

1990 Mazda 323 4-Wheel Drive Workshop Manual Supplement

FOREWORD

This is a supplement to the workshop manual(s) shown below. This supplement describes service procedures of new or modified mechanical and/or electrical systems. For service procedures and important safety notices not contained in this supplement, please refer to the previous workshop manual.

Workshop Manual:
Form No.1195-10-89E

All information in this supplement was the latest available at the time of printing, all alterations related to modifications will be notified by Service Bulletin.

Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:

This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN) shown on the following page.

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1213-10-89I

VEHICLE IDENTIFICATION NUMBERS (VIN)

JM1 BG227 * L0 100001 ~
JM1 BG228 * L0 100001 ~

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IMPORTANT INFORMATION**BASIC ASSUMPTIONS**

This workshop manual assumes that you have certain special tools that are necessary for the safe and efficient performance of service operations on Mazda vehicles and that you know how to use them properly. It also assumes that you are familiar with automobile systems and basic service and repair procedures. You should not attempt to use this manual unless these assumptions are correct and you understand the consequences described below.

SAFETY RISK

This manual contains certain notes, warnings, and other precautionary information that you should carefully read and follow to reduce the risk of personal injury to yourself or others and the risk of improper service that may damage the vehicle or render it unsafe. If there is no such information in regard to any specific service method, this does not mean there is no possibility that personal safety or vehicle safety will be jeopardized by the use of incorrect methods or tools.

POSSIBLE LOSS OF WARRANTY

The manufacturer's warranty on Mazda vehicles and engines can be voided if improper service or repairs are performed by persons other than those at an Authorized Mazda Dealer.

WARNING ON LUBRICANTS AND GREASES

Avoid all prolonged and repeated contact with mineral oils, especially used oils. Used oils contaminated during service (e.g., engine sump oils) are more irritating and more likely to cause serious effects, including skin cancer, in the event of gross and prolonged skin contact.

Wash skin thoroughly after work involving oil.

Protective hand cleaners may be of value provided they can be removed from the skin with water. Do not use gasoline, paraffin, or other solvents to remove oil from the skin.

Lubricants and greases may be slightly irritating to the eyes.

Repeated or prolonged skin contact should be avoided by wearing protective clothing if necessary. Particular care should be taken with used oils and greases containing lead. Do not allow work clothing to be contaminated with oil. Dry clean or launder such clothing at regular intervals.

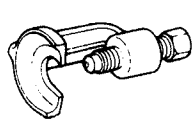
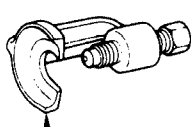
9MUGIX-002

HOW TO USE THIS MANUAL

PREPARATION

PREPARATION points out the needed **Special Service Tool (SST)** for the service operation that it proceeds. Gather all necessary **SST** before beginning work.

Example:

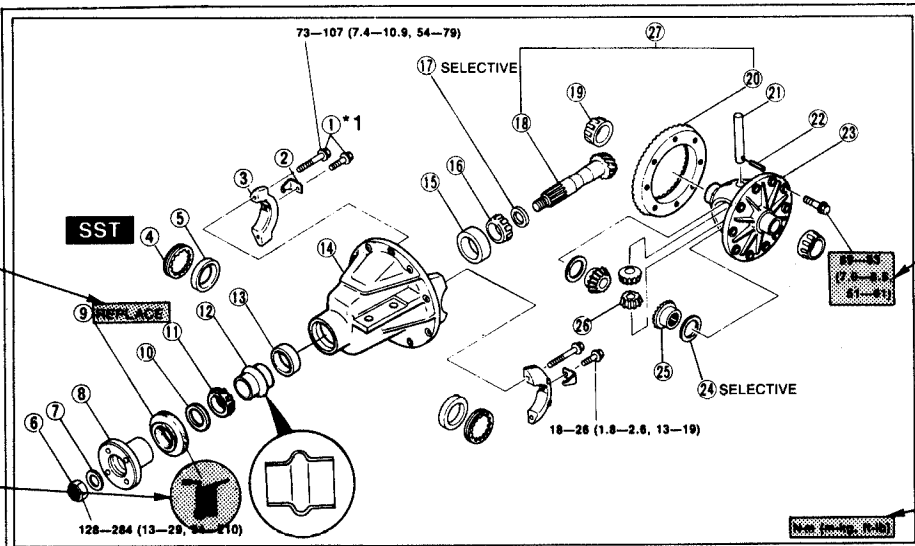
MANUAL STEERING		SST NUMBER	USAGE
PREPARATION SST 49 0118 850C Puller, ball joint 	For removal of tie-rod end	49 0118 850C Puller, ball joint 	For removal of tie-rod end
		SST NAME	SST ILLUSTRATION

9MUGIX-033

REPAIR PROCEDURE

1. Most repair operations begin with an overview illustration. It identifies the components, shows how the parts fit together, and visual parts inspections. If a damaged or worn part is found, repair or replace it as necessary.
2. Expendable parts, tightening torques, and symbols for oil, grease, and sealant are shown in the overview illustration.
3. Pages related to service procedures are shown under the illustration. Refer to this information when servicing the related part.

Example:



SHOWS EXPENDABLE PARTS (points to SST 4)

SHOWS APPLICATION POINT OF OIL, ETC. (points to oil application points)

SHOWS TIGHTENING TORQUE SPECIFICATION *2 (points to torque boxes)

SHOWS TIGHTENING TORQUE UNIT (points to torque box)

SHOWS RELATED PAGE FOR SERVICE (points to service page references)

SHOWS VISUAL INSPECTION INFORMATION (points to inspection instructions)







1. Bolt 2. Lock plate 3. Bearing cup 4. Adjusting screw 5. Bearing outer race 6. Locknut 7. Washer 8. Companion flange Removal page M-21 Inspect splines page M-21	16. Bearing inner race Removal page M-22 Inspect for damage or rough rotation page M-24 Installation page M-24 17. Spacer 18. Drive pinion Removal page M-21 Inspect splines and teeth for wear or damage page M-22 Adjustment of height page M-22 Adjust page M-24
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*1: The numbering (ex. ①) shows service procedure.

*2: Units shown in N·m (m·kg, ft·lb) unless otherwise specified.

SYMBOLS

There are six symbols indicating oil, grease, and sealant. These symbols show the points of applying such materials during service.

Symbol	Meaning	Kind
	Apply oil	New engine oil or gear oil as appropriate
	Apply brake fluid	Only brake fluid
	Apply automatic transmission fluid	Only ATF
	Apply grease	Appropriate grease
	Apply sealant	Appropriate sealant
	Apply petroleum jelly	Appropriate petroleum jelly

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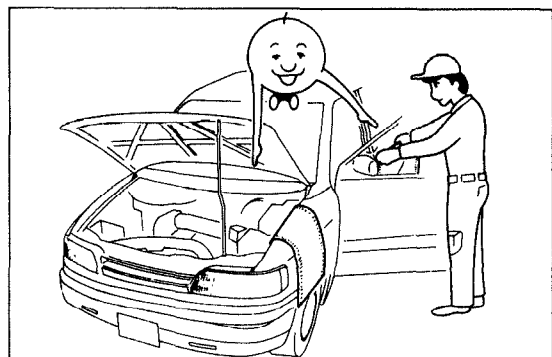
Note

- When special oil or grease is needed, this is shown in the illustration.

NOTES, CAUTIONS, AND WARNINGS

As you read through the procedures, you will come across NOTES, CAUTIONS, and WARNINGS. Each one is there for a specific purpose. **NOTES** give you **added information** that will help you to complete a particular procedure. **CAUTIONS** are given to prevent you from making an error that could **damage the vehicle**. **WARNINGS** remind you to be especially careful in those areas where carelessness can cause **personal injury**. The following list contains some general WARNINGS you should follow when you work on a vehicle.

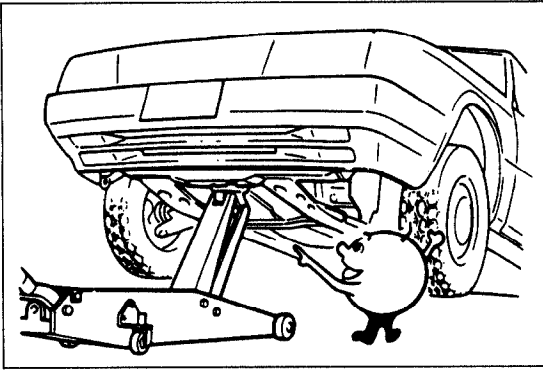
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9MUGIX-037

FUNDAMENTAL PROCEDURES**PROTECTION OF THE VEHICLE**

Always be sure to cover fenders, seats, and floor areas before starting work.



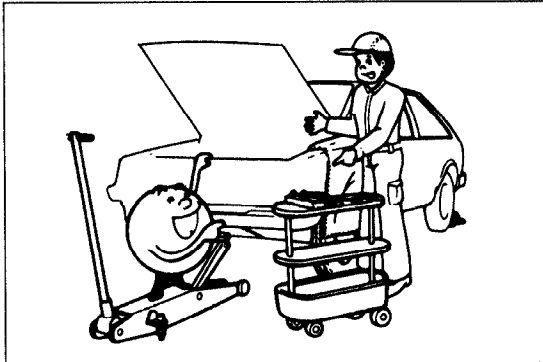
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A WORD ABOUT SAFETY

The following precautions must be followed when jacking up the vehicle.

1. Block the wheels.
2. Use only the specified jacking positions.
3. Support the vehicle with safety stands.

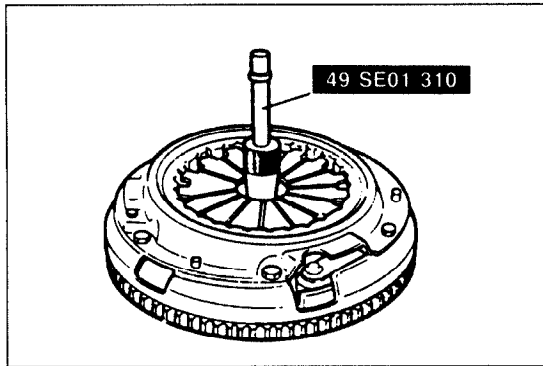
Start the engine only after making certain the engine compartment is clear of tools and people.



9MUGIX-038

PREPARATION OF TOOLS AND MEASURING EQUIPMENT

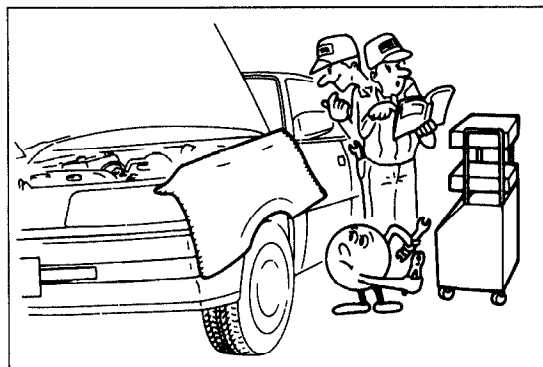
Be sure that all necessary tools and measuring equipment are available before starting any work.



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SPECIAL TOOLS

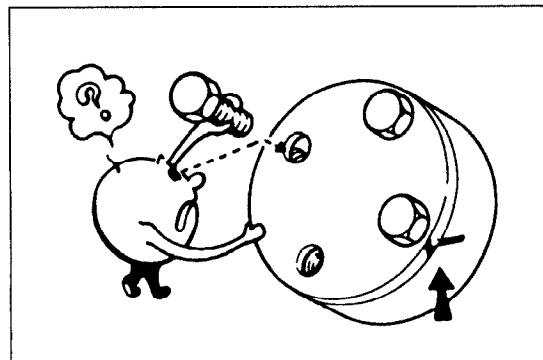
Use special tools when they are required.



47U0GX-006

REMOVAL OF PARTS

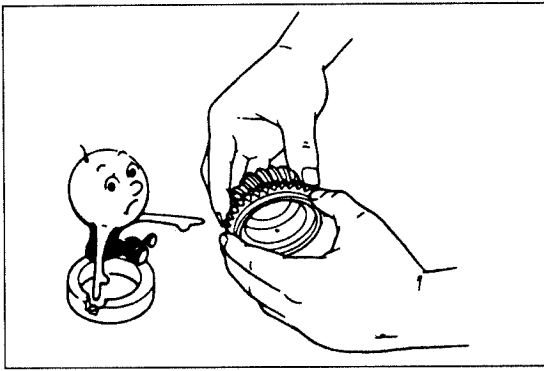
While correcting a problem, try also to determine its cause. Begin work only after first learning which parts and subassemblies must be removed and disassembled for replacement or repair.



9MUGIX-039

DISASSEMBLY

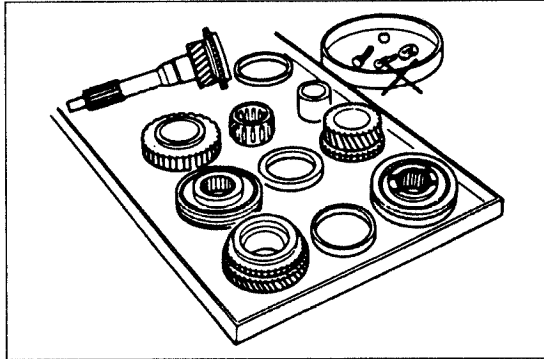
If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled in a way that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.



9MUGIX-040

1. Inspection of parts

When removed, each part should be carefully inspected for malfunctioning, deformation, damage, and other problems.

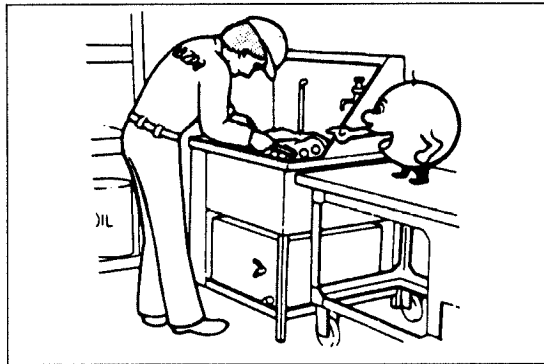


9MUGIX-041

2. Arrangement of parts

All disassembled parts should be carefully arranged for re-assembly.

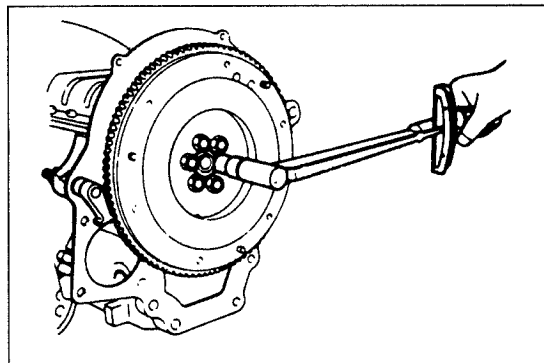
Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.



47U0GX-010

3. Cleaning parts for reuse

All parts to be reused should be carefully and thoroughly cleaned in the appropriate method.



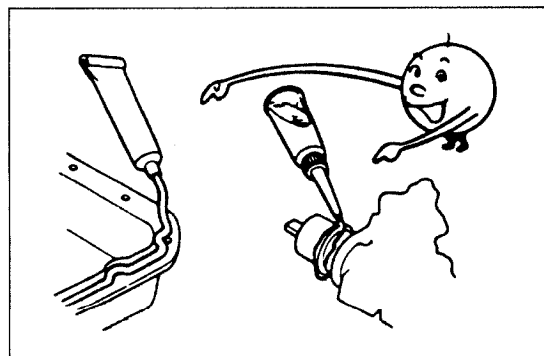
9MUGIX-004

REASSEMBLY

Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts. Refer to STANDARD BOLT AND NUT TIGHTENING TORQUE in Section TD for tightening torques not mentioned in the main text.

If removed, these parts should be replaced with new ones:

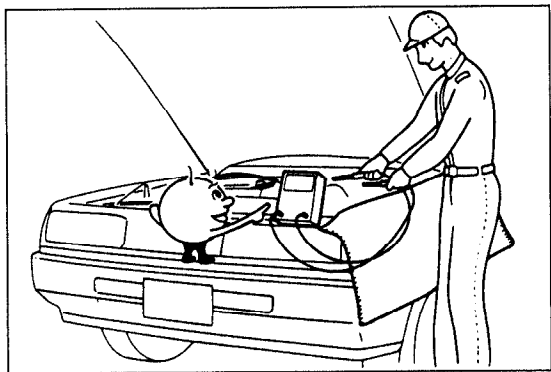
- | | |
|----------------|-----------------|
| 1. Oil seals | 2. Gaskets |
| 3. O-rings | 4. Lock washers |
| 5. Cotter pins | 6. Nylon nuts |



9MUGIX-042

Depending on location:

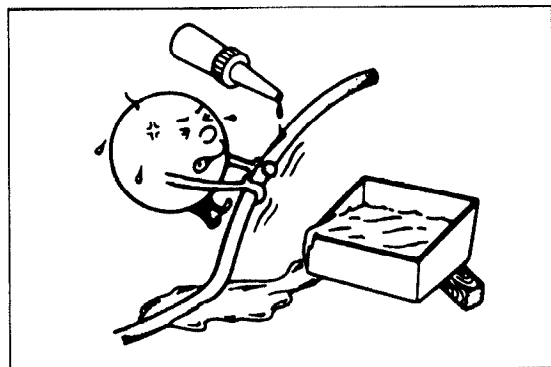
1. Sealant should be applied to gaskets.
2. Oil should be applied to the moving components of parts.
3. Specified oil or grease should be applied at the prescribed locations (such as oil seals) before reassembly.



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ADJUSTMENTS

Use suitable gauges and/or testers when making adjustments.



9MUGIX-005

RUBBER PARTS AND TUBING

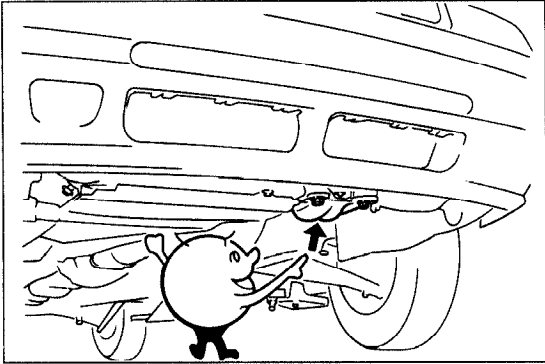
Prevent gasoline or oil from getting on rubber parts or tubing.

JACK AND SAFETY STAND POSITIONS

FRONT END

Jack position:

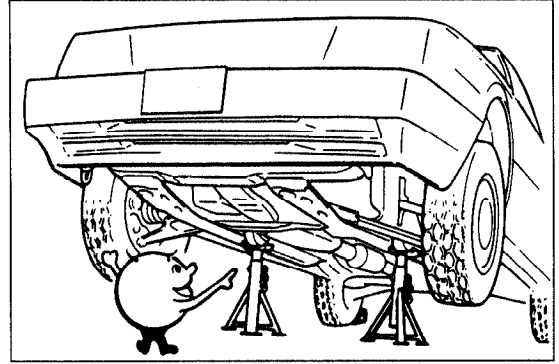
At the front crossmember



03UGIX-007

Safety stand positions:

On both sides of the body frame



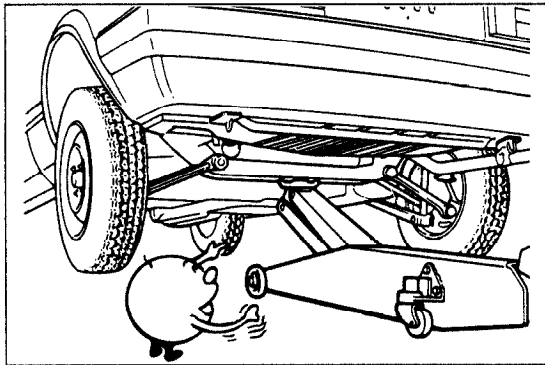
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REAR END

Jack position:

At the center of the rear crossmember (2WD)

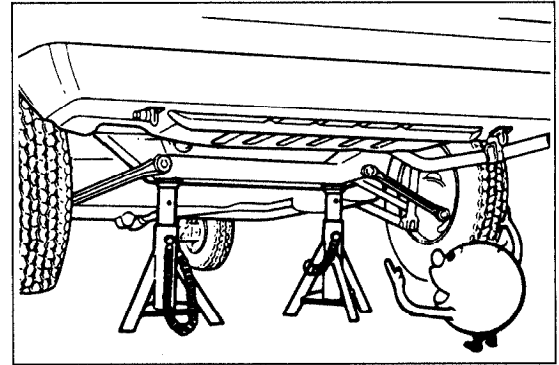
At the rear differential (4WD)



03UGIX-801

Safety stand positions:

On both sides of the body frame



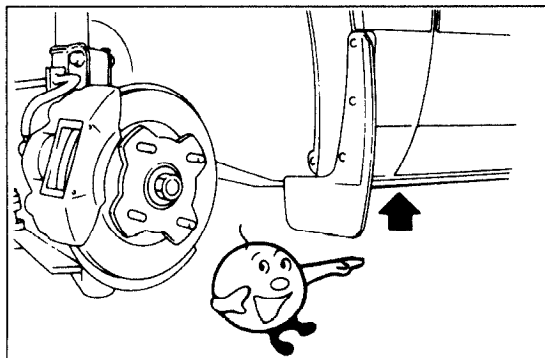
03UGIX-010

VEHICLE LIFT (2-SUPPORT TYPE) POSITIONS

FRONT END

Frame

Side sills

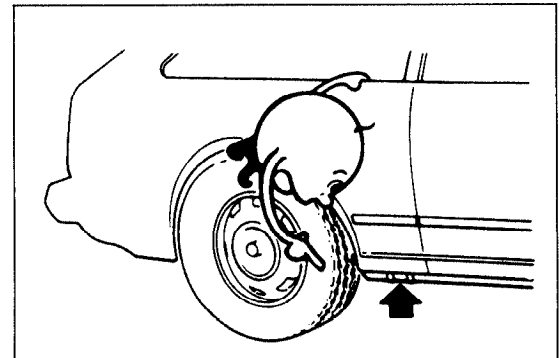


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REAR END

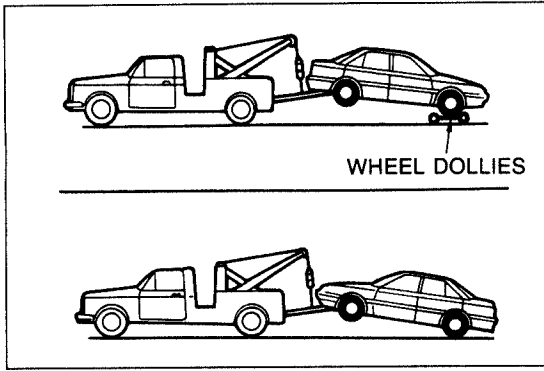
Frame

Side sills

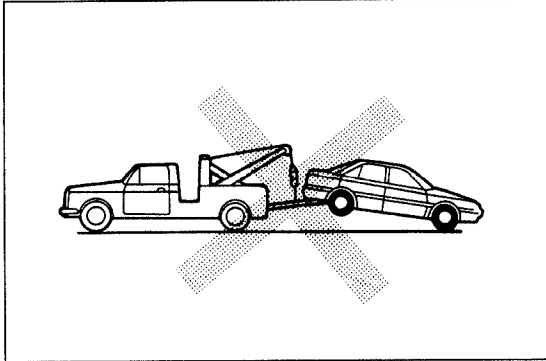


9MUGIX-011

TOWING



03UGIX-002



TOWING

Proper towing equipment is necessary to prevent damage to the vehicle.

Laws and regulations applicable to vehicles in tow must always be observed.

As a general rule, towed vehicles should be pulled with the driving wheels off the ground. If excessive damage or other conditions prevent towing the vehicle with the driving wheels off the ground, use wheel dollies.

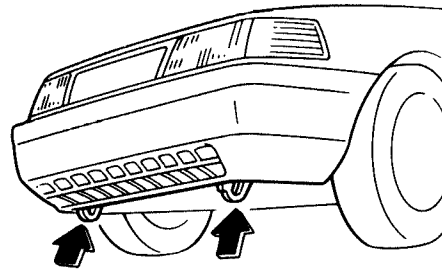
With either automatic or manual transaxle:

1. Set the ignition switch in the ACC position;
2. Place the selector lever or shift lever in N (Neutral);
3. Release the parking brake.

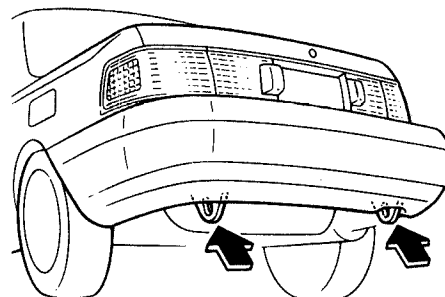
Caution

- **Do not tow the vehicle backward with driving wheels on the ground. This may cause internal damage to the transaxles.**
- **Do not use the hook loops under the front and rear of the vehicle for towing purposes. These hook loops are designed ONLY for transport tie-down. If tie-down hook loops are used for towing, the front/rear bumper will be damaged.**

TIE-DOWN HOOKS — FRONT

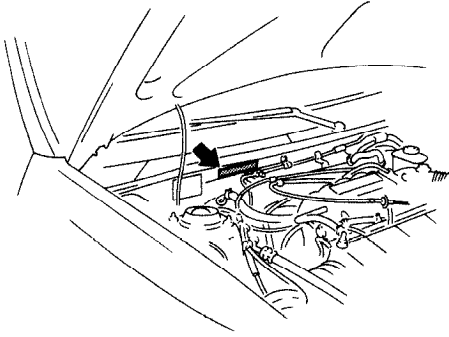


TIE-DOWN HOOKS — REAR

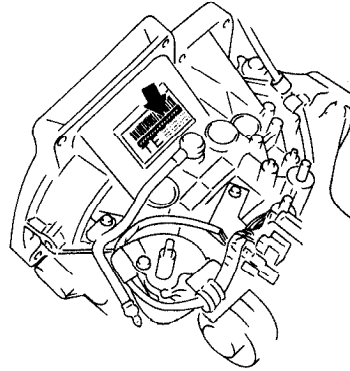


IDENTIFICATION NUMBER LOCATIONS

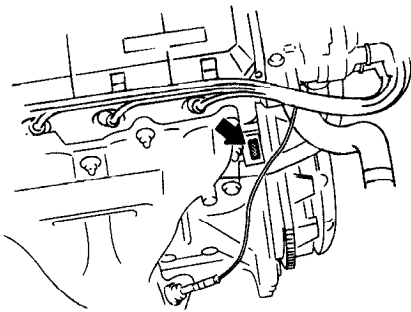
VEHICLE IDENTIFICATION NUMBER (VIN)



AUTOMATIC TRANSAXLE MODEL AND NUMBER



ENGINE MODEL AND NUMBER



9MUGIX-015

UNITS

Nm (m·kg or cm·kg, ft·lb or in·lb).....	Torque
rpm.....	Revolutions per minute
A.....	Ampere(s)
V.....	Volt(s)
Ω	Ohm(s) (resistance)
kPa (kg/cm ² , psi).....	Pressure (usually positive)
mmHg (inHg).....	Pressure (usually negative)
W.....	Watt
liters (US qt, Imp qt)....	Volume
mm (in).....	Length

89U0GX-006

ABBREVIATIONS

ABDC.....	After bottom dead center
A/C.....	Air conditioner
ACC.....	Accessories
ATX.....	Automatic transaxle
ATDC.....	After top dead center
ATF.....	Automatic transmission fluid
BAC.....	Bypass air control
BBDC.....	Before bottom dead center
BTDC.....	Before top dead center
CPU.....	Central processing unit

EC-AT.....	Electronically-controlled automatic transmission
ECU.....	Engine control unit
EGL.....	Electronic gasoline injection
E/L.....	Electrical load
EX.....	Exhaust
IC.....	Integrated circuit
IGN.....	Ignition
IN.....	Intake
INT.....	Intermittent
ISC.....	Idle speed control
LH.....	Left hand
M.....	Motor
MIL.....	Malfunction indicator lamp
MTX.....	Manual transaxle
OD.....	Overdrive
OFF.....	Switch off
ON.....	Switch on
PCV.....	Positive crankcase ventilation
PRC.....	Pressure regulator control
P/S.....	Power steering
P/W.....	Power window
RH.....	Right hand
SST.....	Special service tool
ST.....	Start
SW.....	Switch
TDC.....	Top dead center
4WD.....	4-wheel drive

03UGIX-802

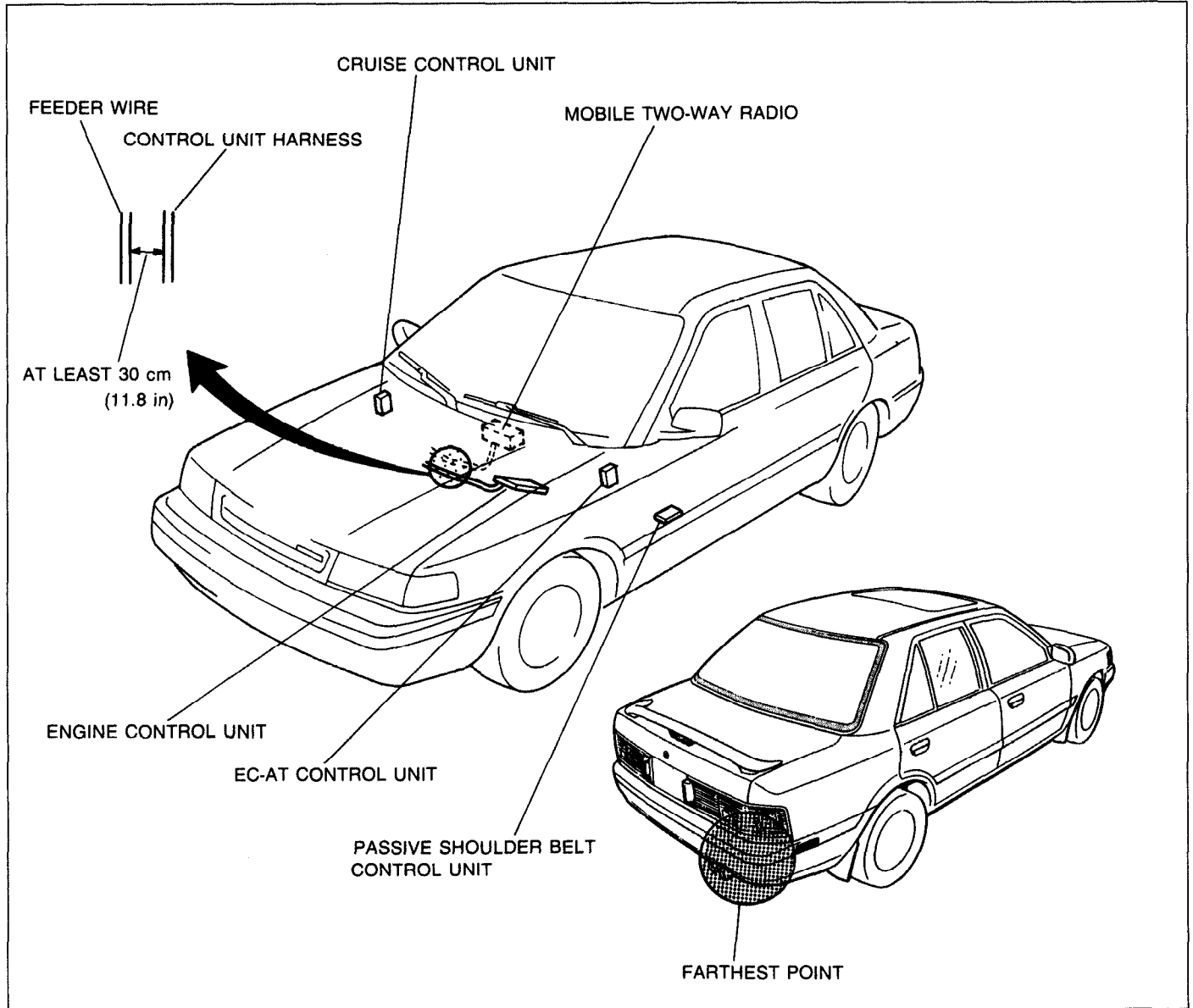
CAUTION

INSTALLATION OF MOBILE TWO-WAY RADIO SYSTEM

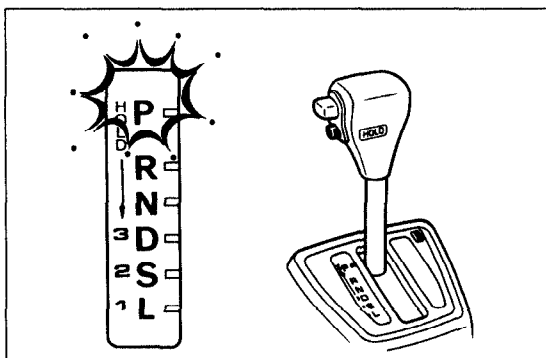
If a mobile two-way radio system is installed improperly or if a high-powered type is used, the EGI system and other systems may be affected.

When the vehicle is to be equipped with a mobile two-way radio, observe the following precautions:

1. Install the antenna at the farthest point from control units.
2. Install the antenna feeder as far as possible from the control unit harnesses (**at least 30 cm [11.8 in]**).
3. Ensure that the antenna and feeder are properly adjusted.
4. Do not install a high-powered mobile two-way radio system.



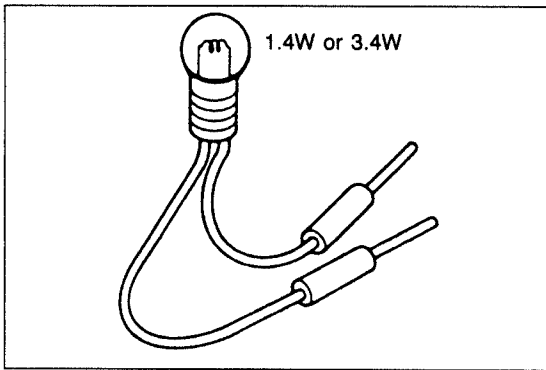
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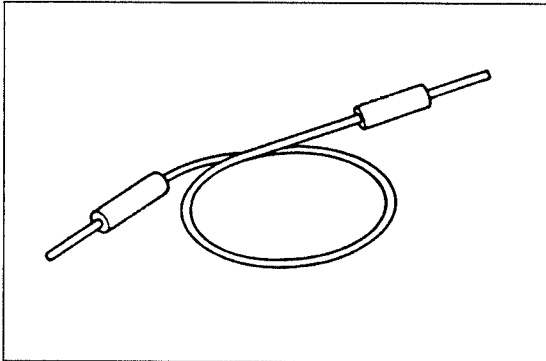
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REMOVAL OF IGNITION KEY ON AUTOMATIC TRANSAXLE MODEL

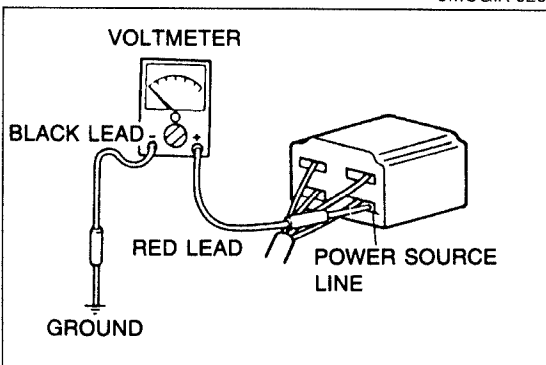
The selector lever must be in P (PARK) to turn the ignition key to the OFF position. If the switch seems to be off but the key cannot be removed, the switch may still be in the ACC position, or the selector lever may not be in P (PARK). Shift the selector lever to P (PARK), and turn the ignition key to the LOCK position. The key should now be free for removal.



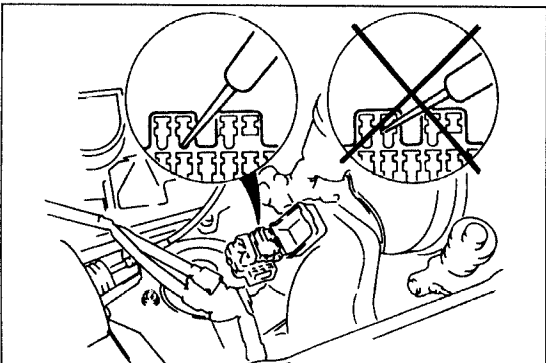
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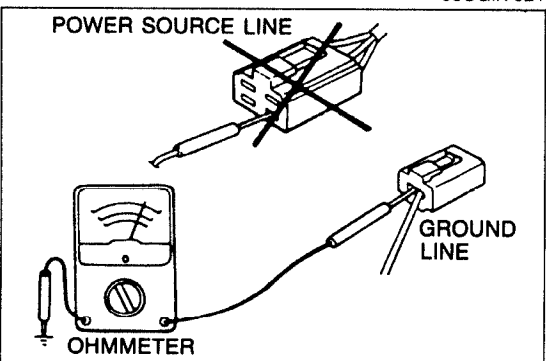
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9MUGIX-021



05UGIX-021



9MUGIX-045

ELECTRICAL TROUBLESHOOTING TOOLS

Test Light

The test light, as shown in the figure, uses a 12V bulb. The two lead wires should be connected to probes. The test light is used for simple voltage checks and for checking for short circuits.

Caution

- When checking the control unit, never use a bulb over 3.4W.

Jumper Wire

The jumper wire is used for testing by shorting across switch terminals and ground connections.

Caution

- Do not connect a jumper wire from the power source line to a body ground; this may cause burning or other damage to harnesses or electronic components.

Voltmeter

The DC voltmeter is used to measure of circuit voltage. A voltmeter with a range of 15V or more is used by connecting the positive (+) probe (red lead wire) to the point where voltage is to be measured and the negative (-) probe (black lead wire) to a body ground.

Diagnosis Connector

Insert the probe into the service hole when connecting a jumper wire to the diagnosis connector.

Caution

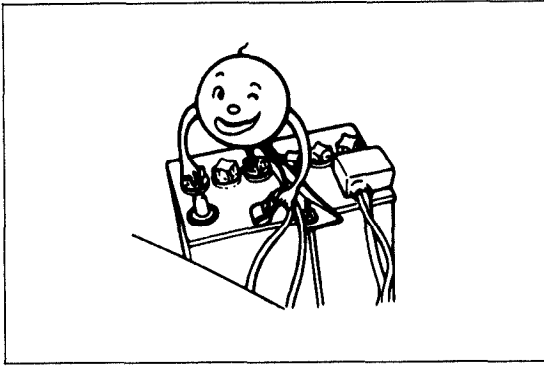
- Do not insert the jumper wire probe into the diagnosis connector terminal, which may damage the terminal.

Ohmmeter

The ohmmeter is used to measure the resistance between two points in a circuit and also to check for continuity and diagnosis of short circuits.

Caution

- Do not attempt to connect the ohmmeter to any circuit to which voltage is applied; this may burn or otherwise damage the ohmmeter.

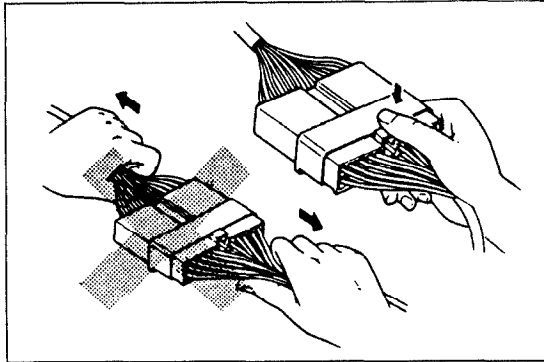


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CAUTION WITH ELECTRICAL PARTS

Battery Cable

Before disconnecting connectors or replacing electrical parts, disconnect the negative battery cable.

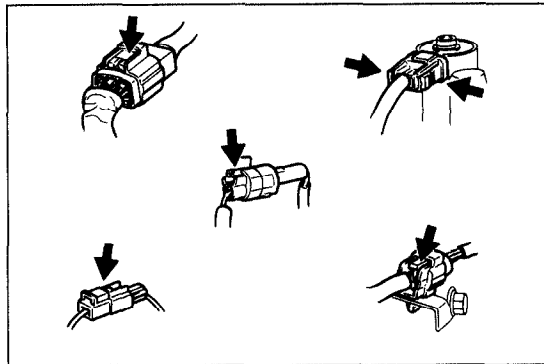


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Connectors

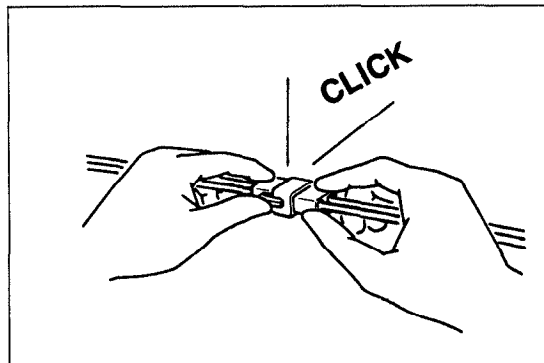
Removal of connector

Never pull on the wiring harness when disconnecting connectors.



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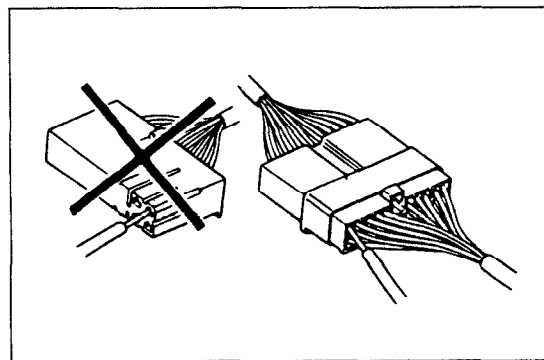
Connectors can be removed by pressing or pulling the lock lever as shown.



9MUGIX-025

Locking of connector

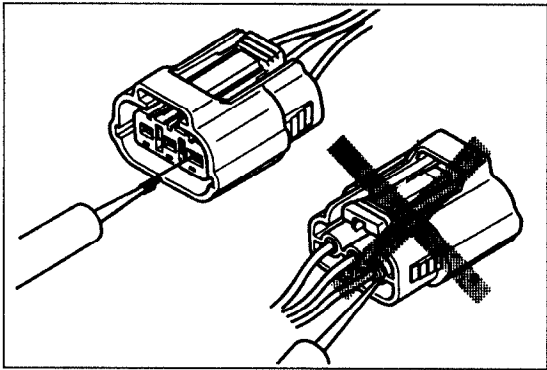
When locking connectors, make sure to listen for a click that will indicate they are securely locked.



03UGIX-011

Inspection

1. When a tester is used to check for continuity or to measure voltage, insert the tester probe from the wire harness side.

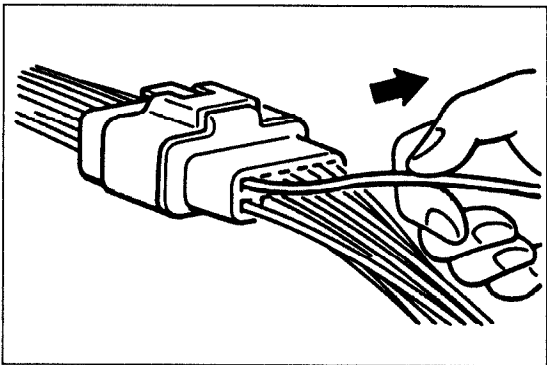


05UGIX-028

2. Check the terminals of waterproof connectors from the connector side, as they cannot be accessed from the wire harness side.

Caution

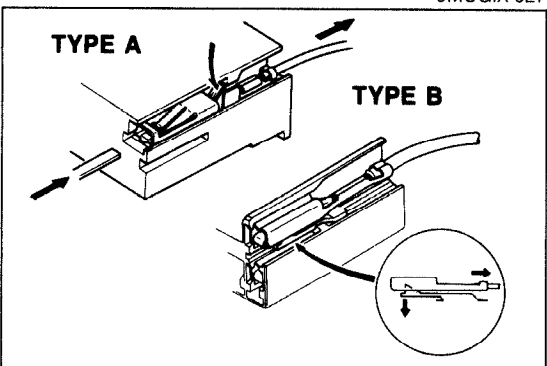
- Use fine wire to prevent damage to the terminal.
- Do not damage the terminal when inserting the tester lead.



9MUGIX-027

Terminals Inspection

Pull lightly on individual wires to check that they are secured in the terminal.



9MUGIX-028

Replacement of terminals

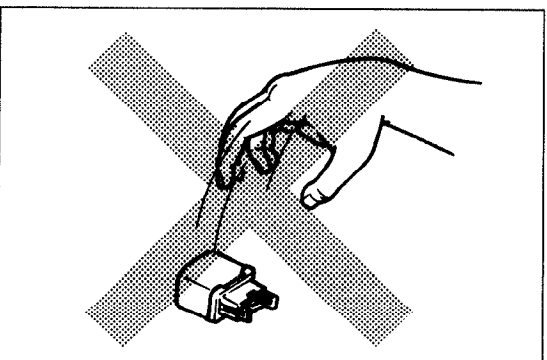
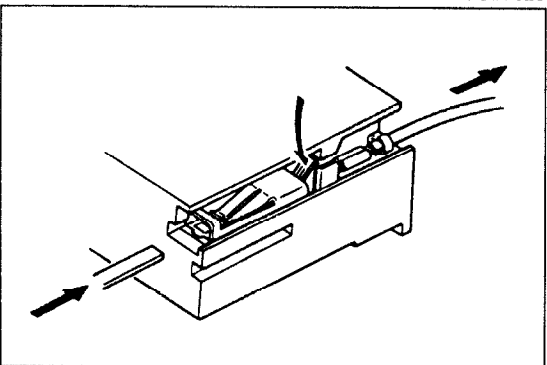
Use the appropriate tools to remove the terminal as shown. When installing the terminal, be sure to insert it until it locks securely.

< Female >

Insert a thin piece of metal from the terminal side of the connector, and then, with the terminal locking tab pressed down, pull the terminal out from the connector.

< Male >

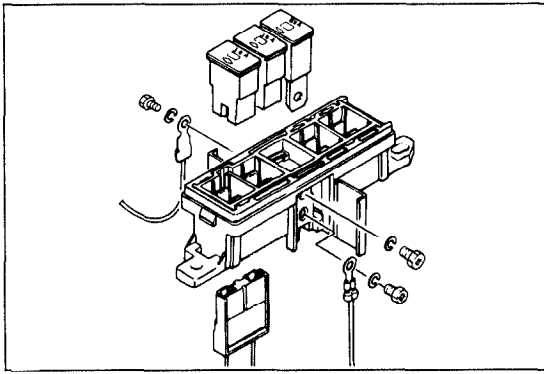
Same as the female type.



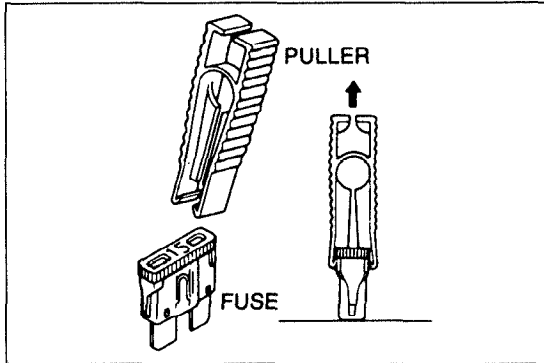
9MUGIX-030

Sensors, Switches, and Relays

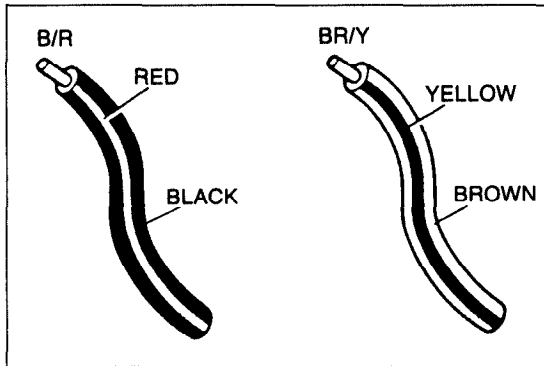
Handle sensors, switches, and relays carefully. Do not drop them or strike them against other parts.



9MUGIX-031



9MUGIX-032



9MUGIX-029

Fuse Replacement

1. When replacing a fuse, be sure to replace it with one of specified capacity.
If a fuse again fails after it has been replaced, the circuit probably has a short circuit and the wiring should be checked.
2. Be sure the negative battery terminal is disconnected before replacing a main fuse (80A).
3. When replacing a pullout fuse, use the fuse puller supplied in the fuse box cover.

**Wiring Harness
Wiring color codes**

Two-color wires are indicated by a two-color code symbol. The first letter indicates the base color of the wire and the second the color of the stripe.

CODE	COLOR	CODE	COLOR
B	Black	O	Orange
BR	Brown	P	Pink
G	Green	R	Red
GY	Gray	V	Violet
L	Blue	W	White
LB	Light Blue	Y	Yellow
LG	Light Green	—	—



PRE-DELIVERY INSPECTION AND SCHEDULED MAINTENANCE SERVICES

PRE-DELIVERY INSPECTION A- 2
PRE-DELIVERY INSPECTION TABLE **A- 2**
SCHEDULED MAINTENANCE SERVICES A- 3
SCHEDULE 1
(NORMAL DRIVING CONDITION)..... **A- 3**
SCHEDULE 2
(UNIQUE DRIVING CONDITION) **A- 6**

9MU0AX-001

PRE-DELIVERY INSPECTION

PRE-DELIVERY INSPECTION TABLE

EXTERIOR

INSPECT and **ADJUST**, if necessary, the following items to the specifications:

- Glass, exterior bright metal and paint for damage
- Wheel lug nuts
 - 88—118 N·m (9—12 m·kg, 65—87 ft·lb)
- Tire pressures (Refer to section Q)
- All weatherstrips for damage or detachment
- Operation of hood release and lock
- Operation of trunk lid, back door, and fuel lid opener
- Door operation and alignment
- Headlight aiming

INSTALL the following parts:

- Wheel caps or rings (if equipped)
- Outside rear view mirror(s)

UNDER HOOD—ENGINE OFF

INSPECT and **ADJUST**, if necessary, the following items to the specifications:

- Fuel, coolant and hydraulic lines, fittings, connections and components for leaks
- Engine oil level
- Power steering fluid level
- Brake and clutch master cylinder fluid level
- Windshield washer reservoir fluid level
- Radiator coolant level and specific gravity

Protection °C (°F)	Specific gravity at 20°C (68°F)
-16 (3)	1.054
-26 (-15)	1.066
-40 (-40)	1.078

- Tightness of water hose clamps (including heater hoses)
- Tightness of battery terminals
- Manual transaxle oil level
- Drive belt tensions
- Accelerator cable and its linkage for free movement

CLEAN spark plugs

INTERIOR

INSTALL the following parts:

- Rubber stopper for inside rear view mirror
- Fuse for accessories

CHECK the operations of the following items:

- Seat controls (sliding and reclining) and head restraint
- Folding rear seat
- Door locks including childproof door locks (if equipped)
- Seat belts and warning system
- Ignition switch and steering lock
- Inhibitor switch (ATX only)
- Starter interlock switch (clutch pedal, MTX only)
- All lights including warning and indicator lights
- Sound warning system
- Horn, wipers and washers (front and rear, if equipped)

- Audio system (if equipped)
- Cigarette lighter and clock
- Heater, defroster and air conditioner at various mode selection (if equipped)

CHECK the following items:

- Presence of spare fuse
- Upholstery and interior finish

CHECK and **ADJUST**, if necessary, the following items:

- Operation and fit of windows
- Pedal height and free play of brake and clutch pedal

	Pedal height mm (in)	Free play mm (in)
Clutch pedal	196—204 (7.72—8.03) (with carpet)	5—13 (0.197—0.512)
Brake pedal	193—196 (7.60—7.72)	4—7 (0.16—0.28)

- Parking brake
 - 5—7 notches/98 N (10 kg, 22lb)

UNDER HOOD—ENGINE RUNNING AT OPERATING TEMPERATURE

CHECK the following items:

- Automatic transaxle fluid level
- Initial ignition timing (with TEN terminal of diagnosis connector grounded)
 - 5 ± 1° BTDC: BP SOHC
- Idle speed (ATX: P range, MTX: Neutral)
 - 750 ± 50 rpm: (With parking brake applied)

ON HOIST

CHECK the following items:

- Underside fuel, coolant and hydraulic lines, fittings, connections and components for leaks
- Tires for cuts or bruises
- Steering linkage, suspension, exhaust system and all underside hardware for looseness or damage

ROAD TEST

CHECK the following items:

- Brake operation
- Clutch operation
- Steering control
- Operation of meters and gauge
- Squeaks, rattles or unusual noise
- Engine general performance
- Emergency locking retractors
- Cruise control system (if equipped)

AFTER ROAD TEST

REMOVE seat and floor mat protective covers

CHECK for necessary owner information materials, tools and spare tire in vehicle

SCHEDULED MAINTENANCE SERVICES

Follow Schedule 1 (Normal Driving Condition) if the vehicle is mainly operated where none of the following conditions apply.
 Follow Schedule 2 (Unique Driving Condition) if any of the conditions below apply:

- Repeated short-distance driving.
- Driving in dusty conditions.
- Driving with extended use of brakes.
- Driving in areas where using road salt or other corrosive materials are used.
- Driving on rough and/or muddy roads.
- Extended periods of idling and/or low-speed operation.
- Driving for prolonged periods in cold temperatures and/or extremely humid climates.

Schedule 1 (Normal Driving Conditions)

MAINTENANCE OPERATION	MAINTENANCE INTERVALS	Number of months or miles (kilometers), whichever comes first								Service data and inspection points	Page						
		Months	7.5	15	22.5	30	37.5	45	52.5			60					
		× 1,000 miles	7.5	15	22.5	30	37.5	45	52.5			60					
	× 1,000 km	12	24	36	48	60	72	84	96								
Drive belts					I				I	<ul style="list-style-type: none"> • Cracks or damage • Tension 	B1-5*						
Engine oil		R	R	R	R	R	R	R	R	<ul style="list-style-type: none"> • Oil pan capacity: All BP 3.6 liters (3.8 US qt, 3.2 Imp qt) 	D-5*						
Oil filter		R	R	R	R	R	R	R	R	<ul style="list-style-type: none"> • Oil filter capacity: 0.17 liter (0.18 US qt, 0.15 Imp qt) 	D-5*						
Engine timing belt* ¹		Replace every 60,000 miles (96,000 km)								—	B1-12*						
Air cleaner element					R				R	—	F-71*						
Spark plugs					R				R	<ul style="list-style-type: none"> • Plug gap: 1.0—1.1mm (0.039—0.043 in) • Recommended spark plugs <table border="1"> <thead> <tr> <th>Engine</th> <th>NGK</th> <th>Nippon Denso</th> </tr> </thead> <tbody> <tr> <td>BP SOHC</td> <td>BKR5E-11 BKR6E-11</td> <td>K16PR-U11 K20PR-U11</td> </tr> </tbody> </table>	Engine	NGK	Nippon Denso	BP SOHC	BKR5E-11 BKR6E-11	K16PR-U11 K20PR-U11	G-18*
Engine	NGK	Nippon Denso															
BP SOHC	BKR5E-11 BKR6E-11	K16PR-U11 K20PR-U11															
Cooling system					I				I	<ul style="list-style-type: none"> • Hoses for cracks or wear • Coolant level 	E-5*						
Engine coolant					R				R	<ul style="list-style-type: none"> • Coolant capacity: 5.0 liters (5.3 US qt, 4.4 Imp qt)..... MTX 6.0 liters (6.3 US qt, 5.3 Imp qt) ATX 	E-6*						
Fuel filter									R	—	F-107*						
Idle speed					A* ²				A	<ul style="list-style-type: none"> • ATX: P range, MTX: Neutral 750 ± 50 rpm (With parking brake applied) 	F-71*						
Fuel lines					I* ³				I	<ul style="list-style-type: none"> • Fittings, connections, and components for leaks 	F-9						

* Indicates page to be referred to on 323 Workshop Manual (1195-10-89E)

A-4 Schedule 1 (Normal Driving Conditions) (Cont'd)

MAINTENANCE OPERATION	MAINTENANCE INTERVALS	Number of months or miles (kilometers), whichever comes first									Service data and inspection points	Page	
		Months	7.5	15	22.5	30	37.5	45	52.5	60			
		× 1,000 miles	7.5	15	22.5	30	37.5	45	52.5	60			
		× 1,000 km	12	24	36	48	60	72	84	96			
Brake lines, hoses and connections						I				I	<ul style="list-style-type: none"> • Proper attachment and connections 	—	
Clutch pedal						I				I	<ul style="list-style-type: none"> • Operation • Pedal height (with carpet): 196—204mm (7.72—8.03 in) • Free play: 5—13mm (0.197—0.512 in) 	H-5	
Disc brake						I				I	<ul style="list-style-type: none"> • Caliper operation • Disc plate thickness: Minimum.... Front 20mm (0.79 in) Rear 7.0mm (0.28 in) • Pad thickness: Minimum.... Front 2.0mm (0.08 in) Rear 1.0mm (0.04 in) 	P-20* P-25* P-18* P-25*	
Steering operation and linkage						I				I	<ul style="list-style-type: none"> • Operation and looseness • Fluid leakage or oozing • Free play.... 0—30mm (0—1.18 in) 	N-18* N-8*	
Front suspension ball joints						I				I	<ul style="list-style-type: none"> • Damage, looseness, and grease leakage 	—	
Driveshaft dust boots						I				I	<ul style="list-style-type: none"> • Cracking and damage 	M-7	
Bolts and nuts on chassis and body						T				T	<ul style="list-style-type: none"> • Retighten all loose nuts and bolts 	—	
Exhaust system heat shield						I				I	<ul style="list-style-type: none"> • Insulation clearance 	F-15	
Air conditioner system (if equipped)		Refrigerant	Inspect refrigerant amount annually									—	U-34*
		Compressor	Inspect operation annually									—	U-38*
Rear differential oil										R	<ul style="list-style-type: none"> • Oil capacity: 0.5 liter (0.53 US qt, 0.44 Imp qt) 	M-17	
Transfer oil										R	<ul style="list-style-type: none"> • Oil capacity: 0.65 liter (0.69 US qt, 0.57 Imp qt) 	J3-12 K2-136	

* Indicates page to be referred to on 323 Workshop Manual (1195-10-89E)

Note

I Inspect, and if necessary correct, clean, or replace

A.... Adjust

R.... Replace or change

T.... Tighten

After 60 months or 60,000 miles (96,000 km), continue to follow the described maintenance at the recommended intervals.

As for * marked items in this maintenance chart, note the following points:

- *1 Replacement of the timing belt is required every 60,000 miles (96,000 km). Failure to replace the timing belt may result in damage to the engine.
- *2 This maintenance is required for all states except California. However, we recommend that it also be performed on California vehicles.
- *3 This maintenance is recommended by Mazda. However, it is not necessary for emission warranty coverage or manufacturer recall liability.

Schedule 2 (Unique Driving Conditions)

MAINTENANCE OPERATION	MAINTENANCE INTERVALS	Number of months or miles (kilometers), whichever comes first												Service data and inspection points	Page						
		Months	5	10	15	20	25	30	35	40	45	50	55			60					
		× 1,000 miles	5	10	15	20	25	30	35	40	45	50	55			60					
		× 1,000 km	8	16	24	32	40	48	56	64	72	80	88			96					
Drive belts							I						I	<ul style="list-style-type: none"> Cracks or damage Tension 	B1-5*						
Engine oil		R	R	R	R	R	R	R	R	R	R	R	R	<ul style="list-style-type: none"> Oil pan capacity: All BP 3.6 liters (3.8 US qt, 3.2 Imp qt) 	D-5*						
Oil filter		R	R	R	R	R	R	R	R	R	R	R	R	<ul style="list-style-type: none"> Oil filter capacity: 0.17 liter (0.18 US qt, 0.15 Imp qt) 	D-5*						
Engine timing belt* ¹		Replace every 60,000 miles (96,000 km)												—	B1-12*						
Air cleaner element				I* ²			R			I* ²			R	—	F-71*						
Spark plugs							R						R	<ul style="list-style-type: none"> Plug gap: 1.0—1.1mm (0.039—0.043 in) Recommended spark plugs <table border="1"> <tr> <td>Engine</td> <td>NGK</td> <td>Nippon Denso</td> </tr> <tr> <td>BP SOHC</td> <td>BKR5E-11 BKR6E-11</td> <td>K16PR-U11 K20PR-U11</td> </tr> </table>	Engine	NGK	Nippon Denso	BP SOHC	BKR5E-11 BKR6E-11	K16PR-U11 K20PR-U11	G-18*
Engine	NGK	Nippon Denso																			
BP SOHC	BKR5E-11 BKR6E-11	K16PR-U11 K20PR-U11																			
Cooling system							I						I	<ul style="list-style-type: none"> Hoses for cracks or wear Coolant level 	E-5*						
Engine coolant							R						R	<ul style="list-style-type: none"> Coolant capacity: 5.0 liters (5.3 US qt, 4.4 Imp qt)..... MTX 6.0 liters (6.3 US qt, 5.3 Imp qt) ATX 	E-6*						
Idle speed							A* ²						A	<ul style="list-style-type: none"> ATX: P range, MTX: Neutral 750 ± 50 rpm (With parking brake applied) 	F-71*						
Fuel filter													R	—	F-107*						
Fuel lines							I* ³						I	<ul style="list-style-type: none"> Fittings, connections, and components for leaks 	F-9						
Brake lines, hoses and connections							I						I	<ul style="list-style-type: none"> Proper attachment and connections 	—						
Clutch pedal							I						I	<ul style="list-style-type: none"> Operation Pedal height (with carpet): 196—204mm (7.72—8.03 in) Free play 5—13mm (0.197—0.512 in) 	H-5						
Disc brake				I			I			I			I	<ul style="list-style-type: none"> Caliper operation Disc plate thickness: Minimum Front.... 20mm (0.79 in) Rear..... 7.0mm (0.28 in) Pad thickness: Minimum Front.... 2.0mm (0.08 in) Rear..... 1.0mm (0.04 in) 	P-20* P-25* P-18* P-25*						

* Indicates page to be referred to on 323 Workshop Manual (1195-10-89E)

Schedule 2 (Unique Driving Conditions) (Cont'd)

MAINTENANCE OPERATION	MAINTENANCE INTERVALS	Number of months or miles (kilometers), whichever comes first													Service data and inspection points	Page
		Months	5	10	15	20	25	30	35	40	45	50	55	60		
		× 1,000 miles	5	10	15	20	25	30	35	40	45	50	55	60		
		× 1,000 km	8	16	24	32	40	48	56	64	72	80	88	96		
Steering operation and linkage								I						I	<ul style="list-style-type: none"> • Operation and looseness • Fluid leakage or oozing • Free play.... 0—30mm (0—1.18 in) 	N-18* N-8*
Front suspension ball joint								I						I	<ul style="list-style-type: none"> • Damage looseness and grease leakage 	—
Driveshaft dust boots								I						I	<ul style="list-style-type: none"> • Cracking and damage 	M-7
Bolts and nuts on chassis and body					T			T			T			T	<ul style="list-style-type: none"> • Retighten all loose nuts and bolts 	—
Exhaust system heat shield								I						I	<ul style="list-style-type: none"> • Insulator clearance 	F-15
Air conditioner system (if equipped)		Refrigerant	Inspect refrigerant amount annually											—	U-34*	
		Compressor	Inspect operation annually											—	U-38*	
Rear differential oil														R	<ul style="list-style-type: none"> • Oil capacity 0.5 liter (0.53 US qt, 0.44 Imp qt) 	M-17
Transfer oil								R						R	<ul style="list-style-type: none"> • Oil capacity 0.65 liter (0.69 US qt, 0.57 Imp qt) 	J3-12 K2-136

* Indicates page to be referred to on 323 Workshop Manual (1195-10-89E)

Note

I.... Inspect, and if necessary correct, clean, or replace

A.... Adjust

R.... Replace or change

T.... Tighten

After 60 months or 60,000 miles (96,000 km), continue to follow the described maintenance at the recommended intervals.

As for * marked items in this maintenance chart, note the following points:

*1 Replacement of the timing belt is required every 60,000 miles (96,000 km). Failure to replace the timing belt may result in damage to the engine.

*2 This maintenance is required for all states except California. However, we recommend that it also be performed on California vehicles.

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ENGINE (SOHC)

INDEX..... B- 2

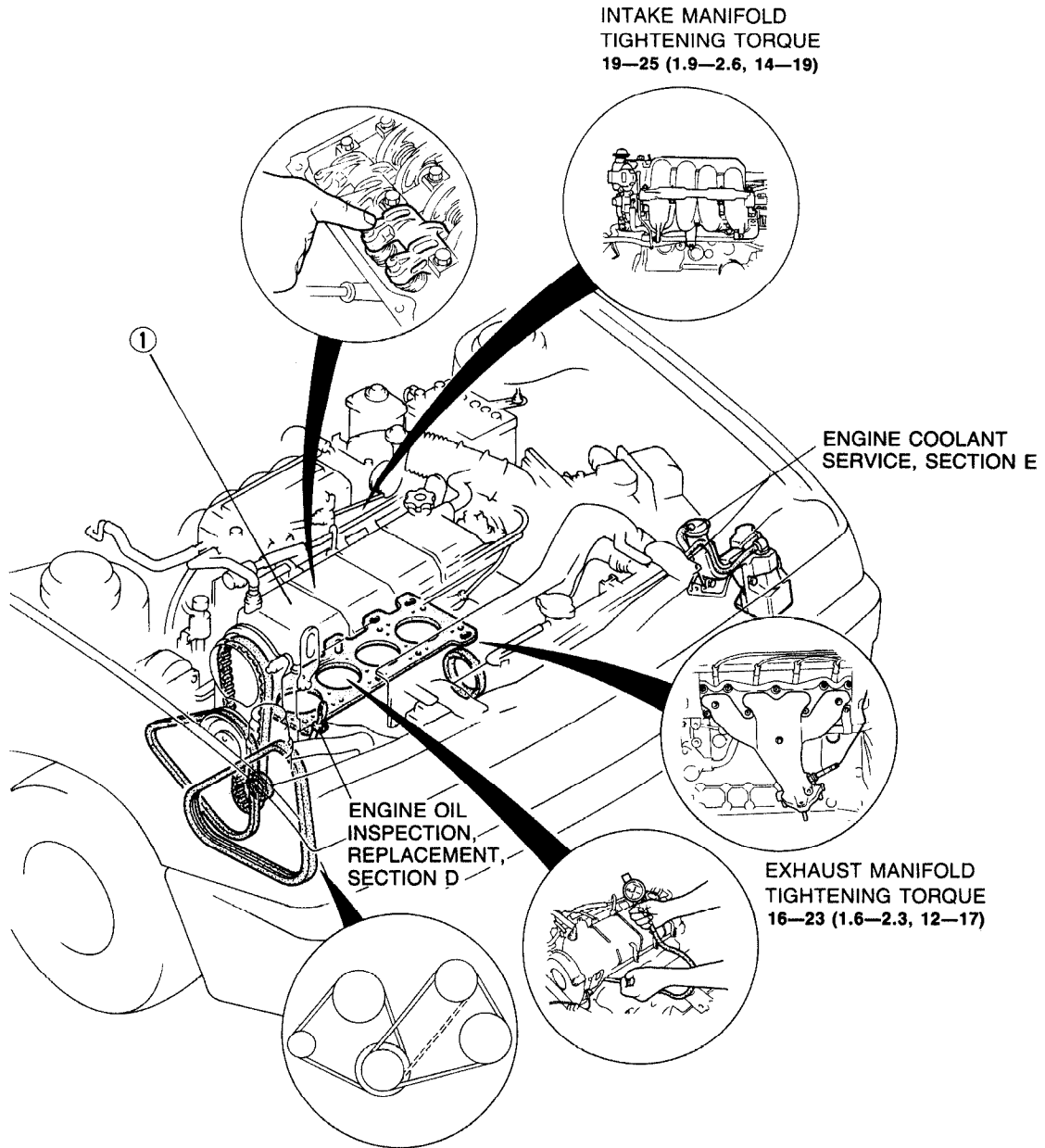
FEATURES

OUTLINE..... B- 3
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 SPECIFICATIONS..... B- 3
 INTERCHANGEABILITY..... B- 4
 FLYWHEEL B- 5

SERVICE

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REMOVAL B- 6
 PROCEDURE B- 6
INSTALLATION..... B-14
 PROCEDURE B-14

INDEX



DEFLECTION AT (98 N, 10 kg, 22 lb) mm (in)

DRIVE BELT	NEW	USED
ALTERNATOR	8.0—9.0 (0.31—0.35)	9.0—10.0 (0.35—0.39)
P/S, P/S + A/C	8.0—9.0 (0.31—0.35)	9.0—10.0 (0.35—0.39)

COMPRESSION kPa (kg/cm², psi)-rpm

	BP SOHC
STANDARD	1,197 (12.2, 173)-300
MINIMUM	834 (8.5, 121)-300

N·m (m·kg, ft·lb)

03U0BX-802

1. Engine

Removal page B- 6

Installation..... page B-14

OUTLINE

OUTLINE OF CONSTRUCTION

The BP SOHC engine for the 4WD model is the same as for the 2WD model, except that the flywheel is shaped differently.

03U0BX-803

SPECIFICATIONS

Item		Engine	BP SOHC
Type			Gasoline, 4-cycle
Cylinder arrangement and number			In-line, 4 cylinders
Combustion chamber			Pentroof
Valve system			OHC, belt-driven
Displacement		cc (cu in)	1,839 (112.2)
Bore and stroke		mm (in)	83.0 x 85.0 (3.27 x 3.35)
Compression ratio			8.9
Compression pressure		kPa (kg/cm ² , psi)-rpm	1,197 (12.2, 173)-300
Valve timing	IN	Open BTDC	2°
		Close ABDC	50°
	EX	Open BBDC	55°
		Close ATDC	8°
Valve clearance	mm (in)	IN	0: Maintenance-free
		EX	0: Maintenance-free
Idle speed ^{*1*2}	rpm	MTX	750 ± 50
		ATX	750 ± 50
Ignition timing ^{*2}		BTDC	5° ± 1°
Firing order			1-3-4-2

03U0BX-804

*1...With parking brake applied. (Canada)

*2...TEN terminal of diagnosis connector grounded.

INTERCHANGEABILITY

The following chart shows interchangeability of the main parts of the BP SOHC engine for the 4WD model and the 2WD model.

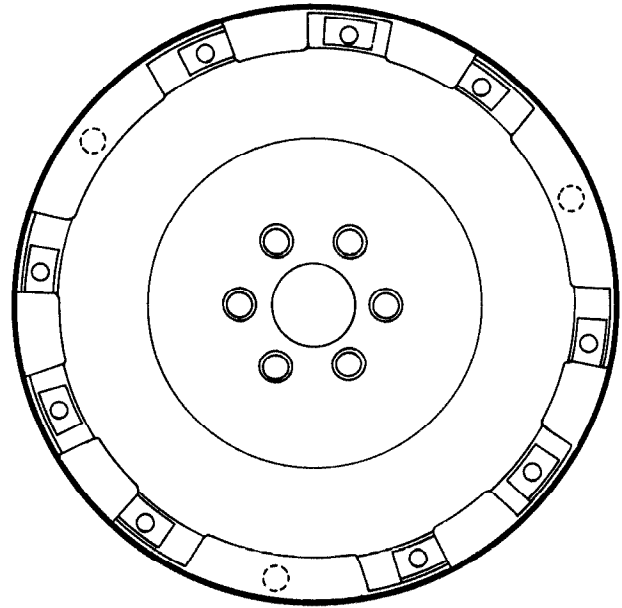
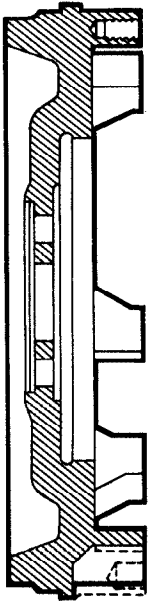
Symbols: ○ Interchangeable

X Not interchangeable

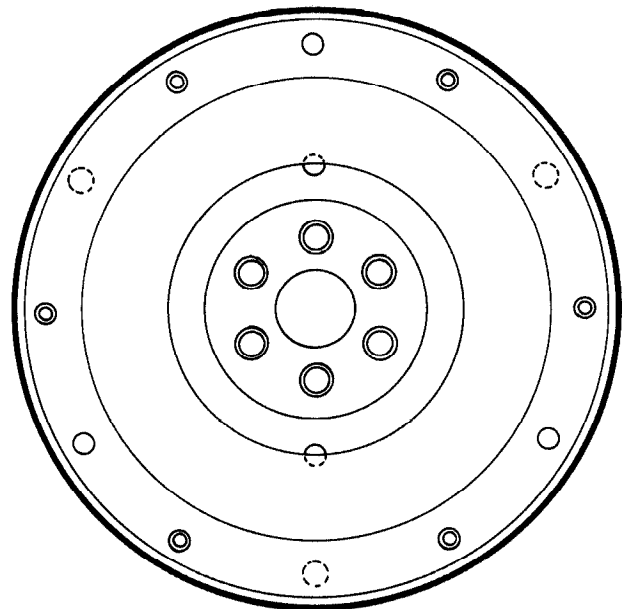
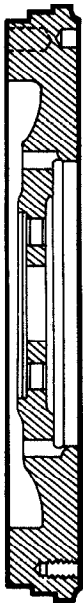
Part name		Interchangeability	Remark	
Cylinder block related	Cylinder head	○		
	Camshaft oil seal	○		
	Cylinder head bolt	○		
	Cylinder head gasket	○		
	Cylinder head cover	○		
	Cylinder head cover gasket	○		
	Cylinder block	○		
	Main bearing cap	○		
	Main bearing support plate	○		
	Oil pan	○		
	Timing belt cover	○		
	Front oil seal	○		
	Rear oil seal	○		
	Crankshaft related	Crankshaft	○	
Main bearing		○		
Thrust bearing		○		
Connecting rod and cap		○		
Connecting rod bearing		○		
Piston		○		
Piston pin		○		
Piston ring		○		
Crankshaft pulley		○		
Rear cover		○		
Flywheel		X	Shape different	
Flywheel bolt		○		
Timing belt related	Timing belt	○		
	Timing belt crank pulley	○		
	Camshaft pulley	○		
	Timing belt tensioner and spring	○		
Valve related	Camshaft	○		
	Rocker arm	○		
	Rocker arm shaft	○		
	HLA	○		
	Valve	Intake	○	
		Exhaust	○	
	Valve spring and seat	Intake	○	
		Exhaust	○	
Valve guide	○			
Valve seal	○			
Lubrication system related	Oil pump	○		
	Oil pump gasket	○		
	Oil strainer	○		
	Oil strainer gasket	○		
	Oil jet	○		
	Oil filter	○		
Cooling system related	Water pump	○		
	Thermostat	○		
	Radiator	X	Specification different	
	Cooling fan	X	Specification different	

FLYWHEEL

4WD MODEL



2WD MODEL



03U0BX-806

The flywheel is shaped differently to accommodate the redesigned clutch disc and clutch cover.

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Workshop Manual (1195-10-89E).

Engine

- Removal
- Installation

03U0BX-807

REMOVAL

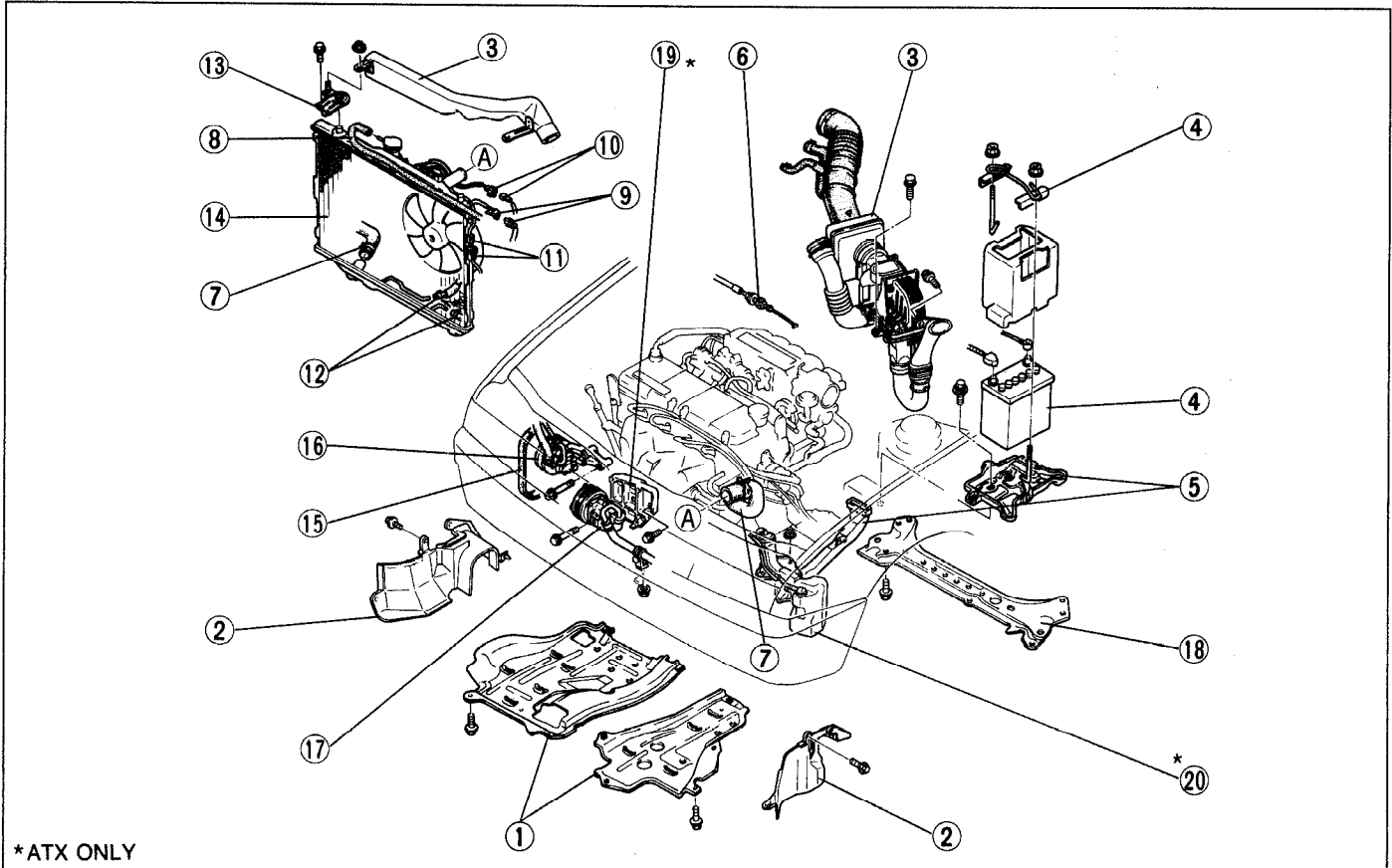
Warning

- Release the fuel pressure.

PROCEDURE

1. Disconnect the negative battery cable.
2. Drain the engine coolant and transaxle oil.
3. Remove in the order shown in the figure, referring to **Removal Note**.

Step 1



*ATX ONLY

03U0BX-808

- | | |
|-----------------------------------------------|---------------------------------------|
| 1. Undercover | 12. Oil cooler hose (ATX) |
| 2. Side cover | 13. Radiator bracket |
| 3. Resonance chamber and air cleaner assembly | 14. Radiator and cooling fan assembly |
| 4. Battery bracket and battery | 15. P/S and/or A/C drive belt |
| 5. Battery carrier and battery duct | 16. P/S oil pump and bracket |
| 6. Accelerator cable | Removal Note..... page B-7 |
| 7. Radiator hose | 17. A/C compressor |
| 8. Coolant reservoir hose | Removal Note..... page B-7 |
| 9. Cooling fan connector | 18. Crossmember |
| 10. Radiator switch connector (ATX) | 19. A/C compressor bracket |
| 11. A/C cut switch connector (ATX) | 20. Coolant reservoir |

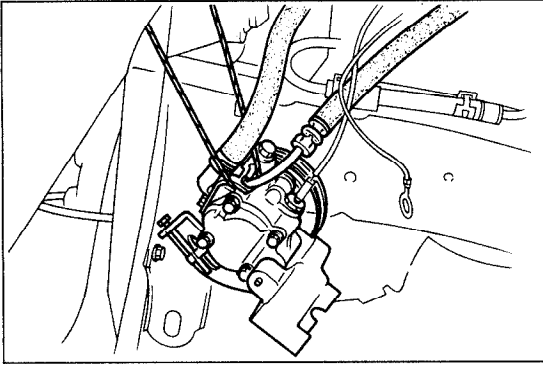
REMOVAL

Removal note P/S oil pump

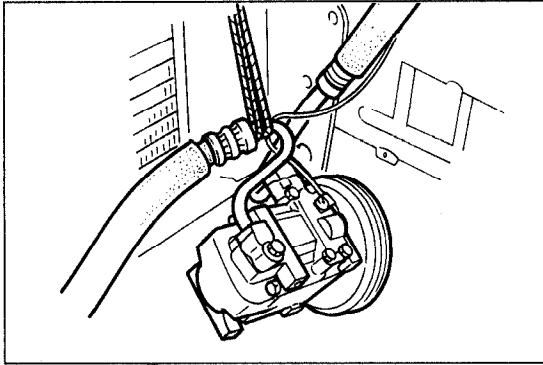
Caution

- Do not damage the hoses.

1. Remove the P/S oil pump with the hoses still connected.
2. Position the pump away from the engine and affix it with wire.



05U0BX-074



05U0BX-075

A/C compressor

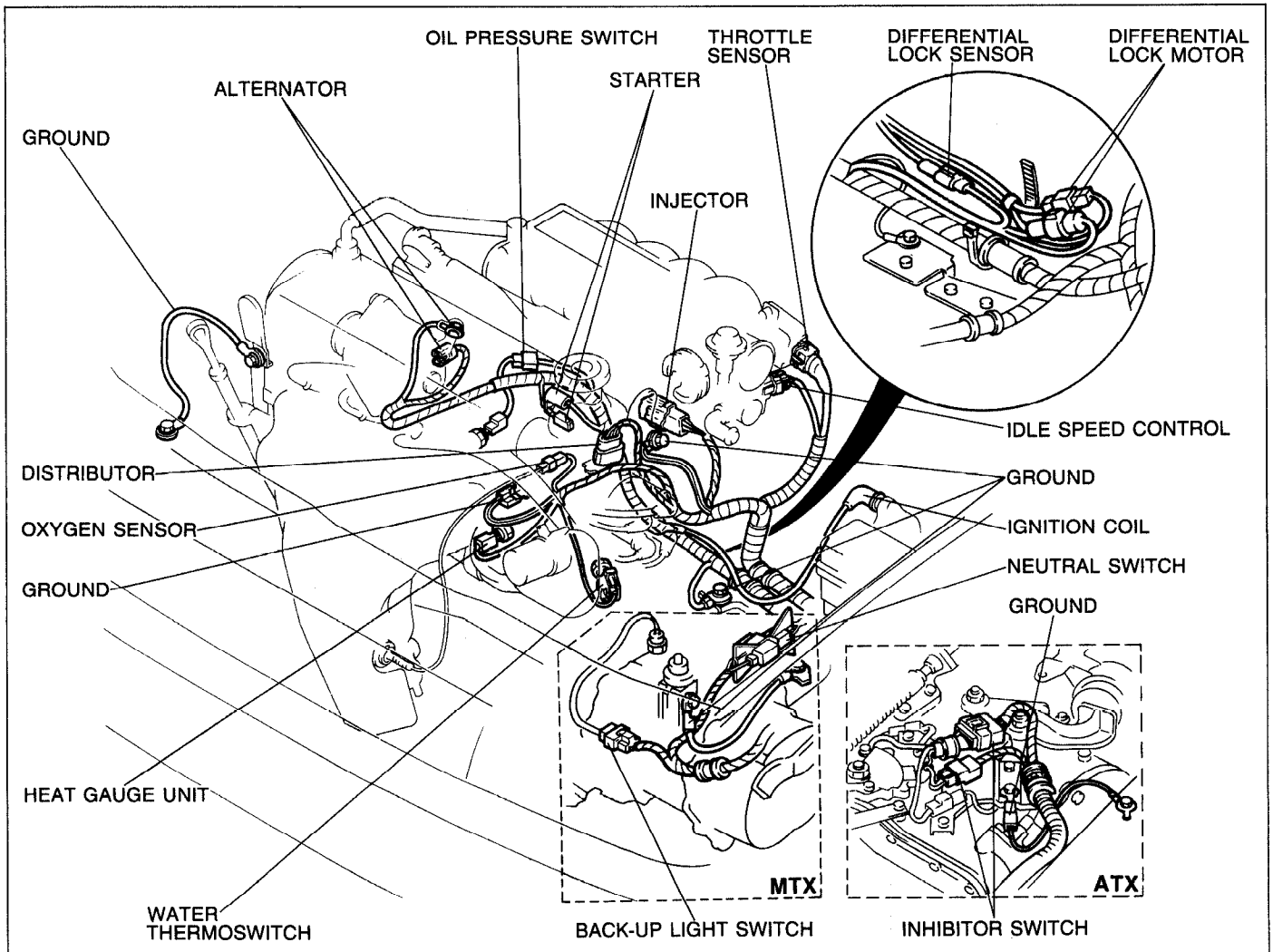
Caution

- Do not damage the hoses.

1. Remove the A/C compressor with the hoses still connected.
2. Position the compressor away from the engine and affix it with wire.

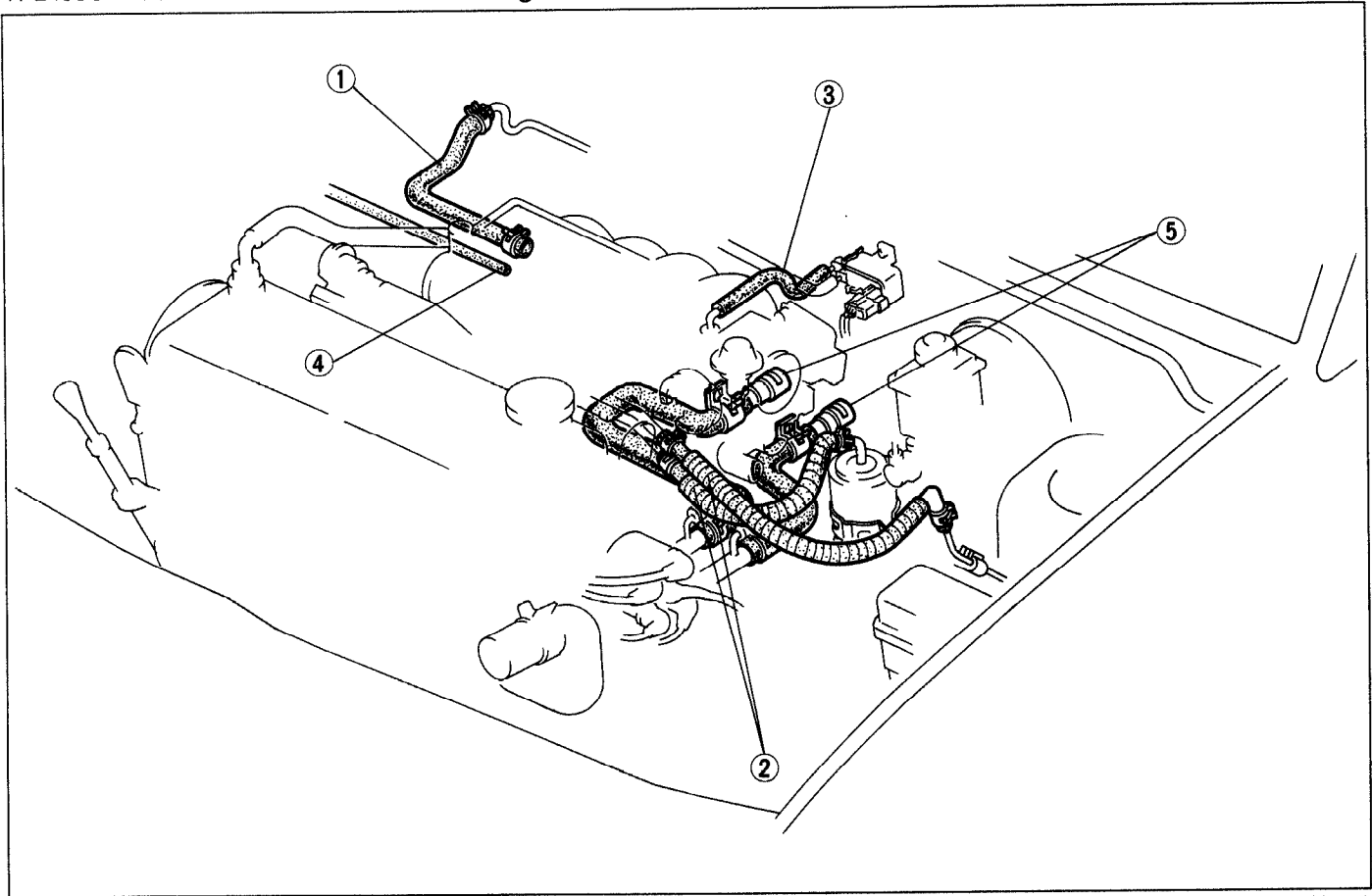
Step 2

1. Disconnect the harness connectors shown in the figure.



Step 3

1. Disconnect the hoses shown in the figure.



03U0BX-810

- 1. Brake vacuum hose
- 2. Fuel hose

Removal Note..... page B-8

- 3. Vacuum hose (Purge control)
- 4. Vacuum hose (Cruise control)
- 5. Heater hose

Removal Note..... page B-8

Removal note Fuel hose

Warning

- Keep sparks and open flame away from the fuel area.

Caution

- Cover the hose with a rag because fuel will spray out when disconnecting.
- Plug the disconnected hoses to avoid fuel leakage.

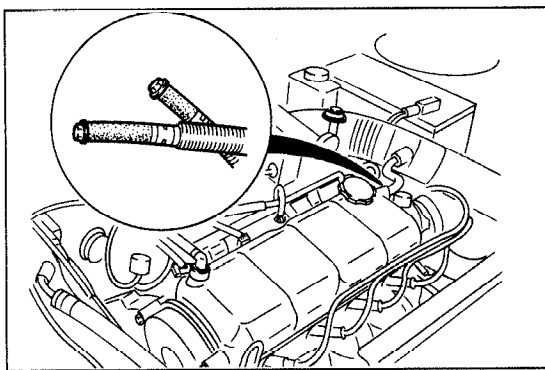
1. Disconnect the fuel hoses.

Heater hose

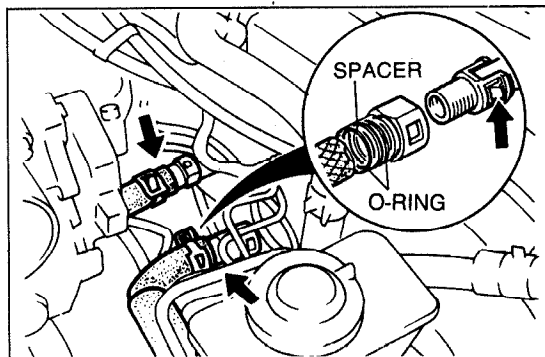
Caution

- Do not lose the heater hose joint O-rings and spacer when removed.

1. Depress the heater hose retainer and remove the heater hose.

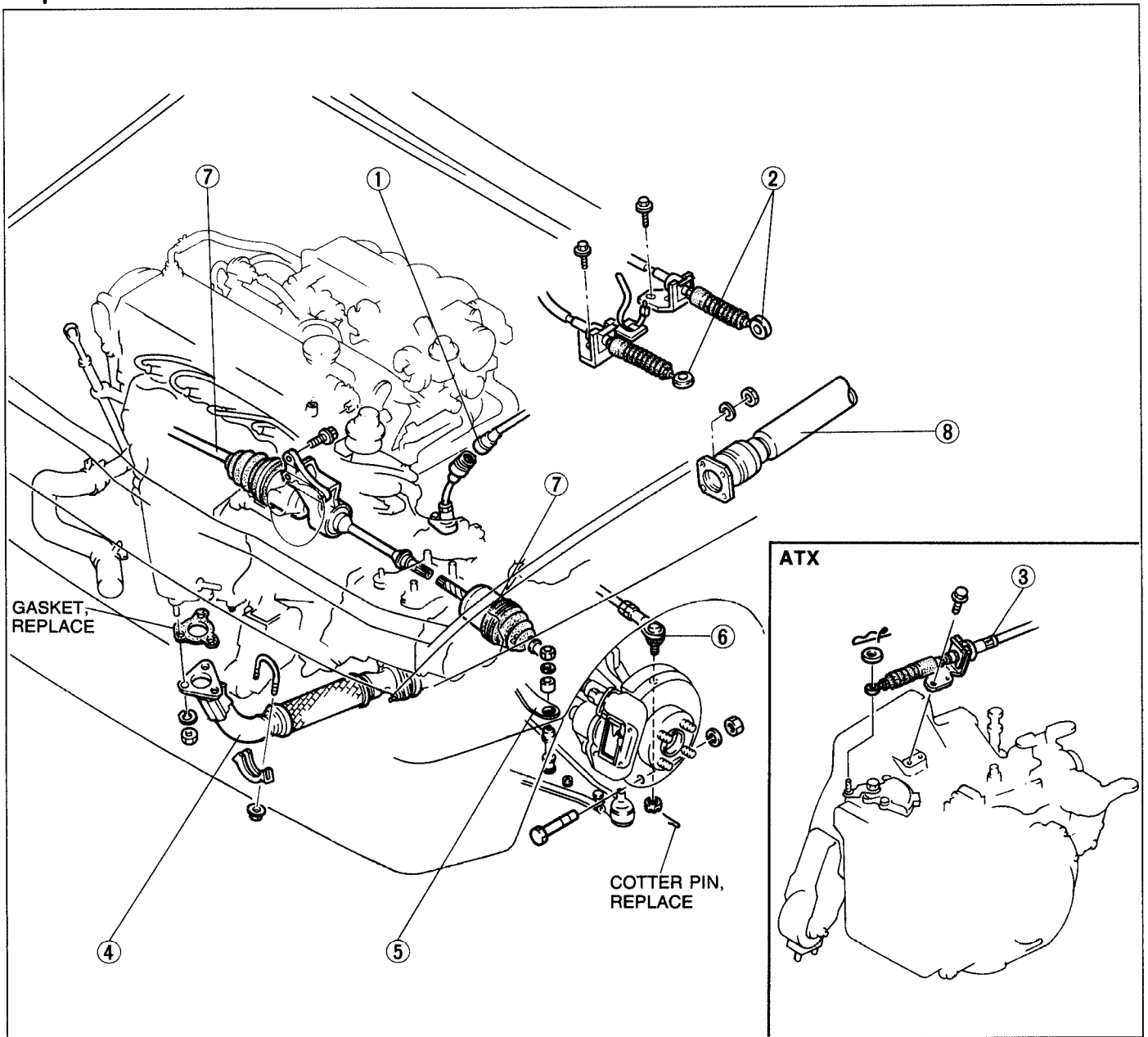


05U0BX-078



03U0BX-845

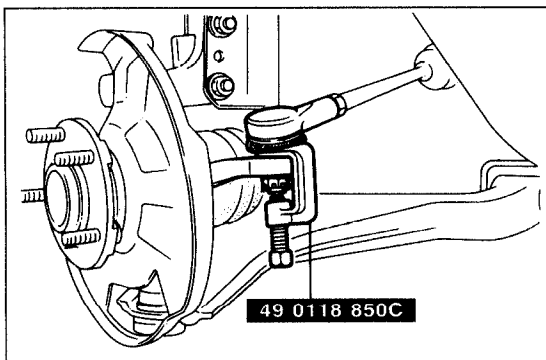
Step 4



03U0BX-811

- 1. Speedometer cable
- 2. Select and shift cable (MTX)
- 3. Shift control cable (ATX)
- 4. Front exhaust pipe
- 5. Stabilizer

- 6. Tie-rod end
Removal Note..... page B- 9
- 7. Driveshaft
Removal Note..... page B-10
- 8. Propeller shaft
Removal Note..... page L- 5



03U0BX-812

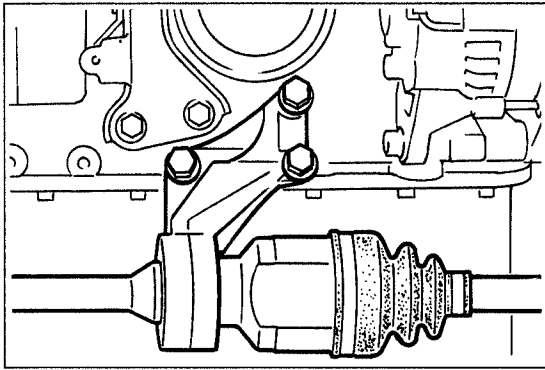
Removal note
Tie-rod end

- 1. Remove the cotter pin and loosen the nut until it is flush with the end of the ball joint stud.

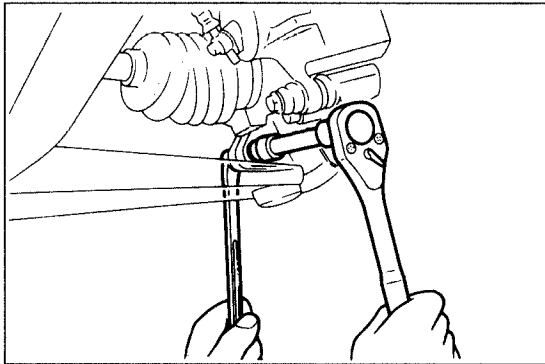
Caution

- **Do not reuse the cotter pin.**

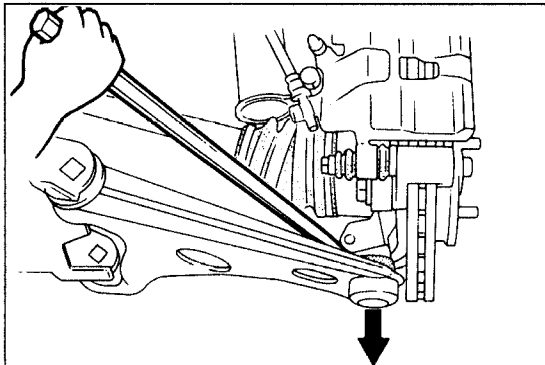
- 2. Separate the ball joint from the knuckle arm with the **SST**.



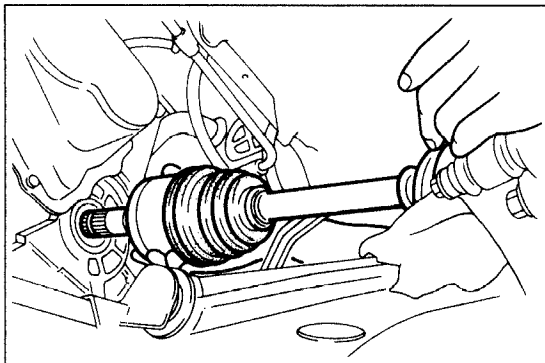
93E0B2-025



03U0BX-846



03U0BX-847



03U0BX-813

Driveshaft

1. Remove the joint shaft.

2. Remove the lower arm ball joint clinch bolt.

Caution

- Do not damage the ball joint dust boots.

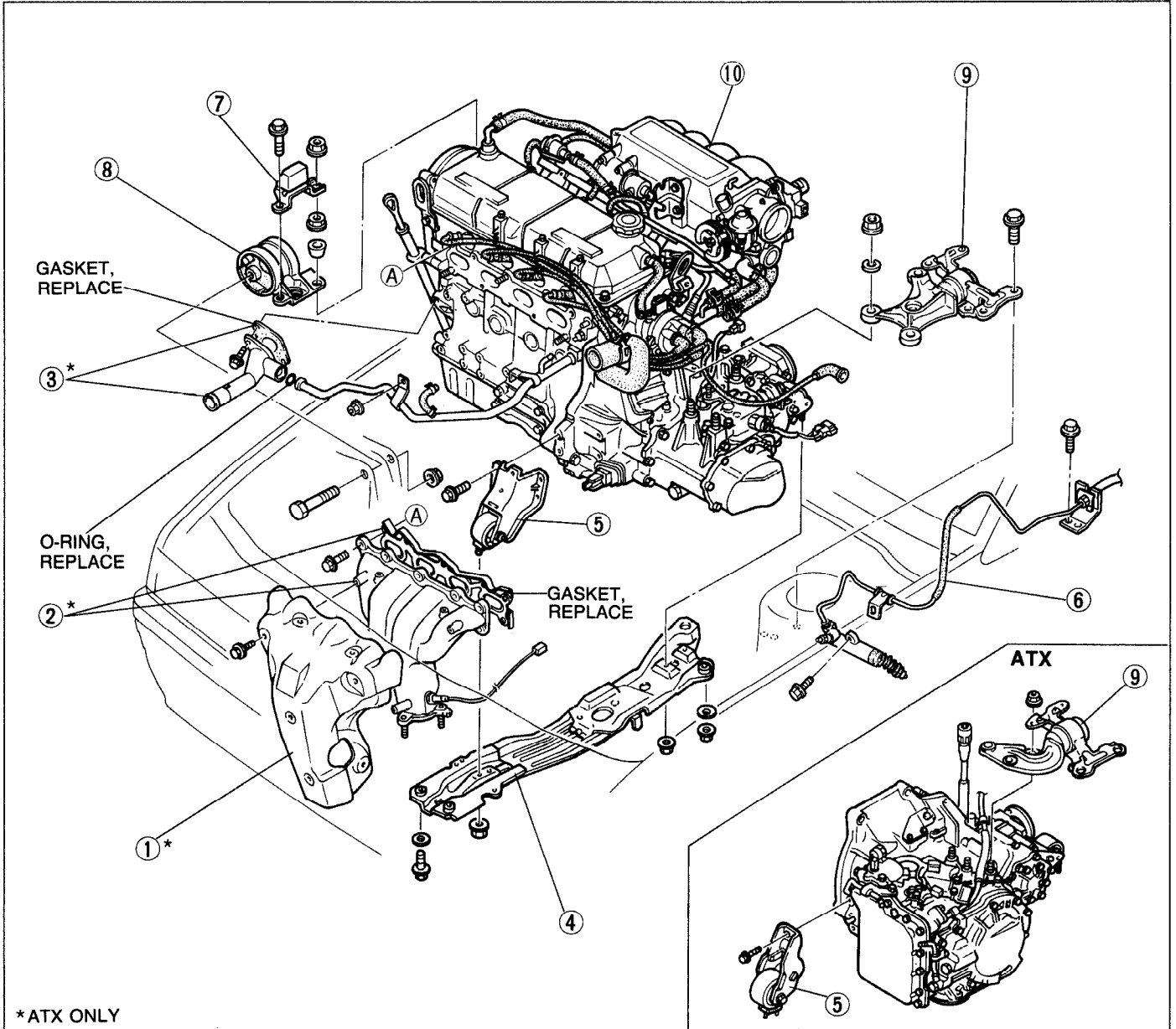
3. Pry the lower arm downward to separate it from the knuckle.

Caution

- Do not damage the oil seal.

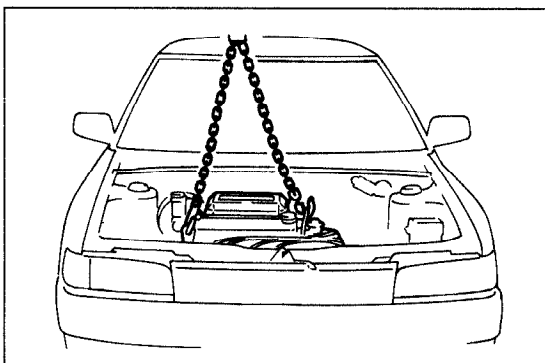
4. Separate the driveshaft from the transaxle.

Step 5



03U0BX-814

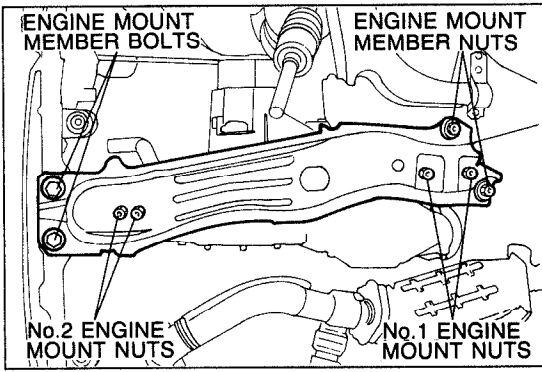
- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Exhaust manifold insulator</p> <p>2. Exhaust manifold and gasket</p> <p>3. Water inlet pipe and gasket</p> <p>4. Engine mount member
Removal Note..... page B-11</p> <p>5. No.2 engine mount rubber and bracket</p> | <p>6. Clutch release cylinder (MTX)
Removal Note..... page B-12</p> <p>7. Dynamic damper</p> <p>8. No.3 engine mount rubber</p> <p>9. No.4 engine mount rubber and bracket</p> <p>10. Engine and transaxle assembly
Removal Note..... page B-12</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



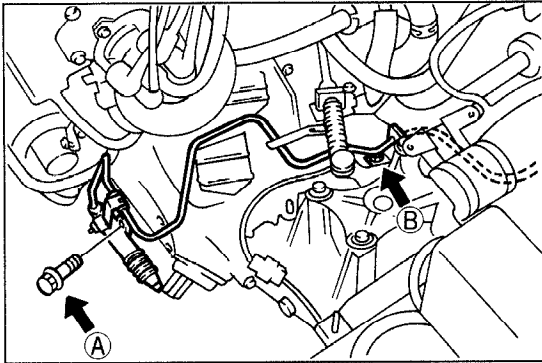
03U0BX-815

Removal note
Engine mount member

1. Suspend the engine with a chain hoist.



03U0BX-816



03U0BX-817

2. Remove the No.1 and No.2 engine mount nuts.
3. Remove the engine mount member bolts and nuts and the engine mount member.

Caution

- Be careful that the engine does not fall when removing the member.

Clutch release cylinder (MTX)

1. Remove the release cylinder pipe bracket from the transaxle.
2. Position the release cylinder with the hose connected away from the transaxle for easier removal.

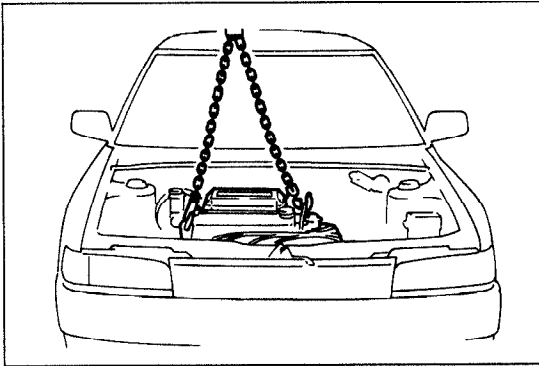
Caution

- Do not damage the pipe and hose.

Engine and transaxle assembly**Caution**

- Do not damage any components in the engine compartment.

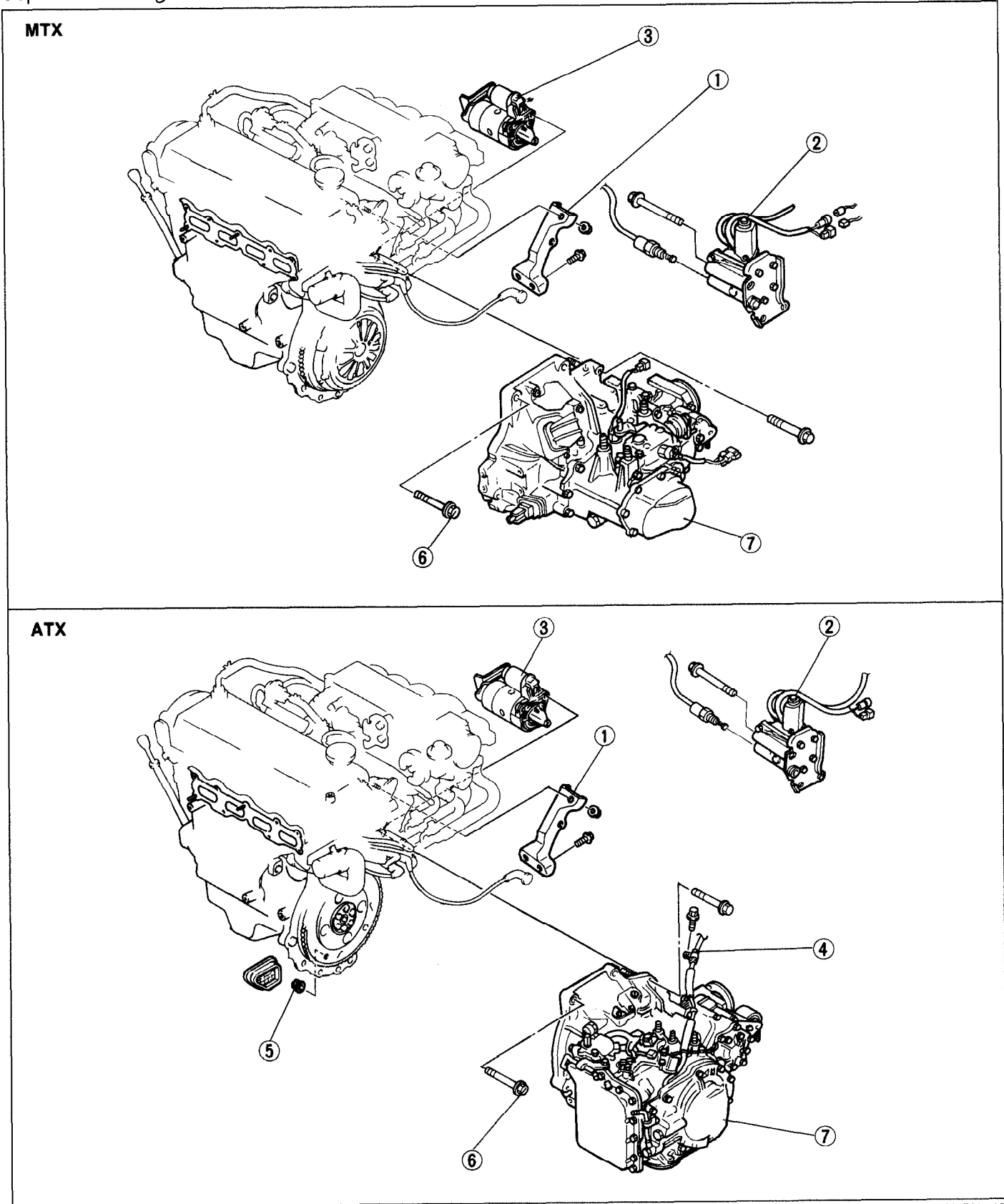
1. Lift the engine and transaxle assembly out as a unit.



03U0BX-818

Step 6

Separate the engine and transaxle in the order shown in the figure.



03U0BX-019

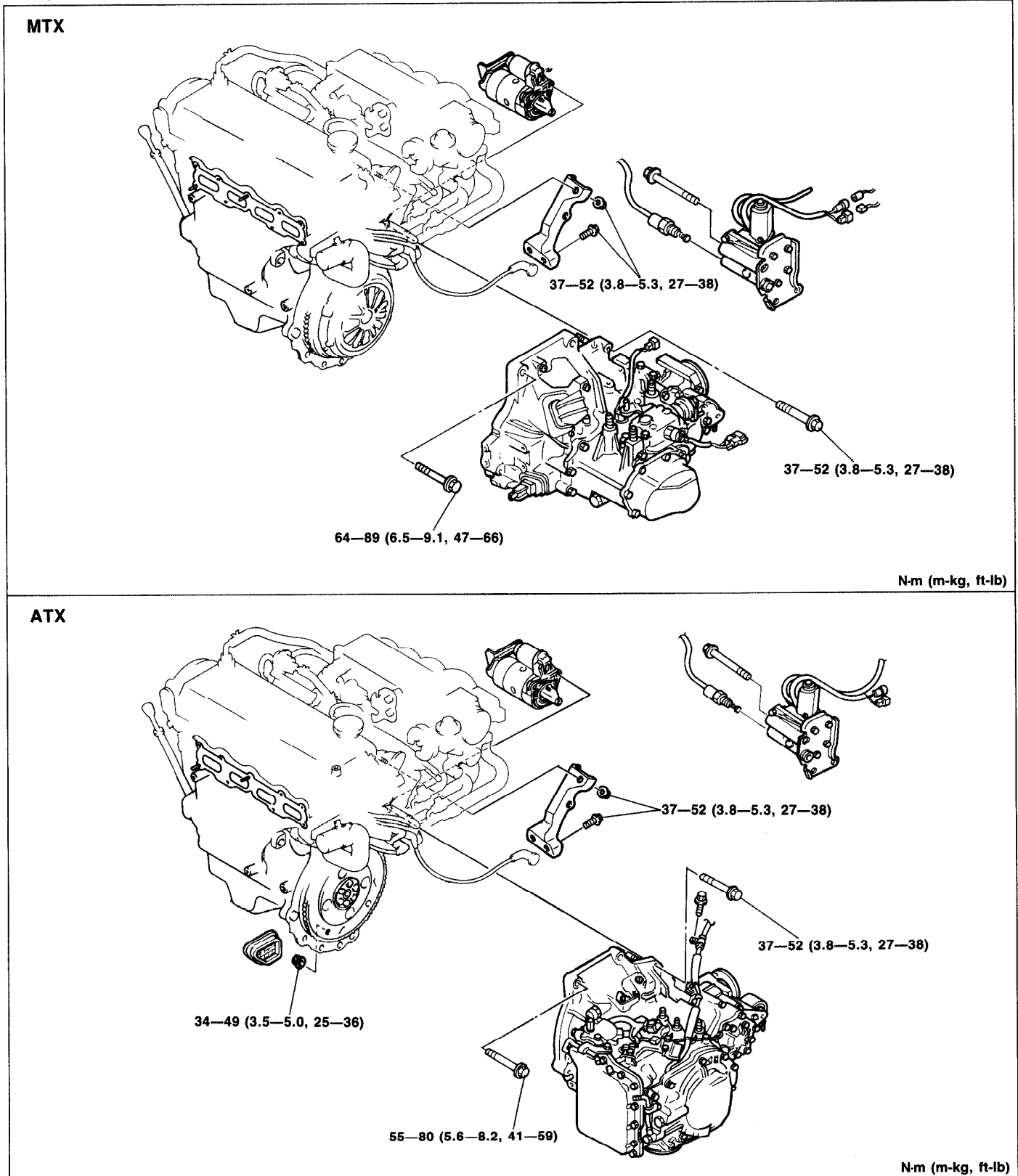
- | | |
|-----------------------------------|--------------------------------|
| 1. Intake manifold bracket | 4. Throttle cable (ATX) |
| 2. Center differential lock motor | 5. Torque converter nuts (ATX) |
| Removal Note page J3-99 | 6. Transaxle mounting bolts |
| 3. Starter and bracket | 7. Transaxle |

INSTALLATION**PROCEDURE**

Tighten all bolts and nuts to the specified torques.

Step 1

1. Join the engine and transaxle.

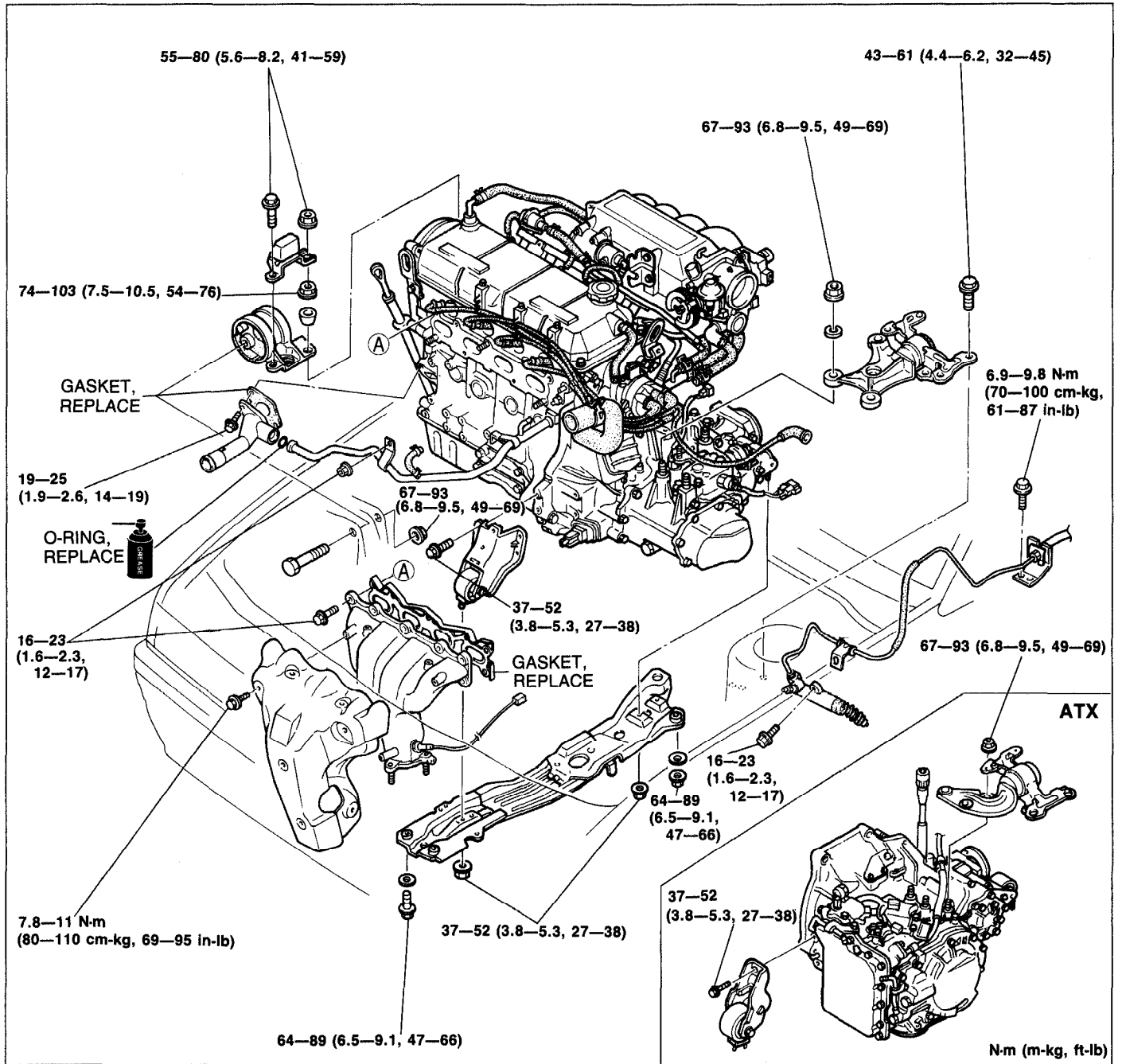
Torque Specifications

Step 2

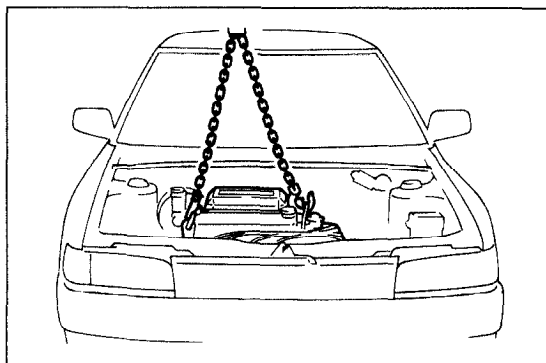
Warning

- Be sure the vehicle is securely supported on safety stands.

Torque Specifications



03U0BX-821



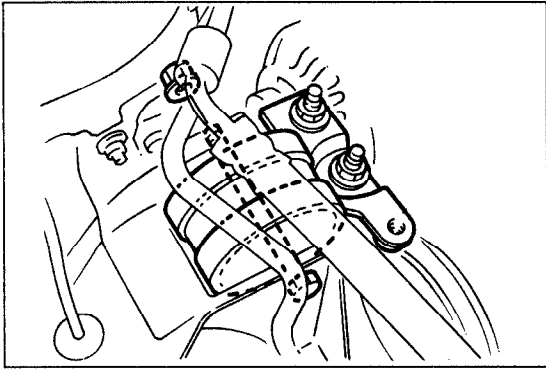
03U0BX-822

Engine and transaxle assembly

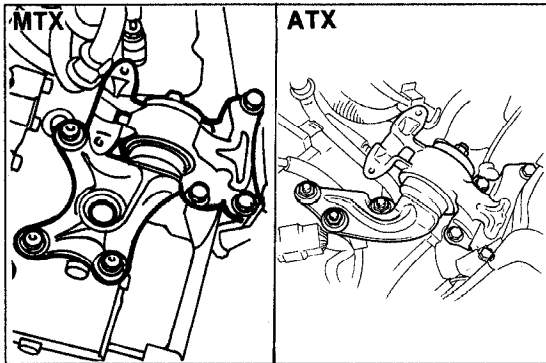
1. Suspend the engine and transaxle assembly.

Caution

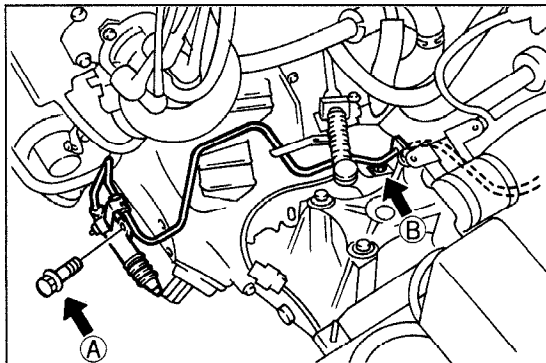
- Do not damage any components in the engine compartment.



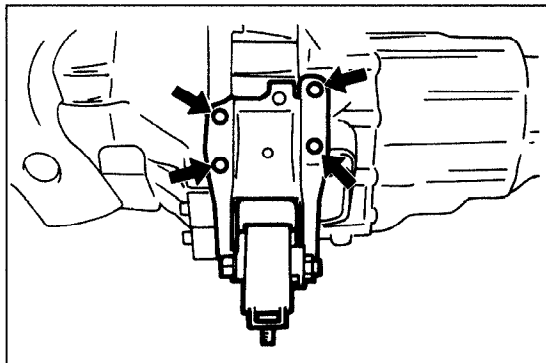
03U0BX-823



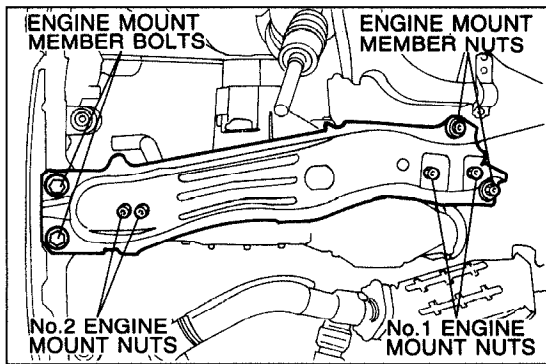
03U0BX-824



03U0BX-825



03U0BX-826



03U0BX-827

Engine mount, clutch release cylinder (MTX) and engine mount member

1. Install the No.3 engine mount rubber; then loosely tighten the bolt and nuts.

2. Install the No.4 engine mount rubber and bracket assembly; then loosely tighten the bolts and nuts.

3. Install the clutch release cylinder and pipe bracket assembly. (MTX)

Tightening torque:

- Ⓐ 16—23 N·m (1.6—2.3 m·kg, 12—17 ft·lb)
- Ⓑ 6.9—9.8 N·m (70—100 cm·kg, 61—87 in·lb)

4. No.2 engine mount rubber and bracket assembly.

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

5. Align the engine mount member to the No.1 and No.2 engine mount bolts; then loosely tighten the nuts.

6. Install the engine mount member bolt and nuts; then tighten them.

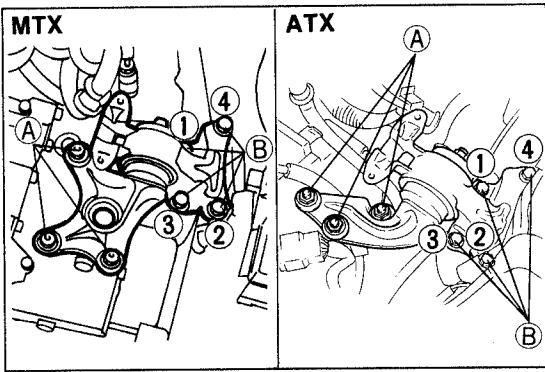
Tightening torque:

64—89 N·m (6.5—9.1 m·kg, 47—66 ft·lb)

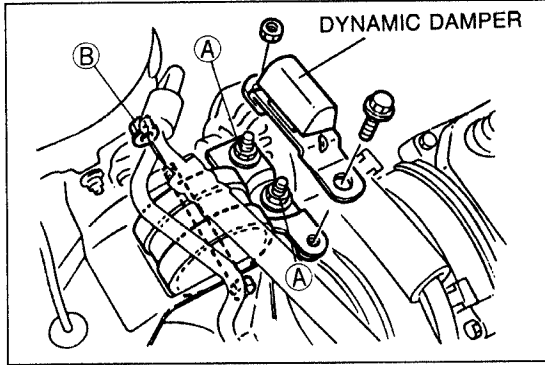
7. Tighten the No.1 and No.2 engine mount nuts.

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)



03U0BX-828



03U0BX-829

8. Tighten bolts (B) in two or three steps in the order shown.

Tightening torque:
43—61 N·m (4.4—6.2 m·kg, 32—43 ft·lb)

9. Tighten nuts (A).

Tightening torque:
67—93 N·m (6.8—9.5 m·kg, 49—69 ft·lb)

10. Tighten the No.3 engine mount nuts (A).

Tightening torque:
74—103 N·m (7.5—10.5 m·kg, 54—76 ft·lb)

11. Tighten nut (B).

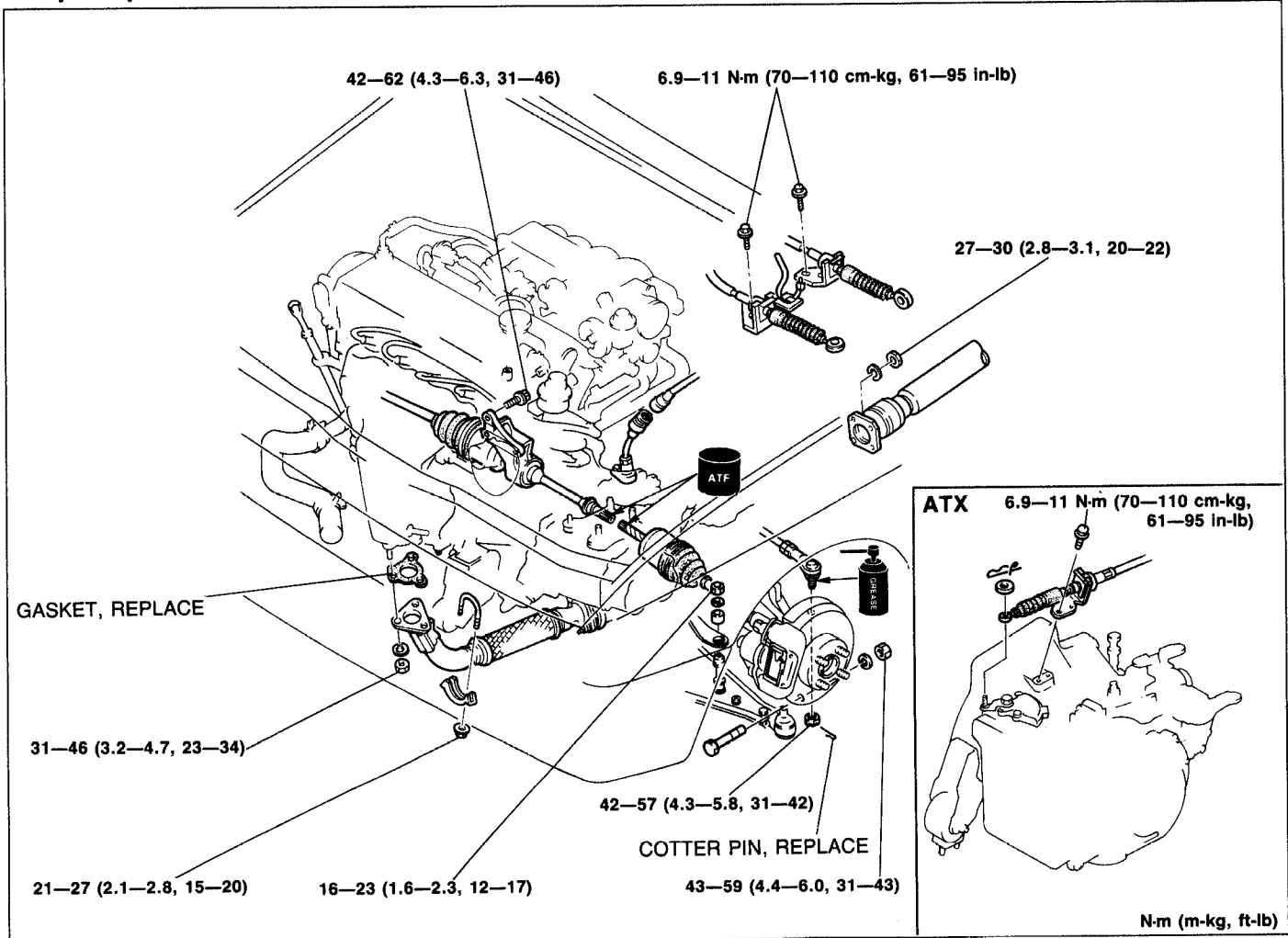
Tightening torque:
67—93 N·m (6.8—9.5 m·kg, 49—69 ft·lb)

12. Install the dynamic damper.

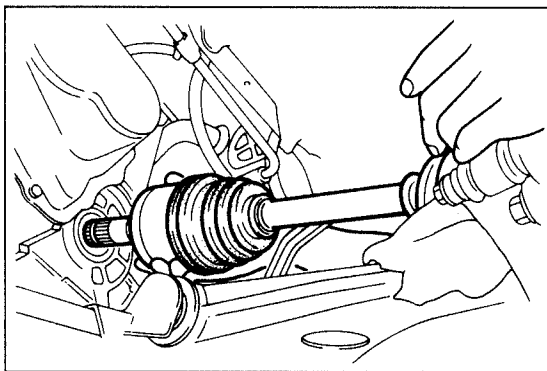
Tightening torque:
55—80 N·m (5.6—8.2 m·kg, 41—59 ft·lb)

13. Remove a chain hoist.

Step 3 Torque Specifications



03U0BX-830



03U0BX-831

Propeller shaft

1. Install the propeller shaft. (Refer to page L-5.)

Driveshaft

1. Apply grease to the end of the driveshaft.

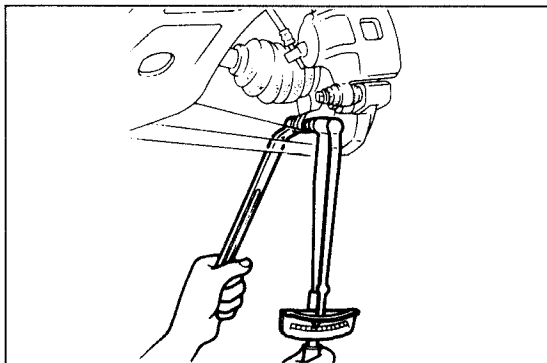
Caution

- When installing the driveshaft, be careful not to damage the oil seal.
- After installation, pull the front hub outward to confirm that the driveshaft is securely held by the clip.

2. Install the driveshaft and a new clip.
3. Install the lower arm ball joint to the knuckle and tighten the clinch bolt.

Tightening torque:

43—59 N·m (4.4—6.0 m·kg, 31—43 ft·lb)

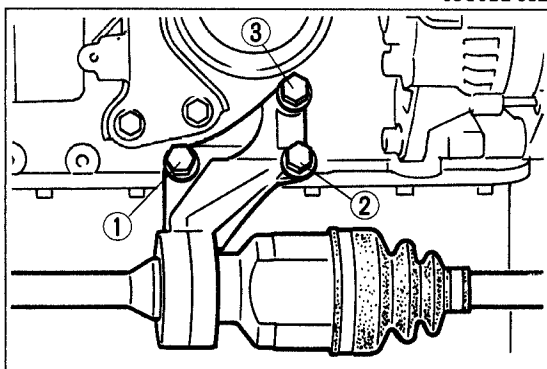


03U0B2-832

4. Install the joint shaft.
5. Tighten the bolts in the order shown.

Tightening torque:

42—62 N·m (4.3—6.3 m·kg, 31—46 ft·lb)



93E0B2-061

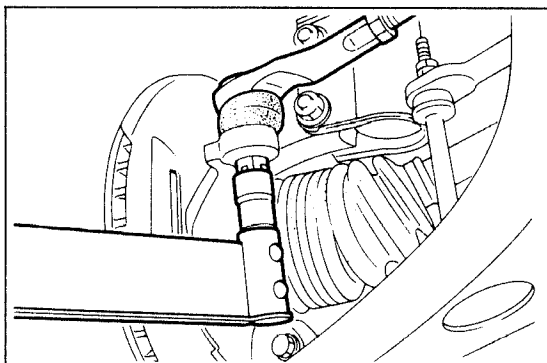
Tie-rod end

1. Install the tie-rod end to the knuckle.

Tightening torque:

42—57 N·m (4.3—5.8 m·kg, 31—42 ft·lb)

2. Install a new cotter pin.



03U0BX-848

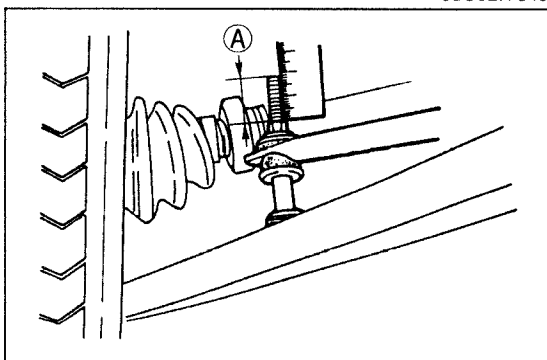
Stabilizer

1. Install and adjust the stabilizer.

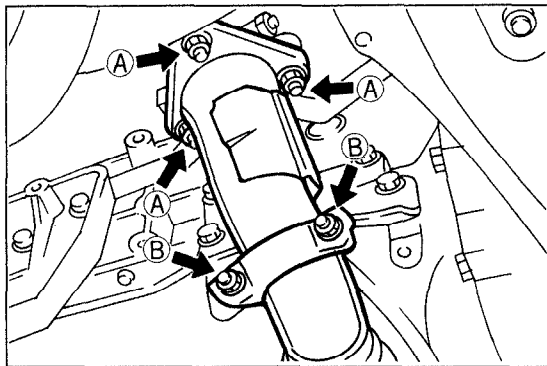
Dimension A: 17—19mm (0.67—0.75 in)

Tightening torque:

16—23 N·m (1.6—2.3 m·kg, 12—17 ft·lb)



93E0B2-078



03U0BX-844

Exhaust pipe

1. Install the exhaust pipe and a new gasket; then loosely tighten the locknuts (A).
2. Loosely tighten the bracket nuts (B).
3. Tighten the locknuts (A).

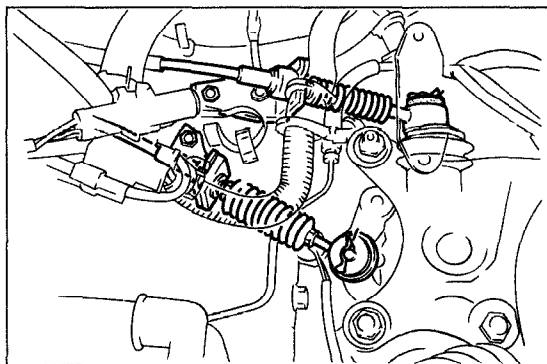
Tightening torque:

31—46 N·m (3.2—4.7 m·kg, 23—34 ft·lb)

4. Tighten the bracket nuts (B).

Tightening torque:

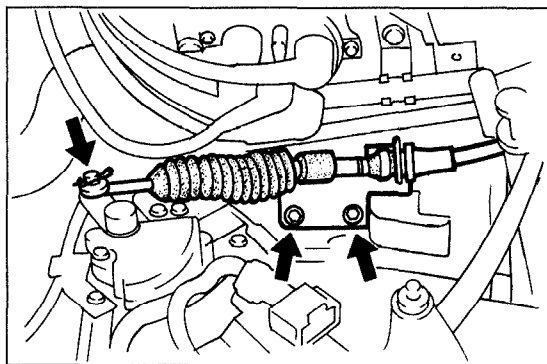
21—27 N·m (2.1—2.8 m·kg, 15—20 ft·lb)



03U0BX-833

Select and shift cable (MTX)

1. Install the select cable and the spring pin.
2. Install the shift cable and the spring pin.



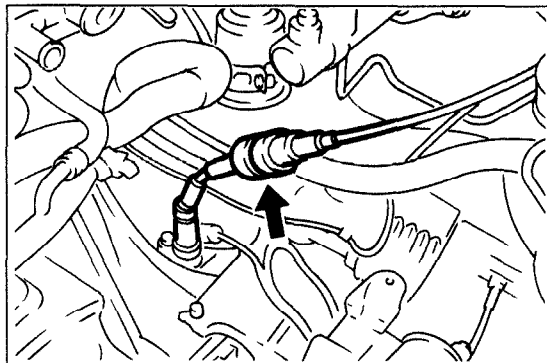
03U0BX-834

Shift control cable (ATX)

1. Install the shift control cable and the spring pin.

Tightening torque:

6.9—11 N·m (70—110 cm·kg, 61—95 in·lb)



03U0BX-835

Speedometer cable

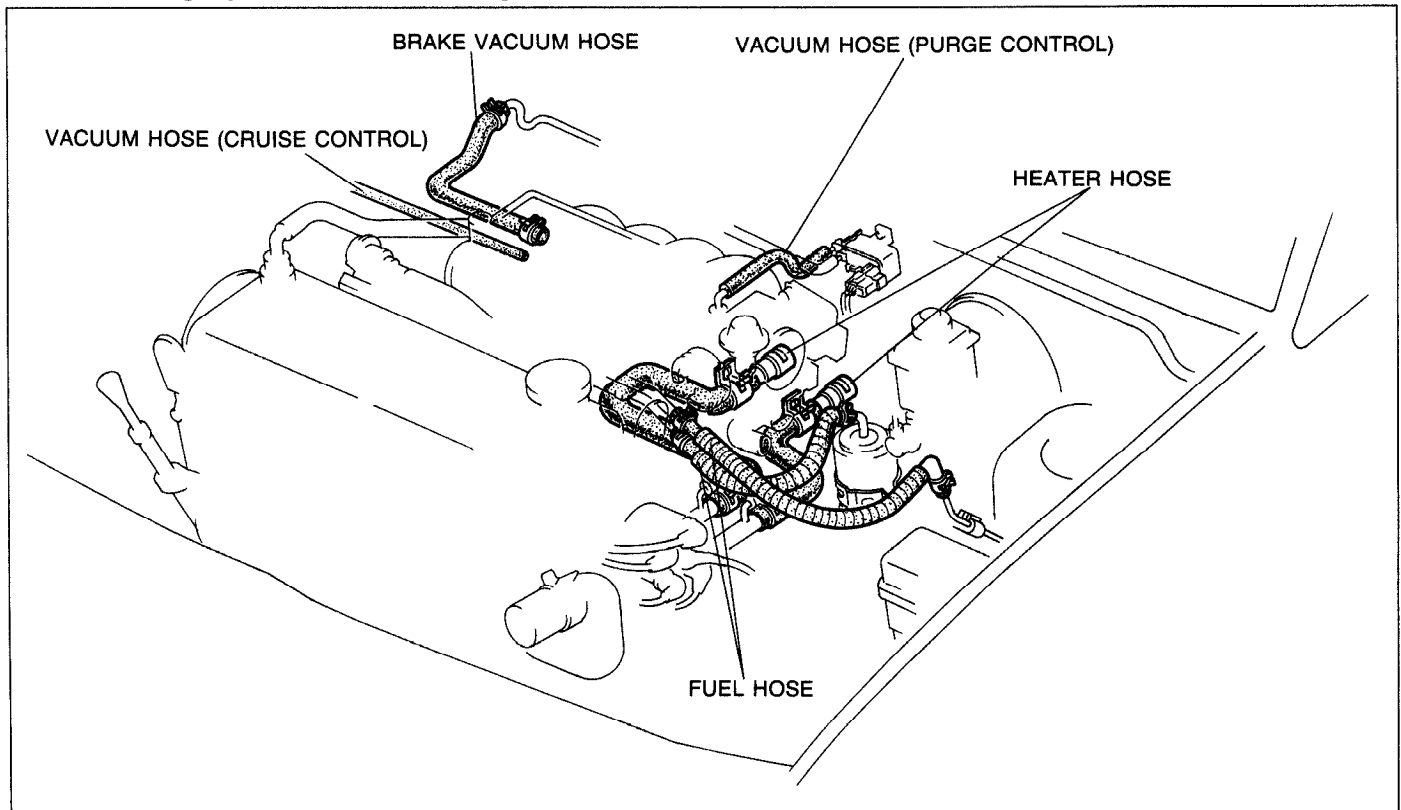
1. Connect the speedometer cable.

Step 4

1. Connect the hoses shown in the figure.

Caution

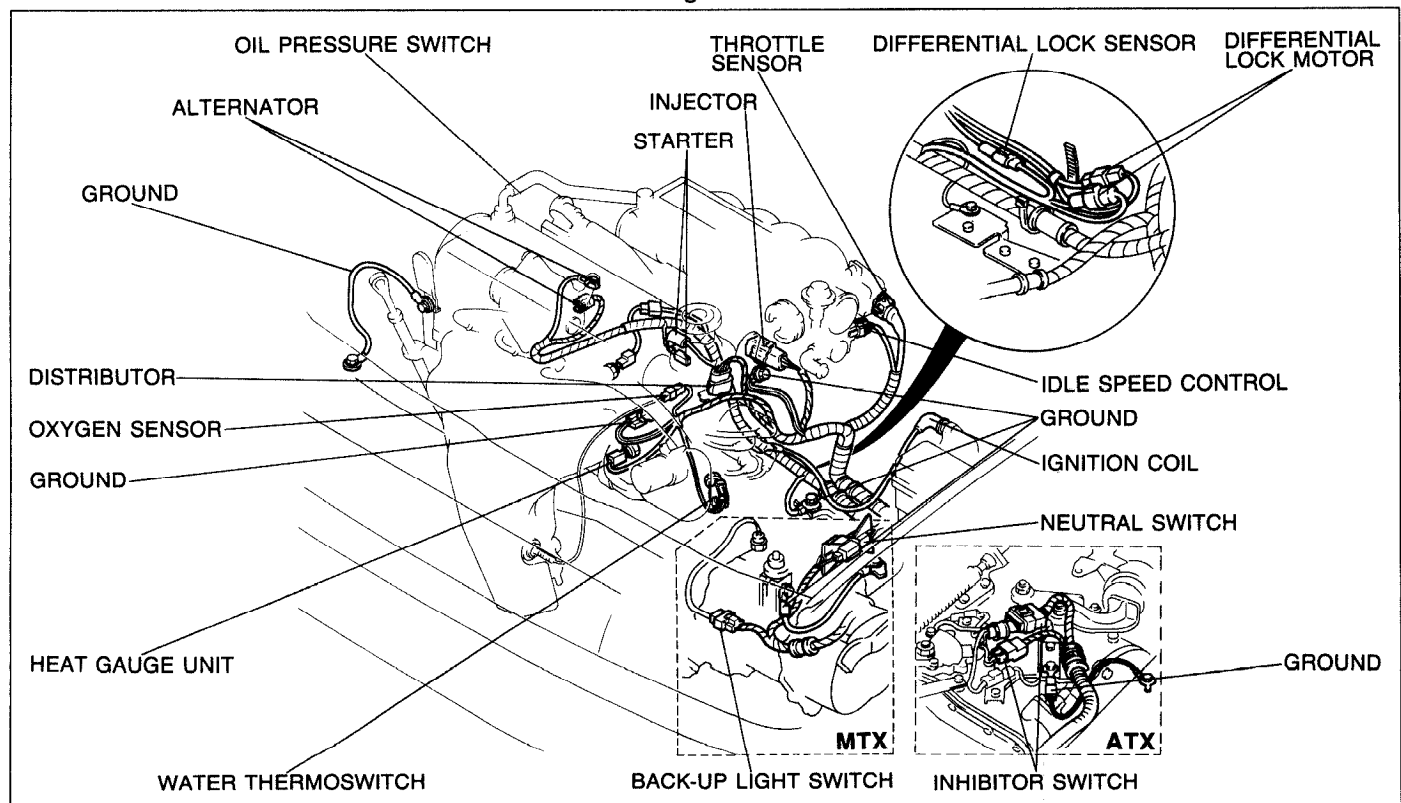
- Position the hose clamp in the original location on the hose, and squeeze the clamp lightly with large pliers to ensure a good fit.



03U0BX-836

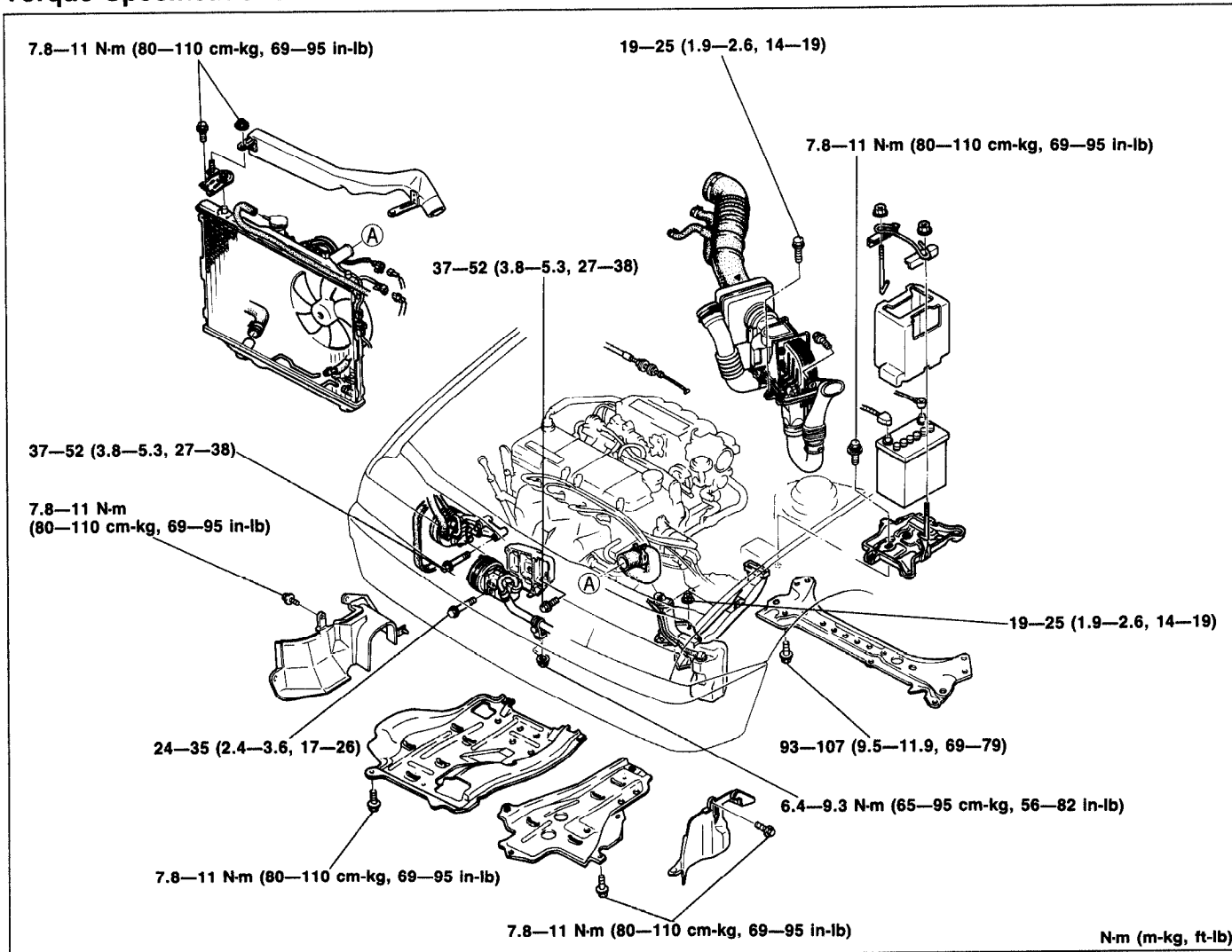
Step 5

1. Connect the harness connectors shown in the figure.

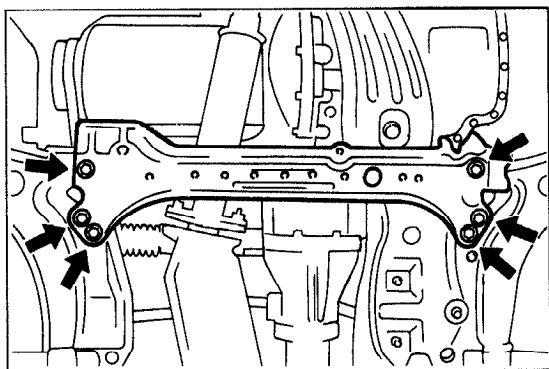


03U0BX-837

Step 6 Torque Specifications



03U0BX-838



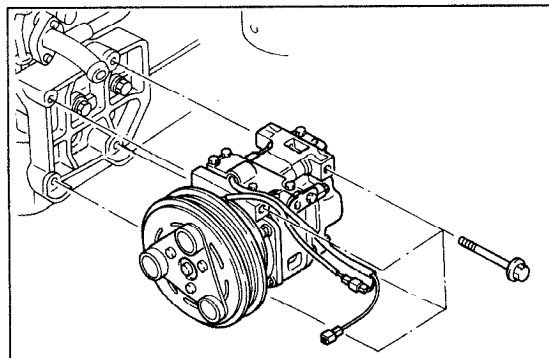
03U0BX-839

Crossmember

1. Install the crossmember.

Tightening torque:

93—107 N·m (9.5—11.9 m·kg, 69—79 ft·lb)



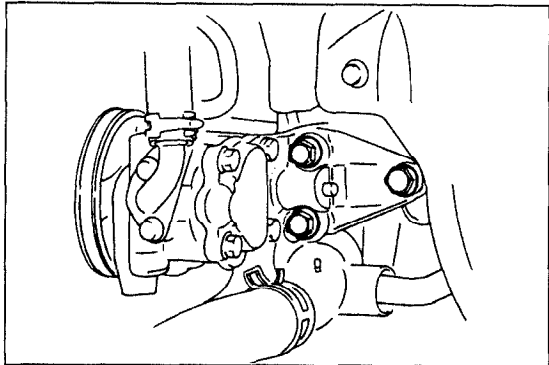
03U0B1-193

A/C compressor

1. Install the A/C compressor.

Tightening torque:

24—35 N·m (2.4—3.6 m·kg, 17—26 ft·lb)



03U0BX-840

P/S oil pump and bracket

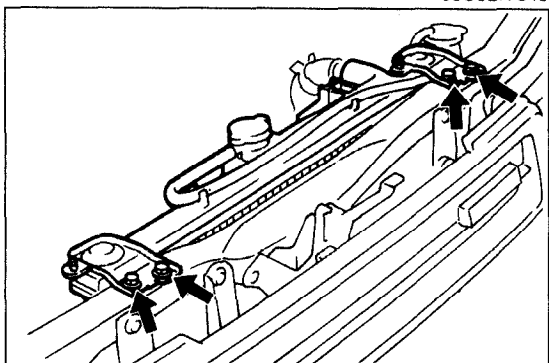
1. Install the P/S oil pump and bracket.

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

Drive belt

1. Install the P/S and/or A/C drive belt.
2. Adjust the drive belt deflections.



03U0BX-841

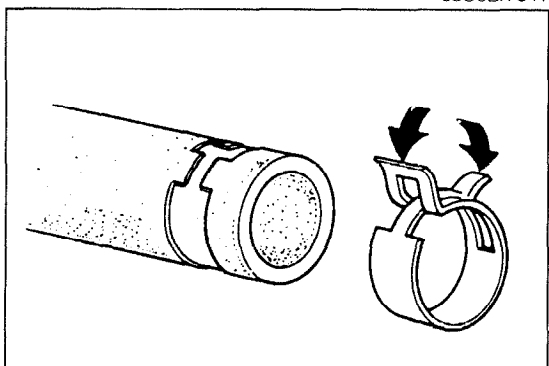
Radiator and cooling fan assembly

1. Install the radiator and cooling fan assembly.

Tightening torque:

7.8—11 N·m (80—110 cm·kg, 69—95 in·lb)

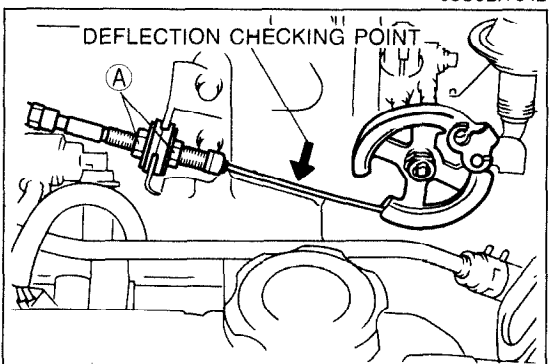
2. Connect the cooling fan connector.
3. Connect the radiator switch connector. (ATX)
4. Connect the A/C cut switch connector. (ATX)
5. Connect the oil cooler hose. (ATX)
6. Connect the coolant reservoir hose.
7. Connect the upper and lower radiator hoses.



03U0BX-842

Caution

- Position the hose clamp in the original location on the hose, and squeeze the clamp lightly with large pliers to ensure a good fit.

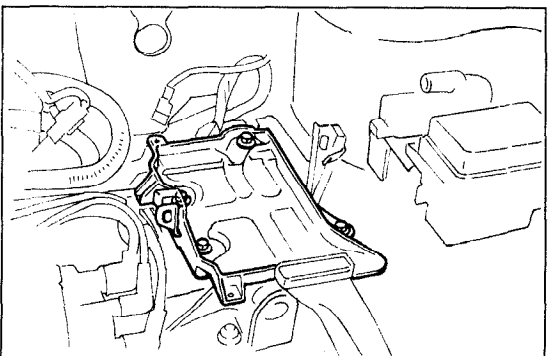


03U0BX-849

Accelerator cable

1. Install the accelerator cable.
2. Adjust the cable deflection by turning nuts A.

Deflection: 1—3mm (0.04—0.12 in)



03U0B1-198

Battery duct, battery carrier, and battery

1. Install the battery duct.
2. Install the battery carrier.

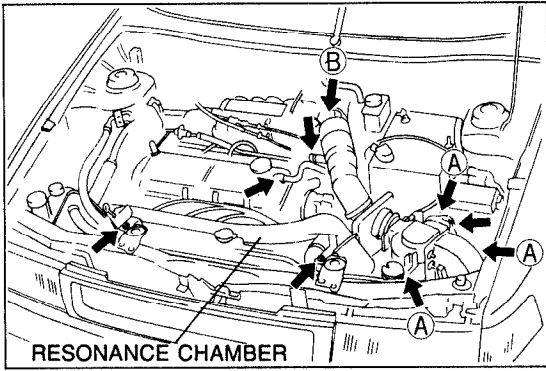
Tightening torque:

19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

3. Install the battery and the battery bracket.

Tightening torque:

2.9—5.9 N·m (30—60 cm·kg, 26—52 in·lb)



03U0B1-199

Air cleaner assembly

1. Install the air cleaner assembly.

Tightening torque:

- Ⓐ 19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)
- Ⓑ 7.8—11 N·m (80—110 cm·kg, 69—95 in·lb)

2. Connect the airflow sensor connector.

Resonance chamber

1. Install the resonance chamber.

Tightening torque:

- 7.8—11 N·m (80—110 cm·kg, 69—95 in·lb)

Undercover and side cover

1. Install the undercover and side cover.

Steps after installation

1. If the engine oil was drained, fill with the specified amount and type of engine oil.
2. Fill the radiator with the specified amount and type of engine coolant.
3. Fill the transaxle with the specified amount and type of transaxle oil. (Refer to pages J3-12, K2-134.)
4. Connect the negative battery cable.
5. Start the engine and check the following:
 - (1) Engine oil, transaxle oil, and engine coolant leakage.
 - (2) Ignition timing, idle speed.
 - (3) Operation of emission control system.
6. Perform a road test.
7. Recheck the engine oil and engine coolant levels.

03U0BX-843



COOLING SYSTEM

OUTLINE..... E- 2
OUTLINE OF CONSTRUCTION..... E- 2
SPECIFICATIONS E- 2
RADIATOR AND COOLING FAN..... E- 3

03U0EX-801

OUTLINE

OUTLINE OF CONSTRUCTION

The cooling system in the 4WD model 323 is basically the same as in the 2WD model 323. The radiator and cooling fan specifications are different, however.

03U0EX-802

SPECIFICATIONS

Item		Engine	BP SOHC		
			MTX	ATX	
Cooling system			Water-cooled, forced circulation		
Coolant capacity		liters (US qt, Imp qt)	5.0 (5.3, 4.4)	6.0 (6.3, 5.3)	
Water pump	Type		Centrifugal		
	Water seal		Unified mechanical seal		
Thermostat	Type		Wax, two-stage		
	Opening temperature	°C (°F)	Main: 86.5—89.5 (188—193) Sub : 83.5—86.5 (182—188)		
	Full-open temperature	°C (°F)	100 (212)		
	Full-open lift	mm (in)	Main: 8.0 (0.31) min. Sub : 1.5 (0.05) min.		
Radiator	Type		Corrugated fin		
	Cap valve-opening pressure	kPa (kg/cm ² , psi)	74—103 (0.75—1.05, 11—15)		
Cooling fan	Type		Electric		
	Blade	Outer diameter	mm (in)	320 (12.6)	340 (13.4)
		Number		4	5
	Motor	Current	A	6.6 ± 1	Hi : 13.3 + 10% max. Low: 8.8 + 10% max.

03U0EX-803

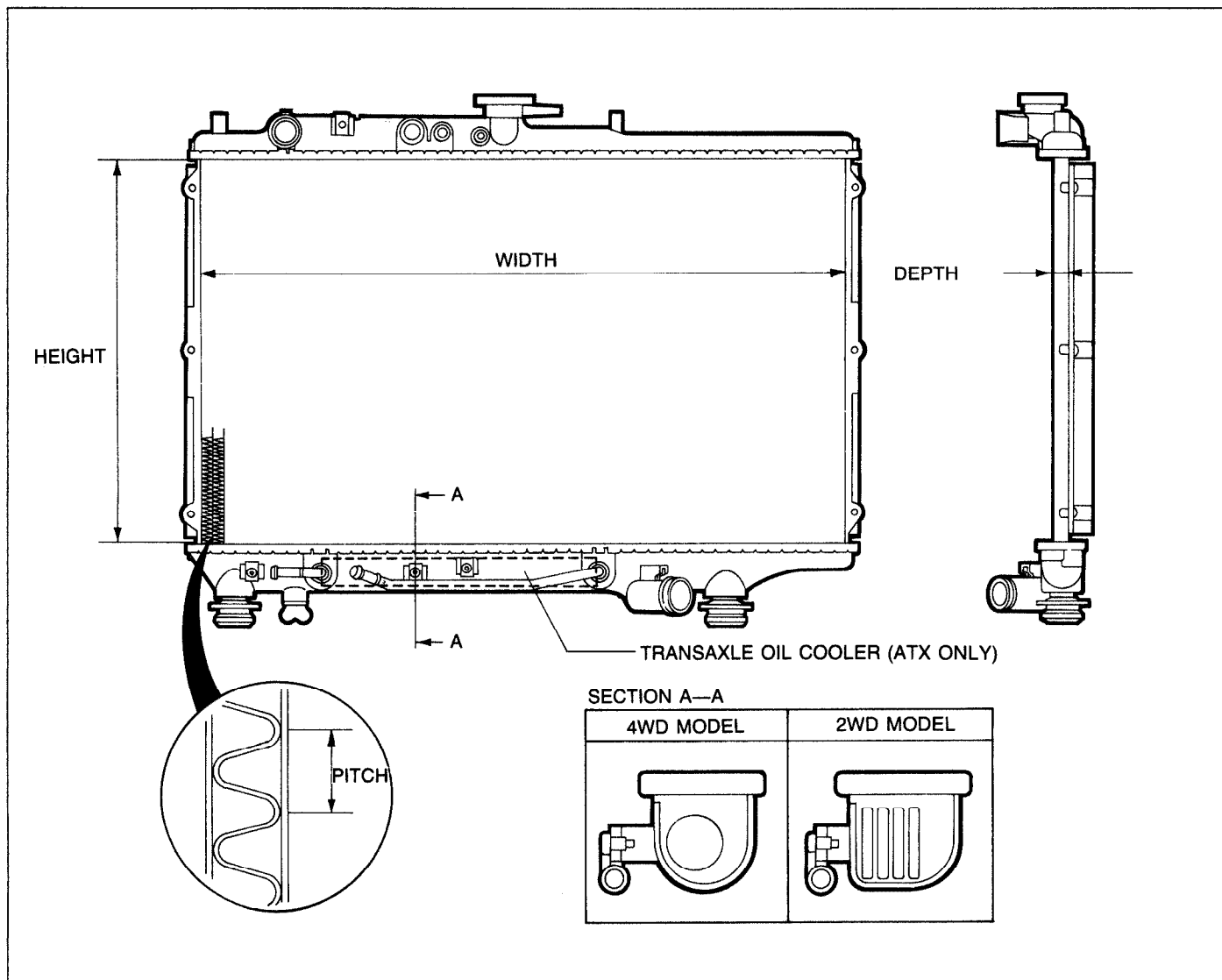
RADIATOR AND COOLING FAN

The radiator and cooling fan specifications are revised.

Specifications

		4WD model		2WD model	
		MTX	ATX	MTX	ATX
Radiator					
Core size	mm (in)				
	Width	648 (25.51)	647 (25.47)	←	←
	Height	400 (15.75)	390 (15.35)	←	←
	Depth	16 (0.63)	25 (0.98)	16 (0.63)	25 (0.98)
Fin pitch	mm (in)	1.25 (0.049)	1.3 (0.051)	←	←
Heat dissipation capacity	kcal/h	38,500	43,800	38,800	43,800
Transaxle oil cooler	Type	—	Double tube	—	Laminated
	Heat dissipation capacity kcal/h	—	1,650	—	1,700
Cooling fan					
Number of blades		4	5	4	←
Outer diameter	mm (in)	320 (12.6)	340 (13.4)	320 (12.6)	←
Capacity	W-V	80-12	160-12	80-12	160-12
Current	A	6.6 ± 1	Hi : 13.3+10% max. Low: 8.8+10% max.	6.6 ± 1	Hi : 13.3+10% max. Low: 8.8+10% max.

03U0EX-804



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FUEL AND EMISSION CONTROL SYSTEMS

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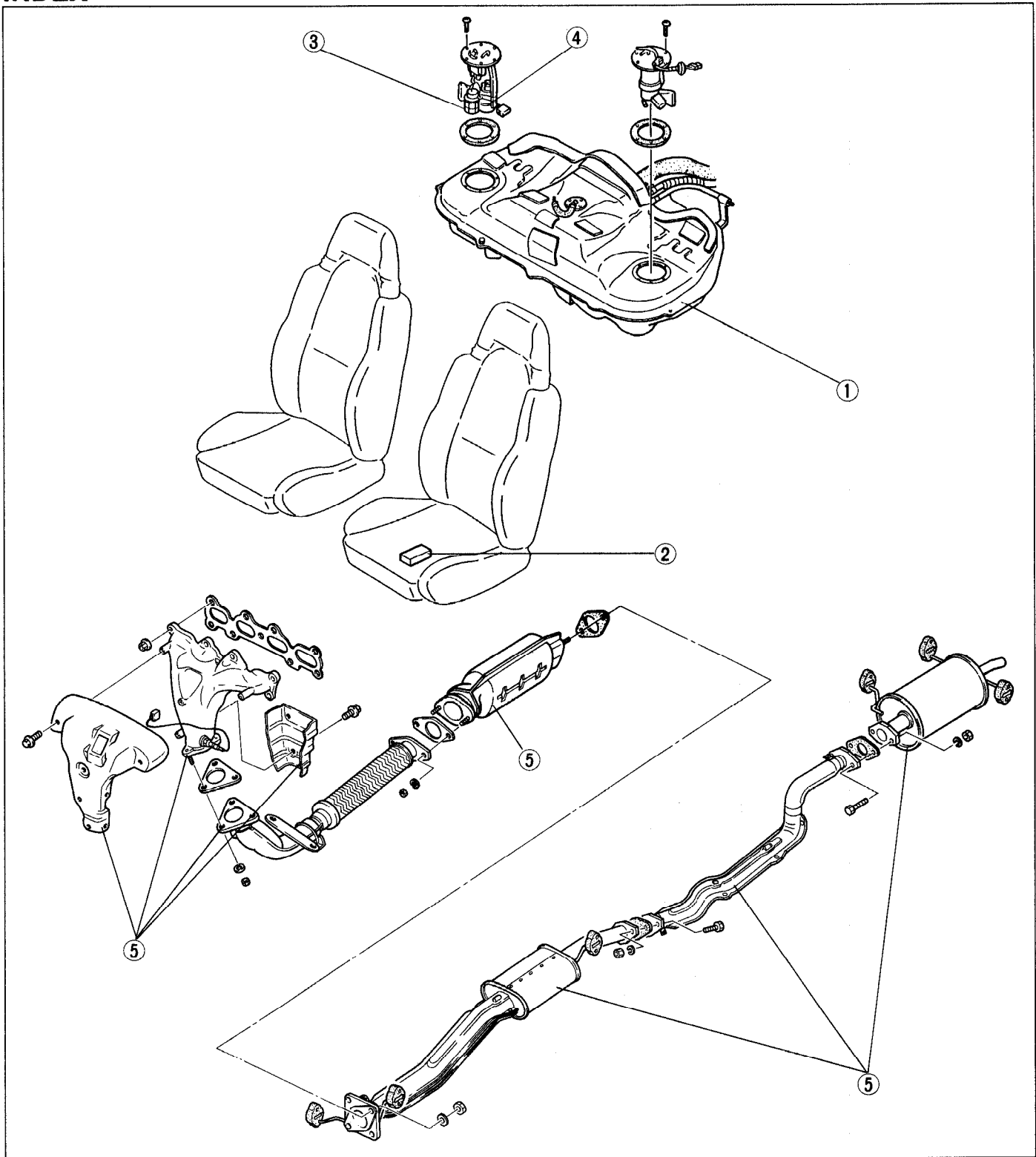
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OUTLINE

OUTLINE OF CONSTRUCTION

The fuel and emission control system of the 1990 323 4WD is basically the same as that of the 1990 323 2WD, however, the fuel tank is designed with separate right and left sections due to the installation of the propeller shaft for the 4-wheel-drive system and the transfer pump is equipped to pump the fuel from the left to the right (fuel pump side) section of the fuel tank.

A water thermostat is equipped for A/C cut-off system.

03U0FX-803

SPECIFICATIONS

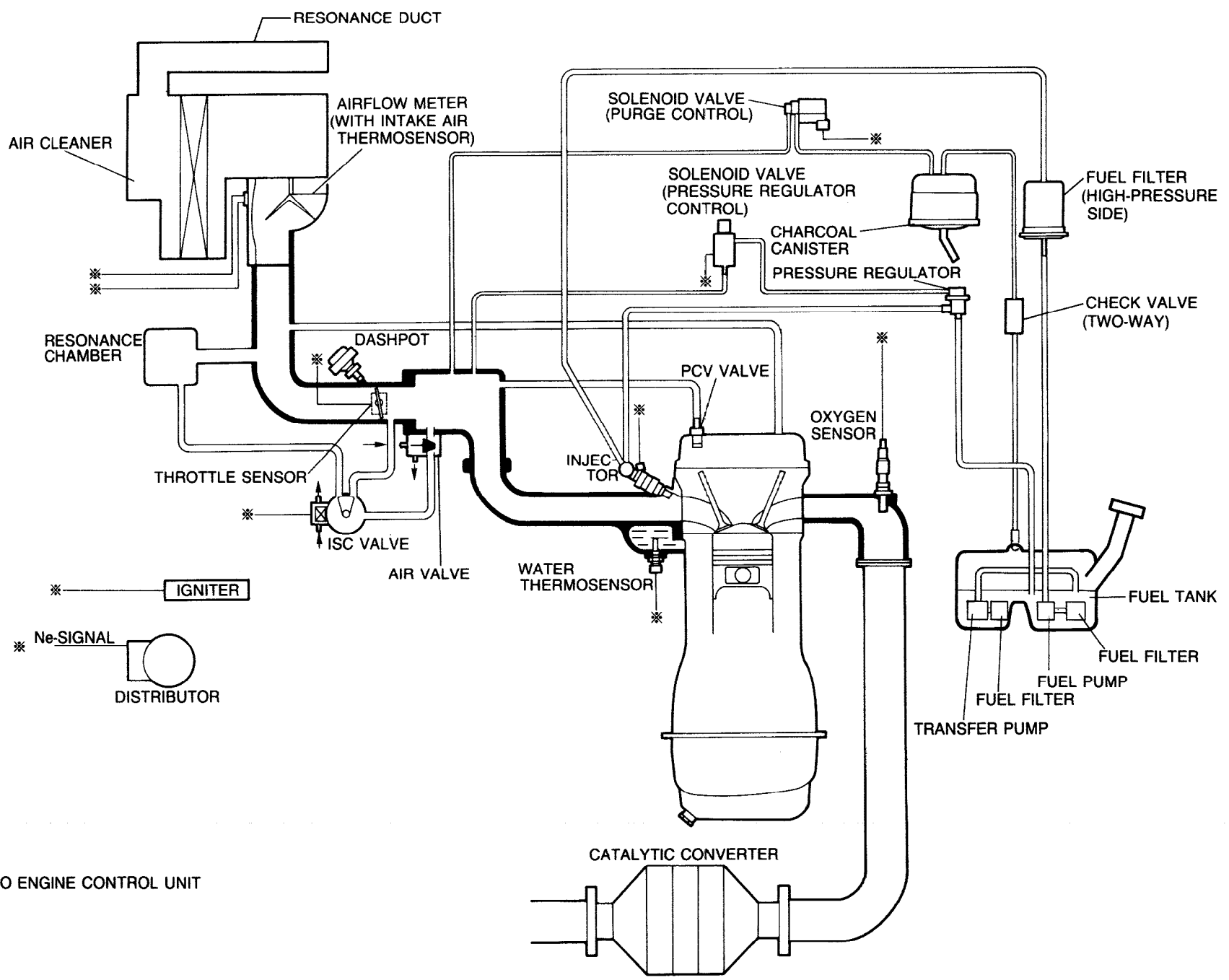
Item		Engine	BP SOHC	
Idle speed* ¹		rpm	750 ± 50	
Ignition timing* ²		BTDC	5 ± 1°	
Fuel pump				
Maximum output pressure		kPa (kg/cm ² , psi)	441—589 (4.5—6.0, 64—85)	
Transfer pump				
Maximum output pressure		kPa (kg/cm ² , psi)	More than 39 (0.4, 5.7)	
Fuel filter				
Type	Low-pressure side		Nylon element	
	High-pressure side		Paper element	
Pressure regulator				
Regulating pressure		kPa (kg/cm ² , psi)	264—314 (2.7—3.2, 38.3—45.5)	
Injector				
Type		High-ohmic		
Type of drive		Electric		
Resistance		Ω	12—16	
Idle speed control (ISC) valve				
Type		Rotary		
Resistance		Ω	11—13	
Solenoid valve (Purge control)				
Resistance		Ω	23—27	
Water thermostat				
Resistance	kΩ	-20°C (-4°F)	14.6—17.8	
		20°C (68°F)	2.21—2.69	
		40°C (104°F)	1.0—1.3	
		80°C (176°F)	0.29—0.35	
Airflow meter				
Resistance	Ω	E2 ↔ Vs	Fully closed	200—600
			Fully open	20—1,200
	E2 ↔ THAA (Intake air thermosensor)	Ω	-20°C (-4°F)	13,600—18,400
			20°C (68°F)	2,210—2,690
			60°C (140°F)	493—667
	E1 ↔ Fc	Ω	Fully closed	∞
Fully open			0	
Fuel tank				
Capacity		liters (US gal, Imp gal)	60 (15.8, 13.2)	
Air cleaner				
Element type		Oil permeated		
Fuel				
Specification		Unleaded regular (RON 91 or higher)		

03U0FX-804

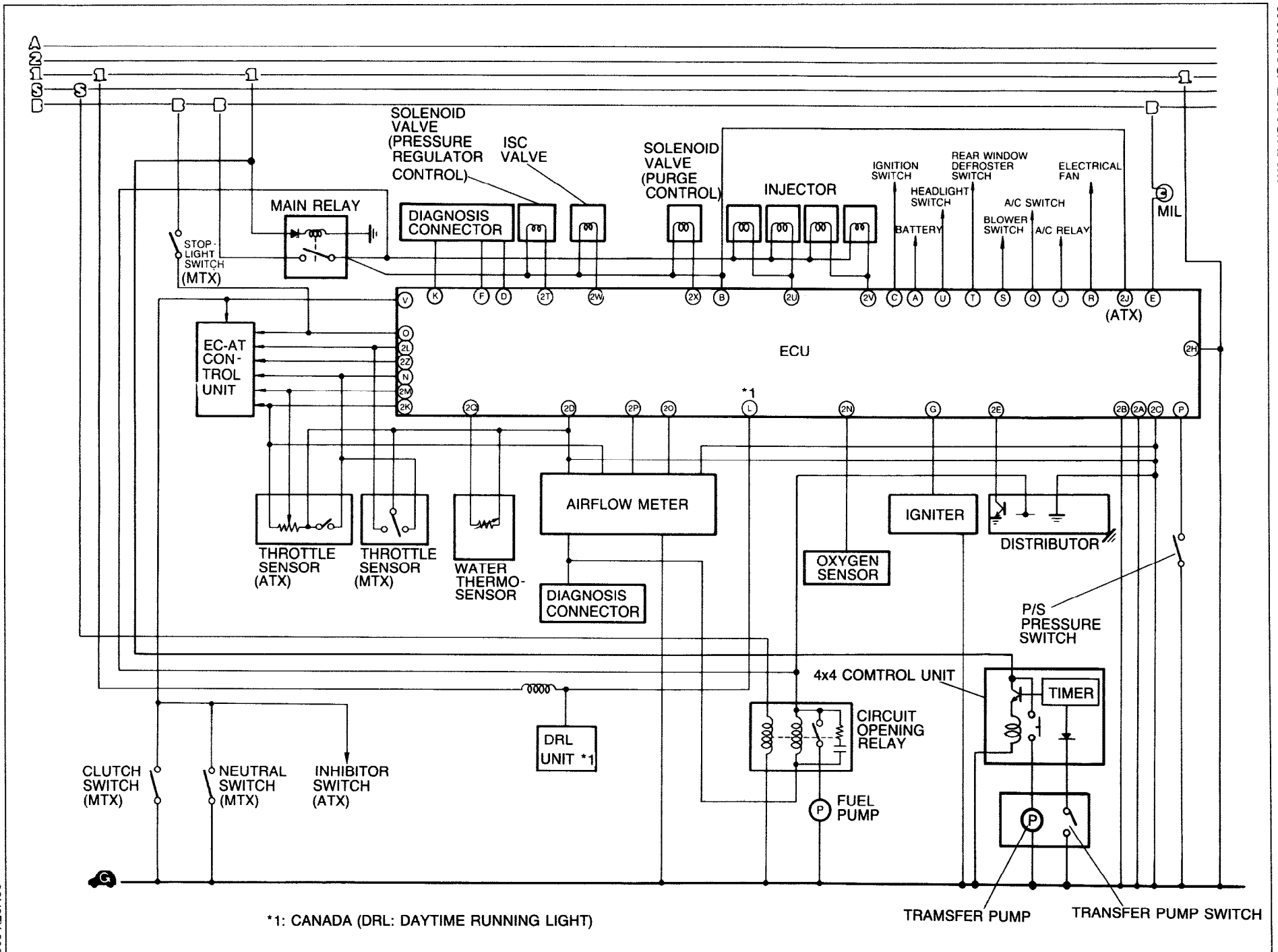
*¹ With parking brake applied (Canada).

*² TEN terminal of diagnosis connector grounded.

The  mark indicates newly equipped parts.



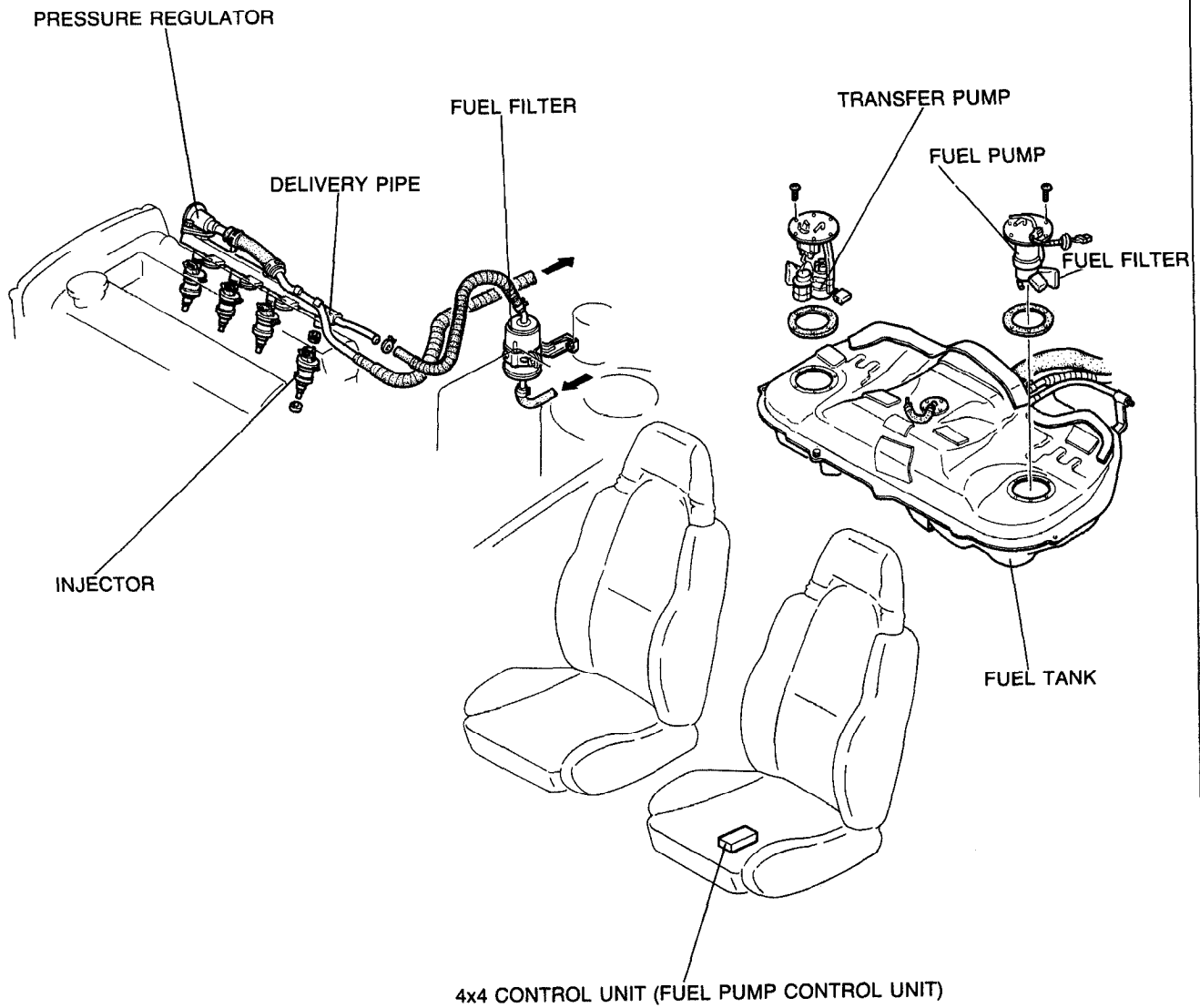
* TO ENGINE CONTROL UNIT



*1: CANADA (DRL: DAYTIME RUNNING LIGHT)

FUEL SYSTEM

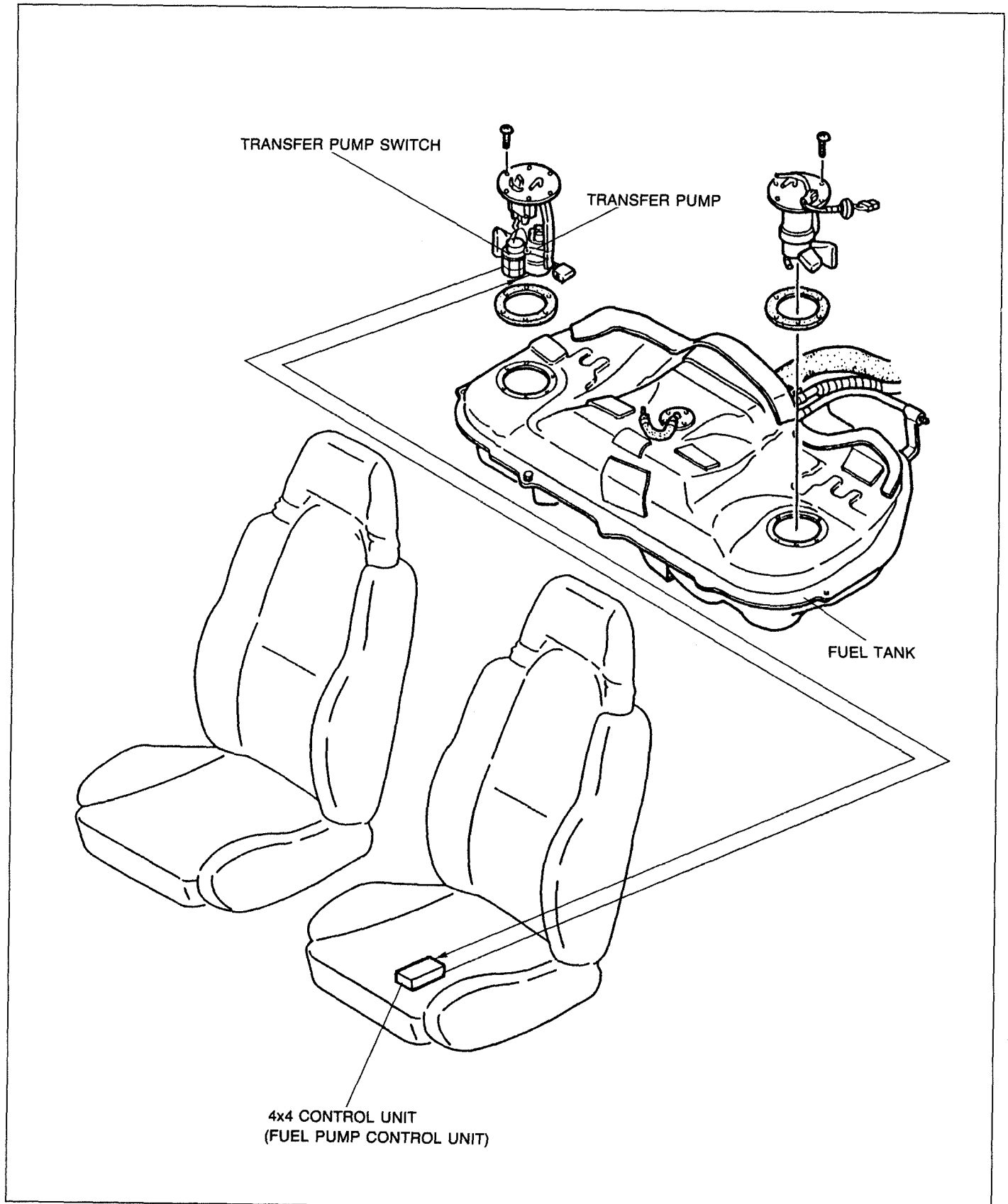
OUTLINE



03U0FX-807

The fuel system consists of the fuel tank, the transfer pump, the fuel pump, the fuel filters, the pressure regulator, the delivery pipe, the injectors, and the 4x4 control unit (fuel pump control unit).

FUEL TANK AND TRANSFER PUMP



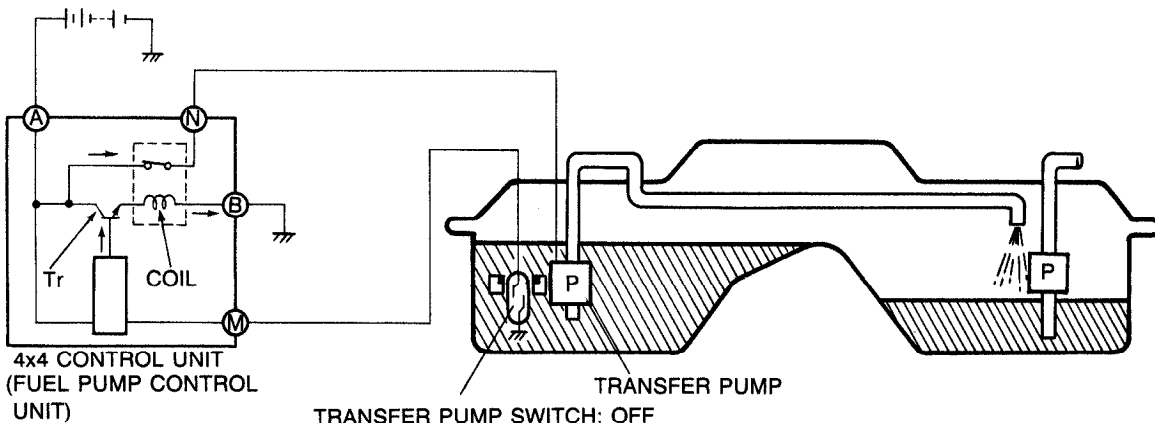
03U0FX-808

The fuel tank is designed with a separate right and left section due to the installation of the propeller shaft for the 4-wheel-drive system.

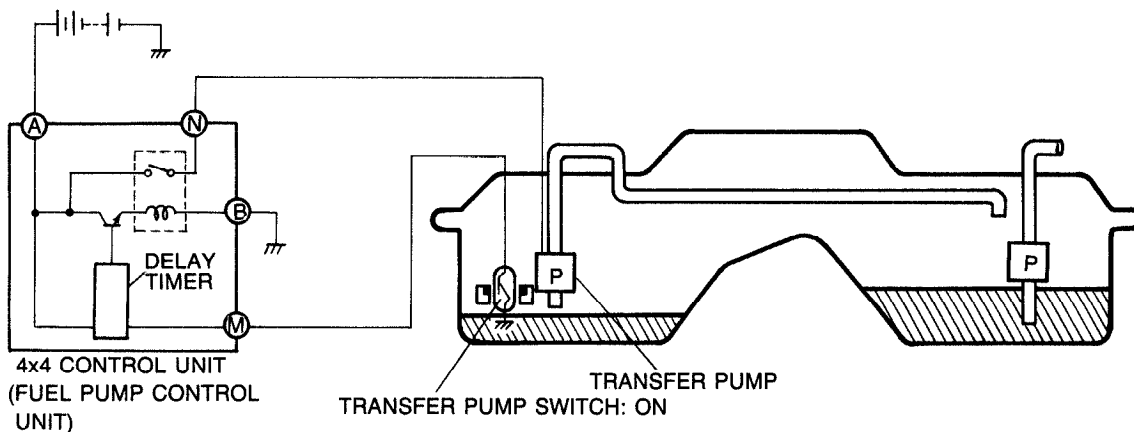
A transfer pump is used to pump the fuel from the left to the right (fuel pump) side. The transfer pump is installed in the fuel tank, and is controlled by the transfer pump switch and the fuel pump control unit (included in the 4x4 control unit).

Transfer Pump Control

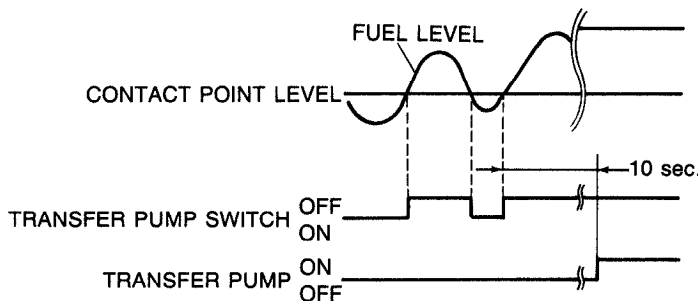
FUEL IN LEFT TANK



NO FUEL IN LEFT TANK



DELAY TIMER FUNCTION



03U0FX-809

Fuel in left tank

The transfer pump switch is OFF, and the transistor within the fuel pump control unit is ON. As a result, current flows to the coil, the switch is switched ON, and the transfer pump is activated.

No fuel in left tank

The transfer pump switch is ON, and the transistor within the fuel pump control unit is OFF. As a result, the current to the coil is interrupted, the switch is switched OFF, and the transfer pump is stopped. When in this condition, if the vehicle were driven on a rough road surface, the fuel level would vary up and down and fuel pump would switch ON and OFF. The transfer pump would then operate excessively, shortening the pump life. In order to prevent this, a ten-second delay circuit is provided within the fuel pump control unit.

A/C CUT-OFF SYSTEM (For ATX)

To improve the reliability of the engine at high temperature condition, the water thermostatic switch on the radiator is switched OFF **above approx. 111°C (232°F)** and stops the A/C operation.

03U0FX-829

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with 1990 Mazda 323 Workshop Manual (1195-10-89E).

Fuel tank

- Removal / Inspection / Installation

4x4 control unit (Fuel pump control unit)

- Inspection procedure added
- Replacement procedure added

Transfer pump switch

- Inspection procedure added
- Replacement procedure added

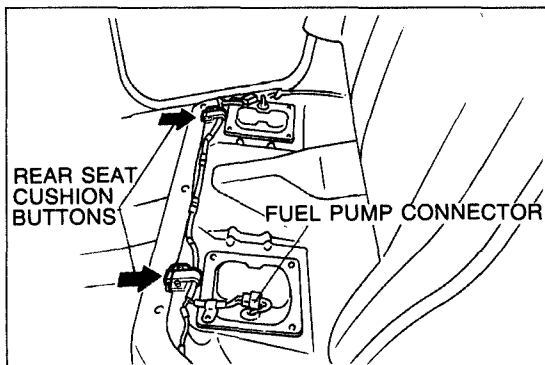
Transfer pump

- Inspection procedure added
- Replacement procedure added

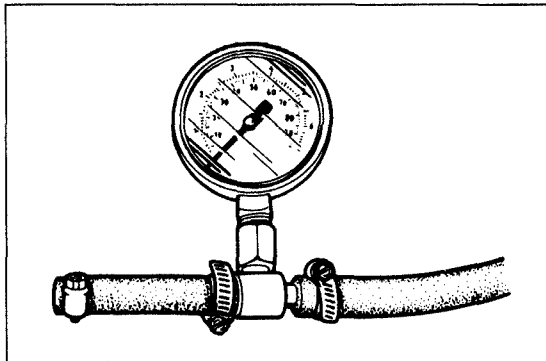
Exhaust system components

- Removal / Inspection / Installation

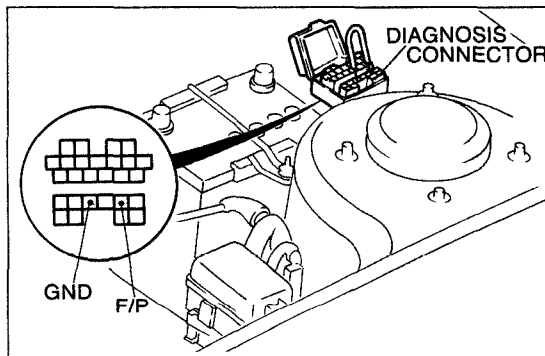
03U0FX-810



03U0FX-811



9MU0F2-122



03U0FX-127

FUEL SYSTEM

PRECAUTION

Fuel Pressure Release and Servicing Fuel System

Fuel in the fuel system remains under high pressure when the engine is not running.

- Before disconnecting any fuel line, release the fuel pressure from the fuel system to reduce the possibility of injury or fire.
 - Start the engine.
 - Push the rear seat cushion buttons and remove the cushion.
 - Disconnect the fuel pump connector.
 - After the engine stalls, turn off the ignition switch.
 - Reconnect the fuel pump connector and install the rear seat cushion.
- Use a rag as protection from fuel spray when disconnecting the hoses.
Plug the hoses after removal.
- When inspecting the fuel system, use a suitable fuel pressure gauge.

Caution

- **Install hose clamps to secure the fuel pressure gauge to the fuel filter and the fuel main hose to prevent fuel leakage.**

Priming Fuel System

After releasing the fuel pressure for repairs or inspection, the system must be primed to avoid excessive cranking when first starting the engine. Follow the steps below.

- Connect the diagnosis connector terminals **F/P** and **GND** with a jumper wire.
- Turn the ignition switch ON for **approx. 10 sec.** and check for fuel leaks.
- Turn the ignition switch OFF and remove the jumper wire.

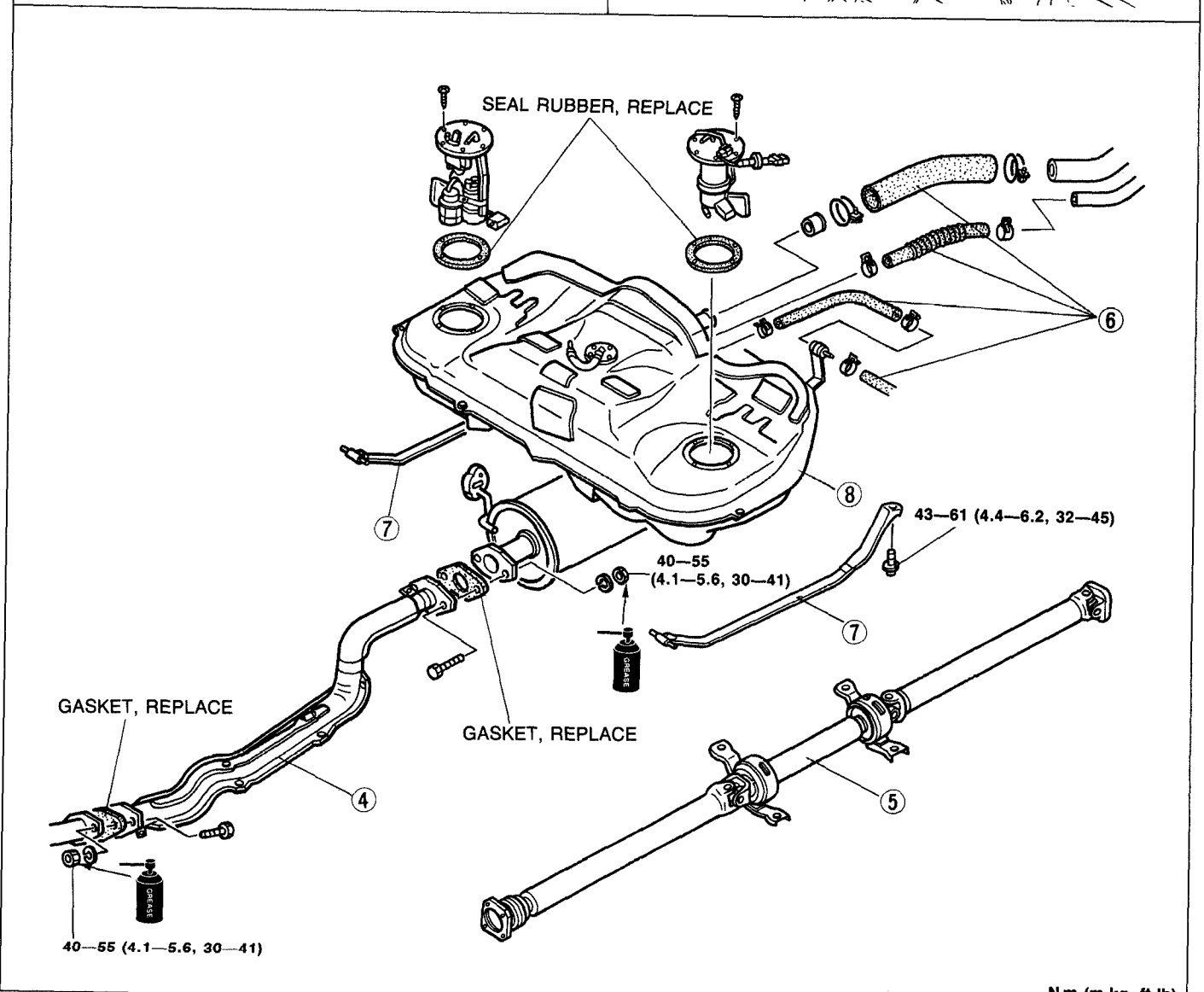
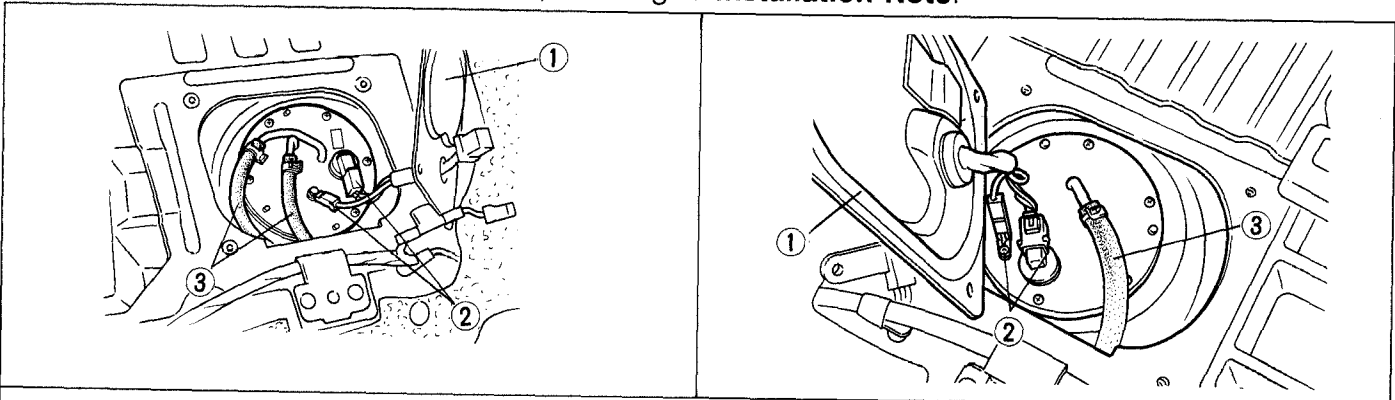
FUEL TANK

Removal / Inspection / Installation

Warning

- Before performing the following operation, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F-9.)
- When removing the fuel tank, keep sparks, cigarettes, and open flames away from it.
- Before repairing the fuel tank, clean it thoroughly with steam to remove all explosive gas.

1. Remove in the order shown in the figure.
2. Inspect the fuel tank components visually and repair or replace if necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.



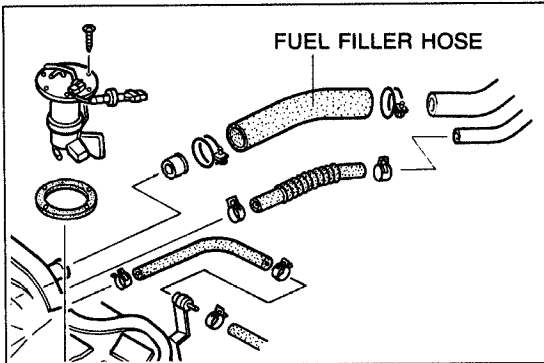
N-m (m·kg, ft·lb)

Note

- Drain the fuel from the fuel tank before removing the tank.

- | | |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 1. Fuel pump cover | 6. Fuel filler hose, breather hose, and evaporation hoses
Installation Note page F-11 |
| 2. Fuel pump connector | |
| 3. Fuel hoses
Installation Note page F-11 | 7. Fuel tank straps |
| 4. Exhaust pipe
Removal / Installation page F-15 | 8. Fuel tank
Inspect for cracks and corrosion |
| 5. Propeller shaft
Removal / Installation Section L | |

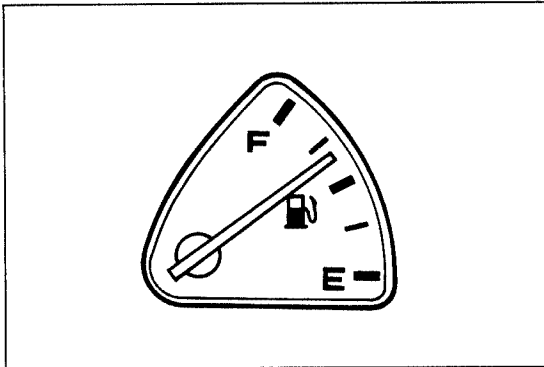
03U0FX-813



03U0FX-135

Installation Note

1. Push the ends of the main fuel hose, fuel return hose, and evaporative hoses onto the fuel tank fittings **at least 25mm (1.0 in)**.
2. Push the fuel filler hose onto the fuel tank pipe and filler pipe **at least 35mm (1.4 in)**.



03U0FX-814

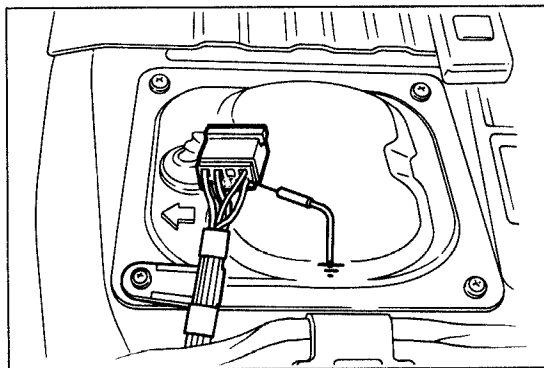
TRANSFER PUMP CONTROL SYSTEM

SYSTEM OPERATION

1. Turn the ignition switch ON and verify that the fuel gauge indicates more than half and that the transfer pump operating sound is heard.

Warning

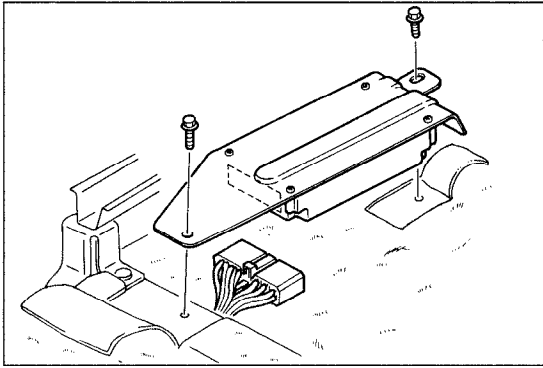
- If the fuel level is less than one half, this inspection cannot be performed.



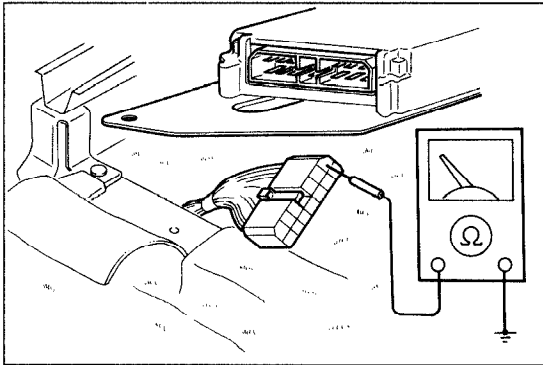
03U0FX-815

2. Ground the transfer pump connector terminal-wire (Y/L) with a jumper wire and verify that the transfer pump stops.
3. Remove the jumper wire and verify that the transfer pump begins operation after **approx. 10 sec**.
4. If not as specified, check the following parts.
 - 4x4 control unit (Fuel pump control unit). (Refer to page F-12.)
 - Transfer pump. (Refer to page F-13.)
 - Transfer pump switch. (Refer to page F-13.)

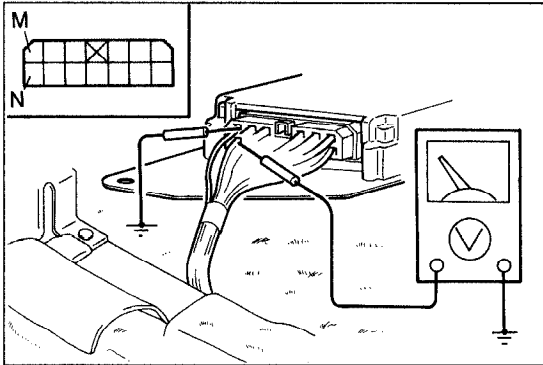
F TRANSFER PUMP CONTROL SYSTEM



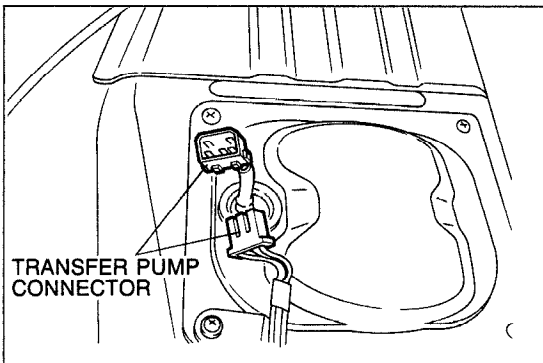
03U0FX-816



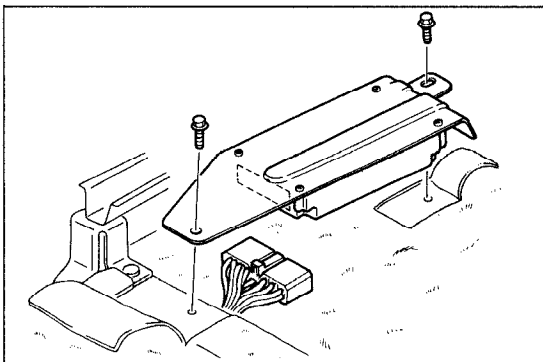
03U0FX-817



03U0FX-818



03U0FX-819



03U0FX-820

4x4 CONTROL UNIT (FUEL PUMP CONTROL UNIT)

Inspection

1. Remove the 4x4 control unit.

2. Disconnect the 4x4 control unit connector.
3. Check continuity between the 4x4 control unit connector terminal M and a ground.
4. Perform the following inspection according to the continuity.

Continuity exists

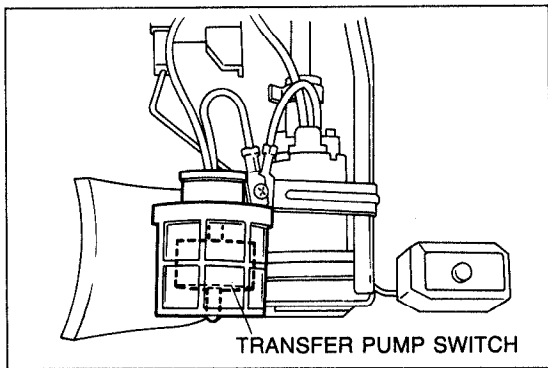
1. Turn the ignition switch ON.
2. Ground the 4x4 control unit terminal M with a jumper wire and verify that the voltage at the 4x4 control unit terminal N is **0V**.
3. Remove the jumper wire and verify that the voltage at the 4x4 control unit terminal N is **approx. 12V** after **approx. 10 sec.**

No continuity exists

1. Turn the ignition switch ON and verify that the voltage at the 4x4 control unit terminal N is **0V**.
2. Disconnect the transfer pump connector.
3. Turn the ignition switch ON and verify that the voltage at the 4x4 control unit terminal N is **approx. 12V**.

Replacement

1. Remove two bolts and remove the 4x4 control unit and the bracket as an assembly.
2. Remove the 4x4 control unit from the bracket.
3. Install in the reverse order of removal.

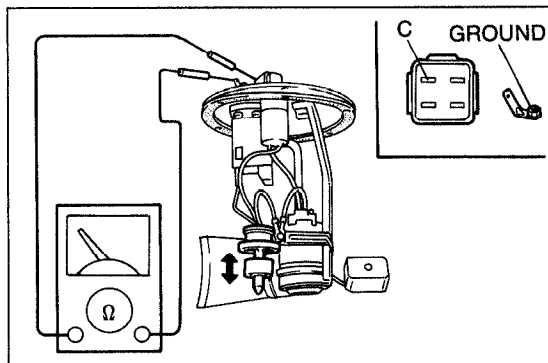


03U0FX-821

TRANSFER PUMP SWITCH

Removal / Installation

1. Refer to replacement of the transfer pump. (Refer to page F-13.)



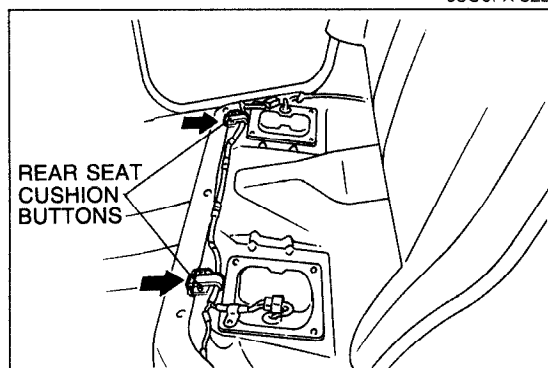
03U0FX-822

Inspection

1. Check continuity between transfer pump connector terminal C and ground terminal.

Float position	Continuity
Up	No
Down	Yes

2. If not as specified, replace the transfer pump switch.

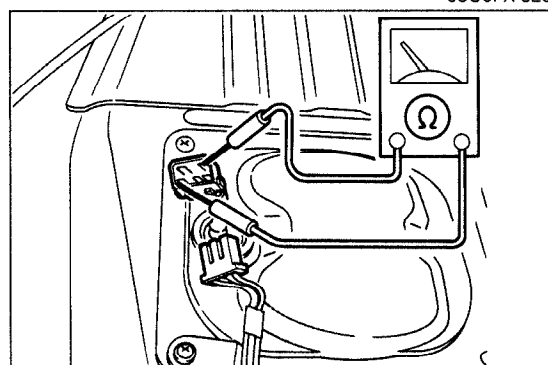


03U0FX-823

TRANSFER PUMP

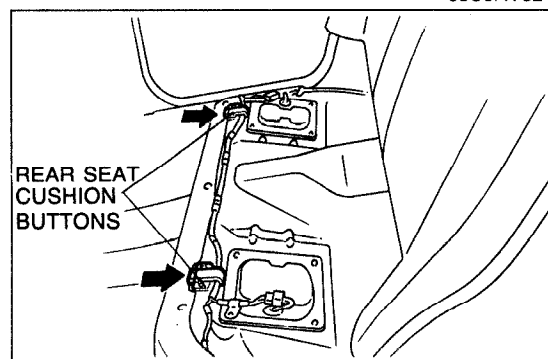
Inspection

1. Remove the rear seat cushion.



03U0FX-824

2. Disconnect the transfer pump connector.
3. Check for continuity between transfer pump connector terminal-wires (B/W) and (Y).
4. If no continuity exists, replace the transfer pump.



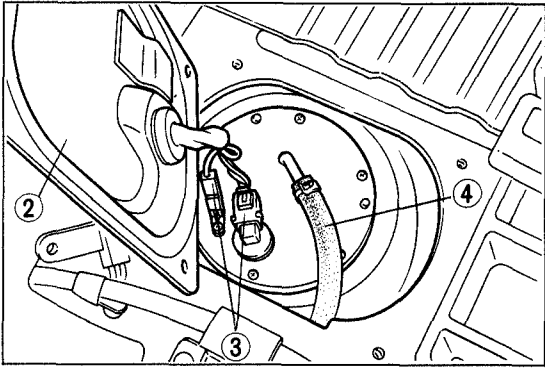
03U0FX-825

Replacement

Warning

- When servicing the fuel system, keep sparks, cigarettes, and open flames away from the fuel.

1. Remove the rear seat cushion.



03U0FX-826

2. Remove the service hole cover of the transfer pump.
3. Disconnect the transfer pump connectors.
4. Disconnect the fuel hose.
5. Remove the transfer pump.

Caution

- Install a new seal rubber.

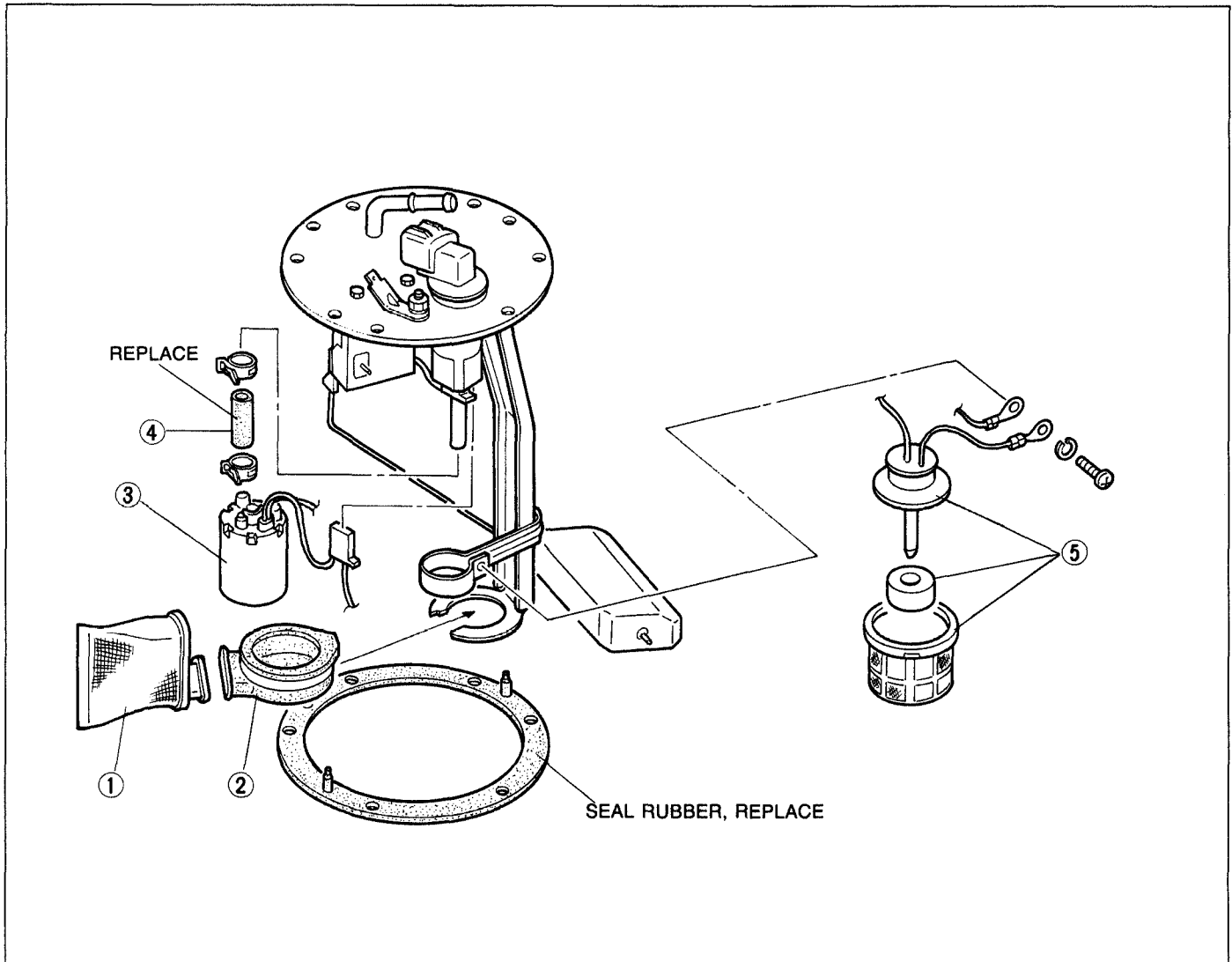
6. Install in the reverse order of removal.

Disassembly / Assembly

Caution

- Prevent contaminants from entering into the transfer pump.

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.
3. Verify that the transfer pump operates correctly after assembling it.



03U0FX-827

1. Fuel filter
2. Rubber mount
3. Transfer pump

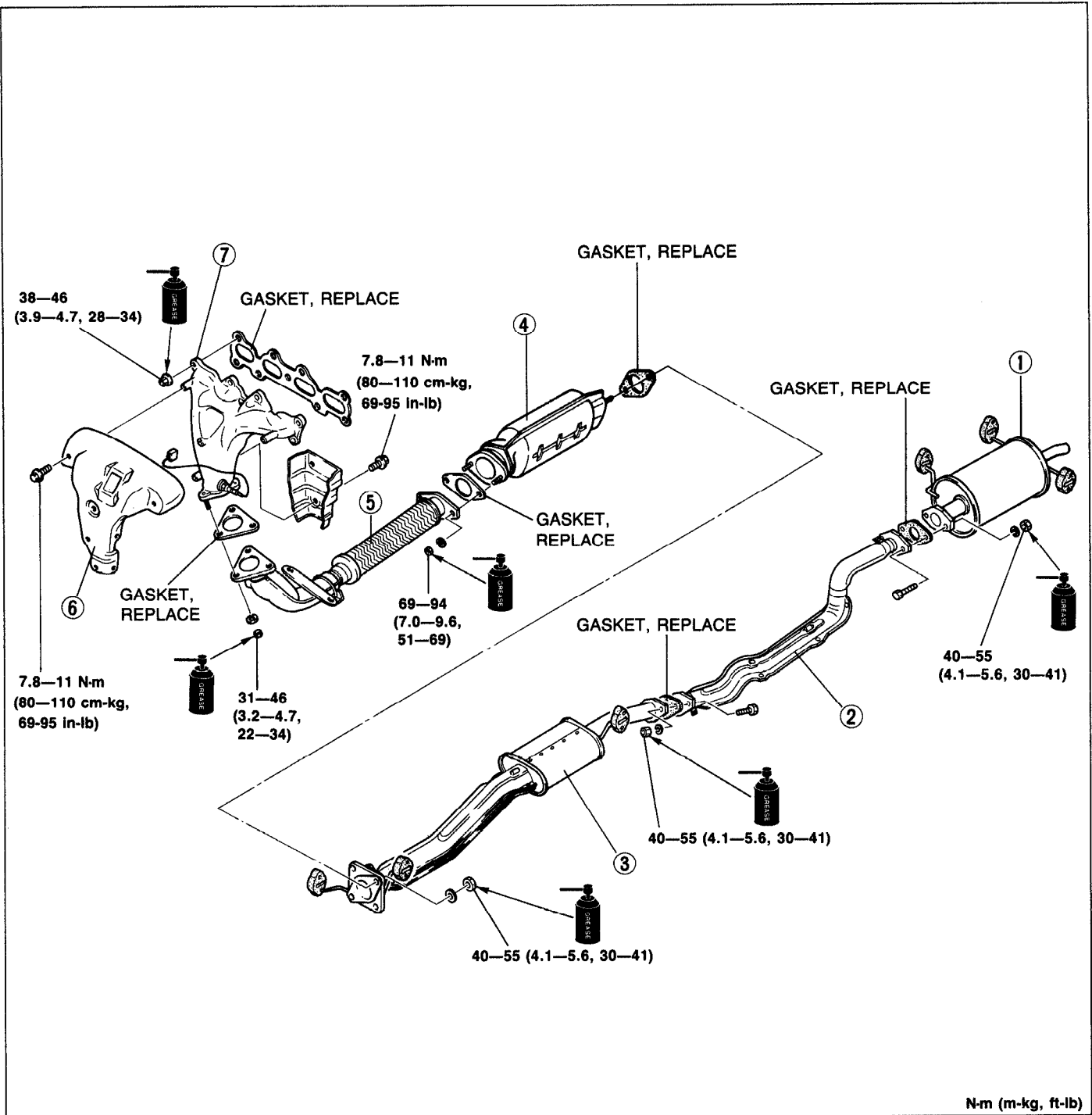
4. Fuel hose
5. Transfer pump switch

EXHAUST SYSTEM

COMPONENTS

Removal / Inspection / Installation

1. Remove in the order shown in the figure.
2. Check the exhaust system components and repair or replace as necessary.
3. Install in the reverse order of removal.



N-m (m-kp, ft-lb)

03U0FX-828

1. Main silencer
Inspect for deterioration and restriction
2. Middle pipe assembly
Inspect for deterioration and restriction
3. Pre-silencer
Inspect for deterioration and restriction

4. Catalytic converter
Inspect for deterioration and restriction
5. Front pipe assembly
Inspect for deterioration and restriction
6. Exhaust manifold insulator
7. Exhaust manifold
Inspect for deterioration and restriction

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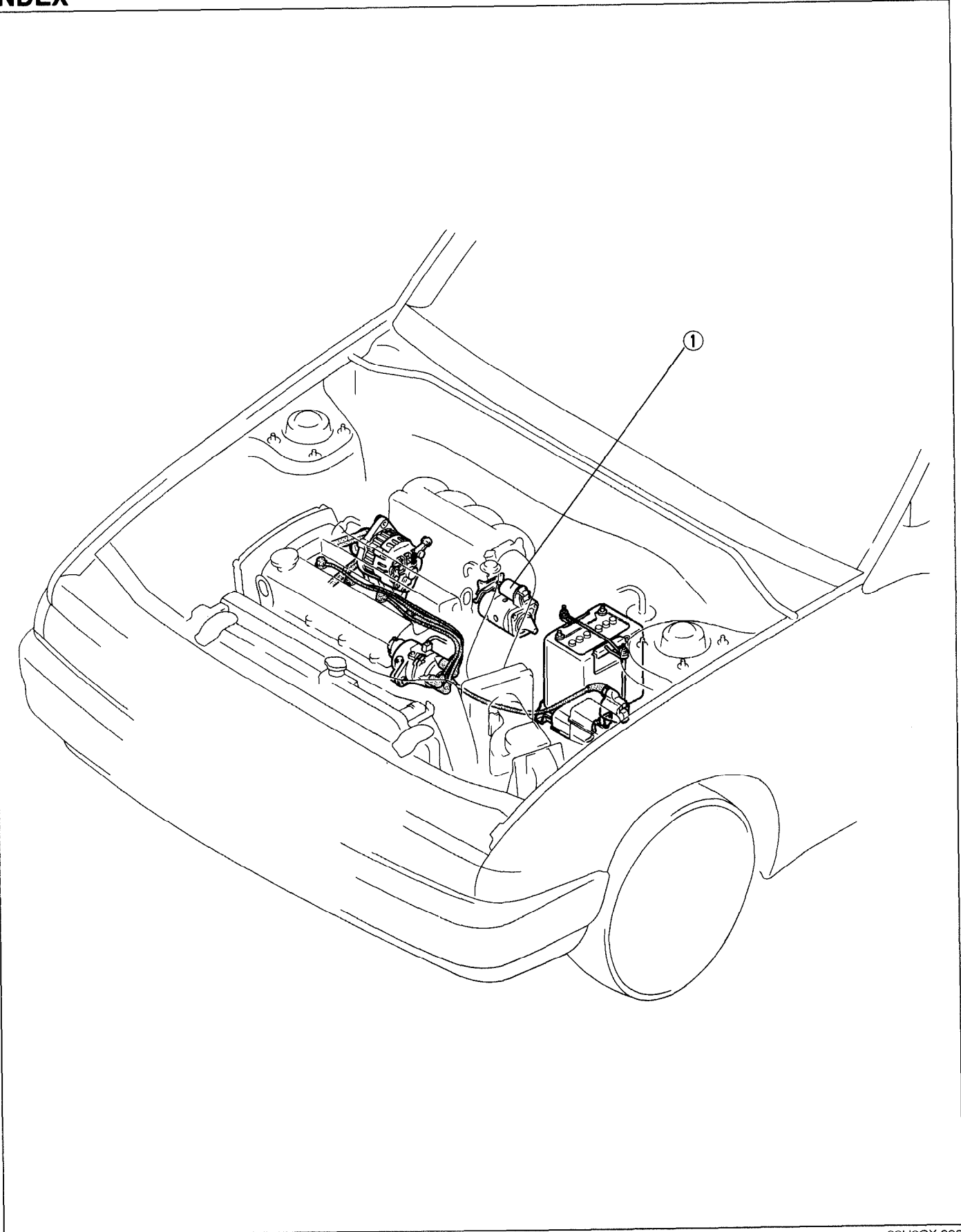
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1. Starter
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OUTLINE

OUTLINE OF CONSTRUCTION

The engine electrical system of the 1990 323 4WD is as same as that of the 1990 323 2WD.

03U0PX-803

SPECIFICATIONS

Item		Engine		BP SOHC		
				MTX	ATX	
Battery	Voltage	V		12		
	Type and capacity (20-hour rate)			55D23L (60AH)		
Dark current* ¹		mA		Max. 20.0		
Alternator	Type			A.C.		
	Output	V-A		12-65		
	Regulator type			Transistorized (built-in IC regulator)		
	Regulated voltage	V		14.1—14.7		
	Brush length mm (in)	Standard			21.5 (0.846)	
		Minimum			8.0 (0.315)	
	Drive belt deflection 98 N (10 kg, 22 lb) mm (in)	New			8—9 (0.31—0.35)	
Used				9—10 (0.35—0.39)		
Starter	Type			Direct	Coaxial reduction	
	Output	V-kW		12-0.85	12-1.4	
	Brush length mm (in)	Standard			17 (0.67)	17.5 (0.69)
		Minimum			11.5 (0.453)	10.0 (0.39)
Distributor				Electronic spark advance (photo diode)		
Ignition timing (TEN terminal of diagnosis connector grounded)		BTDC		5 ± 1°		
Ignition coil	Resistance (at 20°C [68°F])	Primary coil winding			0.81—0.99Ω	
		Secondary coil winding			10—16 kΩ	
Spark plug	Type	NGK			BKR5E11 BKR6E11	
		Nippon Denso			K16PR-U11 K20PR-U11	
	Plug gap	mm (in)		1.0—1.1 (0.039—0.043)		
	Firing order			1—3—4—2		

03U0GX-804

*¹ Dark current is the constant flow of current while the ignition switch is OFF. (i.e., engine control unit, EC-AT control unit, audio, etc.)

SUPPLEMENTAL SERVICE INFORMATION

The following point in this section is changed in comparison with 1990 Mazda 323 Workshop Manual (1195-10-89E).

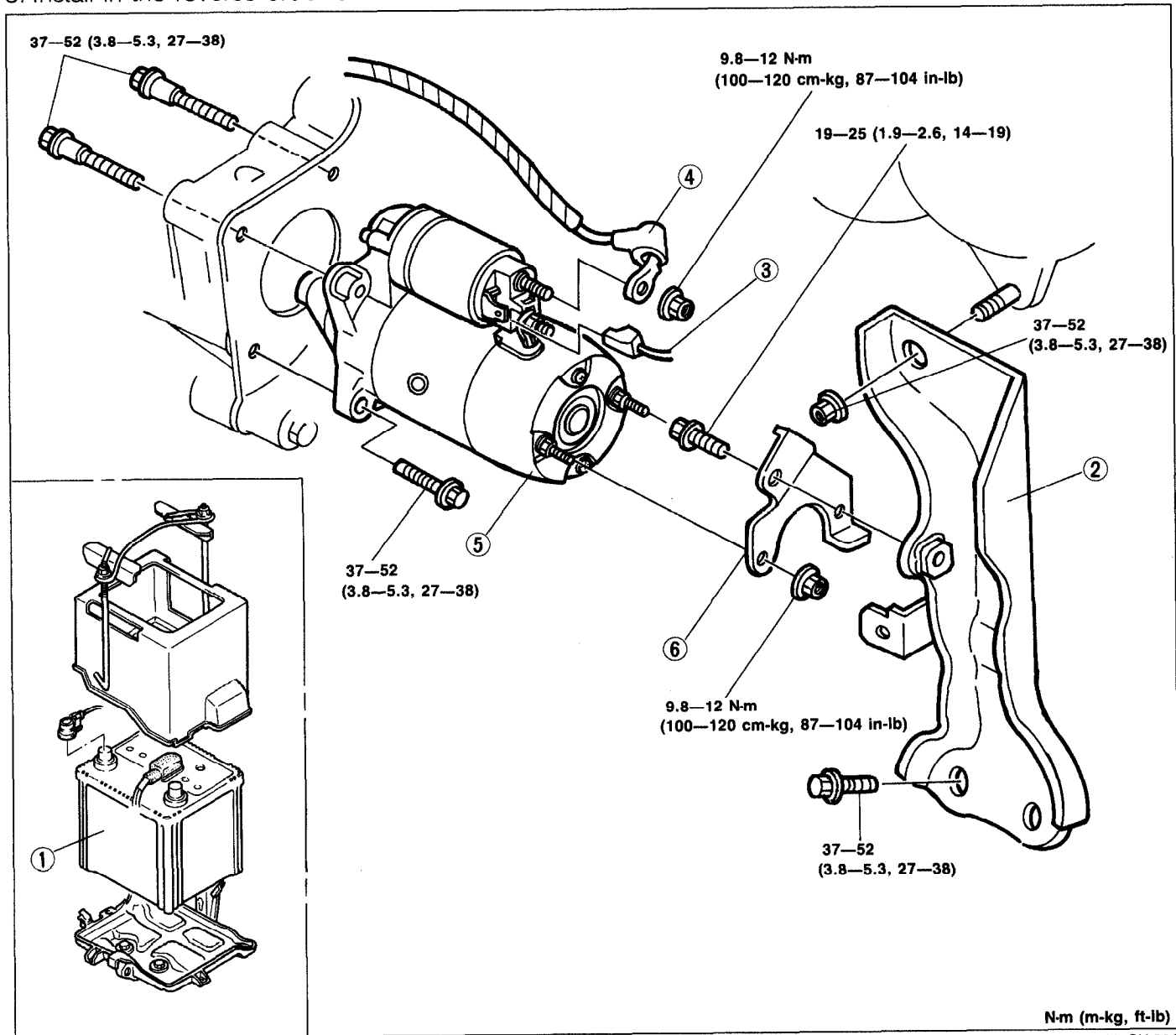
Starter

- Removal / Installation

03U0GX-805

STARTING SYSTEM**STARTER****Removal / Installation**

1. Remove in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal.



03U0GX-806

1. Battery
2. Intake manifold bracket
3. S terminal wire
4. B terminal wire

5. Starter
Remove from upper side of vehicle
6. Starter bracket (MTX)

CLUTCH

OUTLINE	H- 2
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03U0HX-801



OUTLINE

OUTLINE OF CONSTRUCTION

A hydraulic clutch control mechanism is used.

The basic construction is the same as that of 323 2WD model, but there is no interchangeability of component parts except for the clutch pedal, the master cylinder and the release cylinder.

- To improve clutch operation feeling and increased parts life, a newly designed friction plate with needle roller bearings is used between the release fork and the release bearing.

03U0HX-802

SPECIFICATIONS

Engine/Transaxle Model		BP SOHC	
Item		G5MX-R	
Clutch control		Hydraulic	
Clutch cover	Type	Diaphragm spring	
	Set load N (kg, lb)	3,846 (392, 862)	
Clutch disc	Outer diameter mm (in)	225 (8.86)	
	Inner diameter mm (in)	150 (5.91)	
	Thickness	Pressure plate side mm (in)	4.1 (0.161)
		Flywheel side mm (in)	3.5 (0.138)
Clutch pedal	Type	Suspended	
	Pedal ratio	6.55	
	Full stroke mm (in)	135 (5.32)	
	Height (With carpet) mm (in)	196—204 (7.72—8.03)	
Master cylinder inner diameter mm (in)		15.87 (0.625)	
Release cylinder inner diameter mm (in)		19.05 (0.750)	
Clutch fluid		SAE J1703 or FMVSS116 DOT-3	

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INTERCHANGEABILITY OF MAJOR COMPONENTS

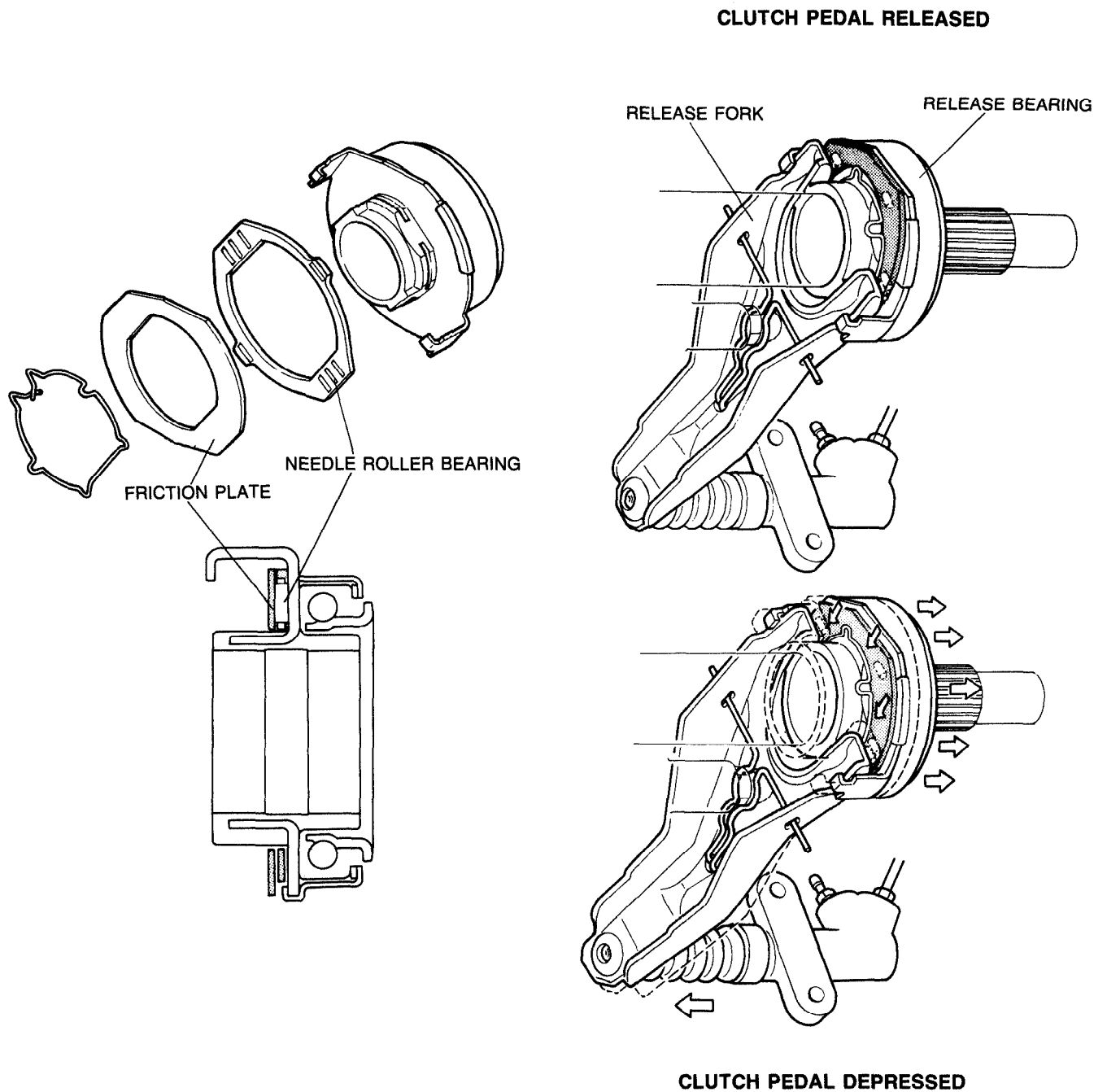
The following chart shows the major components interchangeability between the 2WD model and the 4WD model.

○.....Interchangeability X.....Not interchangeability

Part name	Interchangeability	Remark
Clutch cover	X	Shape, type
Clutch disc	X	Shape diameter
Clutch pedal	○	
Master cylinder	○	
Release cylinder	○	
Release bearing	X	Shape

03U0HX-804

RELEASE BEARING



9MU0HX-505

To improve clutch operation feeling and increased parts life, a newly designed friction plate with needle roller bearings is used between the release fork and the release bearing. With the inclusion of this friction plate, the force required to depress the clutch pedal is reduced because the usual sliding-contact action between the release bearing and the release fork is changed to a rolling action of the friction plate.



MANUAL TRANSAXLE AND TRANSFER UNIT (G5MX-R)

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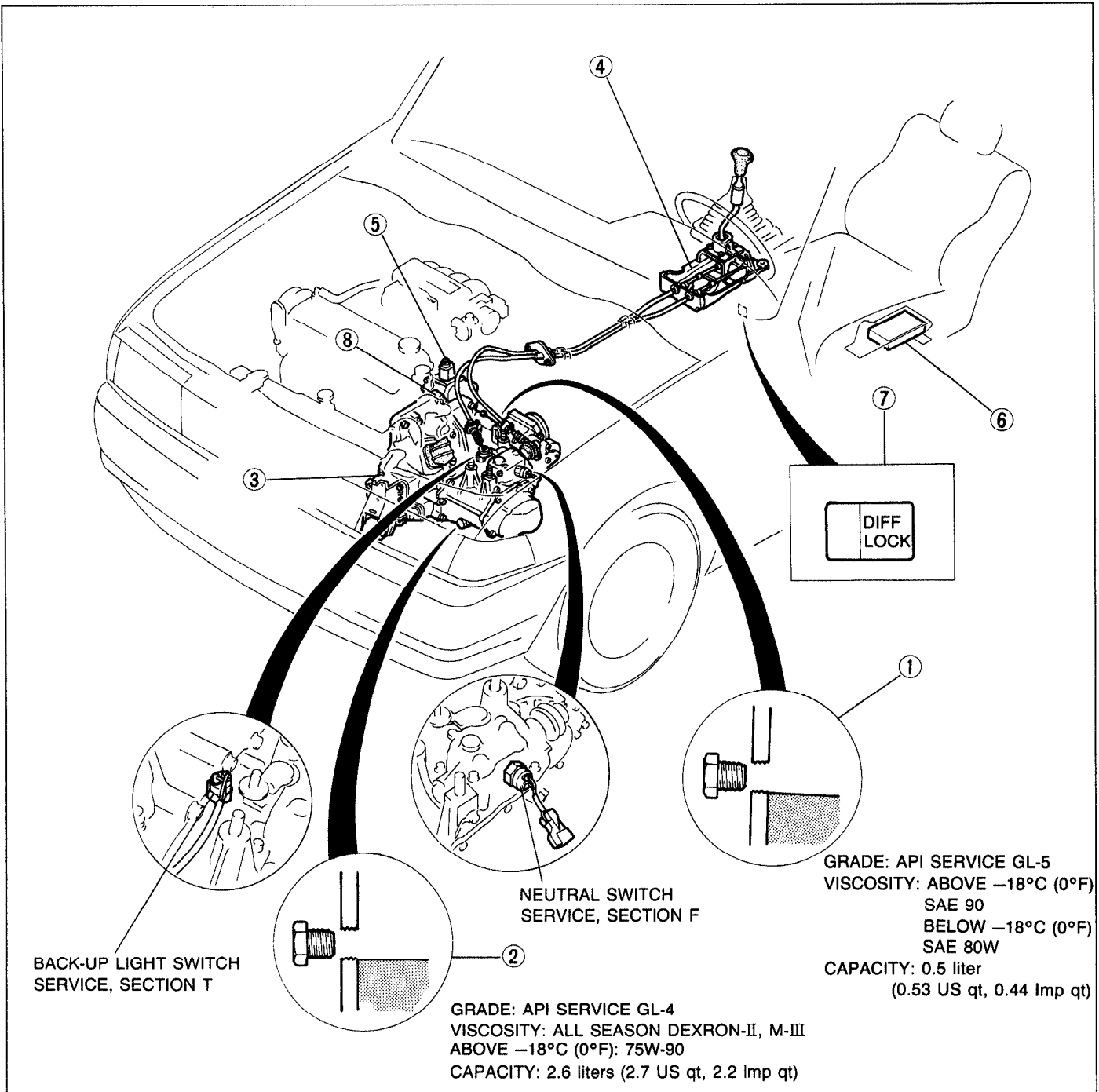
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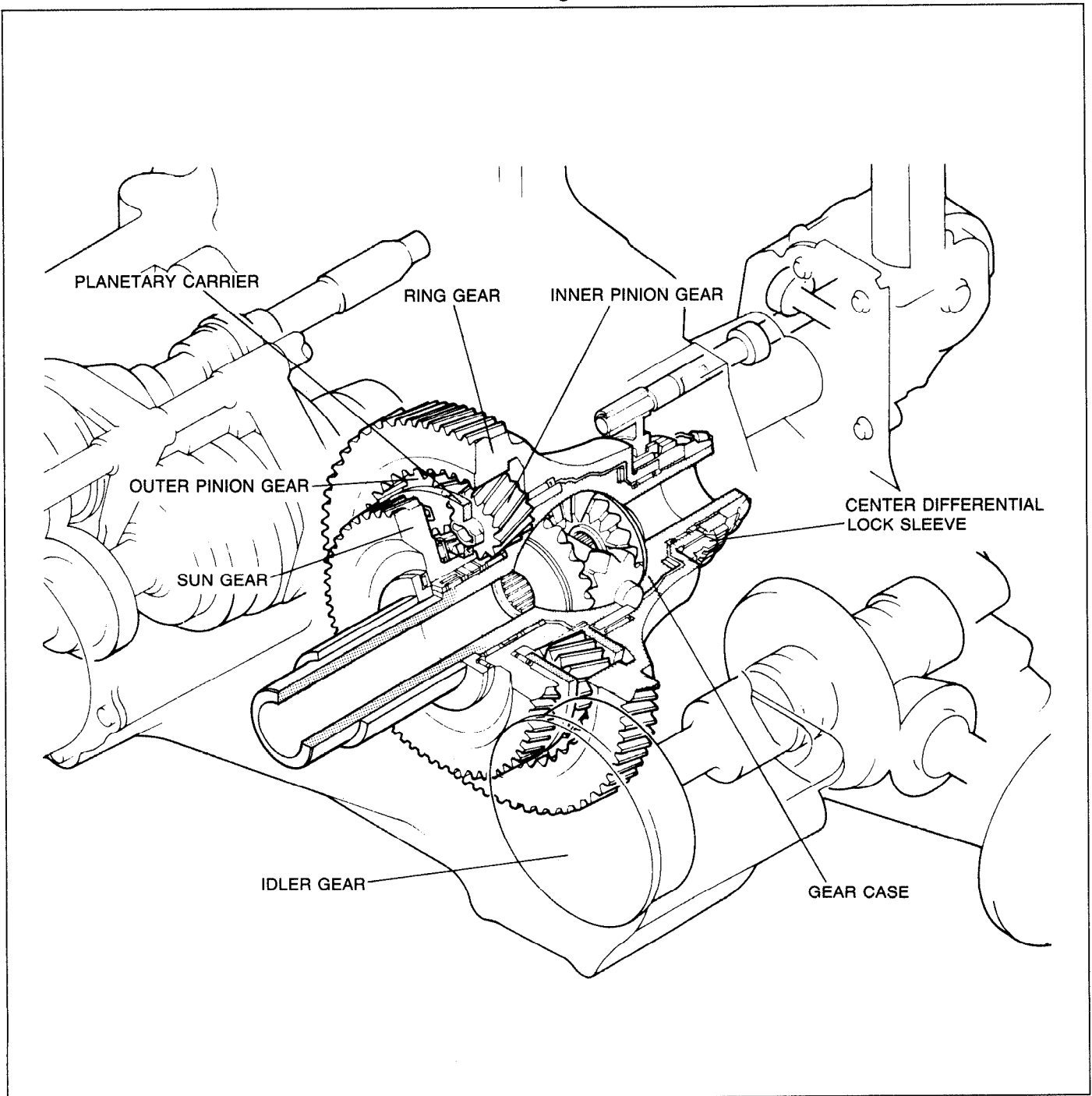
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OUTLINE

OUTLINE OF CONSTRUCTION

- Full-Time 4-Wheel-Drive, incorporating an electronically controlled, lockable center differential, is standard on the 1990 323 4WD. With this system all driving conditions are easily contended with; from good road to bad roads and inclement weather.
- The transaxle and transfer unit were developed based on the transaxle of the 1989 323 4WD. The transaxle, center differential, and front differential are a single compact unit.
- The center differential employs a planetary carrier system, and functions to distribute the driving force to the front and rear differentials.
- Through the use of this center differential, tire scuffing common to 4-wheel-drive vehicles during tight cornering, is eliminated.
- The speedometer driven gear (for detection of vehicle speed) is installed in the transfer carrier and detects the speed of the rear wheels.
- Lubrication oil of the transaxle and transfer unit and the carrier is contained separately.
- A cable shift control is used in order to reduce weight and vibration.



SPECIFICATIONS TRANSAXLE AND TRANSFER UNIT

Item	Engine model		1990 323 (4WD)	1989 323 (4WD)
			BP SOHC	B6 DOHC
Transaxle control		Floor shift		
Synchronesh system	Forward		Synchronesh	
	Reverse		Selective sliding and synchronesh	Selective sliding
Gear ratio	1st		3.307	←
	2nd		1.833	←
	3rd		1.233	←
	4th		0.914	0.970
	5th		0.717	0.795
	Reverse		3.166	←
Final gear ratio		4.388		4.105
Speedometer gear ratio		1.045		←
Center differential	Type		Planetary carrier	
	Number of ring gear teeth	Outer	79	78
		Inner	66	←
	Number of pinion gear teeth	Outer	14	←
		Inner	14	←
	Number of sun gear teeth	Pinion gear side	33	←
		Idler gear side	43	50
Number of idler gear teeth		37	43	
Oil	Type		ATF: DEXRON-II, M-III Above -18°C (0°F) API servie GL-4 SAE 75W-90	ATF: DEXRON-II API servie GL-4 SAE 80W-90 or 90
	Capacity		2.6 liters (2.7 US qt, 2.2 Imp qt)	3.6 liters (3.8 US qt, 3.2 Imp qt)

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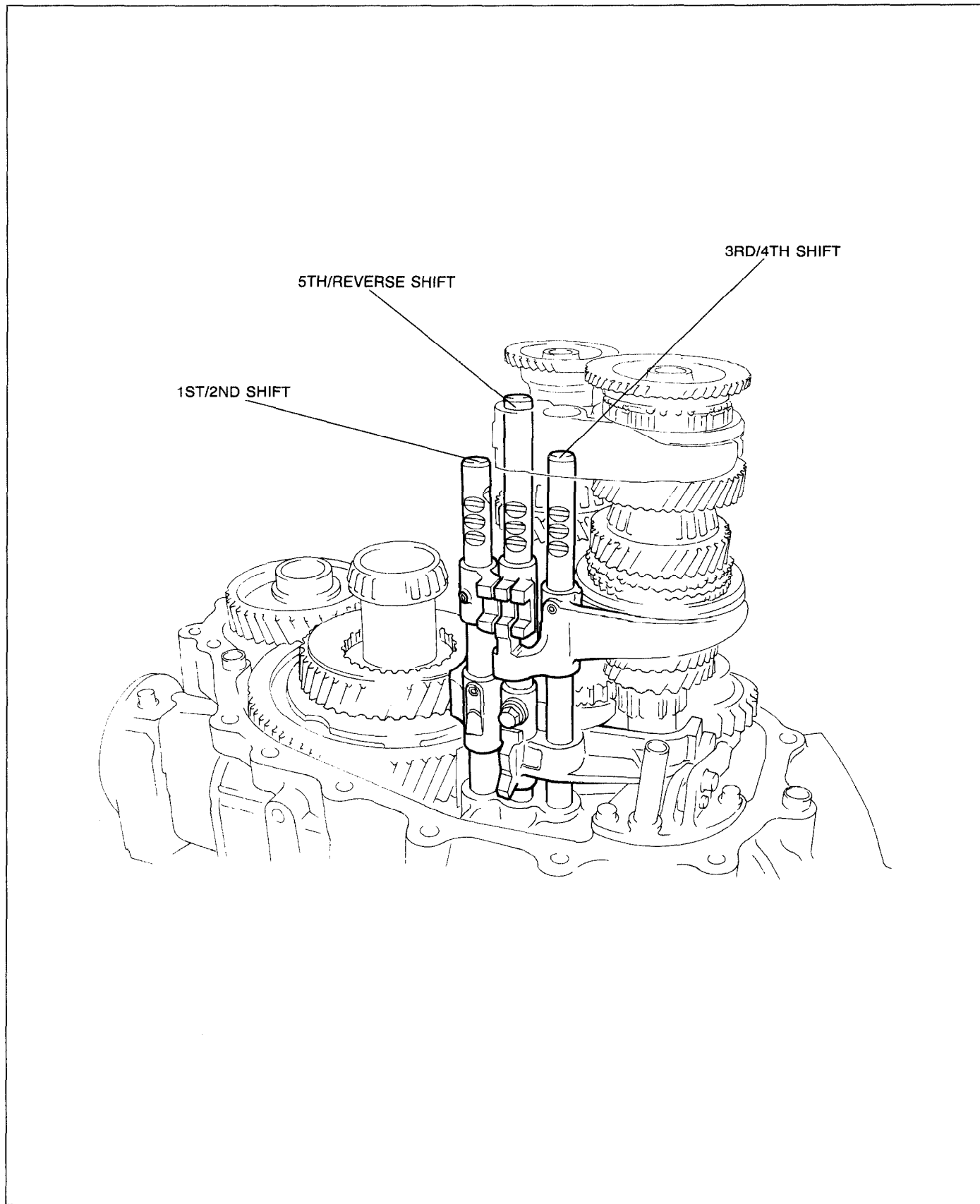
Transfer Carrier

Number of teeth	Ring gear	37
	Pinion gear	11
Oil	Type	API service GL-5 Above -18° (0°F) SAE 90 Below -18° (0°F): SAE 80W
	Capacity	0.5 liter (0.53 US qt, 0.44 Imp qt)

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TRANSAXLE AND TRANSFER UNIT

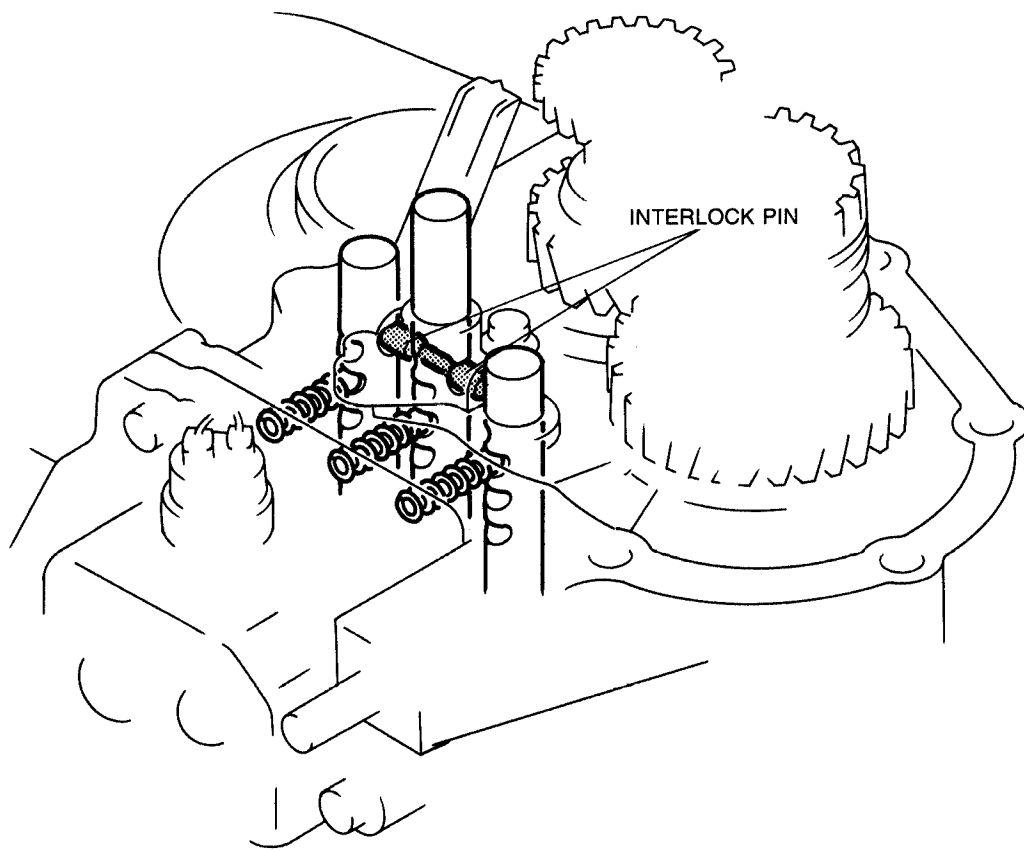
Shift forks and shift rods



03U0J3-006

The shift mechanism is composed of three shift rods, shift forks, and shift rod ends. For the manual transaxle of the 1989 323 4WD, the 1-2 and 3-4 shift forks were moved by one shift rod, but, for the 1990 323 4WD, separate shift rods are used, thus reducing mechanical friction during shifting, and improving the shift feeling.

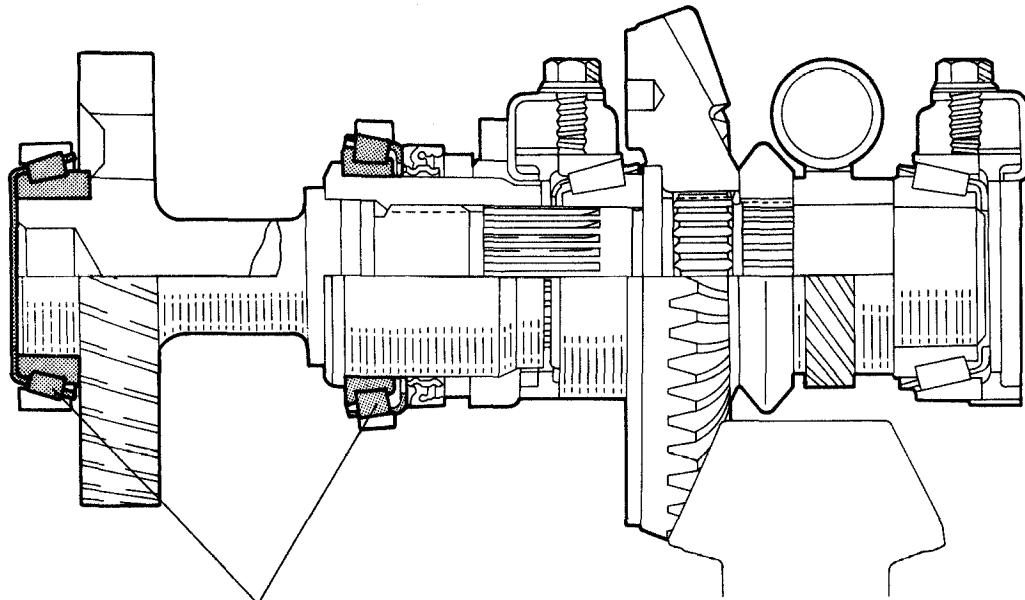
Interlock mechanism



03U0J3-007

The interlock mechanism is the pin type. For the manual transaxle of the 1989 323 4WD, the one shift rod was held by the other shift rod's interlock sleeve, but, for the manual transaxle of the 1990 323 4WD, when one shift rod is caused to move, the interlock pins are pushed out to hold the other shift rods.

Idler gear shaft

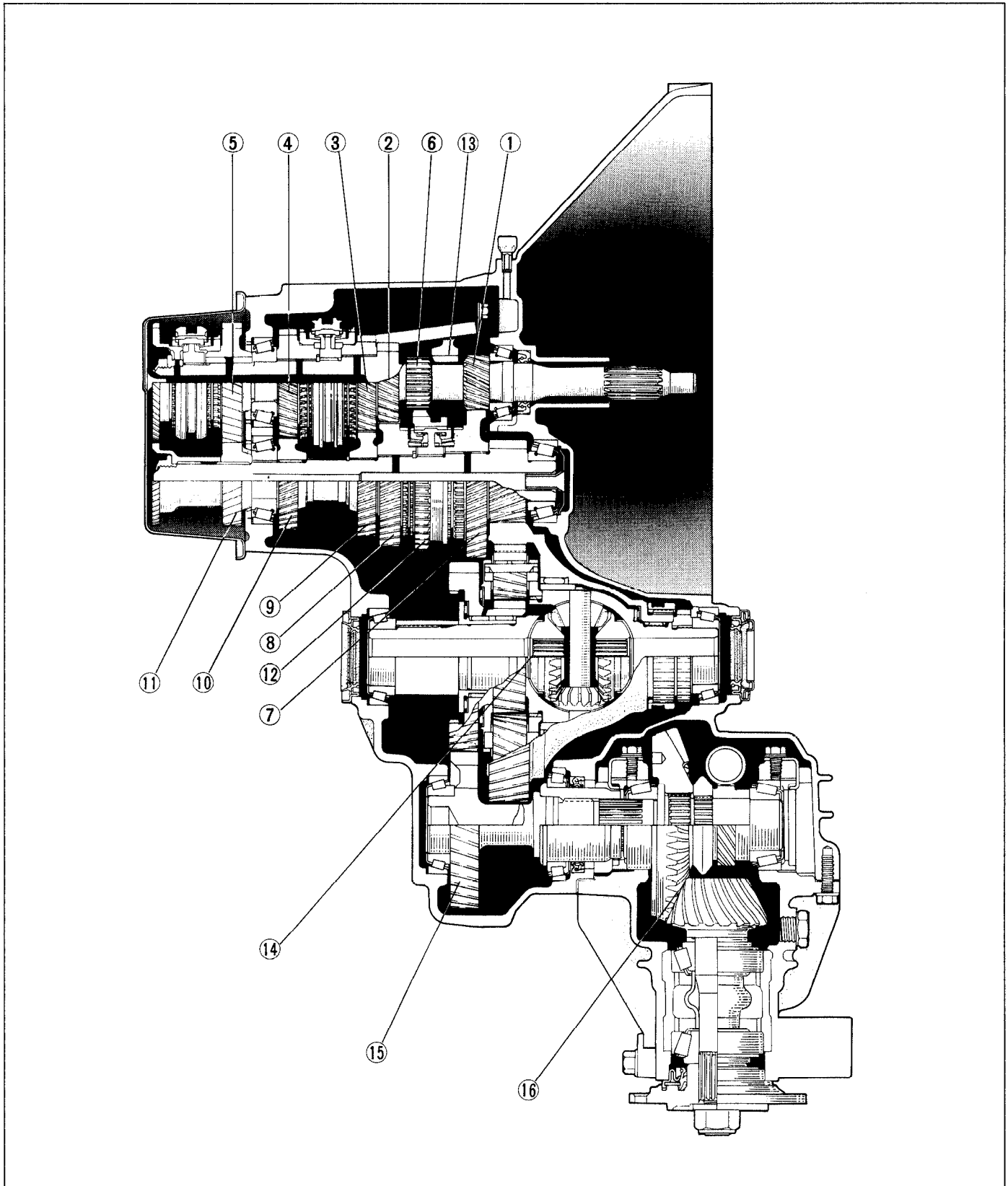


TAPERED ROLLER BEARING

03U0J3-008

For improved transaxle reliability, a tapered roller bearing is newly fitted at the ring gear end of the idler gear shaft for better support; in addition, the previously fitted bearing is changed from a ball bearing to a tapered roller bearing.

STRUCTURAL VIEW



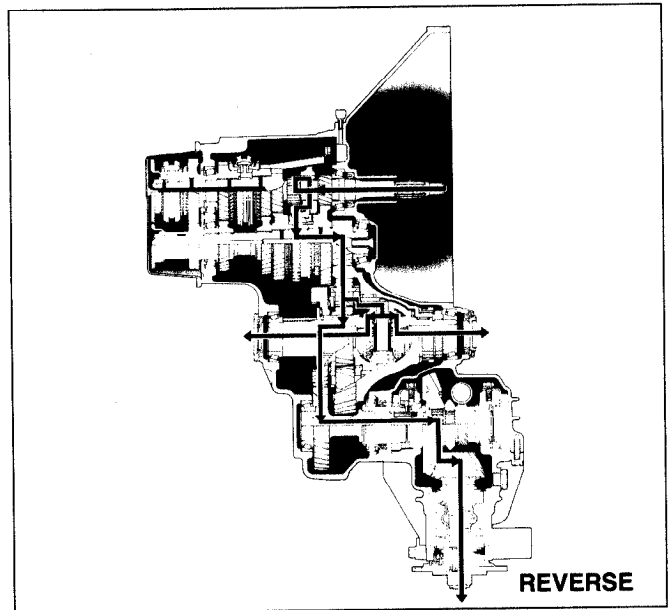
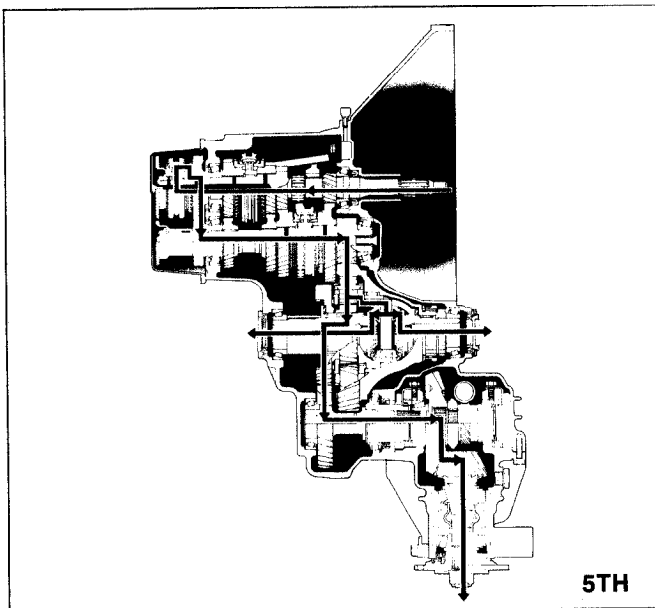
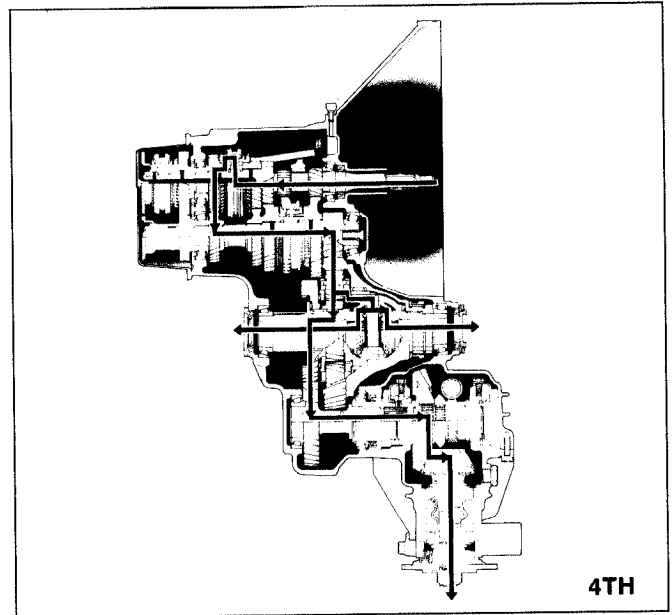
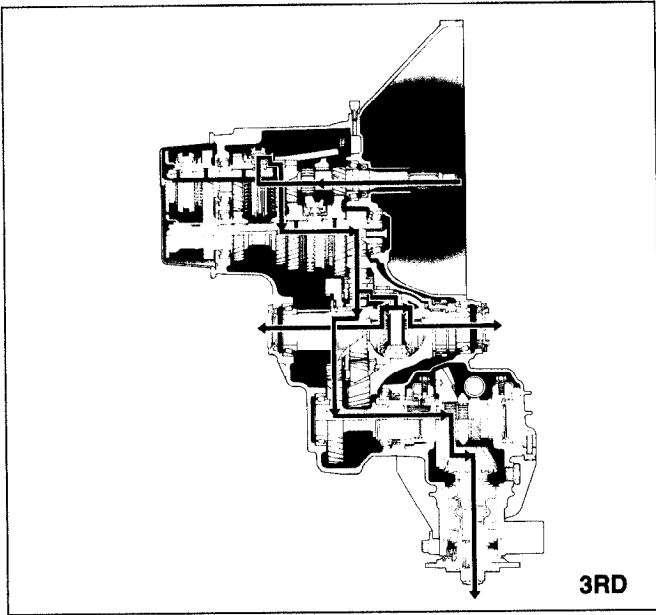
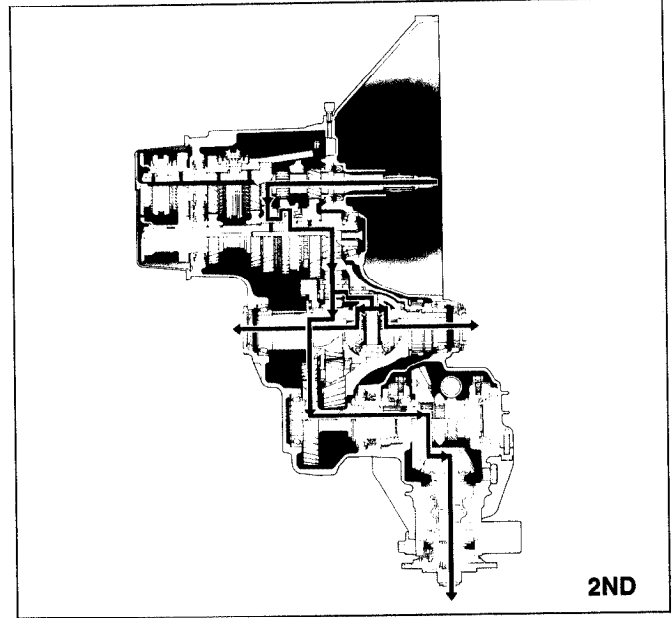
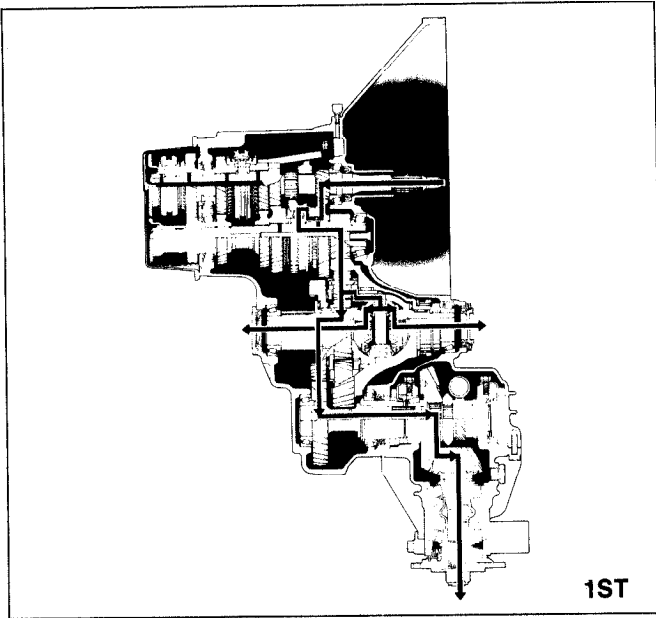
03U0J3-010

- 1. Primary 1st gear
- 2. Primary 2nd gear
- 3. Primary 3rd gear
- 4. Primary 4th gear
- 5. Primary 5th gear
- 6. Primary reverse gear

- 7. Secondary 1st gear
- 8. Secondary 2nd gear
- 9. Secondary 3rd gear
- 10. Secondary 4th gear
- 11. Secondary 5th gear
- 12. Secondary reverse gear

- 13. Reverse idler gear
- 14. Front and center differential assembly
- 15. Idler gear assembly
- 16. Transfer carrier assembly

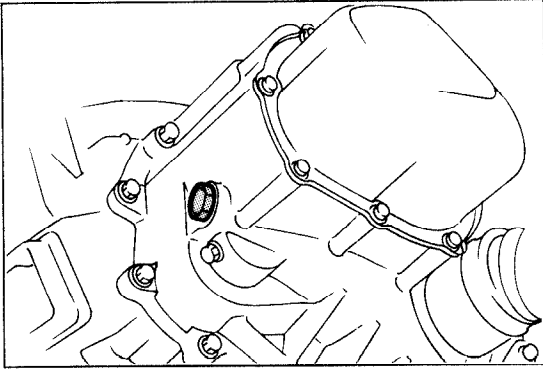
POWERFLOW



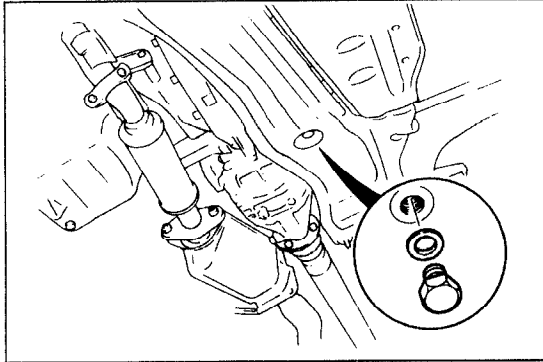
TROUBLESHOOTING GUIDE

Problem	Possible cause	Action	Page
Shift lever won't shift smoothly or is hard to shift	Worn change control cable	Replace	J3-91
Difficult to shift	Worn change rod No grease in transaxle control Insufficient oil Deterioration of oil quality Wear or play of shift fork or shift rod Worn synchronizer ring Worn synchronizer cone of gear Bad contact of synchronizer ring and cone of gear Excessive longitudinal play of gears Worn bearing Worn synchronizer key spring Excessive primary shaft gear bearing preload Improperly adjusted change guide plate	Replace Lubricate Add oil Replace with oil of specified quality Replace Replace Replace Replace Replace Replace Adjust Adjust	J3-91 J3-91 J3-11 J3-11 J3-20 J3-33, 35 J3-33, 35 J3-33, 35 J3-33, 35 J3-33, 35 J3-33, 35 J3-73 J3-31
Won't stay in gear	Worn change control cable Weak shift lever ball spring Worn shift fork Worn clutch hub Worn clutch hub sleeve Worn gear sliding part of both shaft gears Worn gear sliding part of each gear Worn steel sliding groove of control end Weak spring pressing against steel ball Excessive thrust clearance Worn bearing Improperly installed or loose engine mount	Replace Replace Replace Replace Replace Replace Replace Replace Replace Replace Replace Tighten	J3-91 J3-91 J3-20 J3-33, 35 J3-33, 35 J3-33, 35 J3-33, 35 J3-20 J3-20 J3-33, 35 J3-33, 35 J3-86
Abnormal noise	Insufficient oil Deterioration of oil quality Worn bearing Worn sliding surfaces of gears or shafts Excessive gear backlash Damaged gear teeth Foreign material in gears Damaged differential gear or excessive backlash	Add oil Replace Adjust or replace Replace Replace Replace with oil of specified quality Replace Adjust or replace	J3-11 J3-11 J3-33, 35 J3-33, 35 J3-33, 35 J3-33, 35 J3-33, 35 J3-58

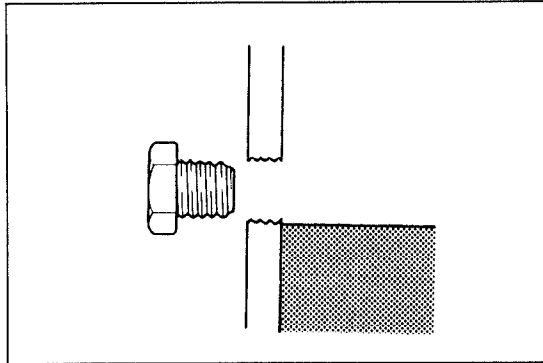
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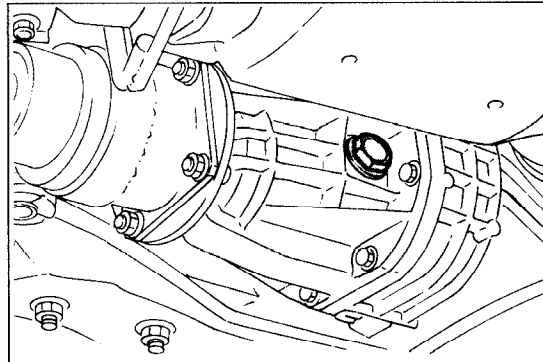
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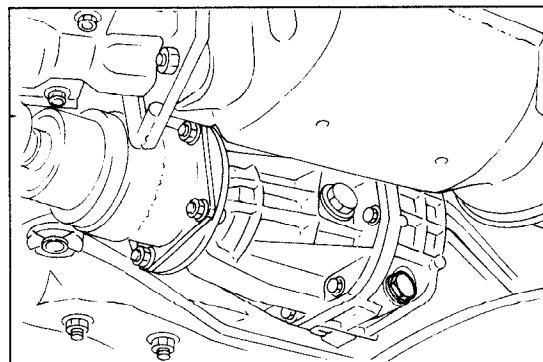
03U0J3-013



03U0J3-014



03U0J3-015



03U0J3-016

TRANSAXLE OIL

INSPECTION

Note

- Park the vehicle on level ground.

1. Remove the check plug.
2. Verify that the oil is at the bottom of the plug port. If it is low, add the specified oil from plug port.
3. Install the check plug.

Tightening torque:

39—58 N·m (4.0—6.0 m·kg, 28—43 ft·lb)

REPLACEMENT

1. Remove the drain plug and washer. Drain the oil into a suitable container.
2. Install a new washer and the drain plug.

Tightening torque:

39—58 N·m (4.0—6.0 m·kg, 28—43 ft·lb)

3. Add the necessary amount of the specified oil through the check plug port.

Specified oil

All-season : ATF (DEXRON-II, M-III)

Above -18°C (0°F): SAE 75W-90

Grade : API service GL4

Capacity: 2.6 liters (2.7 US qt, 2.2 Imp qt)

4. Verify the oil level.
5. Install the check port plug.

Tightening torque:

39—58 N·m (4.0—6.0 m·kg, 28—43 ft·lb)

TRANSFER CARRIER OIL

INSPECTION

Note

- Park the vehicle on level ground.

1. Remove the check plug.
2. Verify that the oil is at the bottom of the plug port. If it is low, add the specified oil from plug port.
3. Install check plug.

Tightening torque:

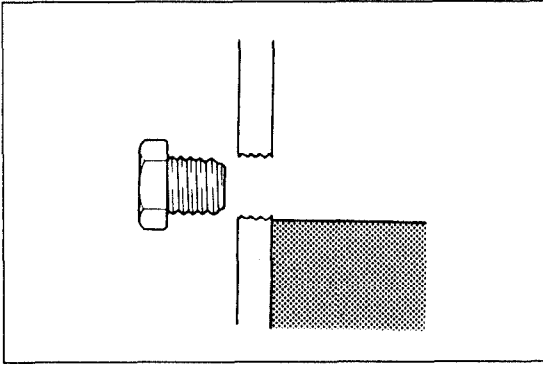
39—58 N·m (4.0—6.0 m·kg, 28—43 ft·lb)

REPLACEMENT

1. Remove the drain plug. Drain the oil into a suitable container.
2. Install a new washer and the drain plug.

Tightening torque:

39—58 N·m (4.0—6.0 m·kg, 28—43 ft·lb)



03U0J3-017

3. Add the necessary amount of the specified oil through the check plug port.

Grade : API servies GI-5

Specified oil: Above -18°C (0°F) SAE 90

Below -18°C (0°F) SAE 80W

Capacity : 0.5 liter (0.53 US qt, 0.44 Imp qt)


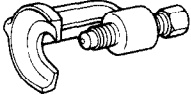
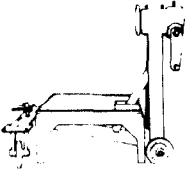

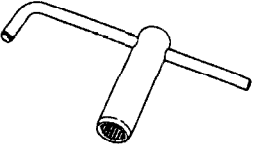
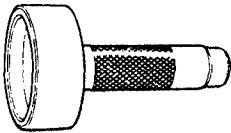
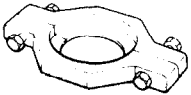
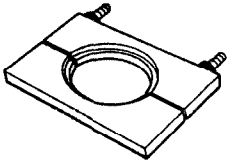
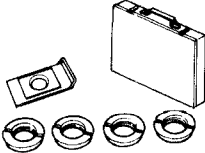
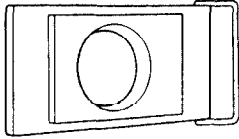
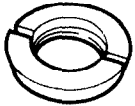
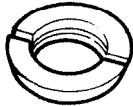
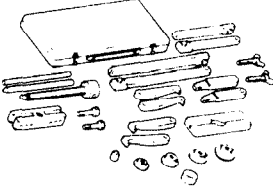
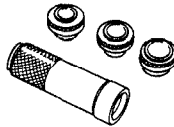


4. Install the check plug.


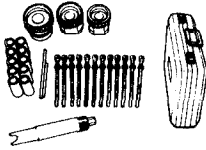



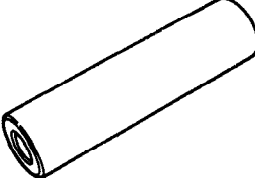

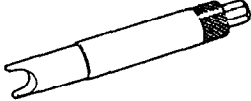

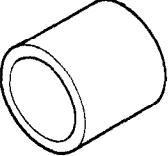
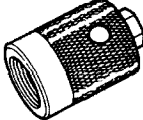
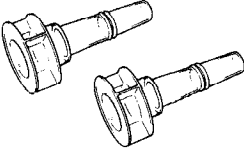
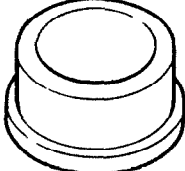
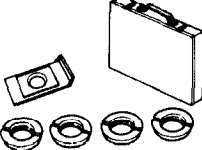
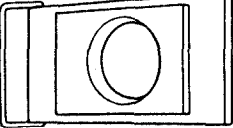
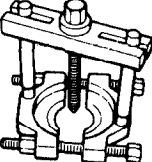
Tightening torque:

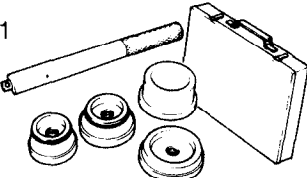
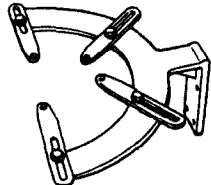

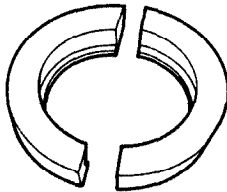
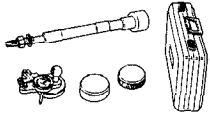
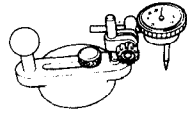

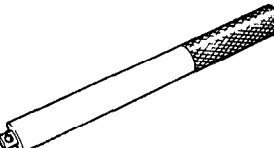
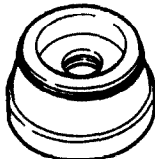
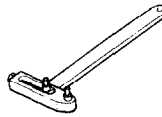
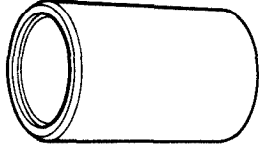

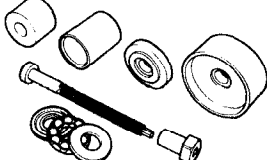
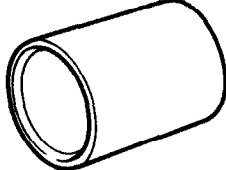
39—58 N·m (4.0—6.0 m·kg, 28—43 in·lb)

TRANSAXLE AND TRANSFER UNIT

PREPARATION
SST

<p>49 G017 5A0 Support, engine</p> 	<p>For support of engine</p>	<p>49 0118 850C Puller, ball joint</p> 	<p>For removal of tie-rod end</p>
<p>49 0107 680A Stand, engine</p> 	<p>For disassembly and assembly of transaxle</p>	<p>49 G019 0A0 Transaxle, hanger</p> 	<p>For disassembly and assembly of transaxle</p>
<p>49 G030 440 Holder, primary shaft</p> 	<p>For holding primary shaft</p>	<p>49 G030 795 Installer, oil seal</p> 	<p>For installation of oil seal</p>
<p>49 0636 145 Puller, fan pulley boss</p> 	<p>For removal of bearing inner race</p>	<p>49 G030 370 Plate, removing</p> 	<p>For removal of secondary 3rd gear and 2nd gear</p>
<p>49 G017 1A0 Remover set, bearing</p> 	<p>For removal of bearing</p>	<p>49 F401 366A Plate (Part of 49 G017 1A0)</p> 	<p>For removal of bearing inner race</p>
<p>49 B092 373 Attachment G (Part of 49 G017 1A0)</p> 	<p>For removal of bearing inner race</p>	<p>49 B092 374 Attachment H (Part of 49 G017 1A0)</p> 	<p>For removal of bearing inner race</p>
<p>49 0839 425C Puller set, bearing</p> 	<p>For removal of bearing inner race</p>	<p>49 F401 330B Installer set, bearing</p> 	<p>For installation of bearing</p>
<p>49 F401 331 Body (Part of 49 F401 330B)</p> 	<p>For installation of bearing inner race</p>	<p>49 F401 335A Attachment A (Part of 49 F401 330B)</p> 	<p>For installation of bearing inner race</p>

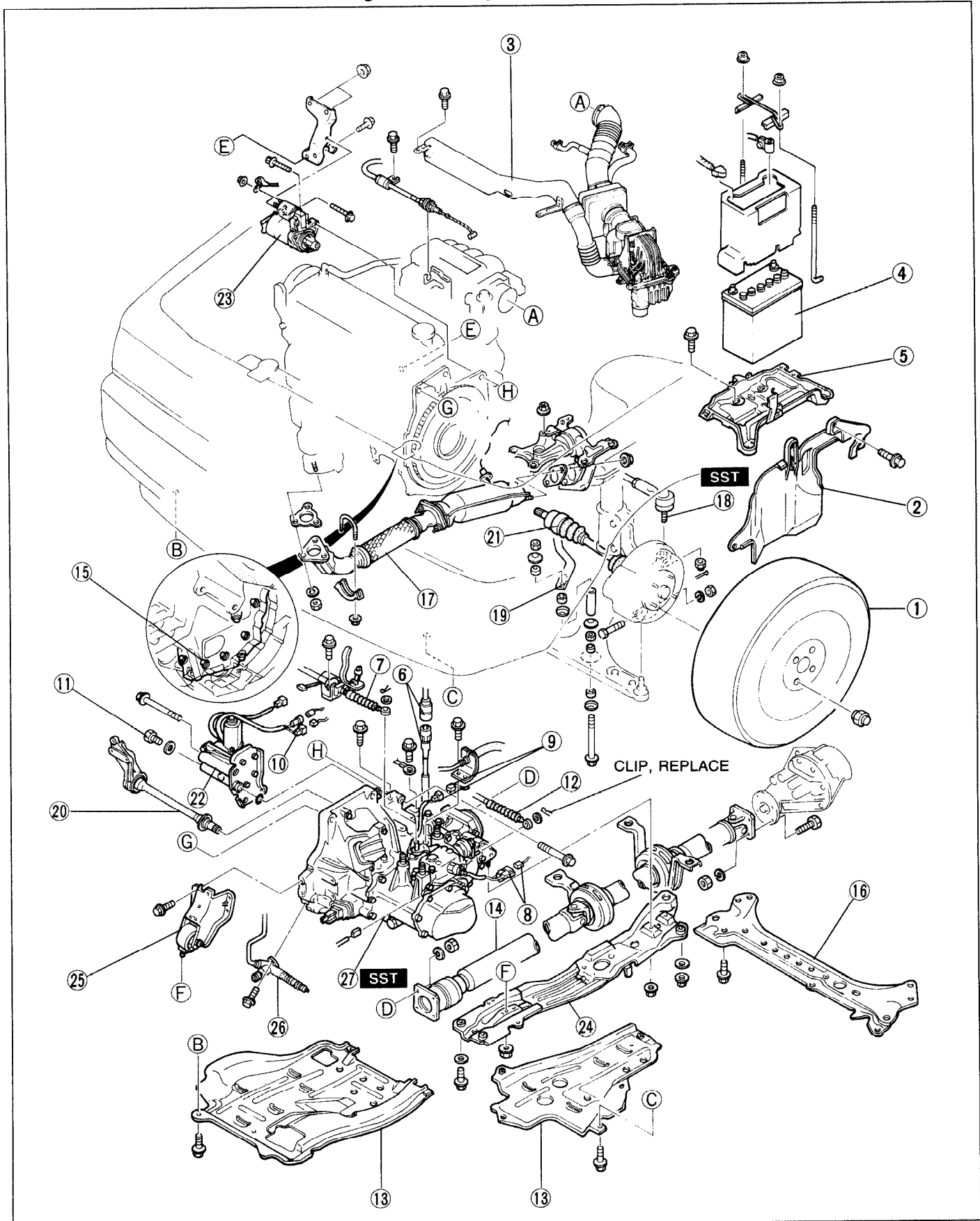
<p>49 F401 337A Attachment B (Part of 49 F401 330B)</p>		<p>For installation of bearing inner race</p>	<p>49 G030 380C Selector set, shim</p> 	<p>For adjustment of bearing preload</p>
<p>49 G030 381 Selector for $\phi 68$ (Part of 49 G030 380C)</p>		<p>For adjustment of bearing preload</p>	<p>49 G030 382A Selector $\phi 58$ (Part of 49 G030 380C)</p> 	<p>For adjustment of bearing preload</p>
<p>49 F401 382A Selector $\phi 52$ (Part of 49 G030 380C)</p>		<p>For adjustment of bearing preload</p>	<p>49 F401 384 Collar (Part of 49 G030 380C)</p> 	<p>For adjustment of bearing preload</p>
<p>49 G019 021 Set, bolt (Part of 49 G030 380C)</p>		<p>For adjustment of bearing preload</p>	<p>49 B027 002 Adapter, preload</p> 	<p>For adjustment of bearing preload</p>
<p>49 F401 385 Bar (Part of 49 G030 380C)</p>		<p>For adjustment of bearing preload</p>	<p>49 U027 003 Installer, oil seal</p> 	<p>For installation of oil seal</p>
<p>49 G017 202 Adapter, preload</p>		<p>For adjustment of bearing preload</p>	<p>49 B027 001 Holder, diff. side gear</p> 	<p>For holding side gear</p>
<p>49 F027 009 Attachment 68 & 77 (Part of 49 F027 0A1)</p>		<p>For installation of bearing inner race</p>	<p>49 G017 1A0 Remover set, bearing</p> 	<p>For removal of bearing</p>
<p>49 F401 366A Plate (Part of 49 G017 1A0)</p>		<p>For removal of bearing</p>	<p>49 0710 520 Puller, bearing</p> 	<p>For removal of bearing</p>

<p>49 F027 0A1 Installer set, bearing</p> 	<p>For installation of bearing</p>	<p>49 M005 561 Hanger, differential carrier</p> 	<p>For disassembly and assembly of differentia</p>
<p>49 S120 710 Holder, coupling flange</p> 	<p>For removal and installation of companion flange</p>	<p>49 B027 003 Attachment M</p> 	<p>For removal of bearing</p>
<p>49 F027 0A0 Gauge set, pinion height adjustment</p> 	<p>For adjustment of pinion height</p>	<p>49 0727 570 Gauge body, pinion height (Part of 49 F027 0A0)</p> 	<p>For adjustment of pinion height</p>
<p>49 F401 337A Attachment C (Part of 49 D017 2A1)</p> 	<p>For installation of bearing inner race (side bearing)</p>	<p>49 F027 003 Handle (Part of 49 F027 0A1)</p> 	<p>For installation of bearing</p>
<p>49 F027 005 Attachment φ62 (Part of 49 F027 0A1)</p> 	<p>For installation of bearing</p>	<p>49 0259 720 Wrench, differential side bearing adjusting nut</p> 	<p>For adjustment of drive pinion and ring gear backlash</p>
<p>49 W023 785 Boot, installer</p> 	<p>For installation of oil seal</p>	<p>49 G030 338 Attachment E</p> 	<p>For installation of bearing</p>
<p>49 H028 2A0 Rubber bush replacer</p> 	<p>For installation of bearing</p>	<p>49 H028 202 Block L (Part of 49 H028 2A0),</p> 	<p>For installation of bearing</p>

03U0J3-018

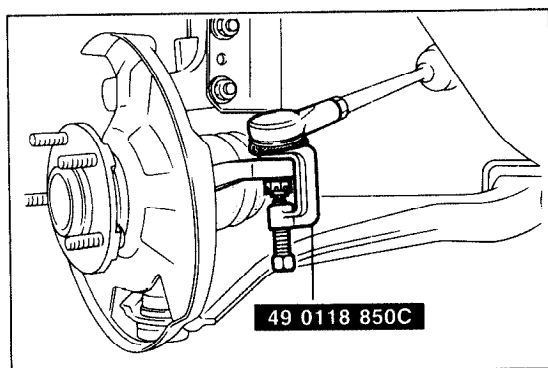
REMOVAL

1. Disconnect the negative battery cable.
2. Raise the vehicle and support it with safety stands.
3. Drain the transaxle oil and transfer carrier oil into a suitable container.
4. Remove in the order shown in the figure, referring to **Removal Note**.



- | | |
|------------------------------------------------------|------------------------------------------------------------------------------|
| 1. Wheel and tire | 17. Exhaust pipe |
| 2. Splash shield | 18. Tie-rod end
Removal Note page J3-17 |
| 3. Air hose and air cleaner assembly | 19. Stabilizer |
| 4. Battery | 20. Joint shaft |
| 5. Battery carrier | 21. Driveshaft
Removal Note page J3-17 |
| 6. Speedometer cable | 22. Center differential lock motor
Removal Note page J3-18 |
| 7. Shift cable | 23. Starter |
| 8. Neutral switch connector | 24. Engine mount member
Removal Note page J3-19 |
| 9. Back-up light switch connector | 25. Engine mount No.2 |
| 10. Differential lock motor connector | 26. Clutch release cylinder and clutch pipe
Removal Note page J3-19 |
| 11. Bolt | 27. Transaxle and transfer carrier
Removal Note page J3-19 |
| 12. Control cable | |
| 13. Undercover | |
| 14. Propeller shaft
Removal Note page J3-17 | |
| 15. Integrated stiffener | |
| 16. Crossmember | |

03U0J3-020



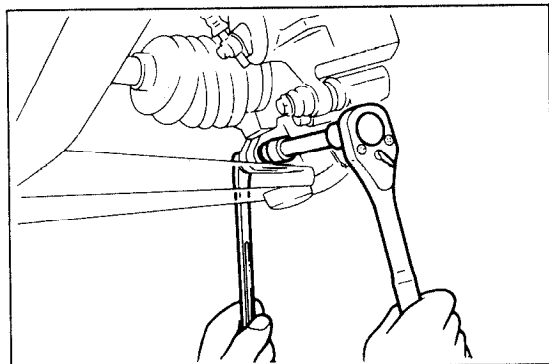
03U0J3-021

Removal note Propeller shaft

Caution

- Do not mark with a punch.

1. Mark the companion flange and the front yoke.
2. Mark the companion flange and the rear yoke.
3. Remove the propeller shaft.



03U0J2-017

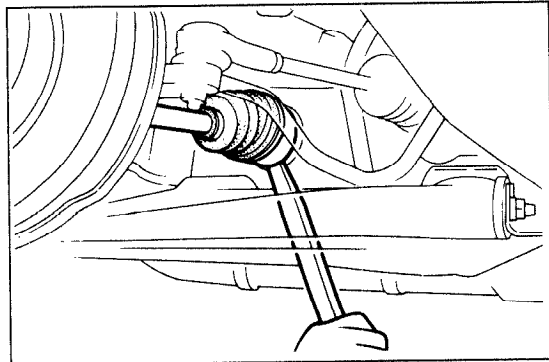
Tie-rod end

1. Remove the cotter pin.

Caution

- Do not damage the dust boot.

2. Loosen the nut and disconnect the tie-rod end with the **SST**.



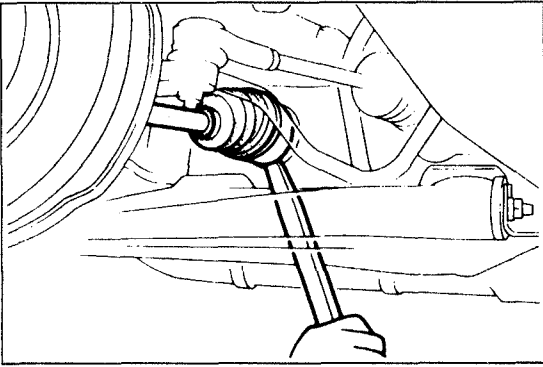
03U0KX-159

Driveshaft

Caution

- Do not damage the ball joint dust boot.

1. Remove the clinch bolts from the lower arm ball joints.
2. Pull the lower arms downward to separate them from the knuckles.

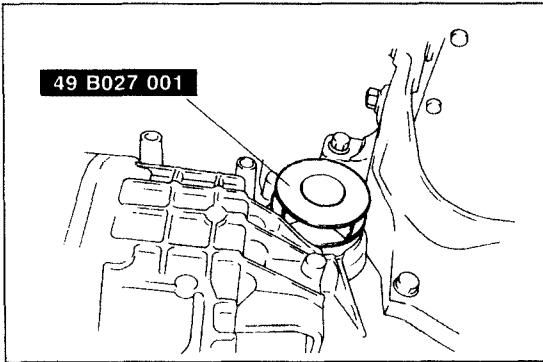


03U0KX-160

Caution

- Do not damage the oil seal.

3. Separate the left driveshaft from the transaxle by prying with a bar inserted between the shaft and the transaxle case.

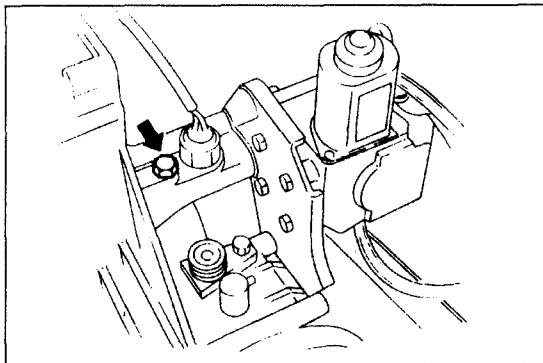


03U0KX-161

Caution

- If the SST is not installed, the differential side gears may become misaligned.

