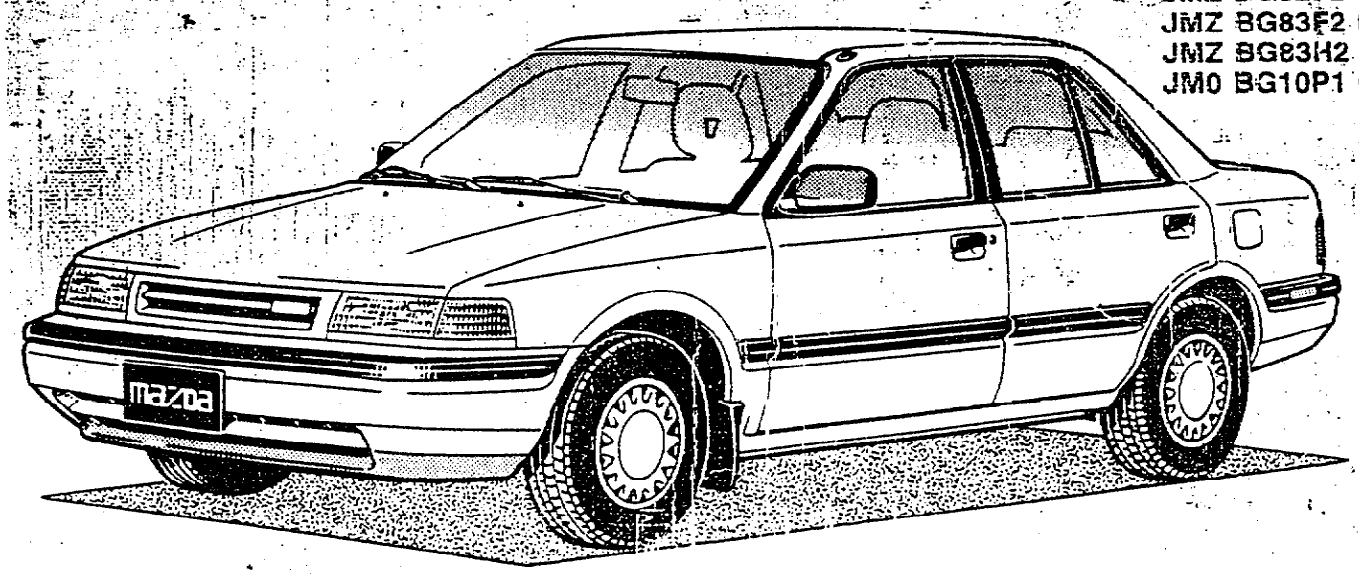
Mazda 323

4-WHEEL DRIVE

Workshop Manual Supplement

JMZ BG8262 00
JMZ BG8362 00
JMZ BG82F2 00
JMZ BG83F2 00
JMZ BG83H2 00
JM0 BG10P1 00



12/89 1229-10-89L

mazda

Europe, Australia

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.1203-10-89F (Vol.1) Europe
1204-10-89F (Vol.1) Australia
1206-10-89F (Vol.2)

All information in this supplement was the latest available at the time of printing, all alternations 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.

CONTENTS

This manual explains only the sections marked with shadows ( )

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1229-10-89L

VEHICLE IDENTIFICATION NUMBERS (VIN)

Europe

JMZ BG8262 00 100001 ~
JMZ BG8362 00 100001 ~
JMZ BG82F2 00 100001 ~
JMZ BG83F2 00 100001 ~
JMZ BG83H2 00 100001 ~

Australia

JM0 BG10P1 00 100001 ~

GENERAL INFORMATION

03UGIX-001

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.

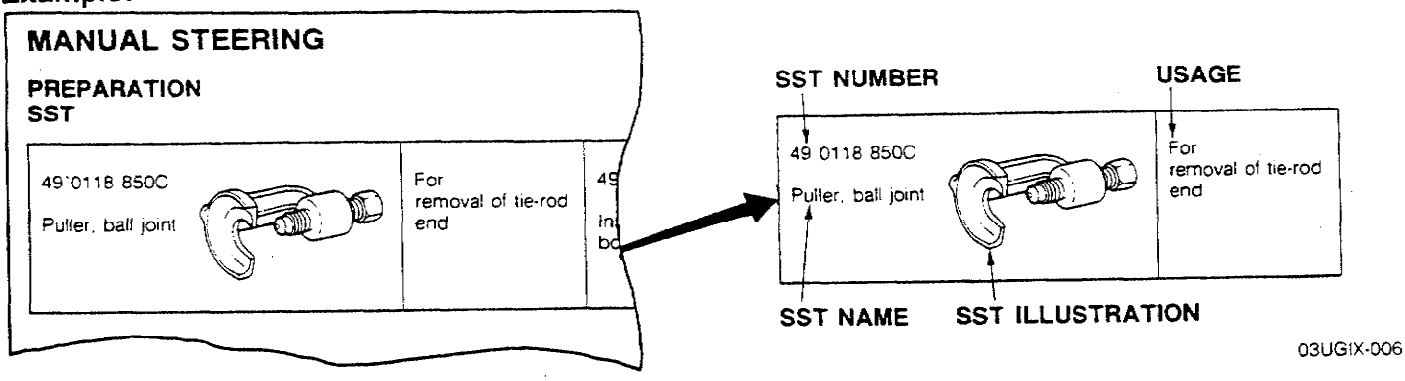
9MUGIX-002

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.

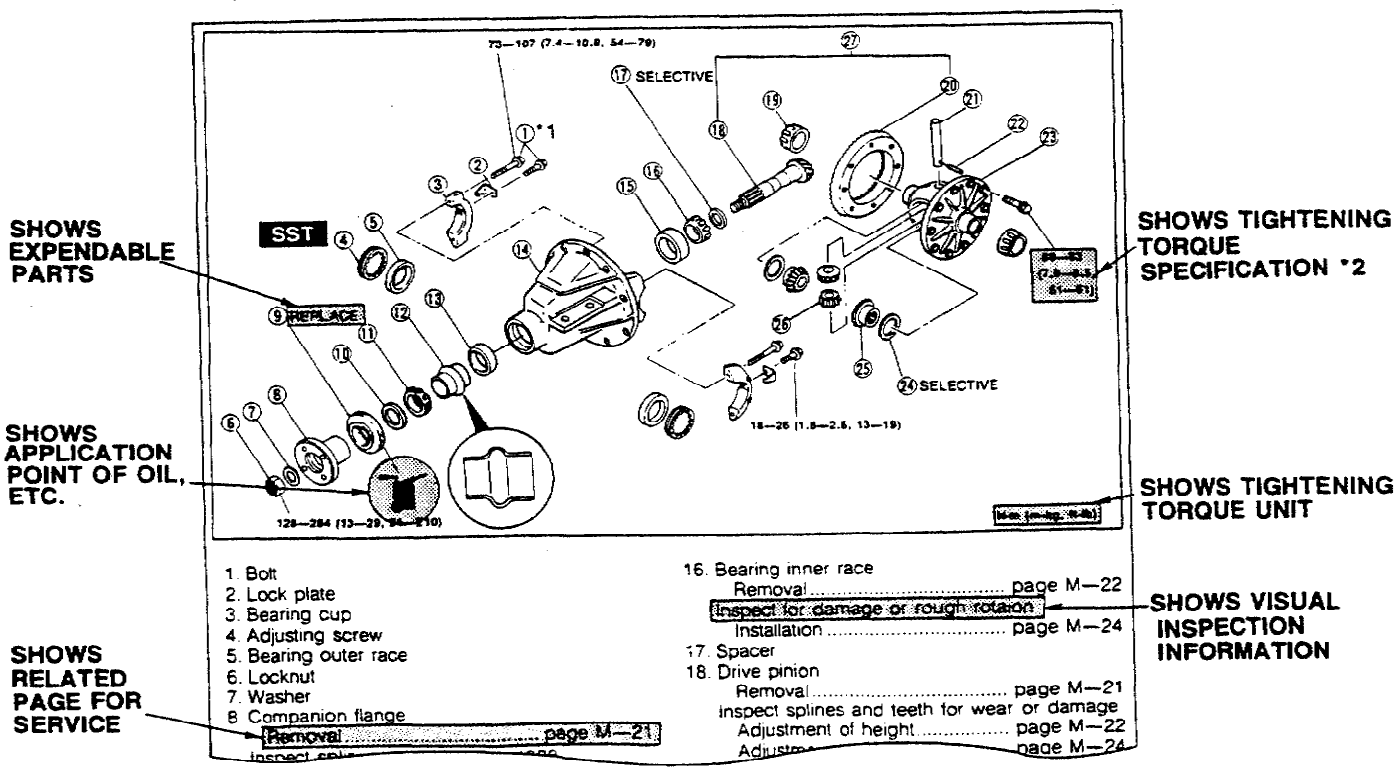
Example:



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:



*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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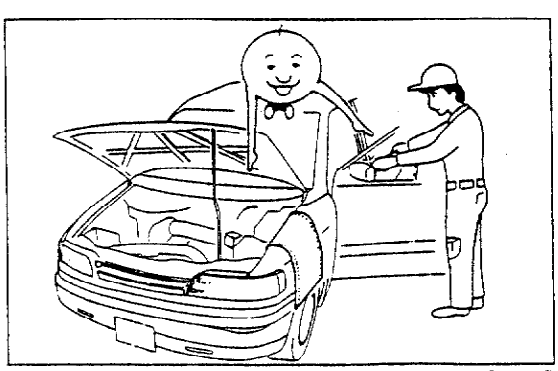

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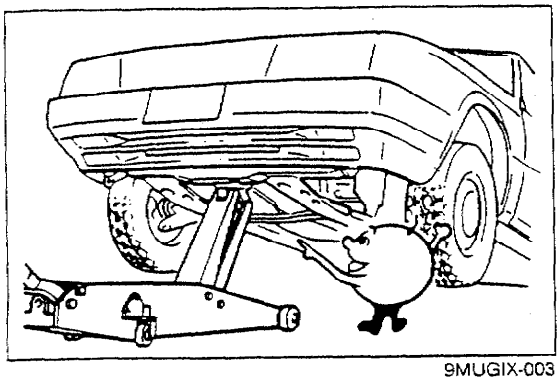
FUNDAMENTAL PROCEDURES

PROTECTION OF THE VEHICLE

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



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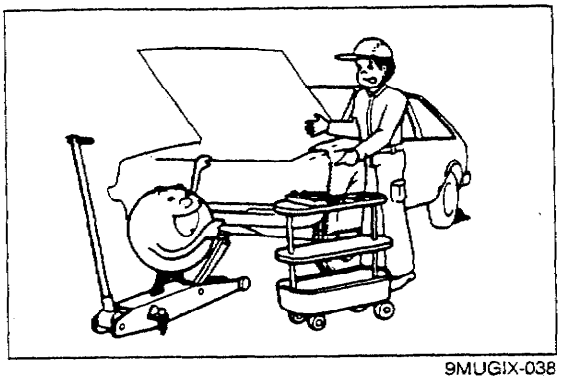
A WORD ABOUT SAFETY

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.



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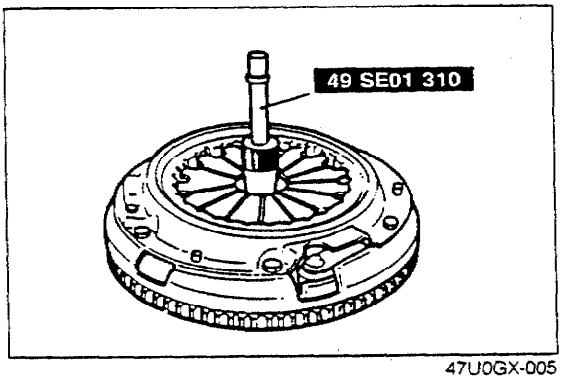
PREPARATION OF TOOLS AND MEASURING EQUIPMENT

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



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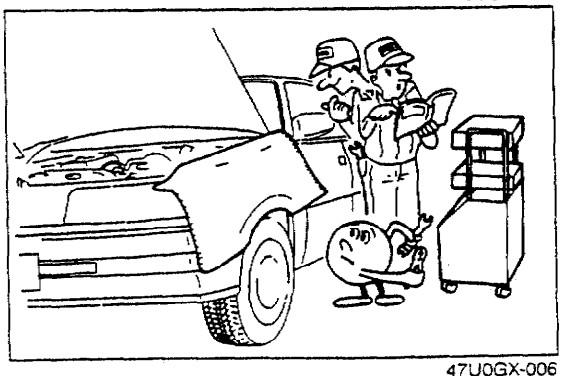
SPECIAL TOOLS

Use special tools when they are required.



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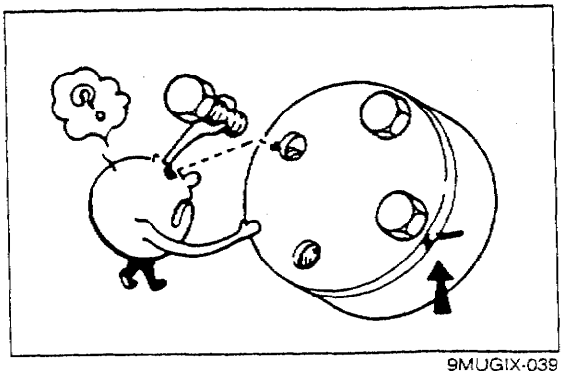
REMOVAL OF PARTS

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.



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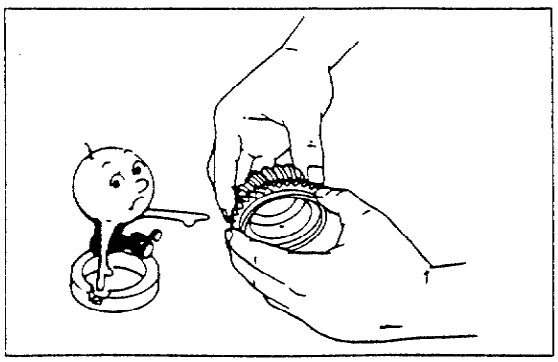
DISASSEMBLY

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.



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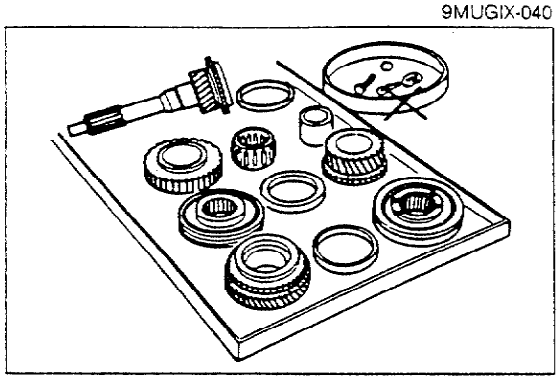
1. Inspection of parts

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



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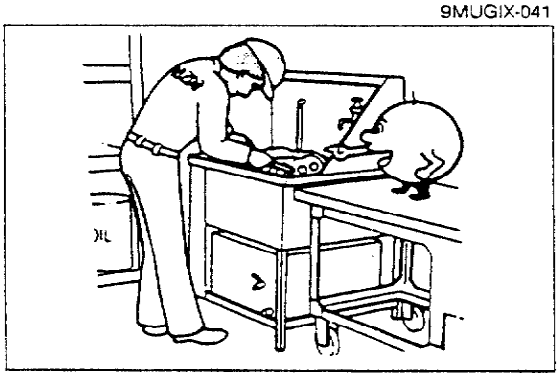
2. Arrangement of parts

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.



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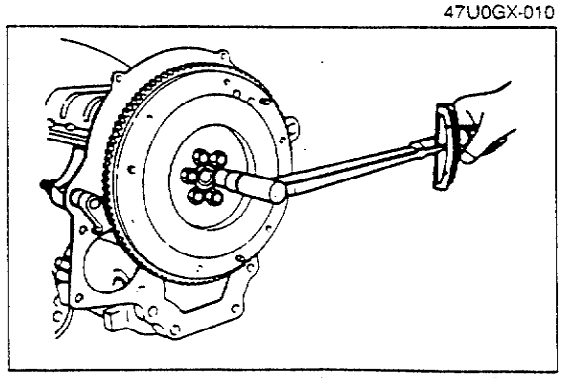
3. Cleaning parts for reuse

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



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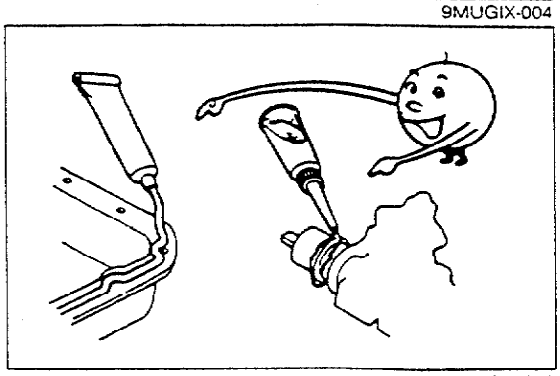
REASSEMBLY

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



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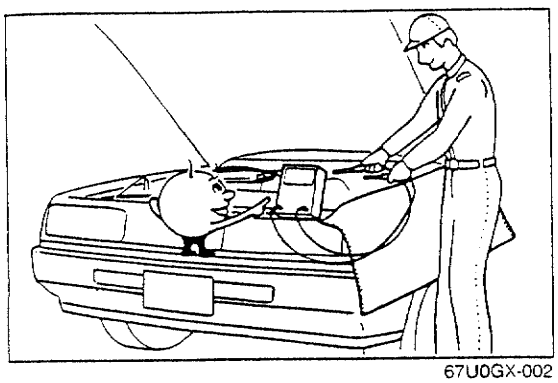
Depending on location:

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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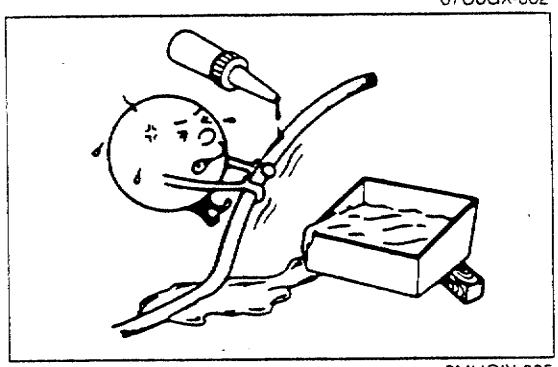


9MUGIX-005

ADJUSTMENTS

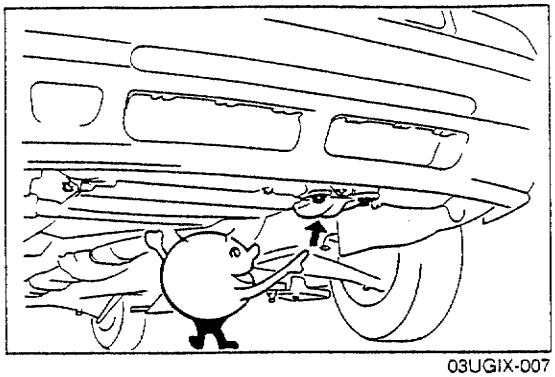
Use suitable gauges and/or testers when making adjustments.

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



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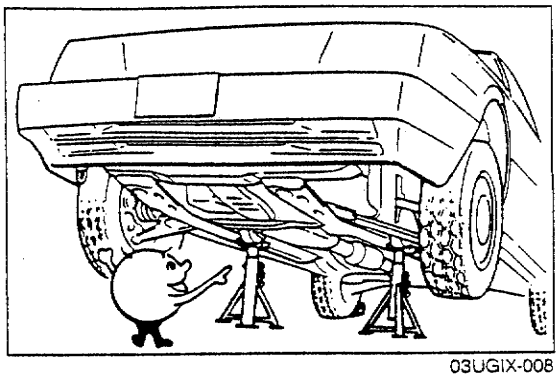
Safety stand positions:
On both sides of the body frame



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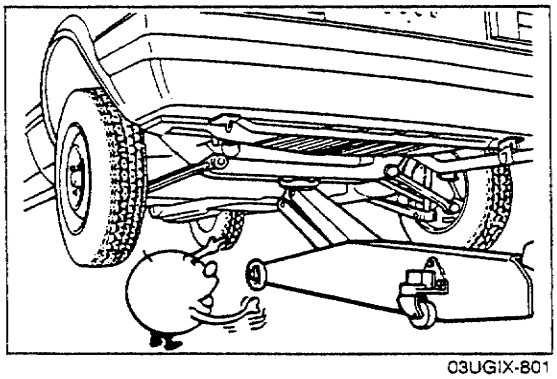
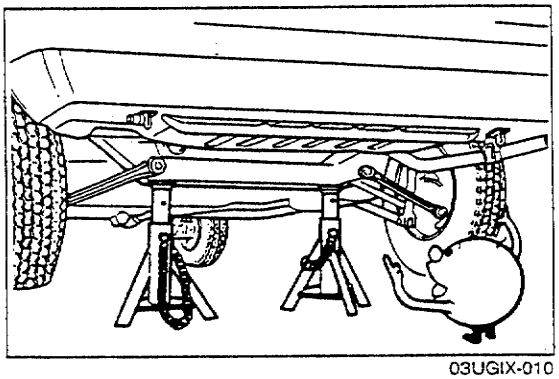
REAR END
Jack position:
At the center of the rear crossmember (2WD)
At the rear differential (4WD)



03UGIX-801

Safety stand positions:
On both sides of the body frame



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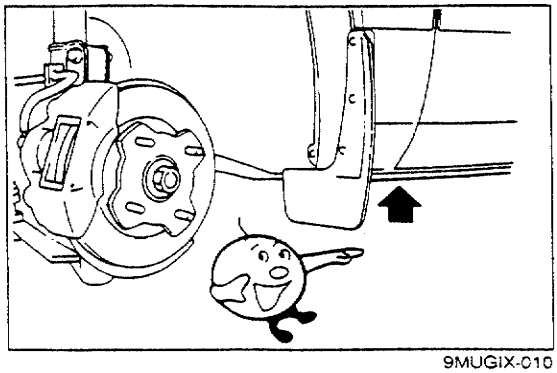
VEHICLE LIFT (2-SUPPORT TYPE) POSITIONS

FRONT END
Frame
Side sills



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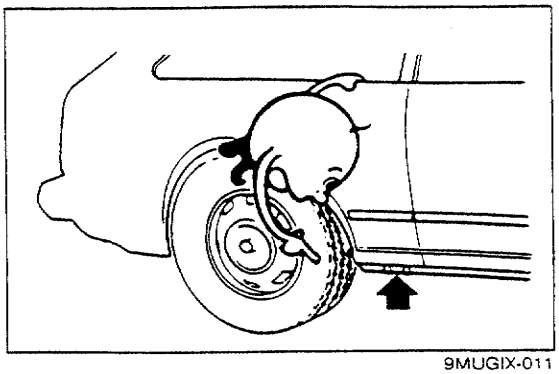
REAR END
Frame
Side sills



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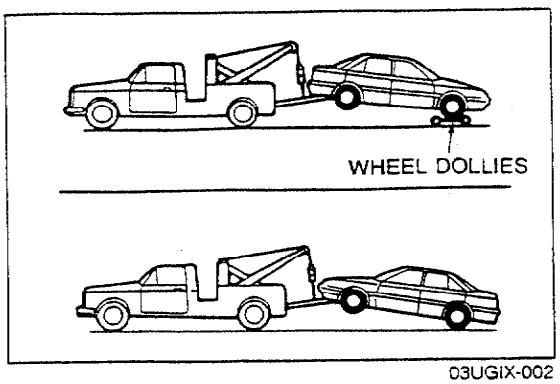

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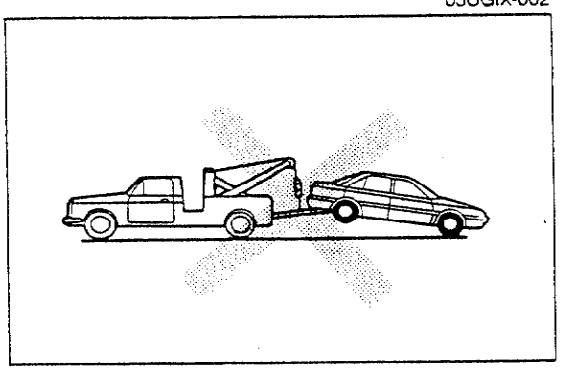


TOWING

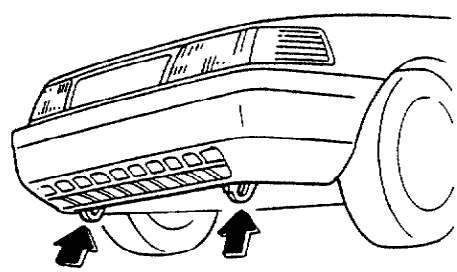
Proper towing equipment is necessary to prevent damage to the vehicle.
Laws and regulations applicable to vehicles in tow must always be observed.
As a general rule, towed vehicles should be pulled with the driving wheels off the ground. If excessive damage or other conditions prevent towing the vehicle 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.

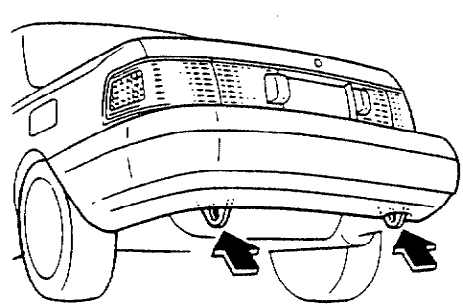
Caution

- **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

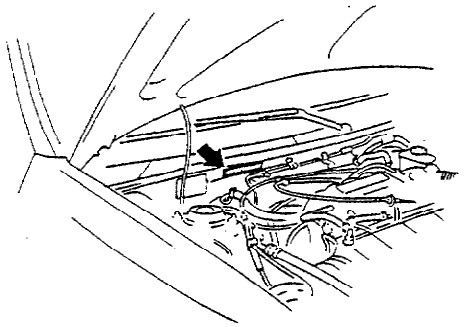


TIE-DOWN HOOKS — REAR

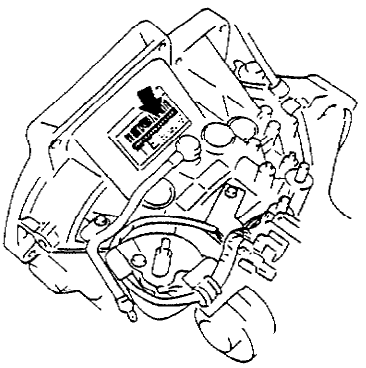


IDENTIFICATION NUMBER LOCATIONS

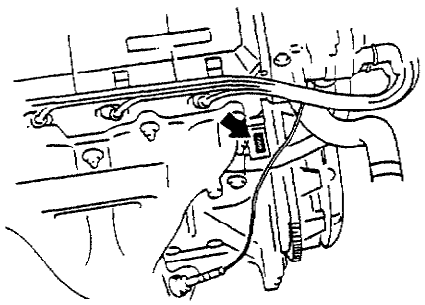
VEHICLE IDENTIFICATION NUMBER (VIN)



AUTOMATIC TRANSAXLE MODEL AND NUMBER



ENGINE MODEL AND NUMBER



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UNITS

N·m (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

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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
EGI	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

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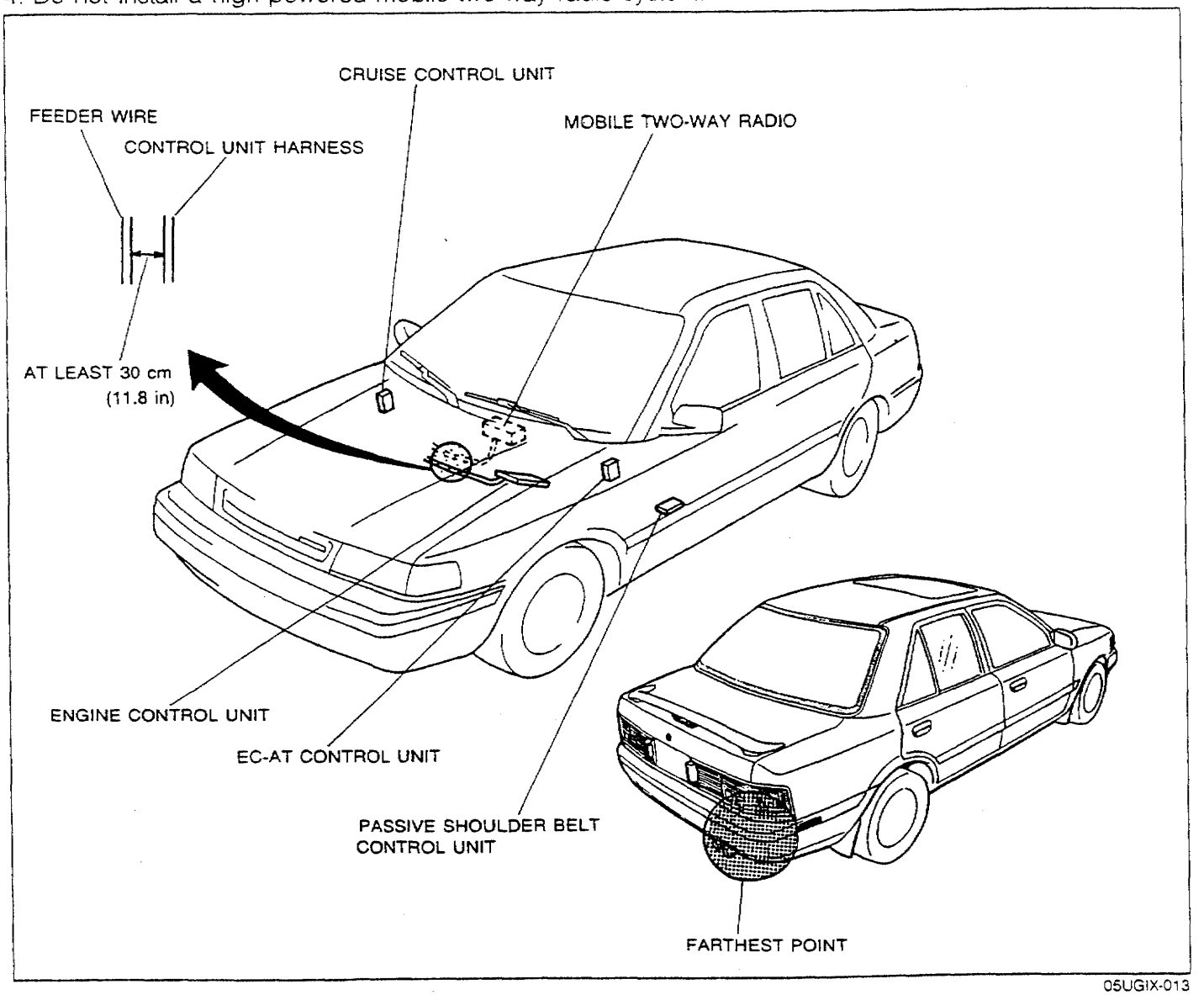
CAUTION

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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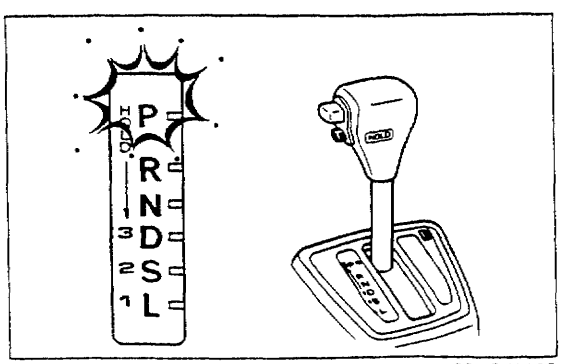
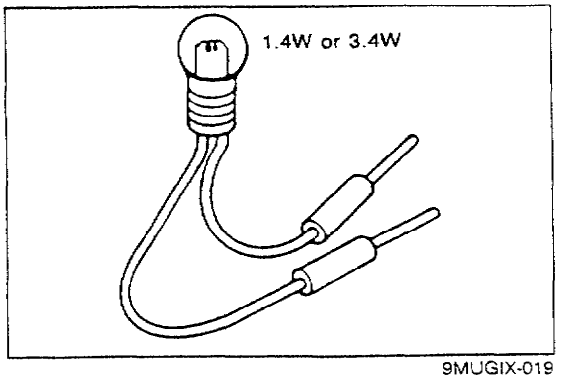


03UGIX-005

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.

CAUTION



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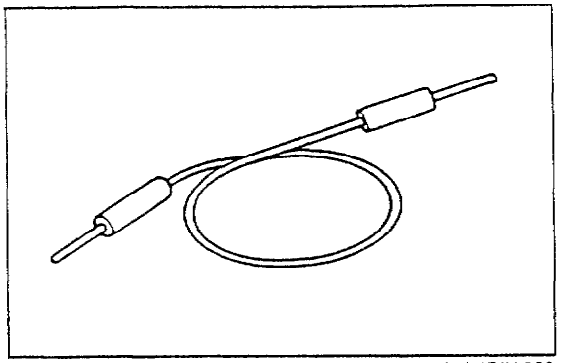

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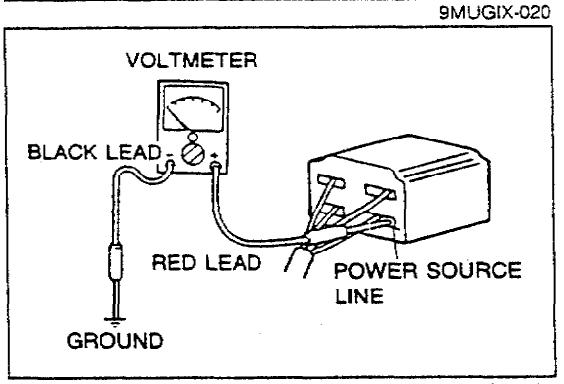

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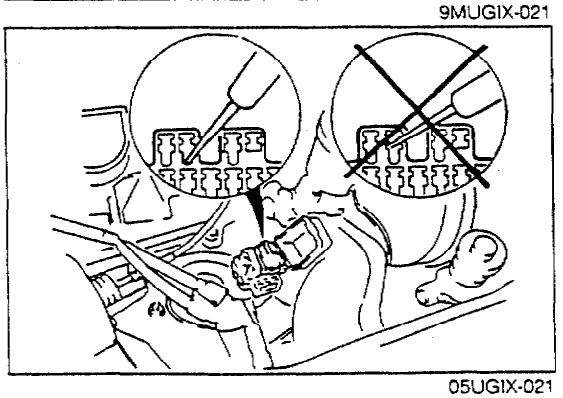

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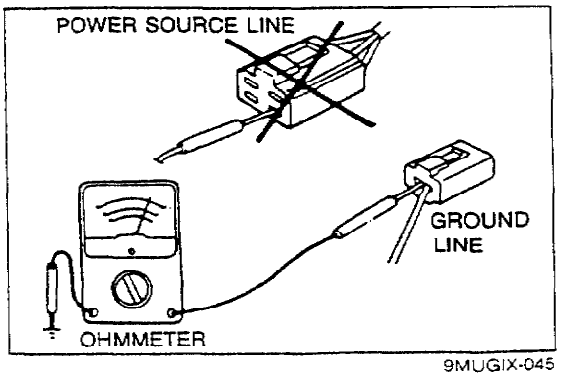

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ELECTRICAL TROUBLESHOOTING TOOLS

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

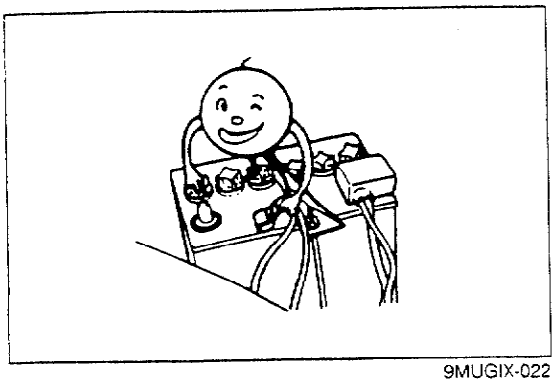
- **Do not insert the jumper wire probe into the diagnosis connector terminal, which may damage the terminal.**

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

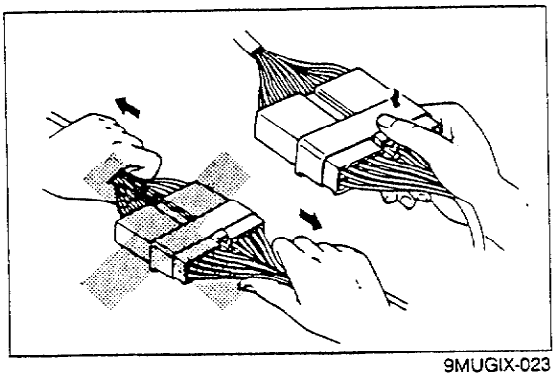
- **Do not attempt to connect the ohmmeter to any circuit to which voltage is applied; this may burn or otherwise damage the ohmmeter.**


9MUGIX-022

CAUTION WITH ELECTRICAL PARTS

Battery Cable

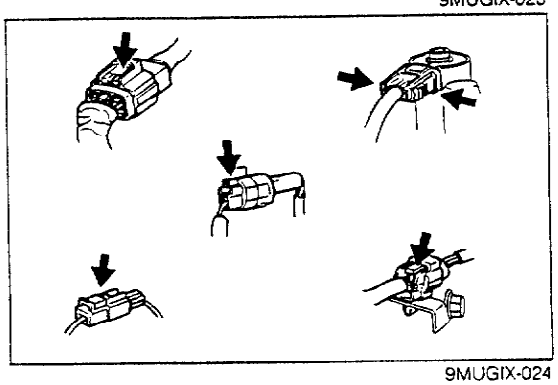
Before disconnecting connectors or replacing electrical parts, disconnect the negative battery cable.


9MUGIX-023

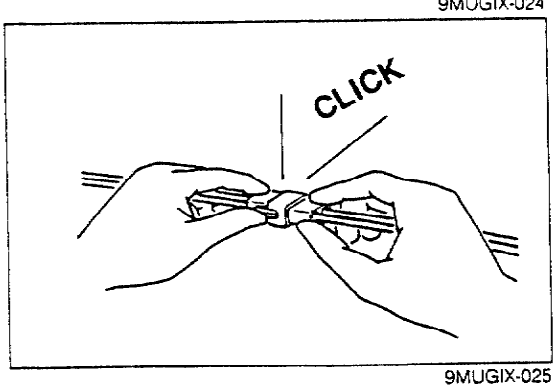
Connectors

Removal of connector

Never pull on the wiring harness when disconnecting connectors.


9MUGIX-024

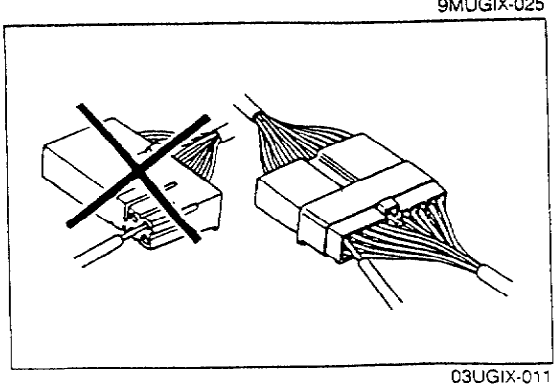
Connectors can be removed by pressing or pulling the lock lever as shown.



9MUGIX-025

Locking of connector

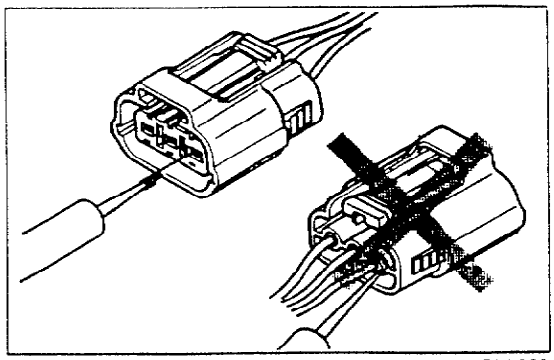
When locking connectors, make sure to listen for a click that will indicate they are securely locked.


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.

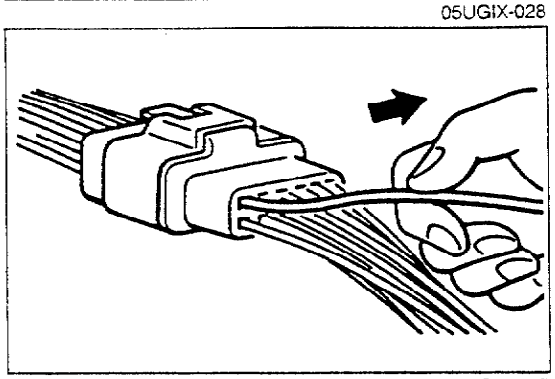
CAUTION



05UGIX-028

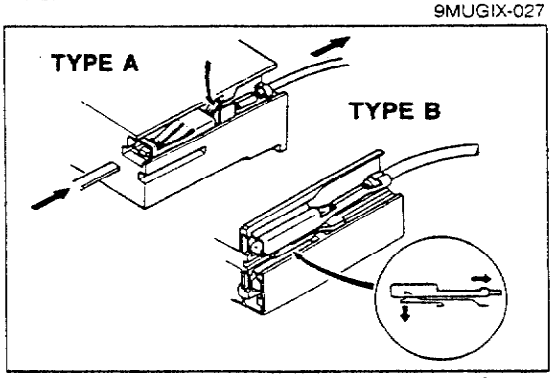
2. Check the terminals of waterproof connectors from the connector side, as they cannot be accessed from the wire harness side.

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.

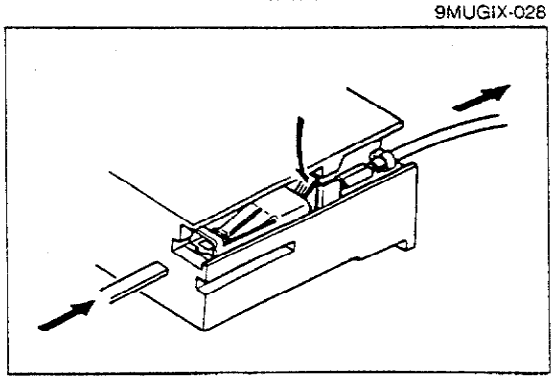


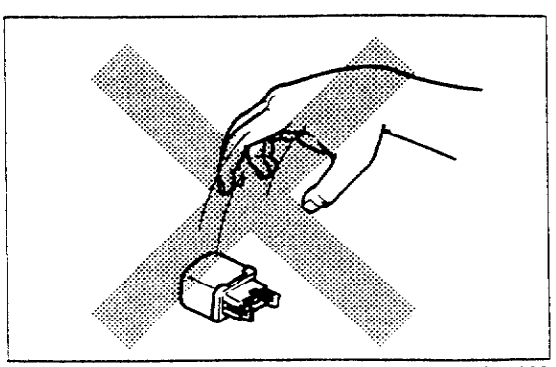
9MUGIX-026

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.

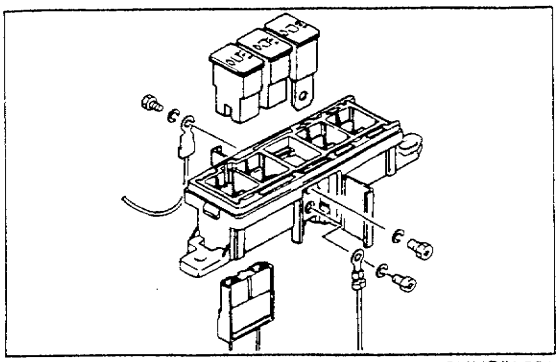
<Male>
Same as the female type.

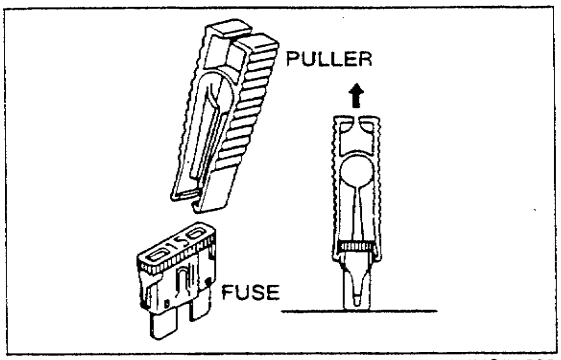




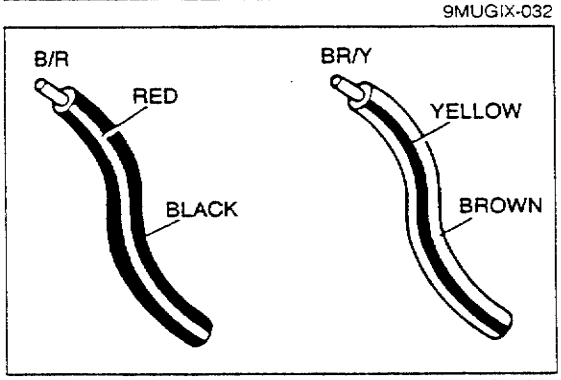
9MUGIX-030

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

93G0AX-701

PRE-DELIVERY INSPECTION TABLE

EXTERIOR

INSPECT and **ADJUST**, if necessary, the following items to specification:
- ☐ Glass, exterior bright metal and paint for damage
- ☐ Wheel lug nuts
- ☐ Tire pressures
- ☐ All weatherstrips for damage or detachment
- ☐ Operation of bonnet release and lock
- ☐ Operation of trunk lid, hatch and fuel lid opener (if equipped)
- ☐ Door operation and alignment
- ☐ Headlight aiming

INSTALL the following parts:
- ☐ Wheel caps or rings (if equipped)
- ☐ Outside mirror(s)

UNDER BONNET-ENGINE OFF

INSPECT and **ADJUST**, if necessary, the following items to specification:
- ☐ Fuel, coolant and hydraulic lines, fittings, connections and components for leaks
- ☐ Engine oil level
- ☐ Power steering fluid level (if equipped)
- ☐ Brake master cylinder fluid levels
- ☐ Clutch master cylinder fluid levels (if equipped)
- ☐ Windshield washer reservoir fluid level
- ☐ Radiator coolant level and specific gravity
- ☐ Tightness of water hose clamps
- ☐ Tightness of battery terminals, electrolyte level and specific gravity
- ☐ Manual transaxle oil level
- ☐ Drive belt(s) tension
- ☐ Carburetor linkage (choke control, wide open throttle position, etc.) (carburetor model only)
- ☐ Accelerator cable and linkage for free movement
- ☐ Headlight cleaner and fluid level (if equipped)

BLEED air from fuel line (diesel engine only)
CLEAN the spark plugs (except for diesel engine)

INTERIOR

INSTALL the following parts:
- ☐ Rubber stopper for inside rear view mirror (if equipped)
- ☐ Fuse for accessories

CHECK the operation of the following items:
- ☐ Seat controls (sliding and reclining) and head rest
- ☐ Seat belts and warning system
- ☐ Ignition switch and steering lock
- ☐ Power window (if equipped)
- ☐ Door locks including child proof door locks
- ☐ Inhibitor switch (ATX only)
- ☐ All lights including warning and indicator lights
- ☐ Ignition key reminder buzzer (if equipped)
- ☐ Horn, wipers and washers (front and rear, if equipped)
- ☐ Antenna (if equipped)
- ☐ Cigarette lighter and clock (if equipped)
- ☐ Remote control outside mirror (if equipped)
- ☐ Heater, defogger and air conditioner at various mode selections (if equipped)
- ☐ Sunroof (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
- ☐ Parking brake

UNDER BONNET-ENGINE RUNNING AT OPERATING TEMPERATURE

CHECK the following items:
- ☐ Operation of idle-up system for air conditioner or power steering (if equipped)
- ☐ Automatic transaxle fluid level
- ☐ Initial ignition timing (except disel engine)
- ☐ Idle speed
- ☐ Operation of throttle position sensor (EGI engine)
- ☐ Operation of cold start device and glow plug warning light (diesel engine only)
- ☐ Operation of dash pot (EGI engine)

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 gauges
- ☐ Squeaks, rattles or unusual noises
- ☐ Engine general performance
- ☐ Emergency locking retractors

AFTER ROAD TEST

REMOVE the seat and floor mat protective covers
CHECK for the necessary owner information materials, tools and spare tire in vehicle

93E0AX-002

SCHEDULED MAINTENANCE SERVICES (Australia)

Chart symbols:
I : Inspect: Visual examination or functional measurement of a system's operation (Performance)
A: Adjust
R: Replace or change
T : Tighten

Note
- **As the result of visual examination or functional measurement of a system's operation (Performance), correct, clean or replace as required.**

REMARKS:
After 90,000 km or 72 months, continue to follow the described maintenance items and intervals periodically.
As for * marked items in this maintenance chart, please pay attention to the following points.
*1 If the vehicle is operated under the following conditions, it is suggested that the engine oil and oil filter be changed more often that at usual recommended intervals.
a) Driving in dusty conditions.
b) Extended periods of idling or low speed operation.
c) Driving for a prolonged period in cold temperatures or driving only short distances regularly.
*2 Replacement of the timing belt is required at every 105,000 km. Failure to replace the timing belt may result in damage to the engine.
*3 If the vehicle is operated in very dusty or sandy areas, inspect and, if necessary, replace more often than at usual recommended intervals.
*4 Adjust or inspect alternator and water pump drive belt, and power steering and air conditioner drive belt if equipped.
*5 Replace every two years.
If there has been continuous hard driving, mountain driving, or if the brakes are used extensively or the vehicle is operated in extremely humid climates, the brake fluid should be changed annually.

Emission Control and Related Systems
The ignition and fuel systems are vitally important to the proper operation of the emission control and related system, as well as for efficient engine operation. It is strongly recommended that all servicing related to these systems be done by your Authorised Mazda Dealer.

93G0AX-702

SCHEDULED MAINTENANCE SERVICES (Australia)

MAINTENANCE INTERVAL / MAINTENANCE ITEM		Number of months or km, whichever comes first												
	Months	—	6	12	18	24	30	36	42	48	54	60	66	72
	x1000 km	1.5	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90
Exhaust manifold bolts and nuts (except turbo)		T						T						T
Engine timing belt*2		Replace every 105,000 km												
Drive belts*4		A		I		I		I		I		I		I
Engine oil*1	Except turbo models	R	R	R	R	R	R	R	R	R	R	R	R	R
	For turbo models	R	Replace every 5,000 km or 6 months											
Oil filter*1	Except turbo models	R		R		R		R		R		R		R
	For turbo models	R	Replace every 10,000 km or 6 moths											
Cooling system		I		I		I		I		I		I		I
Engine coolant (With Reservoir)		Replace every 24 months												

Fuel system

Idle speed	For F.I. system (If equipped idle speed control)	I				I				I				I
Air cleaner element				I		R		I		R		I		R
Fuel filter						R				R				R
Fuel lines and hoses		I		I		I		I		I		I		I

Ignition system

Initial ignition timing		I		I		I		I		I		I		I
Spark plugs				I		I		I		I		I		I

Evaporative emission control system

Evaporative system				I		I		I		I		I		I
Throttle sensor				I		I		I		I		I		I

Exhaust emission control system

Dashpot (Except for ATX)				I		I		I		I		I		I

Electrical system

Battery electrolyte level and specific gravity				I		I		I		I		I		I

Chassis and body

Clutch pedal				I		I		I		I		I		I
Clutch fluid	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Brake lines, hoses and connections	I		I		I		I		I		I			I
Brake fluid*5	I	I	I	I	R	I	I	I	R	I	I	I		R
Parking brake			I		I		I		I		I			I
Disc brakes			I		I		I		I		I			I
Power steering fluid and line (If equipped)	I		I		I		I		I		I			I
Steering operations and gear housing	I				I				I					I
Steering linkages, rack guide and tie rod ends	I				I				I					I
Manual transaxle oil	I	I	I	I	I	I	I	I	I	I	R	I		I
Transfer carrier oil	I	I	I	I	I	I	I	I	I	I	R	I		I
Automatic oil or automatic transaxle fluid level	I	I	I	I	I	I	I	I	I	I	I	I		I
Rear axle oil (Differential)	I	I	I	I	I	I	I	I	I	I	R	I		I
Front suspension ball joints					I				I					I
Bolts and nuts on chassis and body	T		T		T		T		T		T			T
Drive shaft dust boots					I				I					I
Exhaust system heat shield							I							I

93G0AX-703

MAINTENANCE TABLE (Leaded Fuel Model)

Chart symbols:

I: Inspect: Visual examination and/or functional measurement of system's operation or performance
A: Adjust: Examination resulting in adjustment or replacement
R: Replace or change
T: Tighten

REMARKS

After 80,000 km or 48 months, continue to follow the described maintenance at the recommended intervals.
As for * marked items in this maintenance chart, note the following points.

*1 Major service interval at 12 months/20,000 km (12,000 miles).
Lubrication service based on distance only, 10,000 km (6,000 miles), not time.
*2 Adjust or inspect alternator and water pump drive belt, and power steering and air conditioner drive belt if equipped.
*3 Replacement of the timing belt is required every 100,000 km (60,000 miles). Failure to replace the timing belt may result in damage to the engine.
*4 If the vehicle is operated under any of the following conditions, it is suggested that the engine oil and oil filter be changed more often than the recommended intervals.
a) Driving in dusty conditions.
b) Extended periods of idling or low speed operation.
c) Driving for prolonged periods in cold temperatures or regularly driving only short distances.
*5 If the vehicle is operated in very dusty or sandy areas, inspect and, if necessary, replace more often than the recommended intervals.
*6 This is a full function check of all electrical systems, i.e, all lights, washers (including condition of blades) electric windows sunroof, horn, etc.
*7 Replace every two years.
If there has been continuous hard driving, mountain driving, or it the brakes are used extensively or the vehicle is operated in extremely humid climates, the brake fluid should be changed annually.

Emission Control and Related Systems

The ignition and fuel systems are vitally important to the proper operation of the emission control and related system, as well as for efficient engine operation. It is strongly recommended that all servicing related to these systems be done by your Authorised Mazda Dealer.

93G0AX-704

SCHEDULED MAINTENANCE SERVICES (Europe)

Maintenance interval / Maintenance interval	Number of months or km (miles), whichever comes first								
	Months*1	—	6	12	18	24	30	36	42	48
	Kilometers	1,000	10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000
	(Miles)	(600)	(6,000)	(12,000)	(18,000)	(24,000)	(30,000)	(36,000)	(42,000)	(48,000)

Engine

Intake and exhaust manifold nuts (Bolts)	T				T				T
Drive belts*2	A		A		A		A		A
Engine timing belt*3	Replace every 100,000 km (60,000 miles)								
Engine oil (Non-Turbo)*4	R	R	R	R	R	R	R	R	R
Oil filter*4		R	R	R	R	R	R	R	R
Cooling system (Including coolant level adjustment)			I		I		I		I
Engine coolant	Replace every 2 years								

Fuel system

Idle speed		A	A	A		A		A	
Idle mixture			A		A		A		A
Air cleaner element*5			I		R		I		R
Fuel filter					R				R
Fuel lines and hoses			I		I		I		I

Ignition system

Initial ignition timing		I	I	I	I	I	I	I	I
Spark plugs			A		A		A		A

Evaporative emission control system

Throttle sensor			A		A		A		A

Electrical system

Battery electrolyte level and specific gravity	A		A		A		A		A
Electrical system*6		I	I	I	I	I	I	I	I
Headlight alignment			A		A		A		A

Chassis and body

Clutch pedal		I	I	I	I	I	I	I	I
Clutch fluid		I	I	I	I	I	I	I	I
Brake lines, hoses and connections			I		I		I		I
Brake pedal		I	I	I	I	I	I	I	I
Brake fluid*7		I	I	I	R	I	I	I	R
Parking brake			A		A		A		A
Power brake unit and hoses			I		I		I		I
Disc brakes			I		I		I		I
Power steering fluid		I	I	I	I	I	I	I	I
Power steering system and hoses			I		I		I		I
Steering and front suspension			I		I		I		I
MTX oil		A	A	A	R	A	A	A	R
Rear axle oil		R	A	A	R	A	A	A	R
Transfer carrier oil		R	A	A	R	A	A	A	R
Rear suspension ball joint				I				I	
Bolts, nuts on chassis and body	T		T		T		T		T
Body condition (Visual only)	Inspect annually								

93G0AX-705

Maintenance interval / Maintenance interval	Number of months or km (miles), whichever comes first								
Months*1	—	6	12	18	24	30	36	42	48
Kilometers	1,000	10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000
(Miles)	(600)	(6,000)	(12,000)	(18,000)	(24,000)	(30,000)	(36,000)	(42,000)	(48,000)

Chassis and body (Cont'd)

Tires (Including spare tires) with inflation pressure adjustment			I		I		I		I
Hinges and catches			A		A		A		A
Underside of vehicle			I		I		I		I
Seat belt			I		I		I		I
Road test			I		I		I		I
Driveshaft dust boots			I		I		I		I

93G0AX-706

SCHEDULED MAINTENANCE SERVICES (Europe)

MAINTENANCE TABLE (Unlead Fuel Model)

Chart symbols:

I: Inspect: Visual examination and/or functional measurement of system's operation or performance
A: Adjust: Examination resulting in adjustment or replacement
R: Replace or change
T: Tighten

REMARKS

After 80,000 km or 48 months, continue to follow the described maintenance at the recommended intervals.
As for * marked items in this maintenance chart, note the following points.

*1 Major service interval at 12 months/20,000 km (12,000 miles).
Lubrication service based on distance only 10,000 km (6,000 miles) not time.

*2 Adjust or inspect alternator and water pump drive belt, and power steering and air conditioner drive belt if equipped.

*3 Replacement of the timing belt is required at every 100,000 km (60,000 mile). Failure to replace the timing belt may result in damage to the engine.

*4 If the vehicle is operated under any of the following conditions, it is suggested that the engine oil and oil filter be changed more often than the recommended intervals.
a) Driving in dusty conditions.
b) Extended periods of idling or low speed operation.
c) Driving for a prolonged periods in cold temperatures or regularly driving only short distances.

*5 If the vehicle is operated in very dusty or sandy areas, inspect and, if necessary, replace more often than at usual recommended intervals.

*6 This is a full function check of all electrical systems, i.e, all lights, washers (including condition of blades) electric windows, sunroof, horn etc.

*7 Replace every two years.
If there has been continuous hard driving, mountain driving, or if the brakes are used extensively or the vehicle is operated in extremely humid climates, the brake fluid should be changed annually.

Emission Control and Related Systems

The ignition and fuel systems are vitally important to the proper operation of the emission control and related system, as well as for efficient engine operation. It is strongly recommended that all servicing related to these systems be done by your Authorised Mazda Dealer.

93G0AX-707

Maintenance interval / Maintenance interval	Number of months or km (miles), whichever comes first								
	Months*1	—	6	12	18	24	30	36	42	48
	Kilometers	1,000	10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000
	(Miles)	(600)	(6,000)	(12,000)	(18,000)	(24,000)	(30,000)	(36,000)	(42,000)	(48,000)

Engine

Intake and exhaust manifold nuts (Bolts)	T				T				T
Drive belts*2	A		A		A		A		A
Engine timing belt*3	Replace every 100,000 km (60,000 miles)								
Engine oil (Turbo)*4	Replace every 5,000 km (3,000 miles) or 6 months								
Engine oil (Non-turbo)*4	R	R	R	R	R	R	R	R	R
Oil filter*4		R	R	R	R	R	R	R	R
Cooling system (Including coolant level adjustment)			I		I		I		I
Engine coolant	Replace every 2 years								

Fuel system

Idle speed						A			
Air cleaner element*5			I		R		I		R
Fuel filter					R				R
Fuel lines and hoses			I		I		I		I

Ignition system

Initial ignition timing		I	I	I	I	I	I	I	I
Spark plugs			A		A		A		A
Spark plugs (Only for sweden)	Adjust every 30,000 km (18,000 mils)								

Evaporative emission control system

Throttle sensor			A		A		A		A
Throttle sensor (Only for Sweden)	Adjust every 80,000 km (48,000 miles)								
Evaporative system			I		I		I		I
Evaporative system (Only for Sweden)	Inspect every 80,000 km (48,000 miles)								

Electrical system

Battery electrolyte level and specific gravity	A		A		A		A		A
All Electrical system*6		I	I	I	I	I	I	I	I
Headlight alignment			A		A		A		A

Chassis and body

Clutch pedal		I	I	I	I	I	I	I	I
Clutch fluid		I	I	I	I	I	I	I	I
Brake lines, hoses and connections			I		I		I		I
Brake pedal		I	I	I	I	I	I	I	I
Brake fluid*7		I	I	I	R	I	I	I	R
Parking brake			A		A		A		A
Power brake unit and hoses			I		I		I		I
Disc brakes			I		I		I		I
Power steering fluid		I	I	I	I	I	I	I	I
Power steering system and hoses			I		I		I		I

93G0AX-708

Maintenance interval / Maintenance interval	Number of months or km (miles), whichever comes first								
	Months*1	—	6	12	18	24	30	36	42	48
	Kilometers	1,000	10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000
	(Miles)	(600)	(6,000)	(12,000)	(18,000)	(24,000)	(30,000)	(36,000)	(42,000)	(48,000)

Chassis and body (Cont'd)

Steering and front suspension			I		I		I		I
MTX oil		A	A	A	R	A	A	A	R
Rear axle oil		R	A	A	R	A	A	A	R
Trabsfercarrier oil		R	A	A	R	A	A	A	R
Bolts, nuts on chassis and body	T		T		T		T		T
Body condition (Visual only)	Inspect annually								
Exhaust system heat shields					I				I
Tires (Including spare tires) with inflation pressure adjustment			I		I		I		I
Hinges and catches			A		A		A		A
Underside of vehicle			I		I		I		I
Seat belt			I		I		I		I
Road test			I		I		I		I
Driveshaft dust boots			I		I		I		I

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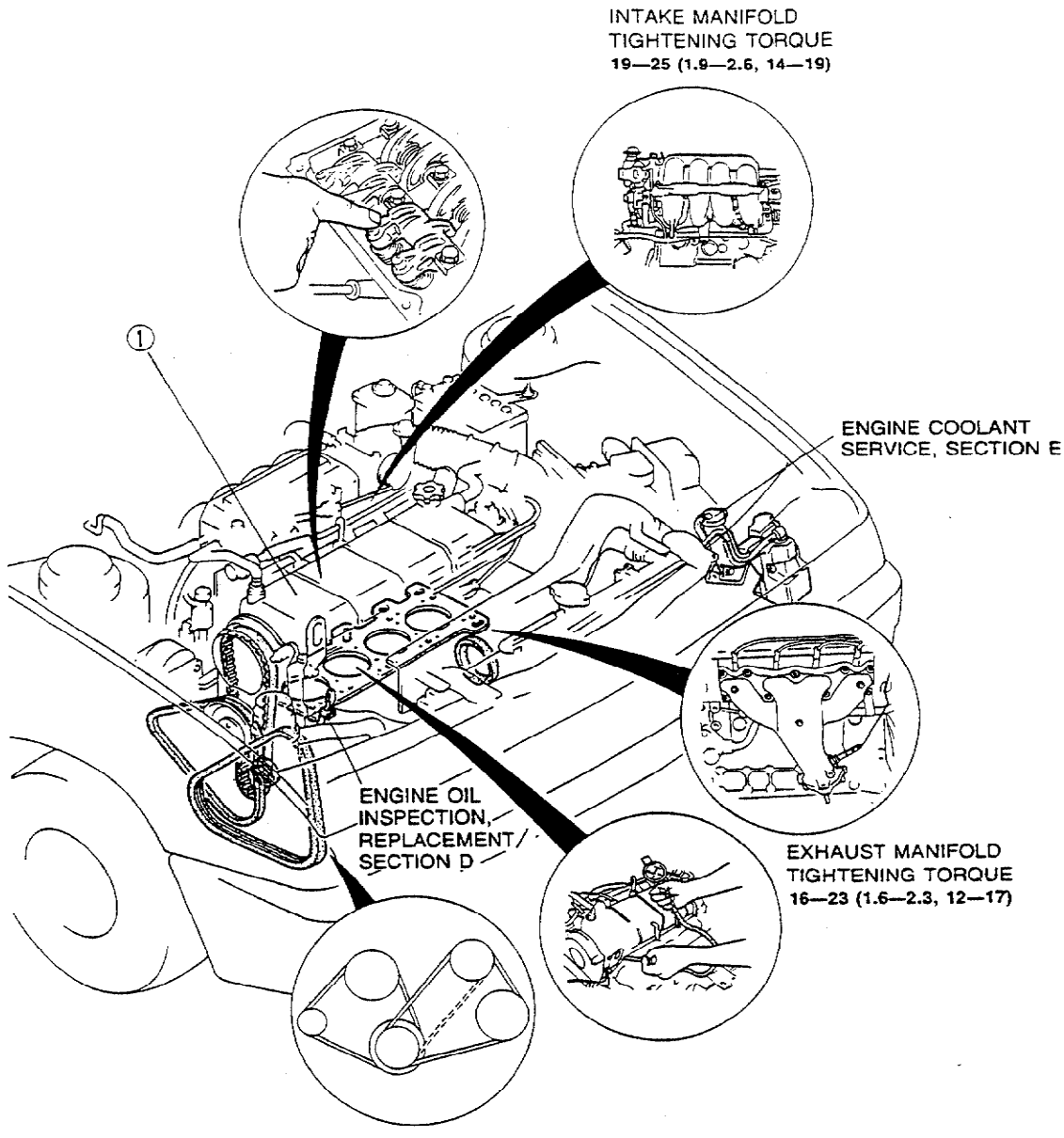
ENGINE (SOHC)

93G0B1-701

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)

ENGINE 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)

93G0B1-702

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.
The BP SOHC engine for the ECE specification (without catalyst) 4WD model is the same as the ECE US'83 model, except that the fuel and emission control system and the engine electrical system are modified. (Refer to Sections F1 and G.)

93G0B1-703

SPECIFICATIONS

Item \ Engine/Market				BP SOHC		
				Australia	Europe	
					US-83	Without catalyst
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		IN	mm (in)	0: Maintenance-free		
		EX		0: Maintenance-free		
Idle speed		MTX	rpm	750 ± 50*		850 ± 50
		ATX		750 ± 50*	—	
Ignition timing			BTDC	5° ± 1°*		
Firing order				1—3—4—2		

*...TEN terminal of diagnosis connector grounded.

93G0B1-704

INTERCHANGEABILITY

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

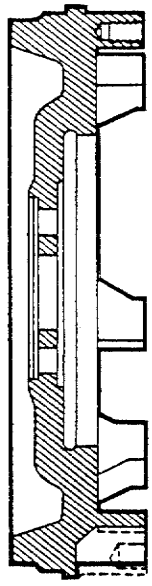
Symbols: ○ .... Interchangeable X .... Not interchangeable

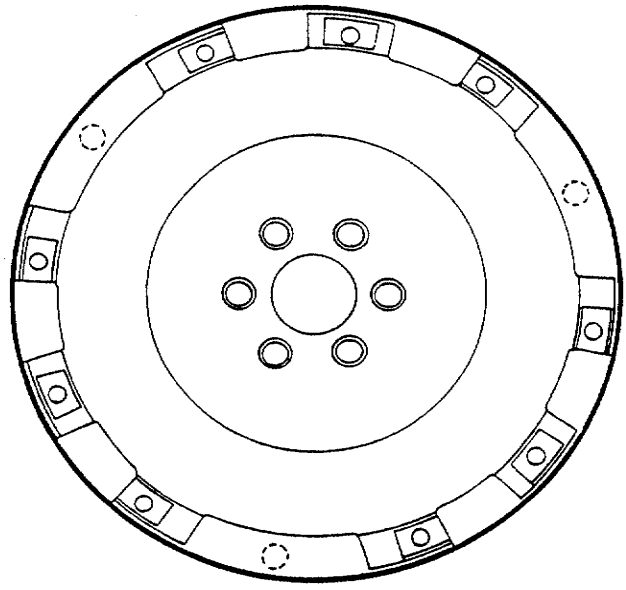
Part name			Interchangeability	Remark
Cylinder block related	Cylinder head		○	
	Camshaft oil seal		○	
	Cylinder head bolt		○	
	Cylinder head gasket		○	
	Cylinder head cover		○	
	Cylinder head cover gasket		○	
	Cylinder block		○	
	Main bearing cap		○	
	Main bearing support plate		○	
	Oil pan		○	
	Timing 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

03U0BX-B05

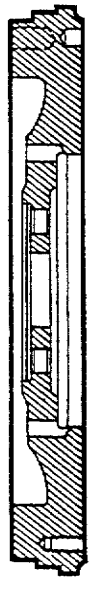
FLYWHEEL

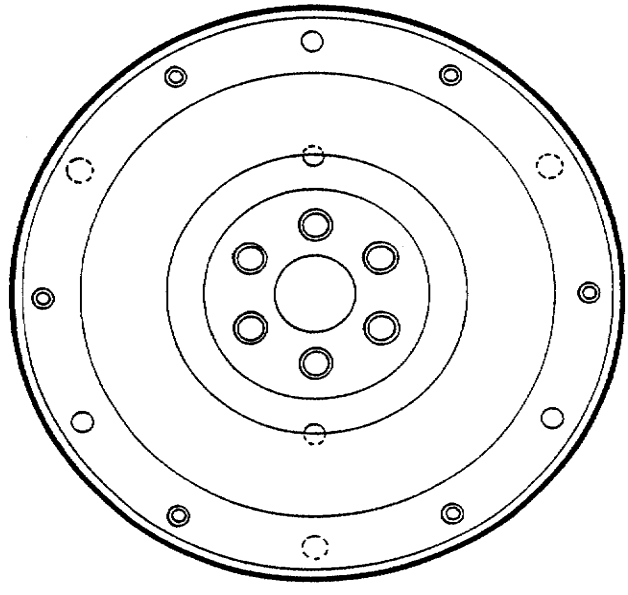
4WD MODEL





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 [Europe (1203-10-89F), Australia (1204-10-89F)].

Engine
- Removal
- Installation

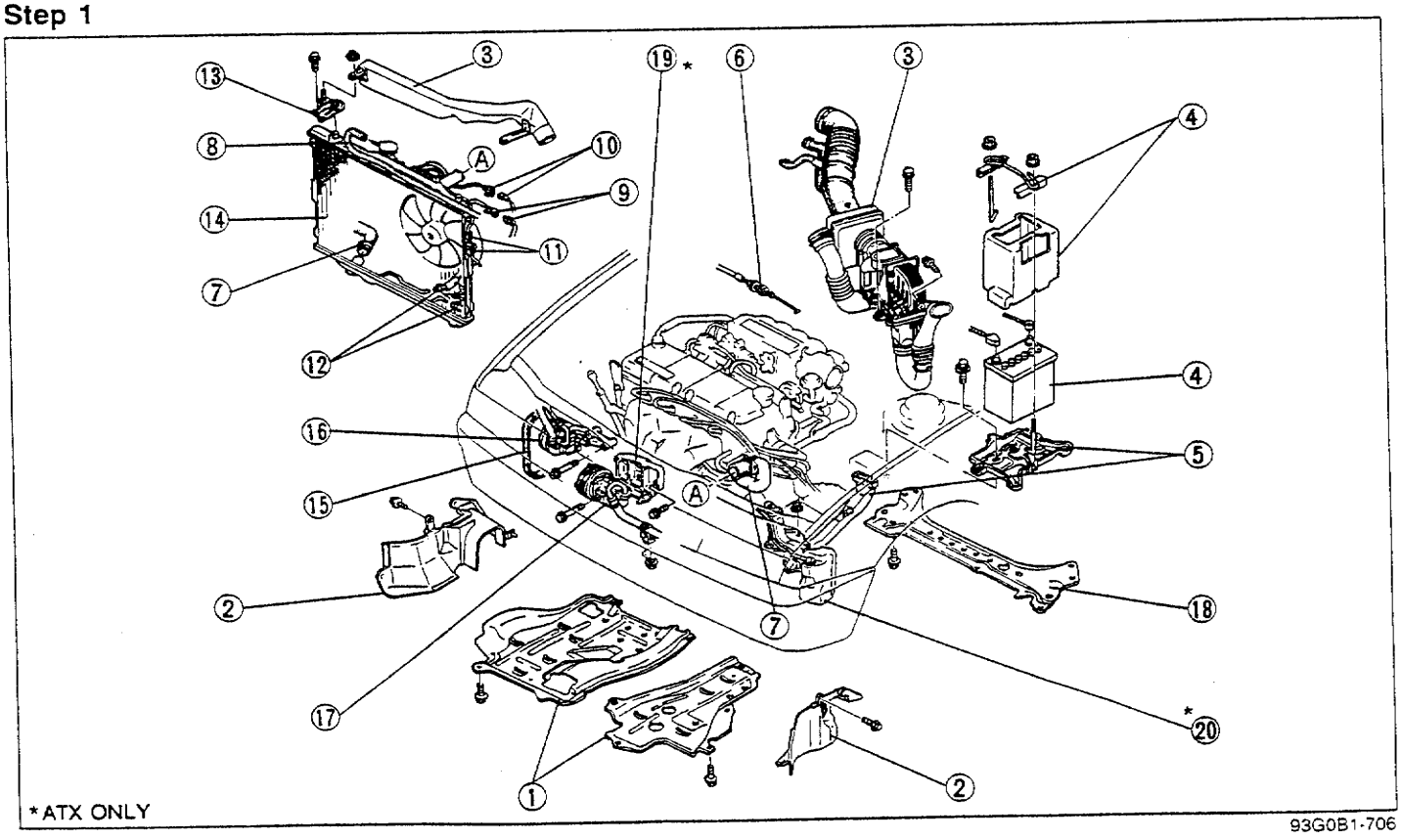
93G0B1-705

REMOVAL

Warning
- **Release the fuel pressure.**

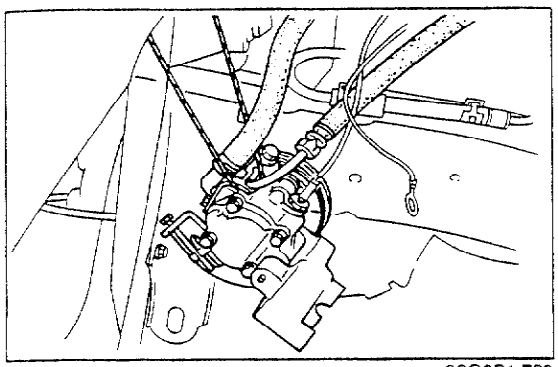
PROCEDURE
1. Disconnect the negative battery cable.
2. Drain the engine coolant and transaxle oil.
3. Remove in the order shown in the figure, referring to **Removal Note**.

Step 1



93G0B1-706

1. Undercovers
2. Side covers
3. Resonance chamber and air cleaner assembly
4. Battery bracket, cover and battery
5. Battery carrier and battery duct
6. Accelerator cable
7. Radiator hose
8. Coolant reservoir hose
9. Cooling fan connector
10. Radiator switch connector (ATX)
11. A/C cut switch connector (ATX)
12. Oil cooler hoses (ATX)
13. Radiator bracket
14. Radiator and cooling fan assembly
15. P/S and/or A/C drive belt
16. P/S oil pump and bracket
    Removal Note..... page B1–7
17. A/C compressor
    Removal Note..... page B1–7
18. Crossmember
19. A/C compressor bracket
20. Coolant reservoir



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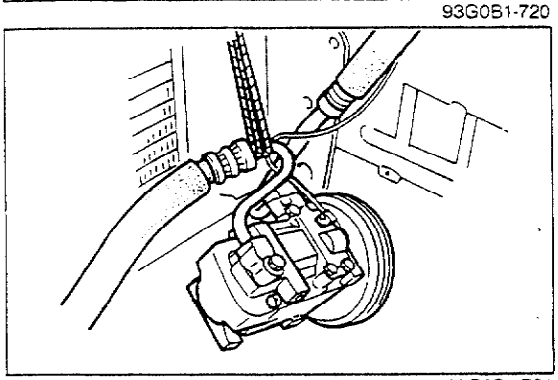


93G0B1-721

Removal note
P/S oil pump

Caution
- **Do not damage the hoses.**

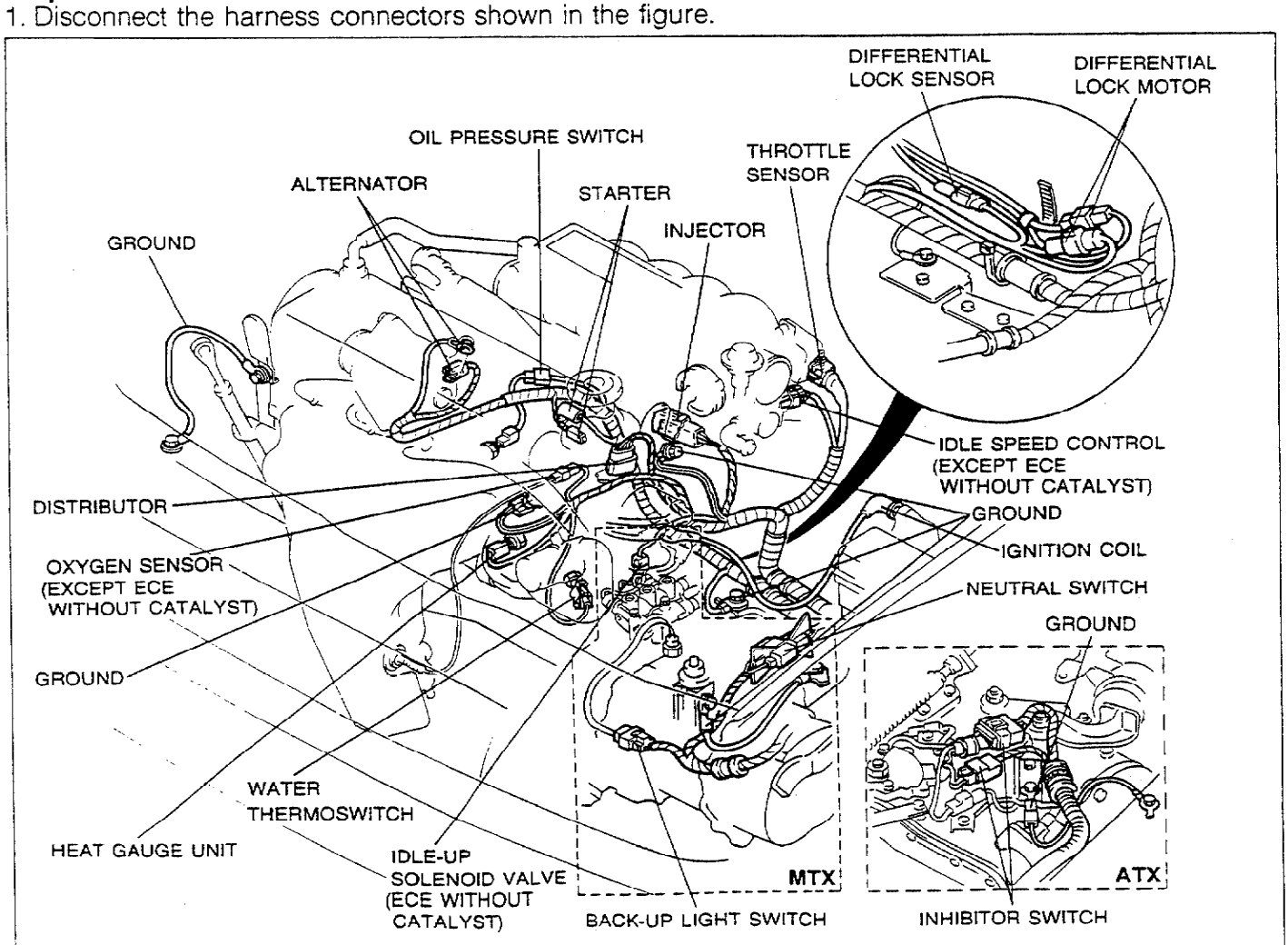
1. Remove the P/S oil pump with the hoses still connected.
2. Position the pump away from the engine and secure it with wire.

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 secure it with wire.

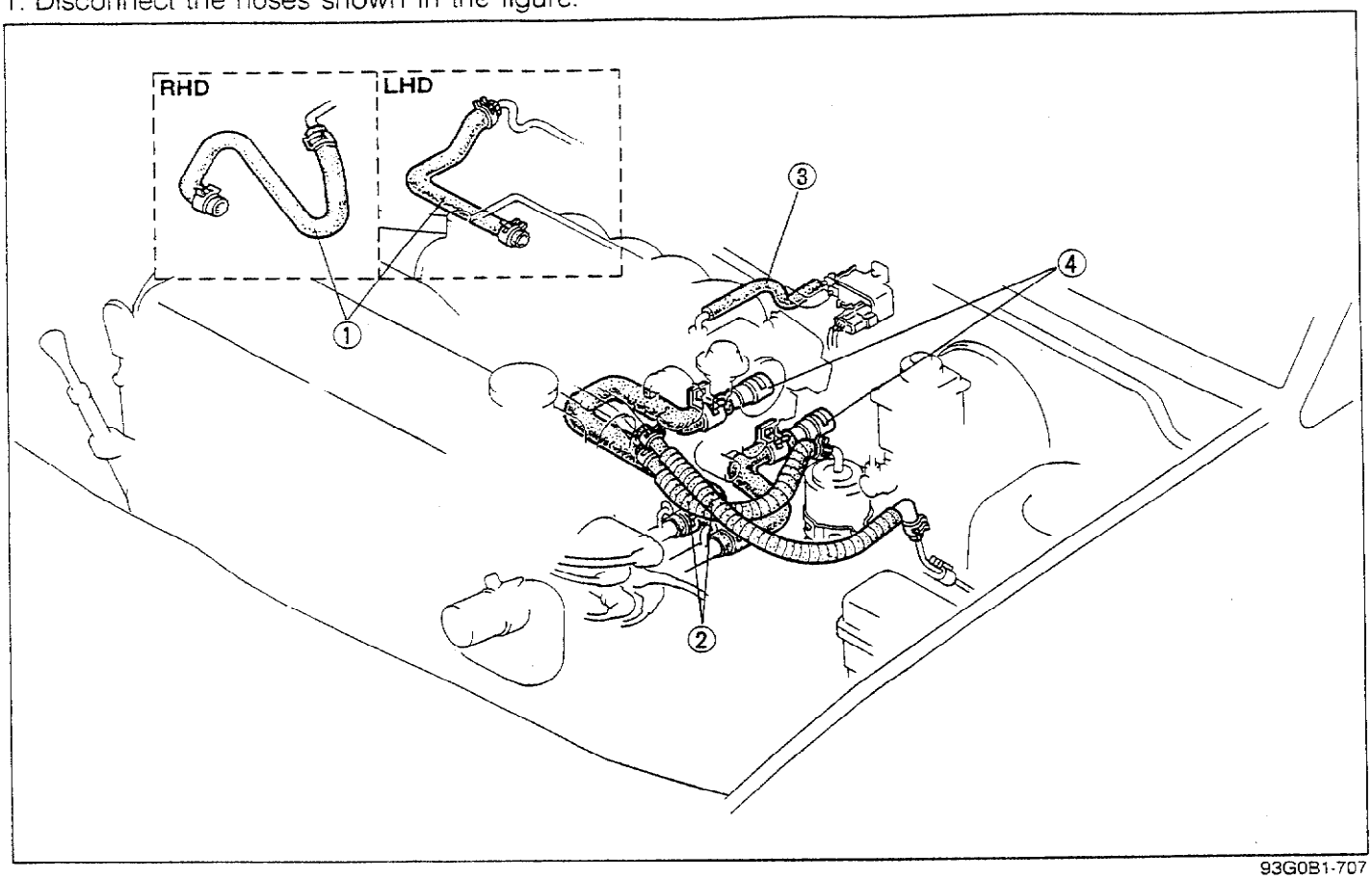
Step 2
1. Disconnect the harness connectors shown in the figure.



03U0BX-809

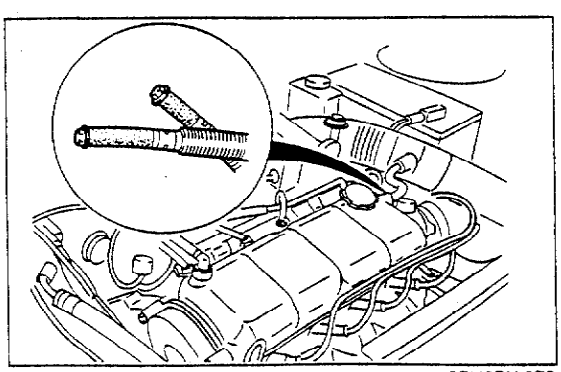
Step 3

1. Disconnect the hoses shown in the figure.



93G0B1-707

1. Brake vacuum hose
2. Fuel hose
   Removal Note ..... below
3. Vacuum hose (Purge control)
   [except ECE without catalyst]
4. Heater hose
   Removal Note ..... below



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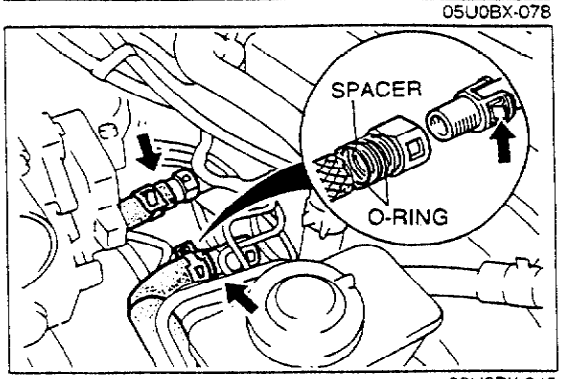


03U0BX-845

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.**

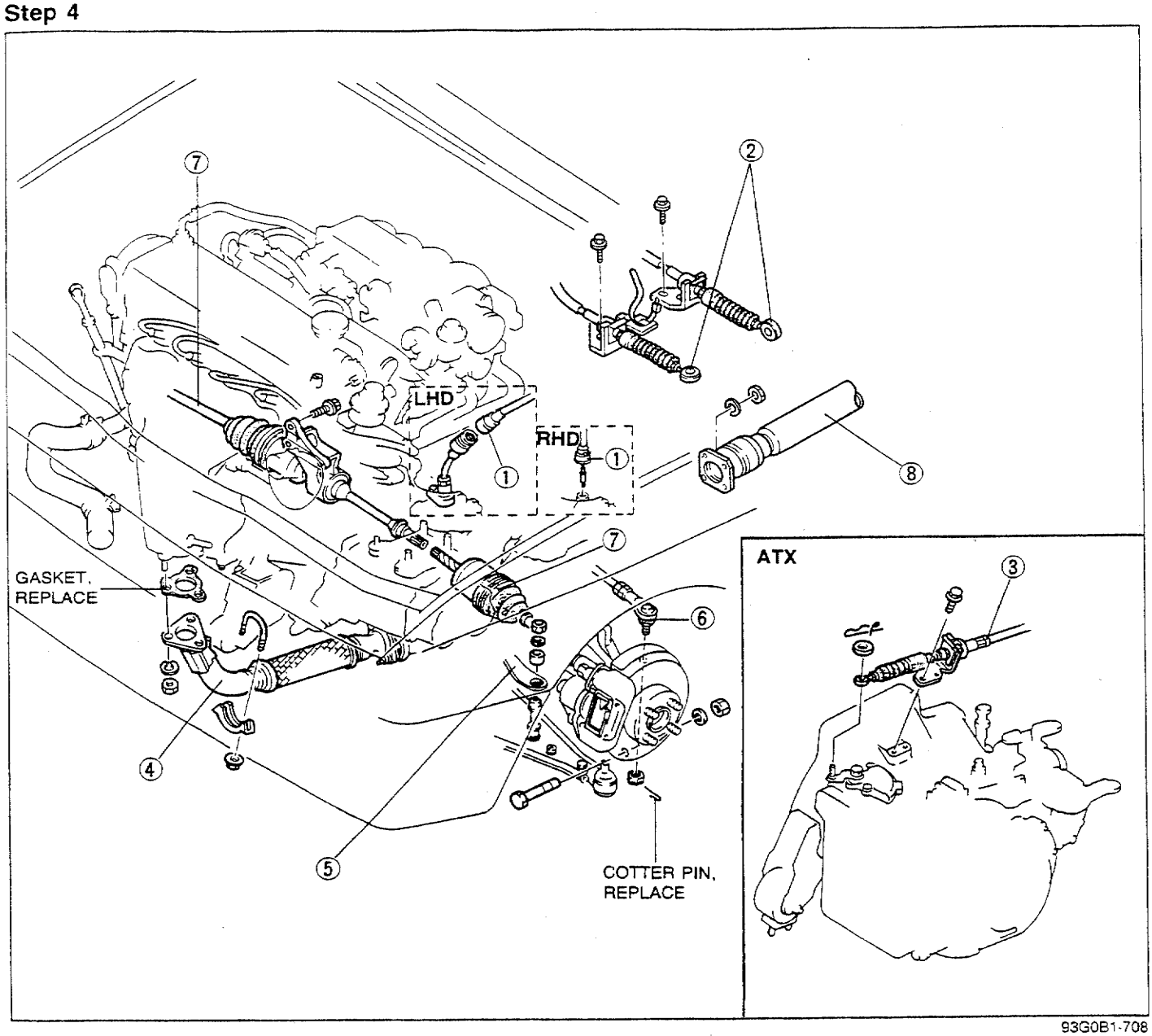
1. Disconnect the fuel hoses.

Heater hose

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

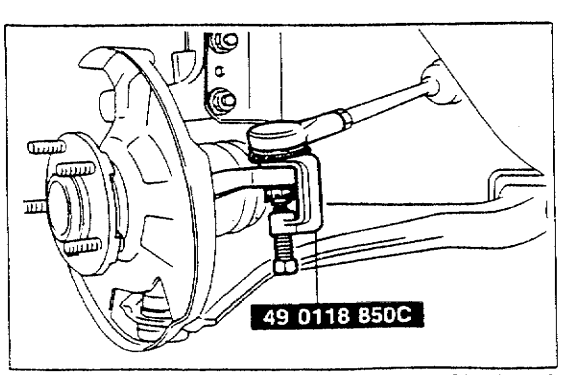
1. Depress the heater hose retainer and remove the heater hose.

Step 4



93G0B1-708

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 ..... below
7. Driveshaft
   Removal Note..... page B1–10
8. Propeller shaft
   Removal Note..... page L– 5



03U0BX-812

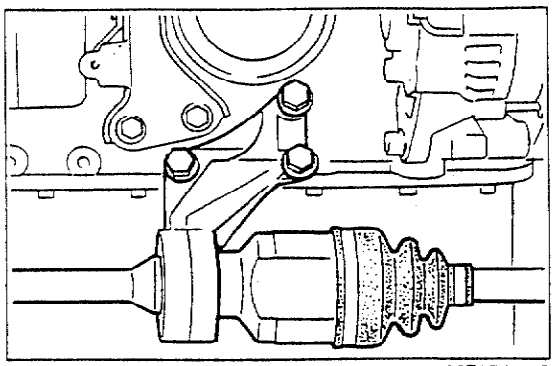
Removal note
Tie-rod end

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**.

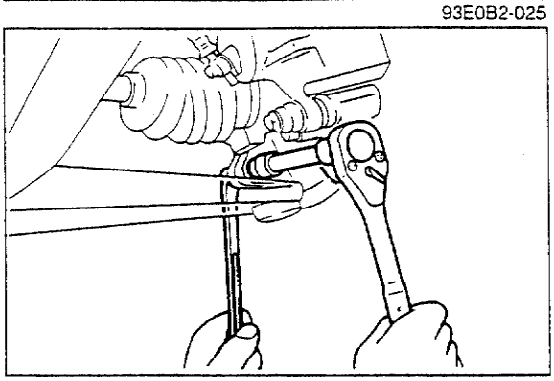
REMOVAL



93E0B2-025

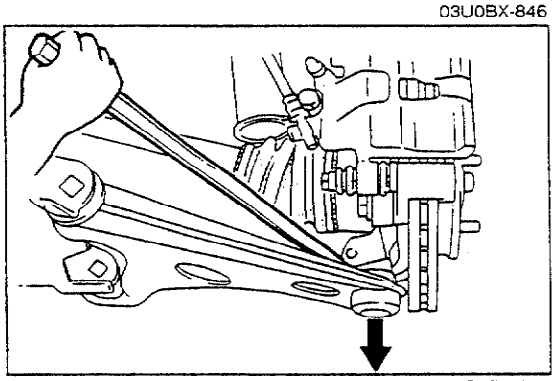
Driveshaft

1. Remove the joint shaft.



03U0BX-846

2. Remove the lower arm ball joint clinch bolt.

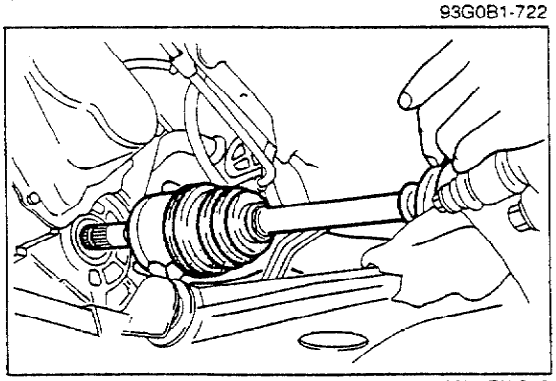


93G0B1-722

Caution

- **Do not damage the ball joint dust boot.**

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



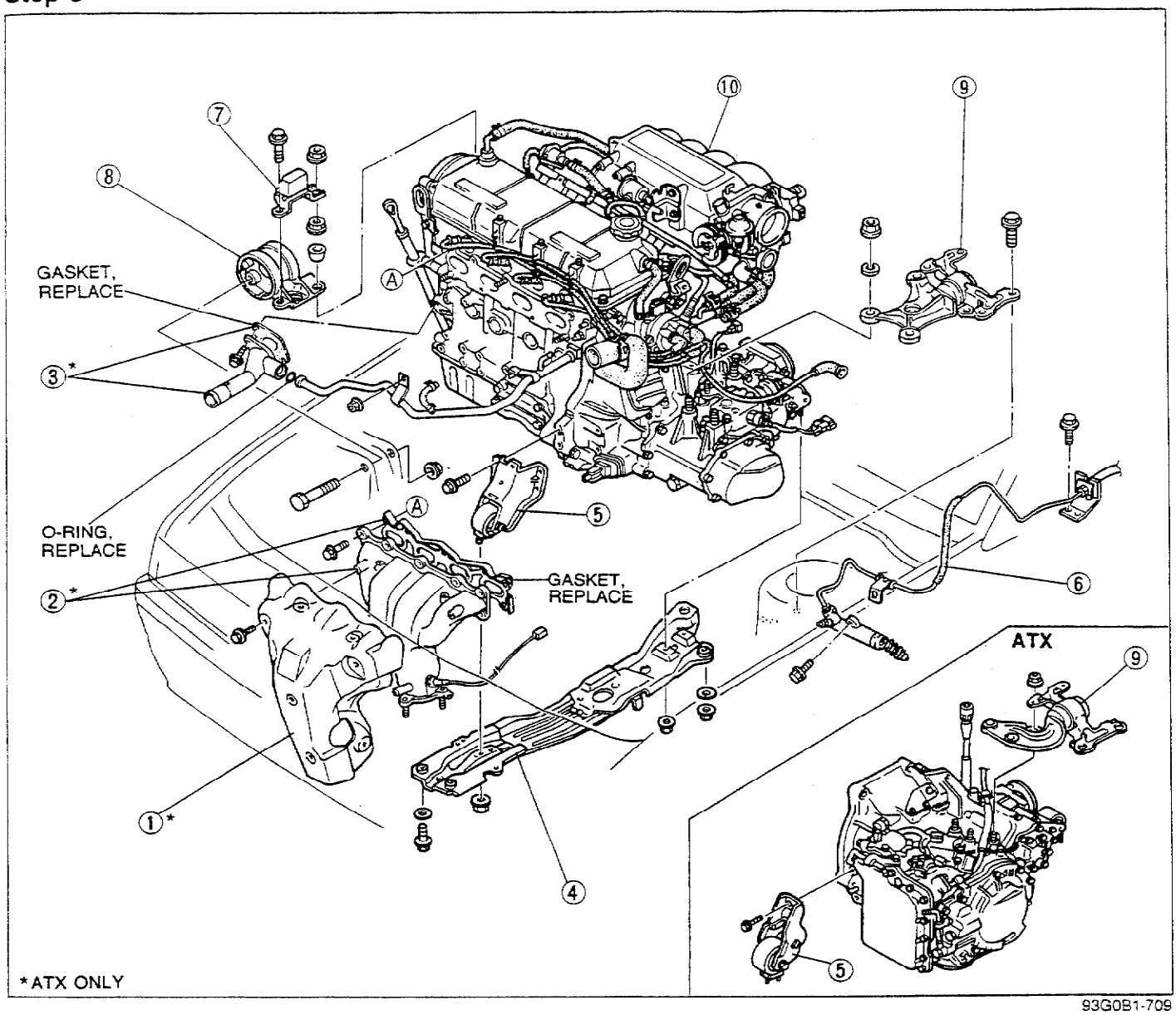
03U0BX-813

Caution

- **Do not damage the oil seal.**

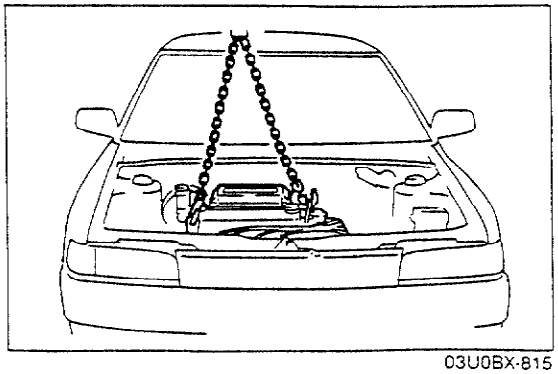
4. Separate the driveshaft from the transaxle.

Step 5



93G0B1-709

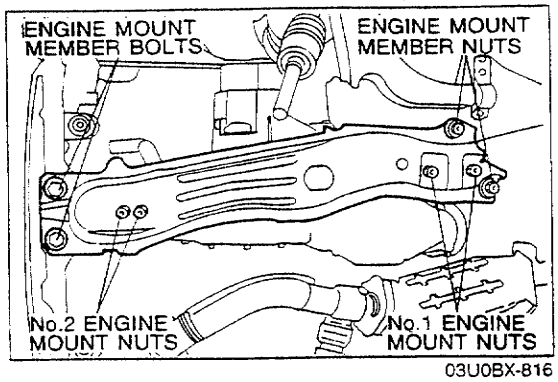
1. Exhaust manifold insulator
2. Exhaust manifold and gasket
3. Water inlet pipe and gasket
4. Engine mount member
   Removal Note ..... below
5. No.2 engine mount rubber and bracket
6. Clutch release cylinder (MTX)
   Removal Note..... page B1–12
7. Dynamic damper
8. No.3 engine mount rubber
9. No.4 engine mount rubber and bracket
10. Engine and transaxle assembly
    Removal Note..... page B1–12



03U0BX-815

Removal note
Engine mount member
1. Suspend the engine with a chain hoist.

REMOVAL

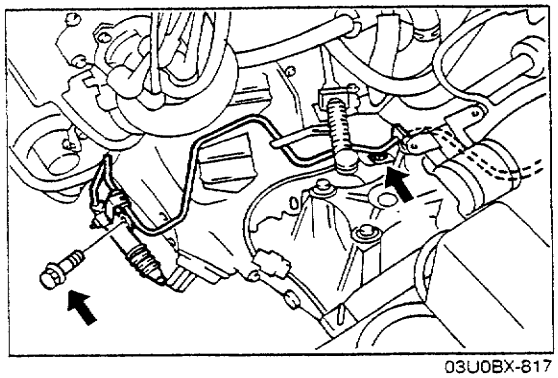


03U0BX-816

2. Remove the No.1 and No.2 engine mount nuts.

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

3. Remove the engine mount member bolts and nuts and the engine mount member.

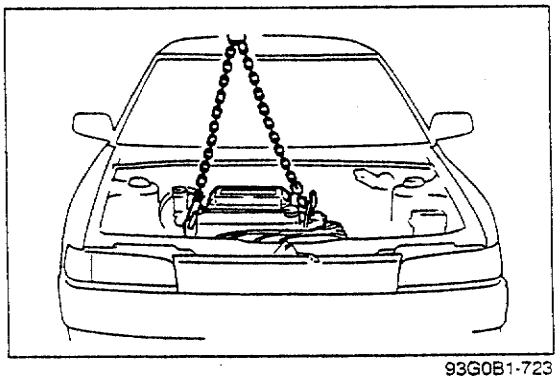


03U0BX-817

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.**



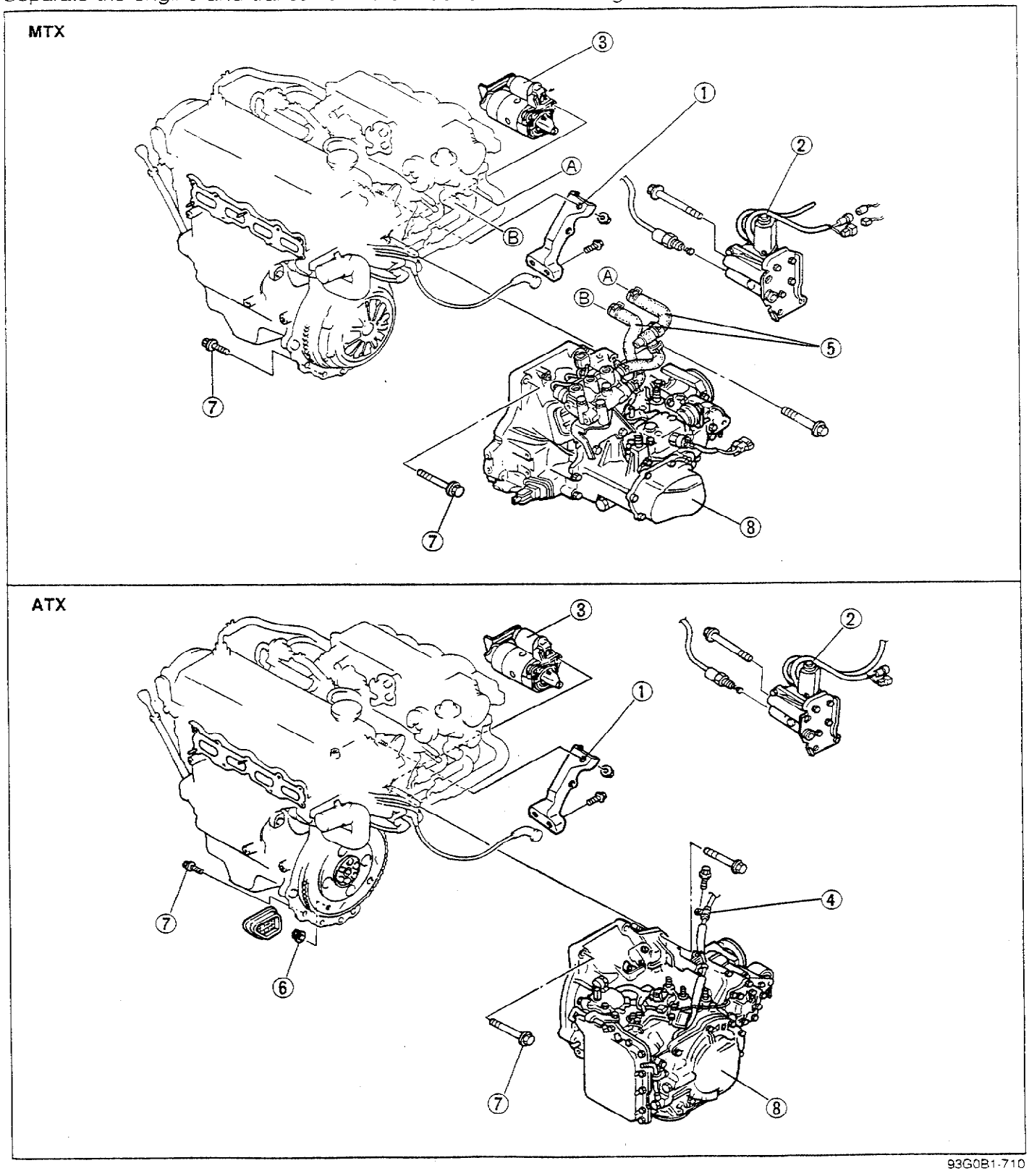
93G0B1-723

Engine and transaxle assembly

Caution
- **Do not damage any components in the engine compartment.**

1. Remove the engine and transaxle assembly.

Step 6
Separate the engine and transaxle in the order shown in the figure.



1. Intake manifold bracket
2. Center differential lock motor
   Removal Note ..... page J3–123
3. Starter and bracket
4. Throttle cable (ATX)
5. Air hose [ECE without catalyst only]
6. Torque converter nuts (ATX)
7. Transaxle mounting bolts
8. Transaxle

INSTALLATION

PROCEDURE

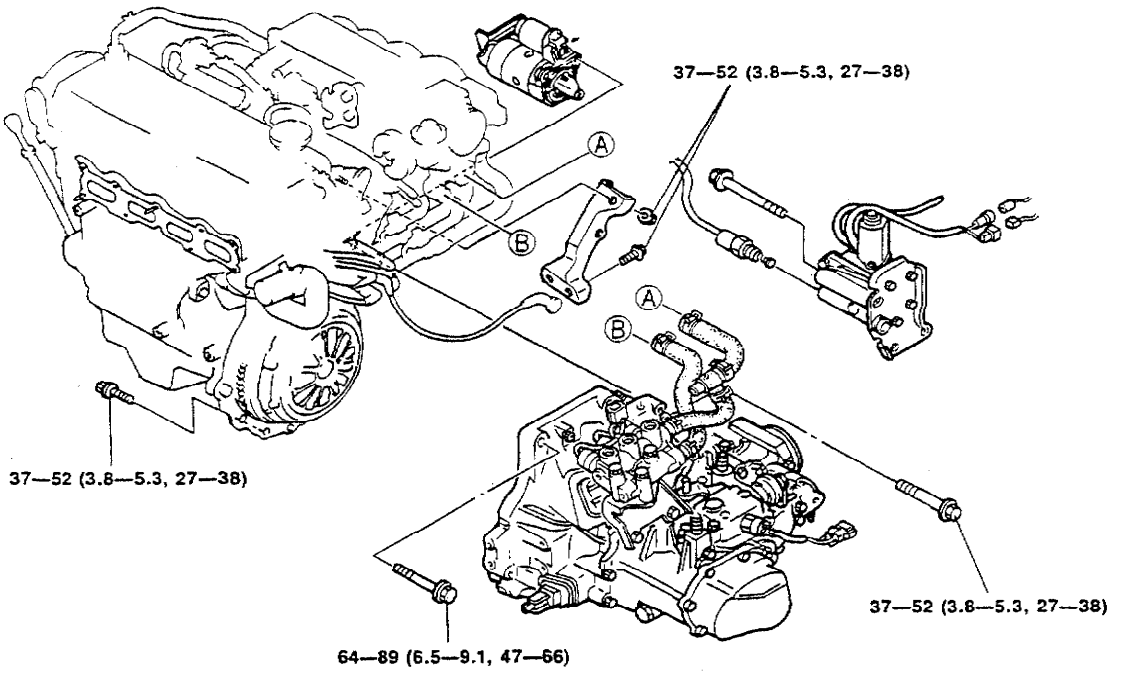
1. Tighten all bolts and nuts to the specified torques.

Step 1

1. Join the engine and transaxle.

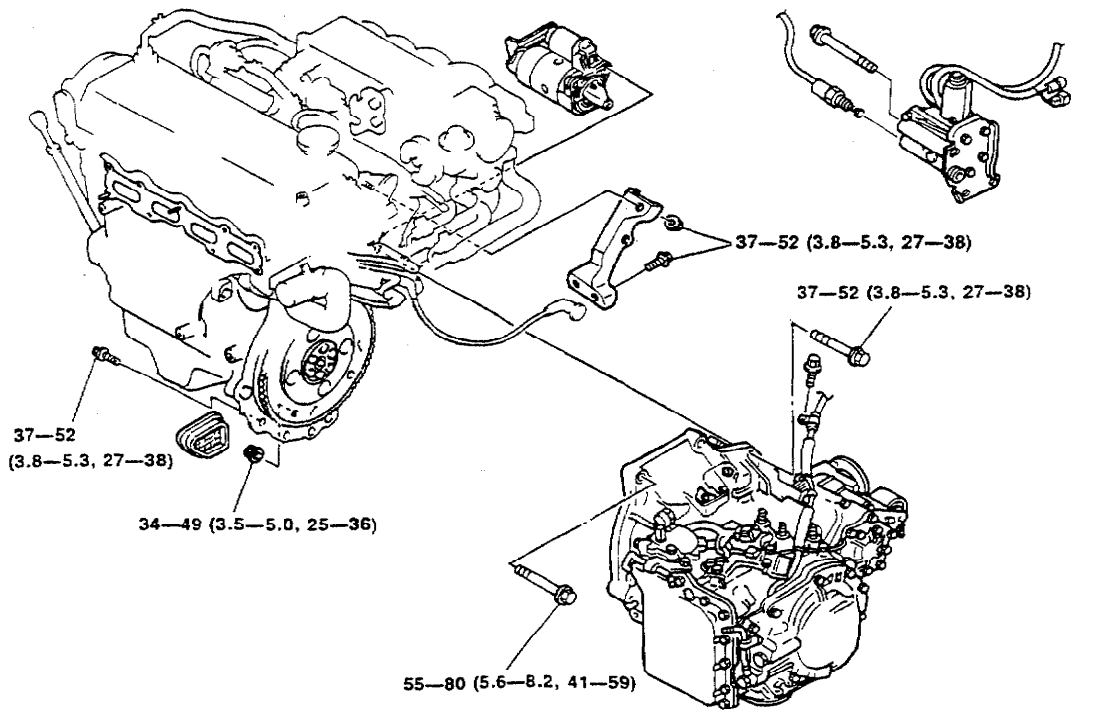
Torque Specifications

MTX



N·m (m-kg, ft-lb)

ATX



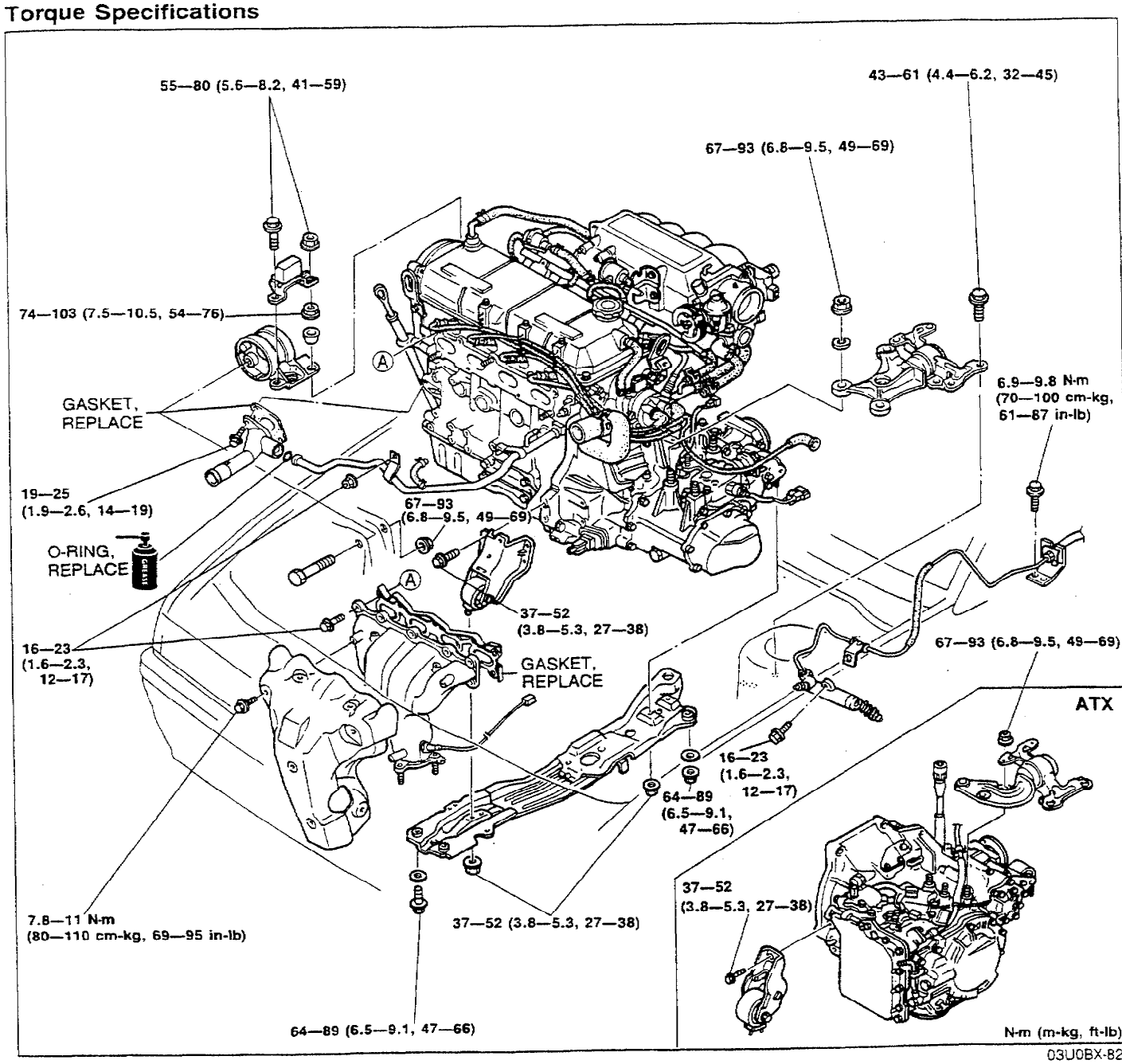
N·m (m-kg, ft-lb)

03U0BX-820

Step 2

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

Torque Specifications



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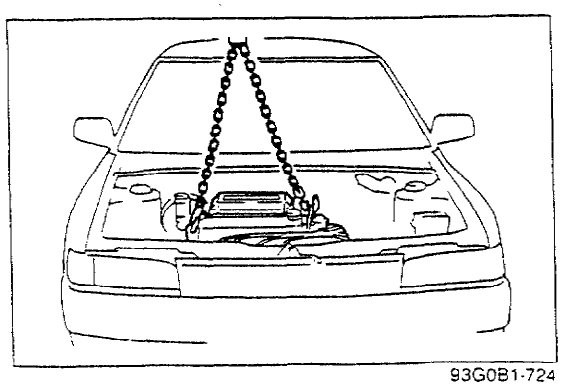
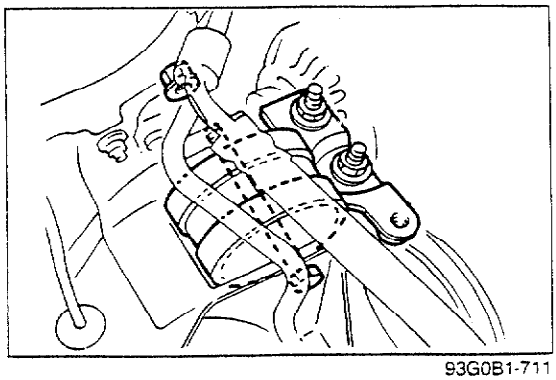


93G0B1-724

Engine and transaxle assembly

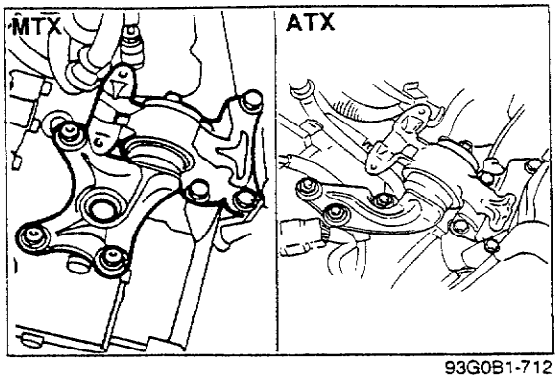
Caution
- **Do not damage any components in the engine compartment.**

1. Install the engine and transaxle assembly.


93G0B1-711

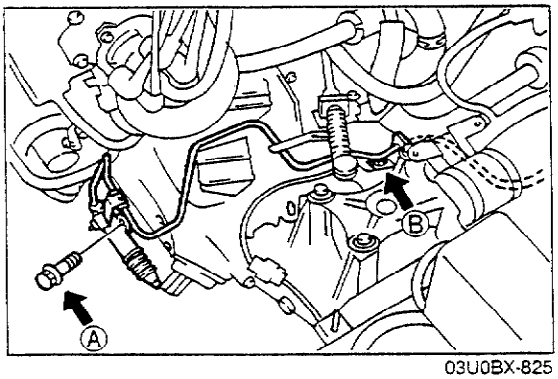
Engine mount, clutch release cylinder (MTX) and engine mount member

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



93G0B1-712

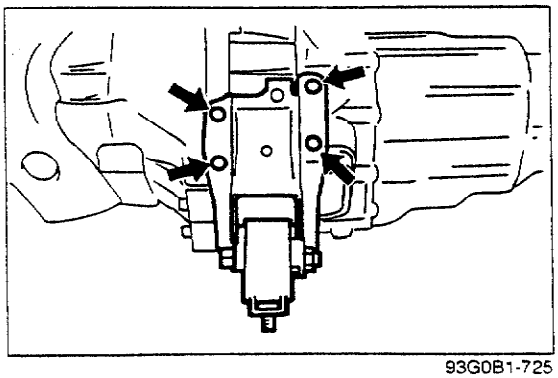
2. Install the No.4 engine mount rubber and bracket assembly, and loosely tighten the bolts and nuts.



03U0BX-825

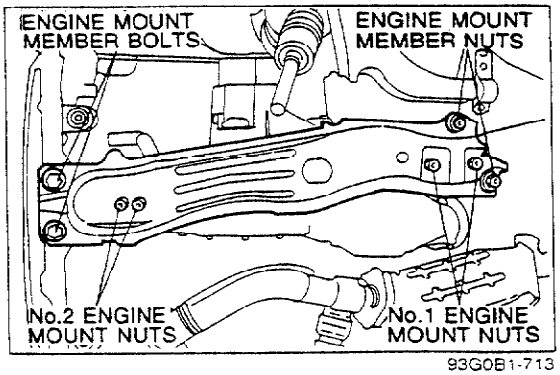
3. Install the clutch release cylinder and pipe bracket assembly. (MTX)

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)


93G0B1-725

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

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



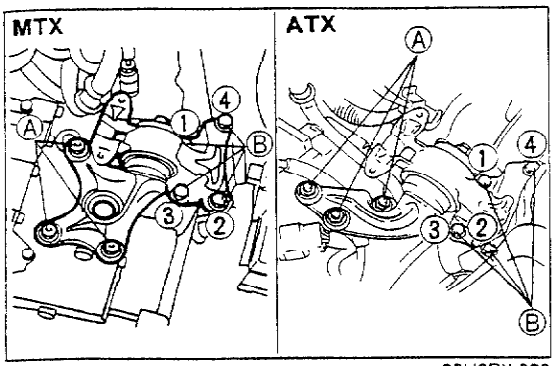
93G0B1-713

5. Align the engine mount member to the No.1 and No.2 engine mount bolts, and loosely tighten the nuts.
6. Install and tighten the engine mount member bolt and nuts.

