) → 180 km/h (112.5 mph) → 0 km/h (0 mph) of each wheel to the control unit to check the control unit self diagnosis circuit. There should be NO kickback.

Mode 2:
Sends the driving signal of each wheel, then sends the lock signal of the rear left wheel to the control unit. There should be kickback.

Mode 3:
Sends the driving signal of each wheel, then sends the lock signal of the rear right wheel to the control unit. There should be kickback.

Mode 4:
Sends the driving signal of each wheel, then sends the lock signal of the front left wheel to the control unit. There should be kickback.

Mode 5:
Sends the driving signal of each wheel, then sends the lock signal of the front right wheel to the control unit. There should be kickback.

NOTE: If little or no kickback is felt from the brake pedal in modes 2-5, repeat the function test of modes 1-5 several times before beginning to troubleshoot other parts of the system.

Inspection points:

1. The ALB warning light goes ON in mode 1.
   - Check the wiring. If there is good condition, the control unit is faulty.
     If ALB warning light goes on 120 seconds later but the power unit stops, refer to page 13 — 32.

2. There are no kickback in modes 2 through 5.
   - Faulty pressure switch (remains ON)
   - Shorted wires
   - Faulty or disconnected power unit coupler
   - Faulty power unit relay

3. Weak kickback in modes 2 through 5.
   - Bleed high pressure circuits.

4. Power unit stops in mode 1 but it does not stop and there are no kickback in modes 2 through 5.
   - Brake fluid leakage
   - Bleed power unit
   - Clogged power unit outlet
   - Clogged or deteriorated power unit hose

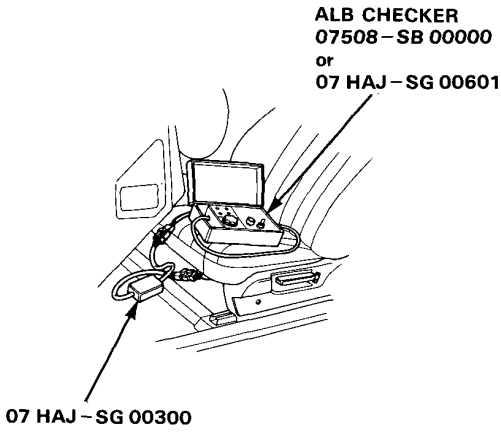
Dog Clutch Inspection Using ALB Checker

Use the ALB checker to inspect ALB operation.

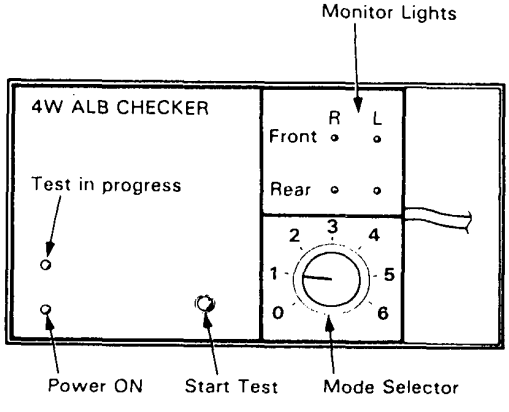
1. Check that there are no problems or abnormalities with operation of the rear differential clutch warning light following O'wners Manual instructions.
2. Switch off the engine.
3. Block the front wheels, raise the rear of the car and support on safety stands.
4. Set the gear shift lever to neutral.
5. Short-circuit the stop switch terminals.

NOTE: Although it is acceptable for another mechanic to step on the brake pedal instead of performing the above, pressing down to hard on the pedal may make it impossible to check the rotation of the rear wheels mantioned below.

6. With the ignition switch off, disconnect the 6-P inspection connector from the connector cover under the driver seat and connect the 6-P connector to the ALB checker and adaptor.



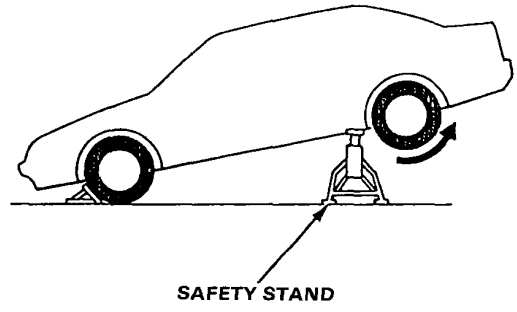
7. Start the engine and release the parking brake.
8. Turn the checker Power switch on.
9. Turn the mode selector Switch to 4 or 5.
10. Push the Start test switch.



11. Check that the rear wheels can be rotated by hand while sound actuation of the solenoid is hard (kickback is taking place)
    If the wheels cannot be rotated, follow the instructions for troubleshooting.

⚠WARNING Disconnect the ALB checker before driving the vehicle. A collision can result from reduction or complete loss of braking function causing personal injury or death.

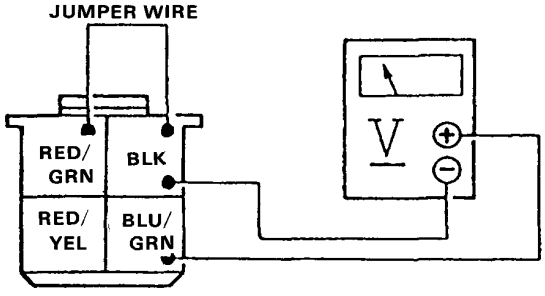
CAUTION: Raise the rear wheels, and support it with properly positioned safety stands.



Dog Clutch Inspection Using Jumper Wires

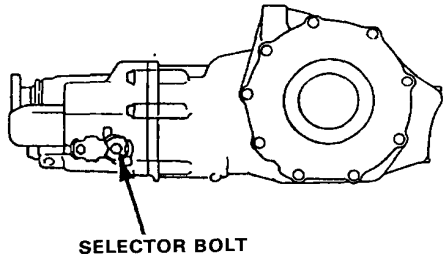
CAUTION : In order to protect the solenoids inside the rear differential from damage do not keep the ignition switch on for more than 5 minutes and do not keep the red/yellow wire (pulling solenoid) and black wire connected for more than 5 seconds.

1. With the ignition switch off, disconnect the 4-P inspection connector (PNK) from the connector cover under the driver's seat, and connect the RED/GREEN wire (holging solenoid) and BLK wire using jumper wire, and connect the circuit tester Voltage tester) to the BLU/GRN wire (Stroke switch (+) and BLK wire (−).

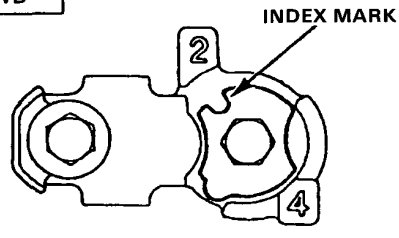


View from wire harness side

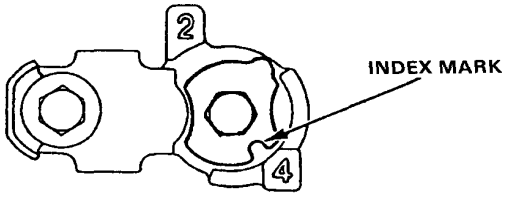
2. Block the front wheels, raise the rear wheels and support it on safety stands.
3. Comfirm that the selector bolt of the rear differencial is set to 4WD.



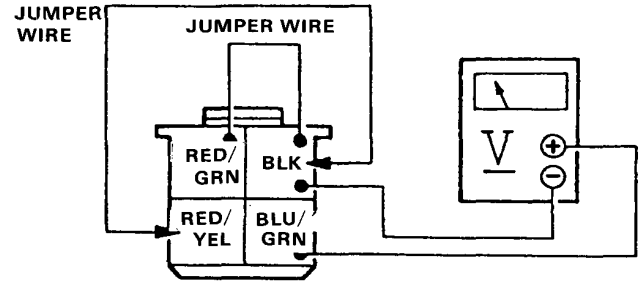
For 2WD



For 4WD



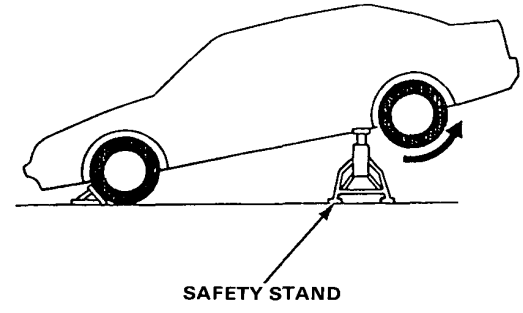
4. Turn the ignition switch on.
5. Comfirm that the circuit tester indicates the battery voltage.
   - If it is OV, check the strock switch.
6. Use the different jumper wire to connect the RED/YEL wire (pulling solenoid) and BLK wire for and instant (less than 5 second).



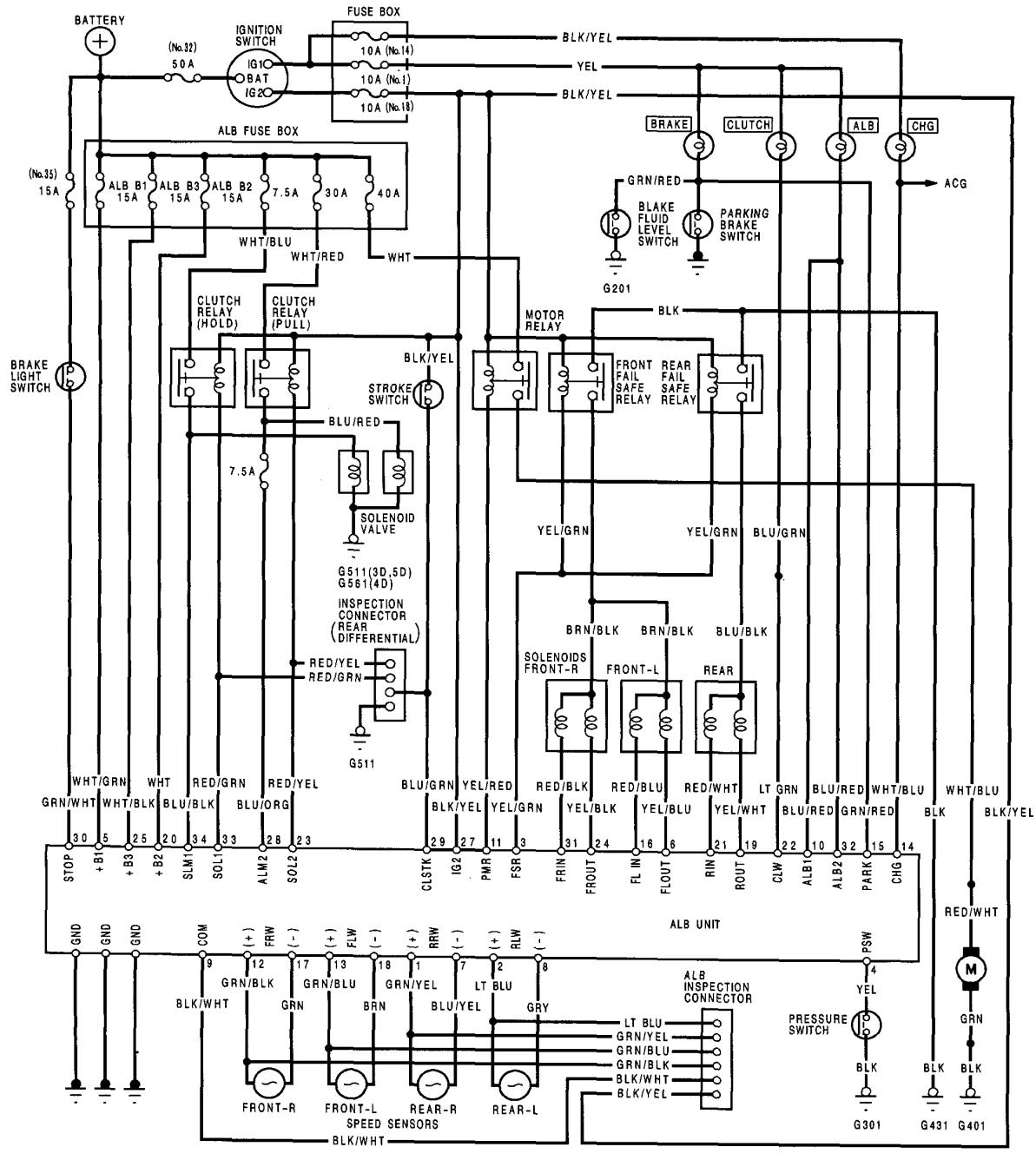
View from wire harness side

7. Comfirm that the circuit tester indicates OV and that the rear wheels can be rotated by hand.
   - If the rear wheels cannot be rotated, check for an open in the rerated wire harness or solenoid valve.
   - If the rear wheels can be rotated but the tester does not indicate OV, check the stroke switch.

CAUTION : Raise the rear wheels, and support it with propery positiond safety stands.



Circuit Diagram (4 WD)



Relation Between ALB Warning and Rear Differential Clutch Warning

In the table which follows, "clutch" refer to the "rear differential clutch."

CAUTION :

- **If there is no indication otherwise in the Troubleshooting Flowchart, turn ignition switch off.**
- **Measurement of the internal impedance of the control unit should be performed with the ignition switch turned off and within 5 seconds.**

Diagnosis of malfunction	Action as soon as malfunction is detected	Follow-up action
ALB system: Normal Clutch system: Defective	• Clutch warning light:lit • Turn clutch relay off (switch to 4WD). • Note problem code.	• Stop clutch control and clutch diagnostics. • Continue ALB control operation normally with 4WD mode.
ALB system: Defective during 4WD mode Clutch system: Normal	• ALB warning light:lit • Turn failsafe relay off. • Note problem code	• Stop ALB control. • Stop clutch control and clutch diagnostics.
ALB system: Defective dring ALB operation in 2WD mode Clutch system: Normal	• ALB warning light:lit • Turn failsafe relay off.	• Stop ALB control. • Maintain 2WD mode until conditions permit switching from 2WD to 4WD mode. • Once conditions permit,switch from 2WD to 4WD mode and stop clutch control and clutch diagnostics.
ALB system: Defective during ALB operation in 2WD mode ↓ Clutch system: Defective during 2WD mode	• ALB warning light:lit • Turn failsafe relay off • Note problem code (ALB system). ↓ • Clutch warning light:lit • Turn clutch relay off (switch to 4WD). • Note problem code (clutch system).	• Stop ALB control. ↓ • Stop clutch control and clutch diagnostics.
Clutch system: Defective ALB system: Defective during 2WD mode	• Clutch warning light:lit • Turn clutch relay off (switch to 4WD). • Note problem code. ↓ • ALB warning light:lit • Turn failsafe relay off. • Note problem code.	• Stop clutch control and clutch diagnostics. • Continue ALB control operation normally with 4WD mode. ↓ • Stop ALB control.

ALB Warning Light

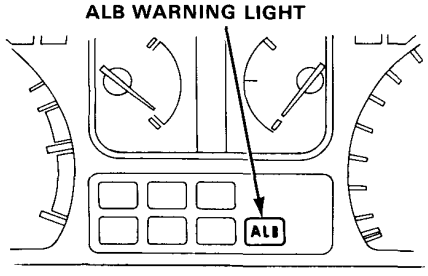
Temporary Driving Conditions:

1. The ALB warning light will come on and the control unit memorizes the problem under certain conditions.

   NOTE: Problem codes explained on pages 13-24 and 13-25.

   - The tire(s) adhesion is lost due to excessive cornering speed.
     Problem codes: 4-4, 4-8, 4-12.
   - The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.
     Problem code: 5.
   - When the parking brake is applied for more than 30 seconds while the vehicle is being driven.
     Problem code: 2.
   - The vehicle is driven on extremely rough road.

   The ALB system is OK, if the ALB warning light goes off after the engine is restarted.



2. If you receive a cuntomer's report that the ALB warning light sometimes comes on, check the System using the ALB checker to confirm whether there is any trouble in the system.
   See page 13 - 11.

3. The ALB warning light will come on and the LED (see page 13 — 23) will display a problem code when there is insufficient battery voltage to the control unit. An example would be when the battery is so weak that the car must be Jump-started.
   After the battery is sufficiently recharged, the ALB warning light will work normally after the engine is stopped and restarted.

   However, after recharging the battery, the LED problem code must be cleared from the control unit's memory by disconnecting the ALB B2 fuse (15A) for at least 3 seconds.

Warning Light Circuit:

1. The ALB warning light does not go on when the ignition switch is turned on.
   Check the following items. If they are OK, check the control unit connectors.
   If not loose or disconnected, install a known-good control unit and recheck:

   - Blown warning bulb.
   - Open circuit in YEL lead between No. 1 fuse (10A) and combination meter.
   - Open circuit BLU/RED lead between combination meter and control unit.
   - Loose component grounding of the control unit to the body.

2. The ALB warning light remains ON or after the engine is started, however the LED on the control unit does not blink any code or sub-code, check for the following :

   - Loose or poor connection of the wire harness at the control unit.
   - Faulty ALB B2 fuse (15A).
   - Open circuit in WHT lead between ALB B2 fuse (15A) and control unit.
   - Short circuit in BLU/RED lead between combination meter and control unit.
   - Open circuit in WHT/BLU lead between alternator and control unit (CHG14).

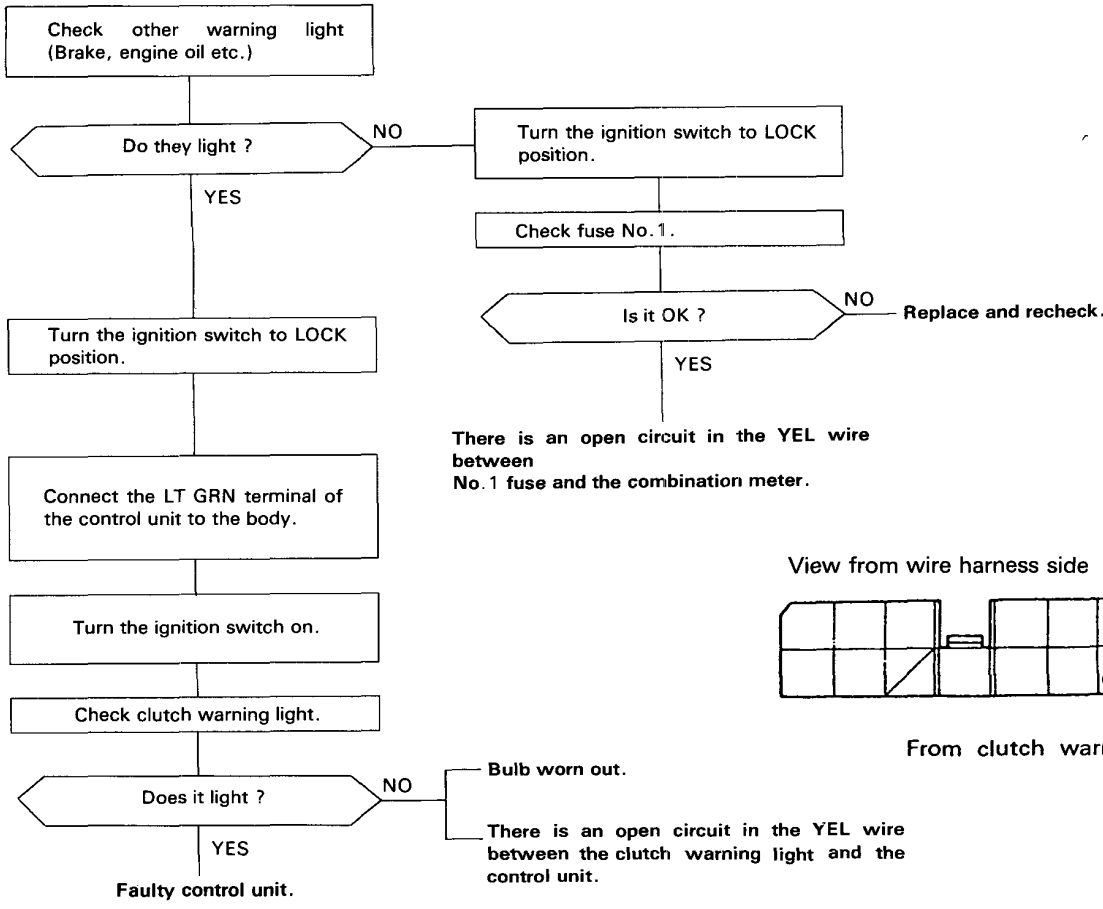
   If the problem is not found substitute a known-good control unit and recheck whether the warning light remains ON.

Troubleshooting

Rear Differential Clutch Warning Light

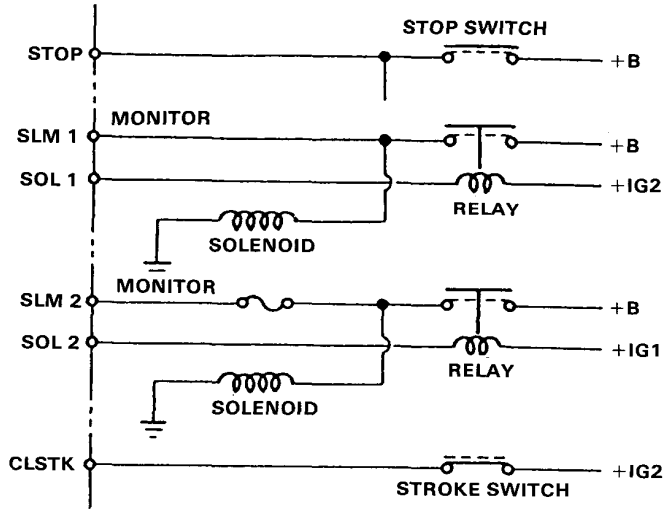
1. The rear differential clutch (below : "clutch") warning light does not light even when the ignition switch is turned on.

NOTE :
The clutch warning light is supposed to light when the ignition switch is turned on to check the bulb.



2. The rear differential clutch (below : "clutch") warning light remains on even when the brake pedal is pressed after the engine is started.

   After the engine is started and a set period of time has elapsed, the clutch can be tested by starting the ALB control unit (below : control unit)
   The clutch warning light comes on when the ignition switch is turned on, before engine starts.
   When the brake pedal in depressed to change the input voltage to HI, the control unit tests the monitor and stroke switch circuits. If there is no HI input voltage, the clutch warning light remains on (no problem code is stored in the memory) and the next test is not carried out.
   Immediately after the engine starts, as no signal to switch from 4WD to 2WD is being output, the relay does not operate and the monitor system is normally at LO level. If the relay closes, battery voltage is applied to the monitor terminal, causing it to switch to HI level and the clutch warning light remains on (the problem code is stored in the memory). Also, it switches to HI level if there is an open circuit between the solenoid ground and the monitor terminal.
   The stroke switch is on during 4WD operation, and HI level signal is present at the terminal. If there is an open circuit between the stroke switch and the control unit, the clutch warning light remains on (the problem code is stored in the memory). The stroke switch is operated mechanically by the clutch mechanism. Therefore, if the solenoid turns on when the relay is closed (2WD), the switch turns off and the clutch warning light remains on (no problem code is stored in the merory).

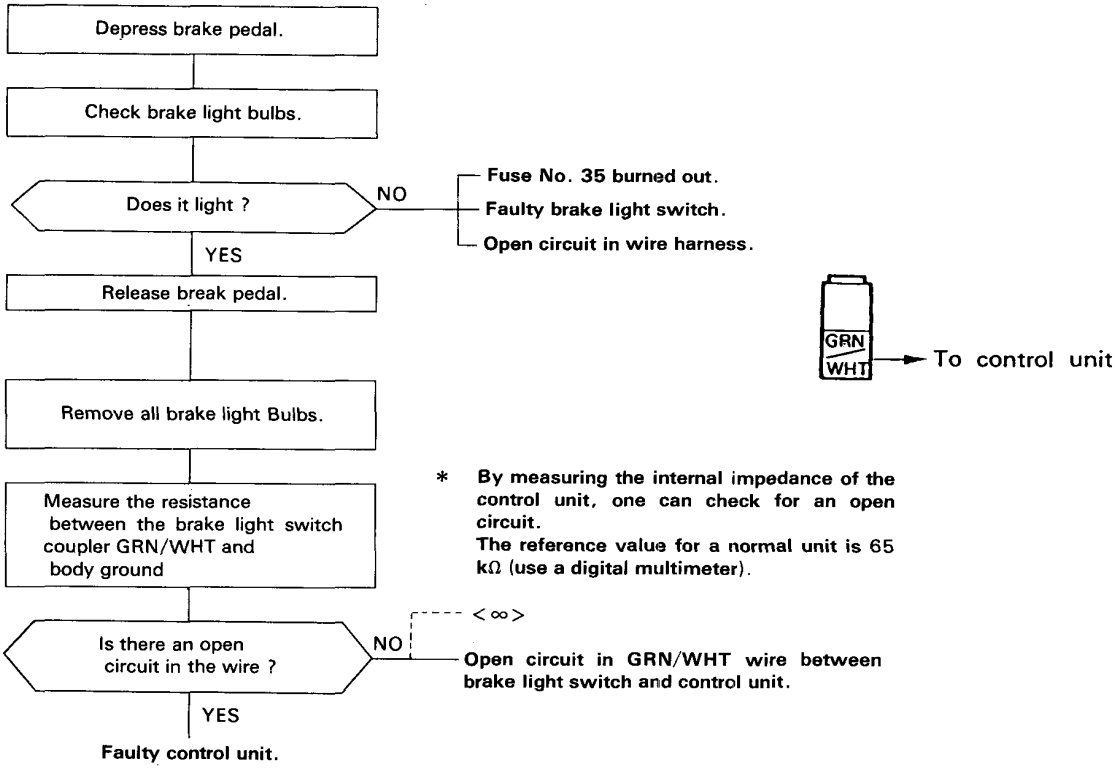


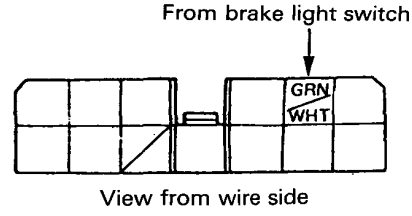
Rear Differential Clutch Warning Light (cont'd)

These tests are divided into three categories, depending on the problem code displayed.

(1) No problem code
(2) Problem codes 1 — 2, 1 — 4 and 1 — 6
(3) Problem code 1 — 1

(1) No problem code





(2) Problem codes 1 — 2, 1 — 4 and 1 — 6

Remove the relay for the rear differential clutch.

Check the relay.

Does it operate properly ? NO — **Faulty relay.**

YES

Check the 7.5 A fuse in the ALB fuse box.

Is it OK ? — ***Replace and recheck.***

Reset the fuse.

Disconnect the solenoid connector.

Check the solenoid.

Is it OK ? — ***Faulty solenoid.***

Check for continuity between BLK terminal and body ground.

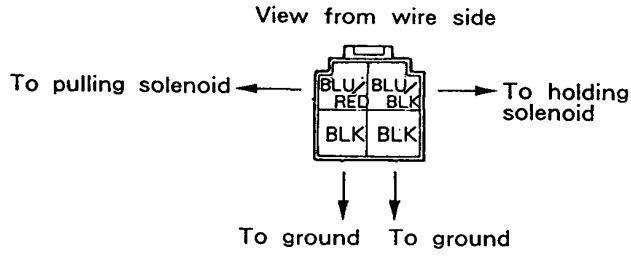
Is there continuity ? — **Open circuit** / **Faulty ground.**

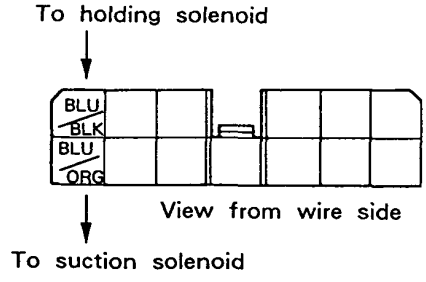
Disconnect the 13 P connector from the control unit.

Check for continuity between the solenoid and the control unit.

Is there continuity ? — **Open circuit.**

Faulty control unit.





Rear Differential Clutch Warning Light (cont'd)

(3) Problem code 1 — 1

Disconnect the 2P coupler from the stroke switch.

Check the stroke switch.

Is it OK ?

NO — **Faulty stroke switch**

YES

Measure the resistance between wire harness terminal A and body ground.

* **By measuring the internal impedance of the control unit. one can check for an open circuit.**
The reference value for a normal unit is 1 kΩ (use a digital multimeter).

Is there continuity ?

NO — <∞> — **Open circuit between stroke switch and control unit.**

YES

Turn the ignition switch on.

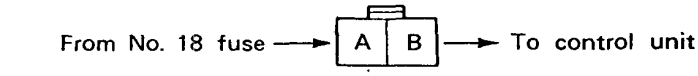
Measure the voltage between terminal B (positive) and body ground.

Is there battery voltage ?

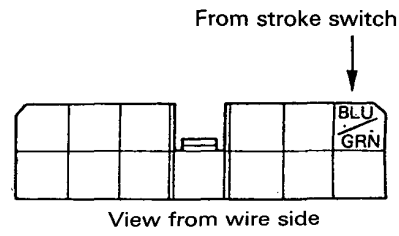
NO — **Open circuit in GRN/BLK (one portion is not colored) wire between stroke switch and control unit.**

YES

Faulty control unit.



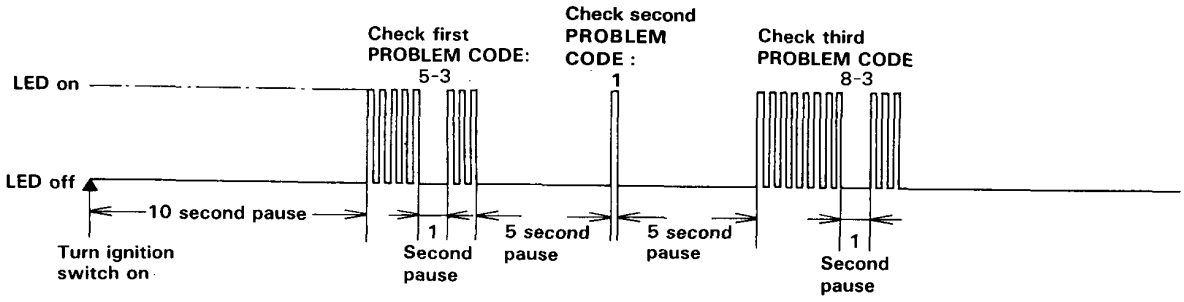
View from terminal side



View from wire side

Comes On And Remains On While Running

1. Stop the engine.
2. Turn the ignition switch on and make sure that the ALB warning light comes on.
3. Restart the engine and check the ALB warning light.
   - There is no problem in the ALB system, if the ALB warning light goes off.
   - Go to step 4, if the ALB warning light remains on.
4. Stop the engine.
5. Remove the inspection hole lid on the right of the front console.
6. Turn the ignition switch on, but do not start the engine.
7. Record the blinking frequency of the LED on the control unit. The blinking frequency indicates the problem code.



NOTE:

- The control unit can indicate three problem codes (one, two or three problems).
- If the LED does not light, see Troubleshooting of Warning Light Circuit page 13-28, except alternator signal (WHT/BLU).
- If you miscount the blinking frequency, turn the ignition switch off, then turn on to blink the LED again.
- The LED lights faintly after starting the engine as the control unit uses the LED circuit to intercommunicate between its internal computers.
- After the repair is completed, disconnect the ALB B2 fuse for at least 3 seconds to erase the control unit's merory. Then turn the ignition key on again and recheck.
- The memory is erased if the connector is disconnected from the control unit or the control unit is removed from the body.

Symptom-to-Sytem Chart

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED				See page	OTHER COMPONENT	See page
MAIN CODE	SUB CODE		FRONT RIGHT	FRONT LEFT	REAR RIGHT	REAR LEFT			
1	—	Hydraulic Controlled Component	—	—	—	—	13 — 26	-ALB MAIN fuse -Motor relay -Pressure Switch -Accumulator -Modulator	13 — 29
2	—	Parking brake switch-related problem	—	—	—	—	13-35	Brake fluid level switch BRAKE light	
3	1	Front fail safe relay	—	—	—	—	13 — 38 (Function Test)		
	2	Rear fail safe relay	—	—	—	—			
3	13	Pulser (s)	○				——		
	14			○					
	15				○	○			
4	4	Speed sensor(s)			○		13 — 35	Modulator	
	8					○			
	12				○	○			
5 or 6 or 7	1	Speed sensor	○				13 — 35		
	2			○					
	4				○				
	8					○			
8	1	Front solenoid related problem (Open)	IN				13 — 37		
	2		OUT					Front R speed sensor	13 — 36
	3		BOTH						
	4			IN					
	8			OUT				Front L speed sensor	13-37
	12			BOTH					
	15	Front fail safe relay	BOTH	BOTH			13 — 38	Solenoids misconnected	

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED			See page	OTHER COMPONENT	See page
MAIN CODE	SUB CODE		FRONT RIGHT	FRONT LEFT	REAR			
9	—	Solenoid related problem (Open)			IN	13 — 40		
10	—				OUT		Rear speed sensors	13 — 36
11	—				BOTH	13 — 41	Rear fail safe relay	13 — 38
11	3		BOTH		BOTH	——		
	12			BOTH	BOTH			
	15		BOTH	BOTH	BOTH		Front or rear fail safe relay	
12	1	Solenoid related problem (Short) Power supply problem	IN			13 — 43		
	2		OUT					
	3		BOTH			13 — 44	ALB B3 fuse	
	4			IN		13 — 43		
	8			OUT				
	12			BOTH		13 — 45	ALB B1 fuse	
	15		BOTH	BOTH		——	ALB B3 and/or ALB B1 fuse(s)	
13	—	Solenoid related problem (Short) Power supply problem			IN	13 — 46		
14	—				OUT			
15	—				BOTH			
15	3		BOTH		BOTH		ALB B3 fuse	
	12			BOTH	BOTH		ALB B1 fuse	
LED stays ON:			BOTH	BOTH	BOTH		ALB B3 and/or ALB B1 fuse(s)	

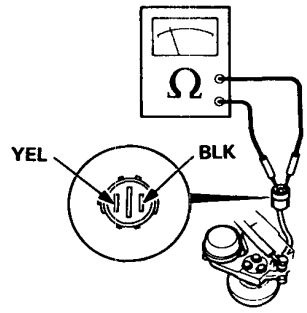
NOTE: The control unit can display a number of sub-codes other than those listed. Such sub-codes indicate unlikely combinations of multiple component failures, or more likely, a problem in a wire or connector common to a group of components. To troubleshoot, refer to the procedures for other sub-codes with the same main code.

Flowchart

Problem Code 1: Hydraulic Controlled Components.

NOTE: The LED does not blink when the following failures occur.
- The contact points of the motor relay remain closed (The motor runs continuously even after the ignition key is removed).
- YEL/RED lead is shorted or the control unit is internally shorted (The motor stops when the ignition switch is turned off).

Pre test steps:
- Check No. 40 Fuse.
- Check all brake system hoses and pipes (low and high pressure) for signs of leaking, bending or kinking.
- Check reservoir fluid level, and if necessary, fill to the MAX level.



Disconnect the pressure switch connector and check the continuity between BLK and YEL terminals.

Is there continuity?

YES → Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench. See page 13-28.

NO

Check the continuity of pressure switch between BLK and YEL terminals.

Is there continuity?

YES → **Replace the pressure switch (closed).**

NO

Reconnect the pressure switch connector.

Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench (see page 13-28).
Jack up the front of car and support with safety stands, then run the engine in gear above 10 km/h (6 mph).

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

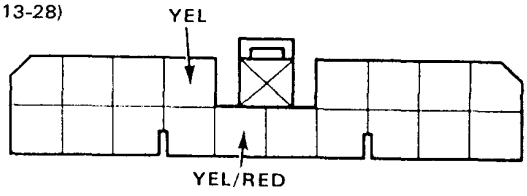
(To page 13-27).

(From page 13-26)

Does the pump motor run?
- YES → (To page 13-28)
- NO →

Disconnect the 21P connector from the control unit.

Check for continuity between the YEL terminal and body ground.



View from wire side.

Is there continuity?
- YES → **Repair short in YEL wire between the control unit and pressure switch.**
- NO →

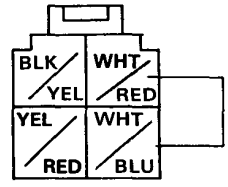
Connect the YEL/RED terminal to *body ground using a jumper wire.* Turn the ignition switch ON.

Does the pump motor run?
- YES → **Faulty the control unit.**
- NO →

Remove the pump motor relay and check the pump motor relay.

Does it work properly?
- NO → **Faulty the pump motor relay.**
- YES →

Connect the WHT/ RED and WHT/ BLU terminals using a jumper wire.



View from terminal side.

CAUTION: If the motor runs disconnect the jumper wire immediately.

Does the pump motor run?
- NO → (To page 13-35)
- YES →

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

Is there battery voltage?
- NO → **Repair open in BLK/YEL wire between the No. 18 fuse (10 A) and pump motor relay.**
- YES →

Repair open in YEL/RED wire *between the control unit and* pump motor relay.

(cont'd)

Flowchart (cont'd)

(From page 13-33)

Does the pump motor run with an increasingly loud, raspy sound?

NO → **Pump runs with a constant soft sound: Bleed air from ALB system using ALB checker and bleeder T-wrench (see page 13-35) and check the pump sound again.**

YES

Does the pump motor stop after about 60 seconds?

NO → **Pump stops about 120 seconds: faulty pressure switch (open).**

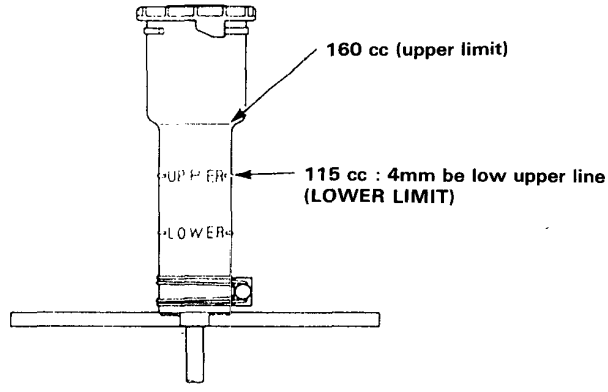
YES

Does the reservoir fluid level go down, and are there no bubbles in the modulator reservoir tank?

NO →
- **If level stays the same and there are bubbles in the modulator reservoir tank, check the accumulator fluid quantity by bleeding the high pressure line with the ALB T-wrench:**
  - **If over 160 cc (upper limit). faulty accumulater**
  - **If over 115 cc : 4 mm below upper line (LOWER LIMIT) Modulator inlet soleenoid leak or accumulator leak.**
- **If level goes up: faulty modulator assembly.**

YES

System is OK; recheck pump motor, to confirm no intermittent problem.



NOTE: The fluid enters the reservoir under pressure; wait 1 or 2 minutes for air bubbles to disappear and level to stabilize.

(From page 13-27)

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

Is there battery voltage? NO → **Repair open in WHT/RED wire between the fuse and pump motor relay.**

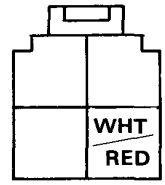
YES

Measure voltage between the WHT/BLU terminal (+) of the pump motor and body ground (–).

Is there battery voltage? NO → **Repair open in WHT/BLU wire between motor relay and pump motor, or open in BLK wire between pump motor and ground or poor ground**

YES

Replace the pump motor.



View from terminal side.

View from terminal side.

Air Bleeding with ALB checker

NOTE : Do not depress the brake pedal while using the ALB checker to bleed air from the system.

1. Fill the modulator reservoir with brake fluid up to the MAX level.
2. Disconnect the 6P coupler (PNK) from the cover mounted in under the driver seat and connect it to the ALB checker.

CAUTION : Place the car on level ground with the wheels blocked. Shift the transmission to P or Neutral.

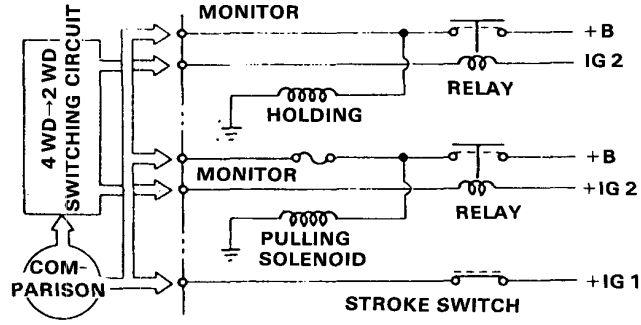
3. Start the engine.
4. Release the parking brake.
5. Turn the power switch of ALB checker on.
6. Turn the mode selector switch to 1.
7. Press the start switch.
8. Make sure that the motor runs.
9. Wait for the motor to stop.
10. Turn the mode switch to 2.
11. Press the start switch.
12. Brake fluid in the reservoir will bubble briskly for 20 seconds after the switch is pressed. Wait for 4 to 5 minutes until the brake fluid stops bubbling.
13. Turn the mode switch to 6.
14. Repeat steps 11 and 12.
15. Repeat steps 10 through 14 two or three times.
16. Fill the reservoir with brake fluid up to the MAX level.
17. Install the cap.
18. Check the ALB function in all modes (page 13 — 11). There should be kickback in modes 2 through 6.

CAUTION : If the kickback is weak, re-bleed air from the system.

Flowchart (cont'd)

When vehicle is running, the rear differential clutch (below : "clutch") warning light comes on and remains on.
When the car is running, the output circuit is constantly being compared with the monitor system and stroke switch system.
If an abnormality is detected, the clutch warning light comes on and a problem code is stored in memory.
Reasons for warning during 4WD operation.

- Stuck relay or break in connection between solenoid and monitor terminal.
- Bad connection in stroke switch system or mechanical failure in the clutch. Reasons for warning during 2WD operation :
- Open circuit between holding solenoid and monitor terminal.
- Stuck pulling solenoid or open circuit between pulling solenoid and monitor (pulling circuit operates only in the split second when switching from 4WD to 2WD operation. 4WD operation then commences immediately.)
- Stuck stroke switch or clutch mechanical connection.



Problem codes : 1 — 2 (holding), 1 — 4 (pulling) and 1 — 6 (both)

Check ALB clutch sub fuse (7.5 A) in ALB fuse box.

Is it OK ? NO → **Replace and recheck.**

YES

Reset fuse.

Check ALB clutch main fuse (30 A).

Is it OK ? NO → **Replace and recheck.**

YES

Reset fuse.

Check ALB Clutch sub fuse (7.5 A) in ALB fuse box.

Is it OK ? NO → **Replace and recheck.**

YES

(To page 13-31)

(From page 13-30)

Reset fuse.

Remove rear differential clutch relay.

Check relay.

Does it operate properly ? NO — **Faulty relay**

YES

Measure voltage between WHT/BLU terminal of (+) coupler for holding relay and body ground.

Is there battery voltage ? NO — **Open circuit in WHT/BLU wire between ALB clutch sub fuse and relay.**

YES

Measure voltage between WHT/RED terminal (+) of coupler for pulling relay and body ground.

Is there battery voltage ? NO — **Open circuit in WHT/RED wire between ALB clutch main fuse and relay.**

YES

Turn ignition switch on.

Measure voltage between WHT/YEL terminal (+) of coupler for holding relay and body ground.

Is there battery voltage ? NO — **Open circuit in BLK/YEL wire between fuse No. 18 and relay.**

YES

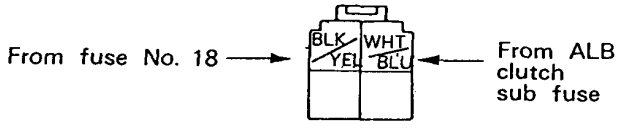
Measure voltage between WHT/YEL terminal (+) of coupler for pulling relay and body ground.

Is there battery voltage ? NO — **Open circuit in BLK/YEL wire between fuse No.18 and relay.**

YES

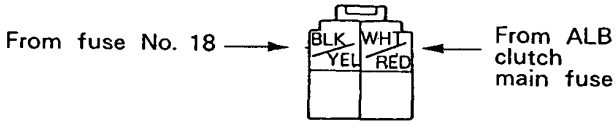
(To page 13-32)

Holding (GRN)



View from terminal side

Pulling (PNK)



View from terminal side

Flowchart (cont'd)

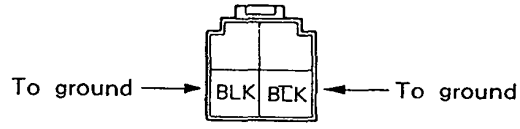
(From page 13-31)

Turn ignition switch off.

Disconnect the 4P coupler from the solenoid.

Check solenoid.

Check for continuity between the BLK terminal of the wire harness and the body ground.



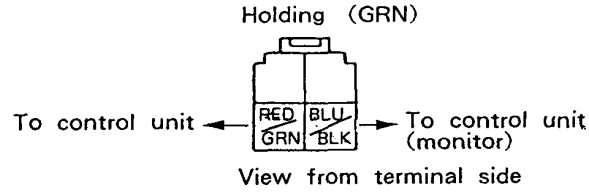
Is there continuity ?

NO → **Open circuit in wire.** / **Faulty ground.**

YES

Disconnect the 13P coupler from the control unit.

Check for continuity in the BLU/BLK wire between the holding relay and the control unit.

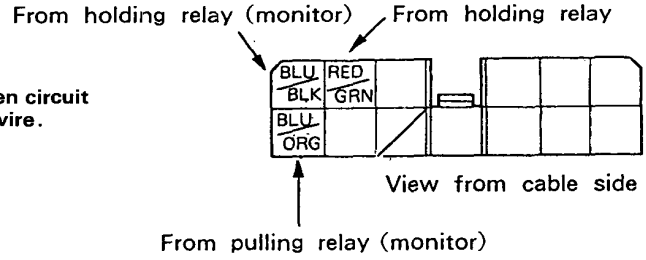


Is there continuity ?

NO → **Open circuit in wire.**

YES

Check for an open circuit between the RED/GRN terminal of the holding relay coupler and the body ground.



Is there open circuit ?

NO → <0 Ω> **There is short circuit between the holding relay and the control unit.**

YES

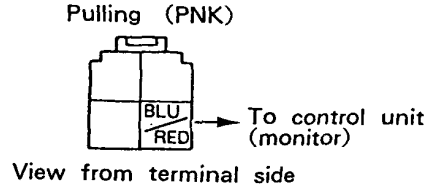
Check for continuity in the RED/GRN wire between the holding relay and the control unit.

Is there continuity ?

NO → **Open circuit in wire.**

YES

Check for continuity in the BLU/RED, BLU/ORN wire between the pulling and the control unit.



Is there continuity ?

NO → **Open circuit in wire.**

YES

(To page 13-33)

(From page 13-32)

Check for an open circuit between the RED/YEL terminal of the coupler for the pulling relay and the body ground.

Is there open circuit ?

NO — <0 Ω> — **There is short circuit in the RED/YEL wire between the pulling relay and the control unit.**

YES

Check for continuity in the RED/YEL wire between the pulling relay and the control unit.

Is there continuity ?

NO — **Open circuit in wire.**

YES

Check for continuity in the BLU/BLK wire between the solenoid and the control unit.

Is there continuity ?

NO — **Open circuit in wire.**

YES

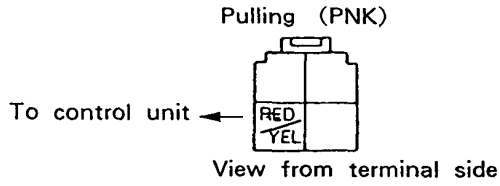
Check for continuity in the BLU/RED wire between the solenoid and the control unit.

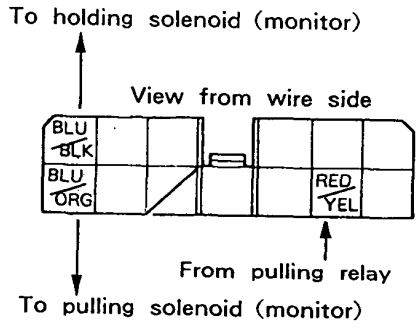
Is there continuity ?

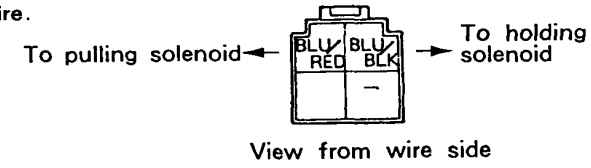
NO — **Open circuit in wire.**

YES

Faulty control unit.







Flowchart (cont'd)

Problem code : 1 — 1 (stroke switch system)

Disconnect the 2 P coupler from the stroke switch and the wire harness.

Check the stroke switch.

Is it OK ? — NO — **Faulty stroke switch.**

YES

Measure resistance between wire harness terminal A and the body ground.

* **By measuring the internal impedance of the control unit, one can check for an open circuit.**
The reference value for a normal unit is 1 kΩ (use a digital multimeter).