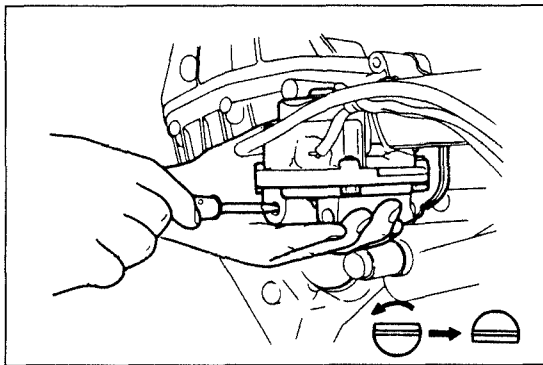
4. Slide the **SST** into the differential side gear.



03U0J3-022

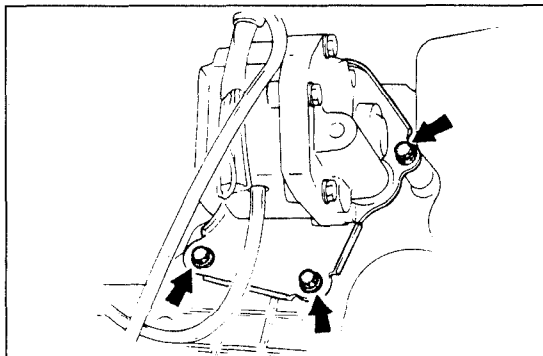
Center differential lock motor

1. Remove the set bolt.



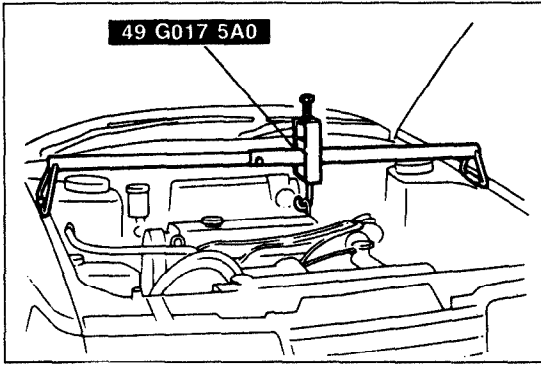
03U0J3-023

2. Remove the center differential lock sensor switch.
3. Remove the plug, and turn the rod with a screwdriver.



03U0J3-024

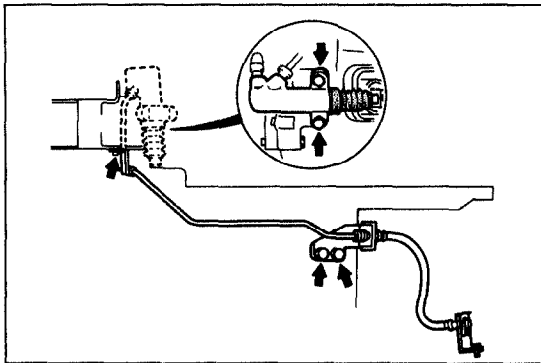
4. Remove the center differential lock motor.
5. Remove the O-ring from the center differential lock motor.



03U0J3-025

Engine mounting member

1. Suspend the engine with the **SST** before removing the engine mounting member.



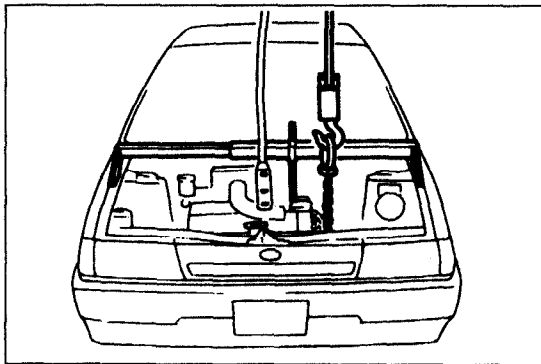
03U0J2-016

Clutch release cylinder

Caution

- Do not damage the clutch pipe.

1. Remove the bolts shown.
2. Lay aside the clutch release cylinder and the clutch pipe.



03U0J3-026

Transaxle and transfer unit

1. Use an engine hoist, and remove the transaxle and transfer unit.

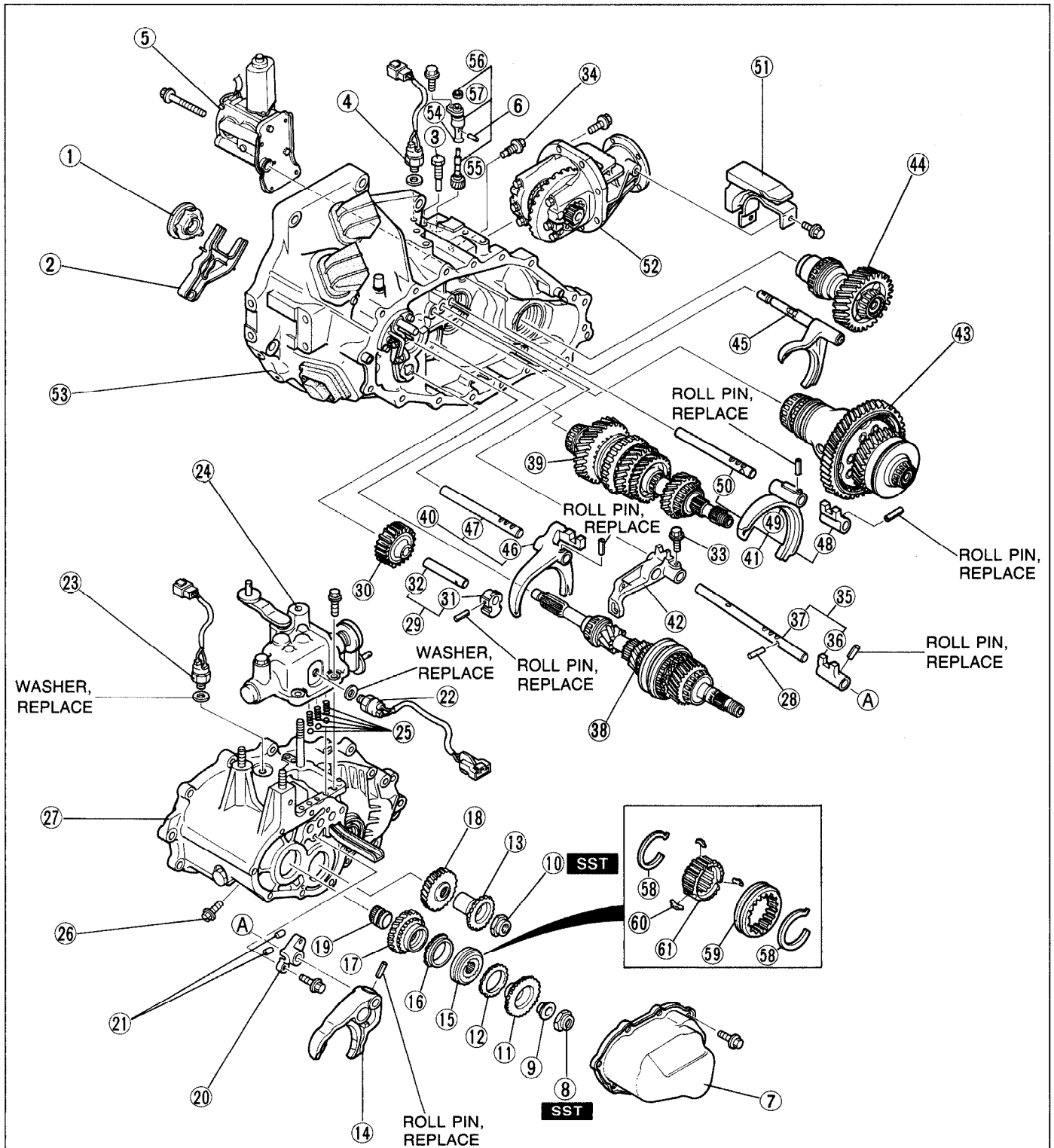
DISASSEMBLY

Precaution

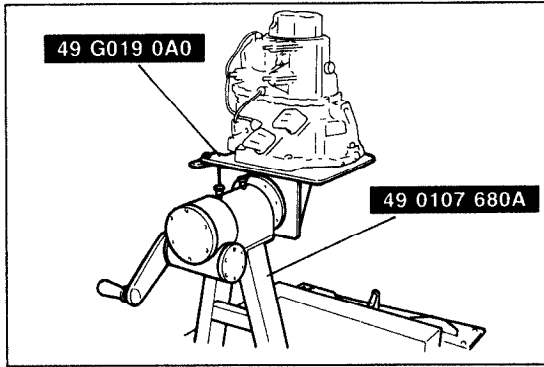
1. Clean the transaxle exterior thoroughly with a steam cleaner and/or cleaning solvent before disassembly.
2. Clean the removed parts (except sealed bearings) and all sealing surfaces with cleaning solvent, and dry with compressed air. Clean out all holes and passages with a compressed air, and check that there are no obstructions.
3. Wear eye protection when using compressed air to clean components.

5th/Reverse Gear and Housing Parts

1. Measure the thrust clearance between 5th gear and the transaxle case, referring to **Preinspection**.
2. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
3. Inspect all parts and repair or replace as necessary.



1. Clutch release bearing Disassembly Note.....	page J3-22	31. Reverse idler gear support	
2. Clutch release fork Disassembly Note.....	page J3-22	32. Reverse idler gear shaft	
3. Differential lock set bolt		33. Bolt	
4. Differential lock switch		34. Steel ball, spring, and bolt	
5. Differential lock motor Disassembly Note.....	page J3-22	35. Shift rod assembly	
6. Speedometer assembly		36. Shift rod end	
7. Rear cover		37. Shift rod	
8. Locknut		38. Primary shaft assembly Disassembly Note.....	page J3-24
9. Spacer		Disassembly.....	page J3-33
10. Locknut		Assembly.....	page J3-64
11. Primary reverse synchronizer gear Inspect gear teeth for damage, wear, and cracks		39. Secondary shaft assembly Disassembly Note.....	page J3-35
12. Synchronizer ring Inspection.....	page J3-45	Disassembly.....	page J3-24
13. Secondary reverse synchronizer gear Inspect gear teeth for damage, wear, and cracks		Assembly.....	page J3-67
14. Shift fork Disassembly Note.....	page J3-23	40. Shift fork assembly (3rd/4th)	
Inspection.....	page J3-46	41. Shift fork assembly (1st/2nd)	
15. Clutch hub assembly Disassembly Note.....	page J3-23	42. Shift gate	
Inspection.....	page J3-45	43. Front and center differential assembly Disassembly Note.....	page J3-24
16. Synchronizer ring Inspection.....	page J3-45	Disassembly.....	page J3-38
17. Primary 5th gear Inspection.....	page J3-45	Assembly.....	page J3-58
18. Secondary 5th gear Inspect gear teeth for damage, wear, and cracks		44. Idler gear assembly Disassembly.....	page J3-40
19. Gear sleeve Inspection.....	page J3-45	Assembly.....	page J3-56
20. Interlock plate		45. Center differential lock shift fork Disassembly.....	page J3-38
21. Interlock pins		Assembly.....	page J3-58
22. Neutral switch		46. Shift fork (3rd/4th) Inspection.....	page J3-45
23. Back-up light switch		47. Shift rod (3rd/4th)	
24. Top cover assembly Disassembly Note.....	page J3-23	48. Shift rod end	
Disassembly.....	page J3-31	49. Shift fork (1st/2nd) Inspection.....	page J3-45
Assembly.....	page J3-62	50. Shift rod (1st/2nd)	
25. Steel balls and springs		51. Dynamic damper assembly	
26. Lock bolt		52. Transfer carrier assembly Disassembly.....	page J3-42
27. Transaxle case assembly Disassembly Note.....	page J3-23	Assembly.....	page J3-50
Disassembly.....	page J3-28	53. Clutch housing assembly Disassembly.....	page J3-28
Assembly.....	page J3-70	Assembly.....	page J3-70
28. Interlock pin		54. O-ring	
29. Reverse idler gear shaft assembly		55. Speedometer driven gear	
30. Reverse idler gear Inspection.....	page J3-45	56. Oil seal Disassembly Note.....	page J3-25
		On-vehicle.....	page J3-25
		57. Speedometer sleeve	
		58. Synchronizer key spring	
		59. Clutch hub sleeve Inspection.....	page J3-45
		60. Synchronizer key	
		61. Clutch hub	

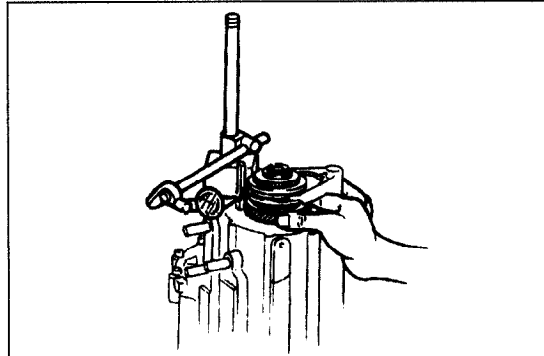


03U0J3-029

Preinspection

5th gear thrust clearance

1. Mount the transaxle and transfer carrier on the **SST**.
2. Remove the rear cover.



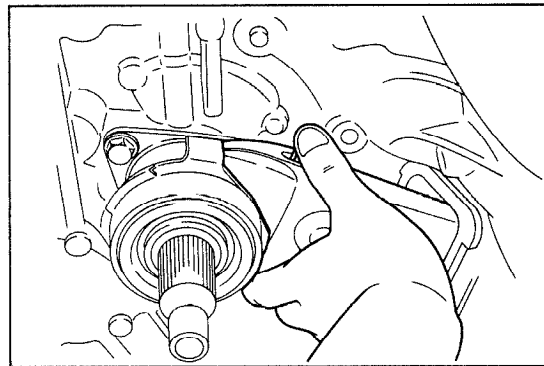
03U0J3-030

3. Measure the 5th gear thrust clearance with a dial indicator.

Clearance: 0.1—0.22mm (0.0039—0.0087 in)

Maximum : 0.27mm (0.0106 in)

4. If the clearance exceeds the maximum, check the contact surfaces of 5th gear and the clutch hub. Replace worn or damaged parts.

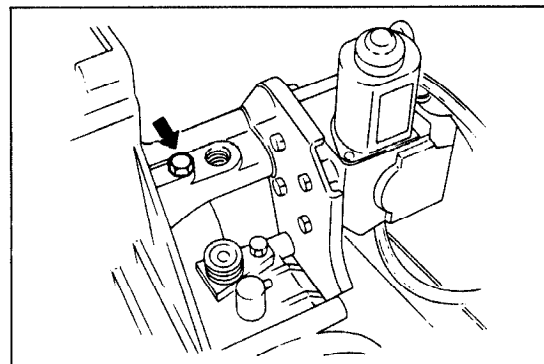


03U0J3-031

Disassembly note

Clutch release bearing, clutch release fork

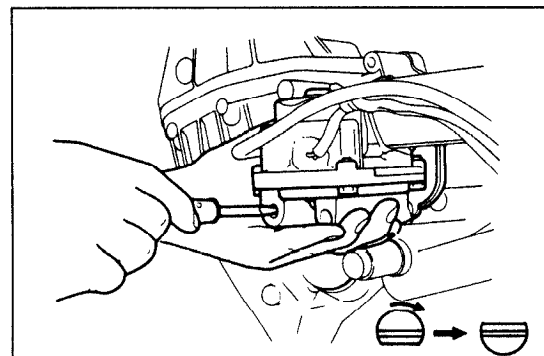
1. Slide the clutch release fork to the boot.
2. Remove the clutch release bearing.
3. Remove the clutch release fork.



03U0J3-032

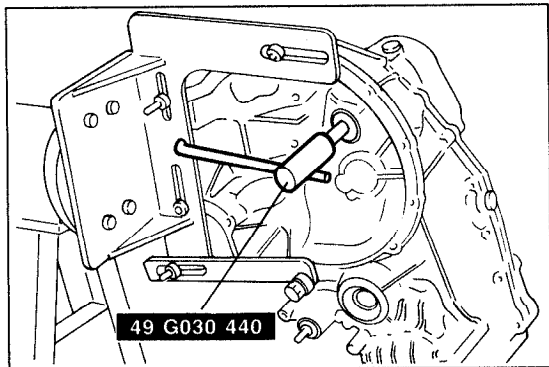
Center differential lock motor

1. Remove the set bolt.



03U0J3-033

2. Remove the plug and turn the differential lock shift rod 180° clockwise with screwdriver.
3. Remove the differential lock assembly.



03U0J3-034

Shift fork, clutch hub assembly

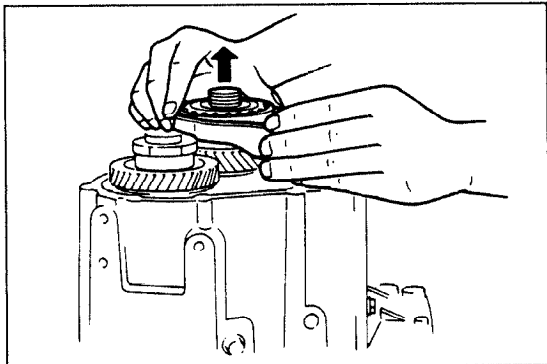
1. Lock the primary shaft with the **SST**.
2. Shift to 1st or 2nd gear to lock the rotation of the primary shaft.

Caution

- Do not reuse the removed locknut.

3. Uncrimp the tabs of the locknuts.
4. Remove the locknuts from the primary and secondary shafts.

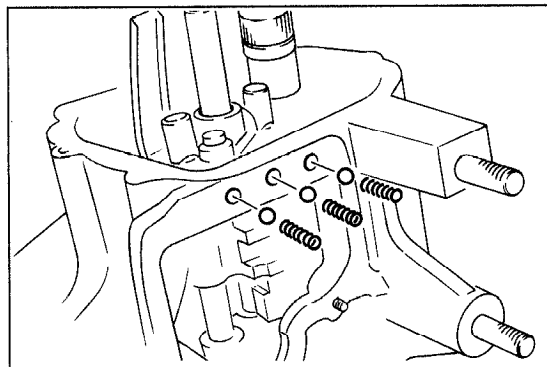
5. Remove the shift fork together with the clutch hub assembly.



03U0J3-035

Top cover assembly

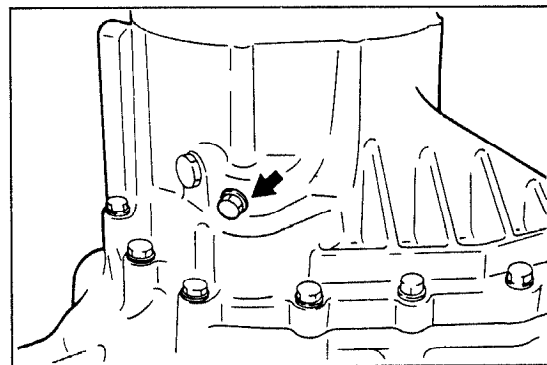
1. Remove the top cover assembly.
2. Remove the springs.
3. Remove the steel balls with a magnet.



03U0J3-036

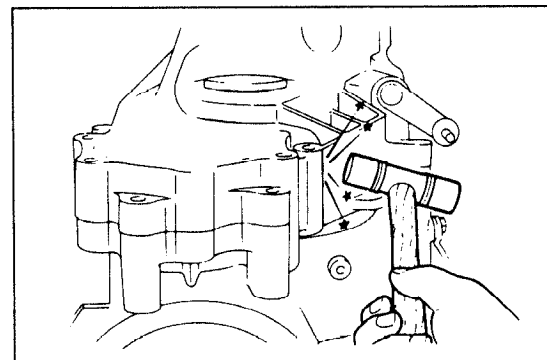
Transaxle case assembly

1. Remove the bolt.

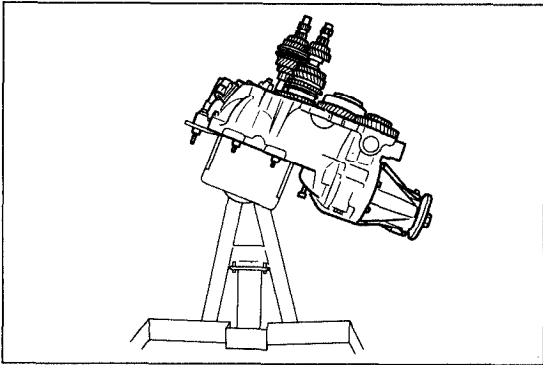


03U0J3-037

2. Remove the bolts and transaxle case by tapping lightly with a plastic hammer.
3. Remove the magnet.



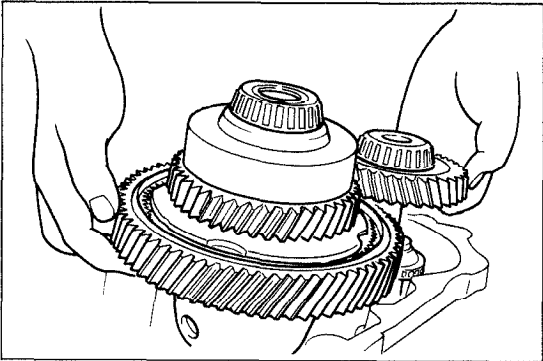
03U0J3-038



03U0J3-039

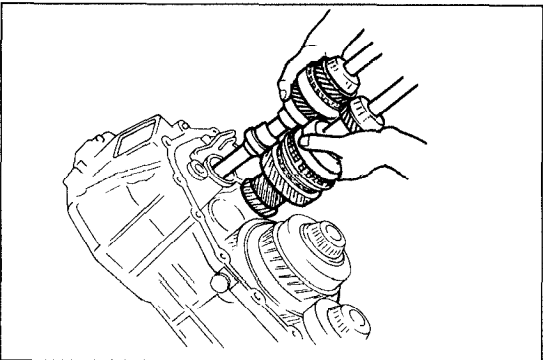
**Primary shaft assembly, secondary shaft assembly,
front and center differential assembly**

1. Lean the clutch housing as shown.



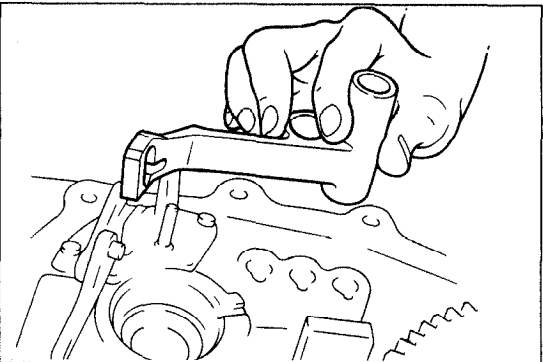
03U0J3-040

2. Hold the front differential assembly and the idler gear assembly so that primary shaft and secondary shaft can be removed.



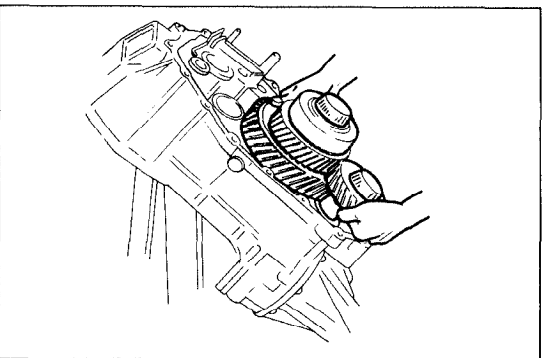
03U0J3-041

3. Remove the primary shaft assembly, secondary shaft assembly and shift fork assembly together.



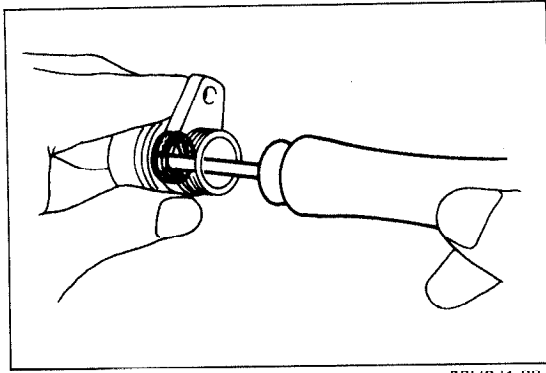
03U0J3-042

4. Remove the shift gate.



03U0J3-043

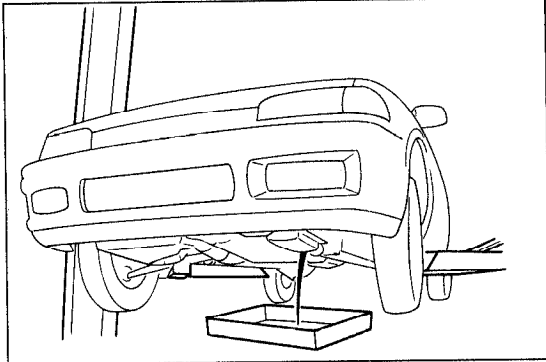
5. Remove the front and center differential assembly, idler gear assembly and center differential lock shift fork assembly together.



03U0J1-034

Oil seal (Speedometer gear case)

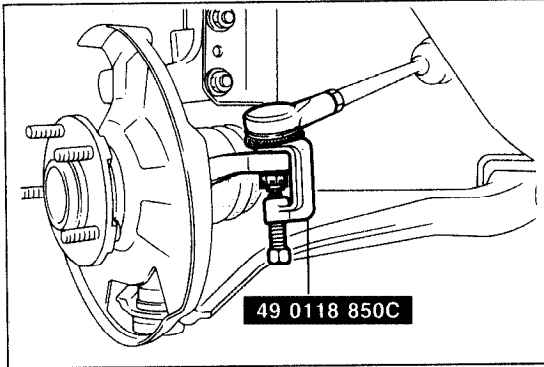
1. Remove the oil seal as shown in the figure.



03U0J3-044

Oil seal (Driveshaft) Replacement (On-vehicle)

1. Jack up the vehicle and support it with safety stands.
2. Drain the transaxle oil.
3. Remove the concerned front wheel.
4. Remove the splash shield.
5. Separate the front stabilizer from the lower arm.

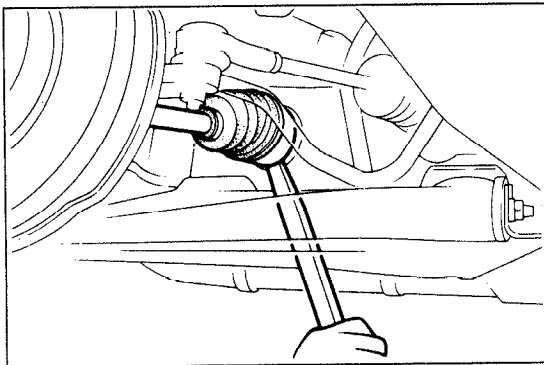


03U0J3-045

Caution

- Do not damage the dust boots.

6. Remove the clinch bolt and pull the lower arm downward. Separate the knuckle from the lower arm ball joint.
7. Loosen the nut and disconnect the tie-rod end with the **SST**.

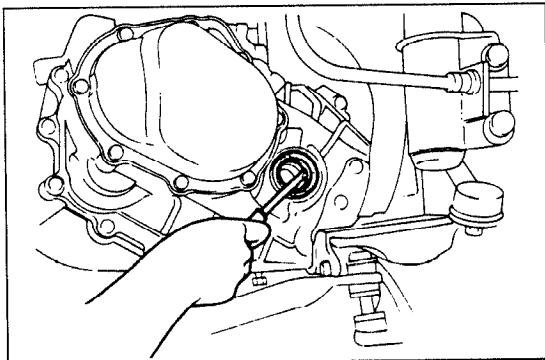


03U0J3-046

Caution

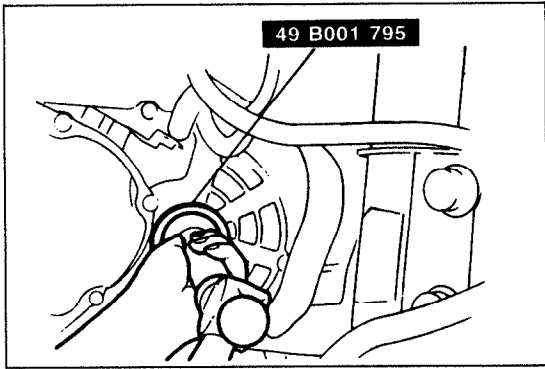
- Do not subject the tripod joint to shock when removing the driveshaft.

8. Disconnect the driveshaft from the transaxle by prying with a bar inserted between the outer ring and the transaxle.
9. Suspend the driveshaft with a rope.

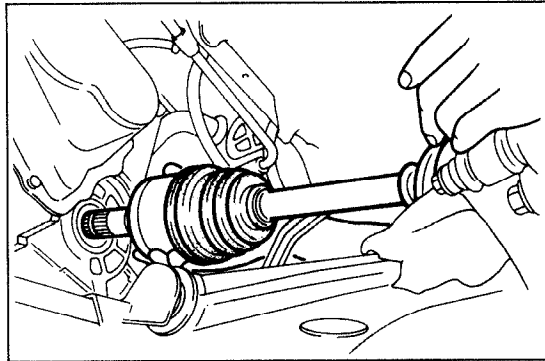


03U0J3-047

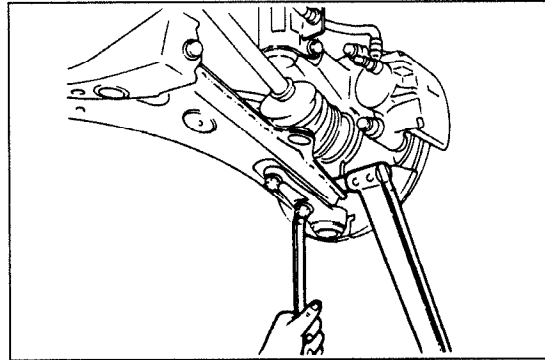
10. Remove the oil seal with a screwdriver.



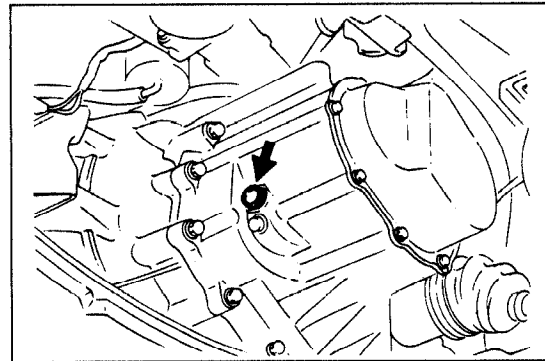
03U0J3-048



03U0J3-049



03U0J3-050



03U0J3-051

Note

- Tap in until the oil seal installer contacts the case.
- Coat the oil seal lip with transaxle oil.

11. Tap the new oil seal into the transaxle case with the **SST**.

12. Replace the driveshaft end clip with a new one. Insert the driveshaft with the end-gap of the clip facing upward.

13. Install the joint shaft.

Tightening torque:

42—62 N·m (4.3—6.3 m·kg, 31—46 ft·lb)

14. Install the lower arm ball joint to the knuckle and tighten.

Tightening torque:

43—54 N·m (4.4—5.5 m·kg, 32—40 ft·lb)

15. Install the tie-rod end to the knuckle and tighten it.

Tightening torque:

29—44 N·m (3.0—4.5 m·kg, 22—33 ft·lb)

16. Install a new gasket, and the drain plug, and add the specified oil from check plug port.

Tightening torque:

39—59 N·m (4.0—6.0 m·kg, 29—43 ft·lb)

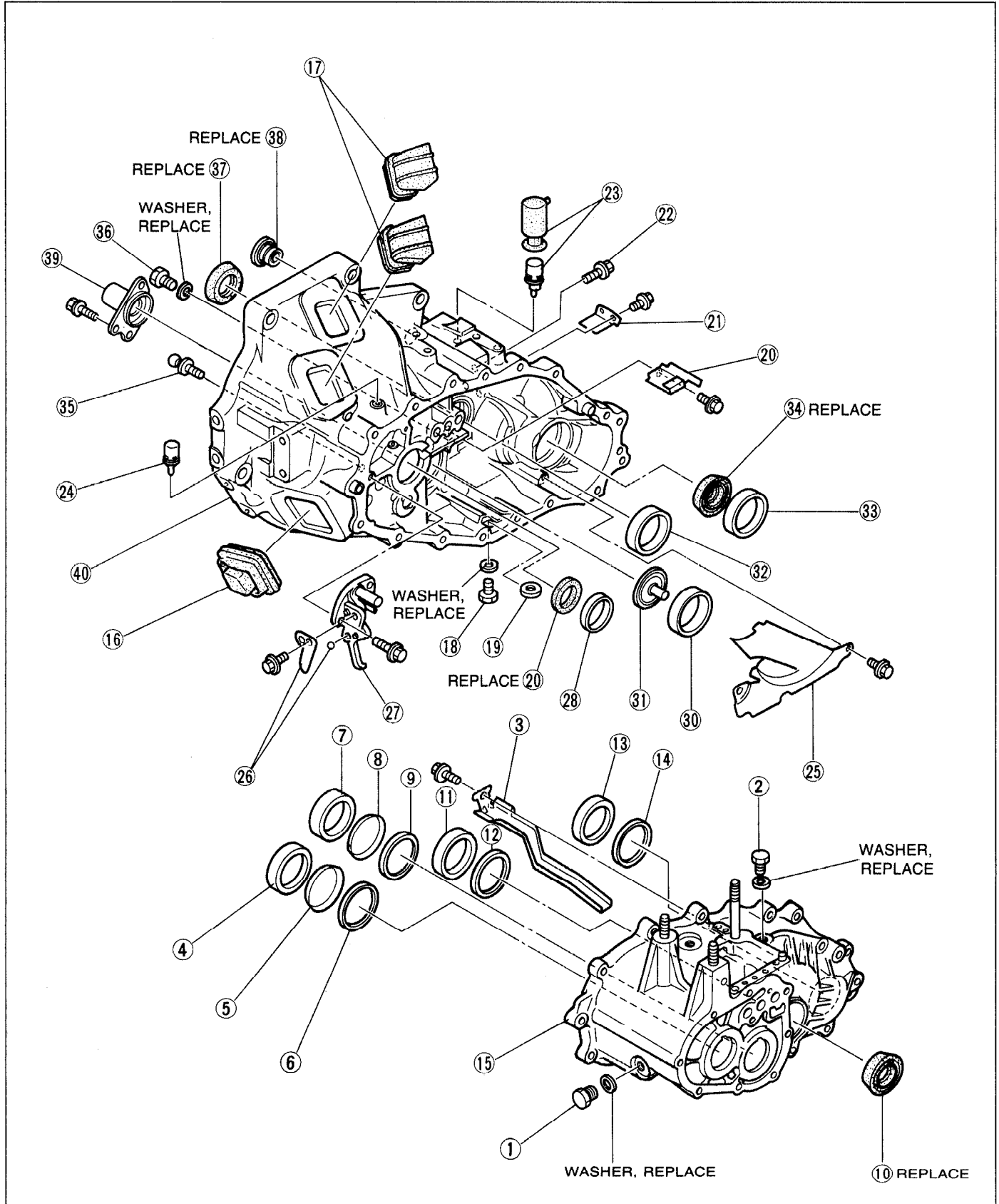
MEMO

Clutch Housing and Transaxle Case Components

Caution

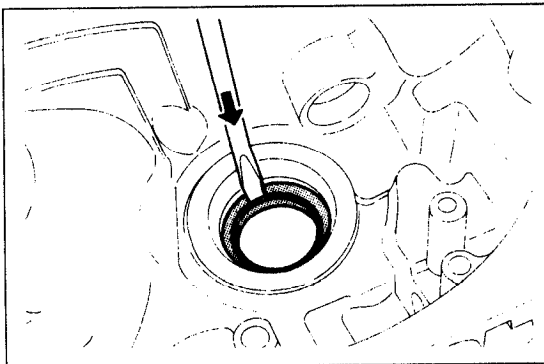
- Do not remove an oil seal if not necessary.

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.



- 1. Plug
- 2. Plug
- 3. Oil guide
- 4. Bearing outer race
- 5. Diaphragm spring
- 6. Adjustment shim
- 7. Bearing outer race
- 8. Diaphragm spring
- 9. Adjustment shim
- 10. Oil seal
Disassembly Note page J3-29
- 11. Bearing outer race
Disassembly Note page J3-30
- 12. Adjustment shim
- 13. Bearing outer race
- 14. Adjustment shim
- 15. Transaxle case
- 16. Dust cover
- 17. Ventilator covers
- 18. Plug
- 19. Magnet
- 20. Oil guide
- 21. Baffle
- 22. Bolt
- 23. Air breather dust boot and air breather
- 24. Air breather
- 25. Baffle
- 26. Lever set spring and steel ball
- 27. Reverse lever support
- 28. Bearing outer race
- 29. Oil seal
- 30. Bearing outer race
Disassembly Note page J3-30
- 31. Funnel
Disassembly Note page J3-30
- 32. Bearing outer race
- 33. Bearing outer race
(Front and center differential side)
Disassembly Note page J3-29
- 34. Oil seal
Disassembly Note page J3-29
- 35. Pivot pin
- 36. Plug
- 37. Oil seal
Disassembly Note page J3-29
- 38. Oil seal
- 39. Front cover
- 40. Clutch housing

03U0J3-053

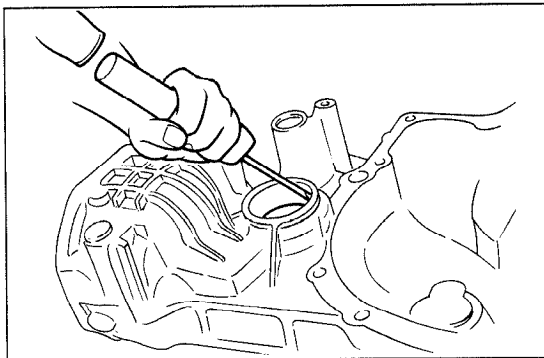


03U0J3-054

Disassembly Note

Oil seal

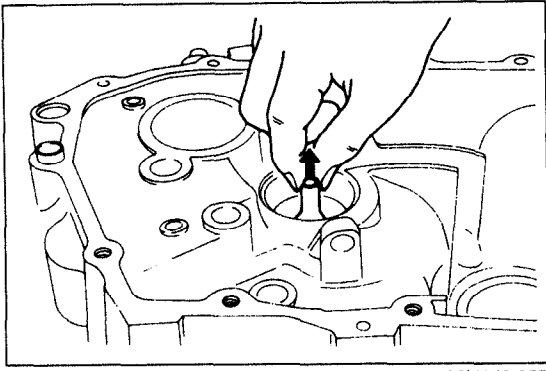
1. Remove the oil seal with a screwdriver.



03U0J3-055

Bearing outer race (Front and center differential side)

1. Remove the bearing outer race with a screwdriver.



03U0J3-057

Funnel, bearing outer race**Note**

- Remove the bearing outer race with a screwdriver if necessary.

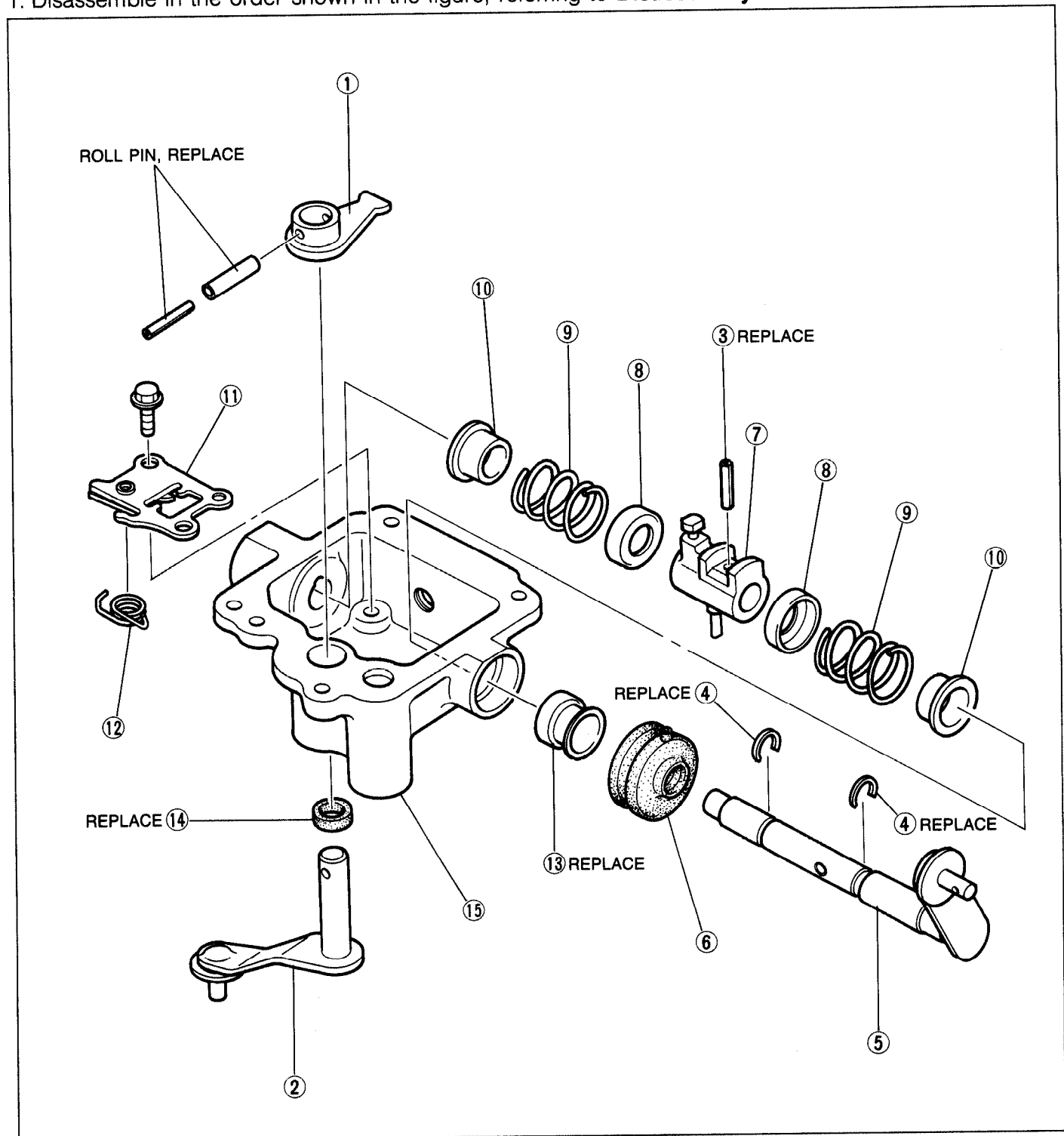
(1) Insert a screwdriver between the clutch housing and bearing outer race.

(2) Pry the bearing outer race free.

1. Remove the bearing outer race by lifting out the funnel and race together.

Top Cover Assembly

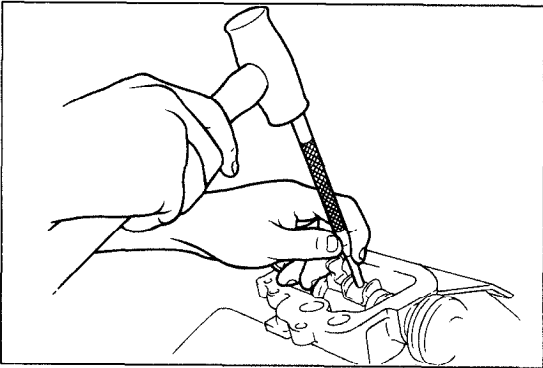
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.



03U0J3-058

- 1. Inner select lever
- 2. Select lever
- 3. Roll pin
Disassembly Note page J3-32
- 4. Retaining rings
Disassembly Note page J3-32
- 5. Shift lever
- 6. Boot
- 7. Inner shift lever
- 8. Washer

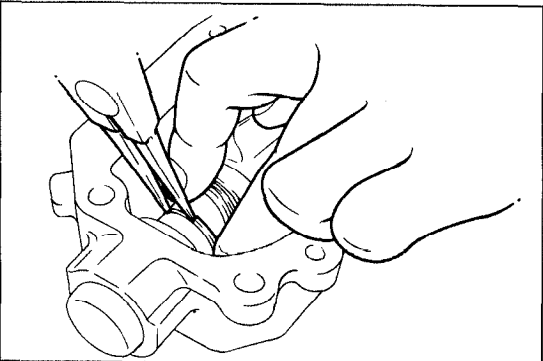
- 9. Springs
Disassembly Note page J3-32
- 10. Guide springs
- 11. Base plate assembly
- 12. Reverse gate spring
- 13. Oil seal
Disassembly Note page J3-32
- 14. Oil seal (Select lever side)
- 15. Top cover



03U0J3-059

Disassembly note**Roll pin**

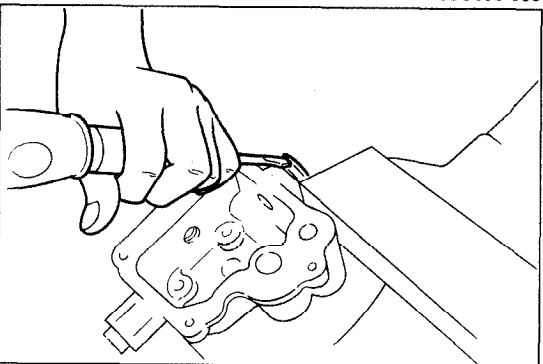
1. Slide the inner shift cover to the boot side.
2. Remove the roll pin.



03U0J3-060

Retaining rings

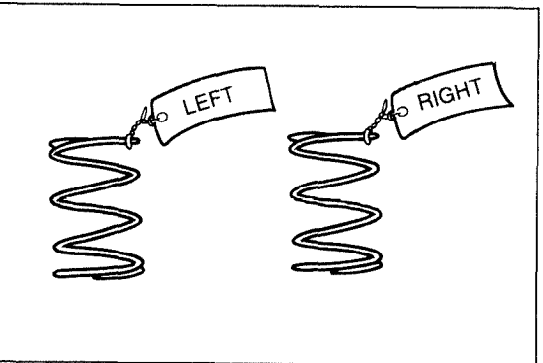
1. Slide the guide spring and remove the retaining ring.
2. Remove the inner shift lever.



03U0J3-061

Oil seal

1. Remove the oil seal with a screwdriver.



03U0J3-062

Springs**Caution**

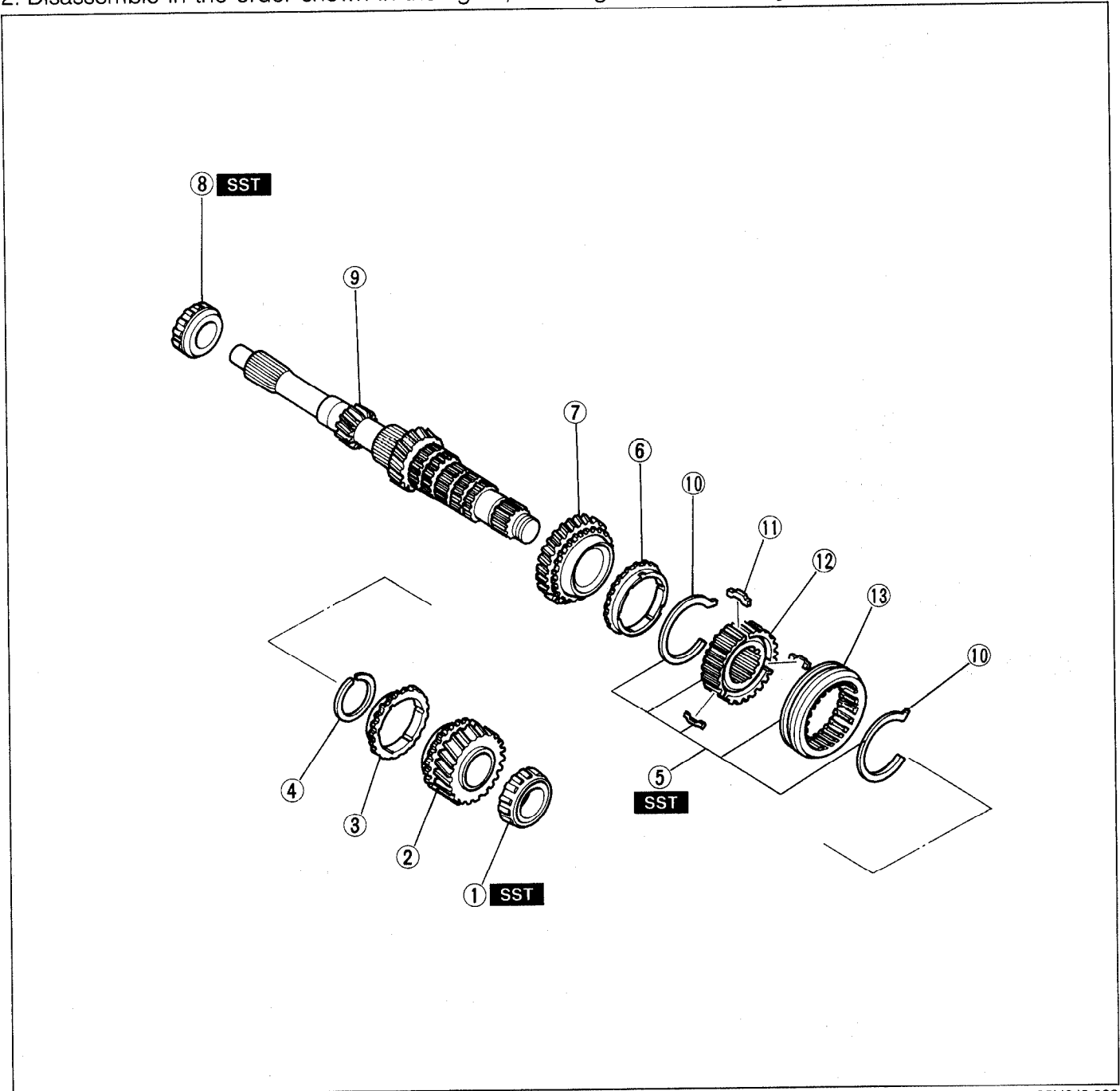
- Do not confuse the springs.
The boot side spring is shortest.

Note

- Mark the springs as shown.

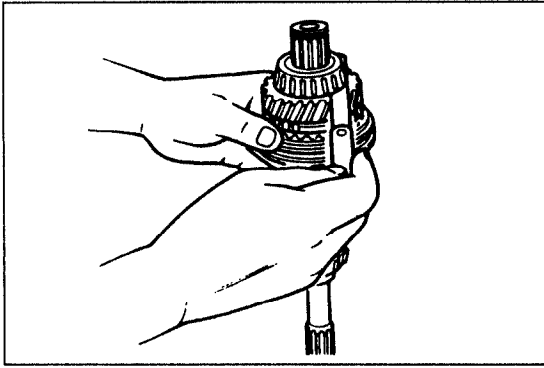
Primary Shaft Assembly

1. Measure the thrust clearance of all gears before disassembly, referring to **Preinspection**.
2. Disassemble in the order shown in the figure, referring to **Disassembly Note**.



03U0J3-063

- | | |
|-------------------------------------------|------------|
| 1. Bearing inner race (4th gear end) | |
| Preinspection | page J3-34 |
| Disassembly Note | page J3-34 |
| 2. 4th gear | |
| Inspection..... | page J3-45 |
| 3. Synchronizer ring (4th) | |
| Inspection..... | page J3-45 |
| 4. Retaining ring | |
| 5. Clutch hub assembly (3rd/4th) | |
| Disassembly Note | page J3-34 |
| Inspection..... | page J3-45 |
| 6. Synchronizer ring (3rd) | |
| Inspection..... | page J3-45 |
| 7. 3rd gear | |
| Preinspection | page J3-45 |
| Inspection..... | page J3-45 |
| 8. Bearing inner race (Primary shaft end) | |
| Disassembly Note | page J3-45 |
| 9. Primary shaft | |
| Inspection..... | page J3-46 |
| 10. Synchronizer springs | |
| 11. Synchronizer keys | |
| 12. Clutch hub | |
| 13. Clutch hub sleeve | |



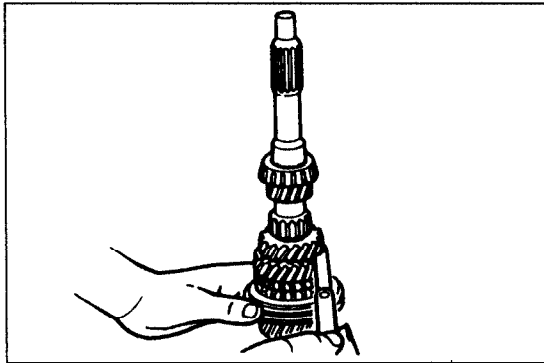
03U0J3-064

Preinspection

1. Measure the clearance between the 4th gear and bearing inner race.

Clearance: 0.165—0.365mm (0.0064—0.0144 in)

Maximum: 0.415mm (0.0163 in)

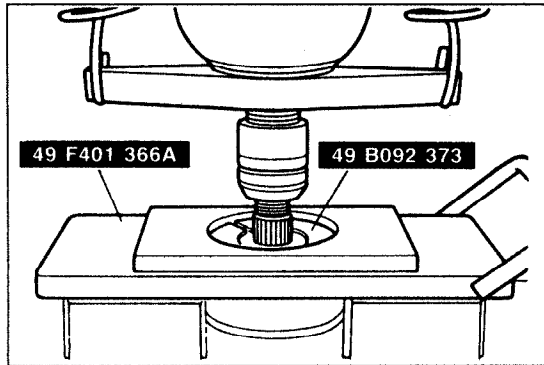


03U0J3-065

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

Clearance: 0.05—0.20mm (0.002—0.008 in)

Maximum: 0.25mm (0.010 in)



03U0J3-066

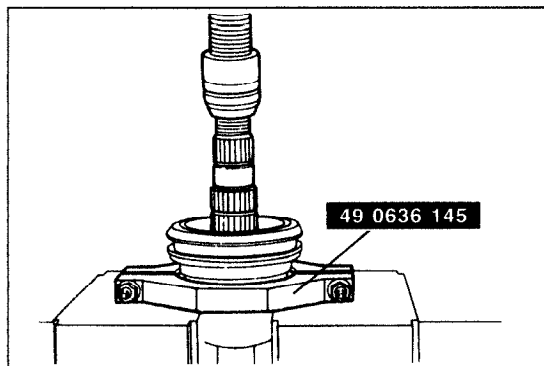
Disassembly note

Bearing inner race (4th gear end)

Caution

- Hold the shaft with one hand so that it does not fall.

1. Remove the bearing inner race with the **SST**.



03U0J2-044

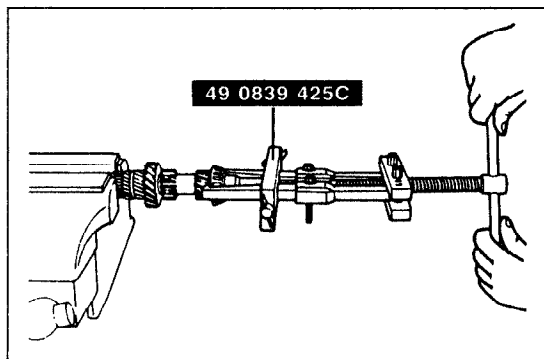
Clutch hub assembly (3rd/4th), synchronizer ring (3rd) and 3rd gear

1. Remove the retaining ring.

Caution

- Hold the shaft with one hand so that it does not fall.

2. Remove the clutch hub assembly (3rd/4th) synchronizer ring (3rd) and 3rd gear with the **SST**.



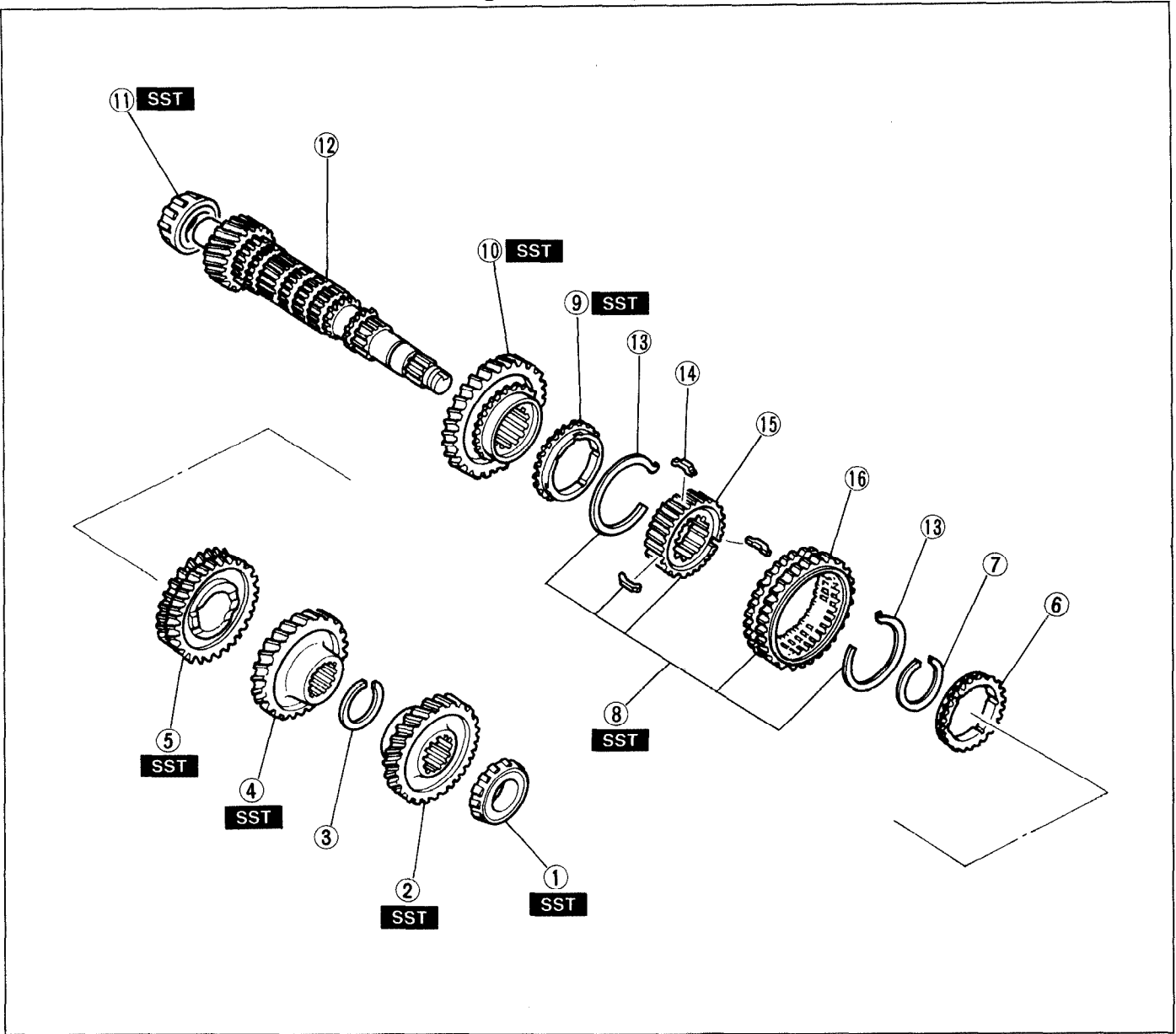
03U0J2-045

Bearing inner race (Primary shaft end)

1. Remove the bearing inner race with the **SST**.

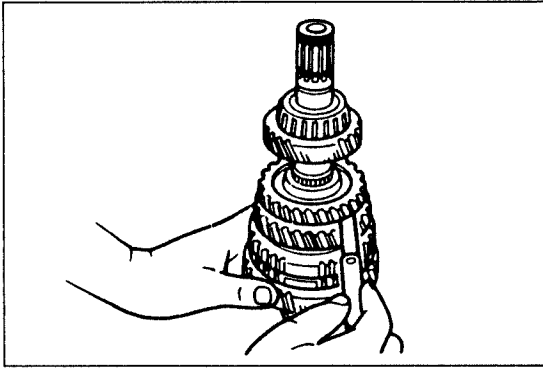
Secondary Shaft Assembly

1. Measure the thrust clearance of all gears before disassembly, referring to **Preinspection**.
2. Disassemble in the order shown in the figure, referring to **Disassembly Note**.



03U0J3-067

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Bearing inner race
Disassembly Note..... page J3-36
Inspection..... page J3-45 2. Secondary 4th gear
Disassembly Note..... page J3-36
Inspection..... page J3-45 3. Retaining ring 4. Secondary 3rd gear
Preinspection page J3-36
Disassembly Note..... page J3-36
Inspection..... page J3-45 5. 2nd gear
Disassembly Note..... page J3-36
Inspection..... page J3-45 6. Synchronizer ring (2nd)
Inspection..... page J3-45 7. Retaining ring | <ol style="list-style-type: none"> 8. Clutch hub assembly (1st/2nd)
Inspection..... page J3-45 9. Synchronizer ring (1st)
Inspection..... page J3-45 10. 1st gear
Preinspection page J3-36
Disassembly Note..... page J3-36
Inspection..... page J3-45 11. Bearing inner race
Disassembly Note..... page J3-37 12. Secondary shaft
Inspection..... page J3-46 13. Synchronizer springs 14. Synchronizer keys 15. Clutch hub 16. Clutch hub sleeve (Reverse gear) |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

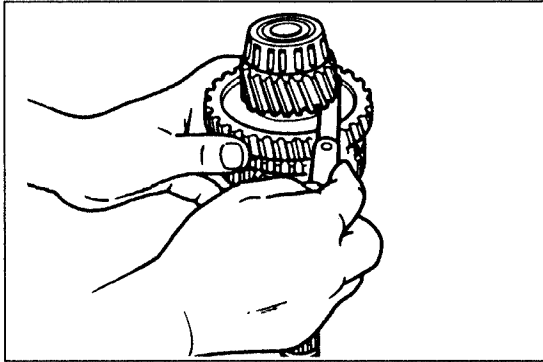


03U0J2-035

Preinspection Thrust clearance

1. Measure the clearance between the 2nd gear and secondary 3rd gear.

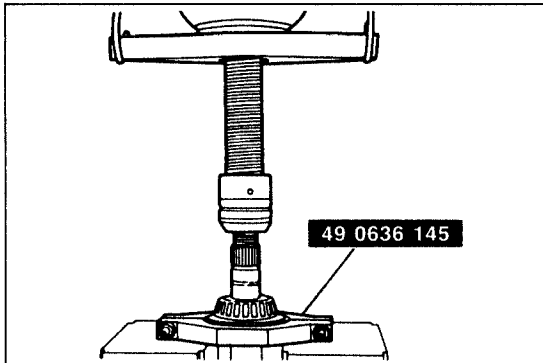
Clearance: 0.175—0.455mm (0.0069—0.0179 in)
Maximum: 0.505mm (0.0199 in)



03U0J2-036

2. Measure the clearance between the 1st gear and differential drive gear.

Clearance: 0.05—0.28mm (0.002—0.011 in)
Maximum: 0.33mm (0.0130 in)



03U0J2-039

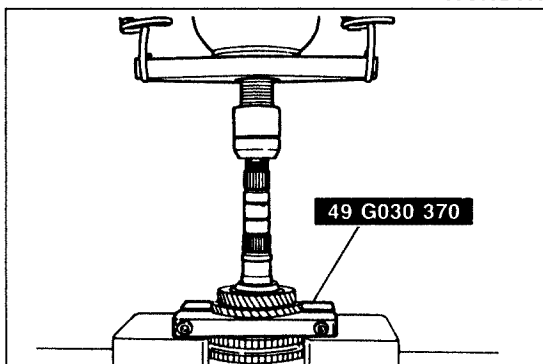
Disassembly note

Bearing inner race and secondary 4th gear

Caution

- Hold the shaft with one hand so that it does not fall.

1. Remove the bearing inner race and secondary 4th gear with the **SST**.



03U0J2-040

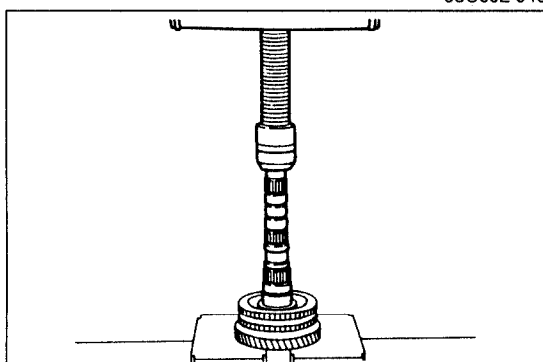
Secondary 3rd gear and 2nd gear

1. Remove the retaining ring.
2. Shift the gears to 1st gear.

Caution

- Hold the shaft with one hand so that it does not fall.

3. Remove the secondary 3rd gear and 2nd gear with the **SST**.



03U0J2-041

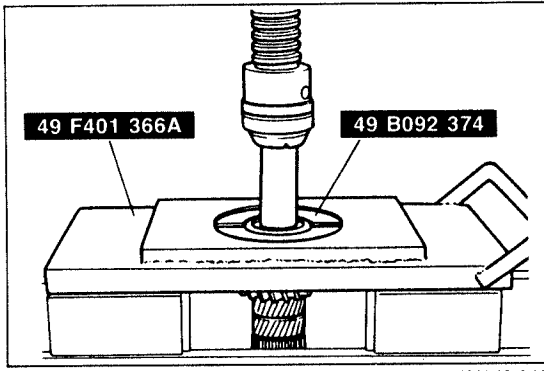
Clutch hub assembly (1st/2nd), synchronizer ring (1st), and 1st gear

1. Remove the retaining ring.

Caution

- Hold the shaft with one hand so that it does not fall.

2. Remove the clutch hub assembly (1st/2nd), synchronizer ring (1st), and 1st gear with a press.



03U0J2-042

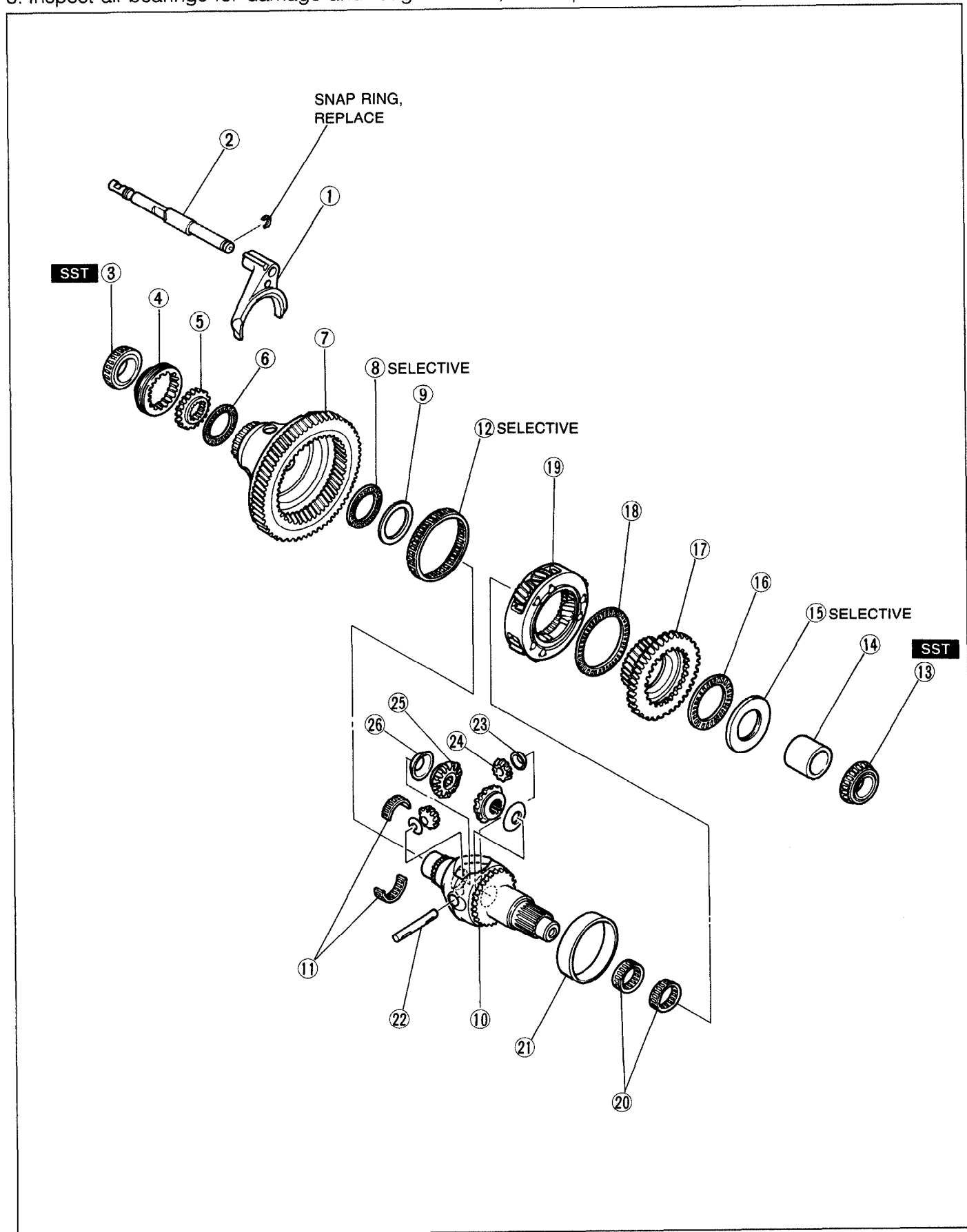
Bearing inner race (Secondary shaft end)**Caution**

- Hold the shaft with one hand so that it does not fall.

1. Remove the bearing inner race with the **SST**.

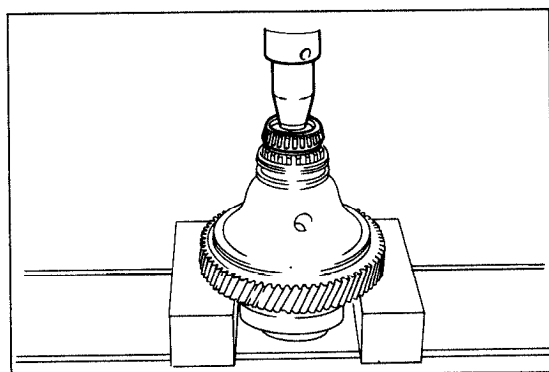
Front and Center Differential Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Inspect all bearings for damage and rough rotation, and replace as necessary.



- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Center differential lock shift fork 2. Center differential lock shift rod 3. Bearing inner race (Gear sleeve side)
Disassembly Note page J3-39 4. Differential lock gear sleeve 5. Differential lock hub
Inspect for damage and wear 6. Gear case needle bearing 7. Ring gear case
Inspect gear teeth for wear and cracks 8. Gear case needle bearing 9. Differential lock thrust washer 10. Front differential gear case 11. Gear case needle bearings 12. Gear case needle bearing 13. Bearing inner race (Sun gear side)
Disassembly Note page J3-39 14. Spacer | <ol style="list-style-type: none"> 15. Thrust washer 16. Gear case needle bearing 17. Sun gear
Inspect gear teeth for wear and cracks 18. Gear case needle bearing 19. Planetary carrier
Inspect gears for wear, cracks and rough rotation 20. Gear case needle bearings 21. Differential gear case sleeve
Disassembly Note page J3-39 22. Pinion shaft 23. Washers 24. Pinion gears
Inspect gear teeth for wear and cracks 25. Side gears
Inspect gear teeth for wear and cracks 26. Washers |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

03U0J3-069



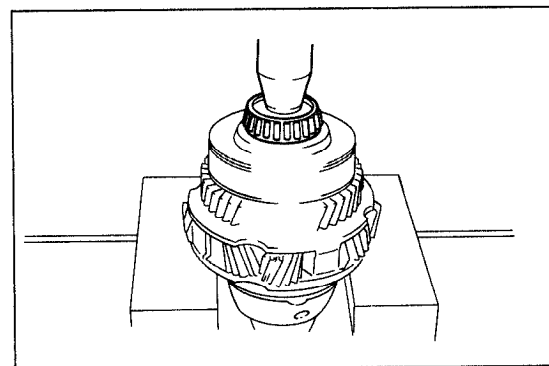
03U0J3-070

Disassembly note
Bearing inner race (Differential lock gear sleeve side)

Caution

- Hold the front differential gear case with one hand so that it does not fall.

1. Remove the bearing inner race.



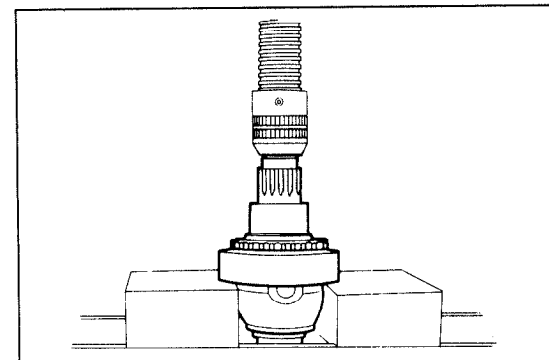
03U0J3-071

Bearing inner race (Sun gear side)

Caution

- Hold the front differential gear case with one hand so that it does not fall.

1. Remove the bearing inner race.



03U0J3-072

Differential gear case sleeve

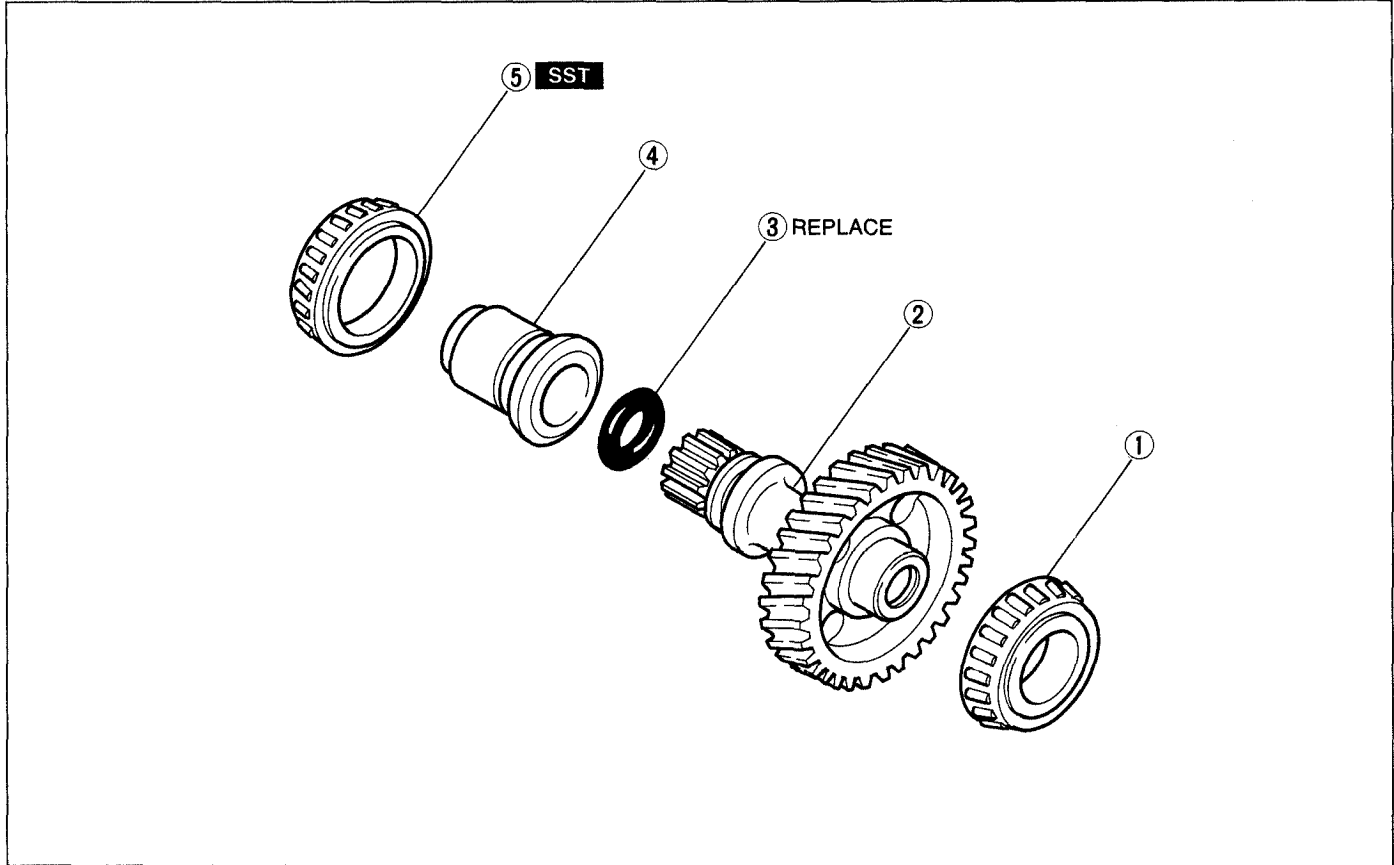
Caution

- Hold the front differential gear case with one hand so that it does not fall.

1. Remove the gear case sleeve with a press.

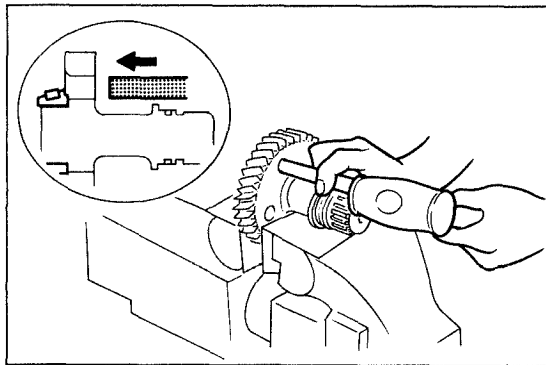
Idler Gear Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.



03U0J3-073

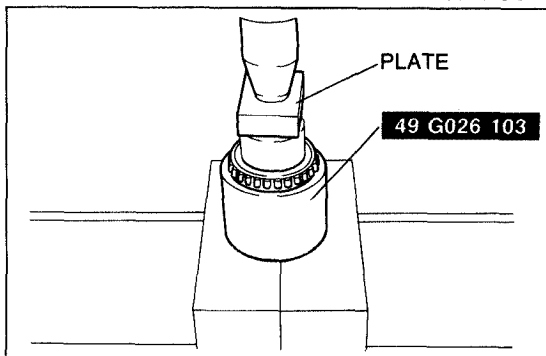
- | | |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 1. Bearing inner race (Idler gear side)
Disassembly Note..... page J3-40 | 3. O-ring |
| 2. Idler gear
Inspect gear teeth for wear and cracks | 4. Joint sleeve |
| | 5. Bearing inner race (Joint sleeve side)
Disassembly Note..... page J3-40 |



03U0J3-074

Bearing inner race (Idler gear side)

1. Fit a punch through a hole in the idler gear and tap off the bearing inner race.



03U0J3-075

Bearing inner race (Joint sleeve side)

Caution

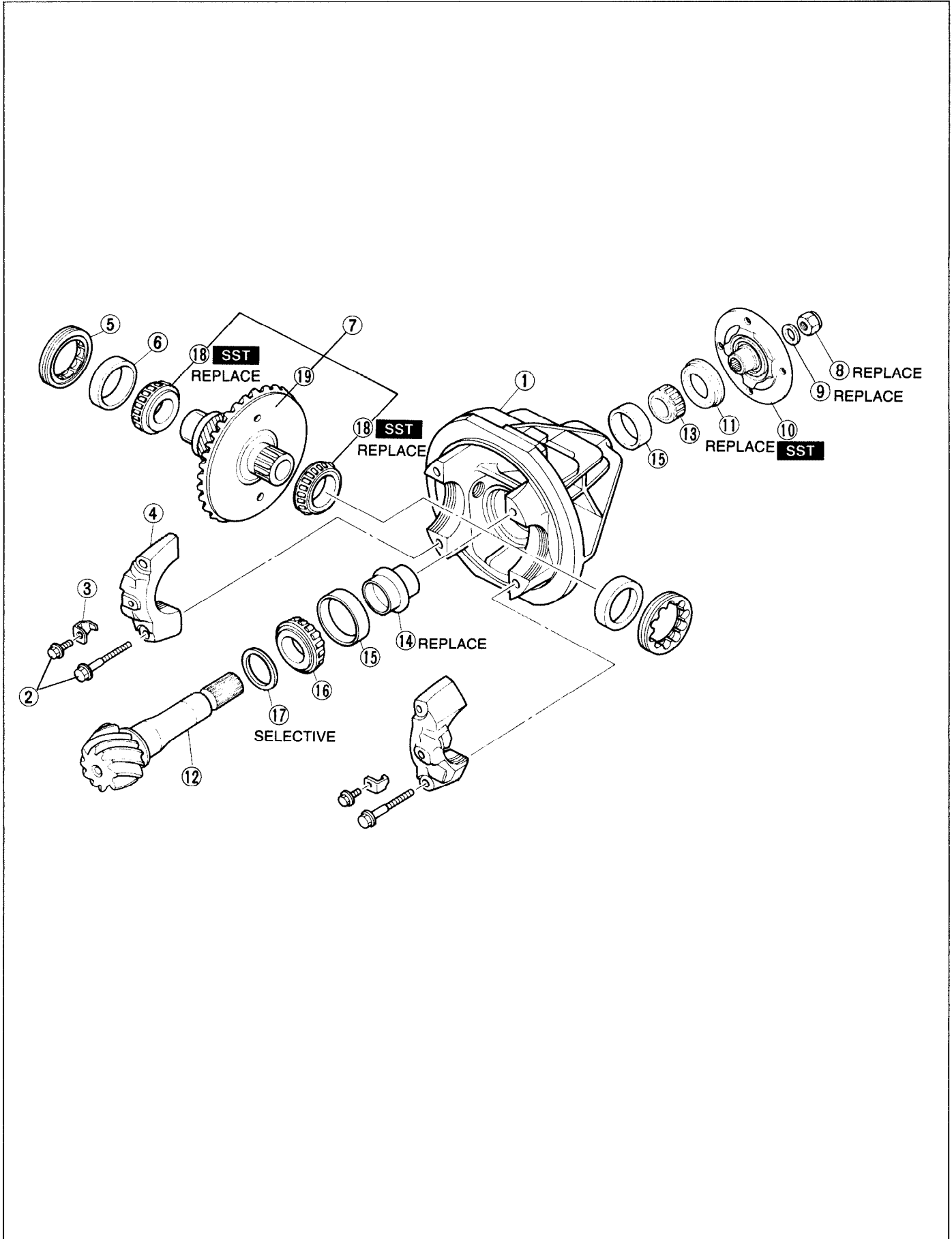
- Hold the shaft with one hand so that it does not fall.

1. Remove the bearing inner race with the **SST**.

MEMO

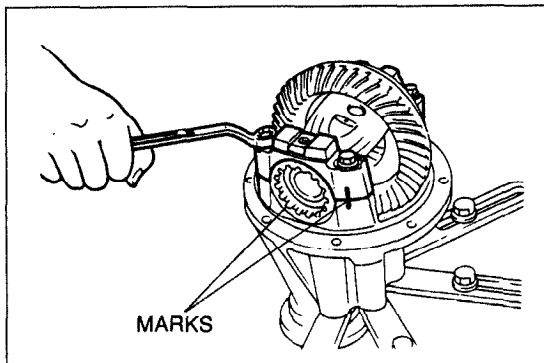
Transfer Carrier Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.



- | | |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 1. Transfer carrier
Disassembly Note page J3-43 | 12. Drive pinion
Disassembly Note page J3-44 |
| 2. Bolts | 13. Bearing inner race
Disassembly Note page J3-44
Inspect for damage and rough rotation |
| 3. Lock plates | 14. Collapsible spacer |
| 4. Bearing caps | 15. Bearing inner race
Disassembly Note page J3-44
Inspect for damage and rough rotation |
| 5. Adjusting screws
Disassembly Note page J3-43 | 16. Bearing inner race
Disassembly Note page J3-44
Inspect for damage and rough rotation |
| 6. Side bearings | 17. Spacer |
| 7. Ring gear assembly | 18. Bearing inner races (Side bearing)
Disassembly Note page J3-44 |
| 8. Nut
Disassembly Note page J3-43 | 19. Ring gear |
| 9. Washer | |
| 10. Companion flange
Disassembly Note page J3-43 | |
| 11. Oil seal | |

03U0J3-077



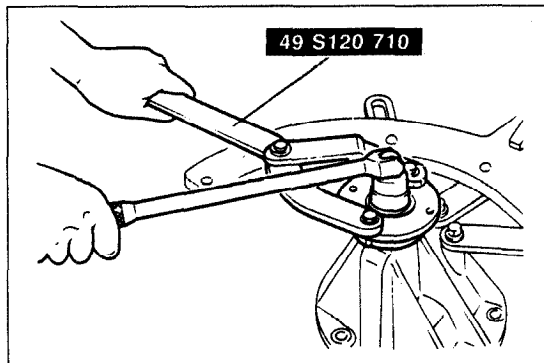
03U0J3-078

Disassembly Note Transfer carrier

1. Mark one bearing cap and the carrier for proper reassembly.

Adjusting screw

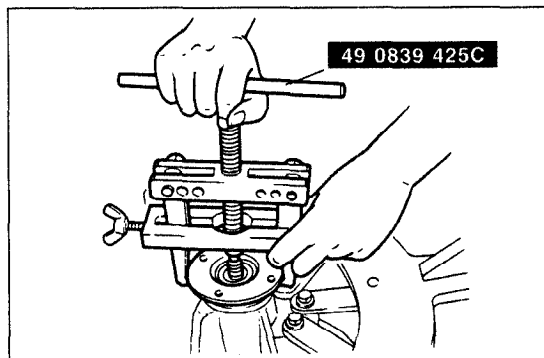
1. Mark one adjusting screw and the carrier for proper reassembly.



03U0J3-079

Nut

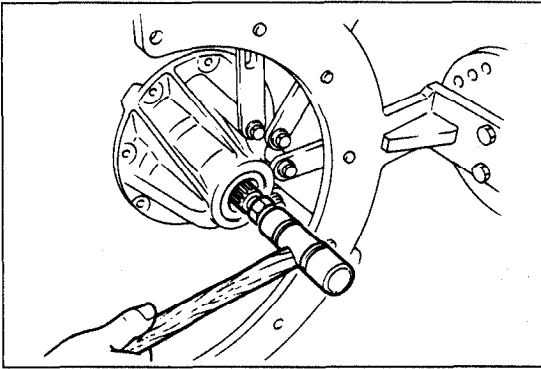
1. Hold the companion flange with the **SST** and remove the nut.



03U0MX-863

Companion flange

1. Remove the companion flange with the **SST**.



03U0MX-864

Drive pinion

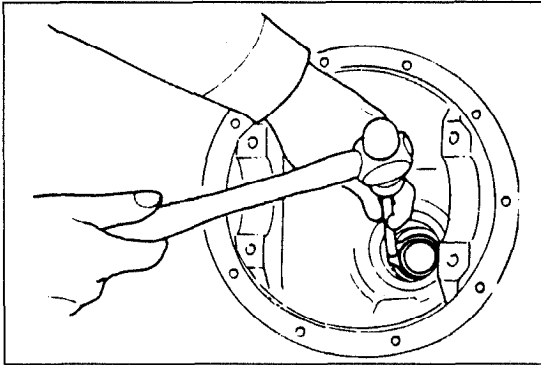
1. Push out the drive pinion by attaching a miscellaneous nut to the drive pinion and tapping it with a copper hammer.

Bearing outer race

Note

- Identify the bearing outer races for proper reassembly.

1. Remove the bearing outer races by alternately tapping the races at the two grooves in the carrier.



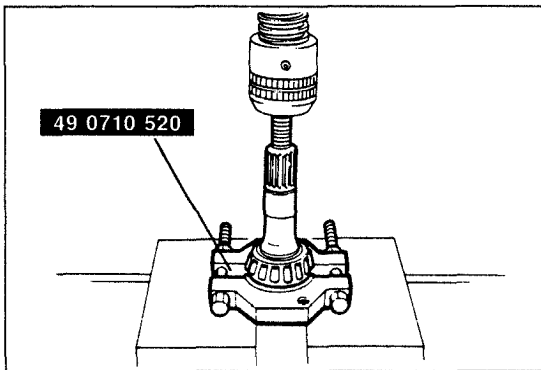
03U0J3-080

Bearing inner race (Drive pinion)

Note

- Support the drive pinion by hand so that it does not fall.

1. Remove the bearing with the SST.



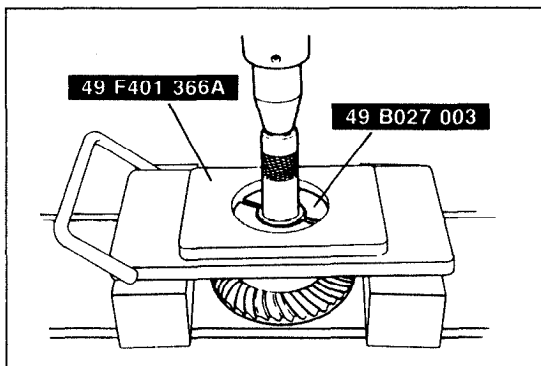
03U0J3-081

Bearing inner races (Side bearing)

Note

- Support the ring gear by hand so that it does not fall.

1. Remove the bearing inner race with the SST.

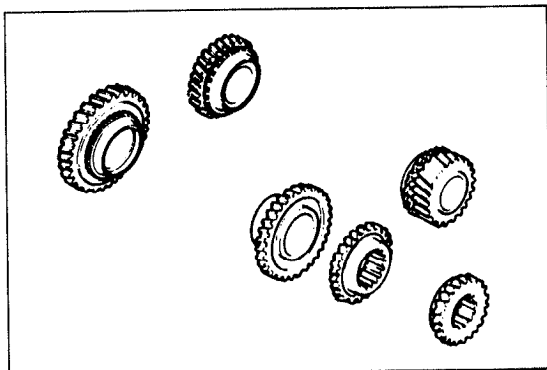


03U0J3-218

INSPECTION

Inspect all parts and repair or replace as necessary.

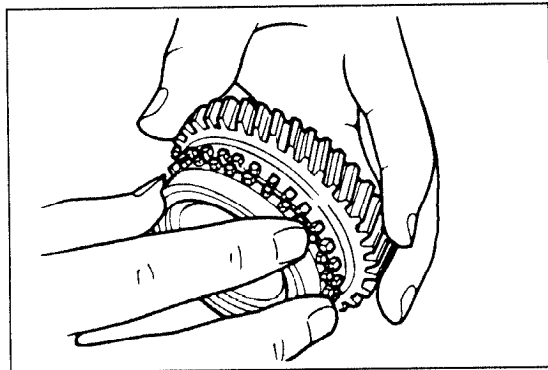
05U0JX-023



03U0J3-082

Gears (1st, 2nd, 3rd, 4th)

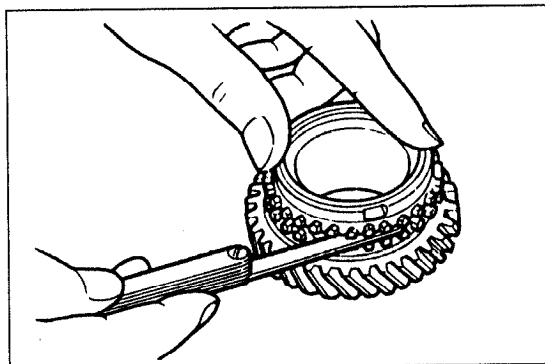
1. Inspect the synchronizer cones for wear.
2. Inspect the individual gear teeth for damage, wear, and cracks.
3. Inspect the synchronizer ring matching teeth for damage and wear.



03U0J3-083

Synchronizer ring, gear (1st, 2nd, 3rd, 4th)

1. Inspect the individual synchronizer ring teeth for damage, wear, and cracks.
2. Inspect the taper surface for wear and cracks.



03U0J2-119

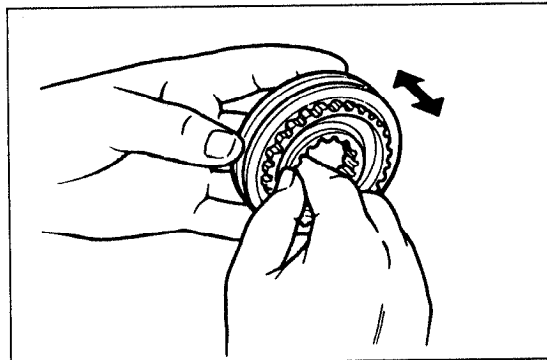
Note

- **Set the synchronizer ring squarely in the gear; then measure around the circumference.**

3. Measure the clearance between the synchronizer ring and flank surface of the gear.

Standard clearance: 1.5mm (0.059 in)

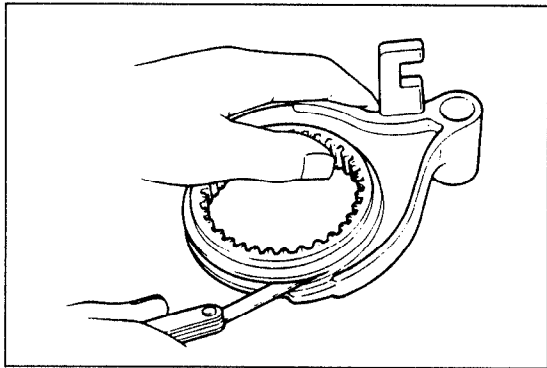
Minimum: 0.8mm (0.031 in)



03U0J3-084

Clutch hub assembly

1. Inspect the clutch hub sleeve and hub operation.
2. Inspect the individual gear teeth for damage, wear, and cracks.
3. Inspect the synchronizer keys for damage, wear, and cracks.



03U0J3-219

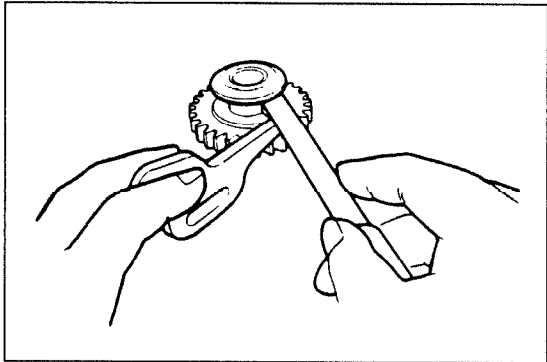
Shift fork

1. Measure the clearance between hub sleeve and shift fork.

Clearance

mm (in)

	Standard	Maximum
1st/2nd	0.10—0.358 (0.004—0.014)	0.858 (0.034)
3rd/4th	0.10—0.40 (0.004—0.016)	0.90 (0.035)
5th/Rev.	0.10—0.40 (0.004—0.016)	0.90 (0.035)



03U0J3-220

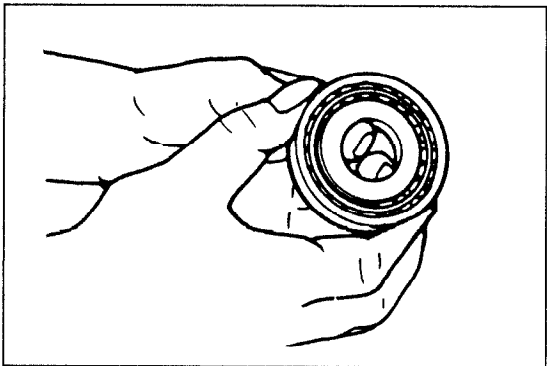
Reverse idler gear and reverse lever

1. Inspect gear teeth for damage, wear, and cracks.
2. Measure the clearance between the reverse idler gear bushing and the reverse lever.

Standard clearance:

0.095—0.345mm (0.0037—0.0136 in)

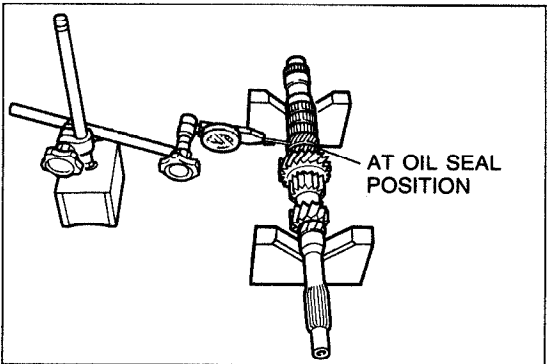
Maximum: 0.845mm (0.0333 in)



03U0J2-115

Bearing

1. Inspect for damage and rough rotation.

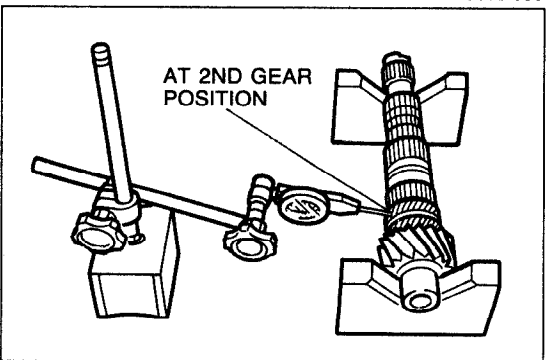


03U0J3-085

Primary Shaft and Secondary Shaft

1. Inspect the gear contact surface for damage and wear.
2. Inspect the splines for damage and wear.
3. Inspect the gear teeth for damage, wear, and cracks.
4. Inspect the oil passage for clogging.
5. Inspect the shaft gear runout.

Primary shaft gear runout: 0.05mm (0.002 in)

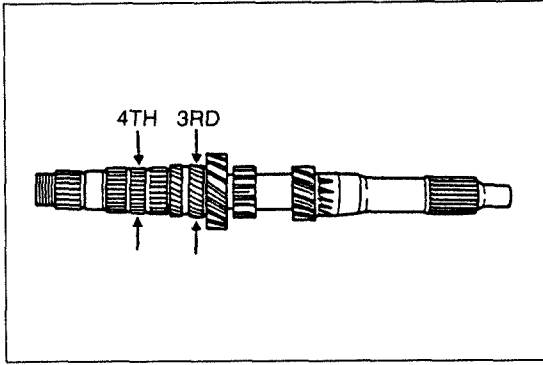


03U0J3-221

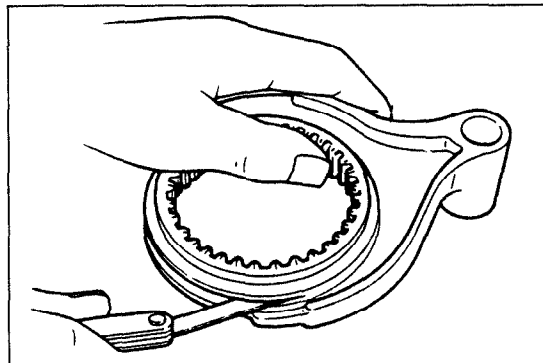
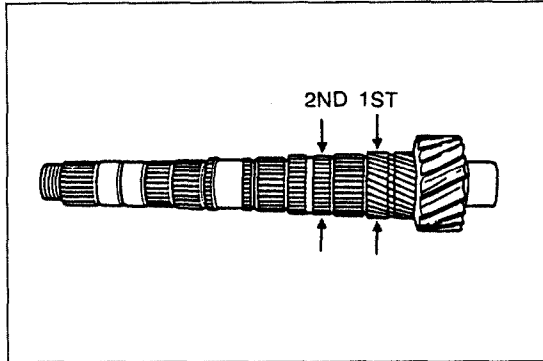
Secondary shaft gear runout: 0.015mm (0.0006 in)

Note

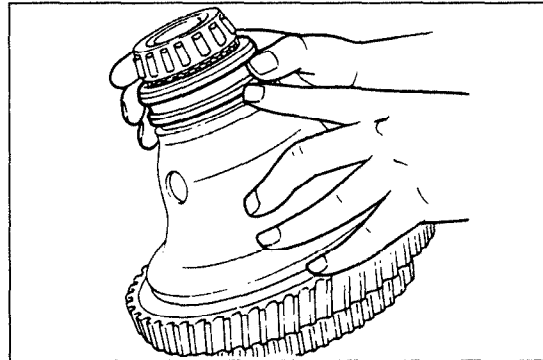
- If the shaft gear is replaced, adjust the bearing preload.



03U0J3-222



03U0J3-086



03U0J3-087

6. Oil clearance between shaft gears and gears.

Oil Clearance

mm (in)

	Shaft (Outer dia.)	Gear (Inner dia.)	Sleeve (Outer dia.)	Oil clearance
1st	39.445—39.470 (1.553—1.554)	39.500—39.525 (1.555—1.556)	—	0.03—0.08 (0.001—0.003)
2nd	34.945—34.970 (1.376—1.377)	35.000—35.025 (1.378—1.379)	—	
3rd	35.945—35.970 (1.415—1.416)	36.000—36.025 (1.417—1.418)	—	
4th	30.945—30.970 (1.218—1.219)	31.000—31.025 (1.220—1.221)	—	
5th	—	34.000—34.025 (1.339—1.400)	33.945—33.970 (1.336—1.337)	

Differential Lock Gear Sleeve

1. Measure the clearance between the gear sleeve groove and shift fork.

Standard clearance: 0.15—0.50mm (0.006—0.02 in)
Maximum: 1.0mm (0.394 in)

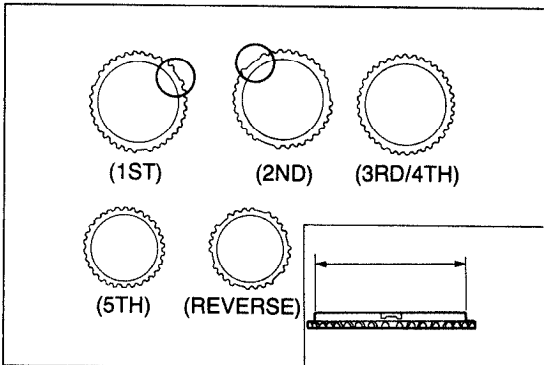
2. Inspect for damage and rough rotation.

ASSEMBLY

Precaution

1. All O-rings and gaskets must be replaced with the new ones supplied in the overhaul kit.
2. Verify that all parts are completely clean before assembly.
3. Assemble parts within 10 minutes after applying sealant.
Allow all sealant to cure at least 30 minutes after assembly before filling the transaxle with transaxle oil.
4. Bearing outer races and inner races must be replaced as assemblies.

03U0J3-088



03U0J3-089

Clutch hub assembly

Note

- Synchronizer ring diameters are as follows.

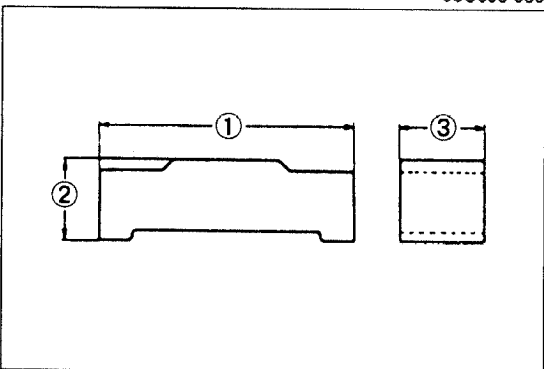
mm (in)

1st and 2nd	67.7 (2.665)
3rd and 4th	67.7 (2.665)
5th and Reverse	55.7 (2.192)

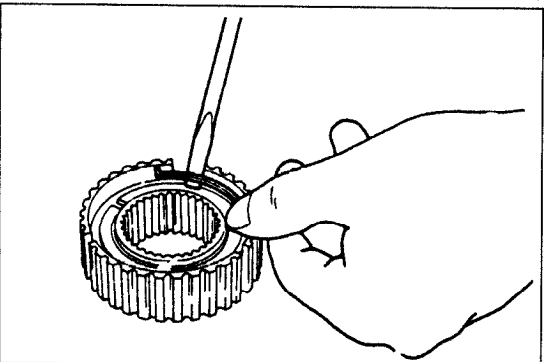
- Synchronizer key dimensions are as follows.

mm (in)

	①	②	③
1st/2nd	19.00 (0.748)	4.25 (0.167)	5.00 (0.197)
3rd/4th	17.00 (0.669)	4.25 (0.167)	5.00 (0.197)
5th	17.00 (0.669)	4.25 (0.167)	5.00 (0.197)



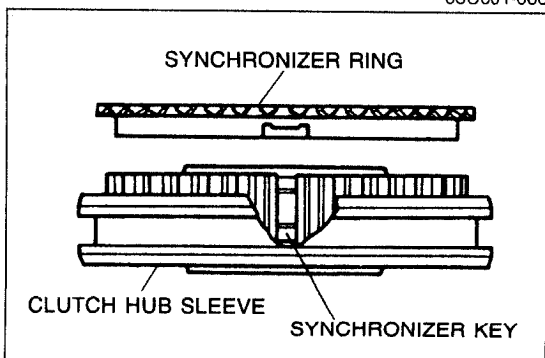
03U0J3-223



03U0J1-066

1. Install the synchronizer key springs in the clutch hub with the hooks in the grooves to hold the three synchronizer keys in place.

2. Align the synchronizer ring grooves with the synchronizer key during assembly.

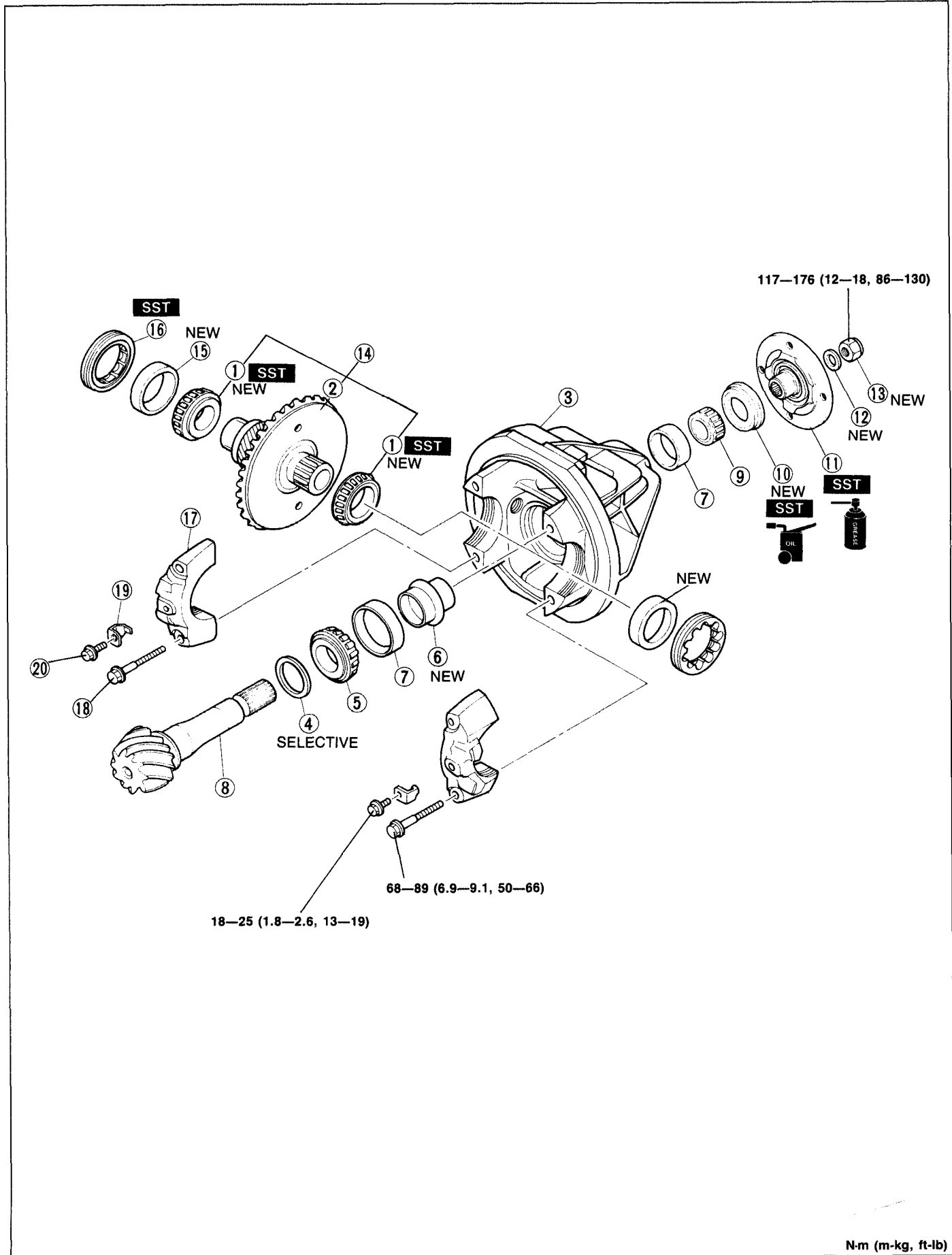


03U0J1-067

MEMO

Transfer Carrier Assembly

1. Assemble in the reverse order of disassembly, referring to **Assembly Note**.

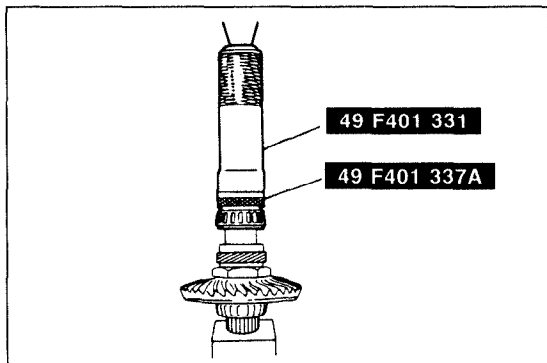


N-m (m-kg, ft-lb)

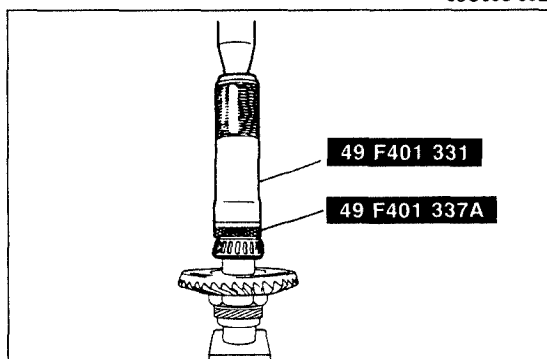
03U0J3-090

- 1. Bearing inner races (Side bearing)
 Assembly Note..... page J3-51
- 2. Ring gear
- 3. Transfer carrier
- 4. Spacer
 Assembly Note..... page J3-53
- 5. Bearing inner race (Drive pinion side)
 Assembly Note..... page J3-53
- 6. Collapsible spacer
- 7. Bearing inner race
- 8. Drive pinion
 Assembly Note..... page J3-52
- 9. Bearing inner race
- 10. Oil seal
 Assembly Note..... page J3-54
- 11. Companion flange
 Assembly Note..... page J3-54
- 12. Washer
- 13. Nut (Companion flange)
- 14. Ring gear assembly
- 15. Bearing outer races (Side bearing)
- 16. Adjusting screws
 Assembly Note..... page J3-54
- 17. Bearing caps
- 18. Bolts
- 19. Lock plates
- 20. Bolts

03U0J3-091



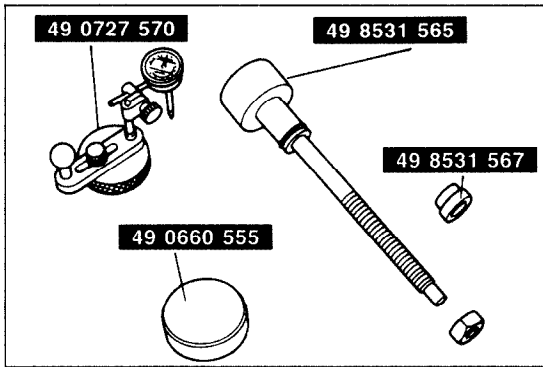
03U0J3-092



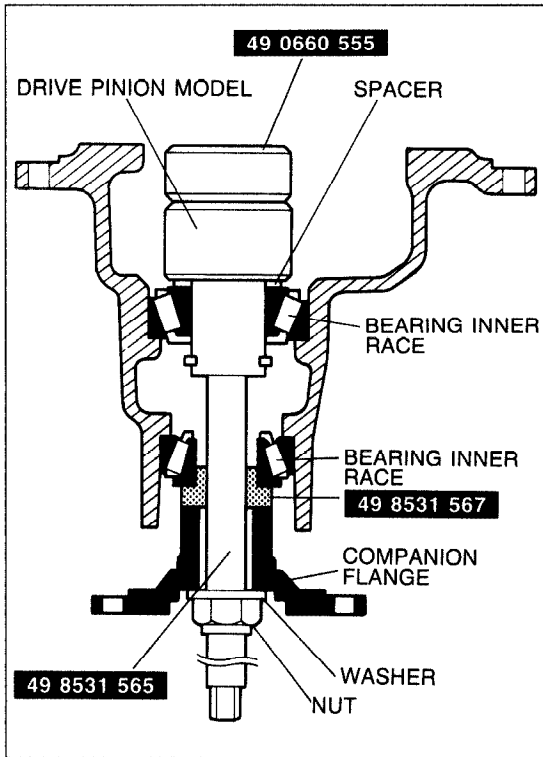
03U0J3-093

Assembly note
Bearing inner races (Side bearing)

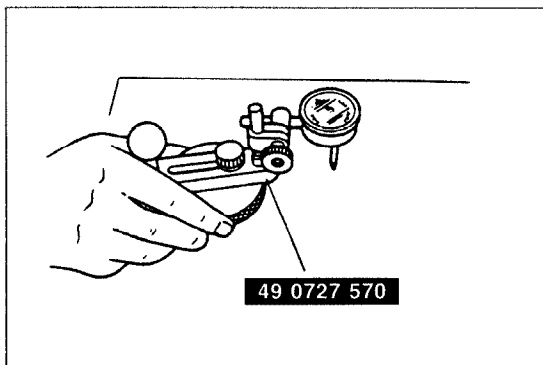
1. Install the bearing with the SST.
2. Install the front and rear bearing outer races with a brass drift and a hammer.



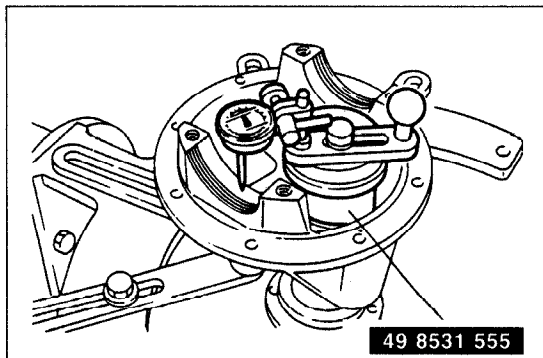
03U0MX-869



03U0MX-870



97U0MX-082



03U0MX-871

Adjustment of pinion height

1. Adjust the drive pinion height as follows with the **SST**.

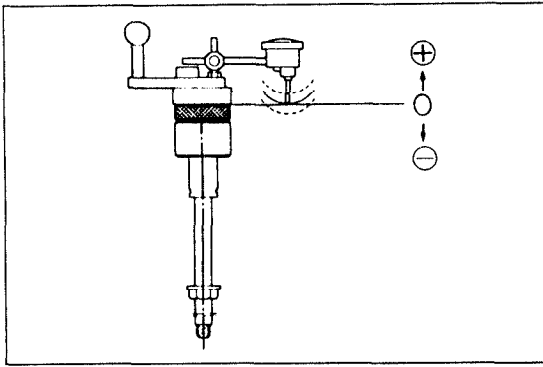
Note

- Use the spacer that was removed.
- Do not install the collapsible spacer.

- a) Install the bearing inner race (rear), spacer, O-ring and **SST**.
- b) Install the bearing inner race (front), companion flange, washer, and nut.
- c) Tighten the nut just enough so that the **SST** can be turned by hand.

- d) Place the **SST** on a surface plate and set the dial indicator to "Zero".

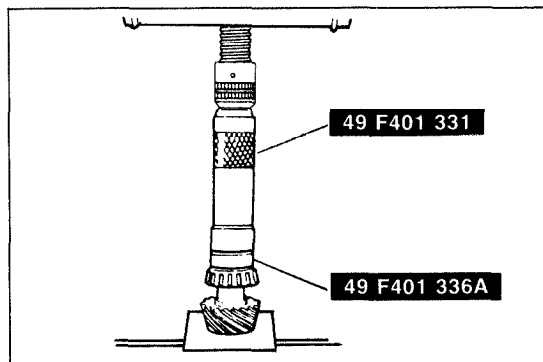
- e) Place the **SST** atop the drive pinion model. Set the gauge body atop the gauge block.
- f) Place the feeler of the dial indicator so that it contacts where the bearing inner race (side bearing) is installed in the carrier. Measure the lowest position on the left and right sides of the carrier.



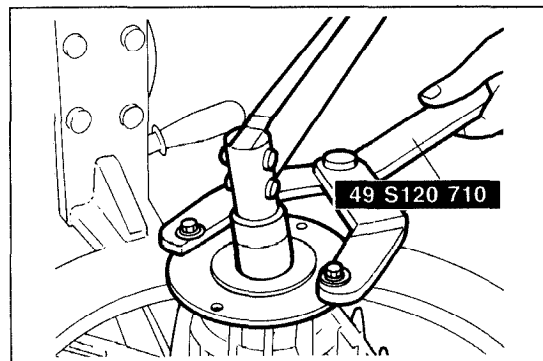
03U0J3-094

Mark	Thickness	Mark	Thickness
08	3.08mm (0.1213 in)	29	3.29mm (0.1295 in)
11	3.11mm (0.1224 in)	32	3.32mm (0.1307 in)
14	3.14mm (0.1236 in)	35	3.35mm (0.1319 in)
17	3.17mm (0.1248 in)	38	3.38mm (0.1331 in)
20	3.20mm (0.1260 in)	41	3.41mm (0.1343 in)
23	3.23mm (0.1271 in)	44	3.44mm (0.1354 in)
26	3.26mm (0.1283 in)	47	3.47mm (0.1366 in)

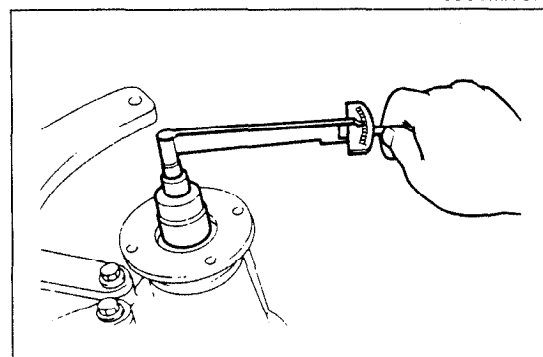
97U0MX-085



03U0J3-095



03U0MX-873



03U0J3-096

g) Average the values obtained in Step f.

Specification: 0mm (0 in)

h) If it is not within specification, adjust the pinion height by selection of a spacer.

Note

- Spacers are available in increments of 0.03mm. Select the spacer thickness that is closest to that necessary.

Adjustment of drive pinion preload

1. Install the spacer.

Note

- Install the spacer selected from the pinion height adjustment above, being careful that the installation direction is correct.
- Press the bearing on until the force required suddenly increases.

2. Press the bearing inner race (rear bearing) on with the SST.

Caution

- Do not install the oil seal.

3. Install the collapsible spacer.

4. Install the drive pinion assembly.

5. Install the companion flange, and tighten the flange nut.

Tightening torque: 117 N·m (12 m·kg, 86 ft·lb)

6. Turn the companion flange by hand to seat the bearing.

7. Measure the drive pinion preload.

Adjust the preload by tightening the flange nut.

Preload:

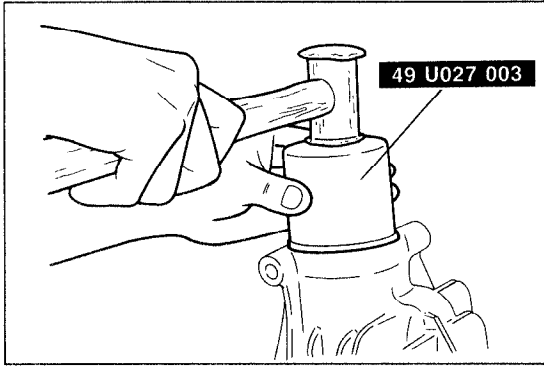
1.00—1.56 N·m (10—16 cm·kg, 8.7—13.8 in·lb)

Tightening torque:

117—176 N·m (12—18 m·kg, 86—130 ft·lb)

If the specified preload cannot be obtained, replace the collapsible spacer with a new one and check again.

8. Remove the nut, washer, and companion flange.



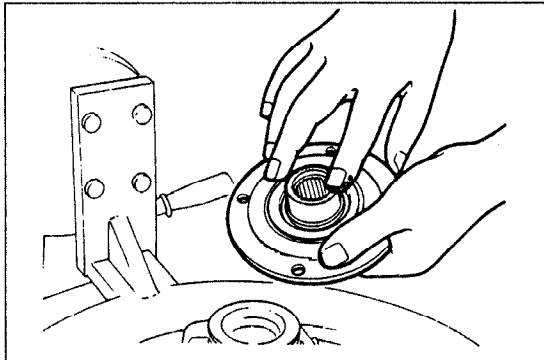
03U0MX-875

Oil seal (Companion flange)

Caution

- Apply differential oil to the oil seal lip.

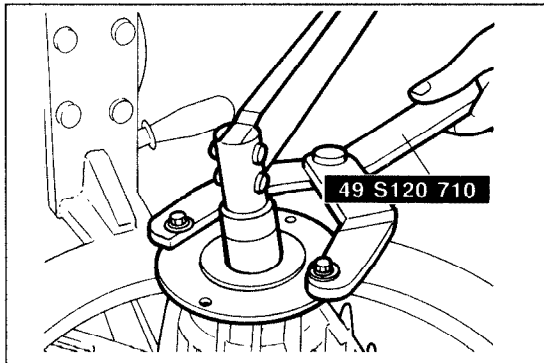
1. Tap a new oil seal into the differential carrier with the **SST**.



03U0MX-876

Companion flange

1. Apply a light coat of grease to the end face of the companion flange.



03U0J3-097

Nut (Companion flange)

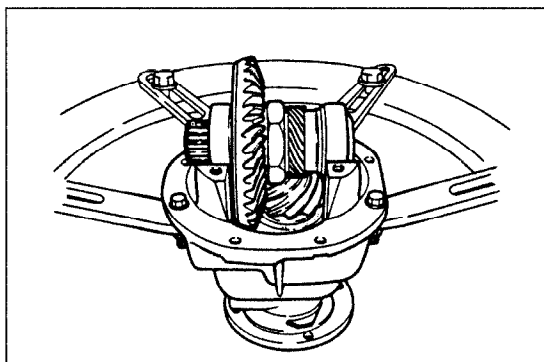
1. Adjust the preload by tightening the flange nut.

Preload:

1.00—1.56 N·m (10—16 cm·kg, 8.7—13.8 in·lb)

Tightening torque:

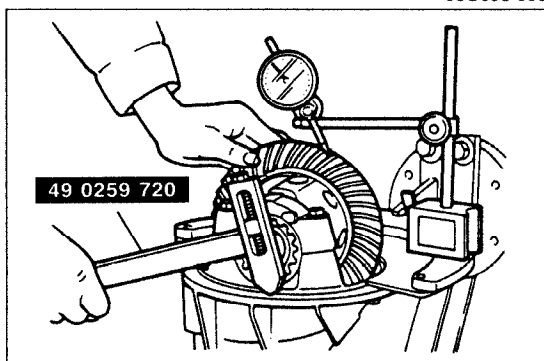
117—176 N·m (12—18 cm·kg, 86—130 in·lb)



03U0J3-098

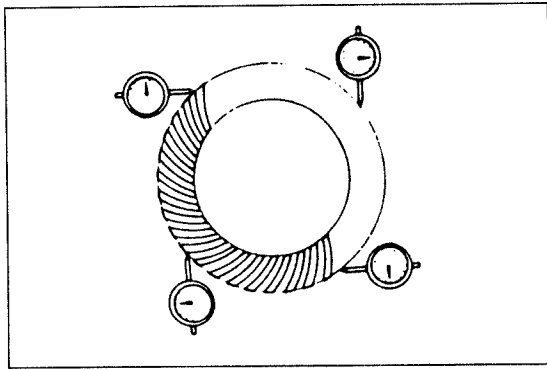
Adjustment of Backlash

1. Position the idler gear assembly in the carrier.



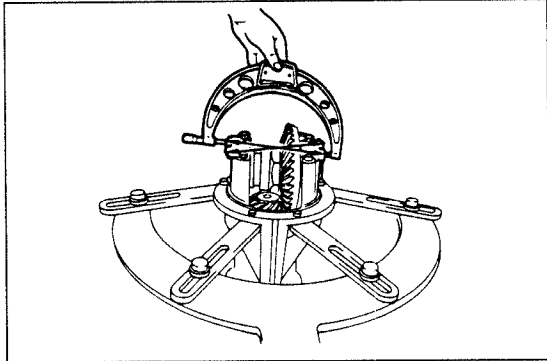
03U0J3-099

2. Install the differential bearing caps making sure that the marks on the cap and carrier agree.
3. Loosely tighten the bearing cap bolts on each side and adjust the backlash by turning the adjusting screws with the **SST**.
4. Mark the ring gear at four points at **approx. 90°** intervals on the ring gear and mount a dial indicator to the carrier so that the feeler comes in contact at a 90° angle with one of the ring gear teeth.



03U0J3-215

5. Check the backlash at the three other marked points, and make sure the minimum backlash is above **0.05mm (0.0020 in)** and the difference between the maximum and minimum is less than **0.07mm (0.0028 in)**.



03U0J3-216

6. Tighten the adjusting screws equally until the distance between the pilot sections on the bearing caps is as specified.

Specified distance: 32mm (1.259 in)

Note

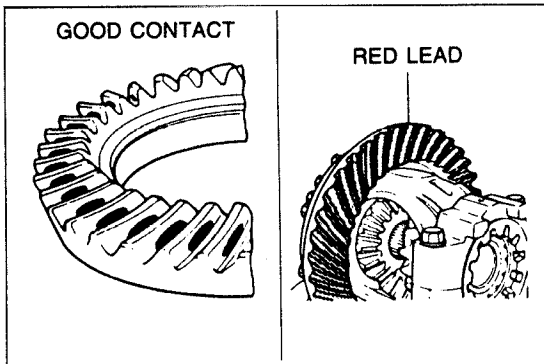
- When adjusting the differential bearing preload, be careful not to affect the backlash of the drive pinion and ring gear.

Tightening torque:

18—25 N·m (1.8—2.6 m·kg, 13—19 ft·lb)

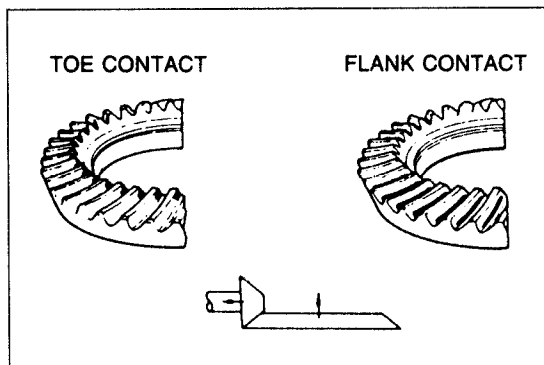
Inspection and adjustment of teeth contact

1. Coat both surfaces of 6—8 teeth of the ring gear with a uniformly thin coat of red lead.
2. While moving the ring gear back and forth by hand, rotate the drive pinion several times and check the tooth contact.
3. If the tooth contact is good, wipe off the red lead.
4. If it is not good, readjust the pinion height, and then readjust the backlash.



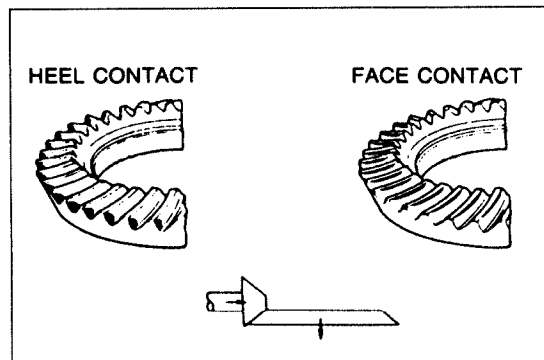
03U0MX-883

- (1) Toe and flank contact
Replace the spacer with a thinner one to move the drive pinion outward.



63G09X-385

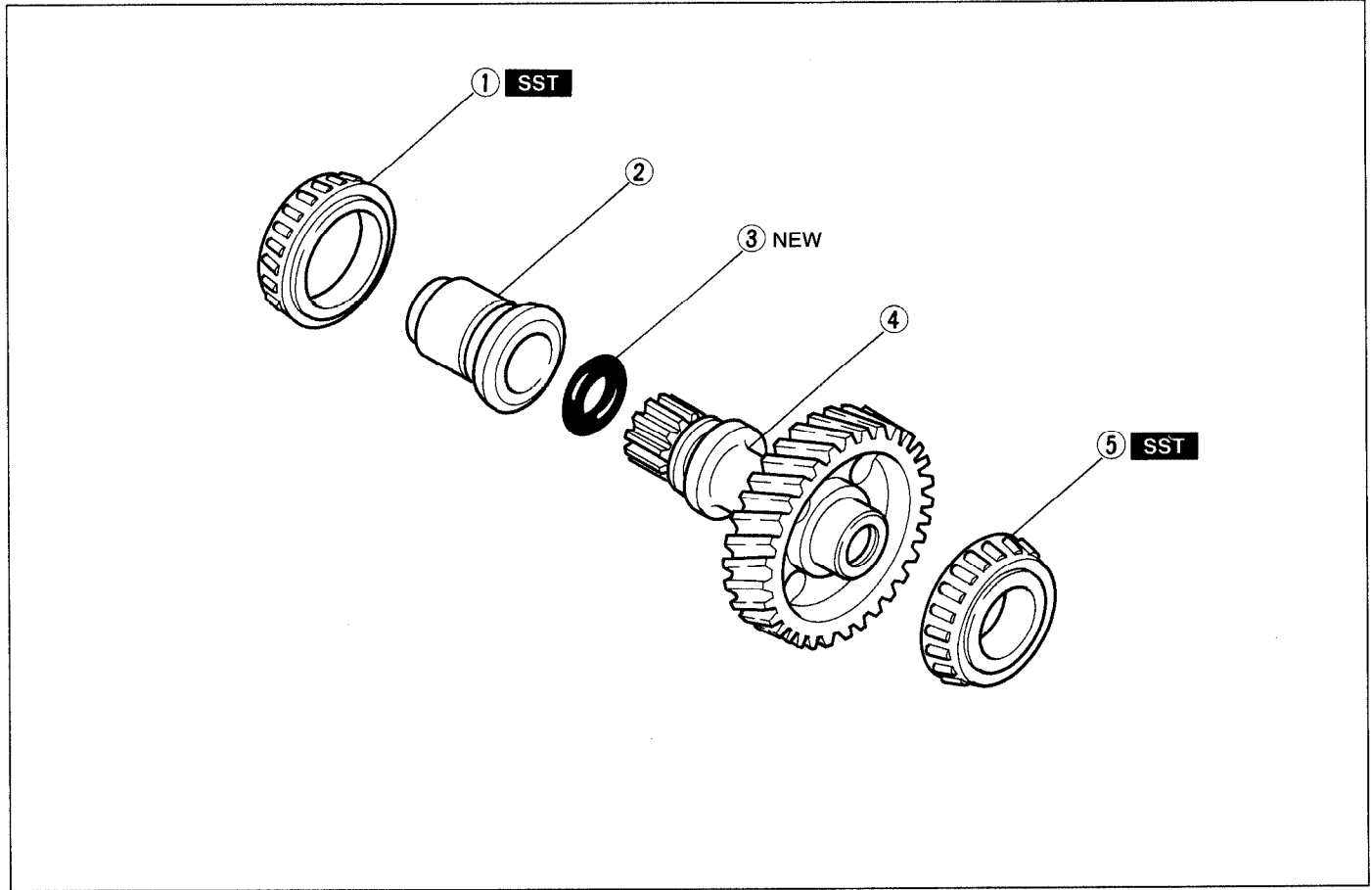
- (2) Heel and face contact
Replace the spacer with a thicker one to bring the drive pinion inward.



9MU0MX-068

Idler Gear Assembly

1. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



03U0J3-101

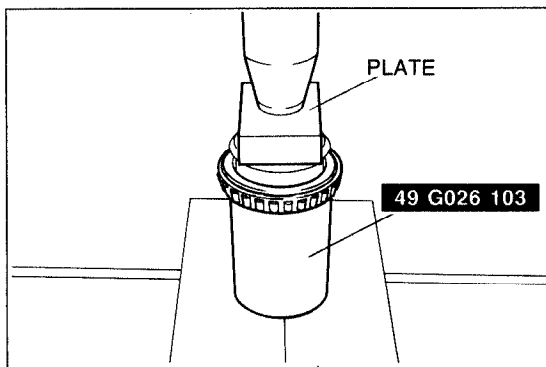
- 1. Bearing inner race (Joint sleeve side)
Assembly Note..... page J3-56
- 2. Joint sleeve
- 3. O-ring

- 4. Idler gear
- 5. Bearing inner race (Idler gear side)
Assembly Note..... page J3-56

Assembly note

Bearing inner race (Joint sleeve side)

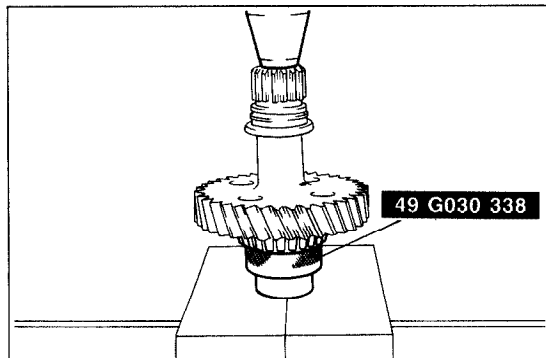
- 1. Install the bearing with the **SST**.



03U0J3-102

Bearing inner race (Idler gear side)

- 1. Install the bearing with the **SST**.

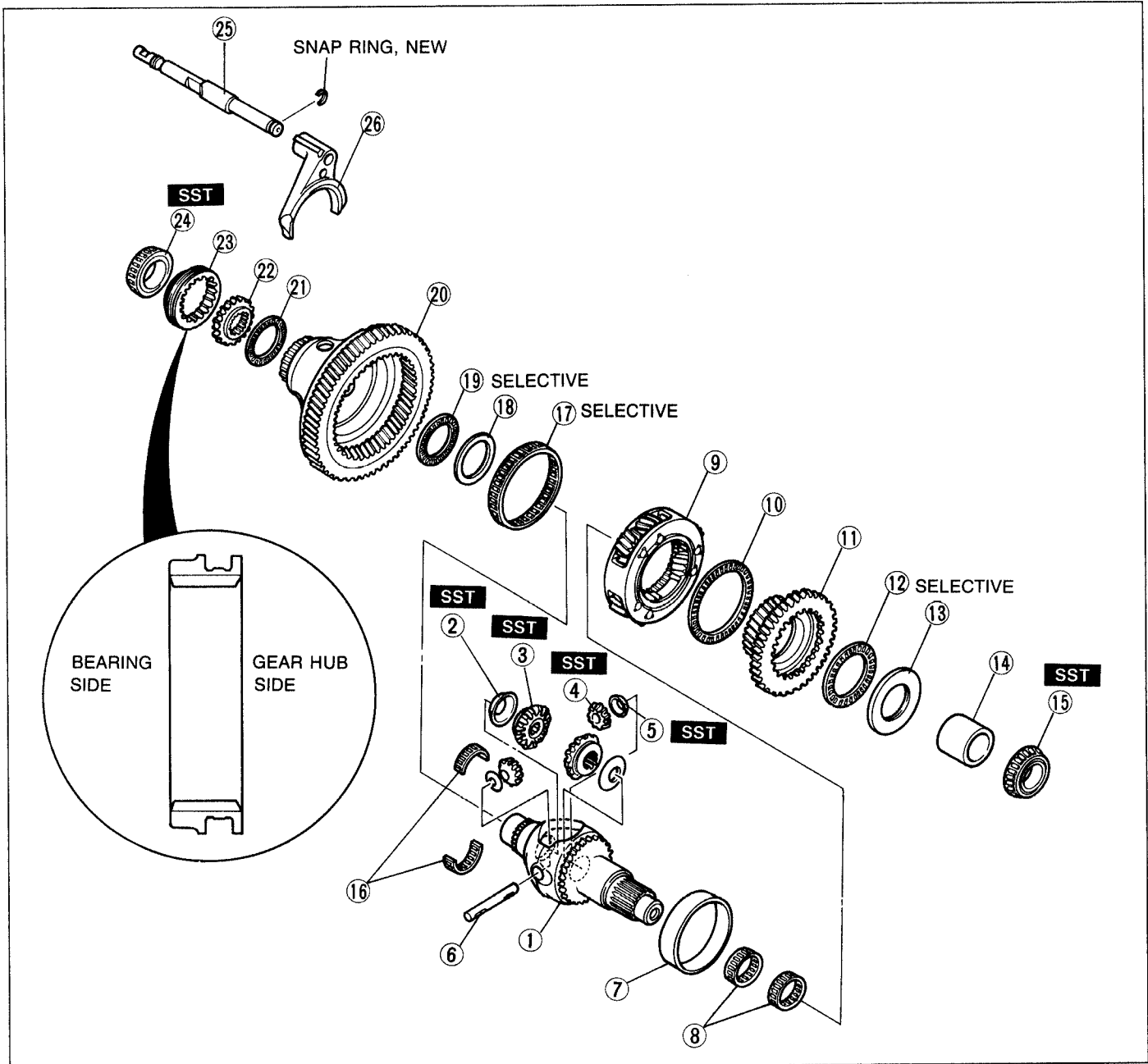


03U0J3-103

MEMO

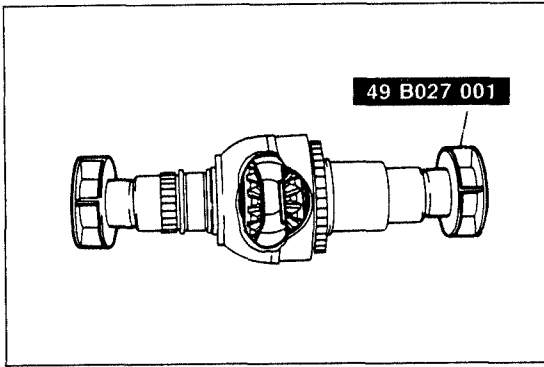
Front and Center Differential Assembly

1. Assemble in the reverse order of disassembly, referring to **Assembly Note**.

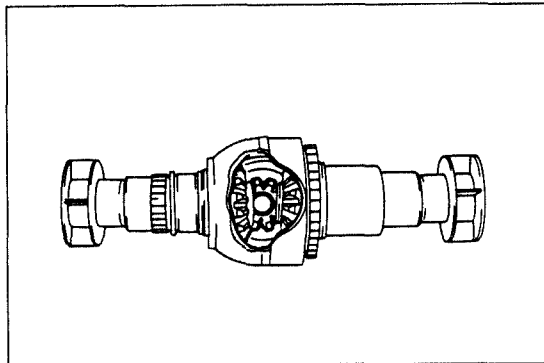


03U0J3-104

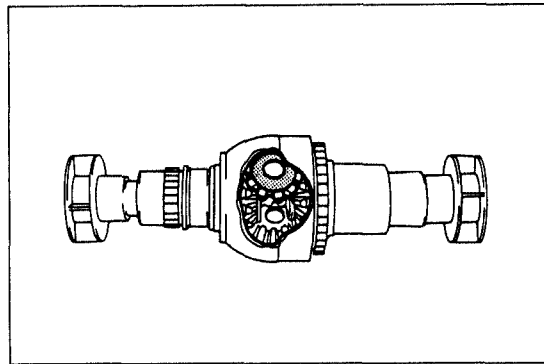
- | | |
|----------------------------------------|-------------------------------------------|
| 1. Front differential gear case | 14. Spacer |
| 2. Washers | 15. Bearing inner race (Sun gear side) |
| 3. Side gears | Assembly Note..... page J3-61 |
| Assembly Note..... page J3-59 | 16. Needle bearings |
| 4. Pinion gears | 17. Needle bearing |
| Assembly Note..... page J3-59 | 18. Washer |
| 5. Washers | Assembly Note..... page J3-60 |
| 6. Pinion shaft | 19. Needle bearing |
| 7. Front differential gear case sleeve | 20. Front ring gear |
| Assembly Note..... page J3-59 | 21. Needle bearing |
| 8. Needle bearings | 22. Differential lock gear hub |
| 9. Planetary carrier assembly | 23. Differential lock gear sleeve |
| 10. Needle bearing | 24. Bearing inner race (Gear sleeve side) |
| 11. Sun gear | Assembly Note..... page J3-61 |
| 12. Needle bearing | 25. Center differential lock shift rod |
| 13. Washer | 26. Center differential lock shift fork |



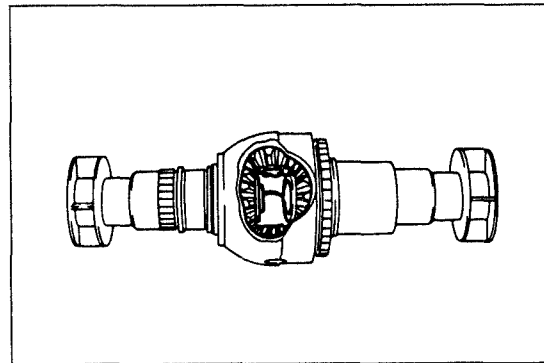
03U0J3-106



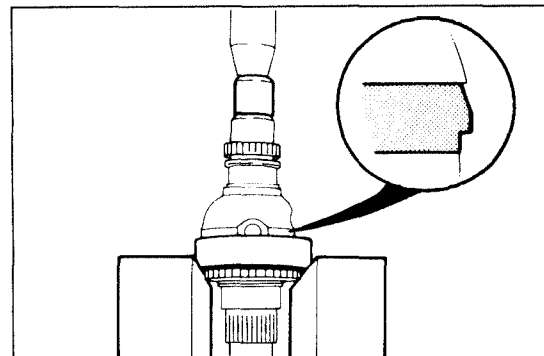
63G07C-141



03U0J3-107



63G07C-143



03U0J3-108

Side gears, pinion gears

1. Install the side gears and washers, and fix them with the SST.

2. Install a pinion gear and turn it 180°.

Note

- Do not install the washer at this time.

3. Install the other pinion gear and washer.

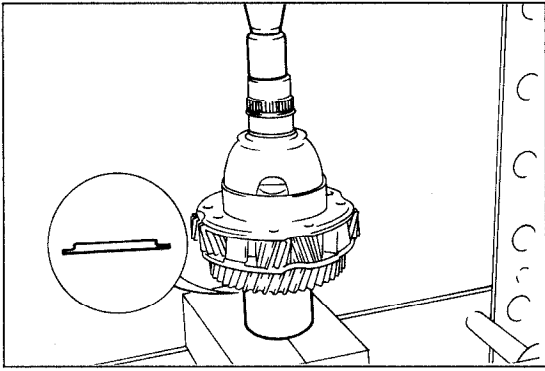
4. Turn the pinion gear and washer 150°.

5. Install the washer under the opposite pinion gear.

6. Align the pinion shaft holes of the pinion gears with the differential gear case.

Front differential case sleeve

1. Install the front differential case sleeve with a press as shown in the figure.



03U0J3-109

Adjustment of sun gear clearance

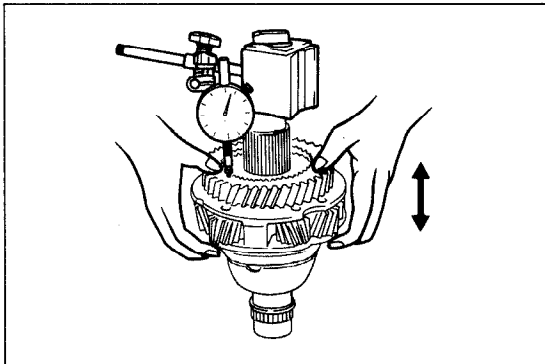
1. Install the washer (4.3mm) onto the gear case with the **SST**.

2. Set a dial indicator onto the gear case and measure the sun gear thrust clearance.

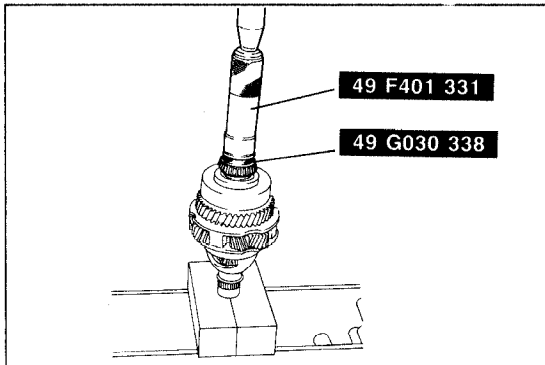
Clearance: 0.1—0.3mm (0.0003—0.0118 in)

3. If the clearance is not within specification, select the proper washer from the chart below.

Measured clearance mm (in)	Washer thickness mm (in)
0.9—1.1 (0.0354—0.0433)	3.5 (0.137)
0.7—0.9 (0.0275—0.0354)	3.7 (0.145)
0.5—0.7 (0.0196—0.0275)	3.9 (0.153)
0.3—0.5 (0.0118—0.0196)	4.1 (0.1614)
0.1—0.3 (0.0003—0.0118)	4.3 (0.1692)



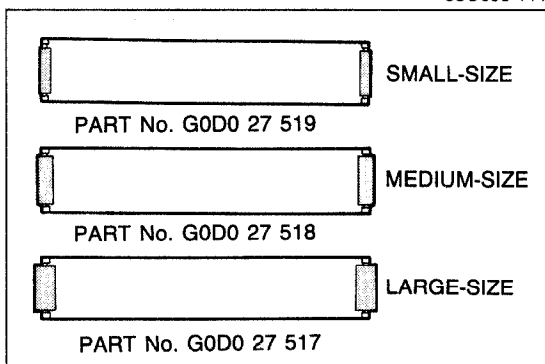
03U0J3-110



03U0J3-111

Bearing inner race (Sun gear side)

1. Install the bearing inner race with the **SST**.



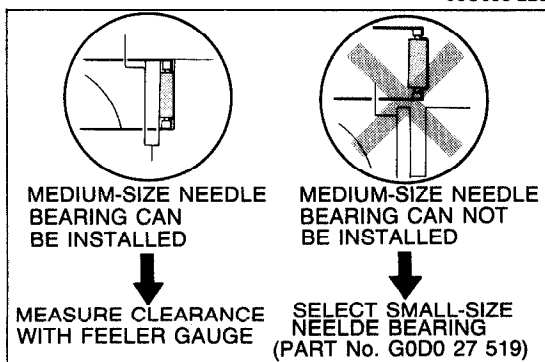
03U0J3-225

Adjustment of front differential gear case radial clearance

1. Install the front differential gear case into the ring gear case.

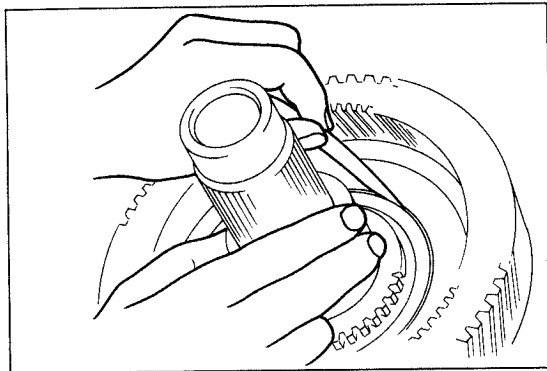
Note

- Available gear case needle bearing part numbers.
Small..... G0D0 27 519
Medium . G0D0 27 518
Large..... G0D0 27 517



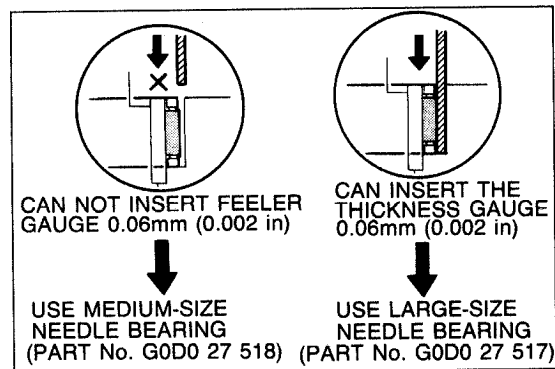
03U0J3-226

2. Verify that the medium-size gear case needle bearing can be installed.
3. If can not, install the small-size gear case needle bearing.



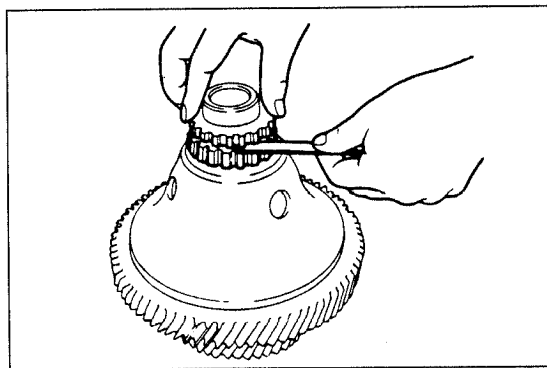
03U0J3-227

4. If the medium-size gear case needle bearing can be installed, measure the clearance between the ring gear case and the needle bearing.



03U0J3-228

5. If the clearance exceeds 0.06mm (0.002 in), install the large-size gear case needle bearing.



03U0J3-114

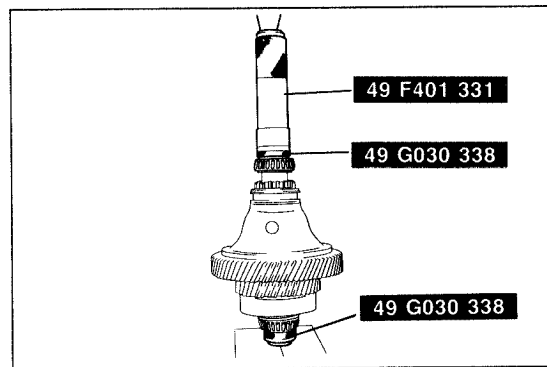
Adjustment of front ring gear clearance

1. Install the washer and front differential gear case.
2. Install the needle bearing and differential lock hub.
3. Measure the clearance between the front ring gear and needle bearing.

Clearance: 0.15—0.30mm (0.0059—0.0118 in)

4. If the clearance is not within specification, select the proper washer from the chart below.

Washer thickness mm (in)		
1.20 (0.0472)	1.35 (0.0531)	1.50 (0.0590)
1.65 (0.0649)	1.80 (0.0708)	



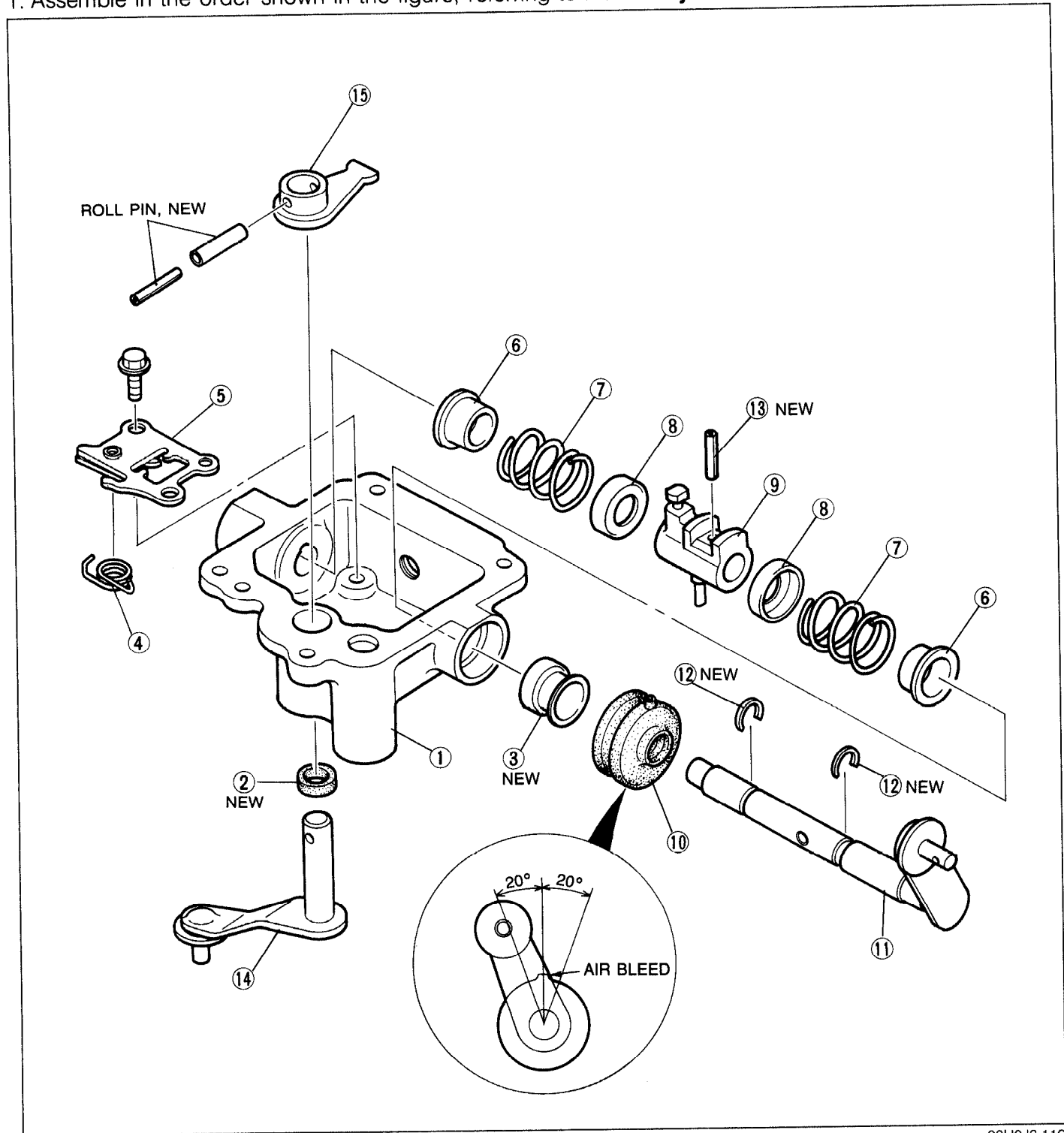
03U0J3-115

Bearing inner race (Gear sleeve side)

1. Install the bearing inner race with the SST.

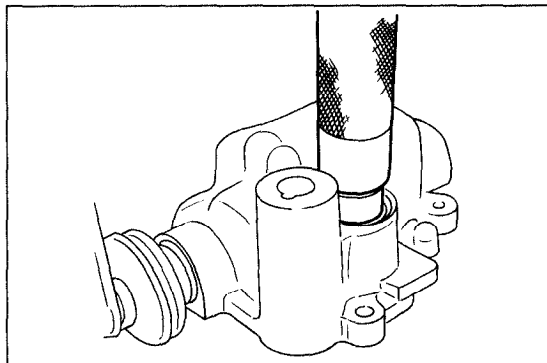
Top Cover Assembly

1. Assemble in the order shown in the figure, referring to **Assembly Note**.



03U0J3-116

- | | |
|------------------------------------------------------------------|--------------------------------------------------|
| 1. Top cover | 8. Washer |
| 2. Oil seal (Select lever side)
Assembly Note..... page J3-63 | 9. Inner shift lever |
| 3. Oil seal
Assembly Note..... page J3-63 | 10. Boot
Assembly Note..... page J3-63 |
| 4. Reverse gate spring | 11. Shift lever
Assembly Note..... page J3-63 |
| 5. Base plate assembly | 12. Snap rings |
| 6. Spring guides | 13. Roll pin |
| 7. Springs
Assembly Note..... page J3-63 | 14. Select lever |
| | 15. Inner select lever |



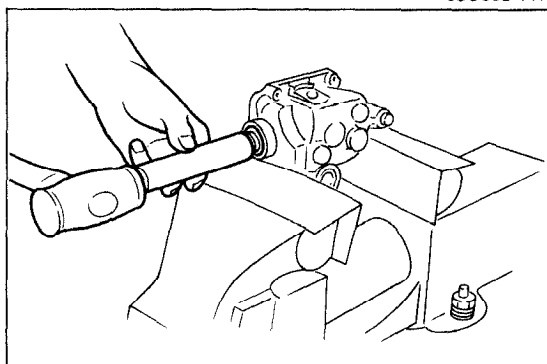
03U0J3-117

Assembly note
Oil seal (Select lever side)

Caution

- Apply transaxle oil to outer circumference of the oil seal.

1. Install the new oil seal with a suitable pipe.



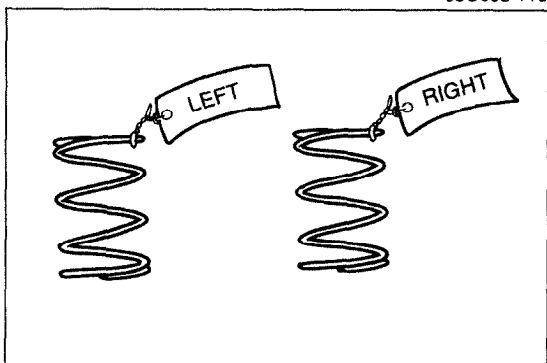
03U0J3-118

Oil seal

Caution

- Apply transaxle oil to the oil seal lip.

1. Install the new oil seal with a suitable pipe.

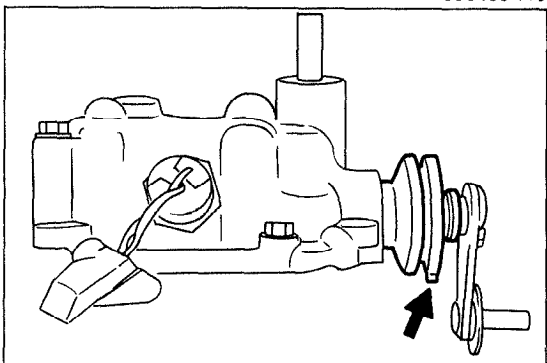


03U0J3-119

Springs

Caution

- Do not misinstall the springs.



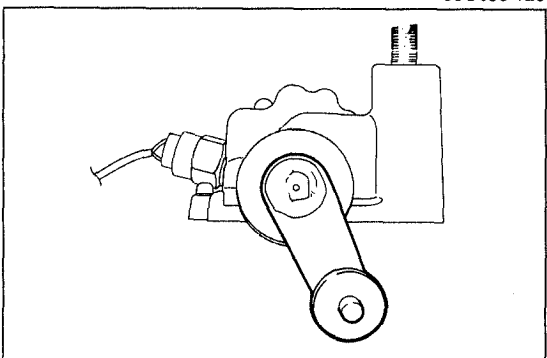
03U0J3-120

Boot

Caution

- Install the boot with the air bleed downward as shown in the figure.

1. Install the boot.



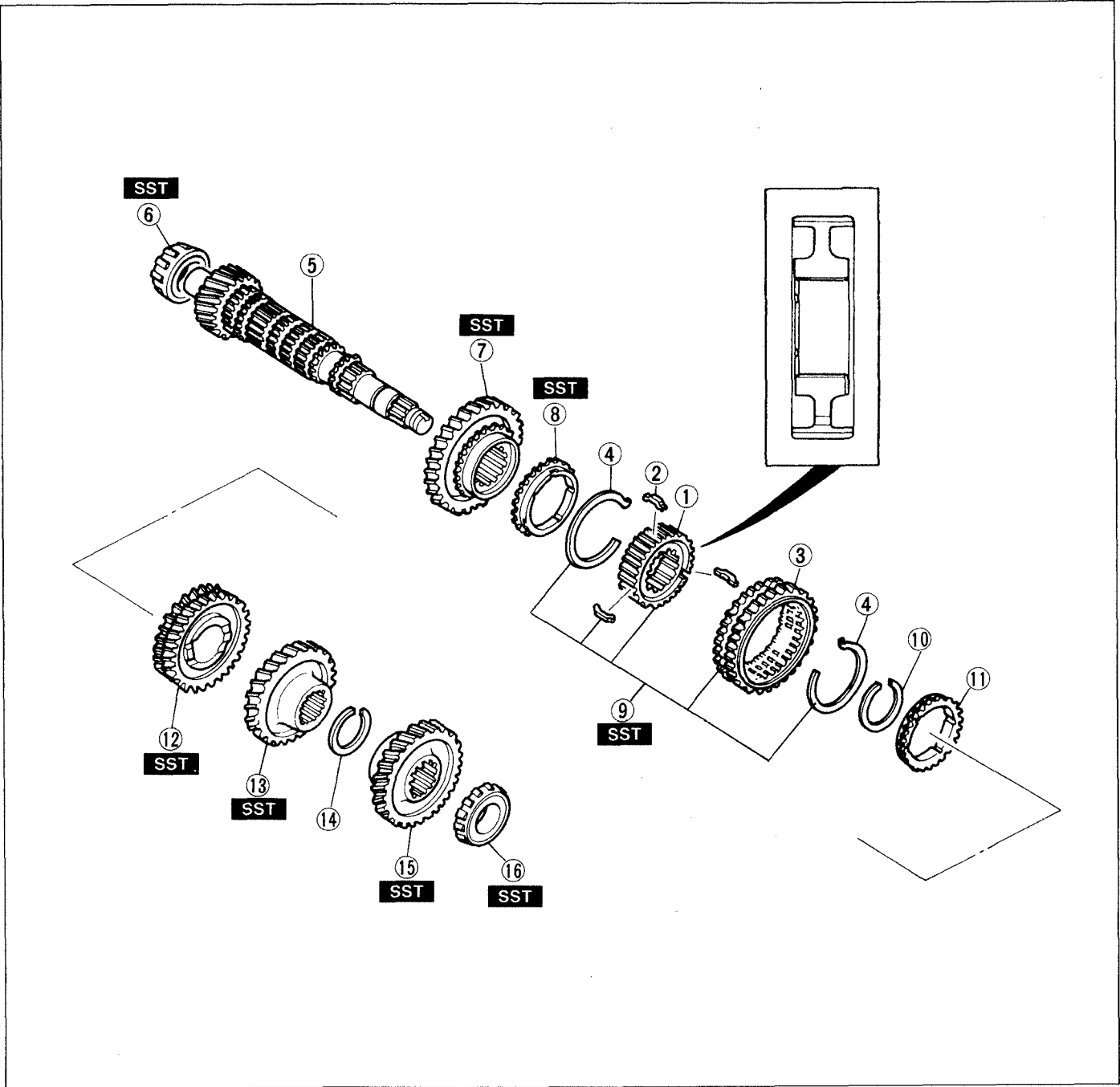
03U0J3-121

Shift lever

1. Install the shift lever as shown in the figure.

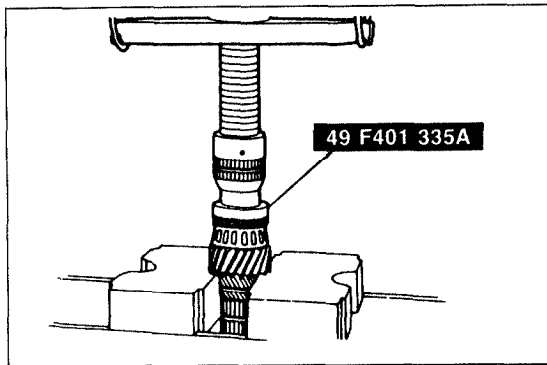
Secondary Shaft Assembly

1. Assemble in the order shown in the figure, referring to **Assembly Note**.



03U0J3-122

- | | |
|------------------------------------------------------------------------------|--------------------------------------------------------------|
| 1. Clutch hub
Assembly Note..... page J3-48 | 10. Retaining ring |
| 2. Synchronizer keys | 11. Synchronizer ring (2nd)
Assembly Note..... page J3-65 |
| 3. Clutch hub sleeve | 12. 2nd gear
Assembly Note..... page J3-65 |
| 4. Synchronizer springs | 13. Secondary 3rd gear
Assembly Note..... page J3-65 |
| 5. Secondary shaft | 14. Retaining ring |
| 6. Bearing inner race (Secondary shaft end)
Assembly Note..... page J3-65 | 15. Secondary 4th gear
Assembly Note..... page J3-65 |
| 7. 1st gear
Assembly Note..... page J3-65 | 16. Bearing inner race
Assembly Note..... page J3-65 |
| 8. Synchronizer ring (1st)
Assembly Note..... page J3-65 | |
| 9. Clutch hub assembly (1st/2nd)
Assembly Note..... page J3-48 | |



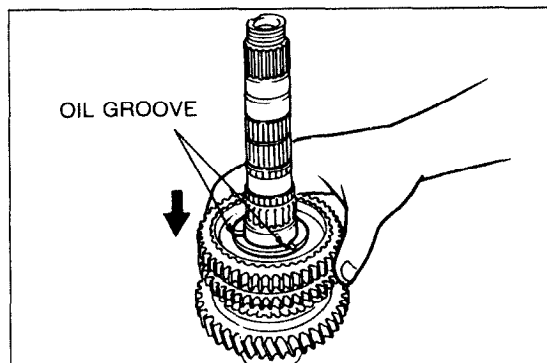
03U0J2-059

Bearing inner race (Secondary shaft end)

1. Install the new bearing inner race with the **SST**.

Note

- Press to 19,620 N (2,000 kg, 4,400 lb).



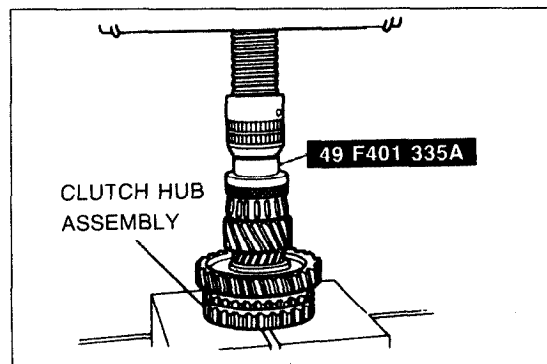
03U0J3-123

1st gear, synchronizer ring (1st) and clutch hub assembly (1st/2nd)

Note

- Align the synchronizer ring, grooves and clutch housing hub keys when installing.

1. Assemble the 1st gear, synchronizer ring (1st), and clutch hub assembly (1st/2nd), as shown in the figure.

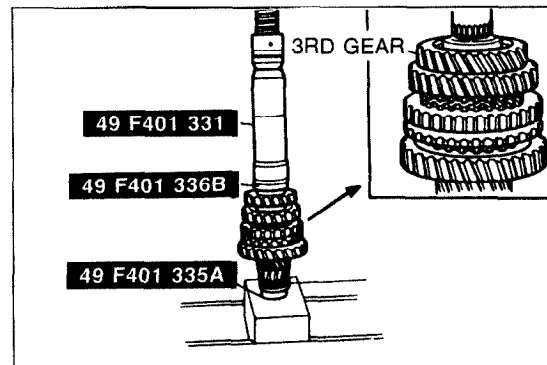


03U0J2-061

2. Press the clutch hub assembly (1st/2nd) on with the **SST**.

Note

- Press to 19,620 N (2,000 kg, 4,400 lb).



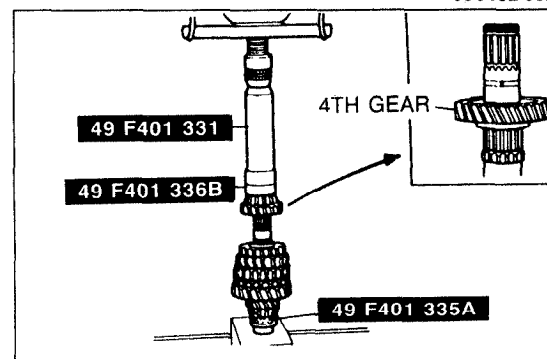
03U0J2-062

Synchronizer ring (2nd), 2nd gear and secondary 3rd gear

1. Install the synchronizer ring (2nd) and 2nd gear.
2. Install the secondary 3rd gear with the **SST**.

Note

- Press to 19,620 N (2,000 kg, 4,400 lb).



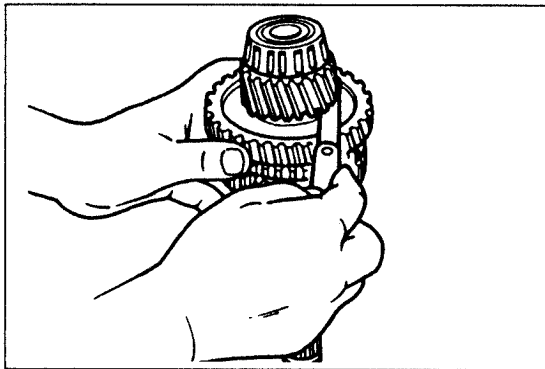
03U0J3-124

Secondary 4th gear and bearing inner race

1. Install the secondary 4th gear and new bearing inner race.

Note

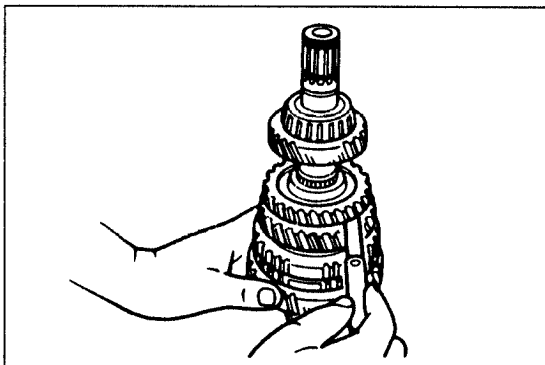
- Press to 19,620 N (2,000 kg, 4,400 lb).



03U0J3-224

2. Measure the clearance between the 1st gear and differential drive gear.

Clearance: 0.05—0.28mm (0.002—0.011 in)
Maximum: 0.33mm (0.013 in)



03U0J2-065

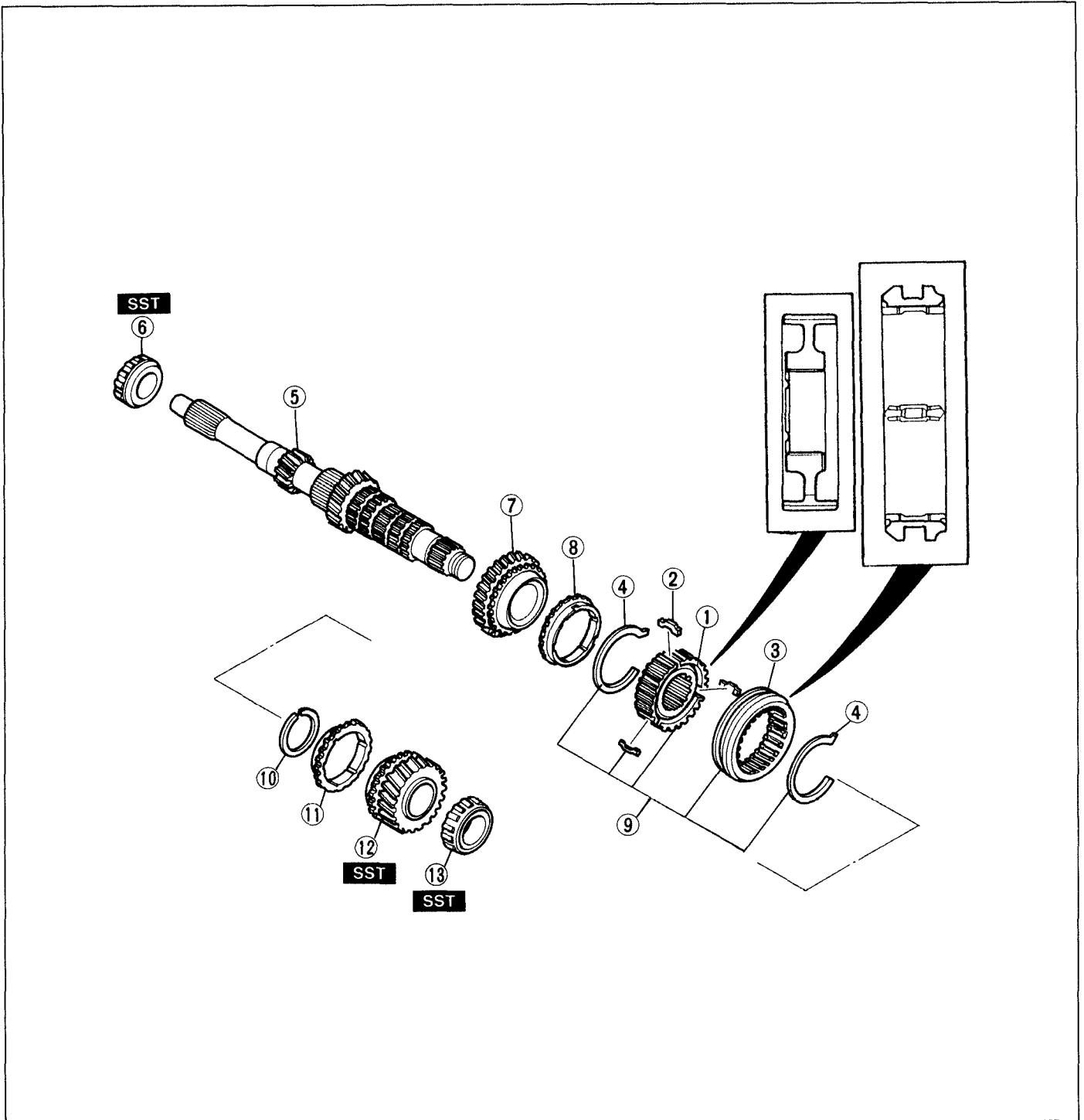
3. Measure the clearance between the 2nd gear and secondary 3rd gear.

Clearance: 0.175—0.455mm (0.0069—0.0179 in)
Maximum: 0.505mm (0.0199 in)

4. If not as specified, reassemble the secondary shaft assembly.

Primary Shaft Assembly

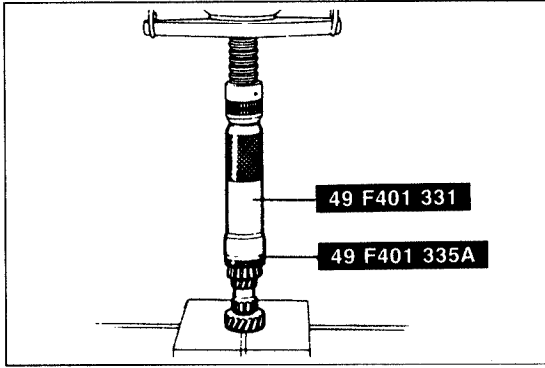
1. Assemble in the order shown in the figure, referring to **Assembly Note**.



03U0J3-125

- 1. Clutch hub
Assembly Note..... page J3-48
- 2. Synchronizer keys
- 3. Clutch hub sleeve (Reverse gear)
- 4. Synchronizer springs
- 5. Primary shaft
- 6. Bearing inner race (Primary shaft end)
Assembly Note..... page J3-68
- 7. 3rd gear
Assembly Note..... page J3-68

- 8. Synchronizer ring (3rd)
Assembly Note..... page J3-68
- 9. Clutch hub assembly (3rd/4th)
Assembly Note..... page J3-48
- 10. Retaining ring
- 11. Synchronizer ring (4th)
Assembly Note..... page J3-68
- 12. 4th gear
Assembly Note..... page J3-68
- 13. Bearing inner race
Assembly Note..... page J3-68



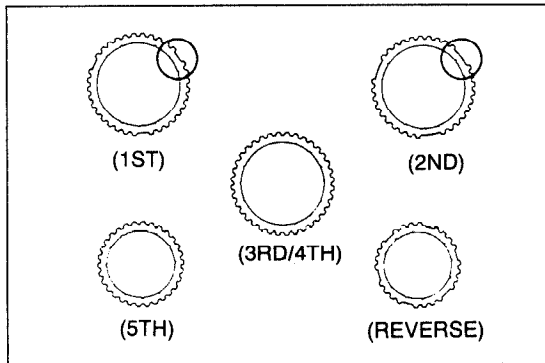
03U0J2-053

Bearing inner race (Primary shaft end)

1. Install the new bearing inner race with the **SST**.

Note

- Press to 19,620 N (2,000 kg, 4,400 lb).

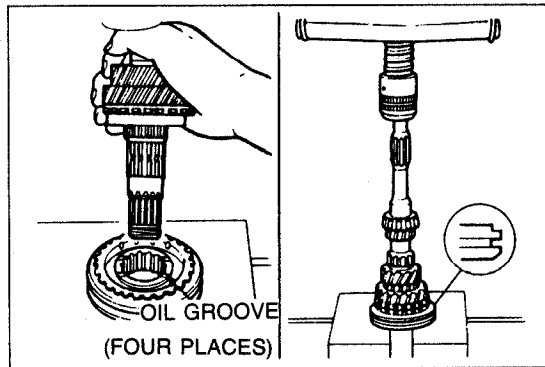


03U0J3-126

3rd gear, synchronizer ring (3rd) and clutch hub assembly (3rd/4th)

Note

- The size of the 1st, 2nd, 3rd, and 4th synchronizer rings are the same. Be careful when installing them. The 2nd gear ring has the larger cut-out as shown in the illustration.
- Align the synchronizer ring grooves and clutch housing hub keys when installing.

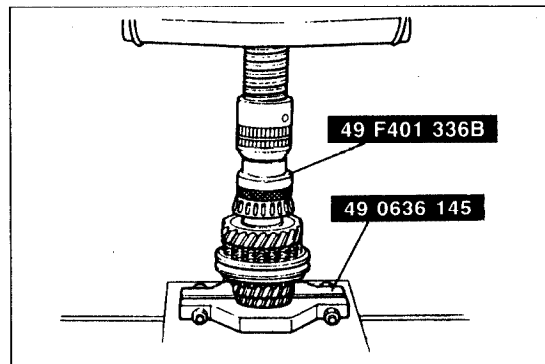


03U0J2-055

1. Install the 3rd gear, synchronizer ring (3rd), and clutch hub assembly (3rd/4th) with the **SST**.

Note

- Press to 19,620 N (2,000 kg, 4,400 lb).



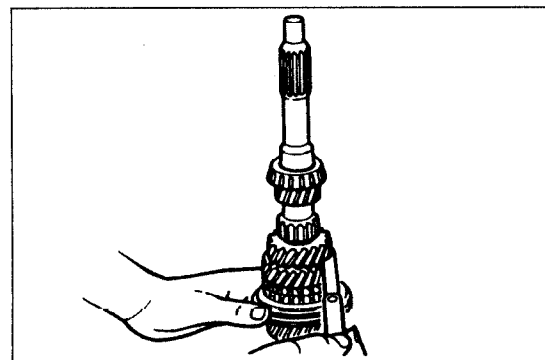
03U0J2-056

Synchronizer ring (4th), 4th gear, and bearing inner race

1. Install the synchronizer ring (4th), 4th gear, and bearing inner race with the **SST**.

Note

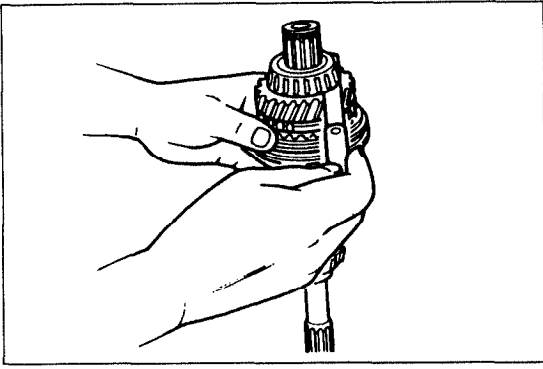
- Press to 19,620 N (2,000 kg, 4,400 lb).



03U0J2-057

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

Clearance: 0.05—0.20mm (0.002—0.008 in)
Maximum: 0.25mm (0.010 in)



03U0J2-058

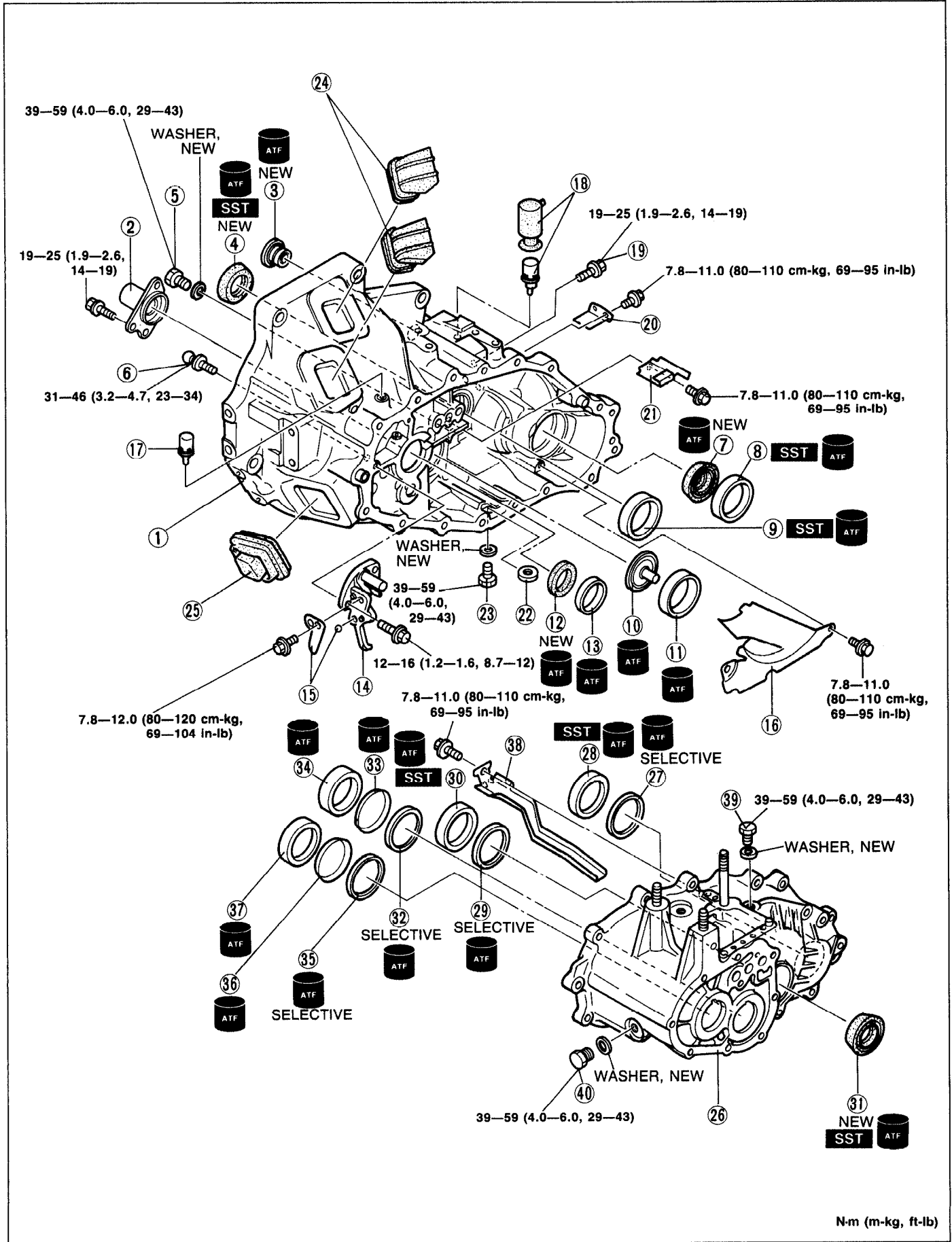
3. Measure the clearance between the 4th gear and bearing inner race.

Clearance: 0.165—0.365mm (0.0064—0.0144 in)
Maximum: 0.415mm (0.0163 in)

4. If not as specified, reassemble the primary shaft assembly.

Clutch Housing and Transaxle Case Components

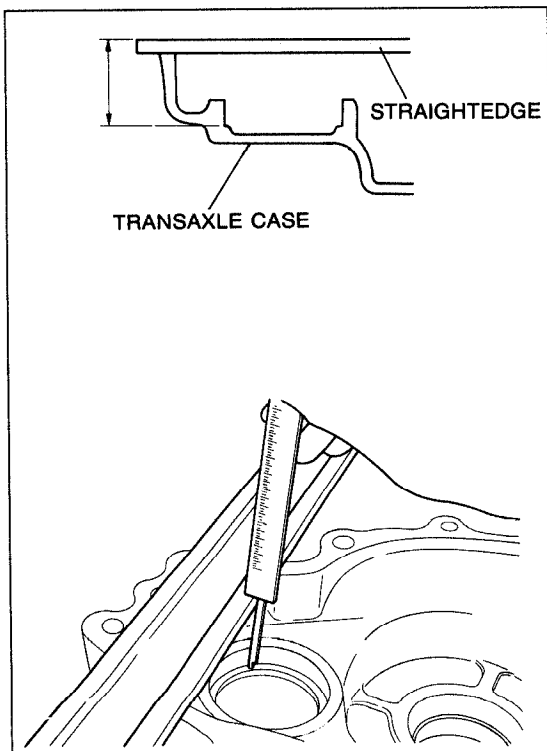
1. Select the adjustment shim(s), referring to **Bearing Preload Adjustment**.
2. Assemble in the order shown in the figure, referring to **Assembly Note**.



N-m (m-kg, ft-lb)

- | | |
|-----------------------------------------|----------------------------------------------|
| 1. Clutch housing | 21. Baffle |
| 2. Front cover | 22. Magnet |
| 3. Oil seal | 23. Plug |
| 4. Oil seal | 24. Ventilator covers |
| 5. Plug | 25. Dust cover |
| 6. Pivot pin | 26. Transaxle case |
| 7. Oil seal | 27. Adjustment shim |
| 8. Bearing outer race (Idler gear) | 28. Bearing outer race |
| Assembly Note..... page J3-78 | 29. Adjustment shim |
| 9. Bearing outer race | 30. Bearing outer race |
| (Front and center differential) | 31. Oil seal (Front and center differential) |
| Assembly Note..... page J3-78 | Assembly Note..... page J3-78 |
| 10. Funnel | 32. Adjustment shim |
| 11. Bearing outer race | 33. Diaphragm spring |
| 12. Oil seal | Assembly Note..... page J3-79 |
| 13. Bearing outer race | 34. Bearing outer race |
| 14. Reverse lever support | 35. Adjustment shim |
| 15. Lever set spring and steel ball | 36. Diaphragm spring |
| 16. Baffle | Assembly Note..... page J3-79 |
| 17. Air breather | 37. Bearing outer race |
| 18. Breather dust boot and air breather | 38. Oil guide |
| 19. Bolt | 39. Plug |
| 20. Baffle | 40. Plug |

03U0J3-128



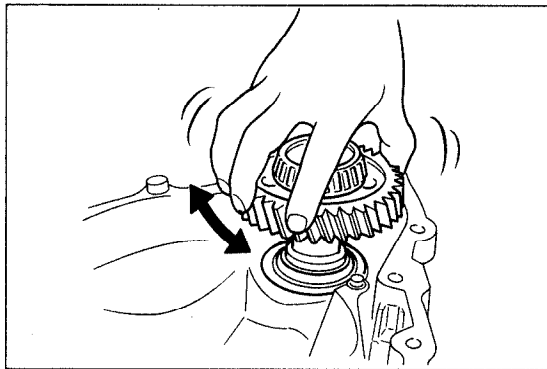
03U0J3-129

Idler gear adjustment shim selection

Note

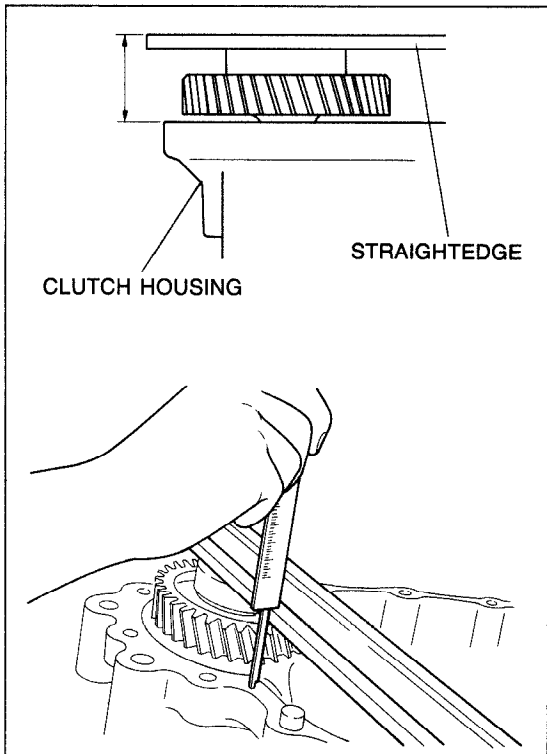
- Measure at three locations and average the reading.

1. Place a straightedge on the transaxle case.
2. Measure the depth on the bearing outer race bore.



03U0J3-130

3. Set the idler gear assembly into the clutch housing.
4. Turn the idler gear assembly to seat the bearing.
5. Install the bearing outer race to the idler gear assembly.



03U0J3-131

6. Measure from the top of the bearing outer race to the clutch housing.

Adjust shim thickness	mm (in)
0.10 (0.003)	0.20 (0.008)
0.25 (0.010)	0.30 (0.012)
0.35 (0.014)	0.40 (0.016)
0.45 (0.018)	0.50 (0.020)
0.55 (0.022)	0.60 (0.024)
0.65 (0.026)	0.70 (0.028)
0.75 (0.030)	0.80 (0.032)
0.85 (0.034)	0.90 (0.035)
0.95 (0.037)	1.00 (0.039)
1.05 (0.041)	1.10 (0.043)
1.15 (0.045)	1.20 (0.047)

03U0J3-132

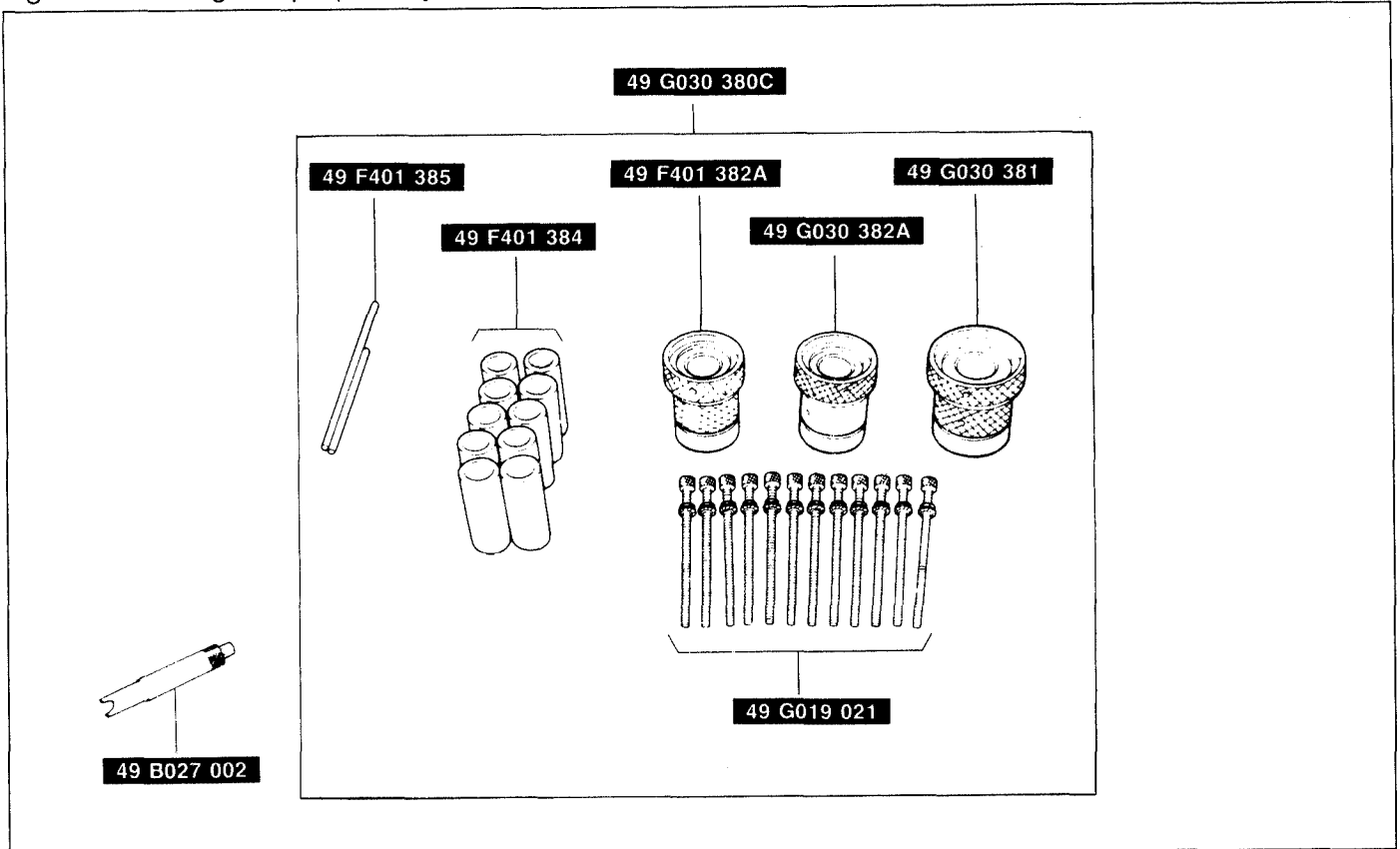
Caution

- The number of shims used must not exceed two.

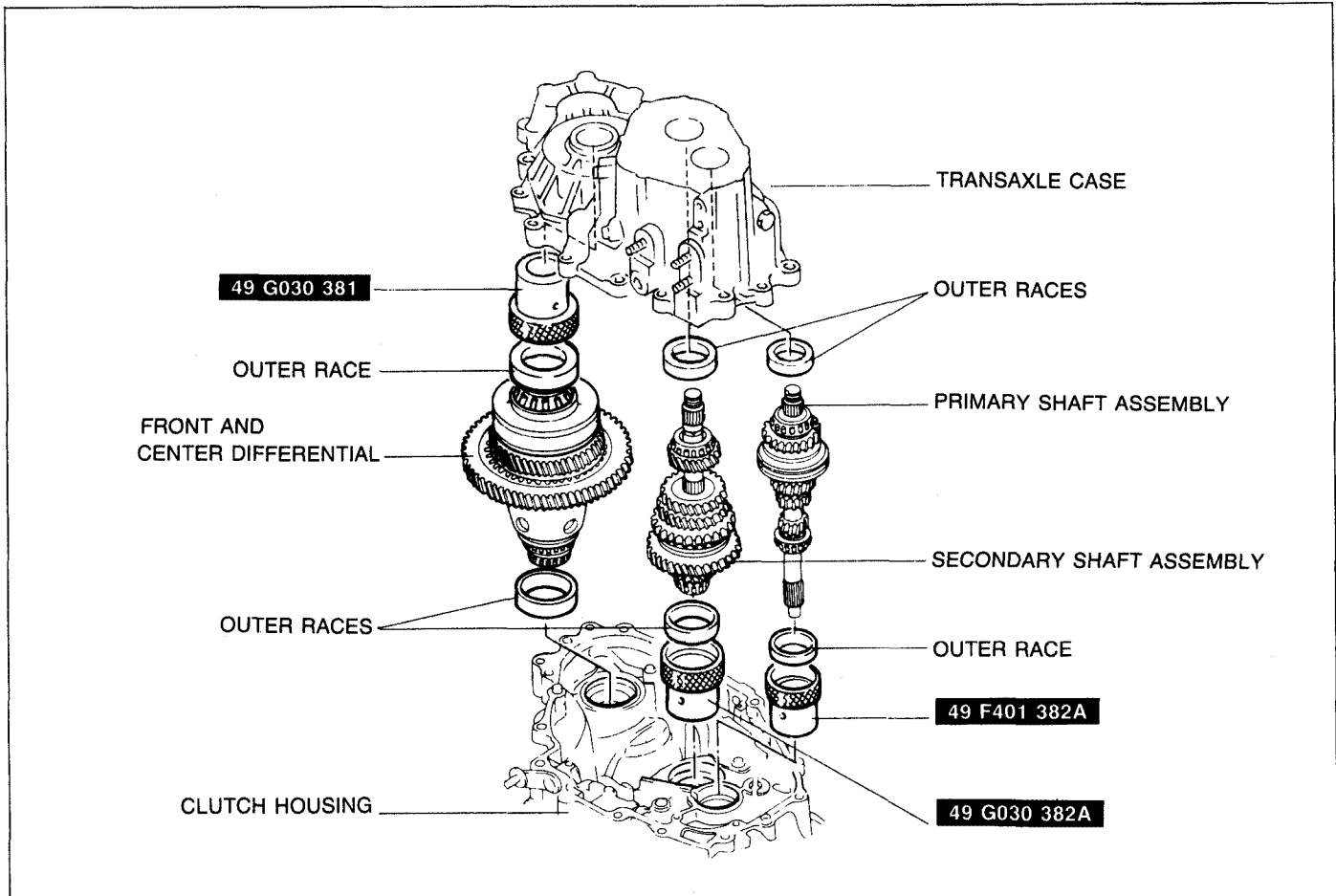
7. Select the shim as follows.
 - (a) Subtract the bearing height (Step 6) from the depth of the bearing bore (Step 2).
 - (b) Add 0.17mm (0.0067 in) to (a).
 - (c) Add 0.22mm (0.0087 in) to (a).
 - (d) Select the shim in the range between (b) and (c) from the table.

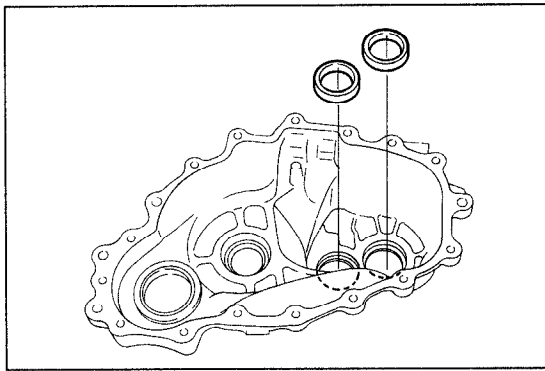
Bearing preload adjustment

Adjust the bearing preload of the primary shaft, secondary shaft, and front and center differential by selecting and installing the proper adjustment shim(s).

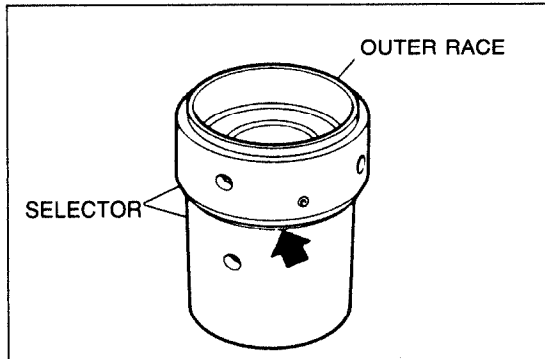


03U0J3-133

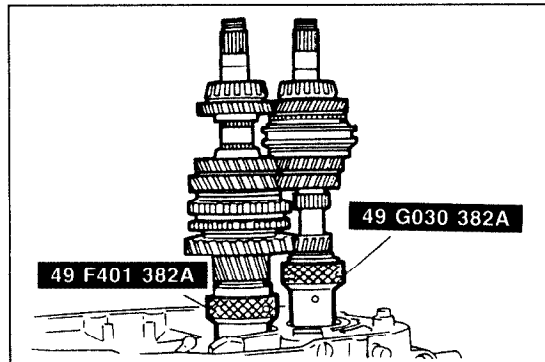




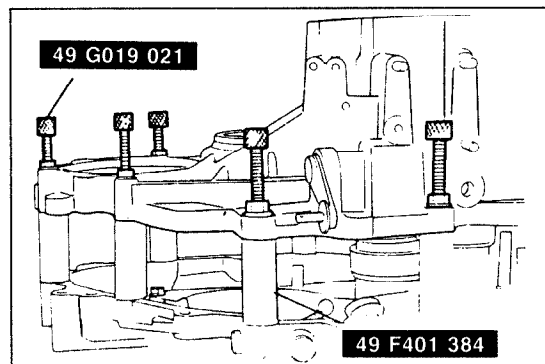
03U0J3-134



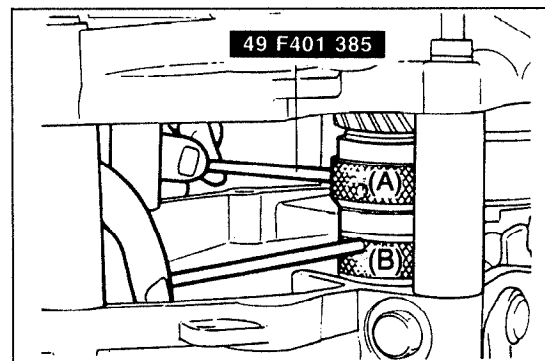
03U0J3-135



03U0J3-136



03U0J3-137



03U0J3-138

Primary and secondary shaft gear

1. Install the primary and secondary shaft bearing outer races into the transaxle case (shims removed).

2. As shown in the figure, put the outer races into the **SST**.

Note

- Turn the selector to eliminate the gap indicated by the arrow in the figure.

3. Set the **SST** (selectors) in place.

4. Mount the primary and secondary shaft gear assemblies onto the **SST** (selectors).

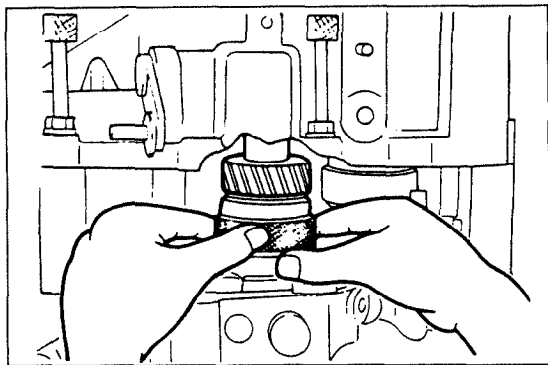
5. Set the **SST** (collars) between the transaxle case and the clutch housing, and install the **SST** (bolts), and tighten to the specified torque.

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

6. To seat the bearings, mount the **SST** (bar) on parts (A) and (B) of the **SST** (selectors), and turn the selector so the gap is enlarged.

Move the bars by hand until the selector can no longer be turned, and then turn it in the reverse direction until the gap is eliminated.

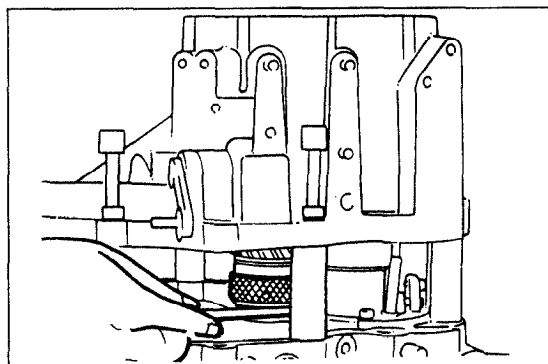


03U0J3-139

7. Manually expand the **SST** (selector) for both shafts until the **SST** (selector) no longer turns.

Note

- Make sure that each shaft turns smoothly.



03U0J3-140

8. Measure the gap of the **SST** (selector) for both gears.

Note

- Measure the gap around the entire circumference of the **SST** (selector).

Note

- The number of shims used must not exceed two.

Thickness	mm (in)
0.20	(0.008)
0.25	(0.010)
0.30	(0.012)
0.35	(0.014)
0.40	(0.016)
0.45	(0.018)
0.50	(0.020)
0.55	(0.022)
0.60	(0.024)
0.65	(0.026)
0.70	(0.028)

03U0J3-141

9. Select an appropriate adjustment shim.

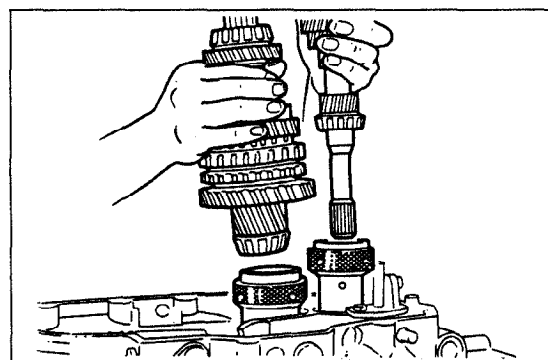
- (1) The shim for the primary shaft gear should be selected by referring to the table and selecting the shim which is nearest (on the thin side) to the value obtained by subtracting the thickness of the diaphragm spring which goes between the shim and the race from the measured value of the gap in the **SST** (selector).

Example: 0.94mm (0.0370 in)
0.94mm (0.0370 in) – 0.70mm (0.0276 in)
[Diaphragm spring]
= 0.24mm (0.009 in)
So the nearest shim (on thin side) to 0.24mm (0.009 in) is 0.20mm (0.008 in).

- (2) The shim for the secondary shaft gear should be selected by referring to the table and selecting the shim which is nearest (on the thick side) to the value obtained by subtracting the thickness of the diaphragm spring which goes between the shim and the race from the measured value of the gap in the **SST** (selector).

Example: 0.94mm (0.0370 in)
0.94mm (0.0370 in) – 0.70mm (0.0276 in)
[Diaphragm spring]
= 0.24mm (0.009 in)
So the nearest shim (on thick side) to 0.24mm (0.009 in) is 0.25mm (0.010 in).

03U0J3-142

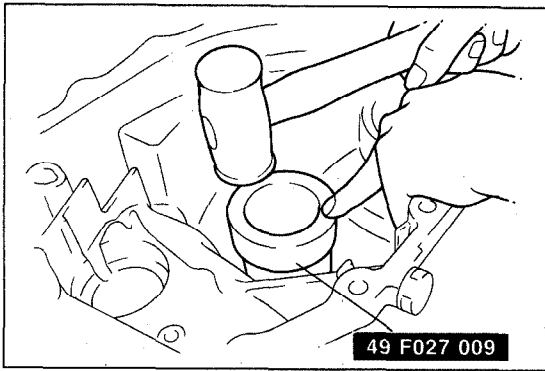


03U0J3-143

10. Remove the **SST** (bolts and collars) and then remove the transaxle case, shaft gears and **SST** (selectors).
11. Remove the bearing outer races for both shafts from the transaxle case.

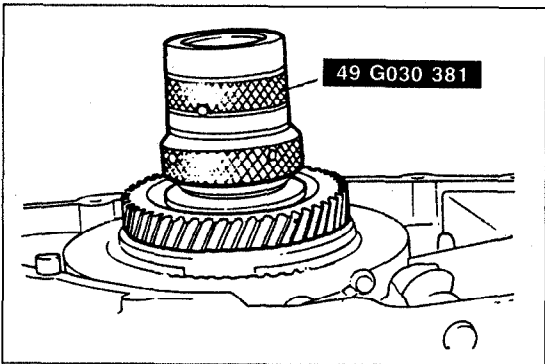
Front and center differential

1. Install the bearing outer race with the **SST**.



03U0J3-144

2. Install the front and center differential and bearing outer race.
3. Set the **SST** (selector) in place.



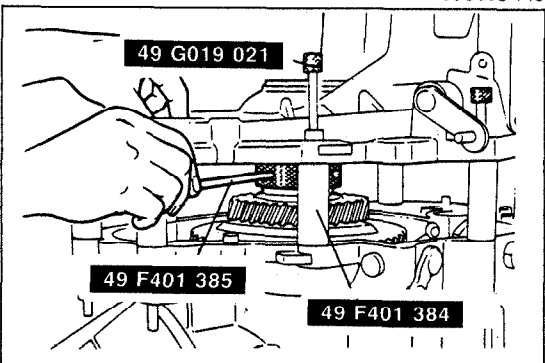
03U0J3-145

4. Set the **SST** (collars) between the transaxle case and the clutch housing, and install the **SST** (bolts), and tighten to the specified torque.

Tightening torque:

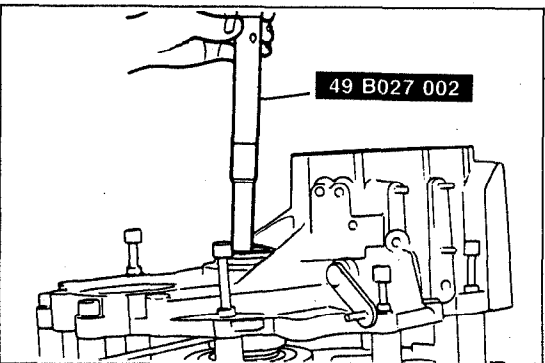
37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

5. Seat the bearings by turning the **SST** (selector) with the **SST** (bar) until the gap is enlarged.



03U0J3-146

6. Insert the **SST**.

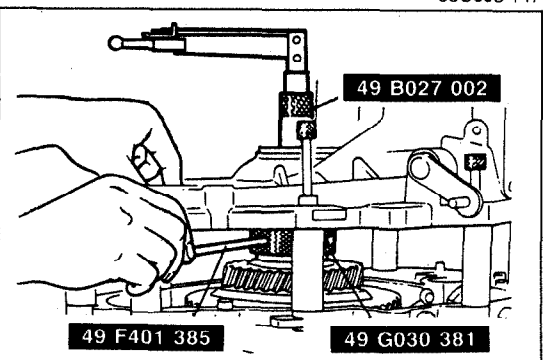


03U0J3-147

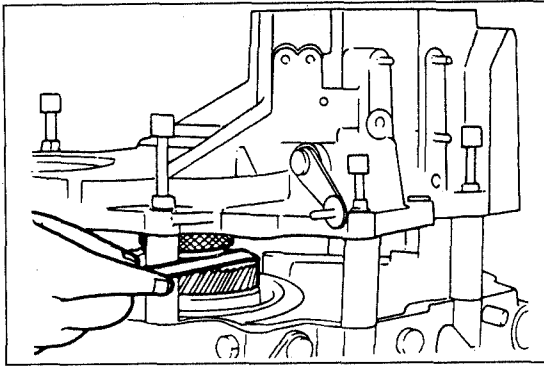
7. Expand the **SST** (selector) until the proper preload specification is obtained.

Preload:

0.3—1.2 N·m (3—12 cm·kg, 2.6—10.4 in·lb)



03U0J3-148



03U0J3-149

Thickness		mm (in)	
0.10 (0.004)	0.20 (0.008)	0.70 (0.028)	0.75 (0.030)
0.25 (0.010)	0.30 (0.012)	0.80 (0.032)	0.85 (0.034)
0.35 (0.014)	0.40 (0.016)	0.90 (0.036)	0.95 (0.037)
0.45 (0.018)	0.50 (0.020)	1.00 (0.040)	1.05 (0.041)
0.55 (0.022)	0.60 (0.024)	1.10 (0.044)	1.15 (0.045)
0.65 (0.026)	0.65 (0.026)	1.20 (0.048)	1.20 (0.048)

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Note

- Measure the gap around the entire circumference of the selector.

8. Measure the gap in the **SST** (selector).

Note

- The number of shims used must not exceed three.

9. Select an appropriate adjustment shim to be used for the differential. It should be selected by referring to the table and selecting the shim which is nearest (on thick side) to the largest measured value of the gap in the **SST** (selector).

Example: 0.54mm (0.021 in)

So the nearest shim (on thick side) to 0.54mm (0.021 in) is 0.6mm (0.014 in).

10. Remove the **SST** (bolts and collars) and then remove transaxle case.

11. Remove the **SST** (selector), bearing outer race and front and center differential.

Bearing Preload

Check the shaft gears and the differential bearing preload.

Note

- Install the diaphragm springs and selected shims.
- If the bearing preload is not within specification, adjust again.

1. Set the primary shaft gear and the front and center differential assembly into the clutch housing.

2. Install the transaxle case, and tighten to the specified torque.

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

3. Connect the **SST** and install it through the driveshaft hole.

Note

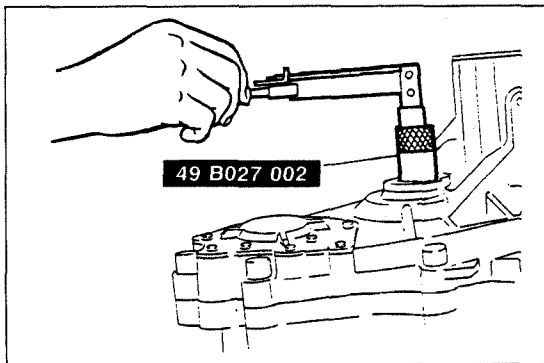
- Extend the handle fully and hook the pull scale to the end of the handle.

4. Hook a spring scale to the attachment and measure the preload.

Preload:

1.4—2.0 N·m (14—20 cm·kg, 12.2—17.5 in·lb)

03U0J3-152



03U0J3-151

5. Connect the **SST** to the primary shaft gear.
6. Check the primary shaft preload.

Preload:

0.10—0.25 N·m (1.0—2.5 cm·kg, 0.87—2.18 in·lb)

7. Remove the **SST**, transaxle case, primary shaft gear and front and center differential assembly.
8. Install the secondary shaft gear and transaxle case, and tighten to the specified torque.

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

9. Check the secondary shaft preload with the **SST**.

Preload:

0.3—0.4 N·m (3.0—4.3 cm·kg, 2.6—3.7 in·lb)

10. Remove the **SST**, transaxle case and secondary shaft gear.

Assembly note

Oil seal (Front and center differential)

Caution

- Apply transaxle oil to the outer edge of the oil seal.

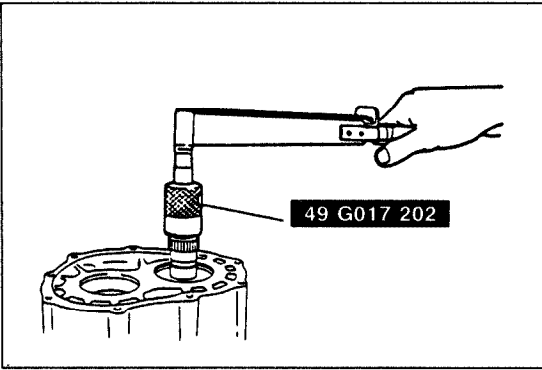
1. Install the new oil seal with the **SST**.

Bearing outer race (Idler gear)

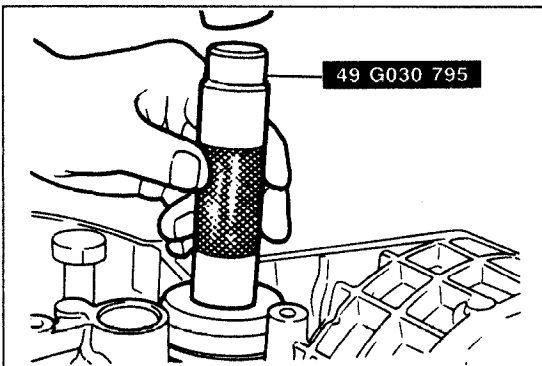
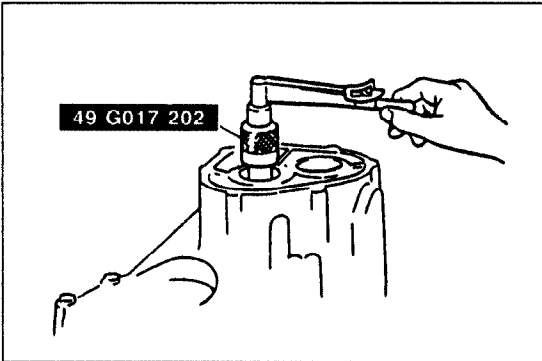
1. Install the bearing outer race with the **SST**.

Bearing outer race (Front and center differential)

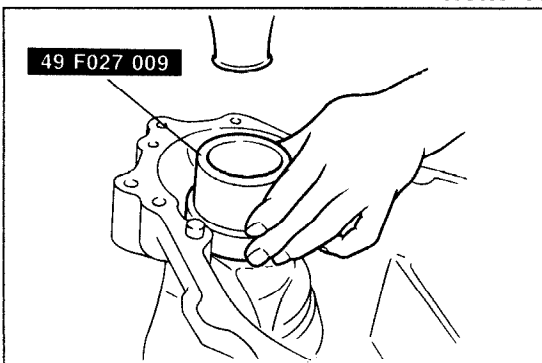
1. Install the bearing outer race with the **SST**.



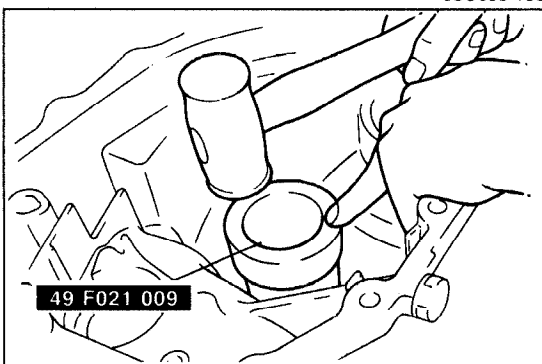
03U0J3-153



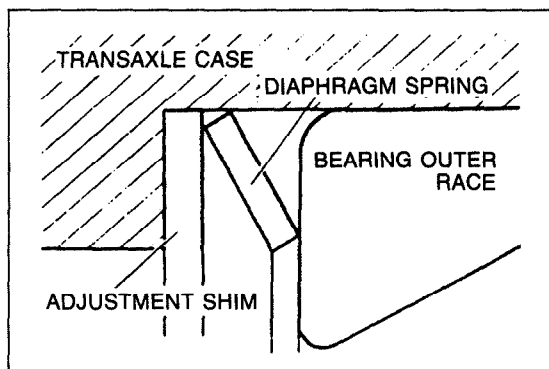
03U0J3-154



03U0J3-155



03U0J3-156



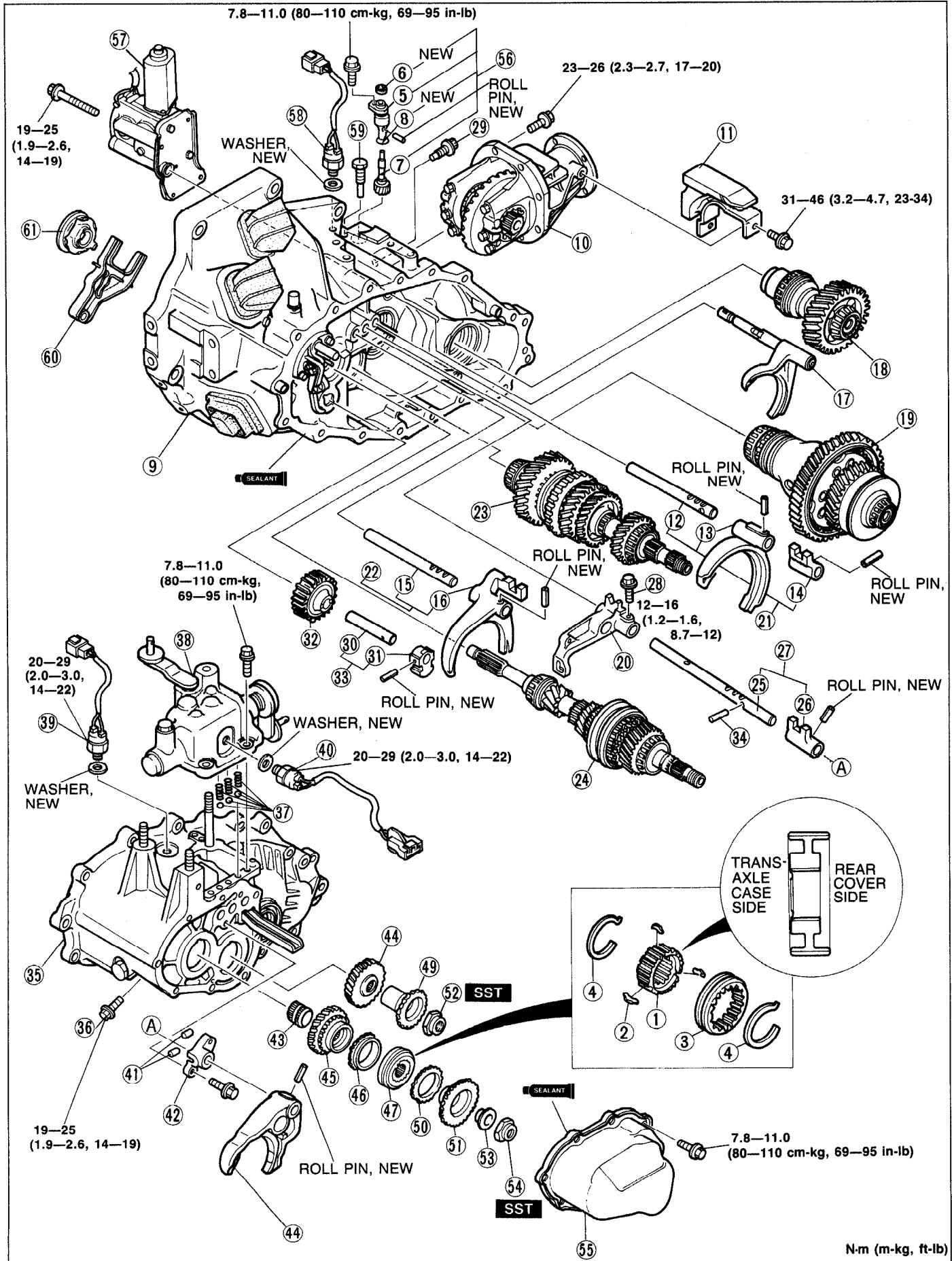
03U0J2-081

Diaphragm spring

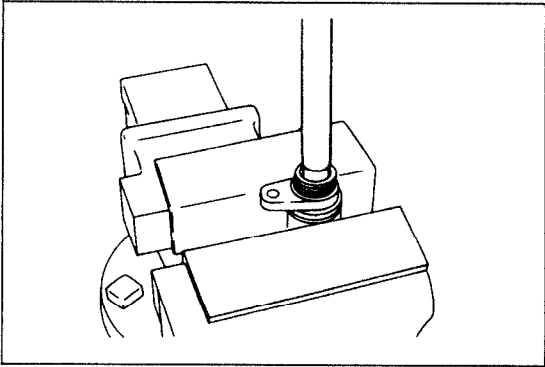
1. Install the diaphragm spring as shown in the figure.

5th/Reverse Gear and Housing Parts

1. Assemble in the order shown in the figure, referring to **Assembly Note**.



1. Clutch hub	33. Reverse idler gear shaft assembly Assembly Note..... page J3-83
2. Synchronizer keys	34. Interlock pin Assembly Note..... page J3-83
3. Clutch hub sleeve	35. Transaxle case assembly Assembly Note..... page J3-83
4. Synchronizer key springs	36. Bolt
5. Speedometer sleeve	37. Steel balls and springs
6. Oil seal (Speedometer driven gear assembly) Assembly Note..... page J3-82	38. Top cover assembly Assembly Note..... page J3-83
7. Speedometer driven gear Assembly Note..... page J3-82	39. Back-up light switch
8. O-ring	40. Neutral switch
9. Clutch housing assembly	41. Interlock pins
10. Transfer carrier assembly	42. Interlock plate
11. Dynamic damper	43. Gear sleeve
12. Shift rod (1st/2nd)	44. Secondary 5th gear
13. Shift fork (1st/2nd)	45. Primary 5th gear Assembly Note..... page J3-84
14. Shift rod end	46. Synchronizer ring
15. Shift rod (3rd/4th)	47. Clutch hub assembly
16. Shift fork (3rd/4th)	48. Shift fork
17. Center differential lock shift fork	49. Secondary reverse synchronizer gear
18. Idler gear assembly Assembly Note..... page J3-82	50. Synchronizer ring
19. Front and center differential assembly Assembly Note..... page J3-82	51. Primary reverse synchronizer gear
20. Shift gate	52. Locknut Assembly Note..... page J3-84
21. Shift fork assembly (1st/2nd)	53. Spacer
22. Shift fork assembly (3rd/4th)	54. Locknut Assembly Note..... page J3-84
23. Secondary shaft assembly Assembly Note..... page J3-82	55. Rear cover Assembly Note..... page J3-84
24. Primary shaft assembly Assembly Note..... page J3-82	56. Speedometer driven gear assembly
25. Shift rod	57. Center differential lock motor Assembly Note..... page J3-84
26. Shift rod end	58. Center differential lock switch
27. Shift rod assembly	59. Differential lock set bolt
28. Bolt	60. Clutch release fork
29. Bolt	61. Clutch release bearing
30. Reverse idler gear shaft	
31. Reverse idler gear support	
32. Reverse idler gear	

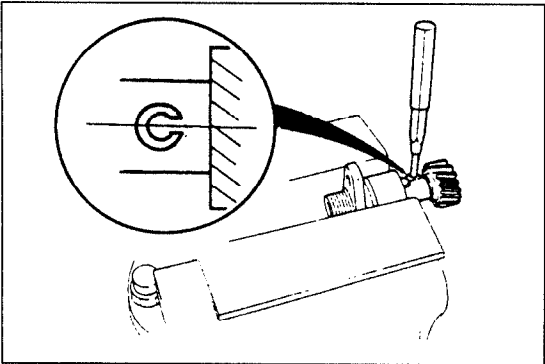


03U0J3-158

Assembly note**Oil seal (Speedometer driven gear assembly)**

1. Install the new oil seal with a suitable pipe.

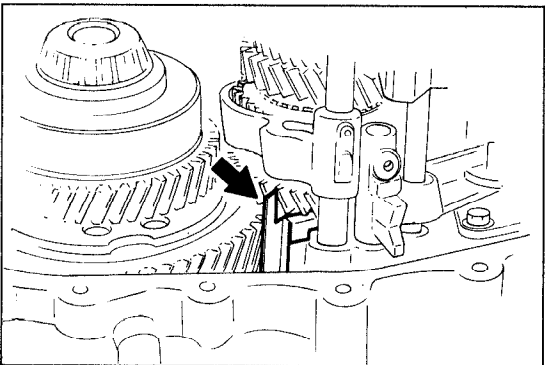
Pipe diameter: 16mm (0.629 in)



03U0J3-159

Speedometer driven gear

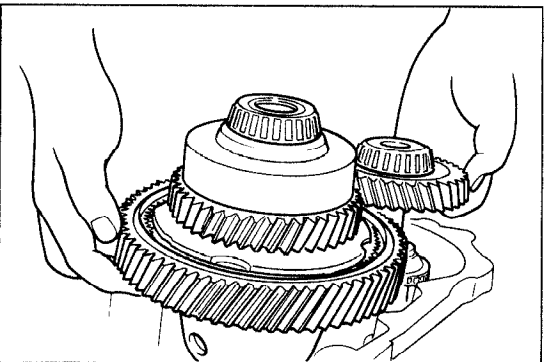
1. Install the new roll pin as shown in the figure.



03U0J3-160

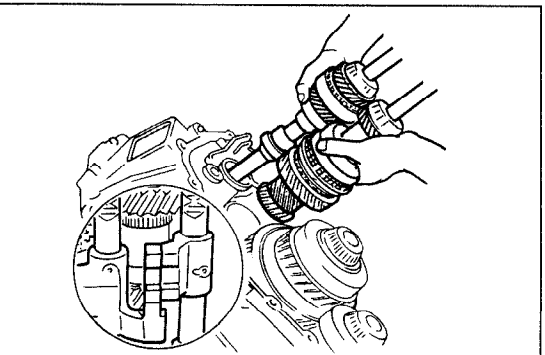
Primary shaft assembly, secondary shaft assembly, front and center differential, idler gear assembly**Caution**

- Do not incision the hands to install time.
- Do not damage the oil seal.



03U0J3-161

1. Lean the clutch housing.
2. Install the front and center differential assembly, idler gear, and center differential shift fork assembly.
3. Hold up the front and center differential assembly and idler gear assembly so that primary shaft and secondary shaft can be removed.



03U0J3-162

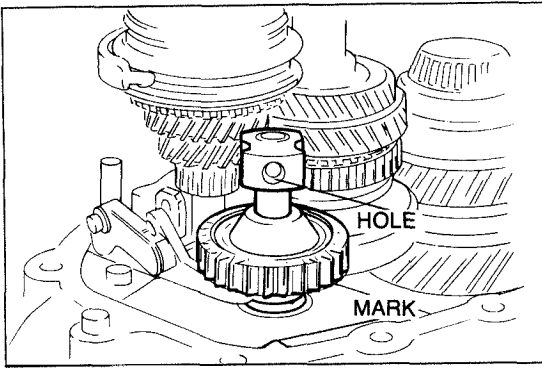
4. Align the shift forks (1st/2nd and 3rd/4th) as shown.
5. Install the primary shaft assembly, secondary shaft assembly, and shift fork assembly.
6. Verify that the gears are properly engaged.

Reverse idler gear shaft assembly

Caution

- Verify that the gears are properly engaged.

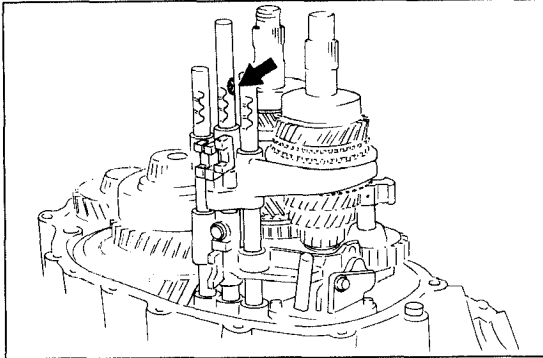
1. Align the lock bolt hole and mark of the clutch housing.



03U0J3-163

Interlock pin

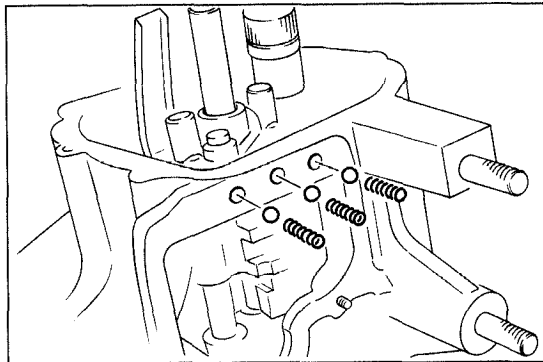
1. Install the interlock pins as shown in the figure.



03U0J3-164

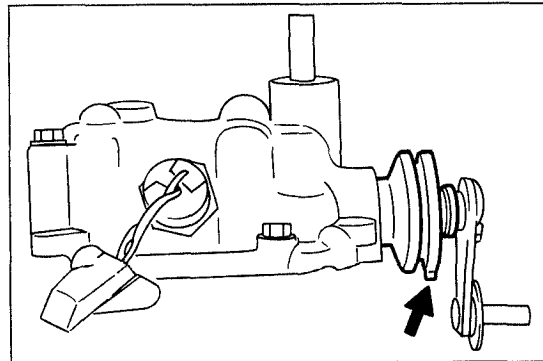
Top cover assembly

1. Install the steel balls and the springs.



03U0J3-165

2. Install the top cover.
3. Install the boot with the air bleed downward as shown in the figure.



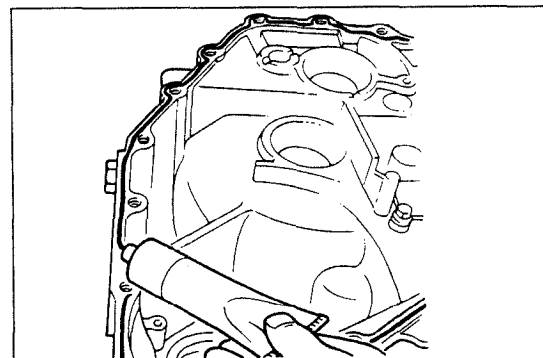
03U0J3-166

Transaxle case assembly

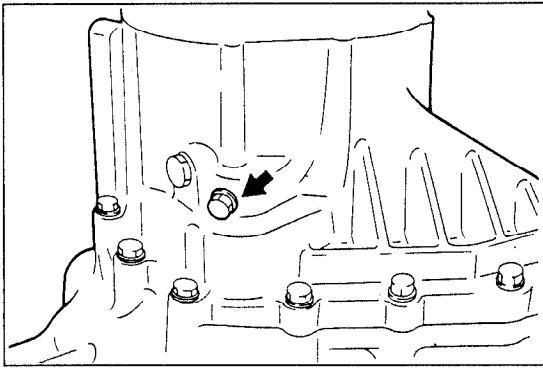
1. Apply a thin coat of sealant to the contact surfaces of the clutch housing and transaxle case.
2. Install and tighten the transaxle case installation bolts to the specified torque.

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)



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03U0J3-168

3. Install the bolt.

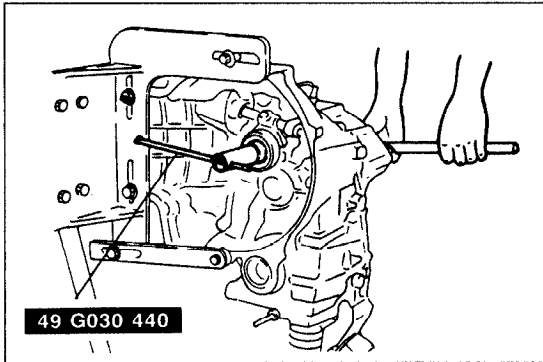
Locknut

1. Shift to 1st gear.
2. Lock the primary shaft with the **SST**.
3. Tighten new locknuts on the primary and secondary shafts.

Tightening torque:

128—206 N·m (13.0—21 m·kg, 94—152 ft·lb)

4. Stake the locknuts to the groove.



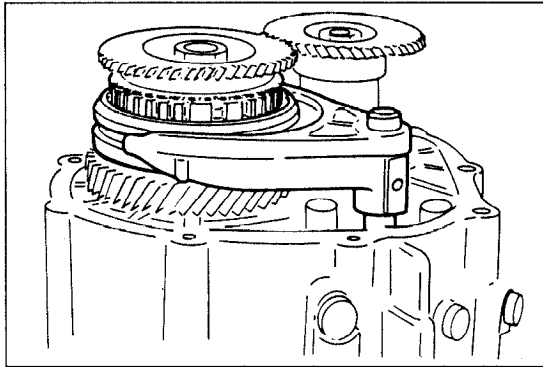
03U0J3-169

Primary 5th gear

Note

- After installation, move the shift rod to verify that the gear change operation is smooth.

1. Shift to neutral and install the roll pin.



03U0J3-170

Rear Cover

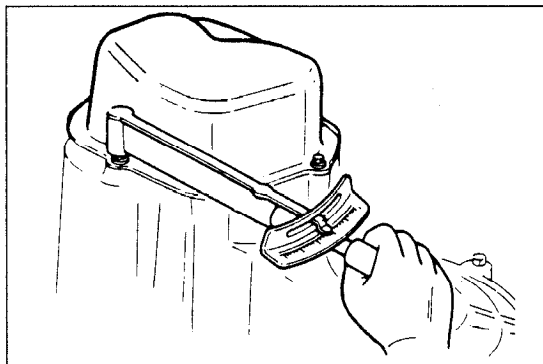
Note

- Clean the contact surfaces before applying sealant.

1. Apply sealant to the transaxle case and rear cover.
2. Install the rear cover.

Tightening torque:

7.8—11 N·m (0.8—1.1 m·kg, 5.8—8.0 ft·lb)



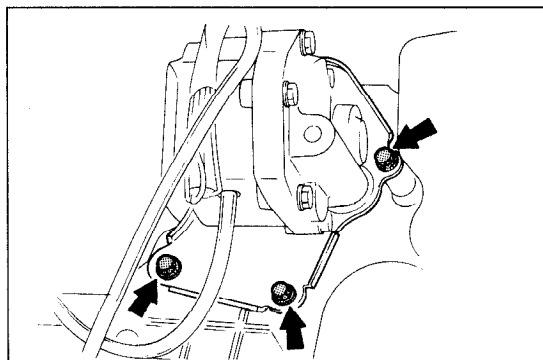
03U0J3-171

Center Differential Lock motor

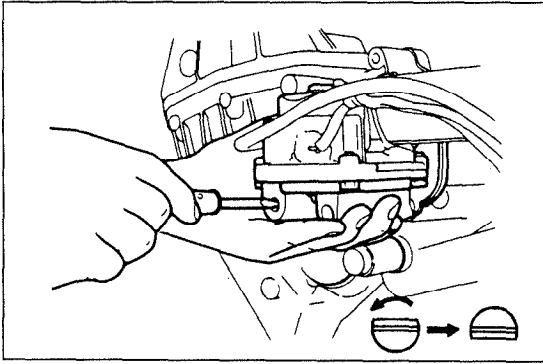
1. Install the center differential lock motor.

Tightening torque:

19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)



03U0J3-172



03U0J3-173

2. Turn the rod 180° counterclockwise with a screwdriver, and install the plug.
3. Install the bolts.

Tightening torque:

9—14 N·m (90—140 cm·kg, 78—122 ft·lb)

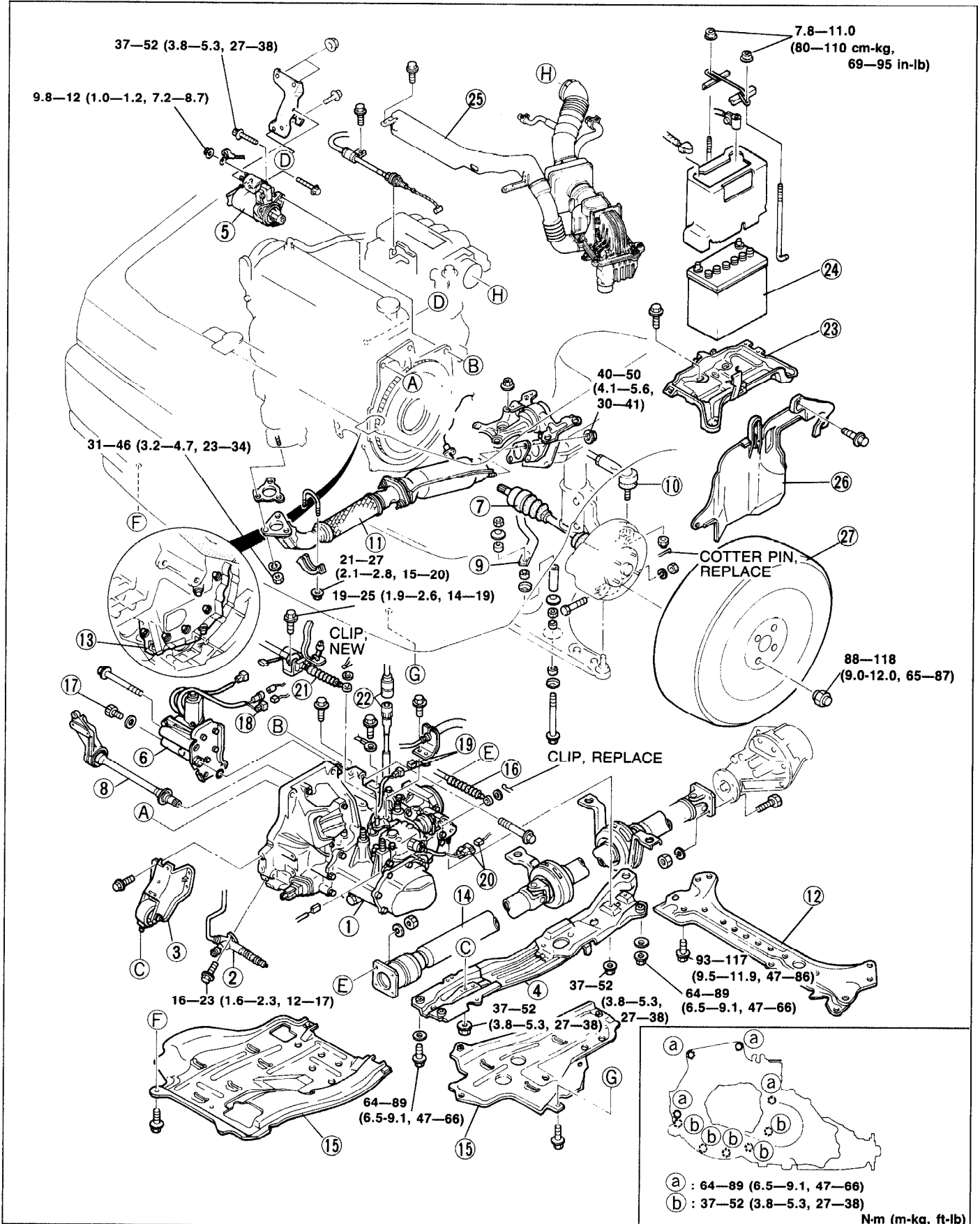
4. Install the differential lock switch.

Tightening torque:

20—29 N·m (2—3 m·kg, 14—22 ft·lb)

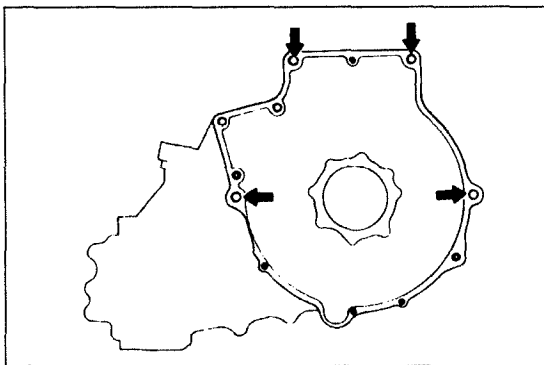
INSTALLATION

1. Raise the vehicle and support it with safety stands.
2. Install in the order shown in the figure, referring to **Installation Note**.
3. Add the specified amount of the specified transaxle oil. (Refer to page J3-11.)
4. Warm-up the engine and transaxle, and inspect for oil leakage and transaxle operation.



<ul style="list-style-type: none"> 1. Transaxle and transfer unit Installation Note page J3-87 2. Clutch release cylinder and clutch pipe 3. Engine mount No.2 4. Engine mounting member Installation Note page J3-87 5. Starter 6. Center differential lock motor 7. Driveshaft Installation Note page J3-88 8. Joint shaft 9. Stabilizer Installation Note page J3-88 10. Tie-rod end Installation Note page J3-89 11. Exhaust pipe 12. Crossmember 13. Integrated stiffener 	<ul style="list-style-type: none"> 14. Propeller shaft Installation Note page J3-89 15. Undercover 16. Control cable Installation Note page J3-89 17. Bolt 18. Differential lock motor connector 19. Back-up light switch connector 20. Neutral switch connector Installation Note page J3-89 21. Shift cable 22. Speedometer cable Assembly Note..... page J3-90 23. Battery carrier 24. Battery 25. Air hose and air cleaner assembly 26. Splash shield 27. Wheel and tire
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03U0J3-175



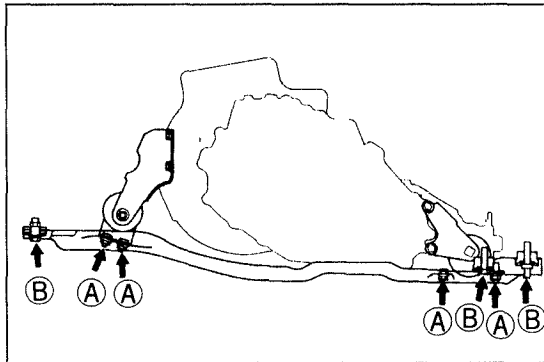
03U0J3-176

Installation Note Transaxle and transfer carrier

1. Mount the transaxle to the engine.

Tightening torque:

55—80 N·m (5.6—8.2 m·kg, 41—59 ft·lb)



03U0J3-177

Engine mounting member

1. Tighten the bolts as shown.

Tightening torque:

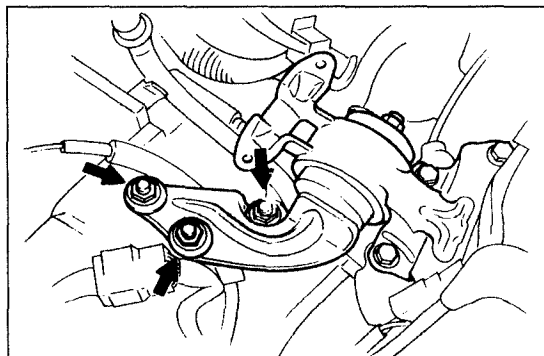
A 37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

B 64—89 N·m (6.5—9.1 m·kg, 47—66 ft·lb)

2. Tighten engine mount No.4 nuts.

Tightening torque:

66—93 N·m (6.8—9.5 m·kg, 49—68 ft·lb)



03U0J3-178

Driveshaft

Caution

- Do not damage the oil seal.
- After installation, pull the front hub outward to verify that the driveshaft is secured.

1. Replace the clips at the ends of the driveshafts and joint shaft with new ones.
2. Push the driveshafts into the differential with the groove of the clips upward.

Note

- Apply ATF to the oil seal lip.

3. Install the driveshaft.

4. Tighten the joint shaft mounting bolts in the order shown.

Tightening torque:

42—62 N·m (4.3—6.3 m·kg, 31—46 ft·lb)

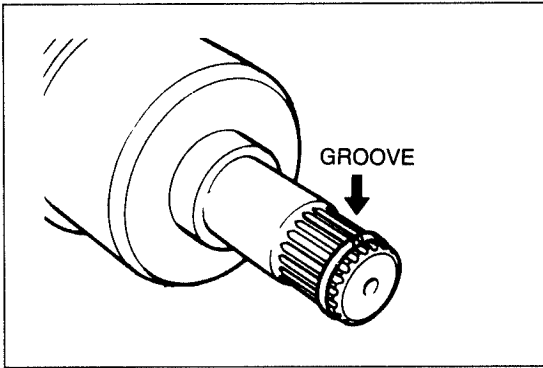
5. Install the lower arm ball joint to the knuckle and tighten the bolt.

Tightening torque:

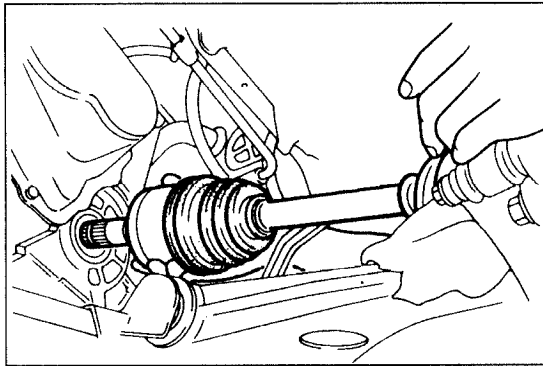
43—54 N·m (4.4—6.0 m·kg, 32—40 ft·lb)

Stabilizer

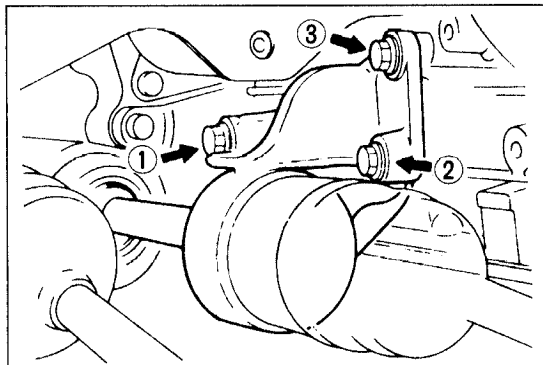
1. Tighten the stabilizer nut so that **17mm (0.67 in) to 19mm (0.75 in)** of thread is exposed at the end of the bolt.



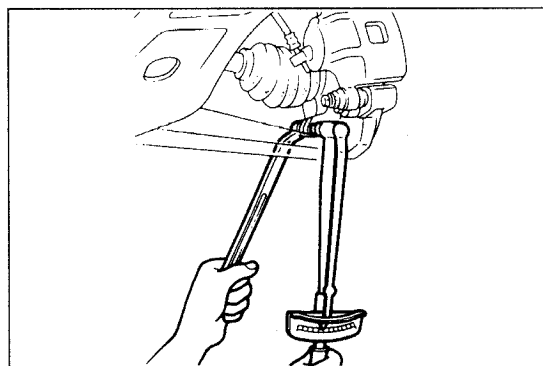
03U0J3-217



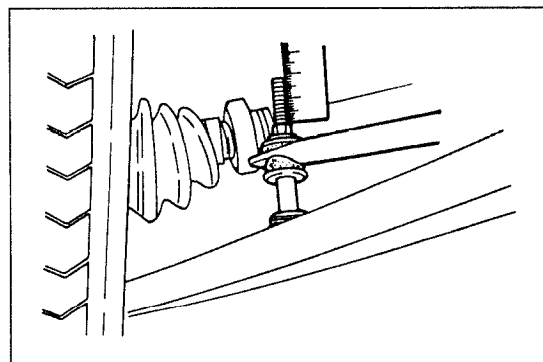
03U0J3-179



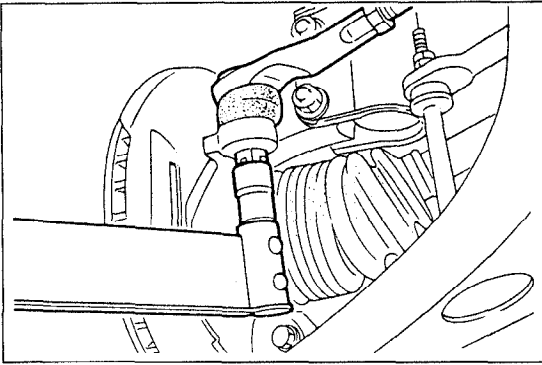
03U0J3-180



03U0J3-181



03U0KX-499



03U0J1-126

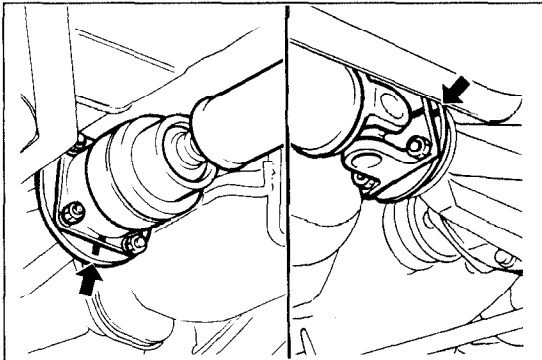
Tie-rod end

1. Install the locknut.

Tightening torque:

42—57 N·m (4.3—5.8 m·kg, 31—42 ft·lb)

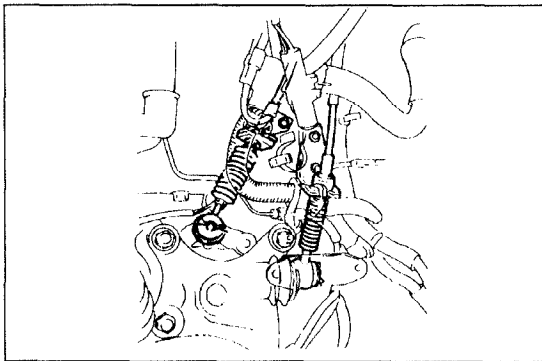
2. Secure the locknut with a new cotter pin.



03U0J3-182

Propeller shaft

1. Align the marks and install the propeller shaft.
(Refer to Section L.)



03U0J3-183

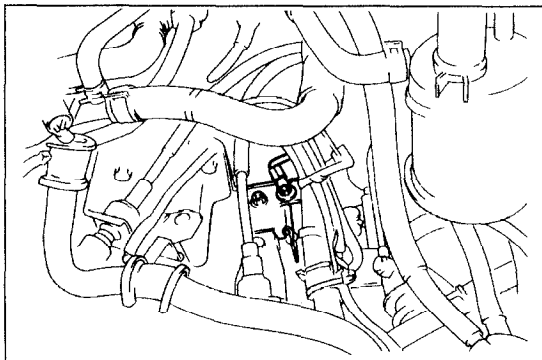
Control cable

1. Install the bracket.

Tightening torque:

18—25 N·m (1.9—2.6 m·kg, 13—18 ft·lb)

2. Attach the control cable to the bracket with the clip.
3. Connect the control cable to the transaxle and transfer unit and install the washers and the pins.

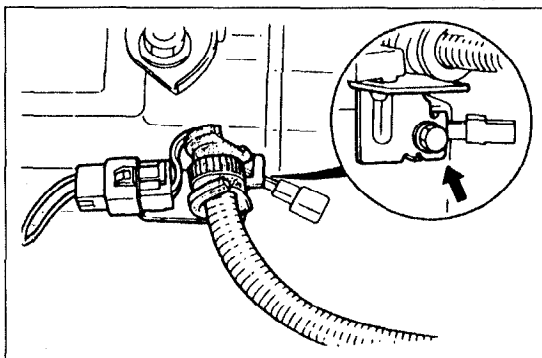


03U0J3-184

4. Connect the ground to the clutch pipe bracket.

Tightening torque:

15—22 N·m (1.6—2.3 m·kg, 11—16 ft·lb)



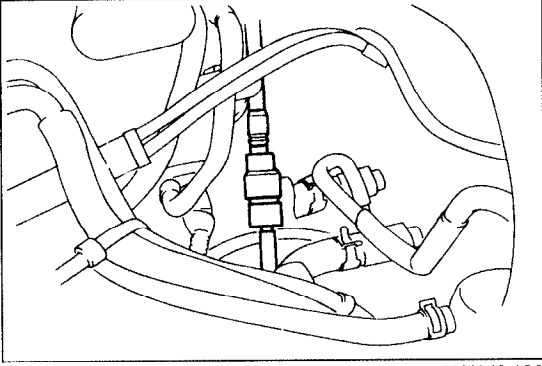
03U0J3-185

Neutral switch connector

1. Install the bracket.
2. Connect the neutral switch connector.

Speedometer cable

1. Connect the speedometer cable.

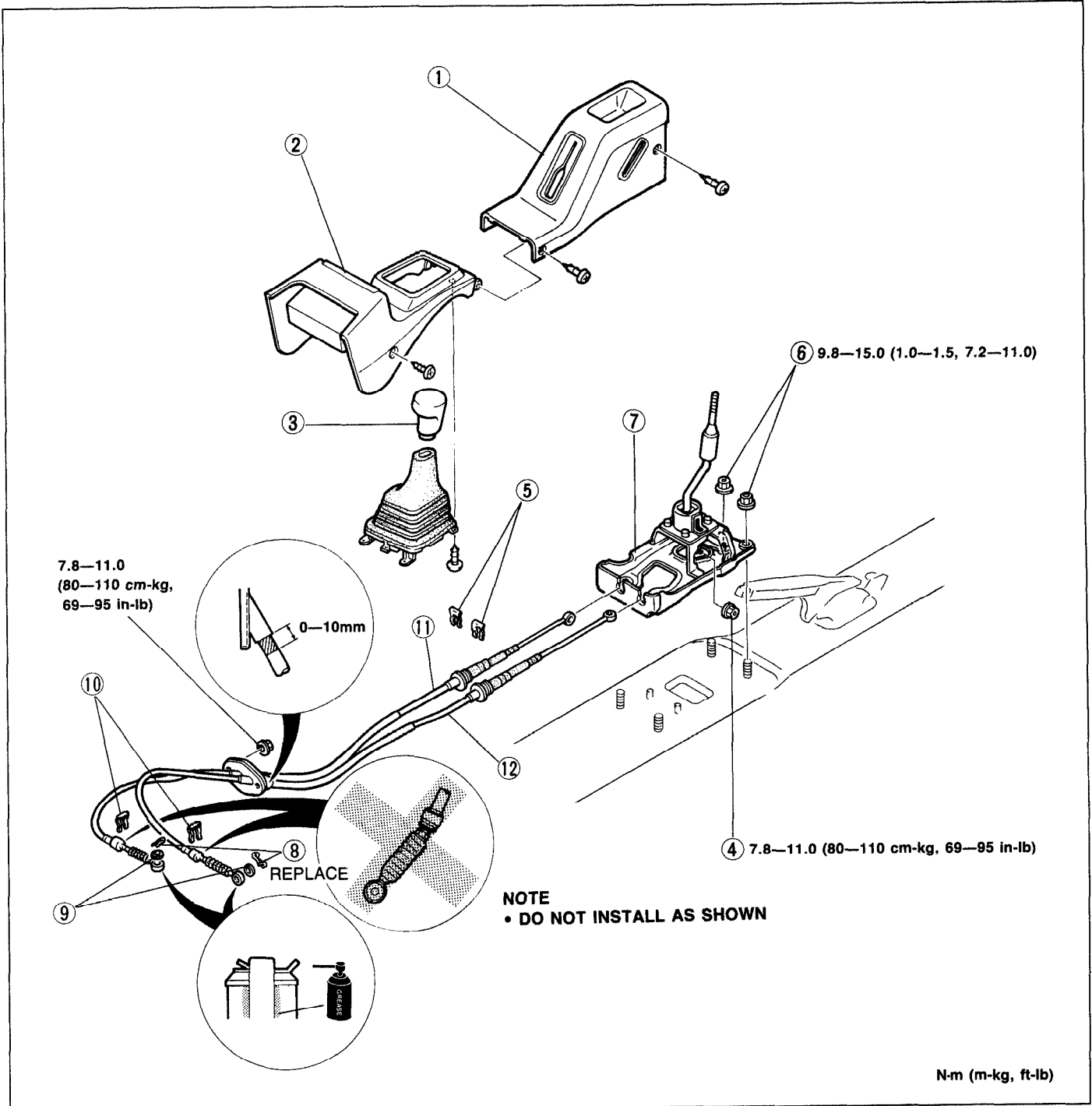


03U0J3-186

SHIFT MECHANISM

OVERHAUL

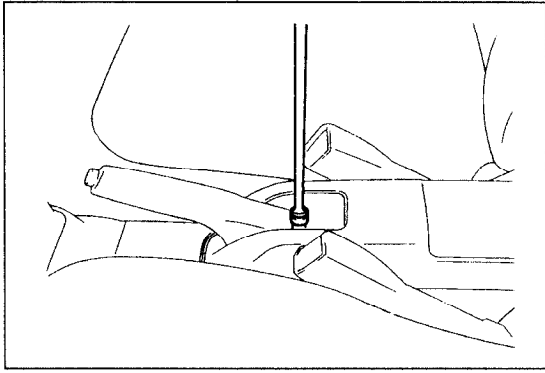
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



03U0J3-187

1. Rear console
Assembly Note..... page J3-92
2. Front console
Disassembly Note page J3-92
3. Shift lever knob
4. Nut (Cable)
5. Clips (Cable)
6. Nuts (Shift lever assembly)

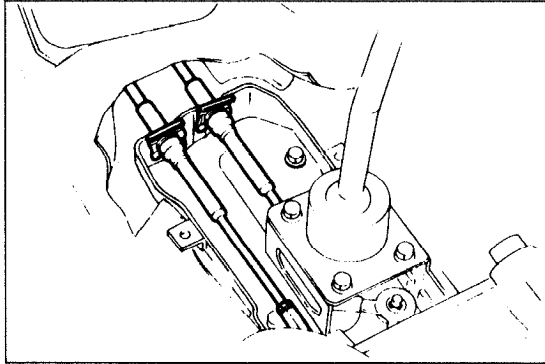
7. Shift lever assembly
Assembly Note..... page J3-92
8. Snap pins
9. Washers
10. Clips (Cable)
11. Select cable
12. Shift cable



03U0J3-188

Disassembly Note**Front console**

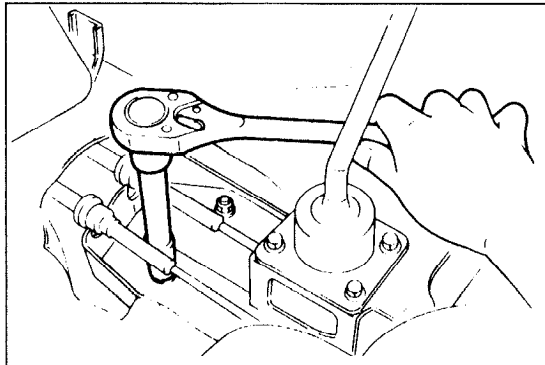
1. Loosen the bolt as shown.
2. Remove the rear console.
3. Remove the front console.



03U0J3-189

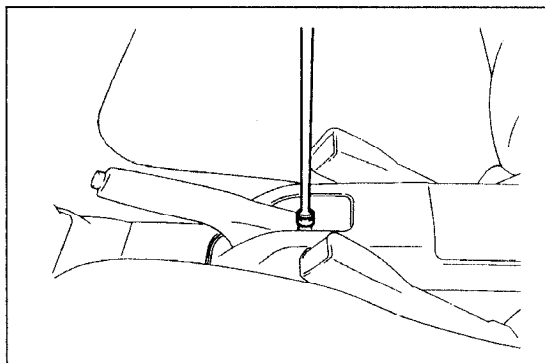
Shift lever assembly

1. Remove the nut and the clips.
2. Disconnect the shift cable and select cable from the shift lever assembly.



03U0J3-190

3. Remove the 4 mounting nuts.
4. Remove the shift lever assembly.



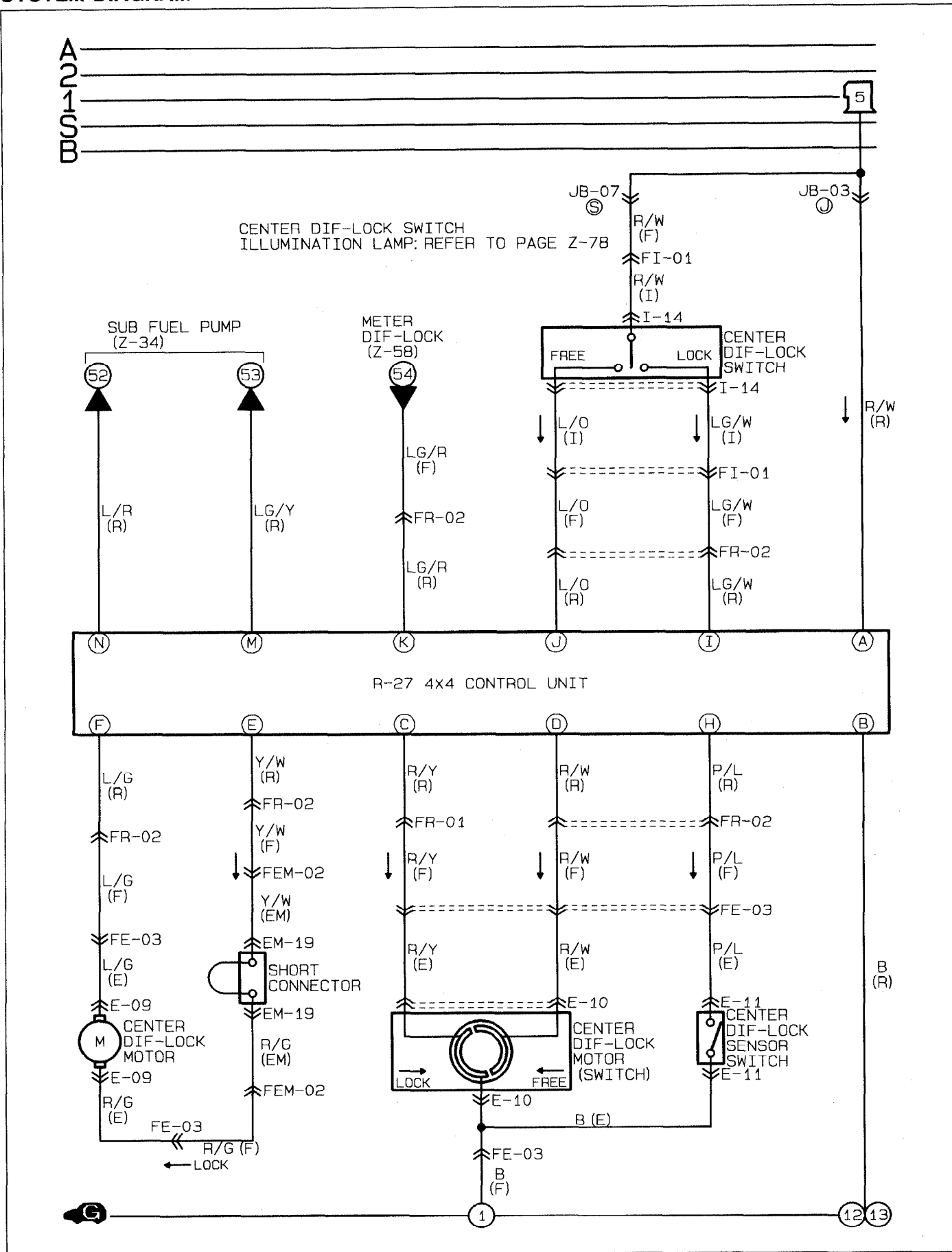
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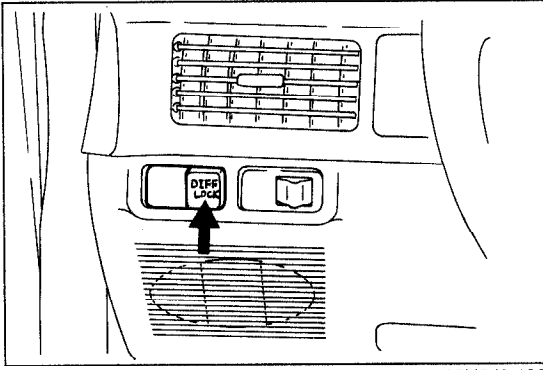
Assembly Note**Rear console**

1. After install the rear console, adjust the parking brake lever. (Refer to Section P.)

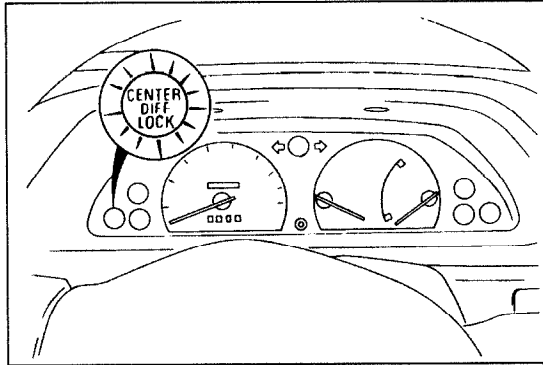
CENTER DIFFERENTIAL LOCK SYSTEM

SYSTEM DIAGRAM

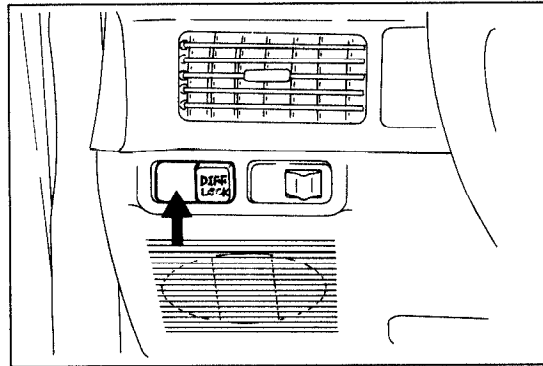




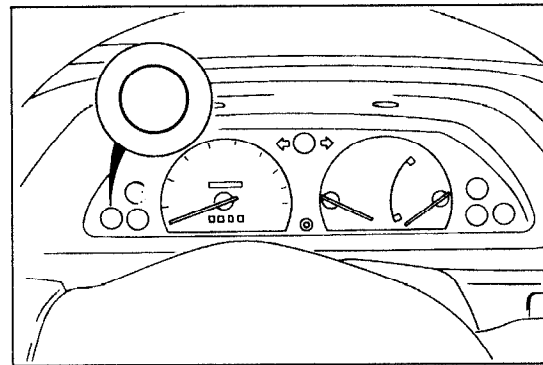
03U0J3-193



03U0J3-194



03U0J3-195



03U0J3-196

INSPECTION

1. Turn the ignition switch ON.
2. Push the center differential lock switch ON.

3. Verify that the indicator lamp in the instrument cluster is turned on and a beep is heard.

Note

- The indicator lamp will flash until the center differential is fully engaged. If necessary, move the vehicle forward until the differential engages.

4. Push the center differential lock switch OFF.

5. Verify that the indicator lamp in the instrument cluster goes OFF.

CENTER DIFFERENTIAL LOCK MOTOR

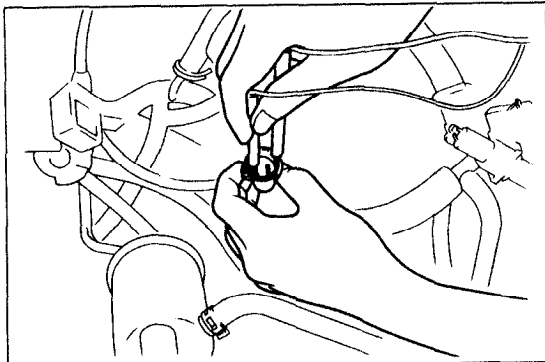
INSPECTION

Continuity

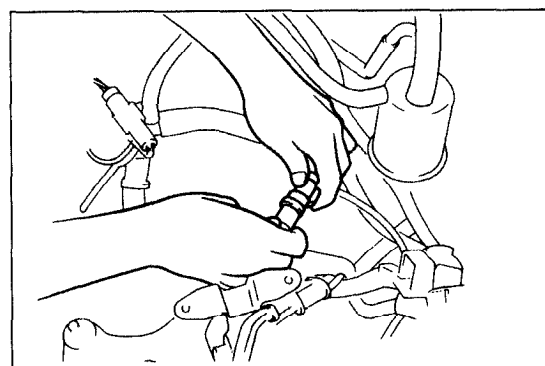
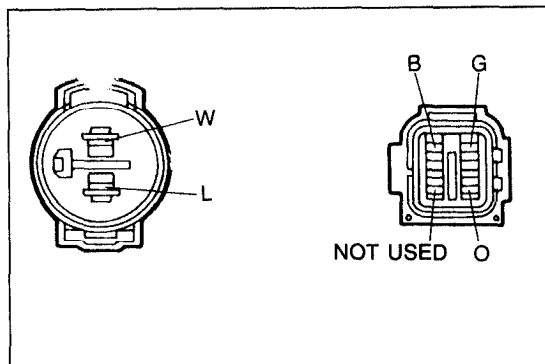
1. Disconnect the negative battery terminal.
2. Disconnect the connectors of the center differential lock motor.
3. Check resistance between terminals at the motor side connectors.

Unit: Ω (Ohm)

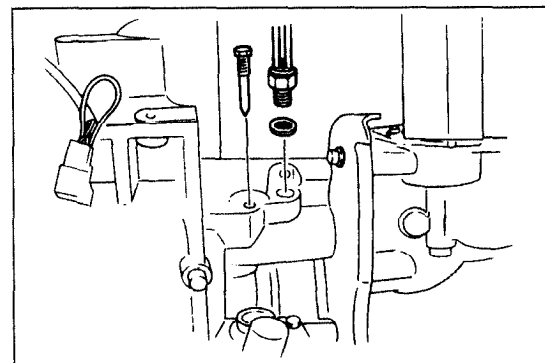
Motor	B-G	D-G	W-L
Free	∞	0	1-3
Lock	0	∞	



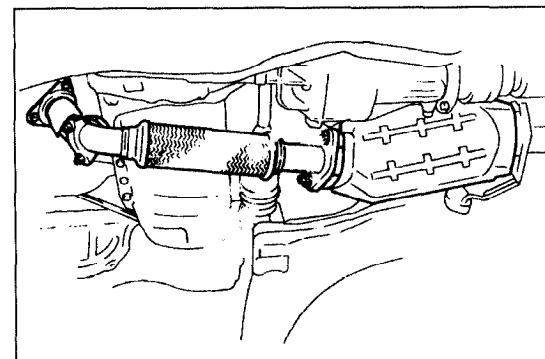
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03U0J3-198



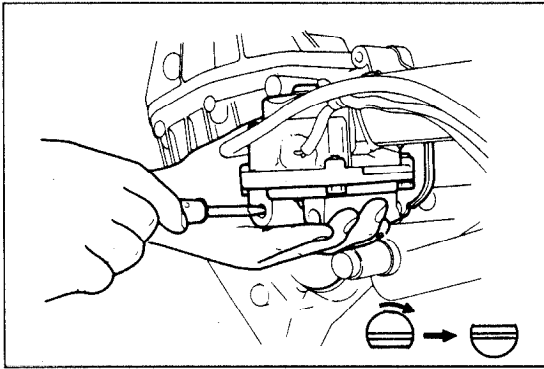
03U0J3-199



03U0J3-200

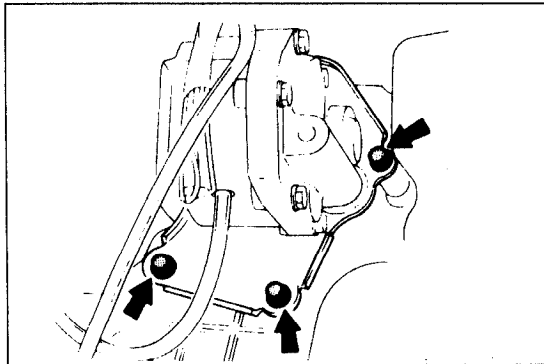
REPLACEMENT

1. Disconnect the negative battery terminal.
2. Disconnect the connector and breather hose of center differential lock motor and center differential lock sensor switch.
3. Remove the set bolt and center differential lock sensor switch.
4. Remove the undercover and crossmember.
5. Remove the exhaust pipe.



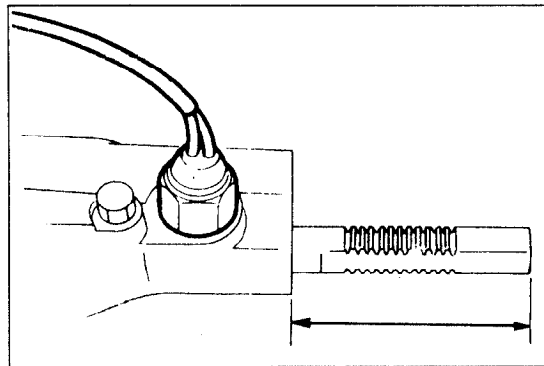
03U0J3-201

6. Remove the plug and turn shift rod 180° clockwise with the screwdriver.



03U0J3-202

7. Remove the center differential lock motor from the transaxle and transfer unit.
8. Remove the O-ring from the center differential lock motor.



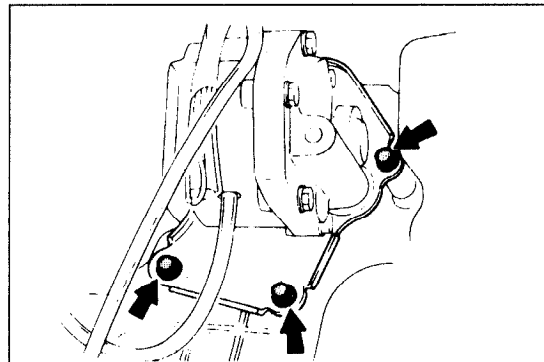
03U0J3-203

9. Measure the shift rod length in FREE and LOCK position.

Standard length:

FREE: 75mm (2.95 in)

LOCK: 83mm (3.26 in)

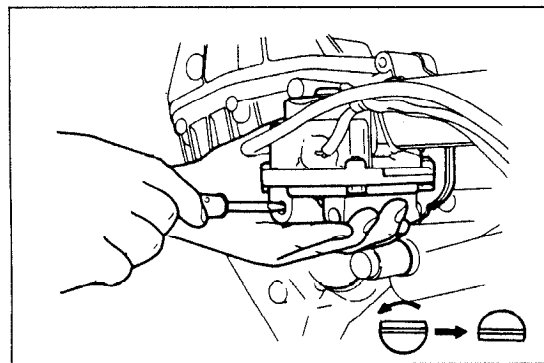


03U0J3-204

Note

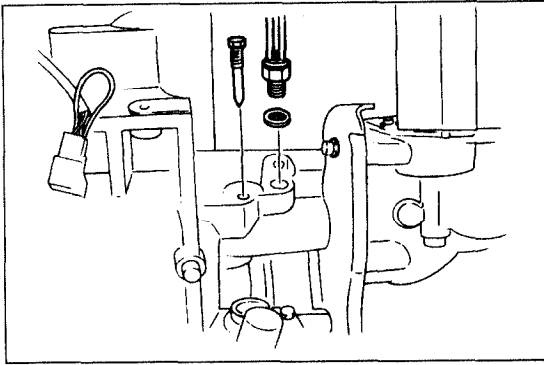
- Apply ATF to the O-ring.

10. Fit a new O-ring onto the center differential lock motor.
11. Confirm that the flat edge of the shift rod is upward.



03U0J3-205

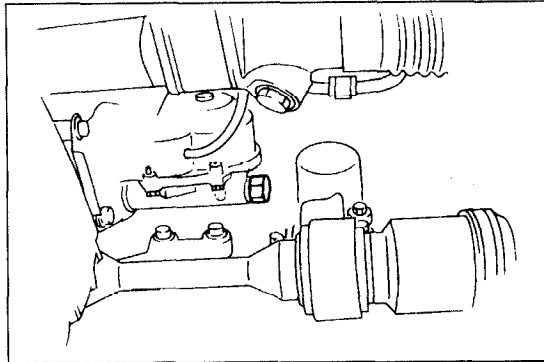
12. Turn the shift rod 180° counterclockwise with a screwdriver.



03U0J3-206

13. Install the mounting bolts.

Tightening torque:
20—29 N·m (2.0—3.0 m·kg, 14—22 ft·lb)



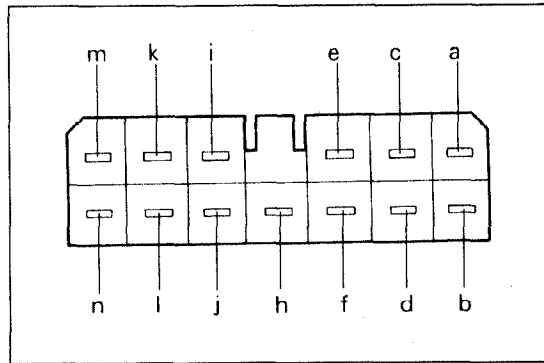
03U0J3-207

14. Install the set bolt.

Tightening torque:
20—29 N·m (2.0—3.0 m·kg, 14—22 ft·lb)

15. Install the center differential lock sensor switch.

Tightening torque:
20—29 N·m (2.0—3.0 m·kg, 14—22 ft·lb)



03U0J3-208

4x4 CONTROL UNIT

INSPECTION

Terminal Voltage

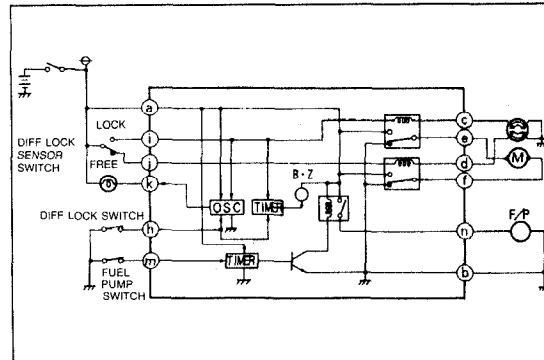
1. Turn the ignition switch ON.
2. Measure the voltage at each terminal.

Unit: Volt

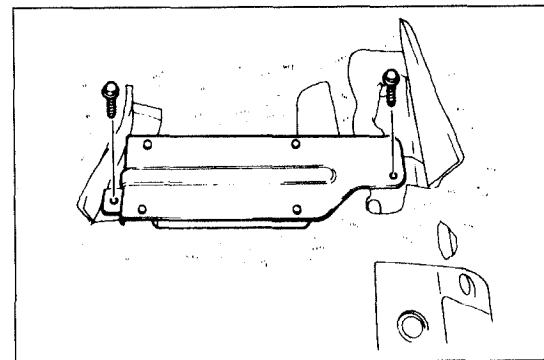
	a	b	c	d	e	f	h	i	j	k	l	m	n
Free	12	0	0	12	0	*0	12	0	12	12	—	6↔0	0↔12
Lock	12	0	12	0	*0	0	0	12	0	0	—	6↔0	0↔12

↔: Repeat the timer time.

*: Start the differential lock motor time is 12 volt.



03U0J3-209



REPLACEMENT

1. Disconnect the negative battery terminal.
2. Remove the driver's seat.
3. Replace the 4x4 control unit.

CENTER DIFFERENTIAL LOCK SWITCH

INSPECTION Terminal Voltage

1. Turn the ignition switch ON.
2. Measure the voltage at each terminal at the switch side of the connector in LOCK and FREE position.

Unit: Volt

Motor	a	b	c	d	e
Free	*12	0	12	12	0
Lock	0	0	12	0	12

* Turn the light switch (first position).

Continuity

1. Disconnect the negative battery terminal.
2. Disconnect the connector of switch.
3. Check continuity in LOCK and FREE position.

Motor	a	b	c	d	e
Free	○—○	○—○	○—○	○—○	
Lock	○—○	○—○	○—○		○—○

○—○: Indicates continuity

REPLACEMENT

1. Disconnect the negative battery terminal.
2. Remove the switch.
3. Replace the switch.

CENTER DIFFERENTIAL LOCK SENSOR SWITCH

INSPECTION Continuity

1. Disconnect the negative battery terminal.
2. Remove the center differential lock sensor switch.
3. Check continuity between terminals in LOCK and FREE position.

Motor	a	b
Free		
Lock	○—○	○—○

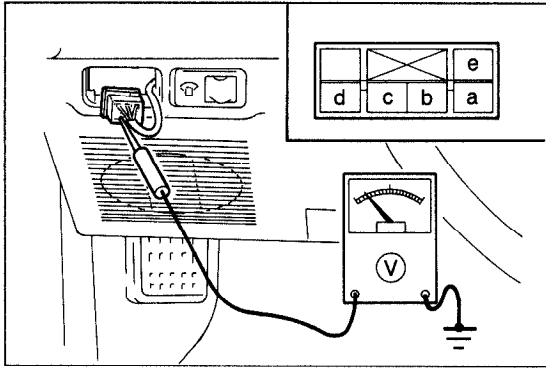
○—○: Indicates continuity

REPLACEMENT

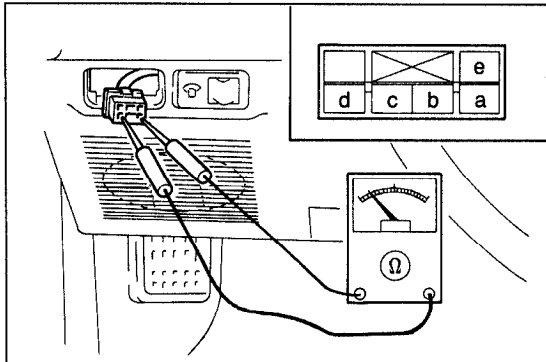
1. Disconnect the negative battery terminal.
2. Disconnect the connector of the center differential lock sensor switch.
3. Replace the switch.

Tightening torque:

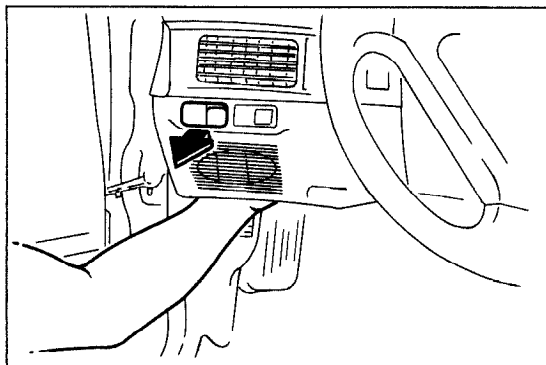
20—29 N·m (2.0—3.0 m·kg, 14—22 ft·lb)



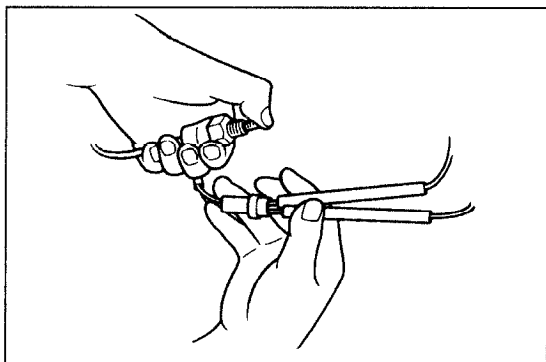
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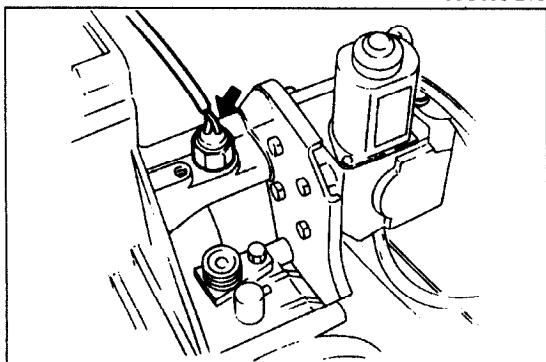
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AUTOMATIC TRANSAXLE AND TRANSFER (Electronically-Controlled)

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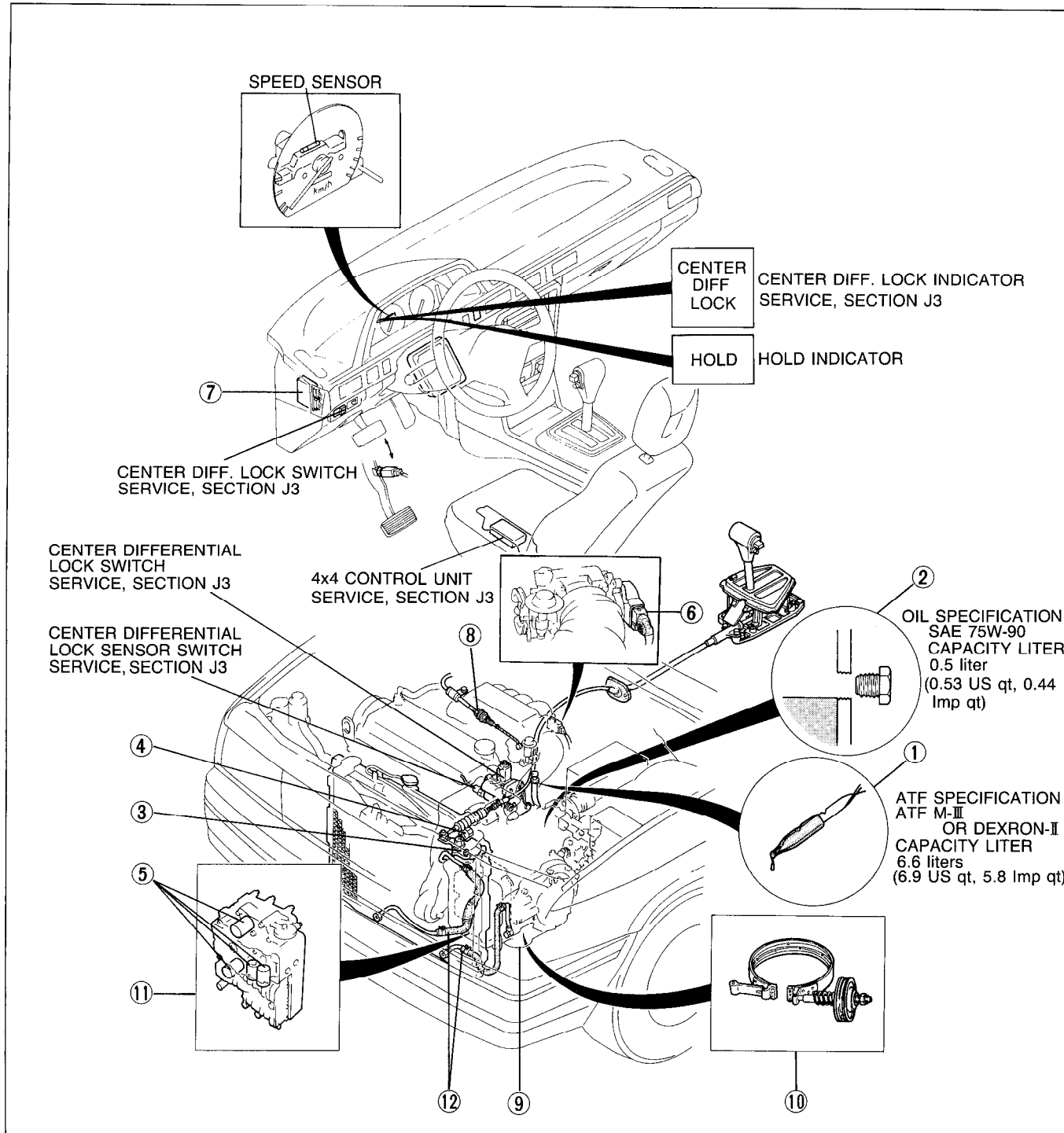
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OUTLINE

OUTLINE OF CONSTRUCTION

- The newly developed EC-AT (G4AX-EL) with Full-time 4-wheel-drive (4WD) is based upon the 1989 626 EC-AT (G4A-EL).
This new transaxle and transfer carrier has been made available for the 1990 323 for improved driveability and roadability.
- The construction and operation of the transaxle is the same as the 1989 626 EC-AT (G4A-EL). The Construction and operation of the transfer unit and carrier are basically the same as the 1989 323 with 4WD. The electronic control system of EC-AT is the same as the 1989 626 EC-AT (G4A-EL) non-turno model.
- The center differential employs a planetary carrier system, and functions to distribute the driving force to the front and rear differentials.
- The electronically controlled, lockable center differential means all driving conditions are easily contended with; from good road to bad roads and inclement weather.
- To improve serviceability, the EC-AT control unit diagnoses malfunctions of the major electrical components and outputs memorized malfunction codes by coded flashing of the HOLD indicator
The diagnosis connector is installed in the engine compartment by the left side suspension tower.
- The 1990 323 4WD EC-AT also has a shift-lock system for improved safety.

03U0K2-003

OUTLINE OF OPERATION

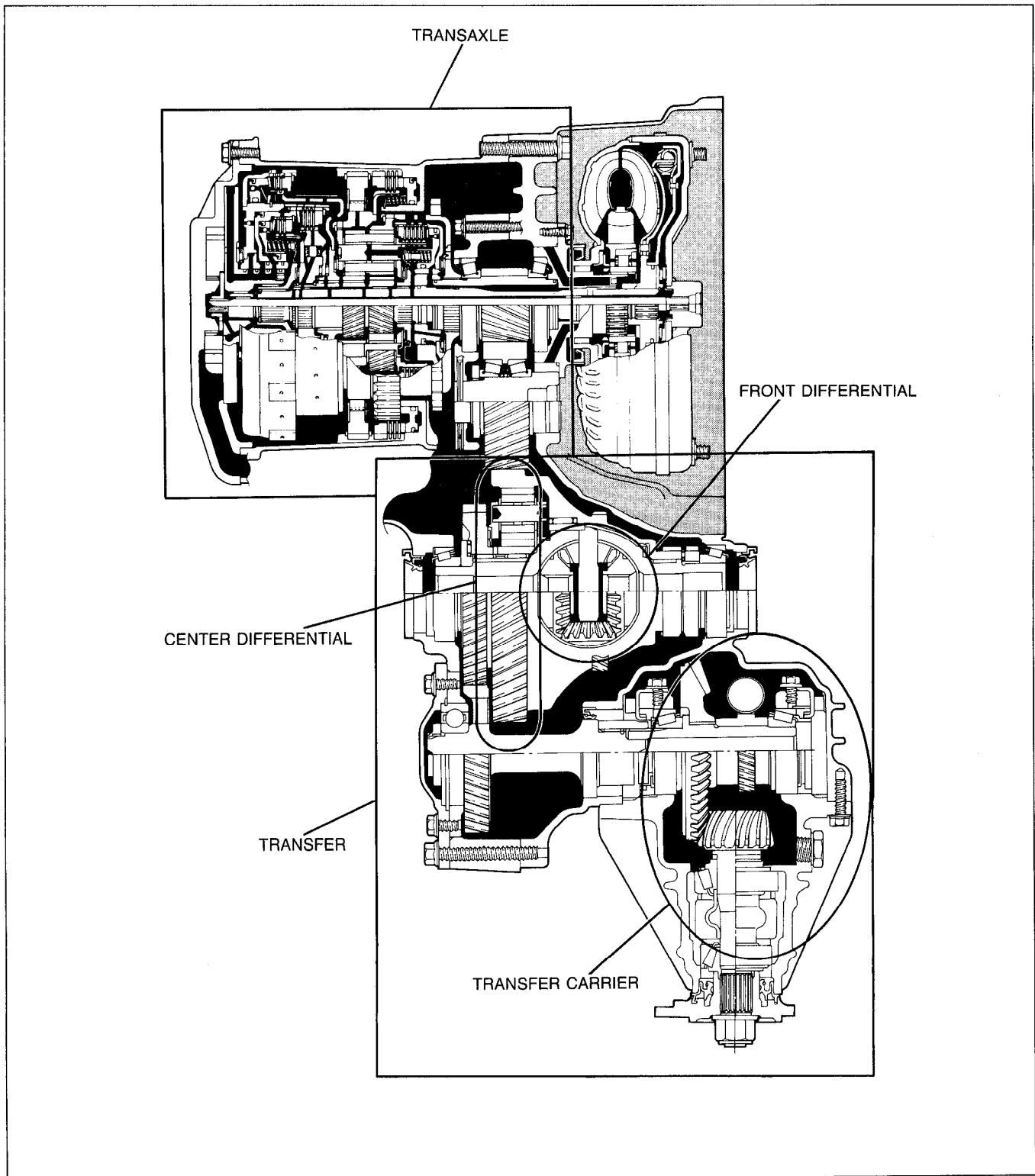
Driving force from engine is transmitted via the drive plate and torque converter to the transaxle.

Driving force through the transaxle is applied to the center differential, from which it is distributed to the front and rear axles.

The front axle applies the driving force, via the front differential, to the left and right wheels. Driving force for the rear axle is transmitted through the transfer unit, the transfer carrier, the propeller shaft, and to the rear differential.

If the vehicle encounters very slippery conditions and one wheel starts to spin, the center differential absorbs the speed difference and the other three wheels lose driving force.

At times like this, the center differential can be locked so that the front and rear axles are directly connected and driving force is transmitted to both axles.