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)



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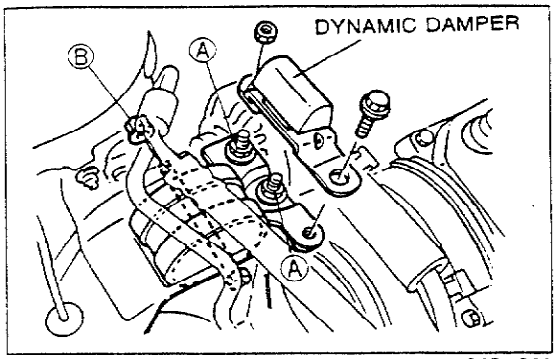


93G0B1-726

8. Tighten bolts Ⓑ 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 Ⓐ.

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

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

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

11. Tighten nut Ⓑ.

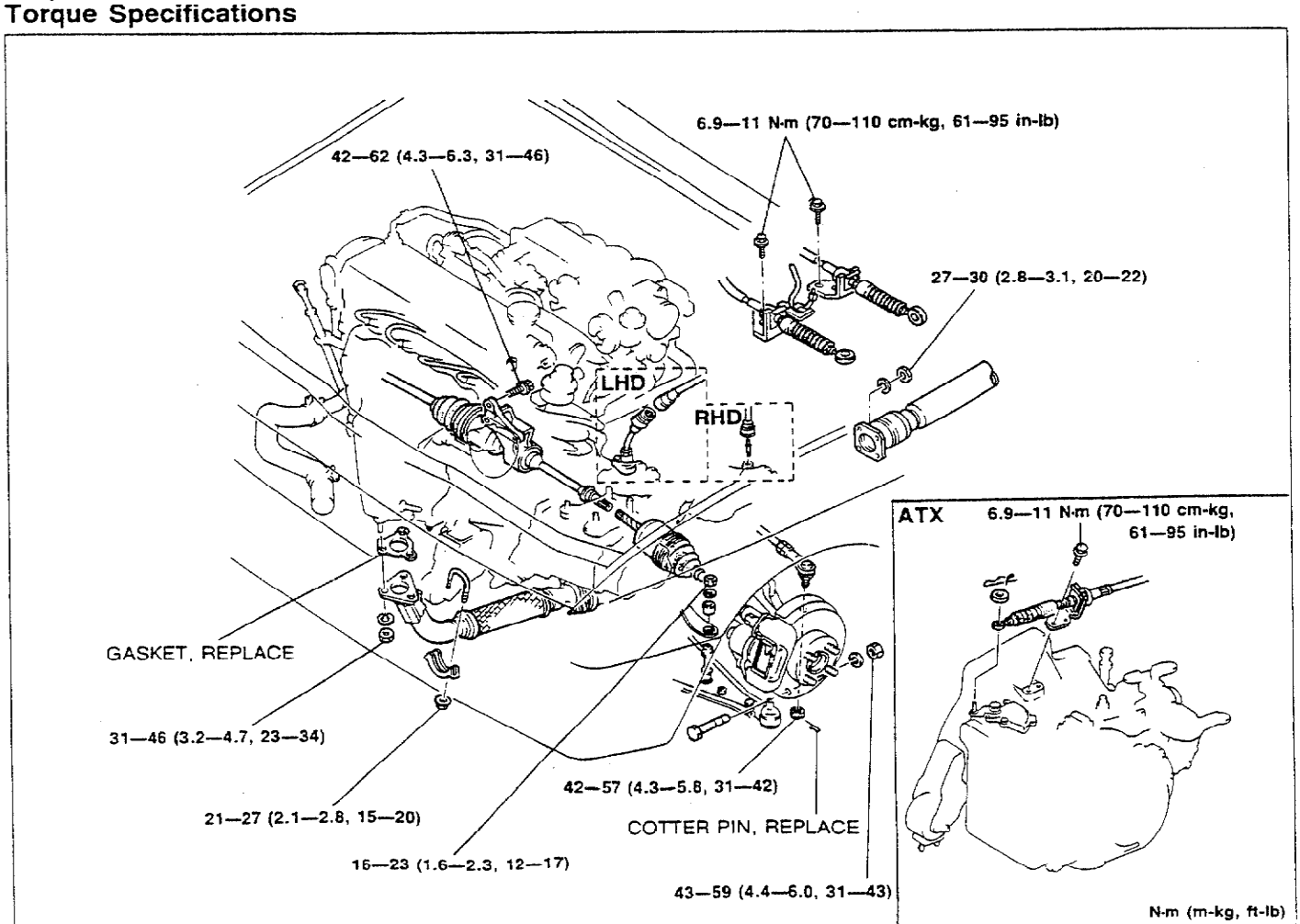
Tightening torque:
67—93 N·m (6.8—9.5 m-kg, 49—69 ft-lb)

12. Install the dynamic damper.

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

13. Remove the chain hoist.

Step 3
Torque Specifications



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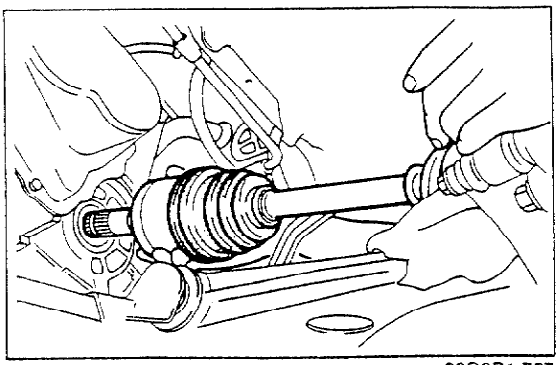

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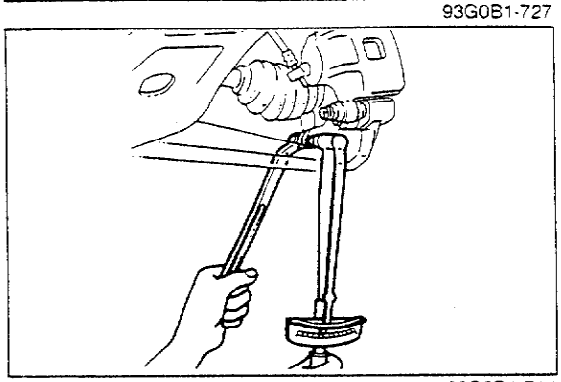

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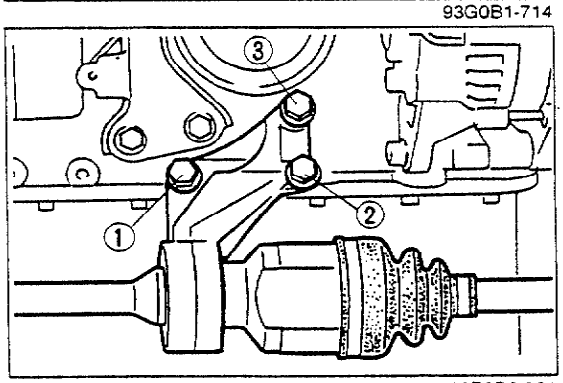

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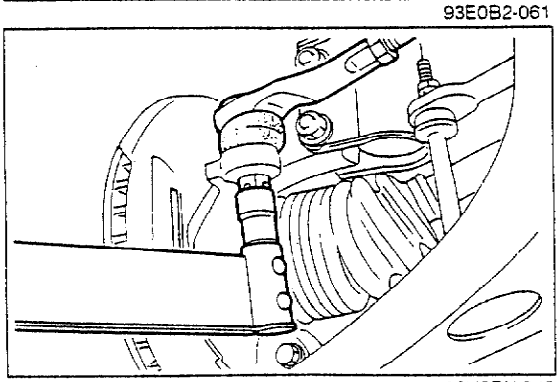

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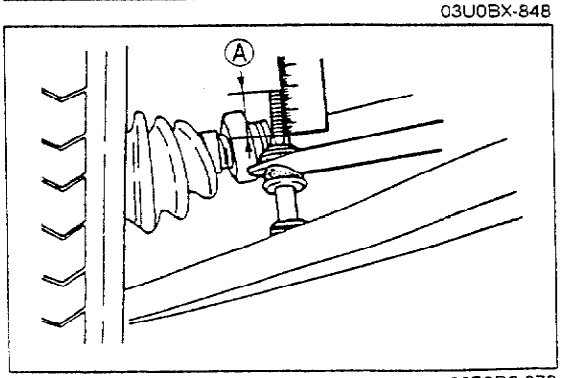


93E0B2-078

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 transaxle oil seal.**
- **After installation, pull the front hub outward to confirm that the driveshaft is securely held by the clip.**

2. Install the driveshaft along with 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)

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)

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)

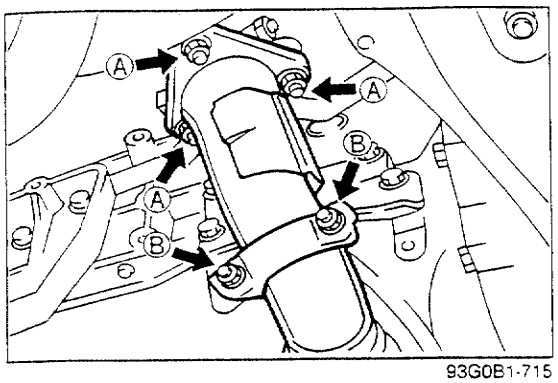
2. Install a new cotter pin.

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)



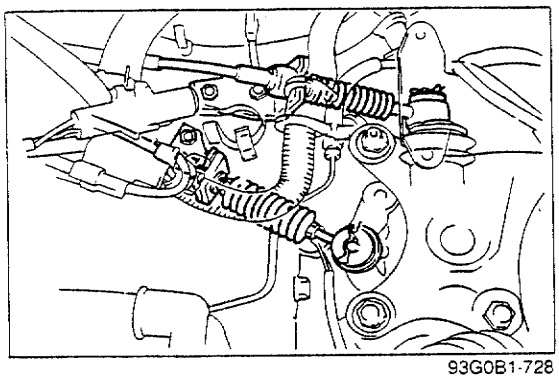
93G0B1-715

Exhaust pipe
1. Install the exhaust pipe along with a new gasket; then loosely tighten locknuts Ⓐ.
2. Loosely tighten bracket nuts Ⓑ.
3. Tighten locknuts Ⓐ.

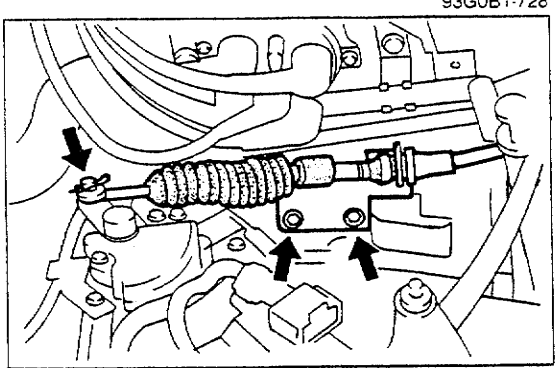
Tightening torque:
31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)

4. Tighten bracket nuts Ⓑ.

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

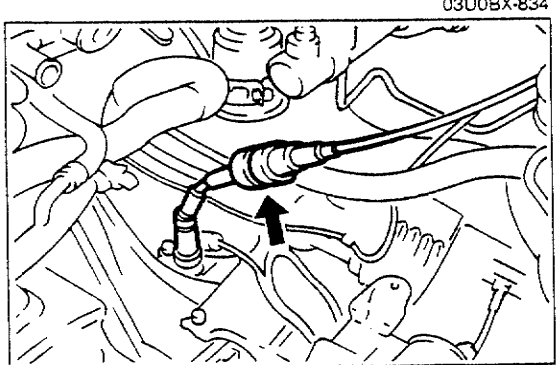

93G0B1-728

Select and shift cables (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

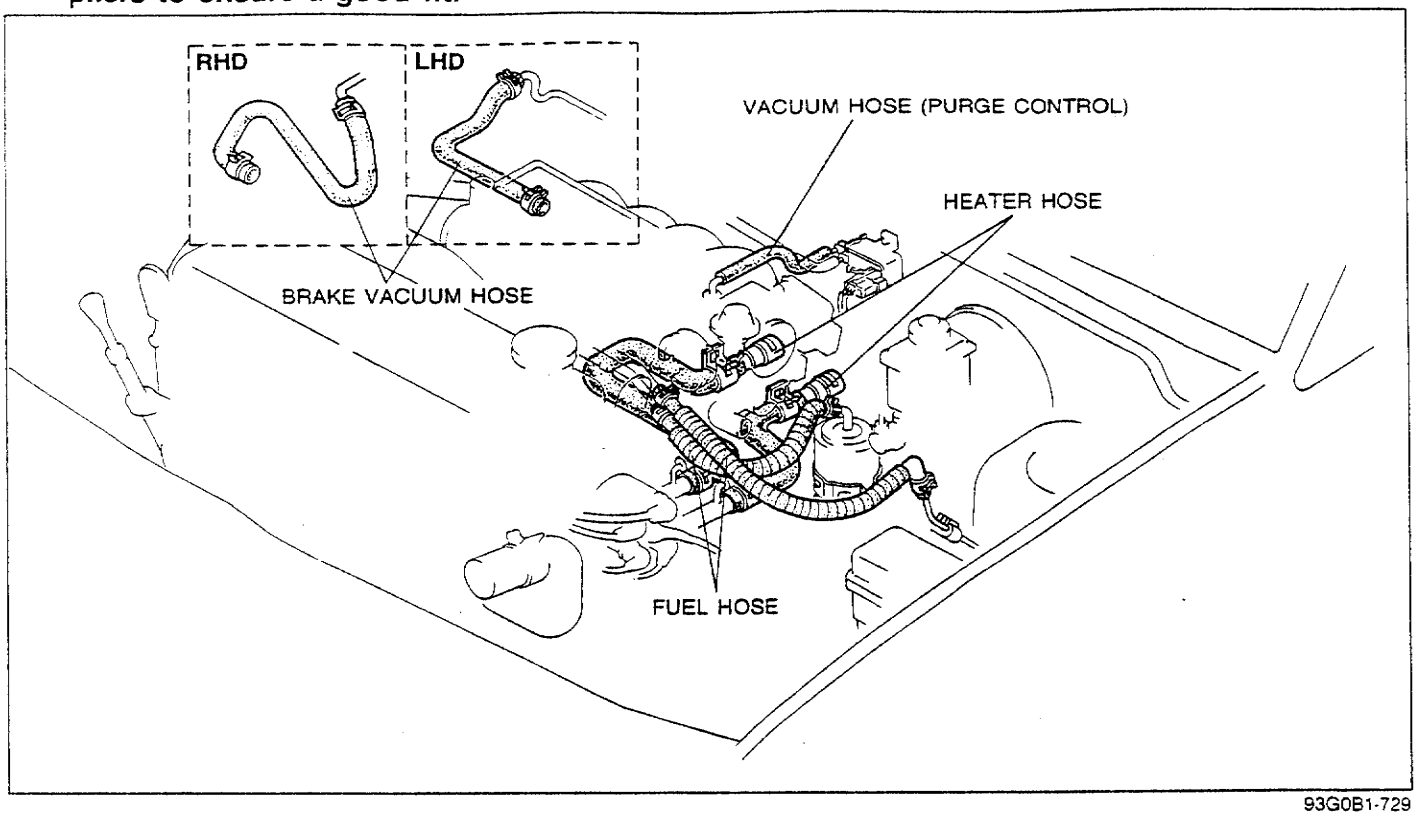
Speedometer cable
1. Connect the speedometer cable.

Step 4

1. Connect the hoses shown in the figure.

Caution

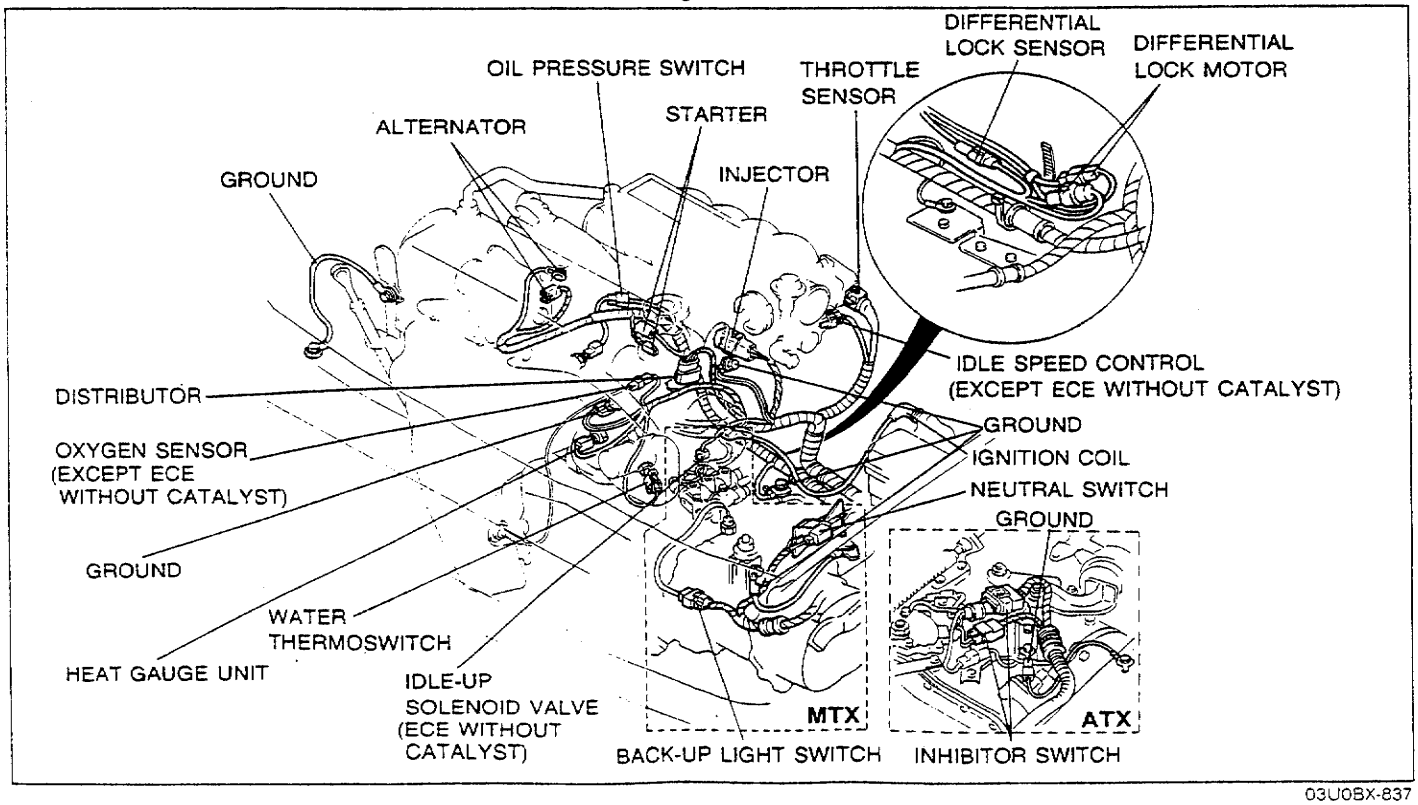
- **Position the hose clamp in the original location on the hose, and squeeze it lightly with large pliers to ensure a good fit.**



93G0B1-729

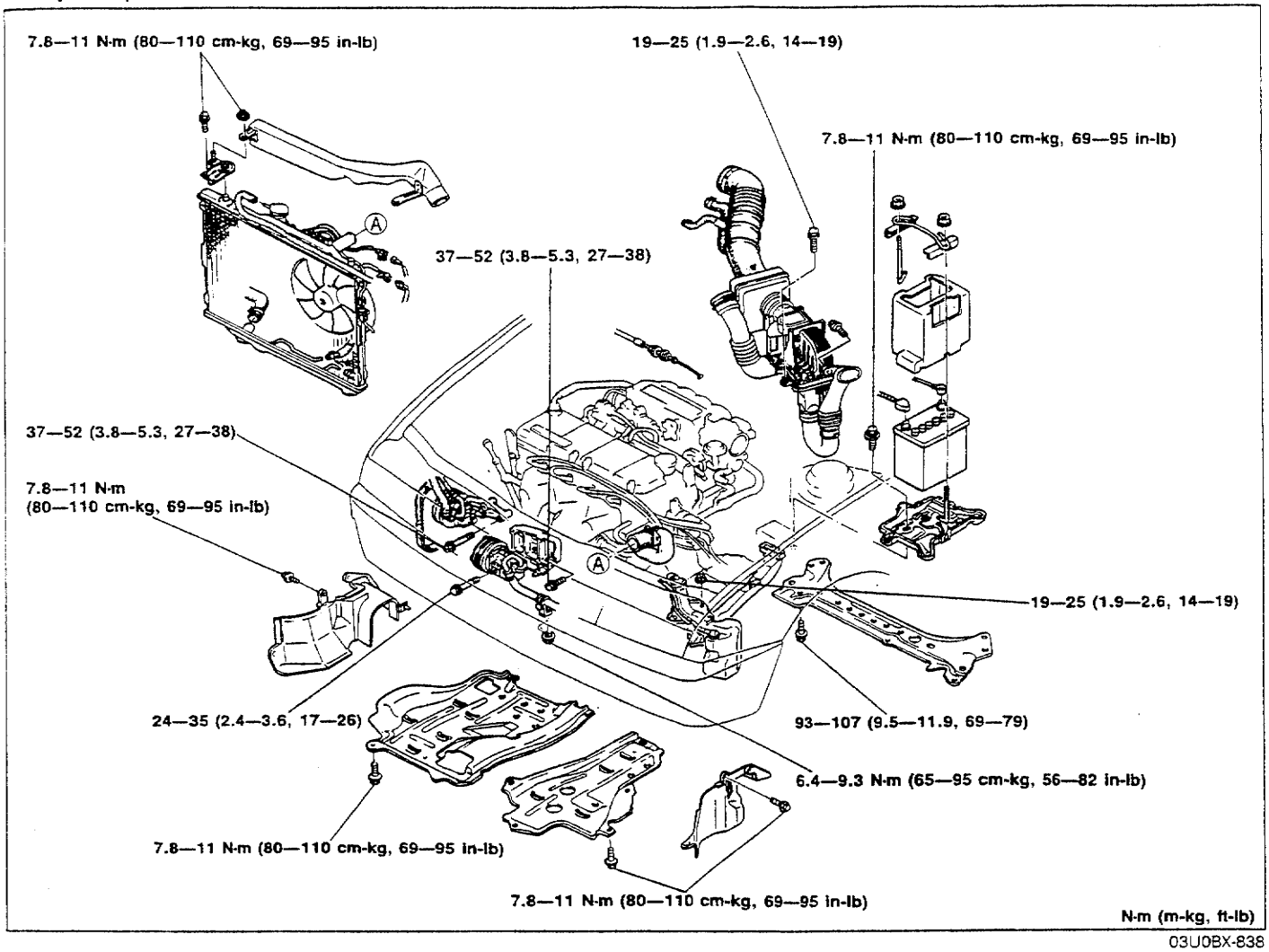
Step 5

1. Connect the harness connectors shown in the figure.



03U0BX-837

Step 6
Torque Specifications



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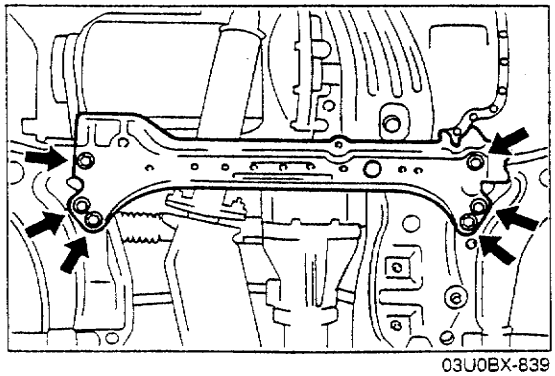

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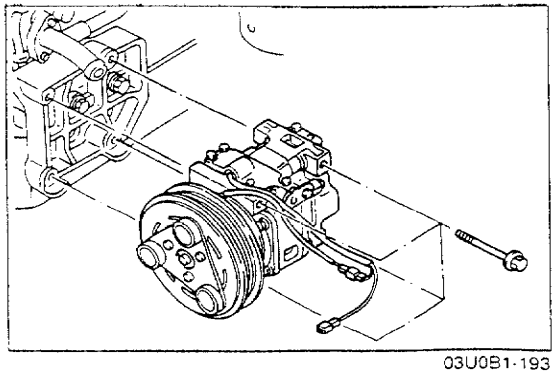


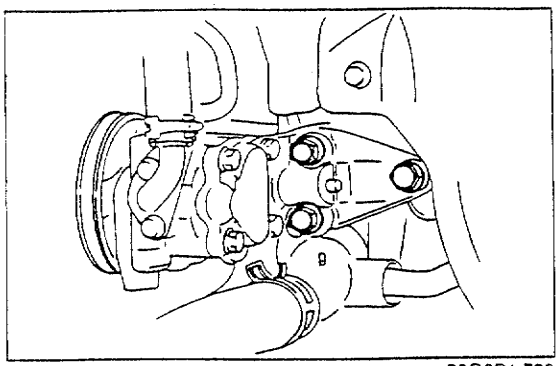
03U0B1-193

Crossmember
1. Install the crossmember.

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

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)



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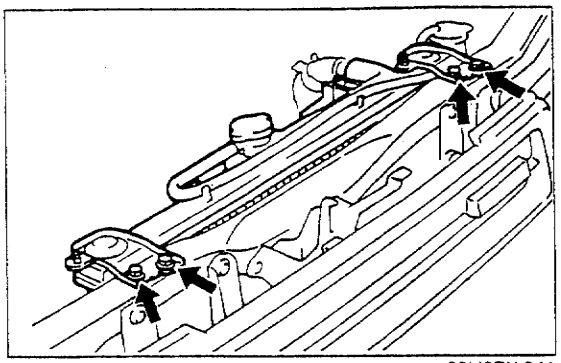

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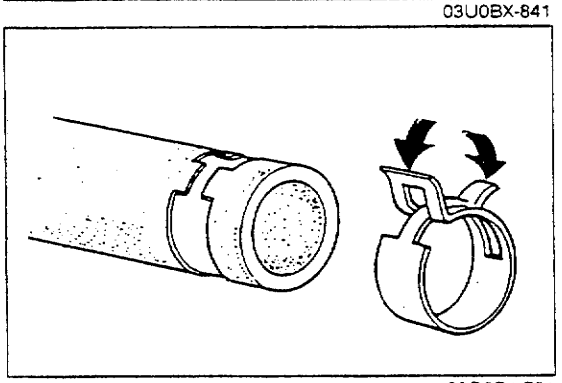
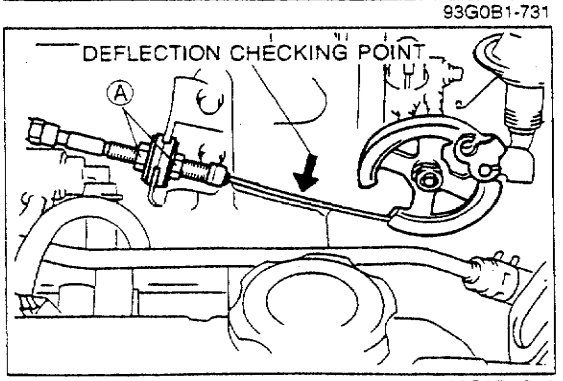


93G0B1-731



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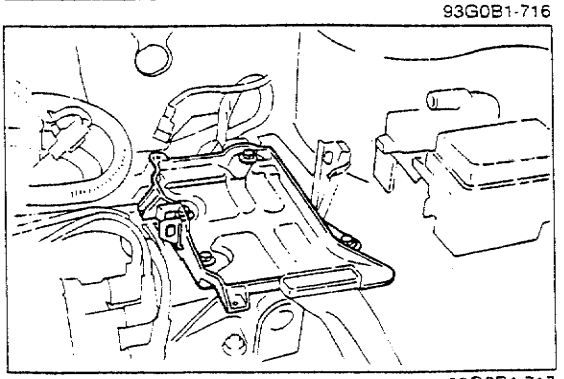


93G0B1-717

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. (Refer to page B1–2.)

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.

Caution

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

Accelerator cable

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

Deflection: 1—3mm (0.04—0.12 in)

Battery duct, battery carrier, and battery

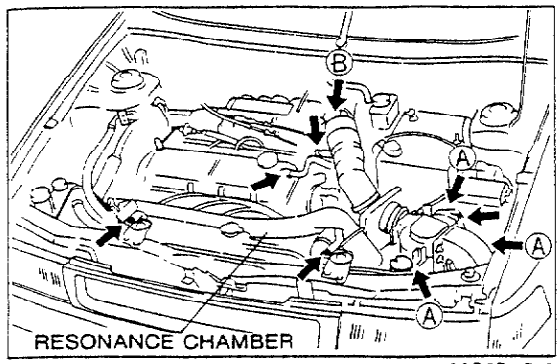
1. Install the battery duct.
2. Install the battery carrier.

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

3. Install the battery, cover and the battery bracket.

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

4. Connect the positive battery cable.



93G0B1-718

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 undercovers and side covers.

Steps after installation
1. If the engine oil was drained, refill 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 J3–36, K3–134.)
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 and idle speed
   (3) Operation of emission control system
6. Perform a road test.
7. Recheck the engine oil and engine coolant levels.

93G0B1-719

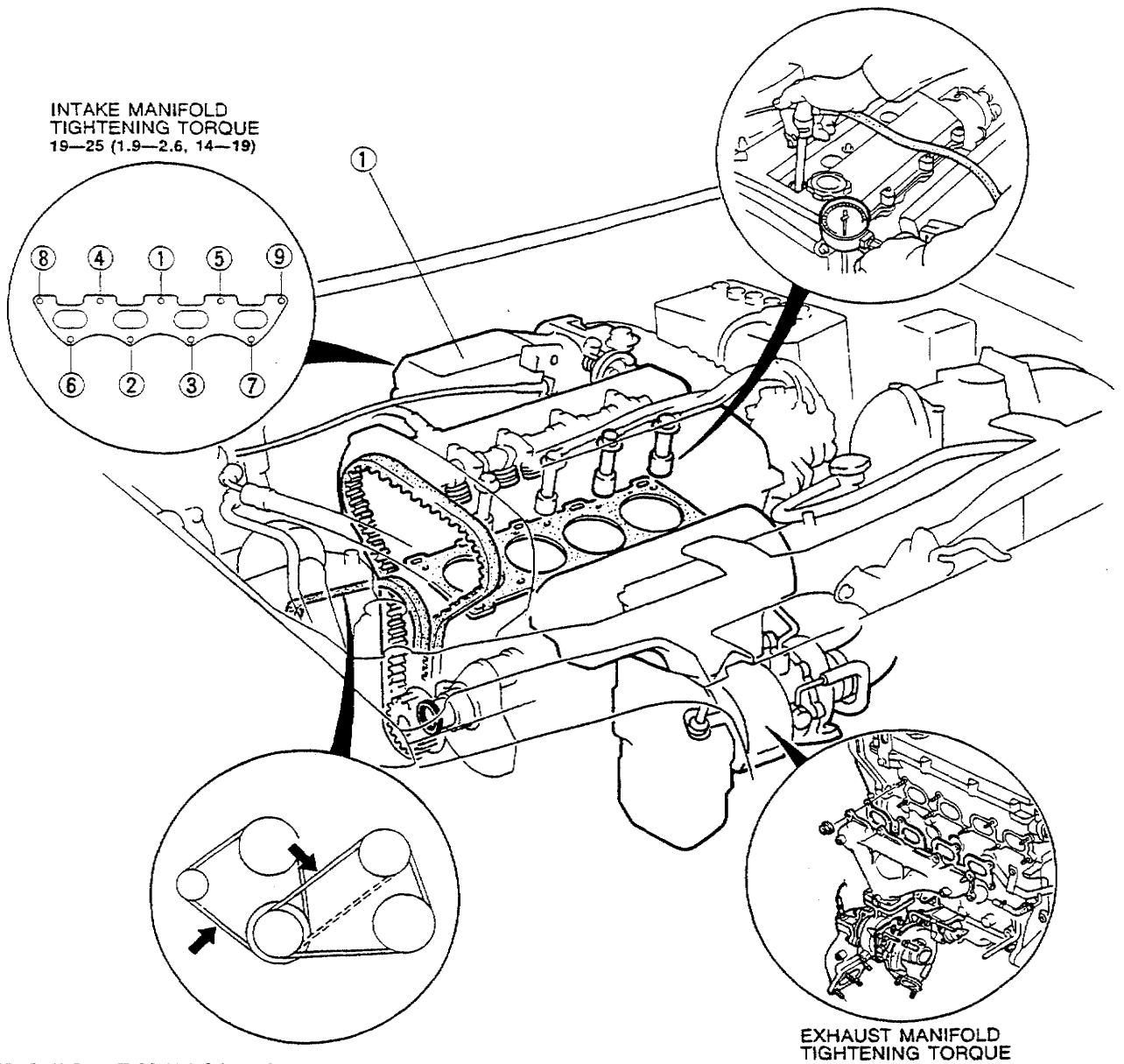
ENGINE
(DOHC)

93G0B2-701

INDEX

ENGINE COMPRESSION kPa (kg/cm², psi)-rpm

	BP Turbo
STANDARD	1,059 (10.8, 154)—300
MINIMUM	785 (8.0, 114)—300



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)

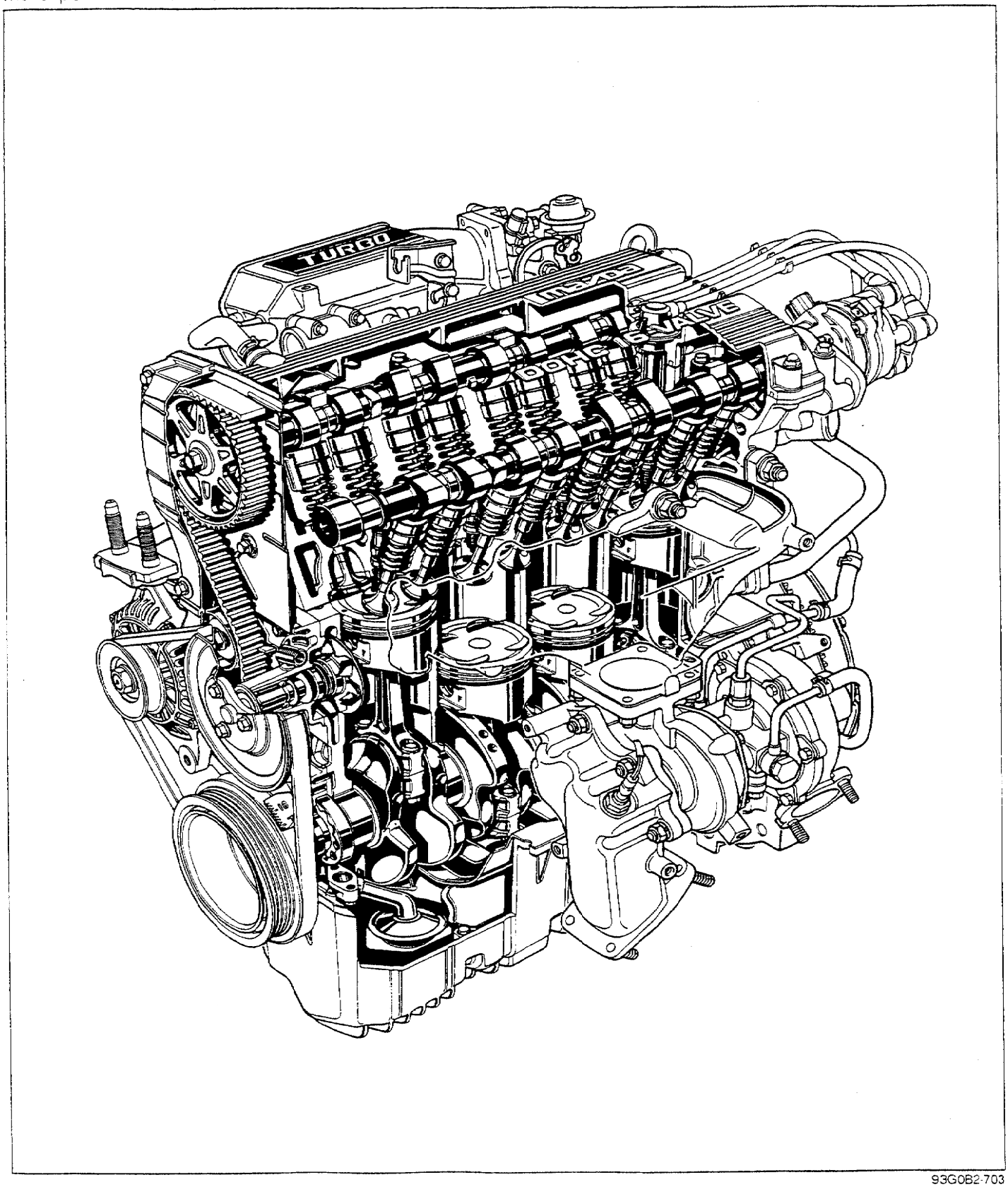
N·m (m-kg, ft-lb)

93G0B2-702

OUTLINE

OUTLINE OF CONSTRUCTION

The BP DOHC Turbo engine for the 4WD model is the BP DOHC Non-Turbo engine of 2WD model to which a turbocharger with intercooler has been equipped. With these additions, engine response is increased and more power is attained.



93G0B2-703

SPECIFICATIONS

Item \ Engine				BP DOHC Turbo
Type				Gasoline, 4-cycle
Cylinder arrangement and number				In-line, 4 cylinders
Combustion chamber				Pentroof
Valve system				DOHC, 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				8.2
Compression pressure			kPa (kg/cm^2, psi)-rpm	1,059 (10.8, 154)-300
Valve timing	IN	Open	BTDC	2°
		Close	ABDC	51°
	EX	Open	BBDC	59°
		Close	ATDC	8°
Valve clearance		IN	mm (in)	0: Maintenance-free
		EX		0: Maintenance-free
Idle speed			rpm	800 ± 50*
Ignition timing			BTDC	10° ± 1°*
Firing order				1—3—4—2

*...TEN terminal of diagnosis connector grounded

93G0B2-704

INTERCHANGEABILITY

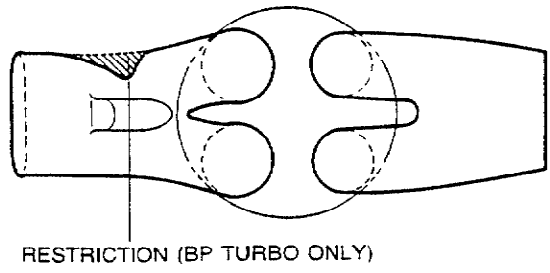
The following chart shows interchangeability of the main parts of the BP DOHC Turbo engine for the 4WD model and the BP DOHC Non-Turbo engine for the 2WD model.

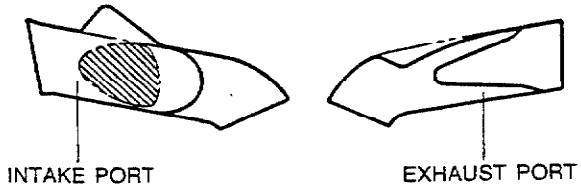
Symbols: ○ .... Interchangeable X .... Not interchangeable

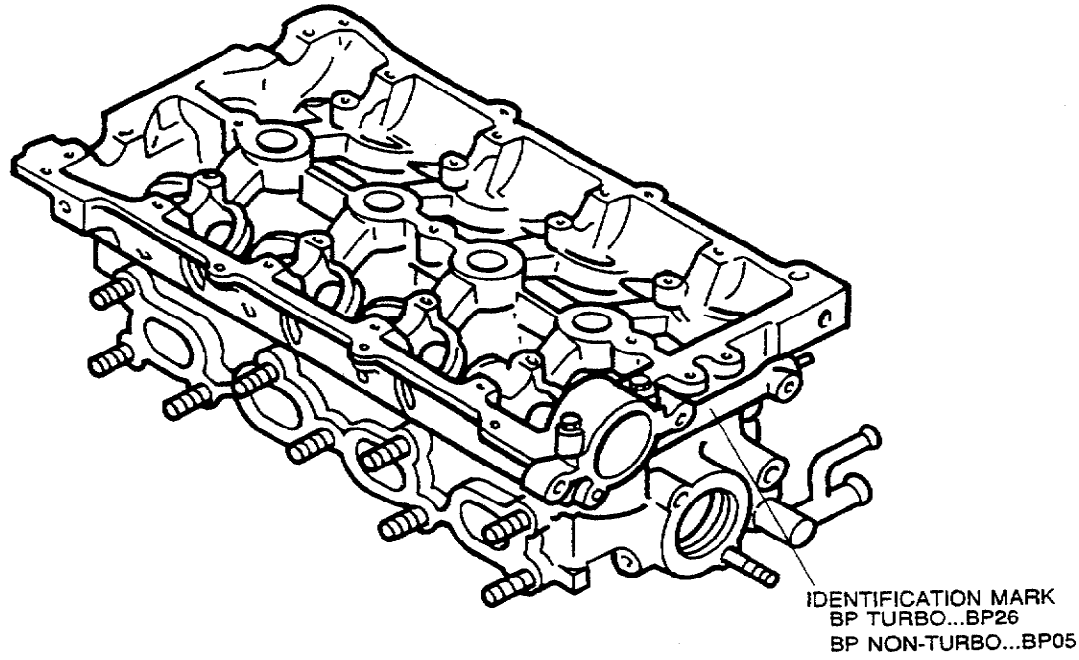
Part name			Interchangeability	Remark
Cylinder block related	Cylinder head		×	Shape different
	Camshaft oil seal		○	
	Cylinder head bolt		○	
	Cylinder head gasket		○	
	Cylinder head cover		○	
	Cylinder head cover gasket		○	
	Cylinder block		○	
	Main bearing cap		○	
	Main bearing support plate		○	
	Oil pan		×	Shape different
	Timing belt cover		○	
	Seal plate		○	
	Front oil seal		○	
	Rear oil seal		○	
Crankshaft related	Crankshaft		○	
	Main bearing		○	
	Thrust bearing		○	
	Connecting rod and cap		○	
	Connecting rod bearing		○	
	Piston		×	Shape different
	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		○	
	Idler		○	
Valve related	Camshaft		×	Valve timing different
	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 cooler		○	
	Oil jet		○	
	Oil filter		○	
Cooling system related	Water pump		○	
	Thermostat		×	Specification different
	Radiator		×	Specification different
	Cooling fan		×	Specification different

93G0B2-705

CYLINDER HEAD





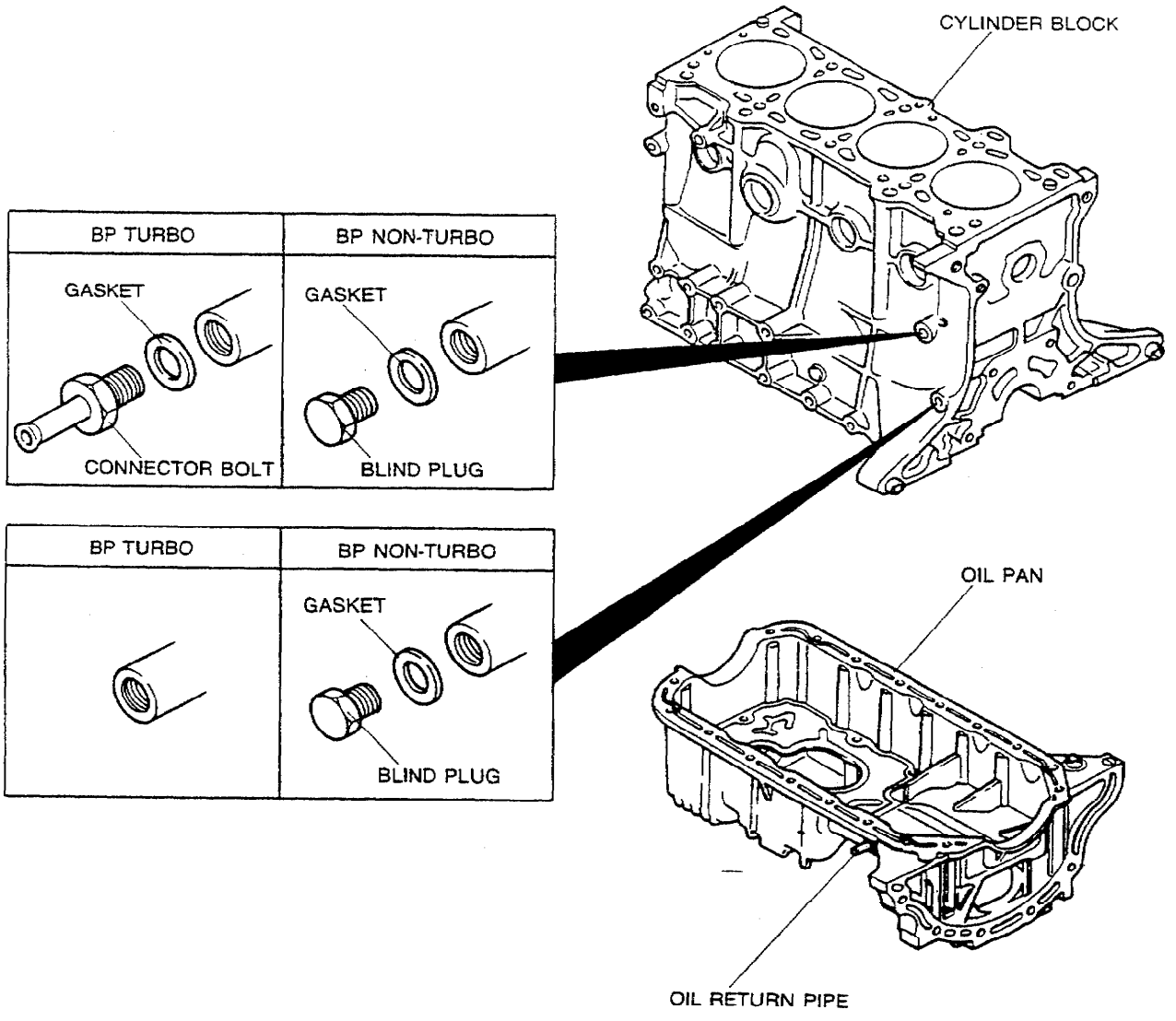


93G0B2-706

The cylinder head for the BP DOHC Turbo engine is the same as for the BP DOHC Non-Turbo engine, except that the intake ports are shaped differently.
The identification mark is cast at the rear of the cylinder head.

Identification:
BP DOHC Turbo : BP26
BP DOHC Non-Turbo: BP05

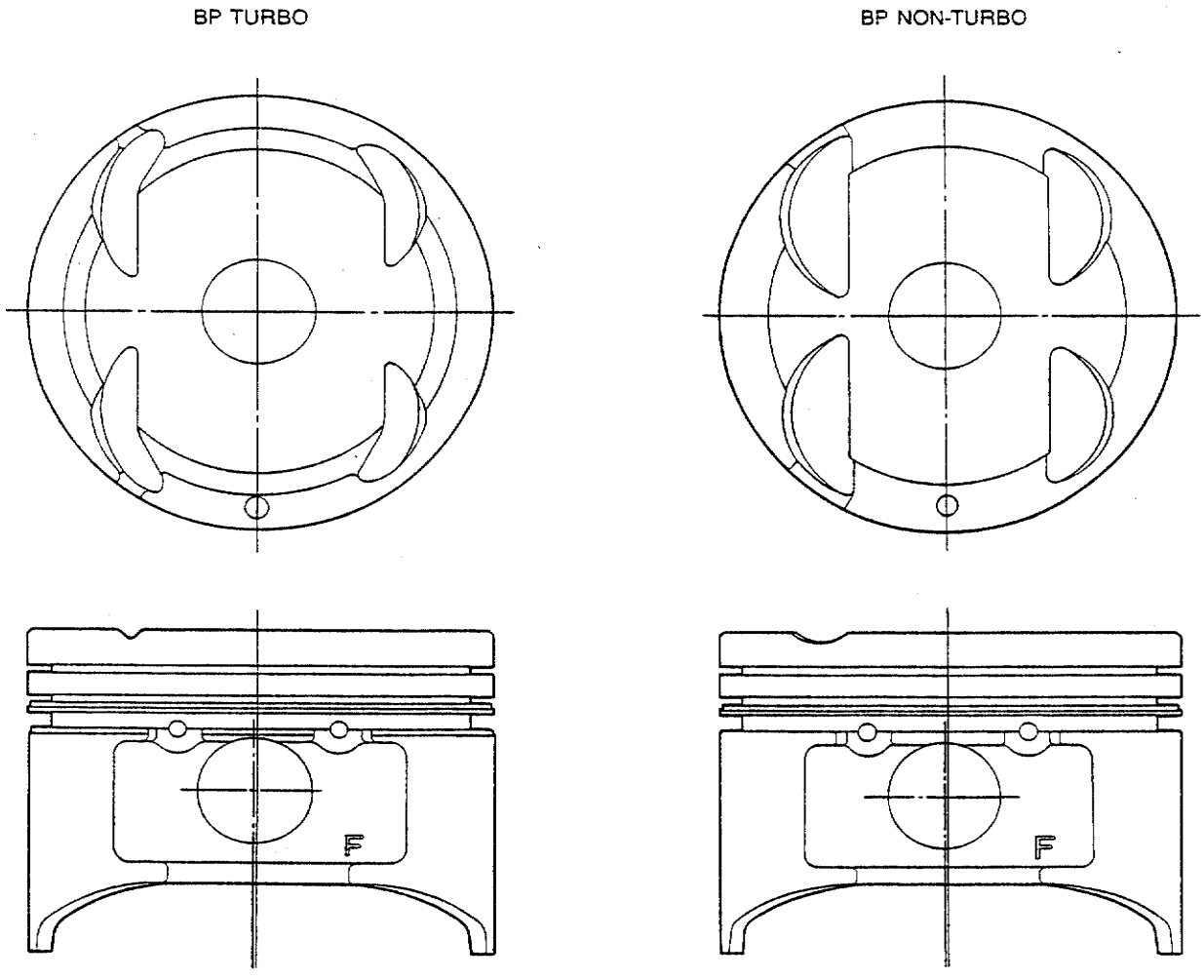
CYLINDER BLOCK AND OIL PAN



93G0B2-707

The cylinder block is no different. But in conjunction with the newly provided turbocharger, the coolant, and lubrication oil passages on the cylinder block are used.
The oil pan has a provision for oil to return from the turbocharger.

PISTON

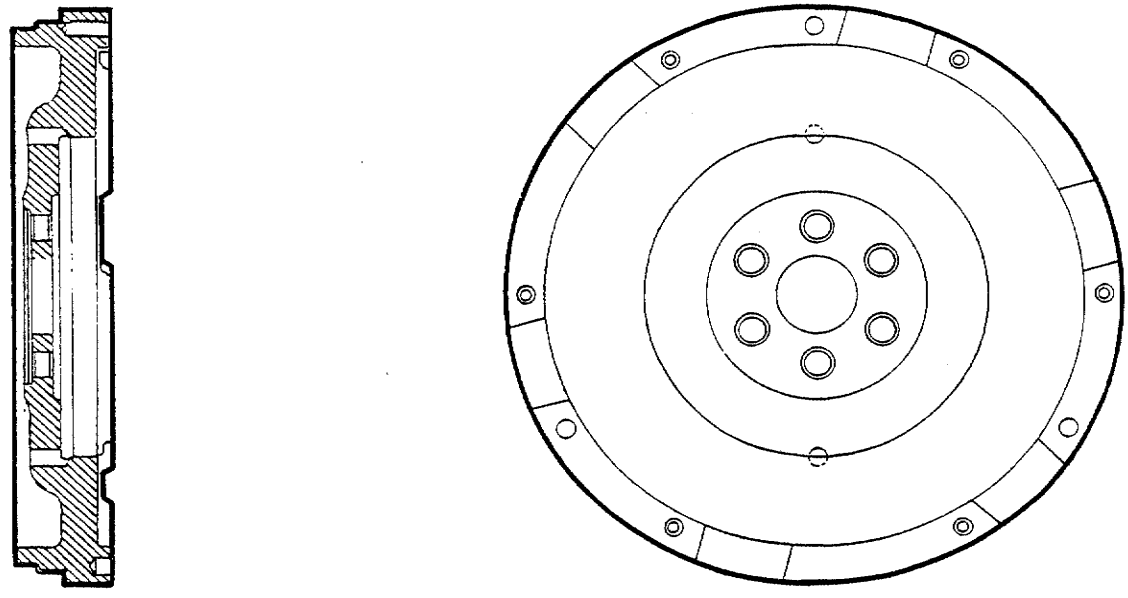


93G0B2-708

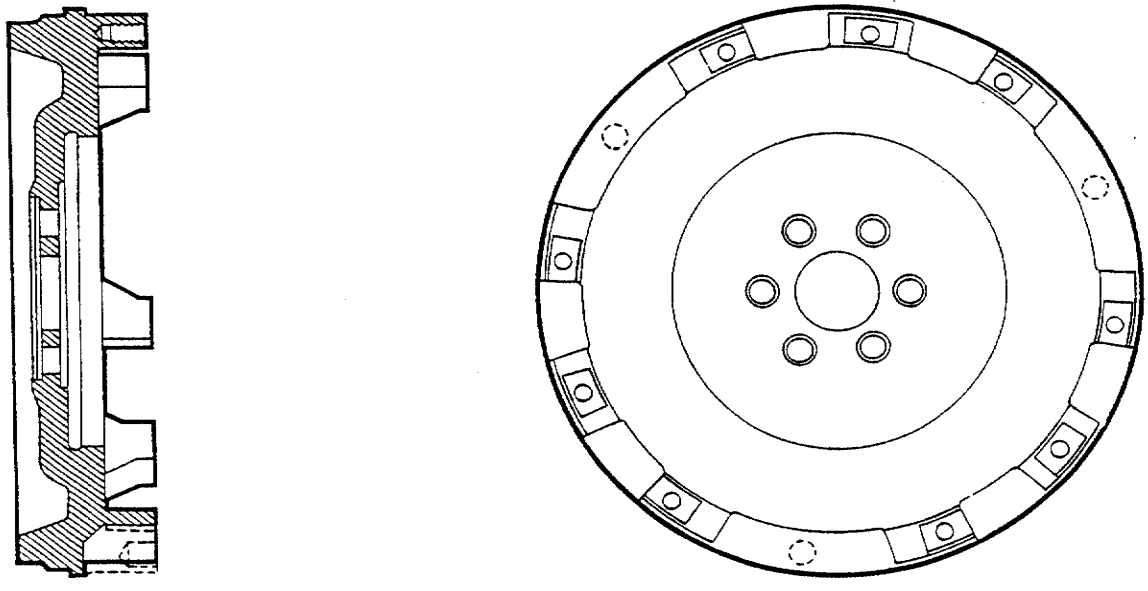
Because of the addition of the turbocharger, the piston crown recess is increased to lower the compression ratio.

FLYWHEEL

BP TURBO



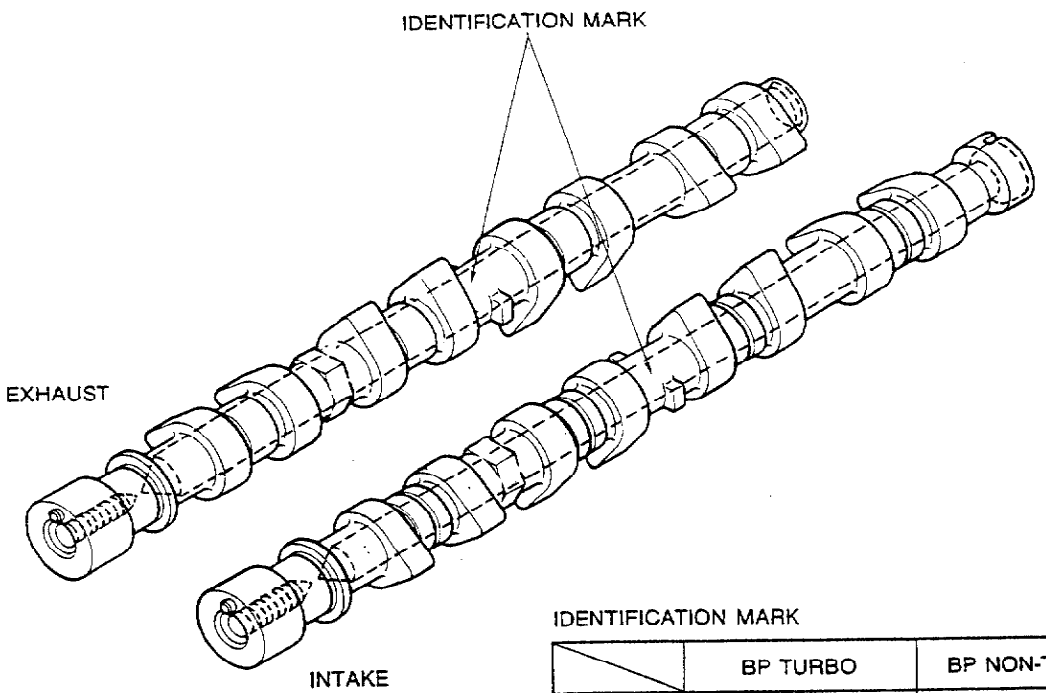
BP NON-TURBO



93G0B2-709

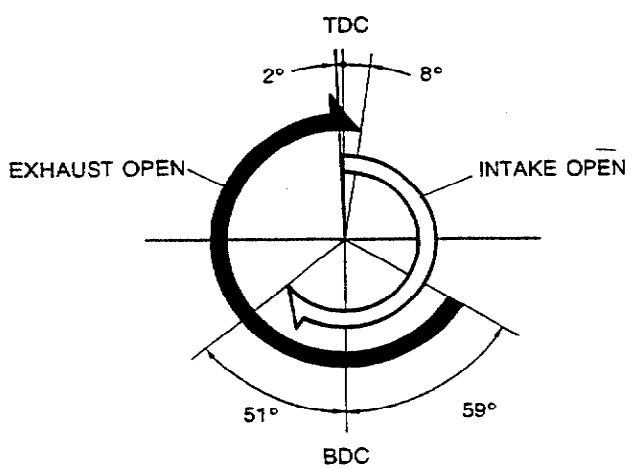
The flywheel is shaped differently to accommodate the redesigned clutch disc and clutch cover.

CAMSHAFT



IDENTIFICATION MARK

	BP TURBO	BP NON-TURBO
IN	BP26	BP05
EX	BP26	BP06



93G0B2-710

The camshaft valve timing specifications are different to improve engine power.

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Workshop Manual [Europe (1203-10-89F), Australia (1204-10-89F)].

Compression
- Inspection

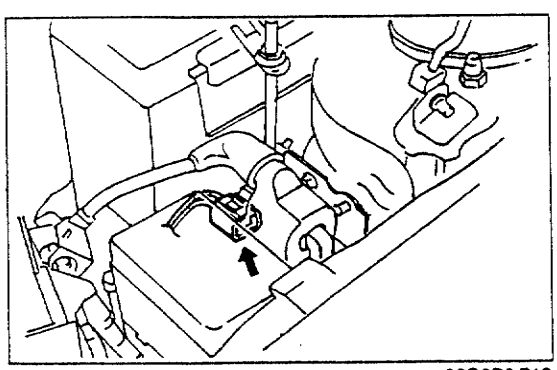
Engine
- Removal
- Engine stand mounting
- Engine stand dismounting
- Installation

93G0B2-711

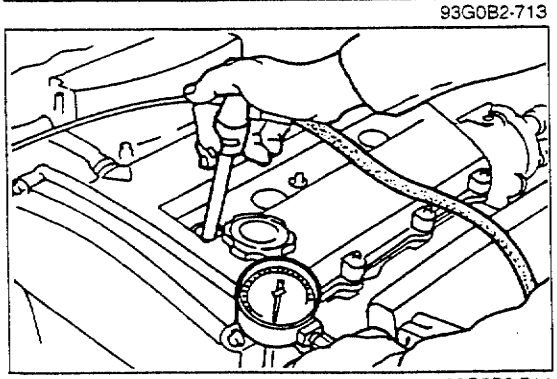
COMPRESSION

If the engine exhibits low power, poor fuel economy, or poor idle, check the following:
1. Ignition system (Refer to Section G.)
2. Compression
3. Fuel system (Refer to Section F3.)

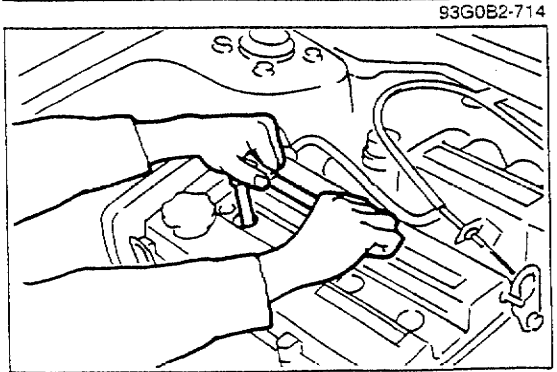
93G0B2-712



93G0B2-713



93G0B2-714



93G0B2-715

INSPECTION

1. Verify that the battery is fully charged. Recharge it if necessary.
2. Warm up the engine to normal operating temperature.
3. Turn the engine OFF.
4. Remove all of the spark plugs.
5. Disconnect the ignition coil connector.
6. Connect a compression gauge to the No.1 spark plug hole.
7. Fully depress the accelerator pedal and crank the engine.
8. Record the maximum gauge reading.
9. Check each cylinder in the same manner.

Compression:
1,059 kPa (10.8 kg/cm^2, 154 psi)-300 rpm
Minimum:
785 kPa (8.0 kg/cm^2, 114 psi)-300 rpm
Allowable difference between cylinders:
196 kPa (2.0 kg/cm^2, 28 psi) max.

10. If the compression in one or more cylinders is low, pour a small amount of engine oil into the cylinder and recheck the compression.
    (1) If the compression increases, the piston, piston rings, or cylinder wall may be worn.
    (2) If the compression stays low, the valve may be stuck or seating improperly.
    (3) If the compression in adjacent cylinders stays low, the cylinder head gasket may be defective or the cylinder head distorted.
11. Connect the ignition coil connector.
12. Apply antiseize compound or molybdenum-based lubricant to the spark plug threads.
13. Install the spark plugs.

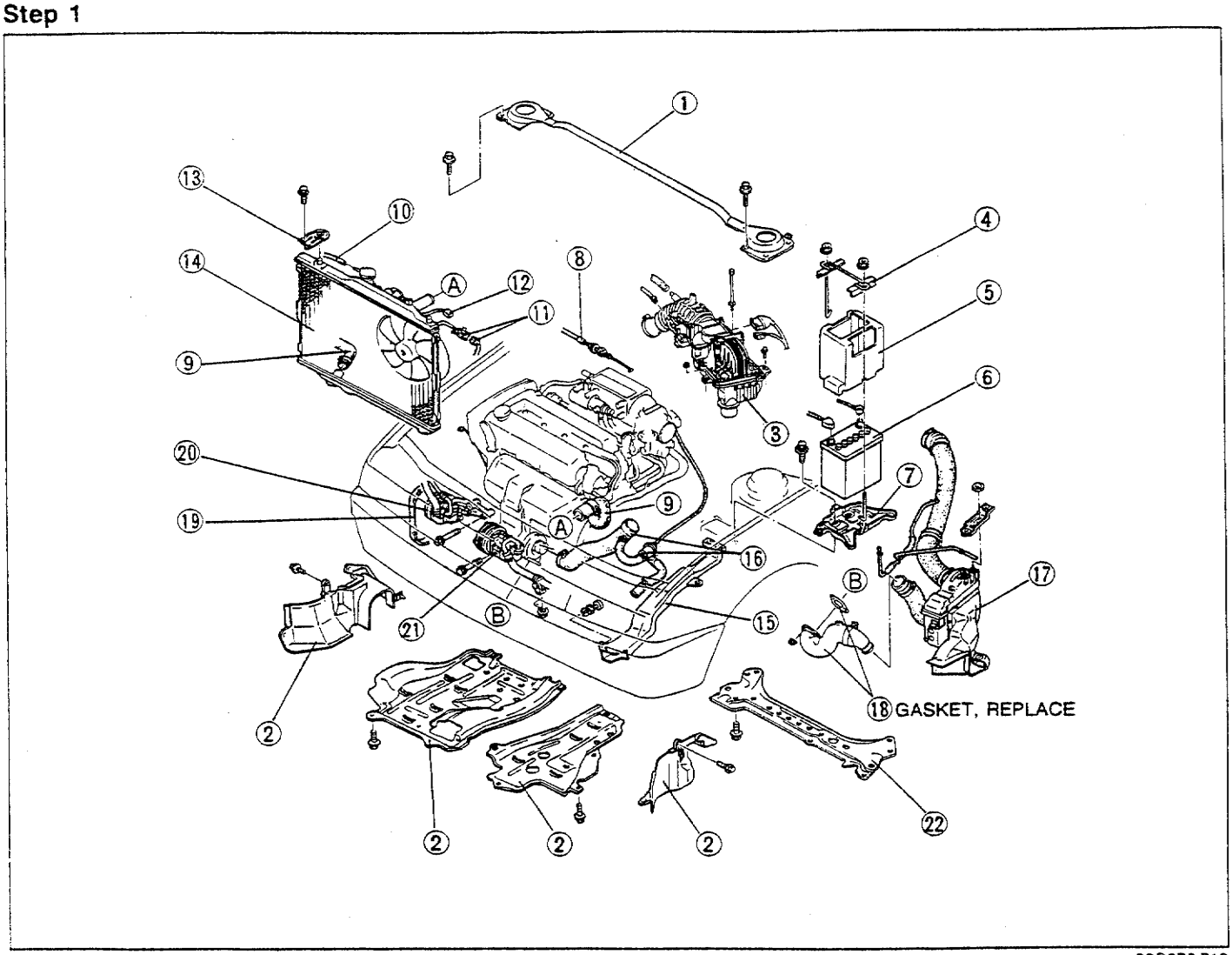
Tightening torque:
15—23 N·m (1.5—2.3 m-kg, 11—17 ft-lb)

REMOVAL

Warning
- **Release the fuel pressure. (Refer to Section F2.)**

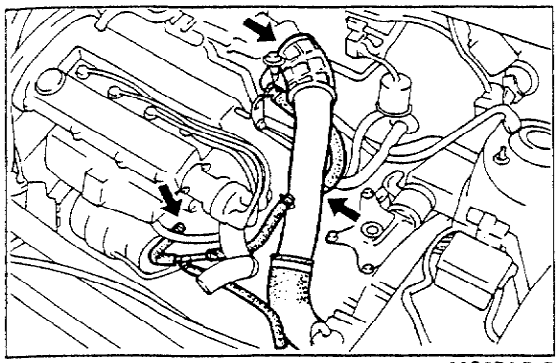
PROCEDURE
1. Disconnect the negative battery cable.
2. Drain the engine coolant and transaxle oil.
3. Remove in the order shown in the figure, referring to **Removal Note**.

Step 1

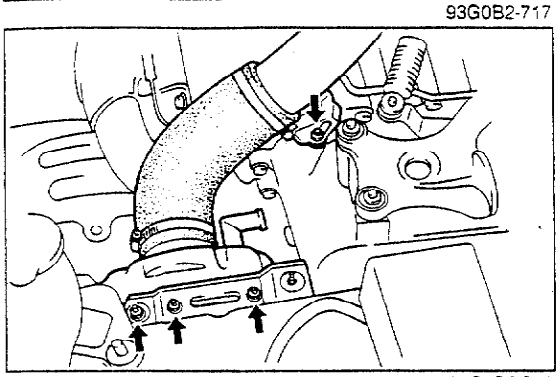


93G0B2-716

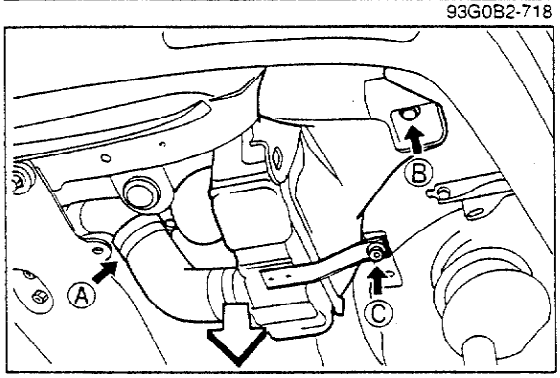
1. Strut tower bar
2. Undercovers and side covers
3. Air cleaner assembly
4. Battery bracket
5. Battery cover
6. Battery
7. Battery carrier
8. Accelerator cable
9. Radiator hoses
10. Coolant reservoir hose
11. Cooling fan connector
12. Radiator switch connector
13. Radiator bracket
14. Radiator and cooling fan assembly
15. Battery duct
16. Air pipe and air bypass valve
17. Intercooler and air pipe
    Removal Note..... page B2–13
18. Air pipe and gasket
19. P/S and/or A/C drive belt
20. P/S oil pump and bracket
    Removal Note..... page B2–13
21. A/C compressor
    Removal Note..... page B2–13
22. Crossmember


93G0B2-717

Removal note
Intercooler and air pipe
1. Disconnect the hoses shown in the figure.

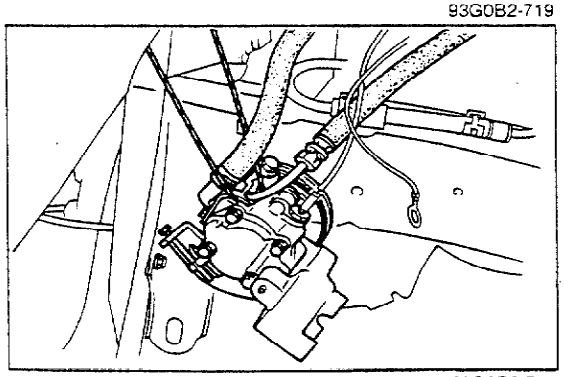

93G0B2-718

2. Remove the nuts and the intercooler bracket shown in the figure.



93G0B2-719

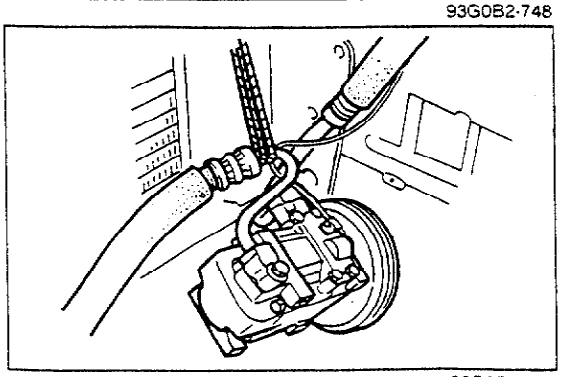
3. Loosen hose band Ⓐ.
4. Remove bolt Ⓑ and nut Ⓒ.
5. Remove the intercooler and air pipe downward.


93G0B2-748

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 secure it with wire.

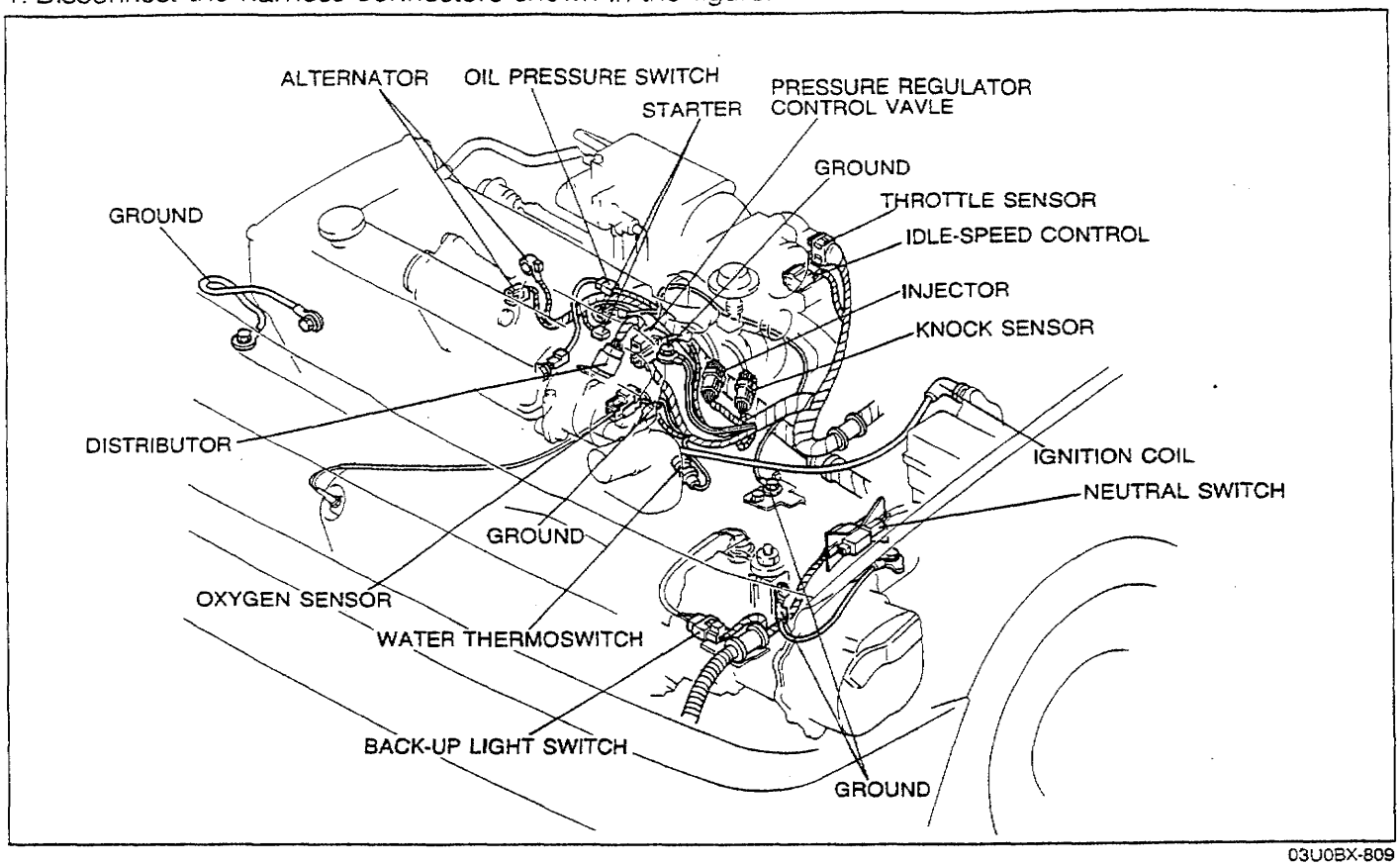

93G0B2-749

A/C compressor

Caution
- **Do not damage the hoses.**

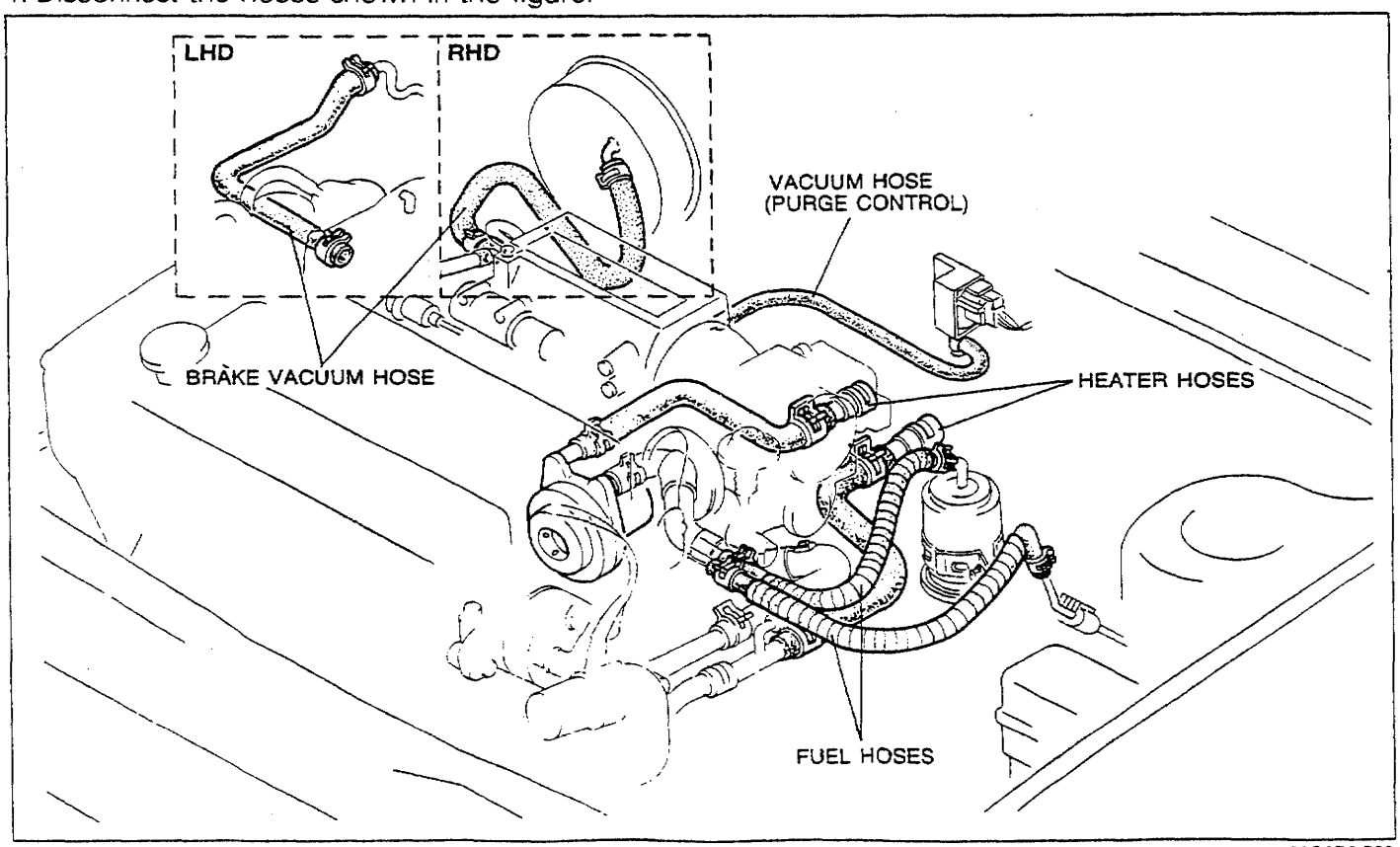
1. Remove the A/C compressor with the hoses still connected.
2. Position the compressor away from the engine and secure it with wire.

Step 2
1. Disconnect the harness connectors shown in the figure.

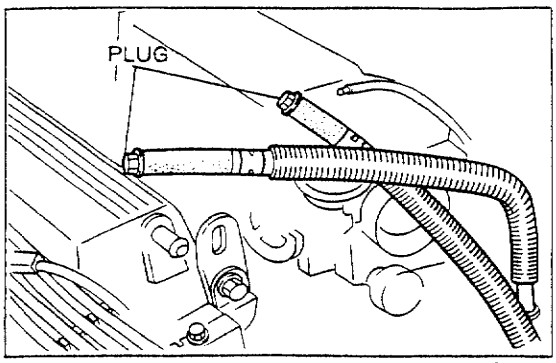


03U0BX-809

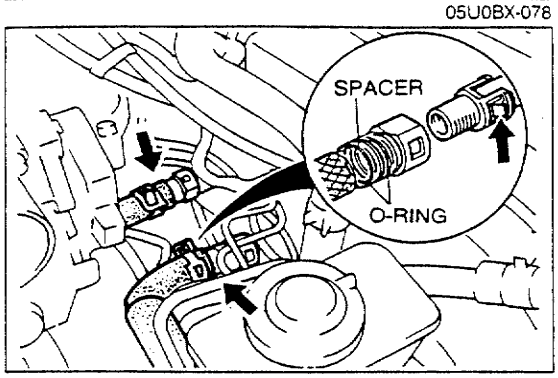
Step 3
1. Disconnect the hoses shown in the figure.



93G0B2-720



05U0BX-078



03U0BX-845

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.**

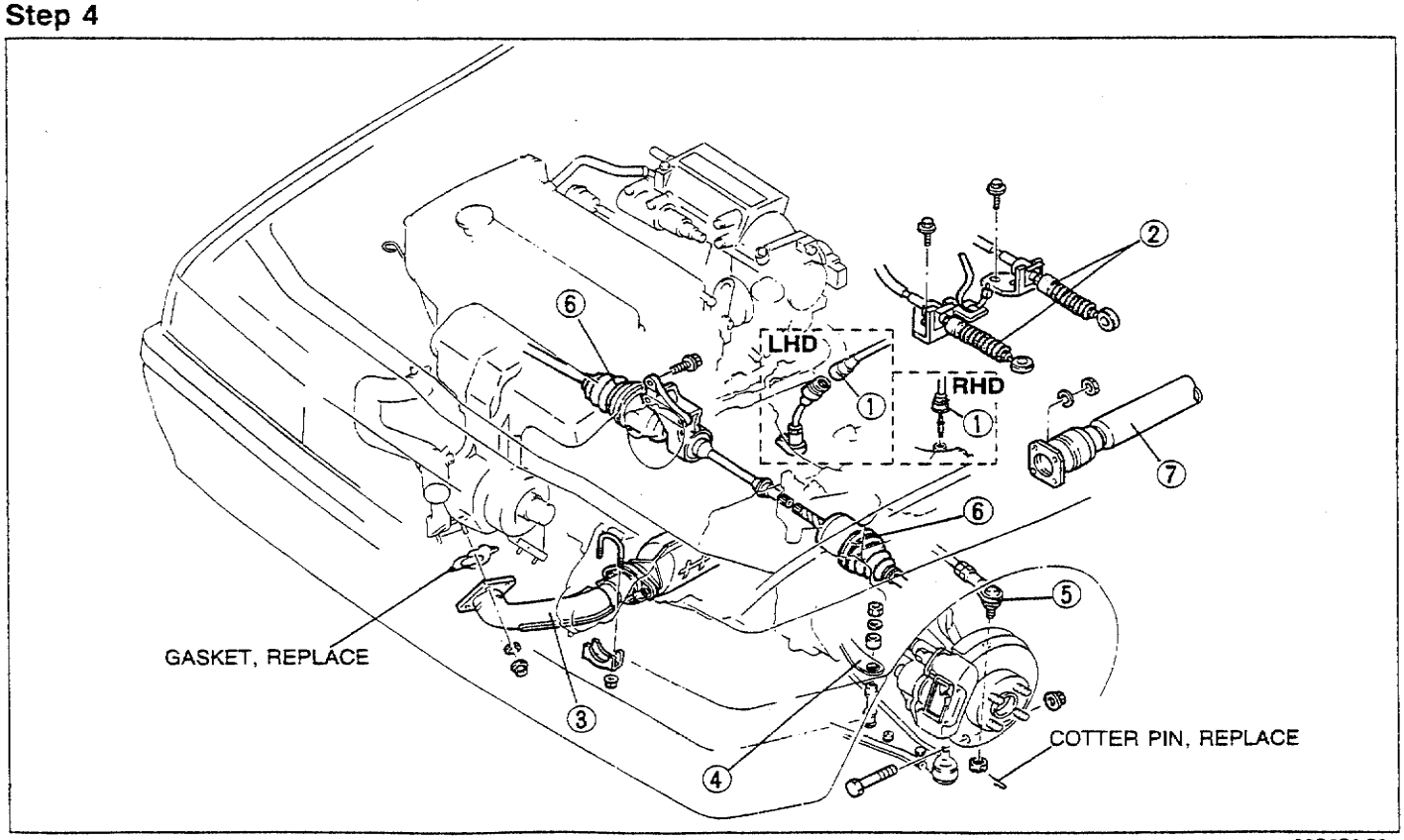
1. Disconnect the fuel hoses.

Heater hose

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

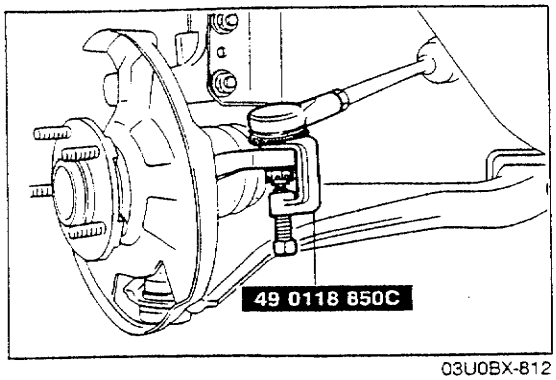
1. Depress the heater hose retainer and remove the heater hose.

Step 4



93G0B2-721

1. Speedometer cable
2. Select and shift cables
3. Front exhaust pipe
4. Stabilizer
5. Tie-rod end
   Removal Note..... page B2–16
6. Driveshafts
   Removal Note..... page B2–16
7. Propeller shaft
   Removal Note..... page L– 5



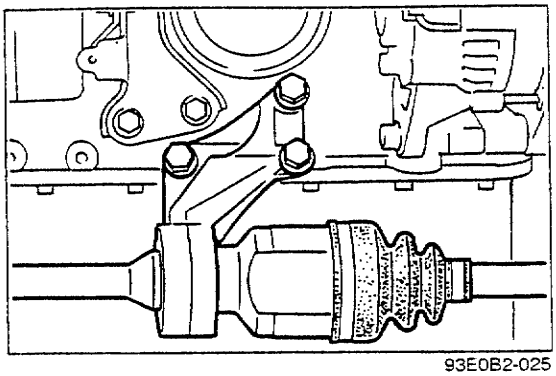
03U0BX-812

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.**

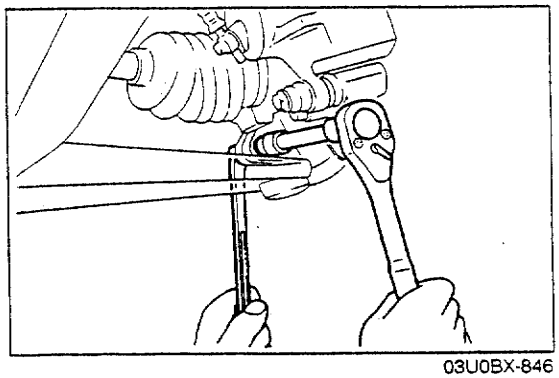
2. Separate the ball joint from the knuckle arm with the **SST**.



93E0B2-025

Driveshaft

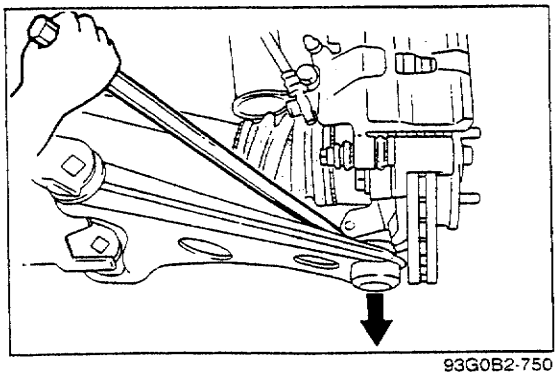
1. Remove the joint shaft.



03U0BX-846

2. Remove the lower arm ball joint clinch bolt.

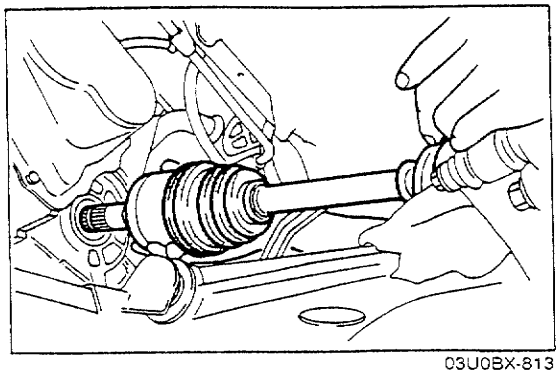
Caution
- **Do not damage the ball joint dust boot.**



93G0B2-750

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

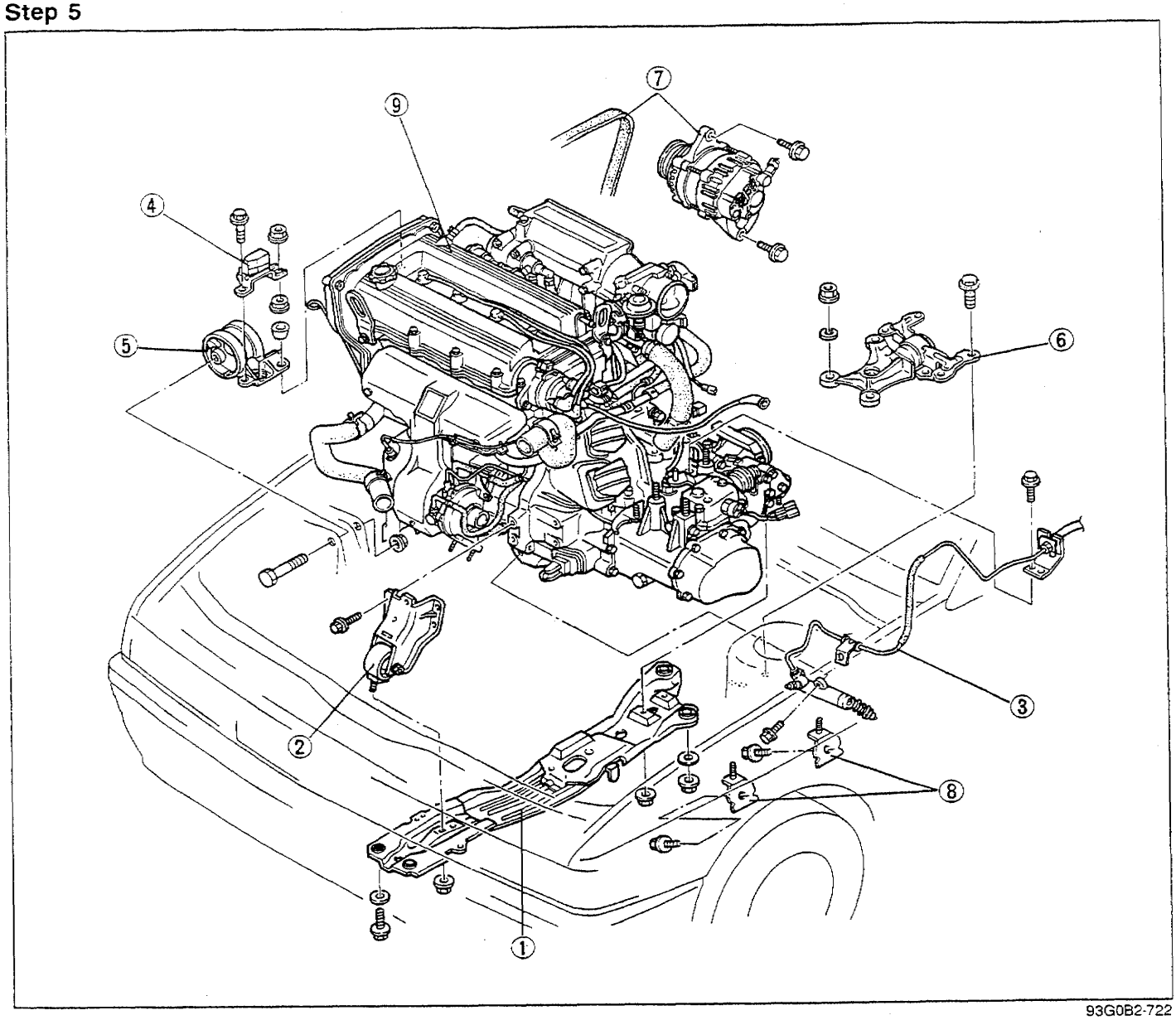
Caution
- **Do not damage the oil seal.**



03U0BX-813

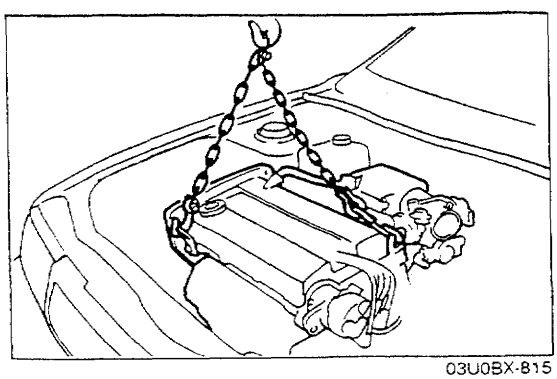
4. Separate the driveshaft from the transaxle.

Step 5



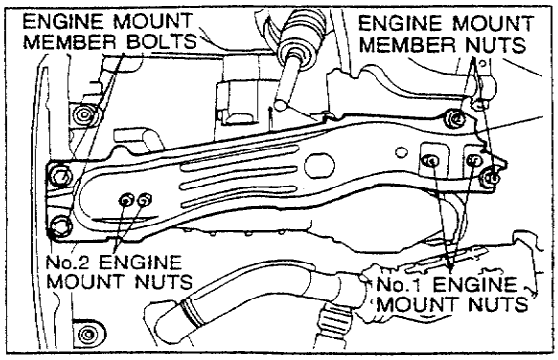
93G0B2-722

1. Engine mount member
   Removal Note ..... below
2. No.2 engine mount rubber and bracket
3. Clutch release cylinder
   Removal Note..... page B2–18
4. Dynamic damper
5. No.3 engine mount rubber
6. No.4 engine mount rubber and bracket
7. Alternator and drive belt
8. Intercooler brackets
9. Engine and transaxle assembly
   Removal Note..... page B2–18



03U0BX-815

Removal note
Engine mount member
1. Suspend the engine with a chain hoist.

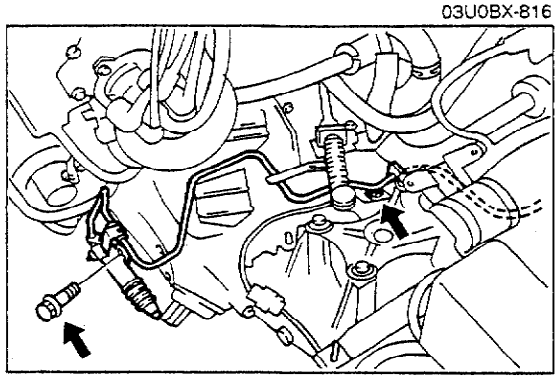


03U0BX-816

2. Remove the No.1 and No.2 engine mount nuts.

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

3. Remove the engine mount member bolts and nuts and the engine mount member.

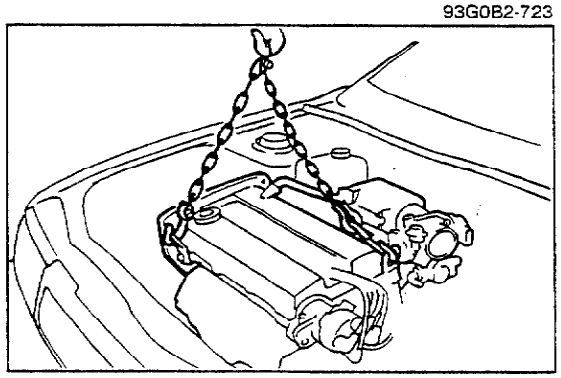


93G0B2-723

Clutch release cylinder

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.**



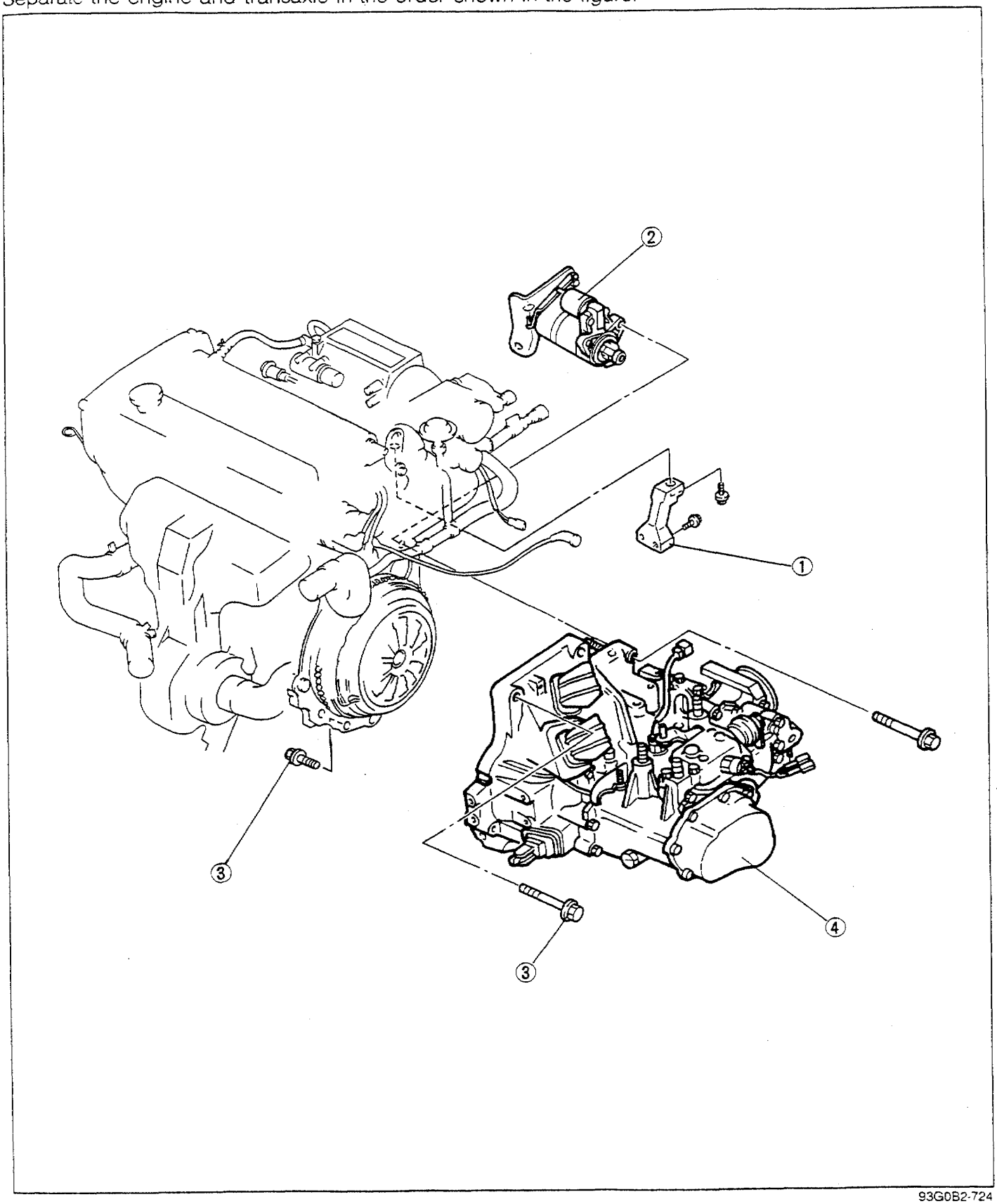
93G0B2-751

Engine and transaxle assembly

Caution
- **Do not damage any components in the engine compartment.**

1. Remove the engine and transaxle assembly.

Step 6
Separate the engine and transaxle in the order shown in the figure.



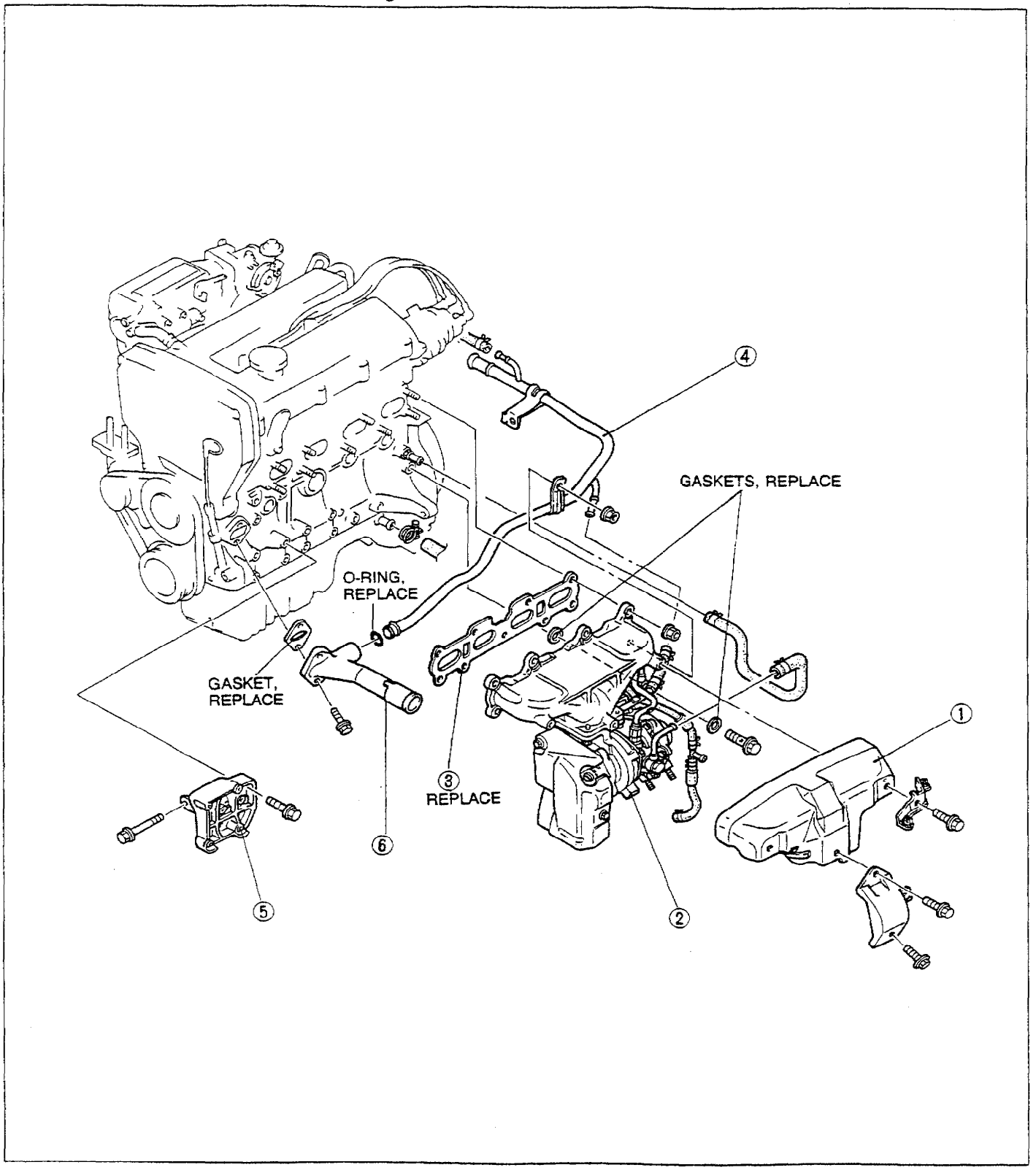
93G0B2-724

1. Intake manifold bracket
2. Starter and bracket
3. Transaxle mounting bolts
4. Transaxle

ENGINE STAND MOUNTING

PROCEDURE

1. Remove in the order shown in the figure.



93G0B2-725

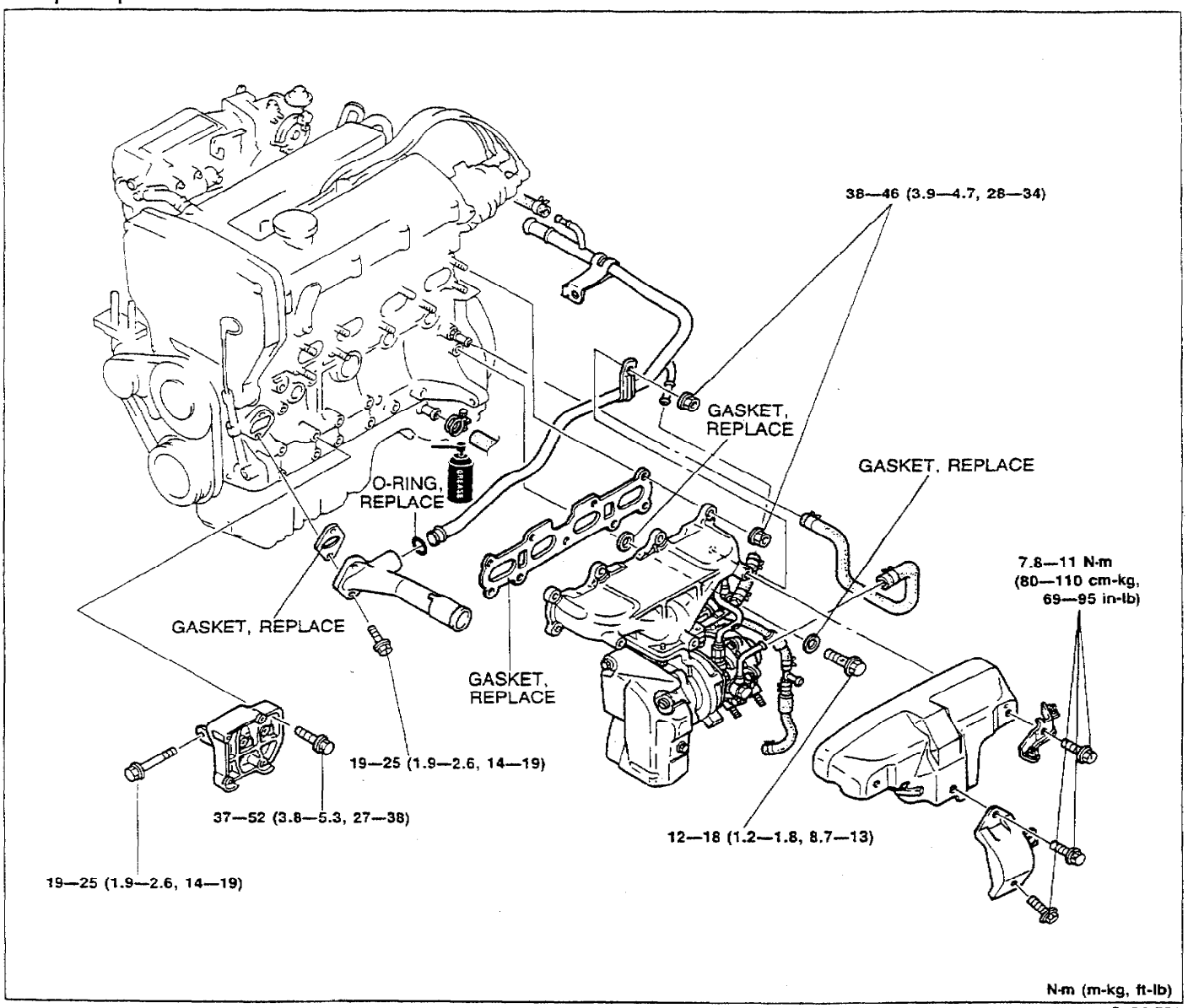
1. Exhaust manifold insulator
2. Exhaust manifold and turbocharger assembly
3. Exhaust manifold gasket
4. Water bypass pipe
5. A/C compressor bracket
6. Water inlet pipe

ENGINE STAND DISMOUNTING

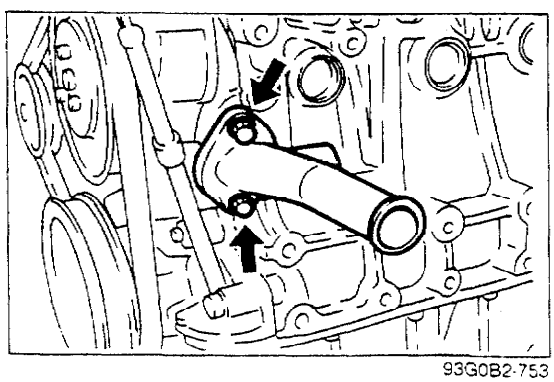
PROCEDURE

1. Remove the engine from the **SST (engine stand)**.
2. Remove the **SST (engine hanger)** from the engine.
3. Install the parts shown in the figure.
4. Tighten the parts to the specified torques.

Torque Specifications



93G0B2-752

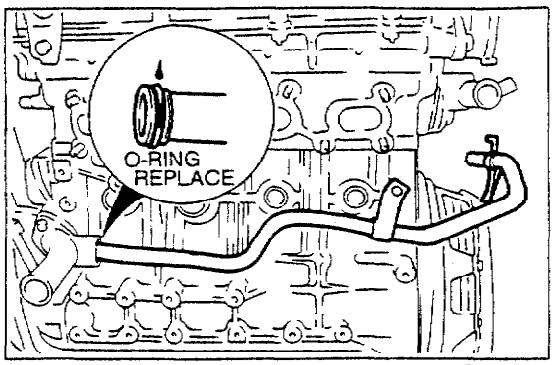


93G0B2-753

Water Inlet Pipe

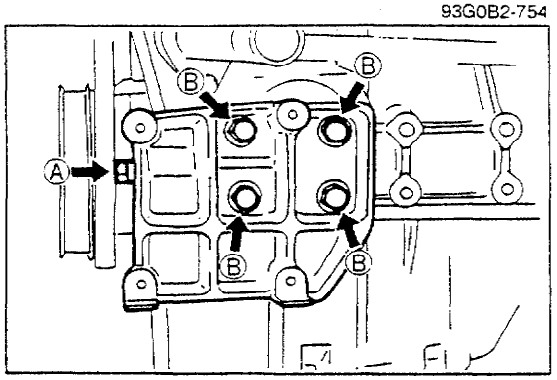
1. Remove all foreign material from the water inlet pipe mounting surfaces.
2. Install a new gasket and the water inlet pipe.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



93G0B2-754

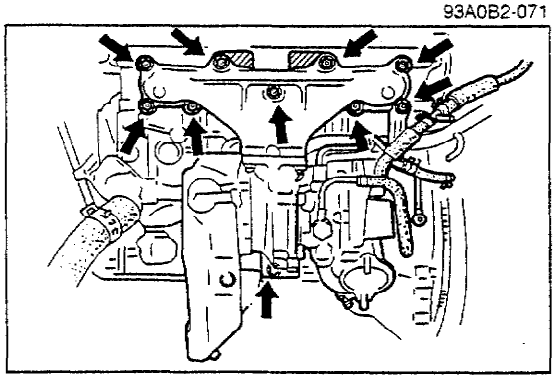
Water Bypass Pipe
1. Apply a small amount of engine coolant to the new O-ring.
2. Install the O-ring on the pipe.
3. Install the water bypass pipe.



93A0B2-071

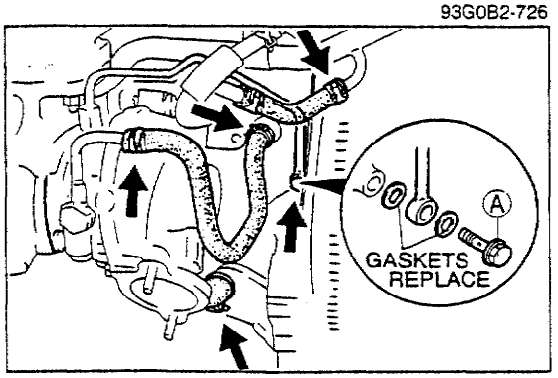
A/C Compressor Bracket (if equipped)
1. Install the A/C compressor bracket.

Tightening torque
Ⓐ: 19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)
Ⓑ: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)


93G0B2-726

Exhaust Manifold and Turbocharger Assembly
1. Remove all foreign material from the exhaust manifold contact surfaces.
2. Install a new gasket.
3. Install the exhaust manifold and turbocharger assembly.

Tightening torque:
38—46 N·m (3.9—4.7 m-kg, 28—34 ft-lb)

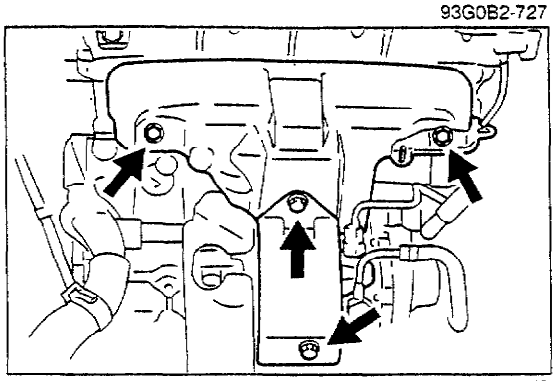


93G0B2-727

4. Connect the water hose to the water bypass pipe.
5. Connect the water hose and the oil pipe to the cylinder block.

Tightening torque
Ⓐ: 12—18 N·m (1.2—1.8 m-kg, 8.7—13 ft-lb)

6. Connect the oil return hose to the oil pan.


05U0BX-257

Exhaust Manifold Insulator
1. Install the exhaust manifold insulator.

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

INSTALLATION

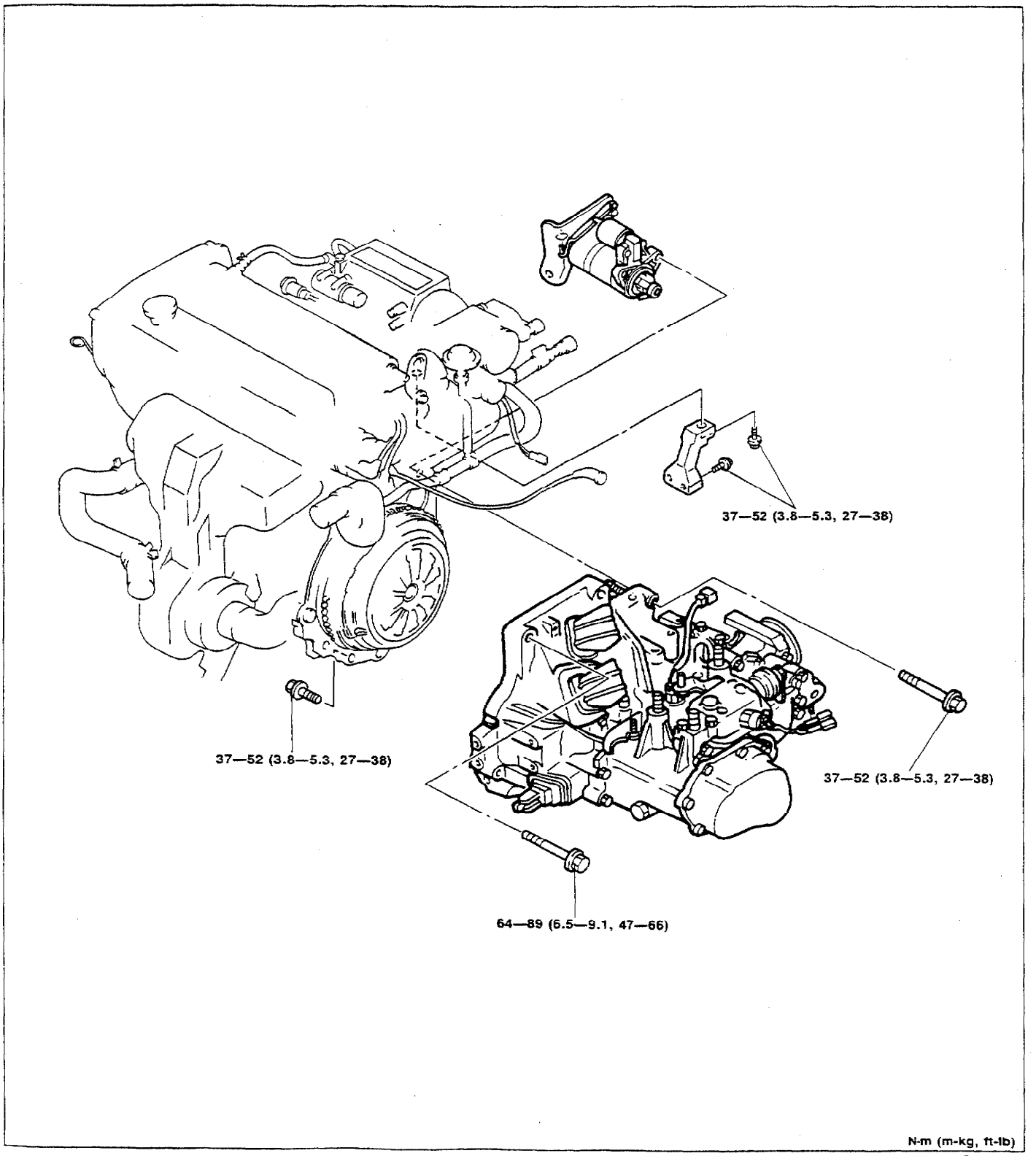
PROCEDURE

1. Tighten all bolts and nuts to the specified torques.

Step 1

1. Connect the engine and transaxle.

Torque Specifications



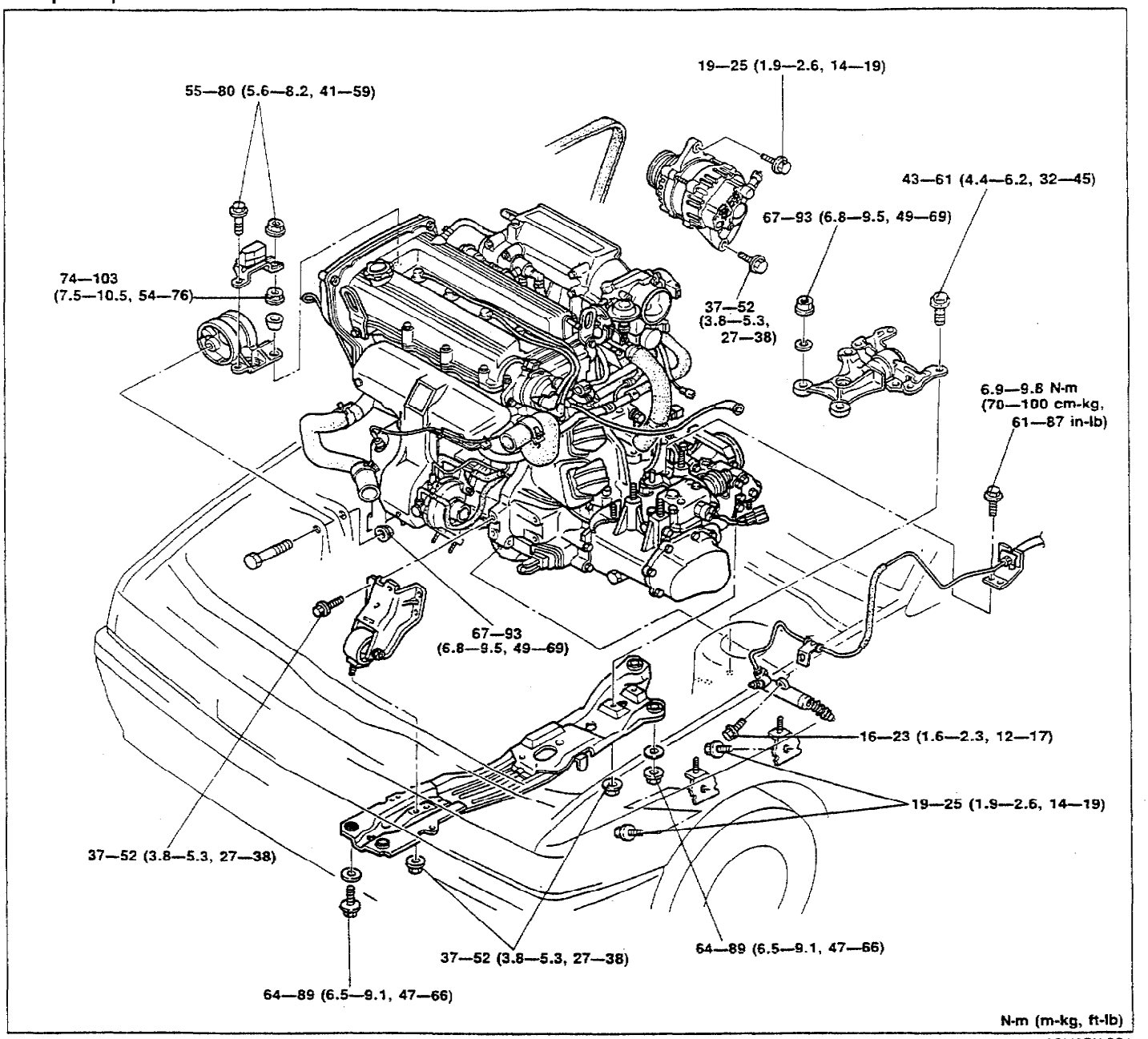
N-m (m-kg, ft-lb)

93G0B2-755

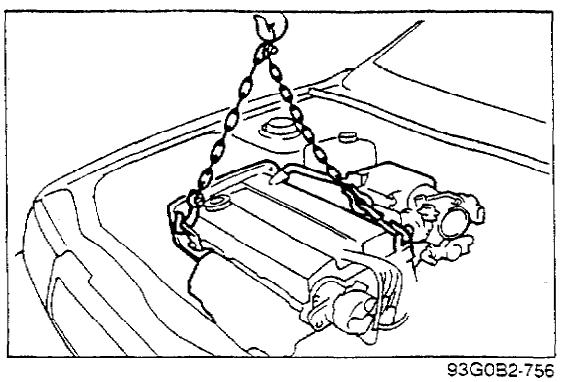
Step 2

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

Torque Specifications



03U0BX-821

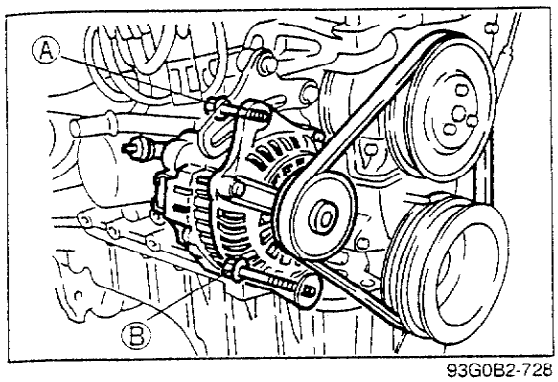


93G0B2-756

Engine and transaxle assembly

Caution
- **Do not damage any components in the engine compartment.**

1. Install the engine and transaxle assembly.



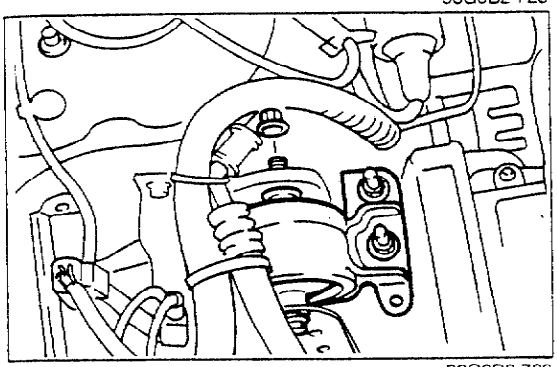
93G0B2-728

Alternator and drive belt

1. Monut the alternator to the engine.

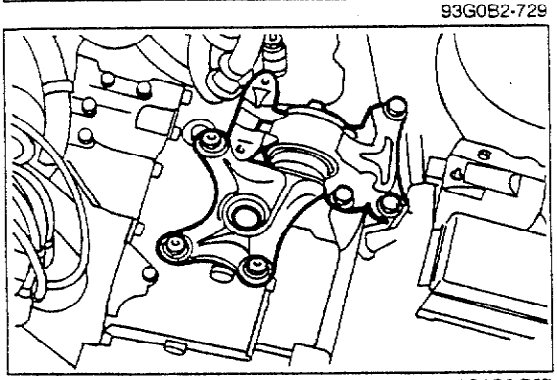
Tightening torque
Ⓐ: 19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)
Ⓑ: 37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

2. Install the drive belt. (Refer to page B2–2)

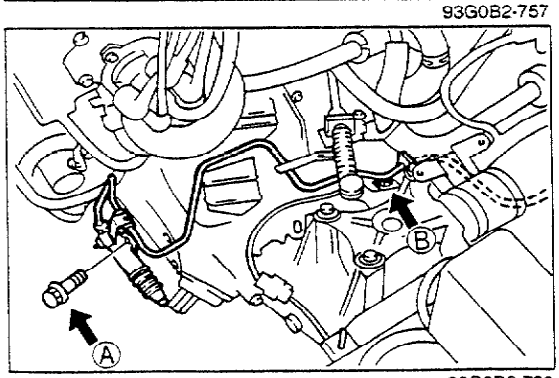

93G0B2-729

Engine mount, clutch release cylinder and engine mount member

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


93G0B2-757

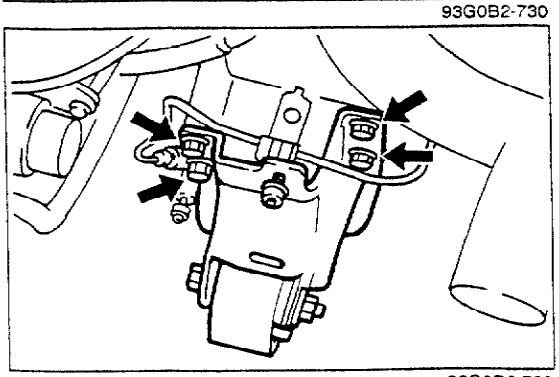
2. Install the No.4 engine mount rubber and bracket assembly, and loosely tighten the bolts and nuts.