Is there continuity ? — NO — <∞> — **Open circuit between stroke switch and control unit.**

YES

Turn ignition switch on.

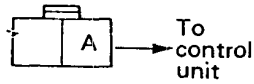
Measure voltage betwees wire harness B terminal (+) and body ground.

Is there battery voltage ? — NO — **Open circuit in BLK/YEL (one portion is not colored) wire between No.18 fuse and stroke switch.**

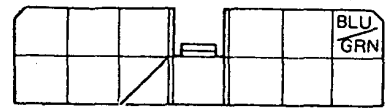
YES

Faulty control unit.

View from terminal side

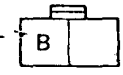


From stroke switch



View from wire side

From fuse No. 18



View from terminal side

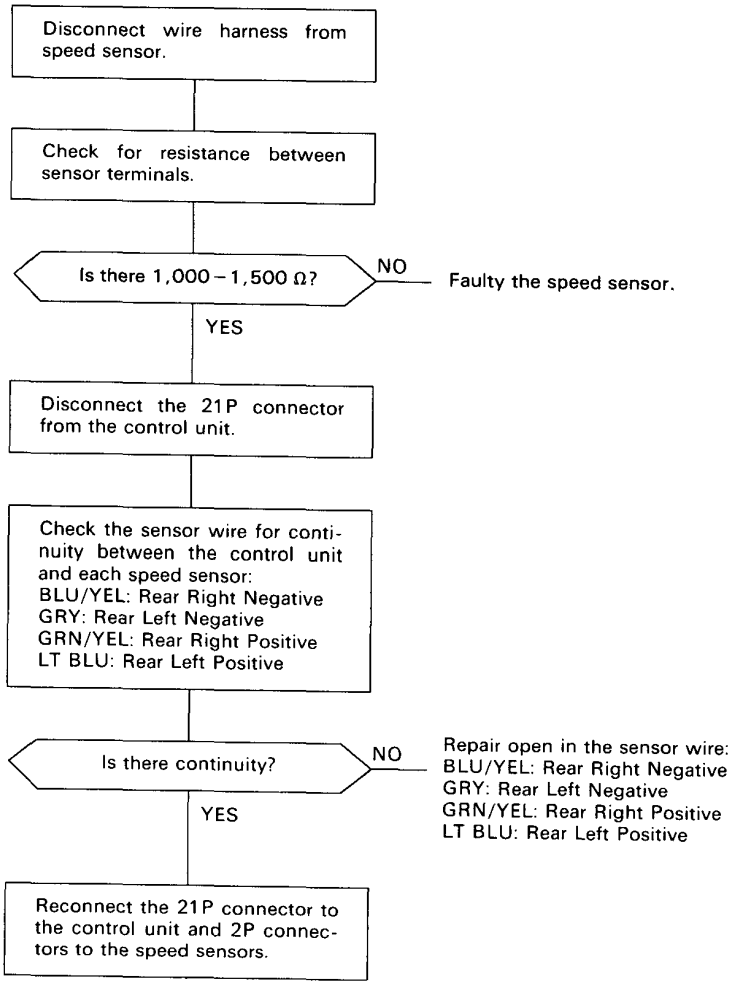
Problem code2: Parking Brake Switch Related Problem

If the parking brake has been released, the following items are possible causes. If they are OK, check the control unit connectors for good connection. If not loose or disconnected, substitute a known-good control unit and recheck.

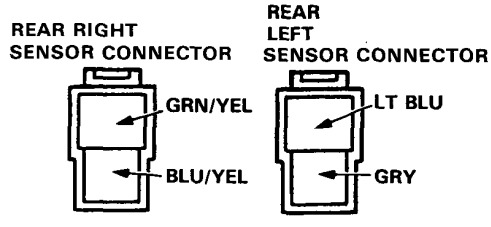
NOTE : Before Troubleshooting Problem Code 2, remove the ALB 2 fuse for three seconds to clear the control unit's memory, then test drive the car.
If the ALB warning light and LED stay off, the probability is that the car was driving with the parking brake applied.

- The parking brake is applied for more than 30 seconds while driving.
- The brake fluid level in the master cylinder is too low.
- GRN/RED lead is shorted between the [BRAKE] warning light and parking brake switch.
- GRN/RED lead is shorted between the [BRAKE] warning light and brake fluid level switch.
- The [BRAKE] warning light is blown.
- GRN/RED has an open between the [BRAKE] warning light and parking brake.
- GRN/RED has an open between the parking brake switch and control unit.

Problem code 4-4 to 4-12: Rear Speed Sensor



(To page 13-36)



View from terminal side.

Flowchart (cont'd)

(From page 13-35)

Connect ALB checker to inspection connector.

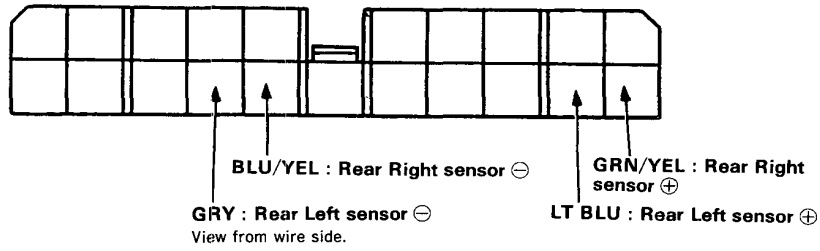
Check ALB function in MODE 2 and 3.

Does it work properly?

NO — Faulty the modulator.

YES

Faulty the control unit.



Problem Code 5-1 to 7-8: Speed Sensor

Disconnect wire harness from speed sensor.

Check for resistance between sensor terminals.

Is there 1,000-1,500 Ω?

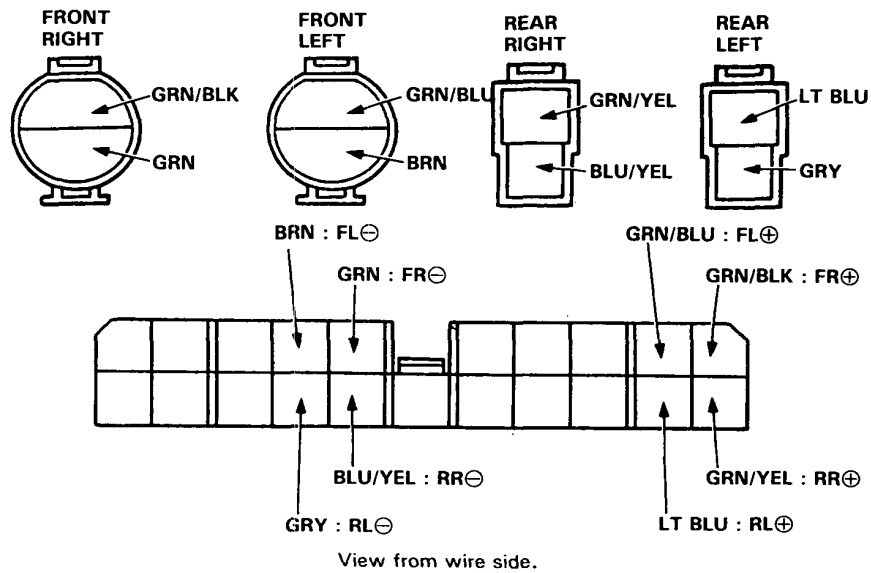
NO — Faulty the speed sensor.

YES

Disconnect the 21P connector from the control unit.

Check the each wires for continuity between the sensor and control unit:
GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative

(To page 13-37)



(From page 13-36)

Is there continuity? NO — Repair open in sensor wire:

GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative

YES

Check pulser air gap :
0.4–1.0 mm (0.016–0.039 m)

Is the air gap OK? NO — Repair air gap or replace the pulser rotor and/or speed sensor

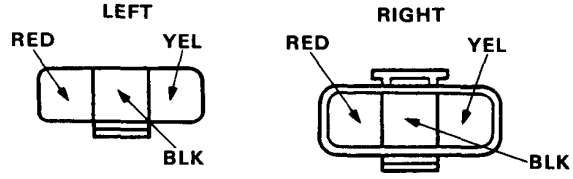
YES

Faulty the control unit.

Problem Code 8-1 to 8-12: Front Solenoid Related Problem

NOTE: Problem Code 8-2 or 8-8, also perform troubleshooting of Problem Code 5-1 to 7-8 (page 13-36).

Disconnect wire harness from front solenoids.



View from terminal side.

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3 Ω? NO — Faulty solenoid.

YES

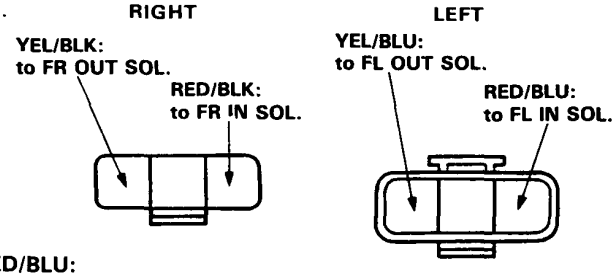
Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1-3 Ω? NO — Faulty solenoid.

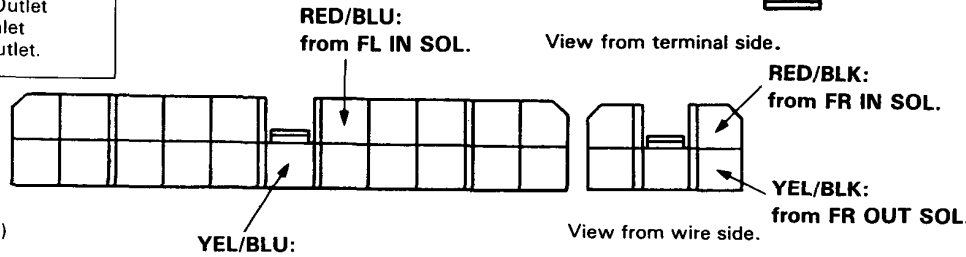
YES

Disconnect the 21P and 5P connectors from the control unit.

Check for continuity between control unit and front solenoid:
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet.



View from terminal side.



View from wire side.

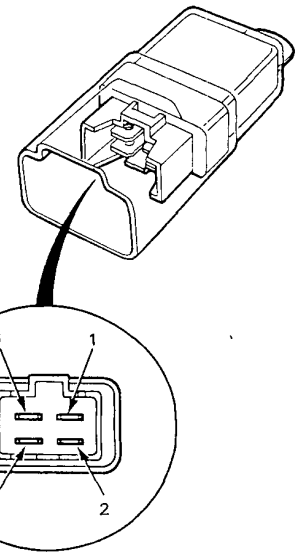
View from wire side.

(To page 13-38)

Flowchart (cont'd)

(From page 13-37)

Is there continuity?
- NO → Repair open in wire:
  RED/BLK: Front Right Inlet
  YEL/BLK: Front Right Outlet
  RED/BLU: Front Left Inlet
  YEL/BLU: Front Left Outlet
- YES → Faulty the control unit.



Problem 8-15: Front Fail Safe Relay Circuit

Remove front fail safe relay.

Check relay function.

*** Check for continuity between terminals ③ and ④ There should be no continuity. Connect a 12 V battery across terminals ① and ②. There should be continuity between terminals ③ and ④.**

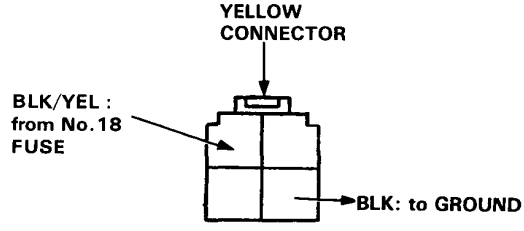
Does it work properly?
- NO → Faulty the front fail safe relay.
- YES

Check for continuity between BLK lead and body ground.

Is there continuity?
- NO → Repair open in BLK wire between the fail safe relay and ground or poor ground
- YES

Turn ignition switch ON.

Check for voltage between **BLK/YEL** lead (+) and body ground (–).



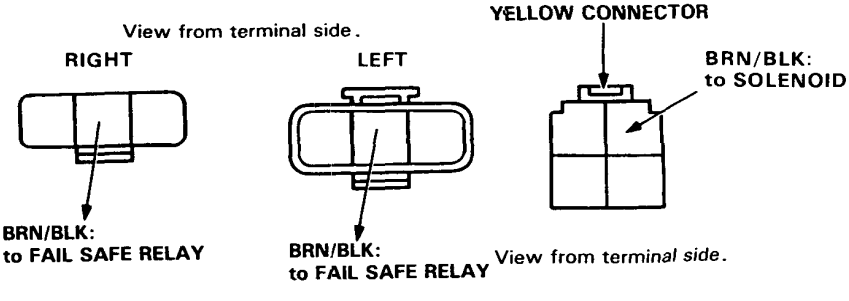
View from terminal side.

Is battery voltage available?
- NO → Repair open in **BLK/YEL** wire between the fail safe relay and **18(10 A) fuse**.
- YES

Turn ignition switch OFF.

Disconnect the 3P connectors from the front solenoids.

Check for continuity in BRN/BLK lead between fail safe relay and solenoids.



(To page 13-39)

Is there continuity?
NO — Repair open in BRN/BLK wire between the solenoids and fail safe relay.
YES

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3 Ω?
NO — Faulty solenoid.
YES

Check for resistance between YEL and BLK terminals of front solenoid.

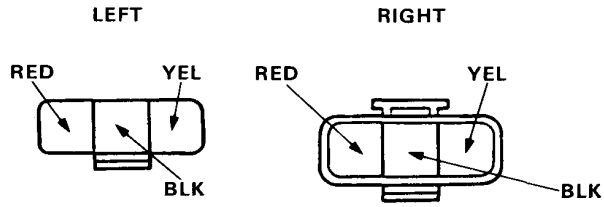
Is there 1-3 Ω?
NO — Faulty solenoid.
YES

Disconnect the 21P and 5P connectors from the control unit.

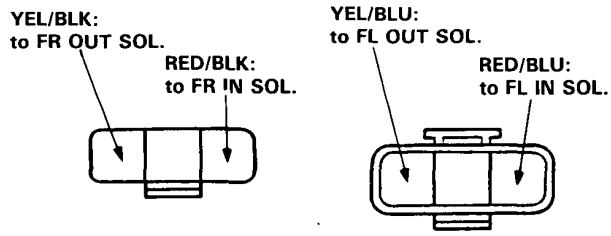
Check for continuity between control unit and front solenoid:
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet.

Is there continuity?
NO — Repair open in wire:
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet
YES

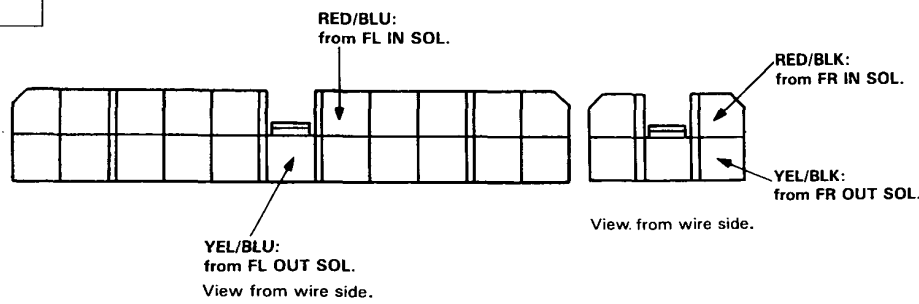
Faulty the control unit.



View from terminal side.



View from terminal side.



View from wire side.
View from wire side.

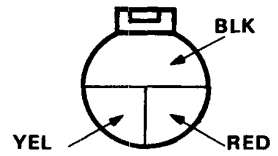
Flowchart (cont'd)

Problem Code 9 or 10: Rear Solenoid Related Problem

NOTE: Problem Code 10, also perform troubleshooting of Problem Code 5-1 to 7-8 (page 13-36).

Disconnect wire harness from rear solenoid.

Check for resistance between RED and BLK terminals of rear solenoid.



View from terminal side.

Is there 1-3 Ω? NO — Faulty solenoid.

YES

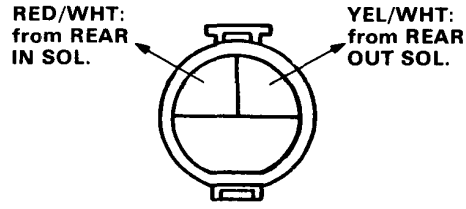
Check for resistance between YEL and BLK terminals of rear solenoid.

Is there 1-3 Ω? NO — Faulty solenoid.

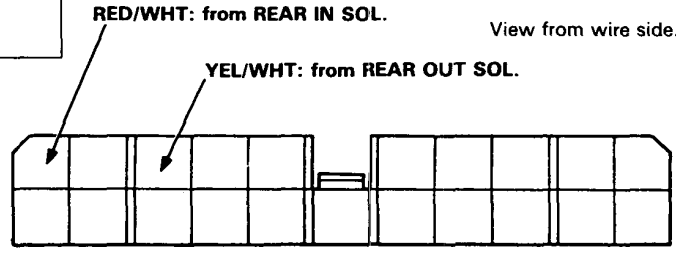
YES

Disconnect the 21P connector from the control unit.

Check for continuity between control unit and rear solenoid:
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet



View from wire side.



View from wire side.

Is there continuity? NO — Repair open in the wire between the rear solenoid and control unit
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

YES

Faulty the control unit.

Problem Code 11: Rear Fail Safe Relay Circuit

NOTE: Also perform Troubleshooting of Problem Code 9 or 10 (page 13-40).

Remove rear fail safe relay.

Check relay function (page 13-38).

Does it work properly? NO — Faulty the relay.

YES

Check for continuity between BLK lead of wire harness and body ground.

Is there continuity? NO — Repair open in BLK wire between the relay and ground or poor ground

YES

Turn ignition switch ON.

Check for voltage between BLK/YEL lead (+) of wire harness and body ground (–).

Is battery voltage available? NO — **Repair open in BLK/YEL wire between the relay and No.18(10 A) fuse.**

YES

Turn ignition switch off.

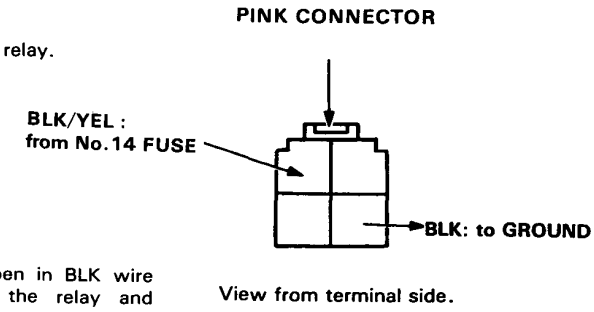
Disconnect the 3P connector (PNK) from the rear solenoid.

Check for continuity in BLU/BLK lead between fail safe relay and solenoid.

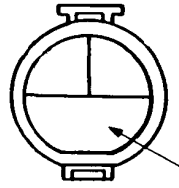
Is there continuity? NO — Repair open in BLU/BLK wire between the relay and solenoid.

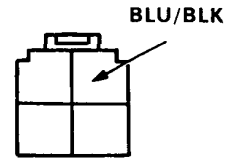
YES

(To page 13-42)



View from terminal side.





View from terminal side.

Flowchart (cont'd)

(From page 13-41)

Disconnect the 21P connector from the control unit.

Check for continuity in YEL/GRN lead between fail safe relay and control unit.

Is there continuity? NO → Repair open in YEL/GRN wire between the relay and control unit.

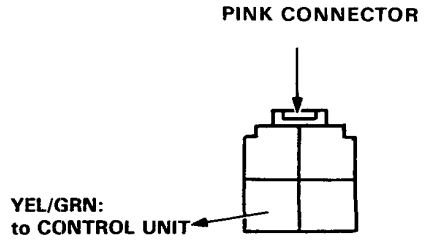
YES

Check for continuity between control unit and rear solenoid.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

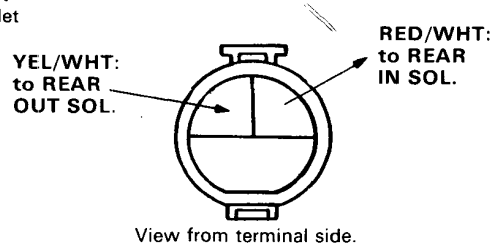
Is there continuity: NO → Repair open in wire between the solenoid and control unit.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

YES

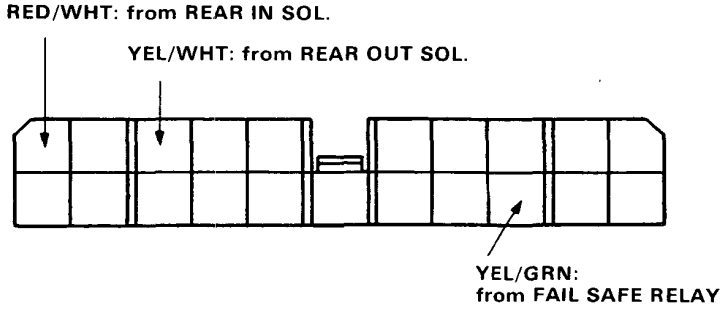
Faulty the control unit.



View from terminal side.



View from terminal side.



View from wire side.

Problem Code 12-1, 12-2, 12-4 or 12-8: Front Solenoid

Disconnect wire harness from front solenoids.

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3 Ω? NO — Faulty solenoid.

YES

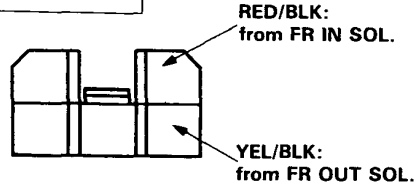
Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1-3 Ω? NO — Faulty solenoid.

YES

Disconnect the 21P and 5P connectors from the control unit.

Check for continuity between wire harness and body ground.
RED/BLK: front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

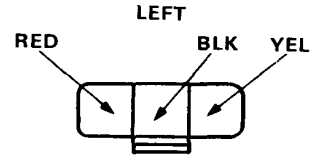


View from wire side.

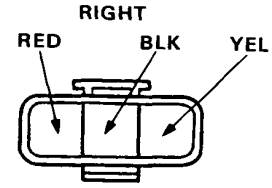
Is there continuity? YES — Repair short in wire between control unit and front solenoids.
RED/BLK: Front Right Inlet
RED/BLU: Front Left Inlet
YEL/BLK: Front Right Outlet
YEL/BLU: Front Left Outlet

NO

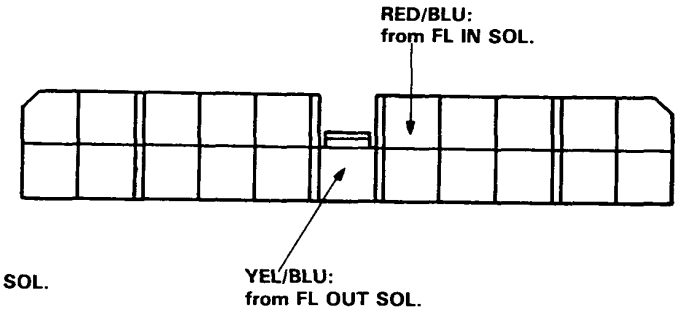
Faulty the control unit.



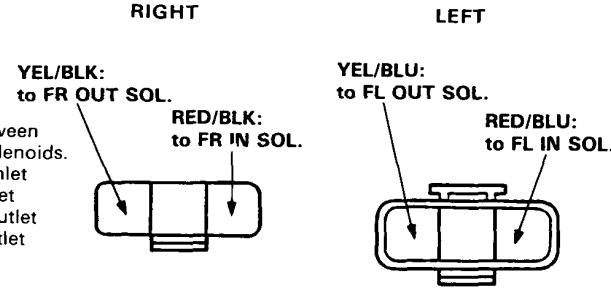
View from terminal side.



View from terminal side.



View from wire side.



View from terminal side.

Flowchart (cont'd)

Problem Code 12-3: Front Right Solenoid and/or Power Supply

Check ALB B3 fuse (15 A).

Is the fuse OK? — NO — Replace the ALB 3 fuse.

YES

Disconnect wire harness from front solenoids.

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3 Ω? — NO — Faulty solenoid.

YES

Check for resistance between YEL and BLK terminals of front solenoid.

Disconnect the 5P connector from the control unit.

Check for voltage between WHT/BLK lead (+) and body ground (−).

Is battery voltage available? — NO — Repair open in WHT/BLK wire between the ALB B3 fuse and control unit.

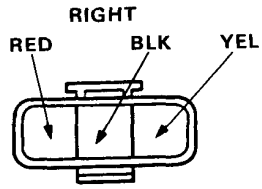
YES

Check for continuity between wire harness and body ground.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet

Is there continuity? — YES — Repair short in wire
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet

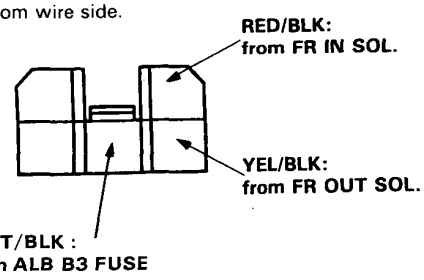
NO

Faulty the control unit.

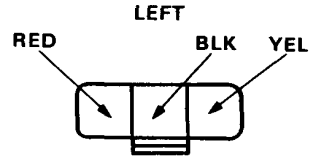


View from terminal side.

View from wire side.



Problem Code 12-12: Front left Solenoid and/or Power Supply Problem



View from terminal side.

Check ALB B1 fuse

Is the fuse OK? NO — Replace the fuse.

YES

Disconnect wire harness from front solenoid.

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1—3 Ω? NO — Faulty solenoid.

YES

Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1—3 Ω? NO — Faulty solenoid.

YES

Disconnect the 21P connector from the control unit.

Check for voltage between WHT/GRN lead (+) and body ground (–).

Is battery voltage available? NO — Repair open in WHT/GRN wire between the ALB B1 fuse and control unit.

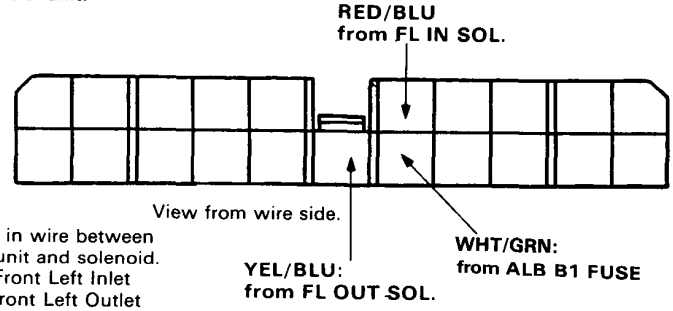
YES

Check for continuity between wire harness and body ground.
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

Is there continuity? YES — Repair short in wire between the control unit and solenoid.
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

NO

Faulty the control unit.



Flowchart (cont'd)

Problem Code 13 or 14: Rear Solenoid Related Problem

Disconnect wire harness from rear solenoid.

Check for resistance between RED and BLK terminals of rear solenoid.

Is there 1—3 Ω?
- NO → Faulty solenoid.
- YES

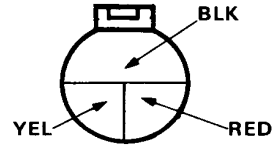
Check for resistance between YEL and BLK terminals of rear solenoid.

Is there 1—3 Ω?
- NO → Faulty solenoid.
- YES

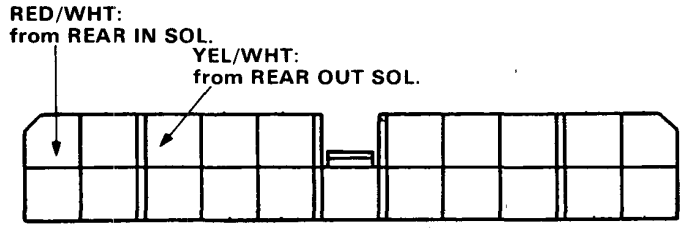
Disconnect the 21P connector from the control unit.

Check for continuity between wire harness and body ground.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

Is there continuity?
- YES → Repair short in wire between the solenoid and control unit.
  RED/WHT: Rear Inlet
  YEL/WHT: Rear Outlet
- NO → Faulty the control unit.

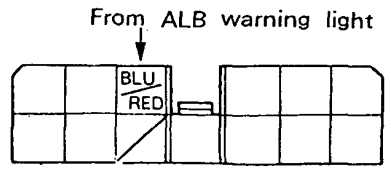


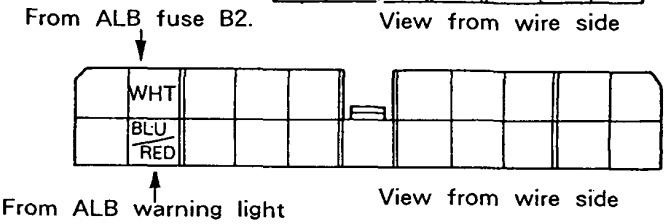
View from Terminal side.



View from wire side.

The ALB warning light comes on while vehicle is running, but the problem code could not be read from memory by following the prescribed procedure.





Check ALB B2 fuse

Is it OK ? — NO → **Replace and recheck. From ALB B2 fuse.**

YES

Measure voltage between control unit WHT (+) terminal and body ground.

is there battery voltage ? — NO → **Open circuit in wire harness between ALB B2 fuse and control unit.**

YES

Measure resistance between control unit BLE/RED terminal and body ground.

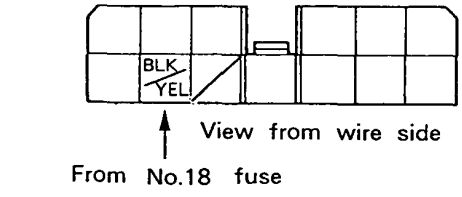
* **By measuring the internai impedance of the control unit, one can check for a short circuit. The reference value for a normal unit is *open or* 300 kΩ *(use a digital* multimeter, value differs depending on polarity).**

Is there short *circuit ?* — NO → **Short circuit in BLU/RED wire between control unit and combination meter.** <0Ω>

YES

Turn ignition switch on.

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



Is there battery voltage? — NO → **Open circuit in BLK/YEL wire between No.18 fuse and control unit.**

YES

Faulty control unit.

Flowchart (cont'd)

The rear differential clutch warning light comes on while vehicle is running, but the problem code could not be read from memory by following the prescribed procedure.

Measure resistance between control unit LT GRN terminal and body ground .

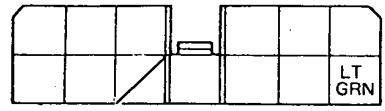
Is there short circuit?

NO ---- <0 Ω>

Short circuit in LT GRN wire between control unit and combination meter.

YES

Faulty control unit.



View from wire side

*** By measuring the internal impedance of the control unit, one can check for a short circuit.**
The reference value for a normal unit is open or 300 kΩ (use a digital multimeter, value differs depending on polarity).

Body

Dashboard..... 14 — 2

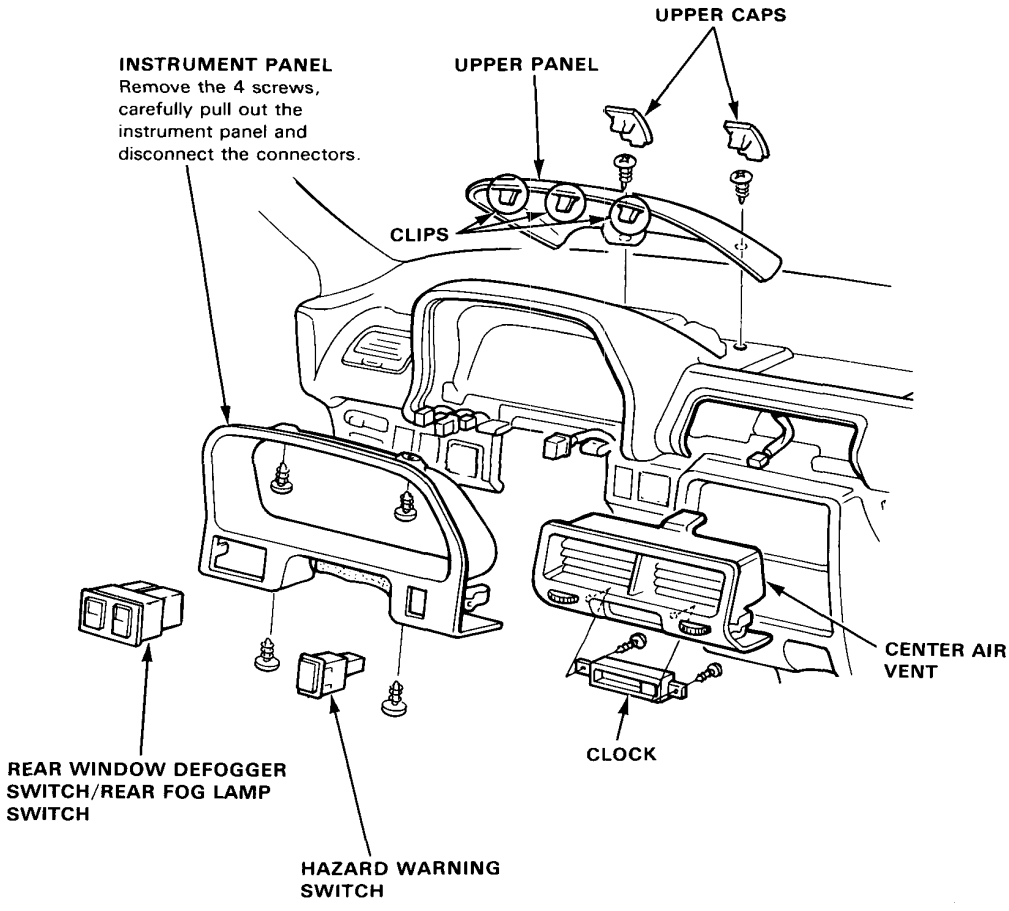
Outline of Model change

The instrument panel has been changed.

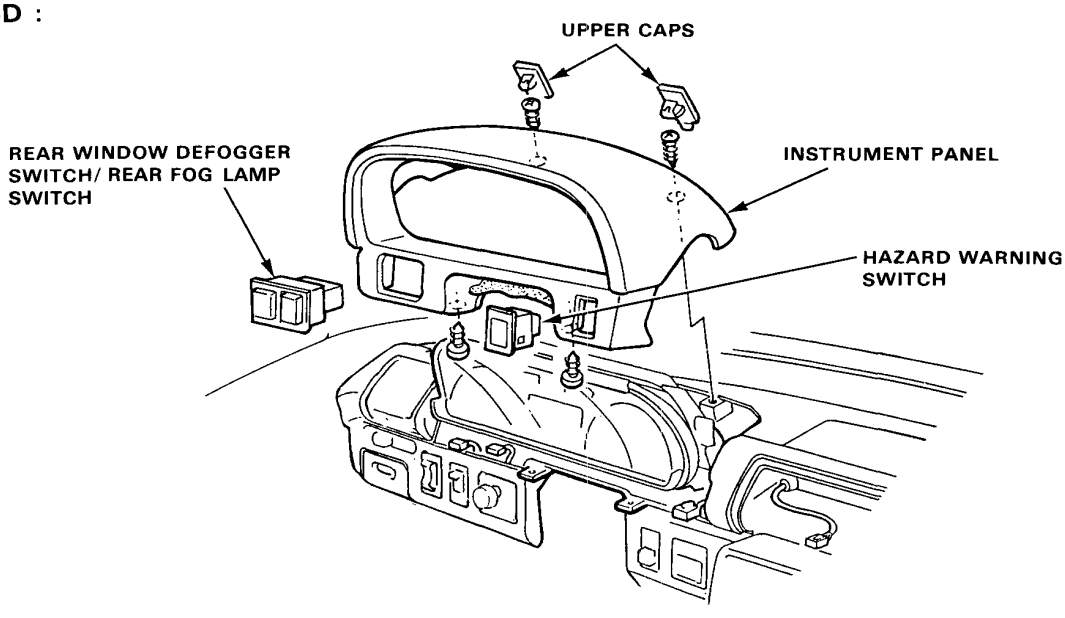
Dashboard

Instrument Panel Replacement

4D :

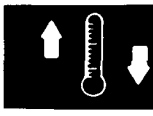


3/5D :



Heater and Air Conditioner

Air Conditioner ..... 15 — 1



Outline of Model Changes

- The pressure plate of the compressor has been changed.
- "Sanden" compressor has been adopted for some types.

Air Conditioner

Special Tools ..... 15 — 2
Illustrated Index ..... 15 — 3
Wire Harness Routing ..... 15 — 4
Service Tips ..... 15 — 5

Compressor
Description ..... 15 — 6
Troubleshooting ..... 15 — 8

MATSUSHITA :

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Clutch Overhaul ..... 15 — 13
Thermal Protector Inspection .... 15 — 15
Thermal Protector Replacement
..... 15 — 15
Shaft Seal Replacement ..... 15 — 16

SANDEN :

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Thermal Protector Inspection .... 15 — 20
Thermal Protector Replacement
..... 15 — 20
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Clutch Overhaul ..... 15 — 23
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Charging Procedure ..... 15 — 32
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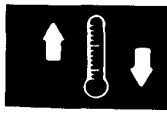
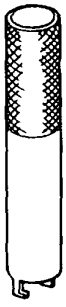
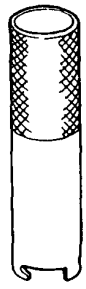


Special Tools

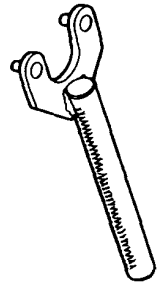
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAF—SF10300	SEAL SEAT REMOVER	1	15-16
②	07HAF—SF10400	SEAL REMOVER/INSTALLER	1	15-16
③	07925—6920001	A/C CLUTCH HOLDER	1	15-23, 26
④	07935—805003	FLY WHEEL PULLER	1	15-23
⑤	07JAC—SH20100	A/C PULLY PULLER	1	15-24
⑥	07JAC—SH20300	SHAFT RING REMOVER	1	15-25, 28
⑦	07965—6340100	BEARING DRIVER	1	15-28
⑧	07947—6340500	DRIVER ATTACHMENT	1	15-29



①



②



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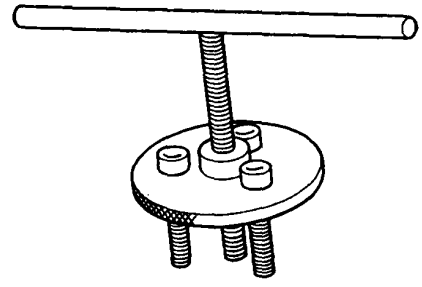

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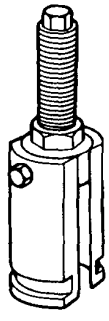
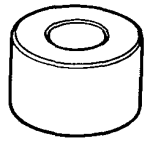
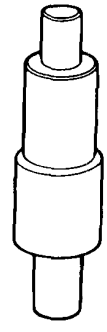


⑤



⑥



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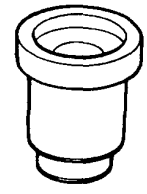


⑧

Air Conditioner

Illustrated Index

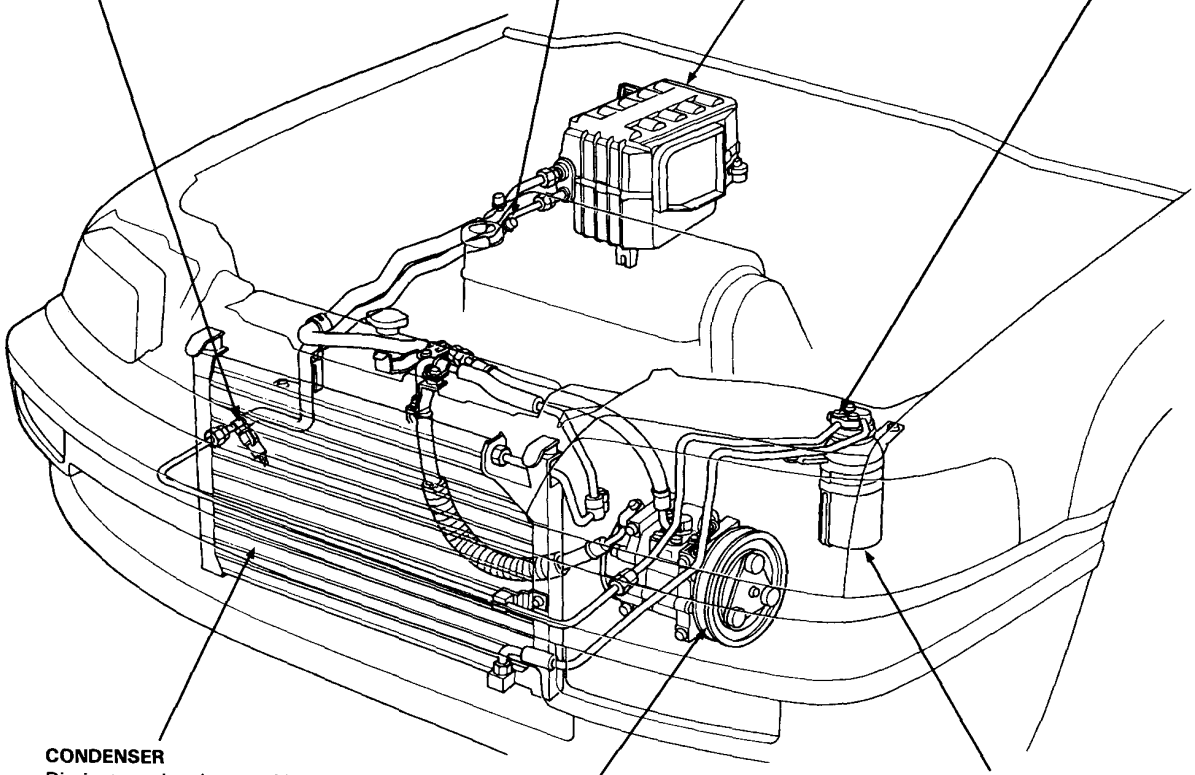
〈LHD〉

A/C HIGH SIDE ADAPTER
The A/C high side charging fitting's O.D. size is reduced from 7/16" to 3/8" to prevent you from accidentally connecting the low side hose to the high side fitting. Consequently, you'll need an adapter for the existing hose on your charging station.

DUAL PRESSURE SWITCH
When the refrigerant pressure is below 215 kPa (33 psi) due to refrigerant leakage or above 2350 kPa (340 psi) due to the coolant blockage the dual pressure switch opens the circuit to the A/C control unit and stops the air conditioner to protect the compressor.

EVAPORATOR
As refrigerant circulates, heat is absorbed from the surrounding passenger compartment air.

SIGHT GLASS



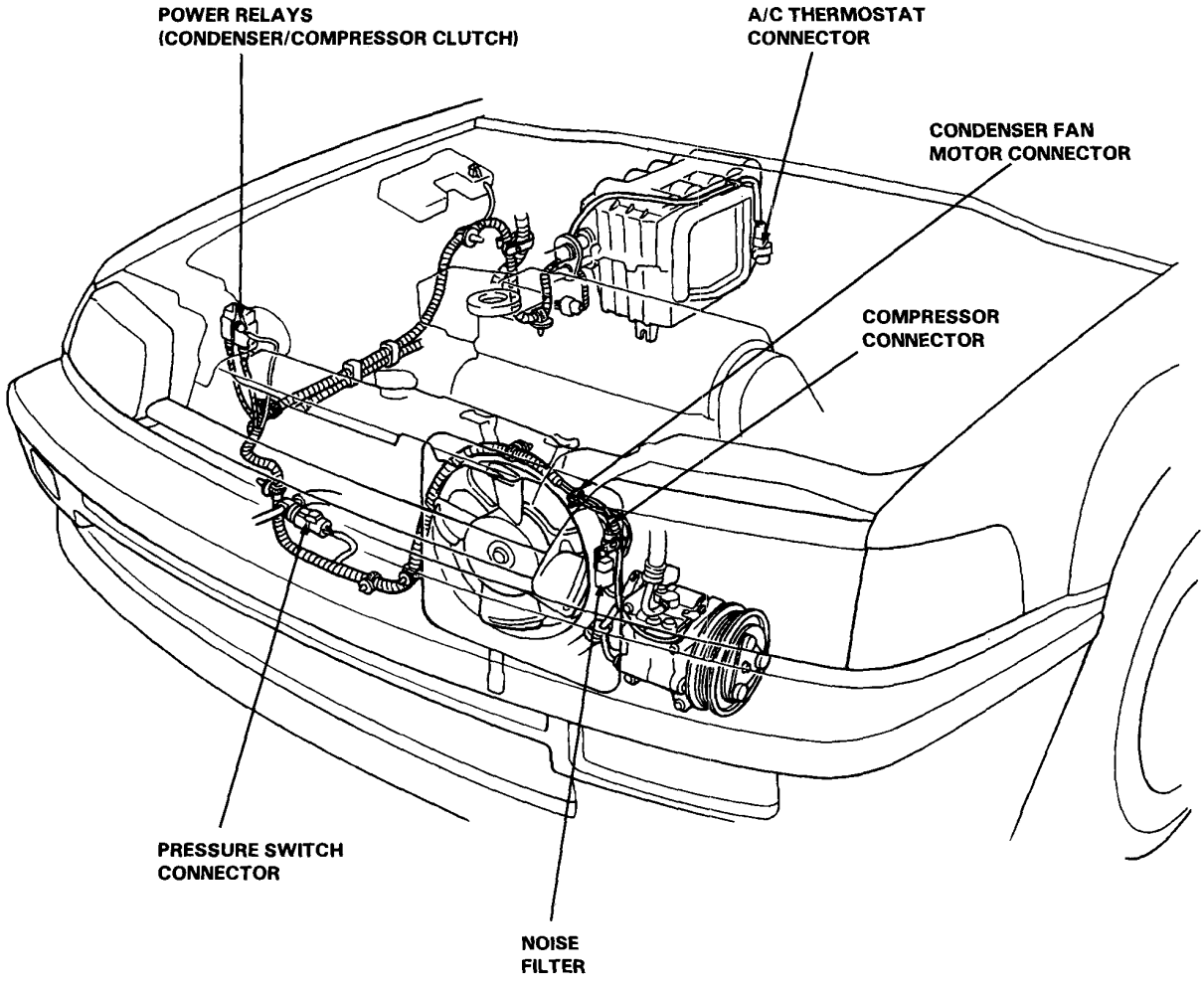
CONDENSER
Dissipates the heat which was absorbed by the refirigerant.

RECEIVER AND FILTER/DRYER
Serves as a reservoir which filters and removes moisture from the refrigerant.