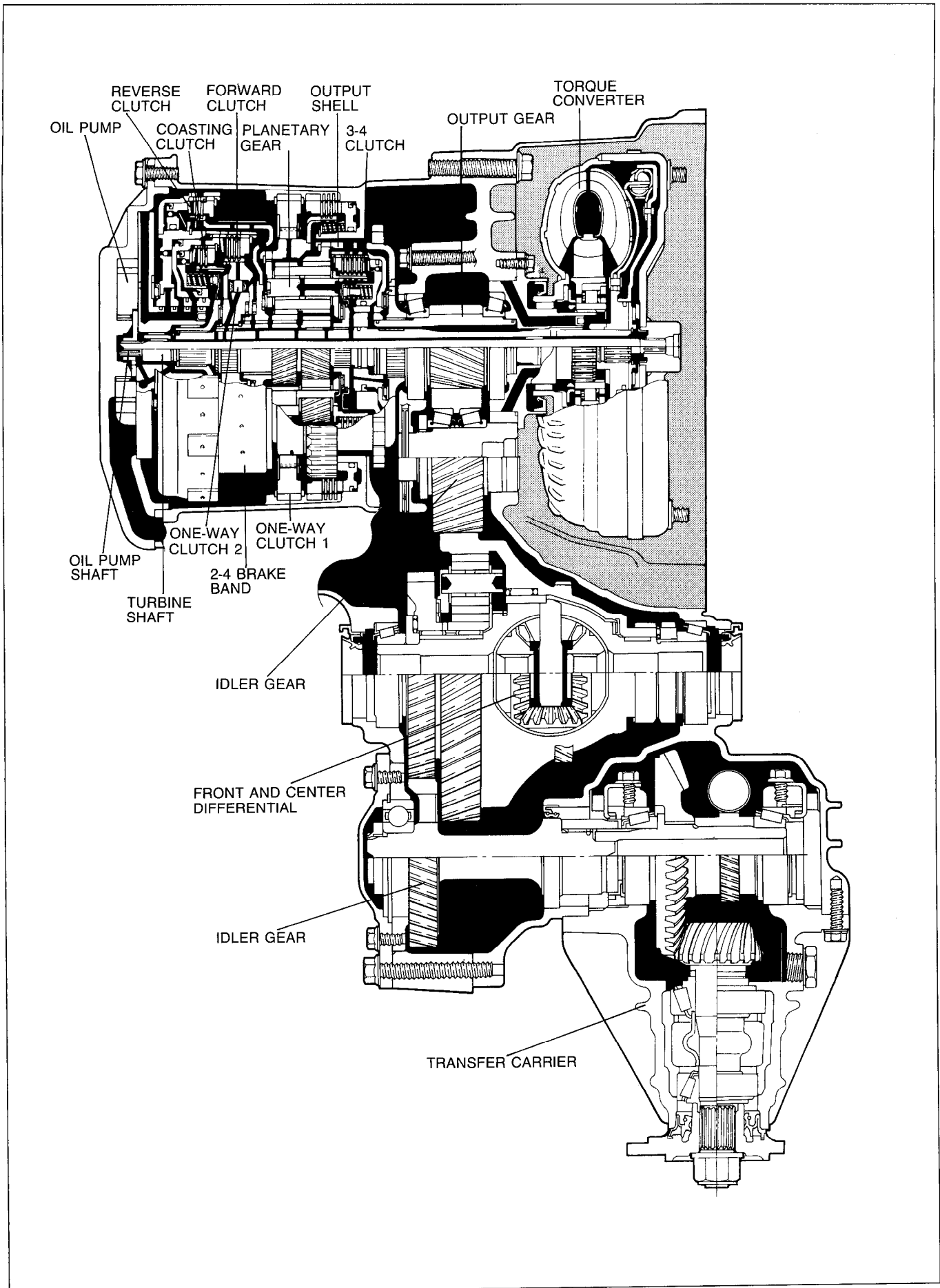
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SPECIFICATIONS

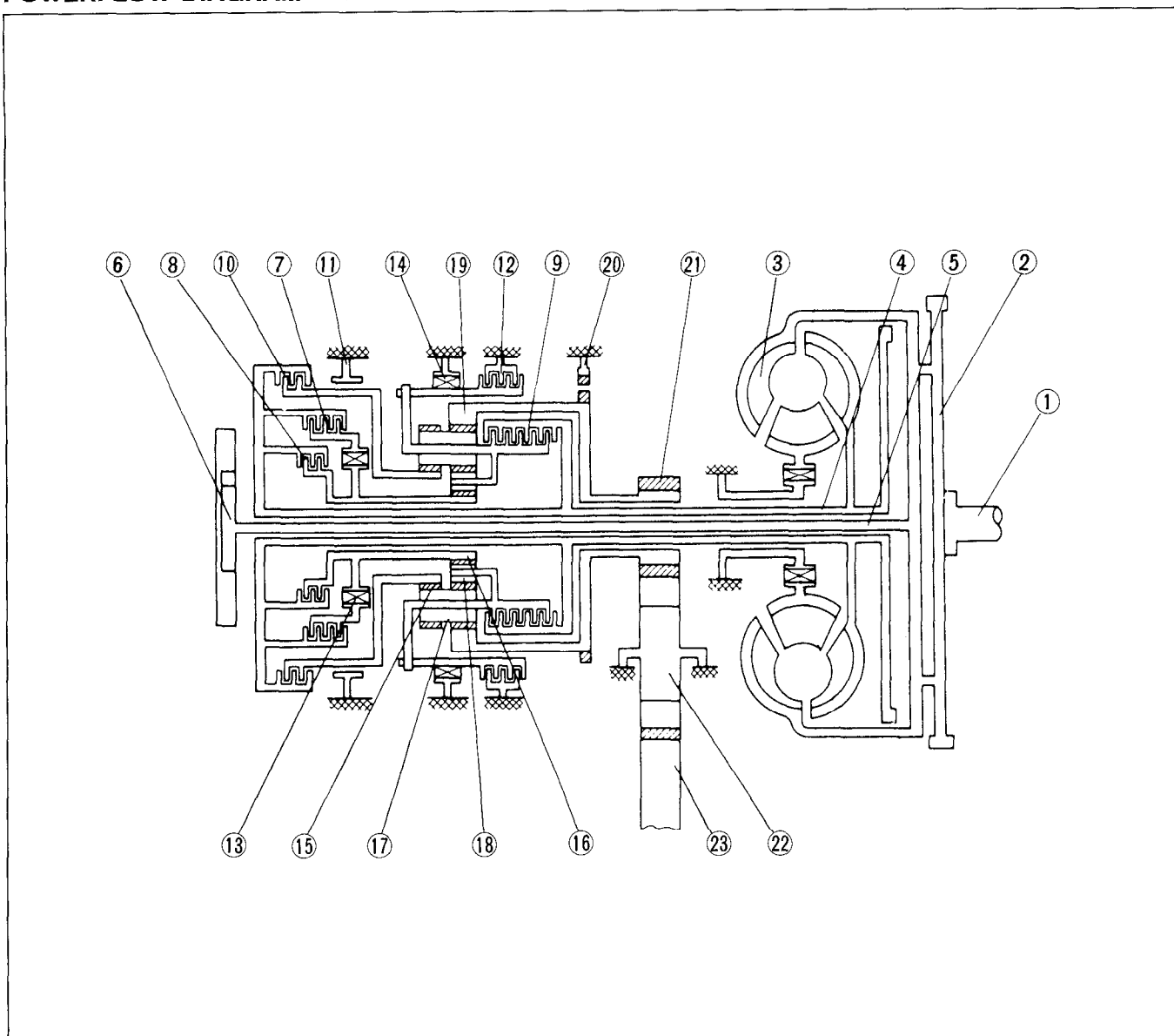
Transaxle			
Engine model		BP SOHC (4WD)	
Transaxle model		G4AX-EL	
Transaxle control		Floor shift	
Lockup Mechanism		Adapted	
Gear ratio	1st		2.800
	2nd		1.540
	3rd		1.000
	OD (4th)		0.700
	Reverse		2.333
Final gear ratio		3.842	
Center differential	Type		Planetary carrier
	Number of ring gear teeth	Outer	73
		Inner	66
	Number of pinion gear teeth	Outer	14
		Inner	14
	Number of sun gear teeth	Pinion gear side	33
Idle gear side		50	
Number of idle gear teeth		43	
Oil	Type		ATF: M-III or DEXRON-II
	Capacity liters (US qt, Imp qt)		6.6 (7.0, 5.8)
Torque converter stall torque ratio			2.7
Number of drive/ driven plates	Forward clutch		3/3
	Coasting clutch		2/2
	3-4 clutch		4/4
	Reverse clutch		2/2
	Low and reverse clutch		3/3
2-4 brake band (Piston outer dia./retainer inner dia.)			78/59
Number of planetary gear teeth	Large sun gear		36
	Small sun gear		30
	Long pinion gear		24
	Short pinion gear		22
	Internal gear		84
Number of output gear teeth			19
Number of idle gear teeth			40
Number of ring gear teeth			73
Transfer carrier			
Number of ring gear teeth			37
Number of pinion gear teeth			11
Speedometer gear ratio (Number of driven/drive gear teeth)			1.000 (22/22)
Oil	Type		API: GL-5 Above -18°C (0°F): SAE 90 Below -18°C (0°F): SAE 80W
	Capacity liter (US qt, Imp qt)		0.5 (0.52, 0.44)

03U0K2-005

STRUCTURAL VIEW



POWERFLOW DIAGRAM



03U0K2-007

- | | | |
|---------------------|---------------------------|-----------------------|
| 1. Crank shaft | 9. 3-4 clutch | 17. Long pinion gear |
| 2. Drive plate | 10. Reverse clutch | 18. Short pinion gear |
| 3. Torque converter | 11. 2-4 Brake band | 19. Internal gear |
| 4. Turbine shaft | 12. Low and reverse brake | 20. Parking gear |
| 5. Oil pump shaft | 13. One-way clutch 1 | 21. Output gear |
| 6. Oil pump | 14. One-way clutch 2 | 22. Idler gear |
| 7. Forward clutch | 15. Large sun gear | 23. Ring gear |
| 8. Coasting clutch | 16. Small sun gear | |

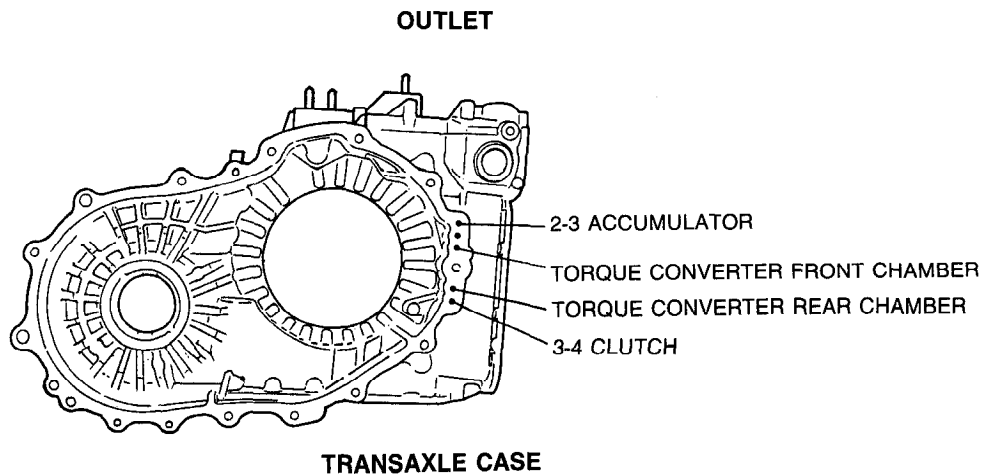
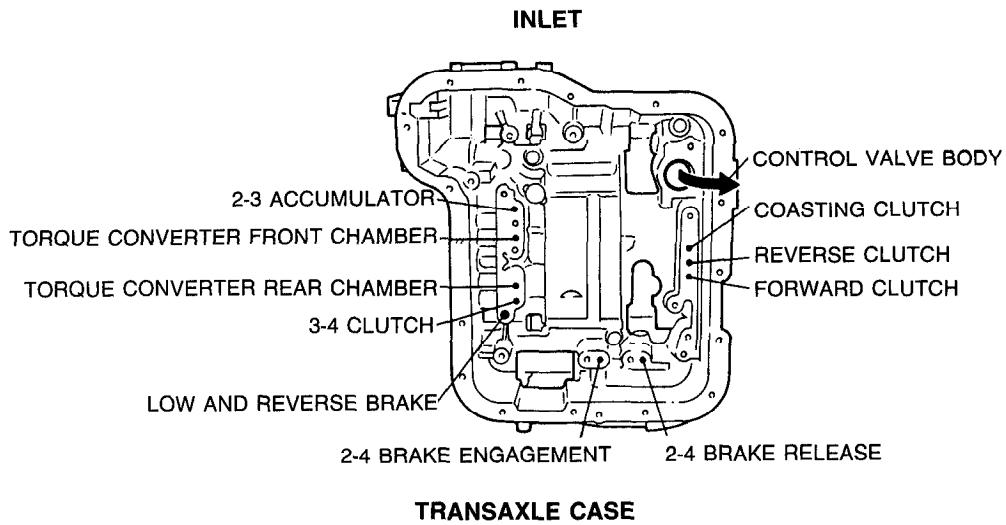
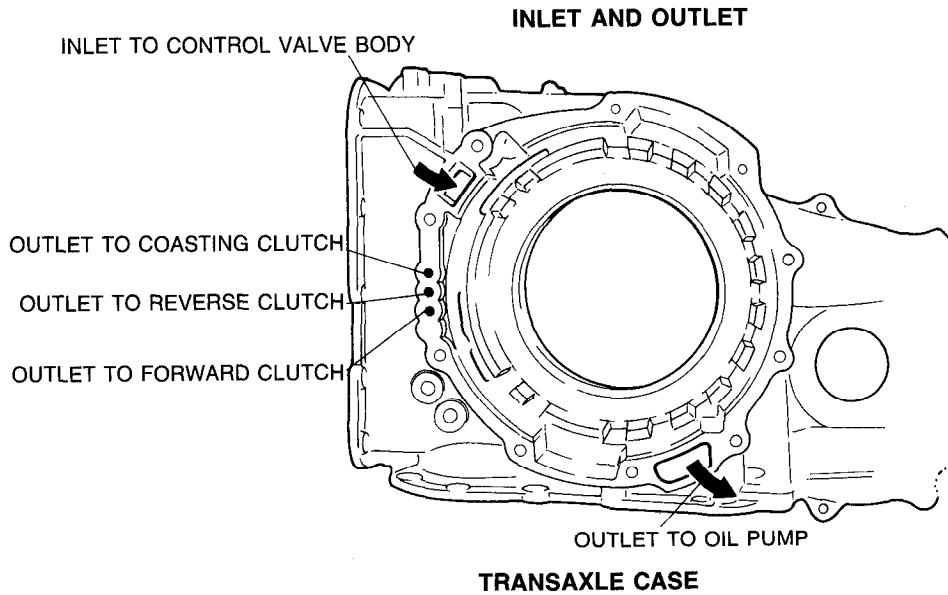
OPERATION OF COMPONENTS

Mode	Range	Gear position	Engine braking effect	Forward clutch	Coasting clutch	3-4 clutch	Reverse clutch	2-4 brake		Low & reverse brake	One-way clutch 1	One-way clutch 2	
								Applied	Released				
Normal	P	—	—										
	R	Reverse	Yes				○			○			
	N	—	Below approx. 4 km/h (2.5 mph)	—									
			Above approx. 5 km/h (3.1 mph)	—									
	D	1st	1st	No	○							○	○
			2nd	No	○			○				○	
		3rd	Below approx. 5 km/h (3.1 mph) at operating temperature	Yes	○	○	○			○		○	
			Above approx. 5 km/h (3.1 mph) or cold engine	Yes	○	○	○		⊗	○		○	
		OD	Lockup OFF	Yes	○		○		○			⊗	
			Lockup ON	Yes									
	S	1st	1st	No	○							○	○
			2nd	No	○			○				○	
		3rd	Below approx. 5 km/h (3.1 mph) at operating temperature	Yes	○	○	○			○		○	
			Above approx. 5 km/h (3.1 mph) or cold engine	Yes	○	○	○		⊗	○		○	
		OD	OD	Yes	○		○		○			⊗	
	L	2nd	1st	No	○						○	○	
			Below approx. 110 km/h (68 mph)	Yes	○	○			○			○	
	L	2nd	Above approx. 110 km/h (68 mph)	Yes								○	
Hold	D	1st	1st	No	○						○		
			2nd	No	○			○			○		
		3rd	Below approx. 5 km/h (3.1 mph) at operating temperature	Yes	○	○	○			○		○	
			Above approx. 5 km/h (3.1 mph) or cold engine	Yes	○	○	○		⊗	○		○	
	OD	OD	Yes	○		○		○			⊗		
	S	2nd	2nd	Yes	○				○			○	
			3rd	Below approx. 5 km/h (3.1 mph) at operating temperature	Yes	○	○	○			○		○
		3rd	Above approx. 5 km/h (3.1 mph) or cold engine	Yes	○	○	○		⊗	○		○	
	OD	OD	Yes	○		○		○			⊗		
	L	1st	1st	Yes	○	○					○	○	
Below approx. 110 km/h (68 mph)			Yes	○	○			○			○		
L	2nd	Above approx. 110 km/h (68 mph)	Yes								○		

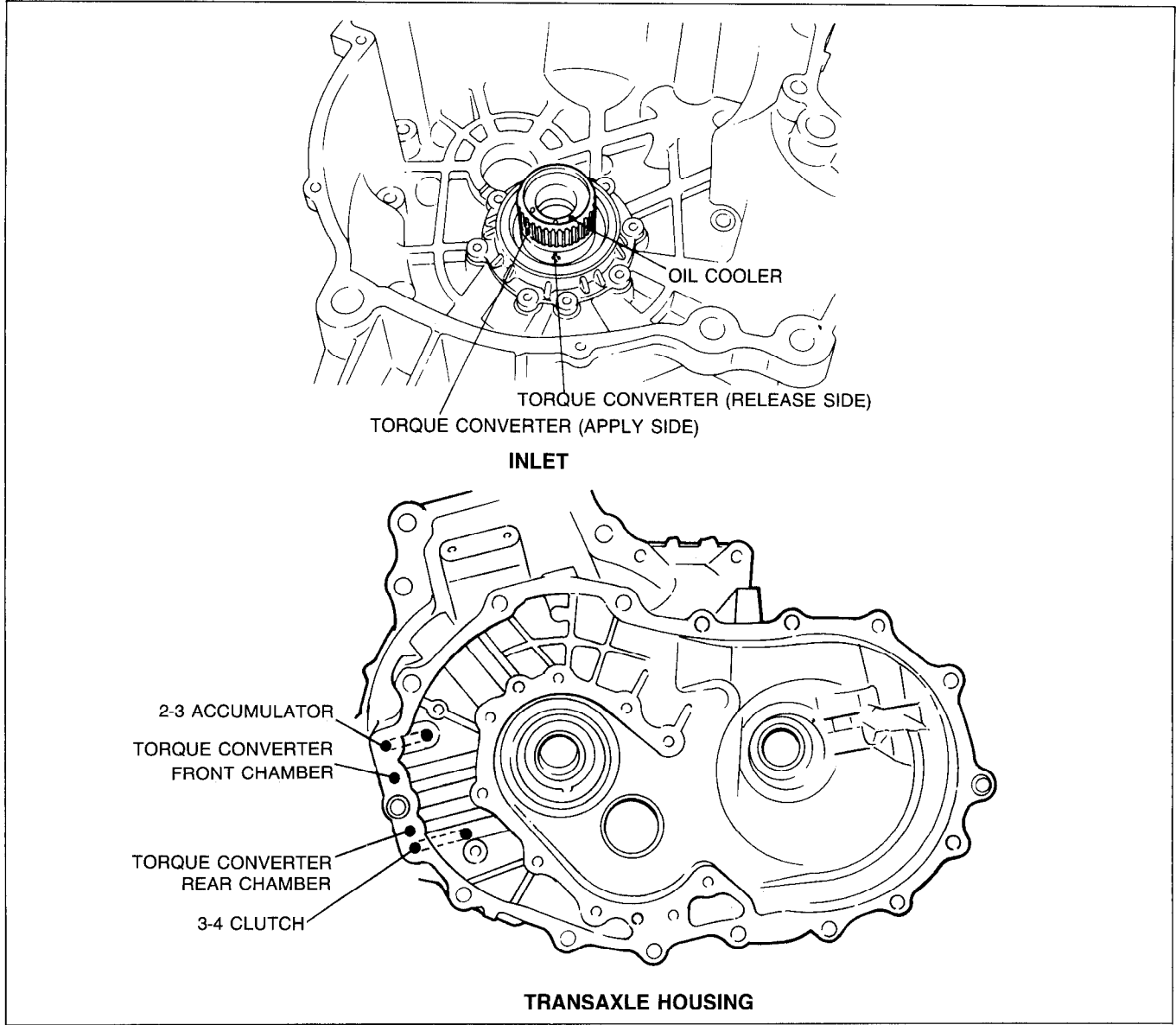
03U0KX-007

⊗ : Fluid pressure to servo but band not applied due to pressure difference in servo.
 ⊙ : Does not transmit power.

FLUID PASSAGE LOCATIONS
Transaxle Case

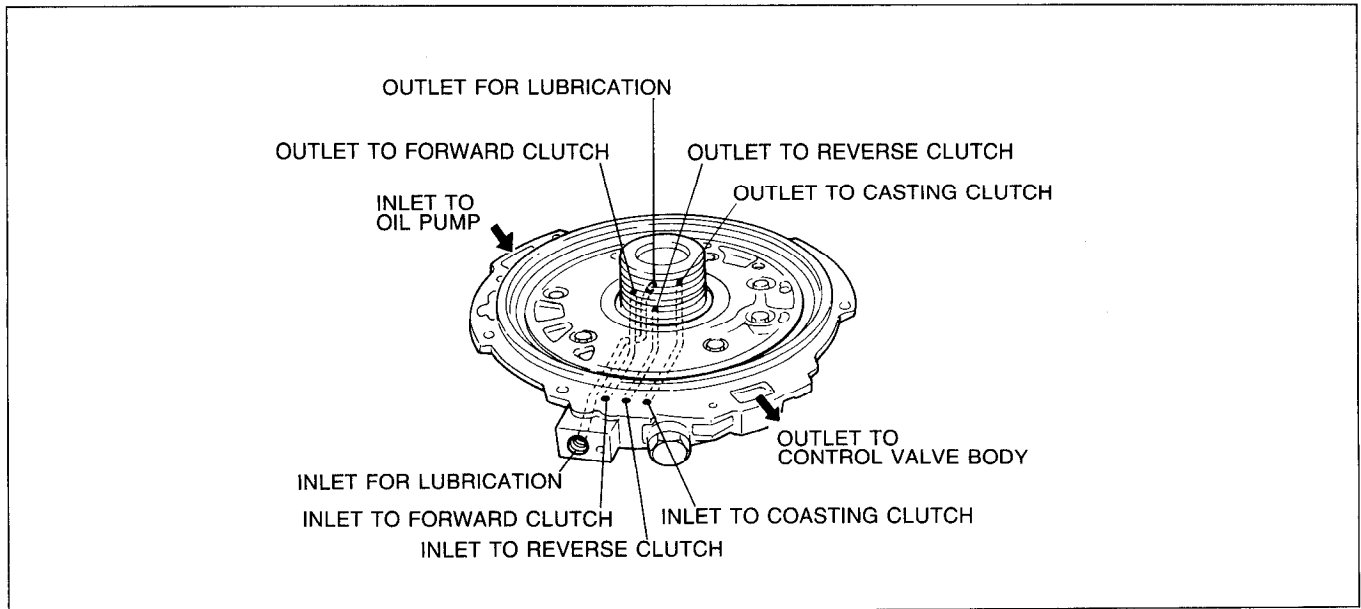


Clutch Housing



03U0KX-009

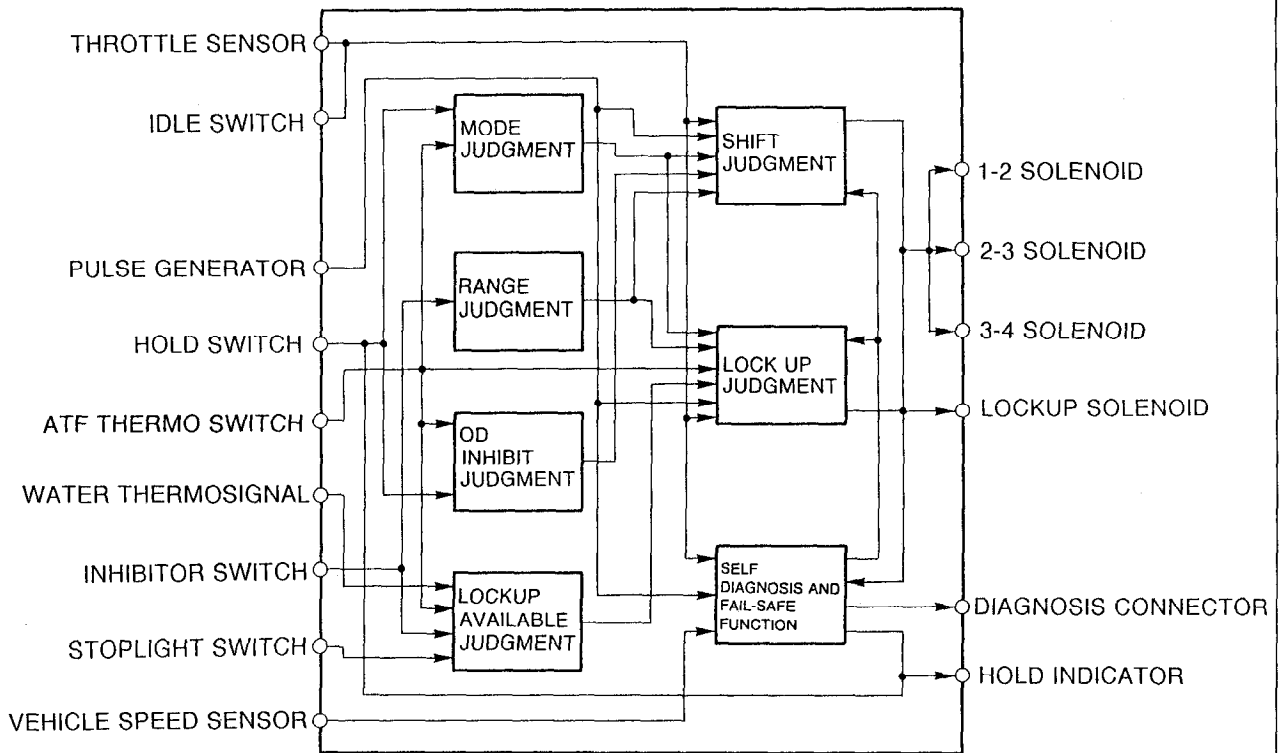
Oil Pump



03U0KX-010

ELECTRONIC CONTROL SYSTEM COMPONENTS

SYSTEM DIAGRAM



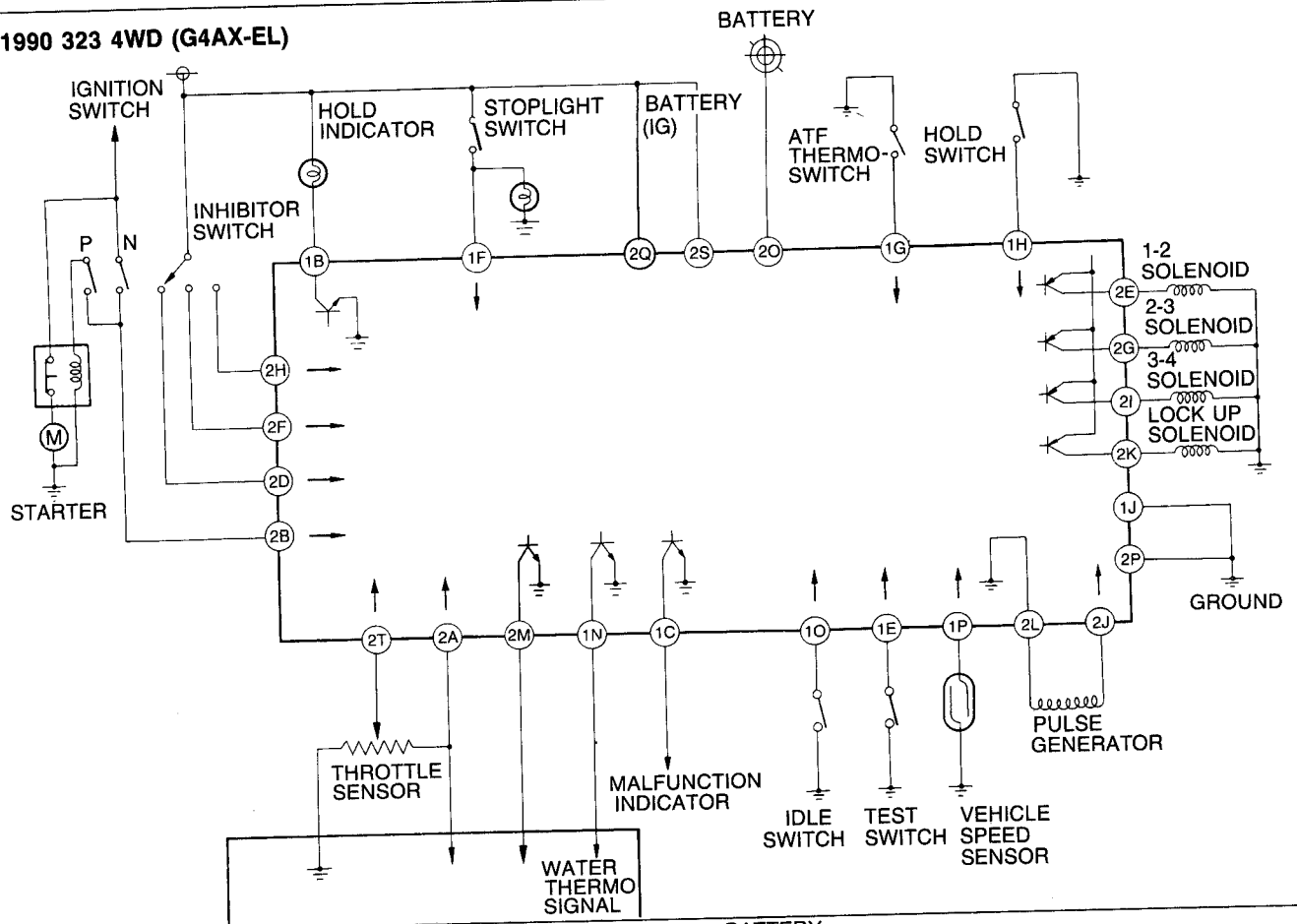
COMPONENT DESCRIPTIONS

Part name		Function
EC-AT control unit		Regulates shift points and lockup points according to signals from various sensors; sends ON/OFF signals to solenoid valves
Input	Pulse generator	Detects reverse and forward drum revolution speed
	Vehicle speed sensor	Detects vehicle speed
	Throttle sensor	Detects amount of throttle valve opening
	Idle switch	Detects throttle valve fully-closed position
	Inhibitor switch	Detects position (range) of gear selector
	Hold switch	Sets Hold mode
	Stoplight switch	Detects use of service brakes
	Water thermo signal	Indicates engine coolant temperature
	ATF thermostwitch	Detects automatic transaxle fluid temperature
Output	Solenoid valve	Switched ON/OFF by electrical signals from EC-AT control unit; regulates shifting and lockup actuation by switching oil passages
	1-2	For 1-2 shift (1st gear → 2nd gear: OFF-ON)
	2-3	For 2-3 shift (2nd gear → 3rd gear: ON-OFF)
	3-4	For 3-4 shift (3rd gear → OD: OFF-ON)
	Lockup	For lockup (lockup at ON)
Hold indicator	Illuminates when Hold mode selected Flashes when malfunction detected as result of self-diagnosis	
No load signal	Send no load signal (P and N ranges) to engine control unit	

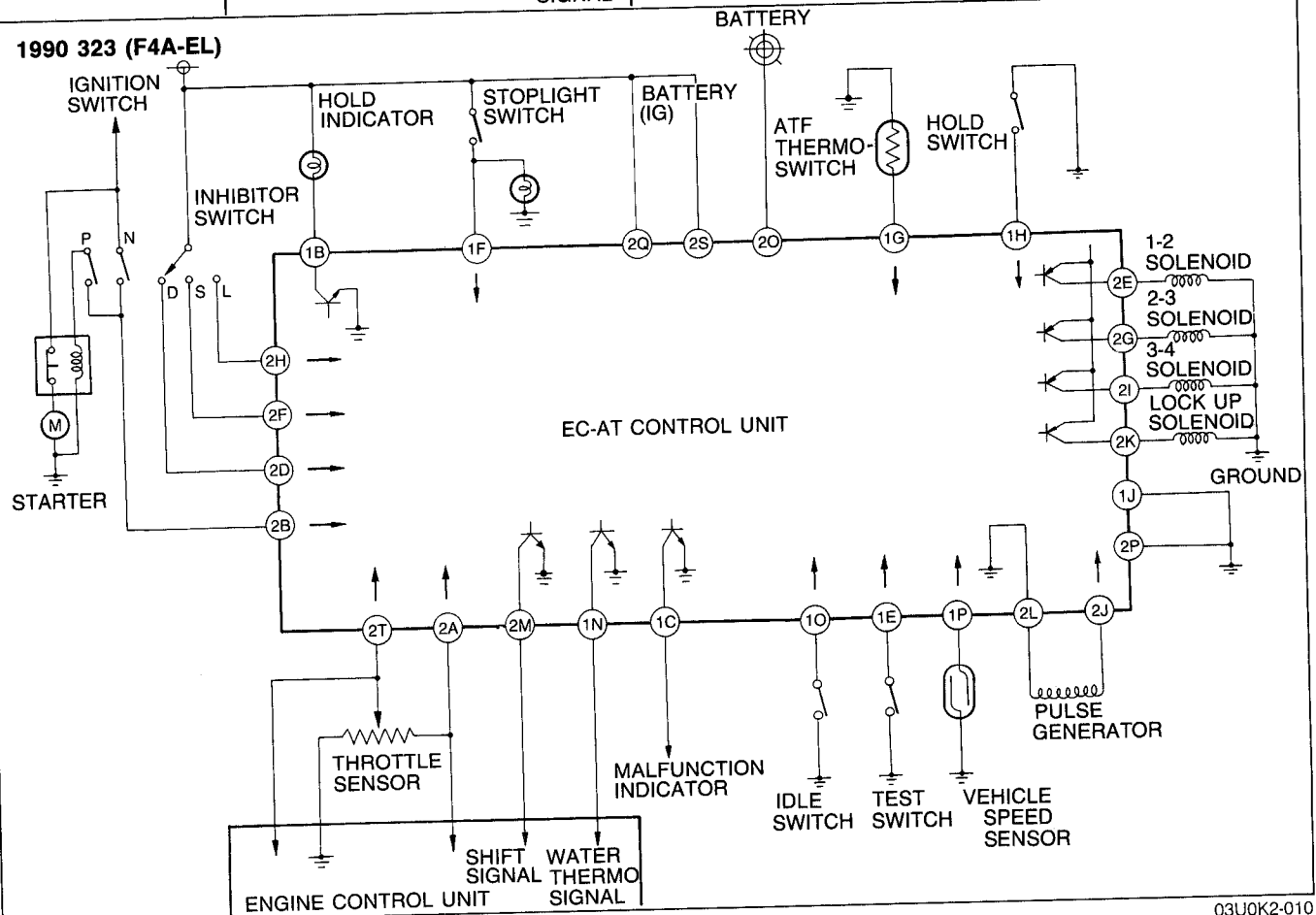
03U0K2-009

ELECTRICAL CIRCUIT

1990 323 4WD (G4AX-EL)



1990 323 (F4A-EL)



SOLENOID VALVE OPERATION TABLE

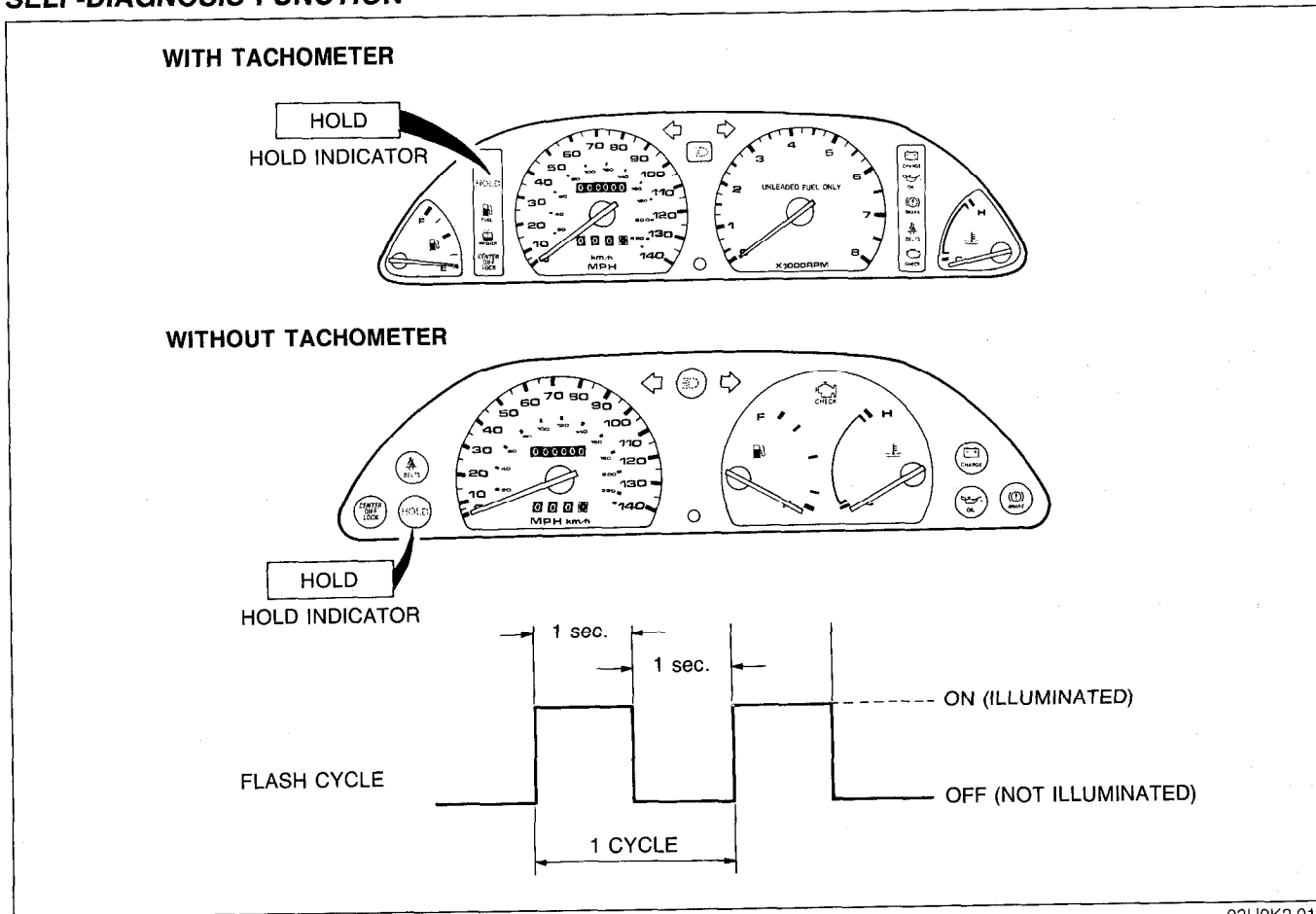
RANGE	GEAR		SOLENOID VALVES								
			1990 323 2WD				1990 323 4WD				
			1-2	2-3	3-4	Lockup	1-2	2-3	3-4	Lockup	
P	—				ON				ON		
R	Reverse		ON				ON				
N	—	Below approx. 4 km/h (2.5 mph)			ON				ON		
		Above approx. 5 km/h (3.1 mph)	ON				ON				
D	1st			ON	ON			ON	ON		
	2nd		ON	ON	ON		ON	ON	ON		
	3rd	Below approx. 5 km/h (3.1 mph) at operating temperature									
		Above approx. 5 km/h (3.1 mph) or cold engine	ON				ON				
	OD	Lockup OFF	ON		ON		ON		ON		
		Lockup ON	ON		ON	ON	ON		ON	ON	
S	1st			ON	ON			ON	ON		
	2nd		ON	ON	ON		ON	ON	ON		
	3rd	Below approx. 5 km/h (3.1 mph) at operating temperature									
		Above approx. 5 km/h (3.1 mph) or cold engine	ON				ON				
		Lockup OFF						ON			
	Lockup ON						ON		ON		
OD		ON		ON		ON		ON			
L	1st			ON	ON			ON	ON		
	2nd	Below approx. 110 km/h (68 mph)	ON	ON			ON	ON			
		Above approx. 110 km/h (68 mph)	ON				ON				
HOLD	D	1st			ON	ON		—			
		2nd		ON	ON	ON		ON	ON	ON	
		3rd	Below approx. 5 km/h (3.1 mph) at operating temperature								
			Above approx. 5 km/h (3.1 mph) or cold engine	ON				ON			
		OD		ON		ON		—			
		2nd		ON	ON			ON	ON		
	S	3rd	Below approx. 5 km/h (3.1 mph) at operating temperature								
			Above approx. 5 km/h (3.1 mph) or cold engine	ON				ON			
		OD		ON		ON		—			
		2nd		ON	ON			ON	ON		
	L	1st			ON				ON		
		2nd	Below approx. 110 km/h (68 mph)	ON	ON			ON	ON		
Above approx. 110 km/h (68 mph)			ON				ON				

03U0K2-011

SELF-DIAGNOSIS SYSTEM

The EC-AT control unit has built-in self-diagnosis, fail-safe, and warning code display function for the main input sensors and all of the output solenoid valves.

SELF-DIAGNOSIS FUNCTION



03U0K2-013

If a malfunction occurs in any of the EC-AT system components described below, the HOLD indicator flashes to warn the driver of the malfunction.

- Vehicle speed sensor.
- Throttle sensor.
- Pulse generator.
- 1-2 shift solenoid valve.
- 2-3 shift solenoid valve.
- 3-4 shift solenoid valve.
- Lockup solenoid valve.

If a condition, as shown in the table below, exists, the EC-AT control unit judges that the component has a malfunction.

Component	Conditions for judgement of malfunction
Vehicle speed sensor	No input signal from speed sensor while driving at drum speed above 600 rpm in D, S, or L range
Throttle sensor	Open circuit when accelerator pedal depressed (idle switch: OFF) or incorrect adjustment
Pulse generator	No input signal from pulse generator while driving at 40 km/h (25 mph) or higher in D, S, or L range
Solenoid valve	Open or short-circuit of transistor within EC-AT control unit or solenoid valve wire harness

03U0K2-013

FAIL-SAFE FUNCTION

If a malfunction occurs in any of the following components, the fail-safe function makes it possible to drive the vehicle with only slightly diminished performance. Hold mode cannot be selected while driving in the fail-safe mode.

1. Vehicle speed sensor
Shifting is performed normally. If the pulse generator or a solenoid valve also fails, operation of all solenoid valves is canceled.
2. Throttle sensor
The EC-AT control unit considers the throttle opening to be at 4/8 stroke. Shifting is performed in accordance with signals from the vehicle speed sensor and the shift pattern for that fail-safe mode. Lockup is not provided.
3. Pulse generator
Shifting is performed in accordance with signals from the vehicle speed sensor and the shift pattern for that fail-safe mode. If a malfunction occurs at one of the solenoid valves along with a malfunction of the pulse generator, the operation of the malfunctioning valve is canceled.
4. 1-2, 2-3, or 3-4 solenoid valve
The operation of the remaining solenoid valve(s) performs the shifting with as little interference as possible with driving performance. If a malfunction occurs at all four solenoid valves, 3rd, 1st and reverse gears are obtained hydraulically.

Note

- If all solenoid valves are switched OFF, D and S ranges become 3rd gear position, L range becomes 1st gear position, and R range remains reverse gear position.

5. Lockup solenoid valve
The solenoid valves for shifting operate normally but no lockup is obtained.

03U0K2-014

DISPLAY OF MALFUNCTION CODE

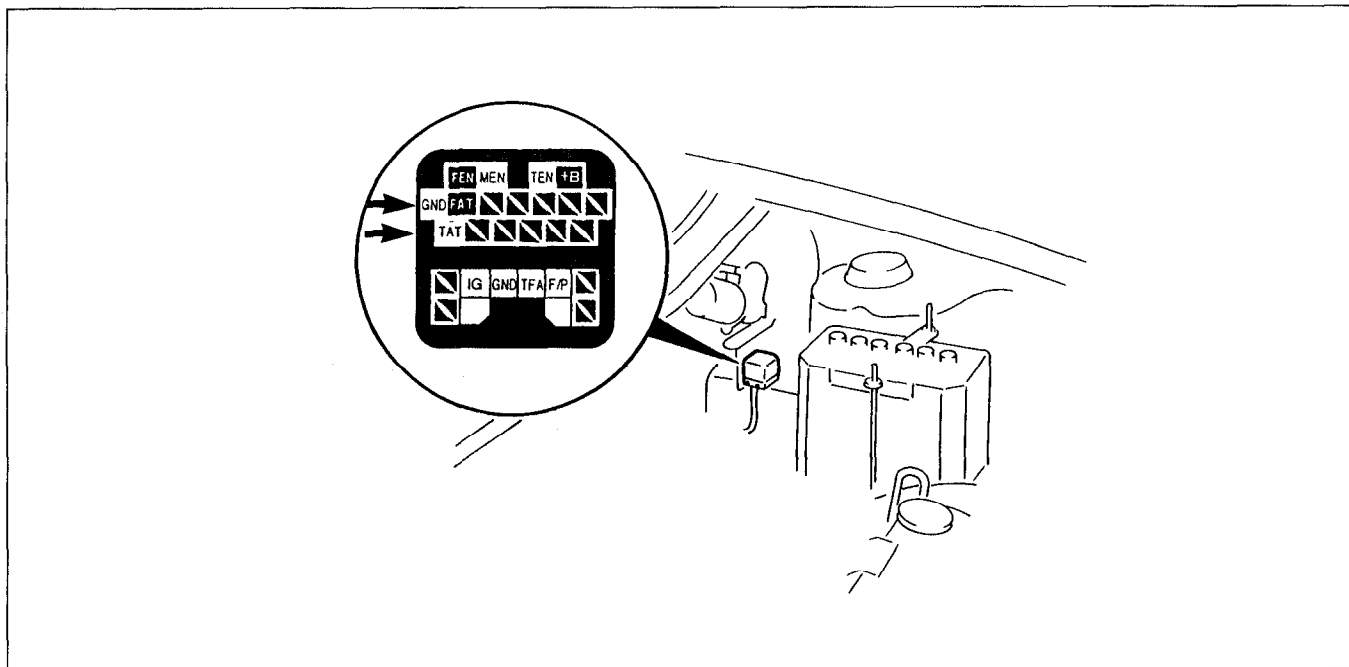
If a malfunction occurs in components which the EC-AT control unit can diagnose, the control unit causes the HOLD indicator to flash while the malfunction is continuing. At the same time, the control unit memorizes the code of the malfunction for later retrieval with the **EC-AT Tester** and **System Selector**.

The flashing of the HOLD indicator ceases if the malfunction recovers.

When the TAT and GND terminals of the diagnosis connector are jumped with the ignition switch ON, the EC-AT control unit outputs any memorized malfunction codes by flashing the HOLD indicator.

The **EC-AT Tester** with **System Selector** will display these codes as malfunction code numbers when connected to the diagnosis connector.







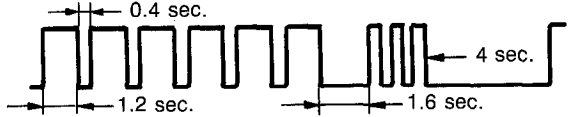
If there is more than one malfunction, the code numbers are displayed sequentially in numerical order.



03U0K2-015

Malfunction Code Table

The following table shows representative malfunction code numbers and code patterns.

Malfunction	Code No.	Code pattern (HOLD indicator)
Vehicle speed sensor	06	
Throttle sensor	12	
Pulse generator	55	
1-2 shift solenoid valve	60	
2-3 shift solenoid valve	61	
2-3 shift solenoid valve	62	
Lockup solenoid valve	63	

03U0K2-016

Note

- The memory of a malfunction can be canceled by disconnecting the negative battery terminal and depressing the brake pedal for approximately 5 seconds.

SHIFT CONTROL

SHIFT PATTERN

Range	Gear	Gear ratio	Normal mode			Hold mode		
			Shift	Lockup	Engine braking	Shift	Lockup	Engine braking
	P	—						
	R	Reverse	2.333			X		X
	N	—						
	1st	2.800	↕			↕		
	2nd	1.540	↕			↕		
	3rd	1.000	↕	X	X	↕	X	X
	OD	0.700	↕	X	X	↑		X
	1st	2.800	↕					
	2nd	1.540	↕			↑		X
	3rd	1.000	↕	X	X	↑	X	X
	OD	0.700	↑		X	↑		X
	1st	2.800	↕			↑		X
	2nd	1.540	↕		X	↑		X

↓↑: Will not shift unless selector button depressed.

↓↑: Will shift without selector button depressed.

↕: Directions of possible shift.

X: Lockup or engine braking possible.

03U0K2-017

HIGH ATF TEMPERATURE DETERMINATION

The ATF thermosensor sends "high-fluid-temperature" signals to the EC-AT control unit if the temperature of the ATF exceeds 128°C (262°F).

The EC-AT control unit then changes the lockup point (lower speed), available gear, and shift point (higher speed) without regard to coolant signals. The shift pattern is as shown below.

This function does not effect R or L range.

Shift Pattern at High ATF Temperature

Range	Gear	Gear ratio	Normal mode			Hold mode		
			Shift	Lockup	Engine braking	Shift	Lockup	Engine braking
P	—	—						
R	Reverse	2.333			X			X
N	—	—						
D	1st	2.800	↕			↕		
	2nd	1.540	↕			↕		
	3rd	1.000	↕	X	X	↑	X	X
	OD	0.700	↕	X	X	↑	X	X
S	1st	2.800	↕					
	2nd	1.540	↕			↑		X
	3rd	1.000	↑	X	X	↑		X
	OD	0.700	↑	X	X	↑		X
L	1st	2.800	↕			↑		X
	2nd	1.540	↕		X	↑		X

‡: Directions of possible shift.
 X: Lockup or engine braking possible.

03U0K2-018

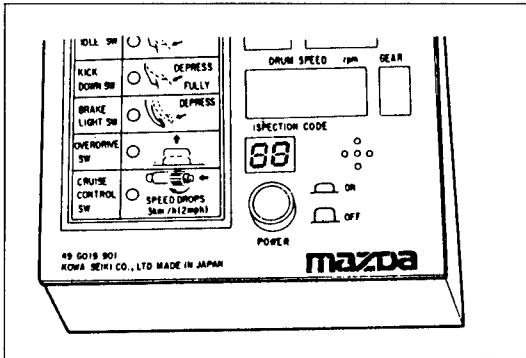
TROUBLESHOOTING GUIDE

GENERAL NOTES

A problem with the EC-AT may be caused by the engine, the EC-AT powertrain, the hydraulic control system, or the electronic control system.

When troubleshooting, therefore, begin with those points which can be inspected quickly and easily. The recommended troubleshooting sequence is described below.

03U0KX-011



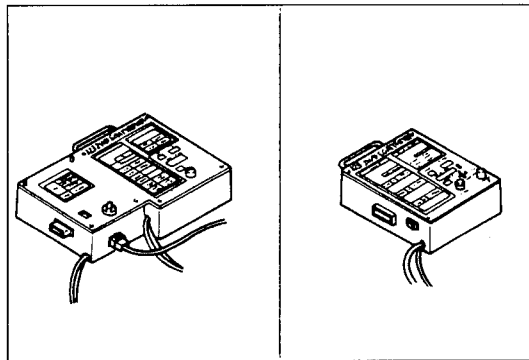
03U0K2-019

Step 1: Self-diagnosis Function

Check for malfunction code(s) memorized in the EC-AT control unit with the **EC-AT Tester**. (Refer to page K2-104.)

Note

- Malfunction code(s) can also be checked for by the flashing sequence of the HOLD indicator lamp. (Refer to page K2-108.)



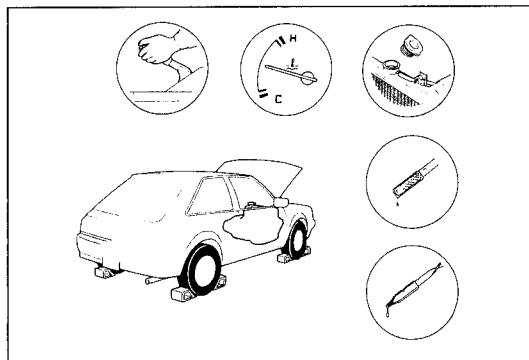
03U0K2-020

Step 2: Electric Signal Inspection

Check the signals to/from the EC-AT control unit with the **EC-AT Tester**. (Refer to page K2-144.)

Note

- Signals can also be checked by checking the EC-AT control unit terminal voltages with a voltmeter. (Refer to page K2-115.)



03U0K2-021

Step 3: Mechanical System Test

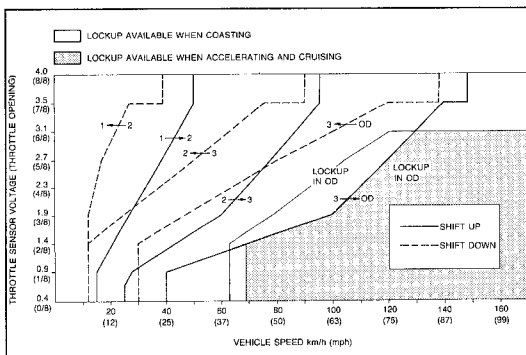
Check the engine stall speed, time lag, line pressure, and throttle pressure. (Refer to page K2-119.)

Step 4: Road Test

Note

- For correct testing, vehicle speed, engine speed, throttle opening (throttle sensor voltage), and gear position should be checked with the **EC-AT Tester**.

Check the shift point, shift schedule, and shift shock. (Refer to page K2-127.)



03U0K2-022

If the 4 steps on page K2-16 are followed, the cause of the problem should be located. Another guide to faster location of the causes of problems, the QUICK DIAGNOSIS CHART, is on pages K2-17 through 19. In this chart, numbers are used to indicate the components that may be the cause of 24 possible problems. It is necessary to check only those components indicated by numbers during each step of the troubleshooting process to locate the cause of the problem quickly.

QUICK DIAGNOSIS CHART

The Quick Diagnosis Chart shows various problems and the relationship of various components that might be the cause of the problem.

- 1. Components indicated in the "Self-Diag." column are diagnosed by the EC-AT control unit self-diagnosis function. The EC-AT Tester can be used for easy retrieval of these signals.
2. Components indicated in the "Adjustment" column indicate that there is a possibility that the problem may be the result of an incorrect adjustment. Check the adjustment of each component, and readjust if necessary.
3. Input and output signals of the EC-AT control unit for the components indicated in the "EC-AT TESTER" column can be easily checked by using of the EC-AT Tester.
4. Components indicated in the "Stall Test" column can be checked for malfunction by the results of the stall test.
5. Components indicated in the "Time Lag Test" column can be checked for malfunction by the results of the time lag test.
6. Components indicated in the "Oil Pressure Test" column can be checked for malfunction by the results of the oil pressure test.
7. Components indicated in the "Road Test" column can be checked for malfunction by the results of the road test.
8. The checking, adjusting, repair or replacement procedures for each component is described in the page(s) noted in the "Reference Page" column.

03U0K2-023

Table with 5 main columns: Inspection point and reference page, Preliminary, Electronic control system, Hydraulic control system, Power train. Rows include: Self-diagnosis, Adjustment, EC-AT TESTER, Stall Test, Time Lag Test, Oil Pressure Test, Road Test. Items listed include: ATF level and condition, Selector lever, Throttle cable, Idle speed and ignition timing, Stoplight switch, Inhibitor switch, Hold switch, Idle switch, Throttle sensor, Water thermo signal, Vehicle speed sensor, Pulse generator, 1-2 solenoid, 2-3 solenoid, 3-4 solenoid, Lockup solenoid, ATF thermostat, Band servo (2-4 brake band), Control valves, Accumulators, Oil pump, Hydraulic circuit, Torque converter, Forward clutch, Coasting clutch, Reverse clutch, 3-4 clutch, 2-4 brake band, Low and reverse brake, One-way clutch 1, One-way clutch 2, Parking gear, Planetary gear, Differential assembly.

* Refer to 1990 323 Workshop Manual (1195-10-89E).

ON-VEHICLE

Item	Inspection point and reference page	Preliminary		Electronic control system												Hydraulic control system									
		K2-134	*K-264	K2-137	*Section F	*Section T	K2-140	K2-140	*Section F	*Section F	K2-145	*Section T	K2-142	K2-143	K2-143	K2-143	K2-143	K2-143	K2-142	K2-197	K2-209	K2-158			
		ATF level and condition	Selector lever	Throttle cable	Idle speed and ignition timing	Stoplight switch	Inhibitor switch	Hold switch	Idle switch	Throttle sensor	Water thermo signal	Vehicle speed sensor	Pulse generator	1-2 solenoid	2-3 solenoid	3-4 solenoid	Lockup solenoid	ATF thermostatic	Band servo (2-4 brake band)	Control valves	Accumulators				
Accelerating	1	Vehicle does not move in D, S, L, and R ranges	<input type="radio"/>	<input type="radio"/>																					
	2	Vehicle moves in N range		<input type="radio"/>																					
	3	Vehicle moves in P range or parking gear not disengaged when P disengaged		<input type="radio"/>																					
	4	Excessive creep			<input type="radio"/>	<input type="radio"/>																			
	5	No creep at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																			
Shifting	6	No shift	<input type="radio"/>					<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>		
	7	Abnormal shift	<input type="radio"/>					<input type="radio"/>		<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>		
	8	Frequent shifting								<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>		
	9	Shift point high or low	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>	
	10	No lockup					<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>	
	11	No kickdown						<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>	
Slipping	12	Engine flares or slips when accelerating vehicle	<input type="radio"/>																			<input type="radio"/>	<input type="radio"/>		
	13	Engine flares up or slips when upshifting or downshifting	<input type="radio"/>		<input type="radio"/>																		<input type="radio"/>	<input type="radio"/>	
Shift shock	14	Excessive N to R or N to D range shift shock	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>						<input type="radio"/>										<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	15	Excessive shift shock when upshifting and downshifting	<input type="radio"/>		<input type="radio"/>								<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Noise	16	Transaxle noisy in N or P ranges	<input type="radio"/>																						
	17	Transaxle noisy in D, S, L, and R ranges	<input type="radio"/>																						
Others	18	No engine braking	<input type="radio"/>											<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>		
	19	No mode changes						<input type="radio"/>		<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>								
	20	Transaxle overheats	<input type="radio"/>														<input type="radio"/>	<input type="radio"/>							
	21	Hold indicator lamp flashes								<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>								
	22	Engine will not start in N or P ranges or will start in other ranges		<input type="radio"/>					<input type="radio"/>																
	23	Engine stalls when shifted to D, S, L, and R ranges				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					<input type="radio"/>				<input type="radio"/>						<input type="radio"/>	<input type="radio"/>	
	24	Engine stalls when brake pedal depressed while driving at low speed or stopping				<input type="radio"/>	<input type="radio"/>						<input type="radio"/>				<input type="radio"/>	<input type="radio"/>					<input type="radio"/>	<input type="radio"/>	

* Refer to 1990 323 Workshop Manual (1195-10-89E).

OFF-VEHICLE

Hydraulic control system		Powertrain										Inspection point and reference page	Item					
K2-168	*K-270	K2-167	K2-173	K2-173	K2-173	K2-187	K2-197	K2-192	K2-185	K2-182	K2-164					K2-185	K2-239	
Oil pump	Hydraulic circuit	Torque converter	Forward clutch	Coasting clutch	Reverse clutch	3-4 clutch	2-4 brake band	Low and reverse brake	One-way clutch 1	One-way clutch 2	Parking gear	Planetary gear	Differential assembly					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vehicle does not move in D, S, L, and R ranges	1	Accelerating		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vehicle moves in N range	2			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vehicle moves in P range or parking gear not disengaged when P disengaged	3			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excessive creep	4			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No creep at all	5			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No shift	6	Shifting		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Abnormal shift	7			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Frequent shifting	8			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Shift point high or low	9			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No lockup	10			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No kickdown	11			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Engine flares up or slips when accelerating vehicle	12	Slipping		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Engine flares up or slips when upshifting or downshifting	13			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excessive N to R or N to D range shift shock	14	Shift shock		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excessive shift shock when upshifting and downshifting	15			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Transaxle noisy in N or P ranges	16	Noise		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Transaxle noisy in D, S, L, and R ranges	17			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No engine braking	18	Others		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No mode changes	19			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Transaxle overheats	20			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hold indicator lamp flashes	21			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Engine will not start in N or P ranges or will start in other ranges	22			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Engine stalls when shifted to D, S, L, and R ranges	23			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Engine stalls when brake pedal depressed while driving at low speed or stopping	24			

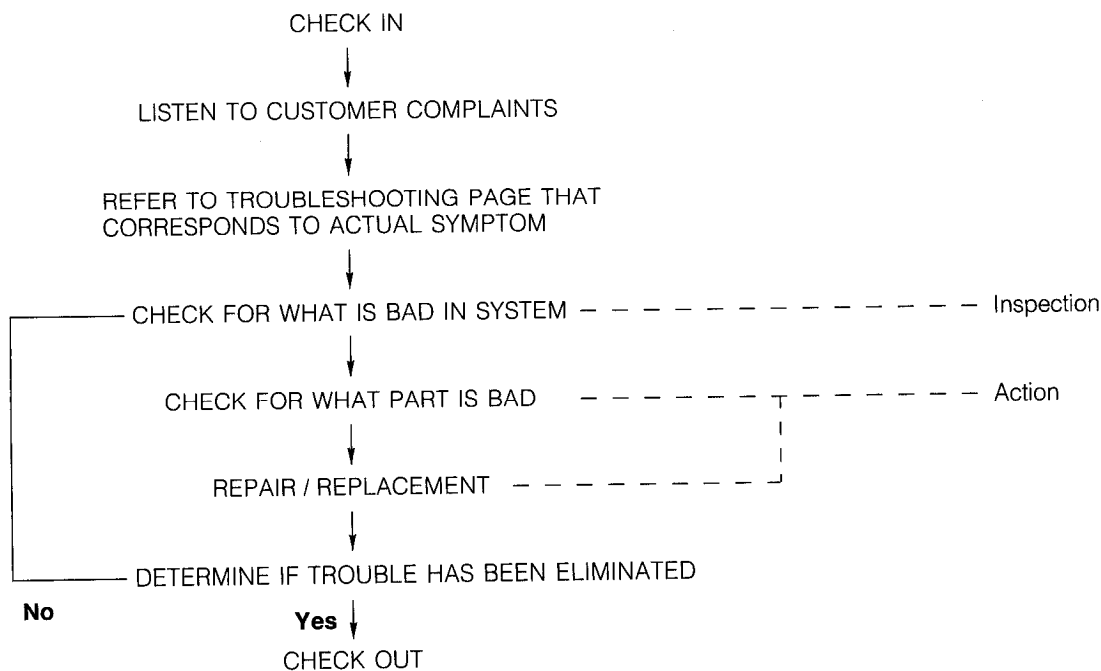
* Refer to 1990 323 Workshop Manual (1195-10-89E).

USING THIS SECTION

Introduction

Most of the automatic transaxle control system is electrically controlled, often making it difficult to diagnose problems in the system, especially intermittent problems. Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drivability complaint. The customer is often a good source of information on such problems, especially intermittent ones. Through talks with the customer, one can find out what the symptoms are and under what conditions they occur.

Work Flow



03U0KX-019

Diagnostic Index

No.:

Each troubleshooting item is assigned a number.

Description:

Describes each troubleshooting item.

Page:

Shows the reference page.

K2 TROUBLESHOOTING GUIDE				
ITEM	No	TROUBLE	DESCRIPTION	PAGE
Accelerating	1	Vehicle does not move in D, S, L, and R ranges.		K2-28
	2	Vehicle moves in M range.		K2-30
	3	Vehicle moves in P range or parking gear not disengaged when P disengaged.		K2-31
	4	Excessive creep	Creep occurs in D, S, L, and R ranges.	K2-32
	5	No creep at all	Creep occurs in D, S, L, and R ranges.	K2-33
Shifting	6	No shift	Shift schedule is as follows: D range: Normal mode: 1st-2nd-3rd-OD Hold mode: 1st-2nd-3rd-OD S range: Normal mode: 1st-2nd-3rd-OD Hold mode: 3rd-3rd-OD L range: Normal mode: 1st-2nd Hold mode: 1st-2nd	K2-35
	7	Abnormal shift	Shift schedule is as follows: D range: Normal mode: 1st-2nd-3rd-OD Hold mode: 1st-2nd-3rd-OD S range: Normal mode: 1st-2nd-3rd-OD Hold mode: 2nd-3rd-OD L mode: Normal mode: 1st-2nd Hold mode: 1st-2nd	K2-41
	8	Frequent shifting		K2-47
	9	Shift point high or low	Refer to page K2-132 for vehicle speed or engine load.	K2-49
No lockup	10	No lockup	Lockup available in follow: D range (Normal mode), SO D range (Hold mode), 3rd S range (Normal mode), 3rd S range (Hold mode), 3rd	K2-53
	11	No lockdown		K2-61
	12	Engine flares up or slips when accelerating vehicle		K2-65
Slipping	13	Engine flares up or slips when upshifting or downshifting		K2-67
	14	Excessive slip to H or H to D range when shock		K2-69
Shifting shock	15	Excessive shift shock when upshifting and downshifting		K2-72
	16	Transaxle noisy in N and P ranges		K2-75
Noise	17	Transaxle noisy in D, S, L, and R ranges		K2-77

Troubleshooting Item:

There are 24 troubleshooting items. Choose the item that most closely corresponds to the actual symptom.

03U0KX-020

Troubleshooting chart

1	VEHICLE DOES NOT MOVE IN D, S, L, AND R RANGES		
DESCRIPTION	• Vehicle does not move when accelerator depressed, engine speed increases		
[TROUBLESHOOTING HINTS]			
① ATF level low ② Selector lever installation or adjustment incorrect ③ Powertrain slippage (Forward clutch, one-way clutch 1, one-way clutch 2, low and reverse brake or reverse clutch) ④ Control valve stuck (Manual valve or pressure regulator valve)		⑤ Oil pump worn ⑥ Torque converter worn ⑦ Hydraulic circuit clogged or leaking (Forward clutch, reverse clutch or low and reverse brake) ⑧ Parking mechanism malfunction	
STEP	INSPECTION		ACTION
1	Check if ATF level is OK <div style="text-align: right;">☞ page K2-134</div> Level: Between notches on HOT side of level gauge at 65°C (149°F)	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134

05U0FX-021

DESCRIPTION:

Further describes the symptom. Confirm that the chart addresses the actual symptom before beginning troubleshooting.

TROUBLESHOOTING HINTS:

This describes the possible point of malfunction.

STEP:

This shows the order of troubleshooting. Proceed with troubleshooting as indicated.

INSPECTION:

This describes an inspection to quickly determine the malfunction of parts. If a detailed procedure is necessary to perform the INSPECTION, refer to the page shown by the "☞" mark.

ACTION:

This recommends the appropriate action to take as a result (Yes/No) of the INSPECTION. How to perform the action is described on the reference page shown by the "☞" mark.

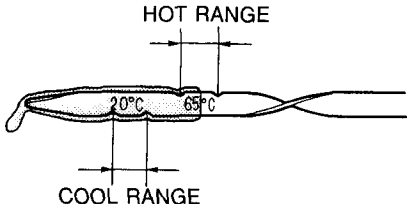
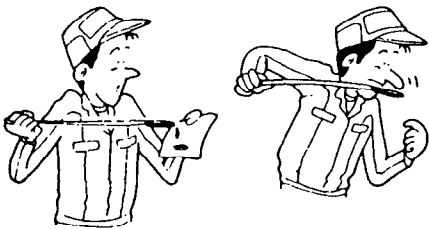

03U0KX-022

TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
ITEM	No	TROUBLE		
Accelerating	1	Vehicle does not move in D, S, L, and R ranges		K2-28
	2	Vehicle moves in N range		K2-30
	3	Vehicle moves in P range or parking gear not disengaged when P disengaged		K2-31
	4	Excessive creep	Creep occurs in D, S, L, and R ranges	K2-32
	5	No creep at all	Creep occurs in D, S, L, and R ranges	K2-33
Shifting	6	No shift	Shift schedule is as follows: D range Normal mode: 1st↔2nd↔3rd↔OD Hold mode: 1st↔2nd↔3rd(←OD) S range Normal mode: 1st↔2nd↔3rd(←OD) Hold mode: 2nd(←3rd)(←OD) L range Normal mode: 1st↔2nd Hold mode: 1st(←2nd)	K2-35
	7	Abnormal shift	Shift schedule is as follows: D range Normal mode: 1st↔2nd↔3rd↔OD Hold mode: 1st↔2nd↔3rd(←OD) S range Normal mode: 1st↔2nd↔3rd(←OD) Hold mode: 2nd(←3rd)(←OD) L range Normal mode: 1st↔2nd Hold mode: 1st(←2nd)	K2-41
	8	Frequent shifting		K2-47
	9	Shift point high or low	Refer to page K2-132 for vehicle speed at shiftpoint table	K2-49
	10	No lockup	Lockup available as follows: D range (Normal mode): OD D range (Hold mode): 3rd S range (Normal mode): 3rd S range (Hold mode): 3rd	K2-53
	11	No kickdown		K2-61
Slipping	12	Engine flares up or slips when accelerating vehicle		K2-65
	13	Engine flares up or slips when upshifting or downshifting		K2-67
Shifting shock	14	Excessive N to R or N to D range shift shock		K2-69
	15	Excessive shift shock when upshifting and downshifting		K2-72
Noise	16	Transaxle noisy in N and P ranges		K2-75
	17	Transaxle noisy in D, S, L, and R ranges		K2-77

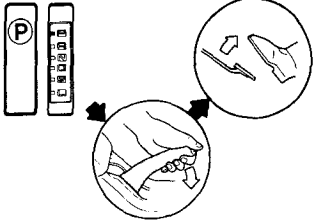
TROUBLESHOOTING ITEM			DESCRIPTION	PAGE
ITEM	No	TROUBLE		
Others	18	No engine braking	Engine braking is available as follows: D range Normal mode: 3rd, OD Hold mode: 3rd, (OD) S range Normal mode: 3rd, (OD) Hold mode: 2nd, (3rd), (OD) L range Normal mode: 2nd Hold mode: 1st, (2nd)	K2-79
	19	No mode changes		K2-83
	20	Transaxle overheats		K2-88
	21	Hold indicator lamp flashes	Hold indicator flashes if a malfunction occurs of any of components as follows: <ul style="list-style-type: none"> • Vehicle speed sensor • Throttle sensor • Pulse generator • Solenoid valves (1-2, 2-3, 3-4, or lockup) 	K2-92
	22	Engine will not start in N or P ranges or will start in other ranges		K2-93
	23	Engine stalls when shifted to D, S, L, and R ranges	Engine will start and run in P, or N ranges	K2-95
	24	Engine stalls when brake pedal depressed while driving at low speed or stopping		K2-100

03U0K2-026

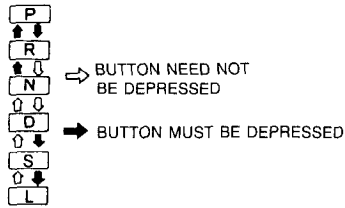
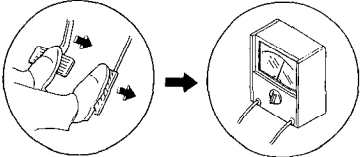
SYMPTOM TROUBLESHOOTING

1	VEHICLE DOES NOT MOVE IN D, S, L, AND R RANGES					
DESCRIPTION	<ul style="list-style-type: none"> • Vehicle does not move when accelerator depressed, engine speed increases 					
[TROUBLESHOOTING HINTS] <ul style="list-style-type: none"> ① ATF level low ② Selector lever installation or adjustment incorrect ③ Powertrain slippage (Forward clutch, one-way clutch 1, one-way clutch 2, low and reverse brake or reverse clutch) ④ Control valve stuck (Manual valve or pressure regulator valve) ⑤ Oil pump worn ⑥ Torque converter worn ⑦ Hydraulic circuit clogged or leaking (Forward clutch, reverse clutch or low and reverse brake) ⑧ Parking mechanism malfunction 						
STEP	INSPECTION	ACTION				
1	Check if ATF level is OK ☞ page K2-134 Level: Between notches on HOT side of level gauge at 65°C (149°F) 	<table border="0"> <tr> <td>Yes</td> <td>Go to next step</td> </tr> <tr> <td>No</td> <td>Add ATF to specified level ☞ page K2-134</td> </tr> </table>	Yes	Go to next step	No	Add ATF to specified level ☞ page K2-134
Yes	Go to next step					
No	Add ATF to specified level ☞ page K2-134					
2	Check if ATF condition is OK ☞ page K2-134 <ul style="list-style-type: none"> ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid 	<table border="0"> <tr> <td>Yes</td> <td>Go to next step</td> </tr> <tr> <td>No</td> <td> No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134 </td> </tr> </table>	Yes	Go to next step	No	No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134
Yes	Go to next step					
No	No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134					
3	Check if selector lever operation is OK ☞ page *K-264 	<table border="0"> <tr> <td>Yes</td> <td>Go to next step</td> </tr> <tr> <td>No</td> <td>Adjust or repair selector lever ☞ page *K-264</td> </tr> </table>	Yes	Go to next step	No	Adjust or repair selector lever ☞ page *K-264
Yes	Go to next step					
No	Adjust or repair selector lever ☞ page *K-264					

* Refer to 1990 323 Workshop Manual (1195-10-89E).


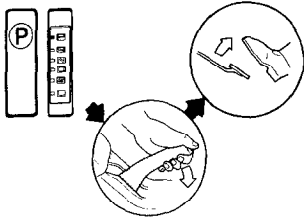
STEP	INSPECTION		ACTION																			
4	Set selector lever in P range with vehicle on a gentle slope, release brakes, and check if vehicle rolls 	Yes	Check parking mechanism ⇒ If OK, go to next step ⇒ If not OK, repair or replace parking mechanism																			
		No	Go to next step																			
5	Check if line pressure and throttle pressure are within specification ☞ page K2-123 125 Line pressure: <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> Throttle pressure: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
			Range	Line pressure kPa (kg/cm ² , psi)																		
Idle	Stall																					
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																				
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)																				
Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
No	Check for cause (Refer to evaluation) ☞ page K2-124 126																					
6	Try known good control valve body assembly or replace transaxle																					

03U0K2-027

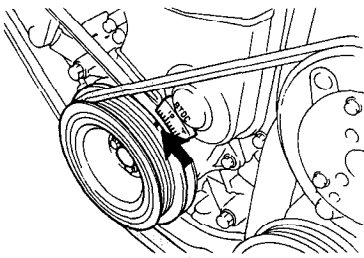
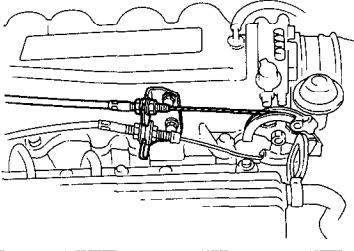
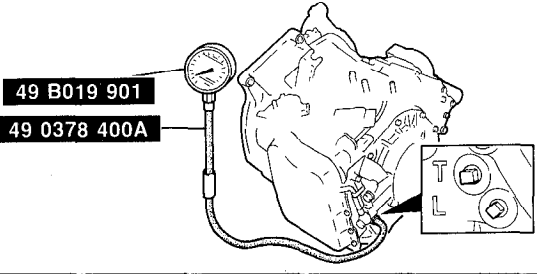
2	VEHICLE MOVES IN N RANGE		
DESCRIPTION	• Vehicle creeps at idle and shifts normally when accelerator depressed		
[TROUBLESHOOTING HINTS]			
① Selector lever installation or adjustment incorrect ② Powertrain slippage (Forward clutch or coasting clutch) ③ Control valve stuck (Manual valve) ④ Hydraulic circuit clogged or leaking (Forward clutch or coasting clutch)			
STEP	INSPECTION		ACTION
1	Check if selector lever operation is OK ☞ page *K-264 	Yes	Go to next step
2	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm 	Yes	Go to next step
3	Try known good EC-AT control unit, control valve body assembly, or replace transaxle		

* Refer to 1990 323 Workshop Manual (1195-10-89E).

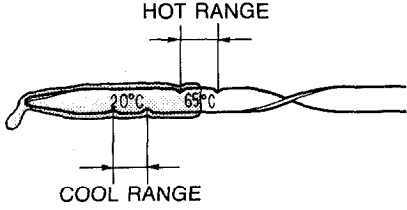
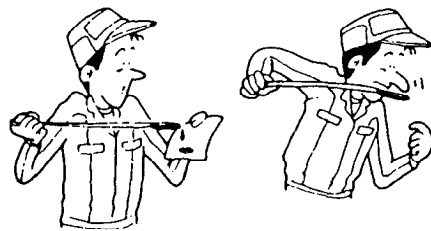
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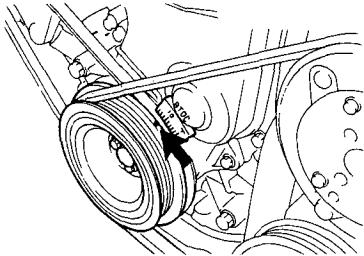

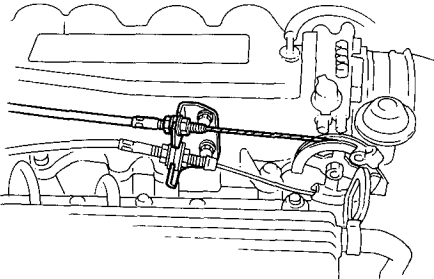
3 VEHICLE MOVES IN P RANGE OR PARKING GEAR NOT DISENGAGED WHEN P DISENGAGED		
DESCRIP-TION	<ul style="list-style-type: none"> • Vehicle rolls in P range but does not accelerate when accelerator depressed • Vehicle will not move in D, S, L, and R ranges and engine in stall condition (Vehicle in stall condition) 	
[TROUBLESHOOTING HINTS]		
① Selector lever installation or adjustment incorrect ② Parking mechanism malfunction		
STEP	INSPECTION	ACTION
1	Check if selector lever operation is OK ☞ page *K-264 	Yes Go to next step
		No Adjust or repair selector lever ☞ page *K-264
2	Set selector lever in P range with vehicle on a gentle slope, release brakes, and check if vehicle rolls 	Yes Check parking mechanism ☞ If OK, go to next step. ☞ If not OK, repair or replace parking mechanism
		No Go to next step
3	Rebuild or replace transaxle	

* Refer to 1990 323 Workshop Manual (1195-10-89E).

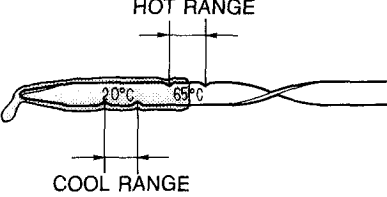
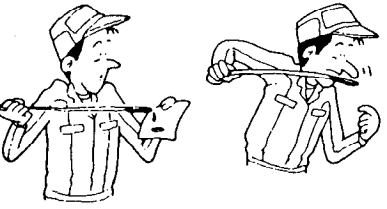
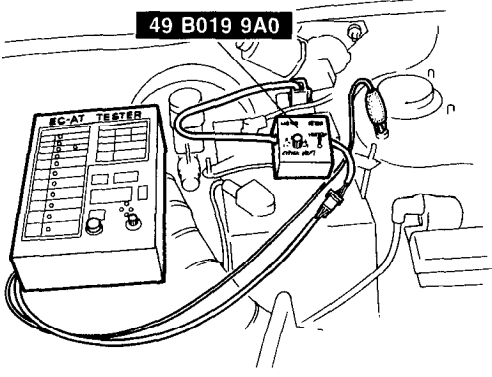
4	EXCESSIVE CREEP		
DESCRIPTION	<ul style="list-style-type: none"> • Vehicle moves quickly in D, S, L, and R ranges without depressing accelerator <p>Note</p> <ul style="list-style-type: none"> • N to R range, and N to D range shift shock felt 		
[TROUBLESHOOTING HINTS]			
<ul style="list-style-type: none"> ① Engine idle speed misadjusted ② Throttle cable misadjusted 			
STEP	INSPECTION	ACTION	
1	Check if ignition timing at idle is OK ☞ page *F-72 Ignition timing (BTDC): $7 \pm 1^\circ$ 	Yes	Check for correct idle speed ☞ page *F-72 Idle speed: 750 ± 50 rpm (with parking brake applied) ⇒ If OK, go to next step ⇒ If not OK, adjust idle speed ☞ page *F-72
		No	Adjust ignition timing ☞ page *F-72
2	Check if throttle cable operates smoothly and is installed correctly ☞ page K2-137 	Yes	Go to next step
		No	Replace throttle cable ☞ page K2-137
3	Check if line pressure at idle is OK ☞ page K2-139 Line pressure: 402—422 kPa (4.1—4.3 kg/cm², 58—61 psi) 	Yes	Go to next step
		No	Adjust throttle cable ☞ page K2-139
4	Rebuild or replace transaxle		

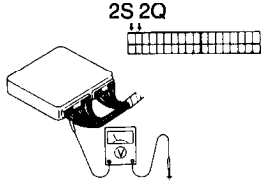
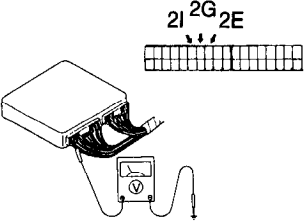
* Refer to 1990 323 Workshop Manual (1195-10-89E).

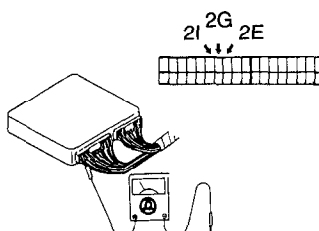
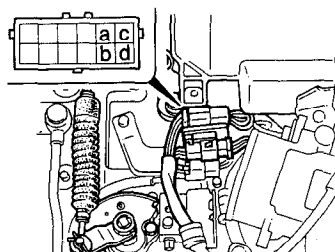
5	NO CREEP AT ALL		
DESCRIPTION	<ul style="list-style-type: none"> • Vehicle does not move in D, S, L, and R ranges when idling • Road condition: flat paved road <p>Note</p> <ul style="list-style-type: none"> • S range HOLD mode creep reduced because transaxle in 2nd gear position 		
[TROUBLESHOOTING HINTS]			
<ul style="list-style-type: none"> ① ATF level low ② Powertrain slippage (Forward clutch, reverse clutch, low and reverse brake, one-way clutch 1 or one-way clutch 2) ③ Control valve stuck (Pressure regulator valve or manual valve) ④ Oil pump worn ⑤ Torque converter worn ⑥ Hydraulic circuit clogged or leaking (Forward clutch, reverse clutch, low and reverse brake, one-way clutch 1 or one-way clutch 2) 			
STEP	INSPECTION	ACTION	
1	Check if ATF level is OK ☞ page K2-134 <p>Level: Between notches on HOT side of level gauge at 65°C (149°F)</p> <div style="text-align: center;">  <p>The diagram shows a horizontal level gauge with two notches. The right side is labeled 'HOT RANGE' and has temperature markers for 20°C and 65°C. The left side is labeled 'COOL RANGE'.</p> </div>	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134
2	Check if ATF condition is OK ☞ page K2-134 <ul style="list-style-type: none"> ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid <div style="text-align: center;">  <p>The illustration shows two mechanics in caps and work clothes. One is holding a dipstick and looking at it, while the other looks on.</p> </div>	Yes	Go to next step
		No	No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134

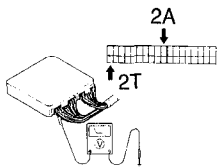
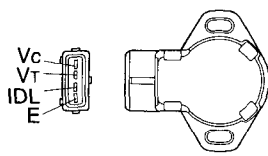
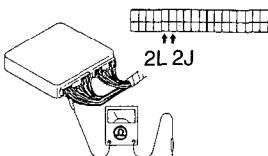
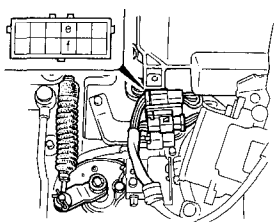
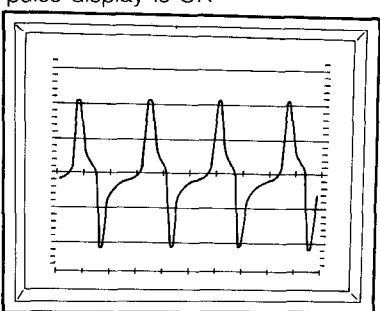
STEP	INSPECTION		ACTION											
3	Check if ignition timing at idle is OK ☞ page *F-72 Ignition timing (BTDC): 7 ± 1° 	Yes	Check for correct idle speed ☞ page *F-72 Idle speed: 750 ± 50 rpm (with parking brake applied) ⇒ If OK, go to next step ⇒ If not OK, adjust idle speed ☞ page *F-72											
4	Check if selector lever operation is OK ☞ page *K-264 	Yes	Go to next step											
5	Check if throttle cable operates smoothly and is installed correctly ☞ page K2-137 	Yes	Go to next step											
6	Check if line pressure at idle is OK ☞ page K2-123 Line pressure: <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Yes	Go to next step
Range	Line pressure kPa (kg/cm ² , psi)													
	Idle	Stall												
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)												
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)												
7	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm	Yes	Go to next step											
8	Rebuild or replace transaxle	No	Check for cause (Refer to Evaluation) ☞ page K2-121											

* Refer to 1990 323 Workshop Manual (1195-10-89E).

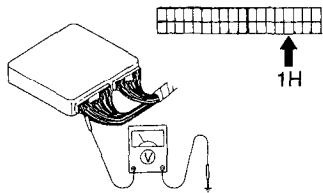
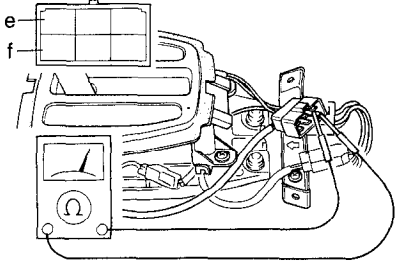
6	NO SHIFT	
DESCRIP- TION	• Vehicle upshifts and downshifts in HOLD mode forward ranges only	
<p>[TROUBLESHOOTING HINTS]</p> <ul style="list-style-type: none"> ① ATF level low ② Hold switch circuit shorted ③ Throttle sensor malfunction or misadjustment ④ Pulse generator malfunction ⑤ Shift solenoid valve stuck (1-2, 2-3, or 3-4) ⑥ Control valve stuck (Pressure regulator valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, or manual valve) ⑦ Oil pump worn ⑧ Hydraulic circuit clogged or leaking 		
STEP	INSPECTION	ACTION
1	<p>Check if ATF level is OK ☞ page K2-134</p> <p>Level: Between notches on HOT side of level gauge at 65°C (149°F)</p> <div style="text-align: center;">  <p>HOT RANGE</p> <p>20°C 65°C</p> <p>COOL RANGE</p> </div>	<p>Yes Go to next step</p> <p>No Add ATF to specified level ☞ page K2-134</p>
2	<p>Check if ATF condition is OK ☞ page K2-134</p> <ul style="list-style-type: none"> ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid <div style="text-align: center;">  </div>	<p>Yes Go to next step</p> <p>No No.2 condition Overhaul transaxle and repair or replace parts as necessary ☞ page K2-134 No.3 or No.4 condition Replace ATF</p>
3	<p>Check if "00" is displayed on EC-AT Tester with ignition switch ON ☞ page K2-106</p> <div style="text-align: center;">  <p>49 B019 9A0</p> </div>	<p>Yes Go to next step</p> <p>No Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108</p> <p>No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit</p> <p>Voltage: Approx. 12V (Ignition switch ON)</p> <p>"88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector</p> <p>⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring</p>

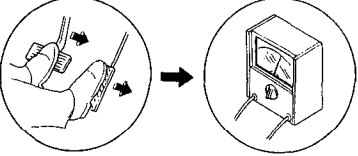
STEP	INSPECTION		ACTION
4	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially hold switch, solenoid valves, throttle sensor voltage, and drum speed)	Yes	Go to Steps 6, 12, 14, 17, 20, 21 and 22 in sequence
		No	No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause
5	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ☞ page K2-144 Voltage: Approx. 12V (Ignition switch ON) 	Yes	Go to next step
		No	Repair wiring
6	Disconnect solenoid valve connector and check if vehicle is driven as follows: R range: Reverse D and S ranges: 3rd L range: 1st Note • Engine rpm at 40 km/h (25 mph) 1st gear: 3,950 rpm 3rd gear: 1,400 rpm	Yes	Go to next step
		No	Overhaul transaxle and repair or replace any faulty parts ☞ page K2-152
7	Check if voltage at 2E, 2G, or 2I terminals of EC-AT control unit is OK ☞ page K2-144 Voltage: Approx. 12V (When solenoid valve ON) 	Yes	Go to Step 9
		No	Go to next step

STEP	INSPECTION		ACTION												
8	<p>Check if continuity of transistors of EC-AT control unit is OK</p> <table border="1"> <thead> <tr> <th>Solenoid valve</th> <th>Terminal</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>1-2 shift</td> <td>2E and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>2-3 shift</td> <td>2G and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>3-4 shift</td> <td>2I and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Solenoid valve	Terminal	Continuity	1-2 shift	2E and 1J or 2P	Yes	2-3 shift	2G and 1J or 2P	Yes	3-4 shift	2I and 1J or 2P	Yes	Yes	Go to next step
Solenoid valve	Terminal	Continuity													
1-2 shift	2E and 1J or 2P	Yes													
2-3 shift	2G and 1J or 2P	Yes													
3-4 shift	2I and 1J or 2P	Yes													
		No	Replace EC-AT control unit												
9	<p>Check if resistance between 2E, 2G, and 2I terminals of EC-AT control unit and ground is OK</p> <p>Resistance: 13—27Ω</p>	Yes	Go to Step 11												
		No	Go to next step												
10	<p>Check if resistance of solenoid valves is OK</p> <p>☞ page K2-147</p> <p>Resistance: 13—27Ω</p>	Yes	<p>Check for poor connection at connectors</p> <p>⇒ If OK, go to next step</p> <p>⇒ If not OK, repair wiring</p>												
		No	Replace solenoid valve												
11	<p>Disconnect 20-pin connector of EC-AT control unit</p> <p>Apply 12V to 2E, 2G, and 2I terminals and check if operation sound (clicking) of solenoid is heard</p>	Yes	Try known good EC-AT control unit and go to next step												
		No	Replace solenoid valve												

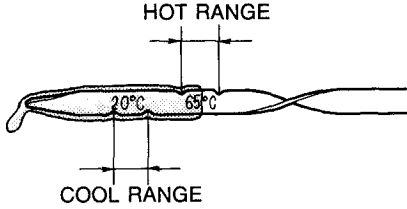
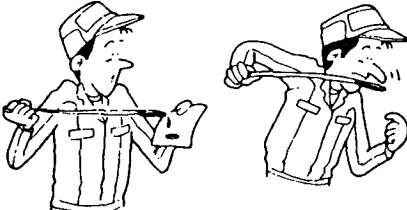
STEP	INSPECTION	ACTION							
12	Check if voltage at 2A and 2T terminals of EC-AT control unit is OK ☞ page K2-144 <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Terminal</th> <th>Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>2A</td> <td>5 (Ignition switch ON)</td> </tr> <tr> <td>2T</td> <td>0.4-4.4 (Accelerator closed to open)</td> </tr> </tbody> </table> 	Terminal	Voltage (V)	2A	5 (Ignition switch ON)	2T	0.4-4.4 (Accelerator closed to open)	Yes	Go to Step 14
		Terminal	Voltage (V)						
2A	5 (Ignition switch ON)								
2T	0.4-4.4 (Accelerator closed to open)								
No	Check for poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair wiring								
13	Check if throttle sensor is OK ☞ page *F-143 	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair wiring						
		No	Adjust or replace throttle sensor ☞ page *F-143						
14	Disconnect 20-pin connector of EC-AT control unit Check if resistance between 2J terminal and 2L terminal of EC-AT control unit is OK Resistance: 200-400Ω 	Yes	Go to Step 16						
		No	Go to next step						
15	Check if resistance of pulse generator is OK ☞ page K2-142 Resistance: 200-400Ω 	Yes	Check for poor connection at connectors and go to next step						
		No	Replace pulse generator						
16	Connect oscilloscope ground terminal to 2L terminal of EC-AT control unit, and oscilloscope input terminal to 2J terminal of EC-AT control unit Check if pulse display is OK 	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair wiring						
		No	Very low voltage: Replace pulse generator						
		Noise in wave form: Check for improper grounding of shield-wiring or replace pulse generator							

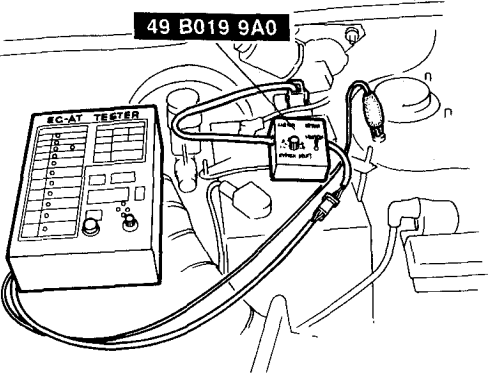
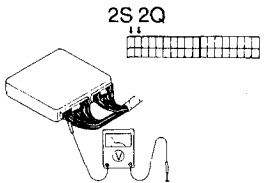
* Refer to 1990 323 Workshop Manual (1195-10-89E).

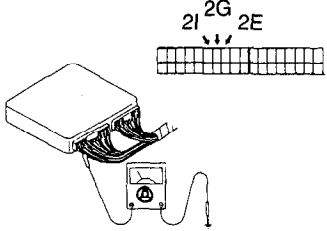
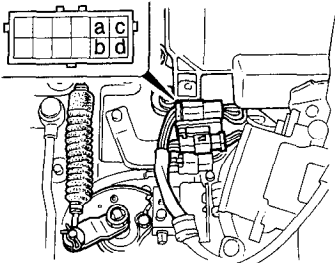
STEP	INSPECTION		ACTION										
17	<p>Check if voltage at 1H terminal of EC-AT control unit is OK</p> <p style="text-align: right;">☞ page K2-144</p> <p>Voltage: Approx. 12V (Hold switch released)</p> 	Yes	Go to Step 19										
		No	Go to next step										
18	<p>Check if continuity between a terminal of hold switch and 1H terminal of EC-AT control unit is OK</p>	Yes	Go to next step										
		No	Repair wiring										
19	<p>Check if operation of hold switch is OK</p> <p style="text-align: right;">☞ page K2-140</p> <table border="1"> <thead> <tr> <th>Switch</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>Depressed</td> <td>No</td> </tr> <tr> <td>Released</td> <td>Yes</td> </tr> </tbody> </table> 	Switch	Continuity	Depressed	No	Released	Yes	Yes	<p>Check for open or short circuit of wiring and poor connection at connectors</p> <p>⇒ If OK, go to next step</p> <p>⇒ If not OK, repair wiring</p>				
Switch	Continuity												
Depressed	No												
Released	Yes												
		No	Replace selector lever knob assembly										
20	<p>Disconnect connectors from EC-AT control unit</p> <p>Apply 12V to solenoid valve terminals shown and check if vehicle drives in conditions below in D range</p> <table border="1"> <thead> <tr> <th>12V to terminal</th> <th>Vehicle condition</th> </tr> </thead> <tbody> <tr> <td>2G and 2I</td> <td>1st</td> </tr> <tr> <td>2E, 2G, and 2I</td> <td>2nd</td> </tr> <tr> <td>—</td> <td>3rd</td> </tr> <tr> <td>2E and 2I</td> <td>OD</td> </tr> </tbody> </table> <p style="text-align: right;">☞ page K2-144</p>	12V to terminal	Vehicle condition	2G and 2I	1st	2E, 2G, and 2I	2nd	—	3rd	2E and 2I	OD	Yes	Try known-good EC-AT control unit and go to next step
12V to terminal	Vehicle condition												
2G and 2I	1st												
2E, 2G, and 2I	2nd												
—	3rd												
2E and 2I	OD												
		No	Overhaul transaxle and check for cause ☞ page K2-152										

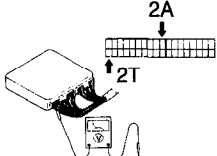
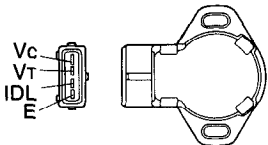
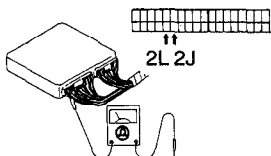
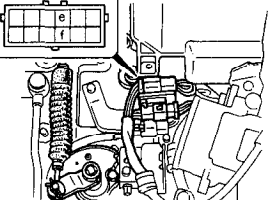
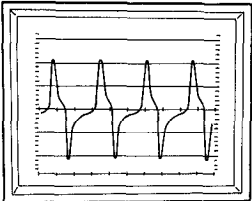
STEP	INSPECTION		ACTION																			
21	<p>Check if engine stall speed is OK ☞ page K2-119</p> <p>Engine stall speed: 2,550—2,650 rpm</p> <div style="text-align: center;">  </div>	Yes	Go to next step																			
		No	Check for cause (Refer to Evaluation) ☞ page K2-121																			
22	<p>Check if line pressure and throttle pressure are within specification ☞ page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
Range	Line pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																				
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)																				
Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
		No	Check for cause (Refer to evaluation) ☞ page K2-124 126																			
23	Try known good EC-AT control unit, control valve assembly, or replace transaxle																					

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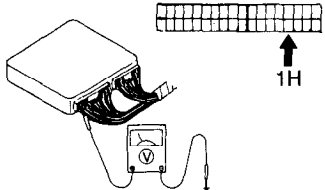
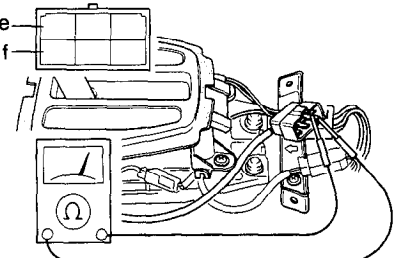
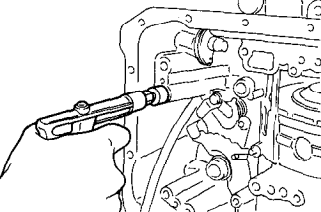
7	ABNORMAL SHIFT	
DESCRIPTION	<ul style="list-style-type: none"> • Abnormal shifting (ex. 1st → 3rd, 1st → OD) 	
[TROUBLESHOOTING HINTS]		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <ul style="list-style-type: none"> ① ATF level low ② Throttle sensor malfunction or misadjusted ③ Pulse generator malfunction ④ Hold switch circuit shorted ⑤ 2-4 brake band misadjusted </div> <div style="width: 45%;"> <ul style="list-style-type: none"> ⑥ Shift solenoid valves stuck (1-2, 2-3, or 3-4) ⑦ Control valve stuck (Pressure regulator valve, 1-2 shift valve, 2-3 shift valve, or 3-4 shift valve) ⑧ Hydraulic circuit clogged or leaking </div> </div>		
STEP	INSPECTION	ACTION
1	Check if ATF level is OK ☞ page K2-134 Level: Between notches on HOT side of level gauge at 65°C (149°F) <div style="text-align: center;">  </div>	Yes: Go to next step No: Add ATF to specified level ☞ page K2-134
2	Check if ATF condition is OK ☞ page K2-134 <ul style="list-style-type: none"> ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid <div style="text-align: center; margin-top: 20px;">  </div>	Yes: Go to next step No: <ul style="list-style-type: none"> No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134

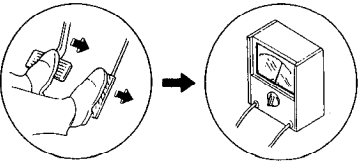
STEP	INSPECTION		ACTION
3	Check if '00' is displayed on EC-AT Tester with ignition switch ON ➤ page K2-106 	Yes	Go to next step
		No	Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ➤ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON) "88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring
4	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially hold switch, solenoid valves, throttle sensor voltage, and drum speed)	Yes	Go to Steps 6, 11, 13, 16, 19, 20 and 21 in sequence
		No	No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause
5	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ➤ page K2-144 Voltage: Approx. 12V (Ignition switch ON) 	Yes	Go to next step
		No	Repair wiring
6	Disconnect solenoid valve connector and check if vehicle is driven as follows: R range: Reverse D and S ranges: 3rd L range: 1st Note • Engine rpm at 40 km/h (25 mph) 1st gear: 3,950 rpm 3rd gear: 1,400 rpm	Yes	Go to next step
		No	Overhaul transaxle and repair or replace any faulty parts ➤ page K2-152

STEP	INSPECTION	ACTION													
7	Check if continuity of transistors of EC-AT control unit is OK	Yes	Go to next step												
	<table border="1"> <thead> <tr> <th>Solenoid valve</th> <th>Terminal</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>1-2 shift</td> <td>2E and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>2-3 shift</td> <td>2G and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>3-4 shift</td> <td>2I and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Solenoid valve	Terminal	Continuity	1-2 shift	2E and 1J or 2P	Yes	2-3 shift	2G and 1J or 2P	Yes	3-4 shift	2I and 1J or 2P	Yes	No	Replace EC-AT control unit
Solenoid valve	Terminal	Continuity													
1-2 shift	2E and 1J or 2P	Yes													
2-3 shift	2G and 1J or 2P	Yes													
3-4 shift	2I and 1J or 2P	Yes													
8	Check if resistance between 2E, 2G, or 2I terminals of EC-At control unit and ground is OK	Yes	Go to Step 10												
	<p>Resistance: 13—27Ω</p> 	No	Go to next step												
9	Check if resistance of solenoid valve is OK	Yes	Check for poor connection at connectors												
	<p>Resistance: 13—27Ω</p> <p>☞ page K2-143</p> 	☞	If OK, go to next step If not OK, repair wiring												
		No	Replace solenoid valve												
10	Disconnect 20-pin connector of EC-AT control unit Apply 12V to 2E, 2G, and 2I terminals and check if operation sound (clicking) of solenoid is heard	Yes	Try known good EC-AT control unit and go to next step												
		No	Replace solenoid valve												

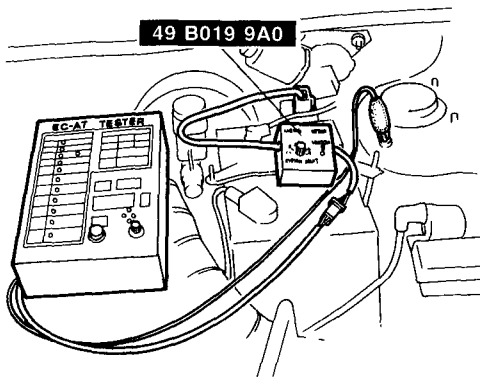
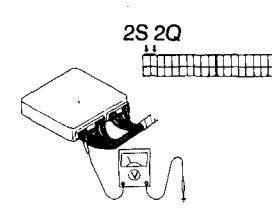
STEP	INSPECTION		ACTION						
11	<p>Check if voltage at 2A and 2T terminals of EC-AT control unit is OK</p> <p style="text-align: right;">☞ page K2-144</p> <table border="1"> <thead> <tr> <th>Terminal</th> <th>Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>2A</td> <td>5 (Ignition switch ON)</td> </tr> <tr> <td>2T</td> <td>0.4—4.4 (Accelerator closed to open)</td> </tr> </tbody> </table> 	Terminal	Voltage (V)	2A	5 (Ignition switch ON)	2T	0.4—4.4 (Accelerator closed to open)	<p>Yes</p> <p>No</p>	<p>Go to Step 13</p> <p>Check for poor connection at connectors</p> <p>⇒ If OK, go to next step ⇒ If not OK, repair wiring</p>
Terminal	Voltage (V)								
2A	5 (Ignition switch ON)								
2T	0.4—4.4 (Accelerator closed to open)								
12	<p>Check if throttle sensor is OK</p> <p style="text-align: right;">☞ page *F-143</p> 	<p>Yes</p> <p>No</p>	<p>Check for open or short circuit of wiring and poor connection at connectors</p> <p>⇒ If OK, go to next step ⇒ If not OK, repair wiring</p> <p>Replace throttle sensor</p>						
13	<p>Disconnect 20-pin connector of EC-AT control unit</p> <p>Check if resistance between 2J terminal and 2L terminal of EC-AT control unit is OK</p> <p>Resistance: 200—400Ω</p> 	<p>Yes</p> <p>No</p>	<p>Go to Step 15</p> <p>Go to next step</p>						
14	<p>Check if resistance of pulse generator is OK</p> <p style="text-align: right;">☞ page K2-142</p> <p>Resistance: 200—400Ω</p> 	<p>Yes</p> <p>No</p>	<p>Check for poor connection at connectors and go to next step</p> <p>Replace pulse generator</p>						
15	<p>Connect oscilloscope ground terminal to 2L terminal of EC-AT control unit, and oscilloscope input terminal to 2J terminal of EC-AT control unit</p> <p>Check if pulse display is OK</p> 	<p>Yes</p> <p>No</p>	<p>Go to next step</p> <p>Very low voltage: Replace pulse generator</p> <p>Noise in wave form: Check for improper grounding of shield-wiring or replace pulse generator</p>						

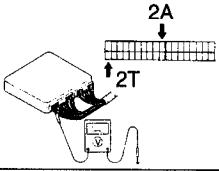
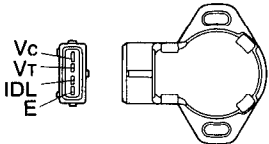
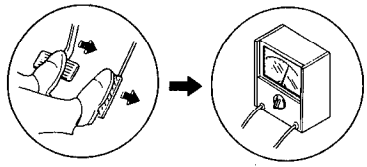
* Refer to 1990 323 Workshop Manual (1195-10-89E).

STEP	INSPECTION		ACTION						
16	<p>Check if voltage at 1H terminal of EC-AT control unit is OK</p> <p style="text-align: right;">☞ page K2-144</p> <p>Voltage: Approx. 12V (Hold switch released)</p> 	Yes	Go to Step 18						
		No	Go to next step						
17	<p>Check if continuity between terminal a of hold switch and 1H terminal of EC-AT control unit is OK</p>	Yes	Go to next step						
		No	Repair wiring						
18	<p>Check if operation of hold switch is OK</p> <p style="text-align: right;">☞ page K2-140</p> <table border="1"> <thead> <tr> <th>Switch</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>Depressed</td> <td>No</td> </tr> <tr> <td>Released</td> <td>Yes</td> </tr> </tbody> </table> 	Switch	Continuity	Depressed	No	Released	Yes	Yes	<p>Check for open or short circuit of wiring and poor connection at connectors</p> <p>⇒ If OK, go to next step</p> <p>⇒ If not OK, repair wiring</p>
Switch	Continuity								
Depressed	No								
Released	Yes								
		No	Replace selector lever knob assembly						
19	<p>Check if servo piston stroke is OK</p> <p style="text-align: right;">☞ page K2-198</p> 	Yes	Go to next step						
		No	Adjust ☞ page K2-198						

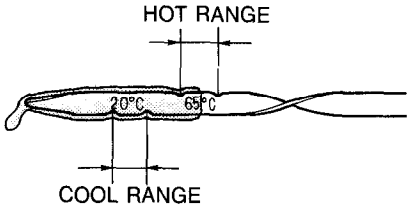
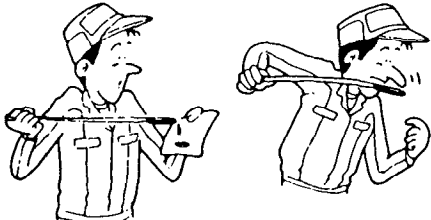
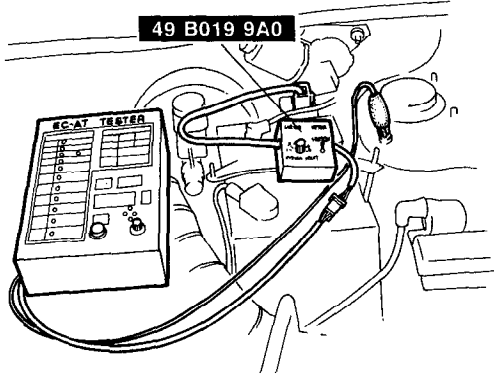
STEP	INSPECTION		ACTION																			
20	<p>Check if engine stall speed is OK ☞ page K2-119</p> <p>Engine stall speed: 2,550—2,650 rpm</p> 	Yes	Go to next step																			
		No	Check for cause (Refer to Evaluation) ☞ page K2-121																			
21	<p>Check if line pressure and throttle pressure are within specification ☞ page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
Range	Line pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																				
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Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
		No	Check for cause (Refer to Evaluation) ☞ page K2-124 126																			
22	Try known good EC-AT control unit, control valve assembly, or replace transaxle																					

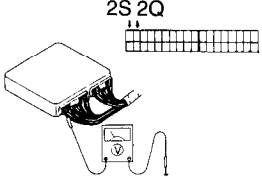
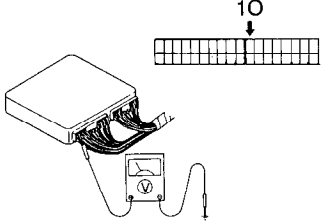
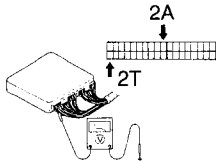
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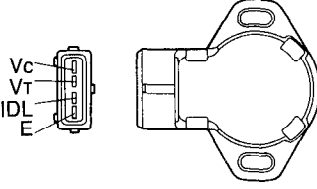
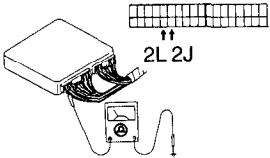
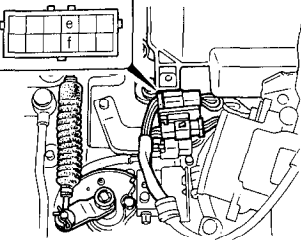
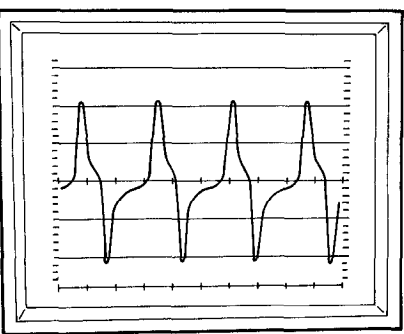
8	FREQUENT SHIFTING							
DESCRIP-TION	• Downshift occurs when accelerator depressed slightly in D, S, and L ranges, Normal mode							
[TROUBLESHOOTING HINTS] ① Throttle sensor malfunction or misadjusted ② Control valve stuck ③ Hydraulic circuit clogged or leaking								
STEP	INSPECTION	ACTION						
1	Check if '00' is displayed on EC-AT Tester with ignition switch ON ⇨ page K2-106 	<table border="0"> <tr> <td>Yes</td> <td>Go to next step</td> </tr> <tr> <td>No</td> <td> Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ⇨ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON) </td> </tr> <tr> <td colspan="2"> "88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇨ If OK, replace EC-AT control unit ⇨ If not OK, repair wiring </td> </tr> </table>	Yes	Go to next step	No	Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ⇨ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON)	"88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇨ If OK, replace EC-AT control unit ⇨ If not OK, repair wiring	
Yes	Go to next step							
No	Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ⇨ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON)							
"88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇨ If OK, replace EC-AT control unit ⇨ If not OK, repair wiring								
2	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially throttle sensor voltage)	<table border="0"> <tr> <td>Yes</td> <td>Go to Steps 4, 6, and 7</td> </tr> <tr> <td>No</td> <td> No indication at all lamps ⇨ Go to next step Individual lamp(s) does not illuminate ⇨ Check for cause </td> </tr> </table>	Yes	Go to Steps 4, 6, and 7	No	No indication at all lamps ⇨ Go to next step Individual lamp(s) does not illuminate ⇨ Check for cause		
Yes	Go to Steps 4, 6, and 7							
No	No indication at all lamps ⇨ Go to next step Individual lamp(s) does not illuminate ⇨ Check for cause							
3	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ⇨ page K2-144 Voltage: Approx. 12V (Ignition switch ON) 	<table border="0"> <tr> <td>Yes</td> <td>Go to next step</td> </tr> <tr> <td>No</td> <td>Repair wiring</td> </tr> </table>	Yes	Go to next step	No	Repair wiring		
Yes	Go to next step							
No	Repair wiring							

STEP	INSPECTION	ACTION																				
4	Check if voltage at 2A and 2T terminals of EC-AT control unit is OK ☞ page K2-144 <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Terminal</th> <th>Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>2A</td> <td>5 (Ignition switch ON)</td> </tr> <tr> <td>2T</td> <td>0.4—4.4 (Accelerator closed to open)</td> </tr> </tbody> </table> 	Terminal	Voltage (V)	2A	5 (Ignition switch ON)	2T	0.4—4.4 (Accelerator closed to open)	Yes	Go to Step 6													
		Terminal	Voltage (V)																			
2A	5 (Ignition switch ON)																					
2T	0.4—4.4 (Accelerator closed to open)																					
No	Check for poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair or replace																					
5	Check if throttle sensor is OK ☞ page *F-143 	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair or replace																			
		No	Adjust or replace throttle sensor ☞ page *F-143																			
6	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm 	Yes	Go to next step																			
		No	Check for cause (Refer to Evaluation) ☞ page K2-121																			
7	Check if line pressure and throttle pressure are within specification ☞ page K2-123 125 <p>Line pressure:</p> <table border="1" style="margin-top: 10px;"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td rowspan="2">D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1" style="margin-top: 10px;"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
			Range	Line pressure kPa (kg/cm ² , psi)																		
Idle	Stall																					
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																				
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Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
No	Check for cause (Refer to Evaluation) ☞ page K2-124 126																					
8	Try known good EC-AT control unit, control valve assembly, or replace																					

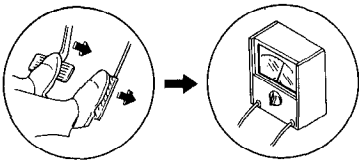
* Refer to 1990 323 Workshop Manual (1195-10-89E).

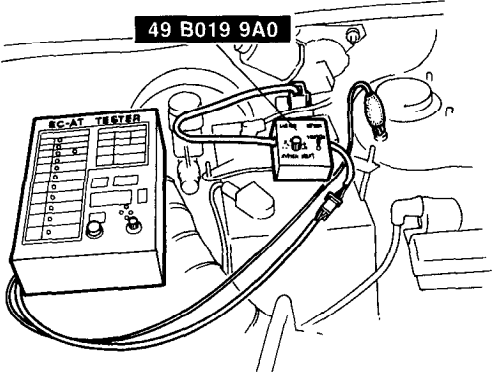
9	SHIFT POINT HIGH OR LOW	
DESCRIP-TION	• Shift points do not match shift diagram (Refer to road test in this section)	
<p>[TROUBLESHOOTING HINTS]</p> <p>① ATF level low ② Throttle sensor malfunction or misadjusted ③ Idle switch worn ④ Pulse generator malfunction</p> <p>⑤ Vehicle speed sensor malfunction ⑥ Control valve stuck (1-2 shift valve, 2-3 shift valve, or 3-4 shift valve)</p>		
STEP	INSPECTION	ACTION
1	<p>Check if ATF level is OK ☞ page K2-134</p> <p>Level: Between notches on HOT side of level gauge at 65°C (149°F)</p> <div style="text-align: center;">  </div>	<p>Yes Go to next step</p> <p>No Add ATF to specified level ☞ page K2-134</p>
2	<p>Check if ATF condition is OK ☞ page K2-134</p> <p>① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid</p> <div style="text-align: center;">  </div>	<p>Yes Go to next step</p> <p>No No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134</p>
3	<p>Check if '00' is displayed on EC-AT tester with ignition switch ON ☞ page K2-106</p> <div style="text-align: center;">  </div>	<p>Yes Go to next step</p> <p>No Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108</p> <p>No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit</p> <p>Voltage: Approx. 12V (Ignition switch ON)</p> <p>“88” flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector</p> <p>⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring</p>

STEP	INSPECTION		ACTION						
4	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially idle switch, throttle sensor voltage, vehicle speed and drum speed)	Yes	Go to Steps 6, 8, 10, 13, 14 and 15 in sequence						
		No	No indication at all lamps ⇒ Go to Step Individual lamp(s) does not illuminate ⇒ Check for cause						
5	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ⇨ page K2-144 Voltage: Approx. 12V (Ignition switch ON)	Yes	Go to next step						
		No	Repair wiring						
6	Check if voltage at 1O terminal of EC-AT control unit is OK ⇨ page K2-144 Voltage: Approx. 12V (Throttle valve open)	Yes	Go to Step 8						
		No	Go to next step						
7	Check for continuity between 1O terminal of EC-AT control unit and idle switch terminal	Yes	Go to next step						
		No	Repair wiring						
8	Check if voltage at 2A and 2T terminals of EC-AT control unit is OK ⇨ page K2-144 <table border="1"> <thead> <tr> <th>Terminal</th> <th>Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>2A</td> <td>5 (Ignition switch ON)</td> </tr> <tr> <td>2T</td> <td>0.4—4.4 (Accelerator closed to open)</td> </tr> </tbody> </table>	Terminal	Voltage (V)	2A	5 (Ignition switch ON)	2T	0.4—4.4 (Accelerator closed to open)	Yes	Go to Step 10
Terminal	Voltage (V)								
2A	5 (Ignition switch ON)								
2T	0.4—4.4 (Accelerator closed to open)								
		No	Check for poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair or replace						

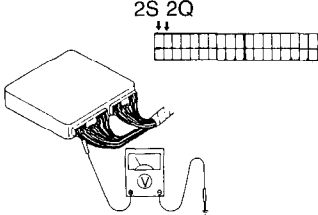
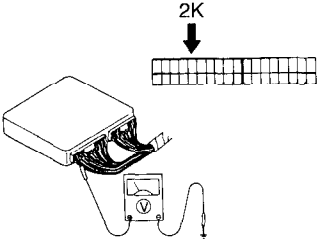
STEP	INSPECTION		ACTION
9	Check if throttle sensor is OK ➤ page *F-143 	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair or replace
		No	Adjust or replace throttle sensor ➤ page *F-143
10	Disconnect 20-pin connector of EC-AT control unit Check if resistance between 2J terminal and 2L terminals of EC-AT control unit is OK Resistance: 200—400Ω 	Yes	Go to Step 12
		No	Go to next step
11	Check if resistance of pulse generator is OK ➤ page K2-142 Resistance: 200—400Ω 	Yes	Check for poor connection at connectors and go to next step
		No	Replace pulse generator
12	Connect oscilloscope ground terminal to 2L terminal of EC-AT control unit, and oscilloscope input terminal to 2J terminal of EC-AT control unit Check if pulse display is OK 	Yes	Go to next step
		No	Very low voltage: Replace pulse generator
			Noise in wave from: Check for improper grounding of shield-wiring or replace pulse generator

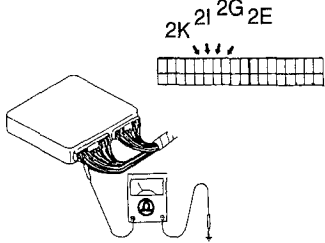
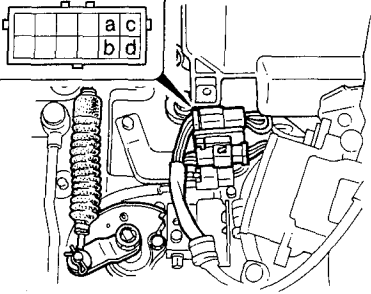
* Refer to 1990 323 Workshop Manual (1195-10-89E).

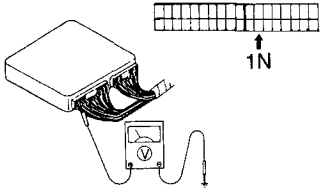
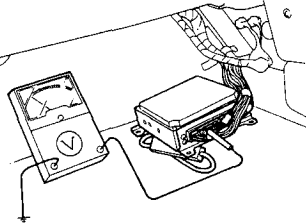
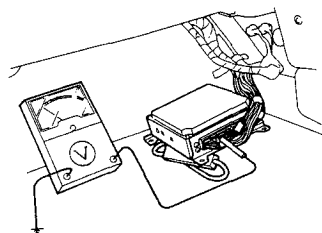
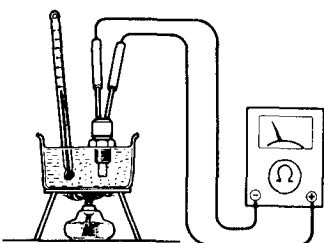
STEP	INSPECTION	ACTION																		
13	Disconnect connectors from EC-AT control unit Apply 12V to solenoid valve terminals shown and check if vehicle drives in conditions below in D range	Yes Try known-good EC-AT control unit and go to next step																		
	<table border="1"> <thead> <tr> <th>12V to terminal</th> <th>Vehicle condition</th> </tr> </thead> <tbody> <tr> <td>2G and 2I</td> <td>1st</td> </tr> <tr> <td>2E, 2G, and 2I</td> <td>2nd</td> </tr> <tr> <td>—</td> <td>3rd</td> </tr> <tr> <td>2E and 2I</td> <td>OD</td> </tr> </tbody> </table>	12V to terminal	Vehicle condition	2G and 2I	1st	2E, 2G, and 2I	2nd	—	3rd	2E and 2I	OD	No Overhaul transaxle and check for cause page K2-152								
12V to terminal	Vehicle condition																			
2G and 2I	1st																			
2E, 2G, and 2I	2nd																			
—	3rd																			
2E and 2I	OD																			
14	Check if engine stall speed is OK page K2-119 Engine stall speed: 2,550—2,650 rpm	Yes Go to next step																		
		No Check for cause (Refer to Evaluation) page K2-119																		
15	Check if line pressure and throttle pressure are within specification page K2-123 125	Yes Go to next step																		
	<p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)
Range	Line pressure kPa (kg/cm ² , psi)																			
	Idle	Stall																		
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																		
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)																		
Range	Throttle pressure kPa (kg/cm ² , psi)																			
	Idle	Stall																		
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																		
16	Try known good EC-AT control unit, control valve assembly, or replace transaxle																			

10	NO LOCKUP		
DESCRIP-TION	• No lockup in D range OD		
[TROUBLESHOOTING HINTS] ① Stoplight switch or circuit shorted ② Solenoid valve stuck (1-2, 2-3, 3-4, or lockup) ③ Water thermo signal malfunction ④ Throttle sensor malfunction or misadjusted ⑤ Pulse generator malfunction ⑥ Hold switch circuit shorted ⑦ Control valve stuck (Lockup control valve) ⑧ Torque converter worn ⑨ Hydraulic circuit clogged or leaking			
STEP	INSPECTION		ACTION
1	Check if "00" is displayed on EC-AT Tester with ignition switch ON ☞ page K2-106 	Yes No	Go to next step Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON) "88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring
2	Turn ignition switch ON Check if malfunction indicator lamp (MIL) is illuminated	Yes No	Go to Step 4 Check for cause (Refer to troubleshooting guide) ☞ page *F-12
3	Start engine and let it at idle Check if malfunction indicator lamp (MIL) goes OFF	Yes No	Go to next step Check for malfunction Code No. ☞ page *F-12

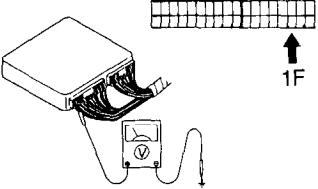
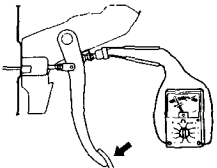
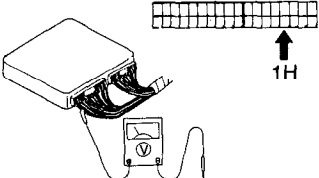
* Refer to 1990 323 Workshop Manual (1195-10-89E).

STEP	INSPECTION		ACTION															
4	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially hold switch, water thermo signal, solenoid valves, throttle sensor voltage, and drum speed)	Yes	Go to Steps 6, 12, 16, 19, 22, 24, 27 and 28 in sequence															
		No	No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause															
5	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ↗ page K2-144 Voltage: Approx. 12V (Ignition switch ON) 2S 2Q 	Yes	Go to next step															
		No	Repair wiring															
6	Drive vehicle above 80 km/h (50 mph) in D range OD Check if voltage at terminal 2K of EC-AT control unit is OK ↗ page K2-144 Voltage: Approx. 12V (Lockup solenoid ON [Lockup]) 2K 	Yes	Go to Step 8															
		No	Go to next step															
7	Check if continuity of transistor in EC-AT control unit is OK <table border="1"> <thead> <tr> <th>Solenoid valve</th> <th>Terminal</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>1-2 shift</td> <td>2E and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>2-3 shift</td> <td>2G and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>3-4 shift</td> <td>2I and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>Lockup</td> <td>2K and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Solenoid valve	Terminal	Continuity	1-2 shift	2E and 1J or 2P	Yes	2-3 shift	2G and 1J or 2P	Yes	3-4 shift	2I and 1J or 2P	Yes	Lockup	2K and 1J or 2P	Yes	Yes	Go to next step
		Solenoid valve	Terminal	Continuity														
1-2 shift	2E and 1J or 2P	Yes																
2-3 shift	2G and 1J or 2P	Yes																
3-4 shift	2I and 1J or 2P	Yes																
Lockup	2K and 1J or 2P	Yes																
No	Replace EC-AT control unit																	

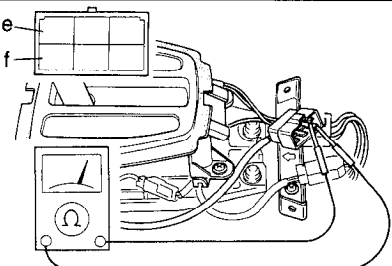
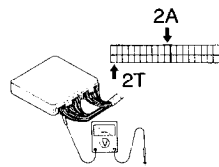
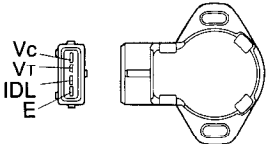
STEP	INSPECTION	ACTION	
8	<p>Check if resistance between 2E, 2G, 2I, or 2K terminals of EC-AT control unit and ground is OK</p> <p>Resistance: 13—27Ω</p> 	Yes	Go to Step 10
		No	Go to next step
9	<p>Check if resistance of solenoid valve(s) is OK</p> <p>☞ page K2-143</p> <p>Resistance: 13—27Ω</p> 	Yes	<p>Check for poor connection at connectors</p> <p>⇒ If OK, go to next step</p> <p>⇒ If not OK, repair wiring</p>
		No	Replace solenoid valve
10	<p>Disconnect 20-pin connector of EC-AT control unit</p> <p>Apply 12V to 2E, 2G, 2I and 2K terminals and check if operation sound (clicking) of solenoid is heard</p>	Yes	Try known good EC-AT control unit and go to next step
		No	Replace solenoid valve
11	<p>Apply 12V to 2K terminal of EC-AT control unit</p> <p>start engine in P range and let it idle</p> <p>Shift to D range and check if engine stalls</p>	Yes	Go to next step
		No	Replace lockup solenoid valve

STEP	INSPECTION		ACTION
12	<p>Check if voltage at 1N terminal of EC-AT control unit is OK</p> <p style="text-align: right;">☞ page K2-144</p> <p>Voltage: Approx. 12V After engine warmed up (Above 72°C [162°F])</p> 	Yes	Go to Step 16
		No	Go to next step
13	<p>Check if voltage at 2Z terminal of engine control unit is OK</p> <p>Voltage: Approx. 12V After engine warmed up (Above 72°C [162°F])</p> 	Yes	<p>Check for continuity between terminal 1N of EC-AT control unit and terminal 2Z of engine control unit</p> <p>If OK, try known good EC-AT control unit and go to next step</p> <p>If not OK, repair wiring</p>
		No	Go to next step
14	<p>Check if voltage at terminal 2Q of engine control unit is OK</p> <p>Approx. 2.5V: Engine coolant temp. 20°C (68°F) Below 0.5V: After engine warmed up</p> 	Yes	Replace engine control unit
		No	Go to next step
15	<p>Check if operation of water thermosensor is OK</p> <p style="text-align: right;">☞ page *F-142</p> 	Yes	<p>Check for open or short circuit of wiring and poor connection at connectors</p> <p>⇒ If OK, go to next step</p> <p>⇒ If not OK, repair wiring</p>
		No	<p>Replace water thermosensor</p> <p style="text-align: right;">☞ page *F-142</p>

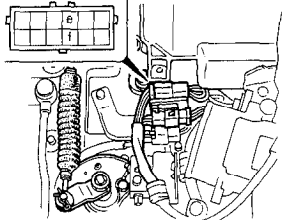
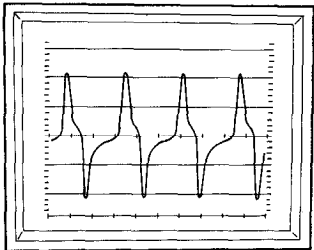
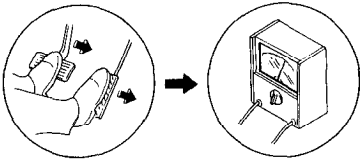
* Refer to 1990 323 Workshop Manual (1195-10-89E).

STEP	INSPECTION		ACTION						
16	Check if voltage at 1F terminal of EC-AT control is OK Voltage: Approx. 12V (Brake pedal depressed) 	Yes	Go to Step 19						
		No	Go to next step						
17	Check for continuity between terminal 1F of EC-AT control unit and stoplight switch	Yes	Go to next step						
		No	Repair wiring						
18	Check if operation of stoplight switch is OK ☞ page *T-45 <table border="1"> <thead> <tr> <th>Switch</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>Depressed</td> <td>Yes</td> </tr> <tr> <td>Released</td> <td>No</td> </tr> </tbody> </table> 	Switch	Continuity	Depressed	Yes	Released	No	Yes	Check for short or open circuit of wiring and poor connection at connector ⇨ If OK, go to next step ⇨ If not OK, repair wiring
		Switch	Continuity						
Depressed	Yes								
Released	No								
No	Replace stoplight switch								
19	Check if voltage at 1H terminal of EC-AT control unit is OK ☞ page K2-144 Voltage: Approx. 12V (Hold switch released) 	Yes	Go to Step 22						
		No	Go to next step						
20	Check if continuity between a terminal of hold switch and 1H terminal of EC-AT control unit is OK	Yes	Go to next step						
		No	Repair wiring						

* Refer to 1990 323 Workshop Manual (1195-10-89E).

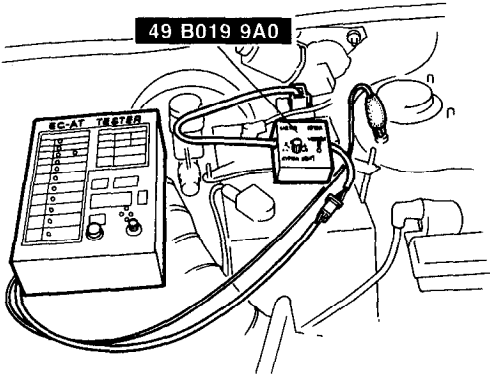
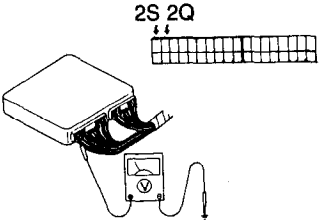
STEP	INSPECTION	ACTION							
21	Check if operation of hold switch is OK ☞ page K2-140 <table border="1" style="margin: 10px 0;"> <thead> <tr> <th>Switch</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>Depressed</td> <td>No</td> </tr> <tr> <td>Released</td> <td>Yes</td> </tr> </tbody> </table> 	Switch	Continuity	Depressed	No	Released	Yes	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair wiring
		Switch	Continuity						
Depressed	No								
Released	Yes								
No	Replace selector lever knob assembly								
22	Check if voltage at 2A and 2T terminals of EC-AT control unit is OK ☞ page K2-144 <table border="1" style="margin: 10px 0;"> <thead> <tr> <th>Terminal</th> <th>Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>2A</td> <td>5 (Ignition switch ON)</td> </tr> <tr> <td>2T</td> <td>0.4—4.4 (Accelerator closed to open)</td> </tr> </tbody> </table> 	Terminal	Voltage (V)	2A	5 (Ignition switch ON)	2T	0.4—4.4 (Accelerator closed to open)	Yes	Go to Step 24
		Terminal	Voltage (V)						
2A	5 (Ignition switch ON)								
2T	0.4—4.4 (Accelerator closed to open)								
No	Check if poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair or replace								
23	Check if throttle sensor is OK ☞ page *F-143 	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair wiring						
		No	Adjust or replace throttle sensor ☞ page *F-143						
24	Disconnect 20-pin connector of EC-AT control unit Check if resistance between 2J and 2L terminals of EC-AT control unit is OK Resistance: 200—400Ω	Yes	Go to Step 26						
		No	Go to next step						

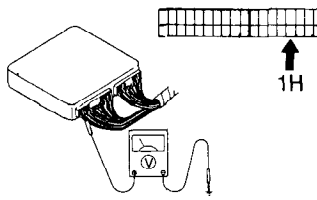
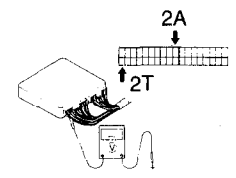
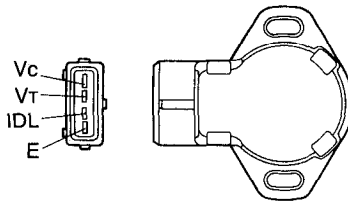
* Refer to 1990 323 Workshop Manual (1195-10-89E).

STEP	INSPECTION		ACTION
25	Check if resistance of pulse generator is OK ☞ page K2-142 Resistance: 200—400Ω 	Yes	Check for poor connection at connectors and go to next step
		No	Replace pulse generator
26	Connect oscilloscope ground terminal to 2L terminal of EC-AT control unit, and oscilloscope input terminal to 2J terminal of EC-AT control unit Check if pulse display is OK 	Yes	Go to next step
		No	Very low voltage: Replace pulse generator
			Noise in wave form: Check for improper grounding of shield-wiring or replace pulse generator
27	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm 	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K2-121

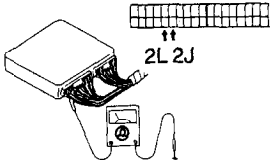
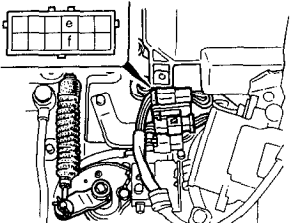
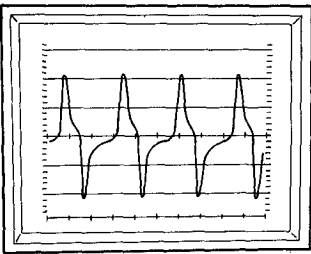
STEP	INSPECTION		ACTION																			
28	<p>Check if line pressure and throttle pressure are within specification</p> <p style="text-align: right;">☞ page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
Range	Line pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																				
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Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
		No	Check for cause (Refer to Evaluation) ☞ page K2-124 126																			
29	Try known good EC-AT control unit, control valve assembly, or replace transaxle																					

03U0K2-036

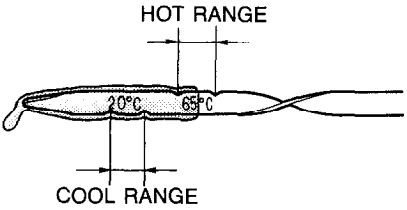
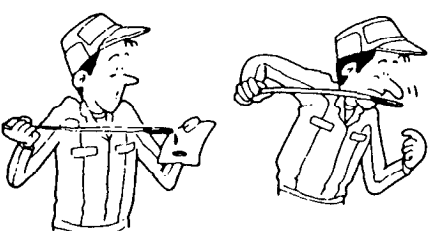
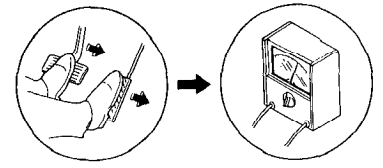
11	NO KICKDOWN	
DESCRIPTION	• Does not downshift when accelerator depressed more than 7/8 within kickdown range	
[TROUBLESHOOTING HINTS]		
① Throttle sensor malfunction or misadjustment ② Pulse generator malfunction ③ Hold switch circuit shorted ④ Shift solenoid valves stuck (1-2, 2-3, or 3-4)		
STEP	INSPECTION	ACTION
1	Check if "00" is displayed on EC-AT Tester with ignition switch ON ➤ page K2-106	Yes Go to next step
		No Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ➤ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON) "88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring
2	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially hold switch, solenoid valves, throttle sensor voltage and drum speed)	Yes Go to Steps 4, 7, 9 and 12 in sequence
		No No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause
3	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ➤ page K2-144 Voltage: Approx. 12V (Ignition switch ON)	Yes Go to next step
		No Repair wiring

STEP	INSPECTION	ACTION							
4	Check if voltage at 1H terminal of EC-AT control unit is OK ☞ page K2-144 Voltage: Approx. 12V (Hold switch released) 	Yes	Go to Step 7						
		No	Go to next step						
5	Check if continuity between a terminal of hold switch and 1H terminal of EC-AT control unit is OK	Yes	Go to next step						
		No	Repair wiring						
6	Check if operation of hold switch is OK ☞ page K2-140 <table border="1"> <thead> <tr> <th>Switch</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>Depressed</td> <td>No</td> </tr> <tr> <td>Released</td> <td>Yes</td> </tr> </tbody> </table>	Switch	Continuity	Depressed	No	Released	Yes	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair wiring
		Switch	Continuity						
Depressed	No								
Released	Yes								
No	Replace selector lever knob assembly								
7	Check if voltage at 2A and 2T terminals of EC-AT control unit is OK ☞ page K2-144 <table border="1"> <thead> <tr> <th>Terminal</th> <th>Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>2A</td> <td>5 (Ignition switch ON)</td> </tr> <tr> <td>2T</td> <td>0.4—4.4 (Accelerator closed to open)</td> </tr> </tbody> </table> 	Terminal	Voltage (V)	2A	5 (Ignition switch ON)	2T	0.4—4.4 (Accelerator closed to open)	Yes	Go to Step 9
		Terminal	Voltage (V)						
2A	5 (Ignition switch ON)								
2T	0.4—4.4 (Accelerator closed to open)								
No	Check if poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair or replace								
8	Check if throttle sensor is OK ☞ page *F-143 	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair wiring						
		No	Adjust or replace throttle sensor ☞ page *F-143						

* Refer to 1990 323 Workshop Manual (1195-10-89E).

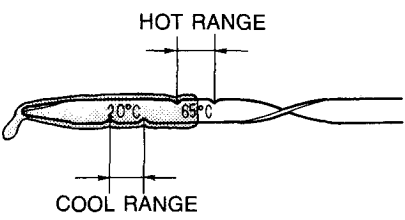

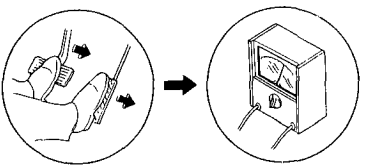
STEP	INSPECTION	ACTION	
9	Disconnect 20-pin connector of EC-AT control unit Check if resistance between 2J terminal and 2L terminals of EC-AT control unit is OK Resistance: 200—400Ω	Yes	Go to Step 11
		No	Go to next step
10	Check if resistance of pulse generator is OK ☞ page K2-142 Resistance: 200—400Ω	Yes	Check for poor connection at connectors and go to next step
		No	Replace pulse generator
11	Connect oscilloscope ground terminal to 2L terminal of EC-AT control unit, and oscilloscope input terminal to 2J terminal of EC-AT control unit Check if pulse display is OK	Yes	Go to next step
		No	Very low voltage: Replace pulse generator
			Noise in wave form: Check for improper grounding of shield-wiring or replace pulse generator
12	Disconnect solenoid valve connector and check if vehicle is driven as follows: R range: Reverse D and S ranges: 3rd L range: 1st Note • Engine rpm at 40 km/h (25 mph) 1st gear: 3,950 rpm 3rd gear: 1,400 rpm	Yes	Go to next step
		No	Overhaul transaxle and repair or replace any faulty parts ☞ page K2-152

STEP	INSPECTION	ACTION												
13	Check if continuity of transistors in EC-AT control unit is OK	Yes	Go to next step											
	<table border="1"> <thead> <tr> <th>Solenoid valve</th> <th>Terminal</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>1-2 shift</td> <td>2E and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>2-3 shift</td> <td>2G and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>3-4 shift</td> <td>2I and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Solenoid valve	Terminal	Continuity	1-2 shift	2E and 1J or 2P	Yes	2-3 shift	2G and 1J or 2P	Yes	3-4 shift	2I and 1J or 2P	Yes	No
Solenoid valve	Terminal	Continuity												
1-2 shift	2E and 1J or 2P	Yes												
2-3 shift	2G and 1J or 2P	Yes												
3-4 shift	2I and 1J or 2P	Yes												
14	Check if resistance between 2E, 2G, or 2I terminals of EC-AT control unit and ground is OK	Yes	Go to Step 16											
	Resistance: 13—27Ω	No	Go to next step											
15	Check if resistance of solenoid valve(s) is OK ☞ page K2-143	Yes	Check for poor connection at connectors ⇒ If OK, go to next step ⇒ If not OK, repair wiring											
	Resistance: 13—27Ω	No	Replace solenoid valve											
16	Disconnect 20-pin connector of EC-AT control unit Apply 12V to 2E, 2G, and 2I terminals and check if operation sound (clicking) of solenoid is heard	Yes	Try known good EC-AT control unit and go to next step											
		No	Replace solenoid valve											
17	Try known good EC-AT control unit, control valve assembly, or replace transaxle													

12	ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE		
<p>[TROUBLESHOOTING HINTS]</p> <ul style="list-style-type: none"> ① ATF level low ② Powertrain slippage (Forward clutch, reverse clutch, low and reverse brake, one-way clutch 1, or one-way clutch 2) ③ Control valve stuck (Pressure regulator valve) ④ Oil pump worn 			
STEP	INSPECTION		ACTION
1	<p>Check if ATF level is OK ☞ page K2-134</p> <p>Level: Between notches on HOT side of level gauge at 65°C (149°F)</p> <div style="text-align: center;">  </div>	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134
2	<p>Check if ATF condition is OK ☞ page K2-134</p> <ul style="list-style-type: none"> ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid <div style="text-align: center;">  </div>	Yes	Go to next step
		No	<p>No.2 condition Overhaul transaxle and repair or replace parts as necessary</p> <p>No.3 or No.4 condition Replace ATF</p> ☞ page K2-134
3	<p>Check if engine stall speed is OK ☞ page K2-119</p> <p>Engine stall speed: 2,550—2,650 rpm</p> <div style="text-align: center;">  </div>	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K2-121

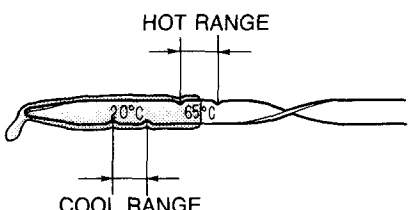
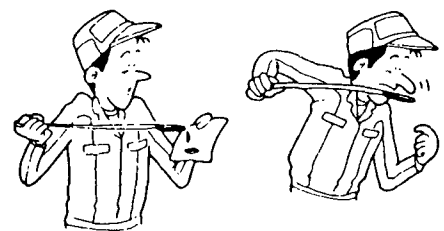
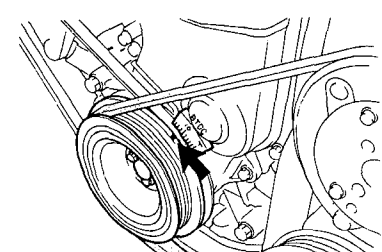
STEP	INSPECTION	ACTION													
4	Check if line pressure and throttle pressure are within specification ☞ page K2-123 125 Line pressure: <table border="1"> <thead> <tr> <th>Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <td></td> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)			Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Yes No	Go to next step Check for cause (Refer to Evaluation) ☞ page K2-124 126
		Range	Line pressure kPa (kg/cm ² , psi)												
	Idle	Stall													
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)													
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)													
Throttle pressure:	<table border="1"> <thead> <tr> <th>Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <td></td> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Throttle pressure kPa (kg/cm ² , psi)			Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)					
Range	Throttle pressure kPa (kg/cm ² , psi)														
	Idle	Stall													
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)													
5	Try known good EC-AT control unit, control valve assembly, or replace transaxle														

03U0K2-038

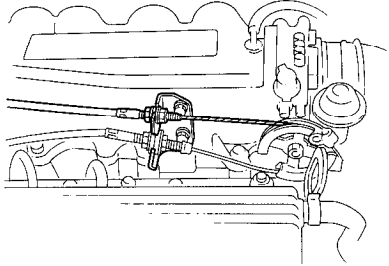
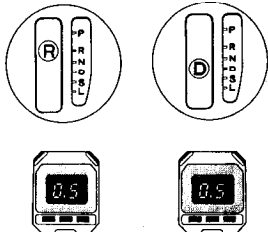
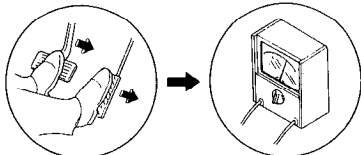
13	ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING		
<p>[TROUBLESHOOTING HINTS]</p> <p>① ATF level low ② Throttle cable misadjusted ③ Powertrain slippage (Forward clutch, 3-4 clutch, 2-4 brake band, one-way clutch 1, one-way clutch 2, or reverse clutch) ④ Control valve stuck (Pressure regulator valve) ⑤ Oil pump worn ⑥ Hydraulic circuit clogged or leaking (Forward clutch, 3-4 clutch, 2-4 brake band, or reverse clutch)</p>			
STEP	INSPECTION	ACTION	
1	Check if ATF level is OK ☞ page K2-134 Level: Between notches on HOT side of level gauge at 65°C (149°F)	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134
2	Check if ATF condition is OK ☞ page K2-134 ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid	Yes	Go to next step
		No	No.2 condition Overhaul transaxle and repair or replace parts as necessary ☞ page K2-134 No.3 or No.4 condition Replace ATF
3	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K2-121

STEP	INSPECTION	ACTION																				
4	<p>Check if line pressure and throttle pressure are within specification</p> <p style="text-align: right;">☞ page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
Range	Line pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																				
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Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
		No	Check for cause (Refer to Evaluation) ☞ page K2-124 126																			
5	Try known good EC-AT control unit or control valve assembly, or replace transaxle																					

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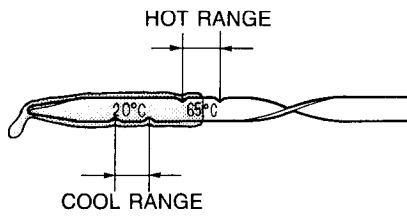
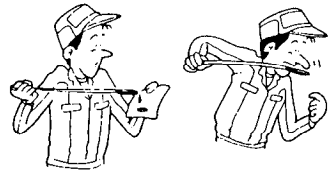
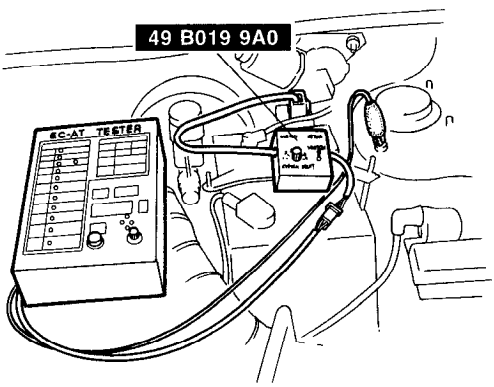
14	EXCESSIVE N TO R OR N TO D RANGE SHIFT SHOCK					
<p>[TROUBLESHOOTING HINTS]</p> <ul style="list-style-type: none"> ① Engine idle speed misadjusted ② Throttle cable misadjusted ③ Accumulator malfunction (N-D accumulator or N-R accumulator) ④ Hydraulic circuit clogged or leaking (N-D accumulator or N-R accumulator) ⑤ Control valve stuck (Pressure control valve, throttle valve, or throttle modulator valve) 						
STEP	INSPECTION	ACTION				
1	<p>Check if ATF level is OK ☞ page K2-134</p> <p>Level: Between notches on HOT side of level gauge at 65°C (149°F)</p> <div style="text-align: center;">  </div>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50px; vertical-align: top;">Yes</td> <td>Go to next step</td> </tr> <tr> <td style="vertical-align: top;">No</td> <td>Add ATF to specified level ☞ page K2-134</td> </tr> </table>	Yes	Go to next step	No	Add ATF to specified level ☞ page K2-134
Yes	Go to next step					
No	Add ATF to specified level ☞ page K2-134					
2	<p>Check if ATF condition is OK ☞ page K2-134</p> <ul style="list-style-type: none"> ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid <div style="text-align: center;">  </div>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50px; vertical-align: top;">Yes</td> <td>Go to next step</td> </tr> <tr> <td style="vertical-align: top;">No</td> <td> No.2 condition Overhaul transaxle and repair or replace parts as necessary ☞ page K2-134 No.3 or No.4 condition Replace ATF </td> </tr> </table>	Yes	Go to next step	No	No.2 condition Overhaul transaxle and repair or replace parts as necessary ☞ page K2-134 No.3 or No.4 condition Replace ATF
Yes	Go to next step					
No	No.2 condition Overhaul transaxle and repair or replace parts as necessary ☞ page K2-134 No.3 or No.4 condition Replace ATF					
3	<p>Check if ignition timing at idle is OK ☞ page *F-72</p> <p>Ignition timing (BTDC): 7 ± 1°</p> <div style="text-align: center;">  </div>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50px; vertical-align: top;">Yes</td> <td> Check for correct idle speed ☞ page *F-72 Idle speed: 750 ± 50 rpm (with parking brake applied) ⇨ If OK, go to next step ⇨ If not OK, adjust the idle speed ☞ page *F-72 </td> </tr> <tr> <td style="vertical-align: top;">No</td> <td>Adjust ignition timing ☞ page *F-72</td> </tr> </table>	Yes	Check for correct idle speed ☞ page *F-72 Idle speed: 750 ± 50 rpm (with parking brake applied) ⇨ If OK, go to next step ⇨ If not OK, adjust the idle speed ☞ page *F-72	No	Adjust ignition timing ☞ page *F-72
Yes	Check for correct idle speed ☞ page *F-72 Idle speed: 750 ± 50 rpm (with parking brake applied) ⇨ If OK, go to next step ⇨ If not OK, adjust the idle speed ☞ page *F-72					
No	Adjust ignition timing ☞ page *F-72					

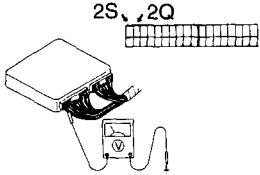
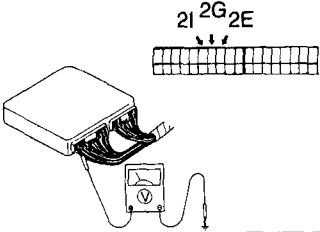
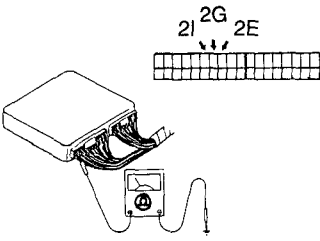
* Refer to 1990 323 Workshop Manual (1195-10-89E).

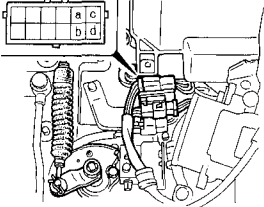
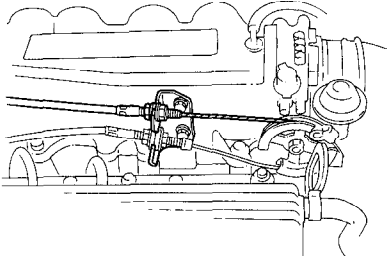
STEP	INSPECTION		ACTION											
4	Check if throttle cable operates smoothly and is installed correctly ☞ page K2-137 	Yes	Go to next step											
		No	Replace throttle cable ☞ page K2-137											
5	Check if line pressure at idle is OK ☞ page K2-139 Line pressure: <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Yes	Go to next step
	Range		Line pressure kPa (kg/cm ² , psi)											
Idle		Stall												
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)												
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)												
	No	Adjust throttle cable ☞ page K2-139												
6	Check if time lag is within specification at idle ☞ page K2-122 Time lag: N → D: 0.5—1.0 second N → R: 0.6—1.0 second 	Yes	Go to next step											
		No	Check for cause (Refer to Evaluation) ☞ page K2-122											
7	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm 	Yes	Go to next step											
		No	Check for cause (Refer to Evaluation) ☞ page K2-121											

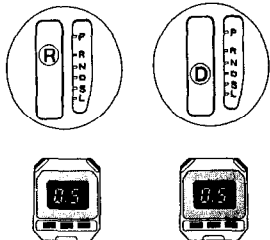
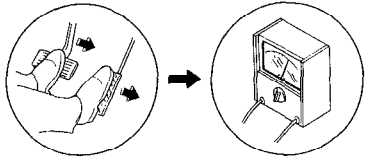
STEP	INSPECTION	Yes	ACTION																			
8	<p>Check if line pressure and throttle pressure are within specification</p> <p style="text-align: right;">☞ page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
Range	Line pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
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Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
		No	Check for cause (Refer to Evaluation) ☞ page K2-124 126																			
9	Try known good EC-AT control unit, control valve assembly, or replace transaxle																					

03U0K2-040

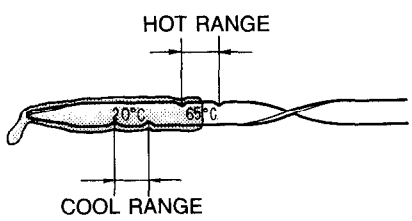
15	EXCESSIVE SHIFT SHOCK WHEN UPSHIFTING AND DOWNSHIFTING		
<p>[TROUBLESHOOTING HINTS]</p> <ul style="list-style-type: none"> ① ATF level low ② Throttle cable misadjusted ③ 2-4 brake band (band servo) misadjusted ④ Accumulator malfunction (1-2 accumulator or 2-3 accumulator) ⑤ Shift solenoid valves stuck (1-2, 2-3, or 3-4) ⑥ Powertrain slippage (Coasting clutch, 3-4 clutch, or 2-4 brake band) ⑦ Control valve stuck (Pressure regulator valve, throttle valve, or throttle modulator valve) ⑧ Hydraulic circuit clogged or leaking (Coasting clutch, 3-4 clutch, or 2-4 brake band) 			
STEP	INSPECTION		ACTION
1	Check if ATF level is OK ☞ page K2-134 Level: Between notches on HOT side of level gauge at 65°C (149°F)	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134
2	Check if ATF condition is OK ☞ page K2-134 ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid	Yes	Go to next step
		No	No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134
3	Check if "00" is displayed on EC-AT Tester with ignition switch ON ☞ page K2-106	Yes	Go to next step
		No	Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON)
			"88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring


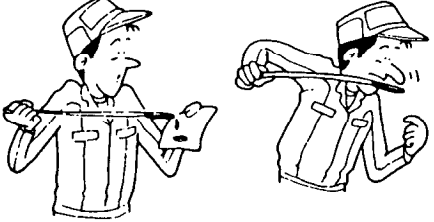


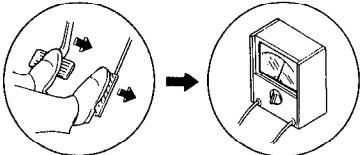



STEP	INSPECTION		ACTION												
4	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct	Yes	Go to Steps 6, 11, 13 and 14 in sequence												
		No	No indication at all lamps ⇒ Go to next step <i>Individual lamp(s) does not illuminate</i> ⇒ Check for cause												
5	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ↗ page K2-144 Voltage: Approx. 12V (Ignition switch ON) <div style="text-align: center;"> 2S, 2Q  </div>	Yes	Go to next step												
		No	Repair wiring												
6	Check if voltage at 2E, 2G, or 2I terminals of EC-AT control unit is OK ↗ page K2-144 Voltage: Approx. 12V (When solenoid ON) <div style="text-align: center;"> 2I 2G 2E  </div>	Yes	Go to Step 8												
		No	Go to next step												
7	Check if continuity in transistors of EC-AT control unit is OK <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 25%;">Solenoid valve</th> <th style="width: 25%;">Terminal</th> <th style="width: 50%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>1-2 shift</td> <td>2E and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>2-3 shift</td> <td>2G and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>3-4 shift</td> <td>2I and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Solenoid valve	Terminal	Continuity	1-2 shift	2E and 1J or 2P	Yes	2-3 shift	2G and 1J or 2P	Yes	3-4 shift	2I and 1J or 2P	Yes	Yes	Go to next step
		Solenoid valve	Terminal	Continuity											
1-2 shift	2E and 1J or 2P	Yes													
2-3 shift	2G and 1J or 2P	Yes													
3-4 shift	2I and 1J or 2P	Yes													
No	Replace EC-AT control unit														
8	Check if resistance between 2E, 2G, and 2I terminals of EC-AT control unit and ground is OK Resistance: 13—27Ω <div style="text-align: center;"> 2I 2G 2E  </div>	Yes	Go to Step 10												
		No	Go to next step												

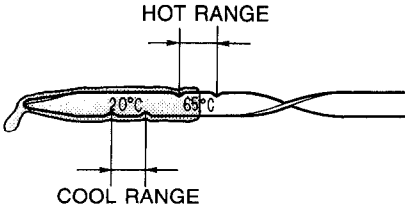
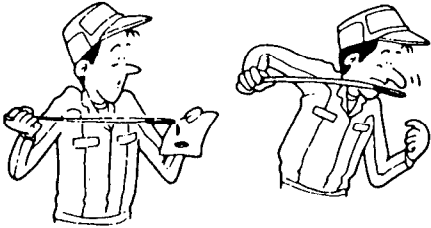
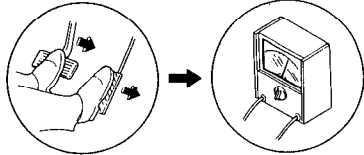
STEP	INSPECTION	ACTION	
9	Check if resistance of solenoid valves is OK ☞ page K2-143	Yes	Check for poor connection at connectors ⇨ If OK, go to next step ⇨ If not OK, repair wiring
	Resistance: 13—27Ω		
		No	Replace solenoid valve
10	Disconnect 20-pin connector of EC-AT control unit Apply 12V to 2E, 2G, and 2I terminals and check if operation sound (clicking) of solenoid is heard	Yes	Try known good EC-AT control unit and go to next step
		No	Replace solenoid valve
11	Check if throttle cable operates smoothly and is installed correctly ☞ page K2-137	Yes	Go to next step
		No	Replace throttle cable ☞ page K2-137
12	Check if line pressure at idle is OK ☞ page K2-139	Yes	Go to next step
	Line pressure: 402—422 kPa (4.1—4.3 kg/cm², 58—61 psi)		
		No	Adjust throttle cable ☞ page K2-139

STEP	INSPECTION		ACTION
13	Check if time lag is within specification at idle ☞ page K2-122 Time lag: N → D: 0.5—1.0 second N → R: 0.6—1.0 second 	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K2-122
17	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm 	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K2-121
15	Try known good EC-AT control unit, control valve body, or replace transaxle		

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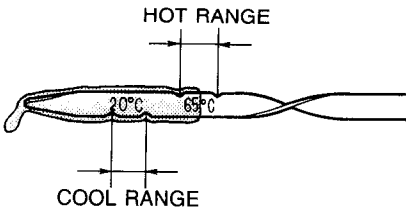
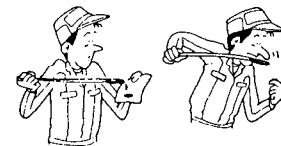
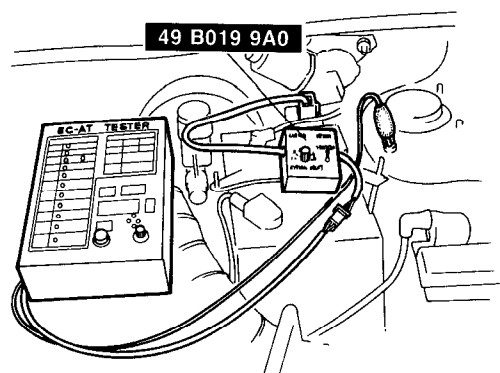
16	TRANSAXLE NOISY IN N AND P RANGES		
DESCRIP-TION	•Noise corresponds to engine speed		
[TROUBLESHOOTING HINTS]			
① ATF level low ② Oil pump worn			
STEP	INSPECTION		ACTION
1	Check if ATF level is OK ☞ page K2-134 Level: Between notches on HOT side of level gauge at 65°C (149°F) 	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134

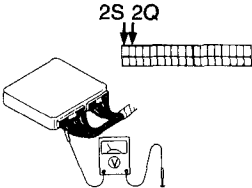
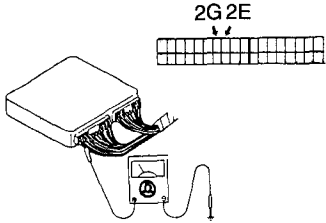
STEP	INSPECTION		ACTION																			
2	<p>Check if ATF condition is OK  page K2-134</p> <p>① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid</p> 	Yes	Go to next step																			
		No	No.2 condition Overhaul transaxle and repair or replace parts as necessary  page K2-134 No.3 or No.4 condition Replace ATF																			
3	<p>Check if engine stall speed is OK  page K2-110</p> <p>Engine stall speed: 2,550—2,650 rpm</p> 	Yes	Go to next step																			
		No	Check for cause (Refer to Evaluation)  page K2-121																			
4	<p>Check if line pressure and throttle pressure are within specification  page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
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	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
		No	Check for cause (Refer to Evaluation)  page K2-124 126																			
5	Check for other cause of noise or overhaul transaxle																					

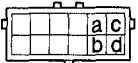
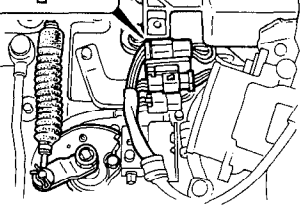
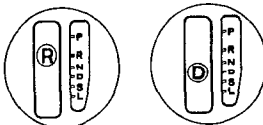


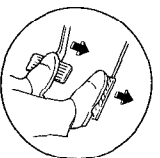
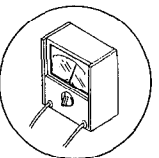
17	TRANSAXLE NOISY IN D, S, L AND R RANGES		
DESCRIPTION	<ul style="list-style-type: none"> • Noise corresponds to vehicle speed 		
[TROUBLESHOOTING HINTS]			
<ul style="list-style-type: none"> ① ATF level low ② Differential backlash incorrect ③ Torque converter worn ④ Oil pump worn 			
STEP	INSPECTION		ACTION
1	Check if ATF level is OK ☞ page K2-134 Level: Between notches on HOT side of level gauge at 65°C (149°F)	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134
2	Check if ATF condition is OK ☞ page K2-134 <ul style="list-style-type: none"> ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid 	Yes	Go to next step
		No	No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134
3	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K2-121

STEP	INSPECTION	ACTION																				
4	<p>Check if line pressure and throttle pressure are within specification</p> <p style="text-align: right;">☞ page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	Yes	Go to next step
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Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
		No	Check for cause (Refer to Evaluation) ☞ page K2-124 126																			
5	Check other cause of noise or overhaul transaxle																					

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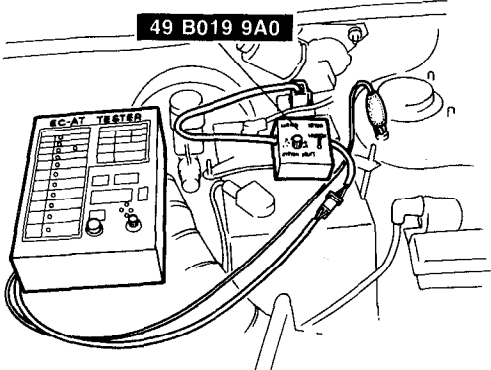
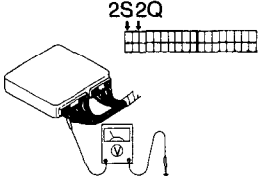
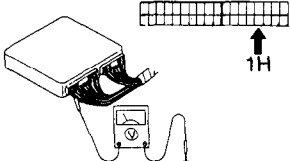
18	NO ENGINE BRAKING		
DESCRIP-TION	<ul style="list-style-type: none"> • No engine braking as follows <ul style="list-style-type: none"> D range (Normal and Hold mode): 3rd and OD S range (Normal mode): 3rd S range (Hold mode): 2nd L range (Normal mode): 2nd L range (Hold mode): 1st 		
[TROUBLESHOOTING HINTS]			
<ul style="list-style-type: none"> ① ATF level low ② Shift solenoid valve stuck (1-2 shift valve or 2-3 shift valve) ③ Powertrain slippage (Coasting clutch, or low and reverse brake) ④ Control valve stuck (1-2 shift valve, 2-3 shift valve, low reducing valve, or manual valve) ⑤ Hydraulic circuit clogged or leaking (Coasting clutch, or low and reverse brake) 			
STEP	INSPECTION		ACTION
1	Check if ATF level is OK ☞ page K2-134 Level: Between notches on HOT side of level gauge at 65°C (149°F)	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134
			
2	Check if ATF condition is OK ☞ page K2-134 <ul style="list-style-type: none"> ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid 	Yes	Go to next step
		No	No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134
			
3	Check if "00" is displayed on EC-AT Tester with ignition switch ON ☞ page K2-106	Yes	Go to next step
		No	Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON)
		"88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring	
			

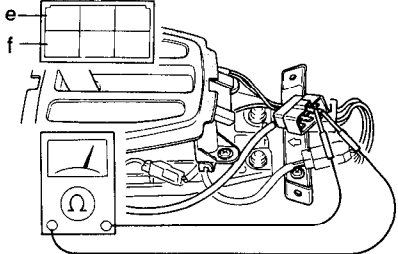
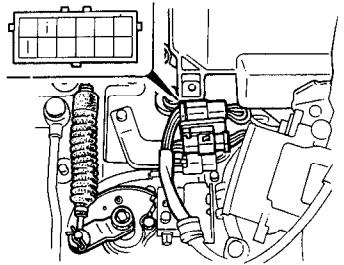
STEP	INSPECTION		ACTION												
4	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially solenoid valves)	Yes	Go to Steps 6, 10, 11 and 12 in sequence												
		No	No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause												
5	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ↗ page K2-144 Voltage: Approx. 12V (Ignition switch ON)	Yes	Go to next step												
		No	Repair wiring												
6	Check of continuity in transistors in EC-AT control unit is OK <table border="1"> <thead> <tr> <th>Solenoid valve</th> <th>Terminal</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>1-2 shift</td> <td>2E and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>2-3 shift</td> <td>2G and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>3-4 shift</td> <td>2I and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Solenoid valve	Terminal	Continuity	1-2 shift	2E and 1J or 2P	Yes	2-3 shift	2G and 1J or 2P	Yes	3-4 shift	2I and 1J or 2P	Yes	Yes	Go to next step
Solenoid valve	Terminal	Continuity													
1-2 shift	2E and 1J or 2P	Yes													
2-3 shift	2G and 1J or 2P	Yes													
3-4 shift	2I and 1J or 2P	Yes													
		No	Replace EC-AT control unit												
7	Check if resistance between 2E, and 2G terminals of EC-AT control unit and ground is OK Resistance: 13—27Ω	Yes	Go to Step 9												
		No	Go to next step												

STEP	INSPECTION		ACTION
8	<p>Check if resistance of solenoid valves is OK ☞ page K2-143</p> <p>Resistance: 13—27Ω</p>  	Yes	<p>Check for poor connection at connectors</p> <p>⇒ If OK, go to next step ⇒ If not OK, repair wiring</p>
		No	<p>Replace solenoid valve</p>
9	<p>Disconnect 20-pin connector of EC-AT control unit Apply 12V to 2E and 2G terminals and check if operation sound (clicking) of solenoid is heard</p>	Yes	<p>Try known good EC-AT control unit and go to next step</p>
		No	<p>Replace solenoid valve</p>
10	<p>Check if time lag is within specified at idle ☞ page K2-122</p> <p>Time lag N → D: 0.5—1.0 second N → R: 0.6—1.0 second</p>   	Yes	<p>Go to next step</p>
		No	<p>Check for cause (Refer to Evaluation) ☞ page K2-122</p>
11	<p>Check if engine stall speed is OK ☞ page K2-119</p> <p>Engine stall speed: 2,550—2,650 rpm</p>  	Yes	<p>Go to next step</p>
		No	<p>Check for cause (Refer to Evaluation) ☞ page K2-121</p>

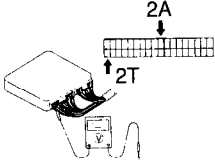
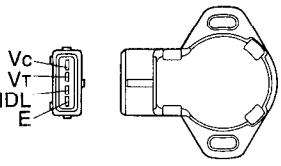
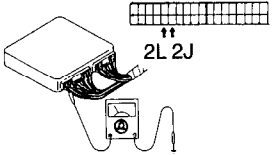
STEP	INSPECTION		ACTION																			
12	<p>Check if line pressure and throttle pressure are within specification</p> <p style="text-align: right;">☞ page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	<p>Yes</p> <p>No</p>	<p>Go to next step</p> <p>Check for cause (Refer to Evaluation) ☞ page K2-124 126</p>
Range	Line pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																				
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)																				
Range	Throttle pressure kPa (kg/cm ² , psi)																					
	Idle	Stall																				
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																				
13	<p>Try known good EC-AT control unit, control valve assembly, solenoid valves, or replace transaxle</p>																					

03U0K2-044

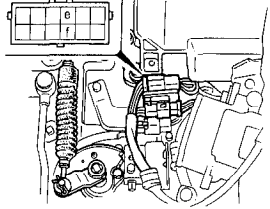
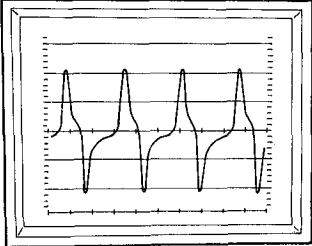
19	NO MODE CHANGES	
DESCRIP-TION	• Hold mode cannot be selected or is not canceled when ignition switch turned OFF	
[TROUBLESHOOTING HINTS]		
① Hold switch circuit shorted ② Throttle sensor malfunction or misadjusted ③ ATF thermosensor malfunction ④ Vehicle speed sensor malfunction ⑤ Pulse generator malfunction ⑥ Solenoid valves stuck		
STEP	INSPECTION	ACTION
1	Check if "00" is displayed on EC-AT Tester with ignition switch ON ⇨ page K2-106 	Yes: Go to next step No: Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ⇨ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12 (Ignition switch ON) "88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring
2	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially hold switch, solenoid valves, ATF thermosensor, shift signal, throttle sensor voltage, vehicle speed, and drum speed)	Yes: Go to Steps 4, 7, 9, 11, 14 and 16 in sequence No: No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause
3	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ⇨ page K2-144 Voltage: Approx. 12V (Ignition switch ON) 	Yes: Go to next step No: Repair wiring
4	Check if voltage at 1H terminal of EC-AT control unit is OK ⇨ page K2-144 Voltage: Approx. 12V (Hold switch released) 	Yes: Go to Step 7 No: Go to next step

STEP	INSPECTION	ACTION					
5	Check if continuity between a terminal of hold switch and 1H terminal of EC-AT control unit is OK	Yes Go to next step					
		No Repair wiring					
6	Check if operation of hold switch is OK ➔ page K2-140	Yes Check for open or short circuit of wiring and poor connection at connectors ⇨ If OK, go to next step ⇨ If not OK, repair wiring					
	<table border="1"> <thead> <tr> <th>Switch</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>Depressed</td> <td>No</td> </tr> <tr> <td>Released</td> <td>Yes</td> </tr> </tbody> </table> 	Switch	Continuity	Depressed	No	Released	Yes
Switch	Continuity						
Depressed	No						
Released	Yes						
7	Measure resistance while warming up ATF (driving vehicle) Check if resistance between 1G terminal and 1J or 2P terminals of EC-AT control unit is OK	Yes Go to Step 22					
		No Go to next step					
8	Check if resistance between terminals of ATF thermosensor is OK 	Yes Check for poor connection at connectors ⇨ If OK, try known good EC-AT control unit or ATF thermosensor and go to next step ⇨ If not OK, repair wiring					
		No Go to next step					

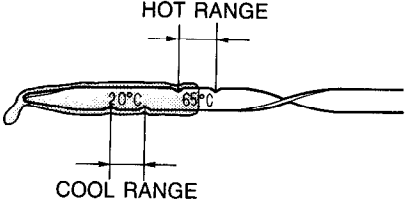
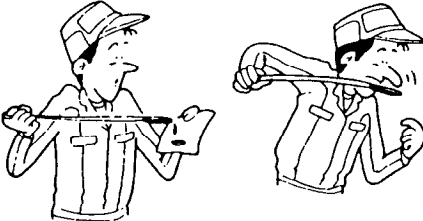
STEP	INSPECTION		ACTION															
9	Drive vehicle above 80 km/h (50 mph) in D range OD Check if voltage at 2K terminal of EC-AT control unit is OK ➤ page K2-144 Approx. 12V: Lockup solenoid ON (Lockup)	Yes	Go to Step 14															
		No	Go to next step															
10	Check if continuity of transistors in EC-AT control unit is OK <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>Solenoid valve</th> <th>Terminal</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>1-2 shift</td> <td>2E and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>2-3 shift</td> <td>2G and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>3-4 shift</td> <td>2I and 1J or 2P</td> <td>Yes</td> </tr> <tr> <td>Lockup</td> <td>2K and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Solenoid valve	Terminal	Continuity	1-2 shift	2E and 1J or 2P	Yes	2-3 shift	2G and 1J or 2P	Yes	3-4 shift	2I and 1J or 2P	Yes	Lockup	2K and 1J or 2P	Yes	Yes	Go to next step
		Solenoid valve	Terminal	Continuity														
1-2 shift	2E and 1J or 2P	Yes																
2-3 shift	2G and 1J or 2P	Yes																
3-4 shift	2I and 1J or 2P	Yes																
Lockup	2K and 1J or 2P	Yes																
No	Replace EC-AT control unit																	
11	Check if resistance between 2E, 2G, 2I, or 2K terminals of EC-AT control unit and ground is OK Resistance: 13—27Ω	Yes	Go to Step 13															
		No	Go to next step															
12	Check if resistance of solenoid valve(s) is OK ➤ page K2-143 Resistance: 13—27Ω	Yes	Check for poor connection at connectors ⇨ If OK, go to next step ⇨ If not OK, repair wiring															
		No	Replace solenoid valve															

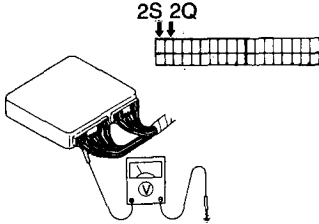
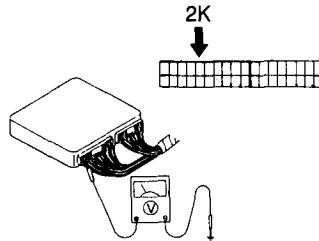
STEP	INSPECTION		ACTION						
13	Disconnect 20-pin connector of EC-AT control unit Apply 12V to 2E, 2G, 2I and 2K terminals and check if operation sound (clicking) of solenoid is heard	Yes	Try known good EC-AT control unit and go to next step						
		No	Replace solenoid valve						
14	Apply 12V to 2K terminal of EC-AT control unit Start engine in P range and let it idle Shift to D range and check if engine stalls	Yes	Go to next step						
		No	Replace lockup solenoid valve						
15	Check if voltage at 2A and 2T terminals of EC-AT control unit is OK ☞ page K2-144	Yes	Go to Step 16						
		No	Check for poor connection at connectors ⇨ If OK, go to next step ⇨ If not OK, repair wiring						
<table border="1"> <thead> <tr> <th>Terminal</th> <th>Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>2A</td> <td>5 (Ignition switch ON)</td> </tr> <tr> <td>2T</td> <td>0.4—4.4 (Accelerator closed to open)</td> </tr> </tbody> </table>		Terminal	Voltage (V)	2A	5 (Ignition switch ON)	2T	0.4—4.4 (Accelerator closed to open)		
Terminal	Voltage (V)								
2A	5 (Ignition switch ON)								
2T	0.4—4.4 (Accelerator closed to open)								
									
16	Check if throttle sensor is OK ☞ page *F-143	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇨ If OK, go to next step ⇨ If not OK, repair wiring						
		No	Adjust or replace throttle sensor ☞ page *F-143						
									
17	Disconnect 20-pin connector of EC-AT control unit Check if resistance between 2J terminal and 2L terminal of EC-AT control unit is OK Resistance: 200—400Ω	Yes	Go to Step 19						
		No	Go to next step						
									

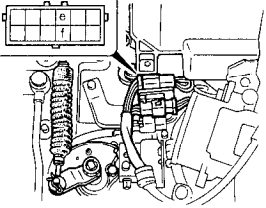
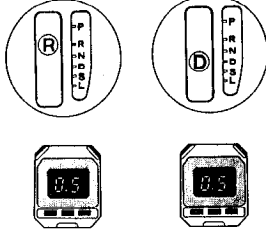
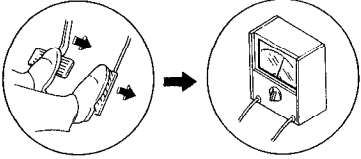
* Refer to 1990 323 Workshop Manual (1195-10-89E).

STEP	INSPECTION		ACTION
18	Check if resistance of pulse generator is OK ➔ page K2-142 Resistance: 200—400Ω 	Yes	Check for poor connection at connectors and go to next step
		No	Replace pulse generator
19	Connect oscilloscope ground terminal to 2L terminal of EC-AT control unit, and oscilloscope input terminal to 2J terminal of EC-AT control unit Check if pulse display is OK 	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇨ If OK, go to next step ⇨ If not OK, repair wiring
		No	Very low voltage: Replace pulse generator
			Noise in wave form: Check for improper grounding of shield-wiring or replace pulse generator
20	Try known good EC-AT control unit		

03U0K2-045

20	TRANSAXLE OVERHEATS		
DESCRIPTION	• Burned smell from transaxle		
[TROUBLESHOOTING HINTS]			
① ATF level low ② Lockup solenoid stuck ③ ATF thermosensor malfunction ④ Oil pump worn ⑤ Torque converter worn			
STEP	INSPECTION		ACTION
1	Check if ATF level is OK ☞ page K2-134 Level: Between notches on HOT side of level gauge at 65°C (149°F) 	Yes	Go to next step
		No	Add ATF to specified level ☞ page K2-134
2	Check if ATF condition is OK ☞ page K2-134 ① Clear pink: Normal condition ② Dark or black (with friction material): Worn powertrain components ③ Milky pink: Water contamination ④ Light to dark brown (Oxidation): Overheated or old fluid 	Yes	Go to next step
		No	No.2 condition Overhaul transaxle and repair or replace parts as necessary No.3 or No.4 condition Replace ATF ☞ page K2-134
3	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially lockup solenoid valve)	Yes	Go to Steps 5, 8, 10, 11 and 12 in sequence
		No	No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause

STEP	INSPECTION	ACTION					
4	<p>Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK</p> <p style="text-align: right;">☞ page K2-144</p> <p>Voltage: Approx. 12V (Ignition switch ON)</p> 	Yes	Go to next step				
		No	Repair wiring				
5	<p>Drive vehicle above 80 km/h (50 mph) in D range OD</p> <p>Check if voltage at terminal 2K of EC-AT control unit is OK</p> <p style="text-align: right;">☞ page K2-144</p> <p>Voltage: Approx. 12V (Lockup solenoid ON [Lockup])</p> 	Yes	Go to Step 7				
		No	Go to next step				
6	<p>Check if continuity of transistor in EC-AT control unit is OK</p> <table border="1"> <thead> <tr> <th>Terminal</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>2K and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Terminal	Continuity	2K and 1J or 2P	Yes	Yes	Go to next step
Terminal	Continuity						
2K and 1J or 2P	Yes						
		No	Replace EC-AT control unit				
7	<p>Apply 12V to 2K terminal of EC-AT control unit</p> <p>Start engine in P range and let it idle</p> <p>Shift to D range and check if engine stalls</p>	Yes	Go to next step				
		No	Replace lockup solenoid valve				

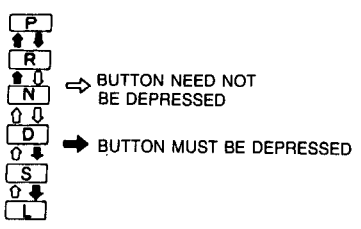
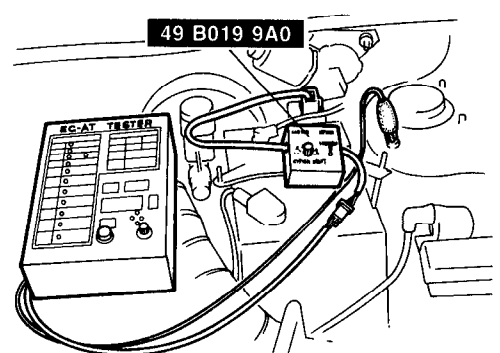
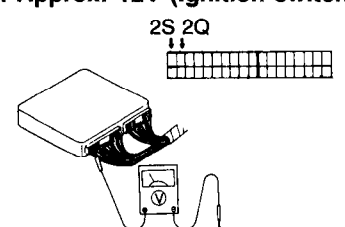
STEP	INSPECTION		ACTION
8	Measure resistance while warming up ATF (driving vehicle) Check for correct resistance between G terminal and J or 2P terminals of EC-AT control unit	Yes	Go to Step 10
		No	Go to next step
9	Check for correct resistance between terminals of ATF thermosensor ↗ page K2-142	Yes	Check for poor connection at connectors ⇒ If OK, try known good EC-AT control unit or ATF thermosensor and go to next step ⇒ If not OK, replace wiring
		No	Go to next step
10	Check if time lag is within specification at idle ↗ page K2-122 Time lag N → D: 0.5—1.0 second N → R: 0.6—1.0 second	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ↗ page K2-122
11	Check if engine stall speed is OK ↗ page K2-119 Engine stall speed: 2,550—2,650 rpm	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ↗ page K2-121

STEP	INSPECTION	ACTION																			
12	<p>Check if line pressure and throttle pressure are within specification</p> <p style="text-align: right;">☞ page K2-123 125</p> <p>Line pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D,S,L</td> <td>353—432 (3.6—4.4, 51—63)</td> <td>873—1,040 (8.9—10.6, 127—151)</td> </tr> <tr> <td>R</td> <td>598—942 (6.1—9.6, 87—137)</td> <td>1,668—2,011 (17.0—20.5, 242—292)</td> </tr> </tbody> </table> <p>Throttle pressure:</p> <table border="1"> <thead> <tr> <th rowspan="2">Range</th> <th colspan="2">Throttle pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>Idle</th> <th>Stall</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>39—88 (0.4—0.9, 6—13)</td> <td>471—589 (4.8—6.0, 68—85)</td> </tr> </tbody> </table>	Range	Line pressure kPa (kg/cm ² , psi)		Idle	Stall	D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)	R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)	Range	Throttle pressure kPa (kg/cm ² , psi)		Idle	Stall	D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)	<p>Yes Go to next step</p> <p>No Check for cause (Refer to Evaluation) ☞ page K2-124 126</p>
Range	Line pressure kPa (kg/cm ² , psi)																				
	Idle	Stall																			
D,S,L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)																			
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)																			
Range	Throttle pressure kPa (kg/cm ² , psi)																				
	Idle	Stall																			
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)																			
13	Try known good EC-AT control unit, control valve assembly, or replace transaxle																				


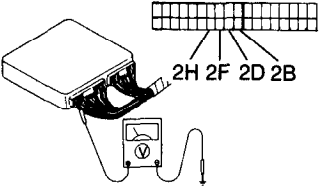

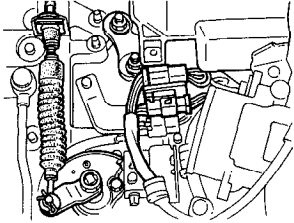

03U0K2-046

21		HOLD INDICATOR LAMP FLASHES																	
DESCRIPTION		• Malfunction in EC-AT system component (Vehicle speed sensor, pulse generator, shift signal, or solenoid valve(s))																	
[TROUBLESHOOTING HINTS] Check for Malfunction Code No. and repair system (Refer to SELF-DIAGNOSIS FUNCTION; page K2-104)																			
STEP	INSPECTION	ACTION																	
1	Connect EC-AT Tester to diagnosis connector and set TEST SW to SELF TEST Check if Malfunction Code No. is displayed <table border="1"> <thead> <tr> <th>Code No.</th> <th>LOCATION OF MALFUNCTION</th> </tr> </thead> <tbody> <tr> <td>06</td> <td>Vehicle speed sensor</td> </tr> <tr> <td>12</td> <td>Throttle sensor</td> </tr> <tr> <td>55</td> <td>Pulse generator</td> </tr> <tr> <td>60</td> <td>1-2 shift solenoid valve</td> </tr> <tr> <td>61</td> <td>2-3 shift solenoid valve</td> </tr> <tr> <td>62</td> <td>3-4 shift solenoid valve</td> </tr> <tr> <td>63</td> <td>Lockup solenoid valve</td> </tr> </tbody> </table>	Code No.	LOCATION OF MALFUNCTION	06	Vehicle speed sensor	12	Throttle sensor	55	Pulse generator	60	1-2 shift solenoid valve	61	2-3 shift solenoid valve	62	3-4 shift solenoid valve	63	Lockup solenoid valve	Yes	Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108
		Code No.	LOCATION OF MALFUNCTION																
06	Vehicle speed sensor																		
12	Throttle sensor																		
55	Pulse generator																		
60	1-2 shift solenoid valve																		
61	2-3 shift solenoid valve																		
62	3-4 shift solenoid valve																		
63	Lockup solenoid valve																		
No	No Code No. displayed Check main relay, and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON) "88" flashes Check wiring between terminal 1C of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring																		

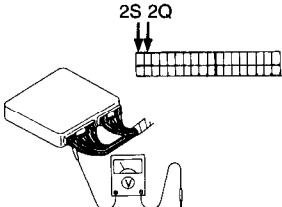
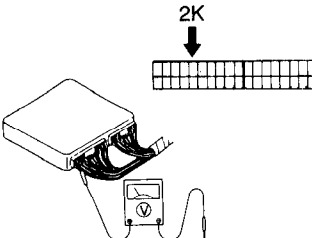
03U0K2-047

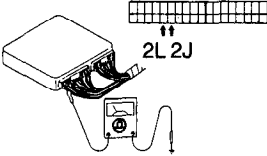
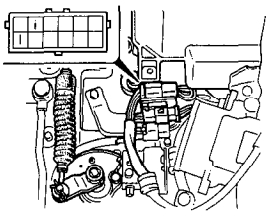
22	ENGINE WILL NOT START IN N OR P RANGE OR WILL START IN OTHER RANGES					
[TROUBLESHOOTING HINTS] ① Inhibitor switch worn or misadjusted ② Selector lever misinstalled or misadjusted						
STEP	INSPECTION	ACTION				
1	Check if selector lever operation is OK ☞ page *K-264 	<table border="0" style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;">Yes</td> <td>Go to next step</td> </tr> <tr> <td style="text-align: center;">No</td> <td>Adjust or repair selector lever ☞ page *K-264</td> </tr> </table>	Yes	Go to next step	No	Adjust or repair selector lever ☞ page *K-264
Yes	Go to next step					
No	Adjust or repair selector lever ☞ page *K-264					
2	Check if "00" is displayed on EC-AT Tester with ignition switch ON ☞ page K2-106 	<table border="0" style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;">Yes</td> <td>Go to next step</td> </tr> <tr> <td style="text-align: center;">No</td> <td> Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON) "88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring </td> </tr> </table>	Yes	Go to next step	No	Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON) "88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring
Yes	Go to next step					
No	Malfunction Code No. displayed Check for cause (Refer to specified check sequence) ☞ page K2-108 No Code No. displayed Check main relay and voltage of terminals 2Q and 2S of EC-AT control unit Voltage: Approx. 12V (Ignition switch ON) "88" flashes Check wiring between 1C terminal of EC-AT control unit and diagnosis connector ⇒ If OK, replace EC-AT control unit ⇒ If not OK, repair wiring					
3	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially inhibitor switch) ☞ page K2-115	<table border="0" style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;">Yes</td> <td>Go to Step 7</td> </tr> <tr> <td style="text-align: center;">No</td> <td> No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause </td> </tr> </table>	Yes	Go to Step 7	No	No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause
Yes	Go to Step 7					
No	No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause					
4	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ☞ page K2-144 Voltage: Approx. 12V (Ignition switch ON) 	<table border="0" style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;">Yes</td> <td>Go to next step</td> </tr> <tr> <td style="text-align: center;">No</td> <td>Repair wiring</td> </tr> </table>	Yes	Go to next step	No	Repair wiring
Yes	Go to next step					
No	Repair wiring					

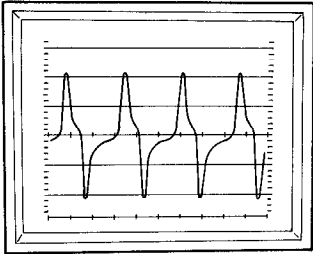
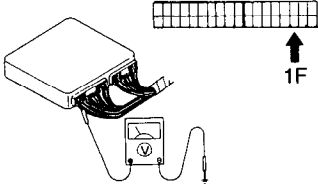
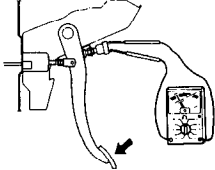
* Refer to 1990 323 Workshop Manual (1195-10-89E).

STEP	INSPECTION		ACTION
5	<p>Check if voltage at 2B, 2D, 2F, and 2H terminals of EC-AT control unit is OK  page K2-144</p> <p>Voltage: Approx. 12V (D,S,L range switch ON) Below 1.5V (P or N range switch ON)</p> 	Yes	Check other cause of malfunction
		No	Go to next step
6	<p>Check for correct continuity between each terminal of inhibitor switch and terminal of EC-AT control unit</p>	Yes	Go to next step
		No	Repair wiring
7	<p>Check if operation of inhibitor switch is OK  page K2-140</p> 	Yes	<p>Check for open or short circuit of wiring and poor connection at connectors</p> <p>⇒ If OK, go to next step ⇒ If not OK repair wiring</p>
		No	Replace inhibitor switch  page K2-141
8	<p>Check other cause of malfunction or try known good EC-AT control unit and see if condition improves</p>		

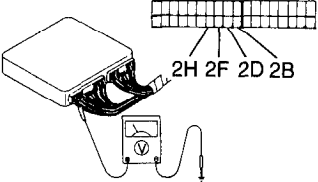
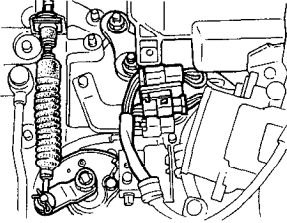
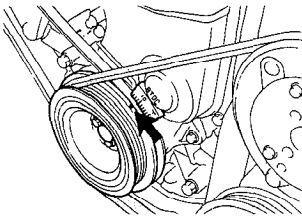
03U0K2-048

23	ENGINE STALLS WHEN SHIFTED TO D, S, L, AND R RANGES	
DESCRIP-TION	<ul style="list-style-type: none"> • Engine stalls when shifting from N or P range to D, S, L, or R range and strong shift shock • Engine will start and run in P and N ranges 	
[TROUBLESHOOTING HINTS]		
<ul style="list-style-type: none"> ① Engine idle speed misadjusted ② Stoplight switch or circuit shorted ③ Inhibitor switch worn or misadjusted ④ Pulse generator malfunction ⑤ Lockup solenoid stuck ⑥ Lockup control valve stuck ⑦ Powertrain slippage (Forward clutch) ⑧ Torque converter worn 		
STEP	INSPECTION	ACTION
1	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially inhibitor switch, stoplight switch, lockup solenoid valve and drum speed)	Yes Go to Steps 3, 6, 9, 12, 15 and 16 in sequence
		No No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause
2	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ➤ page K2-144 Voltage: Approx. 12V (Ignition switch ON) 	Yes Go to next step
		No Repair wiring
3	Drive vehicle above 80 km/h (50 mph) in D range OD Check if voltage at 2K terminal of EC-AT control unit is OK ➤ page K2-144 Voltage: Approx. 12V (Lockup solenoid ON [Lockup]) 	Yes Go to Step 6
		No Go to next step

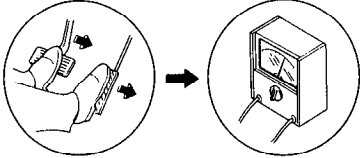
STEP	INSPECTION		ACTION				
4	Check if continuity of transistor in EC-AT control unit is OK <table border="1"> <thead> <tr> <th>Terminal</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td>2K and 1J or 2P</td> <td>Yes</td> </tr> </tbody> </table>	Terminal	Continuity	2K and 1J or 2P	Yes	Yes	Go to next step
	Terminal	Continuity					
2K and 1J or 2P	Yes						
No	Replace EC-AT control unit						
5	Apply 12V to 2K terminal of EC-AT control unit Start engine in P range and let it idle Shift to D range and check if engine stalls	Yes	Go to next step				
	No	Replace solenoid valve					
6	Disconnect 20-pin connector of EC-AT control unit Check if resistance between 2J and 2L terminals of EC-AT control unit is OK Resistance: 200—400Ω	Yes	Go to Step 8				
	No	Go to next step					
7	Check if resistance of pulse generator is OK  Resistance: 200—400Ω	Yes	Check for poor connection at connectors and go to next step				
	No	Replace pulse generator 					

STEP	INSPECTION		ACTION						
8	Connect oscilloscope ground terminal to 2L terminal of EC-AT control unit, and oscilloscope input terminal to 2J terminal of EC-AT control unit Check if pulse display is OK 	Yes	Go to next step						
		No	Very low voltage: Replace pulse generator						
			Noise in wave form: Check for improper grounding of shield-wiring or replace pulse generator						
9	Check if voltage at 1F terminal of EC-AT control is OK Voltage: Approx. 12V (Brake pedal depressed) 	Yes	Go to Step 12						
		No	Go to next step						
10	Check for continuity between terminal 1F of EC-AT control unit and stoplight switch	Yes	Go to next step						
		No	Repair wiring						
11	Check if operation of stoplight switch is OK ⇨ page *T-45 <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">Switch</th> <th style="width: 50%;">Continuity</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Depressed</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">Released</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> 	Switch	Continuity	Depressed	Yes	Released	No	Yes	Check for short or open circuit of wiring and poor connection at connector ⇨ If OK, go to next step ⇨ If not OK, repair wiring
		Switch	Continuity						
Depressed	Yes								
Released	No								
No	Replace stoplight switch								

* Refer to 1990 323 Workshop Manual (1195-10-89E).

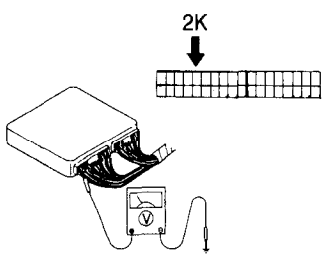
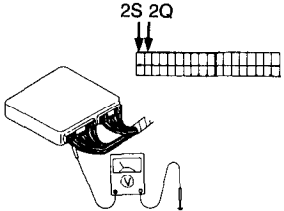
STEP	INSPECTION		ACTION
12	Check if voltage at 2B, 2D, 2F, and 2H terminal of EC-AT control unit is OK ☞ page K2-144 Voltage: Approx. 12V (D,S,L ranges switch ON) Below. 1.5V (P or N ranges switch ON)	Yes	Go to Step 15
		No	Go to next step
13	Check if continuity between each terminal of inhibitor switch and terminal of EC-AT control unit is OK	Yes	Go to next step
		No	Repair or replace wiring
14	Check if operation of inhibitor switch is OK ☞ page K2-140 	Yes	Check for open or short circuit of wiring and poor connection at connectors ⇨ If OK, go to next step ⇨ If not OK, repair or replace
		No	Replace inhibitor switch ☞ page K2-141
15	Check if ignition timing at idle is OK ☞ page *F-72 Ignition timing (BTDC): $7 \pm 1^\circ$ 	Yes	Check for correct idle speed ☞ page *F-72 Idle speed: 750 ± 50 rpm (with parking brake applied) ⇨ If OK, go to next step ⇨ If not OK, adjust idle speed ☞ page *F-72
		No	Adjust ignition timing ☞ page *F-72

* Refer to 1990 323 Workshop Manual (1195-10-89E).

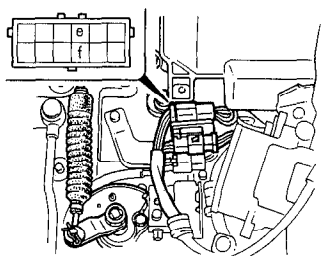
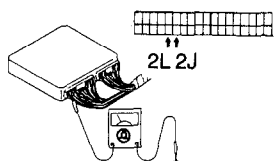
STEP	INSPECTION		ACTION
16	<p>Check if engine stall speed is OK ☞ page K2-119</p> <p>Engine stall speed: 2,550—2,650 rpm</p> 	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K2-121
17	<p>Check engine control system or Try known good EC-AT control unit, control valve assembly or replace transaxle</p>		

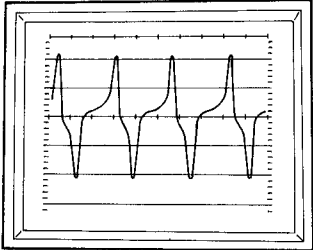
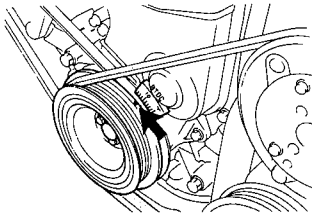
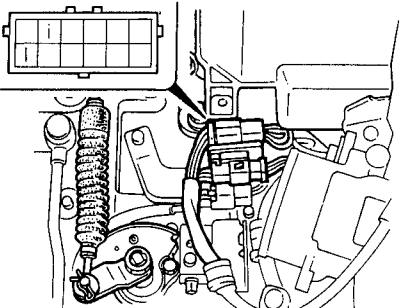
03U0K2-049

24	ENGINE STALLS WHEN BRAKE PEDAL DEPRESSED WHILE DRIVING AT LOW SPEED OR STOPPING		
DESCRIPTION	<ul style="list-style-type: none"> • Engine stalls with strong shift shock 		
[TROUBLESHOOTING HINTS]			
<ul style="list-style-type: none"> ① Engine idle speed misadjusted ② ATF thermosensor malfunction ③ Pulse generator malfunction ④ Lockup solenoid stuck ⑤ Lockup control valve stuck ⑥ Torque converter worn ⑦ Hydraulic circuit clogged or leaking 			
STEP	INSPECTION		ACTION
1	Connect EC-AT Tester to EC-AT control unit Check if all output and input component indications are correct (Especially lockup solenoid valve, ATF thermosensor, and drum speed)	Yes	Go to Steps 3, 6, 9, 10 and 12 in sequence
		No	No indication at all lamps ⇒ Go to next step Individual lamp(s) does not illuminate ⇒ Check for cause
2	Check if voltage at 2Q and 2S terminals of EC-AT control unit is OK ↗ page K2-144 Voltage: Approx. 12V (Ignition switch ON)	Yes	Go to next step
		No	Repair wiring
3	Drive vehicle above 80 km/h (50 mph) in D range OD Check if voltage at 2K terminal of EC-AT control unit is OK ↗ page K2-144 Voltage: Approx. 12V (Lockup solenoid ON [Lockup])	Yes	Go to Step 6
		No	Go to next step

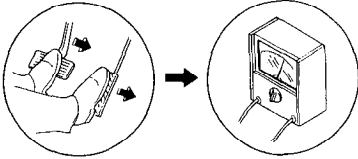


STEP	INSPECTION		ACTION				
4	Check if continuity of transistor in EC-AT control unit is OK <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Terminal</td> <td style="padding: 2px;">Continuity</td> </tr> <tr> <td style="padding: 2px;">2K and 1J or 2P</td> <td style="padding: 2px;">Yes</td> </tr> </table>	Terminal	Continuity	2K and 1J or 2P	Yes	Yes	Go to next step
		Terminal	Continuity				
2K and 1J or 2P	Yes						
No	Replace EC-AT control unit						
5	Apply 12V to 2K terminal of EC-AT control unit Start engine in P range and let it idle Shift to D range and check if engine stalls	Yes	Go to next step				
		No	Replace solenoid valve				
6	Disconnect 20-pin connector of EC-AT control unit Check if resistance between 2J terminal and 2L terminals of EC-AT control unit is OK Resistance: 200—400Ω	Yes	Go to Step 9				
		No	Go to next step				
7	Check if resistance of pulse generator is OK ➤ page K2-142 Resistance: 200—400Ω	Yes	Check for poor connection at connectors and go to next step				
		No	Replace pulse generator				



STEP	INSPECTION	ACTION	
8	Connect oscilloscope ground terminal to 2L terminal of EC-AT control unit, and oscilloscope input terminal to 2J terminal of EC-AT control unit Check if pulse display is OK	Yes	Go to next step
		No	Very low voltage: Replace pulse generator
			Noise in wave form Check improper grounding of shield-wiring or replace pulse generator
9	Check if ignition timing at idle is OK ☞ page *F-72 Ignition timing (BTDC): $7 \pm 1^\circ$ 	Yes	Check for correct idle speed ☞ page *F-72 Idle speed: 750 ± 50 rpm (with parking brake applied) ⇒ If OK, go to next step ⇒ If not OK, adjust idle speed ☞ page *F-72
		No	Adjust ignition timing ☞ page *F-72
10	Measure resistance while warming up ATF (driving vehicle) Check for correct resistance between 1G terminal and J or 2P terminals of EC-AT control unit	Yes	Go to Step 12
		No	Go to next step
11	Check for correct resistance between terminal and terminals of ATF thermosensor 	Yes	Check for poor connection at connectors ⇒ If OK, try known good EC-AT control unit or ATF thermosensor and go to next step ⇒ If not OK, repair wiring
		No	Go to next step

* Refer to 1990 323 Workshop Manual (1195-10-89E).

STEP	INSPECTION		ACTION
12	Check if engine stall speed is OK ☞ page K2-119 Engine stall speed: 2,550—2,650 rpm 	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K2-121
13	Try known good EC-AT control unit, control valve assembly, or replace transaxle		

03U0K2-050

SELF-DIAGNOSIS FUNCTION

DESCRIPTION

The self-diagnostic system integrated in the EC-AT control unit diagnoses malfunction of the main sensors (input) and solenoid valves (output) and the EC-AT control unit.

Malfunions or intermittent malfunions are memorized in the EC-AT control unit to later be output as malfunction codes.

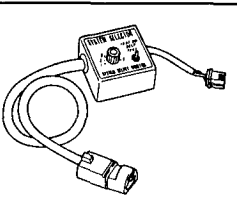
The **EC-AT Tester and EC-AT Selector** are used to retrieve these malfunction codes. Each malfunction is indicated by a code number and the buzzer.

Use the plate 323 2WD model.

03U0K2-308

PREPARATION

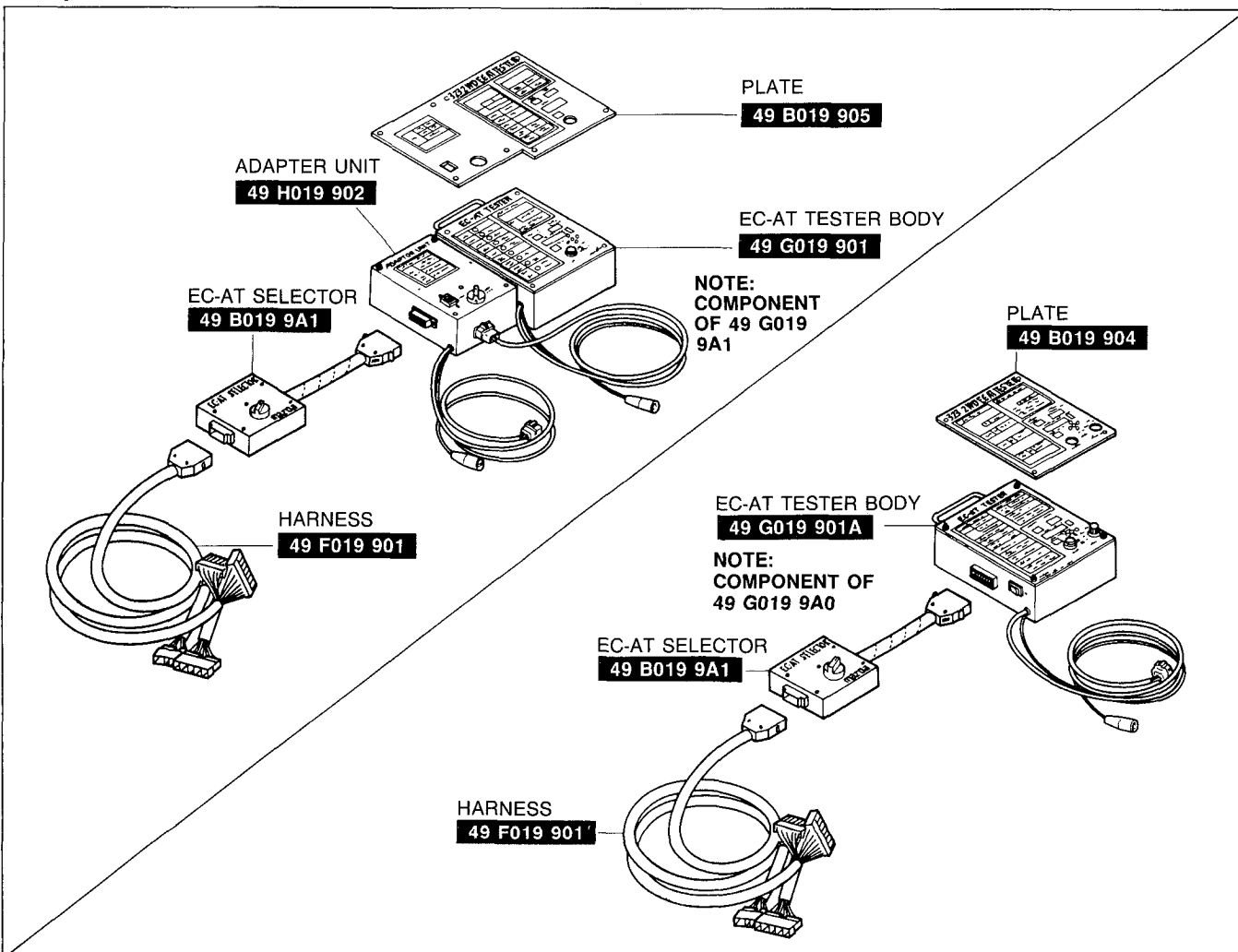
SST

<p>49 B019 9A0 System Selector</p>		<p>For inspection of input and output devices</p>
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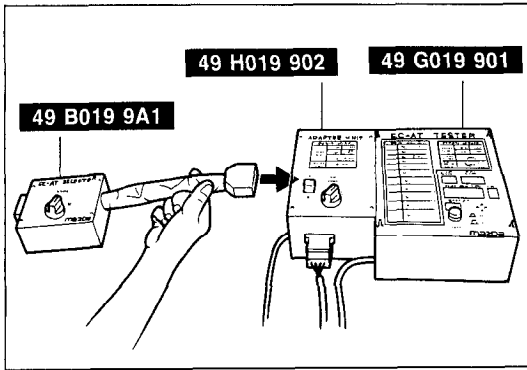
03U0KX-049

EC-AT TESTER

Components



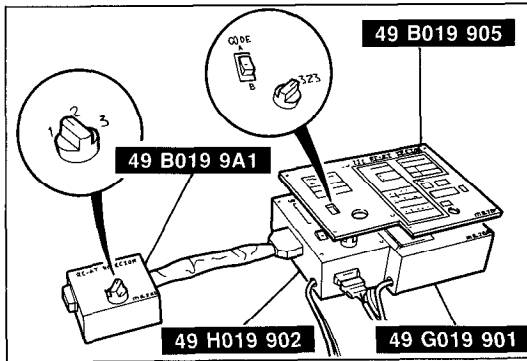
03U0KX-050



Assembly of EC-AT Tester

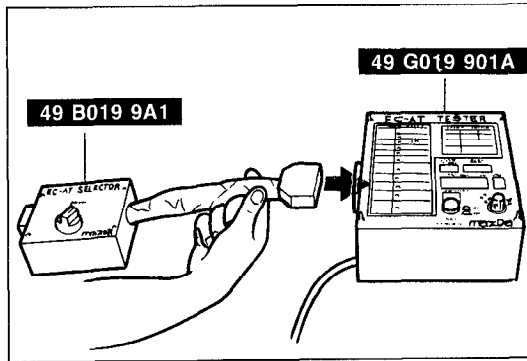
For EC-AT tester body (49 G019 901) and adapter unit (49 H019 902)

1. Connect the **EC-AT selector** (49 B019 9A1) to the assembled **EC-AT tester body** (49 G019 901) and **adapter unit** (49 H019 902).



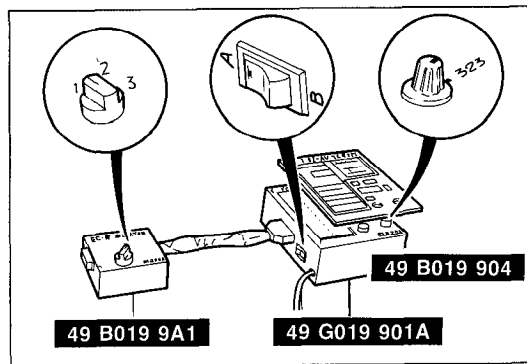
2. Place the **panel** (49 B019 905) onto the assembled EC-AT tester.

3. Set the code switch on the adapter unit to position A.
4. Set the vehicle switch on the adapter unit to the 323 position.
5. Set the vehicle switch on the EC-AT selector to position 1.



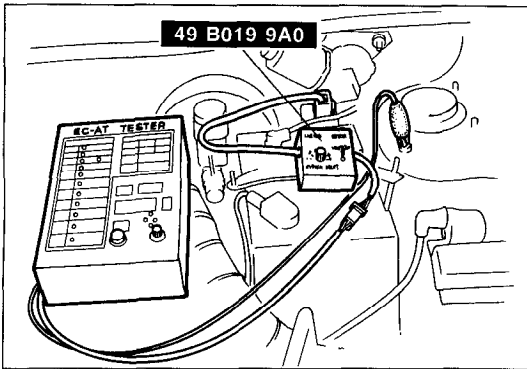
For EC-AT tester body (49 G019 901A)

1. Connect the **EC-AT selector** (49 B019 9A1) to the **EC-AT tester body** (49 G019 901A).

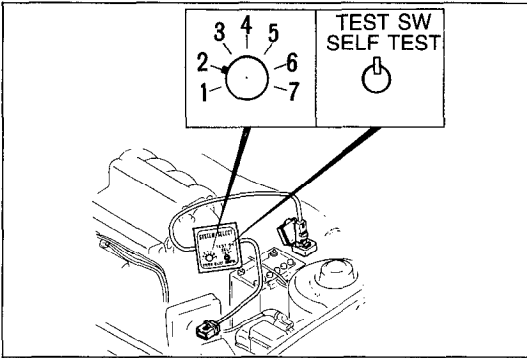


2. Place the **panel** (49 B019 904) onto the EC-AT Tester body.

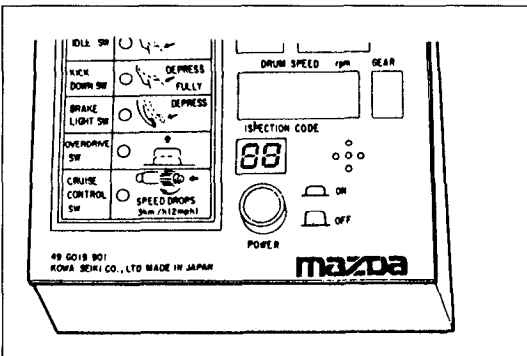
3. Set the code switch on the EC-AT Tester to position A.
4. Set the vehicle switch on the EC-AT Tester to the 323 position.
5. Set the vehicle switch on the EC-AT selector to position 1.



03U0KX-055



03U0KX-056



03U0K2-053

MALFUNCTION CODE NUMBER**Inspection procedure**

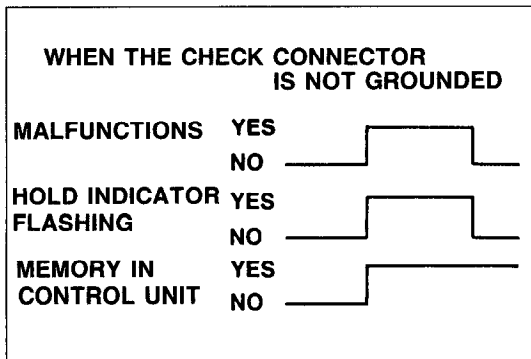
1. Connect the **SST** to the diagnosis connector.
2. Connect the **EC-AT Tester** to the System Selector connector and a ground.
3. Set the **EC-AT Tester** code selector switch to position A.
4. Set the System Selector to position 2 and SELF TEST as shown.
5. Turn the ignition switch ON.
6. Check that **"88"** flashes on the digital display and that the buzzer sounds for **3 seconds**.
7. If **"88"** does not flash, check the diagnosis connector wiring.
8. If **"88"** flashes and the buzzer sounds continuously for more than **20 seconds**, check the wiring to terminal 1C of the EC-AT control unit for a short-circuit. If necessary, replace the EC-AT control unit and repeat from Step 2.
9. Note any code number(s) and check for the cause(s). Repair as necessary. (Refer to page K2-108.)

Note

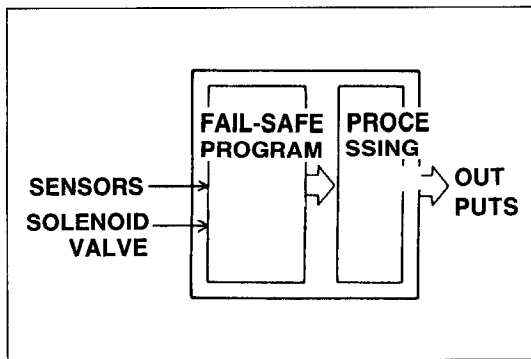
- After repairs are made, recheck for code numbers by performing the After-repair Procedure. (Refer to page K2-115.)

06 → 4-SEC. PERIOD →
62 → 4-SEC. PERIOD →
64 → 4-SEC. PERIOD →
REPEATS ABOVE

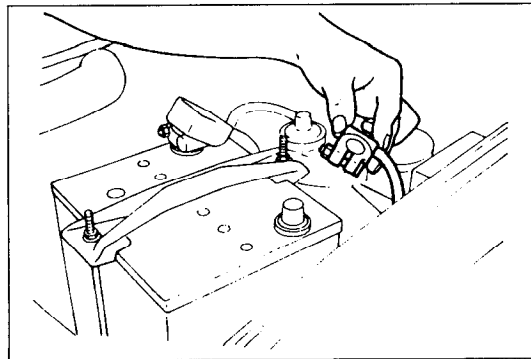
03U0KX-058



03U0KX-059



9MU0K1-027



03U0KX-060














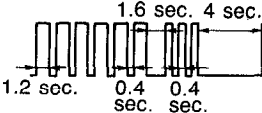
GENERAL NOTES

1. If there is more than one malfunction, the code numbers will be indicated in numerical order, lowest number first.
2. The HOLD indicator flashes to indicate the same pattern as the buzzer of the **EC-AT Tester** (49 G019 901A). When the check connector is not grounded, the indicator flashes at a constant frequency until the malfunction recovers. However, the malfunction code is memorized in the EC-AT control unit.
3. The EC-AT control unit has a built-in fail-safe function for the throttle sensor, the speed sensors, and all the solenoids. If a malfunction occurs, the EC-AT control unit will control operation of the remaining components according to a preset fail-safe program. The vehicle may still be driven, although driving performance will be slightly affected.
4. The memory of malfunction codes is canceled when the negative battery cable is disconnected for approximately five seconds and the brake pedal is depressed.

Troubleshooting

If a malfunction code number is shown on the **SST**, check for the cause by using the chart related to the code number shown.

Malfunction code number

CODE No.	LOCATION OF MALFUNCTION	BUZZER		SELF-DIAGNOSIS	FAIL-SAFE
		49 G019 901 TESTER BODY	49 G019 901A TESTER BODY		
06	Vehicle speed sensor			No input signal from speed sensor while driving at drum speed above 600 rpm in D, S or L ranges	Shifting performed normally
12	Throttle sensor			Open circuit when accelerator depressed (idle switch: OFF) or incorrect adjustment	Throttle opening judged as 4/8 stroke Lockup not provided
55	Pulse generator			No input signal from pulse generator while driving at 40 km/h (25 mph) or higher in D, S or L ranges	Shifting performed in accordance with signals from vehicle speed sensor
60	1-2 shift solenoid valve			Open or short-circuit of transistor within EC-AT control unit or solenoid valve wiring	Solenoid valve(s) performs the shifting with as little interference as possible with driving performance Lockup not provided
61	2-3 shift solenoid valve				
62	3-4 shift solenoid valve				
63	Lockup solenoid valve				

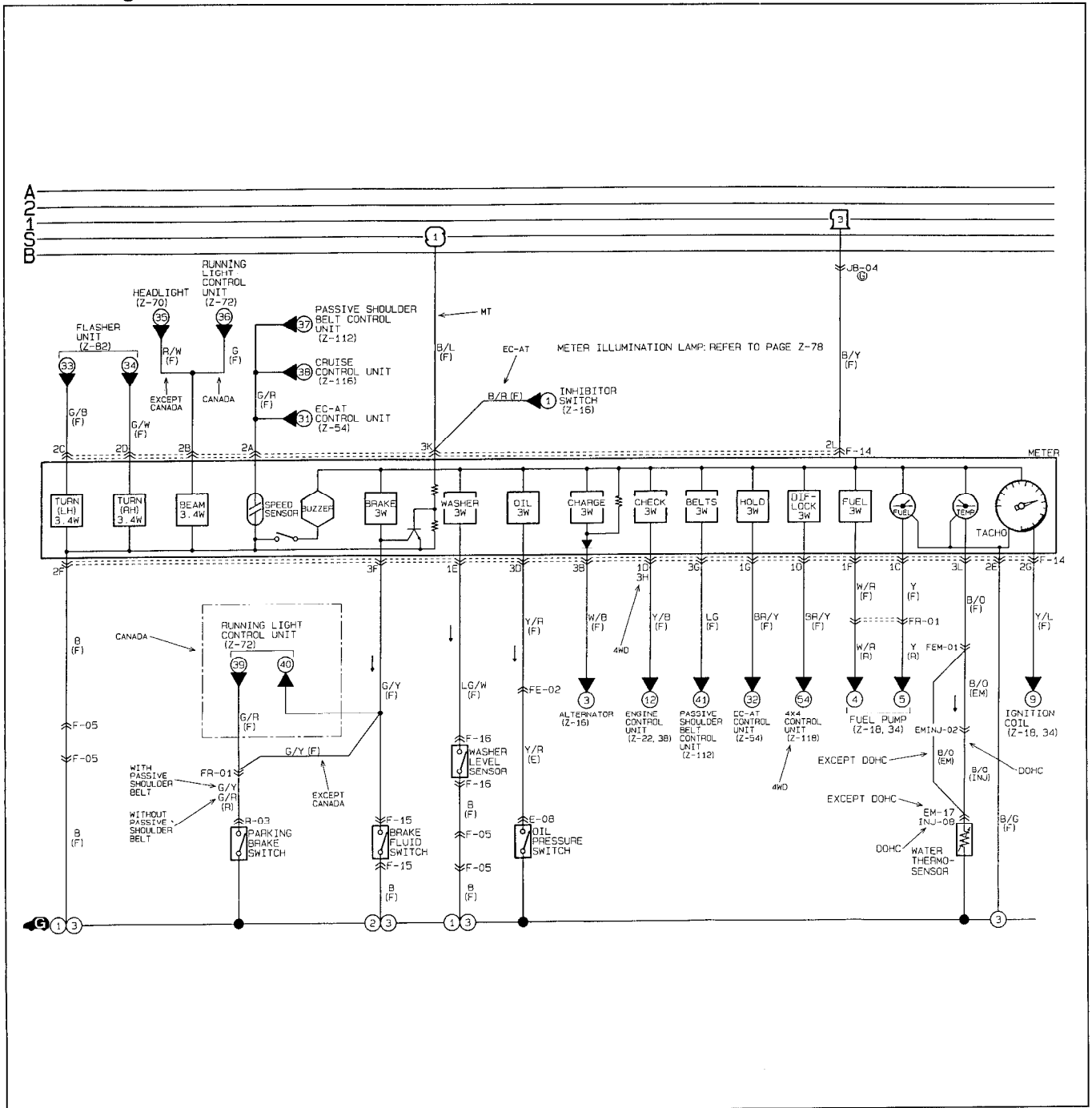
03U0K2-054

CODE No.06 VEHICLE SPEED SENSOR			
STEP	INSPECTION		ACTION
1	Are there any poor connections in vehicle speed sensor circuit?	Yes	Repair connector and/or wiring
		No	Go to next step
2	Does EC-AT Tester display vehicle speed? (Refer to page K2-116)	Yes	Vehicle speed sensor OK Cancel memory of code number or replace EC-AT control unit
		No	Go to next step
3	Does vehicle speed sensor operate correctly? (Refer to page *T-67)	Yes	Check for open or short circuit in wiring from speedometer to EC-AT control unit
		No	Replace speed sensor (Refer to page *T-67)

* Refer to 1990 323 Workshop Manual (1195-10-89E).

03U0K2-055

Circuit Diagram



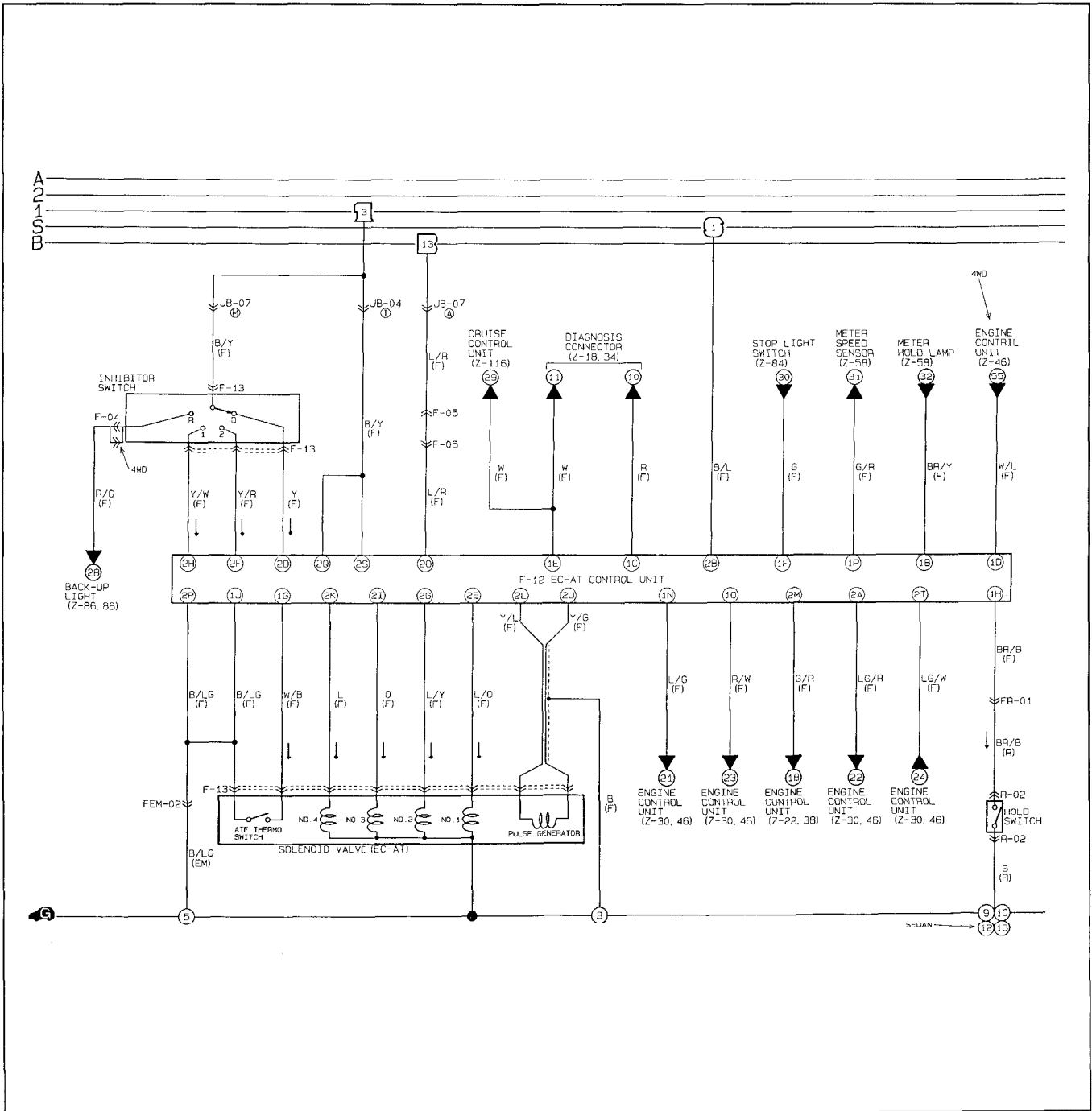
CODE No.12 THROTTLE SENSOR

STEP	INSPECTION		ACTION
1	Are there any poor connections in throttle sensor circuit?	Yes	Repair connector and/or wiring
		No	Go to next step
2	Does EC-AT Tester display throttle sensor voltage? (Refer to page K2-116)	Yes	Throttle sensor OK Cancel memory of code number or replace EC-AT control unit
		No	Go to next step
3	Is variable resistor of throttle sensor OK? (Refer to page *F-143)	Yes	Check for open or short circuit in wiring from throttle sensor to EC-AT control unit
		No	Replace throttle sensor

* Refer to 1990 323 Workshop Manual (1195-10-89E).

03U0K2-056

Circuit Diagram

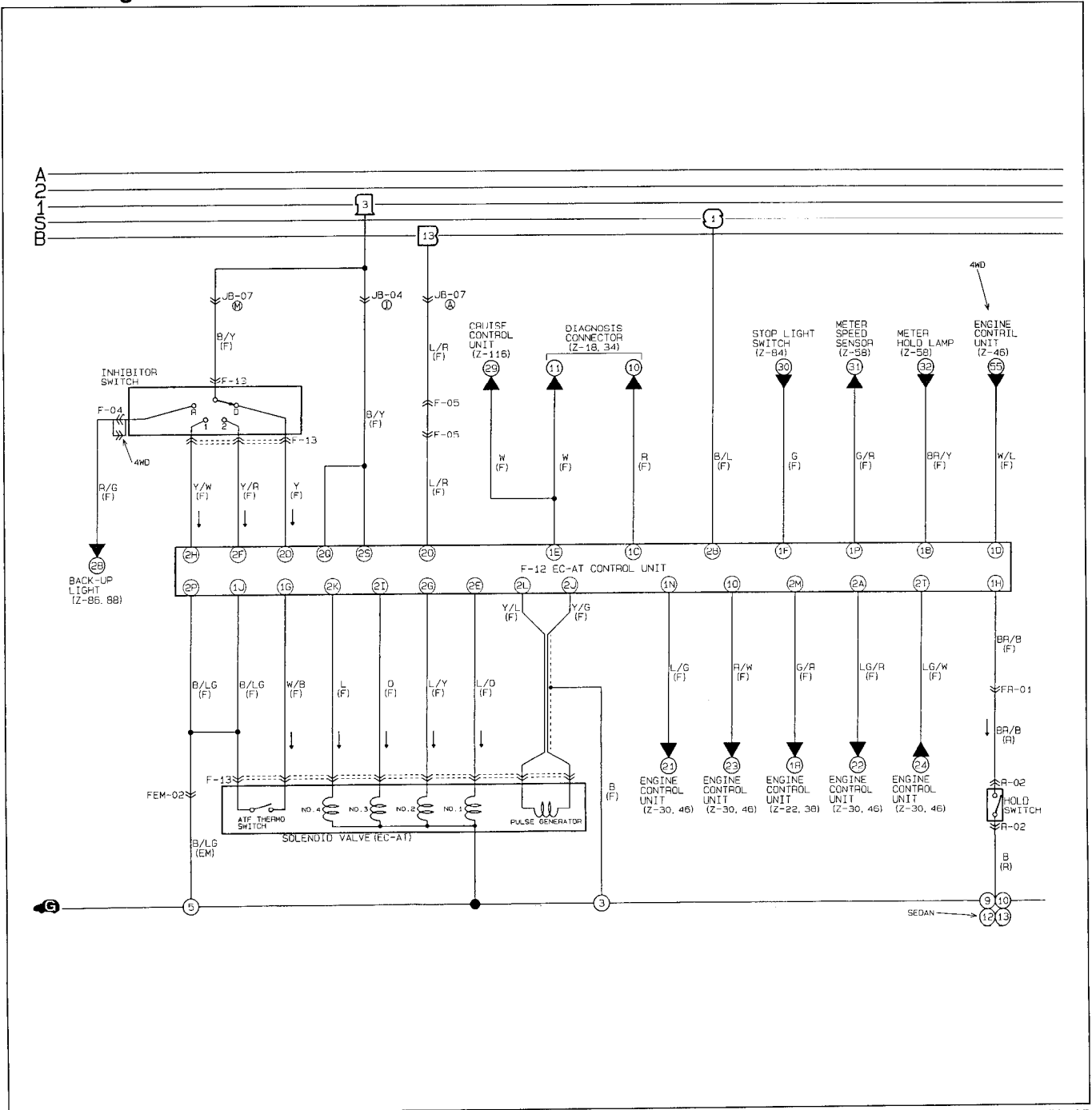


03U0KX-065

CODE No.55 PULSE GENERATOR			
STEP	INSPECTION	ACTION	
1	Are there any poor connections in pulse generator circuit?	Yes	Repair connector and/or wiring
		No	Go to next step
2	Does EC-AT Tester display drum speed?	Yes	Pulse generator OK Cancel memory of code number or replace EC-AT control unit
		No	Go to next step
3	Is resistance of pulse generator OK? Resistance: 200—400Ω	Yes	Check for open or short circuit in wiring from pulse generator to EC-AT control unit
		No	Replace pulse generator

03U0K2-057

Circuit Diagram



03U0KX-067

CODE No.60 1-2 SHIFT SOLENOID VALVE

STEP	INSPECTION		ACTION				
1	Are there any poor connections in 1-2 shift solenoid valve circuit?	Yes	Repair connector and/or wiring				
		No	Go to next step				
2	Does EC-AT Tester 1-2 solenoid valve lamp illuminate as shown in solenoid valve operation table? (Refer to page K2-117)	Yes	1-2 shift solenoid valve OK Cancel memory of code number				
		No	Go to next step				
3	Is there continuity of transistor in EC-AT control unit? <table border="1"> <tr> <td>Terminal</td> <td>Continuity</td> </tr> <tr> <td>2E and 1J or 2P</td> <td>Yes</td> </tr> </table>	Terminal	Continuity	2E and 1J or 2P	Yes	Yes	Go to next step
		Terminal	Continuity				
2E and 1J or 2P	Yes						
No	Replace EC-AT control unit then continue with next step						
4	Is resistance of 1-2 shift solenoid valve OK? <table border="1"> <tr> <td>Terminal</td> <td>Resistance</td> </tr> <tr> <td>A and ground</td> <td>13—27Ω</td> </tr> </table>	Terminal	Resistance	A and ground	13—27Ω	Yes	Go to Step 6
		Terminal	Resistance				
A and ground	13—27Ω						
No	Go to next step						
5	Are there any poor connections at connector in transaxle?	Yes	Repair connector				
		No	Go to next step				
6	Is there continuity between terminal of EC-AT control unit connector and ground? <table border="1"> <tr> <td>Terminal</td> <td>Continuity</td> </tr> <tr> <td>2E and ground</td> <td>Yes</td> </tr> </table>	Terminal	Continuity	2E and ground	Yes	Yes	Replace EC-AT control unit
		Terminal	Continuity				
2E and ground	Yes						
No	Check for open circuit in wiring						

03U0K2-058

CODE No.61 2-3 SHIFT SOLENOID VALVE

STEP	INSPECTION		ACTION				
1	Are there any poor connections in 2-3 shift solenoid valve circuit?	Yes	Repair connector and/or wiring				
		No	Go to next step				
2	Does EC-AT Tester 2-3 solenoid valve lamp illuminate as shown in solenoid valve operation table? (Refer to page K2-117)	Yes	2-3 shift solenoid valve OK Cancel memory of code number				
		No	Go to next step				
3	Is there continuity of transistor in EC-AT control unit? <table border="1"> <tr> <td>Terminal</td> <td>Continuity</td> </tr> <tr> <td>2G and 1J or 2P</td> <td>Yes</td> </tr> </table>	Terminal	Continuity	2G and 1J or 2P	Yes	Yes	Go to next step
		Terminal	Continuity				
2G and 1J or 2P	Yes						
No	Replace EC-AT control unit and continue with next step						
4	Is resistance of 2-3 shift solenoid valve OK? <table border="1"> <tr> <td>Terminal</td> <td>Resistance</td> </tr> <tr> <td>B and ground</td> <td>13—27Ω</td> </tr> </table>	Terminal	Resistance	B and ground	13—27Ω	Yes	Go to Step 6
		Terminal	Resistance				
B and ground	13—27Ω						
No	Go to next step						
5	Are there any poor connections at connector in transaxle?	Yes	Repair connector				
		No	Go to next step				
6	Is there continuity between terminal of EC-AT control unit connector and ground? <table border="1"> <tr> <td>Terminal</td> <td>Continuity</td> </tr> <tr> <td>2G and ground</td> <td>Yes</td> </tr> </table>	Terminal	Continuity	2G and ground	Yes	Yes	Replace EC-AT control unit
		Terminal	Continuity				
2G and ground	Yes						
No	Check for open circuit in wiring						

03U0K2-059

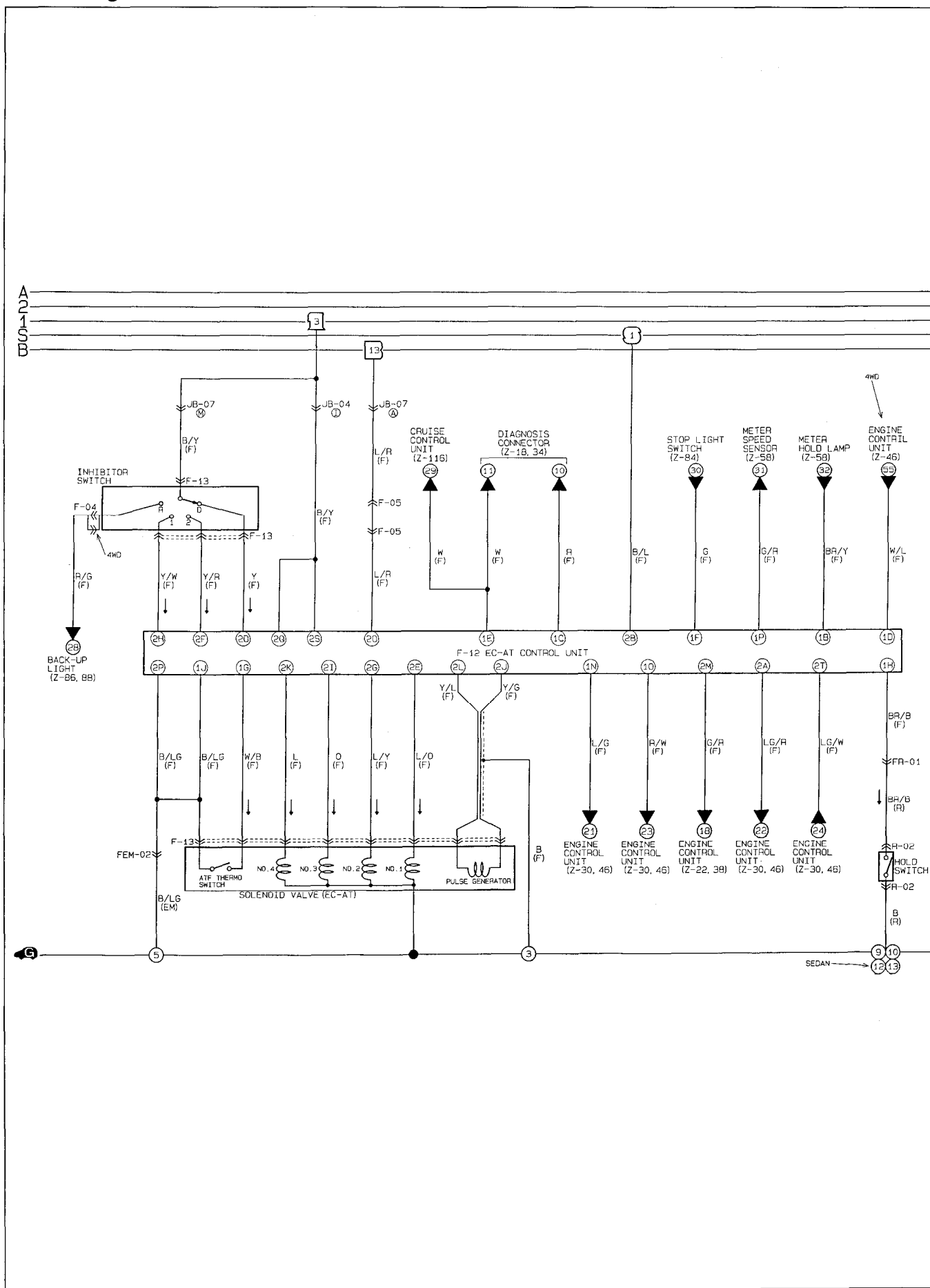
CODE No.62 3-4 SHIFT SOLENOID VALVE							
STEP	INSPECTION		ACTION				
1	Are there any poor connections in 3-4 shift solenoid valve circuit?	Yes	Repair connector and/or wiring				
		No	Go to next step				
2	Does EC-AT Tester 3-4 solenoid valve lamp illuminate as shown in solenoid valve operation table? (Refer to page K2-117)	Yes	3-4 shift solenoid valve OK Cancel memory of code number				
		No	Go to next step				
3	Is there continuity of transistor in EC-AT control unit? <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="width: 50%;">Terminal</td> <td style="width: 50%;">Continuity</td> </tr> <tr> <td>2I and 1J or 2P</td> <td>Yes</td> </tr> </table>	Terminal	Continuity	2I and 1J or 2P	Yes	Yes	Go to next step
		Terminal	Continuity				
2I and 1J or 2P	Yes						
		No	Replace EC-AT control unit and continue with next step				
4	Is resistance of 3-4 shift solenoid valve OK? <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="width: 50%;">Terminal</td> <td style="width: 50%;">Resistance</td> </tr> <tr> <td>D and ground</td> <td>13--27Ω</td> </tr> </table>	Terminal	Resistance	D and ground	13--27Ω	Yes	Go to Step 6
		Terminal	Resistance				
D and ground	13--27Ω						
		No	Go to next step				
5	Are there any poor connections at connector in transaxle?	Yes	Repair connector				
		No	Go to next step				
6	Is there continuity between terminal of EC-AT control unit connector and ground? <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="width: 50%;">Terminal</td> <td style="width: 50%;">Continuity</td> </tr> <tr> <td>2I and ground</td> <td>Yes</td> </tr> </table>	Terminal	Continuity	2I and ground	Yes	Yes	Replace EC-AT control unit
		Terminal	Continuity				
2I and ground	Yes						
		No	Check for open circuit in wiring				

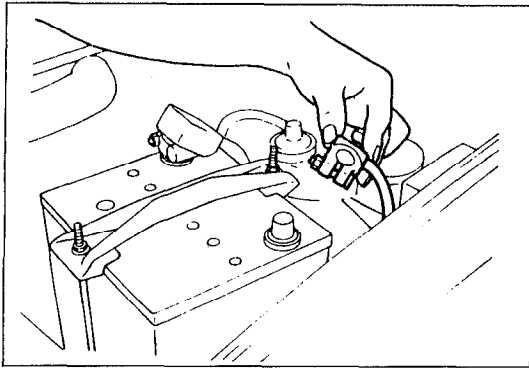
03U0K2-060

CODE No.63 LOCKUP SOLENOID VALVE							
STEP	INSPECTION		ACTION				
1	Are there any poor connections in lockup solenoid valve circuit?	Yes	Repair connector and/or wiring				
		No	Go to next step				
2	Does EC-AT Tester lockup solenoid valve lamp illuminate as shown in solenoid valve operation table? (Refer to page K2-117)	Yes	Lockup solenoid valve OK Cancel memory of code number				
		No	Go to next step				
3	Is there continuity of transistor in EC-AT control unit? <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="width: 50%;">Terminal</td> <td style="width: 50%;">Continuity</td> </tr> <tr> <td>2K and 1J or 2P</td> <td>Yes</td> </tr> </table>	Terminal	Continuity	2K and 1J or 2P	Yes	Yes	Go to next step
		Terminal	Continuity				
2K and 1J or 2P	Yes						
		No	Replace EC-AT control unit then continue with next step				
4	Is resistance of lockup solenoid valve OK? <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="width: 50%;">Terminal</td> <td style="width: 50%;">Resistance</td> </tr> <tr> <td>E and ground</td> <td>13--27Ω</td> </tr> </table>	Terminal	Resistance	E and ground	13--27Ω	Yes	Go to Step 6
		Terminal	Resistance				
E and ground	13--27Ω						
		No	Go to next step				
5	Are there any poor connections at connector in transaxle?	Yes	Repair connector				
		No	Go to next step				
6	Is there continuity between terminal of EC-AT control unit connector and ground? <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="width: 50%;">Terminal</td> <td style="width: 50%;">Continuity</td> </tr> <tr> <td>2K and ground</td> <td>Yes</td> </tr> </table>	Terminal	Continuity	2K and ground	Yes	Yes	Replace EC-AT control unit
		Terminal	Continuity				
2K and ground	Yes						
		No	Check for open circuit in wiring				

03U0K2-061

Circuit Diagram





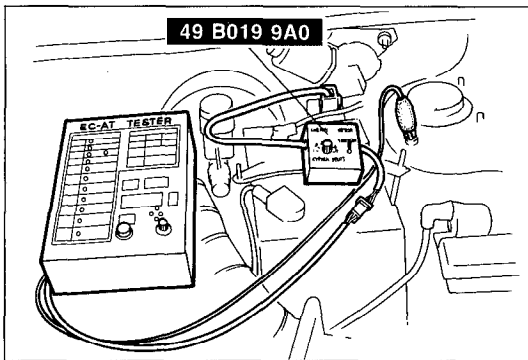
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DRIVE AT 50 km/h (31 mph)

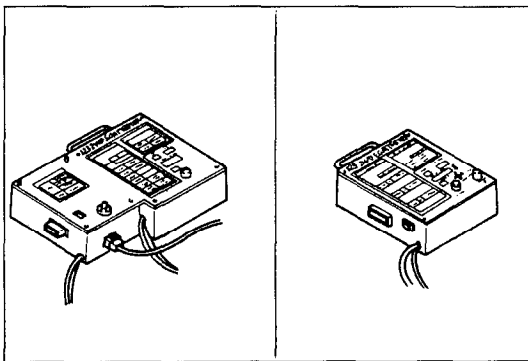
KICKDOWN

STOP THE VEHICLE

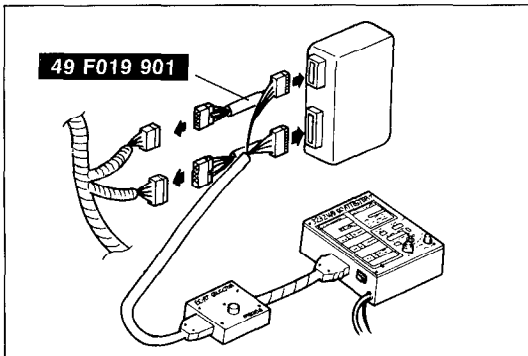
79G07C-069



03U0KX-076



03U0KX-077



03U0K2-062

After-repair Procedure

1. Cancel the memory of malfunctions by disconnecting the negative battery cable for at least **five seconds** and depressing the brake pedal. Reconnect the battery cable.
2. Remove the **EC-AT Tester** if it is connected.

3. Drive the vehicle at 50 km/h (31 mph), then depress the accelerator pedal fully to activate kickdown. Stop the vehicle gradually.

4. Connect the **SSTs** to the diagnosis connector as shown.
5. Turn the ignition switch ON.
6. Verify that no code numbers are displayed.

ELECTRICAL SIGNAL INSPECTION

In this step, the input and output signals are checked with the EC-AT Tester.

The tester checks for proper operation of the various switches and sensors in the EC-AT system. It also checks the EC-AT control unit for output of the various control signals.

INSPECTION PROCEDURE

1. Assemble the EC-AT Tester. (Refer to page K2-104.)
2. Disconnect the connectors from the EC-AT control unit.
3. Connect the harness between the control unit and the connectors.
4. Turn the vehicle ignition switch and main switch of the EC-AT Tester ON.
5. Verify indication of the respective light or digital display in each condition, referring to the indication table on the following page.

Indication Table of Light and Digital Display

Item	Specified indication	Test condition	If incorrect, possible cause	
Input (Light)				
INHIBITOR SW	P,N	ON	P or N ranges	Inhibitor or wiring
		OFF	Other ranges	
	D	ON	D range	
		OFF	Other ranges	
	S	ON	S range	
		OFF	Other ranges	
	L	ON	L range	
		OFF	Other ranges	
WATER THERMO SW	ON	Water temperature above 72°C (162°F)	EC-AT control unit, engine control unit, or wiring	
	OFF	Water temperature below 72°C (162°F)		
ATF THERMOSENSOR	ON	ATF temperature above 142—148°C (288—298°F)	ATF thermostwitch or wiring	
	OFF	ATF temperature below 138°C (280°F)		
HOLD SW	ON	Hold switch released	Hold switch or wiring	
	OFF	Hold switch depressed		
IDLE SW	ON	Throttle valve fully closed	Idle switch or wiring	
	OFF	Throttle valve open		
STOPLIGHT SW	ON	Brake pedal depressed	Stoplight switch or wiring	
	OFF	Brake pedal released		
Input (Digital display)				
THROTTLE SENSOR	EC-AT control unit terminal voltage	Constant	Throttle sensor, idle switch, or wiring	
VEHICLE SPEED*	Vehicle speed calculated from speed sensor signal	Constant	Vehicle speed sensor, speedometer cable, or wiring	
DRUM SPEED*	Drum speed	Constant	Pulse generator or wiring	

03U0K2-063

Note

* Item must be checked with engine running or while driving.

Item	Specified indication	Test condition	If incorrect possible cause
Output (Light)			
1-2 SOLENOID VALVE* ¹	ON	Refer to Solenoid valve operation table (Refer to page K2-118)	EC-AT control unit, 1-2 shift solenoid, or wiring
	OFF		
2-3 SOLENOID VALVE* ¹	ON		EC-AT control unit, 2-3 shift solenoid, or wiring
	OFF		
3-4 SOLENOID VALVE* ¹	ON		EC-AT control unit, 3-4 shift solenoid, or wiring
	OFF		
LOCKUP SOLENOID VALVE* ¹	ON	Lockup condition	EC-AT control unit, lock-up solenoid, or wiring
	OFF	Non-Lockup condition	
SHIFT* ²	Not used		
HOLD INDICATOR	ON	Hold mode	EC-AT control unit, hold switch, or wiring
	OFF	Normal mode	

03U0K2-064

Item	Specified indication	Test condition
Output (Digital display)		
GEAR* ¹	1	1st
	2	2nd
	3	3rd
	4	Overdrive (OD)

03U0K2-065

Note*¹ Item must be checked with the engine running or while driving.*² 2WD only.

Comprehensive usage

The EC-AT Tester is used to inspect for slippage of friction elements, shift points, and shift sequence of the transaxle.

The following inspection must be done while driving the vehicle.

03U0KX-082

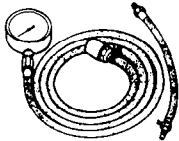
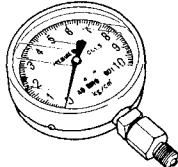
Solenoid valve operation table

Range	Gear		Specified light indication and Solenoid valve operation				
			1-2	2-3	3-4	Lockup	
P	—			ON	ON		
R	Reverse		ON				
N	—	Below approx. 4 km/h (2.5 mph)			ON		
		Above approx. 5 km/h (3 mph)	ON				
D	1st			ON	ON		
	2nd		ON	ON	ON		
	3rd	Below approx. 5 km/h (3.1 mph) at operating temperature					
		Above approx. 5 km/h (3.1 mph) or cold engine	ON				
	OD	Lockup OFF	ON		ON		
		Lockup ON	ON		ON	ON	
S	1st			ON	ON		
	2nd		ON	ON	ON		
	3rd	Below approx. 5 km/h (3.1 mph) at operating temperature					
		Above approx. 5 km/h (3.1 mph) or cold engine	ON				
		Lockup OFF			ON		
		Lockup ON			ON	ON	
	OD		ON		ON		
L	1st			ON	ON		
	2nd	Below approx. 110 km/h (68 mph)	ON	ON			
		Above approx. 110 km/h (68 mph)	ON				
HOLD	D	1st			ON	ON	
		2nd		ON	ON	ON	
		3rd	Below approx. 5 km/h (3.1 mph) at operating temperature				
			Above approx. 5 km/h (3.1 mph) or cold engine	ON			
			Lockup ON	ON			ON
		OD		ON		ON	
	S	2nd		ON	ON		
		3rd	Below approx. 5 km/h (3.1 mph) at operating temperature				
			Above approx. 5 km/h (3.1 mph) or cold engine	ON			
		OD		ON		ON	
	L	1st			ON		
		2nd	Below approx. 110 km/h (68 mph)	ON	ON		
			Above approx. 110 km/h (68 mph)	ON			

03U0K2-066

MECHANICAL SYSTEM TEST

PREPARATION
SST

<p>49 0378 400A</p> <p>Gauge set, oil pressure</p> 	<p>For oil pressure test</p>	<p>49 B019 901</p> <p>Gauge, oil pressure</p> 	<p>For oil pressure test</p>
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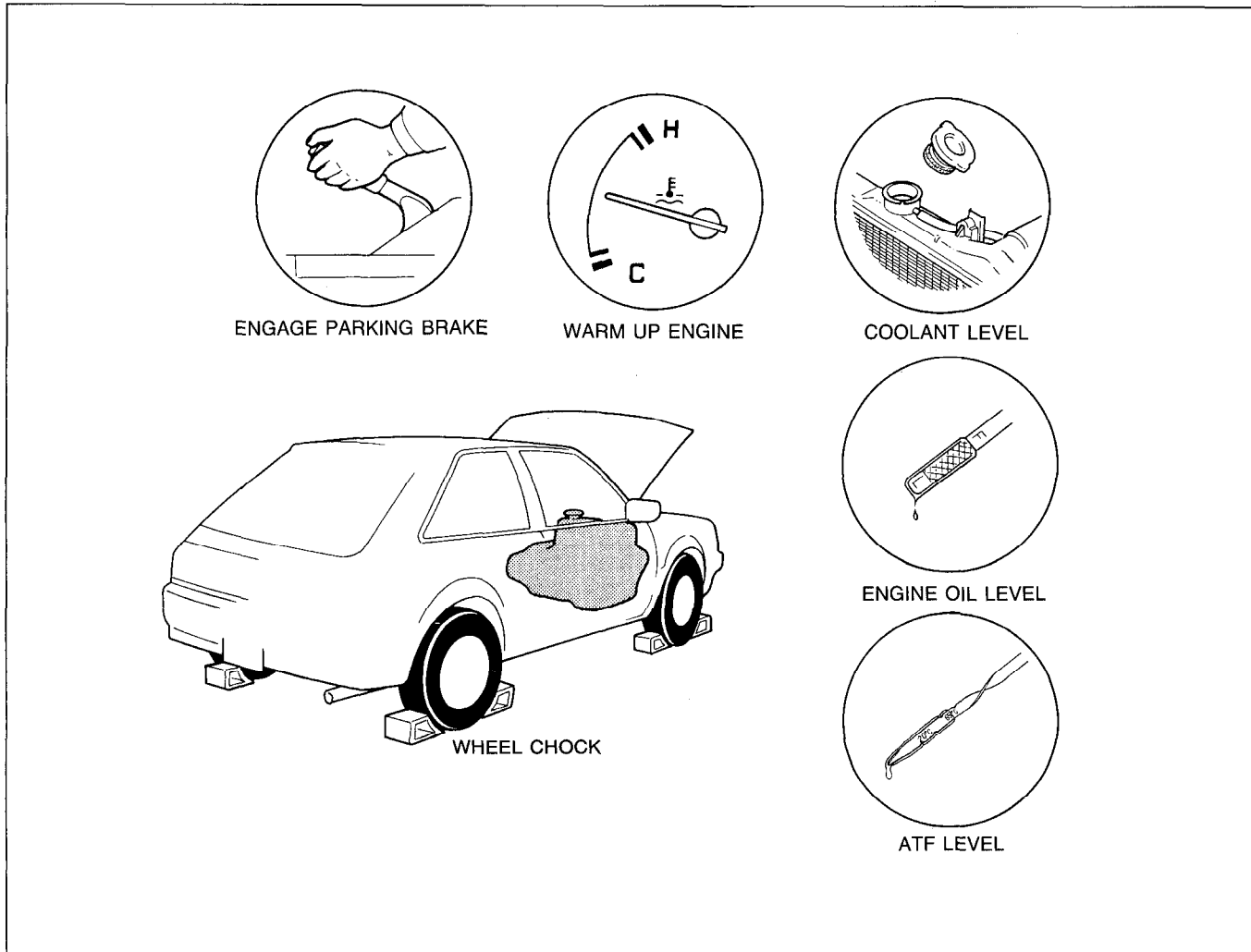
03U0K2-067

STALL TEST

This test is performed to determine if there is slippage of the friction elements or malfunction of the hydraulic components.

Preparation

1. Check, and correct as necessary, the engine coolant, engine oil, and ATF levels before testing.
2. Warm the engine thoroughly to raise the ATF temperature to operating level (**60—70°C, 140—158°F**).
3. Engage the parking brake and use wheel chocks at the front and rear of the wheels.



ENGAGE PARKING BRAKE

WARM UP ENGINE

COOLANT LEVEL

ENGINE OIL LEVEL

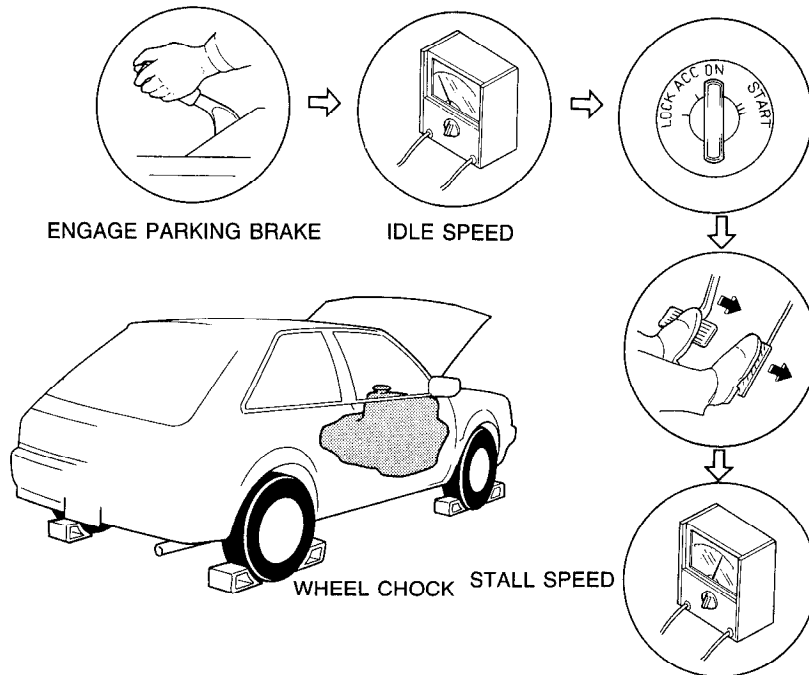
ATF LEVEL

WHEEL CHOCK

03U0KX-085

K2-119

Procedure



03U0KX-086

1. Connect a tachometer to the engine.
2. Start the engine and check the idle speed in P range. (Refer to Section F.)

Idle speed: 750 ± 50 rpm (with parking brake applied)

3. Shift the selector lever to R range.

Caution

- Steps 4 and 5 must be performed within 5 seconds to prevent possible transaxle damage.

4. Firmly depress the foot brake with the left foot, and gently depress the accelerator pedal with the right.
5. When the engine speed no longer increases, quickly read the engine speed and release the accelerator.

Caution

- Idling for at least one minute to cool the ATF and to prevent deterioration of the fluid.

6. Move the selector lever to N range and let the engine idle for at least one minute.

Caution

- **Be sure to allow sufficient cooling time between each stall test.**

7. Perform stall tests for the remaining ranges in the same manner.

- (1) D range
- (2) S range
- (3) L range

Engine stall speed: 2,550—2,650 rpm

Note

- **The stall test can be performed with the EC-AT Tester in place of a tachometer.**

Drum stall speed indication: 0 rpm

03U0K2-068

Evaluation of Stall Test

Condition		Possible cause	
Above specification	In all ranges	Insufficient line pressure	Worn oil pump
			Oil leakage from oil pump, control valve, and/or transaxle case
			Stuck pressure regulator valve
	In forward ranges	Forward clutch slipping One-way clutch 1 slipping	
	In D range	One-way clutch 2 slipping	
	In S (Hold) and L (Hold) ranges	Coasting clutch slipping	
	In D (Hold) and S (Hold) ranges	2-4 brake band slipping	
Below specification	In R, L and L (Hold) ranges	Low and reverse brake slipping	
	In R range	Low and reverse brake slipping Reverse clutch slipping Perform road test to determine whether problem is low and reverse brake or reverse clutch a) Engine breaking felt in L range 1st ...Reverse clutch b) Engine breaking not felt in L range 1st ...Low and reverse brake	
Within specification		All shift control elements within transaxle are functioning normally	
Below specification		Engine out of tune	
		One-way clutch slipping within torque converter	

03U0KX-088

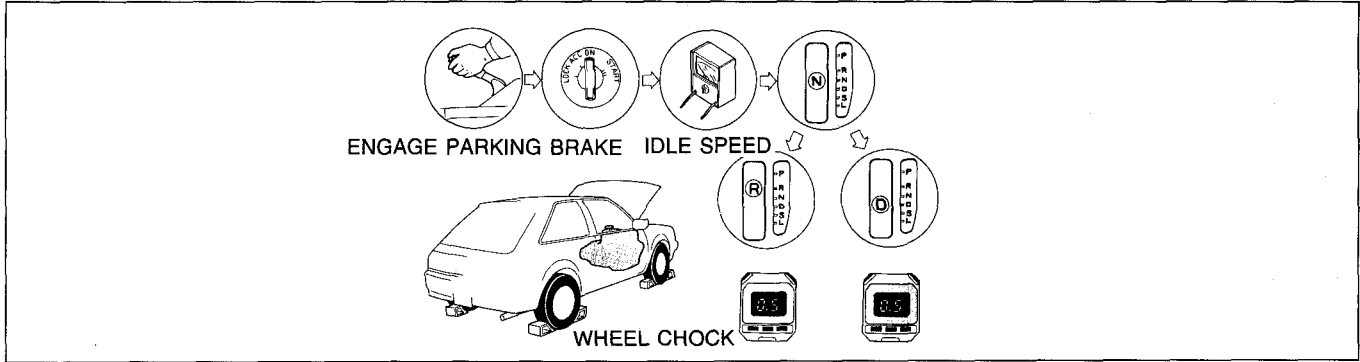
TIME LAG TEST

If the selector lever is shifted while the engine is idling, there will be a certain time lapse, or time lag, before shock is felt. This step measures this time lag for checking conditions of the N-D, 1-2, and N-R accumulators, forward and one-way clutches, 2-4 brake band, and low and reverse brake.

Preparation

Perform the preparation procedure outlined in STALL TEST. (Refer to page K2-119.)

Procedure



03U0K2-069

1. Start the engine and check the idle speed in P range. (Refer to Section F.)

Idle speed: 750 ± 50 rpm (with parking brake applied)

2. Shift from N range to D range.
3. Use a stopwatch to measure the time it takes from shifting until shock is felt.

Caution

- **Idling for at least one minute is to cool the ATF and prevent deterioration of the fluid.**

4. Shift the selector to N range and run the engine at idle speed for at least one minute.

Note

- **Make three measurements for each test and take the average value.**

5. Perform the test for the following shifts in the same manner.

- (1) N→D range
- (2) N→D range (Hold mode)
- (3) N→R range

Time lag: N→D range 0.5—1.0 second
 N→R range 0.6—1.0 second

Evaluation of Time Lag Test

Condition		Possible Cause
N → D shift	More than specification	Insufficient line pressure Forward clutch slipping One-way clutch 1 slipping One-way clutch 2 slipping
	Less than specification	N-D accumulator not operating properly Excessive line pressure
N → D (Hold) shift	More than specification	Insufficient line pressure Forward clutch slipping 2-4 brake band slipping One-way clutch 1 slipping
	Less than specification	1-2 accumulator not operating properly Excessive line pressure
N → R shift	More than specification	Insufficient line pressure Low and reverse brake slipping Reverse clutch slipping
	Less than specification	N-R accumulator not operating properly Excessive line pressure

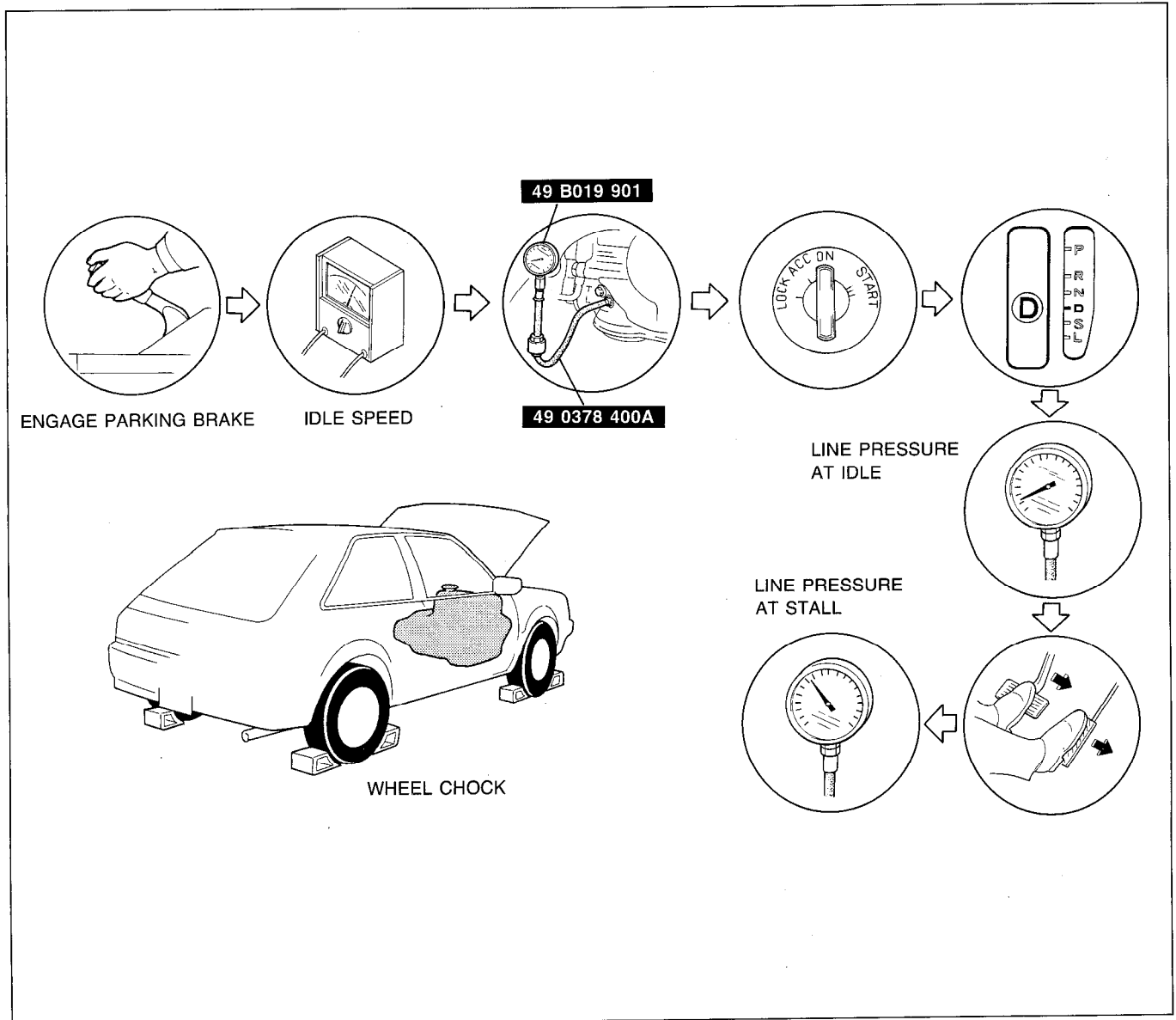
03U0KX-090

LINE PRESSURE TEST

This test measures line pressures as a means of checking the hydraulic components and inspecting for oil leakage.

Preparation

1. Perform the preparation procedure outlined in STALL TEST. (Refer to page K2-119.)
2. Connect a tachometer to the engine.
3. Connect the **SST** to the line pressure inspection port (square head plug L).

Procedure

03U0K2-070

1. Start the engine and check the idle speed in P range. (Refer to Section F.)

Idle speed: 750 ± 50 rpm (with parking brake applied)

2. Shift the selector lever to D range and read the line pressure at idle.

Caution

- **Step 3 and 4 must be performed within 5 seconds to prevent possible transaxle damage.**

3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read the line pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

Caution

- **Idling for at least one minute is to cool the ATF and to prevent deterioration of the fluid.**

5. Shift the selector lever to N range and run the engine at idle for at least one minute.
6. Read the line pressure at idle and at the engine stall speed for each range in the same manner.

Specified line pressure:

Range	Line pressure kPa (kg/cm ² , psi)	
	Idle	Stall
D, S, L	353—432 (3.6—4.4, 51—63)	873—1,040 (8.9—10.6, 127—151)
R	598—942 (6.1—9.6, 87—137)	1,668—2,011 (17.0—20.5, 242—292)

03U0K2-071

7. Install a new square head plug in the inspection port.

Tightening torque: 4.9—9.8 N·m (50—100 cm·kg, 43—87 in·lb)

Evaluation of Line Pressure Test

Line pressure	Possible location of problem
Low pressure in every position	Worn oil pump Fluid leaking from oil pump, control valve body, or transaxle case Pressure regulator valve sticking Throttle valve sticking Throttle modulator valve sticking Throttle cable misadjusted
Low pressure in D and S only	Fluid leaking from hydraulic circuit of forward clutch
Low pressure in R only	Fluid leaking from hydraulic circuit of low and reverse brake
Higher than specification	Throttle valve sticking Throttle modulator valve sticking Pressure regulator valve sticking Throttle cable misadjustment

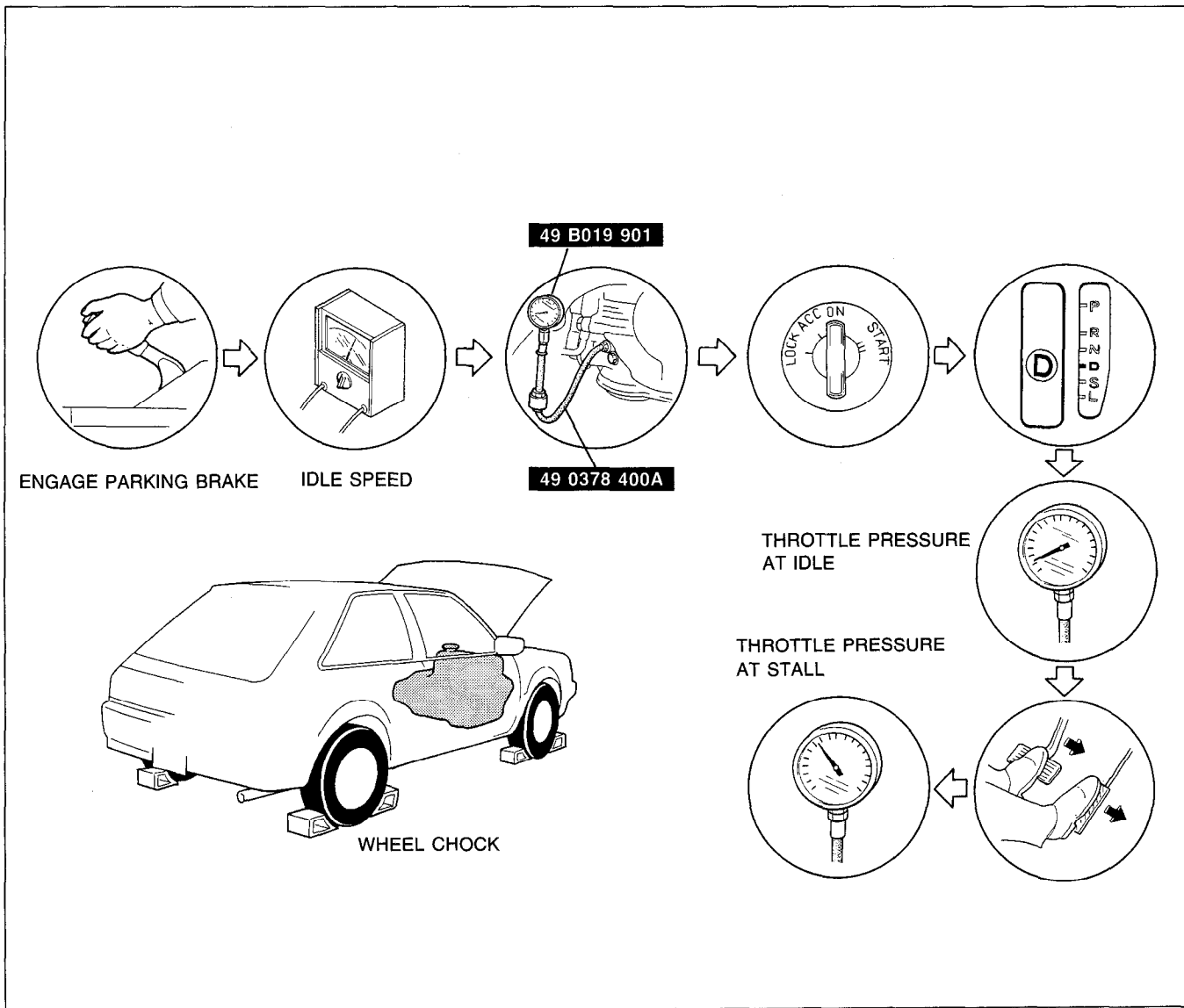
03U0KX-093

THROTTLE PRESSURE TEST

This test measures throttle pressures as a means of checking the hydraulic components and inspecting for oil leakage.

Preparation

1. Perform the preparation procedure outlined in STALL TEST. (Refer to page K2-119.)
2. Connect a tachometer to the engine.
3. Connect the **SST** to the line pressure inspection port (square head plug T).

Procedure

03U0K2-072

1. Start the engine and check the idle speed in P range. (Refer to Section F.)

Idle speed: 750 ± 50 rpm (with parking brake applied)

2. Shift the selector lever to D range and read the throttle pressure at idle.

Caution

- **Steps 3 and 4 must be performed within 5 seconds to prevent possible transaxle damage.**

3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read the throttle pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

Caution

- **Idling for at least one minute is to cool the ATF and to prevent deterioration of the fluid.**

5. Shift the selector lever to N range and run the engine at idle for at least one minute.

Specified throttle pressure:

Range	Throttle pressure kPa (kg/cm ² , psi)	
	Idle	Stall
D	39—88 (0.4—0.9, 6—13)	471—589 (4.8—6.0, 68—85)

03U0K2-073

6. Install a new square head plug in the inspection port.

Tightening torque: 4.9—9.8 N·m (50—100 cm·kg, 43—87 in·lb)

Evaluation of Throttle Pressure Test

Throttle pressure	Possible location of problem
Not within specification	Throttle valve sticking Pressure regulator valve sticking Throttle cable misadjusted

03U0KX-096

ROAD TEST

Caution

- Perform the test at normal ATF operating temperature (60—70°C, 140—158°F).

This step is performed to inspect for problems in the various gear ranges. If these tests show any problems, refer to the electronic system component or mechanical sections to adjust or replace.

D-RANGE TEST**Shift Point, Shift Pattern, and Shift Shock**

1. Shift the selector lever to D range.

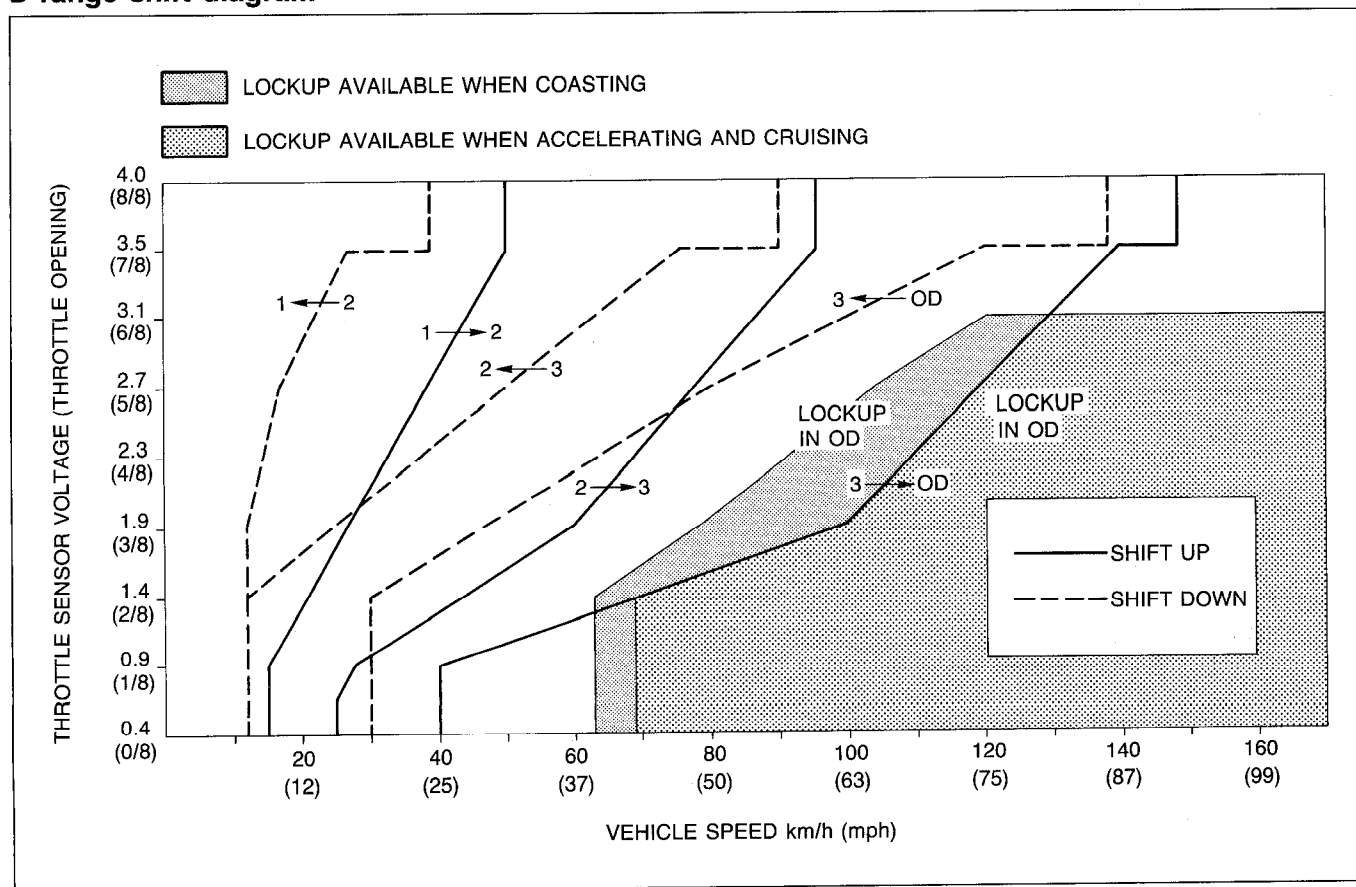
Note

- Throttle sensor voltage of the EC-AT Tester represents the throttle valve opening.

2. Accelerate the vehicle with half- and full-throttle opening.
3. Check that 1-2, 2-3, and 3-OD upshifts, downshifts, and lockup are obtained. The shift points must be as shown in the D range shift diagram.

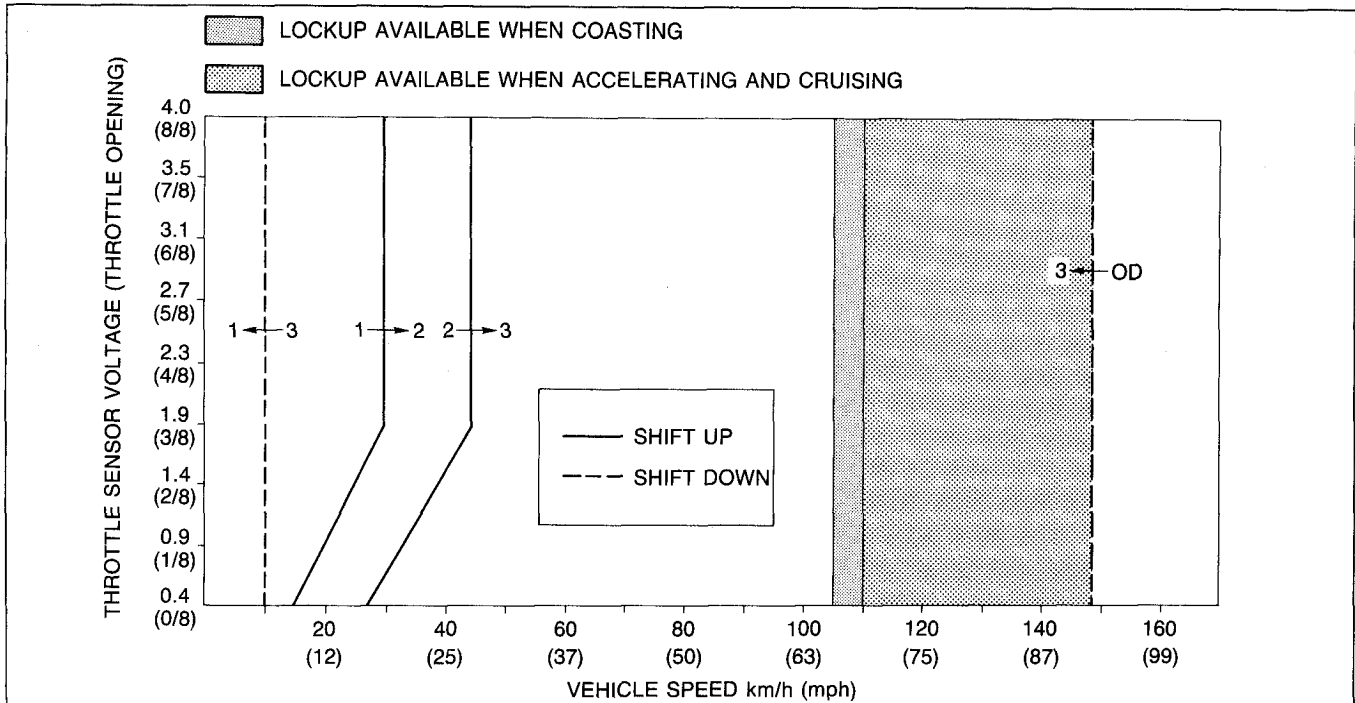
Note

- Drum speed (rpm) of the EC-AT Tester represents the shift point.
 - The vehicle's indicated speed as shown by the vehicle speedometer may not be accurate when the vehicle is on a chassis roller. Therefore, verify the shift points using only the drum speed as shown by the EC-AT Tester.
 - There is no lockup when the coolant temperature is below 72°C (162°F).
 - There is no lockup when the brake pedal is depressed.
4. Check the upshifts for shift shock or slippage in the same manner.
 5. While driving in OD (below 148 km/h, 92 mph), shift the selector lever to S range and check that OD-3 downshift immediately occurs.

D-range shift diagram

6. Select the Hold mode.
7. Accelerate the vehicle and verify that the 1-2 and 2-3 upshifts 3-1, and lockup downshifts are obtained. The shift points are as shown in the D range (Hold) shift diagram.

D-range (Hold) shift diagram



03U0K2-075

Evaluation

Condition	Possible Cause
No 1-2 up- or downshift	Stuck 1-2 shift solenoid valve Stuck 1-2 shift valve
No 2-3 up- or downshift	Stuck 2-3 shift solenoid valve Stuck 2-3 shift valve
No 3-OD up- or downshift	Stuck 3-4 shift solenoid valve Stuck 3-4 shift valve
No lockup shift	Stuck lockup control solenoid valve Stuck lockup control valve
Incorrect shift point	Misadjusted throttle sensor Stuck shift valves
Excessive shift shock or slippage	Stuck accumulators Stuck or no one-way check orifice Worn clutches, brakes, or one-way clutch
No engine braking effect	Worn clutches or brakes

03U0KX-103

Noise and Vibration

Note

- **Abnormal noise and vibration can also be caused by the torque converter, driveshaft, or differential. Therefore, check for the cause with extreme care.**

Drive the vehicle in OD (lockup), OD (no lockup), and 3rd (Hold) and check for abnormal noise or vibration.

Kickdown

Drive the vehicle in OD, 3rd, and 2nd gears and check that kickdown occurs for OD→3, OD→2, OD→1, 3→2, 3→1, 2→1, and that the shift points are as shown in the shift diagram.

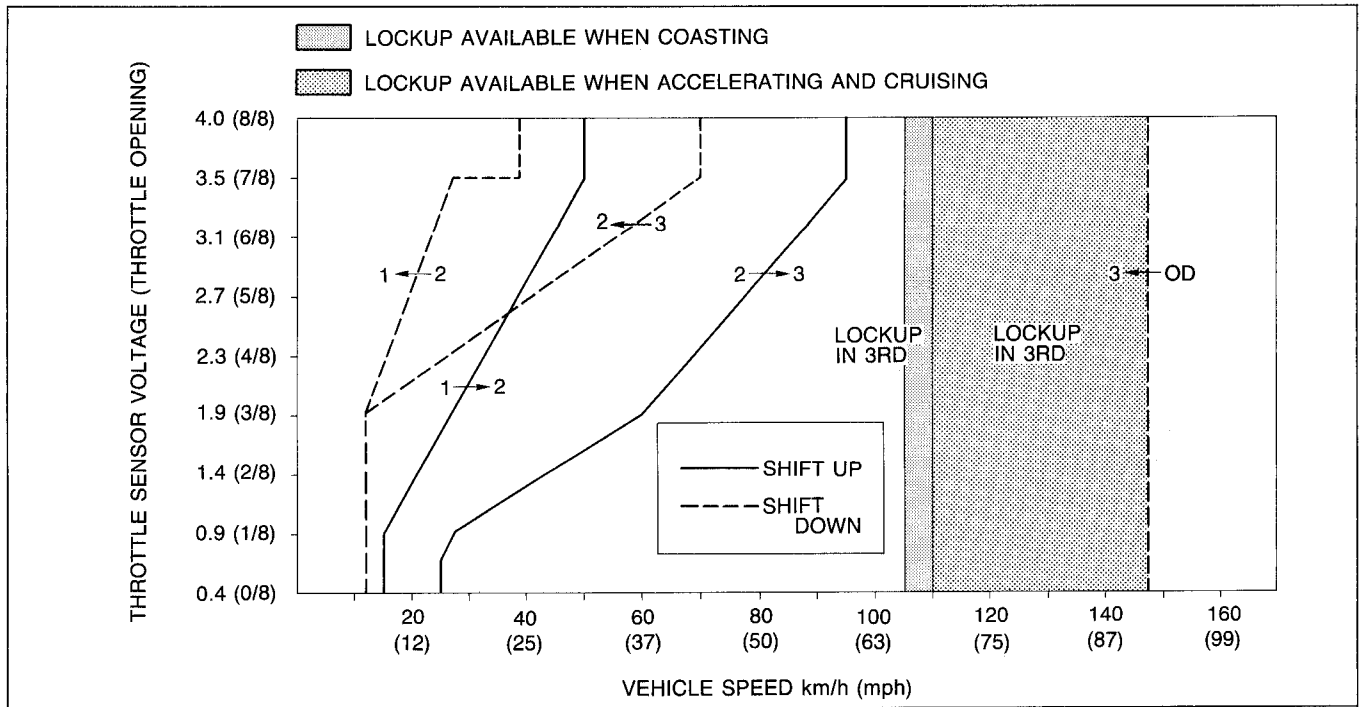
03U0KX-104

S-RANGE TEST

Shift Pattern

1. Shift the selector lever to S range.
2. Accelerate the vehicle and verify that the 1-2 and 2-3 upshifts, downshifts, and lockup are obtained. The shift points must be as shown in the S range shift diagram.

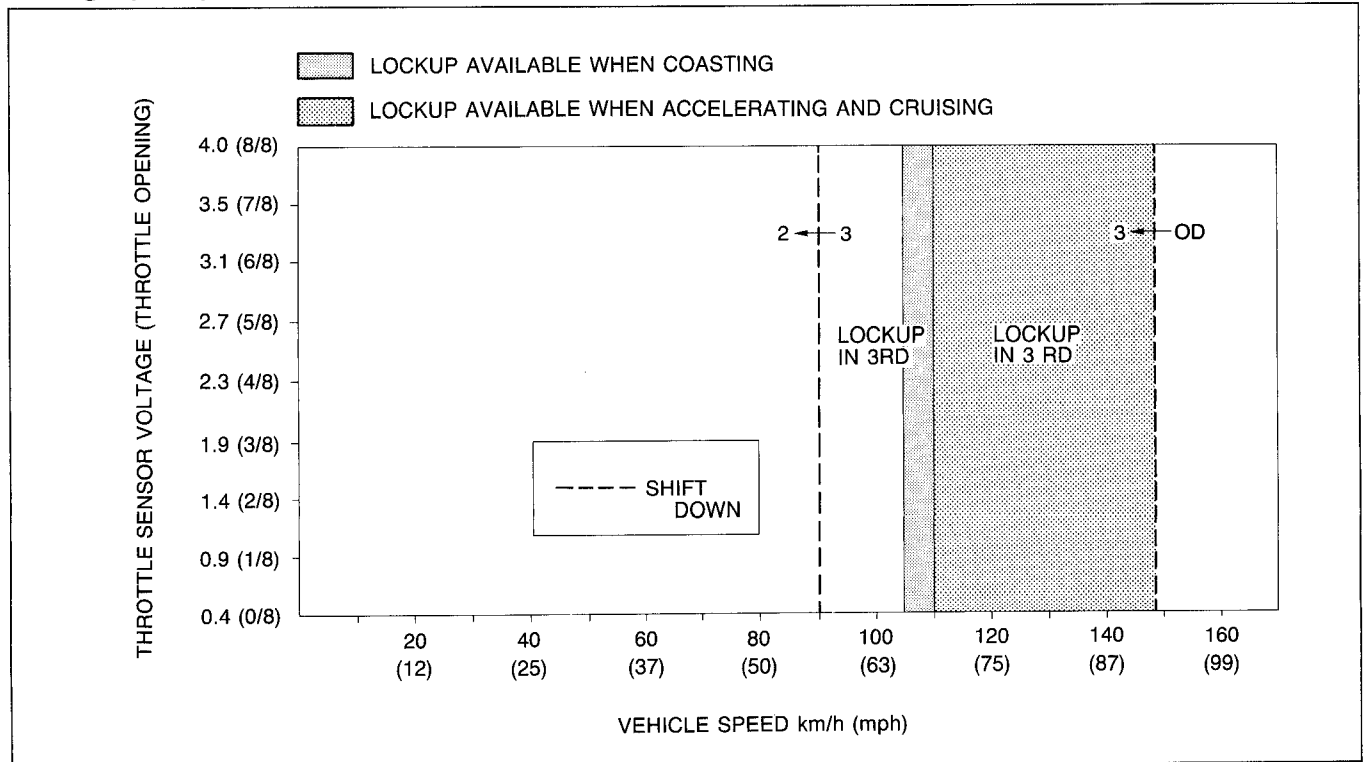
S-range shift diagram



03U0K2-076

3. While driving in S range and 3rd gear, select the Hold mode and verify that 3rd gear is held until the 3-2 downshift point as shown in the S range (Hold) shift diagram is achieved.
4. Accelerate the vehicle in S range (Hold) and verify that 2nd gear is held.

S-range (Hold) shift diagram



03U0K2-077

Noise and vibration

Note

- **Abnormal noise and vibration can also be caused by the torque converter, drive shaft or differential. Therefore, check for the cause with extreme care.**

Drive the vehicle in 2nd gear (Hold mode) and check for abnormal noise or vibration.

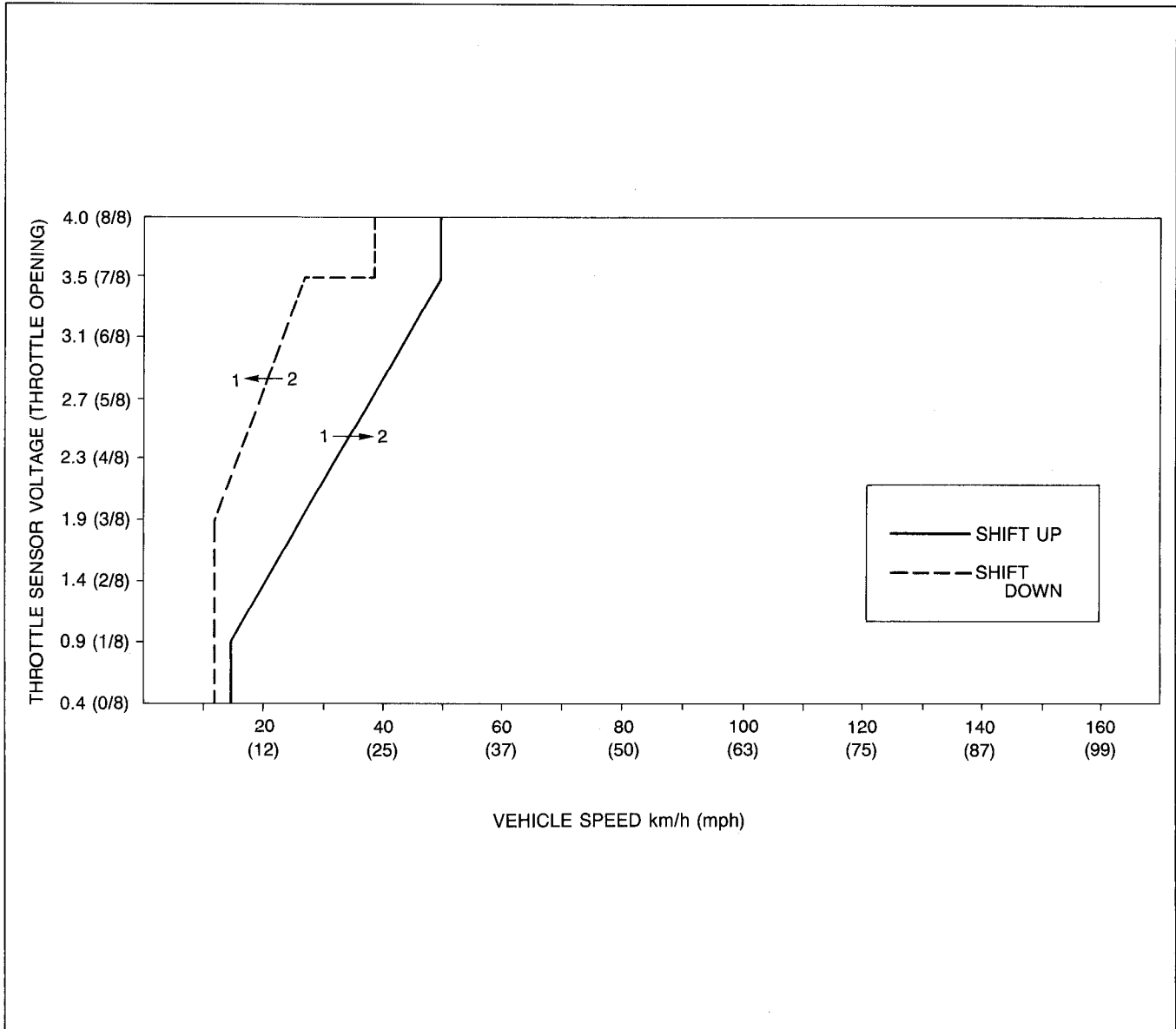
03U0K2-078

L-RANGE TEST

Shift Pattern

1. Shift the selector lever to L range.
2. Accelerate the vehicle and verify that the 1-2 upshifts and downshifts are obtained and that no 3rd gear, OD, or lockup is obtained.
3. Check the upshifts for shift shock or slippage in the same manner.
4. Decelerate the vehicle and verify that engine braking effect is felt in 2nd gear.