93G0B2-730

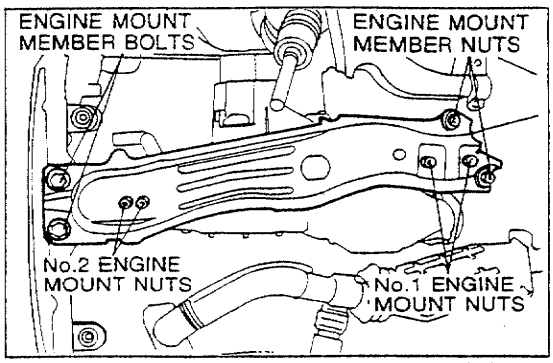
3. Install the clutch release cylinder and pipe bracket assembly.

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)

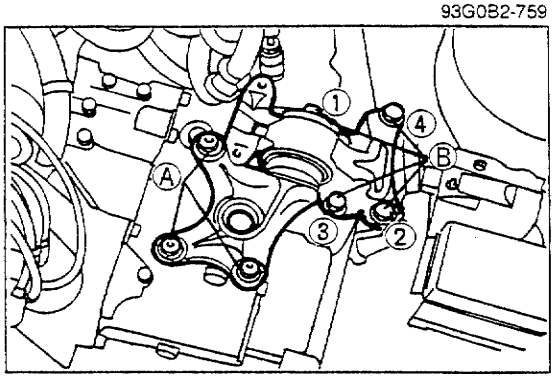

93G0B2-758

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

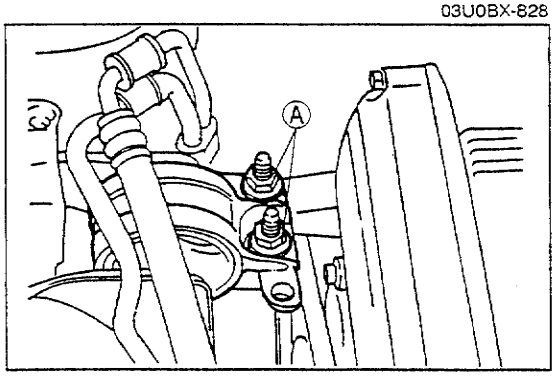
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)



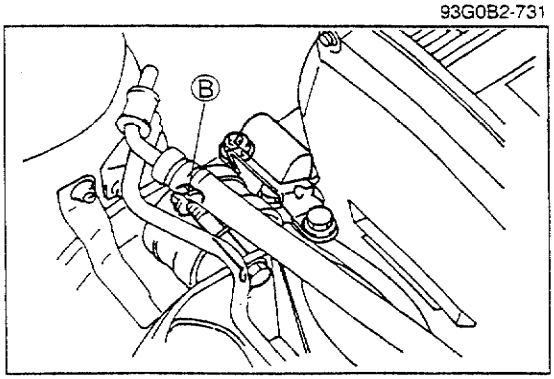
93G0B2-759



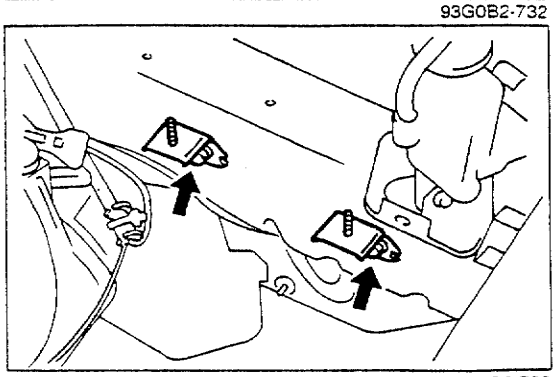
03U0BX-828



93G0B2-731



93G0B2-732


93G0B2-733

5. Align the engine mount member to the No.1 and No.2 engine mount bolts, and loosely tighten the nuts.
6. Install and tighten the engine mount member bolt and nuts.

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)

8. Tighten bolts Ⓑ 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 Ⓐ.

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

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

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

11. Tighten No.3 engine mount nut Ⓑ.

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

12. Install the dynamic damper.

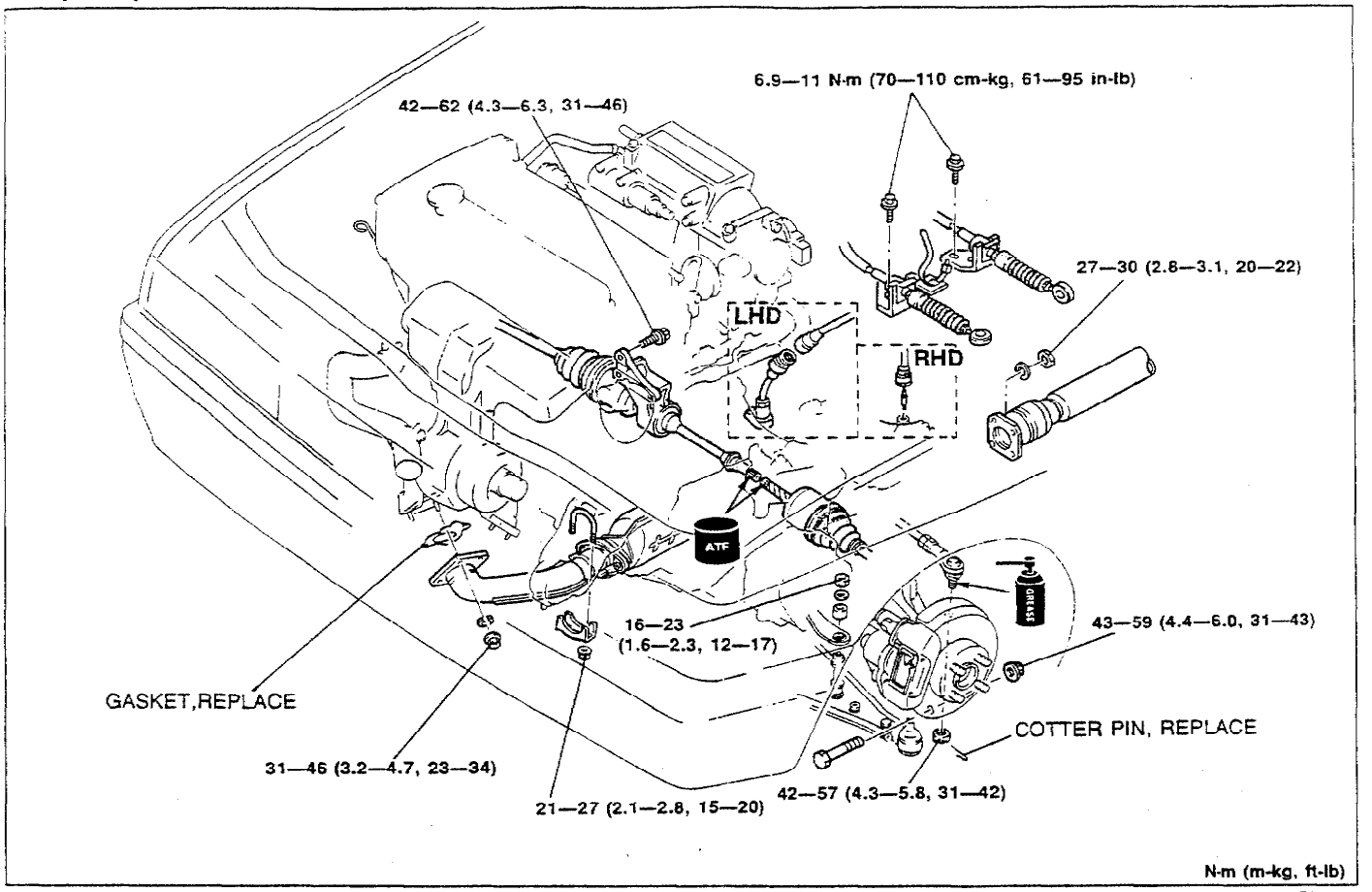
Tightening torque:
55—80 N·m (5.6—8.2 m-kg, 41—59 ft-lb)

13. Remove the chain hoist.

Intercooler bracket
1. Install the intercooler bracket.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

Step 3
Torque Specifications

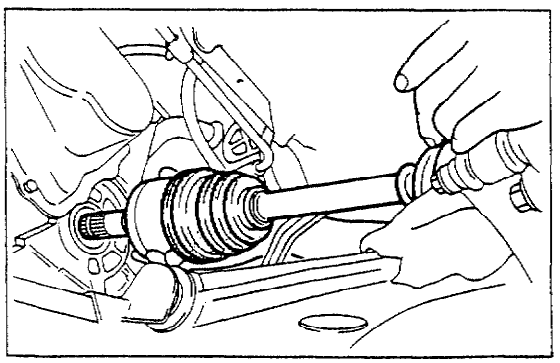


03U0BX-830

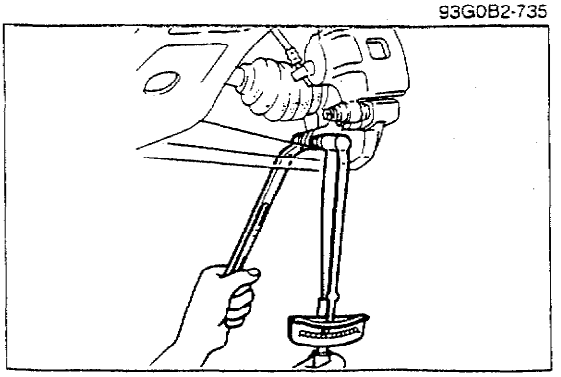
Propeller shaft

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

93G0B2-734



93G0B2-735



93G0B2-736

Driveshaft

1. Apply grease to the end of the driveshaft.

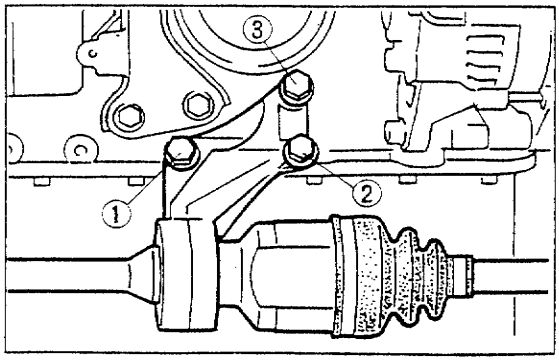
Caution

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

2. Install the driveshaft along with a new clip.

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

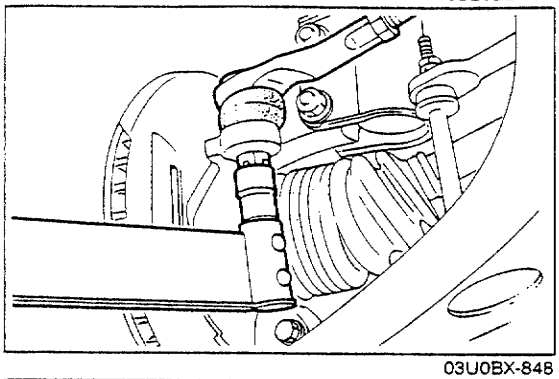
Tightening torque:
43—59 N·m (4.4—6.0 m-kg, 31—43 ft-lb)



93E0B2-061

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

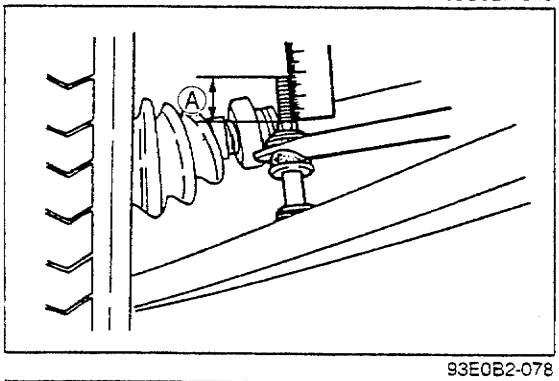
Tightening torque:
42—62 N·m (4.3—6.3 m-kg, 31—46 ft-lb)


03U0BX-848

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.

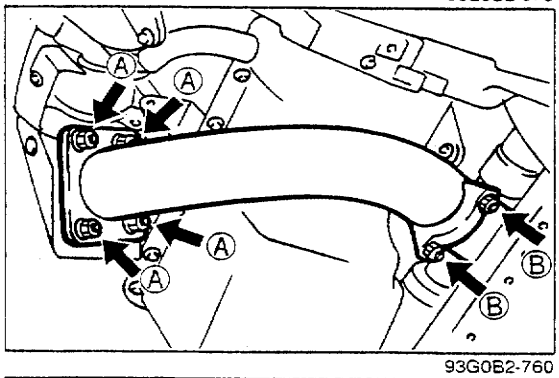


93E0B2-078

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)



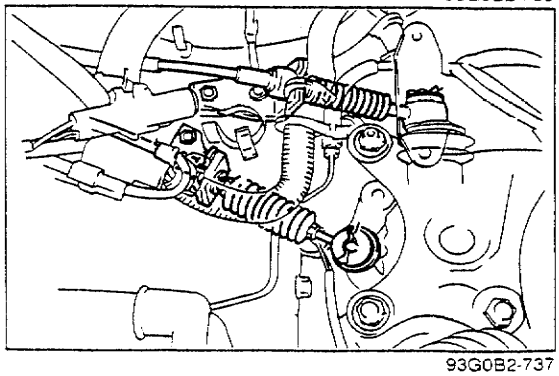
93G0B2-760

Exhaust pipe
1. Install the exhaust pipe along with a new gasket, and loosely tighten locknuts Ⓐ.
2. Loosely tighten bracket nuts Ⓑ.
3. Tighten locknuts Ⓐ.

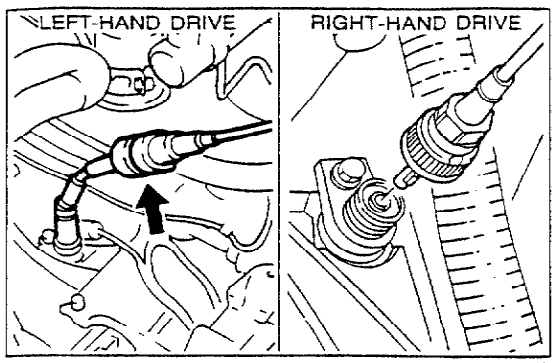
Tightening torque:
31—46 N·m (3.2—4.7 m-kg, 23—34 ft-lb)

4. Tighten bracket nuts Ⓑ.

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


93G0B2-737

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

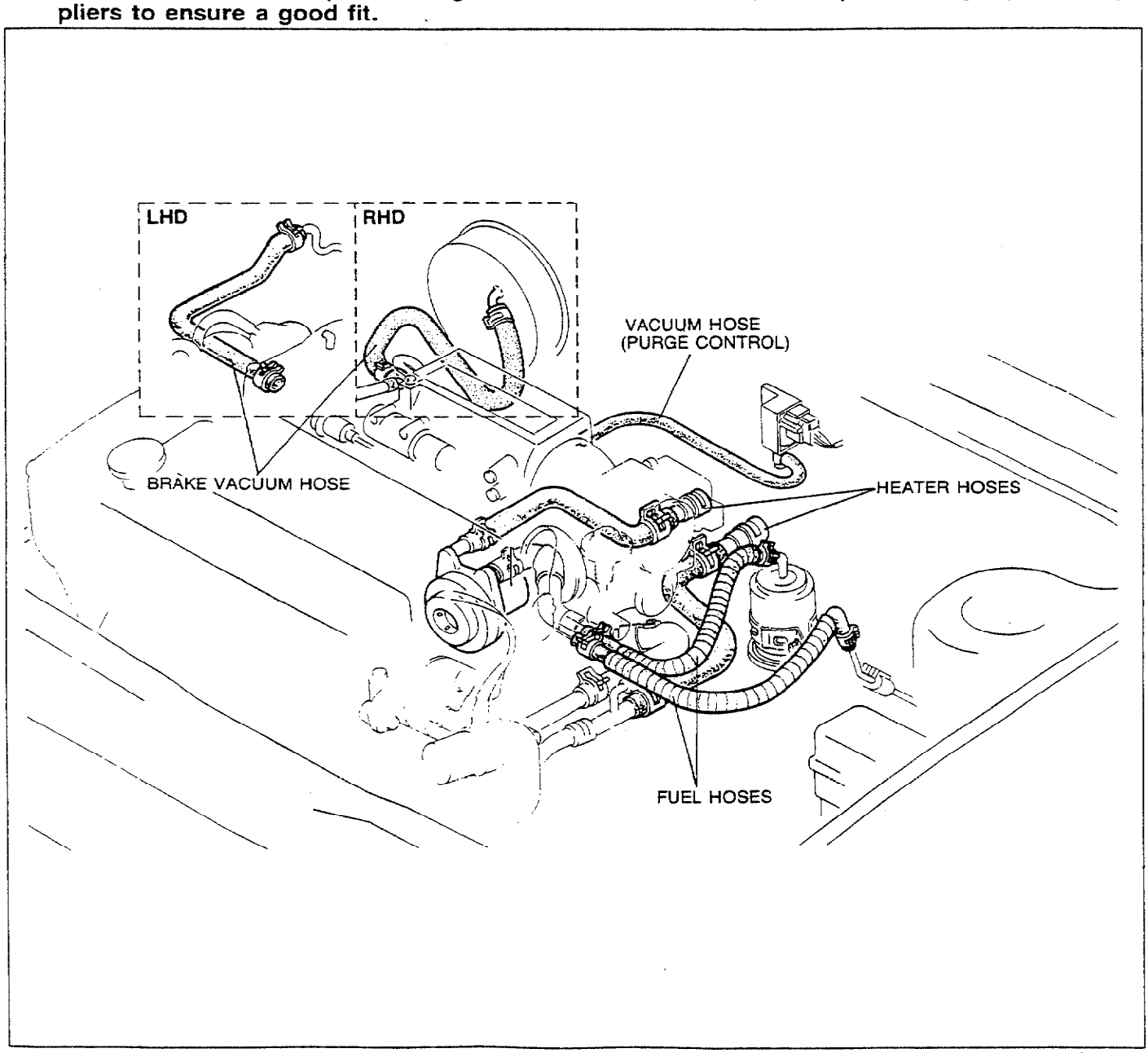


03U0BX-835

Speedometer cable
1. Connect the speedometer cable.

Step 4
1. Connect the hoses shown in the figure.

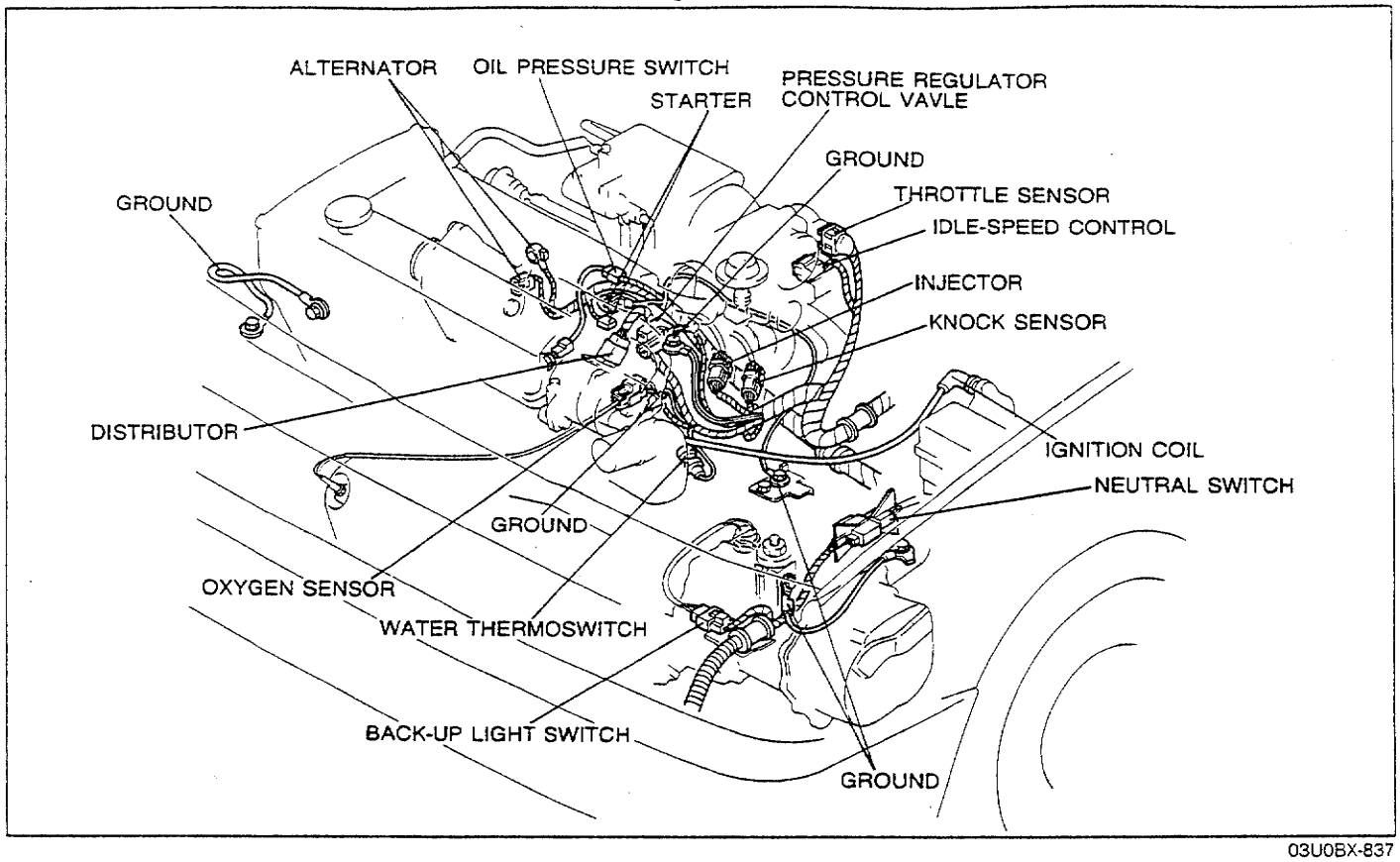
Caution
- **Position the hose clamp in the original location on the hose, and squeeze it lightly with large pliers to ensure a good fit.**



93G0B2-761

Step 5

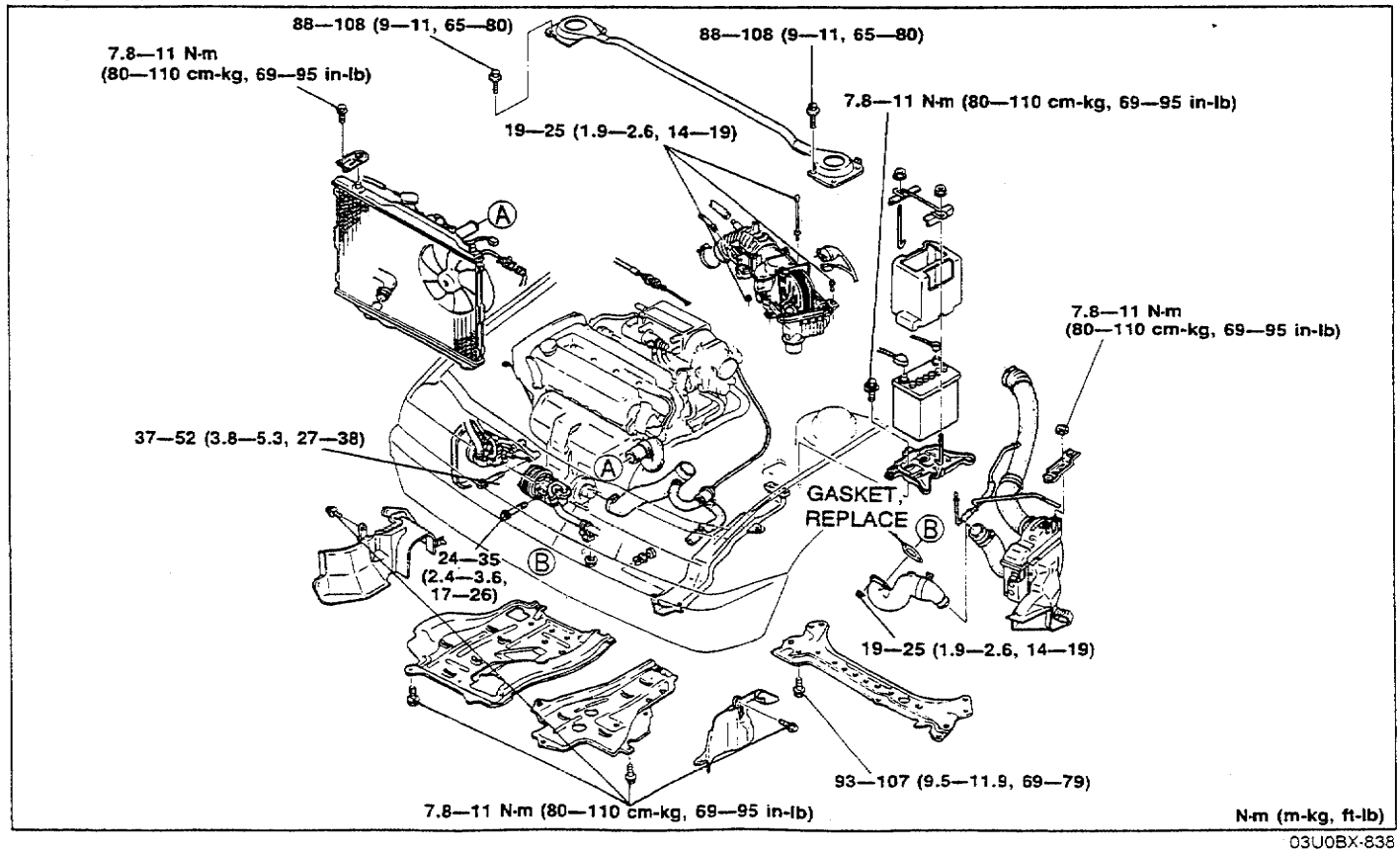
1. Connect the harness connectors shown in the figure.



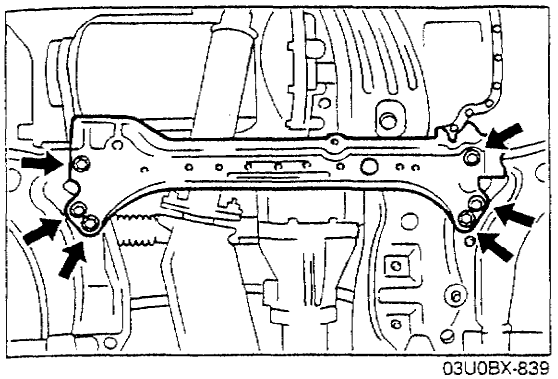
03U0BX-837

Step 6

Torque Specifications

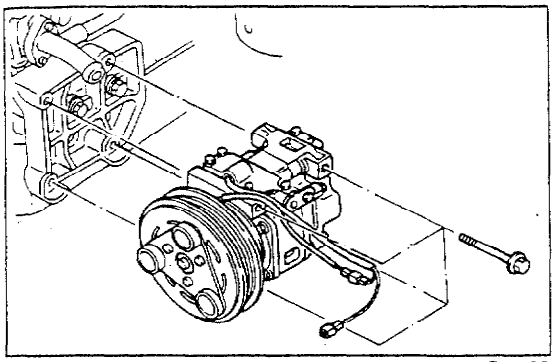


03U0BX-838


03U0BX-839

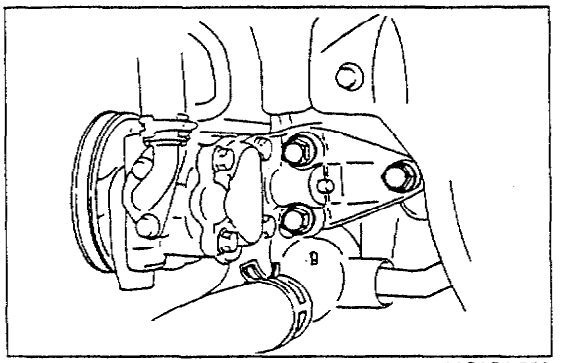
Crossmember
1. Install the crossmember.

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.

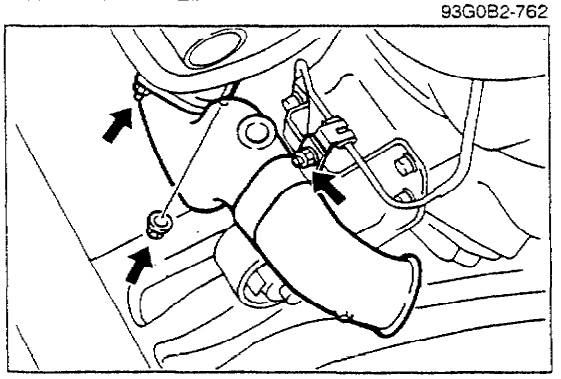
Tightening torque:
24—35 N·m (2.4—3.6 m-kg, 17—26 ft-lb)


93G0B2-762

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

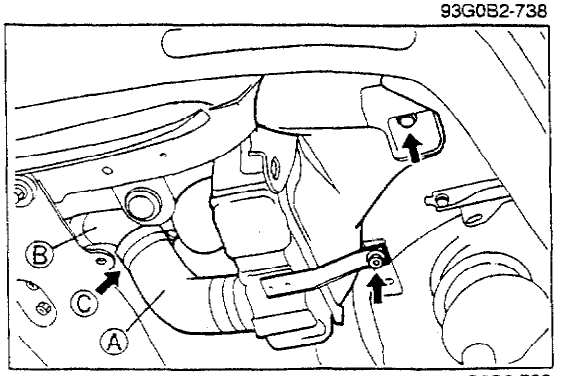
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

Drive belt
1. Install the P/S and/or A/C drive belt.
2. Adjust the drive belt deflections. (Refer to page B2–2)


93G0B2-738

Air pipe
1. Install a new gasket and install the air pipe.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

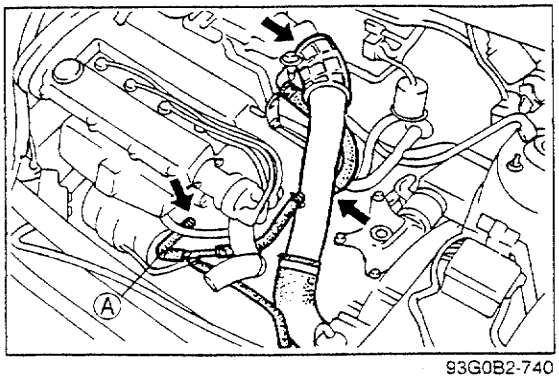


93G0B2-739

Intercooler and air pipe assembly
1. Lift the intercooler and air pipe assembly from the bottom of the vehicle, and install hose Ⓐ in pipe Ⓑ.
2. Install and tighten the mounting bolt and nut.

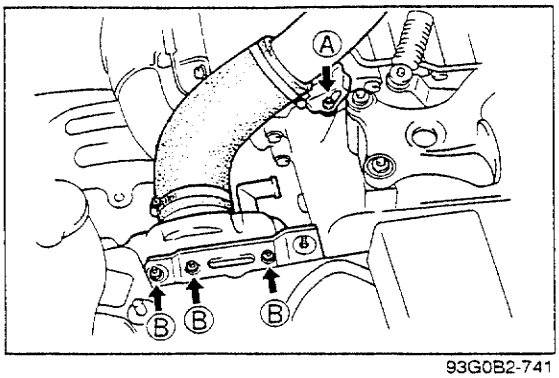
Tightening torque:
7.8—11 N·m (80—110 cm-kg, 69—95 in-lb)

3. Tighten hose clamp Ⓒ.



93G0B2-740

4. Connect the air pipe to the throttle body, and tighten the hose clamp.
5. Connect air hose Ⓐ to the wastegate diaphragm, and securely tighten the hose clamp.



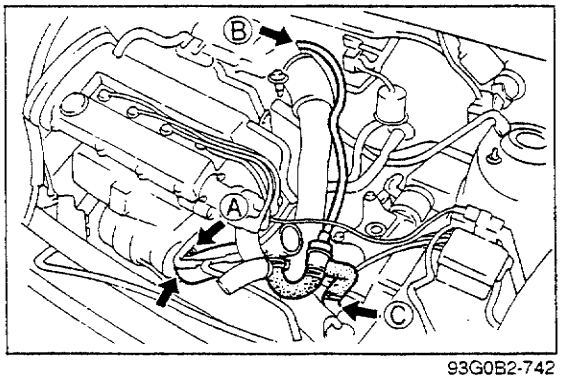
93G0B2-741

6. Install nut Ⓐ.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

7. Install the intercooler bracket and tighten nuts Ⓑ.

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

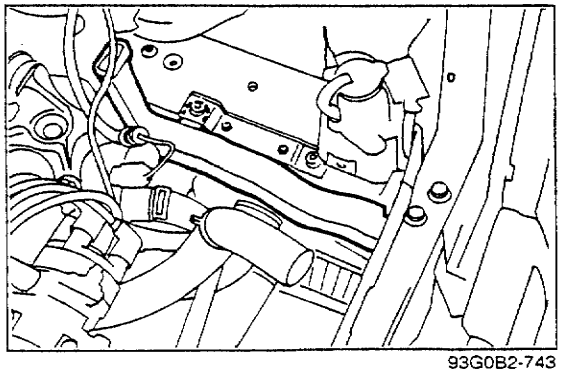


93G0B2-742

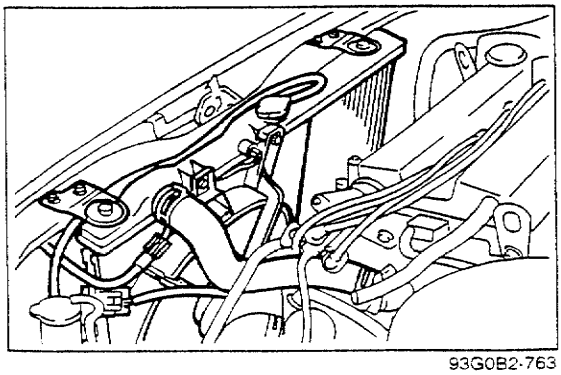
Air pipe and air bypass valve assembly
1. Connect the air pipe to the turbocharger, and securely tighten the hose clamp.
2. Install and tighten the bolt Ⓐ.

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

3. Connect air hose Ⓑand Ⓒ, and securely tighten the hose clamps.


93G0B2-743

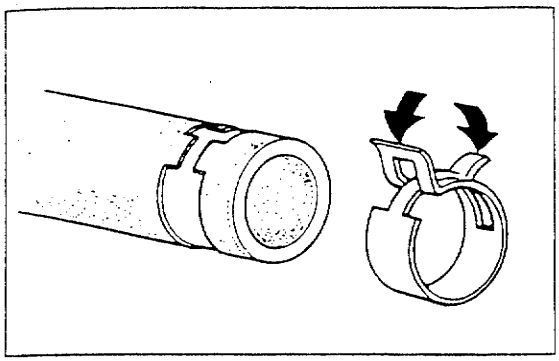
Battery duct
1. Install the battery duct.


93G0B2-763

Radiator and cooling fan assembly
1. Install the radiator and cooling fan assembly.

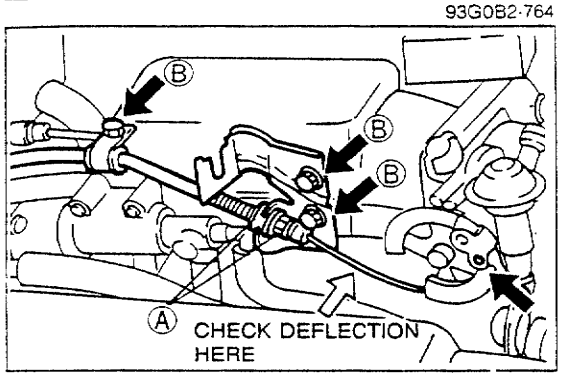
Tightening torque:
7.8—11 N·m (80—110 cm-kg, 69—95 in-lb)

2. Connect the cooling fan connector.
3. Connect the radiator switch connector.
4. Connect the oil cooler hose.
5. Connect the coolant reservoir hose.
6. Connect the upper and lower radiator hoses.



93G0B2-764

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



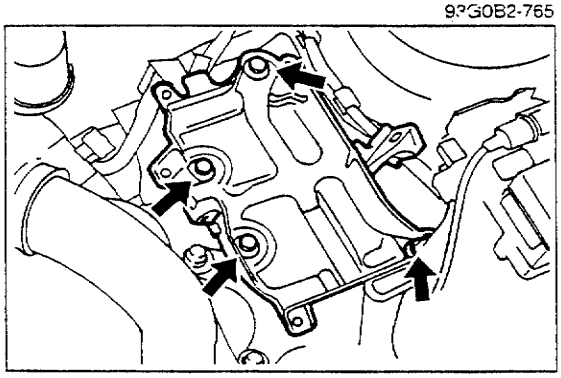
93G0B2-765

Accelerator cable
1. Install the accelerator cable.

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

2. Adjust the cable deflection by turning nuts Ⓐ.

Deflection: 1—3mm (0.04—0.12 in)



93G0B2-744

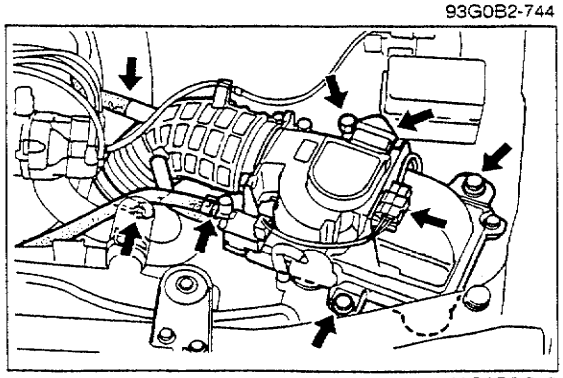
Battery carrier and battery
1. Install the battery carrier.

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

2. Install the battery and the battery cover.
3. Install the battery bracket.

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

4. Connect the positive battery cable.

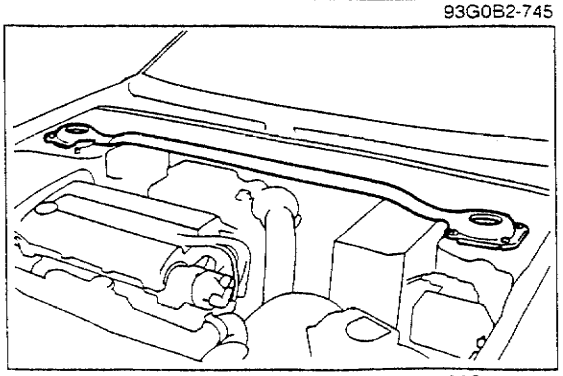


93G0B2-745

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)

2. Connect the airflow sensor connector.
3. Connect the hoses shown in the figure.



93G0B2-746

Strut tower bar
1. Install the strut tower bar.

Tightening torque:
88—108 N·m (9.0—11.0 m-kg, 65—80 ft-lb)

Undercover and side cover
1. Install the undercovers and side covers.

Steps after installation

1. If the engine oil was drained, refill 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 page J3–36.)
4. Connect the negative battery cable.
5. Start the engine and check the following:
   (1) Engine oil, transaxle oil, and engine coolant for leakage
   (2) Ignition timing and idle speed
   (3) Operation of emission control system
6. Perform a road test.
7. Recheck the engine oil and engine coolant levels.

93G0B2-747

LUBRICATION SYSTEM

93G0DX-701

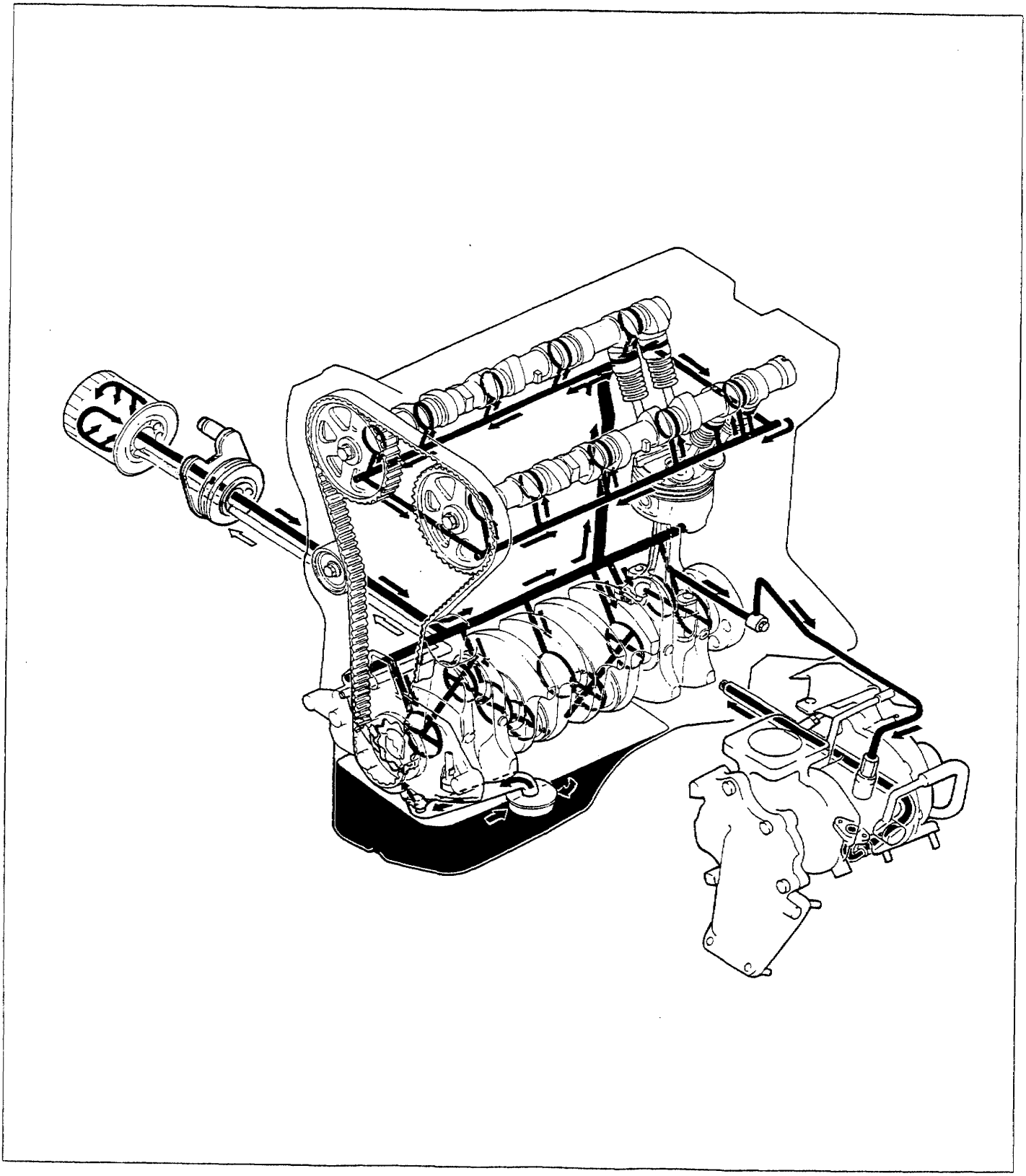
OUTLINE

OUTLINE OF CONSTRUCTION

The lubrication system of the 323 4WD engine is the same as for the 2WD model.
The BP DOHC turbocharged engine oil circulation path is different than that of the BP DOHC non-turbocharged engine because of the turbocharger lubrication.

93G0DX-702

LUBRICATION CIRCUIT



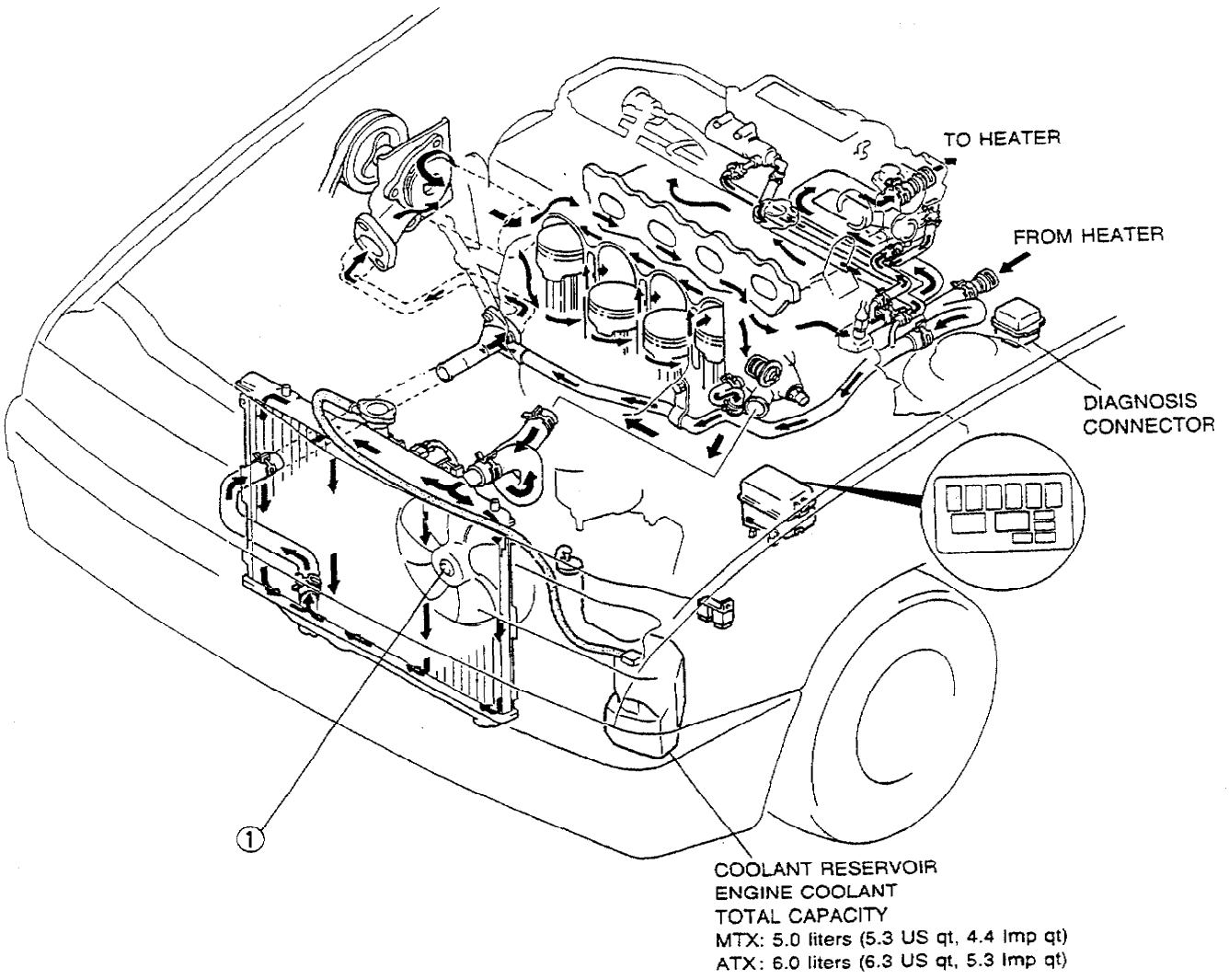
93G0DX-703

COOLING SYSTEM

93G0EX-701

INDEX

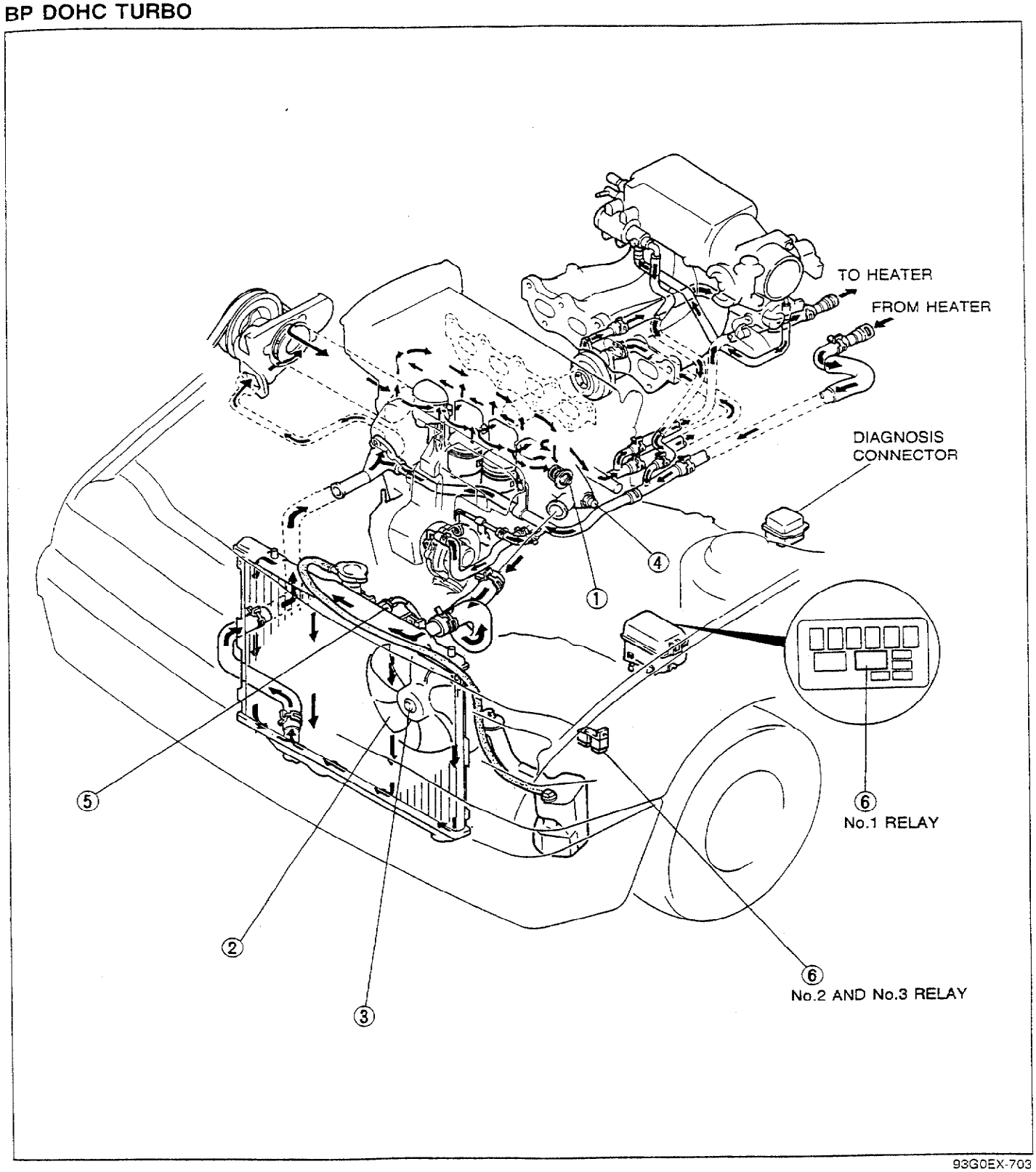
BP SOHC



93G0EX-702

1. Fan motor
   Inspection ..... page E-11

BP DOHC TURBO



93G0EX-703

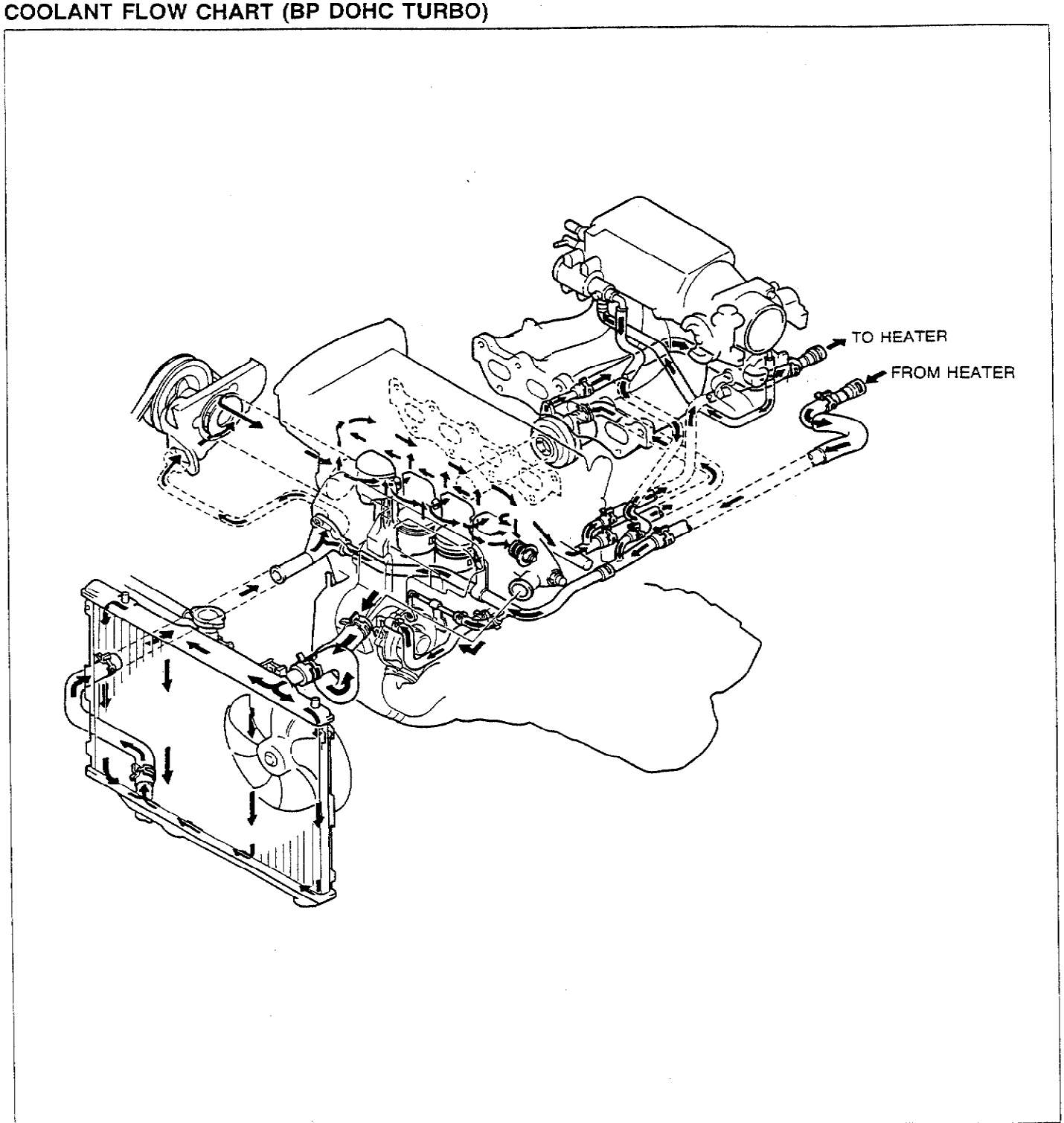
OUTLINE

OUTLINE OF CONSTRUCTION

The cooling system in the 323 4WD model is basically the same as in the 323 2WD model.
Although there is no fundamental change from the BP DOHC of the 2WD model, the coolant circulation path has been changed to direct coolant to the water-cooled turbocharger.
A two-stage thermostat is used in the BP DOHC turbocharged engine to stabilize the engine coolant temperature.
The radiator and cooling fan specifications are different. The BP DOHC turbocharged engine of the 4WD model uses a two-speed electric cooling fan.

93G0EX-704

COOLANT FLOW CHART (BP DOHC TURBO)



93G0EX-705

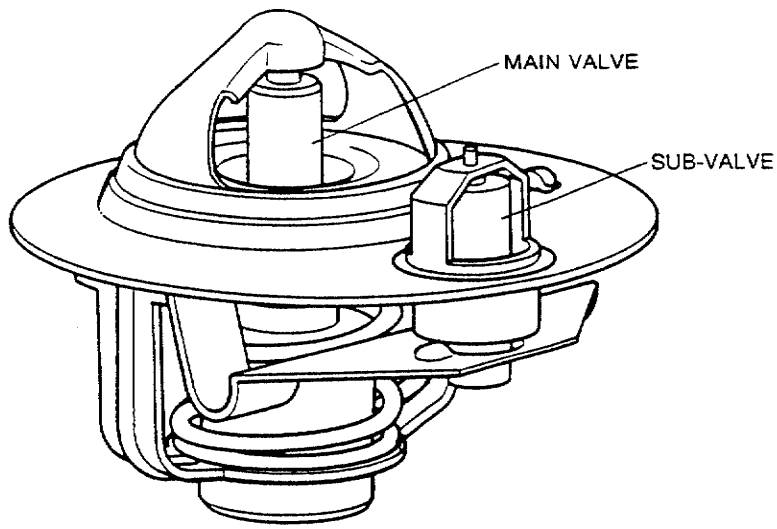
SPECIFICATIONS

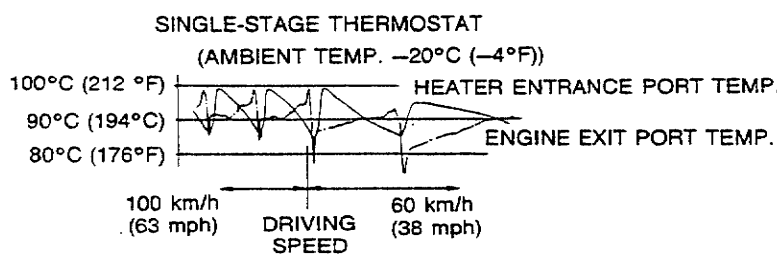
Item \ Engine/Transaxle			BP SOHC		BP DOHC Turbo
			MTX	ATX	MTX
Cooling system			Water-cooled, forced circulation		
Coolant capacity		liters (US qt, Imp qt)	5.0 (5.3, 4.4)	6.0 (6.3,5.3)	
Water pump	Type		Centrifugal		
	Water seal		Unified mechanical seal		
Thermostat	Type		Wax,single stage*1, Wax, two-stage*2		Wax, two-stage
	Opening temperature	°C (°F)	80.5—83.5 (177—182)*1		Main: 86.5—89.5 (188—193) Sub : 83.5—86.5 (182—188)
			Main: 86.5—89.5 (188—193)*2 Sub : 83.5—86.5 (182—188)		
	Full-open temperature	°C (°F)	95 (203)*1, 100 (212)*2		100 (212)
	Full-open lift	mm (in)	8.5 (0.335) or more*1		Main: 8.0 (0.31) min. Sub : 1.5 (0.06) min.
			Main: 8.0 (0.31) min.*2 Sub : 1.5 (0.06) min		
Radiator	Type		Corrugated fin		
	Cap valve opening-pressure	kPa (kg/cm², 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. Lo: 8.8 + 10% max.	

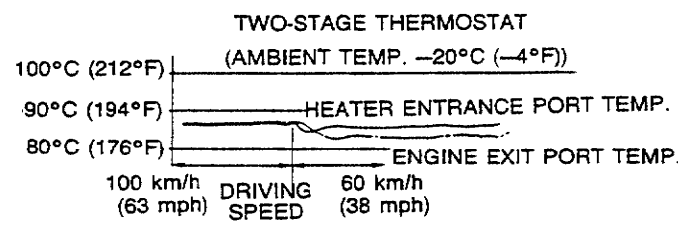
*1...Except cold area, *2...Cold area only

93G0EX-706

TWO-STAGE THERMOSTAT (BP DOHC TURBO)







93G0EX-707

A sub-valve is incorporated in the thermostat to stabilize the coolant temperature in the engine, to improve cold weather performance, and to reduce heater output temperature fluctuations as noted in the diagram.

Operation

Stage 1

During cold weather operation, 83.5°C [182°F]—86.5°C [188°F] only the sub-valve opens to control the engine coolant temperature.

Stage 2

During normal operation, 86.5°C (188°F)—89.5°C (193°F) the main valve opens to permit increased coolant flow through the radiator.

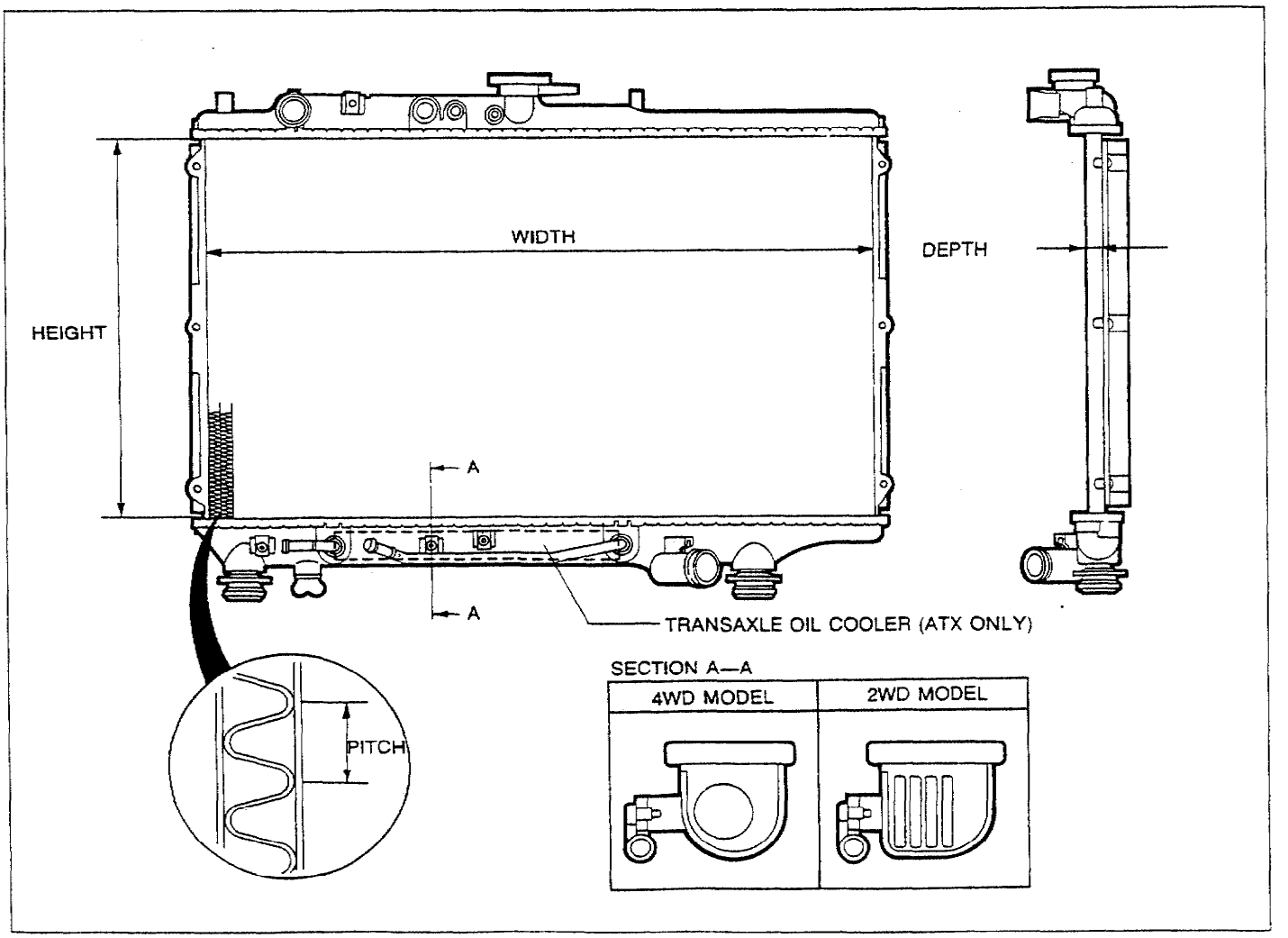
RADIATOR AND COOLING FAN

The radiator and cooling fan specifications are revised.

Specifications

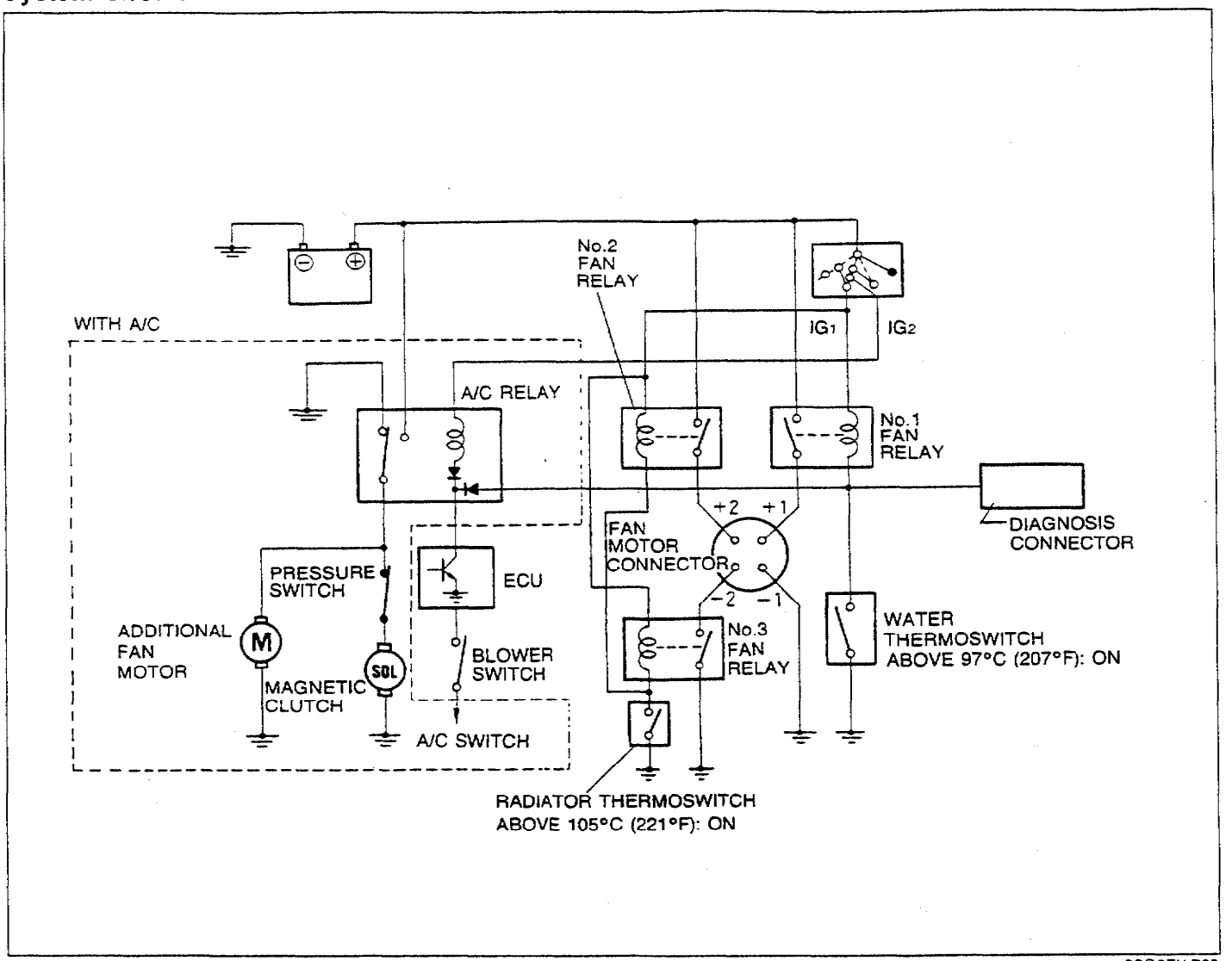
Item \ Engine/Transaxle		BP SOHC		BP DOHC Turbo
		MTX	ATX	MTX
Radiator				
Core size mm (in)	Width	647	←	←
	Height	390	←	←
	Depth	16	25	←
Fin pitch mm (in)		1.3	←	←
Heat dissipation capacity kcal/h		38,800	43,800	←
Transaxle oil cooler	Type	—	Double tube	—
	Heat dissipation capacity kcal/h	—	1,650	—
Cooling fan				
Number of blades		4	5	←
Outer diameter mm (in)		320	340	←
Capacity W-V		80-12	160-12	←
Current A		6.6 ± 1	Hi : 13.3 + 10% max. Lo: 8.8 + 10% max.	←

93G0EX-708



ELECTRIC COOLING FAN SYSTEM (BP DOHC TURBO)

System Circuit



93G0EX-709

Operation

1. When the coolant temperature exceeds 97°C (207°F), the water thermoswitch turns ON to close the No.1 relay, and connects the +1 and −1 terminals of the fan motor connector. The fan motor turns at low speed (about 1,660 rpm).
2. When the coolant temperature exceeds 105°C (221°F), the radiator thermoswitch turns ON, to close the No.2 and No.3 relays, and connects the +2 and −2 terminals of the fan motor connector. The fan motor turns at high speed (about 2,200 rpm).
3. If the vehicle is equipped with air conditioning, the cooling fan motor operates whenever the A/C switch and the blower switch are on, regardless of the coolant temperature.
   Also, when the A/C switch and the blower switch are on, the A/C relay closes to operate the additional fan motor.

Note

- **The water thermoswitch and the cooling fan relay are normally-open switches.**

Checking cooling fan operation

1. Jump across the TFA and the GND terminals of the diagnosis connector with a jumper wire.
2. Turn the ignition switch to ON and verify that the cooling fan operates smoothly.

Note

- **When the water thermoswitch connector is disconnected, the cooling fan will not operate.**

SUPPLEMENTAL SERVICE INFORMATION

The following points in the section are changed in comparison with Workshop Manual [Europe (1203-10-89F), Australia (1204-10-89F)].

Thermostat (BP DOHC Turbo only)
- Inspection

Electric cooling fan system (BP DOHC Turbo only)
- System inspection

Fan motor
- Inspection

Water thermoswitch (BP DOHC Turbo only)
- Inspection

Radiator thermoswitch (BP DOHC Turbo only)
- Removal / Inspection / Installation

Fan relay (BP DOHC Turbo only)
- Removal / Inspection

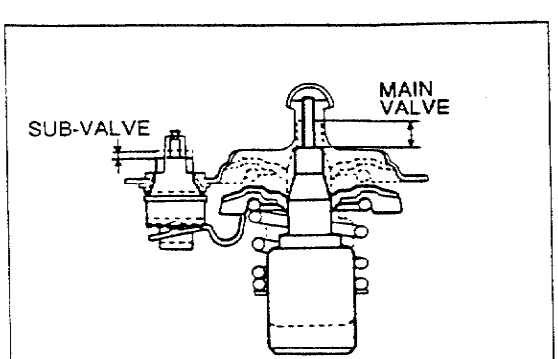
93G0EX-710

THERMOSTAT (BP DOHC TURBO)

INSPECTION

1. Visually check that the thermostat valve is airtight.
2. Place the thermostat and a thermometer in water.
3. Heat the water and check the following:

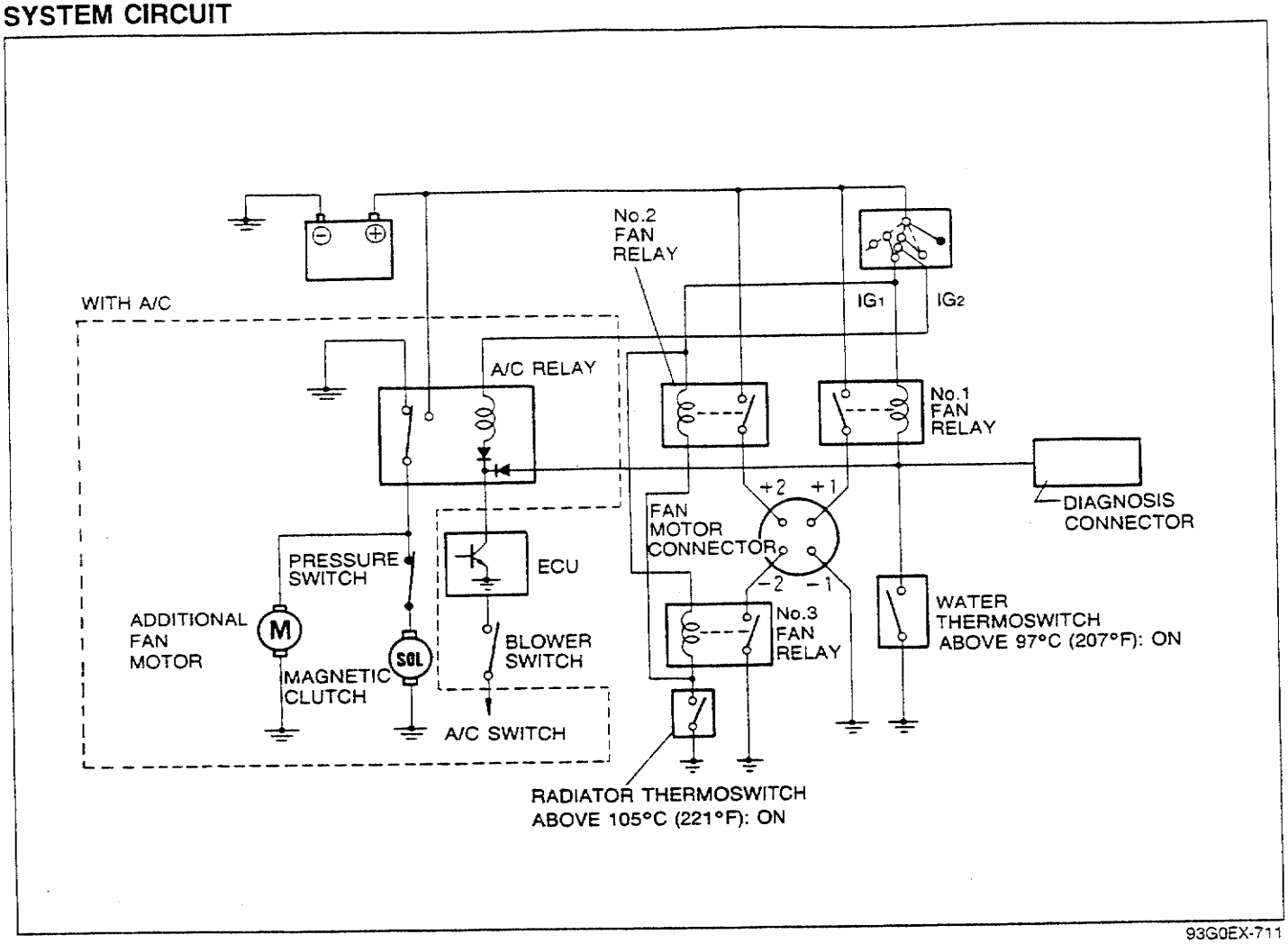
Initial-opening temperature:
Main: 86.5—89.5°C (188—193°F)
Sub : 83.5—86.5°C (182—188°F)
Full-open temperature: 100°C (212°F)
Full-open lift
Main: 8.0mm (0.31 in) min.
Sub : 1.5mm (0.06 in) min.



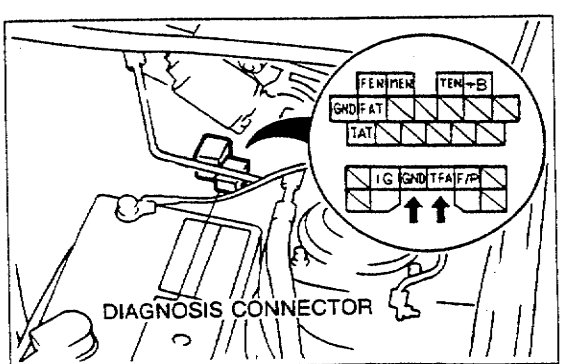
93G0EX-718

ELECTRIC COOLING FAN SYSTEM (BP DOHC TURBO)

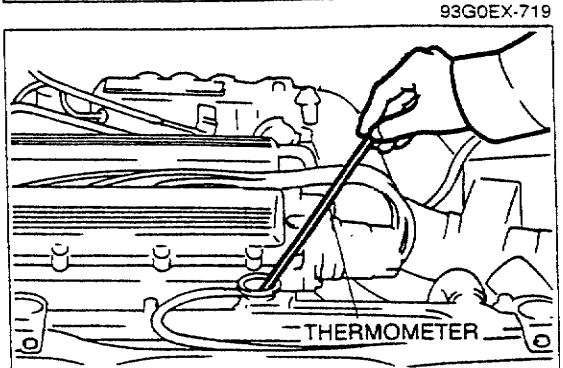
SYSTEM CIRCUIT



93G0EX-711



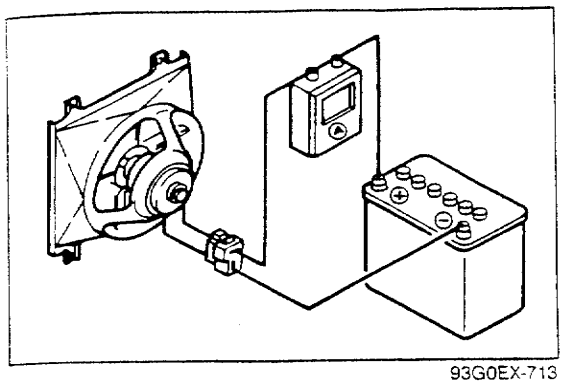
93G0EX-719

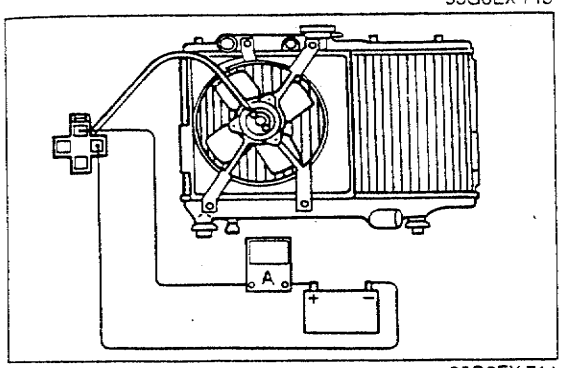


93G0EX-712

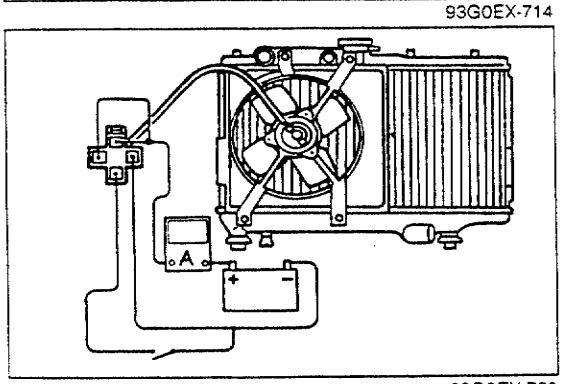
SYSTEM INSPECTION

1. Jump across the test fan (TFA) terminal and the ground (GND) terminal of the diagnosis connector.
2. Turn the ignition switch ON and verify that the fan operates. If the fan does not operate, inspect the cooling fan system components and wiring harness.
3. Remove the radiator cap and place a thermometer in the radiator filler neck.
4. Start the engine.
5. Verify that the fan operates when the coolant temperature reaches **approx. 97°C (207°F)**.
   If it does, check the water thermoswitch. (Refer to page E–11.)


93G0EX-713



93G0EX-714



93G0EX-720

FAN MOTOR

INSPECTION

Single-speed Type (For BP SOHC MTX)

1. Verify that the battery is fully charged.
2. Disconnect the fan motor connector.
3. Connect the battery and an ammeter to the fan motor connector.
4. Verify that current is as specified.

Current (A): 6.6 ± 1

5. If current is not within specification and/or the fan does not turn smoothly, replace the fan motor.

Two-speed Type (Except BP SOHC MTX)

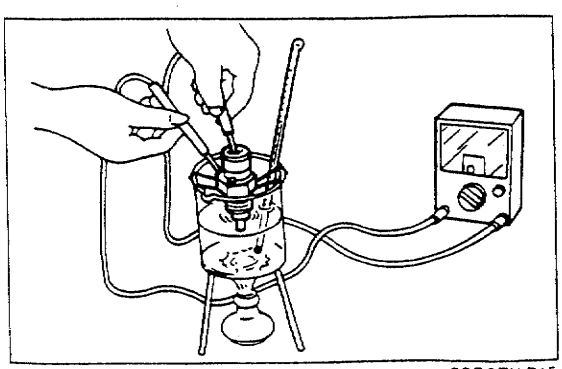
1. Verify that the battery is fully charged.
2. Disconnect the fan motor connector.
3. Connect the battery and an ammeter to the fan motor connectors for low-speed inspection.
4. Verify that the fan motor operates smoothly at the standard current.

Current (A): 8.8 + 10% max.

5. Connect the battery, an ammeter, and switch to the fan motor connectors for high-speed inspection.
6. Verify that the fan motor operates smoothly at the standard current or less with the switch ON.

Current (A): 13.3 + 10% max.

7. If not as specified, replace the fan motor.


93G0EX-715

WATER THERMOSWITCH (BP DOHC TURBO)

INSPECTION

1. Place the switch and a thermometer in water.
2. Heat the water gradually and check continuity of the switch with an ohmmeter.

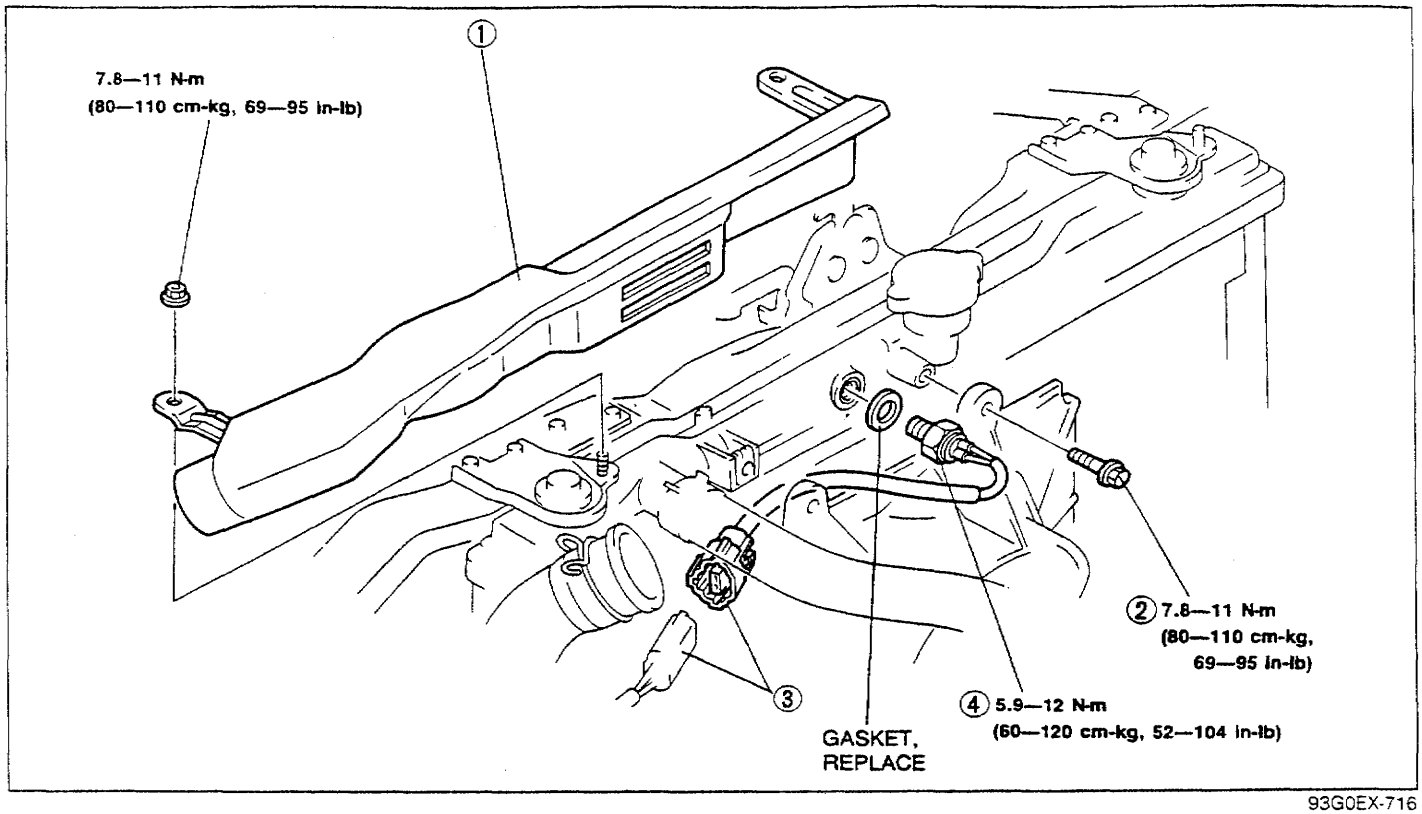
Coolant temperature °C (°F)	Continuity
More than 97 (207)	Yes
Less than 90 (194)	No

3. If not as specified, replace the water thermoswitch.

RADIATOR THERMOSWITCH (BP DOHC TURBO)

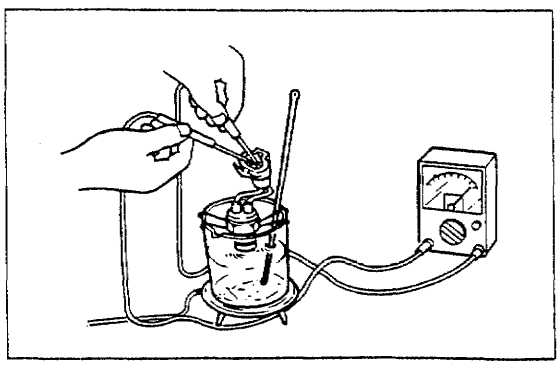
REMOVAL / INSPECTION / INSTALLATION

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to **Installation Note**.



93G0EX-716

1. Resonance chamber
2. Radiator cowling mounting bolts
3. Radiator thermoswitch connector
4. Radiator thermoswitch
   Inspection ..... below
   Installation Note ..... below



03U0EX-027

INSPECTION

1. Place the switch and a thermometer in engine oil.

Warning
- **Do not heat the engine oil above 120°C (248°F)**

2. Heat the engine oil gradually and check continuity of the switch with an ohmmeter.

Engine oil temperature °C (°F)	Continuity
More than 105 (221)	Yes
Less than 96 (205)	No

3. If not as specified, replace the radiator thermoswitch.

Installation Note
Radiator thermoswitch

Caution
- **Do not use an impact wrench for installation.**

1. Install the radiator thermoswitch along with a new gasket.

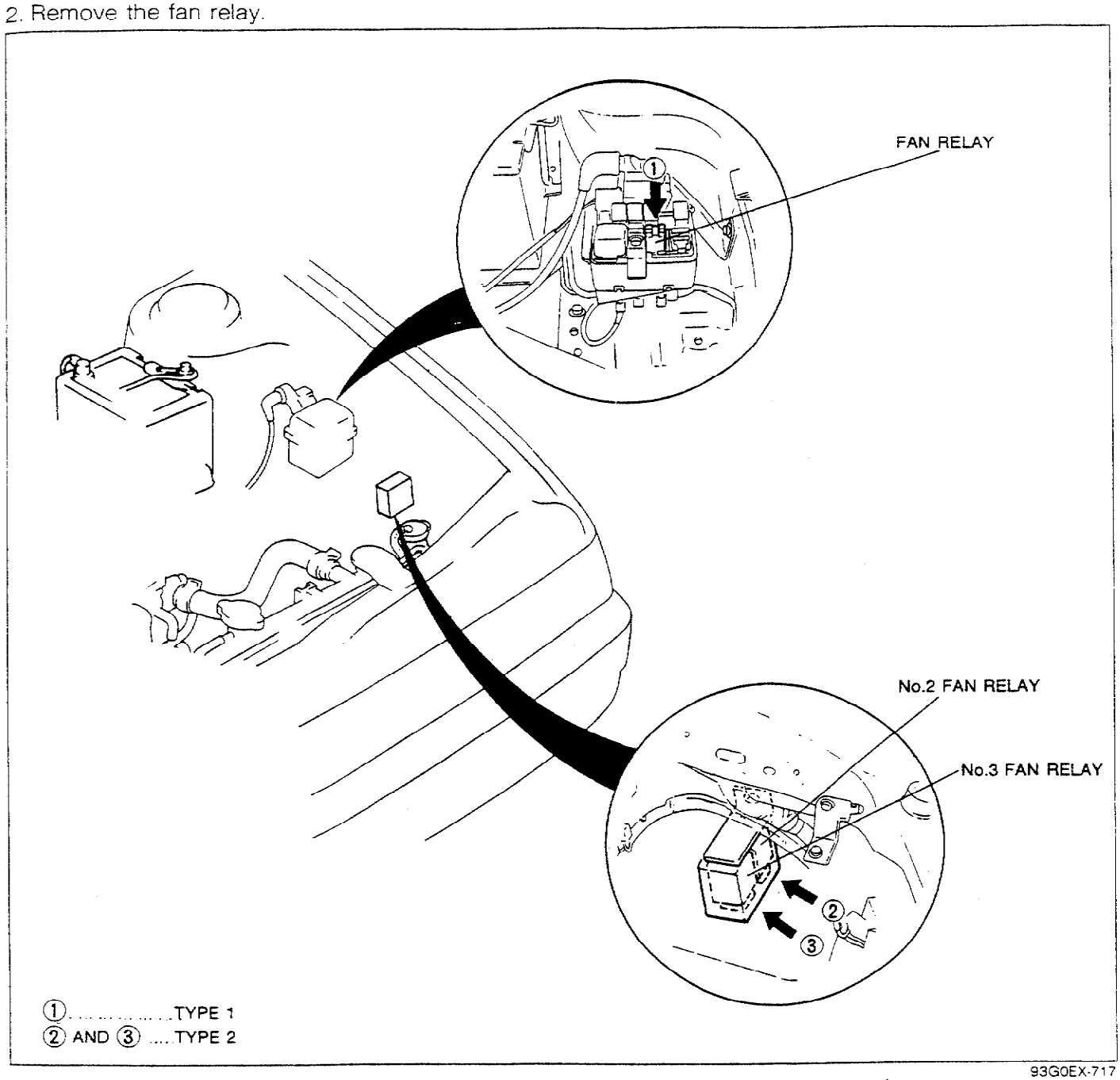
Tightening torque:
5.9—12 N·m (60—120 cm-kg, 52—104 in-lb)

93G0EX-721

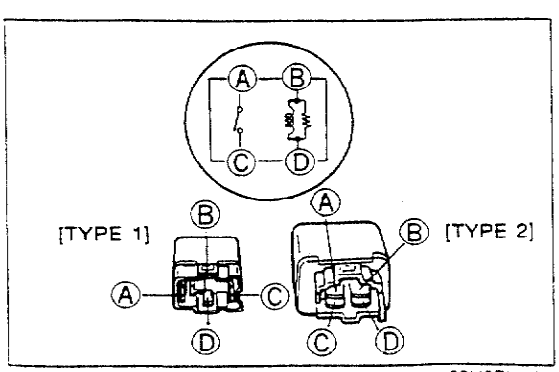
FAN RELAY (BP DOHC TURBO)

REMOVAL / INSPECTION

1. Disconnect the negative battery cable.
2. Remove the fan relay.



93G0EX-717



03U0EX-030

INSPECTION

1. Check continuity as shown with an ohmmeter.

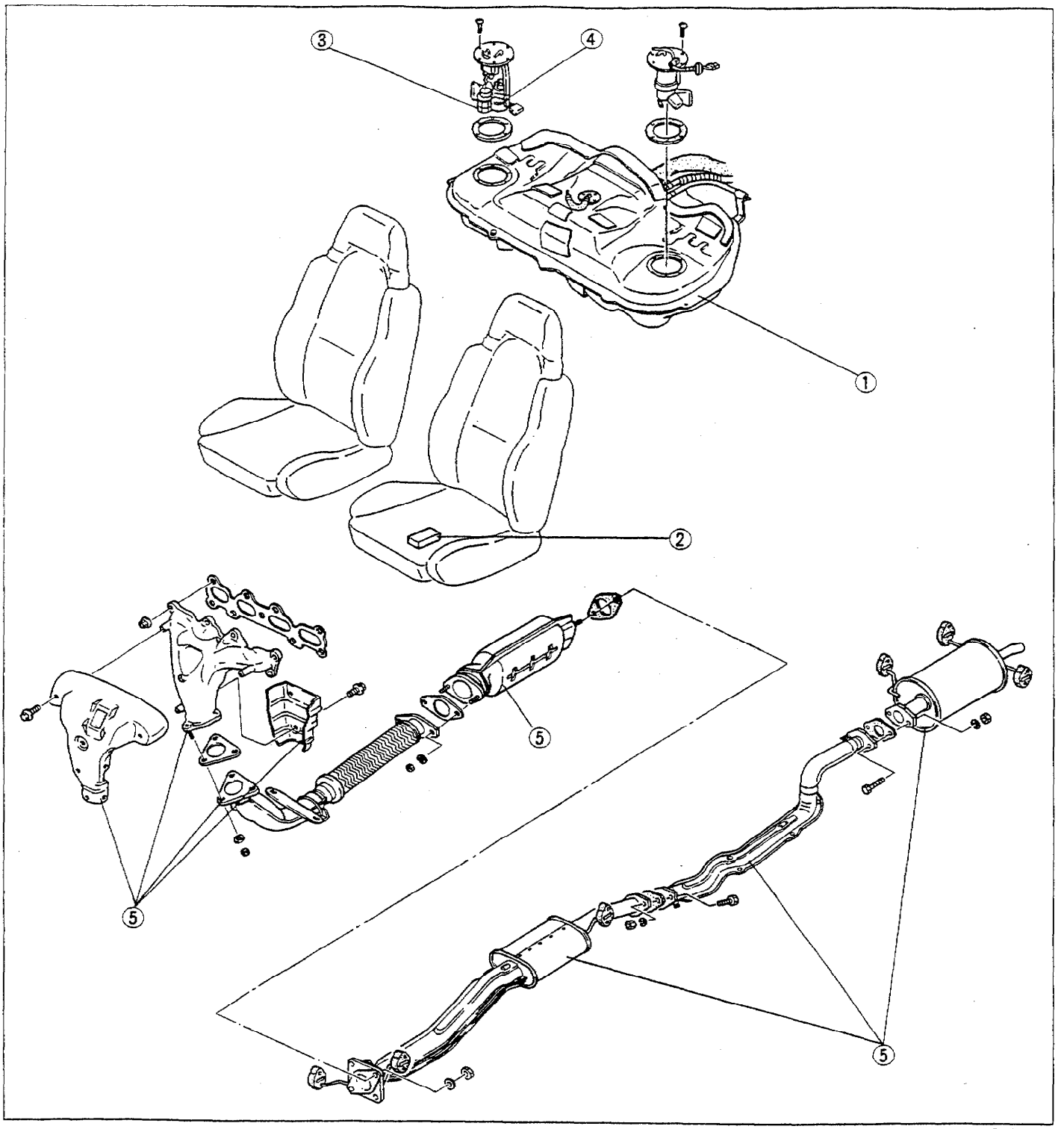
Terminal	Continuity
A—C	No
B—D	Yes

2. Apply 12V between terminals B and D.
   Check for continuity between terminals A and C.
3. If not as specified, replace the fan relay.

FUEL AND EMISSION CONTROL SYSTEMS (WITHOUT CATALYTIC CONVERTER)

93G0F1-701

INDEX



93G0F1-702

OUTLINE

OUTLINE OF CONSTRUCTION

The fuel and emission control systems of the New 323 BP SOHC-engine equipped 4WD model are basically the same as those of the New 323 BP DOHC-engine equipped 2WD model, 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 a transfer pump is equipped to pump the fuel from the left to the right (fuel pump side) section of the fuel tank. The following chart shows the differences between the major parts of the BP DOHC 2WD model and the BP SOHC 4WD model.

93G0F1-703

Difference

Part	BP DOHC 2WD	BP SOHC 4WD	Remark
Transfer pump	—	○	Due to installation of propeller shaft
Variable inertia charging system	○	—	Due to change of engine
Two group fuel injection	○	—	
G-signal (Distributor)	○	—	Due to abolishment of two group fuel injection

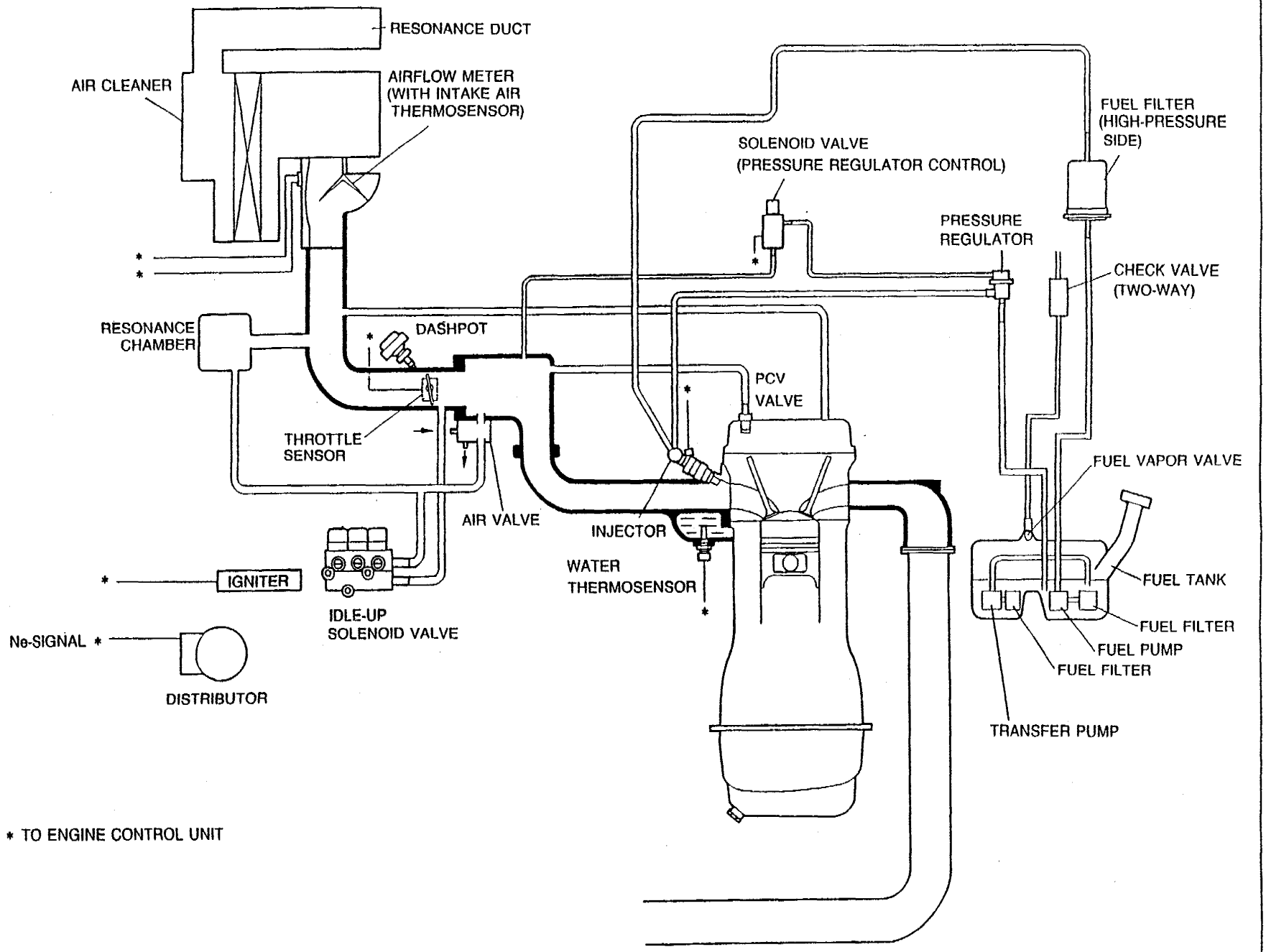
93G0F1-704

SPECIFICATIONS

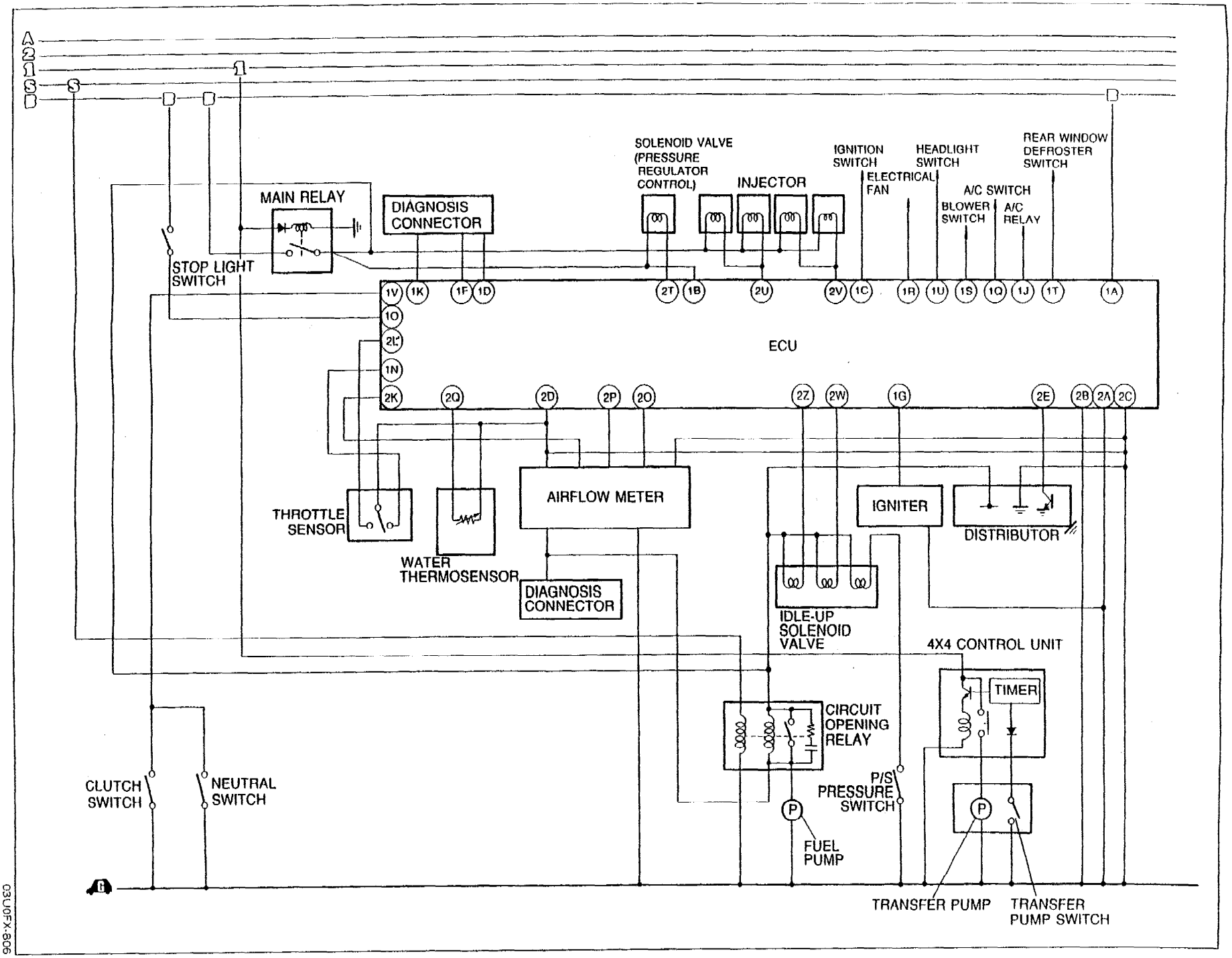
Item \ Engine			BP SOHC
Idle speed		rpm	850 ± 50
Ignition timing*		BTDC	5 ± 1°
Fuel pump			
Maximum output pressure		kPa (kg/cm², psi)	441—589 (4.5—6.0, 64—85)
Transfer pump			
Maximum output pressure		kPa (kg/cm², psi)	More than 39 (0.4, 5.7)
Fuel filter			
Type	Low-pressure side		Nylon element
	High-pressure side		Paper element
Pressure regulator			
Regulating pressure		kPa (kg/cm², psi)	264—314 (2.7—3.2, 38.3—45.5)
Injector			
Type			High-ohmic
Resistance		Ω	12—16
Idle-up solenoid valve			
Resistance		Ω	Solenoid A.....17—23, Solenoid B, C.....27—38
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 200—600
			Fully open 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			Regular (91 RON or higher)

93G0F1-705

* TEN terminal of diagnosis connector grounded.
The ▭ (shading) indicates newly equipped parts.

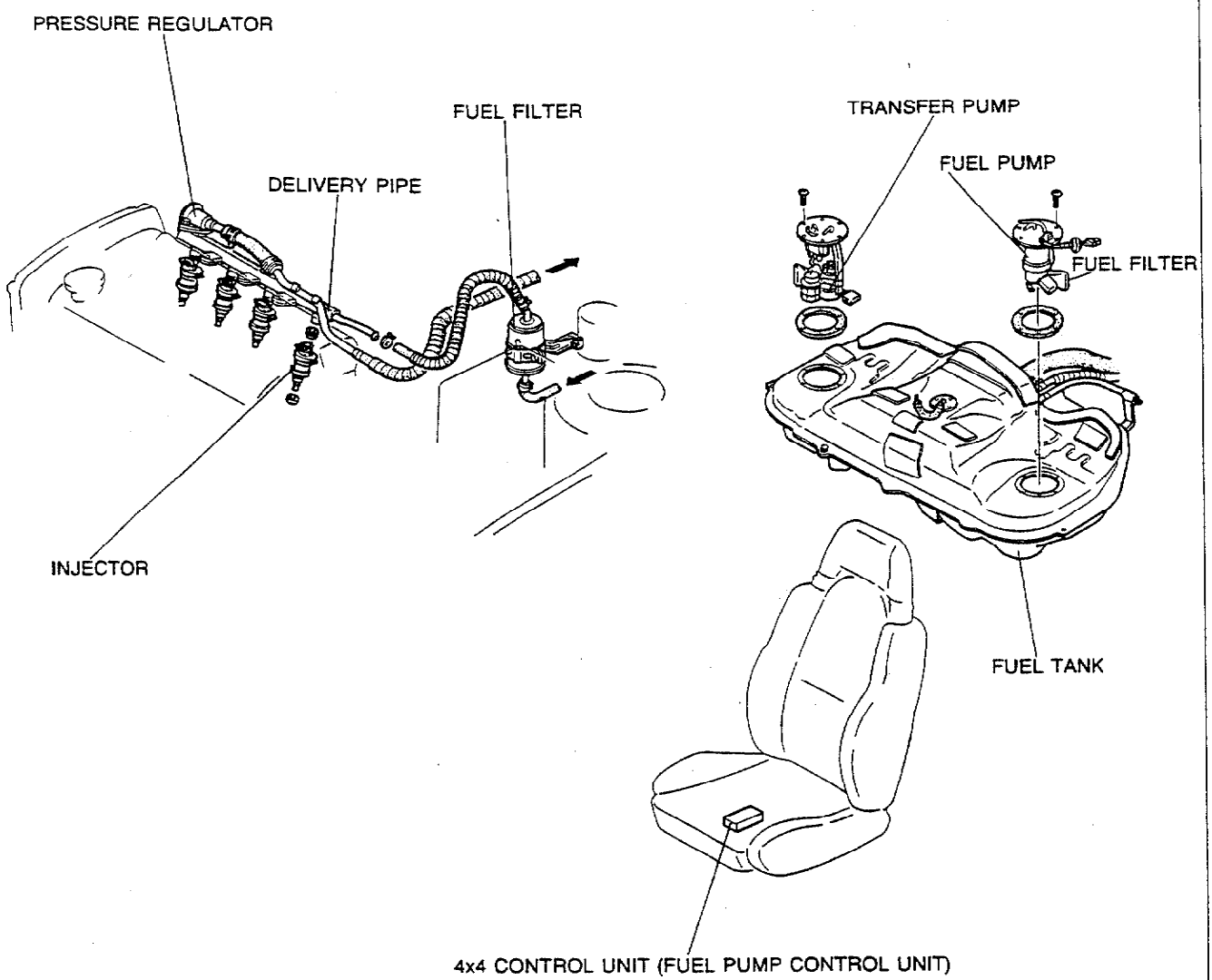

RESONANCE DUCT
AIR CLEANER
AIRFLOW METER
(WITH INTAKE AIR
THERMOSENSOR)
SOLENOID VALVE
(PRESSURE REGULATOR CONTROL)
FUEL FILTER
(HIGH-PRESSURE
SIDE)
PRESSURE
REGULATOR
CHECK VALVE
(TWO-WAY)
RESONANCE
CHAMBER
DASHPOT
PCV
VALVE
THROTTLE
SENSOR
FUEL VAPOR VALVE
AIR VALVE
INJECTOR
WATER
THERMOSENSOR
IGNITER
FUEL TANK
FUEL FILTER
FUEL PUMP
FUEL FILTER
IDLE-UP
SOLENOID VALVE
Ne-SIGNAL *
DISTRIBUTOR
TRANSFER PUMP
* TO ENGINE CONTROL UNIT

03UOFX-805


A2
A1
S
SOLENOID VALVE (PRESSURE REGULATOR CONTROL)
INJECTOR
IGNITION SWITCH
HEADLIGHT SWITCH
REAR WINDOW DEFROSTER SWITCH
ELECTRICAL FAN
A/C SWITCH
BLOWER SWITCH
A/C RELAY
MAIN RELAY
DIAGNOSIS CONNECTOR
STOP LIGHT SWITCH
ECU
AIRFLOW METER
THROTTLE SENSOR
WATER THERMOSENSOR
DIAGNOSIS CONNECTOR
IGNITER
DISTRIBUTOR
IDLE-UP SOLENOID VALVE
4X4 CONTROL UNIT
TIMER
CIRCUIT OPENING RELAY
P/S PRESSURE SWITCH
CLUTCH SWITCH
NEUTRAL SWITCH
FUEL PUMP
TRANSFER PUMP
TRANSFER PUMP SWITCH

FUEL SYSTEM

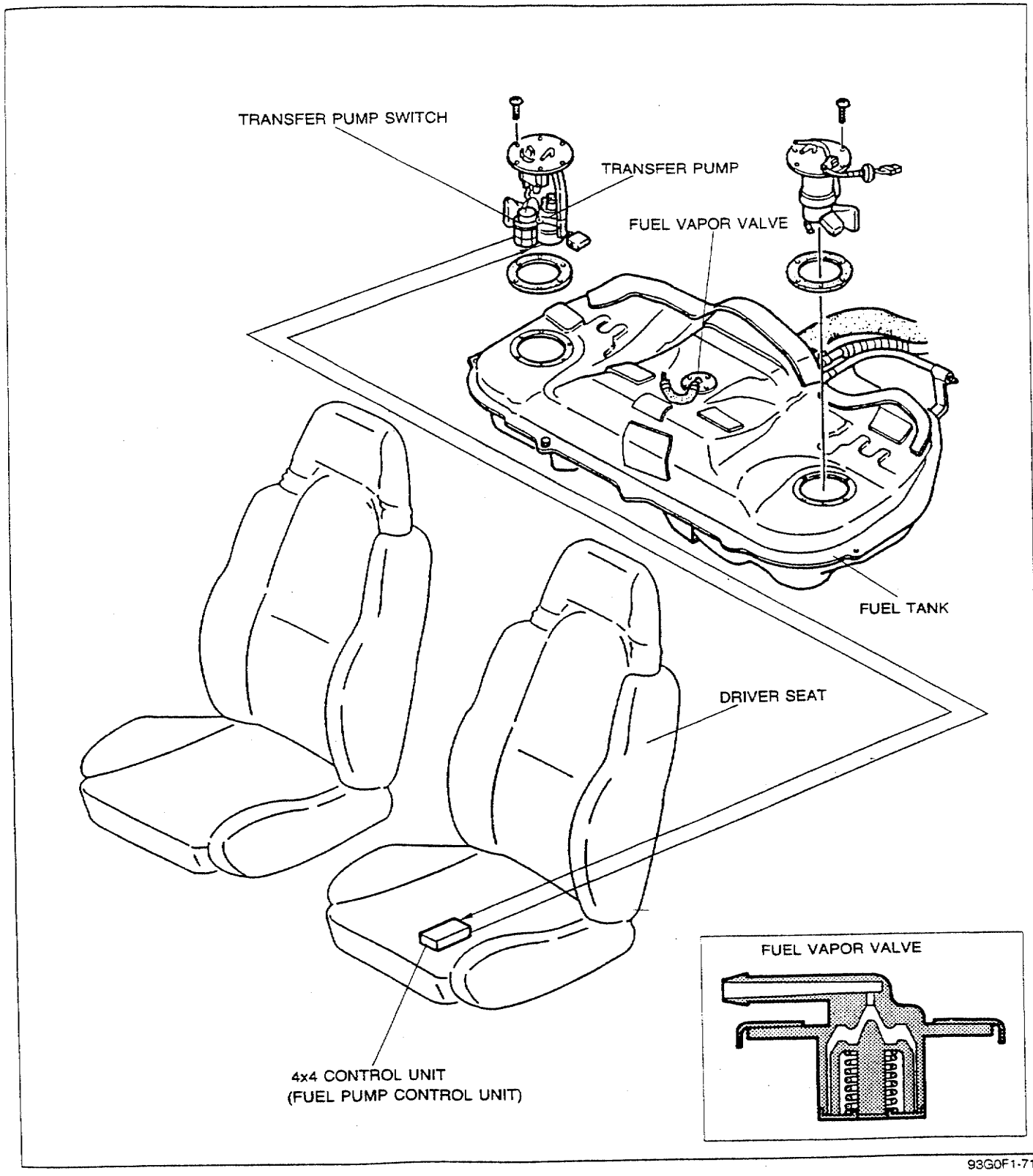
OUTLINE



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



93G0F1-717

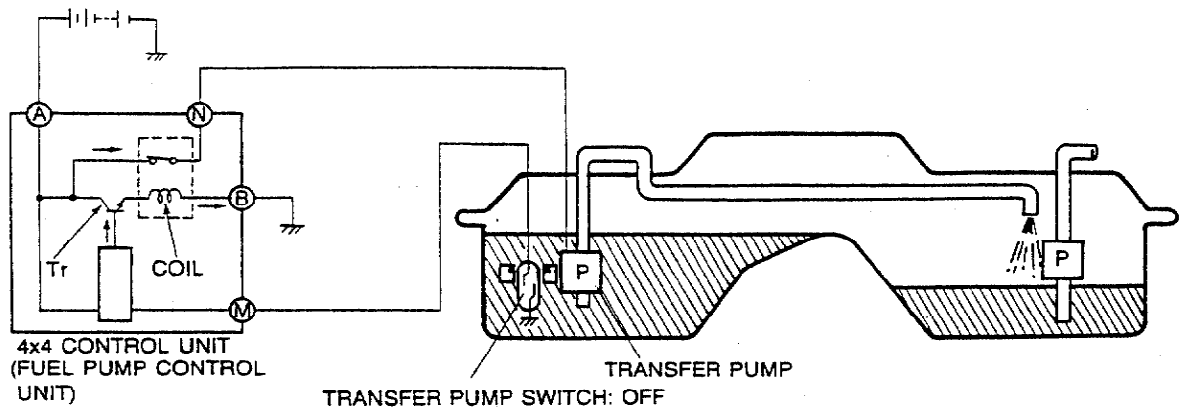
The fuel tank is designed with a separate right and left section due to the installation of the propeller shaft for the 4-wheel-drive system.
A transfer pump is used to pump the fuel from the left to the right (fuel pump) side. The transfer pump is installed in the fuel tank, and is controlled by the transfer pump switch and the fuel pump control unit (included in the 4x4 control unit).
A fuel vapor valve is installed on the top of the fuel tank to prevent fuel from flowing out to the charcoal cansiter.

Transfer Pump Control

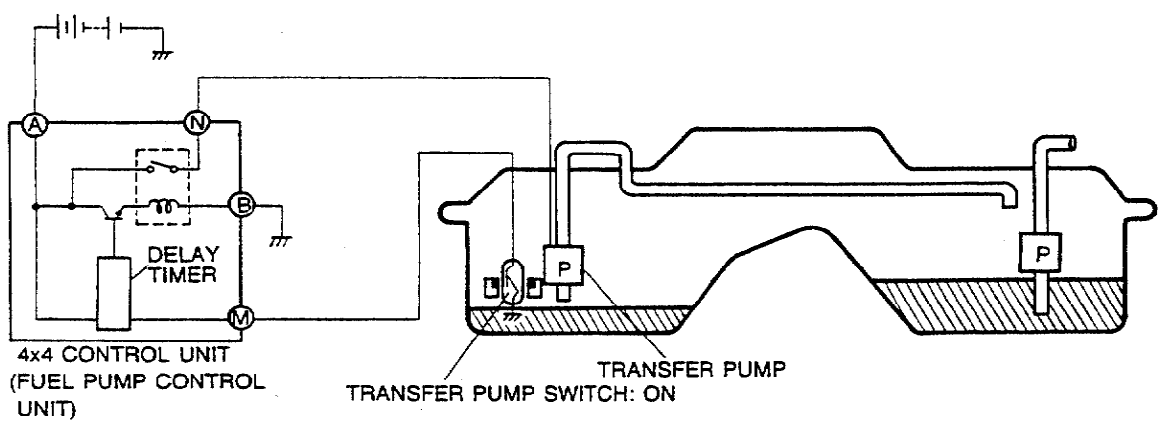
Outline

The fuel tank is built with separate right and left sections to accommodate the installation of the propeller shaft. As fuel is pulled from the right side of the tank, the transfer pump pumps the fuel from the left to the right (fuel pump) side to balance the fuel level.