COMPRESSOR
Compresses the refrigerant and then forces it through the condenser.
There are two types:
1. **MATSUSHITA,** Replacement, page **15-9**
2. **SANDEN,** Replacement, page **15-18**

Wire Harness Routing

〈LHD〉



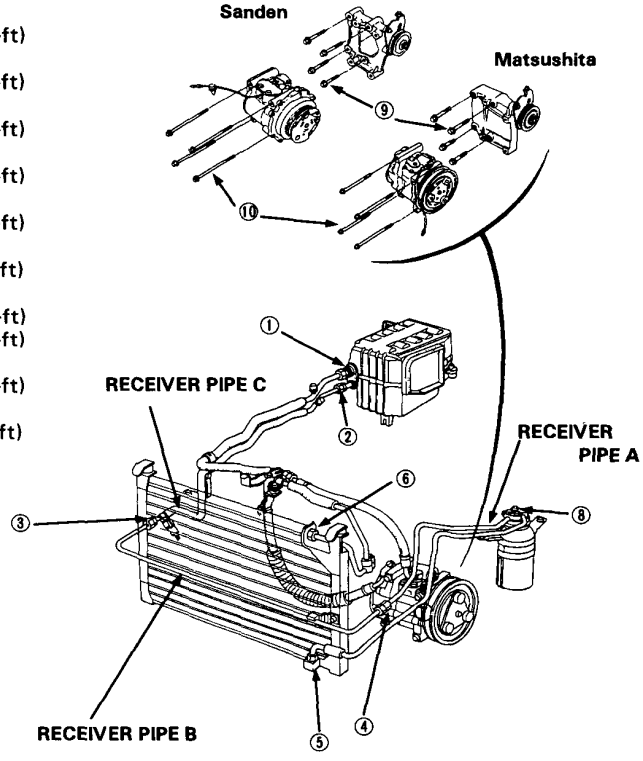
Air Conditioner

Service Tips

CAUTION:

1. Always disconnect the negative cable from the battery whenever replacing air conditioner 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 the lines are reconnected.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the seat of the O-ring or flare nut.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, don't let refrigerant escape too fast; it will draw the compressor oil out of the system.
6. Add refrigerant oil after replacing the following parts:
   - Condenser ..... 10 cc (1/3 fl oz)
   - Evaporator ..... 30 cc (1 fl oz)
   - Line or hose ..... 10 cc (1/3 fl oz)
   - Receiver ..... 10 cc (1/3 fl oz)
   - Compressor ..... On compressor replacement, subtract the volume of oil drained from the removed compressor from 130cc (4,4 fl oz) or 120 cc (4 fl oz), and drain the calculated volume of oil from the new compressor :
     130 cc (4,4 fl oz) — Volume of removed compressor = Draining volume (Matsushita)
     120 cc (4fl oz) — Volume of removed compressor = Draining volume (Sanden)
7. Torque specifications

① Suction hose evaporator side	32 N·m (3.2 kg-m, 23 lb-ft)
② Receiver pipe C evaporator side	17 N·m (1.7 kg-m, 12 lb-ft)
③ Receiver pipe C to Receiver pipe B	17 N·m (1.7 kg-m, 12 lb-ft)
④ Receiver pipe B to Receiver pipe A	17 N·m (1.7 kg-m, 12 lb-ft)
⑤ Condenser pipe to Condenser	17 N·m (1.7 kg-m, 12 lb-ft)
⑥ Discharge hose to Condenser	22 N·m (2.2 kg-m, 16 lb-ft)
⑦ Compressor hose mounting bolts	30 N·m (3.0 kg-m, 22 lb-ft)
⑧ Receiver tank	17 N·m (1.7 kg-m, 12 lb-ft)
⑨ Compressor bracket mounting bolts	48 N·m (4.8 kg-m, 35 lb-ft)
⑩ Compressor mounting bolts	25 N·m (2.5 kg-m, 18 lb-ft)



⚠WARNING

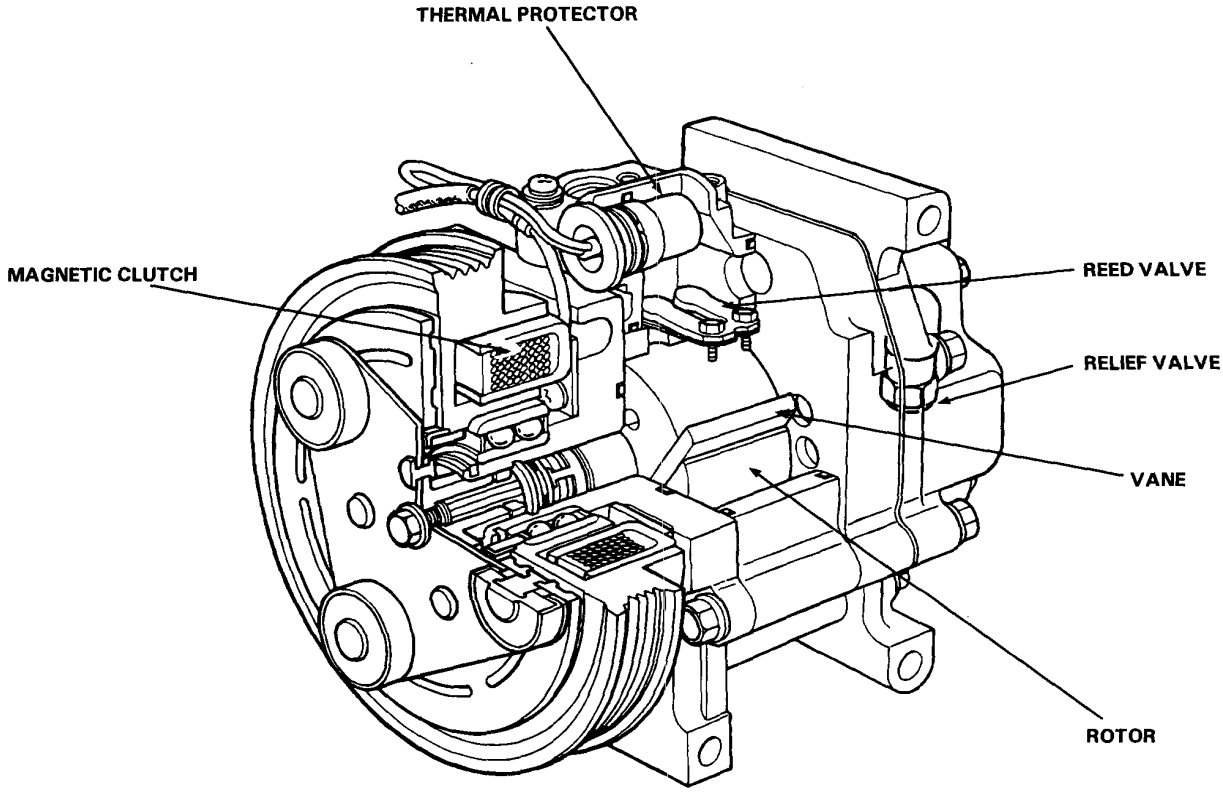
When handling refrigerant (R-12):

- **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-12) stored below 40°C (100°F).**
- **Do not handle or discharge refrigerant in an enclosed area near an open flame; it may ignite and produce a poisonous gas.**
- **The ozone is a fragile layer surrounding the earth which acts as a shield against the sun's ultraviolet radiation. Chlorine from chemicals called Chlorofluorocarbons (CFCs) destroy the ozone in the stratosphere. Automotive air conditioning systems currently use Chlorofluorocarbons as the refrigerant. Auto air conditioning service equipment has been developed to minimize the release of CFCs to the atmosphere. All service procedures should be performed using this equipment and the manufactures instructions.**

Compressor

Description (Matsushita)

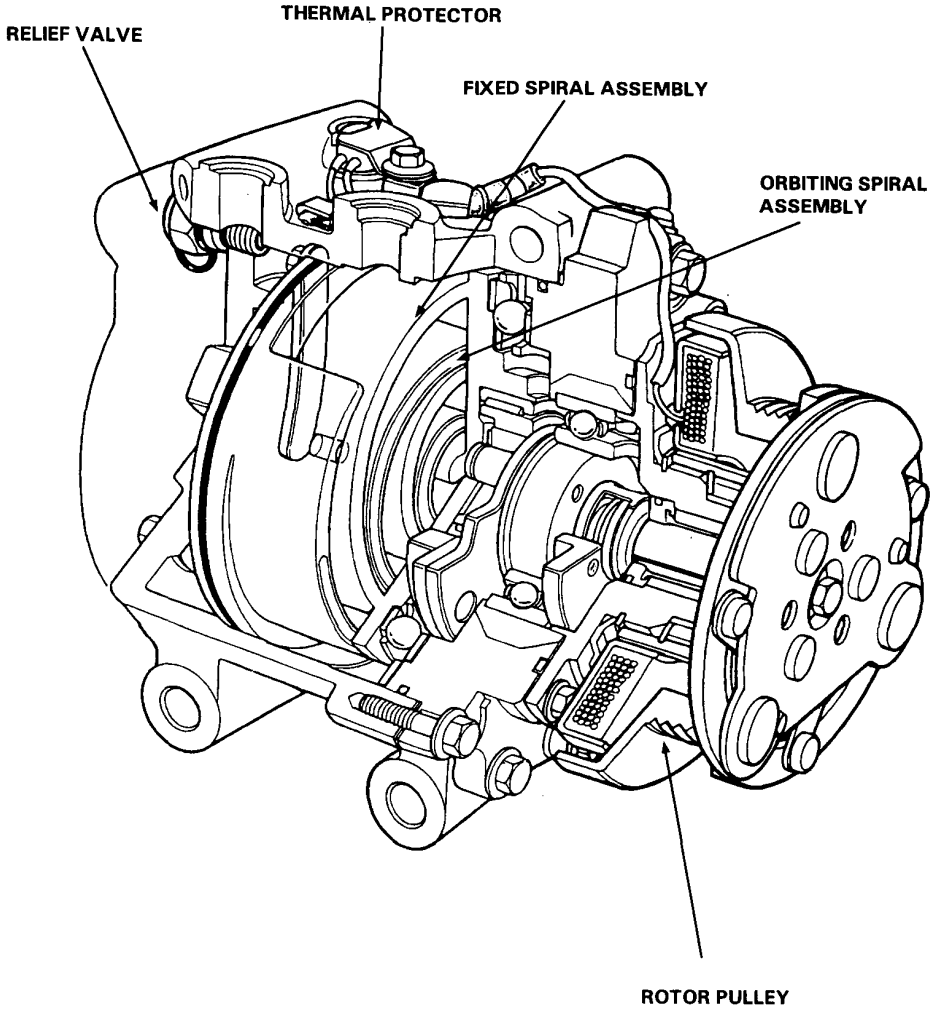
This compressor is a three-vane, rotary type and consists of three vanes that come out of the rotor to the cylinder wall, reed valve that prevents backflow, and magnetic clutch.
A thermal protector is installed on this compressor.



Compressor

Description (Sanden)

This compressor is the spiral type. Refrigerant is compressed between a fixed spiral assembly and an orbiting spiral assembly. A thermal protector is installed on this compressor.



Compressor

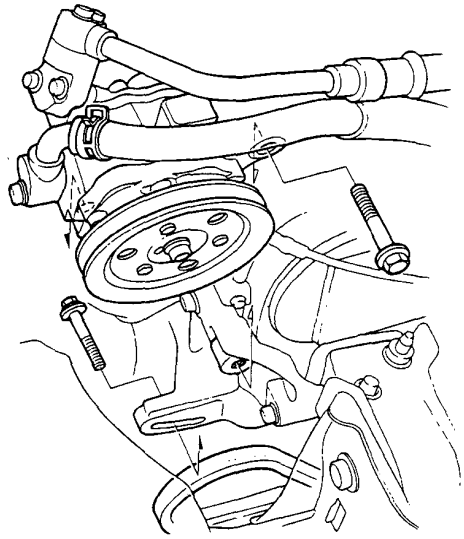
Troubleshooting

NOTE:Performance Test on page 22-50.

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 196 kPa (28 psi) quickly, and then falls gradually	Air in system	Evacuate system; then recharge Evacuation: page 15–30 Recharging: 15–32
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as required
	Reduced or no air flow through condenser.	· Clogged condenser or radiater fins · Condenser or radiator fan not working properly	· Clean · Check voltage and fan rpm
	Line to condenser is excessively hot	Restricted flow of refrigerant in system	Expansion valve
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot	Insufficient refrigerant in system	· Charge system · Check for leak
	High and low pressures are balanced soon after stopping compressor	· Faulty compressor discharge or inlet valve · Faulty compressor seal	Replace compressor Repair
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum	· Faulty expansion valve	Repair or Replace
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum.	Insufficient refrigerant · Frozen expansion valve · Faulty expansion valve	Check for leaks. Charge as required. Replace expansion valve
	Discharge temperature is low and the air flow from vents is restricted	Frozen evaporator	Run the fan with compressor off then check the thermostat and capillary tube.
	Expansion valve 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 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 refrigerant as necessary
	High and low pressure are equalized as soon as the compressor is stopped	· Faulty gasket · Faulty high pressure valve · Foreign particle stuck in high pressure valve	Replace compressor
Suction and discharge pressures abnormally high	Reduced air flow through condenser	· Clogged condenser or radiator fins · Condenser or radiator fan not working properly	· Clean condenser and radiator · Check volatage and fan rpm
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary.
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–driver.	Clogged high pressure line	Repair or Replace
Refrigerant leaks	Compressor clutch is dirty	Compressor shaft seal leaking	Replace compressor shaft seal
	Compressor bolt(s) are dirty	Leaking around bolt(s)	Replace compressor
	Compressor gasket is wet with oil	Gasket leaking	Replace compressor

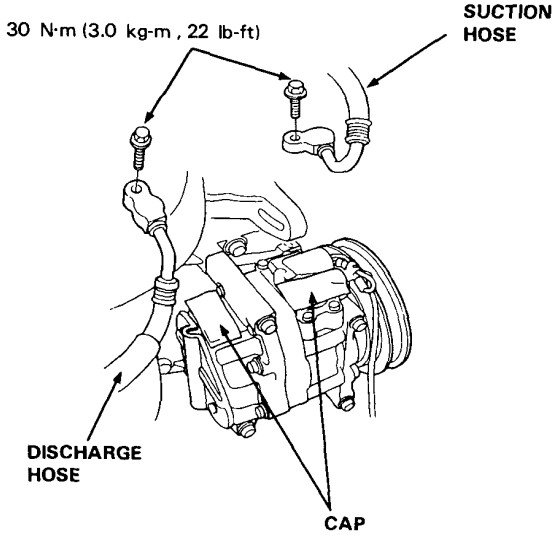
Replacement (Matsushita)

1. If the compressor is marginally operable, run the engine at idle speed and turn on the air conditioner fan a few minutes, then shut the engine off and disconnect the battery negative terminal.
2. Discharge the refrigerant very slowly from the system
3. Remove the mounting bolts (2) the power steering pump belt, and the power steering pump.

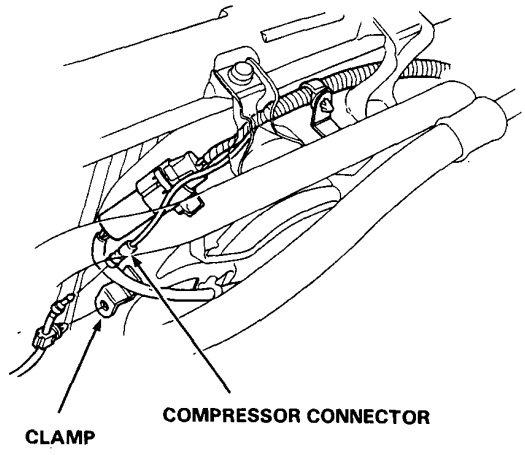


4. Disconnect the suction and discharge hoses from the compressor.

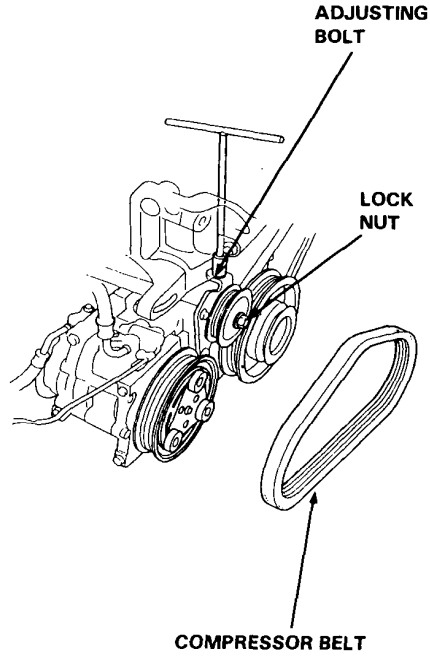
CAUTION:
Cap the open fittings immediately to keep moisture and dirt out of the system.



5. Disconnect the compressor connector and the clamp.



6. Loosen the adjusting bolt and lock nut, then remove the compressor belt.

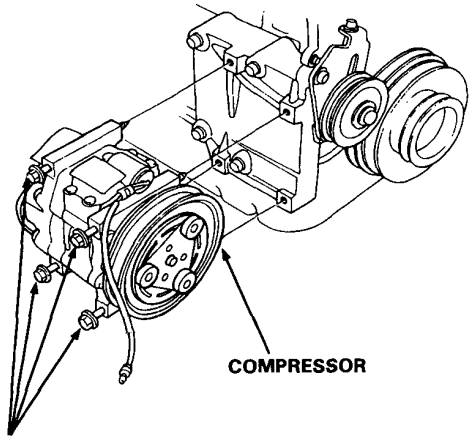


(cont'd)

Compressor (Matsushita)

Replacement (cont'd)

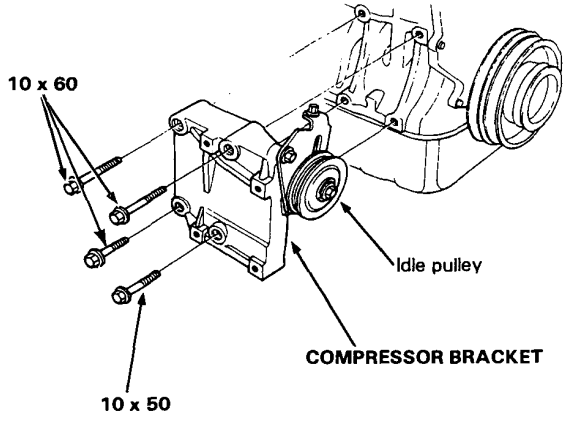
7. Remove the compressor mounting bolts (4) and compressor. Rest the compressor on the front beam.



COMPRESSOR MOUNTING BOLTS
25 N·m (2.5 kg-m , 18 lb-ft)

8. Remove the mounting bolts (4) and compressor bracket with idle pulley.

ALL TORQUE:
48 N·m (4.8 kg-m , 35 lb-ft)



9. Remove the compressor.

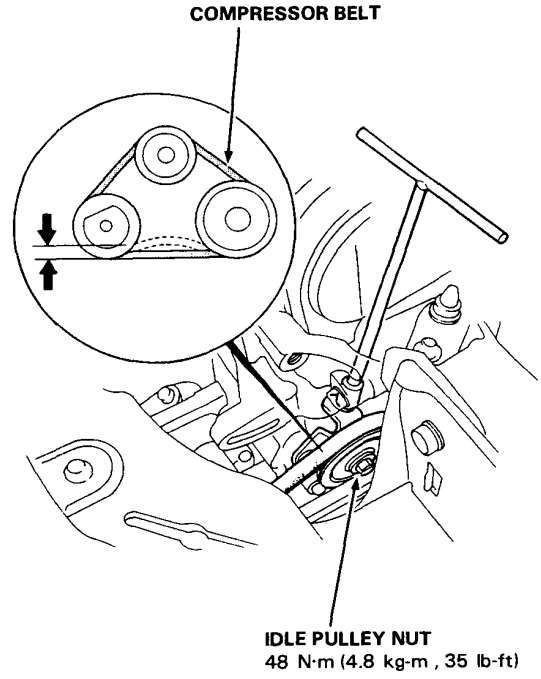
10. Install in the reverse order of removal and:

- If a new compressor is installed, calculate the amount of refrigerant to be drained through the suction fitting on the compressor:
  150 cc (5 fl oz,) minus contents of old compressor, equals amount to drain from new compressor.
- Adjust the compressor belt and the power steering belt.

NOTE:
Measure the deflection when 98 N (10 kg, 22 lb) force is applied between the pulleys.

Compressor belt Adjustment.
9—11 mm (0.4—0.4 in)

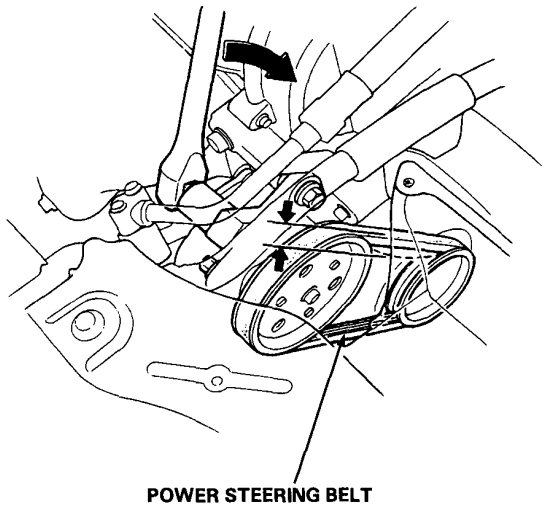
When new belt is installed:
7—9 mm (0.3—0.4 in)



- Charge the system.
- Test the performance.

11. Power steering belt adjustment.
    9—12 mm (0.4—0.5 in)

    When new belt is installed:
    7—10 mm (0.3—0.4 in)



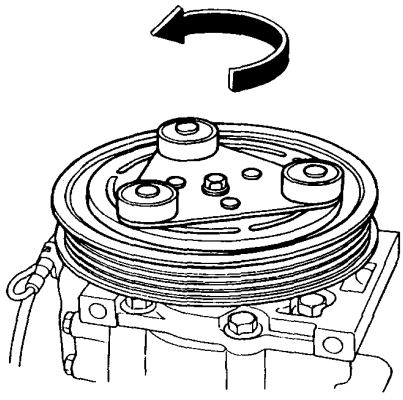
POWER STEERING BELT

Compressor (Matsushita)

Clutch Inspection

- Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play/drag.

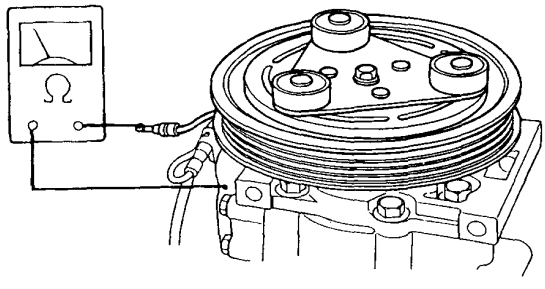
ROTOR PULLEY



- Check resistance of the field coil:

Field Coil Resistance:
3.33 ± 0.17 ohm at 20°C (68°F)

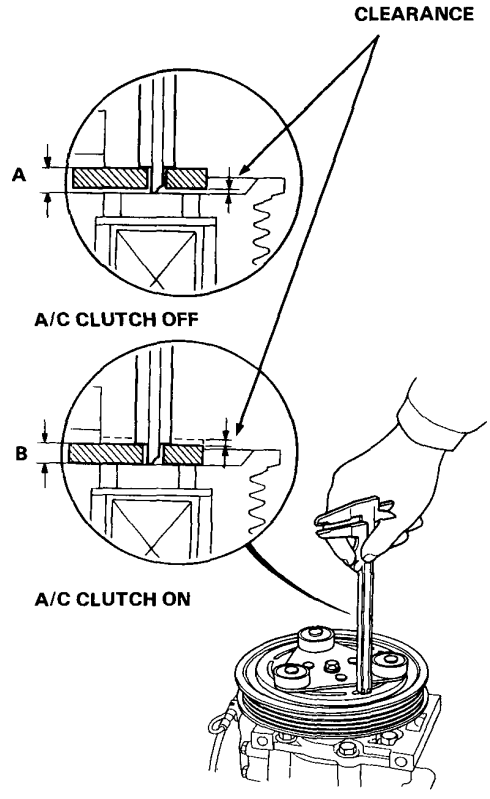
If resistance is not within specifications, replace the coil.



- Measure the clearance between the pulley and pressure plate. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

CLEARANCE: 0.4—0.6 mm (0.016 — 0.02 in)

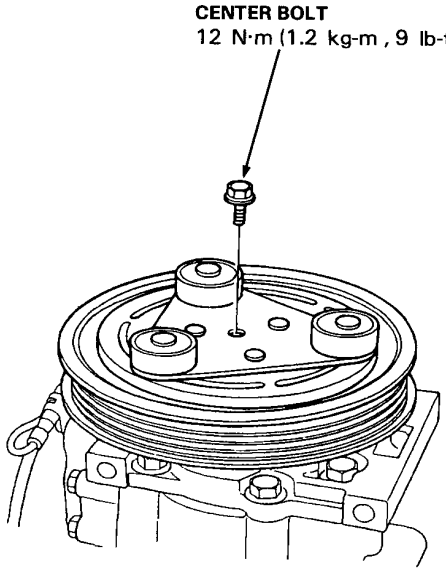
CREARANCE=A(CLUTCH OFF)—B(CLUTCH ON)



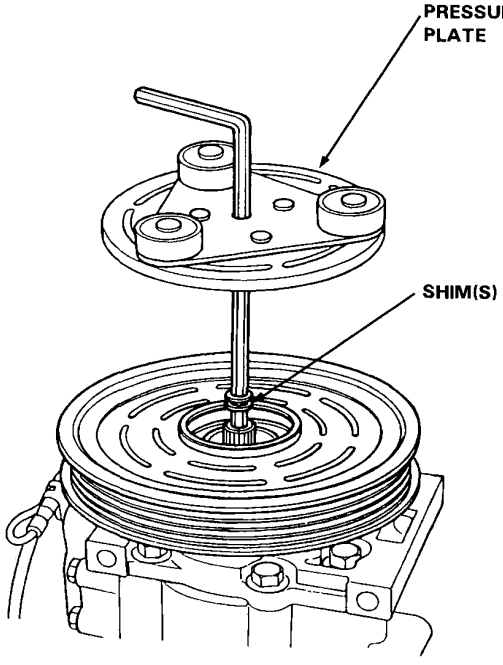
NOTE:
The shims are available in two sizes: 0.2 mm and 0.5 mm of thickness.

Clutch Overhaul

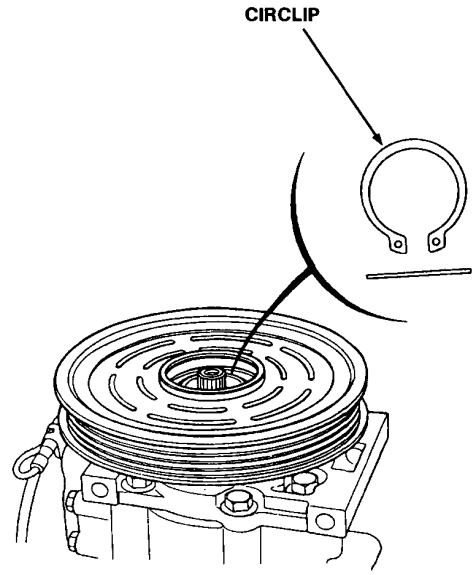
1. Remove the center bolt and washers.



2. Remove the pressure plate and shim(s) taking care not to lose the shims.

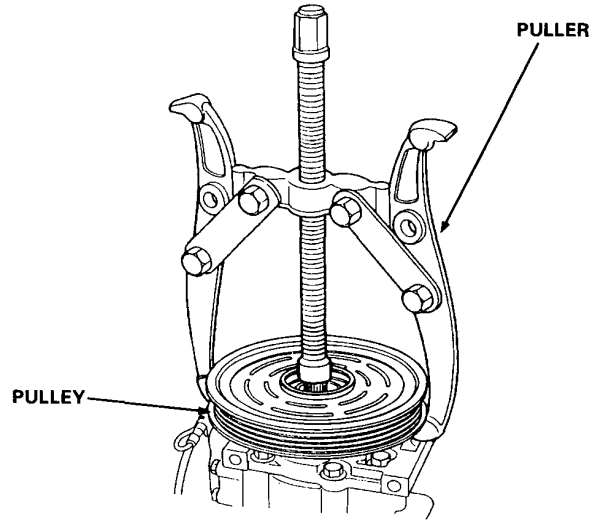


3. Use circlip pliers to remove the circlip.



4. Remove the pulley from the shaft using a 2 or 3 jaw puller.

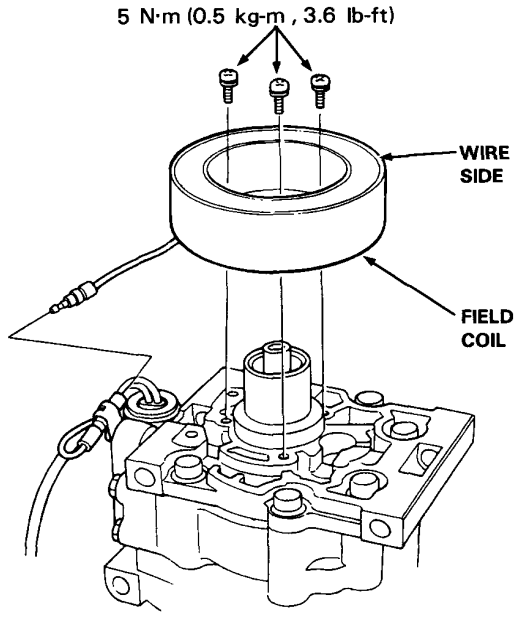
5. Check the pulley, replace the assembly if the pulley is damaged or deformed.



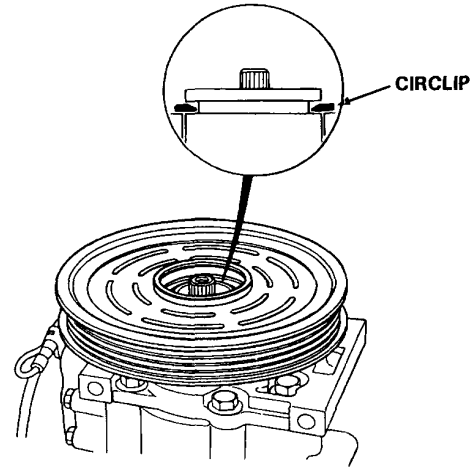
Compressor (Matsushita)

Clutch Overhaul (cont'd)

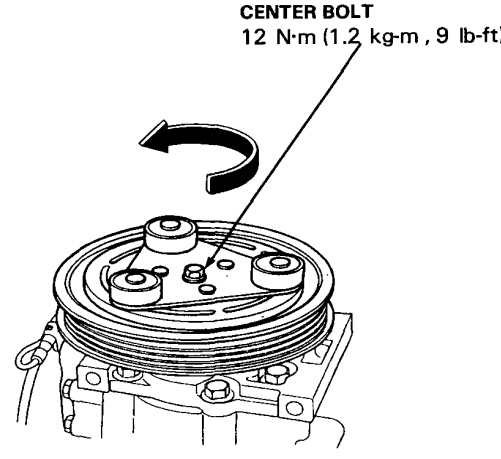
6. Disconnect the field coil connector and remove the screws (3) and field coil.



7. Install in the reverse order of removal and:
   - Install the field coil with the wire side facing up (see above).
   - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
   - Check the pulley bearings for excessive play.
   - Make sure the circlip is fitted to the groove properly.



   - Apply locking agent to the thread of the center bolt and tighten it securely.
   - Make sure that the pulley turns smoothly.

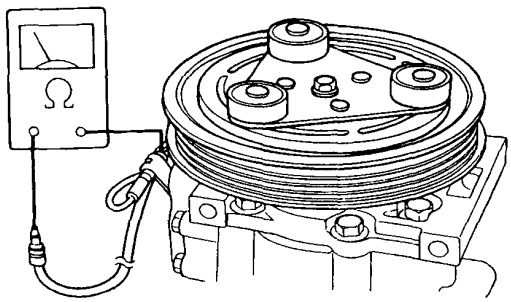


Thermal Protector Inspection

Check for continuity between the 1 and 3 terminals of the compressor connector.

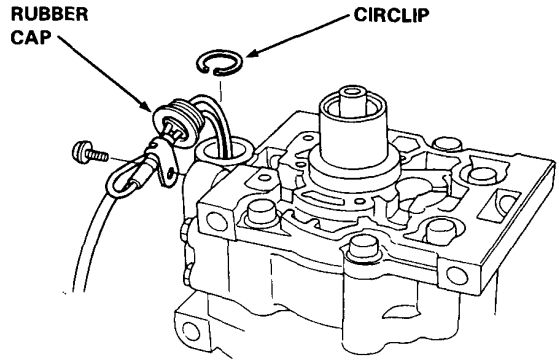
There should be continuity.

- If no continuity, replace the thermal protector.



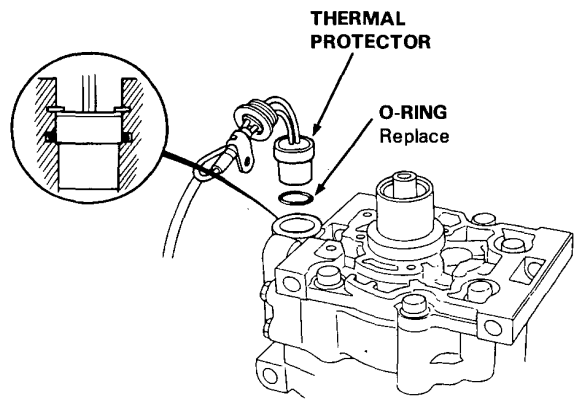
Thermal Protector Replacement

1. Remove the pressure plate and field coil (page 22-29).
2. Pull the rubber cap out from the thermal protector.
3. Remove the screws and wire clips.
4. Remove the circlip and thermal protector.



5. *Install in the reverse order of removal.*

NOTE:
- Replace the O-rings with new ones.
- Set the new O-rings in place as shown.



Compressor (Matsushita)

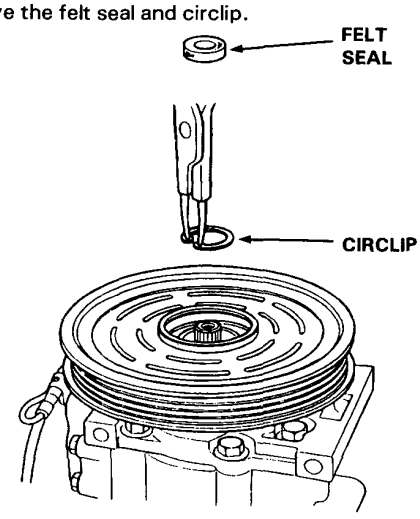
Shaft Seal Replacement

NOTE:
Make sure that the suction and discharge joints are plugged with the caps.

1. Remove the pressure plate.

   NOTE:
   Removal of the clutch pulley and coil is not necessary.

2. Remove the felt seal and circlip.



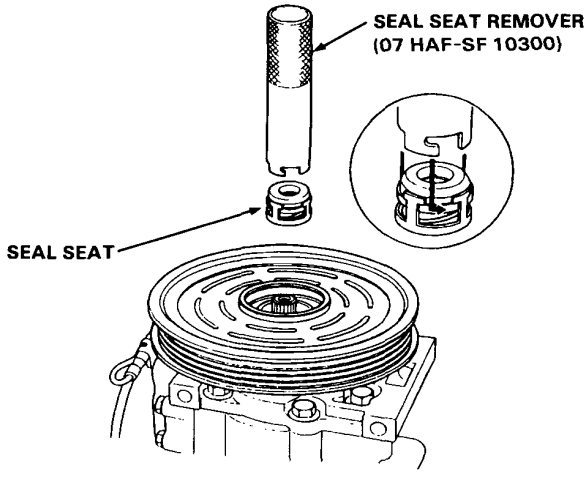
3. Remove the shim(s).

   NOTE:
   After removing, place shim(s) safely in a parts rack.

4. Insert the special tool into the compressor aligning the cutout of the remover with the groove of the seal seat.

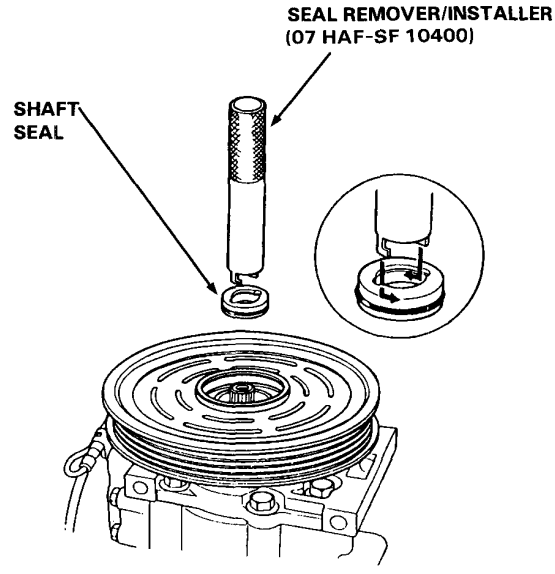
5. Rotate the special tool counterclockwise to make sure that the cutout is engaged with the seal seat.

6. Pull out the seal seat.



7. Insert the special tool into the compressor aligning the cutout of the remover with the metal pawl of the seal case.

8. Rotate the special tool counter clock wise to make sure that the cutout is engaged with the metal pawl.



9. Withdraw the remover.

10. Lay down the compressor and clean the shaft seal contacting face of the compressor with cleaning solvent.

    CAUTION:
    - **Keep the cleaning solvent and dirt out of the compressor.**
    - **Do not use any cloth for cleaning, clean only by rinsing with solvent.**
    - **Do not spill the refrigerant oil from the compressor. Refill the same amount of the oil if the oil is spilled out.**

11. Clean the new shaft seal thoroughly with cleaning solvent.

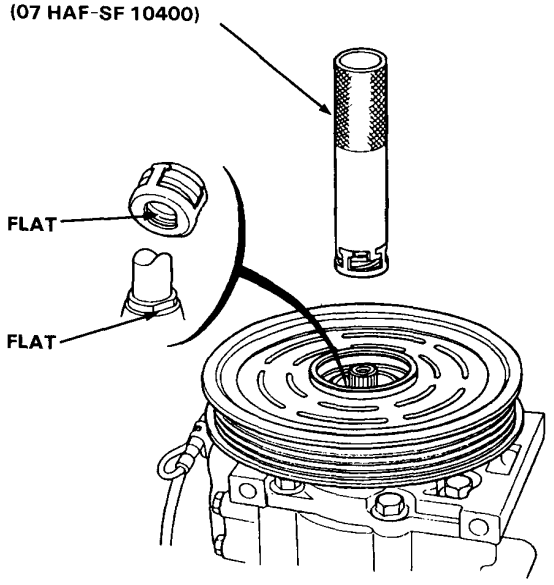
12. Lubricate the shaft seal with refrigerant oil (SUNISO 5GS or equivalent) and install it on the shaft seal remover.

    NOTE:
    - Use only clean refrigerant oil.
    - Do not touch the sealing surfaces of the shaft seal after lubricating.

13. *Liberally lubricate the compressor shaft with* refrigerant oil.

14. Install the shaft seal onto the compressor shaft aligning the seal case flats with the shaft flats.

SEAL REMOVER/INSTALLER
(07 HAF-SF 10400)



15. Clean the seal seat with cleaning solvent, then lubricate the seal seat with refrigerant oil (SUNISO 5GS or equivalent).

    NOTE:
    - Use only clean refrigerant oil.
    - Do not touch the sealing surface of the seal plate after lubricated.

16. First slide the seal seat into the compressor by hand as far as possible.

17. Press the seal seat with the grip side of the remover.

18. Install the circlip with its chamfered edge inside.

19. Press the circlip with the grip side of the remover, then install the felt seal.

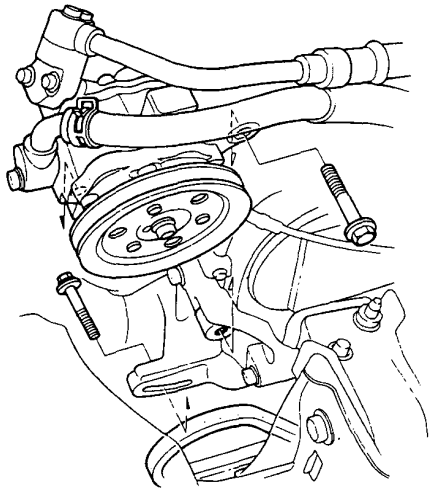
20. Install the shim(s).

21. Install the pressure plate. Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within the specified limits, [0.4 — 0.6mm (0.016 — 0.02 in)] shims must be added or removed as required .

Compressor (Sanden)

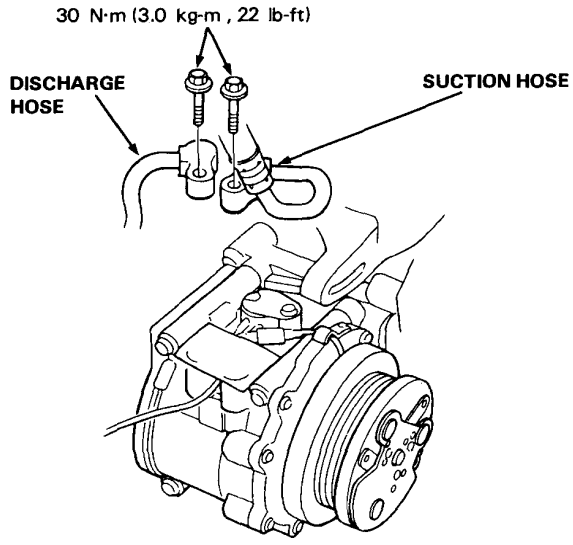
Replacement

1. If the compressor is marginally operable, run the engine at idle speed and turn on the air conditioner fan a few minutes, then shut the engine off and disconnect the battery negative terminal.
2. Discharge the refrigerant very slowly from the system
3. Remove the two mounting bolts, the power steering pump belt, and the power steering pump.

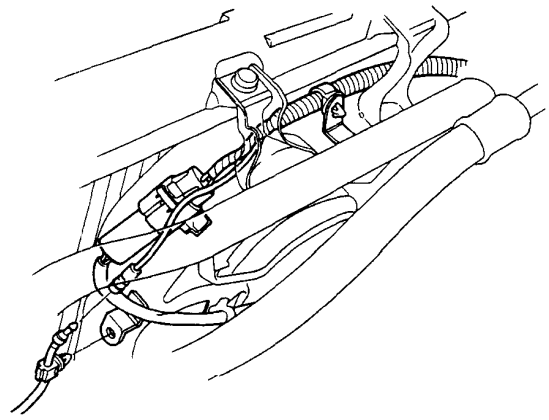


4. Disconnect the suction and discharge hoses from the compressor.

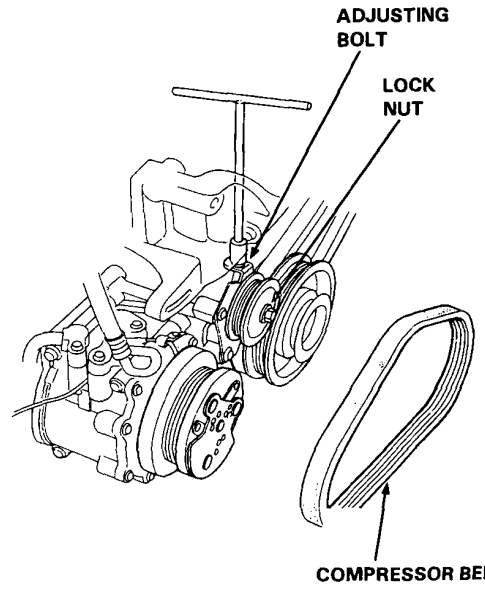
CAUTION:
Cap the open fittings immediately to keep moisture and dirt out of the system.



5. Disconnect the compressor connector and the clamp.

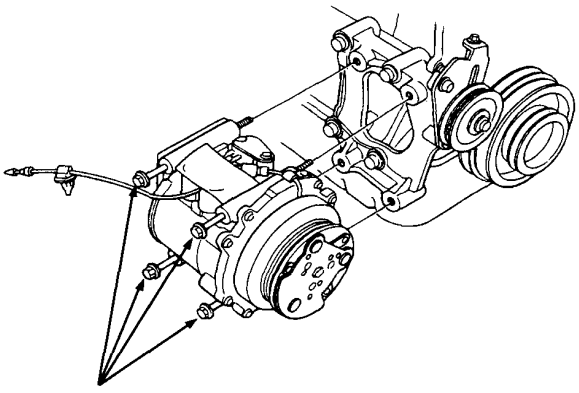


6. Loosen the lock nut and adjusting bolt, then remove the compressor belt.



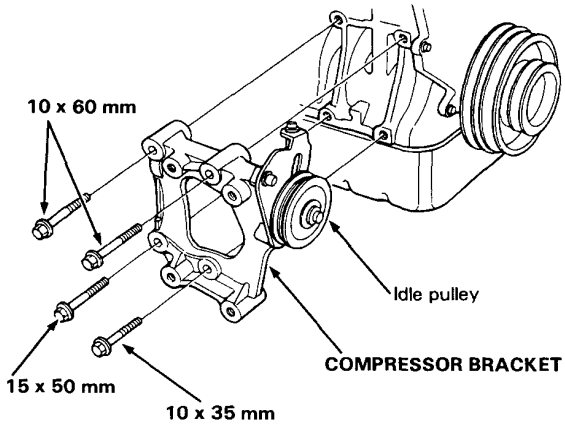
(cont'd)

7. Remove the four compressor mounting bolts and compressor. Rest the compressor on the front beam.



MOUNTING BOLTS
25 N·m (2.5 kg-m, 18 lb-ft)

8. Remove the four mounting bolts and compressor bracket with idle pulley.



MOUNTING BOLTS
48 N·m (4.8 kg-m, 35 lb-ft)

9. Remove the compressor.

10. Install in the reverse order of removal and:

- If a new compressor is installed, calculate the refrigerant oil as below and drain through the suction fitting on the compressor:
  120 cc (4 fl oz) minus contents of old compressor, equals amount to drain from new compressor.

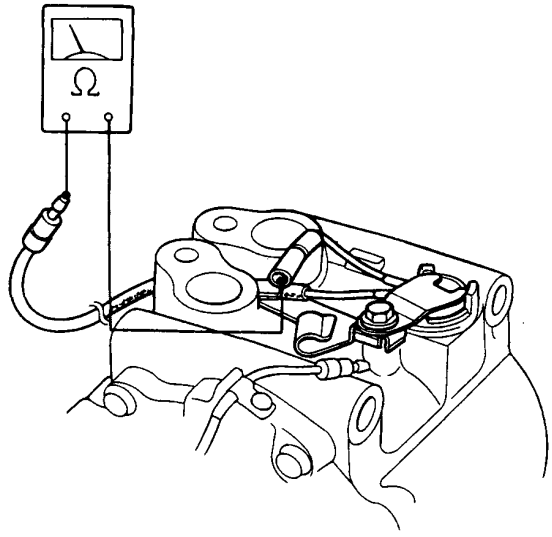
- Adjust the belt
- Charge the system
- Test the performance

Compressor (Sanden)

Thermal Protector Inspection

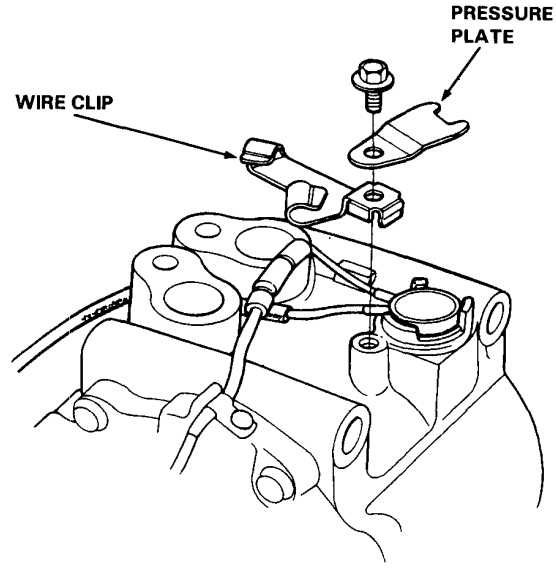
Check for continuity between A and B terminals of the thermal protector connector.
There should be continuity.

- If no continuity, replace the thermal protector.

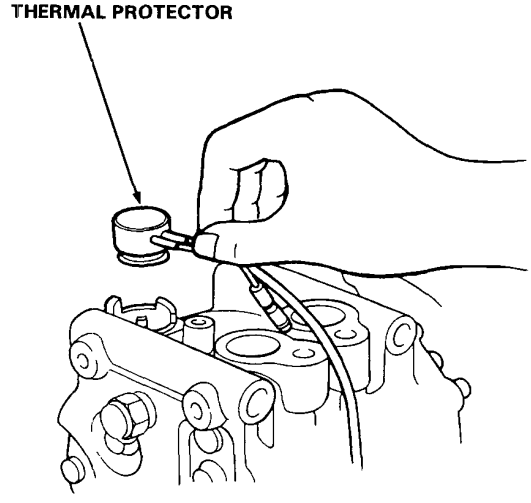


Thermal Protector Replacement

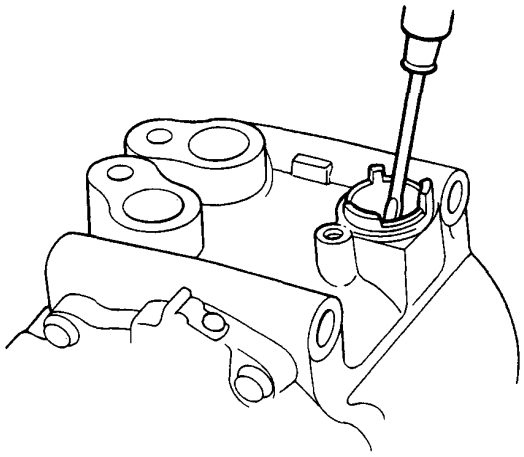
1. Remove the bolt, pressure plate and the wire clip.



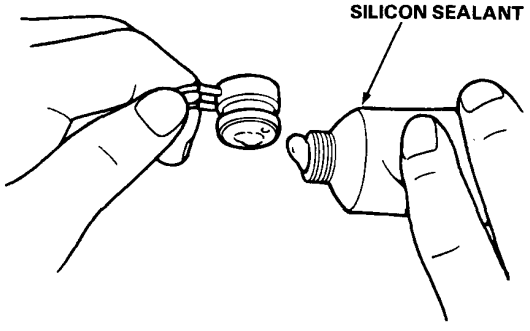
2. Disconnect the thermal protector and field coil connector, then remove the thermal protector.