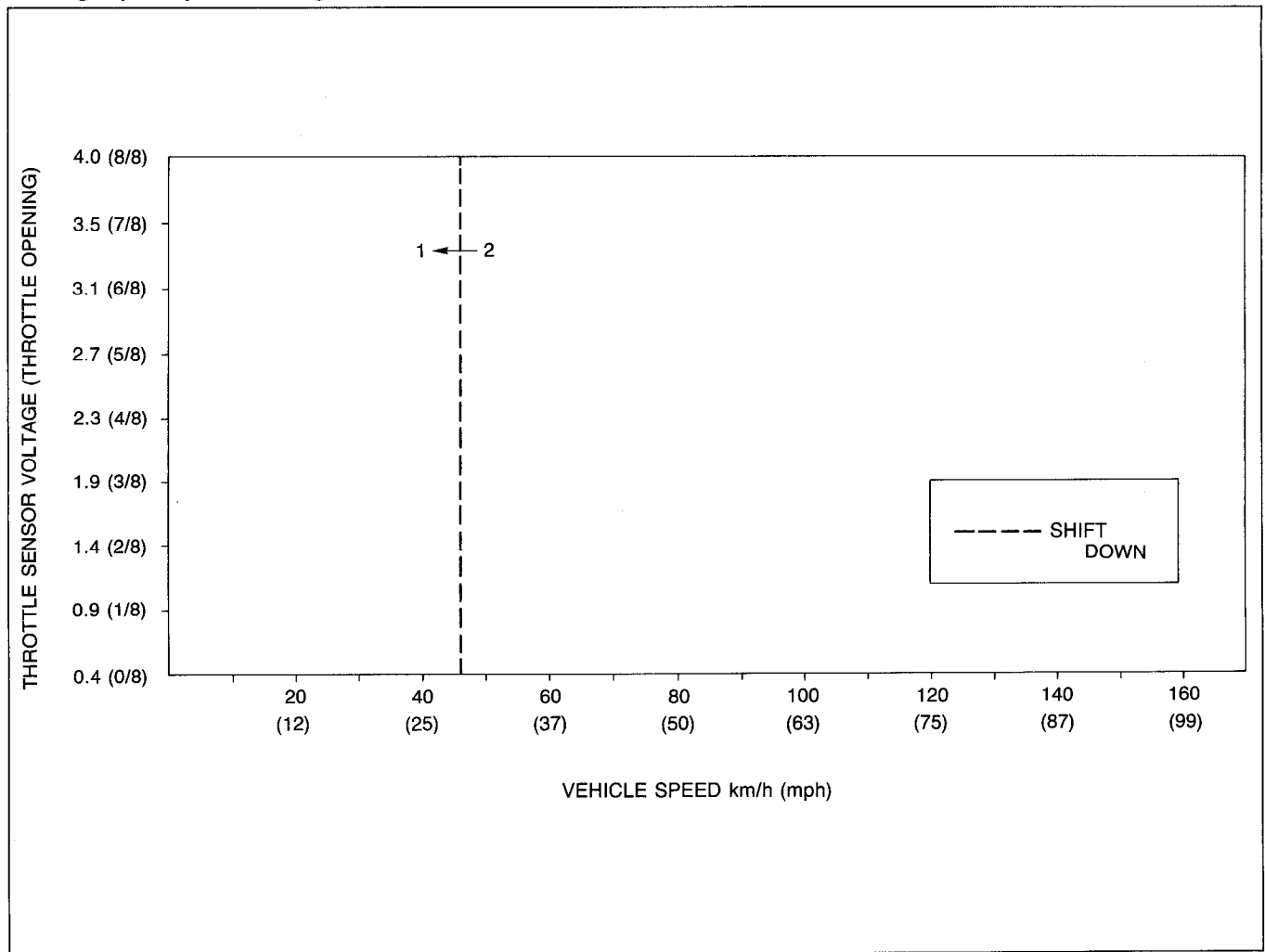
L-range shift diagram



03U0K2-079

5. Select the Hold mode.
6. While driving in S range (Hold mode) and 2nd gear, shift the selector lever to L range and verify that 2nd gear is held until the 2 → 1 downshift point as shown in the L range (Hold) shift diagram is achieved.
7. Accelerate the vehicle in L range (Hold mode) and verify that 1st gear is held.

L-range (Hold) shift diagram



03U0K2-080

Noise and Vibration

Note

- **Abnormal noise and vibration can also be caused by the torque converter, driveshaft or differential. Therefore, check for the cause with extreme care.**

Drive the vehicle in 1st gear (Hold mode) and check for abnormal noise and vibration.

P-RANGE TEST

1. Shift into P range on a gentle slope, release the brake, and verify that the vehicle does not roll.

03U0KX-115

Vehicle Speed at Shiftpoint Table

Mode	Range	Throttle condition (Throttle sensor voltage)	Shift	Drum speed rpm	Vehicle speed km/h (mph)
NORMAL	D	Fully opened (4.0V)	D1 → D2	4,900—5,500	49—55 (30—34)
			D2 → D3	5,100—5,550	93—101 (58—63)
			D3 → OD	5,200—5,500	145—155 (90—96)
		Half throttle (1.6—2.2V)	D1 → D2	2,800—3,700	28—37 (17—23)
			D2 → D3	3,300—4,250	60—77 (37—48)
			D3 → OD	3,500—4,300	98—121 (61—75)
			Lockup ON (OD)	2,100—2,750	84—110 (52—68)
		Kickdown	OD → D3	3,300—3,600	133—143 (82—89)
			D3 → D2	3,100—3,350	86—94 (53—58)
	D2 → D1		2,000—2,300	36—42 (22—26)	
	S	Fully opened (4.0V)	S1 → S2	4,900—5,500	49—55 (30—34)
			S2 → S3	5,100—5,550	93—101 (58—63)
			Lockup ON (S3)	3,850—4,150	108—116 (67—72)
			S3 → S2	3,100—3,350	86—94 (53—58)
			S2 → S1	2,000—2,300	36—42 (22—26)
		Half throttle (1.6—2.2V)	S1 → S2	2,800—3,700	28—37 (17—23)
			S2 → S3	3,300—4,250	60—77 (37—48)
			Lockup ON (S3)	3,700—4,150	104—116 (65—72)
L	Fully opened (4.0V)	L1 → L2	4,900—5,500	49—55 (30—34)	
		L2 → L1	2,000—2,300	36—42 (22—26)	
	Half throttle (1.6—2.2V)	L1 → L2	2,800—3,700	28—37 (17—23)	
HOLD	D	Fully opened (4.0V)	D1 → D2	2,700—3,300	27—33 (17—20)
			D2 → D3	2,200—2,750	40—50 (25—31)
			D3 → D1	250—500	7—13 (4—9)
	S	Fully closed (0.5V)	S3 → S2	3,100—3,300	87—93 (54—58)
			L2 → L1	2,400—2,700	43—49 (27—30)

03U0K2-081

Slippage Test

This step is performed to inspect slippage of the friction elements.

Preparation

1. Connect a tachometer to the engine and set it in the cabin.
2. Connect the **EC-AT Tester Set** between the EC-AT control unit and wiring harness.

Procedure

Drive the vehicle in each of the gears indicated below and check whether the vehicle speed or engine speed is above or below specification as shown by the turbine speed.

Driving condition			Speed	Drum speed (rpm)			
No.	Gears	Other condition		1,000	2,000	3,000	4,000
1	1st	L range, Hold mode	Vehicle speed km/h (mph)	10 (6)	20 (12)	30 (19)	40 (25)
2	1st	D range, Normal mode		10 (6)	20 (12)	30 (19)	40 (25)
3	2nd	S range, Hold mode		18 (11)	36 (22)	55 (34)	73 (45)
4	3rd	D range, Hold mode		28 (17)	56 (35)	84 (52)	112 (69)
5	OD	D range, Normal mode		40 (25)	80 (50)	120 (74)	160 (99)
6	OD	D range, Normal mode, Lockup	Engine speed (rpm)	1,000	2,000	3,000	4,000

03U0K2-082

Evaluation

When there is no malfunction in the electrical system or hydraulic system, but vehicle speed or engine speed is below specification, the problem can be attributed to slippage of the friction elements.

Driving conditions below specification	Possible Cause
No.1 condition only	Low and reverse brake
No.2 condition only	One-way clutch 1
No.3 condition only	2-4 brake band
No.4 condition only	Coasting clutch
No.5 condition only	3-4 clutch
No.1—No.5 conditions	Forward clutch
No.6 condition only	Lookup piston (in torque converter)

03U0KX-118

AUTOMATIC TRANSAXLE FLUID (ATF)

ATF
Inspection
Level

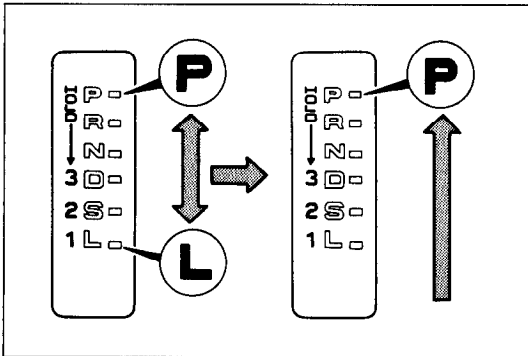
Caution

- Place the vehicle on a flat, level surface.

1. Apply the parking brake and position wheel chocks securely to prevent the vehicle from rolling.
2. Warm-up the engine until the ATF reaches **60—70°C (140—158°F)**.

03U0KX-119

3. While the engine is idling, shift the selector lever from P to L and back to P.
4. Let the engine idle.
5. Shift the selector lever to P.



03U0KX-120

Note

- Only use the COOL 20°C (68°F) range as a rough reference.

6. Ensure that the ATF level is in the HOT 65°C (149°F) range. Add ATF to specification, if necessary.

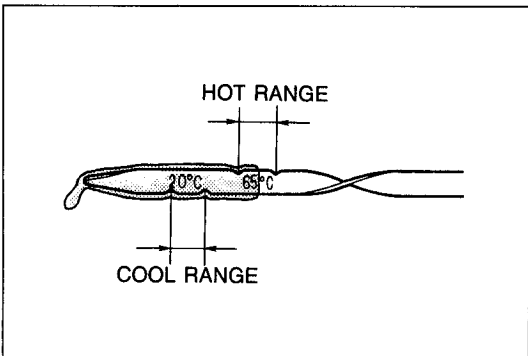
ATF type: M-III or DEXRON-II

Condition

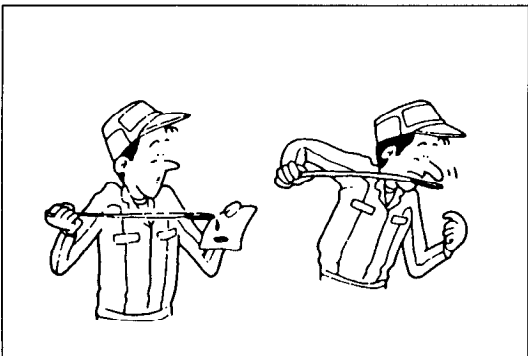
Note

- Determine whether or not the automatic transmission should be disassembled by observing the condition of the ATF carefully. If the ATF is muddy and varnished, it indicates burned drive plates.

1. Check the ATF for discoloration.
2. Check the ATF for any unusual smell.



03U0K2-309

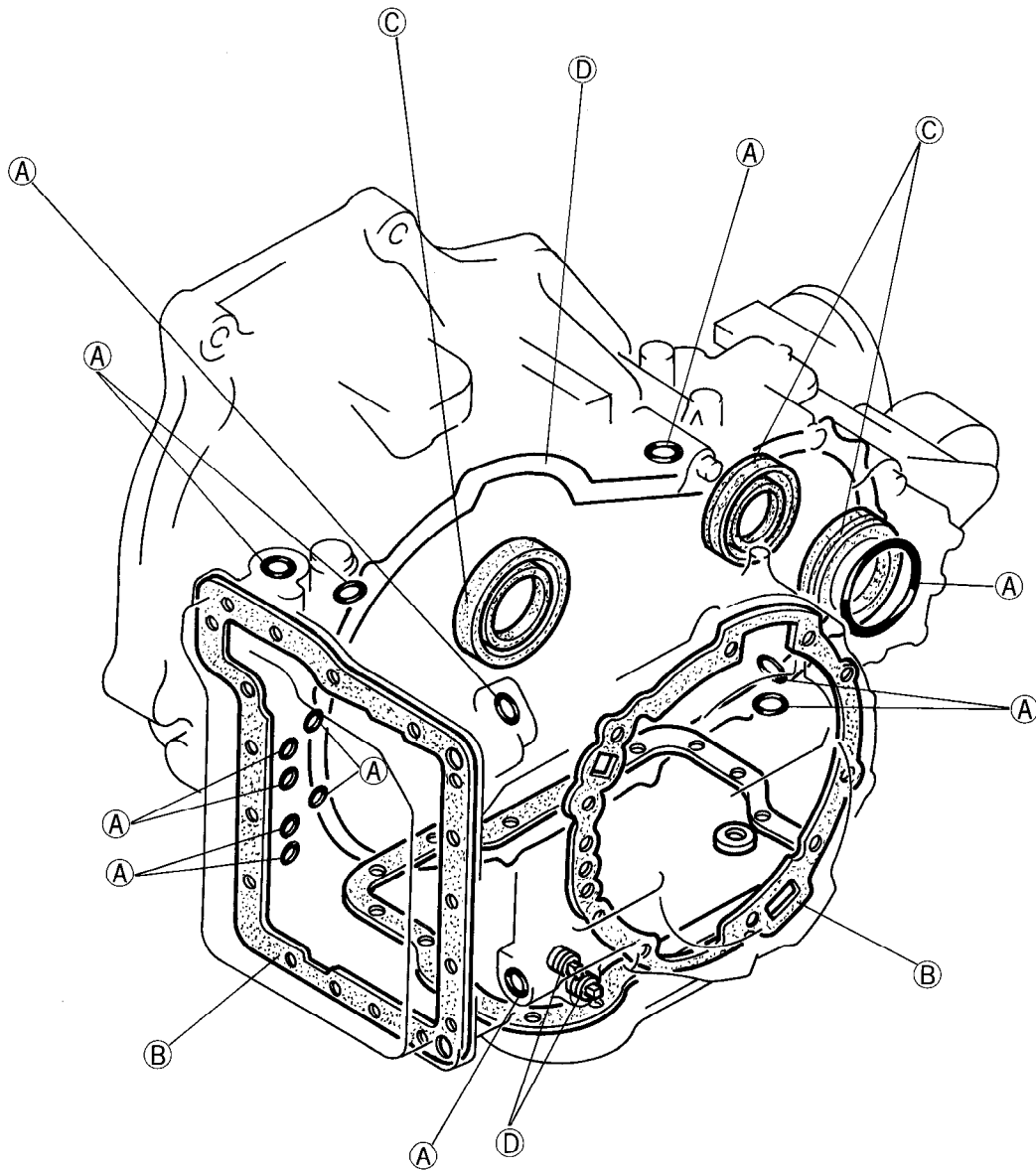


03U0KX-122

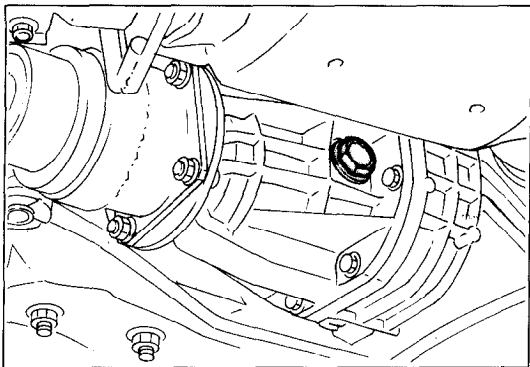
Fluid leaks

Check for fluid leaks of the transaxle at the points shown below and repair or replace as necessary.

1. Gaskets, O-rings, and plugs.
2. Oil hoses, oil pipes, and connections.
3. Oil cooler.



- (A) O-RING
- (B) GASKET
- (C) OIL SEAL
- (D) OTHERS



03U0K2-083

TRANSFER CARRIER OIL

INSPECTION

Note

- Park the vehicle on level ground.

1. Remove the check plug.
2. Verify that the oil is at the bottom of the plug port. If it is low, add the specified oil from plug port.
3. Install the check plug.

Tightening torque:

39—58 N·m (4.0—6.0 m·kg, 28—43 ft·lb)

REPLACEMENT

1. Remove the drain plug. Drain the oil into a suitable container.
2. Install the drain plug.

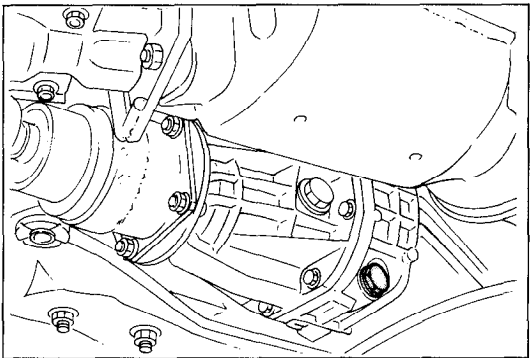
Tightening torque:

39—58 N·m (4.0—6.0 m·kg, 28—43 ft·lb)

3. Add the necessary amount of the specified oil through the plug port.

Specified oil: SAE 75W-90

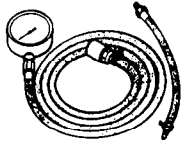
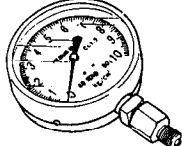
Capacity: 0.5 liter (0.53 US qt, 0.44 Imp qt)



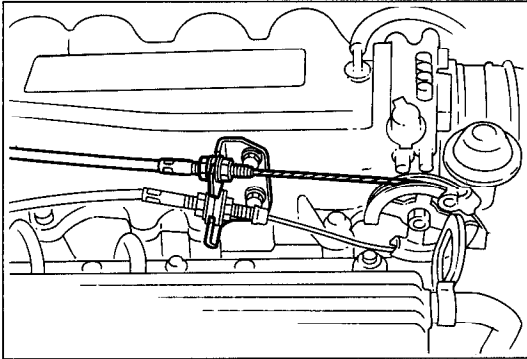
03U0K2-084

THROTTLE CABLE

PREPARATION SST

<p>49 0378 400A</p> <p>Gauge set, oil pressure</p> 	<p>For adjustment of throttle cable</p>	<p>49 B019 901</p> <p>Gauge, oil pressure</p> 	<p>For adjustment of throttle cable</p>
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03U0K2-085

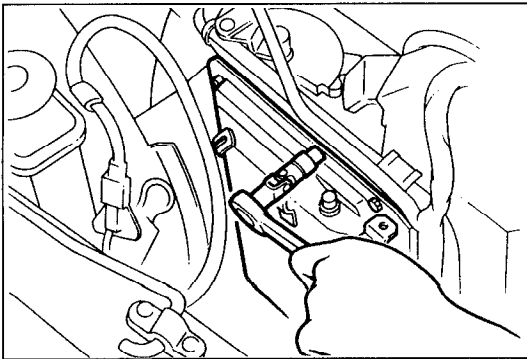


03U0KX-125

THROTTLE CABLE

Inspection

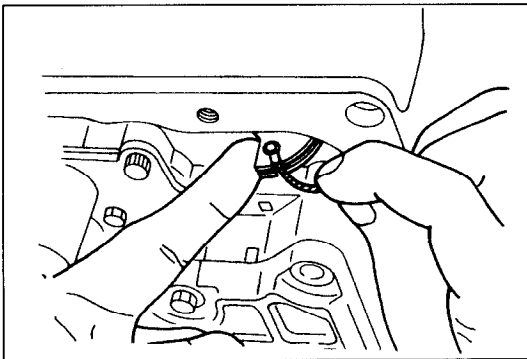
1. Check the inner and outer cable for damage.
2. Verify that the accelerator operates smoothly.



03U0K2-086

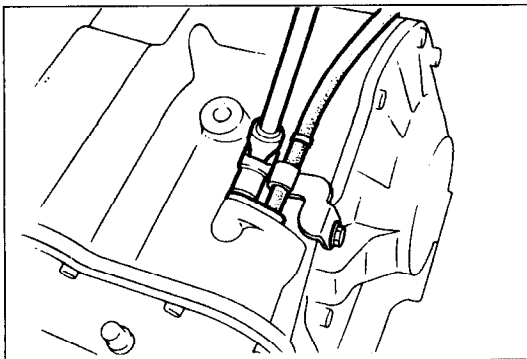
Replacement

1. Disconnect the oil hose.
2. Remove the throttle cable from the throttle lever.
3. Drain the ATF.



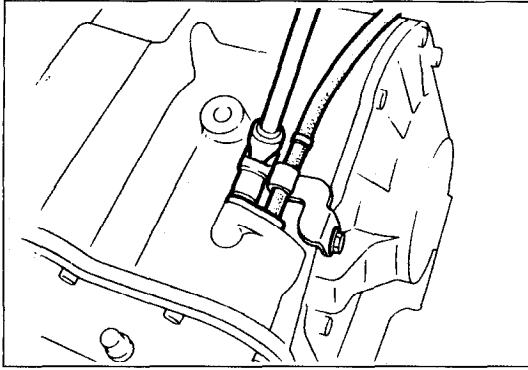
03U0K2-087

4. Remove the control valve body cover and gasket.
5. Remove the throttle cable from the throttle cam.
6. Remove the harness bracket.



03U0K2-088

7. Remove the throttle cable from the transaxle.
8. Remove the O-ring.

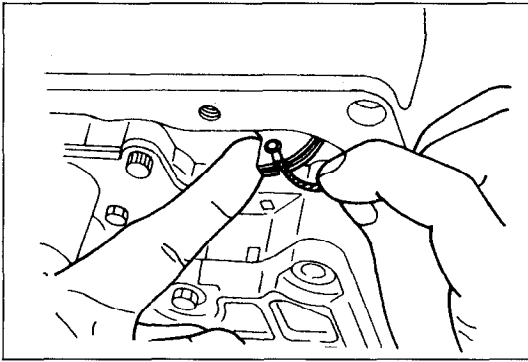


03U0K2-089

9. Install the throttle cable and a new O-ring into the transaxle.

Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)



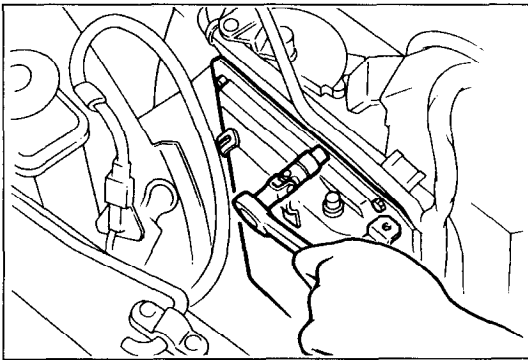
03U0K2-090

10. Install the harness bracket.

Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)

11. Install the throttle cable to the throttle cam.
12. Temporarily install the throttle cable to the throttle lever.

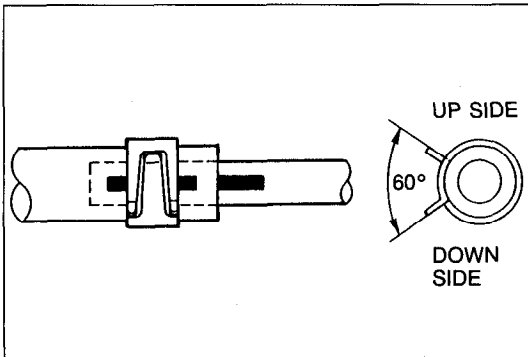


03U0K2-091

13. Install the control valve body cover and a new gasket.

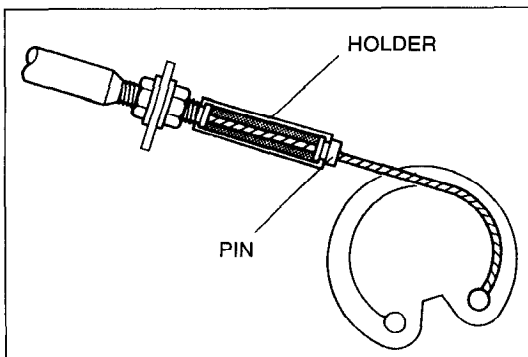
Tightening torque:

8.3—11.0 N·m (85—110 cm·kg, 74—100 in·lb)



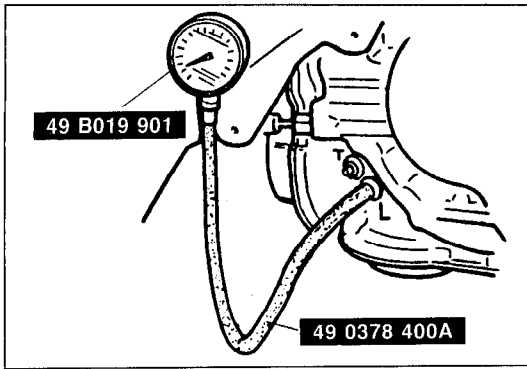
03U0K2-092

14. Align the marks, and slide the oil cooler hose onto the oil cooler pipe until it is fully seated against the ridge.
15. Install the hose clamp onto the hose at the center of the mark and at the angle shown.
16. Verify that the hose clamp does not interfere with any other parts.
17. After installation, add ATF.
18. Check the ATF level and for leaks.
19. Adjust the throttle cable.

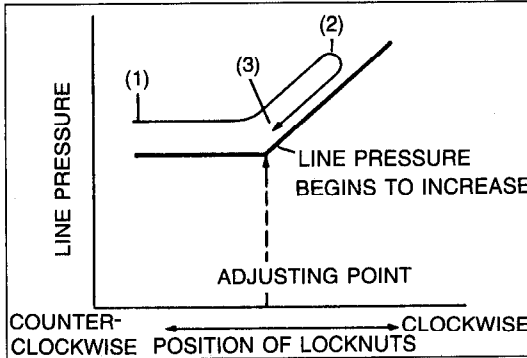


03U0K2-093

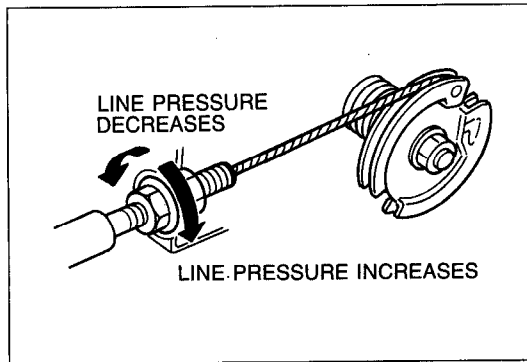
20. Fully open the throttle valve, and crimp the pin with the holder installed as shown.



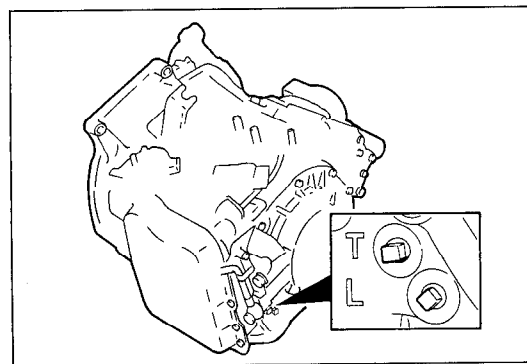
03U0KX-130



03U0KX-131



03U0K2-310



03U0KX-133

Adjustment

1. Remove the square head plug L and install the **SST**.
2. Shift into P range and start the engine. Warm up the engine to normal operating temperature, and adjust the idle speed if necessary.

Idle speed:

750 ± 50 rpm (with parking brake applied)

3. Adjust the locknuts as follows:

When the locknuts are rotated, line pressure is increased or decreased as shown. Adjust the locknuts to the correct position using the following procedure.

- (1) Initially install the locknuts fully away from the throttle cam. (Loosen the cable all the way)
- (2) Adjust the locknuts in a clockwise direction as viewed from the passenger side of the vehicle until the line pressure exceeds the specification.

- (3) Adjust the locknuts in a counterclockwise direction until the line pressure decreases to the specification. Tighten the locknuts.

Adjustment pressure:

431—451 kPa (4.4—4.6 kg/cm², 63—65 psi)

- (4) Tighten the locknuts and verify that the line pressure is as specified.

Specified pressure: 441 kPa (4.5 kg/cm², 64 psi)

Note

- **Transaxle in P range.**

4. Turn off the engine.
5. Install a new square head plug L.

Tightening torque:

5—10 N·m (50—100 cm·kg, 43—87 in·lb)

ELECTRONIC SYSTEM COMPONENTS

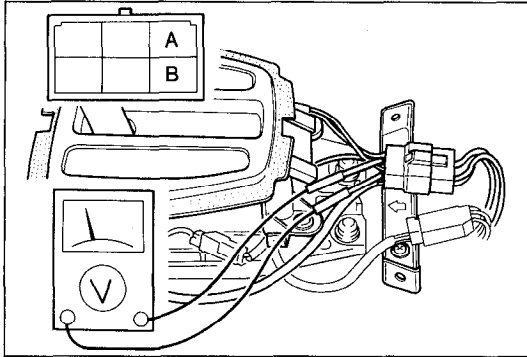
HOLD SWITCH

Inspection

Inspection of operation

1. Turn the ignition switch OFF→ON.
2. Verify that the HOLD indicator is not illuminated. Depress the switch and verify that the HOLD indicator comes ON.
3. If not as specified, check the terminal voltage of the hold switch.

03U0KX-134



03U0KX-135

Inspection of voltage

1. Remove the rear console.
2. Turn the ignition switch ON.
3. Check the voltage between terminals A and B.

Terminal voltage	Switch
Approx. 12V	Released
Below 1.5V	Depressed

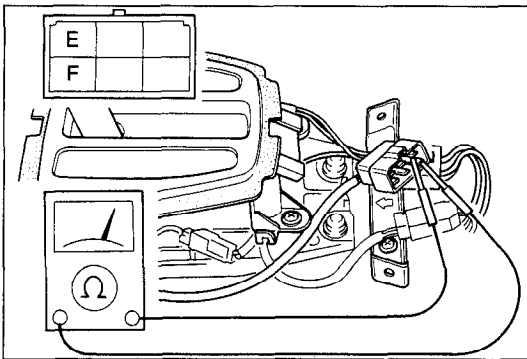
4. If not correct, go to the next step.

Inspection of continuity

1. Disconnect the connector.
2. Check continuity between terminals E and F.

Continuity	Switch
Yes	Released
No	Depressed

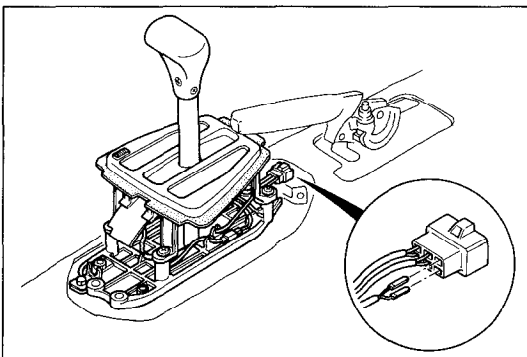
3. If not correct, replace the selector lever knob as an assembly.



03U0KX-136

Replacement

1. Remove the rear console.
2. Disconnect the connector.
3. Remove the selector lever knob.
4. Install a new selector lever knob.
5. Install the rear console.



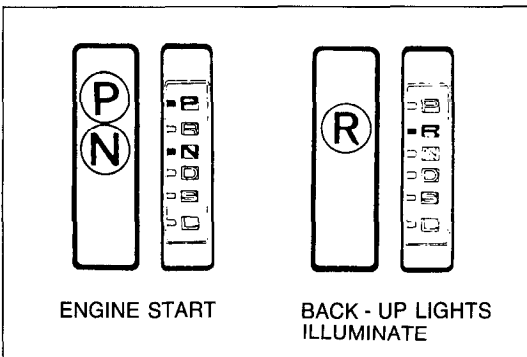
03U0KX-137

INHIBITOR SWITCH

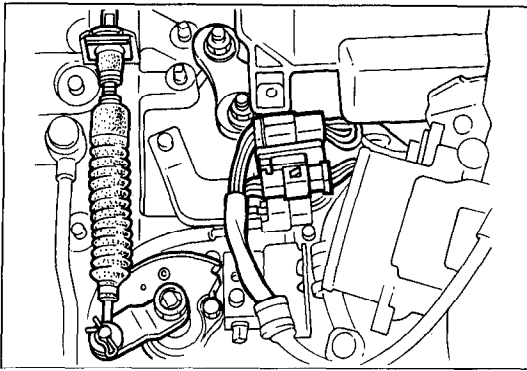
Inspection

Inspection of operation

1. Verify that the starter operates with the ignition switch at START position and the selector lever in P and N ranges only.
2. Verify that the back-up lights illuminate when shifted to R range with the ignition switch in ON position.
3. Check the inhibitor switch if not as specified.



03U0KX-138



03U0KX-139

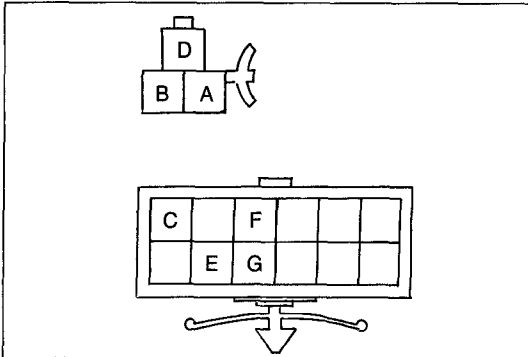
Inspection of continuity

1. Disconnect the inhibitor switch connector.
2. Check continuity of the terminals.

Position	Connector terminal						
	A	B	C	D	E	F	G
P	○	○					
R			○	○			
N	○	○					
D			○		○		
S			○			○	
L			○				○

○—○: Indicates continuity

3. If not correct, replace the switch and perform adjustment of the inhibitor switch.
4. If correct, check or adjust the selector lever.



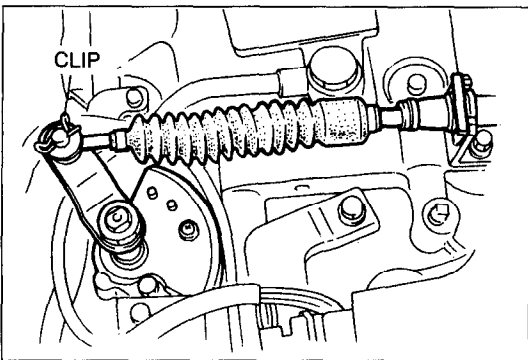
03U0K2-094

Replacement

1. Disconnect the negative battery cable.
2. Remove the air hose and disconnect the harness.
3. Remove the clip.
4. Remove the bolts and the manual shaft nuts.
5. Install the new inhibitor switch and the manual shaft nuts.

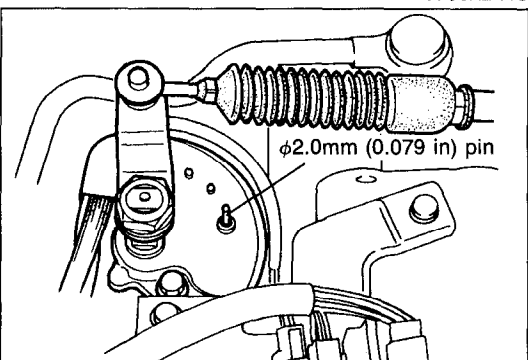
Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)



03U0K2-095

6. Align the holes of the inhibitor switch and the selector lever by inserting an **approx. 2.0mm (0.079 in)** diameter pin.
7. Connect the harness and install the air hose.
8. Connect the negative battery cable.
9. Inspection of inhibitor switch.



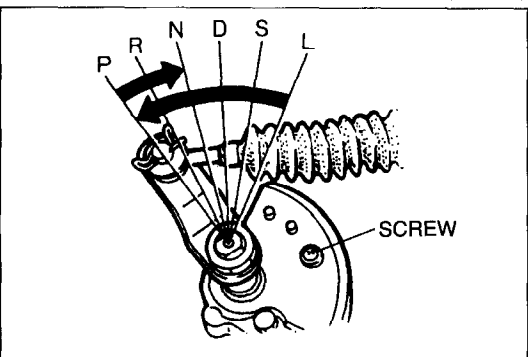
03U0K2-096

Adjustment

1. Remove the air hose.
2. Turn the manual shaft to N position.
3. Loosen the inhibitor switch mounting bolts.
4. Align the holes of the inhibitor switch and the manual shaft lever by inserting an **approx. 2.0mm (0.079 in)** diameter pin.
5. Tighten the mounting bolts.

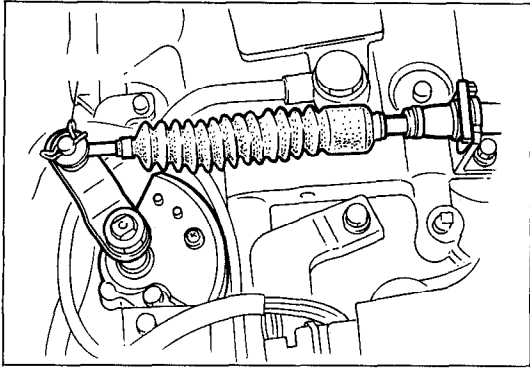
Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)



03U0K2-097

6. Recheck the continuity of the inhibitor switch.
7. If not correct, replace the inhibitor switch.



03U0K2-098

8. Connect the selector lever.

Tightening torque:

44—64 N·m (4.5—6.5 m·kg, 33—47 ft·lb)

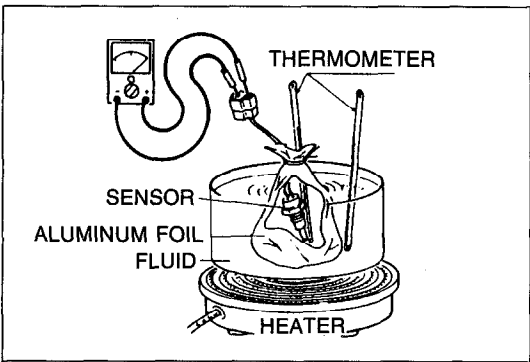
ATF THERMOSWITCH

Inspection

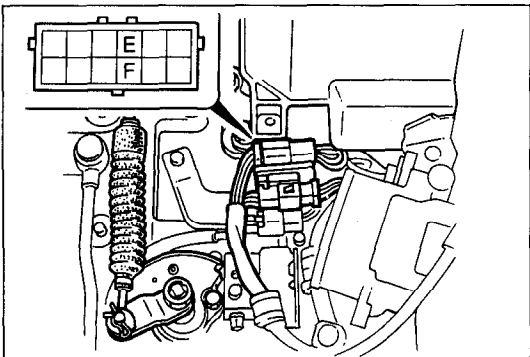
1. Remove the ATF thermoswitch.
2. Place the switch in oil with a thermometer as shown, and heat it up gradually.
3. Check the continuity of the terminals. If necessary replace the switch.

Connection guide

Fluid temperature	Continuity
Above $150 \pm 3^{\circ}\text{C}$ ($302 \pm 37^{\circ}\text{F}$)	Yes
Below 143°C (289°F)	No



03U0K2-099



03U0KX-145

PULSE GENERATOR

Inspection

Inspection of resistance

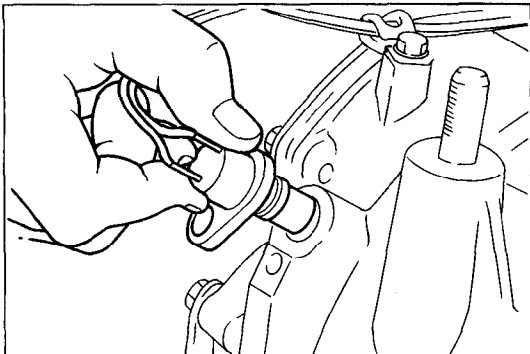
1. Disconnect the pulse generator connector.
2. Measure resistance between the terminals E and F.

Resistance: 200—400Ω

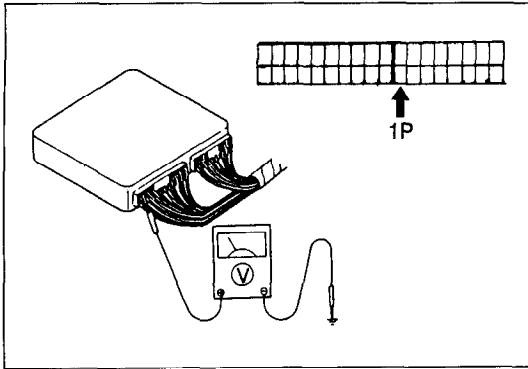
3. If not correct, replace the pulse generator.

Tightening torque:

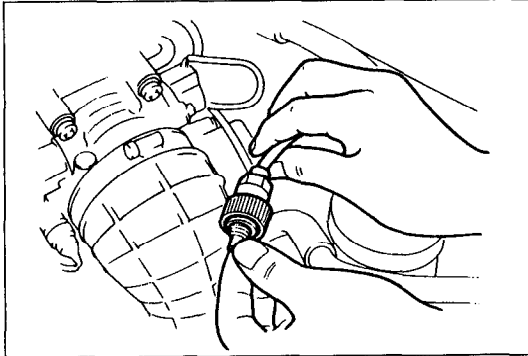
8—11 N·m (80—110 cm·kg, 69—95 in·lb)



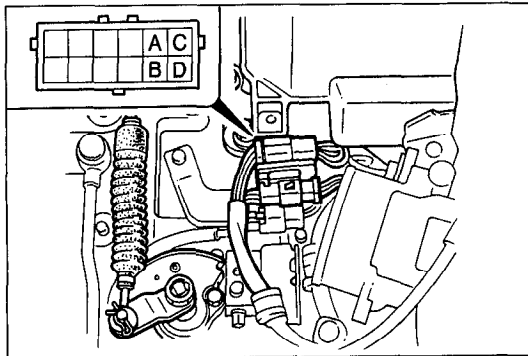
03U0KX-146



03U0KX-147



03U0KX-148



03U0KX-149

SPEED SENSOR

Inspection

1. Connect a voltmeter between the terminal 1P and a ground as shown.
2. Turn the ignition switch ON.

3. Remove the speedometer cable from the transmission.
4. Slowly turn the speedometer cable one turn.
5. Verify that **approx. 7V** is shown 4 times.
6. If not correct, check the speedometer and cable.

SOLENOID VALVE

Inspection

1. Disconnect the solenoid valve connector.
2. Measure resistance between each terminal and a ground.

Resistance: 13—27Ω

Note

- 1-2 shift solenoid valve: **A**
- 2-3 shift solenoid valve: **B**
- 3-4 shift solenoid valve: **C**
- Lockup solenoid valve: **D**

3. If not correct, check the wiring for an open-or short-circuit. Replace the solenoid valve.

Continuity

1. Disconnect the 20-pin connector from the EC-AT control unit.
2. Check continuity between terminals 2E, 2G, 2I, and 2K, and a ground.
3. If not correct, check the wiring for an open-circuit.

03U0KX-150

EC-AT CONTROL UNIT

Inspection

1. Turn the ignition switch ON, and check the EC-AT control unit terminal voltage, referring to the Terminal Voltage Chart.
2. If not correct, check and replace or repair the component(s), wiring, and/or EC-AT control unit.

03U0KX-151

Terminal Voltage Chart

2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1O	1M	1K	1I	1G	1E	1C	1A
2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1P	1N	1L	1J	1H	1F	1D	1B

9MU0K1-083

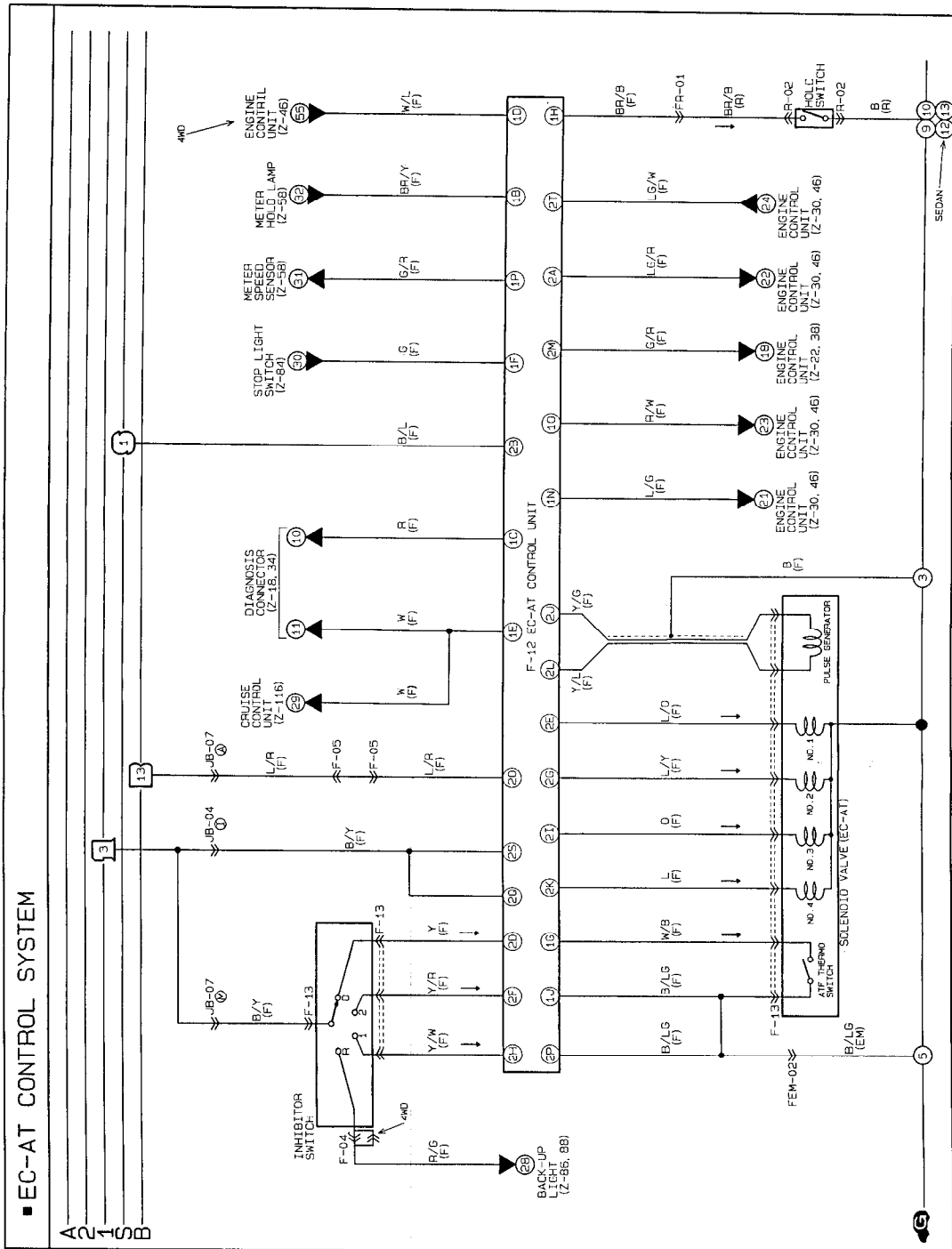
Terminal	Connection to	Voltmeter		Voltage	Condition
		+ terminal	-terminal		
1A	—	—	—	—	—
1B (Output)	Hold indicator	1B	Ground	Below 1.5V	Hold mode
				Approx. 12V	Normal mode
1C (Output)	EC-AT tester (Malfunction code)	1C		Approx. 12V	Normal (With EC-AT Tester)
				Below 1.5V or Approx. 12V (fluctuating)	If malfunction present (With EC-AT Tester)
				Code signal	Diagnosis connector grounded (With EC-AT Tester)
1D (Output)	No load signal	1D		Approx. 12V	P or N ranges
				Below 1.5V	Other ranges
1E (Input)	Diagnosis connector	1E		Approx. 12V	Normal
				Below 1.5V	TAT terminal grounded
1F (Input)	Stoplight switch	1F		Approx. 12V	Brake pedal depressed
				Below 1.5V	Brake pedal released
1G (Input)	ATF thermoswitch	1G		Below 1.5V	Above 145°C (293°F)
				Approx. 12V	Below 138°C (211°F)
1H (Input)	Hold switch	1H		Below 1.5V	Switch depressed
			Approx. 12V	Switch released	
1I	—	—	—	—	
1J (Ground)	Battery ground	1J	Ground	Below 1.5V	—
1K	—	—	—	—	—
1L	—	—	—	—	—
1M	—	—	—	—	—

Terminal	Connected to	Voltmeter		Voltage	Condition
		+ terminal	- terminal		
1N (Input)	Water thermo signal	1N	Ground	Approx. 12V	Above 72°C (162°F)
				Below 1.5V	Below 67°C (153°F)
1O (Input)	Idle switch	1O	Ground	Approx. 12V	Idle switch OFF (Throttle valve open)
				Below 1.5V	Idle switch ON (Throttle valve fully closed)
1P (Input)	Vehicle speed sensor	1P	Ground	Approx. 3V—4V	While driving
				Approx. 3V—4V or below 1.5V	Vehicle stopped
2A (Input)	Throttle sensor	2A	Ground	Approx. 5V	Ignition switch ON
				Below 1.5V	Ignition switch OFF
2B (Input)	Inhibitor switch (P and N ranges)	2B	Ground	Below 1.5V	P and N ranges
				Approx. 12V	Other ranges
2C	—	—	—	—	—
2D (Input)	Inhibitor switch (D range)	2D	Ground	Approx. 12V	D range
				Below 1.5V	Other ranges
2E (Input)	1-2 shift solenoid valve	2E	Ground	Approx. 12V	Refer to page K2-109 of solenoid valve operation table
				Below 1.5V	
2F (Input)	Inhibitor switch (S range)	2F	Ground	Approx. 12V	S range
				Below 1.5V	Other ranges
2G (Input)	2-3 shift solenoid valve	2G	Ground	Approx. 12V	Refer to page K2-109 of solenoid valve operation table
				Below 1.5V	
2H (Input)	Inhibitor switch (L range)	2H	Ground	Approx. 12V	L range
				Below 1.5V	Other ranges
2I (Input)	3-4 shift solenoid valve	2I	Ground	Approx. 12V	Refer to page K2-109 of solenoid valve operation table
				Below 1.5V	
2J (Input)	Pulse generator*	2J	Ground	Above 1V (AC)	Engine running (N range)
				Approx. 0V (AC)	Engine stopped
2K (Input)	Lockup solenoid valve	2K	Ground	Approx. 12V	Lockup
				Below 1.5V	Other
2L (Ground)	Pulse generator	2L	Ground	Below 1.5V	—
2M (Input)	Engine control unit	2M	Ground	Approx. 12V	Shift down with throttle valve opening 2/8 or more
				Below 1.5V	Others
2N	—	—	—	—	—
2O (Memory power)	Battery	2O	Ground	Approx. 12V	Constant
2P (Ground)	Battery ground	2P	Ground	Below 1.5V	—
2Q (Battery power)	Battery	2Q	Ground	Approx. 12V	Ignition switch ON
				Below 1.5V	Ignition switch OFF
2R	—	—	—	—	—
2S (Battery power)	Battery	2S	Ground	Approx. 12V	Ignition switch ON
				Below 1.5V	Ignition switch OFF
2T (Input)	Throttle sensor	2T	Ground	Approx. 0.4—4.4V	Throttle valve fully closed to fully open

* Checked in AC range

03U0K2-100

WIRE HARNESS
Wiring diagram

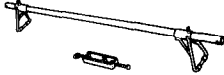
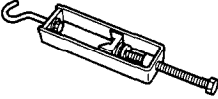
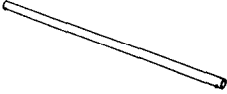
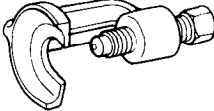
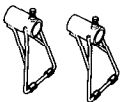
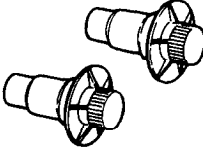


TRANSAXLE AND TRANSFER UNIT

TRANSAXLE AND TRANSFER ASSEMBLY

Preparation

SST

<p>49 G017 5A0 Support, engine</p> 	<p>For support of engine</p>	<p>49 G017 503 Hook (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>
<p>49 G017 501 Bar (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>	<p>49 0118 850C Puller, ball joint</p> 	<p>For removal of tie-rod end</p>
<p>49 G017 502 Support (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>	<p>49 G030 455 Holder, differential side gear</p> 	<p>For holding side gear</p>

03U0K2-101

Removal

1. Disconnect the negative battery cable.
2. Jack up the vehicle and support it with safety stands.

Note

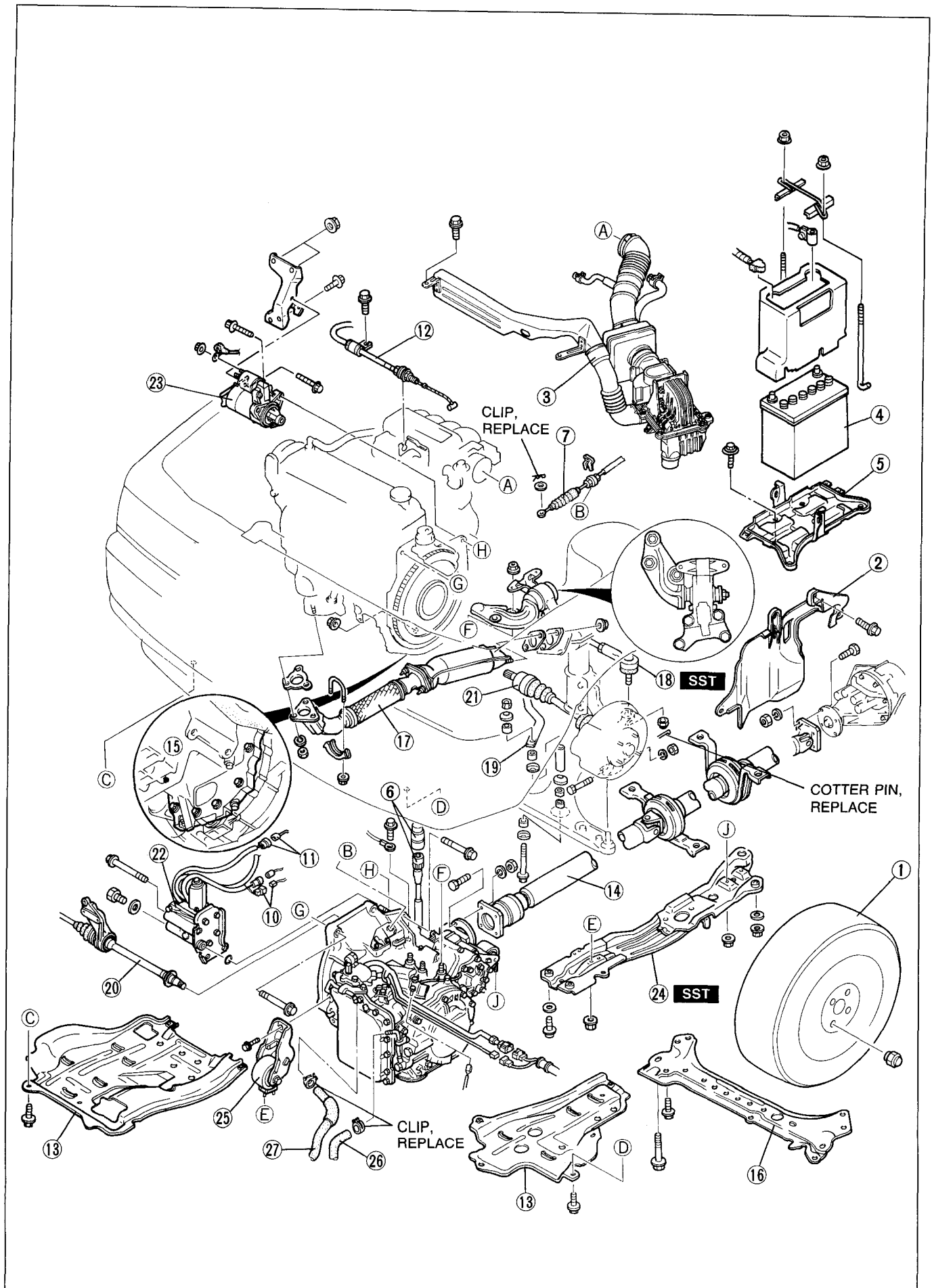
- Drain the ATF before transaxle removal.

3. Drain the ATF into a suitable container.
4. Remove in the order shown in the figure, referring to **Removal Note**.

Caution

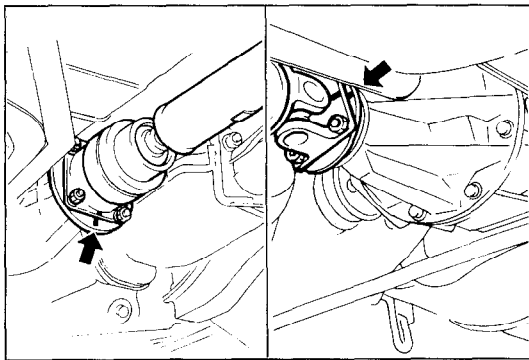
- Do no turn the transaxle and transfer over before removing the oil pan.

03U0K2-102



1. Wheel and tire	17. Exhaust pipe
2. Splash shield	18. Tie-rod end Removal Note..... page K2-149
3. Air hose and air cleaner assembly	19. Stabilizer
4. Battery	20. Joint shaft
5. Battery carrier	21. Driveshaft Removal Note..... page K2-149
6. Speedometer cable	22. Center differential lock motor Removal Note..... page K2-150
7. Selector cable	23. Starter
8. Inhibitor switch connector	24. Engine mount member Removal Note..... page K2-151
9. Solenoid valve connector	25. Engine mount No.2
10. Differential lock motor connector	26. Oil hose (In side)
11. Differential lock sensor switch connector	27. Oil hose (Out side)
12. Throttle cable	28. Transaxle and transfer Removal Note..... page K2-151
13. Under cover	
14. Propeller shaft Removal Note..... page K2-149	
15. Integrated stiffener	
16. Cross member	

03U0K2-103



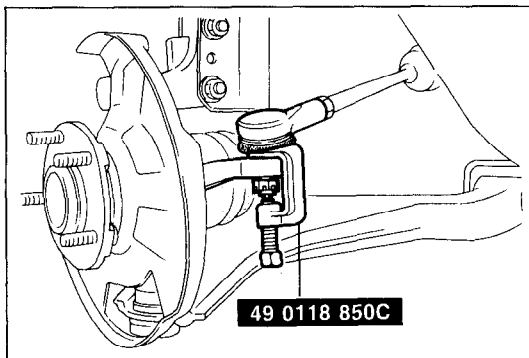
03U0K2-104

**Removal note
Propeller shaft**

Caution

- Do not mark with a punch.

1. Mark the companion flange and the front yoke.
2. Mark the companion flange and the rear yoke.
3. Remove the propeller shaft.



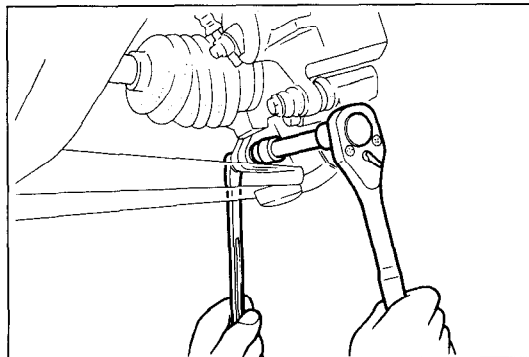
03U0K2-311

Tie-rod end

1. Remove the tie-rod from the knuckle with the **SST**.
2. Loosen the nut and disconnect the tie-rod end with the **SST**.

Caution

- Do not damage the dust boot.



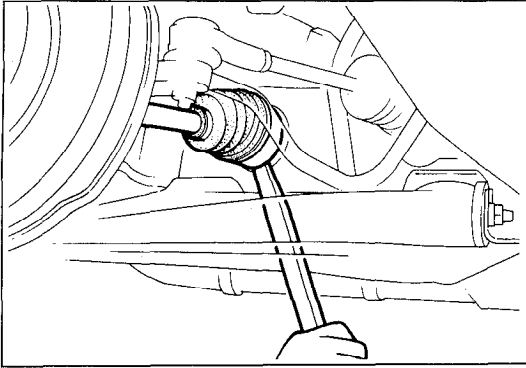
03U0KX-159

Driveshaft

Caution

- Do not damage the ball joint dust boot.

1. Remove the clinch bolts from the lower arm ball joints.
2. Pull the lower arms downward to separate them from the knuckles.

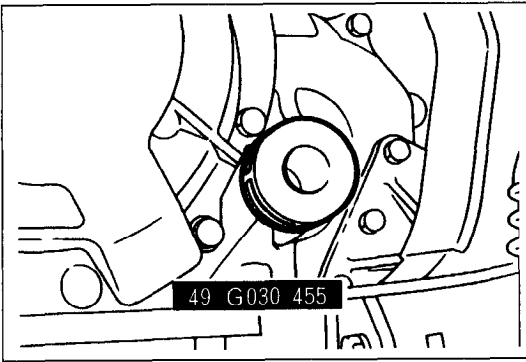


03U0KX-160

Caution

- Do not damage the oil seal.

3. Separate the left driveshaft from the transaxle by prying with a bar inserted between the shaft and the transaxle case.

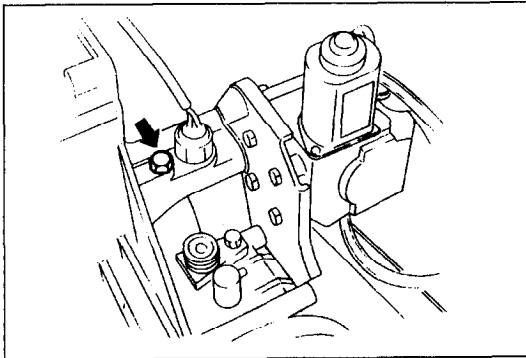


03U0KX-161

Caution

- If the SST is not installed, the differential side gears may become misaligned.

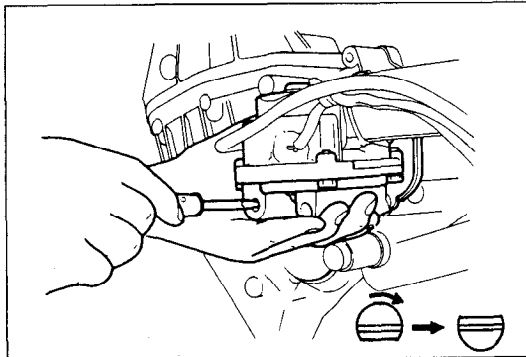
4. Slide the **SST** into the differential side gear.



03U0K2-105

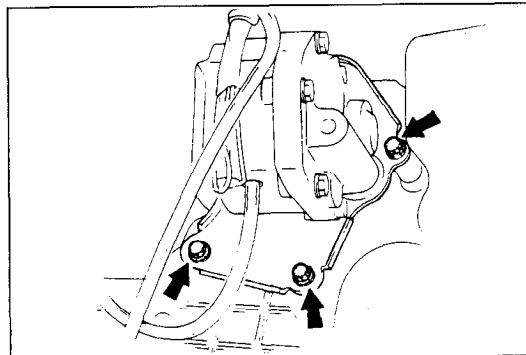
Center differential lock motor

1. Remove the set bolt.



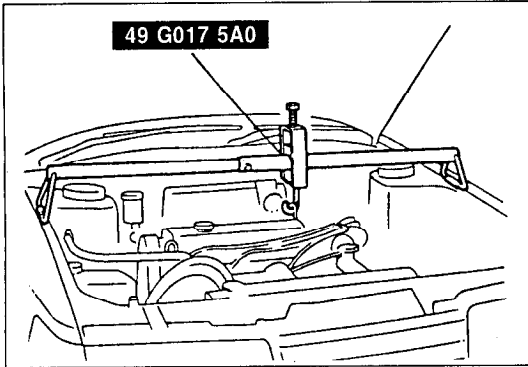
03U0K2-106

2. Remove the center differential lock sensor switch.
3. Turn the differential lock shift rod 180° clockwise with a screwdriver.



03U0K2-107

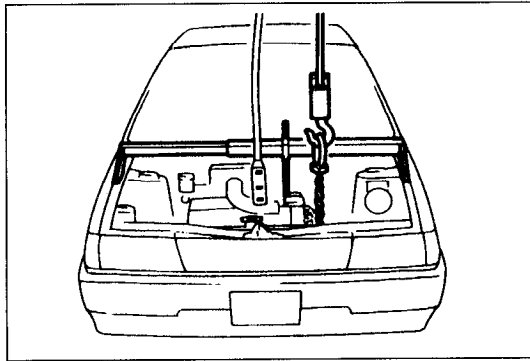
4. Remove the center differential lock motor.
5. Remove the O-ring from center differential lock motor.



03U0K2-108

Engine mounting member

1. Suspend the engine with the **SST** before removing the engine mounting member.



03U0K2-109

Transaxle and transfer

1. Use an engine hoist, and remove the transaxle and transfer unit.

TRANSAXLE AND TRANSFER UNIT (DISASSEMBLY)

Precaution

General Notes:

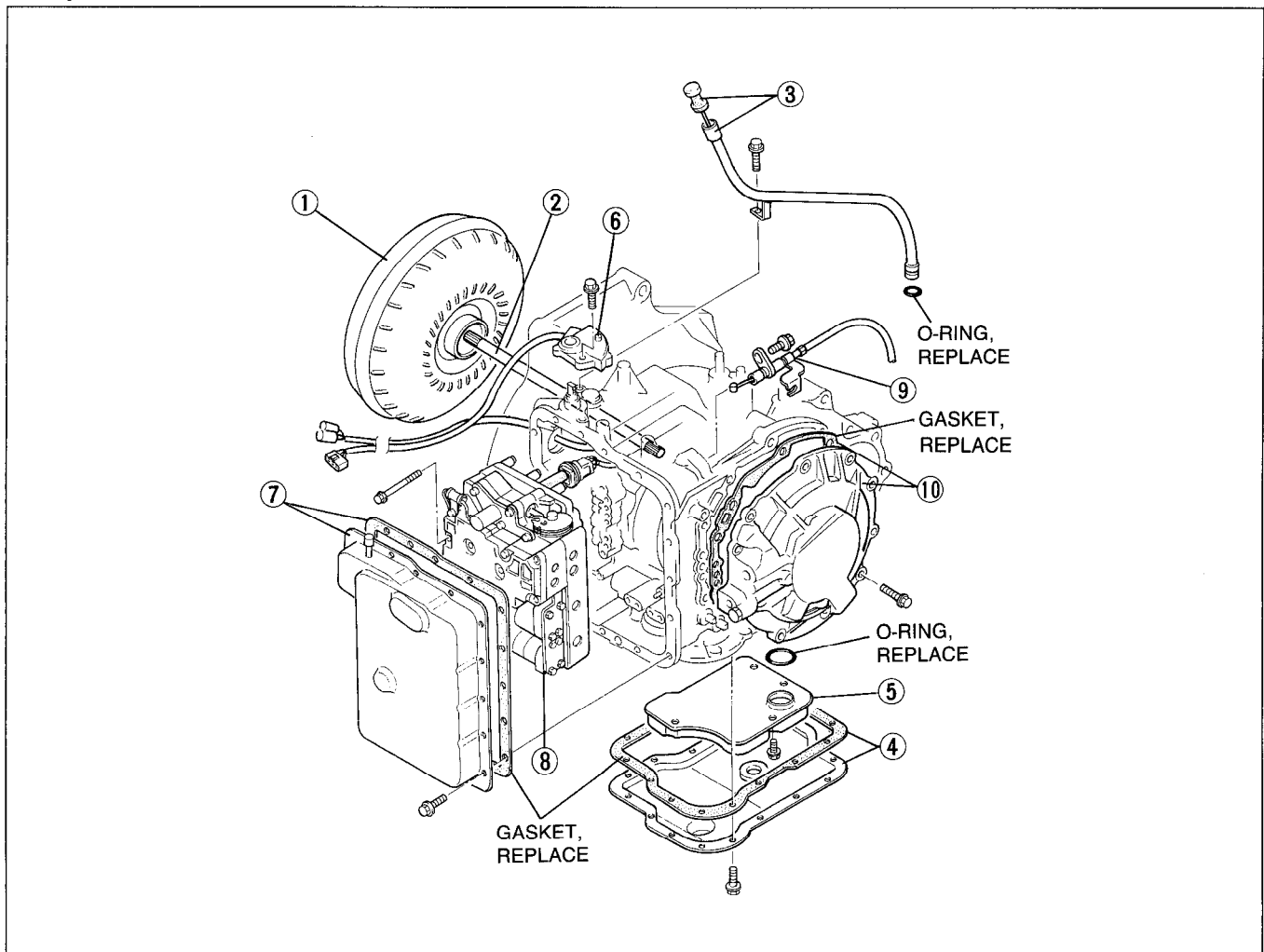
1. Disassemble the transaxle in a clean area (dustproof work space) to prevent entry of dust into the mechanisms.
2. Inspect the individual transaxle components in accordance with the QUICK DIAGNOSIS CHART during disassembly. (Refer to page K2-21.)
3. Use only plastic hammers when applying force to separate the light alloy case joints.
4. Never use rags during disassembly; they may leave particles that can clog fluid passages.
5. Several parts resemble one another; organize them so that they do not get mixed up.
6. Disassemble the control valve assembly and thoroughly clean it when the clutch or brake band has burned or when the ATF has degenerated.

Cleaning Notes:

1. Clean the transaxle exterior thoroughly with a steam cleaner or cleaning solvents before disassembly.
2. Clean the removed parts with cleaning solvent, and dry with compressed air. Clean out all holes and passages with compressed air, and check that there are no obstructions.
3. Wear eye protection when using compressed air to clean components.

03U0K2-110

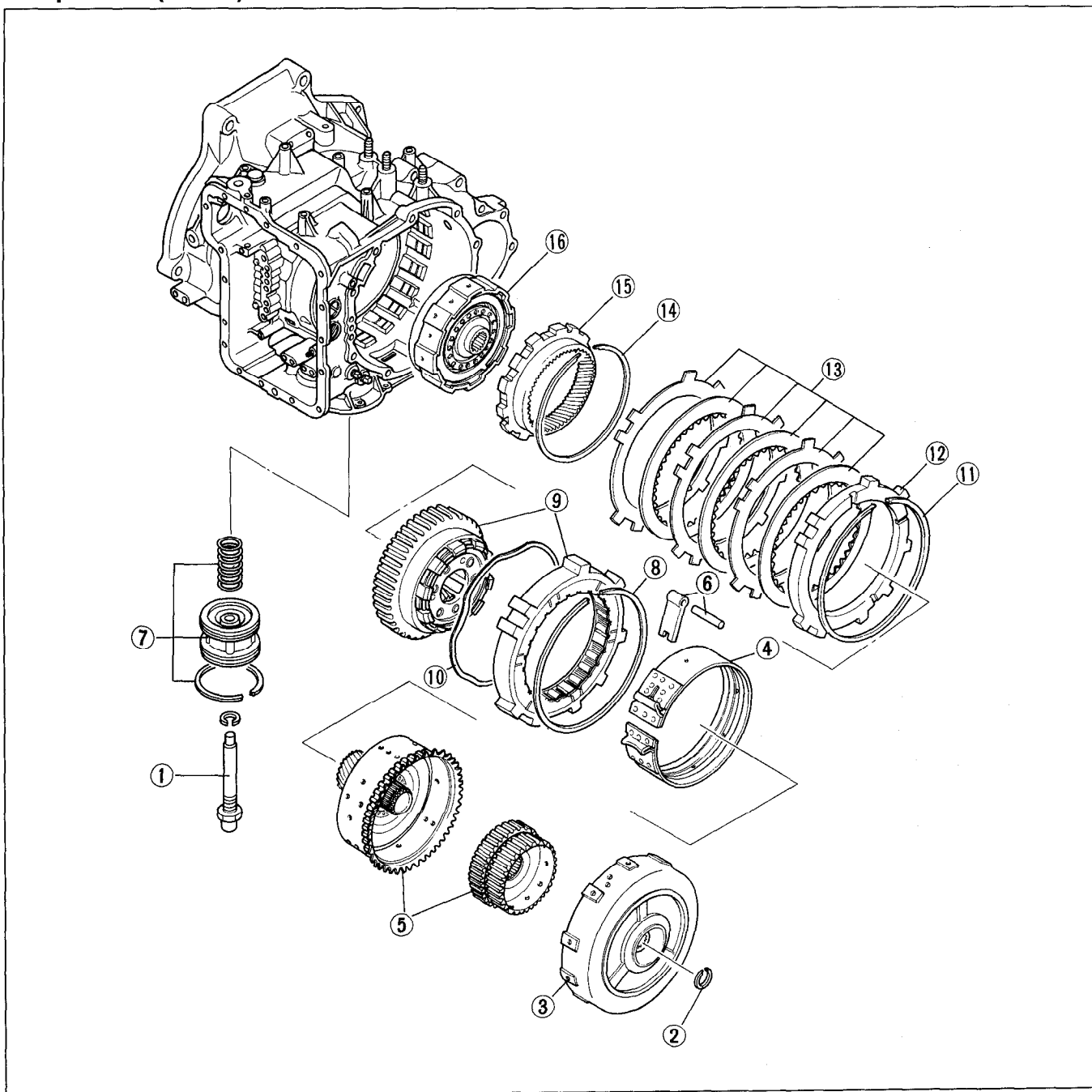
Components



03U0K2-111

- | | | |
|----------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 1. Torque converter
Inspection page K2-167 | 4. Oil pan and gasket | 8. Control valve body assembly
Disassembly / Inspection
..... page K2-209
Assembly page K2-225 |
| 2. Oil pump shaft | 5. Oil strainer | 9. Throttle cable |
| 3. Oil level gauge and oil filler
tube | 6. Inhibitor switch
Inspection page K2-140
Adjustment ... page K2-141 | 10. Oil pump and gasket |
| | 7. Oil pan and gasket | |

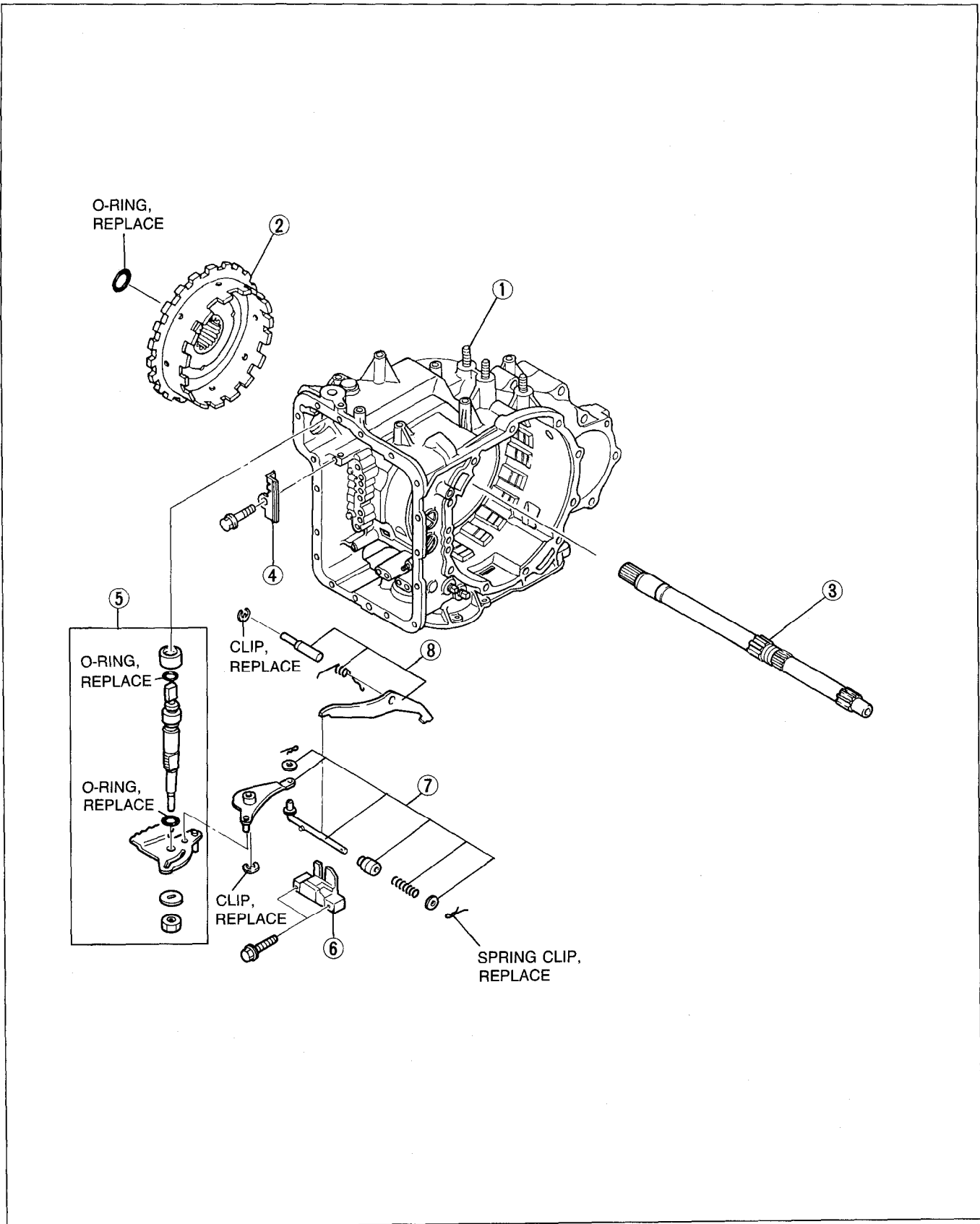
Components (cont'd)



03U0K2-112

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Piston stem</p> <p>2. Snap ring</p> <p>3. Clutch assembly
Disassembly / Inspection /
Assembly page K2-173</p> <p>4. 2-4 brake band
Disassembly / Inspection /
Assembly page K2-197</p> <p>5. Small sun gear and one-way clutch
Disassembly / Inspection /
Assembly page K2-182</p> <p>6. Anchor strut and shaft</p> <p>7. Servo
Disassembly / Inspection /
Assembly page K2-197</p> | <p>8. Snap ring</p> <p>9. One-way clutch and carrier hub assembly
Disassembly / Inspection /
Assembly page K2-185</p> <p>10. Wave washer</p> <p>11. Snap ring</p> <p>12. Retaining plate</p> <p>13. Low and reverse brake (Drive and driven plates)</p> <p>14. Snap ring</p> <p>15. Internal gear</p> <p>16. 3-4 clutch assembly
Disassembly / Inspection /
Assembly page K2-187</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Components (cont'd)

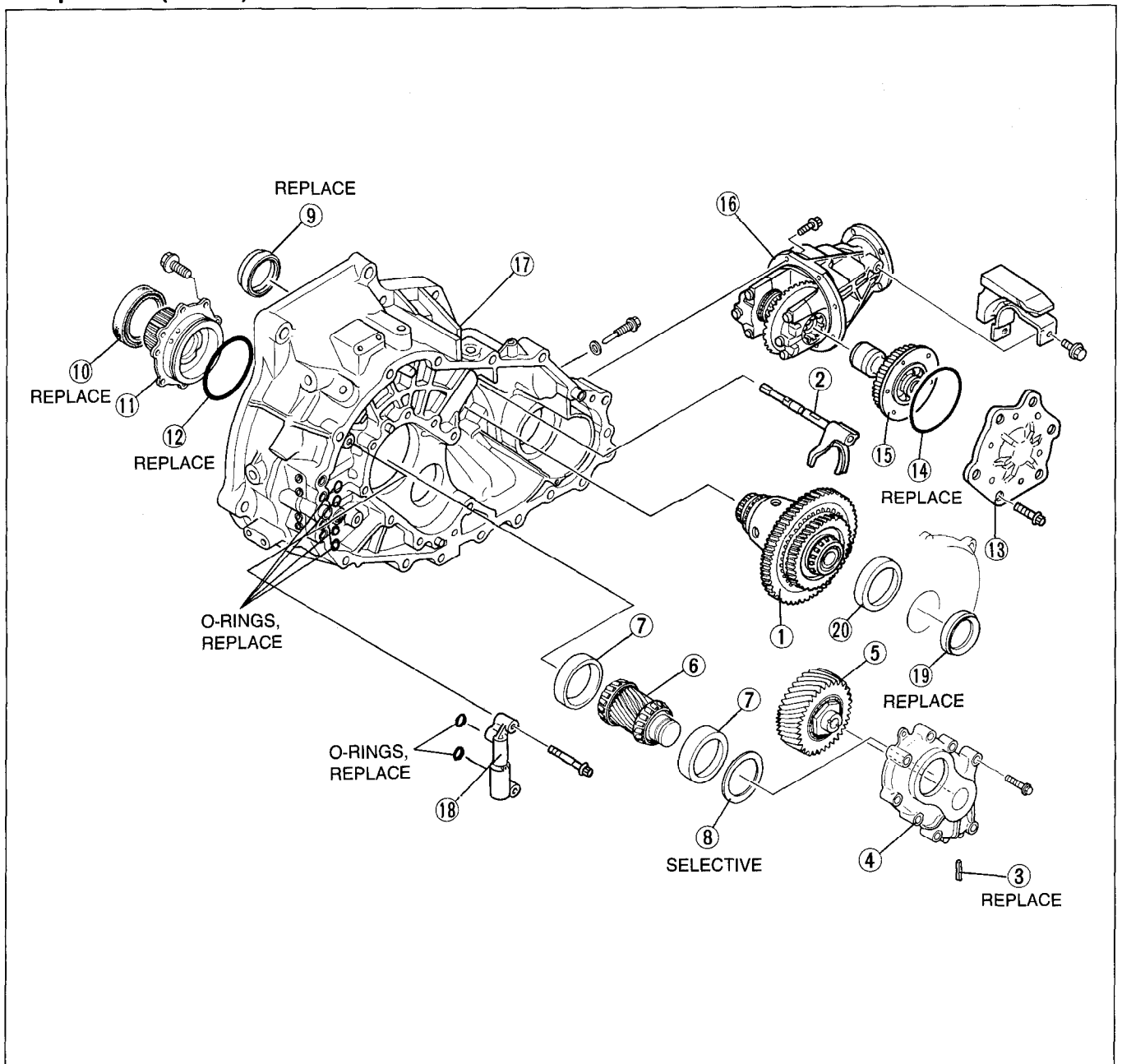


03U0K2-113

- 1. Transaxle case
- 2. Output shell
- 3. Turbine shaft
- 4. Bracket

- 5. Manual shaft and manual plate
- 6. Actuator support
- 7. Parking assist lever
- 8. Parking pawl

Components (cont'd)



03U0K2-114

- | | |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 1. Front and center differential assembly
Disassembly / Inspection /
Assembly..... page K2-239 | 11. Bearing cover
Disassembly / Assembly..... page K2-207 |
| 2. Front and center differential shift fork | 12. O-ring |
| 3. Roll pin | 13. Side cover |
| 4. Bearing housing | 14. O-ring |
| 5. Idler gear assembly (Transaxle)
Disassembly / Inspection /
Assembly..... page K2-202 | 15. Idler gear assembly (Transfer)
Disassembly / Inspection /
Assembly..... page K2-237 |
| 6. Output gear
Disassembly / Inspection /
Assembly..... page K2-205 | 16. Transfer carrier assembly
Disassembly / Inspection /
Assembly..... page K2-244 |
| 7. Bearing outer races | 17. Converter housing |
| 8. Adjustment shim
Adjustment page K2-252 | 18. 2-3 accumulator
Disassembly / Inspection /
Assembly..... page K2-200 |
| 9. Oil seal | 19. Oil seal (Transaxle case) |
| 10. Oil seal (Bearing cover) | 20. Bearing outer race (Transaxle case) |

Procedure

Note

- Do not allow the ATF to spill when removing the torque converter.

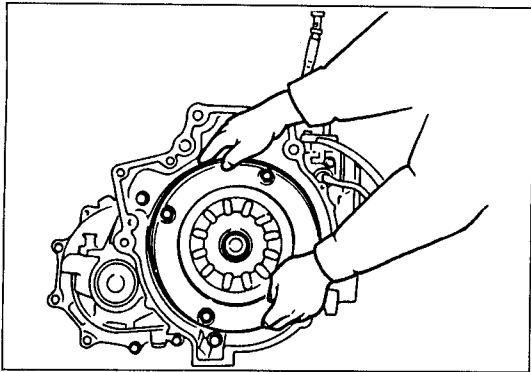
1. Remove the torque converter from the converter housing.

2. Pull out the oil pump shaft by hand.

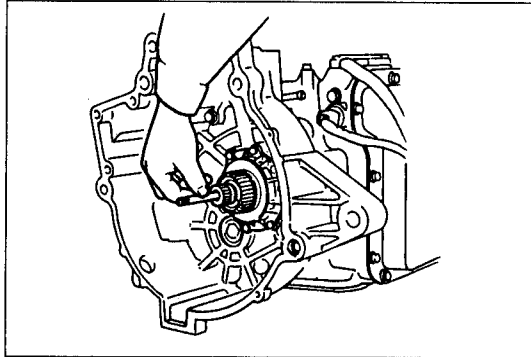
3. Remove the oil level gauge and oil filler tube.

4. Remove the engine mounting bracket No.1.

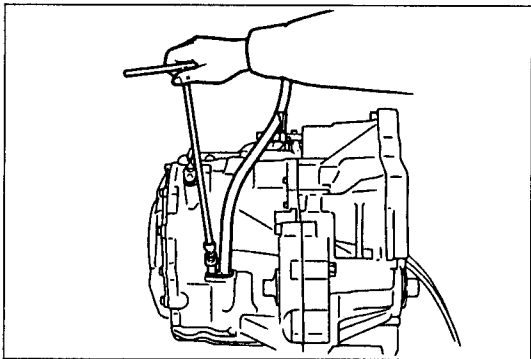
5. Assemble the **SST**.



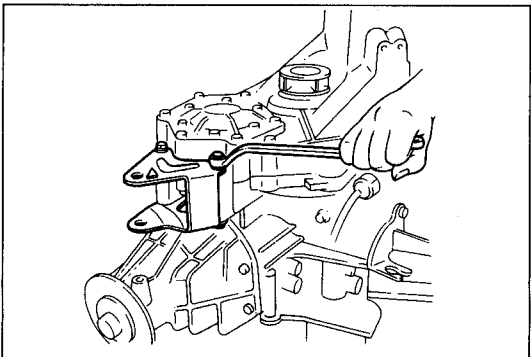
03U0KX-168



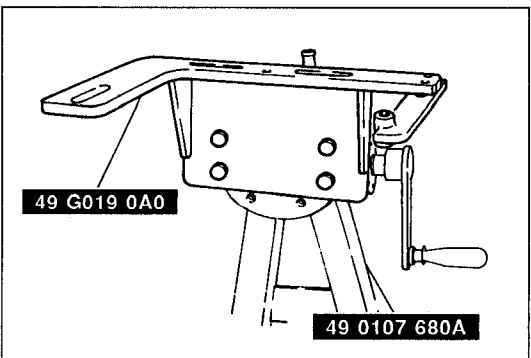
86U07B-119



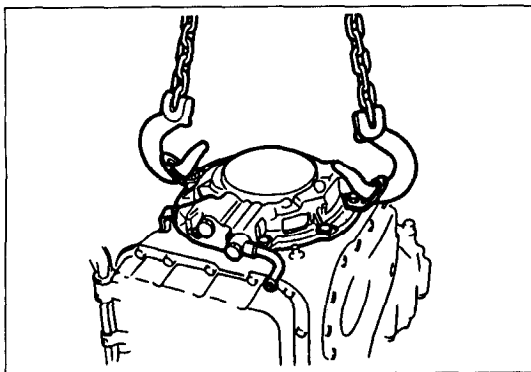
86U07B-120



03U0K2-115

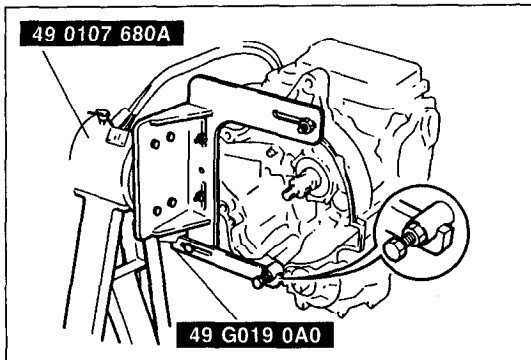


03U0K2-116



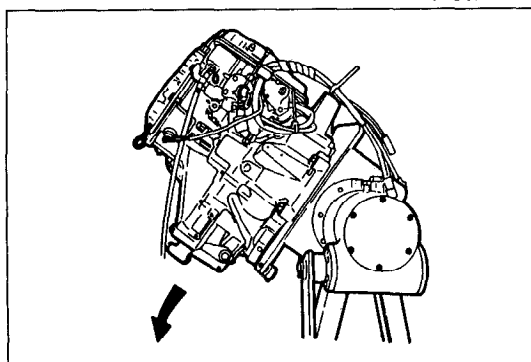
03U0K2-117

6. Attach a suitable hanger to the oil pump as shown.



03U0K2-118

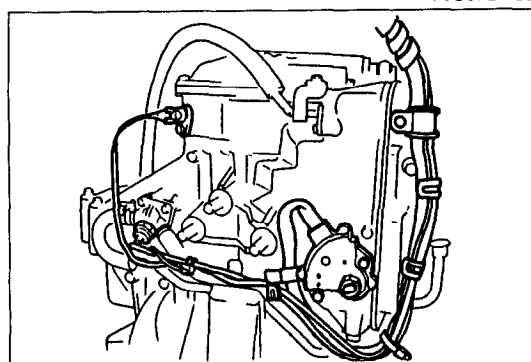
7. Lift the transaxle and mount it on the **SST**.



76U07B-453

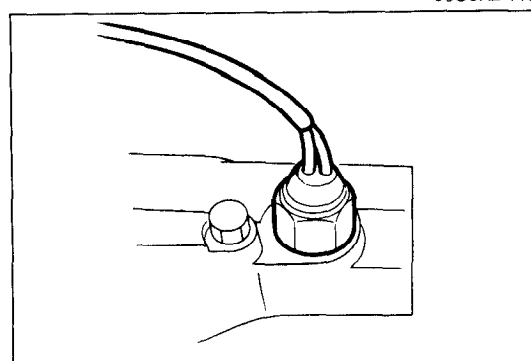
Warning

- Avoid leaning the transaxle to one side during disassembly, it may turn quickly and cause injury.



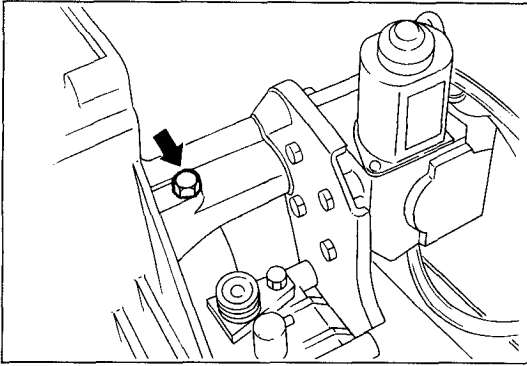
03U0K2-119

8. Remove the pulse generator, inhibitor switch and bracket.



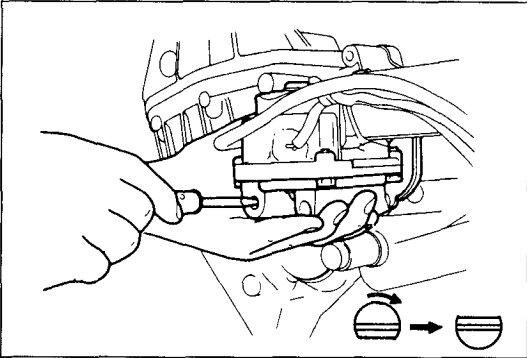
03U0K2-120

9. Remove the center differential lock switch.
10. Remove the washer.



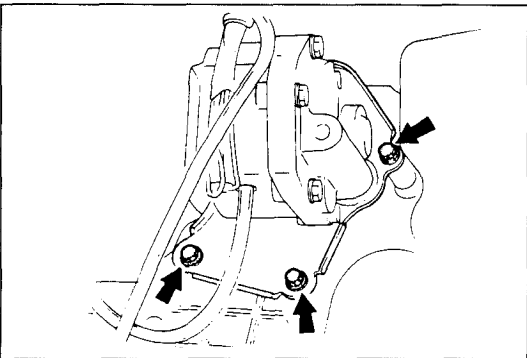
03U0K2-121

11. Remove the bolt.



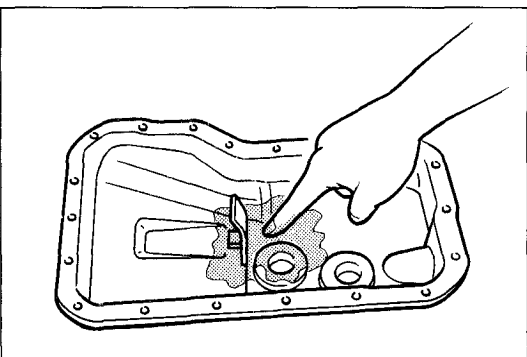
03U0K2-122

12. Turn the differential lock shift rod 180° clockwise with a screwdriver.



03U0K2-123

13. Remove the bolts shown in the figure.
14. Remove the differential lock assembly.

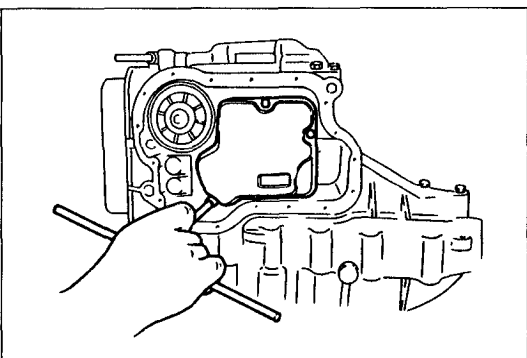


03U0K2-124

15. Remove the oil pan and gasket.
Examine any material found in the pan or on the magnet to determine the condition of the transaxle.

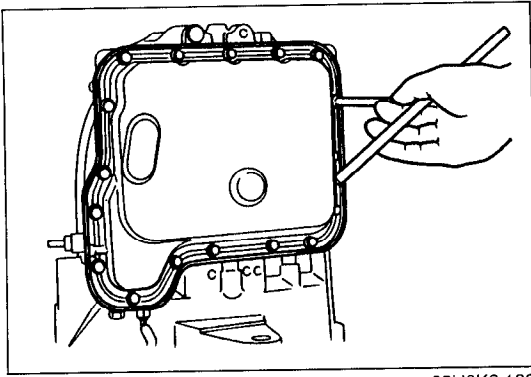
Clutch facing material	Drive plate and brake band wear
Steel (magnetic)	Bearing, gear, and driven plate wear
Aluminum (nonmagnetic)	Bushings or cast aluminum parts wear

If large amounts of material are found, replace the torque converter and carefully check the transaxle for the cause.



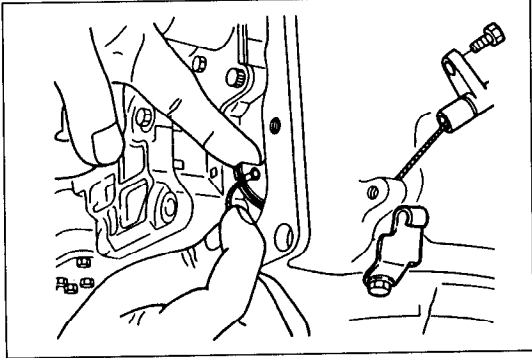
03U0K2-125

16. Remove the oilstrainer and O-ring.



03U0K2-126

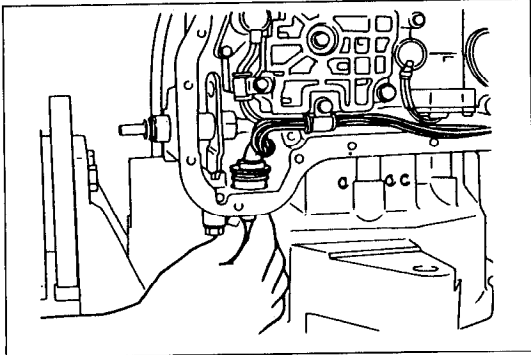
17. Remove the control valve body cover and gasket.



03U0K2-127

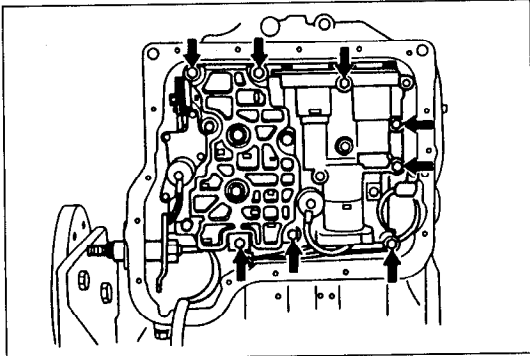
18. Remove the throttle cable.

- (1) Remove the throttle cable attaching bolt and bracket.
- (2) Remove the cable from the throttle lever of the valve body.



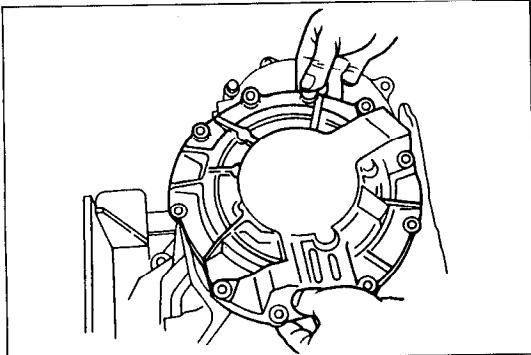
03U0K2-128

19. Pinch the tangs of the solenoid connector and remove it by pushing inward.



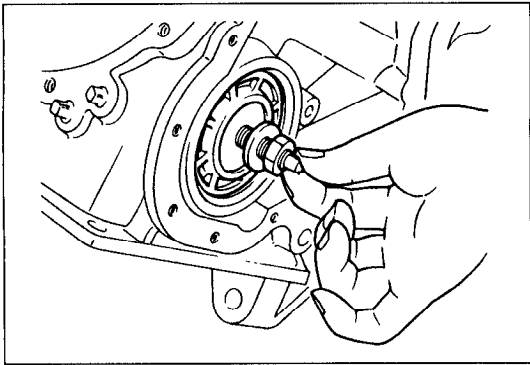
03U0K2-129

20. Remove the control valve body as an assembly.



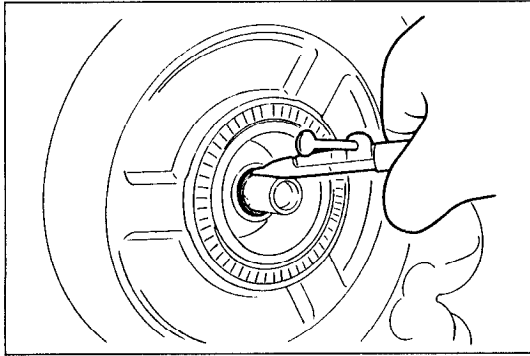
03U0K2-130

21. Remove the oil pump as an assembly.



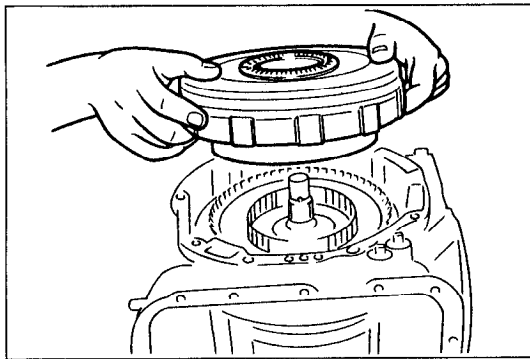
03U0K2-131

22. Remove the piston stem from the servo.



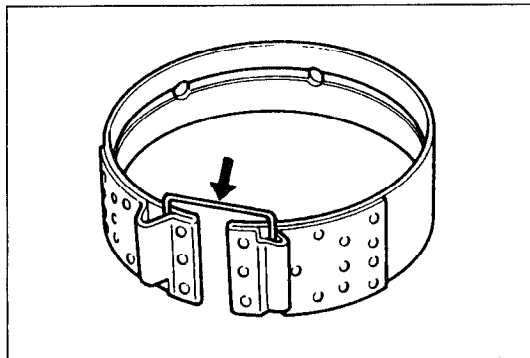
03U0K2-132

23. Remove the clutch assembly.
(1) Remove the turbine shaft snap ring.



86U07B-138

(2) Pull the reverse and forward drum and remove the clutch assembly.

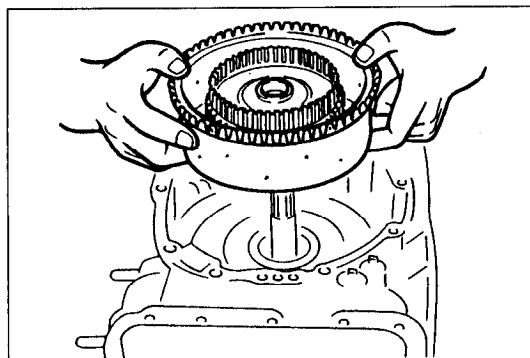


03U0K2-133

Note

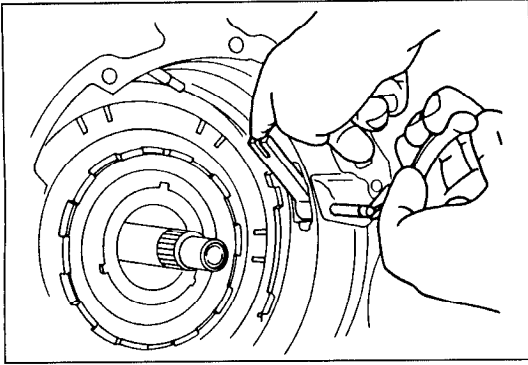
- Use a piece of wire to secure the brake band so that it is not damaged by being stretched.

24. Remove the 2-4 brake band.



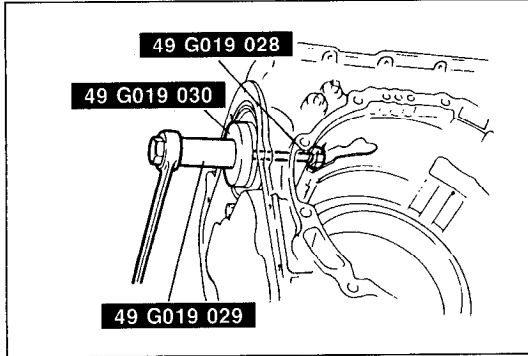
03U0K2-134

25. Remove the small sun gear and one-way clutch.



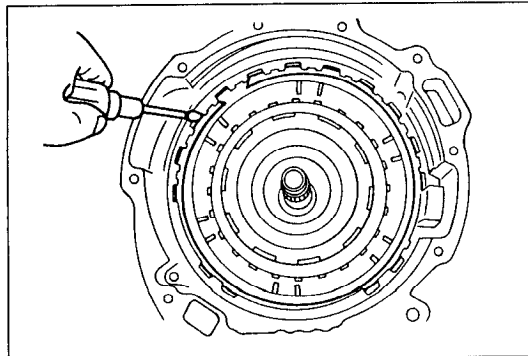
03U0K2-135

26. Pull the anchor shaft while holding the strut, then remove the strut.



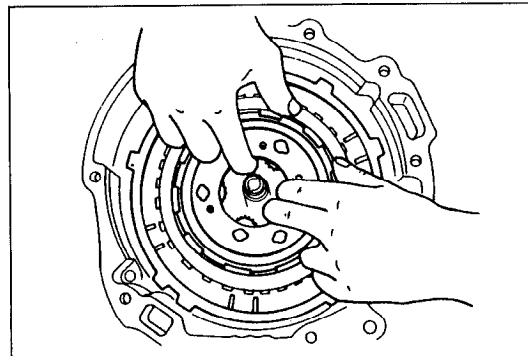
03U0K2-136

27. Remove the servo.
 (1) Remove the snap ring with the **SST**.
 (2) Remove the servo and spring.



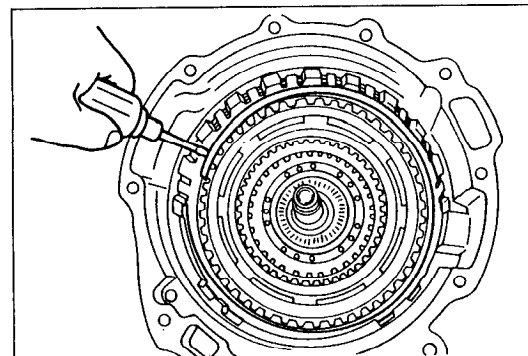
03U0K2-137

28. Remove the one-way clutch and carrier hub assembly.
 (1) Remove the snap ring.



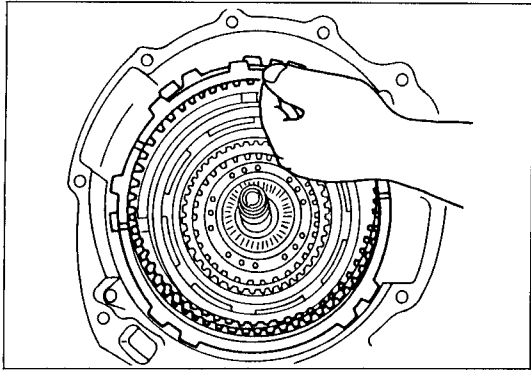
86U07B-144

(2) Remove the one-way clutch together with the carrier hub assembly.



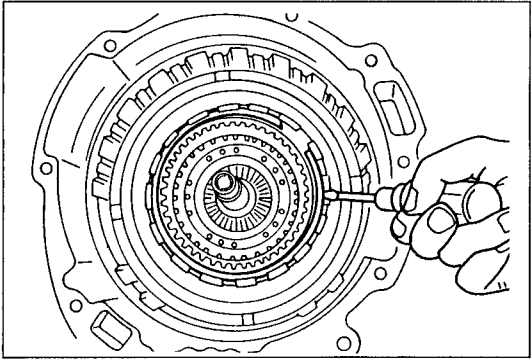
03U0K2-138

29. Remove the low and reverse brake assembly.
 (1) Remove the snap ring.



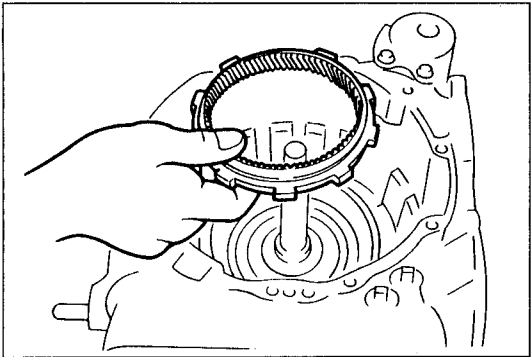
86U07B-146

- (2) Remove the retaining plate and the drive and driven plates.



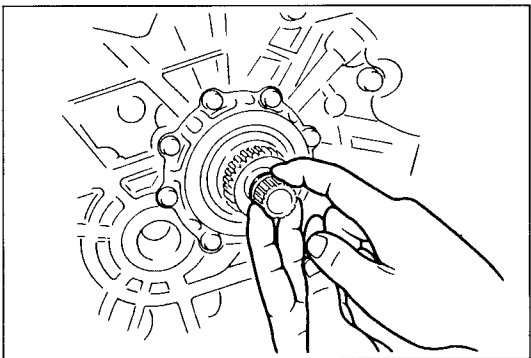
03U0K2-139

30. Remove the internal gear.
(1) Remove the snap ring.



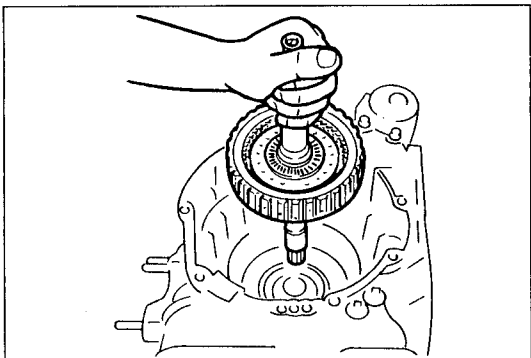
86U07B-148

- (2) Remove the internal gear from the 3-4 clutch drum.



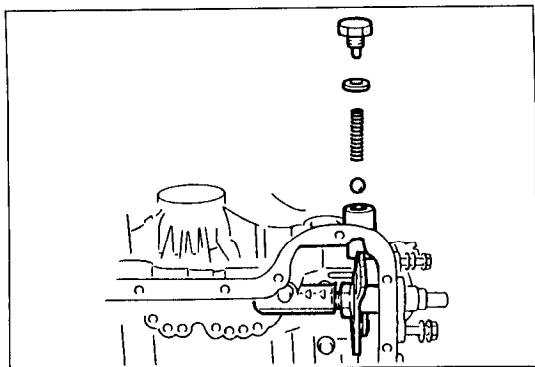
03U0K2-140

31. Remove the 3-4 clutch assembly.
(1) Remove the O-ring from the turbine shaft at the converter housing side.



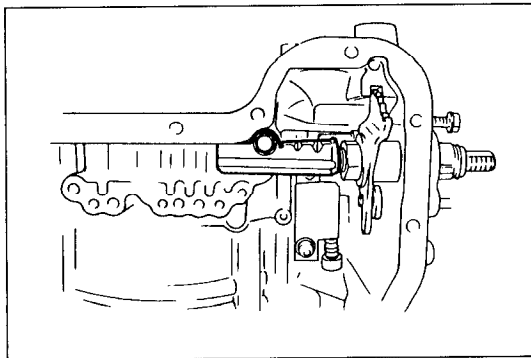
86U07B-150

- (2) Pull out the turbine shaft to remove the 3-4 clutch assembly.
(3) Remove the 3-4 clutch assembly.



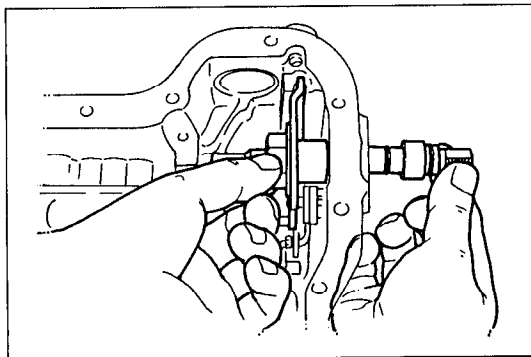
03U0K2-141

32. Remove the manual shaft and manual plate.
 (1) Remove the plug, washer, spring, and detent ball.



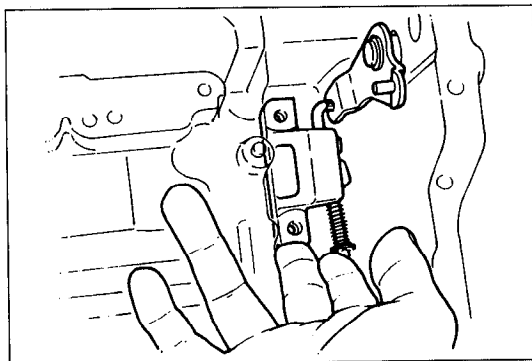
86U07B-158

- (2) Remove the bracket.



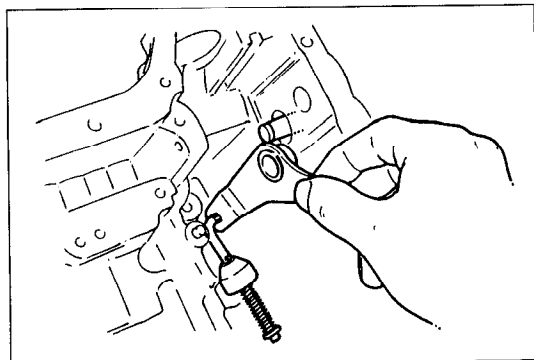
86U07B-159

- (3) Loosen the nut and pull the manual shaft out.
 (4) Remove the nut, washer, spacer, and manual plate.



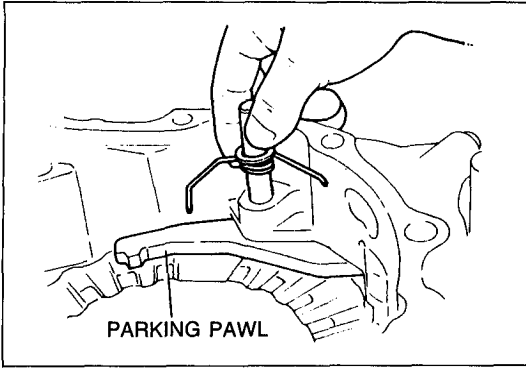
03U0K2-142

33. Remove the actuator support.



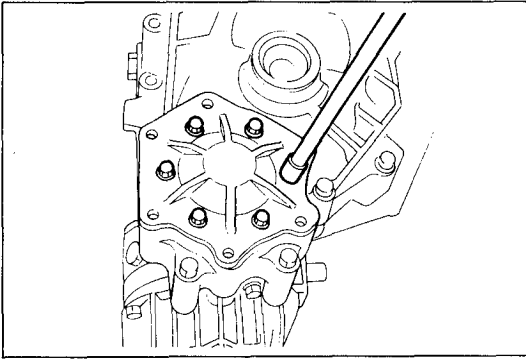
03U0K2-143

34. Remove the snap ring; then remove the parking assist lever.



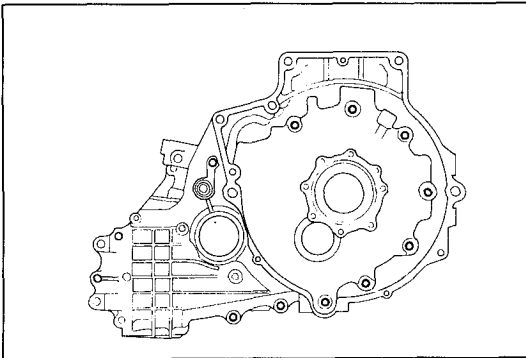
03U0K2-144

35. Remove the parking pawl.
- (1) Remove the snap ring.
 - (2) Pull the parking shaft, then remove the spring and parking pawl.



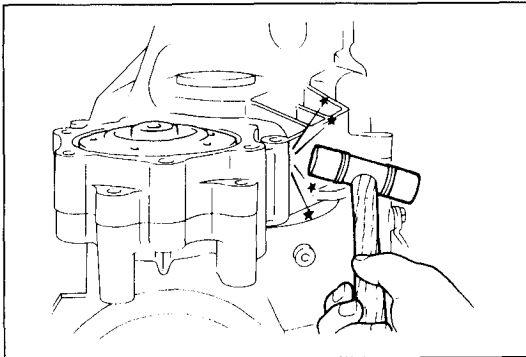
03U0K2-145

36. Remove the side cover.



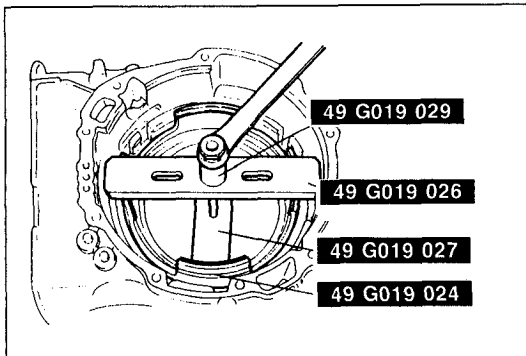
03U0K2-146

37. Remove the bolts shown in the figure.



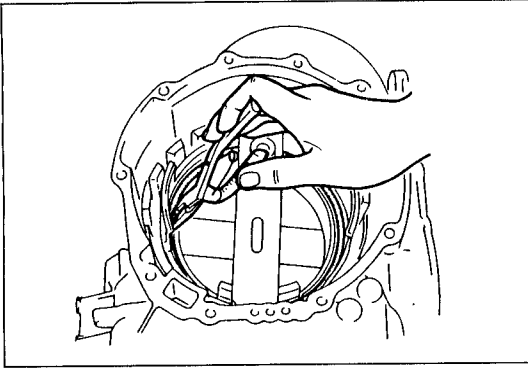
03U0K2-147

38. Remove the transaxle case by tapping lightly with a plastic hammer.



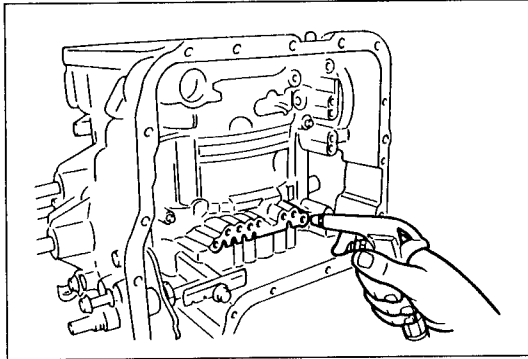
03U0K2-148

39. Remove the low and reverse brake piston
- (1) Install the **SST**.
 - (2) Compress the spring and retainer assembly.



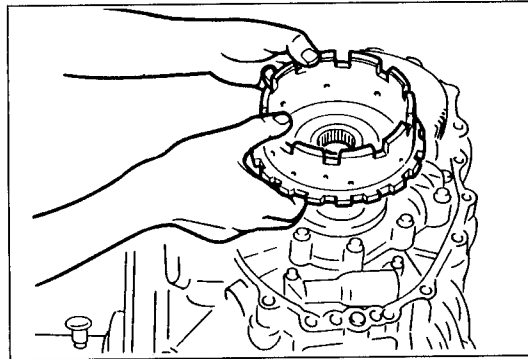
86U07B-155

- (3) Remove the snap ring with snap ring pliers; then remove the spring and retainer assembly.



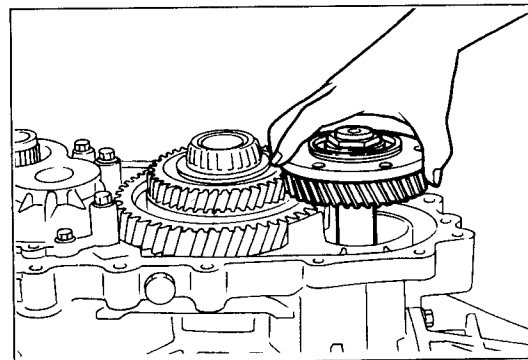
86U07B-156

- (4) Remove the low and reverse brake piston by applying compressed air through the fluid passage.



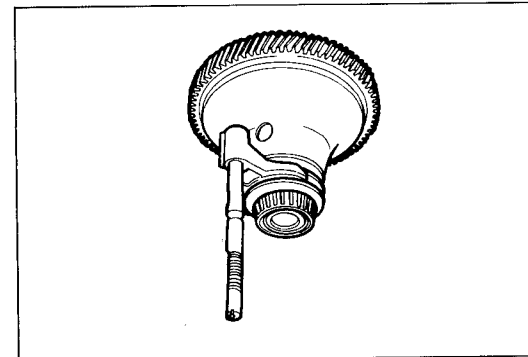
03U0K2-149

40. Remove the output shell from the output gear.



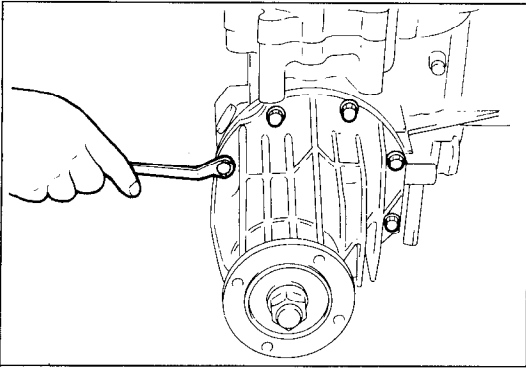
03U0K2-150

41. Remove the idle gear and O-ring.



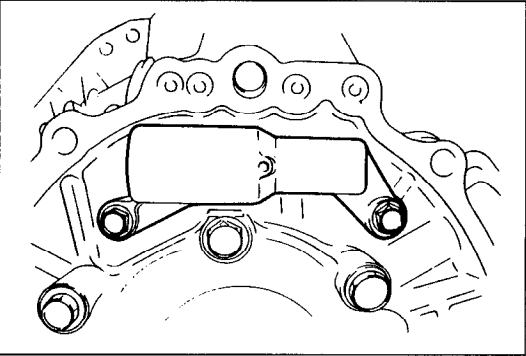
03U0K2-151

42. Remove the lockbolt shown in the figure.
43. Remove the front and center differential assembly.



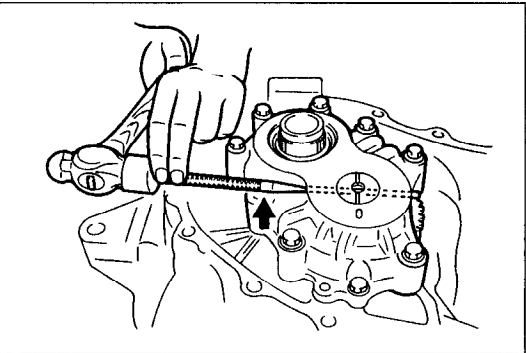
03U0K2-152

44. Remove the speedometer driven gear.
45. Remove the transfer carrier.



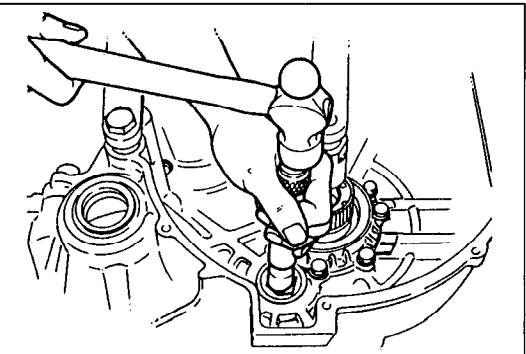
03U0K2-153

46. Remove the 2-3 accumulator piston assembly.



03U0K2-154

47. Remove the bearing housing.
(1) Remove the bolt indicated in the figure.
(2) Remove the roll pin with a pin punch.
(3) Remove the bearing housing by tapping lightly with a plastic hammer.

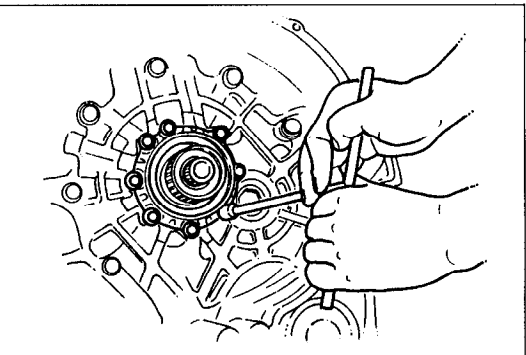


03U0K2-155

48. Remove the idle gear assembly and output gear assembly by tapping out from the torque converter side.

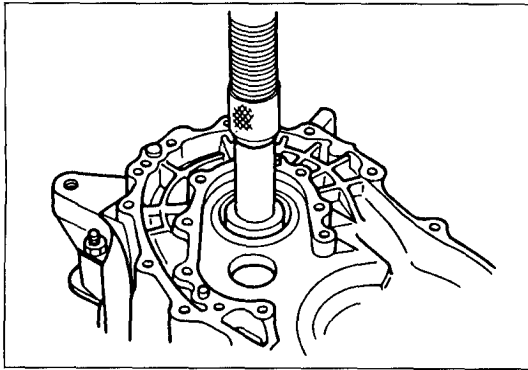
Caution

- Hold the idle gear assembly with one hand so that it does not fall.



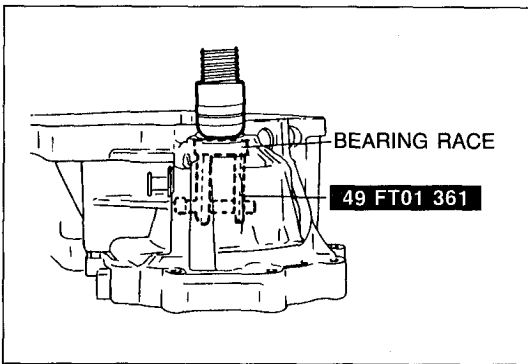
03U0K2-156

49. Remove the bearing cover.
(1) Remove the converter housing from the transaxle hanger.
(2) Remove the bearing cover bolts.



86U07B-169

- (3) Press the bearing cover assembly out of the converter housing.



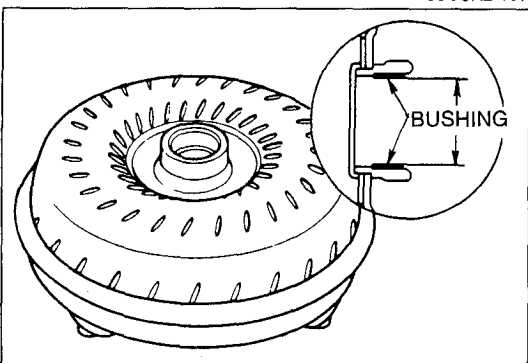
03U0K2-157

50. Remove the bearing outer race.
 - (1) Press out the bearing outer races with the **SST**.

Note

- **Install the bearing outer race during reassembly to adjust the preload.**

51. Check the oil seals for damage, replace if necessary.
52. Check the O-rings for damage, replace if necessary.



03U0KX-195

TORQUE CONVERTER

The torque converter is welded together and cannot be disassembled.

Inspection

1. Check the outer surface of the converter for damage or cracks, and replace it if necessary.
2. Check whether there is any rust on the pilot hub of the converter or on the boss. If there is any, remove it completely.
3. Measure the bushing of the converter boss. Replace the converter assembly if the bushing is worn.

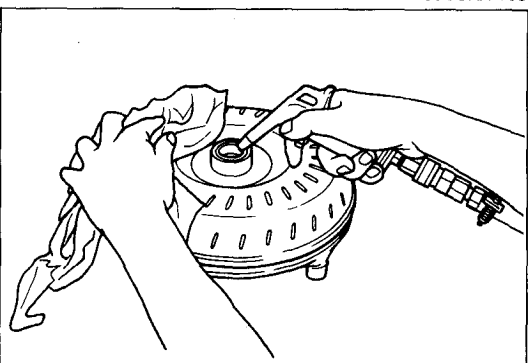
Bushing inner diameter

Standard: 53.030mm (2.088 in)

Maximum: 53.075mm (2.090 in)

Washing inside of converter

1. Drain any ATF remaining in the converter.
2. Pour in solvent (approximately **0.5 liter [0.53 US qt, 0.44 Imp qt]**).
3. Shake the converter to clean the inside. Pour out the solvent.
4. Clean the inside of the converter with compressed air so that the inside is perfectly empty.
5. Pour in ATF.
6. Shake the converter to clean the inside. Pour out the ATF.

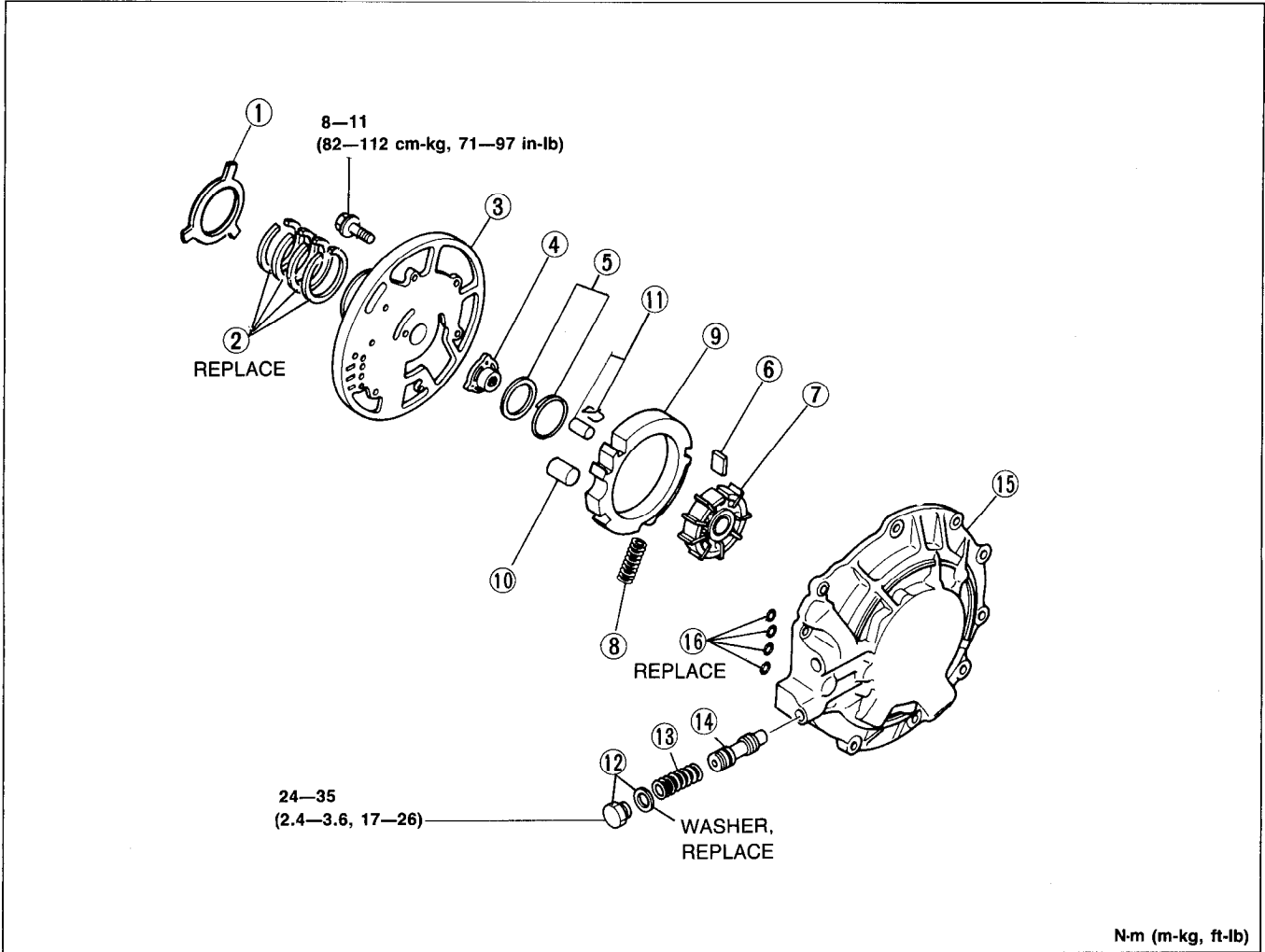


03U0KX-196

OIL PUMP

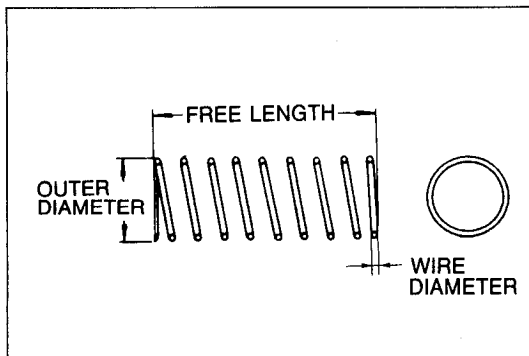
Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



03U0K2-158

- | | |
|--------------------------------|------------------------------|
| 1. Bearing race | 9. Cam ring |
| 2. Seal rings | 10. Pivot roller |
| 3. Oil pump cover | 11. Seal pin and spring |
| 4. Pump flange | 12. Plug and washer |
| 5. Guide ring and guide spring | 13. Spring (Valve side) |
| 6. Vane | Inspection page K2-168 |
| 7. Rotor | 14. Valve |
| 8. Spring (Come ring side) | 15. Oil pump body |
| Inspection page K2-168 | 16. O-rings |



03U0K2-159

Inspection Spring

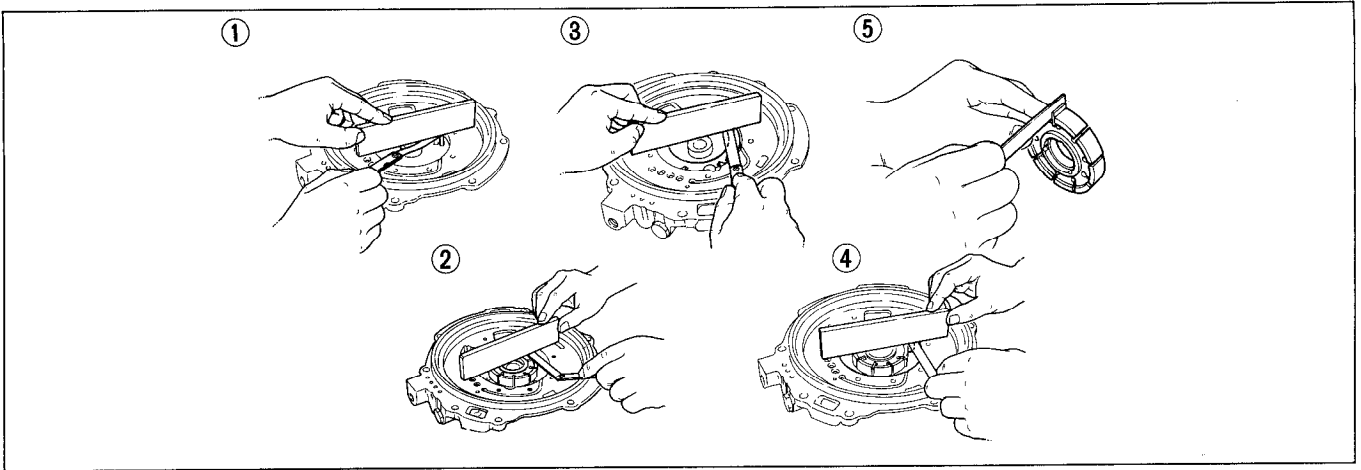
1. Measure the spring free length.

Specification

- 41.6mm (1.64 in): (Can ring side)
- 35.0mm (1.38 in): (Valve side)

Clearance

Measure the clearances below; if not within specification, replace the oil pump.

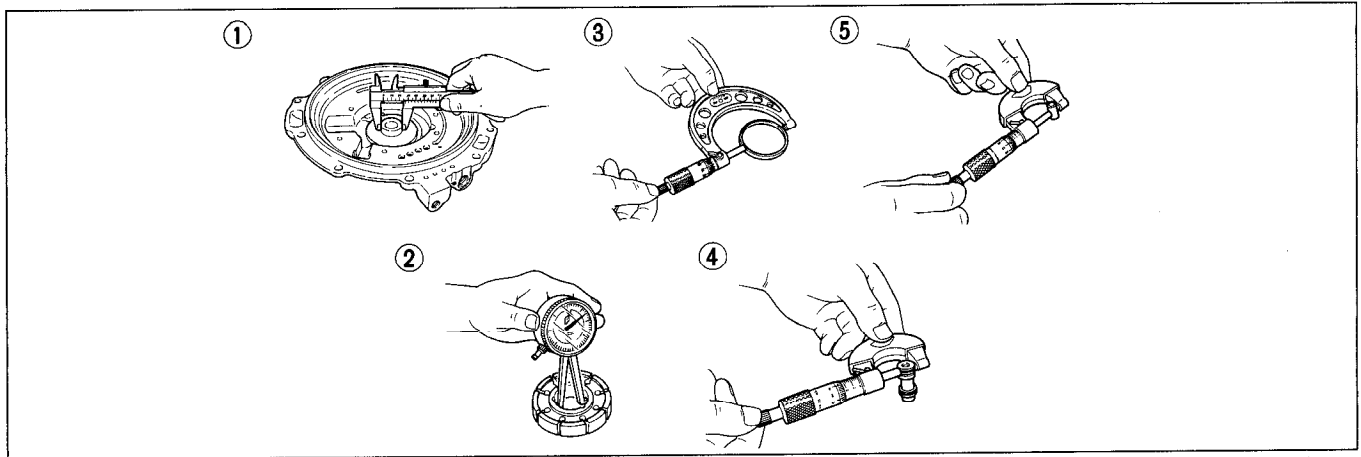


03U0K2-160

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Seal pin—Oil pump cover
 Standard:
 0.005—0.020mm
 (0.0002—0.0008 in)
 Maximum:
 0.060mm (0.002 in)</p> | <p>3. Cam ring—Oil pump cover
 Standard:
 0.005—0.020mm
 (0.0002—0.0008 in)
 Maximum:
 0.080mm (0.003 in)</p> | <p>5. Vane—Rotor groove
 Standard:
 0.010—0.045mm
 (0.0004—0.0018 in)
 Maximum:
 0.065mm (0.0026 in)</p> |
| <p>2. Rotor—Oil pump cover
 Standard:
 0.005—0.020mm
 (0.0002—0.0008 in)
 Maximum:
 0.030mm (0.0012 in)</p> | <p>4. Vane—Oil pump cover
 Standard:
 0.015—0.050mm
 (0.0006—0.0020 in)
 Maximum:
 0.080mm (0.003 in)</p> | |

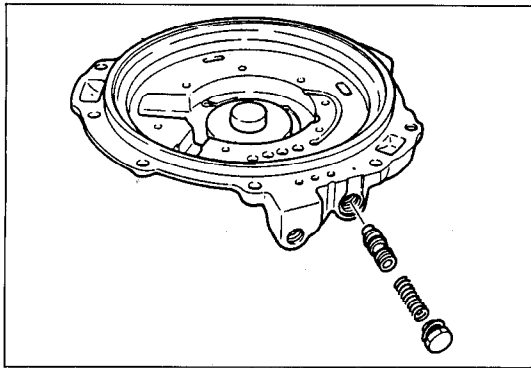
Wear limit

Check each part for wear; if not within specification, replace the oil pump.



03U0K2-161

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Oil pump body sleeve outer diameter
 Standard: 28.00mm (1.102 in)</p> | <p>4. Valve outer diameter
 Standard: 12.00mm (0.472 in)
 Minimum: 11.86mm (0.467 in)</p> |
| <p>2. Rotor bushing inner diameter
 Standard: 28.00mm (1.102 in)
 Maximum: 28.05mm (1.104 in)</p> | <p>5. Seal pin outer diameter
 Standard: 5.00mm (0.197 in)
 Minimum: 4.90mm (0.193 in)</p> |
| <p>3. Guide ring outer diameter
 Standard: 57.85mm (2.278 in)
 Minimum: 57.70mm (2.272 in)</p> | |



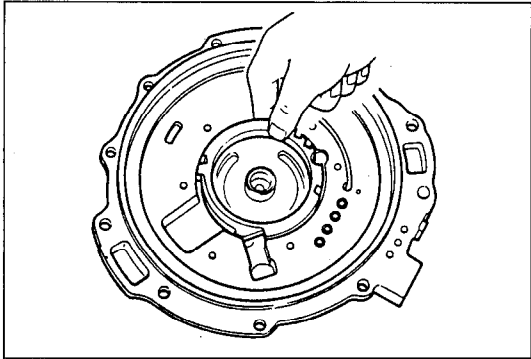
03U0K2-162

Assembly procedure

1. Install the valve and spring into the oil pump body, and check that the valve moves smoothly.
2. Install the plug.

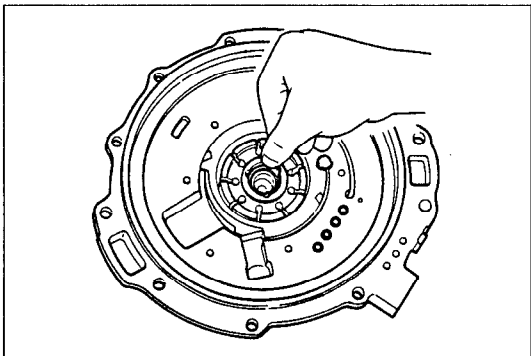
Tightening torque:

24—35 N·m (2.4—3.6 m·kg, 17—26 ft·lb)



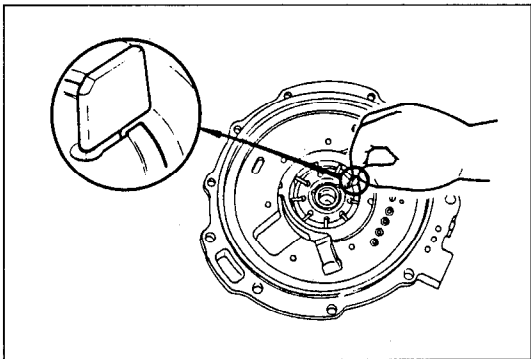
86U07B-179

3. Install the cam ring and pivot roller onto the oil pump body.



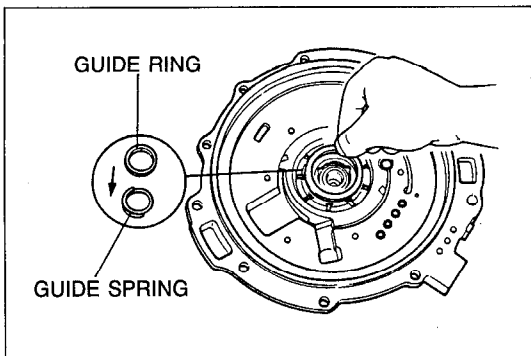
86U07B-180

4. Install the rotor onto the oil pump body.



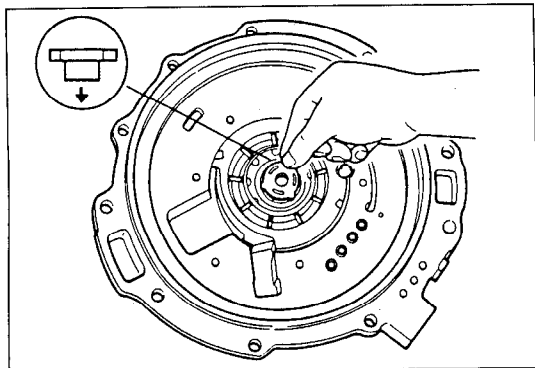
86U07B-181

5. Install the vanes into the rotor as shown.



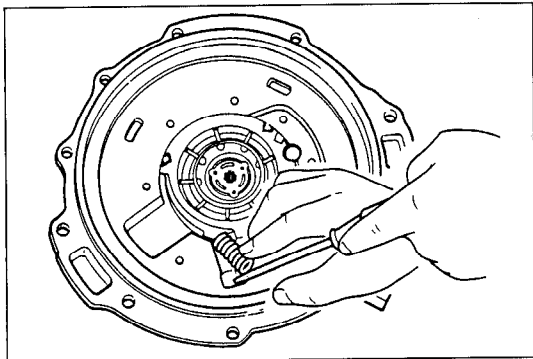
86U07B-182

6. Install the guide spring and guide ring while expanding the vanes toward the cam ring.



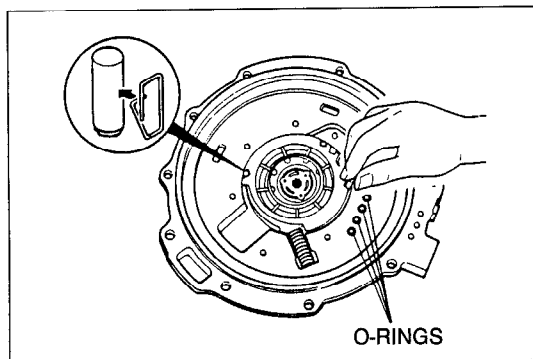
86U07B-183

7. Install the pump flange onto the rotor.



86U07B-184

8. Install the spring between the cam ring and oil pump body.

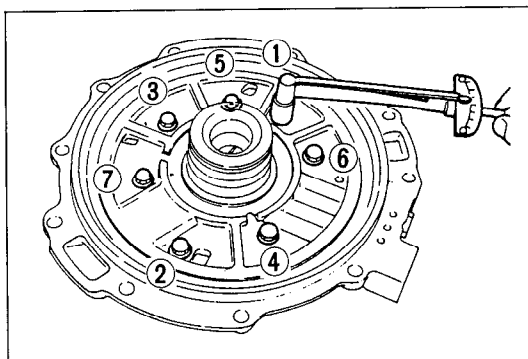


03U0K2-163

Note

- Install the seal pins round end first.

9. Install the seal pins and springs with the pins facing toward the oil pump body.
 10. Install the new O-rings.

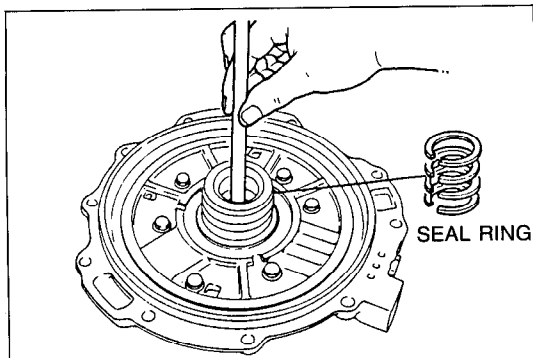


86U07B-186

11. Install the oil pump cover to the oil pump body. Tighten the bolts in sequence.

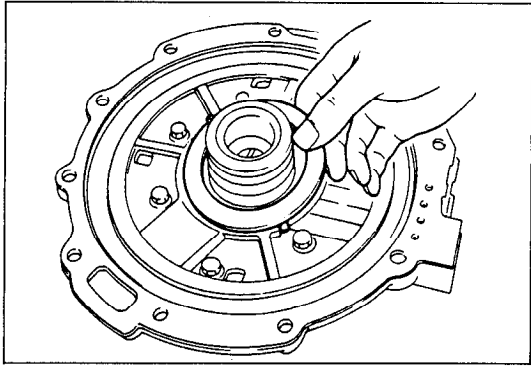
Tightening torque:

8—11 N·m (82—112 cm·kg, 71—97 in·lb)



03U0K2-164

12. Install the oil pump shaft and check for smooth oil pump operation.
 13. Install the new seal rings.



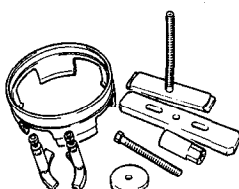
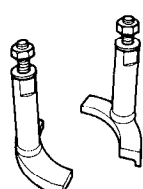
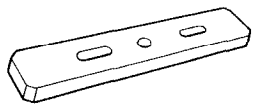
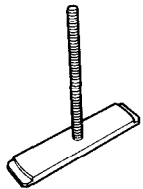
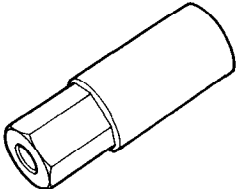

86U07B-188

14. Apply petroleum jelly to the bearing race to secure it to the oil pump cover; then install it on the oil pump cover.

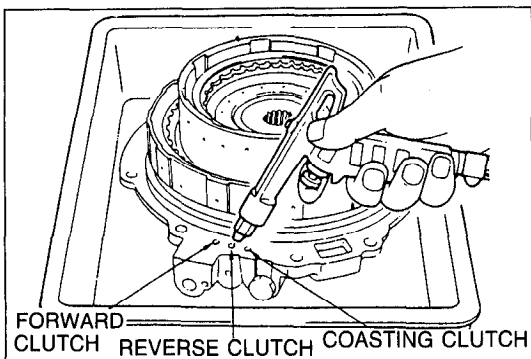
Bearing race outer diameter: 88.0mm (3.46 in)

CLUTCH ASSEMBLY

Preparation SST

<p>49 G019 0A7A</p> <p>Compressor set, return spring</p> 	<p>For disassembly/ assembly of clutch assembly</p>	<p>49 G019 025</p> <p>Body B (Part of 49 G019 0A7)</p> 	<p>For disassembly/ assembly of clutch assembly</p>
<p>49 G019 026</p> <p>Plate (Part of 49 G019 0A7)</p> 	<p>For disassembly/ assembly of clutch assembly</p>	<p>49 G019 027</p> <p>Attachment A (Part of 49 G019 0A7)</p> 	<p>For disassembly/ assembly of clutch assembly</p>
<p>49 G019 029</p> <p>Nut (Part of 49 G019 0A7)</p> 	<p>For disassembly/ assembly of clutch assembly</p>	<p>49 G019 024</p> <p>Body (Part of 49 G019 0A7)</p> 	<p>For disassembly/ assembly of clutch assembly</p>

03U0K2-165



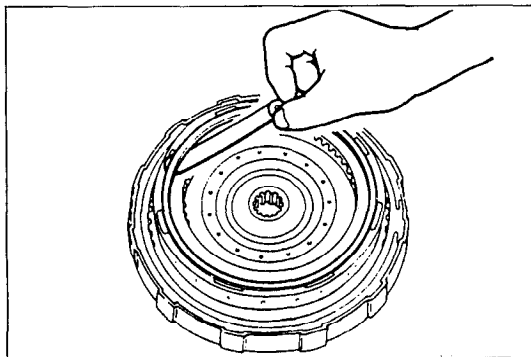
03U0KX-217

Preinspection

Clutch operation

1. Set the clutch assembly onto the oil pump.
2. Check the clutch operation by applying compressed air through the fluid passages shown.

Applied air pressure: 392 kPa (4.0 kg/cm², 57 psi)



03U0KX-221

Forward clutch

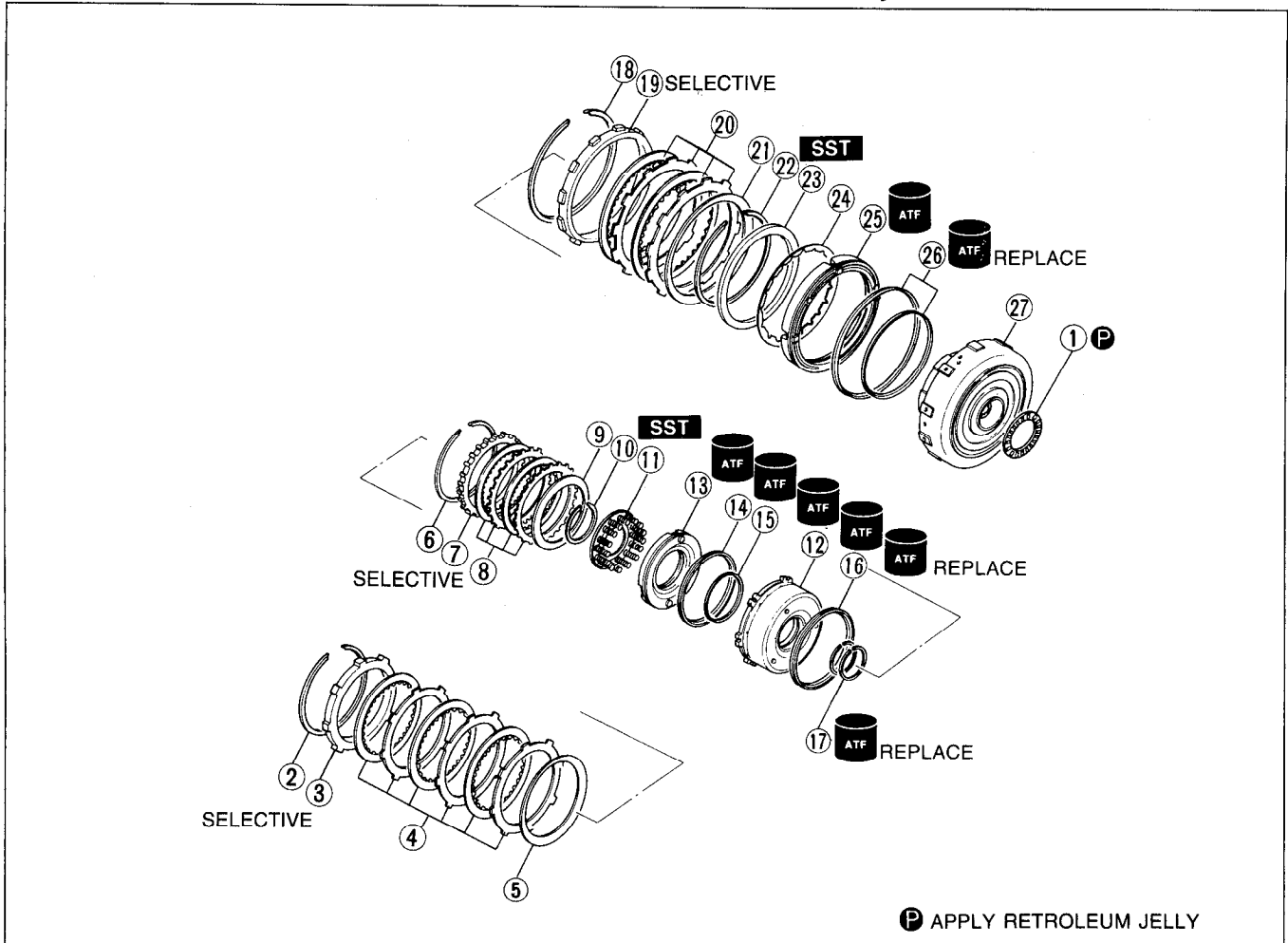
1. Measure the clearance between the retaining plate and the snapping.

Clearance: 1.0—1.2mm (0.040—0.047 in)

2. If not as specified, replace parts as necessary.
3. Select and install the correct snap ring when assembling.

Disassembly / Inspection / Assembly

1. Disassembly in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



P APPLY RETROLEUM JELLY

03U0K2-166

—Forward clutch—

1. Thrust bearings
Inspect for damage and rough rotation
2. Snap ring
3. Retaining plate
4. Drive and driven plate
Inspect for wear and burning
Inspection page K2-176
5. Dished plate

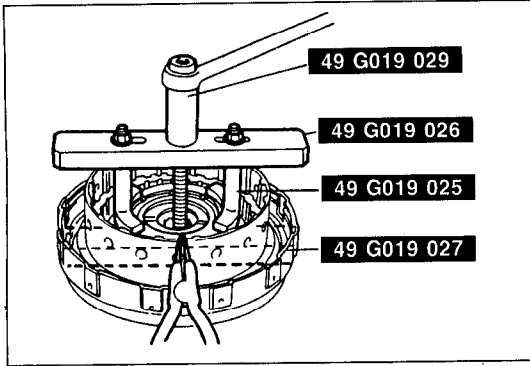
—Coasting clutch—

6. Snap ring
7. Retaining plate
8. Drive and driven plate
Inspect for wear and burning
Inspection page K2-176
9. Dished plate
10. Snap ring
Disassembly note page K2-176
11. Spring and retainer assembly
Inspection page K2-175
12. Coasting clutch drum
Disassembly note page K2-175
Inspection page K2-176

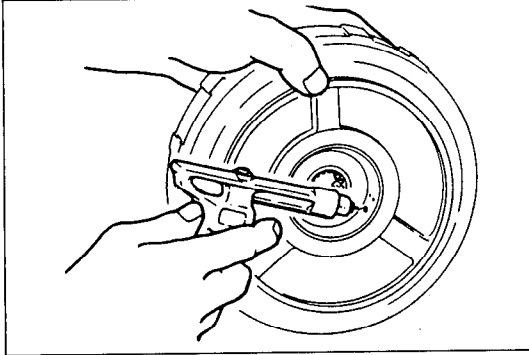
13. Coasting piston
Disassembly note page K2-175
Inspection page K2-177
14. Outer seal
15. Inner seal
16. Outer seal
17. Seal ring

—Reverse clutch—

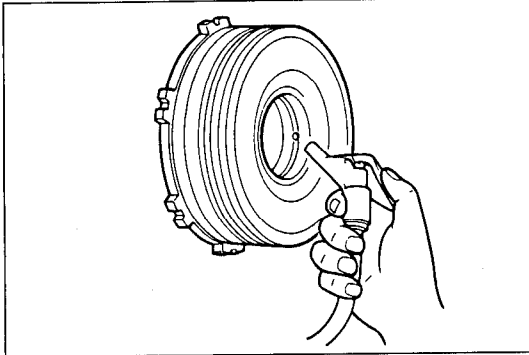
18. Snap ring
19. Retaining plate
20. Drive and driven plate
Inspect for wear and burning
Inspection page K2-176
21. Dished plate
22. Snap ring
Disassembly note page K2-175
23. Return spring stop
24. Piston return spring
25. Reverse piston
Disassembly note page K2-176
26. Seal rings (Inner and outer)
27. Reverse and forward drum
Inspection page K2-177



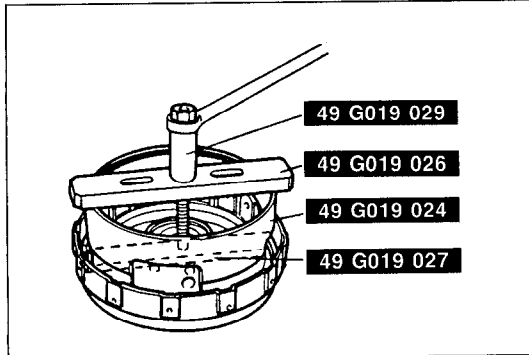
03U0KX-223



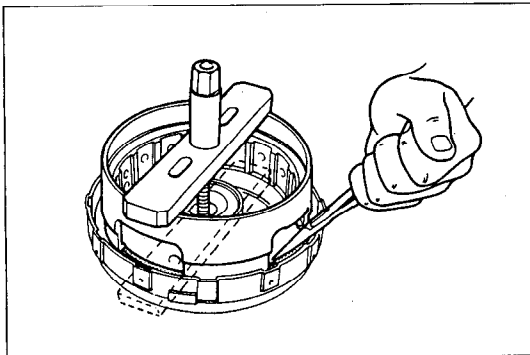
03U0KX-224



96U07B-026



03U0KX-225



03U0KX-226

Disassembly note

Snap ring (coasting clutch)

1. Install the **SST** in the coasting clutch drum as shown.
2. Compress the spring and retainer assembly.
3. Remove the snap ring.
4. Remove the **SST**, then remove the spring and retainer assembly.

Coasting clutch drum

1. Remove the coasting clutch drum from the reverse and forward drum by applying compressed air through the fluid passage.

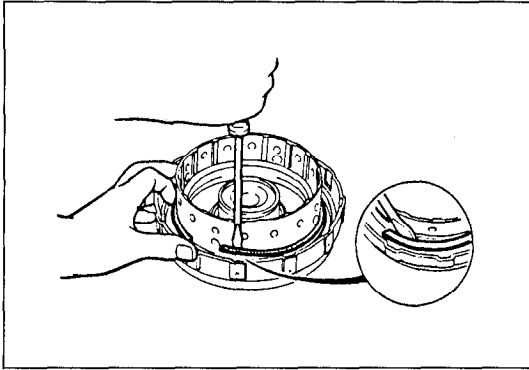
Coasting piston

1. Remove the coasting clutch piston from the coasting clutch drum by applying compressed air through the fluid passage.

Snap ring (reverse clutch)

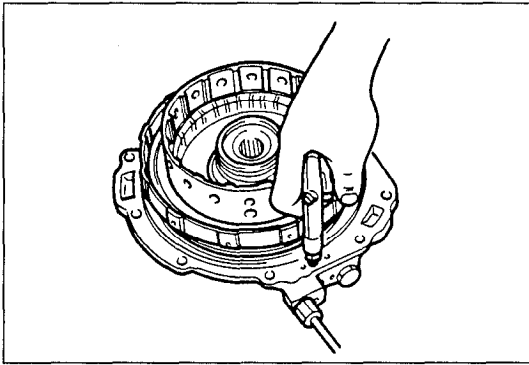
1. Install the **SST** in the reverse and forward drum as shown.
2. Compress the piston return spring.

3. Remove one end of the snap ring from the groove with snap-ring pliers.



86U07B-195

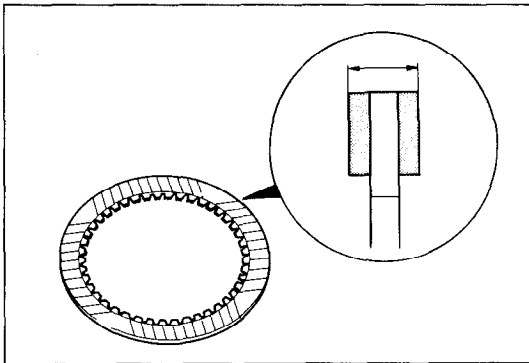
4. Remove the **SST** from the reverse and forward drum.
5. Remove the snap ring with a screwdriver.



03U0KX-227

Reverse piston

1. Place the reverse and forward drum on the oil pump.
2. Remove the reverse piston by applying compressed air through the fluid passage.



03U0KX-228

Inspection

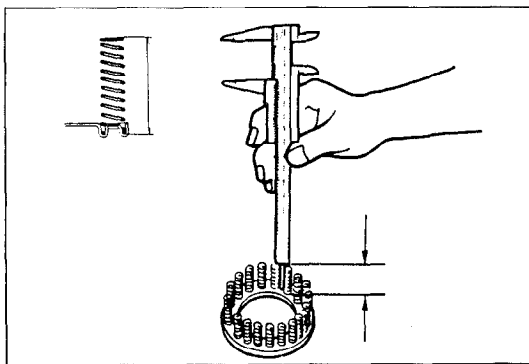
Drive plates

1. Measure the facing thickness in three places, and determine the average of the three readings.

Standard: 1.6mm (0.063 in)

Minimum: 1.4mm (0.055 in)

2. If not within specification, replace the drive plates.



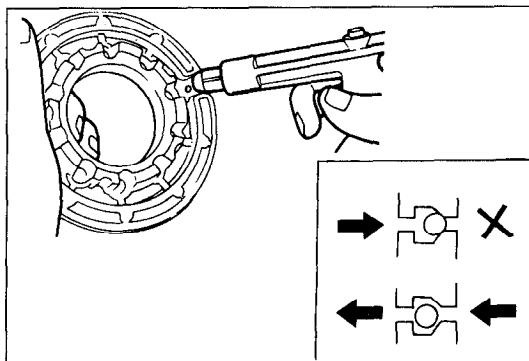
03U0K2-167

Spring and retainer assembly (coasting clutch)

1. Measure the spring free length and check for deformation.

Free length: 29.80mm (1.173 in)

2. If not within specification, replace the spring and retainer assembly.

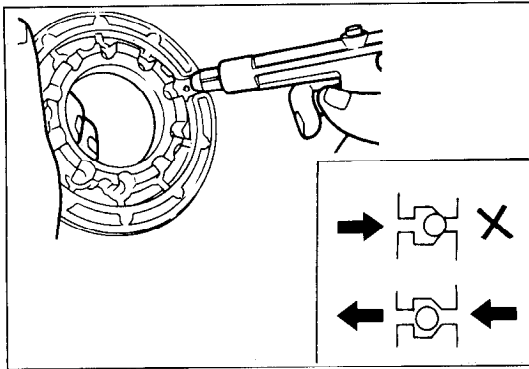


03U0KX-230

Coasting clutch drum

1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

Air pressure: 392 kPa (4.0 kg/cm², 57 psi) max.

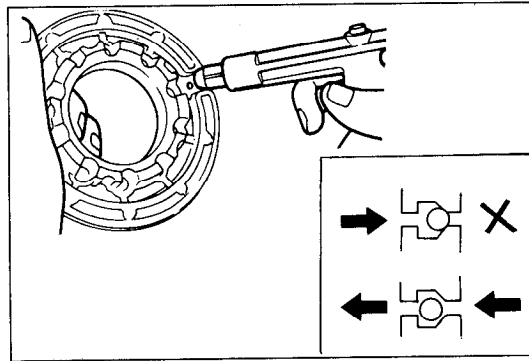


03U0KX-231

Coasting piston

1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

Air pressure: 392 kPa (4.0 kg/cm², 57 psi) max.

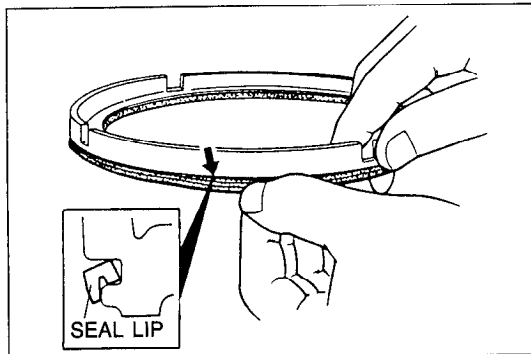


03U0KX-232

Reverse and forward drum

1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

Air pressure: 392 kPa (4.0 kg/cm², 57 psi) max.

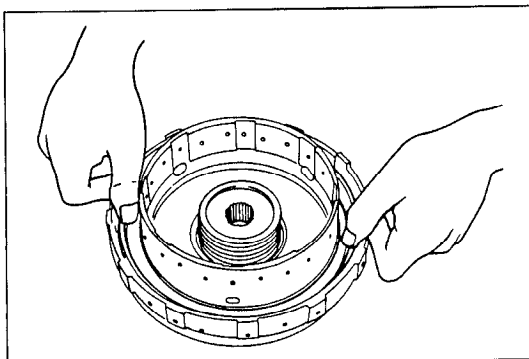


03U0KX-233

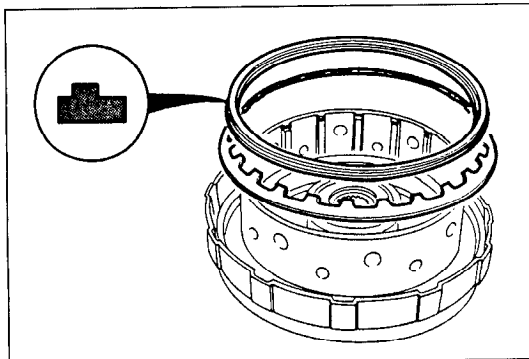
Assembly procedure

Reverse clutch

1. Install the reverse piston.
 - (1) Apply ATF to inner and outer faces of the seals, and install them to the reverse piston.
 - (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the reverse clutch drum.
- (3) Install the reverse piston by pushing evenly around the circumference, being careful not to damage the seal rings.

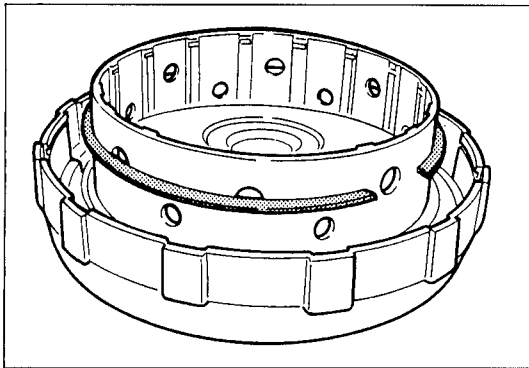


86U07B-200



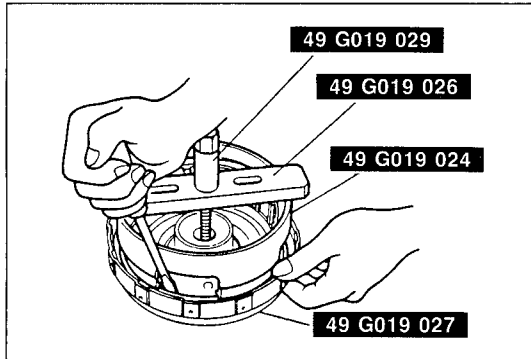
03U0KX-234

2. Install the piston return spring with the tabs facing away from the reverse piston.
3. Install the return spring stop with the step facing upward.



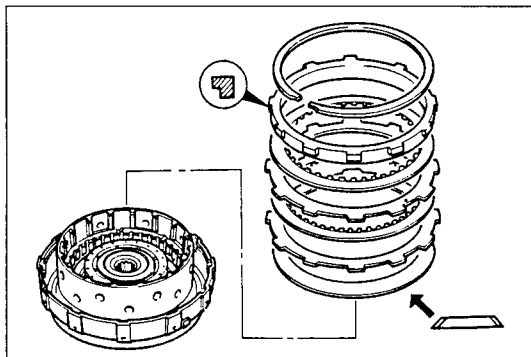
86U07B-202

4. Install the snap ring half-way down the reverse forward drum as shown.



86U07B-203

5. Install the **SST** on the reverse and forward drum.
 6. Compress the spring and retainer assembly.
 7. Install the snap ring with a screwdriver.
 8. Remove the **SST**.



03U0KX-235

9. Install the dished plate with the dished side facing the piston as shown.
 10. Install the drive and driven plates.

Note

• **Installation order: Driven-Drive-Driven-Drive**

11. Install the retaining plate.
 12. Install the snap ring.

13. Measure the reverse clutch clearance.
 (1) Measure the clearance between the snap ring and the retaining plate of the reverse clutch.
 (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Reverse clutch clearance:

0.9—1.1mm (0.035—0.043 in)

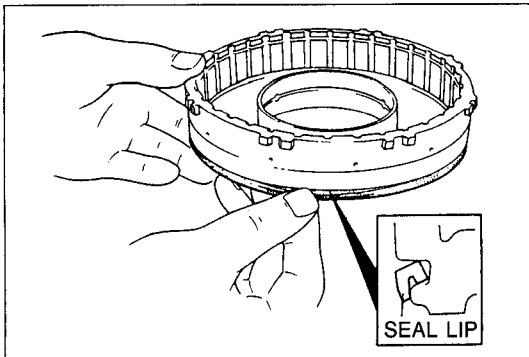
Retaining plate size

mm (in)

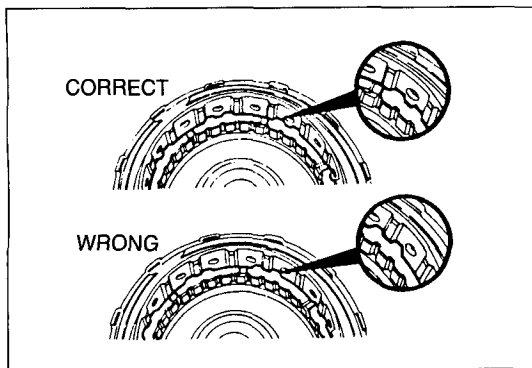
6.5 (0.2559)	6.6 (0.2598)	6.7 (0.2638)
6.8 (0.2677)	6.9 (0.2717)	7.0 (0.2756)
7.1 (0.2795)	7.2 (0.2835)	7.3 (0.2874)
7.4 (0.2913)	7.5 (0.2953)	7.6 (0.2992)
7.7 (0.3031)	7.8 (0.3071)	8.0 (0.3150)

Coasting clutch

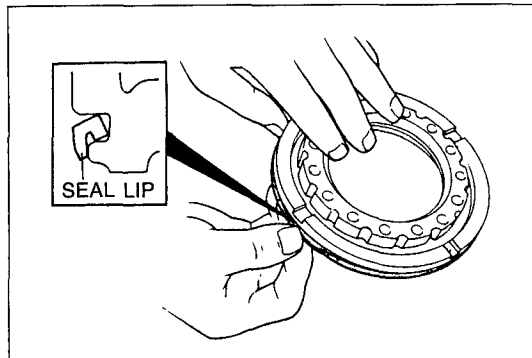
1. Install the coasting clutch drum.
 (1) Apply ATF to inner and outer faces of the seal, and install it onto the coasting clutch drum.
 (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the drum.



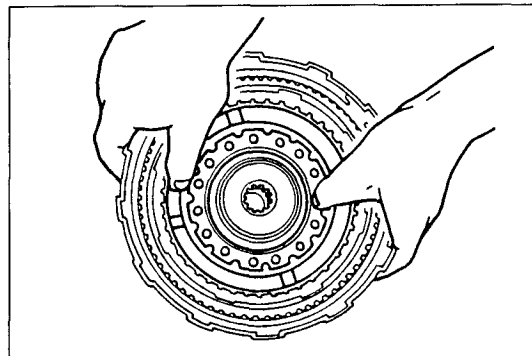
86U07B-206



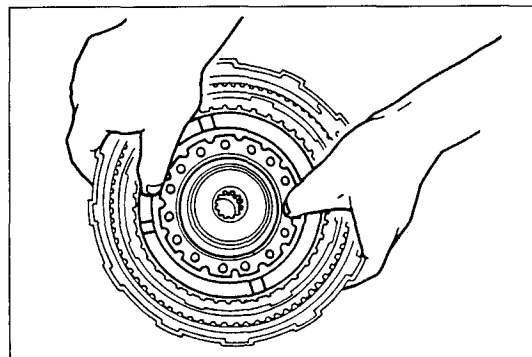
03U0KX-237



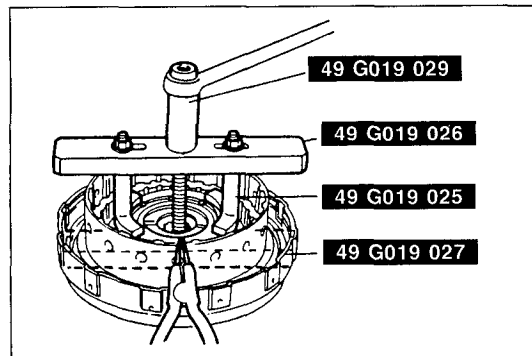
86U07B-208



86U07B-209



86U07B-210



86U07B-211

- (3) Install the coasting clutch drum in the correct position in the reverse and forward drum as shown.
- (4) Push evenly around the circumference, being careful not to damage the outer seal.

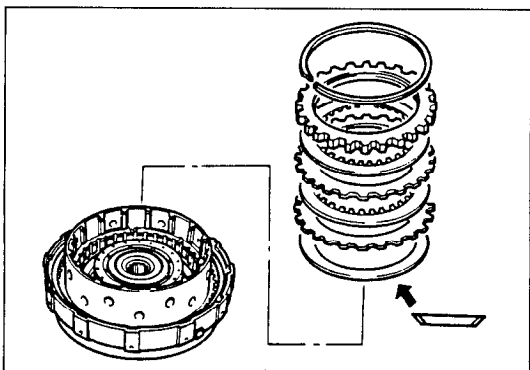
2. Install the coasting piston.

- (1) Apply ATF to inner and outer faces of the seals and install them onto the coasting piston.
- (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the drum.

- (3) Install the coasting piston by pushing evenly around the circumference, being careful not to damage the outer seal.

3. Install the spring and retainer assembly.

4. Install the **SST** in the coasting clutch as shown.
5. Compress the spring and retainer assembly.
6. Install the snap ring.
7. Remove the **SST**.



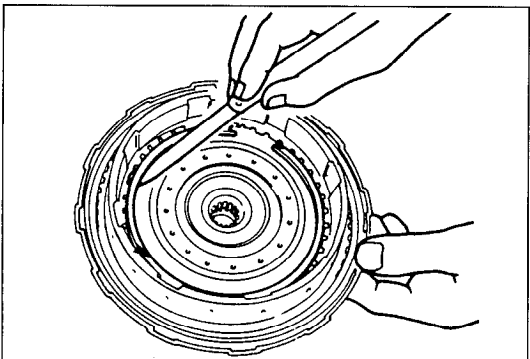
03U0KX-238

8. Install the dished plate with the dished side downward.

Note

- **Installation order: Driven-Drive-Driven-Drive**

9. Install the drive and driven plates.
10. Install the retaining plate.
11. Install the snap ring.



03U0K2-169

12. Measure the coasting clutch clearance.
 - (1) Measure the clearance between the snap ring and the retaining plate of the coasting clutch.
 - (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Coasting clutch clearance:

1.0—1.2mm (0.040—0.047 in)

Retaining plate sizes

mm (in)

4.6 (0.1811)	4.8 (0.1890)	5.0 (0.1969)
5.2 (0.2047)	5.4 (0.2126)	5.6 (0.2205)

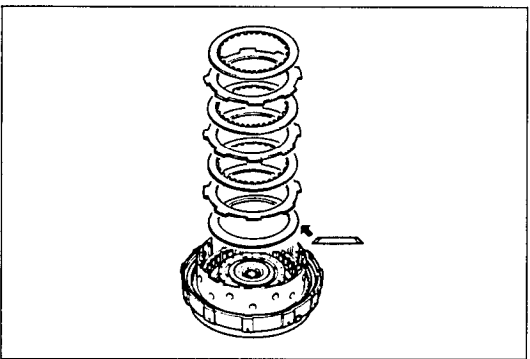
Forward clutch

1. Install the dished plate with the dished side downward.

Note

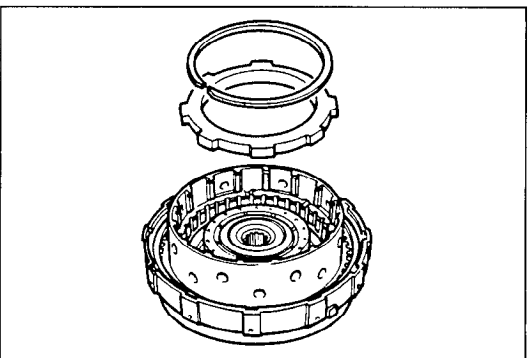
- **Installation order: Driven-Drive-Driven-Drive-Driven-Drive**

2. Install the drive and driven plates.



03U0KX-240

3. Install the retaining plate.
4. Install the snap ring.



86U07B-215

5. Measure the forward clutch clearance.
 - (1) Measure the clearance between the snap ring and the retaining plate of the forward clutch.
 - (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

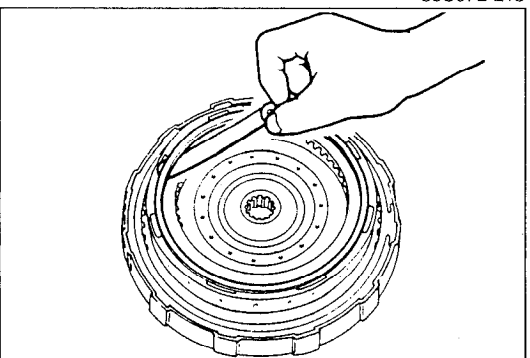
Forward clutch clearance:

1.0—1.2mm (0.040—0.047 in)

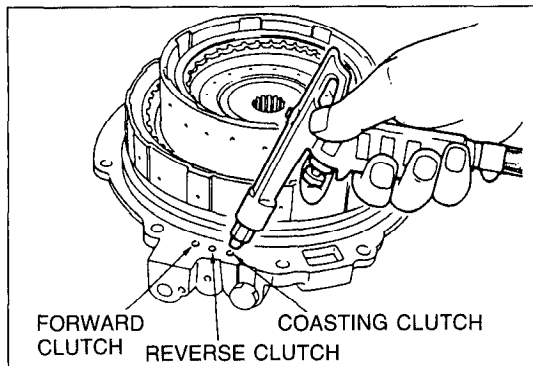
Retaining plate sizes

mm (in)

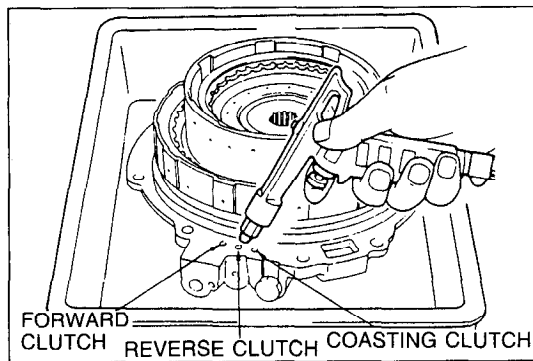
5.9 (0.2323)	6.1 (0.2402)	6.3 (0.2480)
6.5 (0.2559)	6.7 (0.2638)	8.9 (0.3504)



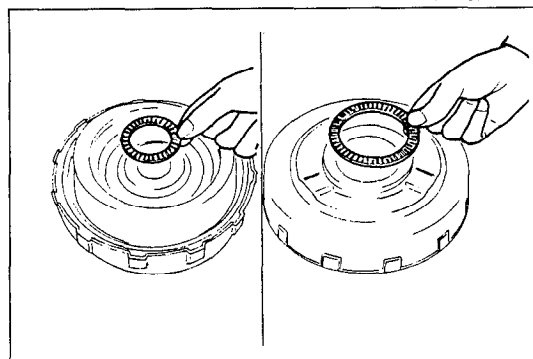
03U0K2-170



03U0KX-242



03U0KX-244



03U0KX-245

6. Check the clutch operation as follows.
 - (1) Set the clutch assembly onto the oil pump.
 - (2) Check the clutch operation by applying compressed air through the fluid passages shown.

Applied air pressure: 392 kPa (4.0 kg/cm², 57 psi)

Caution

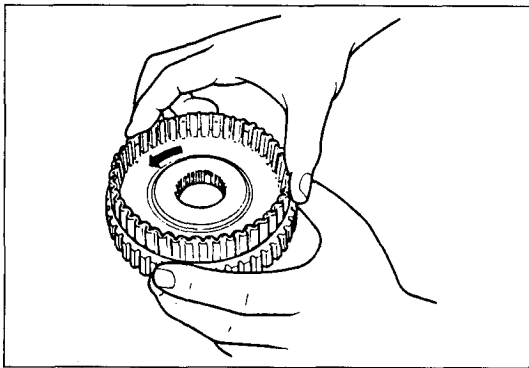
- The compressed air must be under 392 kPa (4.0 kg/cm², 57 psi), and should not applied for over 3 seconds.

- (4) Verify that no bubbles come from between the piston and drum seal when applying compressed air through the fluid passages shown.

7. Apply petroleum jelly to the thrust bearings, and secure them on each side of the reverse and forward drum.

Thrust bearing outer diameter
Oil pump side: 86.0mm (3.39 in)

Small sun gear and one-way clutch side:
56.1mm (2.21 in)



03U0KX-246

SMALL SUN GEAR AND ONE-WAY CLUTCH

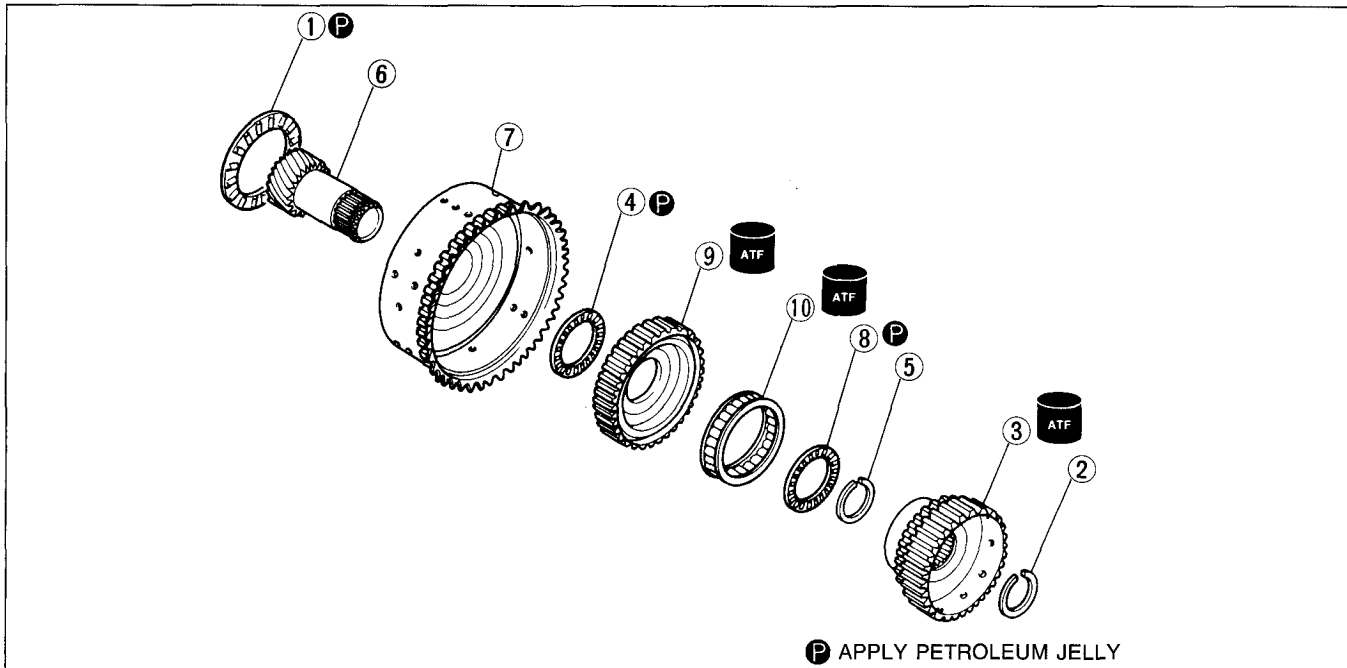
Preinspection

One-way clutch operation

While holding the one-way clutch outer race, verify that the one-way clutch inner race rotates smoothly when turned clockwise and locks when turned counterclockwise. If not as specified, replace the one-way clutch.

Disassembly / Inspection / Assembly

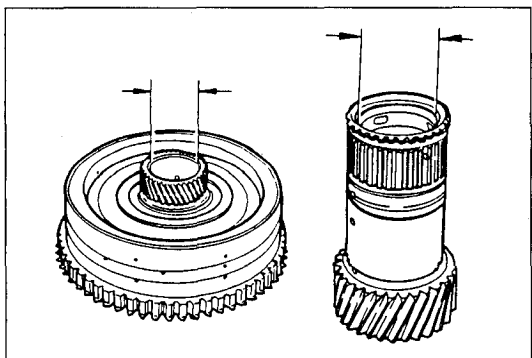
1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



Ⓟ APPLY PETROLEUM JELLY

03U0K2-171

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Thrust bearing
Inspect for damage and rough rotation</p> <p>2. Snap ring</p> <p>3. One-way clutch inner race</p> <p>4. Thrust bearing
Inspect for damage and rough rotation</p> | <p>5. Snap ring</p> <p>6. Small sun gear
Inspection ... page K2-182</p> <p>7. Sun gear drum
Inspection ... page K2-182</p> | <p>8. Thrust bearing
Inspect for damage and rough rotation</p> <p>9. One-way clutch outer race</p> <p>10. One-way clutch</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|



86U07B-222

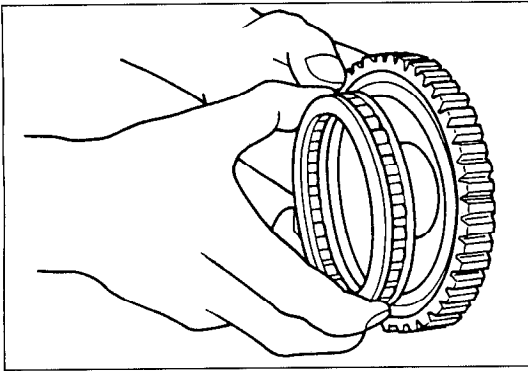
Inspection

Check the following and replace any faulty parts.

1. Sun gear drum and small sun gear for damage or wear
2. Bushing for damage or wear

Specification

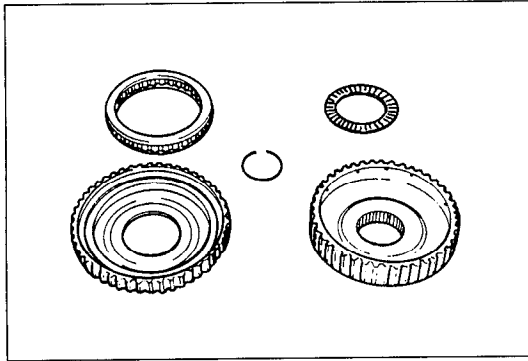
Sun gear drum: 33.425mm (1.316 in) max.
Small sun gear: 24.021mm (0.946 in) max.



86U07B-224

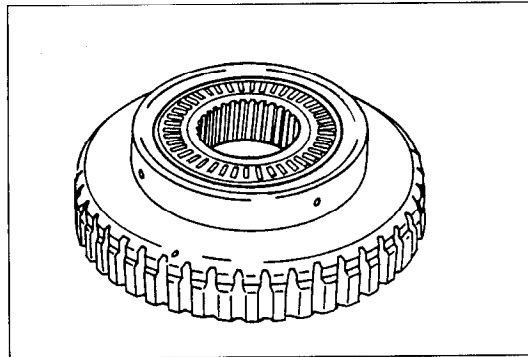
Replacement of one-way clutch

1. Remove the one-way clutch inner race.
2. Remove the one-way clutch.
3. Remove the thrust bearing.



86U07B-225

4. Inspect the one-way clutch inner and outer races, and replace if necessary.



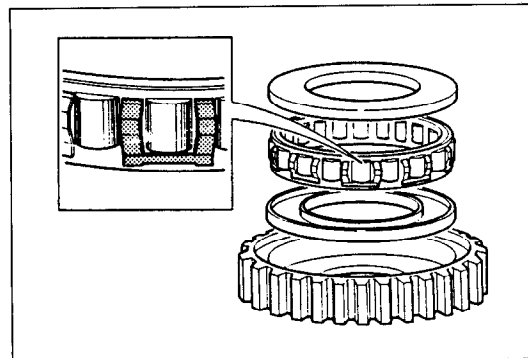
86U07B-226

5. Apply petroleum jelly to the thrust bearing to secure it; then install it to the one-way clutch inner race.

Thrust bearing outer diameter: 62.1mm (2.44 in)

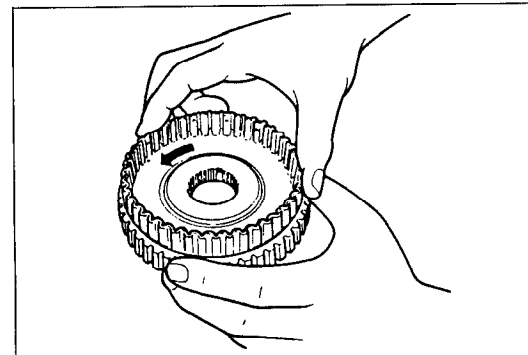
Caution

- Check that the spring cage of the one-way clutch faces toward the outer race.



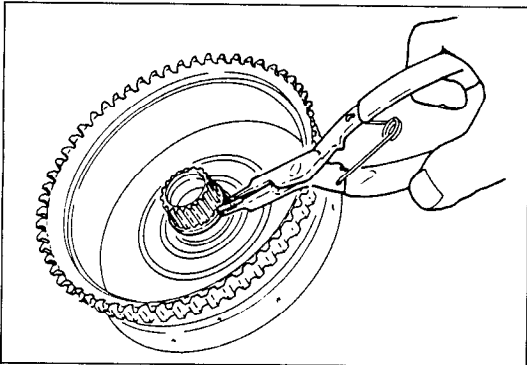
86U07B-227

6. Install the one-way clutch into the one-way clutch outer race.



86U07B-228

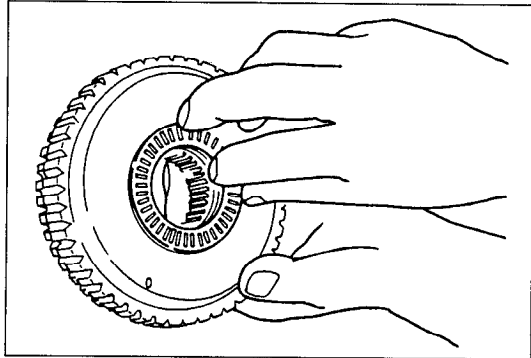
7. Install the one-way clutch inner race into the one-way clutch outer race by turning inner race counterclockwise.
8. Hold the one-way clutch outer race. Check that the inner race turns only counterclockwise.



03U0K2-172

Assembly procedure

1. Install the small sun gear into the sun gear drum.
2. Install the snap ring.



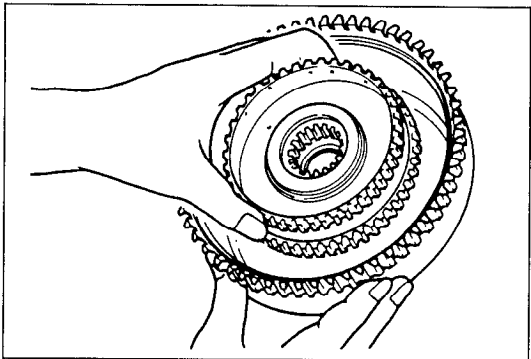
86U07B-230

3. Apply petroleum jelly to the thrust bearing to secure it; then install it to the one-way clutch inner race.

Thrust bearing outer diameter: 62.1mm (2.44 in)

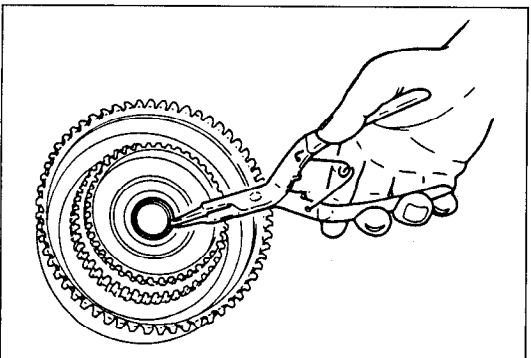
Note

- **Align the splines of the one-way clutch inner race and small sun gear clutch hub.**



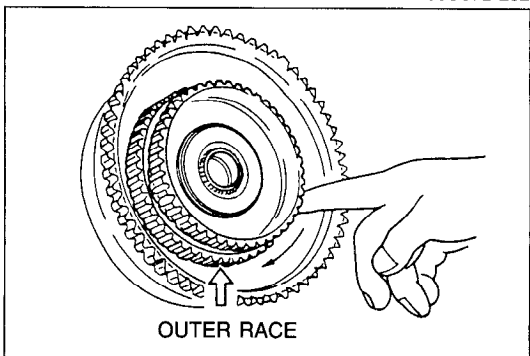
86U07B-231

4. Install the one-way clutch inner and outer race to the sun gear drum.



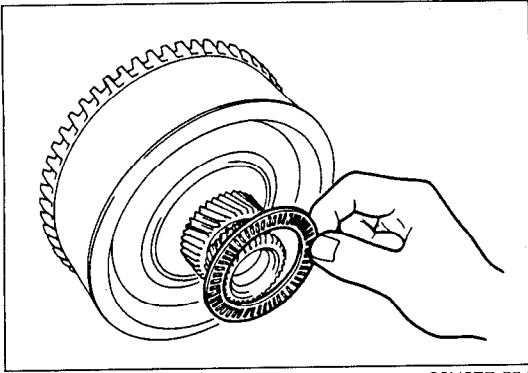
86U07B-232

5. Install the snap ring.



86U07B-233

6. Check that when the small sun gear is held, the one-way clutch outer race turns smoothly and only clockwise.



86U07B-234

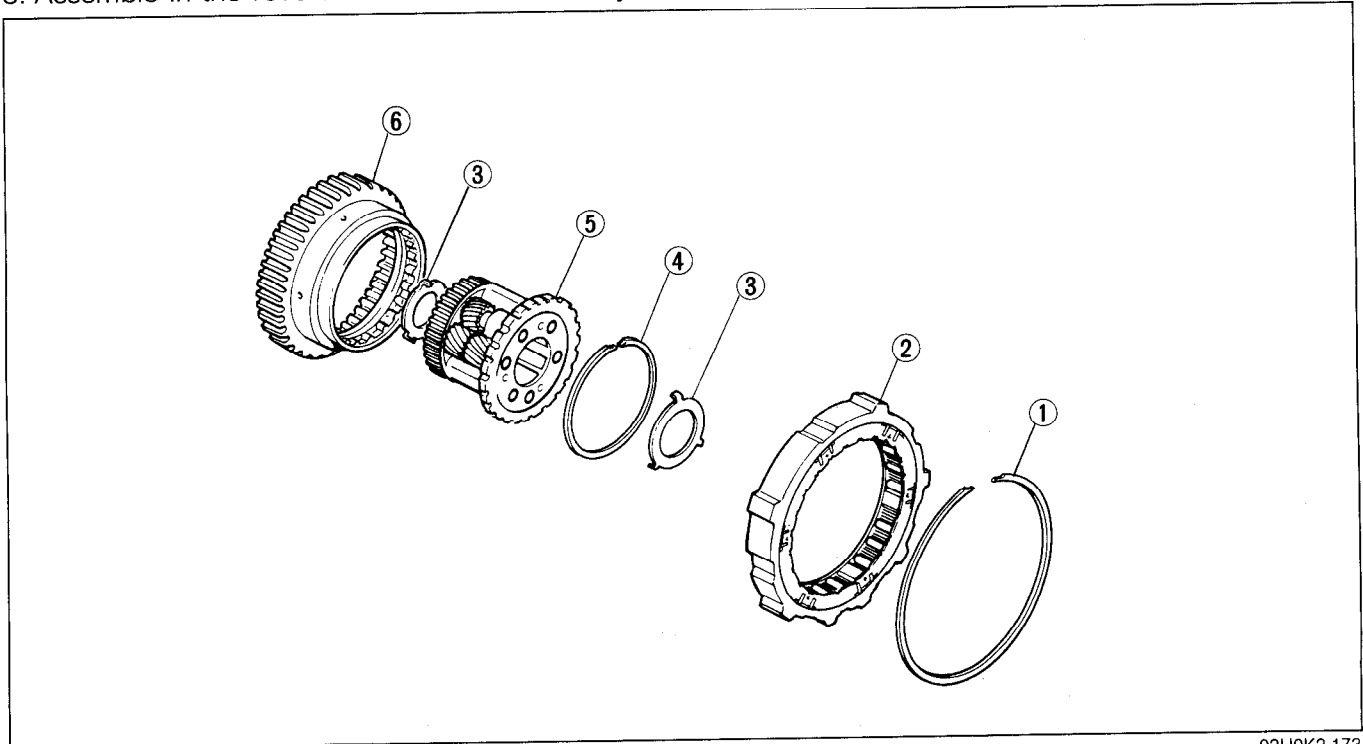
7. Apply petroleum jelly to the thrust bearing to secure it; then install it to the sun gear drum.

Thrust bearing outer diameter: 72.0mm (2.83 in)

ONE-WAY CLUTCH CARRIER HUB ASSEMBLY

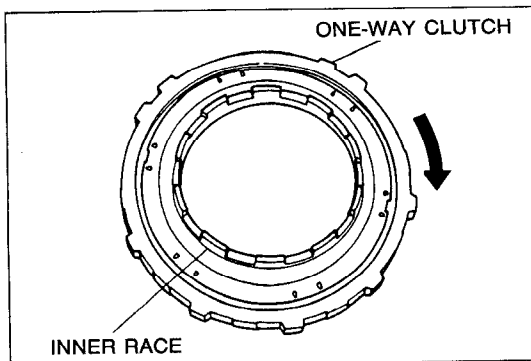
Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



03U0K2-173

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Snap ring 2. One-way clutch
Inspection page K2-185 3. Bearing races
Inspect bearing for scoring and scratches | <ol style="list-style-type: none"> 4. Snap ring 5. Carrier hub assembly
Inspection page K2-186 6. Inner race (Low and reverse hub) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0KX-257

Inspection

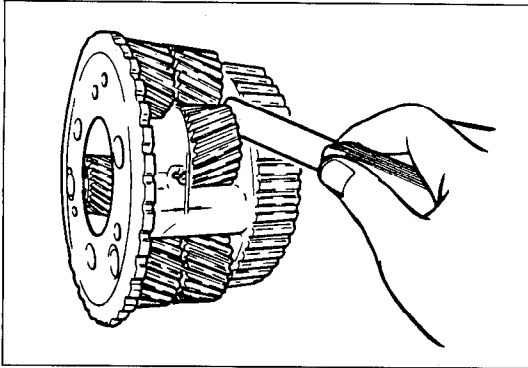
One-way clutch

Check for the following and repair or replace as necessary.

Note

- Assemble the one-way clutch and the inner race, then verify that the one-way clutch rotates only clockwise and smoothly.

1. Damaged or worn one-way clutch and operation.
2. Detached roller.



03U0KX-258

Carrier hub assembly

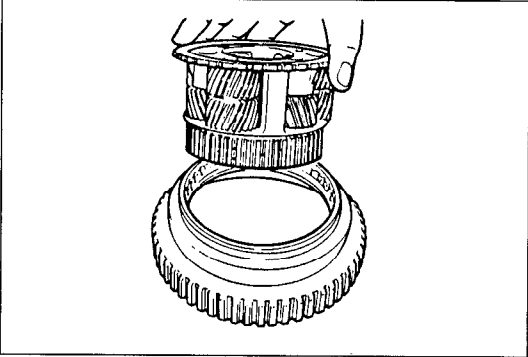
Check for the following and repair or replace as necessary.

1. Damaged or worn gear and operation.
2. Clearance between pinion washers and planetary carrier.

Clearance: 0.2—0.7mm (0.008—0.028 in)

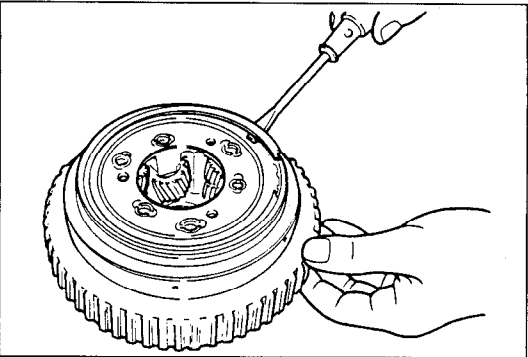
Assembly procedure

1. Assemble the carrier hub assembly to the inner race.



03U0KX-259

2. Install the snap ring.



86U07B-240

Note

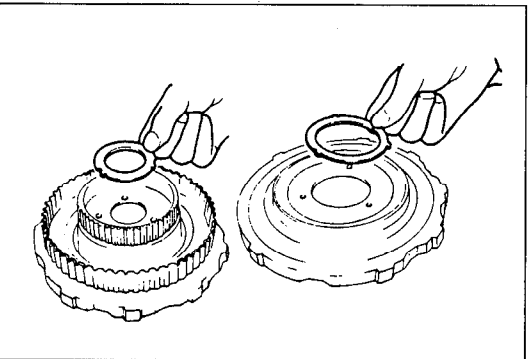
- Install the tangs of the bearing race into the alignment holes.

3. Apply petroleum jelly to the bearing race and secure them to each side of the one-way clutch and carrier hub assembly.

Bearing race outer diameter

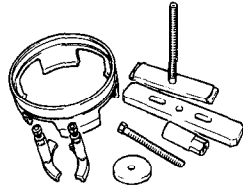
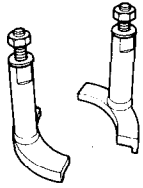
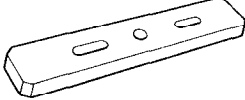
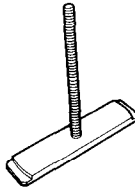
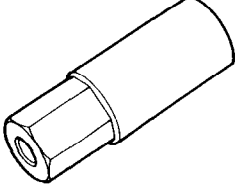
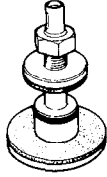
Sun gear drum side: 72.0mm (2.83 in)

3-4 clutch side: 57.0mm (2.21 in)

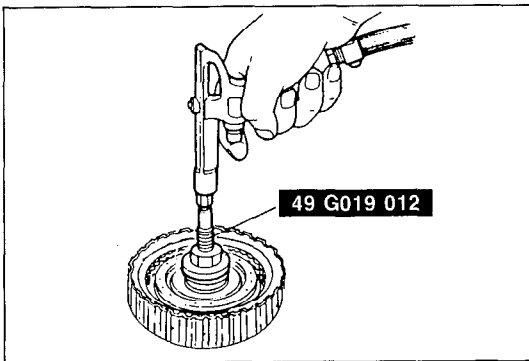


03U0K2-174

3-4 CLUTCH Preparation SST

<p>49 G019 0A7A</p> <p>Compressor set, return spring</p> 	<p>For disassembly/assembly of 3-4 clutch</p>	<p>49 G019 025</p> <p>Body B (Part of 49 G019 0A7)</p> 	<p>For disassembly/assembly of 3-4 clutch</p>
<p>49 G019 026</p> <p>Plate (Part of 49 G019 0A7)</p> 	<p>For disassembly/assembly of 3-4 clutch</p>	<p>49 G019 027</p> <p>Attachment A (Part of 49 G019 0A7)</p> 	<p>For disassembly/assembly of 3-4 clutch</p>
<p>49 G019 029</p> <p>Nut (Part of 49 G019 0A7)</p> 	<p>For disassembly/assembly of 3-4 clutch</p>	<p>49 G019 012</p> <p>Leak checker</p> 	<p>For disassembly/assembly of 3-4 clutch</p>

03U0KX-261

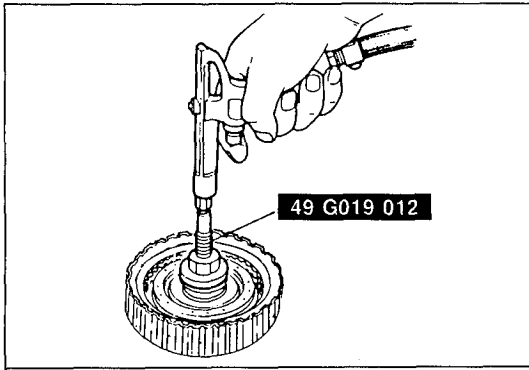


03U0KX-262

Preinspection Clutch operation

1. Install the **SST** as shown, and check clutch operation by applying compressed air.

Air pressure: 392 kPa (4.0 kg/cm², 57 psi)



03U0K2-175

Clutch clearance

1. Measure the clearance between the snap ring and the retaining plate of the 3-4 clutch.
2. If the clearance is not within specification, adjust it by selecting a proper snap ring.

3-4 clutch clearance: 1.3—1.5mm (0.051—0.059 in)

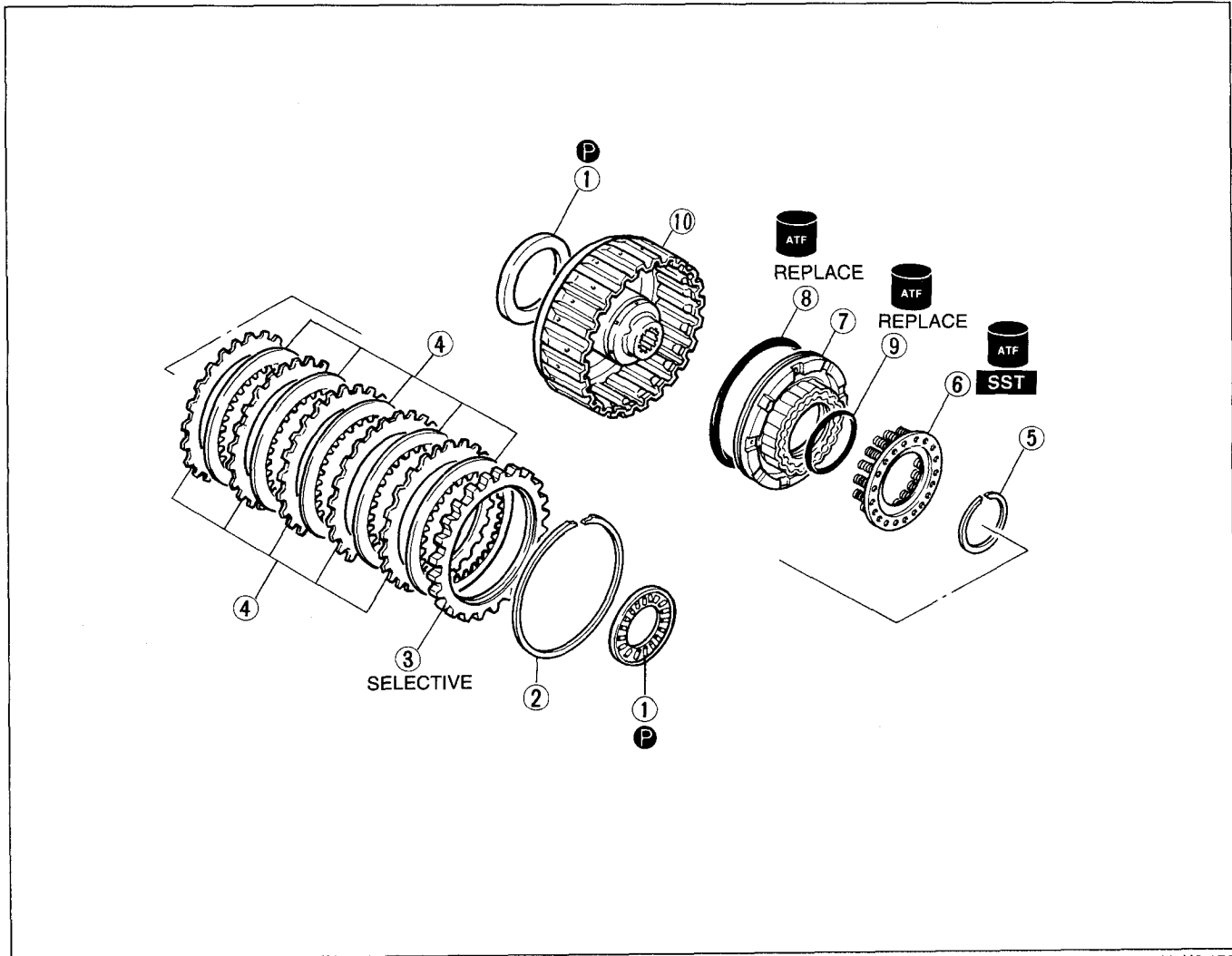
Retaining plate sizes

mm (in)

4.2 (0.1654)	4.4 (0.1732)	4.6 (0.1811)
4.8 (0.1890)	5.0 (0.1969)	5.2 (0.2047)

Disassembly / Inspection / Assembly

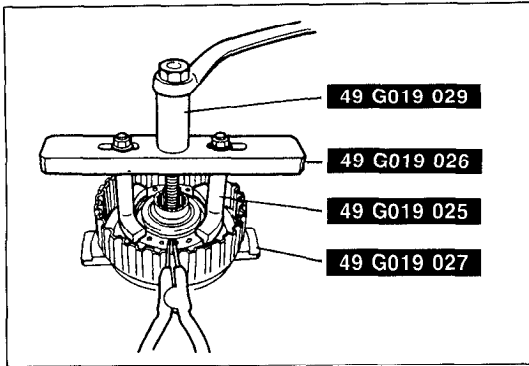
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



03U0K2-176

1. Thrust bearings
Inspect for damage and rough rotation
2. Snap ring
3. Retaining plate
4. Drive and driven plates
Inspect for wear and burning
Inspection..... page K2-189
5. Snap ring

6. Spring and retainer assembly
Inspection..... page K2-189
7. 3-4 clutch piston
Inspection..... page K2-189
8. Outer seal
9. Inner seal
10. 3-4 clutch drum

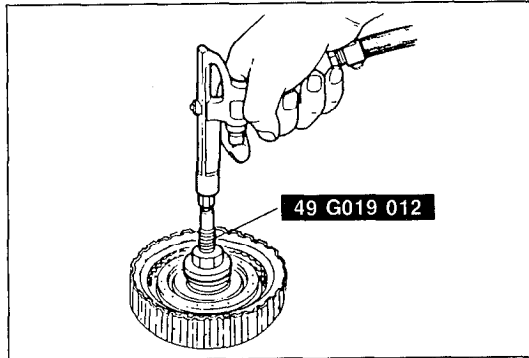


03U0KX-266

Disassembly note

Snap ring

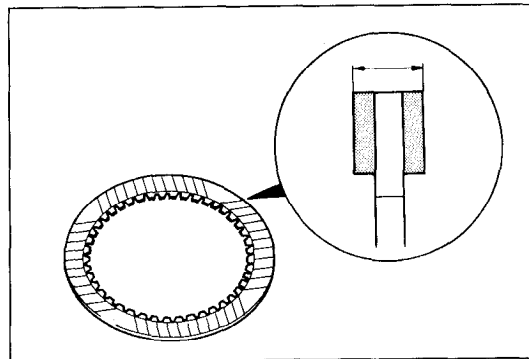
1. Install the **SST** to the 3-4 clutch as shown.
2. Compress the spring and retainer assembly.
3. Remove the snap ring.
4. Remove the **SST**, then remove the spring and retainer.



03U0KX-267

3-4 clutch piston

1. Remove the 3-4 clutch piston with the **SST** and compressed air.



03U0KX-268

Inspection

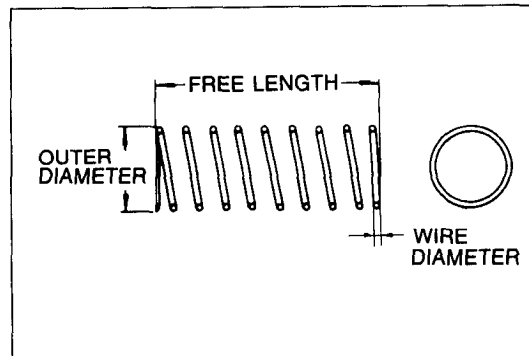
Drive plates

1. Measure the facing thickness in three places, and determine the average of the three readings.

Standard: 1.6mm (0.063 in)

Minimum: 1.4mm (0.055 in)

2. If not within specification, replace the drive plate(s).



03U0K2-177

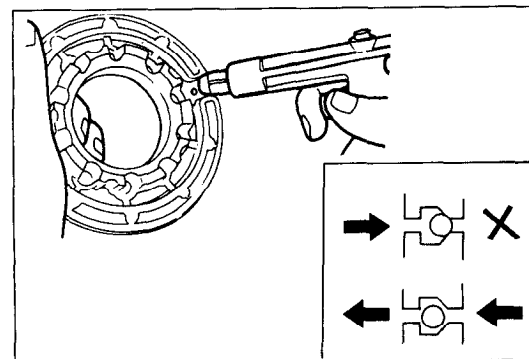
Spring and retainer assembly

1. Measure the spring free length.

Specifications

Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
74.4 (2.929)	40.5 (1.594)	1.0	5.0 (0.197)

2. If not within specification, replace the spring.

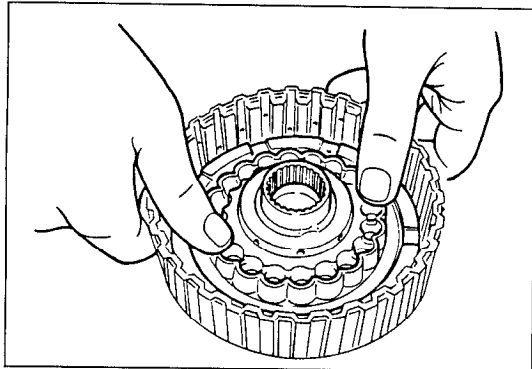


9MUOK1-232

Clutch piston

1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on return spring side.

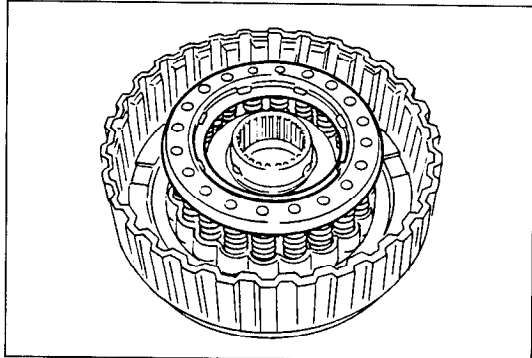
Air pressure: 392 kPa (4.0 kg/cm², 57 psi) max.



03U0KX-270

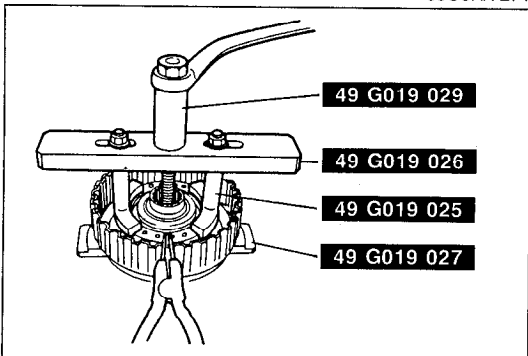
Assembly procedure

1. Install the 3-4 clutch piston.
 - (1) Apply ATF to the inner and outer seals, and install them onto the 3-4 clutch piston.
 - (2) Install the piston by pushing evenly around the circumference, being careful not to damage the seal rings.



03U0KX-271

2. Install the spring and retainer.

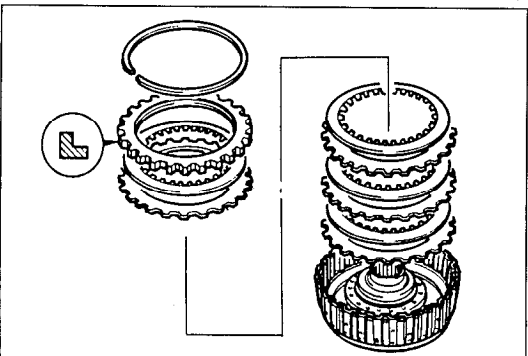


03U0KX-272

3. Install the **SST** to the 3-4 clutch as shown.
4. Compress the spring and retainer.
5. Install the snap ring.
6. Remove the **SST**.

Note

- **Installation order:**
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive



03U0K2-178

7. Install the drive and driven plates.
8. Install the retaining plate.
9. Install the snap ring.

10. Measure the 3-4 clutch clearance.
 - (1) Measure the clearance between the snap ring and the retaining plate of the 3-4 clutch.
 - (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

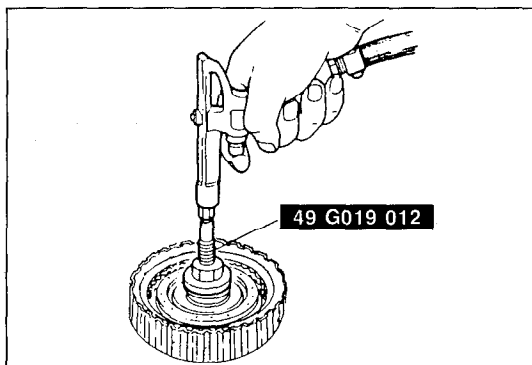
3-4 clutch clearance: 1.3—1.5mm (0.051—0.059 in)

Retaining plate sizes

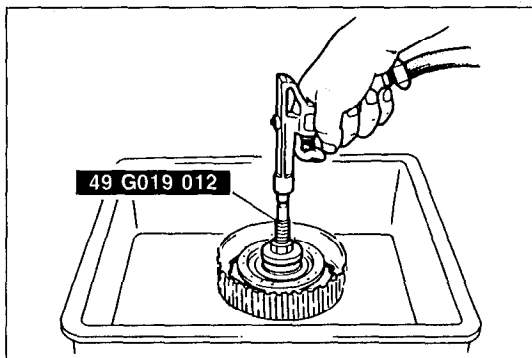
mm (in)

4.2 (0.1654)	4.4 (0.1732)	4.6 (0.1811)
4.8 (0.1890)	5.0 (0.1969)	5.2 (0.2047)

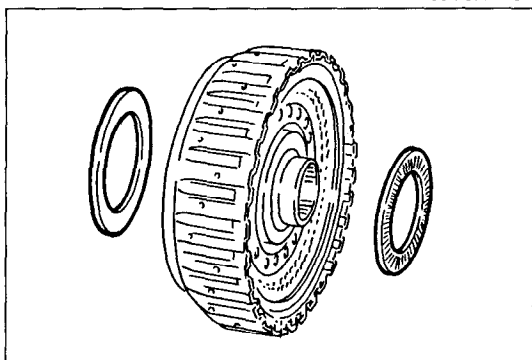
03U0K2-179



03U0K2-180



03U0K2-181



03U0K2-182

11. Check clutch operation as follows:

- (1) Install the **SST** as shown, and check clutch operation by applying compressed air.

Air pressure: 392 kPa (4.0 kg/cm², 57 psi)

Caution

- The compressed air must be under 392 kPa (4.0 kg/cm², 57 psi) and not applied for over 3 seconds.

- (2) Verify that no bubbles escape past the 3-4 clutch piston seal while applying compressed air.

12. Apply petroleum jelly to the thrust bearings and secure them to each side of the 3-4 clutch drum.

Thrust bearing outer diameter

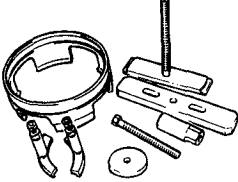
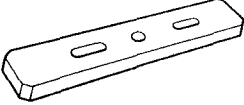
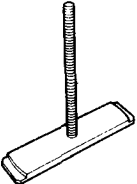
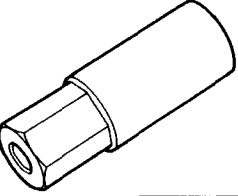
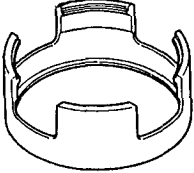
Carrier hub side: 56.1mm (2.21 in)

Output shell side: 72.1mm (2.84 in)

LOW AND REVERSE BRAKE

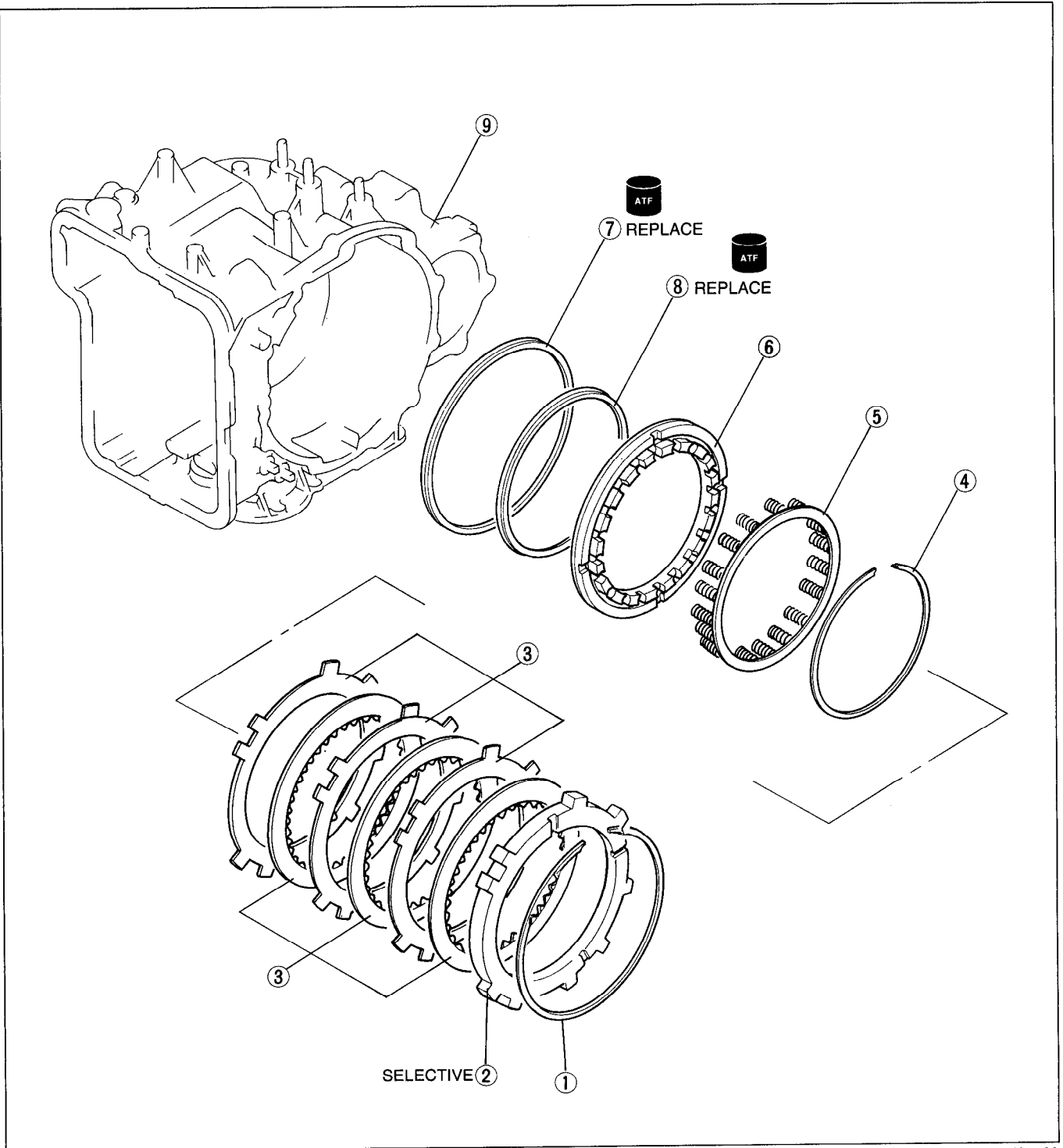
Preparation

SST

<p>49 G019 0A7A</p> <p>Compressor set, return spring</p> 	<p>For disassembly/ assembly of low and reverse brake</p>	<p>49 G019 026</p> <p>Plate (Part of 49 G019 0A7A)</p> 	<p>For disassembly/ assembly of low and reverse brake</p>
<p>49 G019 027</p> <p>Attachment A (Part of 49 G019 0A7A)</p> 	<p>For disassembly/ assembly of low and reverse brake</p>	<p>49 G019 029</p> <p>Nut (Part of 49 G019 0A7A)</p> 	<p>For disassembly/ assembly of low and reverse brake</p>
<p>49 B019 002</p> <p>Body (Part of 49 G019 0A7A)</p> 	<p>For disassembly/ assembly of low and reverse brake</p>	<p style="text-align: right;">03U0KX-278</p>	

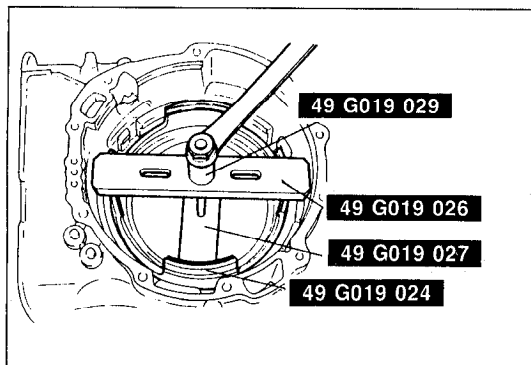
Disassembly / Inspection / Assembly

1. Disassemble as in the shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



03U0K2-183

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> 1. Snap ring 2. Retaining plate 3. Drive and driven plates
Inspect for wear and burning
Inspection page K2-194 4. Snap ring
Disassembly note page K2-194 | <ul style="list-style-type: none"> 5. Spring and retainer assembly
Inspection page K2-194 6. Low and reverse brake piston
Disassembly Note page K2-194
Inspection page K2-194 7. Outer seal 8. Inner seal 9. Transaxle case |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

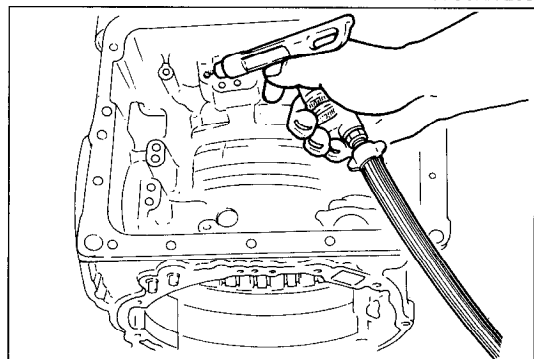


03U0KX-283

Disassembly note

Snap ring

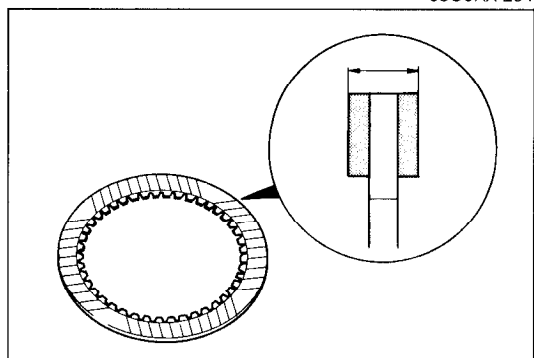
1. Install the **SST** in the transaxle case as shown.
2. Compress the spring and retainer assembly.
3. Remove the snap ring.
4. Remove the **SST**, then remove the spring and spring retainer assembly.



03U0KX-284

Low and reverse brake piston

1. Remove the low and reverse brake piston by applying compressed air through the fluid passage.



03U0KX-285

Inspection

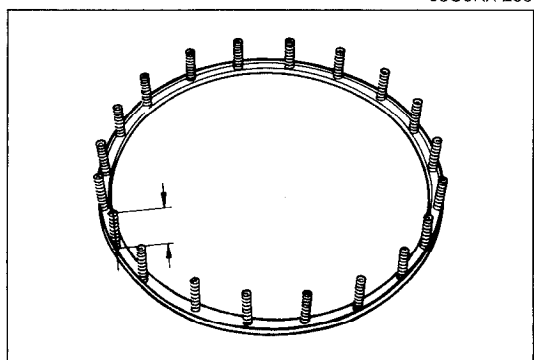
Drive plates

1. Measure the facing thickness in three places, and determine the average of the three readings.

Standard: 1.6mm (0.063 in)

Minimum: 1.4mm (0.055 in)

2. If not within specification, replace the drive plates.



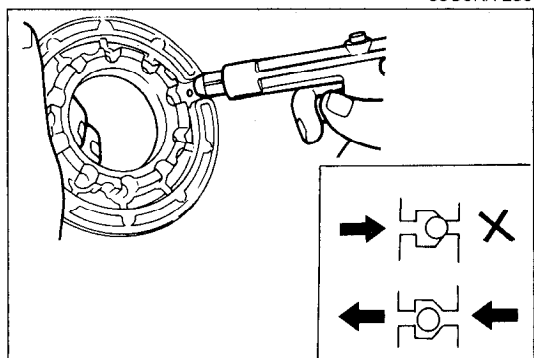
03U0KX-286

Spring and retainer assembly

1. Measure the spring free length and check for deformation.

Free length of spring: 14.3mm (0.563 in)

2. If not within specification, replace the spring and retainer assembly.

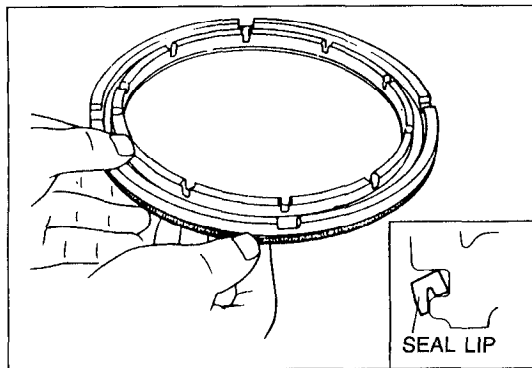


03U0KX-287

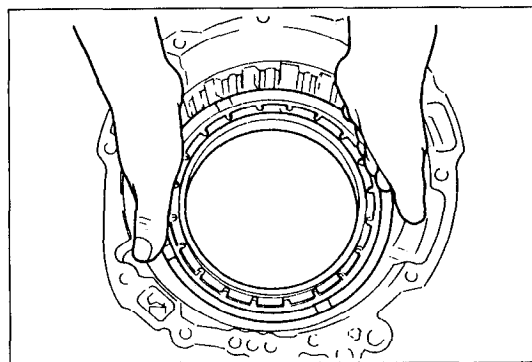
Low and reverse brake piston

1. Verify that there is no air leakage when applying compressed air through the oil hole opposite the return spring.
2. Verify that there is air flow when applying compressed air through the oil hole on the return spring side.

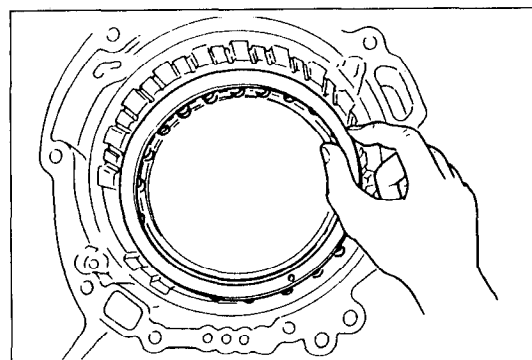
Air pressure: 392 kPa (4.0 kg/cm², 57 psi) max.



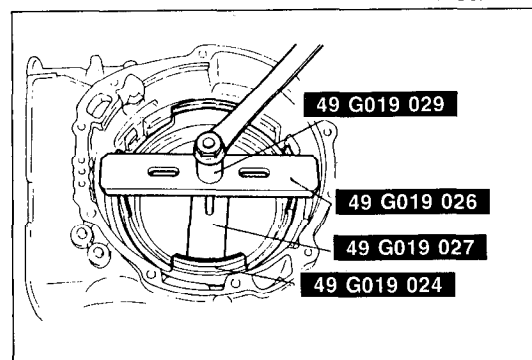
03U0KX-288



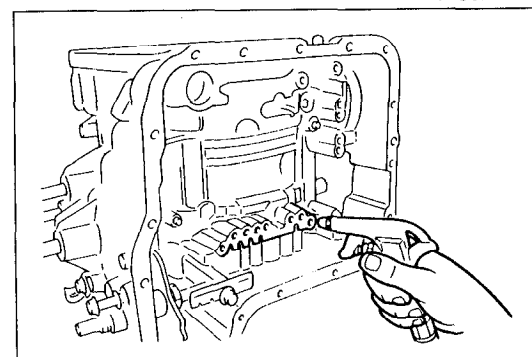
86U07B-388



03U0KX-289



03U0KX-290



03U0K2-184

Assembly procedure

1. Install the low and reverse brake piston.
 - (1) Apply ATF to the inner and outer seals, and install them onto the low and reverse brake piston.
 - (2) Face the outer seal lip toward the inside by gently rolling it down around the circumference for easier installation into the case.
 - (3) Install the low and reverse brake piston by pushing evenly around the circumference, being careful not to damage the outer seal.

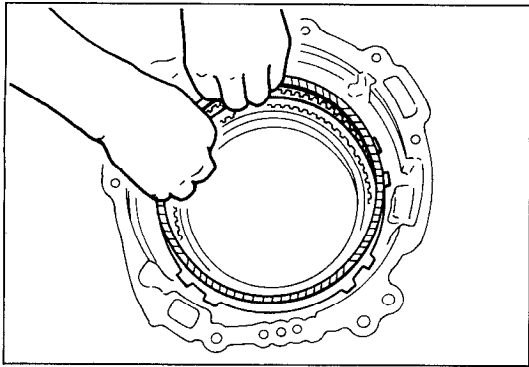
2. Install the spring and retainer assembly.

3. Install the **SST** in the transaxle case.
4. Compress the spring and retainer assembly.
5. Install the snap ring with snap-ring pliers.
6. Remove the **SST**.

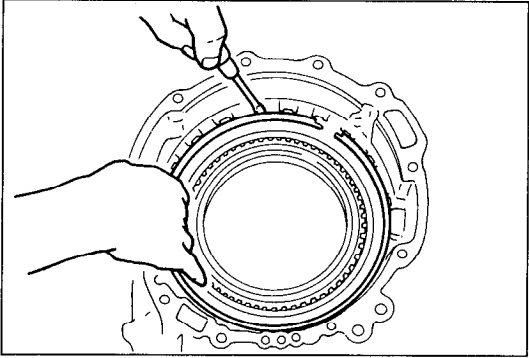
Caution

- The compressed air must be under 392 kPa (4.0 kg/cm², 57 psi) and not applied for over 3 seconds.

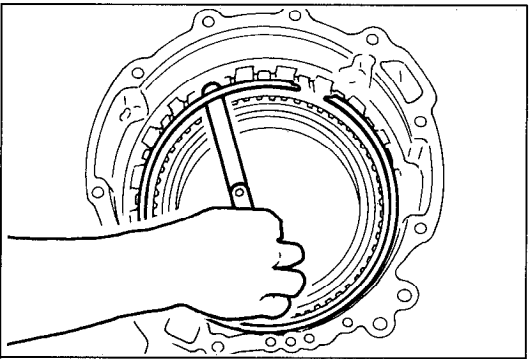
7. Check the low and reverse brake piston operation.
 - (1) Check that no bubbles come from between the piston and seals when applying compressed air through the fluid passage.



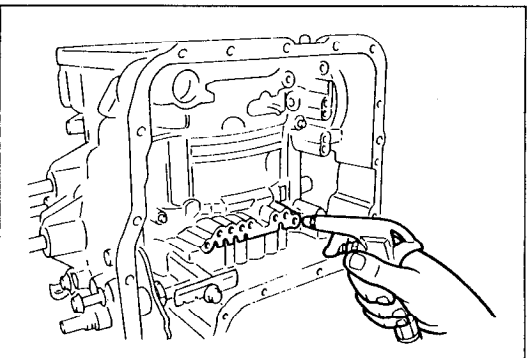
03U0KX-292



03U0KX-293



03U0K2-185



03U0KX-295

Note

- Installation order:
Driven-Drive-Driven-Drive-Driven-Drive-Driven-Drive

8. Install the drive and driven plates.

9. Install the retaining plate.

10. Install the snap ring.

11. Measure the low and reverse brake clearance.

- (1) Measure the clearance between the snap ring and the low and reverse brake retaining plate.
- (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

**Low and reverse brake clearance:
2.1—2.4mm (0.083—0.094 in)**

Retaining plate sizes

mm (in)

10.0 (0.3937)	10.2 (0.4016)	10.4 (0.4094)
10.6 (0.4173)	10.8 (0.4252)	


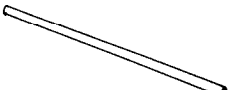
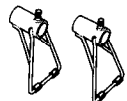
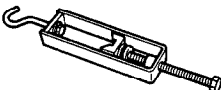

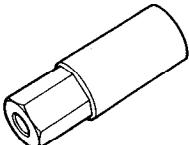

12. Check the low and reverse brake operation by applying compressed air through the fluid passage as shown in the figure.

Air pressure: 392 kPa (4.0 kg/cm², 57 psi)

2-4 BRAKE BAND, SERVO

Preparation

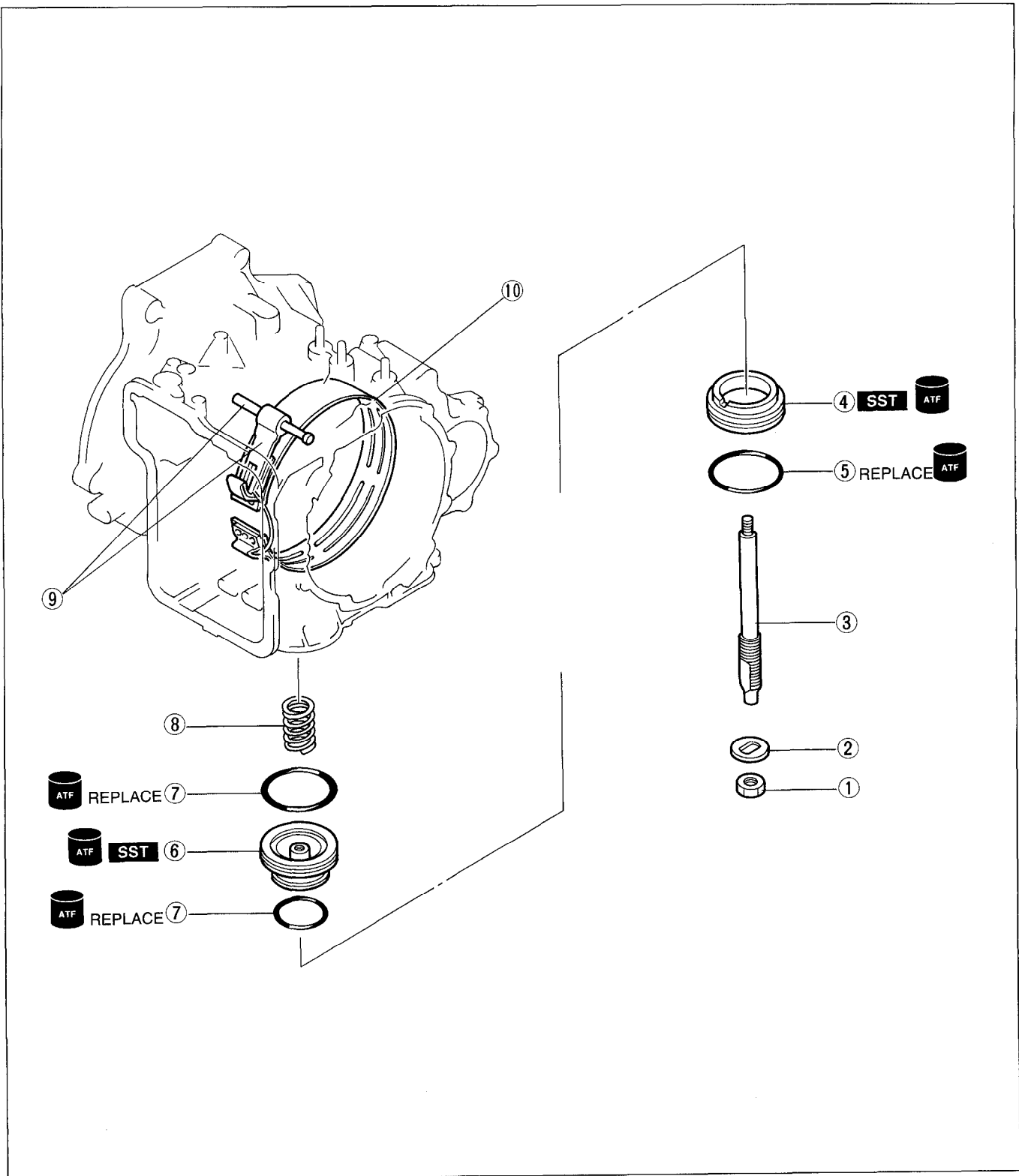
SST

<p>49 G017 5A0 Support, engine</p> 	<p>For support of engine</p>	<p>49 G017 501 Bar (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>
<p>49 G017 502 Support (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>	<p>49 G017 503 Hook (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>
<p>49 G019 028 Bolt</p> 	<p>For adjustment of 2-4 brake band</p>	<p>49 G019 029 Nut</p> 	<p>For adjustment of 2-4 brake band</p>
<p>49 G019 030 Plate</p> 	<p>For adjustment of 2-4 brake band</p>	<p>03U0K2-186</p>	

03U0K2-186

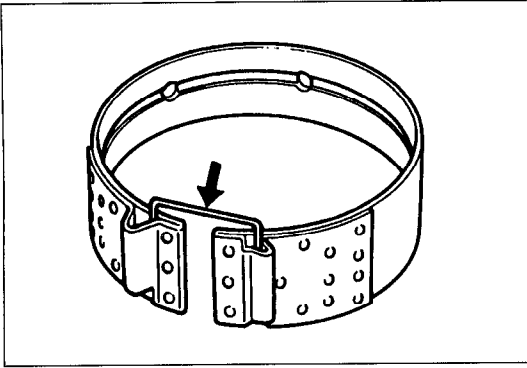
Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



03U0K2-187

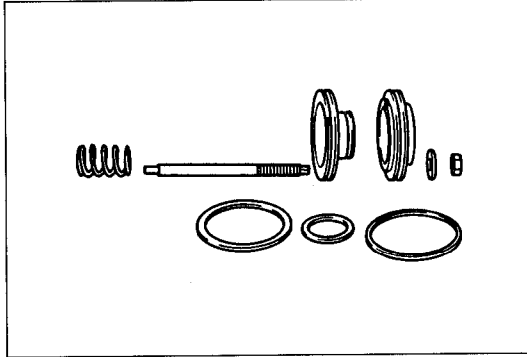
- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Bolt 2. Washer 3. Piston stem 4. Servo retainer 5. O-ring | <ol style="list-style-type: none"> 6. Servo piston 7. D-rings 8. Return servo spring 9. Anchor strut and shaft 10. 2-4 brake band |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0K2-188

Inspection 2-4 brake band

Check the following and replace if necessary.
1. Damaged or worn 2-4 brake band

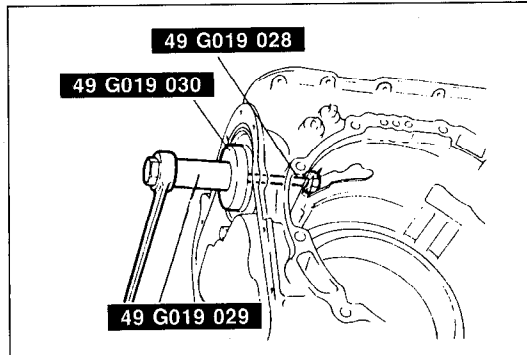


03U0K2-189

Band Servo

Check the following and replace any faulty parts.
1. Damaged or worn piston
2. Weakened return spring

Free length of spring: 42.0mm (1.654 in)

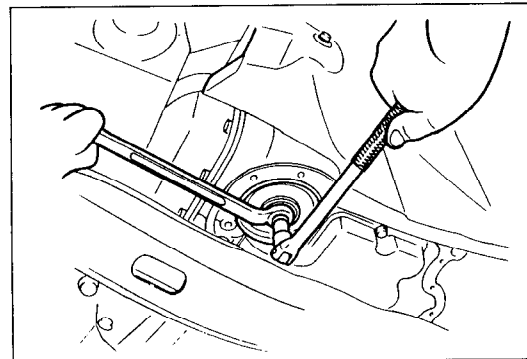


03U0K2-190

Assembly note

Band servo

1. Install the servo to the transaxle case.
 - (1) Install the servo spring and servo.
 - (2) Compress the servo with the **SST**.
 - (3) Install the snap ring.
 - (4) Remove the **SST**.
 - (5) Install the piston stem.



03U0K2-312

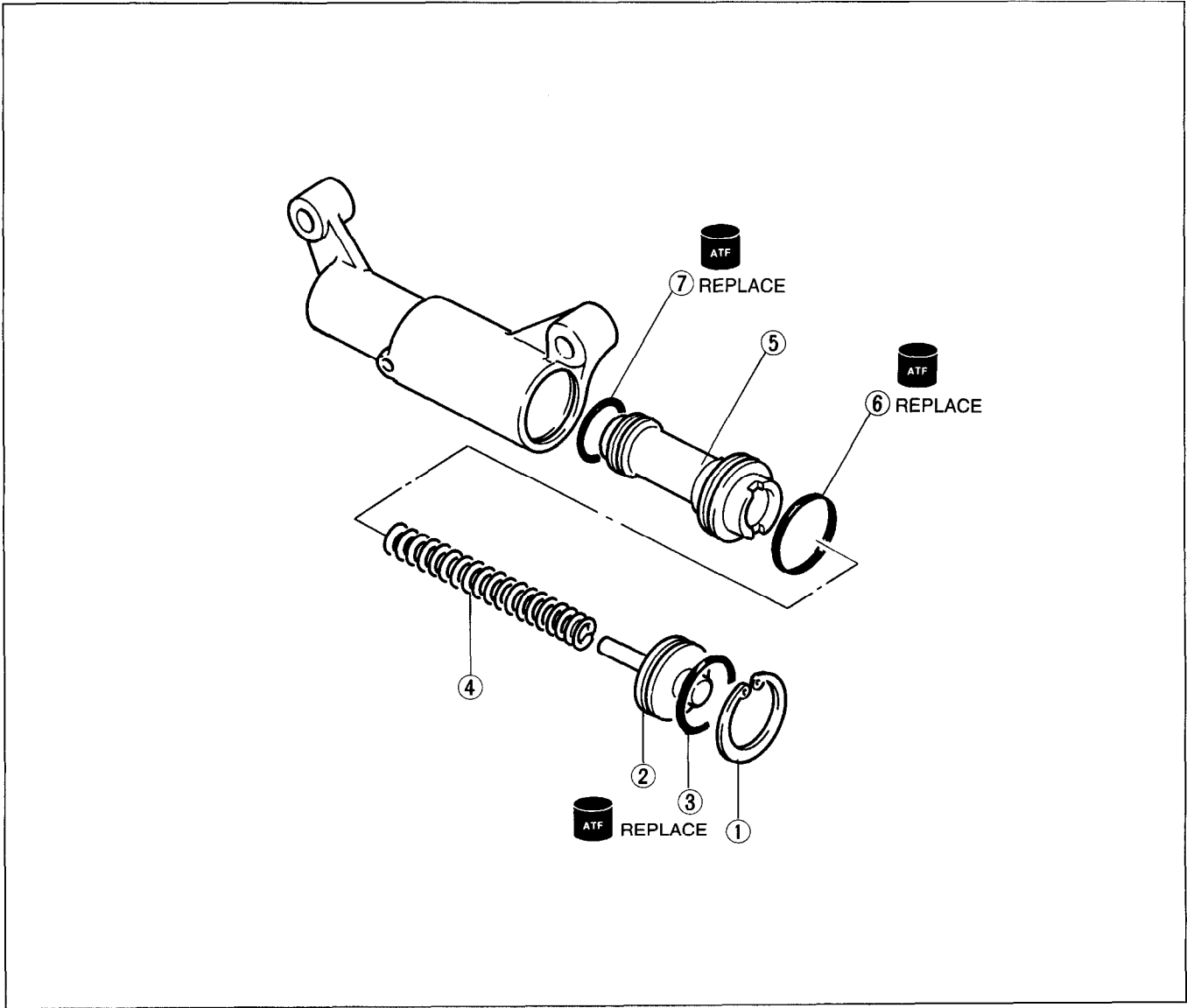
Adjustment of 2-4 brake band

1. Remove the oil pan. (Refer to page K2-158.)
2. Adjust the 2-4 brake band. (Refer to page K2-271.)

2-3 ACCUMULATOR

Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly referring to **Assembly Procedure**.



03U0K2-191

- | | |
|---------------------------|---------------------------|
| 1. Snap ring | 5. 2-3 accumulator piston |
| 2. Stopper plug | 6. Large seal ring |
| 3. O-ring | 7. Small seal ring |
| 4. 2-3 accumulator spring | |

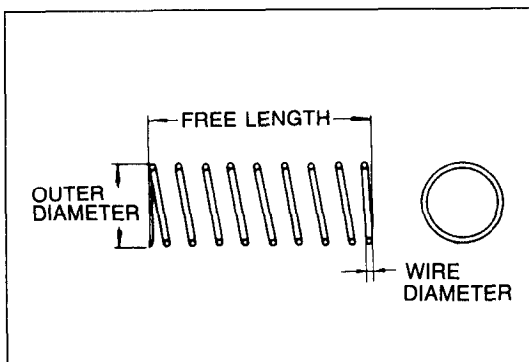
Inspection..... page K2-200

Inspection

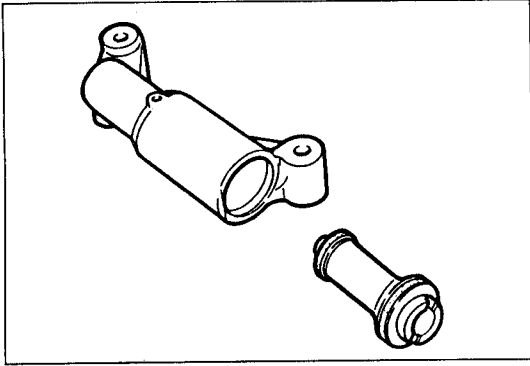
2-3 accumulator spring

1. Measure the spring free length.

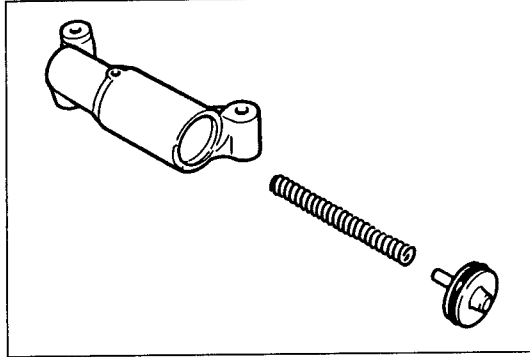
Free length of spring: 75.9mm (2.988 in)



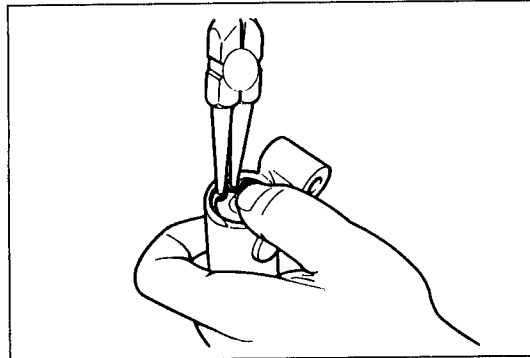
03U0K2-192



03U0K2-193



03U0K2-194



03U0K2-195

Assembly procedure

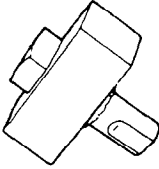
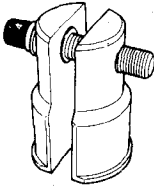
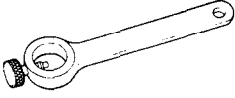
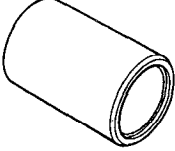
1. Apply ATF to new large seal ring and small seal ring; then install them to the accumulator piston.
2. Install the 2-3 accumulator piston.

3. Install the spring to the piston.
4. Apply ATF to new O-ring, and install it onto the stopper plug.
5. Install the stopper plug.

6. Install the snap ring while holding in the stopper plug.

IDLER GEAR (TRANSAXLE)

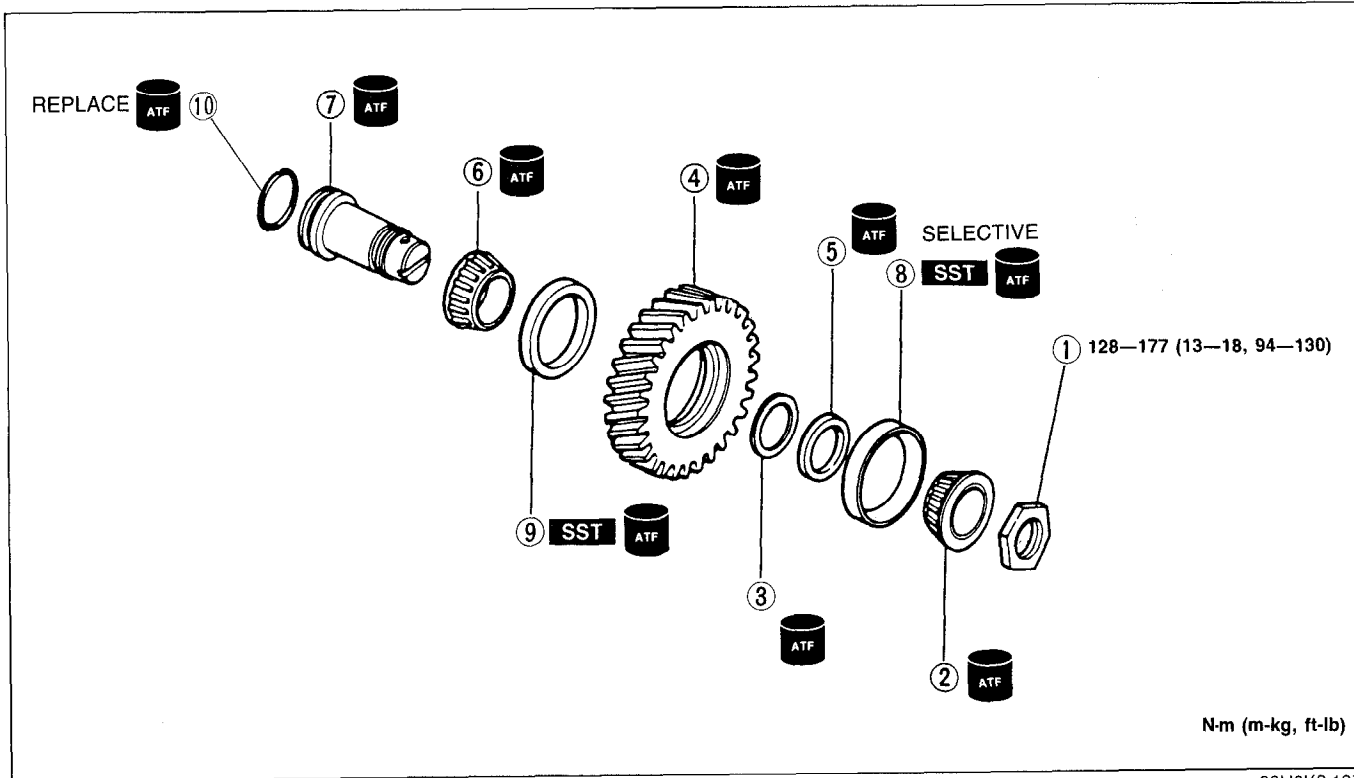
Preparation SST

<p>49 FT01 439</p> <p>Holder, idler gear shaft</p> 	<p>For adjustment of bearing preload</p>	<p>49 G019 013</p> <p>Bearing remover</p> 	<p>For removal of bearing</p>
<p>49 0180 510B</p> <p>Attachment, steering worm bearing preload measuring</p> 	<p>For adjustment of bearing preload</p>	<p>49 S120 785</p> <p>Installer, boot</p> 	<p>For installation of bearing outer race</p>

03U0K2-196

Disassembly / Assembly

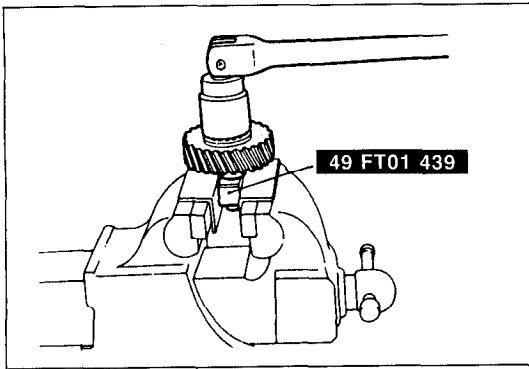
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



N·m (m·kg, ft·lb)

03U0K2-197

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Locknut
Disassembly note page K2-203 2. Bearing
Inspect for wear and rough rotation 3. Spacer 4. Idler gear
Inspect for wear and cracks 5. Adjust shim
Adjustment of bearing preload 6. Bearing
Inspect for wear and rough rotation | <ol style="list-style-type: none"> 7. Idler shaft
Inspect for wear and rough rotation 8. Bearing outer race
Disassembly note page K2-203
Inspect bearing surface for scoring and scratches 9. Bearing outer race
Disassembly note page K2-203
Inspect bearing surface for scoring and scratches 10. O-ring |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0KX-319

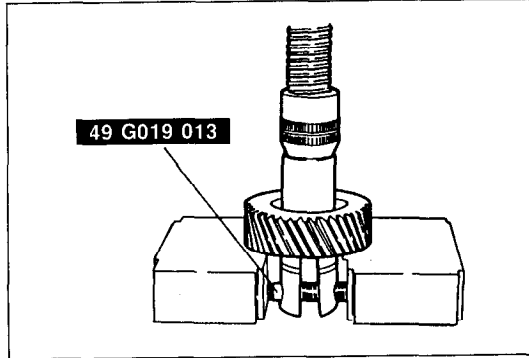
Disassembly note

Locknut

Note

- Use protective plates in the vise to prevent damage to the SST.

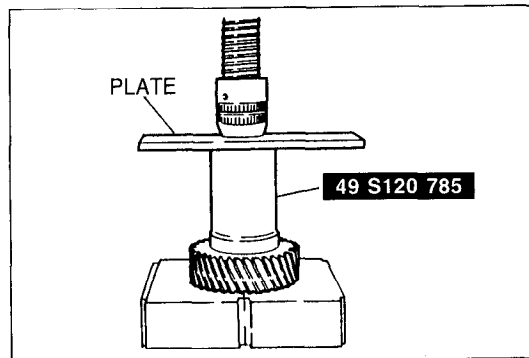
1. Secure the idler shaft in a vise with the **SST**, and remove the locknut.



03U0KX-320

Bearing outer race

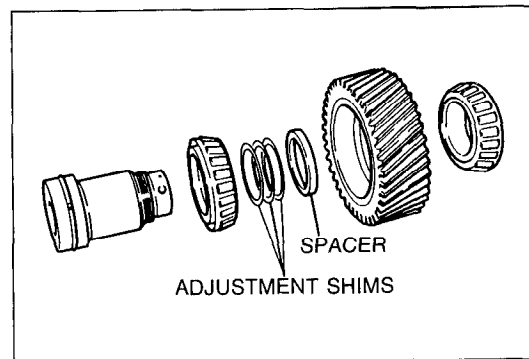
1. Remove the bearing outer race from the idler gear with the **SST**.



03U0KX-321

Assembly procedure

1. Press the bearing outer races in with the **SST**.



03U0KX-322

2. Install the idler gear bearing onto the idler shaft, then install the idler gear, adjustment shims, spacer, and bearing.

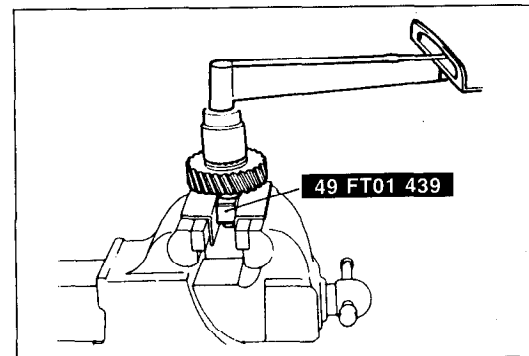
Note

- Use protective plates in the vise to prevent damage to the SST.

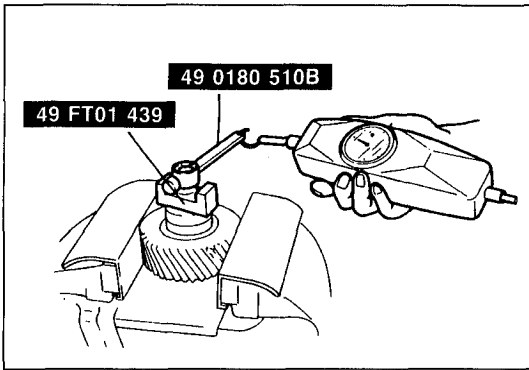
3. Secure the idler shaft in a vise with the **SST**, and tighten the locknut to the lower limit of the tightening torque.

Tightening torque:

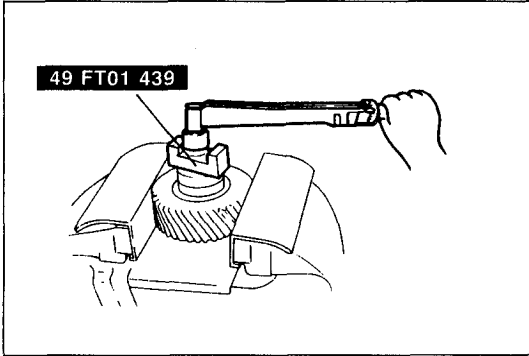
128—177 N·m (13—18 m·kg, 94—130 ft·lb)



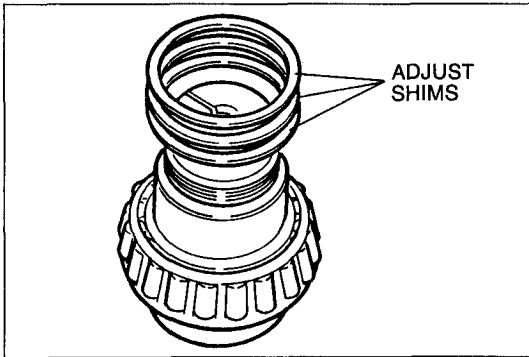
03U0KX-323



03U0KX-324



03U0KX-325



03U0KX-326

Note

- Use protective plates in the vise to prevent damage to the idler gear.

4. Check and adjust the idler gear bearing preload.
 - (1) Turn the idler gear assembly and **SST** over, and secure the gear in the vise.
 - (2) Attach the **SST** and spring scale or torque wrench, and measure the preload while tightening the locknut.

Note

- Read the preload when the idler shaft starts to turn.

Tightening torque:

128—177 N·m (13—18 m·kg, 94—130 ft·lb)

Preload:

0.03—0.9 N·m (0.3—9.0 cm·kg, 0.26—7.8 in·lb)

Value indicated on pull scale:

0.3—9 N (0.03—0.9 kg, 0.066—1.98 lb)

Note

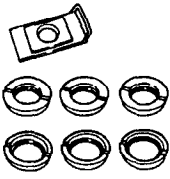
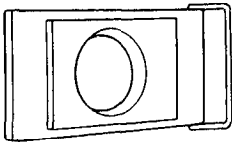
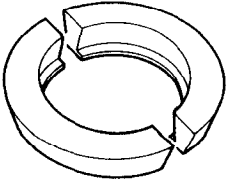
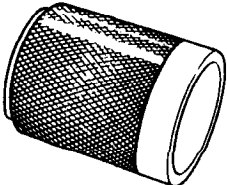
- The maximum allowable number of shims is 7.
- Preload is reduced by increasing the thickness of the shims, or increased by reducing the thickness.

5. If the specified preload cannot be obtained within the specified tightening torque, adjust by selecting the proper adjustment shims.

Thickness of shim			mm (in)
3.80 (0.150)	3.85 (0.152)	3.90 (0.154)	3.95 (0.156)
4.00 (0.158)	4.05 (0.159)	4.10 (0.161)	4.15 (0.163)
4.20 (0.165)	4.25 (0.167)	4.30 (0.169)	4.35 (0.171)
4.40 (0.173)	4.45 (0.175)	4.50 (0.177)	4.55 (0.179)
4.60 (0.181)	4.65 (0.183)	4.70 (0.185)	4.75 (0.187)

OUTPUT GEAR

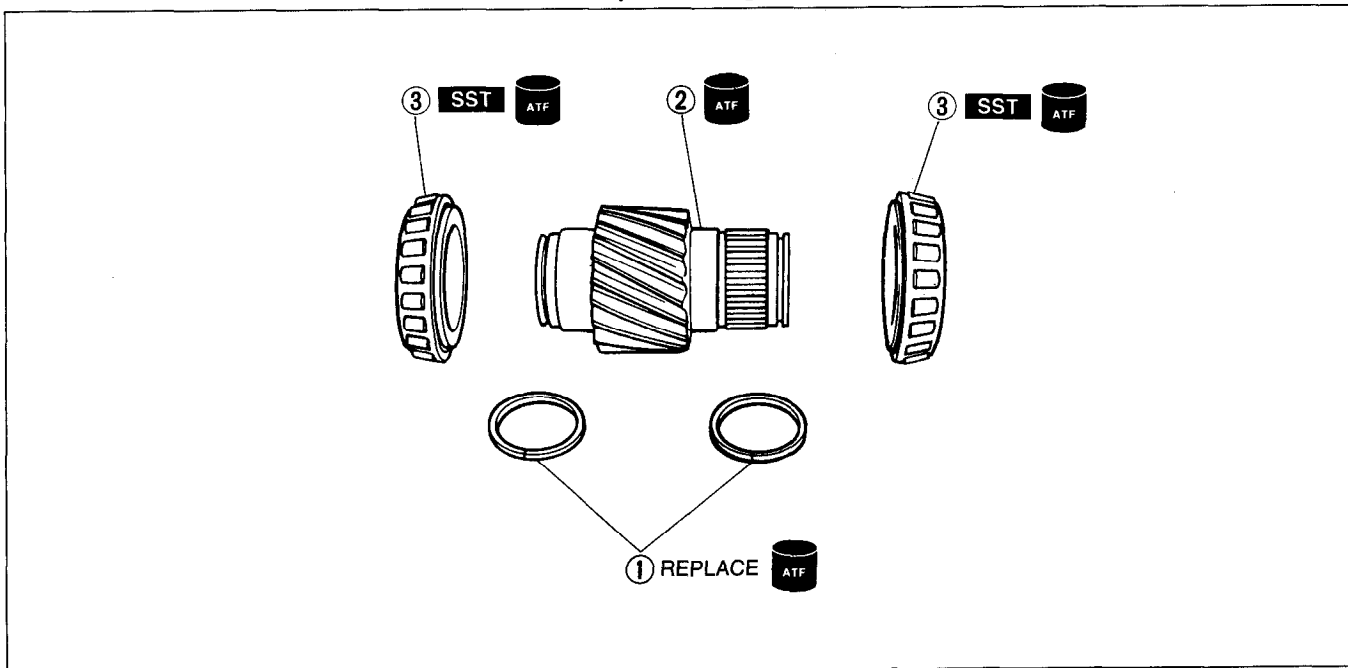
**Preparation
SST**

<p>49 B017 1A0</p> <p>Remover set, bearing</p> 	<p>For removal of bearing inner race</p>	<p>49 F401 366A</p> <p>Plate (Part of 49 B017 1A0)</p> 	<p>For removal of bearing inner race</p>
<p>49 G019 022</p> <p>Attachment K</p> 	<p>For removal of bearing inner race</p>	<p>49 G019 011</p> <p>Installer, bearing</p> 	<p>For installation of bearing inner race</p>

03U0KX-327

Disassembly / Assembly

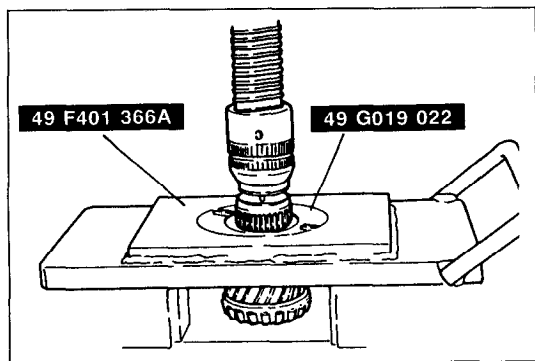
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



03U0K2-198

1. Seal rings
2. Output gear
Inspect for wear and cracks

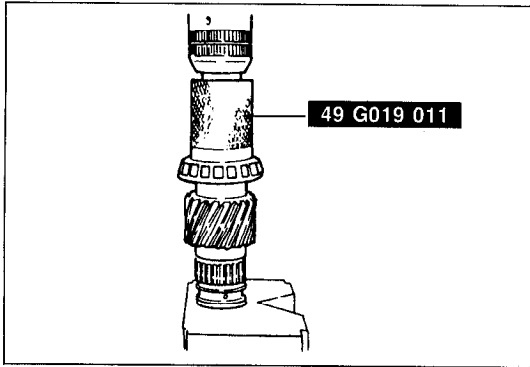
3. Bearings
Disassembly note page K2-205
Inspect for wear and rough rotation



03U0KX-329

**Disassembly note
Bearings**

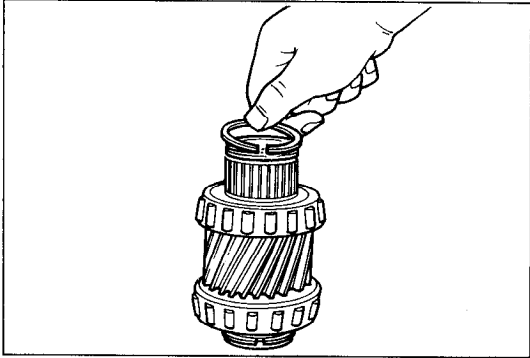
1. Remove the bearings from the output gear with the **SST**.



03U0KX-330

Assembly Procedure Bearings

1. Press the output gear bearings onto the output gear with the **SST**.



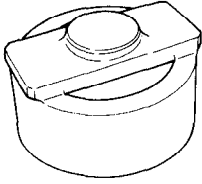
Seal rings

1. Install the seal rings to the output gear.

BEARING COVER ASSEMBLY

Preparation

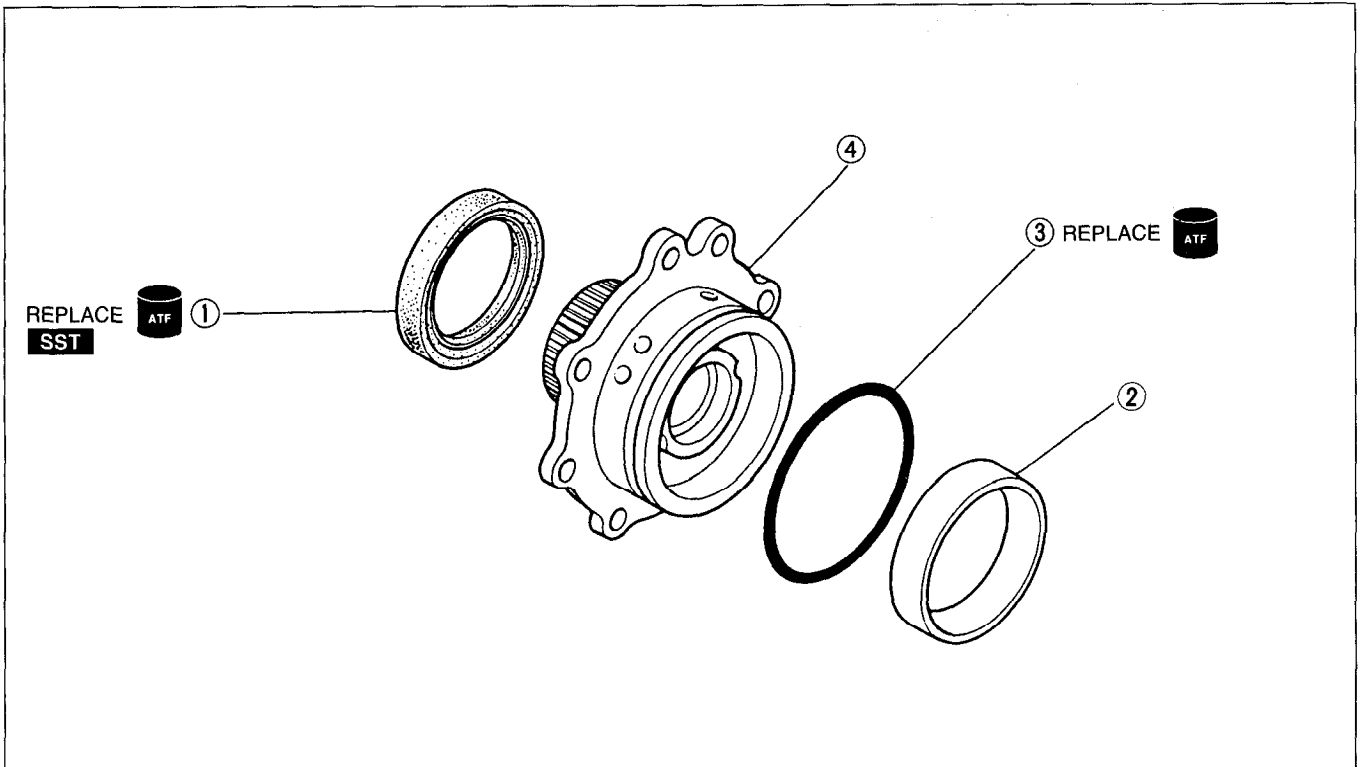
SST

<p>49 G019 017 Installer, oil seal</p>		<p>For installation of bearing outer race</p>
--------------------------------------------	-----------------------------------------------------------------------------------	-----------------------------------------------

03U0KX-332

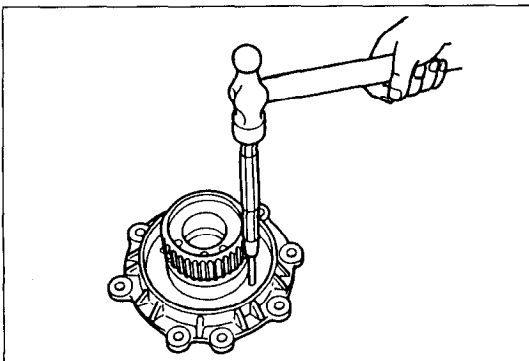
Disassembly / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



03U0K2-199

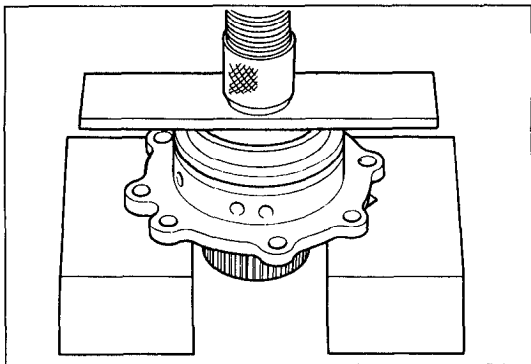
- | | |
|----------------------------------------------|---------------------------------------|
| <p>1. Oil seal
2. Bearing outer race</p> | <p>3. O-ring
4. Bearing cover</p> |
|----------------------------------------------|---------------------------------------|
- Disassembly note page K2-207
Inspect bearing surface for scoring and scratches



03U0KX-334

Disassembly note
Bearing outer race

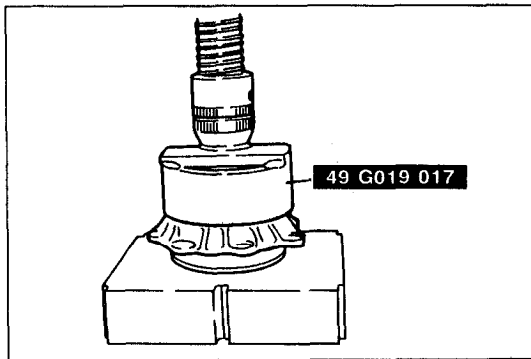
1. Remove the bearing outer race with a pin punch and hammer as shown.



03U0KX-335

Assembly procedure**Bearing outer race**

1. Press the bearing outer race into the cover.



03U0KX-336

Oil seal

1. Press the oil seal into the cover with the **SST**.

CONTROL VALVE BODY (DISASSEMBLY / INSPECTION)

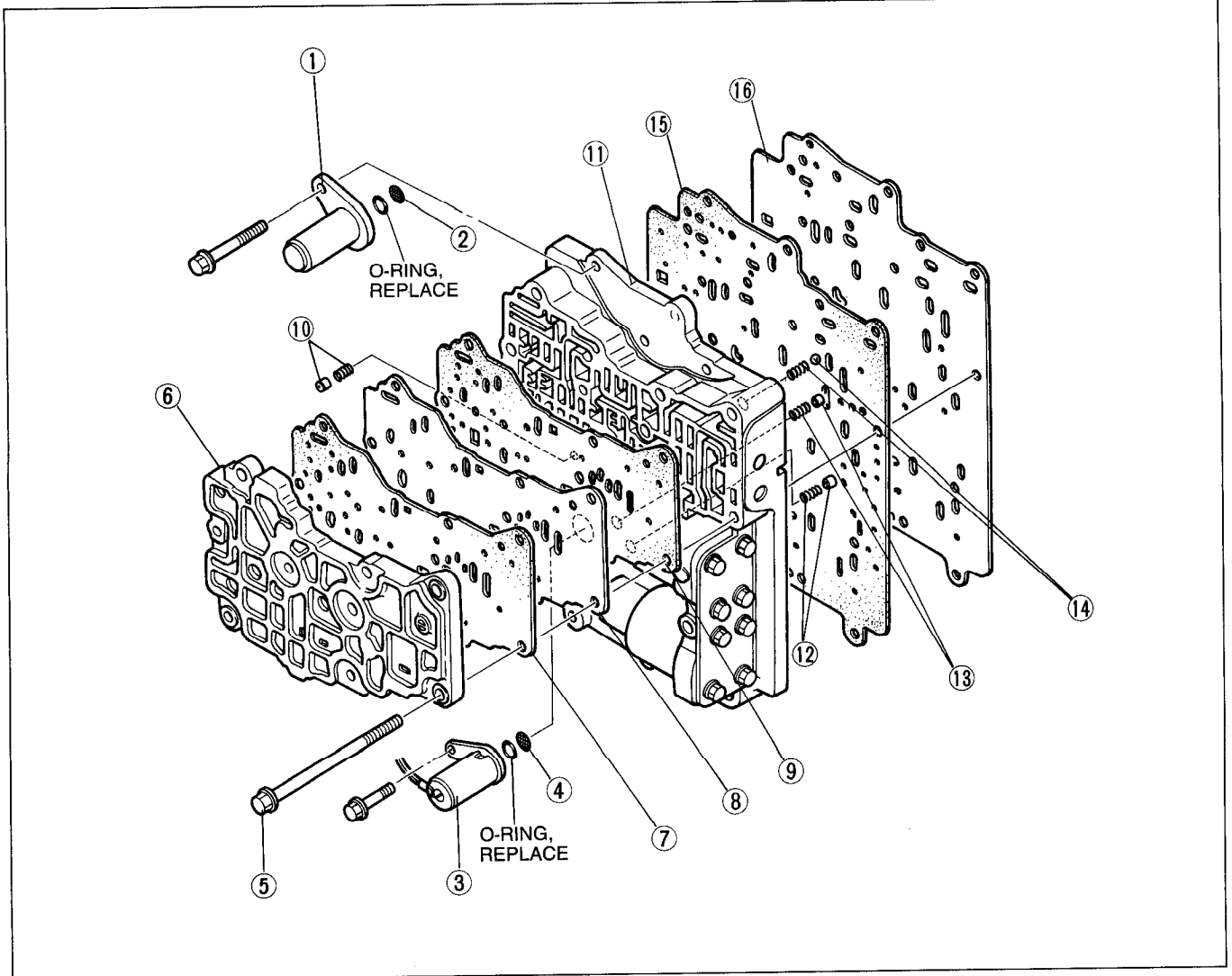
Disassembly / Inspection

Caution

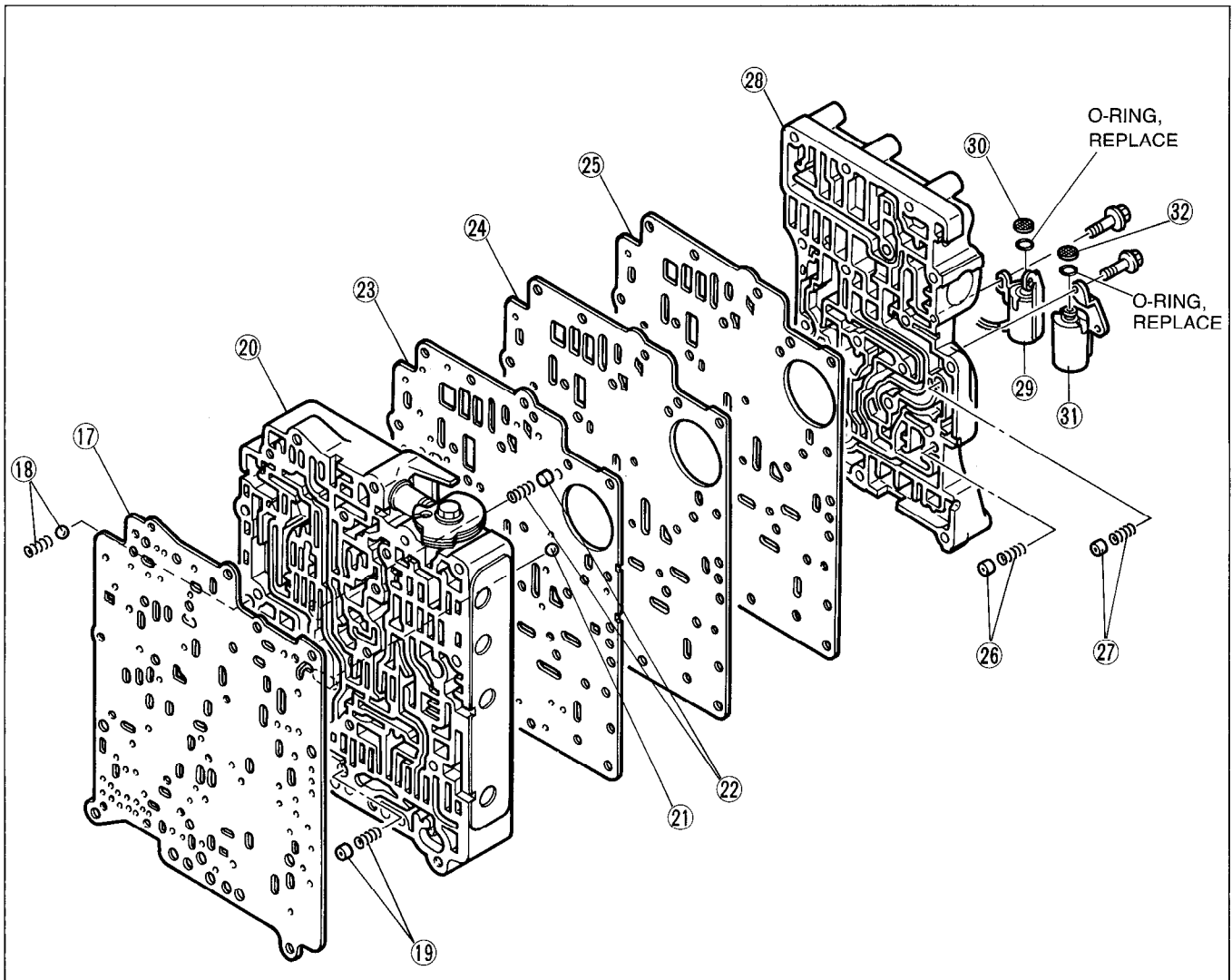
- Be especially careful when handling the control valve because it consists of the most precise and delicate parts of the transaxle.
- Neatly arrange the removed parts to avoid confusing the similar parts.
- Clean the removed parts with cleaning solvent, and dry them with compressed air. Clean out all holes and passages with compressed air.

1. Disassemble in the order shown in the figure, referring to **Disassembly Procedure**.
2. Inspect all parts and repair or replace as necessary.

03U0K2-200

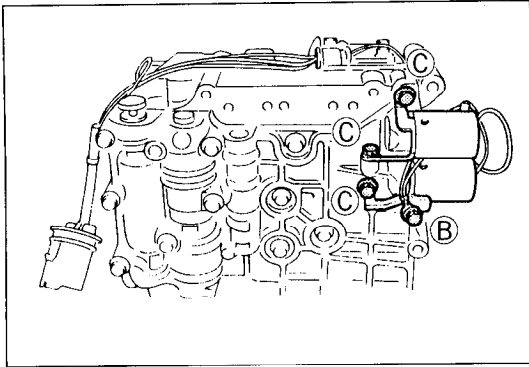


- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. 1-2 solenoid valve
Inspection..... page K2- 2. Oil strainer 3. 2-3 solenoid valve
Inspection..... page K2- 4. Oil strainer 5. Bolts 6. Front control body
Inspect for clogging and damage 7. Front/premain front gasket 8. Premain separator | <ol style="list-style-type: none"> 9. Front premain rear gasket 10. Orifice check valve and spring 11. Premain control body
Disassembly / Inspection /
Assembly..... page K2-214 12. Orifice check valve and spring 13. Orifice check valve and spring 14. Throttle relief ball and spring 15. Premain/main front gasket 16. Main separator |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0K2-201

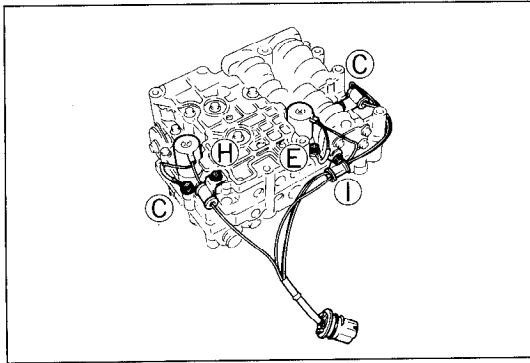
- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>17. Pre-main/main rear gasket</p> <p>18. Converter relief ball and spring</p> <p>19. Orifice check valve and spring</p> <p>20. Main control body
Disassembly / Inspection /
Assembly page K2-218</p> <p>21. Steel ball</p> <p>22. Orifice check valve and spring</p> <p>23. Main/rear front gasket</p> <p>24. Rear separator</p> <p>25. Main/rear rear gasket</p> | <p>26. Orifice check valve and spring</p> <p>27. Orifice check valve and spring</p> <p>28. Rear control valve body
Disassembly / Inspection /
Assembly page K2-222</p> <p>29. 3-4 solenoid valve
Inspection page K2-</p> <p>30. Oil strainer</p> <p>31. Lockup solenoid valve
Inspection page K2-</p> <p>32. Oil strainer</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0K2-202

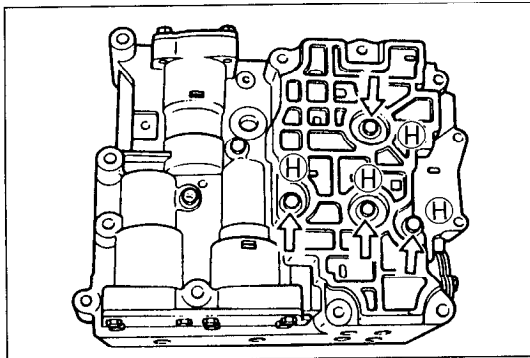
Disassembly Procedure

1. Remove the 3-4 solenoid valve and lockup solenoid valve.
2. Remove the O-rings and oil strainers.



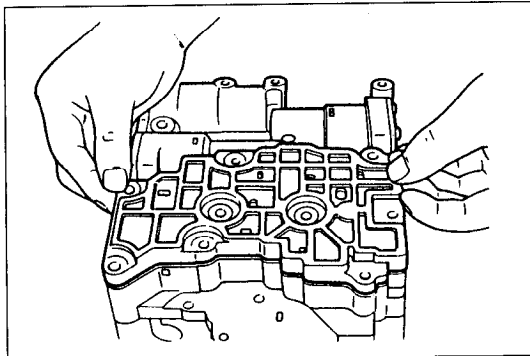
86U07B-268

3. Remove the 1-2 solenoid valve and 2-3 solenoid valve and wire harness.
4. Remove the O-rings and oil strainers.



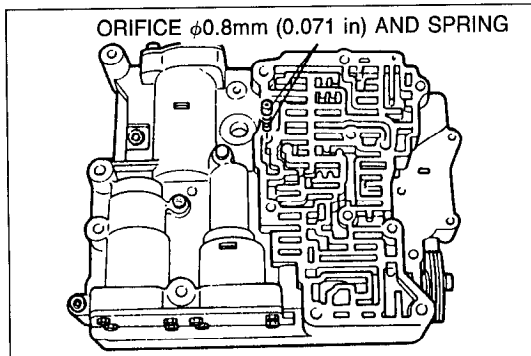
86U07B-269

5. Remove the front indicated bolts and pull out the front control body with premain separator as a unit.



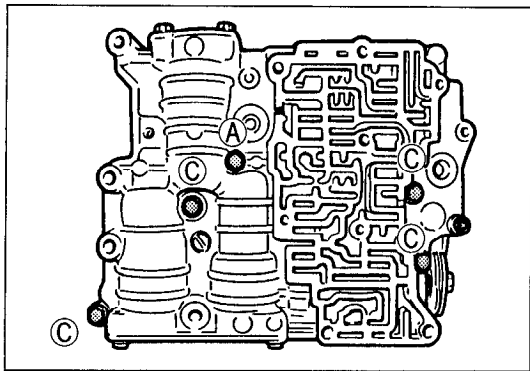
86U07B-270

6. Remove the front/premain gaskets and separator from the front control body.



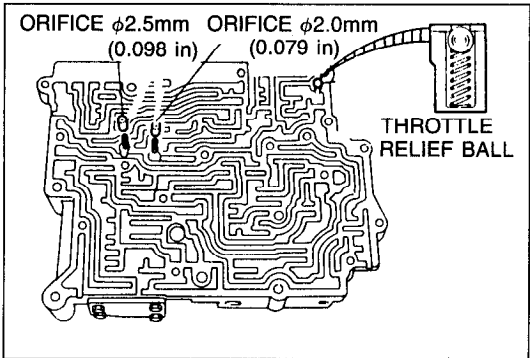
86U07B-271

7. Remove the orifice check valve ($\phi 0.8\text{mm}$, 0.071 in) and spring from the premain control body.



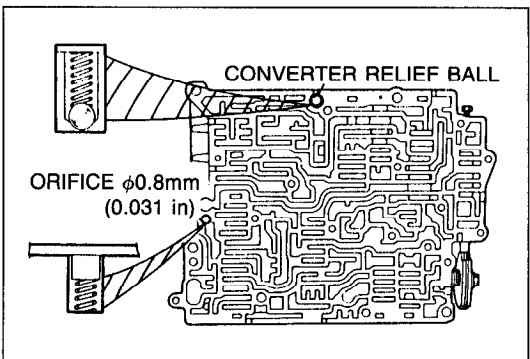
86U07B-272

- Remove the bolts and hexagonal head bolt and remove the premain control body and the main separator as a unit.



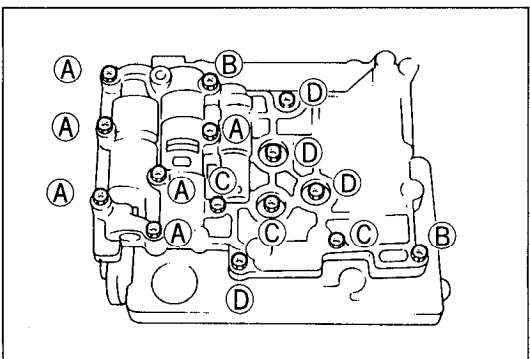
03U0K2-313

- Remove the premain/main gaskets and separator from the premain control body.
- Remove the orifice check valves ($\phi 2.0\text{mm}$, 0.079 in; $\phi 2.5\text{mm}$, 0.098 in) and springs, and the throttle relief ball and spring from the premain control body.



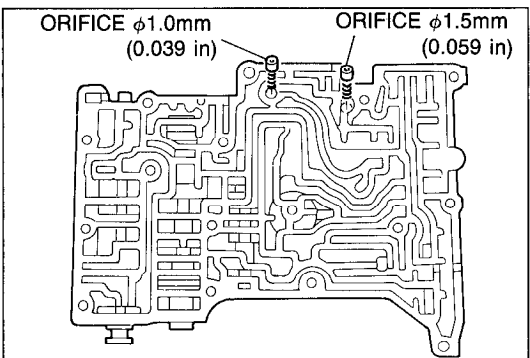
86U07B-274

- Remove the converter relief ball and spring, and the orifice check valve ($\phi 0.8\text{mm}$, 0.031 in) and spring from the main control body.



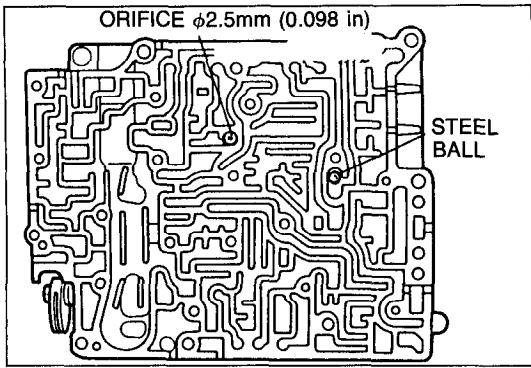
86U07B-275

- Turn the assembly over and remove the bolts shown in the figure. Remove the rear separator as a unit.



03U0K2-314

- Remove the main/rear gaskets and separator from the rear control body.
- Remove the orifice check valves ($\phi 1.5\text{mm}$, 0.059 in; $\phi 1.0\text{mm}$, 0.039 in) and spring from the rear control body.