FUEL IN LEFT TANK



NO FUEL IN LEFT TANK



93G0F1-718

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.

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Mazda 323 Workshop Manuals (1203-10-89F, 1204-10-89F, 1206-10-89F).

Fuel tank
- Removal / Inspection / Installation

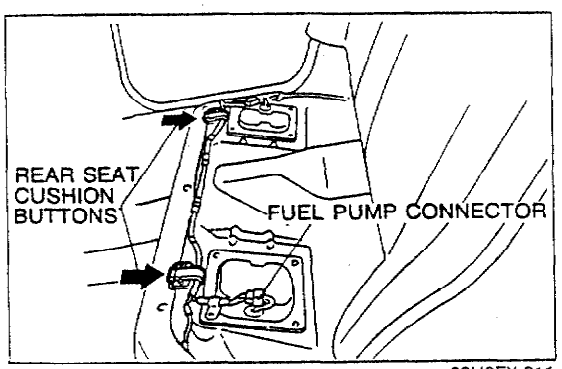
4x4 control unit (Fuel pump control unit)
- Inspection procedure added
- Replacement procedure added

Transfer pump switch
- Inspection procedure added
- Replacement procedure added

Transfer pump
- Inspection procedure added
- Replacement procedure added

Exhaust system components
- Removal / Inspection / Installation

93G0F1-706



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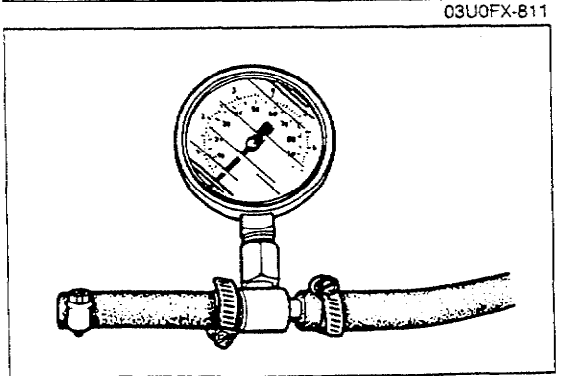
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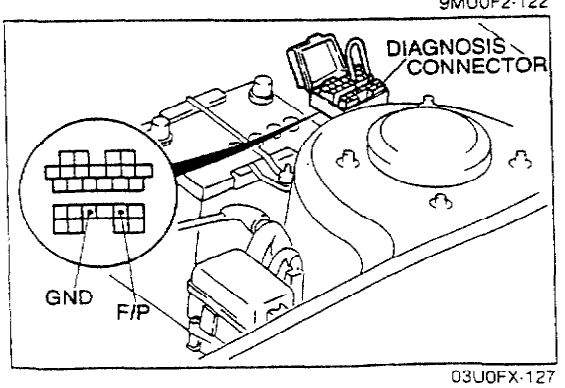


03U0FX-127

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.

a) Before disconnecting any fuel line, release the fuel pressure from the fuel system to reduce the possibility of injury or fire.
   1. Start the engine.
   2. Push the rear seat cushion buttons and remove the cushion.
   3. Disconnect the fuel pump connector.
   4. After the engine stalls, turn off the ignition switch.
   5. Reconnect the fuel pump connector and install the rear seat cushion.

b) Use a rag as protection from fuel spray when disconnecting the hoses.
   Plug the hoses after removal.

c) 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

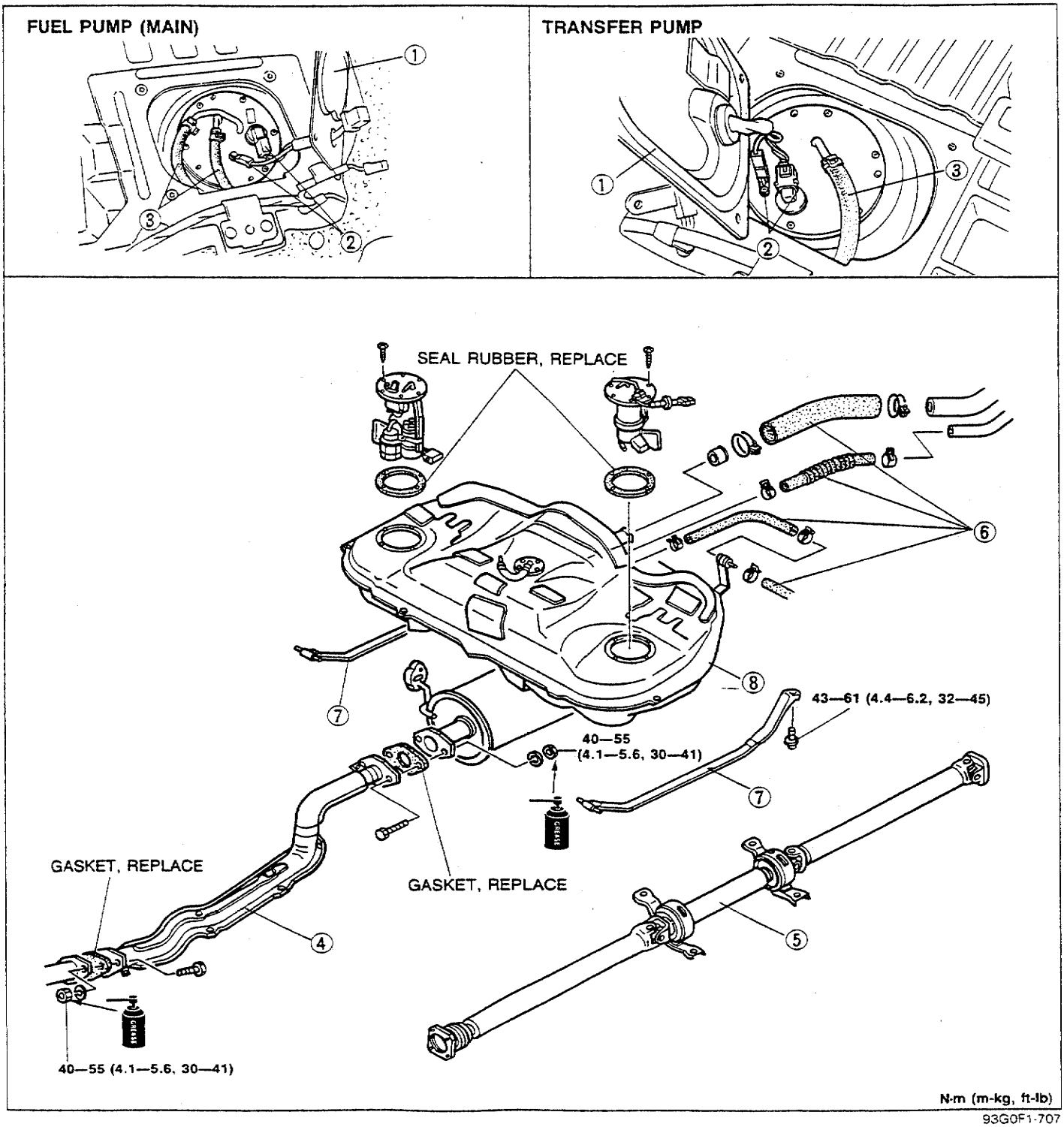
After releasing the fuel pressure for repairs or inspection, the system must be primed to avoid excessive cranking when first starting the engine. Follow the steps below.

1. Connect the diagnosis connector terminals **F/P** and **GND** with a jumper wire.
2. Turn the ignition switch ON for **approx. 10 sec.** and check for fuel leaks.
3. 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 F1–9.)**
- **When removing the fuel tank, keep sparks, cigarettes, and open flames away from it.**
- **Before repairing the fuel tank, clean it throughly 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 as necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.



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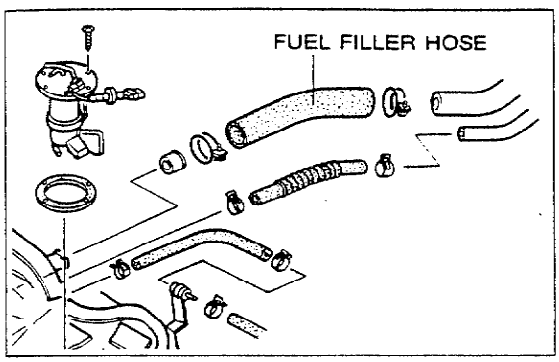
Note
- **Drain the fuel from the fuel tank before removing the tank.**

1. Fuel pump cover
2. Fuel pump connector
3. Fuel hoses
   Installation Note ..... below
4. Exhaust pipe
   Removal / Installation ..... page F1–15
5. Propeller shaft
   Removal / Installation ..... Section L
6. Fuel filler hose, breather hose, and evaporation hoses
   Installation Note ..... below
7. Fuel tank straps
8. Fuel tank
   Inspect for cracks and corrosion

93G0F1-708



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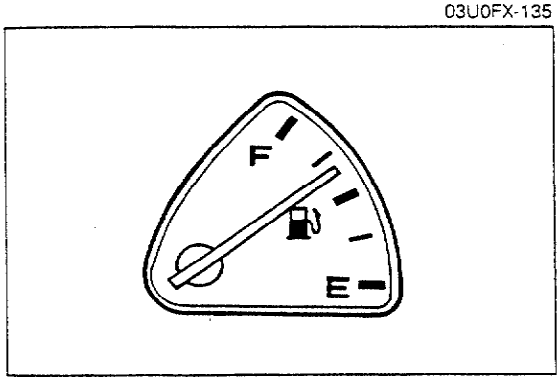

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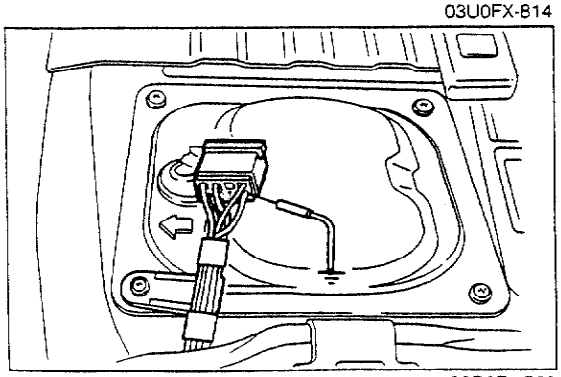


93G0F1-709

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)**.

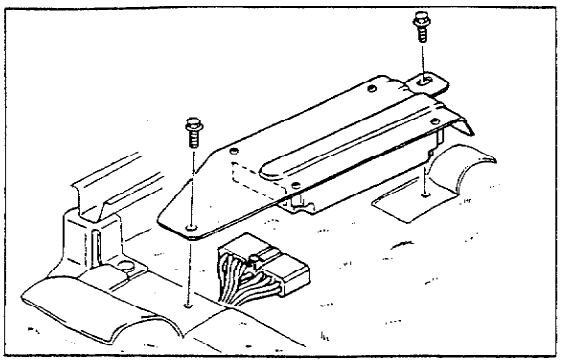
TRANSFER PUMP CONTROL SYSTEM

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.**

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 F1–12.)
   - Transfer pump. (Refer to page F1–13.)
   - Transfer pump switch. (Refer to page F1–13.)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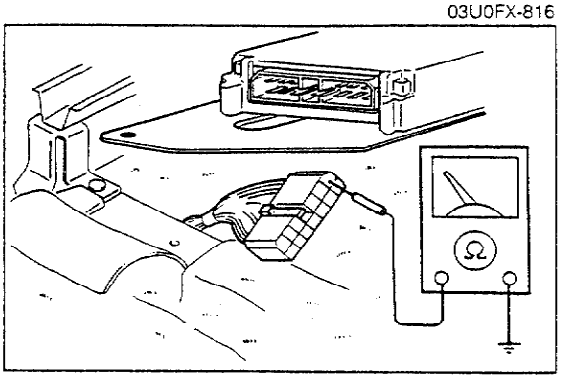
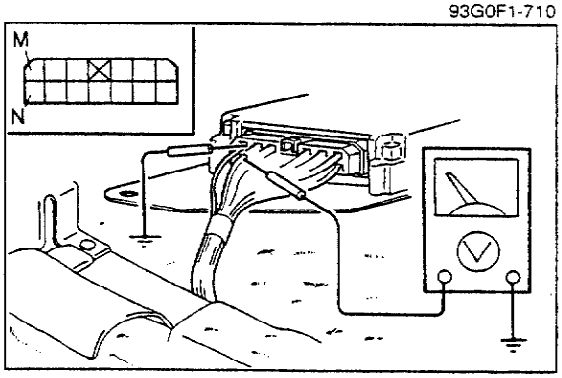
4x4 CONTROL UNIT (FUEL PUMP CONTROL UNIT)

Inspection

1. Remove the 4x4 control unit.


93G0F1-710

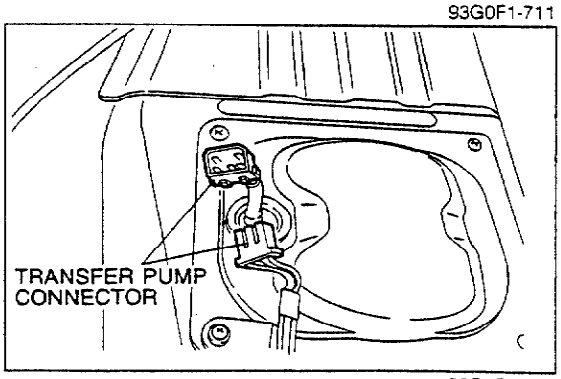
2. Disconnect the 4x4 control unit connector.
3. Check continuity between the 4x4 control unit connector terminal M and a ground.
4. Perform the following inspection according to the measured continuity.



93G0F1-711

Continuity exists

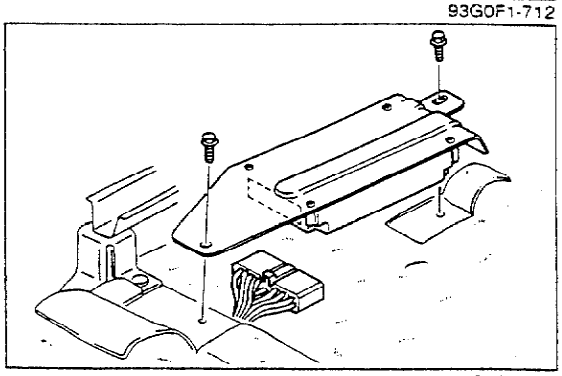
1. Turn the ignition switch ON.
2. Ground the 4x4 control unit terminal M with a jumper wire and verify that the voltage at the 4x4 control unit terminal N is **0V**.
3. Remove the jumper wire and verify that the voltage at the 4x4 control unit terminal N is **approx. 12V** after **approx. 10 sec**.
4. If not as specified, replace 4x4 control unit.



93G0F1-712

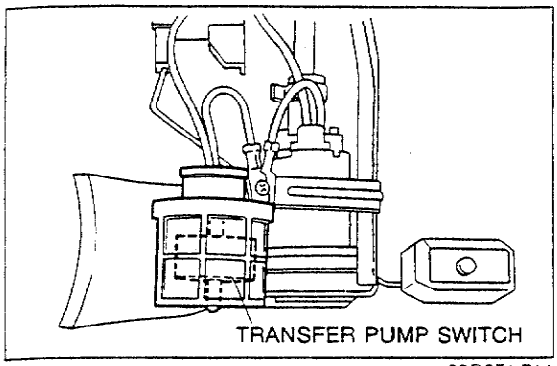
No continuity exists

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**.
4. If not as specified, replace 4x4 control unit.


93G0F1-713

Replacement

1. Remove the 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.



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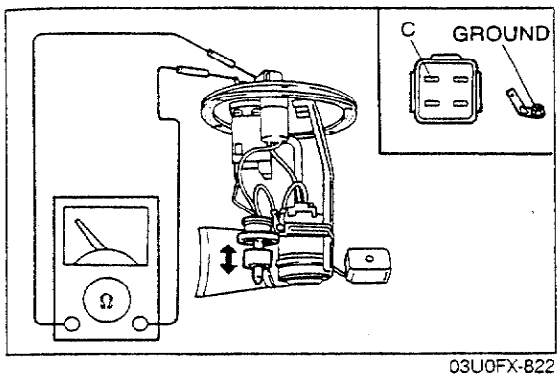

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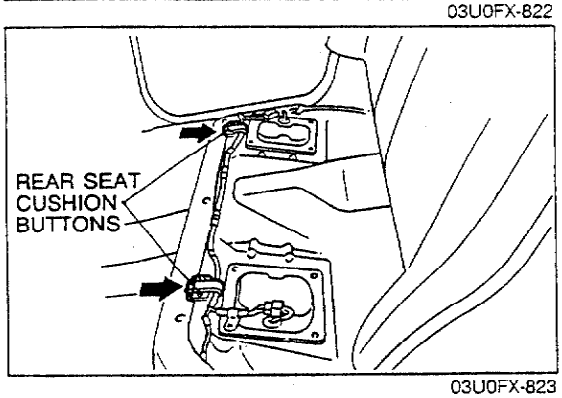

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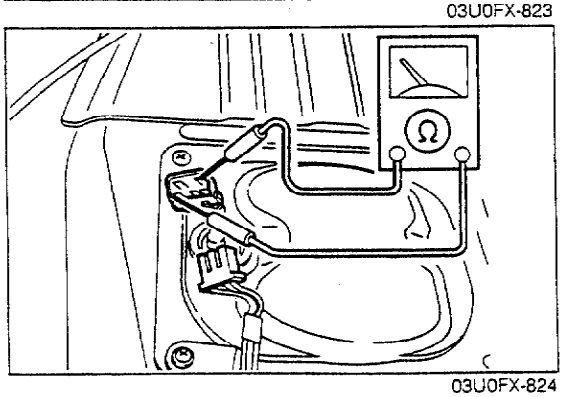

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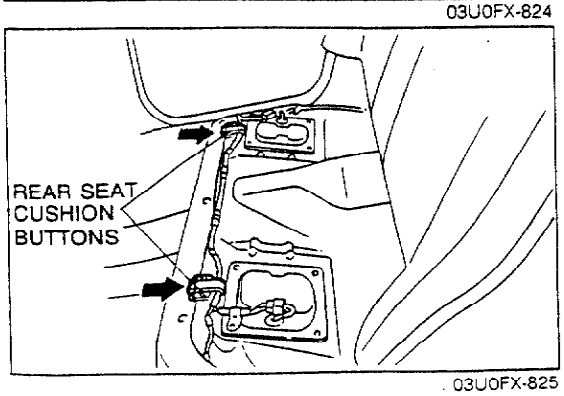


03U0FX-825

TRANSFER PUMP SWITCH

Removal / Installation

1. Refer to "Transfer pump replacement". (Refer to below.)

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.

TRANSFER PUMP

Inspection

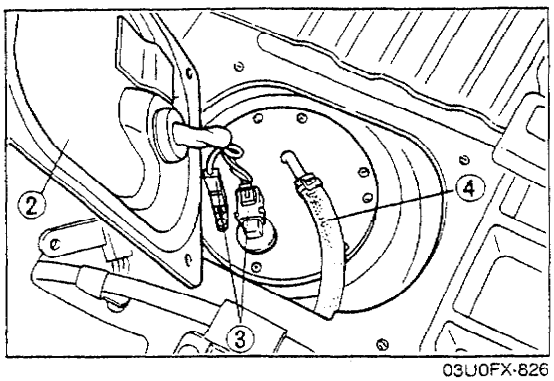
1. Remove the rear seat cushion.
2. Disconnect the transfer pump connector.
3. Check for continuity between transfer pump connector terminal-wires (B/W) and (Y).
4. If no continuity exists, replace the transfer pump.

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.

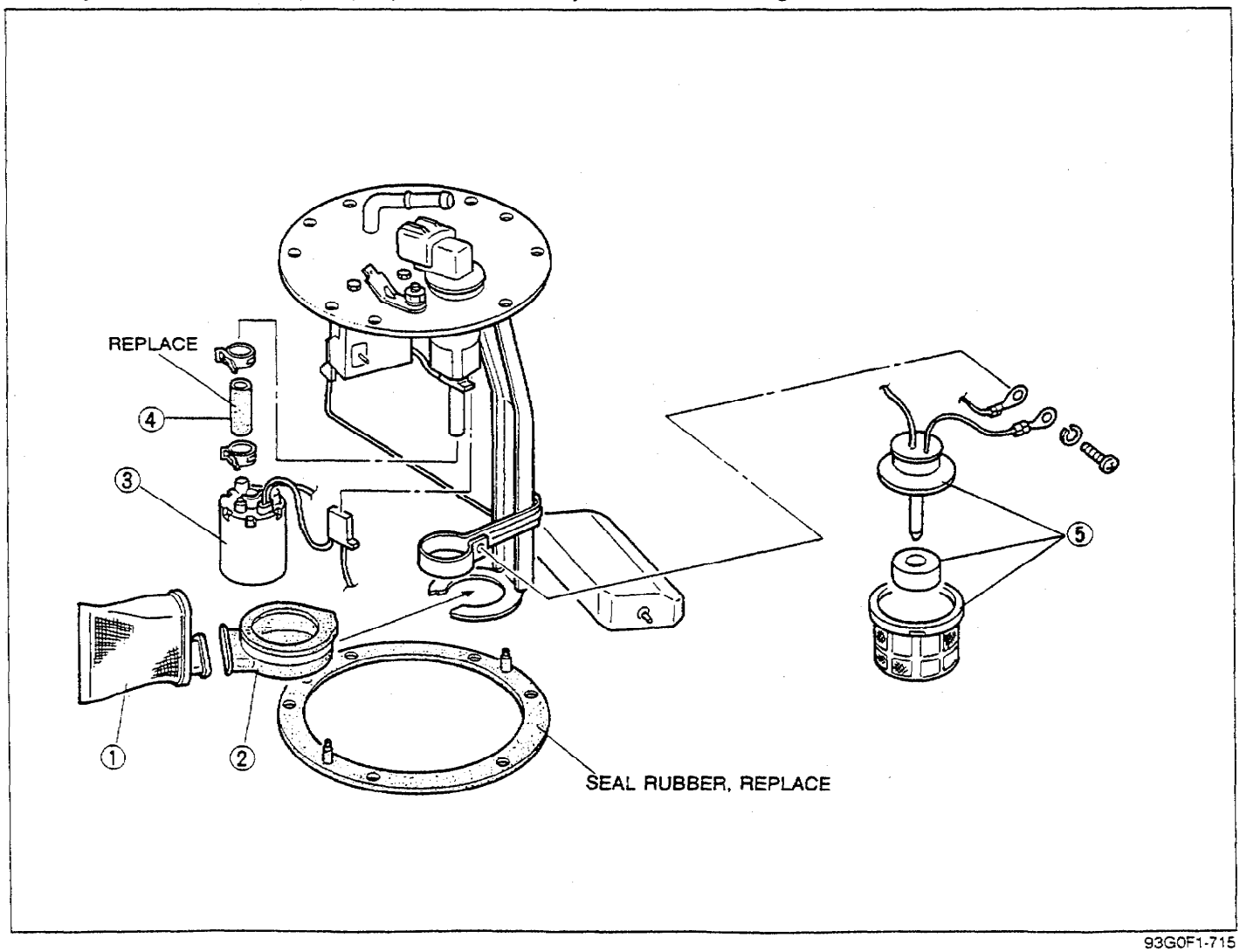
Caution
- **Install a new seal rubber.**

6. Install in the reverse order of removal.

Disassembly / Assembly

Caution
- **Prevent contaminants from entering 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.



93G0F1-715

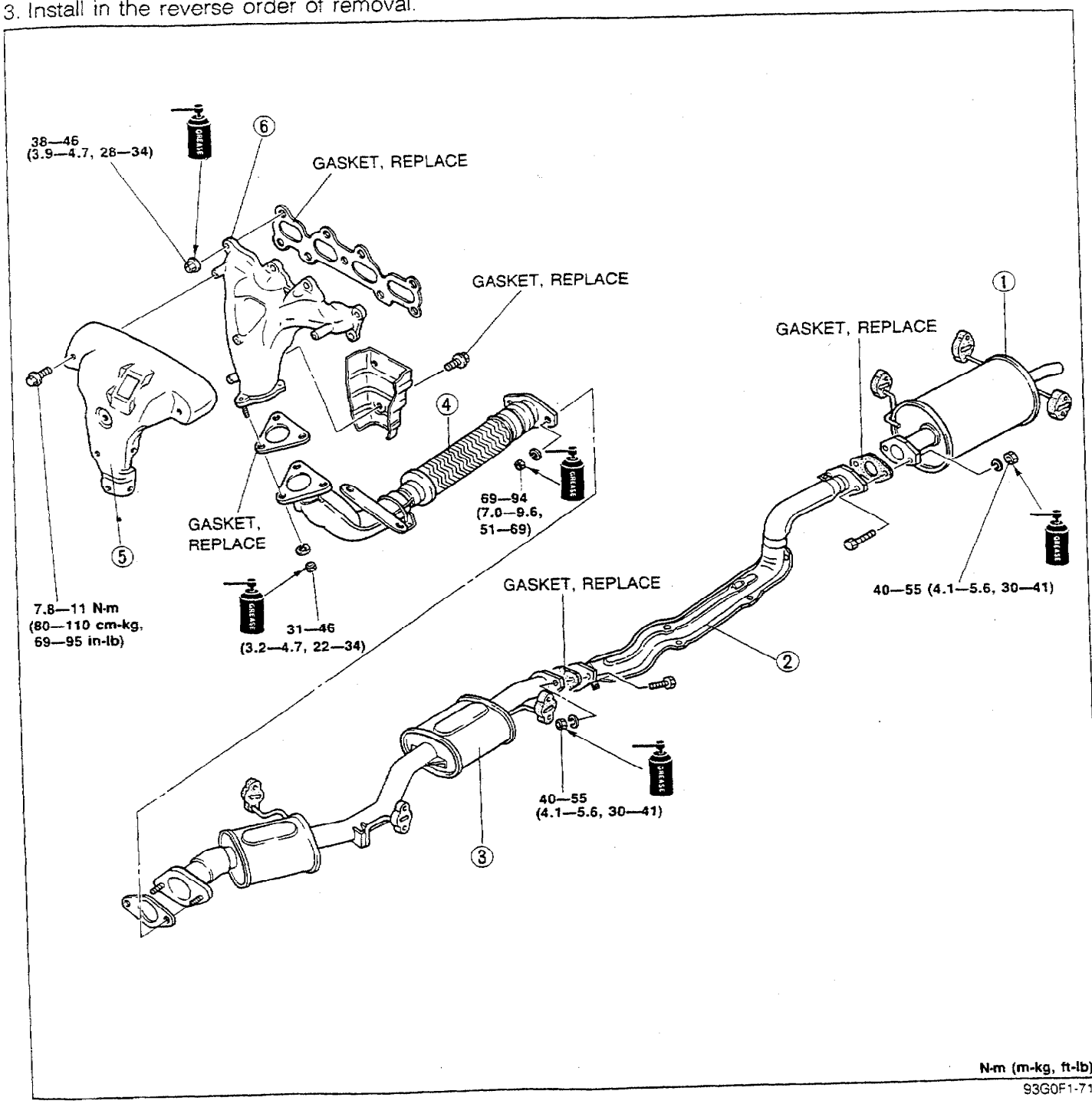
1. Fuel filter
2. Rubber mount
3. Transfer pump
4. Fuel hose
5. Transfer pump switch

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.



93G0F1-716

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. Front pipe assembly
   Inspect for deterioration and restriction
5. Exhaust manifold insulator
6. Exhaust manifold
   Inspect for deterioration and restriction

FUEL AND EMISSION CONTROL SYSTEMS (WITH CATALYTIC CONVERTER)

93G0F2-701

OUTLINE

OUTLINE OF CONSTRUCTION

The fuel and emission control system of the new 323 4WD model is basically the same as that of the new 323 2WD model; however, a turbocharger and knock control system are added to the BP TURBO model and 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. A transfer pump is also equipped to pump the fuel from the left to the right (fuel pump side) section of the fuel tank.
The major points of difference between the 2WD model and 4WD model are as shown below.

93G0F2-705

Difference

Component			2WD		4WD		Remark
			BP SOHC	BP DOHC	BP SOHC	BP TURBO	
INTAKE AIR SYSTEM	Resonance duct		○	○	○	—	—
	Resonance chamber		○	○	○	—	—
	VICS		—	○	—	—	—
	Turbocharger		—	—	—	○	Refer to page F2–12
	Intercooler		—	—	—	○	Refer to page F2–14
	Air bypass valve		—	—	—	○	Refer to page F2–14
FUEL SYSTEM	Fuel pump control		—	—	—	○	Refer to page F2–16
	Transfer pump		—	—	○	○	Refer to page F2–18
	Pressure regulator control		○	○	○	○	Operating time for BP TURBO is different (Refer to page F2–23)
	Fuel pump resistor/relay		—	—	—	○	Refer to page F2–18
EVAPORATIVE EMISSION CONTROL SYSTEM	Fuel vapor valve		—	—	○	○	Refer to page F2–16
CONTROL SYSTEM	Throttle sensor	Point type	○	○	○ (MTX)	—	—
		Variable type	—	—	○ (ATX)	○	
	Oxygen sensor	Without heater	○	○	○	—	Refer to page F2–23
		With heater	—	—	—	○	
	Water thermoswitch (on radiator)		—	—	○ (ATX)	—	A/C cut-off system
	Knock control system		—	—	—	○	Refer to page F2–22
	Overboost warning buzzer		—	—	—	○	Refer to page F2–21
	Turbocharge indicator		—	—	—	○	Refer to page F2–21

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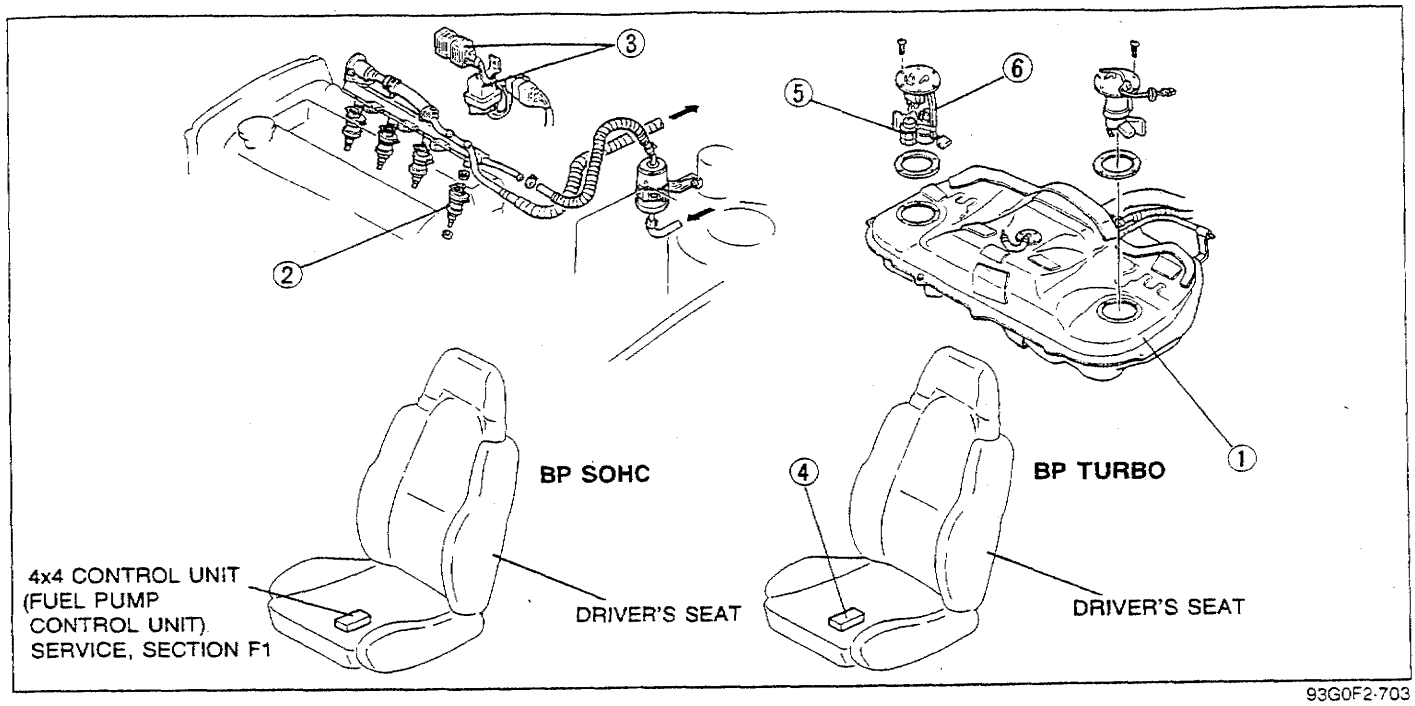

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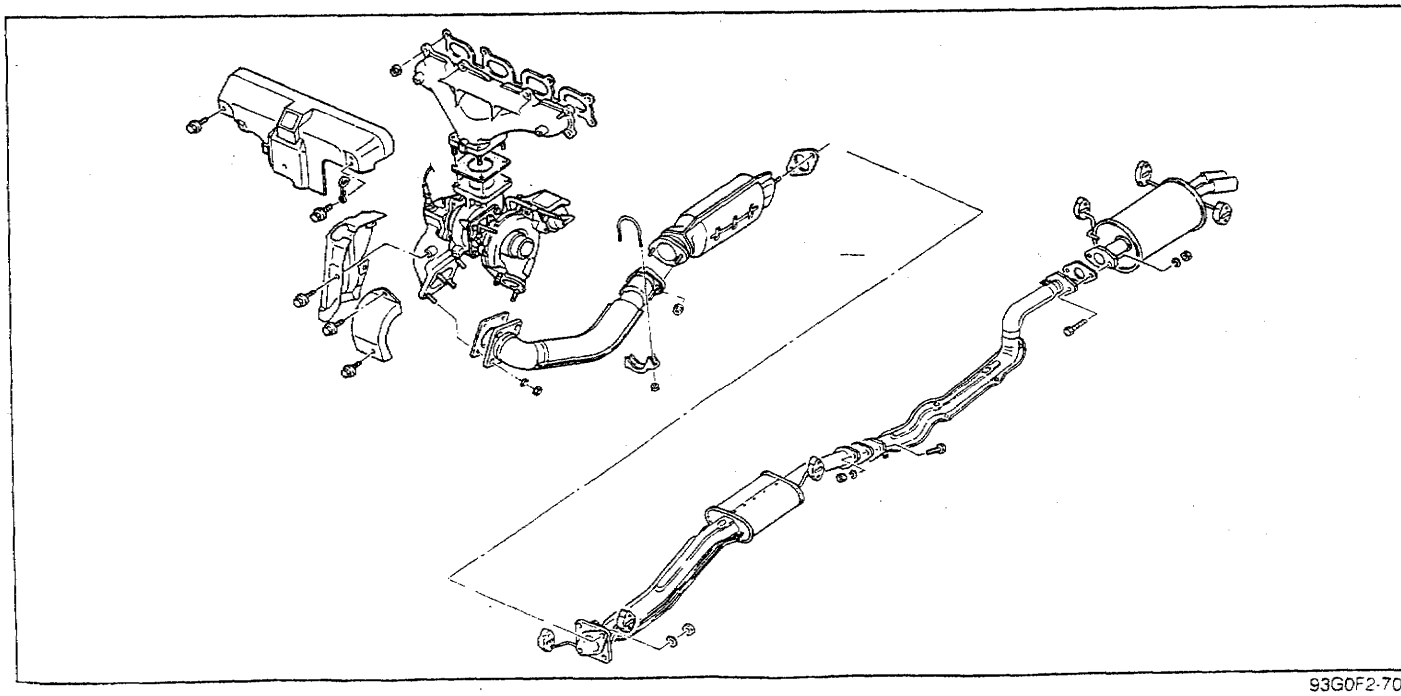

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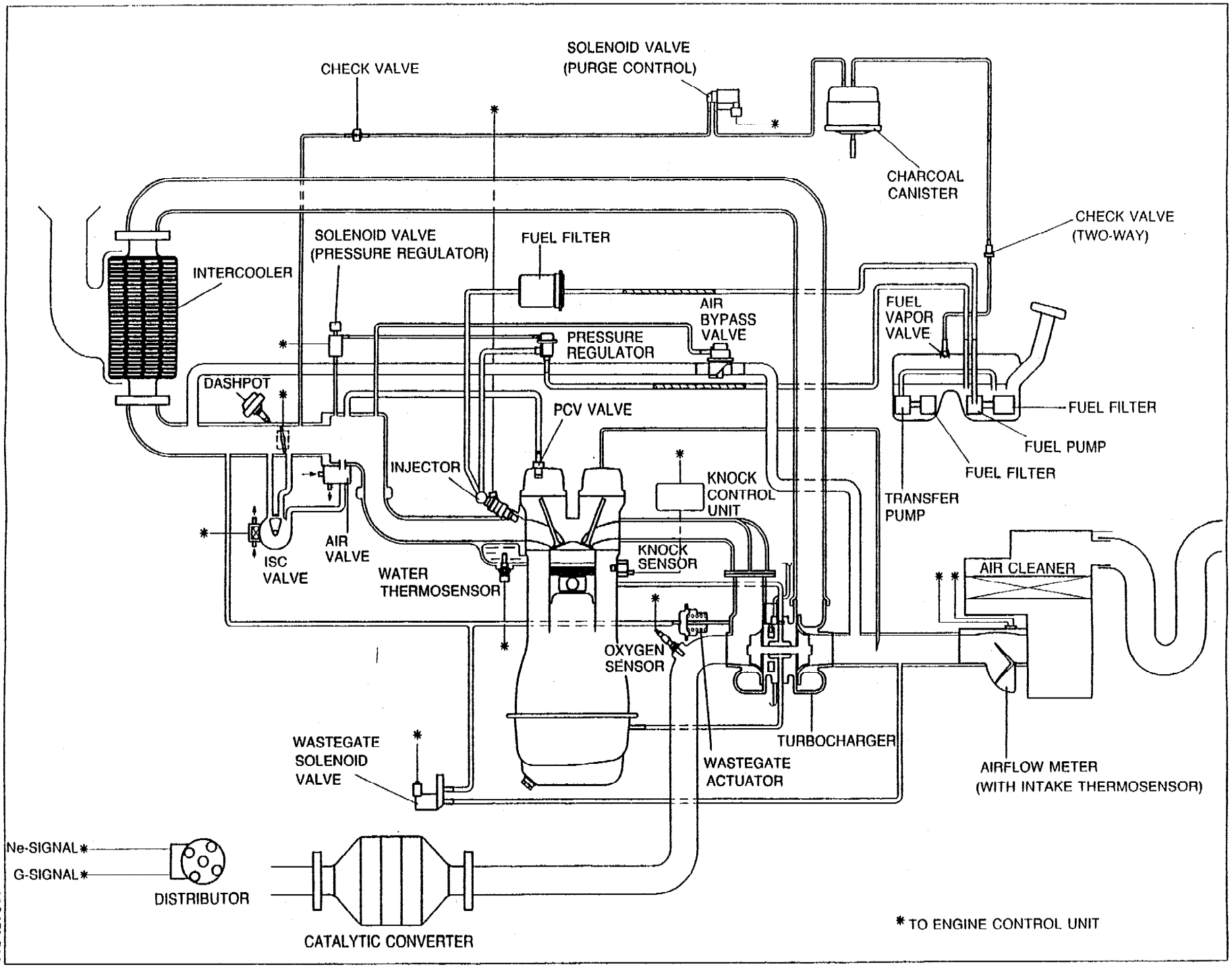
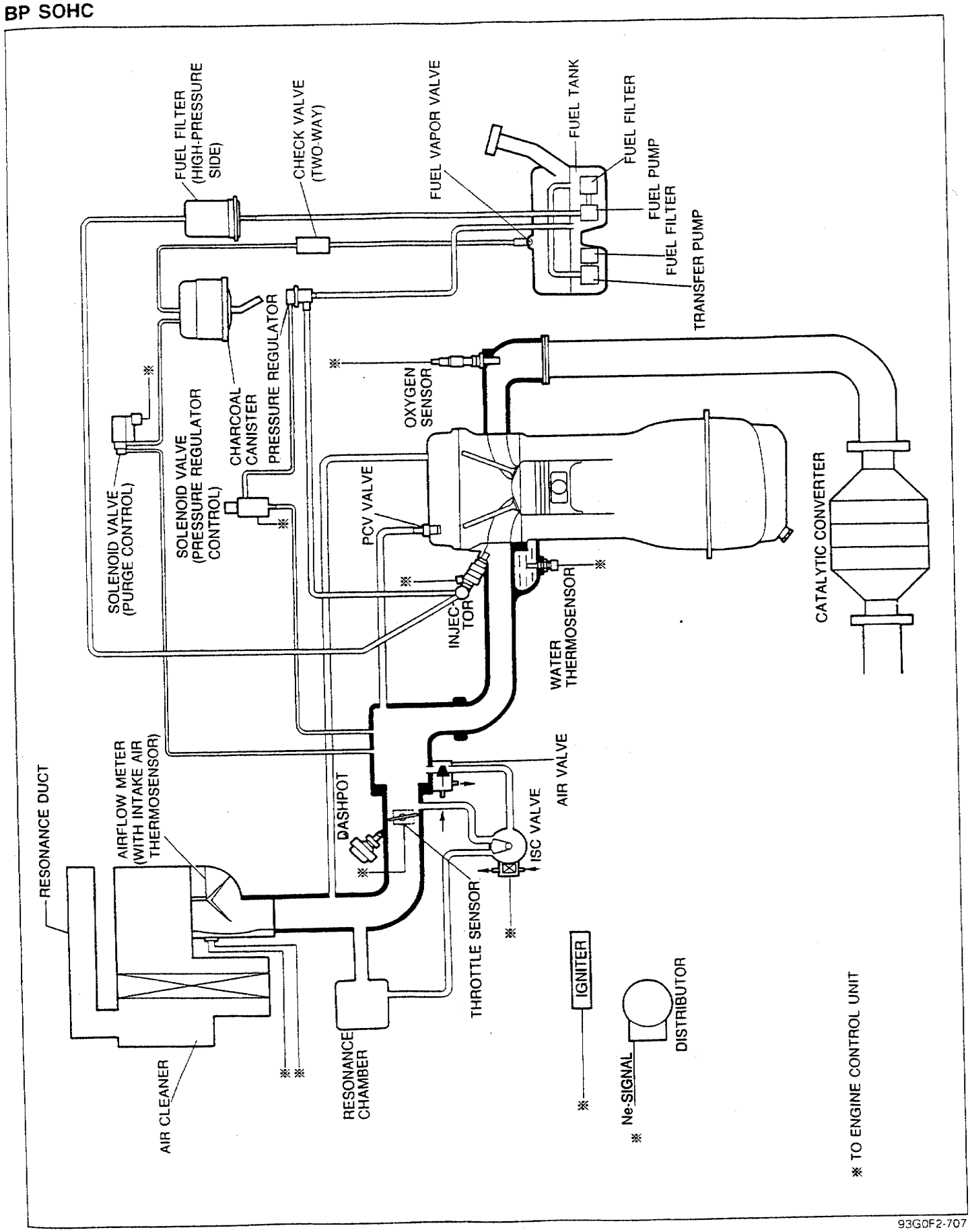

CHECK VALVE
SOLENOID VALVE (PURGE CONTROL)
CHARCOAL CANISTER
CHECK VALVE (TWO-WAY)
SOLENOID VALVE (PRESSURE REGULATOR)
FUEL FILTER
INTERCOOLER
AIR BYPASS VALVE
PRESSURE REGULATOR
FUEL VAPOR VALVE
DASHPOT
PCV VALVE
FUEL FILTER
FUEL PUMP
FUEL FILTER
INJECTOR
KNOCK CONTROL UNIT
TRANSFER PUMP
ISC VALVE
AIR VALVE
KNOCK SENSOR
AIR CLEANER
WATER THERMOSENSOR
OXYGEN SENSOR
WASTEGATE SOLENOID VALVE
TURBOCHARGER
WASTEGATE ACTUATOR
AIRFLOW METER (WITH INTAKE THERMOSENSOR)
Ne-SIGNAL*
G-SIGNAL*
DISTRIBUTOR
CATALYTIC CONVERTER
* TO ENGINE CONTROL UNIT

93G0F2-708

SYSTEM DIAGRAM
BP SOHC



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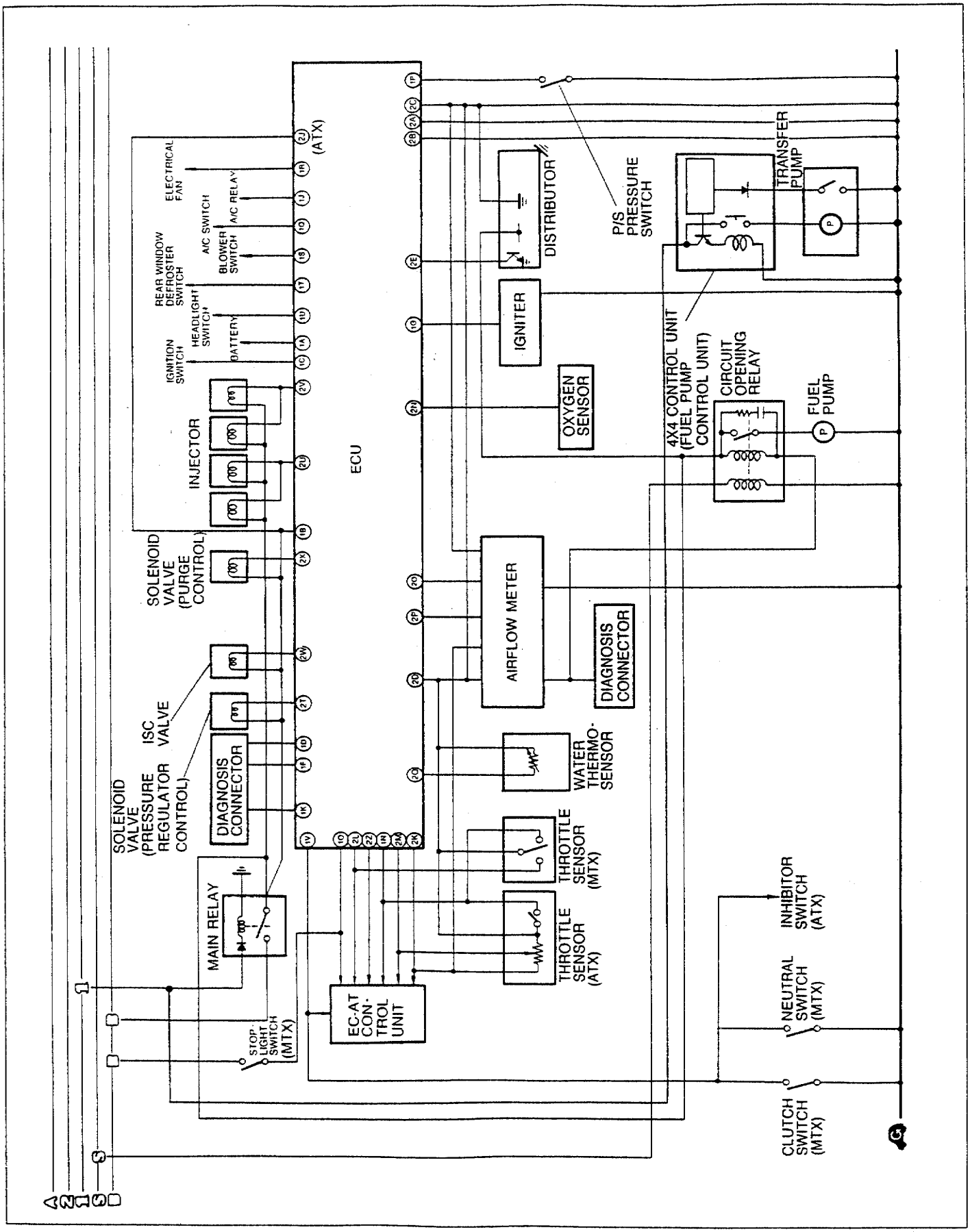
WIRING DIAGRAM
BP SOHC



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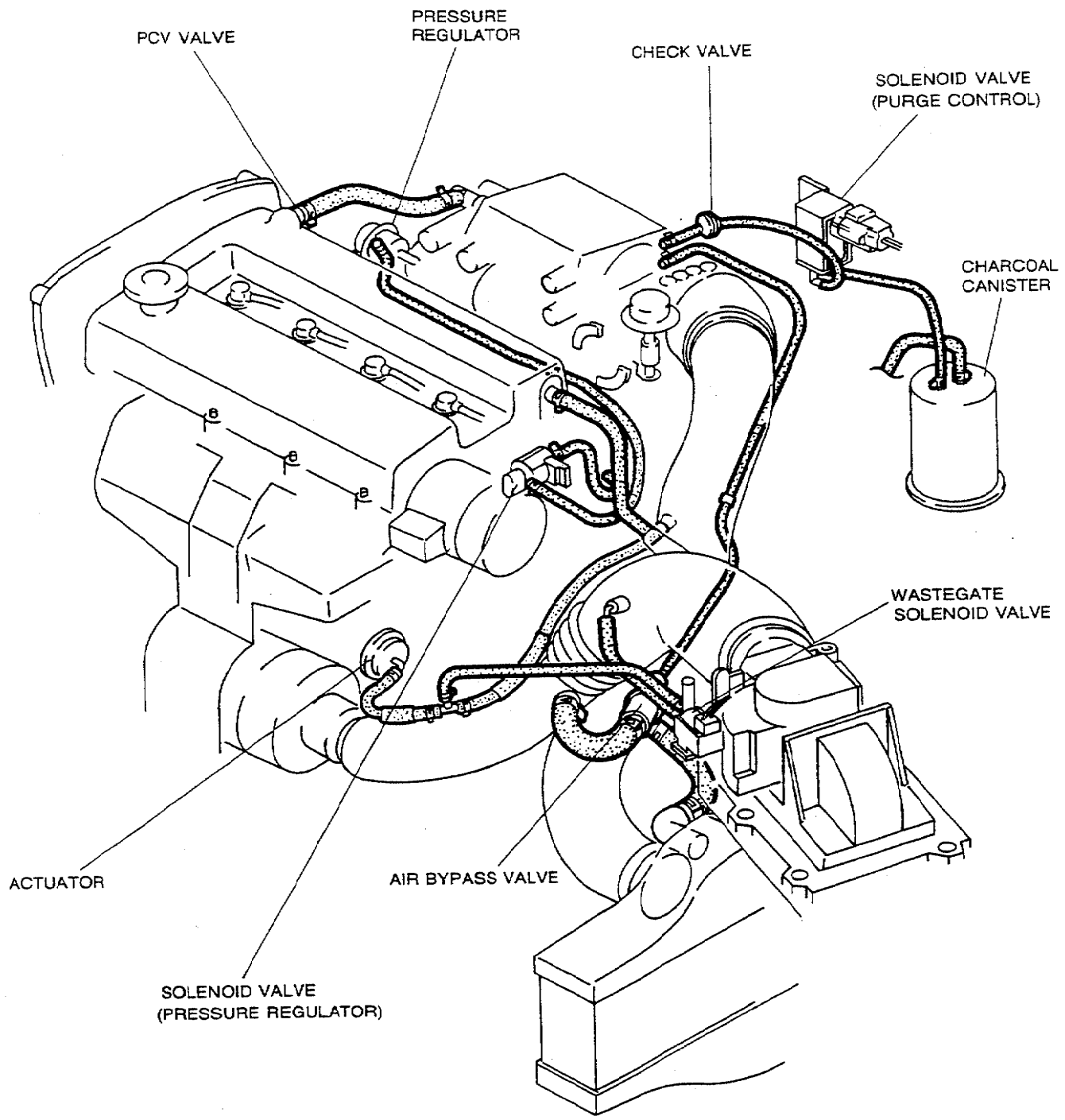
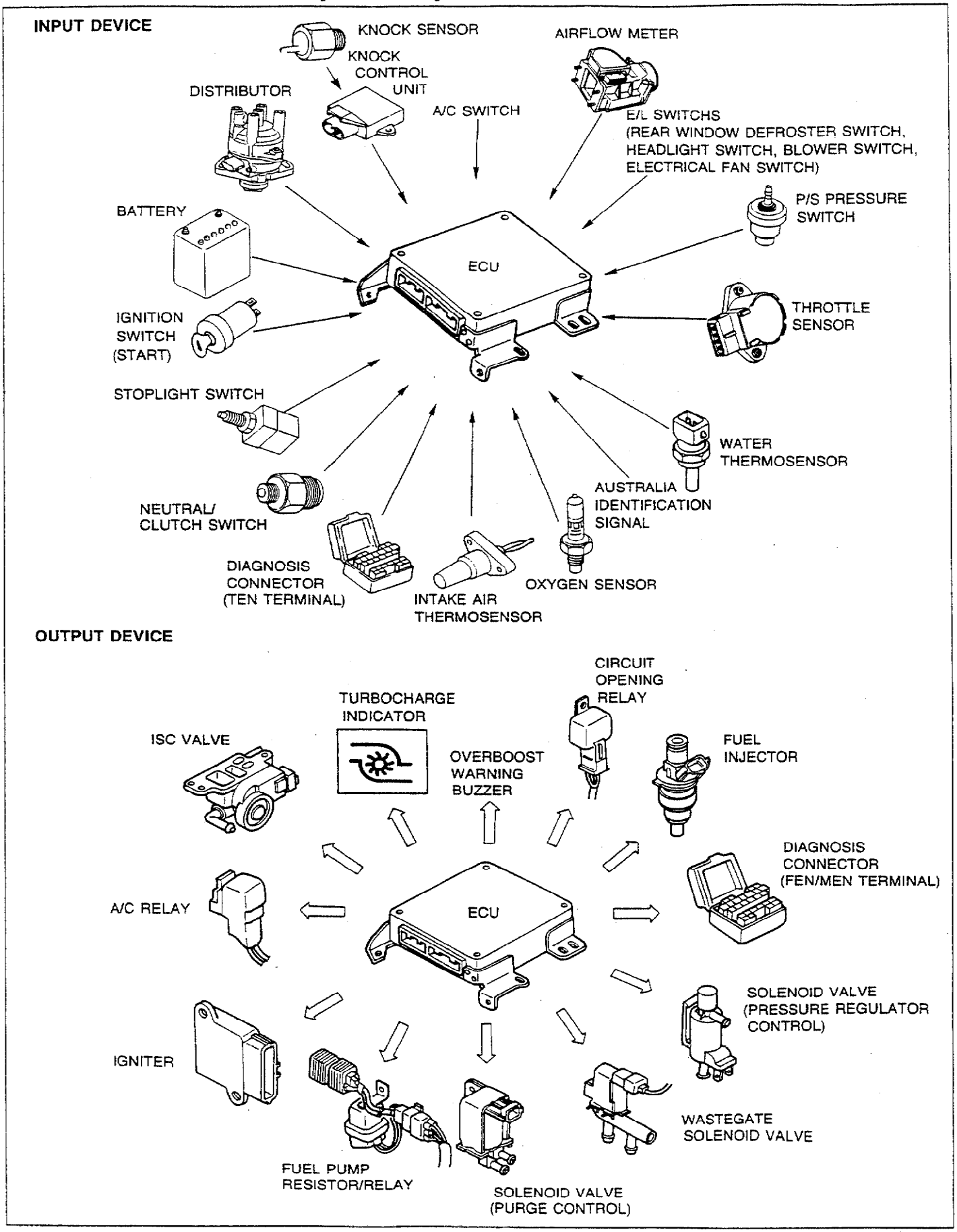
VACUUM HOSE ROUTING DIAGRAM [BP TURBO]



ECU RELATIONSHIP DIAGRAM [BP TURBO]



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SPECIFICATIONS

Item \ Engine			BP SOHC	BP TURBO
Idle speed		rpm	750 ± 50	800 ± 50
Ignition timing*		BTDC	5 ± 1°	10 ± 1°
Fuel pump				
Maximum output pressure		kPa (kg/cm², psi)	441—589 (4.5—6.0, 64—85)	491—638 (5.0—6.5, 71—92)
Transfer pump				
Maximum output pressure		kPa (kg/cm², psi)	39 (0.4, 5.7) or higher	
Fuel filter				
Type	Low-pressure side		Nylon element (in fuel pump)	
	High-pressure side		Paper element	
Pressure regulator				
Regulating pressure		kPa (kg/cm², 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	
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	$E_2 \leftrightarrow V_S$	Ω	Fully closed	200—600
			Fully open	20—1,200
	$E_2 \leftrightarrow V_C$			200—400
	$E_2 \leftrightarrow THA_A$ (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
	$E_1 \leftrightarrow F_C$		Fully closed	∞
			Fully open	0
Oxygen sensor (Ceramic heater coil)				
Resistance		Ω	—	Approx. 6 [at 20°C (68°F)]
Fuel tank				
Capacity		liters (US gal, Imp gal)	60 (15.9, 13.2)	
Air cleaner				
Element type			Oil permeated	
Fuel				
Specification			Unleaded regular (RON 91 or higher)	Europe.....Unleaded premium (RON 95 or higher) Australia...Unleaded regular (RON 91 or higher)

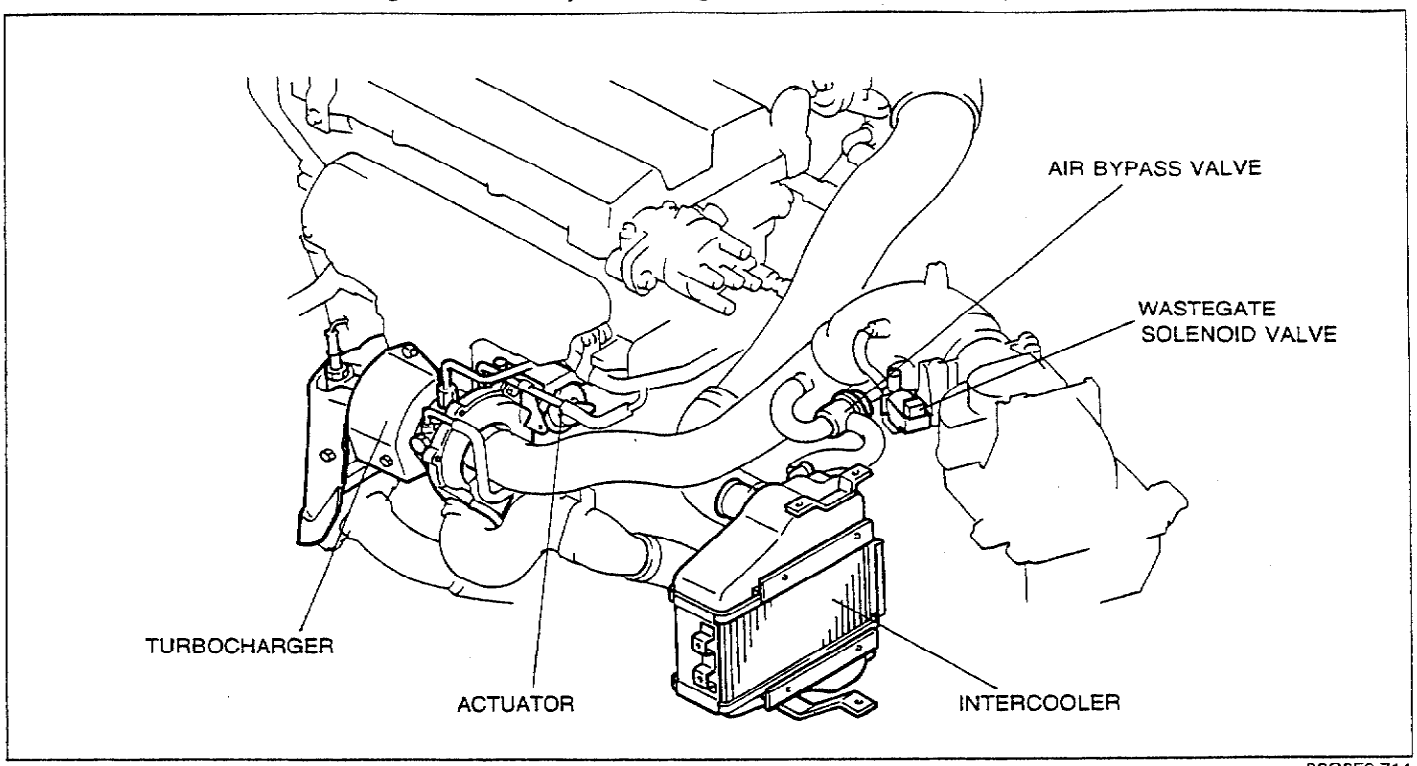
93G0F2-713

* TEN terminal of diagnosis connector grounded.
The ▭ mark indicates newly equipped parts.

TURBOCHARGER CONTROL [BP TURBO]

OUTLINE

- The air-to-air intercooler is adopted to lower intake air temperature and to improve engine performance.
- With addition of the wastegate control system, engine torque at higher rpm is increased.



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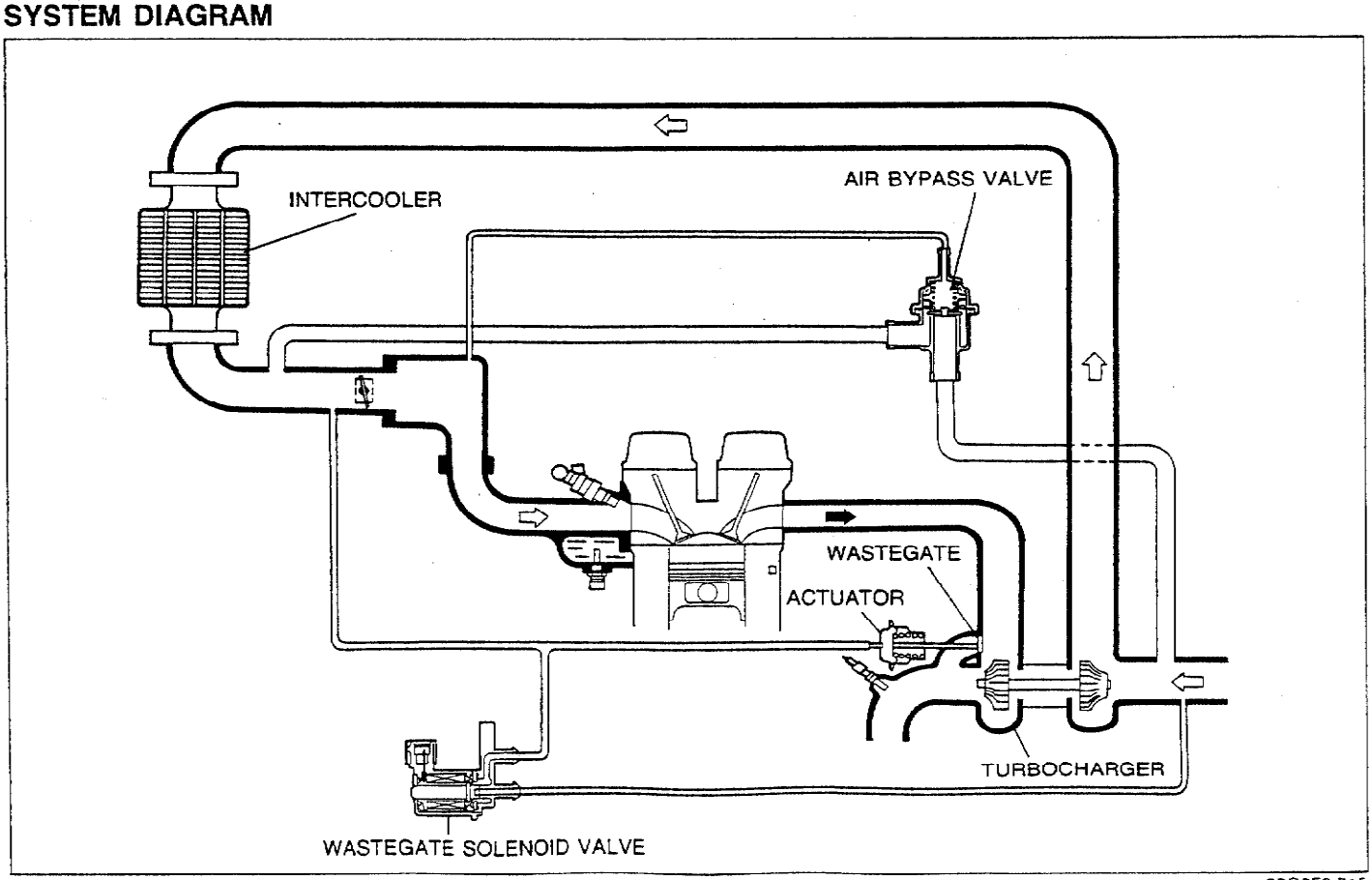
SYSTEM DIAGRAM



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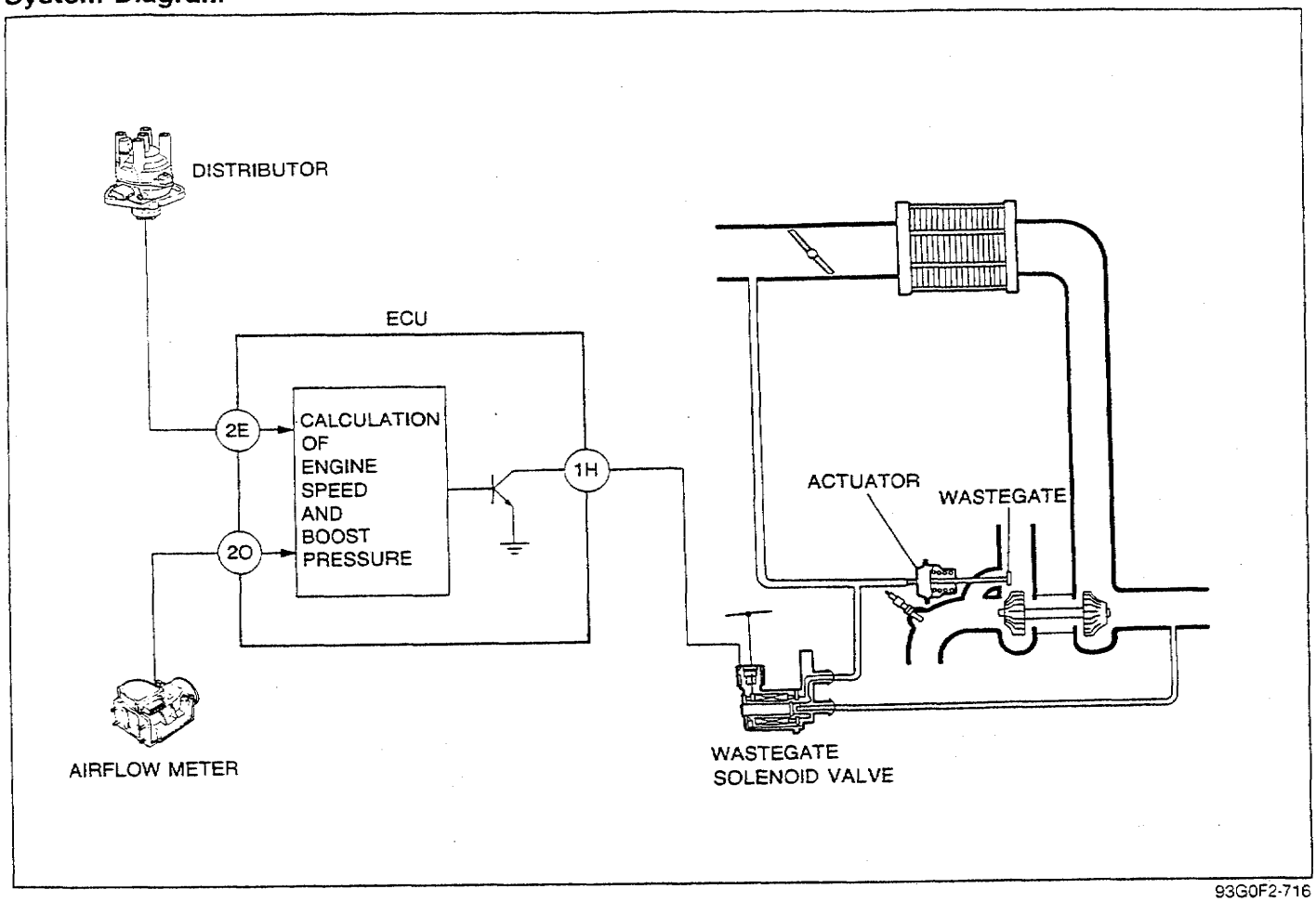
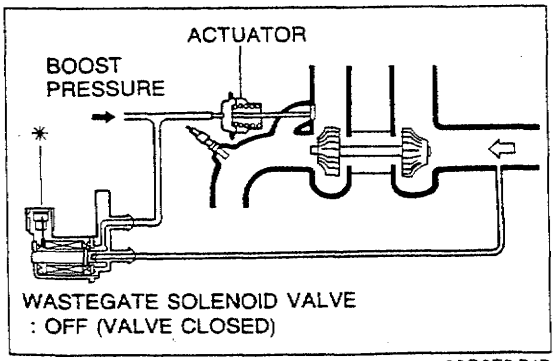
WASTEGATE CONTROL

The engine control unit controls the wastegate solenoid valve to give higher boost to the engine in the higher rpm range, increasing engine torque and power.

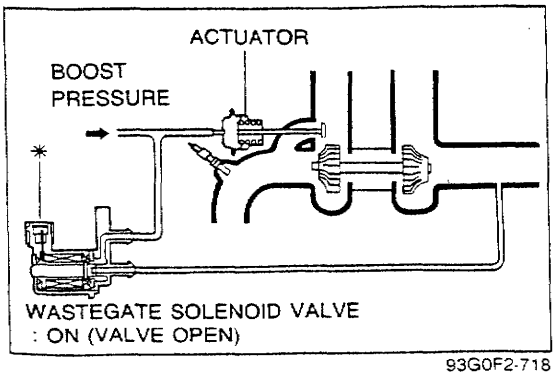
System Diagram



93G0F2-716



93G0F2-717



93G0F2-718

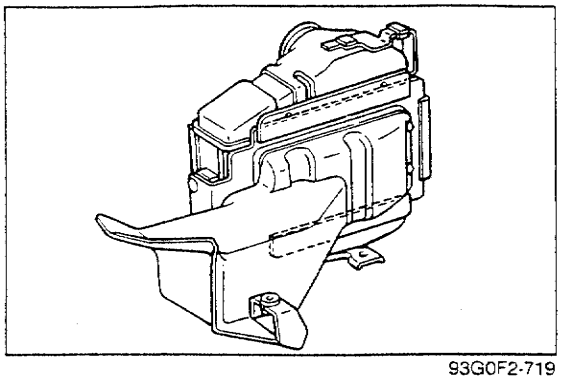
Operation

Engine speed below 5,300 rpm

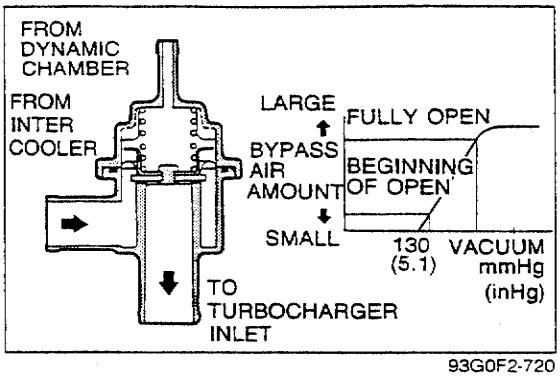
The wastegate solenoid valve is OFF. Boost pressure is applied directly to the actuator and the wastegate opens when the boost pressure exceeds **49 kPa (0.5 kg/cm^2, 7.1 psi)**.

Engine speed above 5,300 rpm

The wastegate solenoid valve is ON. Some boost pressure is bypassed to the intake manifold, limiting the opening of the wastegate to increase boost pressure and improve engine performance.



93G0F2-719



93G0F2-720

Intercooler

The air-to-air intercooler utilizes fresh air flow through the intercooler core to reduce the intake air temperature.

If the air compressed by the turbocharger was sent directly into the combustion chamber without passing through the intercooler, the charging air efficiency would be reduced by the high temperature of the intake air.

The intercooler, by cooling this high temperature air, substantially increases the charging air efficiency and engine output, as well as supressing ignition knocking by reducing the combustion gas temperature.

The intercooler is mounted at the left front of the vehicle.

Air Bypass Valve

The air bypass valve bypasses intake air from the air funnel to before the turbocharger in order to reduce air vibration noise during deceleration.

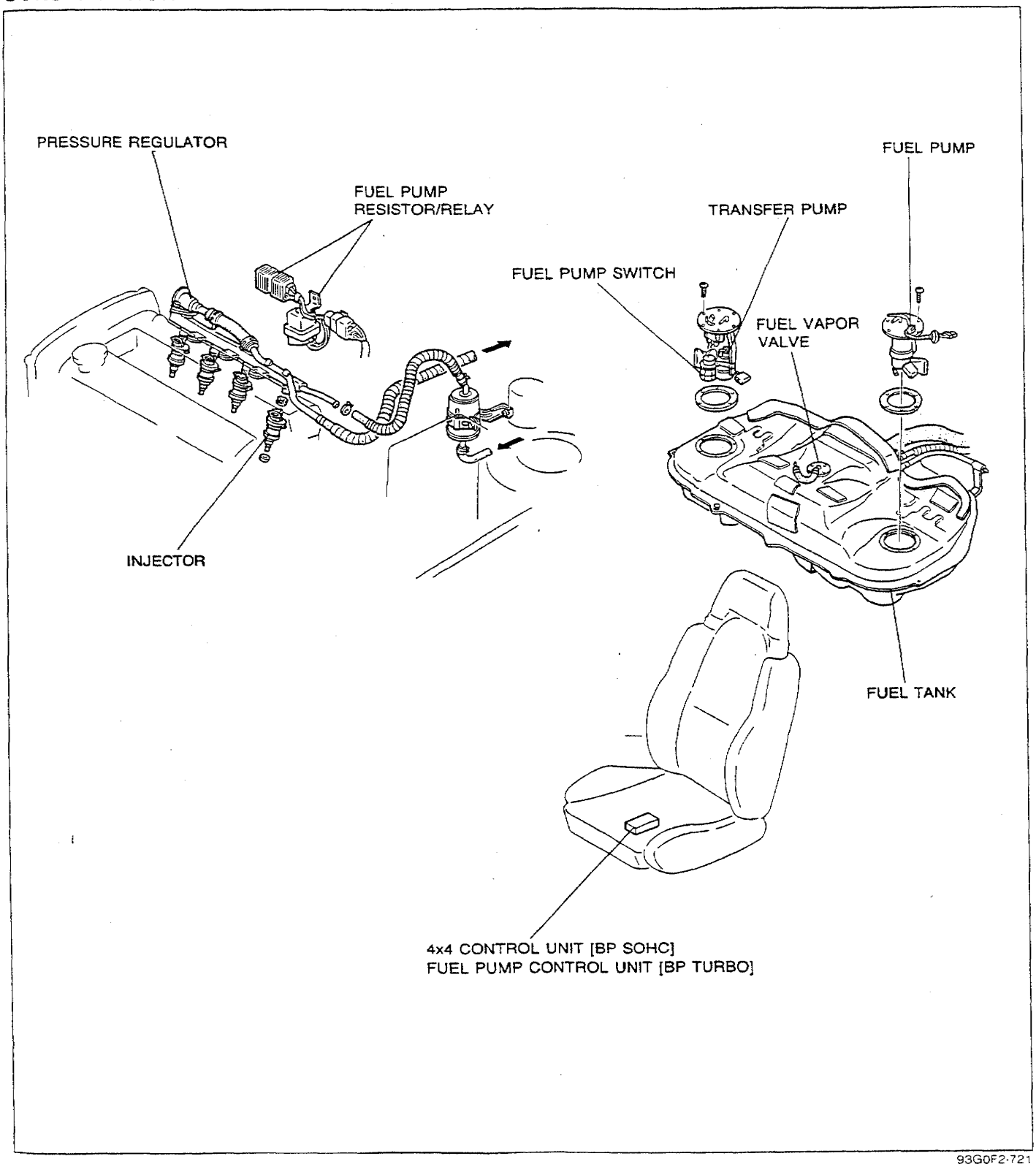
When the throttle valve is closed suddenly during high-rpm and heavy-load operation, air vibration occurs between the throttle valve and the turbocharger as a result of pressurization caused by inertia of the intake air. This system prevents such noise.

FUEL SYSTEM

OUTLINE

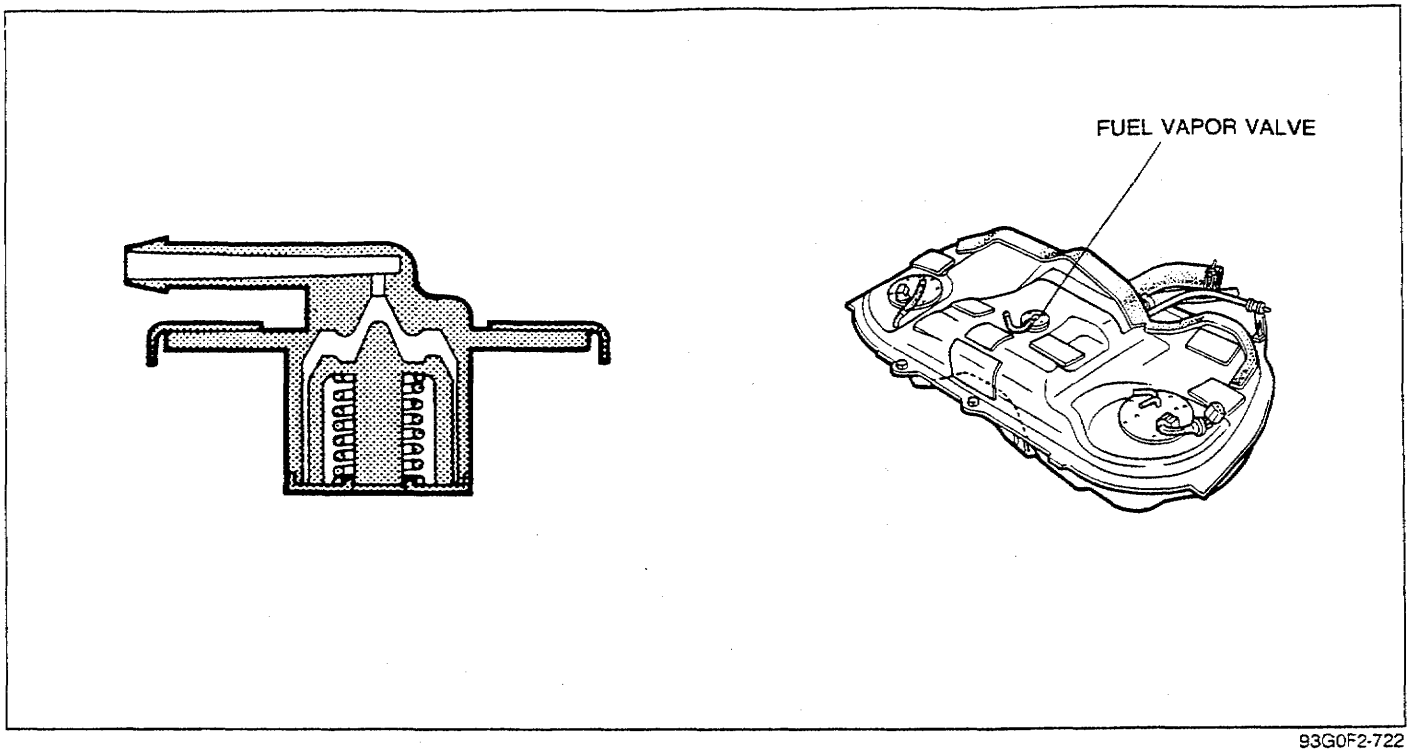
Due to the installation of the propeller shaft for the 4WD, the fuel tank is designed with left and right section. Therefore, a transfer pump is used to pump the fuel from the left to the right (fuel pump) side. The transfer pump is mounted in the fuel tank, and is controlled by the transfer pump switch and the fuel pump control unit. The fuel pump control system is adopted for BP turbo model.

CONSTRUCTION



93G0F2-721

FUEL VAPOR VALVE



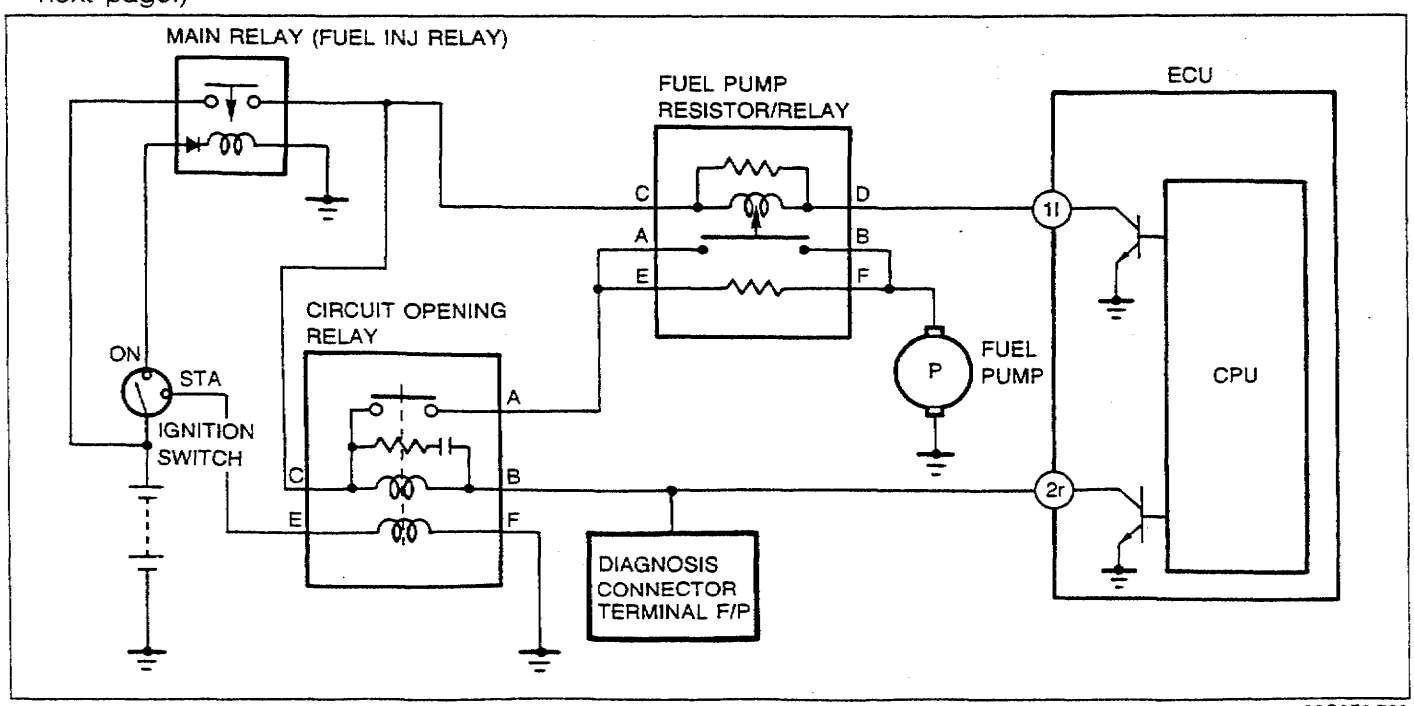
93G0F2-722

The fuel vapor valve is installed in the fuel tank to allow fuel vapors within the tank to escape to the charcoal canister.
The fuel vapor valve contains a shut-off valve to prevent raw fuel from escaping during hard cornering or at other times when there is significant fuel slosh.

FUEL PUMP CONTROL SYSTEM [BP TURBO]

Outline

- The fuel pump control system supplies electric power to the fuel pump at all times while the engine is running. The fuel pump can thus operate even though the fuel pump switch in the airflow meter OFF. [The fuel pump switch may open (switch OFF) on deceleration due to back-flow of air from the turbocharger.]
- To improve fuel pump longevity, the fuel pump is controlled by the engine control unit (ECU). (Refer to next page.)

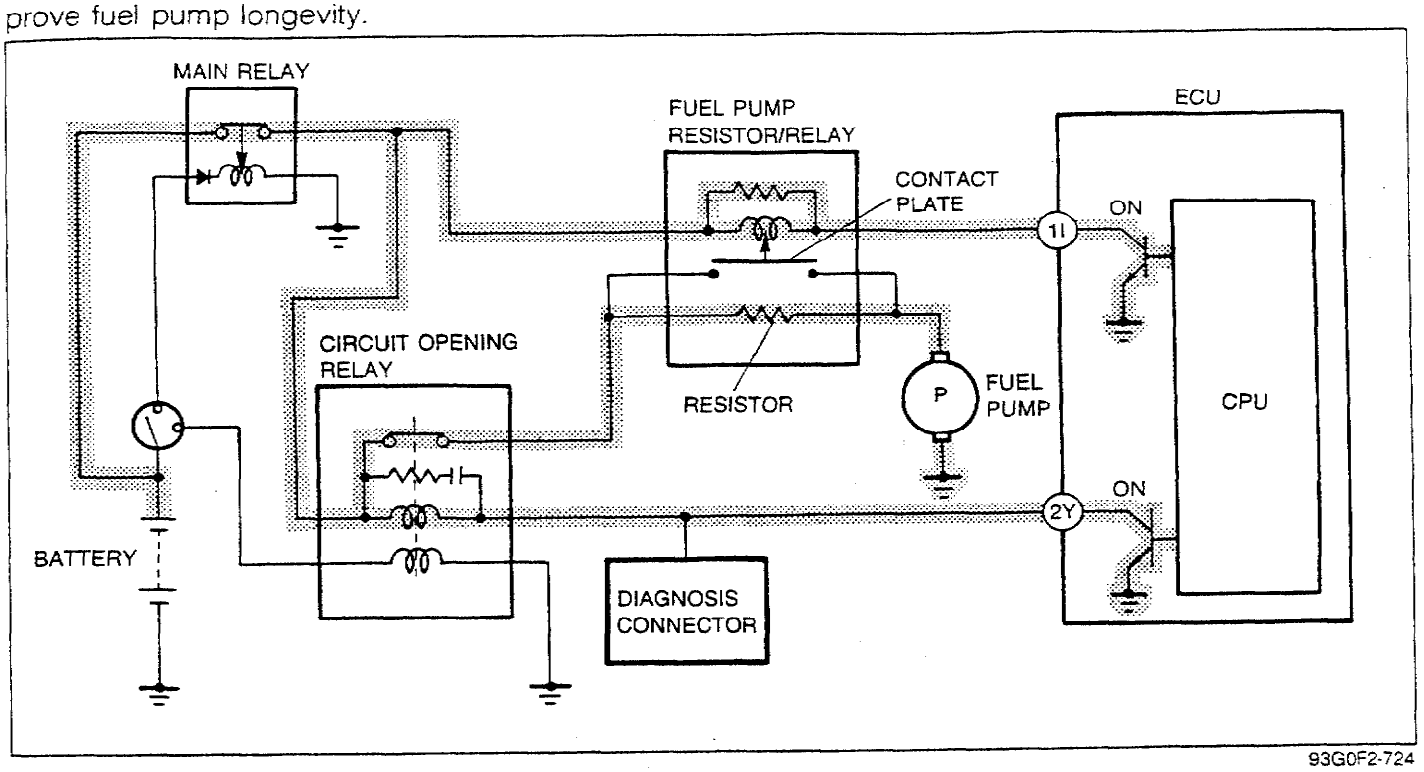


93G0F2-723

Two-stage fuel pump operation

Engine running (Except heavy load or cranking)

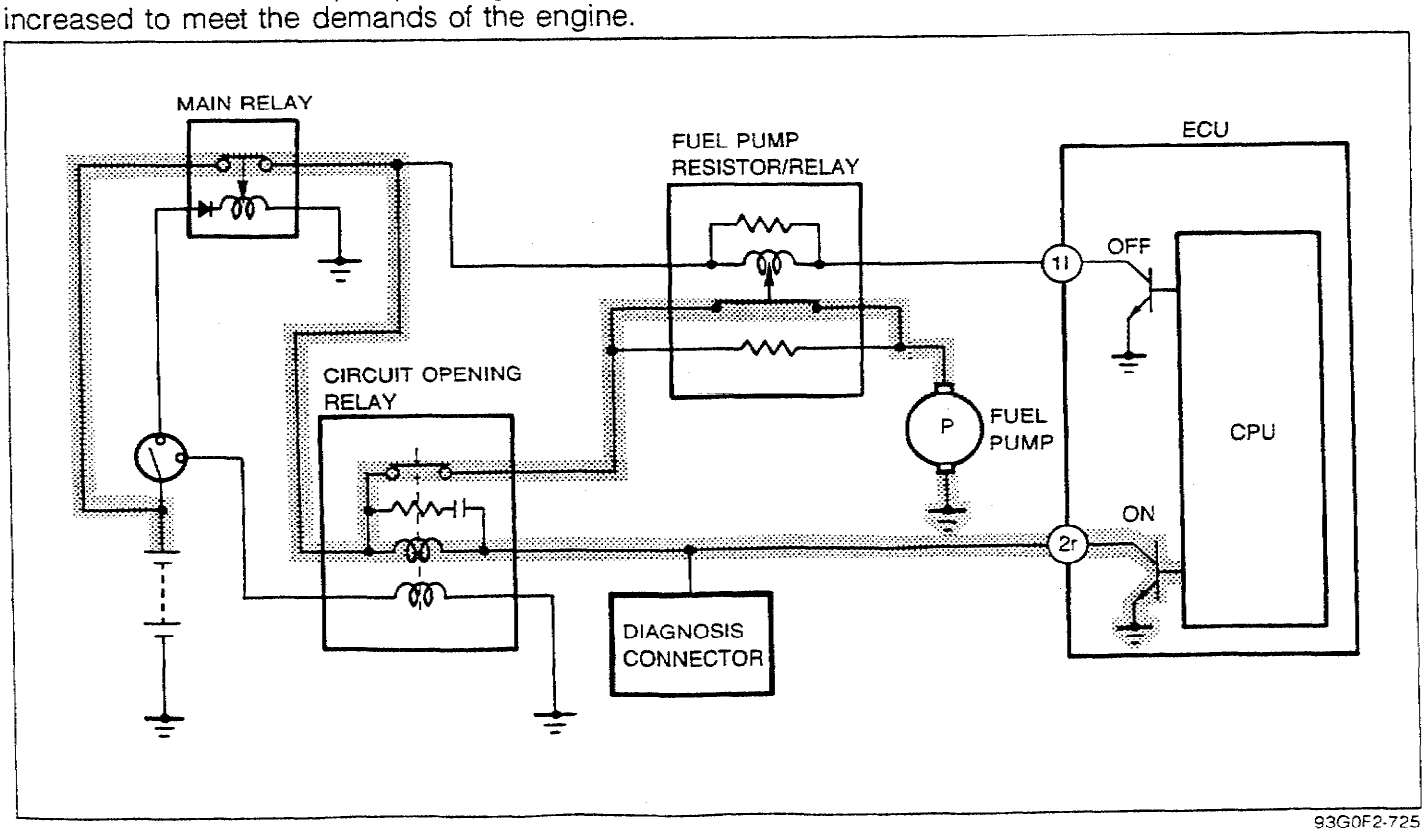
The ECU 1I circuit is ON, opening the contact plate in the fuel pump resistor/relay. Current from the circuit opening relay to the fuel pump flows through the resistor in the fuel pump resistor/relay, and the voltage to the fuel pump is reduced to **approx. 10V**, causing the fuel pump to operate at a reduced speed to improve fuel pump longevity.



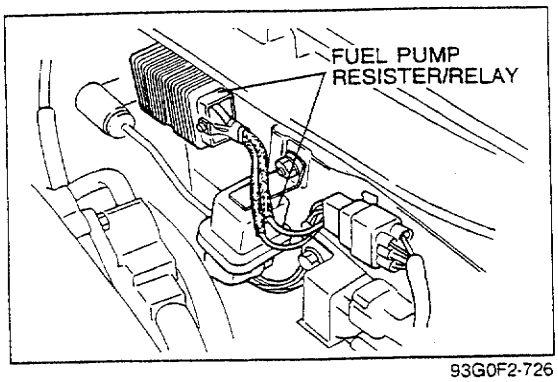
93G0F2-724

Engine under heavy load or cranking

The ECU 1I circuit is OFF and the contact plate in the fuel pump resistor/relay is closed. Unreduced battery current flows to the fuel pump through the contact plate, causing the fuel pump speed and output to be increased to meet the demands of the engine.



93G0F2-725



93G0F2-726

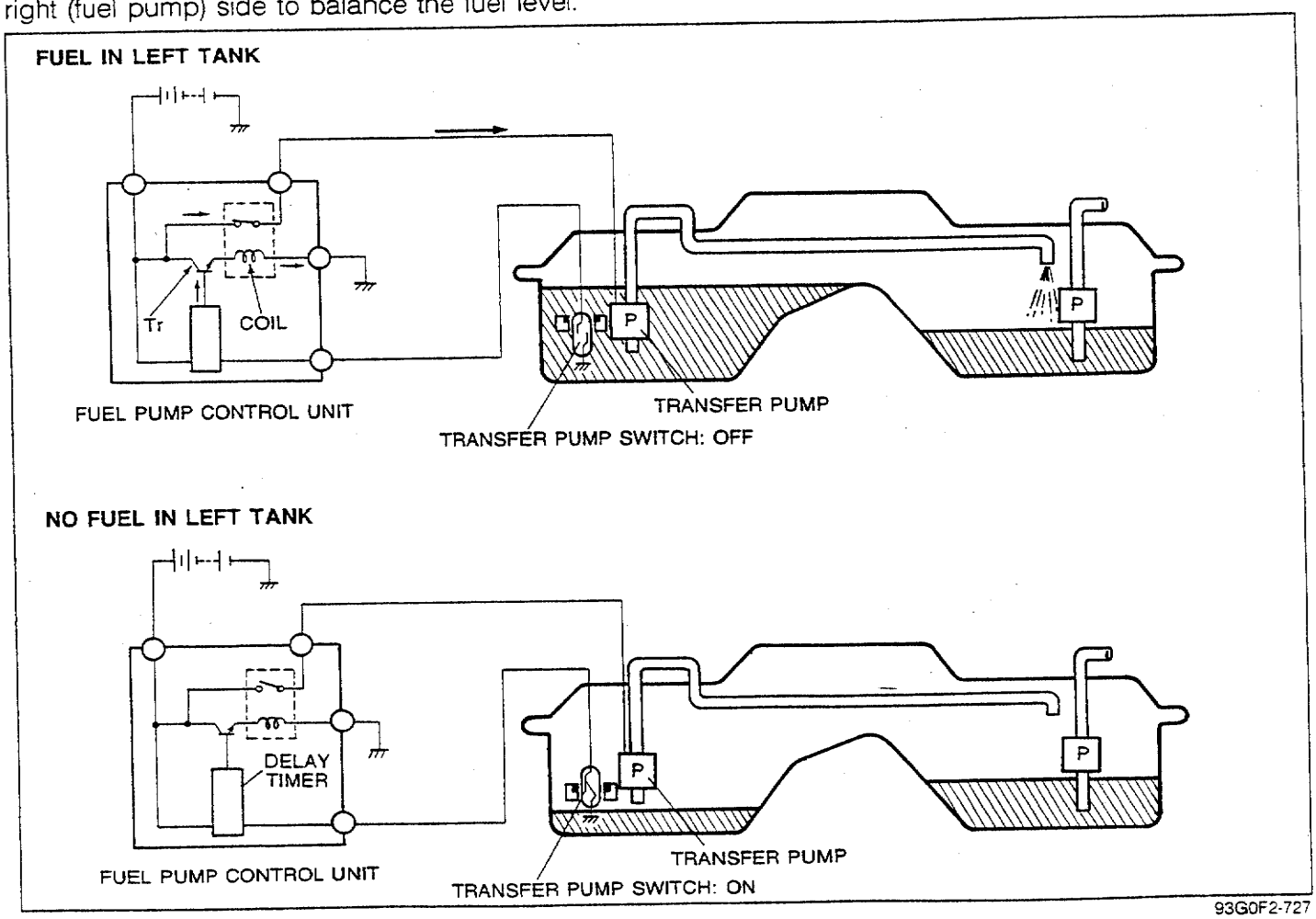
FUEL PUMP RESISTOR/RELAY [BP TURBO]

The fuel pump resistor/relay supplies battery voltage to the fuel pump when the ECU 1I circuit is OFF, and **approx. 10V** when the ECU 1I circuit is ON. It is mounted on the firewall.

TRANSFER PUMP CONTROL

Outline

The fuel tank is built with separate right and left sections to accommodate the installation of the propeller shaft. As fuel is pulled from the right side of the tank, the transfer pump pumps the fuel from the left to the right (fuel pump) side to balance the fuel level.

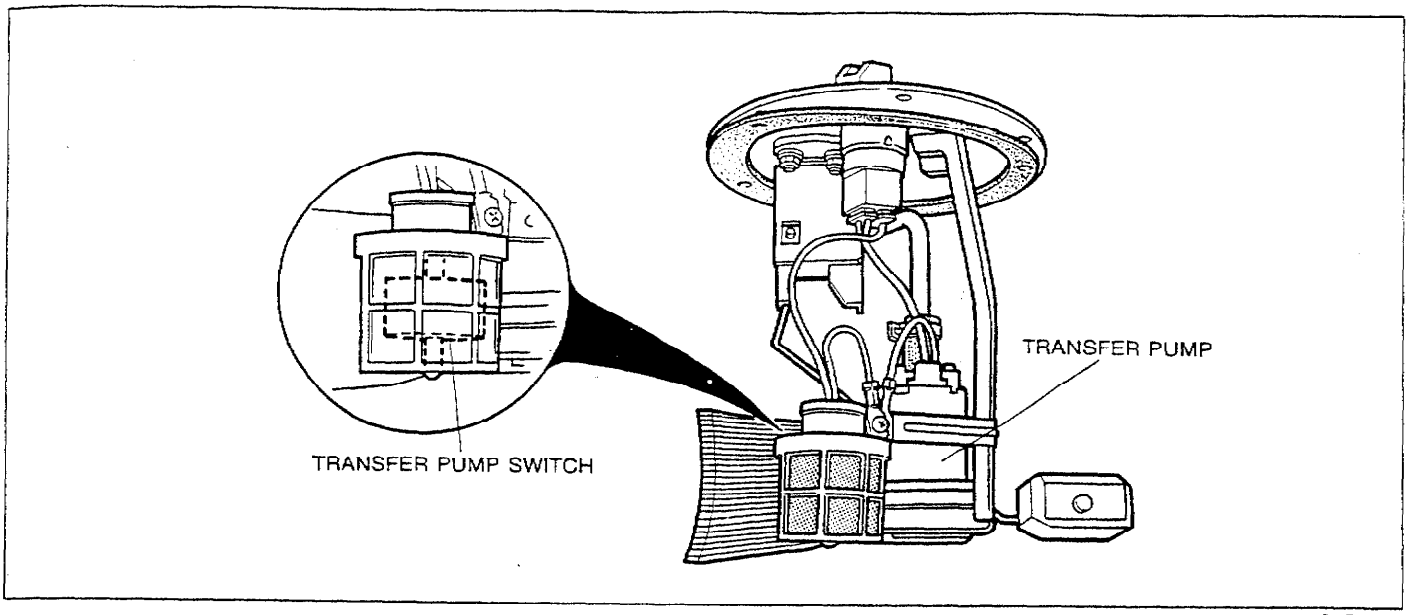


93G0F2-727

Operation

1. Whenever the ignition switch is ON and fuel is in the left (transfer pump) side of the fuel tank the fuel pump switch is open, the transfer pump circuit in the fuel pump control unit is closed, and the transfer pump operates.
2. When the fuel in the left side of the tank drips below a specified point, the fuel pump switch is grounded and the transfer pump stops operation.
3. To prevent the transfer pump from being turned ON and OFF repeatedly, possibly shorting the life of the pump, when the vehicle is driven on a rough road and the fuel level is low, there is a ten-second delay circuit in the control unit to delay the turning ON and OFF the pump.

Transfer Pump Switch

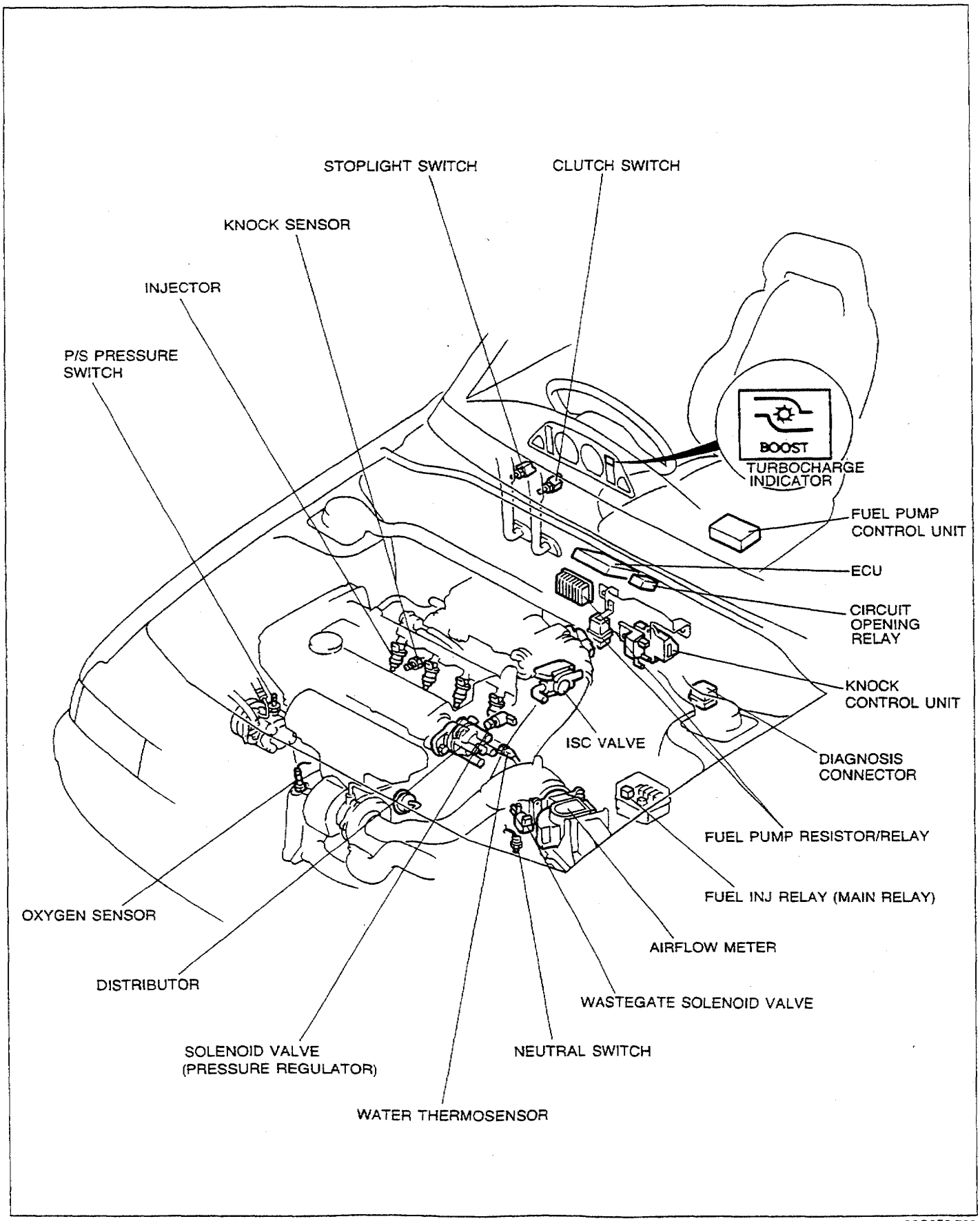


93G0F2-728

The fuel pump switch is a float-type ON/OFF switch used to operate the transfer pump. It is part of the fuel gauge sender unit.

CONTROL SYSTEM

STRUCTURAL VIEW

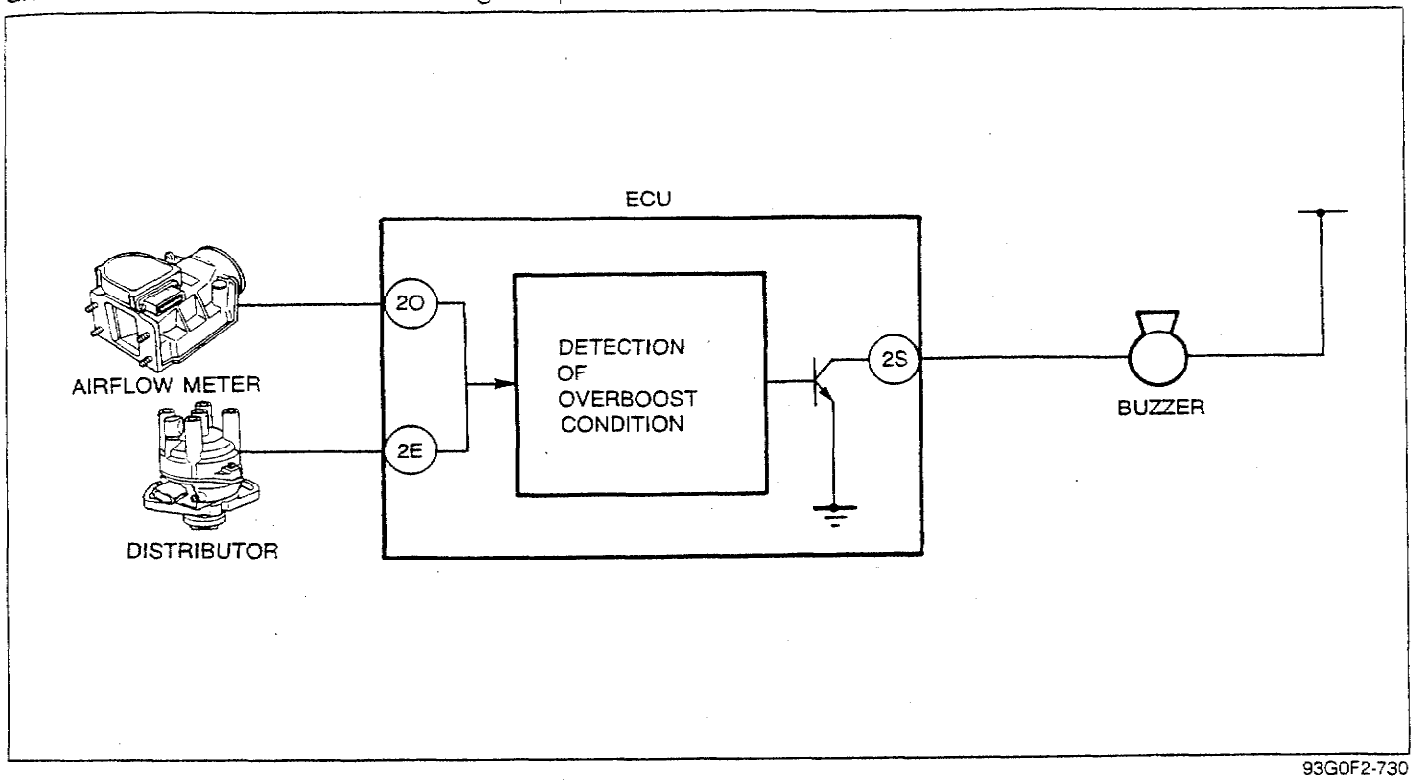


93G0F2-729

OVERBOOST WARNING BUZZER [BP TURBO]

Outline

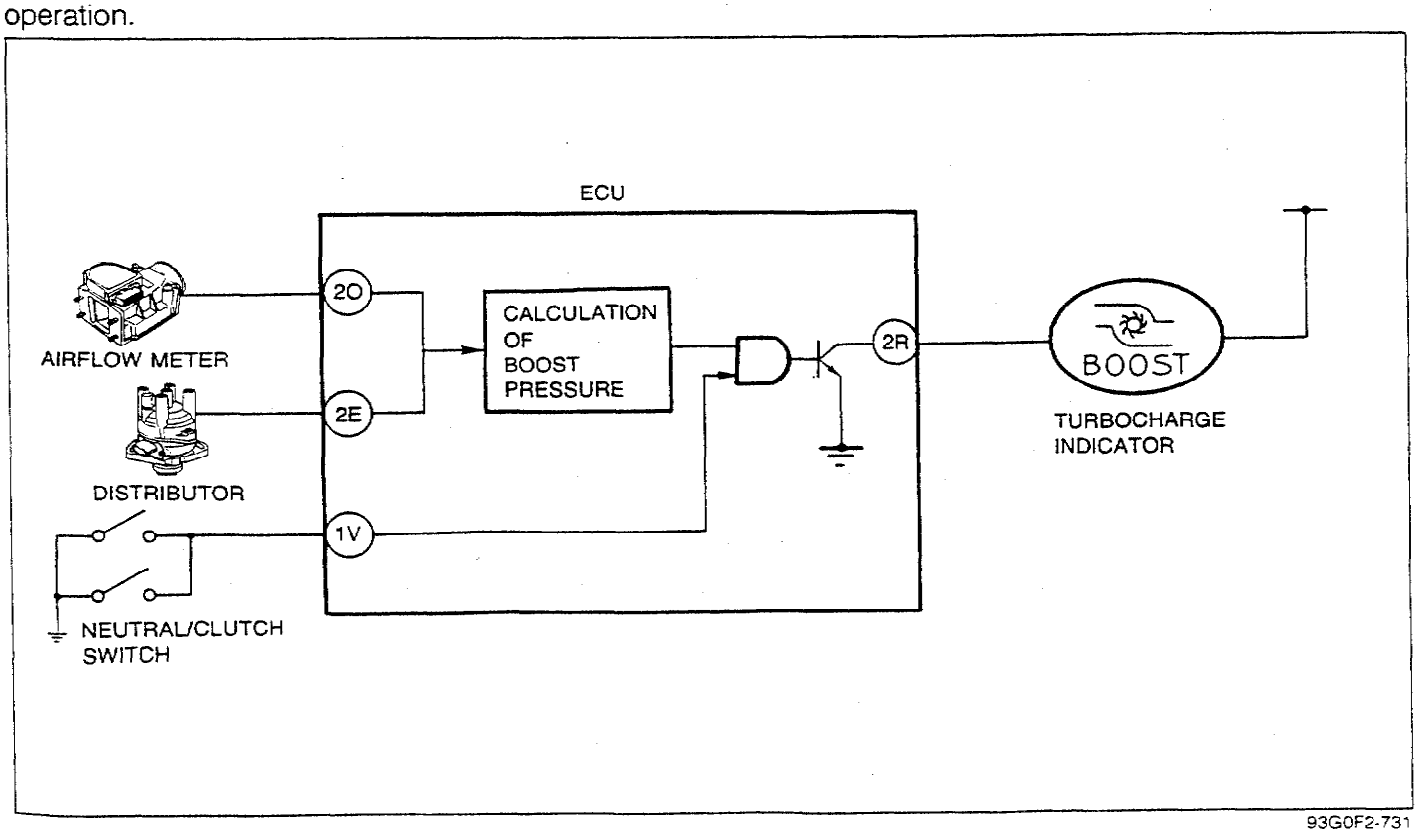
To improve engine reliability, the overboost warning buzzer installed in the instrument cluster sounds during overboost conditions as detected by engine speed and intake air amount calculations within the ECU. The driver is thus warned to reduce engine speed.



93G0F2-730

TURBOCHARGE INDICATOR [BP TURBO]

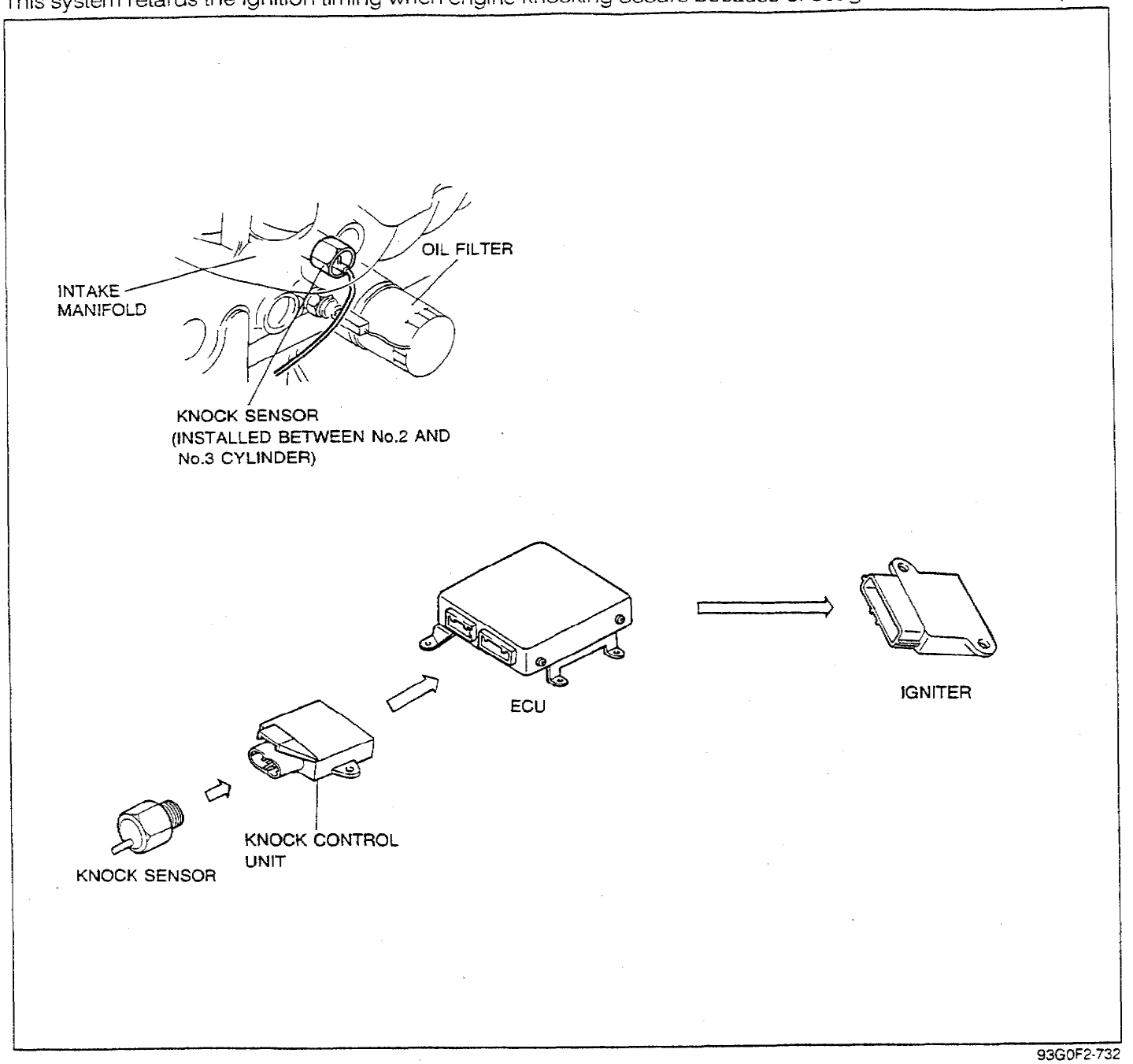
When the turbocharger boost pressure calculated by intake air amount and engine speed reaches the predetermined level and the transaxle is in gear, the turbocharge indicator illuminates to inform the driver of turbocharge operation.



93G0F2-731

KNOCK CONTROL SYSTEM [BP TURBO]

This system retards the ignition timing when engine knocking occurs because of usage of low octane fuel, etc.



93G0F2-732

Operation

When the engine vibrates, the knock sensor generates a slight voltage signal that is the sent to the knock control unit. The knock control unit determines whether the signal is a knocking signal. If it is a knocking signal, the ignition spark is retarded according to the intensity of the knock to a maximum of 4°.

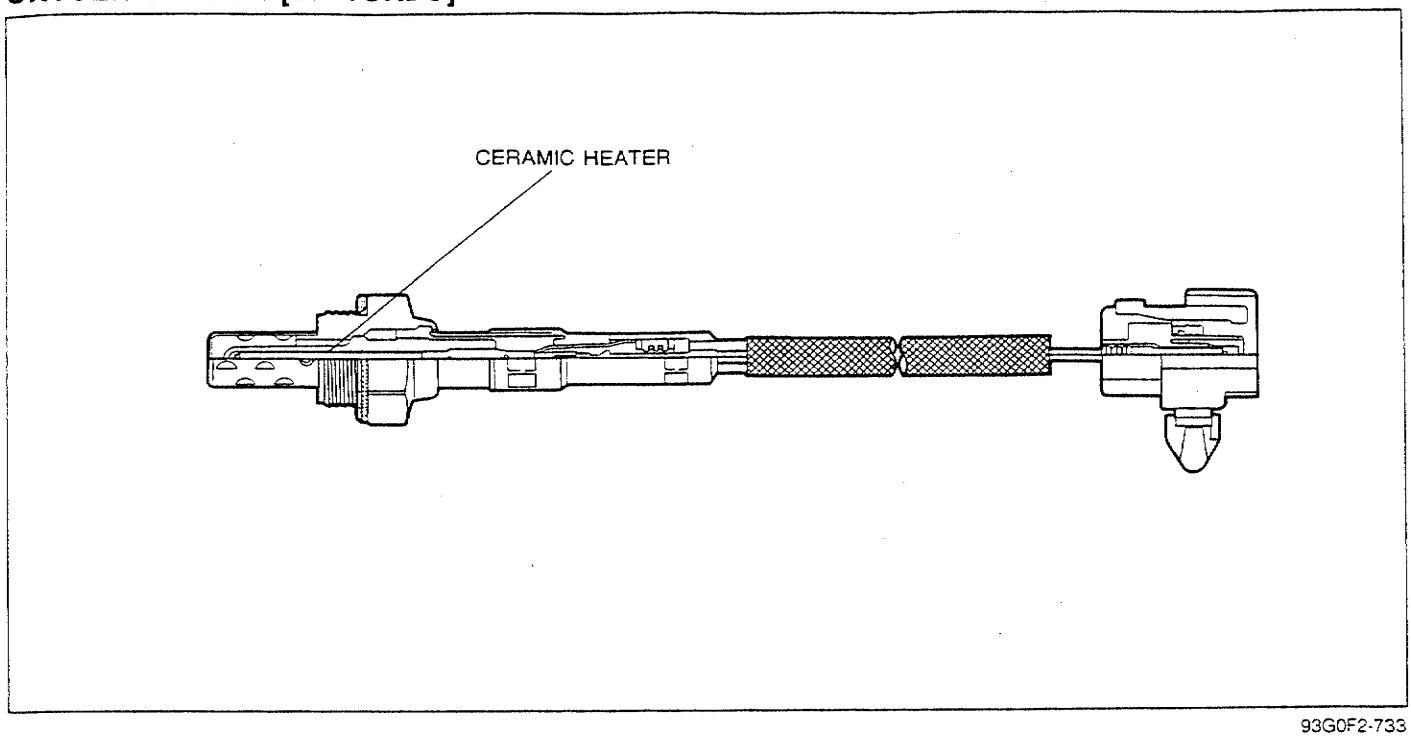
Inhibition of spark retardation

In order to improve drivability and fuel economy, the ECU inhibits the above spark retardation when the engine load is light, the coolant temperature is below 0°C (32°F), the engine is cranking during engine test conditions.