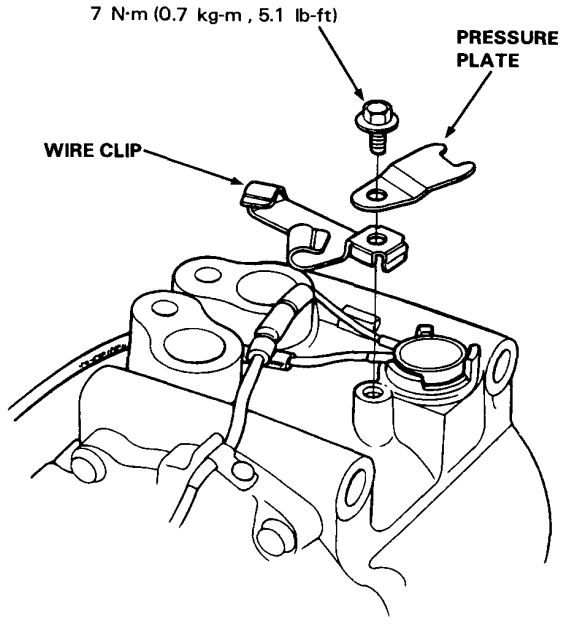
3. Remove the old silicon sealant from the cup of thermal protector.



4. Lubricate the new thermal protector with silicon sealant, then install the thermal protector into compressor.



5. Connect the thermal protector wire, then install the wire with the pressure plate and the wire clip.

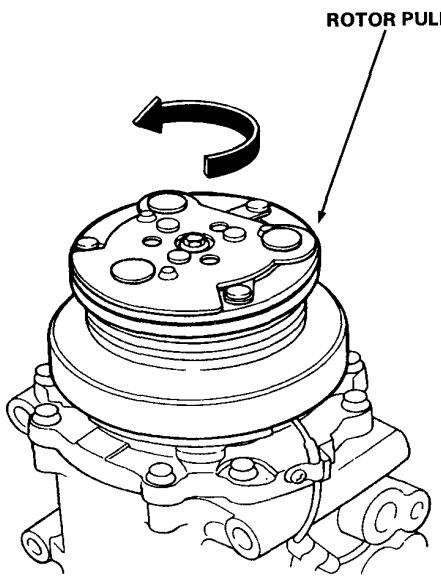


- Make sure that the thermal protector has continuity.

Compressor (Sanden)

Clutch Inspection

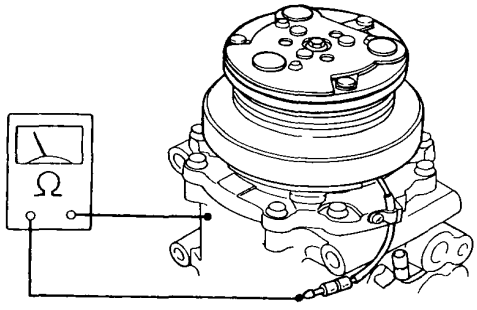
- Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play or drag.



- Check resistance of the field coil:

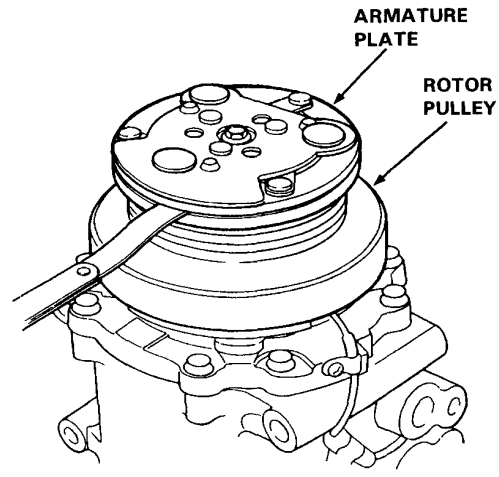
Field Coil Resistance:
3.58 ± 0.15 ohm at 20°C (68°F)

If resistance is not within specifications, replace the coil.

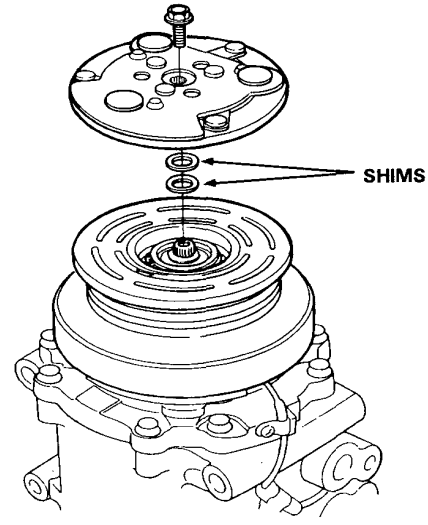


- Measure the clearance between the rotor pulley and armature plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

CLEARANCE: 0.35—0.65 mm (0.014—0.026 in)

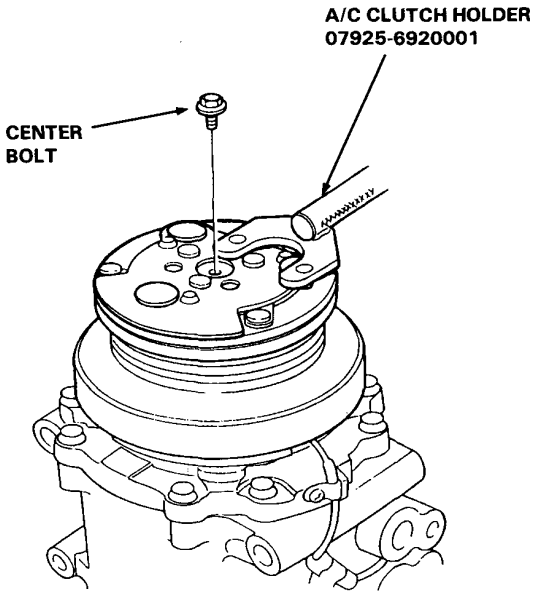


NOTE:
The shims are available in four sizes: 0.1 mm, 0.2 mm, 0.4 mm and 0.5 mm of thickness.

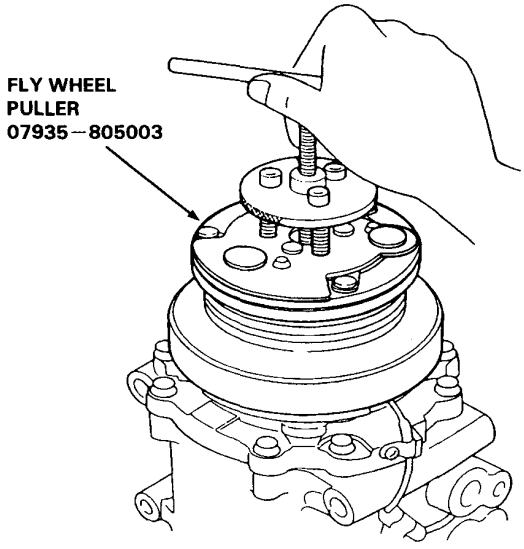


Clutch Overhaul

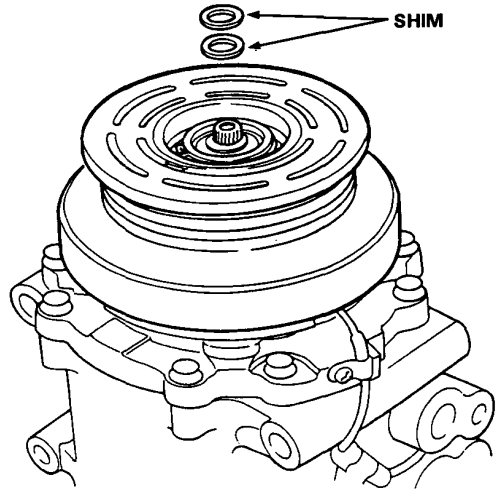
1. Use an A/C clutch holder to assist removing the center bolt.



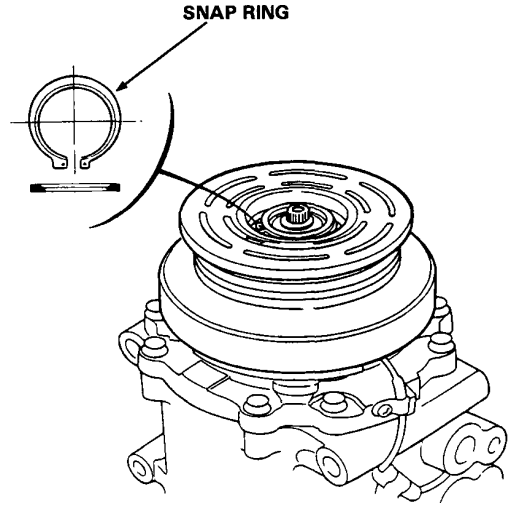
2. Remove the armature plate. (If you can't by hand, use a puller.)



3. Remove the two shims, taking care not to lose them.



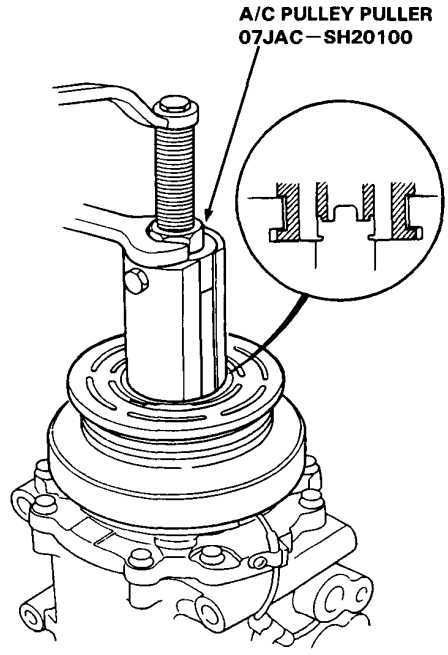
4. Use snap ring pliers to remove the snap ring.



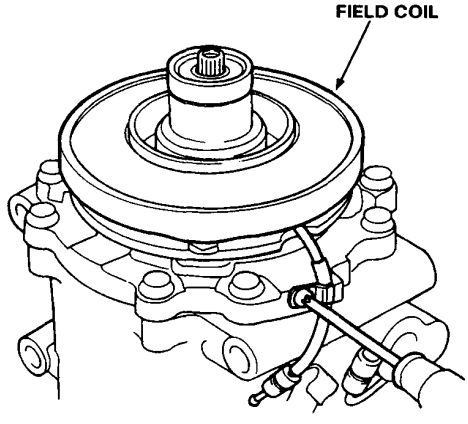
(cont'd)

Clutch Overhaul (cont'd)

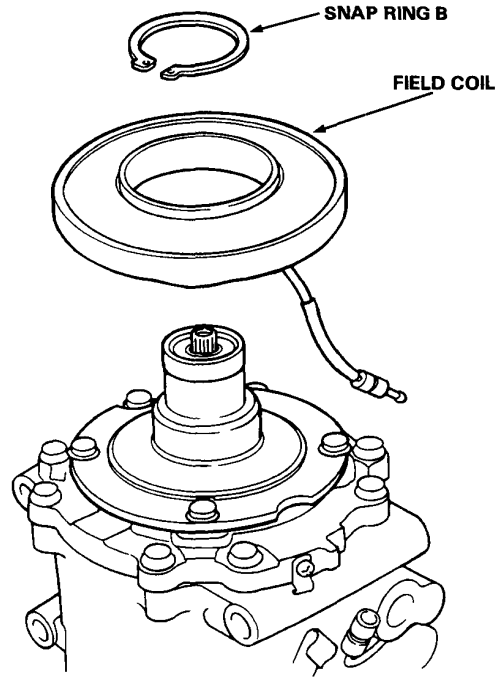
5. Remove the clutch rotor using the special tool.



6. Remove the screw and disconnect the wire.

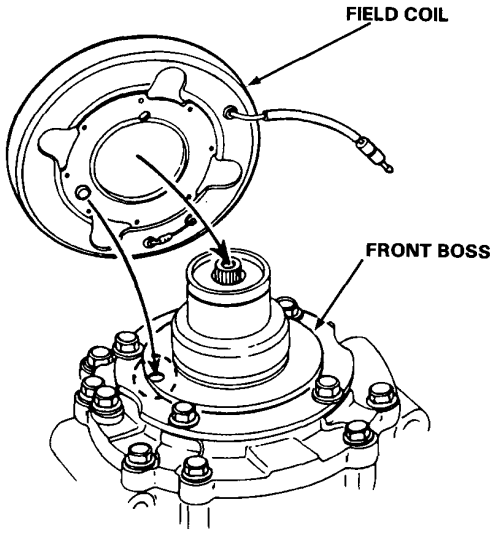


7. Remove the snap ring B using snap ring pliers and remove the field coil.

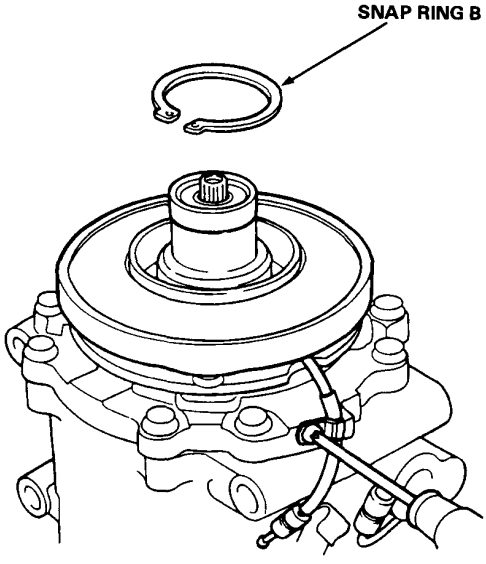


★Installation

8. *Fit the lug of field coil on the slot of front boss.*

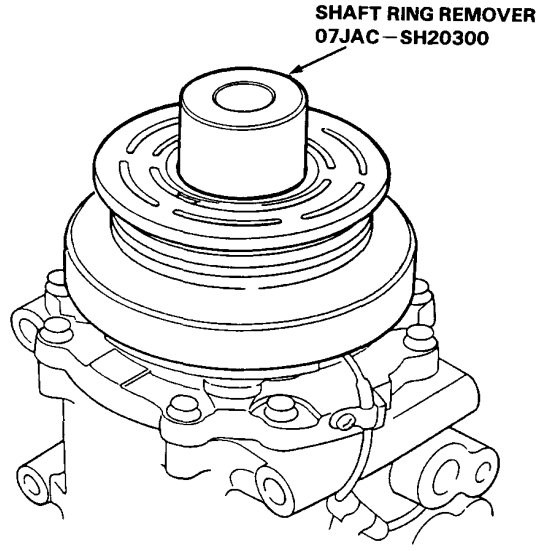


9. Install the snap ring B and wire.

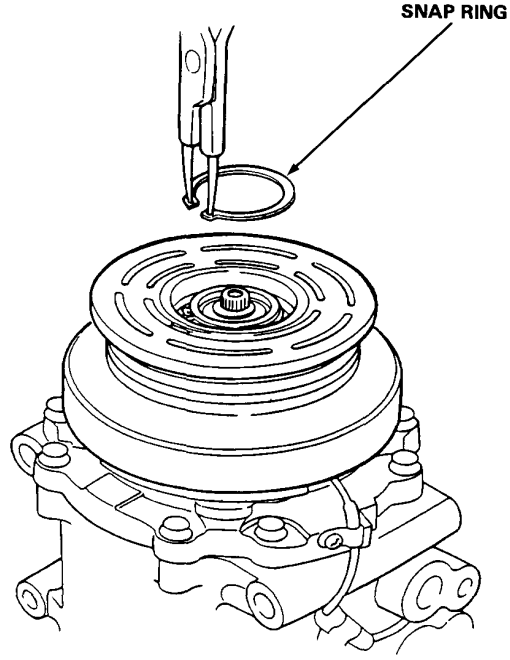


10. Press rotor pulley onto field coil with shaft ring remover.

CAUTION:
Maximum press load: 1.5 tons.



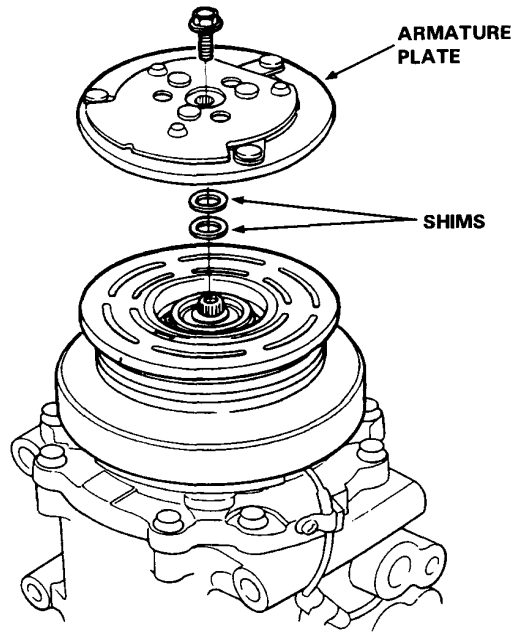
11. Secure the rotor pulley with the snap ring.



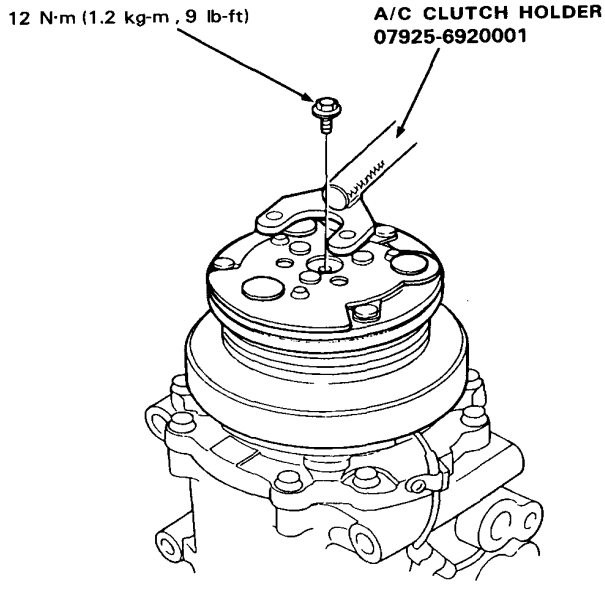
Compressor (Sanden)

Clutch Overhaul (cont'd)

12. Set the armature plate onto rotor pulley with shims(2).



13. Use A/C clutch holder to secure armature plate while tightening bolt.

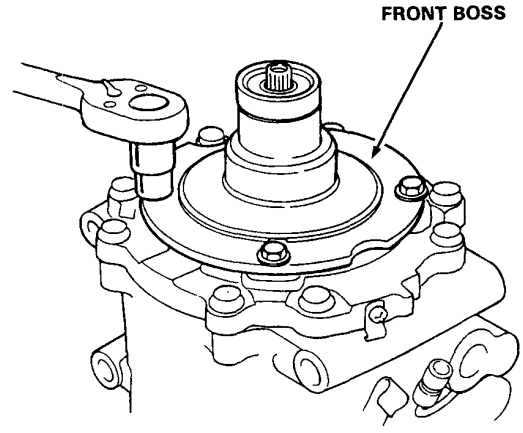


Make sure that the rotor pulley turns smoothly.

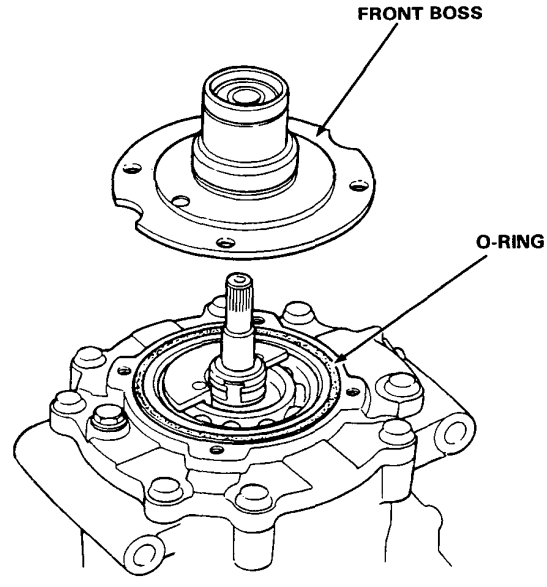
Shaft Seal Replacement

NOTE:
Make sure that the suction and discharge joints are plugged with the caps.

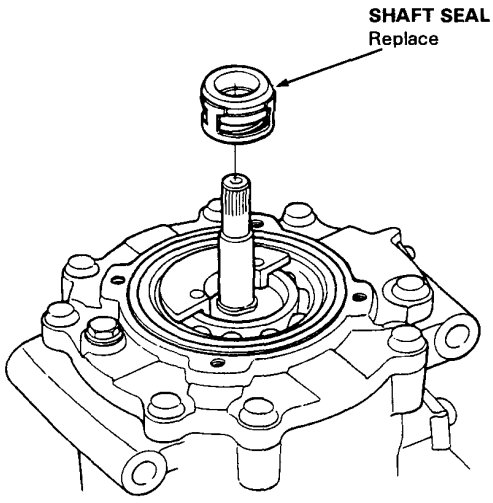
1. Remove the armature, rotor pulley and field coil, then remove the four bolts.



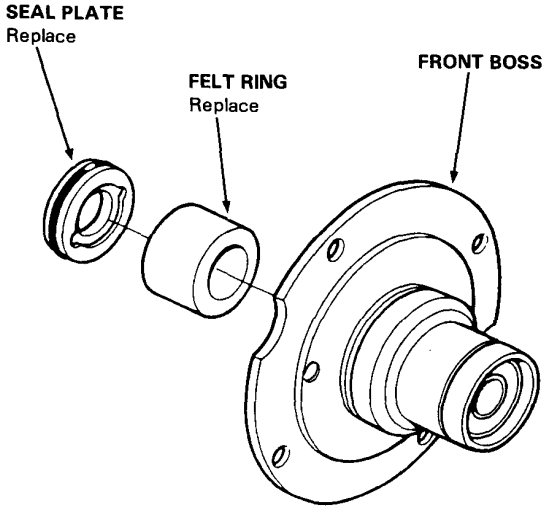
2. Remove the front boss and O-ring.



3. Remove the shaft seal.



4. Remove the felt ring and seal plate from the front boss.

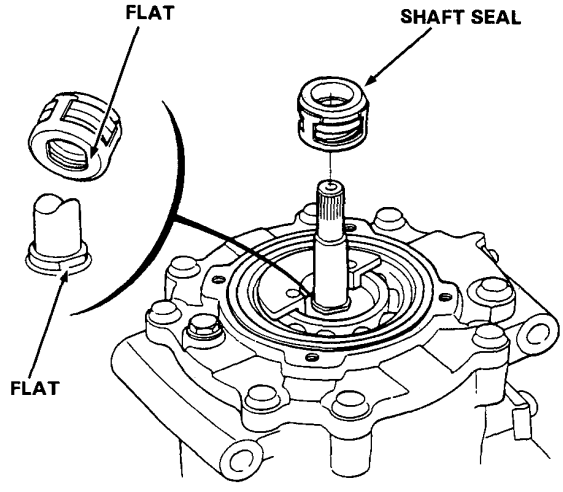


5. Clean the new shaft seal thoroughly with cleaning solvent.

6. Lubricate the shaft seal with refrigerant oil (SUNISO 5GS)

   NOTE:
   - Use only clean refrigerant oil.
   - Do not touch the sealing surfaces of the shaft seal after Lubricating.
   - Liberally lubricate the compressor shaft with refrigerant oil.

7. Install the shaft seal onto the compressor shaft aligning the seal case flats with the shaft flats.

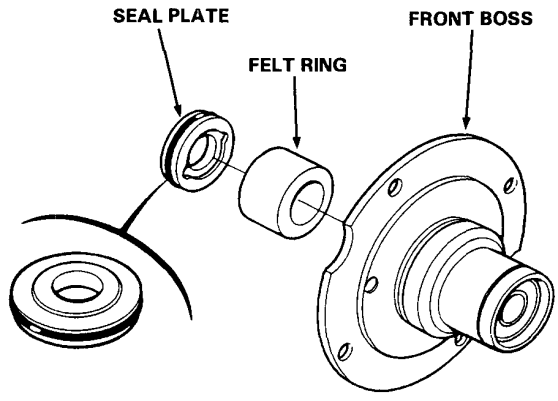


Compressor (Sanden)

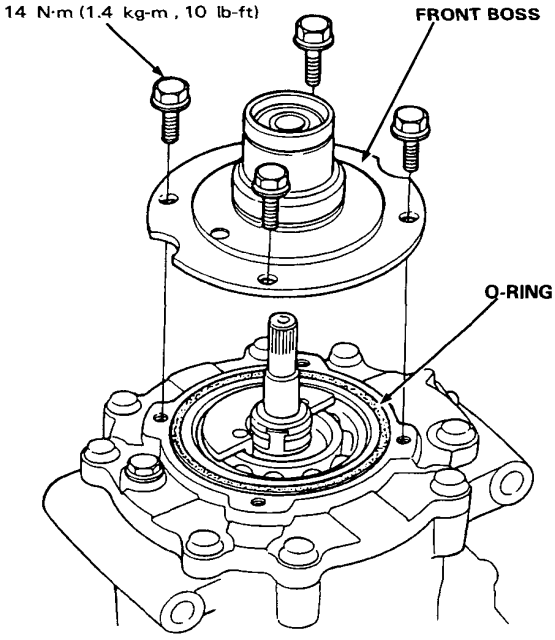
Shaft Seal Replacement (cont'd)

8. Install the felt ring and seal plate into the front boss.

   NOTE:
   - Clean the seal with cleaning solvent, then lubricate the seal seat with refrigerant oil (SUNISO 5GS).
   - Use only clean refrigerant oil.
   - Do not touch the sealing surface of the seal plate after lubricated.



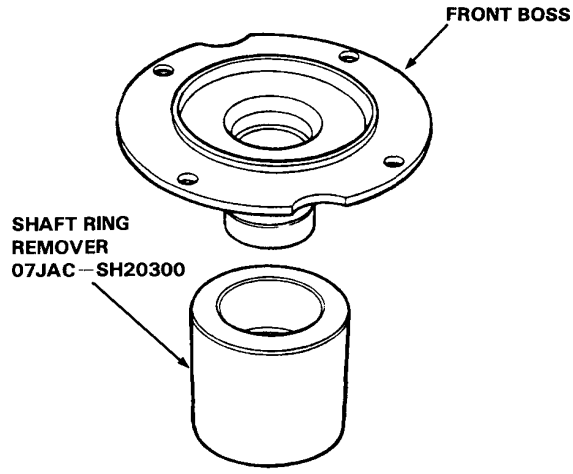
9. Set the O-ring into the front end plate and install the front boss with 4 bolts.



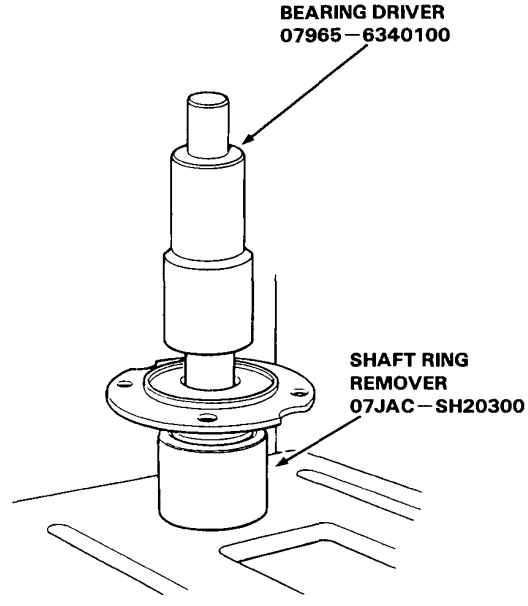
10. Install the field coil.

Shaft Bearing Replacement

1. Remove armature plate, rotor pulley and field coil.
2. Remove front boss, seal plate and felt ring.
3. Set the front boss onto shaft ring remover.



4. Use Bearing Driver with a hydraulic press to remove the bearing.

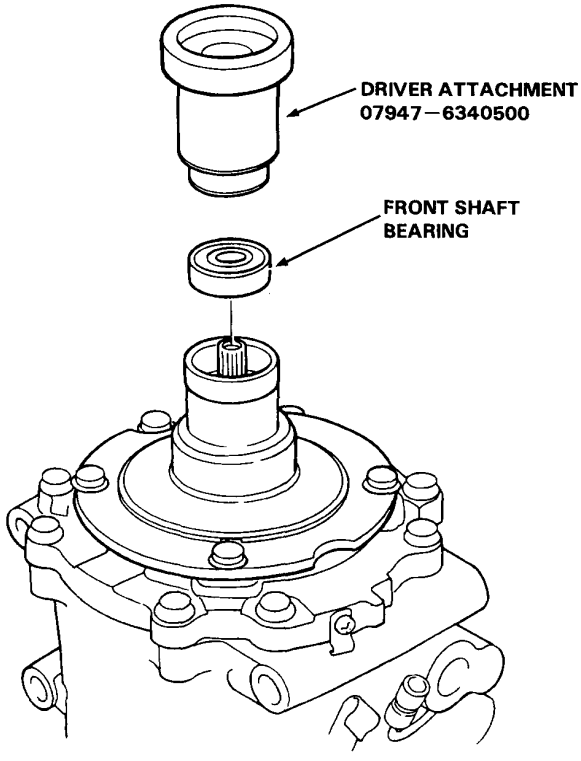


5. Install the shaft seal, seal plate and felt ring.

6. Install the front boss onto compressor.

7. Install the bearing using the driver attachment and a hydraulic press. Center the tool on the bearing before pressing. Recheck tool centering as soon as the press first contacts the attachment.

   CAUTION:
   Maximum press load: 0.4 tons.



8. Install the field coil, rotor pulley and armature plate.

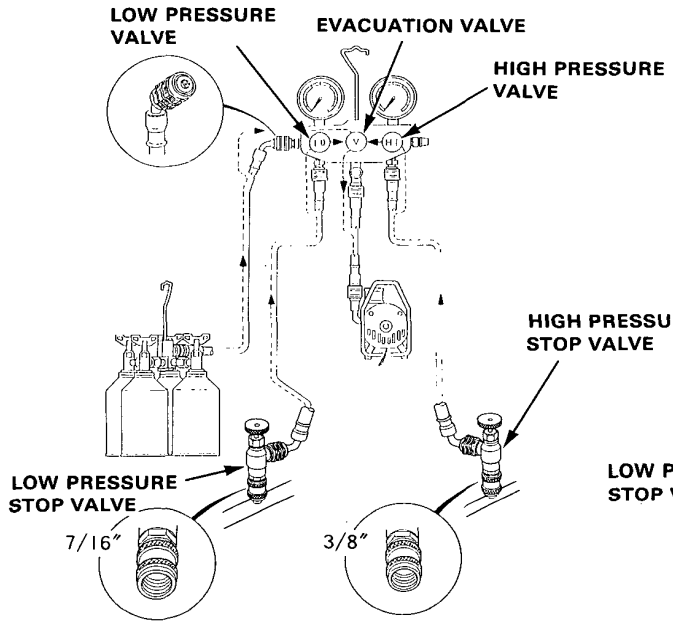
System Charging

System Evacuation

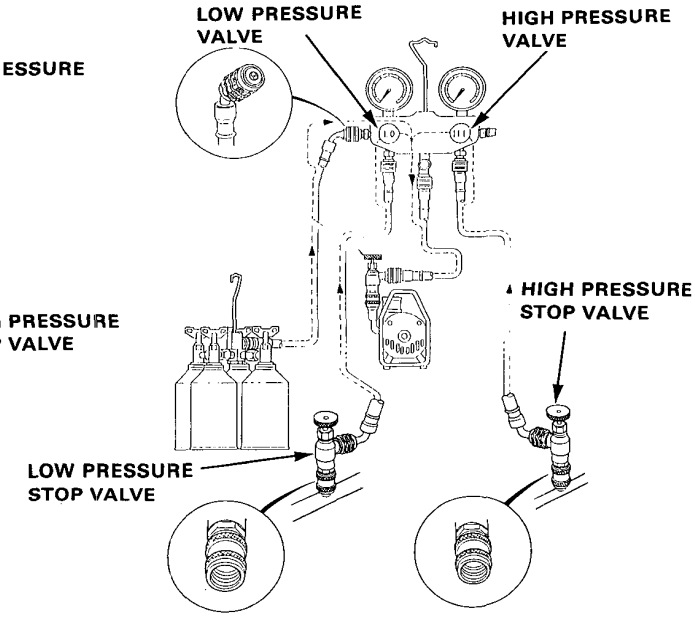
The following are the procedures to be adhered to when servicing air conditioners to reduce the amount of Fron R-12 into the atmoshpere.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a vacuum pump. (If the system has been open for several days, the receiver/dryer should be replaced).
2. Connect a gauge, pump and refrigerant containers (cans of R-12) as shown.
   NOTE: Do not open the cans.
3. Start the pump, then open the both pressure valves, both pressure stop valves and evacuation valve (2 valve gauge: evacuation stop valve). Run the pump about 15 minutes. Close the both pressure valves and evacuation valve (2 valve gauge: evacuation stop valve) and stop the pump. The low gauge should indicate above 700 mmHg (27 in-Hg) and remain steady with the valves closed.
   NOTE: If low pressure does not reach more than 700 mmHg (27 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, stop the pump.

3 VALVE GAUGE



2 VALVE GAUGE



Leak Test

The following are the procedures to be adhered to when servicing air conditioners to reduce the amount of from R-12 into the atmoshpere.

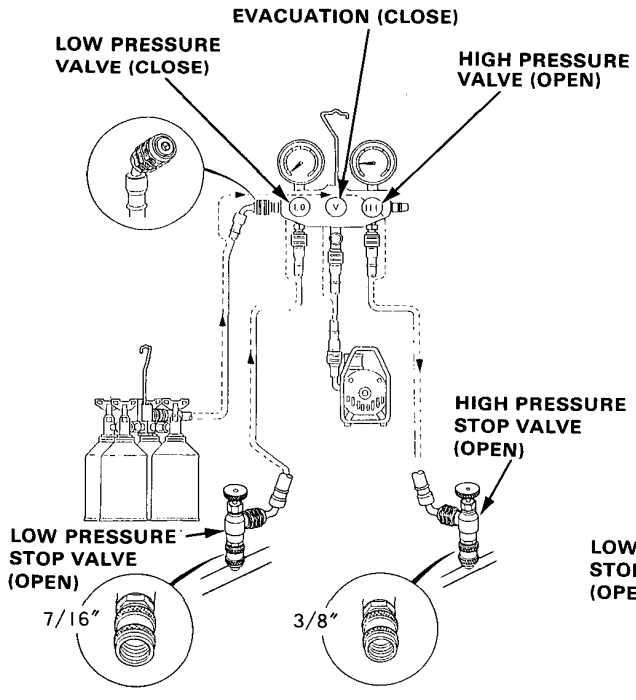
⚠WARNING **When handling refrigerant (R-12):**

- **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 ment. Do not attempt to treat it yourself.**
- **Keep refrigerant containers (cans of R-12) stored below 40°C (100°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.**

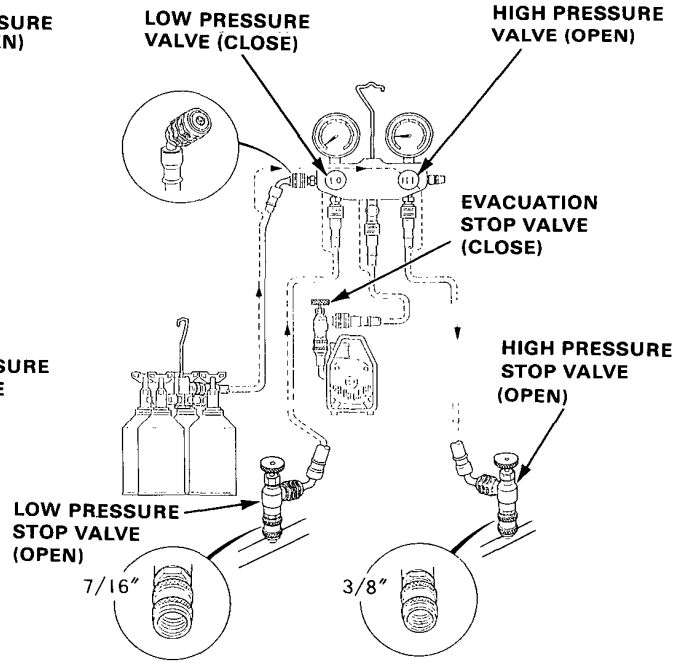
NOTE: Check fof leaks after evacuation.

1. Close the evacuation valve (2 valve gauge; evacuation stop valve).
2. Open the cans.
3. Open high pressure valve to charge the system to about 100 kpa (14 psi), then close the supply valve. NOTE: Particularly check for leaks around the compressor, condenser, and receiver-driver.
5. If you find any leaks, tighten the joint nuts and to the specified torque.
6. Recheck the system for leaks using a leak detector.
7. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), release any charge in the system.
8. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 15–81).

3 VALVE GAUGE



2 VALVE GAUGE



System Charging

Charging Procedures

The following are the procedures to be adhered to when servicing air conditioners to reduce the amount of from R-12 into the atmoshpere.

⚠WARNING **When handling refrigerant (R-12):**

- **Always wear eye protection.**
- **Donot 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 ment. Do not attempt to treat it yourself.**
- **Keep refrigerant containers (cans of R-12) stored below 40°C (100°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 dameged.

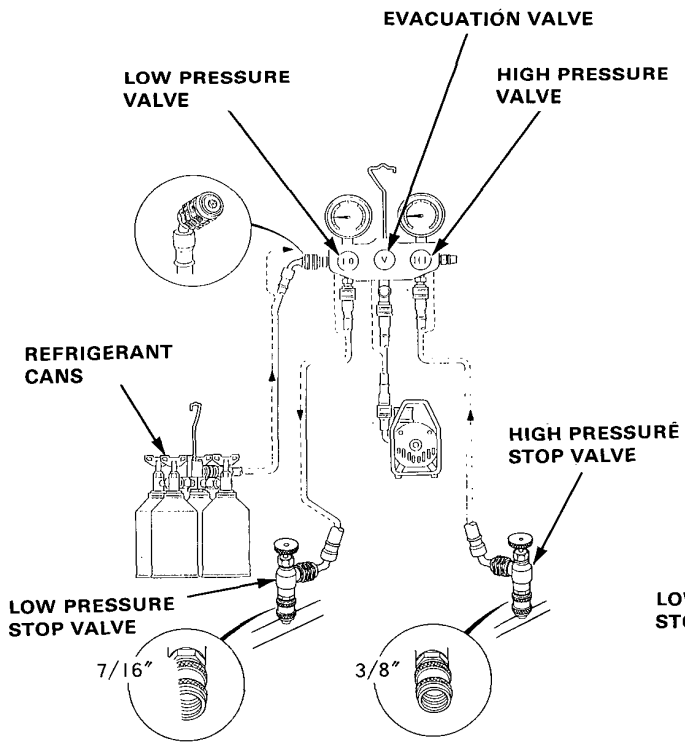
1. After leak test, check that the high pressure valve is closed and start the engine.
   NOTE: Run the engine balow 1500 rpm.
2. Open the front door.
   Turn the A/C switch on.
   Turn the air mix dial (lever) to COOL.
   Turn the function control switch (lever) on
   Turnthe heater fan switch on "E" (MAX).
3. Open the low pressure valve and charge with ant.

⚠WARNING

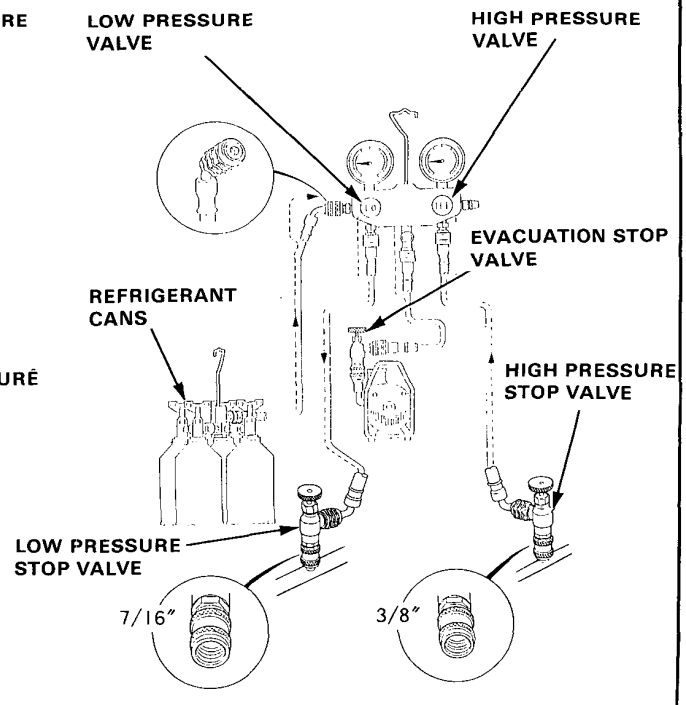
- **Do not open the high gauge valve.**
- **Do not turn the cans upside down.**

4. Charge the system with refrigerant capacity.
   Refrigerant capacity: 900±50 g (32±2 oz)
5. When fully charged, close the low pressure valve and the refrigerant cans. Check the system.
6. Close the high pressure stop valve.
7. Open the low pressure valve and gradually open the high pressure valve. When both pressure gauge are the same, close the low pressure stop valve and stop the engine.
8. Disconnect the charge hose quickly.
9. Check the system for leaks using a leak detector.
   NOTE: Particularly check for leaks around the compressor, condenser, and receiver-dryer.

3 VALVE GAUGE



2 VALVE GAUGE



System Charging

Supplement

The following are the procedures to be adhered to when servicing air conditioners to reduce the amount of from R-12 into the atmoshpere.

⚠WARNING **When handling refrigerant (R-12):**

- **Always wear eye protection.**
- **Donot 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 ment. Do not attempt to treat it yourself.**
- **Keep refrigerant containers (cans of R-12) stored below 40°C (100°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. Connect the gauge as shown, close both pressure stop valves. Purge air from the charge hose A, then loosen the stop valve connector.
2. Attach apump and refrigerant containers (can:250 g x 2) as shown.
   NOTE: Do not open cans.
3. Open both pressure valves and evacuation valve (2 valve gauge: evacuation stop valve), start the pump. The low gauge should indicate above 700 mmHg (27 in-Hg), then run the pump about 1 minute.
4. Close both pressure valves and evacuation valve (2 valve gauge: evacuation stop valve). Open both pressure stop valve.
5. Start the engine and turn on A/C switch.
6. Stop the engine and check for leaks using a leak detector.
   NOTE: Particularly check for leaks around the compressor, condenser, and receiver-dryer.
7. Test the system using the pressure test and inspection data.
   Test condition:
   - Start the engine.
   - Turn the air mix dial (lever) to COOL.
   - Turn the function control switch (lever) on
   - Turn the recirculation control switch on
   - Turn the heater fan switch on "E" (MAX).

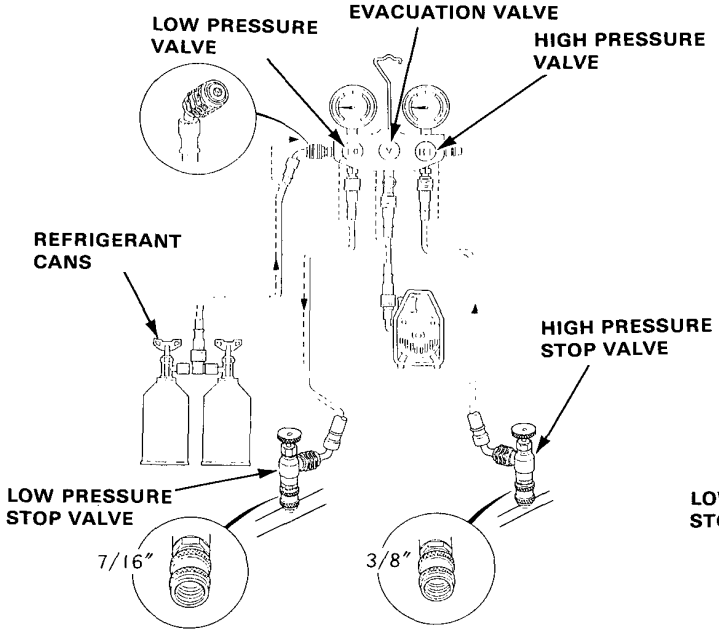
   If there is insufficient refrigerant in system, continue to charge system.
8. Open one or two cans, open the low pressure gauge. Charge the system untill there are no bubbles in the sight glass.

⚠WARNING

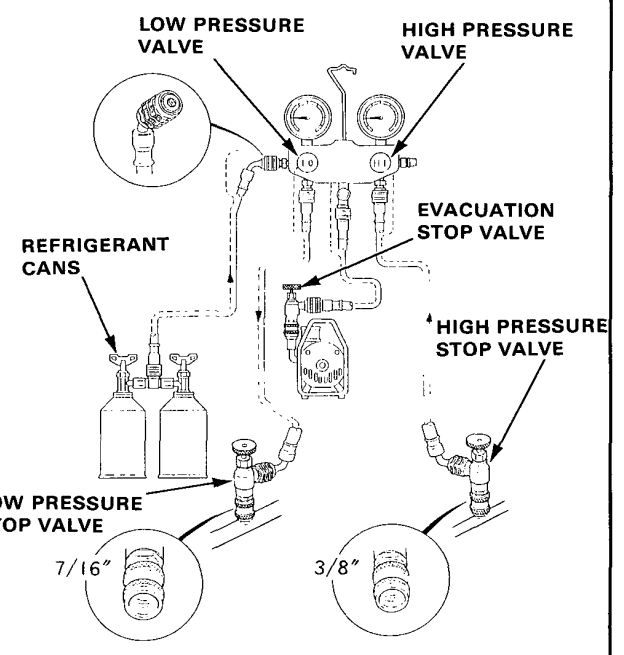
- **Do not open the high gauge valve.**
- **Do not turn the cans upside down.**

9. After adding supplemental refrigerant, close the pressure stop valve. Open the low pressure valve and gradually open the high pressure valve. When pressure gauge read same, close the low pressure stop valve and stop the engine.
10. Disconnect the charge hose quickly.
11. Check the system for leaks using a leak detector.

3 VALVE GAUGE



2 VALVE GAUGE



Electrical

Fuses
- Main Fuse Box ..... 16 — 2
- ALB Fuse Box ..... 16 — 3
- Dash Fuse Box ..... 16 — 4

Power Distribution ..... 16 — 8
Ground Distribution ..... 16 — 15
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- Gauge / Indcator Location Index ·· 16 — 22
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Shift Lever Position Indicator System
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- Circuit Diagram ..... 16 — 34

Lighting System
- Circuit Diagram ..... 16 — 40

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- Component Location Index ..... 16 — 46
- Circuit Diagram ..... 16 — 46

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- Component Location Index ..... 16 — 49
- Circuit Diagram ..... 16 — 50

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- Component Location Index ..... 16 — 53
- Circuit Diagram ..... 16 — 54

Headlight Adjuster
- Circuit Diagram ..... 16 — 58

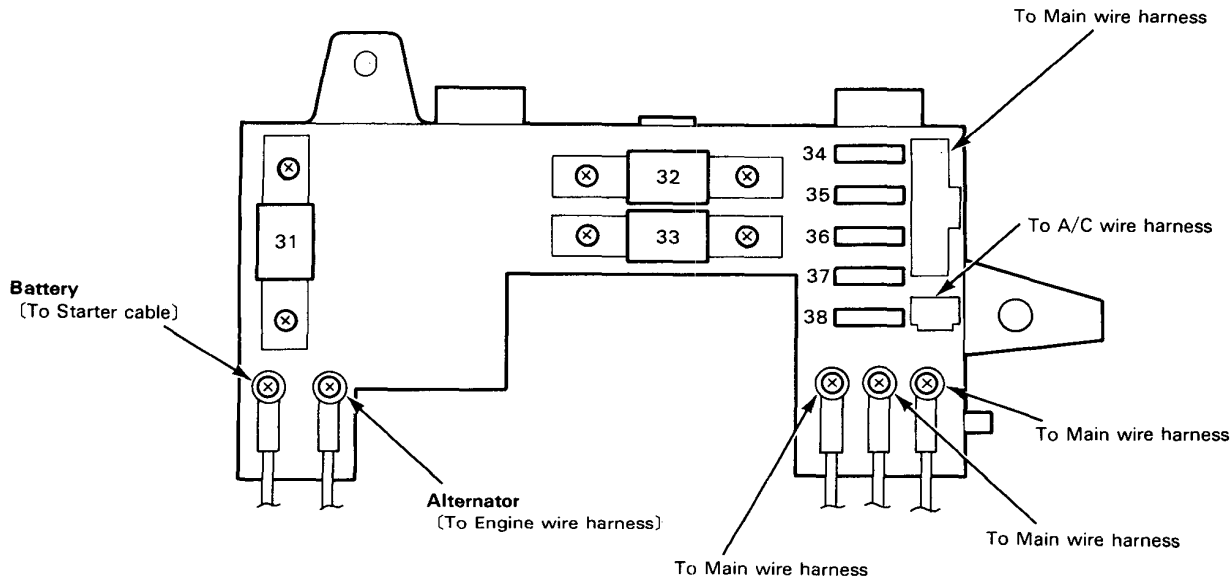
Outline of Model Changes

- The lighting, turn signal / hazard flasher, rear fog light and rear window defogger systems have been modified.
- The gauge assembly has been changed.
- The shift lever position indicator system has been adopted.
- The dashlight brightness control system has been modified to KQ model only.