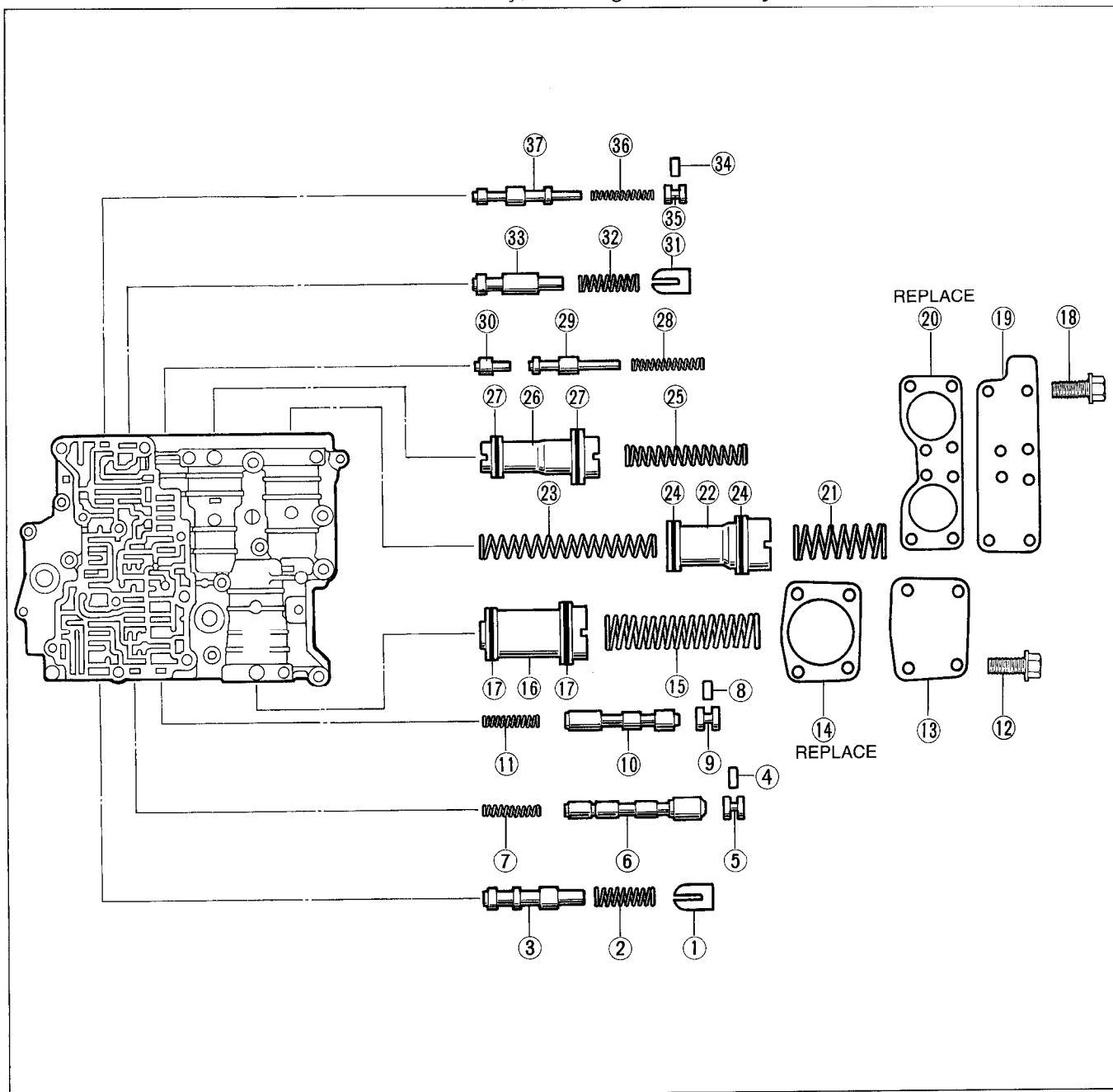
15. Remove the orifice check valve ($\phi 2.5\text{mm}$, 0.98 in) and spring and the steel ball from the main control body.

PREMAIN CONTROL VALVE BODY Disassembly / Inspection / Assembly

Caution

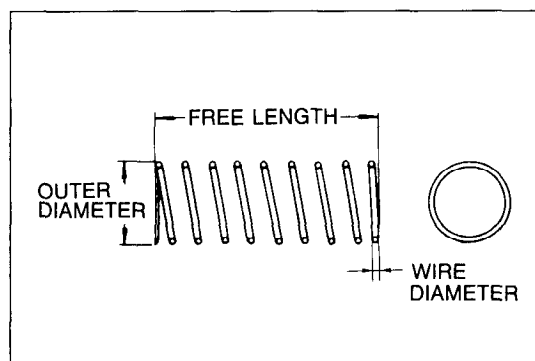
- Each valve should slide out/in under its own weight.
- When a valve will not slide out under its own weight, depending on the valve, push it out it with a wire or place the valve body open-side down and lightly tap it with a soft hammer. Never scratch or otherwise damage a valve surface or bore.
- Do not drop or lose the valves or internal parts.
- Before assembly, make sure all parts are thoroughly clean.
- Apply ATF to all parts and bores.
- Note the proper direction of the valves and internal parts.
- Do not reuse any part that has been dropped.
- Wrap a screwdriver or rod with a tape before using it to insert a valve.

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> 1. Retainer 2. 2-3 timing spring
Inspection page K2-215 3. 2-3 timing valve
Inspect for sticking, scoring and scratches 4. Stop pin 5. Stop plug 6. Servo control valve
Inspect for sticking, scoring and scratches 7. Servo control spring
Inspection page K2-215 8. Stop pin 9. Stop plug 10. Bypass valve
Inspect for sticking, scoring and scratches 11. Bypass spring
Inspection page K2-215 12. Bolts 13. 1-2 accumulator plate 14. Gasket 15. 1-2 accumulator spring
Inspection page K2-215 16. 1-2 accumulator piston 17. 1-2 accumulator seal rings 18. Bolts 19. N-R accumulator plate 20. Gasket | <ul style="list-style-type: none"> 21. N-R accumulator front spring
Inspection page K2-215 22. N-R accumulator piston 23. N-R accumulator rear spring
Inspection K2-215 24. N-R accumulator seal rings 25. N-D accumulator front spring
Inspection page K2-215 26. N-D accumulator piston 27. N-D accumulator seal rings 28. Coasting bypass spring
Inspection page K2-215 29. Coasting bypass valve
Inspect for sticking, and scratches 30. Coasting baypass plug 31. Retainer 32. 3-2 timing spring
Inspection page K2-215 33. 3-2 timing valve
Inspect for sticking, scoring and scratches 34. Stop pin 35. Stop plug 36. 3-2 capacity valve
Inspection page K2-215 37. 3-2 capacity valve
Inspect for sticking, scoring and scratches |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

03U0K2-204



03U0KX-358

Inspection

1. Measure the spring free length.
2. If not within specification, replace the spring(s).

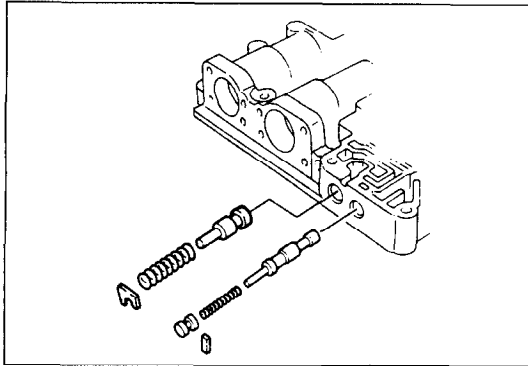
Spring	Item	Outer dia. mm (in)	Free length mm (in)	Wire dia. mm (in)	Spring color
1-2 accumulator spring		16.0 (0.630)	72.1 (2.839)	2.2 (0.087)	—
Bypass, servo control spring		4.9 (0.193)	27.6 (1.087)	0.55 (0.022)	Yellow
2-3 timing spring		*6.7 (0.263)	26.5 (1.043)	0.8 (0.031)	—
N-R accumulator rear spring		11.1 (0.437)	62.0 (2.441)	1.2 (0.047)	Light green
N-D accumulator front spring		9.8 (0.386)	60.9 (2.398)	1.1 (0.043)	Yellow
Coasting bypass spring		5.8 (0.228)	37.7 (1.484)	0.6 (0.024)	Dark blue
3-2 timing spring		*6.6 (0.260)	28.6 (1.126)	0.8 (0.031)	Red
3-2 capacity spring		*4.4 (0.173)	30.6 (1.205)	0.5 (0.020)	White
Throttle relief ball spring		6.6 (0.260)	21.6 (0.850)	0.8 (0.031)	—

* Inner diameter

03U0K2-205

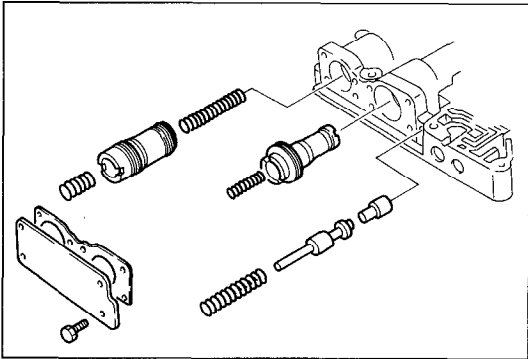
Assembly Procedure

1. Install the 3-2 capacity valve, 3-2 capacity spring, and stopper plug; then install the stopper pin.
2. Install the 3-2 timing valve, the 3-2 timing spring, and re-
tainer.



03U0K2-206

3. Install the coasting bypass plug, coasting bypass valve and coasting bypass spring.
4. Apply ATF to the O-rings, and install them to the piston; then insert the N-R accumulator rear spring and N-R accumulator piston.
5. Apply ATF to the O-rings, and install them to the piston; then insert the N-D accumulator piston and N-D accumulator front spring.

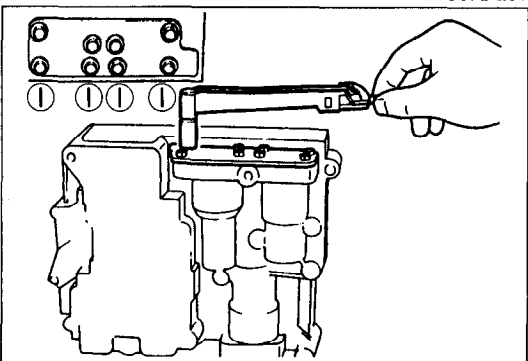


86U07B-281

6. Install the N-R accumulator gasket and plate; then tighten the plate.

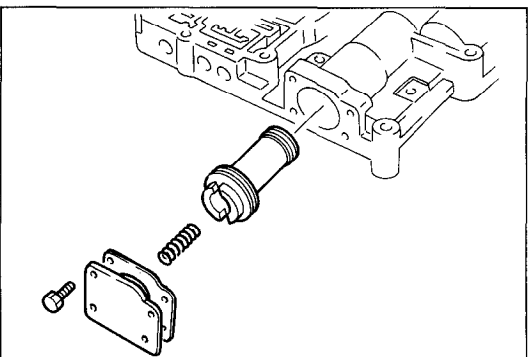
Tightening torque:

6—8 N·m (66—80 cm·kg, 57—69 in·lb)



86U07B-282

7. Apply ATF to the O-rings, and install them onto the piston; then install the 1-2 accumulator piston and 1-2 accumulator springs.

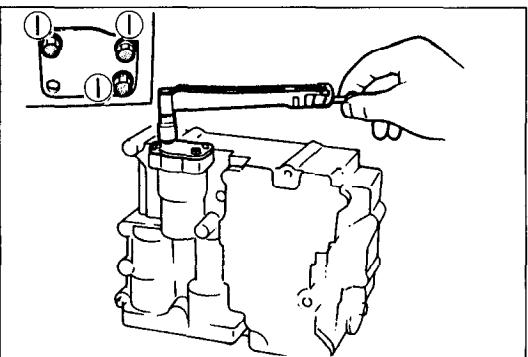


86U07B-283

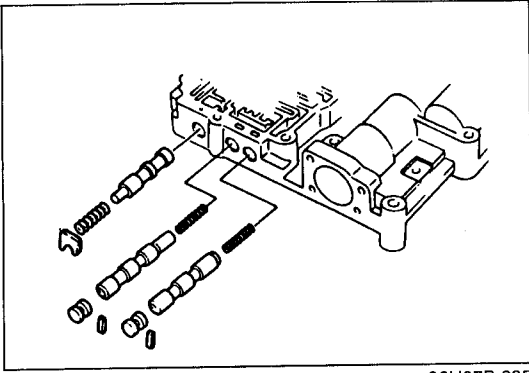
8. Install the 1-2 accumulator gasket and plate; then tighten the plate.

Tightening torque:

6—8 N·m (66—80 cm·kg, 57—69 in·lb)



86U07B-284



86U07B-285

9. Install the bypass spring, bypass valve, stopper plug, and stopper pin.
10. Install the servo control spring, servo control valve, stopper plug, and stopper pin.
11. Install the 2-3 timing valve, 2-3 timing spring, and retainer.

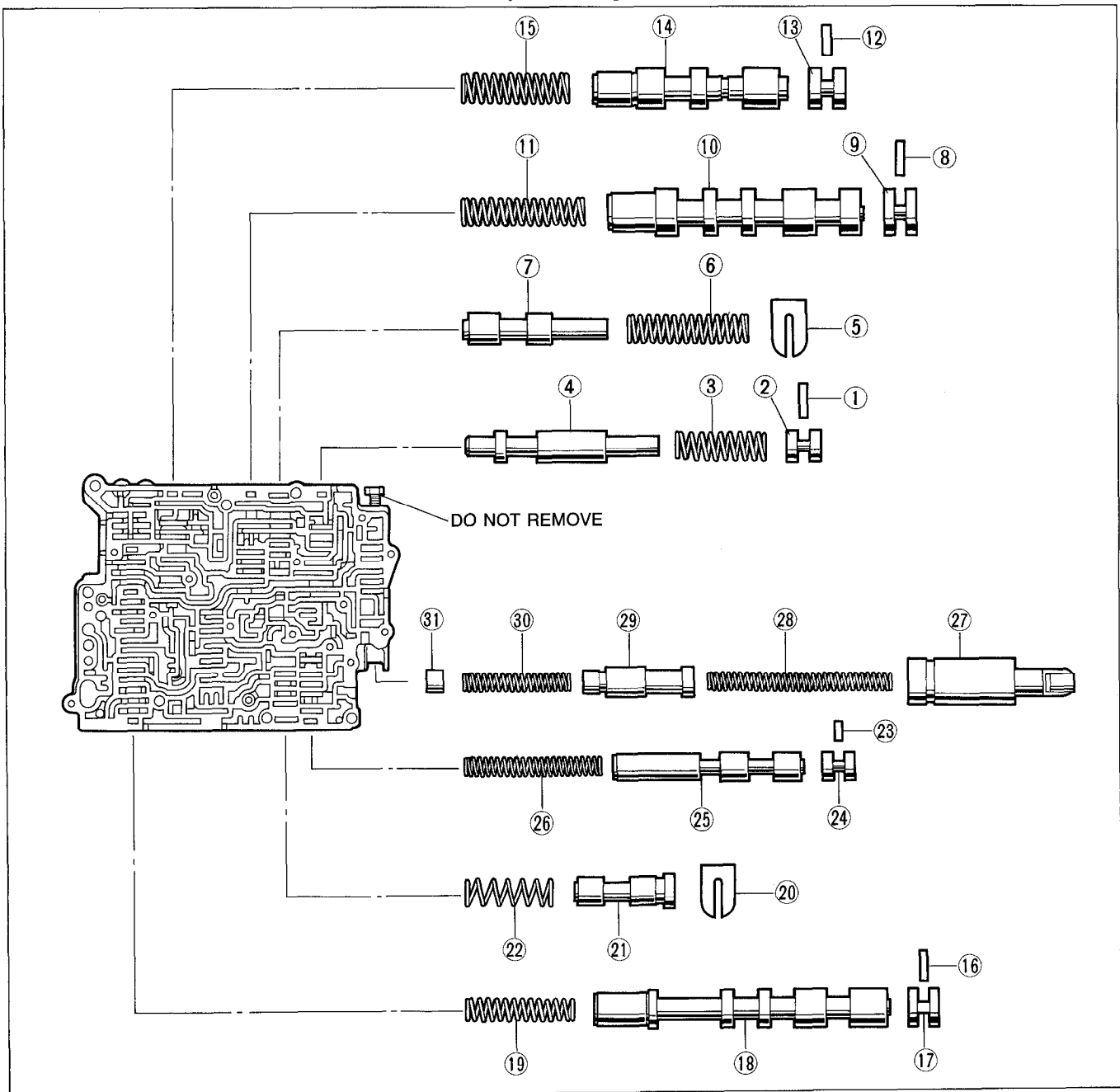
MAIN CONTROL VALVE BODY

Disassembly / Inspection / Assembly

Caution

- Each valve should slide out/in under its own weight.
- When a valve will not slide out under its own weight, depending on the valve, push it out it with a wire or place the valve body open-side down and lightly tap it with a soft hammer. Never scratch or otherwise damage a valve surface or bore.
- Do not drop or lose the valves or internal parts.
- Before assembly, make sure all parts are thoroughly clean.
- Apply ATF to all parts and bores.
- Note the proper direction of the valves and internal parts.
- Do not reuse any part that has been dropped.
- Wrap a screwdriver or rod with a tape before using it to insert a valve.

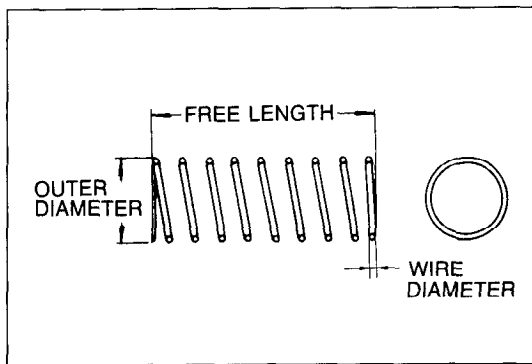
1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.



03U0K2-207

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> 1. Stop pin 2. Stop plug 3. Pressure modifier spring
Inspection page K2-219 4. Pressure modifier valve
Inspect for sticking, scoring and scratches 5. Retainer 6. Low reducing spring
Inspection page K2-219 7. Low reducing valve
Inspect for sticking, scoring and scratches 8. Stop pin 9. Stop plug 10. 1-2 shift valve
Inspect for sticking, scoring and scratches 11. 1-2 shift spring
Inspection page K2-219 12. Stop pin 13. Stop plug 14. 2-3 shift valve
Inspect for sticking, scoring and scratches 15. 2-3 shift spring
Inspection page K2-219 16. Stop pin 17. Stop plug | <ul style="list-style-type: none"> 18. 3-4 shift valve
Inspect for sticking, scoring and scratches 19. 3-4 shift spring
Inspection page K2-219 20. Retainer 21. Throttle back-up valve
Inspect for sticking, scoring and scratches 22. Throttle back-up spring
Inspection K2-219 23. Stop pin 24. Stop plug 25. Throttle modulator valve
Inspect for sticking, scoring and scratches 26. Throttle modulator spring
Inspection page K2-219 27. Throttle plug assembly
Inspect for sticking, scoring and scratches 28. Throttle spring
Inspection page K2-219 29. Throttle valve
Inspect for sticking, scoring and scratches 30. Throttle assist spring
Inspection page K2-219 31. Throttle adjust plug |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

03U0K2-208



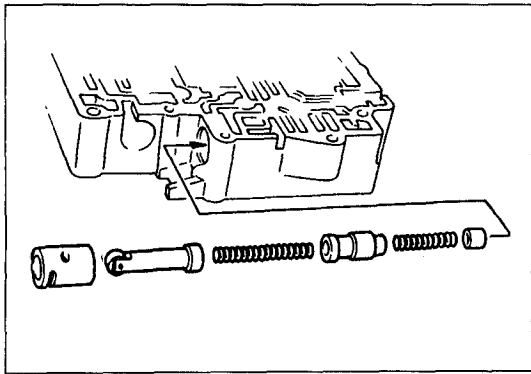
03U0KX-358

Inspection

1. Measure the spring free length.
2. If not within specification, replace the spring(s).

Spring	Item	Outer dia. mm (in)	Free length mm (in)	No. of coils	Wire dia. mm (in)
Pressure modifier spring		8.3 (0.327)	26.5 (1.043)	0.8 (0.031)	—
Low reducing spring		8.7 (0.343)	38.3 (1.508)	0.9 (0.035)	Black
1-2 shift spring		8.7 (0.343)	41.3 (1.626)	1.0 (0.039)	Yellow
2-3, 3-4 shift spring		7.4 (0.291)	36.6 (1.441)	0.8 (0.031)	Gray
Throttle back-up spring		9.65 (0.380)	26.9 (1.059)	0.55 (0.022)	Red
Throttle modulator spring		6.3 (0.248)	47.9 (1.886)	0.8 (0.031)	—
Throttle assist spring		5.15 (0.203)	32.3 (1.272)	0.55 (0.022)	Dark green
Throttle spring		5.4 (0.213)	47.2 (1.858)	0.8 (0.031)	Pink
Converter relief ball spring		*5.1 (0.200)	24.1 (0.949)	0.9 (0.035)	Maroon
Orifice check valve spring		5.0 (0.197)	12.5 (0.492)	0.23 (0.009)	—

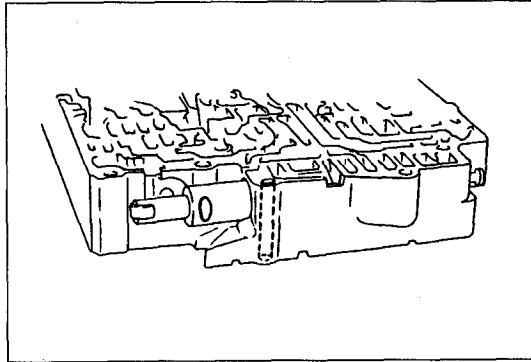
03U0K2-209



03U0K2-210

Assembly Procedure

1. Install the throttle adjust plug, throttle assist spring, throttle valve, and throttle plug assembly.

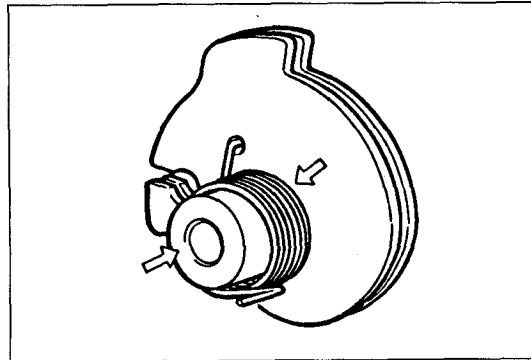


86U07B-289

Caution

- Install the throttle plug assembly with the groove aligned with the bolt hole.

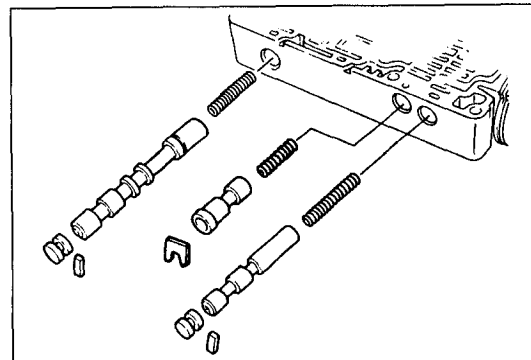
2. Install the throttle return spring as shown.
3. Install the throttle lever assembly to the main control body.



96U07B-052

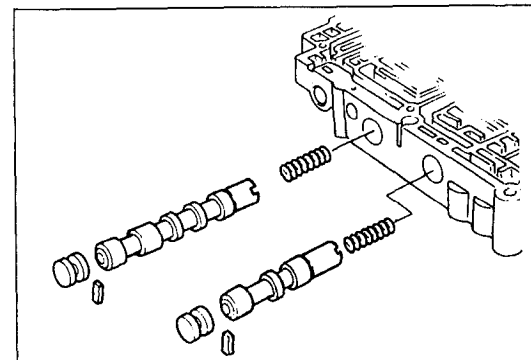
Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)



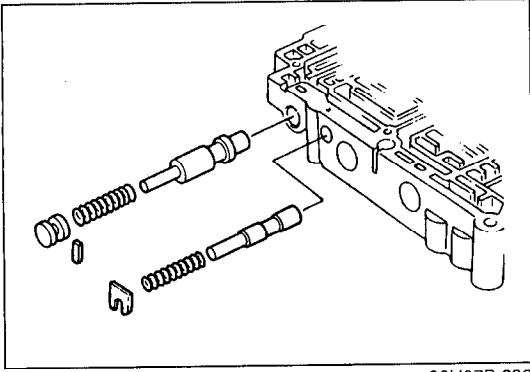
86U07B-291

4. Install the throttle modulator spring, throttle modulator valve, stopper plug, and stopper pin.
5. Install the throttle backup spring, throttle back valve, and retainer.
6. Install the 3-4 shift spring, 3-4 shift valve, stopper plug, and stopper pin.



86U07B-292

7. Install the 2-3 shift spring, 2-3 shift valve, stopper plug, and stopper pin.
8. Install the 1-2 shift spring, 1-2 shift valve, stopper plug, and stopper pin.



86U07B-293

9. Install the low reducing valve, low reducing spring, and retainer.
10. Install the pressure modifier valve, pressure modifier spring, stopper plug, and stopper pin.

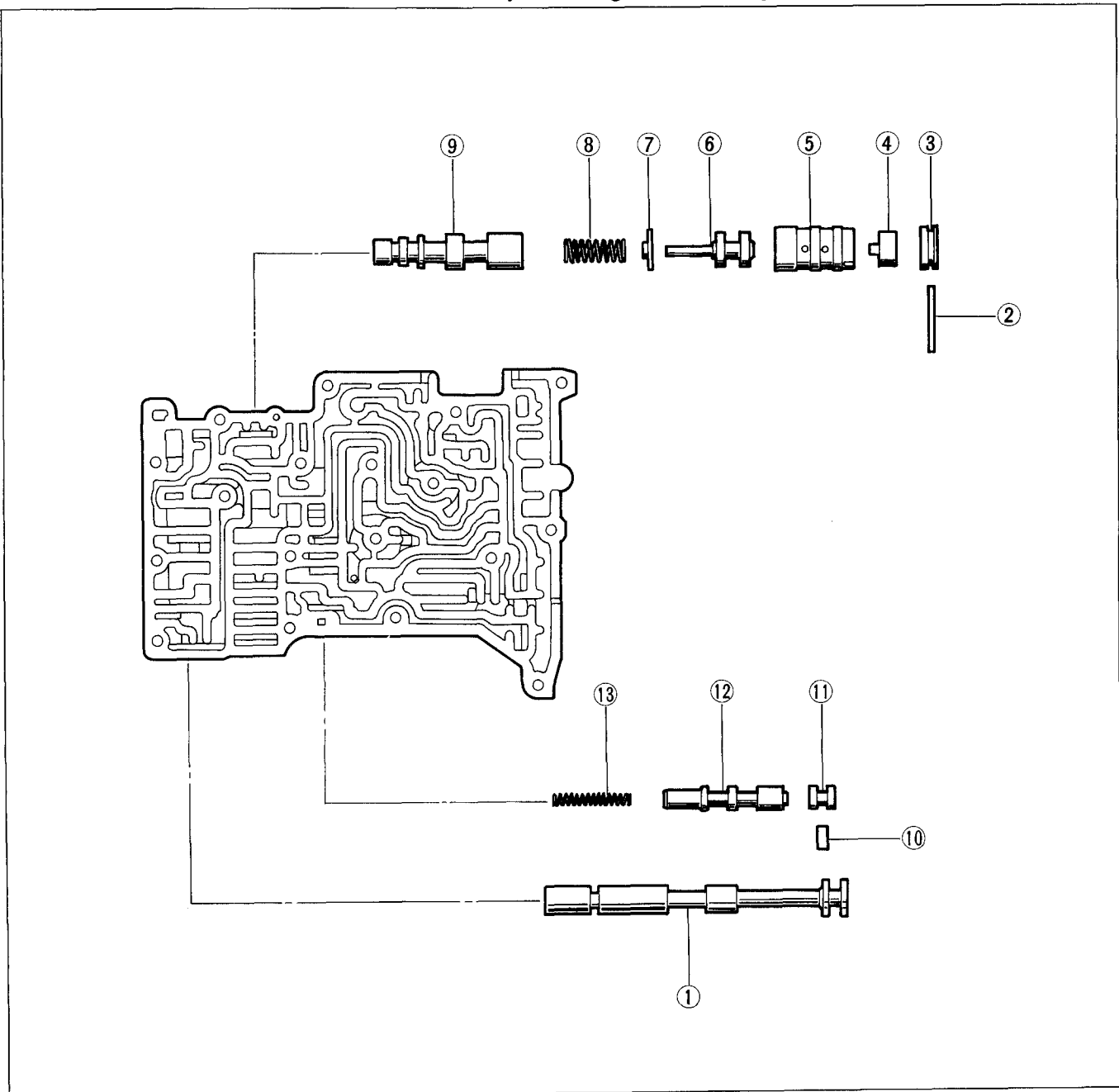
REAR CONTROL VALVE BODY

Disassembly / Inspection / Assembly

Caution

- Each valve should slide out/in under its own weight.
- When a valve will not slide out under its own weight, depending on the valve, push it out it with a wire or place the valve body open-side down and lightly tap it with a soft hammer. Never scratch or otherwise damage a valve surface or bore.
- Do not drop or lose the valves or internal parts.
- Before assembly, make sure all parts are thoroughly clean.
- Apply ATF to all parts and bores.
- Note the proper direction of the valves and internal parts.
- Do not reuse any part that has been dropped.
- Wrap a screwdriver or rod with a tape before using it to insert a valve.

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Procedure**.

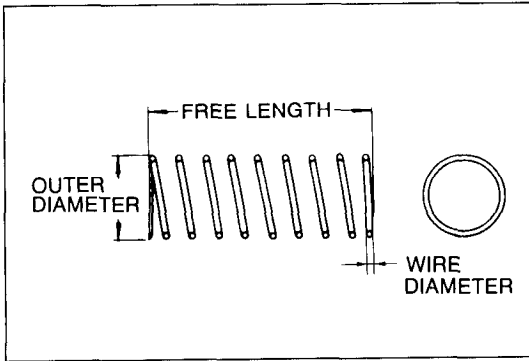


03U0K2-211

1. Manual valve
Inspect for sticking, scoring and scratches
2. Stop pin
3. Stop pin
4. Pressure regulator backup plug
5. Pressure regulator plug sleeve
6. Pressure regulator plug
7. Pressure regulator spring seat
8. Pressure regulator spring
Inspection page K2-223

9. Pressure regulator valve
Inspect for sticking, scoring and scratches
10. Stop pin
11. Stop plug
12. Lockup control valve
Inspect for sticking, scoring and scratches
13. Lockup control spring
Inspection page K2-223

03U0K2-212



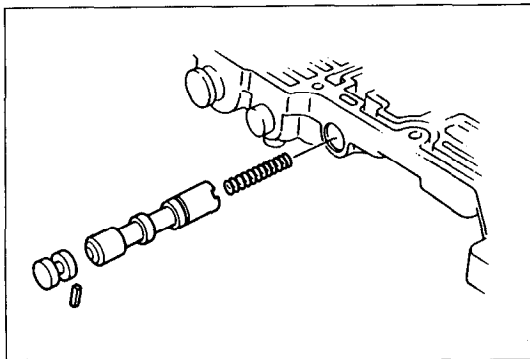
03U0KX-358

Inspection

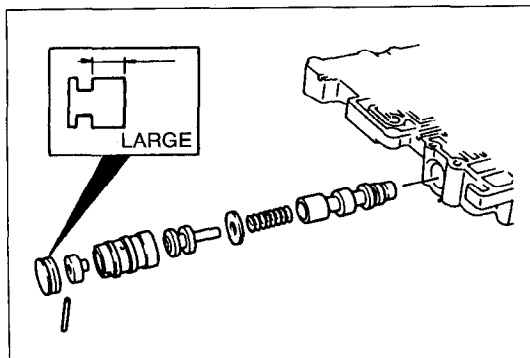
1. Measure the spring free length.
2. If not within specification, replace the spring(s).

Spring	Item	Outer dia. mm (in)	Free length mm (in)	Wire diameter mm (in)	Spring color
Pressure regulator spring		11.5 (0.452)	26.5 (1.043)	1.0 (0.039)	Maroon
Lockup control spring		5.0 (0.196)	35.2 (1.386)	0.6 (0.024)	Purple

03U0K2-213



03U0K2-214



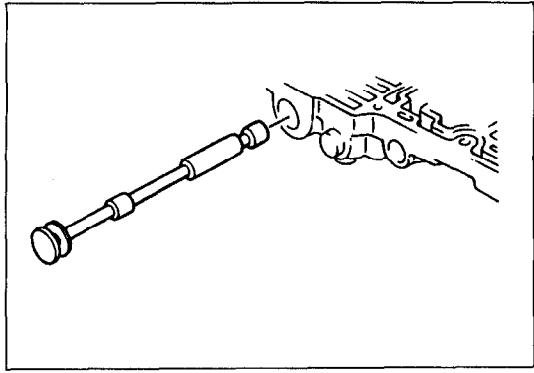
86U07B-297

Assembly Procedure

1. Install the lockup control spring, lockup control valve, stopper plug, and stopper pin.
2. Install the pressure regulator valve, pressure regulator spring, pressure regulator spring seat, pressure regulator plug, pressure regulator plug sleeve, pressure regulator backup plug, stopper plug, and stopper pin.

Note

- Install the stopper plug larger end first.



86U07B-298

3. Install the manual valve.

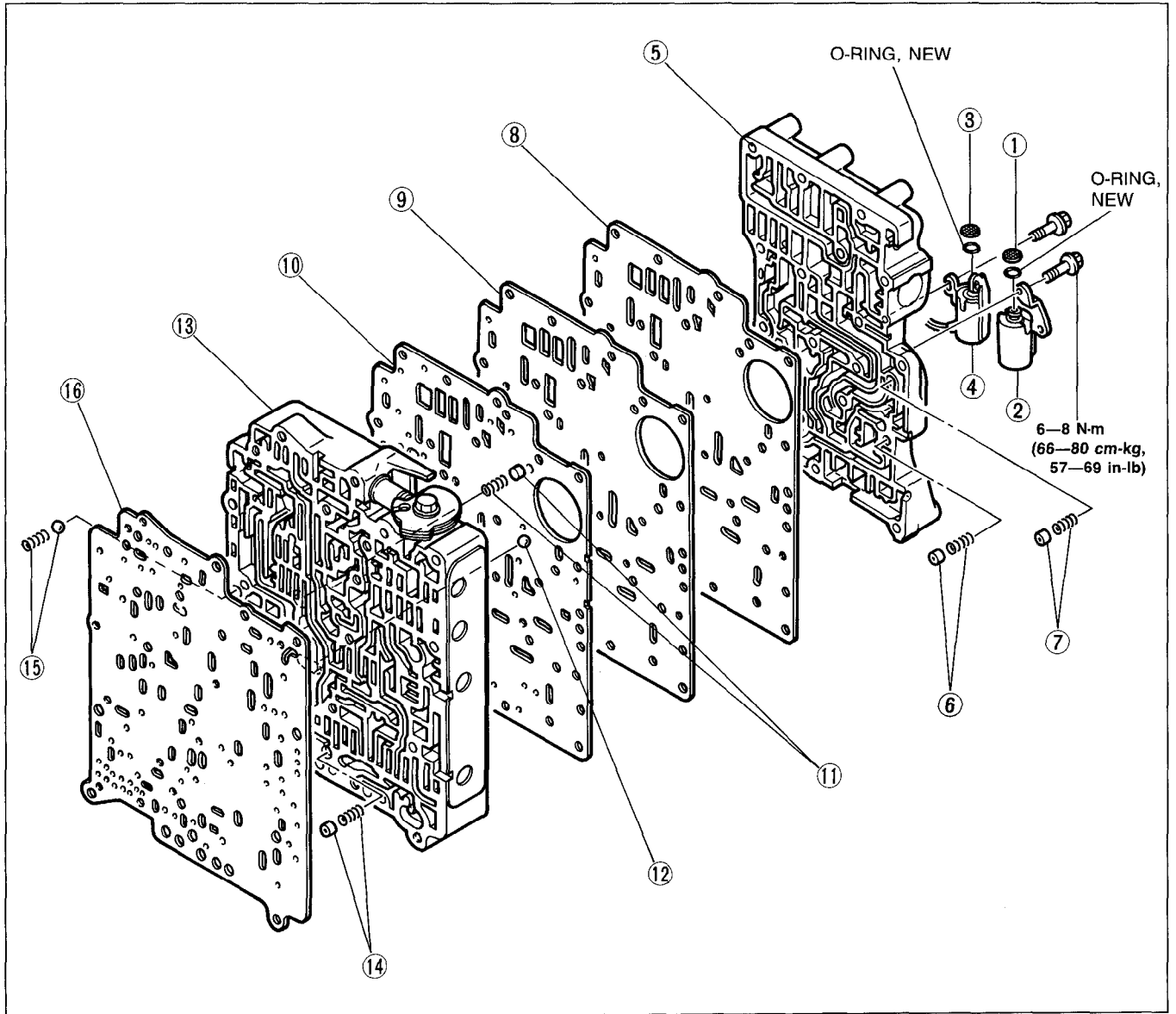
CONTROL VALVE BODY (ASSEMBLY)

Assembly

Caution

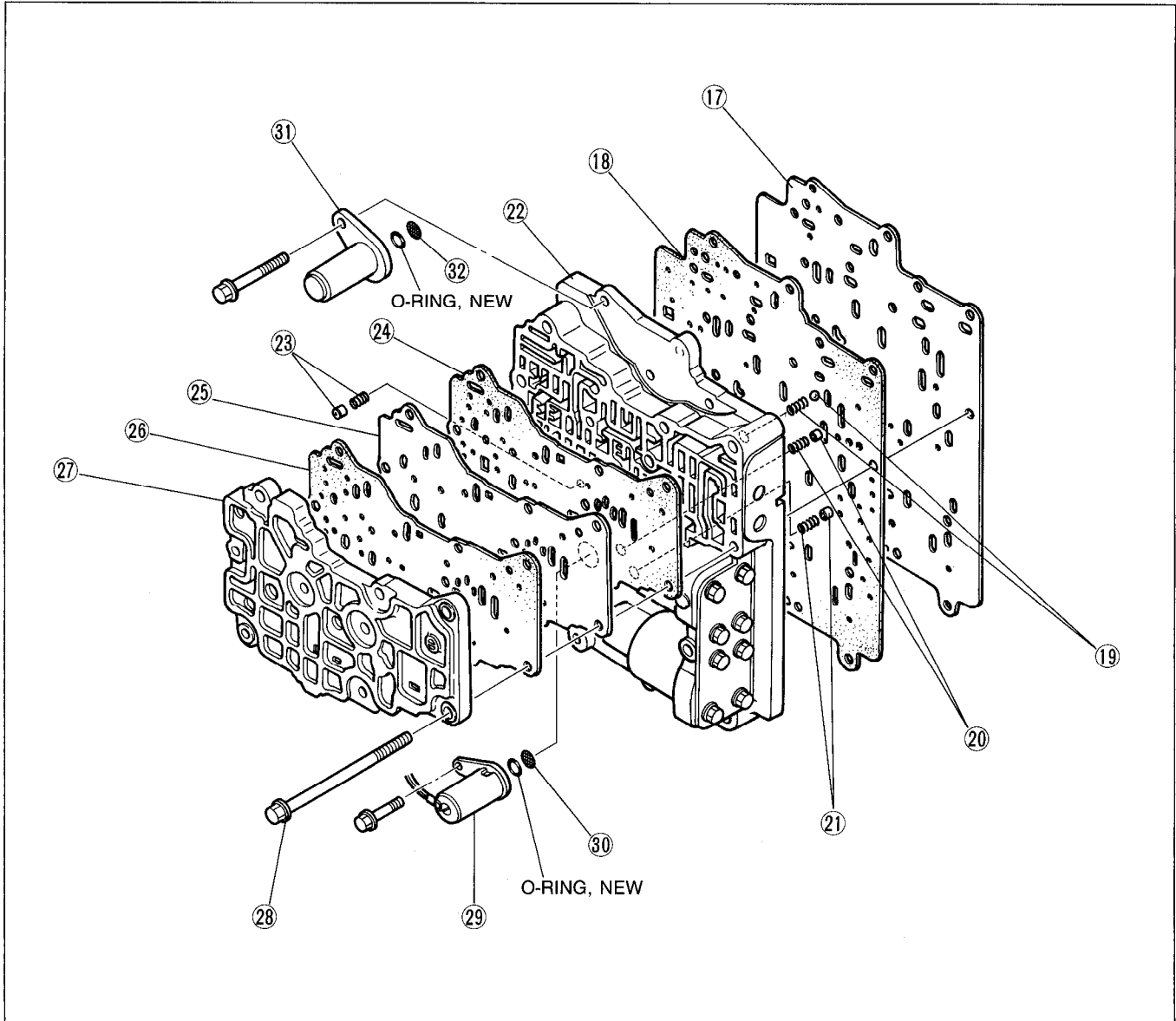
- Before assembly, make sure all parts are perfectly clean.
- Apply ATF to all parts.
- Do not reuse the gaskets or O-rings.

1. Assemble as shown in the figure, referring to **Assembly Procedure**.



03U0K2-215

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Oil strainer</p> <p>2. Lockup solenoid valve</p> <p>3. Oil strainer</p> <p>4. 3-4 solenoid valve</p> <p>5. Rear control valve body
Bolt installation position page K2-229</p> <p>6. Orifice check valve and spring
Installation position page K2-228</p> <p>7. Orifice check valve and spring
Installation position page K2-228</p> <p>8. Main/rear rear gasket</p> <p>9. Rear separator</p> | <p>10. Main/rear front gasket</p> <p>11. Orifice check valve and spring
Installation position page K2-228</p> <p>12. Steel ball
Installation position page K2-228</p> <p>13. Main control valve body
Bolt installation position page K2-229</p> <p>14. Orifice check valve and spring
Installation position page K2-228</p> <p>15. Converter relief ball and spring
Installation position page K2-228</p> <p>16. Premain/main rear gasket</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



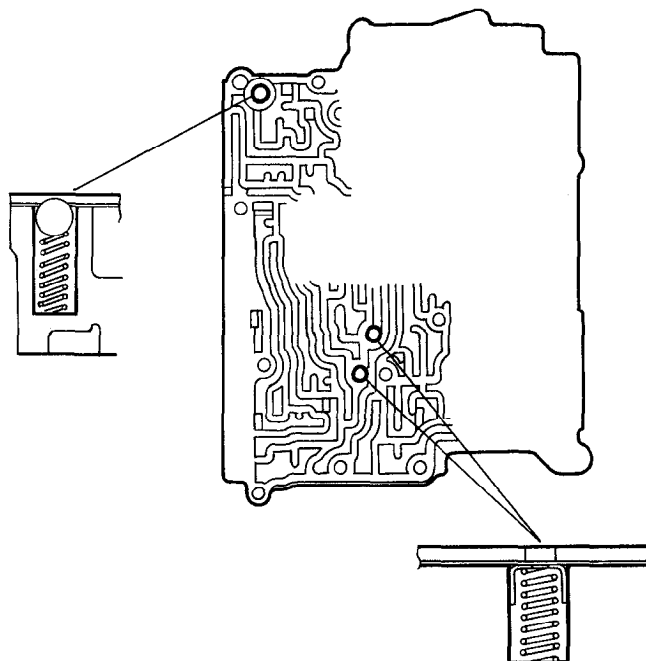
03U0K2-216

- | | |
|----------------------------------------------|----------------------------------------------|
| 17. Main separator | 24. Front/premain rear gasket |
| 18. Premain/main front gasket | 25. Premain separator |
| 19. Throttle relief ball and spring | 26. Front/premain front gasket |
| Installation position page K2-227 | 27. Front control body |
| 20. Orifice check valve and spring | Bolt installation position page K2-229 |
| Installation position page K2-227 | 28. Bolts |
| 21. Orifice check valve and spring | 29. 2-3 solenoid valve |
| Installation position page K2-227 | 30. Oil strainer |
| 22. Premain control body | 31. 1-2 solenoid valve |
| Bolt installation position page K2-229 | 32. Oil strainer |
| 23. Orifice check valve and spring | |
| Installation position page K2-227 | |

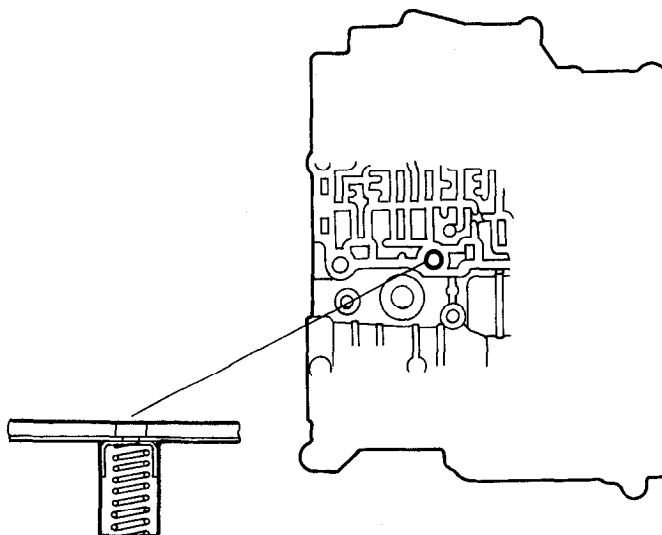
Installation positions

PREMAIN CONTROL VALVE BODY

(MAIN CONTROL VALVE BODY SIDE)



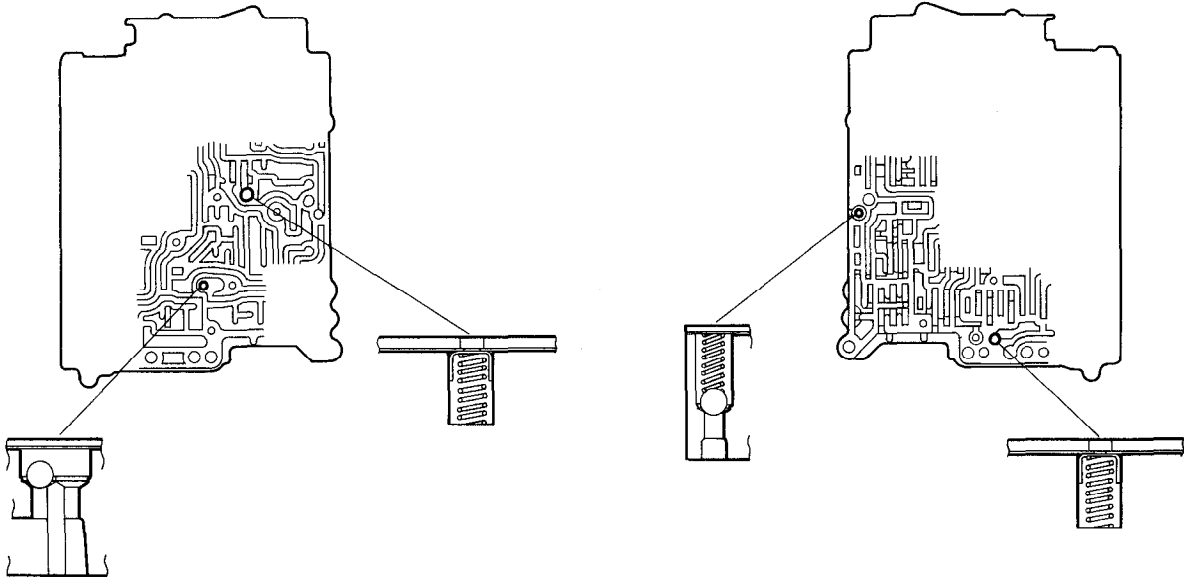
(FRONT CONTROL BODY SIDE)



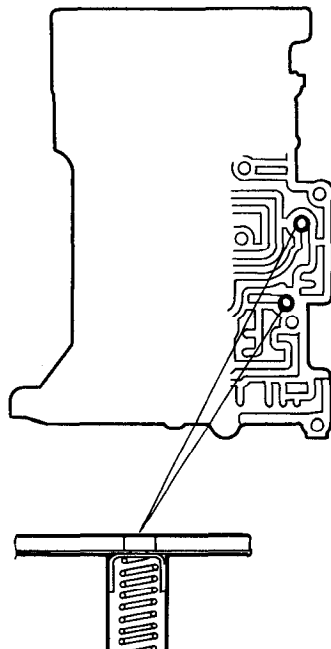
MAIN CONTROL VALVE BODY

(REAR CONTROL VALVE BODY SIDE)

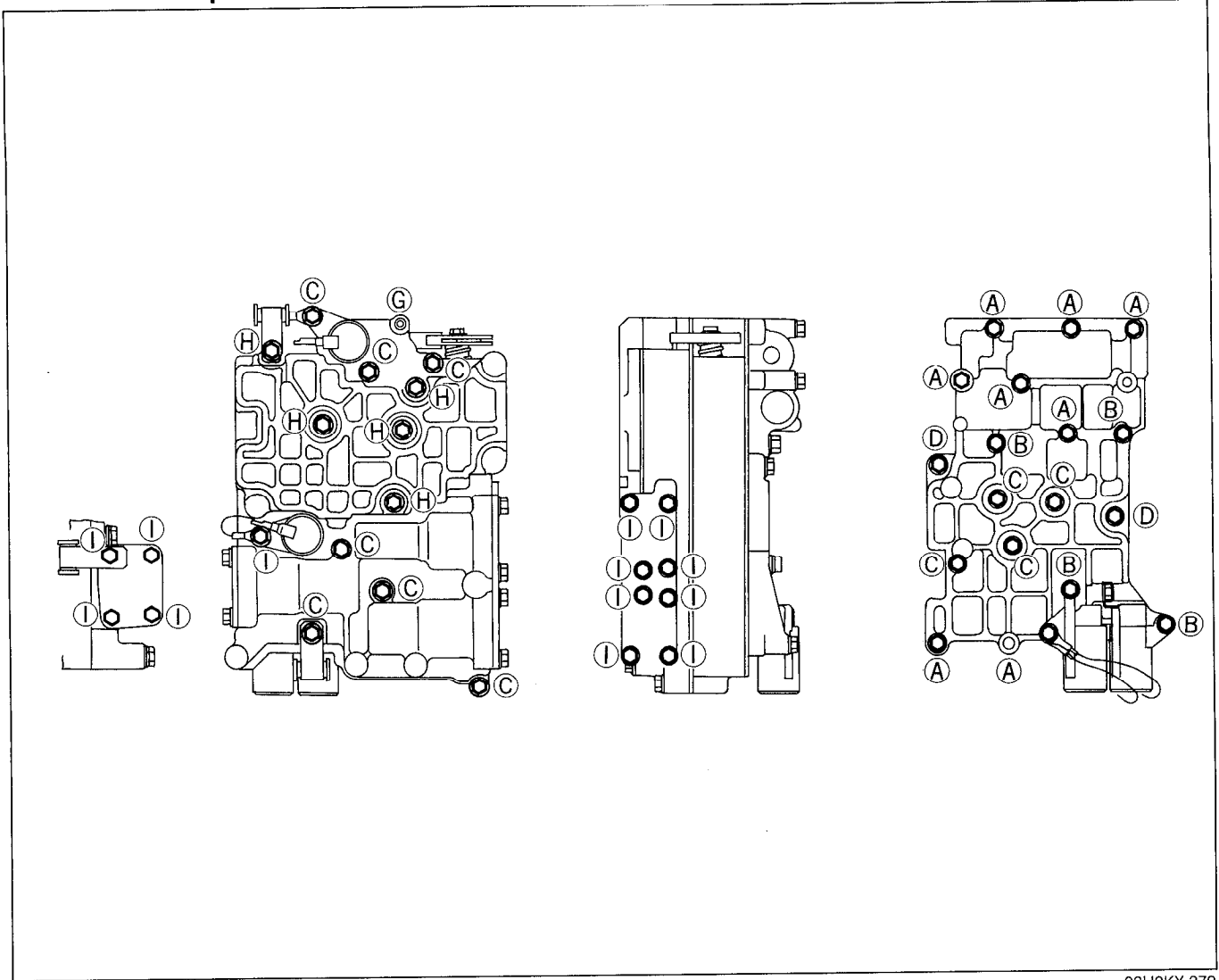
(PREMAIN CONTROL VALVE BODY SIDE)









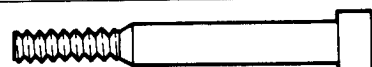
REAR CONTROL VALVE BODY



Bolt installation positions and external parts locations



03U0KX-379

Identification mark	Bolt	Length mm (in)	Tightening torque N-m (cm-kg, in-lb)
H		50 (1.969)	7.8—11 (80—110, 69—95)
A		40 (1.575)	
B		35 (1.378)	
C		25 (0.984)	
D		20 (0.787)	
I		16 (0.630)	
G		—	

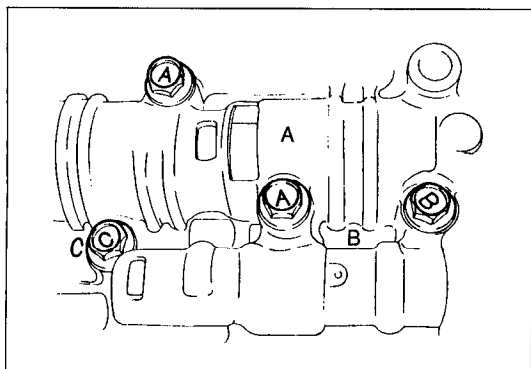
03U0K2-316

K2-229

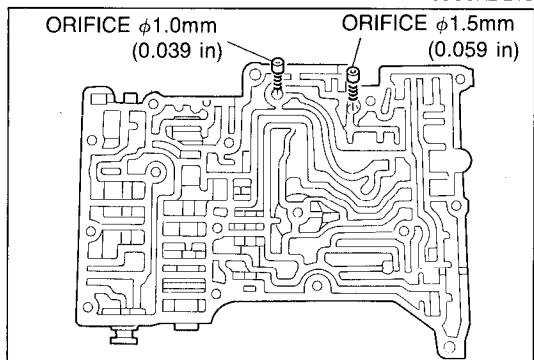
Assembly Procedure

Note

- Do not mix-up the front and rear gaskets during assembly.
- Match the bolt head letter and the control valve body letter.

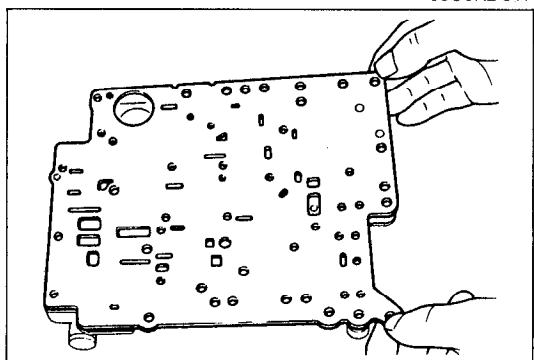


03U0K2-218



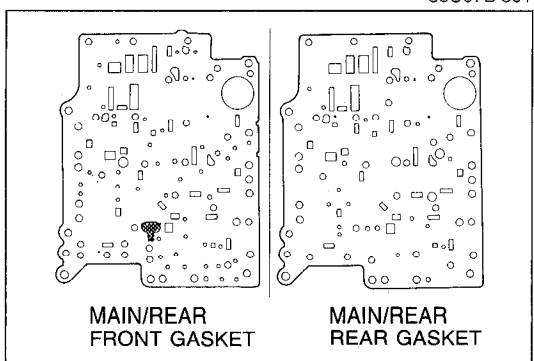
03U0K2-317

1. Install the orifice check valves ($\phi 1.5\text{mm}$, 0.059 in; $\phi 1.0\text{mm}$, 0.039 in) and springs in the rear control body as shown.



86U07B-301

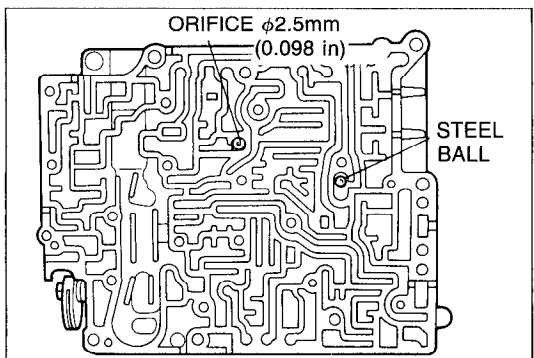
2. Install the gaskets on both sides of the rear separator; then install it onto the rear control body.



86U07B-302

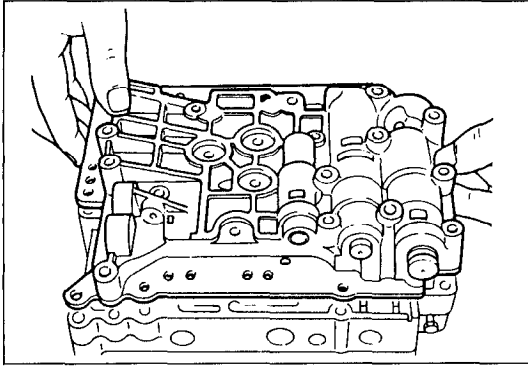
Note

- The main/rear rear gasket and main/rear front gasket are not interchangeable.



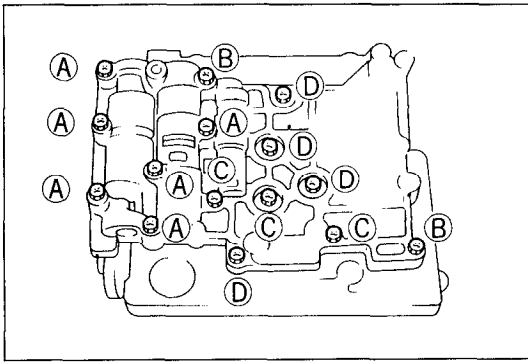
03U0K2-318

3. Install the orifice check valve ($\phi 2.5\text{mm}$, 0.098 in) and spring, and the steel ball in the main control body as shown.



86U07B-304

4. Install the rear control body to the main control body.

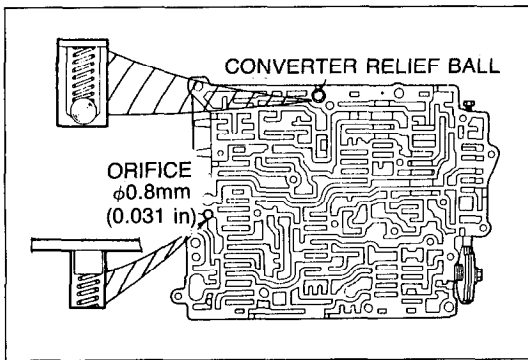


86U07B-305

Note

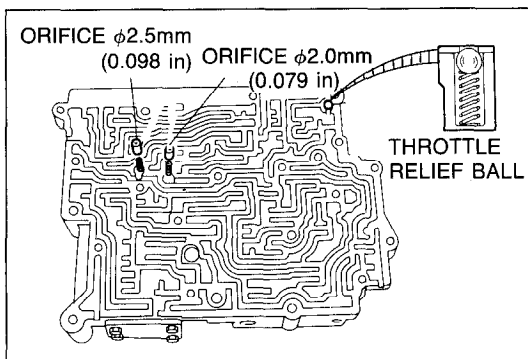
- Match the bolt head letter as shown.

5. Loosely tighten the bolts.



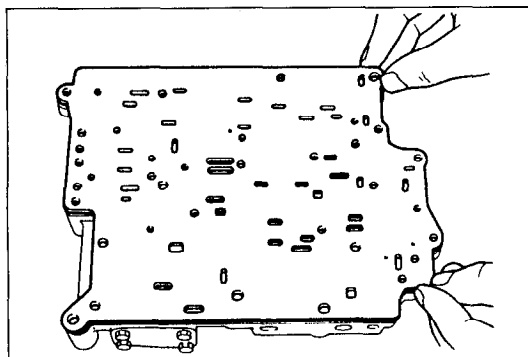
86U07B-306

6. Turn the assembly over and install the orifice check valve ($\phi 0.8\text{mm}$, 0.031 in) and spring, and the converter relief ball and spring in the main control body as shown.



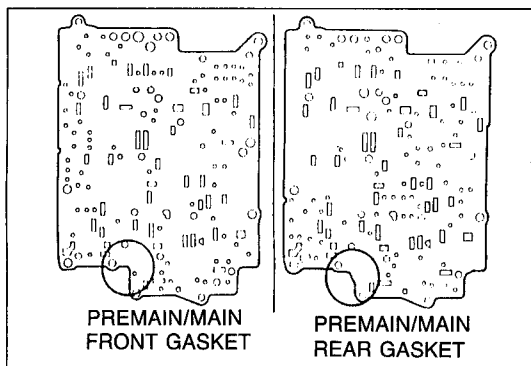
03U0K2-319

7. Install the orifice check valves ($\phi 2.0\text{mm}$, 0.079 in; $\phi 2.5\text{mm}$, 0.098 in) and springs, and the throttle relief ball and spring in the premain control body as shown.



86U07B-308

8. Install the gaskets on both sides of the main separator; then install it onto the premain control body.

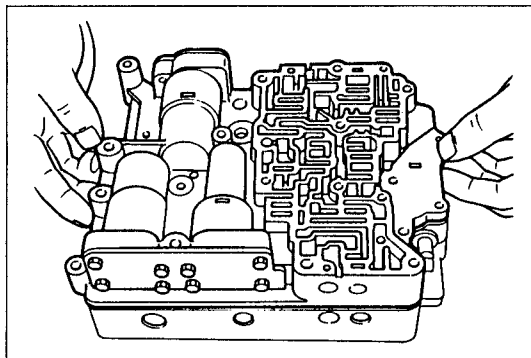


86U07B-309

Note

- The premain/main rear gasket and premain/main front gasket are not interchangeable.

9. Set the premain control body onto the main control body.

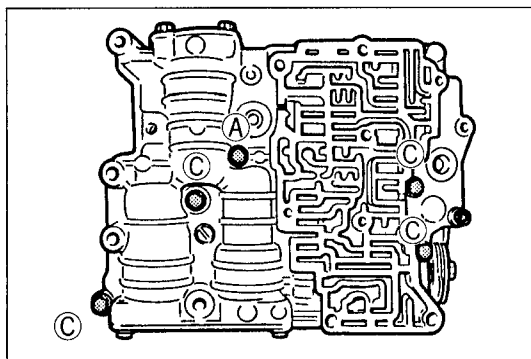


86U07B-310

Note

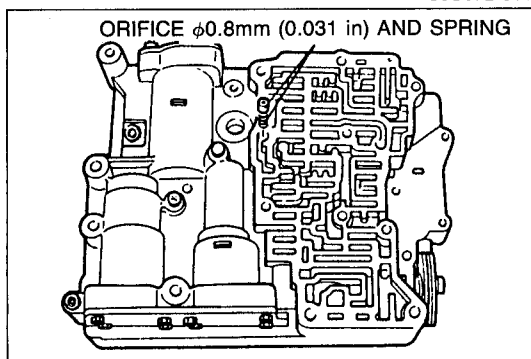
- Match the bolt head letter as shown.

10. Loosely tighten the bolts.



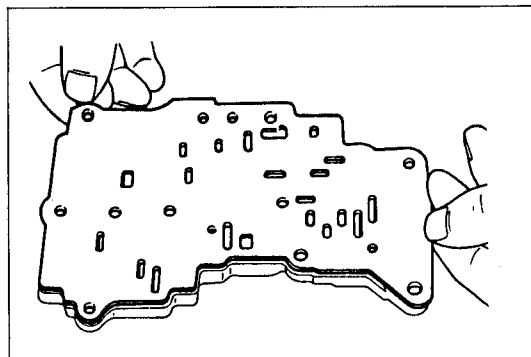
86U07B-311

11. Install the orifice check valve ($\phi 0.8\text{mm}$, 0.071 in) and spring in the premain control body as shown.

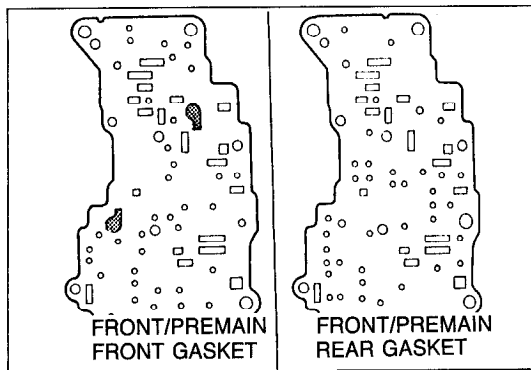


86U07B-312

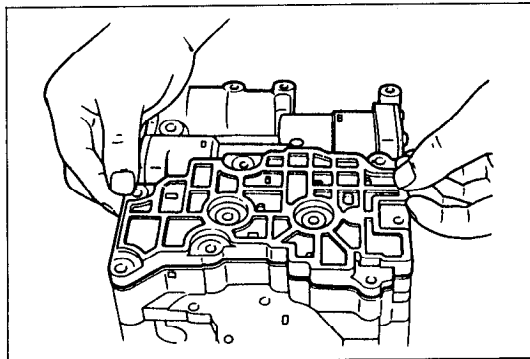
12. Install the gaskets on both sides of the premain separator; then install it onto the front control body.



86U07B-313

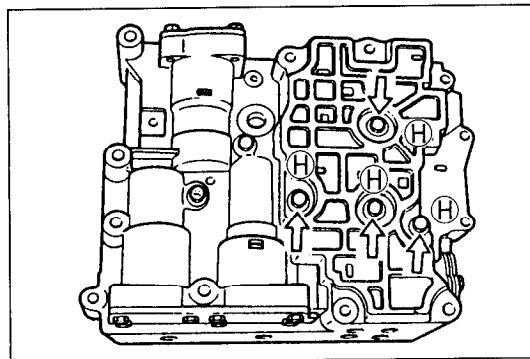


86U07B-314



86U07B-315

13. Install the front control body on the premain control body.

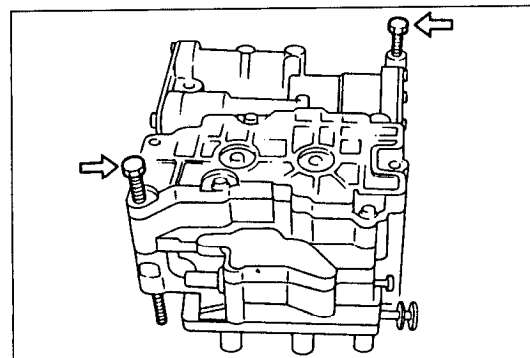


86U07B-316

Note

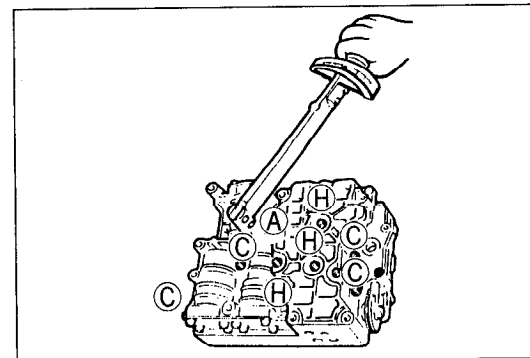
- Match the bolt head letter as shown.

14. Loosely tighten the bolts.



86U07B-317

15. Install the control valve body mounting bolts as shown for alignment.

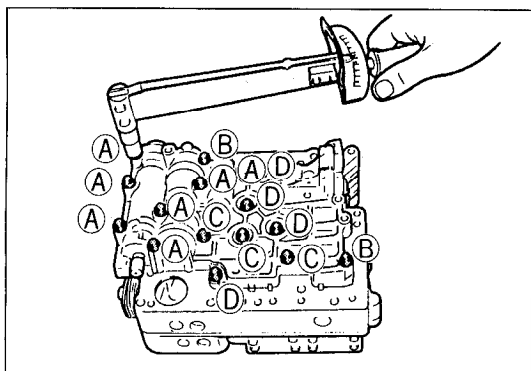


86U07B-318

16. Tighten the mounting bolts.
(1) Tighten the front control body.

Tightening torque:

6—8 N·m (66—80 cm·kg, 57—69 in·lb)

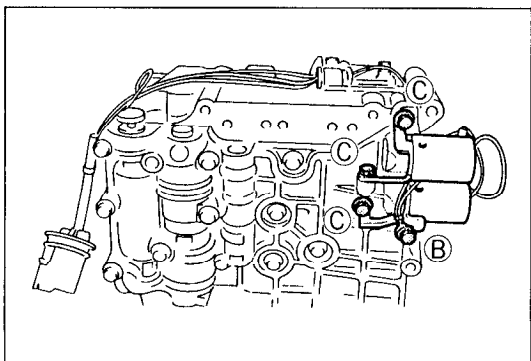


86U07B-319

(2) Tighten the rear control body.

Tightening torque:

6—8 N·m (66—80 cm·kg, 57—69 in·lb)

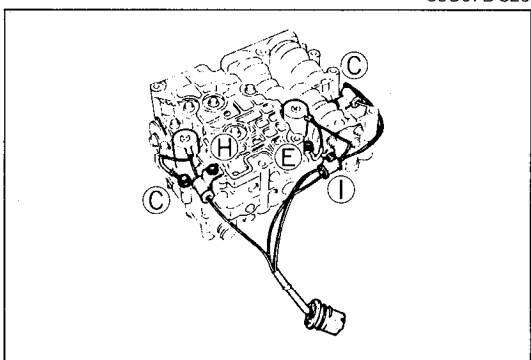


86U07B-320

17. Install the 3-4 solenoid valve and lock-up solenoid valve along with new O-rings and oil strainers.

Tightening torque:

6—8 N·m (66—80 cm·kg, 57—69 in·lb)



86U07B-321

18. Install the 1-2 solenoid valve and 2-3 solenoid valve along with new O-rings and oil strainers.

Tightening torque:

6—8 N·m (66—80 cm·kg, 57—69 in·lb)

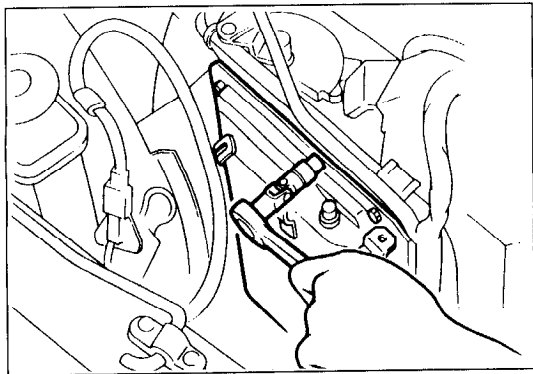
CONTROL VALVE BODY (ON-VEHICLE REMOVAL / INSTALLATION)

On-vehicle Removal

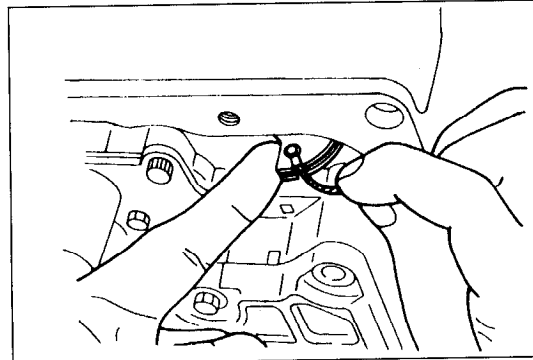
Caution

- Clean the transaxle exterior thoroughly with a steam cleaner or cleaning solvents before removal.

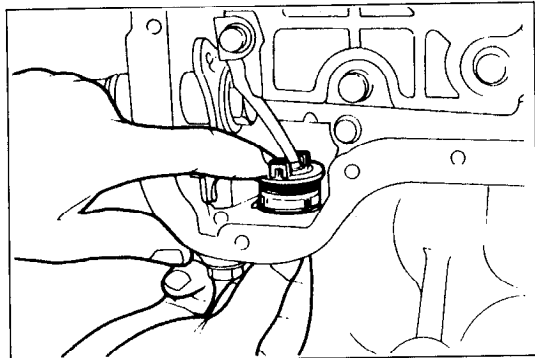
1. Disconnect the oil hose.
2. Drain the ATF into a suitable container.



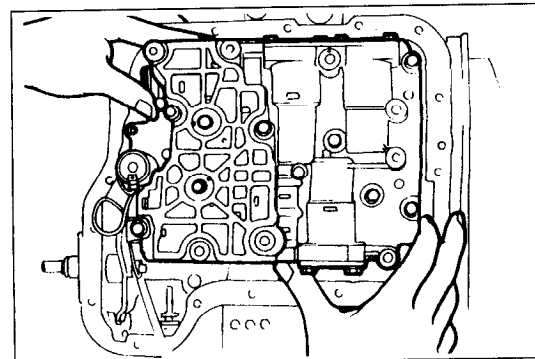
03U0K2-219



03U0K2-220



03U0K2-221



03U0K2-222

3. Remove the control valve cover and the gasket.
4. Remove the throttle cable from the throttle cam of the valve body.

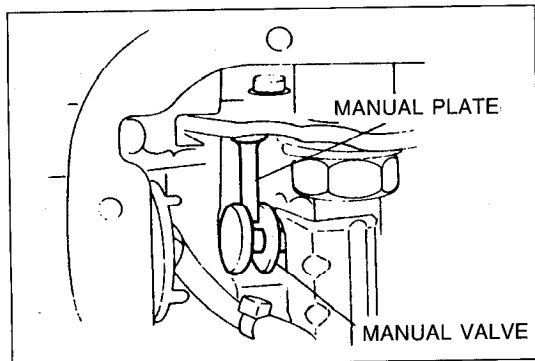
5. Disconnect the solenoid connector.
6. Pinch the tangs of the solenoid connector and remove it by pushing inward.

7. Remove the control valve body as an assembly.

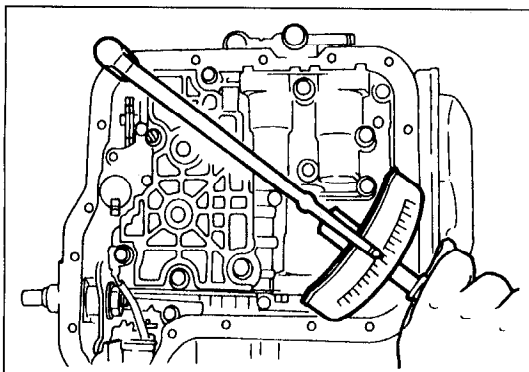
On-vehicle Installation

Caution

- Be sure to align the manual plate and the manual valve.



03U0K2-223

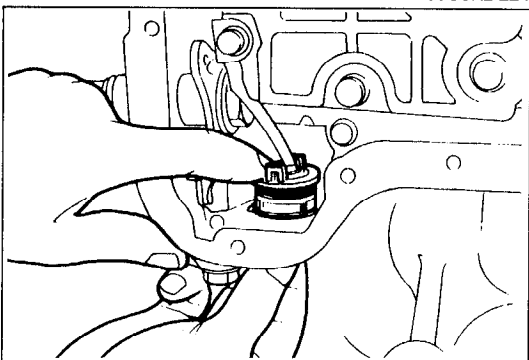


03U0K2-224

1. Install the control valve body assembly.

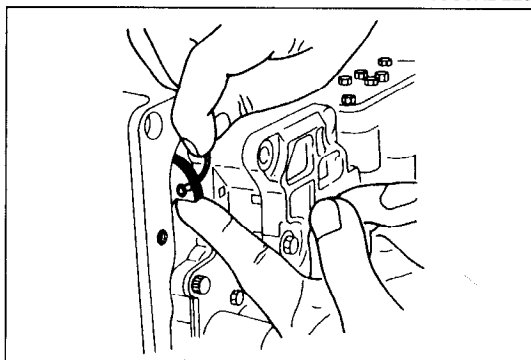
Tightening torque:

11—15 N·m (1.1—1.5 m·kg, 8.0—11 ft·lb)



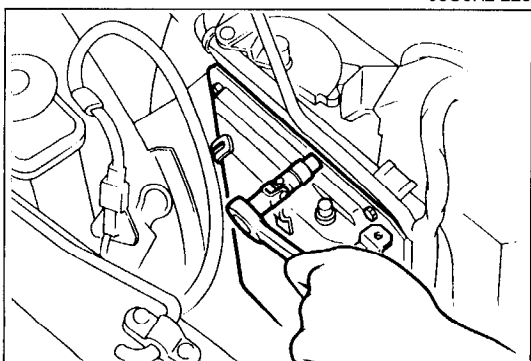
03U0K2-225

2. Apply ATF to a new O-ring and install it onto the solenoid connector.
3. Install the solenoid connector into the transaxle case.



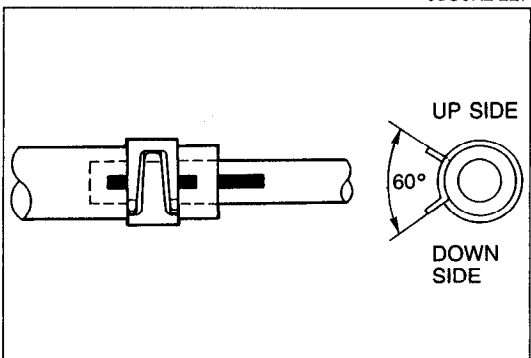
03U0K2-226

4. Install the throttle cable to the throttle cam.



03U0K2-227

5. Install the control valve body cover along with a new gasket.

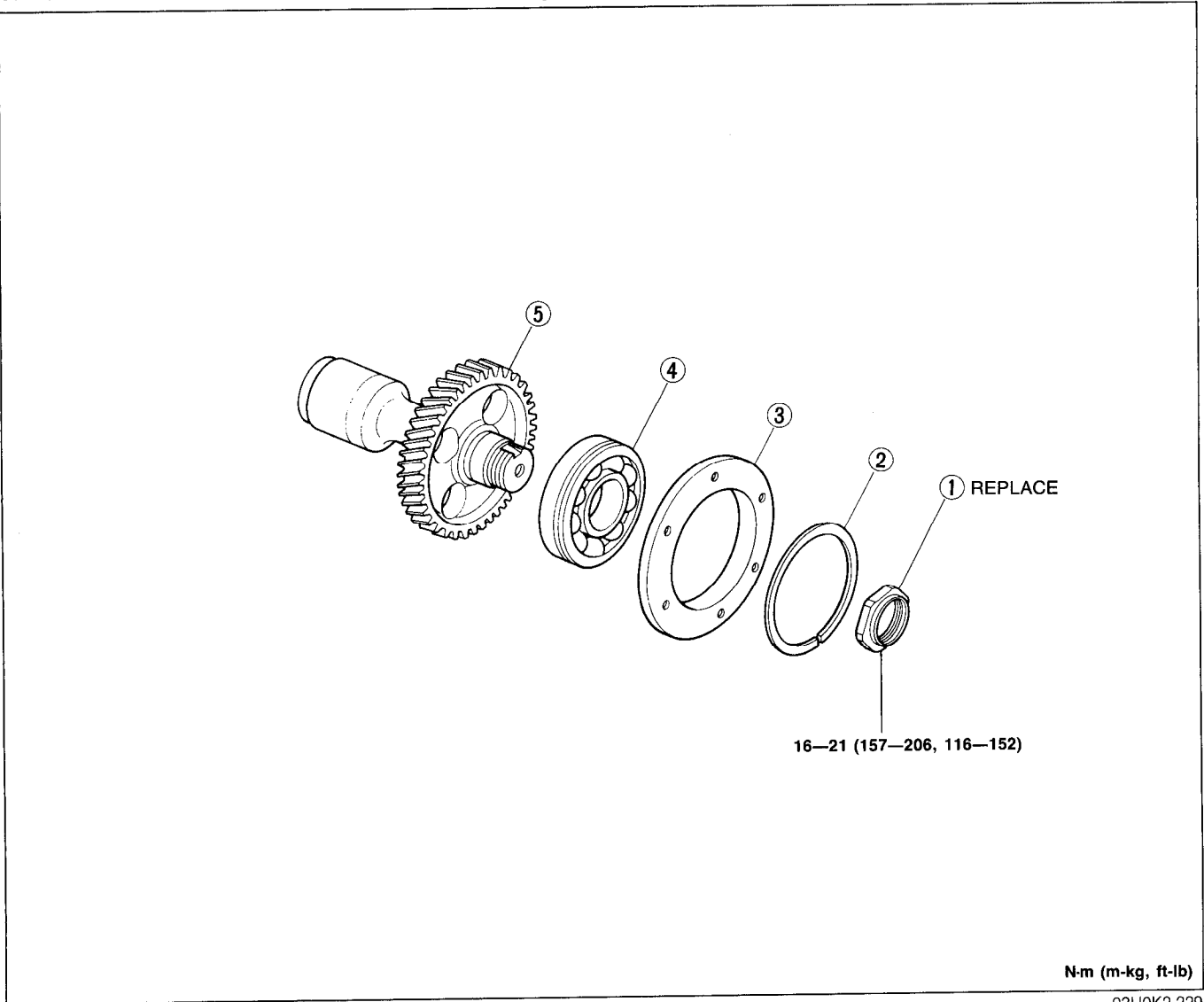
Tightening torque:

03U0K2-228

6. Align the marks, and slide the oil cooler hose onto the oil cooler pipe until it is fully seated against the ridge.
7. Install the hose clamp onto the hose at the center of the mark and at the angle shown.
8. Verify that the hose clamp does not interfere with any other parts.
9. Pour in ATF and with the engine idling, check the ATF level and check for leaks. (Refer to page K2-134.)
10. Drive the vehicle and check the shift points, shift schedule, and shift shock. (Refer to Road test; page K2-127.)

IDLER GEAR ASSEMBLY (TRANSFER)

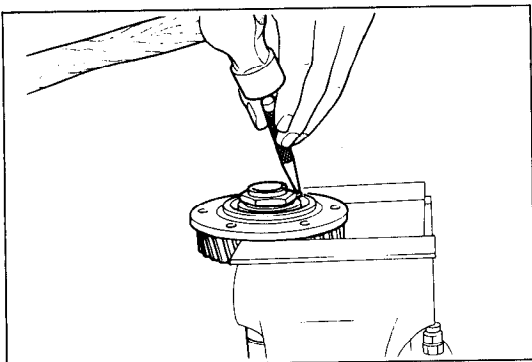
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



N-m (m-kg, ft-lb)

03U0K2-229

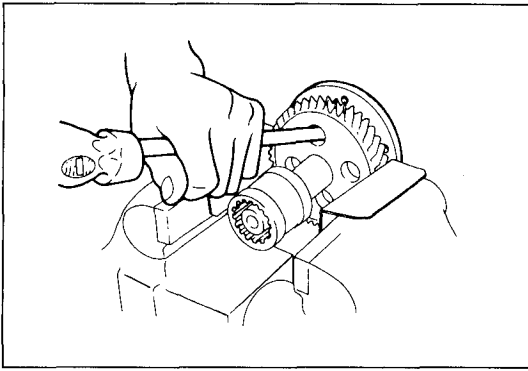
- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Locknut
 Disassembly Note page K2-237
 Assembly Note page K2-238</p> <p>2. Retaining ring
 Disassembly Note page K2-238
 Assembly Note page K2-238</p> <p>3. Side cover
 Disassembly Note page K2-238
 Assembly Note page K2-238</p> | <p>4. Bearing
 Disassembly Note page K2-238
 Assembly Note page K2-238</p> <p>5. Idle gear
 Inspect individual gear teeth for wear and cracks</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0K2-230

Disassembly Note
Locknut

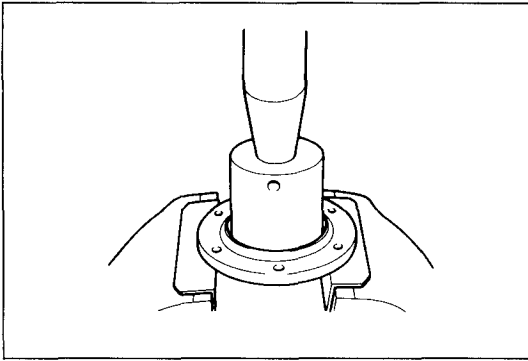
1. Raise the nut tab and loosen the locknut, but do not remove it.



03U0K2-231

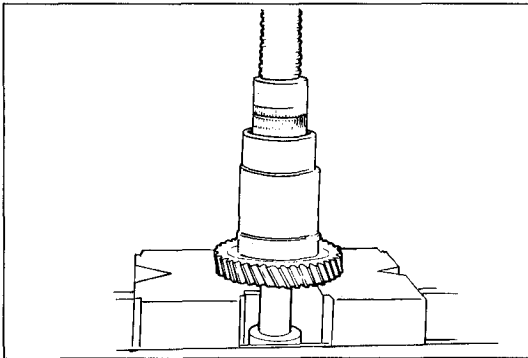
Side cover, bearing

1. Tap the bearing and remove the side cover and the bearing.



03U0K2-232

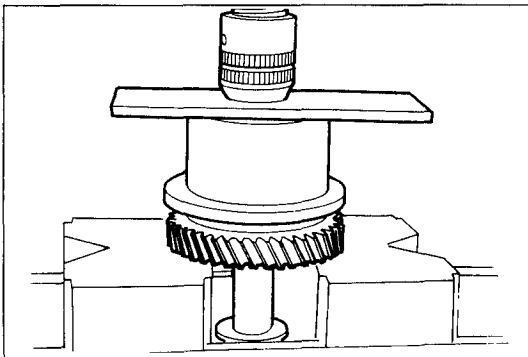
2. Remove the bearing from the side cover with a press.



03U0K2-233

Assembly Note**Bearing**

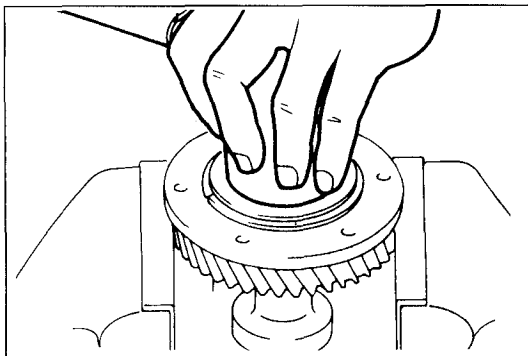
1. Install the bearing with a press.



03U0K2-234

Side cover

1. Install the top cover with a press.



03U0K2-235

Locknut

1. Tighten a new locknut and crimp it.

Tightening torque:

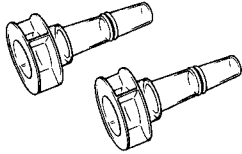
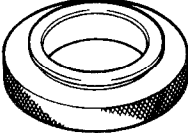
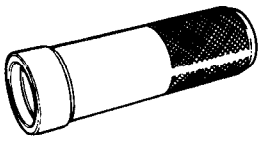

157—206 N·m (16—21 m·kg, 116—152 ft·lb)

MEMO

FRONT AND CENTER DIFFERENTIAL ASSEMBLY

PREPARATION

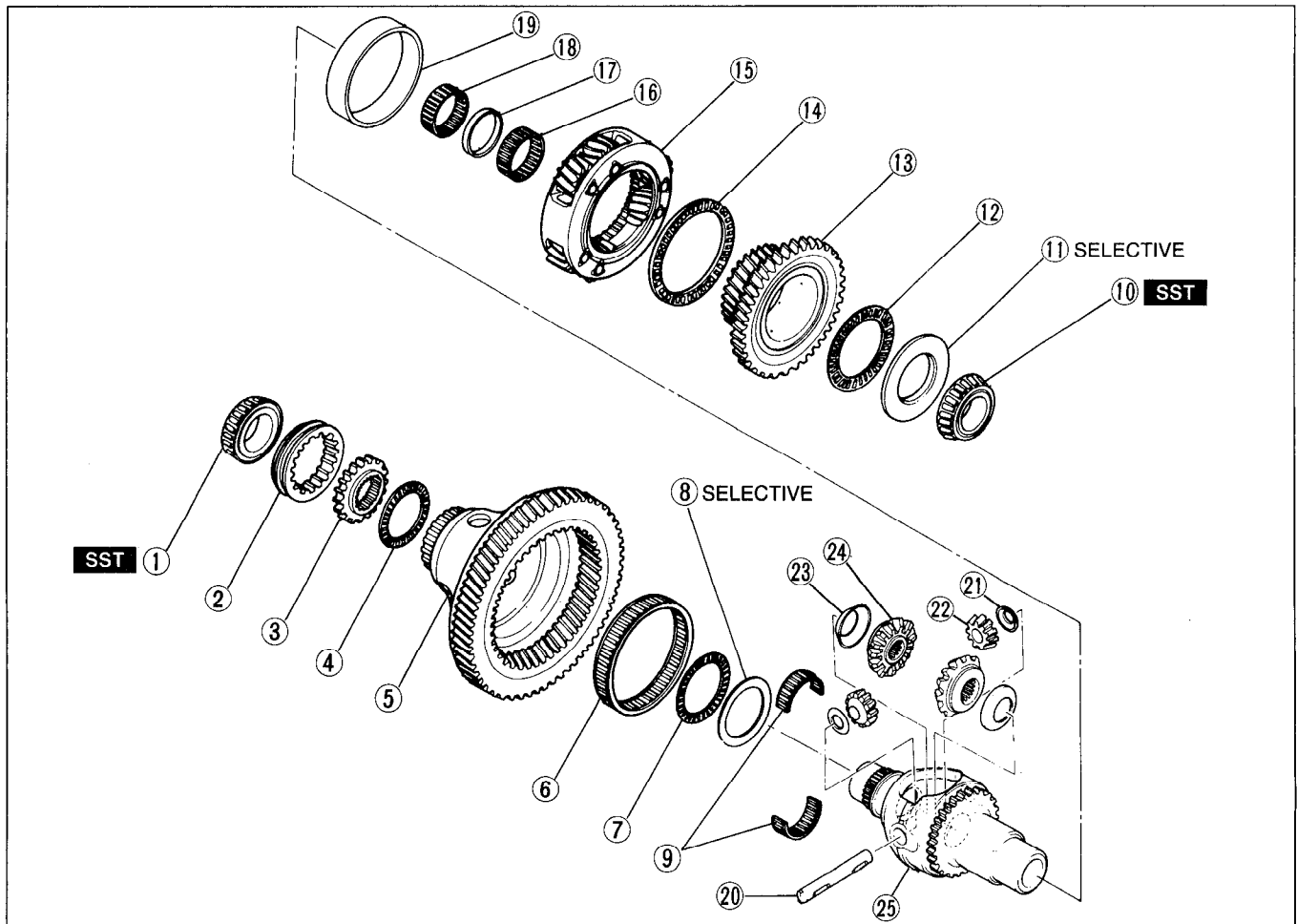
SST

<p>49 B027 001</p> <p>Holder, diff. side gear</p> 	<p>For holding side gear</p>	<p>49 B027 004</p> <p>Measuring plate</p> 	<p>For measure of clearance</p>
<p>49 F401 331</p> <p>Body</p> 	<p>For installation of bearing</p>	<p>49 G030 338</p> <p>Attachment E</p> 	<p>For installation of bearing</p>

03U0K2-236

Disassembly / Inspection / Assembly

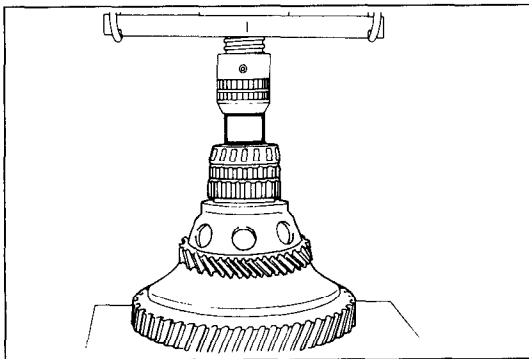
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary:
3. Assemble in the reverse order of disassembly, referring to **Assembly procedure**.



03U0K2-237

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Bearing inner race (Gear sleeve side)
Disassembly Note page K2-241
Inspect for damage or rough rotation 2. Differential lock gear sleeve 3. Differential lock hub
Inspect for wear or damage 4. Gear case needle bearing
Inspect for wear or damage 5. Ring gear case
Inspect for wear or damage 6. Gear case needle bearing
Inspect for wear or damage 7. Gear case needle bearing
Inspect for wear or damage 8. Differential lock thrust washer 9. Gear case needle bearings
Inspect for wear or damage 10. Bearing inner race (Sun gear side)
Disassembly Note page K2-241
Inspect for wear or damage 11. Thrust washer 12. Gear case needle bearing
Inspect for wear or damage | <ol style="list-style-type: none"> 13. Sun gear
Inspect for wear or damage 14. Gear case needle bearing
Inspect for wear or damage 15. Planetary carrier
Inspect for engagement with pinion gears 16. Gear case needle bearing
Inspect for wear or damage 17. Spacer 18. Gear case needle bearing
Inspect for wear or damage 19. Differential gear case sleeve
Disassembly Note page K2-242 20. Pinion shaft 21. Washer 22. Pinion gear
Inspect for wear or damage 23. Washer 24. Side gear
Inspect for wear or damage 25. Differential gear case
Inspect for wear or damage |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

03U0K2-238



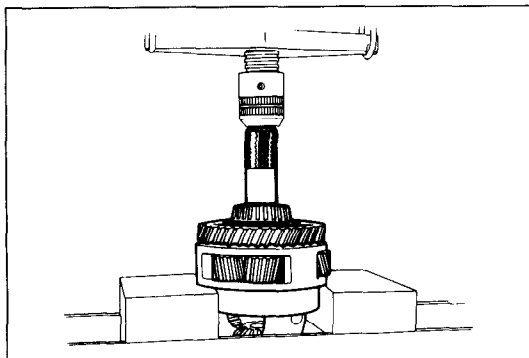
03U0K2-239

Disassembly note
Bearing inner race (Gear sleeve side)

Caution

- Hold the front differential with one hand so that it does not fall.

1. Remove the bearing with a press.



03U0K2-240

Bearing inner race (Sun gear side)

Caution

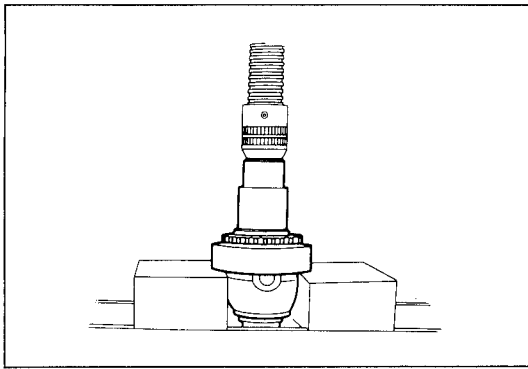
- Hold the front differential gear case with one hand so that it does not fall.

1. Remove the bearing with a suitable pipe.

Differential gear case sleeve**Caution**

- Hold the gear case one hand so that it dose not fall.

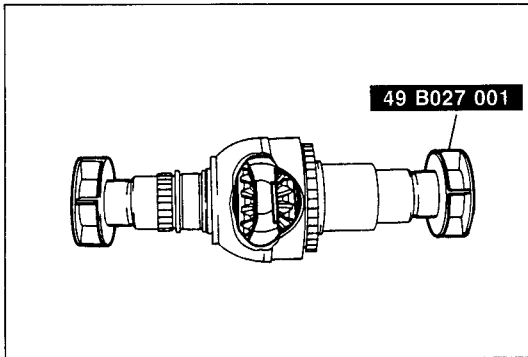
1. Remove the differential gear case sleeve with a press.



03U0K2-241

Assembly procedure**Front differential**

1. Install the side gears and washers, and fix them with the SST.

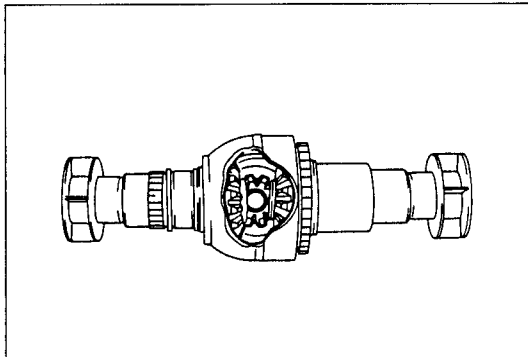


03U0K2-242

2. Install a pinion gear and turn it 180°.

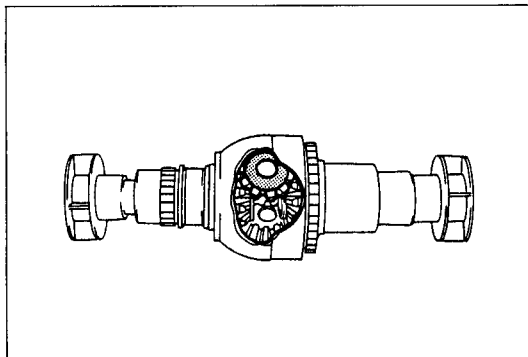
Note

- Do not install the washer at this time.



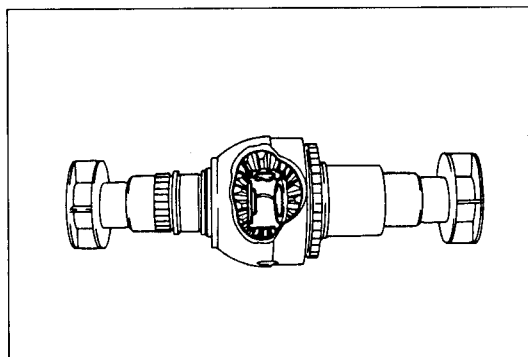
63G07C-141

3. Install the other pinion gear and washer.
4. Turn the pinion gear and washer 150°.
5. Install the washer on opposite pinion gear.

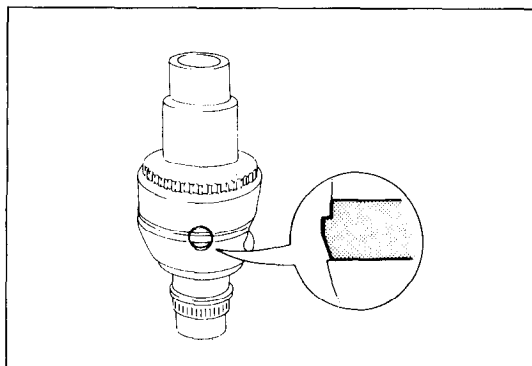


63G07C-142

6. Align the pinion shaft holes of the pinion gears with the differential gear case.

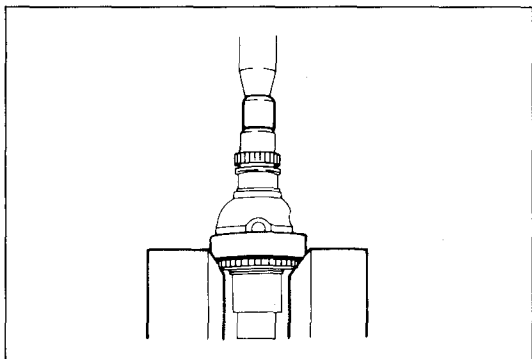


63G07C-143



63G07C-144

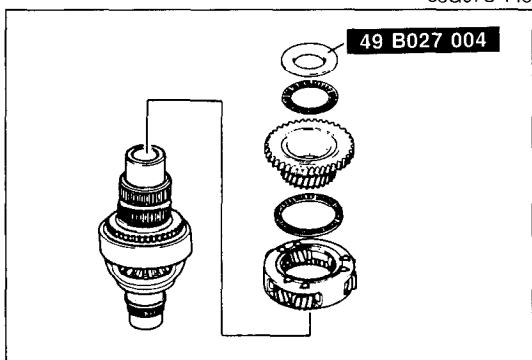
7. Insert the pinion shaft.



63G07C-145

Center differential

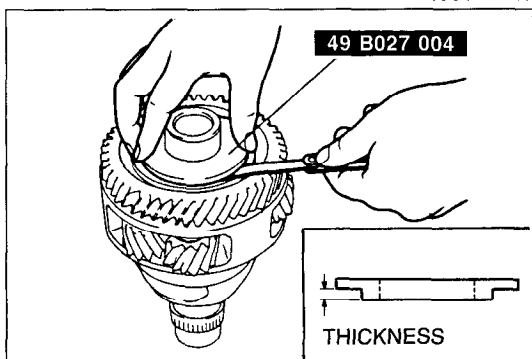
1. Install the differential gear case sleeve.



03U0K2-243

- 2. Install the gear case needle bearings and spacer.
- 3. Install the planetary carrier assembly, gear case needle bearing, and the **SST**.

Measuring plate thickness: 4.3mm (0.169 in)

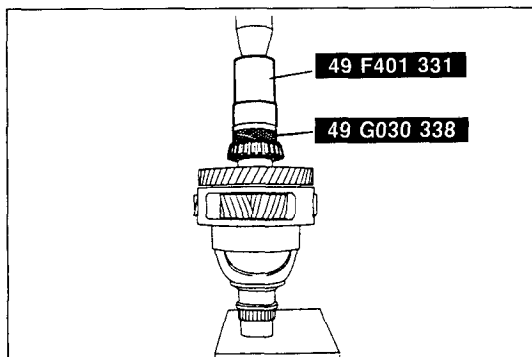


93U07C-040

- 4. Measure the clearance between the **SST** and gear case needle bearing.
If the clearance is not within specification, select the proper washer from the chart below.

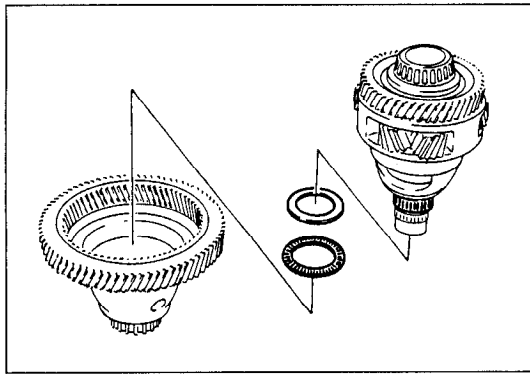
Standard: 0.10—0.30mm (0.004—0.012 in)

Measured clearance mm (in)	Washer thickness mm (in)
0.10—0.25 (0.0039—0.0098)	4.3 (0.169)
0.30—0.45 (0.0118—0.0177)	4.1 (0.161)
0.50—0.65 (0.0196—0.0256)	3.9 (0.154)
0.70—0.85 (0.0276—0.0334)	3.7 (0.146)
0.90—1.10 (0.0354—0.0433)	3.5 (0.138)

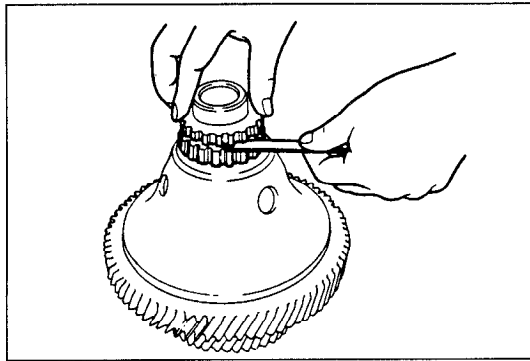


93U07C-041

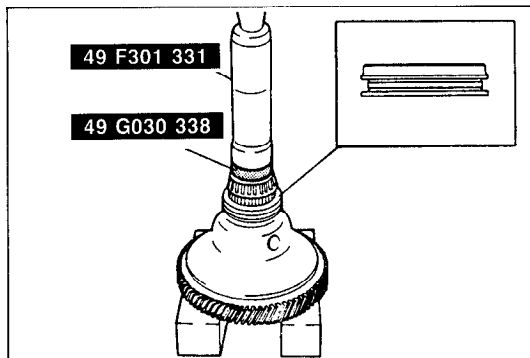
- 5. Install the proper washer and the bearing inner race with the **SST**.



63G07C-149



93U07C-042



83U07C-015

6. Install the gear case needle bearings and differential lock thrust washer.

7. Install the differential lock gear sleeve, differential lock hub and gear case needle bearing.

8. Measure the clearance between the differential lock hub and the gear case needle bearing.

If the clearance is not within specification, select the proper differential lock thrust washer.

Standard: 0.15—0.30mm (0.006—0.011 in)

Available washer thickness:

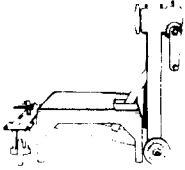
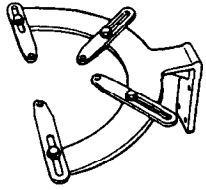
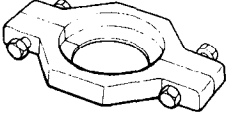
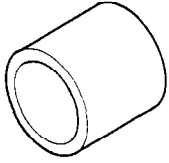
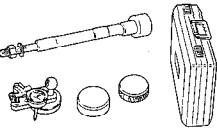
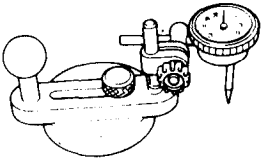
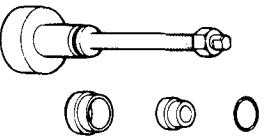


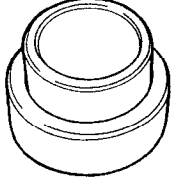
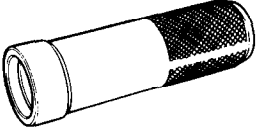
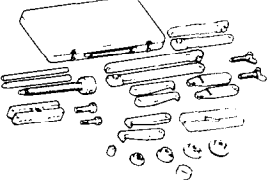
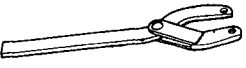
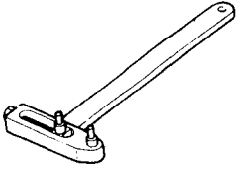
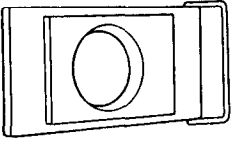
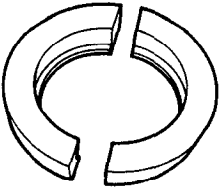
1.20mm (0.047 in), 1.35mm (0.053 in),

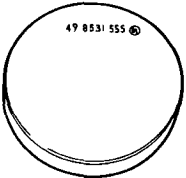

1.50mm (0.059 in), 1.65mm (0.065 in),

1.80mm (0.071 in)

9. Install the bearing inner race with a press and the **SST**.

TRANSFER CARRIER ASSEMBLY PREPARATION SST

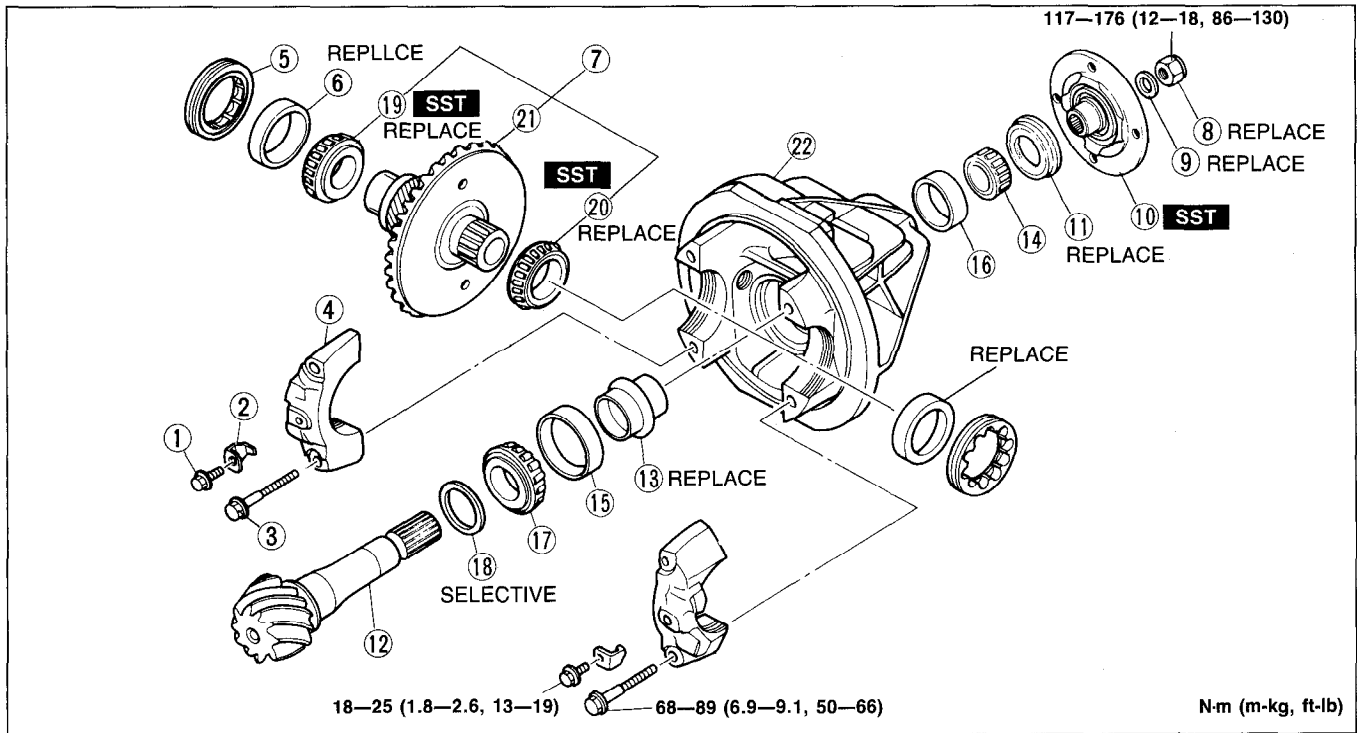
<p>49 0107 680A Engine stand</p> 	<p>For disassembly and assembly of differential</p>	<p>49 M005 561 Hanger, differential carrier</p> 	<p>For disassembly and assembly of differential</p>
<p>49 0636 145 Puller, fan pulley boss</p> 	<p>For removal of bearing inner race (side bearing)</p>	<p>49 U027 003 Installer, oil seal</p> 	<p>For installation of oil seal (companion flange)</p>
<p>49 F027 0A0 Gauge set, pinion height adjustment</p> 	<p>For adjustment of pinion height</p>	<p>49 0727 570 Gauge body, pinion height (Part of 49 F027 0A0)</p> 	<p>For adjustment of pinion height</p>
<p>49 8531 565 Pinion model</p> 	<p>For adjustment of pinion height</p>	<p>49 8531 567 Collar A (Part of 49 8531 565)</p> 	<p>For adjustment of pinion height</p>
<p>49 D017 2A1 Installer set, bearing</p> 	<p>For installation of bearing</p>	<p>49 F401 336B Attachment B (Part of 49 D017 2A1)</p> 	<p>For installation of bearing inner race (rear bearing)</p>
<p>49 F401 331 Body (Part of 49 D017 2A1)</p> 	<p>For installation of bearing inner race (rear bearing)</p>	<p>49 0839 425C Puller set, bearing</p> 	<p>For removal and installation of companion flange</p>
<p>49 S120 710 Holder, coupling flange</p> 	<p>For removal and installation of companion flange</p>	<p>49 0259 720 Wrench, differential side bearing adjusting nut</p> 	<p>For adjustment of drive pinion and ring gear backlash</p>
<p>49 F401 366A Plate</p> 	<p>For removal of bearing inner race</p>	<p>49 B027 003 Attachment M</p> 	<p>For removal of bearing inner race</p>

<p>49 8531 555</p> <p>Gauge block</p>		<p>For adjustment of pinion height</p>	<p>49 8531 568</p> <p>Collar B</p>	 <p>For adjustment of pinion height</p>
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03U0K2-244

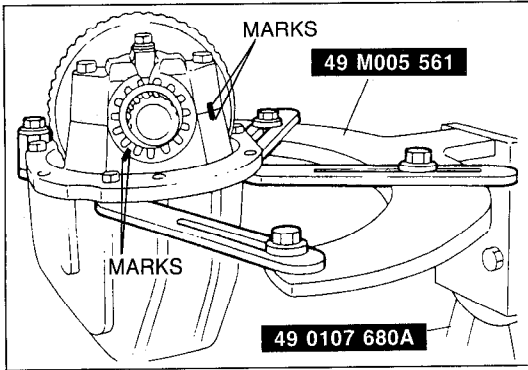
Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



03U0K2-245

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Bolts 2. Lock plates 3. Bolts 4. Bearing caps
Disassembly Note page K2-246 5. Adjusting nuts
Disassembly Note page K2-246 6. Bearing outer races (Side bearing) 7. Differential gear assembly 8. Locknut
Disassembly Note page K2-246 9. Washer 10. Companion flange
Disassembly Note page K2-246 11. Oil seal 12. Drive pinion
Disassembly Note page K2-246
Inspect splines for wear and damage
Assembly Note page K2-247 13. Collapsible spacer | <ol style="list-style-type: none"> 14. Bearing inner race
Inspect for damage and rough rotation
Assembly Note page K2-247 15. Bearing outer race
Disassembly Note page K2-246
Assembly Note page K2-247 16. Bearing outer race
Disassembly Note page K2-246
Assembly Note page K2-247 17. Bearing outer race
Disassembly Note page K2-247
Assembly Note page K2-247 18. Spacer
Assembly Note page K2-247 19. Bearing inner race
Disassembly Note page K2-247 20. Bearing inner race
Disassembly Note page K2-247 21. Differential gear
Inspect individual gear teeth for wear and cracks 22. Transfer carrier |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0K2-246

Disassembly Note Transfer carrier assembly

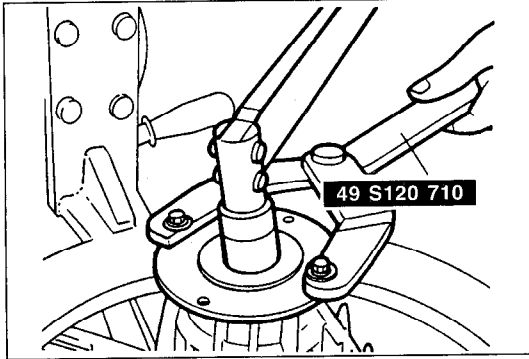
1. Mount the transfer carrier assembly on the **SST**.

Bearing caps

1. Mark one bearing cap and the carrier.

Adjusting nuts

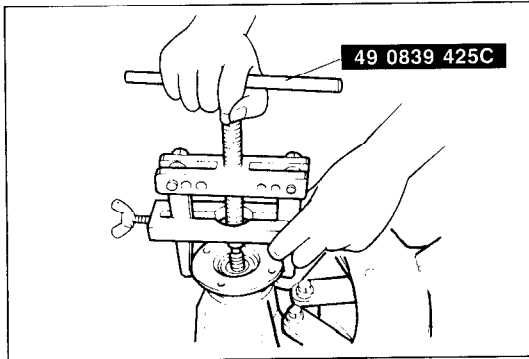
1. Mark one adjusting nuts and the carrier.



03U0K2-247

Locknut

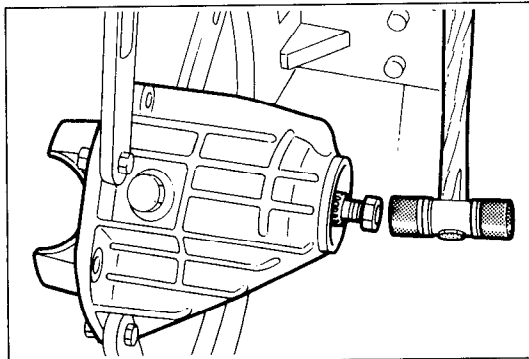
1. Hold the companion flange with the **SST** and remove the locknut.



03U0K2-248

Companion flange

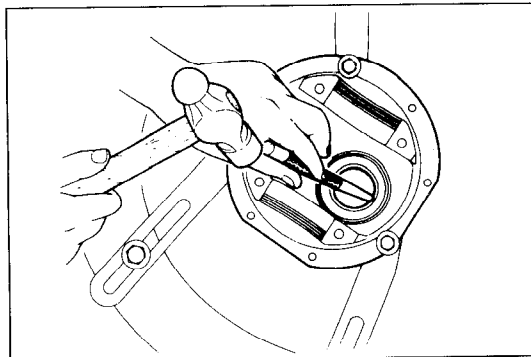
1. Remove the companion flange with the **SST**.



03U0K2-249

Drive pinion

1. Push the drive pinion out by attaching a miscellaneous locknut to it, then tapping it with a brass hammer.



03U0K2-250

Bearing outer race

Note

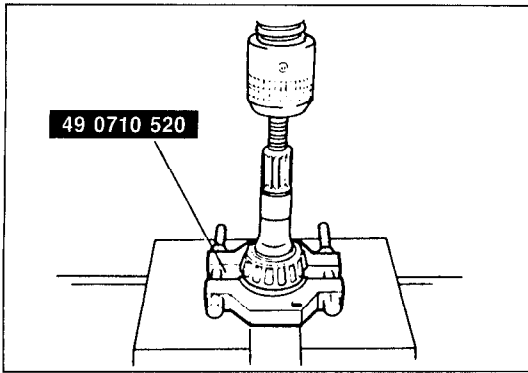
- For proper reassembly, identify the bearing outer race.

1. Remove the bearing outer races by using the two grooves in the carrier and tapping the races alternately.

Bearing inner race (Rear bearing)**Note**

- Support the drive pinion by hand so that it will not fall.

1. Remove the bearing inner race (rear bearing) with the **SST**.

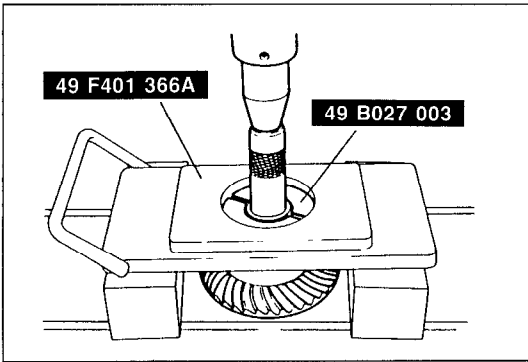


03U0K2-251

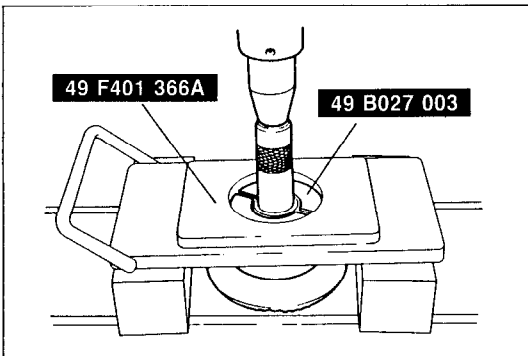
Bearing inner race (Differential gear)**Note**

- Do not disassemble the bearing inner race unless necessary.
- For proper reassembly, identify the bearing inner race.
- Support the drive pinion by hand so that it will not fall.

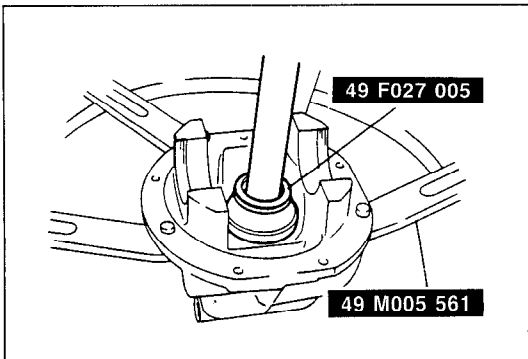
1. Remove the bearing inner race with the **SST**.



03U0K2-252

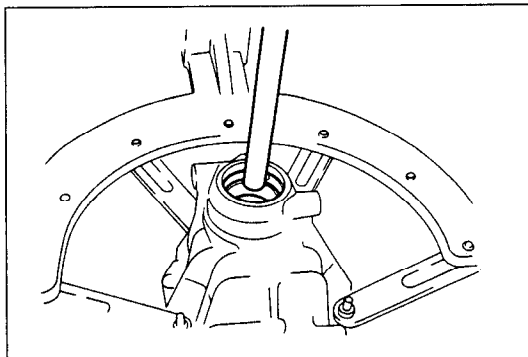
**Assembly note****Adjustment of pinion height**

1. Install the bearing inner race with the **SST**.

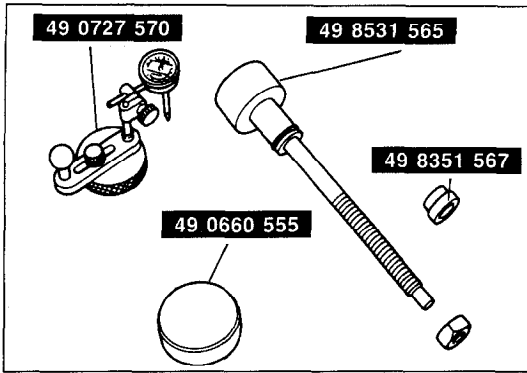


03U0K2-253

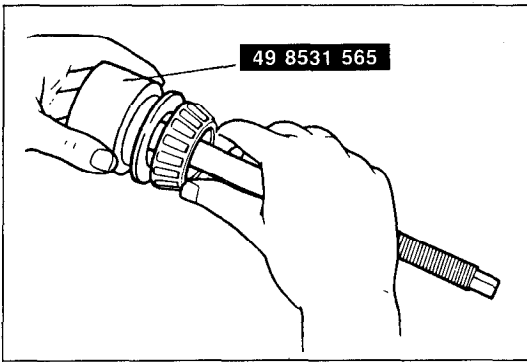
2. Install the bearing outer race with a brass drift.



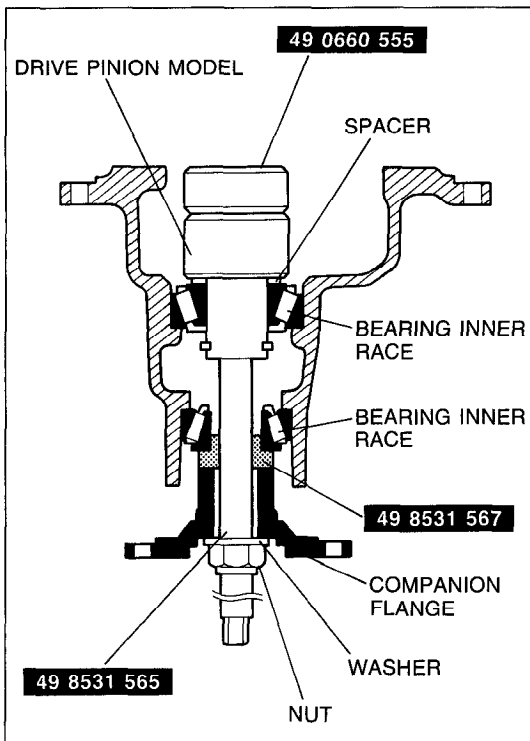
03U0K2-254



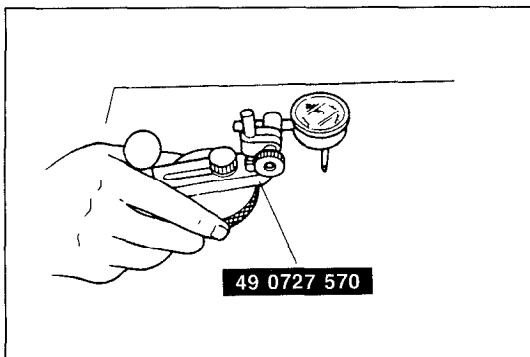
9MU0MX-052



9MU0MX-053



9MU0MX-054



9MU0MX-055

3. Adjust the drive pinion height as follows with the **SST**.

Note

- Use the spacer that was removed.

a) Install the spacer and bearing inner race to the **SST**.

b) Assemble the spacer, rear bearing, and **SST**. Secure the **SST** with the O-ring. Install the assembly in the carrier.

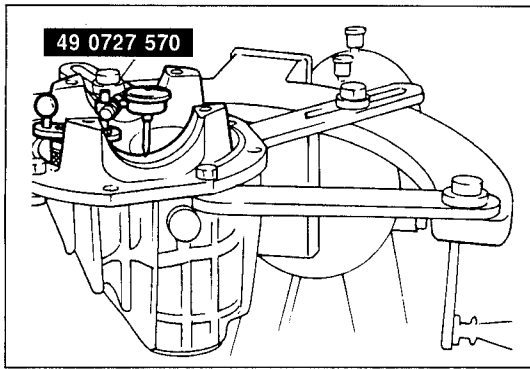
Note

- Use the same spacer and nut removed during disassembly.

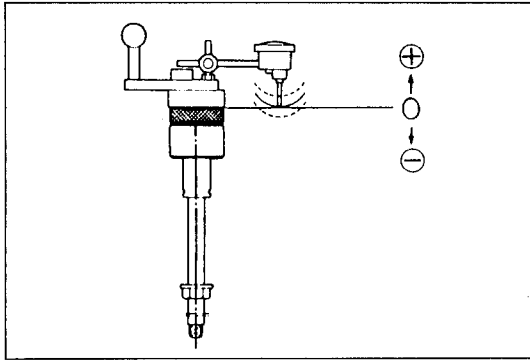
c) Install the front bearing, **SST**, companion flange, washer, and nut.

d) Tighten the nut to the extent that the companion flange can still be turned by hand.

e) Place the **SST** on the surface plate and set the dial indicator to "Zero".



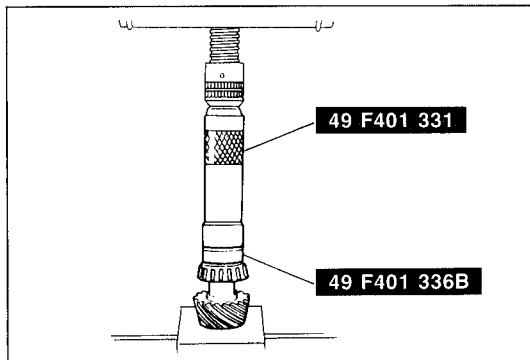
9MU0MX-056



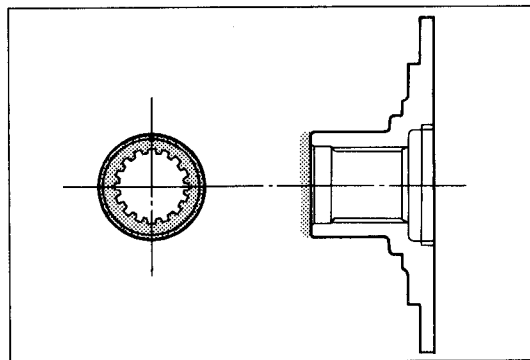
9MU0MX-057

Mark	Thickness	Mark	Thickness
08	3.08mm (0.1213 in)	29	3.29mm (0.1295 in)
11	3.11mm (0.1224 in)	32	3.32mm (0.1307 in)
14	3.14mm (0.1236 in)	35	3.35mm (0.1319 in)
17	3.17mm (0.1248 in)	38	3.38mm (0.1331 in)
20	3.20mm (0.1260 in)	41	3.41mm (0.1343 in)
23	3.23mm (0.1271 in)	44	3.44mm (0.1354 in)
26	3.26mm (0.1283 in)	47	3.47mm (0.1366 in)

9MU0MX-058



9MU0MX-059



05U0MX-106

- f) Place the **SST** atop the drive pinion model; then set the gauge body atop the gauge block.
- g) Place the feeler of the dial indicator so that it contacts where the side bearing is installed in the carrier. Measure the lowest position on both the left and right sides.

- h) Add the two (left and right) values obtained by the measurements taken in step g, and divide the total by 2.

Standard: 0mm (0 in)

Note

- The spacer thicknesses are available in increments of 0.03mm. Select the spacer thickness that is closest to that necessary.

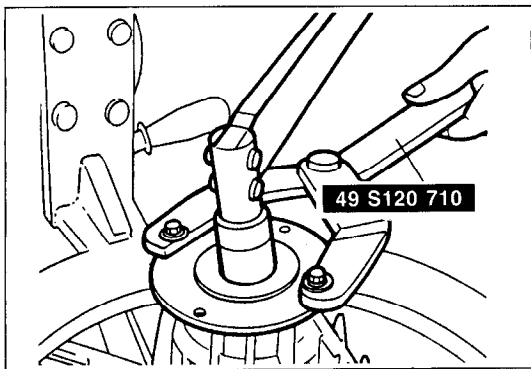
- i) If it is not within specification, adjust the pinion height by selection of a spacer.

Adjustment of drive pinion preload

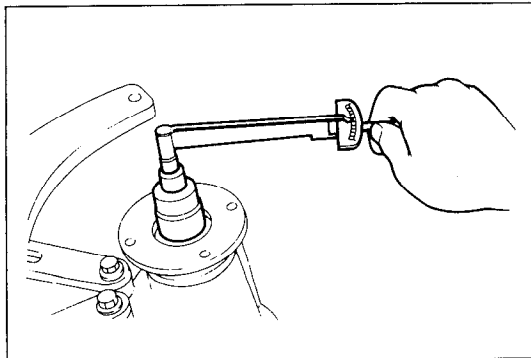
Note

- Press on until the force required suddenly increases.
- Install the spacer selected for the pinion height adjustment, being careful that the installation direction is correct.

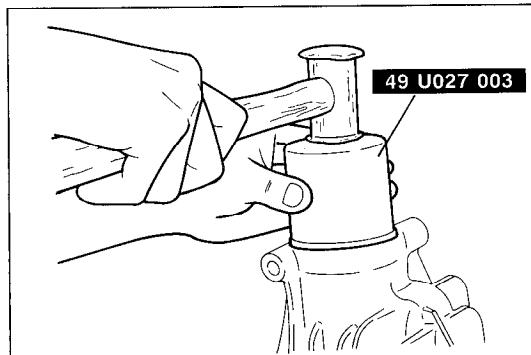
1. Install the spacer.
2. Press the rear bearing on with the **SST**.
3. Apply a light coat of grease to the end face of the companion flange.



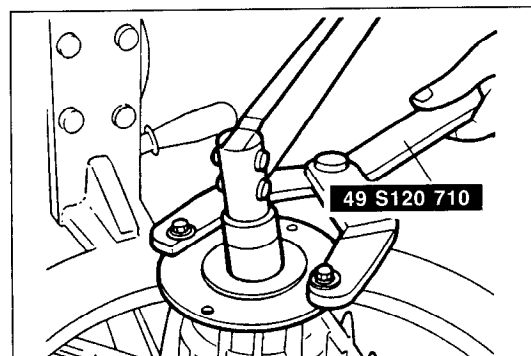
05U0MX-107



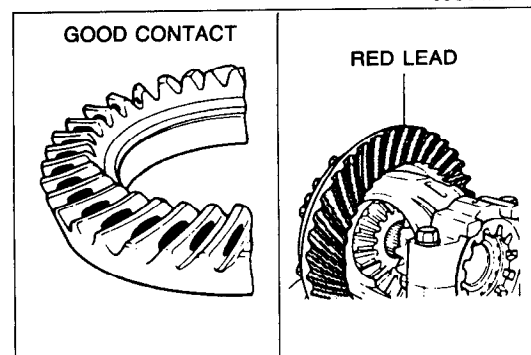
05U0MX-108



05U0MX-109



05U0MX-110



9MU0MX-067

4. Install a new collapsible spacer.
5. Install the drive pinion assembly.

Note

- Do not install the oil seal.

6. Install the companion flange, and tighten the locknut with the **SST**.

Tightening torque: 118 N·m (12 m·kg, 87 ft·lb)

7. Turn the companion flange several turns by hand to seat the bearing.
8. Measure the drive pinion preload. Adjust the preload by tightening the locknut and record the tightening torque.

Preload:

0.3—0.7 N·m (3—7 cm·kg, 2.6—6.1 in·lb)

Tightening torque:

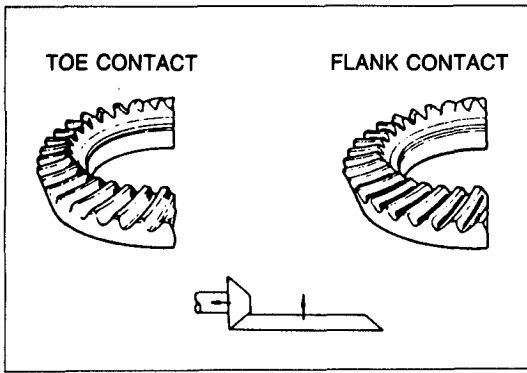
118—177 N·m (12—18 m·kg, 87—130 ft·lb)

9. Remove the nut, washer, and companion flange.
10. Tap a new oil seal into the differential carrier with the **SST**.

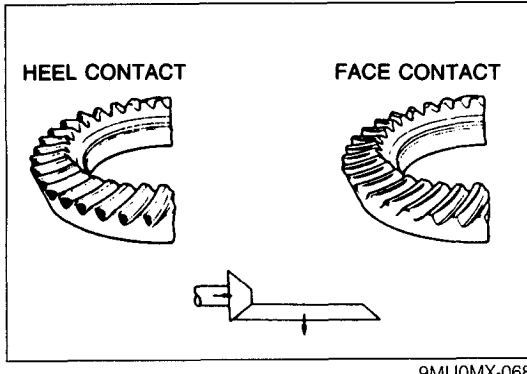
11. Install the companion flange and washer, and tighten the locknut to the tightening torque recorded in Step 8.

Inspection and adjustment of teeth contact

1. Coat both surfaces of 6—8 teeth of the ring gear with a uniformly thin coat of red lead.
2. While moving the ring gear back and forth by hand, rotate the drive pinion several times and check the tooth contact.
3. If the tooth contact is good, wipe off the red lead.
4. If it is not good, adjust the pinion height, and then adjust the backlash.



- (1) Toe and flank contact
Replace the spacer with a thinner one to move the drive pinion outward.



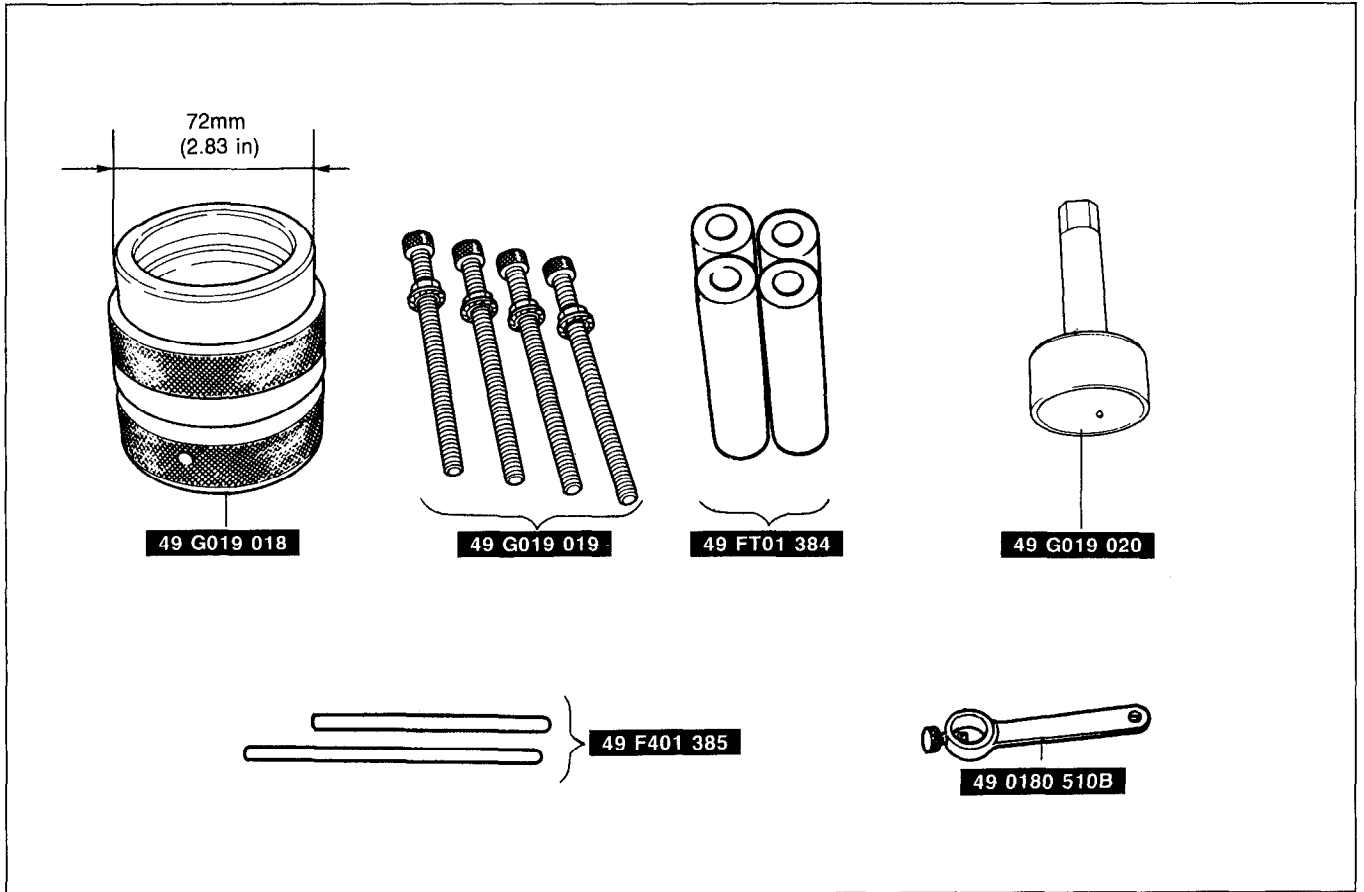
- (2) Heel and face contact
Replace the spacer with a thicker one to bring the drive pinion inward.

BEARING PRELOAD Procedure

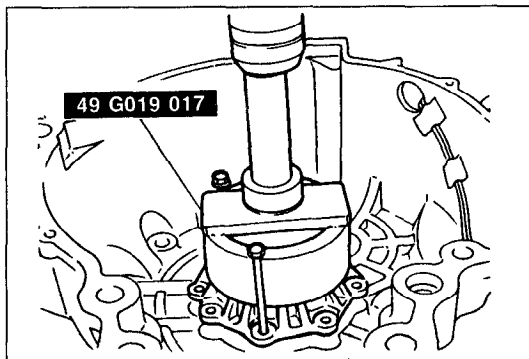
Note

- Use the SST shown below to adjust the preload.

1. Measure the output gear bearing preload, and select the proper adjustment shim(s) as described below.



03U0KX-421

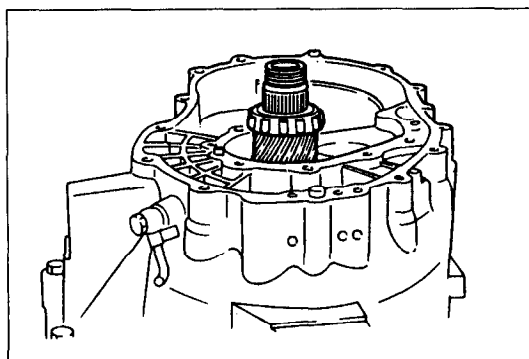


03U0KX-422

- (1) Align the bearing cover with guide bolts as shown, and press it in. Tighten the bearing cover bolts.

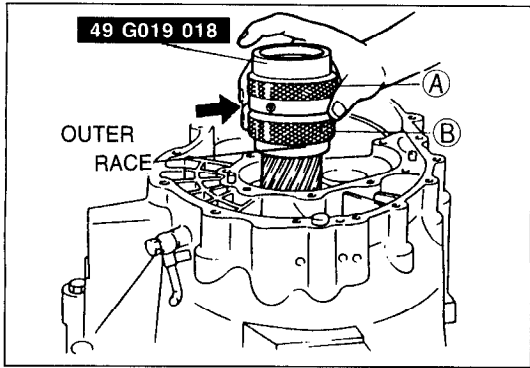
Tightening torque:

11—14 N·m (1.1—1.4 m·kg, 8—10 ft·lb)

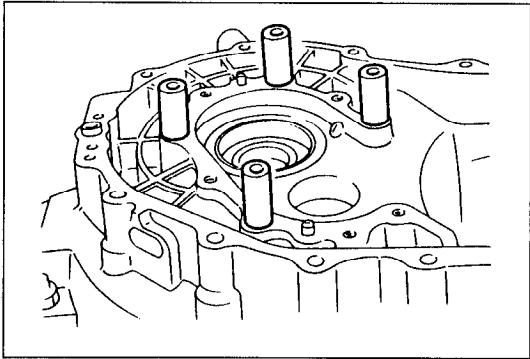


03U0KX-423

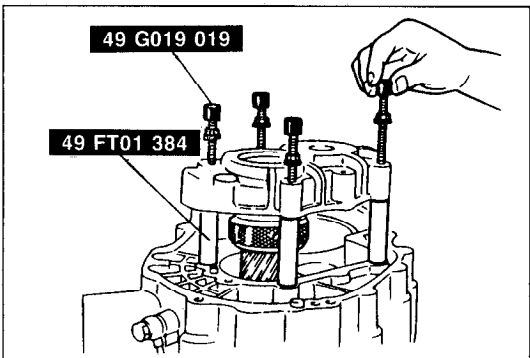
- (2) Install the converter housing onto the transaxle hanger.
- (3) Remove the bearing outer race and adjustment shims from the bearing housing.
- (4) Set the output gear assembly into the converter housing.



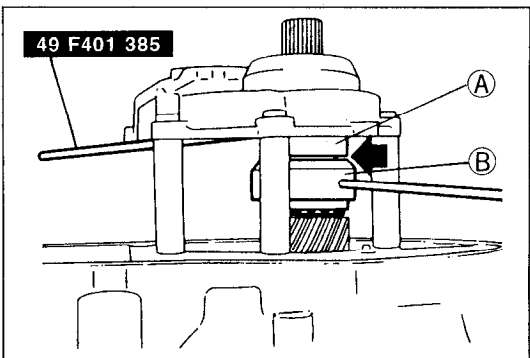
03U0KX-424



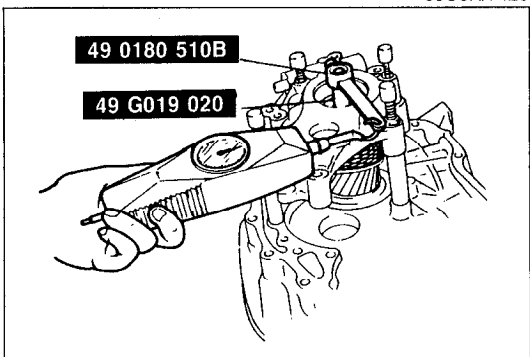
76G07B-723



03U0KX-425



03U0KX-426



03U0KX-427

Caution

- Eliminate the gap (arrow) by turning A or B of the selector.

(5) Install the outer race removed in Step (3) to the **SST**. Set the **SST** and outer race onto the output gear assembly.

(6) Set the four **SST** on the converter housing in the positions shown.

(7) Set the bearing housing on the **SST** (selector) and install the four **SST** (bolts); then tighten them to the specified torque.

Tightening torque:

19—26 N·m (1.9—2.6 m·kg, 14—18 ft·lb)

Note

- Seat the bearing.

(8) Turn the **SST** (selector) to increase the clearance indicated by the arrow with the **SST** (bars) until it no longer turns.

(9) Turn the selector in the opposite direction until the gap is reduced.

(10) Mount the **SST** and pull scale or torque wrench on the output gear.

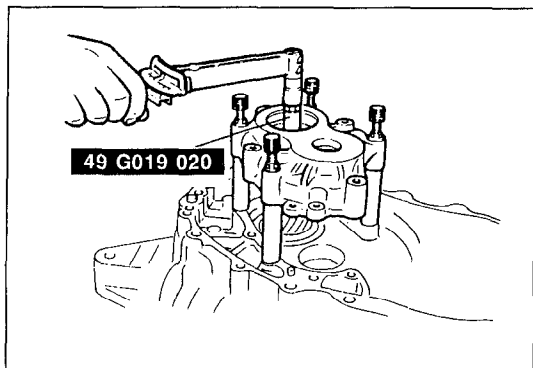
(11) Adjust the clearance between A and B to obtain the specified preload/pull scale reading.

Preload:

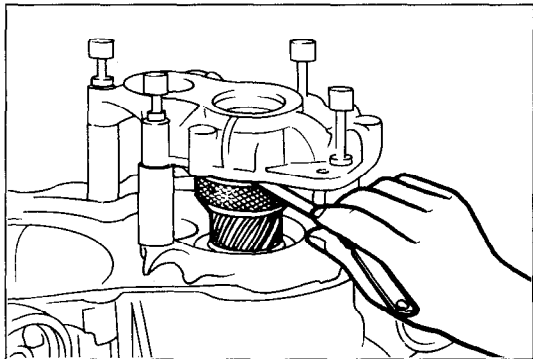
0.03—0.9 N·m (0.3—9.0 cm·kg, 0.26—7.81 in·lb)

Reading on pull scale:

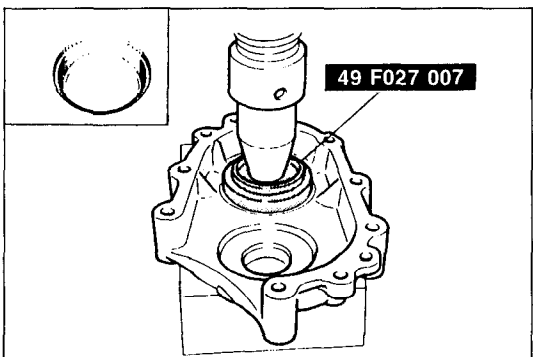
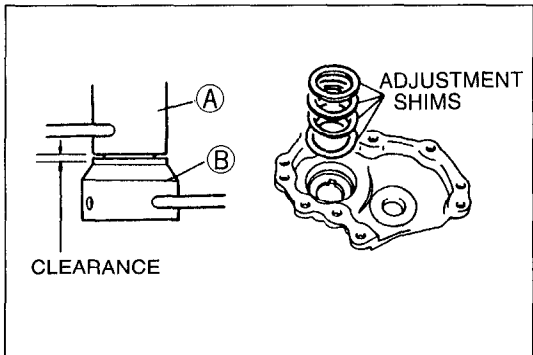
0.3—9 N (0.03—0.9 kg, 0.066—1.98 lb)



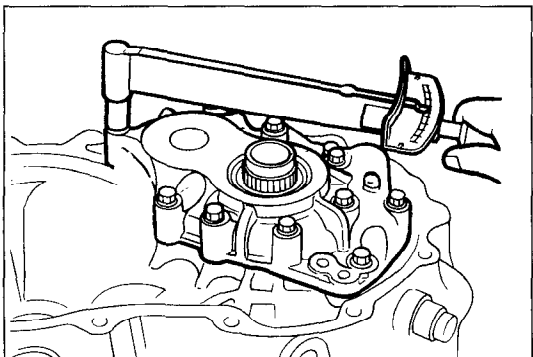
86U07B-361



03U0KX-428



76G07B-728



03U0KX-429

Note

- Read the preload when the output gear starts to turn.

Caution

- Measure the clearance around the entire circumference, and select shims equivalent to the maximum clearance.
- The maximum allowable number of shims is 7.

(12) Measure the clearance. Select adjustment shim(s) equivalent to the measured clearance.

Thickness of shim mm (in)			
0.50 (0.020)	0.55 (0.022)	0.60 (0.024)	0.65 (0.026)
0.70 (0.028)	0.75 (0.030)	0.80 (0.032)	0.85 (0.034)
0.90 (0.035)	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)
1.10 (0.043)	1.15 (0.045)	1.20 (0.047)	1.25 (0.049)
1.30 (0.051)	1.35 (0.053)	1.40 (0.055)	1.45 (0.057)

- (13) Remove the bearing housing and **SST**.
 (14) Install the required shim(s) and press the bearing race into the bearing housing with the **SST**.

(15) Install the bearing housing.

Tightening torque:

19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

(16) Verify that the preload/pull scale reading is within specification. If not within specification return to Step (3).

Preload:

0.03—0.9 N·m (0.3—9.0 cm·kg, 0.26—7.81 in·lb)

Reading on pull scale:

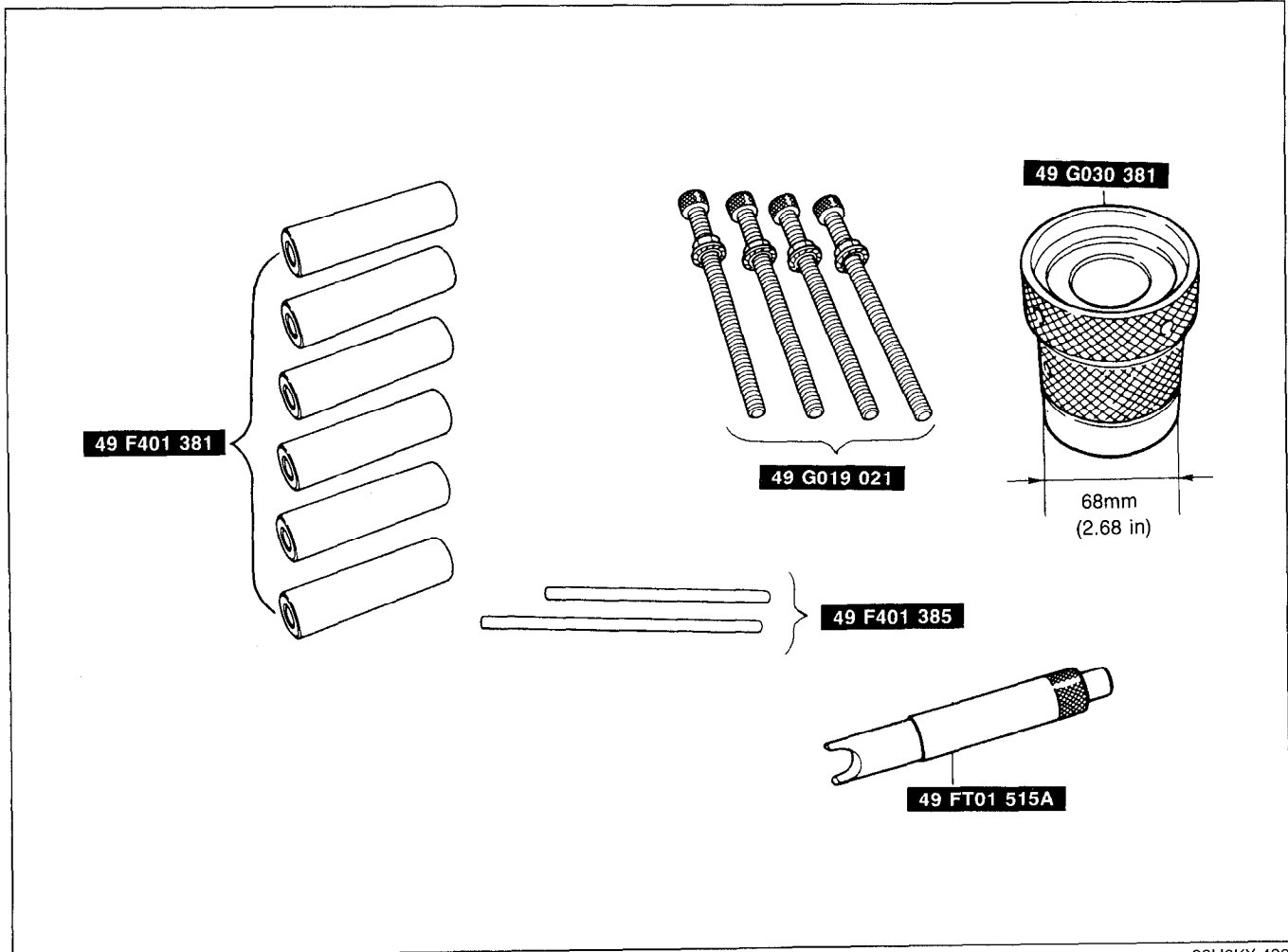
0.3—9 N (0.03—0.9 kg, 0.066—1.98 lb)

(17) Remove the bearing housing and output gear assembly.

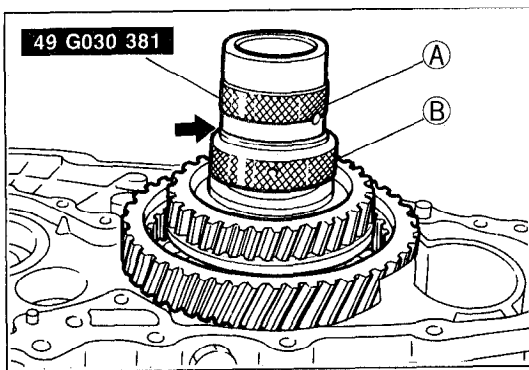
Note

- Use the **SST** shown below to inspect and adjust the preload.

2. Measure the differential side bearing preload, and select the proper adjustment shim(s) as described below.



03U0KX-430



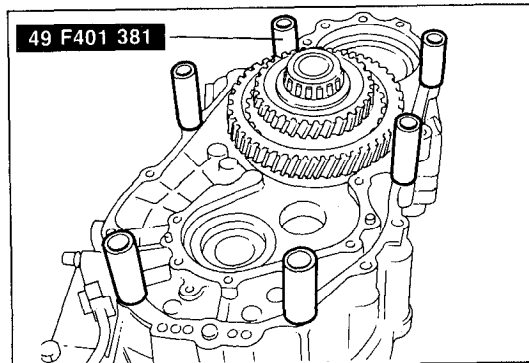
03U0KX-431

- (1) Remove the bearing outer race and adjustment shims from the transaxle case.
- (2) Set the differential assembly into the converter housing.

Caution

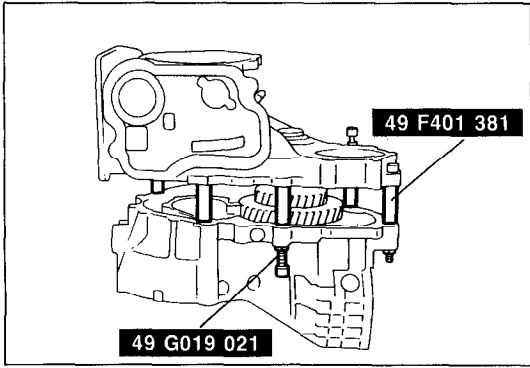
- Eliminate the gap (arrow) by turning either **A** or **B** of the selector.

- (3) Install the outer race removed in Step (1) into the **SST**. Set the **SST** and outer race onto the differential assembly.

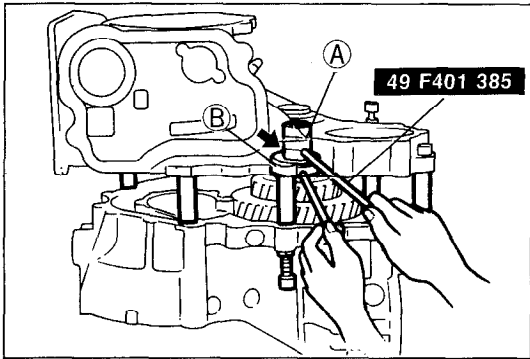


03U0KX-432

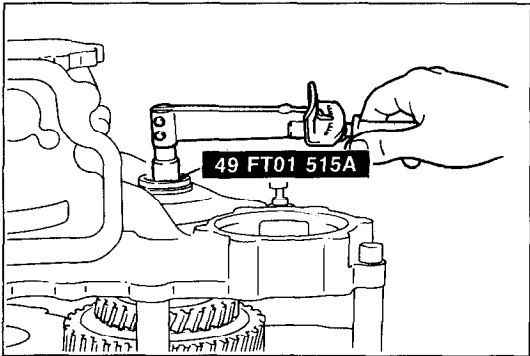
- (4) Set the six **SST** on the converter housing in the positions shown.



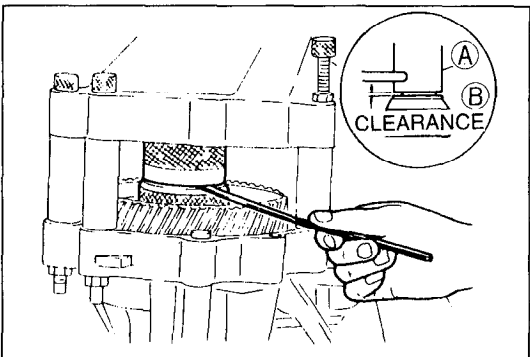
86U07B-370



03U0KX-434



03U0K2-320



86U07B-373

- (5) Set the transaxle case on the selectors.
- (6) Tighten the **SST** (bolts) to the specified torque.

Tightening torque:

36—52 N·m (3.7—5.3 m·kg, 27—38 ft·lb)

Note

- **Seat the bearing.**
- **Bend the bar as shown to turn the SST at B.**

- (7) Turn the **SST** (selector) to increase the clearance indicated by the arrow with the **SST** (bars), until it no longer turns.
- (8) Turn the selector in the opposite direction until the gap is reduced.

- (9) Insert the **SST** through the transaxle case and attach it to the side gear.
- (10) Mount the **SST** and pull scale or torque wrench.

Note

- **Read the preload when the differential starts to turn.**

- (11) Adjust the clearance between A and B to obtain the specified preload/pull scale reading.

Preload: 2.9—3.9 N·m (30—40 cm·kg, 26—35 in·lb)

Reading on pull scale:

29—39 N (3.0—4.0 kg, 6.6—8.8 lb)

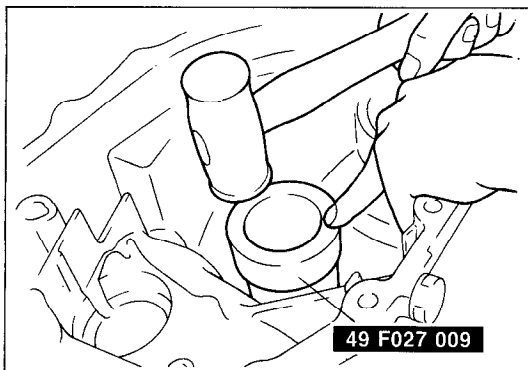
- (12) Measure the clearance between A and B.
- (13) Add **0.3mm (0.0118 in)** to the measured clearance, and select the shim(s) closest in value to that measurement.

Caution

- **Measure the clearance around the entire circumference, and select shims based on the maximum clearance.**
- **The maximum allowable number of shims is 3.**

Thickness of shim mm (in)			
0.50 (0.020)	0.55 (0.022)	0.60 (0.024)	0.65 (0.026)
0.70 (0.028)	0.75 (0.030)	0.80 (0.032)	0.85 (0.034)
0.90 (0.035)	0.95 (0.037)	1.00 (0.039)	1.05 (0.041)
1.10 (0.043)	1.15 (0.045)	1.20 (0.047)	1.25 (0.049)
1.30 (0.051)	1.35 (0.053)	1.40 (0.055)	1.45 (0.057)

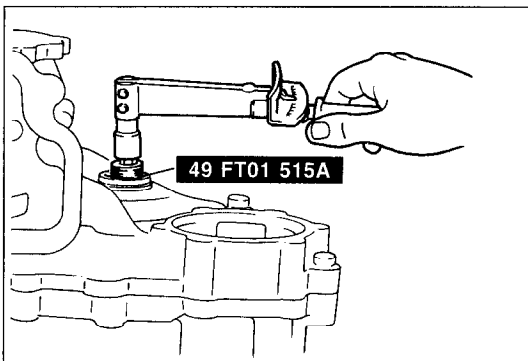
03U0KX-436



49 F027 009

03U0KX-437

- (14) Remove the transaxle case and **SST**.
 (15) Install the required shim(s) and tap the bearing race into the transaxle case.



49 FT01 515A

03U0K2-321

- (16) Install the transaxle case.

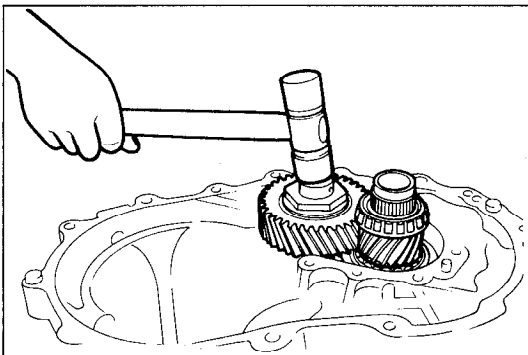
Tightening torque:
37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

- (17) Verify that the preload is within specification. If not within specification, return to Step (1).

Preload: 2.9—3.9 N·m (30—40 cm·kg, 26—35 in·lb)

- (18) Remove the transaxle case.

3. Install the idler gear and output gear as an assembly by tapping in with a plastic hammer.

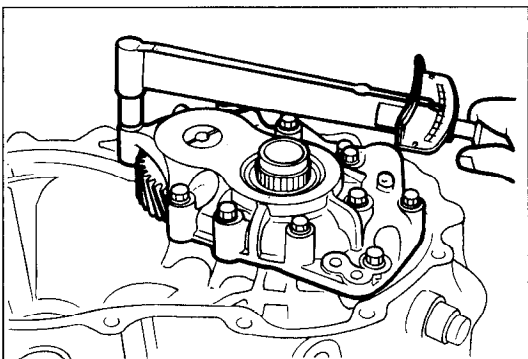


03U0KX-439

4. Install the bearing housing.
 (1) Mount the bearing housing onto the converter housing.

Tightening torque:
19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

- (2) Align the groove on the idler shaft with the mark on the bearing housing.
 (3) Tap a new roll pin in with a pin punch and hammer.

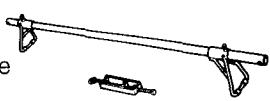
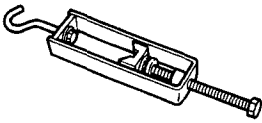

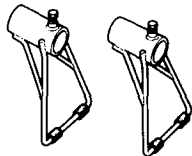


03U0KX-440

TRANSAXLE AND TRANSFER UNIT (ASSEMBLY)

Preparation

SST

<p>49 G017 5A0 Support, engine</p> 	<p>For support of engine</p>	<p>49 G017 503 Hook (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>
<p>49 G017 501 Bar (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>	<p>49 G017 502 Support (Part of 49 G017 5A0)</p> 	<p>For support of engine</p>

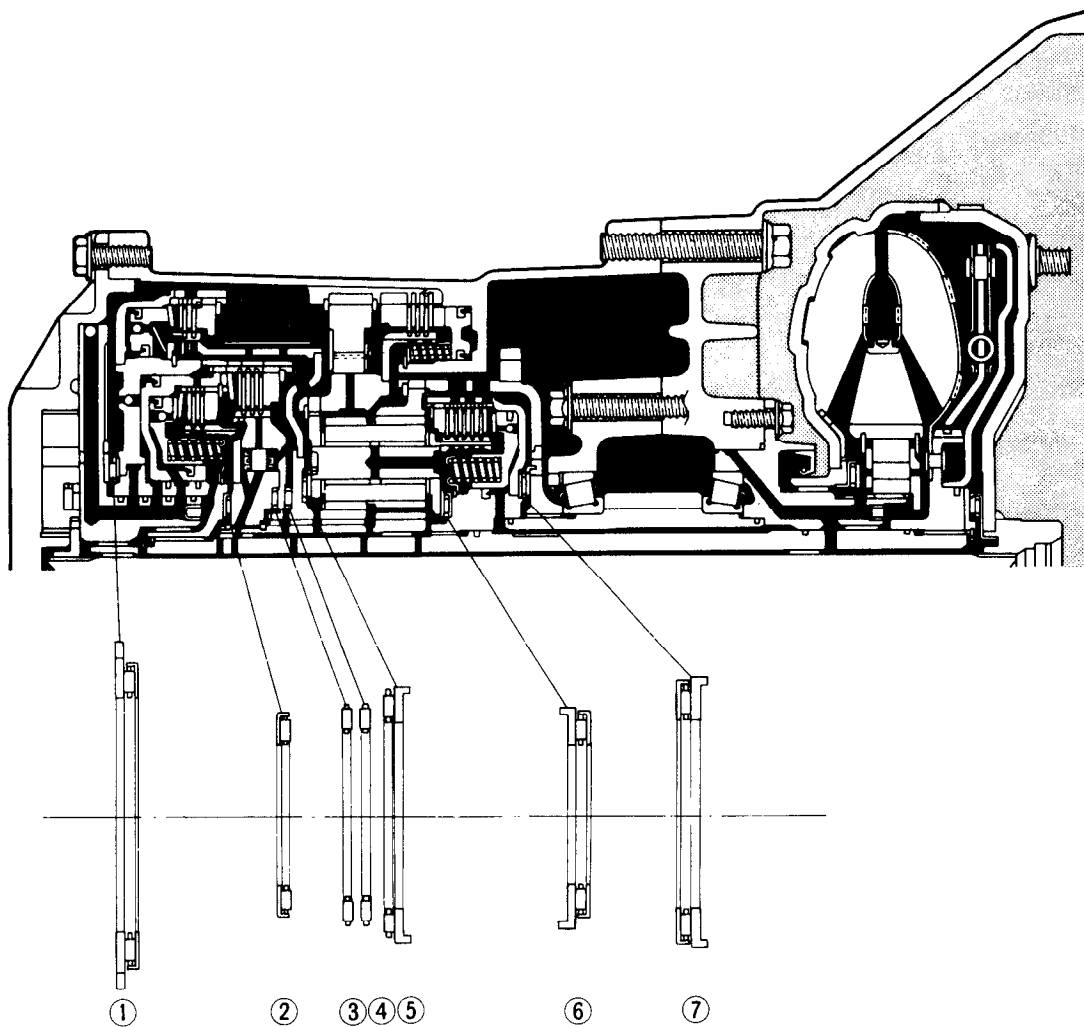
03U0K2-255

Precaution

1. If the drive plates or brake band are replaced with new ones, soak the new part in ATF for at least 2 hours before installation.
2. Before assembly, apply ATF to all seal rings, rotating parts, O-rings, and sliding parts.
3. All O-rings, seals, and gaskets must be replaced with the new ones included in the overhaul kit.
4. Use petroleum jelly, not grease, during reassembly.
5. When it is necessary to replace a bushing, replace the subassembly that includes that bushing.
6. Assemble the housing within 10 minutes after applying sealant, and allow it to cure at least 30 minutes after assembly before filling the transaxle with ATF.

03U0KX-442

Bearing, and race locations



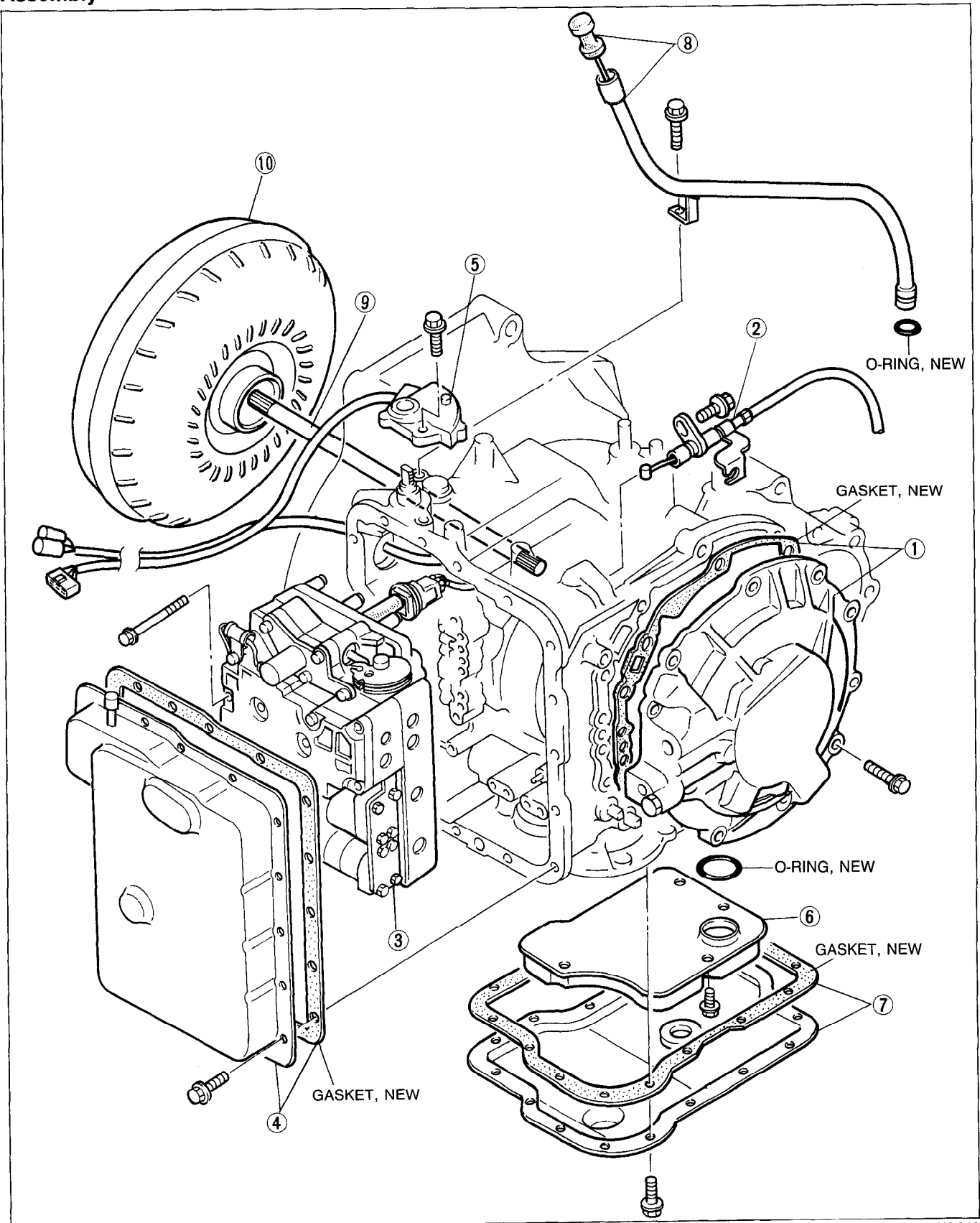
03U0KX-443

Outer diameter of bearing and race

		1	2	3	4	5	6	7
Bearing	mm (in)	86.0 (3.39)	56.1 (2.21)	62.1 (2.44)	62.1 (2.44)	72.0 (2.83)	56.1 (2.21)	72.1 (2.84)
Race	mm (in)	88.0 (3.46)				72.0 (2.83)	57.0	

03U0K2-322

Assembly

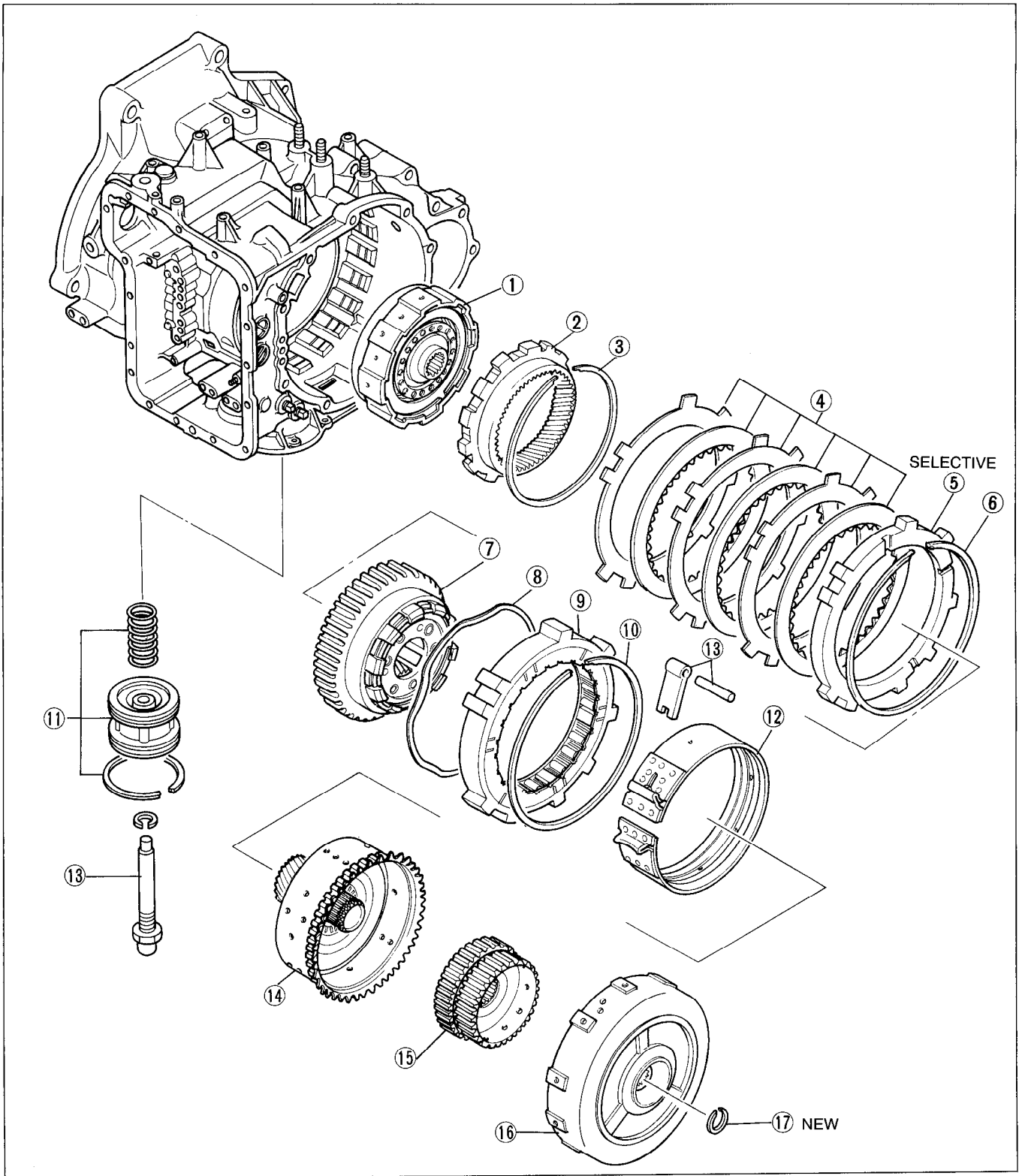


03U0K2-256

- 1. Oil pump and gasket
- 2. Throttle cable
- 3. Control valve body assembly
- 4. Oil pan and gasket

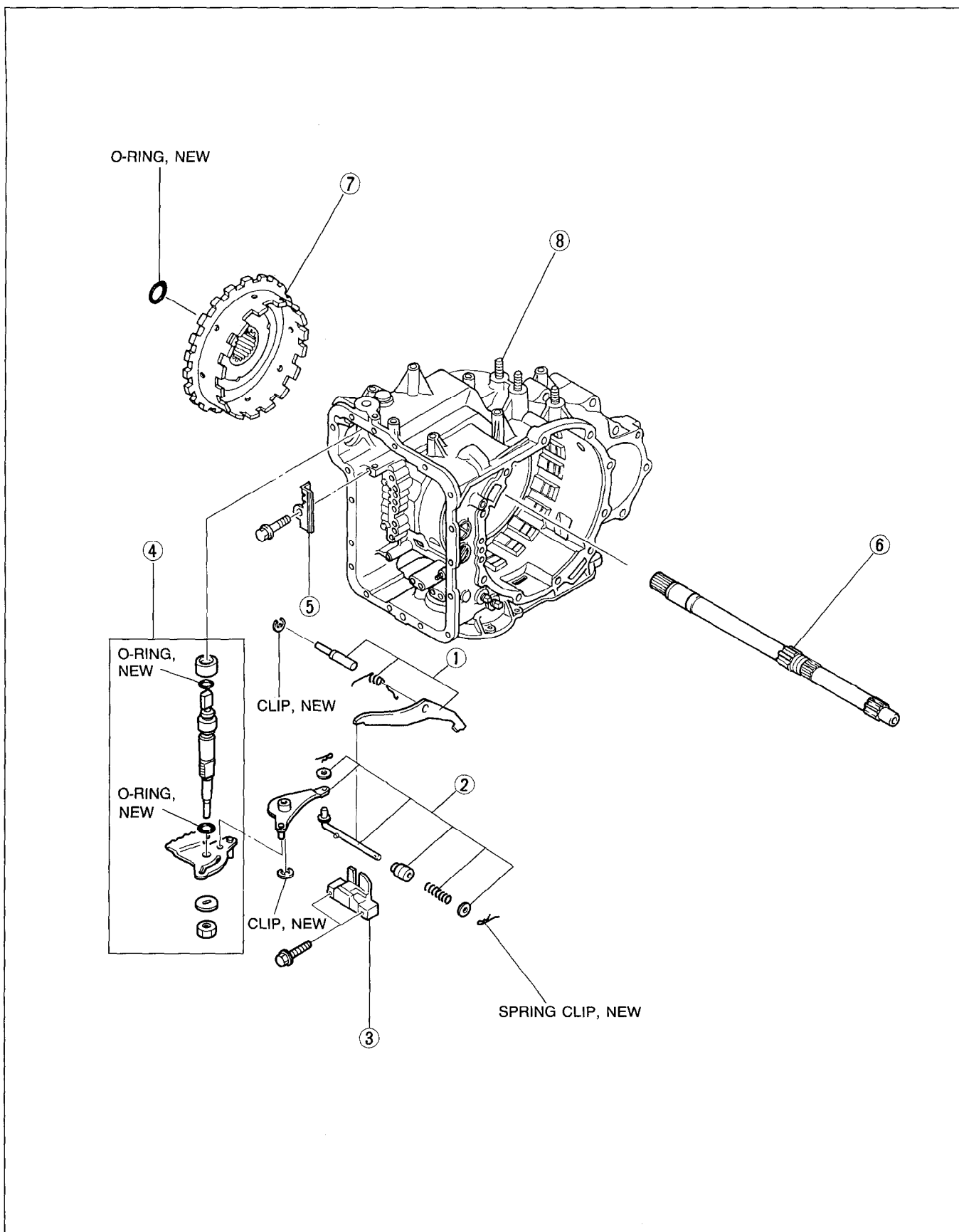
- 5. Inhibitor switch
- 6. Oil strainer
- 7. Oil pan and gasket

- 8. Oil level gauge and oil filler tube
- 9. Oil pump shaft
- 10. Torque converter



03U0K2-257

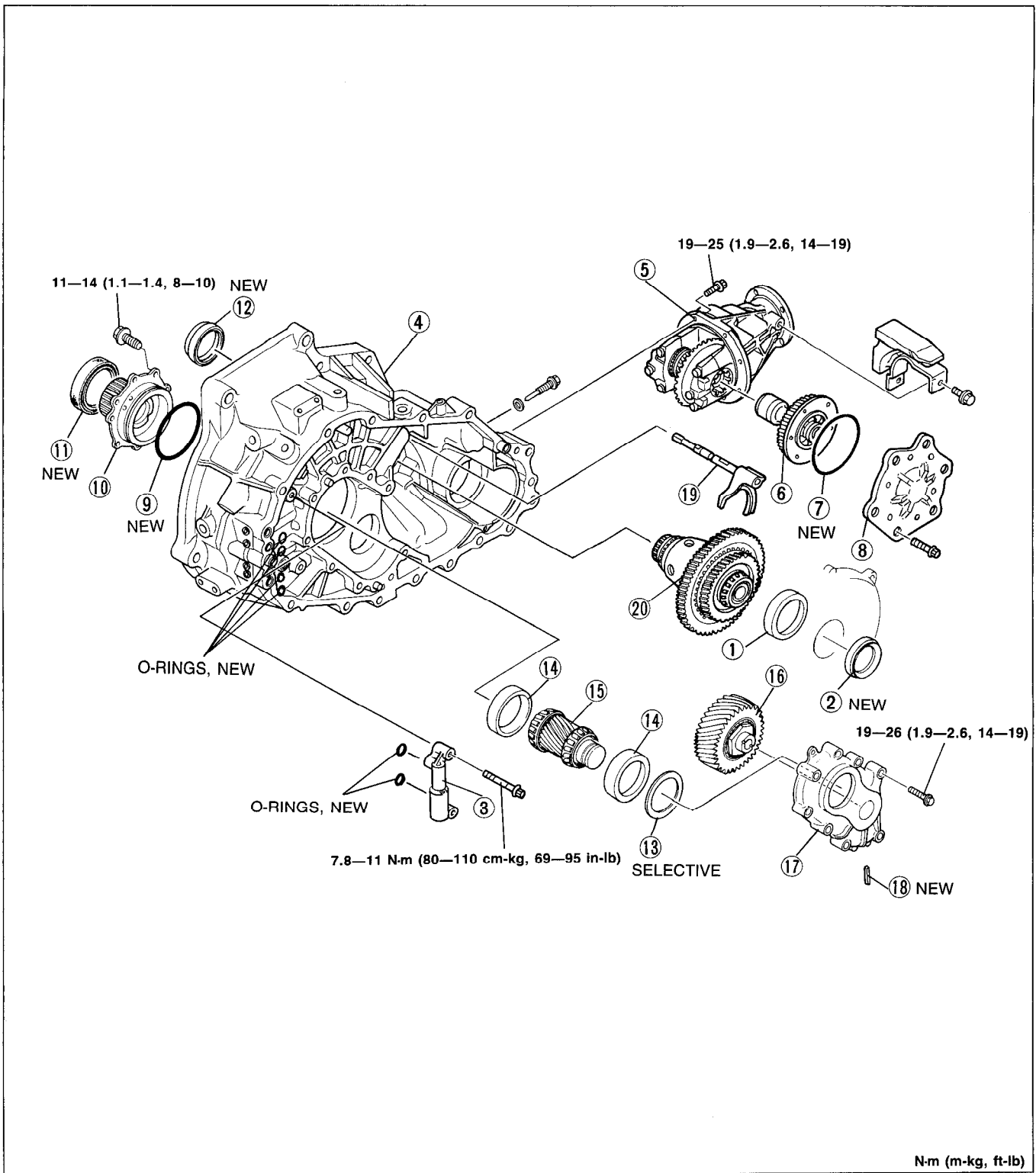
- | | |
|---------------------------------------------------|----------------------------|
| 1. 3-4 clutch assembly | 10. Snap ring |
| 2. Internal gear | 11. Servo |
| 3. Snap ring | 12. 2-4 brake band |
| 4. Low and reverse brake (Drive and drive plates) | 13. Anchor strut and shaft |
| 5. Retaining plate | 14. Small sun gear |
| 6. Snap ring | 15. One-way clutch |
| 7. Carrier hub | 16. Clutch assembly |
| 8. Wave washer | 17. Snap ring |
| 9. One-way clutch | |



03U0K2-258

- 1. Parking pawl
- 2. Parking assist lever
- 3. Actuator support
- 4. Manual shaft and manual plate

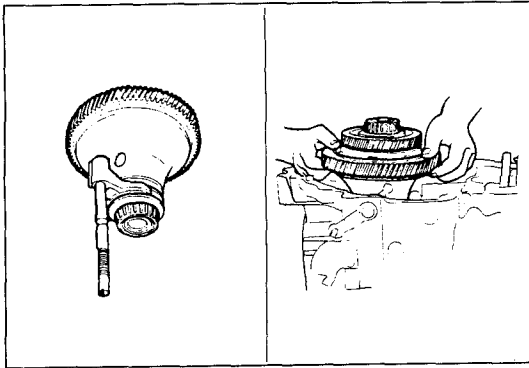
- 5. Bracket
- 6. Turbine shaft
- 7. Output shell
- 8. Transaxle case



N-m (m-kg, ft-lb)

03U0K2-259

- | | |
|----------------------------------------|----------------------------------------------|
| 1. Bearing outer race (Transaxle case) | 11. Oil seal (Bearing cover) |
| 2. Oil seal (Transaxle case) | 12. Oil seal |
| 3. 2-3 accumulator | 13. Adjustment shim |
| 4. Converter housing | 14. Bearing outer race |
| 5. Transfer carrier assembly | 15. Output gear |
| 6. Idler gear assembly (Transfer) | 16. Idler gear assembly (Transaxle) |
| 7. O-ring | 17. Bearing housing |
| 8. Side cover | 18. Roll pin |
| 9. O-ring | 19. Front and center differential shift fork |
| 10. Bearing cover | 20. Front and center differential assembly |

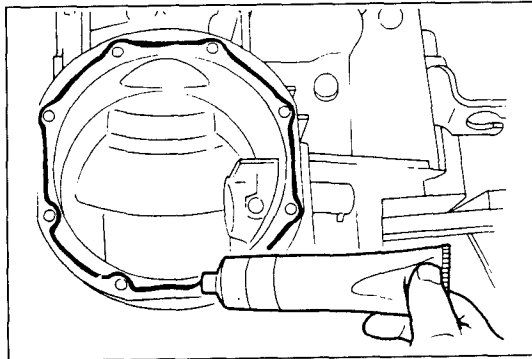


03U0K2-260

1. Assemble the center differential lock shift fork assembly to the center differential assembly, and install the center differential assembly into the clutch housing.
2. Install the set bolt.

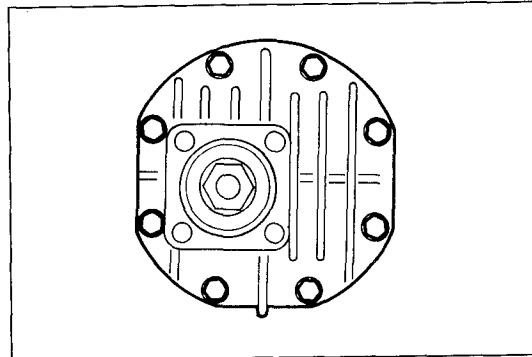
Note

- Before coating with sealant, clean the contact surfaces.



03U0K2-261

3. Coat both surfaces with sealant.

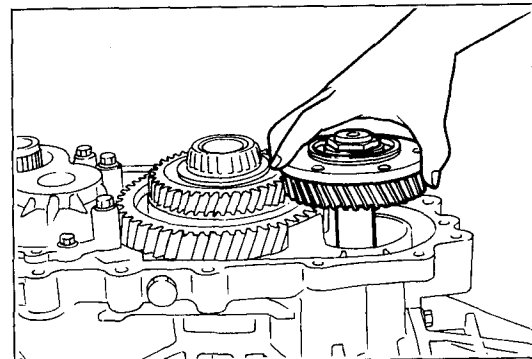


03U0K2-262

4. Install the transfer carrier assembly.

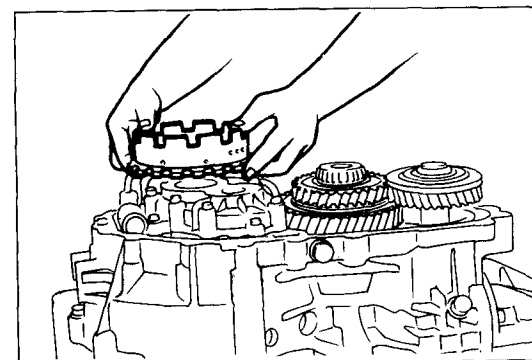
Tightening torque:

25—30 N·m (2.5—3.1 m·kg, 18—22 ft·lb)



03U0K2-263

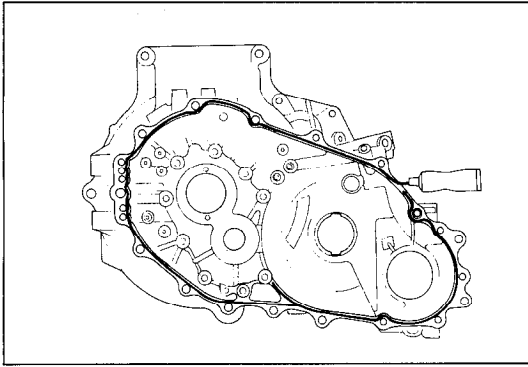
5. Install the idle gear.



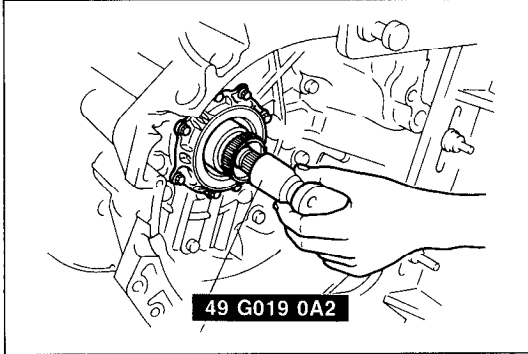
03U0K2-264

6. Install the output shell to the output gear, and install the bearing race onto the output shell.

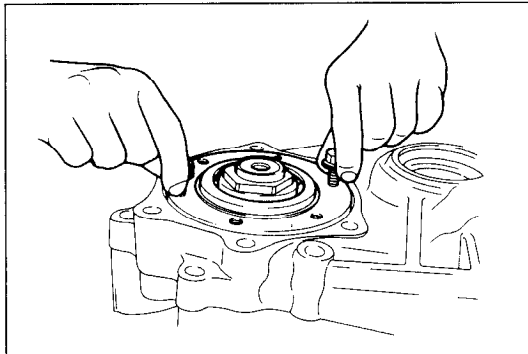
Thrust bearing outer diameter: 72.1mm (2.84 in)



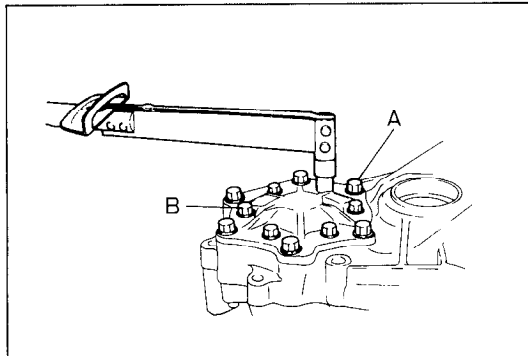
03U0K2-265



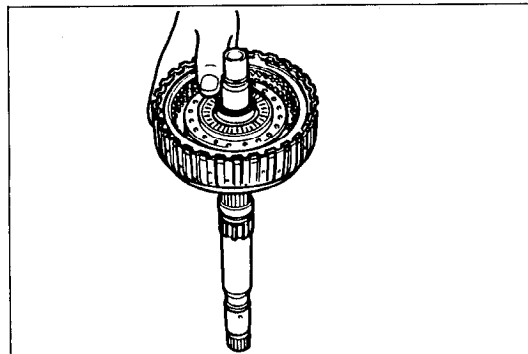
03U0K2-266



03U0K2-267



03U0K2-268



03U0KX-461

7. Apply a thin coat of silicone sealant to the contact surfaces of the converter housing and transaxle case.
8. Install the new O-rings.
9. Mount the transaxle case to the converter housing.

Tightening torque:**37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)**

10. Install the **SST** to hold the turbine shaft.

11. Lift the idle gear slightly.
12. Install a new oil seal.

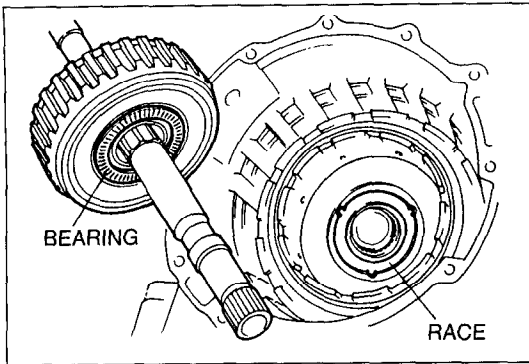
Note

- Before coating with sealant, clean the contact surfaces.

13. Coat the side cover and the converter housing with sealant.
14. Install the side cover.

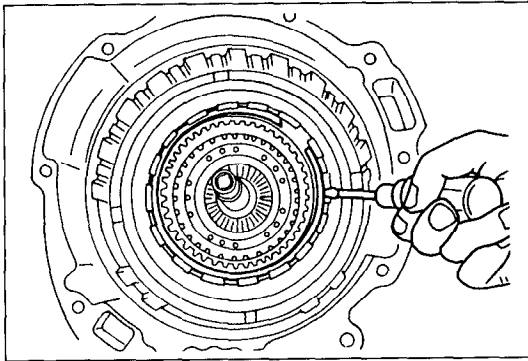
Tightening torque:**A 37—52 N·m (3.8—5.3 m·kg, 27.5—38.3 ft·lb)****B 19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)**

15. Install the turbine shaft and 3-4 clutch assembly.
 - (1) Assemble the turbine shaft and 3-4 clutch assembly.



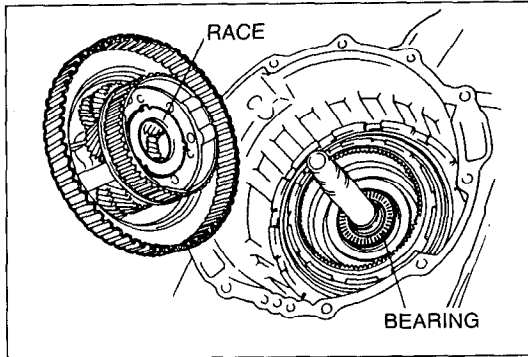
03U0KX-462

- (2) Verify that the thrust bearing is properly installed.
- (3) Install the turbine shaft and 3-4 clutch assembly into the transaxle case.



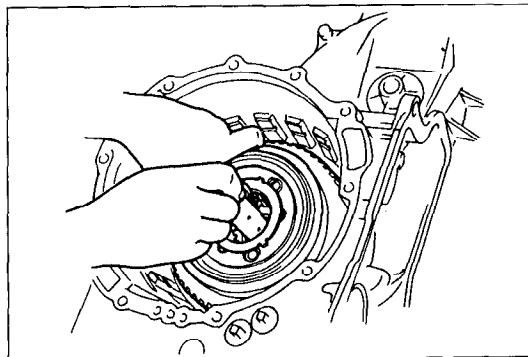
03U0KX-463

16. Install the internal gear.
 - (1) Install the internal gear to the 3-4 clutch drum.
 - (2) Install the snap ring.



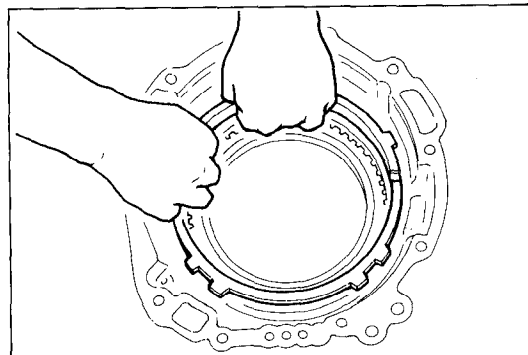
03U0KX-464

17. Install the carrier hub assembly.
 - (1) Verify that the thrust bearing and bearing race are properly installed.



86U07B-401

- (2) Hold the turbine shaft with one hand to prevent it from rotating.
- (3) Install the carrier hub assembly into the 3-4 clutch drum by rotating it.

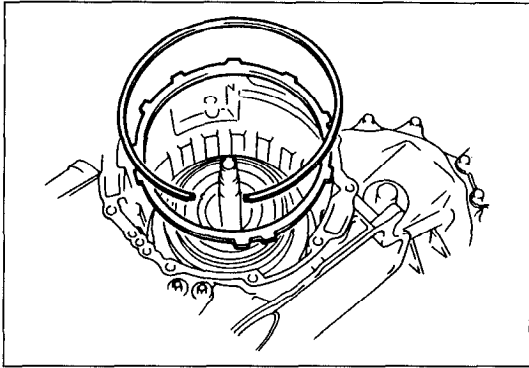


03U0KX-465

18. Install the drive and driven plates.

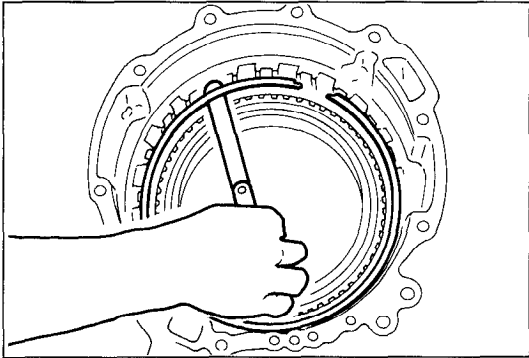
Note

- **Installation order:**
Driven-Drive-Driven-Drive-Driven-Drive-
Driven-Drive



03U0KX-466

19. Install the retaining plate.
20. Install the snap ring.



03U0K2-269

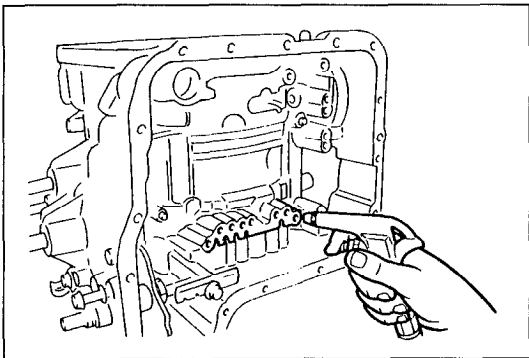
21. Check the low and reverse brake clearance.
 - (1) Measure the clearance between the snap ring and the low and reverse brake retaining plate.
 - (2) If the clearance is not within specification, adjust it by selecting a proper retaining plate.

Low and reverse brake clearance:
2.1—2.4mm (0.083—0.094 in)

Retaining plate sizes

mm (in)

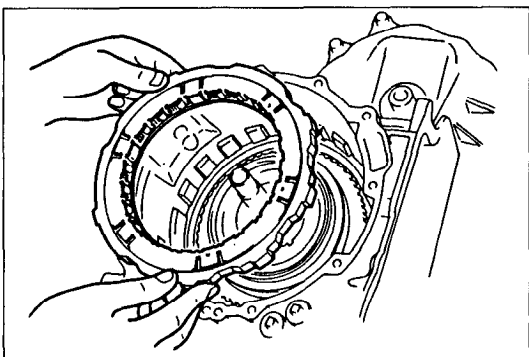
6.8 (0.268)	7.0 (0.276)	7.2 (0.283)
7.4 (0.291)	7.6 (0.299)	7.8 (0.307)



03U0K2-270

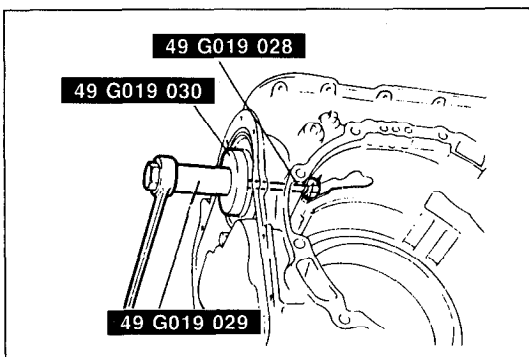
22. Check the low and reverse brake operation by applying compressed air through the fluid passage as shown in the figure.

Air pressure: 392 kPa (4.0 kg/cm², 57 psi)



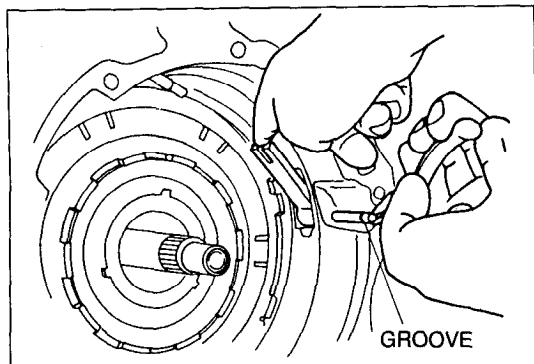
03U0K2-271

23. Install the wave washer.
24. Install the one-way clutch.
 - (1) Hold the one-way clutch horizontally.
 - (2) Install it by turning the carrier hub assembly counter-clockwise.
 - (3) Install the snap ring.



03U0K2-272

25. Install the servo to the transaxle case.
 - (1) Install the servo spring and servo.
 - (2) Compress the servo with the **SST**.
 - (3) Install the snap ring.
 - (4) Remove the **SST**.
 - (5) Install the piston stem.

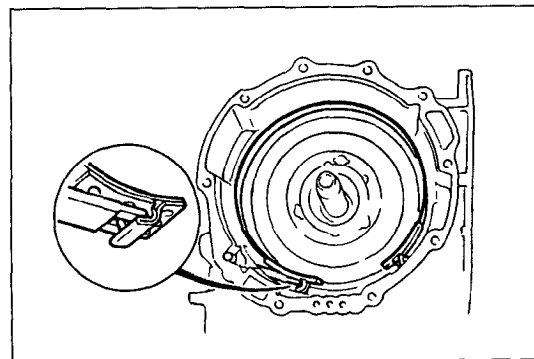


03U0K2-273

26. Install the anchor strut.

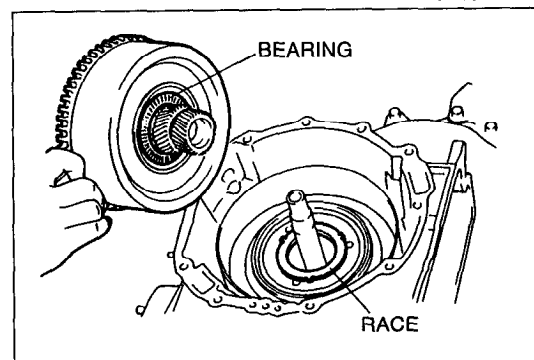
Note

- Interlock the 2-4 brake band and anchor strut as shown.



03U0K2-274

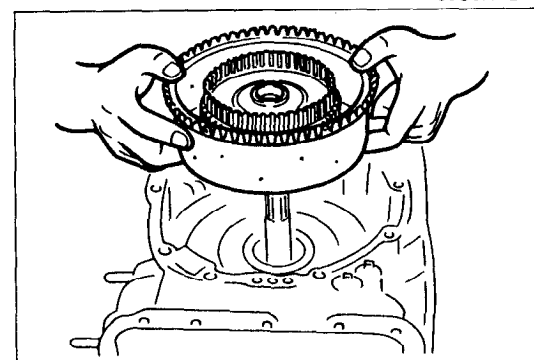
27. Install the 2-4 brake band in the transaxle case so that it is fully expanded.



03U0K2-275

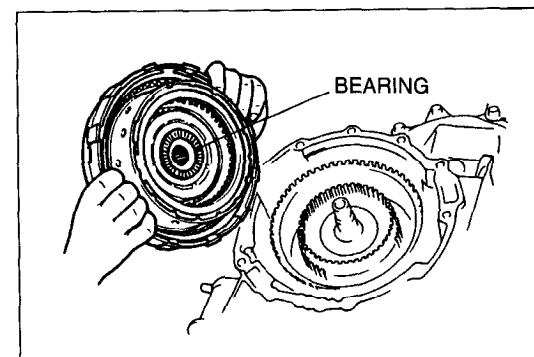
28. Install the small sun gear and one-way clutch.

- (1) Verify that the thrust bearing and bearing race are installed in the correct position.



03U0KX-472

- (2) Install the small sun gear and one-way clutch while rotating it.

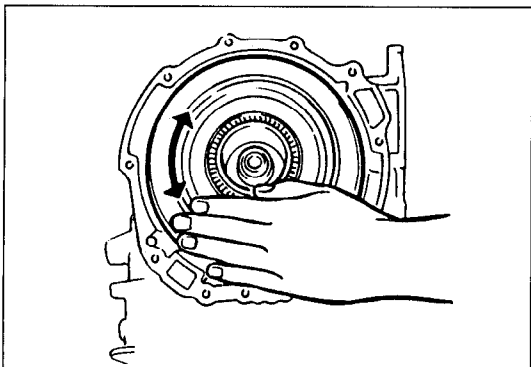


03U0K2-276

29. Install the clutch assembly.

- (1) Verify that the thrust bearing is installed in the correct position.

(2) Install the clutch assembly while rotating it.

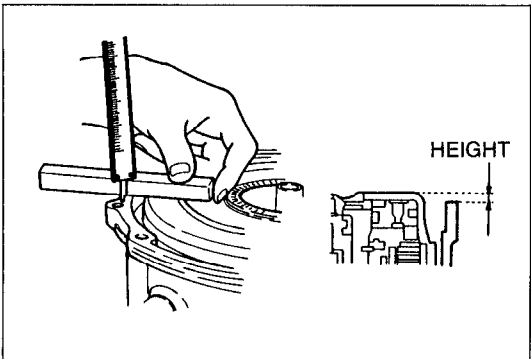


03U0KX-474

Note

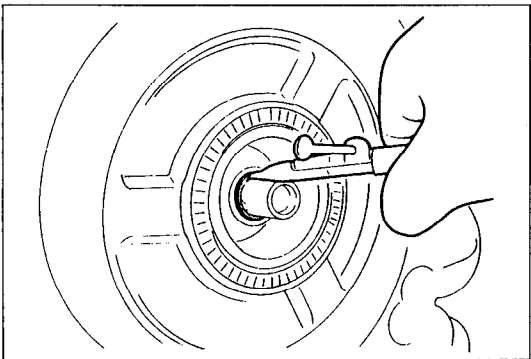
- Measure the height difference between the reverse and forward drum and the transaxle case.

Maximum: 0.9mm (0.035 in)



03U0KX-475

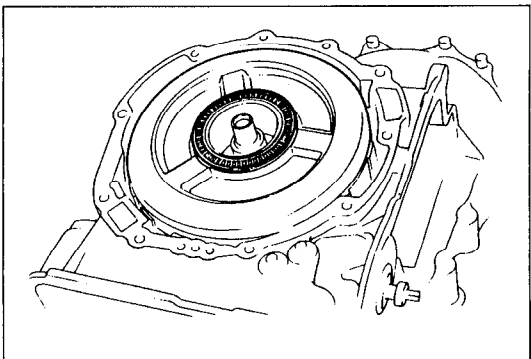
30. Install the snap ring into the bottom ring groove of the turbine shaft.



03U0K2-277

31. Use the following procedure to adjust the total end play and select a suitable bearing race.

(1) Set the thrust bearing onto the clutch assembly.

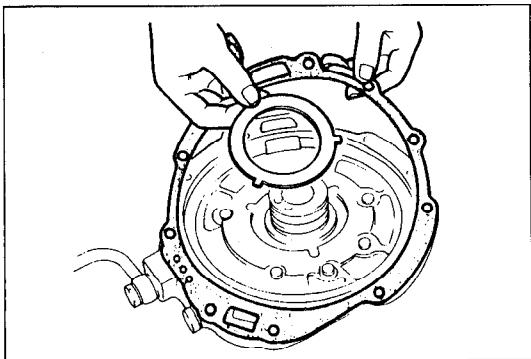


03U0K2-278

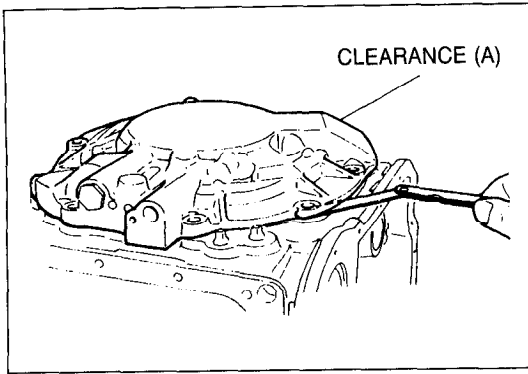
(2) Remove the previously used race and gasket.

(3) Set the thickest bearing race **2.2mm (0.087 in)** onto the oil pump.

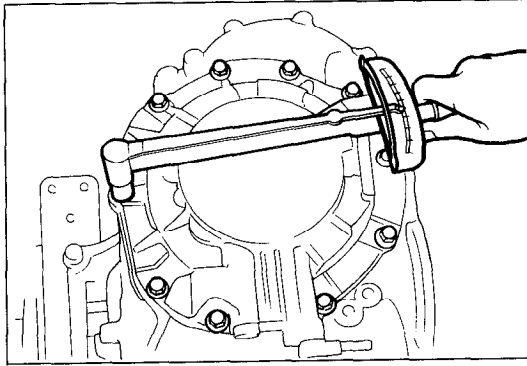
(4) Set the oil pump onto the clutch assembly.



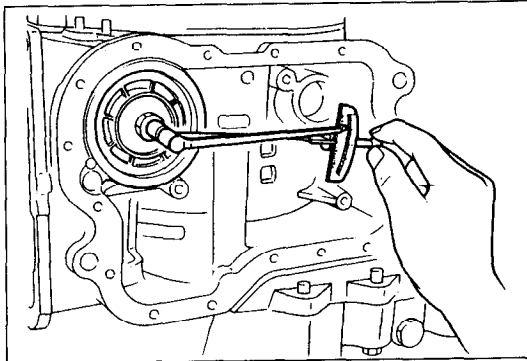
03U0KX-478



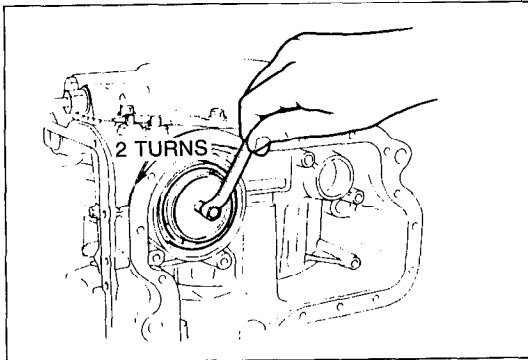
03U0KX-479



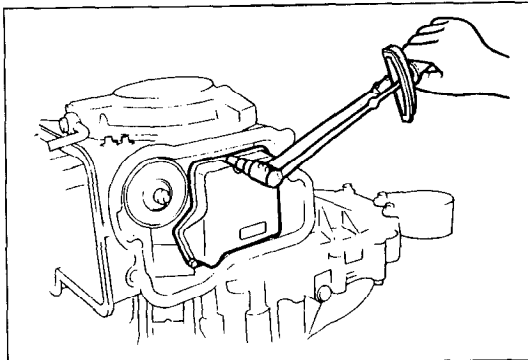
86U07B-421



03U0K2-279



03U0K2-280



03U0K2-281

- (5) Measure clearance A between the transaxle case and the oil pump.
- (6) Select a suitable bearing race from the chart below.

Clearance A	mm (in)	Select this bearing race mm (in)
0.91—1.10	(0.036—0.043)	1.2 (0.047)
0.71—0.90	(0.028—0.035)	1.4 (0.055)
0.51—0.70	(0.020—0.027)	1.6 (0.063)
0.31—0.50	(0.012—0.019)	1.8 (0.071)
0.11—0.30	(0.004—0.011)	2.0 (0.078)
0—0.10	(0—0.003)	2.2 (0.087)

- (7) Remove the oil pump.
- (8) Place the selected bearing race and a new gasket onto the oil pump.
- (9) Install the oil pump onto the clutch assembly.

Tightening torque:

19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

32. Adjust the 2-4 brake band.

- (1) Loosen the locknut and tighten the piston stem to the specified torque.

Tightening torque:

9—11 N·m (90—110 cm·kg, 78—95 in·lb)

- (2) Loosen the piston stem 2 turns.
- (3) Hold the piston stem and tighten the locknut to the specified torque.

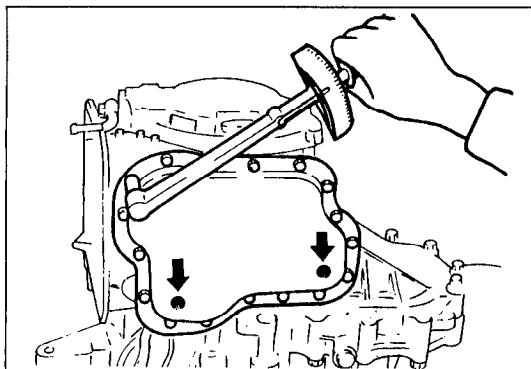
Tightening torque:

25—39 N·m (2.5—4.0 m·kg, 18—29 ft·lb)

33. Install the oil strainer along with a new O-ring to the transaxle.

Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)



03U0K2-282

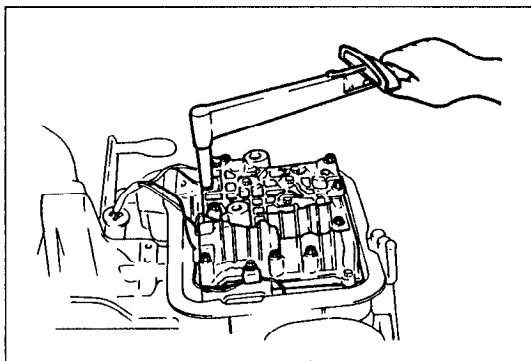
34. Install the oil pan along with a new gasket.

Tightening torque:

8—11 N·m (85—110 cm·kg, 74—95 in·lb)

Note

- Install the magnets in the positions shown in the illustration.

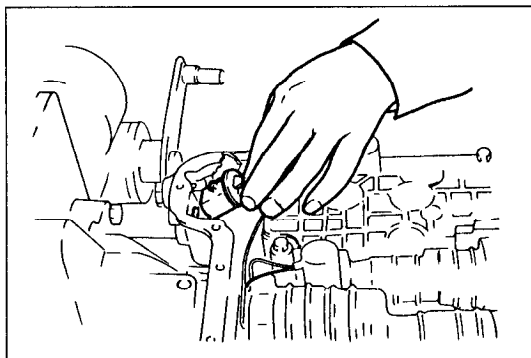


03U0K2-283

35. Align the manual valve with the pin on the manual plate, and install the control valve body into the transaxle case.

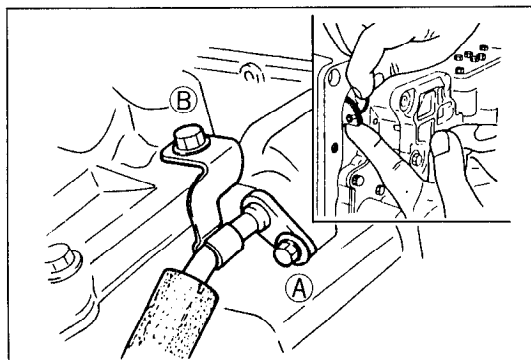
Tightening torque:

11—15 N·m (110—150 cm·kg, 95—130 in·lb)



03U0K2-284

36. Install the solenoid connector and a new O-ring in the transaxle case.



03U0K2-285

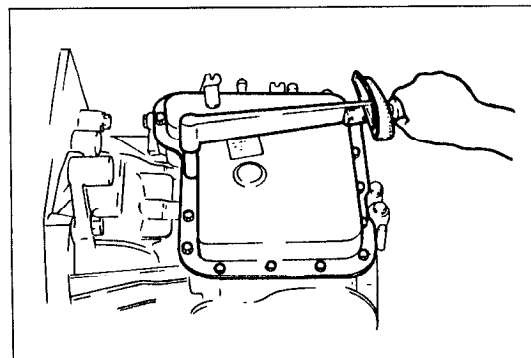
37. Install a new O-ring on the bracket; then feed the throttle cable through the transaxle case and connect it to the throttle lever.

38. Install the throttle cable bracket and attaching bolts.

Tightening torque:

A 8—11 N·m (80—110 cm·kg, 69—95 in·lb)

B 19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

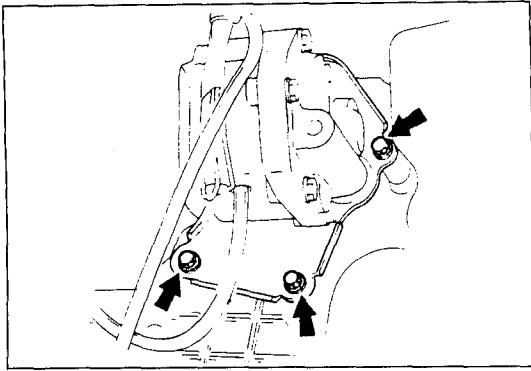


03U0K2-286

39. Install the control valve body cover along with a new gasket.

Tightening torque:

8—11 N·m (85—110 cm·kg, 74—95 in·lb)

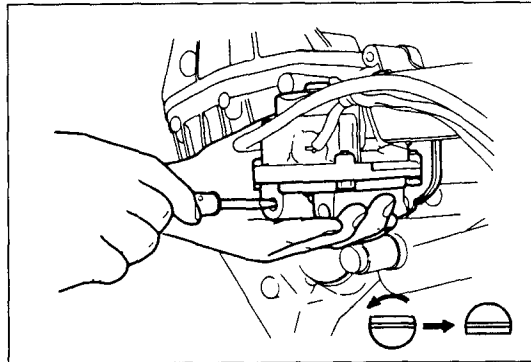


03U0K2-287

40. Install the center differential lock assembly.

Tightening torque:

19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)



03U0K2-288

41. Turn the rod 180° counterclockwise with a flat-tipped screwdriver.

42. Install the bolts.

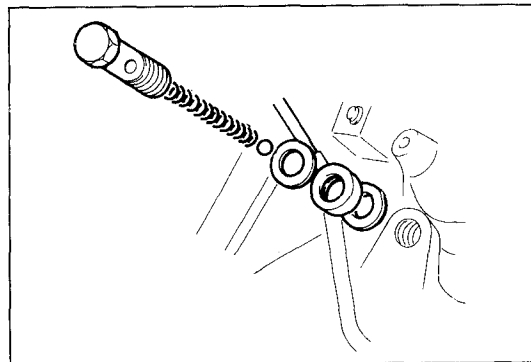
Tightening torque:

9—14 N·m (90—140 cm·kg, 78—122 ft·lb)

43. Install the differential lock switch.

Tightening torque:

20—29 N·m (2—3 m·kg, 14—22 ft·lb)

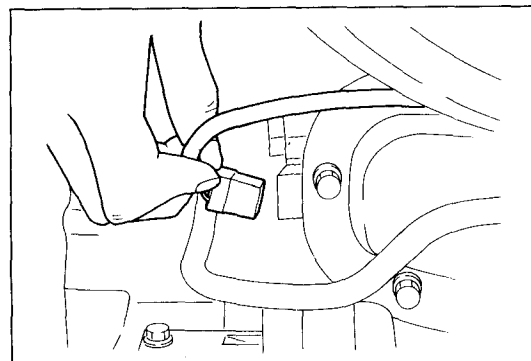


03U0K2-289

44. Install the ball, spring, gasket, and a plug.

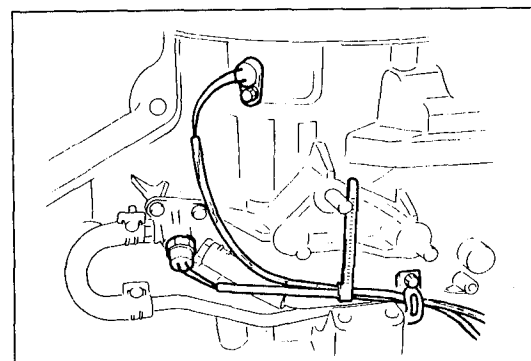
Tightening torque:

31—47 N·m (3.2—4.8 m·kg, 23—35 ft·lb)



03U0K2-290

45. Install the solenoid connector.



03U0K2-291

46. Install the pulse generator and fluid thermost switch.

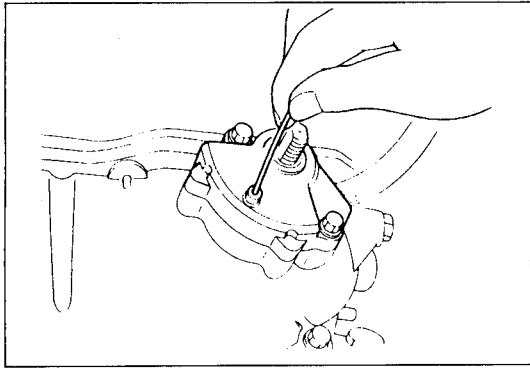
Tightening torque:

Pulse generator

8—11 N·m (80—110 cm·kg, 69—95 in·lb)

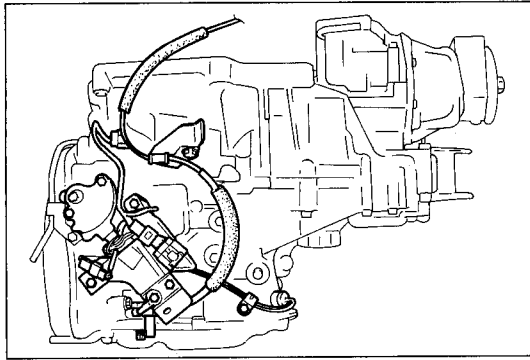
Fluid thermost switch

29—39 N·m (3.0—4.0 m·kg, 22—29 in·lb)



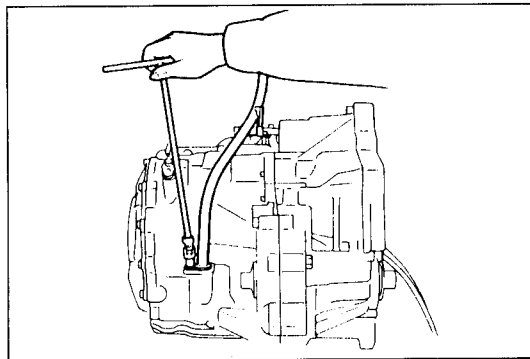
03U0K2-292

47. Install the inhibitor switch.
 - (1) Turn the manual shaft to the N position.
 - (2) Install the inhibitor switch and loosely tighten the bolts.
 - (3) Remove the screw and move the inhibitor switch so that the small alignment hole is aligned with the screw hole.
 - (4) Set the alignment by inserting an **approx. 2.0mm (0.079 in)** diameter pin through the holes.
 - (5) Tighten the bolts to the specified torque.

Tightening torque:**8—11 N·m (80—110 cm·kg, 69—95 in·lb)**

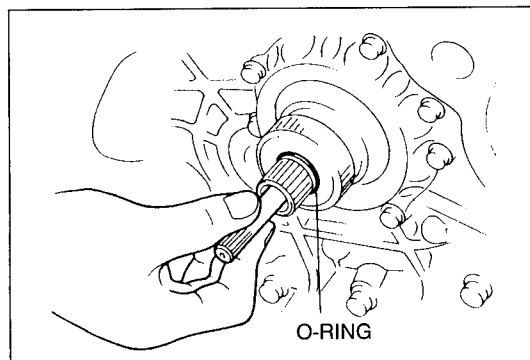
03U0K2-293

- (6) Remove the pin, and install and tighten the screw to specification.
48. Install the harness with the remaining clip.

Tightening torque:**0.4—0.7 N·m (4—7 cm·kg, 4—6 in·lb)**

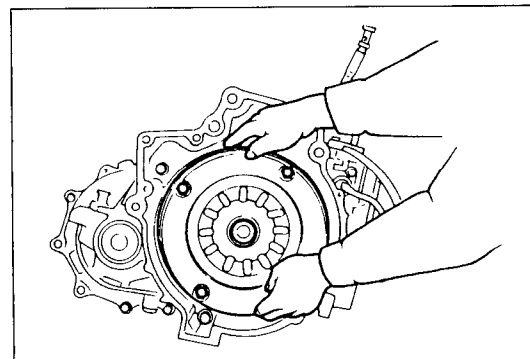
03U0K2-294

49. Remove the transaxle from the **SST**.
50. Install a new O-ring and install the oil level gauge and oil filler tube to the transaxle case.

Tightening torque:**7—10 N·m (70—100 cm·kg, 61—87 in·lb)**

03U0K2-295

51. Install the oil pump shaft.
52. Install a new O-ring onto the turbine shaft.



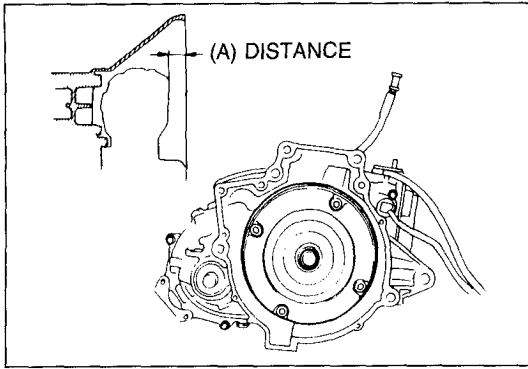
03U0K2-296

53. Fill the torque converter with ATF if it has been drained and washed.

ATF type: M-III or DEXRON-II**Caution**

- **Hold the torque converter in an erect position when filling it with ATF, do not allow the fluid to overflow.**
- **If the converter does not fit in easily, do not try to force it; install carefully.**

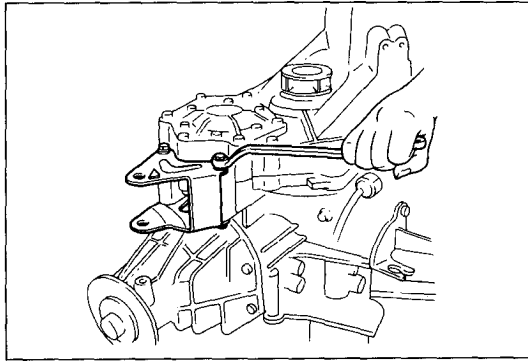
54. Install the torque converter in the converter housing while rotating it to align the splines.



03U0K2-297

55. To ensure that the torque converter is installed accurately, measure distance A between the end of the torque converter and the end of the converter housing.

(A): 13.6mm (0.535 in)



03U0K2-298

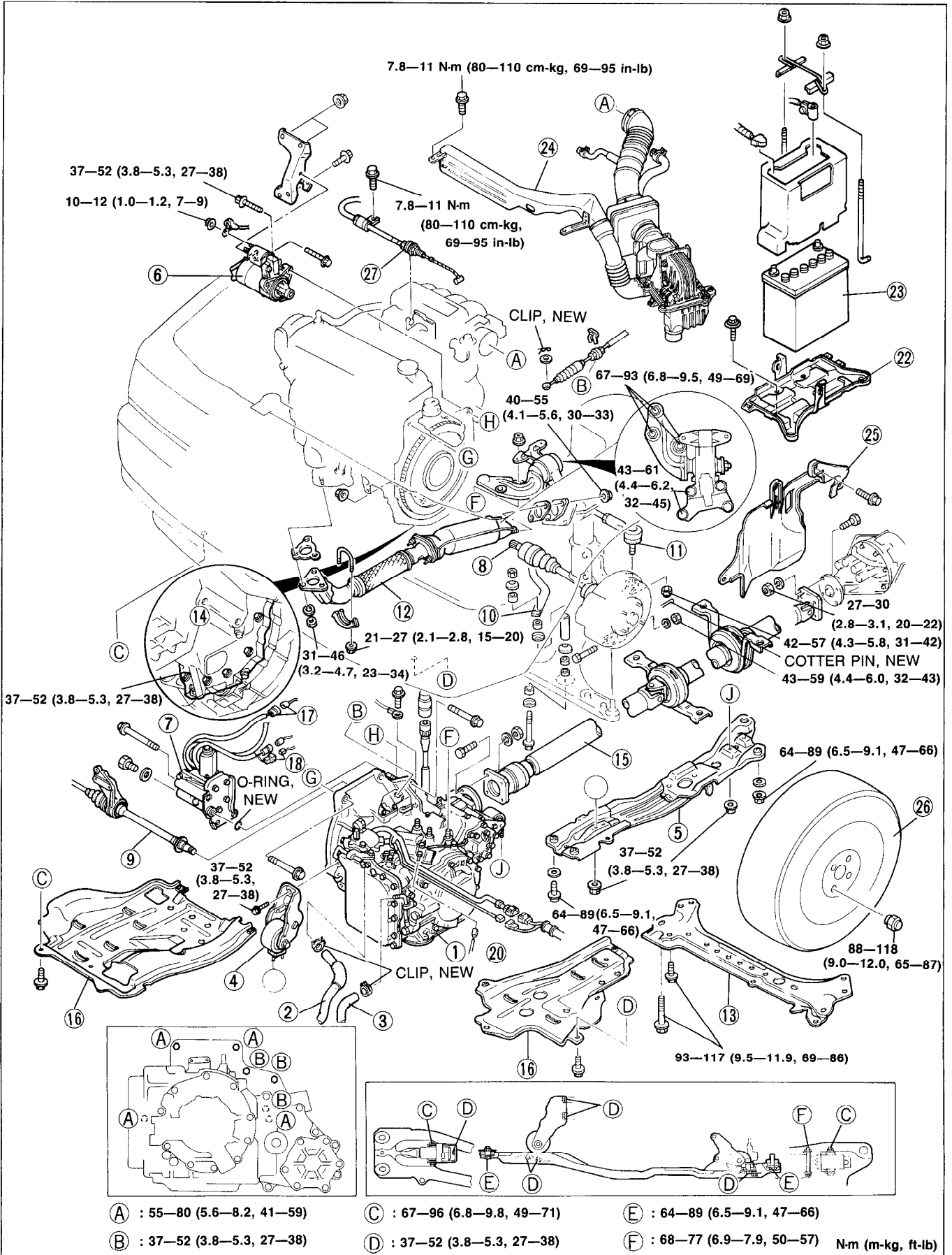
56. Install engine mount No.1.

Tightening torque:

58—67 N·m (5.9—6.8 m·kg, 43—49 ft·lb)

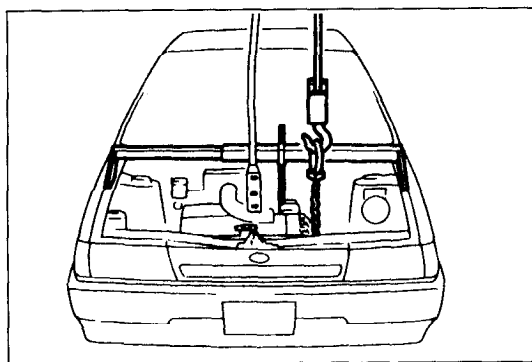
INSTALLATION

1. Install in the reverse order of removal, referring to **Installation Note**.
2. Fill the transaxle with the specified ATF after installation.

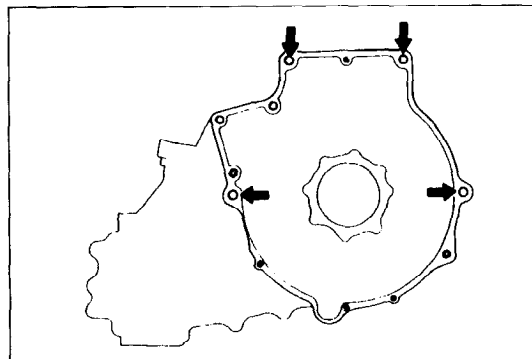


1. Transaxle and transfer Installation Note..... page K2-277	13. Cross member
2. Oil hose (Outlet side) Installation Note..... page K2-277	14. Integrated stiffener
3. Oil hose (Inlet side) Installation Note..... page K2-277	15. Propeller shaft Installation Note..... page K2-279
4. Engine mount No.2	16. Under cover
5. Engine mounting member Installation Note..... page K2-278	17. Differential lock sensor switch connector
6. Starter	18. Differential lock motor connector
7. Center differential lock motor	19. Solenoid valve connector
8. Driveshaft Installation Note..... page K2-278	20. Inhibitor switch connector
9. Joint shaft	21. Speedometer cable Installation Note..... page K2-279
10. Stabilizer Installation Note..... page K2-279	22. Battery carrier
11. Tie-rod end	23. Battery
12. Exhaust pipe	24. Air hose and air cleaner assembly
	25. Splash shield
	26. Wheel and tire
	27. Throttle cable Installation Note..... page K2-279

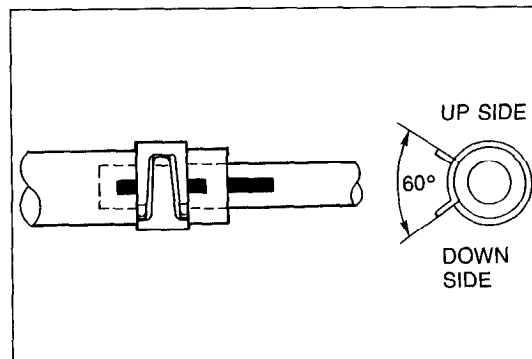
03U0K2-299



03U0K2-300



03U0K2-301



03U0KX-497

**Installation Note
Transaxle and transfer**

Caution

- **Do not lean the transaxle and transfer to torque converter side.**

1. Use an engine hoist, and install the transaxle and transfer.
2. Mount the transaxle and transfer to the engine.

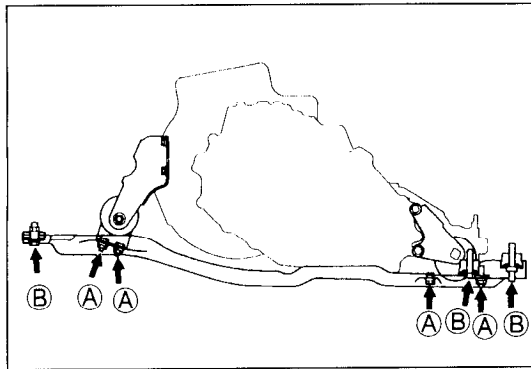
3. Install the bolt.

Tightening torque:

55—80 N·m (5.6—8.2 m·kg, 41—59 ft·lb)

Oil hose (inlet and outlet side)

1. Align the marks, and slide the oil cooler hose onto the oil cooler pipe until it is fully seated against the ridge.
2. Install the hose clamp onto the hose at the center of the mark and at the angle shown.
3. Verify that the hose clamp does not interfere with any other parts.



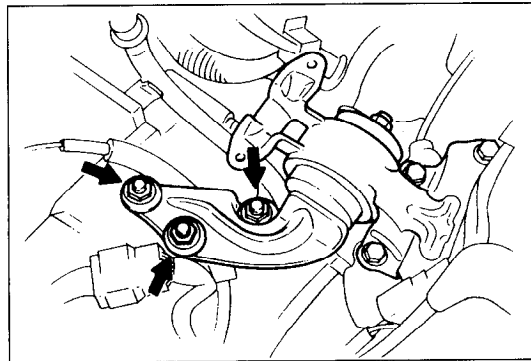
03U0K2-323

Engine mounting member

1. Tighten the bolts as shown.

Tightening torque:

A 37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)
 B 64—89 N·m (6.5—9.1 m·kg, 47—66 ft·lb)

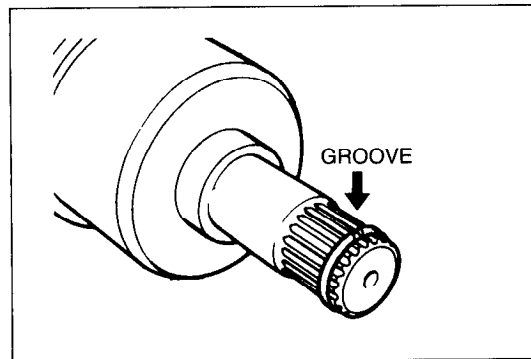


03U0K2-302

2. Tighten the engine mount No.4 nuts.

Tightening torque:

66—93 N·m (6.8—9.5 m·kg, 49—68 ft·lb)

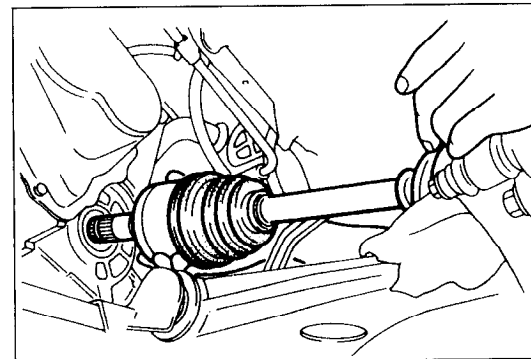


03U0KX-498

Driveshaft**Caution**

- Do not damage the oil seal.
- After installation, pull the front hub outward to verify that the driveshaft is secured.

1. Replace the clips at the ends of the driveshafts and joint shaft with new ones.
2. Push the driveshafts into the differential with the groove of clips upward.

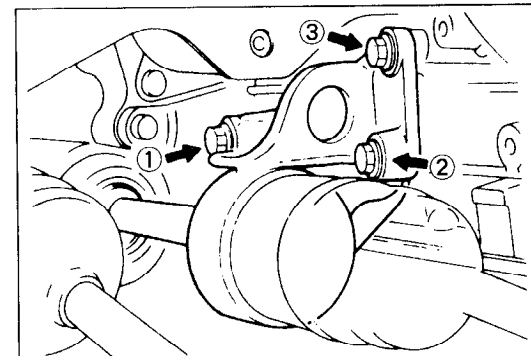


03U0K2-303

Note

- Apply ATF to the oil seal lip.

3. Install the driveshaft.

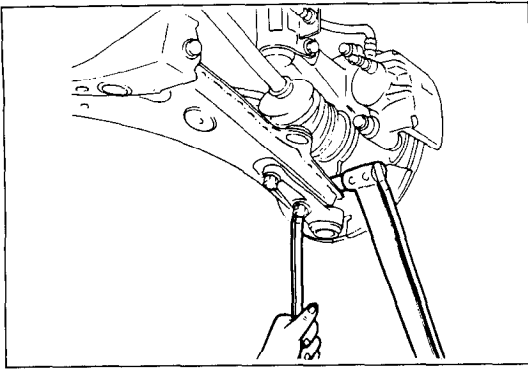


03U0K2-304

4. Tighten the joint shaft mounting bolts in the order shown.

Tightening torque:

42—62 N·m (4.3—6.3 m·kg, 31—46 ft·lb)

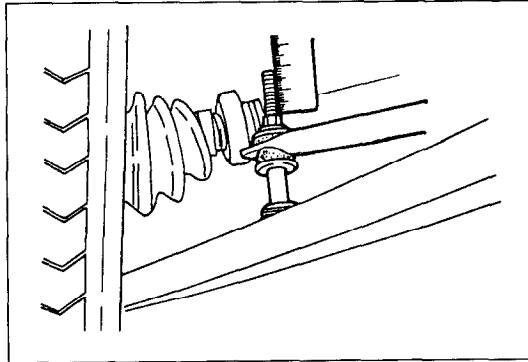


03U0K2-305

5. Install the lower arm ball joint to the knuckle and tighten the bolt.

Tightening torque:

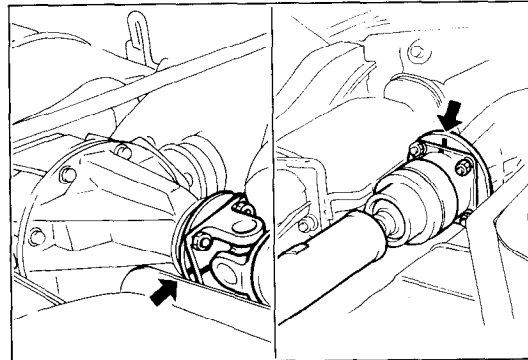
43—58 N·m (4.4—6.0 m·kg, 32—43 ft·lb)



03U0KX-499

Stabilizer

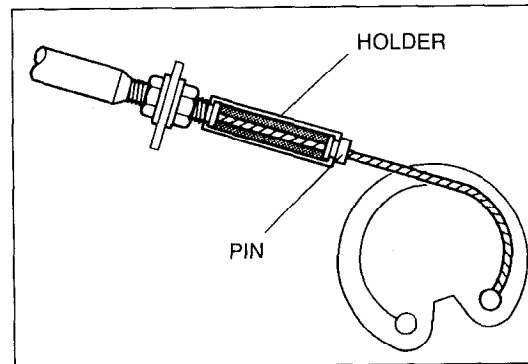
1. Tighten the stabilizer nut so that **17mm (0.67 in)** to **19mm (0.75 in)** of thread is exposed at the end of the bolt.



03U0K2-306

Propeller shaft

1. Align the marks and install the propeller shaft. (Refer to Section L.)



03U0K2-307

Throttle cable

1. Connect the throttle cable.
2. Adjusting the throttle cable. (Refer to page K2-137.)

OIL COOLER

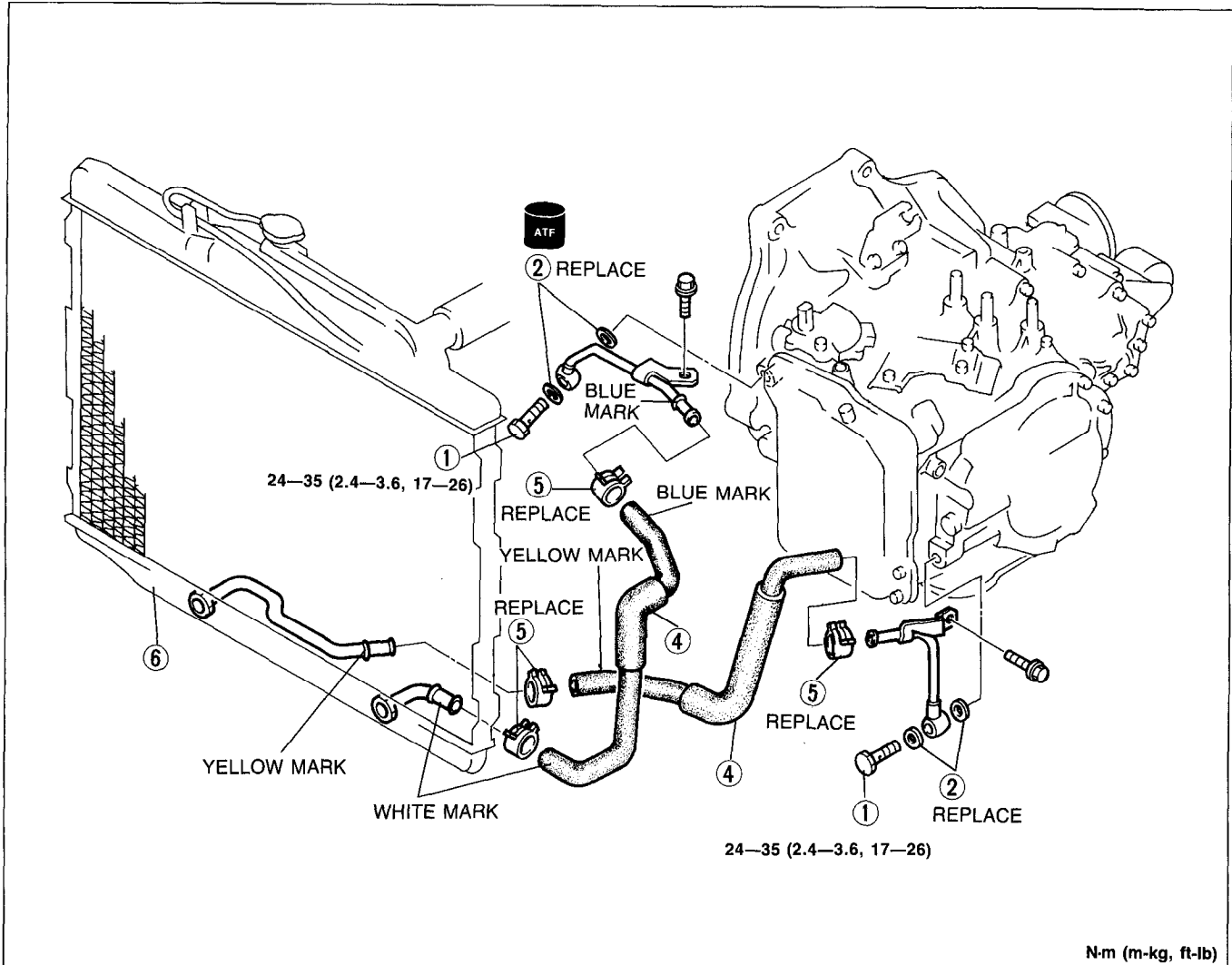
OIL COOLER

Removal / Inspection / Installation

Remove in the order shown in the figure.

Inspect all parts and repair or replace as necessary.

Install in the reverse order of removal, referring to **Installation Note**.



93G0K2-093

1. Connector bolts
Inspect for clogging

2. Packing

3. Oil pipes

Inspect for damage or cracks

4. Oil hoses

Inspect for damage or cracks

Installation note page K2-253

5. Hose clamps

6. Radiator

Service Section E

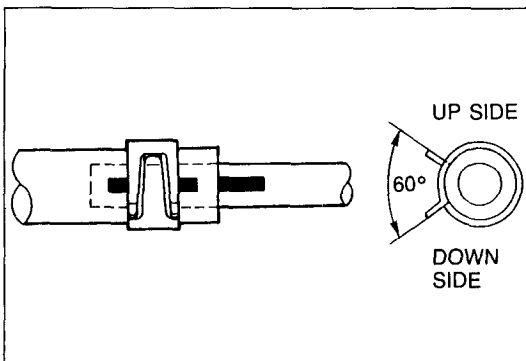
Installation note

Oil hose

1. Align the marks, and slide the oil cooler hose onto the oil cooler pipe until it is fully seated against the ridge.

2. Install the hose clamp onto the hose at the center of the mark and at the angle shown.

3. Verify that the hose clamp does not interfere with any other parts.



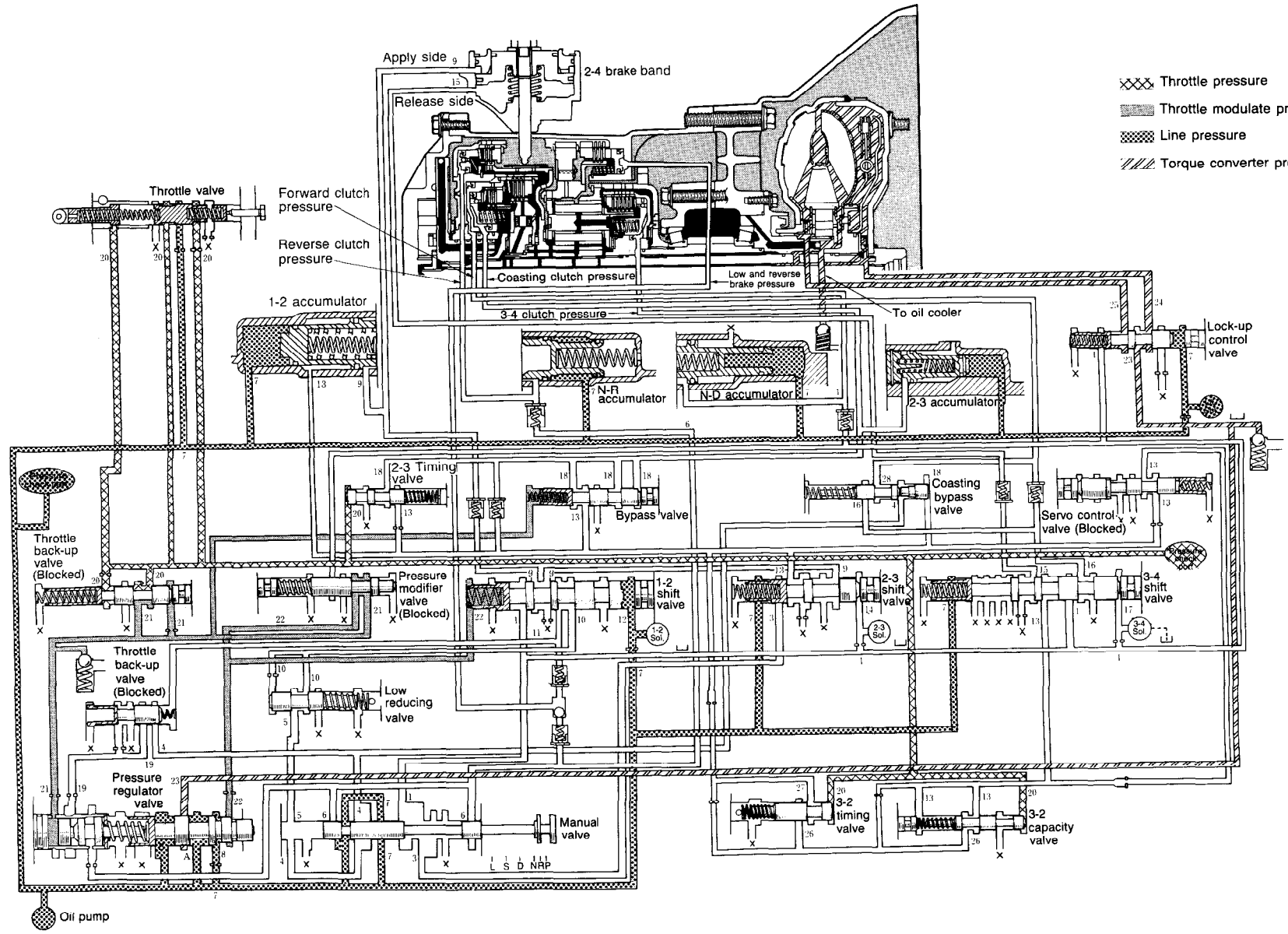
03U0KX-503

HYDRAULIC CIRCUIT

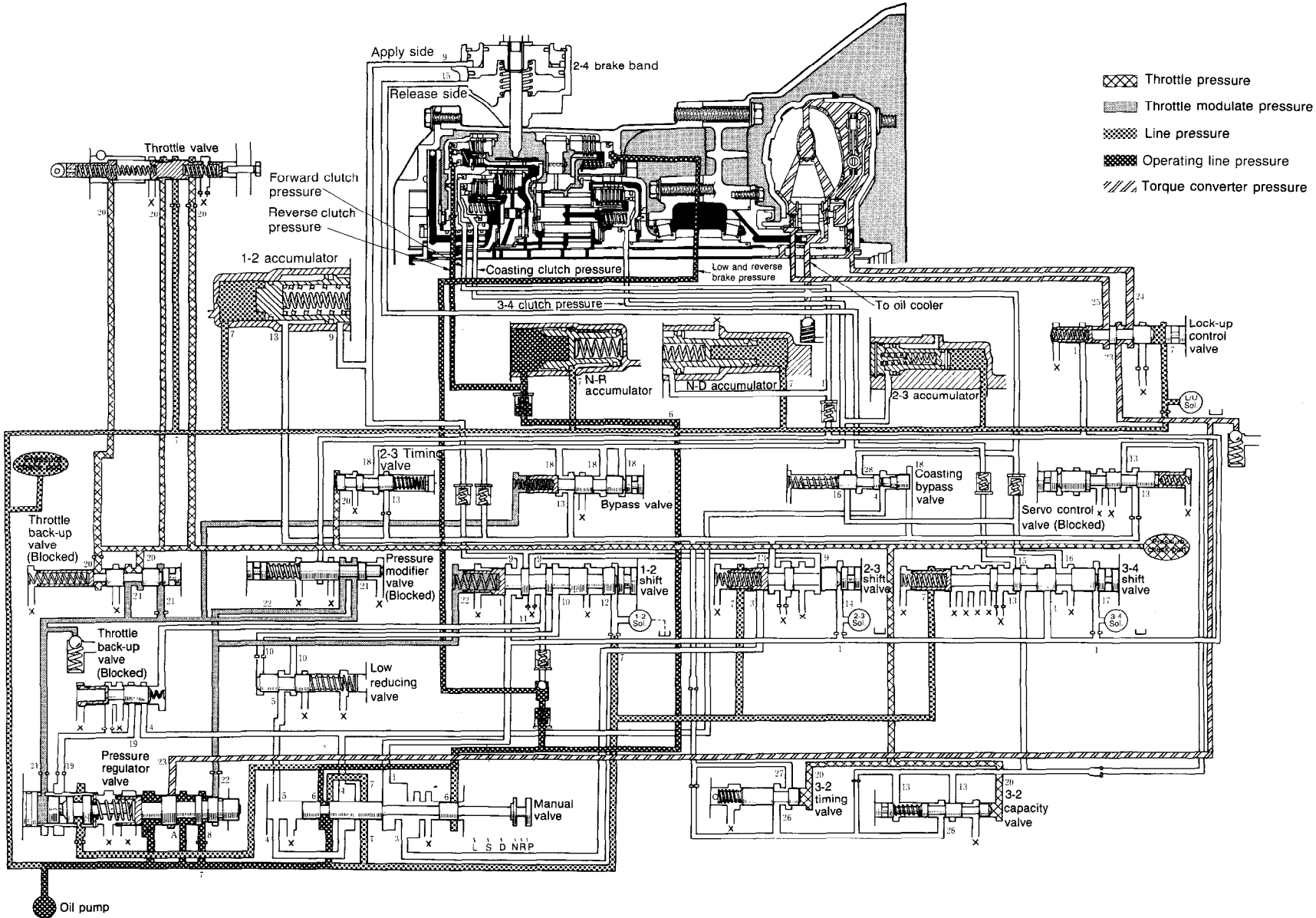
P RANGE

HYDRAULIC CIRCUIT

K2



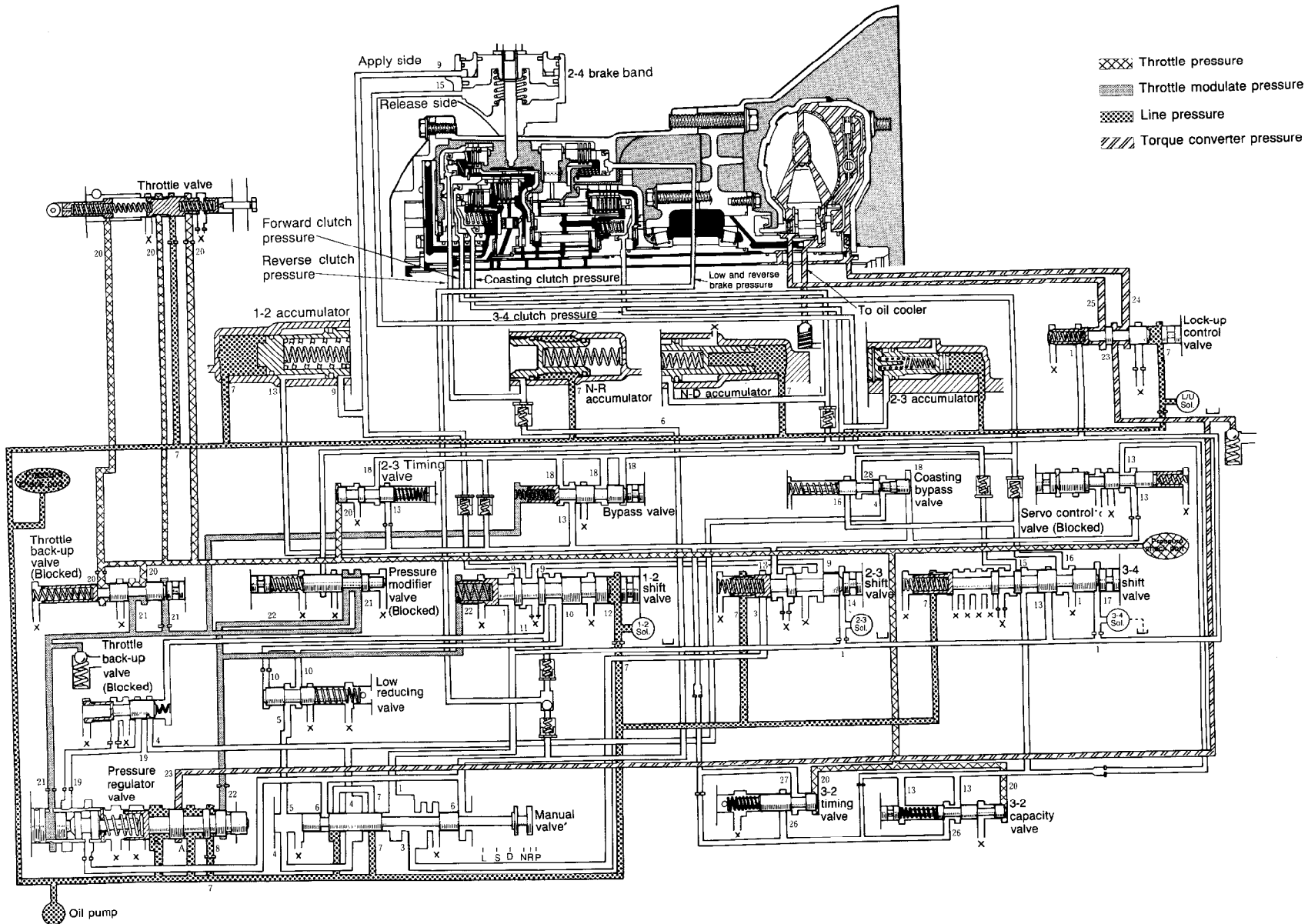
- Throttle pressure
- Throttle modulate pressure
- Line pressure
- Torque converter pressure



N RANGE: BELOW APPROX. 18 km/h (11 mph)

HYDRAULIC CIRCUIT

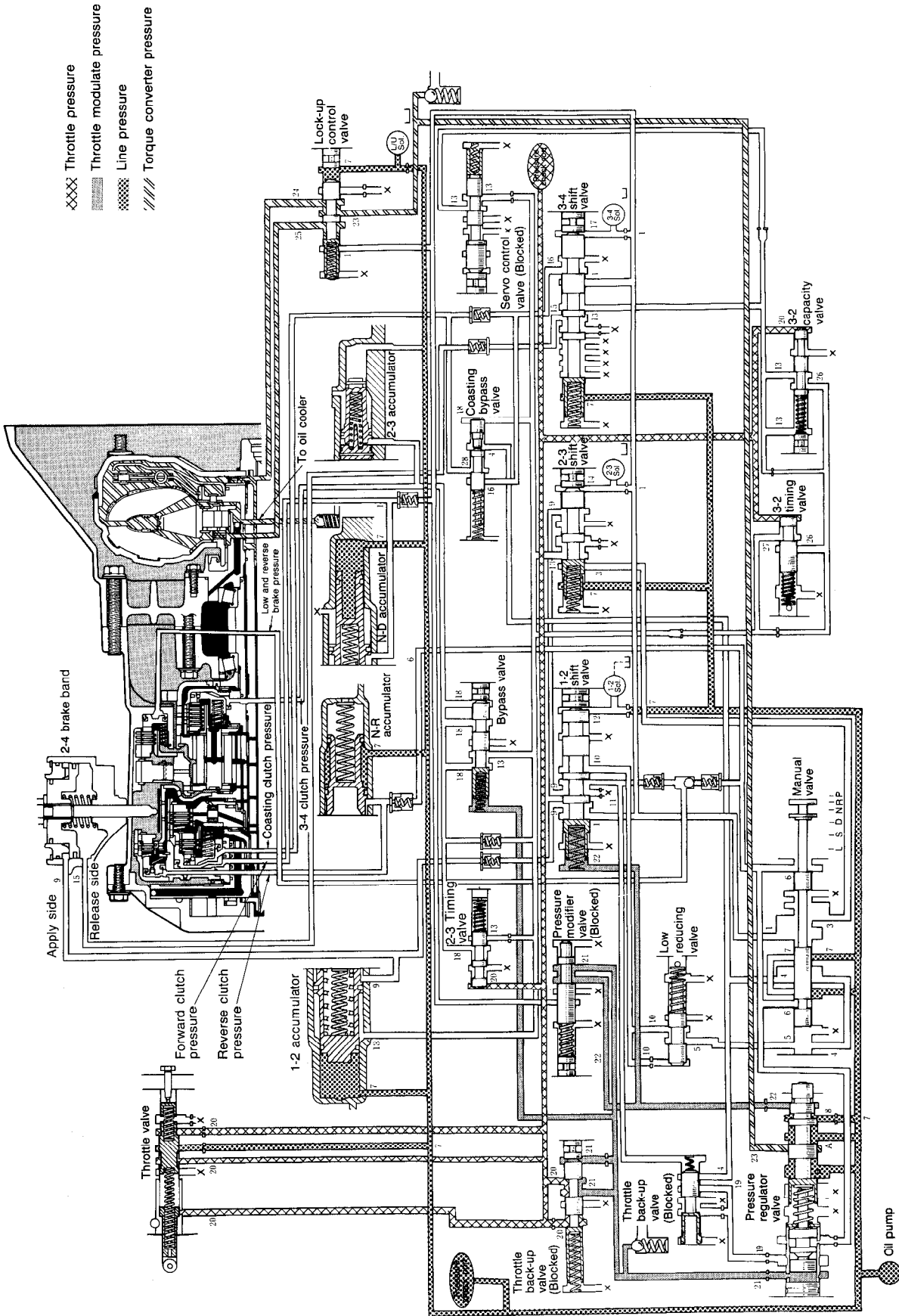
K2

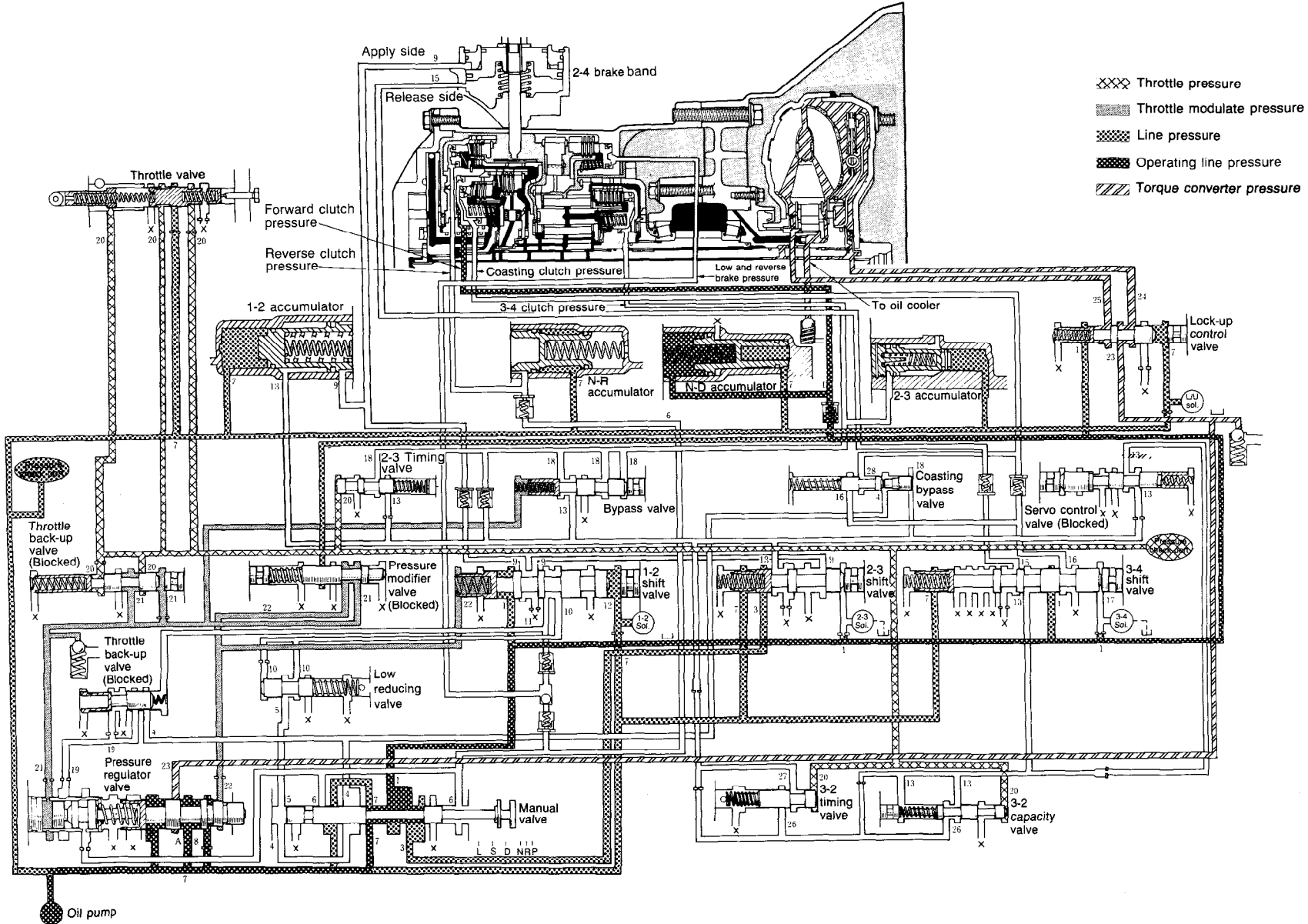


- Throttle pressure
- Throttle modulate pressure
- Line pressure
- Torque converter pressure

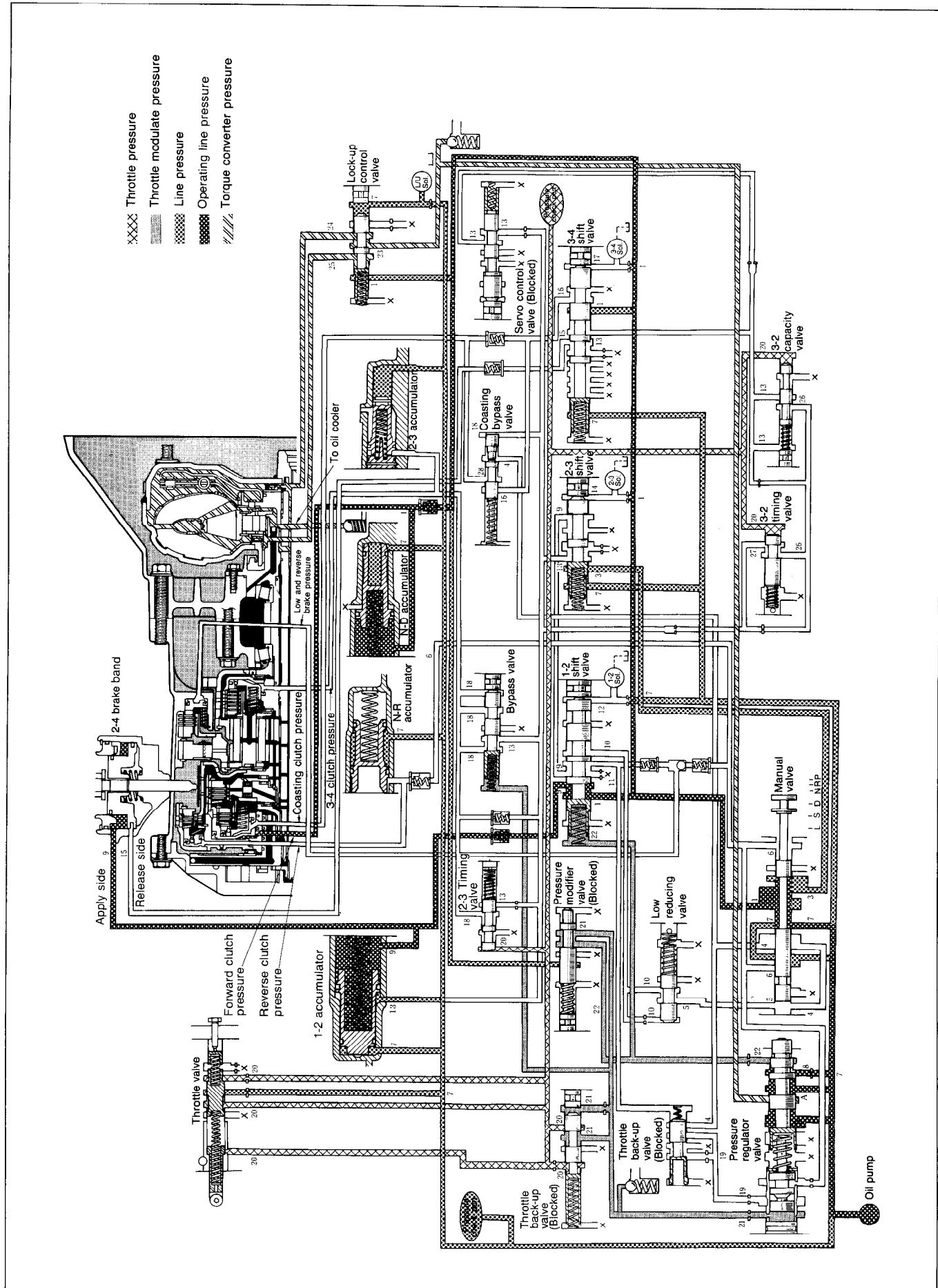
03U0K2-326
K2-283

N RANGE; ABOVE APPROX. 18 km/h (11 mph)





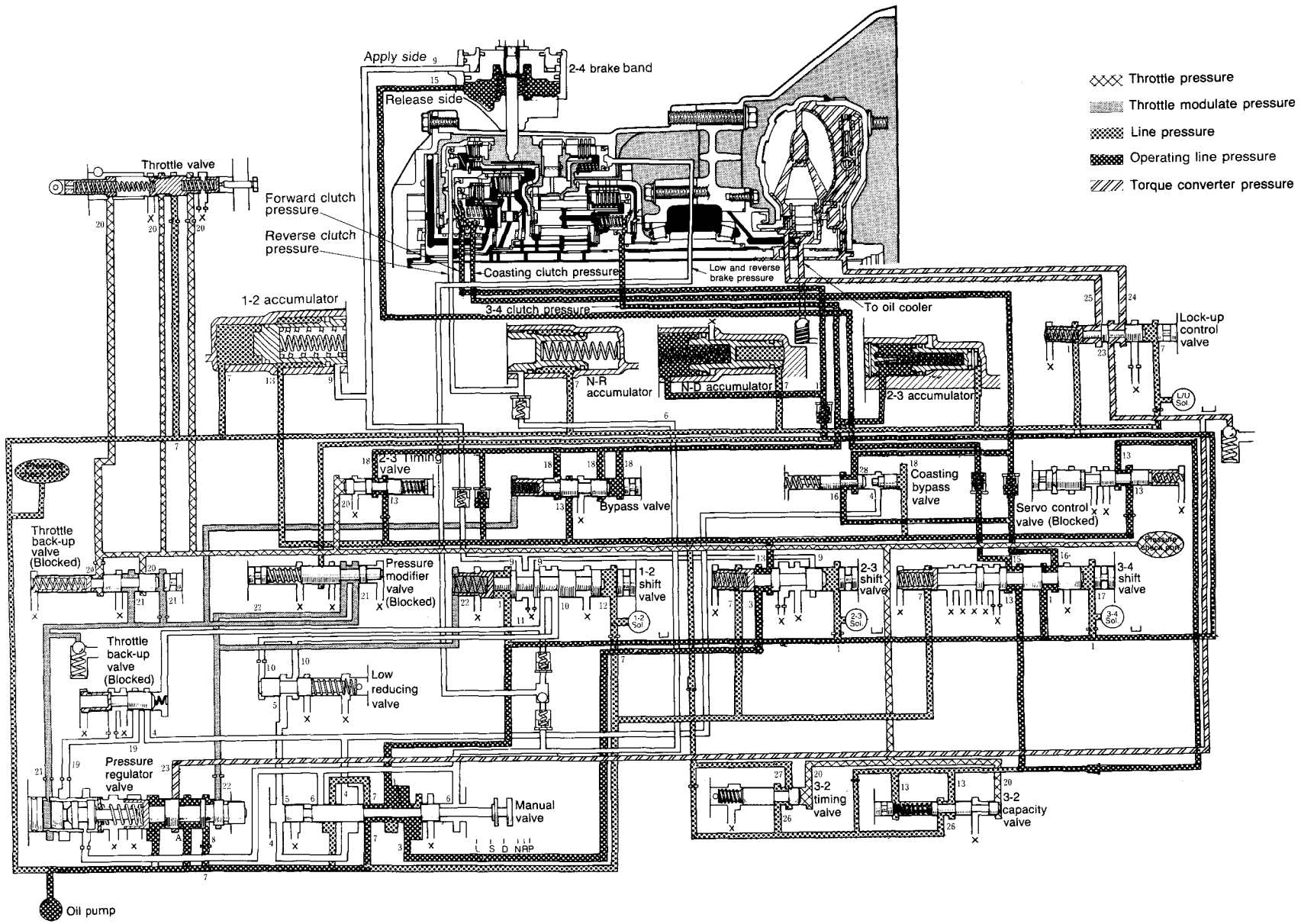
D RANGE; 2ND GEAR



D RANGE; 3RD GEAR BELOW APPROX. 40 km/h (25 mph)

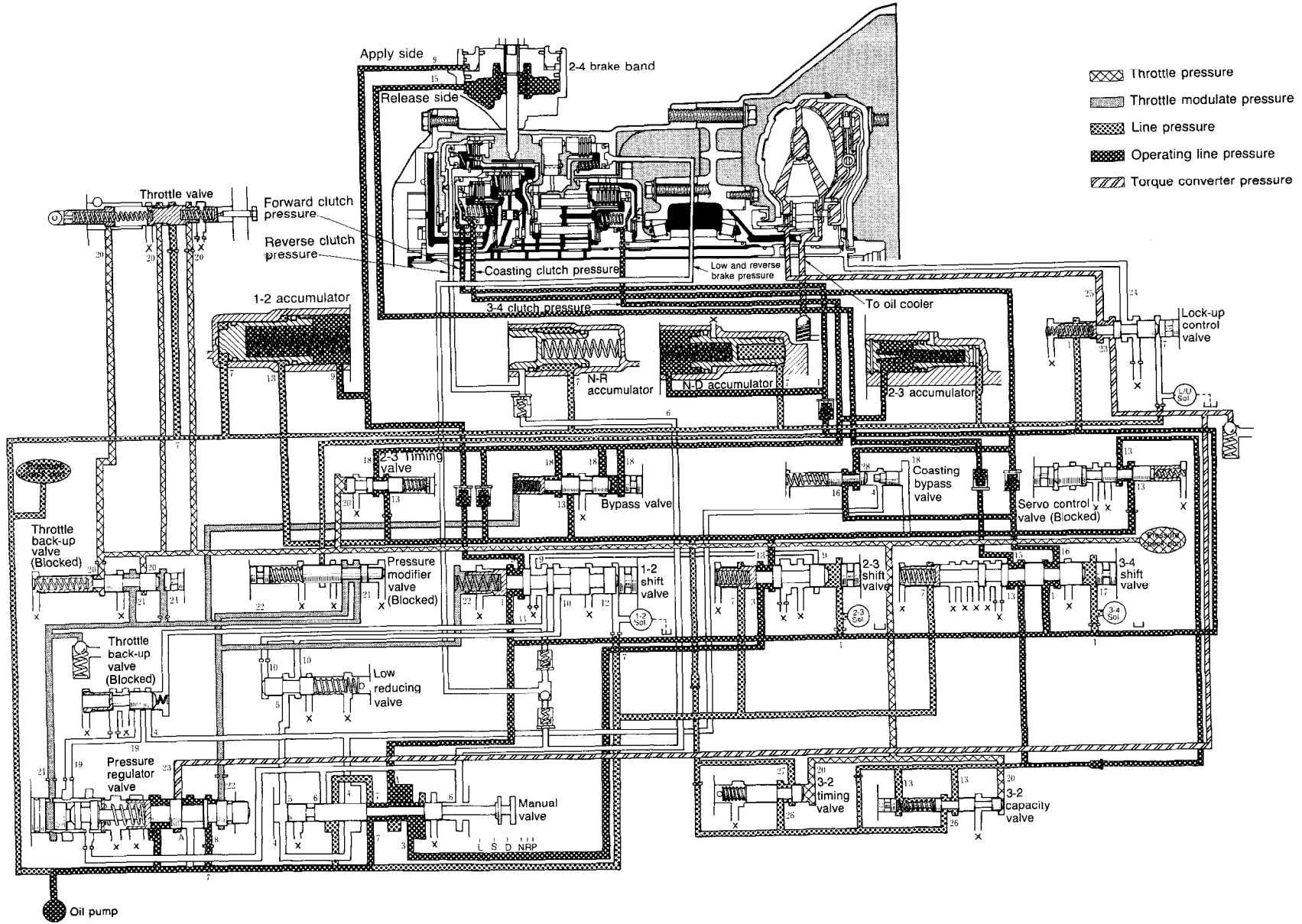
HYDRAULIC CIRCUIT

K2

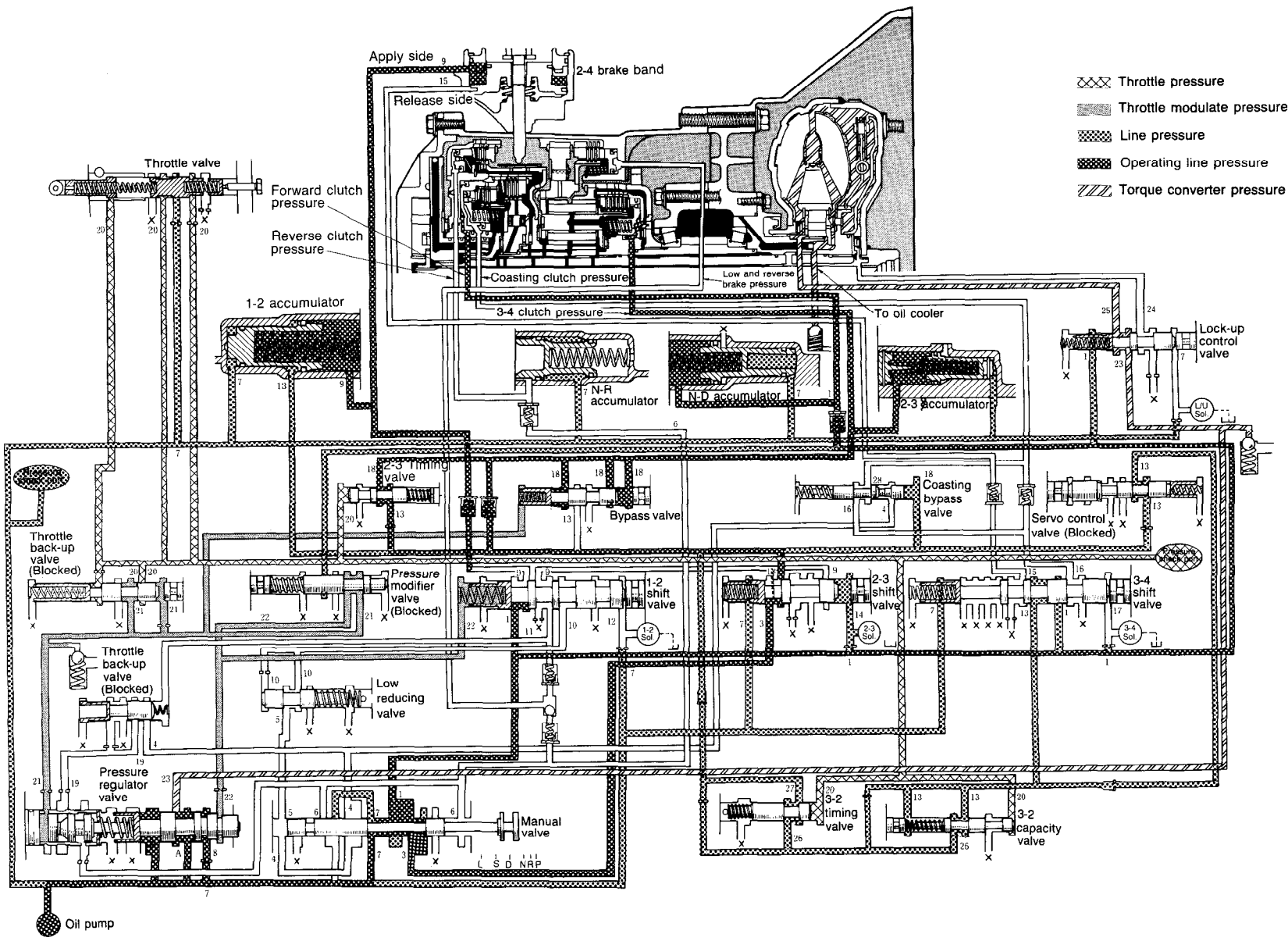


03U0K2-330
K2-287

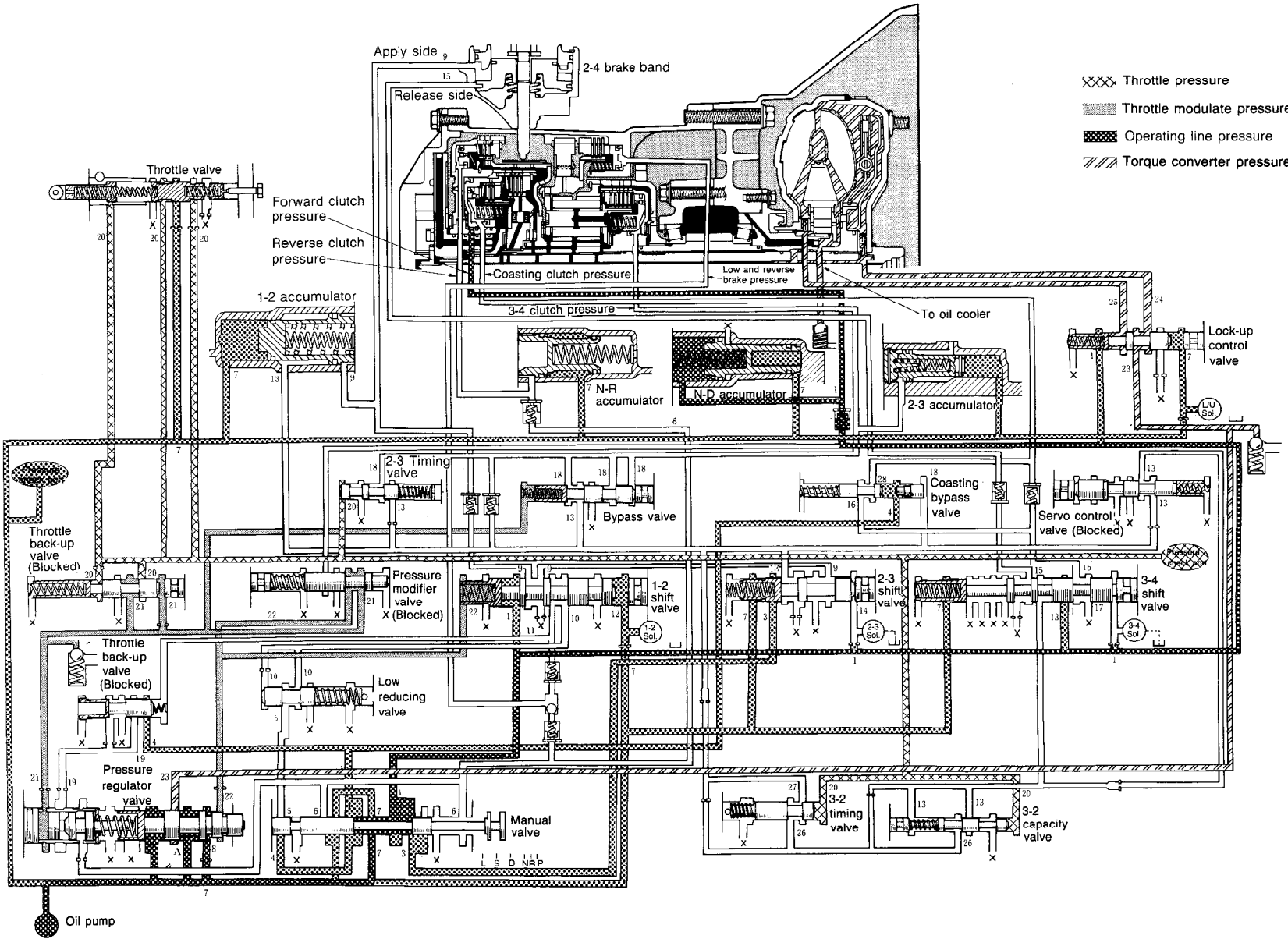
D RANGE: 3RD GEAR ABOVE APPROX. 40 km/h (25 mph)



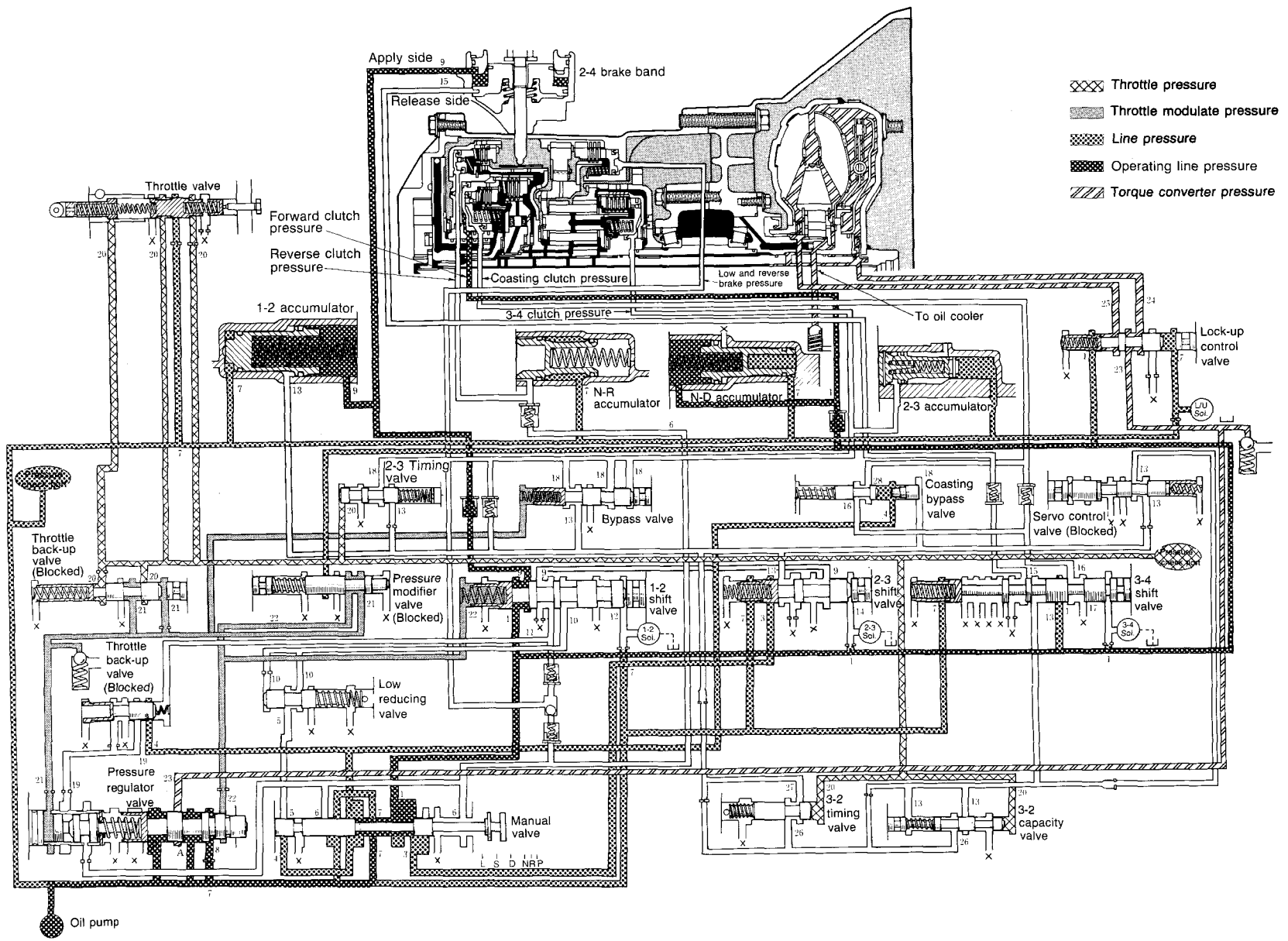
- Throttle pressure
- Throttle modulate pressure
- Line pressure
- Operating line pressure
- Torque converter pressure



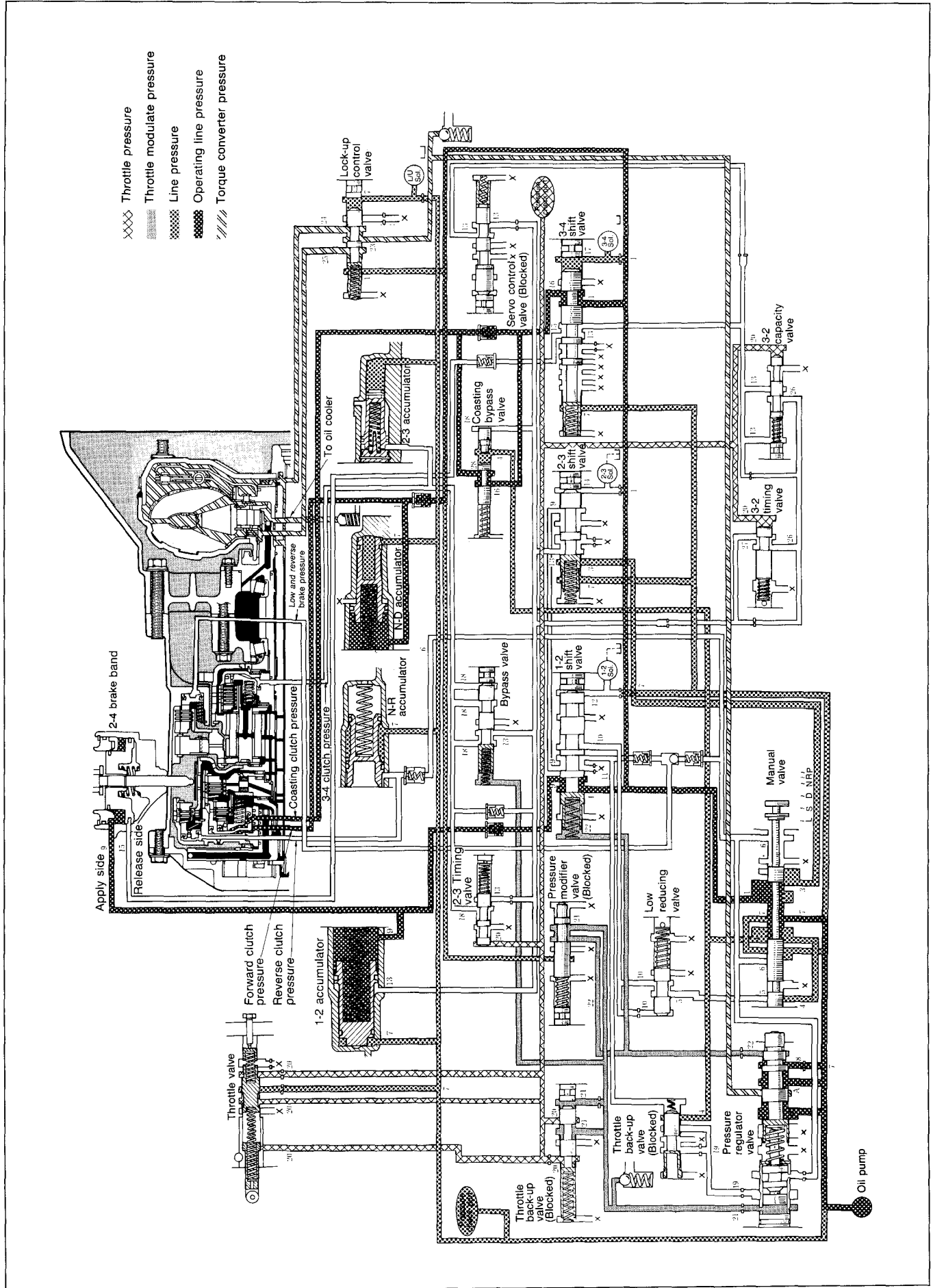
- Throttle pressure
- Throttle modulate pressure
- Line pressure
- Operating line pressure
- Torque converter pressure



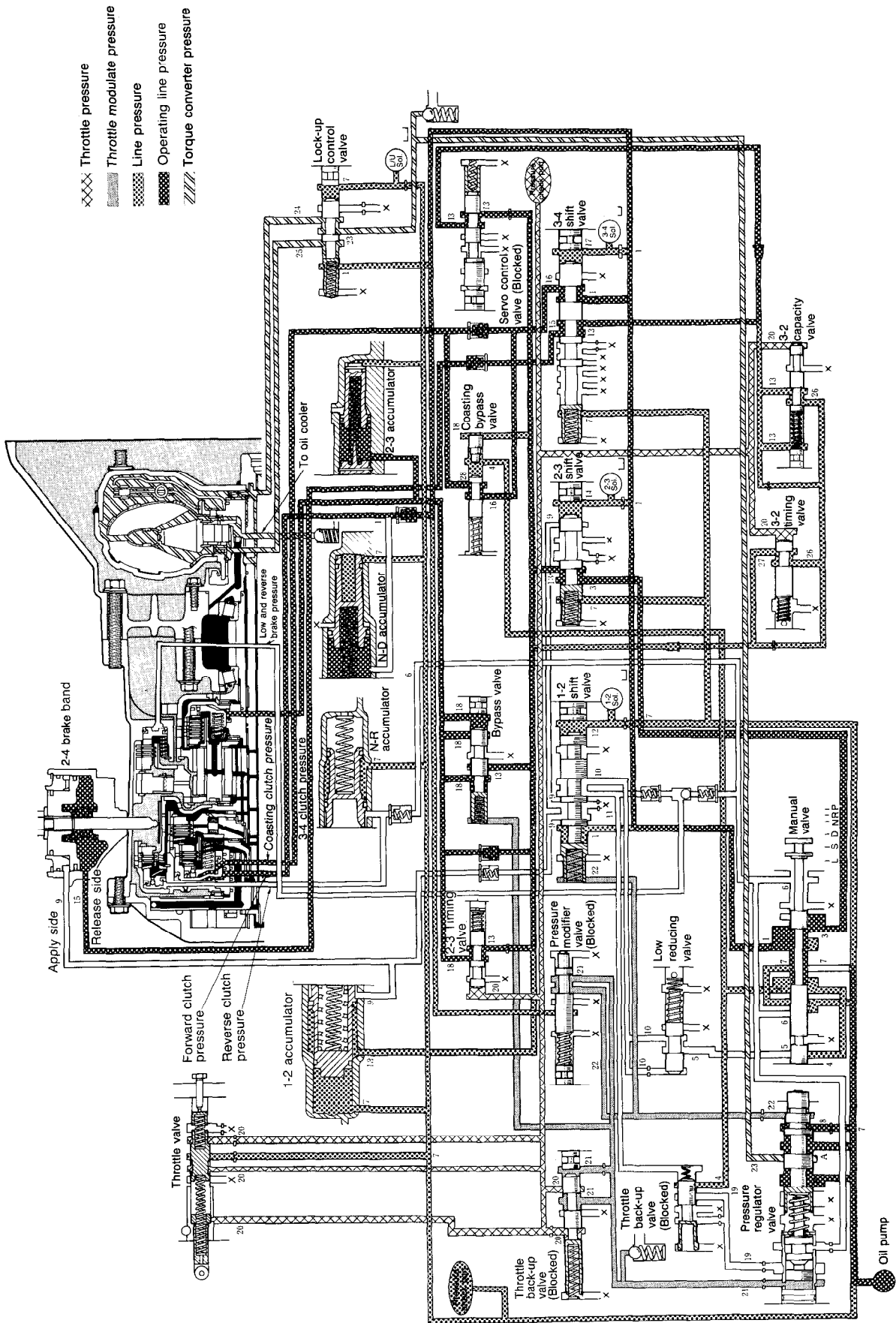
- Throttle pressure
- Throttle modulate pressure
- Operating line pressure
- Torque converter pressure



S RANGE; HOLD 2ND GEAR

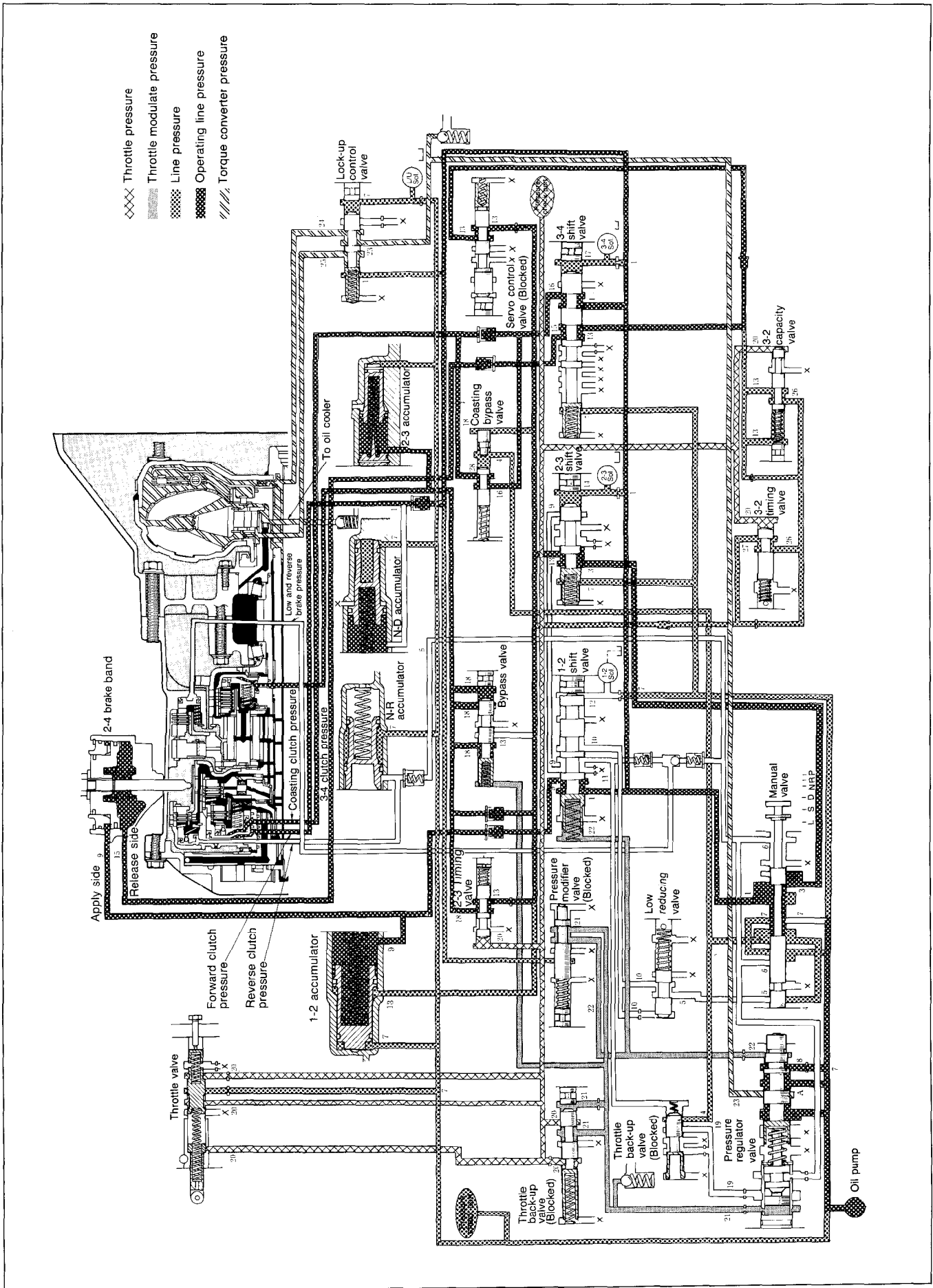


S RANGE; 3RD GEAR BELOW APPROX. 40 km/h (25 mph)

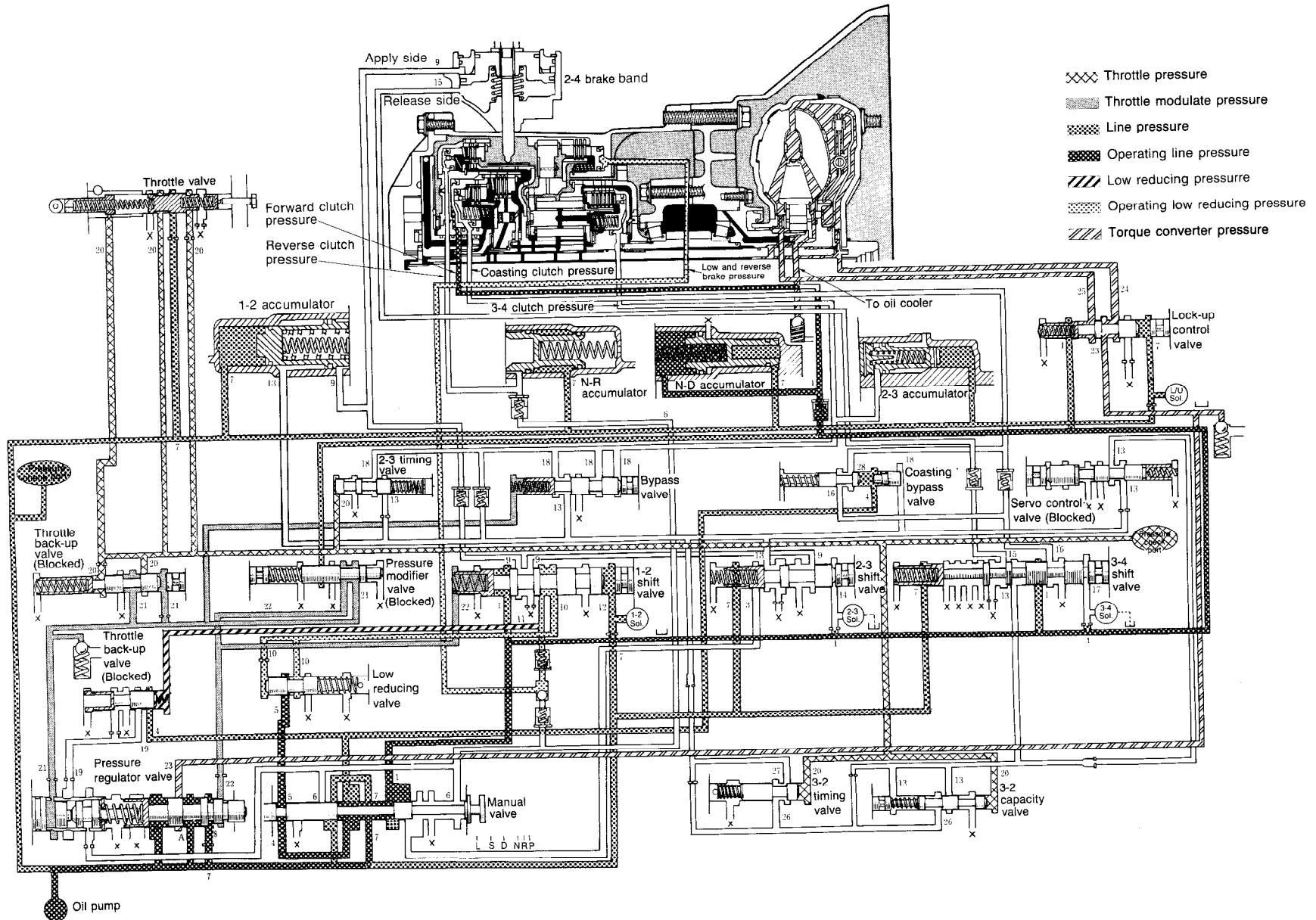


- XXXX Throttle pressure
- XXXX Throttle modulate pressure
- XXXX Line pressure
- XXXX Operating line pressure
- XXXX Torque converter pressure

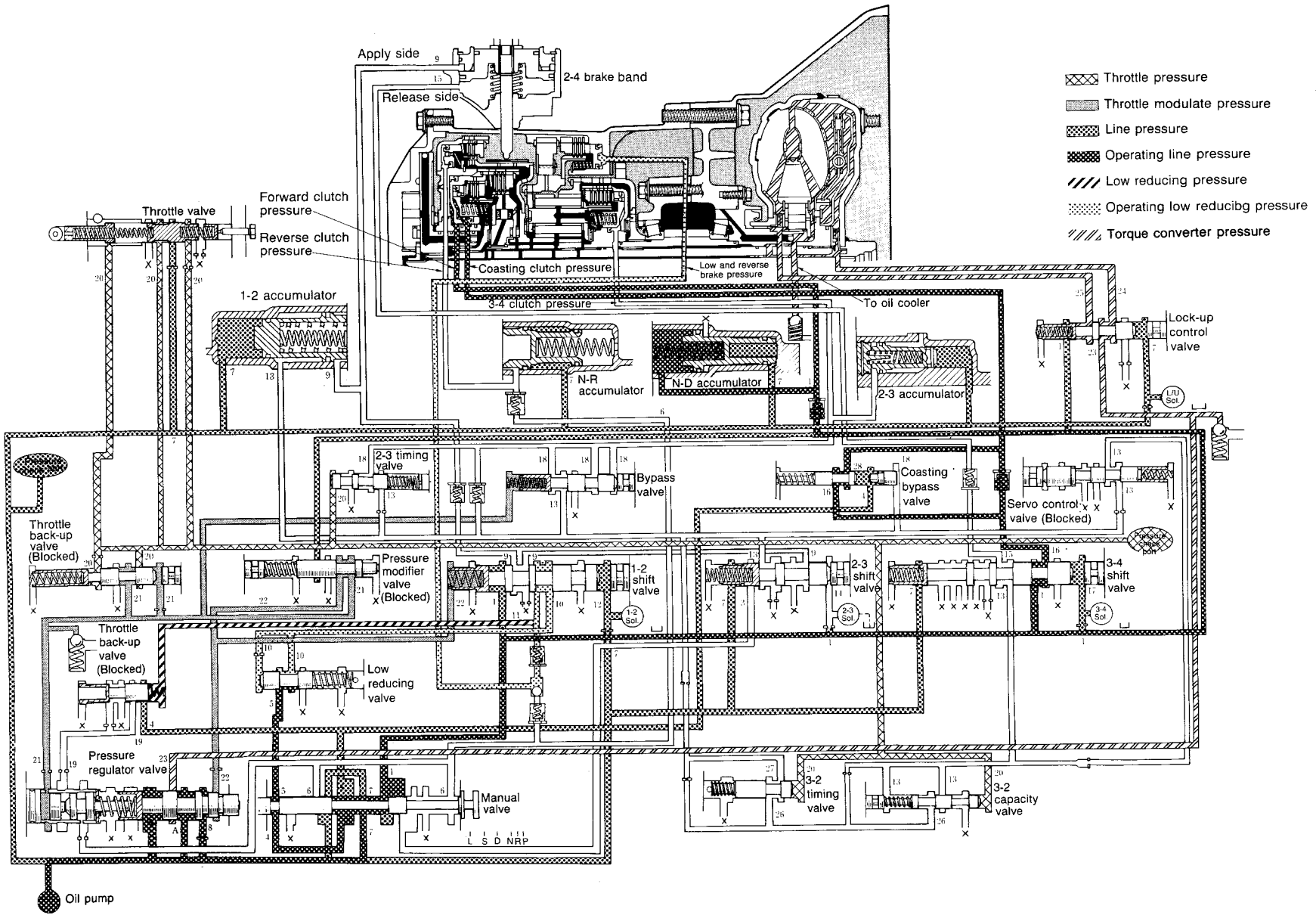
S RANGE; 3RD GEAR ABOVE APPROX. 40 km/h (25 mph)



03U0K2-337



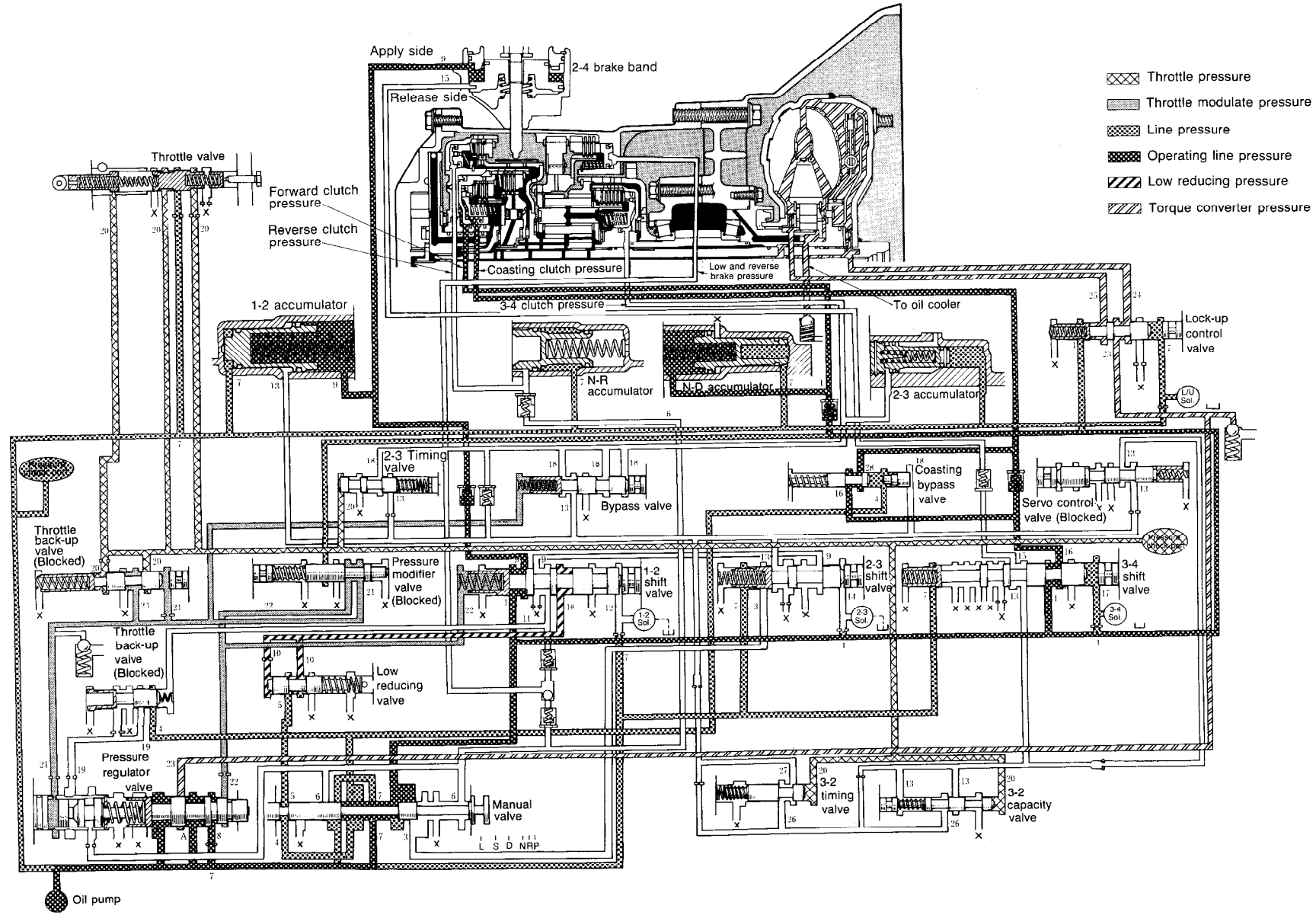
- XXXX Throttle pressure
- Throttle modulate pressure
- Line pressure
- Operating line pressure
- Low reducing pressure
- Operating low reducing pressure
- Torque converter pressure



- Throttle pressure
- Throttle modulate pressure
- Line pressure
- Operating line pressure
- Low reducing pressure
- Operating low reducing pressure
- Torque converter pressure

L RANGE; 2ND GEAR BELOW APPROX. 110 km/h (68 mph)

HYDRAULIC CIRCUIT

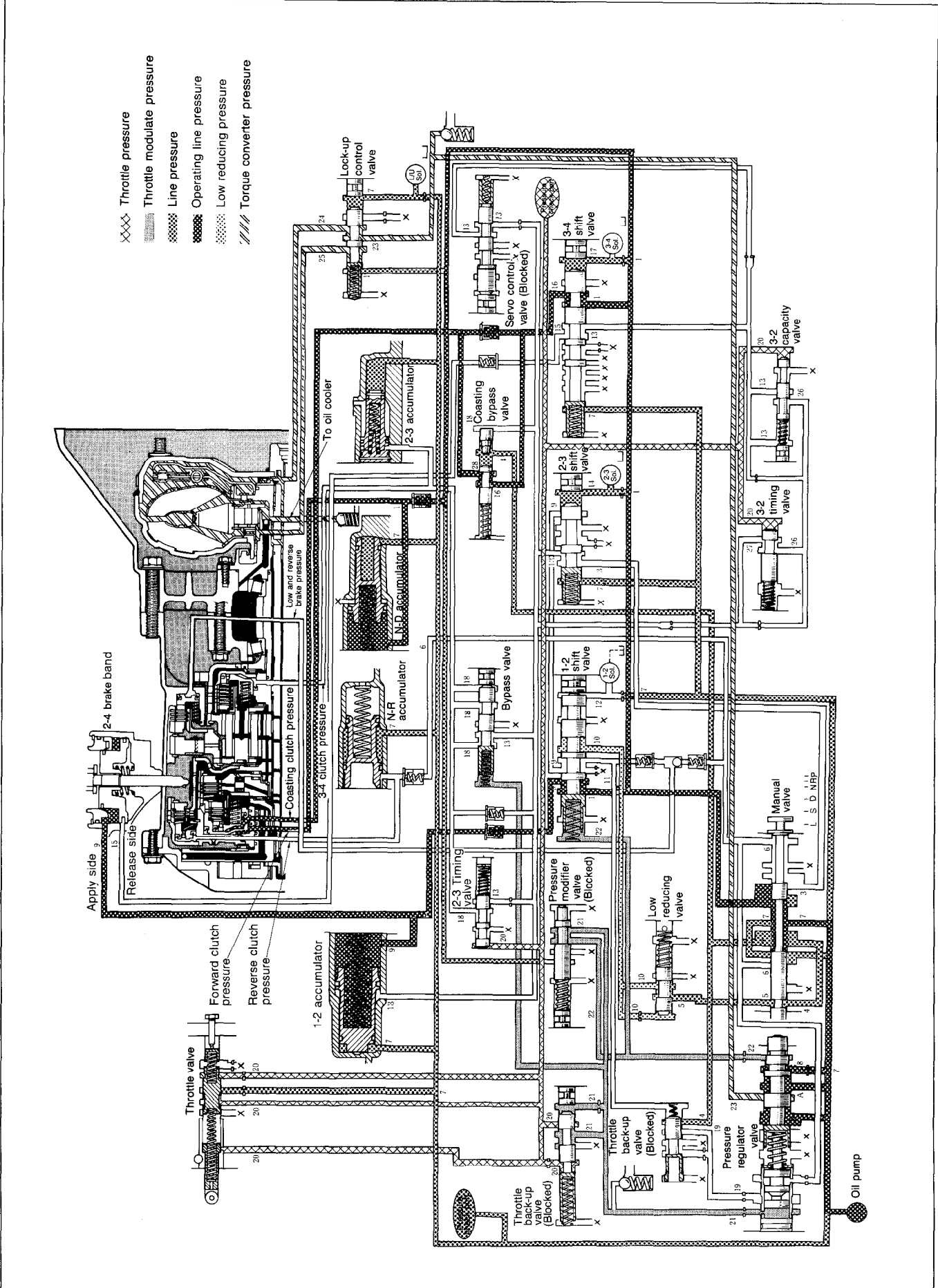


- ⊗⊗ Throttle pressure
- ▨ Throttle modulate pressure
- ▤ Line pressure
- ▩ Operating line pressure
- ▧ Low reducing pressure
- ▨ Torque converter pressure

03U0K2 340
K2-297

K2

L RANGE; 2ND GEAR ABOVE APPROX. 110 km/h (68 mph)



PROPELLER SHAFT

FEATURES

OUTLINE	L- 2
OUTLINE OF CONSTRUCTION	L- 2
SPECIFICATIONS	L- 2
PROPELLER SHAFT	L- 3

SERVICE

TROUBLESHOOTING GUIDE	L- 4
PROPELLER SHAFT	L- 4
PREPARATION	L- 4
REMOVAL / INSPECTION / INSTALLATION ..	L- 5
OVERHAUL	L- 7

03U0LX-801

OUTLINE

OUTLINE OF CONSTRUCTION

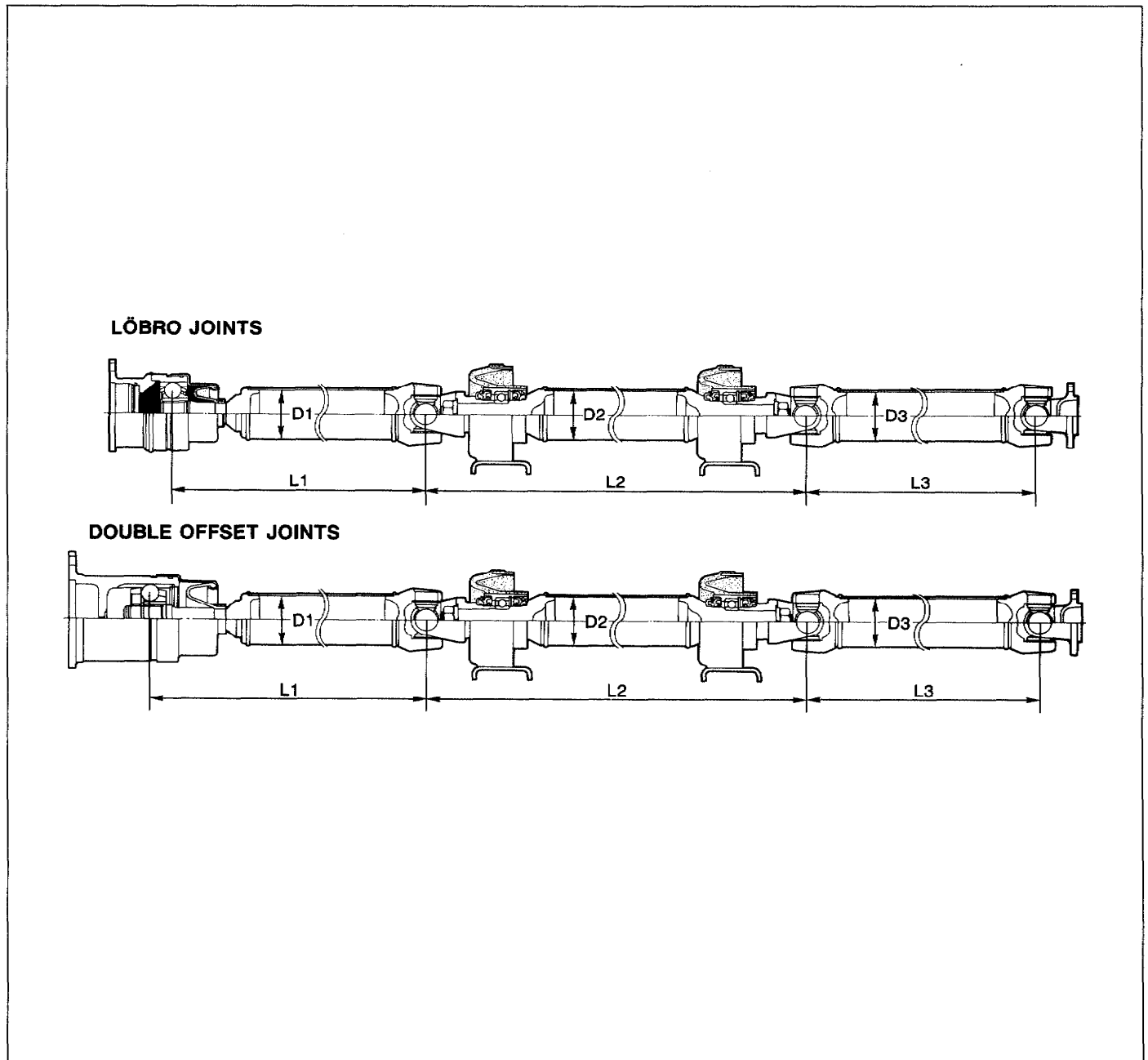
1. The propeller shaft is a three-piece, four-joint type with two center bearings for support.