Note

- **The knock sensor and knock control unit cannot be inspected individually. When a malfunction code number 05 is indicated, replace the knock control unit or sensor only after inspecting the related wiring and connectors.**

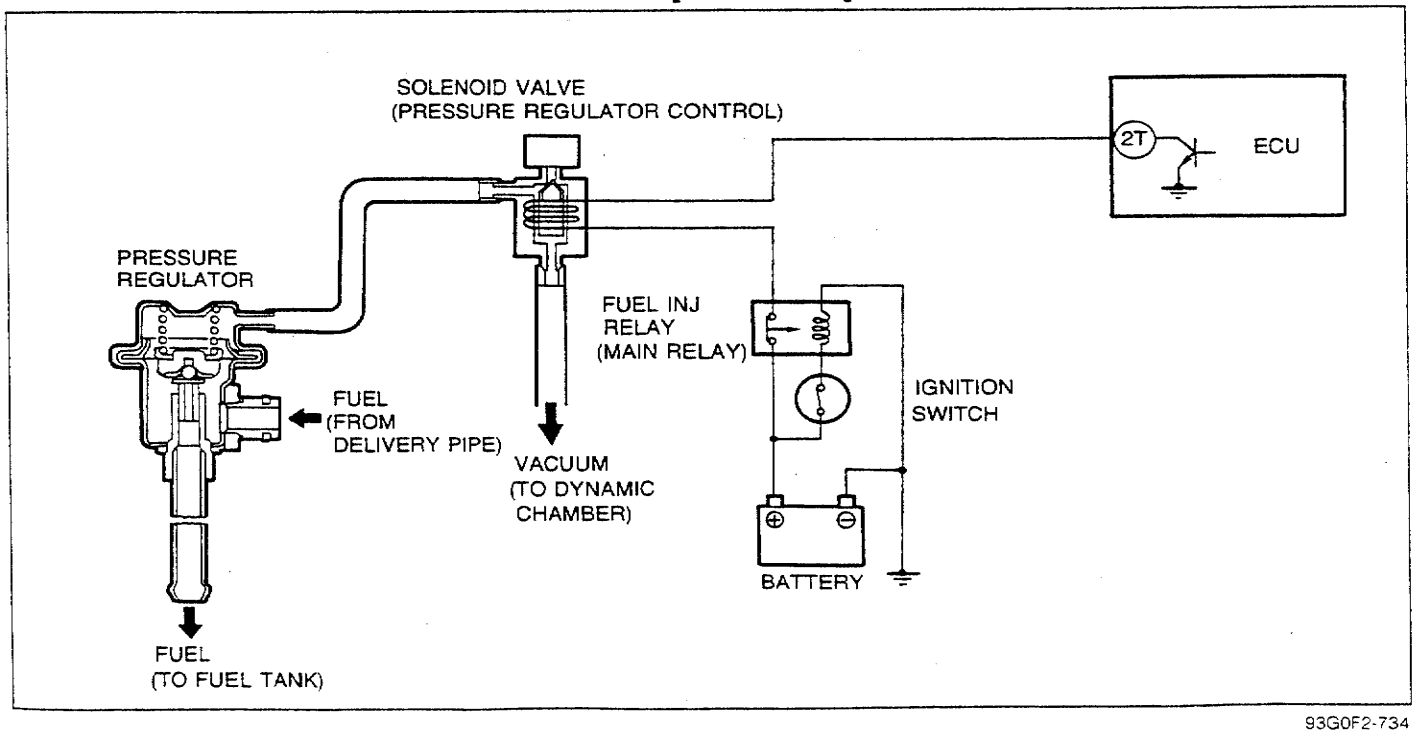
OXYGEN SENSOR [BP TURBO]



93G0F2-733

Because the temperature of the exhaust gas is inherently low in turbocharged engines, the BP Turbo model uses a rapid heating ceramic heater to detect the air/fuel ratio.

PRESSURE REGULATOR CONTROL SYSTEM [BP TURBO]



93G0F2-734

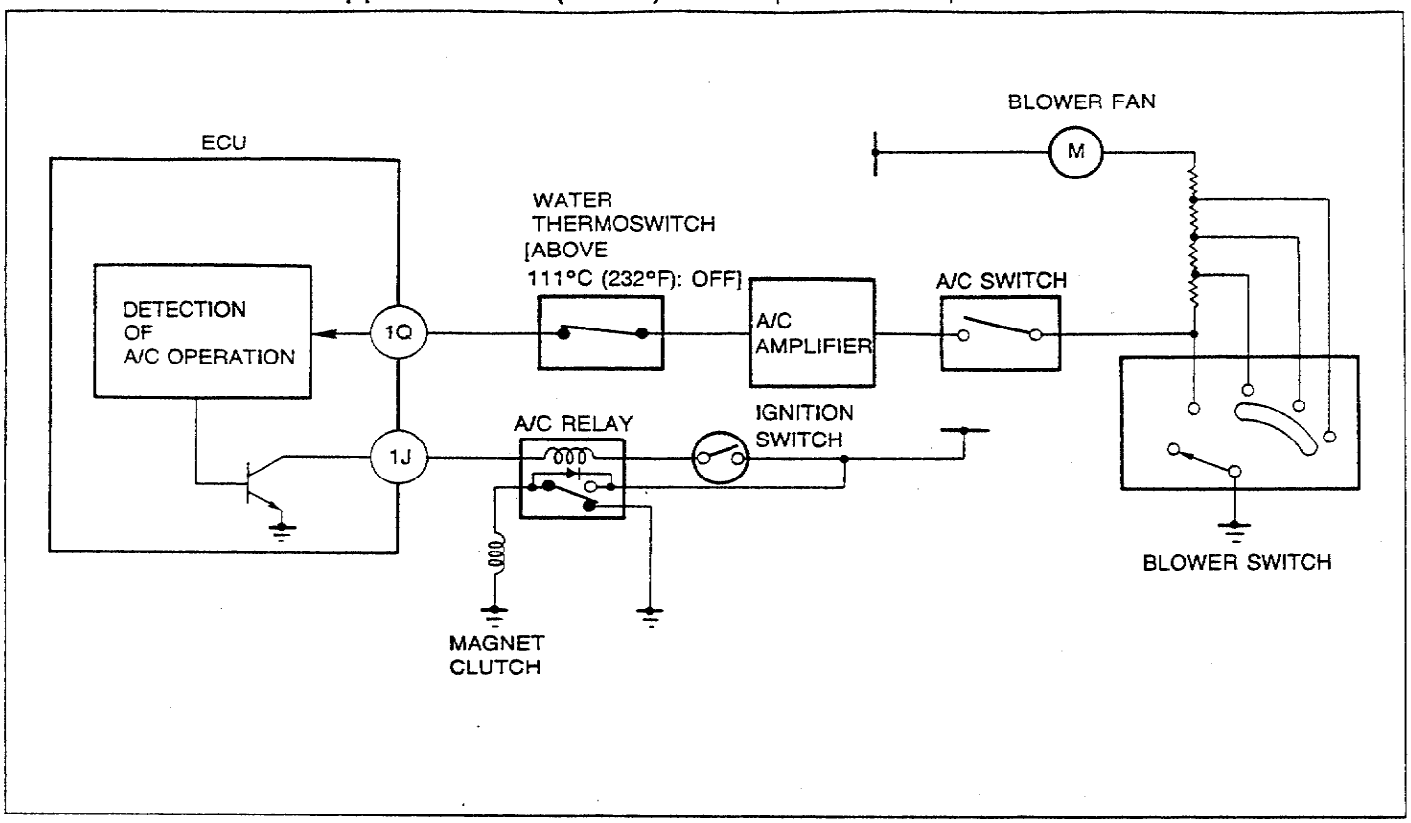
To prevent percolation of the fuel during hot restart idle, vacuum to the pressure regulator is cut for **180 sec.**, and the fuel injection pressure is increased to slightly more than **284 kPa (2.90 kg/cm^2, 41.2 psi)**.

Operating condition

- Coolant temperature: Above 90°C (194°F)
- Intake air temperature: Above 58°C (136°F)
- No-load condition

A/C CUT-OFF SYSTEM (ATX)

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



93G0F2-735

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison to the Mazda 323 Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

Intake air system components [BP Turbo]
- Removal/Inspection/Installation

WASTEGATE [BP Turbo]
- Inspection

WASTEGATE SOLENOID VALVE [BP Turbo]
- Inspection

Turbocharger [BP Turbo]
- Inspection
- Removal/Installation

Air bypass valve [BP Turbo]
- Removal/Installation
- Inspection

Intercooler [BP Turbo]
- Removal/Inspection/Installation

Fuel tank
- Removal / Inspection / Installation

Fuel pump control unit [BP Tubro]/4x4 control unit [BP SOHC]
- Inspection
- Replacement

Transfer pump switch
- Inspection
- Replacement

Transfer pump
- Inspection
- Replacement

Fuel pump resistor/relay
- System operation
- Inspection

Injector [BP Turbo]
- Volume test

Exhaust system components
- Removal / Inspection / Installation

Engine control unit (ECU) [BP Turbo]
- Terminal voltage

Oxygen sensor [BP Turbo]
- Inspection
- Replacement

Knock sensor [BP Turbo]
- Replacement

93G0F2-736

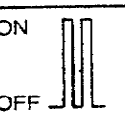
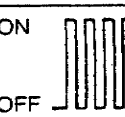
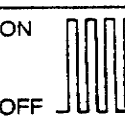
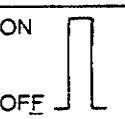
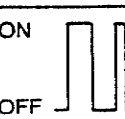
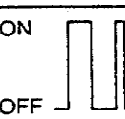
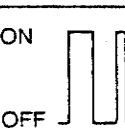
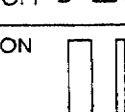
SELF-DIAGNOSIS FUNCTION

OUTLINE

The self-diagnostic function and diagnosis procedure are the same as for the 2WD model. However there are some additional malfunction codes for BP Turbo models.

93G0F2-737

MALFUNCTION CODE NUMBERS

Sensor or subsystem	Condition	Fail-safe	Malfunction display	
			Malfunction Code No.	Output signal pattern
Ne-signal	No Ne-signal	—	02	
G-signal [BP Turbo]	No G-signal	Cancels 2-group injection	03	
Knock sensor [BP Turbo]	Open or short circuit	Retards ignition timing 1°	05	
Airflow meter	Open or short circuit	Basic fuel injection amount fixed as for 2 driving modes (1) Idle switch: ON (2) Idle switch: OFF	08	
Water thermosensor	Open or short circuit	Maintains constant 20°C (68°F) command	09	
Intake air thermosensor	Open or short circuit	Maintains constant 20°C (68°F) command	10	
Throttle sensor [BP Turbo and ATX]	Open or short circuit	Maintains constant command of throttle valve fully open	12	
Atmospheric pressure sensor (in ECU)	Open or short circuit	Maintains constant command of sea level pressure	14	
Oxygen sensor	Sensor output continues less than 0.55V 95 sec. after engine starts (1,500 rpm)	Cancels engine feedback operation	15	
Feedback system	Sensor output continues unchanged 50 sec. after engine exceeds 1,500 rpm	Cancels engine feedback operation	17	

Sensor or subsystem	Condition	Fail-safe	Malfunction display	
			Malfunction Code No.	Output signal pattern
Fuel pump resistor/relay [BP TURBO]	Open or short circuit	—	24	
Solenoid valve (Pressure regulator)		—	25	
Solenoid valve (Purge control)		—	26	
ISC valve		—	34	
Solenoid valve (Wastegate) [BP TURBO]		—	42	

93G0F2-738

Caution

- **If there is more than one failure present, the code numbers will be indicated in numerical order, lowest number first.**
- **After repairing a failure, turn off the ignition switch, disconnect the negative battery cable, and depress the brake pedal for at least five (5) seconds to erase the malfunction code(s) from the ECU memory.**

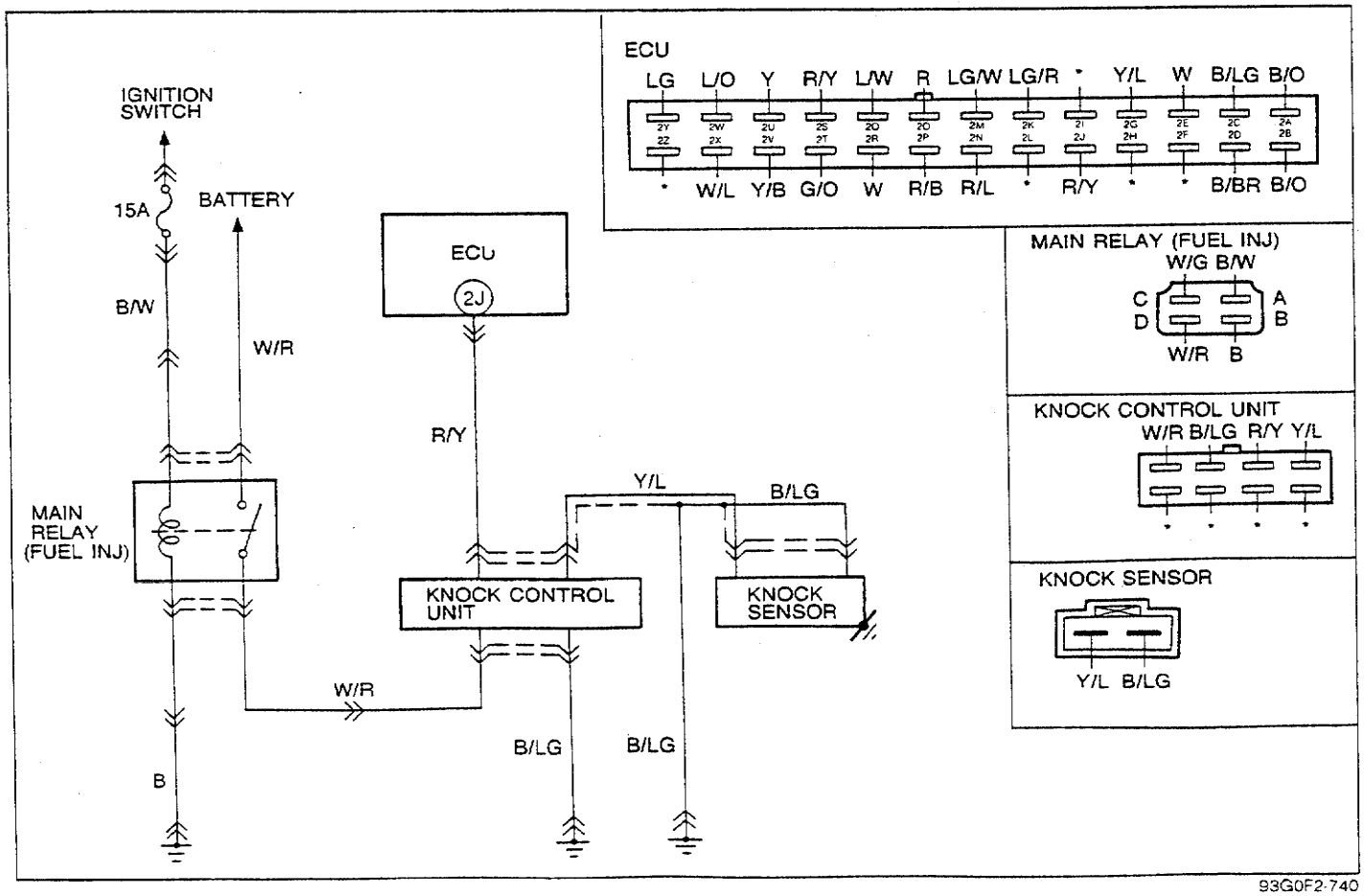
Troubleshooting

If a malfunction code number is shown on the **SST (49 H018 9A1, 49 B019 9A0)**, check for the cause using the chart related to the code number shown. [Regarding code numbers except 05, 24, and 42, refer to "Troubleshooting" in Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

<table>
<tr><td>CODE No.</td><td colspan="3">05 (KNOCK CONTROL UNIT)—BP TURBO</td></tr>
<tr><td>STEP</td><td>INSPECTION</td><td></td><td>ACTION</td></tr>
<tr><td>1</td><td>Check knock sensor and knock control unit circuit for poor connection</td><td>Yes</td><td>Repair or replace connector</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step</td></tr>
<tr><td>2</td><td>Check knock control unit terminal voltage with ignition switch ON
<table><tr><td>Terminal</td><td>Voltage (V)</td></tr><tr><td>A (Y/L)</td><td>Below 1.0</td></tr><tr><td>C (R/Y)</td><td>Approx. 4.0</td></tr><tr><td>E (B/LG)</td><td>Below 1.0</td></tr><tr><td>G (W/R)</td><td>Approx. 12</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for open or short circuit</td></tr>
<tr><td>3</td><td>Check that voltage at ECU terminal 2J is approx. 4V at idle
☞ page F2–64</td><td>Yes</td><td>Recheck ECU connector for poor connection
⇨ If OK, replace ECU
⇨ If not OK, repair or replace connector</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair wiring harness (R/Y) between ECU terminal 2J and knock control unit</td></tr>
</table>

93G0F2-739

Circuit Diagram

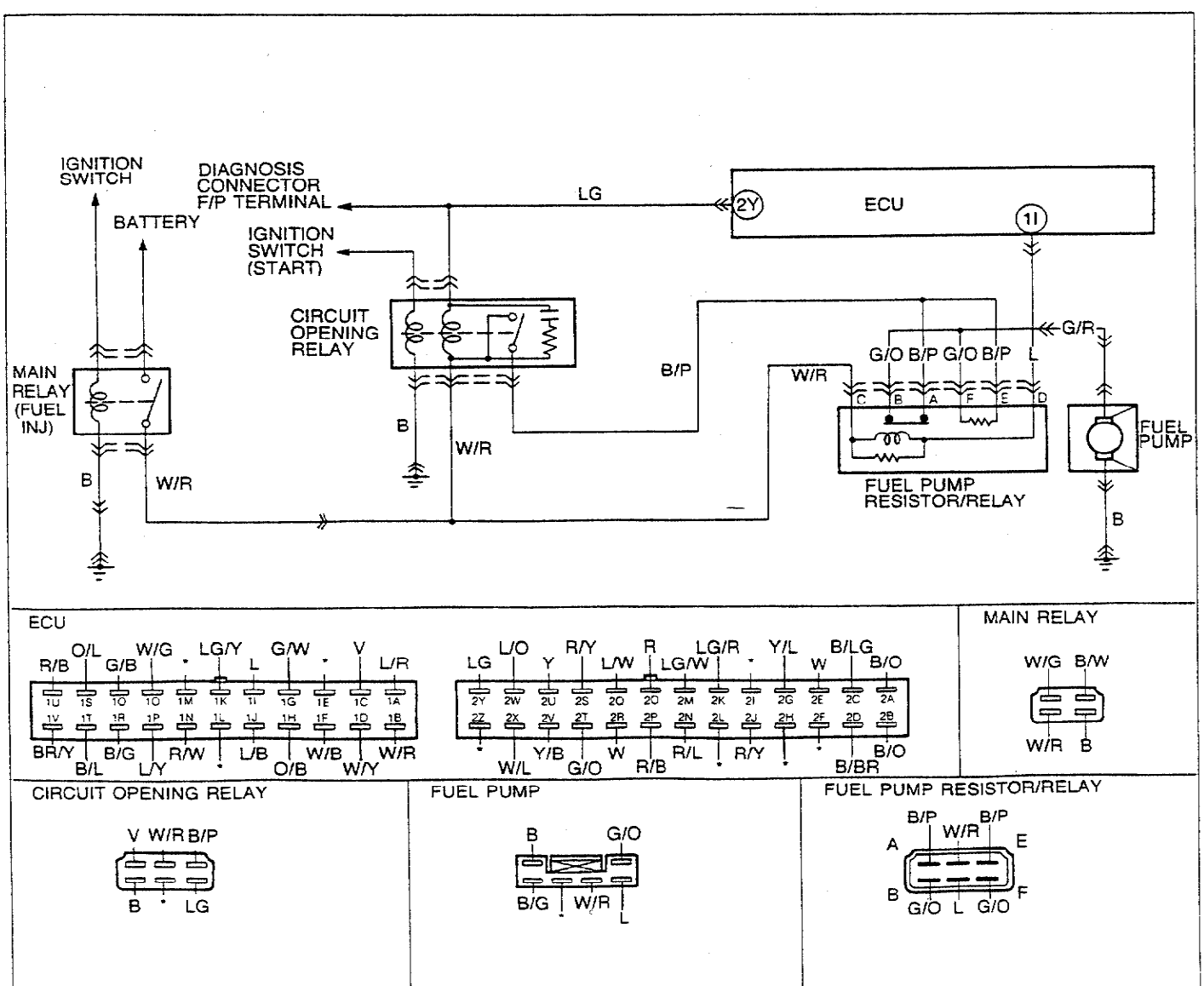


93G0F2-740

CODE No.	24 (FUEL PUMP RESISTOR/RELAY)-BP TURBO		
STEP	INSPECTION		ACTION
1	Disconnect connector from ECU and check if battery voltage exists at connector terminal 1I (L) with ignition switch ON	Yes	Check ECU terminal connector for poor connection ⇨ If OK, replace ECU ⇨ If not OK, repair or replace connector
		No	Go to next step
2	In same condition as Step 1, check if battery voltage exists at resistor/relay connector terminal-wire (W/R)	Yes	Repair wiring harness (W/R)
		No	Go to next step
3	Check if there is continuity between fuel pump resistor/relay terminals C (W/R) and D (L)	Yes	Check for short or open circuit in wiring from main relay (FUEL INJ relay) to resistor/relay
		No	Replace resistor/relay

93G0F2-741

Circuit Diagram

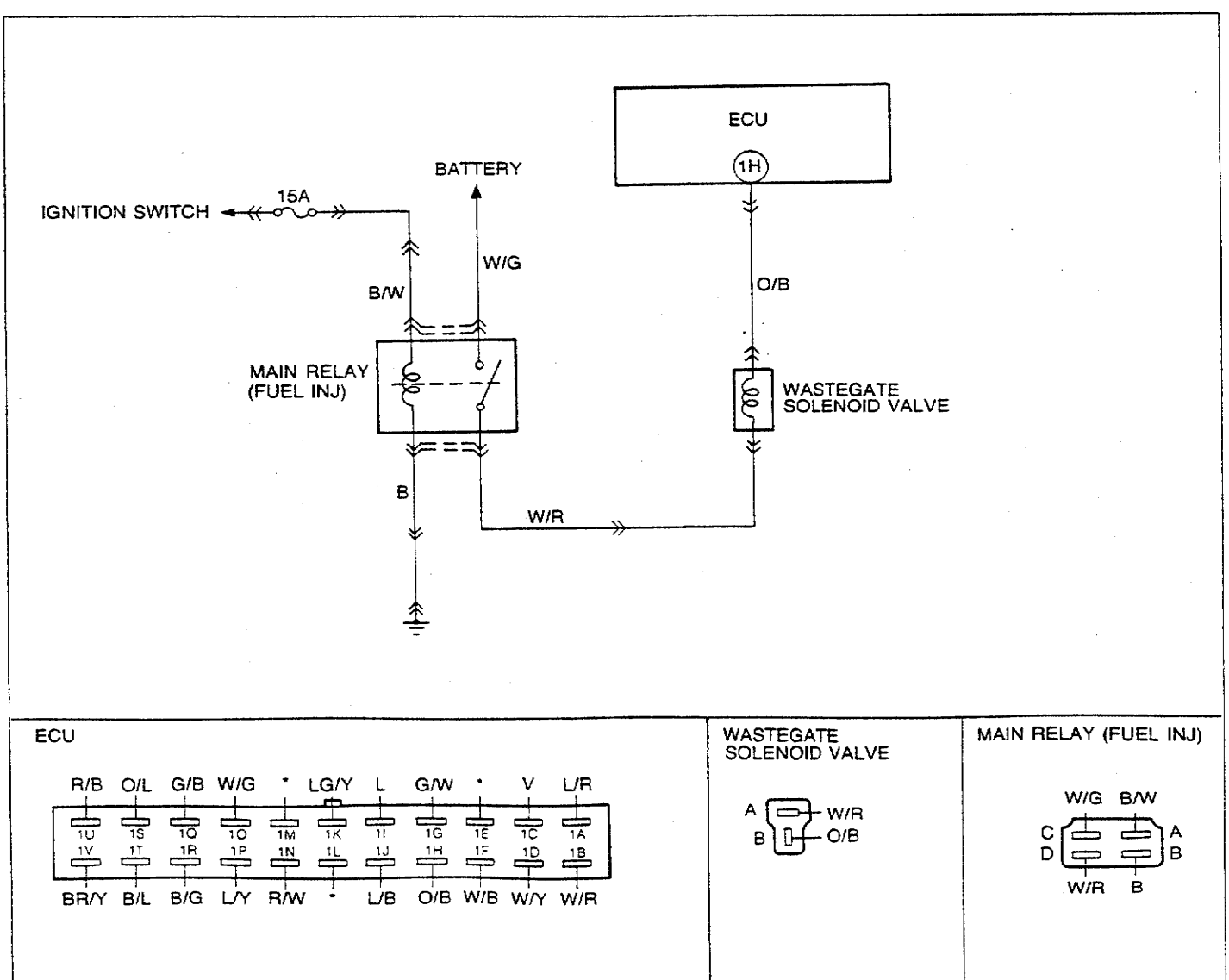


93G0F2-742

CODE No.	42 (SOLENOID VALVE — WASTEGATE)—BP TURBO		
STEP	INSPECTION		ACTION
1	Disconnect connector from ECU and check if battery voltage exists at connector terminal 1H (O/B) with ignition switch ON	Yes	Check ECU terminal connector for poor connection ⇨ If OK, replace ECU ⇨ If not OK, repair or replace connector
		No	Go to next step
2	In same condition as Step 1, check if battery voltage exists at solenoid valve connector terminal-wire	Yes	Repair wiring harness
		No	Go to next step
3	Check if solenoid valve is OK ☞ page F2–46	Yes	Check for short or open circuit in wiring from main relay (FUEL INJ relay) to solenoid valve
		No	Replace solenoid valve

93G0F2-743

Circuit Diagram



93G0F2-744

TROUBLESHOOTING GUIDE [BP TURBO]

RELATIONSHIP CHART

OUTPUT DEVICE / INPUT DEVICE		INJECTOR: FUEL INJECTION AMOUNT	INJECTOR: FUEL INJECTION TIMING	ISC VALVE	SOLENOID VALVE (PURGE CONTROL)	A/C RELAY (A/C CUT-OFF)	CIRCUIT OPENING RELAY	IGNITER (IGNITION TIMING CONTROL)	SOLENOID VALVE (PRESSURE REGULATOR)	WASTEGATE SOLENOID VALVE	FUEL PUMP RESISTOR/RELAY	OVERBOOST WARNING BUZZER	TURBOCHARGE INDICATOR	SELF-DIAGNOSIS CHECKER (MALFUNCTION CODE)	SELF-DIAGNOSIS CHECKER (MONITOR LAMP)
KNOCK SENSOR								○						○	
DIAGNOSIS CONNECTOR (TEN TERMINAL)				○				○						○	○
IGNITION SWITCH (START POSITION)		○	○	○		○	○	○	○		○				
E/L SIGNAL *1				○											○
P/S PRESSURE SWITCH				○		○									
A/C SWITCH				○		○									○
NEUTRAL AND CLUTCH SWITCHES		○		○	○	○		○	○				○		○
STOPLIGHT SWITCH		○													○
ATMOSPHERIC PRESSURE SENSOR (IN ECU)		○		○	○	○								○	
THROTTLE SENSOR		○	○	○	○	○		○	○					○	○
INTAKE AIR THERMOSENSOR		○		○	○				○					○	
AIRFLOW METER		○	○		○			○			○	○	○	○	
OXYGEN SENSOR		○			○									○	○
WATER THERMOSENSOR		○		○	○		○	○	○					○	
DISTRIBUTOR	G-SIGNAL		○											○	
	Ne-SIGNAL	○	○	○	○	○	○	○		○	○	○	○	○	

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*1 E/L SIGNAL: Blower fan control switch second position or higher, cooling fan operating, headlights ON, or rear window defroster switch ON

SYMPTOM TROUBLESHOOTING

Regarding symptom troubleshooting except LACK OF POWER, POOR ACCELERATION, KNOCKING, and HIGH OIL CONSUMPTION, refer to Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

19	LACK OF POWER [BP TURBO]
DESCRIPTION	• Performance poor under load when throttle valve wide open • Reduced maximum speed • Idle condition normal

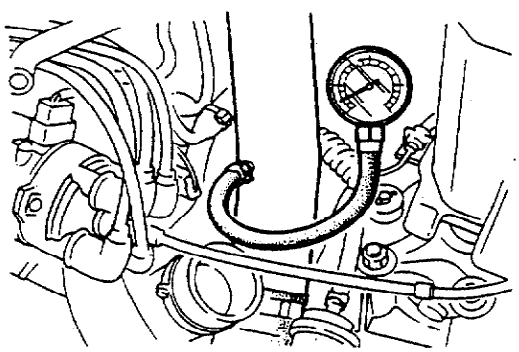
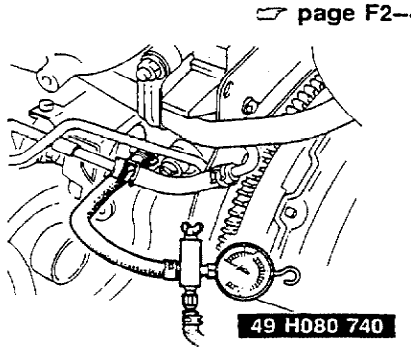
[TROUBLESHOOTING HINTS]

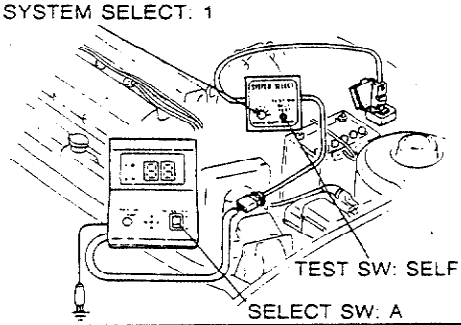
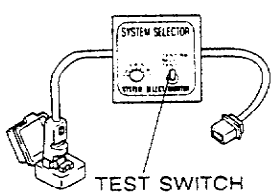
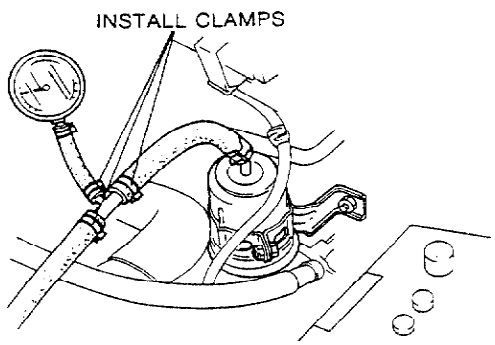
① Wastegate always open or opens early
② Turbocharger damage
③ Factors other than engine malfunction
- Clutch slipping
- Brake dragging
- Low tire pressure
- Incorrect tire size
- Overloaded vehicle

④ Low intake air amount
- Throttle valve not open fully
- Clogged intake air system

⑤ Air/Fuel mixture lean
- Fuel line pressure decreases
- Fuel injection malfunction

⑥ Poor ignition
⑦ Low engine compression
⑧ Alcohol blended fuel used
⑨ Knock control system malfunction

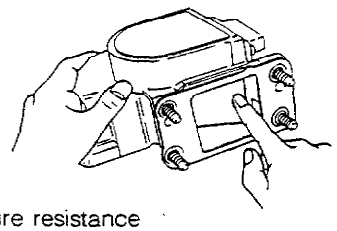
STEP	INSPECTION		ACTION
1	Install pressure gauge in intake air pipe and check boost pressure at engine speed of 4,000 rpm ☞ **page F2–45** **Boost pressure:** **More than 2.0 kPa (0.02 kg/cm², 0.3 psi)** 	Yes	Go to Step 3
		No	Check for air leakage and exhaust gas leakage ⇨ If OK, go to next step ⇨ In not OK, repair
2	Check wastegate ☞ **page F2–45**  	Yes	Remove intake air pipe from turbocharger and check if compressor wheel rotates smoothly ☞ **page F2–46** ⇨ If OK, check air cleaner element and throttle valve ⇨ If not OK, replace turbocharger
3	Check factors other than engine • Clutch slipping • Brake dragging • Low tire pressure • Incorrect tire size	Yes	Go to next step
		No	Repair or adjust

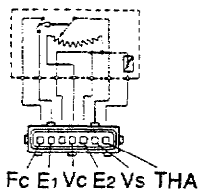
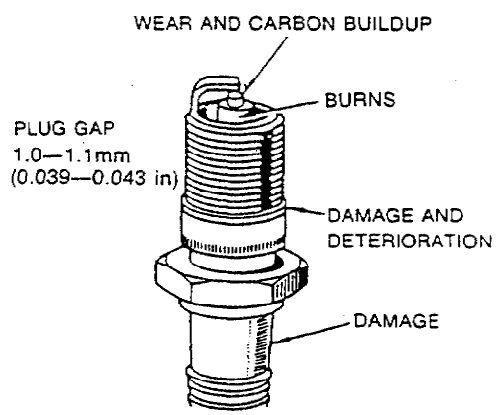
STEP	INSPECTION		ACTION
4	Check if throttle valve fully opened when accelerator depressed fully	Yes	Go to next step
		No	Check if accelerator cable is correctly installed* ⇨ If OK, check throttle body* ⇨ If not OK, install accelerator cable correctly*
5	Check if "00" is displayed on Self-Diagnosis Checker with ignition switch ON* SYSTEM SELECT: 1  	Yes	Go to next step
		No	**Malfunction Code No. displayed** Check for cause (Refer to specified check sequence)*
			"88" flashes Check ECU terminal 1F voltage ☞ **page F2–60** **Voltage: Approx. 12V (Ignition switch ON)** ⇨ If OK, replace ECU ⇨ If not OK, check wiring between ECU and Self-Diagnosis Checker
6	Connect System Selector to diagnosis connector and set Test Switch to "SELF TEST" and check for correct ignition timing at idle after warm-up* **Ignition timing: BTDC 10 ± 1°**  	Yes	Check if ignition timing advances when accelerating ⇨ If advances, go to next step ⇨ If no advance, check ECU terminal voltages ☞ **page F2–60**
		No	Adjust*
7	Check if ECU terminal voltages are OK [Especially 1K, 1N, 2M, and 2K] ☞ **page F2–60**	Yes	Go to next step
		No	Check for cause ☞ **page F2–61**
8	Check for correct fuel line pressure at idle* **Fuel line pressure: 265—314 kPa (2.7—3.2 kg/cm², 38—46 psi) (Vacuum hose to pressure regulator disconnected)** INSTALL CLAMPS 	Yes	Check if fuel line pressure decreases when accelerating quickly ⇨ If decreases, check fuel pump maximum pressure* If OK, check fuel line and filter for clogging ⇨ If no decrease, go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ⇨ If fuel line pressure quickly increases, check pressure regulator* ⇨ If fuel line pressure gradually increases, check for clogging between fuel pump and pressure regulator If not clogged, check fuel pump maximum pressure*
			High pressure Check if fuel return line is clogged ⇨ If OK, replace pressure regulator ⇨ If not OK, replace

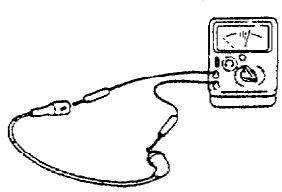
* Refer to 323 Workshop Manual [1203-10-89F (Europe), or 1204-10-89F (Australia)].

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>9</td><td>Check for correct intake manifold vacuum at idle

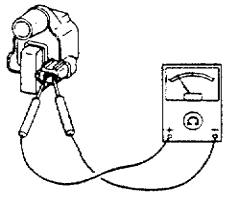
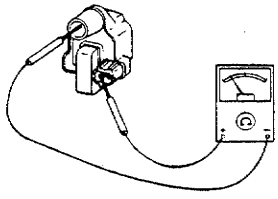
Intake manifold vacuum:
More than 450 mmHg (17.7 inHg)</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for air leakage of intake air system components</td></tr>
<tr><td>10</td><td>Check if air cleaner element is clean*</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace air cleaner element</td></tr>
<tr><td>11</td><td>Check if airflow meter is OK*

I. Check if measuring plate moves smoothly
 

II. Measure resistance
 
Fc E1 Vc E2 Vs THA
<table><tr><th rowspan="2">Terminal</th><th colspan="2">Resistance (Ω)</th></tr><tr><th>Fully closed</th><th>Fully open</th></tr><tr><td>E2↔Vs</td><td>200—600</td><td>20—1,200</td></tr><tr><td>E2↔Vc</td><td colspan="2">200—400</td></tr><tr><td>E1↔Fc</td><td>∞</td><td>0</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Repair or replace</td></tr>
<tr><td>12</td><td>Check if spark plugs are OK*
 
</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Clean or replace</td></tr>
<tr><td>13</td><td>Check if resistance of high-tension leads are OK*

Resistance: 16 kΩ per 1 m (3.28 ft)
  </td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Replace</td></tr>
</table>

* Refer to 323 Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

STEP	INSPECTION		ACTION
14	Check if resistance of ignition coil is OK* **Resistance (at 20°C [68°F]):** **Primary coil winding..... 0.81—0.99Ω** **Secondary coil winding.... 10—16 kΩ** PRIMARY COIL WINDING  SECONDARY COIL WINDING 	Yes	Go to next step
		No	Replace
15	Check for correct engine compression* **Engine compression:** **785 kPa (8.0 kg/cm², 114 psi)-300 rpm**	Yes	Go to next step
		No	Check engine condition* • Worn piston, piston rings or cylinder wall • Defective cylinder head gasket • Distorted cylinder head • Improper valve seating • Valve sticking in guide
16	Change fuel and check if condition improves	Yes	Change fuel to another brand
		No	Try known good ECU and check if condition improves

* Refer to 323 Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

93G0F2-746

20	POOR ACCELERATION [BP TURBO]
DESCRIPTION	• Performance poor while accelerating • Idle condition normal

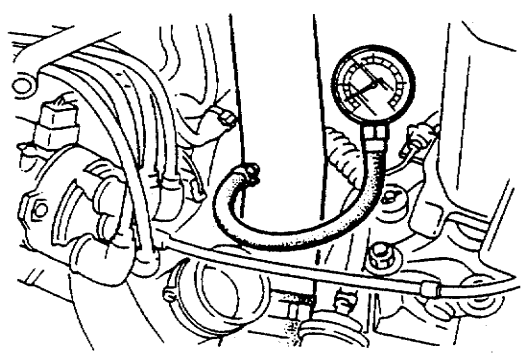
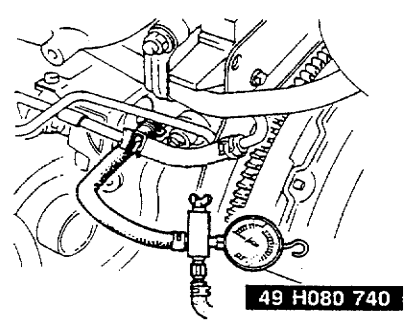
[TROUBLESHOOTING HINTS]

① Wastegate always open or opens early
② Turbocharger damage
③ Factors other than engine malfunction
- Clutch slipping
- Brake dragging
- Low tire pressure
- Incorrect tire size
- Overloaded vehicle

④ Low intake air amount
- Throttle valve not open fully
- Clogged intake air system

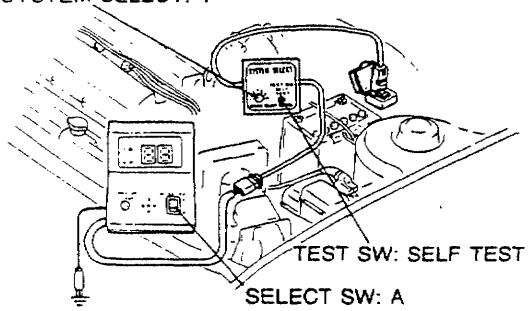
⑤ Air/Fuel mixture lean
- Fuel line pressure decreases
- Fuel injection malfunction

⑥ Poor ignition
⑦ Low engine compression
⑧ Alcohol blended fuel used

STEP	INSPECTION		ACTION
1	Install pressure gauge in intake air pipe and check boost pressure at engine speed of 4,000 rpm ☞ **page F2–45** **Boost pressure:** **More than 2.0 kPa (0.02 kg/cm², 0.3 psi)** 	Yes	Go to Step 3
		No	Check for air leakage and exhaust gas leakage ⇨ If OK, go to next step ⇨ If not OK, repair
2	Check wastegate ☞ **page F2–45**  49 H080 740	Yes	Remove intake air pipe from turbocharger and check if compressor wheel rotates smoothly ☞ **page F2–46** ⇨ If OK, check air cleaner element and throttle valve ⇨ If not ok, replace turbocharger
3	Check factors other than engine • Clutch slipping • Brake dragging • Low tire pressure • Incorrect tire size	Yes	Go to next step
		No	Repair or adjust

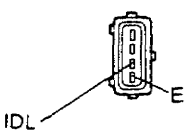
<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Check if throttle valve fully opens when depressing accelerator fully</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>Check if accelerator cable is correctly installed*

⇨ If OK, check throttle body*
⇨ If not OK, install accelerator cable correctly*</td></tr>
<tr><td rowspan="3">5</td><td rowspan="3">Check if "00" is displayed on Self-Diagnosis Checker with ignition switch ON*

SYSTEM SELECT: 1
 
</td><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)*</td></tr>
<tr><td>"88" flashes
Check ECU terminal 1F voltage ☞ page F2–60

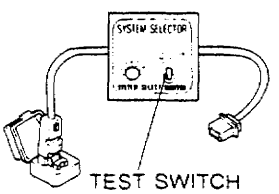
Voltage: Approx. 12V
(Ignition switch ON)

⇨ If OK, replace ECU*
⇨ If not OK, check wiring between ECU and Self-Diagnosis Checker</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Check if continuity between throttle sensor terminals IDL and E is as shown*

<table><tr><th>Clearance between throttle lever and stopper</th><th>Continuity</th></tr><tr><td>0.1mm (0.004 in)</td><td>Yes</td></tr><tr><td>0.6mm (0.024 in)</td><td>No</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>Adjust*</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Connect System Selector to diagnosis connector and set Test Switch to "SELF TEST" and check for correct ignition timing at idle after warm-up*

Ignition timing: BTDC 10 ± 1°

 
</td><td>Yes</td><td>Check if ignition timing advances when accelerating

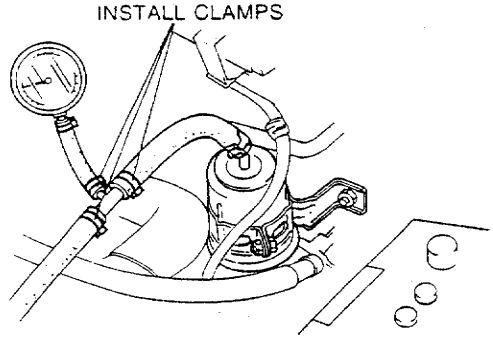
⇨ If advances, go to next step
⇨ If no advance, check ECU terminal voltages</td></tr>
<tr><td>No</td><td>Adjust</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Check if ECU terminal voltages are OK
☞ page F2–60</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>Check for cause</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Check for correct intake manifold vacuum at idle

Intake manifold vacuum:
More than 450 mmHg (17.7 inHg)</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>Check for air leakage of intake air system components</td></tr>
</table>

* Refer to 323 Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td rowspan="3">10</td><td rowspan="3">Check for correct fuel line pressure at idle*

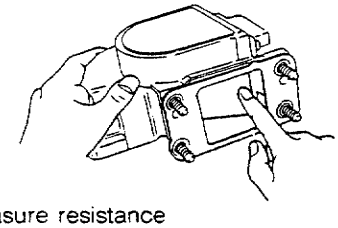
Fuel line pressure:
265—314 kPa (2.7—3.2 kg/cm², 38—46 psi)
(Vacuum hose to pressure regulator disconnected)

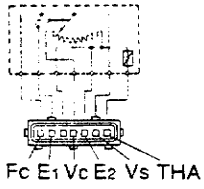
INSTALL CLAMPS
  </td><td>Yes</td><td>Check if fuel line pressure decreases when accelerating quickly

⇨ If decrease, check fuel pump maximum pressure*
If OK, check fuel line and filter for clogging
⇨ If no decrease, go to next step</td></tr>
<tr><td>No</td><td>Low pressure
Check for fuel line pressure while pinching fuel return hose

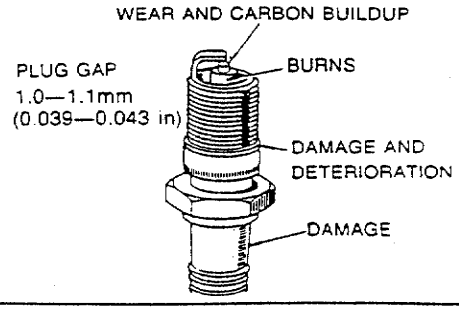
⇨ If fuel line pressure quickly increases, check pressure regulator*
⇨ If fuel line pressure gradually increases, check for clogging between fuel pump and pressure regulator*
If not clogged, check fuel pump maximum pressure*</td></tr>
<tr><td>High pressure
Check if fuel line is clogged

⇨ If OK, replace pressure regulator
⇨ If not OK, replace</td></tr>
<tr><td rowspan="2">11</td><td rowspan="2">Check if airflow meter is OK*

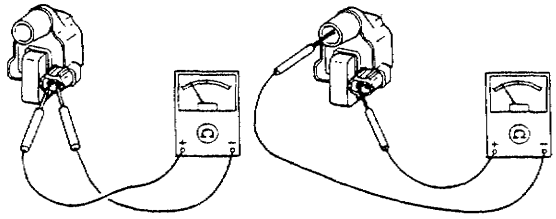
I. Check if measuring plate moves smoothly
 

II. Measure resistance
 
Fc E1 Vc E2 Vs THA

<table><tr><th rowspan="2">Terminal</th><th colspan="2">Resistance (Ω)</th></tr><tr><th>Fully closed</th><th>Fully open</th></tr><tr><td>E2↔Vs</td><td>200—600</td><td>20—1,200</td></tr><tr><td>E2↔Vc</td><td colspan="2">200—400</td></tr><tr><td>E1↔Fc</td><td>∞</td><td>0</td></tr></table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>Repair or replace</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2">Check if spark plugs are OK*

 
</td><td>Yes</td><td>Go to next step</td></tr>
<tr><td>No</td><td>Clean or replace</td></tr>
</table>

* Refer to 323 Workshop Manual [1203-10-89F (Europe) 1204-10-89F (Australia)].

STEP	INSPECTION		ACTION
13	Check if resistance of ignition coil is OK* **Resistance (at 20°C [68°F]):** **Primary coil winding..... 0.81—0.99Ω** **Secondary coil winding.... 10—16 kΩ** PRIMARY COIL WINDING SECONDARY COIL WINDING 	Yes	Go to next step
		No	Replace
14	Check for correct engine compression* **Engine compression (Minimum):** **785 kPa (8.0 kg/cm², 114 psi)-300 rpm**	Yes	Go to next step
		No	Check engine condition* • Worn piston, piston rings or cylinder wall • Defective cylinder head gasket • Distorted cylinder head • Improper valve seating • Valve sticking in guide
15	Change fuel and check if acceleration improves	Yes	Change fuel to another brand
		No	Go to next step
16	Check if A/C cut-off control system is OK*	Yes	Go to next step
		No	Repair or replace
17	Try known good ECU and check if condition improves		

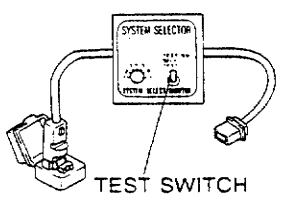
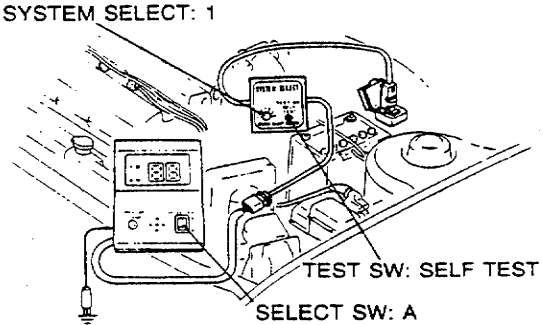
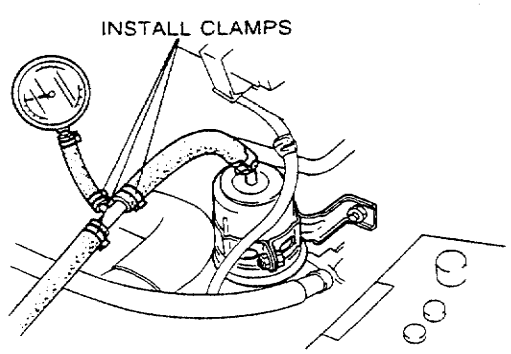
* Refer to 323 Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

93G0F2-747

22	KNOCKING [BP TURBO]
DESCRIPTION	• Abnormal combustion accompanied by audible "pinging" noise

[TROUBLESHOOTING HINTS]

① Incorrect ignition timing (Too advanced)
② Knock control system malfunction
③ Carbon deposits in cylinder
④ Overheating
⑤ Low octan fuel used
⑥ Air/Fuel mixture lean
- Fuel injection amount not correct
- Fuel line pressure decreases while accelerating

STEP	INSPECTION		ACTION
1	Connect System Selector to diagnosis connector and set Test Switch to "SELF TEST" and check for correct ignition timing at idle after warm-up* **Ignition timing: BTDC 10 ± 1°**  	Yes	Go to next step
		No	Adjust
2	Check if "00" is displayed on Self-Diagnosis Checker with ignition switch ON* SYSTEM SELECT: 1  	Yes	Go to next step
		No	**Malfunction Code No. displayed** Check for cause (Refer to specified check sequence)*
			"88" flashes Check ECU terminal 1F voltage ☞ **page F2–60** **Voltage: Approx. 12V (Ignition switch ON)** ⇨ If OK, replace ECU ⇨ If not OK, check wiring between ECU and Self-Diagnosis Checker
3	Check for correct fuel line pressure at idle* **Fuel line pressure: 265—314 kPa (2.7—3.2 kg/cm², 38—46 psi) (Vacuum hose to pressure regulator disconnected)**  	Yes	Check if fuel line pressure decreases when accelerating quickly ⇨ If decreases, check for clogging between fuel pump and pressure regulator ⇨ If no decrease, go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ⇨ If fuel line pressure quickly increases, check pressure regulator* ⇨ If fuel line pressure gradually increases, check for clogging between fuel pump and pressure regulator If not clogged, check fuel pump maximum pressure*

* Refer to 323 Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

STEP	INSPECTION		ACTION
4	Check if cooling system is OK*	Yes	Go to next step
		No	Repair or replace • Thermostat* • Electric cooling fan* • Radiator*
5	Try known good ECU and check if condition improves	Yes	Replace ECU*
		No	Change fuel to another brand or use higher octane fuel

* Refer to 323 Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

93G0F2-748

25	HIGH OIL CONSUMPTION [BP TURBO]
DESCRIPTION	• Oil consumption excessive • Exhaust gas white

[TROUBLESHOOTING HINTS]
① PCV system malfunction
② Engine malfunction (Oil working up, working down, or leakage)
③ Oil leakage from turbocharger

STEP	INSPECTION		ACTION
1	Check if PCV hose, ventilation hose or their attaching nipples are separated, damaged, clogged, or restricted	Yes	Repair or replace
		No	Go to next step
2	Check inside of air hose, air pipe, and intercooler for excessive oil	Yes	Possibly oil working up Check PCV valve and PCV hose for clogged ⇨ If OK, go to next step ⇨ If not OK, repair or replace
		No	Go to next step
3	Check white exhaust gas visible when ventilation hose or PCV hose removed	Yes	Go to next step
		No	Check hoses for clogged
4	Remove turbocharger and check at oil seals of compressor and turbine shaft for oil leakage	Yes	Replace turbocharger
		No	Engine malfunction (Oil working up, working down, or leakage) Check following • Worn piston or cylinder • Worn piston ring groove* • Stuck piston rings* • Worn valve seal* • Worn valve stem* • Worn valve guide*

93G0F2-749

* Refer to 323 Workshop Manual [1203-10-89F (Europe) or 1204-10-89F (Australia)].

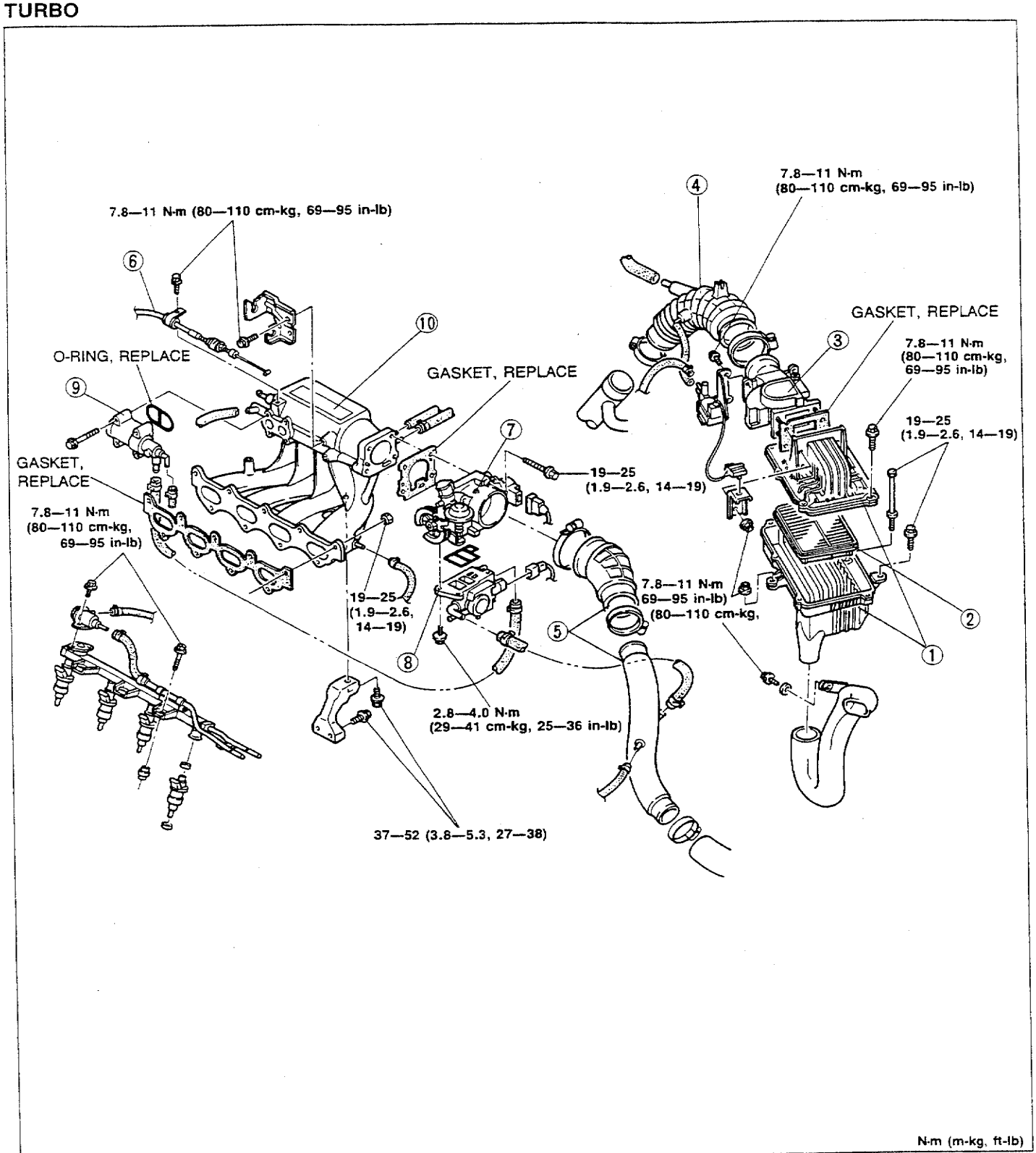
INTAKE AIR SYSTEM

COMPONENTS

Removal / Inspection / 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, referring to **Installation Note**.

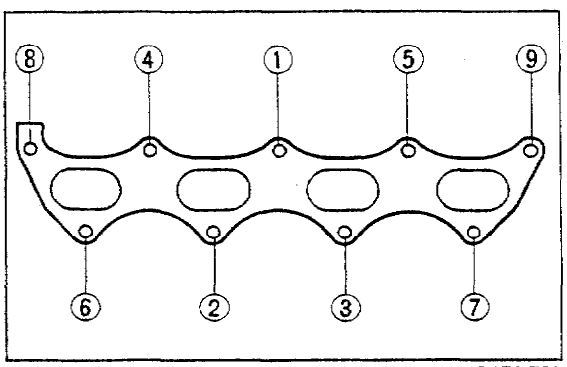
TURBO



93G0F2-750

1. Air cleaner
2. Air cleaner element
   Inspect for dirt, damage, or oil
3. Airflow meter
4. Air hose
5. Air pipe and air hose
6. Accelerator cable
7. Throttle body
8. ISC valve
9. Air valve
10. Dynamic chamber
11. Intake manifold
    Installation Note ..... below

93G0F2-751



93G0F2-752

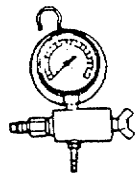
Installation Note
Intake manifold

1. Tighten the bolts in steps in the order shown in the figure.

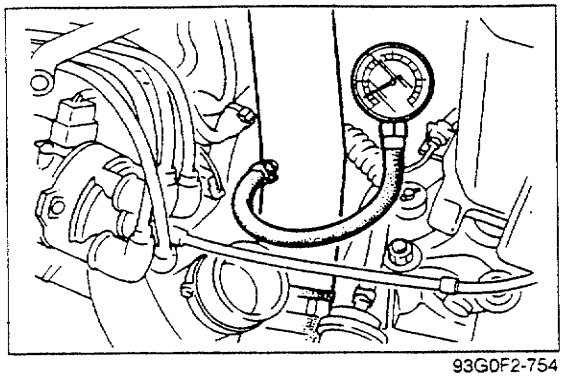
Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)

TURBOCHARGER CONTROL SYSTEM

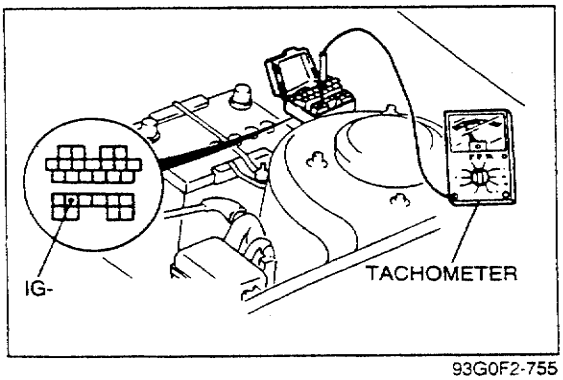
PREPARATION
SST

49 H080 740 Gauge, pressure		For inspection of wastegate

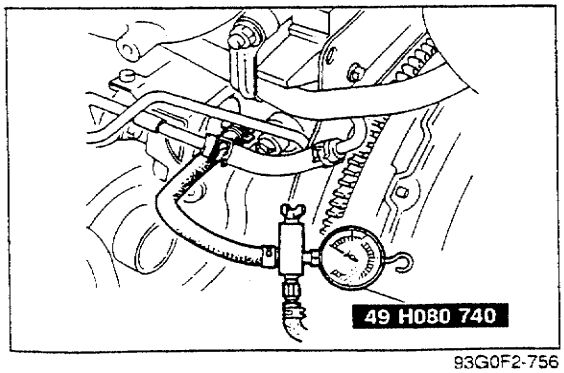
93G0F2-753



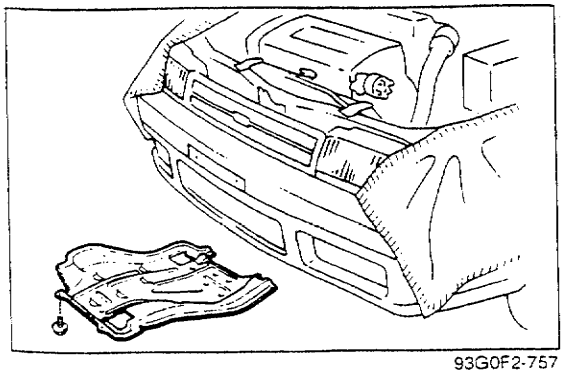
93G0F2-754



93G0F2-755



93G0F2-756



93G0F2-757

SYSTEM OPERATION

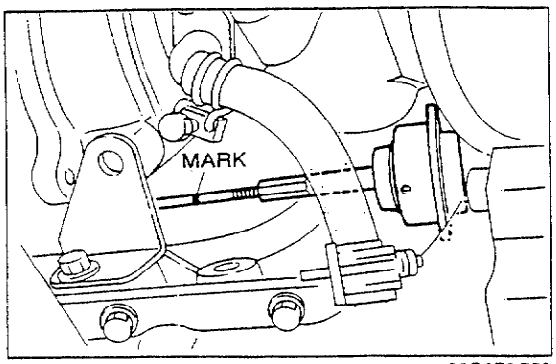
1. Install a pressure gauge **[49 kPa (0.5 kg/cm^2, 7.1 psi) min.]**.
2. Connect a tachometer to the diagnosis connector IG- terminal.
3. Start the engine.
4. Verify that the boost pressure when the engine speed is **4,000 rpm** is within specification.

   Specification: More than 2.0 kPa (0.02 kg/cm^2, 0.3 psi)

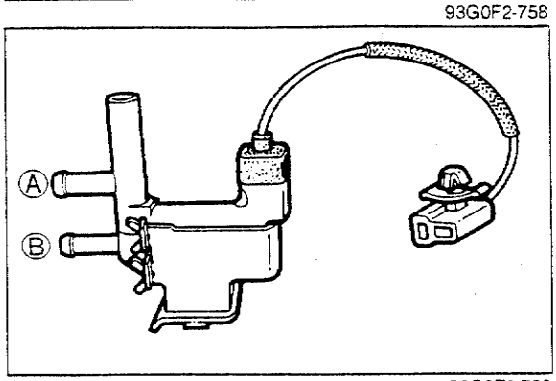
5. If not within the specification, check for air leakage, exhaust gas leakage, and for the wastegate stuck open.
6. If OK, replace the turbocharger.

WASTEGATE
Inspection

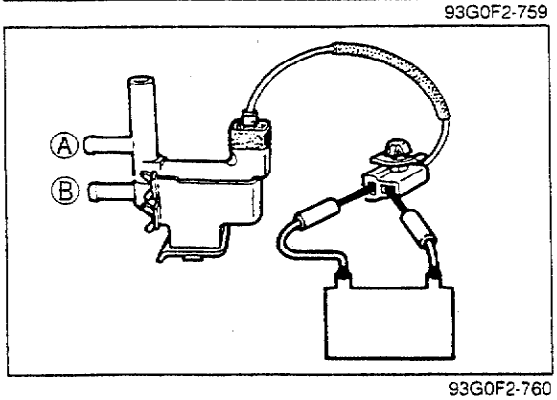
1. Remove the air hose from the wastegate actuator.
2. Connect the **SST** to the actuator.
3. Raise the front of the vehicle and support it on safety stands.
4. Remove the undercover.



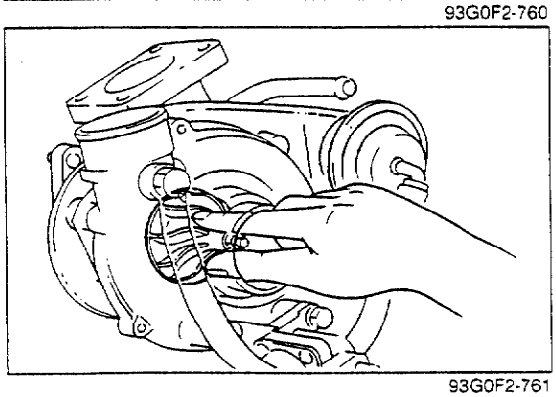
93G0F2-758



93G0F2-759



93G0F2-760


93G0F2-761

5. Mark the actuator rod.

Caution
- **Do not apply compressed air over 98 kPa (1.0 kg/cm^2, 14 psi).**

6. Adjust the compressed air pressure to **83 kPa (0.85 kg/cm^2, 12 psi)**.
7. Verify that the rod moves when applying and releasing air pressure.

WASTEGATE SOLENOID VALVE

Inspection

1. Remove the solenoid valve.
2. Verify that air does not flow from Ⓐ through Ⓑ.

3. Apply 12V to the solenoid valve and verify that air flows from Ⓐ through Ⓑ.

TURBOCHARGER

Inspection

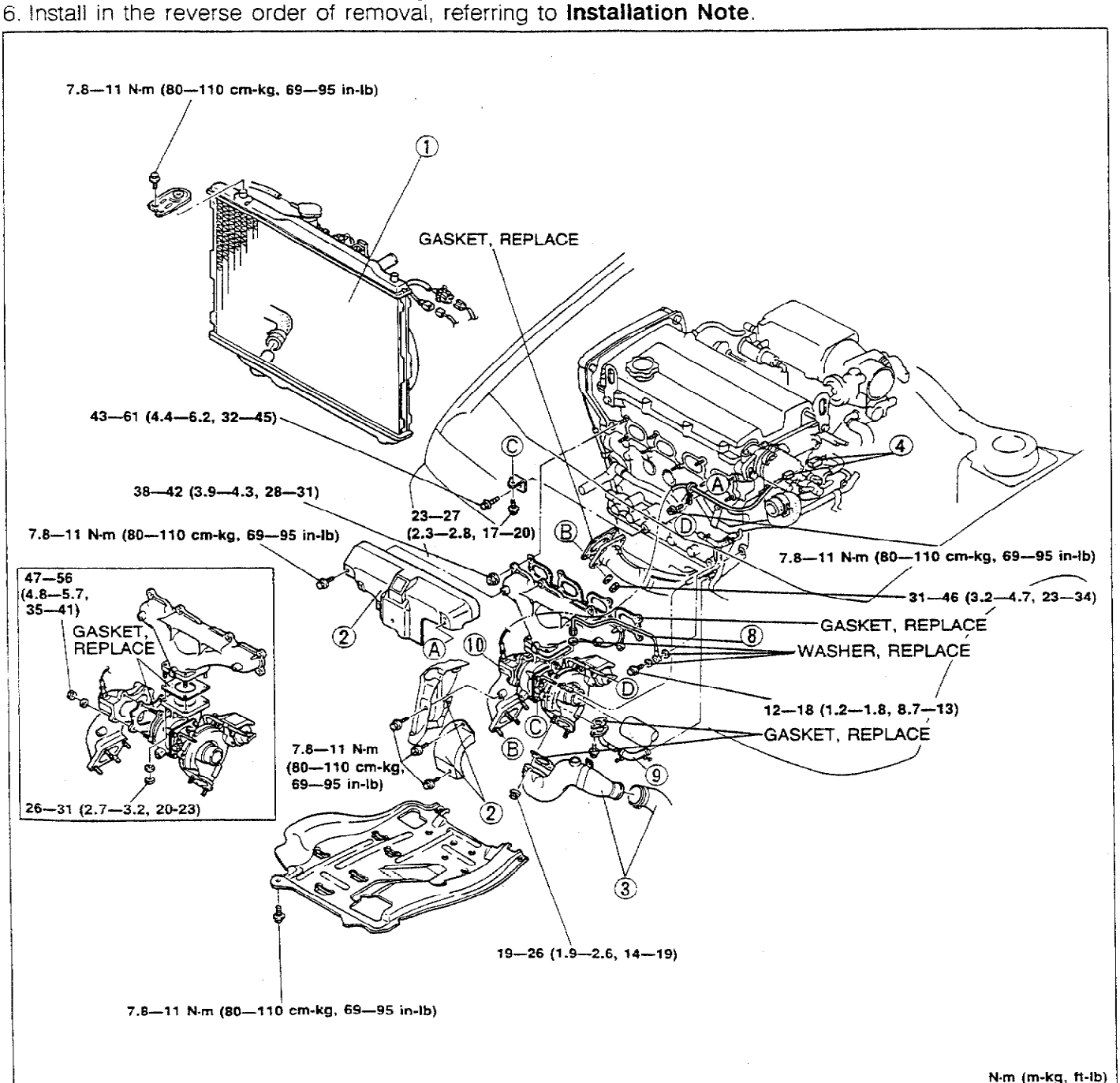
1. Be sure the engine is cool.
2. Remove the air hose.
3. Check that the compressor wheel assembly turns smoothly.
4. If there is excessive drag or noise, replace the turbocharger.

Removal / Installation

Caution

- **Be careful of following points after turbocharger removal.**
  - **Do not carry the turbocharger by the actuator rod or actuator hose.**
  - **Do not drop the turbocharger.**
  - **Set the turbocharger down with the turbine shaft horizontal.**
  - **Cover the intake, exhaust, and oil passages to prevent dirt or other material from entering.**
  - **Use the specified new studs when installing the turbocharger.**

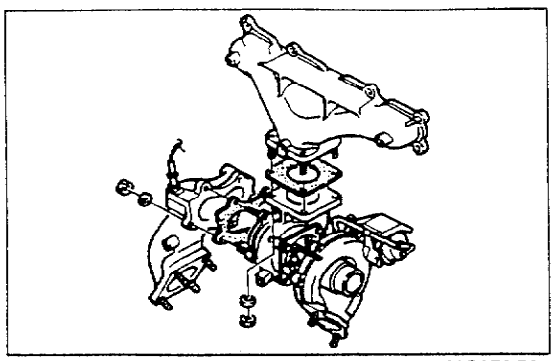
1. Disconnect the negative battery cable.
2. Lift up the vehicle.
3. Remove the undercover.
4. Drain the engine coolant.
5. Remove in the order shown in the figure.
6. Install in the reverse order of removal, referring to **Installation Note**.



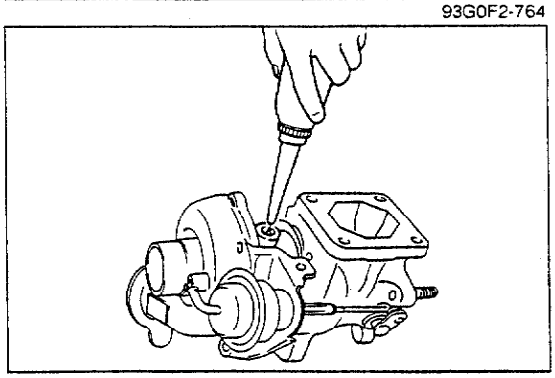
93G0F2-762

1. Radiator
2. Insulators
3. Air hose, and air pipe
4. Oxygen sensor connector
5. Front exhaust pipe
6. Bracket
7. Water hoses
8. Oil pipe
9. Oil return pipe
10. Exhaust manifold and turbocharger
    - Removal Note ..... below
    - Installation Note ..... below

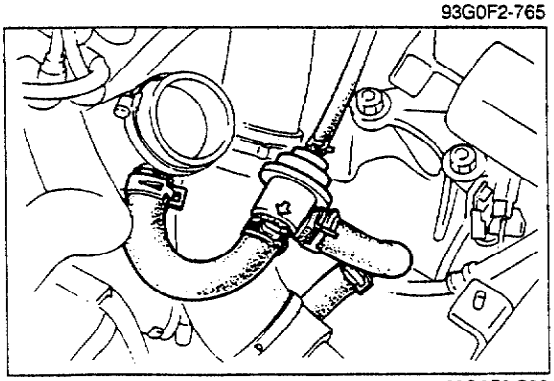
93G0F2-763



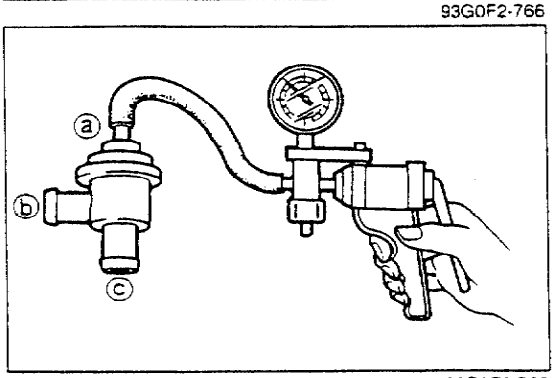
93G0F2-764



93G0F2-765



93G0F2-766



93G0F2-767

Removal Note
Exhaust manifold and turbocharger
1. Remove the exhaust manifold and the turbocharger as an assembly.
2. Remove the turbocharger from the exhaust manifold.

Installation Note
Exhaust manifold and turbocharger
1. Remove all gaskets and sealant.
2. Install new gaskets.
3. Supply **25 cc (1.5 cu in)** of oil through the oil passage of the turbocharger.
4. Install the turbocharger to the exhaust manifold.
5. Install the turbocharger and the exhaust manifold assembly to the engine and loosely tighten the nuts.
6. Install the bracket and the front exhaust pipe, and tighten the turbocharger mounting nuts.

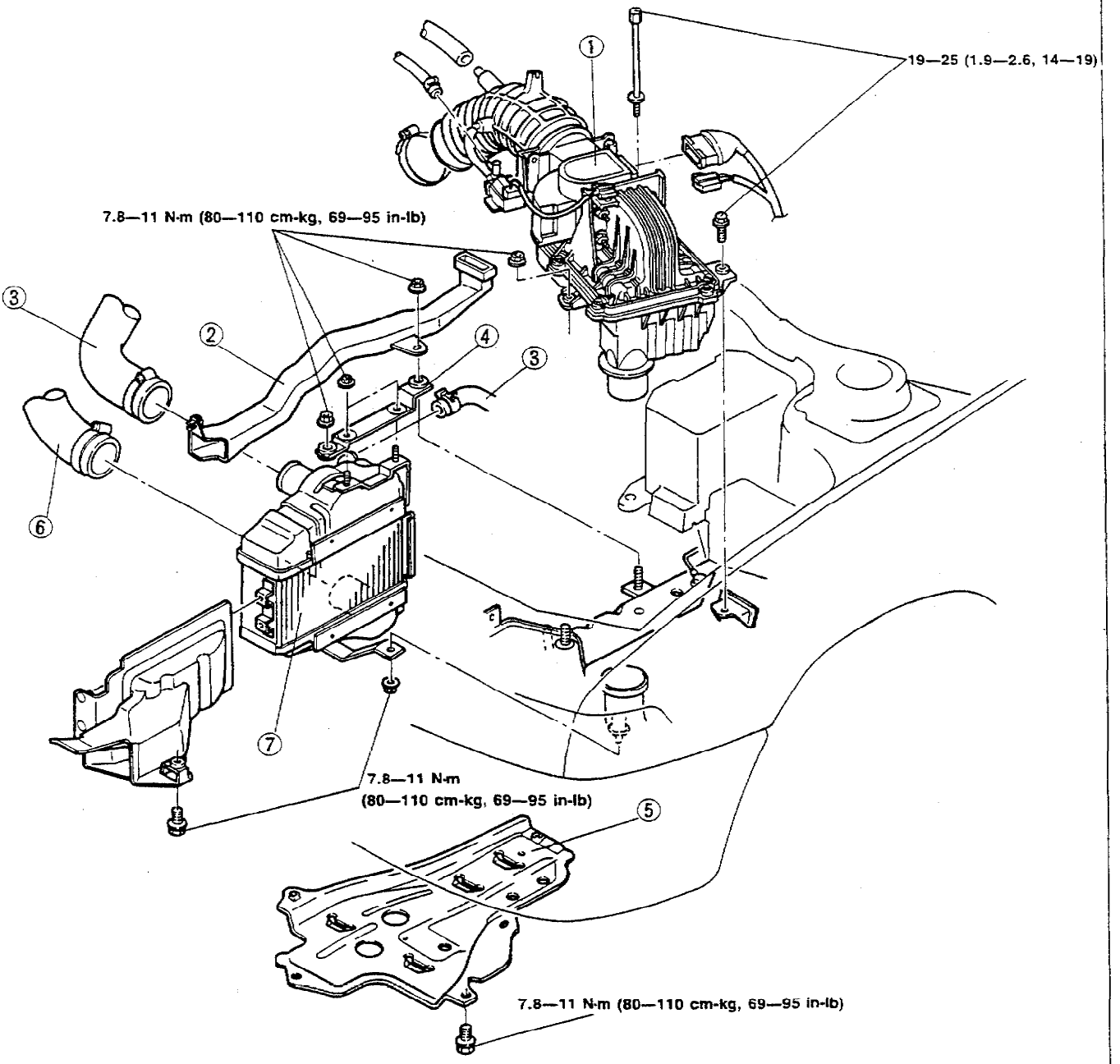
AIR BYPASS VALVE
Removal / Installation
1. Remove the vacuum hose and the air hoses from the air bypass valve.
2. Remove the air bypass valve.
3. Install in the reverse order of removal.

Inspection
1. Connect a vacuum pump to air bypass valve port ⓐ.
2. Verify that air flows from port ⓑ through port ⓒ when **250 ± 35 mmHg (9.8 ± 1.4 inHg)** vacuum is applied to port ⓐ.

INTERCOOLER

Removal / Inspection / Installation

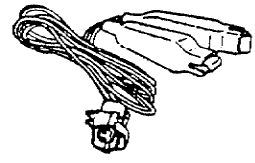
1. Remove in the order shown in the figure.
2. Inspect the intercooler for crack or damage. Replace it if necessary.
3. Install in the reverse order of removal



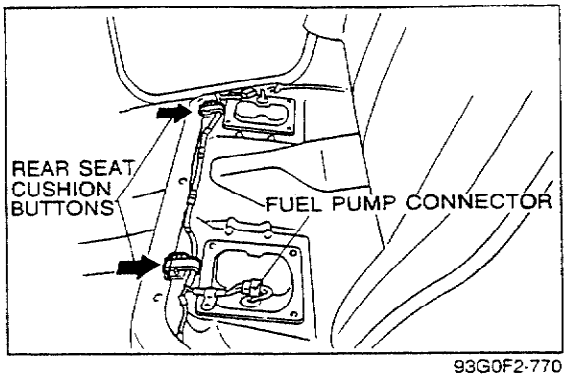
1. Air cleaner and airflow meter assembly
2. Battery cooling duct
3. Air hose
4. Bracket
5. Undercover
6. Air hose
7. Intercooler

FUEL SYSTEM

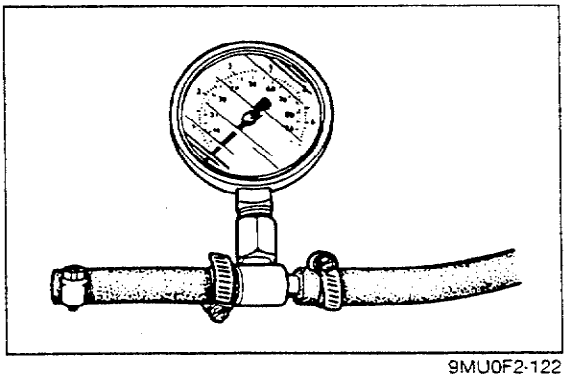
PREPARATION
SST

49 L018 901 Injector checker		For inspection of injector

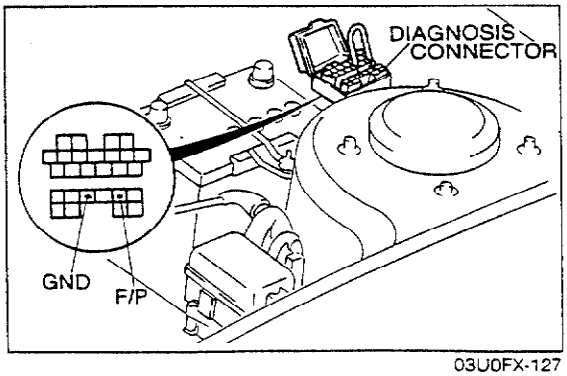
93G0F2-769



93G0F2-770



9MU0F2-122



03U0FX-127

PRECAUTION
Fuel Pressure Release and Servicing Fuel System

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

a) Before disconnecting any fuel line, release the fuel pressure from the fuel system to reduce the possibility of injury or fire.
   1. Start the engine.
   2. Push the rear seat cushion buttons and remove the cushion.
   3. Disconnect the fuel pump connector.
   4. After the engine stalls, turn off the ignition switch.
   5. Reconnect the fuel pump connector and install the rear seat cushion.

b) Use a rag as protection from fuel spray when disconnecting the hoses.
   Plug the hoses after removal.

c) 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

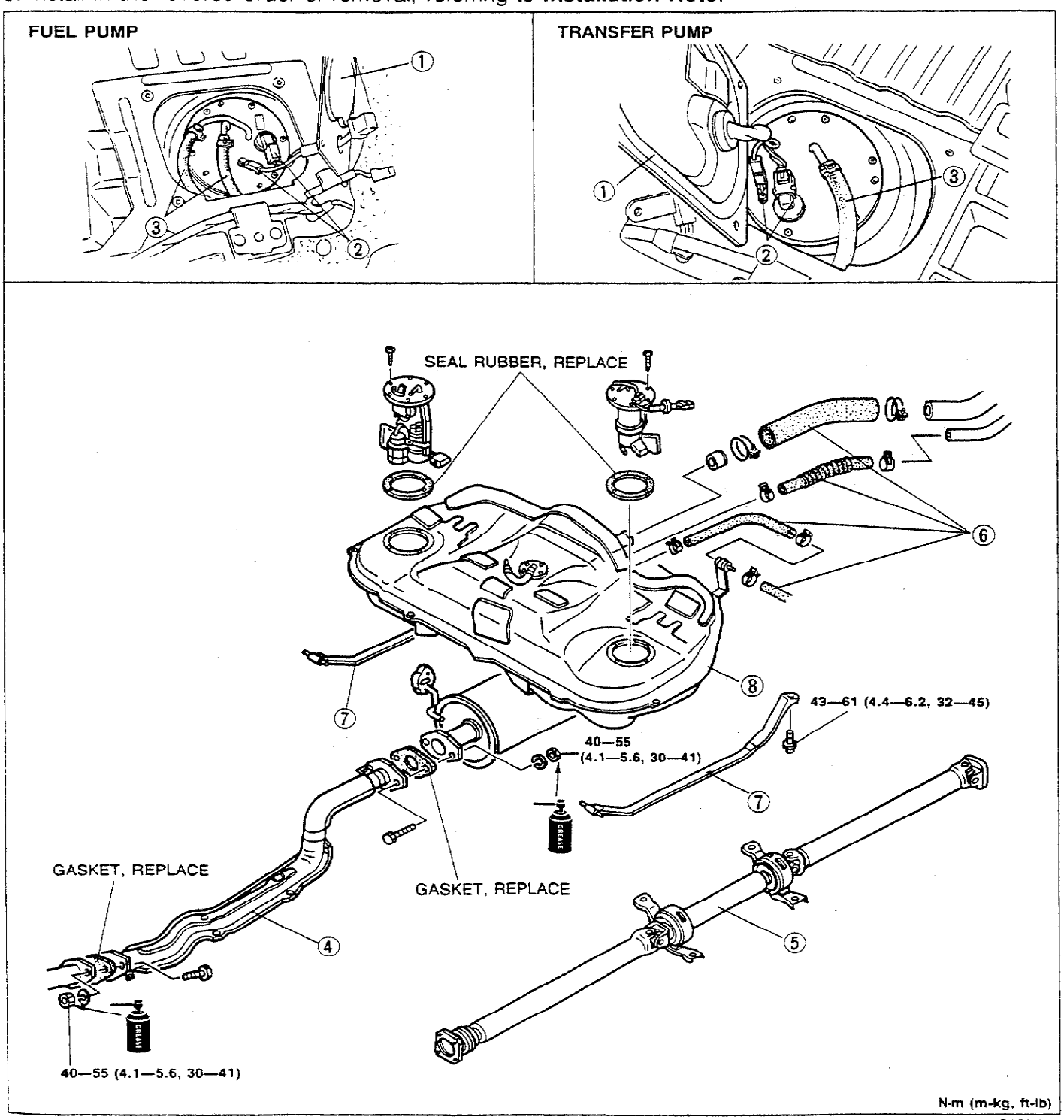
After releasing the fuel pressure for repairs or inspection, the system must be primed to avoid excessive cranking when first starting the engine. Follow the steps below.

1. Connect the diagnosis connector terminals **F/P** and **GND** with a jumper wire.
2. Turn the ignition switch ON for **approx. 10 sec.** and check for fuel leaks.
3. 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 F2–50.)**
- **When removing the fuel tank, keep sparks, cigarettes, and open flames away from it.**
- **Before repairing the fuel tank, clean it throughly with steam to remove all explosive gas.**

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

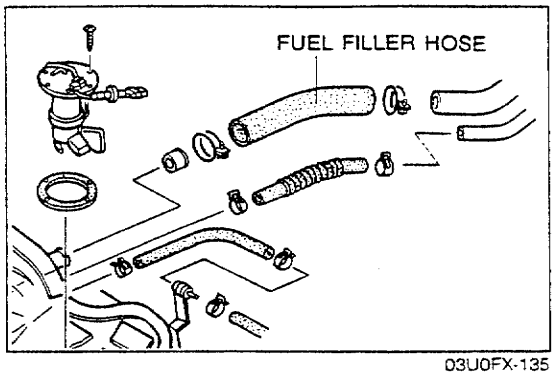


93G0F2-771

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

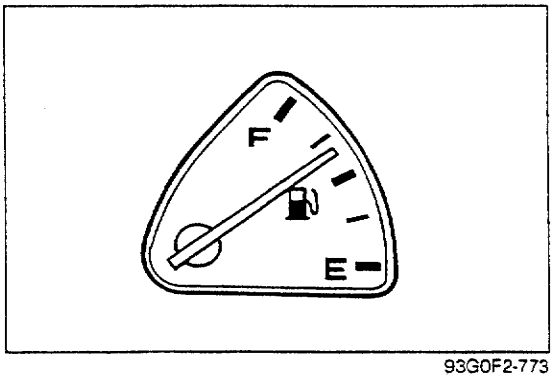
1. Fuel pump cover
2. Fuel pump connector
3. Fuel hoses
   Installation Note ..... below
4. Exhaust pipe
   Removal / Installation F2–57, 58
5. Propeller shaft
   Removal / Installation ..... Section L
6. Fuel filler hose, breather hose, and evaporation hoses
   Installation Note ..... below
7. Fuel tank straps
8. Fuel tank
   Inspect for cracks and corrosion

93G0F2-772



03U0FX-135

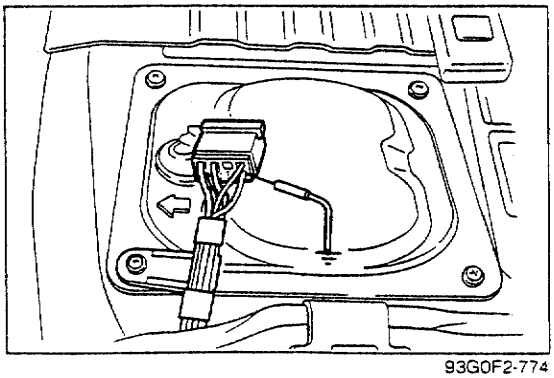
Installation Note
1. Push the ends of the main fuel hose, fuel return hose, and evaporative hoses onto the fuel tank fittings **at least 25mm (1.0 in)**.
2. Push the fuel filler hose onto the fuel tank pipe and filler pipe **at least 35mm (1.4 in)**.



93G0F2-773

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.**



93G0F2-774

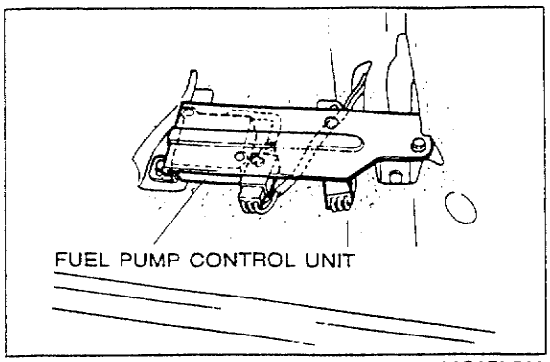
2. Ground the transfer pump connector terminal-wire (Y/L) with a jumper wire and verify that the transfer pump stops.
3. Remove the jumper wire and verify that the transfer pump begins operation after **approx. 10 sec**.
4. If not as specified, check the following parts.
   - Fuel pump control unit. [BP turbo] (Refer to page F2–53.)
     4x4 control unit [BP SOHC] (Refer to page F1–12.)
   - Transfer pump. (Refer to page F2–54.)
   - Transfer pump switch. (Refer to page F2–54.)

FUEL PUMP CONTROL UNIT [BP TURBO]

Note
- **Refer to page F1–12 for BP SOHC model.**

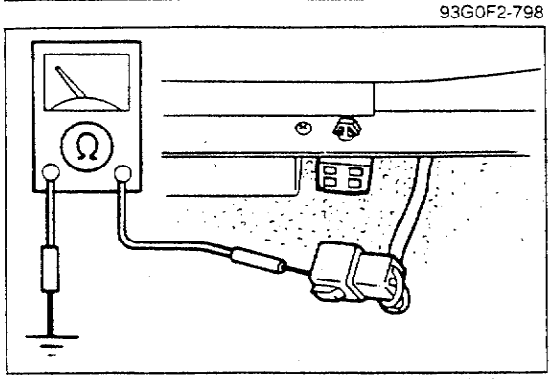
Inspection

1. Remove the fuel pump control unit.



93G0F2-798

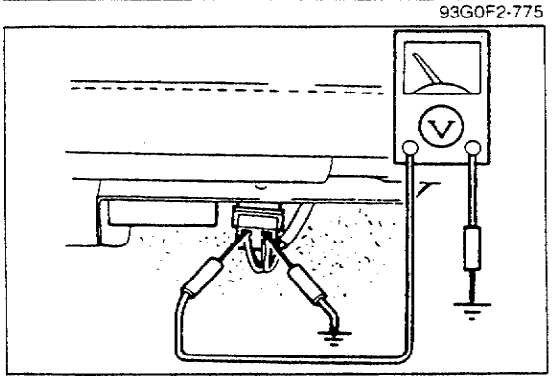
2. Disconnect the fuel pump control unit connector.
3. Check continuity between the fuel pump control unit connector terminal B (Y/L) and a ground.
4. Perform the following inspection according to the results of the continuity check.



93G0F2-775

Continuity exists

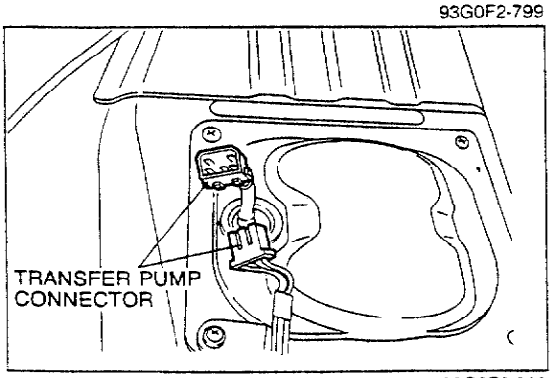
1. Turn the ignition switch ON.
2. Ground the fuel pump control unit terminal B (Y/L) with a jumper wire and verify that the voltage at the fuel pump control unit terminal D (L/Y) is **0V**.
3. Remove the jumper wire and verify that the voltage at the fuel pump control unit terminal D (L/Y) is **approx. 12V** after **approx. 10 sec**.



93G0F2-799

No continuity exists

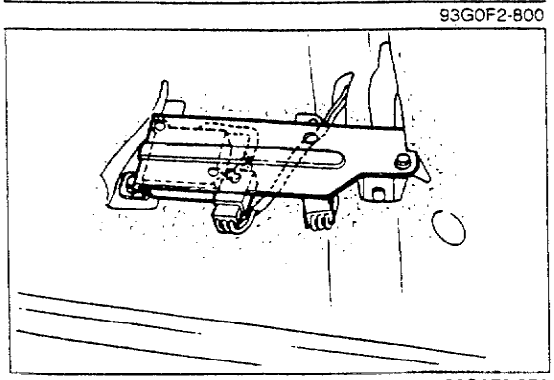
1. Turn the ignition switch ON and verify that the voltage at the fuel pump control unit terminal D (L/Y) is **0V**.
2. Disconnect the transfer pump connector.
3. Turn the ignition switch ON and verify that the voltage at the fuel pump control unit terminal D (L/Y) is **approx. 12V**.

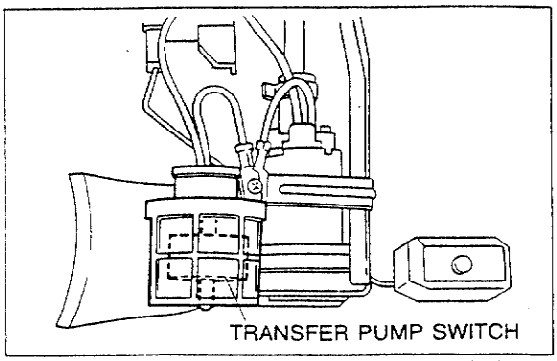


93G0F2-800

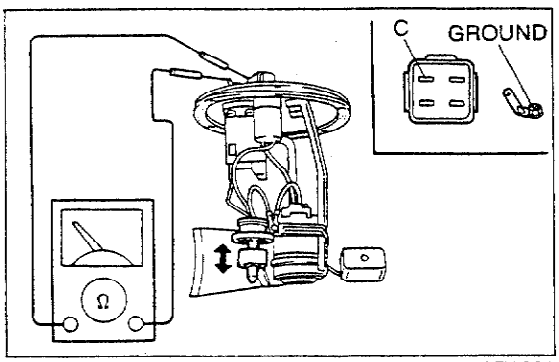
Replacement

1. Move the driver's seat backward.
2. Remove the bolts and remove the fuel pump control unit and bracket as an assembly.
3. Remove the fuel pump control unit from the bracket.
4. Install in the reverse order of removal.

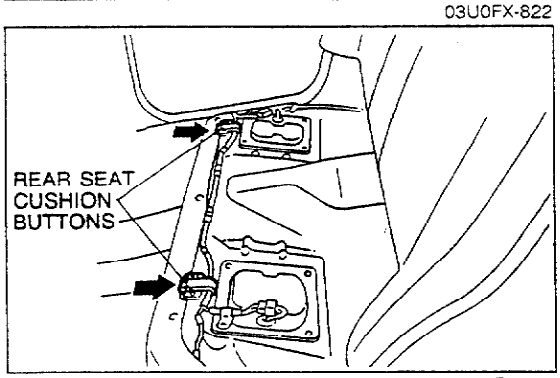

93G0F2-776



93G0F2-777



03U0FX-822



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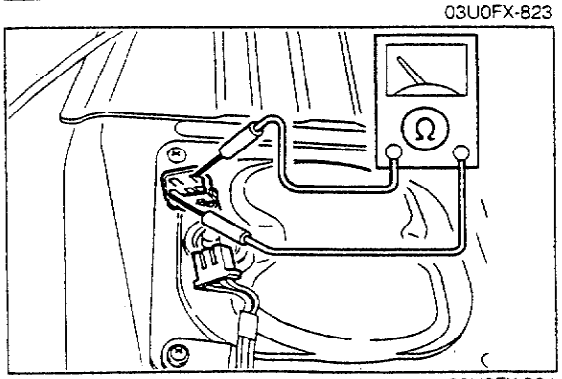
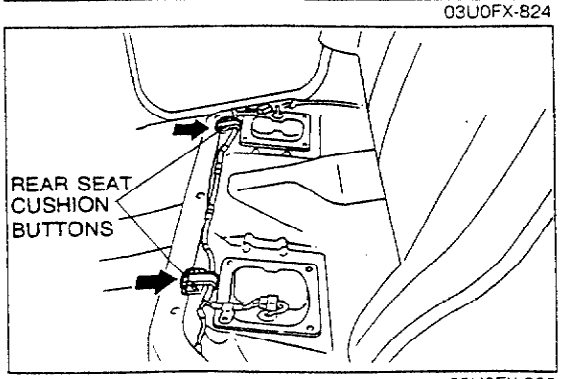


03U0FX-824



03U0FX-825

TRANSFER PUMP SWITCH

Removal / Installation

1. Refer to replacement of the transfer pump. (Refer to below.)

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.

TRANSFER PUMP

Inspection

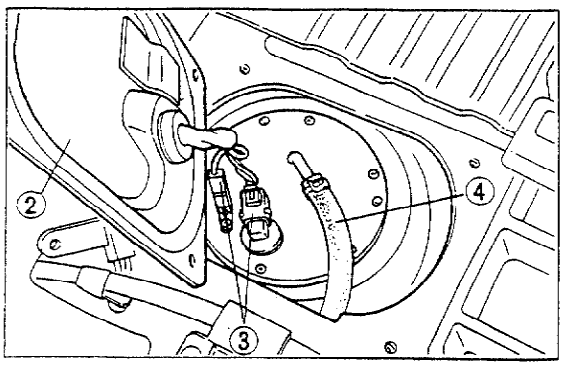
1. Remove the rear seat cushion.
2. Disconnect the transfer pump connector.
3. Check for continuity between transfer pump connector terminal-wires (B) and (L/Y).
4. If no continuity exists, replace the transfer pump.

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.

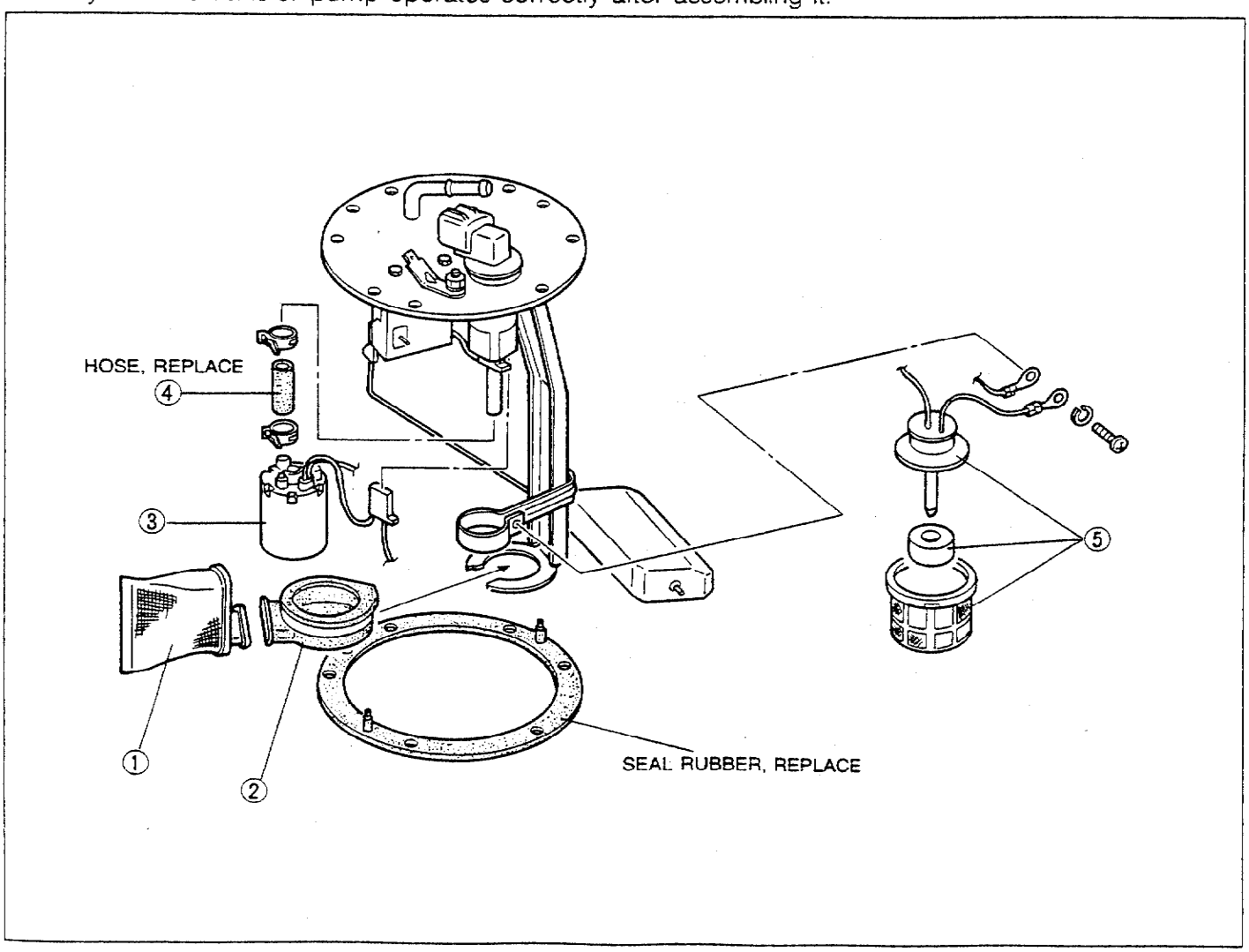
Caution
- **Install a new seal rubber.**

6. Install in the reverse order of removal.

Disassembly / Assembly

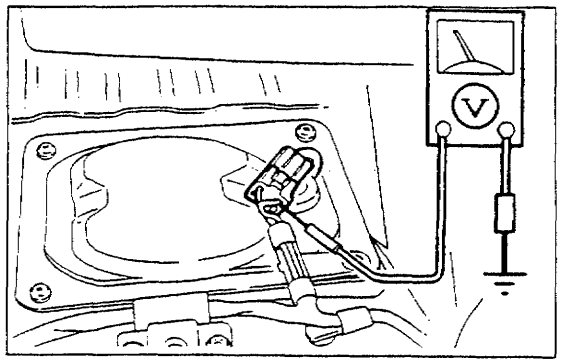
Caution
- **Prevent contaminants from entering the transfer pump.**

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.



93G0F2-778

1. Fuel filter
2. Rubber mount
3. Transfer pump
4. Fuel hose
5. Transfer pump switch assembly



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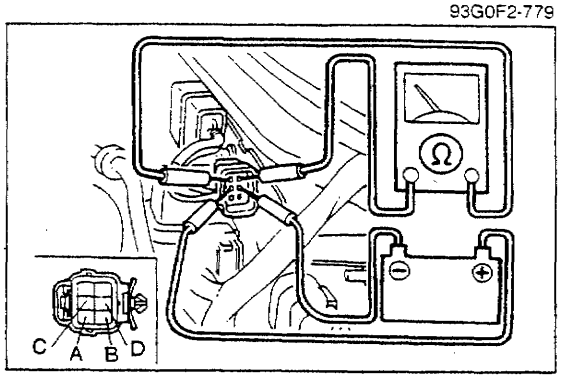

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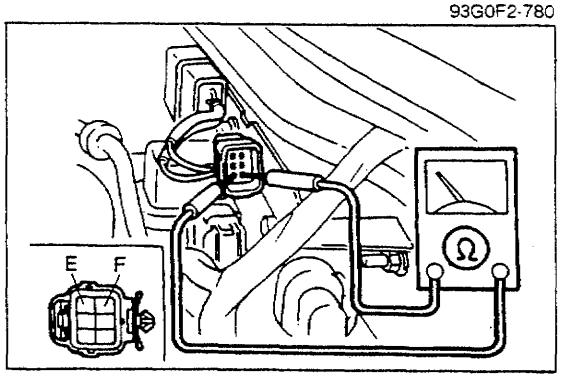

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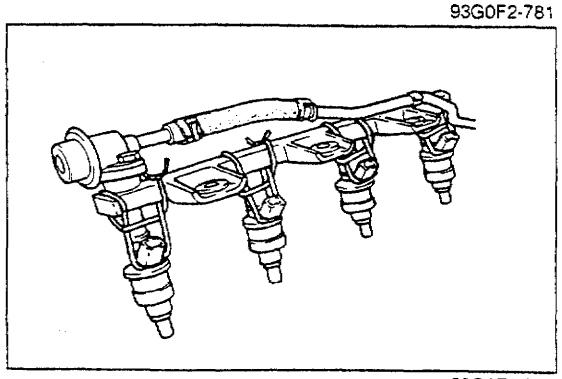
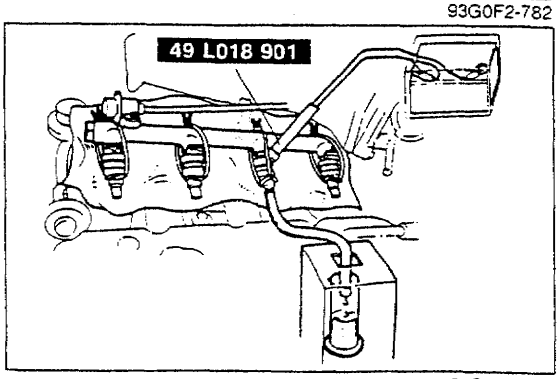

93G0F2-782



93G0F2-783

FUEL PUMP RESISTOR/RELAY

System Operation

1. Remove the rear seat cushion.
2. Measure the voltage at the fuel pump connector terminal A (G/O).

Voltage

Cranking	Approx. 12V
Others	Approx. 10V

3. If not within specification, perform the following inspection, and repair or replace if necessary.
   - Fuel pump resistor/relay resistance. (Refer to below.)
   - ECU 1I terminal voltage. (Refer to page F2–60.)
   - Wiring harness and connector.

Inspection

1. Disconnect the connector.
2. Ground the fuel pump resister relay terminal D.
3. Apply 12V to terminal C and check for continuity between terminals A and B.

Terminal C	Continuity between A and B
12 applied	No
0V	Yes

4. Measure the resistance between terminals E and F.

Resistance : 0.62—0.66Ω [at 20°C (68°F)]

INJECTOR

Volume Test

1. Remove the injectors with the delivery pipe.
2. Affix the injectors to the delivery pipe with wire.

Caution
- **Affix the injectors firmly to the delivery pipe so that no movement of the injectors is possible.**

Warning
- **Be extremely careful when working with fuel. Always work away from sparks or open flames.**

3. Connect the **SST** to the battery and injector.
4. Check the injection volume with a graduated container.

Injection volume:
BP SOHC....44—47 cc (2.68—2.87 cu in)/15 sec.
BP Turbo....87—105 cc (5.31—6.41 cu in)/15 sec.

Caution
- **When using the SST, make sure of the SST number and use correct one.**

5. If not correct, replace the injector(s).

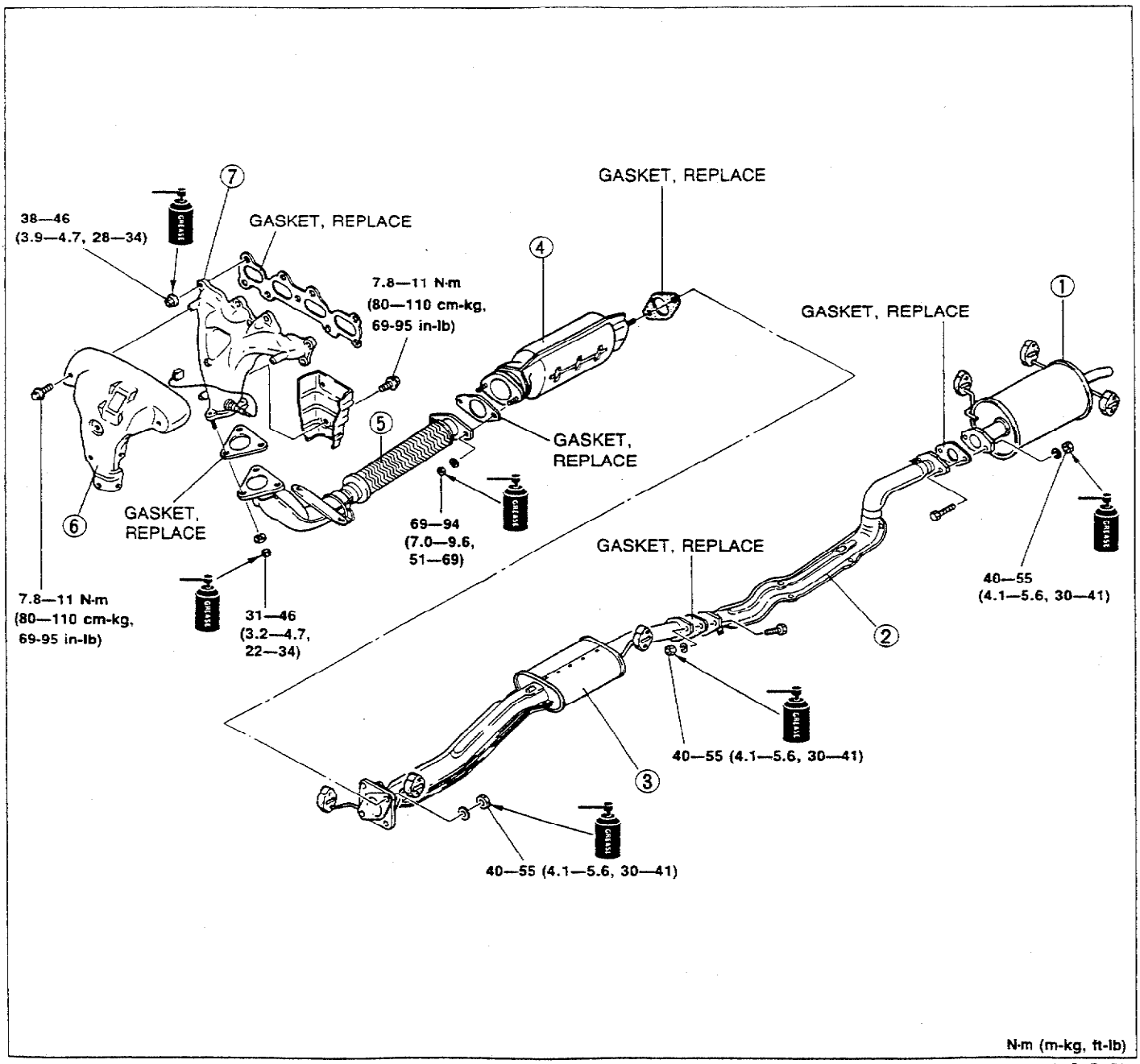
EXHAUST SYSTEM

COMPONENTS

Removal / Inspection / 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.

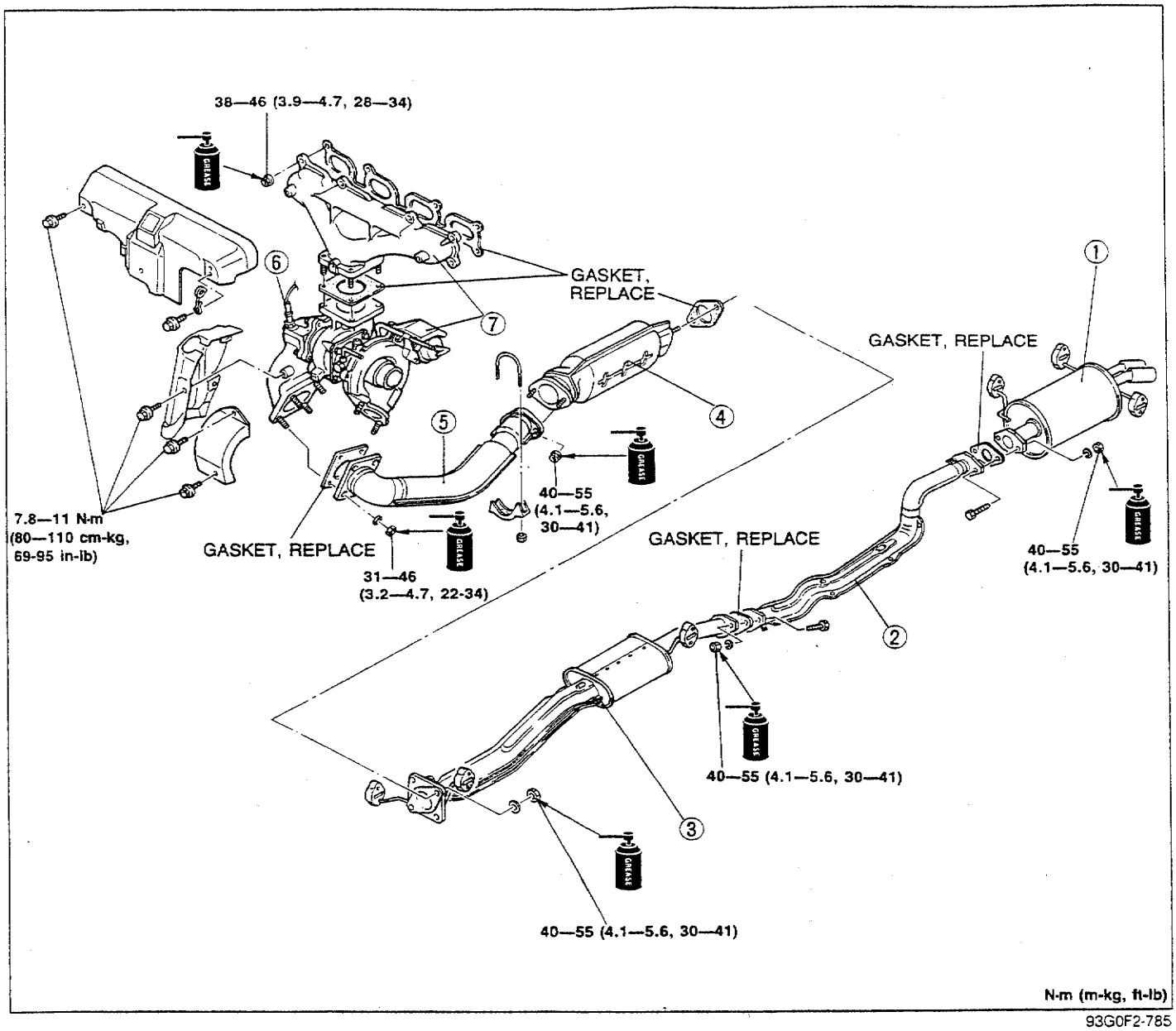
BP SOHC



93G0F2-784

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

BP DOHC TURBO



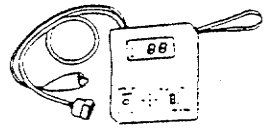
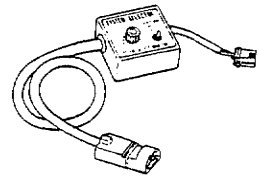
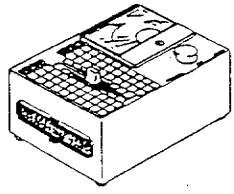
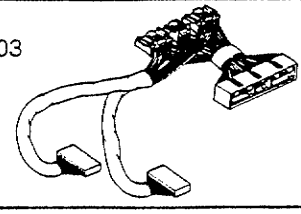
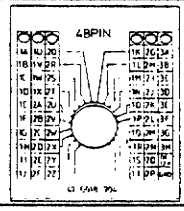
93G0F2-785

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. Oxygen sensor
   Inspection ..... page F2–68
   Replacement ..... page F2–68
7. Exhaust manifold and turbocharger
   Removal / Installation ..... page F2–47

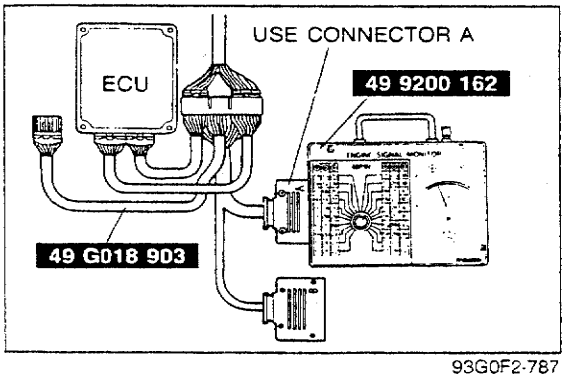
CONTROL SYSTEM

PREPARATION

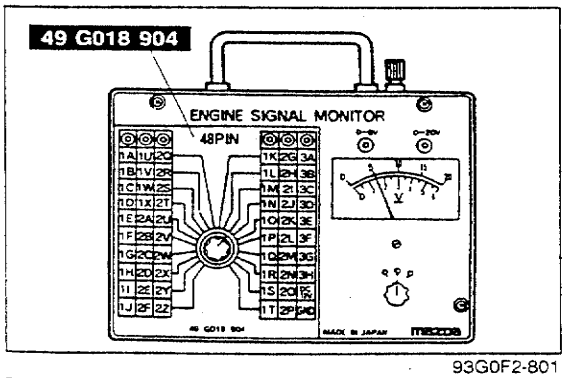
SST

49 H018 9A1 Self-diagnosis checker 	For self-diagnosis and inspection of oxygen sensor	49 B019 9A0 System selector 	For self-diagnosis and inspection of oxygen sensor
49 9200 162 Engine signal monitor 	For inspection of ECU	49 G018 903 Adapter harness 	For inspection of ECU
49 G018 904 Sheet 	For inspection of ECU		

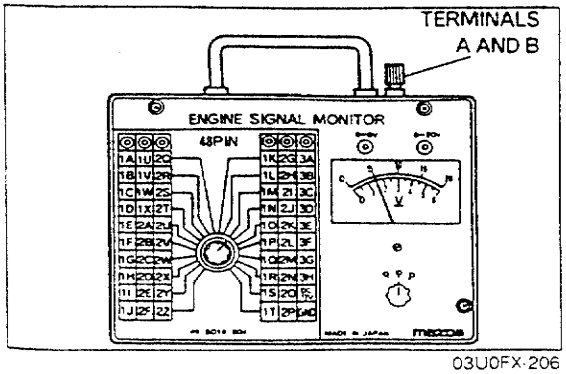
93G0F2-786



93G0F2-787



93G0F2-801



03U0FX-206

ENGINE CONTROL UNIT (ECU)

Inspection

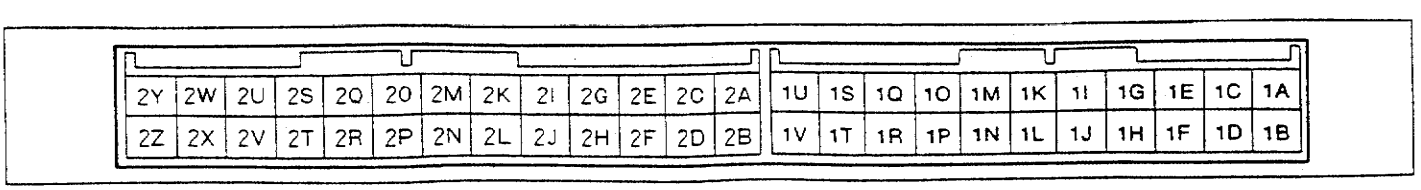
1. Disconnect the ECU connectors.
2. Connect the **SSTs** (**Engine Signal Monitor** and **Adapter**) to the ECU as shown.
3. Place the **SST (Sheet)** on the **Engine Signal Monitor**.
4. Measure the voltage at each terminal.
   (Refer to pages F2–60 to F2–67.)
5. If any ECU terminal voltage is incorrect, check the related input or output devices and wiring. If no problem is found, replace the ECU. (Refer to above.)