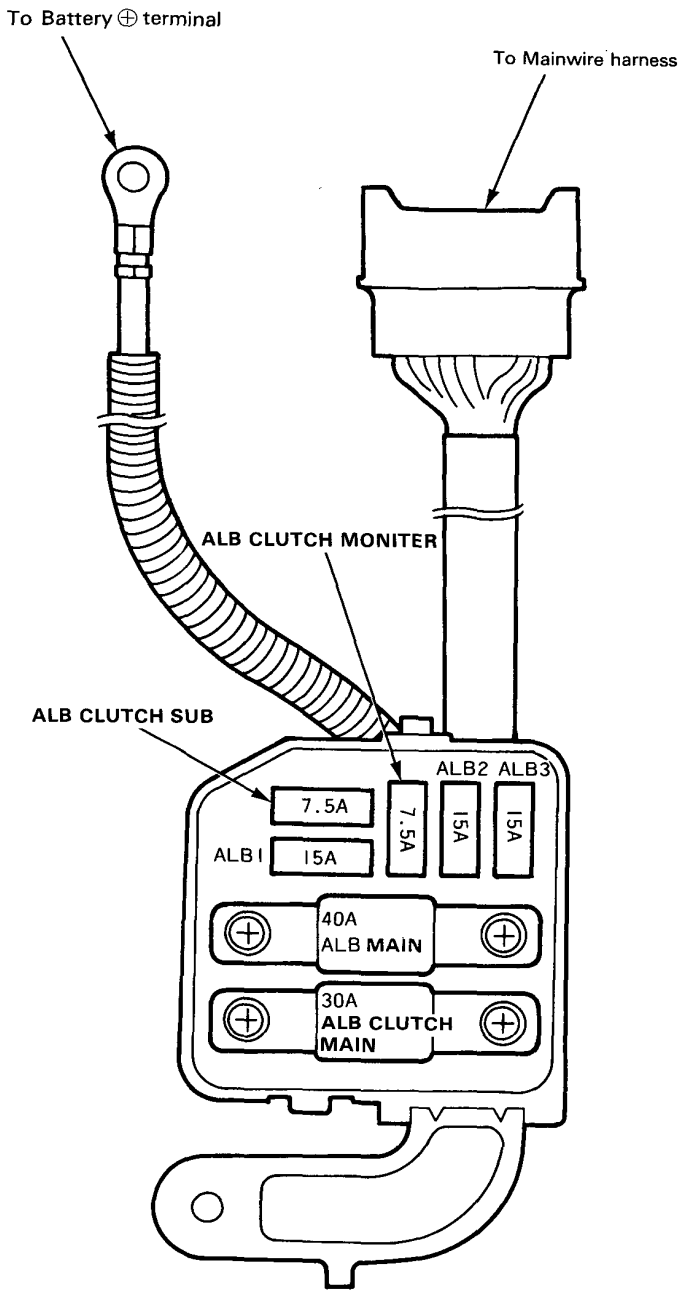
Fuses

Main Fuse Box

NOTE: Main fuse box is located right side, engine compartment.



ALB Fuse Box

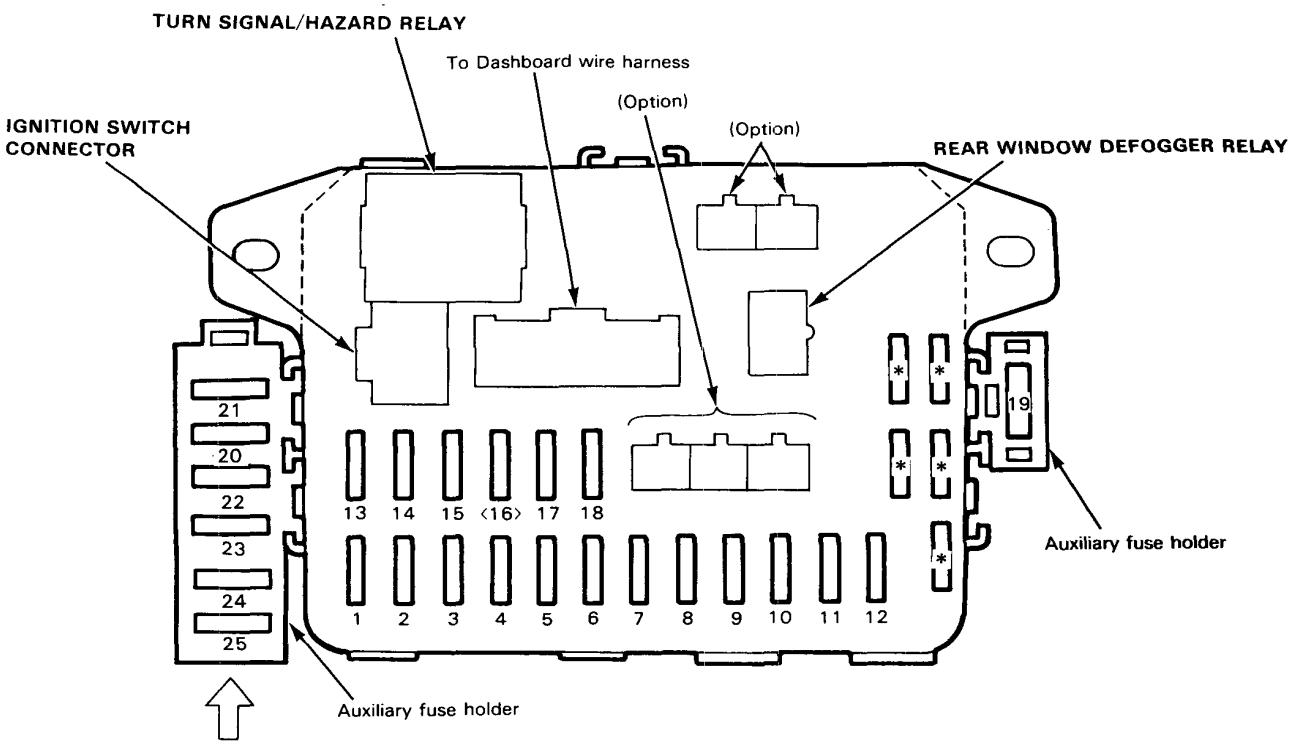


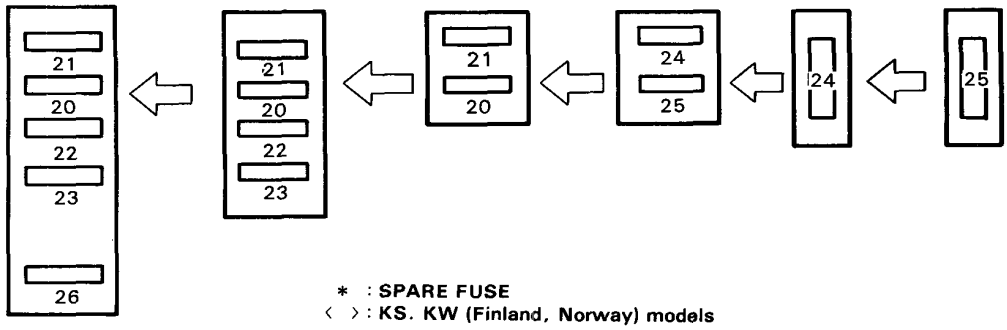
ALB CLUTCH MAIN (30 A)
ALB CLUTCH SUB (7.5 A)
ALB CLUTCH MONITER (7.5 A)
} With 4 WD-ALB only

Fuses

Dash Fuse Box (LHD)

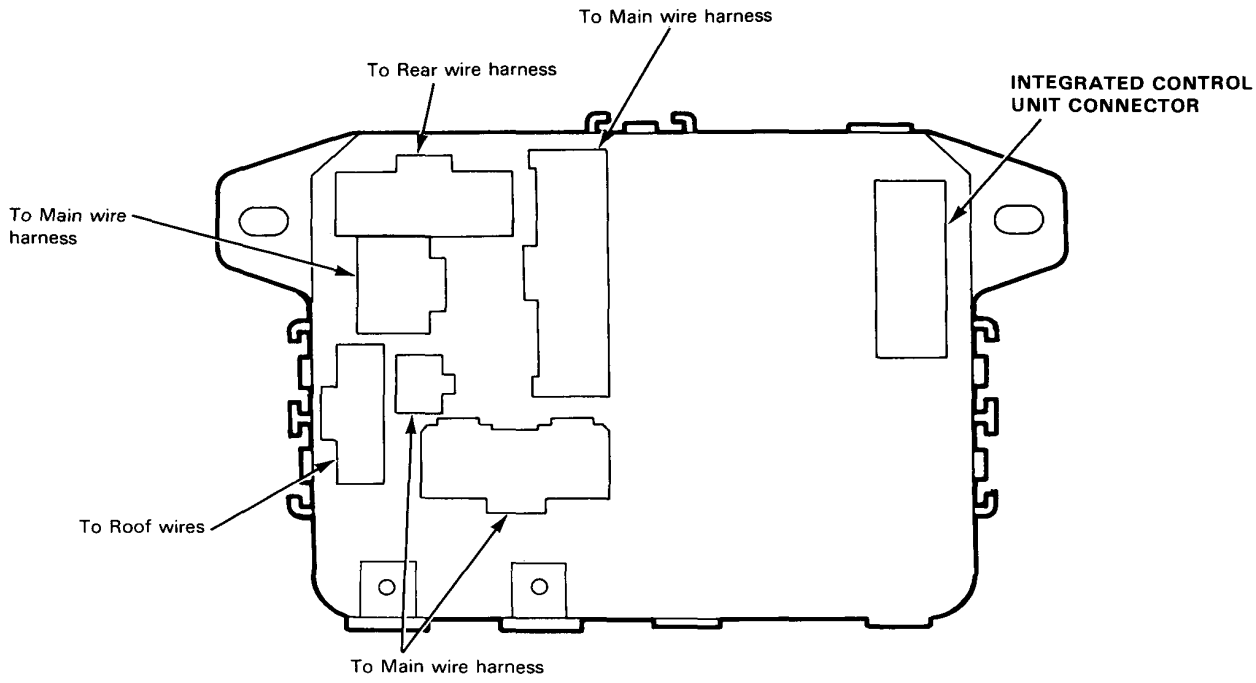
NOTE: Dash fuse box is located left side, under dash.





* : SPARE FUSE
〈 〉: KS. KW (Finland, Norway) models

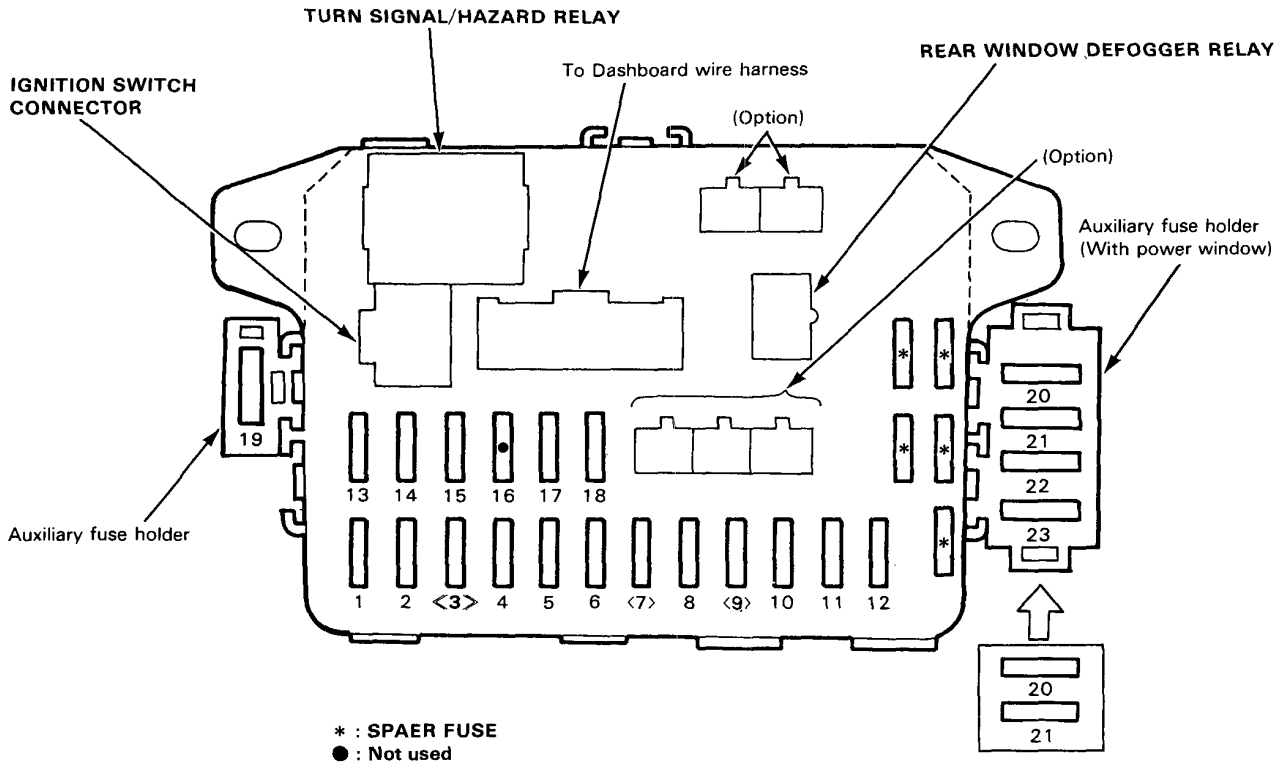
No.19(30 A)FUSE : Blower motor
No.20(20 A)FUSE : Front passengers bower window
No.21(20 A)FUSE : Drivers power window
No.22(20 A)FUSE : Right rear power window
No.23(20 A)FUSE : Left rear power window
No.24(15 A)FUSE : Seat heaters-KS, KW(Finland, Norway)models
No.25(15 A)FUSE : Dower door lock-KS, KW(Finland, Norway)models
No.26(15 A)FUSE : Radiator fan-4 WD-AT(Electronic control)


To Main wire harness
To Rear wire harness
INTEGRATED CONTROL UNIT CONNECTOR
To Main wire harness
To Roof wires
To Main wire harness

Fuses

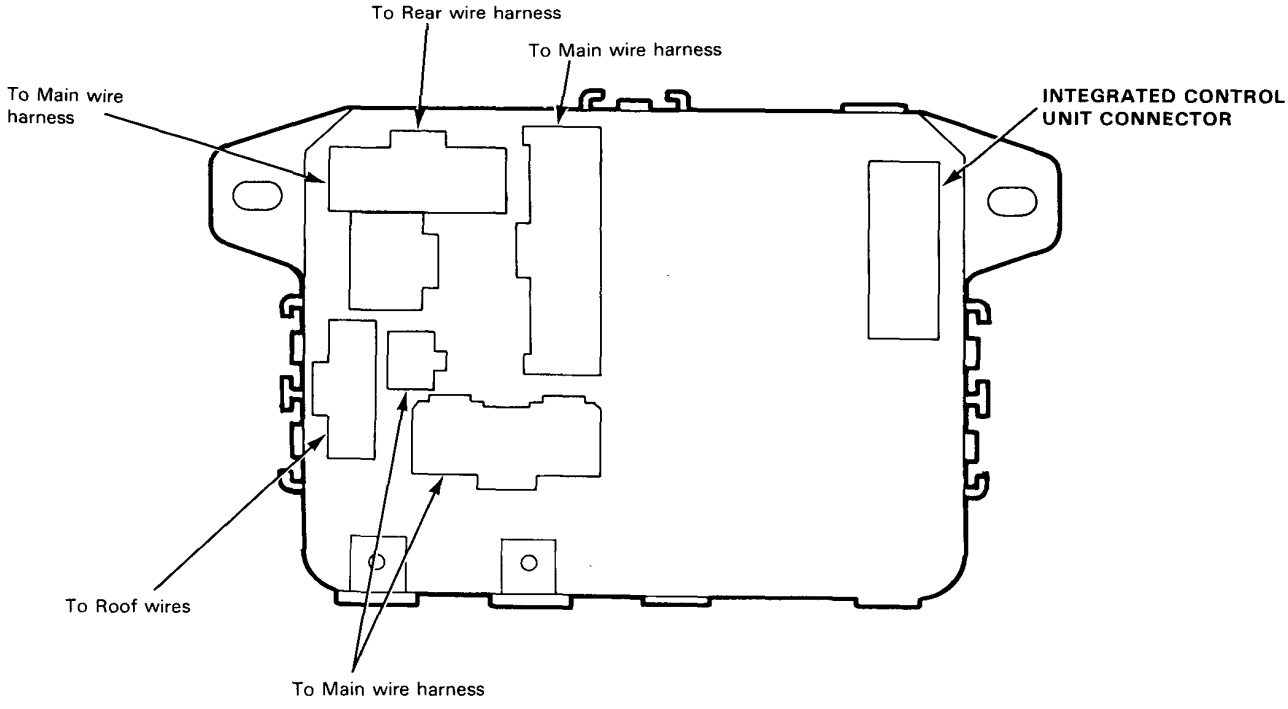
Dash Fuse Box (RHD)

NOTE: Dash fuse box is located right side, under dash.



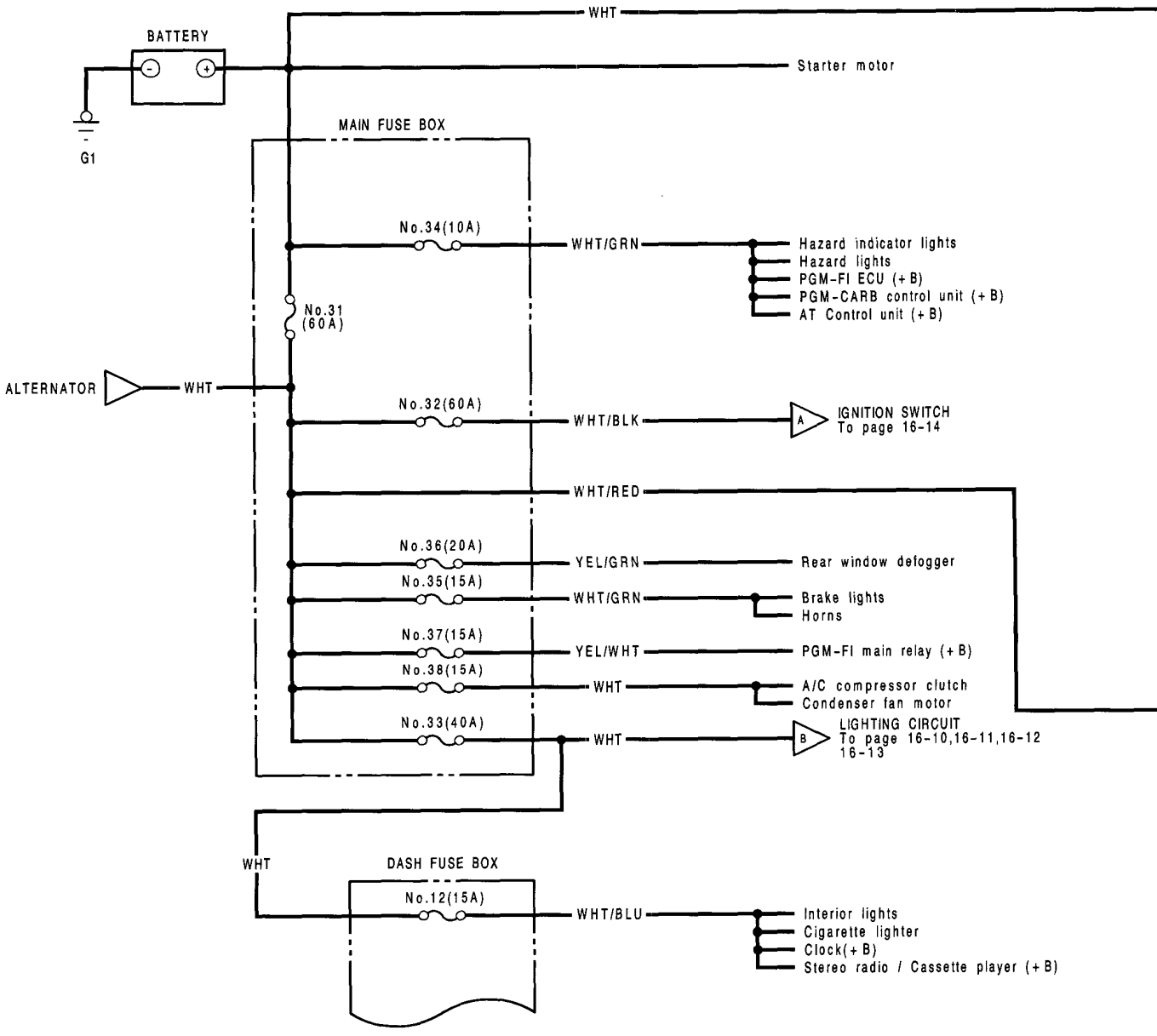
* : SPAER FUSE
● : Not used
〈 〉: KE model only
《 》: With power door lock

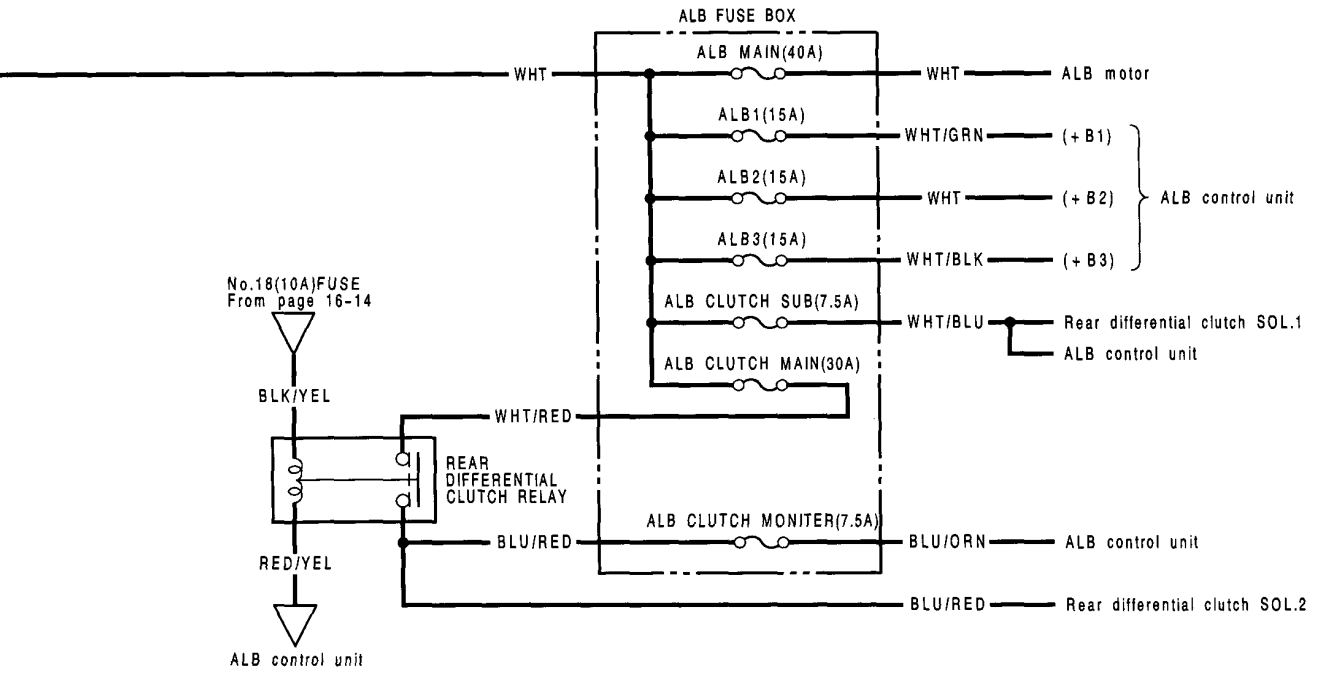
No.19(30 A)FUSE : Blower motor
No.20(20 A)FUSE : Driver's power window
No.21(20 A)FUSE : Front passenger's power window
No.22(20 A)FUSE : R.Rear power window
No.23(20 A)FUSE : L.Rear power window

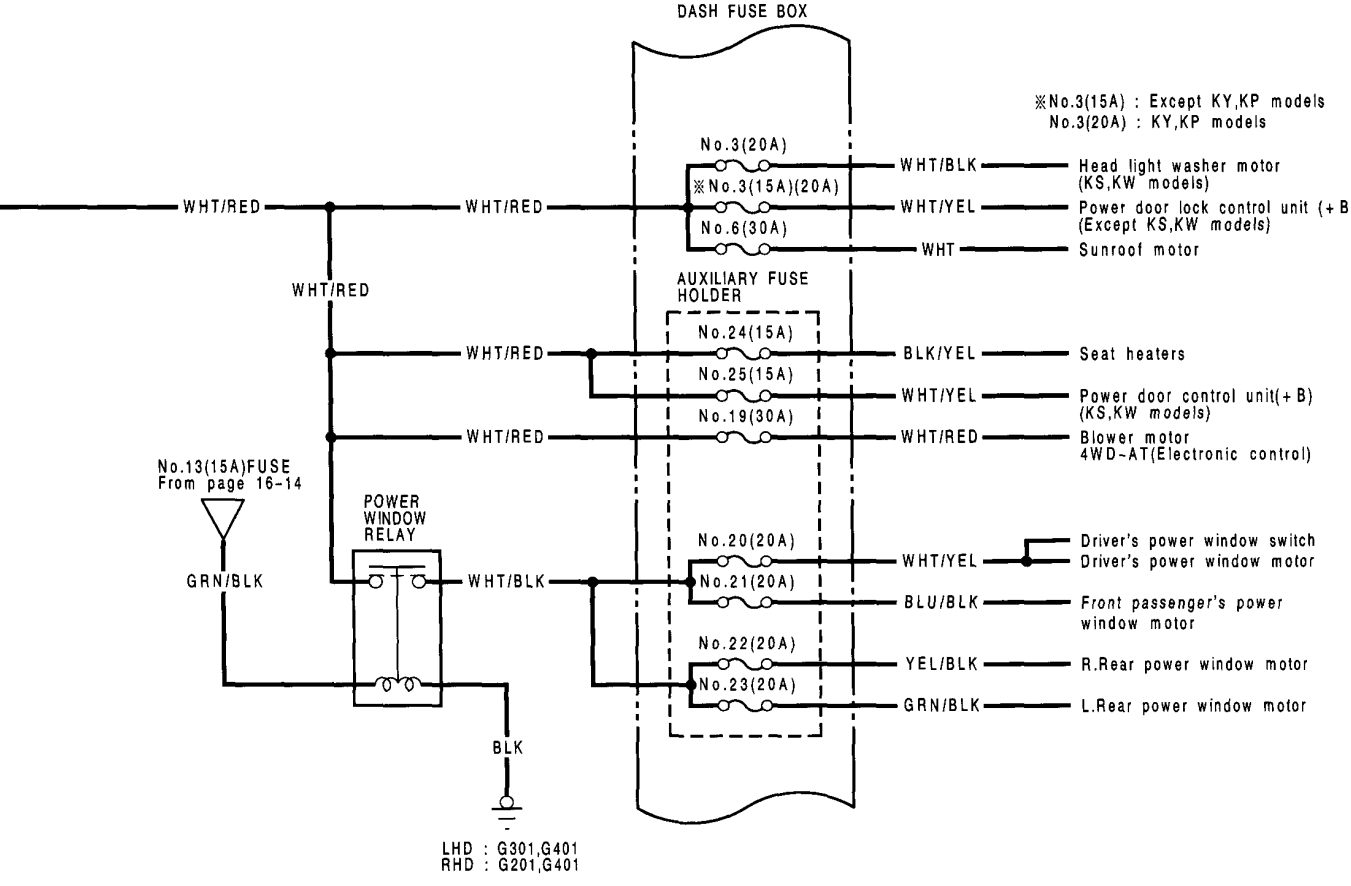

To Rear wire harness
To Main wire harness
To Main wire harness
INTEGRATED CONTROL UNIT CONNECTOR
To Roof wires
To Main wire harness

Power Distribution

Circuit Identification



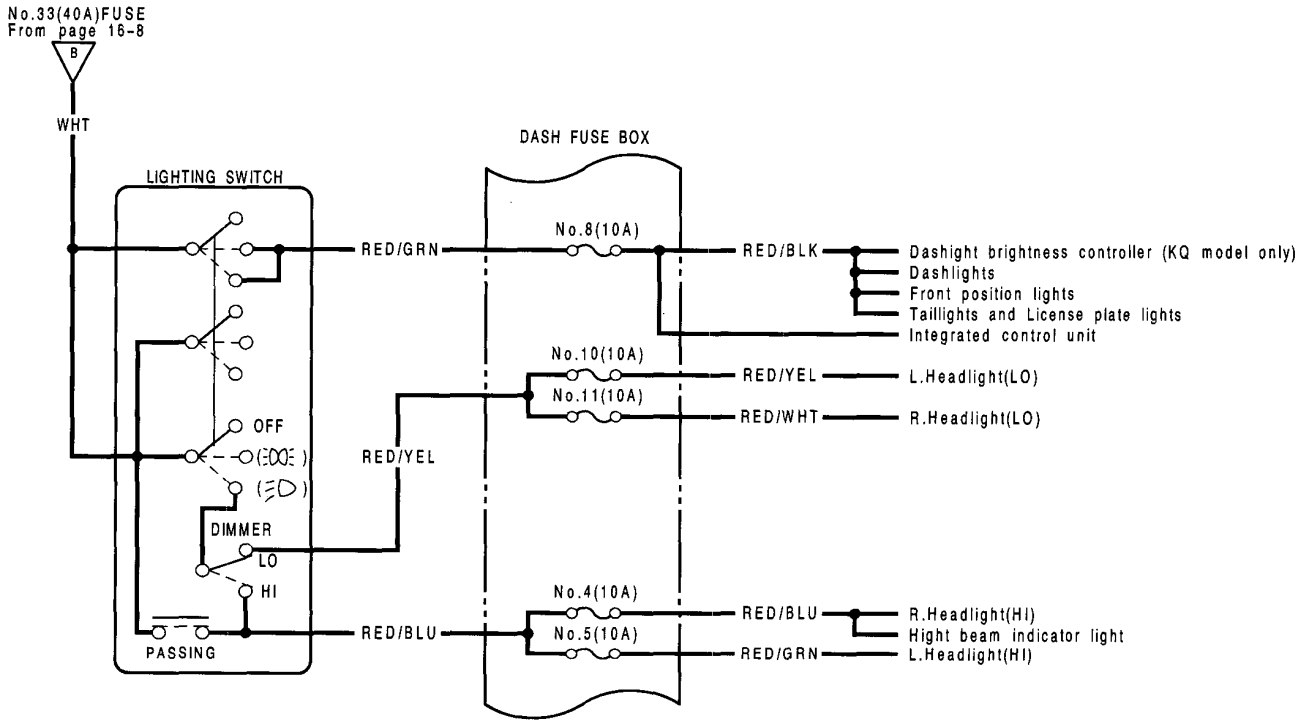

ALB FUSE BOX
ALB MAIN(40A)
WHT
WHT
ALB motor
ALB1(15A)
WHT/GRN
(+B1)
ALB2(15A)
WHT
(+B2)
ALB control unit
ALB3(15A)
WHT/BLK
(+B3)
No.18(10A)FUSE
From page 16-14
ALB CLUTCH SUB(7.5A)
WHT/BLU
Rear differential clutch SOL.1
ALB control unit
ALB CLUTCH MAIN(30A)
BLK/YEL
WHT/RED
REAR
DIFFERENTIAL
CLUTCH RELAY
ALB CLUTCH MONITER(7.5A)
BLU/RED
BLU/ORN
ALB control unit
RED/YEL
BLU/RED
Rear differential clutch SOL.2
ALB control unit


DASH FUSE BOX
※No.3(15A) : Except KY,KP models
No.3(20A) : KY,KP models
No.3(20A)
WHT/BLK
Head light washer motor
(KS,KW models)
※No.3(15A)(20A)
WHT/RED
WHT/RED
WHT/YEL
Power door lock control unit (+B)
(Except KS,KW models)
No.6(30A)
WHT
Sunroof motor
WHT/RED
AUXILIARY FUSE
HOLDER
No.24(15A)
WHT/RED
BLK/YEL
Seat heaters
No.25(15A)
WHT/YEL
Power door control unit(+B)
(KS,KW models)
No.19(30A)
WHT/RED
WHT/RED
Blower motor
4WD~AT(Electronic control)
No.13(15A)FUSE
From page 16-14
POWER
WINDOW
RELAY
No.20(20A)
WHT/YEL
Driver's power window switch
Driver's power window motor
GRN/BLK
WHT/BLK
No.21(20A)
BLU/BLK
Front passenger's power
window motor
No.22(20A)
YEL/BLK
R.Rear power window motor
No.23(20A)
GRN/BLK
L.Rear power window motor
BLK
LHD : G301,G401
RHD : G201,G401

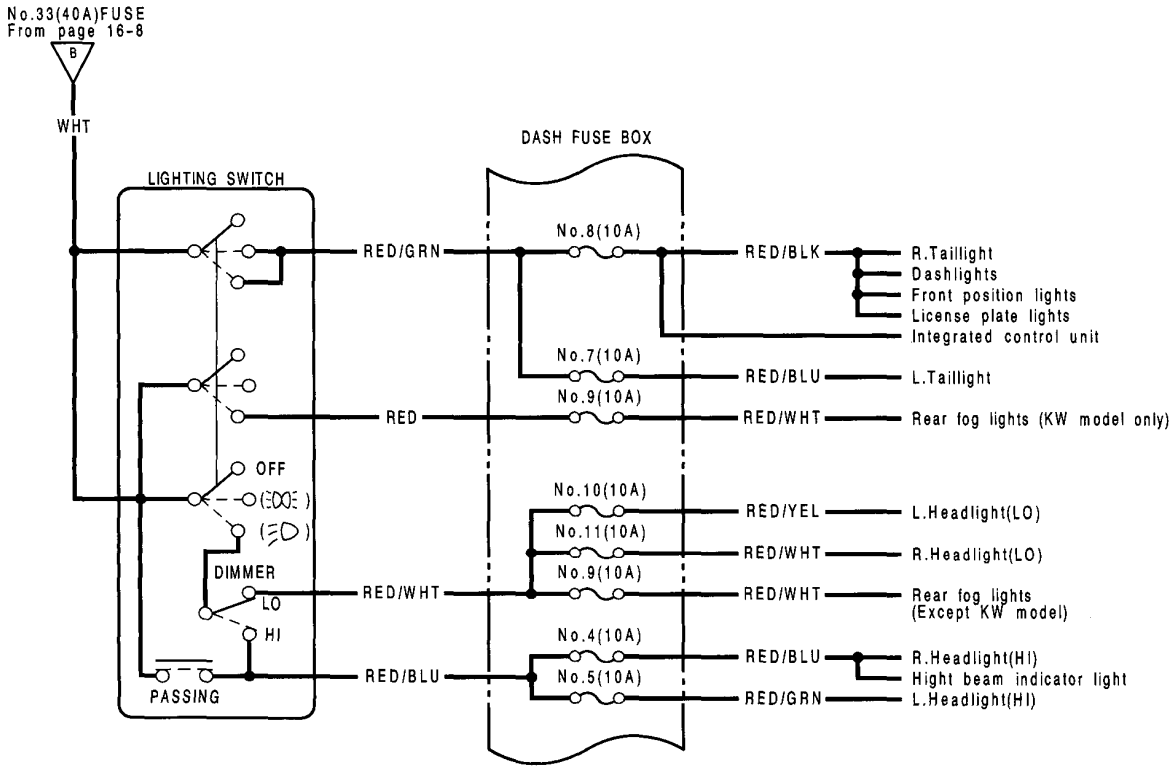
Power Distribution

Circuit Identification (cont'd)

Except Europan model :



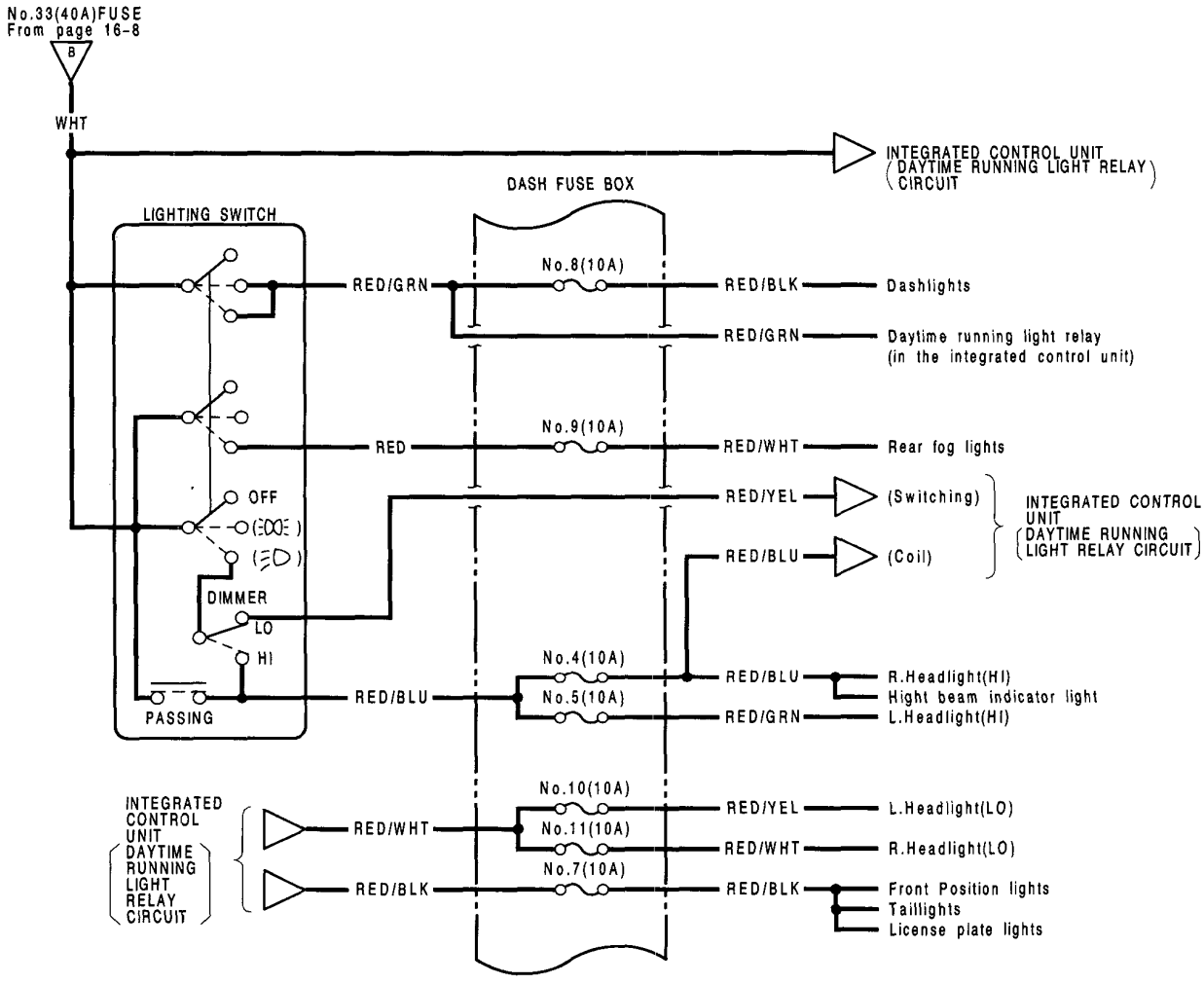
KG,KF,KB and KW (Except Finland,Norway)models :



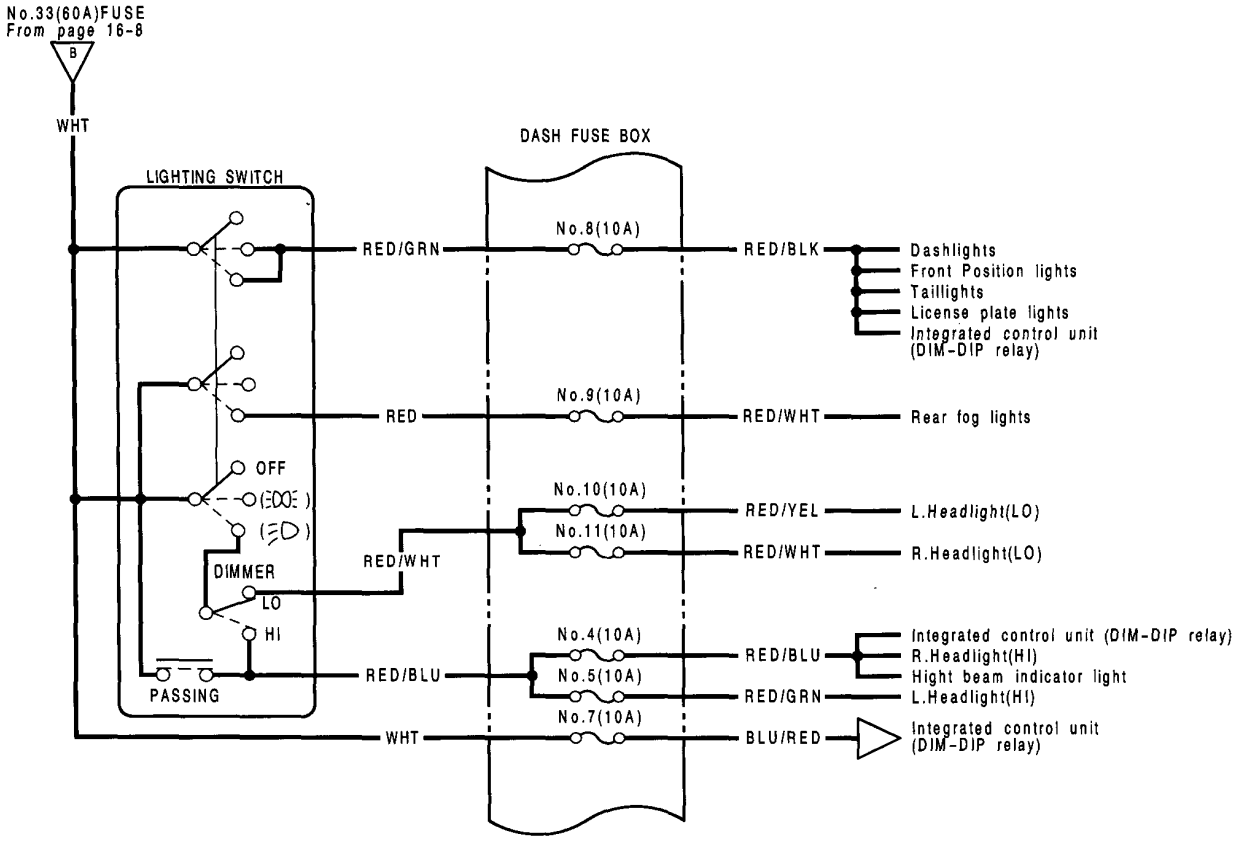
Power Distribution

Circuit Identification (cont'd)

With Daytime Running Light :

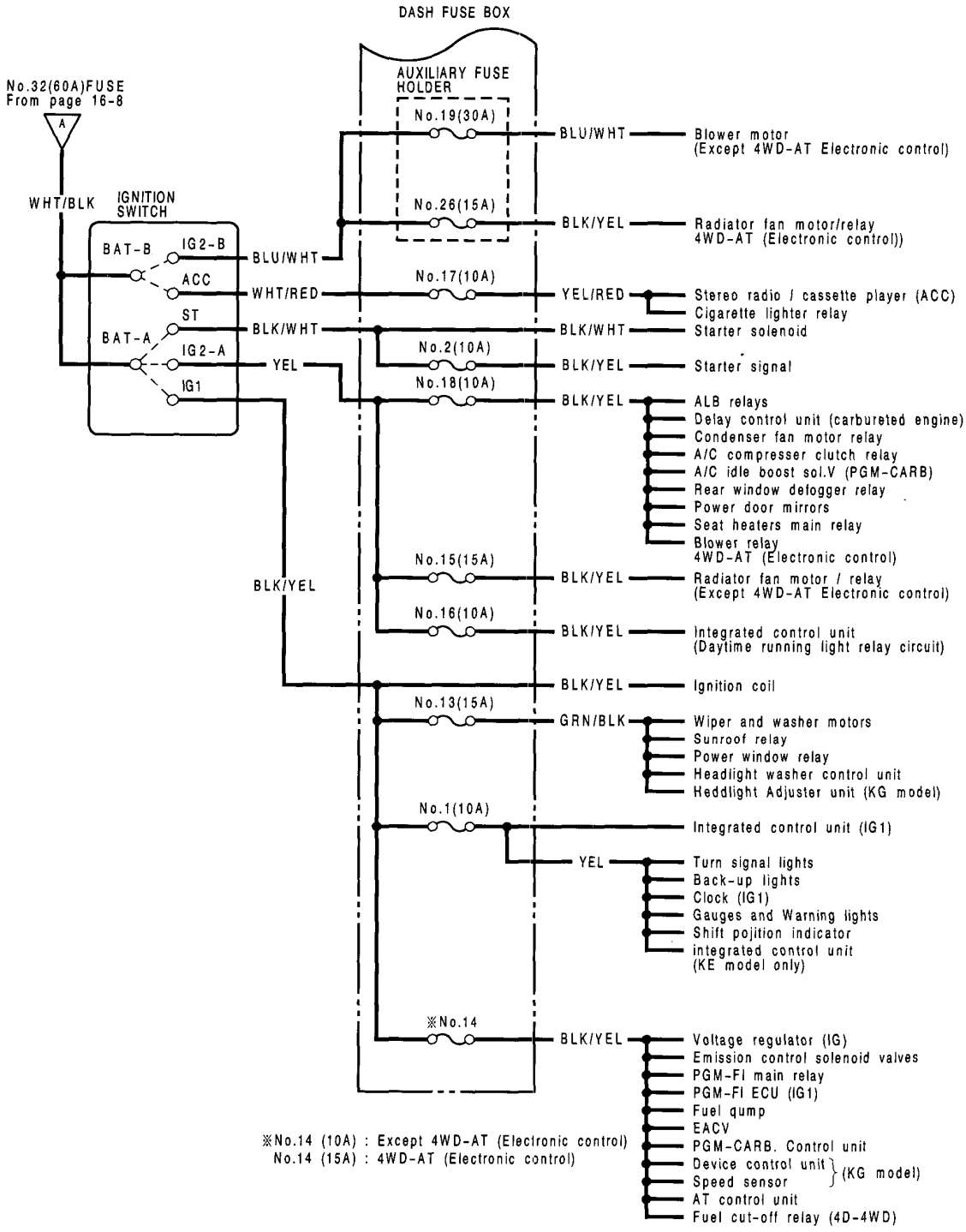


With Dim-Dip Headlight :