03U0LX-802

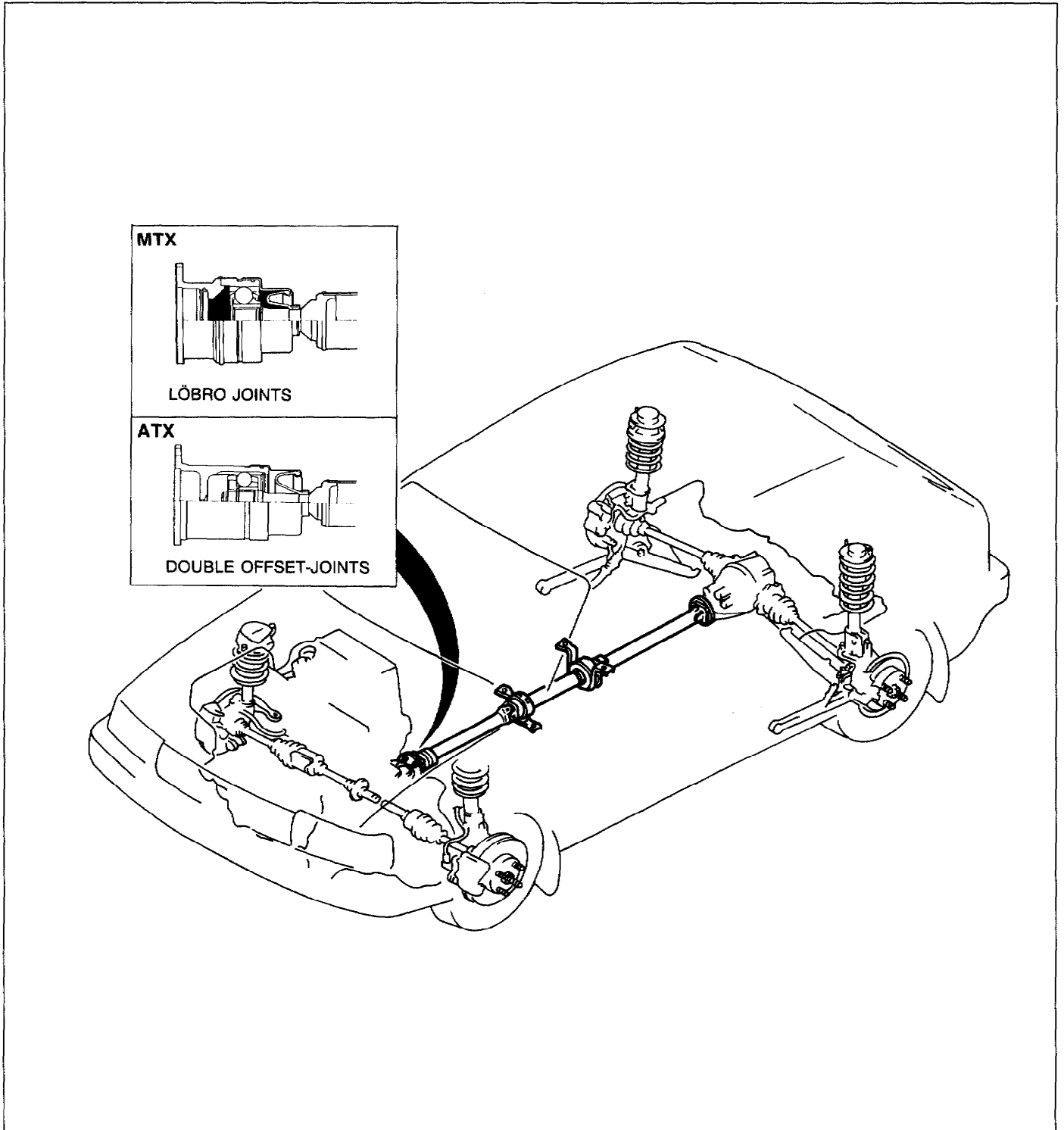
SPECIFICATIONS

Item		Model	MTX	ATX
Length	mm (in)	L1	834.3 (32.84)	836.5 (32.93)
		L2		634.0 (24.96)
		L3		437.0 (17.20)
Outer diameter	mm (in)	D1		75.0 (2.95)
		D2		57.0 (2.24)
		D3		57.0 (2.24)

03U0LX-803



PROPELLER SHAFT



03U0LX-804

A three-piece, four-joint type propeller shaft is used.

By employing two center bearings for support of the propeller shaft assembly, the shaft's flexibility is increased, thus reducing the amount of vibration and noise at high speed.

A constant-velocity joint, matched with either the automatic or manual transaxle, is employed at the front of the front propeller shaft for smoother power flow and improved riding comfort.

A Löbro joint is used for the front joint of MTX models for reduction of torque fluctuation, vibration and noise at the high-rpm range.

A double-offset joint, with low thrust resistance, is used for the front joint of ATX models for reduction of idle vibrations.

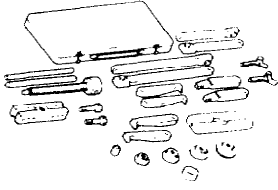
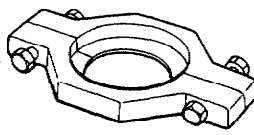
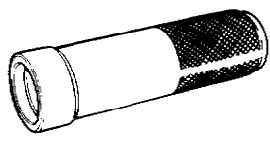
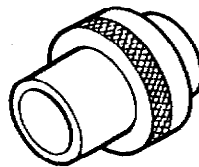
TROUBLESHOOTING GUIDE

Problem	Possible cause	Action	Page
Vibration	Bent propeller shaft	Replace	L- 5
	Improperly installed universal joint snap ring	Repair	L- 7
	Worn or damaged center bearing	Replace	L- 7
	Loose center bearing mounting bolts	Tighten	L- 5
	Loose yoke mounting bolts	Tighten	L- 5
	Improperly assembled center bearing yoke	Repair	L- 7
Abnormal noise	Worn or damaged bearing cup	Replace	L- 7
	Improperly installed universal joint snap ring	Repair	L- 7
	Worn or damaged center bearing	Replace	L- 7
	Loose yoke mounting bolts	Tighten	L- 5
	Incorrect propeller shaft alignment angle	Adjust	L- 5

03U0LX-805

PROPELLER SHAFT

PREPARATION SST

<p>49 0839 425C</p> <p>Puller set, bearing</p> 	<p>For removal of center companion flange and center bearing</p>	<p>49 0636 145</p> <p>Puller, fan pulley boss</p> 	<p>For removal of center bearing support assembly</p>
<p>49 F401 331</p> <p>Body</p> 	<p>For installation of center bearing support assembly</p>	<p>49 H025 003</p> <p>Installer, bearing</p> 	<p>For installation of center bearing support assembly</p>

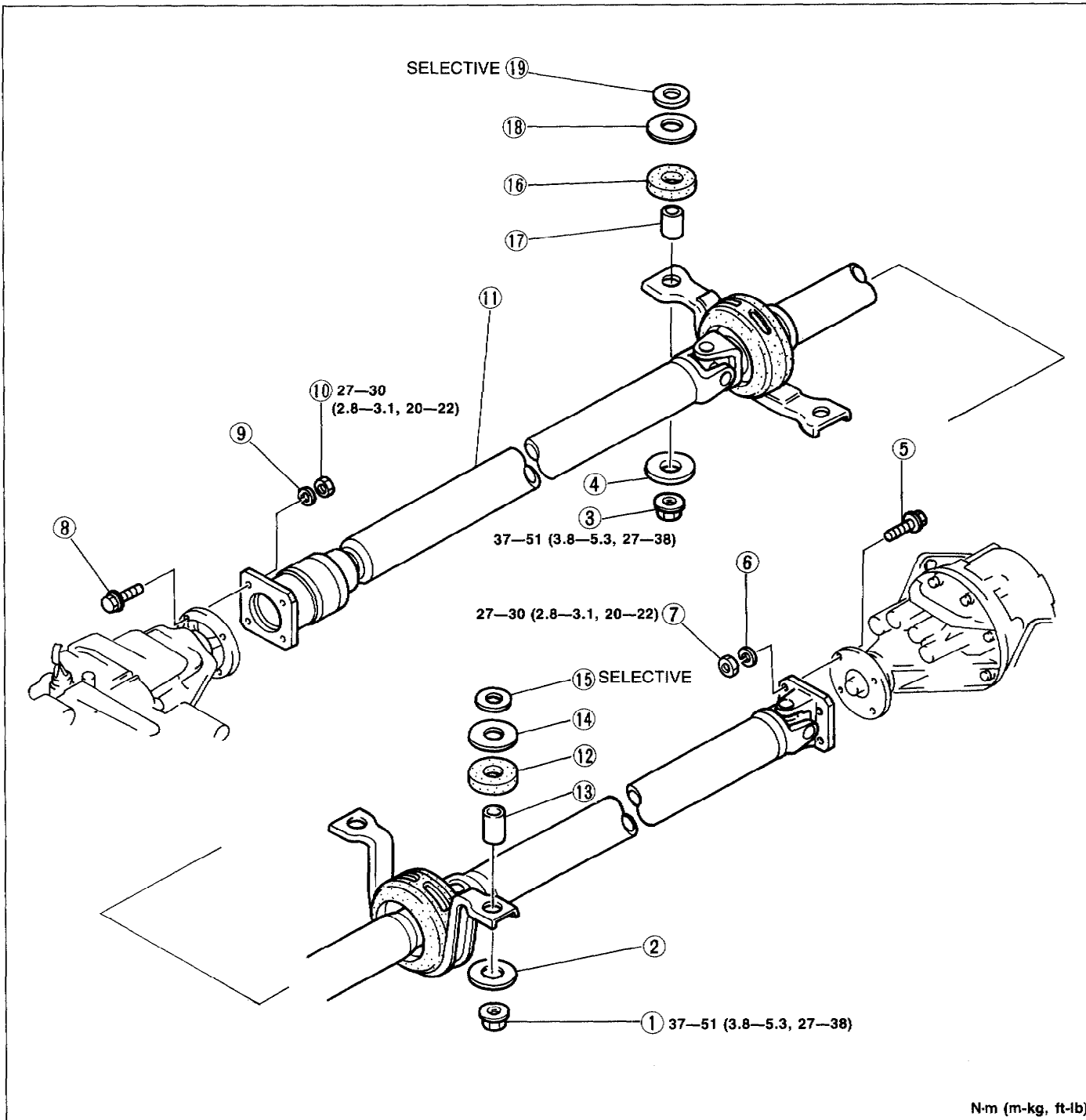
03U0LX-806

PROPELLER SHAFT

L

REMOVAL / INSPECTION / INSTALLATION

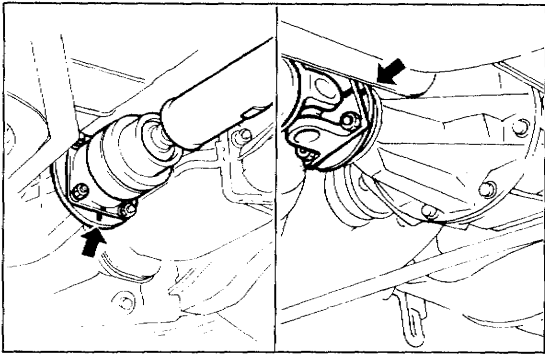
1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.



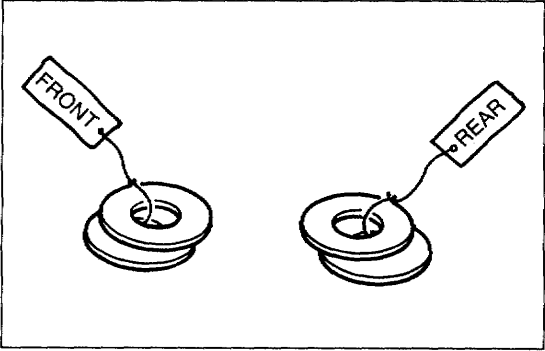
N-m (m-kg, ft-lb)

03U0LX-807

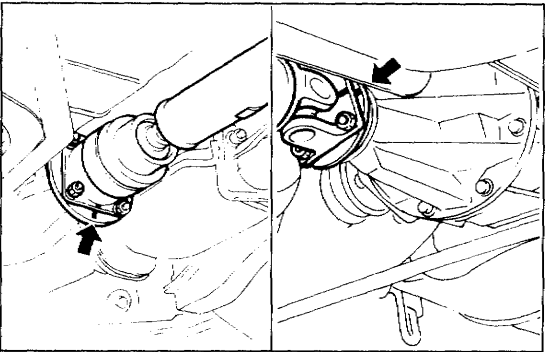
- | | | |
|--------------------------------------|-------------------------------------------------|-------------------------------------------|
| 1. Nut
Removal Note page L-6 | 8. Bolt | 14. Washer |
| 2. Washer | 9. Lock washer | 15. Spacers
Removal Note page L-6 |
| 3. Nut | 10. Nut | 16. Bushing |
| 4. Washer | 11. Propeller shaft
Inspection..... page L-9 | 17. Spacer |
| 5. Bolt | Installation Note.. page L-6 | 18. Washer |
| 6. Lock washer | | 19. Spacer |
| 7. Nut | 12. Bushing | |
| | 13. Spacer | |



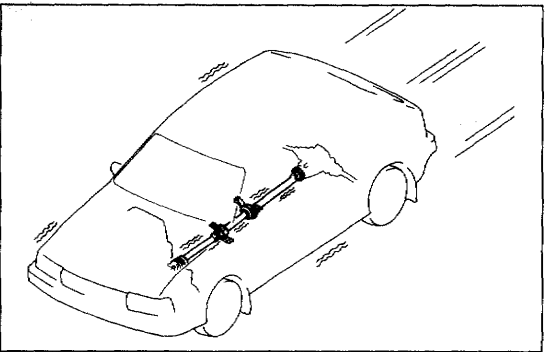
03U0LX-808



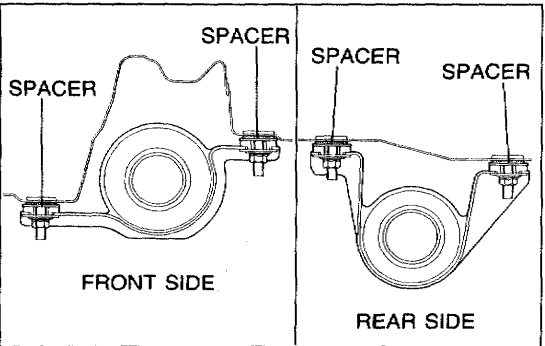
03U0LX-809



03U0LX-810



03U0LX-811



Removal Note

Nuts

1. Before removing the propeller shaft, mark the flanges for proper reassembly.

Spacers

1. Identify the spacers for proper reassembly.

Installation Note

Propeller shaft

1. Align the marks and install the propeller shaft.

2. Verify that there is no abnormal noise or vibration when driving the vehicle.

Note

- The spacer on each side must be the same size.

3. If noise or vibration seems to be the result of incorrect propeller shaft alignment angle, substitute different spacer at the center bearing support assembly to eliminate the problem.

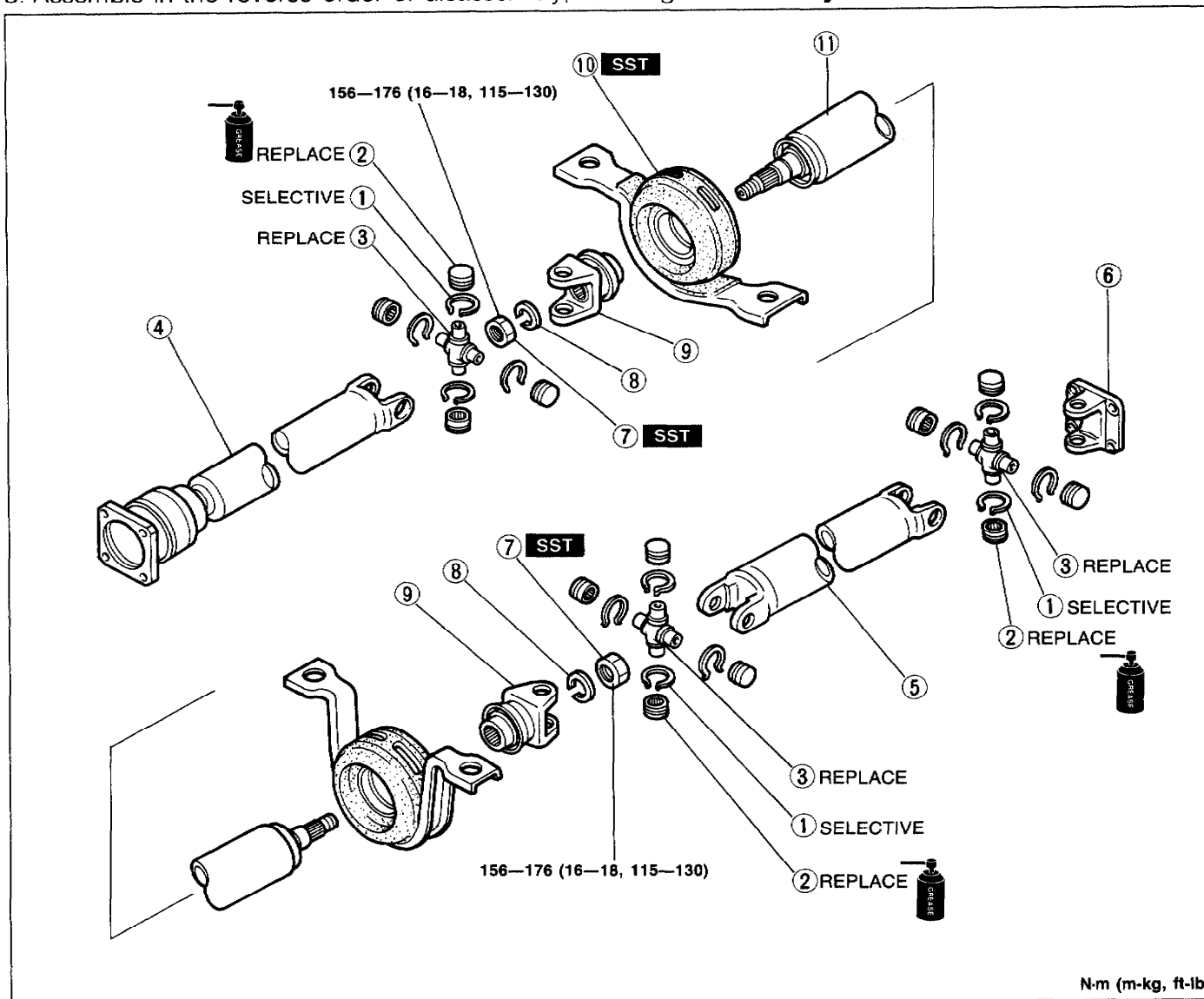
	Spacer size mm (in)	
No spacer	1.6 (0.06)	3.2 (0.13)
4.5 (0.18)	6.0 (0.24)	8.0 (0.31)
10.0 (0.39)	13.0 (0.51)	

OVERHAUL

Caution

- Use pads in the vise to prevent damaging the part.

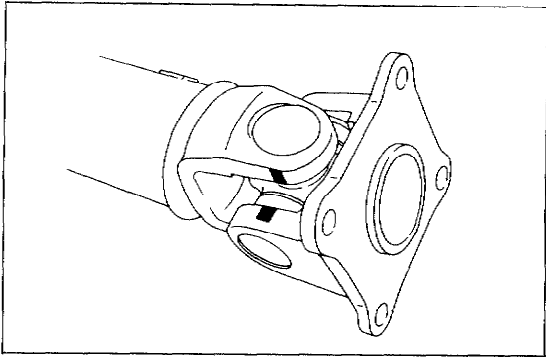
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



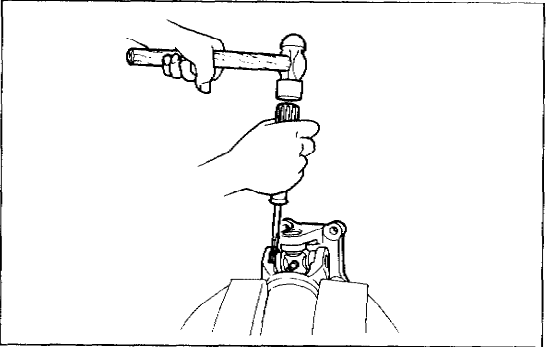
N-m (m-kg, ft-lb)

03U0LX-812

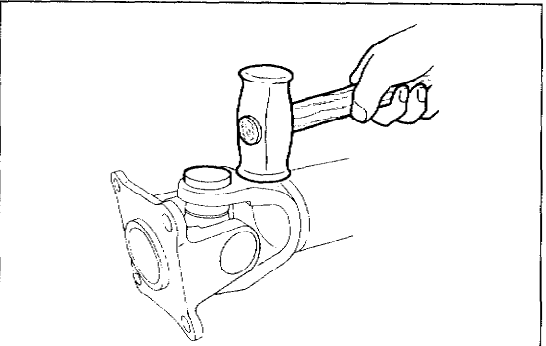
<p>1. Snap ring Disassembly Note..... page L- 8 Assembly Note page L-10</p> <p>2. Bearing cup Disassembly Note..... page L- 8 Inspect for damage, wear and rough rotation Assembly Note page L- 9</p> <p>3. Spider</p> <p>4. Front propeller shaft Inspection page L- 9</p> <p>5. Rear propeller shaft Inspection page L- 9</p>	<p>6. Yoke (Diff side)</p> <p>7. Nut Disassembly Note..... page L- 8 Assembly Note page L- 9</p> <p>8. Lock washer</p> <p>9. Yoke</p> <p>10. Center bearing support assembly Disassembly Note..... page L- 8 Inspect for damage and rough rotation Assembly Note page L- 9</p> <p>11. Center propeller shaft Inspection page L- 9</p>
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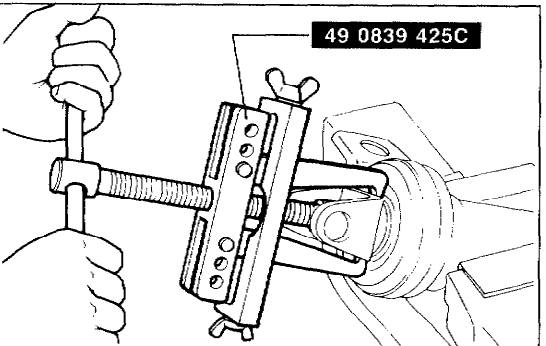
03U0LX-813



9TG0LX-013

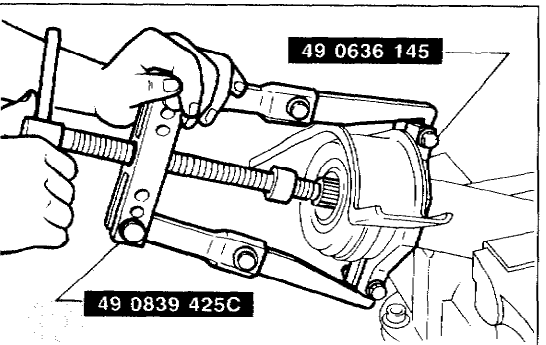


9TG0LX-014



49 0839 425C

03U0LX-814



49 0636 145

49 0839 425C

03U0LX-815

Disassembly Note**Snap ring**

1. Mark the yoke and propeller shaft for proper reassembly.
2. Clamp the propeller shaft in a vise.
3. Remove the snap ring.

Bearing cup

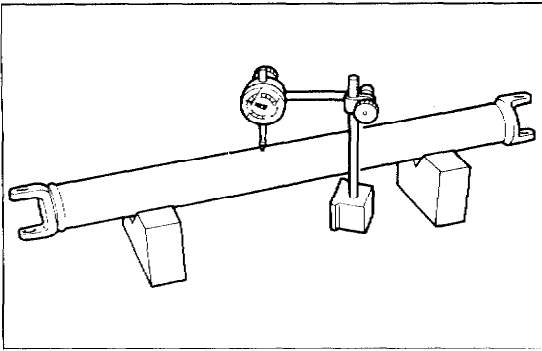
1. Push one bearing cup out of the propeller shaft by tapping the propeller shaft yoke.
2. Remove the opposite bearing cup in the same manner.
3. Separate the propeller shaft and yoke.
4. Clamp the yoke in a vise.
5. Remove the bearing cups and the spider from the yoke as in Steps 1 and 2.

Locknut

1. Align the marks on the center propeller shaft and yoke.
2. Remove the nut and lock washer.
3. Remove the yoke with the **SST**.

Center bearing support assembly

1. Remove the center bearing support assembly with the **SST**.



03U0LX-816

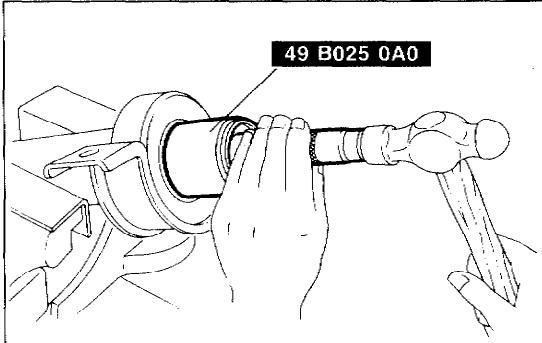
Inspection Center propeller shaft

Caution

- **Replace the center propeller shaft as an assembly if runout is excessive.**

1. Measure the center propeller shaft runout with a dial indicator.

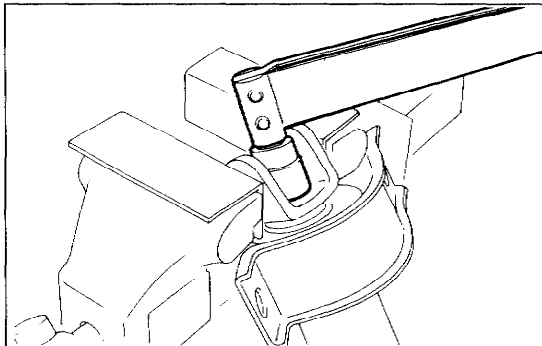
Runout: 0.4mm (0.0157 in) max.



03U0LX-817

Assembly Note Center bearing support assembly

1. Install the center bearing support assembly with the **SST**.



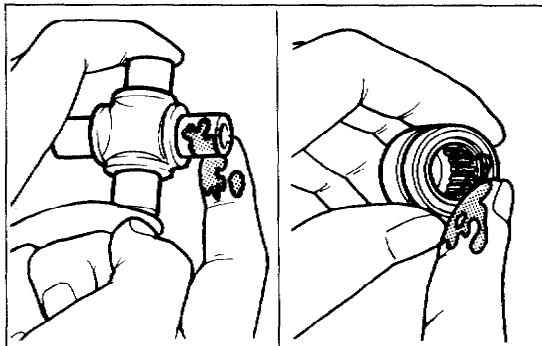
03U0LX-818

Nut

1. Align the marks on the center propeller shaft and yoke.
2. Install the nut.

Tightening torque:

157—177 N·m (16—18 m·kg, 116—130 ft·lb)



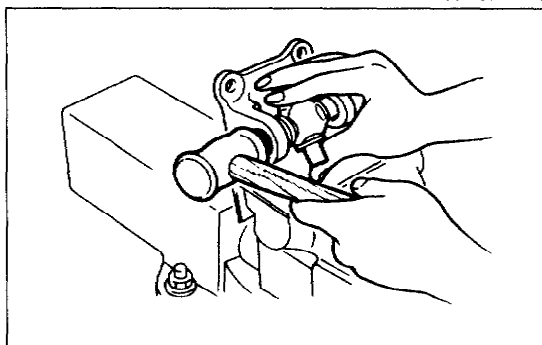
03U0LX-819

Bearing cup

Caution

- **Do not reuse the snap rings, bearing cups, or spider.**

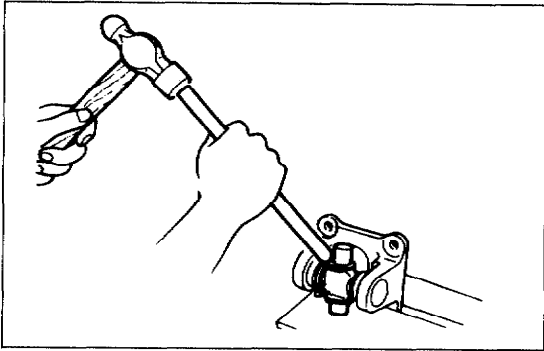
1. Apply lithium based grease to the roller bearings inside the bearing cups.
2. Clamp the yoke in a vise.



03U0LX-820

3. Set the new spider into the yoke and tap in a bearing cup using the spider to hold the rollers.
4. Slide the yoke to the opposite side and install the other bearing cup.

PROPELLER SHAFT



9TG0LX-024

Snap ring

Caution

- Use only new snap rings and ones of the same thickness.

1. Install the thinnest snap rings.

Caution

- Align the marks on the propeller shaft and yoke.

2. Install the yoke to the propeller shaft.
3. Lightly tap the yoke and propeller shaft flanges with a plastic hammer to seat the cups.

4. Measure the starting torque of the spider.

Starting torque:

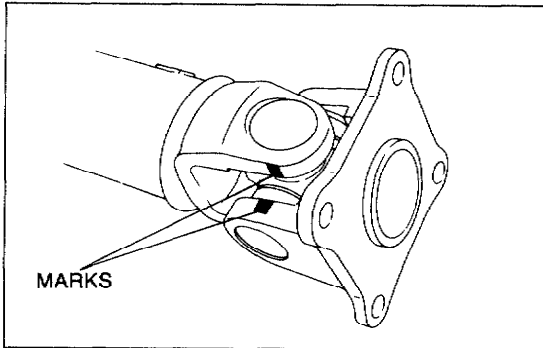
0.29—0.98 N·m (3—10 cm·kg, 2.60—8.68 in·lb)

5. Install different snap rings to adjust the starting torque if necessary.

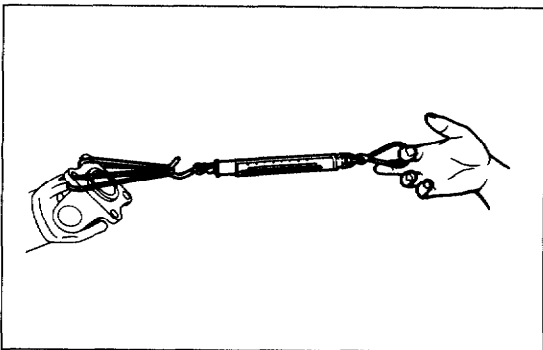
Snap ring thicknesses (19 types)

mm (in)

1.21 (0.0476)	1.22 (0.0480)
1.23 (0.0484)	1.24 (0.0488)
1.25 (0.0492)	1.26 (0.0496)
1.27 (0.0500)	1.28 (0.0504)
1.29 (0.0508)	1.30 (0.0512)
1.31 (0.0516)	1.32 (0.0520)
1.33 (0.0524)	1.34 (0.0528)
1.35 (0.0531)	1.36 (0.0535)
1.37 (0.0539)	1.38 (0.0543)
1.39 (0.0547)	



03U0LX-821



03U0LX-822

FRONT AND REAR AXLES

INDEX M- 2

FEATURES

OUTLINE M- 3
 OUTLINE OF CONSTRUCTION M- 3
 SPECIFICATIONS..... M- 3
REAR AXLE AND DIFFERENTIAL M- 4
 REAR AXLE..... M- 4

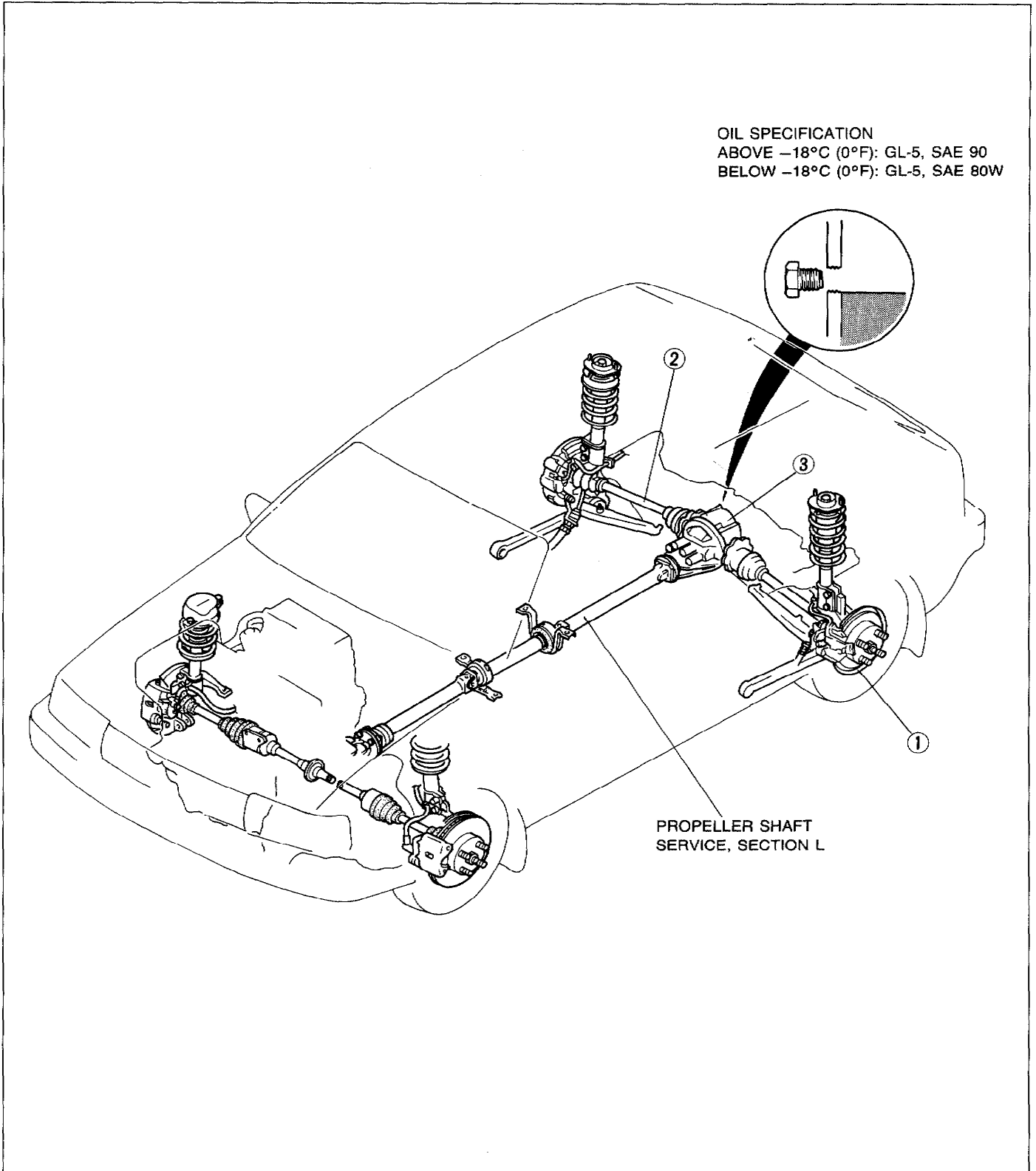
SERVICE

SUPPLEMENTAL SERVICE INFORMATION.. M- 5
TROUBLESHOOTING GUIDE..... M- 5
 REAR AXLE M- 5
 DIFFERENTIAL (STANDARD) M- 5
REAR AXLE M- 6
 PREPARATION..... M- 6
 DISC BRAKE TYPE M- 7
REAR DRIVESHAFT M-12
 DOUBLE-OFFSET JOINT..... M-12
REAR DIFFERENTIAL..... M-16
 PREPARATION..... M-16
 DIFFERENTIAL OIL M-17
 OIL SEAL (OUTPUT SHAFT)..... M-18
 REAR DIFFERENTIAL..... M-20

03U0MX-801

INDEX

OIL SPECIFICATION
 ABOVE -18°C (0°F): GL-5, SAE 90
 BELOW -18°C (0°F): GL-5, SAE 80W



03U0MX-802

1. Rear axle	
Removal / Inspection / Installation	M- 7
Disassembly / Inspection / Assembly...	M- 8
2. Rear driveshaft	
Inspection / Removal / Installation	M-12
Disassembly / Inspection / Assembly...	M-13

3. Rear differential	
Differential oil.....	M-17
Oil seal (Output shaft)	M-18
Removal / Installation.....	M-20
Overhaul.....	M-22

OUTLINE

OUTLINE OF CONSTRUCTION

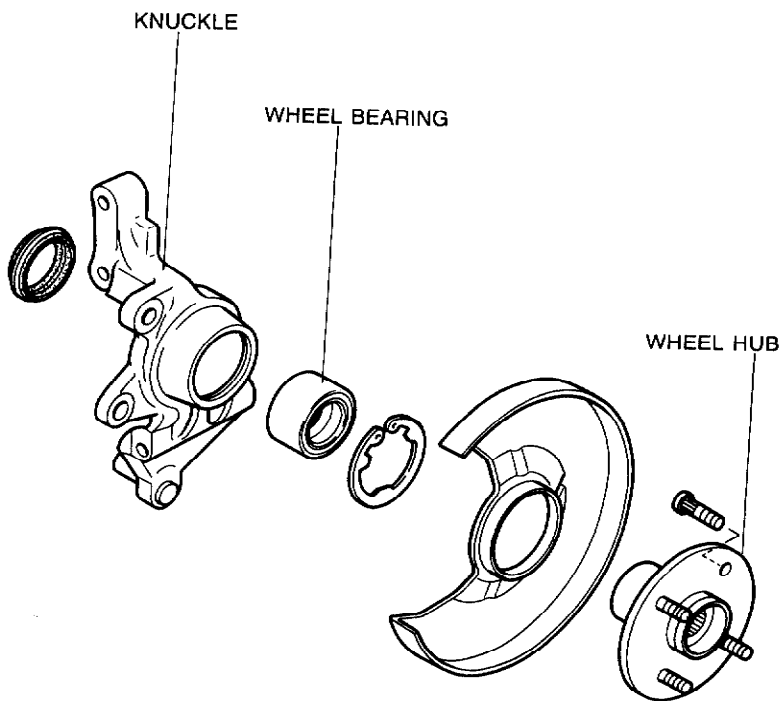
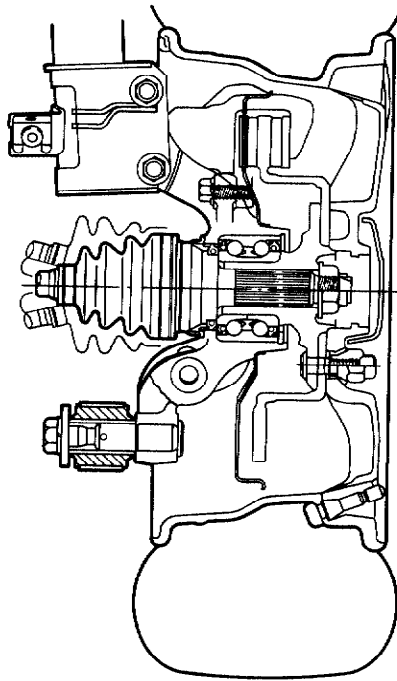
1. Constant-velocity joints, which feature low rotational fluctuation and low noise, and show excellent vibration resistance, are used for the driveshafts.
2. Joint shafts are used for all models, and, because of the resultant equal lengths of the left and right driveshafts, torque-steer during sudden acceleration from a stop is reduced.
3. The rear differential is a standard non-limited-slip differential.
4. Angular type ball bearings are employed for the rear wheel bearings for improved durability and serviceability.

03U0MX-803

SPECIFICATIONS

Item		Model	BP SOHC	
			MTX	ATX
Rear axle				
Wheel bearing axial play	Maximum	mm (in)	0.05 (0.002)	
Rear differential				
Reduction gear		Hypoid gear		
Differential gear		Straight bevel gear		
Reduction ratio		3.909		
Number of teeth	Ring gear	43		
	Drive pinion gear	11		
Differential oil	Grade	API Service GL-5		
	Viscosity	Above -18°C (0°F)	SAE 90	
		Below -18°C (0°F)	80W	
	Amount	liter (US qt, Imp qt)	0.65 (0.69, 0.57)	
Rear driveshaft				
Joint type	Inside	Double-offset joint		
	Outside	Bell joint		
Length of joint	Right	mm (in)	689 (27.12)	
	Left	mm (in)	659 (25.94)	
Shaft diameter		mm (in)	21 (0.82)	

03U0MX-804

REAR AXLE AND DIFFERENTIAL**REAR AXLE
Wheel Bearings**

03UOMX-805

Angular type ball bearings, for which the bearing preload is set by tightening the driveshaft nut to the specified torque, are employed for the wheel bearings, thus improving durability and serviceability.

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Workshop Manual (1195-10-89E).

Troubleshooting guide

- Rear axle
- Rear differential

Rear axle

- Removal / Inspection / Installation
- Disassembly / Assembly

Rear driveshaft

- Inspection / Removal / Installation
- Disassembly / Inspection / Assembly

Rear differential

- Removal / Installation
- Overhaul

Differential oil

- Inspection
- Replacement

03U0MX-806

TROUBLESHOOTING GUIDE

REAR AXLE

Problem	Possible Cause	Action	Page
Abnormal noise	Bent bearing housing	Replace	—
	Bent driveshaft	Replace	M-12
	Worn or damaged wheel bearing	Replace	M- 8
	Worn driveshaft spline	Replace	M-13

03U0MX-807

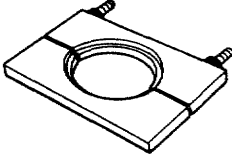
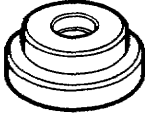
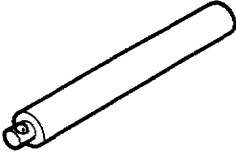

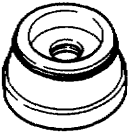
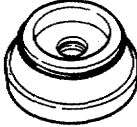
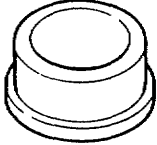
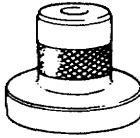
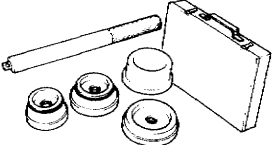
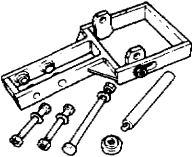
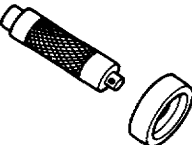
DIFFERENTIAL (STANDARD)

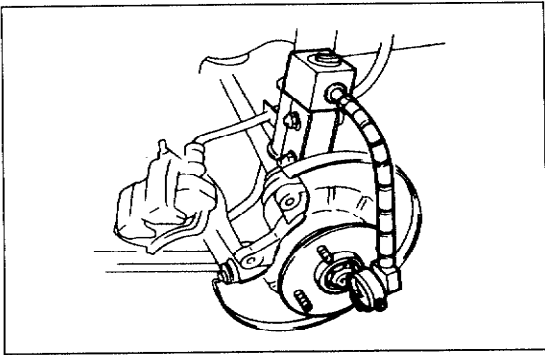
Problem	Possible Cause	Action	Page
Abnormal noise	Insufficient differential oil	Add oil	M-17
	Incorrect differential oil	Replace	M-17
	Improperly adjusted ring gear backlash	Adjust	M-29
	Poor contact of ring gear teeth	Adjust	M-29
	Worn or damaged side bearing	Replace	M-22
	Worn or damaged ring gear	Replace	M-22
	Worn or damaged drive pinion bearing	Replace	M-22
	Worn or damaged pinion and side gear	Replace	M-22
	Seized side gear and case	Replace	M-22
	Worn side gear spline	Replace	M-22
	Worn pinion shaft	Replace	M-22
	Loose companion flange nut	Tighten	M-28
	Worn thrust washer	Replace	M-28
	Improperly adjusted side gear preload	Adjust	M-28
Improperly adjusted drive pinion gear preload	Adjust	M-27	
Heat buildup	Insufficient differential oil	Add oil	M-17
	Insufficient gear backlash	Adjust	M-28
	Excessive bearing preload	Adjust	M-28
Oil leakage	Excessive differential oil	Remove oil	M-17
	Loose differential carrier	Tighten or repair	M-31
	Worn or damaged oil seal	Replace	M-18
No differential operation	Misassembled	Repair	M-22

03U0MX-808

REAR AXLE

PREPARATION SST

<p>49 G030 370 Plate, removing</p> 	<p>For removal of wheel hub and wheel bearing</p>	<p>49 G030 727 Attachment A (Part of 49 B026 1A0)</p> 	<p>For removal of wheel hub</p>
<p>49 G033 102 Handle (Part of 49 B026 1A0)</p> 	<p>For removal of wheel hub</p>	<p>49 G030 797 Handle (Part of 49 G030 795)</p> 	<p>For removal of wheel hub</p>
<p>49 F027 005 Attachment 62 (Part of 49 F027 0A1)</p> 	<p>For removal of wheel bearing</p>	<p>49 F027 007 Attachment 72 (Part of 49 F027 0A1)</p> 	<p>For installation of wheel bearing</p>
<p>49 F027 009 Attachment 68 & 77 (Part of 49 F027 0A1)</p> 	<p>For installation of wheel bearing</p>	<p>49 V001 795 Installer, oil seal</p> 	<p>For installation of oil seal</p>
<p>49 F027 0A1 Installer set, bearing</p> 	<p>For installation of wheel bearing</p>	<p>49 B026 1A0 Puller, wheel hub</p> 	<p>For removal of wheel hub</p>
<p>49 G030 795 Installer, oil seal</p> 	<p>For installation of wheel bearing</p>	<p>03U0MX-809</p>	



03U0MX-810

DISC BRAKE TYPE

Preinspection

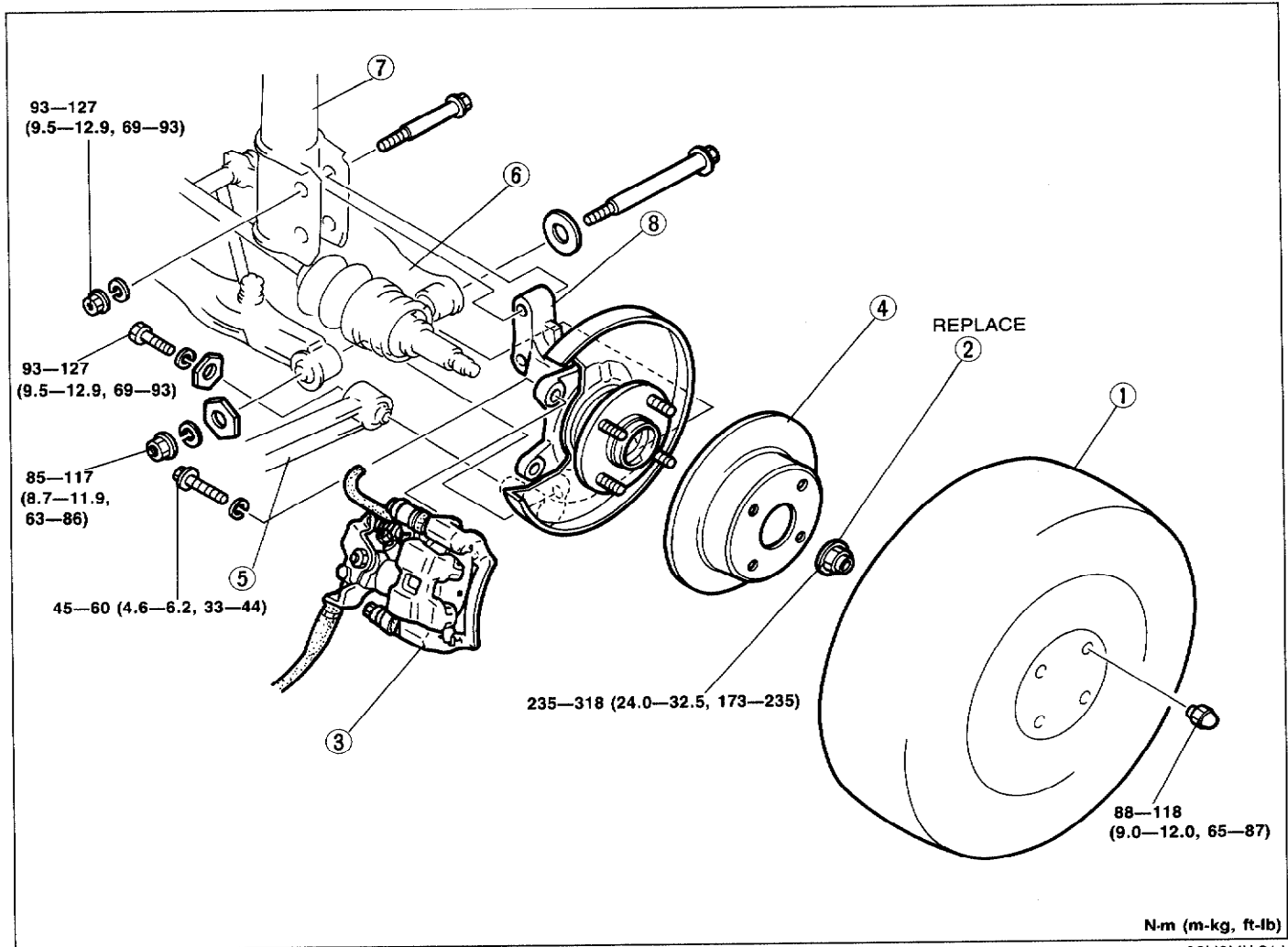
Wheel bearing play

1. Remove the wheel and tire.
2. Remove the brake caliper assembly.
3. Position a dial indicator against the wheel hub. Push and pull the wheel hub by hand in the axial direction and measure the wheel bearing play.
4. If the bearing play exceeds specification, check and adjust the wheel hub nut torque or replace the wheel bearing if necessary.

Maximum wheel bearing play: 0.05mm (0.002 in)

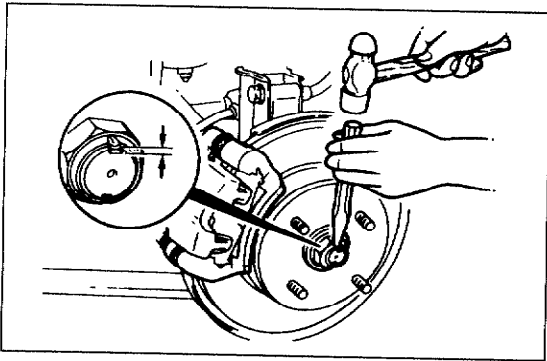
Removal / Inspection / Installation

1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.



03U0MX-811

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Wheel and tire 2. Wheel hub nut
Installation Note page M-8 3. Brake caliper assembly
Service Section P 4. Disc plate
Service Section P | <ol style="list-style-type: none"> 5. Trailing link 6. Lateral link 7. Shock absorber 8. Wheel hub, knuckle
Disassembly / Inspection /
Assembly page M-8 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0MX-812

Installation Note

Wheel hub nut

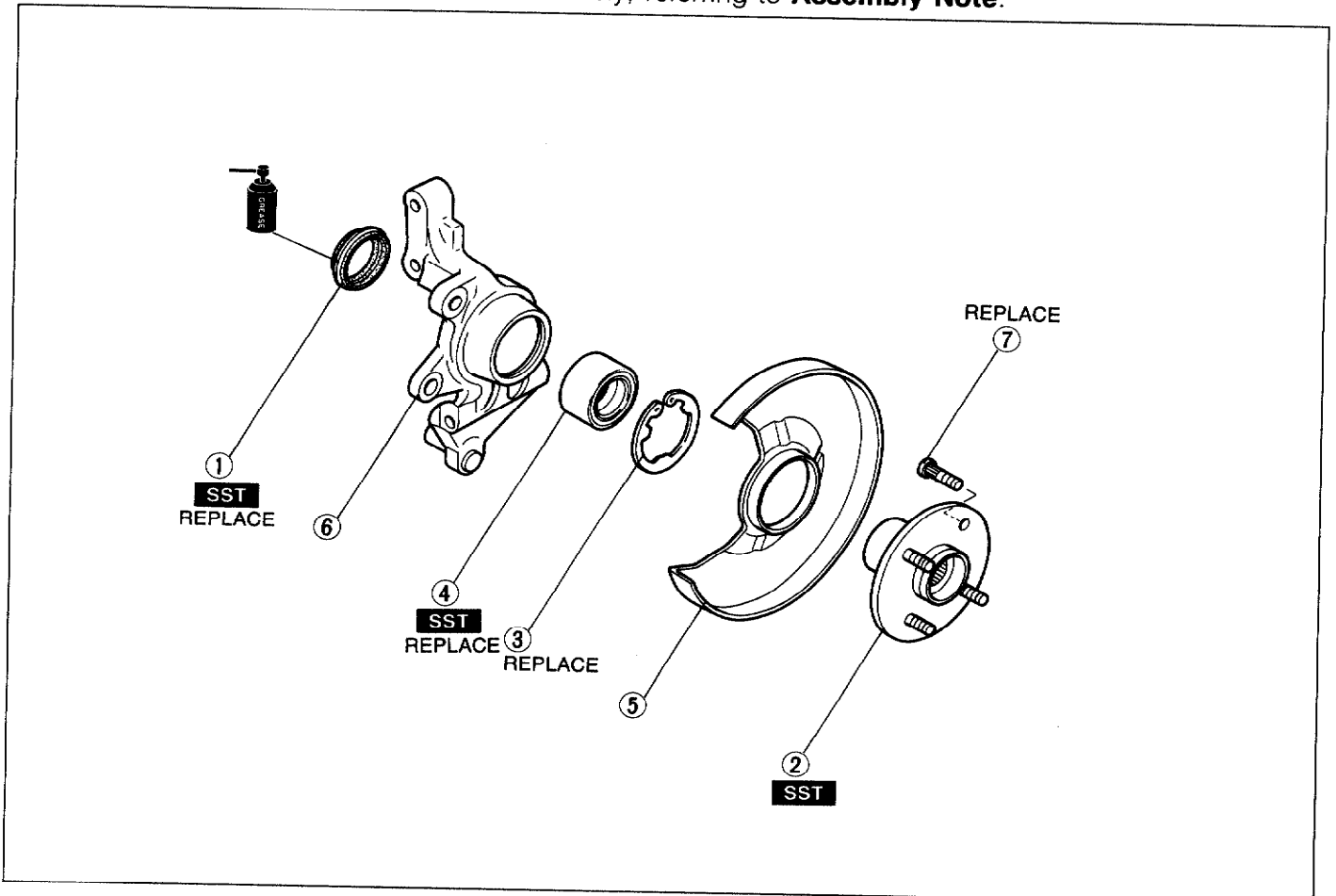
1. Install a new nut, and stake it as shown.

Tightening torque:

177—235 N·m (18—24 m·kg, 130—174 ft·lb)

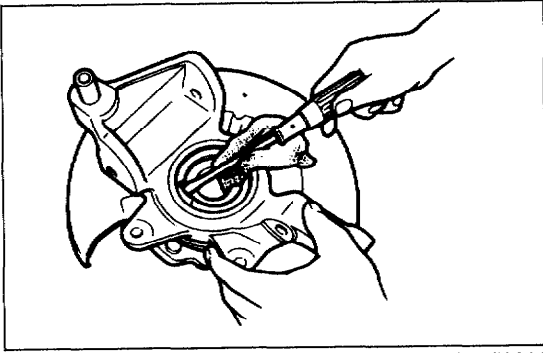
Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



03U0MX-813

- | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Oil seal
 Disassembly Note
 page M- 9
 Assembly Note page M-11</p> | <p>3. Retaining ring
 4. Wheel bearing
 Disassembly Note
 page M- 9
 Assembly Note page M-10</p> | <p>6. Knuckle
 Inspect for cracks and other damage</p> |
| <p>2. Wheel hub
 Disassembly Note
 page M- 9
 Inspect for cracks and other damage
 Assembly Note page M-11</p> | <p>5. Dust cover
 Disassembly Note
 page M-10
 Inspect for damage and distortion
 Assembly Note page M-10</p> | <p>7. Wheel stud
 Disassembly Note
 page M-10
 Assembly Note page M-10</p> |

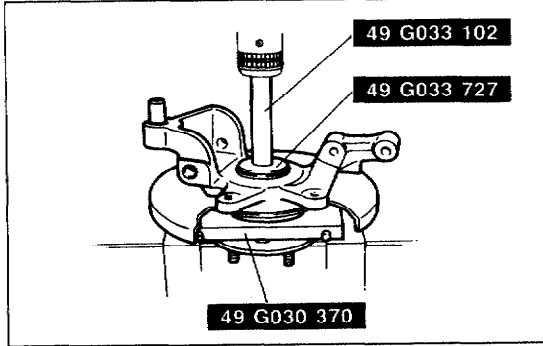


03U0MX-814

Disassembly Note

Oil seal

1. Remove the oil seal with a screwdriver.



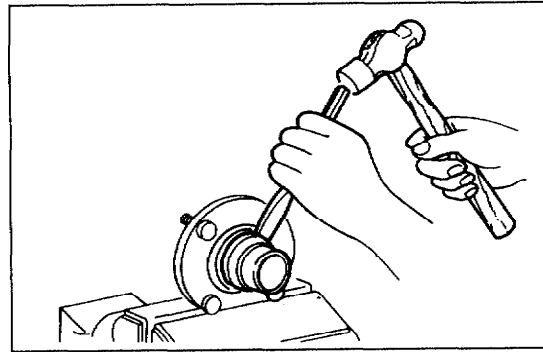
03U0MX-815

Wheel hub

1. Remove the wheel hub from the knuckle with the **SST** and a press.

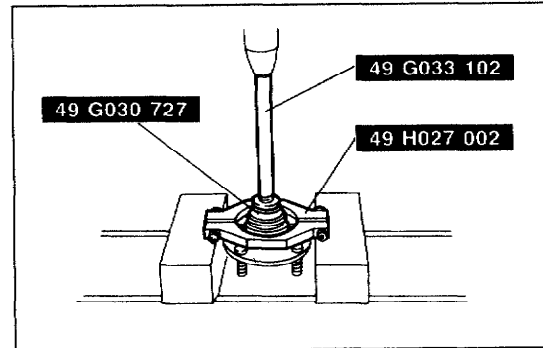
Caution

- Support the wheel hub by hand to prevent it from falling.



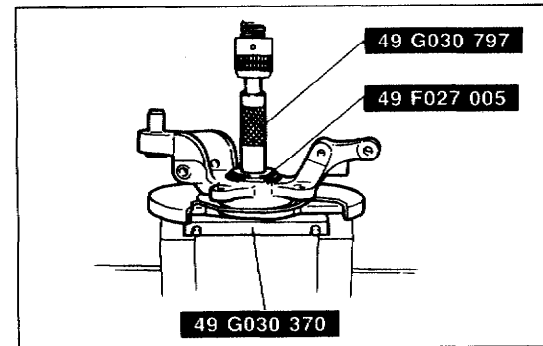
03U0MX-816

2. Move the inner bearing race away from the axle with a hammer and chisel.



03U0MX-817

3. Set the **SST** between the wheel hub and bearing inner race, and remove the bearing inner race.



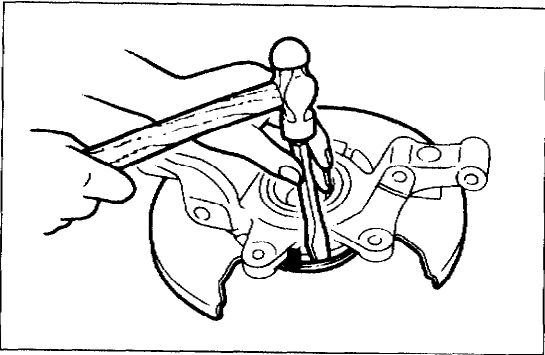
03U0MX-818

Wheel bearing

Caution

- Do not reuse the removed wheel bearing.

1. Remove the wheel bearing from the knuckle with the **SST** and a press.

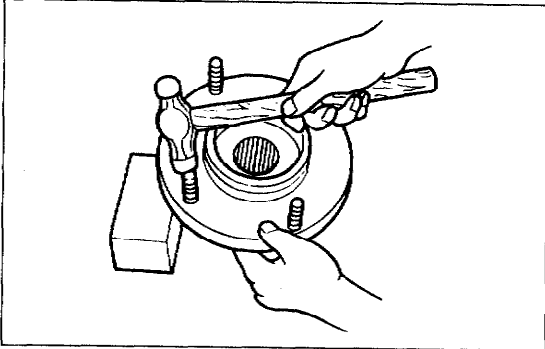


03U0MX-819

Dust cover**Caution**

- Do not remove the dust cover if not necessary.
- Do not reuse the removed dust cover.

1. Mark the dust cover and knuckle for proper reassembly.
2. Remove the dust cover with a chisel.

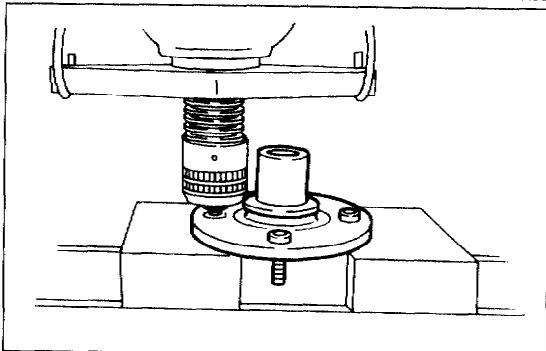


03U0MX-820

Wheel studs**Caution**

- Do not remove the wheel studs unless necessary.
- Do not reuse the removed wheel.

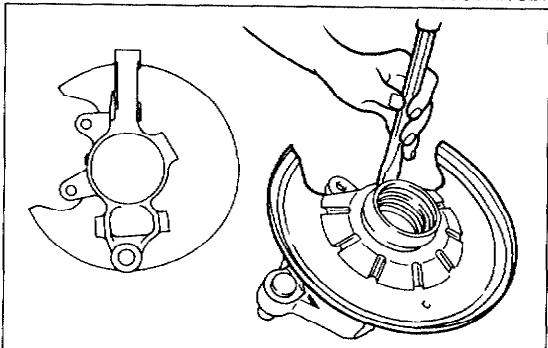
1. Remove the wheel studs with a press.



03U0MX-821

Assembly Note**Wheel stud**

1. Install the new wheel studs with a press.



03U0MX-822

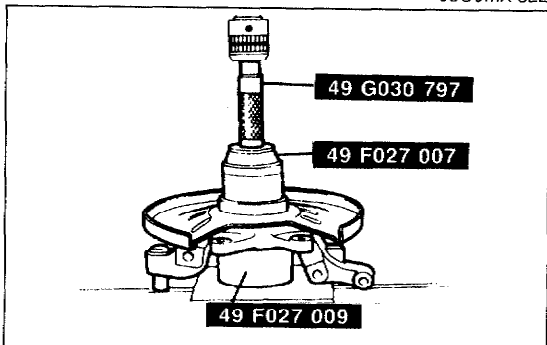
Dust cover

1. Mark the new dust cover the same as the one removed.
2. Align the marks of the new dust cover and the knuckle.

Caution

- Install the new dust cover as shown.

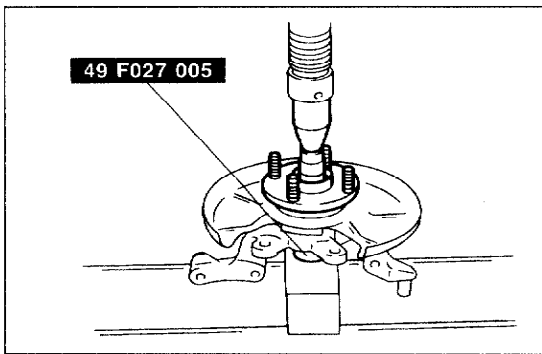
3. Install the new dust cover.



03U0MX-823

Wheel bearing

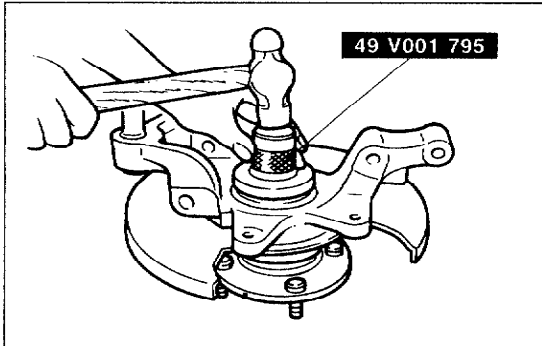
1. Press the new wheel bearing in with the **SST**.



03U0MX-824

Wheel hub

1. Press the wheel hub in with the **SST**.



03U0MX-014

Oil seal**Caution**

- Use a new oil seal, and apply grease to the lip of the seal.
- Install the oil seal flush with the knuckle.

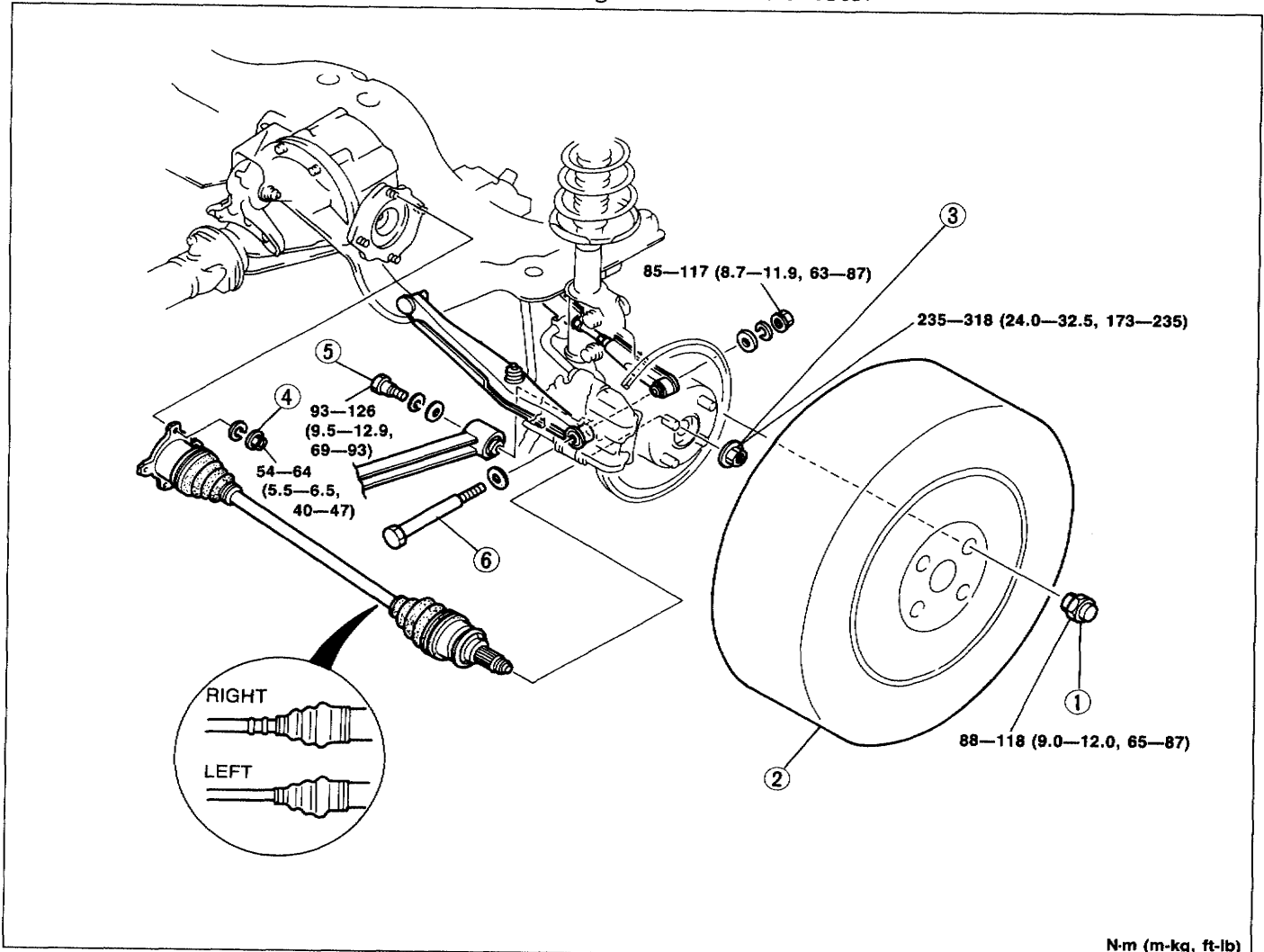
1. Install the new oil seal with the **SST**.

REAR DRIVESHAFT

DOUBLE-OFFSET JOINT

Inspection / Removal / Installation

1. Inspection the rear driveshaft, referring to **Inspection**.
2. Remove in the order shown in the figure, referring to **Removal Note**.
3. Install in the reverse order of removal, referring to **Installation Note**.



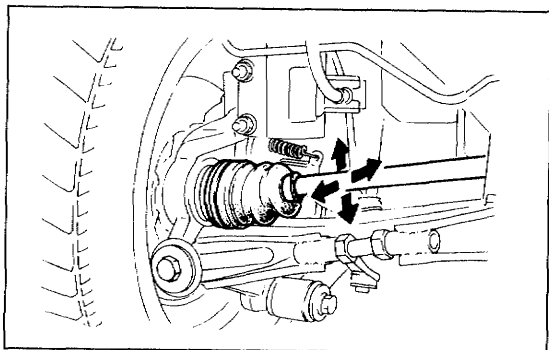
N-m (m-kg, ft-lb)

03U0MX-826

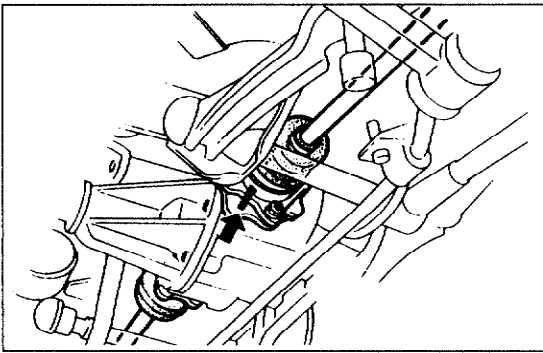
- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Wheel nuts 2. Wheel and tire 3. Wheel hub nut 4. Nut (Driveshaft) | <ol style="list-style-type: none"> 5. Bolt (Trailing link) 6. Bolt (Lateral link) 7. Rear driveshaft |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
- Removal Note..... page M-13 Disassembly / Inspection / Assembly page M-13

Inspection Driveshaft

1. Check the dust boot on the driveshaft for cracks, damage, leaking grease, and loose boot bands.
2. Check the driveshaft for bending, cracking, and wear of joints or splines.
Replace the driveshaft if necessary.



03U0MX-827



03U0MX-828

Removal Note
Nuts (Driveshaft)

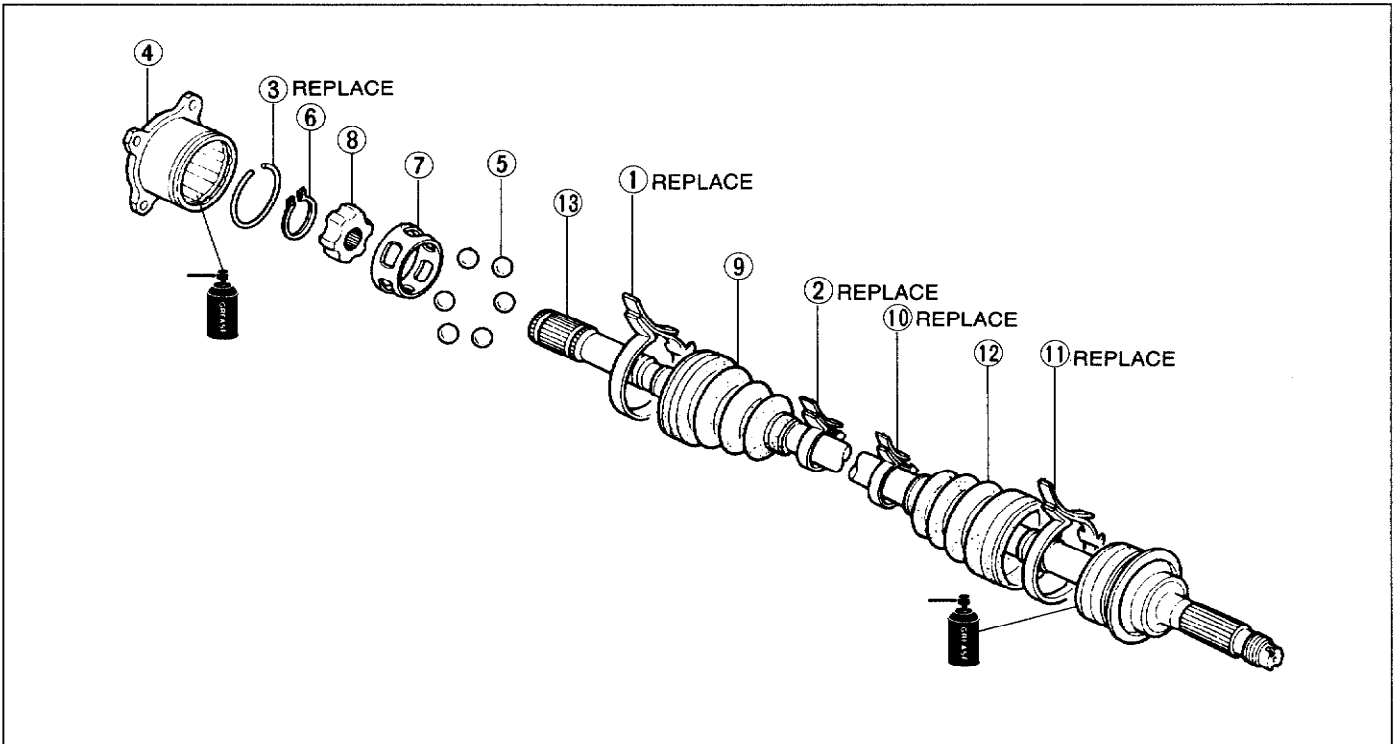
1. Before removing the driveshaft, mark the driveshaft and output shaft for proper reassembly.

Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of removal, referring to **Assembly Note**.

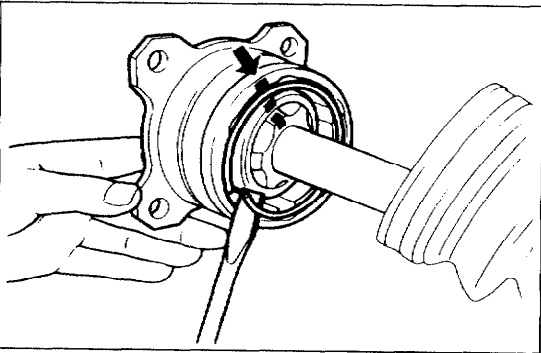
Caution

- **Secure the driveshaft in a vise with protective material (such as copper plates) on the vise jaws.**
- **Be careful that dust or other foreign material does not enter the ball joint while the work is being performed.**
- **Do not disassemble the wheel side ball joint.**
- **Do not wash the ball joint unless it is being disassembled.**



03U0MX-829

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Boot band</p> <p>2. Boot band</p> <p>3. Clip
Disassembly Note
..... page M-14</p> <p>4. Outer ring</p> <p>5. Ball</p> <p>6. Snap ring
Disassembly Note
..... page M-14</p> | <p>7. Cage
Disassembly Note
..... page M-14
Assembly Note page M-15</p> <p>8. Inner ring
Disassembly Note
..... page M-14</p> <p>9. Boot
Disassembly Note
..... page M-14</p> | <p>10. Boot band</p> <p>11. Boot
Disassembly Note
..... page M-14
Assembly Note page M-15</p> <p>12. Axleshaft
Inspect for bending, twisting and other damage</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



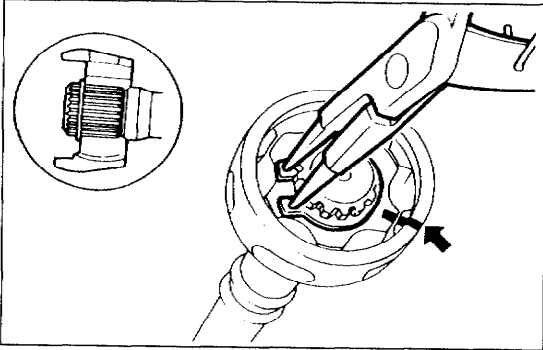
03U0MX-830

Disassembly Note Clip

Caution

- Mark with paint, do not use a punch.

1. Mark the outer ring and the cage for proper reassembly.
2. Remove the clip with a screwdriver.



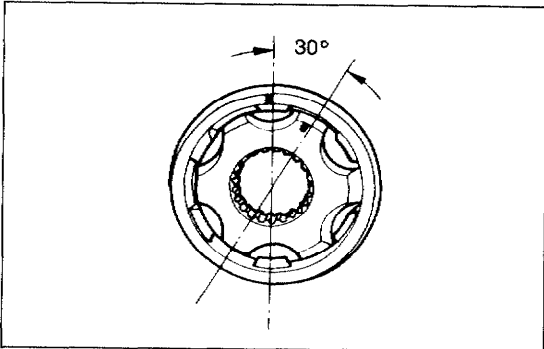
03U0MX-831

Snap ring

Caution

- Mark with paint, do not use a punch.

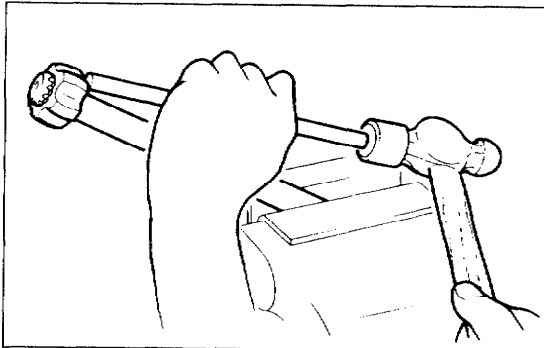
1. Mark the axleshaft, the cage and the inner ring for proper reassembly.
2. Remove the snap ring with snap-ring pliers.



03U0MX-832

Cage

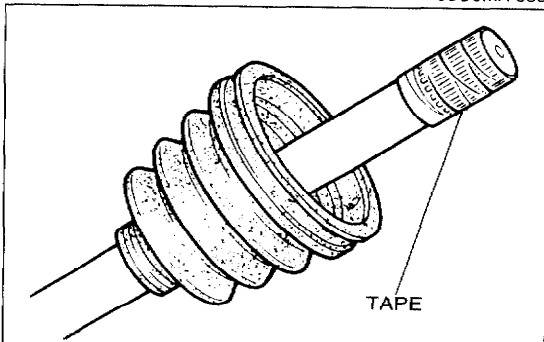
1. Turn the cage approximately 30°, then pull it away from the inner ring.



03U0MX-833

Inner ring

1. Remove the inner ring from the driveshaft with a bar and a hammer.



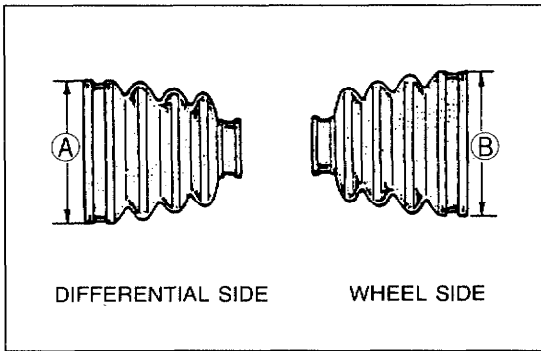
03U0MX-834

Boot

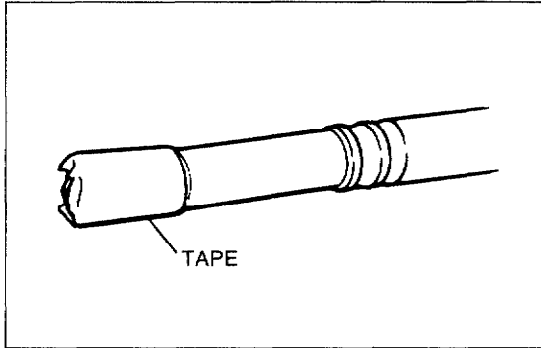
Caution

- Do not remove the boot (wheel side) if not necessary.

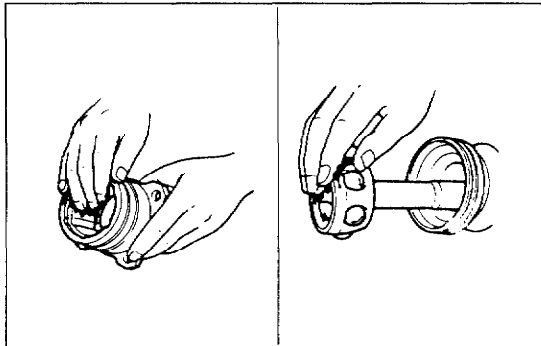
1. Wrap the splines of the driveshaft with tape to prevent damaging the boot.
2. Remove the boot.



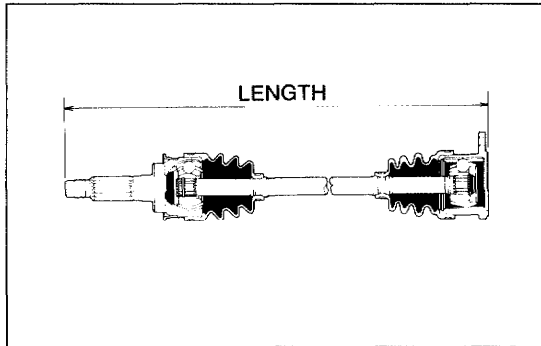
03U0MX-835



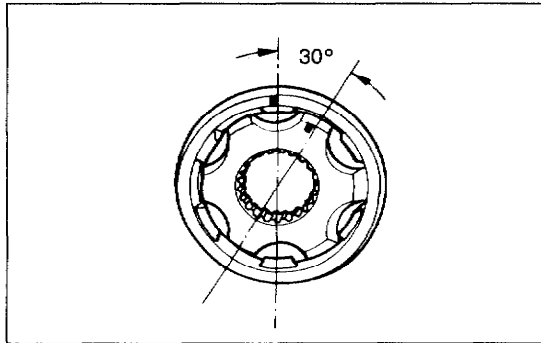
03U0MX-836



03U0MX-837



03U0MX-838



03U0MX-839

Assembly Note Boot

Caution

- The wheel-side and transaxle-side boots are different.

A: 89.9mm (3.54 in)

B: 85.2mm (3.35 in)

1. Wrap the splines of the wheel side of the shaft with tape and install the boot and a new boot band.

Caution

- Do not use other than the specified grease.

2. Apply molybdenum disulfide grease to the joint.

Quantity

Differential side: 75 g (2.64 oz)

Wheel side : 80 g (2.82 oz)

3. Measure the length of the driveshaft.

Standard length

Right side: 689mm (27.12 in)

Left side : 659mm (25.94 in)

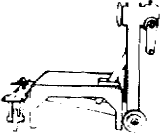
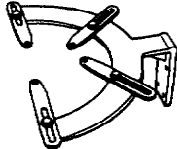
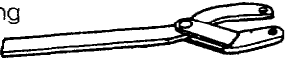
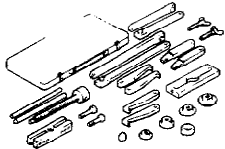
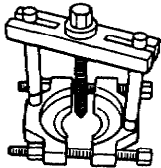
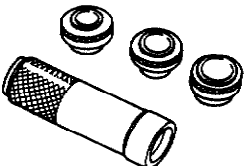
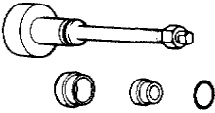
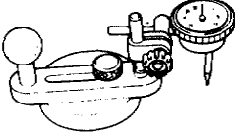
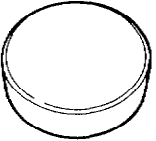
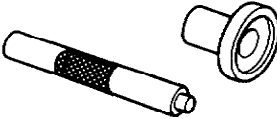
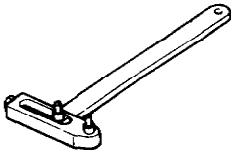
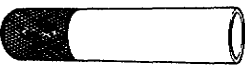


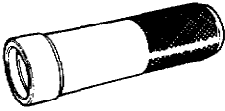
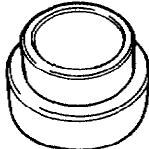
Cage


1. Install the cage at approximately 30° from the mark, then align the marks.

REAR DIFFERENTIAL

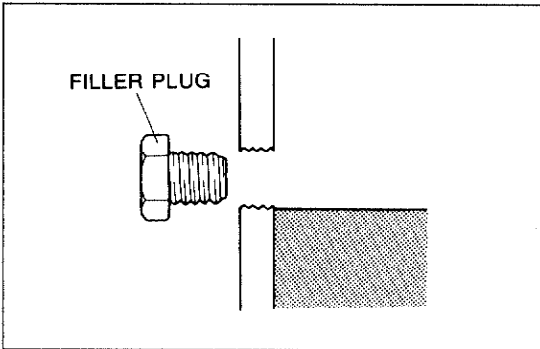
PREPARATION

SST

<p>49 0107 680A Engine stand</p> 	<p>For installation of differential carrier</p>	<p>49 M005 561 Hanger, diff. carrier</p> 	<p>For support of differential carrier</p>
<p>49 S120 710 Holder, coupling flange</p> 	<p>For removal and installation of flange nut</p>	<p>49 0839 425C Puller set, bearing</p> 	<p>For removal of bearing inner race</p>
<p>49 0710 520 Puller, bearing</p> 	<p>For removal of bearing inner race</p>	<p>49 F401 330B Installer set, bearing</p> 	<p>For installation of bearing inner race</p>
<p>49 8531 565 Pinion model</p> 	<p>For measurement of pinion height</p>	<p>49 0727 570 Gage body, pinion height (Part of 49 F027 0A0)</p> 	<p>For measurement of pinion height</p>
<p>49 N027 001 Gauge block</p> 	<p>For measurement of pinion height</p>	<p>49 M005 795 Installer set, oil seal</p> 	<p>For installation of oil seal</p>
<p>49 0259 720 Wrench, diff. side bearing adjusting nut</p> 	<p>For adjustment of drive pinion and ring gear backlash</p>	<p>49 0727 415 Installer, bearing</p> 	<p>For installation of oil seal</p>
<p>49 G038 338 Attachment E</p> 	<p>For installation of bearing inner race</p>	<p>49 8531 567 Collar A</p> 	<p>For measurement of pinion height</p>
<p>49 F401 331 Body (Part of 49 D017 2A1)</p> 	<p>For installation of bearing inner race</p>	<p>49 F401 336B Attachment B (Part of 49 D017 2A1)</p> 	<p>For installation of bearing inner race</p>

<p>49 M005 796</p> <p>Body (Part of 49 M005 795)</p>	 <p>For installation of oil seal</p>
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03U0MX-840



9MU0MX-033

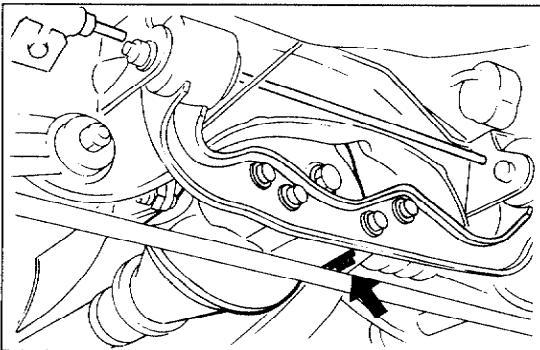
DIFFERENTIAL OIL

Inspection

1. Remove the filler plug.
2. Verify that the oil is at the bottom of the filler plug hole. If it is low, add the specified oil.
3. Install the filler plug.

Tightening torque:

39—54 N·m (4.0—5.5 m·kg, 29—40 ft·lb)



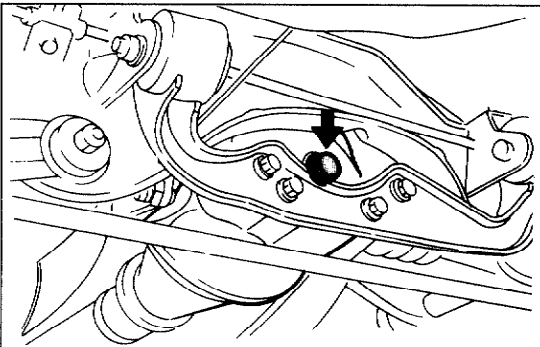
97U0MX-048

Replacement

1. Remove the filler and drain plugs.
2. Drain the differential oil into a suitable container.
3. Wipe the plugs clean.
4. Install the drain plug and washer.

Tightening torque:

39—54 N·m (4.0—5.5 m·kg, 29—40 ft·lb)



03U0MX-841

5. Add the specified oil from the filler plug until the level reaches the bottom of the plug hole.

Specified oil

Type:

Above -18°C (0°F): GL-5, SAE 90

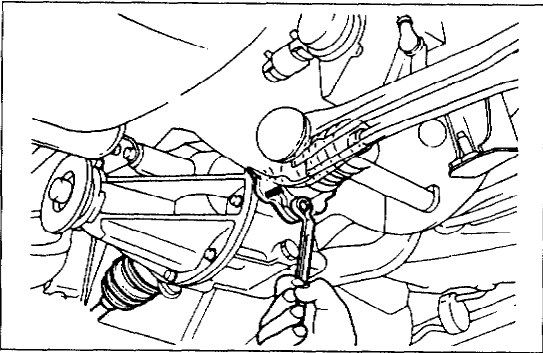
Below -18°C (0°F): GL-5, SAE 80W

Capacity: 0.65 liter (0.6 US qt, 0.5 Imp qt)

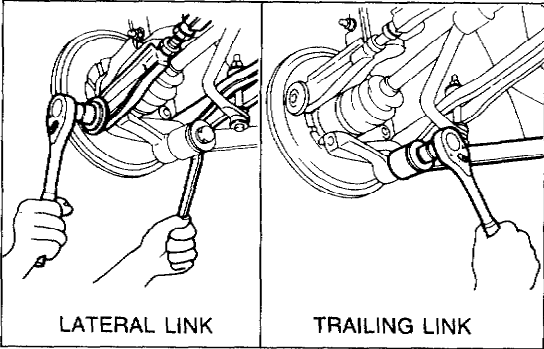
6. Install the filler plug.

Tightening torque:

39—54 N·m (4.0—5.5 m·kg, 29—40 ft·lb)



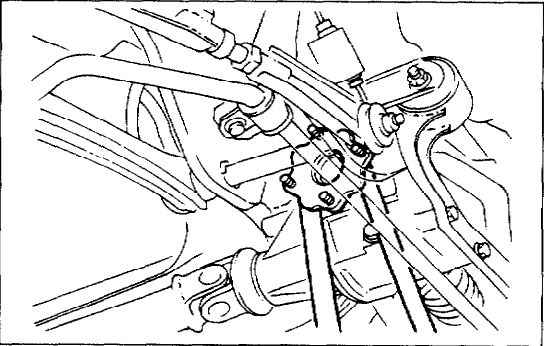
03U0MX-842



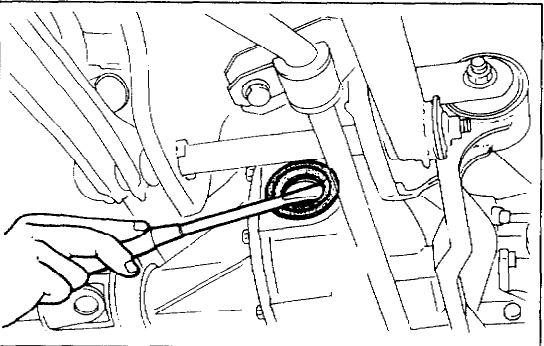
LATERAL LINK

TRAILING LINK

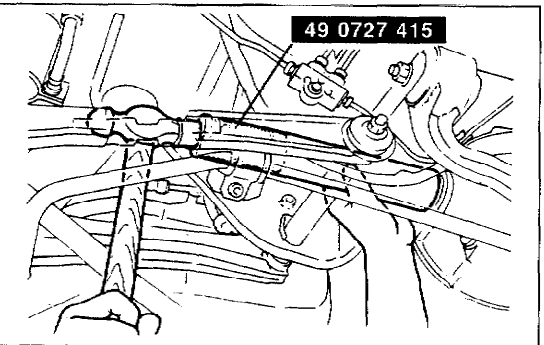
03U0MX-843



03U0MX-844



03U0MX-845



03U0MX-846

OIL SEAL (OUTPUT SHAFT)**Replacement**

1. Jack up the vehicle and support it with safety stands.
2. Drain the differential gear oil.

Note

- **Mark the driveshaft and output shaft flanges for proper reassembly.**

3. Separate the driveshaft from the differential, and suspend it as shown in the figure.

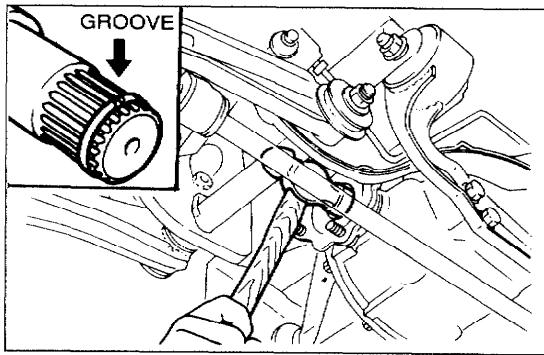
4. Remove the lateral link.
5. Remove the trailing link.

6. Pull the wheel hub out to separate the driveshaft from the output shaft.

7. Remove the output shaft with two pry bars as shown in the figure.

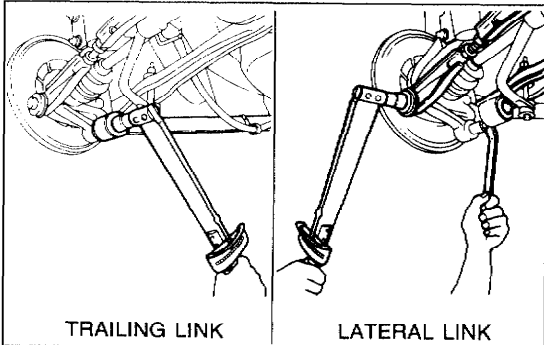
8. Remove the oil seal with a screwdriver.

9. Apply lithium-base grease to the new oil seal lip and install it with the **SST**.



03U0MX-847

10. Install a new clip at the end of the output shaft.
11. Install the output shaft into the side gear by lightly tapping with a plastic hammer.
12. Verify that the output shaft is hooked into the side gear by pulling it by hand.



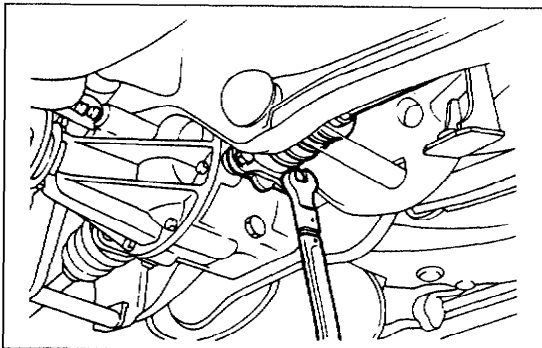
03U0MX-848

13. Install the lateral link.

Tightening torque:
63—75 N·m (6.4—7.6 m·kg, 46—55 ft·lb)

14. Install the trailing link.

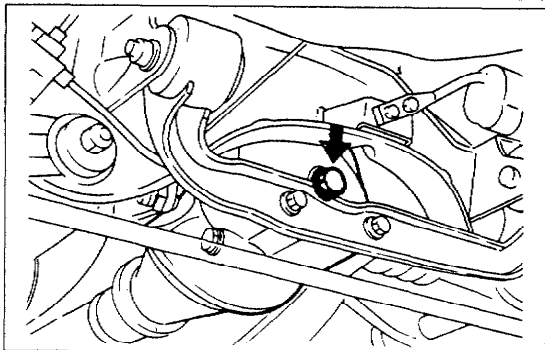
Tightening torque:
49—59 N·m (5.0—6.0 m·kg, 36—43 ft·lb)



03U0MX-849

15. Align the marks and reinstall the driveshaft.

Tightening torque:
49—59 N·m (5.0—6.0 m·kg, 36—43 ft·lb)



03U0MX-850

16. Add the specified oil through the filler plug hole until it reaches the bottom of the hole.

Specified oil

Type:

Above -18°C (0°F): GL-5, SAE 90

Below -18°C (0°F): GL-5, SAE 80W

Capacity:

0.65 liter (0.6 US qt, 0.5 Imp qt)

17. Install the filler plug and a new gasket.

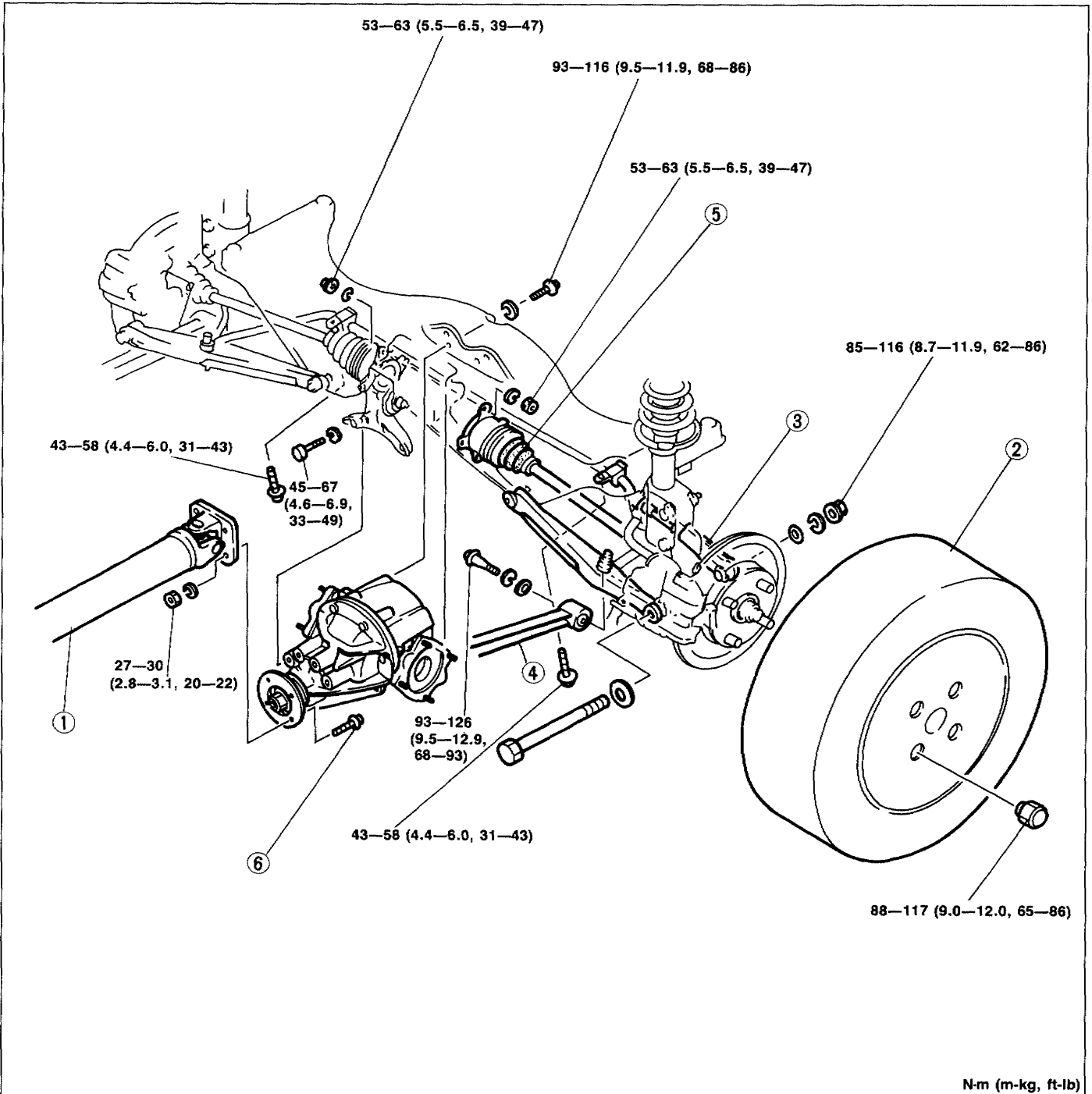
Tightening torque:
39—54 N·m (4.0—5.5 m·kg, 29—40 ft·lb)

REAR DIFFERENTIAL Removal / Installation

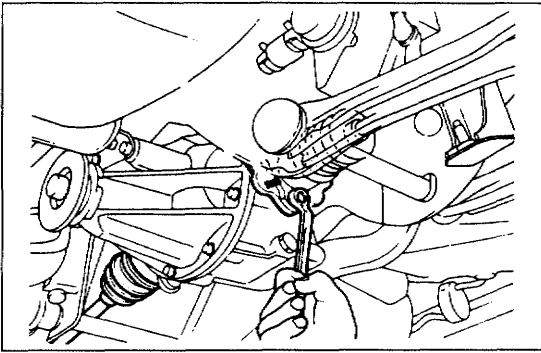
Note

- Drain the differential oil before removal.

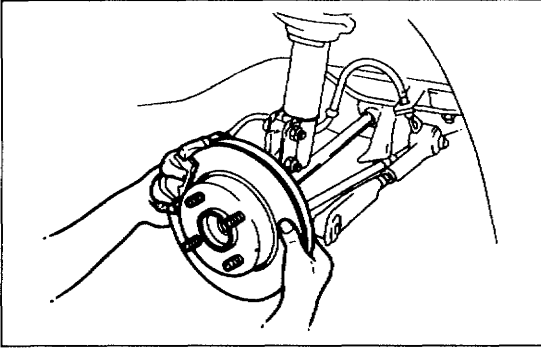
1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal, referring to **Installation Note**.



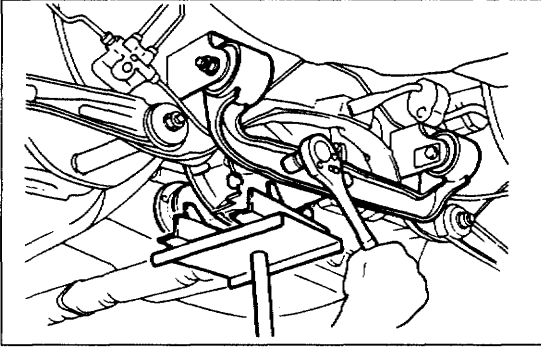
- | | | |
|-----------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 1. Propeller shaft
Service Section L | 4. Trailing link
Disassembly Note
..... page M-21
Assembly Note page M-21 | 6. Rear differential
Disassembly Note
..... page M-21
Assembly Note page M-21
Overhaul..... page M-22 |
| 2. Wheel and tire | | |
| 3. Lateral link | | |
| | | |



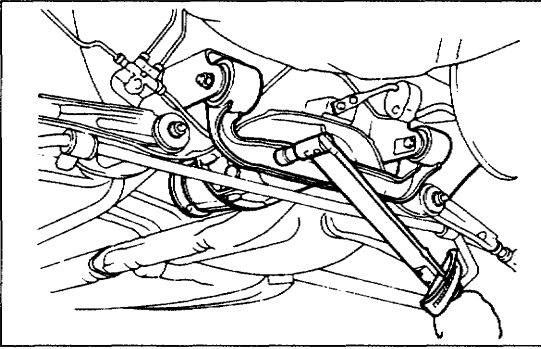
03U0MX-852



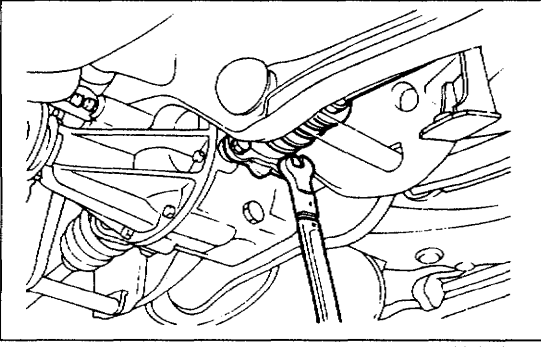
03U0MX-853



03U0MX-854



03U0MX-855



03U0MX-856

Removal Note Driveshaft

1. Before removing the driveshaft, mark the driveshaft and output shaft for proper reassembly.
2. Pull the wheel hub out to separate the driveshaft from the output shaft.

Rear differential

1. Support the differential with a jack while removing it.

Installation Note Rear differential

1. Support the differential with a jack while installing it.

Tightening torque:

Front: 45—68 N·m (4.6—6.9 m·kg, 33—50 ft·lb)
Rear: 93—116 N·m (9.5—11.9 m·kg, 68—86 ft·lb)

Driveshaft

1. Align the marks and reinstall the driveshaft.

Tightening torque:

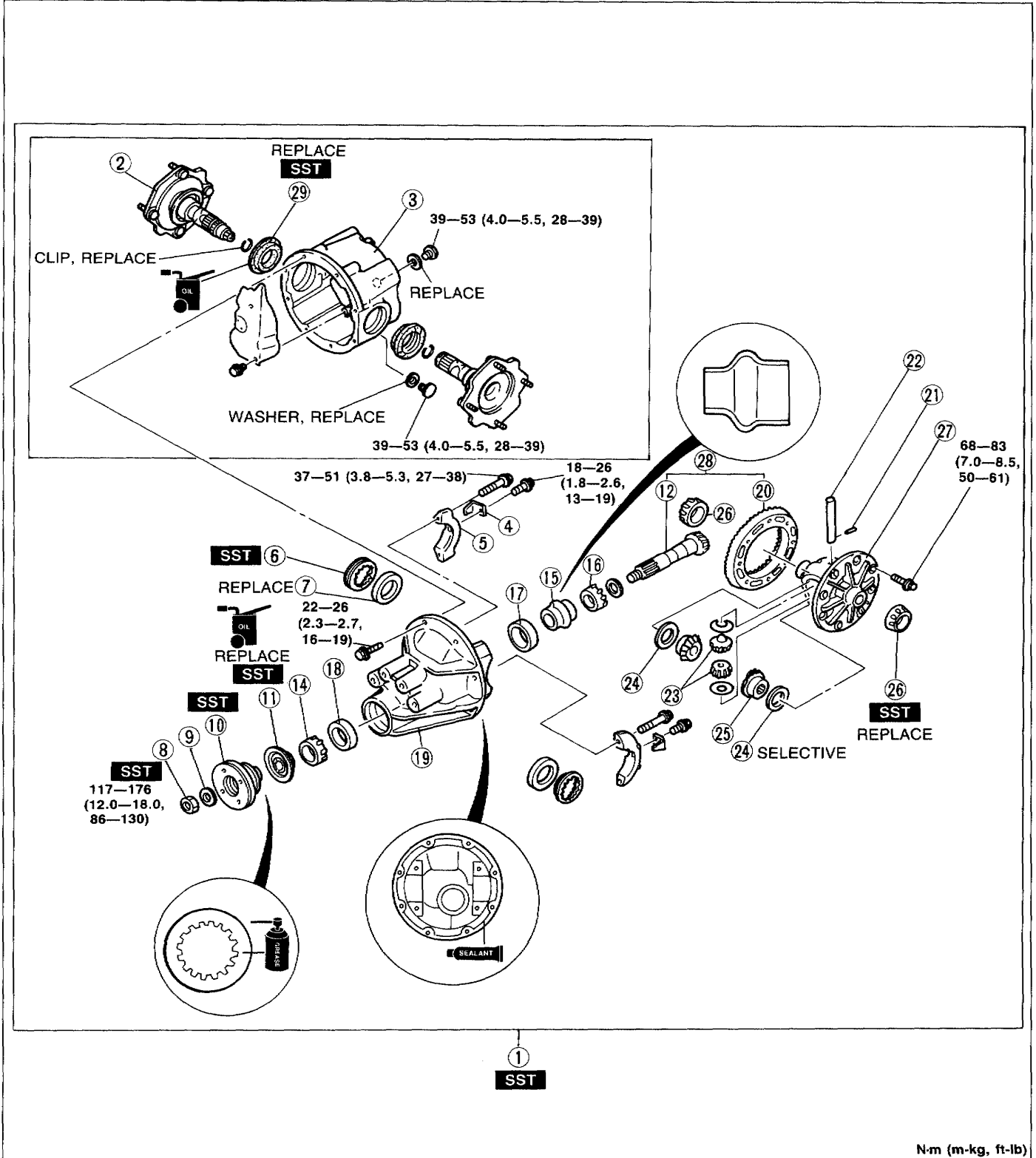
53—63 N·m (5.5—6.5 m·kg, 39—47 ft·lb)

Overhaul

Caution

- Install the differential carrier within 10 min. after applying sealant. Allow the sealant to set at least 30 min. after installation before filling the differential with the specified oil.

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.

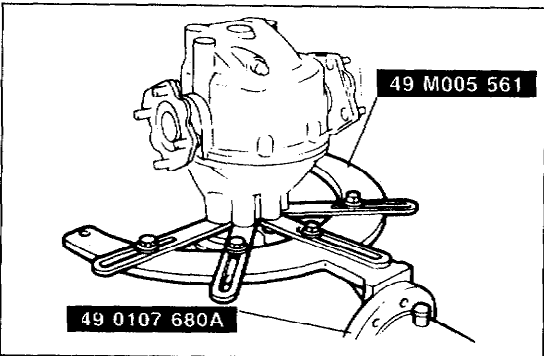


N-m (m-kg, ft-lb)

03UOMX-857

1. Differential gear assembly Disassembly Note..... page M-24	14. Bearing inner race (Front bearing) Inspect for rough rotation
2. Output shaft Disassembly Note..... page M-24 Assembly Note page M-31	15. Collapsible spacer
3. Differential case Assembly Note page M-31	16. Bearing inner race (Rear bearing) Disassembly Note..... page M-25 Inspect for rough rotation
4. Lock plate	17. Bearing outer race (Rear bearing) Disassembly Note..... page M-25
5. Bearing cap Disassembly Note..... page M-24	18. Bearing outer race (Front bearing) Disassembly Note..... page M-25
6. Adjusting screw Disassembly Note..... page M-24	19. Differential carrier
7. Bearing outer race (Side bearing)	20. Ring gear Inspect for cracks and other damage
8. Nut (Companion flange) Disassembly Note..... page M-24 Assembly Note page M-28	21. Roll pin Disassembly Note..... page M-25
9. Washer	22. Pinion shaft
10. Companion flange Disassembly Note..... page M-24 Inspect splines for cracks and other damage Assembly Note page M-28	23. Pinion gear Inspect for cracks and other damage
11. Oil seal (Companion flange) Assembly Note page M-28	24. Thrust washer
12. Drive pinion Assembly Note page M-25 Inspect splines for cracks and other damage	25. Side gear Inspect for cracks and other damage
13. Spacer	26. Bearing inner race (Side bearing)
	27. Gear case
	28. Final gear set
	29. Oil seal (Output shaft) Assembly Note page M-31

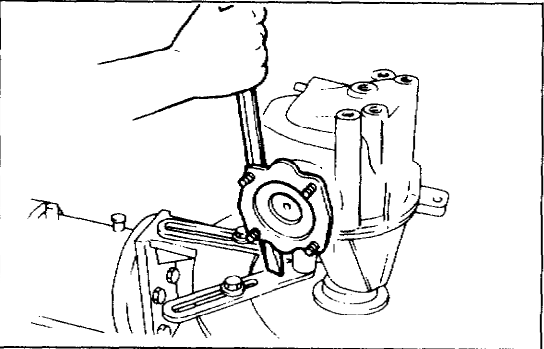
03U0MX-858



03U0MX-859

Disassembly Note
Differential gear assembly

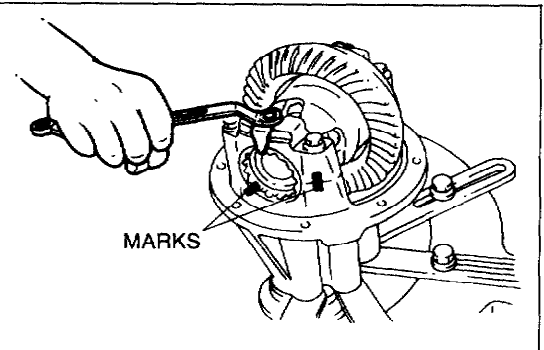
1. Mount the differential carrier on the **SST**.



03U0MX-860

Output shaft

1. Remove the output shaft with a pry bar as shown in the figure.



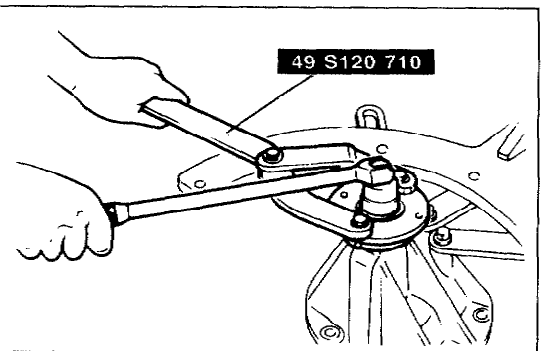
03U0MX-861

Bearing cap

1. Mark one bearing cap and the carrier.

Adjusting screw

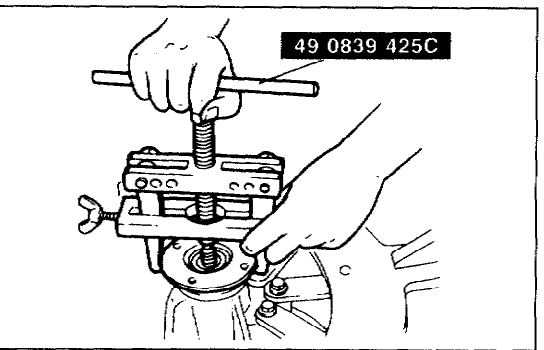
1. Mark one adjusting screw and the carrier.



03U0MX-862

Nut (Companion flange)

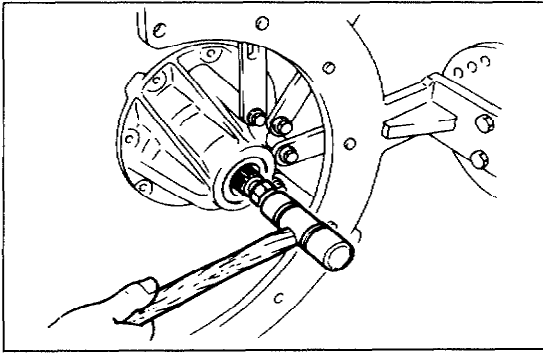
1. Hold the companion flange with the **SST** and remove the nut.



03U0MX-863

Companion flange

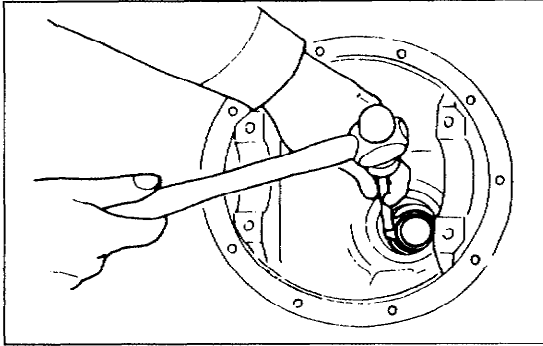
1. Remove the companion flange with the **SST**.



03U0MX-864

Drive pinion

1. Push out the drive pinion by attaching a miscellaneous nut to the drive pinion and tapping it with a copper hammer.



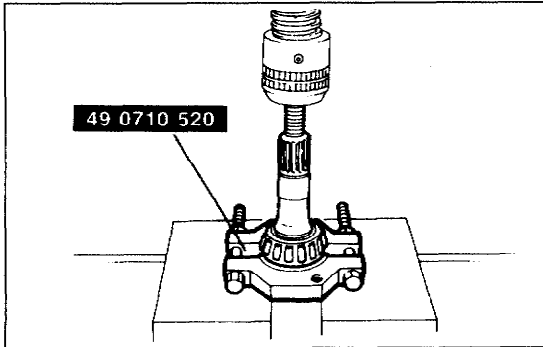
03U0MX-865

Bearing outer race (Front), (Rear)

Note

- Identify the bearing outer races for proper reassembly.

1. Remove the bearing outer races by alternately tapping the races at the two grooves in the carrier.



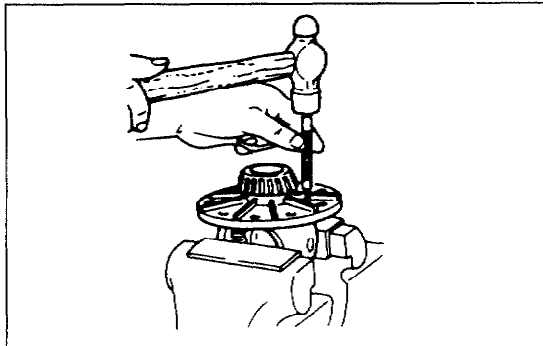
03U0MX-866

Bearing inner race (Rear bearing)

Note

- Support the drive pinion by hand so that it does not fall.

1. Remove the rear bearing with the **SST**.



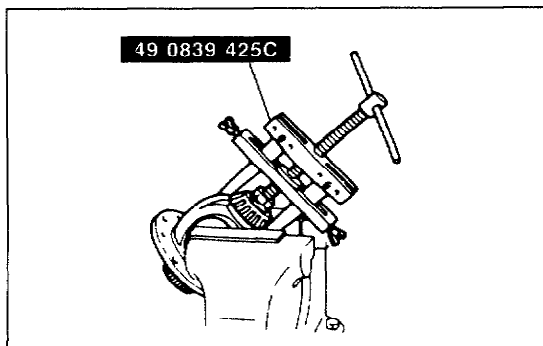
9MU0MX-076

Knock pin

Note

- Tap out toward the ring gear side.

1. Secure the gear case in a vise and remove the knock pin.



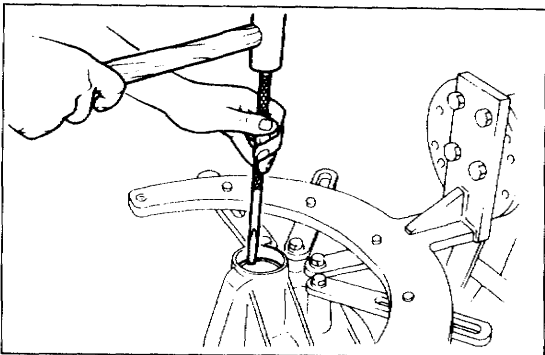
03U0MX-867

Bearing inner races (Side bearing)

Note

- Do not remove the bearing inner races if not necessary.
- Replace the bearing inner races with new bearings if removed.

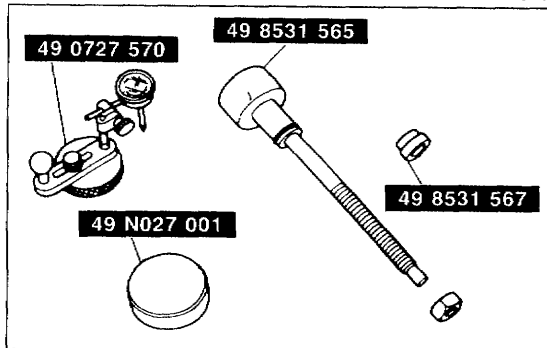
1. Remove the side bearings from the gear case with the **SST**.



03U0MX-868

Assembly Note Bearing outer race

1. Install the front and rear bearing outer races with a brass drift and a hammer.



03U0MX-869

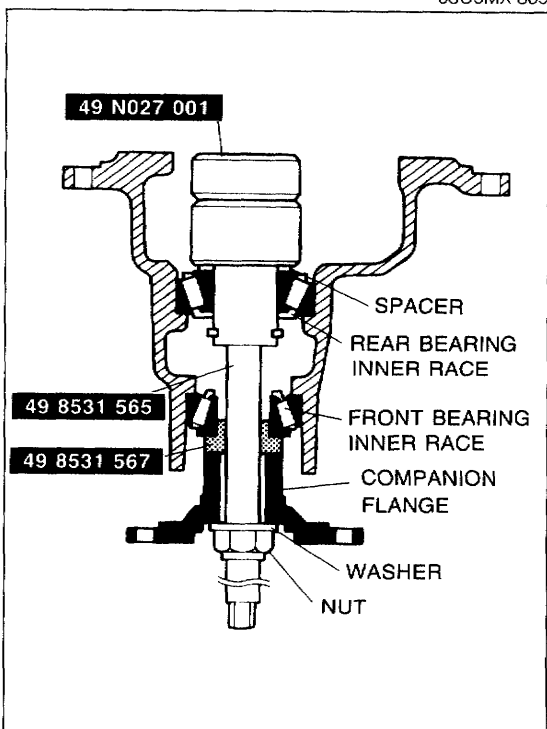
Adjustment of pinion height

1. Adjust the drive pinion height as follows with the **SST**.

Note

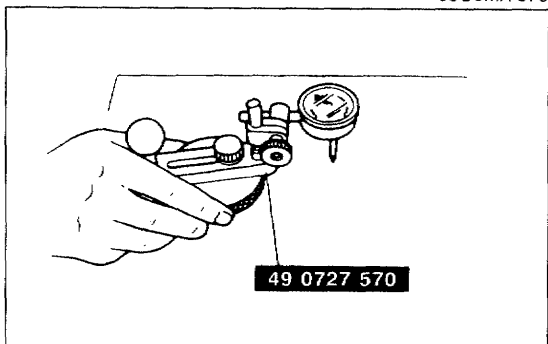
- Use the spacer that was removed.
- Do not install the collapsible spacer.

- a) Install the bearing inner race (rear), spacer, O-ring and **SST**.
- b) Install the bearing inner race (front), companion flange, washer, and nut.
- c) Tighten the nut just enough so that the **SST** can be turned by hand.

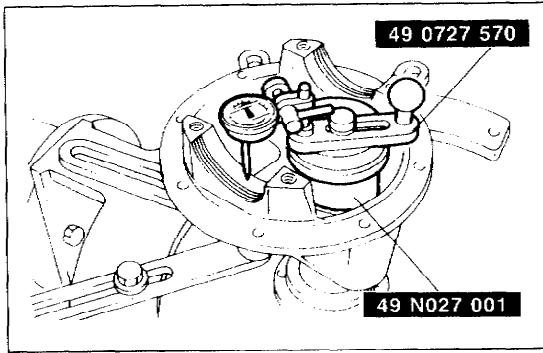


03U0MX-870

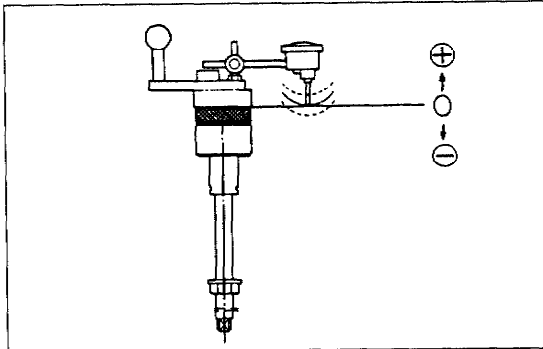
- d) Place the **SST** on a surface plate and set the dial indicator to "Zero".



97U0MX-082



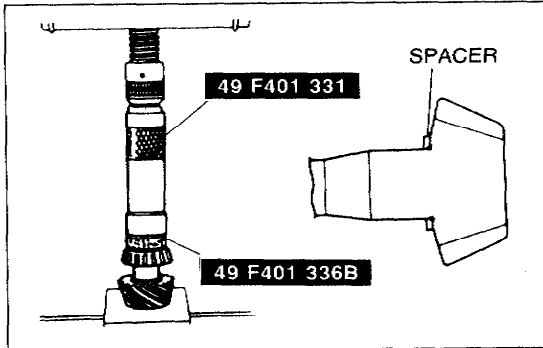
03U0MX-871



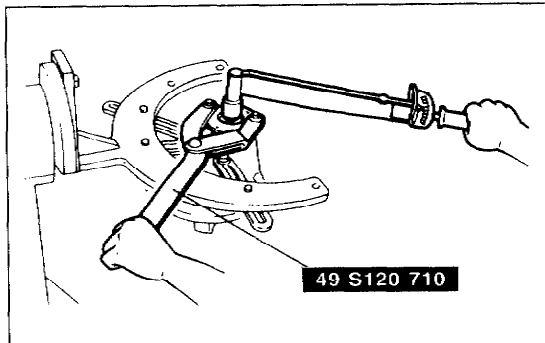
97U0MX-084

Mark	Thickness	Mark	Thickness
08	3.08mm (0.1213 in)	29	3.29mm (0.1295 in)
11	3.11mm (0.1224 in)	32	3.32mm (0.1307 in)
14	3.14mm (0.1236 in)	35	3.35mm (0.1319 in)
17	3.17mm (0.1248 in)	38	3.38mm (0.1331 in)
20	3.20mm (0.1260 in)	41	3.41mm (0.1343 in)
23	3.23mm (0.1271 in)	44	3.44mm (0.1354 in)
26	3.26mm (0.1283 in)	47	3.47mm (0.1366 in)

97U0MX-085



03U0MX-872



03U0MX-873

- e) Place the **SST** atop the drive pinion model. Set the gauge body atop the gauge block.
- f) Place the feeler of the dial indicator so that it contacts where the bearing inner race (side bearing) is installed in the carrier. Measure the lowest position on the left and right sides of the carrier.

- g) Add the two (left and right) values obtained in Step f, and divide the total by 2.

Specification: 0mm (0 in)

- h) If it is not within specification, adjust the pinion height by selection of a spacer.

Note

- Spacers are available in increments of 0.03mm. Select the spacer thickness that is closest to that necessary.

Adjustment of drive pinion preload

1. Install the spacer.

Note

- Press the bearing on until the force required suddenly increases.
- Install the spacer selected from the pinion height adjustment above, being careful that the installation direction is correct.

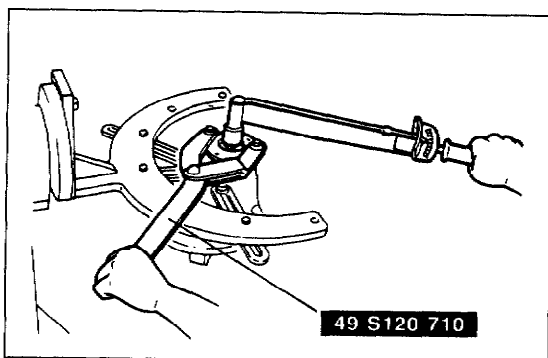
2. Press the bearing inner race (rear bearing) on with the **SST**.

Caution

- Do not install the oil seal.

3. Install the collapsible spacer.
4. Install the drive pinion assembly.
5. Install the companion flange, and tighten the flange nut.

Tightening torque: 117 N·m (12 m·kg, 86 ft·lb)



03U0MX-874

6. Turn the companion flange by hand to seat the bearing.
7. Measure the drive pinion preload.
Adjust the preload by tightening the flange nut.

Preload:

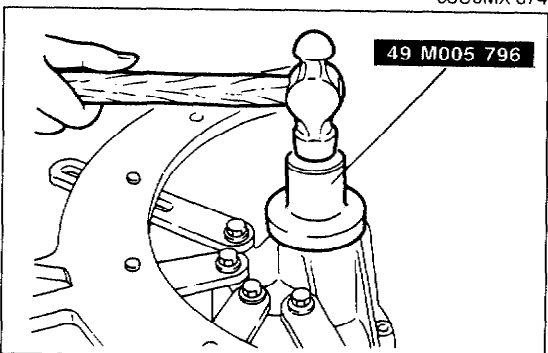
0.29—0.68 N·m (3—7 cm·kg, 2.6—6.0 in·lb)

Tightening torque:

117—176 N·m (12—18 m·kg, 86—130 ft·lb)

If the specified preload cannot be obtained, replace the collapsible spacer with a new one and check again.

8. Remove the nut, washer, and companion flange.

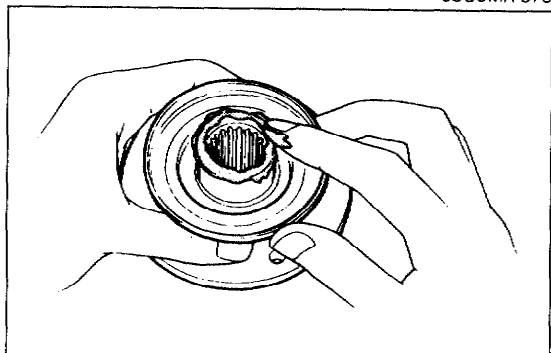


03U0MX-875

Oil seal (Companion flange)**Caution**

- Apply differential oil to the oil seal lip.

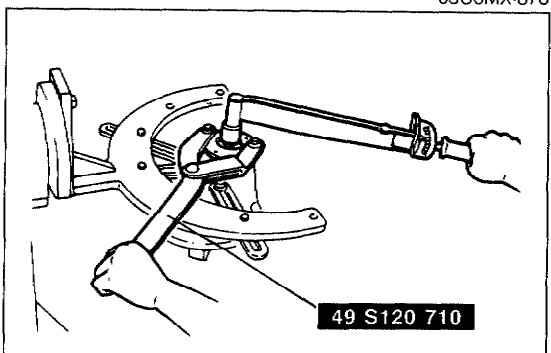
1. Tap a new oil seal into the differential carrier with the **SST**.



03U0MX-876

Companion flange

1. Apply a light coat of grease to the end face of the companion flange.



03U0MX-877

Nut (Companion flange)

1. Adjust the preload by tightening the flange nut.

Preload:

0.29—0.68 N·m (3—7 cm·kg, 2.6—6.0 in·lb)

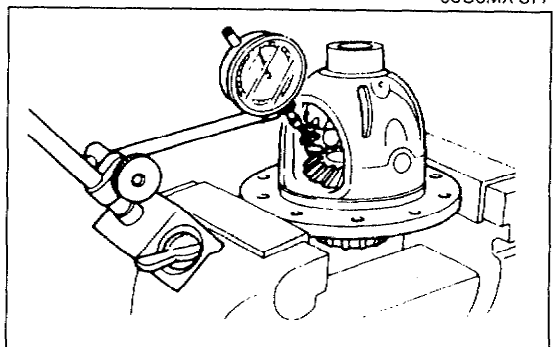
Tightening torque:

117—176 N·m (12—18 cm·kg, 86—130 in·lb)

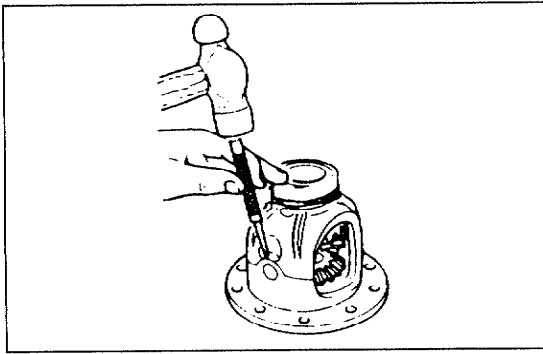
Adjustment of side gear and pinion gear backlash

1. Measure the backlash of the side gears and pinion gears.
Adjust by inserting the proper thickness thrust washer at both sides.

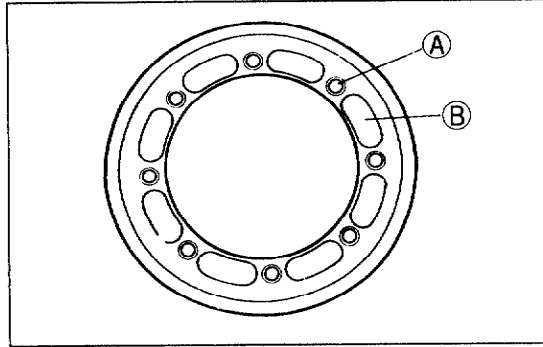
Backlash: 0—0.1mm (0—0.004 in)



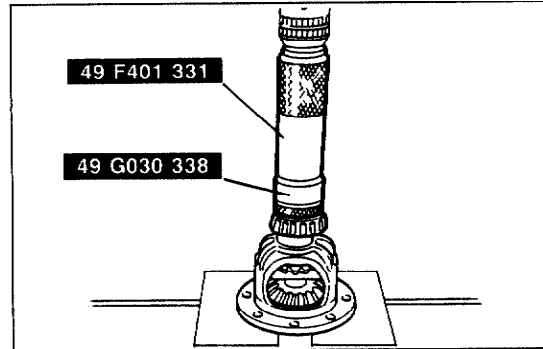
03U0MX-878



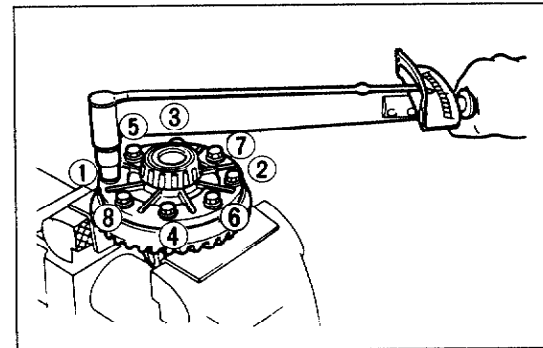
97U0MX-094



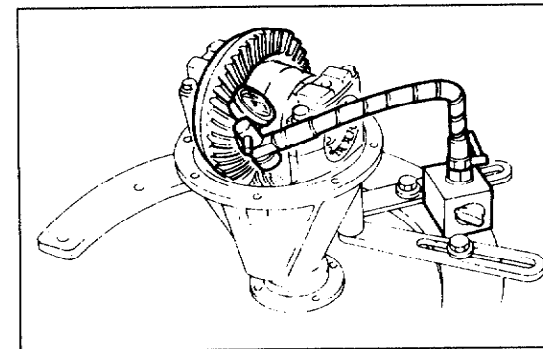
97U0MX-095



03U0MX-879



03U0MX-880



03U0MX-881

Thrust washer thickness:

Identification mark	Thickness
0	2.00mm (0.0787 in)
05	2.05mm (0.0807 in)
1	2.10mm (0.0827 in)
15	2.15mm (0.0846 in)
2	2.20mm (0.0866 in)

2. Install the knock pin to secure the pinion shaft. Stake the pin with a punch to prevent it from coming out of the case.

Adjustment of drive pinion and ring gear backlash

Note

- Apply approx. 0.04 cc (0.0024 cu in) of compound at each point.

1. Apply thread-locking compound to points (A) and (B) around the gear back face.
2. Mount the ring gear onto the gear case.

Tightening torque:

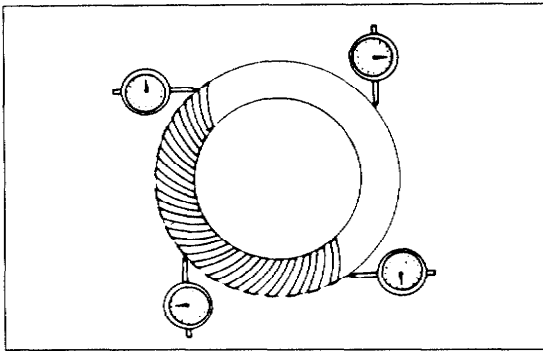
69—83 N·m (7.0—8.5 m·kg, 51—61 ft·lb)

3. Press the new bearing inner race (side gear) on with the **SST**.

4. Install the differential gear assembly in the carrier.
5. Note the identification mark on the adjusting screw, and install the screws to their respective sides.
6. Install the differential bearing caps, making sure that the identification mark on the cap corresponds with the one on the carrier with the **SST**.

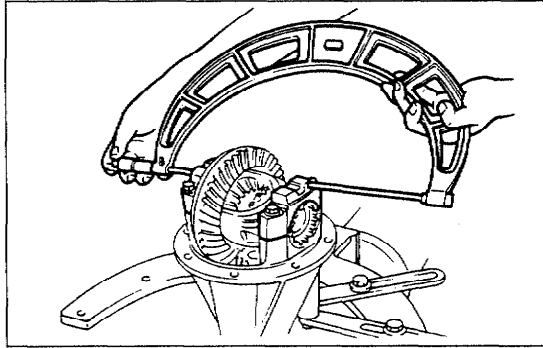
7. Mark the ring gear at four points at approx. **90°** intervals. Mount a dial indicator to the carrier so that the feeler comes into contact at a right angle with one of the ring gear teeth.
8. Turn both bearing adjusting screw, equally with the **SST** until the backlash is as specified.

Backlash: 0.09—0.11mm (0.0035—0.0043 in)



97U0MX-104

9. Check the backlash at the three other marked points, and make sure the minimum backlash is above **0.05mm (0.0020 in)** and the difference between the maximum and minimum is less than **0.07mm (0.0028 in)**.



03U0MX-882

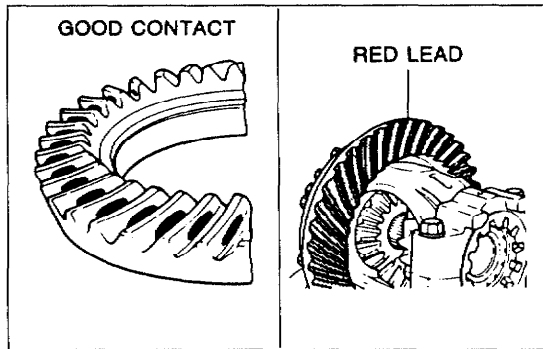
10. Tighten the adjusting screws equally until the distance between the pilot sections on the bearing caps is as specified.

Specified distance:

150.13—150.20mm (5.910—5.913 in)

Note

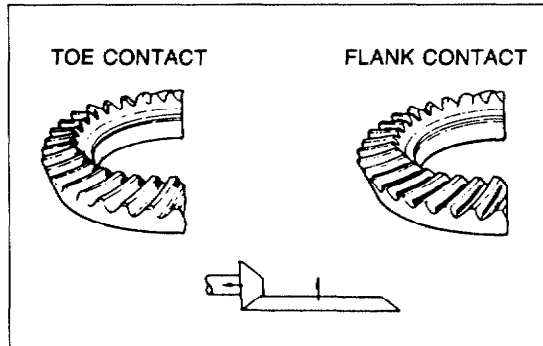
- **When adjusting the differential bearing preload, be careful not to affect the backlash of the drive pinion and ring gear.**



03U0MX-883

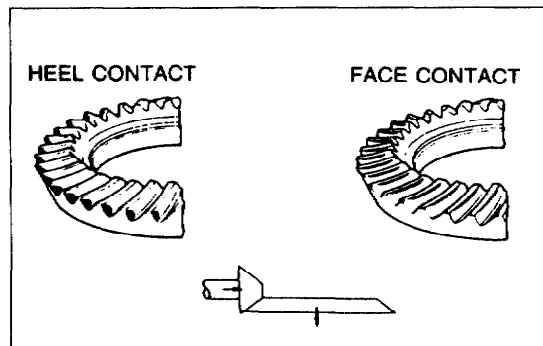
Inspection and adjustment of teeth contact

1. Coat both surfaces of 6—8 teeth of the ring gear with a uniformly thin coat of red lead.
2. While moving the ring gear back and forth by hand, rotate the drive pinion several times and check the tooth contact.
3. If the tooth contact is good, wipe off the red lead.
4. If it is not good, readjust the pinion height, and then readjust the backlash.



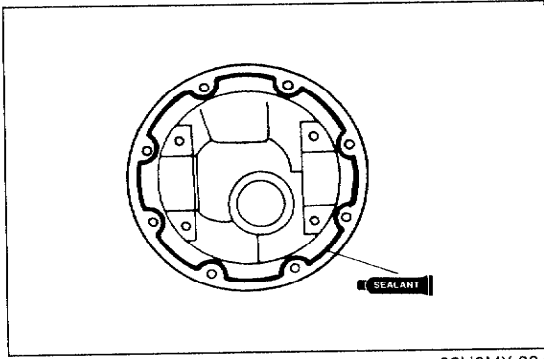
63G09X-385

- (1) Toe and flank contact
Replace the spacer with a thinner one to move the drive pinion outward.



9MU0MX-068

- (2) Heel and face contact
Replace the spacer with a thicker one to bring the drive pinion inward.



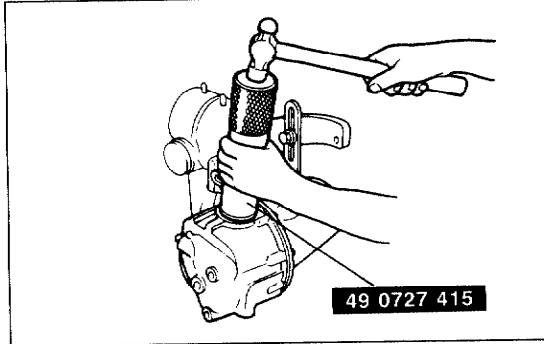
03U0MX-884

Differential case

1. Apply sealant to the case face.
2. Tighten the bolts.

Tightening torque:

23—26 N·m (2.3—2.7 m·kg, 10—20 ft·lb)



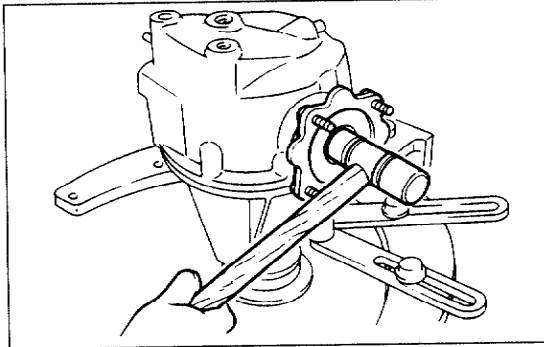
03U0MX-885

Oil seal (Output shaft)

Caution

- Apply lithium-base grease to the new oil seal lip.

1. Install the new oil seal with the **SST**.



03U0MX-886

Output shaft

1. Install new clips.
2. Install the output shaft into the side gears by lightly tapping with a plastic hammer.
3. Verify that the output shafts are hooked into the side gears by pulling them by hand.



STEERING SYSTEM

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FEATURES

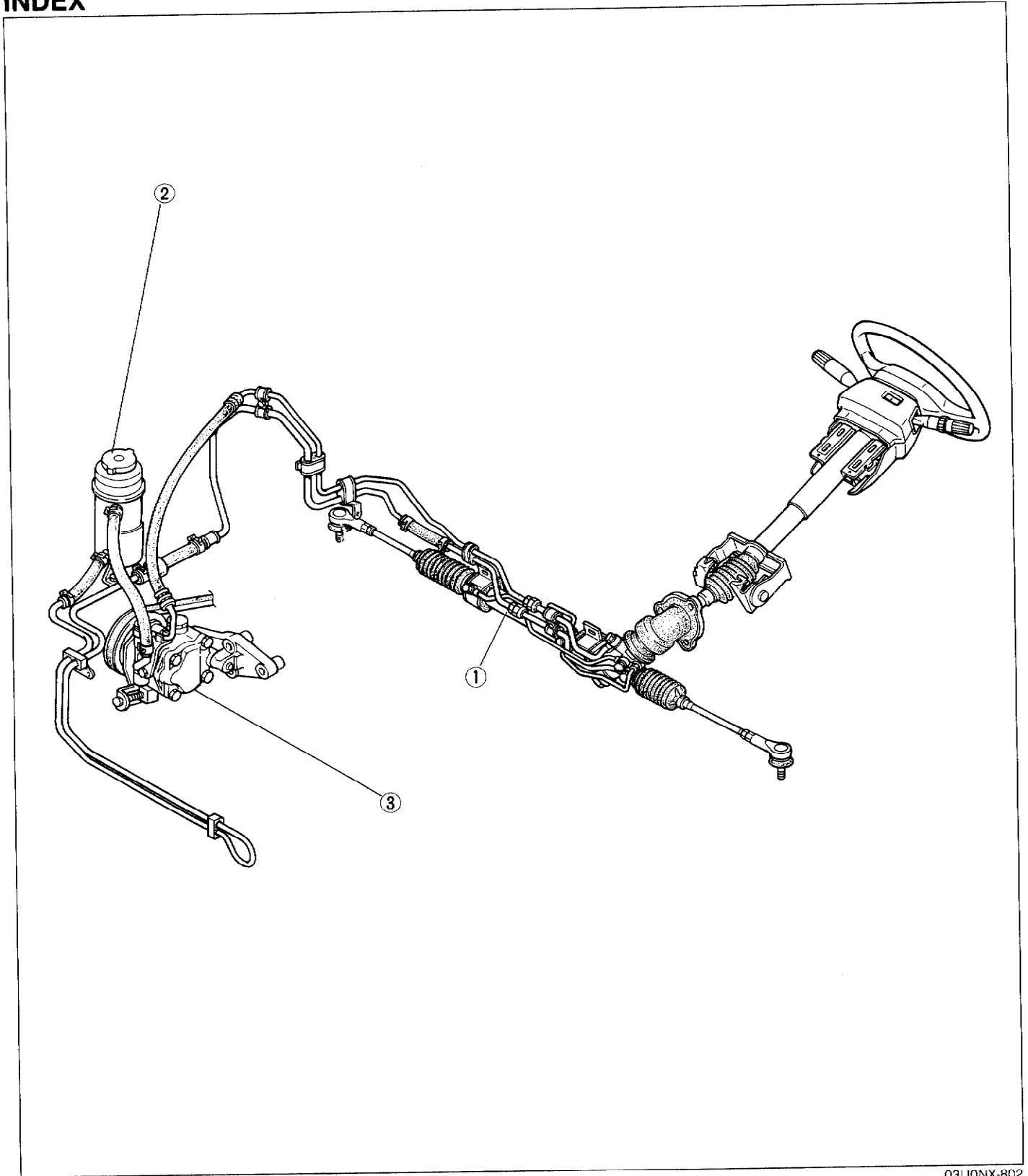
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SERVICE

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POWER STEERING..... N- 4
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03U0NX-801

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03U0NX-802

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OUTLINE

- A rack-and-pinion type steering is used on all models.
- The structure of steering system is basically same as 2WD models.

SPECIFICATION

Item	Type	Engine speed sensing power steering
Steering wheel	Outer diameter mm (in)	370 (14.57)
	Lock-to-lock turns	2.76
Steering shaft and joint	Shaft type	Collapsible
	Joint type	2-cross joint
	Tilt stroke mm (in)	30 (1.18)
Steering gear	Type	Rack-and-pinion
	Gear ratio	∞ (Infinite)
	Rack stroke mm (in)	121 (4.76)
Oil	Type	ATF M-III or DEXRON-II
	Capacity liter (US qt, Imp qt)	0.9—1.0 (0.95—1.06, 0.79—0.88)

03U0NX-803

SUPPLEMENTAL SERVICE INFORMATION

The following points shown in this section are changed in comparison with Workshop Manual (1195-10-89E).

Steering gear and linkage

- Removal / Installation procedure
- Disassembly / Inspection / Assembly procedure

Power steering fluid

- Inspection procedure

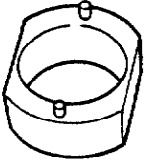
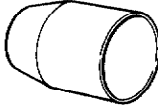
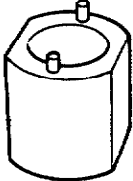
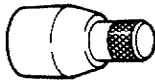
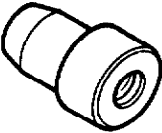


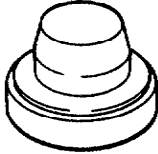
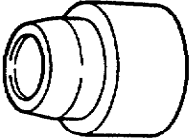
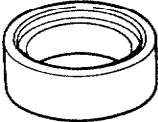
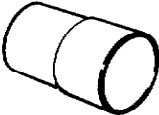

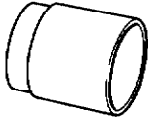
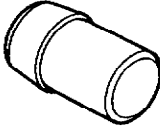
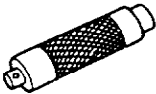
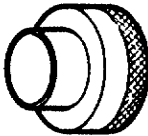
Power steering oil pump


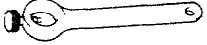

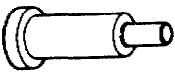
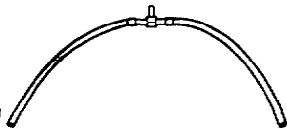

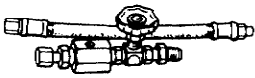
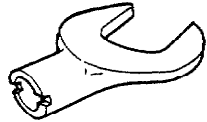

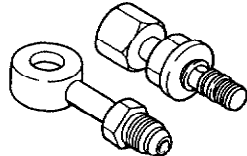
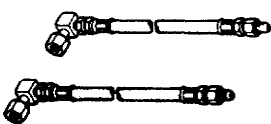

- Disassembly / Inspection / Assembly procedure

03U0NX-804

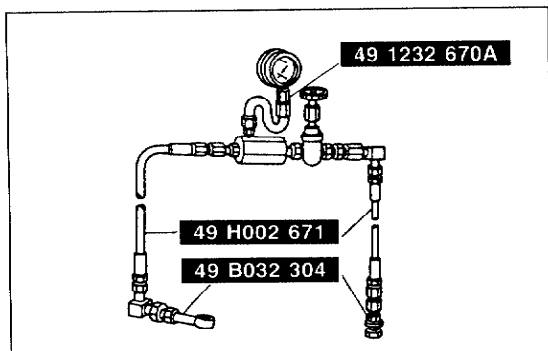
ENGINE SPEED SENSING POWER STEERING

PREPARATION
SST

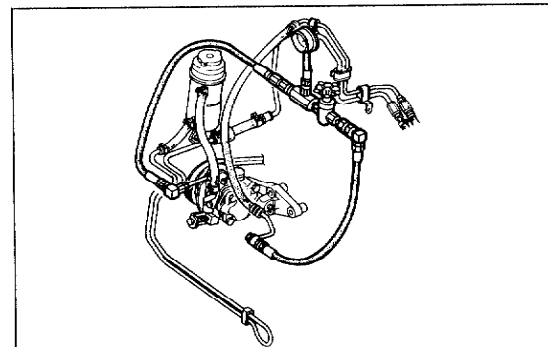
49 B032 306 Wrench, plug		For removal and installation of plug	49 B032 312 Protector, slipper seal		For installation of seal ring
49 B032 327 Wrench, outer box		For removal and installation of outer box	49 B032 326 Protector, outer box		For installation of outer box
49 B032 323 Remover body, rod seal		For removal of oil seal	49 B032 314 Slipper seal former		For form of seal ring
49 F032 303 Handle		For removal of oil seal	49 B032 315 Installer, oil seal		For installation of oil seal
49 B032 309 Installer body, pinion seal		For installation of oil seal	49 B032 316 Support block, plug		For removal of oil seal & bearing
49 B032 310 Protector, pinion seal		For installation of oil seal	49 B032 317 Remover, bearing & oil seal		For removal of oil seal & bearing
49 B032 311 Protector, slipper seal		For installation of pinion shaft	49 B032 325 Guide, rod seal		For installation of inner guide & oil seal
49 G030 797 Handle		For installation of pinion seal	49 B032 324 Protector body, rod seal		For installation of inner guide & oil seal

<p>49 B032 320 Wrench</p> 	<p>For removal and installation of adjustment cover locknut</p>	<p>49 0180 510B Attachment, preload</p> 	<p>For measurement of pinion torque</p>
<p>49 B032 321 Adapter</p> 	<p>For hermetic inspection</p>	<p>49 B032 305 Holder, power steering pump</p> 	<p>For installation of oil pump</p>
<p>49 G032 317 Hose (Part of 49 B032 3A1)</p> 	<p>For hermetic inspection</p>	<p>49 1232 670A Gauge set, power steering</p> 	<p>For measurement of fluid pressure</p>
<p>49 1232 673 Valve body (Part of 49 1232 670A)</p> 	<p>For measurement of fluid pressure</p>	<p>49 H032 301 Wrench</p> 	<p>For removal of tie-rod</p>
<p>49 1232 672 Gauge (Part of 49 1232 670A)</p> 	<p>For measurement of fluid pressure</p>	<p>49 B032 304 Adapter</p> 	<p>For measurement of fluid pressure</p>
<p>49 H002 671 Adapter</p> 	<p>For measurement of fluid pressure</p>	<p>49 G017 5A0 Support, engine</p> 	<p>For removal and installation of steering gear</p>

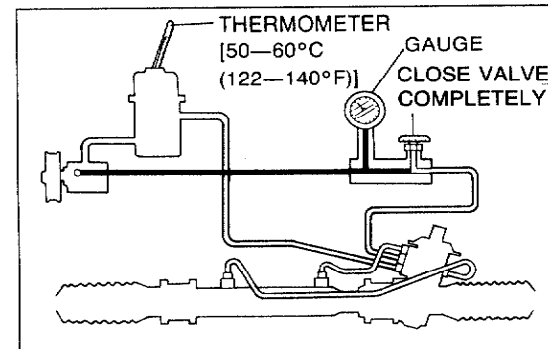
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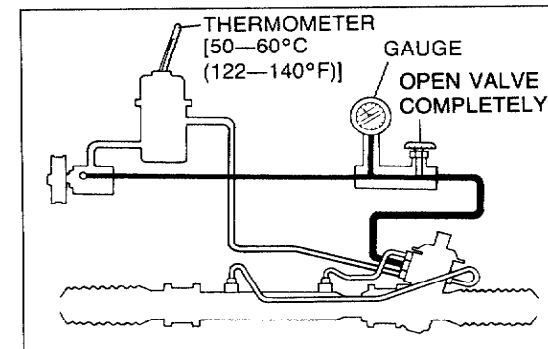
03U0NX-806



03U0NX-807



03U0NX-808



03U0NX-809

POWER STEERING FLUID

Inspection

Fluid pressure

1. Assemble the **SST** as shown in the figure.

Tightening torque:

39—49 N·m (4.0—5.0 m·kg, 29—36 ft·lb)

Note

- Before disconnecting the hose, make marks at the connections for proper reinstallation.

2. Disconnect the high-pressure hose from the oil pump. Attach the **SST**.
3. Bleed air from the system.
4. Open the gauge valve fully. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.

5. Close the gauge valve completely. Increase the engine speed to **1,000—1,500 rpm** and measure the fluid pressure generated by the oil pump. If the pressure is below specification, replace the oil pump assembly.

Oil pump fluid pressure:

7,848 kPa (80 kg/cm², 1,137 psi)

Caution

- If the valve is left closed for more than 15 seconds, the fluid temperature will increase excessively and adversely affect the oil pump.

6. Open the gauge valve fully again and increase the engine speed to **1,000—1,500 rpm**.
7. Turn the steering wheel fully to the left and right and measure the fluid pressure generated by the gear housing. If the pressure is below specification, replace the gear housing assembly.

Gear housing fluid pressure:

7,848 kPa (80 kg/cm², 1,137 psi)

Caution

- If the steering wheel is kept in the fully turned position for more than 15 seconds, the fluid temperature will rise excessively.

8. Remove the gauge set. Install and tighten the high-pressure hose to the specified torque.

Tightening torque:

16—24 N·m (1.6—2.4 m·kg, 12—17 ft·lb)

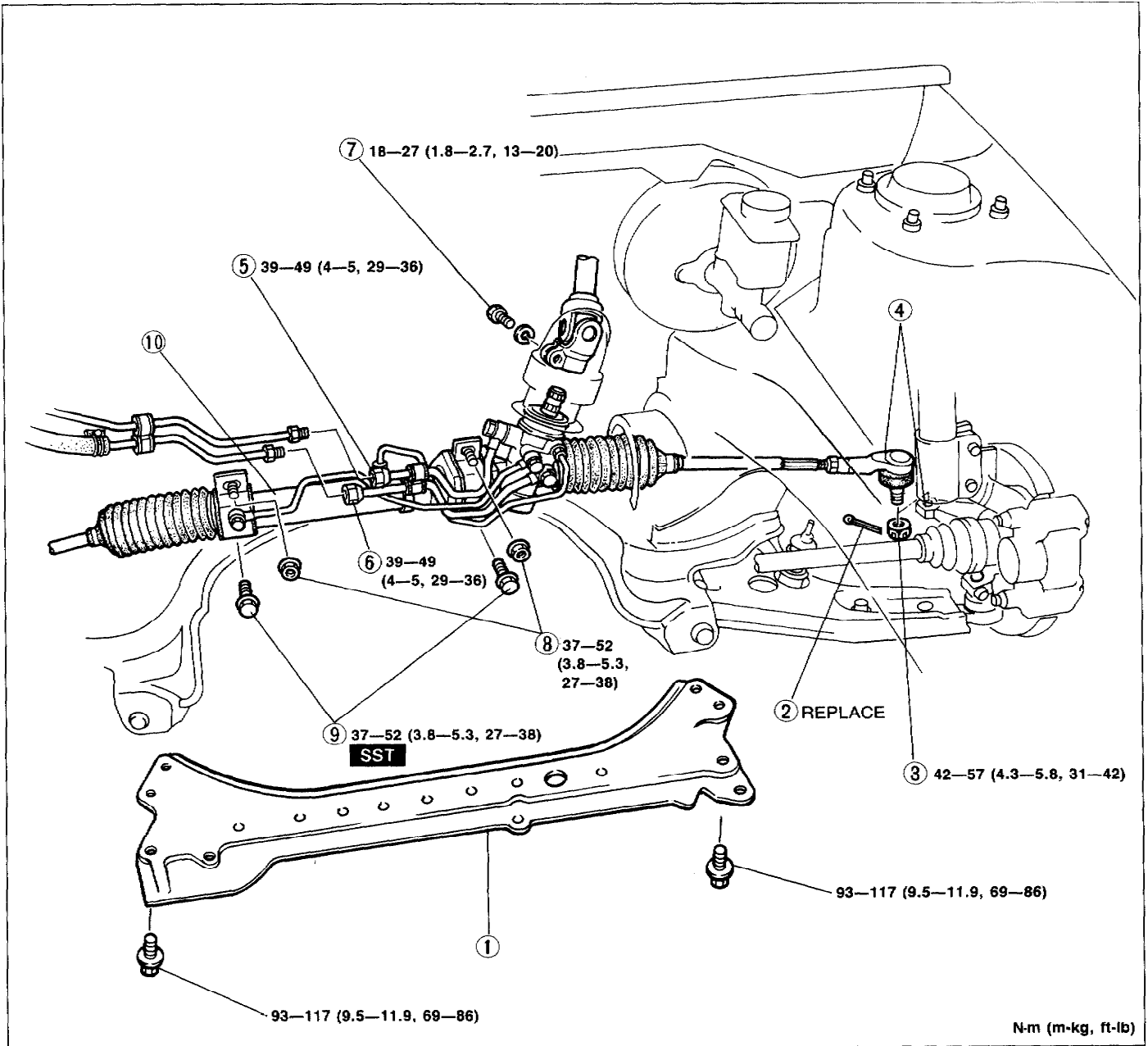
9. Bleed air from the system.

03U0NX-810

STEERING GEAR AND LINKAGE

Removal / Installation

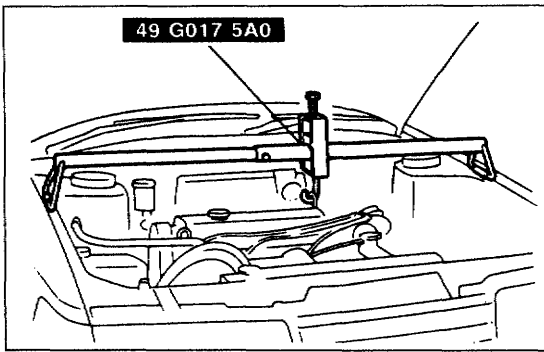
1. Loosen the wheel lug nuts.
2. Jack up the front of the vehicle and support it with safety stands.
3. Remove the wheels.
4. Remove the battery and the battery tray.
5. Remove the undercover.
6. Remove in the order shown in the figure, referring to **Removal Note**.
7. Install in the reverse order of removal, referring to **Installation Note**.
8. After installation, bleed air from the steering system.



N-m (m-kg, ft-lb)

03UONX-811

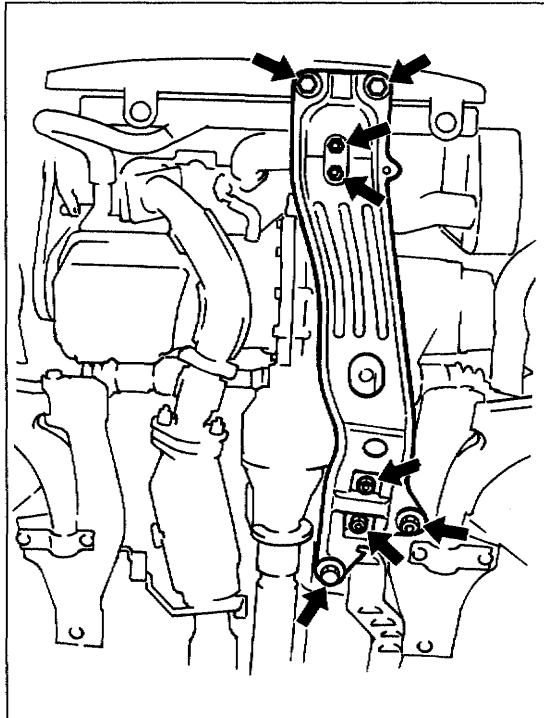
- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Crossmember 2. Cotter pin 3. Nut 4. Tie-rod end/Steering knuckle 5. Pressure pipe 6. Return pipe 7. Fixing bolt (intermediate shaft/pinion shaft) | <ol style="list-style-type: none"> 8. Nut (Steering gear mounting nut) 9. Bolt (Steering gear mounting bolt)
Removal note page N- 8
Installation note page N- 9 10. Steering gear and linkage
Disassembly / Inspection / Assembly
..... page N-10 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



03U0NX-812

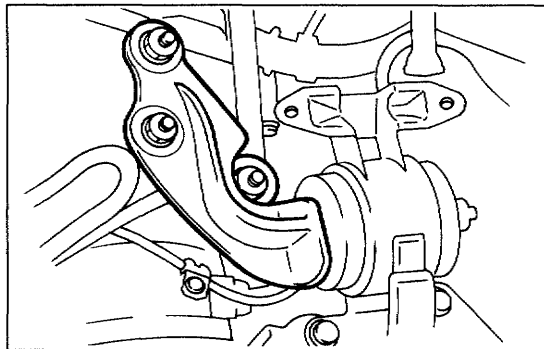
Removal note**Bolt (Steering gear mounting bolt)**

1. Set the SST as shown.



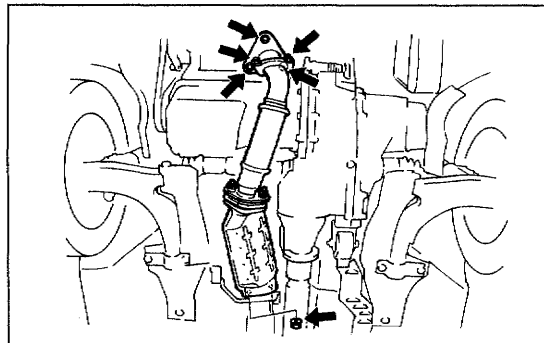
03U0NX-813

2. Remove the No.1 and No.2 engine mount nuts.
3. Remove the engine mount member.



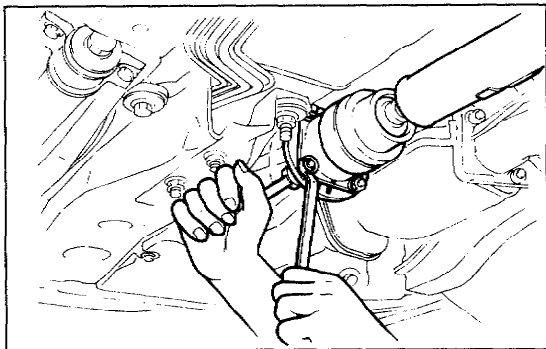
03U0NX-814

4. Remove the No.4 engine mount mounting bolts.

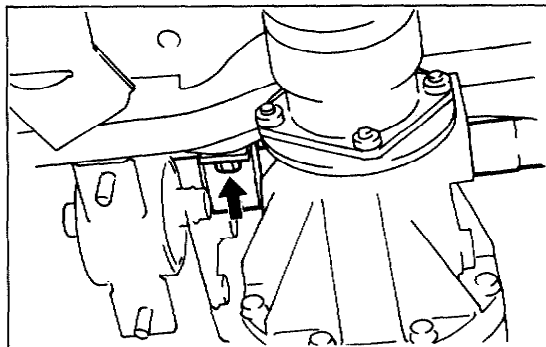


03U0NX-815

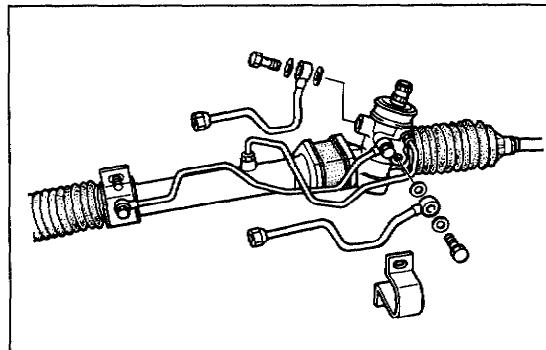
5. Remove the front exhaust pipe and the catalytic converter together.



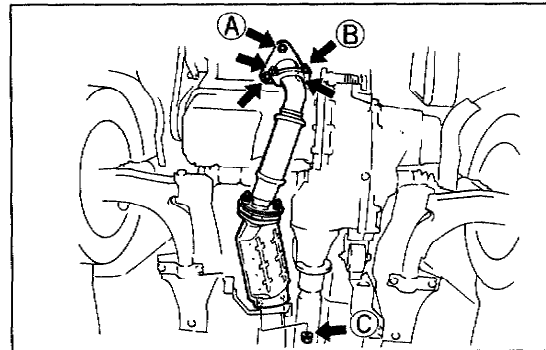
03U0NX-816



03U0NX-817



03U0NX-818



03U0NX-819

6. Separate the front of propeller shaft.

7. Lower the engine gradually until the lower left mounting bolt can be removed.

Caution

- Do not lower the engine too much because it will damage the front left driveshaft boot.

8. Remove the lower left mounting bolt.

9. Remove the pressure pipe and the return pipe.

10. Remove the left bracket.

11. Pull the steering gear from the left side to remove it.

Installation note

Bolt (Steering gear mounting bolt)

Tightening torque:

Pressure pipe (O-ring replace):

29—39 (3—4, 22—29)

Return pipe (O-ring replace):

29—39 (3—4, 22—29)

Propeller shaft (Refer to Section L):

27—30 (2.8—3.1, 20—22)

Exhaust pipe (Gasket replace)

A: 31—46 (3.2—4.7, 23—34)

B: 21—27 (2.1—2.8, 15—20)

C: 40—55 (4.1—5.6, 30—41)

No.4 engine mount: 67—93 (6.8—9.5, 49—69)

Engine mount member: 64—89 (6.5—9.1, 47—66)

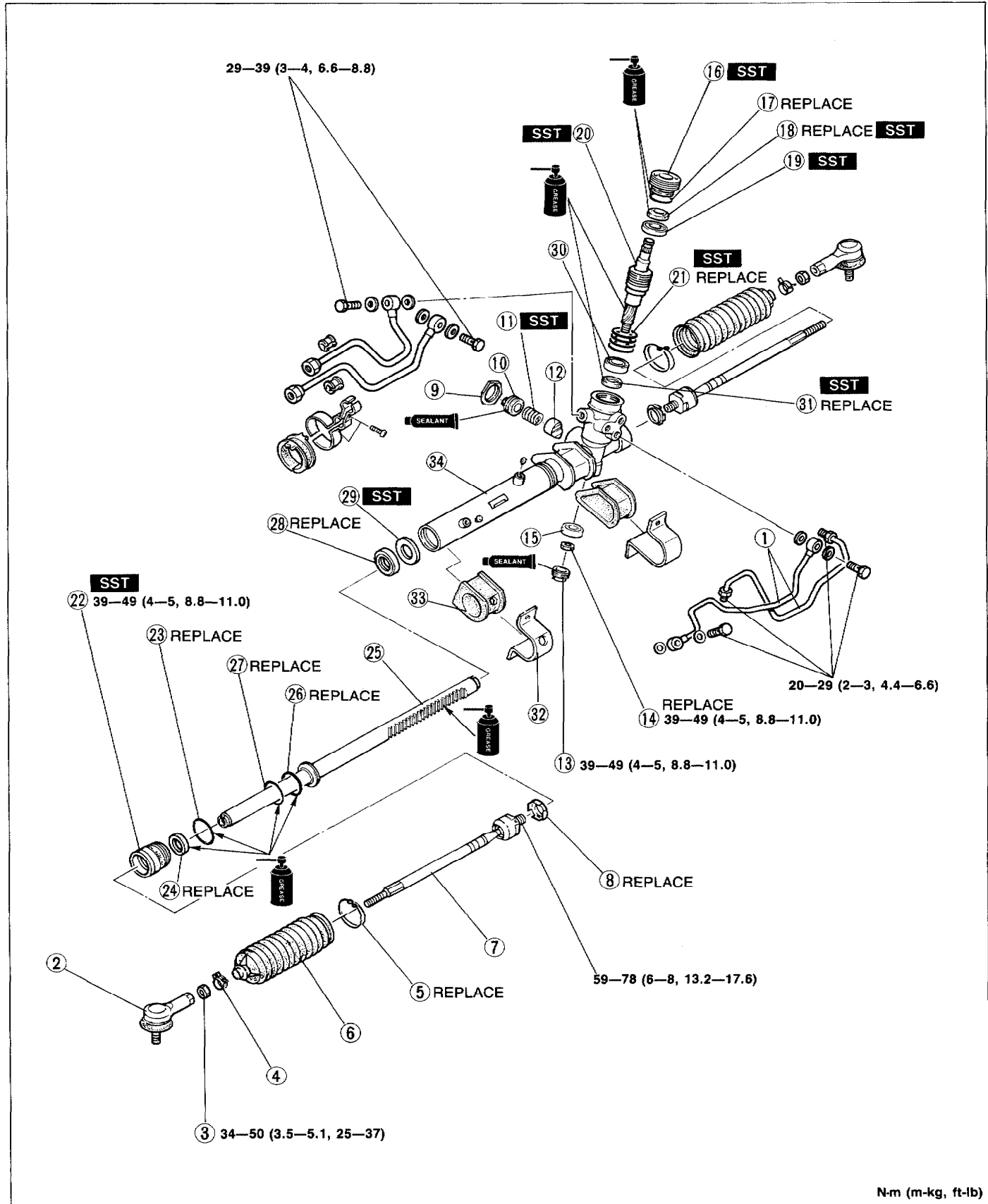
No.1 and No.2 engine mount nut:

37—52 (3.8—5.3, 27—38)

Nm (m-kg, ft-lb)

Disassembly / Inspection / Assembly

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.

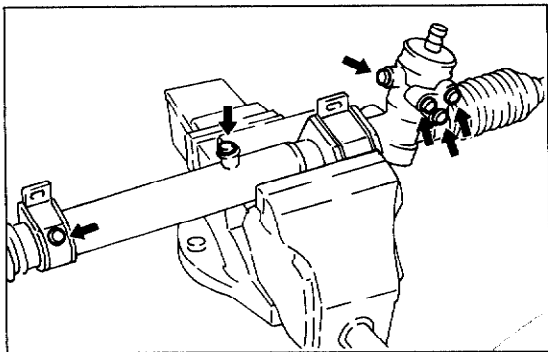


N-m (m-kg, ft-lb)

03U0NX-820

1. Oil pipe		19. Bearing	
Disassembly note.....	page N-12	Disassembly note.....	page N-13
2. Tie-rod end		Inspect for wear and operation	
3. Locknut		20. Pinion shaft assembly	
4. Boot band		Inspect for damage and wear	
5. Boot wire		21. Seal ring	
6. Boot		Assembly note.....	page N-15
7. Tie-rod		22. Outer box assembly	
Disassembly note.....	page N-12	Disassembly note.....	page N-13
Inspect for damage		Assembly note.....	page N-14
Inspect operation of ball joint		23. O-ring	
8. Washer		24. U-gasket	
9. Locknut		25. Steering rack	
Disassembly note.....	page N-12	Inspection.....	page N-14
10. Adjusting cover		Assembly note.....	page N-14
Assembly note.....	page N-16	26. Seal ring	
11. Spring		27. O-ring	
12. Support yoke		28. Oil seal	
13. Housing cover		Disassembly note.....	page N-13
Disassembly note.....	page N-12	29. Inner guide	
14. Locknut		Disassembly note.....	page N-13
15. Bearing		30. Bearing	
Inspect for wear and operation		Inspect for wear and operation	
16. Plug		31. Oil seal	
Disassembly note.....	page N-12	Assembly note.....	page N-15
Inspection.....	page N-14	32. Mounting bracket	
Assembly note.....	page N-15	33. Mounting rubber	
17. O-ring		34. Gear box	
18. Oil seal		Inspect for damage and crack	
Disassembly note.....	page N-13		

03U0NX-821



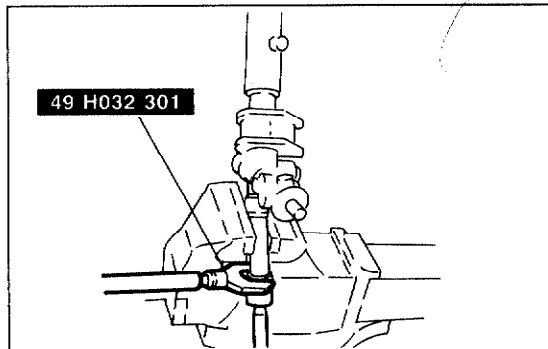
93G0NX-026

Disassembly note

Oil pipe

Caution

- After disconnecting the pipes, use a plug or adhesive type tape to seal each port to prevent the entry of foreign materials.



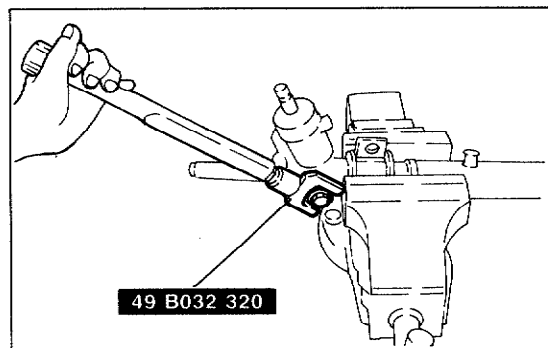
93G0NX-027

Tie-rod

1. Use the **SST** to remove the tie-rod.

Caution

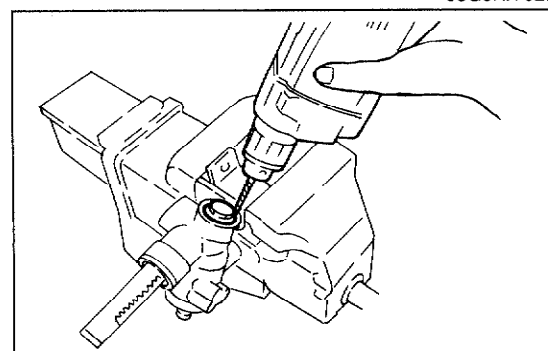
- To avoid scratching the rack, secure the rack in a vise protected with brass pads or cloth.



93G0NX-028

Locknut

1. Use the **SST** to remove the locknut.



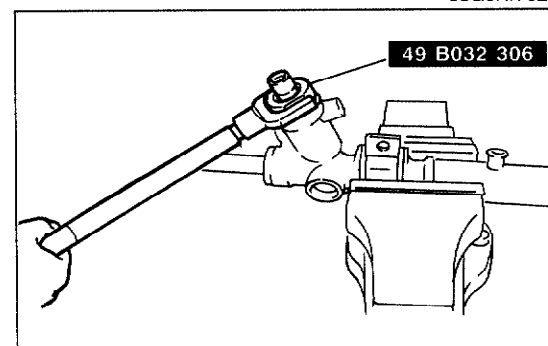
93G0NX-029

Housing cover

1. Use a drill ($\phi 1.5\text{mm}$ (0.06 in)) to make a recessed area (approx. 1.5mm (0.06 in)) at the punch-crimped part of the threaded part.

Caution

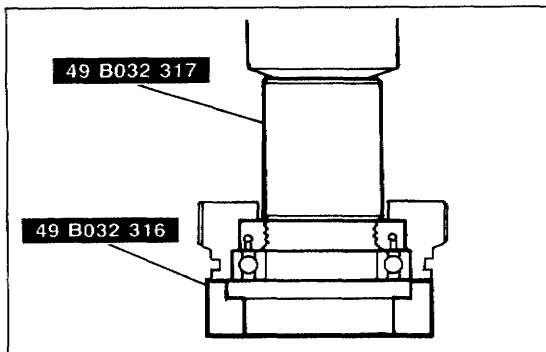
- If the drill diameter and/or the depth of the recess are excessive, the threads will be too loose when the plug is reused.



93G0NX-030

Plug

1. Use the **SST** to remove the plug.



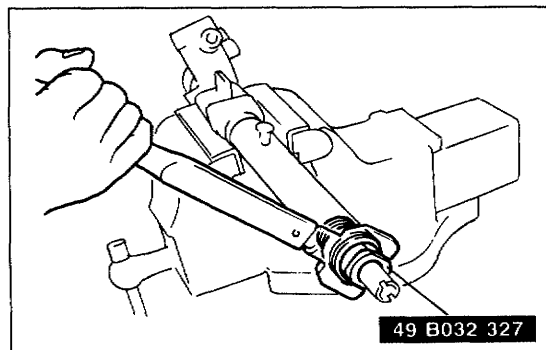
93G0NX-031

Oil seal and bearing

1. Use the **SST** to remove the bearing and the oil seal from the plug.

Caution

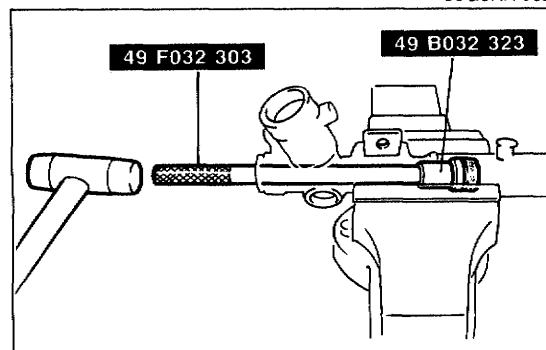
- The oil seal can not be reused.



93G0NX-032

Outer box assembly

1. Use the **SST** to remove the outer box.



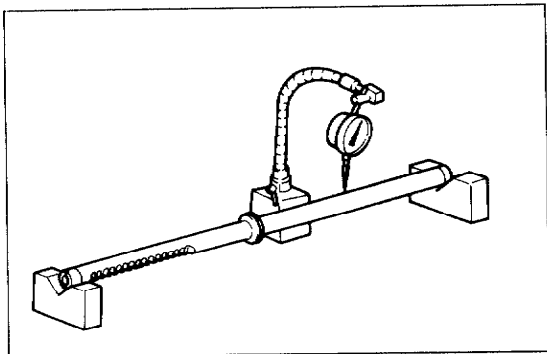
93G0NX-033

Oil seal and inner guide

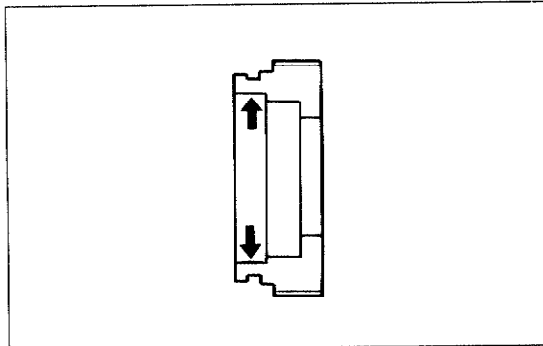
1. Use the **SST** to remove the oil seal and inner guide toward the cylinder side.

Caution

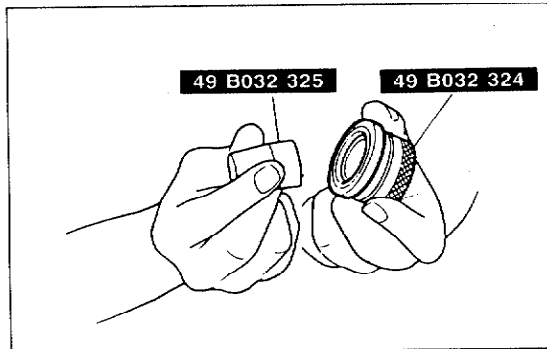
- The oil seal can not be reused.



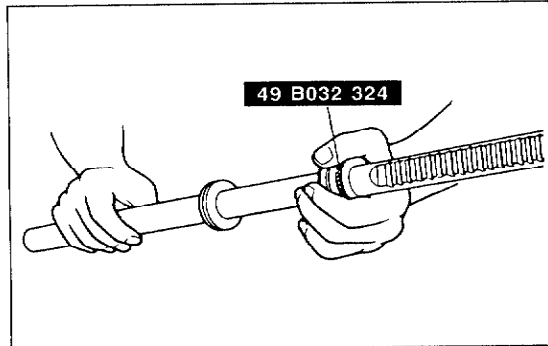
03U0NX-822



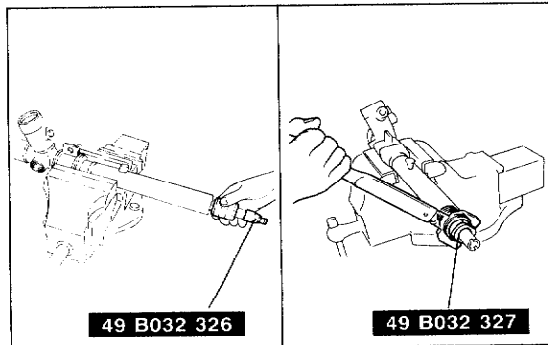
93G0NX-036



93G0NX-038



03U0NX-823



93G0NX-040

Inspection

Steering rack

1. Check the rack for cracking or other damage or for abnormal wear of the teeth; replace it if necessary.
2. Check the seal ring installation part of the rack for abnormal wear or damage; replace it if necessary.
3. Use V blocks to support both ends of the large-diameter part of the rack; check for excessive bending; replace it if necessary.

Bending limit: 0.15mm (0.006 in) (near rack center)

Plug

1. Check for scratches or other damage at the oil seal installation inner diameter; replace it if necessary.

Assembly note

Note

- With the oil seal, inner guide, steering rack and outer box installed to the gear box, check to confirm the air-tightness of the cylinder part of the gear box.

Steering rack

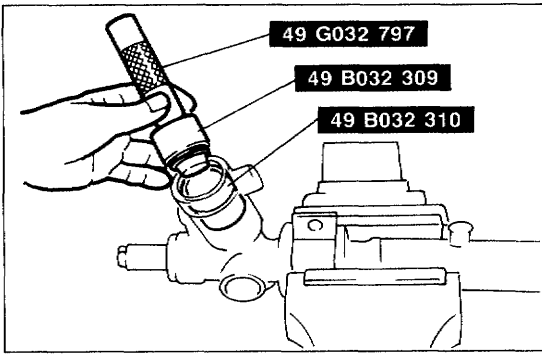
1. Install a new oil seal and new seal ring to the rack's piston.
2. After installing the seal ring, seat it properly at the piston circumference.
3. Install the oil seal and inner guide to the **SST**.
4. Using the **SST**, place the oil seal and inner, guide at the edge of the steering rack's pinion.
5. After mounting the steering rack to the gear box, use a press to install the oil seal and inner guide to the correct position.

Caution

- When pressing in, do not apply a load pressure of more than 29,430 kPa (300 kg/cm², 4,266 psi), because to do so will damage the oil seal and inner guide.
- Apply grease to the seal ring, oil seal and inner guide.

Outer box assembly

1. After installing the **SST** to the rack, install the outer box, and use the **SST** to tighten.



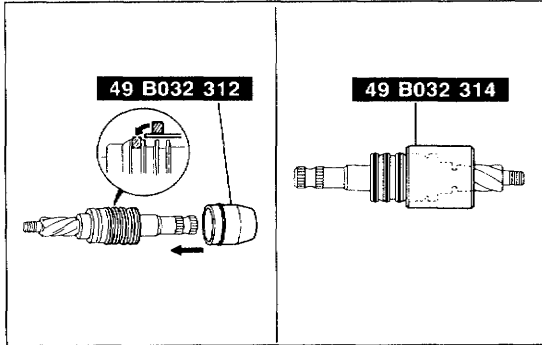
03U0NX-824

Oil seal

1. Use the **SST** to install a new oil seal to the gear housing.

Note

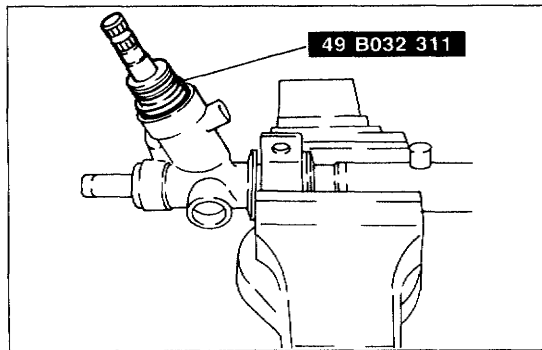
- Apply grease to the oil seal.



93G0NX-042

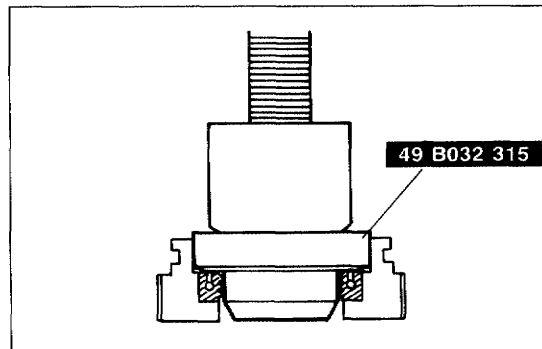
Seal ring

1. Use the **SST** to install a new seal ring to the valve part of the pinion shaft.
2. After installing it, use the **SST** to seat it properly.



93G0NX-043

3. Use the **SST** to install the pinion shaft assembly to the gear housing.



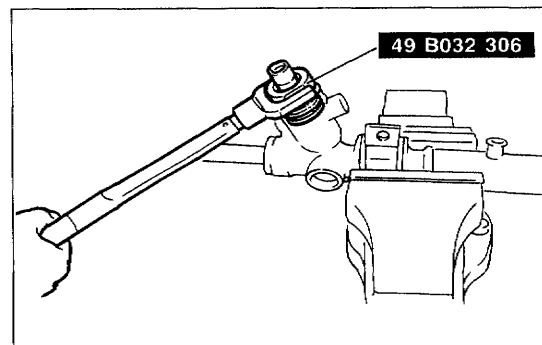
03U0NX-825

Plug

1. Use the **SST** to press in a new oil seal.
2. Press in by placing the flat plate against the bearing.

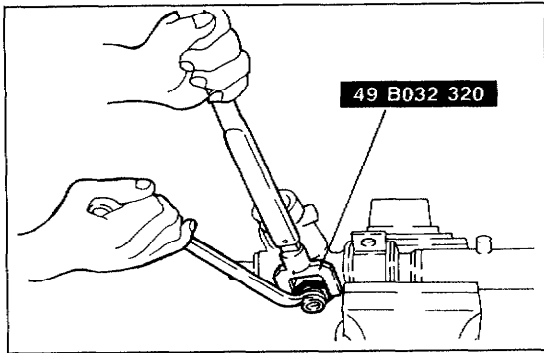
Caution

- Apply grease to the oil seal and bearing.

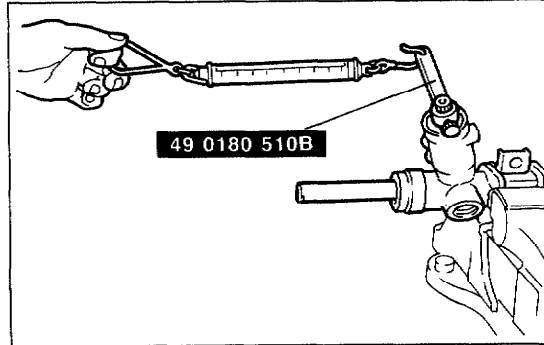


93G0NX-045

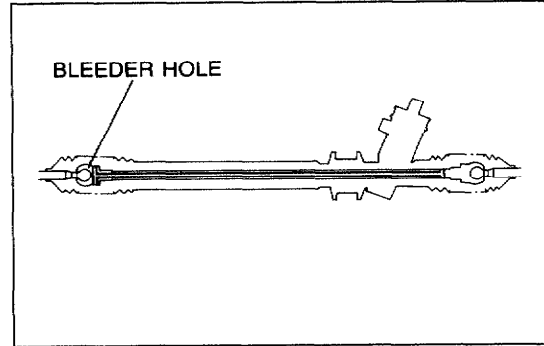
3. Use the **SST** to tighten the plug to the gear housing.



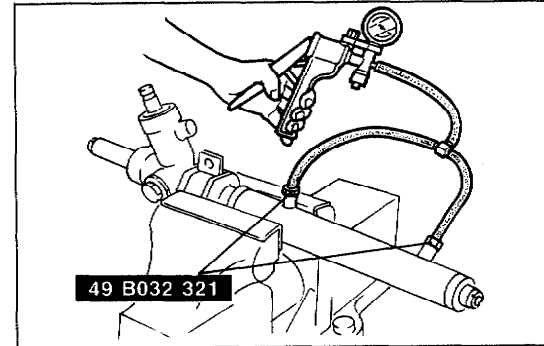
03U0NX-826



03U0NX-827



93G0NX-048



93G0NX-049

Adjusting cover

1. Apply sealant to the adjusting cover and temporarily tighten it to a torque of **11 N·m (110 cm·kg, 95 in·lb)**.
2. Move the rack back and forth **approx. 3 times** and loosen the adjusting cover.
3. Retighten the adjusting cover to the specified torque and then loosen it **0—40°**.

Tightening torque:

4.4—5.4 N·m (45—55 cm·kg, 39—48 in·lb)

4. Tighten the locknut with the **SST**.
5. Measure the pinion starting torque with the **SST** and a pull scale.

Starting torque:

At ± 90° from the straight-ahead position:
1.0—1.3 N·m (10—14 cm·kg, 8.7—12 in·lb)
(Pull scale reading: 1.0—1.4 kg)

At other position:

1.6 N·m (17 cm·kg, 14.7 in·lb) max.
(Pull scale reading: 1.7 kg max.)

6. If not as specified, repeat Steps 3 to 5.

Tie-rod**Note**

- **Install the tie-rod (with air bled out) at the rack housing side.**

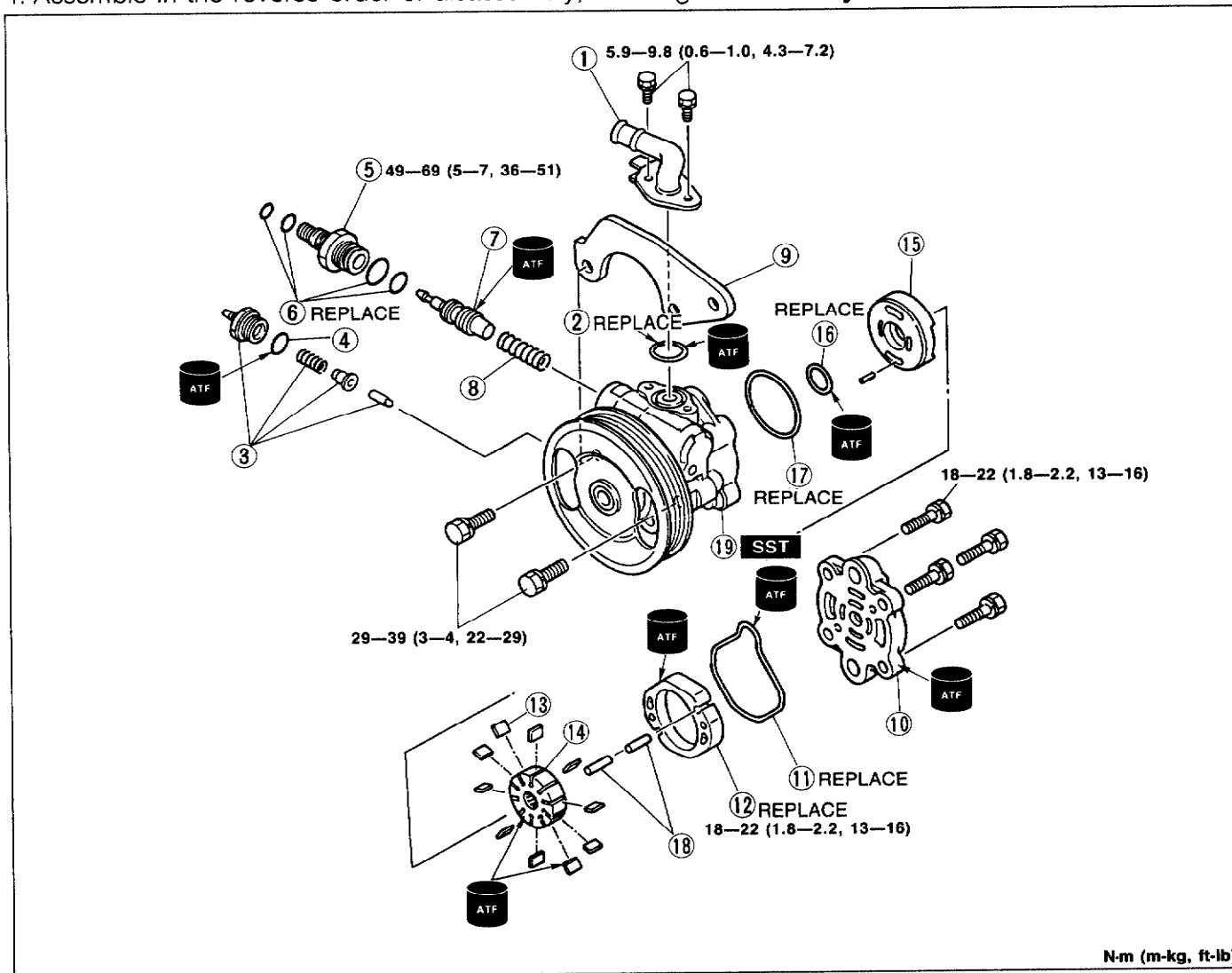
Cylinder air-tightness check

1. Install the **SST** to the cylinder part of the gear housing.
2. Using a vacuum pump, apply a vacuum of 400 mmHg and check to be sure that the vacuum is maintained for 30 seconds.
3. If there is any leakage, replace the oil seal.

POWER STEERING OIL PUMP

Disassembly / Inspection / Assembly

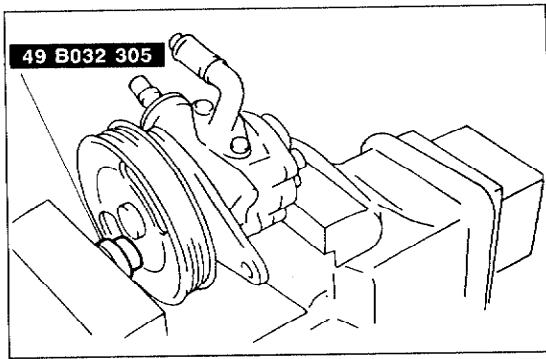
1. The following procedures show replacement of the O-rings. If a problem is found in other parts, replace the oil pump assembly.
2. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
3. Inspect all parts and repair or replace as necessary.
4. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



N-m (m-kg, ft-lb)

03U0NX-828

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Suction pipe 2. O-ring 3. Pressure-switch assembly 4. O-ring 5. Connector 6. O-ring 7. Control valve
Inspect for damage and wear 8. Spring
Inspect for damage 9. Bracket 10. Pump body (rear)
Inspect for damage and wear 11. O-ring | <ol style="list-style-type: none"> 12. Cam ring
Inspect for damage and wear
Assembly note page N-17 13. Vane
Inspect for damage and wear
Assembly note page N-17 14. Rotor
Inspect for damage and wear
Assembly note page N-17 15. Side plate
Inspect for damage and wear 16. O-ring 17. O-ring 18. Pin 19. Pump body (front)
Inspect for damage and wear |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



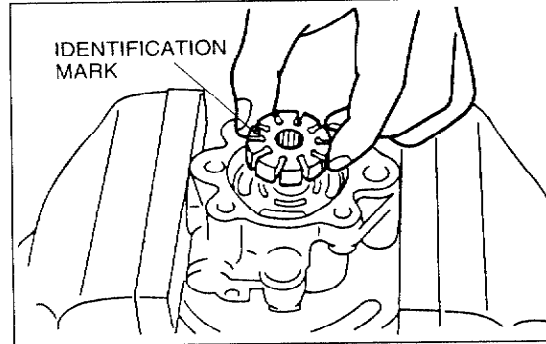
93G0NX-052

Disassembly note

Oil pump

Note

- As shown in the figure, when securing the oil pump in a vise, be sure to use the SST so that force is not applied to the pulley or shaft.

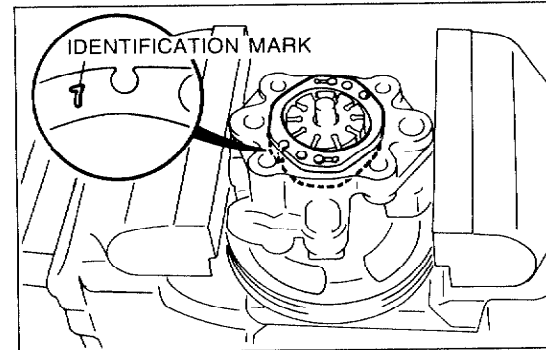


93G0NX-056

Assembly note

Rotor

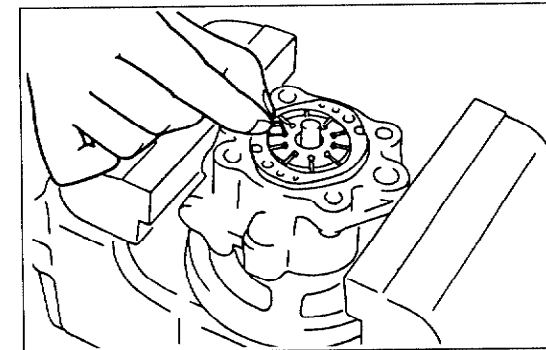
1. Install the rotor to the shaft with the rotor's identification mark facing upward.



93G0NX-057

Cam ring

1. Install the cam ring so that its identification mark is facing downward.



03U0NX-829

Vane

1. Install the vanes (10 pieces) to the rotor, with the R part of the vanes facing outward.

BRAKING SYSTEM

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FEATURES

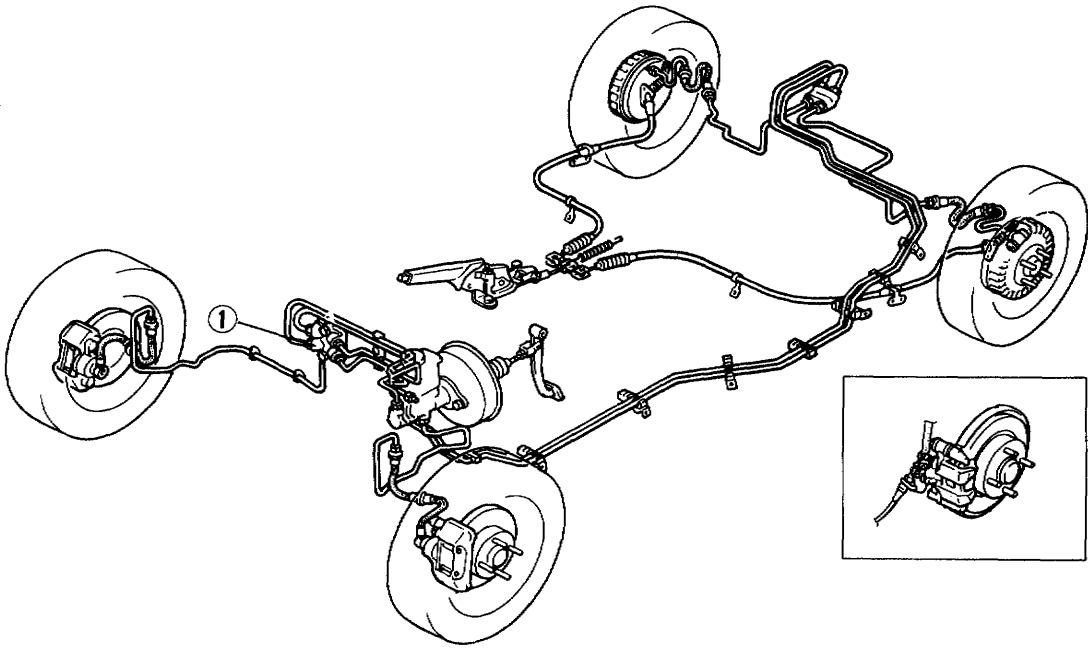
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OUTLINE OF CONSTRUCTION..... **P- 3**
SPECIFICATIONS **P- 3**

SERVICE

SUPPLEMENTAL SERVICE INFORMATION.. P- 4
CONVENTIONAL BRAKE SYSTEM P- 4
DUAL PROPORTIONING VALVE..... **P- 4**

03U0PX-801

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03U0PX-802

- 1. Dual proportioning valve
Inspection page P-4

OUTLINE

OUTLINE OF CONSTRUCTION

The braking system is mostly unchanged however, the dual proportioning valve is changed on 4-wheel drive models. Other parts are basically the same as the previous models.

03U0PX-803

SPECIFICATIONS

Item		5MTX	4ATX
Brake pedal	Type	Suspended	
	Pedal lever ratio	4.2	
	Maximum stroke	131 (5.16) mm (in)	
Master cylinder	Type	Tandem (with level sensor)	
	Cylinder bore	22.22 (0.875) mm (in)	
Power brake unit	Type	Single diaphragm	
	Diameter	214 (8.43) mm (in)	239 (9.41) mm (in)
Front disc brake	Type	Ventilated disc	
	Cylinder bore	53.97 (2.12) mm (in)	
	Pad dimensions (Area x Thickness)	4,300 (6.66) x 10 (0.39) mm ² x mm (in ² x in)	
	Disc plate dimensions (Outer diameter x Thickness)	257 x 22 (10.12 x 0.87) mm (in)	
Rear disc brake	Type	Solid disc	
	Cylinder bore	30.2 (1.19) mm (in)	
	Pad dimensions (Area x Thickness)	2,600 (4.03) x 7.5 (0.30) mm ² x mm (in ² x in)	
	Disc plate dimensions (Outer diameter x Thickness)	251 x 9 (9.88 x 0.35) mm x in	
Braking force control device		Dual proportioning valve	
Parking brake		Center lever (Mechanical, two rear brakes)	
Brake fluid		FMVSS 116: DOT-3 SAE: J1703	

03U0PX-804

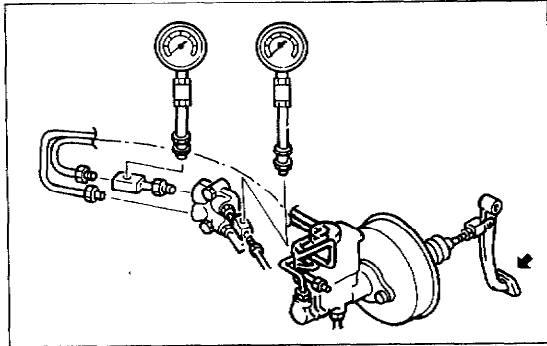
SUPPLEMENTAL SERVICE INFORMATION

The point shown in this section is comparison with workshop manual (1195-10-89E)

Dual proportioning valve

- Inspection

03U0PX-805



03U0PX-806

CONVENTIONAL BRAKE SYSTEM

DUAL PROPORTIONING VALVE

Inspection

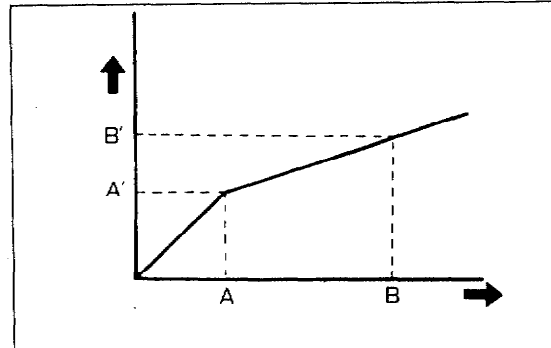
1. Connect two pressure gauges (9,810 kPa [100 kg/cm², 1,422 psi]) to the brake pipes with adapters as shown in the figure.

Adapter and flare nut tightening torque:
13—22 N·m (1.3—2.2 m·kg, 9.4—16 ft·lb)

Note

- Disconnect and connect the brake pipes with SST.

2. Bleed the air from the brake system.
3. Depress the brake pedal until the master cylinder pressure equals A; then record rear brake pressure A'.
4. Depress the brake pedal again, apply additional pressure until the pressure equals B; then record pressure B'.



03U0PX-807

Fluid pressure

kPa (kg/cm², psi)

A	A'	B	B'
2,943 (30, 427)	2,943 (30, 427) ± 196 (2, 28)	5,886 (60, 853)	3,826 (39, 555) ± 294

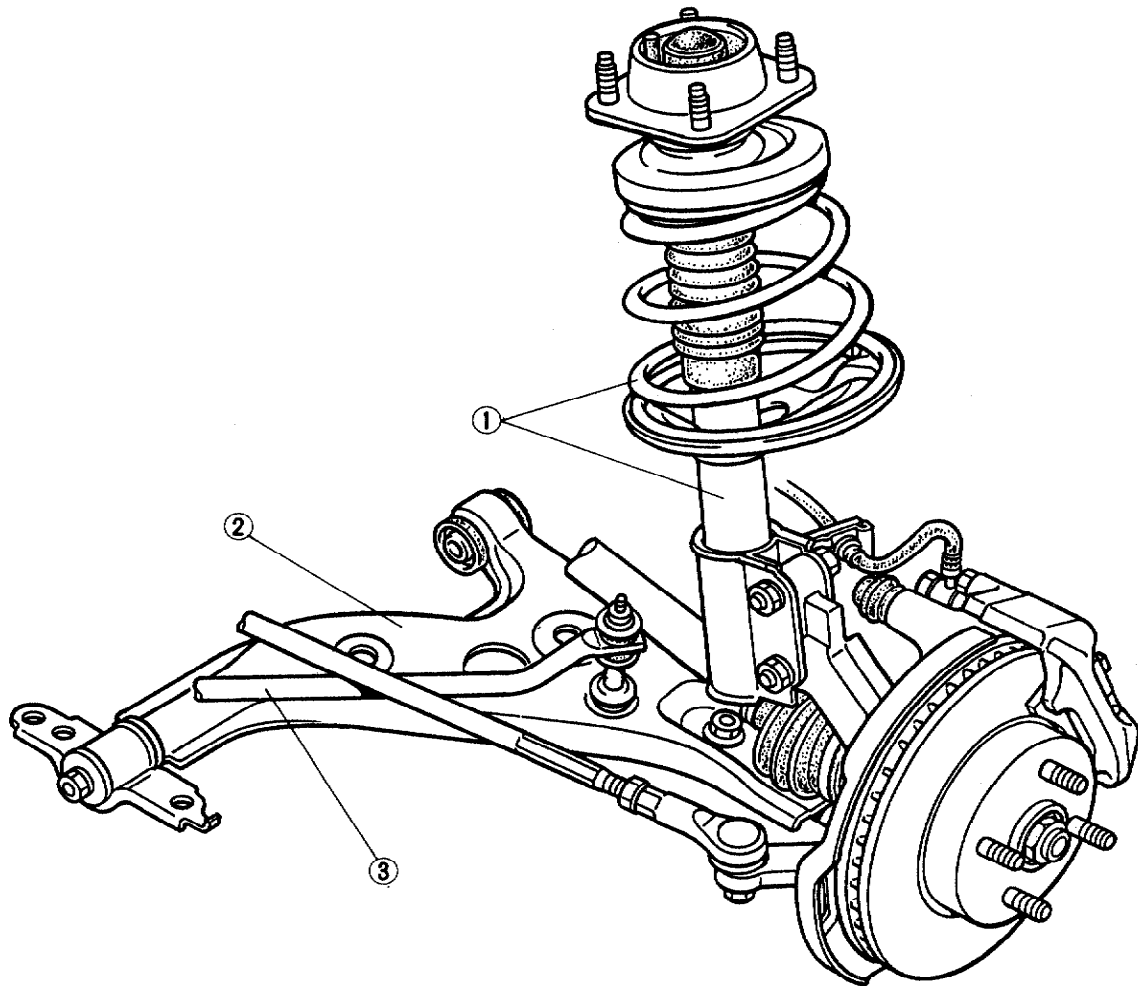
SUSPENSION

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REAR WHEEL ALIGNMENT.....	R- 8
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FRONT SHOCK ABSORBER AND SPRING..	R-10
FRONT LOWER ARM.....	R-15
FRONT STABILIZER	R-17
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03U0RX-001

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FRONT SUSPENSION



FRONT WHEEL ALIGNMENT

MAXIMUM STEERING ANGLE: $40^{\circ}00' \pm 2^{\circ}$ (Inner) $33^{\circ}00' \pm 2^{\circ}$ (Outer)

TOTAL TOE-IN: $2 \pm 3\text{mm}$ ($0.08 \pm 0.12\text{ in}$)
 $0.2^{\circ} \pm 0.3^{\circ}$

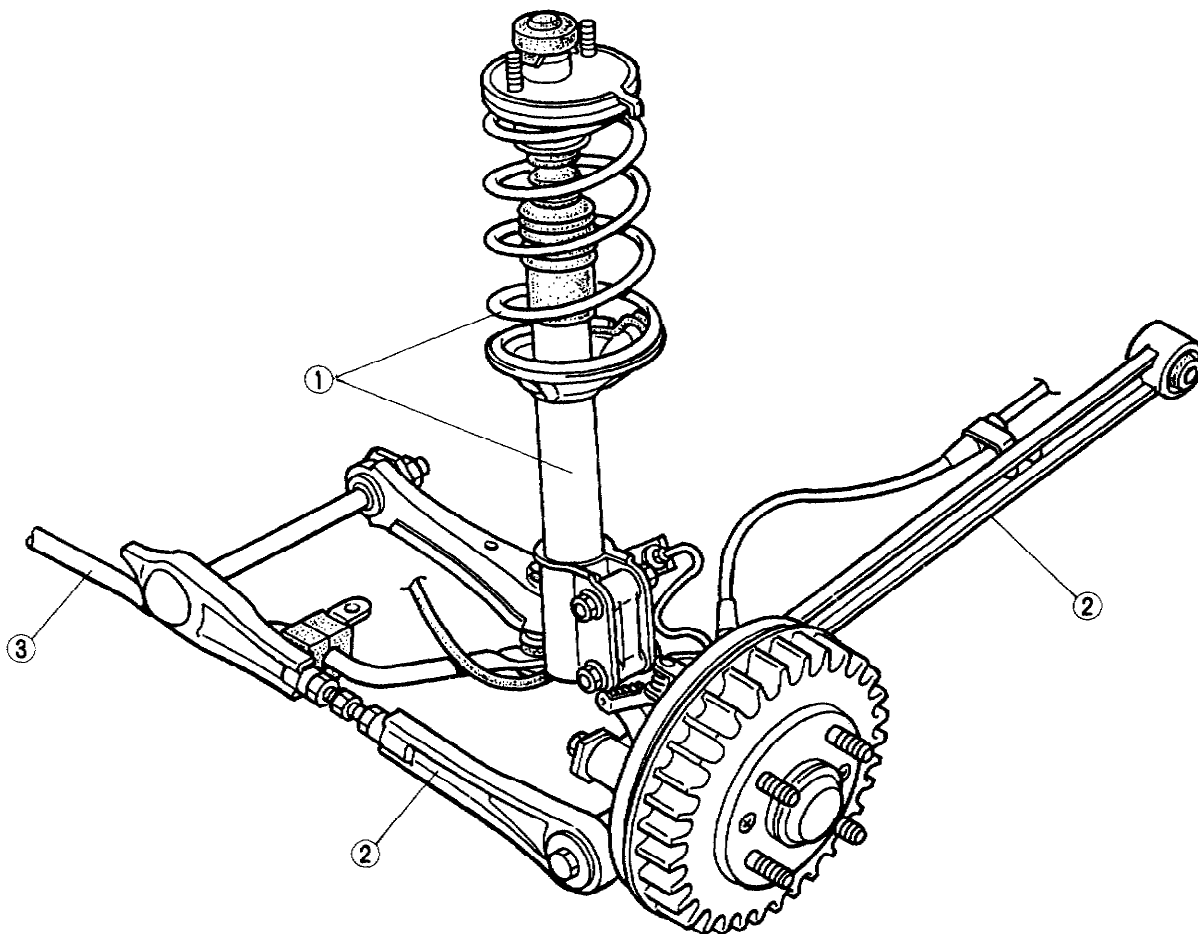
CAMBER: $-0^{\circ}05' \pm 45'$

CASTER: $1^{\circ}55' \pm 55'$

03UORX-002

- | | |
|-----------------------------------------|-----------------------------------------------|
| 1. Front shock absorber and spring | 2. Front lower arm |
| Removal / Installation..... page R-10 | Removal / Inspection / Installation page R-15 |
| Disassembly / Inspection..... page R-11 | Inspection..... page R-16 |
| Inspection..... page R-12 | 3. Front stabilizer |
| Assembly..... page R-13 | Removal / Inspection / Installation page R-17 |

REAR SUSPENSION



REAR WHEEL ALIGNMENT

TOTAL TOE-IN: $2 \pm 3\text{mm}$ ($0.08 \pm 0.12\text{ in}$)
 $0.2^\circ \pm 0.3^\circ$

CAMBER: $-0^\circ 20' \pm 45'$

03U0RX-003

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Rear shock absorber and spring
 Removal / Installation page R-20
 Disassembly / Inspection page R-21
 Inspection page R-22
 Assembly page R-23</p> | <p>2. Lateral link and trailing link
 Removal / Inspection / Installation page R-25</p> <p>3. Rear stabilizer
 Removal / Inspection / Installation page R-26</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

OUTLINE

SPECIFICATIONS

Item			Specification		
Suspension type					
Shock absorber	Suspension		Double-acting, oil-filled		
Coil spring	Type	Front	Taper wound		
		Rear	Straight wound		
	Dimension		See coil spring specification below		
Stabilizer	Type		Torsion bar		
	Diameter mm (in)	BP SOHC	Front	19.1 (0.75)	
			Rear	20.0 (0.79)	
		BP DOHC	Front	22.0 (0.87)	
			Rear	20.0 (0.79)	
		B6 SOHC	Front	—	
Rear			20.0 (0.79)		
Wheel alignment (* ¹ Unladen)	Front	Maximum steering angle	Inner	40° ± 2°	
			Outer	33° ± 2°	
		Total toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)	
			degree	0.2° ± 0.3°	
		Camber angle		-0°05' ± 45'	
		Caster angle		1°55' ± 55'	
	Kingpin angle		12°25'		
	Rear	Total toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)	
degree			0.2° ± 3°		
Camber angle		-0°20' ± 45'			

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*¹ Fuel tank full; radiator coolant and engine oil at specified levels; and spare tire, jack, and tools in designated positions.

Coil Spring Specifications

Item	Wire diameter mm (in)	Coil outer diameter mm (in)	Free length mm (in)	Coil number	Identification mark color		
					M ^{*1}	A ^{*2}	
Front	A	12.7 (0.5)	133-159 (5.24-6.26)	293 (11.54)	3.1	Pink	Yellow
	B	12.9 (0.51)	133-159 (5.24-6.26)	294 (11.57)	3.2	Light green	Yellow
	C	13.2 (0.52)	133-159 (5.24-6.26)	300 (11.81)	3.4	Purple	Yellow
	D	13.3 (0.52)	132-158 (5.20-6.22)	301 (11.85)	3.4	Light blue	Yellow
	E	13.3 (0.52)	132-158 (5.20-6.22)	286 (11.26)	3.2	Orange	Red
	F	13.4 (0.53)	133-159 (5.24-6.26)	287 (11.3)	3.3	Cream	Red
Rear	G	11.6 (0.46)	140 (5.51)	334 (13.15)	4.6	Brown	—
	H	11.9 (0.47)		333 (13.11)	4.7	Gray	—
	I	12.1 (0.48)		332 (13.07)	4.8	Orange	—
	J	11.7 (0.46)		333 (13.11)	4.5	Blue	—
	K	12.3 (0.48)		332 (13.07)	4.9	Blue & White	—
	L	12.5 (0.49)		331 (13.03)	5.1	Blue & Green	—

*¹ Main identification mark color: Indicated on second coil from bottom.

*² Auxiliary identification mark color: Indicated on third coil from bottom.

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TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Body "rolls"	Weak stabilizer Worn or deteriorated stabilizer bushing Worn or deteriorated lower arm bushing Malfunction of shock absorber	Replace Replace Replace Replace	R-17,26 R-17,26 — R-10,20
Poor riding comfort	Weak coil spring Malfunction of shock absorber	Replace Replace	R-11,21 R-10,20
Body leans	Weak coil spring Worn or deteriorated stabilizer bushing Worn or deteriorated lower arm bushing	Replace Replace Replace	R-11,21 R-17,26 —
Abnormal noise from suspension system	Poor lubrication or wear of lower arm ball joint Looseness of peripheral connections Malfunction of shock absorber Worn or deteriorated stabilizer bushing Worn or deteriorated lower arm bushing	Lubricate or replace Tighten Replace Replace Replace	R-15 — R-10,20 R-17,26 —
General driving instability	Weak coil spring Malfunction of shock absorber Worn or deteriorated lower arm bushing Worn or deteriorated stabilizer bushing Improperly adjusted wheel alignment Damaged lower arm ball joint Malfunction of steering system Damaged or unbalanced wheel(s)	Replace Replace Replace Replace Adjust Replace — —	R-11,21 R-10,20 — R-17,26 R- 6 R-15 Section N Section Q
Heavy steering	Poor lubrication or wear of lower arm ball joint Improperly adjusted wheel alignment Malfunction of steering system Damaged or unbalanced wheel(s)	Lubricate or replace Adjust — —	R-15 R- 6 Section N Section Q
Steering wheel pulls to one side	Weak coil spring Worn or deteriorated stabilizer bushing Worn or deteriorated lower arm bushing Damaged lower arm ball joint Improperly adjusted wheel alignment Malfunction of steering system Malfunction of braking system Damaged or unbalanced wheel(s)	Replace Replace Replace Replace Adjust — — —	R-11,21 R-17,26 — R-15 R- 6 Section N Section P Section Q
"Shimmy" occurs (Steering wheel vibrates left/right)	Damaged lower arm ball joint Malfunction of shock absorber Loose shock absorber mounting Worn or deteriorated lower arm bushing Worn or deteriorated stabilizer bushing Improperly adjusted wheel alignment Damaged or worn wheel bearing Malfunction of steering system Damaged or unbalanced wheel(s)	Replace Replace Tighten Replace Replace Adjust Replace — —	R-15 R-10,20 R-10,20 — R-17,26 R- 6 Section M Section N Section Q
Steering wheel doesn't return properly	Stuck or damaged lower arm ball joint Improperly adjusted wheel alignment Malfunction of steering system Damaged or unbalanced wheel(s)	Replace Adjust — —	R-15 R- 6 Section N Section Q

03U0RX 006

WHEEL ALIGNMENT

PRE-INSPECTION

1. Check the tire inflations and set to the recommended pressure, if necessary.
2. Inspect the front wheel bearing play; replace the bearing if necessary.
3. Inspect the wheel and tire runout.
4. Inspect the ball joints and steering linkage for any excessive looseness.
5. The vehicle must be on level ground and have no luggage or passenger load.
6. The difference in height between the left and right sides from the center of the wheel to the fender brim must not exceed **10mm (0.39 in)**.
7. Shake the vehicle to check operation of the shock absorbers.

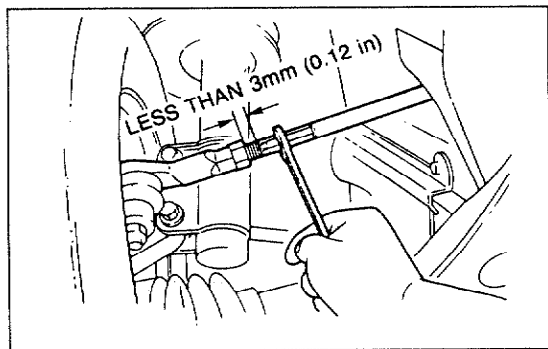
03U0RX-007

FRONT WHEEL ALIGNMENT
Specifications

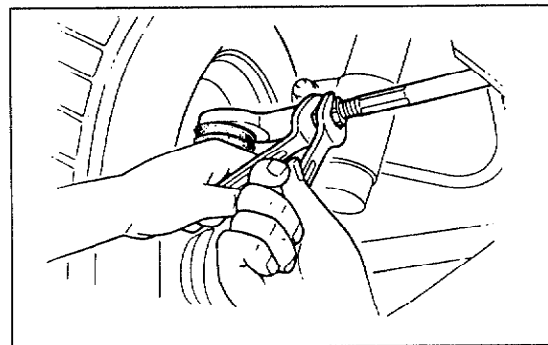
Item			Specification	
Wheel alignment (* ¹ Unladen)	Front	Maximum steering angle	Inner	$40^{\circ} \pm 2^{\circ}$
			Outer	$33^{\circ} \pm 2^{\circ}$
		Total toe-in	mm (in)	$2 \pm 3 (0.08 \pm 0.12)$
			degree	$0.2^{\circ} \pm 0.3^{\circ}$
		Camber angle		$-0^{\circ}05' \pm 45'$
		Caster angle		$1^{\circ}55' \pm 55'$
Kingpin angle		$12^{\circ}25'$		

*¹ Fuel tank full; radiator coolant and engine oil at specified level; and spare tire, jack, and tools in designated positions.

03U0RX-008



03U0RX-009



03U0RX-010

Adjustments

Maximum steering angle

1. Loosen the left and right tie-rod locknuts, then turn the tie-rods equally.

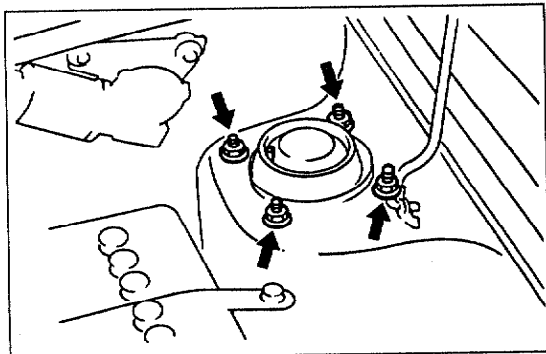
Maximum left/right difference: 3mm (0.12 in)

2. Tighten the tie-rod locknuts.

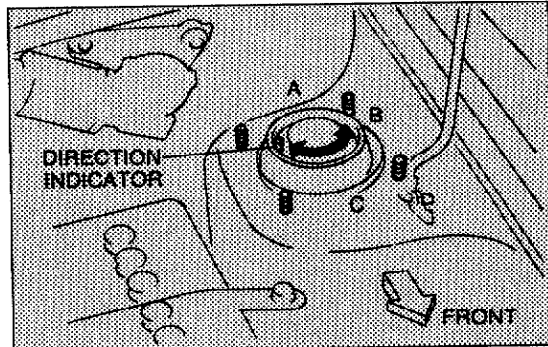
Tightening torque:

34—39 N·m (3.5—4.0 m·kg, 25—29 ft·lb)

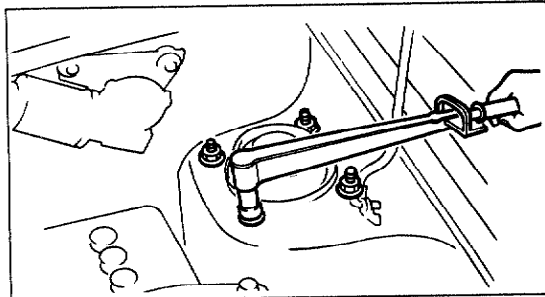
3. Adjust the toe-in after adjusting the steering angle.
4. Inspect and adjust the toe-in after adjusting the turning angle.



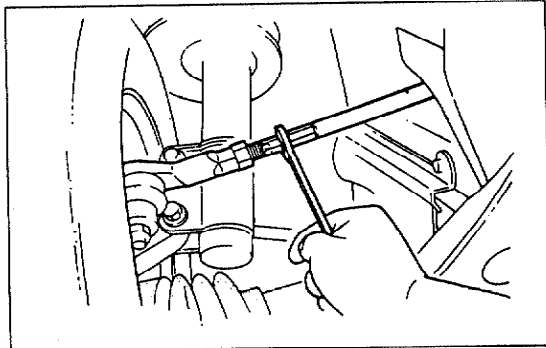
03U0RX-011



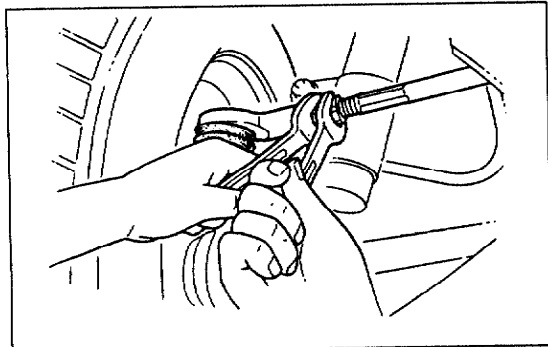
03U0RX-100



03U0RX-012



03U0RX-013



03U0RX-014

Camber and Caster

Note

- Caster is not adjustable.

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the mounting block nuts.

3. Push the mounting block downward, and turn it to the desired position

Direction indicator	Difference from standard position	
	Camber angle	Caster angle
A	+14	+14
B	+29	0°
C	+14	-14

4. Install and tighten the mounting nuts to the specified torque.

Tightening torque:

29—40 N·m (3.0—4.1 m·kg, 22—30 ft·lb)

Adjustments

Total toe-in

To adjust the toe-in, loosen the left and right tie-rod locknuts, then turn the tie-rods equally.

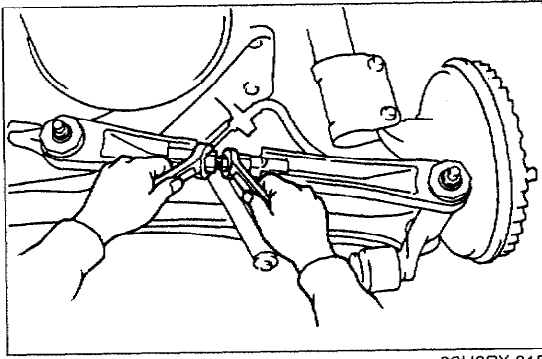
Caution

- The left and right tie-rods are both right threaded, so, to increase the toe-in, turn the right tie-rod toward the front of the vehicle and the left tie-rod equally toward the rear.
- One turn of the tie-rod (both sides) changes the toe-in by about 6mm (0.24 in).

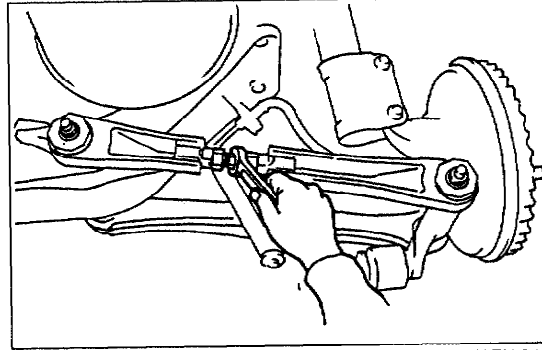
Tighten the tie-rod locknuts.

Tightening torque:

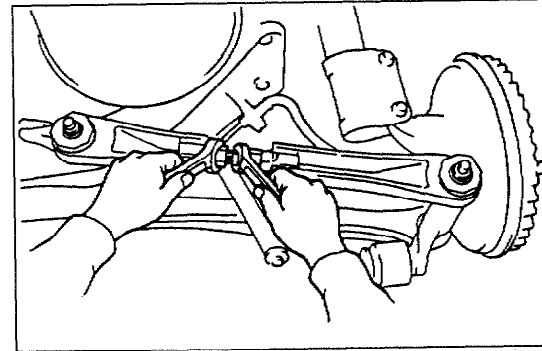
34—39 N·m (3.5—4.0 m·kg, 25—29 ft·lb)



03U0RX-015



03U0RX-016



03U0RX-017

REAR WHEEL ALIGNMENT**Adjustment****Total toe-in**

1. Loosen the lateral link locknuts.

2. Turn the lateral link adjustment link to adjust.

Note

- One turn of the link changes 11.3 m (0.44 in).

3. Tighten the lateral link locknuts to the specified torque.

Tightening torque:

55—64 N·m (5.6—6.5 m·kg, 41—47 ft·lb)

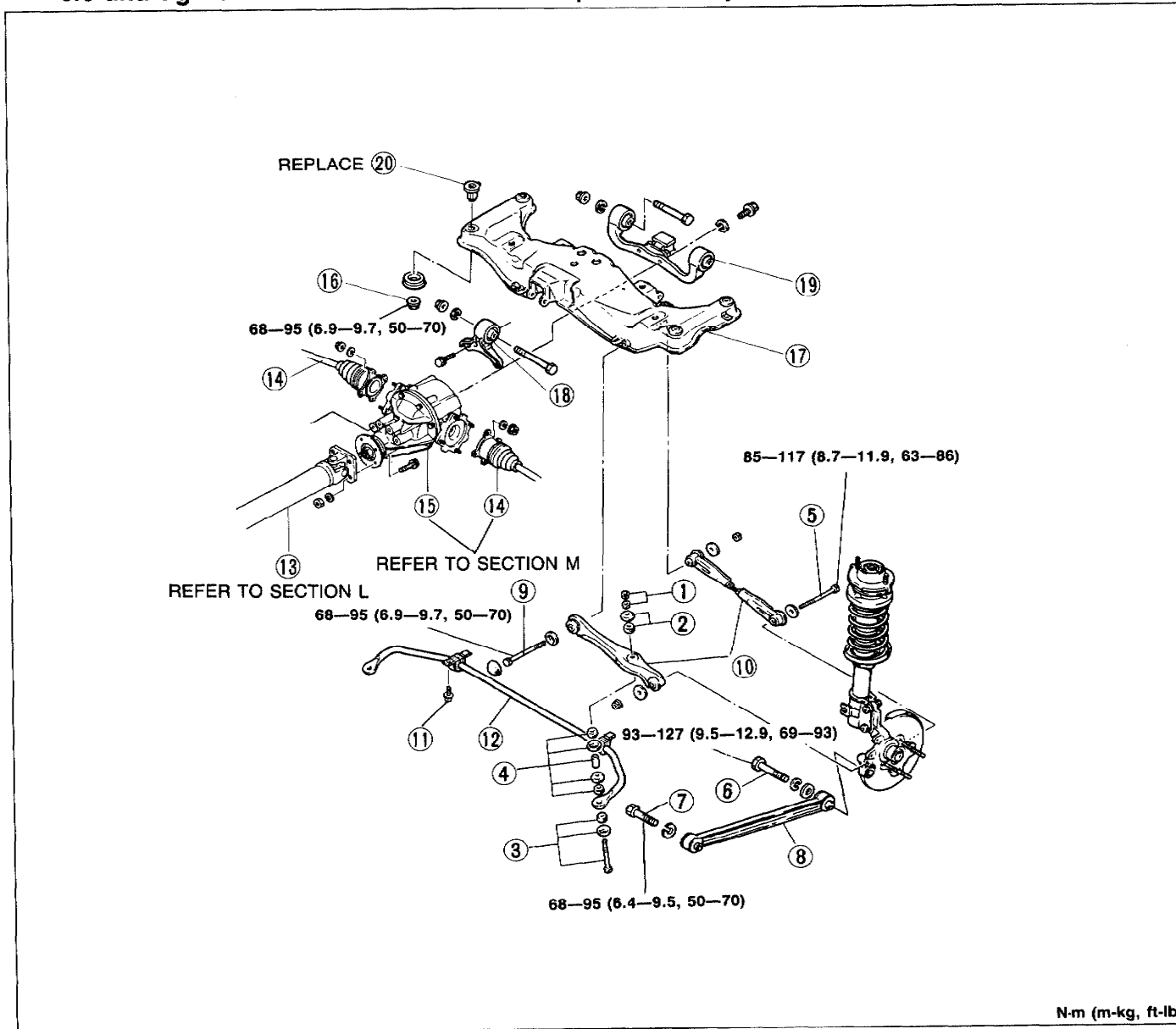
REAR CROSSMEMBER

Removal / Installation

1. Jack up the vehicle and support it with safety stands.
2. Remove the wheels and tires.
3. Remove in the order shown in the figure, referring to **Removal Note**.
4. Inspect all parts and repair or replace as necessary.
5. Install in the reverse order of removal, referring to **Installation Note**.

Caution

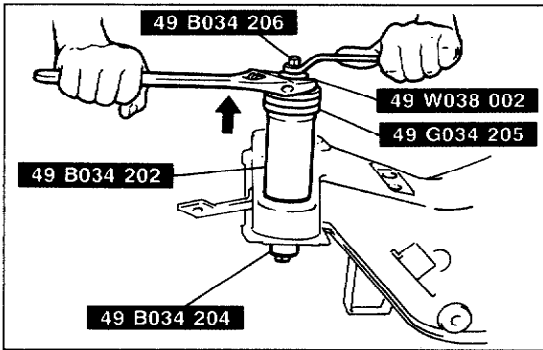
- Loosely tighten the lateral link and trailing link bolts and nuts when installing. Lower the vehicle and tighten all nuts and bolts to the specified torques with the vehicle unladen.



N-m (m-kG, ft-lb)

03U0RX-814

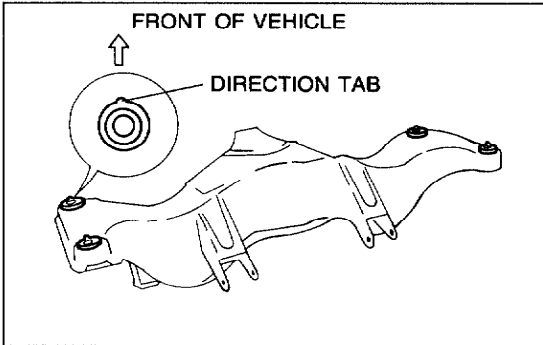
- | | | |
|---------------------------------|----------------------------|---------------------------|
| 1. Nut (Stabilizer) | 9. Bolt (Lateral link) | 17. Rear crossmember |
| 2. Bushing and retainer | 10. Lateral link | 18. Front rubber mount |
| 3. Bolt, retainer and bushing | 11. Bolt | 19. Rear rubber mount |
| 4. Retainer, bushing and spacer | 12. Rear stabilizer | 20. Crossmember bushing |
| 5. Bolt (Lateral link) | 13. Propeller shaft | Removal note... page R-10 |
| 6. Bolt (Trailing link) | 14. Driveshaft | Installation note |
| 7. Bolt (Trailing link) | 15. Rear differential | page R-10 |
| 8. Trailing link | 16. Nut (Rear crossmember) | |



03U0RX-815

Removal note**Crossmember bushing**

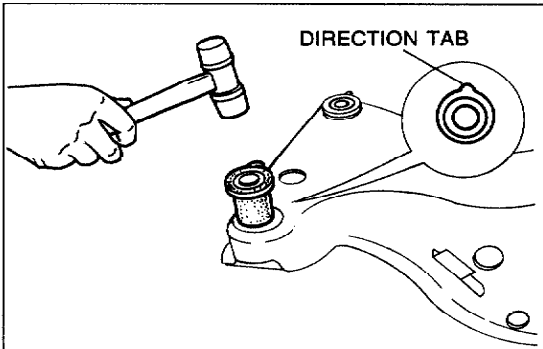
1. Remove the crossmember bushing in the direction of the arrow with the **SST**.



03U0RX-816

Installation note**Crossmember bushing**

1. Apply soapy water to the crossmember bushing and position it with the direction tab forward.



03U0RX-817

2. Install the lower arm bushing with a plastic hammer.

BODY

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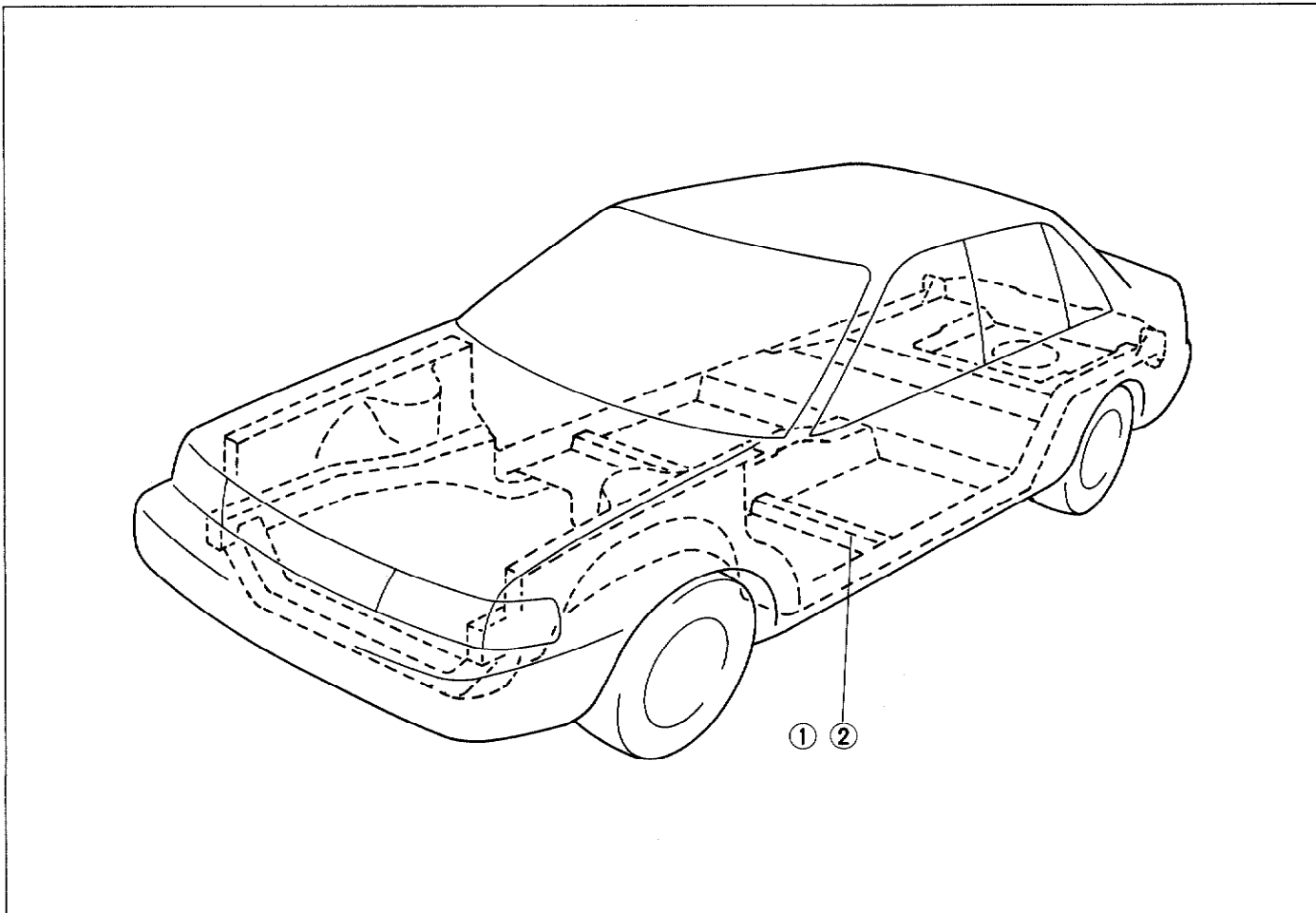
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OUTLINE OF CONSTRUCTION..... S- 2

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SUPPLEMENTAL SERVICE INFORMATION .. S- 2
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UNDERBODY PROJECTED DIMENSIONS... S- 3
UNDERBODY STRAIGHT-LINE
DIMENSIONS..... S- 4

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03U0SX-802

1. Underbody projected dimensions..... page S-3
2. Underbody straight-line dimensions..... page S-4

OUTLINE

OUTLINE OF CONSTRUCTION

- The body for the 4WD model is basically the same as for the 2WD model; however, underbody is changed. (Refer to pages S-2, 3.)

03U0SX-803

SUPPLEMENTAL SERVICE INFORMATION

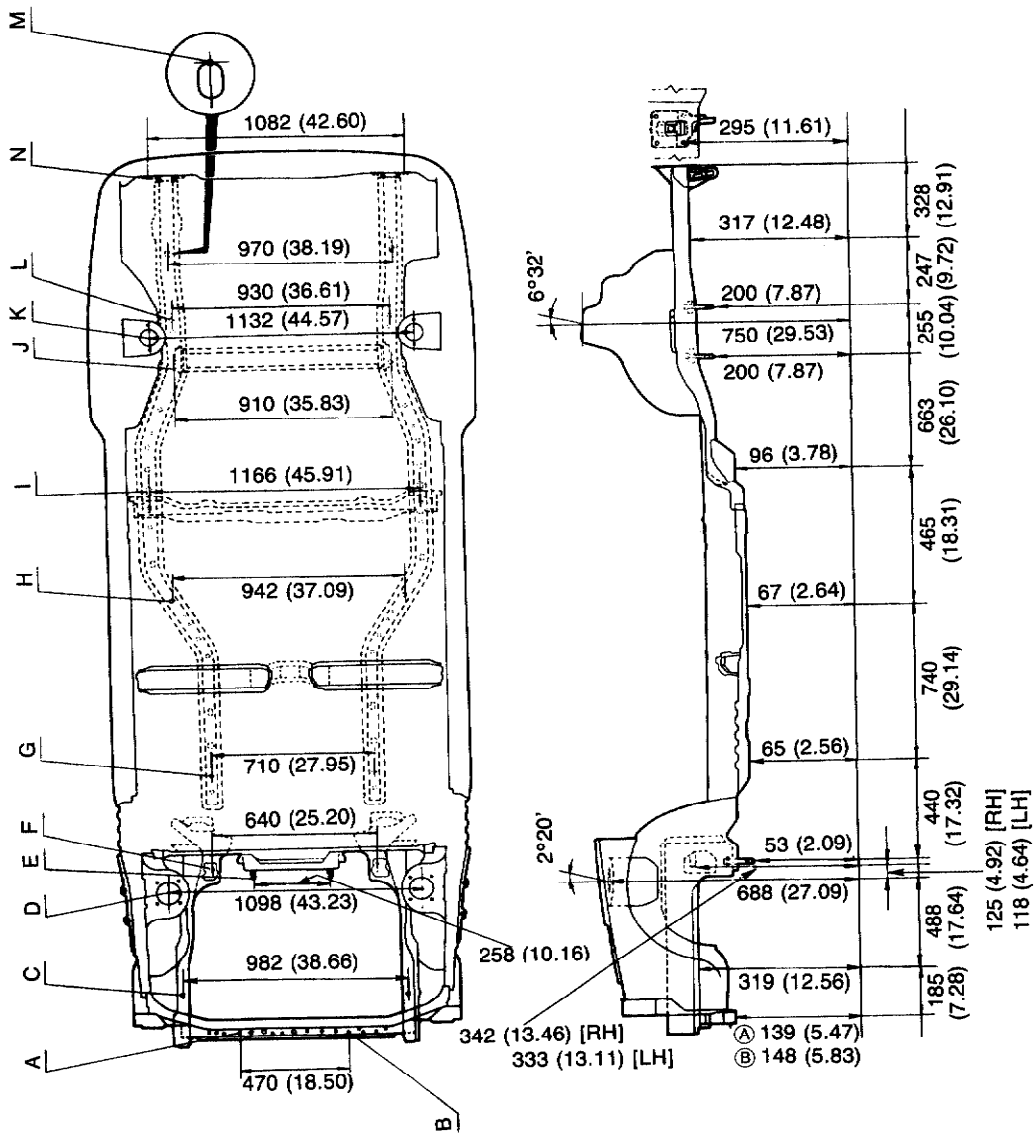
The following points in this section are changed in comparison with Workshop Manual (1195-10-89E).

- Underbody projected dimensions**
- Underbody straight-line dimensions**

03U0SX-804

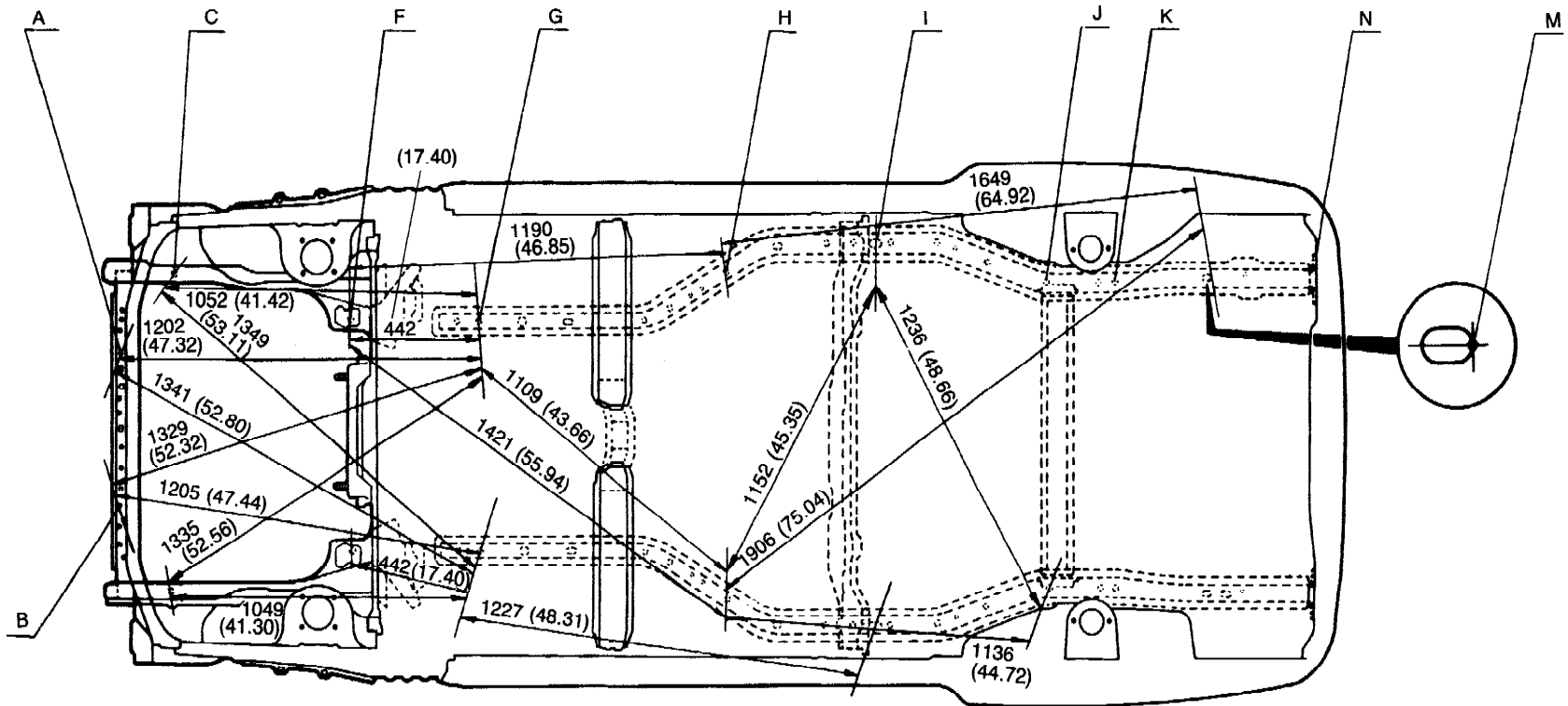
UNDERBODY DIMENSIONS

UNDERBODY PROJECTED DIMENSIONS



- A: CROSSMEMBER REFERENCE HOLE ϕ 12 (0.47)
- B: CROSSMEMBER REFERENCE HOLE ϕ 12 (0.47)
- C: FRONT FRAME REFERENCE HOLE ϕ 16 (0.63)
- D: FRONT SUSPENSION MOUNTING BLOCK MOUNTING SURFACE
- E: STEERING GEAR MOUNTING BOLT
- F: CROSSMEMBER MOUNTING BOLT
- G: FRONT FRAME B REFERENCE HOLE ϕ 16 (0.63)
- H: FRONT FRAME B REFERENCE HOLE ϕ 20 (0.79)
- I: TRAILING LINK BRACKET REFERENCE HOLE 10 x 12 (0.39 x 0.47)
- J: REAR CROSSMEMBER MOUNTING BOLT
- K: REAR SUSPENSION MOUNTING BLOCK MOUNTING SURFACE
- L: REAR SUSPENSION MOUNTING BOLT
- M: REAR SIDE FRAME REFERENCE HOLE 16 x 22 (0.63 x 0.87)
- N: REAR BUMPER MOUNTING HOLE ϕ 12 (0.47)

mm (in)



- A: CROSSMEMBER REFERENCE HOLE $\phi 12$ (0.47)
 B: CROSSMEMBER REFERENCE HOLE $\phi 12$ (0.47)
 C: FRONT FRAME REFERENCE HOLE $\phi 16$ (0.63)
 D: FRONT SUSPENSION MOUNTING BLOCK MOUNTING SURFACE
 E: STEERING GEAR MOUNTING BOLT
 F: CROSSMEMBER MOUNTING BOLT
 G: FRONT FRAME B REFERENCE HOLE $\phi 16$ (0.63)

- H: FRONT FRAME B REFERENCE HOLE $\phi 20$ (0.79)
 I: TRAILING LINK BRACKET REFERENCE HOLE 10 x 12 (0.39 x 0.47)
 J: REAR CROSSMEMBER MOUNTING BOLT
 K: REAR SUSPENSION MOUNTING BLOCK MOUNTING SURFACE
 L: REAR CROSSMEMBER MOUNTING BOLT
 M: REAR SIDE FRAME REFERENCE HOLE 16 x 22 (0.63 x 0.87)
 N: REAR BUMPER MOUNTING HOLE $\phi 12$ (0.47)

mm (in)

BODY ELECTRICAL SYSTEM

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FEATURES

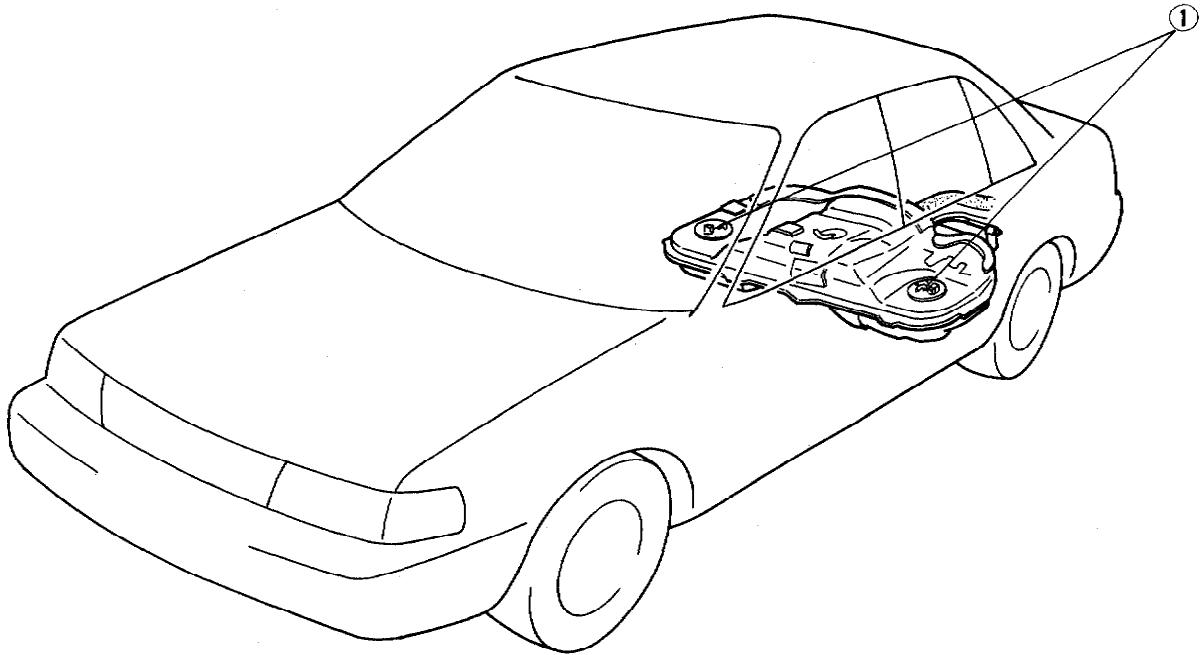
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FUSE AND JOINT BOX..... T- 3
FUSE T- 3
WARNING SYSTEM T- 4
WARNING AND INDICATOR LAMPS T- 4

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INSTRUMENT CLUSTER T- 6
FUEL GAUGE SENDER UNIT..... T- 6

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03U0TX-802

- 1. Fuel gauge sender unit (in fuel tank)
Inspection page T-6

OUTLINE

OUTLINE OF CONSTRUCTION

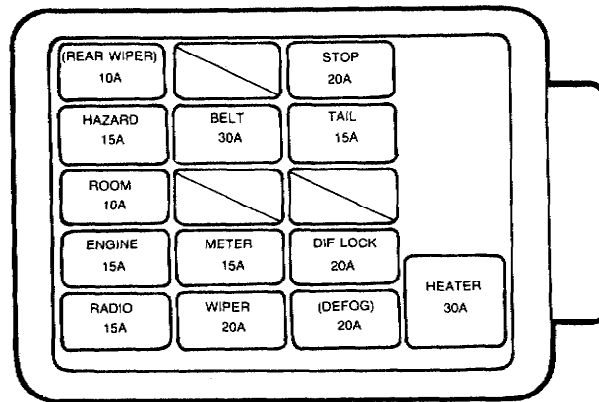
- The body electrical system for the 4WD model is basically the same as for the 2WD model; however, with the addition of the 4WD components, an additional fuse is included and the warning and indicator lamp system is upgraded.

03U0TX-803

FUSE AND JOINT BOX

FUSE

- A center differential lock (DIF LOCK) fuse is added.

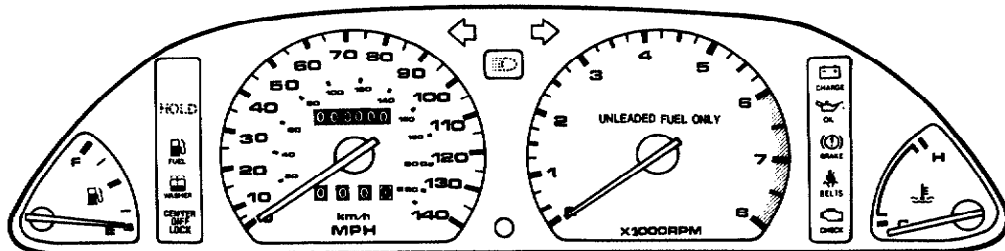
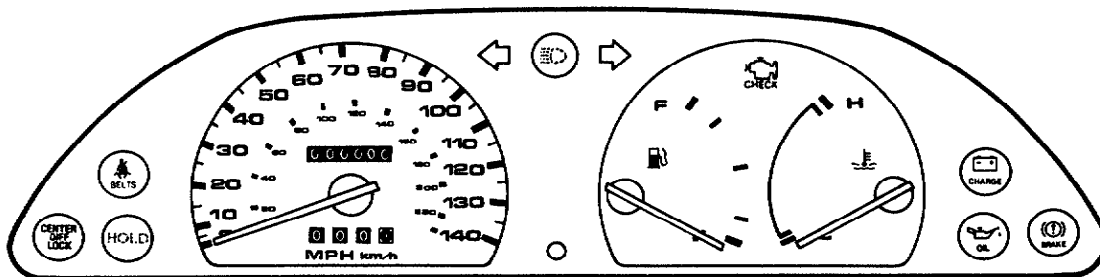


03U0TX-804

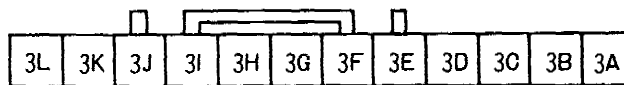
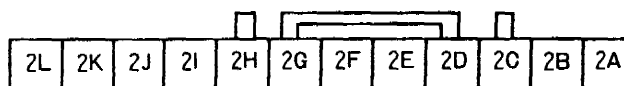
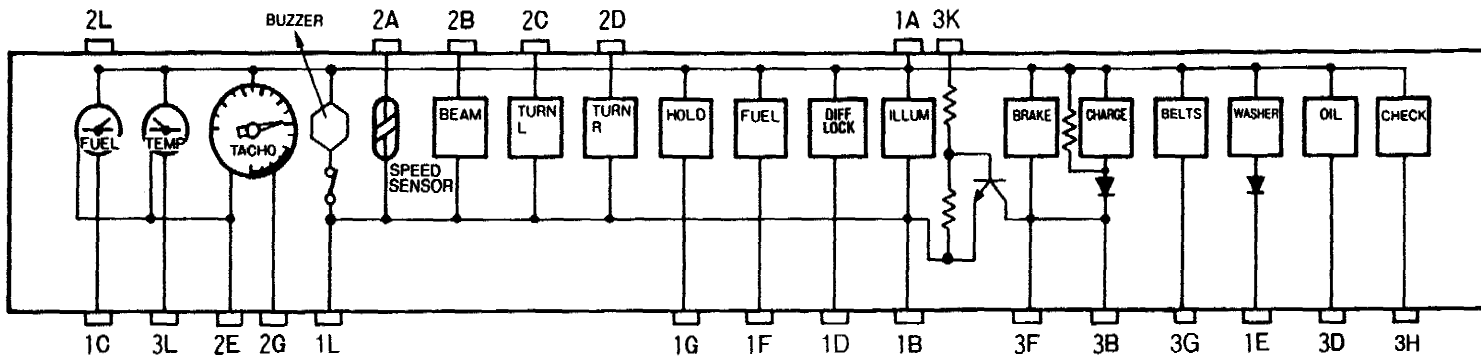
Fuse		Protected circuit
(REAR WIPER)	10A	Rear wiper and washer
HAZARD	15A	Hazard warning
ROOM	10A	Clock, interior lamps, Cargo area lamp, Trunk compartment lamp
ENGINE	15A	Alternator
RADIO	15A	Audio
BELT	30A	Passive shoulder belts
METER	15A	Cruise control system, Turn signals, Instrument panel (gauges and warning lamps), Back-up lights
WIPER	20A	Windshield wiper and washer
STOP	15A	Stoplights, Horn
TAIL	15A	Taillights, Side marker lights, Parking lights, illumination lights, License plate lights
DIF LOCK	20A	Center differential lock
(DEFOG)	20A	Rear window defroster
Circuit breaker		
HEATER	30A	Blower motor

WARNING SYSTEM**WARNING AND INDICATOR LAMP**

- With the addition of the center differential lock indicator, the arrangement of the warning and indicator lamps is changed.

WITH TACHOMETER**WITHOUT TACHOMETER**

03U0TX-805



TERMINAL	CONNECTED TO
1A	COMBINATION SWITCH
1B	GROUND
1C	FUEL TANK UNIT
1D	4WD CONTROL UNIT
1E	WASHER LEVEL SENSOR
1F	FUEL TANK UNIT
1G	EC-AT CONTROL UNIT
1H	
1I	
1J	

TERMINAL	Connected to
2A	SPEED SENSOR OUTPUT
2B	LIGHT SWITCH (HIGH BEAM)
2C	TURN SWITCH (L)
2D	TURN SWITCH (R)
2E	GROUND
2F	GROUND
2G	IG COIL (IGNITER)
2H	
2I	
2J	
2K	
2L	IG1 BATTERY

TERMINAL	Connected to
3A	
3B	ALTERNATOR
3C	
3D	OIL PRESSURE SWITCH
3E	
3F	PARKING BRAKE SWITCH, BRAKE FLUID SWITCH
3G	PASSIVE SHOULDER BELT CONTROL UNIT
3H	EGI CONTROL UNIT
3I	
3J	
3K	ST (MT), INHIBITOR (EC-AT)
3L	WATER TEMPERATURE GAUGE UNIT

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Workshop Manual (1195-10-89E).

Fuel gauge sender unit

- Inspection

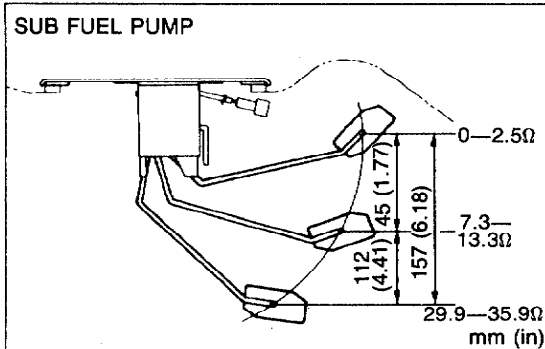
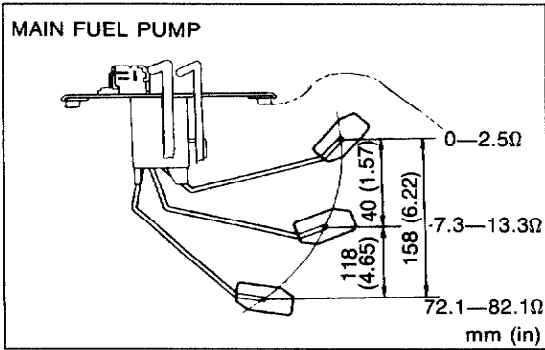
03U0TX-807

INSTRUMENT CLUSTER (METER)

FUEL GAUGE SENDER UNIT

Inspection

1. Remove the fuel tank gauge unit. (Refer to Section F.)
2. Disconnect the fuel gauge sender unit connector.
3. Check resistance while slowly moving the unit arm from point F to point E.
4. If not as specified, replace the fuel gauge sender unit.



HEATER AND AIR CONDITIONER SYSTEM

OUTLINE..... U- 2
OUTLINE OF CONSTRUCTION U- 2

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OUTLINE

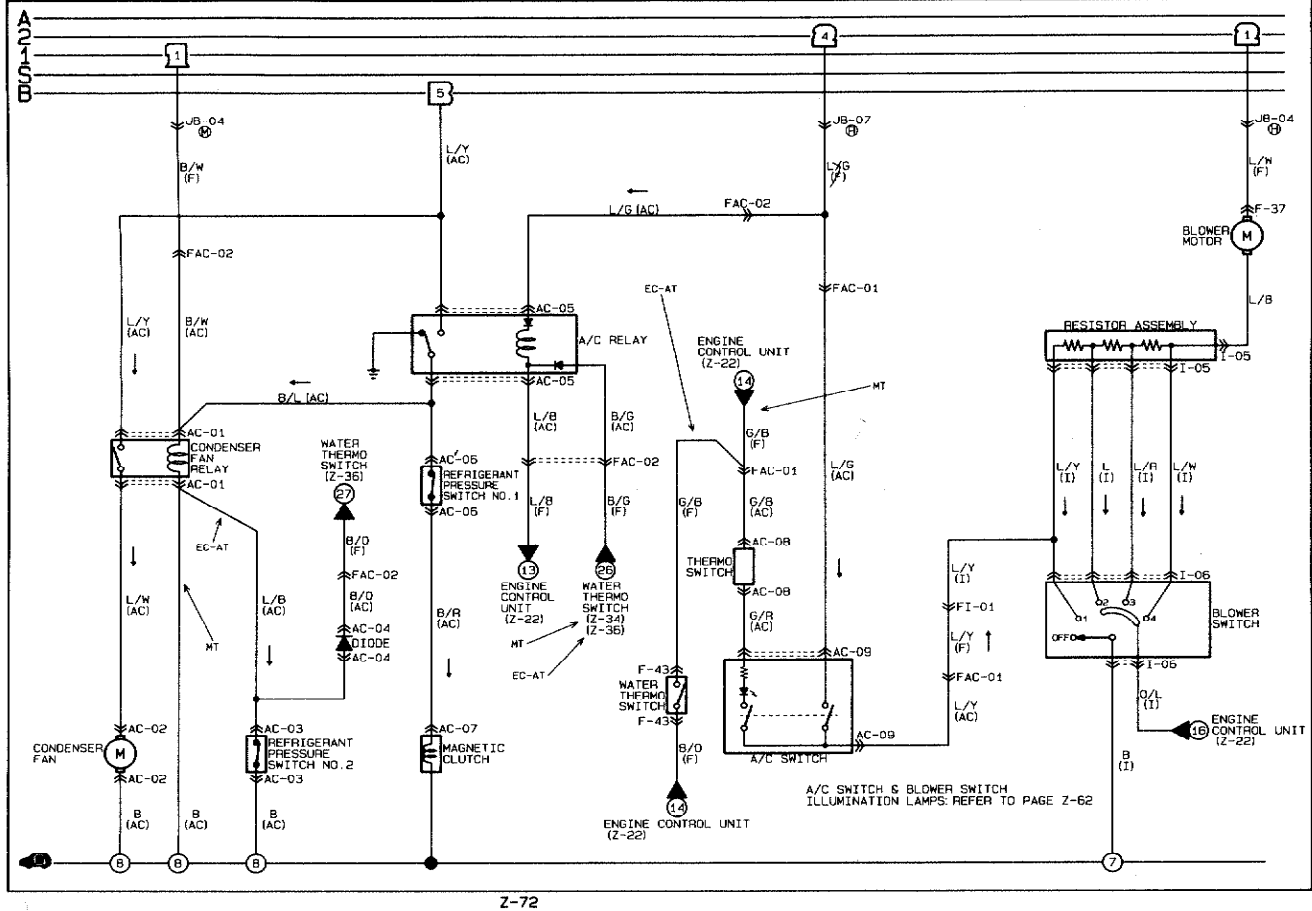
OUTLINE OF CONSTRUCTION

- The heater and air conditioner systems for the 4WD model is basically the same as for the 2WD model; however, for EC-AT equipped vehicles, the cooling efficiency of the engine is improved by operating the additional fan independent of the A/C switch.

Circuit Diagram

Z WIRING DIAGRAM

HEATER & AIR CONDITIONER



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STANDARD BOLT AND NUT TIGHTENING TORQUE	TD-16

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MEASUREMENTS

Item	Type	Sedan
Overall length	mm (in)	4,355 (171.5)
Overall width	mm (in)	1,675 (65.9)
Overall height	mm (in)	1,375 (54.1)
Wheel base	mm (in)	2,500 (98.4)
Front tread	mm (in)	1,430 (56.3)
Rear tread	mm (in)	1,435 (56.5)

B. ENGINE

Item		Engine	BP SOHC	
Type			Gasoline, 4-cycle	
Cylinder arrangement and number			In-line 4-cylinder	
Combustion chamber			Pentroof	
Valve system			OHC, belt-driven 16 valves	
Bore x Stroke		mm (in)	83.0 x 85.0 (3.27 x 3.35)	
Total piston displacement		cc (cu in)	1,839 (112.2)	
Compression ratio			8.9	
Compression pressure kPa (kg/cm ² , psi)-rpm		Standard	1,197 (12.2, 173)-300	
		Minimum	834 (8.5, 121)-300	
		Maximum difference between each cylinders	196 (2.0, 28)	
Valve timing		IN	Open BTDC	2°
			Close ABDC	50°
		EX	Open BBDC	55°
			Close ATDC	8°
Valve clearance mm (in) (Warm engine)		Valve side	IN	0 Maintenance-free
			EX	0 Maintenance-free
		Cam side	IN	0 Maintenance-free
			EX	0 Maintenance-free
Cylinder head				
Height		mm (in)	107.4—107.6 (4.228—4.236)	
Distortion		mm (in)	0.10 (0.004) max.	
Grinding		mm (in)	0.10 (0.004) max.	
Valve and valve guide				
Valve head diameter		mm (in)	IN	29.9—30.1 (1.177—1.185)
			EX	24.85—25.15 (0.978—0.990)
Valve head margin thickness		mm (in)	IN	0.65 (0.026)
			EX	0.71 (0.028)
Valve face angle			IN	45°
			EX	45°
Valve length		IN	Standard	101.77 (4.007)
			Minimum	101.27 (3.987)
		EX	Standard	102.97 (4.054)
			Minimum	102.47 (4.034)
Valve stem diameter		mm (in)	IN	5.970—5.985 (0.2350—0.2356)
			EX	5.965—5.980 (0.2348—0.2354)
Guide inner diameter		mm (in)	6.01—6.03 (0.2366—0.2374)	
Valve stem-to-guide clearance		mm (in)	IN	0.025—0.060 (0.0010—0.0024)
			EX	0.030—0.065 (0.0011—0.0026)
			Maximum	0.20 (0.008)
Guide projection (Height "A")		mm (in)	IN	18.3—18.9 (0.720—0.744)
			EX	16.8—17.4 (0.661—0.685)

Item		Engine	BP SOHC		
Valve seat					
Seat angle		IN	45°		
		EX	45°		
Seat contact width		mm (in)			
		IN	0.8—1.4 (0.031—0.055)		
		EX	0.8—1.4 (0.031—0.055)		
Seat sinking		mm (in)	IN	Standard	42.05—42.95 (1.656—1.691)
			Maximum	44.0 (1.732)	
		EX	Standard	40.55—41.45 (1.596—1.632)	
			Maximum	42.5 (1.673)	
Valve spring					
Free length		IN	Standard	mm (in)	46.1 (1.815)
			Minimum	N (kg, lb)/mm (in)	205—231 (20.9—23.5, 46—52)/39 (1.535)
		EX	Standard	mm (in)	43.6 (1.717)
			Minimum	N (kg, lb)/mm (in)	129—147 (13.1—15.0, 29—33)/37.5 (1.476)
Out-of-square		mm (in)	Maximum	IN...1.61 (0.063), EX...1.52 (0.060)	
Camshaft					
Lobe height		mm (in)	IN	Standard	35.993 (1.4170)
			Wear limit	35.793 (1.4092)	
		EX	Standard	36.273 (1.4281)	
			Wear limit	36.073 (1.4202)	
Journal diameter		mm (in)	No.1 & No.5	43.440—43.460 (1.7102—1.7110)	
			No.2 & No.4	43.425—43.450 (1.7096—1.7106)	
			No.3	43.410—43.435 (1.7091—1.7100)	
			Out-of-round	0.05 (0.002) max.	
Camshaft bearing oil clearance		mm (in)	No.1 & No.5	0.040—0.075 (0.0016—0.0030)	
			No.2 & No.4	0.035—0.080 (0.0014—0.0031)	
			No.3	0.050—0.095 (0.0020—0.0037)	
			Maximum	0.15 (0.006)	
Camshaft runout		mm (in)		0.03 (0.0012) max.	
Camshaft end play		mm (in)	Standard	0.06—0.20 (0.0024—0.0079)	
			Maximum	0.2 (0.008)	
Rocker arm and rocker arm shaft					
Rocker arm inner diameter		mm (in)	IN...19.000—19.027 (0.7480—0.7491), EX...19.000—19.033 (0.7480—0.7493)		
Rocker arm shaft diameter		mm (in)	18.959—18.980 (0.7464—0.7472)		
Rocker arm to shaft clearance		mm (in)	Standard	IN...0.020—0.068 (0.0008—0.0027), EX...0.020—0.074 (0.0008—0.0029)	
			Maximum	0.10 (0.004)	
Cylinder block					
Height		mm (in)	221.5 (8.720)		
Distortion		mm (in)	0.15 (0.006) max.		
Grinding		mm (in)	0.20 (0.008) max.		
Cylinder bore diameter		mm (in)	Standard size	83.006—83.013 (3.2679—3.2682)	
			0.25 (0.010) oversize	83.256—83.263 (3.2778—3.2781)	
			0.50 (0.020) oversize	83.506—83.513 (3.2876—3.2879)	
Cylinder bore taper and out-of-round		mm (in)	0.019 (0.0007) max.		