Caution

- **Never apply voltage to SST terminals A and B.**

Terminal voltage [BP TURBO]

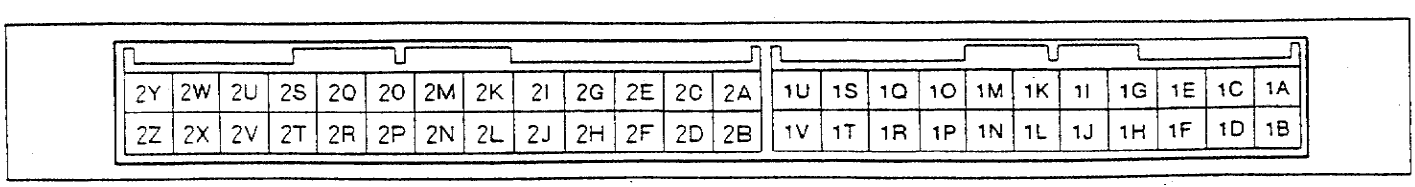
Terminal	Input	Output	Connected to	Test condition		Correct voltage	Remark
1A	—	—	Battery	Constant		Approx. 12V	For backup
1B	○		Main relay (FUEL INJ relay)	Ignition switch	OFF	Approx. 0V	—
					ON	Approx. 12V	
1C	○		Ignition switch (START)	While cranking		Approx. 10V	—
				Ignition switch ON		Approx. 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 not illuminated		Approx. 12V	
1E	—	—	—	—		—	—
1F		○	Self-Diagnosis Checker (Code Number)	Buzzer sounded for 3 sec. after ignition switch OFF→ON		Below 2.5V	• With Self-Diagnosis Checker and System Selector • With System Selector test switch 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	
1H		○	Solenoid valve (Wastegate)	Engine speed below 5,300 rpm		Approx. 12V	—
				Engine speed above 5,300 rpm		Below 1.5V	
1I		○	Fuel pump resistor/relay	While cranking		Approx. 10V	—
				Idle		Below 1.5V	
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	
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	
1L	—	—	—	—		—	—
1M	○		Ground (Australia)	Constant		Below 1.0V	Not used (Except Australia)



Incorrect voltage		Possible cause
Always 0V		• ROOM 10A fuse burned • Open circuit in wiring from ROOM 10A fuse to ECU terminal 1A
Always 0V		• Main relay malfunction • Open or short circuit in wiring from main relay to ECU terminal 1B
Always 0V (Starter turns)		• Open or short circuit in wiring from ignition switch to ECU terminal 1C
Always 0V		• Main relay (FUEL INJ relay) malfunction • Open circuit in wiring from main relay to diagnosis connector terminal +B • Open or short circuit in wiring from diagnosis connector terminal MEN to ECU terminal 1D
Always approx. 12V		• Poor connection at ECU connector • ECU malfunction
Always approx. 5V		• ECU malfunction
—		—
Always below 2.5V	No display on Self-Diagnosis Checker	• Main relay (FUEL INJ relay) malfunction (Refer to page F3–142) • Open circuit in wiring from main relay to diagnosis connector terminal +B
	"88" displayed and buzzer sounds continuously	• Open or short circuit in wiring from diagnosis connector terminal FEN to ECU terminal 1F
Always approx. 12V		• Poor connection at ECU connector • ECU malfunction
Always 0V		• Short circuit in wiring from igniter to ECU terminal 1G
Always 0V or approx. 12V		• Refer to Code No.42 Troubleshooting (Refer to page F2–30)
Always approx. 12V		• Fuel pump resistor/relay malfunction
Always 0V		• Open or short circuit in wiring from ECU terminal 1I to resistor/relay
Always below 2.5V	A/C does not operate	• A/C relay malfunction • Open circuit in wiring from ignition switch to A/C relay • Open circuit in wiring from A/C relay to ECU terminal 1J
	A/C switch OFF but A/C operates	• Short circuit in wiring from A/C relay to ECU terminal 1J • ECU malfunction
Always approx. 12V		• Poor connection at ECU connector • ECU malfunction
Always below 1.0V		• Short circuit in wiring from diagnosis connector terminal TEN to ECU terminal 1K
Always approx. 12V		• Open circuit in wiring from diagnosis connector terminal TEN to ECU terminal 1K • Open circuit in wiring from diagnosis connector terminal GND to ground
—		—
Always above 1.0V		• Open circuit in wiring from ECU terminal 1M to ground

93G0F2-788

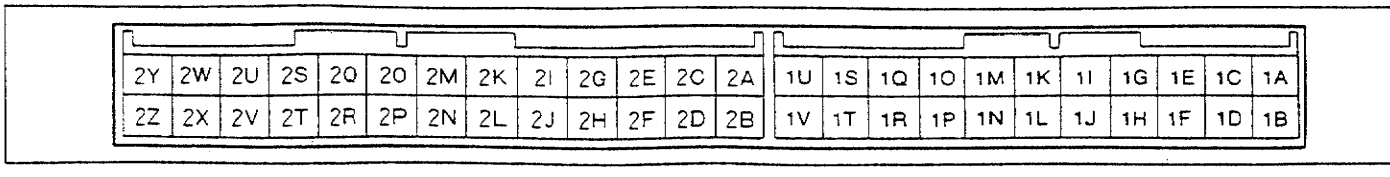
Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
1N	○		Throttle sensor (Idle switch)	Accelerator pedal released	Below 1.0V	Ignition switch ON
				Accelerator pedal depressed	Approx. 12V	
1O	○		Stoplight switch	Brake pedal released	Below 1.0V	—
1P	○		P/S pressure switch	Ignition 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	
1R	○		Electric fan switch	Fan operating (Engine coolant temperature over 91°C (196°F) or diagnosis connector terminal TFA grounded)	Below 1.0V	—
				Fan not operating (Idle)	Approx. 12V	
1S	○		Blower control switch	Blower control switch OFF or 1st position	Approx. 12V	Ignition switch ON
				Blower control switch 2nd or higher 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	
1V	○		Neutral/Clutch switches	Neutral position or clutch pedal depressed	Below 1.0V	
				Others	Approx. 12V	



Incorrect voltage		Possible cause
Always below 1.0V		• Throttle sensor misadjustment • Short circuit in wiring from throttle sensor to ECU terminal 1N • ECU malfunction
Always approx. 12V		• Throttle sensor misadjustment • Open circuit in wiring from throttle sensor to ECU terminal 1N • Open circuit in wiring from throttle sensor to ECU terminal 2D
Always below 1.0V (Stoplights OK)		• Open circuit in wiring from stoplight switch to ECU terminal 1O
Always below 1.0V		• P/S pressure switch malfunction • Short circuit in wiring from P/S pressure switch to ECU terminal 1P • ECU malfunction
Always approx. 12V		• P/S pressure switch malfunction • Open circuit in wiring from P/S pressure switch to ECU terminal 1P • Open circuit in wiring from P/S pressure switch to ground
Always below 2.5V (Blower fan OK)		• A/C switch malfunction • Short circuit in wiring from A/C switch to ECU terminal 1Q • Poor connection at ECU connector • ECU malfunction
Always approx. 12V (Blower fan OK)		• A/C switch malfunction • Open circuit in wiring from A/C switch to ECU terminal 1Q • Open circuit in wiring from A/C switch to blower control switch
Always below 1.0V (Electrical cooling fan OK)		• Open or short circuit in wiring from fan relay to ECU terminal 1R • ECU malfunction
Always below 1.0V (Blower fan OK)		• Short circuit in wiring from blower control switch to ECU terminal 1S • Poor connection at ECU connector • ECU malfunction
Always approx. 12V (Blower fan OK)		• Open circuit in wiring from blower control switch to ECU terminal 1S
Always below 1.0V	Illumination lamp ON when rear window defroster switch ON	• Open or short circuit in wiring from rear window defroster switch to ECU terminal 1T
	Illumination lamp never ON	• Open circuit in wiring from ignition switch to rear window defroster switch • Rear window defroster switch malfunction
Always below 1.0V (Headlights OK)		• Open or short circuit in wiring from headlight relay to ECU terminal 1U
Always below 1.0V		• Neutral switch malfunction • Clutch switch malfunction • Short circuit in wiring from ECU terminal 1V to neutral or clutch switch
Always approx. 12V		• Neutral switch malfunction • Clutch switch malfunction • Open circuit in wiring from ECU terminal 1V to neutral or clutch switch • Poor connection at ECU connector

93G0F2-789

Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
2A	—	—	Ground (Injector)	Constant	0V	—
2B	—	—	Ground (Output)	Constant	0V	—
2C	—	—	Ground (CPU)	Constant	0V	—
2D	—	—	Ground (Input)	Constant	0V	—
2E	○		Distributor (Ne-signal)	Ignition switch ON	Approx. 0V or 5V	—
				Idle	Approx. 2V	
2F	—	—	—	—	—	—
2G	○		Distributor (G-signal)	Ignition switch ON	Approx. 0V or 5V	
				Idle	Approx. 1.5V	
2H	—	—	—	—	—	—
2I	—	—	—	—	—	—
2J	○		Knock control unit	Idle	Approx. 4.0V	—
2K	○		Throttle sensor/ Airflow meter	Constant	4.5—5.5V	—
2L	—	—	—	—	—	—
2M	○		Throttle sensor	Accelerator pedal released	Approx. 0.5V	—
				Accelerator pedal fully depressed	Approx. 4.0V	
2N	○		Oxygen sensor	Ignition switch ON	0V	—
				Idle (Cold engine)	0V	
				Idle (After warm-up)	0—1.0V	
				Increasing engine speed (After warm-up)	0.5—1.0V	
				Deceleration	0—0.4V	
2O	○		Airflow meter	Ignition switch ON	Approx. 3.8V	—
				Idle	Approx. 3.0V	
2P	○		Intake air thermosensor	Ambient air temperature 20°C (68°F)	Approx. 2.5V	In airflow meter
2Q	○		Water thermosensor	Engine coolant temperature 20°C (68°F)	Approx. 2.5V	—
				After warm-up	Below 0.5V	
2R		○	Turbocharge indicator	Ignition switch ON	Approx. 12V	—



Incorrect voltage	Possible cause
Above 0V	• Poor contact at ground terminal • Open circuit in wiring from ECU to ground
Always approx. 0V or approx. 2V	• Refer to Code No.02 Troubleshooting
—	—
Always approx. 0V or approx. 1.5V	• Refer to Code No.03 Troubleshooting
—	—
—	—
Always 0V	• Refer to Code No.05 Troubleshooting
Always 0V	• Short circuit in wiring from ECU terminal 2K to throttle sensor, or airflow meter • Poor connection at ECU connector • ECU malfunction
Below 4.5V or above 5.5V	• ECU malfunction
Always 0V	• Throttle sensor malfunction • Short circuit in wiring from ECU terminal 2L to throttle sensor • Poor connection at ECU connector • ECU malfunction
Always approx. 5V	• Throttle sensor misadjustment • Open circuit in wiring from ECU terminal 2L to throttle sensor • Open circuit in wiring from ECU terminal 2L to ECU terminal 2D
Always constant	• Open circuit in wiring from ECU terminal 2M to throttle sensor • Open circuit in wiring from ECU terminal 2K to throttle sensor • Open circuit in wiring from ECU terminal 2D to throttle sensor
Always above 1V	• Throttle sensor misadjustment
0V after warm-up	• Refer to Code No.15 Troubleshooting
Always approx. 1V after warm-up	• Refer to Code No.17 Troubleshooting
Always 0V or approx. 5V	• Refer to Code No.08 Troubleshooting —
Always 0V or approx. 5V	• Refer to Code No.10 Troubleshooting
Always 0V or approx. 5V	• Refer to Code No.09 Troubleshooting
Always 0V	• Indicator broken • Open or short circuit in wiring from ECU 2R to ignition switch

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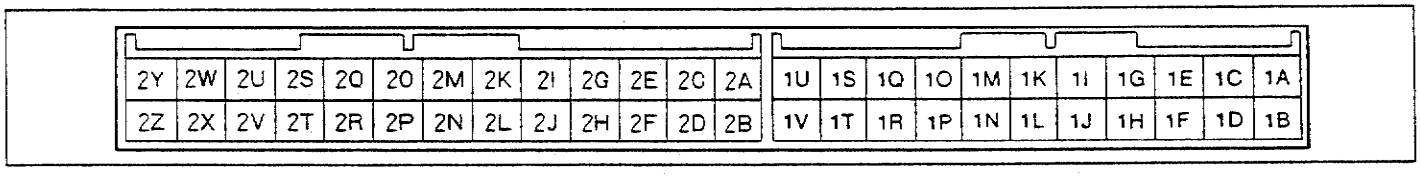
Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
2S		○	Overboost warning buzzer	Ignition switch ON	Approx. 12V	—
2T		○	Solenoid valve (Pressure regulator)	180 seconds after engine started when engine coolant temperature above 90°C (194°F) and intake air temperature above 58°C (136°F)	Below 1.5V	—
				Other condition at idle	Approx. 12V	
2U		○	Injector (Nos. 1, 3)	Ignition switch ON	Approx. 12V	* Engine Signal Monitor: Green and red lamps flash
				Idle	Approx. 12V*	
				Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx. 12V	
2V		○	Injector (Nos. 2, 4)	Ignition switch ON	Approx. 12V	
				Idle	Approx. 12V*	
				Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx. 12V	
2W		○	ISC valve	Ignition switch ON	Approx. 7V	—
				Idle	Approx. 9V	
2X		○	Solenoid valve (Purge control)	Ignition switch ON	Approx. 12V	—
				Idle	Approx. 12V	
2Y		○	Circuit opening relay	Ignition switch ON	Approx. 12V	—
				Idle	Below 1.0V	
2Z	—	—	—	—	—	—



Incorrect voltage	Possible cause
Always 0V	• Open or short circuit in wiring from ECU terminal 2S to buzzer
Always 0V or approx. 12V	• Refer to Code No.25 Troubleshooting
Always 0V	• Main relay (FUEL INJ relay) malfunction • Open or short circuit in wiring from injector to ECU terminal 2U or 2V
Always approx. 12V	• ECU malfunction
Always 0V or approx. 12V	• Refer to Code No.34 Troubleshooting
Always 0V or approx. 12V	• Refer to Code No.26 Troubleshooting
Always 0V	• Open or short circuit in wiring from ECU terminal 2Y to relay
—	—

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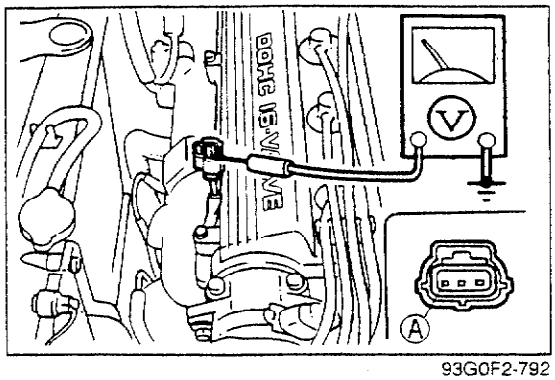

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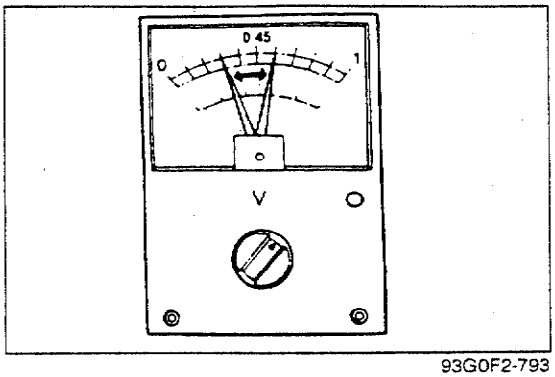

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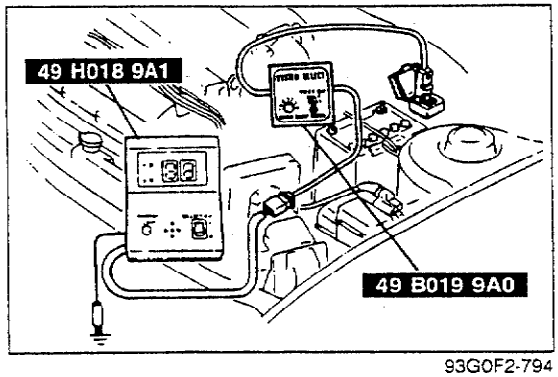

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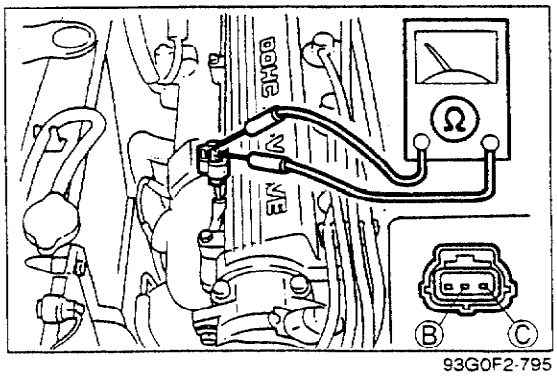

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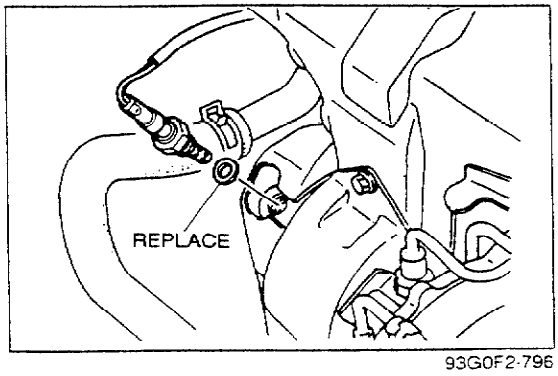


93G0F2-796

OXYGEN SENSOR [BP TURBO]

Inspection

Sensor

1. Warm up the engine to normal operating temperature.
2. Disconnect the oxygen sensor connector.
3. Connect a voltmeter to the oxygen sensor terminal Ⓐ.
4. Run the engine at **4,500 rpm** until the voltmeter indicates **approx. 0.7V**.
5. Increase and decrease the engine speed suddenly and measure the voltage.

Voltage

Engine speed	Voltage (V)
Decelerating	0—0.4
Accelerating	0.5—1.0

6. Connect the **SSTs** to the diagnosis connector.
7. Set the system selector select switch to 1 and the test switch to O_2 MONITOR.
8. Increase the engine speed to **between 2,000 and 3,000 rpm**, and verify that the monitor lamp flashes for 10 seconds.

Specification:
Monitor lamp flashes more than 8 times/10 sec.

Heater

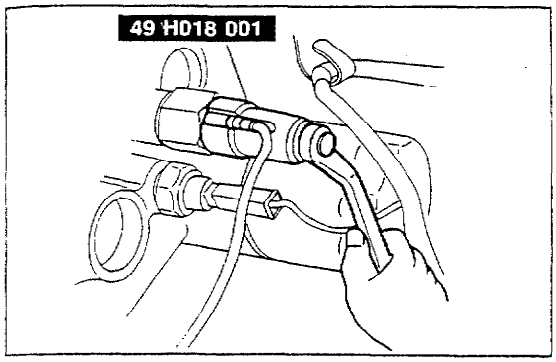
1. Disconnect the oxygen sensor connector.
2. Check resistance between oxygen sensor connector terminals Ⓑ and Ⓒ.

Resistance: Approx. 6Ω [at 20°C (68°F)]

Replacement

1. Disconnect the oxygen connector.
2. Remove the oxygen sensor.
3. Install the new oxygen sensor and new washer.
4. Tighten the oxygen sensor to specified torque.

Tightening torque:
29—49 N·m (3—5 m-kg, 22—36 ft-lb)



93G0F2-797

KNOCK SENSOR

Note

- **The knock sensor and knock control unit cannot be inspected individually.**
  When a malfunction code number 05 is indicated, replace.

Replacement

1. Disconnect the knock sensor connector.
2. Raise the vehicle and support it on safety stands.
3. Remove the knock sensor with using the **SST**.
4. Install it in the reverse order of removal.

Tightening torque:
20—34 N·m (2.0—3.5 m-kg, 14—25 ft-lb)

ENGINE ELECTRICAL SYSTEM

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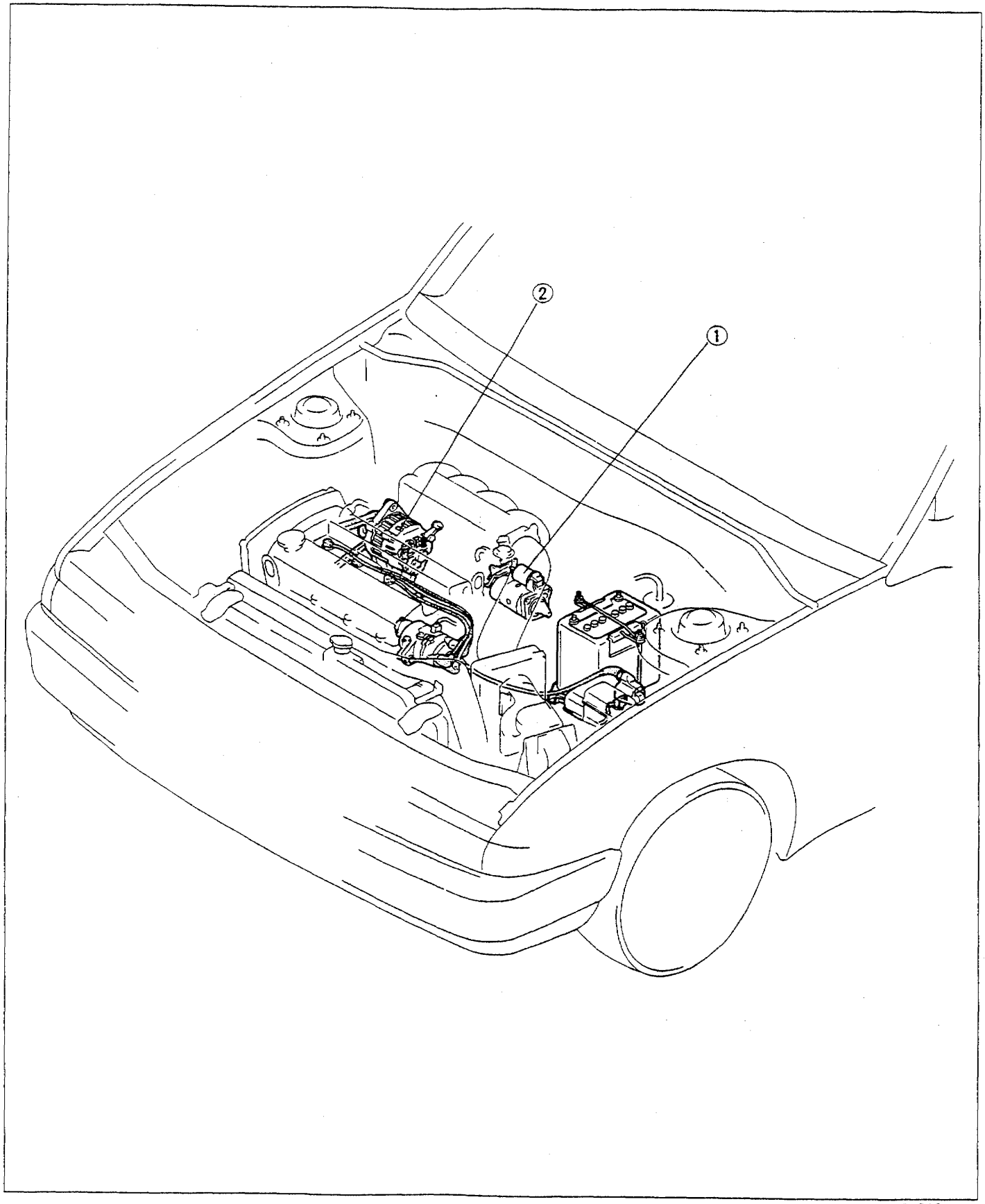
INDEX



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1. Starter
   Removal / Installation..... page G–4
2. Alternator (RHD)
   Removal / Installation..... page G–5

OUTLINE

OUTLINE OF CONSTRUCTION

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

93G0GX-703

SPECIFICATIONS

Item \ Engine/Transaxle			BP TURBO	BP SOHC	
			MTX	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		Coaxical reduction
	Output V-kW		12-0.85	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			10 ± 1°	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*2 BKR5E*3 BKR6E11*2 BKR6E*3		
		Nippon Denso	K16PR-U11*2 K16PR-U*3 K20PR-U11*2 K20PR-U*3		
	Plug gap mm (in)		1.0—1.1 (0.039—0.043)*2 0.7—0.8 (0.028—0.031)*3		
	Firing order		1—3—4—2		

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*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.)
*2 With catalytic converter.
*3 Without catalytic converter.

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Mazda 323 Workshop Manual [1203-10-89F (Europe), 1204-10-89F (Australia)].

Starter
- Removal / Installation

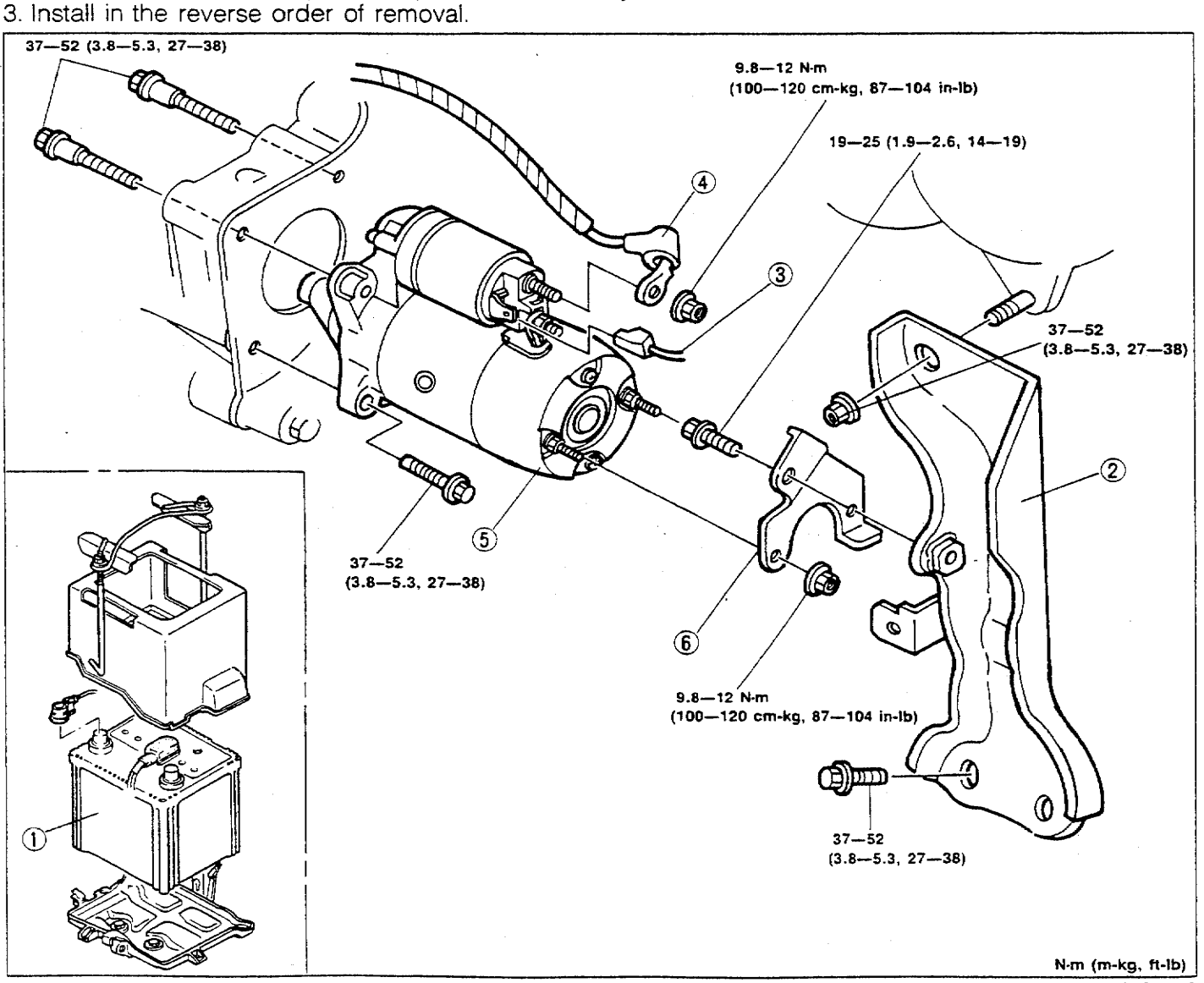
Alternator (RHD)
- Removal / Installation

93G0GX-705

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.

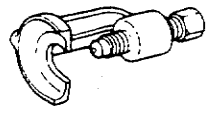


93G0GX-706

1. Battery
2. Intake manifold bracket
3. S terminal wire
4. B terminal wire
5. Starter
   Remove from above
6. Starter bracket

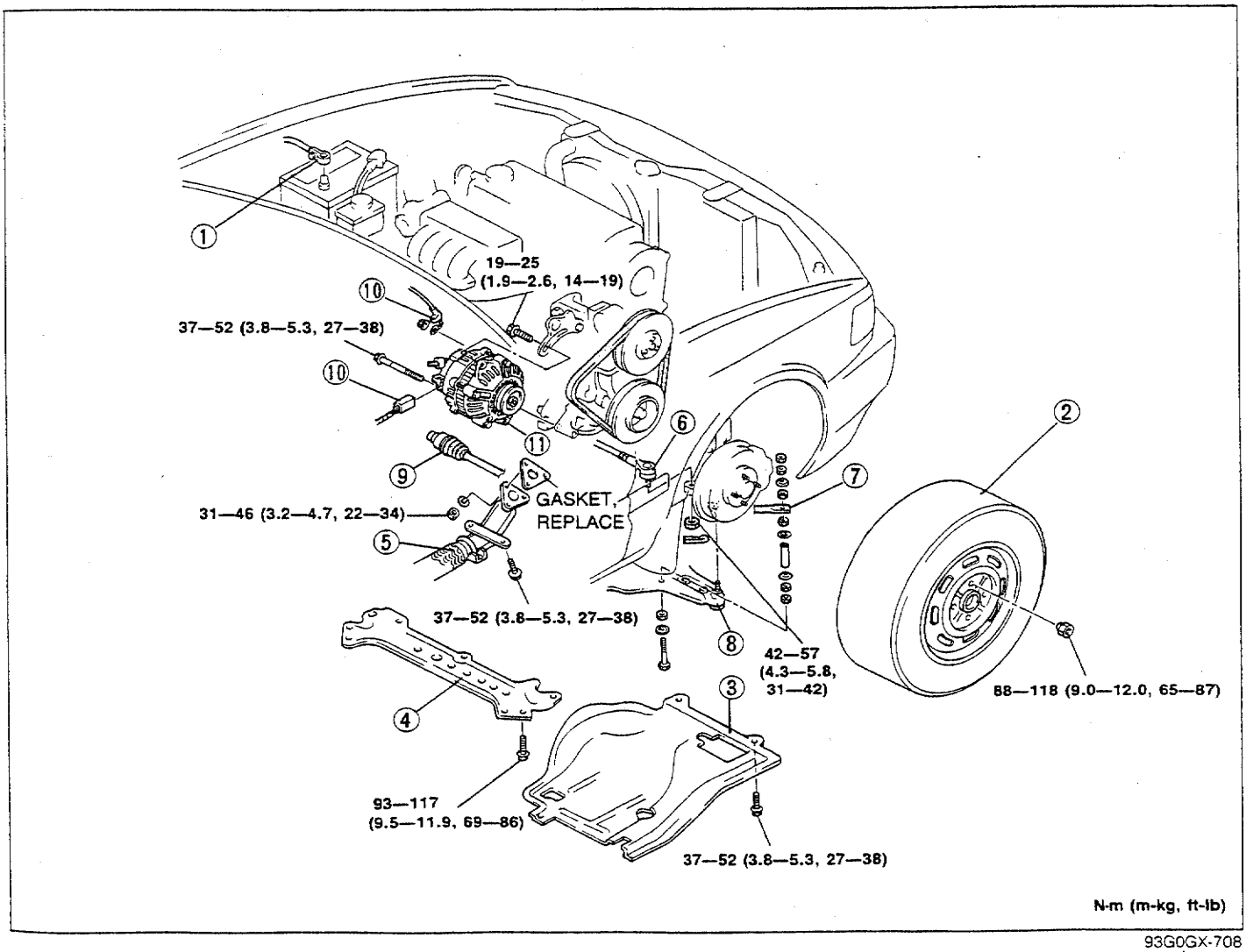
CHARGING SYSTEM

PREPARATION
SST

49 0118 850C Puller, ball joint		For removal of ball joint

93G0GX-707

ALTERNATOR (RHD)
Removal / Installation
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal, referring to **Installation Note**.



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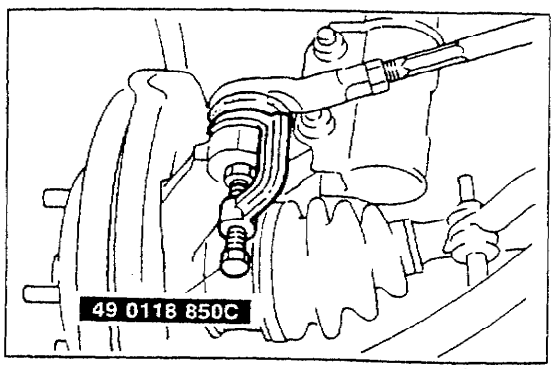
1. Negative battery cable
2. Tire and wheel (Right front)
3. Undercover
4. Crossmember
5. Front exhaust pipe
6. Tie-rod end
   Removal Note ..... page G–6
7. Stabilizer (Right)
   Installation Note ..... page G–6
8. Lower arm (Right)
9. Driveshaft (Right)
10. Alternator connectors
11. Alternator
    Remove from below



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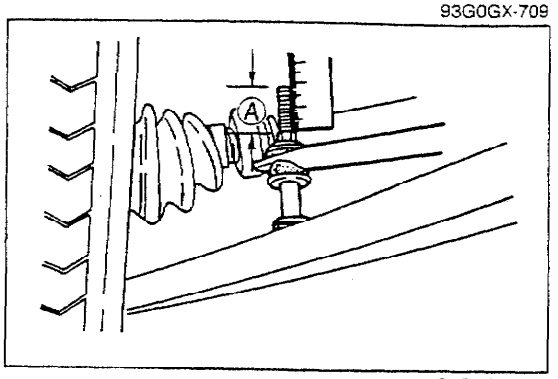
Removal Note
Tie-rod end
1. Remove the right side tie-rod end with the **SST**.



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Installation Note
Stabilizer
1. Install the stabilizer bolt.

Dimension A: 17—19mm (0.67—0.75 in)

CLUTCH

93G0HX-701

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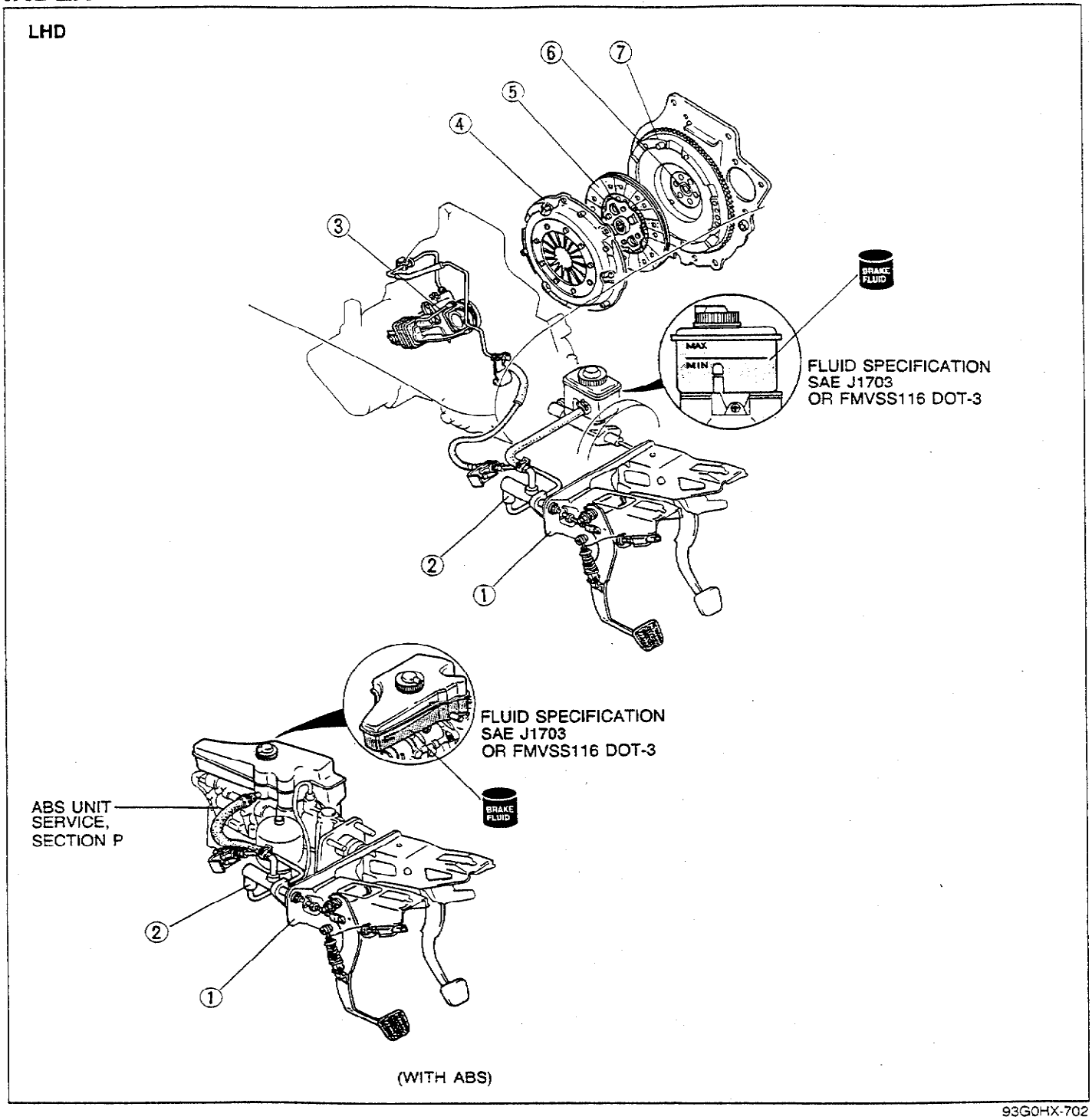

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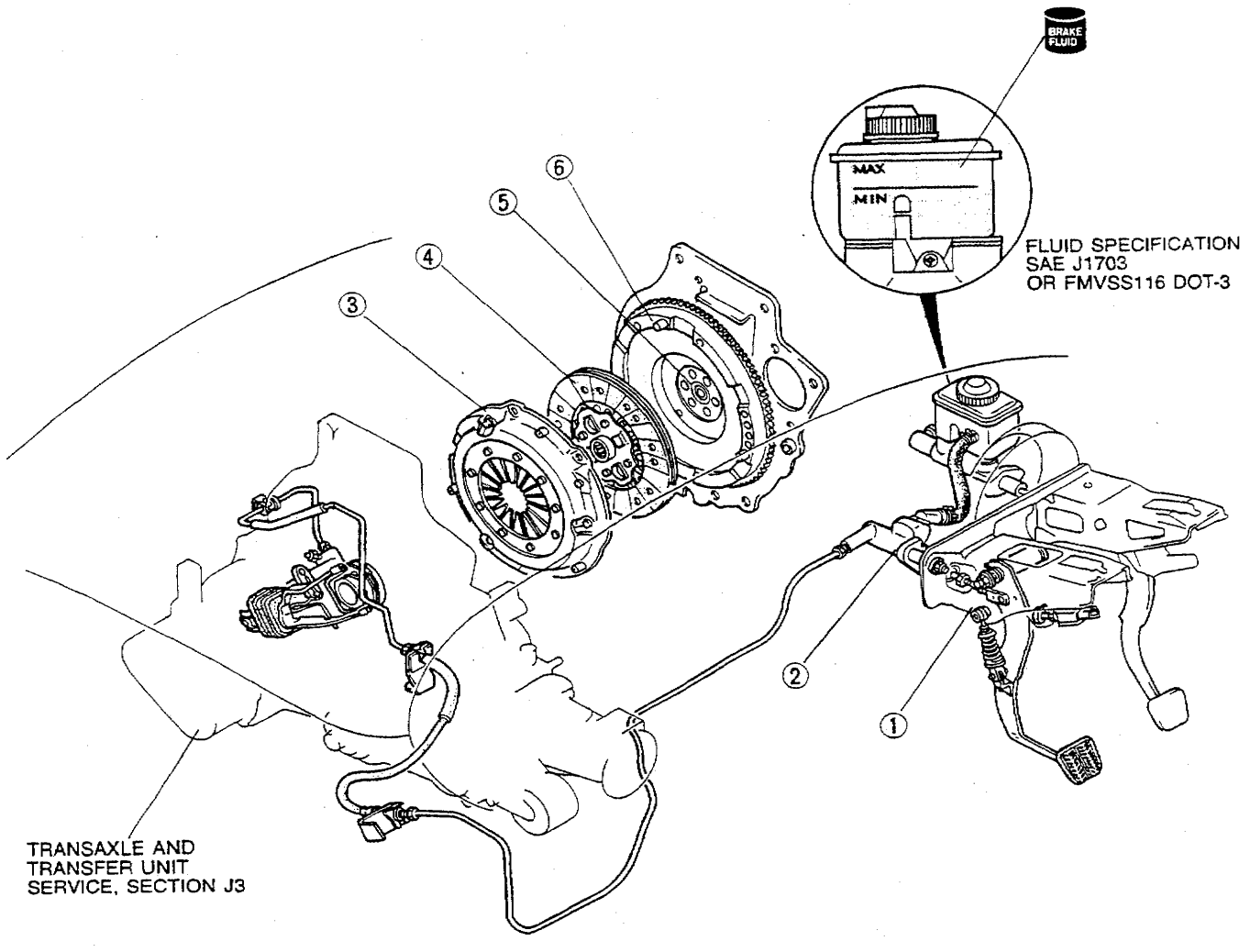
RHD



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1. Clutch pedal (BP DOHC Turbo)
   Removal / Inspection / Installation ..... page H–11
2. Clutch master cylinder (BP DOHC Turbo)
   Overhaul..... page H–15
3. Clutch cover
   Removal / Installation..... page H–19
4. Clutch disc
   Removal / Installation..... page H–19
5. Pilot bearing
   Removal / Installation..... page H–19
6. Flywheel
   Removal / Installation..... page H–19

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 parts except for the release cylinder.

1. An assist/return spring is used on the BP DOHC Turbo model to reduce the required clutch pedal effort.
2. The hydraulic clutch master cylinder for the BP DOHC Turbo model has a built-in check valve.
3. To improve clutch operation feeling and increased parts life, a friction plate and needle roller bearings are used between the release fork and the release bearing.

93G0HX-704

SPECIFICATIONS

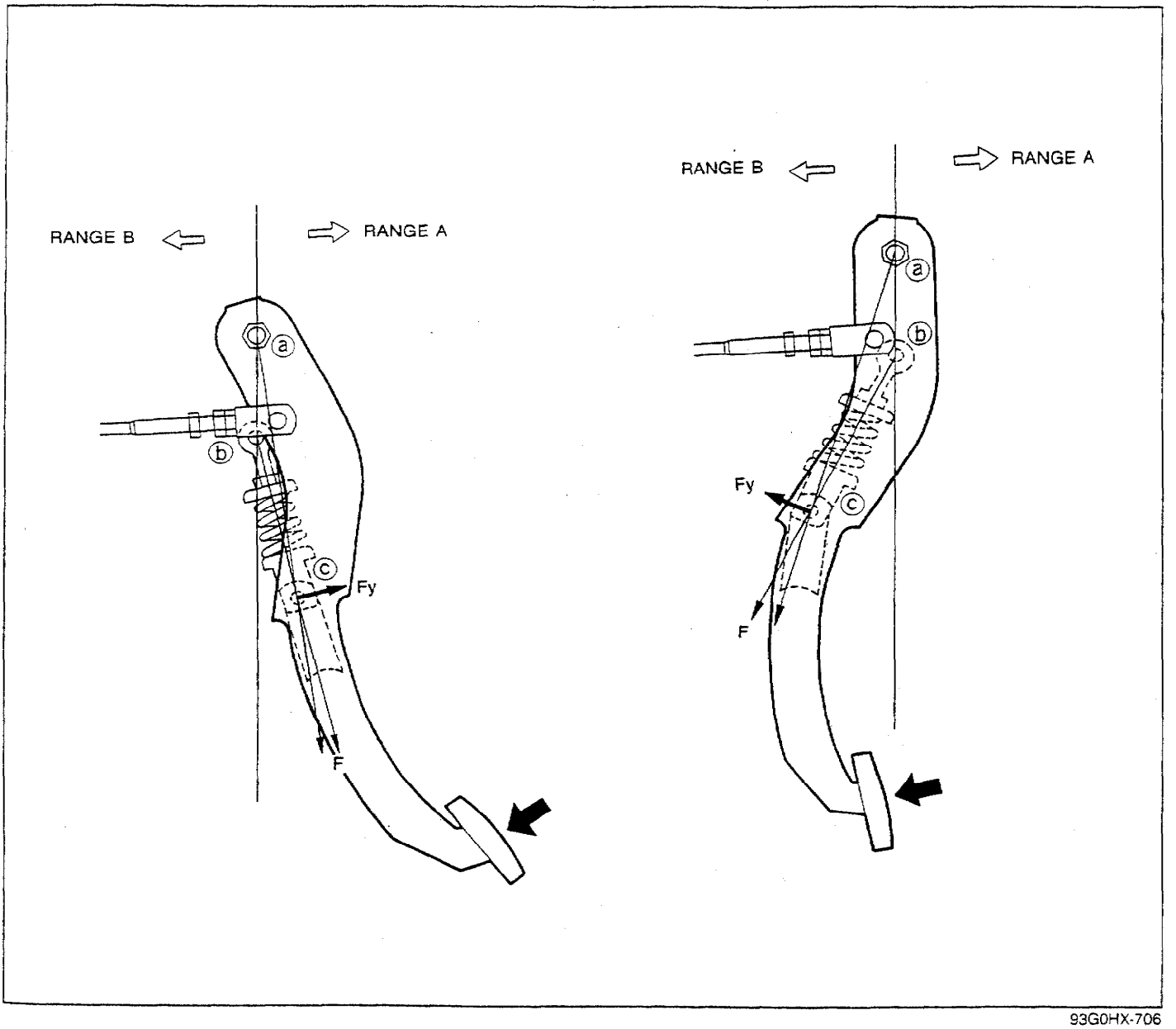
Item \ Engine/Transaxle			BP SOHC	BP DOHC Turbo
			G5MX-R	
Clutch control			Hydraulic	
Clutch cover	Type		Diaphragm spring	
	Set load N (kg, lb)		3,846 (392, 862)	5,494 (560, 1,232)
Clutch disc	Outer diameter mm (in)		225 (8.858)	230 (9.055)
	Inner diameter mm (in)		150 (5.906)	155 (6.102)
	Thickness	Pressure plate side mm (in)	4.1 (0.161)	3.2 (0.126)
		Flywheel side mm (in)	3.5 (0.138)	3.2 (0.126)
Clutch pedal	Type		Suspended	
	Pedal ratio	LHD	6.55	
		RHD	6.7	
	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	

93G0HX-705

CLUTCH CONTROL

CLUTCH PEDAL

- An assist/return spring is used on BP DOHC Turbo engine-equipped models to reduce the required pedal effort.
- The assist/return spring is mounted vertical to the pedal for a compact arrangement.



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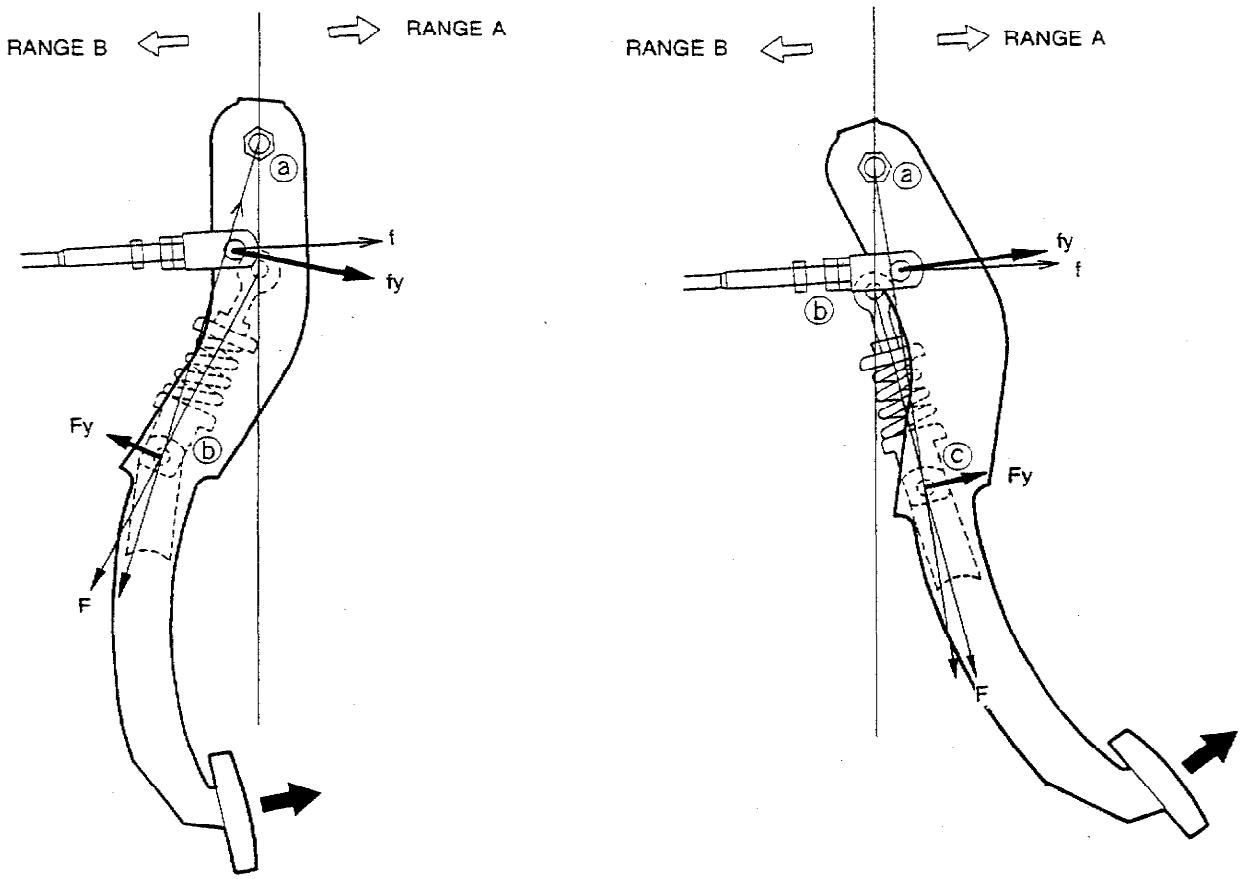
Operation

With the clutch pedal fully released, the assist/return spring is compressed, causing force F to act upon fulcrum ⓒ.
As a result, force Fy is created, and acts upon fulcrum ⓒ to hold the pedal outward.

1. When clutch pedal depressed.
   (1) Fulcrum ⓒ within range A
   When the pedal is depressed, it moves inward, centered upon fulcrum ⓐ.
   Fy, which is the force opposing pedal movement, acts upon fulcrum ⓒ until fulcrum ⓒ crosses the imaginary line connecting fulcrums ⓐ and ⓑ.
   As a result, there is a slight feeling of resistance when the clutch pedal is first depressed.
   (2) With fulcrum ⓒ within range B
   When fulcrum ⓒ crosses the imaginary line between fulcrums ⓐ and ⓑ, Fy now acts in the same direction as pedal movement, thus reducing the force required to depress the pedal.



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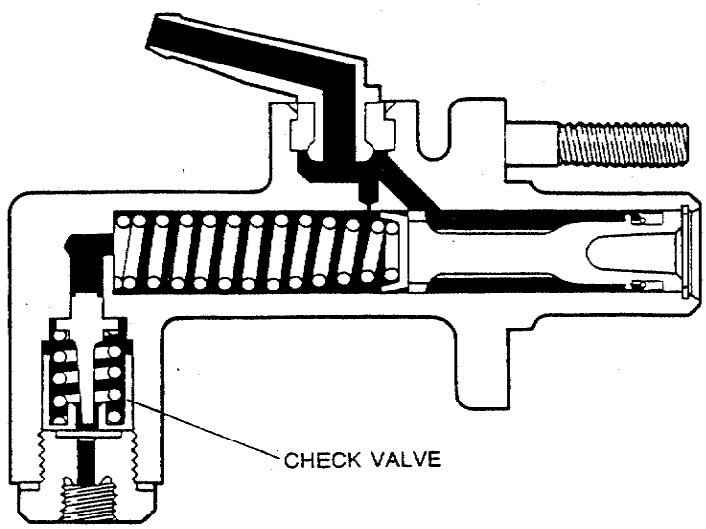
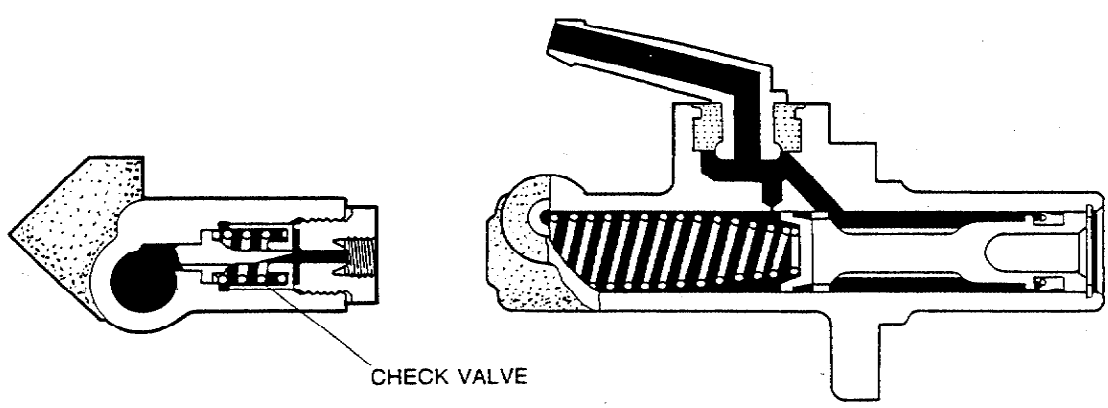
2. When clutch pedal released.
   (1) With fulcrum ⓒ within range B
   When the clutch pedal is released, reaction force f (from clutch master cylinder push rod) is applied, and fy force pushing outward overcomes Fy force, with the result that the clutch pedal moves outward, centered upon fulcrum ⓐ.
   (2) With fulcrum ⓒ within range A
   When fulcrum ⓒ crosses the imaginary line between fulcrums ⓐ and ⓑ, force Fy, which is a result of force F trying to expand the spring, is added to fy and pushes the pedal fully outward.

CLUTCH MASTER CYLINDER

LHD



RHD



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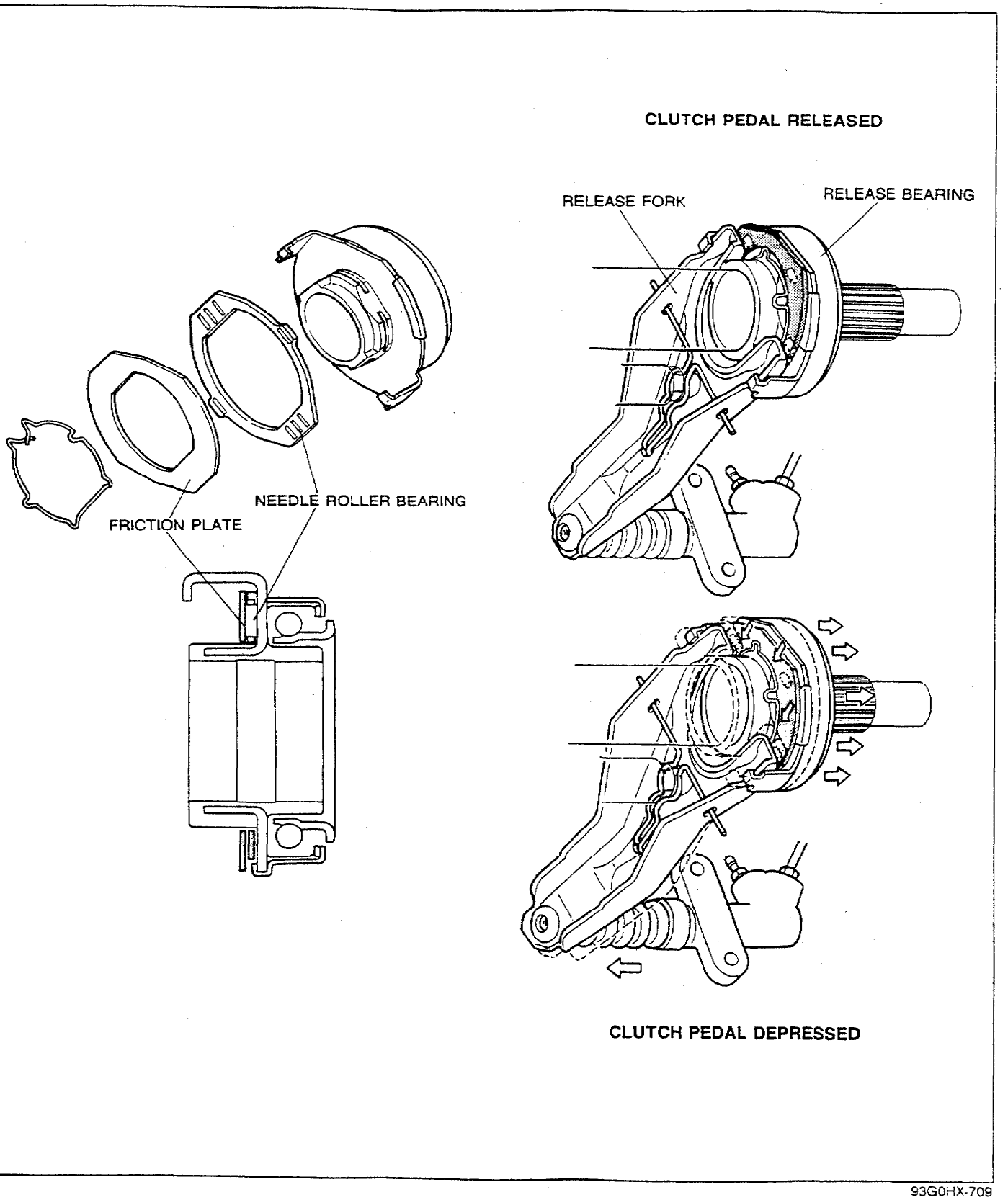
A hydraulic clutch master cylinder with a built-in check valve is used on the BP DOHC Turbo model. This is to provide smooth engagement of the clutch disc by controlling (by the check valve) the flow of fluid from the clutch release cylinder back to the master cylinder when the clutch pedal is released, thus cushioning the impact "shock".

RELEASE BEARING



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To improve clutch operation feeling and increased parts life, a newly designed friction plate and needle roller bearings are 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.

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with 323 Workshop Manual (1206-10-89F).

Troubleshooting guide
Clutch fluid (with ABS)
- Replacement

Clutch pedal (BP DOHC Turbo)
- Removal / Inspection / Installation

Clutch master cylinder (BP DOHC Turbo or with ABS)
- Removal / Inspection / Installation (BP DOHC Turbo)
- Air bleeding (with ABS)
- Overhaul (BP DOHC Turbo)

Clutch release cylinder (with ABS)
- Air bleeding

Clutch unit
- Removal / Inspection / Installation

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TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Slipping	Clutch disc facing worn excessively	Replace	H–19
	Clutch disc facing surface hardened or oiled	Repair or replace	H–19
	Pressure plate damaged	Replace	H–19
	Diaphragm spring damaged or weakened	Replace	H–19
	Insufficient clutch pedal play	Adjust	H–12
	Clutch pedal sticking	Repair or replace	H–11
	Flywheel damaged	Repair or replace	H–19
Faulty disengagement	Excessive runout or damaged clutch disc	Replace	H–19
	Clutch disc splines rusted or worn	Remove rust or replace	H–19
	Clutch disc facing oiled	Repair or replace	H–19
	Diaphragm spring weakened	Replace	H–19
	Excessive clutch pedal play	Adjust	—
	Insufficient clutch fluid	Add fluid	H–10
	Leakage of clutch fluid	Locate and repair or replace	—
Clutch vibrates when accelerating	Clutch disc facing oiled	Repair or replace	H–19
	Torsion rubbers weakened	Replace	H–19
	Clutch disc facing hardened or damaged	Repair or replace	H–19
	Clutch disc facing rivets loose	Replace	H–19
	Pressure plate damaged or excessive runout	Replace	H–19
	Flywheel surface hardened or damaged	Repair or replace	H–19
	Loose or worn engine mount	Tighten or replace	—
Clutch pedal sticking	Pedal shaft not properly lubricated	Lubricate or replace	H–11
	Asist/return spring damaged or poor adjust	Replace or adjust	H–11, 12
Abnormal noise	Clutch release bearing damaged	Replace	H–19
	Poor lubrication of release bearing sleeve	Lubricate or replace	H–19
	Torsion rubbers weakened	Replace	H–19
	Excessive crankshaft end play	Repair	—
	Pilot bearing worn or damaged	Replace	H–19
	Worn pivot points of release fork	Repair or replace	H–19

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CLUTCH FLUID (WITH ABS)

PREPARATION
SST

49 0259 770B Wrench, flare nut 	For air bleeding

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REPLACEMENT

Note
- **A common reservoir is used for the clutch and brake system fluids.**
- **The fluid in the reservoir must be maintained at 3/4 level or higher during replacement.**

Caution
- **Be careful not to spill the fluid on a painted surface. If this should happen, wash it off immediately.**
- **Do not mix different brands of fluid.**
- **Do not reuse the clutch fluid that was drained.**

1. Drain the brake fluid from the master cylinder by pumping it through a wheel cylinder bleed screw.
2. Remove the bleeder cap from the clutch release cylinder and attach a vinyl hose to the bleeder plug.

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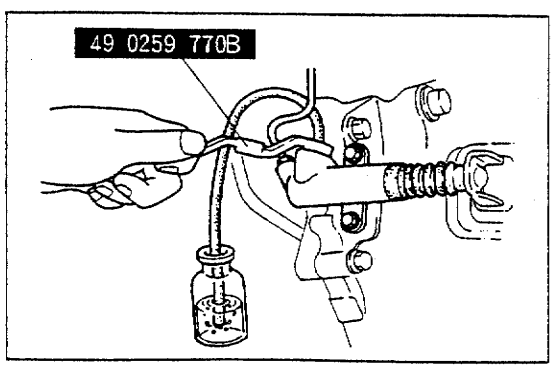


93G0HX-714

3. Place the other end of the vinyl hose in a clear container.
4. Fill the reservoir with new fluid to the MAX mark.
5. Slowly pump the clutch pedal several times.
6. With the clutch pedal depressed, loosen the bleeder screw with the **SST** to let the fluid escape. Close the bleeder screw with the **SST**.
7. Repeat Steps 4 and 5 until only clean fluid is seen.
8. Tighten the bleeder screw.

Tightening torque:
5.9—8.8 N·m (60—90 cm-kg, 52—78 in-lb)

9. Add fluid to the MAX mark.
10. Slowly pump the clutch pedal several times. Verify that there is no fluid leakage.
11. Check operation of the clutch system.
12. Bleed and check operation of the brake system. (Refer to Section P.)

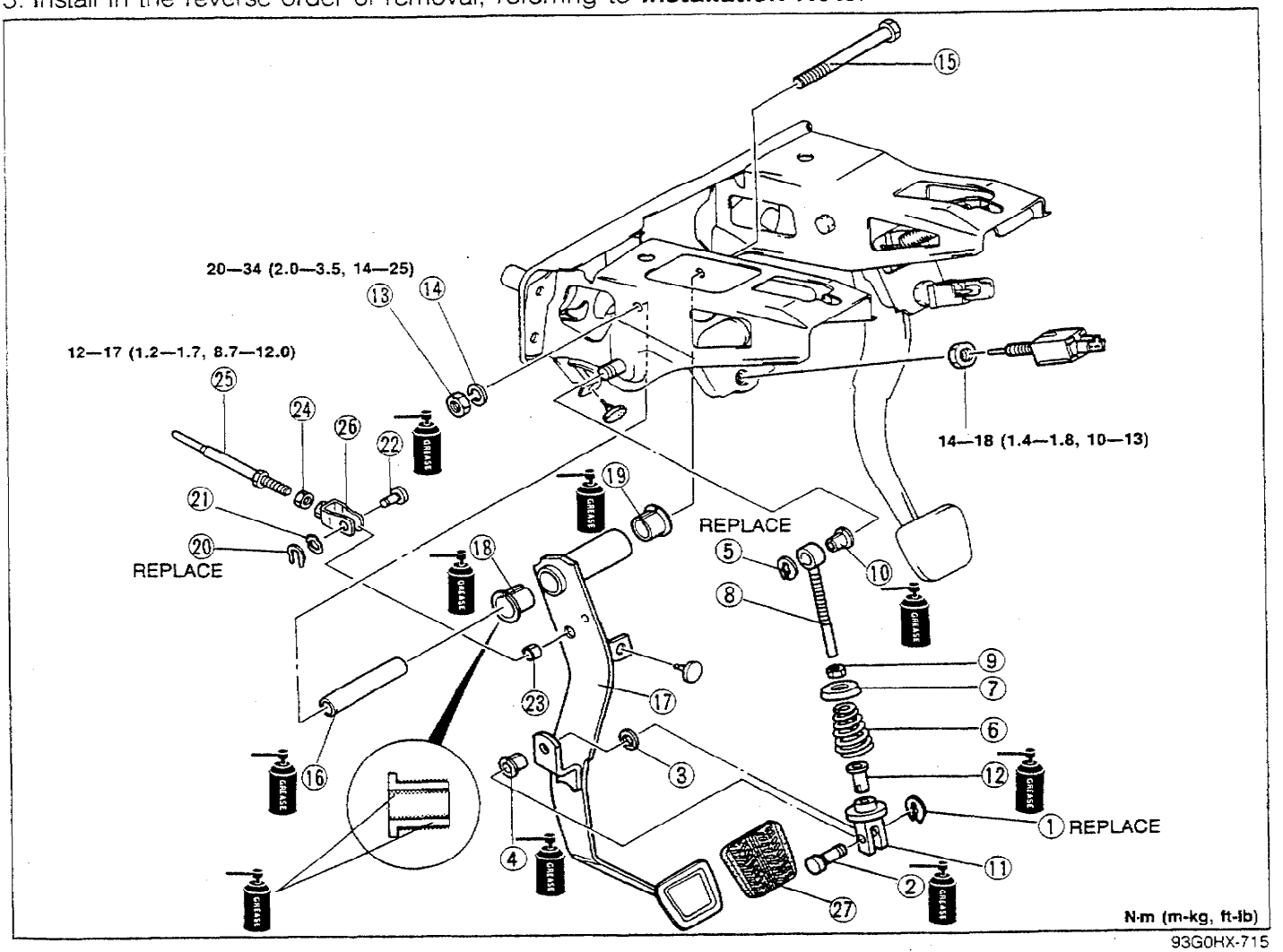
CLUTCH PEDAL (BP DOHC TURBO)

REMOVAL / INSPECTION / INSTALLATION

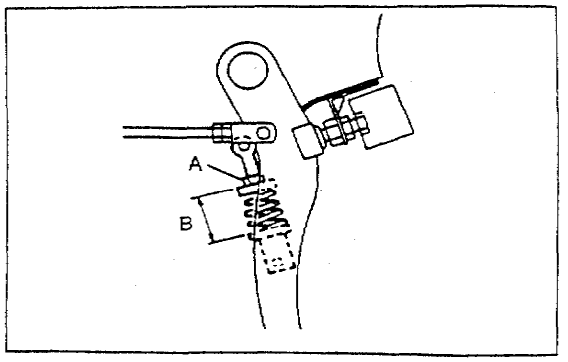
1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Inspect all parts, and repair or replace as necessary.

Note
- **Apply lithium based grease to the bushings and pins before installation.**

3. Install in the reverse order of removal, referring to **Installation Note**.



1. Clip
2. Pin
3. Spacer
4. Bushing
5. Clip
6. Assist/return spring
   Adjustment ..... page H–12
7. Spring seat
8. Clutch pedal rod
9. Adjusting nut
10. Busing
11. Spring seat
12. Bushing
13. Nut
14. Washer
15. Bolt
16. Spacer
17. Clutch pedal
18. Bushing
19. Bushing
20. Clip
21. Wave washer
22. Pin
23. Bushing
24. Nut
25. Push rod
    Inspect for damage and bending
26. Clutch fork
27. Pedal pad
    Inspect for damage and wear



93G0HX-716

Adjustment

Assist/return spring

1. Measure the installation length B of the assist/return spring.
2. Adjust the installation length B by turning nut A shown in the figure.

Installation length: 35.5—36.5mm (1.398—1.437 in)

CLUTCH MASTER CYLINDER (BP DOHC TURBO OR WITH ABS)

PREPARATION
SST

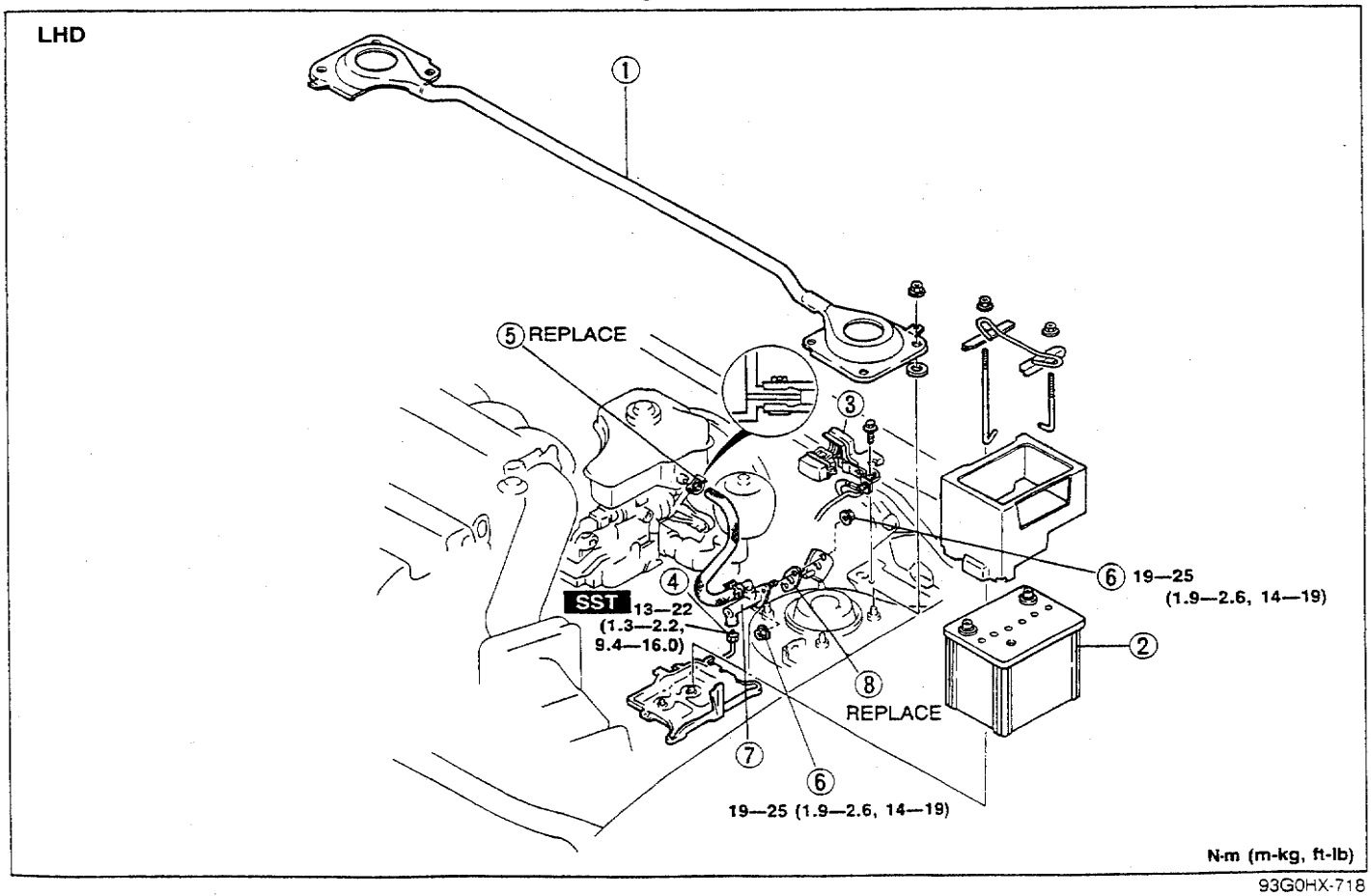
49 0259 770B Wrench, flare nut 	For disconnecting and connecting clutch pipe

93G0HX-717

REMOVAL / INSPECTION / INSTALLATION (BP DOHC TURBO)

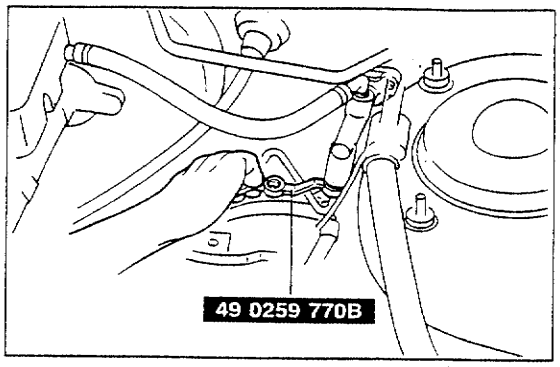
Caution
- **Clutch fluid will damage painted surfaces. Be sure to use a container or rags to collect it. If fluid does get on a painted surface, wipe it off immediately with a rag.**

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**.

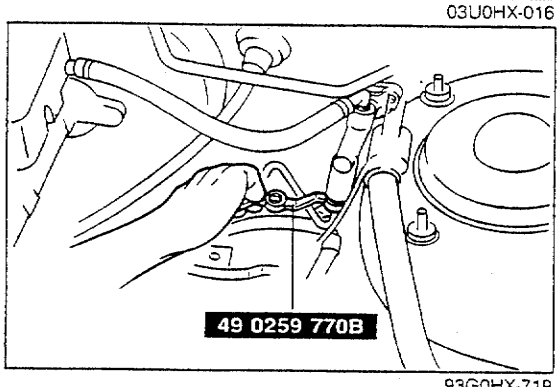


93G0HX-718

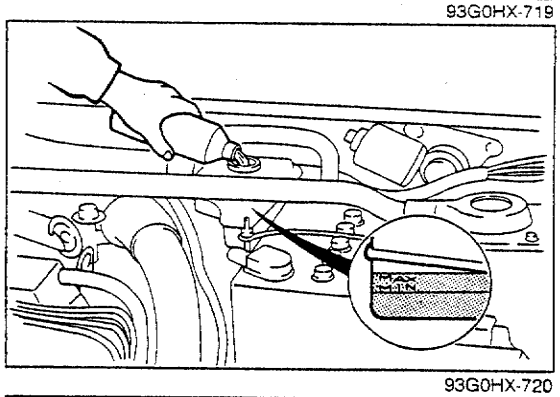
1. Strut bar
2. Battery
3. Diagnosis connector
4. Clutch pipe
   - Removal Note ..... page H–14
   - Installation Note..... page H–14
5. Clip
6. Nut
7. Clutch master cylinder
   - Check for fluid leakage from cylinder bore
   - Overhaul ..... page H–15
   - Air bleeding..... page H–14
8. Gasket

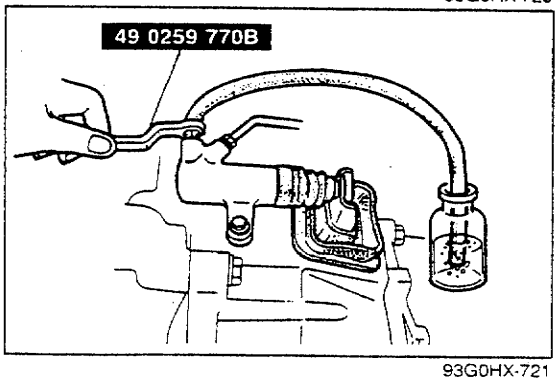


03U0HX-016



93G0HX-719


93G0HX-720



93G0HX-721

Removal Note
Clutch pipe
1. Disconnect the clutch pipe with the **SST**.

Installation Note
Clutch pipe
1. Tighten the clutch pipe with the **SST**.

Tightening torque:
13—22 N·m (1.3—2.2 m-kg, 9.4—16 ft-lb)

Air Bleeding
1. After installation, bleed the clutch system. (Refer to below.)

AIR BLEEDING (WITH ABS)
The clutch hydraulic system must be bled to remove air introduced whenever a hydraulic line is disconnected.

Note
- **The fluid in the reservoir must be maintained at 3/4 level or higher during air bleeding.**

Caution
- **Clutch fluid will damage a painted surface. If fluid does get on a painted surface, wipe it off immediately.**
- **Do not mix different brands of clutch fluid.**
- **Do not reuse the clutch fluid that was drained.**

1. Remove the bleeder cap from the clutch release cylinder and attach a vinyl hose to the bleeder screw.
2. Insert the other end of the vinyl hose in a clear container.
3. Slowly pump the clutch pedal several times.
4. While depressing the pedal, loosen the bleeder screw with the **SST** to let fluid and air escape.
   Close the bleeder screw with the **SST**.
5. Repeat Steps 3 and 4 until no air bubbles are seen in the fluid.
6. Tighten the bleeder screw.

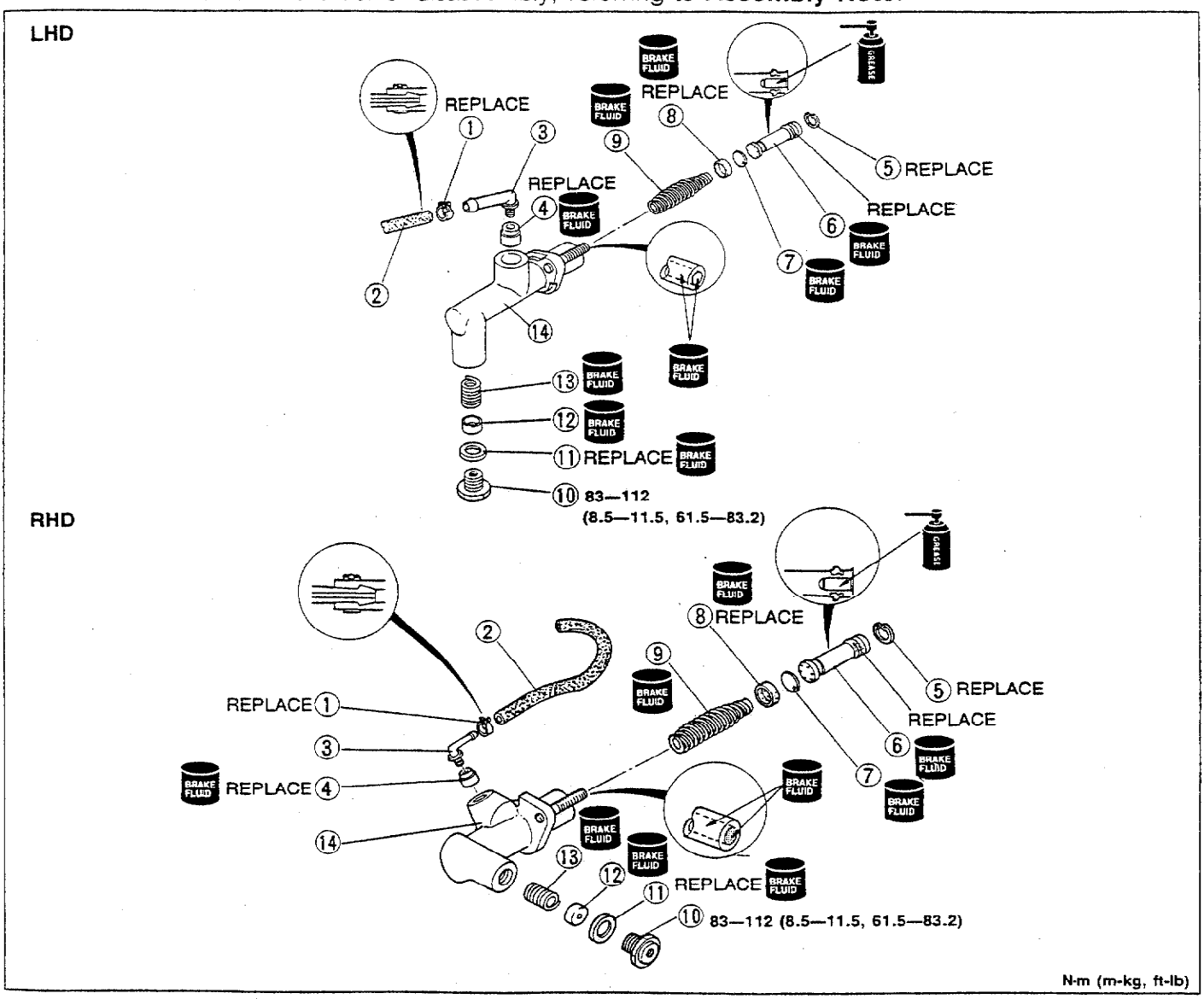
Tightening torque:
5.9—8.8 N·m (60—90 cm-kg, 52—78 in-lb)

7. Check for correct clutch operation.
8. Verify that there is no fluid leakage.

OVERHAUL (BP DOHC TURBO)

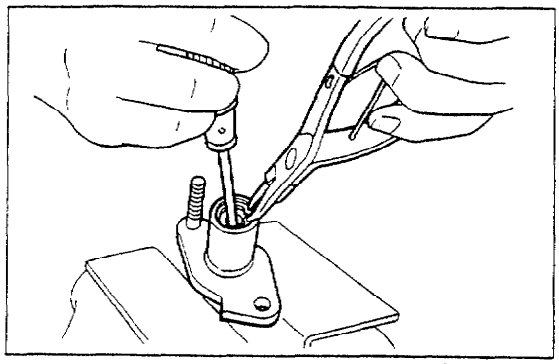
Caution
- **Clean the disassembled parts in solvent and blow through all ports and passages with compressed air.**

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**.



93G0HX-722

1. Clip
2. Hose
3. Joint
4. Bushing
5. Snap ring
   - Disassembly Note ..... page H–16
   - Assembly Note ..... page H–17
6. Piston and secondary cup assembly
   - Disassembly Note ..... page H–16
   - Assembly Note ..... page H–16
   - Inspect for wear, scoring and cracks
7. Spacer
8. Primary cup
   - Inspect for wear and cracks
9. Return spring
10. Joint bolt
11. Packing
12. One-way valve piston
    - Disassembly Note ..... page H–16
13. Return spring ..... page H–16
14. Master cylinder body
    - Inspect cylinder bore for scoring and corrosion



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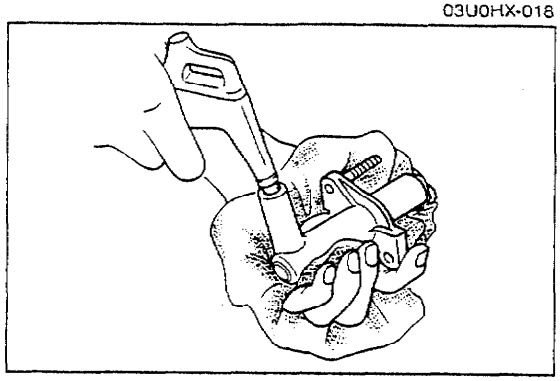
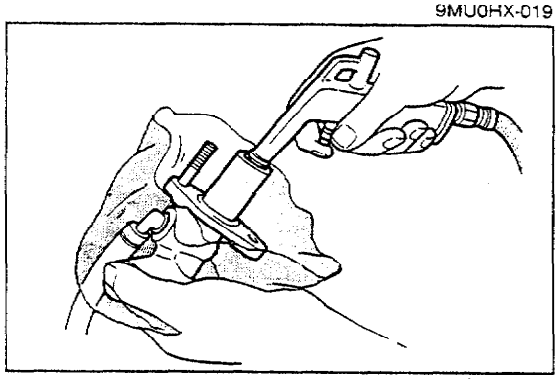


9MU0HX-019



93G0HX-723

Disassembly Note
Snap ring

Caution
- **Do not damage the push rod contact surface of the piston.**

1. Press the piston down and remove the snap ring with snap-ring pliers.

Piston and secondary cup assembly

Caution
- **Hold a rag over the master cylinder to prevent the piston and secondary cup assembly from jumping out.**

1. Remove the piston and secondary cup assembly, spacer, and primary cup by applying compressed air through the clutch pipe installation hole.

One-way valve piston and return spring

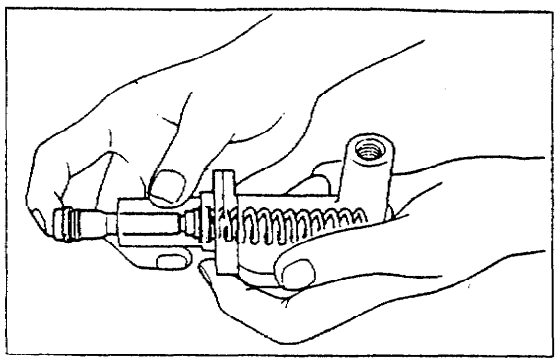
Caution
- **Hold a rag over the master cylinder to prevent the piston and spring from jumping out.**

1. Remove the piston by applying compressed air through the cylinder bore.

Assembly Note

Caution
- **Before assembly, make sure all parts are completely clean.**
- **Do not mix different brands of clutch fluid.**
- **Do not reuse the clutch fluid that was drained.**
- **Apply the specified clutch fluid to the piston and secondary cup assembly, spacer, primary cup, and cylinder bore before assembly.**
- **Replace parts with new ones whenever specified to do so.**

03U0HX-019



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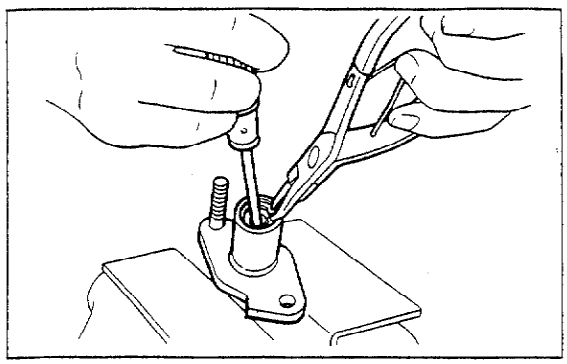
Piston and secondary cup assembly

1. Install the spring, primary cup, spacer, and piston and secondary cup assembly, noting the proper direction of the parts.



03U0HX-021

Snap ring

Caution
- **Do not damage the push rod contact surface of the piston.**

1. While pressing the piston, install the snap ring.

CLUTCH RELEASE CYLINDER (WITH ABS)

PREPARATION
SST

49 0259 770B Wrench, flare nut 	For disconnecting and connecting clutch pipe

93G0HX-724

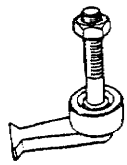
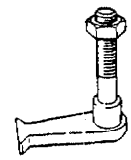
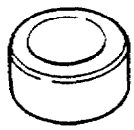
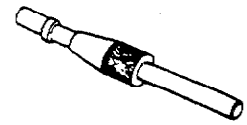
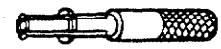
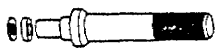
AIR BLEEDING (WITH ABS)

1. After installation, bleed the clutch system. (Refer to page H–16.)

93G0HX-725

CLUTCH UNIT

PREPARATION
SST

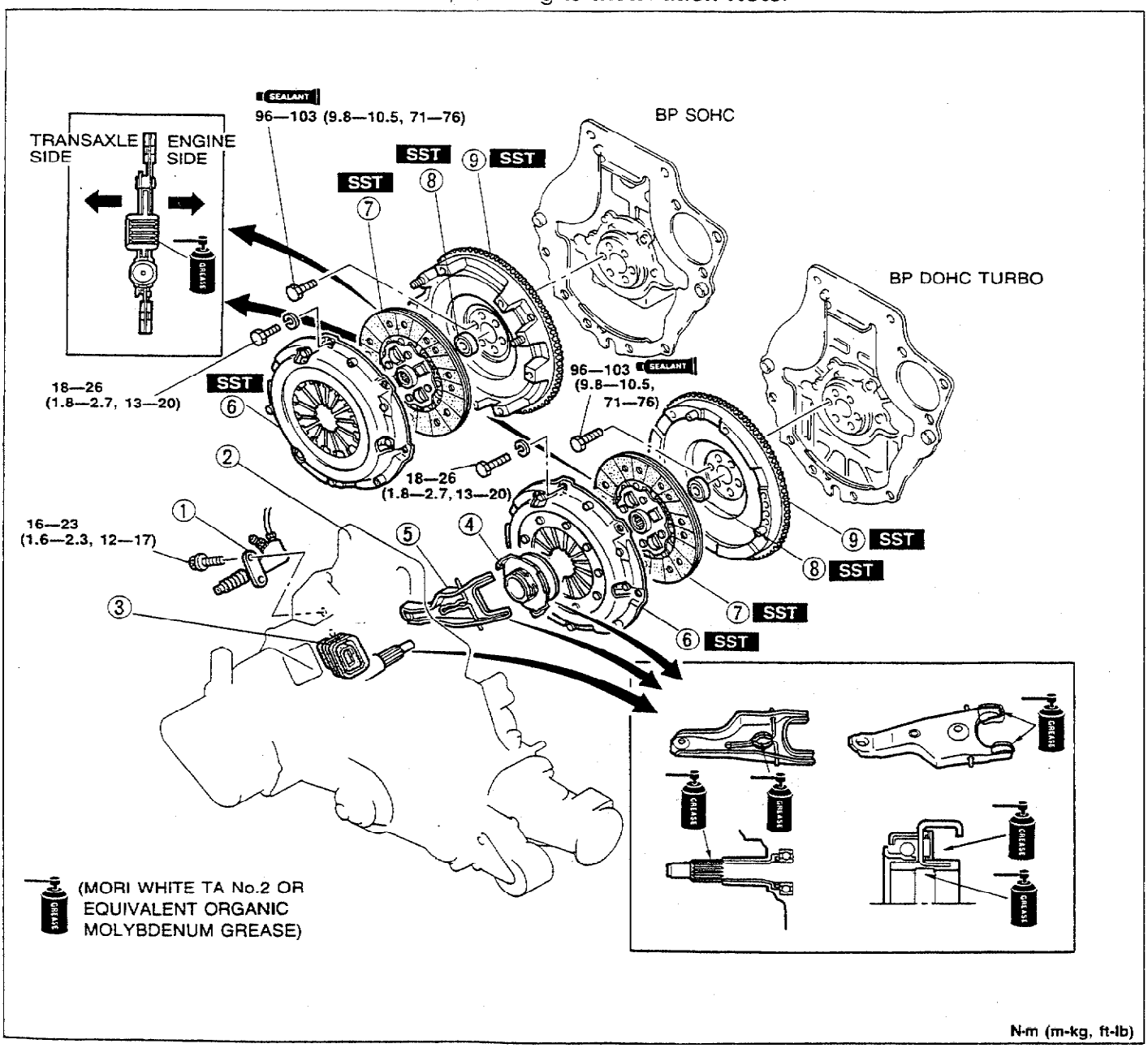
49 E301 060 Brake, ring gear 	For removal and installation of clutch cover and flywheel	49 E301 061 Body (Part of 49 E301 060) 	For removal and installation of clutch cover and flywheel
49 E301 062 Collar (Part of 49 E301 060) 	For removal and installation of clutch cover and flywheel	49 SE01 310 Centering tool, clutch disc 	For support and alignment of clutch disc
49 1285 071 Puller, bearing 	For removal of pilot bearing	49 1285 073 Chuck (Part of 49 1285 071) 	For removal of pilot bearing
49 0823 072A Installer, eccentric shaft bearing 	For installation of pilot bearing		

93G0HX-726

REMOVAL / INSTALLATION

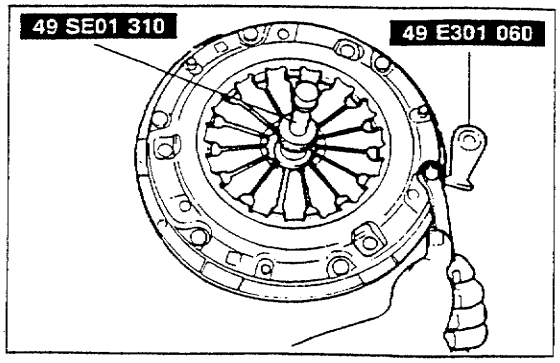
Note
- **Remove the clutch release cylinder with the clutch pipe connected.**
- **Do not remove the pilot bearing if not necessary.**

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**.

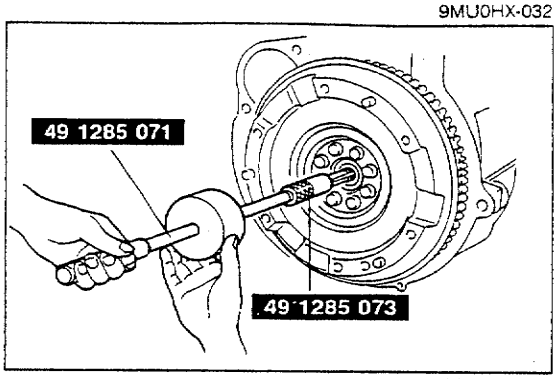


93G0HX-727

1. Clutch release cylinder
2. Transaxle
   Service ..... Section J3
3. Boot
4. Release bearing
5. Clutch release fork
6. Clutch cover
   Removal Note ..... page H–20
   Installation Note ..... page H–21
7. Clutch disc
   Removal Note ..... page H–20
   Installation Note ..... page H–21
8. Pilot bearing
   Removal Note ..... page H–20
   Installation Note ..... page H–21
9. Flywheel
   Removal Note ..... page H–20
   Installation Note ..... page H–20



9MU0HX-032



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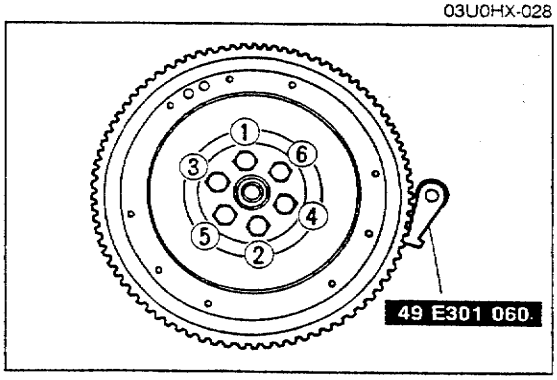
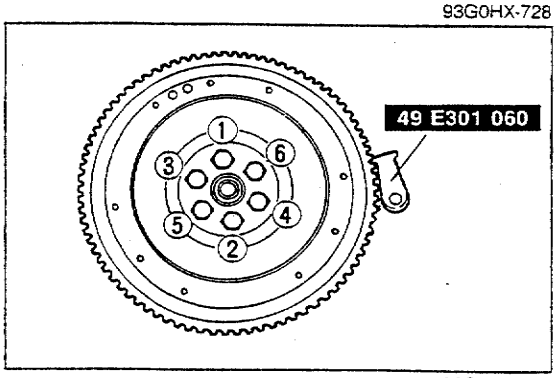


93G0HX-728



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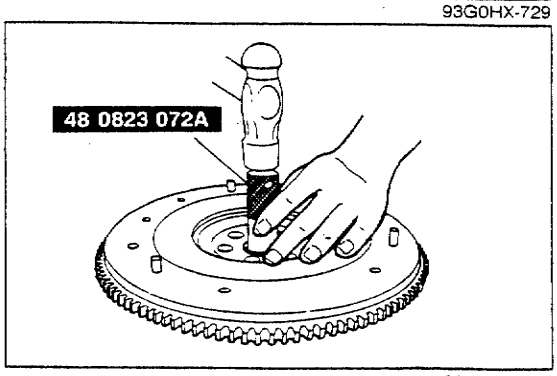


03U0HX-030

Removal Note
Clutch cover and disc
1. Install the **SST**.
2. Loosen each bolt one turn at a time in a crisscross pattern until spring tension is released. Then remove the clutch cover and disc.

Pilot bearing
1. Remove the pilot bearing with the **SST** if necessary.

Flywheel

Note
- **After removing the flywheel, inspect for oil leakage past the crankshaft rear oil seal. If necessary, replace the oil seal.**

1. Hold the flywheel with the **SST**.
2. Remove the flywheel.

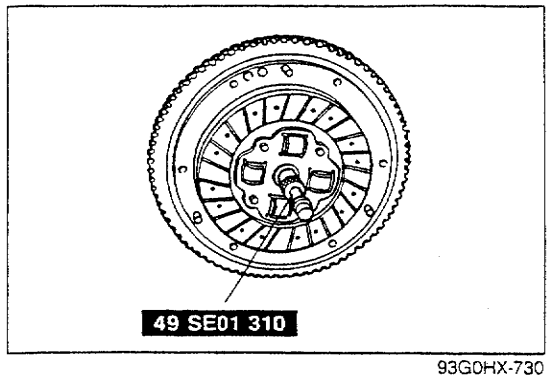
Installation Note
Flywheel
1. Wipe the bolts clean and apply sealant to the bolt threads.
2. Install the flywheel and **SST**.
3. Tighten the bolts evenly and gradually in the pattern shown.

Tightening torque:
96—103 N·m (9.8—10.5 m-kg, 71—76 ft-lb)

Pilot bearing

Note
- **Install the pilot bearing flush with the flywheel.**

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



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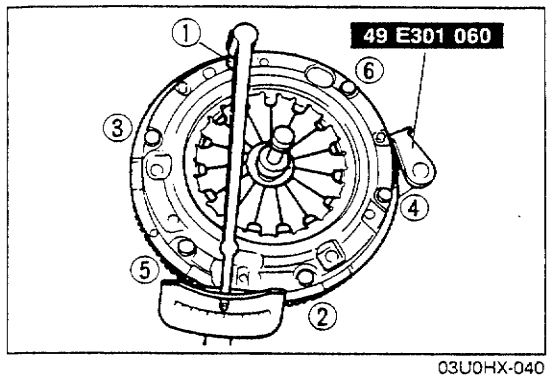


03U0HX-040

Clutch disc

1. Clean the clutch disc splines and main drive gear splines; then apply organic molybdenum grease.
2. Hold the clutch disc in position with the **SST**.

Clutch cover

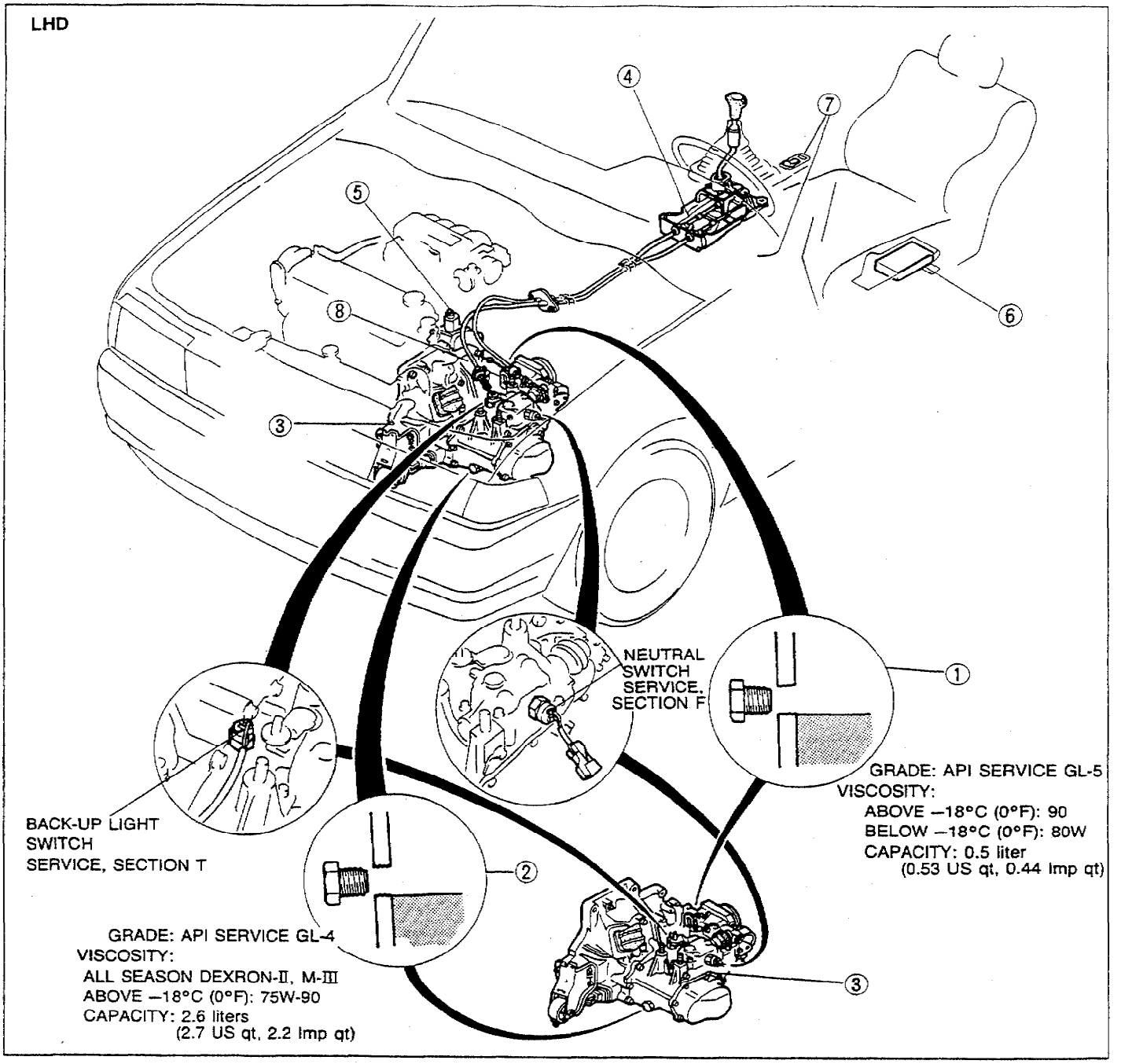
1. Install the **SST**.
2. Align the dowel holes with the flywheel dowels.
3. Tighten the bolts evenly and gradually in the pattern shown.

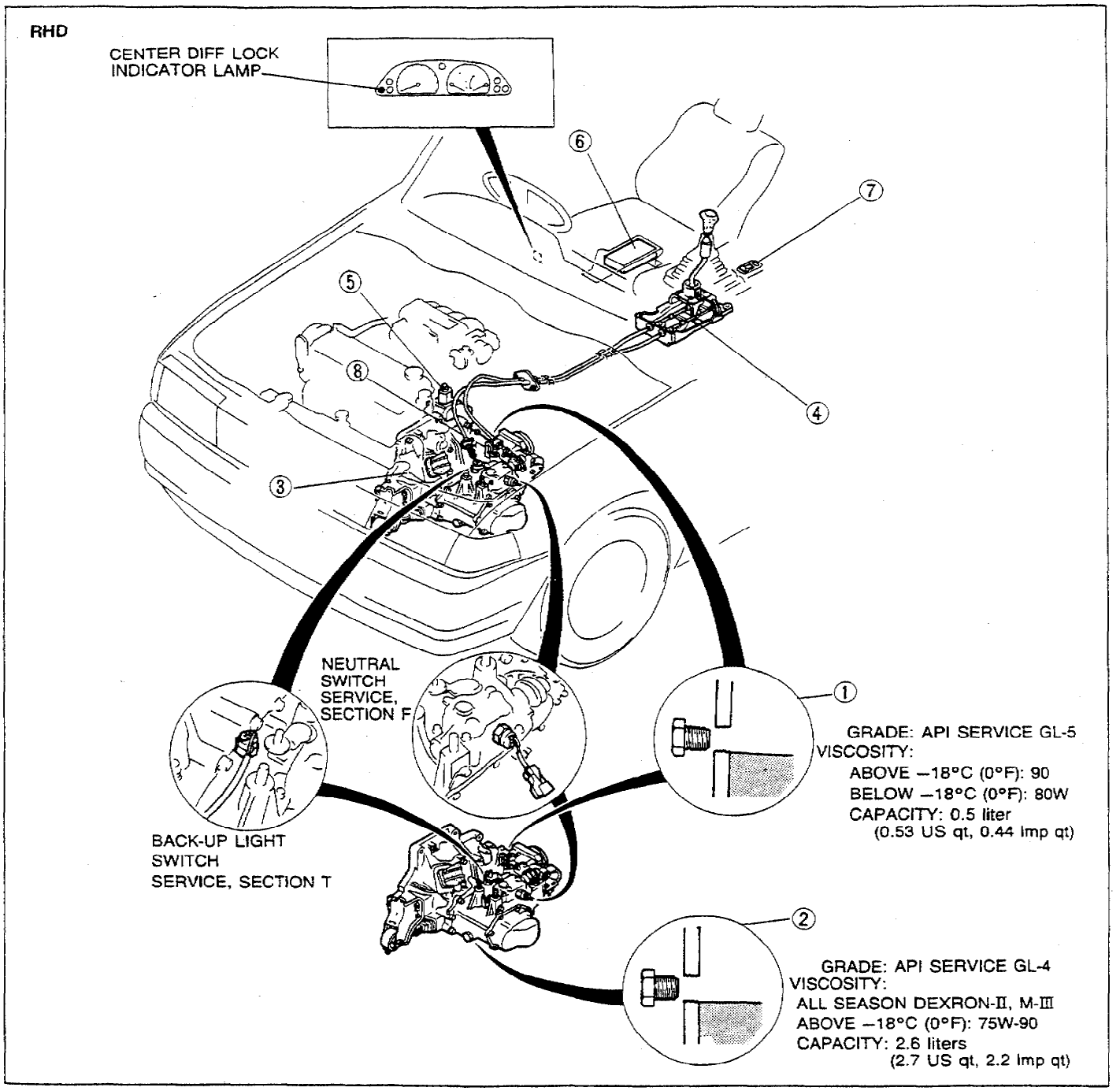
Tightening torque:
18—26 N·m (1.8—2.7 m-kg, 13—20 ft-lb)

MANUAL TRANSAXLE AND TRANSFER UNIT (G5MX-R)

93G0J3-701

INDEX





93G0J3-703

OUTLINE

OUTLINE OF CONSTRUCTION

- Full-time 4-wheel drive, incorporating a viscous coupling is used on the BP DOHC Turbo model. BP SOHC engine equipped models are fitted with an electronically controlled, lockable center differential.
  With this system all driving conditions are easily contended with; from good roads to bad roads and adverse weather conditions.
- The transaxle and transfer unit were developed based on the G5M-R type transaxle.
  The transaxle, center differential, viscous coupling, and front differential are a single, compact unit.
- The center differential employs a planetary carrier system and a viscous coupling, and functions to distribute the driving force to the front and rear differentials as needed.
  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 of the carrier is contained separately.

93G0J3-704

SPECIFICATIONS
TRANSAXLE AND TRANSFER UNIT

Item \ Engine model			BP DOHC turbo	BP SOHC
Transaxle control			Floor shift	
Synchromesh system		Forward	Synchromesh	
		Reverse	Selective sliding and synchromesh	
Gear ratio		1st	3.454	3.307
		2nd	1.833	
		3rd	1.310	1.233
		4th	0.970	0.914
		5th	0.717	
		Reverse	3.166	
Final gear ratio			4.214	4.388
Speedometer gear ratio			1.00	
Center differential	Type		Planetary carrier	
	Number of ring gear teeth	Outer	59	79
		Inner	75	66
	Number of pinion gear teeth	Outer	14	
		Inner	14	
	Number of sun gear teeth	Pinion gear side	43	33
		Idler gear side	43	
	Number of idler gear teeth		37	
Oil		Type	ATF: DEXRON-II, M-III Above −18°C (0°F) API servie GL-4 SAE 75W-90	
		Capacity	2.6 liters (2.7 US qt, 2.2 Imp qt)	

93G0J3-705

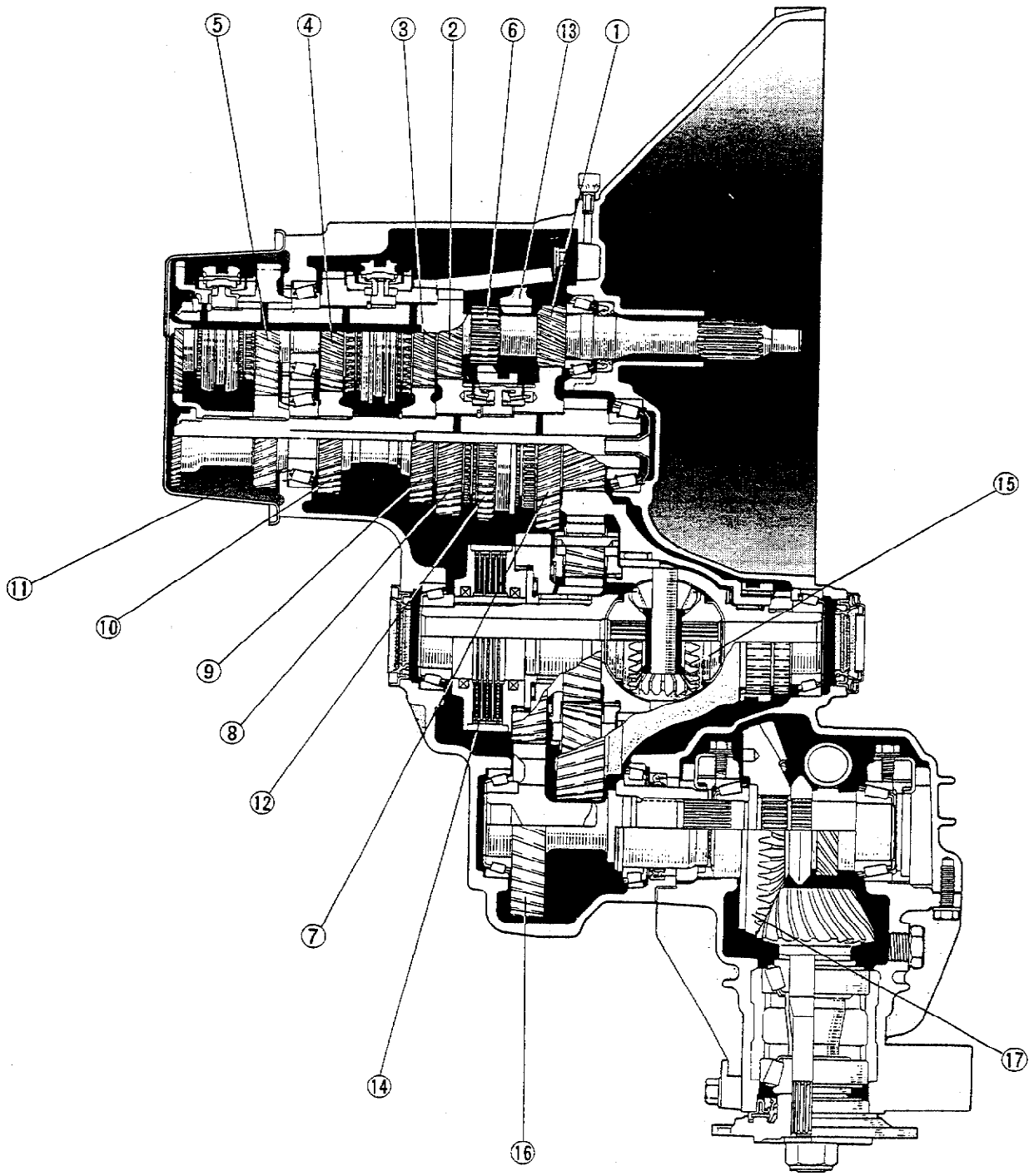
Transfer Carrier

Number of teeth	Ring gear	37
	Pinion gear	11
Oil	Type	API service GL-5 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)

93G0J3-776

STRUCTURAL VIEW

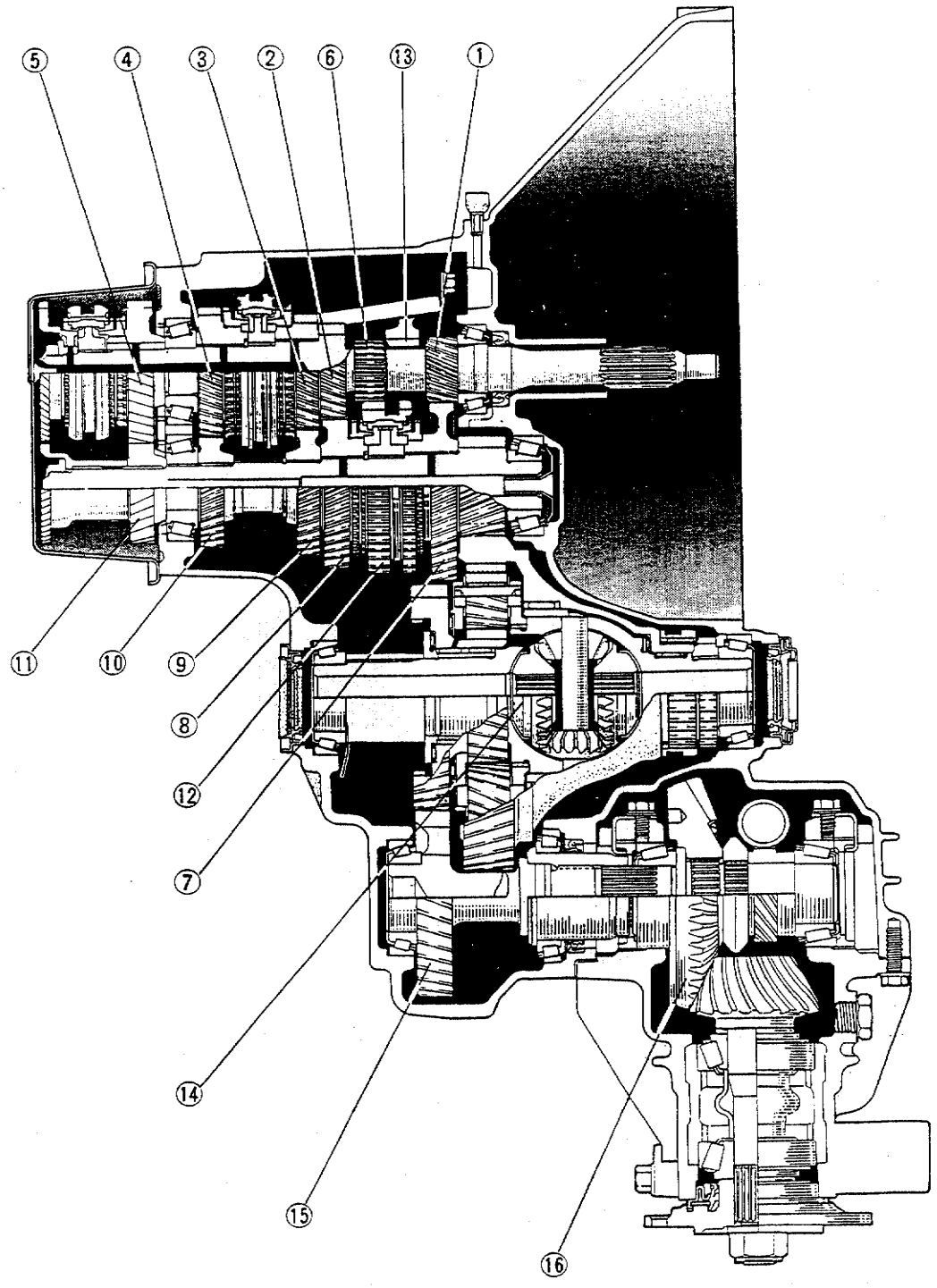
BP DOHC TURBO



93G0J3-706

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. Viscous coupling
15. Front and center differential assembly
16. Idler gear assembly
17. Transfer carrier assembly

BP SOHC



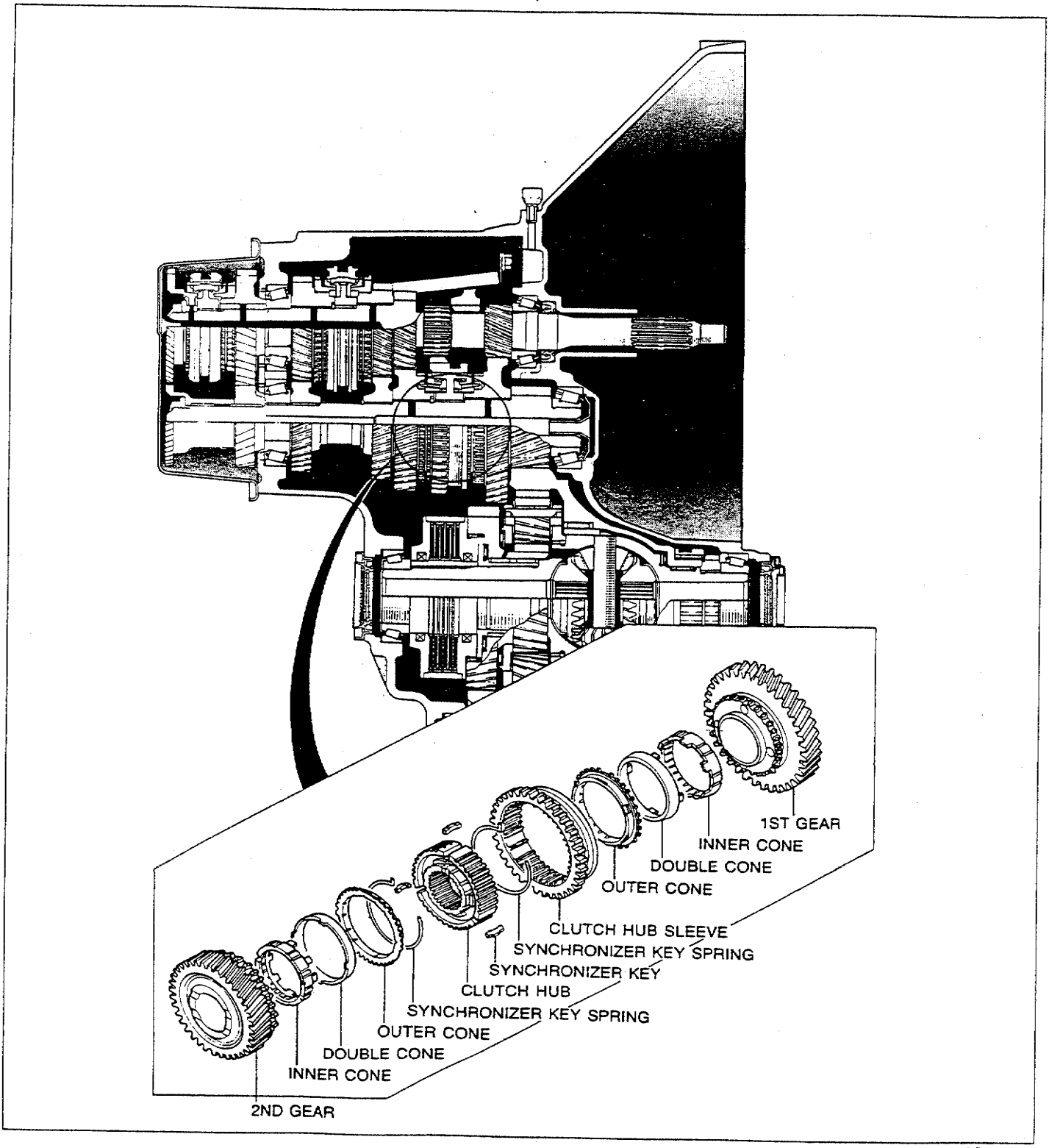
93G0J3-707

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

TRANSAXLE

DOUBLE CONE SYNCHRO MECHANISM

- The double cone synchro mechanism is employed for 1st and 2nd gears on the BP DOHC turbo model of the G5MX-R type transaxle in order to shorten the synchro time and to lessen the force required to shift the transmission.
- The adoption of the double cone synchro mechanism also makes possible a more compact configuration and a greater synchro capacity.
- The double cone synchro mechanism is composed of the outer cone, the double cone, the inner cone, and the inner cone hub.