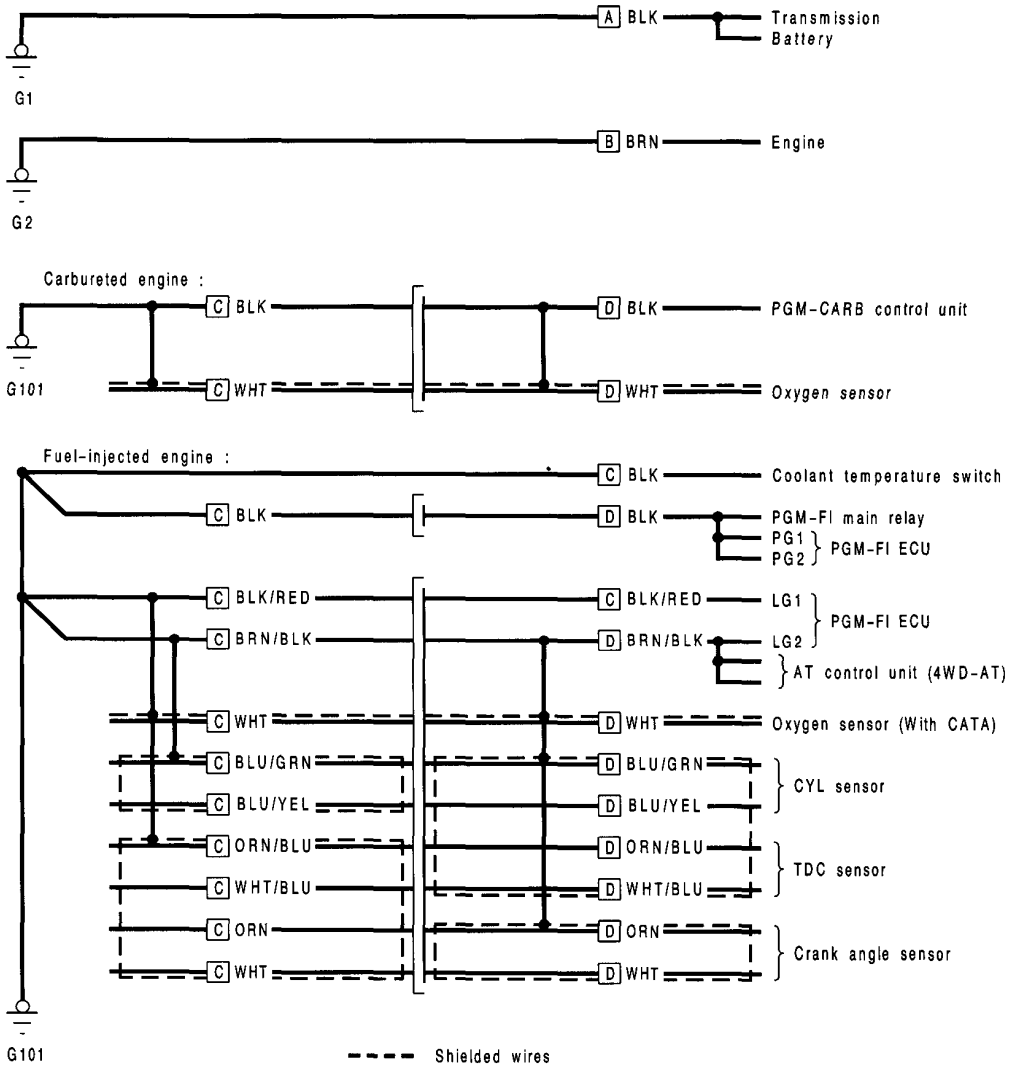
Power Distribution

Circuit Identification (cont'd)



Ground Distribution

Circuit Identification

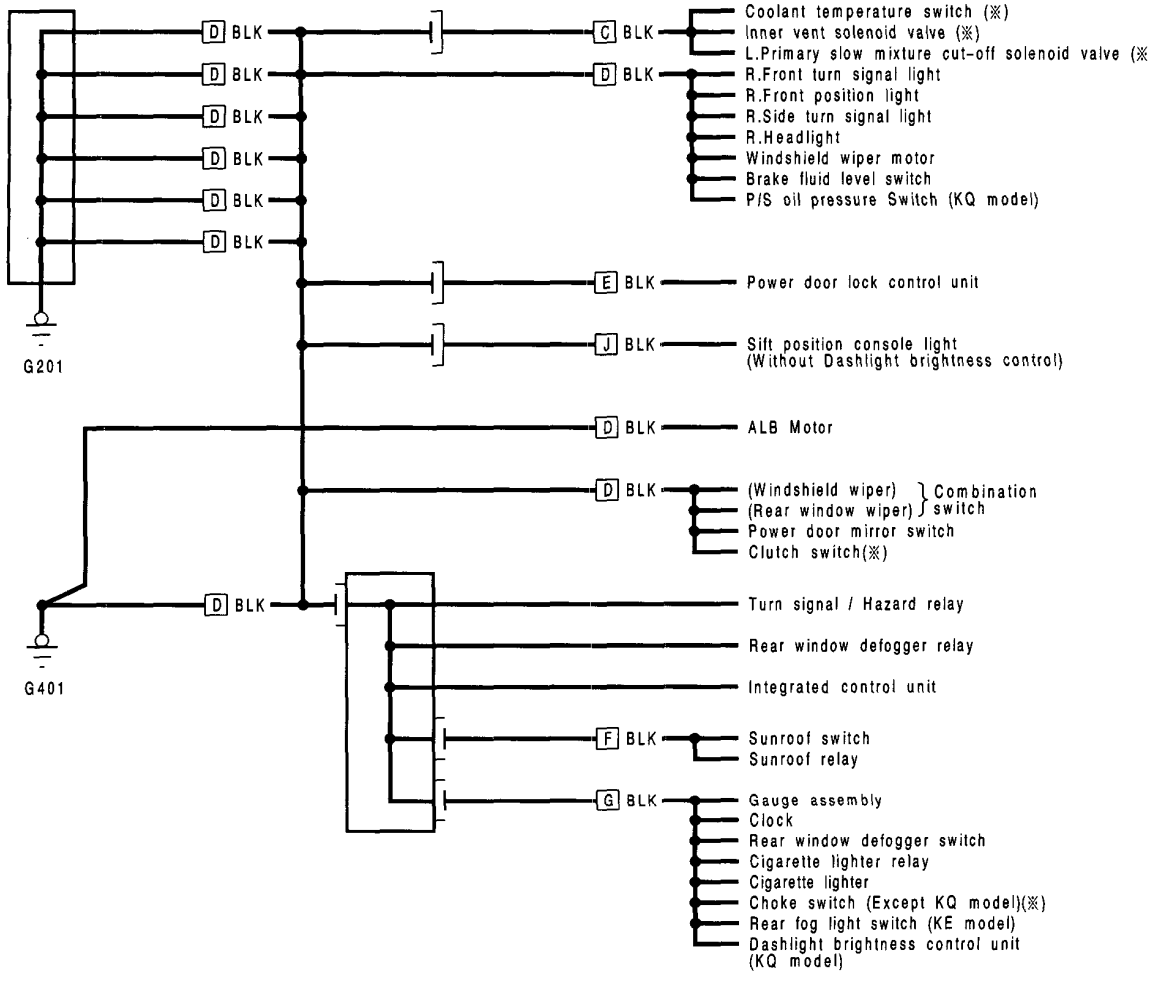


A : Battery ground wire
B : Engin ground wire
C : Engine wire harness
D : Main wire harness

Ground Distribution

Circuit Identification (cont'd)

RHD :



※ : Carbureted engine

C : Engine wire harness

D : Main wire harness

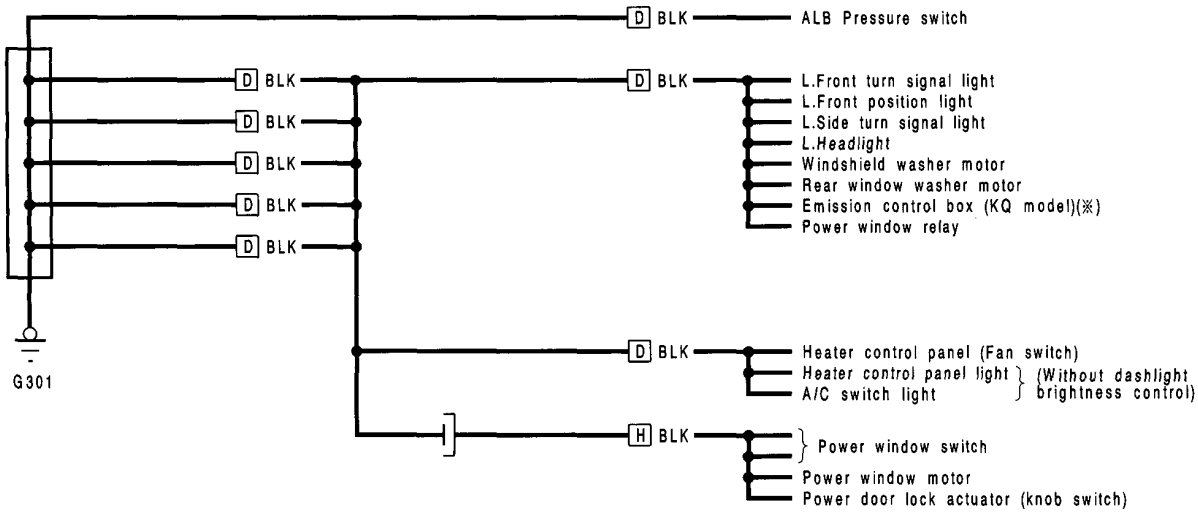
E : Front Passenger's door wire harness

F : Roof wiress

G : Dashboard wire harness

J : Rear wire harness

RHD :

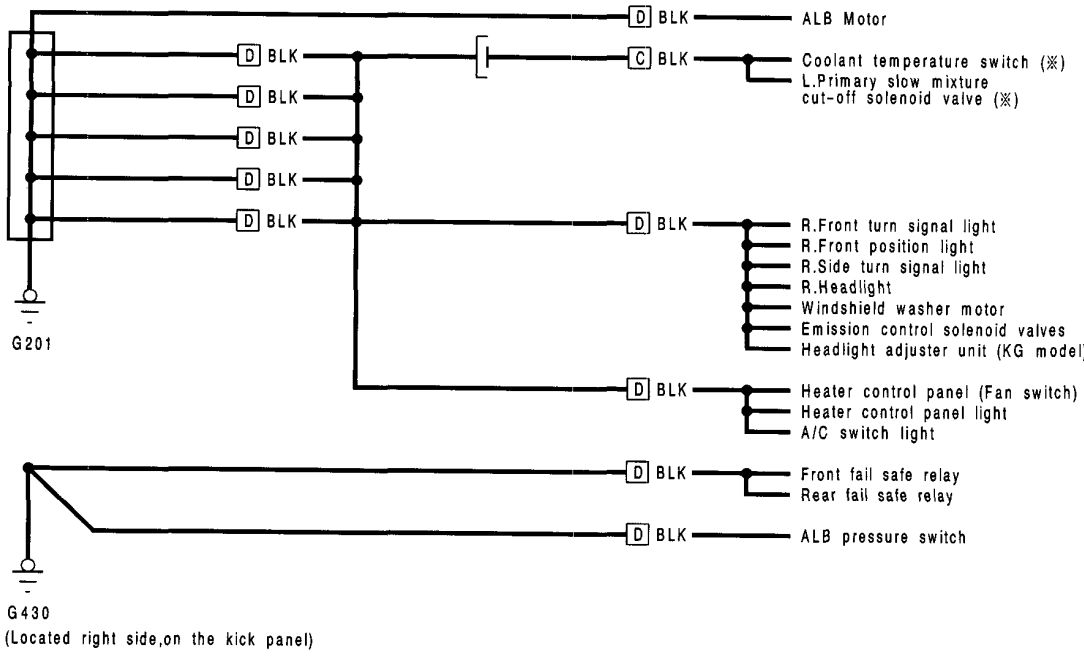


※ : Carbureted engine
D : Main wire harness
H : Driver's door wire harness

Ground Distribution

Circuit Identification (cont'd)

LHD :

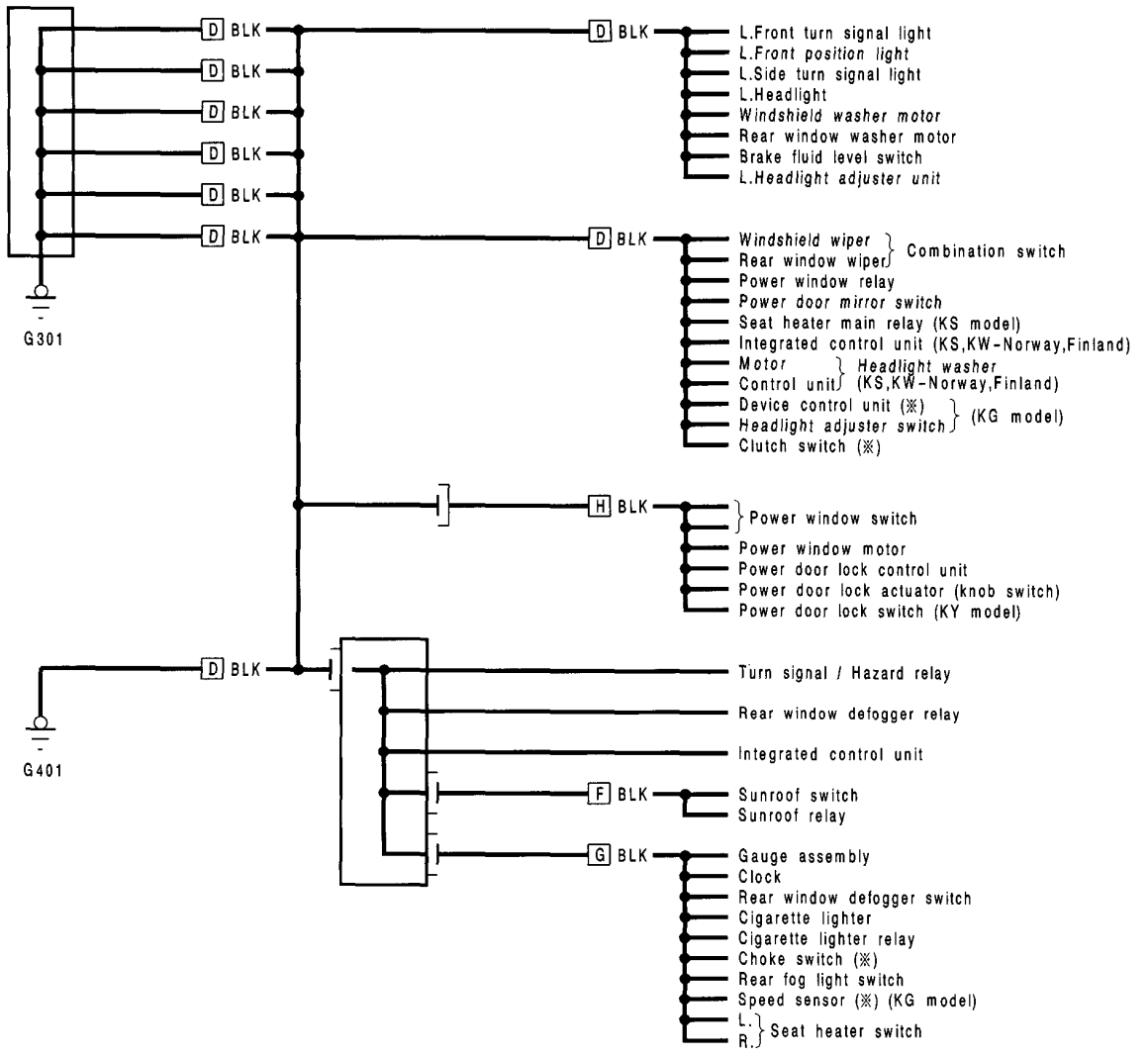


※ : Carbureted engine

C : Engine wire harness

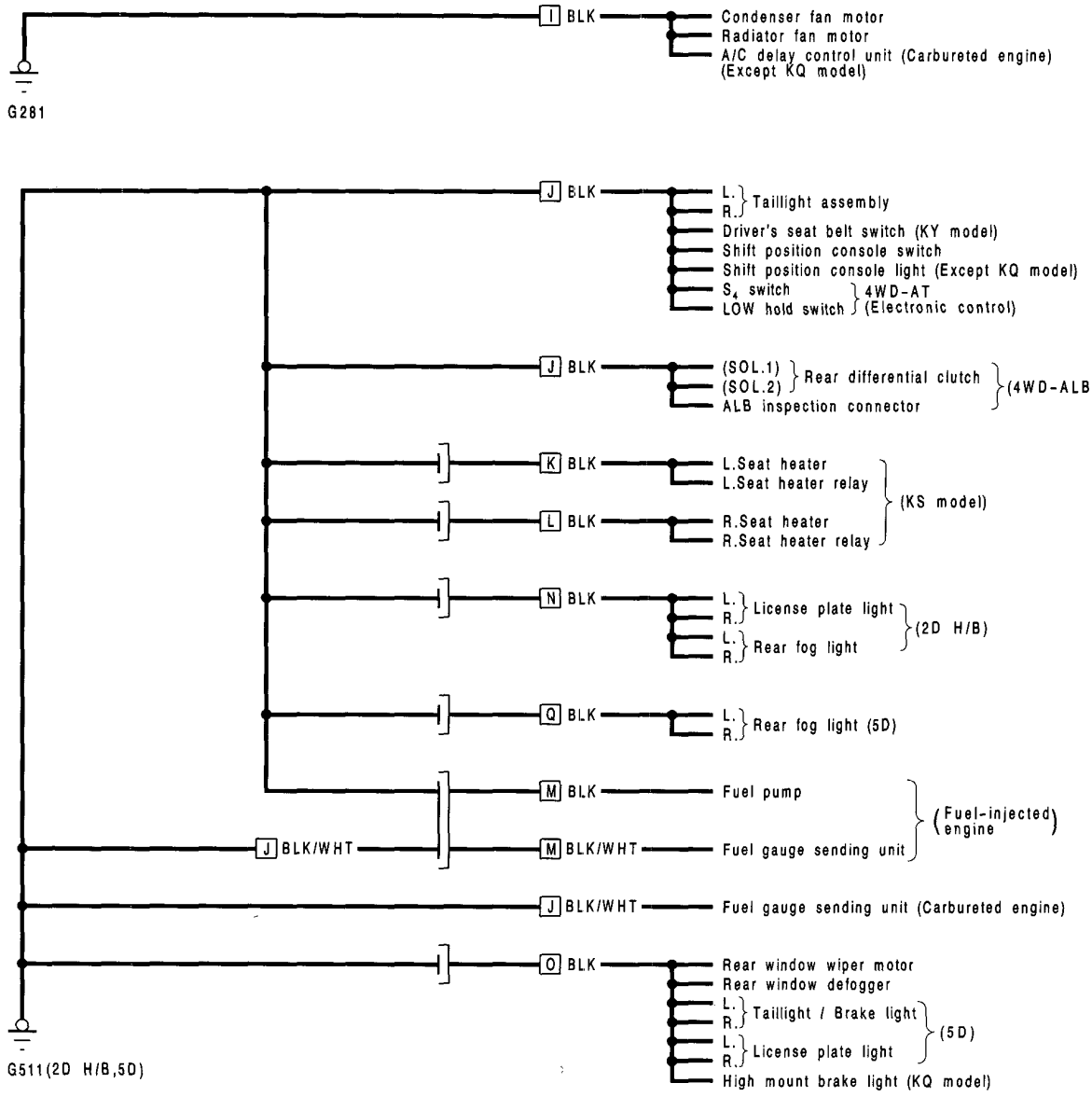
D : Main wire harness

LHD :

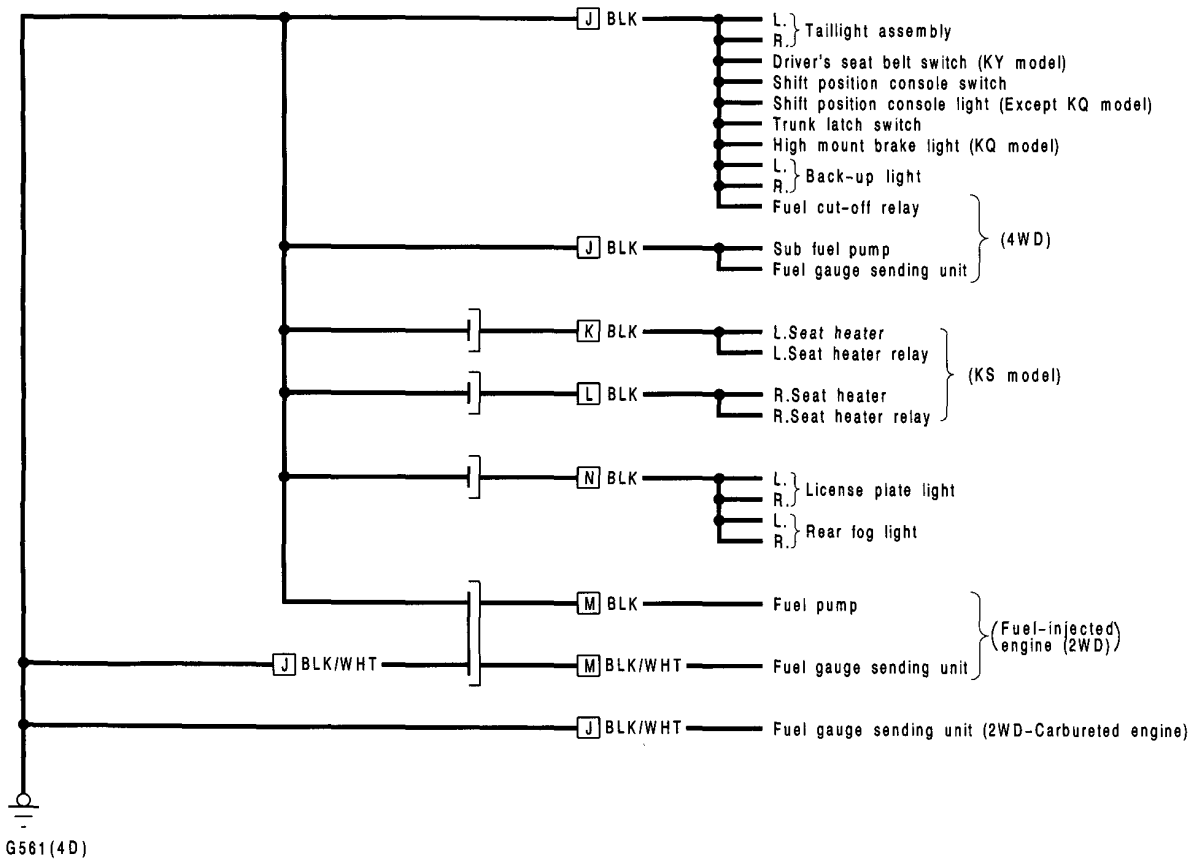


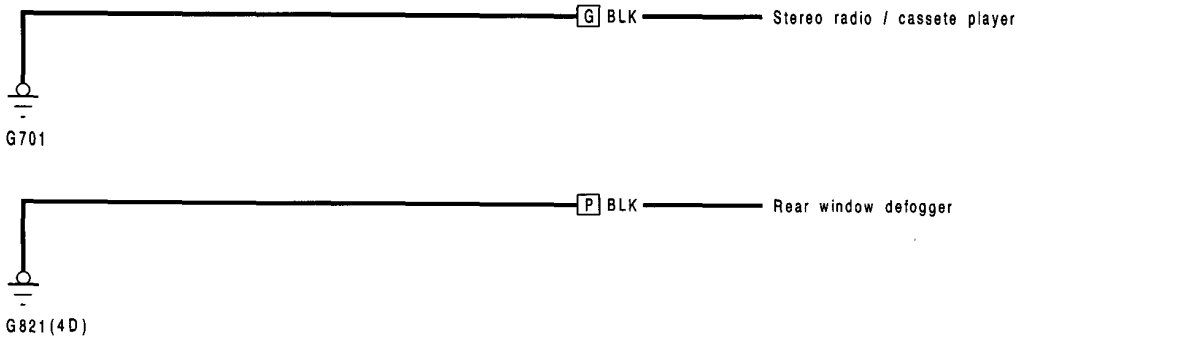
※ : Carbureted engine
D : Main wire harness
F : Roof wires
G : Dashboard wire harness
H : Driver's door wire harness

Ground Distribution



I : A/C wire harness
J : Rear wire harness
K : Left seat heater wires
L : Right seat heater wires
M : Fuel tank wires
N : License plate light wires
O : Hatch wires
Q : Rear fog light wires



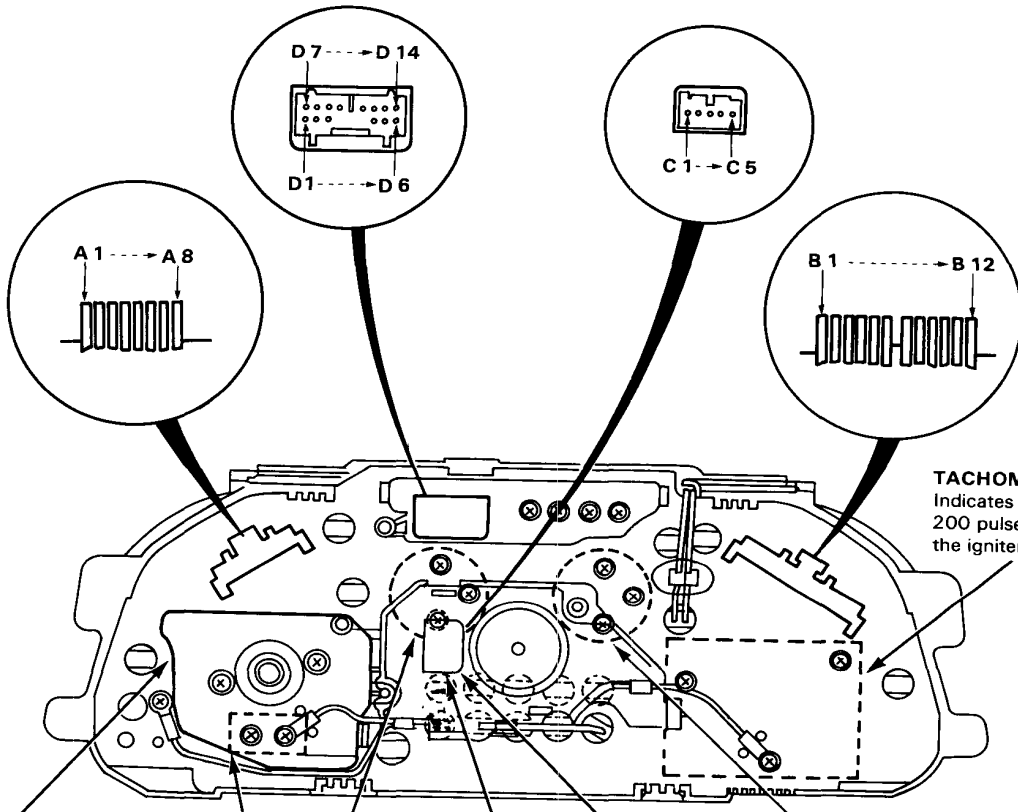


J : Rear wire harness
K : Left seat heater wires
L : Right seat heater wires
M : Fuel tank wires
N : License plate light wires
G : Dashboard wire harness
P : Rear defogger sub cord

Gauge Assembly

Gauge / Indcator Location Index (With Tachometer)

- Gauge Assembly
  Removal, page 16-30
  Disassembly, page 16-28



TACHOMETER
Indicates 100 min-1 (rpm) 200 pulses per minute of the igniter unit.

SPEEDMETER
Indicates 60 km/h [mph]at 637 [1,026] min-1 (rpm) of the speedometer cable.

FUEL GAUGE

COOLANT TEMPERATURE GAUGE

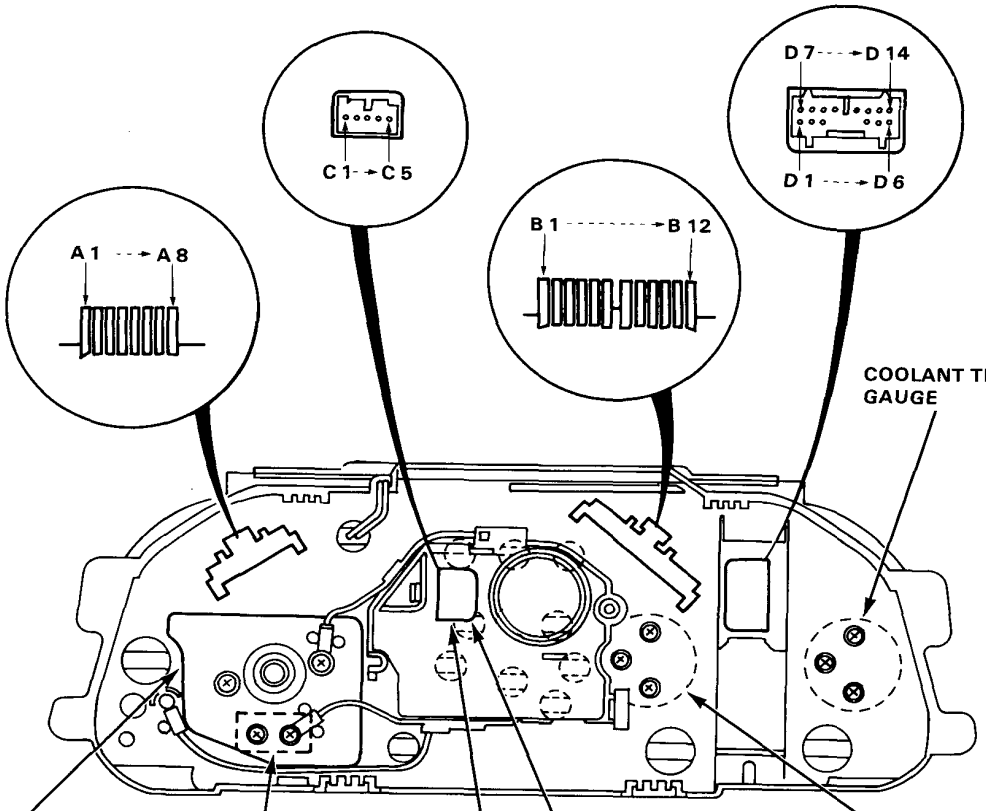
SPEED PULSER
Outputs 4 pulses per speedometer cable revolution
Test, page 16-31

SPEED SENSOR AMPLIFIER (KG model)
Outputs about 5 V when the speed is above 60 km/h [37 mph].

SPEED ALARM BEEPER (KY model)
The beeper sounds when the speed is above 116 km/h [72 mph]

— (With Tachometer)

- Gauge Assembly
  Removal, page16-30
  Disassembly, page 16-29



SPEEDOMETER
Indicates 60 km/h [mph] at 637 [1,026] min-1 (rpm) of the speedometer cable.

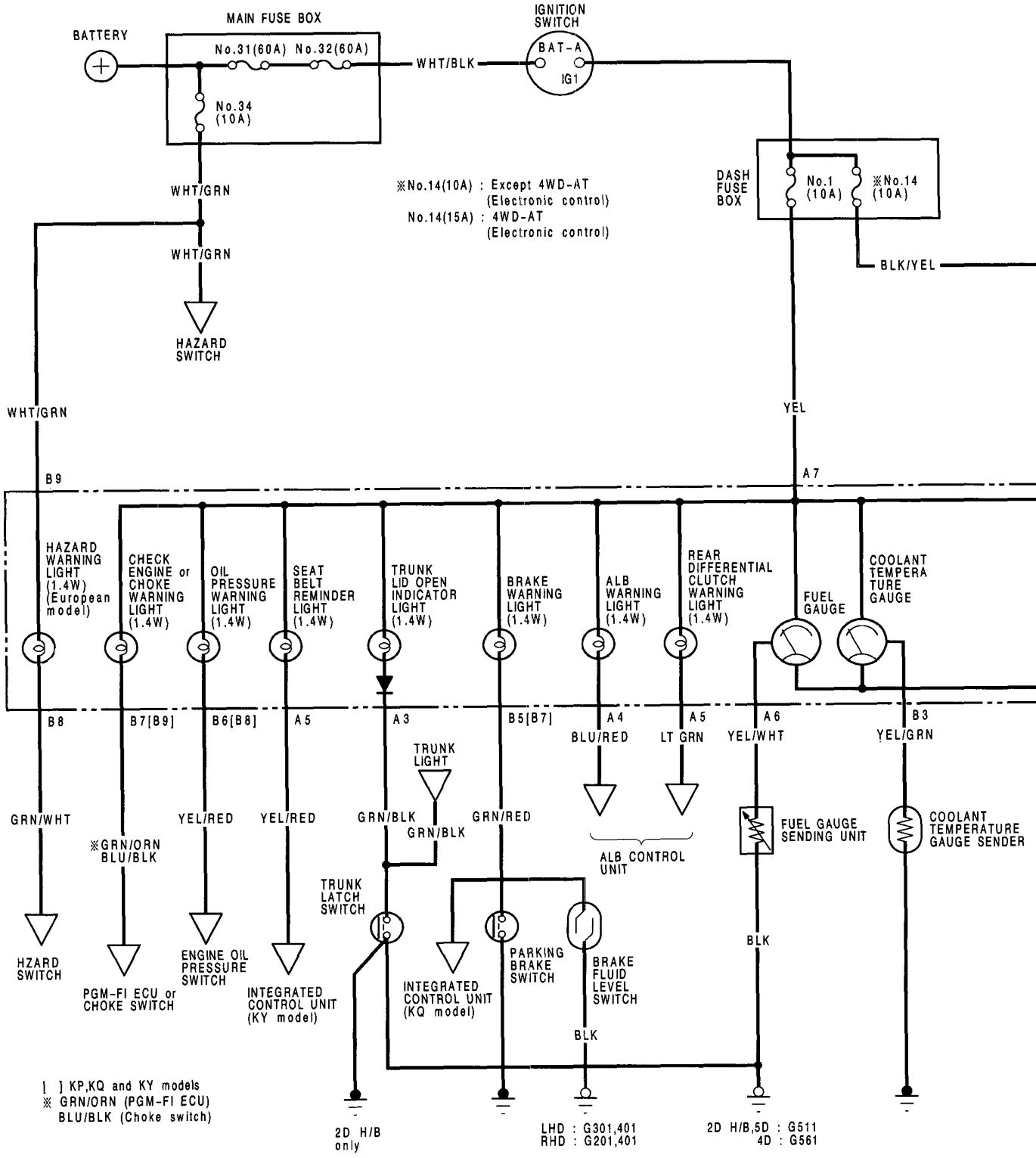
SPEED PULSER
Outputs 4 pulses per speedometer cable revolution
Test, page 16-31

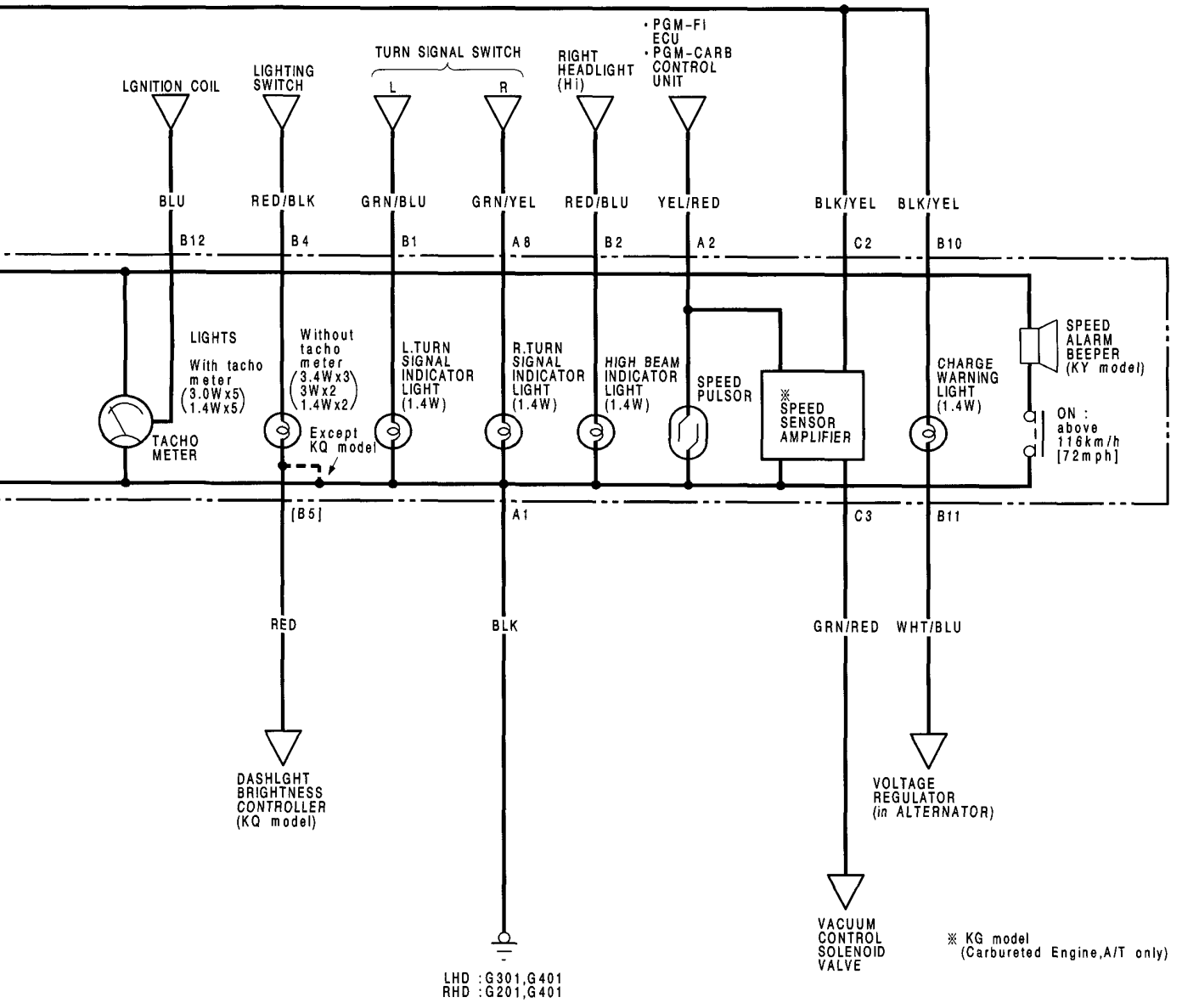
SPEED SENSOR AMPLIFIER (KG model)
Outputs about 5 V when the speed is above 60 km/h [37 mph].

SPEED ALARM BEEPER (KY model)
The beeper sounds when the speed is above 116 km/h [72 mph].

Gauge Assembly

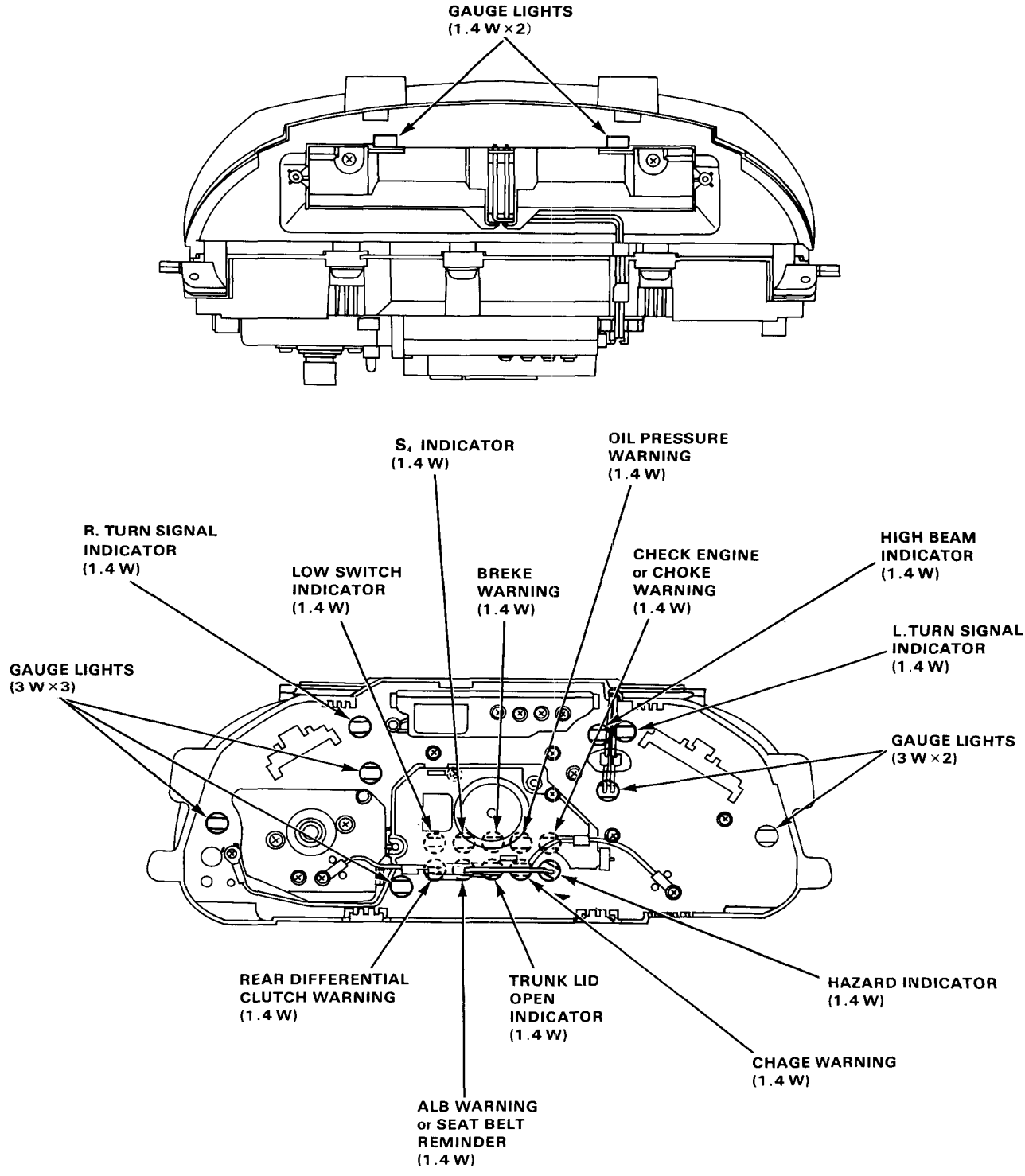
Circuit Diagram



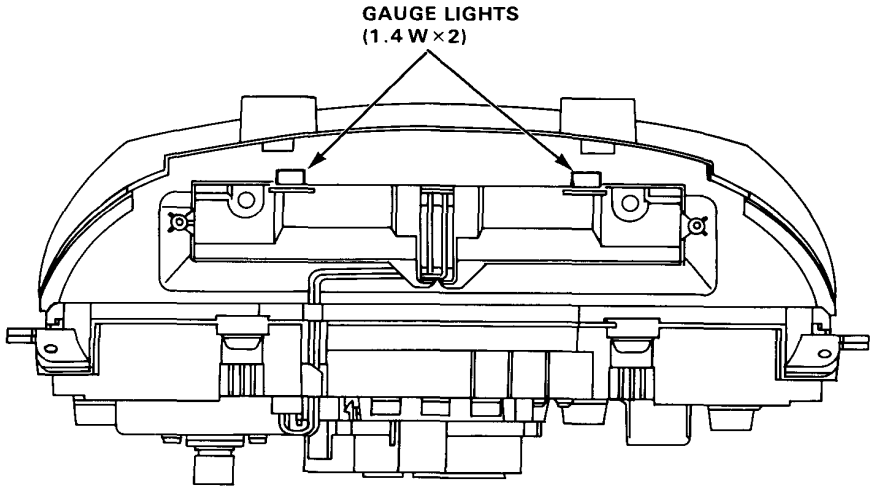

IGNITION COIL
LIGHTING SWITCH
TURN SIGNAL SWITCH
L
R
RIGHT HEADLIGHT (Hi)
• PGM-FI ECU
• PGM-CARB CONTROL UNIT
BLU
RED/BLK
GRN/BLU
GRN/YEL
RED/BLU
YEL/RED
BLK/YEL
BLK/YEL
B12
B4
B1
A8
B2
A2
C2
B10
LIGHTS
With tacho meter (3.0Wx5) (1.4Wx5)
Without tacho meter (3.4Wx3) (3Wx2) (1.4Wx2)
L.TURN SIGNAL INDICATOR LIGHT (1.4W)
R.TURN SIGNAL INDICATOR LIGHT (1.4W)
HIGH BEAM INDICATOR LIGHT (1.4W)
SPEED PULSOR
※ SPEED SENSOR AMPLIFIER
CHARGE WARNING LIGHT (1.4W)
SPEED ALARM BEEPER (KY model)
ON : above 116km/h [72mph]
TACHO METER
Except KQ model
[B5]
A1
C3
B11
RED
BLK
GRN/RED
WHT/BLU
DASHLGHT BRIGHTNESS CONTROLLER (KQ model)
VOLTAGE REGULATOR (in ALTERNATOR)
VACUUM CONTROL SOLENOID VALVE
※ KG model (Carbureted Engine,A/T only)
LHD : G301,G401
RHD : G201,G401

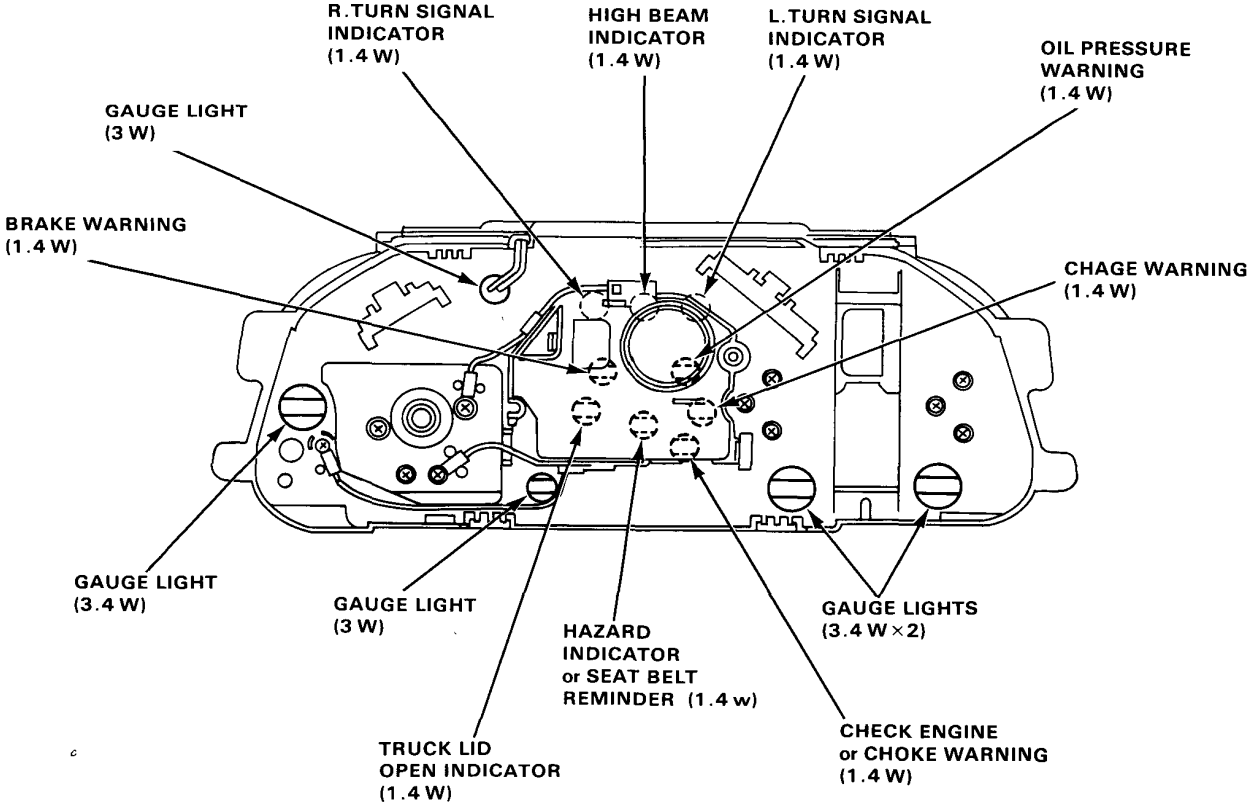
Gauge Assembly

Bulb Locations (With Tachometer)



(Without Tachometer)

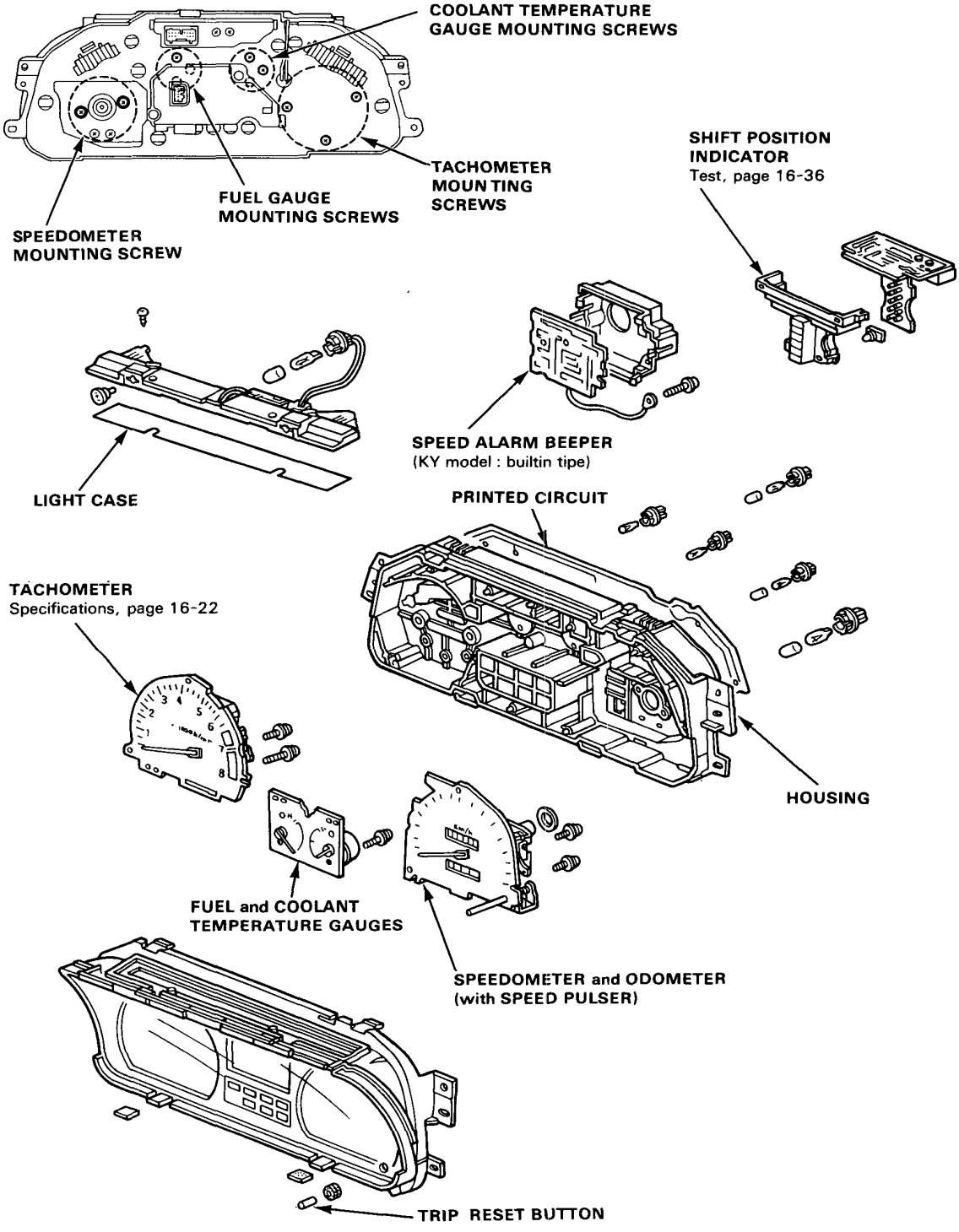




Gauge Assembly

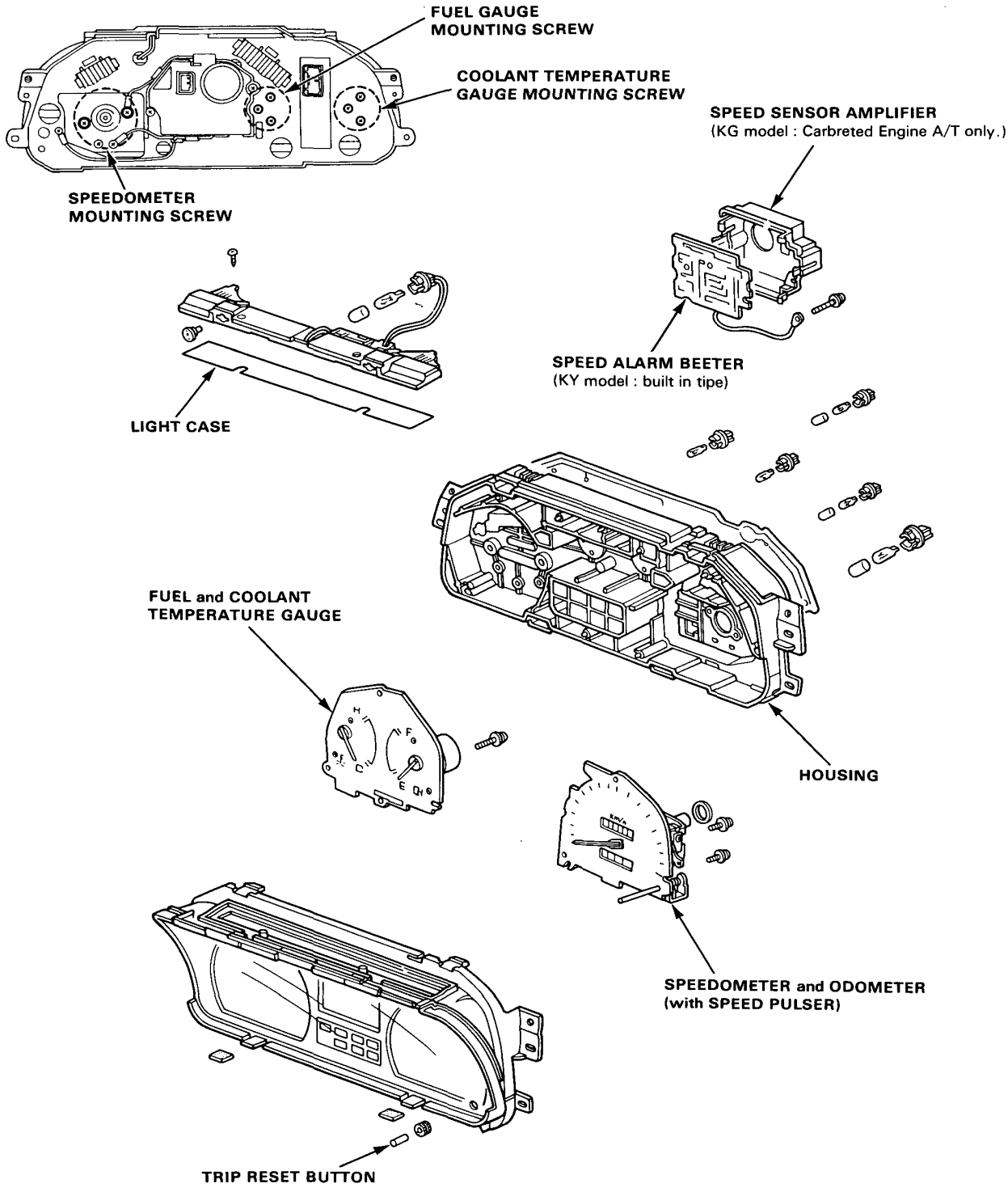
Disassembly (With Tachometer)

NOTE :
- Handle the terminals and printed circuits carefully to avoid damaging them.
- Gauge assembly manufactured by Nippon Seiki is show below.