Item		Engine	BP SOHC
Piston			
Piston diameter Measured at 90° to pin bore axis and 16.5mm (0.650 in) below oil ring groove mm (in)	Standard size		82.954—82.974 (3.2659—3.2667)
	0.25 (0.010) oversize		83.211—83.217 (3.2760—3.2763)
	0.50 (0.020) oversize		83.461—83.467 (3.2859—3.2861)
Piston-to-cylinder clearance mm (in)	Standard		0.039—0.052 (0.0015—0.0020)
	Maximum		0.15 (0.006)
Piston ring			
Thickness mm (in)	Top		1.47—1.49 (0.0579—0.0587)
	Second		1.47—1.49 (0.0579—0.0587)
End gap (Measured in cylinder) mm (in)	Top		0.15—0.30 (0.006—0.012)
	Second		0.15—0.30 (0.006—0.012)
	Oil (rail)		0.20—0.70 (0.008—0.028)
	Maximum		1.0 (0.039)
Ring groove width in piston mm (in)	Top		1.520—1.535 (0.0598—0.0604)
	Second		1.520—1.535 (0.0598—0.0604)
	Oil		3.02—3.04 (0.1189—0.1197)
Piston ring-to-ring groove clearance mm (in)	Top		0.030—0.065 (0.0012—0.0026)
	Second		0.030—0.065 (0.0012—0.0026)
	Maximum		0.15 (0.006)
Piston pin			
Diameter	mm (in)		19.974—19.980 (0.7864—0.7866)
Interference in connecting rod	mm (in)		0.013—0.037 (0.0005—0.0015)
Installing pressure	N (kg, lb)		4,905—14,715 (500—1,500, 1,100—3,300)
Connecting rod and connecting rod bearing			
Length (Center to center)	mm (in)		132.85—132.95 (5.2303—5.2342)
Bending	mm (in)		0.075 (0.0030) max./50 (1.97)
Small end bore	mm (in)		19.943—19.961 (0.7852—0.7859)
Big end bore	mm (in)		48.000—48.016 (1.8898—1.8904)
Big end width	mm (in)		21.838—21.890 (0.8598—0.8618)
Connecting rod side clearance mm (in)	Standard		0.110—0.262 (0.0043—0.0103)
	Maximum		0.30 (0.012)
Crankshaft			
Crankshaft runout	mm (in)		0.04 (0.0016) max.
Main journal diameter mm (in)	Standard size	Standard	49.938—49.956 (1.9661—1.9668)
		Minimum	49.904 (1.9647)
	0.25 (0.010) undersize	Standard	49.704—49.708 (1.9568—1.9570)
		Minimum	49.652 (1.9548)
0.50 (0.020) undersize	Standard	49.454—49.458 (1.9470—1.9472)	
	Minimum	49.402 (1.9450)	
Main journal taper and out-of-round	mm (in)		0.05 (0.020) max.
Crankpin diameter mm (in)	Standard size	Standard	44.940—44.956 (1.7693—1.7699)
		Minimum	44.908 (1.7680)
	0.25 (0.010) undersize	Standard	44.690—44.706 (1.7594—1.7601)
		Minimum	44.658 (1.7582)
	0.50 (0.020) undersize	Standard	44.440—44.456 (1.7496—1.7502)
		Minimum	44.408 (1.7483)
0.75 (0.030) undersize	Standard	44.190—44.206 (1.7398—1.7404)	
Minimum	44.158 (1.7385)		
Crankpin taper and out-of-round	mm (in)		0.05 (0.020) max.
Main bearing			
Main journal bearing oil clearance mm (in)	Standard		0.018—0.036 (0.0007—0.0014)
	Maximum		0.10 (0.004)
Available undersized bearing	mm (in)		0.25 (0.010), 0.50 (0.020)

Item		Engine	BP SOHC
Crankpin bearing			
Crankpin bearing oil clearance	mm (in)	Standard	0.028—0.068 (0.0011—0.0027)
		Maximum	0.10 (0.004)
Available undersized bearing		mm (in)	0.25 (0.010), 0.50 (0.020), 0.75 (0.030)
Thrust bearing			
Crankshaft end play	mm (in)	Standard	0.08—0.282 (0.0031—0.0111)
		Maximum	0.30 (0.012)
Bearing width	mm (in)	Standard size	2.500—2.550 (0.0984—0.1004)
		0.25 (0.010) oversize	2.625—2.675 (0.1033—0.1053)
		0.50 (0.020) oversize	2.750—2.800 (0.1083—0.1102)
		0.75 (0.030) oversize	2.875—2.925 (0.1132—0.1152)
Timing belt			
Belt deflection		mm (in)/98 N (10 kg, 22 lb)	11.0—13.0 (0.43—0.51)

D. LUBRICATION SYSTEM

Item		Engine	BP SOHC
Lubricating method			Force-fed
Oil pump			
Type			Trochoid gear
Relief pressure		kPa (kg/cm ² , psi)	343—441 (3.5—4.5, 50—64)
Regulated pressure		kPa (kg/cm ² , psi)-rpm	294—392 (3.0—4.0, 43—57)-3,000
Inner rotor tooth tip to outer rotor clearance	mm (in)	Standard	0.02—0.16 (0.0008—0.0063)
		Maximum	0.20 (0.0078)
Outer rotor to body clearance	mm (in)	Standard	0.09—0.18 (0.0035—0.0071)
		Maximum	0.22 (0.0087)
Side clearance	mm (in)	Standard	0.03—0.11 (0.0012—0.0043)
		Maximum	0.14 (0.0055)
Oil filter			
Type			Full-flow, paper element
Relief pressure differential		kPa (kg/cm ² , psi)	78—118 (0.8—1.2, 11—17)
Engine oil			
Capacity liters (US qt, Imp qt)	Total (dry engine)		4.0 (4.2, 3.5)
	Oil pan		3.6 (3.8, 3.2)
	Oil filter		0.17 (0.18, 0.15)
Grade			API Service SF or SG
Viscosity number	Above 30°C (86°F)		SAE 40
	0°C—40°C (32°F—104°F)		SAE 30
	-10°C—20°C (14°F—68°F)		SAE 20W-20
	Above -10°C (14°F)		SAE 20W-40 or 20W-50
	-25°C—30°C (-13°F—86°F)		SAE 10W-30
	Above -25°C (-13°F)		SAE 10W-40 or 10W-50
	Below 0°C (32°F)		SAE 5W-30
Below -20°C (-4°F)		SAE 5W-20	

E. COOLING SYSTEM

Item	Engine	BP SOHC		
		MTX	ATX	
Cooling method		Water-cooled, forced circulation		
Water pump				
Type		Centrifugal, V-belt driven		
Impeller diameter	mm (in)	70 (2.76)		
Number of impeller blades		6		
Speed ratio		1 : 1.05		
Water seal type		Unified mechanical seal		
Thermostat				
Type		Wax, two-stage		
Opening temperature	°C (°F)	Sub: 83.5—86.5 (182—188), Main: 86.5—89.5 (188—193)		
Full-open temperature	°C (°F)	100 (212)		
Full-open lift	mm (in)	Sub: 1.5 (0.06) min., Main: 8.0 (0.31) min.		
Radiator				
Type		Corrugated fin		
Cap valve opening pressure	kPa (kg/cm ² , psi)	74—103 (0.75—1.05, 11—15)		
Cooling circuit checking pressure	kPa (kg/cm ² , psi)	103 (1.05, 15)		
Cooling fan				
Type		Electric		
Number of blades		4	5	
Outer diameter	mm (in)	320 (12.6)	340 (13.4)	
Capacity	W-V	80-12	160-12	
Current	A	6.6	Hi : 13.3, Low : 8.8	
Water thermostwitch				
OFF→ON	°C (°F)	97 (207)		
Radiator thermostwitch				
OFF→ON	°C (°F)	—	105 (221)	
Coolant				
Capacity	liters (US qt, Imp qt)	5.0 (5.3, 4.4)	6.0 (6.3, 5.3)	
Antifreeze solution	Coolant protection	Volume percentage %		Specific gravity at 20°C (68°F)
		Water	Coolant	
	Above -16°C (3°F)	65	35	1.054
	Above -26°C (-15°F)	55	45	1.066
Above -40°C (-40°F)	45	55	1.078	

F. FUEL AND EMISSION CONTROL SYSTEMS

Item	Engine	BP SOHC	
		MTX	ATX
Idle speed	rpm	750 ± 50 (with parking brake applied)	
Ignition timing	BTDC	5 ± 1°	
Fuel pump			
Maximum output pressure	kPa (kg/cm ² , psi)	441—589 (4.5—6.0, 64—85)	
Fuel filter			
Type	Low-pressure side	Nylon element (built-in fuel pump)	
	High-pressure side	Paper element	
Pressure regulator			
Regulating pressure	kPa (kg/cm ² , psi)	265—314 (2.7—3.2, 38—46)	
Injector			
Type		High-ohmic	
Type of drive		Electromechanical	
Resistance	Ω	12—16	
Idle speed control (ISC) valve			
Type		Rotary	
Resistance	Ω	11—13	

F. FUEL AND EMISSION CONTROL SYSTEMS

Item		Engine	BP SOHC	
Purge control solenoid valve				
Resistance		Ω	23—27	
Water thermosensor				
Resistance	kΩ	-20°C (-4°F)	14.6—17.8	
		20°C (68°F)	2.21—2.69	
		40°C (104°F)	1.0—1.3	
		80°C (176°F)	0.29—0.35	
Airflow meter				
Resistance	Ω	E2↔Vs	Fully closed Fully open	200—600 20—1,200
		E2↔Vc		200—400
	E2↔THAA (Intake air thermosensor)	-20°C (-4°F)	13,600—18,400	
		20°C (68°F)	2,210—2,690	
		60°C (140°F)	493—667	
	E1↔Fc	Fully closed	∞	
Fully open		0		
Fuel tank				
Capacity		liters (US gal, Imp gal)	60 (15.8, 13.2)	
Air cleaner				
Element type			Oil permeated	
Fuel				
Specification			Unleaded regular (RON 91 or higher)	

G. ENGINE ELECTRICAL SYSTEM

Item		Engine	BP SOHC		
			MTX	ATX	
Battery	Voltage	V	12		
	Type and capacity (20-hour rate)		55D23L (60AH)		
Dark current* ¹		mA	Max. 20.0		
Alternator	Type		A.C		
	Output	V-A	12-65		
	Regulator type		Transistorized (built-in IC regulator)		
	Regulated voltage	V	14.1—14.7		
	Brush length mm (in)	Standard		21.5 (0.846)	
		Minimum		8.0 (0.315)	
	Drive belt deflection mm (in)/98 N (10 kg, 22 lb)	New		8—9 (0.31—0.35)	
Used			9—10 (0.35—0.39)		
Starter	Type		Direct	Coaxial reduction	
	Output	V-kW	12-0.95	12-1.4	
	Brush length mm (in)	Standard		17 (0.67)	17.5 (0.69)
Minimum			11.5 (0.453)	10.0 (0.39)	
Distributor			Electronic spark advance (photo diode)		
Ignition timing (TEN terminal of diagnosis connector grounded)		BTDC	5 ± 1°		
Ignition coil	Resistance (at 20°C [68°F])	Primary coil winding	0.81—0.99Ω		
		Secondary coil winding	10—16 kΩ		
Spark plug	Type	NGK	BKR5E 11	BKR6E 11	
		Nippon Denso	K16PR-U11	K20PR-U11	
	Plug gap	mm (in)	1.0—1.1 (0.039—0.043)		
Firing order			1—3—4—2		

*¹ Dark current is the constant flow of current while the ignition switch is OFF.
(i.e engine control unit, EC-AT control unit, audio, etc.)

H. CLUTCH

Item		Engine/Transaxle Model		BP SOHC	
				G5MX-R	
Clutch control				Hydraulic	
Clutch pedal					
Type				Suspended	
Pedal ratio				6.55	
Full stroke		mm (in)		135 (5.32)	
Height (With carpet)		mm (in)		196—204 (7.72—8.03)	
Free play		mm (in)		5.5—17.4 (0.22—0.69)	
Distance to carpet when clutch fully disengaged		mm (in) Minimum		41.0 (1.61)	
Flywheel					
Runout limit		mm (in)		0.2 (0.008)	
Clutch disc					
Type				Single dry plate	
Runout limit		mm (in)		0.7 (0.027)	
Wear limit		mm (in)		0.3 (0.012) from rivet head	
Outer diameter		mm (in)		225 (8.85)	
Inner diameter		mm (in)		150 (5.91)	
Facing thickness		mm (in)		Flywheel side	
				Pressure plate side	
				3.5 (0.138)	
				4.1 (0.161)	
Clutch cover					
Type				Diaphragm spring	
Set load		N (kg, lb)		3,846 (392, 862)	

J3. MANUAL TRANSAXLE AND TRANSFER

Item		Model		BP SOHC			
				G5MX-R			
Transmission							
Shift lever position				Floor shift			
Gear ratio		First		3.307			
		Second		1.833			
		Third		1.233			
		Fourth		0.914			
		Fifth		0.717			
		Reverse		3.166			
Oil		All season		ATF: DEXRON-II or M-III API: GL-4 SAE 75W-90			
		Capacity liters (US qt, Imp qt)		2.6 (2.748, 2.288)			
Clearance							
Clearance of lever and reverse idler gear		mm (in)		Standard			
				Wear limit			
				0.1—0.32 (0.004—0.013)			
				0.5 (0.02)			
Clearance of shift fork and clutch sleeve		Standard		1st—2nd			
				3rd—4th			
				5th—Rev.			
						0.08—0.228 (0.003—0.009)	
						0.1—0.5 (0.004—0.020)	
						0.15—0.458 (0.060—0.018)	
		Wear limit		1st—2nd			
				3rd—4th			
				5th—Rev.			
				0.278 (0.011)			
				0.55 (0.022)			
				0.508 (0.020)			
Clearance of synchronizer ring and gear		mm (in)		Standard			
				Wear limit			
				1.5 (0.059)			
				0.8 (0.031)			

Item		Model		BP SOHC
				G5MX-R
Gear thrust clearance	First	Standard		0.050—0.280 (0.002—0.011)
		Limit		0.330 (0.013)
	Second	Standard		0.175—0.455 (0.007—0.018)
		Limit		0.505 (0.020)
	Third	Standard		0.050—0.200 (0.002—0.008)
		Limit		0.250 (0.039)
	Fourth	Standard		0.165—0.365 (0.065—0.144)
		Limit		0.415 (0.016)
	Fifth	Standard		0.050—0.175 (0.002—0.007)
		Limit		0.225 (0.010)
Bearing preload adjust shim	Primary shaft		0.20 (0.007), 0.25 (0.009), 0.30 (0.011), 0.35 (0.013), 0.40 (0.015), 0.45 (0.017), 0.50 (0.019), 0.55 (0.021), 0.60 (0.023), 0.65 (0.025), 0.70 (0.027)	
	Secondary shaft		0.20 (0.007), 0.25 (0.009), 0.30 (0.011), 0.35 (0.013), 0.40 (0.015), 0.45 (0.017), 0.50 (0.019), 0.55 (0.021), 0.60 (0.023), 0.65 (0.025), 0.70 (0.027)	
Center differential				
Type		Planetary carrier		
Number of ring gear teeth	Outer		79	
	Inner		66	
Number of pinion gear teeth	Outer		14	
	Inner		14	
Number of sun gear teeth	Pinion gear side		33	
	Idle gear side		43	
Number of idle-gear teeth		37		
Bearing preload		Nm (cm-kg, in-lb)		2.9—3.9 (30—40, 26—34)
Bearing preload adjustment shim	mm (in)		0.10 (0.003), 0.15 (0.005), 0.20 (0.007), 0.25 (0.009), 0.30 (0.011), 0.35 (0.013), 0.40 (0.015), 0.45 (0.017), 0.50 (0.019), 0.55 (0.021), 0.60 (0.023), 0.65 (0.025), 0.70 (0.027), 0.75 (0.029), 0.80 (0.031), 0.85 (0.033), 0.90 (0.035), 0.95 (0.037), 1.00 (0.039), 1.05 (0.041), 1.10 (0.043), 1.15 (0.045), 1.20 (0.047)	
End play of ring gear		0.15—0.30 (0.006—0.012)		
Ring gear end play adjustment washer		1.20 (0.047), 1.25 (0.049), 1.30 (0.051), 1.35 (0.053), 1.40 (0.055), 1.45 (0.057), 1.50 (0.059), 1.55 (0.061), 1.60 (0.063), 1.65 (0.065), 1.70 (0.067), 1.75 (0.069), 1.80 (0.071)		
End play of sun gear		0.10—0.30 (0.004—0.012)		
Sun gear adjustment wadher		3.50 (0.137), 3.55 (0.139), 3.60 (0.141), 3.65 (0.143), 3.70 (0.145), 3.75 (0.147), 3.80 (0.149), 3.85 (0.151), 3.90 (0.153), 3.95 (0.155), 4.00 (0.157), 4.05 (0.159), 4.10 (0.161), 4.15 (0.163), 4.20 (0.165), 4.25 (0.167), 4.30 (0.169)		
Transfer carrier				
Final gear reduction ratio				
Number of teeth	Ring gear		37	
	Pinion gear		11	
Fluid	Grade		API GL-5	
	Viscosity	Above -18°C (0°F)		SAE 90
		Below -18°C (0°F)		SAE 80W
	Capacity	liter (US qt, Imp qt)		0.5 (0.53, 0.44)

K2. AUTOMATIC TRANSAXLE

Item		Model	BP SOHC	
			G4AX-EL	
Torque converter stall torque ratio				
Gear ratio		1st		2.800
		2nd		1.541
		3rd		1.000
		OD (4th)		0.700
		Reverse		2.333
Final gear ratio				3.842
Automatic transaxle fluid (ATF)		Type	DEXRON-II or M-III	
		Capacity liters (US qt, Imp qt)	6.6 (1.74, 1.45)	
Engine stall speed	rpm	D, S, L and R ranges		2,550—2,650
Time lag	sec.	N→D range		0.5—1.0
		N→R range		0.6—1.0
Line pressure kPa (kg/cm ² , psi)	At idle	D, S and L ranges		353—432 (3.6—4.4, 51—63)
		R range		598—942 (6.1—9.6, 87—137)
	At stall	D, S and L ranges		873—1,040 (8.9—10.6, 127—151)
		R range		1,668—2,011 (17.0—20.5, 242—292)
Throttle pressure kPa (kg/cm ² , psi)	At idle	D range		39—88 (0.4—0.9, 6—13)
	At stall	D range		471—589 (4.8—6.0, 68—85)
Oil pump	Cam ring and oil pump cover clearance	mm (in)	Standard	0.005—0.020 (0.0002—0.0008)
			Maximum	0.080 (0.003)
	Rotor and oil pump cover clearance	mm (in)	Standard	0.005—0.020 (0.0002—0.0008)
			Maximum	0.030 (0.0012)
	Vane and oil pump cover clearance	mm (in)	Standard	0.015—0.050 (0.0006—0.0020)
			Maximum	0.080 (0.003)
	Seal pin and oil pump cover clearance	mm (in)	Standard	0.005—0.020 (0.0002—0.0008)
			Maximum	0.060 (0.002)
	Vane and rotor groove clearance	mm (in)	Standard	0.010—0.045 (0.0004—0.0018)
			Maximum	0.065 (0.0026)
	Sleeve outer diameter	mm (in)	Standard	28.00 (1.102)
	Rotor bushing in inner diameter	mm (in)	Standard	28.00 (1.102)
			Maximum	28.05 (1.104)
Seal pin outer diameter	mm (in)	Standard	5.00 (0.197)	
		Maximum	4.90 (0.193)	
Guide ring outer diameter	mm (in)	Standard	57.85 (2.278)	
		Maximum	57.70 (2.272)	
Valve outer diameter	mm (in)	Standard	12.00 (0.472)	
		Maximum	11.86 (0.467)	
3-4 clutch	Number of drive/driven plates		4/4	
	Drive plate thickness	mm (in)	Standard	1.6 (0.063)
			Minimum	1.4 (0.055)
	3-4 clutch clearance		mm (in)	1.3—1.5 (0.051—0.059)
	Retaining ring size		mm (in)	4.2 (0.165), 4.4 (0.173), 4.6 (0.181), 4.8 (0.189), 5.0 (0.1969), 5.2 (0.2047)
Return spring free length		mm (in)	33.2 (1.307)	
Forward clutch	Number of drive/driven plates		3/3	
	Drive plate thickness	mm (in)	Standard	1.6 (0.063)
			Minimum	1.4 (0.055)
	Forward clutch clearance		mm (in)	1.0—1.2 (0.040—0.047)
Retaining ring size		mm (in)	5.9 (0.232), 6.1 (0.240), 6.3 (0.248), 6.5 (0.256), 6.7 (0.267), 8.9 (0.350)	

H. CLUTCH

Item	Engine/Transaxle Model		B6 SOHC	BP SOHC	BP DOHC
			F5M-R		G5M-R
Clutch control			Hydraulic		
Clutch pedal					
Type			Suspended		
Pedal ratio			6.55		
Full stroke	mm (in)		135 (5.32)		
Height (With carpet)	mm (in)		196—204 (7.72—8.03)		
Free play	mm (in)		5.5—17.4 (0.22—0.69)		
Distance to carpet when clutch fully disengaged	mm (in)	Minimum	41.0 (1.61)		
Flywheel					
Runout limit	mm (in)		0.2 (0.008)		
Clutch disc					
Type			Single dry plate		
Runout limit	mm (in)		0.7 (0.027)		
Wear limit	mm (in)		0.3 (0.012) from rivet head		
Outer diameter	mm (in)		190 (7.48)	200 (7.87)	215 (8.46)
Inner diameter	mm (in)		132 (5.20)	150 (5.91)	
Facing thickness	mm (in)	Flywheel side	3.5 (0.138)		
		Pressure plate side	3.5 (0.138)	3.8 (0.150)	
Clutch cover					
Type			Diaphragm spring		
Set load	N (kg, lb)		3,630 (370, 814)	• 3,826 (390, 858)	3,846 (392, 862)

J1. MANUAL TRANSAXLE (F5M-R)

Item		Engine/Transaxle Model		B6 SOHC		BP SOHC	
				F5M-R			
Transmission							
Shift lever position				Floor shift			
Gear ratio	First				3.416		
	Second				1.842		
	Third				1.290		
	Fourth				0.918		
	Fifth				0.731		
	Reverse				3.214		
Oil	Grade				API service GL-4 or GL-5		
	Viscosity	All season				DEXRON-II, M2C33-F or SAE 75W-90	
		Above -18°C (0°F)				SAE 80W-90	
	Capacity	liters (US qt, Imp qt)				2.68 (2.83, 2.36)	
Clearance							
Clearance of lever and reverse idler gear		mm (in)		Standard	0.10—0.32 (0.004—0.013)		
				Wear limit	0.37 (0.015)		
Clearance of shift fork and clutch sleeve	mm (in)		Standard	1st—2nd	0.10—0.36 (0.004—0.014)		
				3rd—4th	0.20—0.50 (0.008—0.020)		
				5th—Rev.	0.40—0.75 (0.016—0.030)		
	mm (in)		Wear limit	1st—2nd	0.46 (0.018)		
				3rd—4th	0.60 (0.024)		
				5th—Rev.	0.85 (0.034)		
Clearance of synchronizer ring and gear		mm (in)		Standard	1.12—1.88 (0.044—0.074)		
				Wear limit	0.8 (0.032)		
Gear thrust clearance	mm (in)		First	Standard	0.05—0.28 (0.002—0.011)		
				Limit	0.33 (0.013)		
	mm (in)		Second	Standard	0.18—0.51 (0.007—0.020)		
				Limit	0.56 (0.022)		
	mm (in)		Third	Standard	0.06—0.21 (0.002—0.008)		
				Limit	0.26 (0.010)		
	mm (in)		Fourth	Standard	0.21—0.61 (0.008—0.024)		
				Limit	0.66 (0.026)		
	mm (in)		Fifth	Standard	0.06—0.26 (0.002—0.010)		
				Limit	0.31 (0.012)		
Bearing preload adjust shim	mm (in)		Primary shaft	0.1 (0.004), 0.2 (0.008), 0.3 (0.012), 0.4 (0.016)			
			Secondary shaft	0.15 (0.006), 0.20 (0.008), 0.25 (0.010), 0.30 (0.012), 0.35 (0.014), 0.40 (0.016), 0.45 (0.018), 0.50 (0.020)			
Drive and differential							
Final gear	Type				Helical		
	Reduction ratio				3.850 : 1		3.619 : 1
Bearing preload		N·m (cm·kg, in·lb)		0.33—0.74 (0.3—7.8, 0.26—6.60)			
Bearing preload adjust shim		mm (in)		0.20 (0.008), 0.25 (0.010), 0.30 (0.012), 0.35 (0.014), 0.40 (0.016), 0.45 (0.018), 0.50 (0.020), 0.55 (0.022)			
Backlash of side gear and pinion gear		mm (in)		0—0.1 (0—0.004)			

M. FRONT AND REAR AXLES

Engine/Transaxle type		BP SOHC	
		MTX	ATX
Driveshaft			
Joint type	Inside	Double offset joint	
	Outside	Bell joint	
Length of joint (between center of joint) mm (in)	Right	689 (27.12)	
	Left	659 (25.94)	
Shaft diameter	mm (in)	21.0 (0.82)	
Front axle			
Bearing play axial direction	mm (in)	0.050 (0.002)	
Rear axle			
Bearing play axial direction	mm (in)	0.050 (0.002)	
Rear differential			
Reduction gear		Hypoid gear	
Differential gear		Straight bevel gear	
Differential ratio		3.909	
Number of teeth	Ring gear	43	
	Drive pinion gear	11	
Fluid	Grade	API Service GL-5	
	Viscosity	SAE 90 or 80W	
	Capacity liter (US qt, Imp qt)	0.65 (0.69, 0.57)	

N. STEERING SYSTEM

Item	POWER STEERING	
Steering wheel		
Outer diameter	mm (in)	370 (14.57)
Free play	mm (in)	0-30 (0-1.18)
Operation force	N (kg, lb)	29 (3.0, 6.6) or less
Lock-to-lock		2.76
Steering gear		
Type		Rack and pinion
Steering gear ratio		Infinite (∞)
Backlash between rack and pinion	mm (in)	0 (0)
Pinion preload	Nm (cm-kg, in-lb)	1.0-1.3 (10-14, 8.7-12.1)
	Preload measured by torque wrench	
Pinion preload	kg (oz)	1.0-1.4 (35.3-49.4)
	Preload measured by pull scale with attachment	
Limit of rack housing movement	mm (in)	1.5 (0.06)
Distance between left and right brackets	mm (in)	258 (10.16)
Rack stroke	mm (in)	121 (4.76)
Lubricant type		ATF: M-III or DEXRON-II
Oil capacity	liter (US qt, Imp qt)	0.8 (0.85, 0.70)
Drive belt	N-m (m-kg, ft-lb)	0.9-1.0 (0.95-1.06, 0.79-0.88)
Deflection with force of 98 N (10 kg, 22 lb)	mm (in)	New belt: 8-9 (0.31-0.35)
		Used belt: 9-10 (0.35-0.39)

P. BRAKING SYSTEM

Item		Specifications	
Brake type		Front disc, Rear disc	
Brake pedal			
Height	mm (in)	203—206 (7.99—8.11)	
Free play	mm (in)	4—7 (0.16—0.28)	
Reserve travel Clearance when pedal depressed at 589 N (60 kg, 132 lb)	mm (in)	70 (2.76) min	
Master cylinder			
Master cylinder	Type	Tandem	
	Bore diameter	mm (in)	22.22 (0.875)
Front disc brake			
Type		Ventilated	
Thickness of pad	mm (in)	Standard	10 (0.39)
		Minimum	2 (0.08)
Thickness of disc plate	mm (in)	Standard	22 (0.87)
		Minimum	20 (0.79)
Runout of disc plate	mm (in)	0.1 (0.004)	
Cylinder bore	mm (in)	53.97 (2.12)	
Rear brake (disc)			
Type		Solid	
Thickness of pad	mm (in)	Standard	7.5 (0.30)
		Minimum	1 (0.04)
Thickness of disc plate	mm (in)	Standard	9 (0.35)
		Minimum	7 (0.28)
Runout of disc plate	mm (in)	0.1 (0.004)	
Cylinder bore	mm (in)	30.2 (1.19)	
Parking brake			
Type		Mechanical two-rear-wheel control	
Parking brake lever notches When lever is pulled at 98N (10 kg, 22 lb)		5—7	
Power brake unit			
Diameter	mm (in)	5MTX: 214 (8.43) EC-AT: 239 (9.41)	
Fluid pressure per treading force kPa (kg/cm ² , psi)/N (kg, lb)		5TX More than 1,177 (12, 171)/196 (20, 44) at 0 mmHg (0 inHg) More than 7,063 (72, 1,024)/196 (20, 44) at 500 mmHg (19.7 inHg) EC-AT More than 1,517 (15, 213)/196 (20, 44) at 0 mmHg (0 inHg) More than 8,593 (88, 1,251)/196 (20, 44) at 500 mmHg (19.7 inHg)	
Rear wheel hydraulic control system			
Type		Dual proportioning valve	
Switching point (Master cylinder pressure)		kPa (kg/cm ² , psi)	2,943 (30, 427)

Item			Model	F4A-EL		
				B6 SOHC	BP SOHC	BP DOHC
Carrier hub	Clearance between pinion washer and planet carrier	mm (in)	Maximum	0.2—0.7 (0.008—0.028)		
Sun gear drum	Bushing inner diameter	mm (in)	Maximum	30.425 (1.198)		
Small sun gear	Busing inner diameter	mm (in)	Maximum	21.021 (0.828)		
Gear assembly						
Total end play			mm (in)	0.25—0.50 (0.010—0.020)		
End play adjust race			mm (in)	1.2 (0.047), 1.4 (0.055), 1.6 (0.063), 1.8 (0.071), 2.0 (0.079), 2.2 (0.087)		
Idle gear bearing preload			N·m (cm·kg, in·lb)	0.03—0.9 (0.3—9.0, 0.26—7.8)		
Preload adjust shims			mm (in)	3.80 (0.150), 3.85 (0.152), 3.90 (0.154), 3.95 (0.156), 4.00 (0.158), 4.05 (0.159), 4.10 (0.161), 4.15 (0.163), 4.20 (0.165), 4.25 (0.167), 4.30 (0.169), 4.35 (0.171), 4.40 (0.173), 4.45 (0.175), 4.50 (0.177), 4.55 (0.179), 4.60 (0.181), 4.65 (0.183), 4.70 (0.185), 4.75 (0.187)		
Output gear bearing preload			N·m (cm·kg, in·lb)	0.03—0.9 (0.3—9.0, 0.26—7.8)		
Preload adjust shims			mm (in)	0.50 (0.020), 0.55 (0.022), 0.60 (0.024), 0.65 (0.026), 0.70 (0.028), 0.75 (0.030), 0.80 (0.032), 0.85 (0.034), 0.90 (0.035), 0.95 (0.037), 1.00 (0.039), 1.05 (0.041), 1.10 (0.043), 1.15 (0.045), 1.20 (0.047), 1.25 (0.049), 1.30 (0.051), 1.35 (0.053), 1.40 (0.055), 1.45 (0.057)		
Differential						
Bearing preload			N·m (cm·kg, in·lb)	2.9—3.9 (30—40, 26—35)		
Preload adjust shims			mm (in)	0.50 (0.020), 0.55 (0.022), 0.60 (0.024), 0.65 (0.026), 0.70 (0.028), 0.75 (0.030), 0.80 (0.032), 0.85 (0.034), 0.90 (0.035), 0.95 (0.037), 1.00 (0.039), 1.05 (0.041), 1.10 (0.043), 1.15 (0.045), 1.20 (0.047), 1.25 (0.049), 1.30 (0.051), 1.35 (0.053), 1.40 (0.055), 1.45 (0.057)		
Backlash of side gear and pinion		mm (in)	Standard	0.025—0.1 (0.001—0.004)		
			Maximum	0.5 (0.020)		
Torque converter						
Bushing inner diameter		mm (in)	Standard	53.030—53.075 (2.088—2.090)		
			Maximum	53.075 (2.090)		

Spring Specification

Spring name			Outer diameter mm (in)	Free length mm (in)	No. of coil	Wire diameter mm (in)
Upper control valve body	Throttle modulator spring		8.1 (0.319)	44.4 (1.748)	10.5	0.8 (0.032)
	Throttle spring		5.4 (0.231)	44.5 (1.752)	24.6	0.9 (0.035)
	Throttle assist spring		5.15 (0.203)	26.88 (1.058)	16.2	0.6 (0.024)
Main control valve body	Pressure regulator spring		11.5 (0.453)	34.2 (1.346)	9.5	1.0 (0.039)
	1-2 shift spring		7.4 (0.291)	36.6 (1.441)	12.0	0.8 (0.032)
	Low reducing spring		7.9 (0.311)	34.5 (1.358)	11.0	0.8 (0.032)
	2-3 timing spring		8.0 (0.315)	27.84 (1.096)	10.0	0.8 (0.032)
	3-2 timing spring		8.0 (0.315)	29.98 (1.180)	10.0	0.8 (0.032)
	3-4 shift spring		7.4 (0.291)	36.6 (1.441)	12.0	0.8 (0.032)
Premain control valve body	Bypass spring	B6 SOHC	4.9 (0.193)	27.6 (1.087)	23.0	0.55 (0.022)
		BP SOHC	4.9 (0.193)	30.5 (1.201)	23.0	0.55 (0.022)
		BP DOHC	4.9 (0.193)	30.5 (1.201)	23.0	0.55 (0.022)
	2-3 shift spring		7.4 (0.291)	36.6 (1.441)	12.0	0.8 (0.032)
	Converter relief spring		8.6 (0.339)	68.4 (2.693)	27.5	1.2 (0.047)
Lockup control spring		5.0 (0.197)	35.2 (1.386)	19.0	0.6 (0.024)	
Control valve body	Throttle relief spring		6.6 (0.260)	21.6 (0.850)	11.5	0.8 (0.032)
Oil pump	Spring		13.0 (0.512)	53.0 (2.087)	12.0	1.2 (0.047)

Spring name			Outer diameter mm (in)	Free length mm (in)	No. of coil	Wire diameter mm (in)	
Accumulator	2-3 accumulator small spring	BP DOHC	11.6 (0.457)	59.7 (2.350)	16.9	1.8 (0.071)	
		B6 SOHC BP SOHC	10.0 (0.394)	71.8 (2.827)	24.2	1.4 (0.055)	
	2-3 accumulator large spring	BP DOHC	15.0 (0.591)	71.8 (2.827)	9.8	1.2 (0.047)	
		B6 SOHC BP SOHC	15.0 (0.591)	71.8 (2.827)	15.8	2.0 (0.079)	
	1-2 accumulator small spring			—	—	—	—
	1-2 accumulator large spring	BP DOHC	16.0 (0.630)	79.0 (3.110)	17.2	2.1 (0.083)	
		B6 SOHC BP SOHC	16.0 (0.630)	87.8 (3.457)	18.2	2.0 (0.079)	
	N-D Accumulator small spring	B6 SOHC	10.5 (0.413)	61.4 (2.417)	15.0	1.0 (0.039)	
		BP SOHC BP DOHC	10.5 (0.413)	53.6 (2.110)	16.7	1.0 (0.039)	
	N-D Accumulator large spring	B6 SOHC	14.7 (0.579)	61.4 (2.417)	12.9	1.5 (0.059)	
		BP SOHC BP DOHC	14.7 (0.579)	53.6 (2.110)	11.7	1.6 (0.063)	
	N-R Accumulator small spring			9.8 (0.386)	93.2 (3.669)	31.5	1.3 (0.051)
	N-R Accumulator large spring			14.0 (0.551)	106.5 (4.193)	23.0	1.7 (0.067)
3-4 clutch	Return spring		74.4 (2.929)	40.5 (1.594)	1.0	5.0 (0.197)	
Coasting clutch	Return spring		7.3 (0.287)	20.45 (0.805)	10.0	1.0 (0.039)	
Low and reverse brake	Return spring		5.55 (0.219)	14.3 (0.563)	12.0	0.75 (0.030)	
Servo	Return spring		27.7 (1.091)	43.25 (1.703)	4.5	3.2 (0.126)	

Vehicle Speed at Shiftpoint Table

Mode	Range	Throttle condition (Throttle sensor voltage)	Shift	Drum speed rpm			Vehicle speed km/h (mph)		
				B6 SOHC	BP SOHC	BP DOHC	B6 SOHC	BP SOHC	BP DOHC
NORMAL	D	Fully opened (4.0 volt)	D1 → D2	5,150—5,700	5,150—5,700	5,850—6,400	52—58 (32—36)	56—62 (35—38)	59—65 (37—40)
			D2 → D3	4,850—5,300	4,850—5,250	5,350—5,800	92—100 (57—62)	99—107 (61—66)	101—109 (63—68)
			D3 → OD	5,500—5,850	5,500—5,850	5,950—6,300	158—166 (97—103)	168—178 (104—110)	167—177 (104—110)
		Half throttle (1.6—2.2 volt)	D1 → D2	2,550—3,150	3,000—3,550	3,450—4,050	26—32 (16—20)	33—39 (20—24)	35—41 (22—25)
			D2 → D3	2,500—3,150	3,100—3,700	3,700—4,350	48—60 (30—37)	63—75 (39—47)	70—82 (43—51)
			D3 → OD	2,750—3,350	3,400—4,000	4,200—4,750	78—96 (48—60)	104—122 (64—76)	119—137 (74—85)
			Lock-up ON (OD)	1,900—2,350	2,350—2,800	2,950—3,400	78—96 (48—60)	104—122 (64—76)	119—137 (74—85)
		Kickdown	Lock-up OFF (OD)	1,850—2,050	2,150—2,350	2,400—2,600	76—84 (47—52)	94—102 (58—63)	97—105 (60—65)
			OD → D3	3,600—3,750	3,500—3,700	3,850—4,100	142—152 (88—94)	153—163 (95—101)	155—165 (96—102)
			OD → D2	2,000—2,200	2,000—2,200	2,300—2,500	82—90 (51—56)	88—96 (55—60)	94—102 (58—63)
			OD → D1	1,000—1,150	950—1,100	1,250—1,400	42—48 (26—30)	42—48 (26—30)	52—58 (32—36)
			D3 → D2	2,900—3,150	2,850—3,150	3,350—3,600	82—90 (51—56)	88—96 (55—60)	94—102 (58—63)
	S	Fully opened (4.0 volt)	D3 → D1	1,450—1,650	1,350—1,550	1,850—2,050	42—48 (26—30)	42—48 (26—30)	52—58 (32—36)
			D2 → D1	2,200—2,500	2,050—2,350	2,750—3,100	42—48 (26—30)	42—48 (26—30)	52—58 (32—36)
			S1 → S2	5,150—5,750	5,150—5,700	5,850—6,450	52—58 (32—36)	56—62 (35—38)	59—65 (37—40)
			S2 → S3	4,850—5,300	4,850—5,250	5,400—5,800	92—100 (57—62)	99—107 (61—66)	101—109 (63—68)
		Half throttle (1.6—2.2 volt)	S3 → S2	2,900—3,150	2,850—3,150	3,350—3,600	82—90 (51—56)	88—96 (55—60)	94—102 (58—63)
			S2 → S1	2,200—2,500	2,050—2,350	2,750—3,100	42—48 (26—30)	42—48 (26—30)	52—58 (32—36)
L	Fully opened (4.0 volt)	S1 → S2	2,550—3,150	3,000—3,550	3,450—4,050	26—32 (16—20)	33—39 (20—24)	35—41 (22—25)	
		S2 → S3	2,500—3,150	3,100—3,700	3,700—4,350	48—60 (30—37)	63—75 (39—47)	70—82 (43—51)	
	Half throttle (1.6—2.2 volt)	L1 → L2	5,150—5,750	5,150—5,700	5,850—6,450	52—58 (32—36)	56—62 (35—38)	59—65 (37—40)	
		L2 → L1	2,200—2,500	2,050—2,350	2,800—3,100	42—48 (26—30)	42—48 (26—30)	52—58 (32—36)	

Mode	Range	Throttle condition (Throttle sensor voltage)	Shift	Drum speed rpm			Vehicle speed km/h (mph)			
				B6 SOHC	BP SOHC	BP DOHC	B6 SOHC	BP SOHC	BP DOHC	
HOLD	D	Fully opened (4.0 volt)	D1 → D2	2,650—3,250	2,450—3,000	2,650—3,250	27—33 (17—20)			
			D2 → D3	2,100—2,650	1,950—2,450	2,100—2,650	40—50 (25—31)			
			D3 → D1	300—500	250—450	400—600	9—15 (6—9)	12—18 (7—11)		
	S	Fully closed (0.5 volt)	S3 → S2	3,200—3,400	3,200—3,400	3,550—3,750	91—97 (56—60)	98—104 (61—64)	100—106 (62—66)	
			L	L2 → L1	2,250—2,600	2,100—2,400	2,250—2,600	43—49 (27—30)		

M. FRONT AND REAR AXLES

Item	Engine/Transaxle type	B6 SOHC		BP SOHC		BP DOHC	
		MTX	ATX	MTX	ATX	MTX	ATX
Driveshaft							
Joint type	Inside	Tripod joint					
	Outside	Ball joint					
Length of joint (between center of joint) mm (in)	Right	662.0 (22.06)		668.5 (23.32)		427.5 (16.83)	
	Left	383.5 (15.10)		382.5 (15.06)		365.5 (14.39)	385.0 (15.16)
Shaft diameter		21.5 (0.85)		23.0 (0.91)			
Front axle							
Bearing play axial direction	mm (in)	0.050 (0.002)					
Rear axle							
Bearing play axial direction	mm (in)	0.050 (0.002)					

N. STEERING SYSTEM

Item	Specifications
Steering wheel	
Outer diameter	mm (in) 370 (14.57)
Free play	mm (in) 0—30 (0—1.18)
Operation force	N (kg, lb) M/S : 108 (11, 24.2) or less P/S : 29 (3.0, 6.6) or less
Lock-to-lock	M/S : 4.3 P/S : 3.0
Max. steering angle	Inner 40°00' ± 2°
	Outer 33°00' ± 2°
Steering gear	
Type	Rack and pinion
Steering gear ratio	Infinite (∞)
Backlash between rack and pinion	mm (in) 0 (0)
Pinion preload	N·m (cm·kg, in·lb) M/S : 1.0—1.4 (10—14, 8.68—12.15) P/S : 1.0—1.2 (10—12, 8.68—10.42)
	Preload measured by torque wrench g (oz) M/S : 1,000—1,400 (35.3—49.4) P/S : 1,000—1,200 (35.3—42.36)
Preload measured by pull scale with attachment	
Limit of rack housing movement	mm (in) 1.5 (0.06)
Distance between left and right brackets	mm (in) 298.5 (11.75)
Rack stroke	mm (in) 140 (5.51)
Lubricant type (power steering)	ATF: M-III or DEXRON-II
Oil capacity (power steering)	liter (US qt, Imp qt) 0.8 (0.85, 0.70)
Drive belt	
Deflection with force of 98 N (10 kg, 22 lb)	mm (in) New belt: 8—9 (0.31—0.35) Used belt: 9—10 (0.35—0.39)

P. BRAKING SYSTEM

Item		Specifications	
Brake type		Front disc, Rear disc or drum	
Brake pedal			
Height	mm (in)	193—196 (7.60—7.72)	
Free play	mm (in)	4—7 (0.16—0.28)	
Reserve travel Clearance when pedal depressed at 589 N (60 kg, 132 lb)	mm (in)	70 (2.76) min	
Master cylinder			
Master cylinder	Type	Tandem	
	Bore diameter	mm (in)	22.22 (0.875)
Front disc brake			
Type		Ventilated	
Thickness of pad	mm (in)	Standard	10 (0.39)
		Minimum	2 (0.08)
Thickness of disc plate	mm (in)	Standard	22 (0.87)
		Minimum	20 (0.79)
Runout of disc plate	mm (in)	0.1 (0.004)	
Cylinder bore	mm (in)	53.97 (2.12)	
Rear brake (disc)			
Type		Solid	
Thickness of pad	mm (in)	Standard	7.5 (0.30)
		Minimum	1 (0.04)
Thickness of disc plate	mm (in)	Standard	9 (0.35)
		Minimum	7 (0.28)
Runout of disc plate	mm (in)	0.1 (0.004)	
Cylinder bore	mm (in)	30.2 (1.19)	
Rear brake (drum)			
Type		Leading & trailing	
Thickness of lining	mm (in)	Standard	4.5 (0.18)
		Minimum	1 (0.04)
Drum inside diameter	mm (in)	Standard	228.6 (9.0)
		Minimum	229.6 (9.04)
Wheel cylinder bore	mm (in)	17.46 (0.687)	
Parking brake			
Type		Mechanical two-rear-wheel control	
Parking brake lever notches When lever is pulled at 98N (10 kg, 22 lb)		5—7	
Power brake unit			
Diameter	mm (in)	(a): 214 (8.43) (b): 239 (9.41)	
Fluid pressure per trading force kPa (kg/cm ² , psi)/N (kg, lb)		More than 1,177 (12, 171)/196 (20, 44) at 0 mmHg (0 inHg) More than 7,063 (72, 1,024)/196 (20, 44) at 500 mmHg (19.7 inHg)	
Rear wheel hydraulic control system			
Type		Dual proportioning valve	
Switching point (Master cylinder pressure)	kPa (kg/cm ² , psi)	2,453 (25, 356)	

(a): BP engine with 5MTX, B6 engine

(b): BP engine with EC-AT

Q. WHEELS AND TIRES

Item		Specifications	
Wheel			
Size		Standard: 5-Jx13, 5 1/2-JJx14 Temporary spare: 4-Tx14	
Offset	mm (in)	Standard: 45 (1.77) Temporary spare: 45 (1.77)	
Diameter of pitch circle	mm (in)	100 (3.94)	
Tire			
Size		Standard: 155/80R13, 175/70R13, 185/60R14 Temporary spare: T115/70D14	
Inflation pressure	kPa (kg/cm ² , psi)	Front	Standard: 216 (2.2, 31) Temporary spare: 415 (4.2, 60)
		Rear	Standard: 216 (2.2, 31) Temporary spare: 415 (4.2, 60)
Wheel and tire			
Runout limit	mm (in)	Horizontal	2.0 (0.079)
		Vertical	1.5 (0.059)
Unbalance limit		g (oz)	20 (0.71)

R. SUSPENSION

Item			Specifications	
Suspension type				
Shock absorber	Suspension		Double-acting, oil-filled	
Coil spring	Type	Front	Taper wound	
		Rear	Straight wound	
	Dimension		See coil spring specification below	
Stabilizer	Type		Torsion bar	
	Diameter mm (in)	BP SOHC	Front	19.1 (0.75)
			Rear	20.0 (0.79)
		BP DOHC	Front	22.0 (0.87)
			Rear	20.0 (0.79)
		B6	Front	—
Rear			20.0 (0.79)	
Wheel alignment (* ¹ Unladen)	Front	Maximum steering angle	Inner	40° ± 2°
			Outer	33° ± 2°
		Total toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)
			degree	0.2° ± 0.3°
		Camber angle		-0°05' ± 45'
		Caster angle		2°05' ± 45'
	Kingpin angle		12°25'	
	Rear	Total toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)
			degree	0.2° ± 3°
Camber angle		-0°20' ± 45'		

*¹ Fuel tank full; radiator coolant and engine oil at specified level; and spare tire, jack, and tools in designated positions.

Coil Spring Specifications

Item	Wire diameter mm (in)	Coil outer diameter mm (in)	Free length mm (in)	Coil number	Identification mark color		
					M* ¹	A* ²	
Front	A	12.7 (0.5)	133-159 (5.24-6.26)	293 (11.54)	3.1	Pink	Yellow
	B	12.9 (0.51)	133-159 (5.24-6.26)	294 (11.57)	3.2	Light green	Yellow
	C	13.2 (0.52)	133-159 (5.24-6.26)	300 (11.81)	3.4	Purple	Yellow
	D	13.3 (0.52)	132-158 (5.20-6.22)	301 (11.85)	3.4	Light blue	Yellow
	E	13.3 (0.52)	132-158 (5.20-6.22)	286 (11.26)	3.2	Orange	Red
	F	13.4 (0.53)	133-159 (5.24-6.26)	287 (11.3)	3.3	Cream	Red
Rear	G	11.6 (0.46)	140 (5.51)	334 (13.15)	4.6	Brown	—
	H	11.9 (0.47)		333 (13.11)	4.7	Gray	—
	I	12.1 (0.48)		332 (13.07)	4.8	Orange	—
	J	11.7 (0.46)		333 (13.11)	4.5	Blue	—
	K	12.3 (0.48)		332 (13.07)	4.9	Blue & White	—
	L	12.5 (0.49)		331 (13.03)	5.1	Blue & Green	—

*1 Main identification mark color: Indicated on second coil from bottom.

*2 Auxiliary identification mark color: Indicated on third coil from bottom.

T. BODY ELECTRICAL SYSTEM

Item		Specification (W) (Bulb Trade number)
Exterior lamps	Headlight	65/45 (9004)
	Front turn signal/Parking light	27/8 (1157)
	Stop/Taillight	27/8 (1157)
	High mount stoplight	18.4 (1141)
	Rear turn single light	27 (1156)
	Back-up light	27 (1156)
	Rear side marker light (Sedan)	3.8 (194)
	License plate light	7.5 (89) [Sedan], 5 (168) [3HB]
Interior lamps	Interior and spot lamp	Interior 10 Spot 6
	Interior lamp	10
	Spot lamp (in overhead console)	8 (67)
	Cargo room lamp	5 (168)
	Trunk room lamp	5 (168)
Indicator and warning lamps	High beam	3.4
	Turn light	3.4
	Brake	3
	Hold	3 (158)
	Charge	3 (158)
	Oil pressure	3 (158)
	Washer	3 (158)
	Seat belt	3 (158)
	Malfunction	3 (158)
	Fuel	3 (158)
Illumination	3.4	

SPECIAL TOOLS

GENERAL INFORMATION	ST- 2
ENGINE.....	ST- 3
CLUTCH AND MANUAL TRANSAXLE.....	ST- 4
AUTOMATIC TRANSAXLE.....	ST- 6
DIFFERENTIAL	ST- 6
FRONT AND REAR AXLES.....	ST- 7
STEERING SYSTEM	ST- 8
BRAKING SYSTEM.....	ST- 9
FRONT AND REAR SUSPENSIONS	ST-10
HEATER AND AIR CONDITIONER SYSTEMS	ST-10
CHECKER AND OTHER EQUIPMENT.....	ST-10

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GENERAL INFORMATION

The letters A and B in the priority column indicate the degree of importance of each tool.

A.....Indispensable

The tools ranked A in this list are indispensable for performing operations satisfactorily, easily, safely, and efficiently. It is, therefore advisable that all service shops have these tools.

B.....Selective

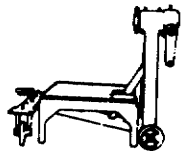
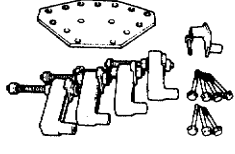
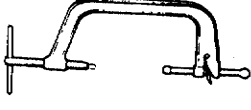
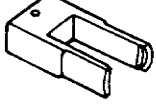
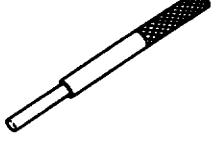

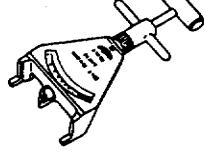
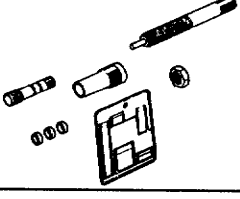
The tools in this list are not as necessary as tools ranked A, but all service shops should have these tools to perform repairs more easily and more efficiently.

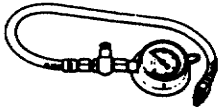
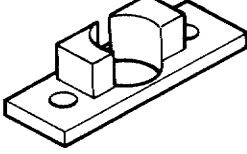
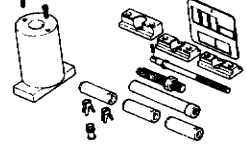
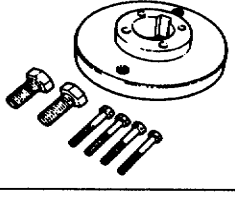
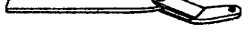
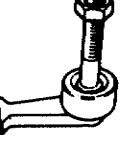

Note

- **When ordering tool sets that consist of several tools, check the List in the Parts Catalogue to make sure that some tools are not duplicated in other sets you may already have. If they are, instead of ordering the set, order only those new tools that are needed.**
- **There are new SST explanations in this tool chart.
These tools are indicated by "NEW SST" in description column.**

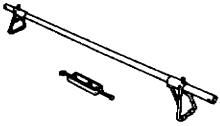
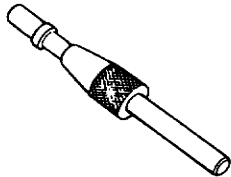
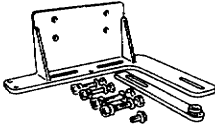
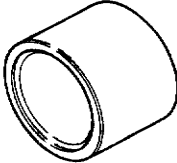
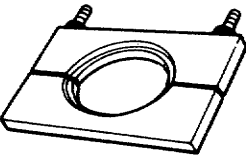
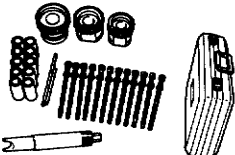
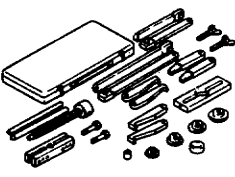

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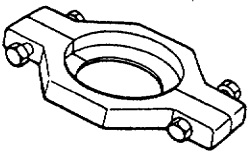
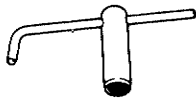
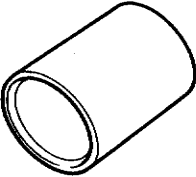
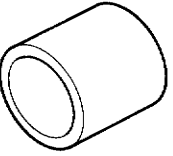
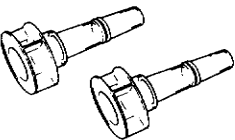
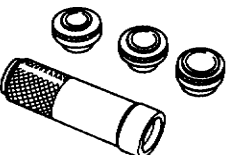
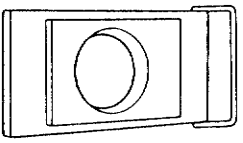
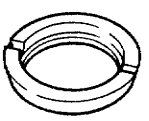
ENGINE

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0107 680A Engine stand	A	
49 L010 1A0 Hanger set, engine stand	A	
49 0636 100A Arm, valve spring lifter	A	
49 B012 006 Pivot	A	
49 B012 005 Remover & installer, valve guide	A	
49 9200 145 Adapter set, radiator cap tester	A	
49 9200 020 Tension gauge, V-ribbed belt	B	
49 L012 0A0 Installer set, valve seal & valve guide	A	

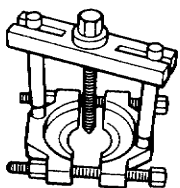
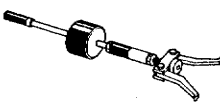
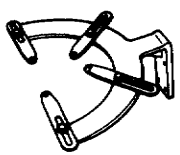
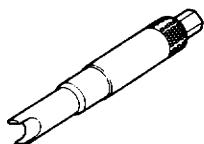
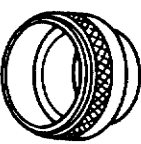
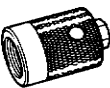
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0187 280 Oil pressure gauge	B	
49 H011 001A Support block head	A	
49 L011 0A0 Setting tool set, piston pin	A	
49 B011 102 Lock tool, crankshaft	A	
49 S120 710 Holder, coupling flange	A	
49 E301 060 Brake, ring gear	A	
49 1285 071 Puller, needle bearing	A	
—	—	—

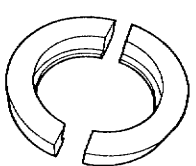
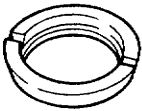
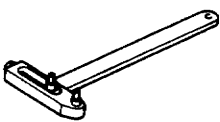
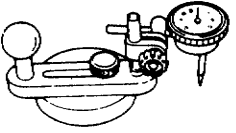
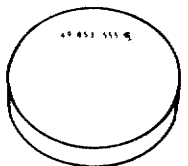
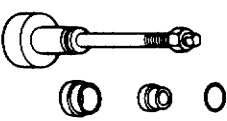
CLUTCH AND MANUAL TRANSAXLE

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G017 5A0 Engine support	A	
49 SE01 310 Clutch disc centering tool	A	
49 G019 0A0 Hanger, transaxle	A	
49 G026 103 Support block	A	
49 G030 370 Removing plate	A	
49 G030 380C Shim selector set	A	
49 0839 425C Puller set, bearing	A	
49 G030 795 Installer, oil seal	A	

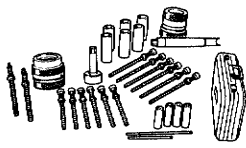
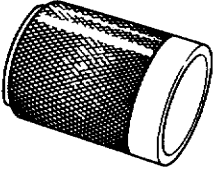
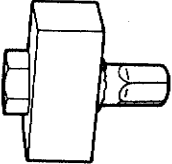
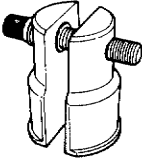
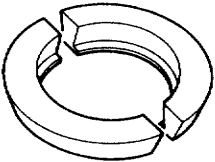
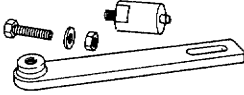
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0636 145 Puller, fan pulley boss	A	
49 G030 440 Holder, primary shaft	A	
49 H028 202 Block L	A	
49 U027 003 Installer, oil seal	A	
49 B027 001 Holder, differential side gear	A	
49 F401 330B Installer set, bearing	A	
49 F401 366A Plate	A	
49 B092 373 Attachment G	A	

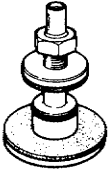
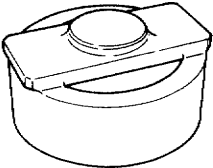
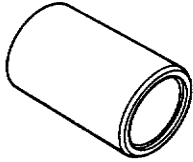
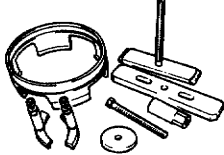
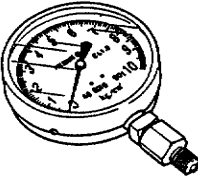
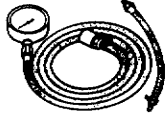
CLUTCH AND MANUAL TRANSAXLE (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0710 520 Puller bearing	A	
49 W032 2A0 Remover, bearing NEW SST	A	
49 M005 561 Hanger, differential carrier	A	
49 B027 002 Preload adapter	A	
49 G030 338 Attachment E	A	
49 B017 102 Preload adapter	A	

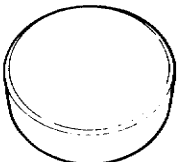
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B027 003 Attachment M	A	
49 B092 374 Attachment H	A	
49 0259 720 Wrench, differential side bearing adjust nut	B	
49 0727 570 Gauge body, pinion height adjust	A	
49 8531 555 Gauge block	A	
49 8531 565 Pinion model	A	

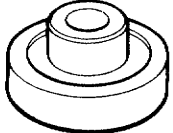
AUTOMATIC TRANSAXLE

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G019 0A5A Shim selector set	A	
49 G019 011 Installer, bearing	A	
49 FT01 439 Holder, idle gear shaft	A	
49 G019 013 Remover, bearing	A	
49 G019 022 Attachment K	A	
49 G019 0A2 Holder, turbine shaft	A	

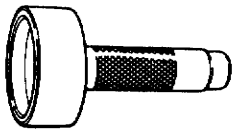
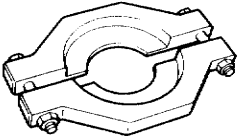
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G019 012 Leak checker	A	
49 G019 017 Installer, oil seal	A	
49 S120 785 Installer, dust boot	A	
49 G019 0A7A Compressor set, return spring	A	
49 B019 901 Gauge, oil pressure	A	
49 0378 400A Gauge set, oil pressure	A	

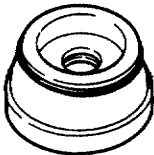
DIFFERENTIAL

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 N027 001 Gauge block	A	

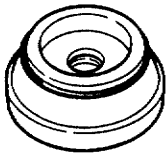
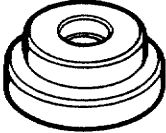
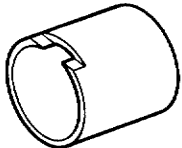
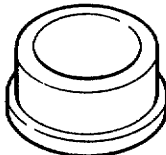
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 H033 101 Remover, bearing	A	

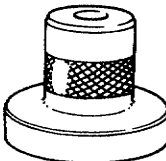
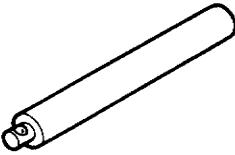
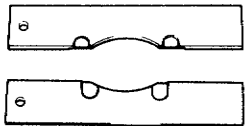
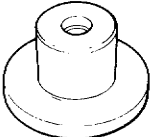
DIFFERENTIAL (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B001 795 Installer, oil seal	A	
49 H027 002 Remover, bearing	A	

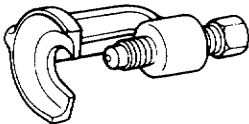
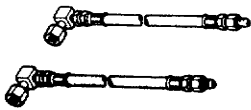
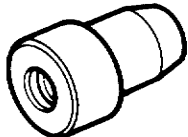
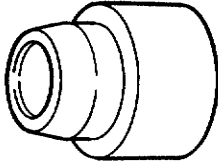
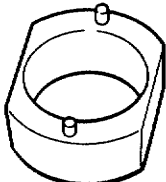
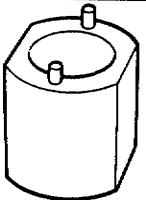
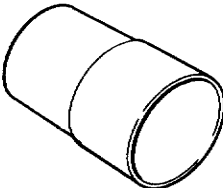
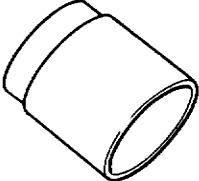
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F027 005 Attachment $\phi 62$	A	
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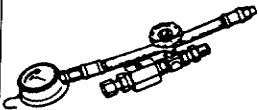
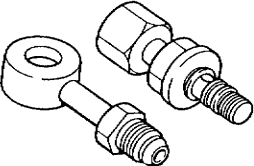
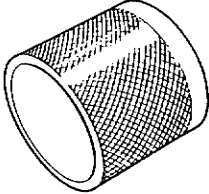
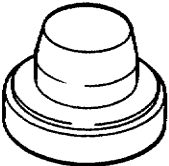
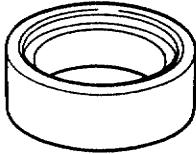
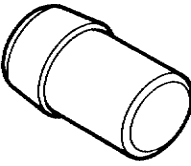
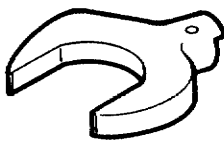

FRONT AND REAR AXLES

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F027 007 Attachment $\phi 72$	A	
49 G030 727 Attachment A	A	
49 H034 201 Support block	A	
49 F027 009 Attachment $\phi 68$ and 77	A	

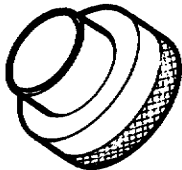
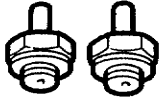
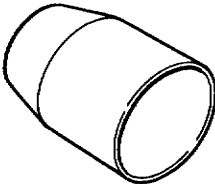
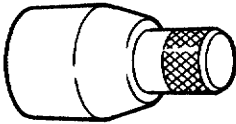
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 V001 795 Installer, oil seal	A	
49 G033 102 Handle	A	
49 F026 103 Puller, wheel hub	A	
49 F026 102 Installer, bearing	A	

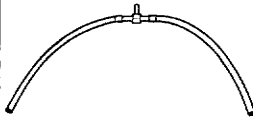
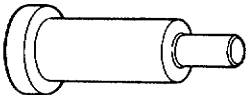
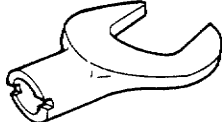
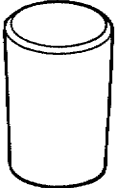
STEERING SYSTEM

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0118 850C Puller, ball joint	B	
49 H002 671 Adapter	A	
49 B032 323 Remover body, rod seal NEW SST	A	
49 B032 309 Installer body, pinion seal	A	
49 B032 306 Wrench, plug	A	
49 B032 327 Wrench, outer box NEW SST	A	
49 B032 310 Protector, pinion seal	A	
49 B032 311 Protector, slipper seal	A	


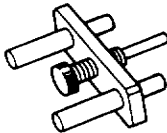
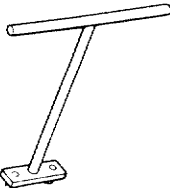
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 1232 670A Gauge set, power steering	A	
49 B032 304 Adapter	A	
49 B032 314 Slipper seal former	A	
49 B032 315 Installer, oil seal	A	
49 B032 316 Support block, plug	A	
49 B032 325 Guide, rod seal	A	
49 B032 320 Wrench	A	
49 F032 303 Handle	A	

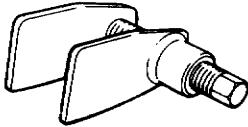
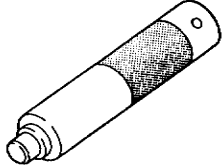
STEERING SYSTEM (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B032 324 Protector body, rod seal NEW SST	A	
49 B032 321 Adapter	A	
49 B032 312 Protector, slipper seal	A	
49 B032 326 Protector, outer box NEW SST	A	

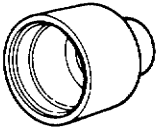
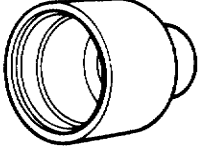

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G032 317 House	A	
49 B032 305 Holder, power steering pump	A	
49 H032 301 Wrench	A	
49 B032 317 Remover, bearing & oil seal	B	

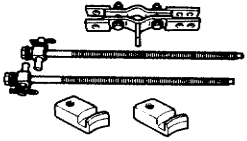
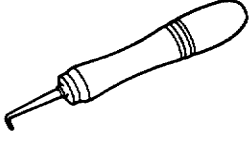
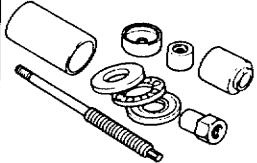
BRAKE SYSTEM

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0259 770B Wrench, flare nut	A	
49 F043 001 Adjust gauge	A	
49 FA18 602 Wrench disc, brake piston	B	

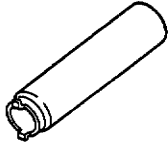
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0221 600C Expand tool, disc brake	B	
49 B043 002 Installer, bearing	A	
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FRONT AND REAR SUSPENSIONS

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 1243 785 Installer, dust boot	A	
49 8038 785 Installer, dust boot	A	
49 0180 510B Preload attachment	B	

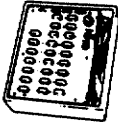

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G034 1A0 Compressor, coil spring	A	
49 0208 701A Air out tool, boot	B	
49 B034 2A0 Replacer, rubber bush	A	

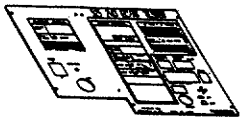
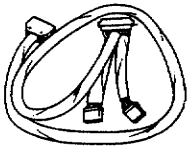
HEATER AND AIR CONDITIONER SYSTEMS

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B061 005 Replacer, seal plate	A	

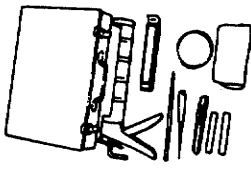
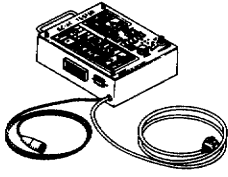
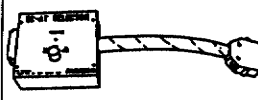
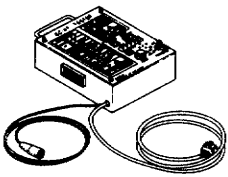
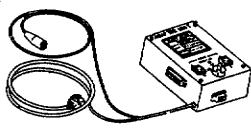
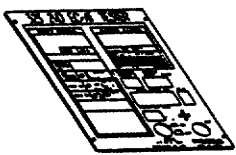
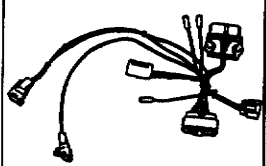
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
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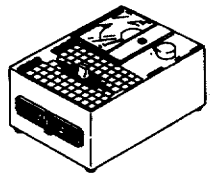
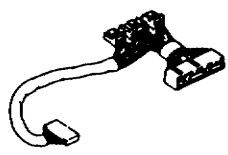
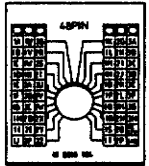
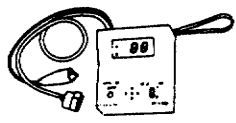
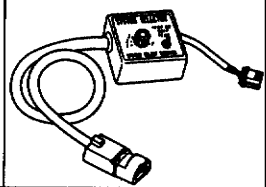
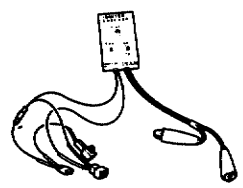
CHECKER AND OTHER EQUIPMENT

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0839 285 Checker, fuel & thermometer	A	
49 0259 866A Inserting tool, seal pusher & blade	B	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B019 905 Panel (EC-AT tester)	A	
49 F019 901 Adapter harness (EC-AT tester)	A	

CHECKER AND OTHER EQUIPMENT (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0305 870A Tool set, window	A	
49 G019 901A EC-AT tester	A	
49 B019 9A1 EC-AT selector (EC-AT tester)	A	
49 G019 901 EC-AT tester	A	
49 H019 902 Adapter unit (EC-AT tester)	A	
49 B019 904 Panel (EC-AT tester)	A	
49 N018 001 Adapter harness (igniter checker)	A	

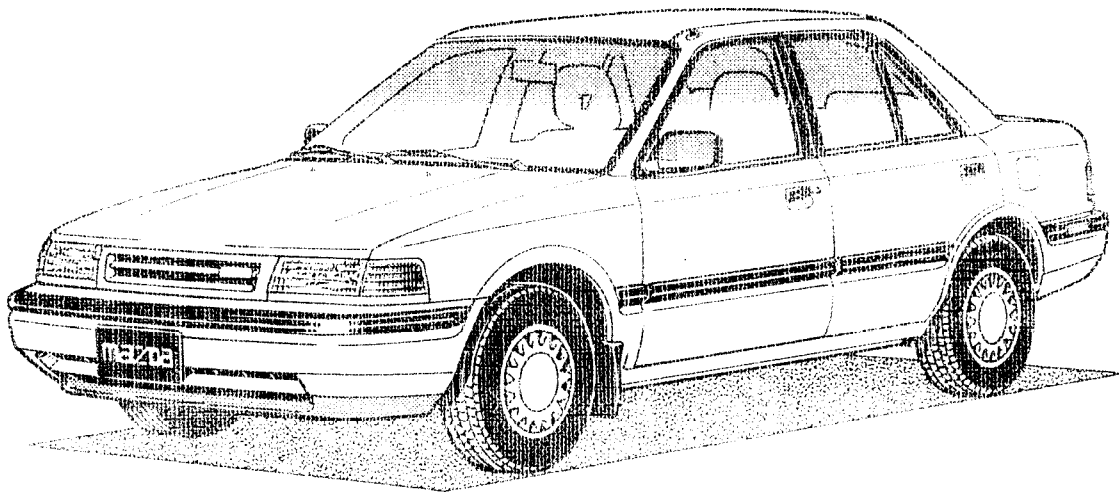
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 9200 162 Monitor, engine signal	A	
49 G018 903 Adapter harness (Engine signal monitor)	A	
49 G018 904 Sheet (Engine signal monitor)	A	
49 H018 9A1 Checker, self-diagnosis	A	
49 B019 9A0 System selector (Self-diagnosis checker)	A	
49 F018 002 Igniter checker	A	
—	—	—



Mazda 323

2WD & 4WD

1990
Wiring Diagram



MAZDA

323 2WD & 4WD Wiring Diagram

- HOW TO USE THIS WIRING DIAGRAM
- SYMBOLS IN THIS WIRING DIAGRAM
- HOW TO READ ELECTRIC PARTS

Z-3

- CIRCUIT DIAGRAM

Z-12

- PARTS LOCATION
- HARNESS DIAGRAM

Z-126

FOREWORD

This wiring diagram incorporates the wiring schematic for the basic vehicle and its available optional equipment. Actual vehicle wiring may vary slightly depending upon optional equipment and/or local specifications. All information contained in this booklet is based on the latest information available at the time of printing. Mazda Motor Corporation reserves the right to make changes without previous notice.

Mazda Motor Corporation
HIROSHIMA, JAPAN

This manual is applicable from the following Vehicle Identification Numbers (VIN).

4 DOOR SEDAN	4WD
JM1 BG223*LO 100001~	JM1 BG227*LO 100001~
JM1 BG224*LO 100001~	JM1 BG228*LO 100001~
JM1 BG225*LO 100001~	
JM1 BG226*LO 100001~	

3 DOOR HATCHBACK
JM1 BG231*LO 100001~
JM1 BG232*LO 100001~
JM1 BG233*LO 100001~
JM1 BG234*LO 100001~

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PRINTED IN JAPAN JUL '89 ®
5145-10-89G

Note:

This wiring diagram includes 1990 2WD and 4WD models and supersedes 1990 323 Wiring Diagram (5128-10-89E, 9999-95-019G-90).

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LENER DIF-LOCK SYSTEM(4WD).....	Z-118	LICENSE PLATE LIGHTS	Z- 74
CHARGING SYSTEM	Z- 16	METER & WARNING LAMPS	Z- 58
CIGARETTE LIGHTER	Z-102	PARTS INDEX	Z- 10
COOLING FAN SYSTEM	Z- 50	PARTS LOCATION	Z-126
CRUISE CONTROL SYSTEM	Z-116	PASSIVE SHOULDER BELT CONTROL SYSTEM	Z-112
DAYTIME RUNNING LIGHTS	Z- 72	POWER DOOR LOCK	Z-104
DIGITAL CLOK	Z-102	POWER SYSTEM	Z- 12
EC-AT CONTROL SYSTEM	Z- 54	POWER WINDOW	Z-108
ELECTRICAL WIRING SCHEMATIC	Z- 14	REAR WINDOW DEFROSTER	Z-102
ENGINE CONTROL SYSTEM	Z- 18	REAR WIPER & WASHER	Z- 66
FRONT WIPER & WASHER	Z- 62	REMOTE CONTROL MIRROR	Z-106
HARNESS DIAGRAM	Z-127	SHIFT LOCK SYSTEM	Z- 84
HEADLIGHTS	Z- 68	SIDE MARKER LIGHTS	Z- 74
HEATER & AIR CONDITIONER	Z- 90	SLIDING SUNROOF	Z-120
HORN	Z- 86	SOUND WARNING SYSTEM	Z- 98
HOW TO READ ELECTRIC PARTS	Z- 8	STARTING SYSTEM	Z- 16
HOW TO USE THIS WIRING DIAGRAM	Z- 3	STOP LIGHTS	Z- 84
IGNITION KEY CYLINDER LAMP	Z- 98	TAIL LIGHTS	Z- 74
ILLUMINATION LAMPS	Z- 78	TURN & HAZARD FLASHER LIGHTS	Z- 82
INTER CONNECTING OF JOINT BOX	Z-124		

The Way to View a Wiring Diagram

This Wiring Diagram is made up of circuit diagrams, connector diagrams, location diagrams, and harness diagrams.

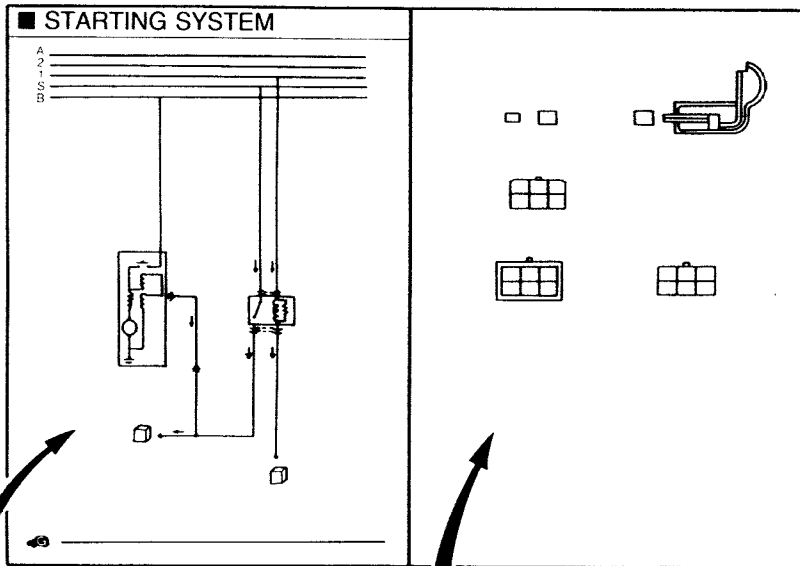
The circuit diagrams are divided according to each system, and by using them, the wiring of each system's circuit can be understood.

Connector diagrams and location diagrams are divided according to vehicle harness, and the location diagrams are designed so that the connector locations and the circuit's course in the vehicle harnesses can be understood.

From the connector diagrams the connector shape and the arrangement of the pins used in the circuit diagrams can be understood.

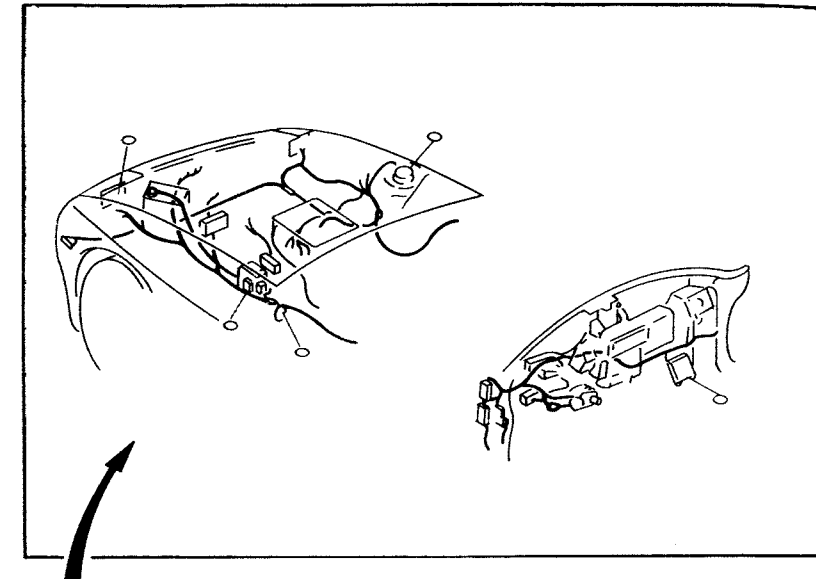
In the circuit diagrams and the location diagrams, the different kinds of harnesses are colored differently, which makes easy distinguishing.

The harness diagrams on the last page can be understood to indicate the connector shape for each harness, the wiring color, and each part and each turning point in the vehicle.

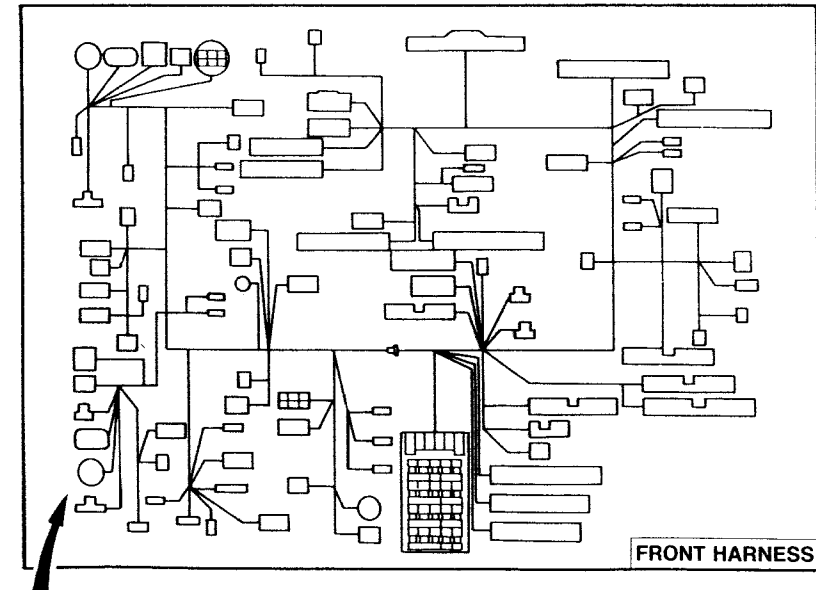


Circuit Diagram
Designed so that operation of electrical parts and the layout of the wiring may be understood.

Connector Diagram
Lists the connectors that are used in the circuit on the left page.
As a rule, it shows the connectors on the harness side.



Location Diagram
This page illustrates the actual location of each connector and the routing diagram of the harness.



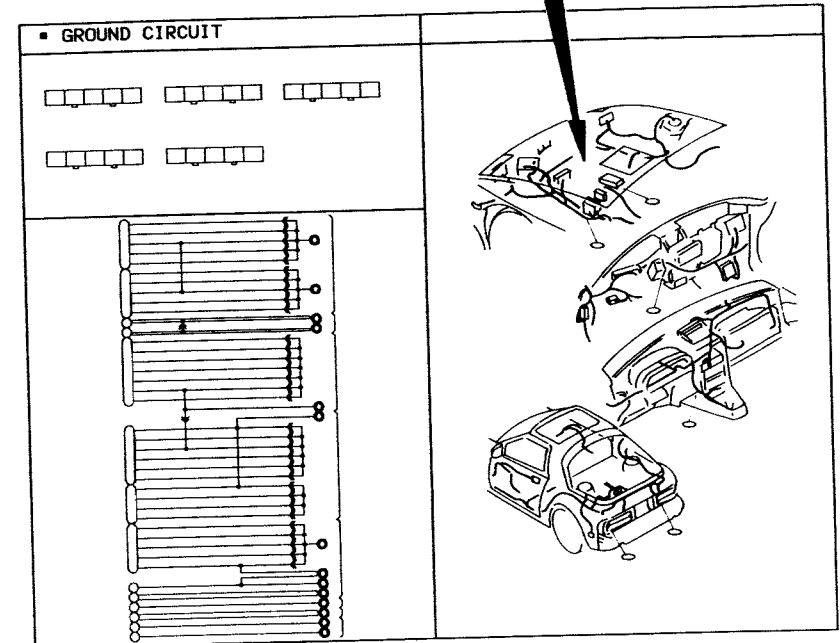
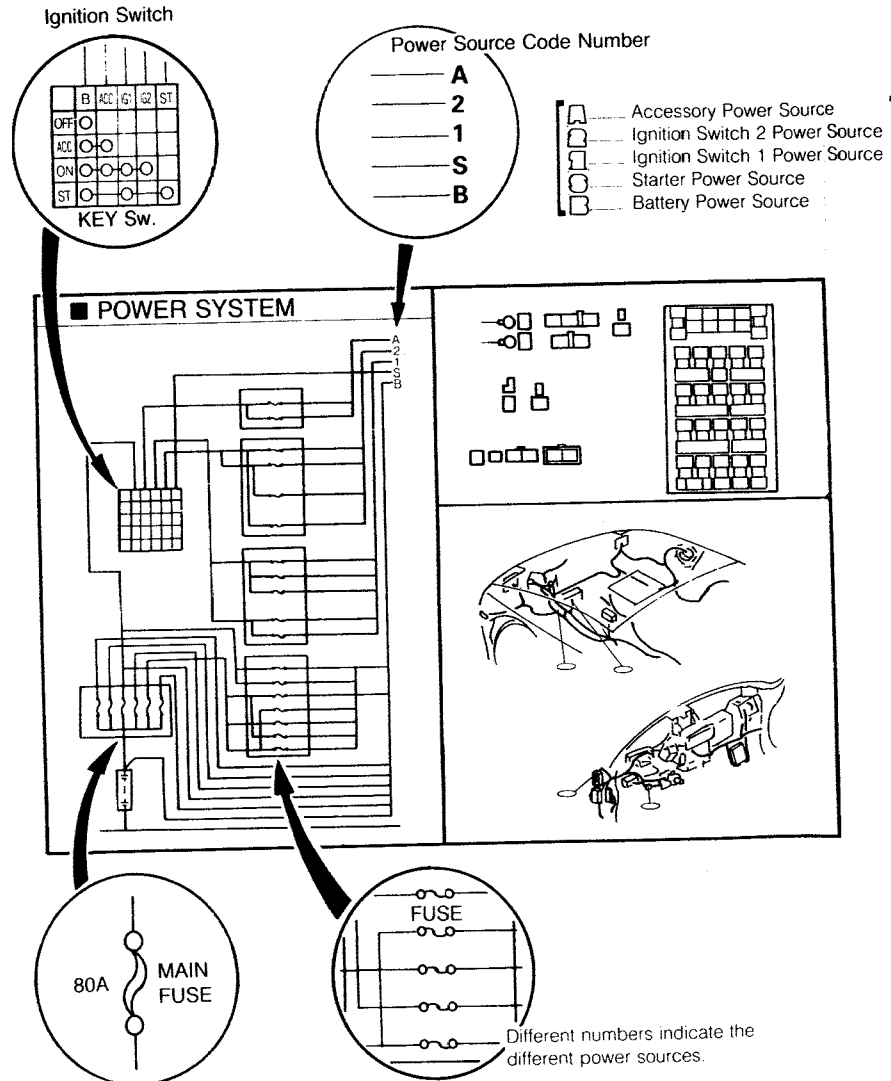
Harness Diagram
Indicate the connectors used in the circuit diagrams, arranging them according to each different kind of harness.

Z HOW TO USE THIS WIRING DIAGRAM

Overview of Power Source Diagrams and Ground Circuit Diagrams

The electrical power sources on the circuit are shown by designated code numbers. Therefore, by extending to the left the folding power source diagram, the power sources and fuse that are used be seen and understood at one glance.

The ground locations are shown on the diagram.



Here are listed together the fuses that have been designated for use in the vehicle.

Some Points to Remember When Viewing a Wiring Diagram

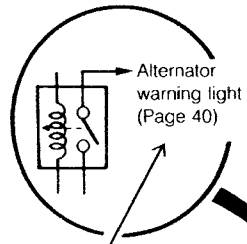
WIRING COLOR CODE

Two-color wires are indicated by a Two-letter symbol. The first letter indicates the base color of the wire and the second indicates the color of the stripe.

For example:

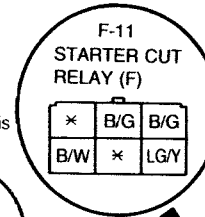
W/R is a white wire with a red strip
BR/Y is a brown wire with a yellow strip

CODE	COLOR	CODE	COLOR
B	Black	LG	Light green
BR	Brown	O	Orange
G	Green	R	Red
L	Blue	Y	Yellow
LB	Light blue	W	White
P	Pink	V	Violet
GY	Gray		



Legend in the parenthesis () indicates the reference Page.

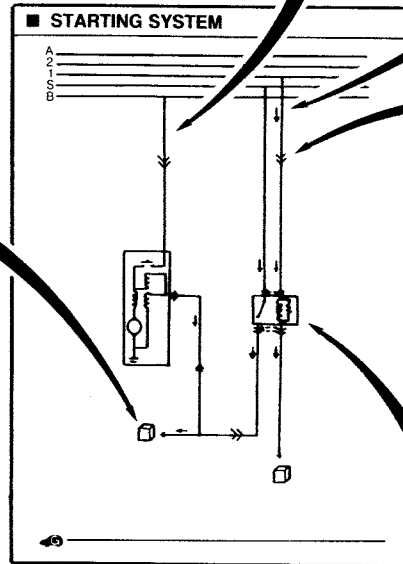
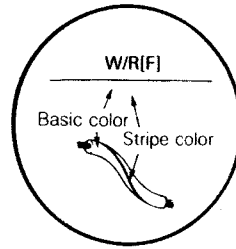
Some Points to Remember When Viewing a Connector Diagram



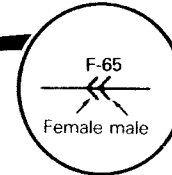
Connector numbers are written in sequence according to each harness, and the letter at the head of each code number indicates the kind of harness.
For example:

"F-11" stands for the 11th connector in the Front Harness.

Direction of current is shown by the arrow

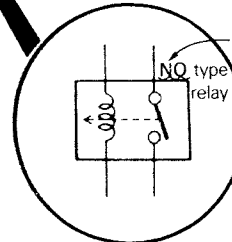


CONNECTOR AND NO.



The connector numbers are decided according to each kind of harness.
For example:

- (F-20 Front Harness
- I-01 Instrument panel Harness
- R-12 Rear Harness



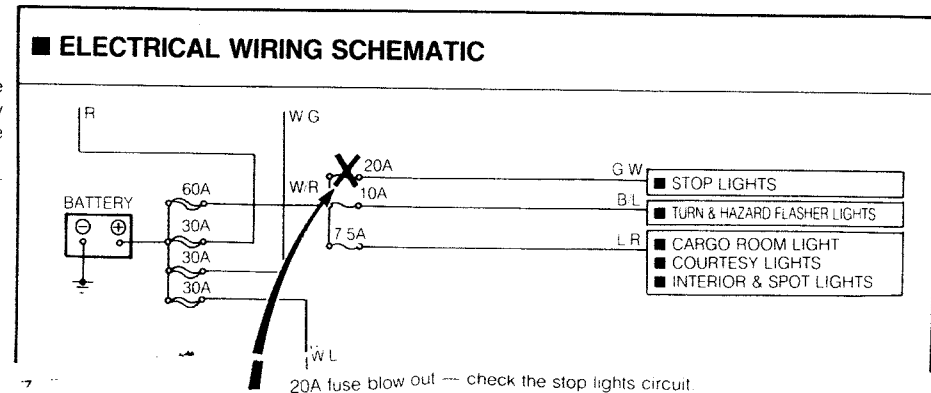
Abbreviation

The Way to View a Electrical Wiring Schematic

The electrical wiring schematic explains the outline of all the electrical parts in the vehicle. Also, it clarifies power line and the way to use each fuses.

	Relay		Switch	
	NO type relay	NC type relay	NO switch	NC switch
Not in operation				
	Stop	Flow	Stop	Flow
In operation				
	Flow	Stop	Flow	Stop

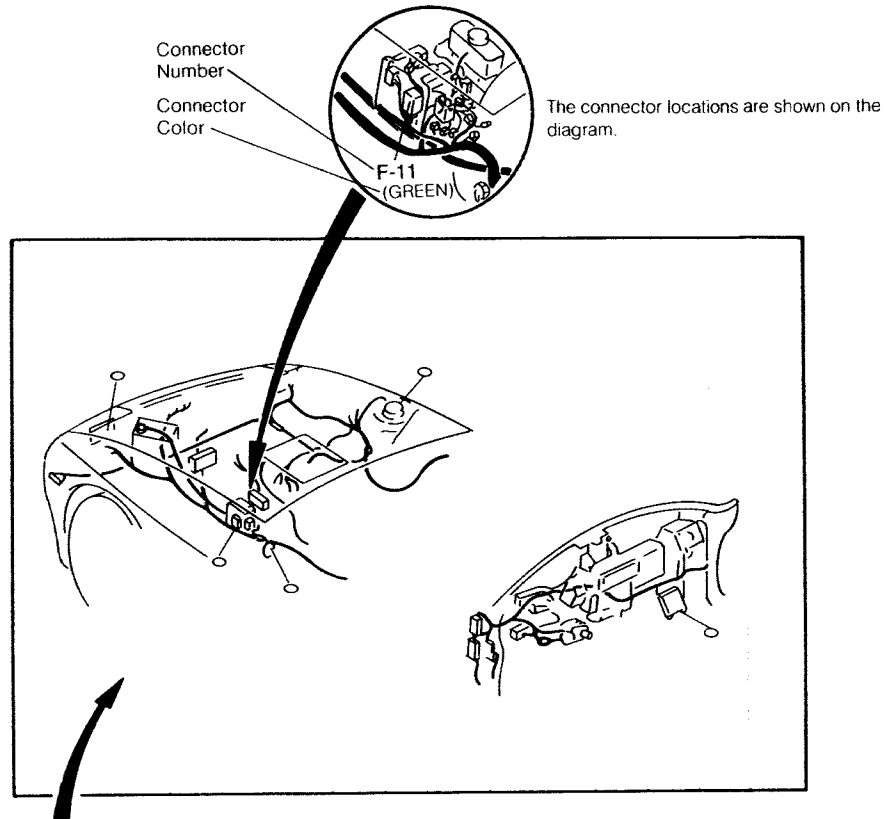
The NC (Normally Closed) type relay and switch are shown by "●", the NO (Normally Open) are shown by "○". These are shown without operation in this book



20A fuse blow out --- check the stop lights circuit.

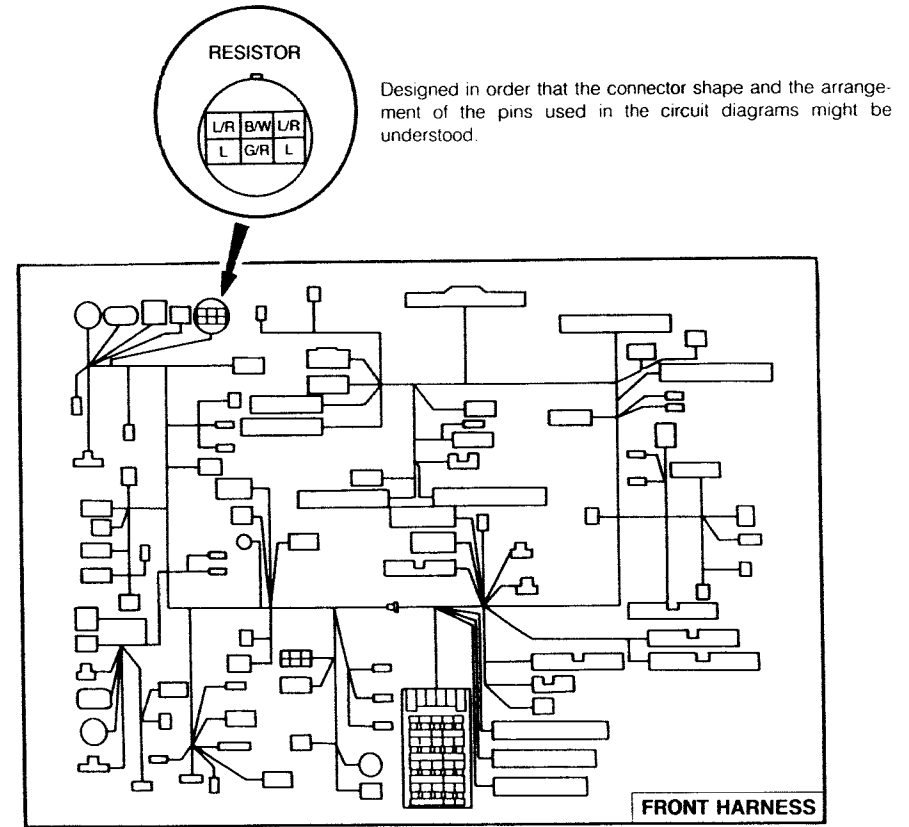
Z HOW TO USE THIS WIRING DIAGRAM

Some Points to Remember When Viewing a Location Diagram



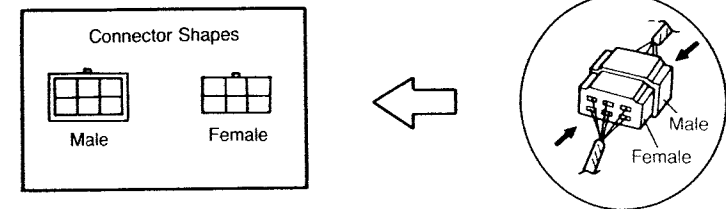
Connectors in circuit diagram are all described in location diagram, and connector numbers are shown by leader line.
Each frame has the alphabets and numerical numbers to search the connector easily.
For example:
"F-11" connector is across "E" on horizontal line and "7" on vertical line.
Connector Color:
Color is shown unless connector is white.

Some Points to Remember When Viewing a Harness Diagram



Designed in order that the connector shape and the arrangement of the pins used in the circuit diagrams might be understood.

The way of looking at a connector

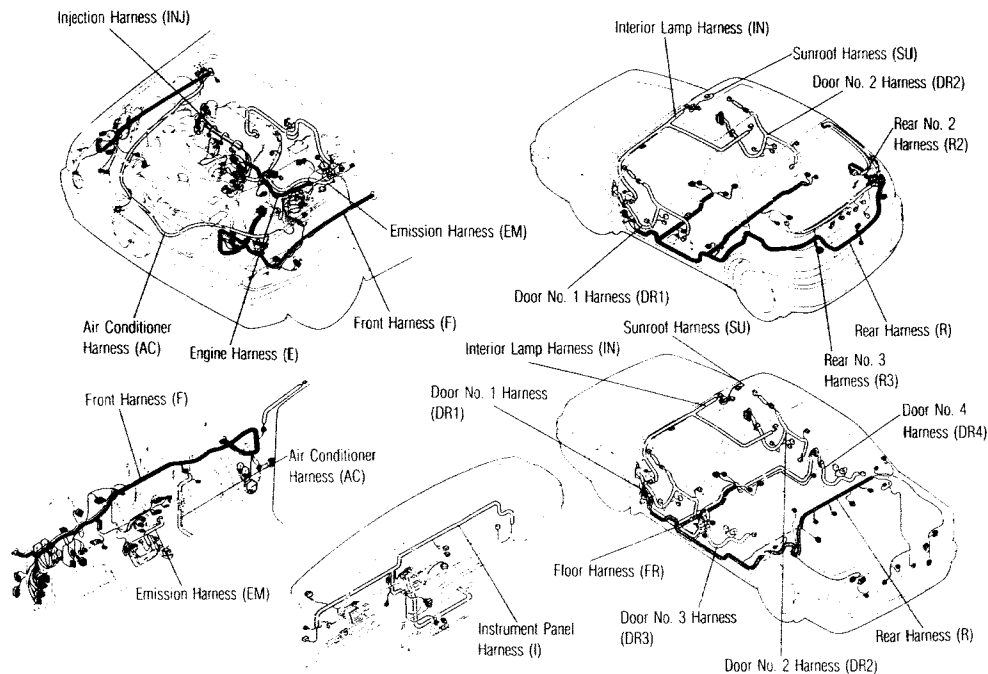


HOW TO USE THIS WIRING DIAGRAM

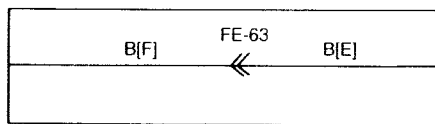
HARNESS SYMBOLS

Each harness is distinguished by a symbol to indicate to which harness belong a wiring and connector in circuit diagrams and connector charts.

DESCRIPTION OF HARNESS	COLOR	SYMBOL	DESCRIPTION OF HARNESS	SYMBOL
Front Harness	Black	[F]	Interior Lamp Harness	[IN]
Engine Harness	Black	[E]	Door No. 1 Harness	[DR1]
Instrument Panel Harness	Black	[I]	Door No. 2 Harness	[DR2]
Rear Harness	Black	[R]	Door No. 3 Harness	[DR3]
Rear No. 2 Harness	Black	[R2]	Door No. 4 Harness	[DR4]
Rear No. 3 Harness	Black	[R3]	Air Conditioner Harness	[AC]
Emission Harness	Black	[EM]		

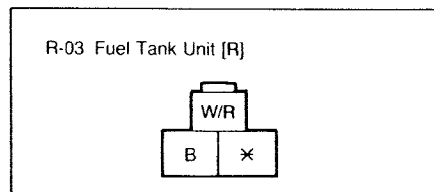


EXAMPLE OF CIRCUIT DIAGRAM



- It is seen from the above that the male-side black line of the FE-63 shows the engine harness and the female-side black line shows the front harness.
- It is seen from the above that the FE-63 connector is a connector connecting the engine and the front.

EXAMPLE OF CONNECTOR



- This sign (*) means "empty" - Not Used.
- It is seen from the above that this connector R-03 is on the Rear harness.

SYMBOLS IN THIS WIRING DIAGRAM

SYMBOLS IN THIS WIRING DIAGRAM

LOGICAL SYMBOLS

The logical symbols are of four kinds: OR, AND, INV. (Inverter), PROCESS. The circuit operation can be easily read by understanding these symbols.

<p>OR</p>	<p>In case of input to either A or B, an output comes out from C. When A and B are off (0V), C is off (0V). When either A or B is on (12V), C is on (12V). This can be simply shown in the relay circuit on the right-hand side.</p>
<p>AND</p>	<p>In case on input to both A and B, an output comes out from C. When A and B are on (12V), C is on (12V). When either A or B is off (0V), C is off (0V). This can be simply shown in the relay circuit on the right-hand side.</p>
<p>INV. (Inverter)</p>	<p>In case of input to A, B is grounded. When A is off (0V), B is on (12V). When A is on (12V), B is off (0V). This can be simply shown in the relay circuit on the right-hand side.</p>
	<p>PROCESS makes a simplified representation of complicated functions of the circuit. Functions mainly used: 1. Detection of signals 2. Conversion of signals The process of the full transistor ignition control unit is as shown in the right-hand figure.</p>

GRAPHIC SYMBOLS

Battery	Harness Ground	Holder	Box	Main Fuse	Motor
Coil solenoid	Resistance	Variable resistance	Thermister	Diode	Diode
Condenser	Transistor	Pump	Light	Horn	Horn
Speaker	Cigarette lighter	Heater	Illuminating Diode	Zener Diode	Zener Diode

ABBREVIATIONS

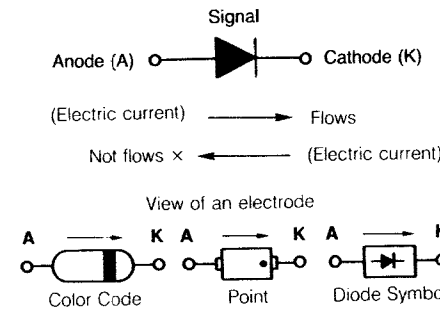
ABBREVIATIONS USED IN THIS BOOKLET

A	Ampere	HI	High
AAS	Auto Adjusting Suspension	ISC	Idle Speed Control
ABS	Anti-lock Brake System	IG	Ignition
ACV	Air Control Valve	ILLUMI	Illumination
AE	Acoustic Equilibration	INT	Intermittent
AIS	Air Injection System	JB	Joint Box
ALL	Automatic Load Leveling	LH	Left Hand
AS	Auto Stop	LCD	Liquid Crystal Display
ASV	Air Supply Valve	LO	Low
A/C	Air Conditioner	LW	Low Wave
A/F	Air Fuel	M	Motor
A/R	Auto Reverse	MIL	Mulfanction Indicator Light
A/T	Automatic Transmission	MTR	Mechanical Tuning Radio
ACC	Accessory	M/T	Manual Transmission
ACCEL	Accelerator	MI	Middle
ADD	Additional	MIN	Minute
ALT	Alternator	MIX	Mixture
AM	Amplitude Modulation	MPX	Multiplex
AMP	Amplifier	MTX	Manual Transaxle
ANT	Antenna	MW	Middle Wave
ATP	Atmospheric Pressure	NC	Normally Closed
ATX	Automatic Transaxle	NO	Normally Open
B	Battery	OD	Over Drive
BAC	By-pass Air Control Valve	P	Power
B/L	Bi-Level	PRCV	Pressure Regulator Control
CPU	Central Processing Unit	Solenoid Valve	
CSD	Cold Start Device	PTC	Positive Temperature
CARB	Carburator	Coefficient Heater	
CCT	Circuit	P/S	Power Steering
CIGAR	Cigarette	PRG	Purge Solenoid Valve
COMBI	Combination	QSS	Quick Start System
CON	Conditioner	R	Rear
CONT	Control	RH	Right Hand
DOHC	Double Over Head Camshaft	RL	Rear Left
DEF	Defroster	RPM	Revolution Per Minute
ECE	Economic Commission For Europe	RR	Rear Right
EGI	Electric Gasoline Injection	REC	Recirculation
EGR	Exhaust Gas Recirculation	SOL	Solenoid
EGRP	Exhaust GAS Recirculation	SQ	Square Per Milimeter
	Pressure Sensor	ST	Start
ELR	Emergency Locking Retractor	SW	Short Wave
ELEC	Electric	SW	Switch
ETR	Electronic Tuner	TCV	Twin Scrol Turbocharger
EXH	Exhaust	Solenoid Valve	
F	Front	TICS	Triple Induction Control System
FICB	Fast Idle Cam Breaker	TEMP	Temperature
FL	Front Left	TR	Transistor
FR	Front Right	TWS	Total Wiring System
F/B	Feed Back	V	Volt
F/I	Fuel Injector	VRIS	Variable Resonance Induction
FM	Frequency Modulation	System	
GEN	Generator	VENT	Ventiration
HEI	High Energy Ignition	VOL	Volume
H/D	Heat/Defroster	W	Watt
HEAT	Heater		

AN OVERVIEW OF ELECTRICAL COMPONENTS

Following is an overview of electrical components representative of the many electrical components related to the control and warning instruments in automobiles.

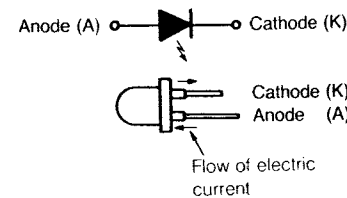
DIODE



The nature of diode is to allow a current to flow in only one direction. It is used in a circuit when desiring to let current flow in only one direction, or as a rectifier when changing an alternating current to a direct current. The different terminals of a diode are called anode (A) and cathode (K). Electric current flows from anode to cathode, but never from cathode to anode.

In checking a diode with a tester be careful about the tester's polarity. The tester's (-) means positive electrical potential, and (+) means negative electrical potential. To check a diode's current, touch the tester's (-) lead to the anode, and the tester's (+) lead to the cathode.

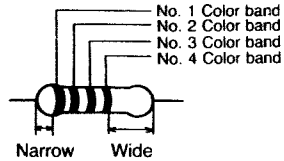
ILLUMINATING DIODE



An illuminating diode emits light from the contact surface of a semiconductor when an electric current flows in its forward direction.

in setting the two battery in tester for the 10kΩ range, touch the tester's (-) lead to the anode (A), and the (+) lead to the cathode (K), it lights up.

RESISTOR

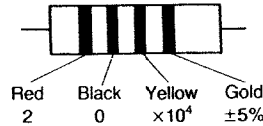


Color Band	No. 1	No. 2	No. 3	No. 4
Color	Value	Value	Multiplier	Clearance
Black	0	0	$\times 10^0$	
Brown	1	1	$\times 10^1$	
Red	2	2	$\times 10^2$	
Orange	3	3	$\times 10^3$	
Yellow	4	4	$\times 10^4$	
Green	5	5	$\times 10^5$	
Blue	6	6	$\times 10^6$	
Purple	7	7	$\times 10^7$	
Gray	8	8	$\times 10^8$	
White	9	9	$\times 10^9$	
Gold			$\times 10^{-1}$	$\pm 5\%$
Silver			$\times 10^{-2}$	$\pm 10\%$
Non				$\pm 20\%$

As resistors are essential to make an electric circuit. Reading the resistance value of the widely used resistor is explained below.

As shown in the chart at left, there are four color bands to represent resistances. Each resistance value can be understood from each color band.

For example:



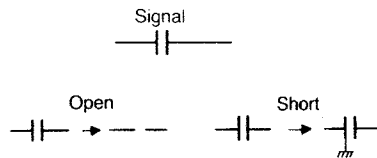
The resistance value is $200k\Omega \pm 5\%$.

Code number clarification

The first two digits in each code number represent the resistance value, and the third digit represents multiplier. For example:

$$332 \rightarrow 33 \times 10^2(\Omega) \rightarrow 3.3 \times 10^3(\Omega) \rightarrow 3.3(k\Omega)$$

CONDENSER



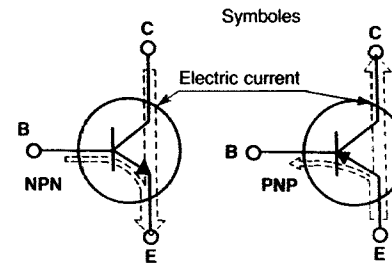
A Condenser is for storing electricity. In the case of an open circuit, a condenser is not able to store electric charge. And the circuit remains in an open state.

A short circuit, its name indicate, means the break-down phenomena when voltage is applied.

Inspection of low voltage condenser with circuit tester

- (1) Short a condenser and discharge the remaining electric charge
- (2) Set $\times 10k\Omega$; largest resistance range in the circuit tester
- (3) When the test lead touches both ends, the indicate moves a little bit; and then returns to $\infty (\Omega)$

TRANSISTOR



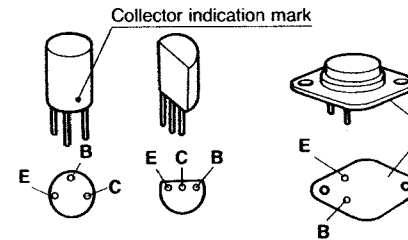
There are two types of transistor function:

- (1) Switching Acting as a switch
- (2) Amplification action Amplifying a small signal to a big signal

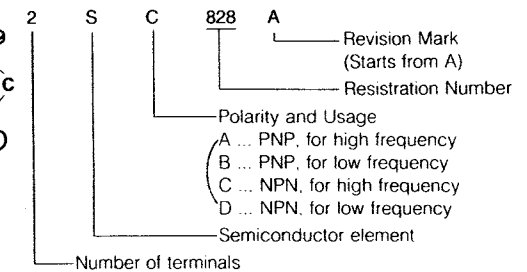
Transistors are classified according to polarity (structure): NPN and PNP. Generally, the NPN are widely used. Transistor has three terminals: Emitter (E), Collector (C), and Base (B).

To operate the transistor, make a base current flow to the arrow direction (B to E). Then the resistance between the collector and the emitter becomes extremely small, and large current flows from the collector to the emitter (In the case of PNP transistor, electric current flows to the emitter to the collector).

Electrodes indication

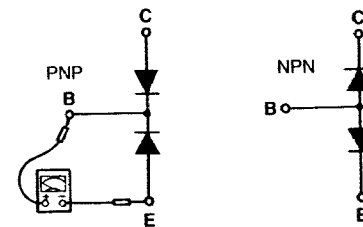


Name of Models



A simply way of checking

PNP and NPN transistor can be simplified shown in diagrams on the left-hand side. Set $\times 100\Omega$ or $1k\Omega$; resistance measurement range in the circuit tester, and touch leads to each electrode to check conductivity.



- Current Flow only C to B
- Current Flow only E to B
- Current Flow only B to C
- Current Flow only B to E

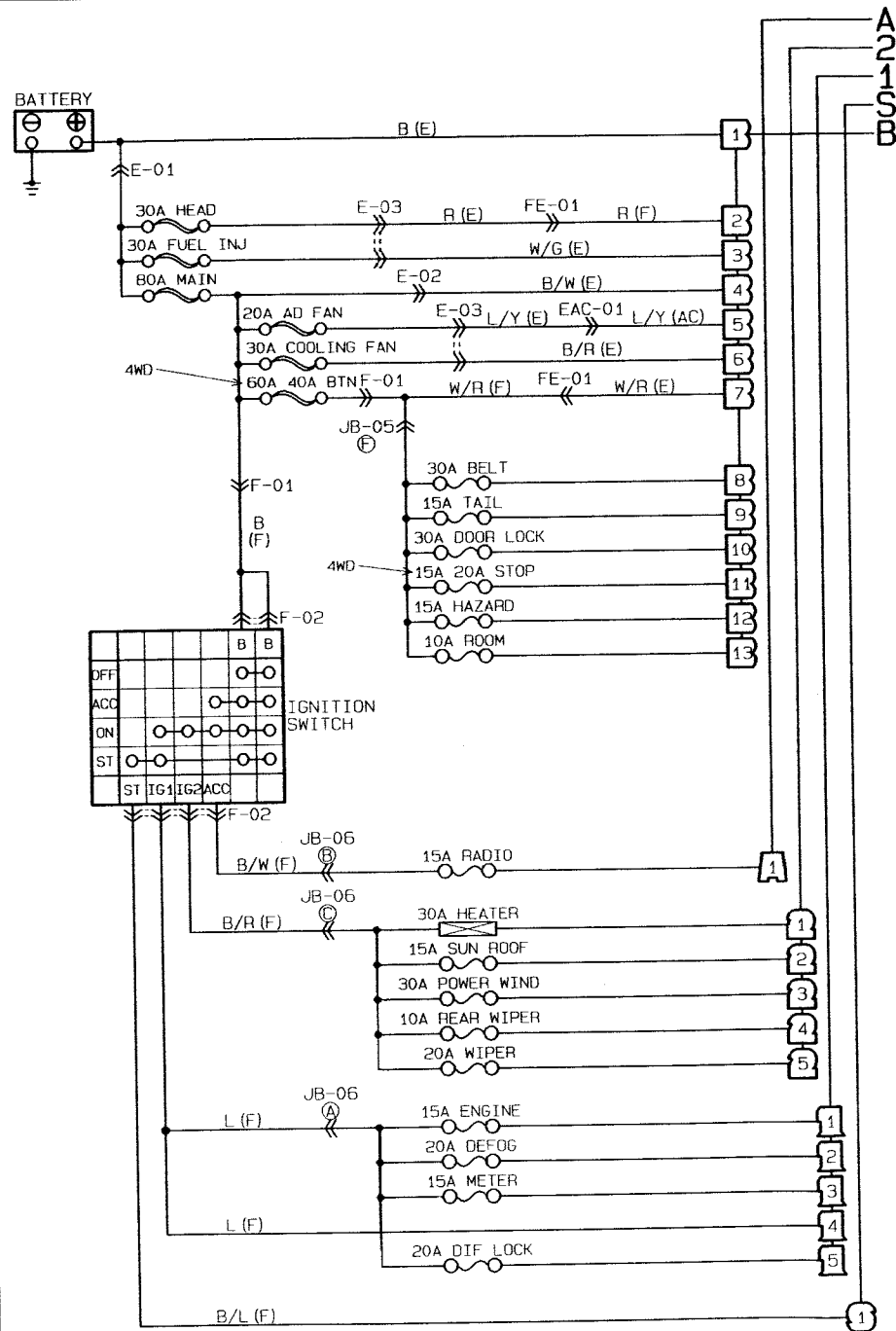
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Front Wiper Relay	Z-64	Remote Control Mirror Switch	Z-106
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Fuel Tank Unit	Z-18, 34	Ⓢ Shift Lock Unit	Z-84
Fuse Box	Z-12, 16	Short Connector	Z-50, 52, 118
Ⓖ Hazard Switch	Z-82		
Headlight	Z-68, 70		

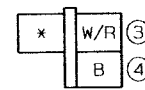
PARTS INDEX

PARTS	PAGE	PARTS	PAGE
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Sliding Sunroof Relay	Z-120	Sub Fuel Tank Unit	Z-34
Sliding Sunroof Switch	Z-120		
Solenoid Valve		① Tail Light	Z-74
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Pressure Regulator	Z-26, 42	Thermo Switch	Z-90, 94
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Starter	Z-16	Ⓜ Washer Level Sensor	Z-58
Starter Interlock Switch	Z-16	Water Thermosensor	Z-26, 42, 58
Stop Light	Z-84	Water Thermo Switch	Z-50, 52, 94

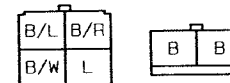
■ POWER SYSTEM



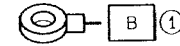
F-01 FUSE BOX (F)



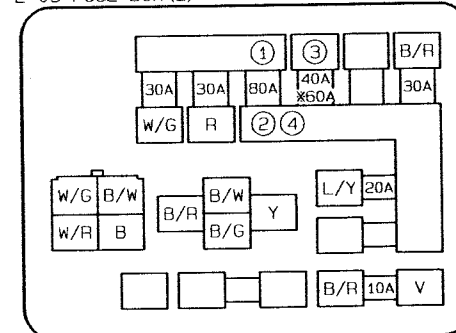
F-02 IGNITION SWITCH (F)



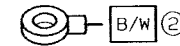
E-01 MAIN FUSE (E)



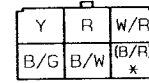
E-03 FUSE BOX (E)



E-02 MAIN FUSE (E)



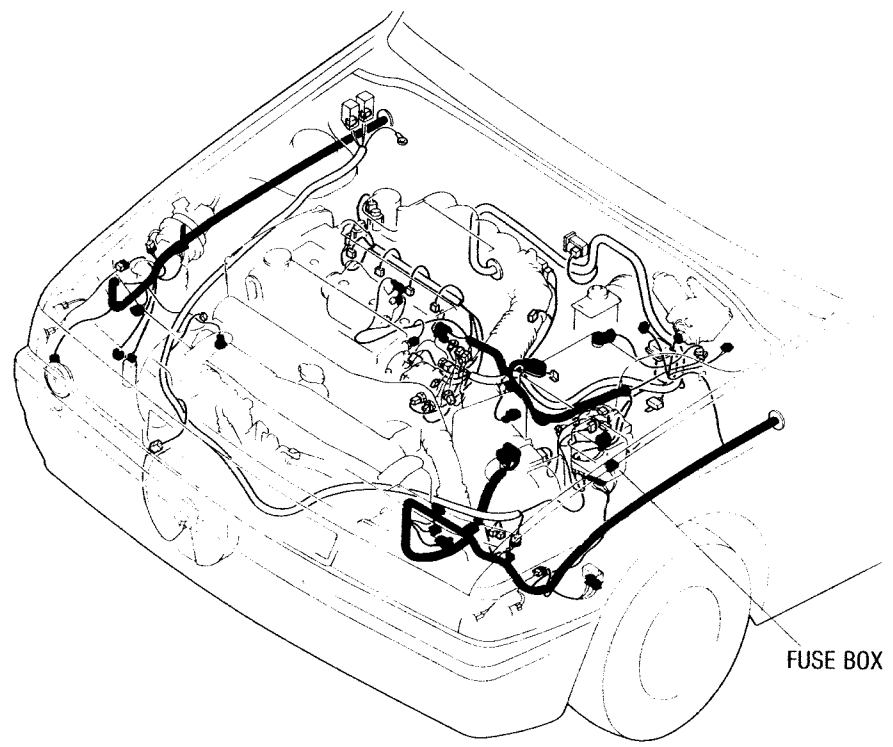
FE-01 FRONT (F) -ENGINE (E)



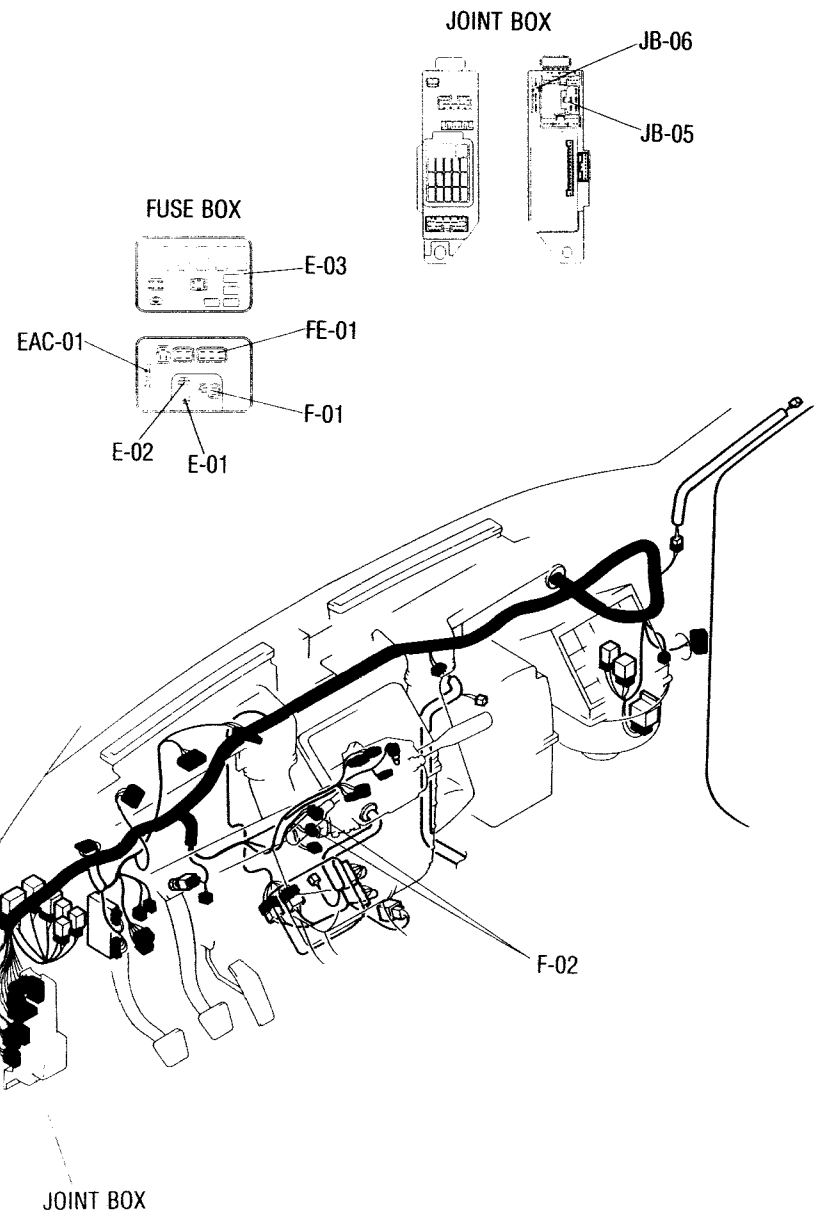
EAC-01 ENGINE (E) -A/C (AC)



() ... EC-AT



FUSE BOX

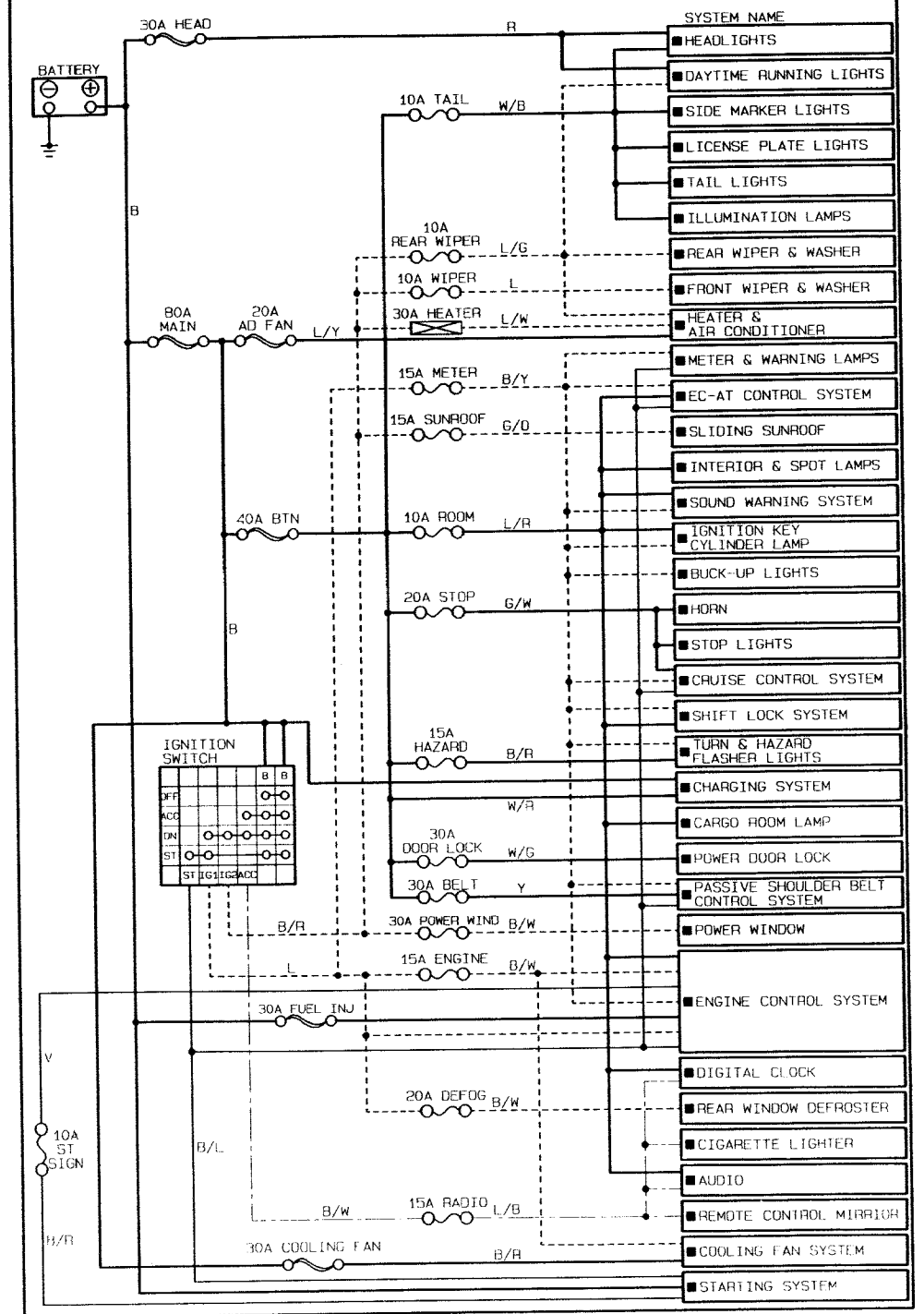


JOINT BOX

Z WIRING DIAGRAM

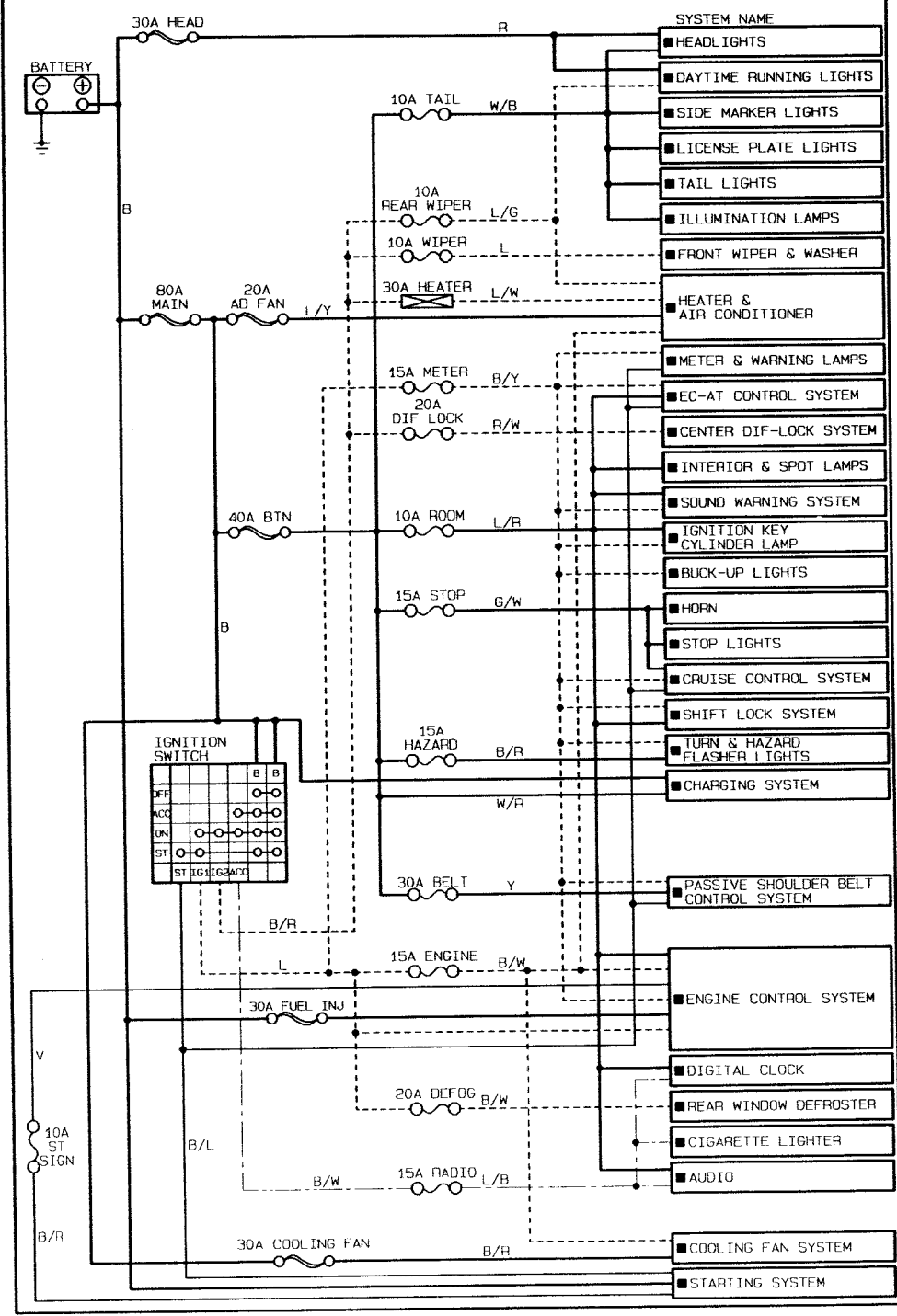
EXCEPT 4WD ELECTRICAL WIRING SCHEMATIC

— CURRENT FROM BATTERY
 - - - CURRENT FROM IG1, IG2
 - · - · CURRENT FROM ACC
 — OTHERS



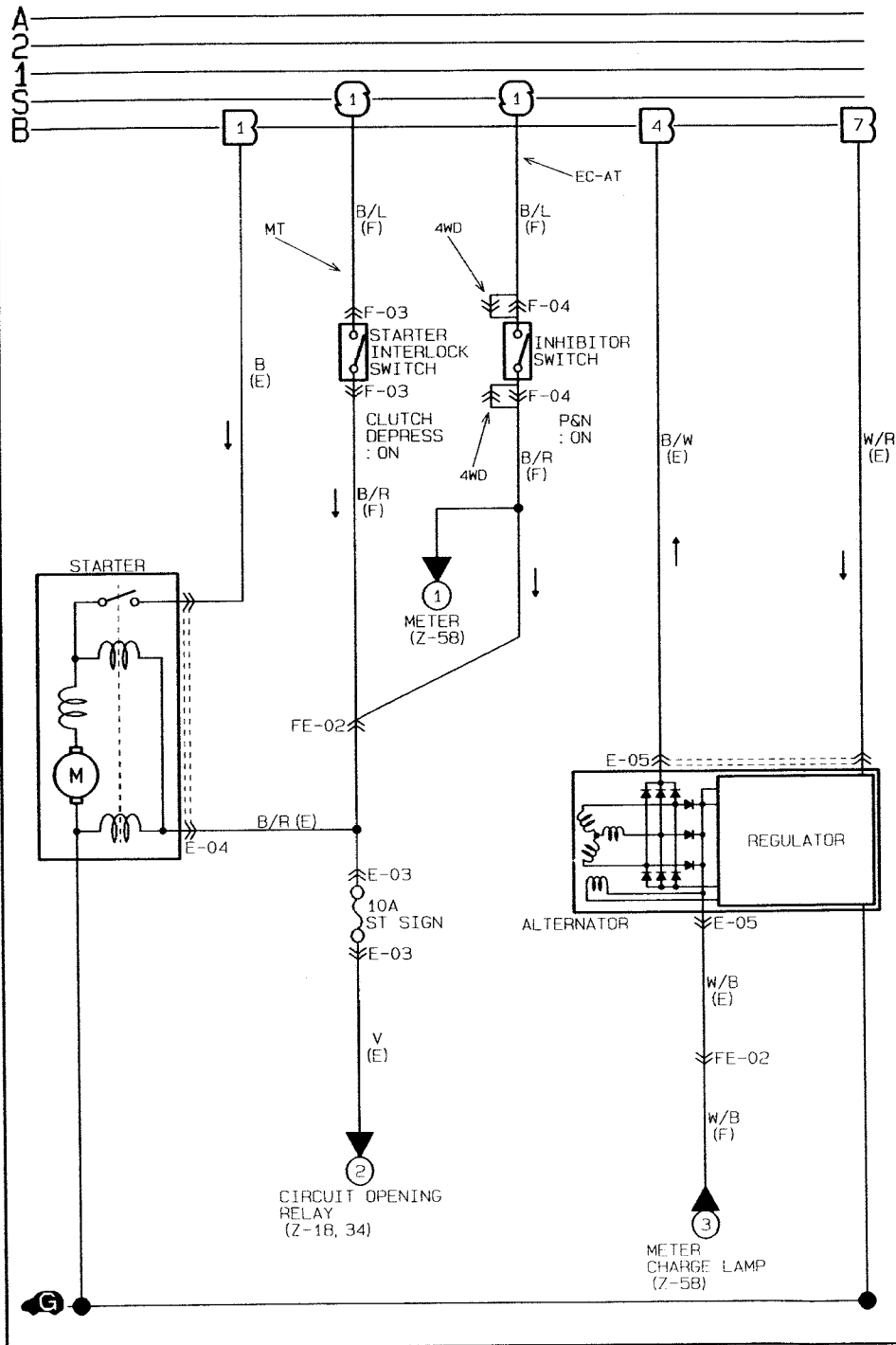
4WD
ELECTRICAL WIRING SCHEMATIC

— CURRENT FROM BATTERY
 - - - CURRENT FROM IG1, IG2
 ···· CURRENT FROM ACC
 ——— OTHERS



WIRING DIAGRAM

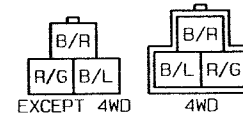
- STARTING SYSTEM
- CHARGING SYSTEM



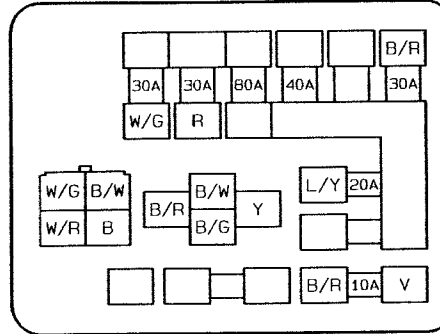
F-03 STARTER INTERLOCK SWITCH (F)



F-04 INHIBITOR SWITCH (F)



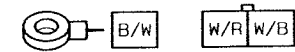
E-03 FUSE BOX (E)



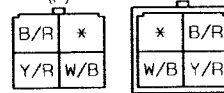
E-04 STARTER (E)

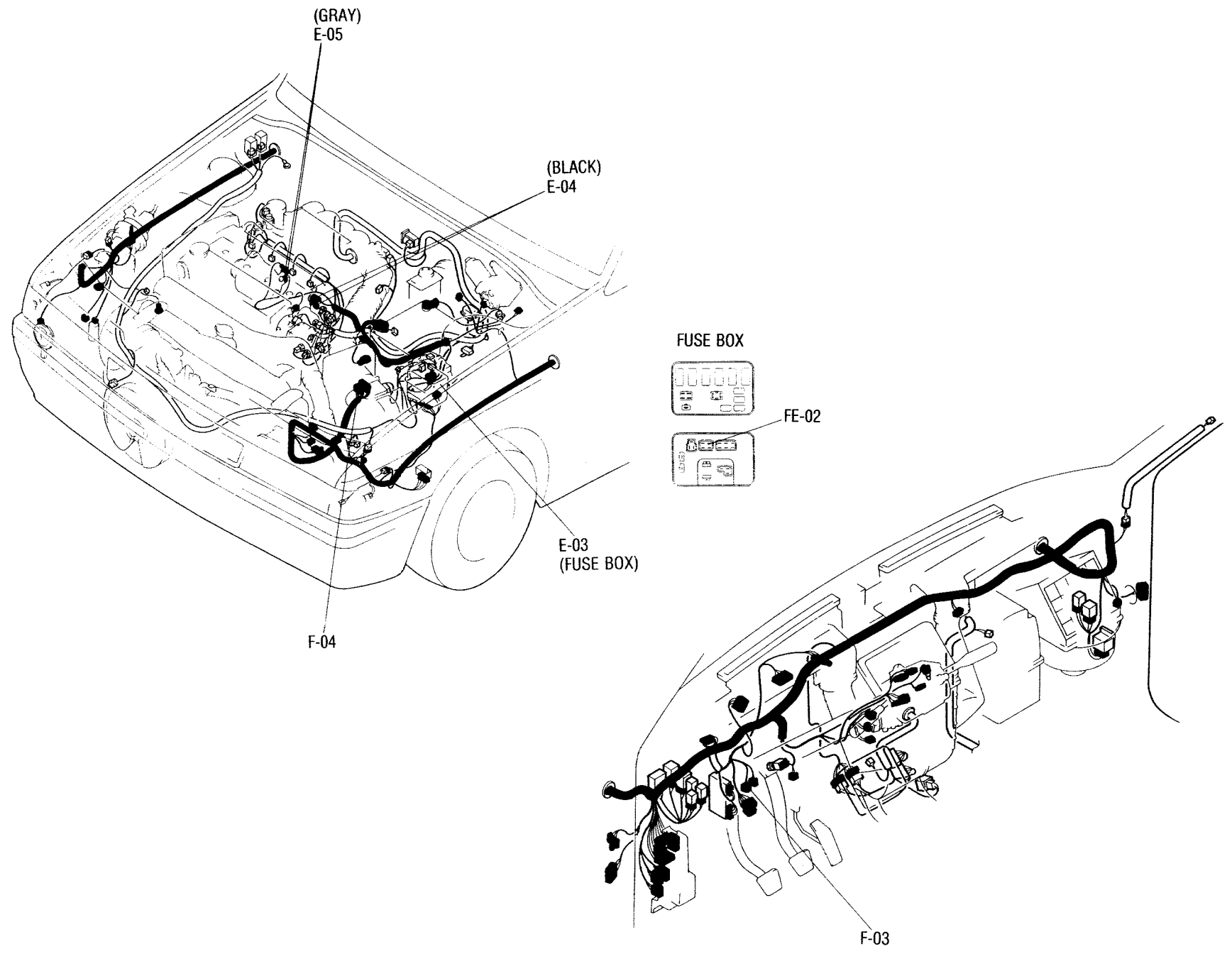


E-05 ALTERNATOR (E)

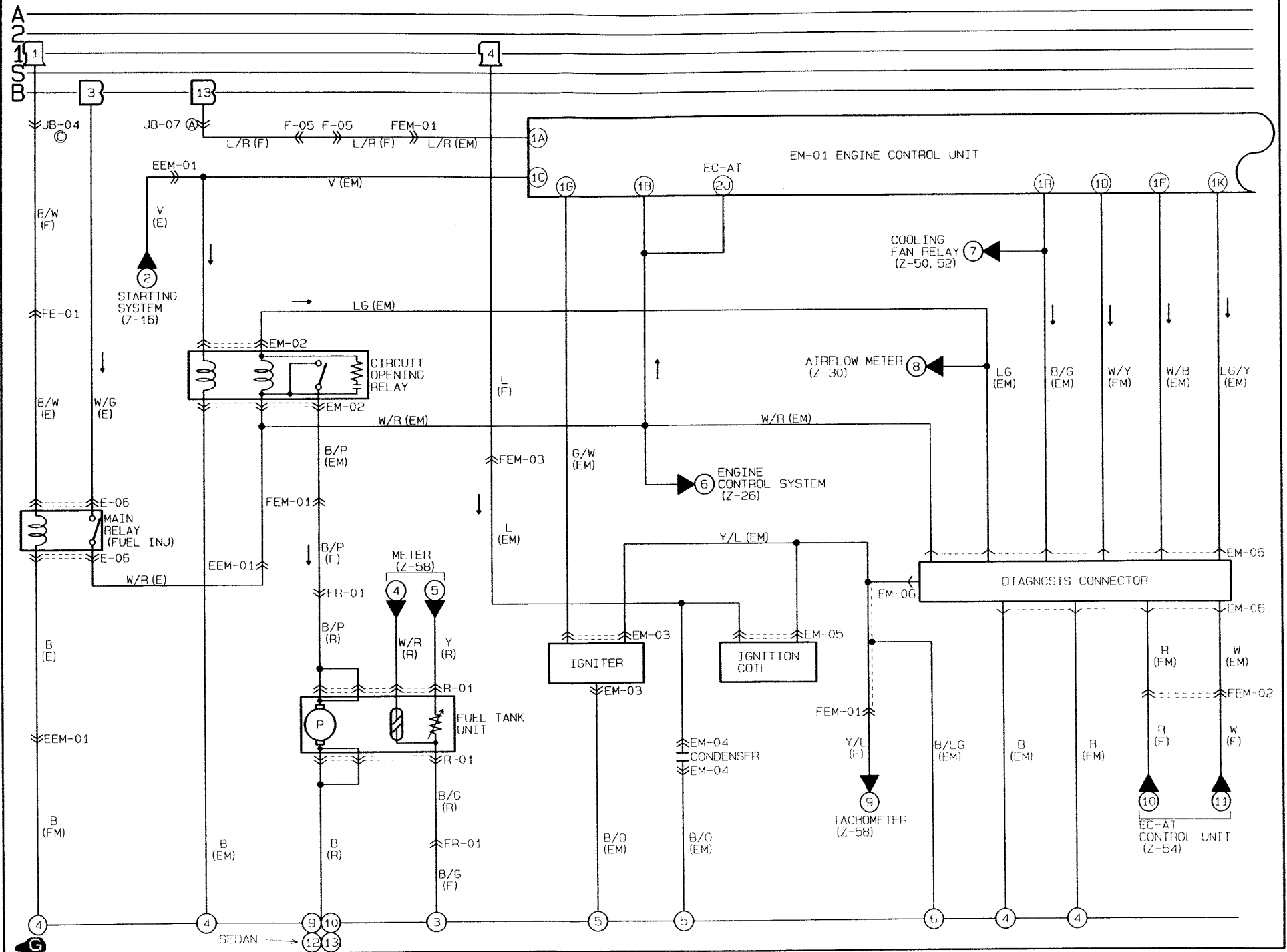


FE-02 FRONT (F) -ENGINE (E)



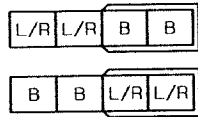


EXCEPT 4WD ■ ENGINE CONTROL SYSTEM (1/4)

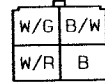


SEDAN →

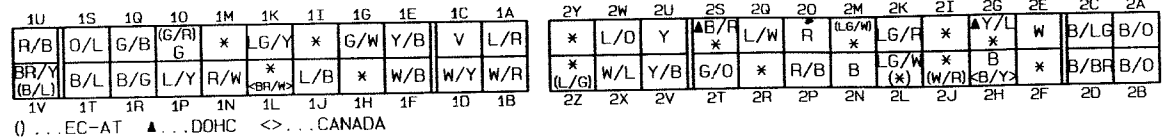
F-05 JOINT CONNECTOR (F)



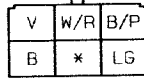
E-06 MAIN RELAY (E)
(FUEL INJ)



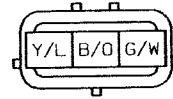
EM-01 ENGINE CONTROL UNIT (EM)



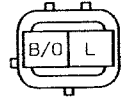
EM-02 CIRCUIT OPENING RELAY (EM)



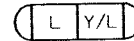
EM-03 IGNITER (EM)



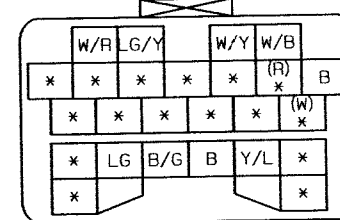
EM-04 CONDENSER (EM)



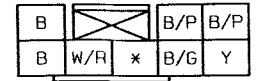
EM-05 IGNITION COIL (EM)



EM-06 DIAGNOSIS CONNECTOR (EM)

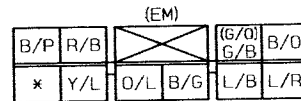
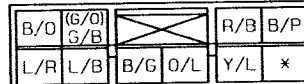


R-01 FUEL TANK UNIT (R)

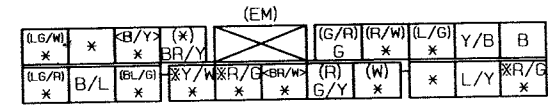
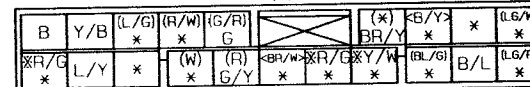


() ...EC-AT

FEM-01 FRONT (F) -EMISSION (EM)



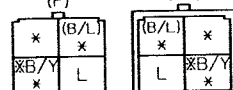
FEM-02 FRONT (F) -EMISSION (F)



() ...EC-AT

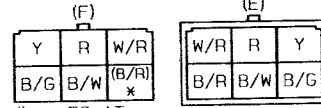
() ...EC-AT <> ...CANADA * ...4WD

FEM-03 FRONT (F) -EMISSION (EM)



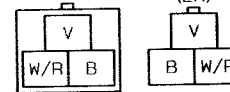
() ...EC-AT * ...4WD

FE-01 FRONT (F) -ENGINE (E)

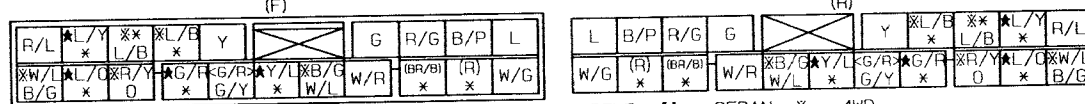


() ...EC-AT

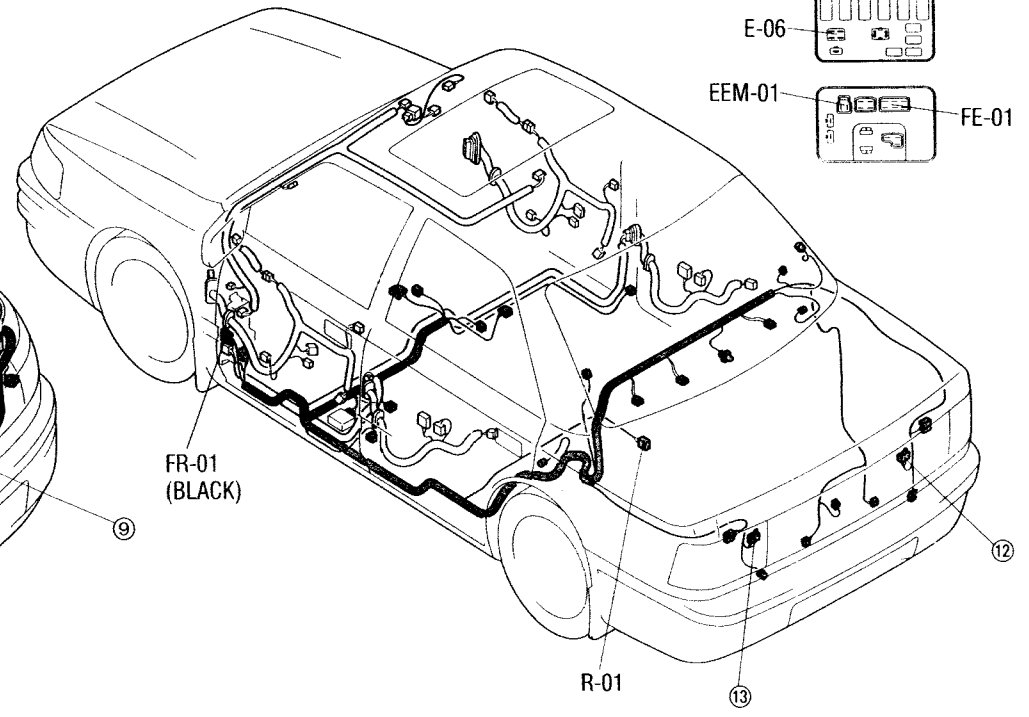
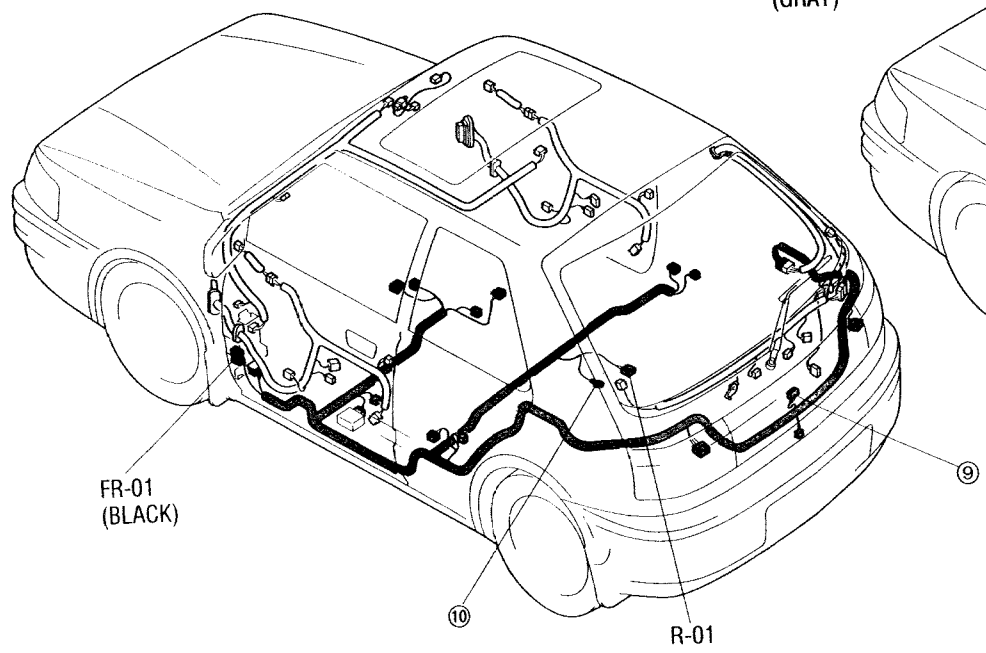
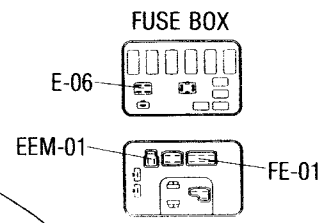
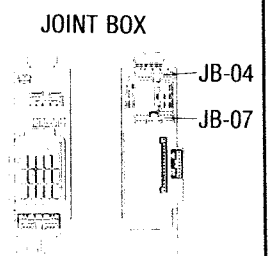
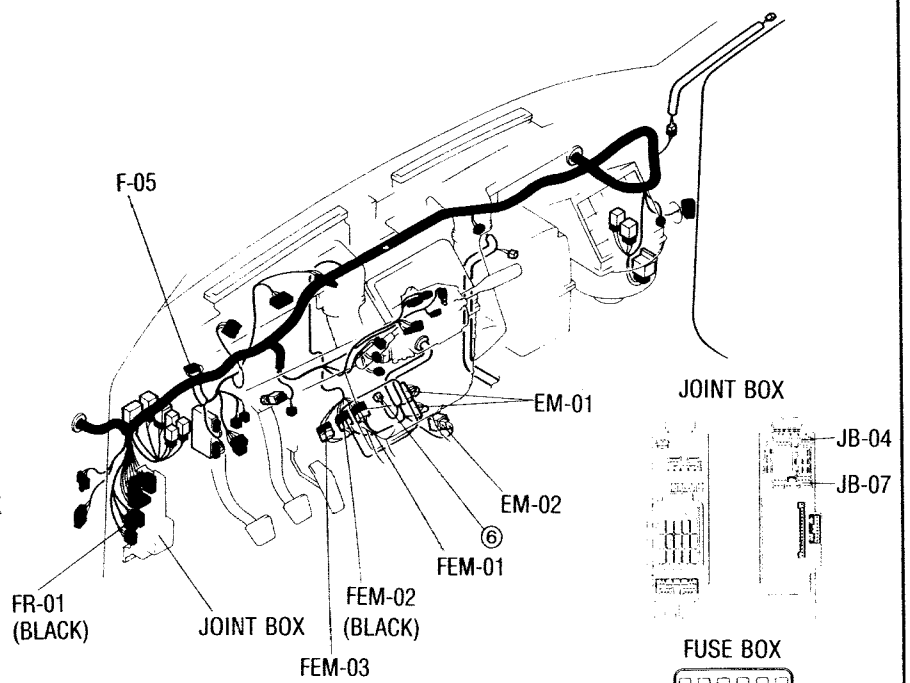
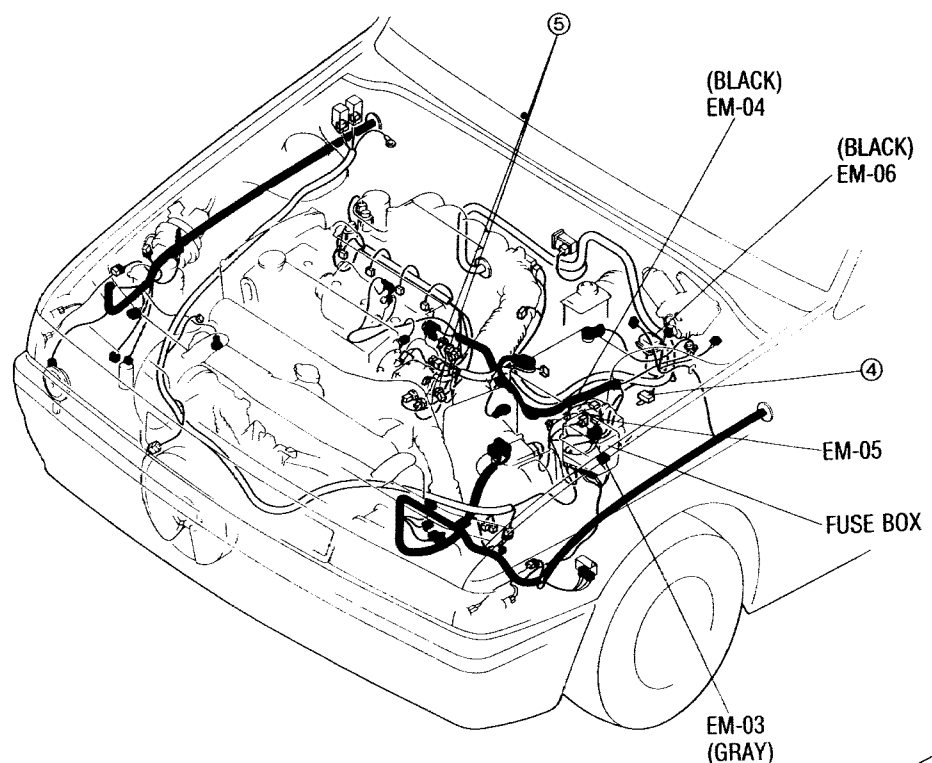
EEM-01 ENGINE (E) -EMISSION (EM)



FR-01 FRONT (F) -REAR (R)



() ...EC-AT <> ...CANADA * ...WITH PASSIVE SHOULDER BELT () ...SEDAN * ...4WD



Engine control unit terminal (unit side)

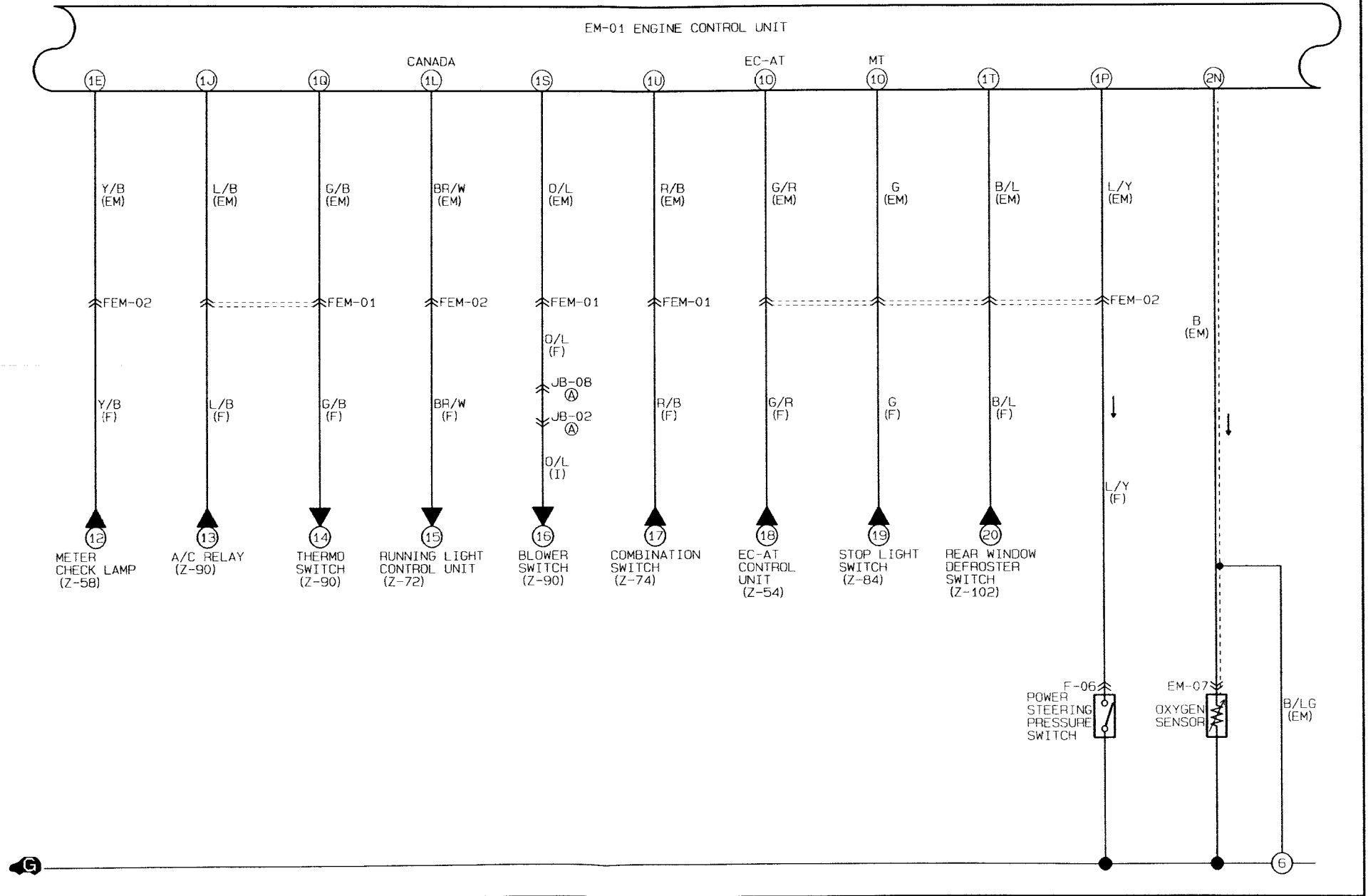
2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

Terminal	Input	Output	Connection to	Test condition	Correct voltage	Remark
1A	—	—	Battery	Constant	Approx. 12V	For backup
1B	○		Main relay (FUEL INJ relay)	Ignition switch OFF	Approx. 0V	—
				ON	Approx. 12V	—
1C	○		Ignition switch (START)	While cranking	Approx. 10V	—
				Ignition switch ON	Approx. 0V	—
1D		○	Self-Diagnosis Checker (Monitor lamp)	Test switch at "SELF-TEST" Lamp illuminated for 3 sec. after ignition switch OFF→ON	Approx. 5V	With Self-Diagnosis Checker and System Selector
				Lamp not illuminated after 3 sec.	Approx. 12V	
				Test switch at "O ₂ MONITOR" at idle Monitor lamp illuminated	Approx. 5V	
				Test switch at "O ₂ MONITOR" at idle Monitor lamp illuminated	Approx. 12V	
1F		○	Self-Diagnosis Checker (Code Number)	Buzzer sounded for 3 sec. after ignition switch OFF→ON	Below 2.5V	<ul style="list-style-type: none"> •With Self-Diagnosis Checker and System Selector •With System Selector test Selector at "SELF-TEST"
				Buzzer not sounded after 3 sec.	Approx. 12V	
				Buzzer sounded	Below 2.5V	
				Buzzer not sounded	Approx. 12V	
1G		○	Igniter	Ignition switch ON	Approx. 0V	—
				Idle	Approx. 0.2V	—
1K	○		Diagnosis connector (TEN terminal)	System selector test switch at "O ₂ MONITOR"	Approx. 12V	—
				System selector test switch at "SELF-TEST"	Below 1.0V	—
1R	○		Fan switch	Fan operating (Engine coolant temperature over 91°C (196°F), CANADA, 97°C (207°F), USA or diagnosis connector terminal TFA grounded)	Below 1.0V	—
				Fan not operating (Idle)	Approx. 12V	—
2J	○		Open (MTX)	Constant	Approx. 0V	—
			Main relay (FUEL INJ relay) (ATX)	Ignition switch ON	Approx. 12V	—

EXCEPT 4WD ■ ENGINE CONTROL SYSTEM (2/4)

A
C
S
S
B

EM-01 ENGINE CONTROL UNIT



F-06 POWER STEERING PRESSURE SWITCH (F)



EM-01 ENGINE CONTROL UNIT (EM)

1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	G/B	(G/R) G	*	L/G/Y	*	G/W	Y/B	V	L/R
BR/Y (B/L)	B/L	B/G	L/Y	R/W	* (BR/W)	L/B	*	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

() ... EC-AT ▲ ... DOHC <> ... CANADA

EM-07 OXYGEN SENSOR (EM)



FEM-01 FRONT (F) -EMISSION (EM)

B/D	(G/O) G/B		R/B	B/P	
L/R	L/B	B/G	O/L	Y/L	*

() ... EC-AT

(EM)

B/P	R/B		(G/O) G/B	B/D	
*	Y/L	O/L	B/G	L/B	L/R

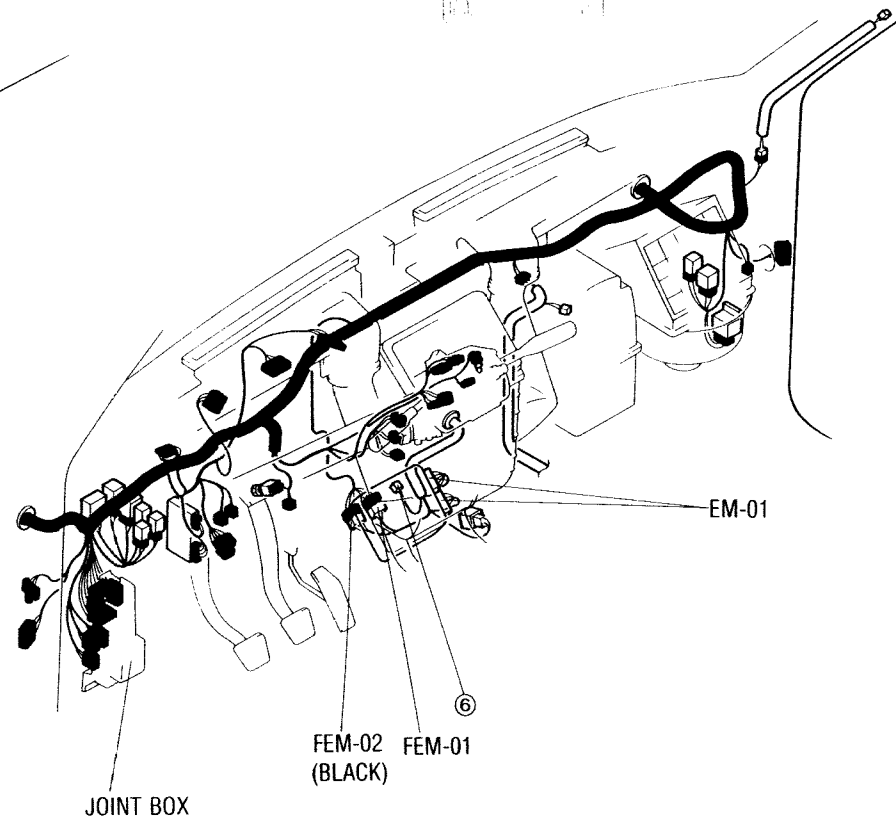
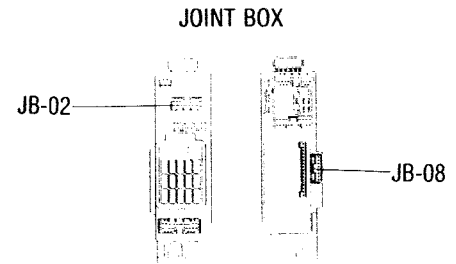
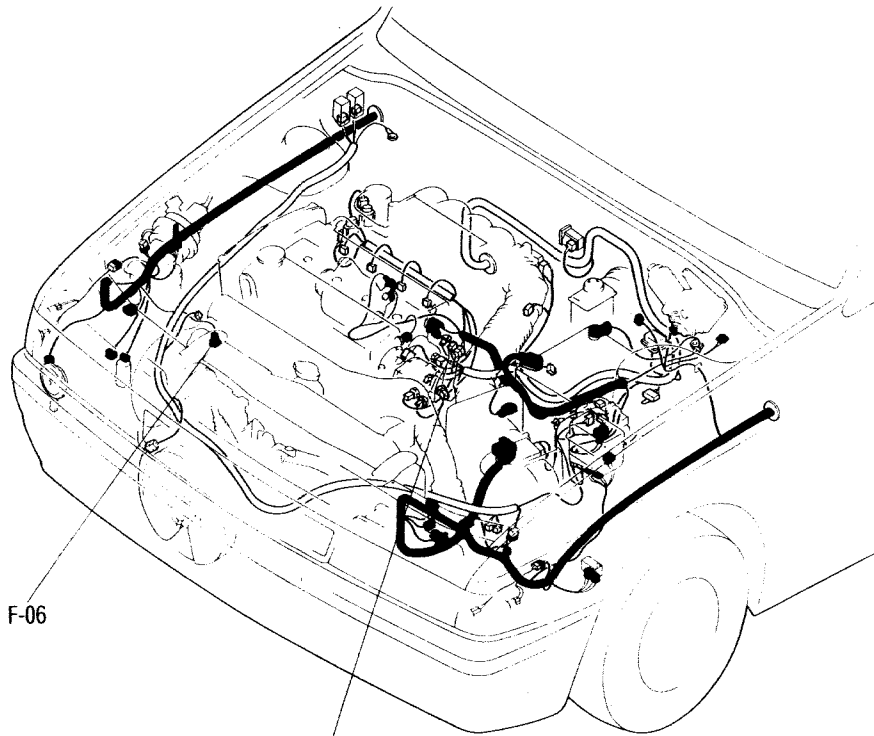
FEM-02 FRONT (F) -EMISSION (EM)

B	Y/B	(L/G)	(R/W)	(G/R)		(*)	<B/Y>	*	(L/G/W)
R/G	L/Y	*	(W)	(R)	<BR/W>	R/G	Y/W	(BL/G)	(L/G/R)
*	*	*	*	*	*	*	*	*	*

() ... EC-AT <> ... CANADA * ... 4WD

(EM)

(L/G/W)	*	<B/Y>	(*)		(G/R)	(R/W)	(L/G)	Y/B	B
*	*	*	BR/Y	*	G	*	*	*	*
(L/G/R)	(BL/G)	*Y/W	R/G	<BR/W>	(R)	(W)	*	L/Y	R/G
*	B/L	*	*	*	G/Y	*	*	*	*



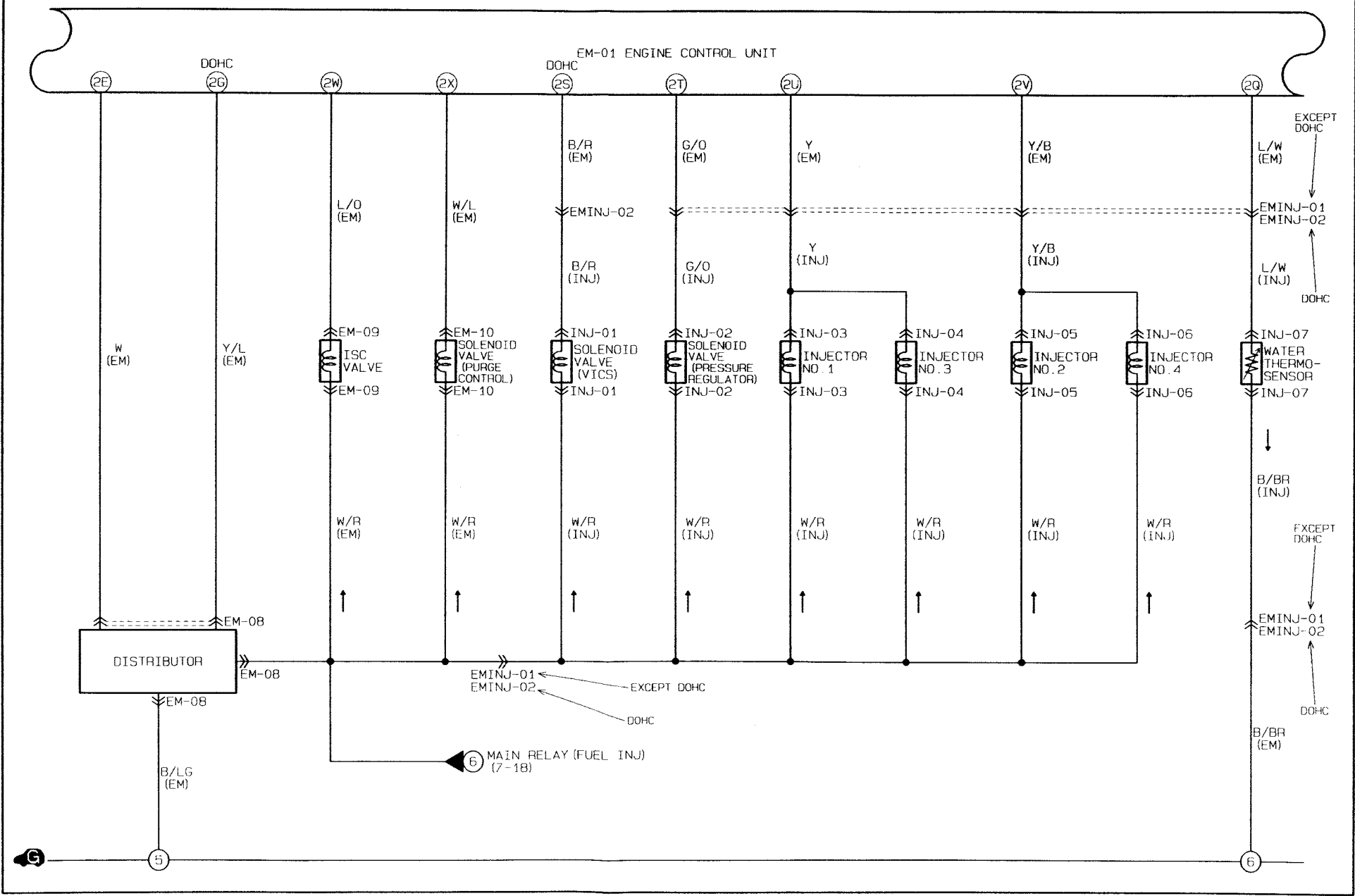
Engine control unit terminal (unit side)

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1U	1S	1G	1O	1M	1K	1I	1G	1E	1C	1A
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

Terminal	Input	Output	Connection to	Test condition	Correct voltage	Remark
1E		○	Malfunction indicator lamp (MIL)	Lamp illuminated for 3 sec. after ignition switch OFF→ON	Below 2.5V	With System Selector test switch at "SELF-TEST"
				Lamp not illuminated after 3 sec.	Approx. 12V	
				Lamp illuminated	Below 2.5V	
				Lamp not illuminated	Approx. 12V	
1J		○	A/C relay	Ignition switch ON	Approx. 12V	—
				A/C switch ON at idle	Below 2.5V	
				A/C switch OFF at idle	Approx. 12V	
1L	○	DRL relay (Canada)	Parking brake pulled with ignition switch ON (DRL OFF)	Approx. 12V	●DRL: Daytime Running Light	
			Idle (DRL ON)	Below 2.5V		
1O	○	Stoplight switch/EC-AT control unit (ATX)	Brake pedal released	Below 1.0V	—	
			Brake pedal depressed	Approx. 12V		
1P	○	P/S pressure switch	Ignition switch ON	Approx. 12V	—	
			P/S ON at idle	Below 1.0V		
			P/S OFF at idle	Approx. 12V		
1Q	○	A/C switch	A/C switch ON	Below 2.5V	Ignition switch ON and blower motor ON	
			A/C switch OFF	Approx. 12V		
1S	○	Blower control switch	Blower control switch OFF or 1st position	Approx. 12V	Ignition switch ON	
			Blower control switch 2nd or more position	Below 1.0V		
1T	○	Rear window defroster switch	Rear window defroster switch OFF	Below 1.0V	Ignition switch ON	
			Rear window defroster switch ON	Approx. 12V		
1U	○	Headlight switch	Headlights ON	Approx. 12V	—	
			Headlights OFF	Below 1.0V		
2N	○	Oxygen sensor	Ignition switch ON	0V	—	
			Idle (Cold engine)	0V		
			Idle (After warm-up)	0-1.0V		
			Increase engine speed (After warm-up)	0.5-1.0V		
			Deceleration	0-0.4V		

EXCEPT 4WD ■ ENGINE CONTROL SYSTEM (3/4)

A
2
1
5
B



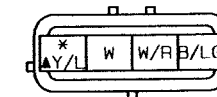
EM-01 ENGINE CONTROL UNIT (EM)

1U	1S	1Q	10	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	G/B	(G/R) G	*	LG/Y	*	G/W	Y/B	V	L/R
BR/Y (B/L)	B/L	B/G	L/Y	R/W	* <BR/W>	L/B	*	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

() ... EC-AT ▲ ... DOHC <> ... CANADA

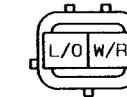
2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	
*	L/D	Y	▲B/R *	L/W	R	(L/G/W) *	LG/R	*	▲Y/L *	W	B/LG	B/O	
*	(L/G)	W/L	Y/B	G/O	*	R/B	B	LG/W (*)	W/R	▲B <B/Y>	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	

EM-08 DISTRIBUTOR (EM)

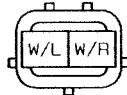


▲ ... DOHC

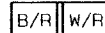
EM-09 ISC VALVE (EM)



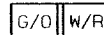
EM-10 SOLENOID VALVE (PURGE CONTROL) (EM)



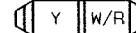
INJ-01 SOLENOID VALVE (VICS) (INJ)



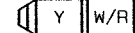
INJ-02 SOLENOID VALVE (PRESSURE REGULATOR) (INJ)



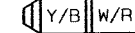
INJ-03 INJECTOR NO. 1 (INJ)



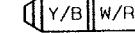
INJ-04 INJECTOR NO. 3 (INJ)



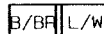
INJ-05 INJECTOR NO. 2 (INJ)



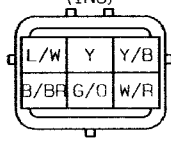
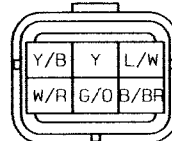
INJ-06 INJECTOR NO. 4 (INJ)



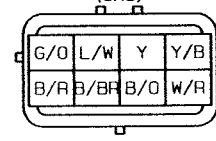
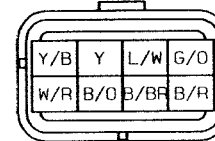
INJ-07 WATER THERMOSENSOR (INJ)



EMINJ-01 EMISSION (EM) - INJECTOR (INJ)

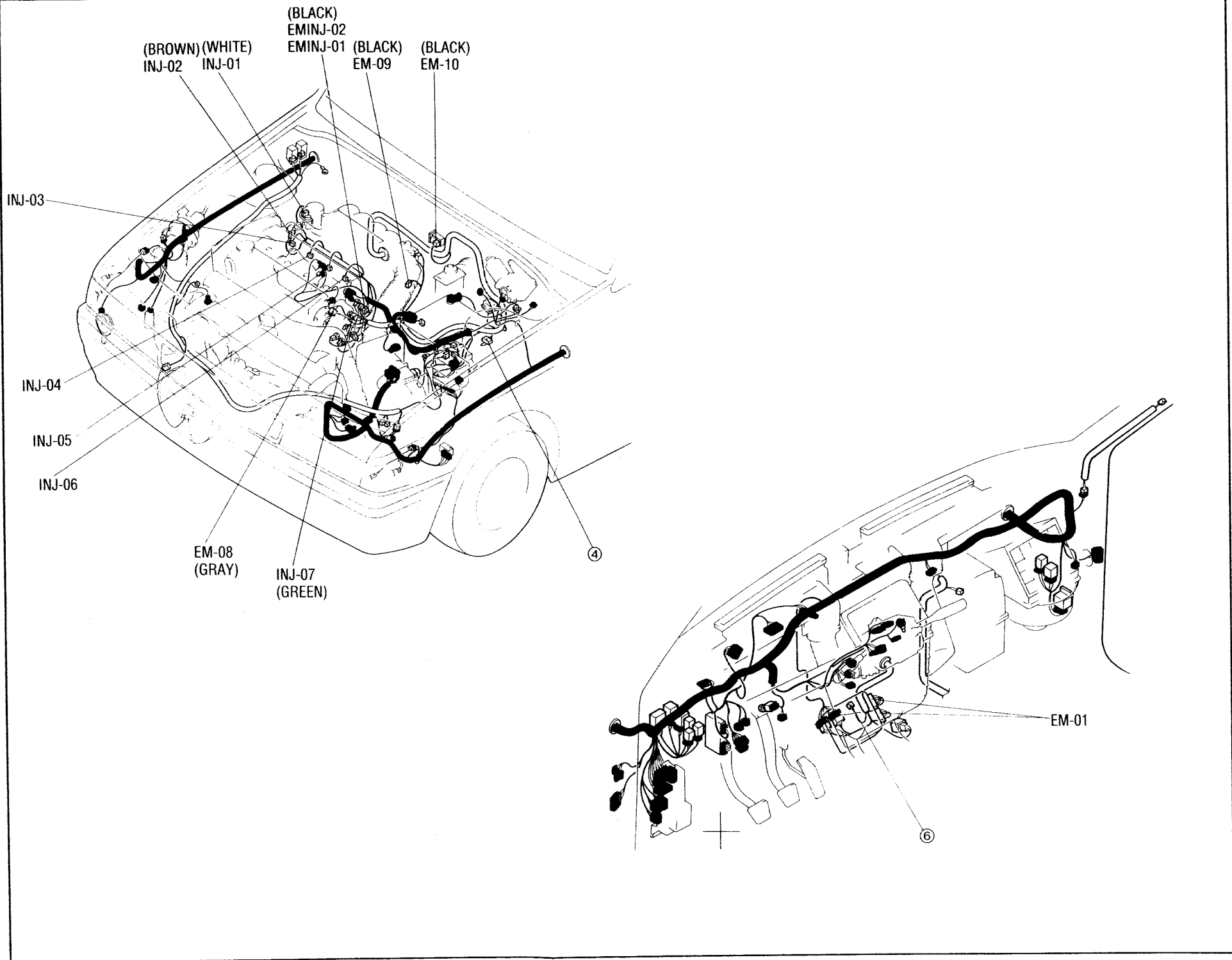


EMINJ-02 EMISSION (EM) - INJECTOR (INJ)



Z WIRING DIAGRAM

HARNESS COLOR FRONT ENGINE



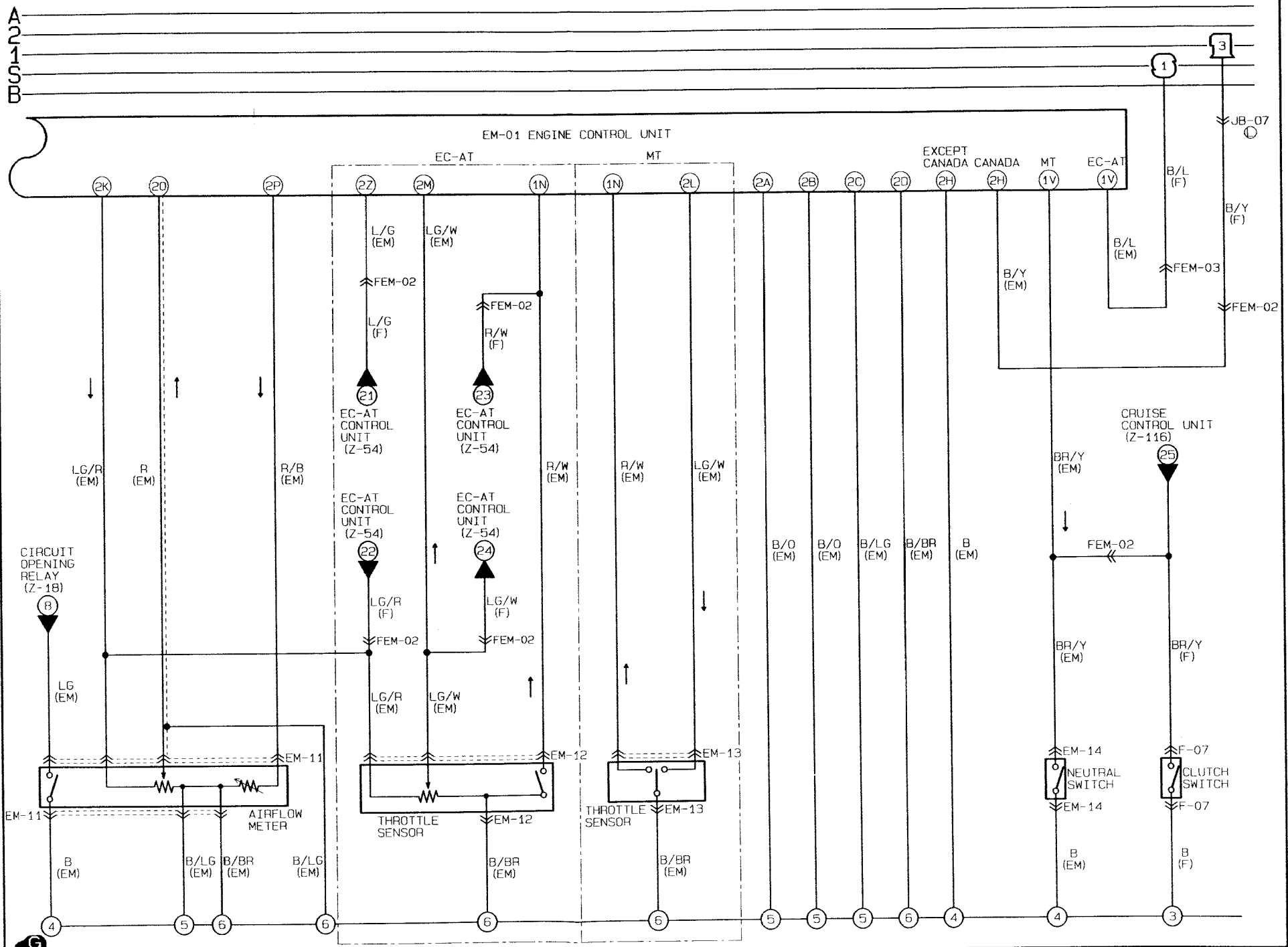
Engine control unit terminal (unit side)

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

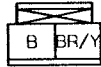
Terminal	Input	Output	Connection to	Test condition	Correct voltage	Remark
2E	○		Distributor (Ne-signal)	Ignition switch ON Idle	Approx. 0V or 5V Approx. 2V	
2G	○		Distributor (G-signal) [DOHC]	Ignition switch ON Idle	Approx. 0V or 5V Approx. 1.5V	
2Q	○		Water thermo-sensor	Engine coolant temperature 20°C (68°F) After warm-up	Approx. 2.5V Below 0.5V	
2S	○		Solenoid valve (VICS)	Engine speed below 5,000 rpm Engine speed above 5,000 rpm	Below 1.5V Approx. 12V	● VICS: Variable Inertia Charging System
2T	○		Solenoid valve (Pressure regulator) (BP)	60 seconds after engine started when engine coolant temperature above 90°C (194°F) and intake air temperature above 58°C (136°F) Other condition at idle	Below 1.5V Approx. 12V	
2U	○		Injector (Nos. 1, 3)	Ignition switch ON Idle Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx. 12V Approx. 12V* Approx. 12V	*Engine Signal Monitor: Green and red lamps flash
2V	○		Injector (Nos. 2, 4)	Ignition switch at idle Idle Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx. 12V Approx. 12V* Approx. 12V	
2W	○		ISC valve	Ignition switch ON Idle	Approx. 12V Approx. 10V	
2X	○		Solenoid valve (Purge control)	Ignition switch ON Idle	Approx. 12V Approx. 12V	

Z WIRING DIAGRAM

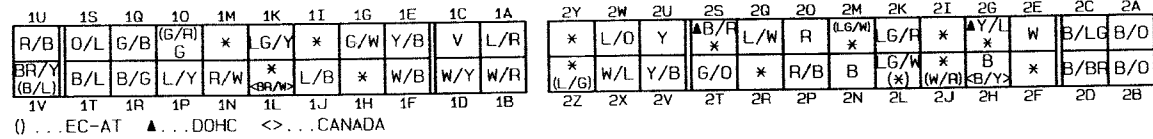
EXCEPT 4WD ■ ENGINE CONTROL SYSTEM (4/4)



F-07 CLUTCH SWITCH (F)



EM-01 ENGINE CONTROL UNIT (EM)



EM-11 AIRFLOW METER (EM)



EM-12 THROTTLE SENSOR (EM)



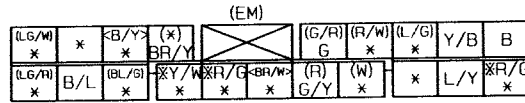
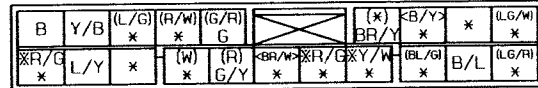
EM-13 THROTTLE SENSOR (EM)



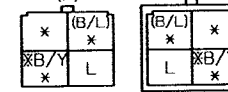
EM-14 NEUTRAL SWITCH (EM)



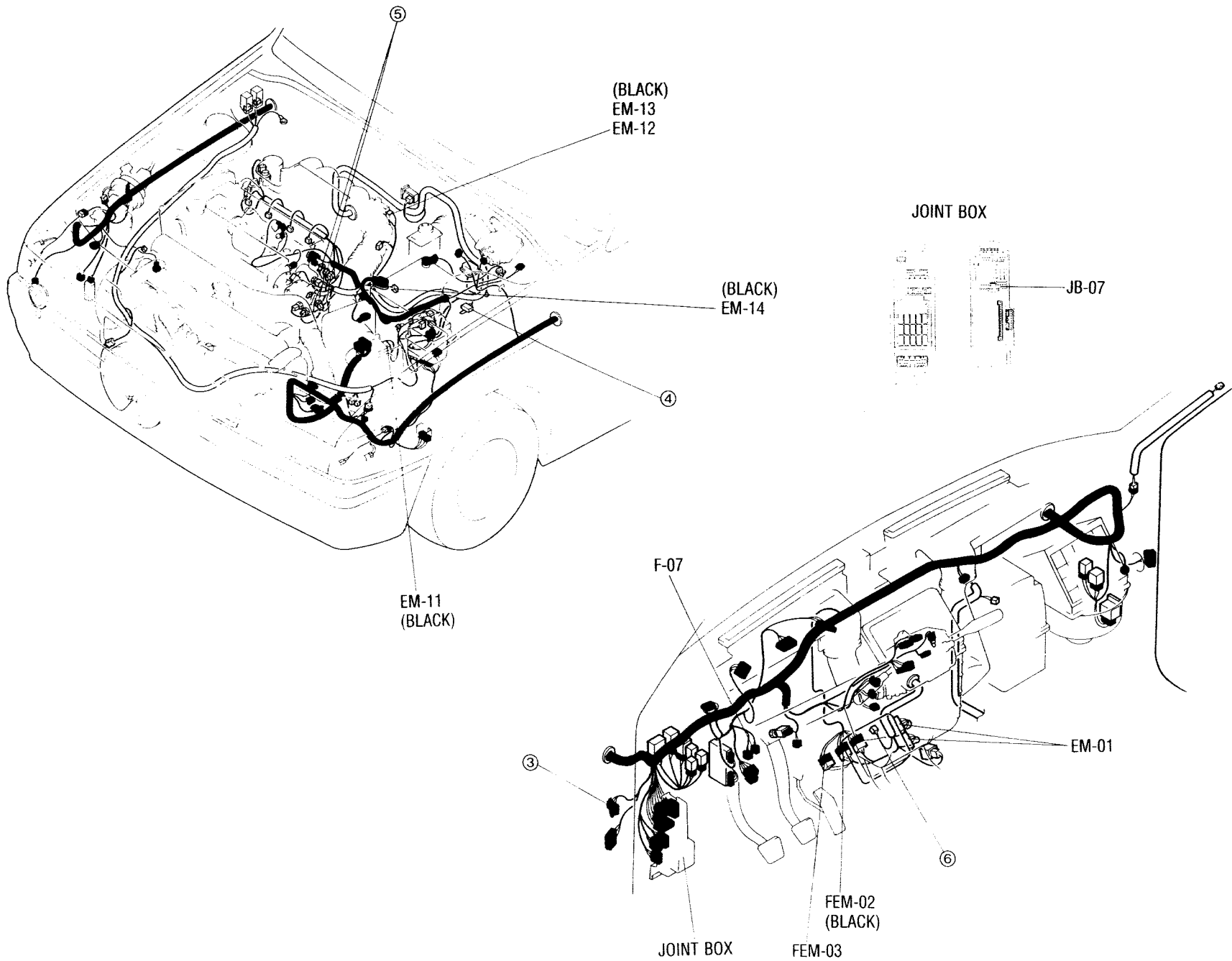
FEM-02 FRONT (F) -EMISSION (EM)



FEM-03 FRONT (F) -EMISSION (EM)



() ...EC-AT * ...4WD



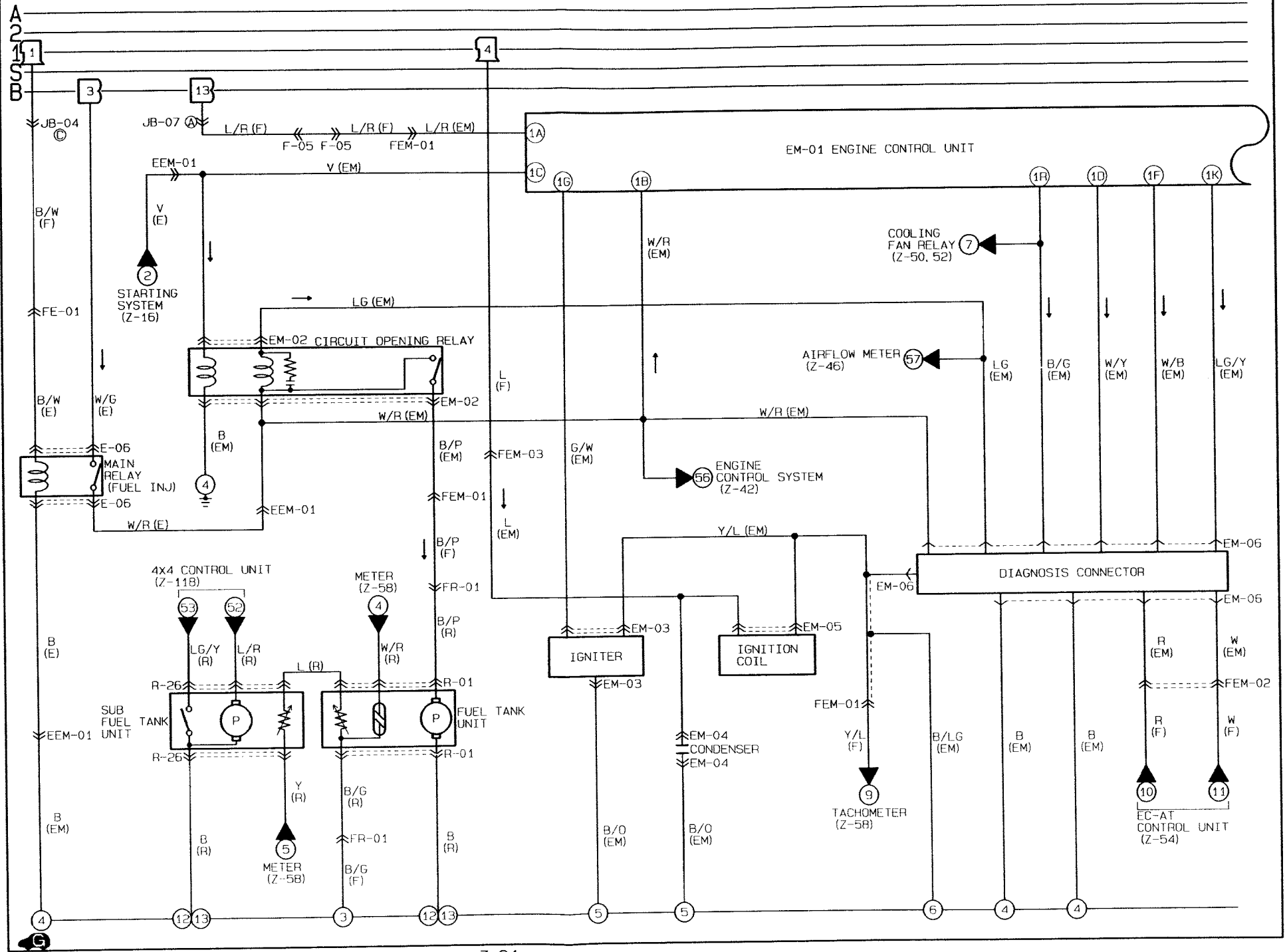
Engine control unit terminal (unit side)

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

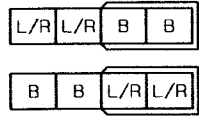
Terminal	Input	Output	Connection to	Test condition	Correct voltage	Remark
1N	○		Throttle sensor (Idle switch) (MTX/ATX) EC-AT control unit (ATX)	Accelerator pedal released Accelerator pedal depressed	Below 1.0V Approx. 12V	Ignition switch ON
1V	○		Neutral/Clutch switches (MTX) Inhibitor switch (ATX)	Neutral position or clutch pedal depressed Others N or P range Others	Below 1.0V Approx. 12V Below 1.0V Approx. 12V	
2A	—	—	Ground (Injector)	Constant	0V	—
2B	—	—	Ground (Output)	Constant	0V	—
2C	—	—	Ground (CPU)	Constant	0V	—
2D	—	—	Ground (Input)	Constant	0V	—
2H	○		Ground (California) Open (Federal) Main relay (Canada)	Constant Constant Ignition switch ON	0V Approx. 2V Approx. 12V	—
2K	○		Throttle sensor (ATX)/EC-AT control unit (ATX)/Airflow meter	Constant	4.5-5.5V	
2L	○		Throttle sensor (Power switch) (MTX)	Accelerator pedal released Accelerator pedal fully opened	Approx. 5V Below 1.0V	
2M	○		Throttle sensor (ATX)/EC-AT control unit (ATX)	Accelerator pedal released Accelerator pedal fully opened	Approx. 0.5V Approx. 4.0V	
2O	○		Airflow meter	Ignition switch ON Idle	Approx. 3.8V Approx. 3.3V	
2P	○		Intake air thermo-sensor	Ambient air temperature 20°C (68°F)	Approx. 2.5V	Built in airflow meter
2Z		○	EC-AT control unit (ATX)	Engine coolant temperature below 72°C (162°F) at idle Engine coolant temperature above 72°C (162°F) at idle	Below 2.5V Approx. 12V	

Z WIRING DIAGRAM

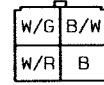
4WD ■ ENGINE CONTROL SYSTEM (1/4)



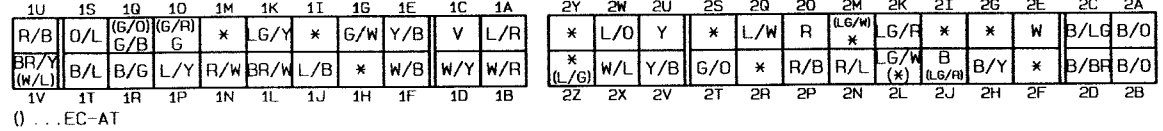
F-05 JOINT CONNECTOR (F)



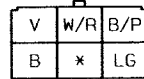
E-06 MAIN RELAY (E)
(FUEL INJ)



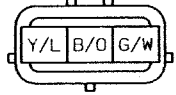
EM-01 ENGINE CONTROL UNIT (EM)



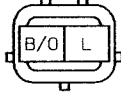
EM-02 CIRCUIT OPENING RELAY (EM)



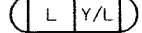
EM-03 IGNITER (EM)



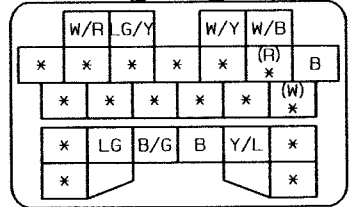
EM-04 CONDENSER (EM)



EM-05 IGNITION COIL (EM)



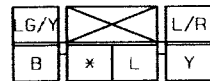
EM-06 DIAGNOSIS CONNECTOR (EM)



R-01 FUEL TANK UNIT (R)



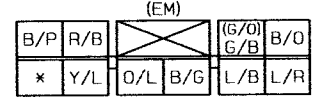
R-26 SUB FUEL TANK UNIT (R)



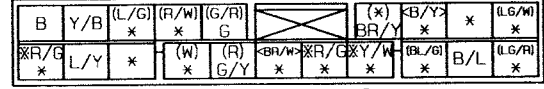
FEM-01 FRONT (F) -EMISSION (EM)



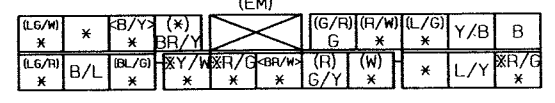
() ...EC-AT



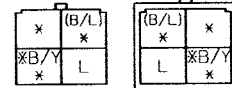
FEM-02 FRONT (F) -EMISSION (EM)



() ...EC-AT <>...CANADA *...4WD

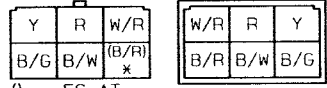


FEM-03 FRONT (F) -EMISSION (EM)



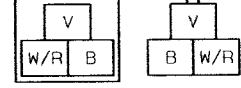
() ...EC-AT *...4WD

FE-01 FRONT (F) -ENGINE (E)

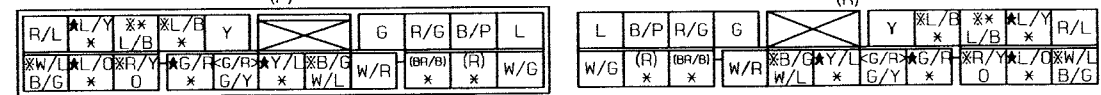


() ...EC-AT

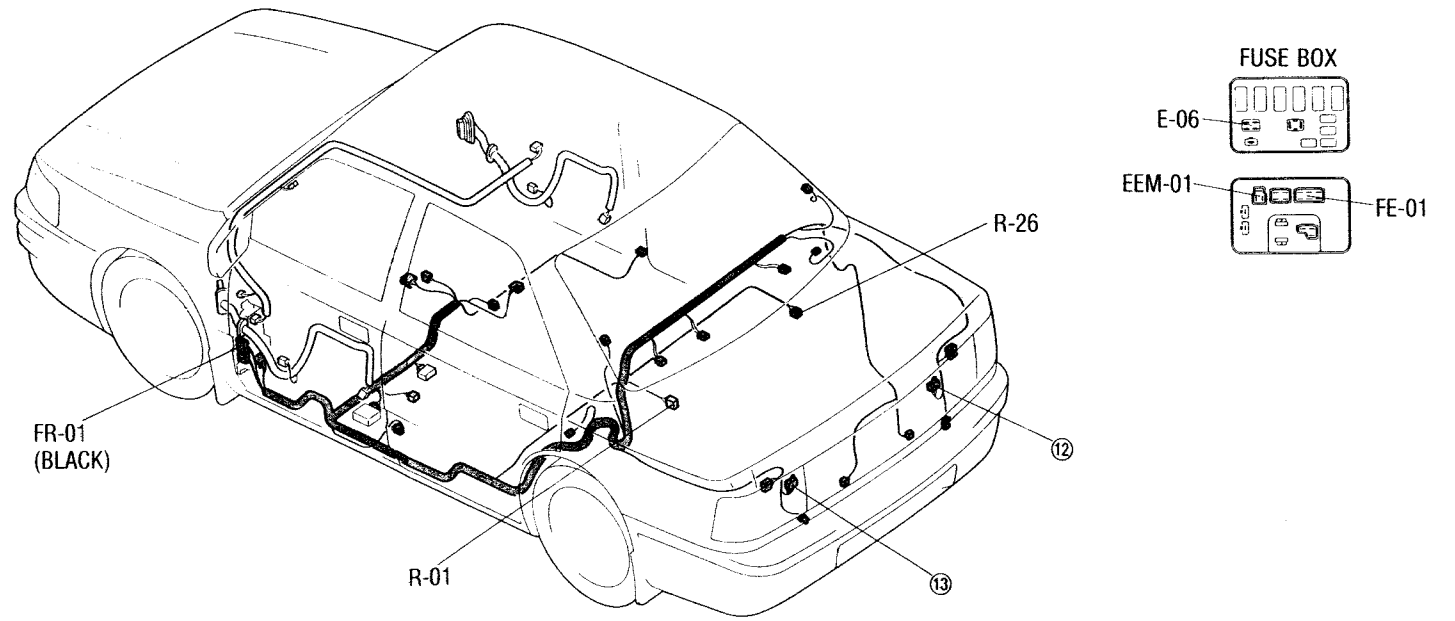
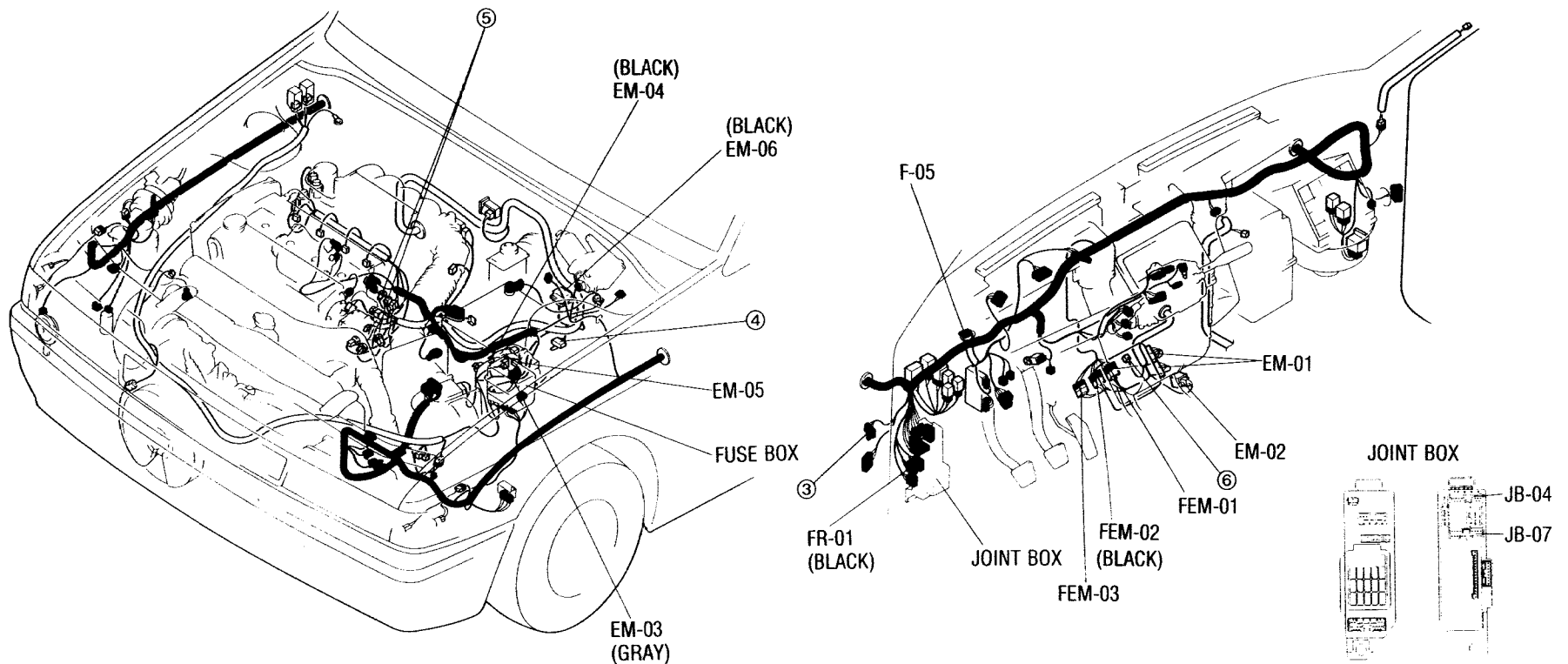
EEM-01 ENGINE (E) -EMISSION (EM)



FR-01 FRONT (F) -REAR (R)



() ...EC-AT <>...CANADA *...WITH PASSIVE SHOULDER BELT []...SEDAN *...4WD



Engine control unit terminal (unit side)

2Y	2W	2U	2S	2O	2N	2M	2K	2I	2G	2E	2C	2A	1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

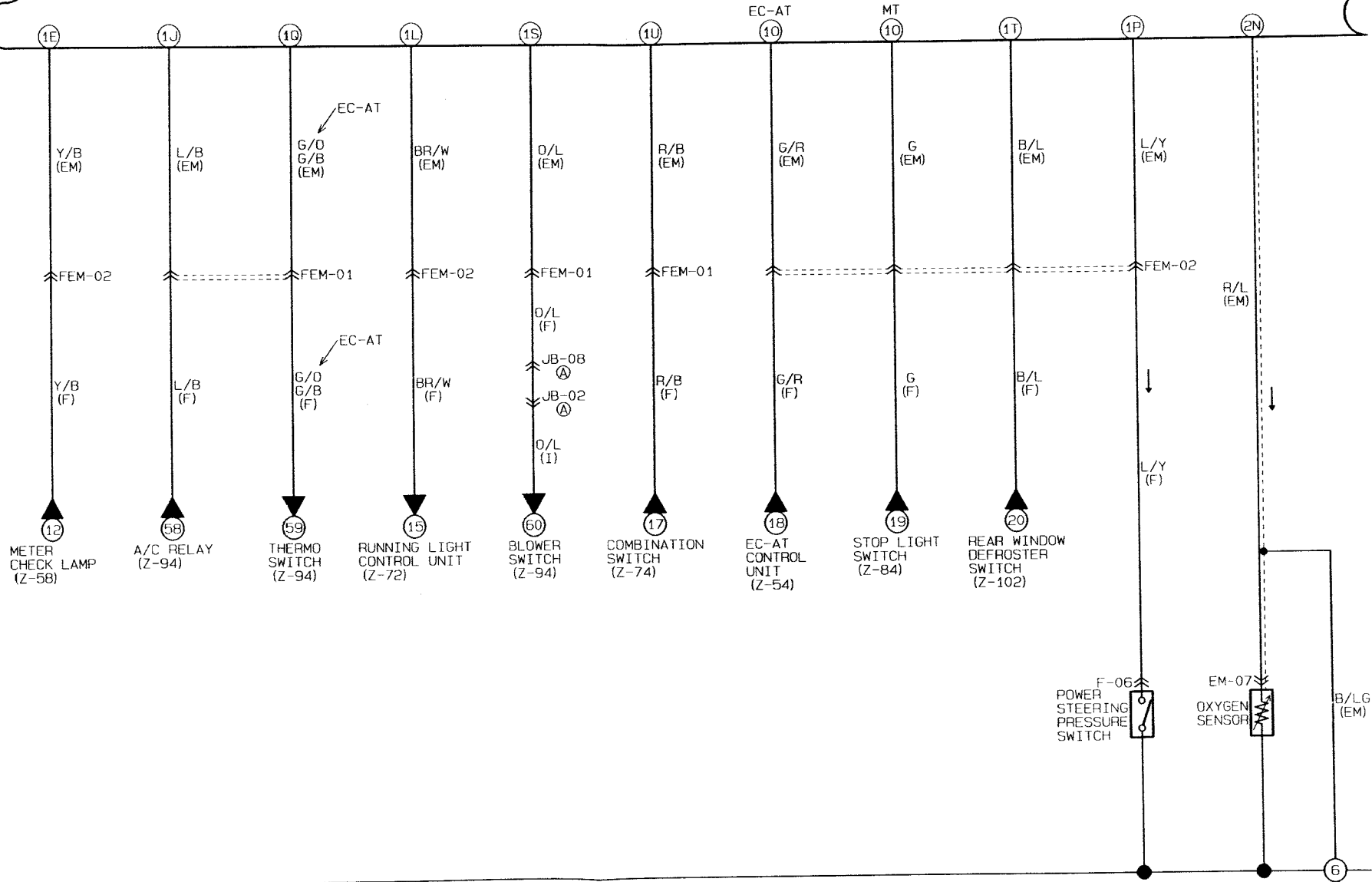
Terminal	Input	Output	Connection to	Test condition	Correct voltage	Remark
1A	—	—	Battery	Constant	Approx. 12V	For backup
1B	○	—	Main relay (FUEL INJ relay)	Ignition switch OFF	Approx. 0V	—
				Ignition switch ON	Approx. 12V	—
1C	○	—	Ignition switch (START)	While cranking	Approx. 10V	—
				Ignition switch ON	Approx. 0V	—
1D	○	○	Self-Diagnosis Checker (Monitor lamp)	Test switch at "SELF-TEST" Lamp illuminated for 3 sec. after ignition switch OFF→ON	Approx. 5V	With Self-Diagnosis Checker and System Selector
				Lamp not illuminated after 3 sec.	Approx. 12V	
				Test switch at "O ₂ MONITOR" at idle Monitor lamp illuminated	Approx. 5V	
				Test switch at "O ₂ MONITOR" at idle Monitor lamp illuminated	Approx. 12V	
1F	○	○	Self-Diagnosis Checker (Code Number)	Buzzer sounded for 3 sec. after ignition switch OFF→ON	Below 2.5V	<ul style="list-style-type: none"> • With Self-Diagnosis Checker and System Selector • With System Selector test Selector at "SELF-TEST"
				Buzzer not sounded after 3 sec.	Approx. 12V	
				Buzzer sounded	Below 2.5V	
				Buzzer not sounded	Approx. 12V	
1G	○	○	Igniter	Ignition switch ON	Approx. 0V	—
				Idle	Approx. 0.2V	—
1K	○	—	Diagnosis connector (TEN terminal)	System selector test switch at "O ₂ MONITOR"	Approx. 12V	—
				System selector test switch at "SELF-TEST"	Below 1.0V	—
1R	○	○	Fan switch	Fan operating (Engine coolant temperature over 91°C (196°F). CANADA. 97°C (207°F) USA or diagnosis connector terminal TFA grounded)	Below 1.0V	—
				Fan not operating (Idle)	Approx. 12V	—

Z WIRING DIAGRAM

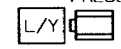
4WD ■ ENGINE CONTROL SYSTEM (2/4)

A
S
S
E
M
B
L
Y

EM-01 ENGINE CONTROL UNIT



F-06 POWER STEERING PRESSURE SWITCH (F)



EM-01 ENGINE CONTROL UNIT (EM)

1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	(G/O) G/B	(G/R) G	*	L/G/Y	*	G/W	Y/B	V	L/R
BR/Y (W/L)	B/L	B/G	L/Y	R/W	BR/W	L/B	*	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

() ...EC-AT

EM-07 OXYGEN SENSOR (EM)



2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
*	L/D	Y	*	L/W	R	(L/G/W) *	L/G/R	*	*	W	B/LG	B/O
*	W/L	Y/B	G/O	*	R/B	R/L	L/G/W (*)	B (L/G/R)	B/Y	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

FEM-01 FRONT (F) -EMISSION (EM)

B/O	(G/O) G/B		R/B	B/P	
L/R	L/B	B/G	O/L	Y/L	*

() ...EC-AT

(EM)

B/P	R/B		(G/O) G/B	B/O	
*	Y/L	O/L	B/G	L/B	L/R

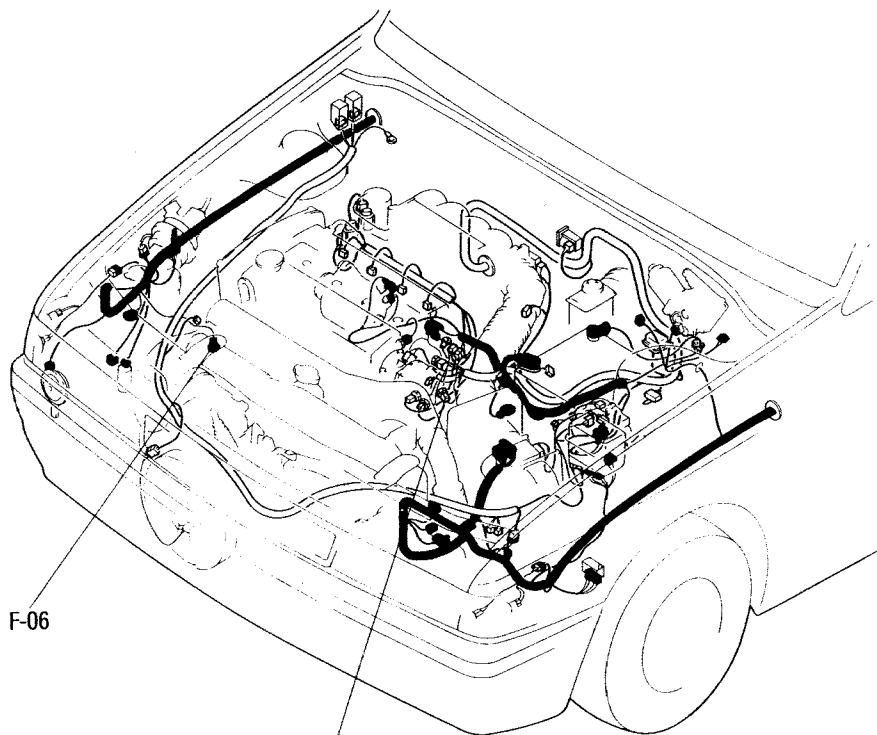
FEM-02 FRONT (F) -EMISSION (EM)

B	Y/B	(L/G) *	(R/W) *	(G/R) G		(*) BR/Y	<B/Y> *	(L/G/W) *		
R/G *	L/Y	*	(W) *	(R) G/Y	<BR/W> *	R/G *	Y/W *	(BL/G) *	B/L	(L/G/R) *

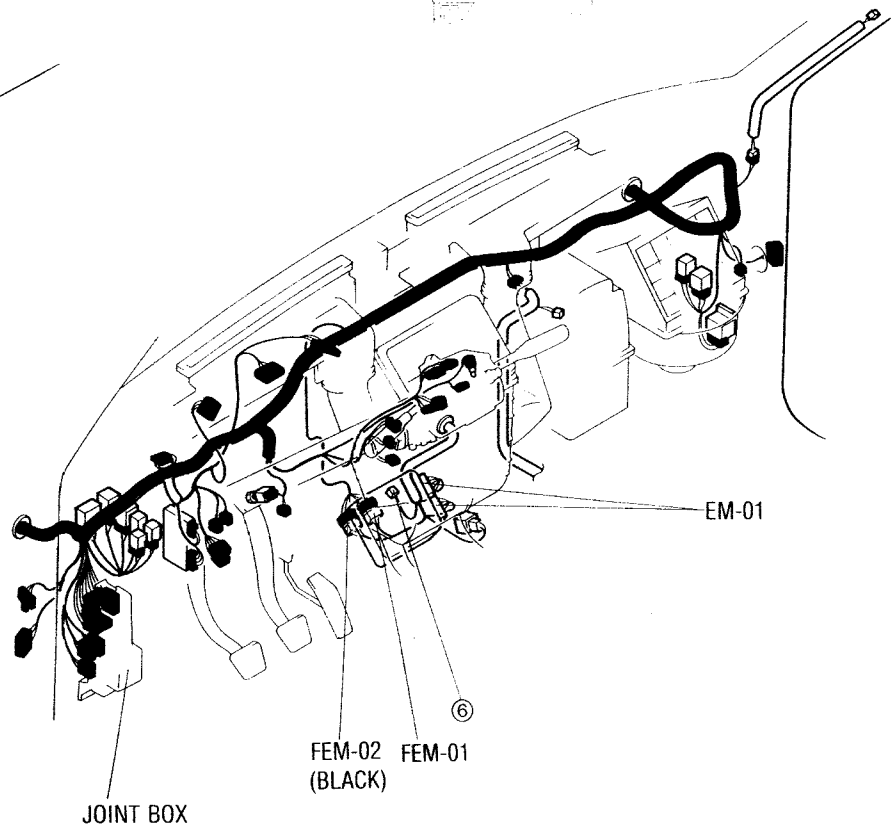
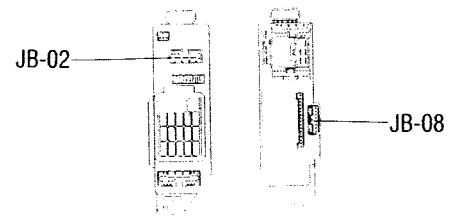
() ...EC-AT <> ...CANADA * ...4WD

(EM)

(L/G/W) *	*	<B/Y> *	(*) BR/Y		(G/R) G	(R/W) *	(L/G) *	Y/B	B
(L/G/R) *	B/L	(BL/G) *	<Y/W> *	R/G *	(R) G/Y	(W) *	*	L/Y	R/G *



JOINT BOX



Engine control unit terminal (unit side)

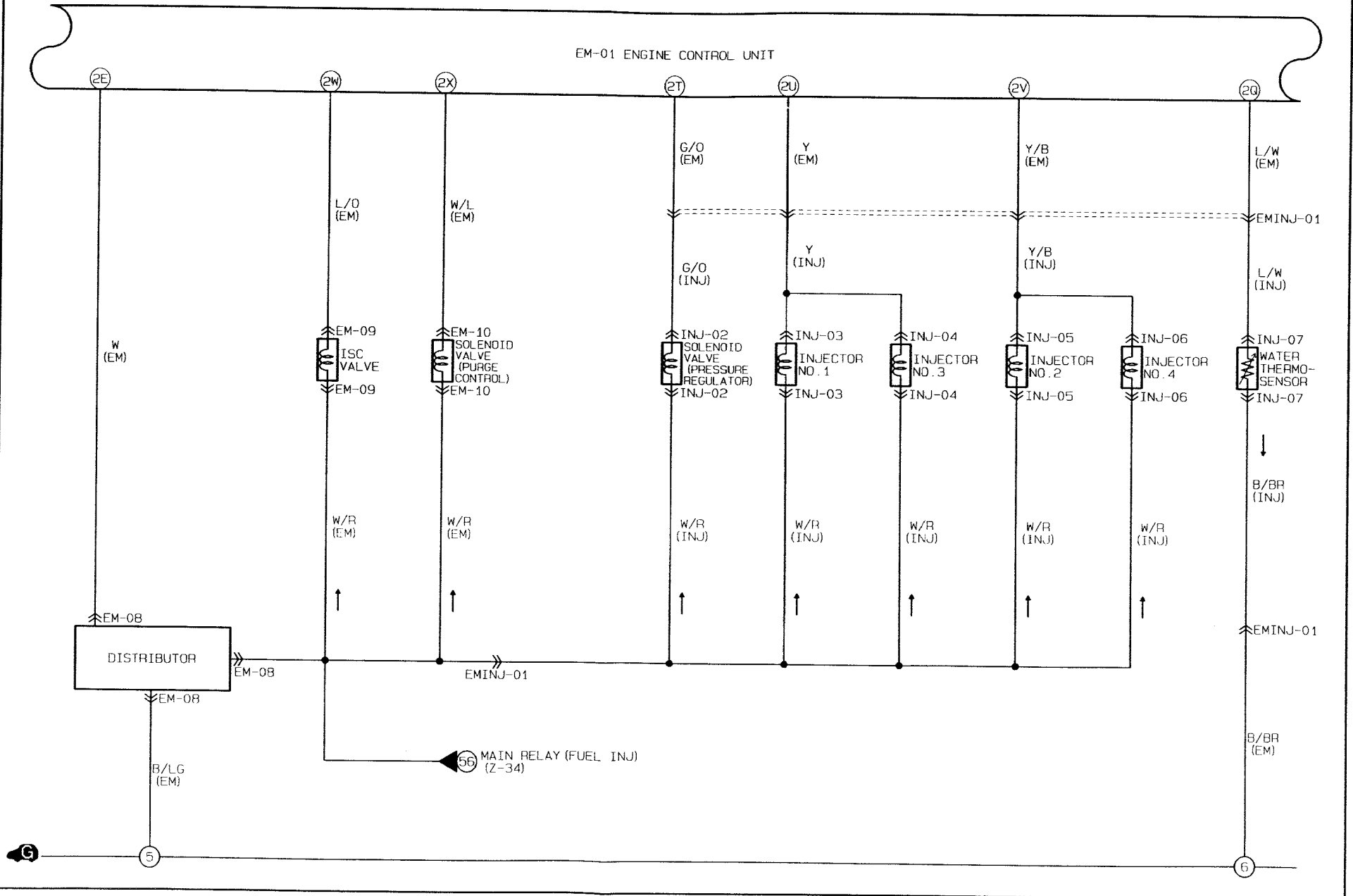
2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

Terminal	Input	Output	Connection to	Test condition	Correct voltage	Remark
1E		○	Malfunction indicator lamp (MIL)	Lamp illuminated for 3 sec. after ignition switch OFF→ON Lamp not illuminated after 3 sec. Lamp illuminated Lamp not illuminated	Below 2.5V Approx. 12V Below 2.5V Approx. 12V	With System Selector test switch at "SELF-TEST"
1J		○	A/C relay	Ignition switch ON A/C switch ON at idle A/C switch OFF at idle	Approx. 12V Below 2.5V Approx. 12V	—
1L		○	DRL relay (Canada)	Parking brake pulled with ignition switch ON (DRL OFF) Idle (DRL ON)	Approx. 12V Below 2.5V	•DRL Daytime Running Light
1O		○	Stoplight switch/EC-AT control unit (ATX)	Brake pedal released Brake pedal depressed	Below 1.0V Approx. 12V	—
1P		○	P/S pressure switch	Ignition switch ON P/S ON at idle P/S OFF at idle	Approx. 12V Below 1.0V Approx. 12V	—
1Q		○	A/C switch	A/C switch ON A/C switch OFF	Below 2.5V Approx. 12V	Ignition switch ON and blower motor ON
1S		○	Blower control switch	Blower control switch OFF or 1st position Blower control switch 2nd or more position	Approx. 12V Below 1.0V	Ignition switch ON
1T		○	Rear window defroster switch	Rear window defroster switch OFF Rear window defroster switch ON	Below 1.0V Approx. 12V	Ignition switch ON
1U		○	Headlight switch	Headlights ON Headlights OFF	Approx. 12V Below 1.0V	
2N		○	Oxygen sensor	Ignition switch ON Idle (Cold engine) Idle (After warm-up) Increase engine speed (After warm-up) Deceleration	0V 0V 0-1.0V 0.5-1.0V 0-0.4V	

4WD ■ ENGINE CONTROL SYSTEM (3/4)

A
2
1
S
B

EM-01 ENGINE CONTROL UNIT



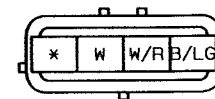
EM-01 ENGINE CONTROL UNIT (EM)

1U	1S	1Q	10	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	(G/O) G/B	(G/R) G	*	LG/Y	*	G/W	Y/B	V	L/R
BR/Y (W/L)	B/L	B/G	L/Y	R/W	BR/W	L/B	*	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

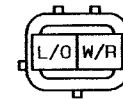
() ... EC-AT

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
*	L/O	Y	*	L/W	R	(L/G/W) *	LG/R	*	*	W	B/LG	B/O
*	W/L	Y/B	G/O	*	R/B	R/L	G/W (*)	B (L/G/R)	B/Y	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

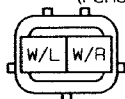
EM-08 DISTRIBUTOR (EM)



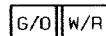
EM-09 ISC VALVE (EM)



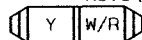
EM-10 SOLENOID VALVE (PURGE CONTROL) (EM)



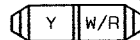
INJ-02 SOLENOID VALVE (PRESSURE REGULATOR) (INJ)



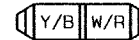
INJ-03 INJECTOR NO. 1 (INJ)



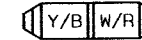
INJ-04 INJECTOR NO. 3 (INJ)



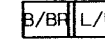
INJ-05 INJECTOR NO. 2 (INJ)



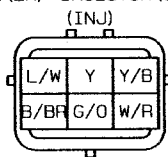
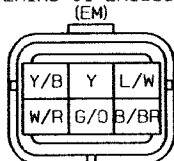
INJ-06 INJECTOR NO. 4 (INJ)

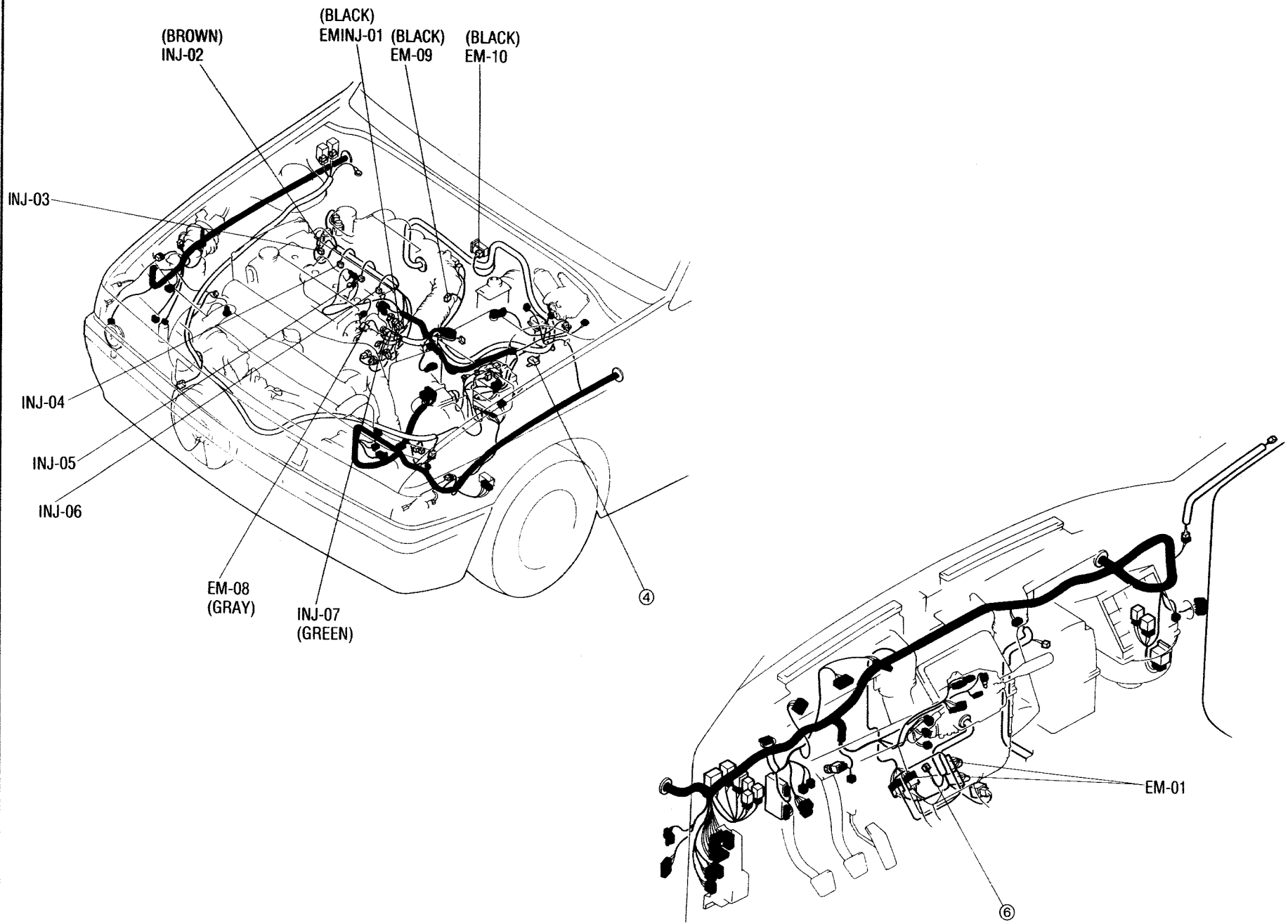


INJ-07 WATER THERMOSENSOR (INJ)



EMINJ-01 EMISSION (EM) - INJECTOR (INJ)



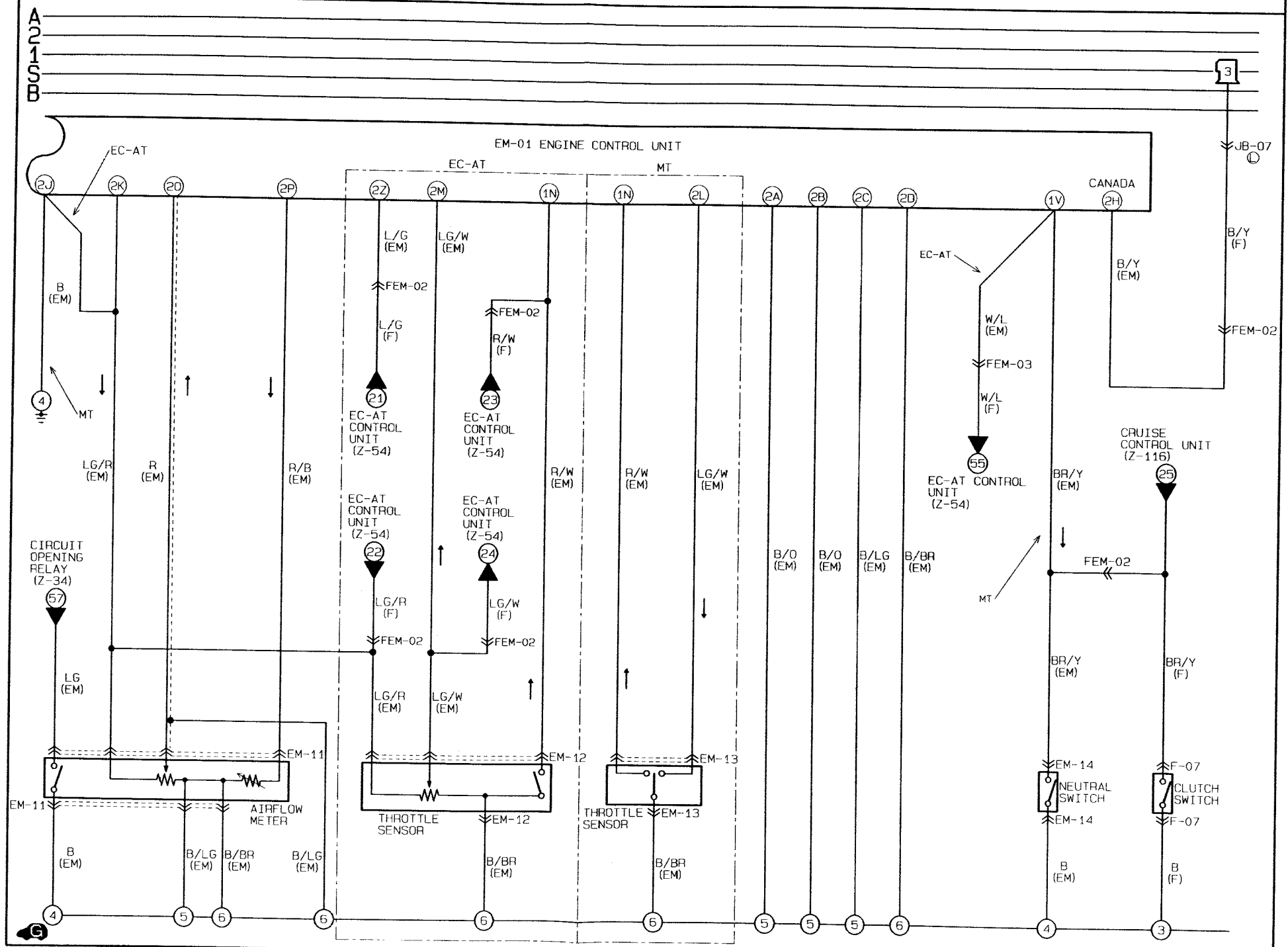


Engine control unit terminal (unit side)

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

Terminal	Input	Output	Connection to	Test condition	Correct voltage	Remark
2E	○		Distributor (Ne signal)	Ignition switch ON Idle	Approx 0V or 5V Approx 2V	
2Q	○		Water thermo-sensor	Engine coolant temperature 20°C (68°F) After warm-up	Approx 2.5V Below 0.5V	
2T	○		Solenoid valve (Pressure regulator) (BP)	60 seconds after engine started when engine coolant temperature above 90°C (194°F) and intake air temperature above 58°C (136°F) Other condition at idle	Below 1.5V Approx 12V	
2U	○		Injector (Nos. 1, 3)	Ignition switch ON Idle Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx 12V Approx 12V Approx 12V	*Engine Signal Monitor. Green and red lamps flash
2V	○		Injector (Nos. 2, 4)	Ignition switch at idle Idle Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx 12V Approx 12V* Approx 12V	
2W	○		ISC valve	Ignition switch ON Idle	Approx 12V Approx 10V	
2X	○		Solenoid valve (Purge control)	Ignition switch ON Idle	Approx 12V Approx 12V	

4WD ■ ENGINE CONTROL SYSTEM (4/4)



F-07 CLUTCH SWITCH (F)



EM-01 ENGINE CONTROL UNIT (EM)

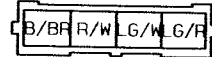
1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A	2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
R/B	O/L	(G/O) G/B	(G/R) G	*	LG/Y	*	G/W	Y/B	V	L/R	*	L/O	Y	*	L/W	R	(L/G/W) *	LG/R	*	*	W	B/LG	B/O
BR/Y (W/L)	B/L	B/G	L/Y	R/W	BR/W	L/B	*	W/B	W/Y	W/R	(L/G)	W/L	Y/B	G/O	*	R/B	R/L	(L/G/W) (*)	B	B/Y	*	B/BR	B/O
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B	2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

() ...EC-AT

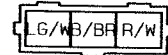
EM-11 AIRFLOW METER (EM)



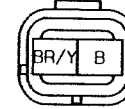
EM-12 THROTTLE SENSOR (EM)



EM-13 THROTTLE SENSOR (EM)



EM-14 NEUTRAL SWITCH (EM)



FEM-02 FRONT (F) -EMISSION (EM)

B	Y/B	(L/G) *	(R/W) *	(G/R) G		(*) BR/Y	(B/Y) *	(L/G/W) *
(R/G) *	L/Y	*	(W) *	(R) G/Y	(BR/W) *	(R/G) *	(L/G/R) *	

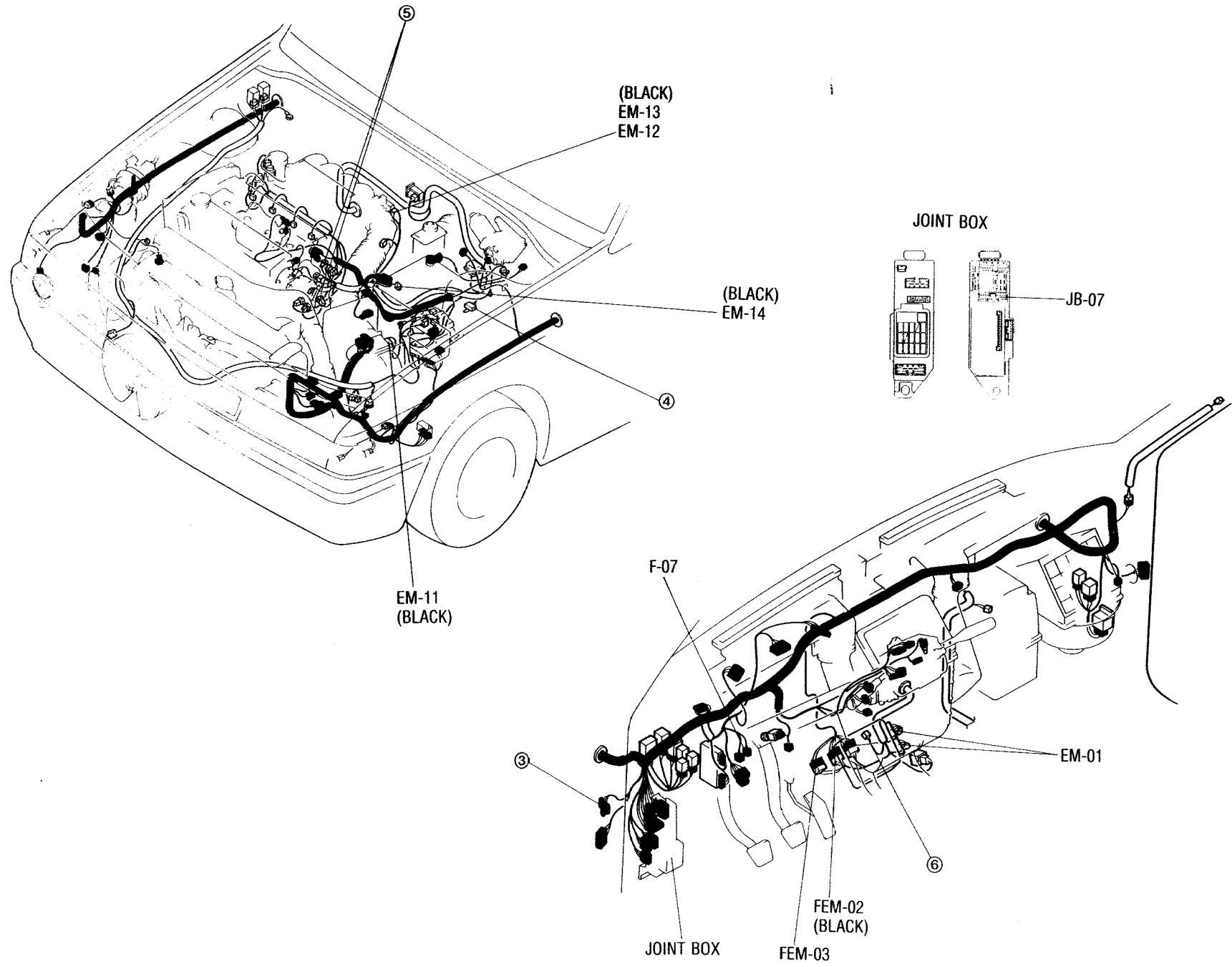
() ...EC-AT <> ...CANADA * ...4WD

(L/G/W) *	*	(B/Y) *	(*) BR/Y		(G/R) G	(R/W) *	(L/G) *	Y/B	B
(L/G/R) *	B/L	(L/G) *	(R/W) *	(R) G/Y	(W) *	*	L/Y	(R/G) *	

FEM-03 FRONT (F) -EMISSION (EM)

*	(B/L) *
(B/L) *	*

() ...EC-AT * ...4WD

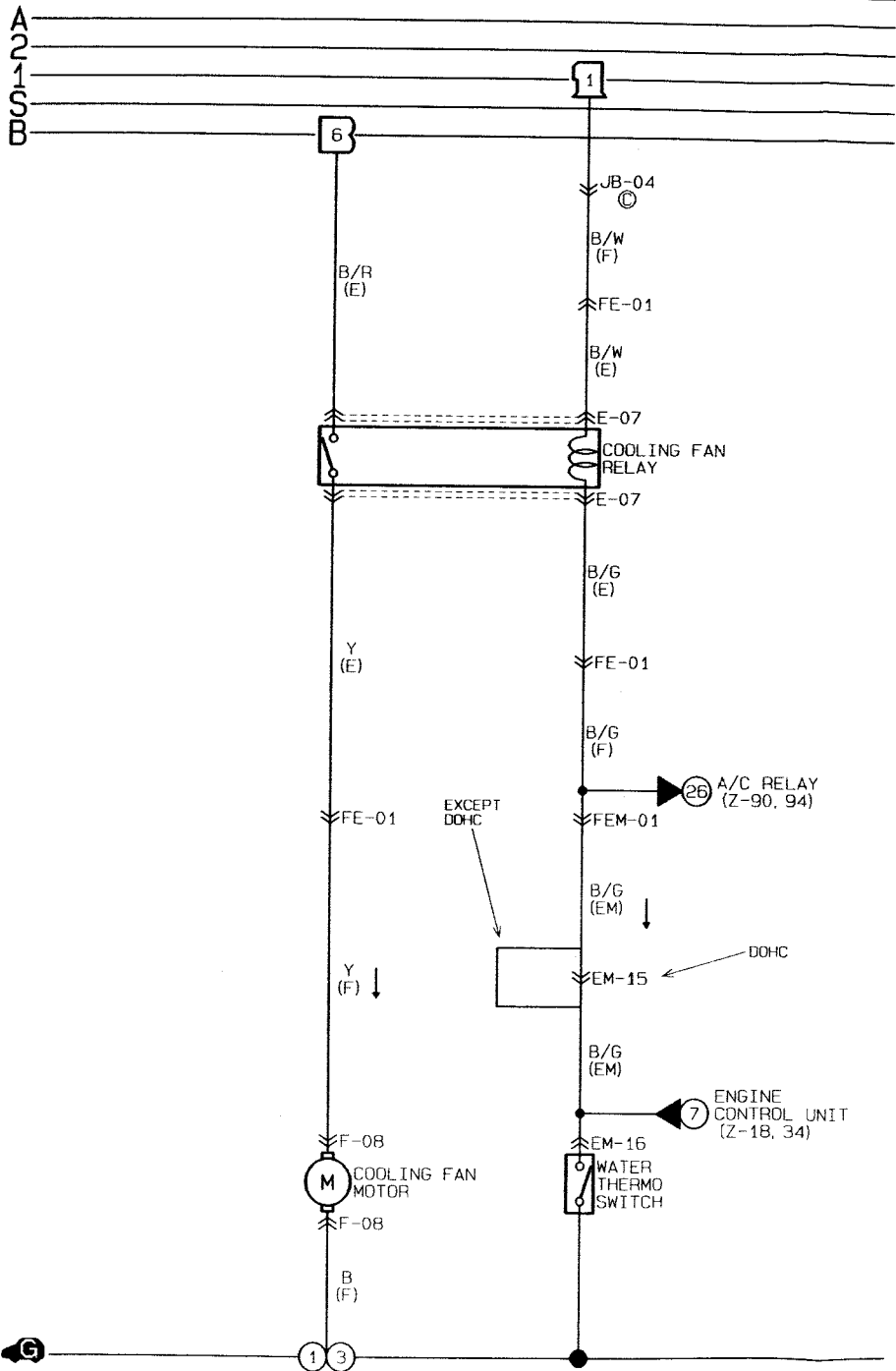


Engine control unit terminal (unit side)

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A	1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B	1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

Terminal	Input	Output	Connection to	Test condition	Correct voltage	Remark
1N	○		Throttle sensor (Idle switch) (MTX/ATX) EC-AT control unit (ATX)	Accelerator pedal released Accelerator pedal depressed	Below 1.0V Approx. 12V	Ignition switch ON
1V	○		Neutral/Clutch switches (MTX) Inhibitor switch (ATX)	Neutral position or clutch pedal depressed Others N or P range Others	Below 1.0V Approx. 12V Below 1.0V Approx. 12V	
2A	—	—	Ground (Injector)	Constant	0V	—
2B	—	—	Ground (Output)	Constant	0V	—
2C	—	—	Ground (CPU)	Constant	0V	—
2D	—	—	Ground (Input)	Constant	0V	—
2H	○		Ground (California) Open (Federal) Main relay (Canada)	Constant Constant Ignition switch ON	0V Approx. 2V Approx. 12V	— — —
2J	— ○	—	Ground (MTX) Throttle sensor (ATX)/EC-AT control unit (ATX)/Airflow meter	Constant Constant	0V 4.5-5.5V	— —
2K	○		Throttle sensor (ATX)/EC-AT control unit (ATX)/Airflow meter	Constant	4.5-5.5V	—
2L	○		Throttle sensor (Power switch) (MTX)	Accelerator pedal released Accelerator pedal fully opened	Approx. 5V Below 1.0V	—
2M	○		Throttle sensor (ATX)/EC-AT control unit (ATX)	Accelerator pedal released Accelerator pedal fully opened	Approx. 0.5V Approx. 4.0V	—
2O	○		Airflow meter	Ignition switch ON Idle	Approx. 3.8V Approx. 3.3V	—
2P	○		Intake air thermo-sensor	Ambient air temperature 20°C (68°F)	Approx. 2.5V	Built in airflow meter
2Z	○		EC-AT control unit (ATX)	Engine coolant temperature below 72°C (162°F) at idle Engine coolant temperature above 72°C (162°F) at idle	Below 2.5V Approx. 12V	

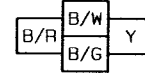
MT ■ COOLING FAN SYSTEM



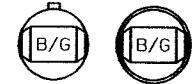
F-08 COOLING FAN MOTOR (F)



E-07 COOLING FAN RELAY (E)



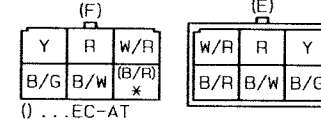
EM-15 SHORT CONNECTOR (EM)



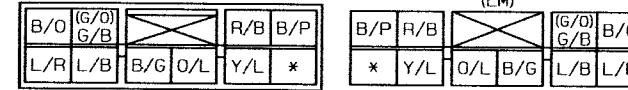
EM-16 WATER THERMO SWITCH (EM)



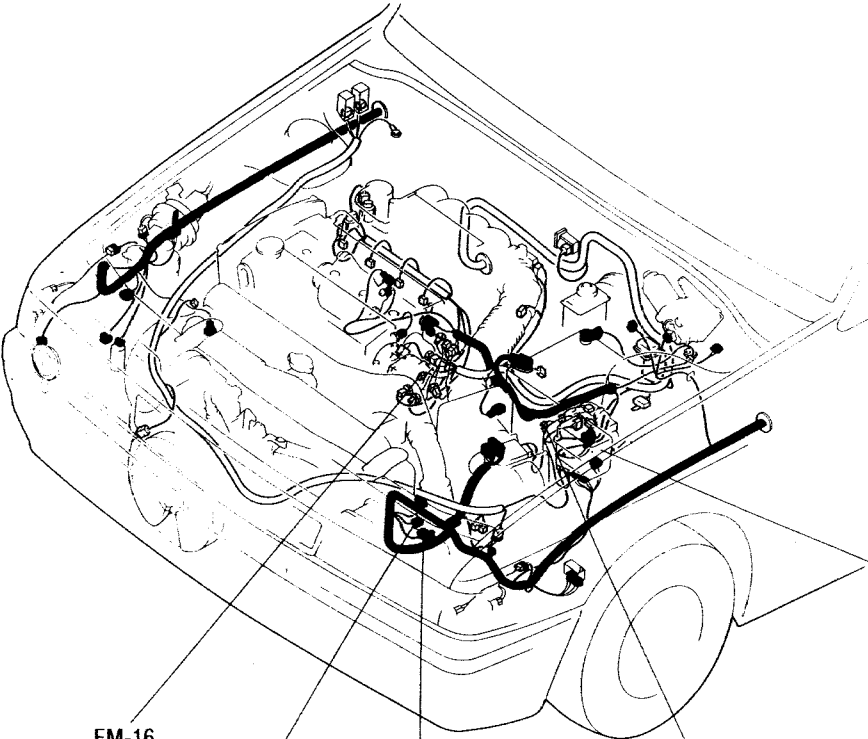
FE-01 FRONT (F) -ENGINE (E)



FEM-01 FRONT (F) -EMISSION (EM)



() ...EC-AT



FUSE BOX

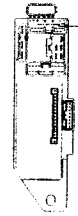
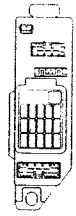


E-07



FE-01

JOINT BOX



JB-04

FUSE BOX

EM-16

F-08 (BLACK)

①

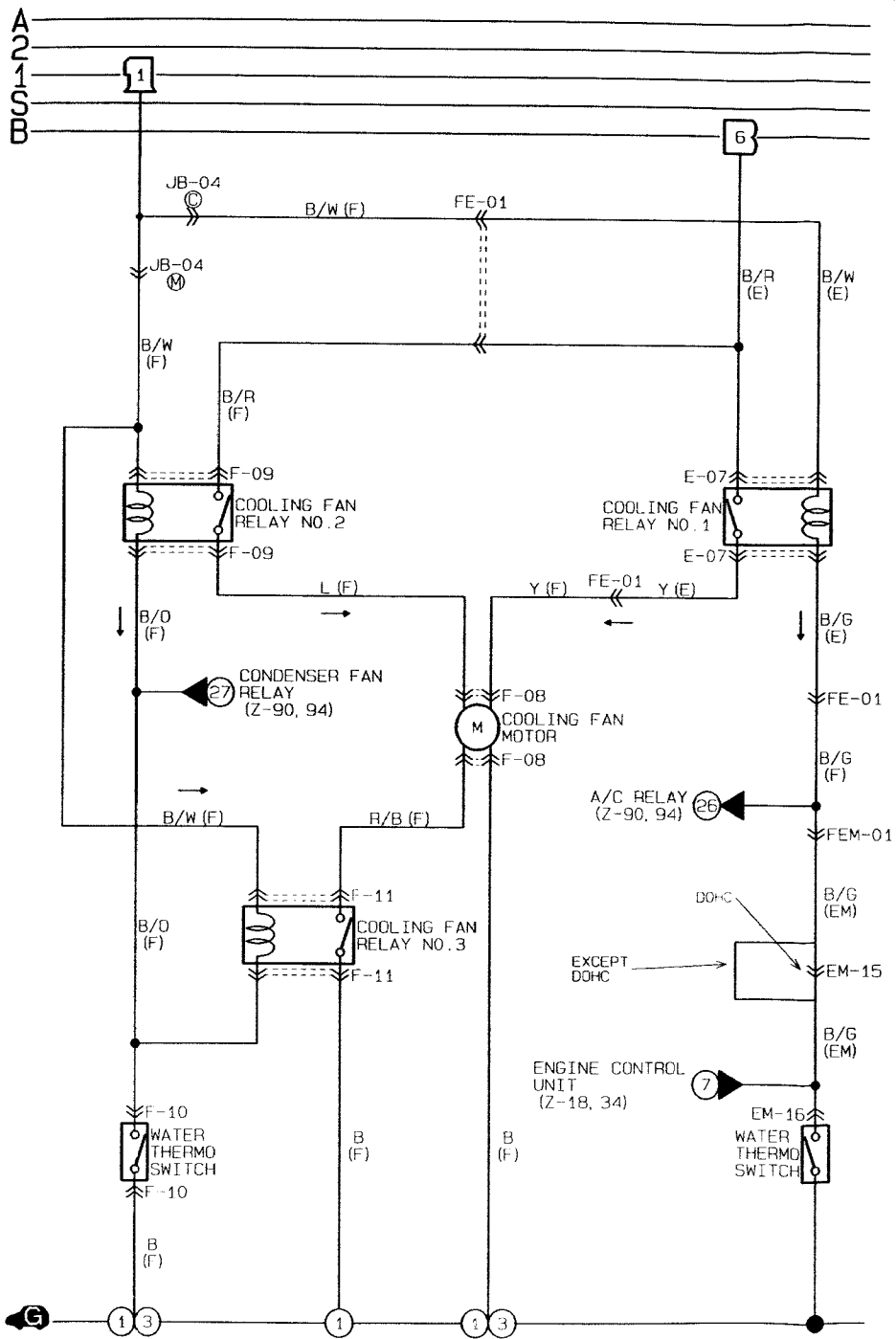
EM-15 (BLACK)

③

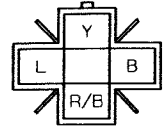
FEM-01

JOINT BOX

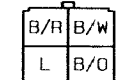
EC-AT ■ COOLING FAN SYSYTEM



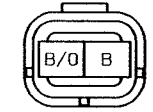
F-08 COOLING FAN MOTOR (F)



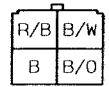
F-09 COOLING FAN RELAY NO.2 (F)



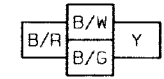
F-10 WATER THERMO SWITCH (F)



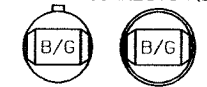
F-11 COOLING FAN RELAY NO.3 (F)



E-07 COOLING FAN RELAY NO.1 (E)



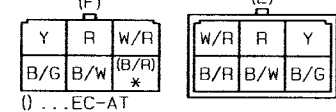
EM-15 SHORT CONNECTOR (EM)



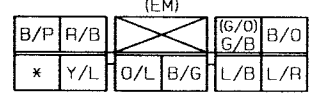
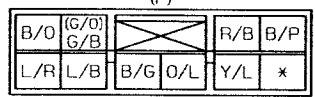
EM-16 WATER THERMO SWITCH (EM)

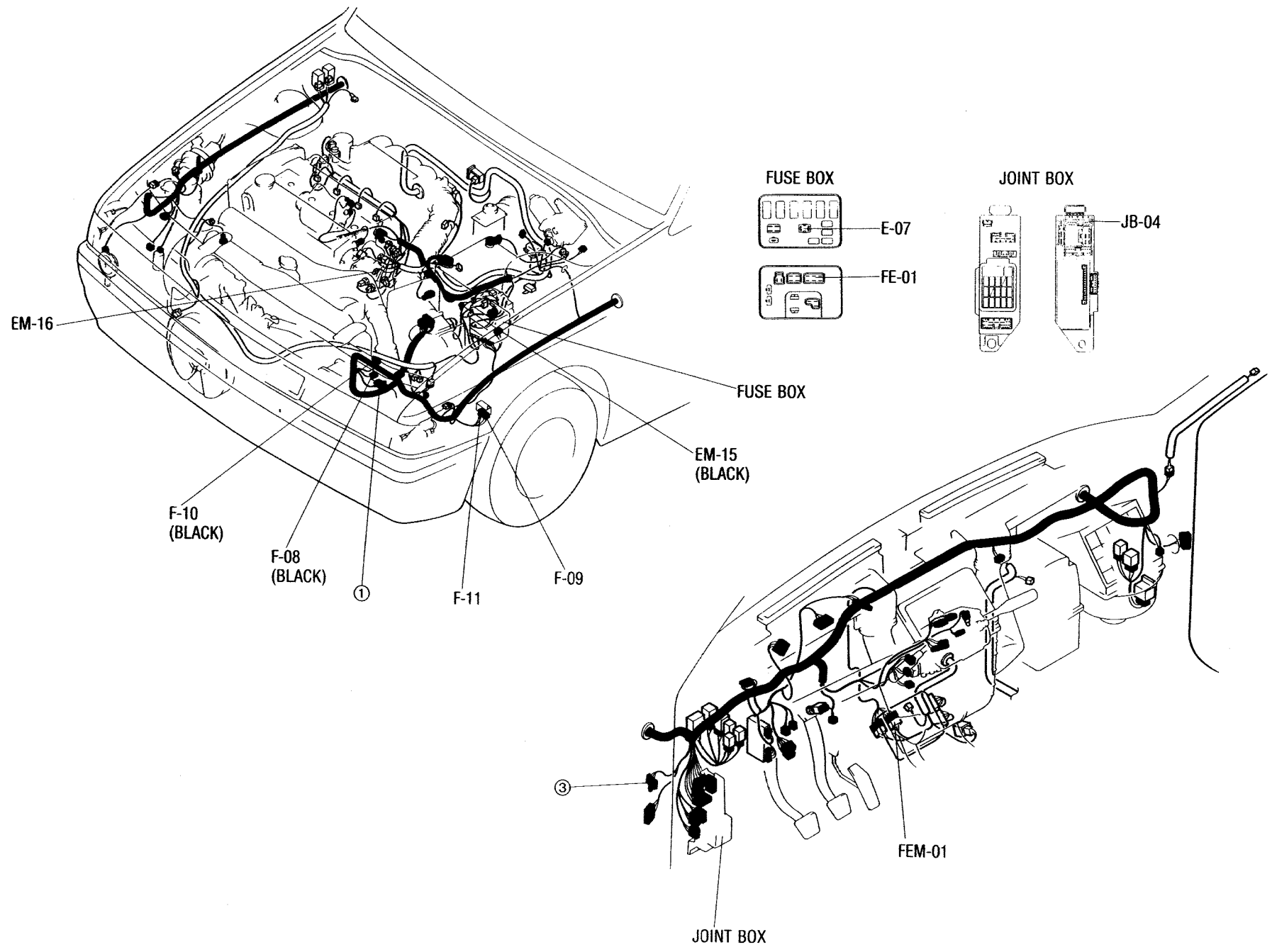


FE-01 FRONT (F) -ENGINE (E)

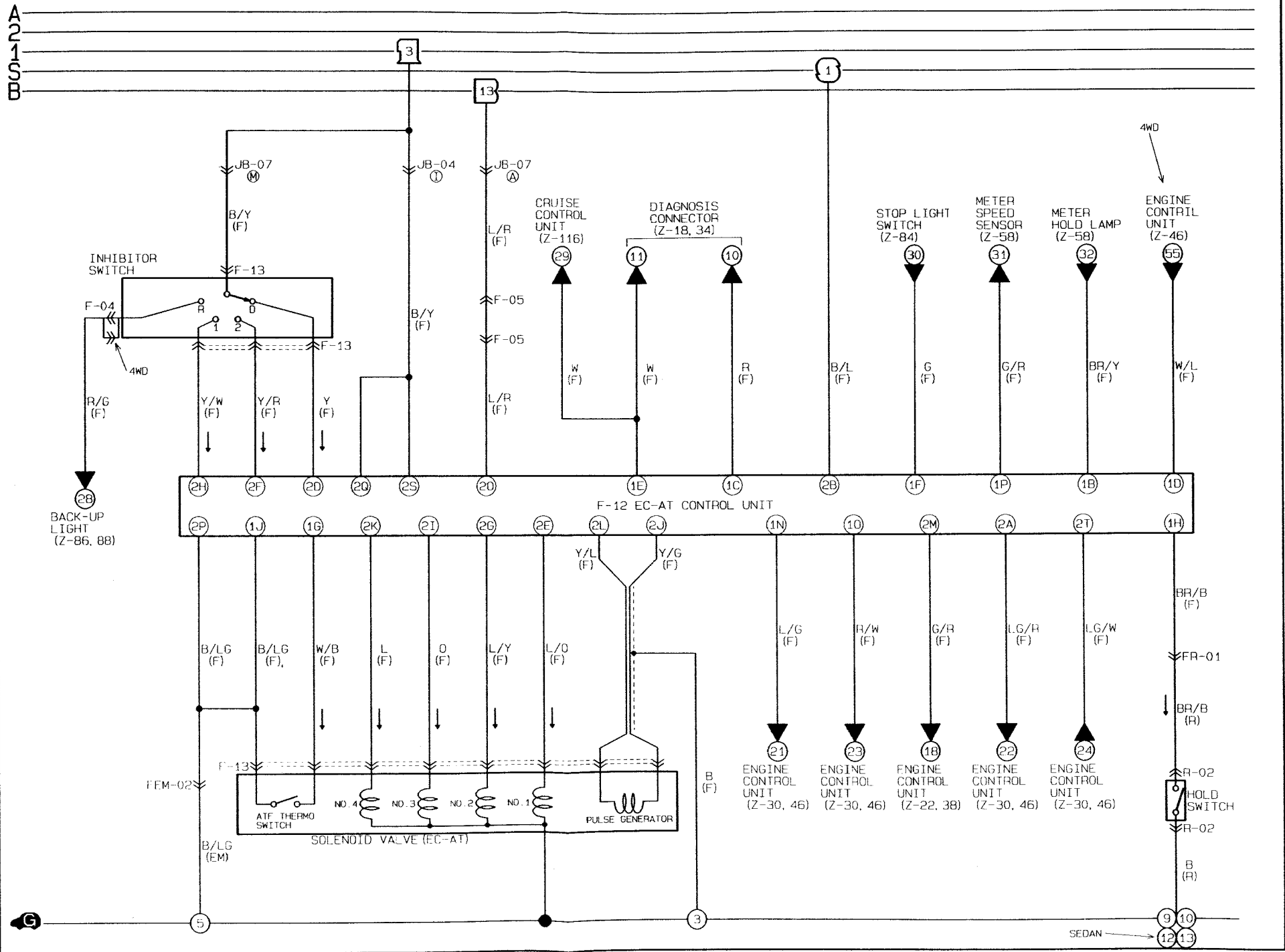


FEM-01 FRONT (F) -EMISSION (EM)

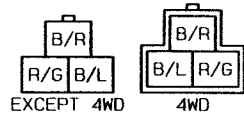




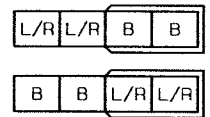
■ EC-AT CONTROL SYSTEM



F-04 INHIBITOR SWITCH (F)



F-05 JOINT CONNECTOR (F)



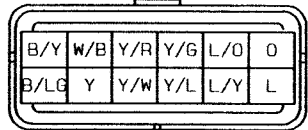
F-12 EC-AT CONTROL UNIT (F)

1D	1M	1K	1I	1G	1E	1C	1A
R/W	*	*	*	W/B	W	R	*
G/R	L/G	*	B/LG	BR/B	G	W/L	BR/Y
1P	1N	1L	1J	1H	1F	1D	1B

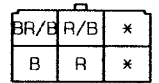
*...4WD

2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
B/Y	B/Y	L/R	G/R	L	O	L/Y	L/O	*	LG/R
LG/W	*	B/LG	*	Y/L	Y/G	Y/W	Y/R	Y	B/L
2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

F-13 SOLENOID VALVE (EC-AT) & INHIBITOR SWITCH (F)



R-02 HOLD SWITCH (R)



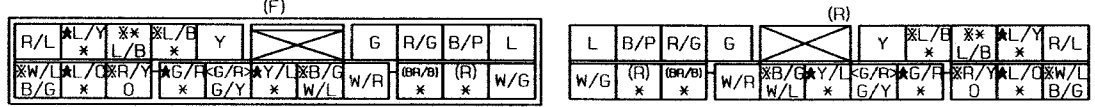
FEM-02 FRONT (F) -EMISSION (EM)

B	Y/B	(L/G)	(R/W)	(G/R)	X	(*)	B/Y	*	(LG/W)
R/G	L/Y	*	(W)	(R)	BR/W	R/G	Y/W	(BL/G)	B/L

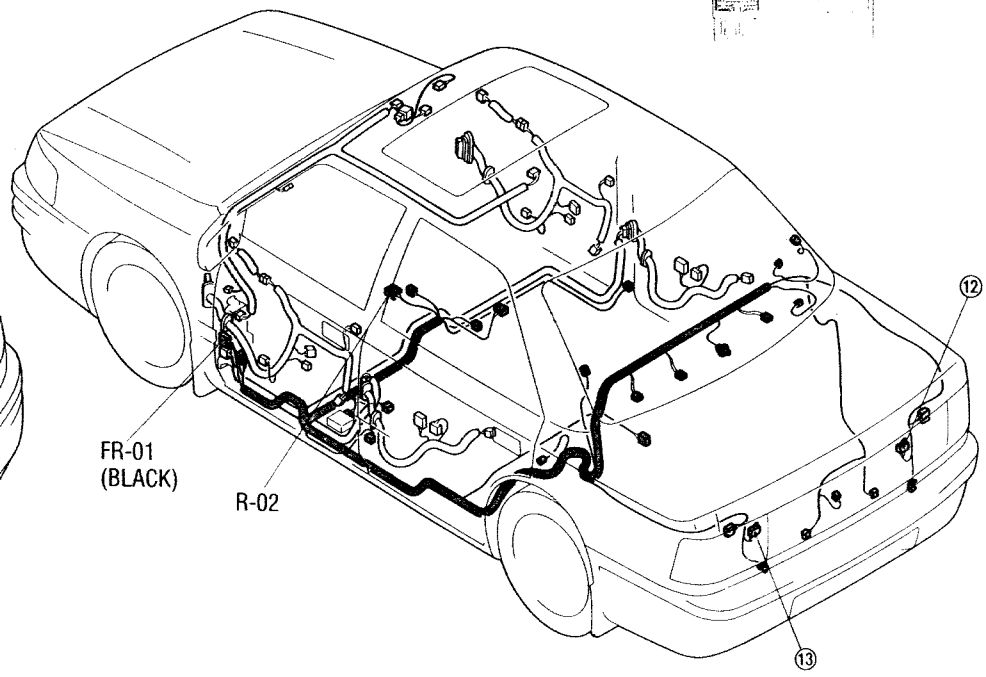
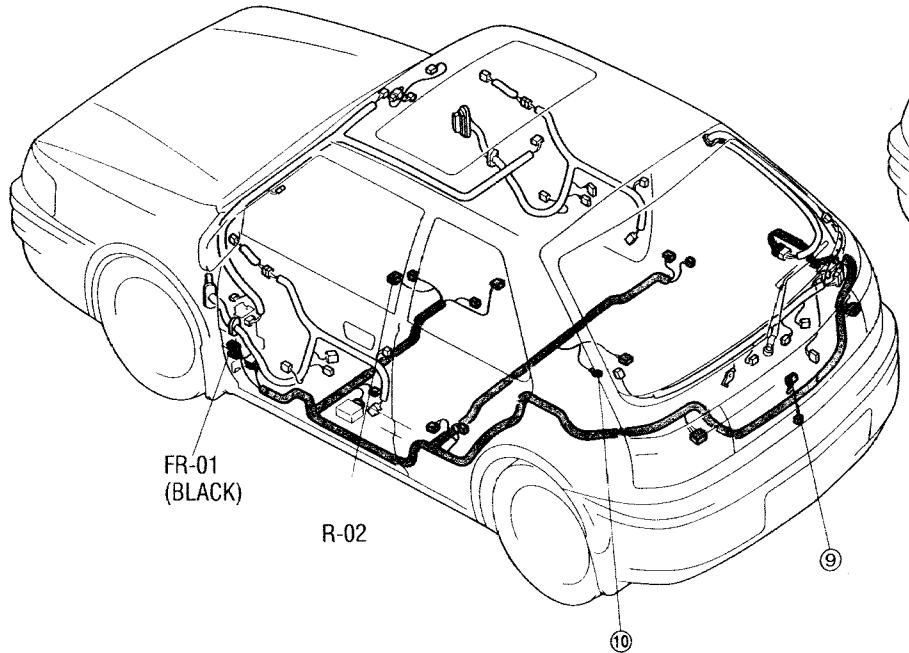
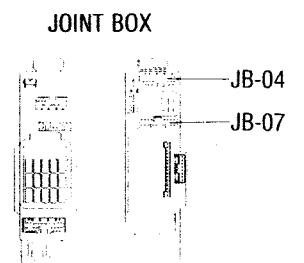
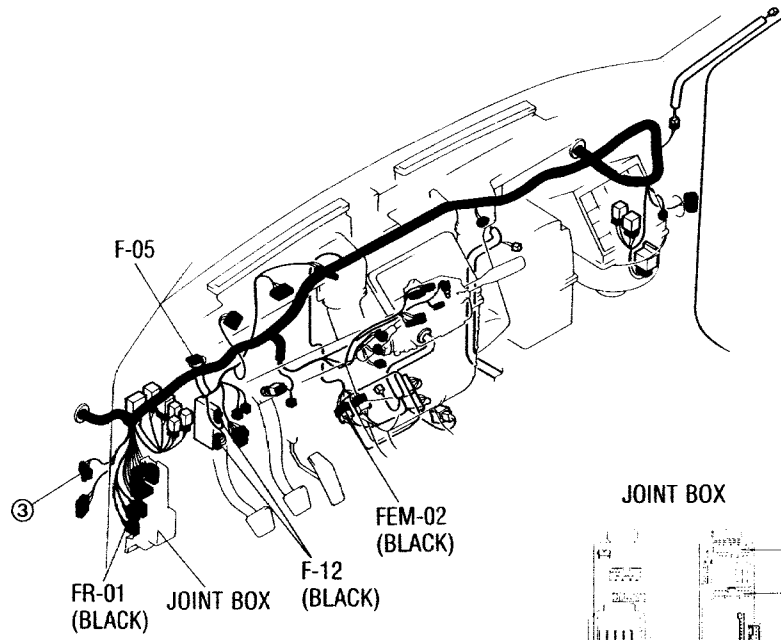
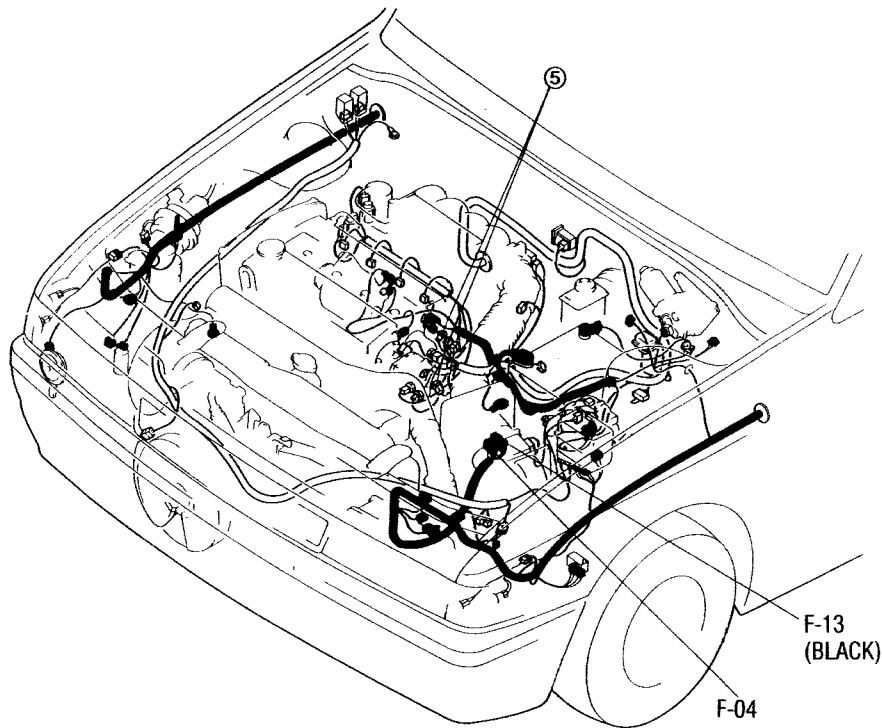
(LG/W)	*	B/Y	(*)	X	(G/R)	(R/W)	(L/G)	Y/B	B
*	*	*	BR/Y	X	G	*	*	*	*
(LG/R)	B/L	(BL/G)	X	Y/W	R/G	BR/W	(R)	(W)	R/G
*	*	*	*	*	*	*	G/Y	*	*

()...EC-AT <>...CANADA *...4WD

FR-01 FRONT (F) -REAR (R)



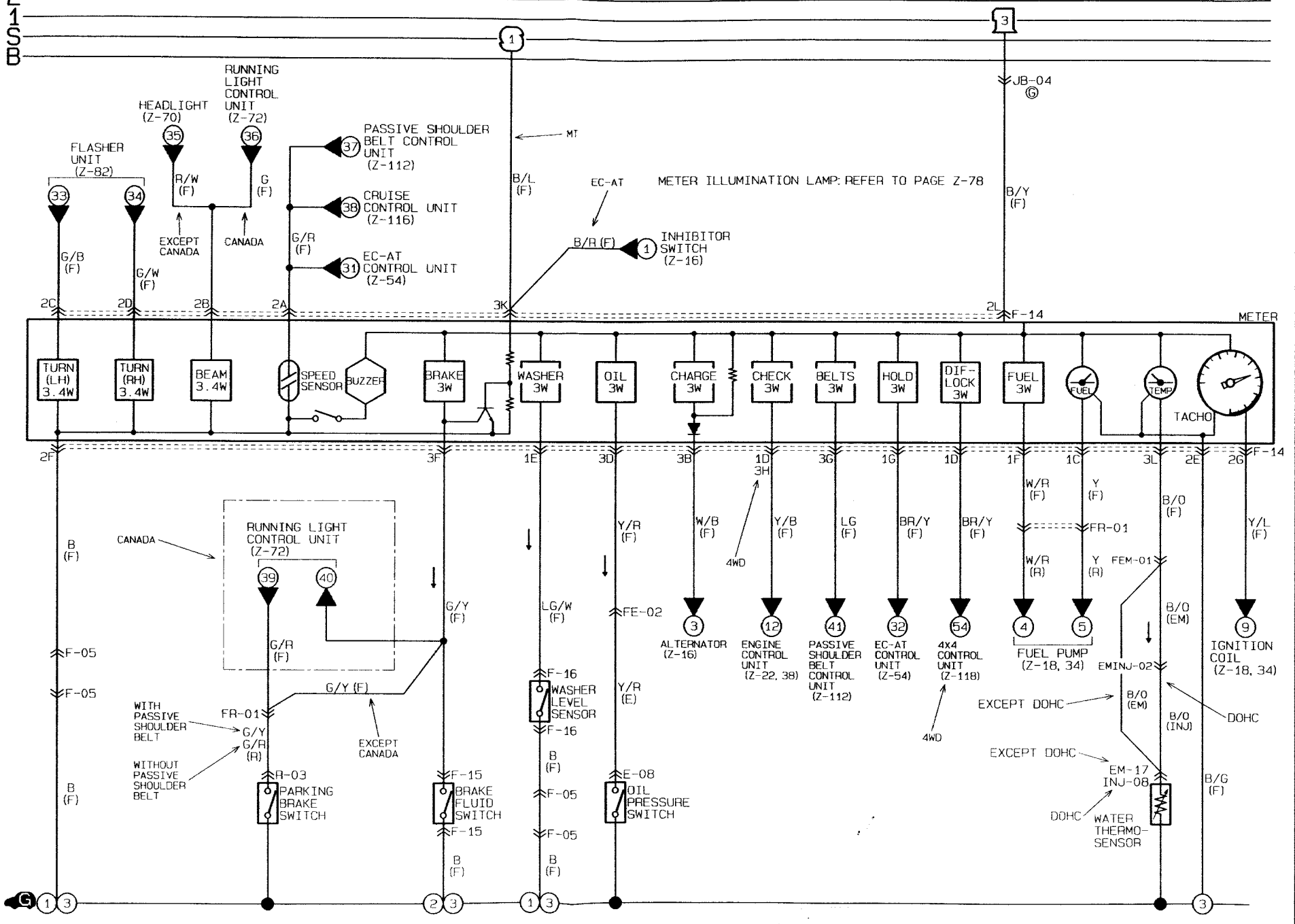
()...EC-AT <>...CANADA *...WITH PASSIVE SHOULDER BELT ||...SEDAN *...4WD



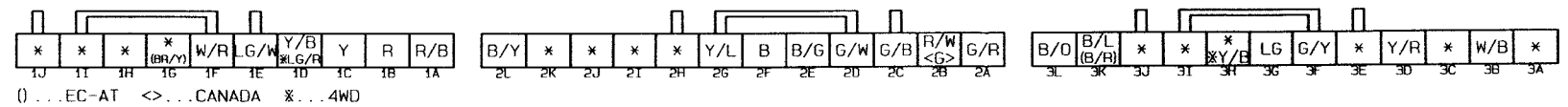


METER & WARNING LAMPS

ANSI
B

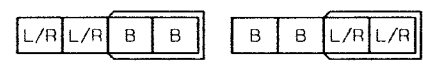


F-14 METER (F)



() ...EC-AT <> ...CANADA * ...4WD

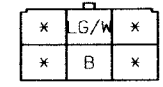
F-05 JOINT CONNECTOR (F)



F-15 BRAKE FLUID SWITCH (F)



F-16 WASHER LEVEL SENSOR (F)

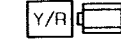


R-03 PARKING BRAKE SWITCH (R)

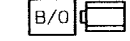


* ... WITH PASSIVE SHOULDER BELT

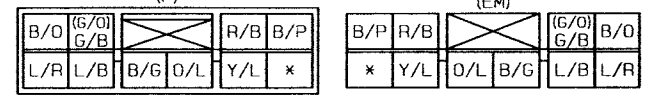
E-08 OIL PRESSURE SWITCH (E)



EM-17 WATER THERMO-SENSOR (EM)

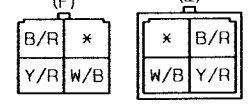


FEM-01 FRONT (F) -EMISSION (EM)

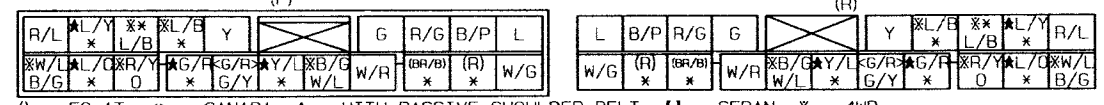


() ...EC-AT

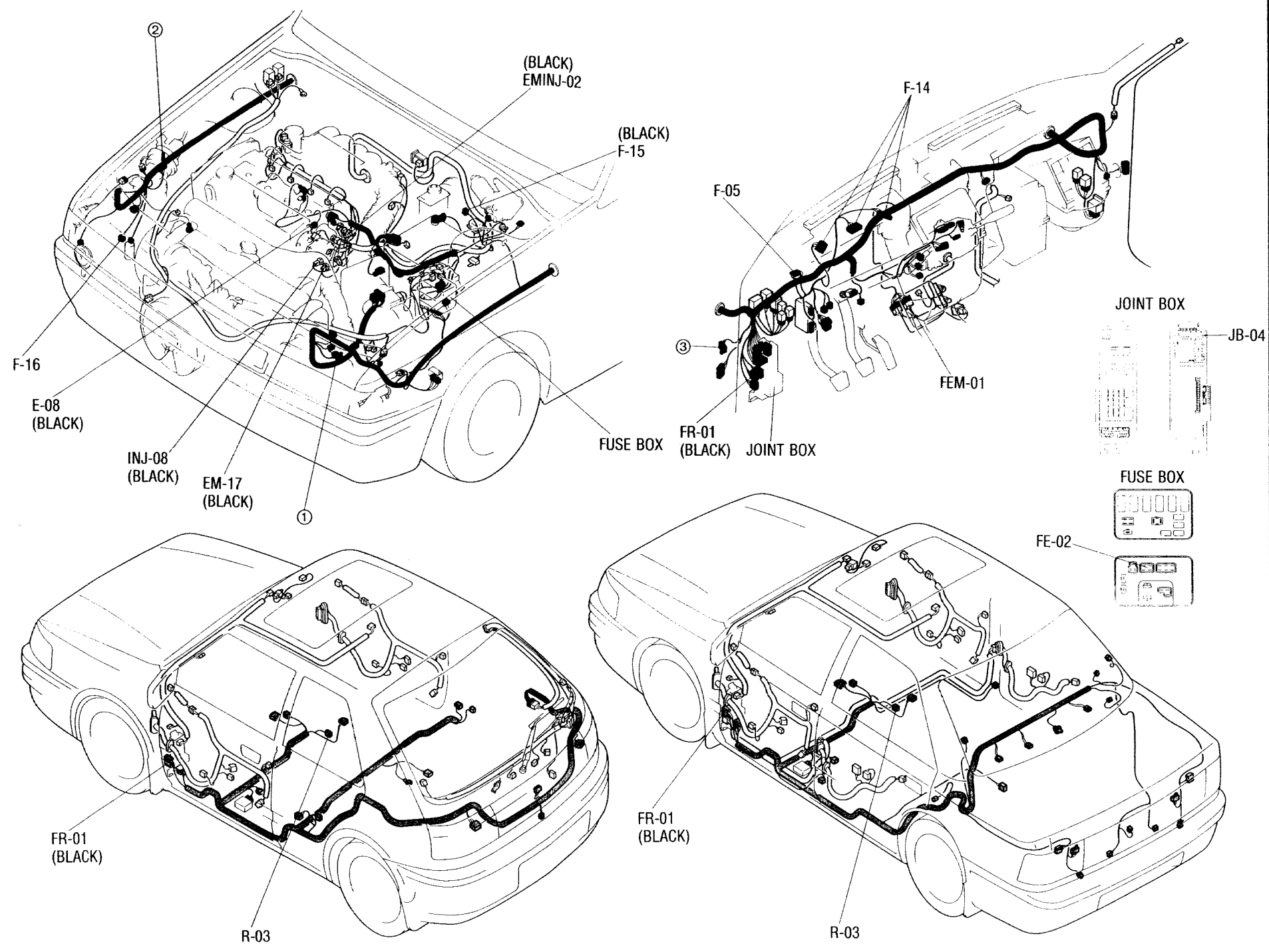
FE-02 FRONT (F) -ENGINE (E)



FR-01 FRONT (F) -REAR (R)



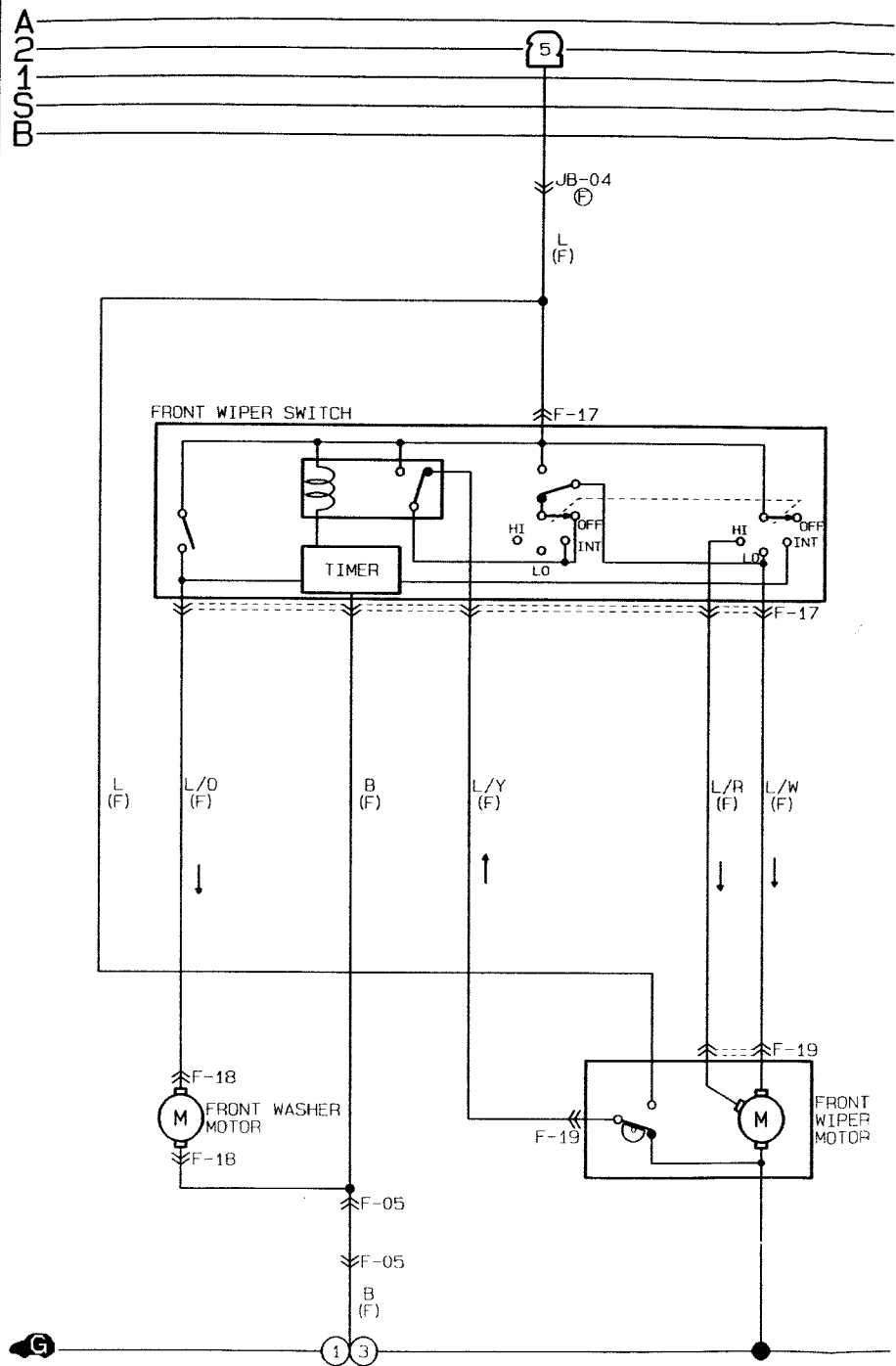
() ...EC-AT <> ...CANADA * ...WITH PASSIVE SHOULDER BELT [] ...SEDAN * ...4WD





Z WIRING DIAGRAM

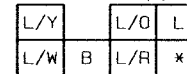
CANADA WITHOUT CRUISE CONTROL ■ FRONT WIPER & WASHER



F-05 JOINT CONNECTOR (F)



F-17 FRONT WIPER SWITCH (F)

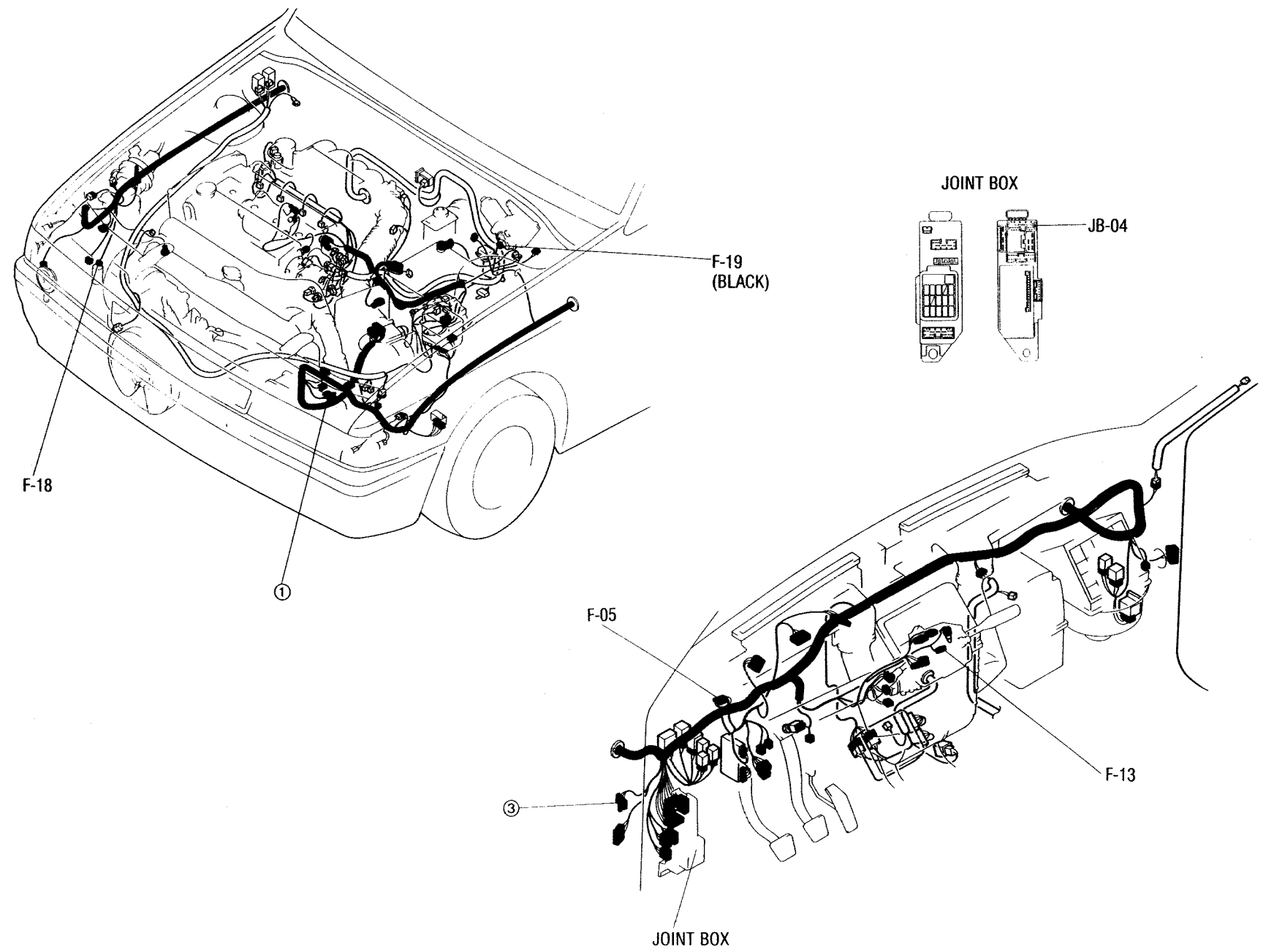


F-18 FRONT WASHER MOTOR (F)



F-19 FRONT WIPER MOTOR (F)

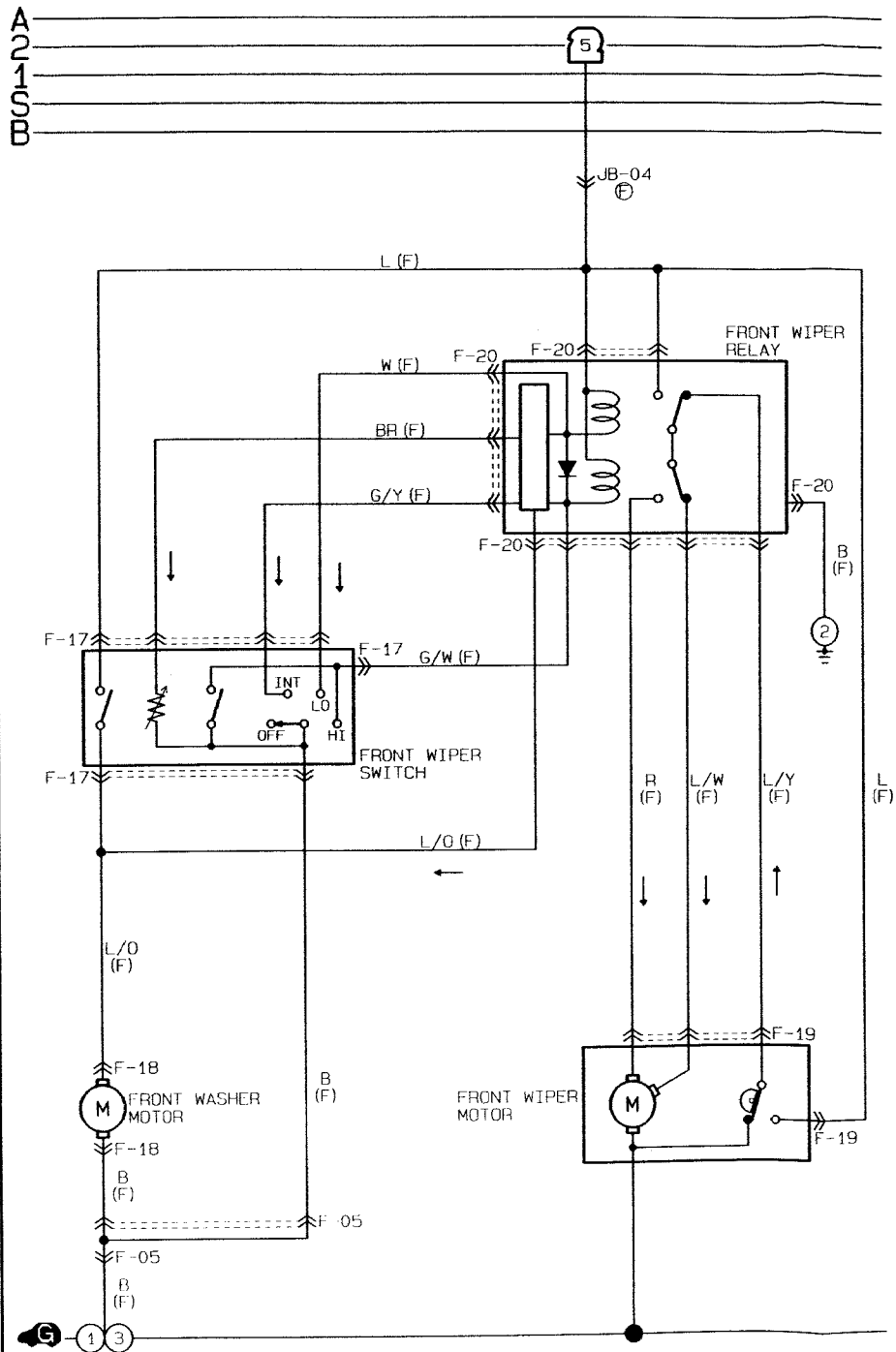




Z WIRING DIAGRAM

EXCEPT CANADA WITHOUT CRUISE CONTROL

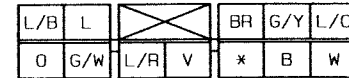
FRONT WIPER & WASHER



F-05 JOINT CONNECTOR (F)



F-17 FRONT WIPER SWITCH (F)



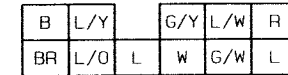
F-18 FRONT WASHER MOTOR (F)