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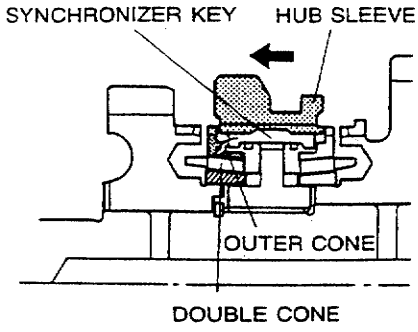
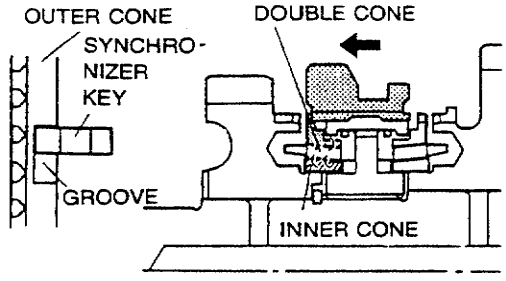
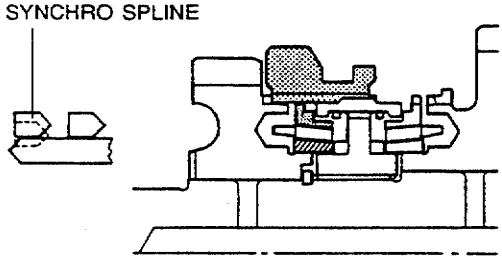
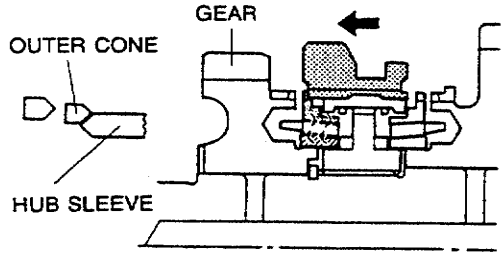






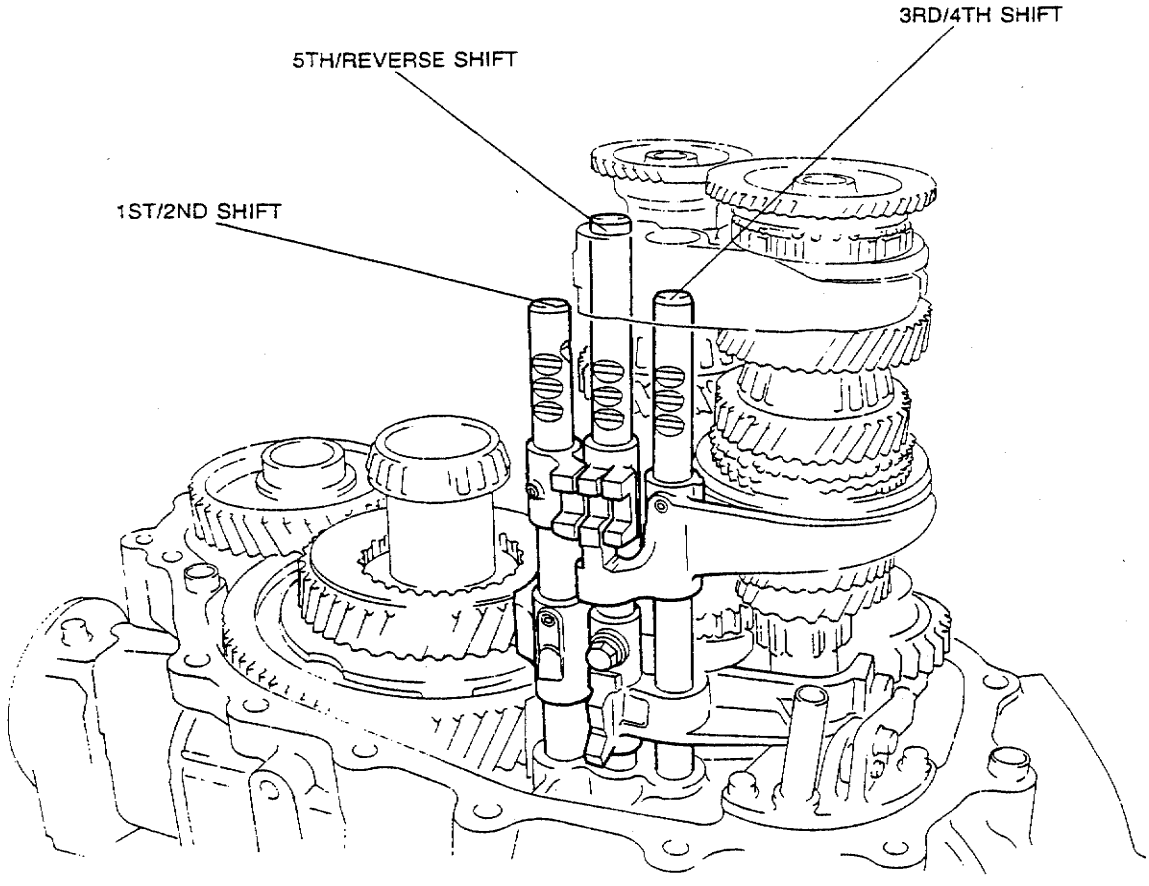


96E0J2-007

Operation Description

1. When the hub sleeve moves leftward (in the direction of the arrow), the synchronizer key presses against the outer cone.
2. As the hub sleeve moves leftward, the key causes friction to be produced between the outer cone, double cone, and inner cone, with the result that the outer cone turns by the amount of the gap of the key channel. Consequently, the teeth of the hub sleeve and the outer cone are aligned. As the hub sleeve continues moving, the friction between the cones becomes greater, and the difference of the rotational speeds of the outer cone, the inner cone and the double cone (unified with gear) gradually disappears.
3. The hub sleeve then moves up onto the synchronizer key, and engages the outer cone.
4. The hub sleeve then engages the synchro teeth of the gear to complete the shift.

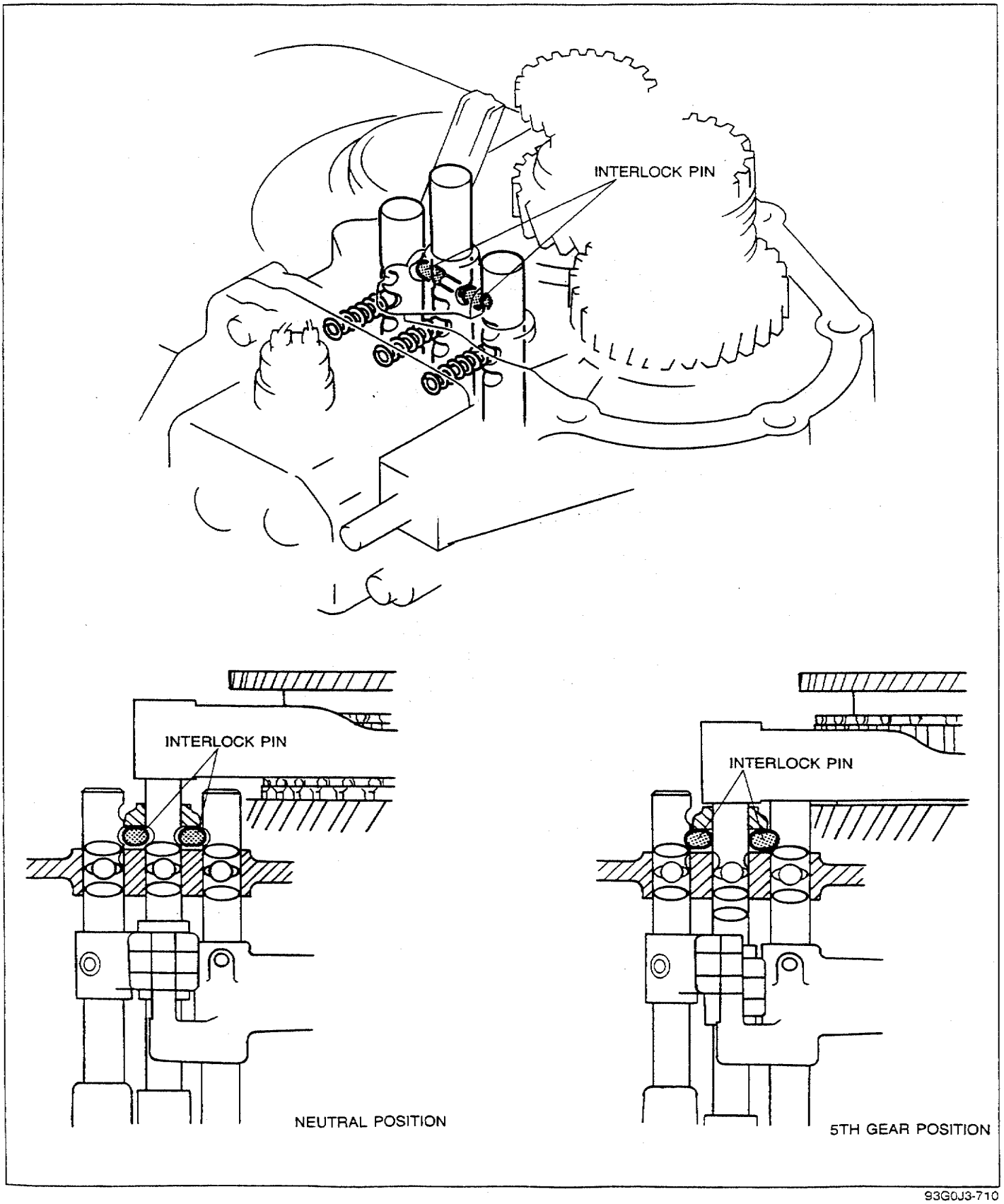
SHIFT FORKS AND SHIFT RODS



93G0J3-709

To assure smooth shifting, there are three separate shift rods for activation of 1st-2nd, 3rd-4th, and 5th-Rev shifts.

INTERLOCK MECHANISM

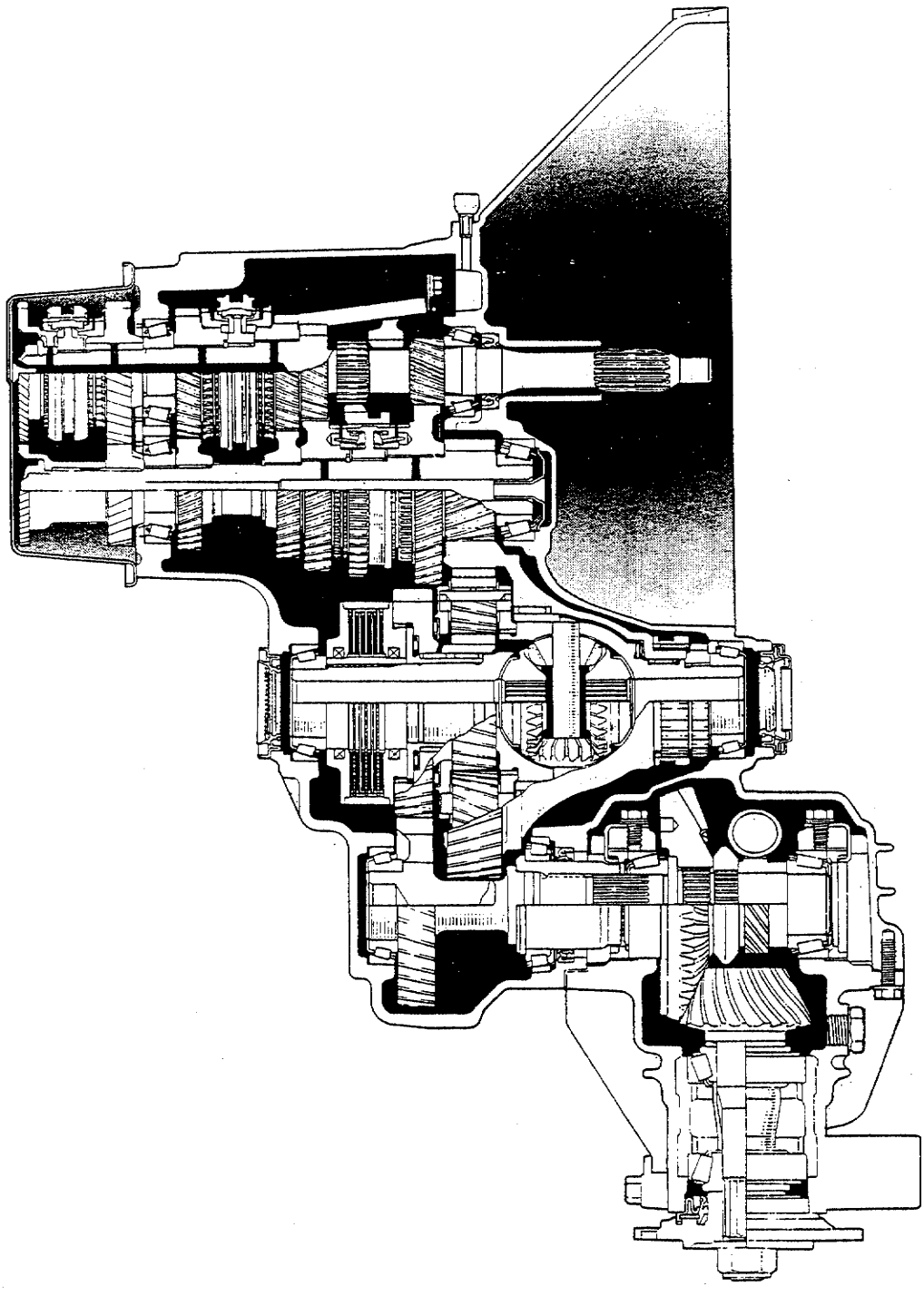


93G0J3-710

A pin type of interlock mechanism is used.
It is designed so that as one rod is moved, it pushes the interlock pins out and prevents the other rods from moving.

TRANSFER UNIT

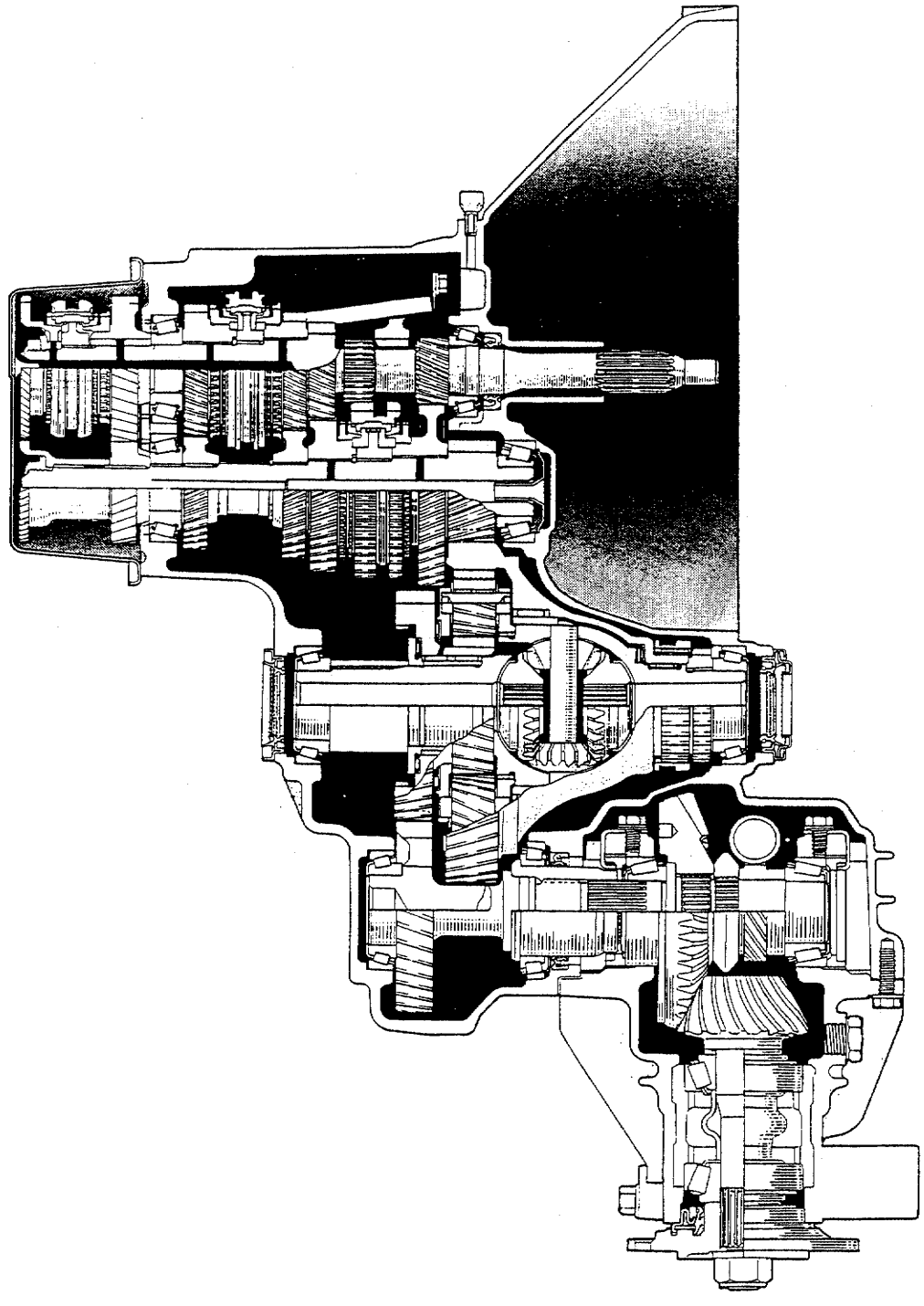
BP DOHC TURBO



93G0J3-711

The transaxle and transfer unit carry out two separate functions, that of transmission of power and separation of power.
The transfer unit consists of; the center differential which separates the flow of power 43/57 front and rear and also compensates for the speed differential of the front and rear differentials, the viscous coupling which interlocks the front and rear axles under slippery road conditions, the front differential which drives the front wheels, and the transfer carrier to drive the rear wheels through the rear differential.

BP SOHC

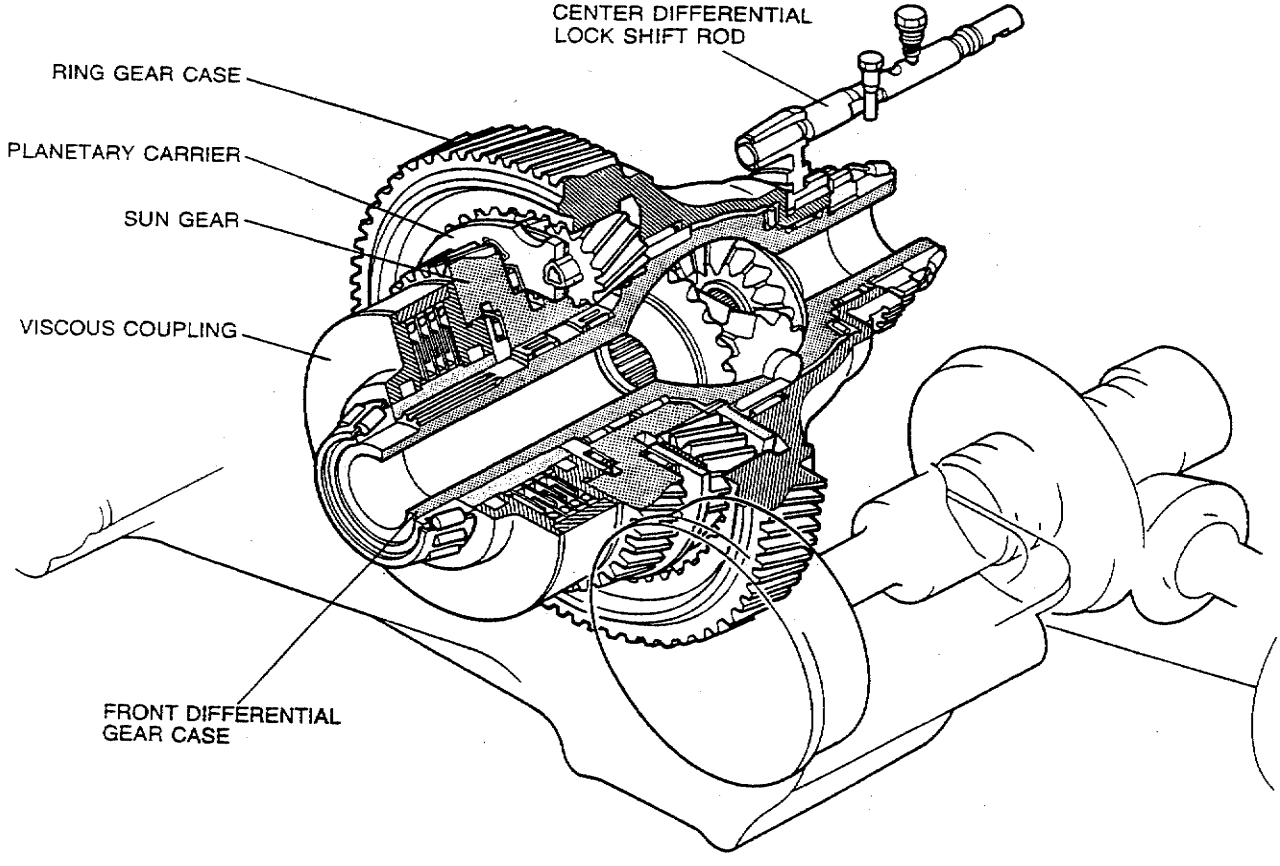


93G0J3-712

The transaxle and transfer unit carry out two separate functions, that of transmission of power and separation of power.
The transfer unit consists of; the center differential which separates the flow of power 50/50 front and rear and also compensates for the speed differential of the front and rear differentials; the front differential which drives the front wheels; and the transfer carrier to drive the rear wheels through the rear differential.

CENTER DIFFERENTIAL

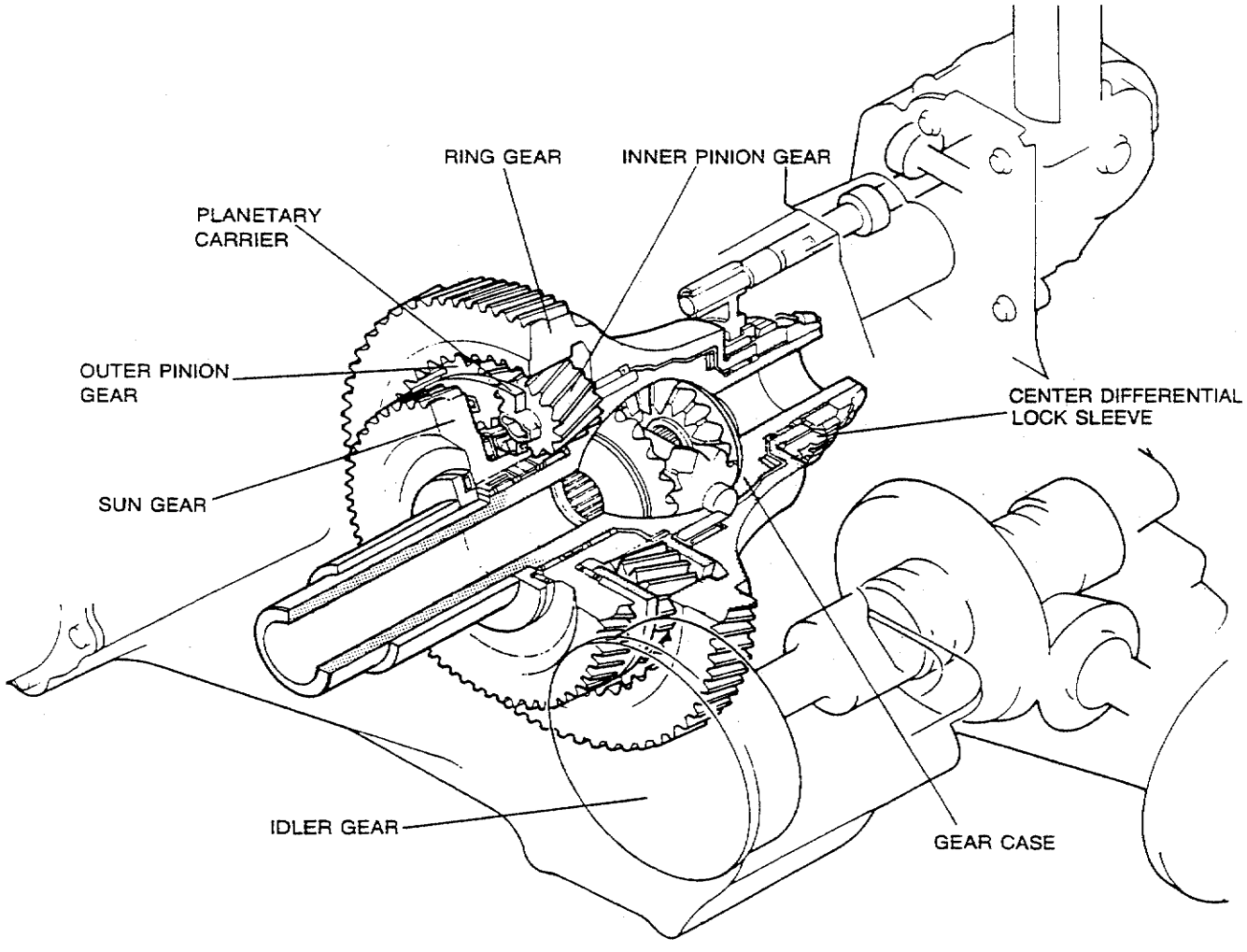
BP DOHC TURBO



96E0J2-012

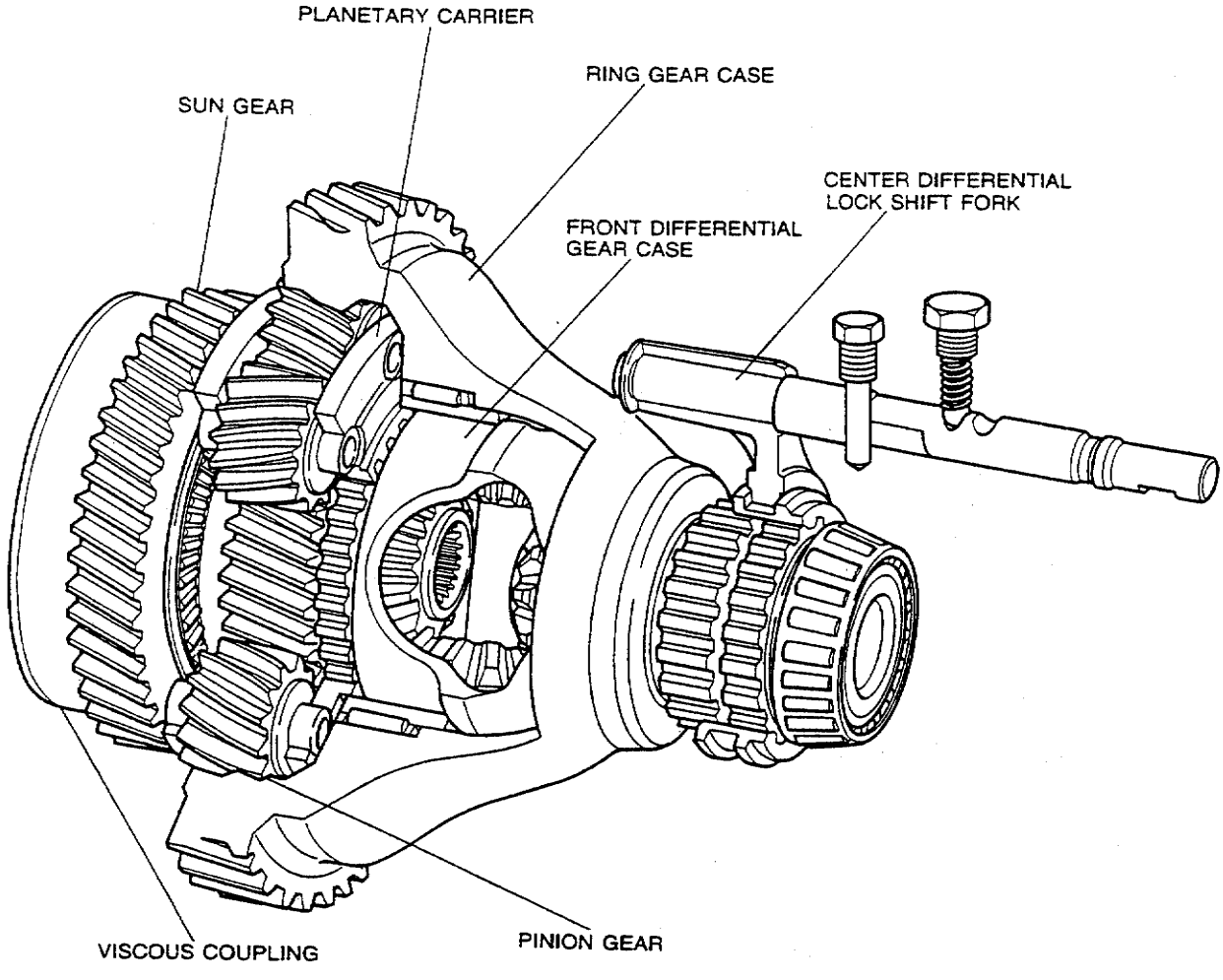
The center differential is composed of the ring gear, planetary carrier, pinion gears, sun gear, viscous coupling, and front differential gear case.
The outer teeth of the ring gear mesh with the final gear of the transaxle secondary shaft, and the ring gear inner teeth mesh with the outer pinion gears of the planetary carrier.
The center differential lock sleeve slides on the other end of the ring gear case.
There are three sets of pinion gears (each set consisting of one outer pinion gear and one inner pinion gear) spaced at regular intervals. The outer pinion gears mesh with the inner teeth of the ring gear, and the inner pinion gears mesh with the sun gear. The outer and inner pinion gears also mesh with each other.
The outer teeth of the viscous coupling mesh with the sun gear, and the inner teeth of the viscous coupling mesh with the front differential gear case.

BP SOHC



93G0J3-713

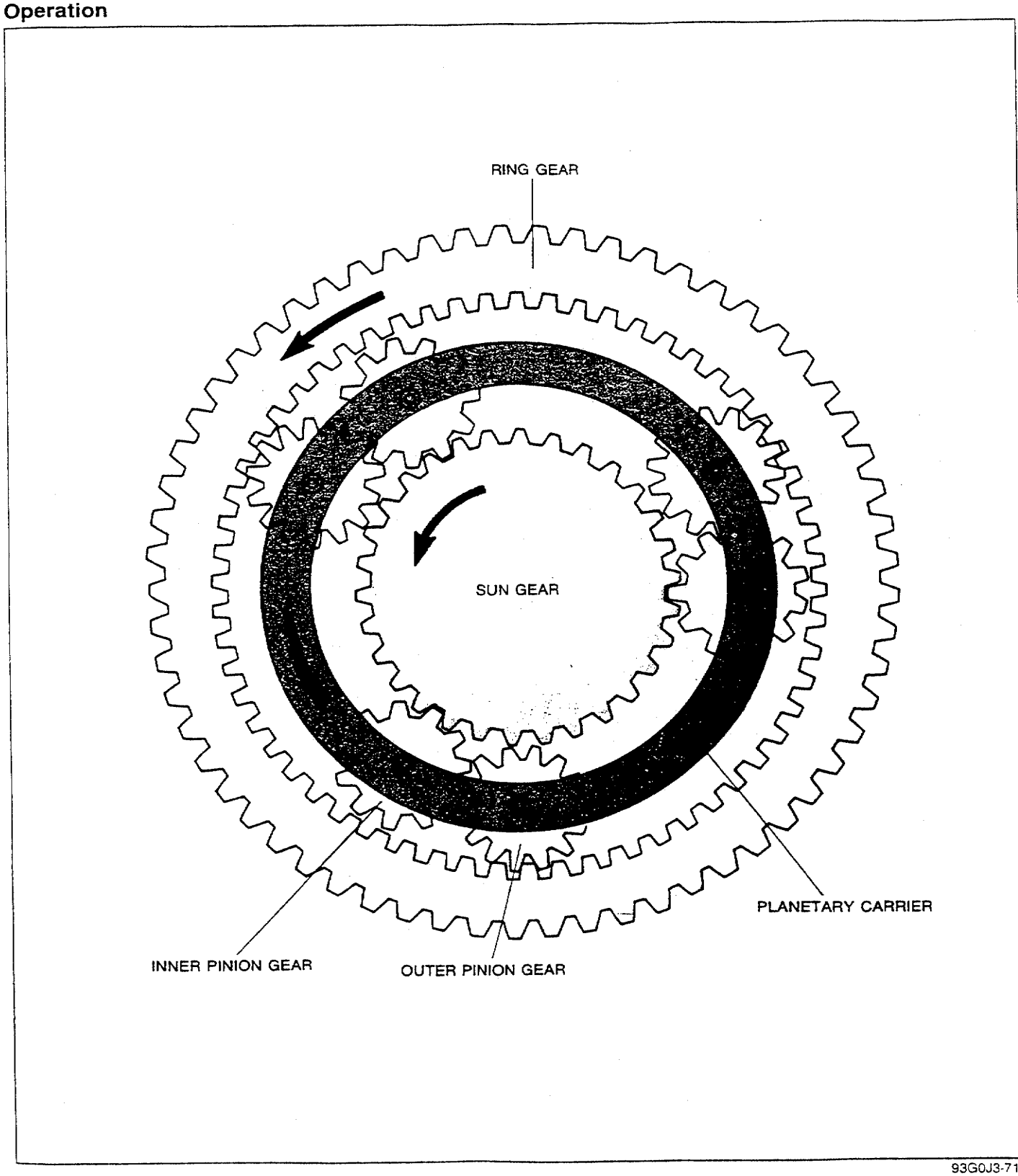
The center differential is composed of the ring gear, planetary carrier, pinion gears, sun gear, and front differential gear case.
The outer teeth of the ring gear mesh with the final gear of the transaxle secondary shaft, and the ring gear inner teeth mesh with the outer pinion gears of the planetary carrier.
The center differential lock sleeve slides on the other end of the ring gear case.
There are three sets of pinion gears (each set consisting of one outer pinion gear and one inner pinion gear) spaced at regular intervals. The outer pinion gears mesh with the inner teeth of the ring gear, and the inner pinion gears mesh with the sun gear. The outer and inner pinion gears also mesh with each other.



93G0J3-714

In addition, the planetary carrier is coupled to the front differential gear case and can be manually locked to the ring gear case by the center differential lock sleeve.
The sun gear is meshed with the inner pinion gears of the planetary carrier. The other side of the sun gear provides power to the rear differential through the idler gear, transfer carrier, and propeller shaft. The ring gear is the input driving force, and the output forces are the planetary carrier (front differential) and the sun gear (rear differential).

Operation

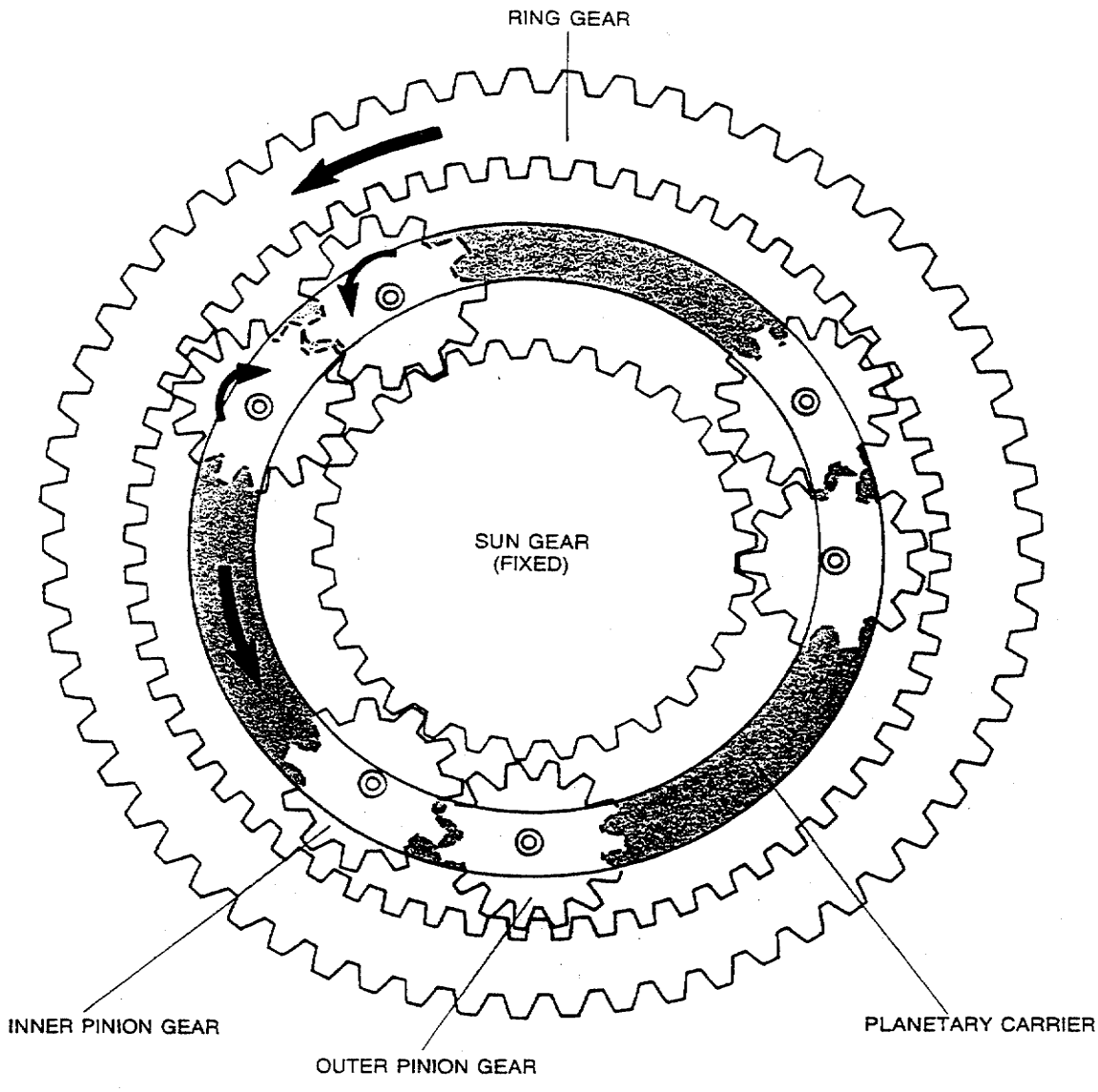


93G0J3-715

During straight-ahead travel

Driving force from the engine is transmitted from the final gear of the transaxle secondary shaft to the ring gear of the center differential, causing the ring gear to rotate.

Because the speed of the front and rear wheels are the same during straight-ahead travel, the planetary carrier (output force to the front wheels) and the sun gear (output force to the rear wheels) act united (fixed condition) and rotate together with the ring gear.



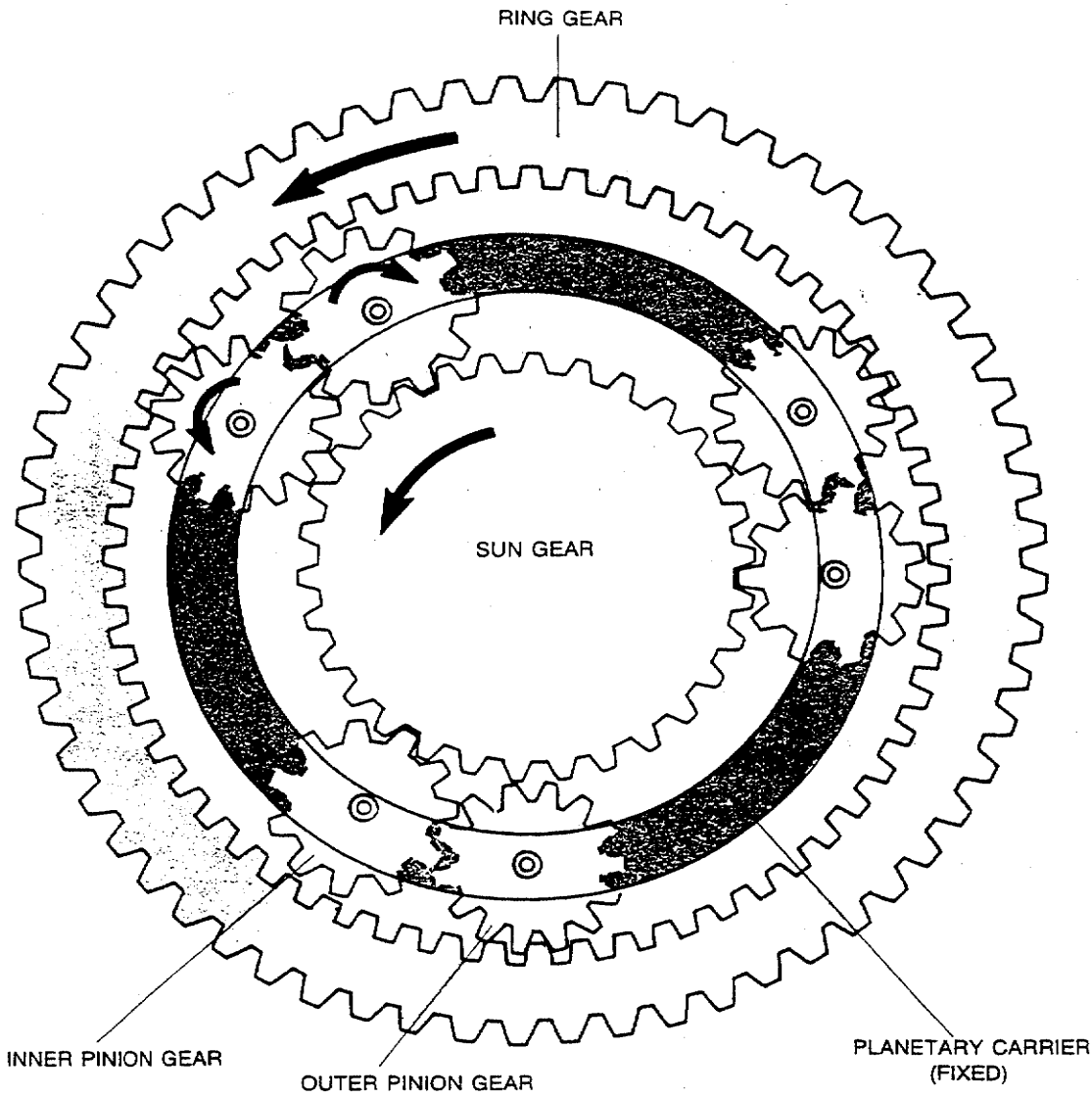
93G0J3-716

Front wheel speed greater than rear wheels

The speed of the sun gear (output force to the rear wheels) is less than that of the planetary carrier (output force to the front wheels), thus it is effectively fixed.

As a result, the outer pinion gears rotate clockwise and the inner pinion gears rotate counterclockwise, thus rotating the planetary carrier counterclockwise.

In this way, the center differential absorbs the speed difference between the front and rear wheels and the driving force is distributed uniformly to the front and rear differentials.

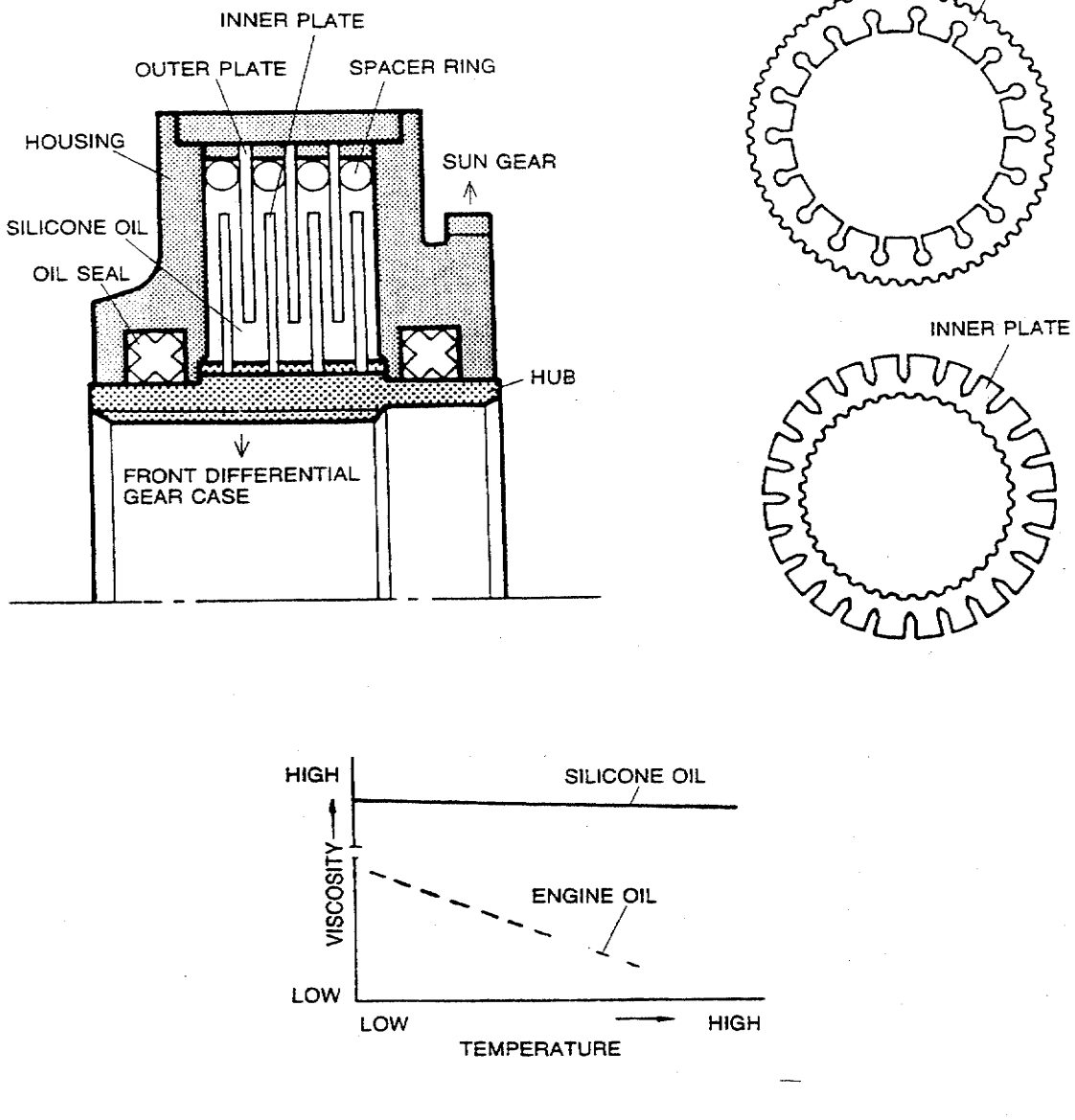


93G0J3-717

Rear wheel speed greater than front wheels

The speed of the planetary carrier (output force to front wheels) is less than that of the sun gear (output force to rear wheels), thus effectively becoming fixed. As a result, the outer pinion gears rotate counterclockwise and the inner pinion gears rotate clockwise, rotating the sun gear counterclockwise.

VISCOUS COUPLING (BP DOHC TURBO)



93G0J3-718

Operation

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 viscous coupling automatically causes the center differential to lock so that the front and rear axles are interconnected, and driving force is transmitted to all wheels.

Construction

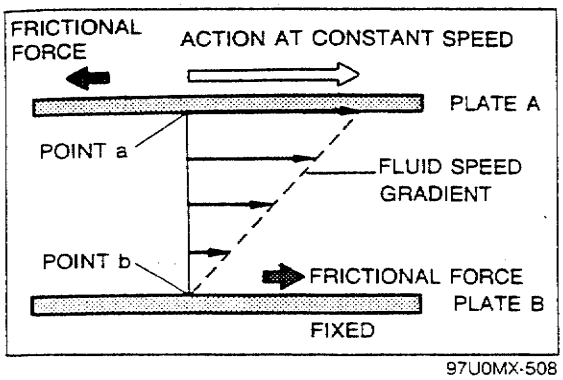
The viscous coupling consists of a number of thin steel inner and outer plates and high-viscosity silicone oil. The outer plates couple the housing and the spline.
The housing, via the sun gear and transfer carrier, is linked to the rear wheels.
Between the outer plates are spacer rings. The inner plates are coupled to the hub, and the hub, via the front differential gear case and the driveshafts, is linked to the front wheels.
The inner plates can move side to side on the hub.
The slots in the plates create shearing of the silicone oil and cause a fluid coupling effect.
The viscous coupling unit is sealed by heat- and pressure-resistant oil seals, and is not rebuildable.

Characteristics of Silicone Oil

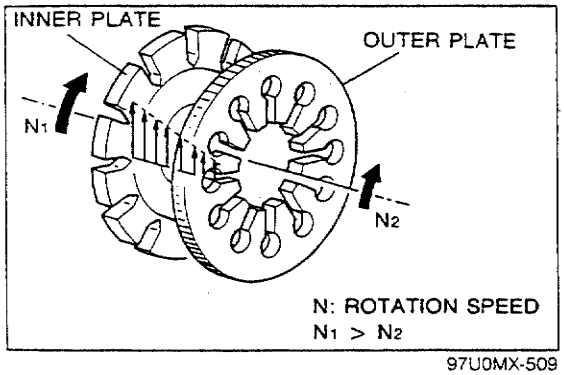
1. Viscosity changes little relative to temperature.
2. Expands greatly relative to temperature.
3. Viscosity change small relative to shearing.

The viscous coupling housing is filled to 80% to 90% of full with silicone oil.

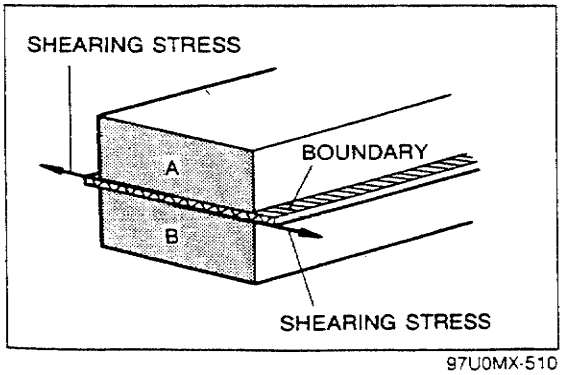
93G0J3-719



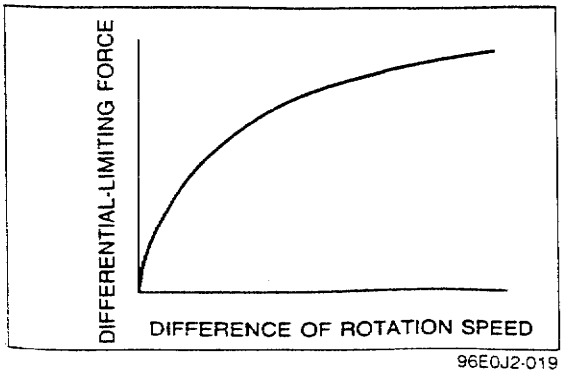
97U0MX-508



97U0MX-509



97U0MX-510



96E0J2-019

Principle of Operation

Suppose that there is fluid between two parallel plates (A and B), and that plate B is fixed and plate A moves in parallel at a constant speed. The molecules of the fluid that contact the plates at points a and b adhere to the plates, and for that reason the fluid at point a moves at the same speed as plate A, and at point b the fluid speed remains 0.
Because the fluid has a certain viscosity, a related degree of force is required to move plate A.
Seen another way, because of the difference in the speed of plates A and B, shearing stress* is produced within the fluid, and an equal frictional force is caused to act upon plate A, acting as resistance trying to impede its movement. At the same time, this fluid-generated frictional force also acts upon plate B in the opposite direction.

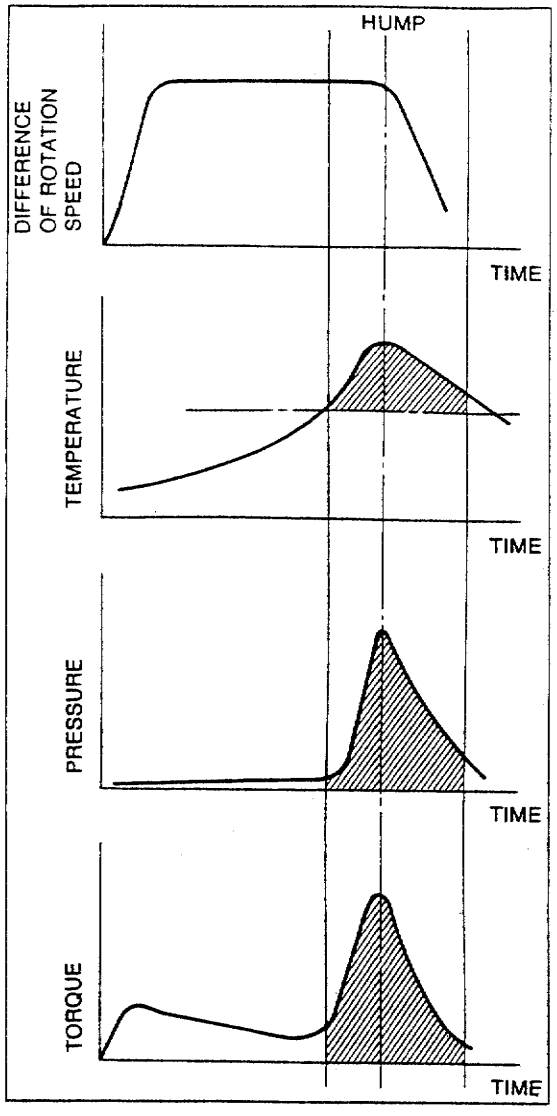
How, then, does this principle apply to the viscous coupling unit? Suppose, for example, that the rotational speed of the inner plate is, as shown in the illustration, faster than that of the outer plate. Because there is a speed difference between the two plates, shearing stress is produced in the silicone oil, and an equal frictional force acts upon the faster-turning inner plate as resistance. This resistance becomes differential-limiting torque. This frictional force then also acts upon the slower-turning outer plate (in the opposite direction), thus increasing its rotational speed.

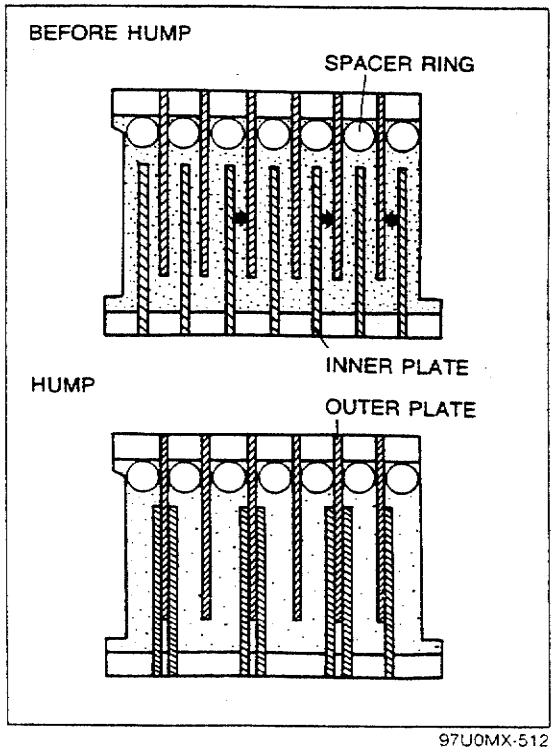
* **Shearing stress**
Consider fluid (A and B) held in extremely close proximity to each other, and further suppose that the speed at which A moves is faster than the speed at which B moves. There is, consequently, a mutual "sliding" that occurs at the boundary layer between A and B, and, in the same manner as when two rough solid surfaces slide against one another, a force acts to hinder the mutual parallel sliding at the boundary. This force per unit surface area at the boundary is known as shearing stress.

Operation

Power transmission at normal mode

In normal use, differential-limiting force (driving force) is transmitted according to the difference in the rotational speed of the front and rear wheels.





97U0MX-512

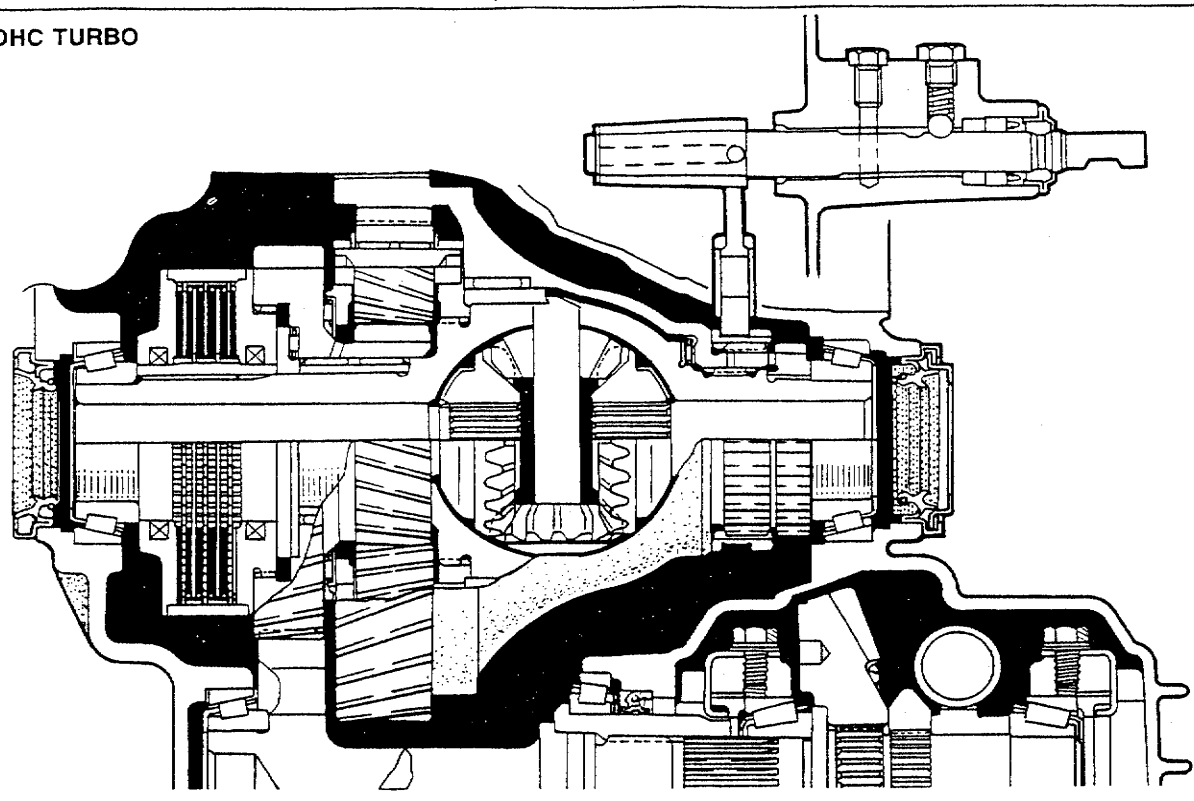
Power transmission at hump mode

When the rotational speed continues at a fixed amount over a period of time (i.e. one wheel in mud), an increase in transmission of power occurs suddenly. This called the "hump phenomenon." The figure shows the relationship of time and the hump phenomenon. What happens is, as the silicone oil is sheared by the plates, its temperature increases, suddenly breaking down the air bubbles in the oil. As the air bubbles break down, the oil expands and causes the inner plates to move and contact the outer plates. Because torque transmission occurs as a result of the friction between the plates, the transmitted torque increases suddenly (hump mode). In the hump mode, as the rotational speed of the plates equalizes, the oil temperature falls, and the inner plates again move away from the outer plates. There is, then, a return to the original torque transmission according to the silicone oil viscosity.

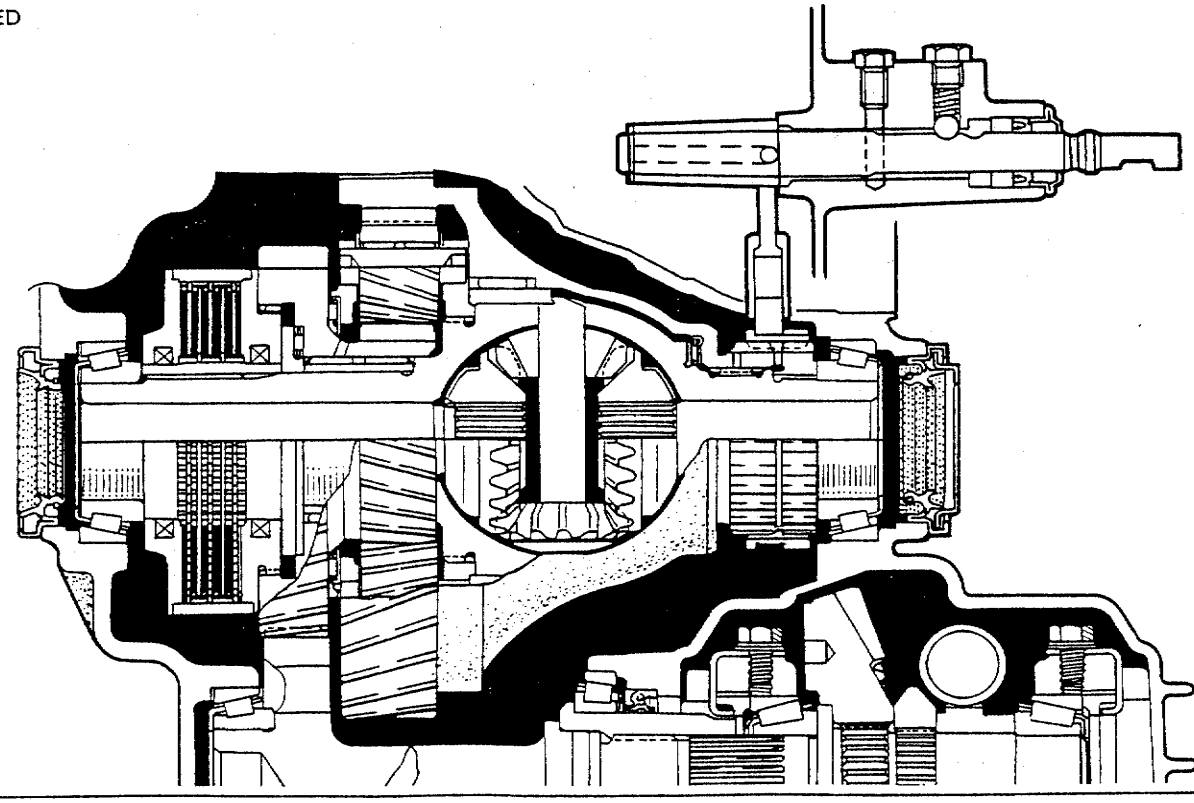
CENTER DIFFERENTIAL LOCK SYSTEM (MANUAL)

BP DOHC TURBO

FREE



LOCKED

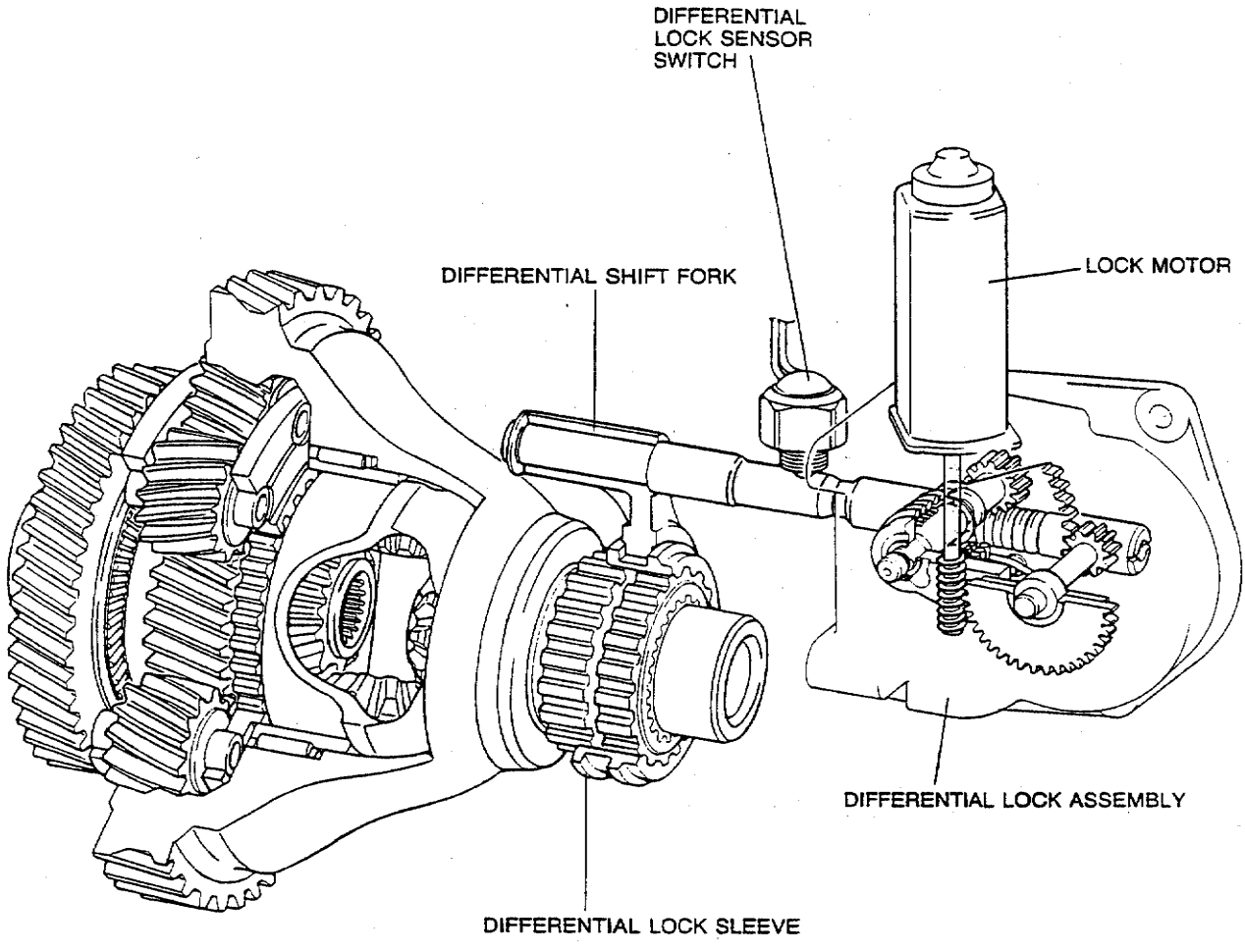


96E0J2-020

The center differential should not be locked for normal driving.
If the vehicle is to be tested on a speedometer tester or a chassis dynamometer, the propeller shaft must be removed to prevent the vehicle from jumping off the tester. And, because the propeller shaft is removed, the center differential must be manually locked to provide power to the front wheels.
The center differential is manually locked by pulling the differential lock rod outward.

CENTER DIFFERENTIAL LOCK SYSTEM (ELECTRICAL)

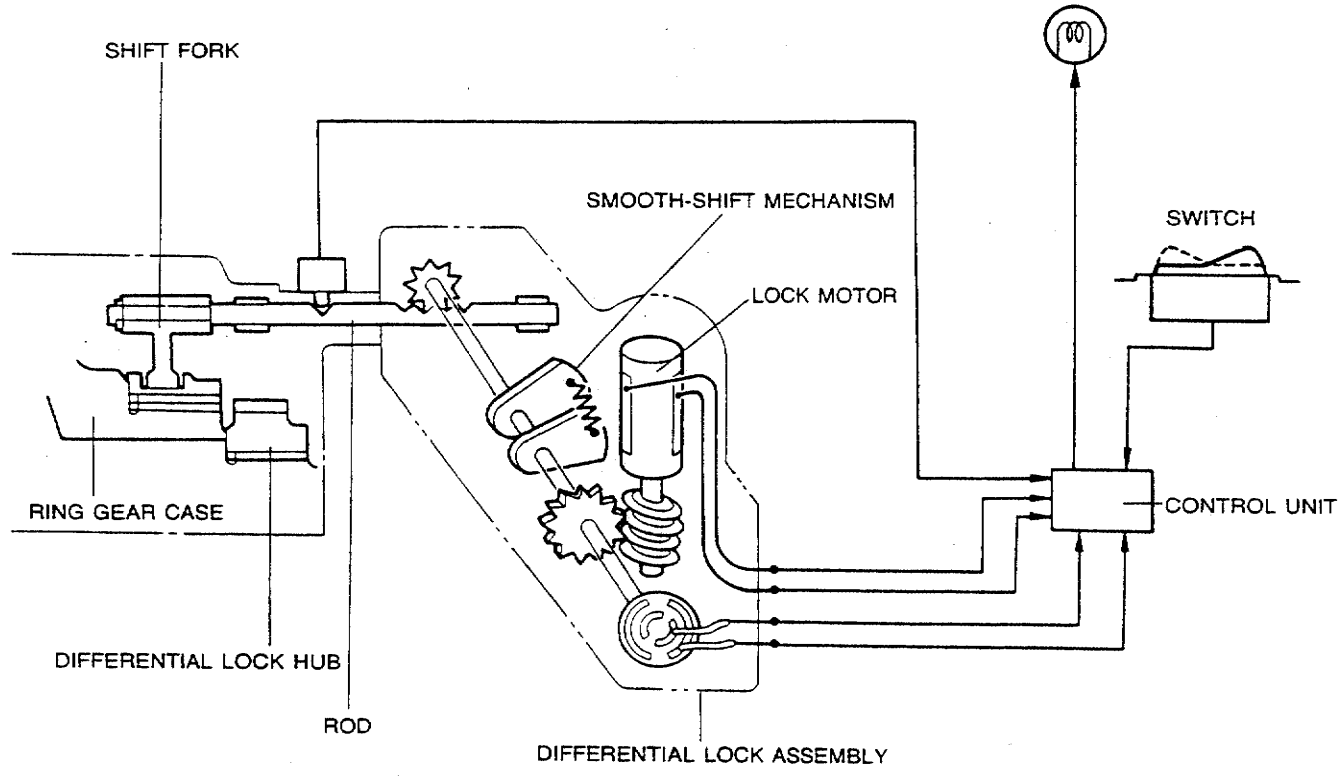
BP SOHC



93G0J3-720

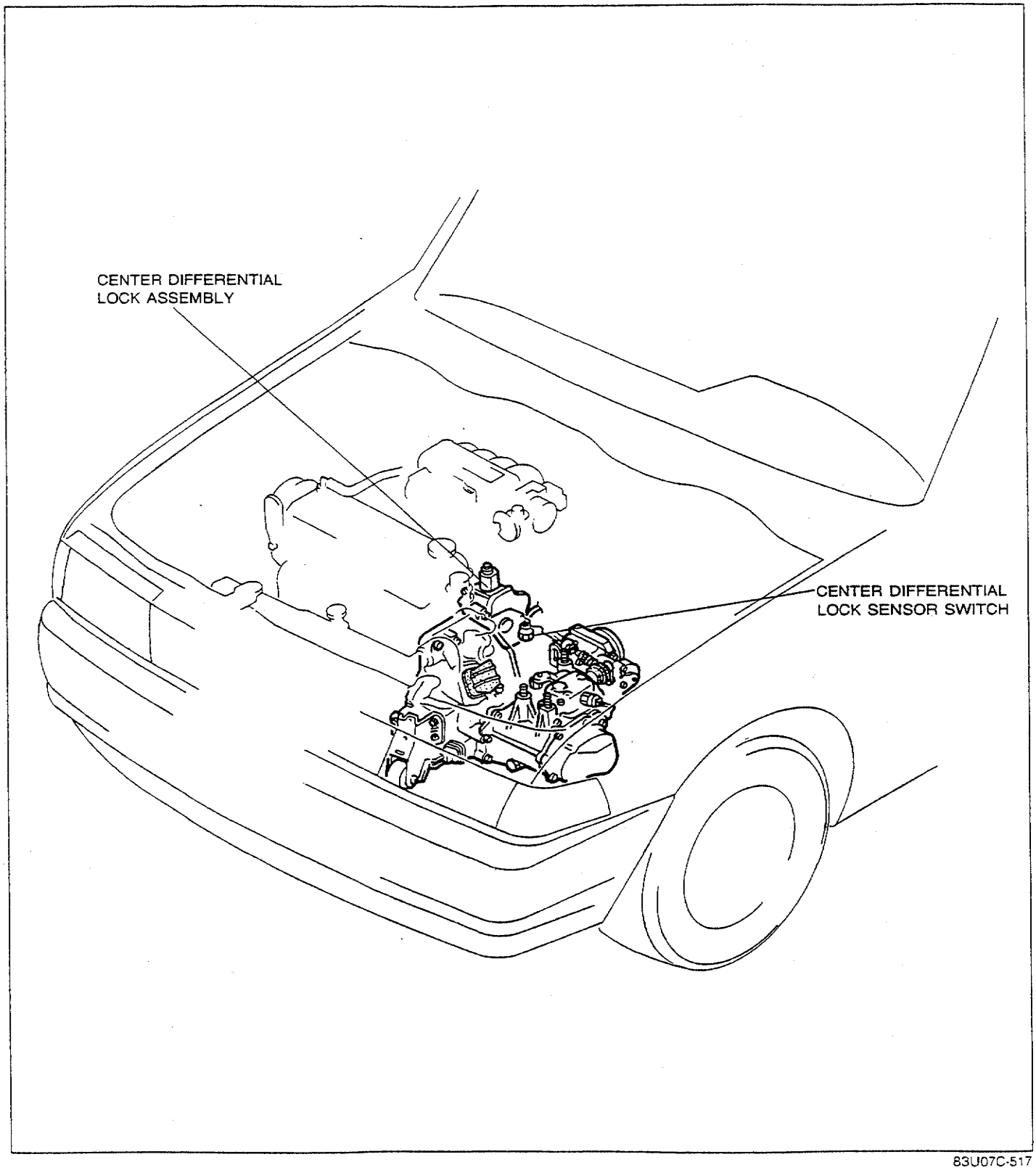
This system is composed of the control switch, motor, differential lock sensor switch, shift fork and lock sleeve.
Ordinary driving is done in the free condition. If the vehicle encounters very slippery conditions and one wheel starts to spin, the center differential absorbs the speed difference and 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.
Locking and unlocking of the differential is controlled by a switch located in the console.

Operation



93G0J3-721

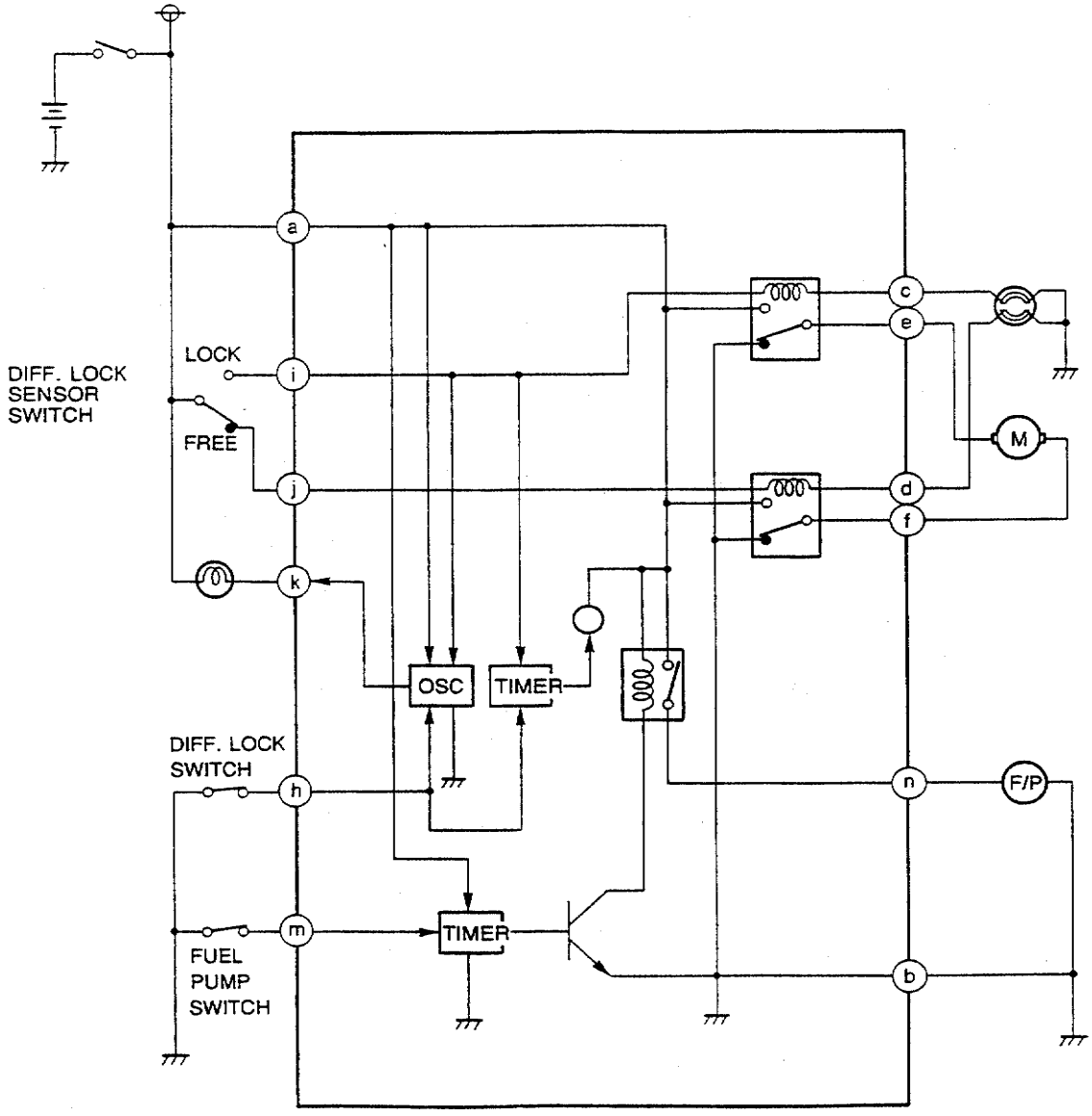
When the control switch is in the free position, the lock sleeve is held in by the shift fork. The ring gear case is not splined to the differential lock hub, and is free to rotate.



83U07C-517

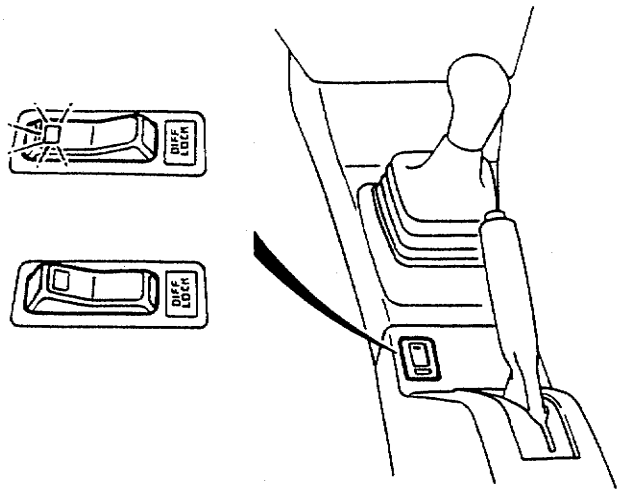
When the control switch is switched ON, the motor rotates and pulls the rod and shift fork toward the motor. The shift fork slides the lock sleeve on the ring gear case and engages the differential lock hub. The ring gear and gear case are then locked together.
The smooth-shift mechanism, built into the differential lock assembly, is a spring unit which allows smooth engagement of the lock sleeve to the differential lock hub. When the sleeve is slid along the ring gear case to engage the hub, the teeth may not be properly aligned, preventing engagement. When this happens the spring unit holds pressure on the lock sleeve until it can engage.

Circuit Diagram

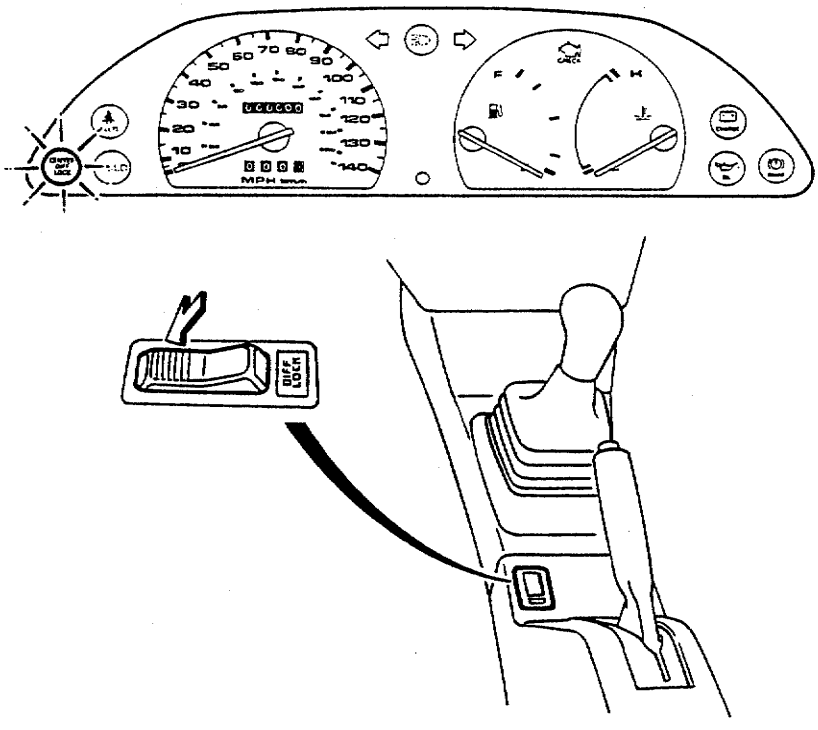


CENTER DIFFERENTIAL LOCK CONTROL SWITCH

LHD



RHD



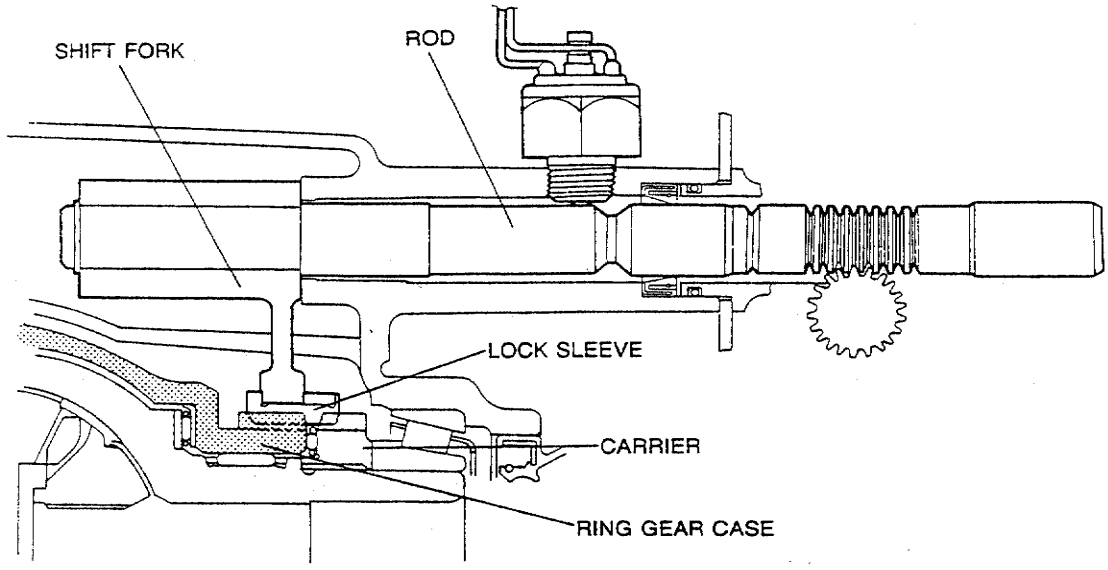
93G0J3-723

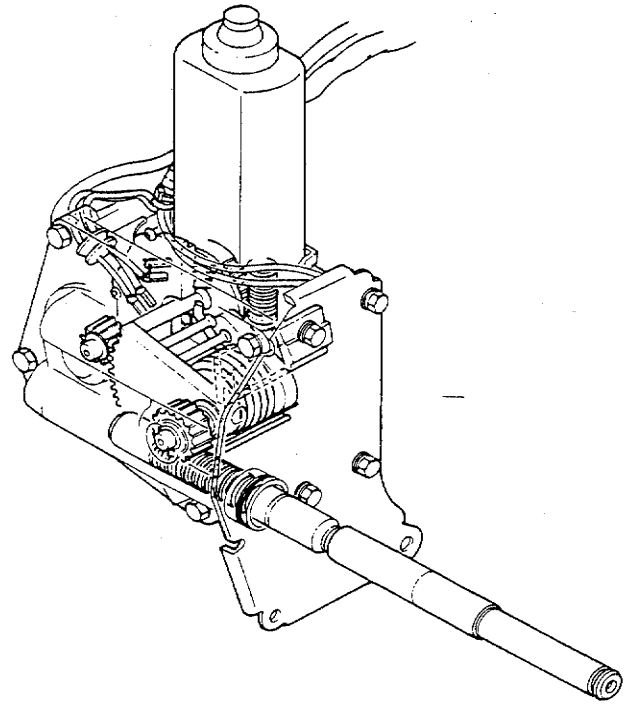
The center differential lock control switch is seesaw-type switch, and is located in the console.
The center differential is locked and freed by operation of the switch; the indicator shows the selected setting.

Operation

When the switch is pressed to set it to the "LOCK" position, the CENTER DIFF. LOCK indicator begins flashing. When the center differential becomes locked (the center differential lock sensor switch is ON), a "beep" sounds. At the same time, the lock indicator changes from flashing to steady illumination to indicate to the driver that the center differential is locked.
When the switch is again pressed to set it to the "FREE" position, the center differential is unlocked (the center differential lock sensor switch is OFF), and the lock indicator stops illuminating, thus indicating to the driver that the center differential lock has been released.

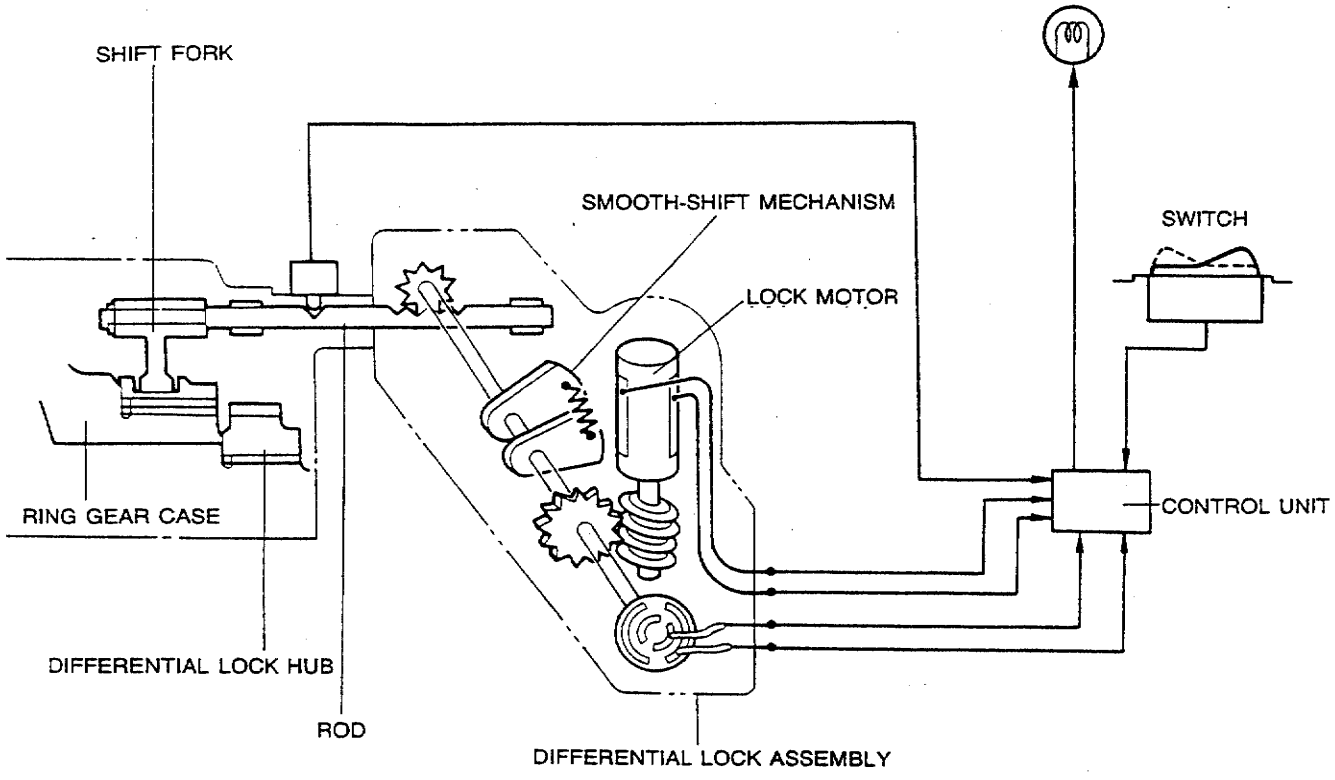
CENTER DIFFERENTIAL LOCK ASSEMBLY





93G0J3-724

The center differential lock motor is a rack and pinion type. It is located near the starter, mounted to the transfer unit. The motor is activated by the center differential lock control switch.

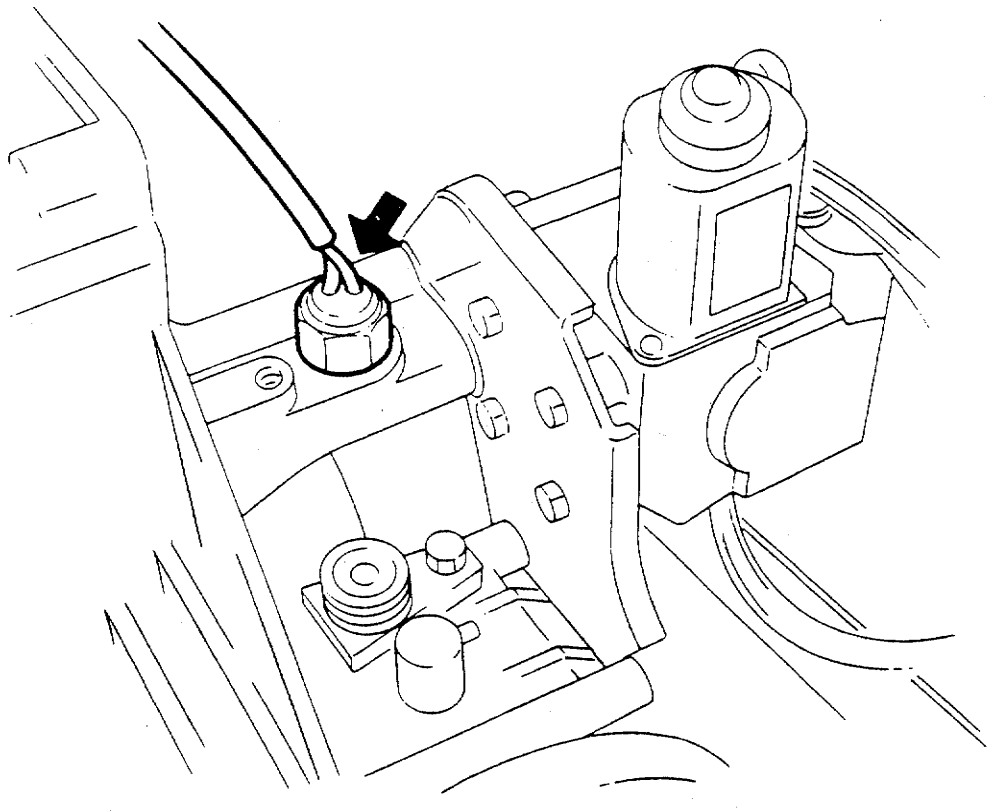


83U07C-518

Operation

When voltage is applied to the lock motor, the motor turns the worm gear, which in turn, turns the pinion through the smooth-shift mechanism.
The pinion gear causes the rod to slide depending upon the direction of rotation of the motor.
A contact cam plate is located within the lock motor assembly to cut the electrical power to the motor when the lock sleeve has reached its proper position.

CENTER DIFFERENTIAL LOCK SENSOR SWITCH

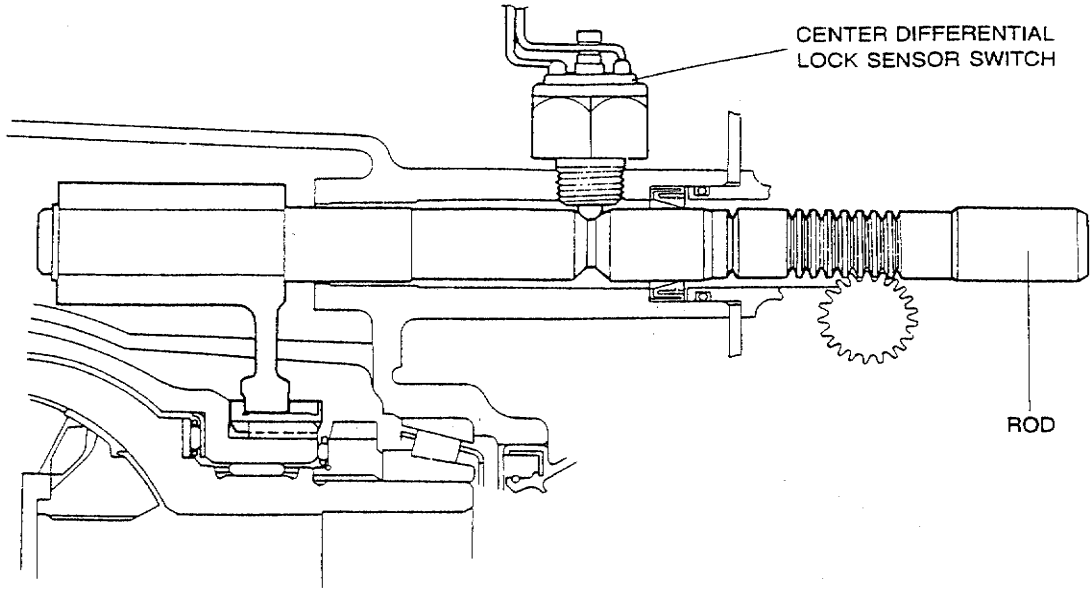


93G0J3-725

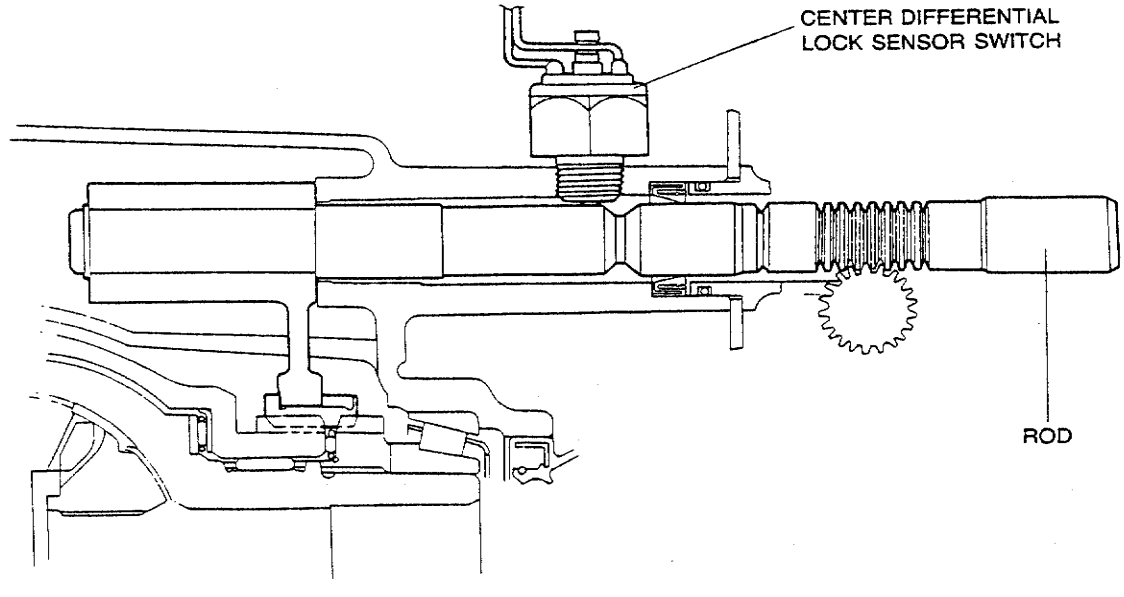
The sensor switch is an on-off switch. It is screwed into the clutch housing, near the center differential lock motor assembly. It detects the locked or free condition of the center differential.

Operation

FREE



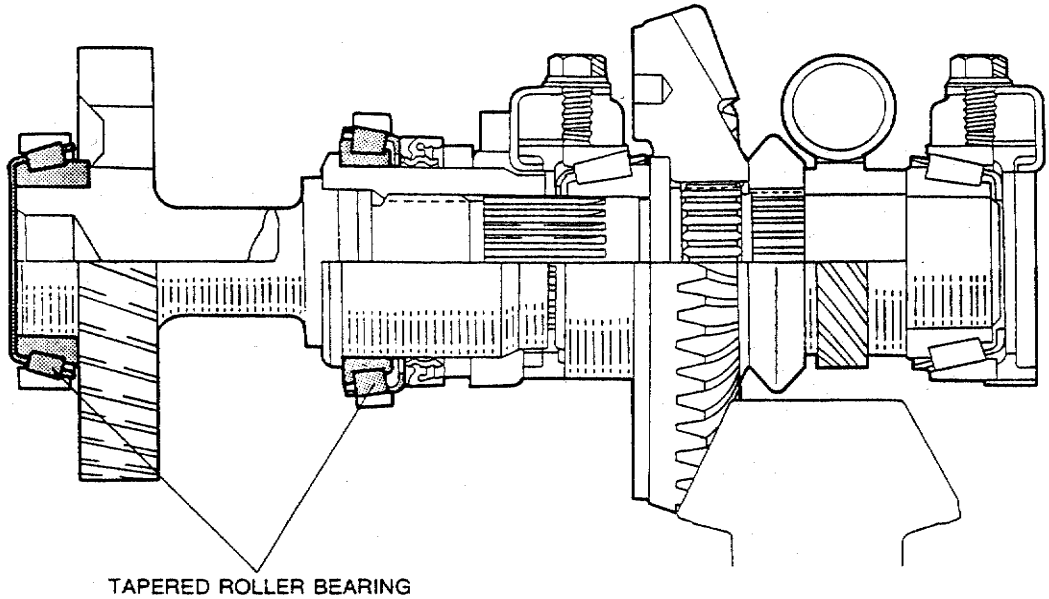
LOCK



93G0J3-726

With the center differential freed, the tip of the sensor switch is positioned in the detent of the center differential lock rod. The sensor switch is OFF.
When the lock rod slides to the locked position, the tip of the sensor switch is pushed out of the detent. The sensor switch is switched ON and the CENTER DIFF. LOCK indicator illuminates.

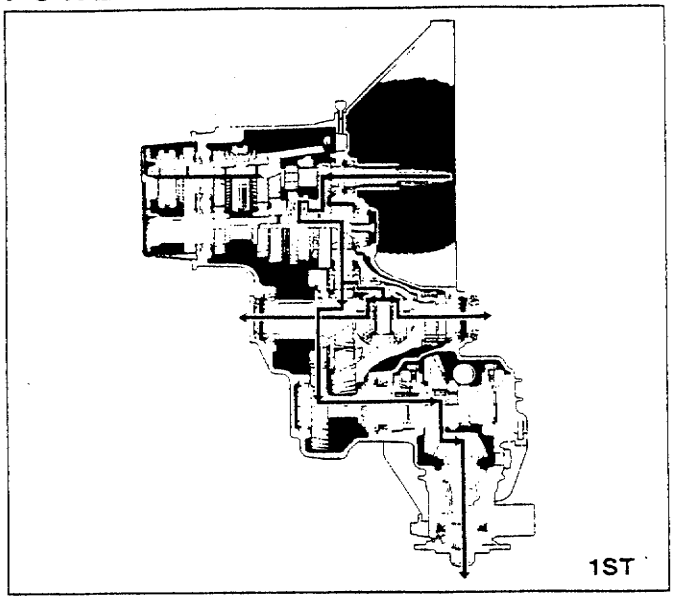
IDLER GEAR SHAFT

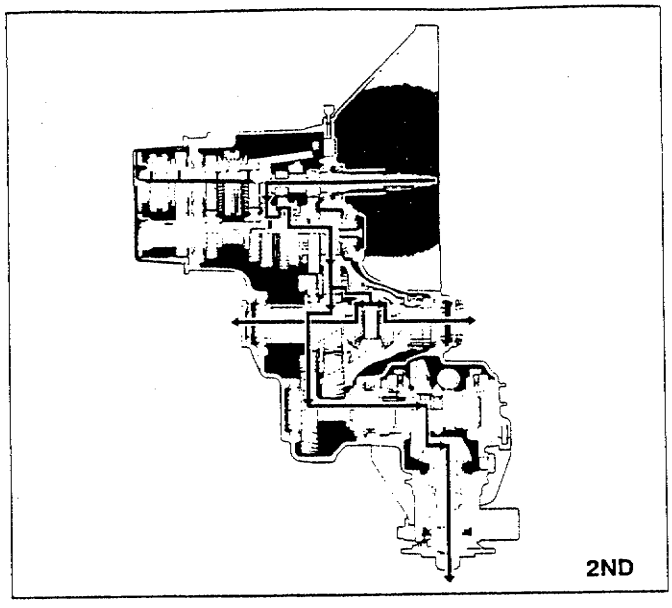


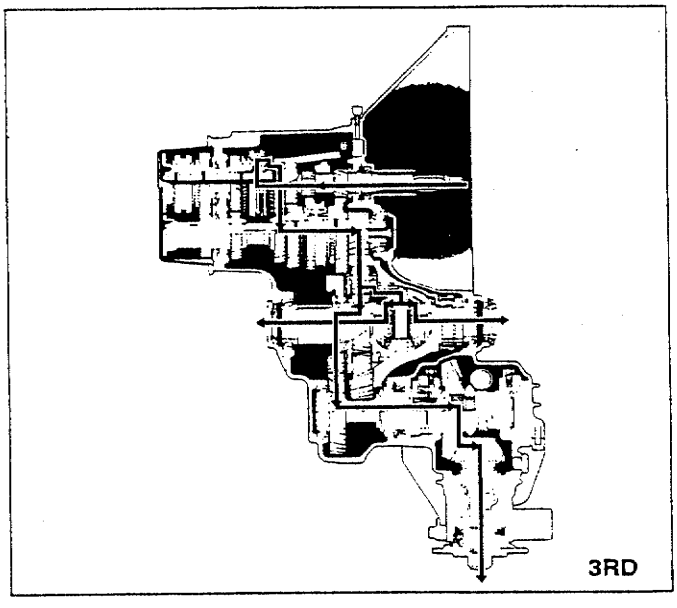
93G0J3-727

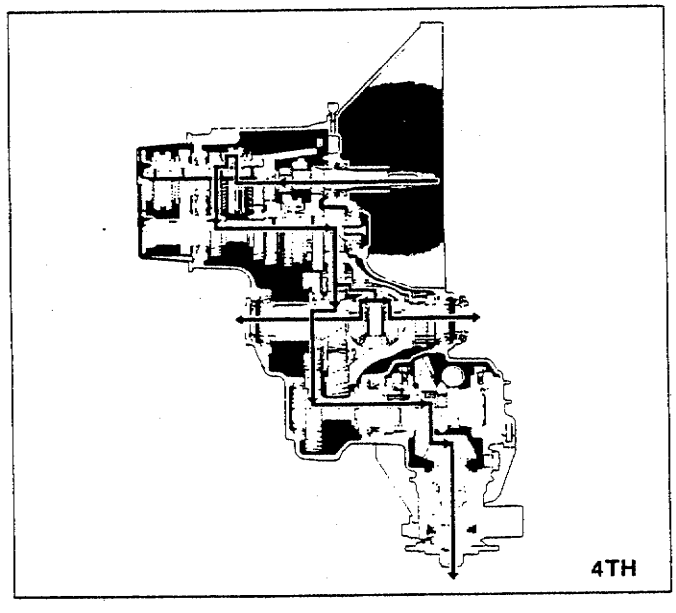
For improved transaxle reliability, a tapered roller bearing is newly fitted at the ring gear end of the idler gear shaft for better support; in addition, the previously fitted bearing is changed from a ball bearing to a tapered roller bearing.

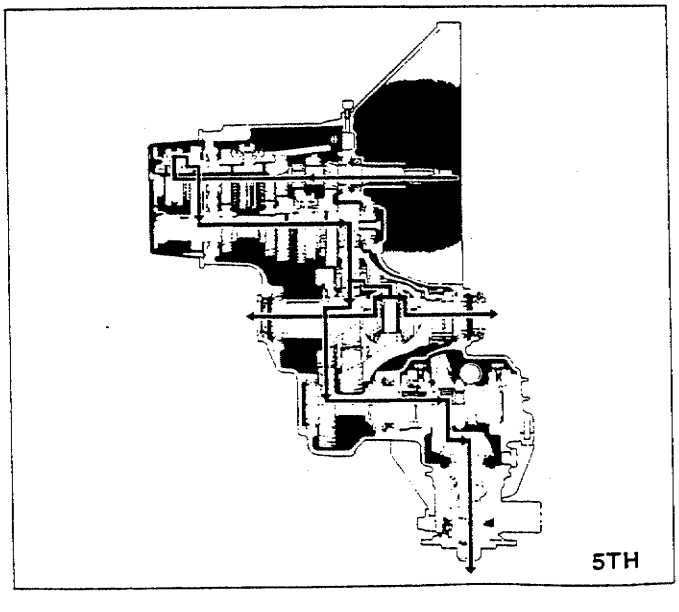
POWERFLOW

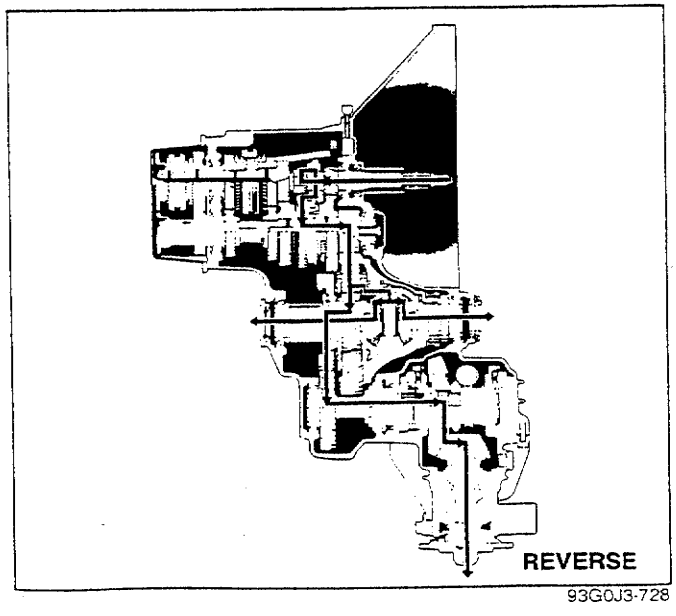










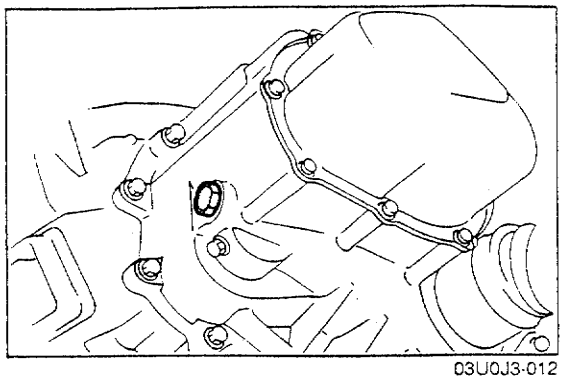


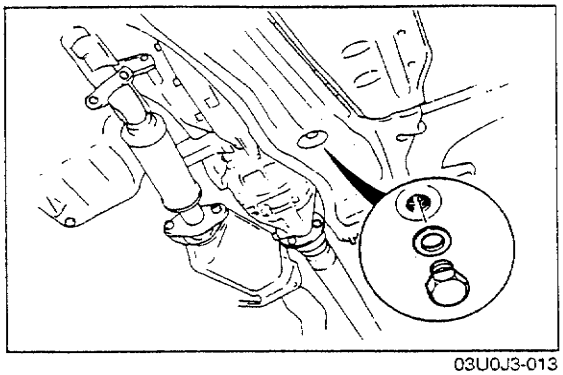
93G0J3-728

TROUBLESHOOTING GUIDE

Problem	Possible cause	Action	Page
Shift lever won't shift smoothly or is hard to shift	Worn change control cable	Replace	J3–119
Difficult to shift	Worn change rod	Replace	J3–119
	No grease in transaxle control	Lubricate	J3–119
	Insufficient oil	Add oil	J3–36
	Deterioration of oil quality	Replace with oil of specified quality	J3–36
	Wear or play of shift fork or shift rod	Replace	J3–48
	Worn synchronizer ring	Replace	J3–61, 63
	Worn synchronizer cone of gear	Replace	J3–61, 63
	Bad contact of synchronizer ring and cone of gear	Replace	J3–61, 63
	Excessive longitudinal play of gears	Replace	J3–61, 63
	Worn bearing	Replace	J3–61, 63
	Worn synchronizer key spring	Replace	J3–61, 63
	Excessive primary shaft gear bearing preload	Adjust	J3–99
	Improperly adjusted change guide plate	Adjust	J3–59
Won't stay in gear	Worn change control cable	Replace	J3–119
	Weak shift lever ball spring	Replace	J3–119
	Worn shift fork	Replace	J3–48
	Worn clutch hub	Replace	J3–61, 63
	Worn clutch hub sleeve	Replace	J3–61, 63
	Worn gear sliding part of both shaft gears	Replace	J3–61, 63
	Worn gear sliding part of each gear	Replace	J3–61, 63
	Worn steel sliding groove of control end	Replace	J3–48
	Weak spring pressing against steel ball	Replace	J3–48
	Excessive thrust clearance	Replace	J3–61, 63
	Worn bearing	Replace	J3–61, 63
	Improperly installed or loose engine mount	Tighten	J3–112
Abnormal noise	Insufficient oil	Add oil	J3–36
	Deterioration of oil quality	Replace	J3–36
	Worn bearing	Adjust or replace	J3–61, 63
	Worn sliding surfaces of gears or shafts	Replace	J3–61, 63
	Excessive gear backlash	Replace	J3–61, 63
	Damaged gear teeth	Replace with oil of specified quality	J3–61, 63
	Foreign material in gears	Replace	J3–61, 63
	Damaged differential gear or excessive backlash	Adjust or replace	J3–83

93G0J3-729


03U0J3-012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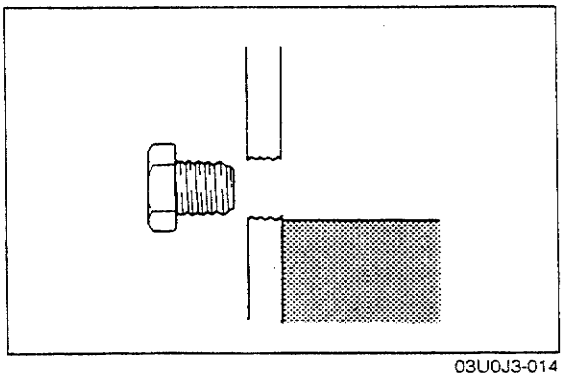
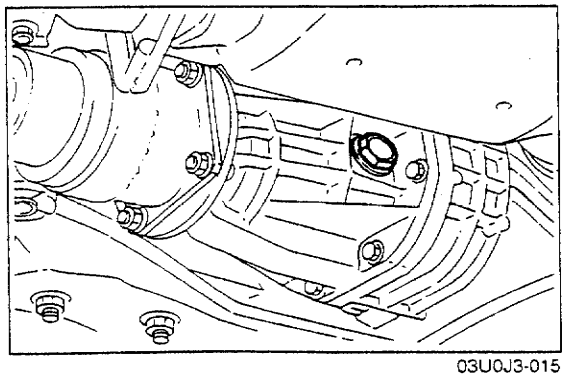

03U0J3-014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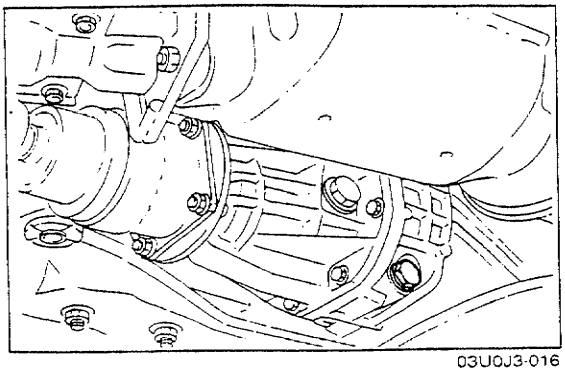

03U0J3-016

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.**

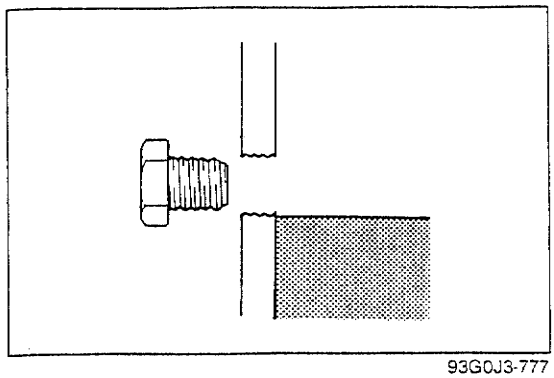
1. Remove the check plug.
2. Verify that the oil is at the bottom of the plug port. If it is low, add the specified oil from plug port.
3. Install check plug.

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)



93G0J3-777

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

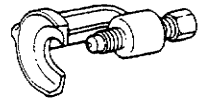
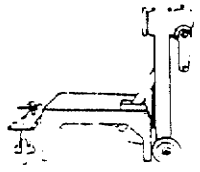
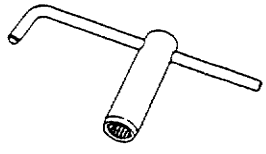
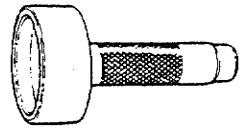
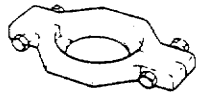
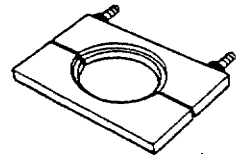
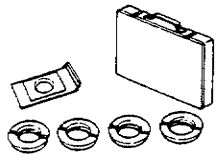
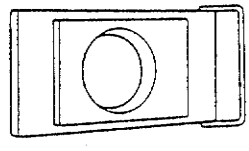
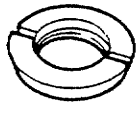
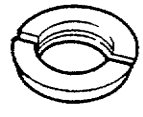
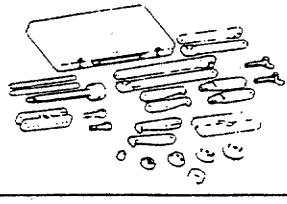
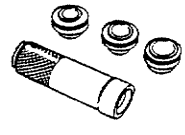
Grade : API service GL-5
Specified oil: Above −18°C (0°F) SAE 90
Below −18°C (0°F) SAE 80W
Capacity : 0.5 liter (0.53 US qt, 0.44 Imp qt)

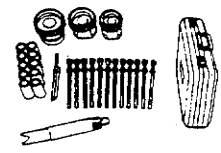
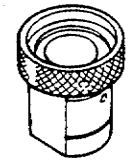
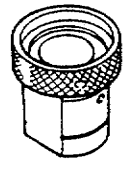
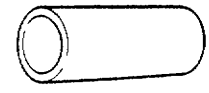
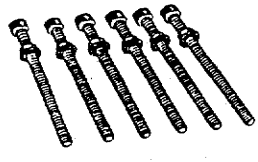
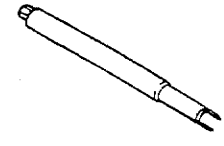
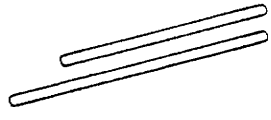
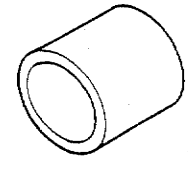
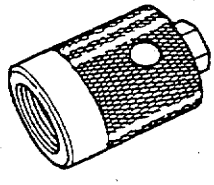
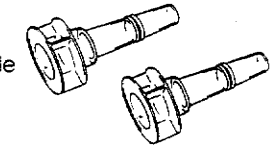
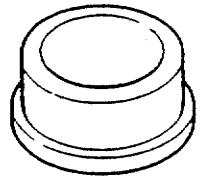
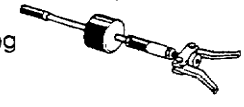
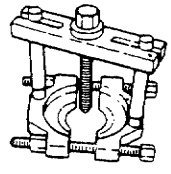
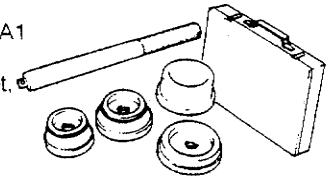
4. Install the check plug.

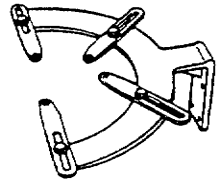
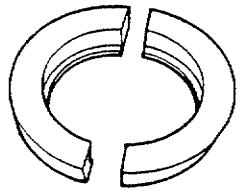
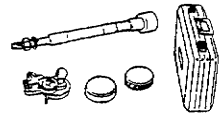
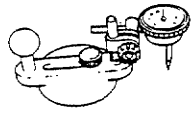
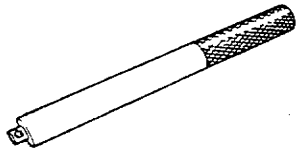
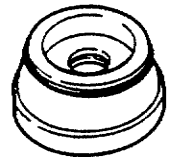
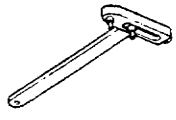
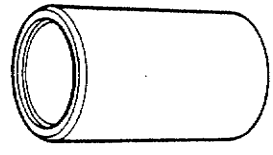
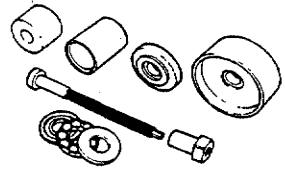
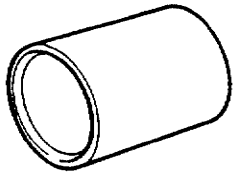
Tightening torque:
39—58 N·m (4.0—6.0 m-kg, 28—43 in-lb)

TRANSAXLE AND TRANSFER UNIT

PREPARATION
SST

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

49 F401 336B Attachment B (Part of 49 F401 330B) 	For installation of bearing inner race	49 G030 380C Selector set, shim 	For adjustment of bearing preload
49 G030 381 Selector for ϕ68 (Part of 49 G030 380C) 	For adjustment of bearing preload	49 G030 382A Selector ϕ58 (Part of 49 G030 380C) 	For adjustment of bearing preload
49 F401 382A Selector ϕ52 (Part of 49 G030 380C) 	For adjustment of bearing preload	49 F401 384 Collar (Part of 49 G030 380C) 	For adjustment of bearing preload
49 G019 021 Set, bolt (Part of 49 G030 380C) 	For adjustment of bearing preload	49 B027 002A Adapter, preload 	For adjustment of bearing preload
49 F401 385 Bar (Part of 49 G030 380C) 	For adjustment of bearing preload	49 U027 003 Installer, oil seal 	For installation of oil seal
49 G017 202 Adapter, preload 	For adjustment of bearing preload	49 B027 001 Holder, diff. side gear 	For holding side gear
49 F027 009 Attachment 68 & 77 (Part of 49 F027 0A1) 	For installation of bearing inner race	49 W032 2A0 Remover, bearing 	For removal of bearing
49 0710 520 Puller, bearing 	For removal of bearing	49 F027 0A1 Installer set, bearing 	For installation of bearing

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

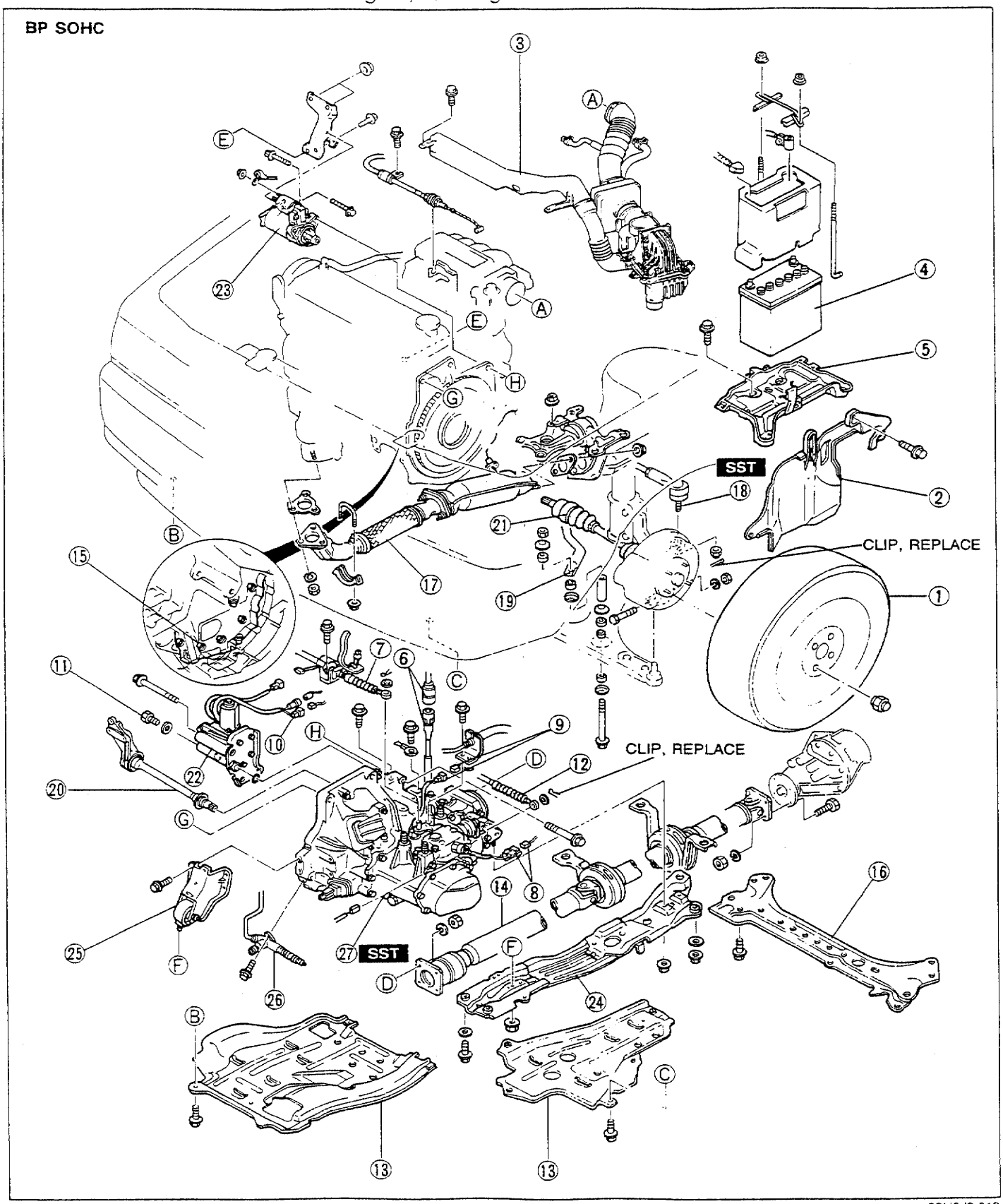
93G0J3-730

MEMO

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**.