(Without Tachometer)

NOTE :
- Handle the terminals and printed circuits carefully to avoid damaging them.
- Gauge assembly manufuctured by Nippon Seiki is shown below.

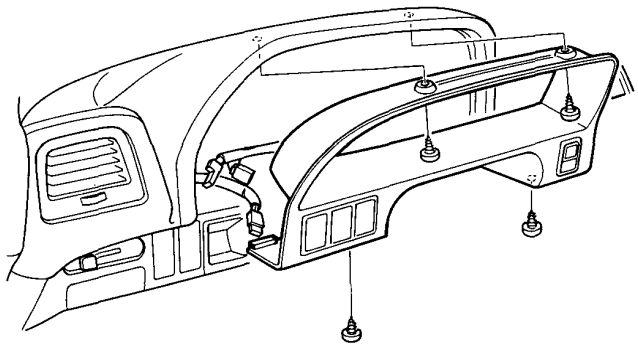


Gauge Assembly

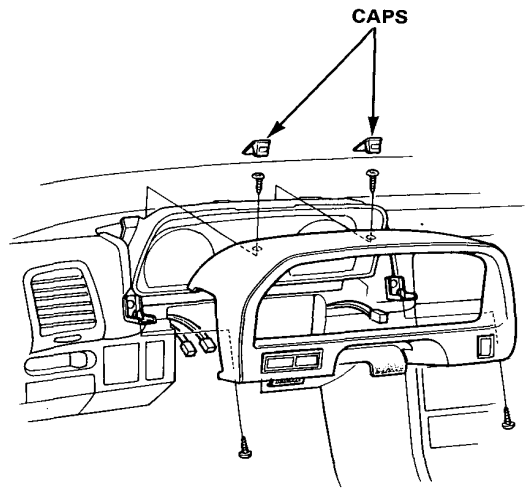
Removal

1. Remove the dashboard lower panel.
2. Remove the 4 screws, then remove the instrument panel from the dashboard.

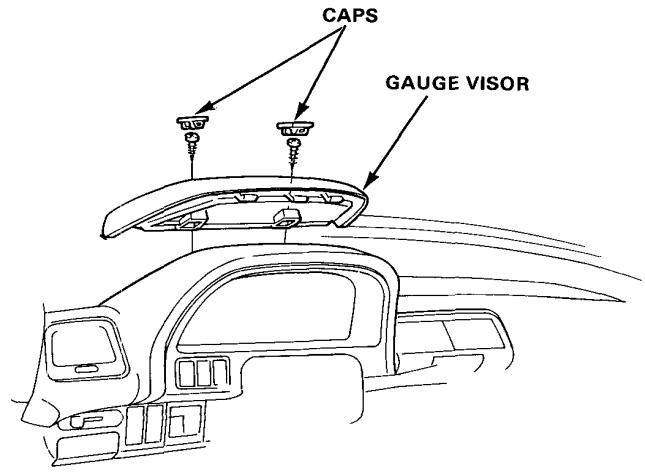
4D :



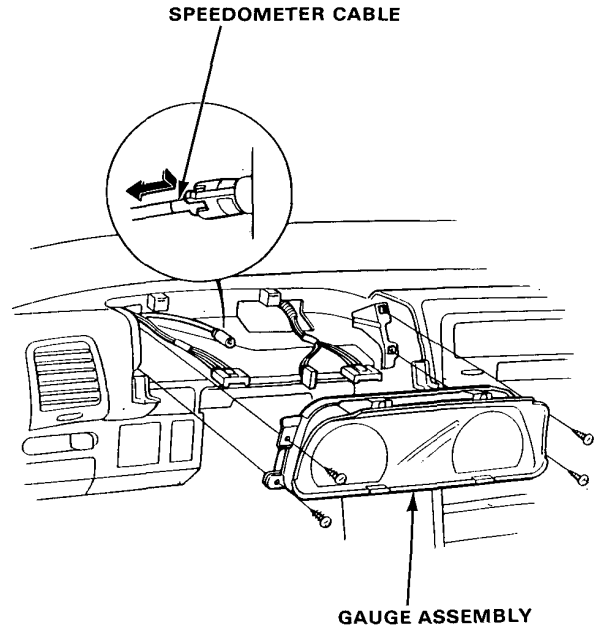
2D H/B and 5D :



3. Remove the caps and 2 screws, then remove the gauge visor from the dashboard (4D only).

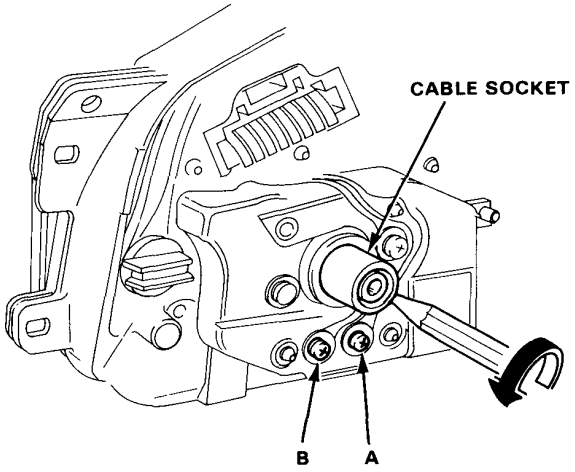


4. Remove the 4 screws, then remove the gauge assembly half-way and disconnect the speedometer cable and connectors.



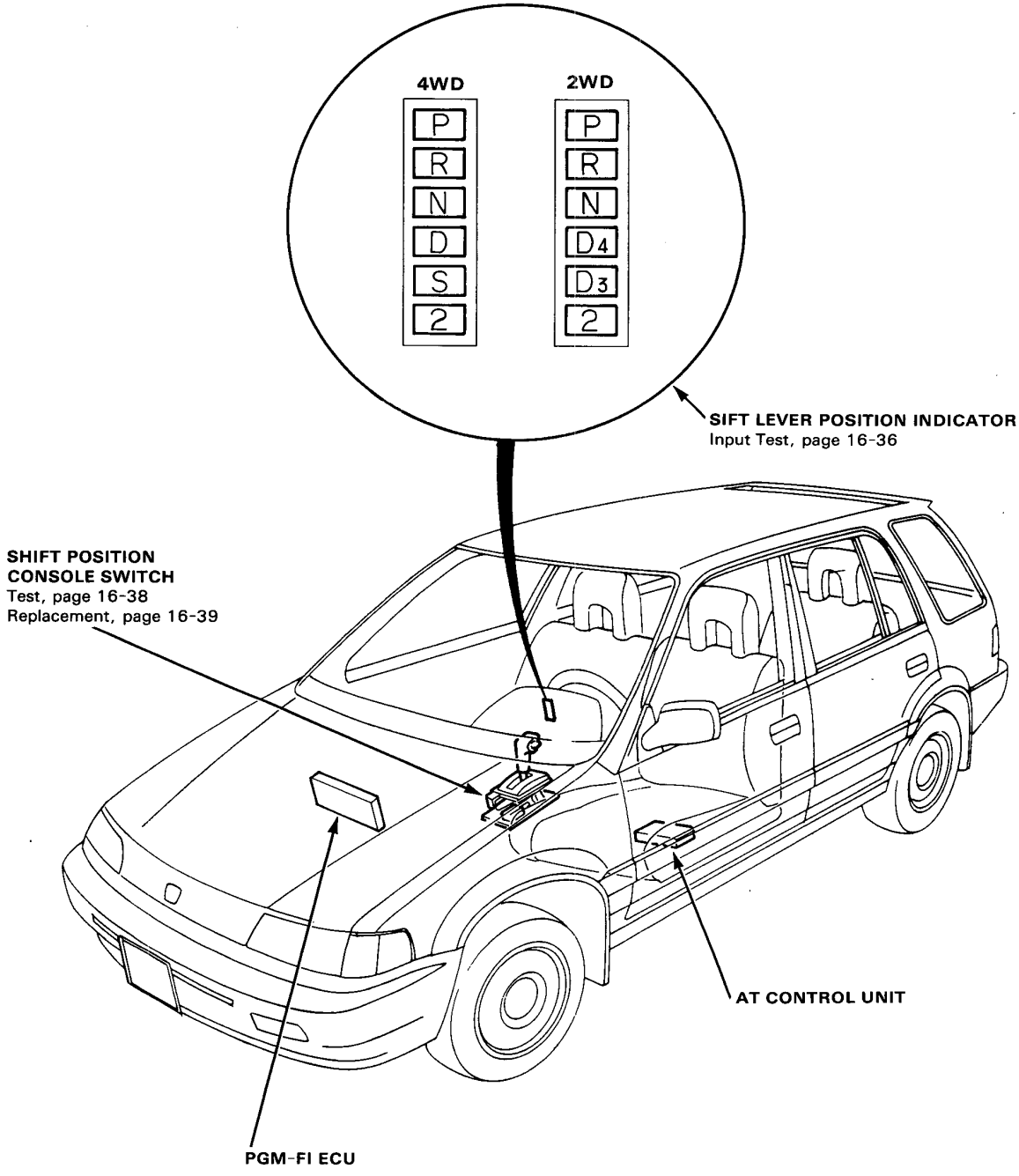
Speed Pulser Test

1. Remove the gauge assembly from the dashboard, then turn it over.
2. Break the lead off a pencil tip then insert the pencil into the speedometer cable connector socket and turn it.
   Connect an ohmmeter between the A and B terminals. There should be continuity 4 times between the A and B terminals per revolution.



Shift Lever Position Indicator

Component Location Index



Discription

S_4 Indicator :

The "S_4" indicator light will remain on for about 2 seconds after the ignition switch has been turned on to show thet the system circuit is functioning.

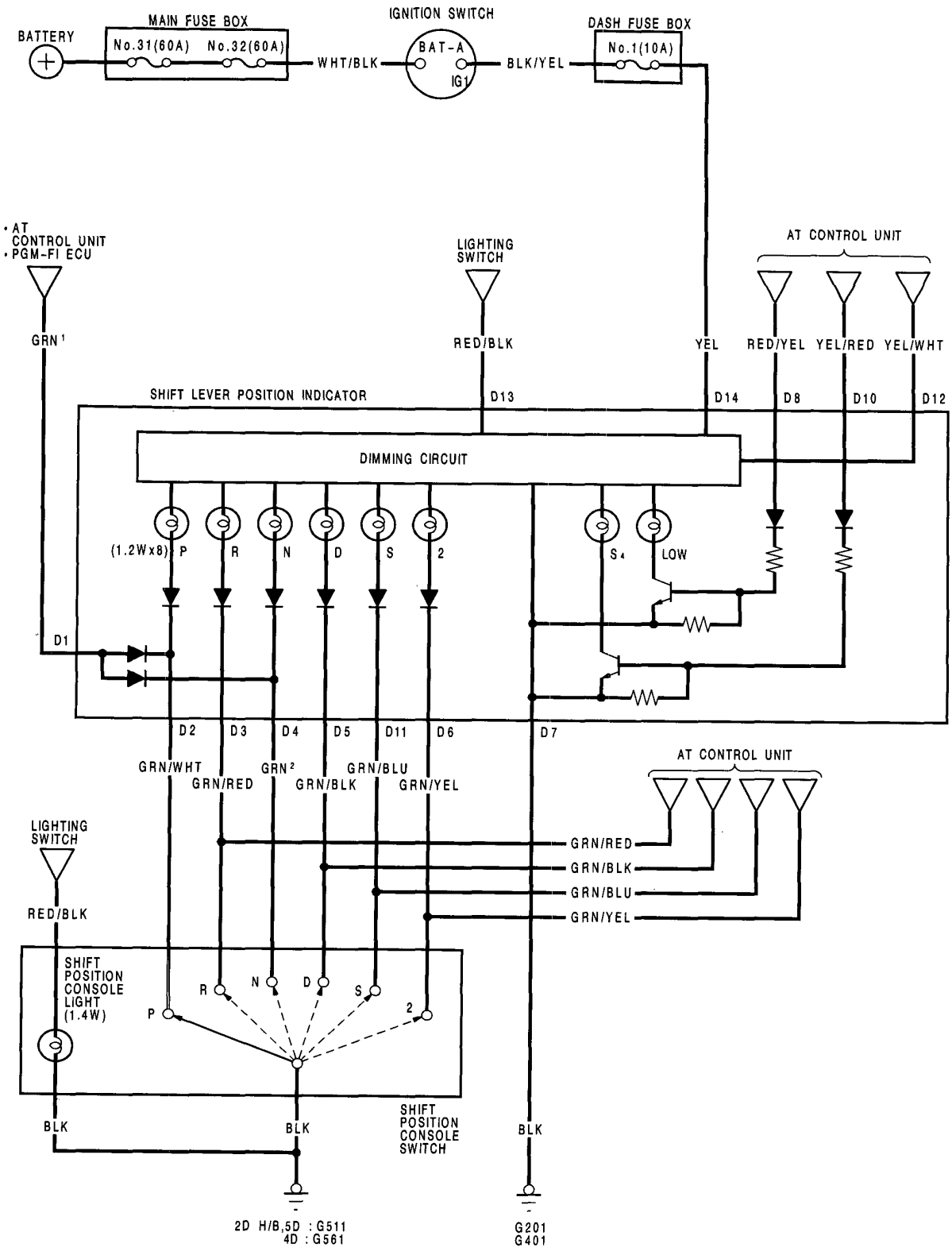
The shift lever position indicator is dimmed by the dimming circuit with the lighting switch on.

In the "S_4" mode, which can be selected by the "S_4" switch, the A/T control unit applies voltage to the " D 10" terminal of the shift lever position indicator to light up the "S_4" indicator.

The "S_4" indicator also functions as the warning indicator for the A/T control system. If some malfunction occurs in the A/T control system, the A/T control unit applies voltage to the "D 10" terminal of the shift lever position indicator to make the "S_4" indicator flash. The flashing "S_4" indicator informs the driver of some malfunction in the A/T control system. When the "S_4" indicator functions as the warning indicator, the A/T control unit sends a cancelling signal to the "D 12" terminal of the shift lever position indicator so that the "S_4" indicator light is not dimmed.

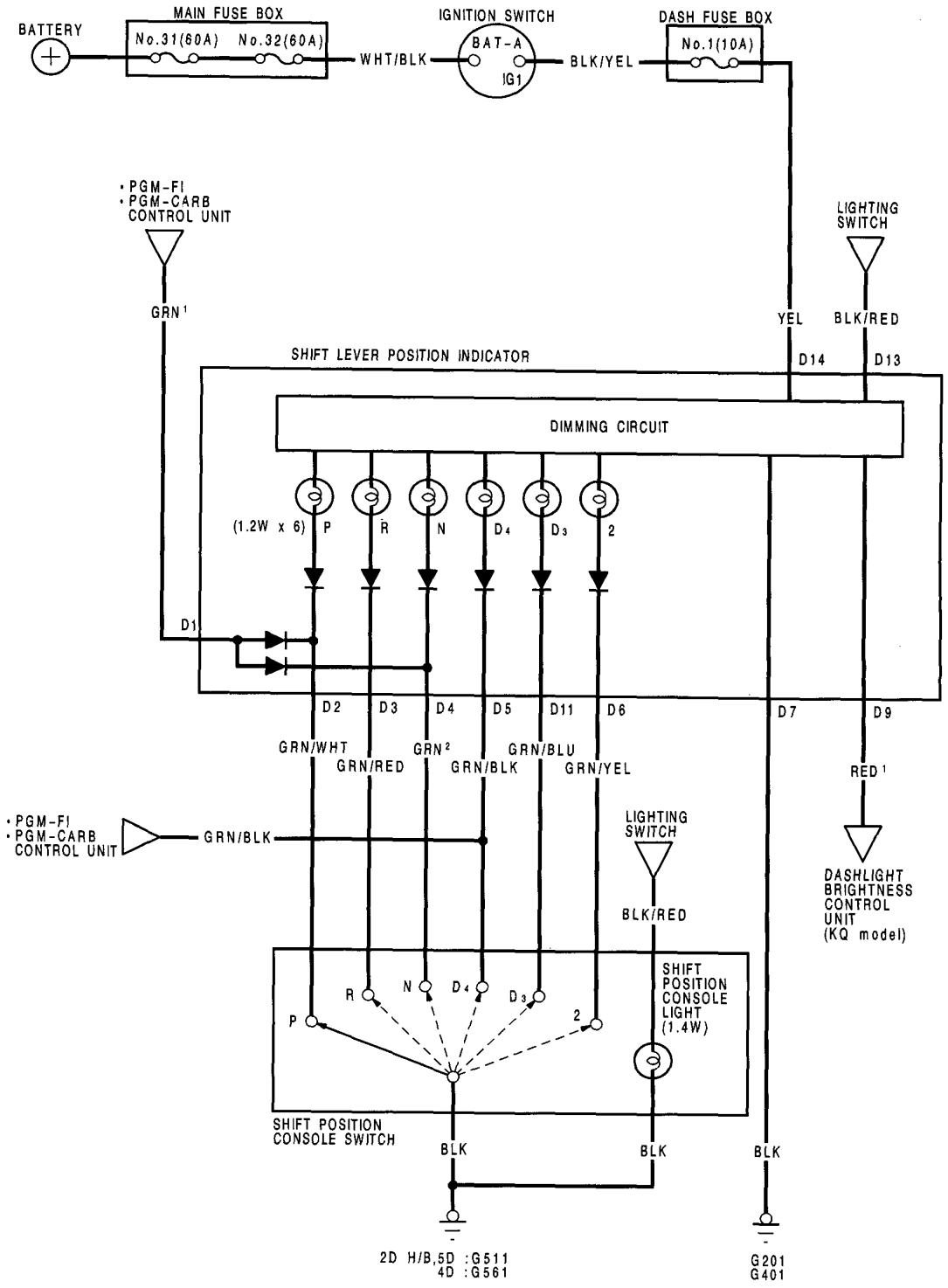
Shift Lever Position Indicator

Circuit Diagram (AT Electronic Control Type)



Shift Lever Position Indicator

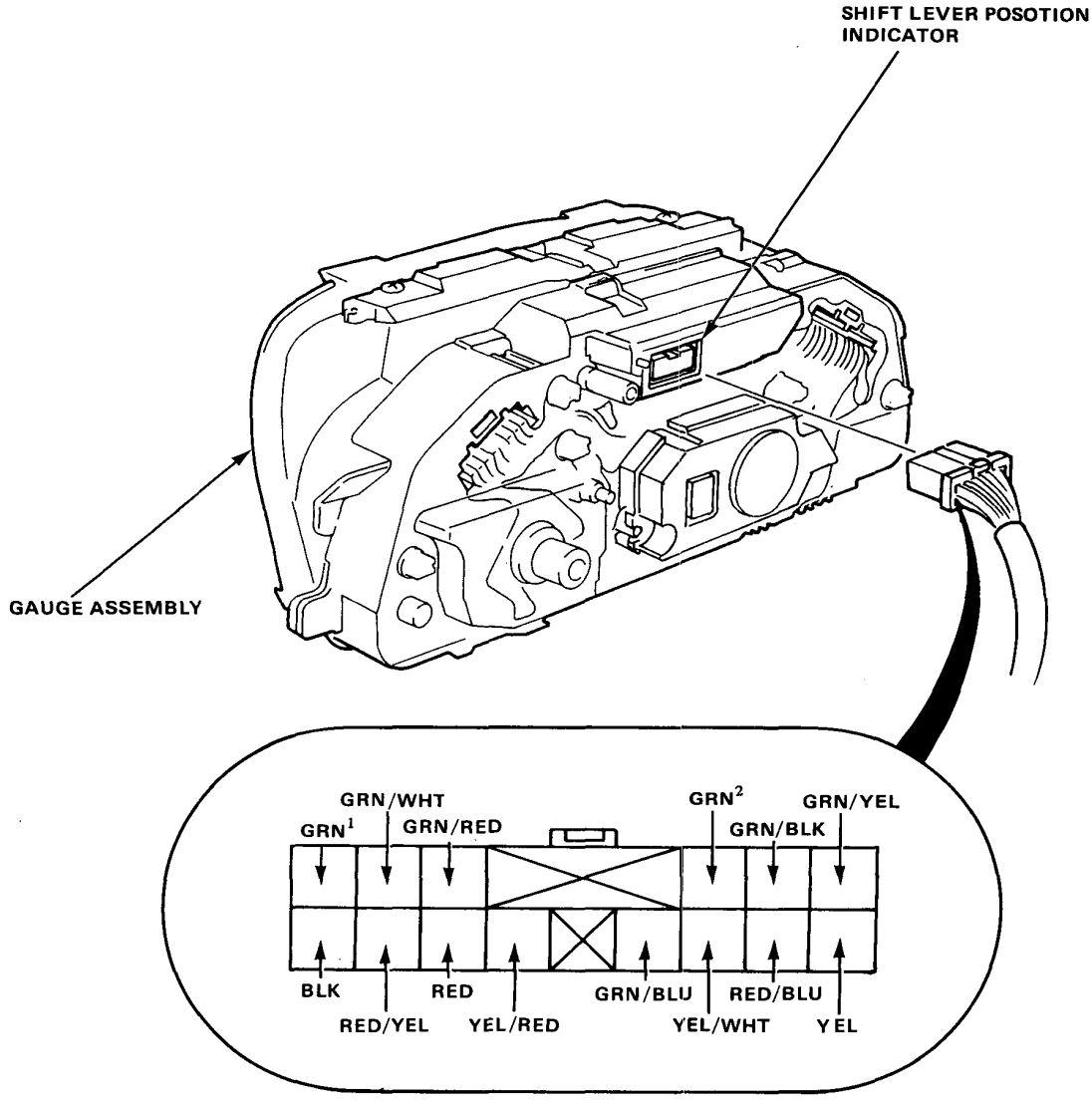
(Expect AT Electronic Control Type)



Shift Lever Position Indicator

Indicator Input Test

Remove the gauge assembly from the dashboad and disconnect the 14-P connector from the indicator.
Make the following input tests at the harness pins.
If all tests prove OK, yet the indicator still fails to work, replace the indicator assembly.



View from wire side

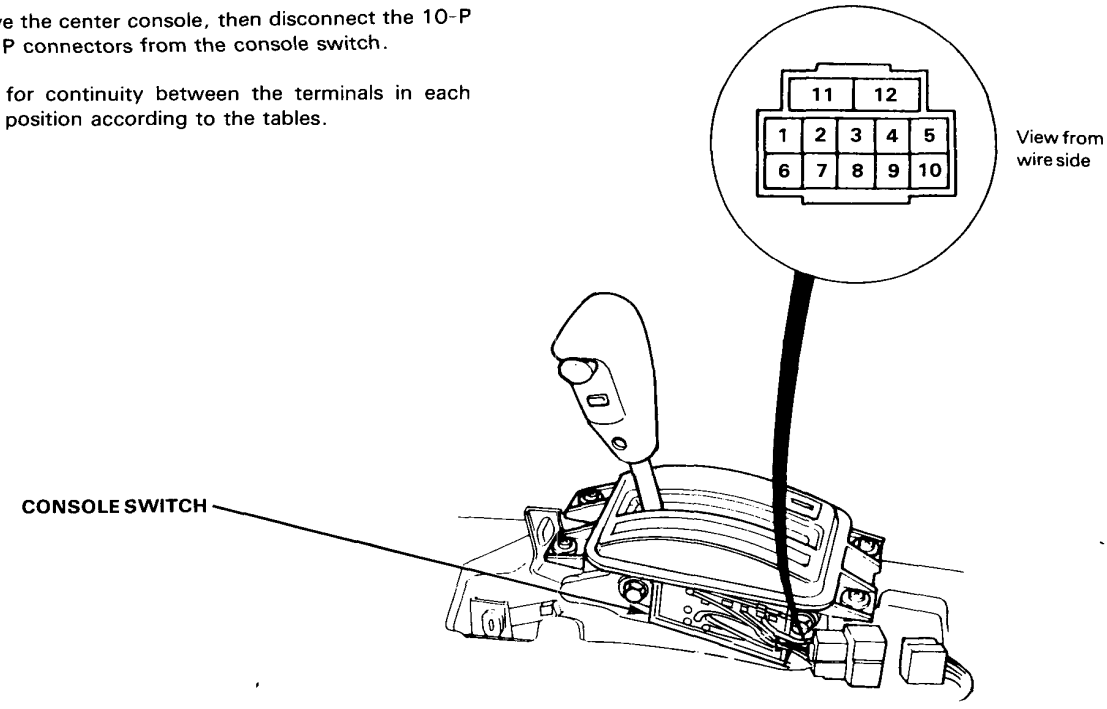
No.	Wire	Test condition	Test:desired result	Possible cause(if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground(G201,G401). • An open in the wire.
2	YEL	Ignition switch ON.	Chek for voltage to ground: should be battery voltage.	• Blown NO.1(10A)fuse. • An open in the wire.
3	GRN/WHT	Shift lever position in P.	Check for continuity to ground:should be continuity.	• Faulty shift position console switch. • Poor ground(G511 or G561) • An open in the wire.
	GRN/RED	Shift lever position in R.		
	GRN[2]	Shift lever position in N.		
	GRN/BLK	Shift lever position in D_4 or D		
	GRN/BLU	Shift lever position in D_3 or S		
	GRN/YEL	Shift lever position in 2.		
4	RED/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	• Faulty Lighting switch. • An open in the wire.
*1 5	RED/BLK and RED_1	Lighting switch ON and dashlight brightness control dial on full bright.	Check for voltage between RED/BLK and RED_1 terminals: should be battery voltage.	• Faulty dashlight brightness control system. • An open in the wire.
6	GRN[1]	Ignition switch ON.	Check for voltage to ground: should be about 5V.	• Faulty PGM-FI system. • An open in the wire.
*2 7	YEL/RED	Ignition switch ON, shift lever position in S and S_4 switch ON.	Check for voltage to ground: should be about 5V.	• Faulty S_4 switch. • Faulty AT control system. • An open in the wire.
*2 8	RED/YEL	Ignition switch ON, shift lever position 2 and LOW switch ON.	Check for voltage to ground: should be battery voltage.	• Faulty LOW switch. • Faulty AT control system.

*1 KQ model only
*2 4WD-AT only

Shift Lever Position Indicator

Console switch test

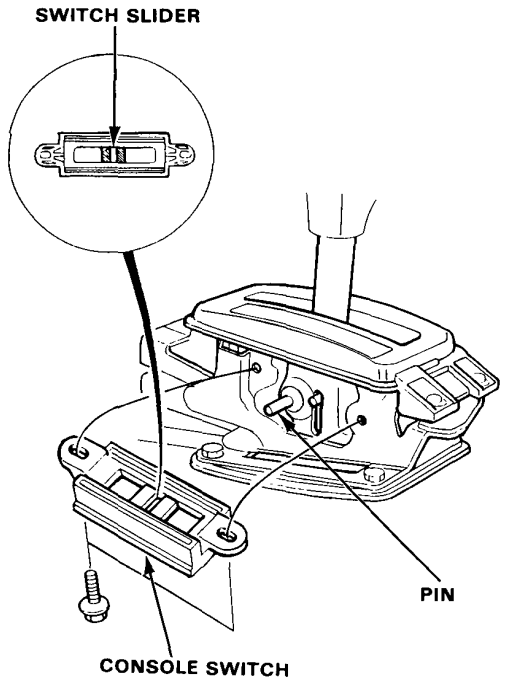
1. Remove the center console, then disconnect the 10-P and 2-P connectors from the console switch.
2. Check for continuity between the terminals in each switch position according to the tables.



Shift Position Console switch								Back up Light Switch		Neutral Safety Switch	
Terminal / Position	7	8	9	10	5	4	6	2	3	11	12
2	○	○									
D_3 or S	○		○								
D_4 or D	○			○							
N	○				○					○	○
R	○					○		○	○		
P	○						○			○	○

Shift Position Console Switch Replacement

1. Remove the console, then disconnect the 10-P and 2-P connectors from the console switch.
2. Remove the 2 console switch mounting bolts.



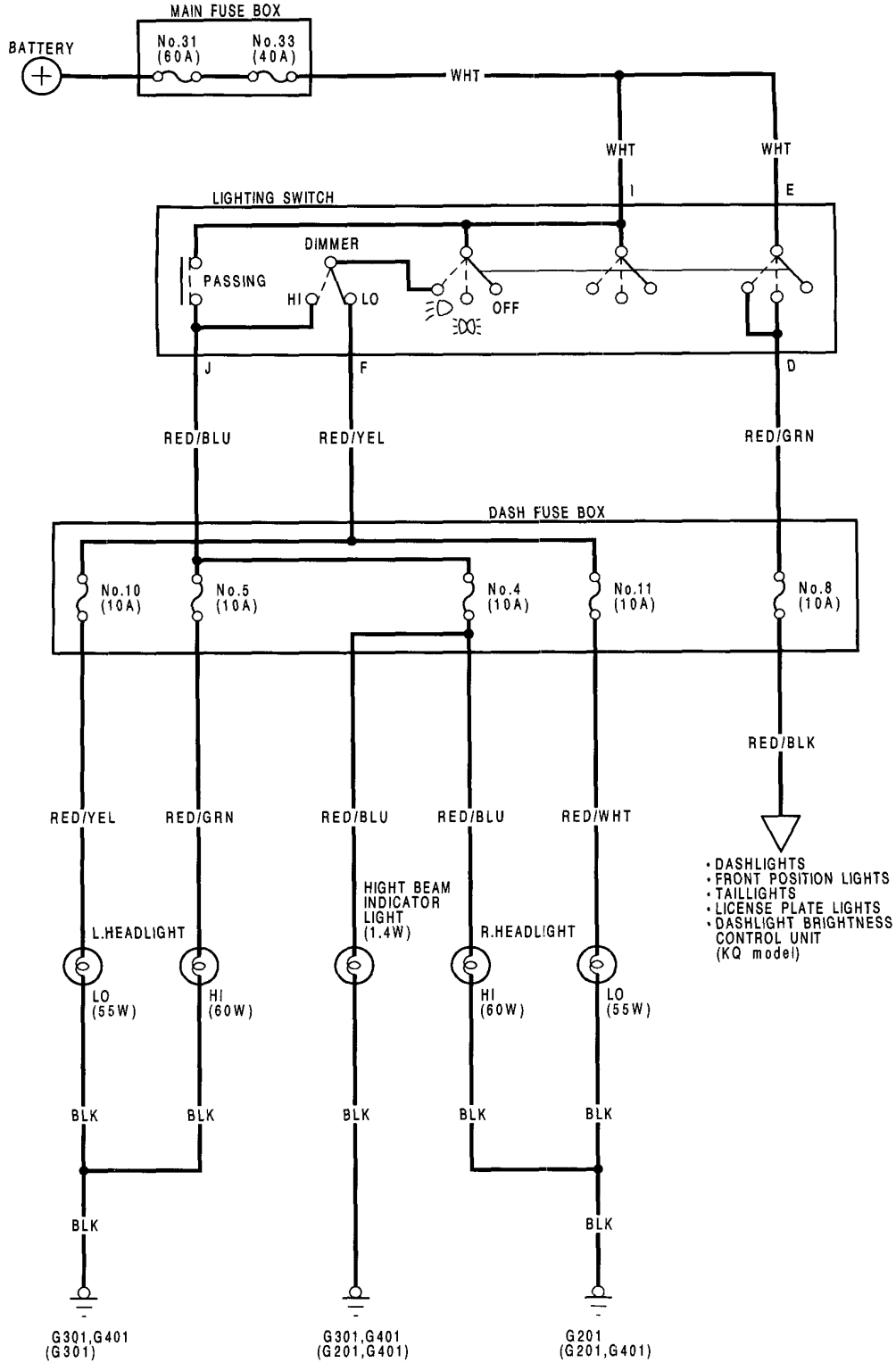
3. Position the switch slider to "Neutral" as shown above.
4. Shift the select lever to "Neutral", then slip the console switch into position.
5. Attach the switch with the 2 bolts.
6. Test the console switch with P and N position of shift lever (see page 16-38).

   NOTE: The engine should start when the shift lever is in the N position in the range of free play.

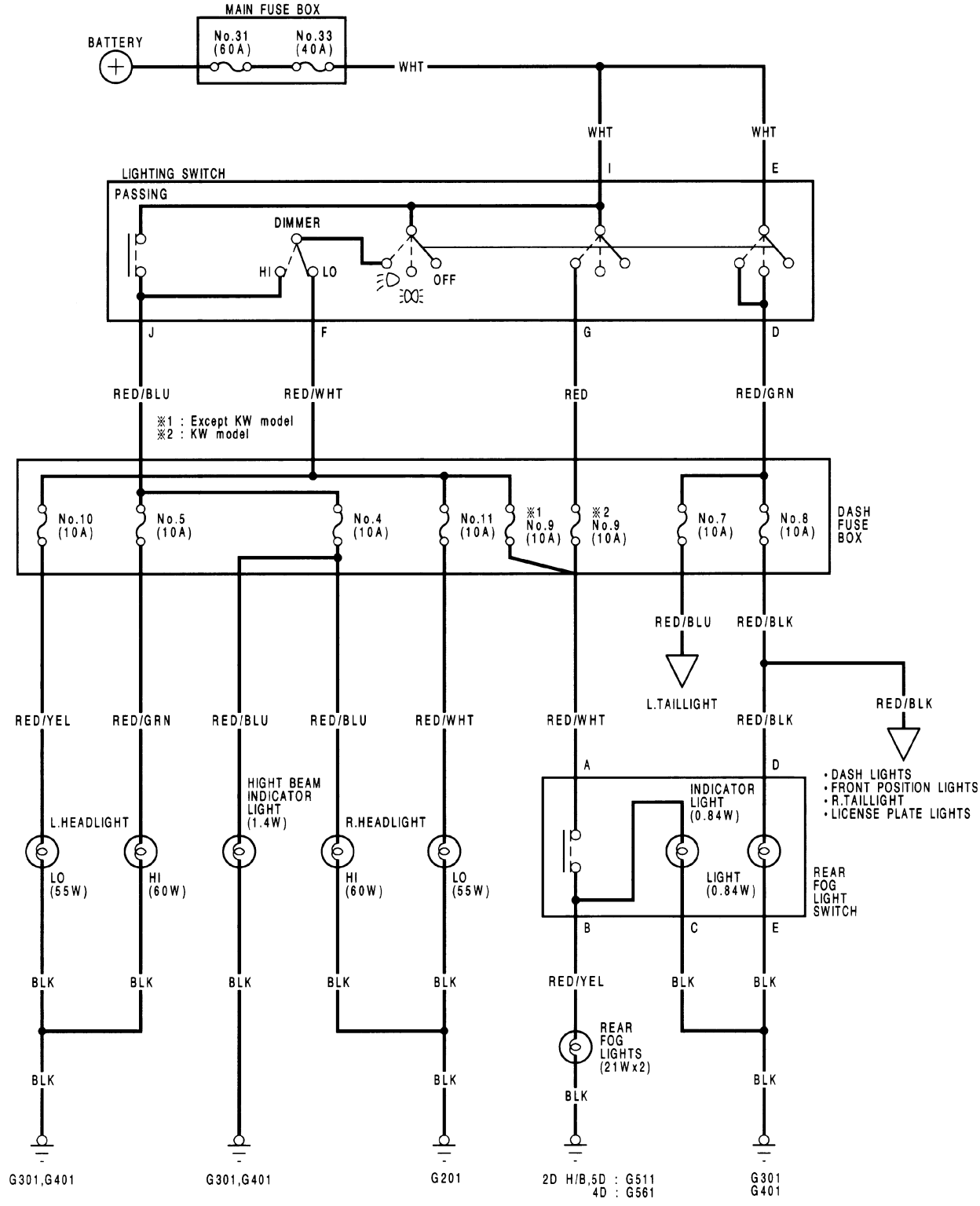
7. Connect the 10-P and 2-P connectors, clamp the harness and install the console.

Lighting System

Circuit Diagram (KQ, KT, KT and KP models)

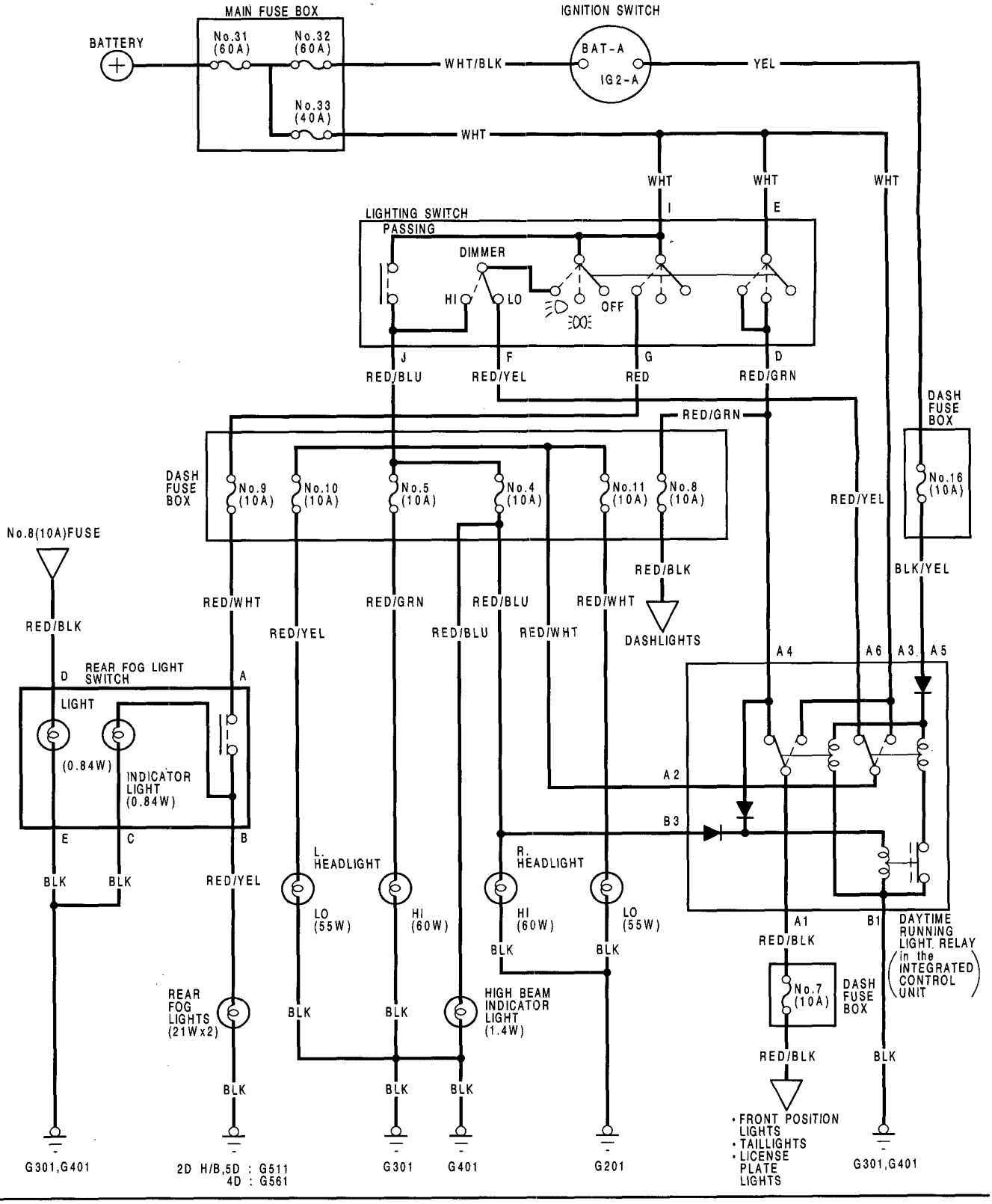


(KG, KF, KB, KW and KX models)

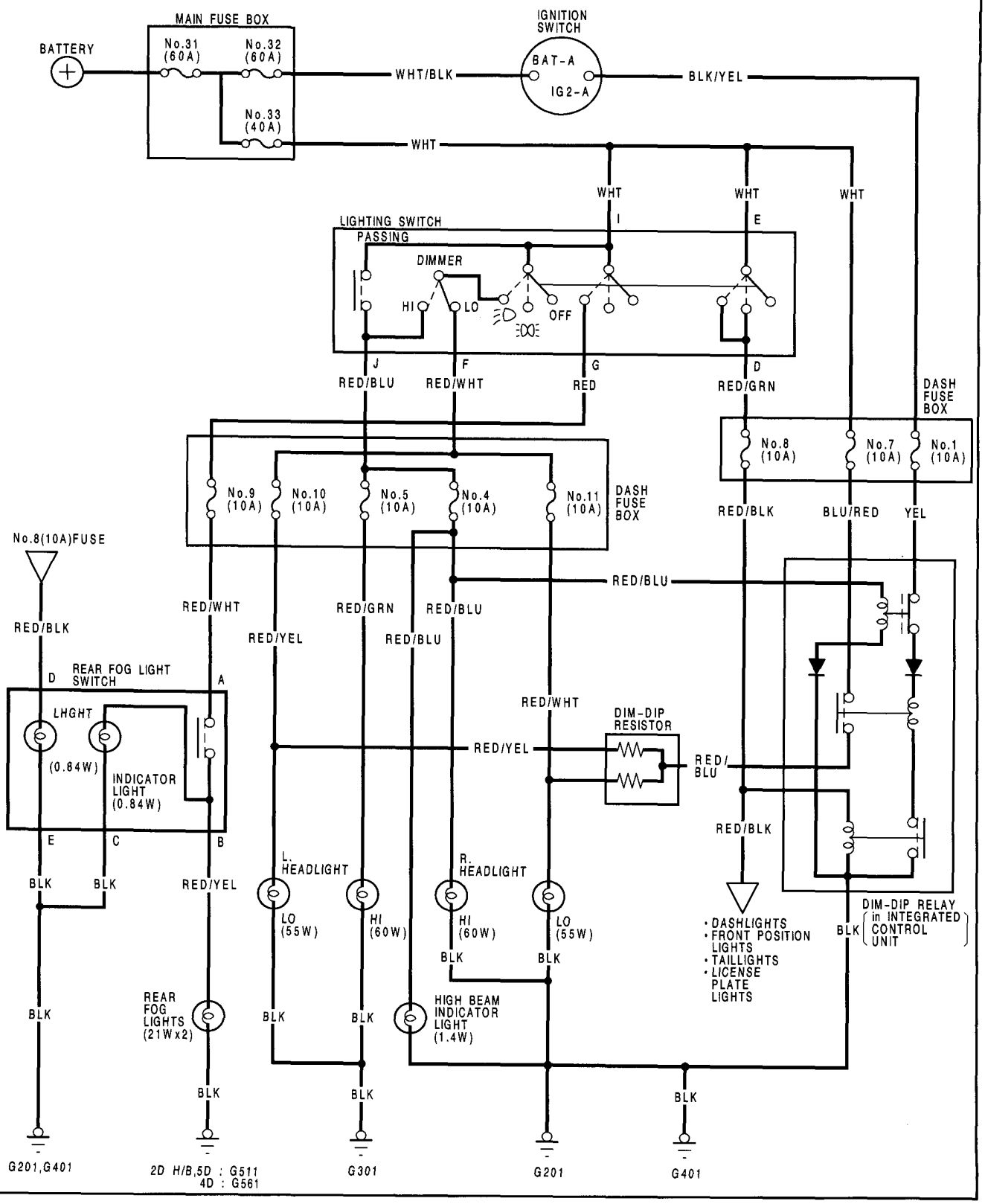


Lighting System

Circuit Diagram (With Daytime Light)



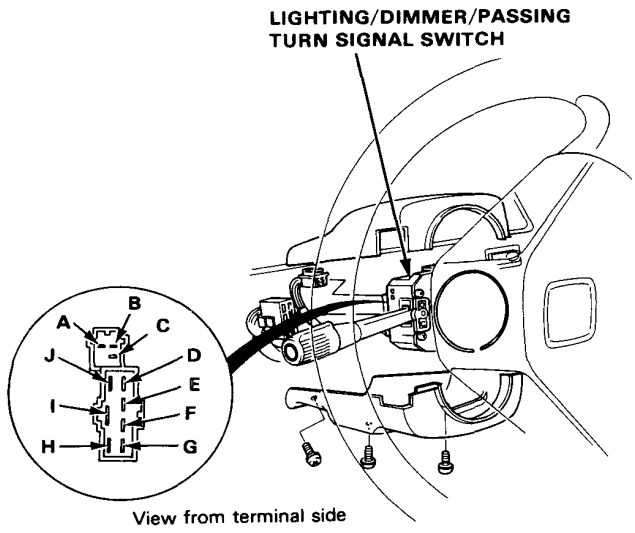
(With Dim-Dip Headlight)



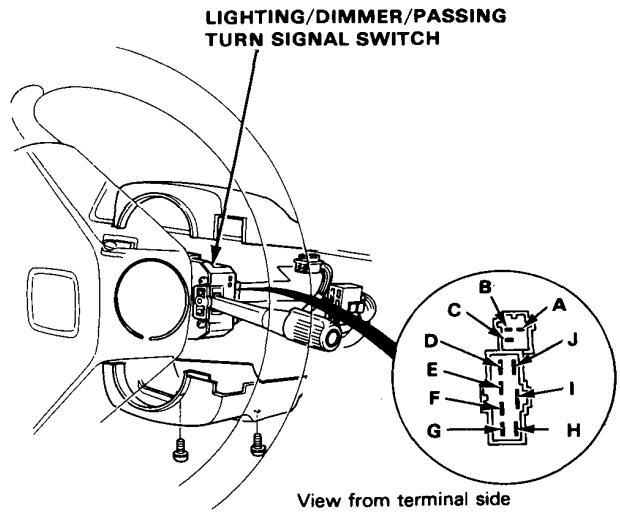
Lighting/Turn Signal Switch Test

1. Remove the column covers.
2. Disconnect the 7-P and 4-P connectors from the switch.
3. Check for continuity between the terminals in each switch position according to the tables.