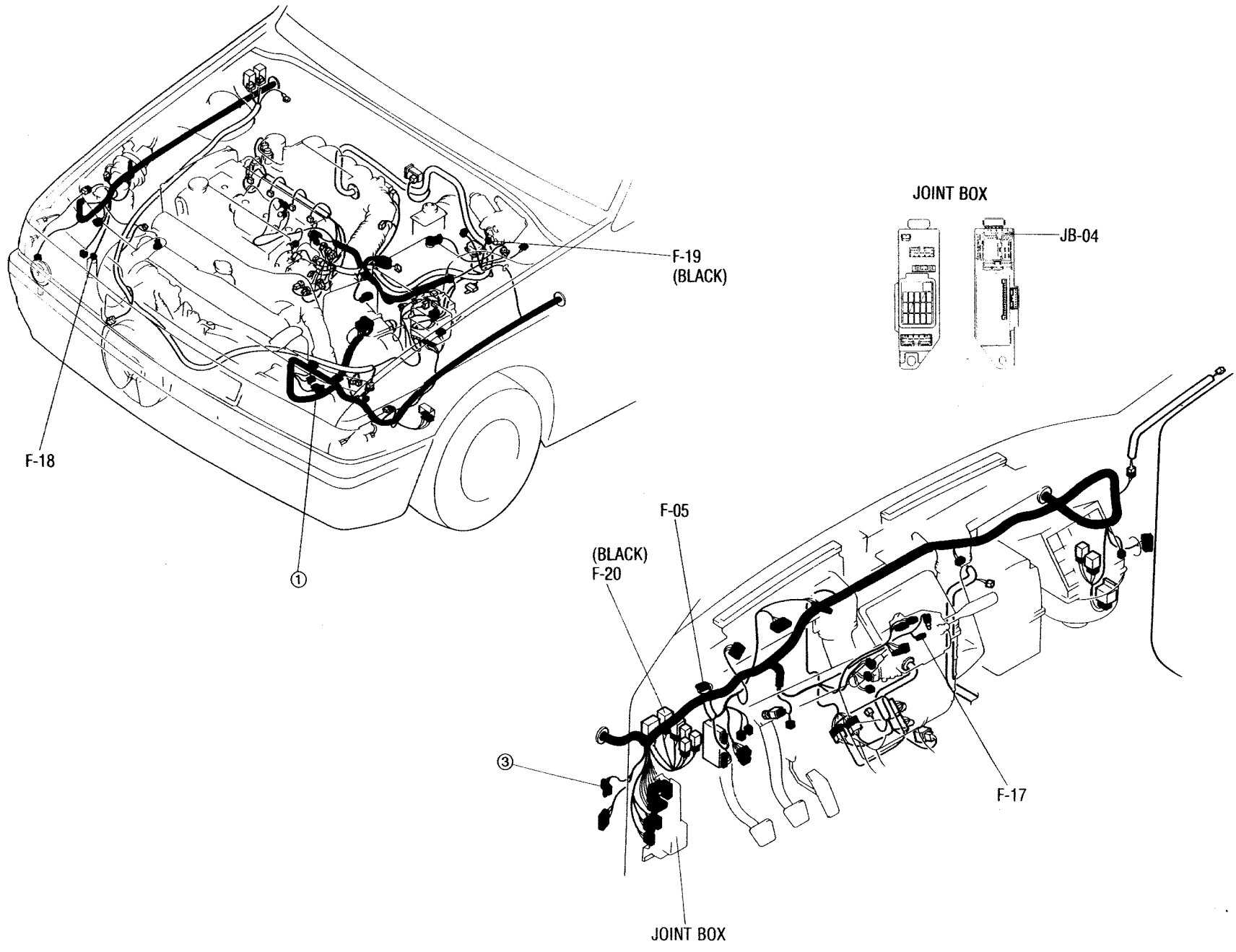


F-19 FRONT WIPER MOTOR (F)

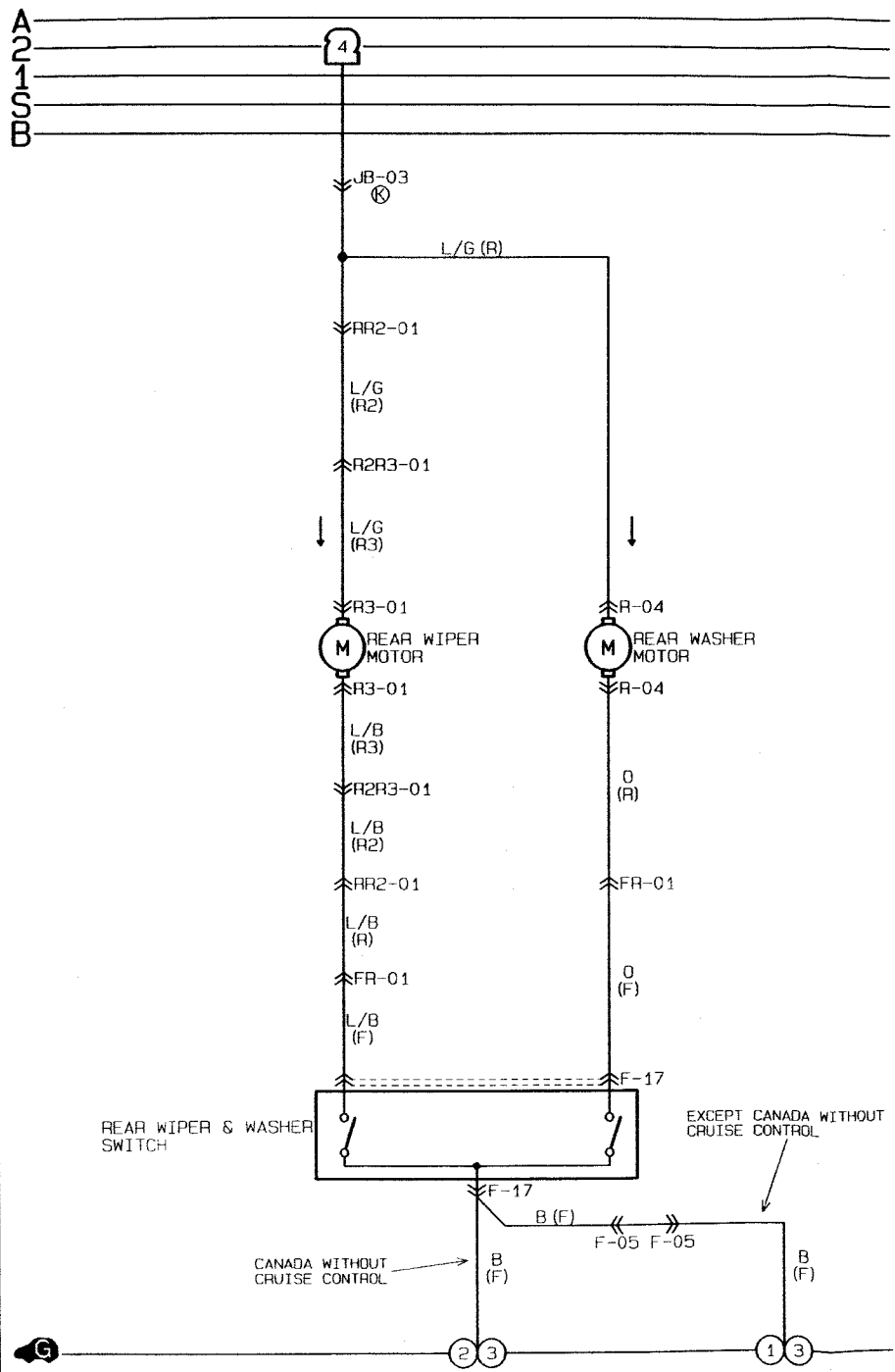


F-20 FRONT WIPER RELAY (F)

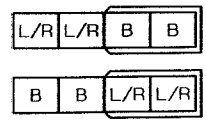




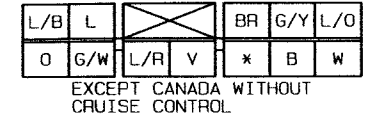
REAR WIPER & WASHER



F-05 JOINT CONNECTOR (F)



F-17 REAR WIPER & WASHER SWITCH (F)

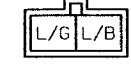


CANADA WITHOUT CRUISE CONTROL

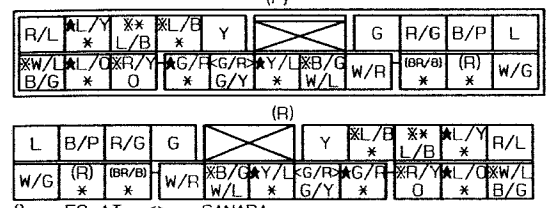
R-04 REAR WASHER MOTOR (R)



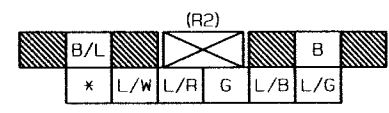
R3-01 REAR WIPER MOTOR (R3)



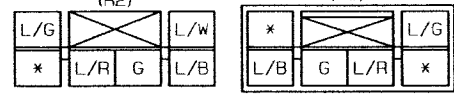
FR-01 FRONT (F) - REAR (R)

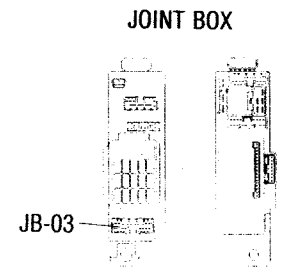
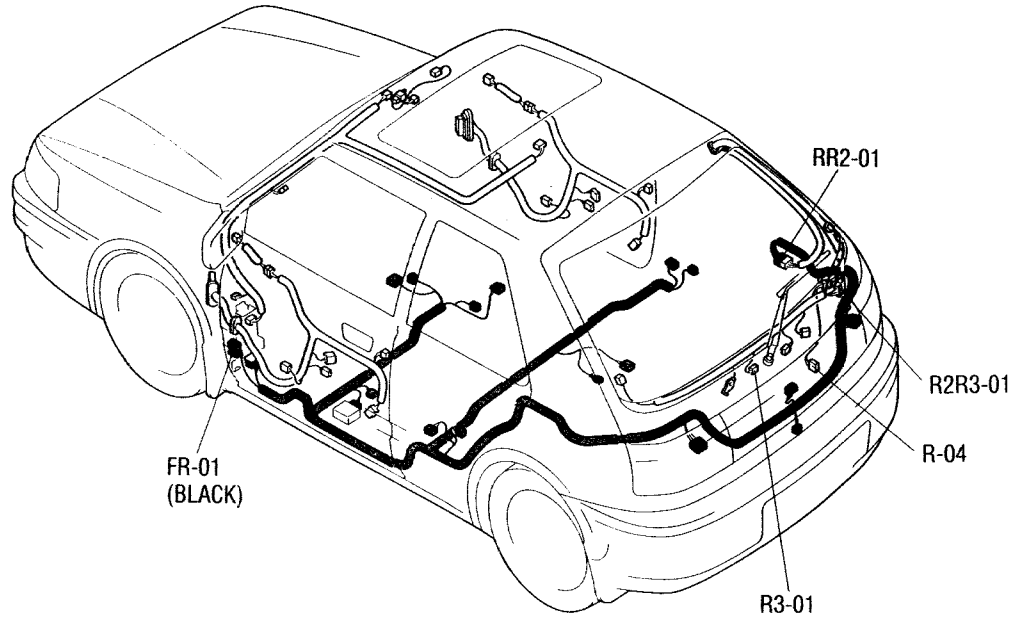
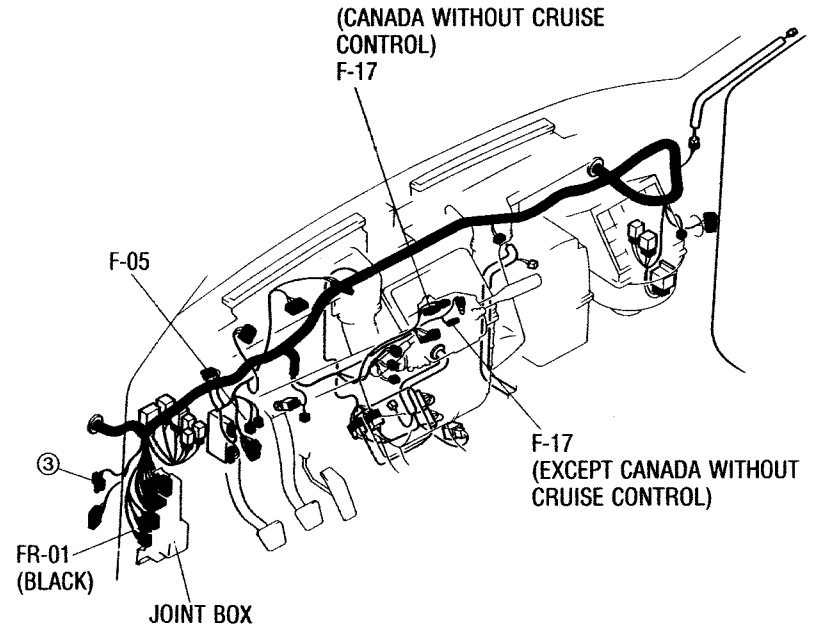
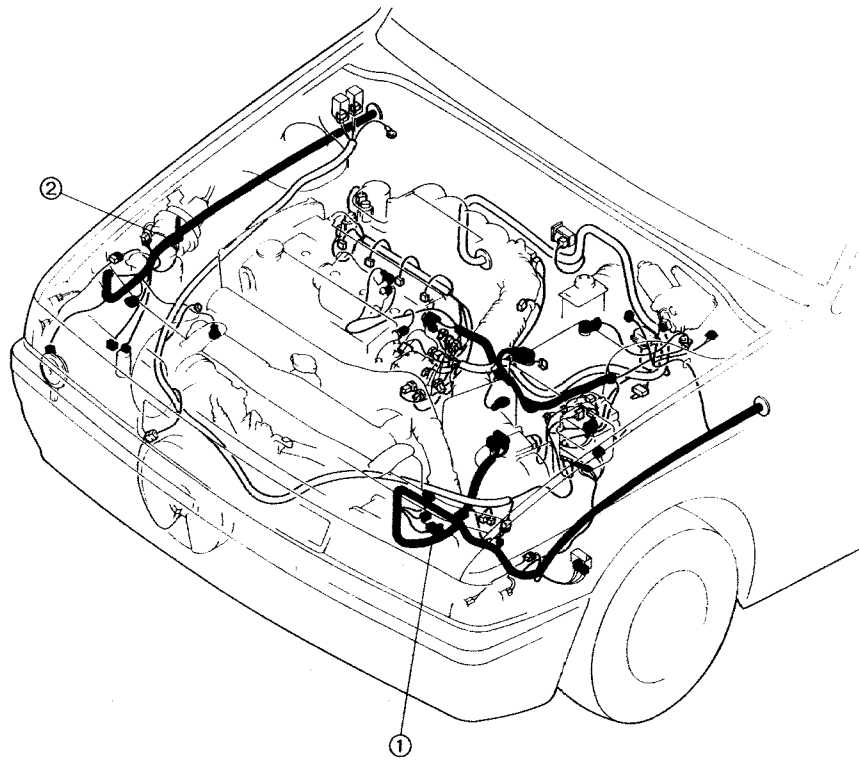


RR2-01 REAR (R) - REAR NO. 2 (R2)



R2R3-01 REAR NO. 2 (R2) - REAR NO. 3 (R3)

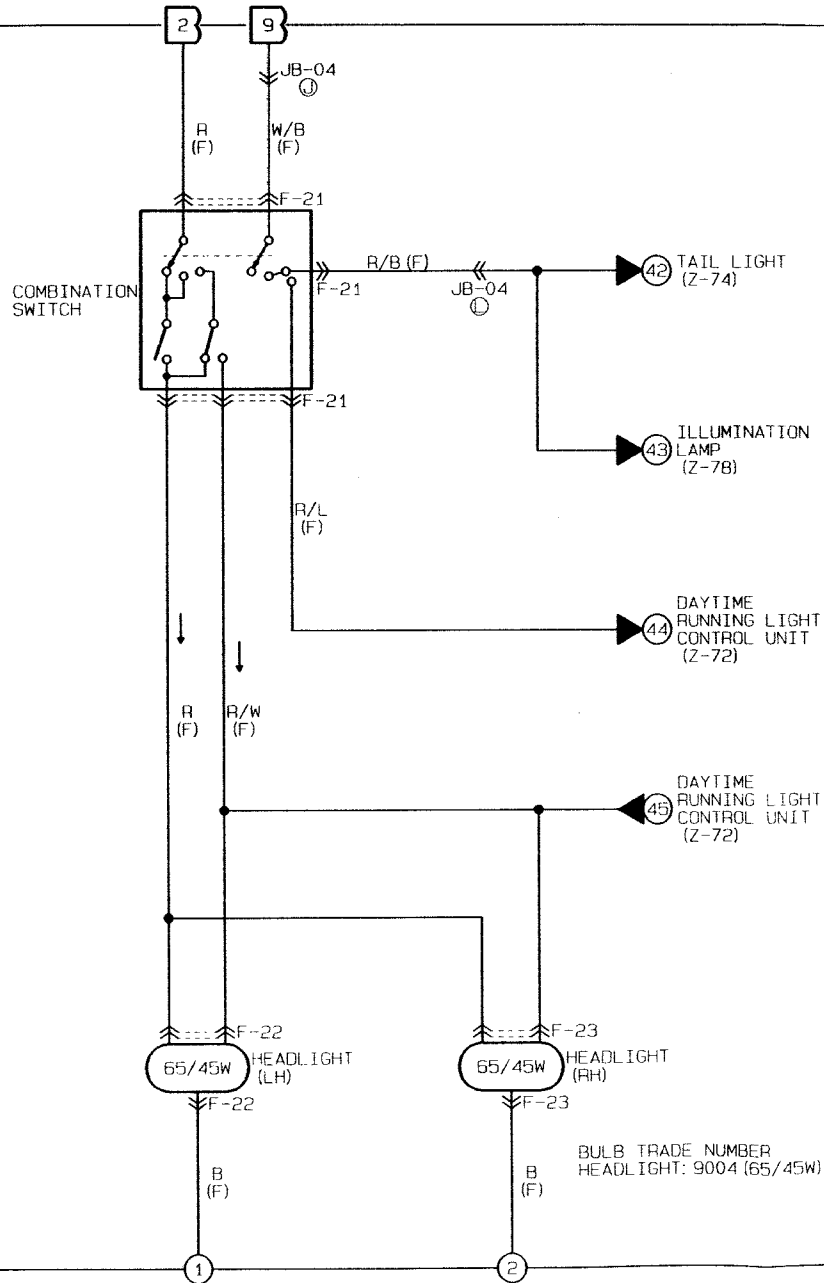




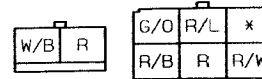
Z WIRING DIAGRAM

CANADA WITHOUT CRUISE CONTROL ■ HEADLIGHTS

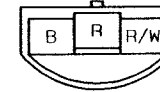
A
2
1
S
B



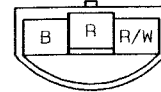
F-21 COMBINATION SWITCH (F)

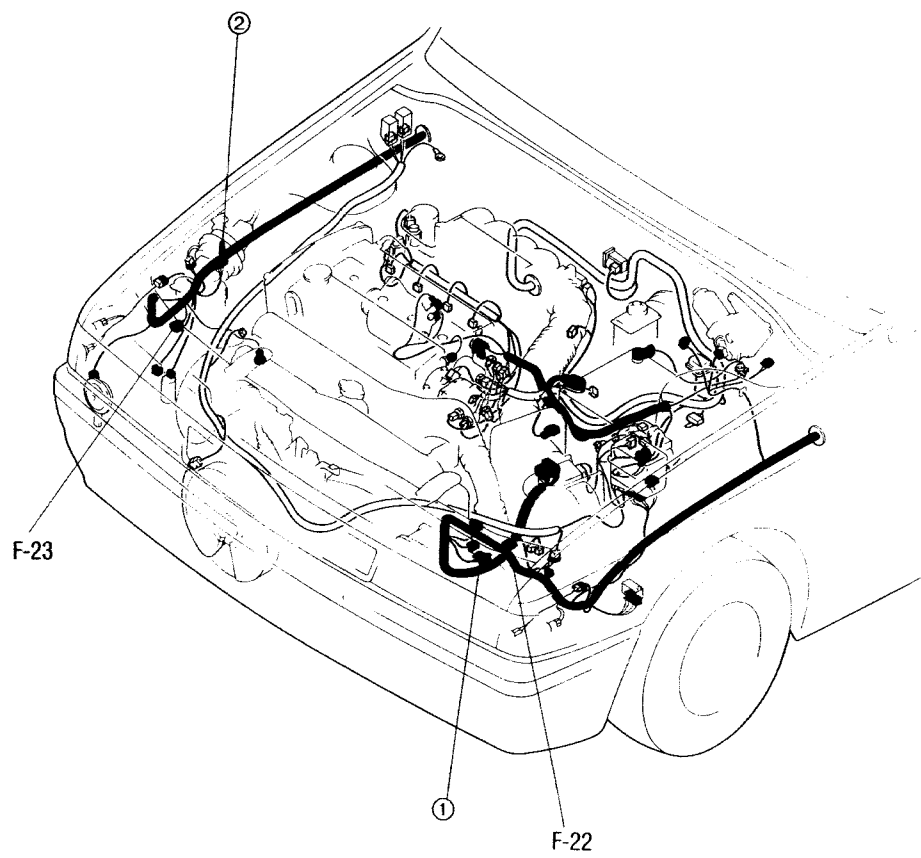


F-22 HEADLIGHT LH (F)

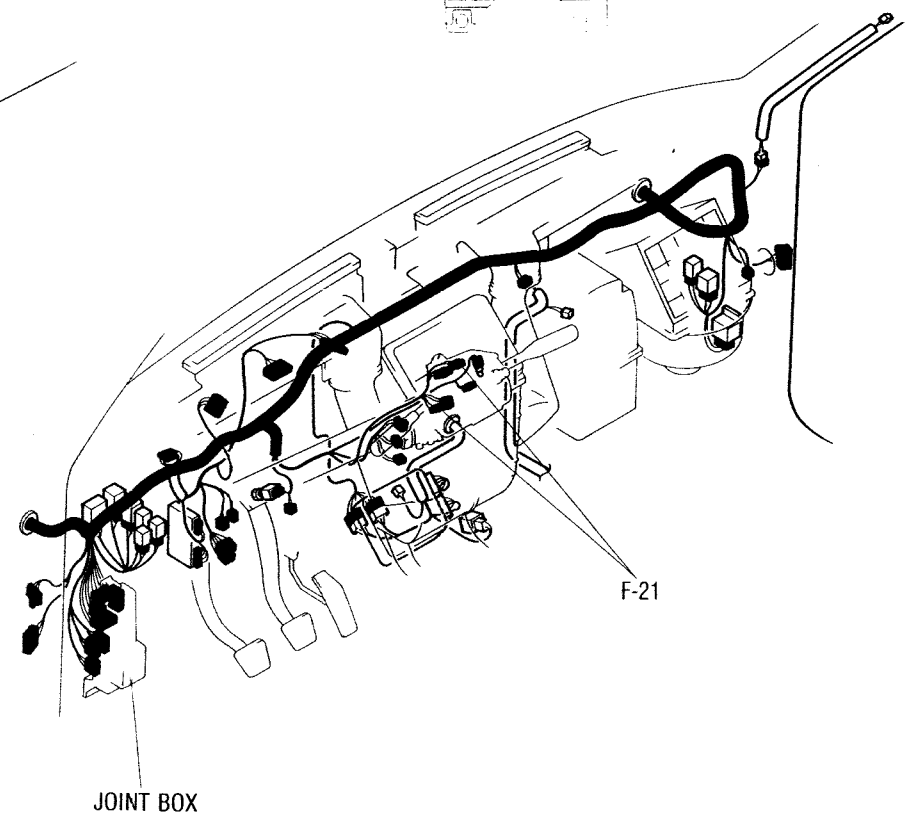
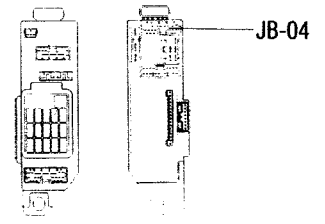


F-23 HEADLIGHT RH (F)



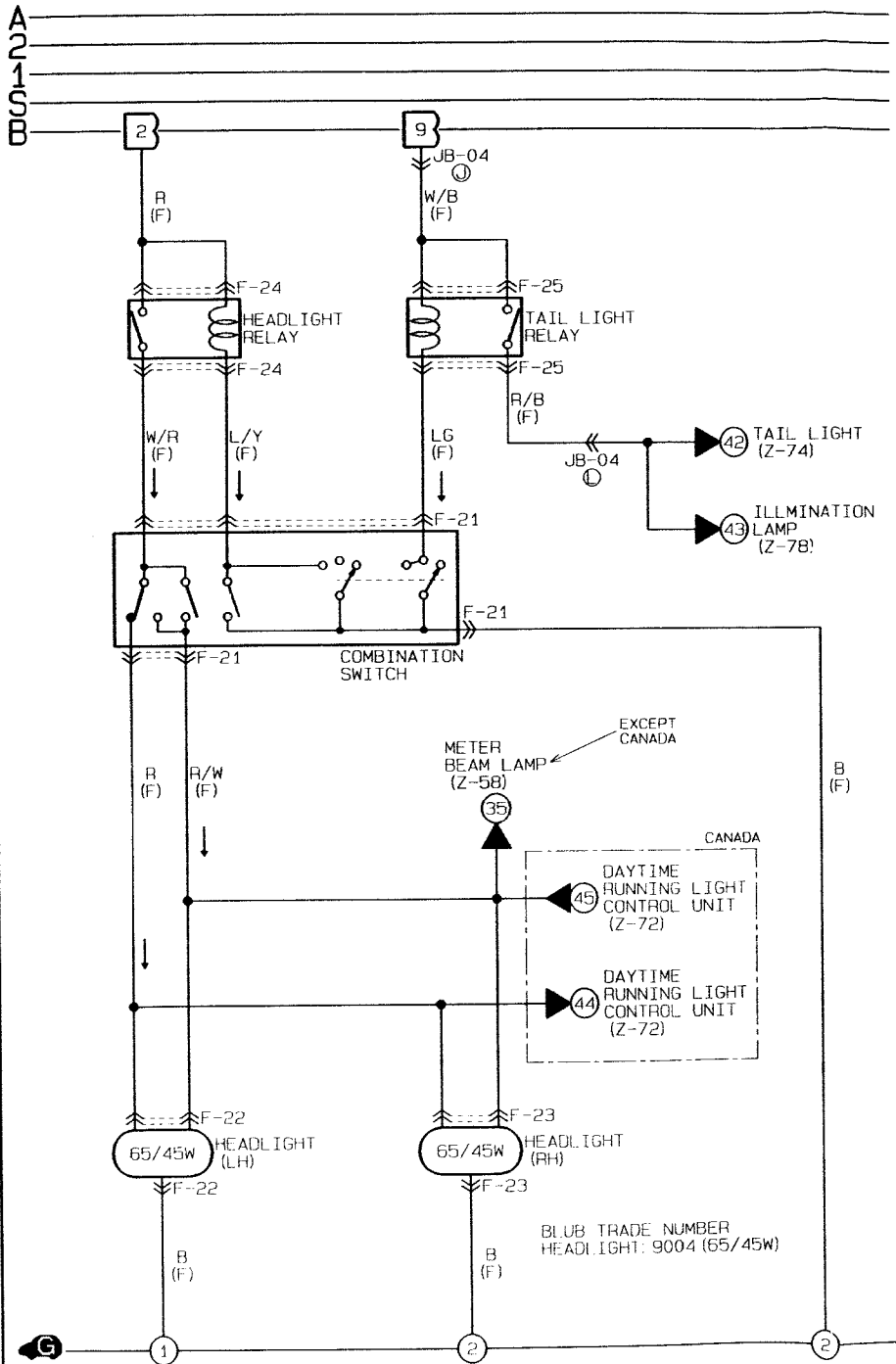


JOINT BOX

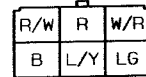


Z WIRING DIAGRAM

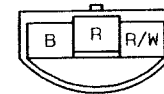
EXCEPT CANADA WITHOUT CRUISE CONTROL ■ HEADLIGHTS



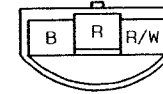
F-21 COMBINATION SWITCH (F)



F-22 HEADLIGHT LH (F)



F-23 HEADLIGHT RH (F)

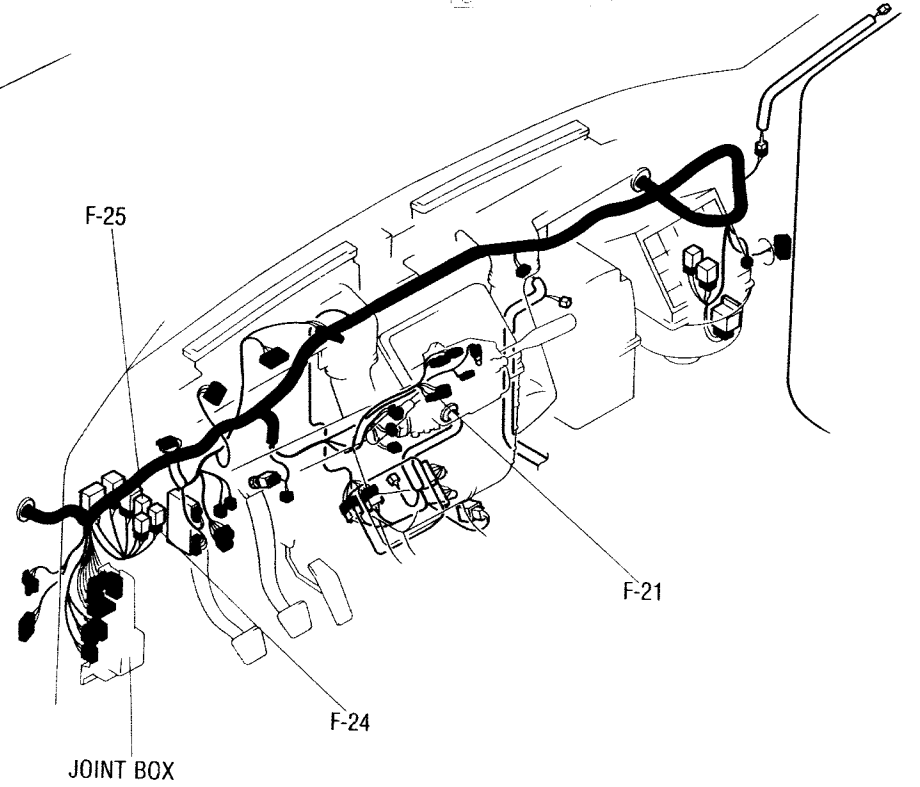
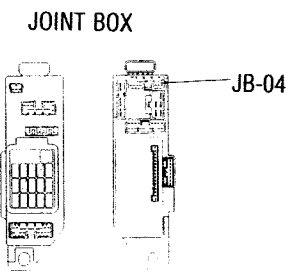
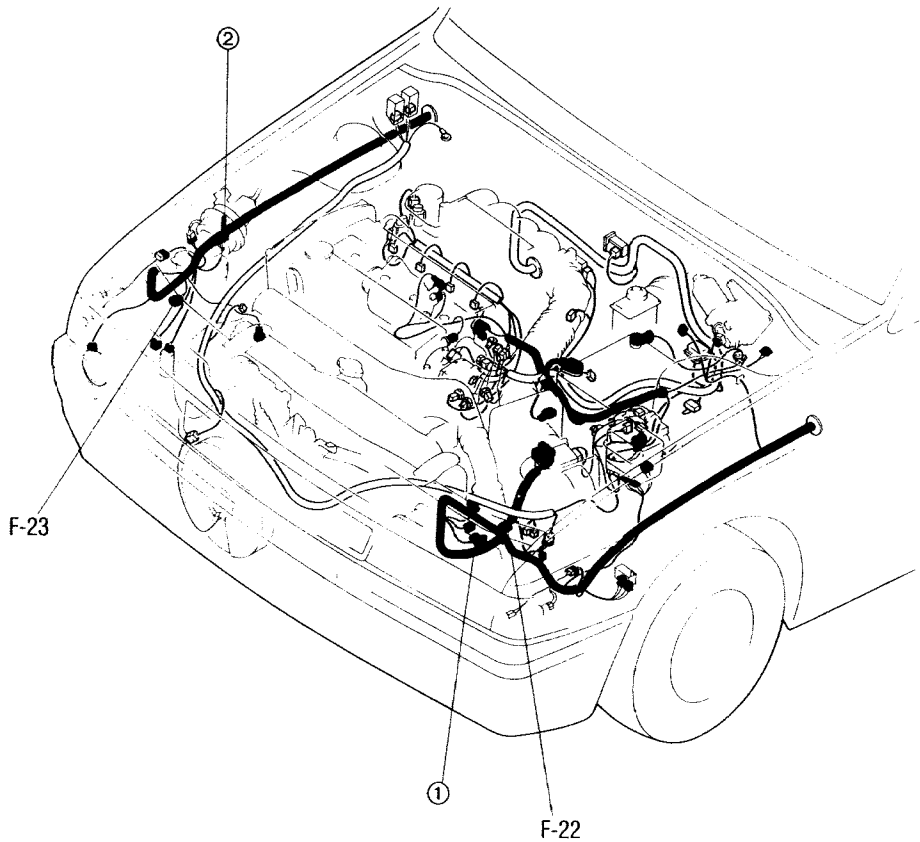


F-24 HEADLIGHT RELAY (F)



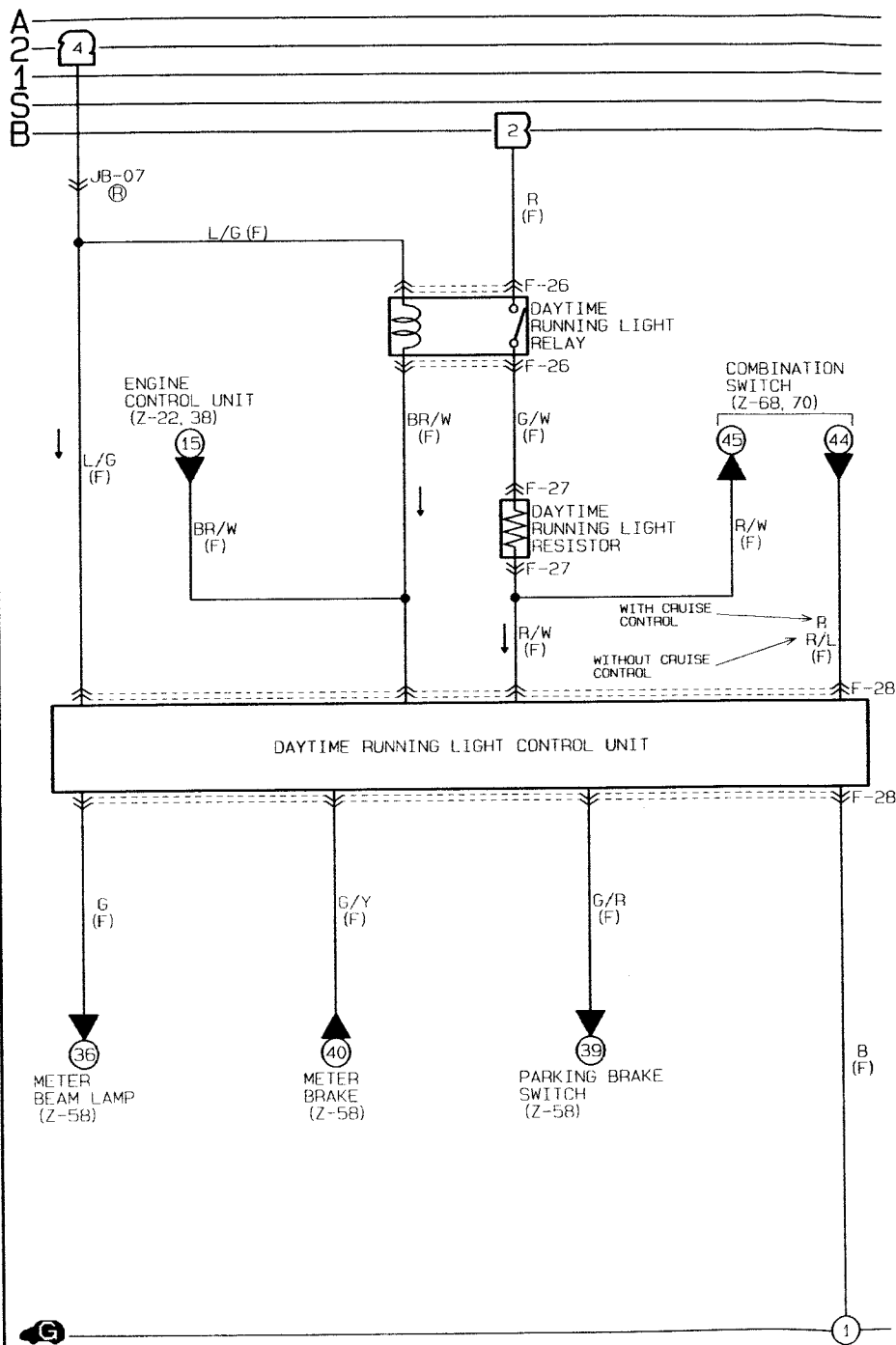
F-25 TAIL LIGHT RELAY (F)





Z WIRING DIAGRAM

CANADA ■ DAYTIME RUNNING LIGHTS



F-26 DAYTIME RUNNING LIGHT RELAY (F)



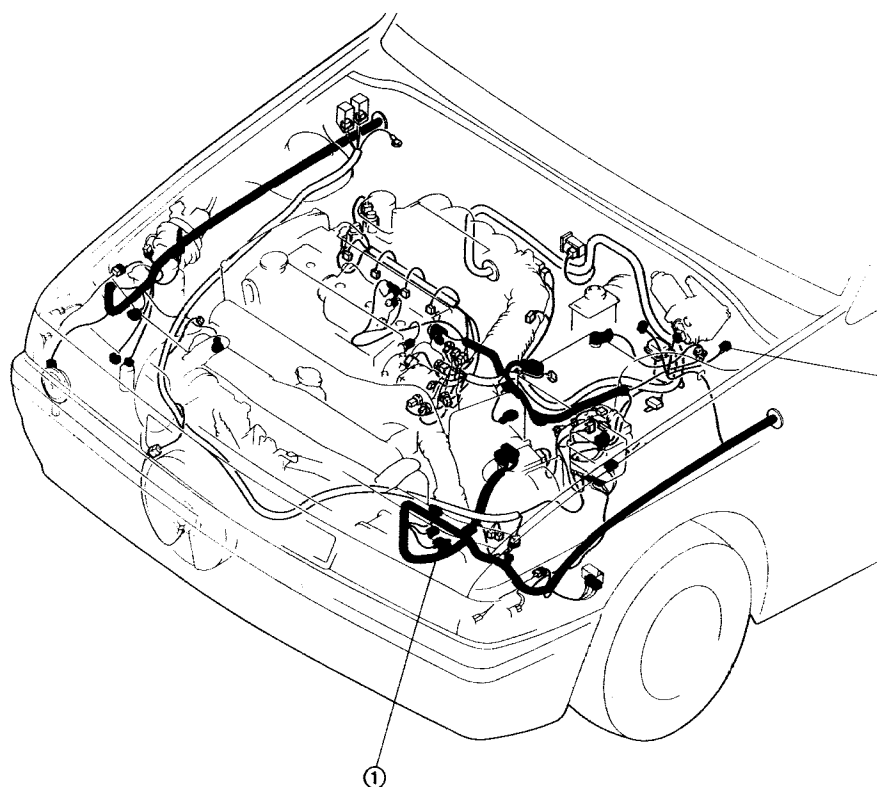
F-27 DAYTIME RUNNING LIGHT RESISTOR (F)



F-28 DAYTIME RUNNING LIGHT CONTROL UNIT (F)



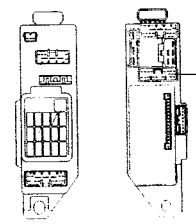
●...WITHOUT CRUISE CONTROL



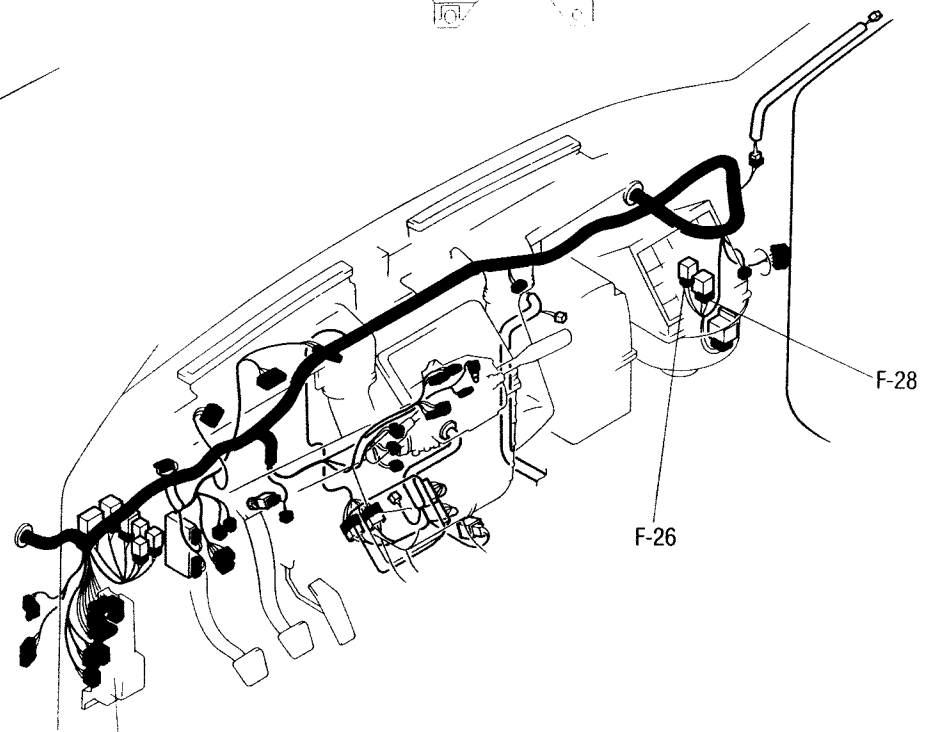
F-27

1

JOINT BOX



JB-07



F-28

F-26

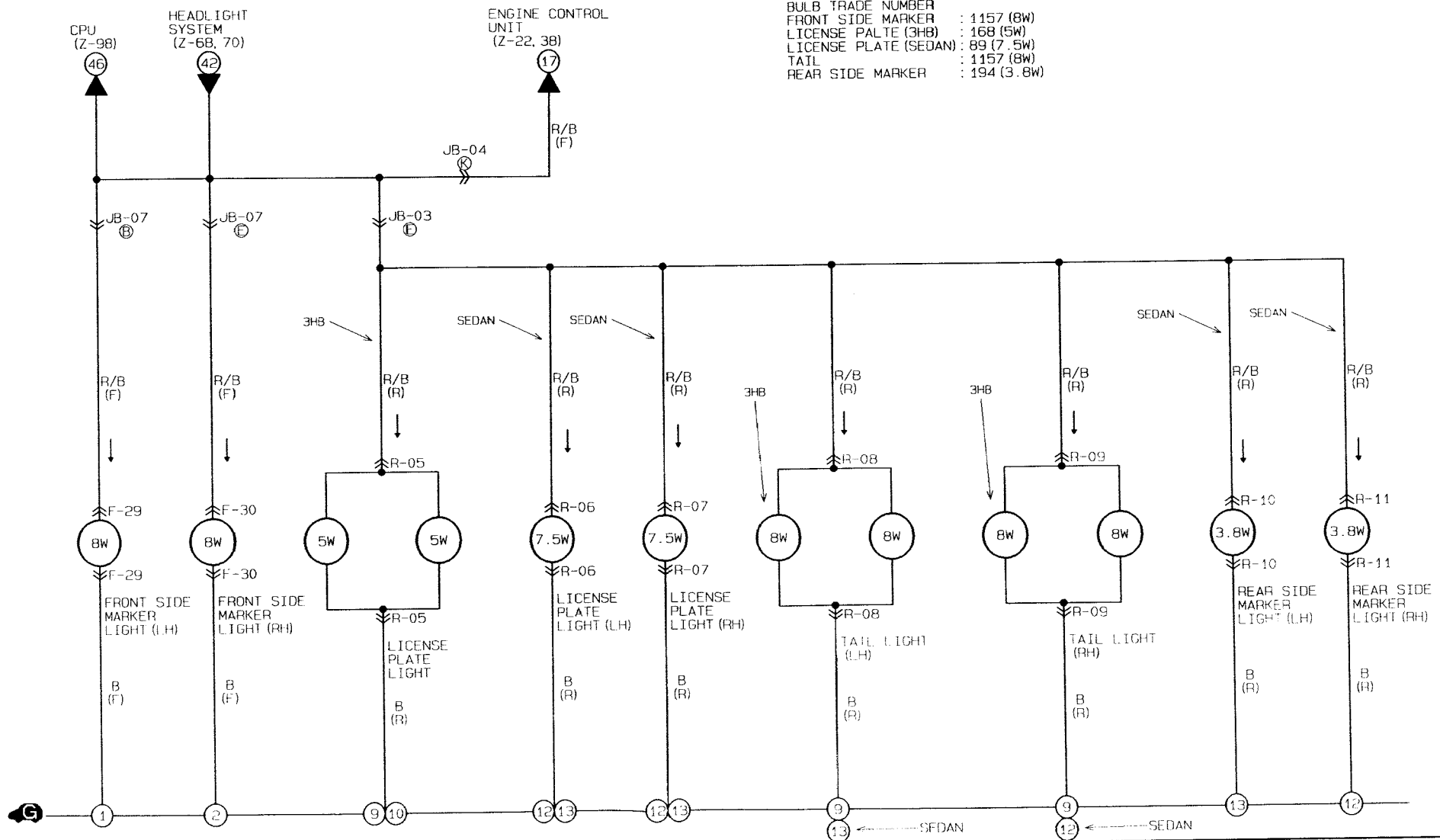
JOINT BOX

Z WIRING DIAGRAM

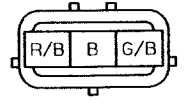
■ SIDE MARKER LIGHTS ■ LICENSE PLATE LIGHTS ■ TAIL LIGHTS

A
2
1
B

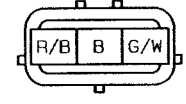
BULB TRADE NUMBER	
FRONT SIDE MARKER	: 1157 (8W)
LICENSE PALTE (3HB)	: 168 (5W)
LICENSE PLATE (SEDAN)	: 89 (7.5W)
TAIL	: 1157 (8W)
REAR SIDE MARKER	: 194 (3.8W)



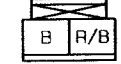
F-29 FRONT SIDE
MARKER LIGHT LH (F)



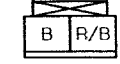
F-30 FRONT SIDE
MARKER LIGHT RH (F)



R-05 LICENSE PLATE
LIGHT (R)



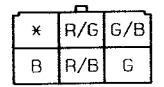
R-06 LICENSE PLATE
LIGHT LH (R)



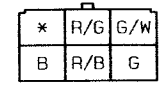
R-07 LICENSE PLATE
LIGHT RH (R)



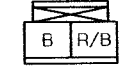
R-08 TAIL LIGHT LH (R)



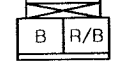
R-09 TAIL LIGHT RH (R)

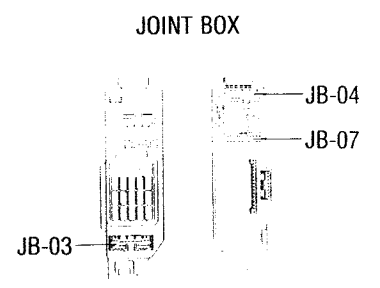
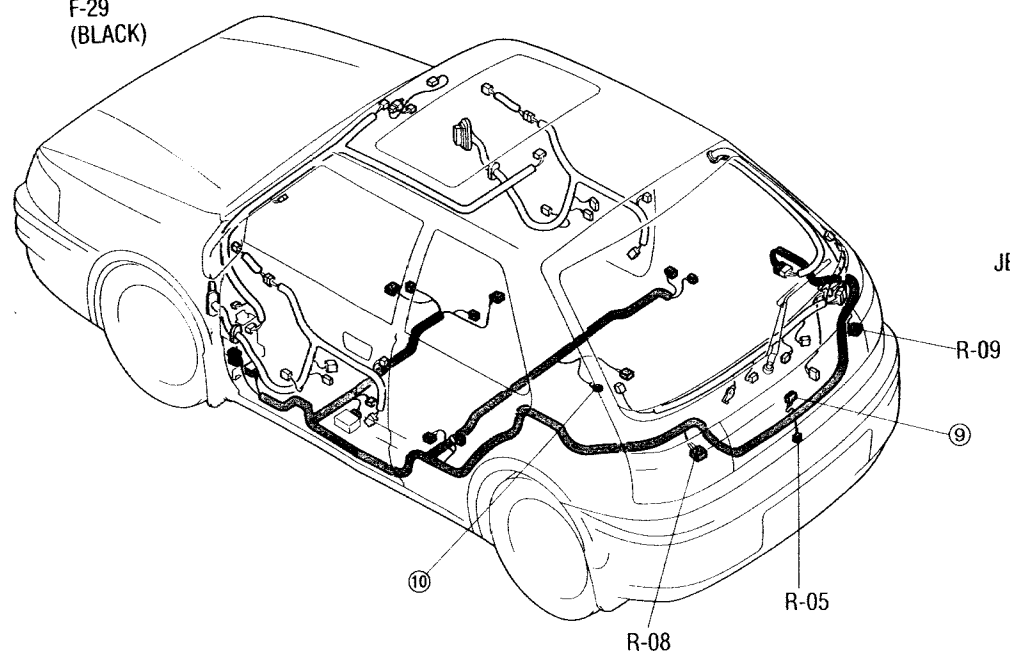
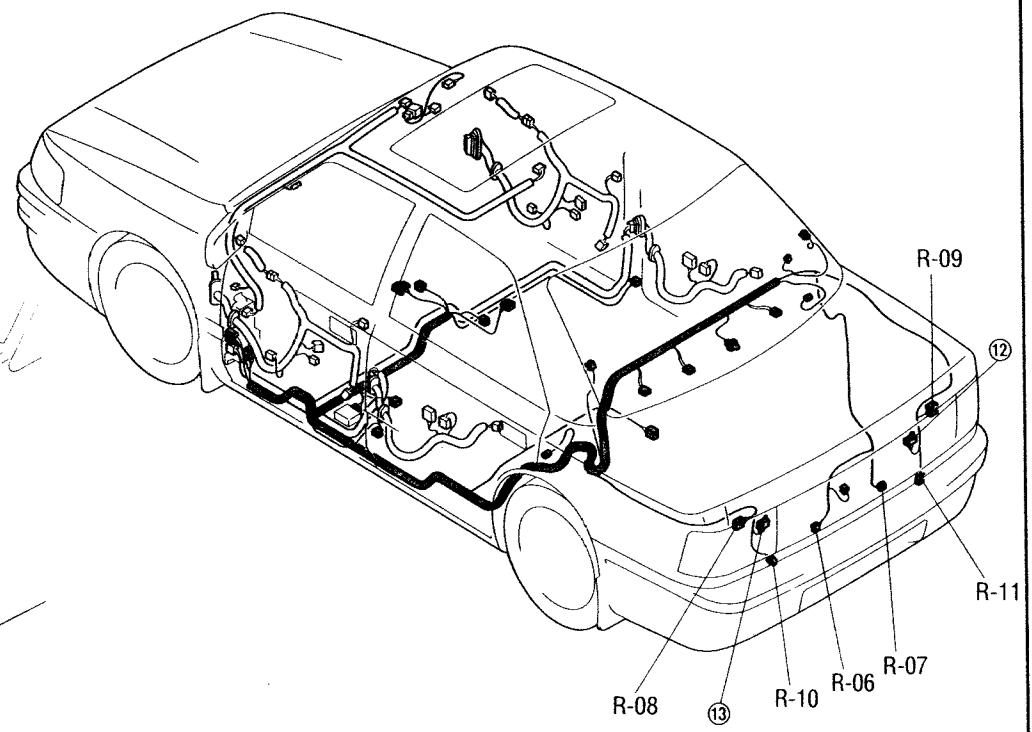
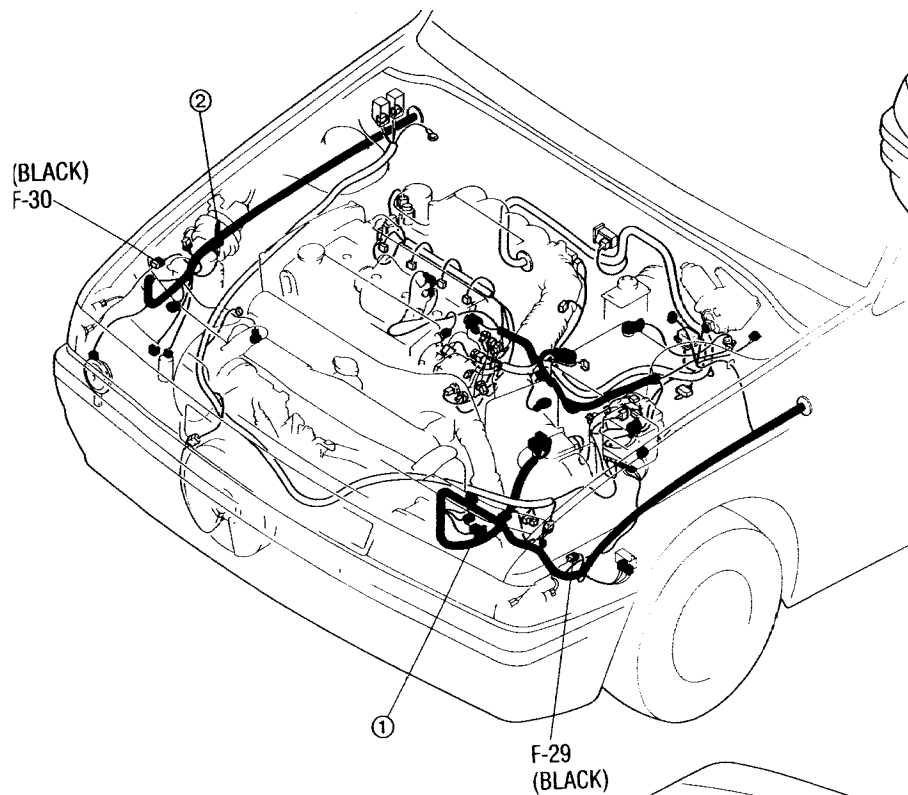


R-10 REAR SIDE
MARKER LIGHT LH (R)



R-11 REAR SIDE
MARKER LIGHT RH (R)

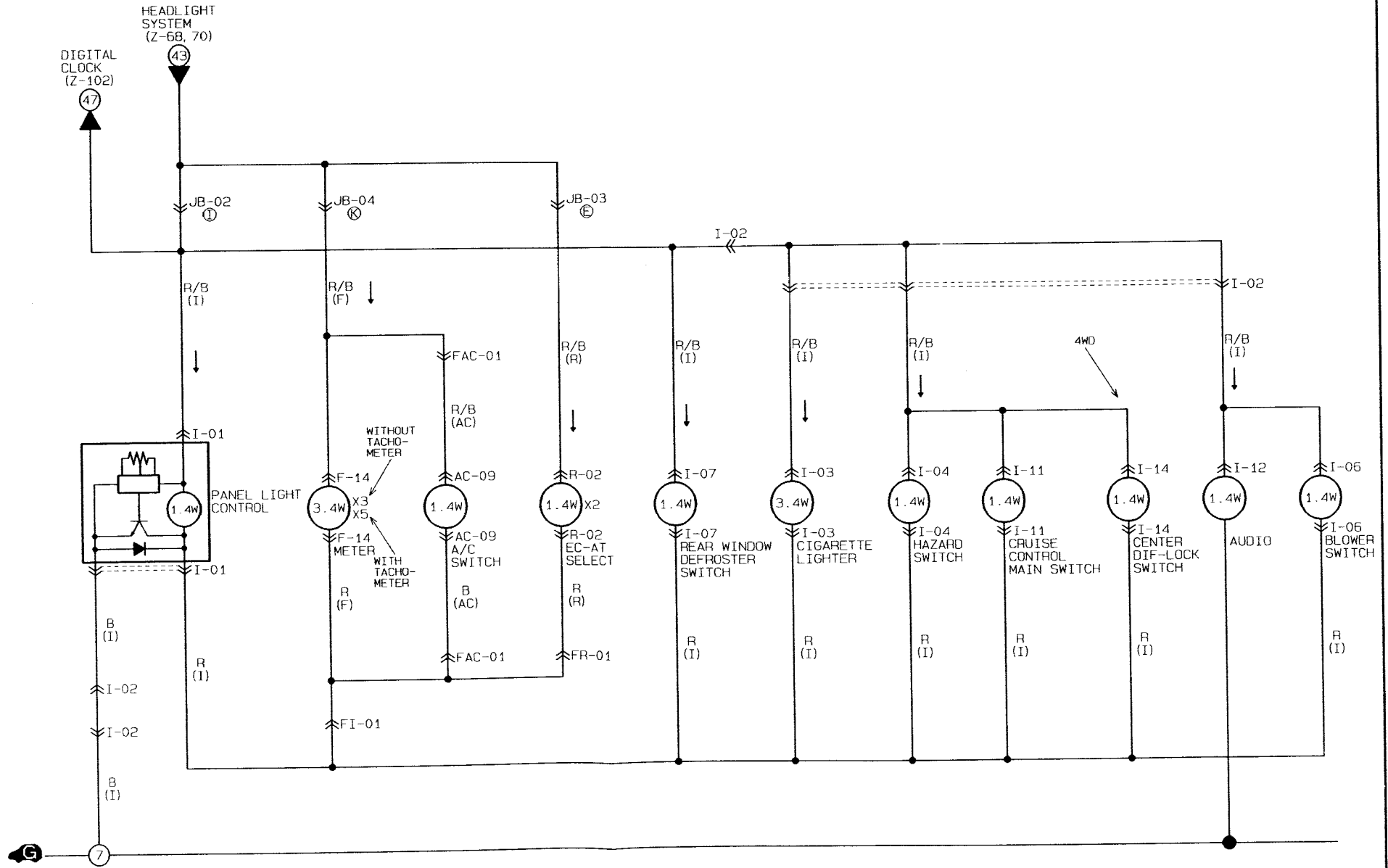




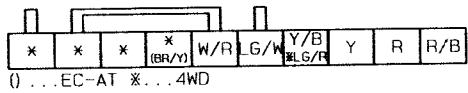


ILLUMINATION LAMPS

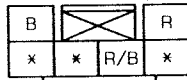
A
2
1
S
B



F-14 METER (F)



I-01 PANEL LIGHT CONTROL (I)



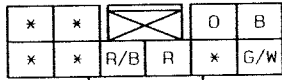
I-02 JOINT CONNECTOR (I)



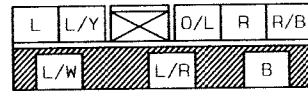
I-03 CIGARETTE LIGHTER ILLUMINATION LAMP (I)



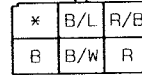
I-04 HAZARD SWITCH (I)



I-05 BLOWER SWITCH (I)



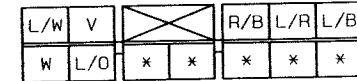
I-07 REAR WINDOW DEFROSTER SWITCH (I)



I-11 CRUISE CONTROL MAIN SWITCH (I)



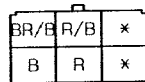
I-12 AUDIO (I)



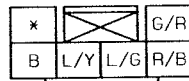
I-14 CENTER DIF-LOCK SWITCH (I)



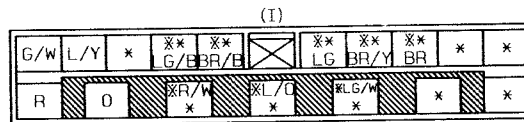
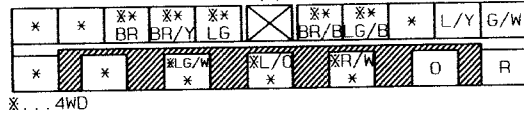
R-02 EC-AT SELECT (R)



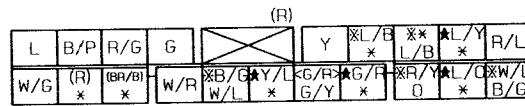
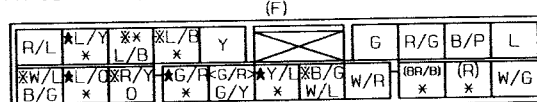
AC-09 A/C SWITCH (AC)



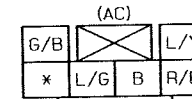
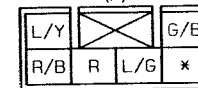
FI-01 FRONT (F) - INSTRUMENT PANEL (F)



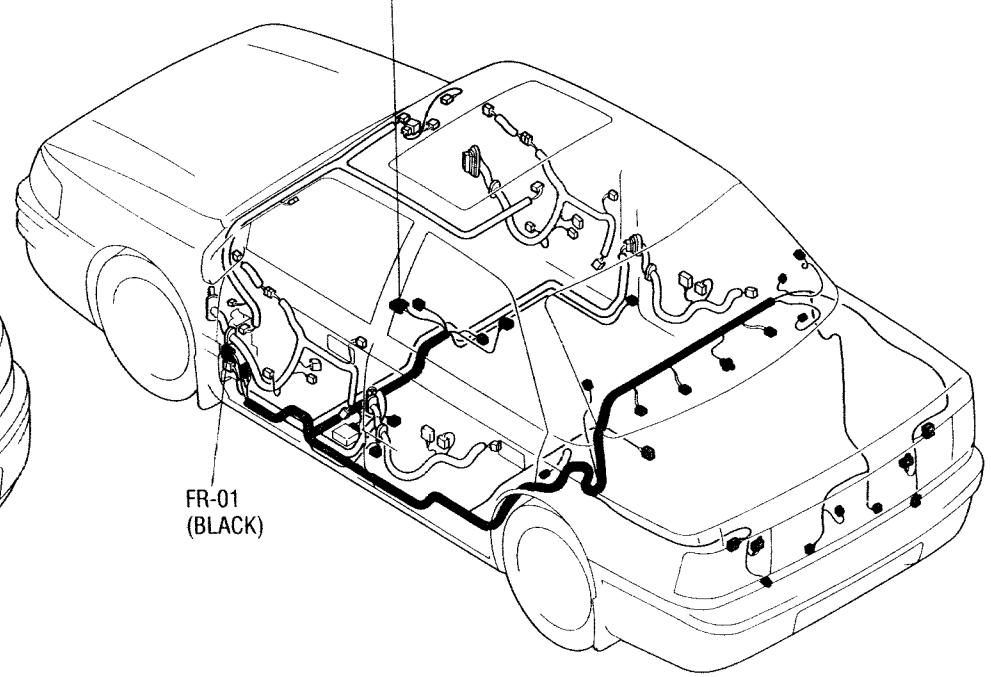
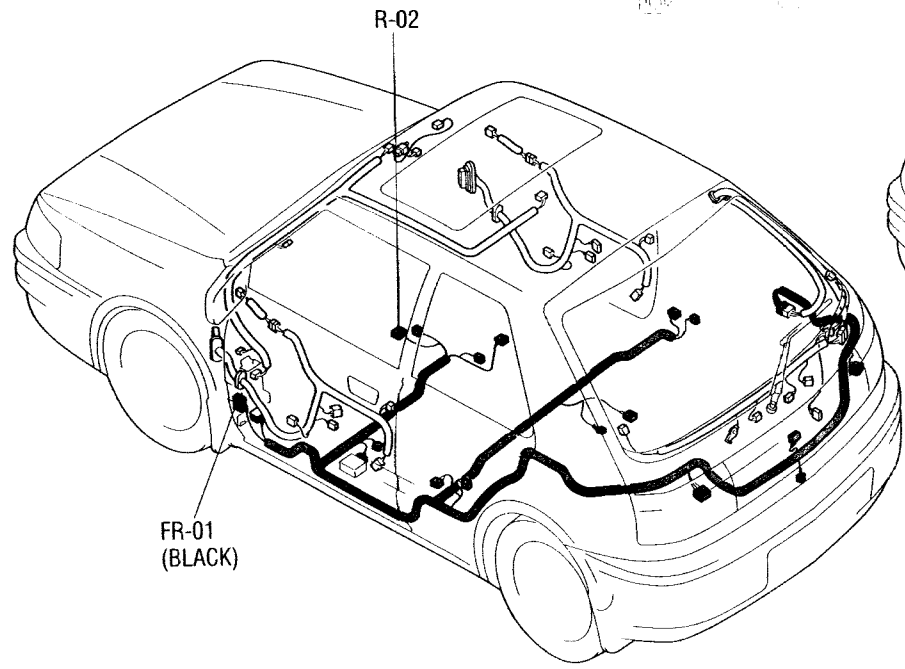
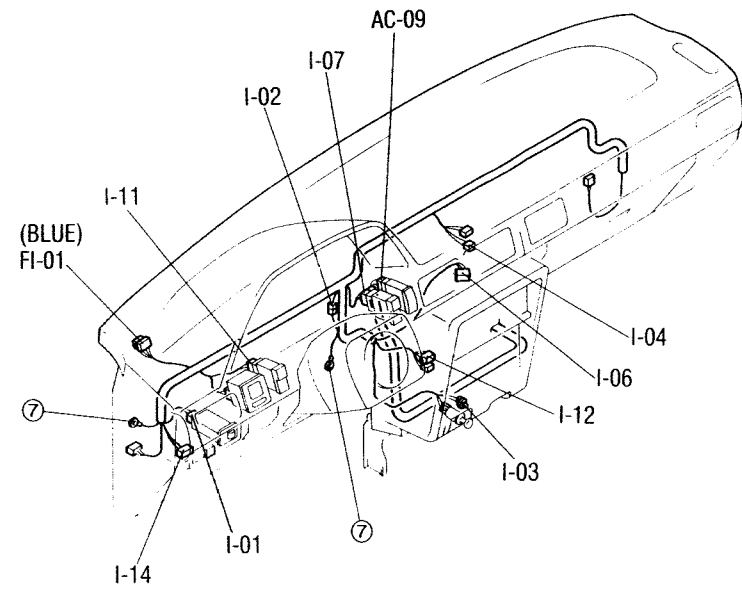
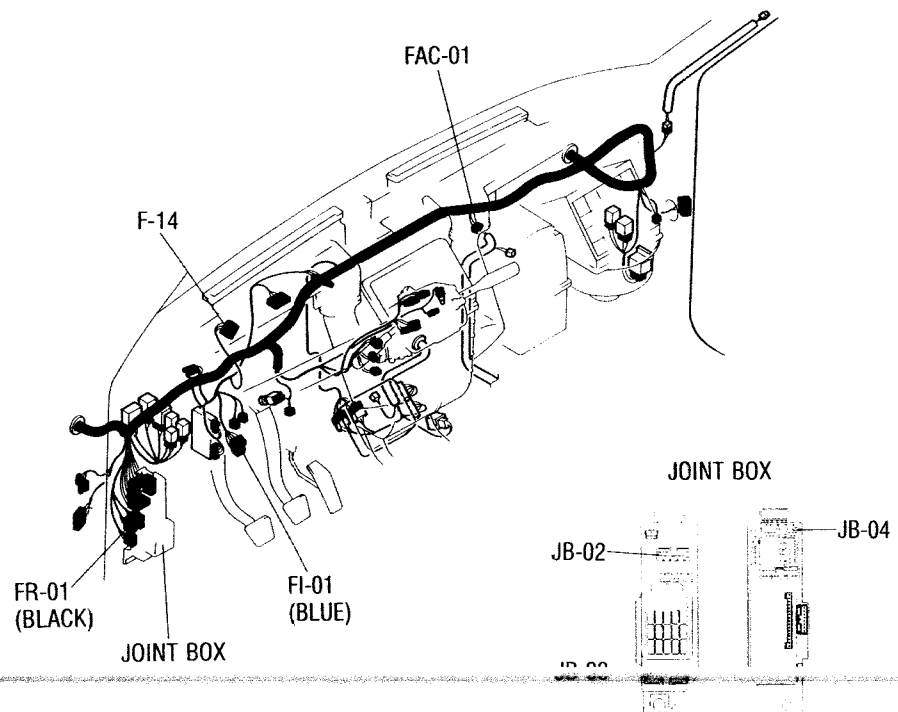
FR-01 FRONT (F) - REAR (R)



FAC-01 FRONT (F) - A/C (AC)



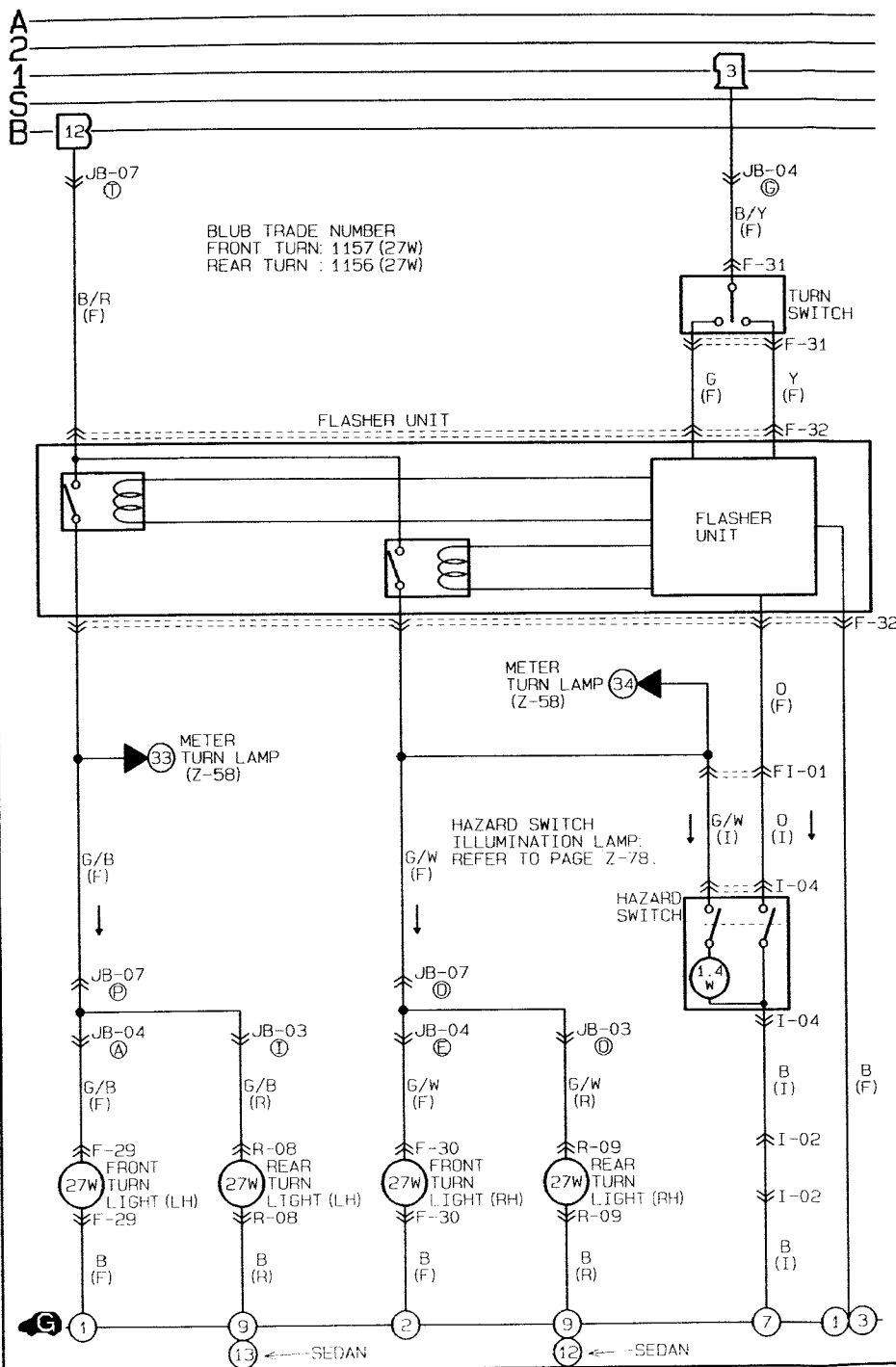
() ... EC-AT <> ... CANADA * ... WITH PASSIVE SHOULDER BELT [] ... SEDAN * ... 4WD





Z WIRING DIAGRAM

TURN & HAZARD FLASHER LIGHTS



F-31 TURN SWITCH (F)

Y	*	*	*
B/Y	G	*	*

CANADA
WITHOUT CRUISE
CONTROL

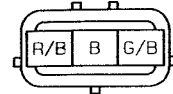
●*	●*	G/O	Y	G	B/Y
----	----	-----	---	---	-----

...WITHOUT CRUISE CONTROL
EXCEPT CANADA
WITHOUT CRUISE
CONTROL

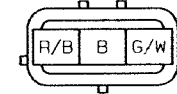
F-32 FLASHER UNIT (F)

G/W	G	O	B
B/R	Y	G/B	*

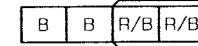
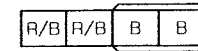
F-29 FRONT TURN LIGHT LH (F)



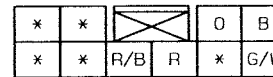
F-30 FRONT TURN LIGHT RH (F)



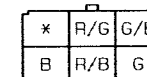
I-02 JOINT CONNECTOR (I)



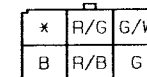
I-04 HAZARD SWITCH (I)



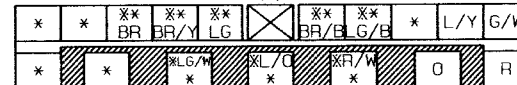
R-08 REAR TURN LIGHT LH (R)



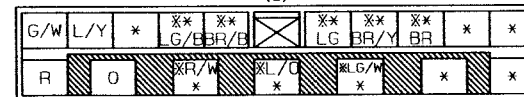
R-09 REAR TURN LIGHT RH (R)



FI-01 FRONT (F) - INSTRUMENT PANEL (I)

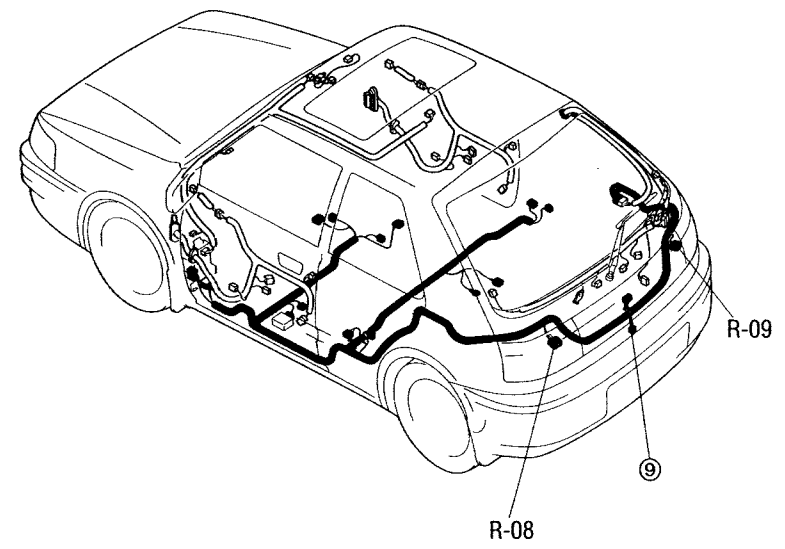
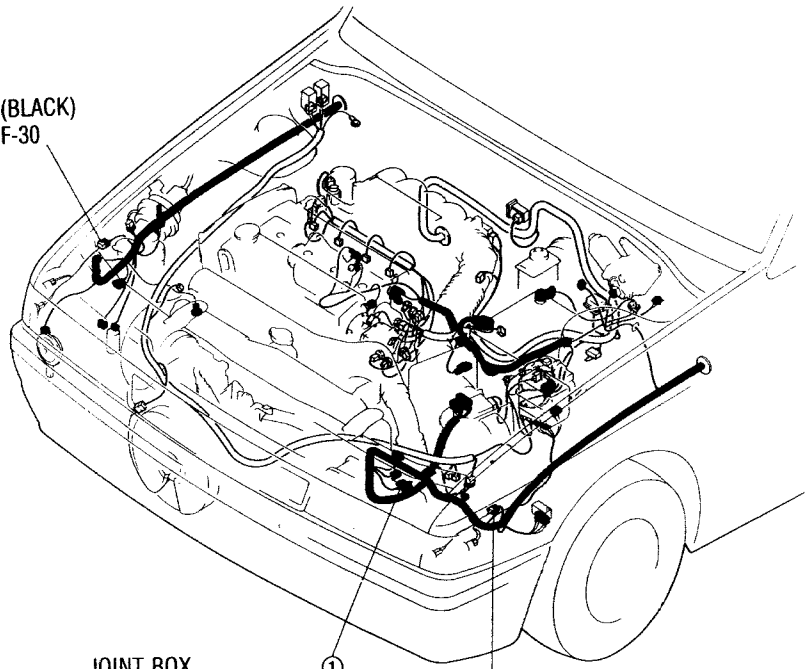


(I)

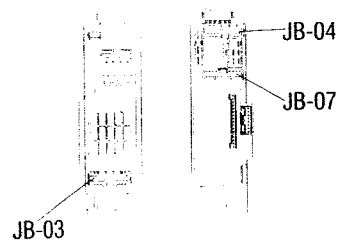


*...4WD

(BLACK)
F-30



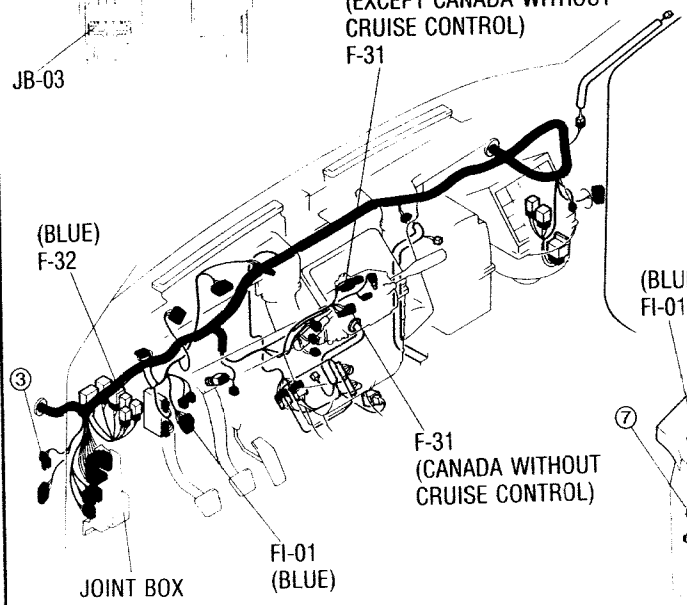
JOINT BOX



F-29
(BLACK)

(EXCEPT CANADA WITHOUT
CRUISE CONTROL)
F-31

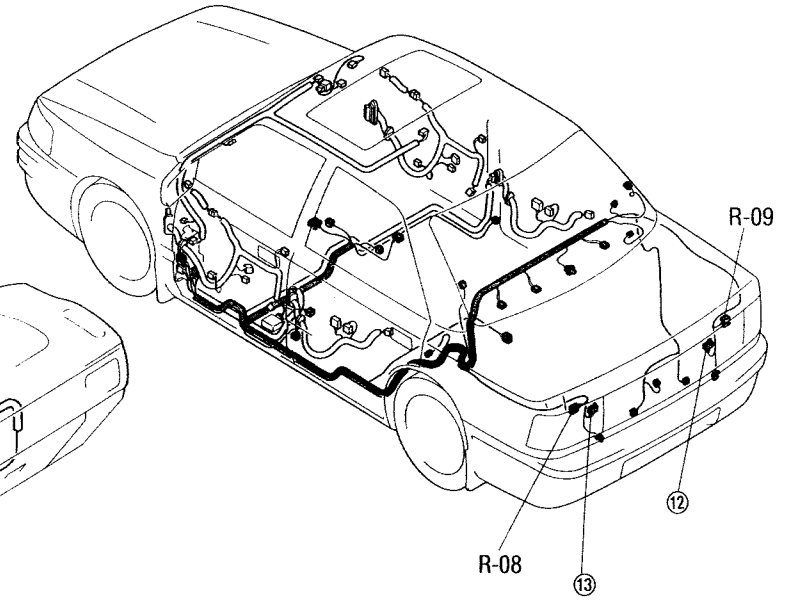
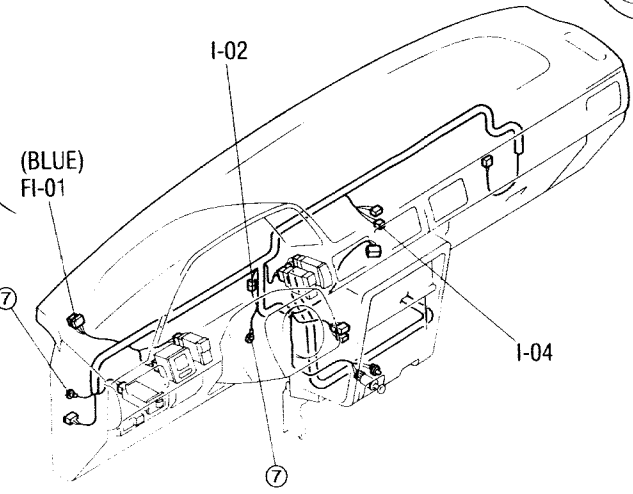
(BLUE)
F-32



JOINT BOX

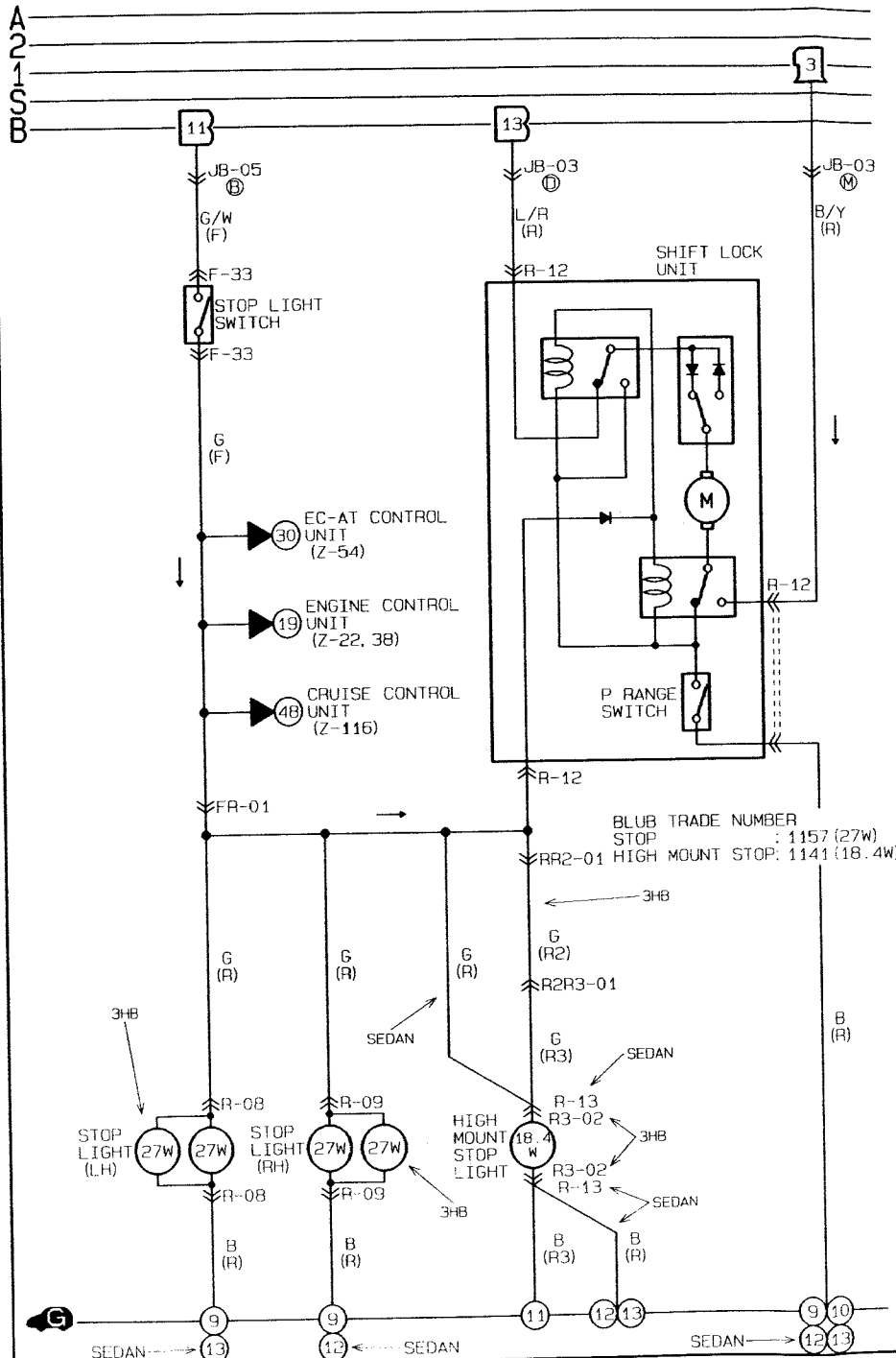
FI-01
(BLUE)

F-31
(CANADA WITHOUT
CRUISE CONTROL)

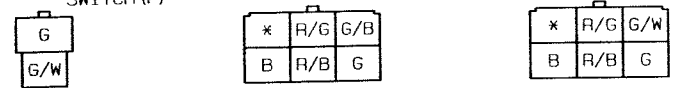


Z WIRING DIAGRAM

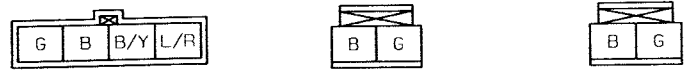
- STOP LIGHTS
- SHIFT LOCK SYSTEM



F-33 STOP LIGHT SWITCH (F) R-08 STOP LIGHT LH (R) R-09 STOP LIGHT RH (R)



R-12 SHIFT LOCK UNIT (R) R-13 HIGH MOUNT STOP LIGHT (R) R3-02 HIGH MOUNT STOP LIGHT (R3)

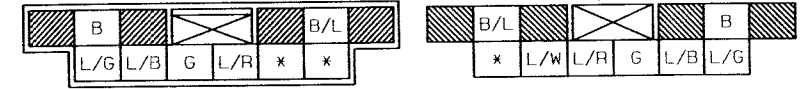


FR-01 FRONT (F) - REAR (R)

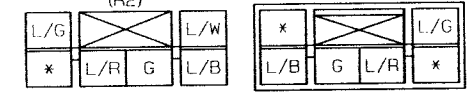
(F)											
R/L	* L/Y	* L/B	* L/B	Y		G	R/G	B/P	L		
* W/L	* R/Y	* G/R	* Y/L	* B/G	W/R	(B/R)	(R)	*	*	W/G	
B/G	*	O	*	G/Y	*	W/L					
(R)											
L	B/P	R/G	G		Y	* L/B	* L/Y	R/L			
W/G	(R)	(B/R)	W/R	* B/G	* Y/L	* G/R	* G/R	* R/Y	* L/O	* W/L	
	*	*		W/L	*	G/Y	*	O	*	B/G	

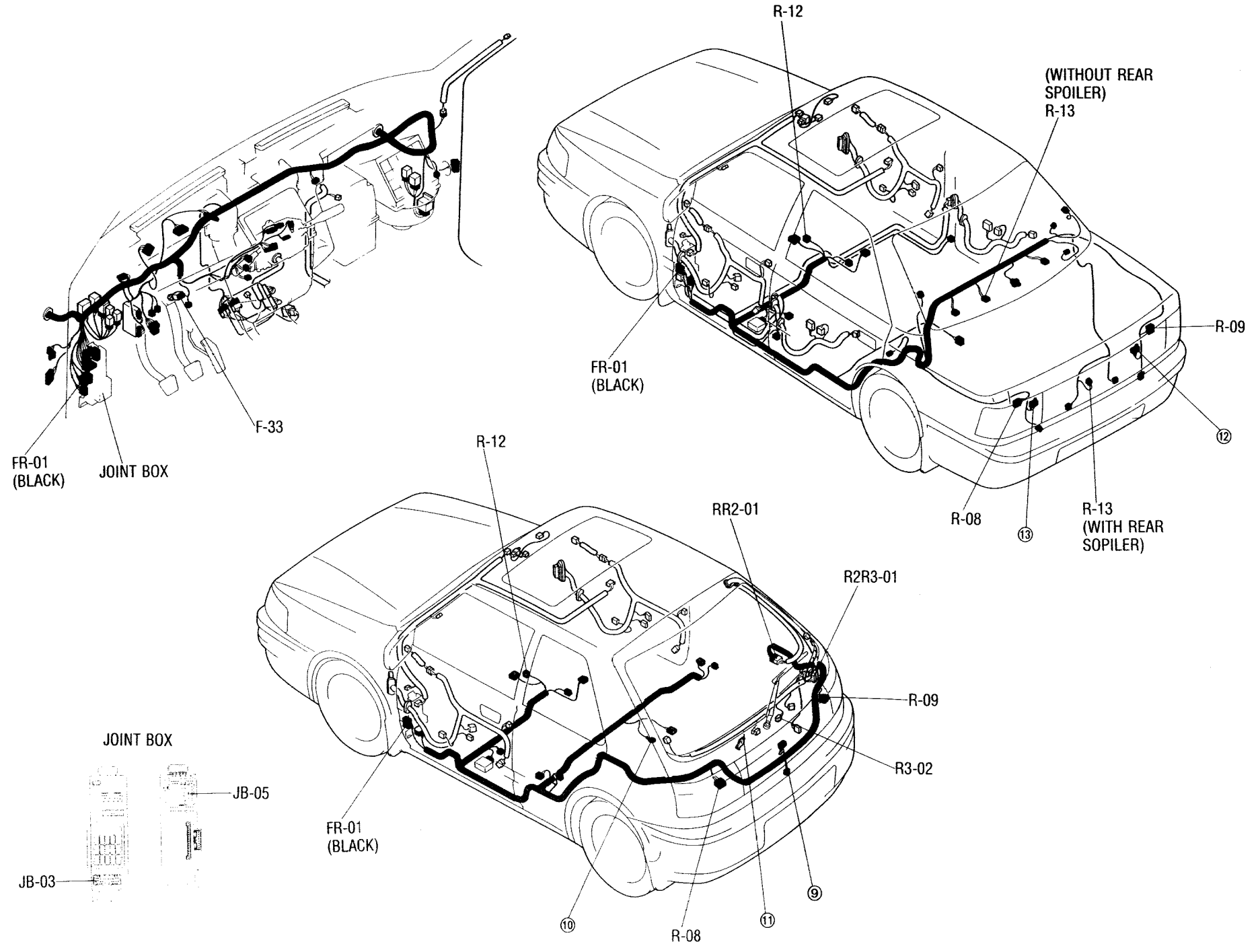
() ...EC-AT <> ...CANADA
 * ...WITH PASSIVE SHOULDER BELT I ...SEDAN * ...4WD

RR2-01 REAR (R) - REAR NO. 2 (R2)



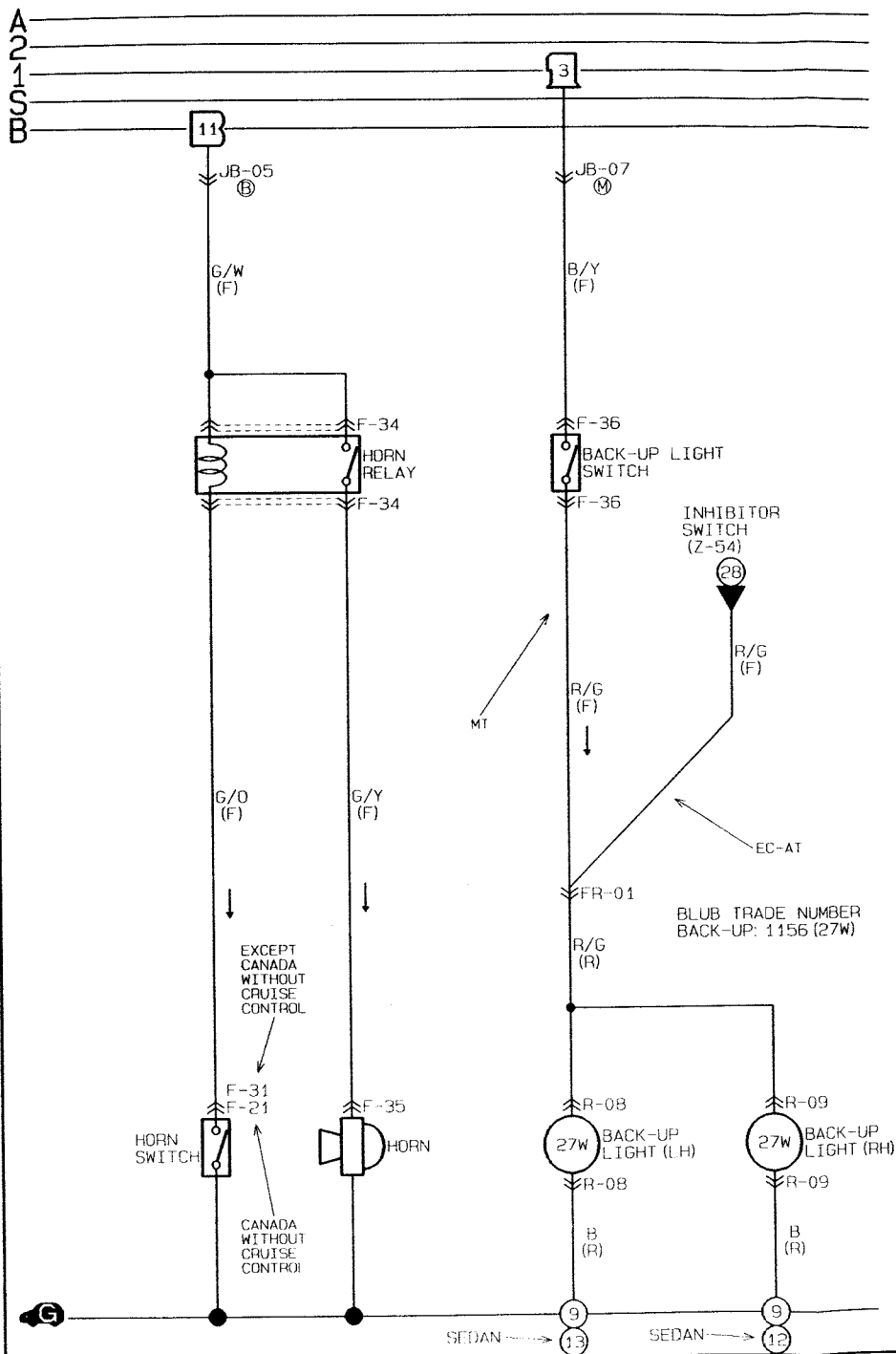
R2R3-01 REAR NO. 2 (R2) - REAR NO. 3 (R3)





Z WIRING DIAGRAM

EXCEPT 4WD ■ HORN
 ■ BACK-UP LIGHTS



F-21 HORN SWITCH (F)

G/O	R/L	*
R/B	R	R/W

F-31 HORN SWITCH (F)

●*	●*	G/O	Y	G	B/Y
R	B				

●...WITHOUT CRUISE CONTROL

F-34 HORN RELAY (F)

G/Y	G/O	G/W
	G/W	

F-35 HORN (F)

G/Y	
-----	--

F-36 BACK-UP LIGHT SWITCH (F)

R/G	*
B/Y	*

R-08 BACK-UP LIGHT LH (R)

*	R/G	G/B
B	R/B	G

R-09 BACK-UP LIGHT RH (R)

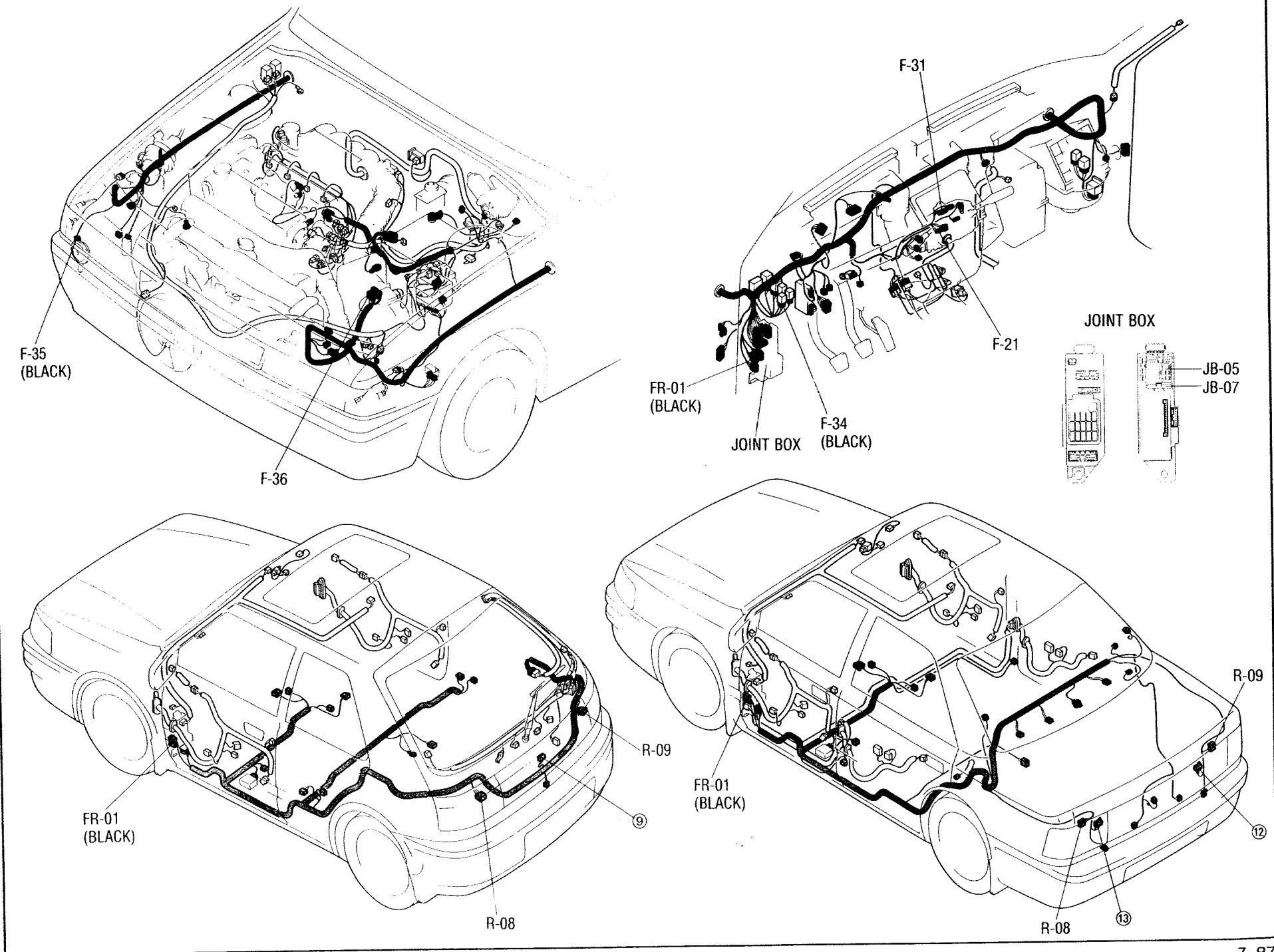
*	R/G	G/W
B	R/B	G

FR-01 FRONT (F) -REAR (R)

R/L	L/Y	**	L/B	*	Y		G	R/G	B/P	L
W/L	L/O	R/Y	R/G	R/R	*Y/L	B/G	W/R	(B/R/B)	(R)	W/G
B/G	*	O	*	G/Y	*	W/L		*	*	

L	B/P	R/G	G		Y	L/B	**	L/Y	R/L
W/G	(R)	(B/R/B)	W/R	B/G	Y/L	R/R	R/G	R/Y	L/O
*	*	*		W/L	*	G/Y	*	O	B/G

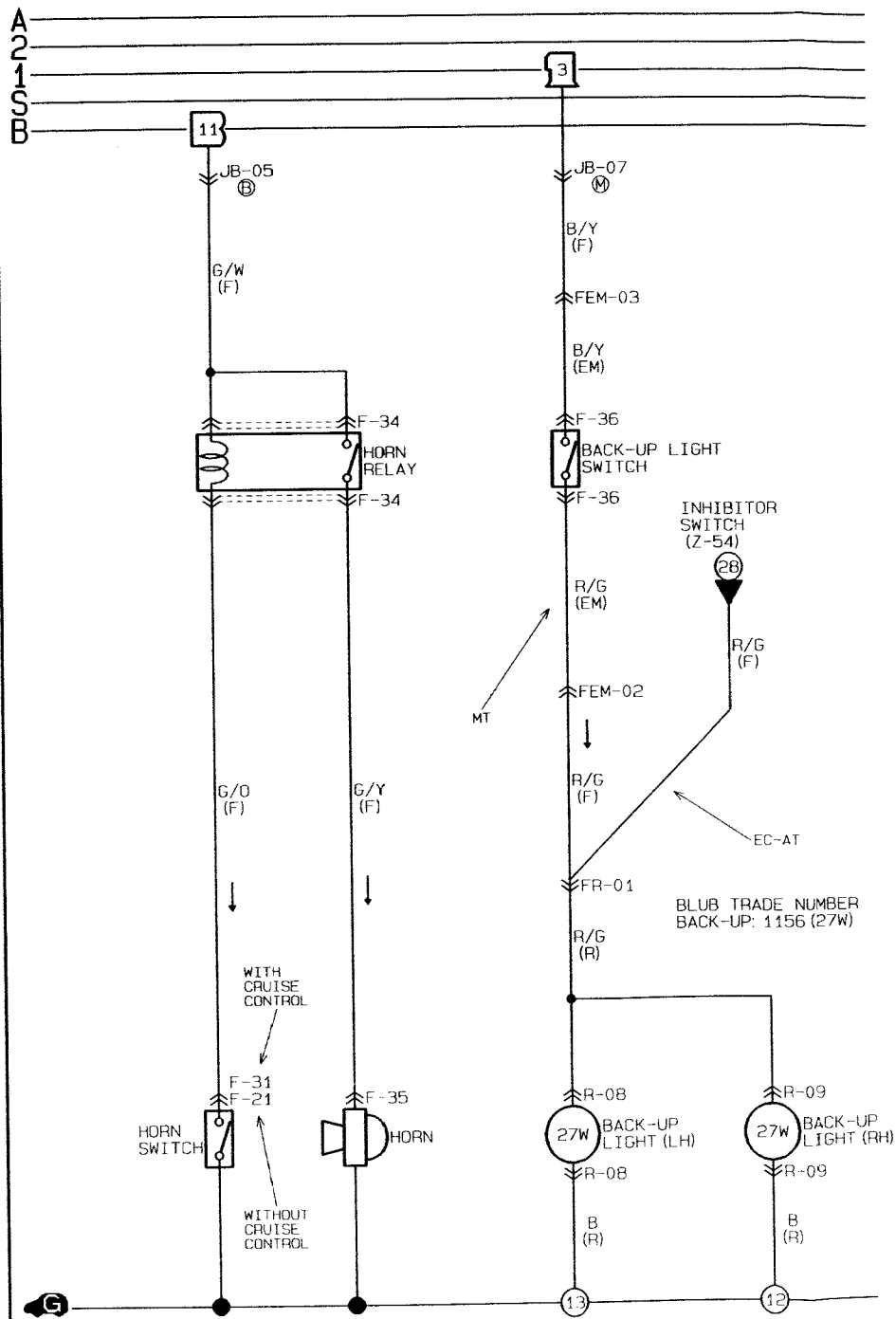
()...EC-AT <>...CANADA
 *...WITH PASSIVE SHOULDER BELT I...SEDAN **...4WD



Z WIRING DIAGRAM

4WD

- HORN
- BACK-UP LIGHTS



F-21 HORN SWITCH (F)

G/O	R/L	*
R/B	R	R/W

F-31 HORN SWITCH (F)

R	B	G/O	Y	G	B/Y
---	---	-----	---	---	-----

F-34 HORN RELAY (F)

G/Y	G/O	G/W
	G/W	

F-35 HORN (F)

G/Y

EM-18 BACK-UP LIGHT SWITCH (EM)

B/Y	*
R/G	*

R-08 BACK-UP LIGHT LH (R)

*	R/G	G/B
B	R/B	G

R-09 BACK-UP LIGHT RH (R)

*	R/G	G/W
B	R/B	G

FR-01 FRONT (F) -REAR (R)

R/L	*L/Y	*X	X/L/B	Y		G	R/G	B/P	L
*W/L	*L/O	*R/Y	*G/R	*Y/L	*X/B/G		(B/R/B)	(R)	
B/G	*	O	*	G/Y	*	W/L	W/R	*	W/G

(F)

(R)

L	B/P	R/G	G		Y	X/L/B	*X	*L/Y	R/L
W/G	(R)	(B/R/B)	W/R	*B/G	*Y/L	*G/R	*G/R	*R/Y	*L/O
*	*	*	W/L	*	G/Y	*	O	*	B/G

() ... EC-AT <> ... CANADA
 * ... WITH PASSIVE SHOULDER BELT I ... SEDAN * ... 4WD

FEM-02 FRONT (F) -EMISSION (EM)

B	Y/B	(L/G)	(R/W)	(G/R)		(X)	<B/Y>	*	(L/G/W)
*R/G	L/Y	*	(W)	(R)	<B/R/W>	*R/G	*Y/W	(B/L/G)	B/L
*	*	*	G/Y	*	*	*	*	*	(L/G/P)

(EM)

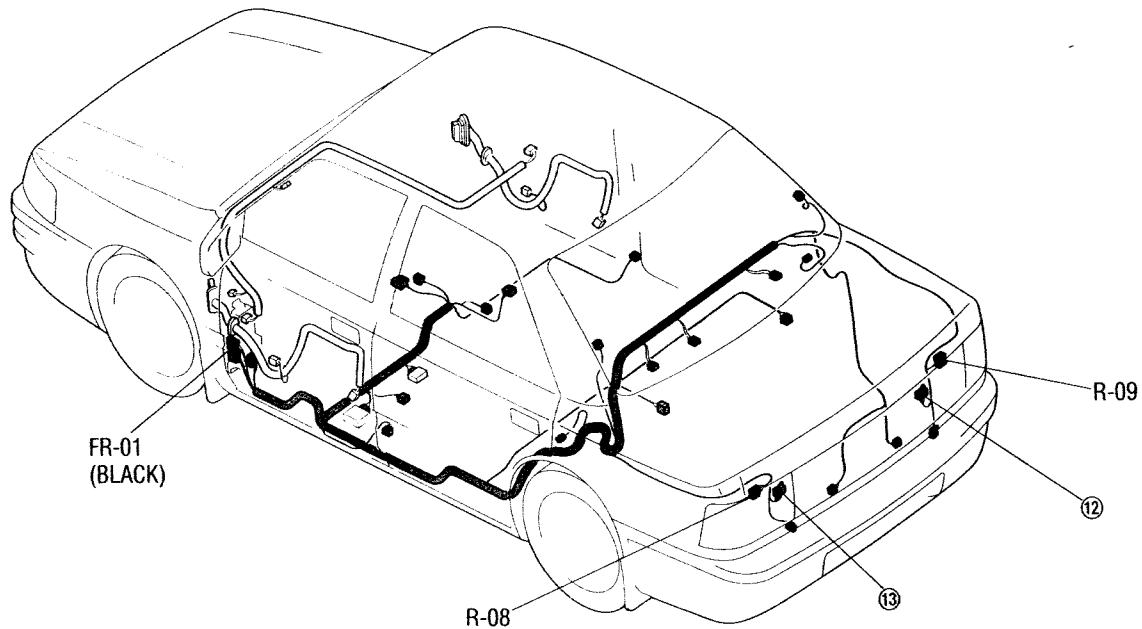
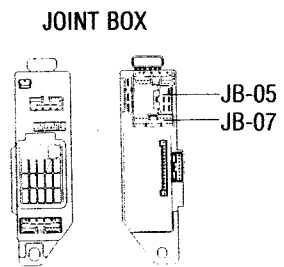
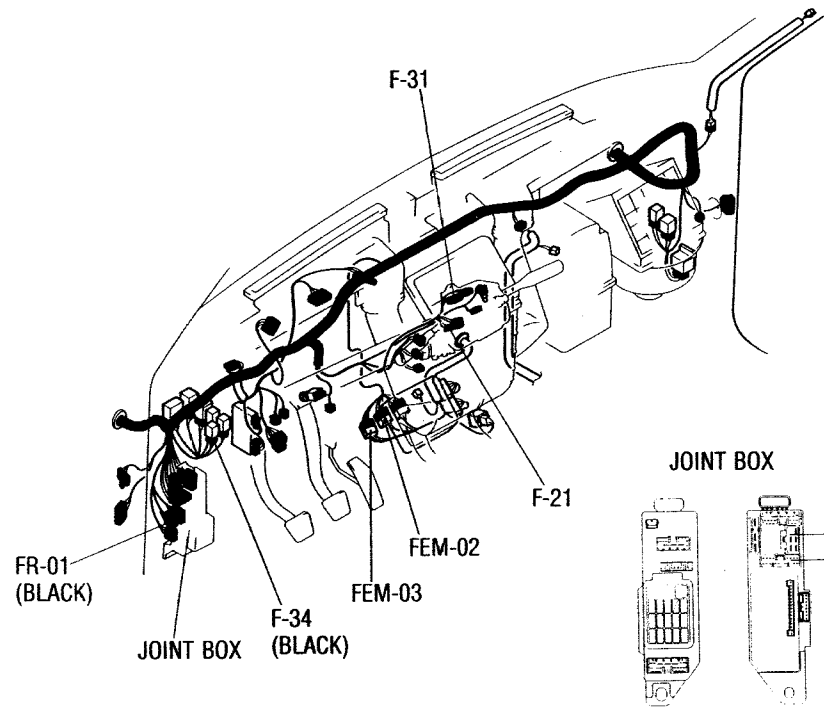
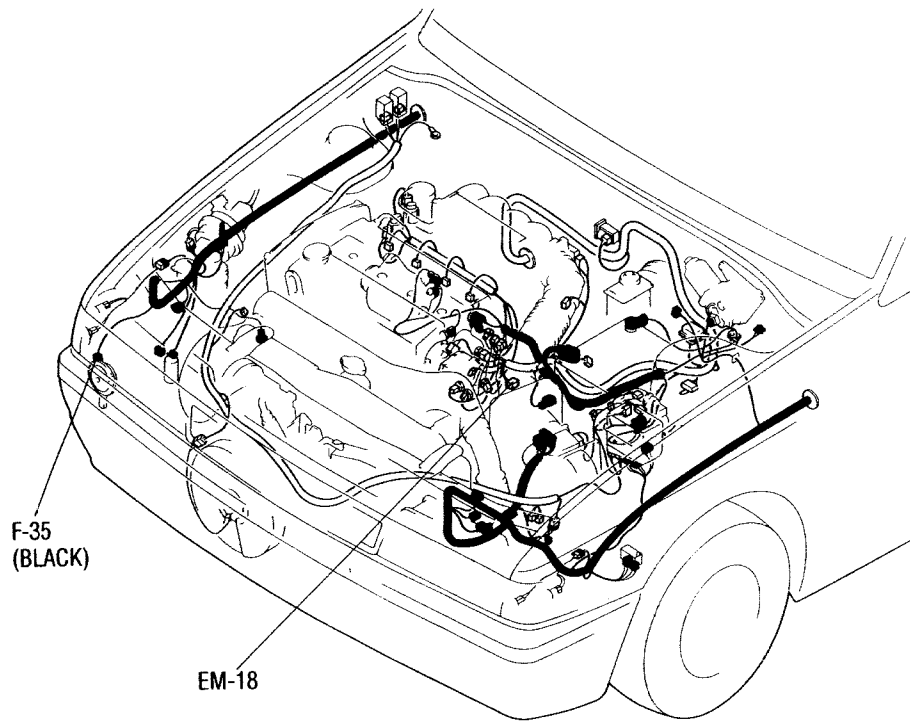
(L/G/W)	*	<B/Y>	(*)		(G/R)	(R/W)	(L/G)	Y/B	B
*R/P	B/L	(B/L/G)	*X/Y	*W/R	*R/G	*B/R/W	(R)	(W)	*R/G
*	*	*	G/Y	*	*	*	*	*	L/Y

() ... EC-AT <> ... CANADA * ... 4WD

FEM-03 FRONT (F) -EMISSION (EM)

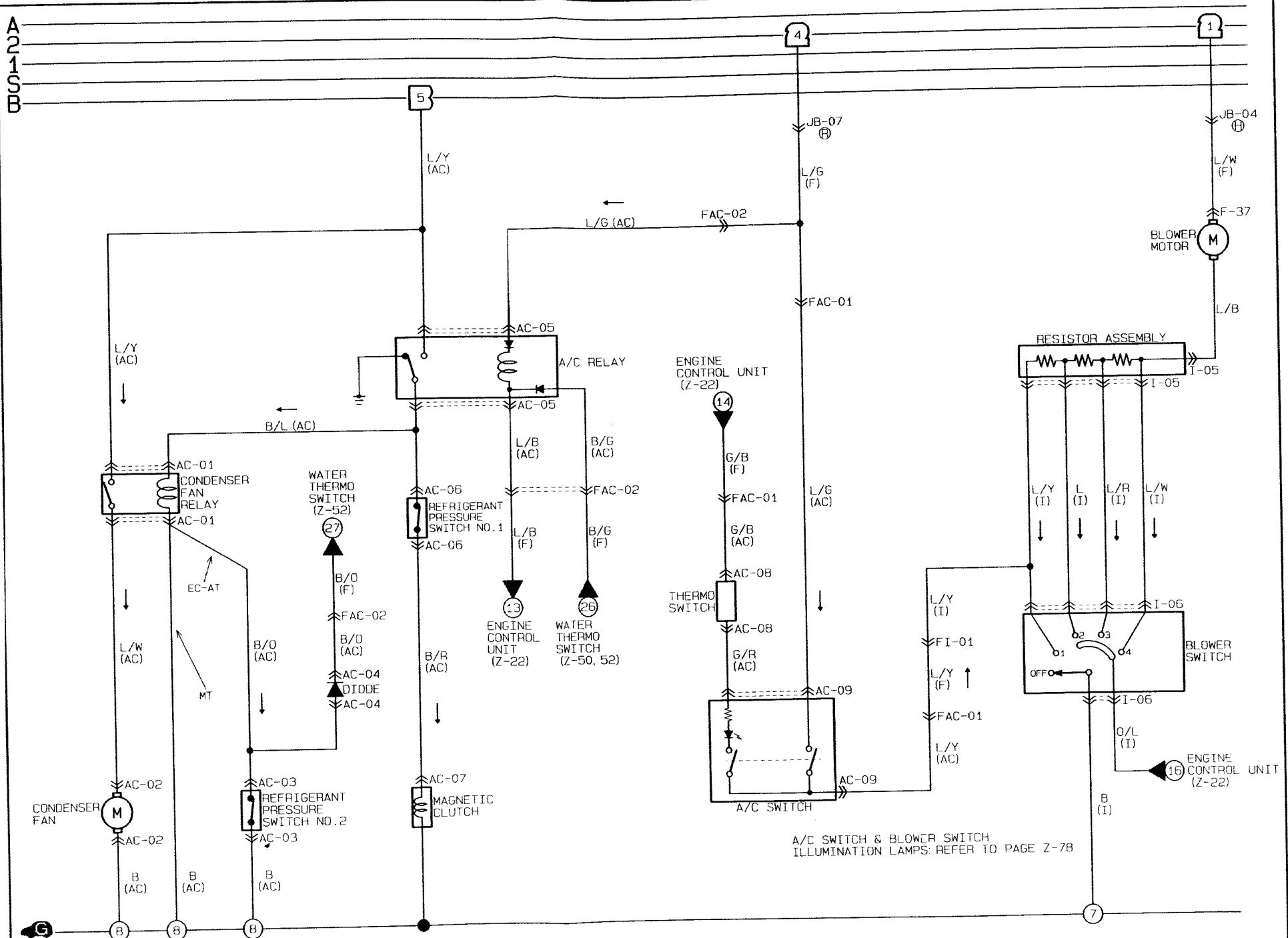
*	(B/L)	*
*B/Y	L	*

() ... EC-AT * ... 4WD



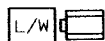
Z WIRING DIAGRAM

EXCEPT 4WD ■ HEATER & AIR CONDITIONER

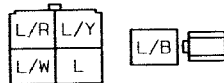


A/C SWITCH & BLOWER SWITCH
ILLUMINATION LAMPS: REFER TO PAGE Z-78

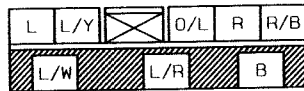
F-37 BLOWER MOTOR (F)



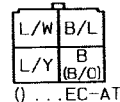
I-05 RESISTOR ASSEMBLY (I)



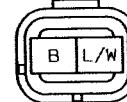
I-06 BLOWER SWITCH (I)



AC-01 CONDENSER FAN RELAY (AC)



AC-02 CONDENSER FAN (AC)



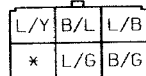
AC-03 REFRIGERANT PRESSURE SWITCH NO.2 (AC)



AC-04 DIODE (AC)



AC-05 A/C RELAY (AC)



AC-06 REFRIGERANT PRESSURE SWITCH NO. 1 (AC)



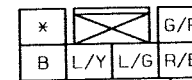
AC-07 MAGNETIC CLUTCH (AC)



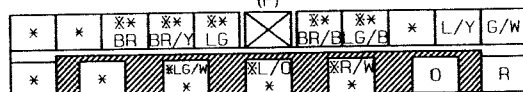
AC-08 THERMO SWITCH (AC)



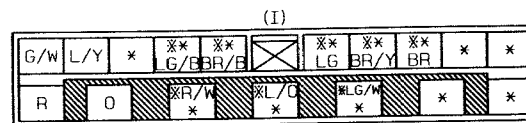
AC-09 A/C SWITCH (AC)



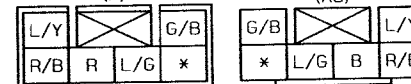
FI-01 FRONT (F) - INSTRUMENT PANEL (I)



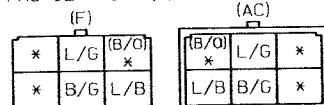
* ... 4WD



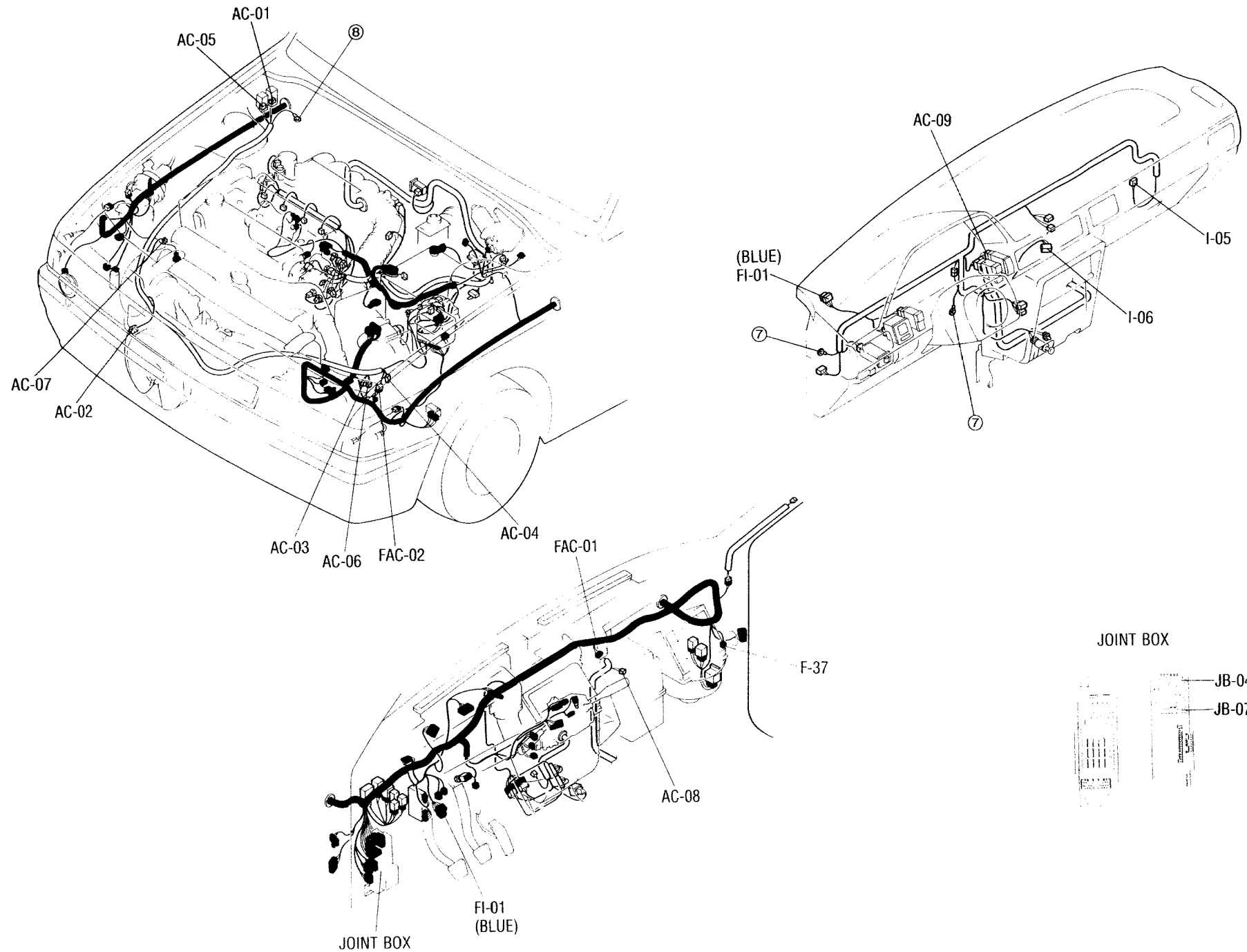
FAC-01 FRONT (F) - A/C (AC)



FAC-02 FRONT (F) - A/C (AC)

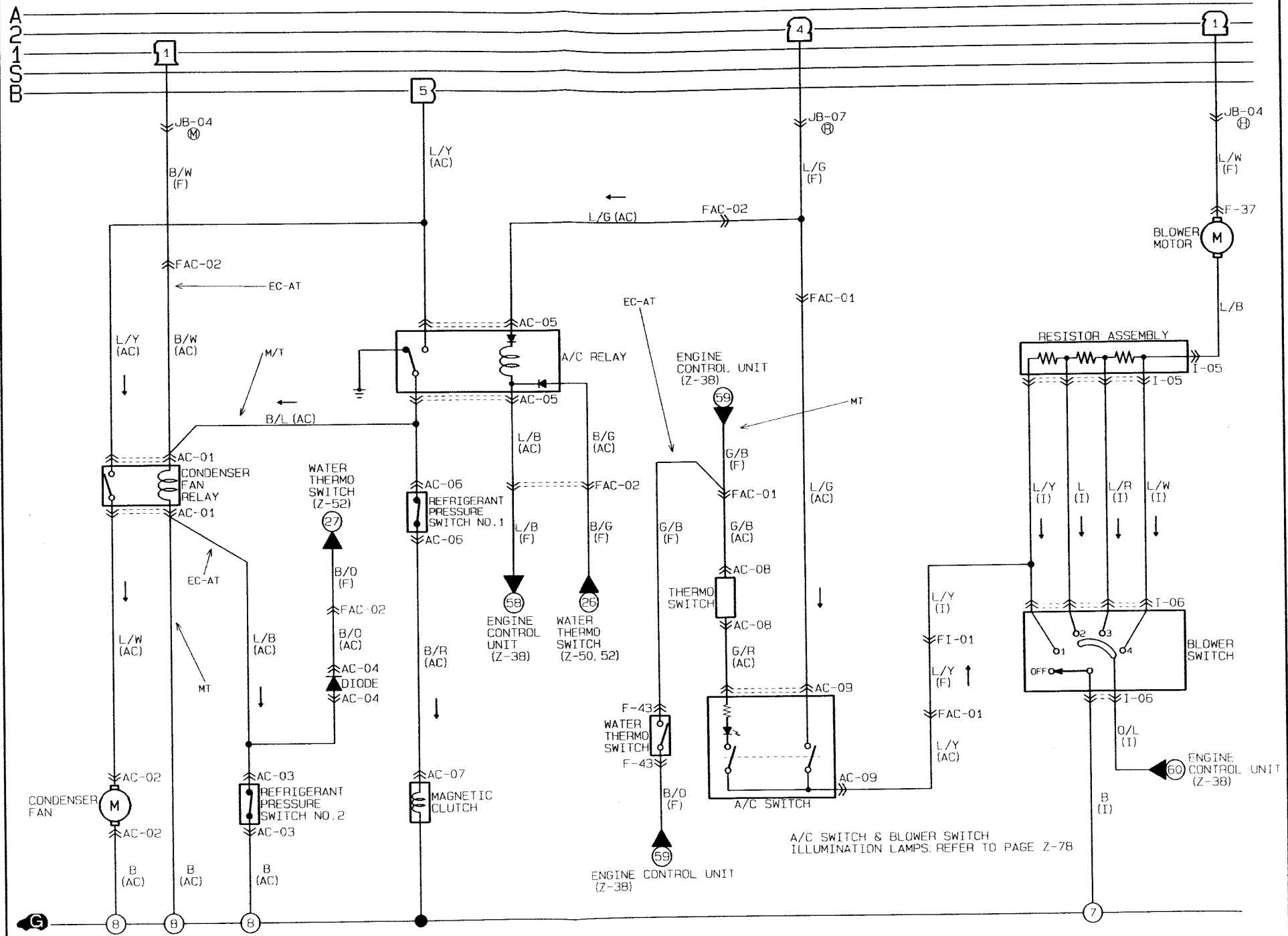


() ... EC-AT

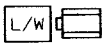


Z WIRING DIAGRAM

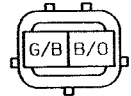
4WD ■ HEATER & AIR CONDITIONER



F-37 BLOWER MOTOR (F)



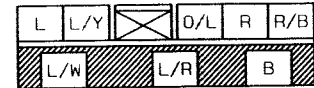
F-43 WATER THERMO SWITCH (F)



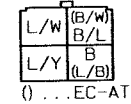
I-05 RESISTOR ASSEMBLY (I)



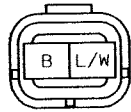
I-06 BLOWER SWITCH (I)



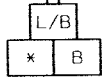
AC-01 CONDENSER FAN RELAY (AC)



AC-02 CONDENSER FAN (AC)



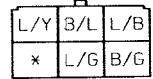
AC-03 REFRIGERANT PRESSURE SWITCH NO. 2 (AC)



AC-04 DIODE (AC)



AC-05 A/C RELAY (AC)



AC-06 REFRIGERANT PRESSURE SWITCH NO. 1 (AC)



AC-07 MAGNETIC CLUTCH (AC)



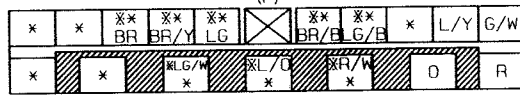
AC-08 THERMO SWITCH (AC)



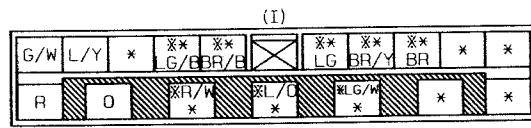
AC-09 A/C SWITCH (AC)



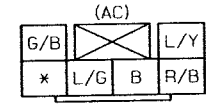
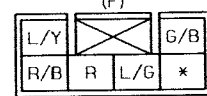
FI-01 FRONT (F) - INSTRUMENT PANEL (I)



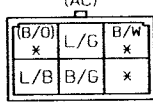
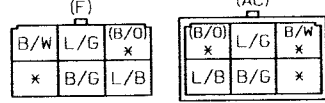
* ... 4WD

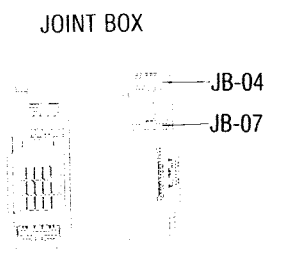
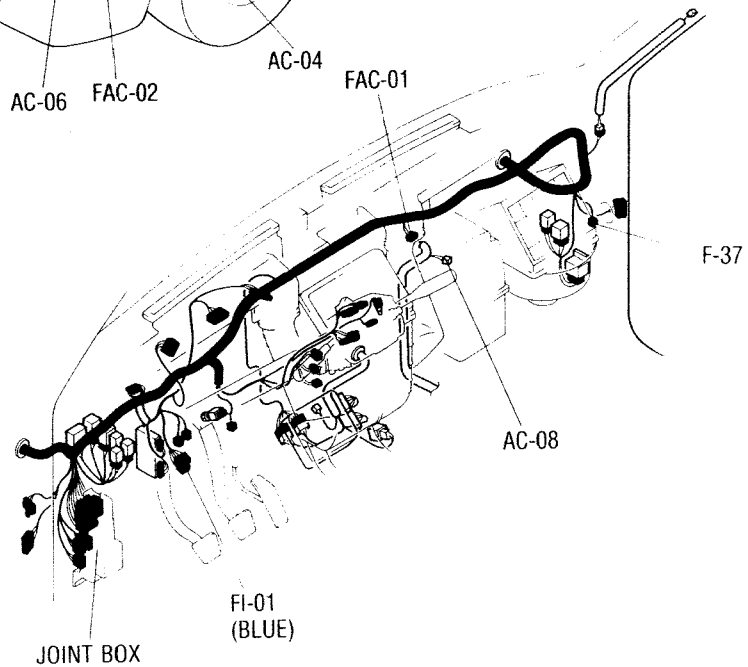
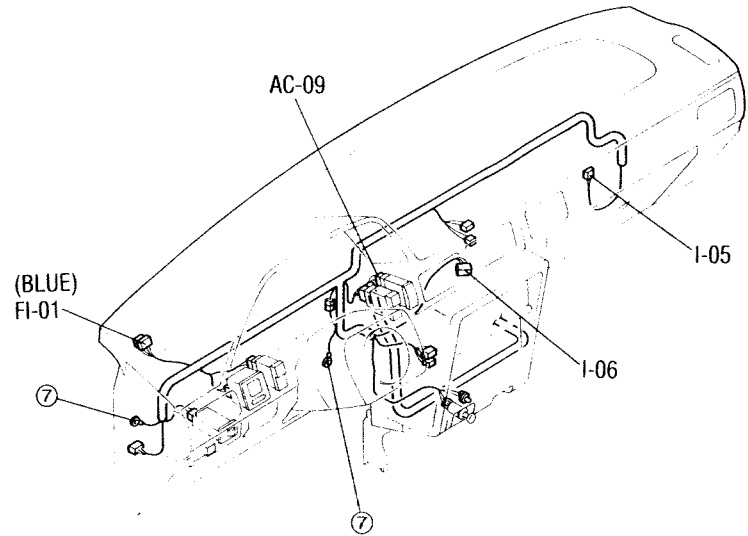
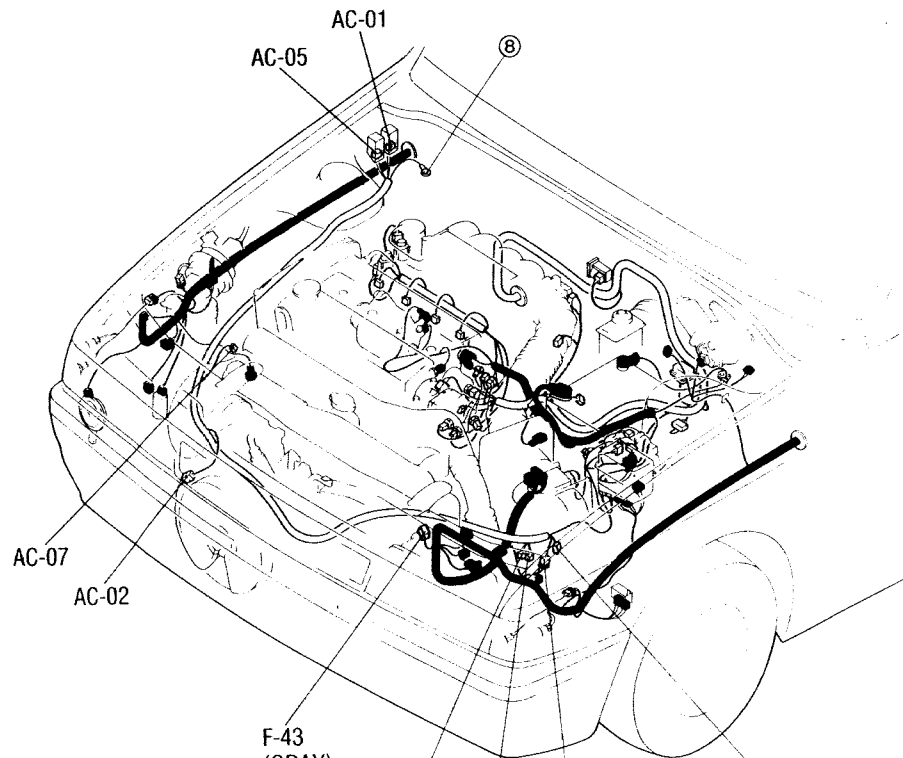


FAC-01 FRONT (F) - A/C (AC)



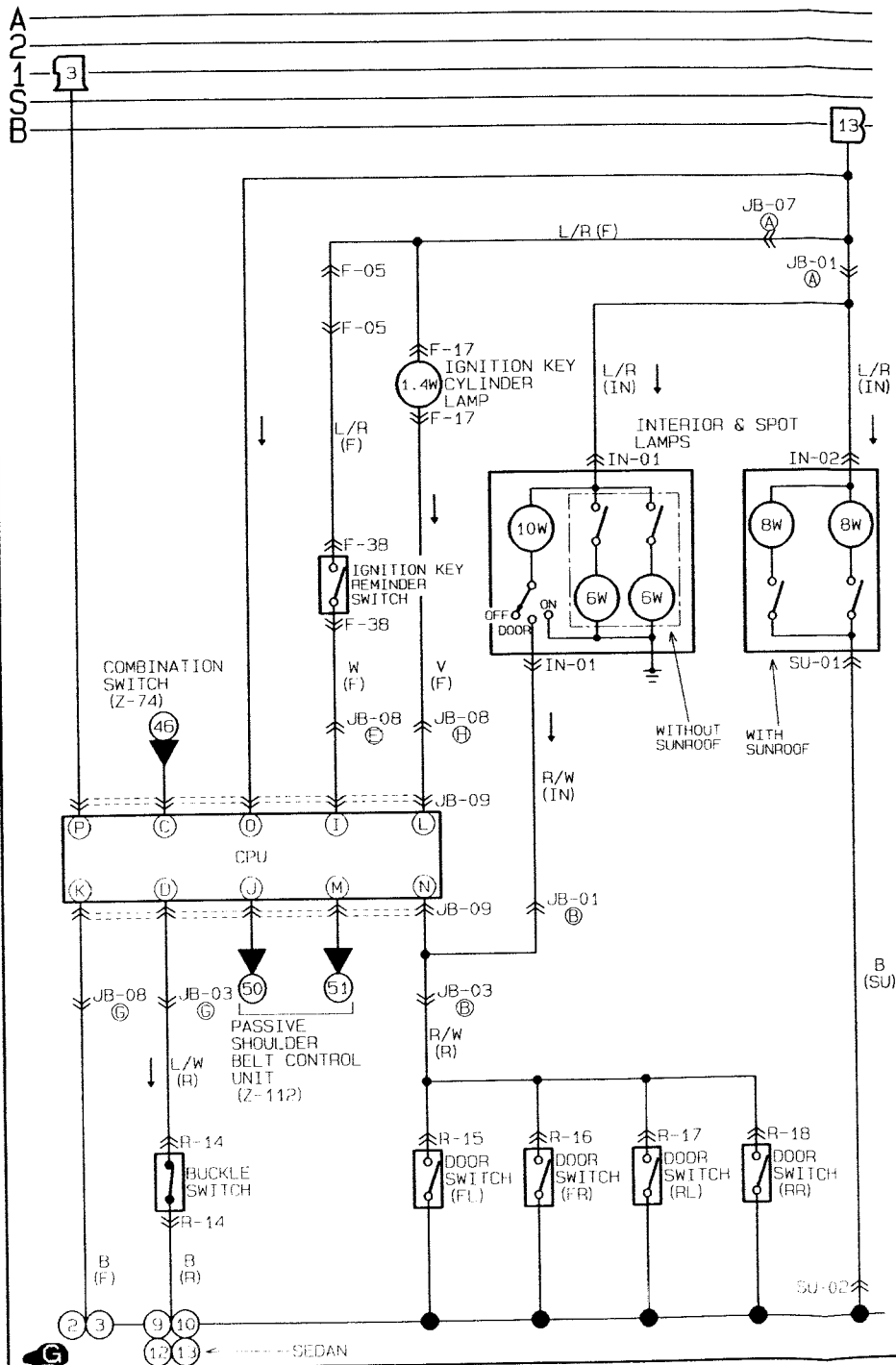
FAC-02 FRONT (F) - A/C (AC)



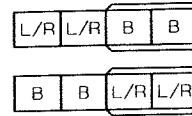


Z WIRING DIAGRAM

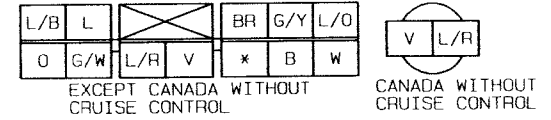
- INTERIOR & SPOT LAMPS
- IGNITION KEY CYLINDER LAMP
- SOUND WARNING SYSTEM



F-05 JOINT CONNECTOR (F)



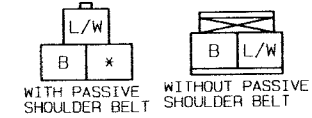
F-17 IGNITION KEY CYLINDER LAMP (F)



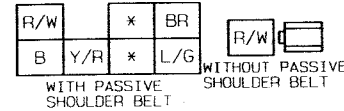
F-38 IGNITION KEY REMINDER SWITCH (F)



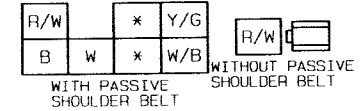
R-14 BUCKLE SWITCH (R)



R-15 DOOR SWITCH FL (R)



R-16 DOOR SWITCH FR (R)



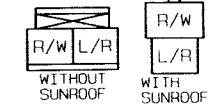
R-17 DOOR SWITCH RL (R)



R-18 DOOR SWITCH RR (R)



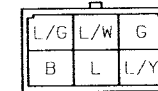
IN-01 INTERIOR & SPOT LAMP (IN)



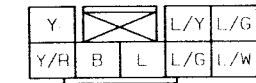
IN-02 SPOT LAMP (IN)

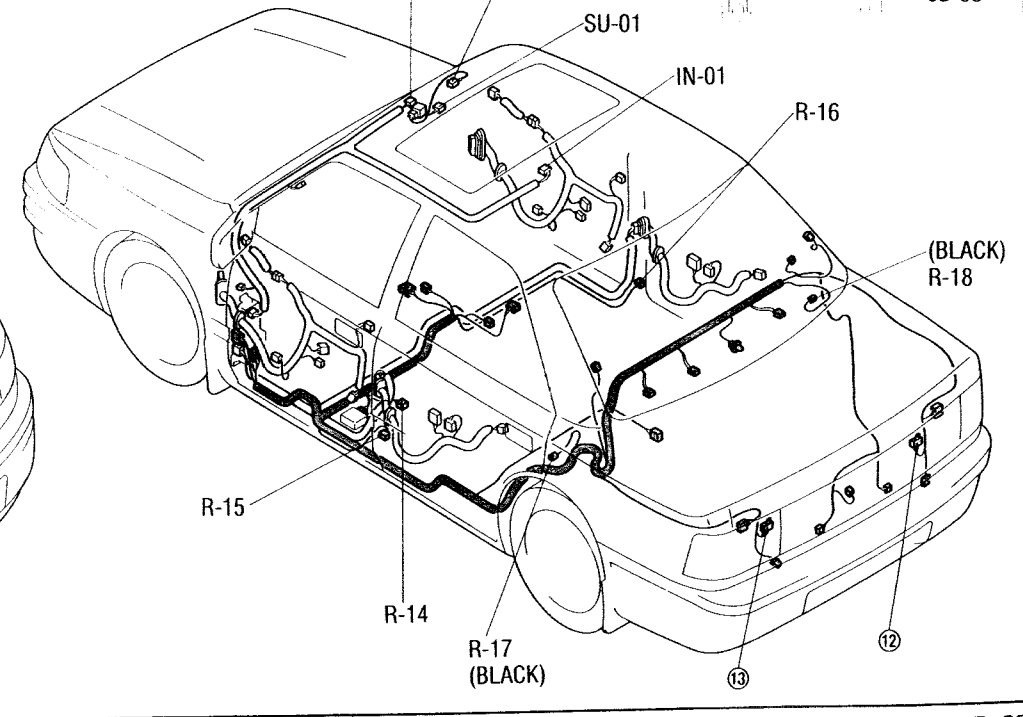
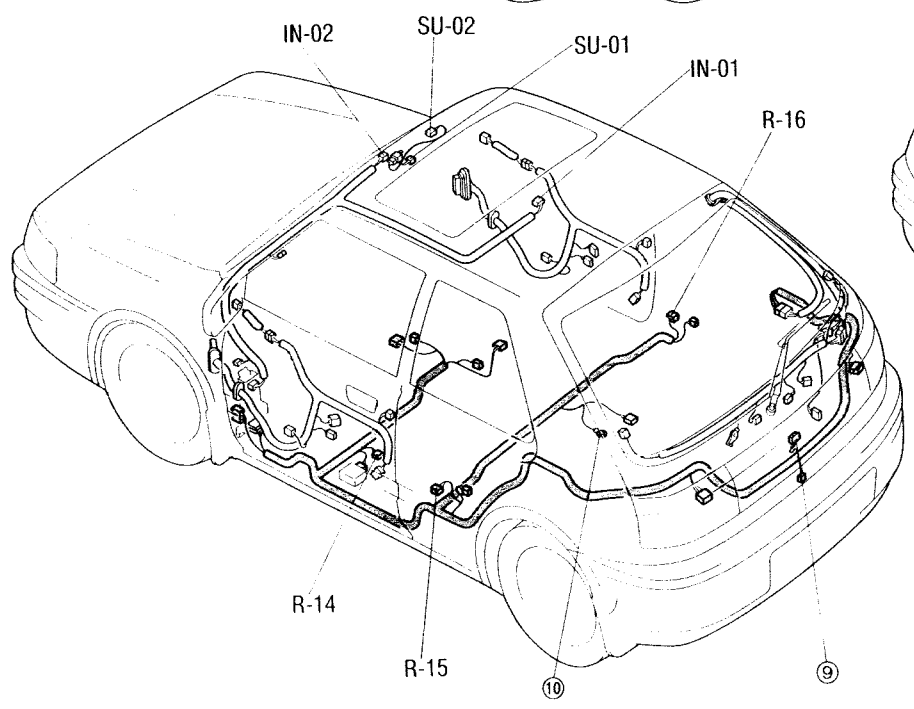
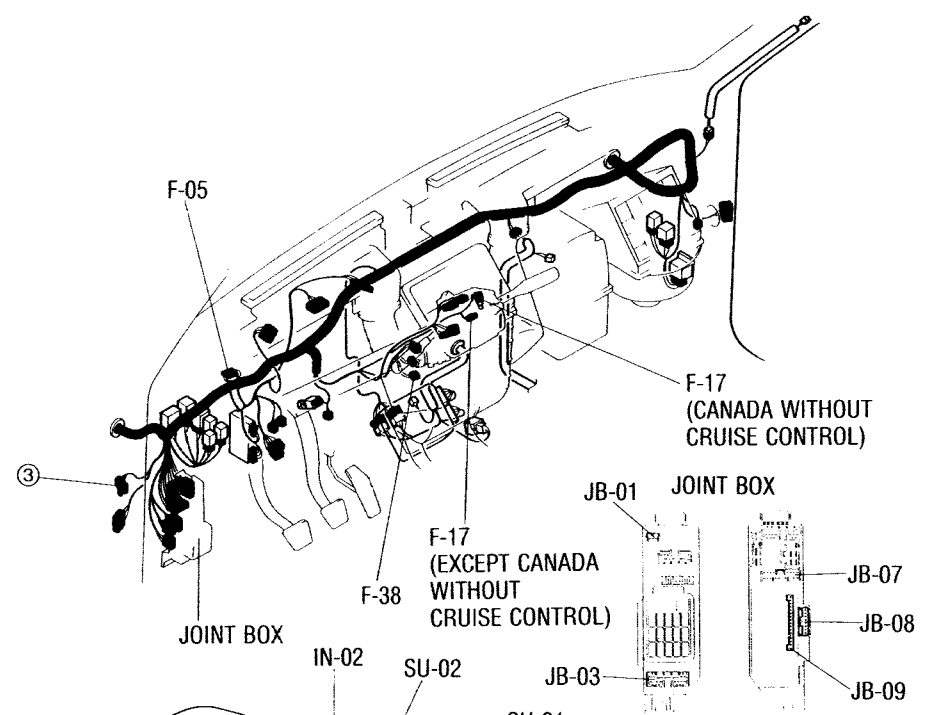
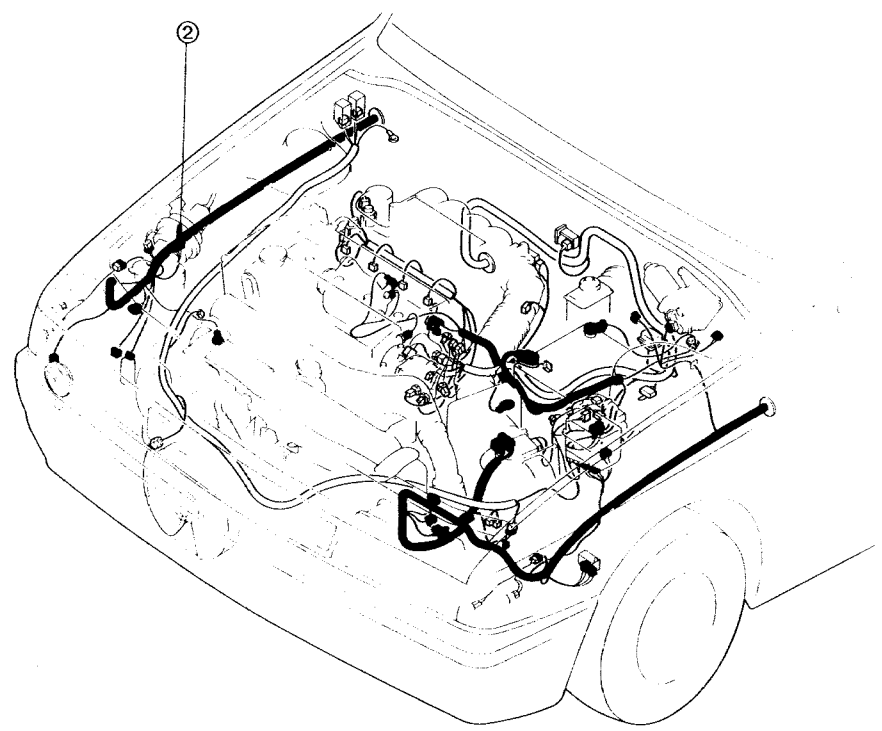


SU-01 SPOT LAMP (SU)



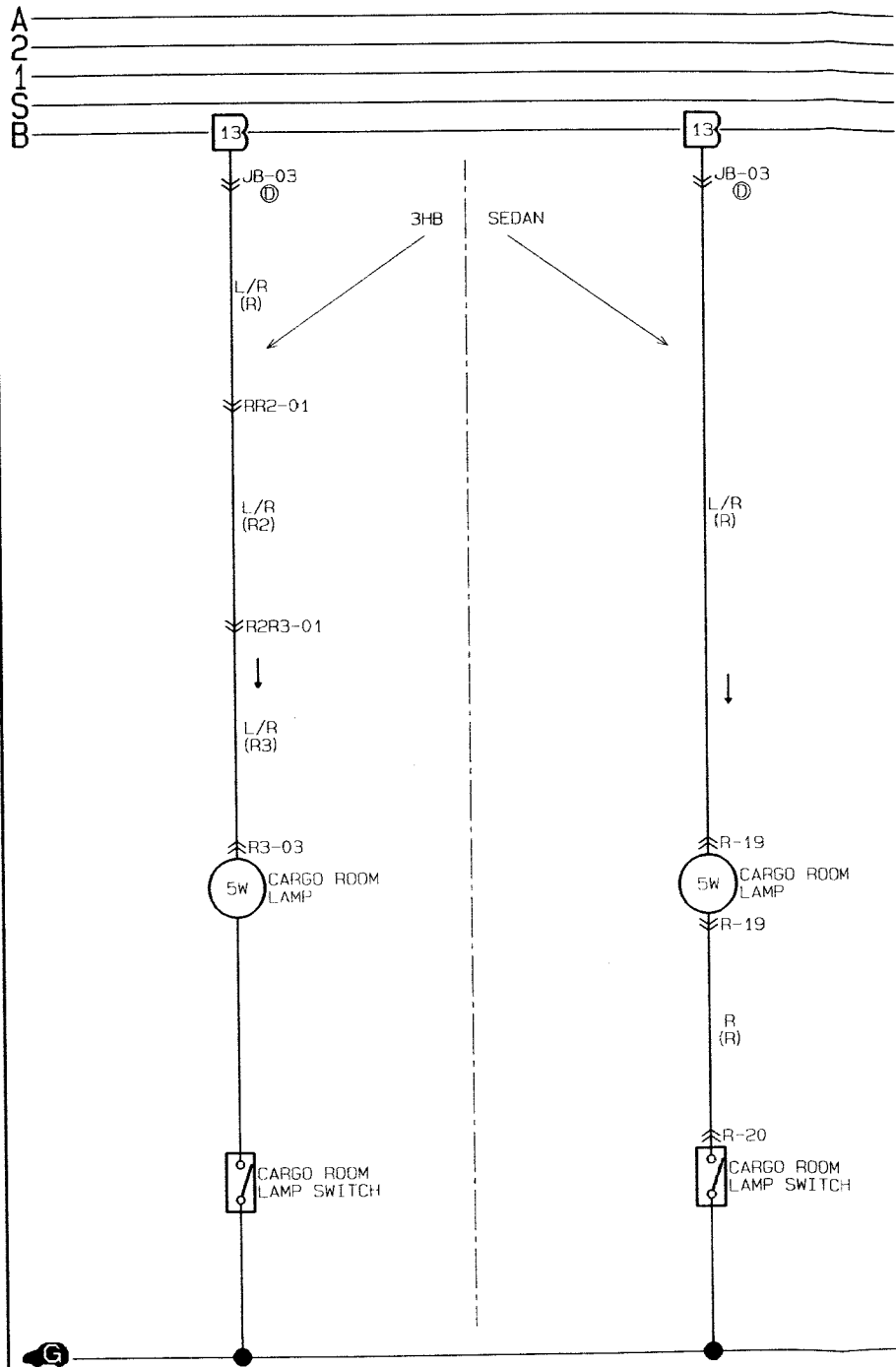
SU-02 GROUND (SU)



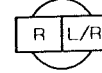


Z WIRING DIAGRAM

■ CARGO ROOM LAMP



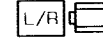
R-19 CARGO ROOM LAMP (R)



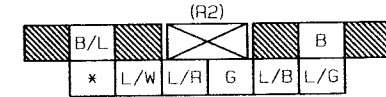
R-20 CARGO ROOM LAMP SWITCH (R)



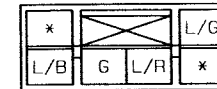
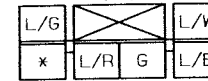
R3-03 CARGO ROOM LAMP (R3)

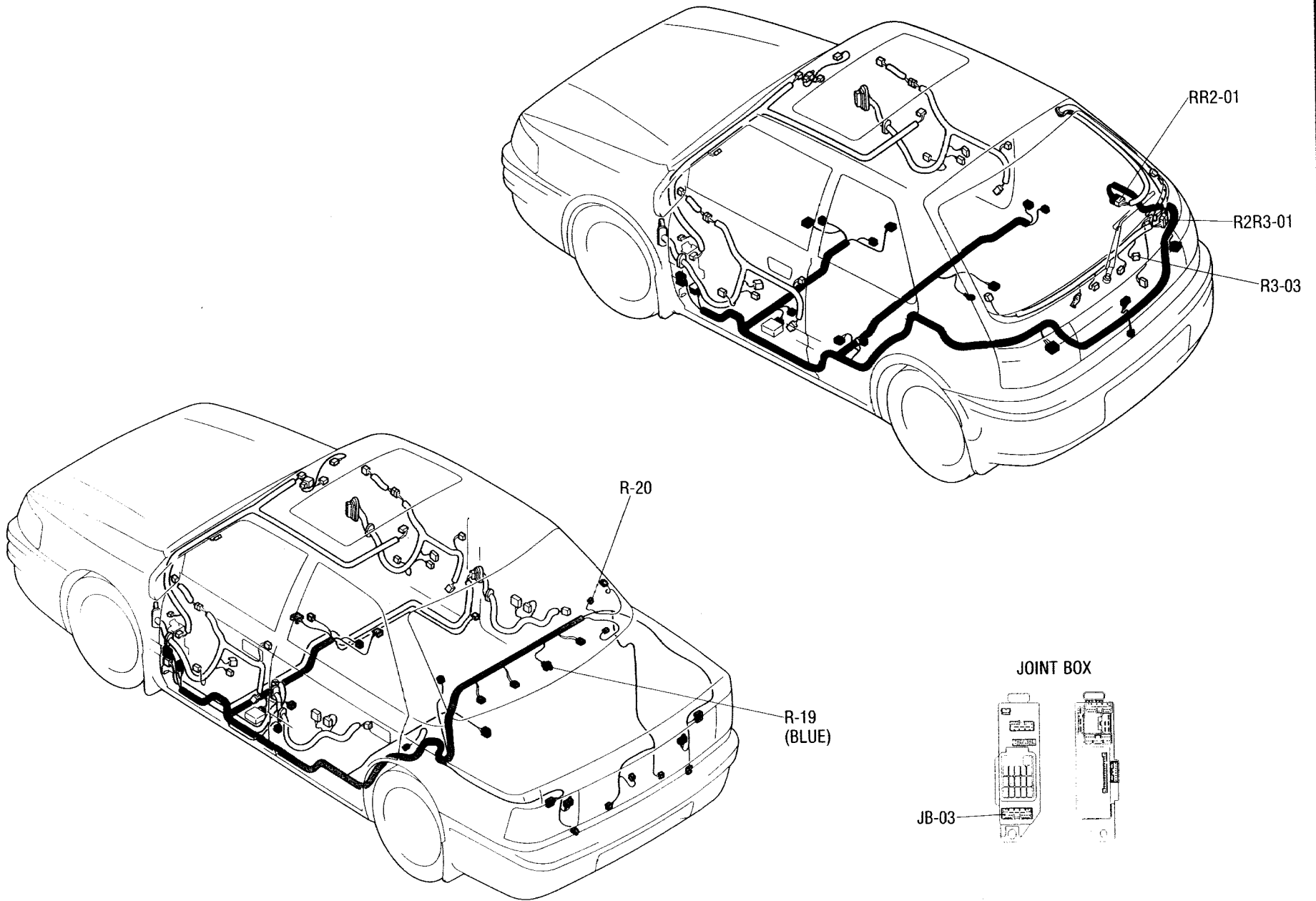


RR2-01 REAR (R) - REAR NO. 2 (R2)



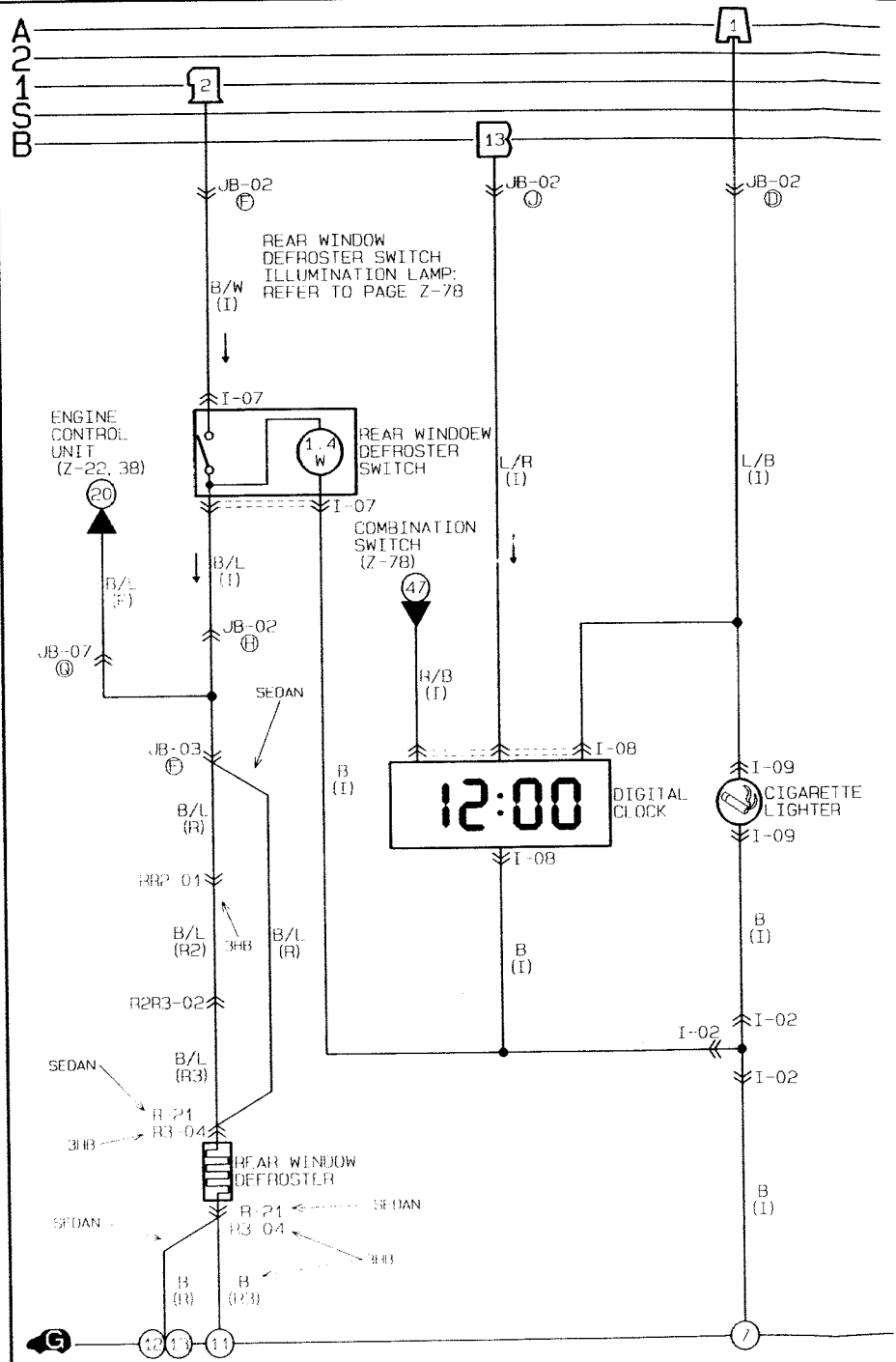
R2R3-01 REAR NO. 2 (R2) - REAR NO. 3 (R3)





Z WIRING DIAGRAM

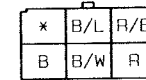
- DIGITAL CLOCK ▪ CIGARETTE LIGHTER
- REAR WINDOW DEFROSTER



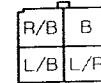
I-02 JOINT CONNECTOR (I)



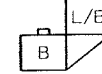
I-07 REAR WINDOW DEFROSTER SWITCH (I)



I-08 DIGITAL CLOCK (I)



I-09 CIGARETTE LIGHTER (I)



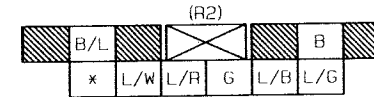
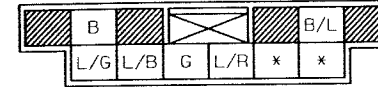
R-21 REAR WINDOW DEFROSTER (R)



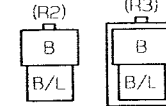
R3-04 REAR WINDOW DEFROSTER (R3)

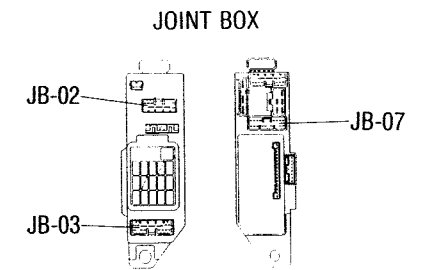
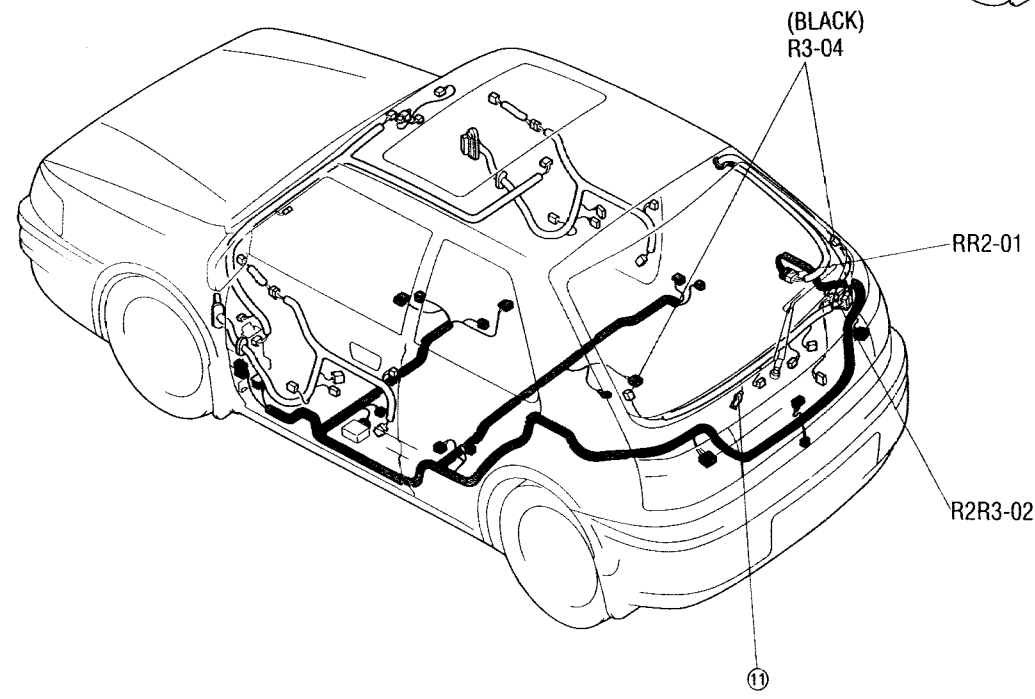
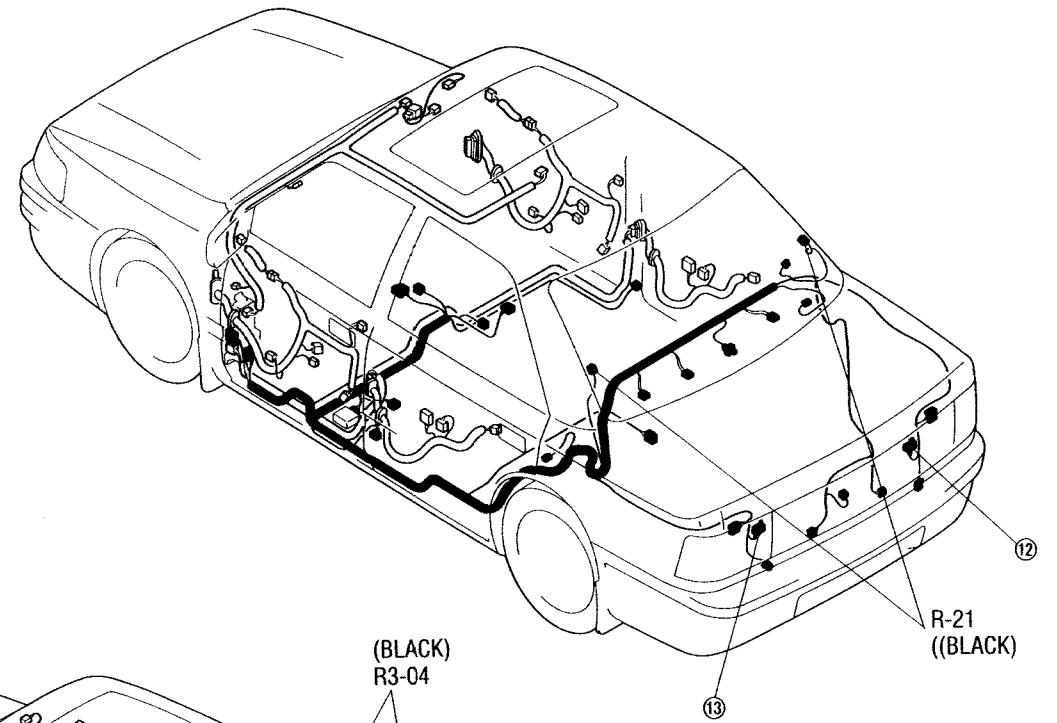
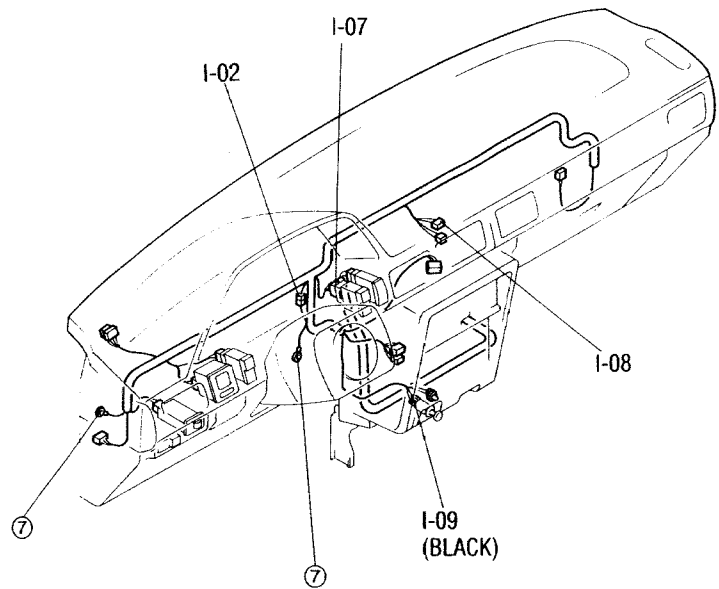


RR2-01 REAR (R) -REAR NO. 2 (R2) (R)

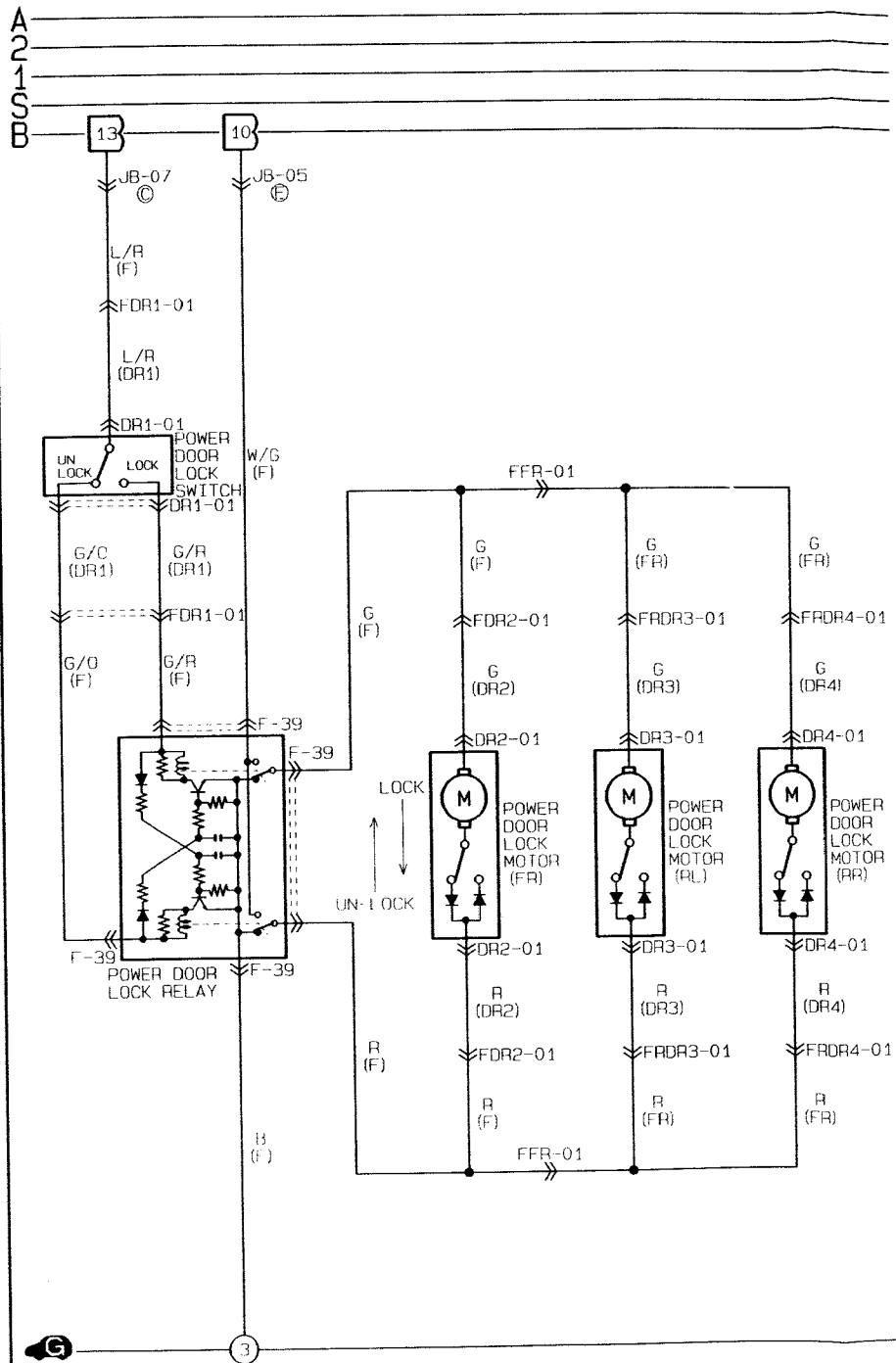


R2R3-02 REAR NO. 2 (R2) -REAR NO. 3 (R3)





■ POWER DOOR LOCK



F-39 POWER DOOR LOCK RELAY (F)

*	G	G/O	B
*	R	G/R	W/G

DR1-01 POWER DOOR LOCK SWITCH (DR1)

L/R
G/O G/R

DR2-01 POWER DOOR LOCK MOTOR (FR) (DR2)

R
G

DR3-01 POWER DOOR LOCK MOTOR (RL) (DR3)

R
G

DR4-01 POWER DOOR LOCK MOTOR (RR) (DR4)

R
G

FDR1-01 FRONT (F) -DOOR NO.1 (DR1)

B/L		B		L/O		LG		BR/Y		*
AL/Y	G/Y	Y/W	R/W	L/R	L/O	LG	BR/Y	*		
*B	W/R	L/W	G/W	BR	V	G/O	*	G/R		
*										

B/W		B		L/O		B		B/L	
*	BR/Y	LG	L/O	L/R	R/W	[Y/W]	[G/Y]	L/Y	
G/R	*	G/O	V	BR	G/W	[L/W]	[W/R]	*	B

*...WITH PASSIVE SHOULDER BELT []...SEDAN

FDR2-01 FRONT (F) -DOOR NO.2 (DR2)

B/L		G		W		LG		BR/B		*
AL/C	*	*	R/W	*	W	LG	BR/B	*		
*B	*	*	G/W	BR	L/W	*	*	*		
*										

R		G		B/L				
*	BR/B	LG	W	*	R/W	*	*	L/O
*	*	*	L/W	BR	G/W	*	*	B

*...WITH PASSIVE SHOULDER BELT

FFR-01 FRONT (F) -FLOOR (FR)

L/W	Y/W	R
B/L	G/Y	W/R

R	Y/W	L/W
G	W/R	G/Y

FRDR3-01 FLOOR (FR) -DOOR NO.3 (DR3)

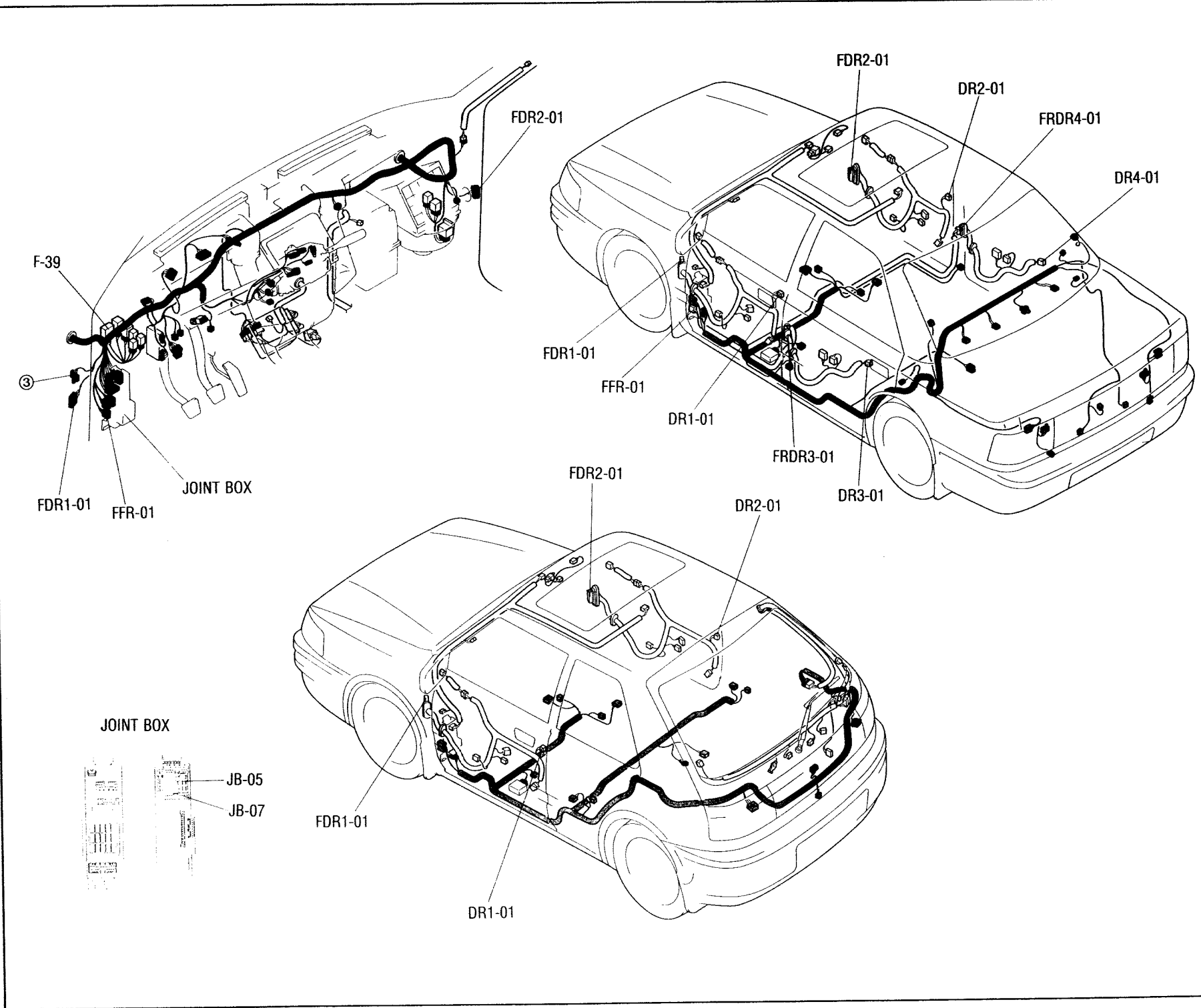
R	B/L
G	W/R

B/L	R
L/W	Y/W

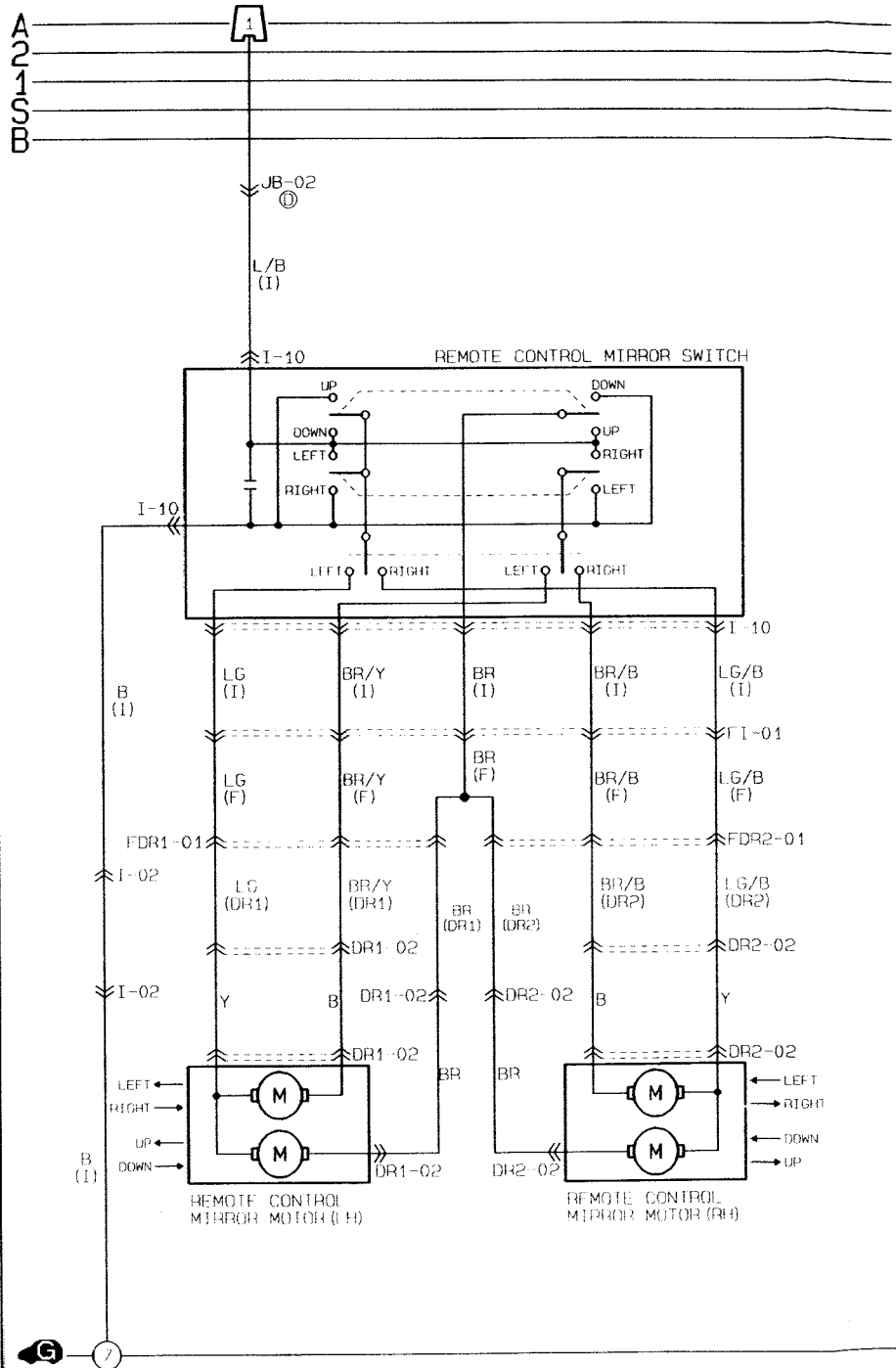
FRDR4-01 FLOOR (FR) -DOOR NO.4 (DR4)

R	B/L
G	Y/W

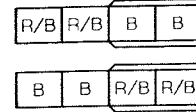
B/L	R
L/W	Y/W



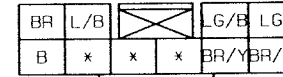
■ REMOTE CONTROL MIRROR



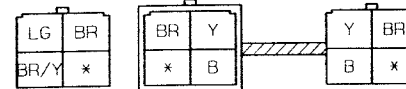
I-02 JOINT CONNECTOR (I)



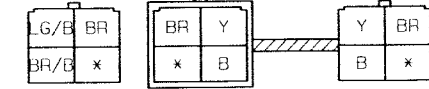
I-10 REMOTE CONTROL MIRROR SWITCH (I)



DR1-02 REMOTE CONTROL MIRROR MOTOR LH (DR1)



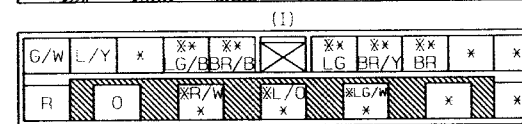
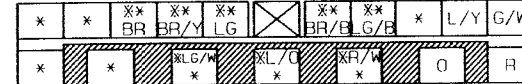
DR2-02 REMOTE CONTROL MIRROR MOTOR RH (DR2)



CONNECT

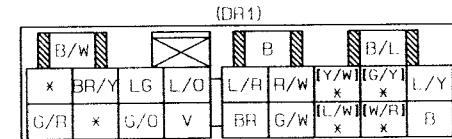
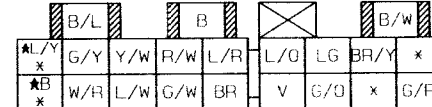
CONNECT

FI-01 FRONT (F) - INSTRUMENT PANEL (I)



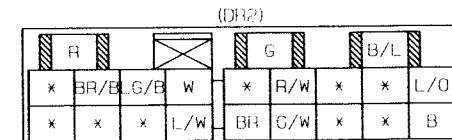
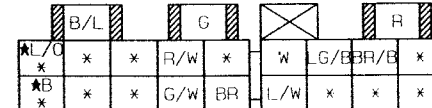
*...4WD

FDR1-01 FRONT (F) - DOOR NO. 1 (DR1)

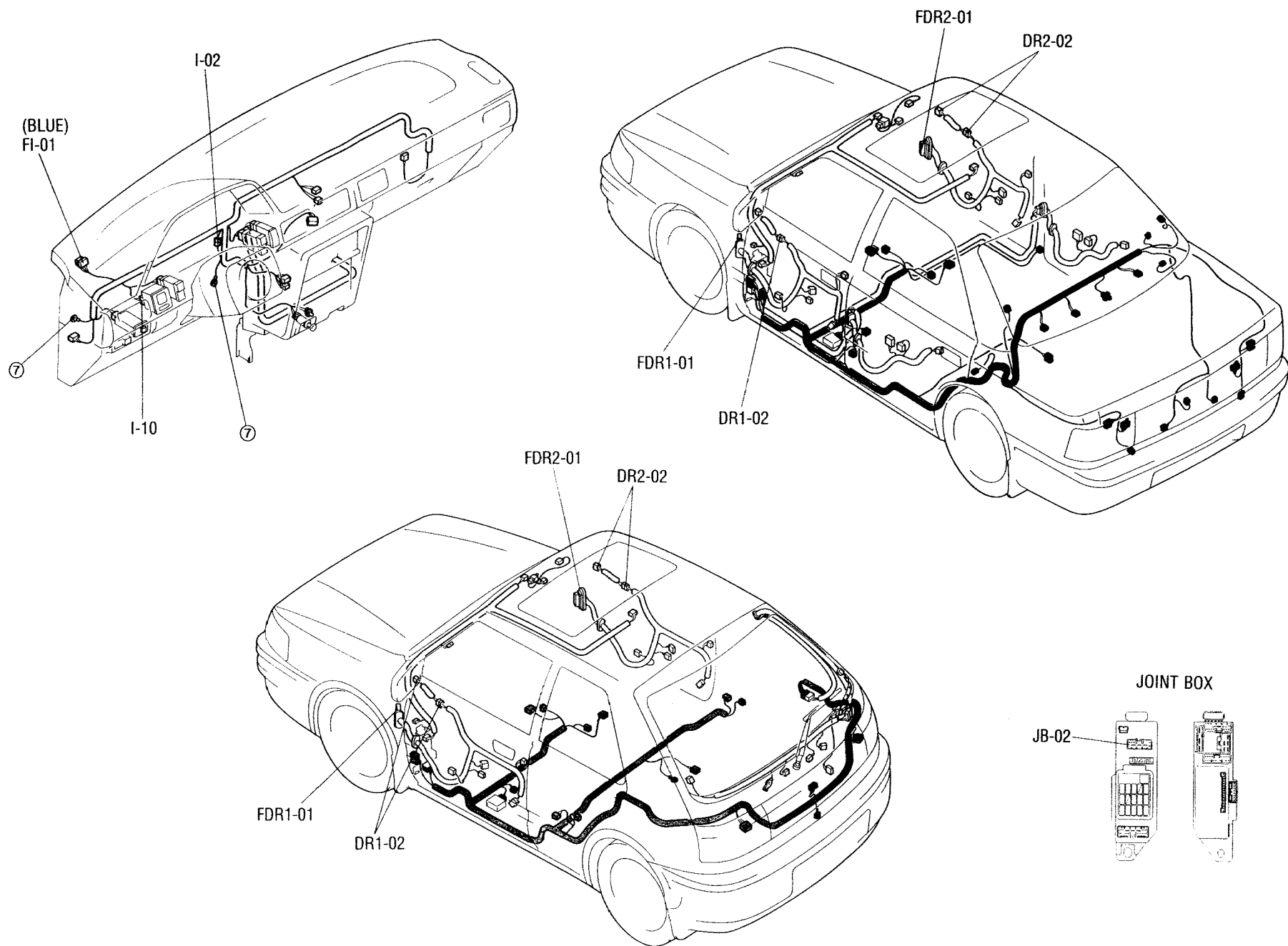


*...WITH PASSIVE SHOULDER BELT (I)...SEVAN

FDR2-01 FRONT (F) - DOOR NO. 2 (DR2)



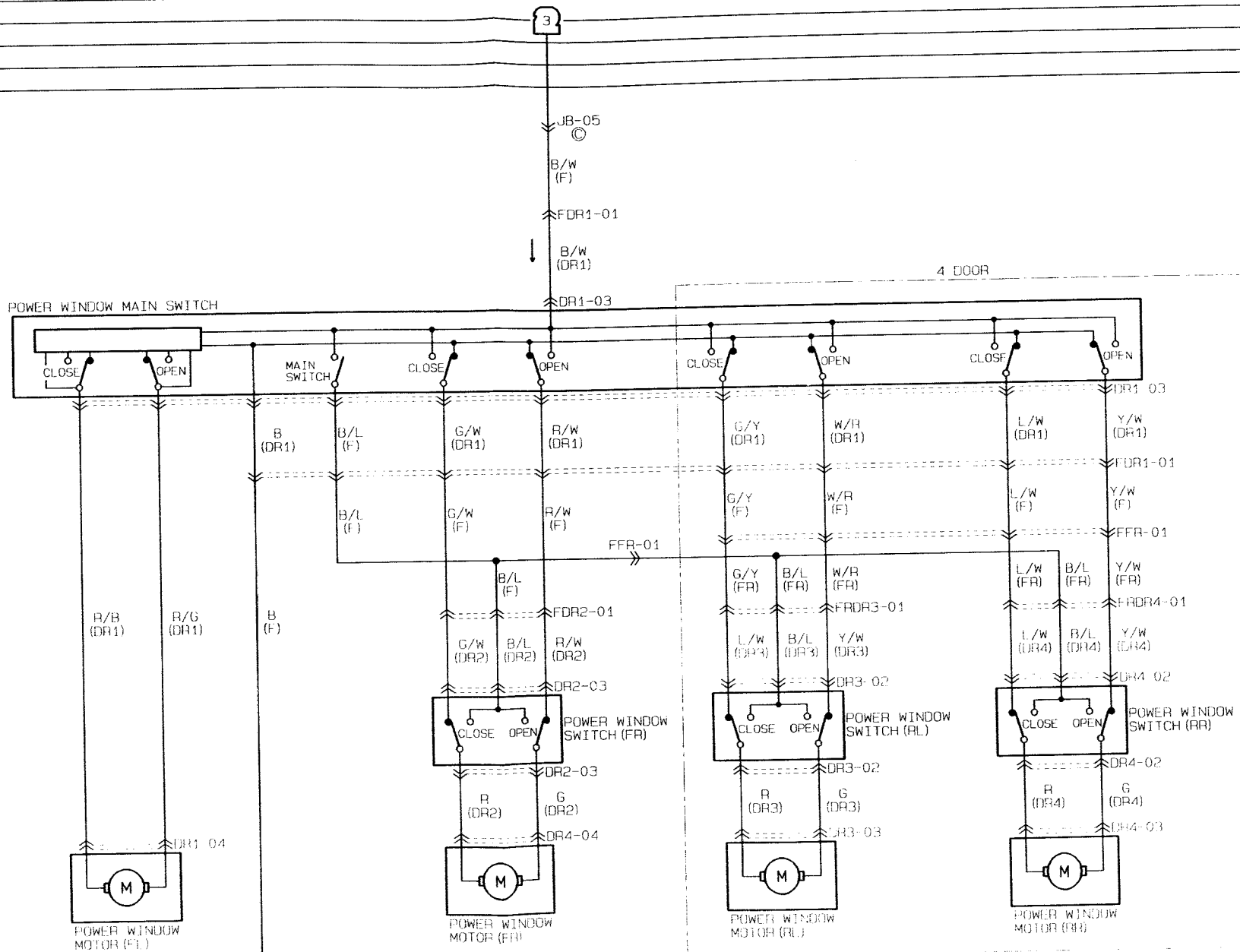
*...WITH PASSIVE SHOULDER BELT



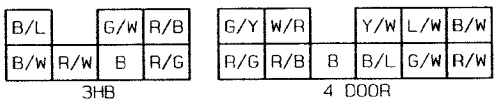
Z WIRING DIAGRAM

■ POWER WINDOW

A
2
1
S
B



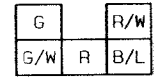
DR1-03 POWER WINDOW MAIN SWITCH (DR1)



DR1-04 POWER WINDOW MOTOR FL (DR1)



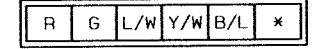
DR2-03 POWER WINDOW SWITCH FR (DR2)



DR2-04 POWER WINDOW MOTOR FR (DR2)



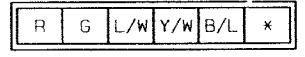
DR3-02 POWER WINDOW SWITCH RL (DR3)



DR3-03 POWER WINDOW MOTOR RL (DR3)



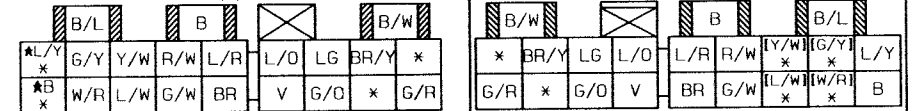
DR4-02 POWER WINDOW SWITCH RR (DR4)



DR4-03 POWER WINDOW MOTOR RR (DR4)

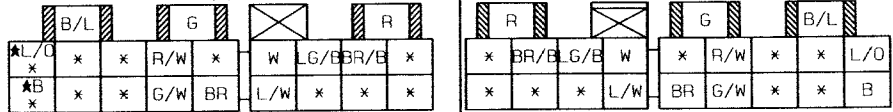


FDR1-01 FRONT (F) -DOOR NO. 1 (DR1)



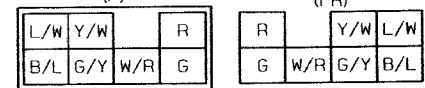
*... WITH PASSIVE SHOULDER BELT []... SEDAN

FDR2-01 FRONT (F) -DOOR NO. 2 (DR2)

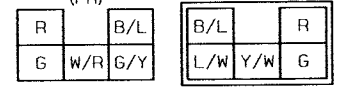


*... WITH PASSIVE SHOULDER BELT

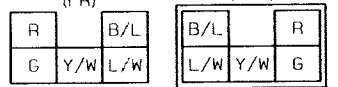
FFR-01 FRONT (F) -FLOOR (FR)

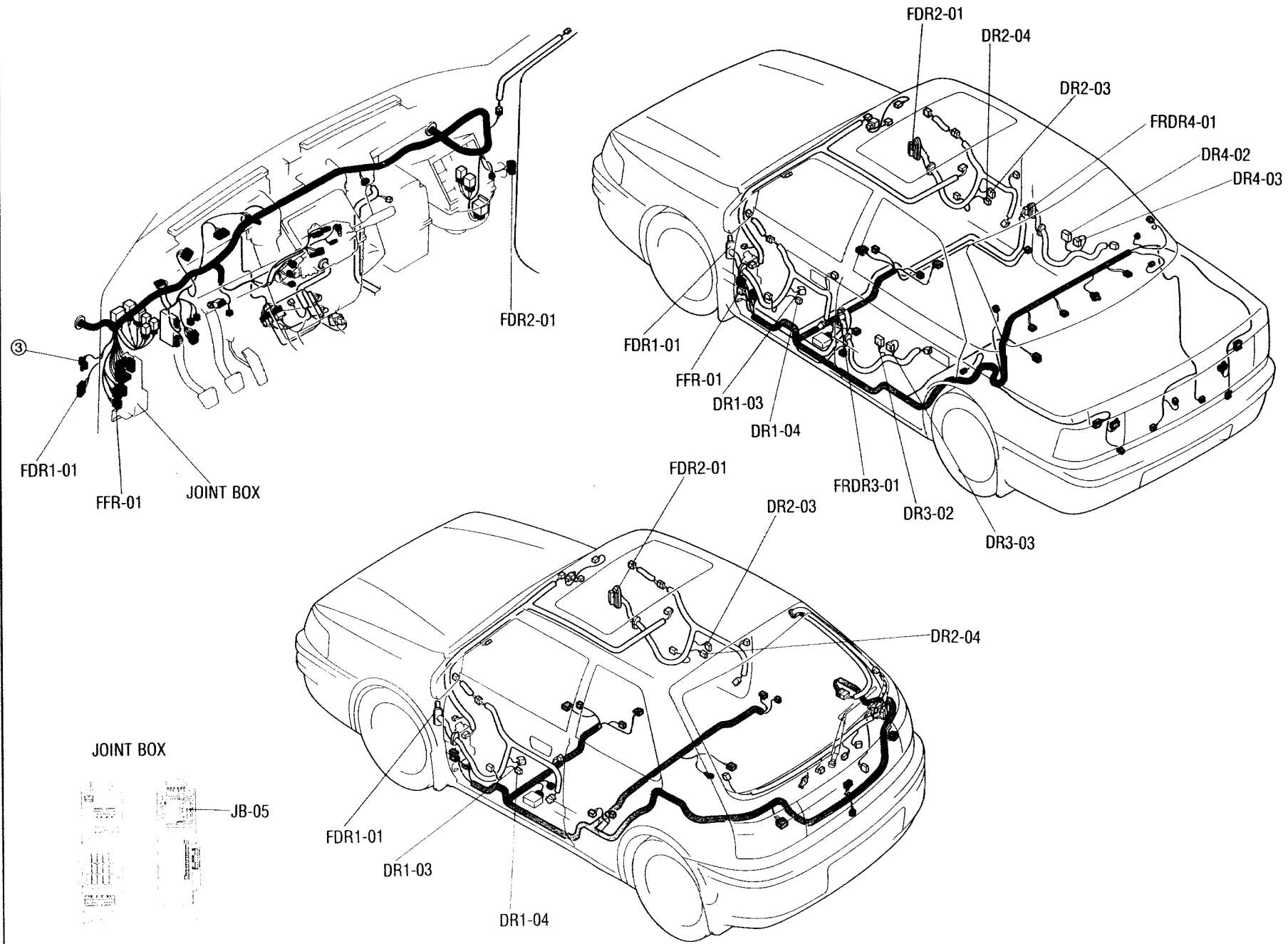


FRDR3-01 FLOOR (FR) -DOOR NO. 3 (DR3)



FRDR4-01 FLOOR (FR) -DOOR NO. 4 (DR4)

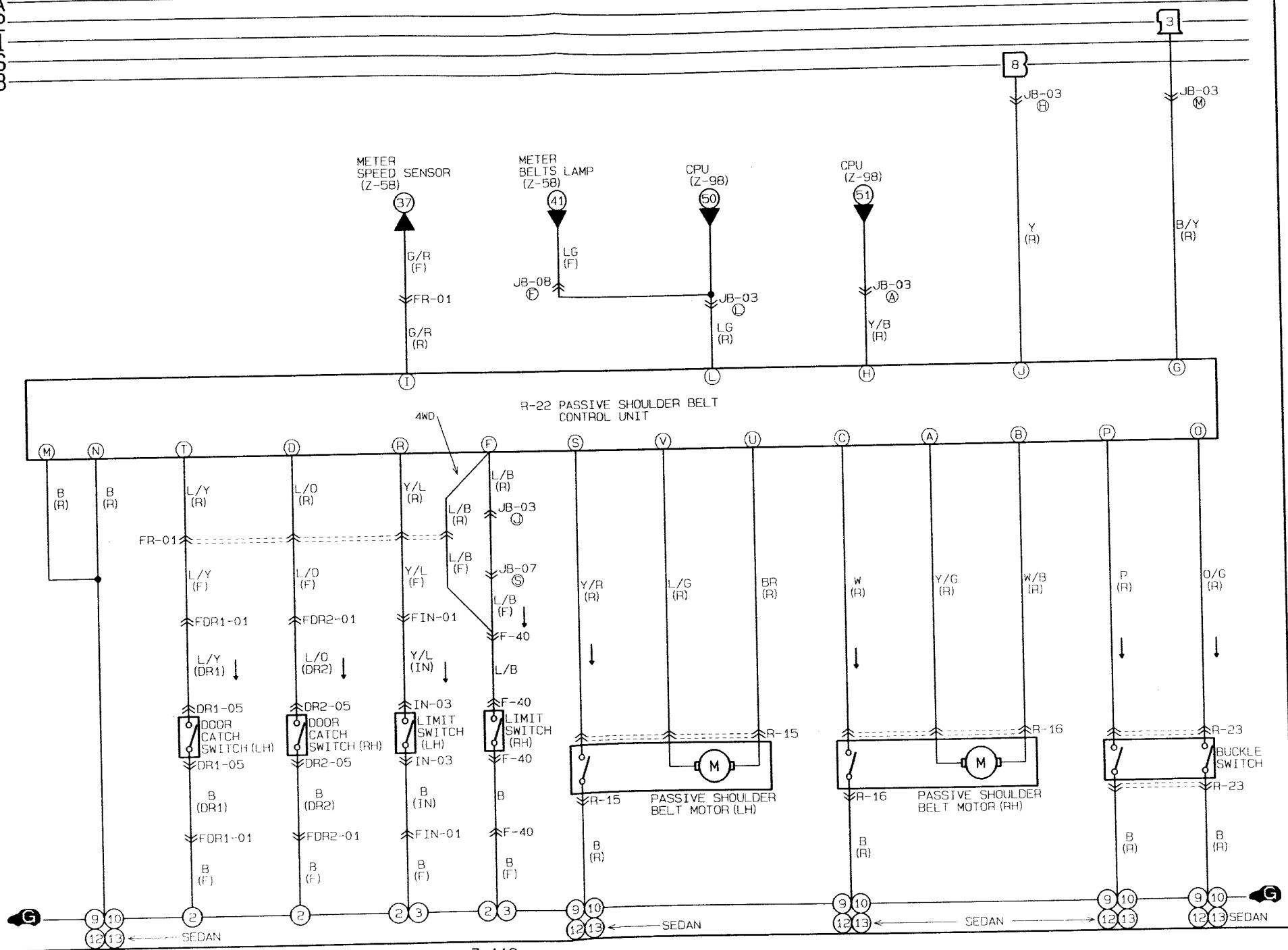




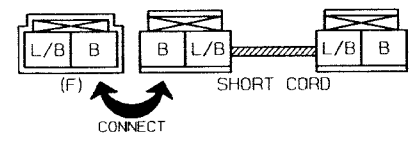
Z WIRING DIAGRAM

■ PASSIVE SHOULDER BELT CONTROL SYSTEM

A
2
1
S
B



F-40 LIMIT SWITCH RH (F)



R-15 PASSIVE SHOULDER BELT MOTOR LH (R)

R/W		*	BR
B	Y/R	*	L/G

R-16 PASSIVE SHOULDER BELT MOTOR RH (R)

R/W		*	Y/G
B	W	*	W/B

R-22 PASSIVE SHOULDER BELT CONTROL UNIT (R)

U	S	Q	O	M	I	G	E	C	A
BR	Y/R	*	O/G	B	G/R	B/Y	*	W	Y/G
L/G	L/Y	Y/L	P	B	LG	Y	Y/B	L/B	L/O
V	T	R	P	N	L	J	H	F	D

R-23 BUCKLE SWITCH (R)

O/G	P
B	B

DR1-05 DOOR CATCH SWITCH LH (DR1)

B	L/Y
*	*

3HB

B
L/Y

SEDAN

DR2-05 DOOR CATCH SWITCH RH (DR2)

B	L/O
*	*

3HB

B
L/O

SEDAN

IN-03 LIMIT SWITCH LH (IN)



FR-01 FRONT (F) - REAR (R)

R/L	*L/Y	**	L/B	Y	G	R/G	B/P	L	L	B/P	R/G	G	Y	*L/B	**	*L/Y	R/L			
*W/L	*L/O	*R/Y	*G/R	*Y/L	*B/G	W/R	(R/B)	(R)	W/G	W/G	(R)	(R/B)	W/R	*B/G	*Y/L	*G/R	*G/T	*R/Y	*L/O	*W/L
B/G	*	O	*	G/Y	*	W/L	*	*	*	*	*	*	*	W/L	*	G/Y	*	O	*	B/G

() ... EC-AT <> ... CANADA * ... WITH PASSIVE SHOULDER BELT [] ... SEDAN % ... 4WD

FDR1-01 FRONT (F) - DOOR NO. 1 (DR1)

*L/Y	G/Y	Y/W	R/W	L/R	L/O	LG	BR/Y	*	B/W	B/W	B/L						
*B	W/R	L/W	G/W	BR	V	G/O	*	G/R	*	BR/Y	LG	L/O	L/R	R/W	Y/W	G/Y	L/Y
*	*	*	*	*	*	*	*	*	G/R	*	G/O	V	BR	G/W	L/W	W/R	B

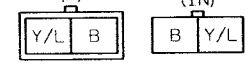
* ... WITH PASSIVE SHOULDER BELT [] ... SEDAN

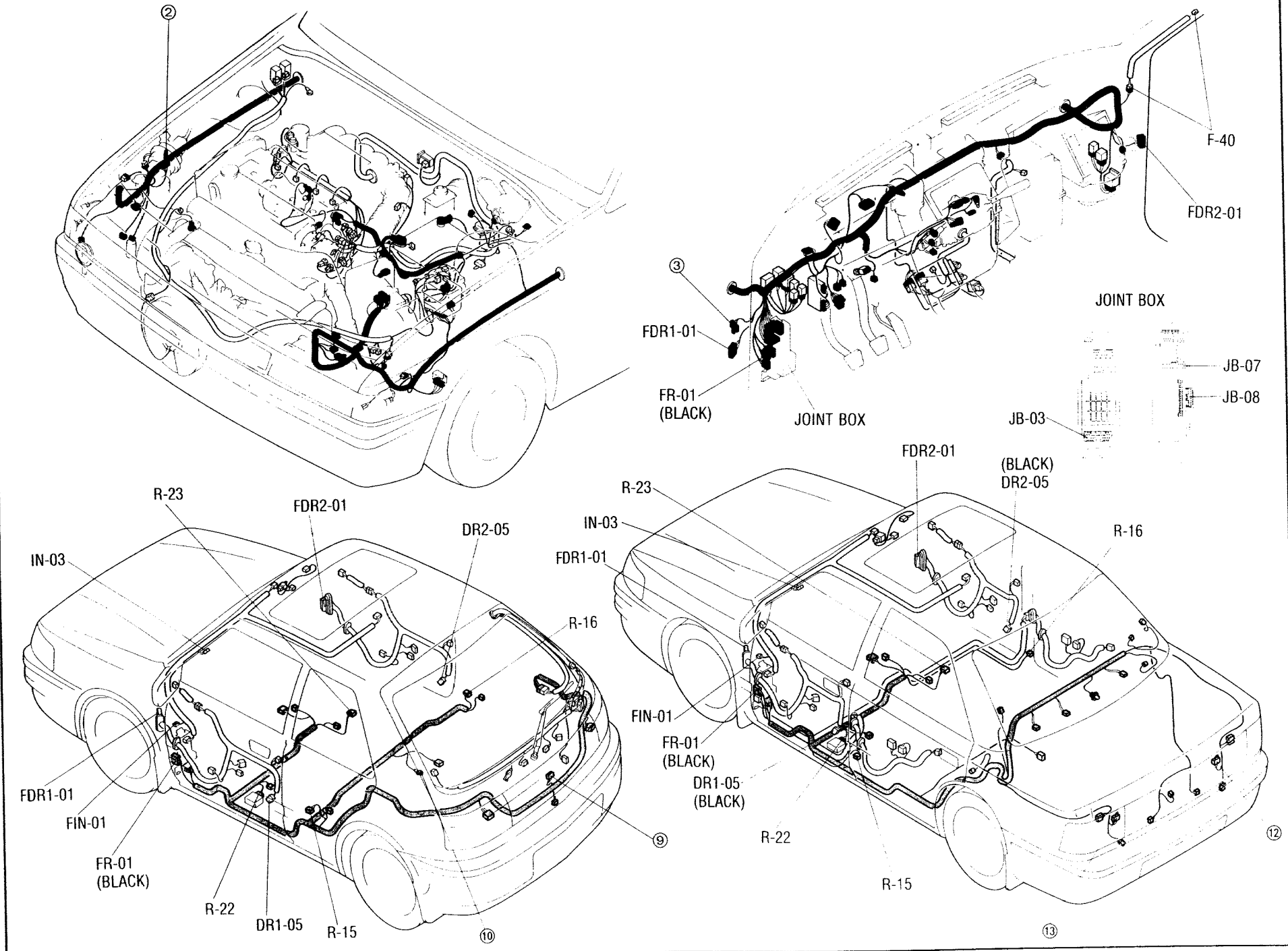
FDR2-01 FRONT (F) - DOOR NO. 2 (DR2)

*L/O	*	*	R/W	*	W	LG	BR/B	*	R	G	B/L						
*B	*	*	G/W	BR	L/W	*	*	*	*	BR/B	LG	W	*	R/W	*	*	L/O
*	*	*	*	*	*	*	*	*	*	*	*	L/W	BR	G/W	*	*	B

* ... WITH PASSIVE SHOULDER BELT

FIN-01 FRONT (F) - INTERIOR LAMP (IN)

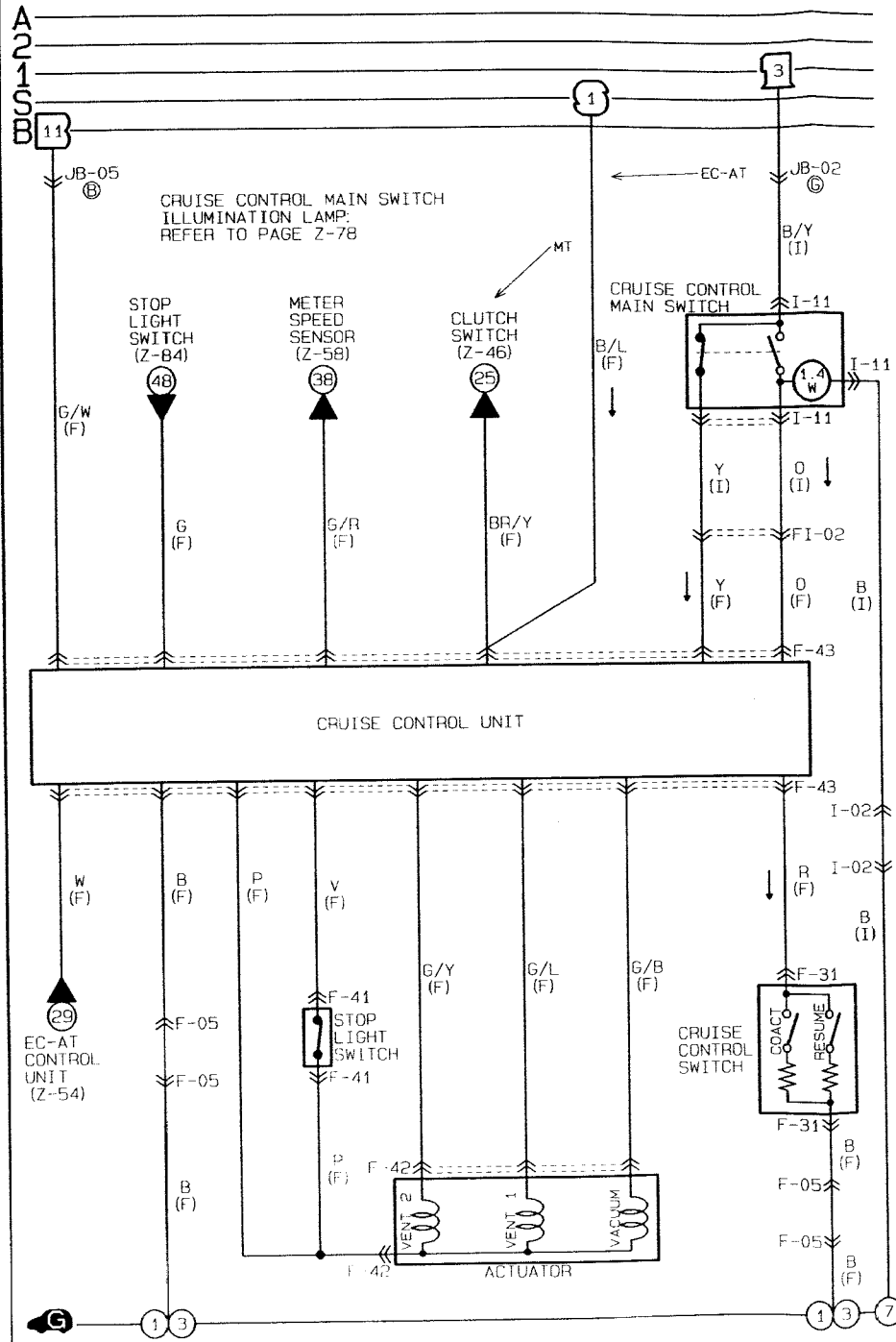




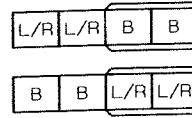


Z WIRING DIAGRAM

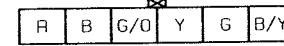
■ CRUISE CONTROL SYSTEM



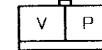
F-05 JOINT CONNECTOR (F)



F-31 CRUISE CONTROL SWITCH (F)



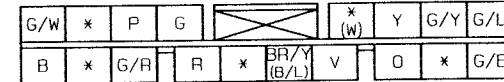
F-41 STOP LIGHT SWITCH (F)



F-42 ACTUATOR (F)

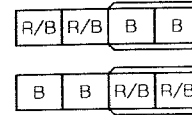


F-43 CRUISE CONTROL UNIT (F)



() ... EC-AT

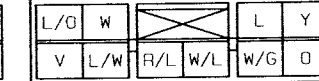
I-02 JOINT CONNECTOR (I)



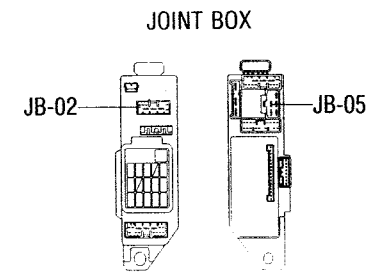
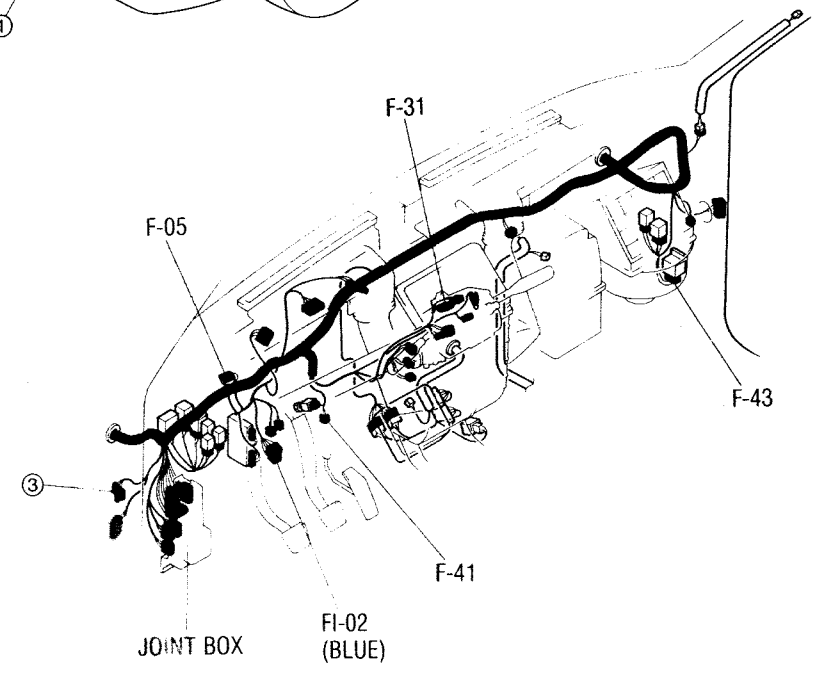
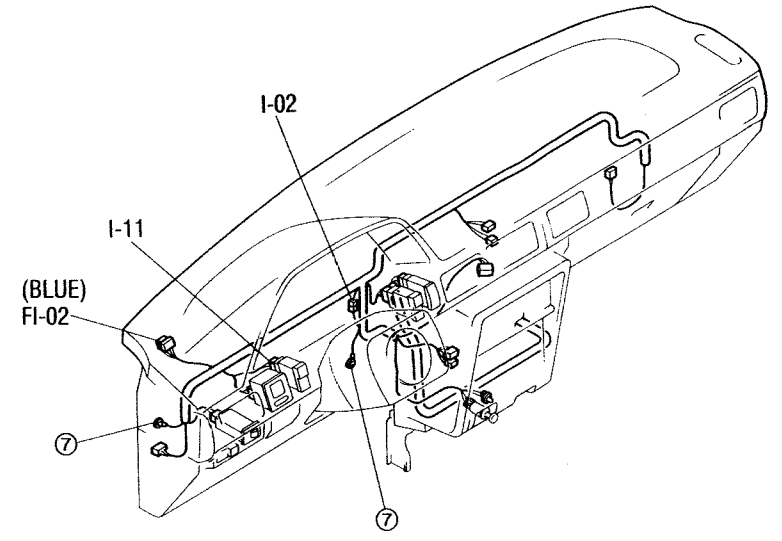
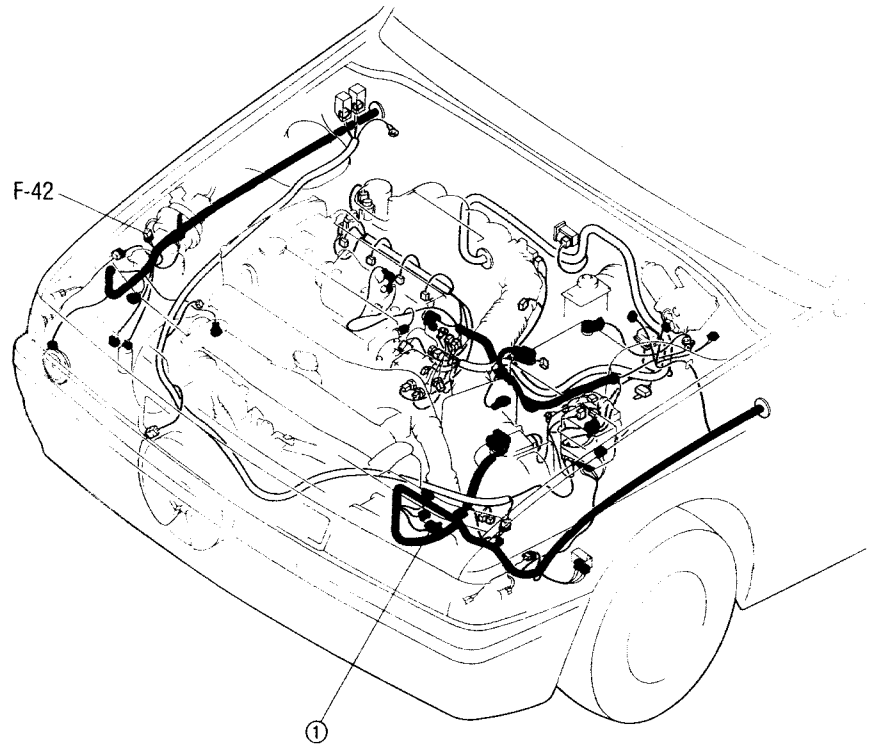
I-11 CRUISE CONTROL MAIN SWITCH (I)



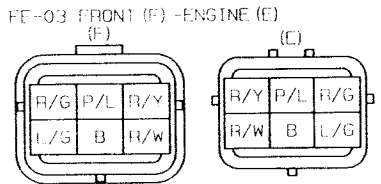
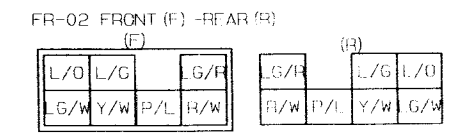
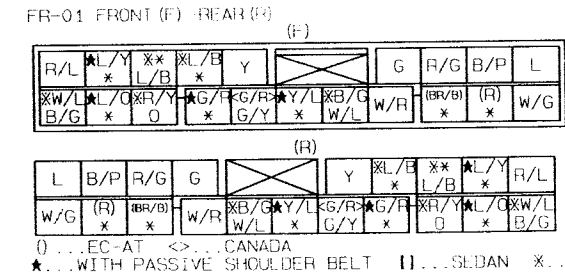
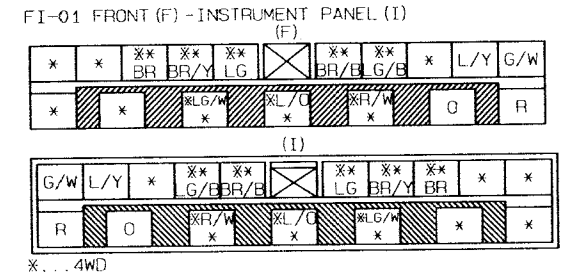
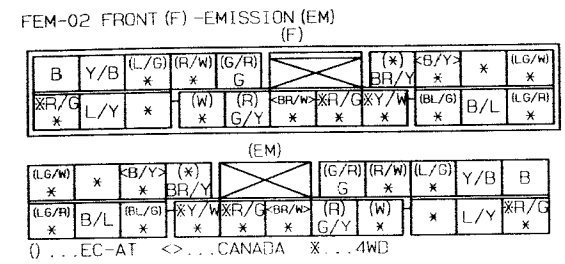
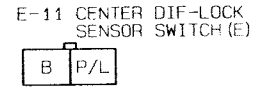
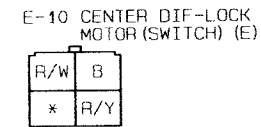
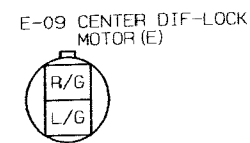
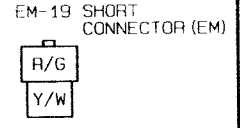
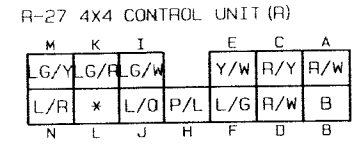
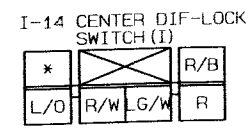
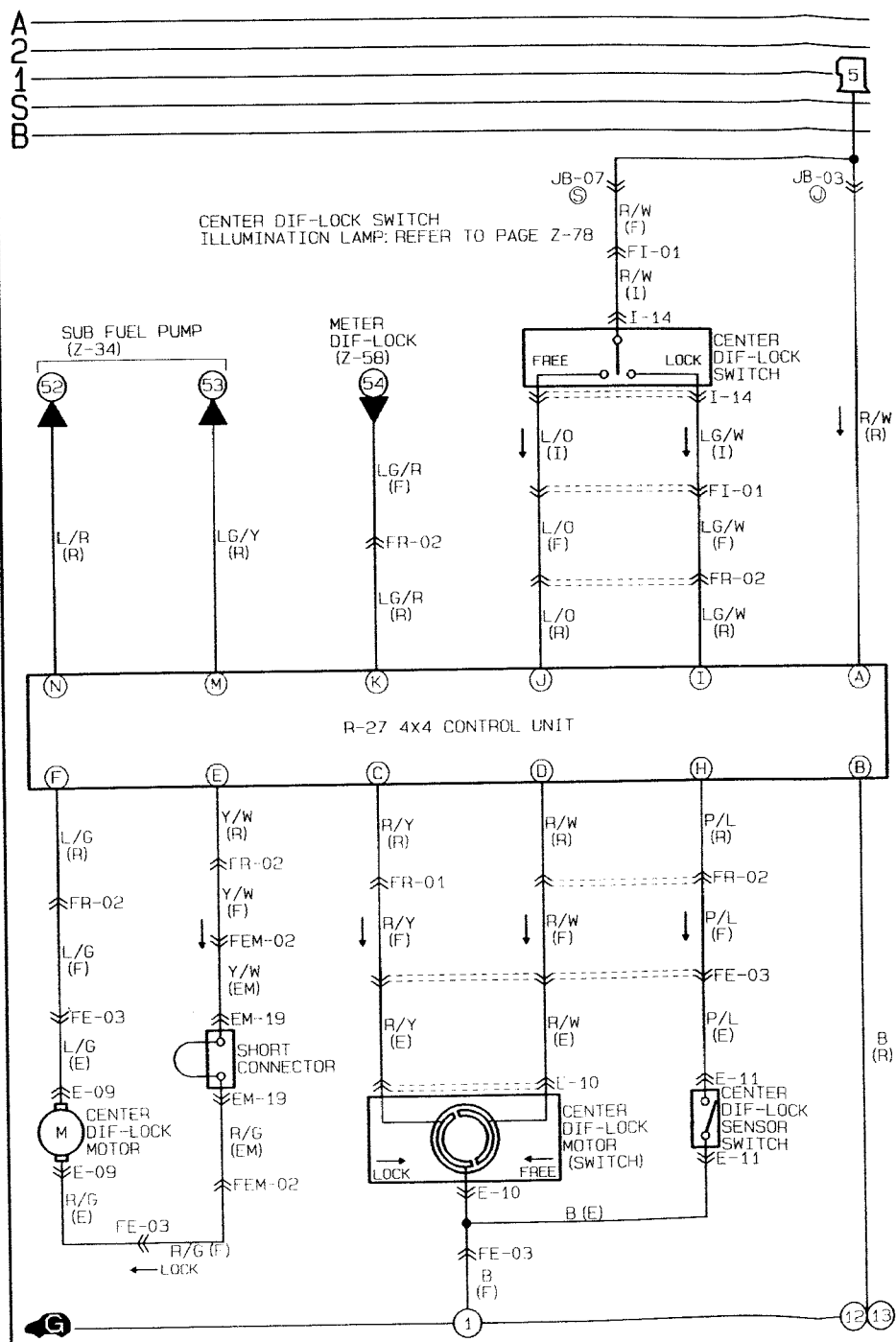
FI-02 FRONT (F) - INSTRUMENT PANEL (I)

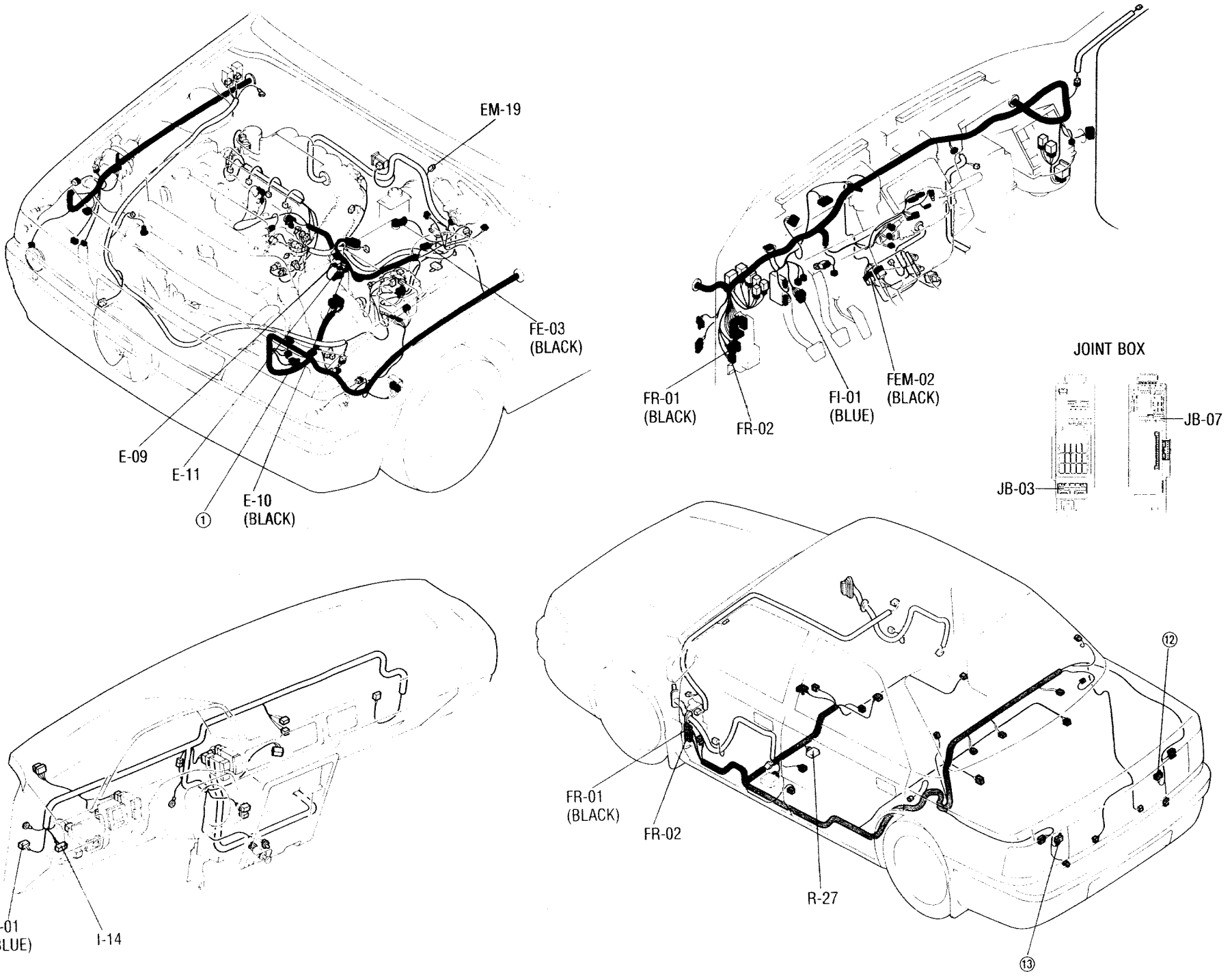


• ... WITHOUT CRUISE CONTROL



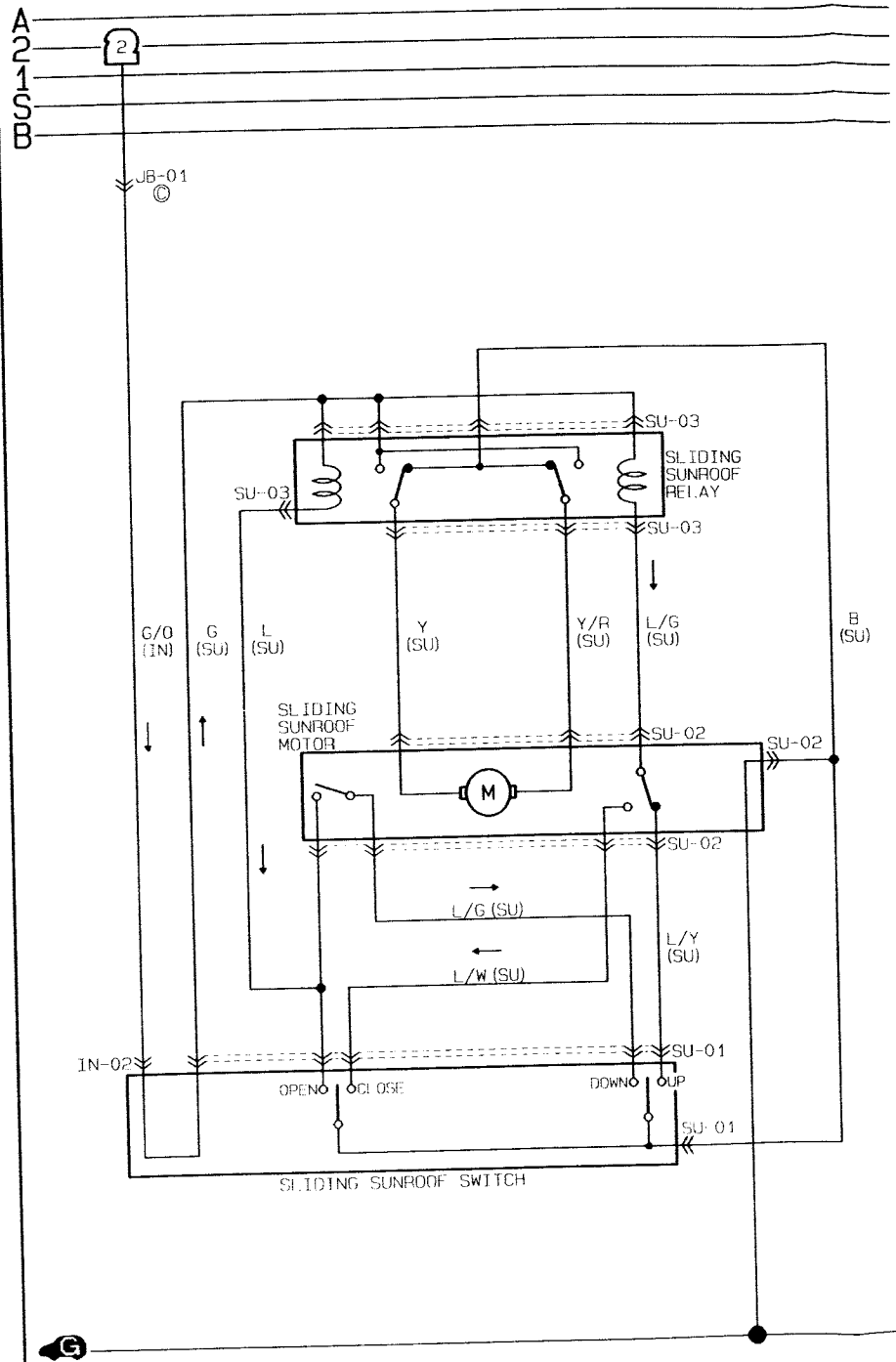
4WD ■ CENTER DIF-LOCK SYSTEM





Z WIRING DIAGRAM

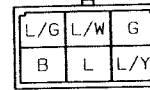
■ SLIDING SUNROOF



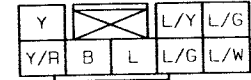
IN-02 SLIDING SUNROOF (IN)



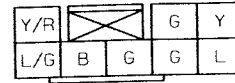
SU-01 SLIDING SUNROOF SWITCH (SU)

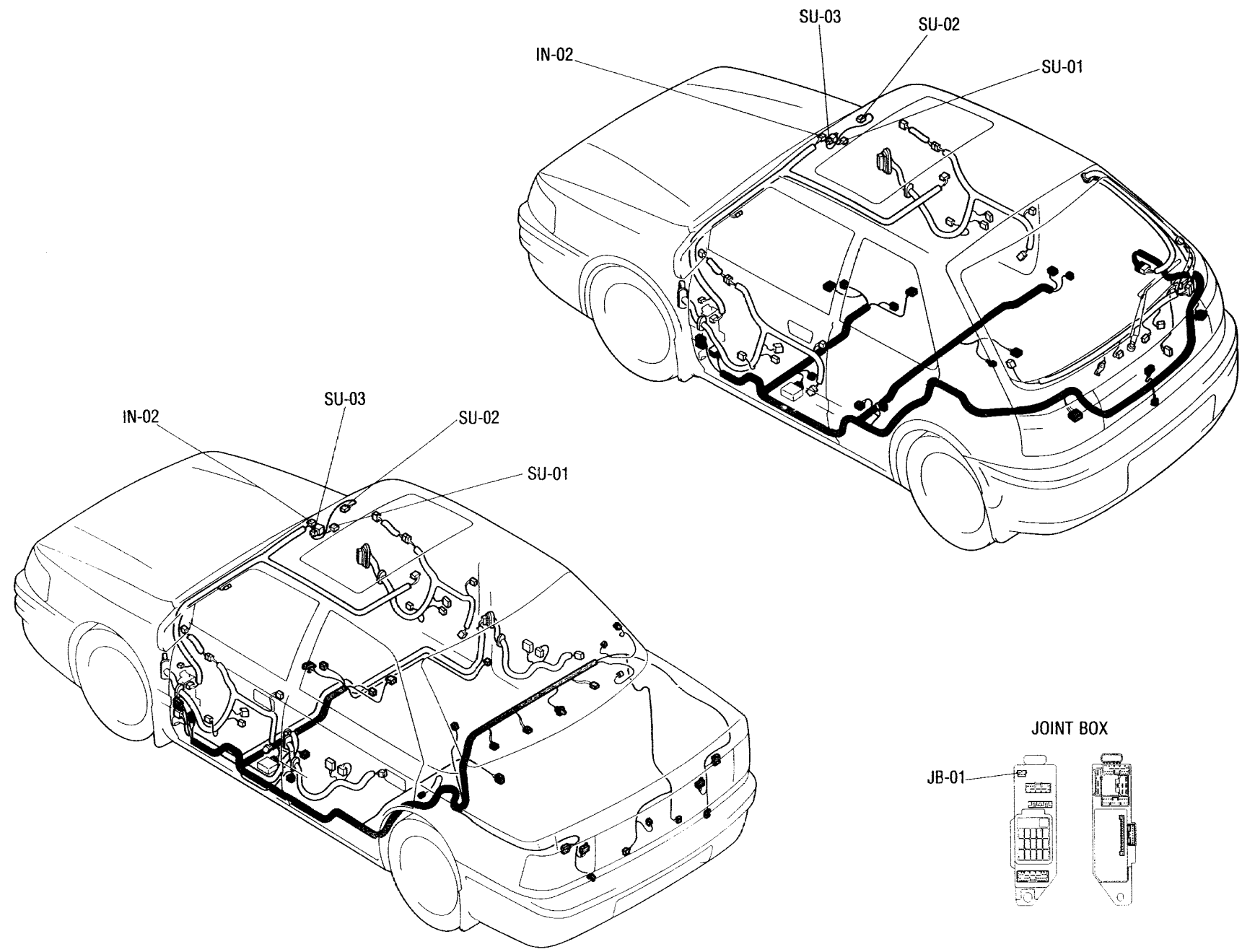


SU-02 SLIDING SUNROOF MOTOR (SU)



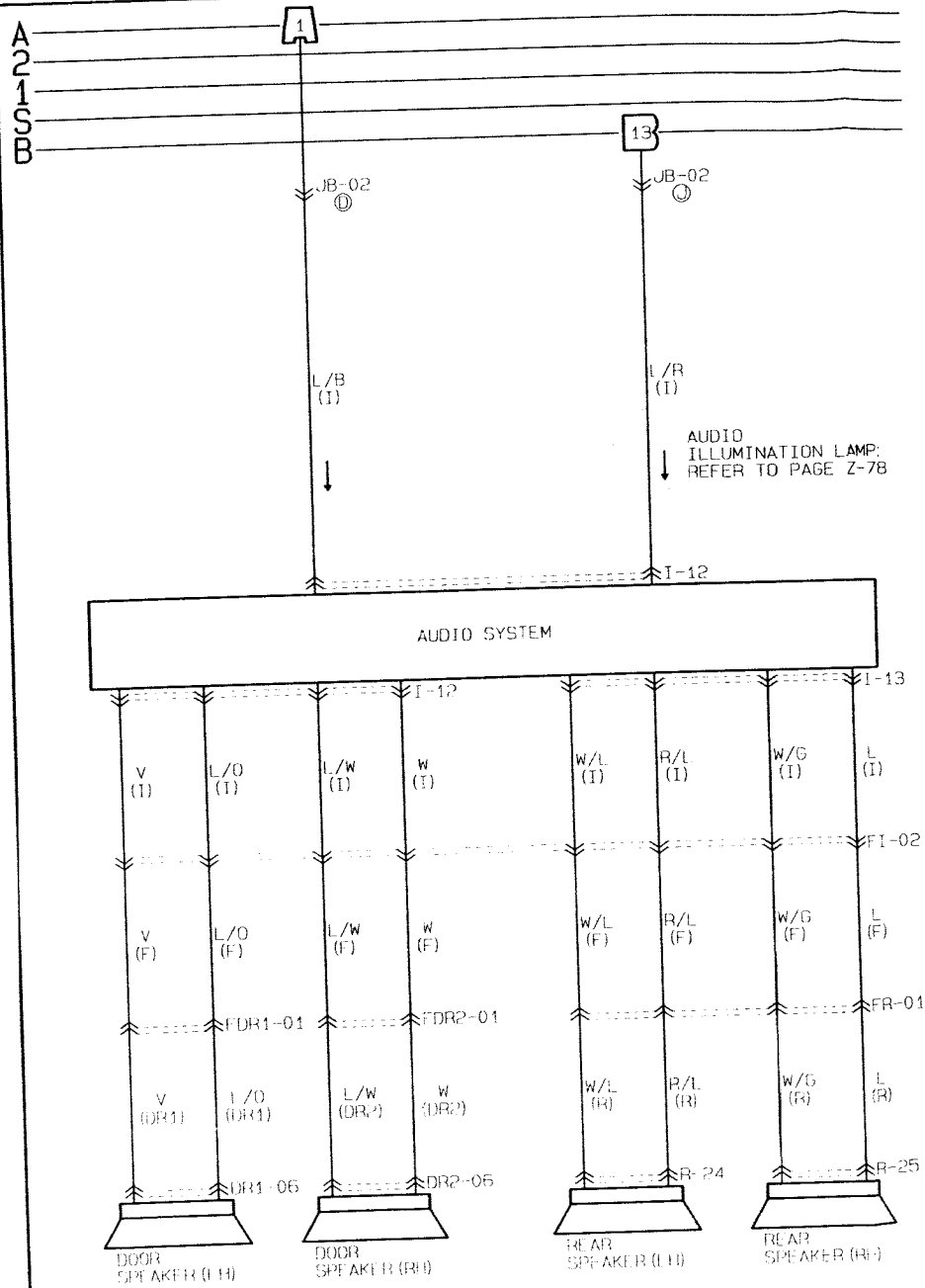
SU-03 SLIDING SUNROOF RELAY (SU)





Z WIRING DIAGRAM

■ AUDIO



I-12 AUDIO (I)

L/W	V	X		R/B	L/R	L/B
W	L/O	X	X	*	*	*

I-13 AUDIO (I)

X	X		X	W/L
X	L	W/G	X	R/L

DR1-06 DOOR SPEAKER LH (DR1)



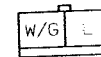
DR2-06 DOOR SPEAKER RH (DR2)



R-24 REAR SPEAKER LH (R)



R-25 REAR SPEAKER RH (R)



FR-01 FRONT (F) - REAR (R)

R/L	L/Y	X	X	L/R	Y	X		G	R/G	B/P	I
X	*	L/B	X	*	*	*	*	*	*	*	*
X	W/L	L/O	X	R/Y	X	G/R	X	G/Y	X	X	B/G
B/G	X	O	X	*	G/Y	X	W/L	W/R	(R/B)	(R)	W/G

L	B/P	R/G	G	X		Y	X	L/B	X	L/Y	R/L
W/G	(R)	(R/B)	X	W/R	X	B/G	X	Y/L	X	L/O	X
X	X	X	X	W/L	X	G/Y	X	X	X	X	B/G

(I) ... EC-AT < ... CANADA
 * ... WITH PASSIVE SHOULDER BELT (I) ... SEDAN * ... 4W

FI-02 FRONT (F) - INSTRUMENT PANEL (I)

X	Y	L	X		W	L/O	L/O	W	X		L	Y
X	O	W/G	W/L	R/L	L/W	V	V	L/W	R/L	W/L	W/G	O

* ... WITHOUT CRUISE CONTROL

FDR1-01 FRONT (F) - DOOR NO. 1 (DR1)

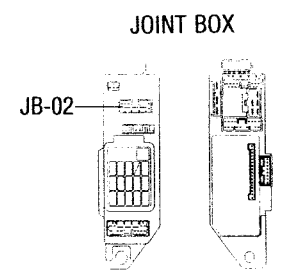
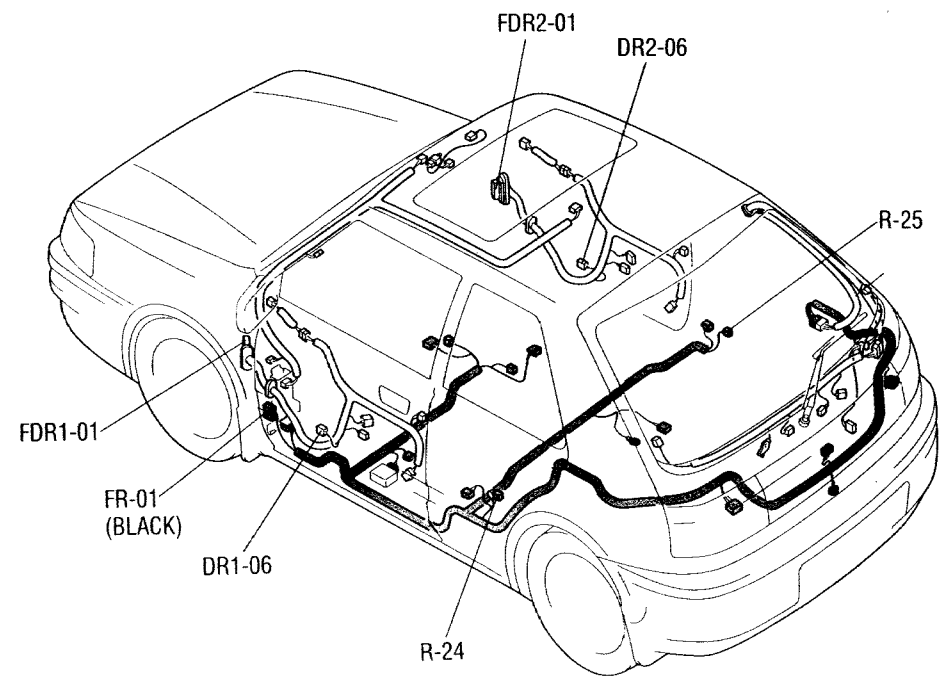
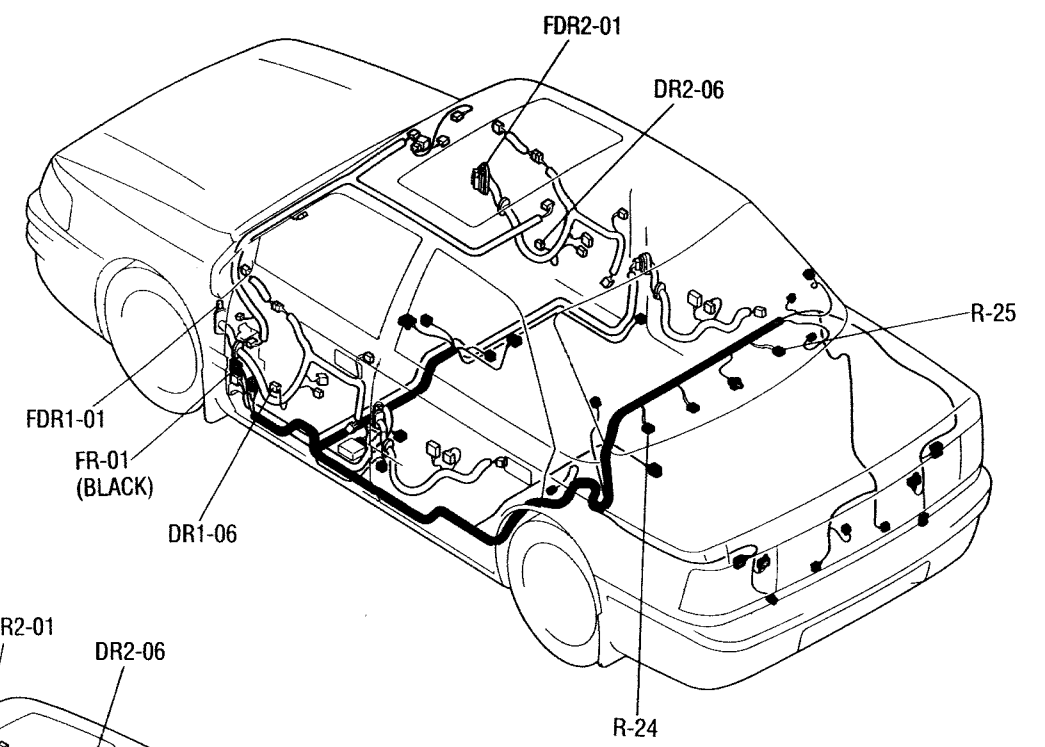
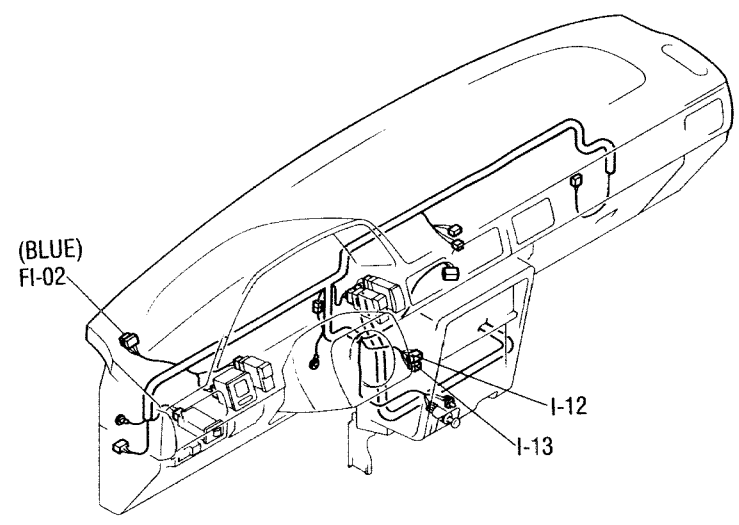
B/L	B	X		B/W	B/W	B/W	B	B/L	
L/Y	X	G/Y	Y/W	R/W	L/R	L/O	LG	BR/Y	X
B	X	W/R	L/W	G/W	BR	V	G/O	X	G/R
X	X	X	X	X	X	X	X	X	X

* ... WITH PASSIVE SHOULDER BELT (I) ... SEDAN

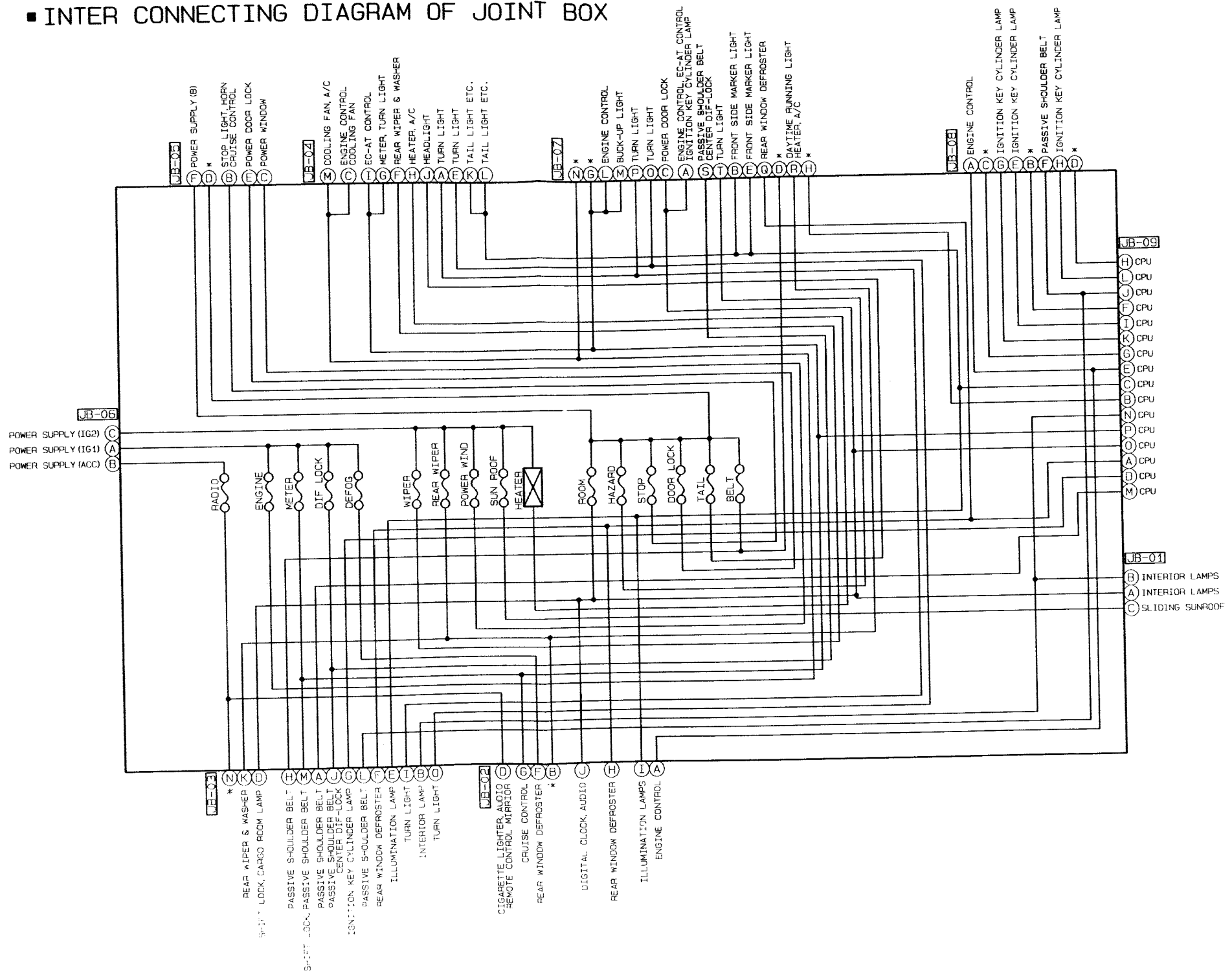
FDR2-01 FRONT (F) - DOOR NO. 2 (DR2)

B/L	G	X		R	R	G	R/L
L/O	X	X	R/W	X	W	G/BR/B	X
B	X	X	G/W	BR	L/W	X	X
X	X	X	X	X	X	X	X

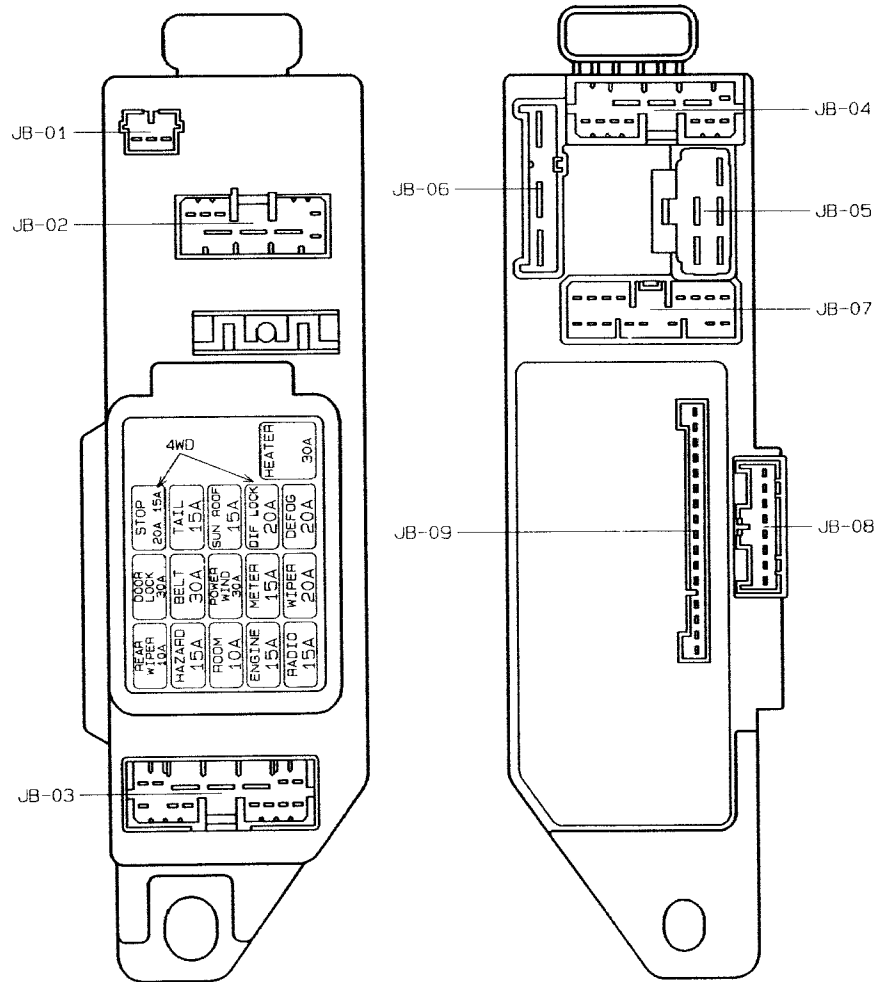
* ... WITH PASSIVE SHOULDER BELT



■ INTER CONNECTING DIAGRAM OF JOINT BOX



JB CONNECTOR LOCATION



JOINT BOX

JB-01 INTERIOR LAMP HARNESS

AG/O	R/W	L/R
*		
C	B	A

JB-02 INSTRUMENT PANEL HARNESS

J	I	G	E	C	A
L/R	R/B	B/Y	X	X	O/L
*	B/L	B/W	L/B		*
K	H	F	D	B	

JB-03 REAR HARNESS

N	L	K	I	G	E	C	A
*	LG	L/G	G/B	L/W	R/B	*	Y/B
G/W	B/Y	*	L/B	*	B/L	L/R	R/W
O	M	X	R/W	H	F	D	B
		J					

JB-04 FRONT HARNESS

L	K	I	G	E	C	A
R/B	R/B	(B/Y)	B/Y	G/W	B/W	G/B
(B/W)	*	W/B	L/W	L	*	*
M	J	H	F	D	B	

JB-05 FRONT HARNESS

E	C	A
W/G	B/W	*
W/R	*	G/W
F	D	B

JB-06 FRONT HARNESS

C	B	A
B/R	B/W	L

JB-07 FRONT HARNESS

S	X	R/W	Q	O	M	G	E	C	A
<<X>	L/B	B/L	G/W	B/Y	X	R/B	L/R	L/R	
B/R	L/G	G/B	*	(B/Y)	*	*	*	*	R/B
T	R	P	N	L	J	H	F	D	B

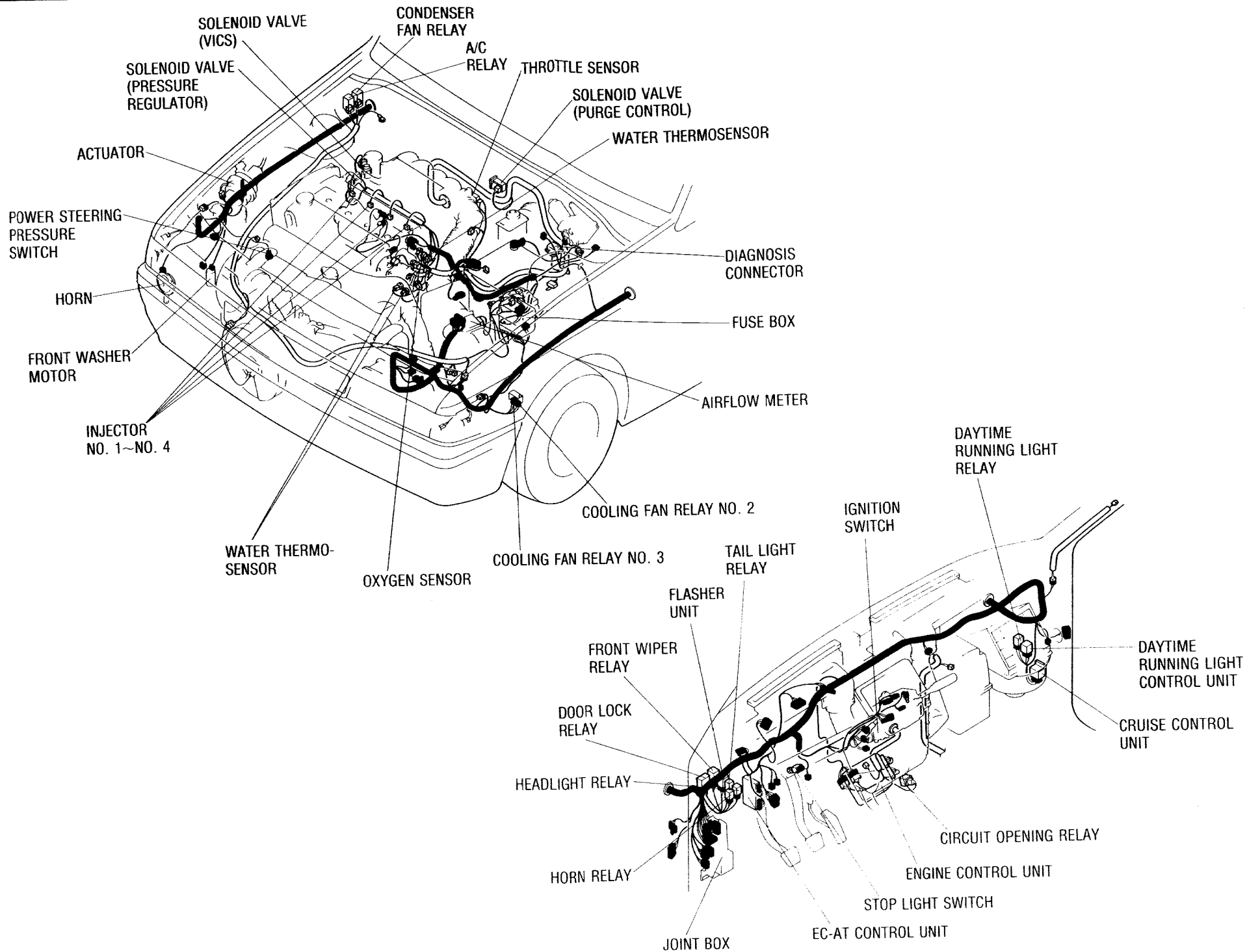
JB-08 FRONT HARNESS

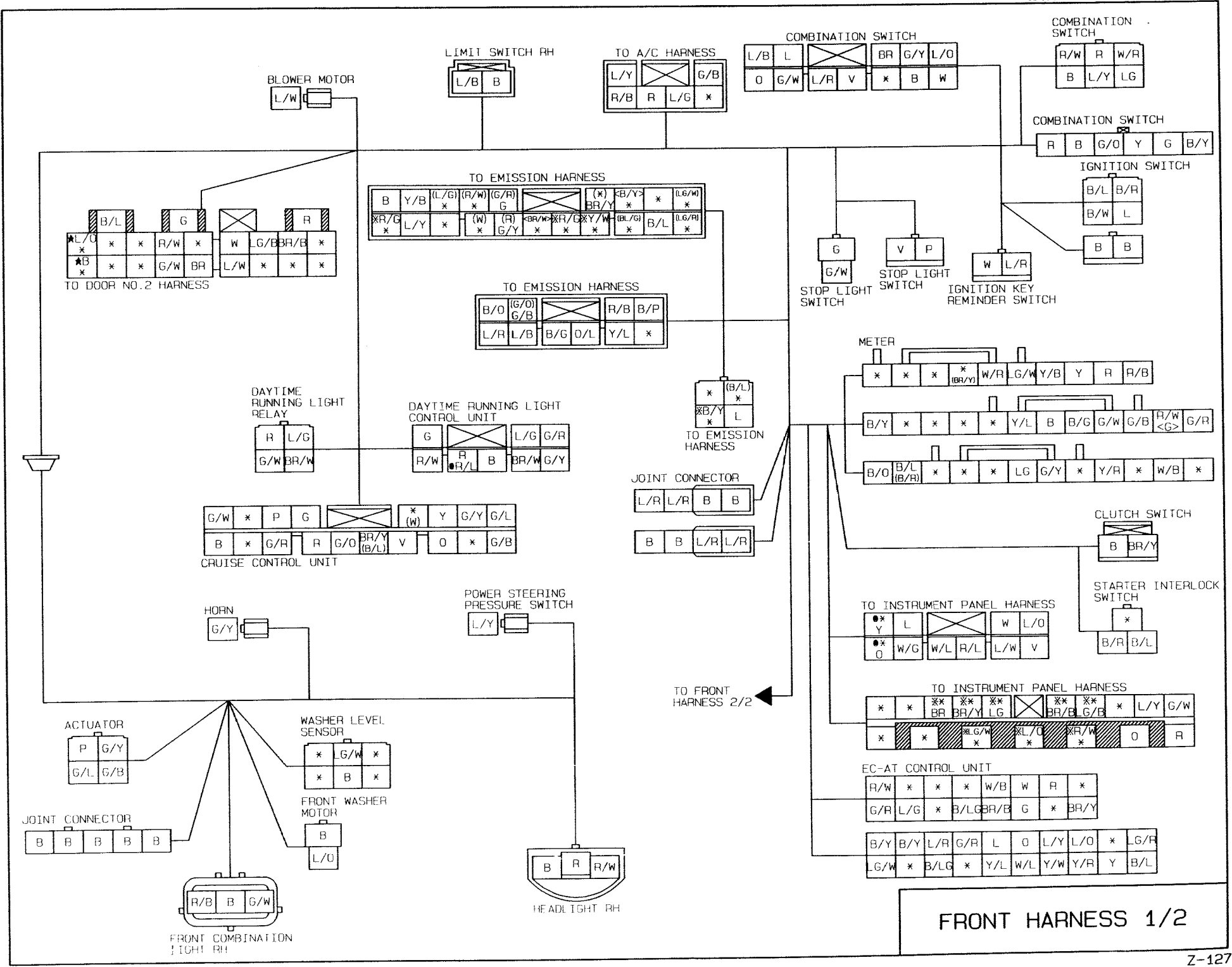
V	B	LG	W	*	*	*	O/L
H	G	F	E	D	C	B	A

JB-09 CPU

P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

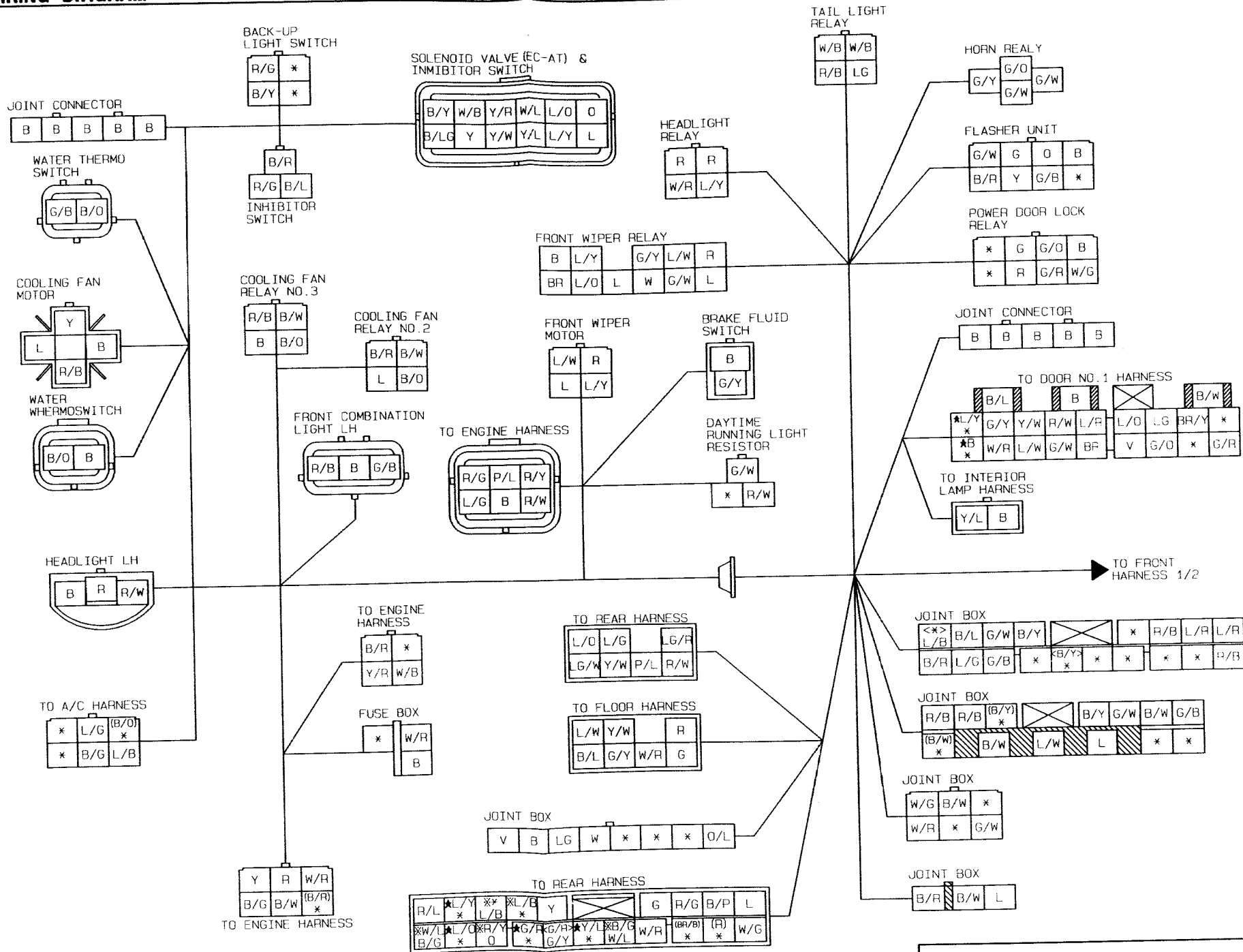
☆...WITH SUNROOF ★...WITH PASSIVE SHOULDER BELT
 ()...EC-AT <>...CANADA []...SEDAN X...4WD



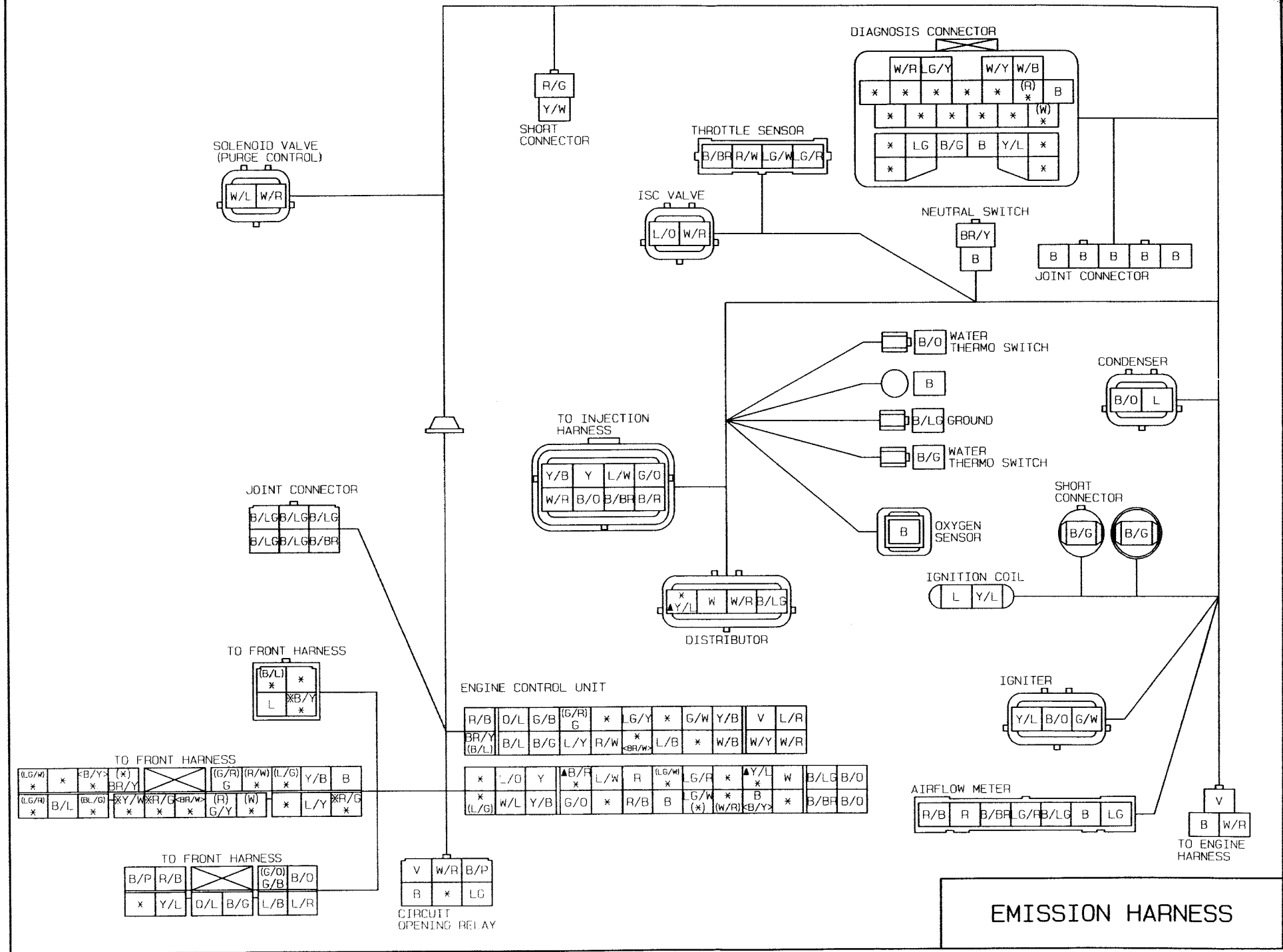


FRONT HARNESS 1/2

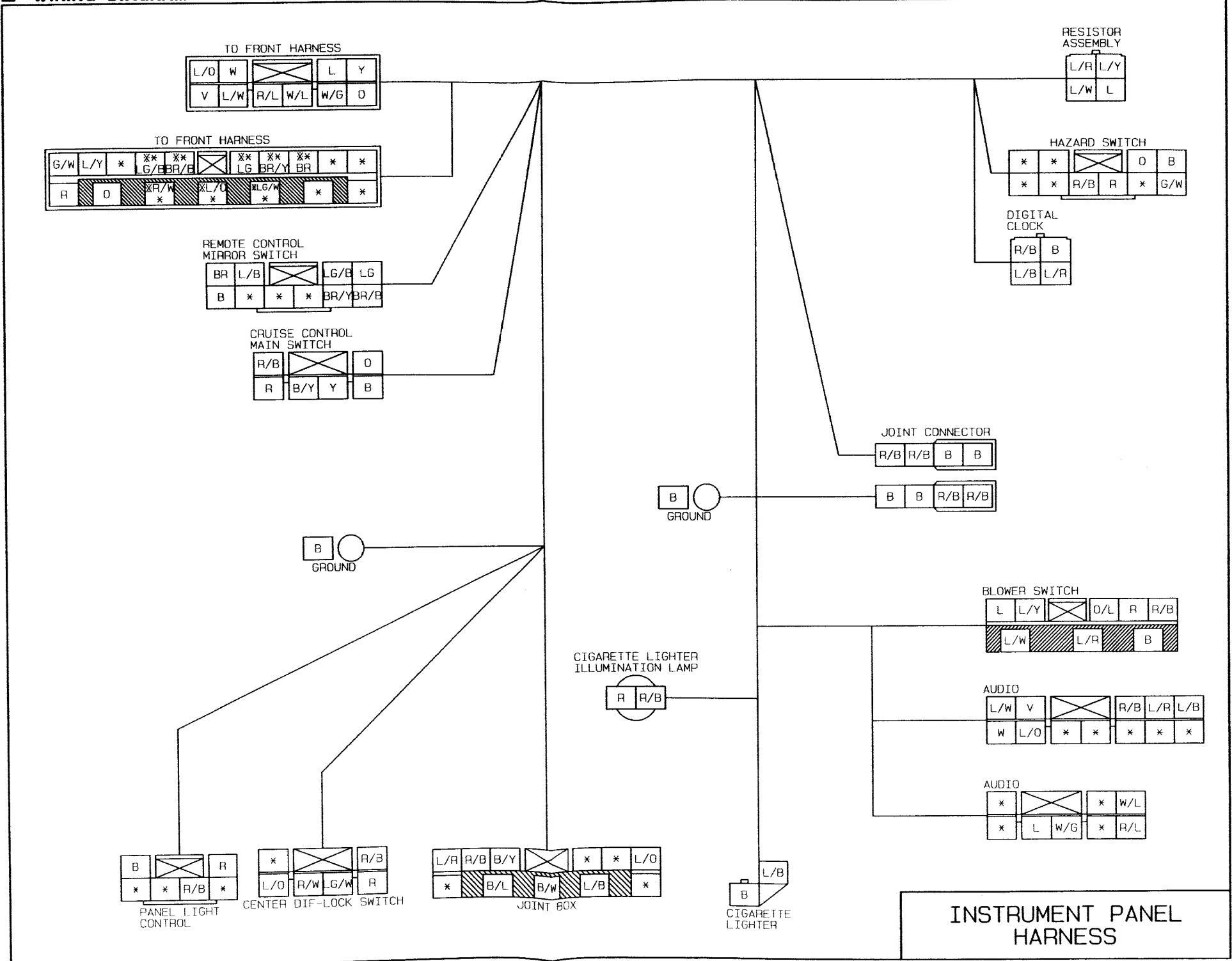
Z WIRING DIAGRAM



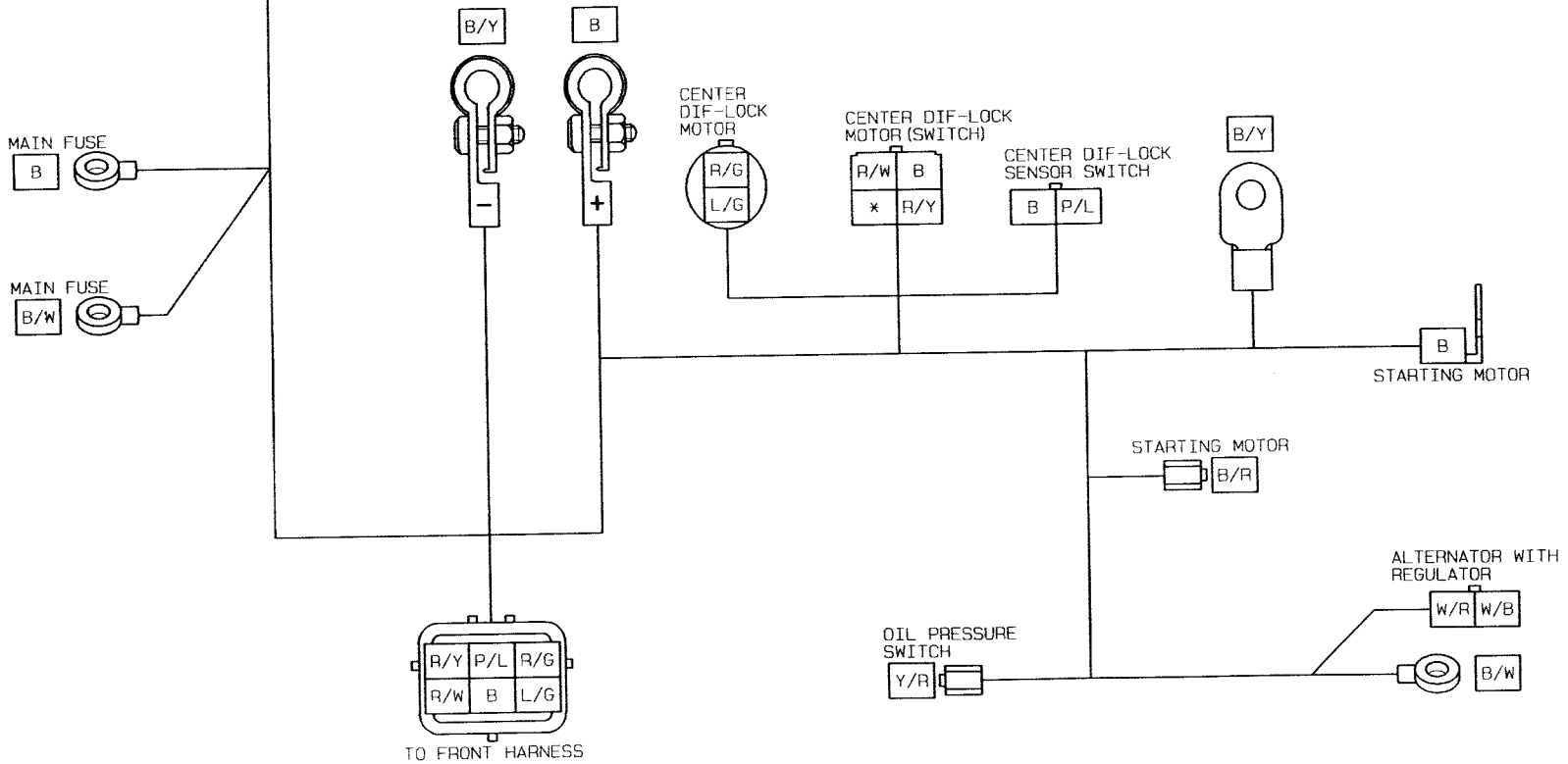
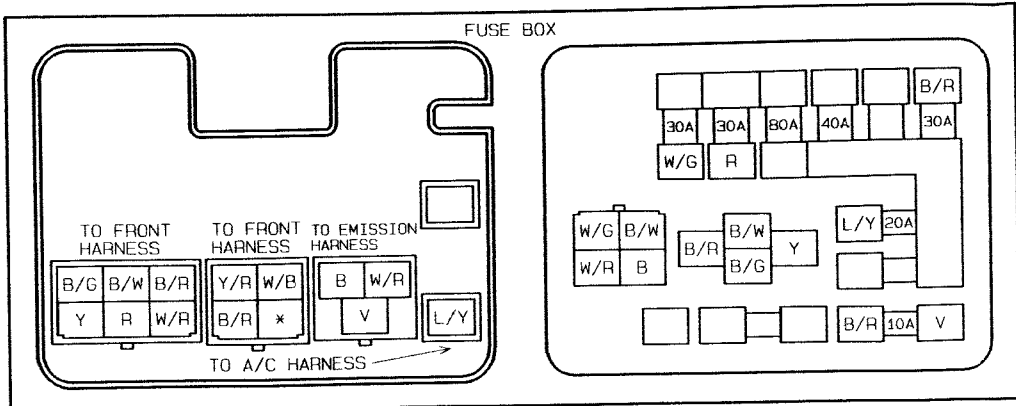
FRONT HARNESS 2/2



Z WIRING DIAGRAM

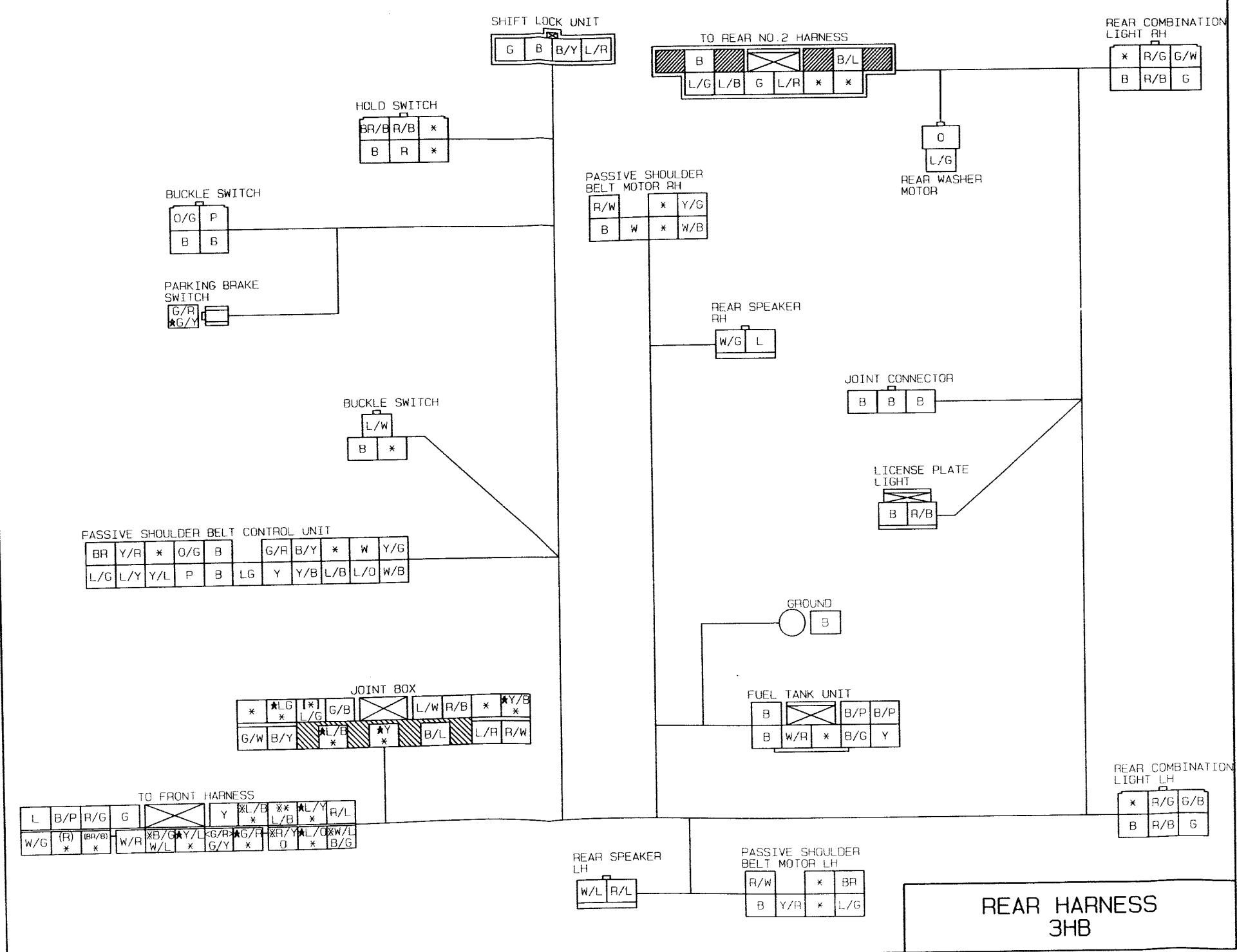


INSTRUMENT PANEL HARNESS

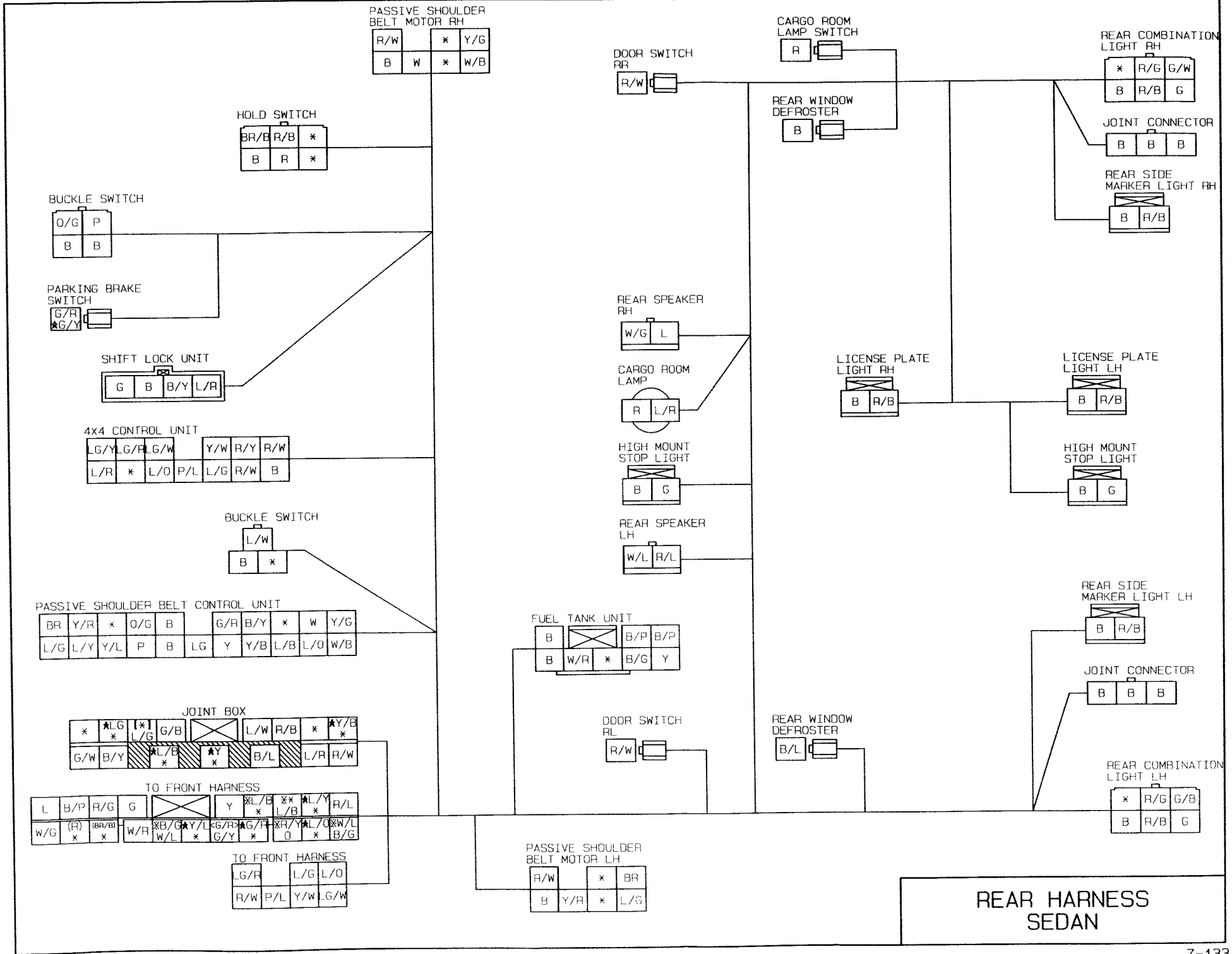


ENGINE HARNESS

Z WIRING DIAGRAM



REAR HARNESS
3HB

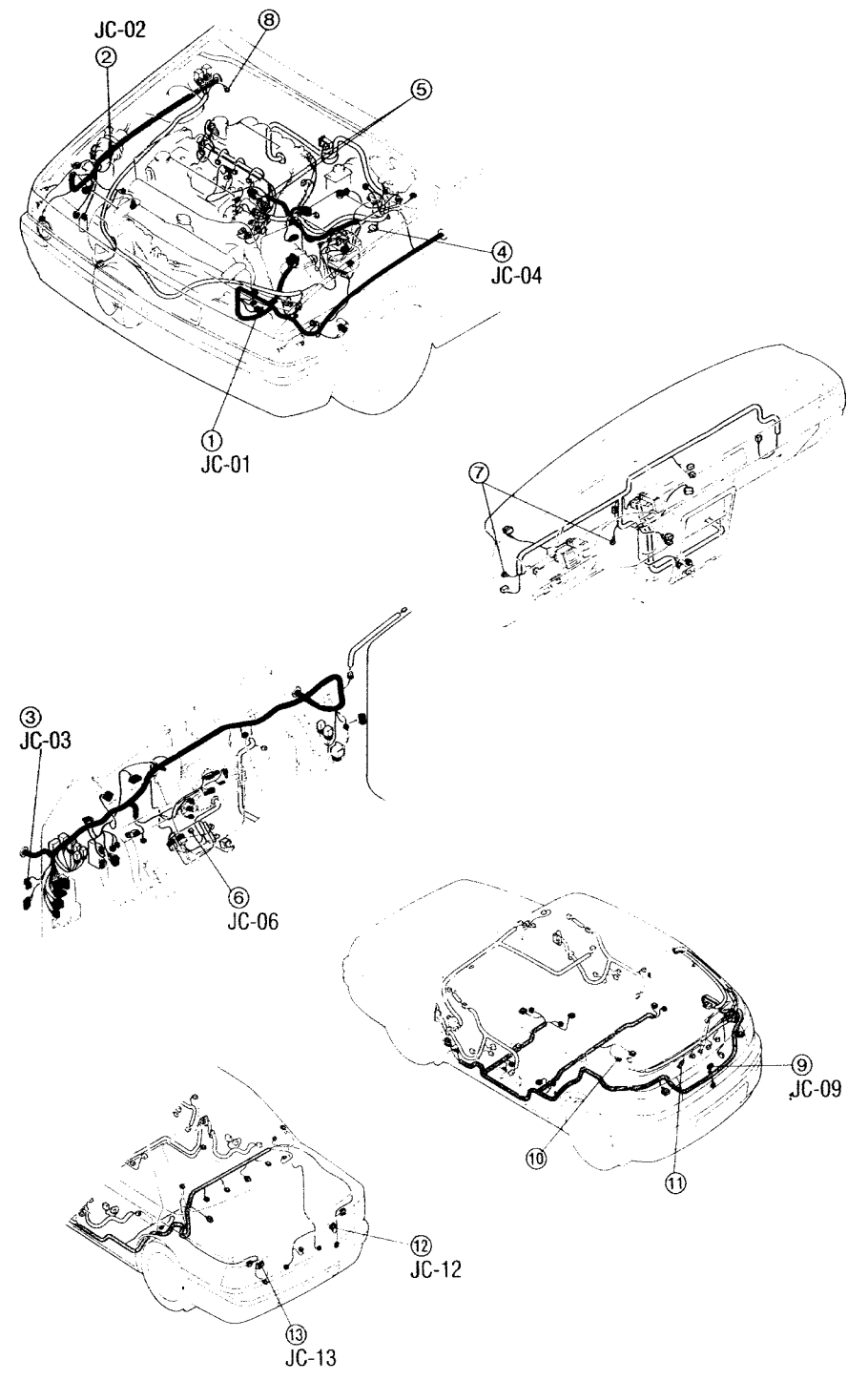
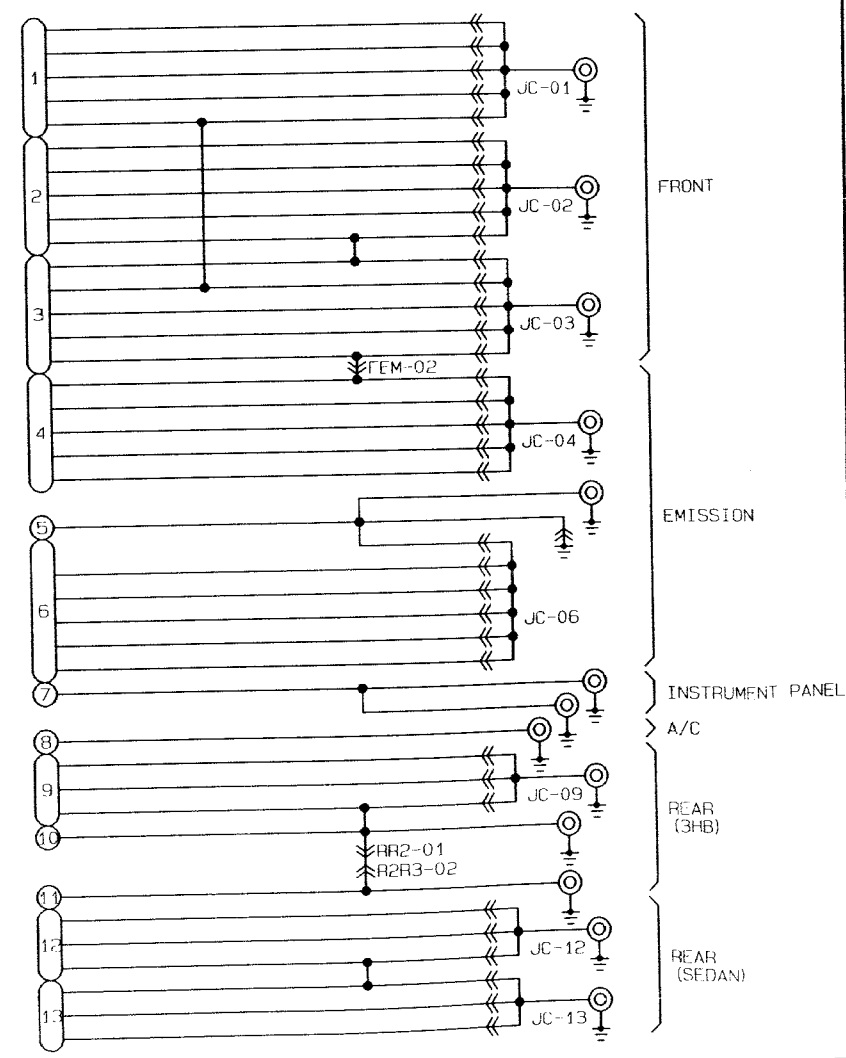


**REAR HARNESS
SEDAN**

JOINT CONNECTOR & GROUND CIRCUIT

WIRING ORDER INTO JOINT CONNECTOR MAY BE CHANGED

JC-01 JOINT CONNECTOR (F) B B B B B	JC-02 JOINT CONNECTOR (F) B B B B B	JC-03 JOINT CONNECTOR (F) B B B B B
JC-04 JOINT CONNECTOR (EM) B B B B B	JC-06 JOINT CONNECTOR (EM) B/LGB/LGB/LG B/LGB/LGB/BR	JC-09 JOINT CONNECTOR (R) (3HB) B B B
JC-12 JOINT CONNECTOR (R) (SEDAN) B B B	JC-13 JOINT CONNECTOR (R) (SEDAN) B B B	



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RUM

JAN



LOC.	K1575E	mazda	10	INV.
PART NO.	9999-95-0276-90		K67795	LINE
DESC.	323 4WD W/DGM		11/01/89	NO.
QTY.			10828	INV.
ORD.				DATE
				DLR.
				CODE

CUSTOMER SATISFACTION

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5145-10-39G

Part No. 9999-95-0276-90