LHD:



RHD:



Lighting/Dimmer/Passing Switch

Position \ Terminal		D	E	F	G	I	J
Lighting switch	OFF						
	≡D	○	○				
	≡D				○	○	
Dimmer switch *	LOW			○		○	
	HIGH					○	○
Passing switch	OFF						
	ON					○	○

*: With ligting switch position in (≡D)

Turn Signal Switch

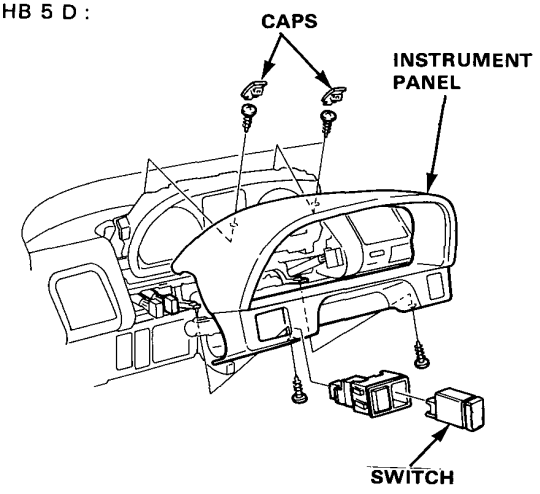
Position \ Terminal		A	B	C
LHD:	R	○		○
	NEUTRAL			
	L	○	○	
RHD:	R	○	○	
	NEUTRAL			
	L	○		○

Rear Fog Light Switch Removal

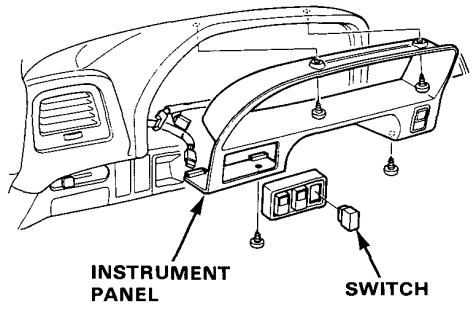
1. Remove the caps, then remove the 4 screws from the instrument panel (2 DH/B, 5 D).
2. Remove the 4 screws from the instrument panel (4 D).
3. Remove the instrument panel from the dashboad.
4. Pisconnect the 10-P conector from the switch.
5. Remove the switch from the instrument panel.

NOTE : LHD type shown, RHD type similar.

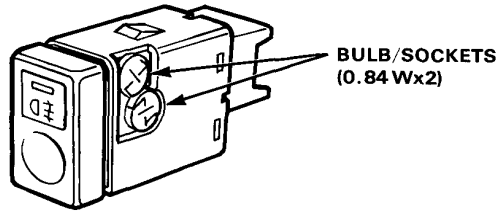
2 DHB 5 D :



4 D :



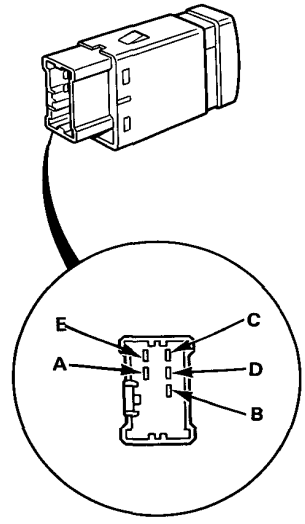
6. Turn the socket 45° connter clock wise sockets to remove it.

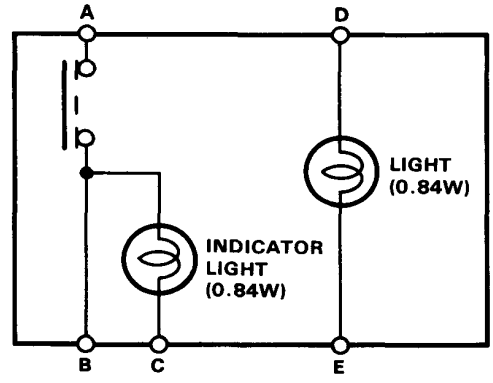


Rear Fog Light Switch Test

1. Remove the switch from the instrument panel.
2. Check for continuity between the terminals according to the table.

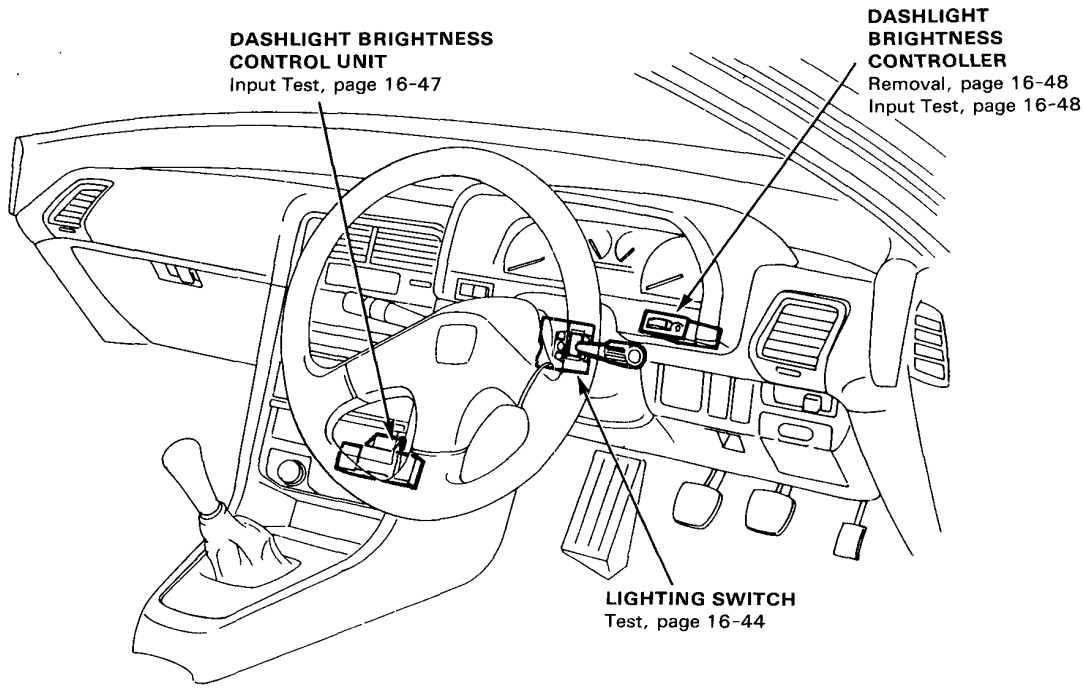
Terminal / Position	A		B		C	D		E
ON	○		○	⌀	○	○	⌀	○
OFF								



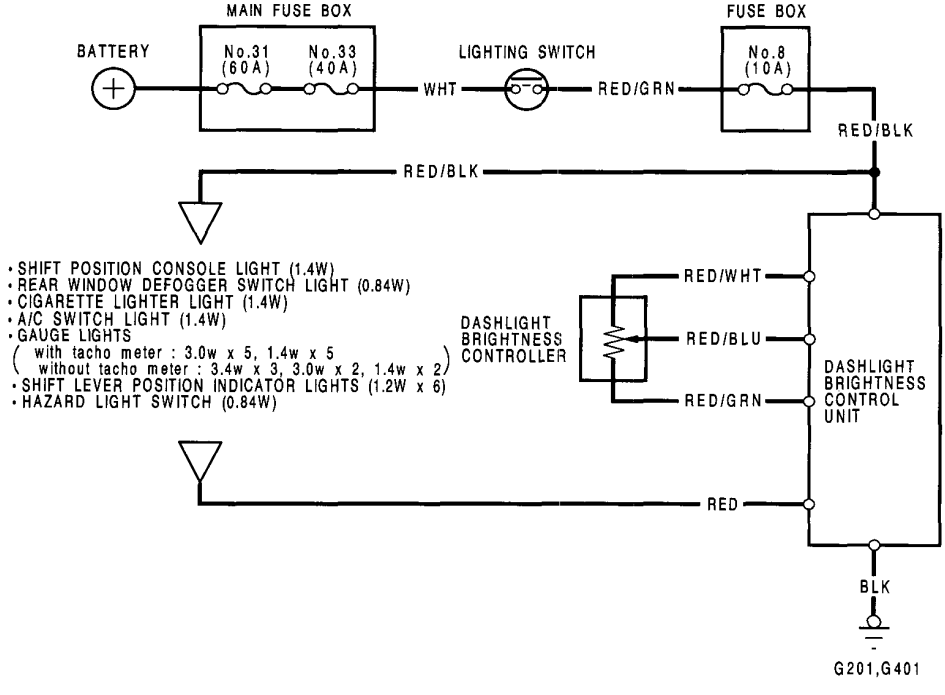


Dashlight Brightness Control (KQ model only)

Component Location Index

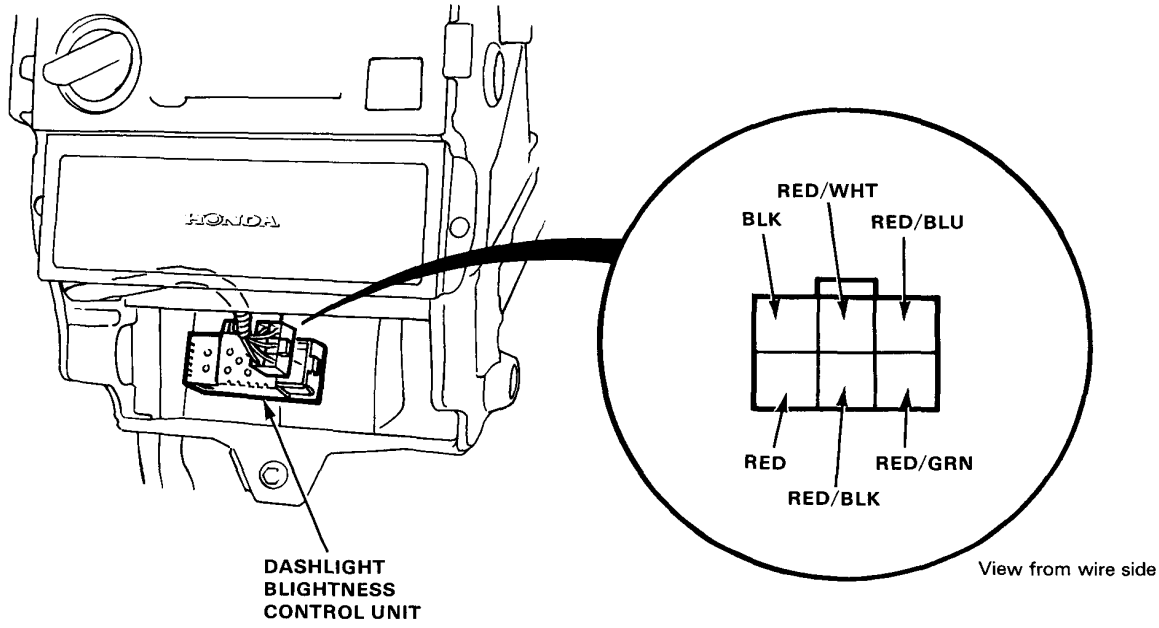


Circuit Diagram



Control Unit Input Test

Remove the center consol and disconnect the 6-P connector from the control unit.
Make the following input tests at the harness pins. If all tests prove OK, yet the dash lights still cannot be *ccontrolled, check the connector for a good connection.* If OK, substitute a known-good control unit and recheck.



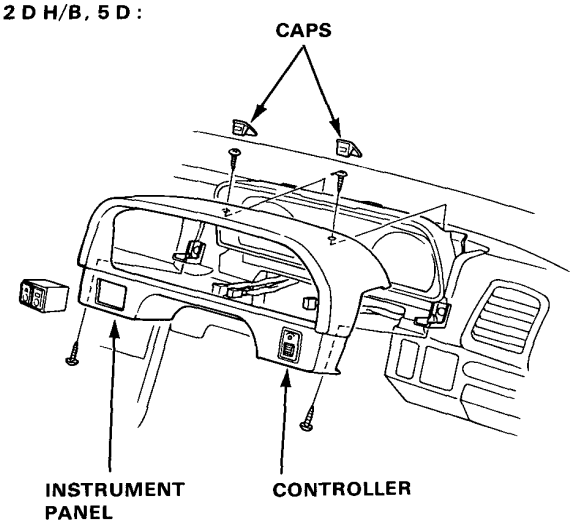
No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G201 G401). • An open in the wire.
2	RED/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No. 8 (10A) • Faulty lighting switch. • An open in the wire.
3	RED	Lighting switch ON.	Attach to ground Dash lights should come on full bright.	• An open in the RED/BLK or RED wire.
4	RED/GRN or RED/WHT	Adjusting dial rotated.	Check for resistance between the RED/GRN and RED/WHT terminals: should be 8—12 kΩ at all time.	• Faulty controller. • An open in the wires.
5	RED/BLU and RED/WHT	Adjusting dial rotated.	Check for resistance between the RED/BLU and RED/WHT terminals: should vary from 0 to 10,000 ohms as the dial is rotated.	

Dashlight Brightness Control (KQ model only)

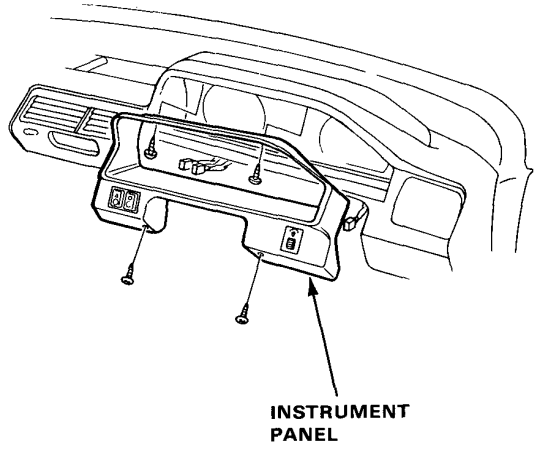
Controller Removal

1. Remove the caps, then remove the 4 screws from the instrument panel (3 D, 5 D).
2. Remove the 4 screws from the instrument panel (4 D).
3. Remove the instrument panel from the dashboad.
4. Disconnect the 3-P connector from the controller.

2 D H/B, 5 D :



4 D :

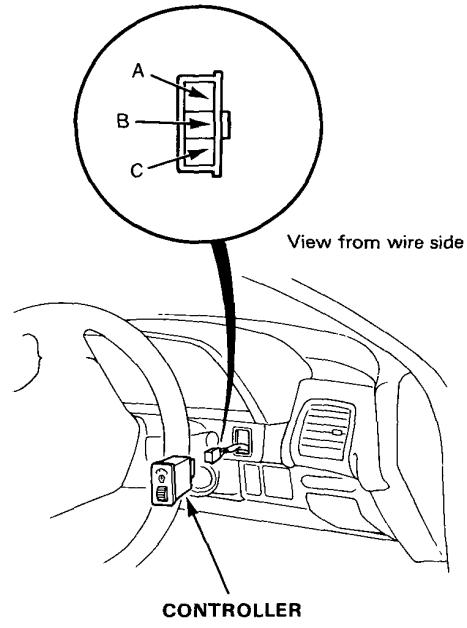


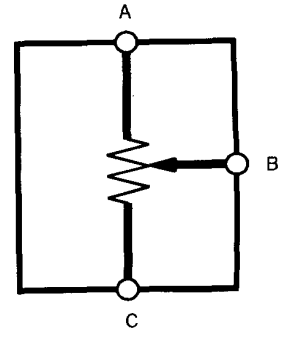
Controller Test

1. Remove the instrument panel from the dashboad.
2. Measure resistance between the A and C terminals.

   Resistance : 8,000-12,000 ohms

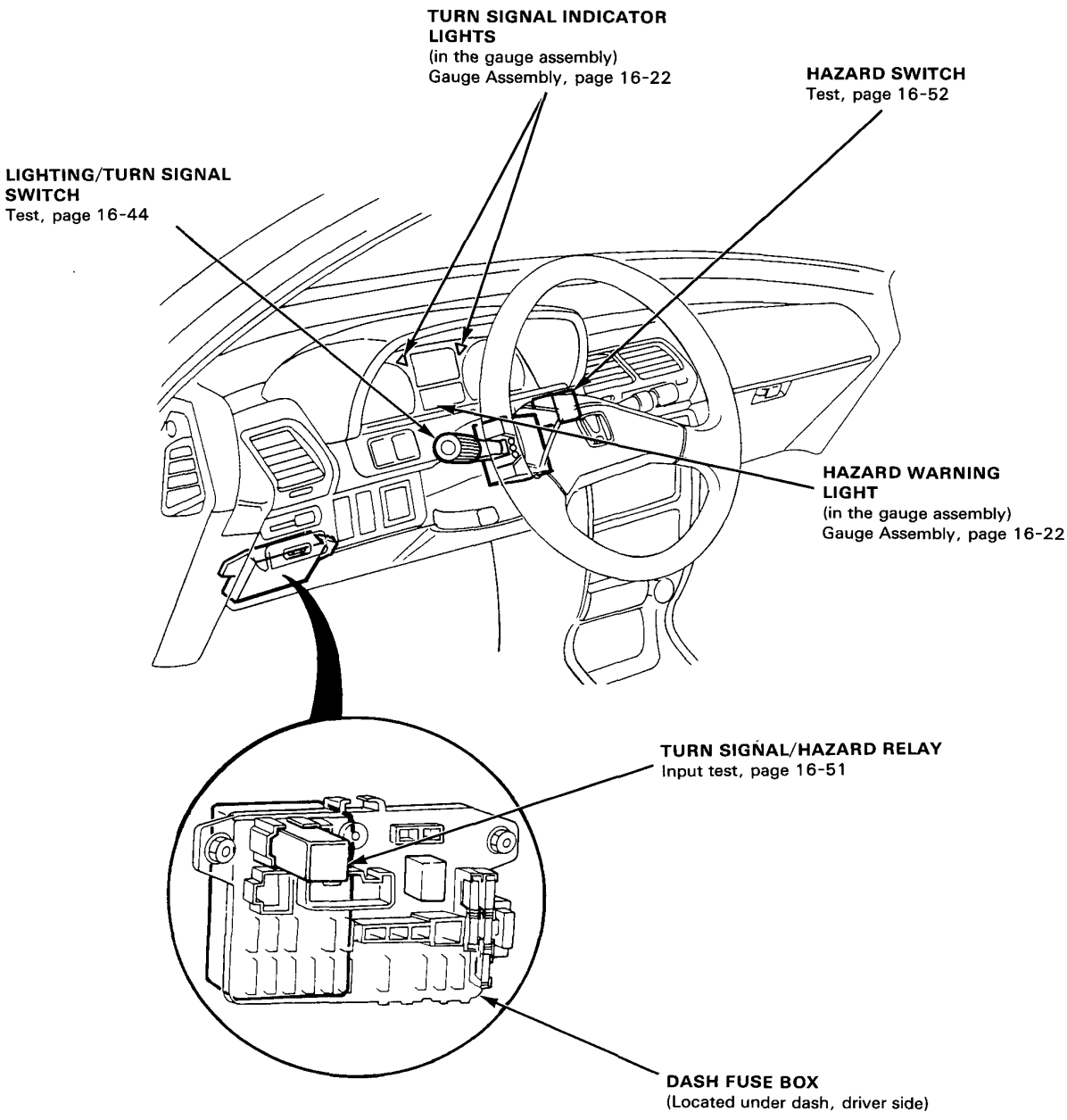
   NOTE : Resistance will vary slightly with temperature.
3. Measure resistance between the B and C terminals while rotaring the adjusting dial.
   Resistance should vary from 0 to 10,000 ohms as the dial is rotated.





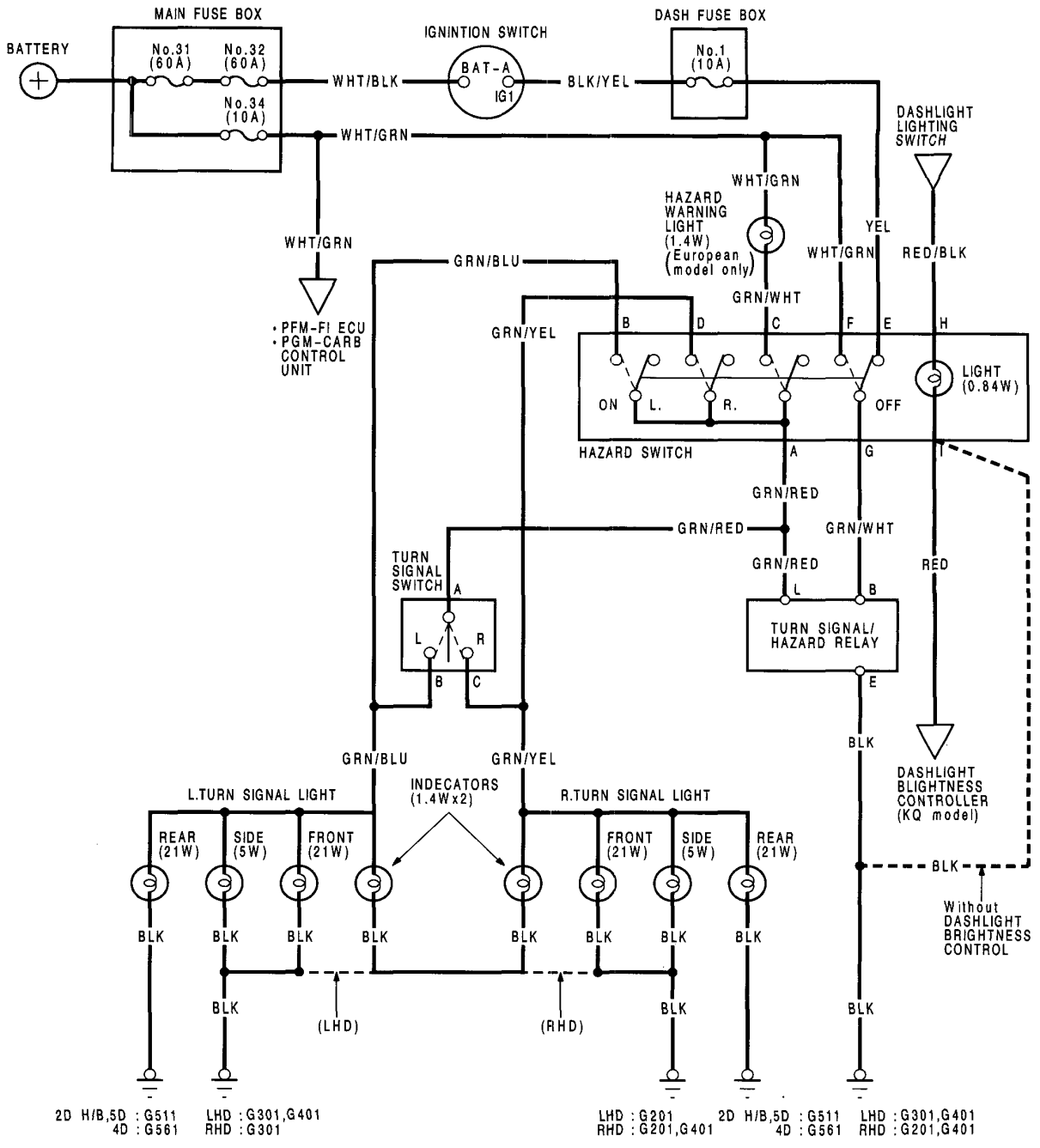
Turn Signal / Hazard Flasher System

Component Location Index



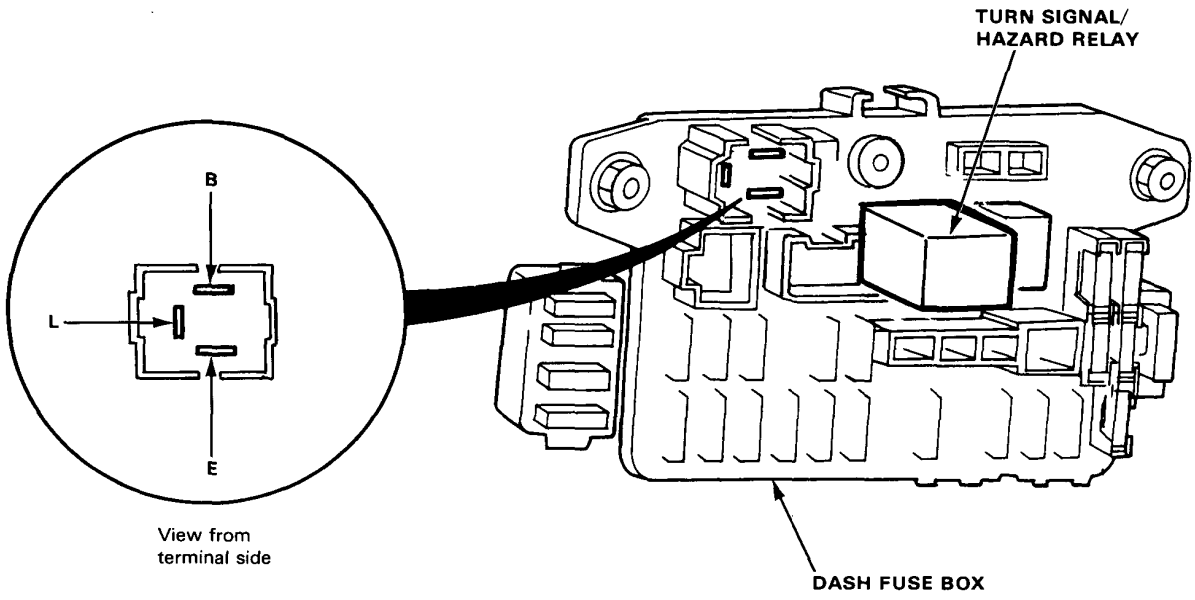
Turn Signal / Hazard Flasher System

Circuit Diagram



Turn Signal/Hazard Relay Input Test

Remove the dashboard lower panel, then remove the turn signal /hazard relay from the dash fuse box.
Make the following input tests at the relay holder pins.
If all tests prove OK, but the relay fails to work, replace the turn signal/hazard relay.



No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	E	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor grond (G301, G401 〔G201, G401〕) • An open in he BLK wire.
2	B	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.1 (10A) fuse. • An open in he YEL or GRN/WHT wire. • Faulty hazard switch.
3	B and L	Hazard switch ON and connect the B terminal to the L terminal.	Hazard lights should come on.	• Blown No.34 (10A) fuse. • Blown bulb. • Poor ground. • Faulty hazard switch. • An open in the WHT/GRN, GRN/RED, GRN/YEL or GRN/BLU wire.
		Ignition switch ON and turn signal switch in R or L and connect the B terminal to the L terminal.	R or L side turn lights should come on.	• Faulty turn signal switch.

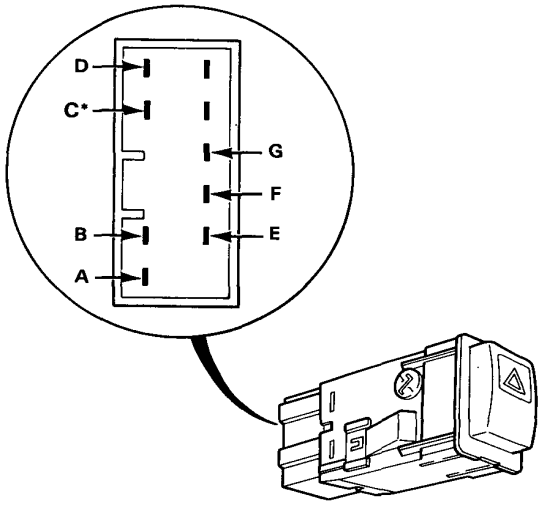
〔 〕: RHD

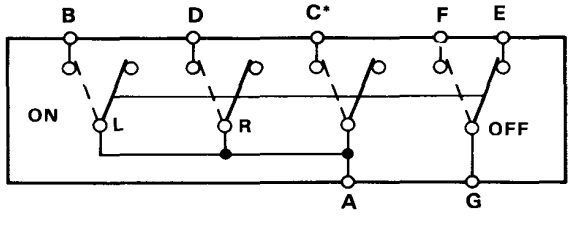
Turn Signal / Hazard Flasher System

Hazard Switch Test

1. Remove the hazard switch
2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A	B	C	D	E	F	G
OFF					○		○
ON	○	○	○	○		○	○

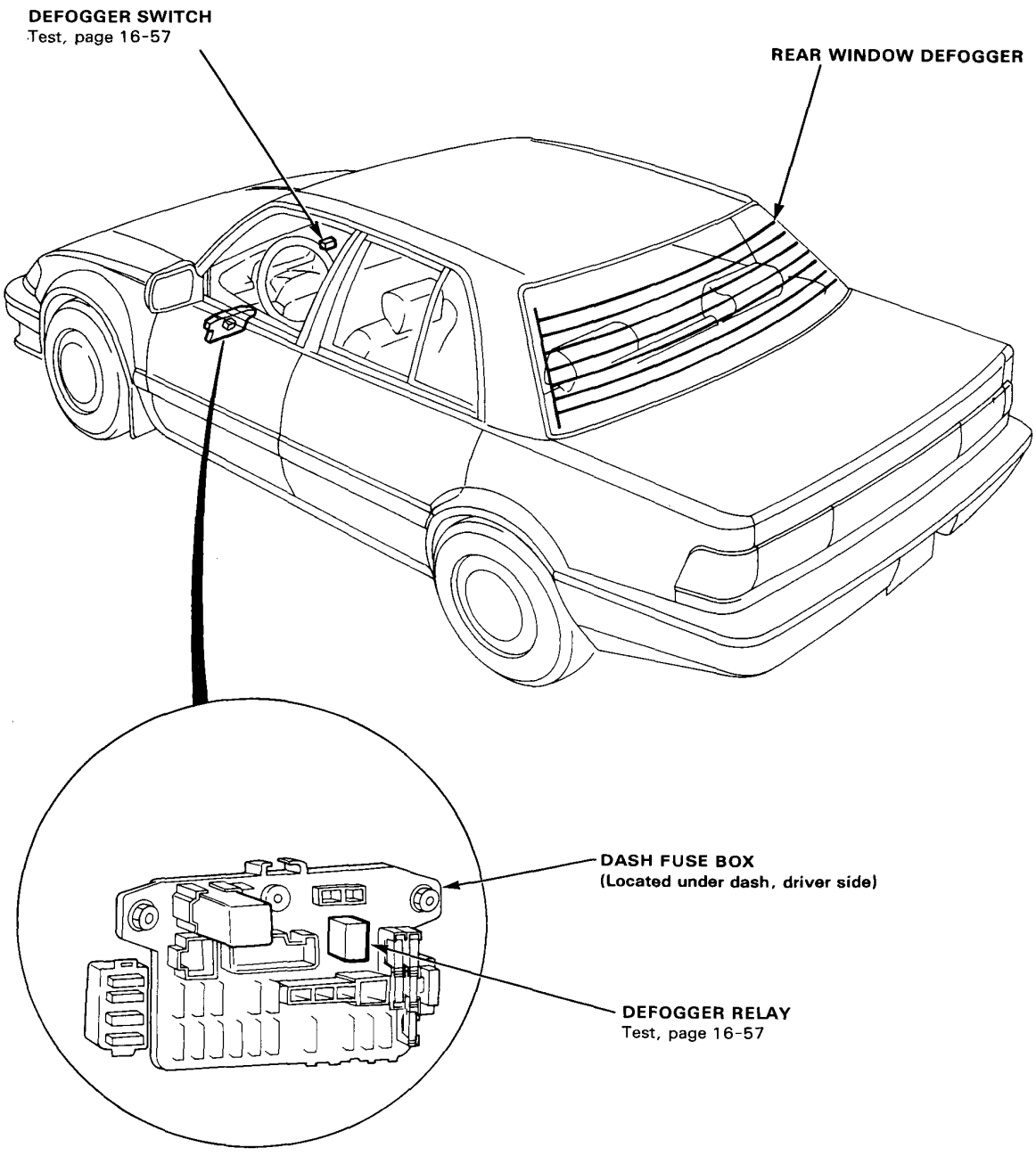




C*·····European model only

Rear Window Defogger

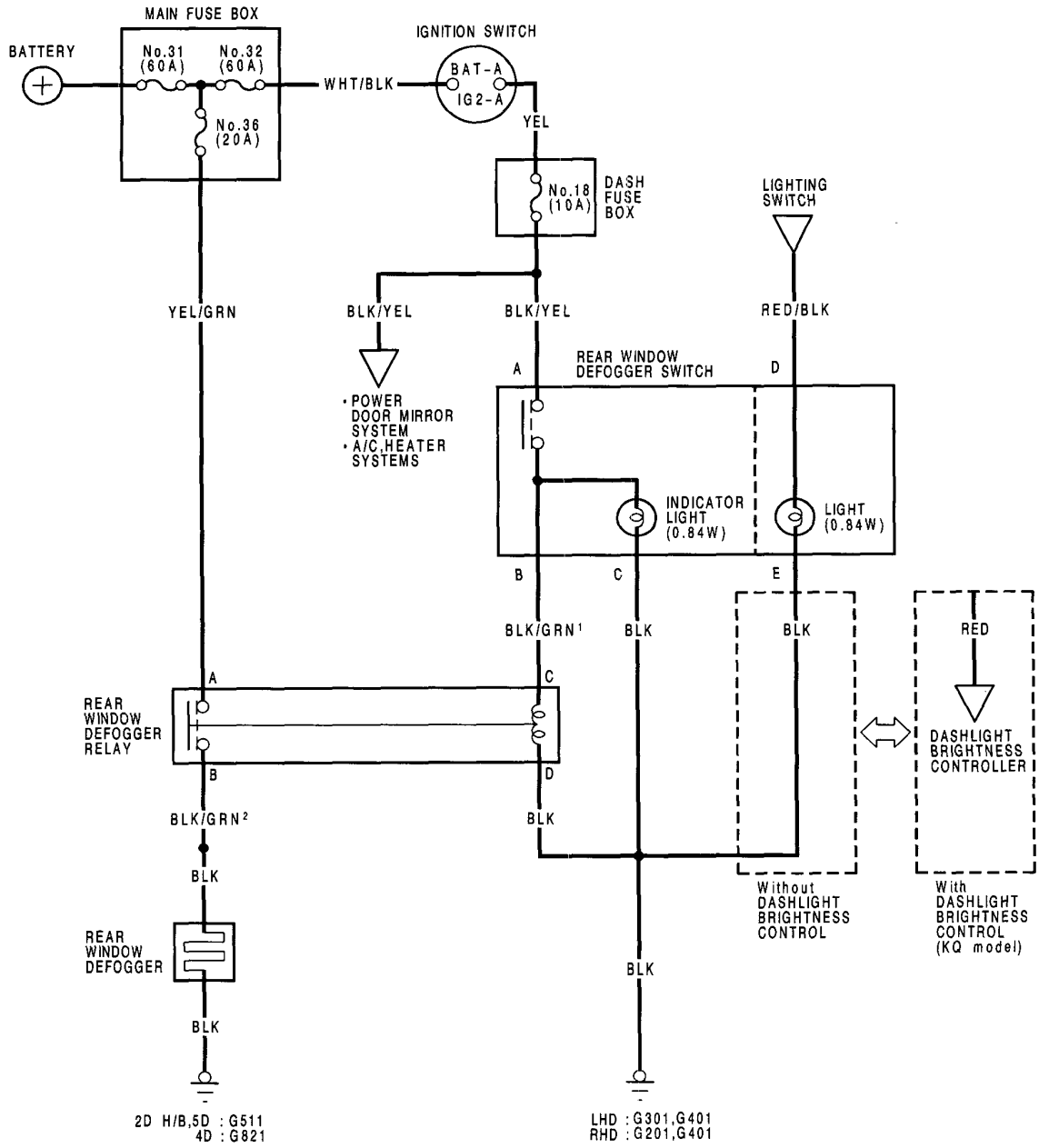
Component Location Index



Rear Window Defogger

Circuit Diagram

NOTE : Serveral different wires have the same color. They have been given a number suffix to distinguish them (for example BLK/GRN1 and BLK/GRN2 are not the same).



Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown indicator light bulb	Blown No.18 (10A) fuse (in the dash fuse box)	Blown No.36 (20A) fuse (in the main fuse box)	Defogger switch	Function test	Defogger relay	Repair defogger wire	Poor ground	Open circuit in wires or loose or disconnected terminals
Defogger operates, but indicator light does not go on.	1								
Defogger does not operate and indicator light does not go on.		1		2				G301, G401 [G201, G401]	BLK/YEL or BLK/GRN[1]
Defogger does not operate, but indicator light goes on.			1		2	3		2D H/B, 5D : G511 4D: G821	YEL/GRN or BLK/GRN[2]
Broken defogger wire							1		

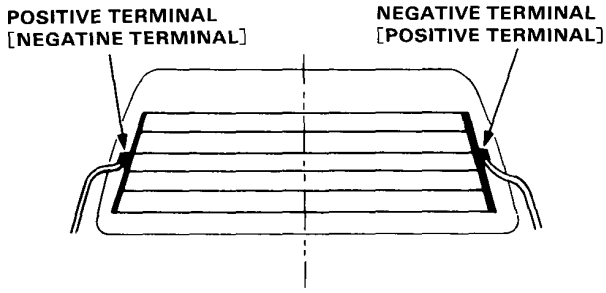
[ ] : RHD

Rear Window Defogger

Function Test

CAUTION: Be careful not to scratch or damage the defogger wires with the tester probe end.

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.
     - An open in the BLK, BLK/GRN[2] or YEL/GRN wire.
   - If there is battery voltage, go to step 2.



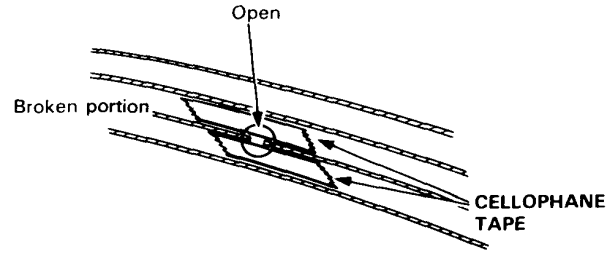
[ ] : 4D (LHD)

2. Check for continuity between the negative terminal and body ground.
   If no continuity, check for open in the defogger ground wire.
3. Lightly touch the voltmeter positive probe to the center 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 in the negative side from the center.
   - If there is no voltage, the defogger wire is broken is positive side from the center.

Defogger Wire Repair

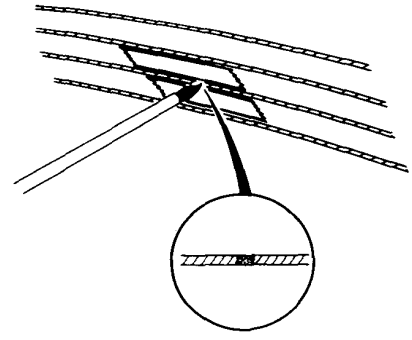
NOTE: Repair section must be no longer than one inch.

1. Lightly rub area around the break with the fine steel wool, then clean with alcohol.
2. Carefully mask above and below the broken portion defogger wire with cellophane tape.



3. Using a small brush, apply heavy coat of silver conductive paint extending about 1/8 in. on both sides of the break. Allow 30 minutes to dry.

   NOTE: Throughly mix paint before use.

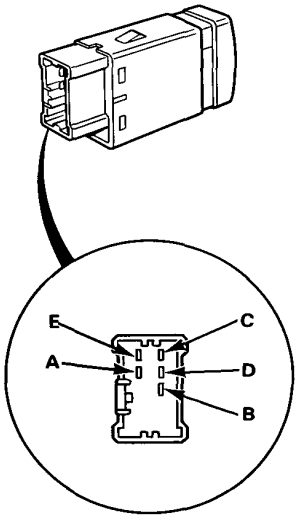


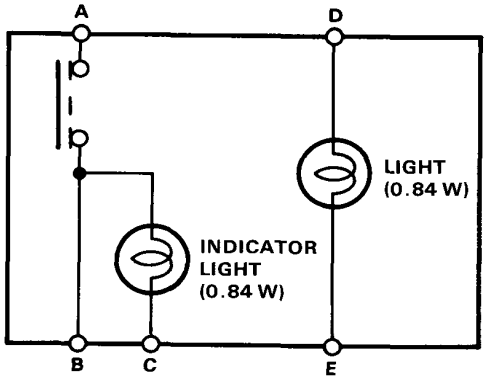
4. Check for proper operation with a voltmeter (approximately 6 V at the mid-point).
5. Apply a second coat of paint in the same manner. Dry 3 hours before removing tape.

Switch Test

1. Remove the switch from the instrument panel.
2. Check for continuity between the terminals according to the table.

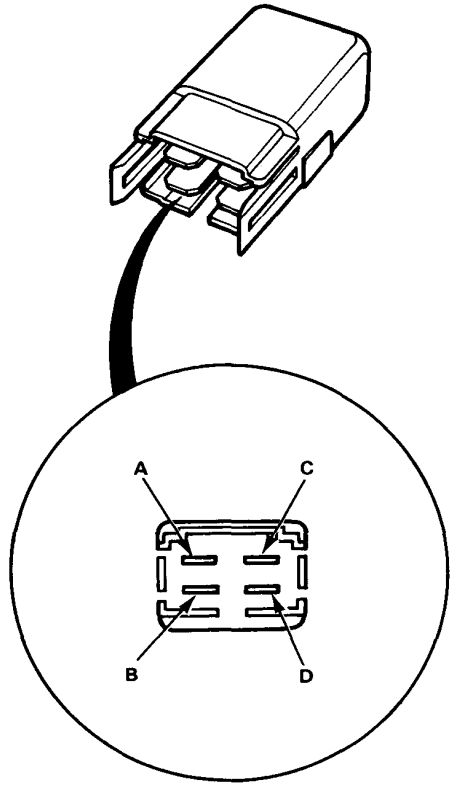
Terminal / Position	A		B		C	D		E
ON	○		○	○	○	○	○	○
OFF								

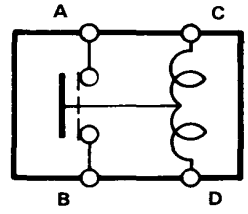




Relay Test

1. Remove the defogger relay from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.

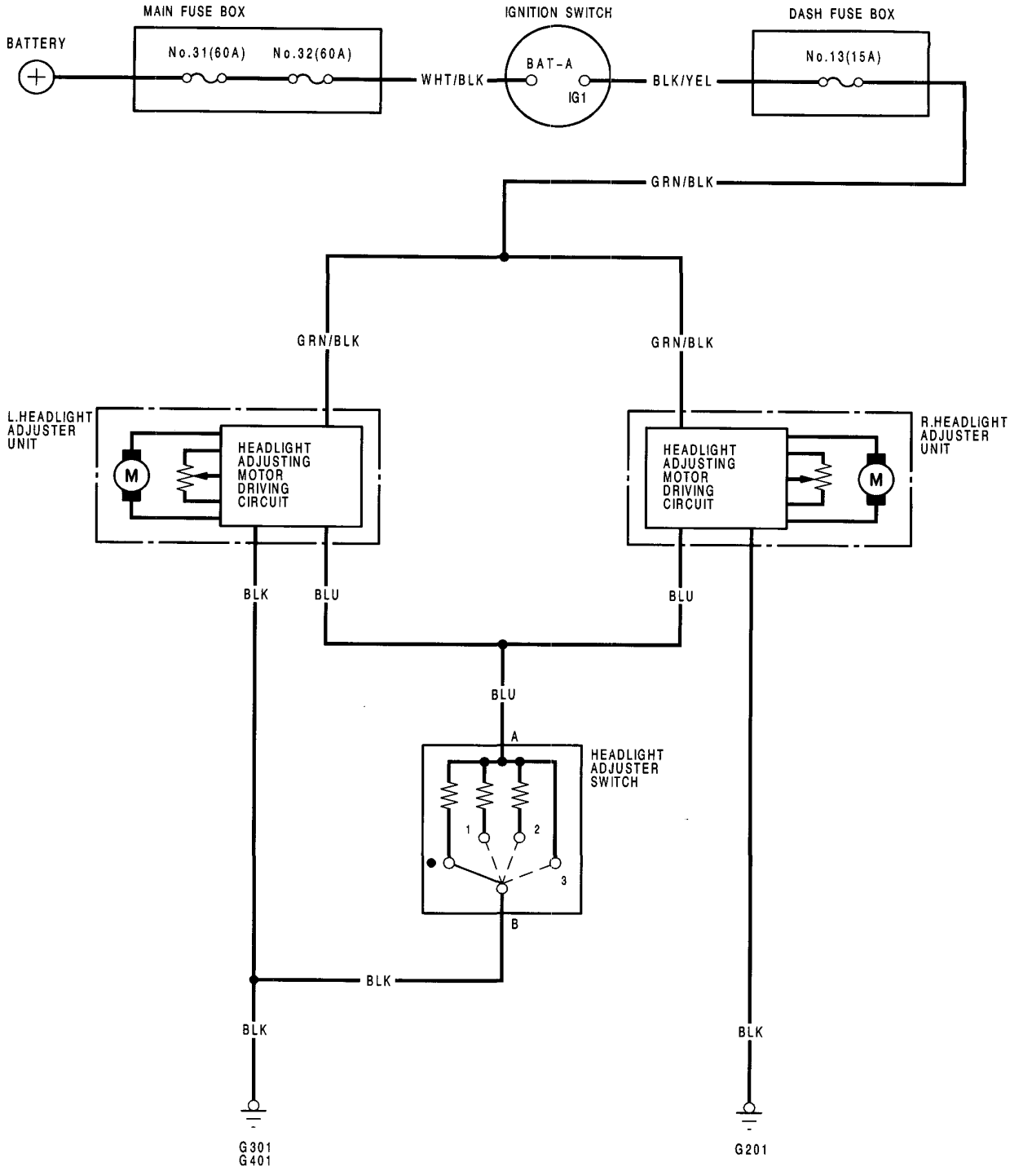




Headlight Adjuster (KG model only)

Circuit Diagram

Discription :
The motor-driven type headlight adjuster is mounted behind the headlight unit. When you operate the adjuster switch, the motor driving circuit senses the ground through each resistor and the headlight adjuster is actuated.



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