BP SOHC

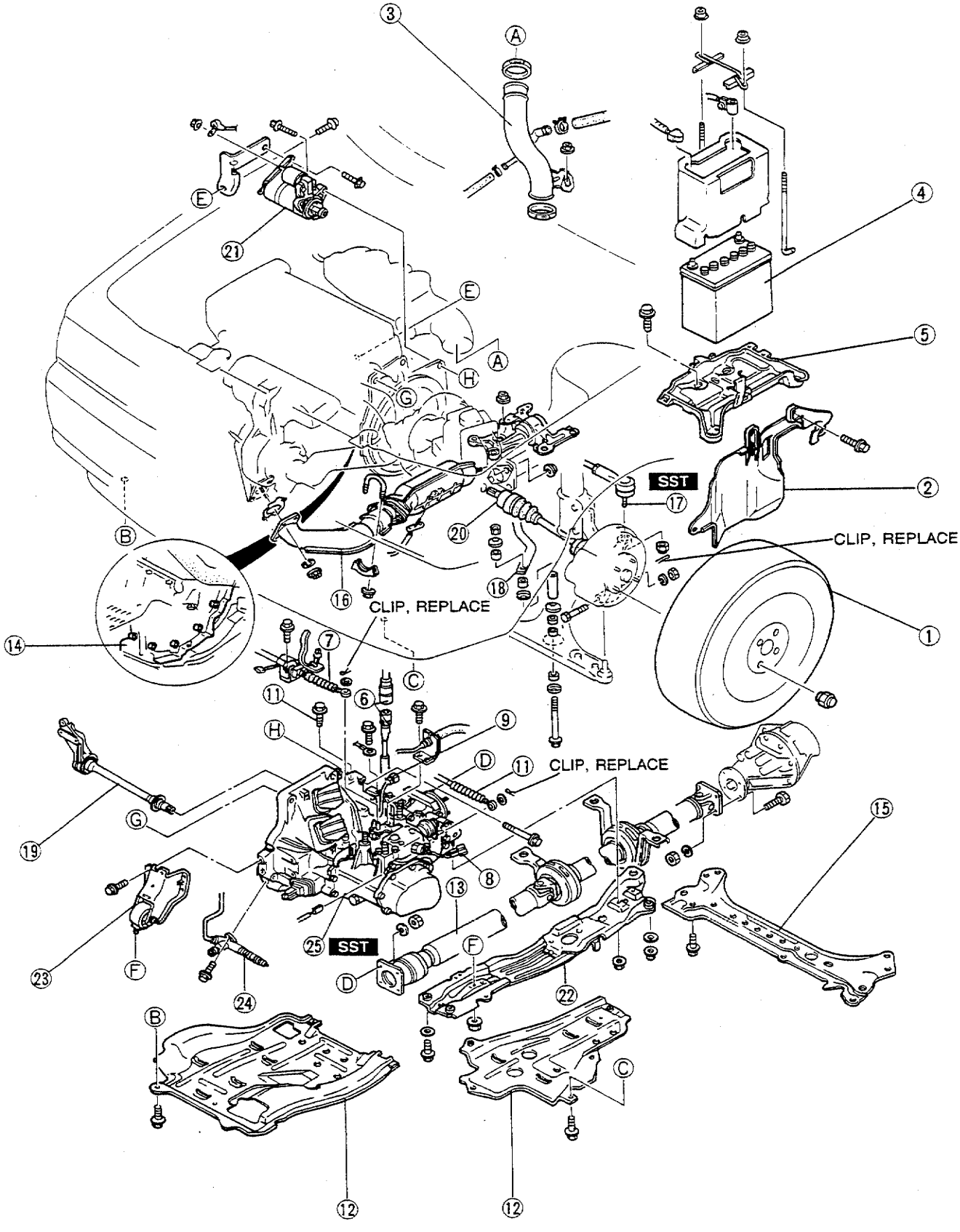


03U0J3-019

1. Wheel and tire
2. Splash shield
3. Air hose and air cleaner assembly
4. Battery
5. Battery carrier
6. Speedometer cable
7. Shift cable
8. Neutral switch connector
9. Back-up light switch connector
10. Differential lock motor connector
11. Bolt
12. Control cable
13. Undercover
14. Propeller shaft
    Removal Note ..... page J3–45
15. Integrated stiffener
16. Crossmember
17. Exhaust pipe
18. Tie-rod end
    Removal Note ..... page J3–45
19. Stabilizer
20. Joint shaft
21. Driveshaft
    Removal Note ..... page J3–45
22. Center differential lock motor
    Removal Note ..... page J3–46
23. Starter
24. Engine mount member
    Removal Note ..... page J3–47
25. Engine mount No.2
26. Clutch release cylinder and clutch pipe
    Removal Note ..... page J3–47
27. Transaxle and transfer carrier
    Removal Note ..... page J3–47

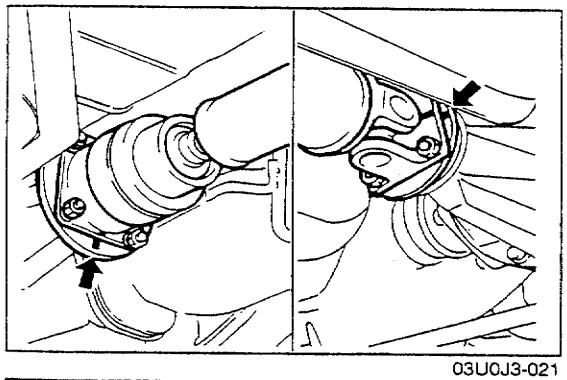
93G0J3-731

BP DOHC Turbo

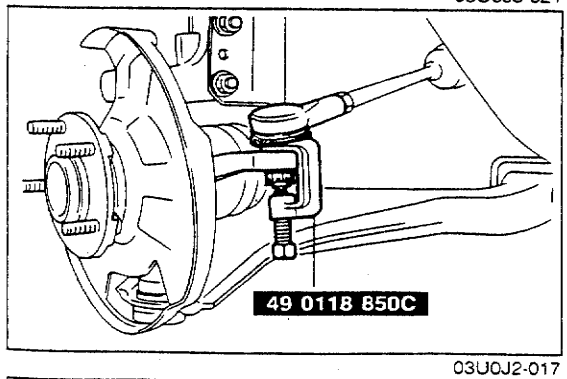


1. Wheel and tire
2. Splash shield
3. Air hose
4. Battery
5. Battery carrier
6. Speedometer cable
7. Shift cable
8. Neutral switch connector
9. Back-up light switch connector
10. Control cable
11. Undercover
12. Propeller shaft
    Removal Note ..... page J3–45
13. Integrated stiffener
14. Crossmember
15. Exhaust pipe
16. Tie-rod end
    Removal Note ..... page J3–45
17. Stabilizer
18. Joint shaft
19. Driveshaft
    Removal Note ..... page J3–45
20. Starter
21. Engine mount member
    Removal Note ..... page J3–47
22. Engine mount No.2
23. Clutch release cylinder and clutch pipe
    Removal Note ..... page J3–47
24. Transaxle and transfer unit
    Removal Note ..... page J3–47

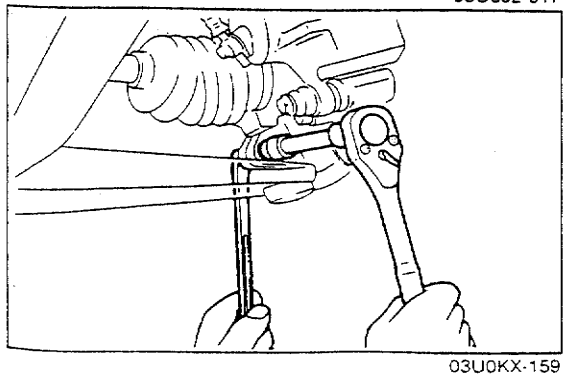
93G0J3-732



03U0J3-021



03U0J2-017



03U0KX-159

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.

Tie-rod end

1. Remove the cotter pin.

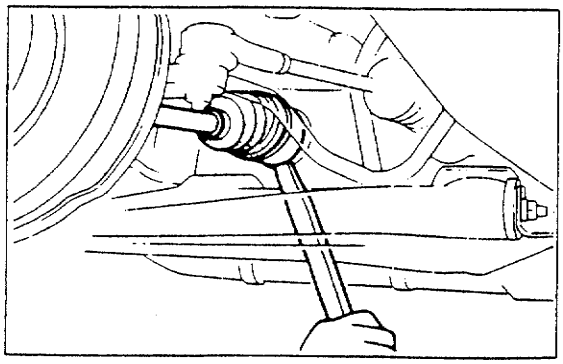
Caution
- **Do not damage the dust boot.**

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

Driveshaft

Caution
- **Do not damage the ball joint dust boot.**

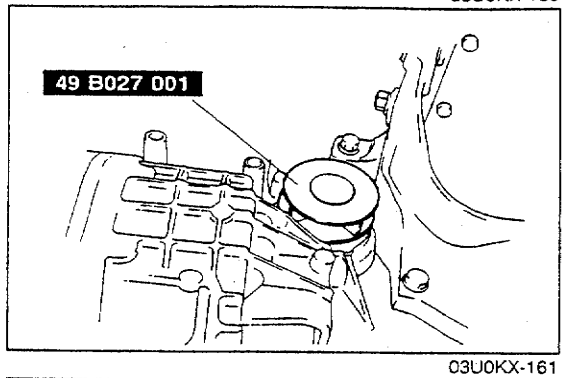
1. Remove the clinch bolts from the lower arm ball joints.
2. Pull the lower arms downward to separate them from the knuckles.



03U0KX-160

Caution
- **Do not damage the oil seal.**

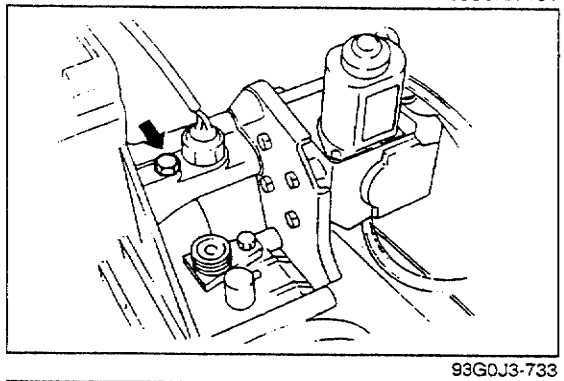
3. Separate the left driveshaft from the transaxle by prying with a bar inserted between the shaft and the transaxle case.



03U0KX-161

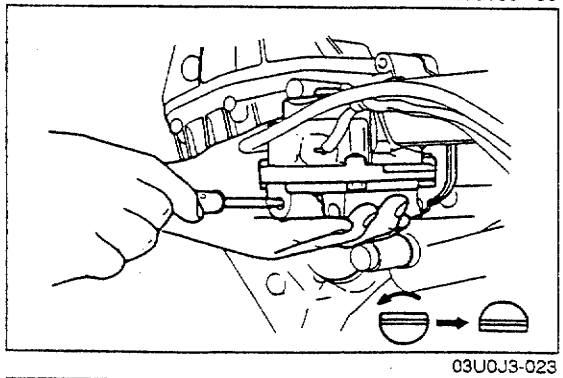
Caution
- **If the SST is not installed, the differential side gears may become misaligned.**

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



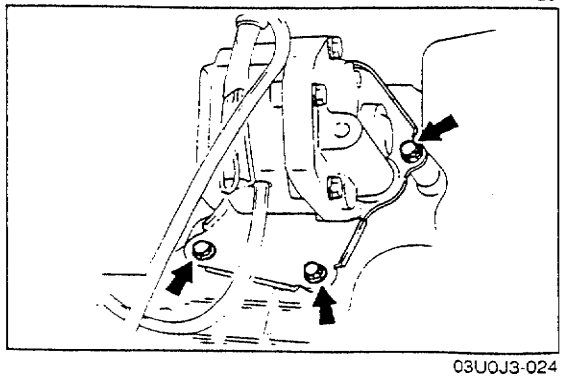
93G0J3-733

Center differential lock motor (BP SOHC)
1. Remove the set bolt.



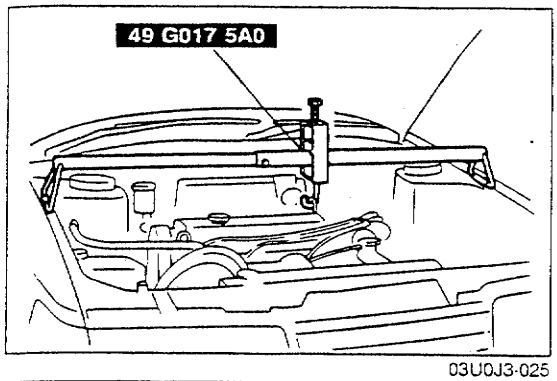
03U0J3-023

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



03U0J3-024

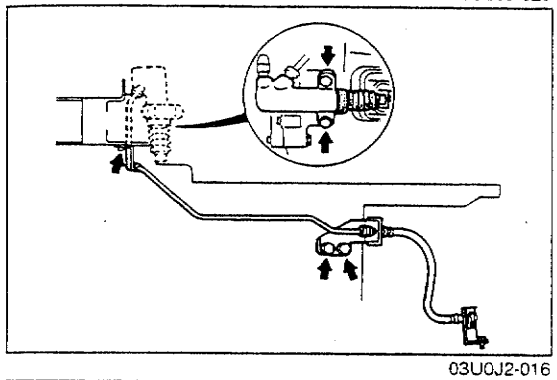
4. Remove the center differential lock motor.
5. Remove the O-ring from the center differential lock motor.



03U0J3-025

Engine mounting member

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

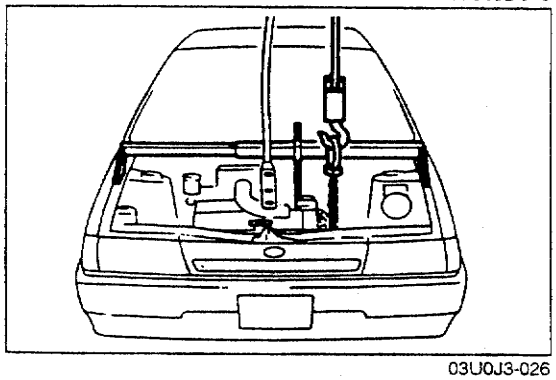


03U0J2-016

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.

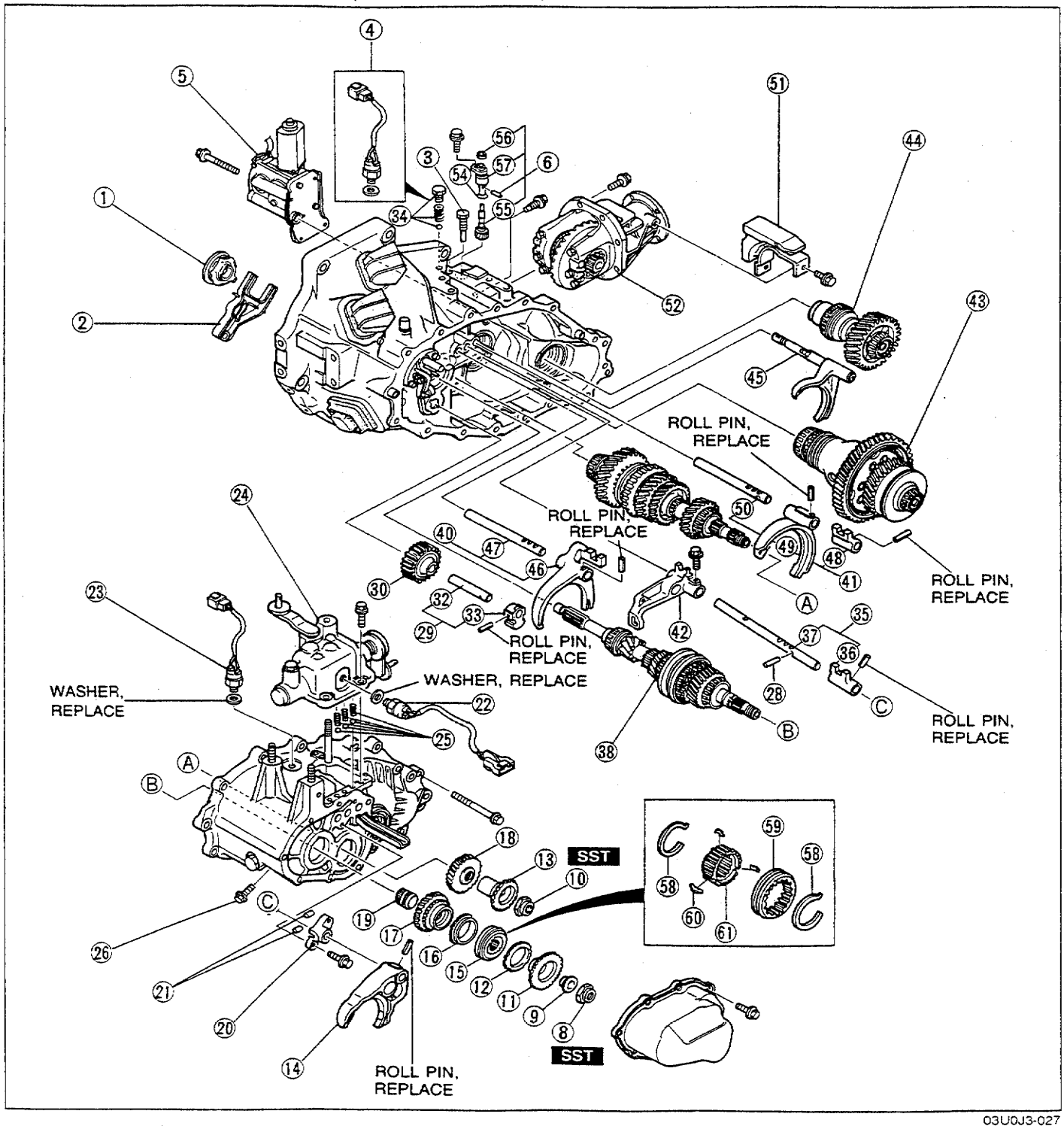
DISASSEMBLY

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

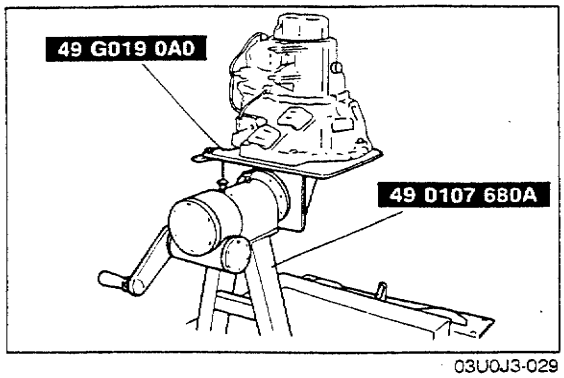
1. Measure the thrust clearance between 5th gear and the transaxle case, referring to **Preinspection**.
2. Disassmble in the order shown in the figure, referring to **Disassembly Note**.
3. Inspect all parts and repair or replace as necessary.



03U0J3-027

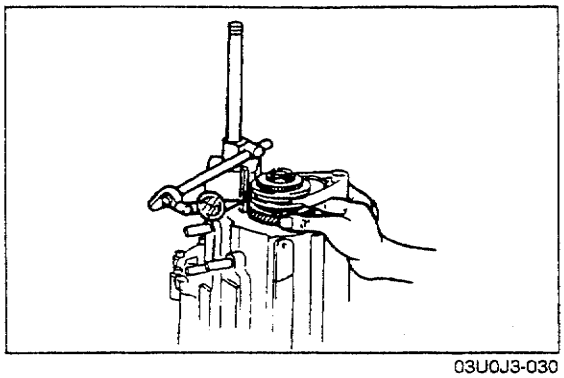
1. Clutch release bearing
   Disassembly Note ..... page J3–50
2. Clutch release fork
   Disassembly Note ..... page J3–50
3. Differential lock set bolt
4. Center differential lock switch (BP SOHC)
5. Center differential lock motor (BP SOHC)
   Disassembly Note ..... page J3–50
6. Speedometer driven gear assembly
7. Rear cover
8. Locknut
9. Spacer
10. Locknut
11. Primary reverse synchronizer gear
    Inspect gear teeth for damage, wear, and cracks
12. Synchronizer ring
    Inspection ..... page J3–72
13. Secondary reverse synchronizer gear
    Inspect gear teeth for damage, wear, and cracks
14. Shift fork
    Disassembly Note ..... page J3–51
    Inspection ..... page J3–73
15. Clutch hub assembly
    Disassembly Note ..... page J3–57
    Inspection ..... page J3–72
16. Synchronizer ring
    Inspection ..... page J3–72
17. Primary 5th gear
    Inspection ..... page J3–72
18. Secondary 5th gear
    Inspect gear teeth for damage, wear, and cracks
19. Gear sleeve
    Inspection ..... page J3–72
20. Interlock plate
21. Interlock pins
22. Neutral switch
23. Back-up light switch
24. Top cover assembly
    Disassembly Note ..... page J3–51
    Disassembly ..... page J3–59
    Assembly ..... page J3–87
25. Steel balls and springs
26. Lock bolt
27. Transaxle case assembly
    Disassembly Note ..... page J3–51
    Disassembly ..... page J3–56
    Assembly ..... page J3–96
28. Interlock pin
29. Reverse idler gear shaft assembly
30. Reverse idler gear
    Inspection ..... page J3–71
31. Reverse idler gear support
32. Reverse idler gear shaft
33. Bolt
34. Steel ball, spring, and bolt (BP DOHC Turbo)
35. Shift rod assembly
36. Shift rod end
37. Shift rod
38. Primary shaft assembly
    Disassembly Note ..... page J3–52
    Disassembly ..... page J3–61
    Assembly ..... page J3–92
39. Secondary shaft assembly
    Disassembly Note ..... page J3–93
    Disassembly ..... page J3–52
    Assembly ..... page J3–89
40. Shift fork assembly (3rd/4th)
41. Shift fork assembly (1st/2nd)
42. Shift gate
43. Front and center differential assembly
    Disassembly Note ..... page J3–52
    Disassembly ..... page J3–66
    Assembly ..... page J3–83
44. Idler gear assembly
    Disassembly ..... page J3–68
    Assembly ..... page J3–82
45. Center differential lock shift fork
    Disassembly ..... page J3–66
    Assembly ..... page J3–83
46. Shift fork (3rd/4th)
    Inspection ..... page J3–72
47. Shift rod (3rd/4th)
48. Shift rod end
49. Shift fork (1st/2nd)
    Inspection ..... page J3–72
50. Shift rod (1st/2nd)
51. Dynamic damper assembly
52. Transfer carrier assembly
    Disassembly ..... page J3–69
    Assembly ..... page J3–76
53. Clutch housing assembly
    Disassembly ..... page J3–56
    Assembly ..... page J3–96
54. O-ring
55. Speedometer driven gear
56. Oil seal
    Disassembly Note ..... page J3–53
    On-vehicle ..... page J3–53
57. Speedometer sleeve
58. Synchronizer key spring
59. Clutch hub sleeve
    Inspection ..... page J3–72
60. Synchronizer key
61. Clutch hub

93G0J3-734



03U0J3-029

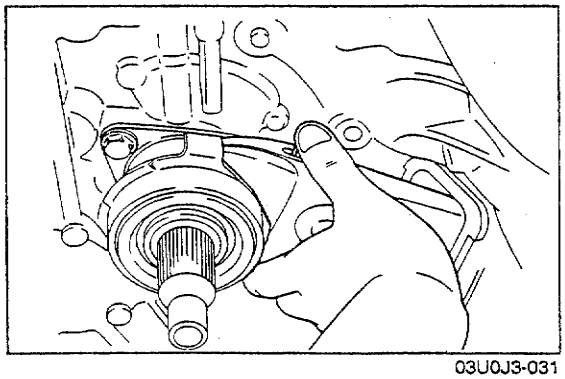
Preinspection
5th gear thrust clearance
1. Mount the transaxle and transfer carrier on the **SST**.
2. Remove the rear cover.


03U0J3-030

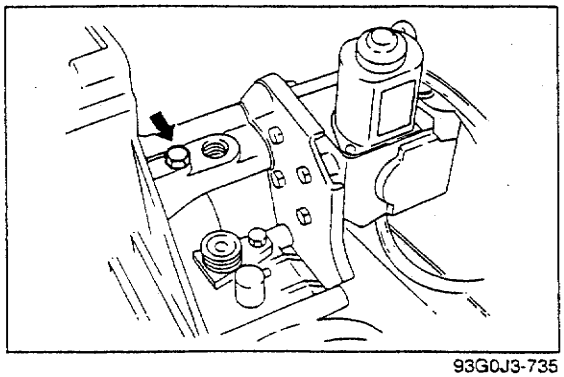
3. Measure the 5th gear thrust clearance with a dial indicator.

   Clearance: 0.1—0.22mm (0.0039—0.0087 in)
   Maximum : 0.27mm (0.0106 in)

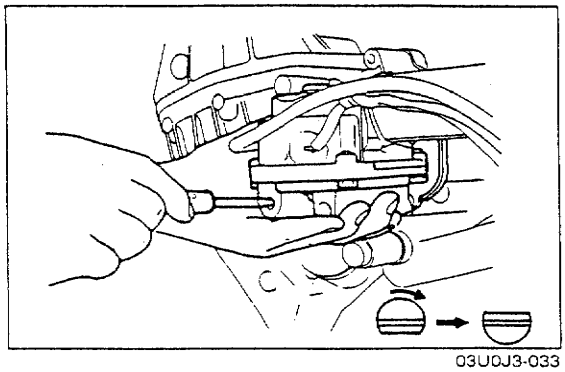
4. If the clearance exceeds the maximum, check the contact surfaces of 5th gear and the clutch hub. Replace worn or damaged parts.


03U0J3-031

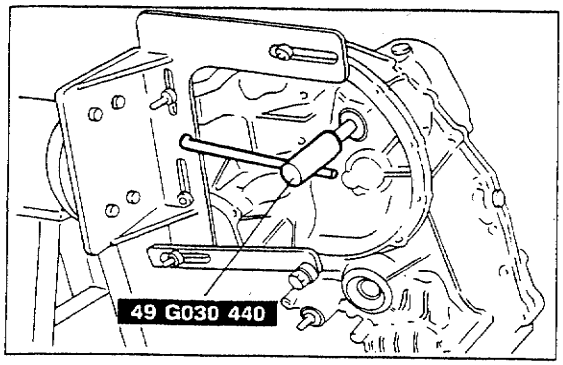
Disassembly note
Clutch release bearing, clutch release fork
1. Slide the clutch release fork to the boot.
2. Remove the clutch release bearing.
3. Remove the clutch release fork.


93G0J3-735

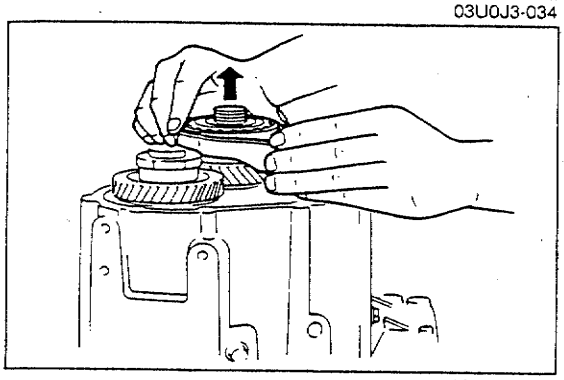
Center differential lock motor (BP SOHC)
1. Remove the set bolt.


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



03U0J3-035

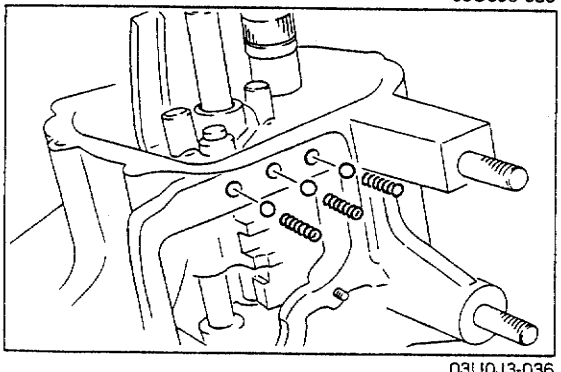
Shift fork, clutch hub assembly

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.**

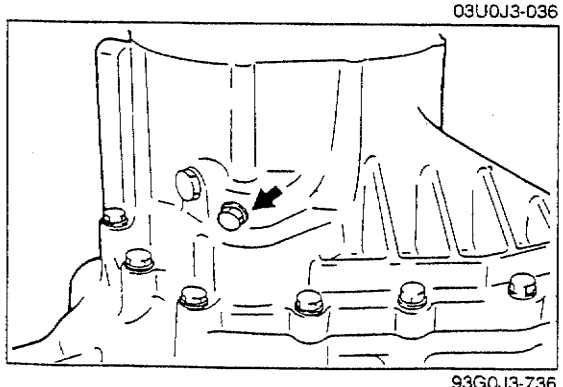
3. Uncrimp the tabs of the locknuts.
4. Remove the locknuts from the primary and secondary shafts.
5. Remove the shift fork together with the clutch hub assembly.



03U0J3-036

Top cover assembly

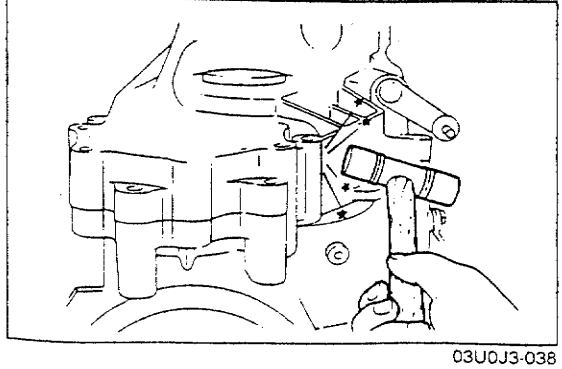
1. Remove the top cover assembly.
2. Remove the springs.
3. Remove the steel balls with a magnet.



93G0J3-736

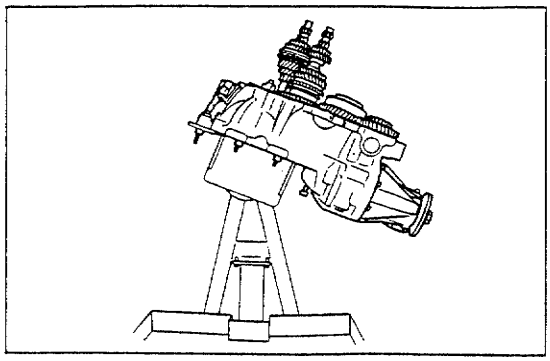
Transaxle case assembly

1. Remove the bolt. (BP SOHC)



03U0J3-038

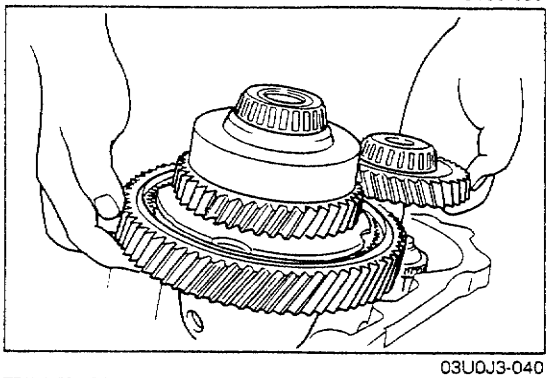
2. Remove the bolts and transaxle case by tapping lightly with a plastic hammer.
3. Remove the magnet.



03U0J3-039

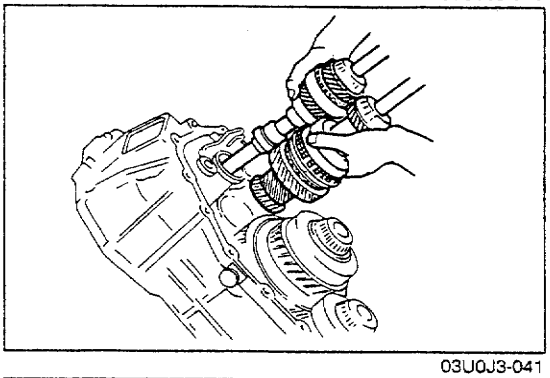
Primary shaft assembly, secondary shaft assembly, front and center differential assembly

1. Lean the clutch housing as shown.



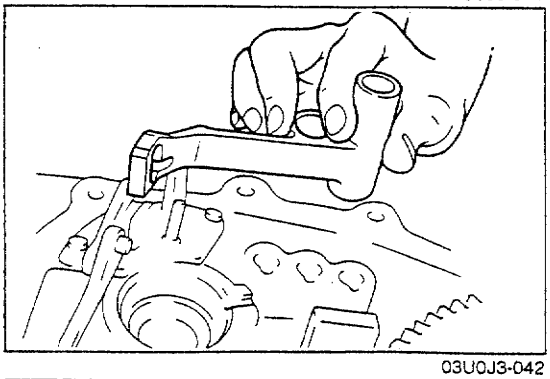
03U0J3-040

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



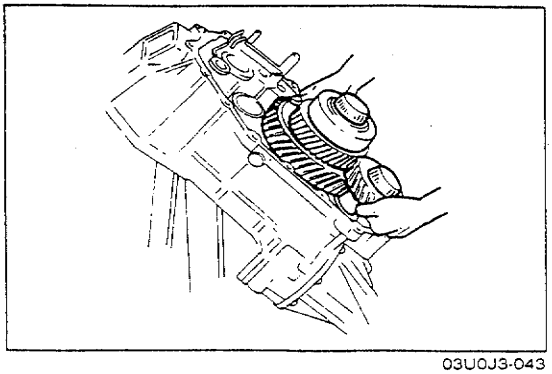
03U0J3-041

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



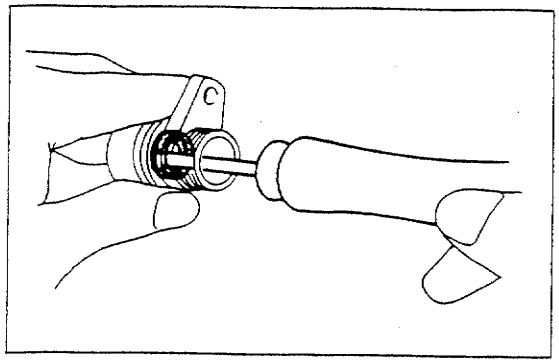
03U0J3-042

4. Remove the shift gate.



03U0J3-043

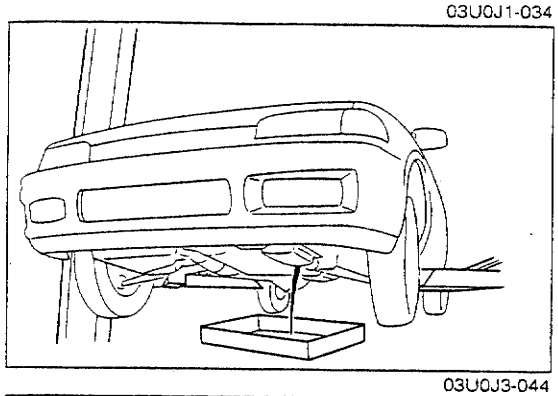
5. Remove the front and center differential assembly, idler gear assembly and center differential lock shift fork assembly together.



03U0J1-034

Oil seal (Speedometer gear case)

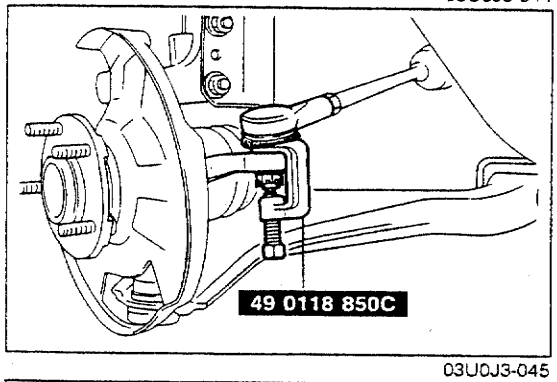
1. Remove the oil seal as shown in the figure.



03U0J3-044

Oil seal (Driveshaft)
Replacement (On-vehicle)

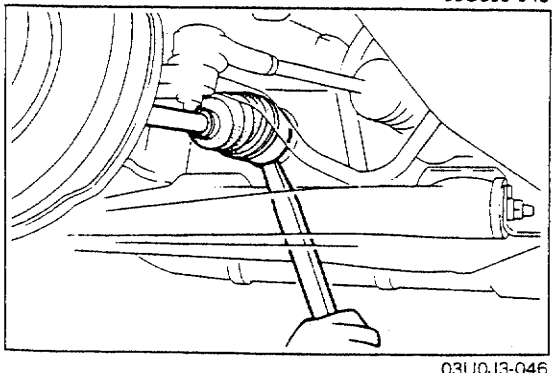
1. Jack up the vehicle and support it with safety stands.
2. Drain the transaxle oil.
3. Remove the concerned front wheel.
4. Remove the splash shield.
5. Separate the front stabilizer from the lower arm.



03U0J3-045

Caution
- **Do not damage the dust boots.**

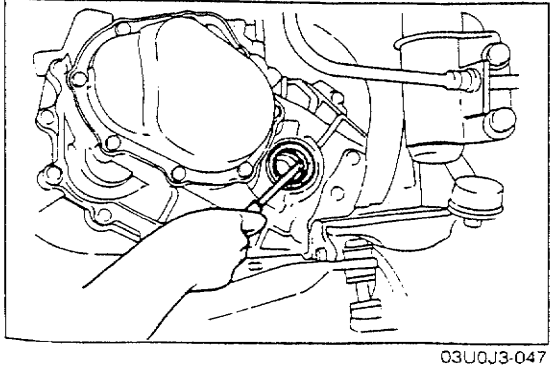
6. Remove the clinch bolt and pull the lower arm downward. Separate the knuckle from the lower arm ball joint.
7. Loosen the nut and disconnect the tie-rod end with the **SST**.



03U0J3-046

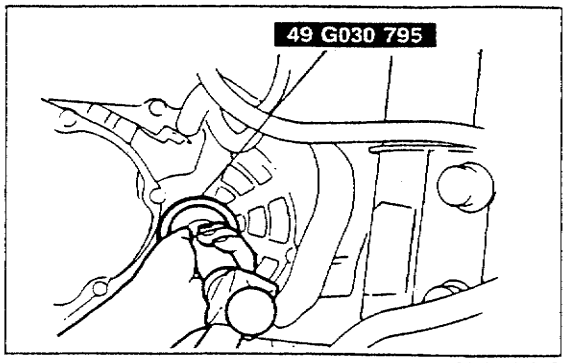
Caution
- **Do not subject the tripod joint to shock when removing the driveshaft.**

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.

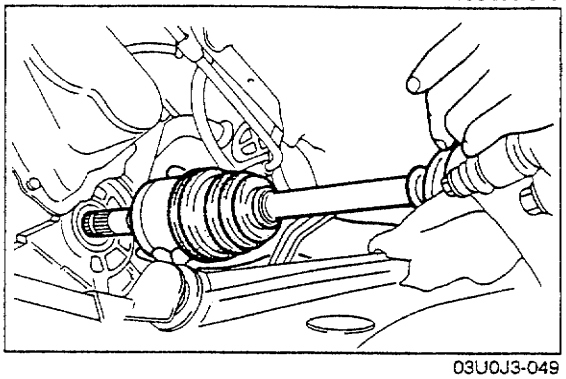


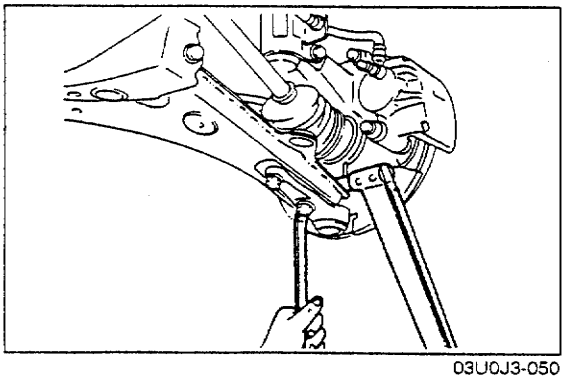
03U0J3-047

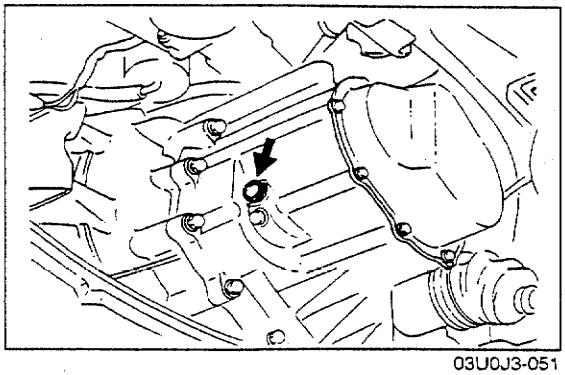
10. Remove the oil seal with a screwdriver.



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.

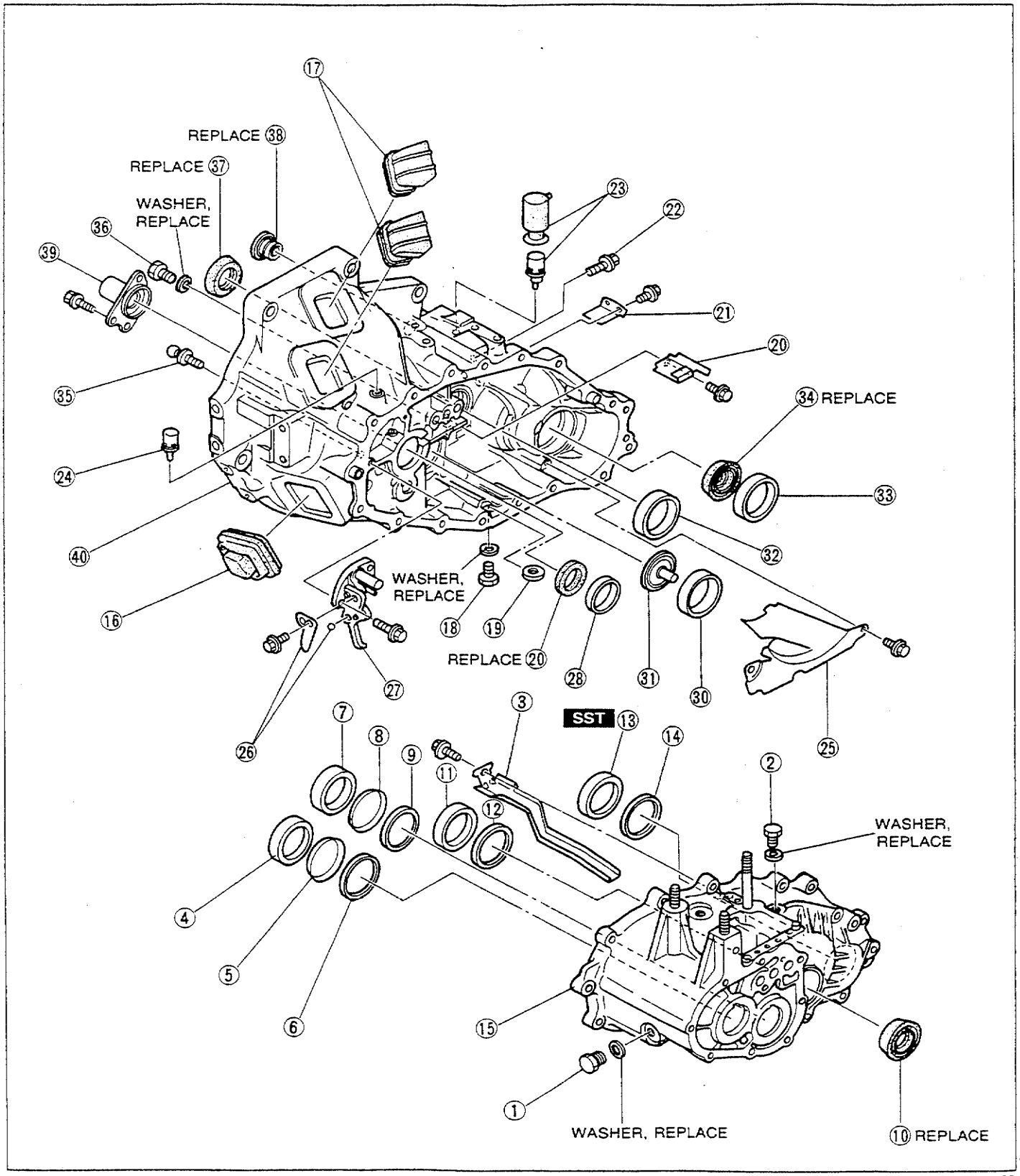
Tightening torque:
39—59 N·m (4.0—6.0 m-kg, 29—43 ft-lb)

MEMO

Clutch Housing and Transaxle Case Components

Caution
- **Do not remove an oil seal if not necessary.**

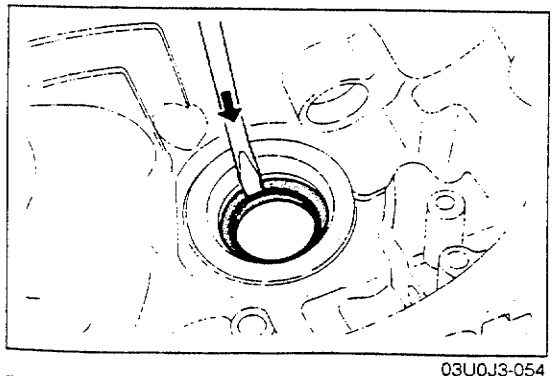
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.



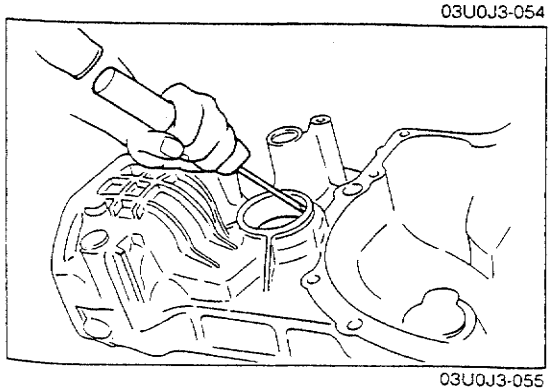
03U0J3-052

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 J3–57
11. Bearing outer race
12. Adjustment shim
13. Bearing outer race (Idler gear side)
    Disassembly Note ..... page J3–58
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 J3–58
31. Funnel
    Disassembly Note ..... page J3–58
32. Bearing outer race
33. Bearing outer race
    (Front and center differential side)
    Disassembly Note ..... page J3–57
34. Oil seal
    Disassembly Note ..... page J3–57
35. Pivot pin
36. Plug
37. Oil seal
    Disassembly Note ..... page J3–57
38. Oil seal (BP Turbo)
    Disassembly Note ..... page J3–64
39. Front cover
40. Clutch housing

93G0J3-737



03U0J3-054



03U0J3-055

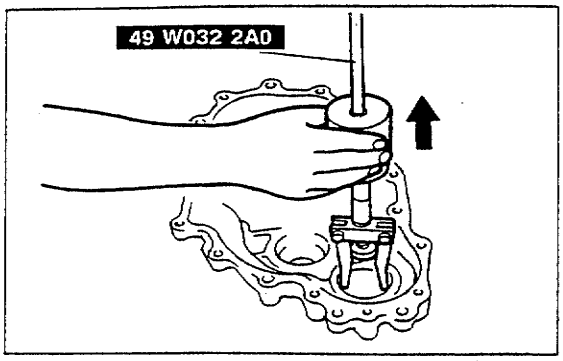
Disassembly Note

Oil seal

1. Remove the oil seal with a screwdriver.

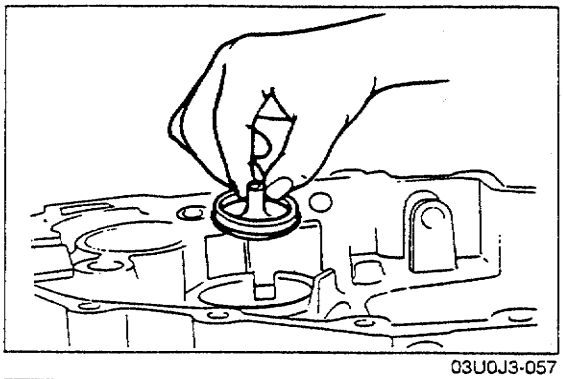
Bearing outer race (Front and center differential side)

1. Remove the bearing outer race with a screwdriver.



93G0J3-738

Bearing outer race (Idler gear side)
1. Remove the bearing outer race with a **SST**.

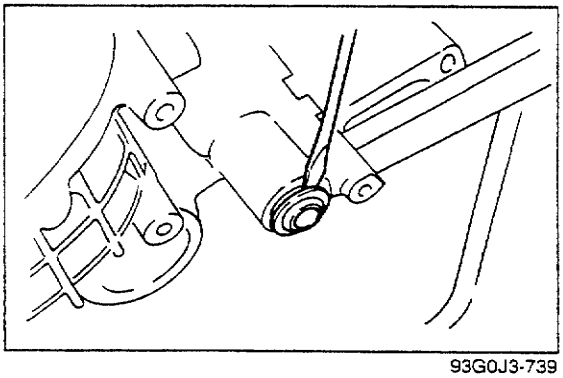


03U0J3-057

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.

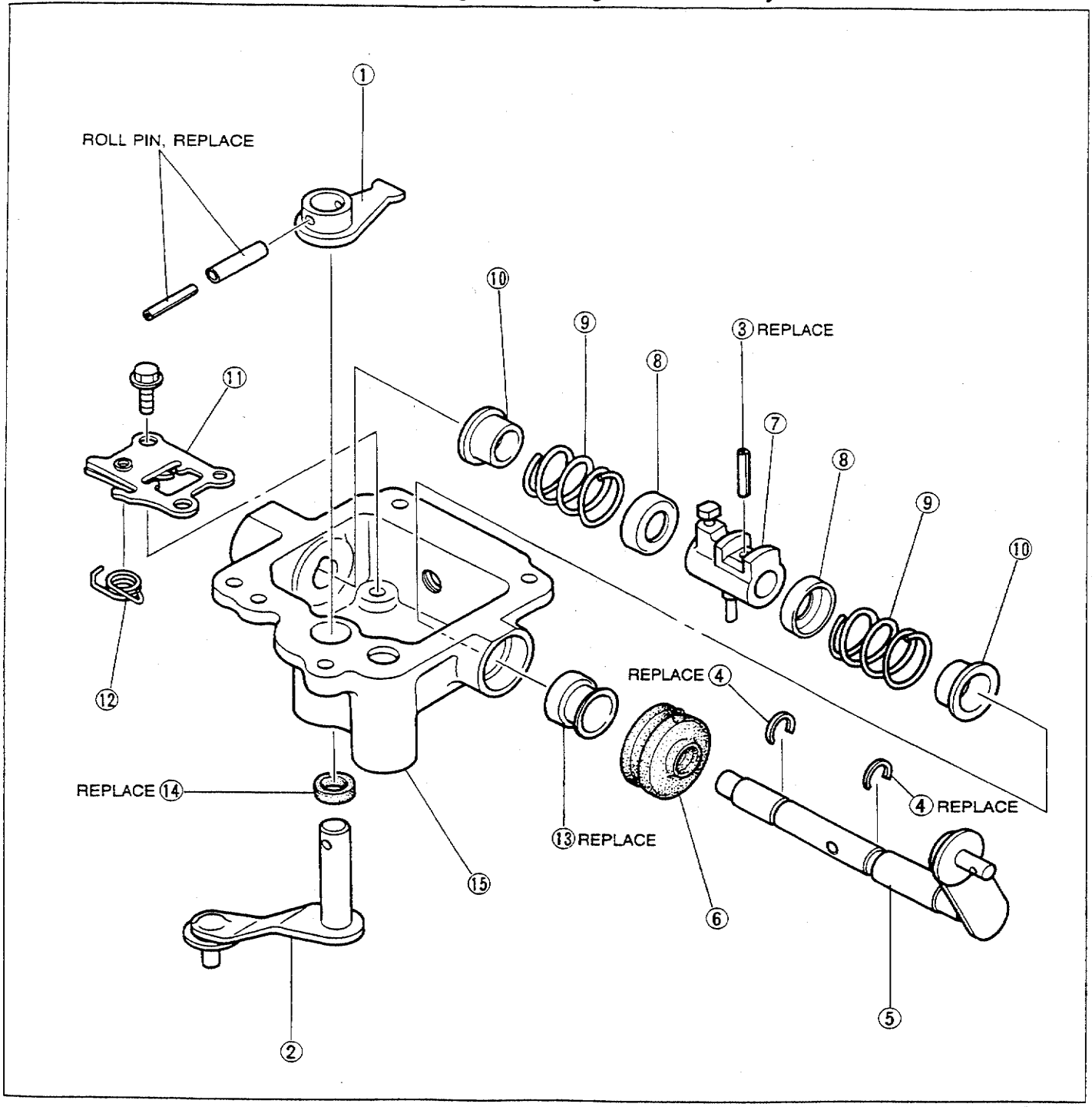


93G0J3-739

Oil seal (BP DOHC Turbo)
1. Remove the oil seal with a screwdriver.

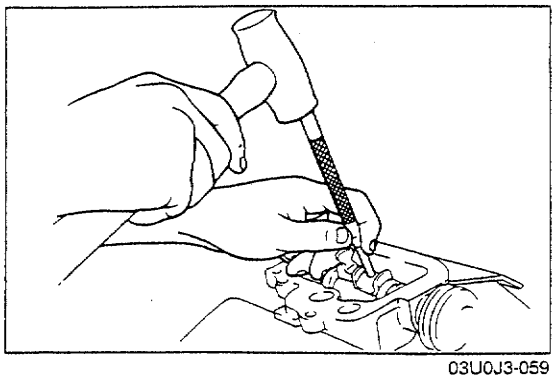
Top Cover Assembly

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



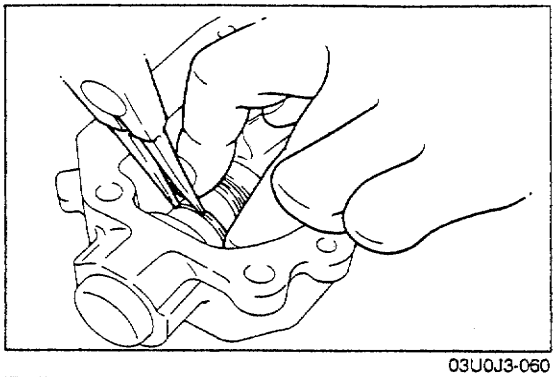
93G0J3-740

1. Inner select lever
2. Select lever
3. Roll pin
   Disassembly Note ..... page J3–66
4. Retaining rings
   Disassembly Note ..... page J3–66
5. Shift lever
6. Boot
7. Inner shift lever
8. Washer
9. Springs
   Disassembly Note ..... page J3–66
10. Guide springs
11. Base plate assembly
12. Reverse gate spring
13. Oil seal
    Disassembly Note ..... page J3–66
14. Oil seal (Select lever side)
15. Top cover



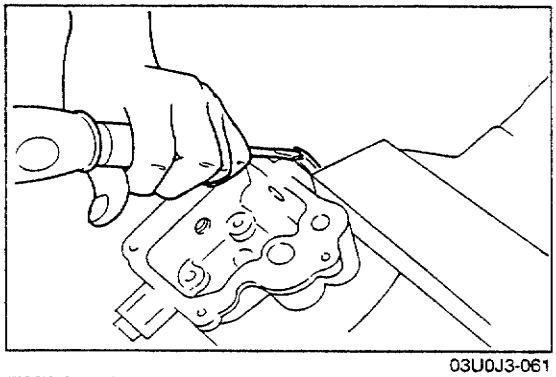
03U0J3-059

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



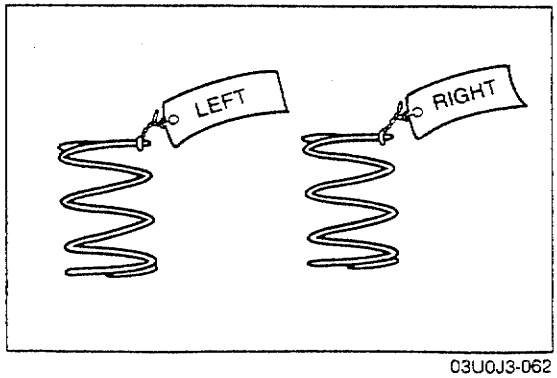
03U0J3-060

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

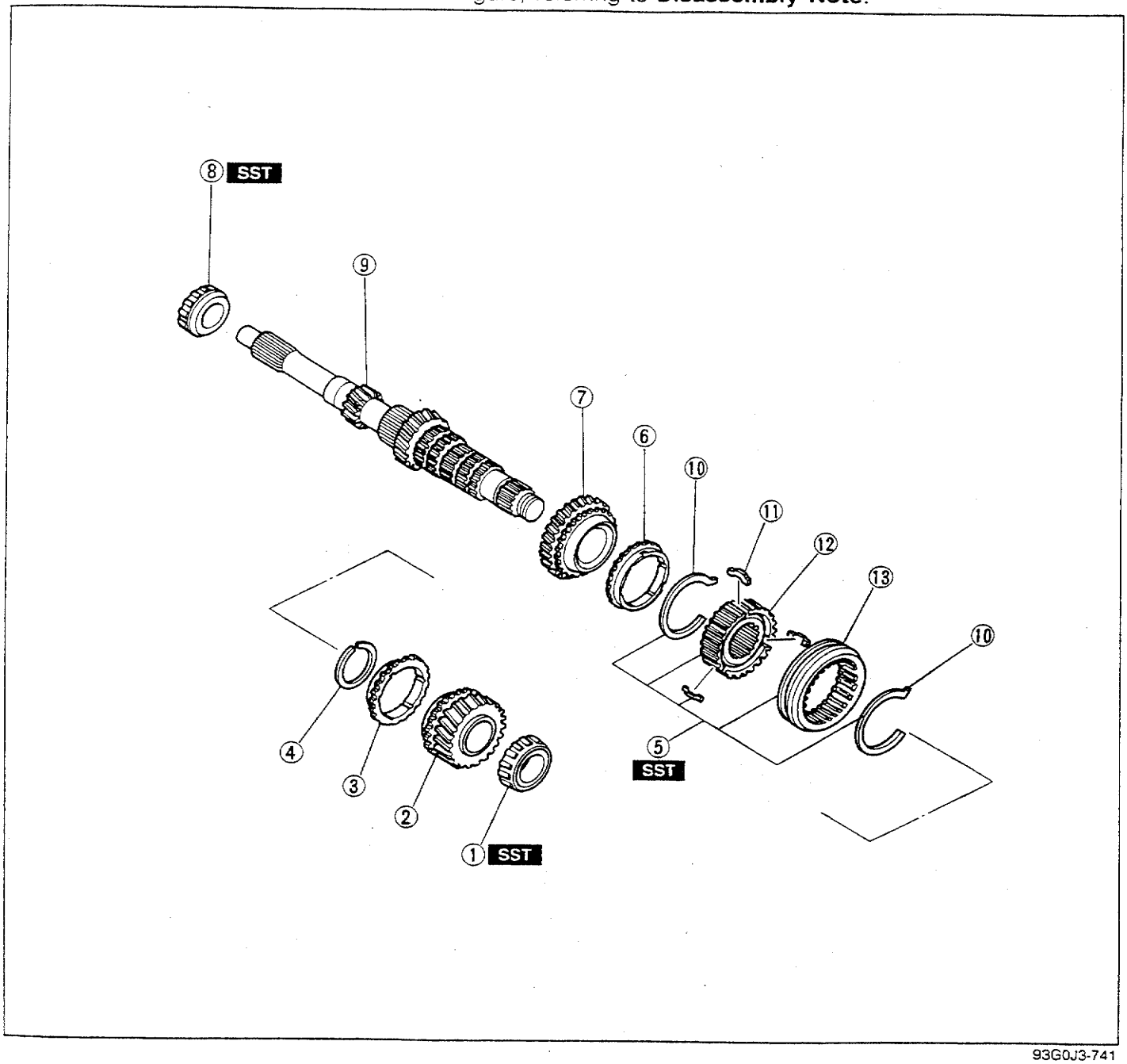
Springs

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

Note
- **Mark the springs as shown.**

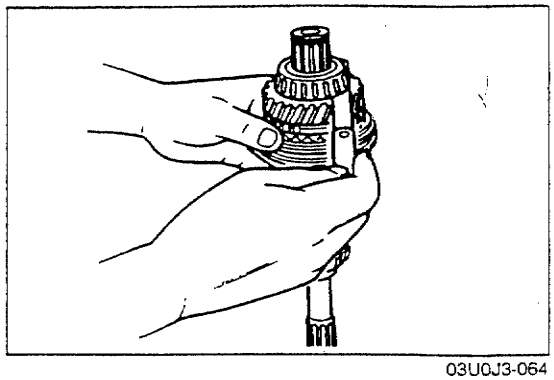
Primary Shaft Assembly

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**.

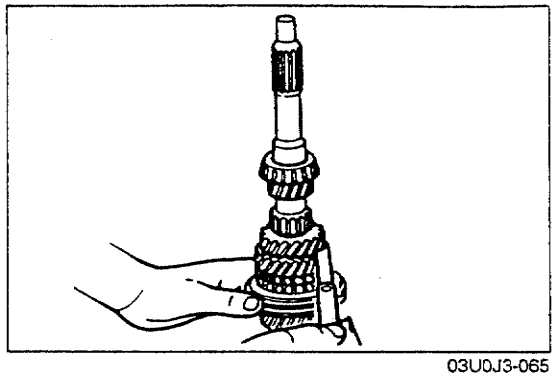


93G0J3-741

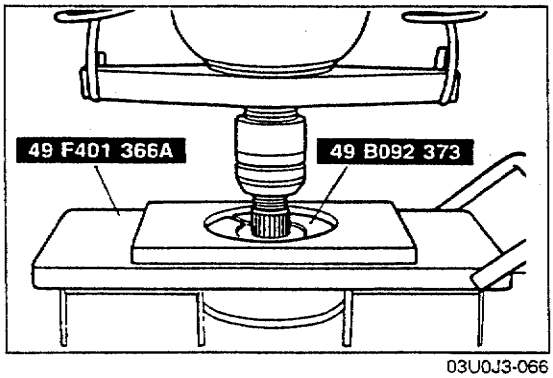
1. Bearing inner race (4th gear end)
   Preinspection ..... page J3–62
   Disassembly Note ..... page J3–62
2. 4th gear
   Inspection ..... page J3–72
3. Synchronizer ring (4th)
   Inspection ..... page J3–72
4. Retaining ring
5. Clutch hub assembly (3rd/4th)
   Disassembly Note ..... page J3–62
   Inspection ..... page J3–72
6. Synchronizer ring (3rd)
   Inspection ..... page J3–72
7. 3rd gear
   Preinspection ..... page J3–62
   Inspection ..... page J3–72
8. Bearing inner race (Primary shaft end)
   Disassembly Note ..... page J3–72
9. Primary shaft
   Inspection ..... page J3–73
10. Synchronizer springs
11. Synchronizer keys
12. Clutch hub
13. Clutch hub sleeve



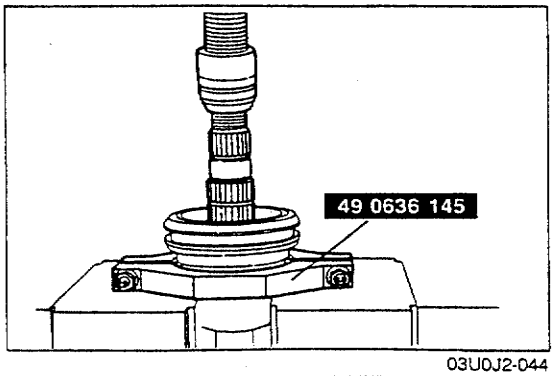
03U0J3-064



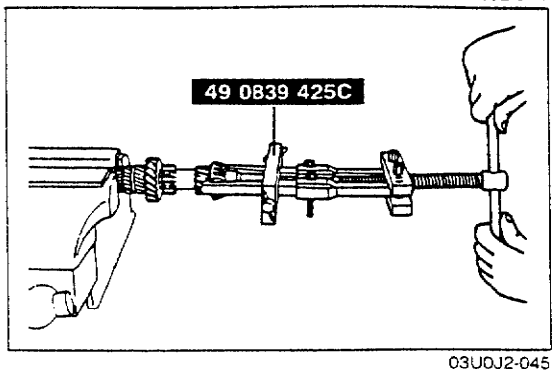
03U0J3-065



03U0J3-066



03U0J2-044



03U0J2-045

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)

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)

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**.

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.**

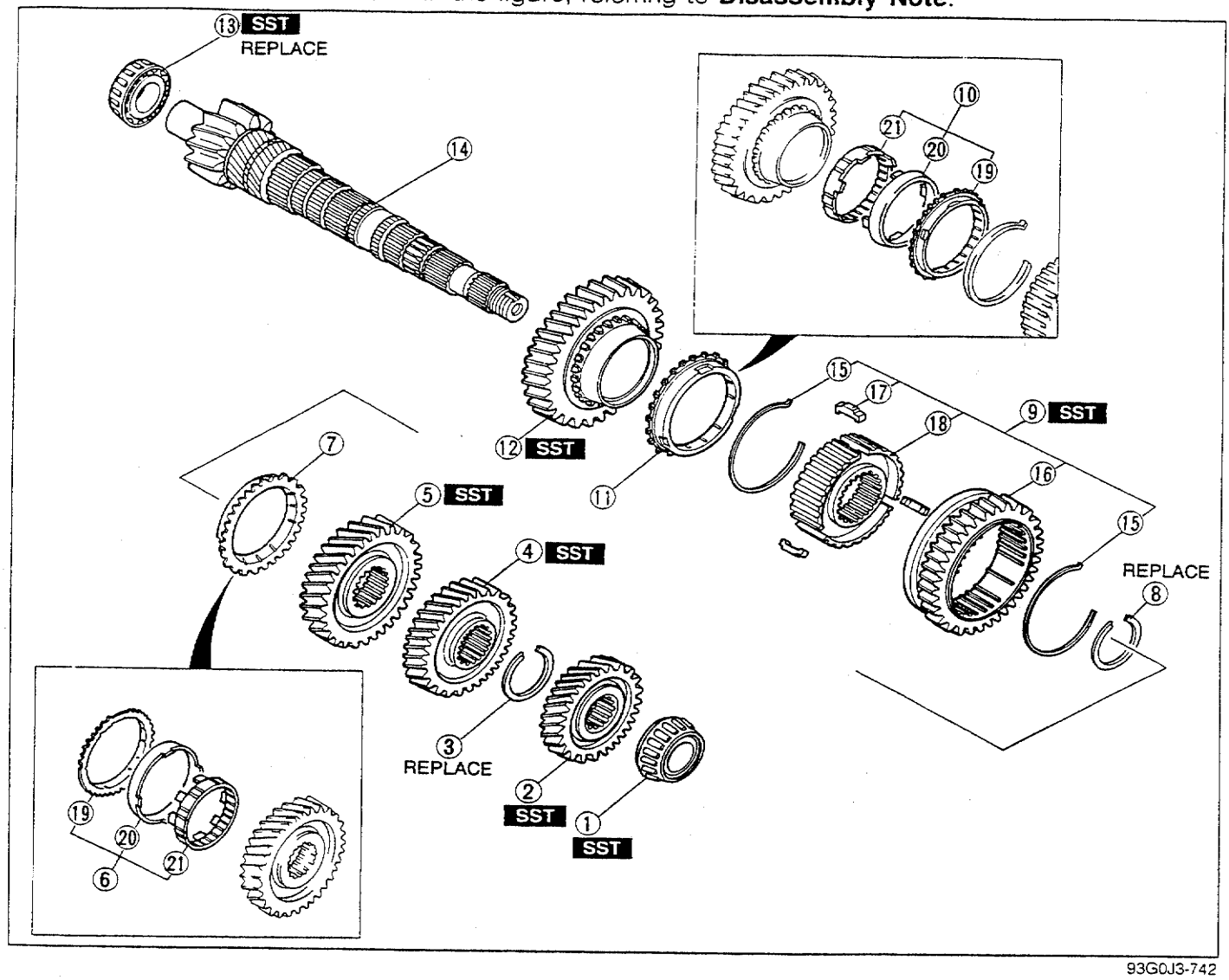
2. Remove the clutch hub assembly (3rd/4th) synchronizer ring (3rd) and 3rd gear with the **SST**.

Bearing inner race (Primary shaft end)

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

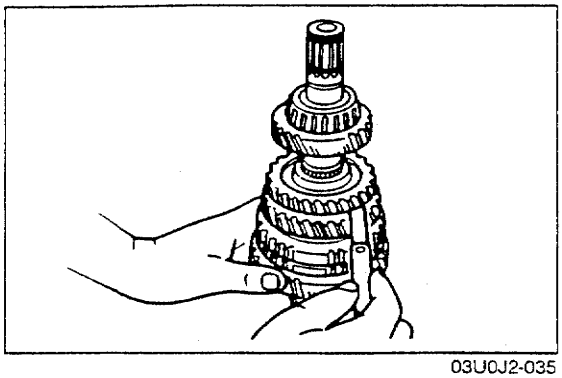
Secondary Shaft Assembly

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**.

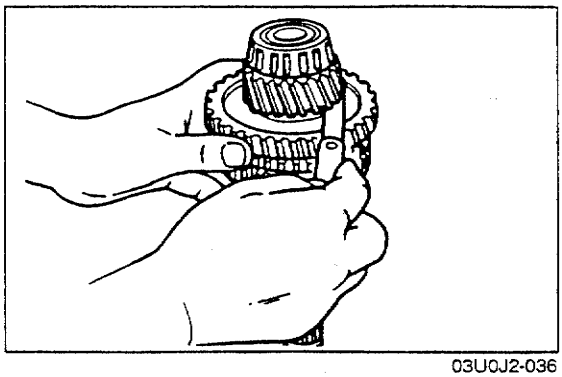


93G0J3-742

1. Bearing inner race
   Disassembly Note ..... page J3–64
2. 4th gear
   Disassembly Note ..... page J3–64
3. Retaining ring
4. 3rd gear
   Disassembly Note ..... page J3–64
5. 2nd gear
   Disassembly Note ..... page J3–64
   Inspection ..... page J3–72
6. Double cone assembly (BP DOHC Turbo)
7. Synchronizer ring (BP SOHC)
   Inspection ..... page J3–72
8. Retaining ring
9. Clutch hub assembly (1st/2nd)
   Disassembly Note ..... page J3–64
   Inspection ..... page J3–73
10. Double cone assembly (BP Turbo)
    Disassembly Note ..... page J3–64
    Inspection ..... page J3–72
11. Synchronizer ring (BP SOHC)
12. 1st gear
    Inspection ..... page J3–72
13. Bearing inner race
    Inspect for wear, damage and rough rotation
    Disassembly Note ..... page J3–65
14. Secondary shaft
    Inspection ..... page J3–74
15. Synchronizer key spring
16. Clutch hub sleeve (1st/2nd)
17. Synchronizer keys
18. Clutch hub (1st/2nd)
19. Synchronizer ring (BP DOHC Turbo)
20. Double cone (BP DOHC Turbo)
21. Inner cone (BP DOHC Turbo)



03U0J2-035



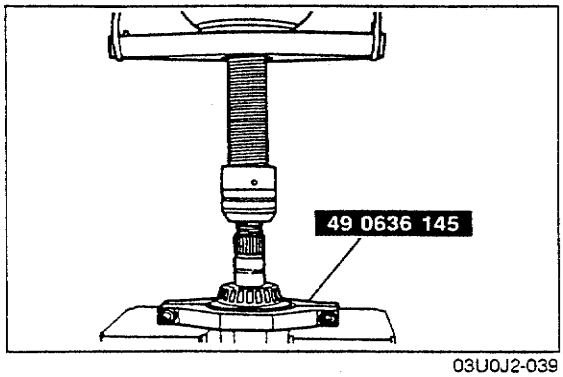
03U0J2-036

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)

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)

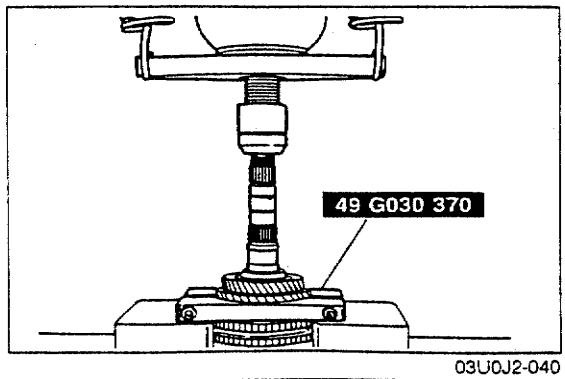


03U0J2-039

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**.

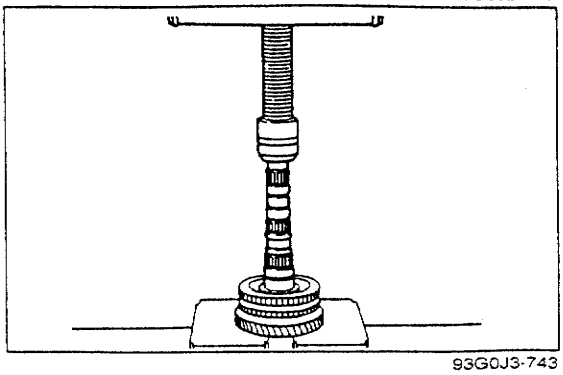


03U0J2-040

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**.

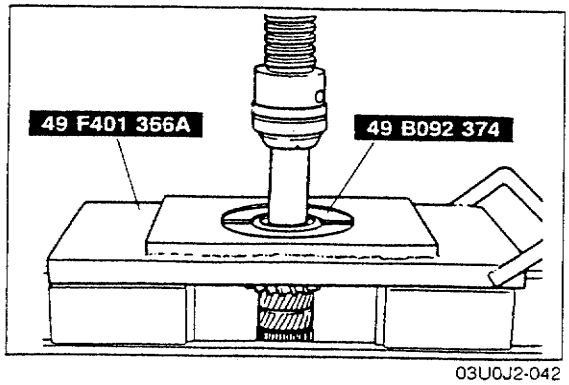


93G0J3-743

Clutch hub assembly (1st/2nd), synchronizer ring (1st) or double cone assembly (BP DOHC Turbo), 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) or double cone assembly (BP DOHC Turbo), and 1st gear with a press.



03U0J2-042

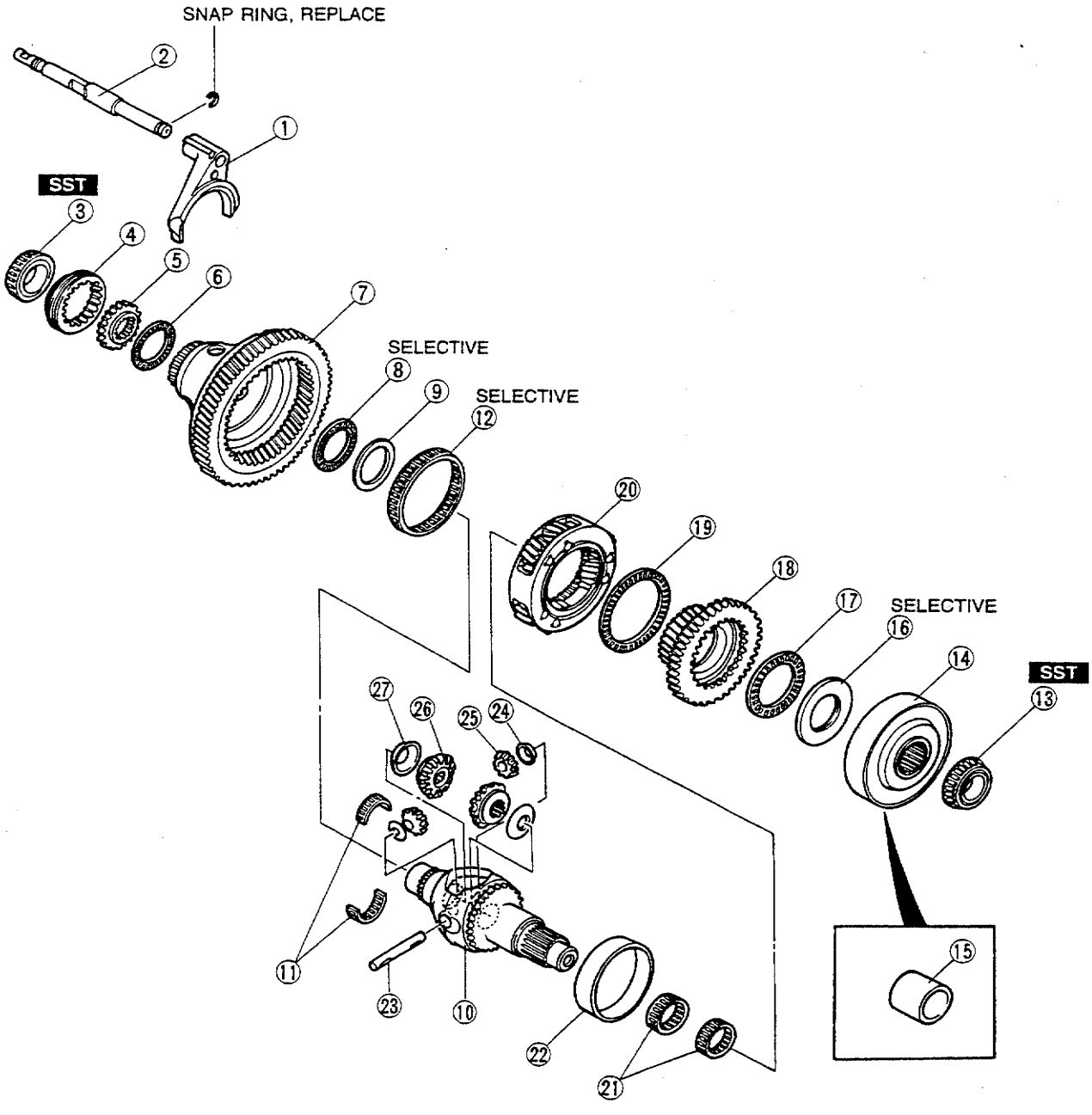
Bearing inner race (Secondary shaft end)

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

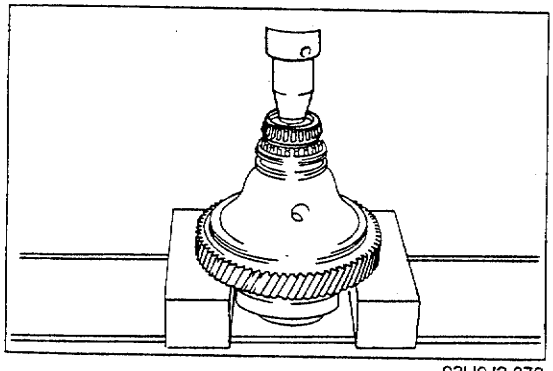
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Inspect all bearings for damage and rough rotation, and replace as necessary.



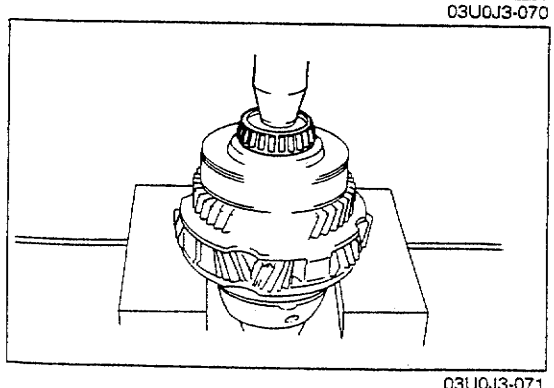
03U0J3-068

1. Center differential lock shift fork
2. Center differential lock shift rod
3. Bearing inner race (Gear sleeve side)
   Disassembly Note ..... page J3–67
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 J3–67
14. Viscous coupling (BP DOHC Turbo)
15. Spacer (BP SOHC)
16. Thrust washer
17. Gear case needle bearing
18. Sun gear
    Inspect gear teeth for wear and cracks
19. Gear case needle bearing
20. Planetary carrier
    Inspect gears for wear, cracks and rough rotation
21. Gear case needle bearings
22. Differential gear case sleeve
    Disassembly Note ..... page J3–67
23. Pinion shaft
24. Washers
25. Pinion gears
    Inspect gear teeth for wear and cracks
26. Side gears
    Inspect gear teeth for wear and cracks
27. Washers

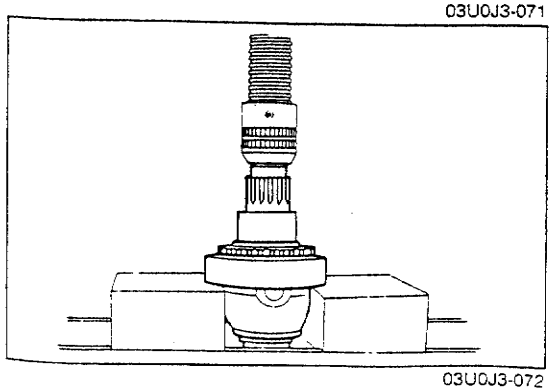
93G0J3-744



03U0J3-070



03U0J3-071



03U0J3-072

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.

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.

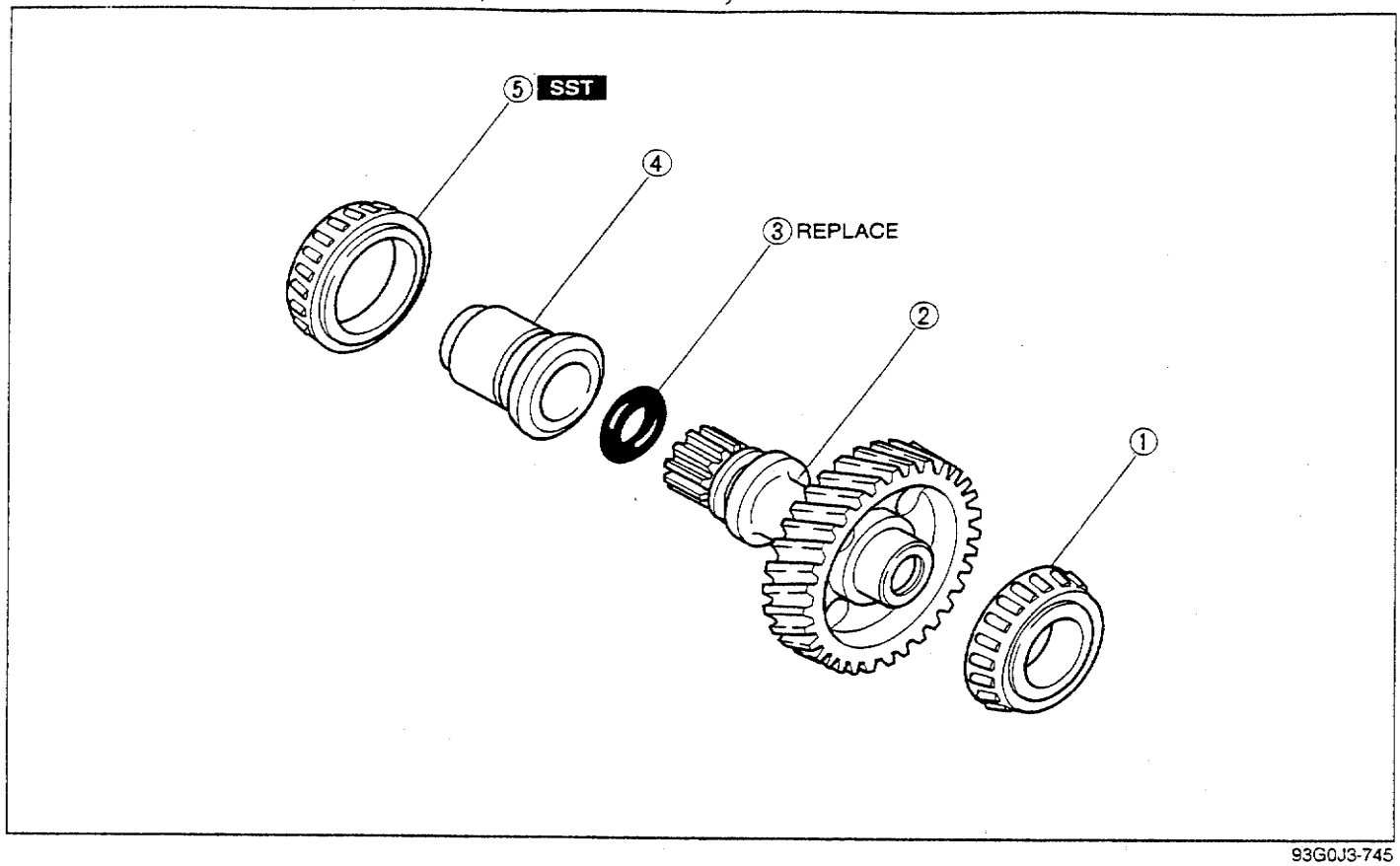
Differential gear case sleeve

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.

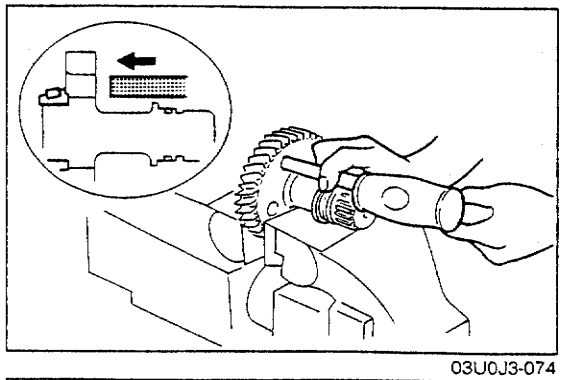
Idler Gear Assembly

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



93G0J3-745

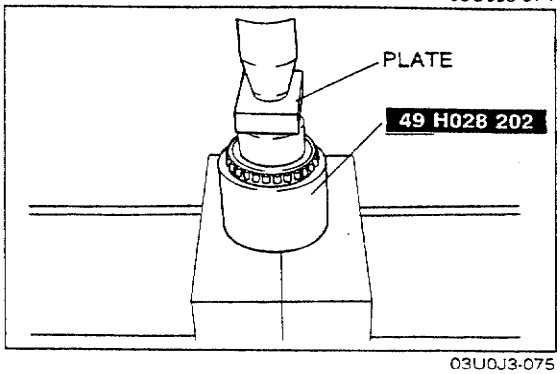
1. Bearing inner race (Idler gear side)
   Disassembly Note ..... page J3–68
2. Idler gear
   Inspect gear teeth for wear and cracks
3. O-ring
4. Joint sleeve
5. Bearing inner race (Joint sleeve side)
   Disassembly Note ..... page J3–68



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)

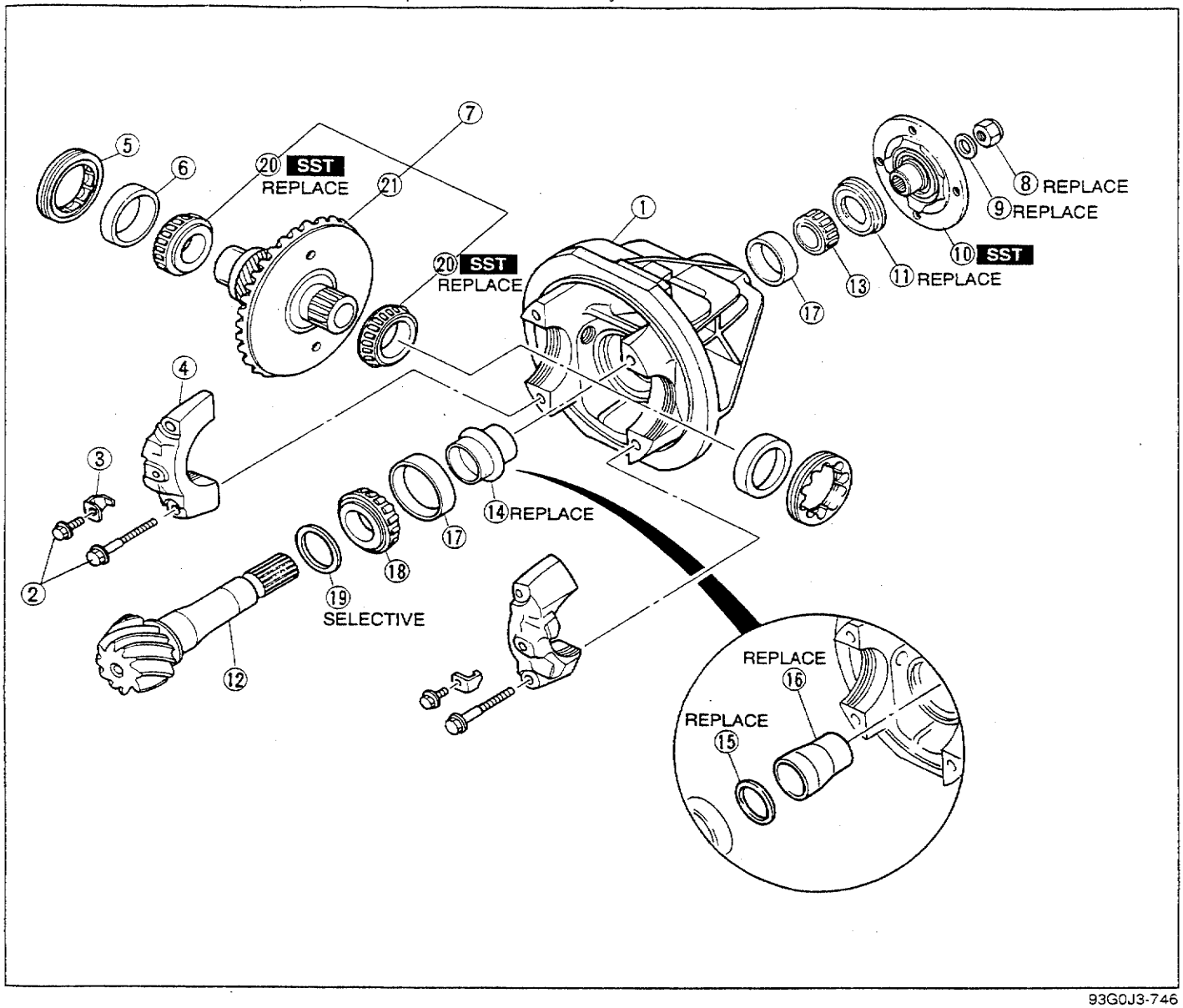
Caution

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

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

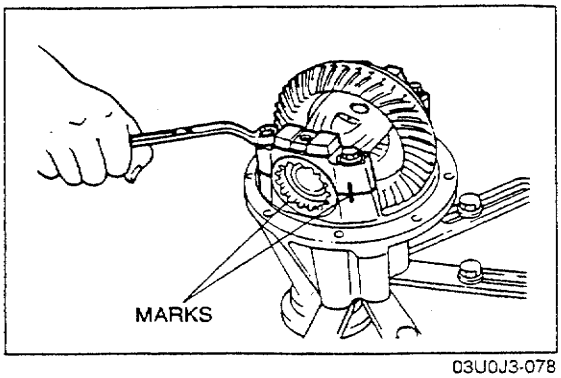
Transfer Carrier Assembly

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



93G0J3-746

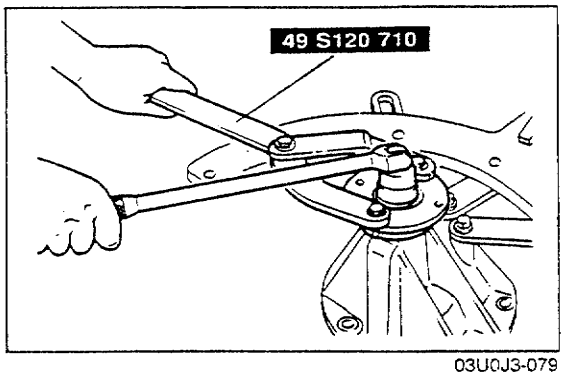
1. Transfer carrier
   Disassembly Note ..... page J3–70
2. Bolts
3. Lock plates
4. Bearing caps
5. Adjusting screws
   Disassembly Note ..... page J3–70
6. Side bearings
7. Ring gear assembly
8. Nut
   Disassembly Note ..... page J3–70
9. Washer
10. Companion flange
    Disassembly Note ..... page J3–70
11. Oil seal
12. Drive pinion
    Disassembly Note ..... page J3–70
13. Bearing inner race
    Inspect for damage and rough rotation
14. Collapsible spacer (BP SOHC)
15. Collapsible spacer (BP DOHC Turbo)
16. Spacer (BP DOHC Turbo)
17. Bearing outer race
    Disassembly Note ..... page J3–70
    Inspect for damage and rough rotation
18. Bearing inner race (Drive pinion)
    Disassembly Note ..... page J3–71
    Inspect for damage and rough rotation
19. Spacer
20. Bearing inner races (Side bearing)
    Disassembly Note ..... page J3–71
21. Ring gear



03U0J3-078

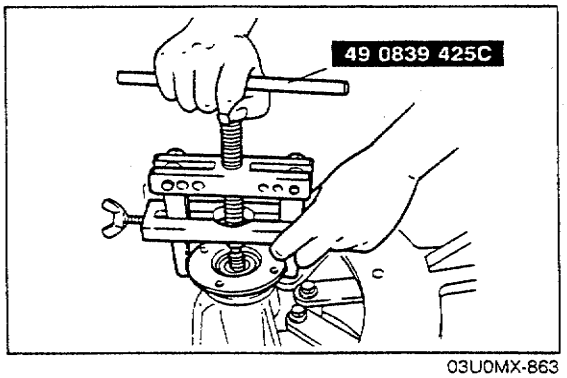
Disassembly Note
Transfer carrier
1. Mark one bearing cap and the carrier for proper reassembly.

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



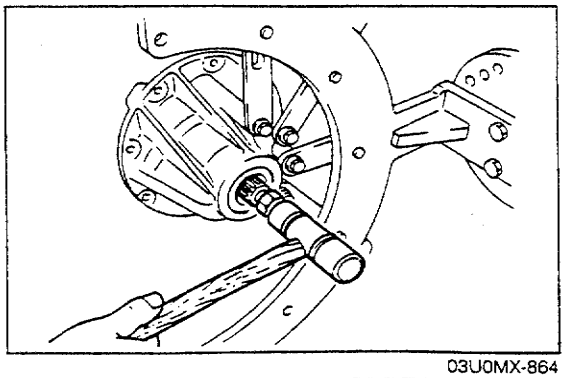
03U0J3-079

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



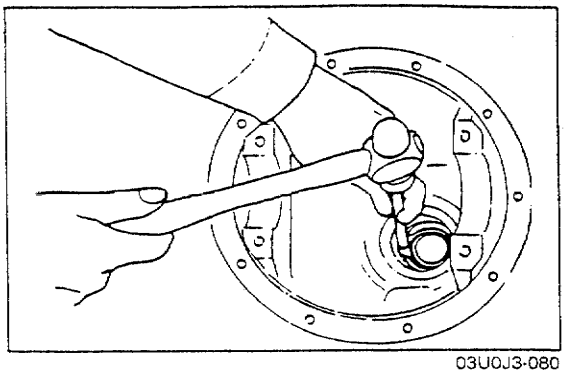
03U0MX-863

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.

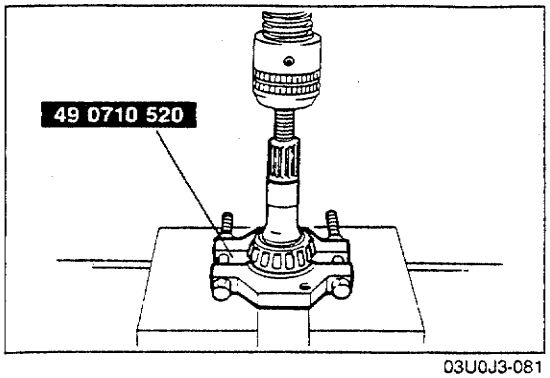


03U0J3-080

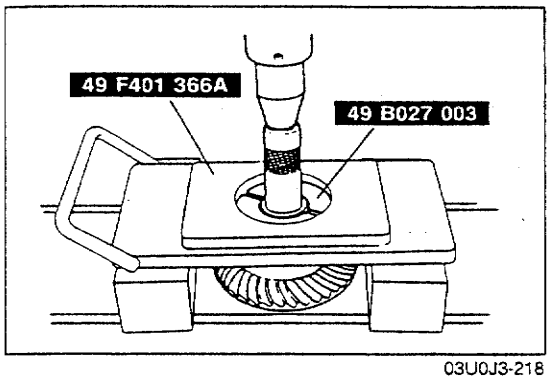
Bearing outer race

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.



03U0J3-081



03U0J3-218

Bearing inner race (Drive pinion)

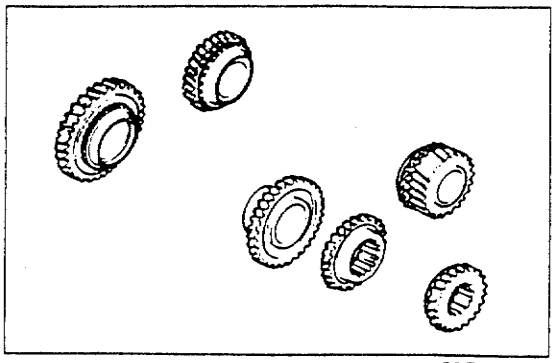
Note
- **Support the drive pinion by hand so that it does not fall.**

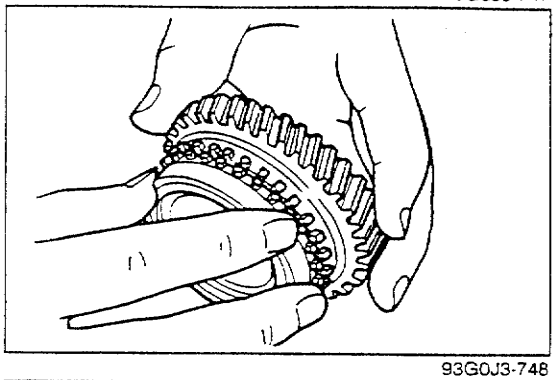
1. Remove the bearing with the **SST**.

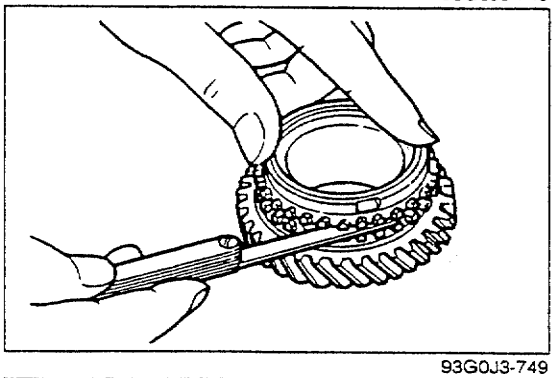
Bearing inner races (Side bearing)

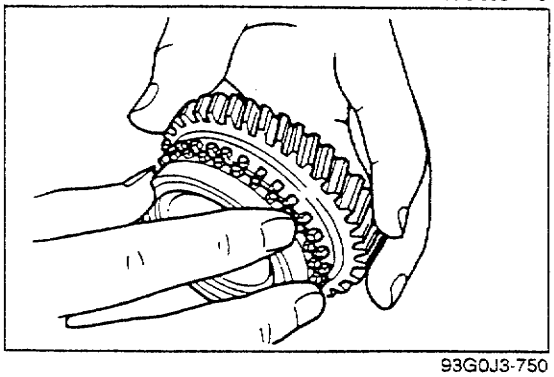
Note
- **Support the ring gear by hand so that it does not fall.**

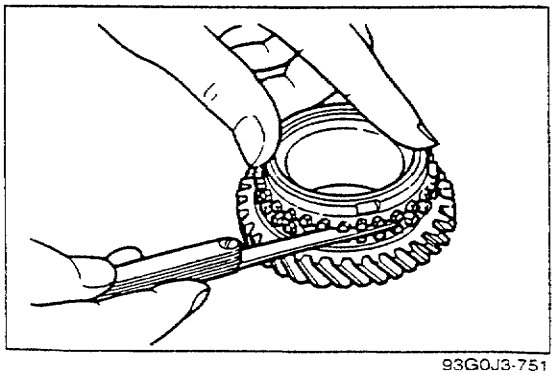
1. Remove the bearing inner race with the **SST**.


93G0J3-747


93G0J3-748


93G0J3-749


93G0J3-750


93G0J3-751

INSPECTION

Inspect all parts and repair or replace as necessary.

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.

Synchronizer ring (BP SOHC), 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.

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: 1.02—1.98mm (0.040—0.078 in)
Minimum: 0.50mm (0.020 in)

Double cone assembly (BP DOHC Turbo), gear (1st, 2nd)

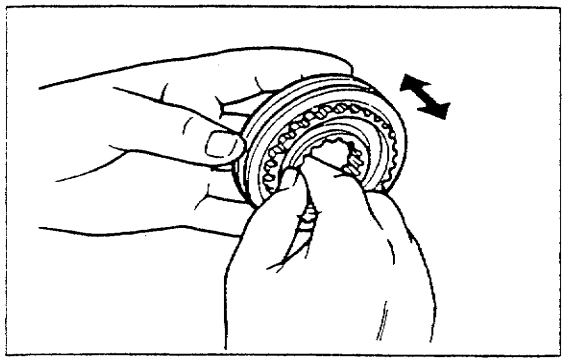
1. Inspect the individual synchronizer ring double cone and inner cone teeth for damage, wear, and cracks.
2. Inspect the taper surface for wear and cracks.

Note

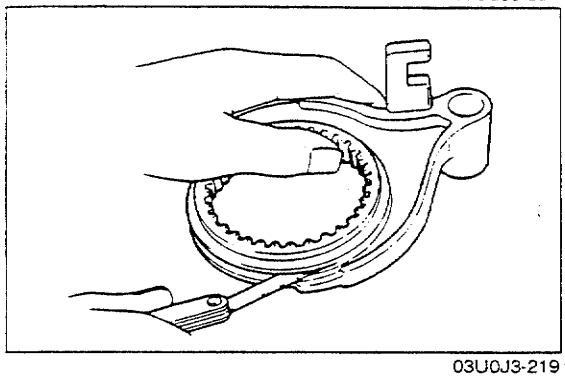
- **Set the synchronizer ring, double cone and inner cone squarely in the gear; then measure around the circumference.**
- **Replace the double cone, inner cone and synchronizer ring as one assembly.**

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

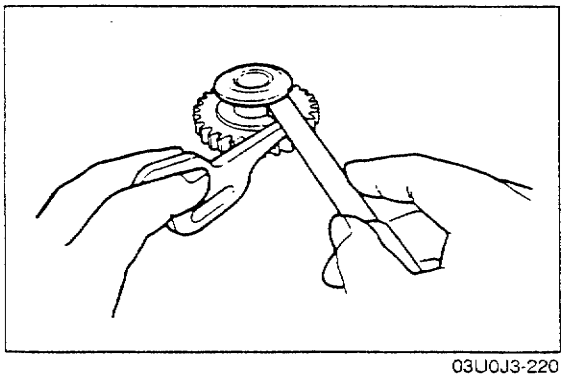
Standard clearance: 1.5mm (0.059 in)
Minimum: 0.8mm (0.031 in)



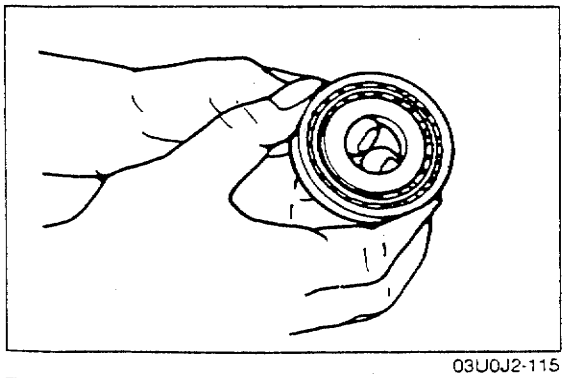
03U0J3-084



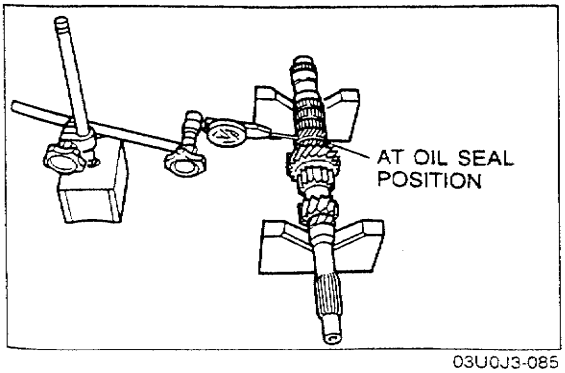
03U0J3-219



03U0J3-220



03U0J2-115



03U0J3-085

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.

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)

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)

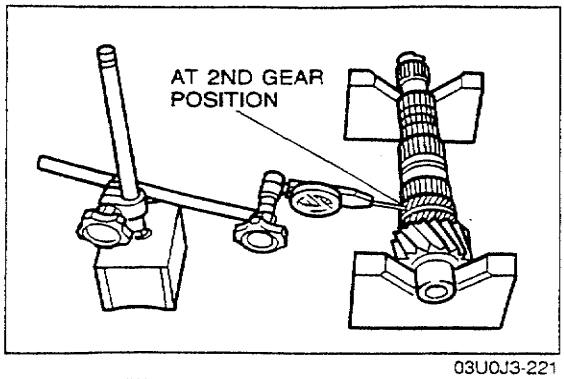
Bearing

1. Inspect for damage and rough rotation.

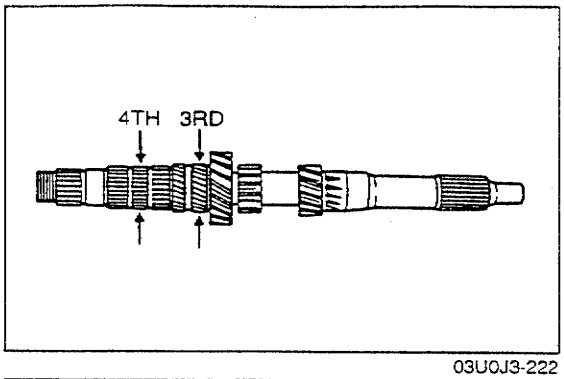
Primary Shaft and Secondary Shaft

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.

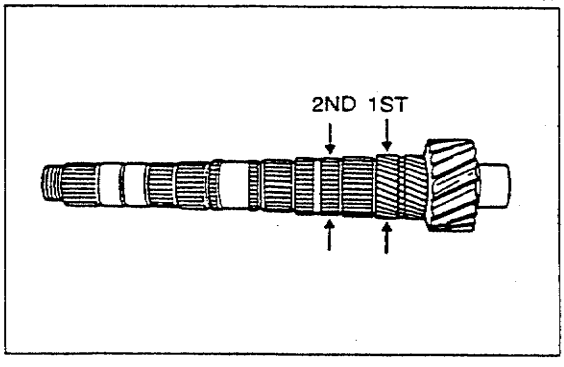
Primary shaft gear runout: 0.05mm (0.002 in)

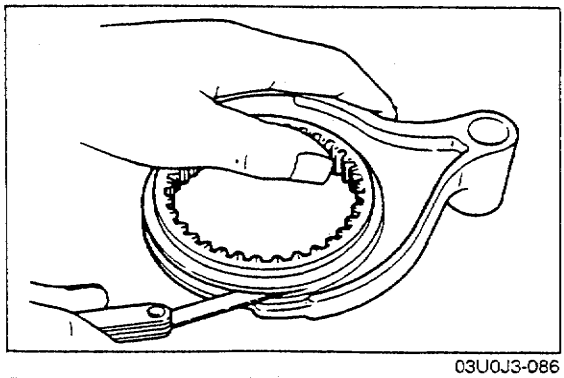


03U0J3-221

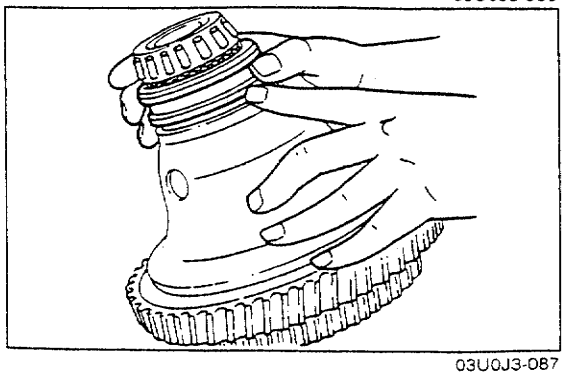


03U0J3-222





03U0J3-086



03U0J3-087

Secondary shaft gear runout: 0.015mm (0.0006 in)

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

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)

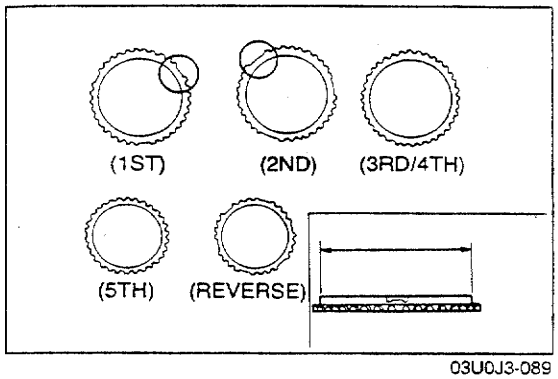
2. Inspect for damage and rough rotation.

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



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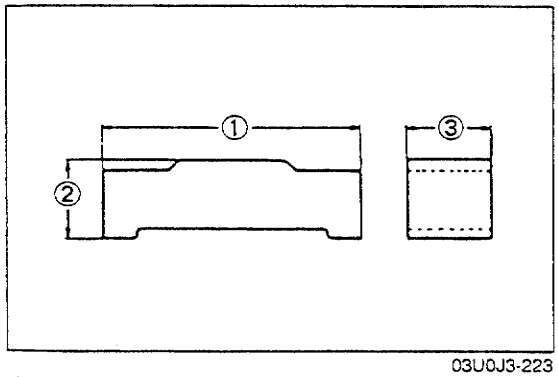

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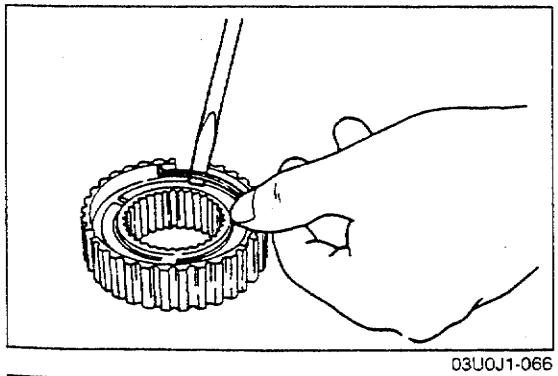
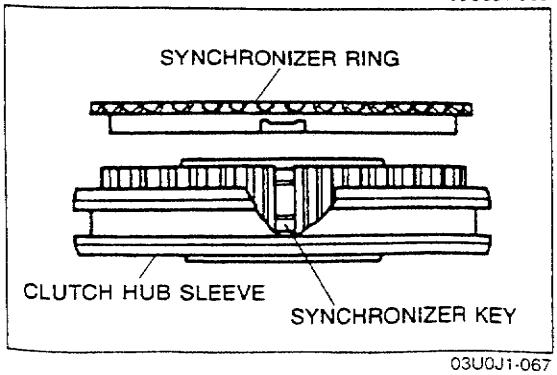


03U0J1-066



03U0J1-067

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)

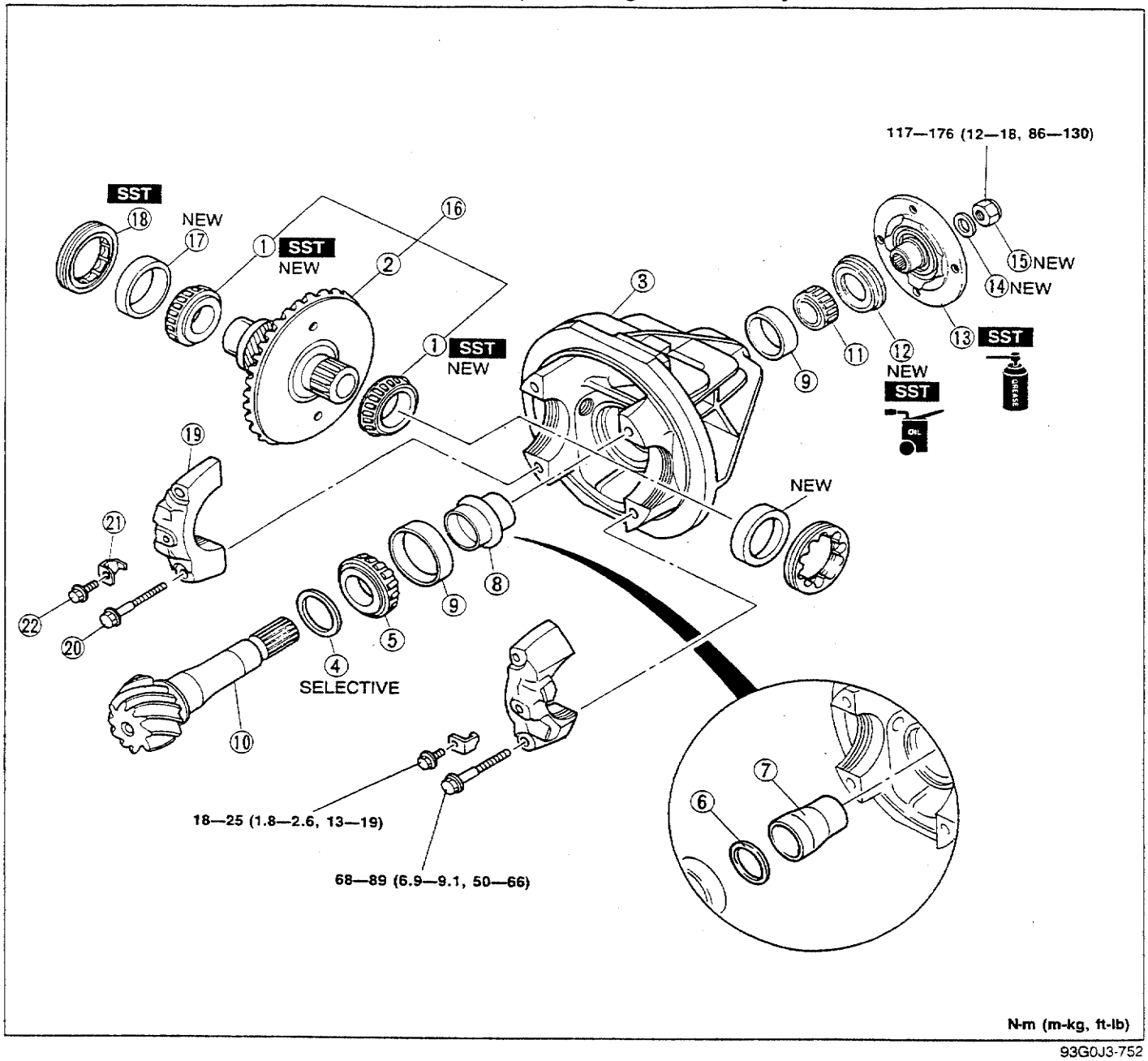
	①	②	③
1st/2nd	19.00 (0.748)	4.25 (0.167)	5.00 (0.197)
3rd/4th	17.00 (0.669)	4.25 (0.167)	5.00 (0.197)
5th	17.00 (0.669)	4.25 (0.167)	5.00 (0.197)

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

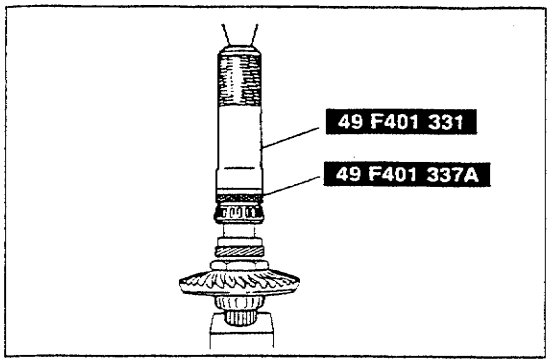
2. Align the synchronizer ring grooves with the synchronizer key during assembly.

Transfer Carrier Assembly

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

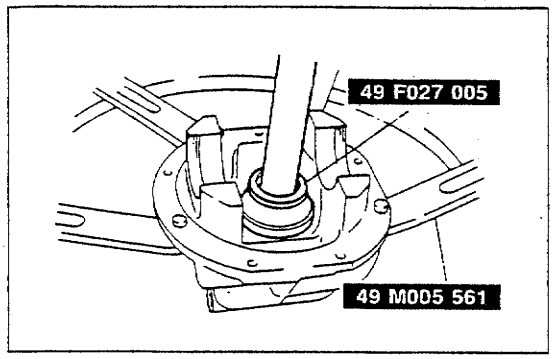


1. Bearing inner races (Side bearing)
   Assembly Note..... page J3–77
2. Ring gear
3. Transfer carrier
4. Spacer
   Assembly Note..... page J3–78
5. Bearing inner race (Drive pinion side)
   Assembly Note..... page J3–78
6. Spacer (BP DOHC Turbo)
7. Collapsible spacer (BP DOHC Turbo)
8. Collapsible spacer (BP SOHC)
9. Bearing outer race
10. Drive pinion
    Assembly Note..... page J3–77
11. Bearing inner race
12. Oil seal (Companion flange)
    Assembly Note..... page J3–79
13. Companion flange
    Assembly Note..... page J3–79
14. Washer
15. Nut (Companion flange)
    Assembly Note..... page J3–85
16. Ring gear assembly
17. Bearing outer races (Side bearing)
18. Adjusting screws
    Assembly Note..... page J3–80
19. Bearing caps
20. Bolts
21. Lock plates
22. Bolts



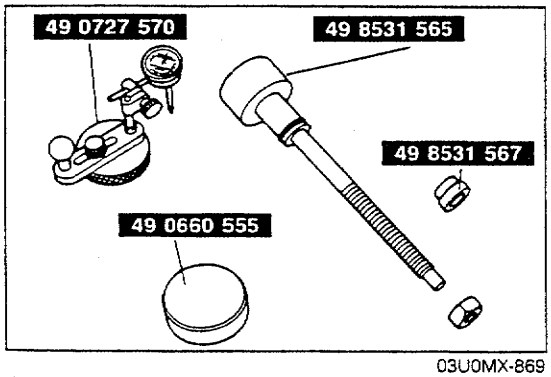
03U0J3-092

Assembly note
Bearing inner races (Side bearing)
1. Install the bearing with the **SST**.



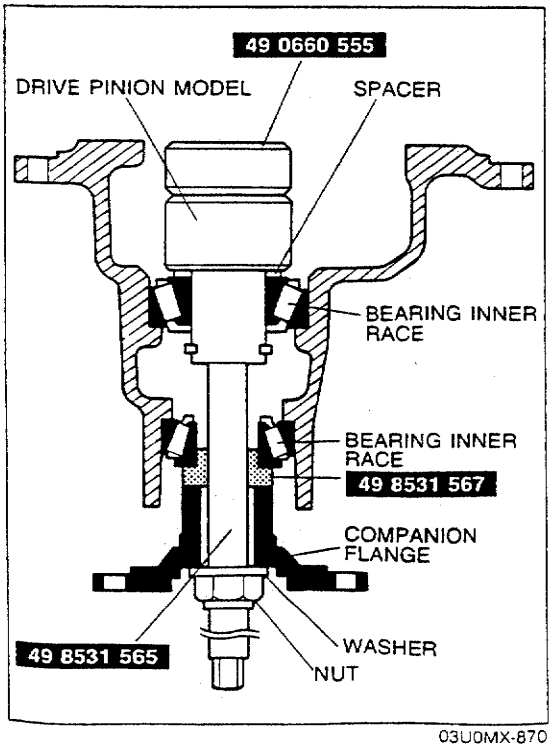
93G0J3-753

Bearing outer races
1. Install the front and rear bearing outer races with the **SST**.



03U0MX-869

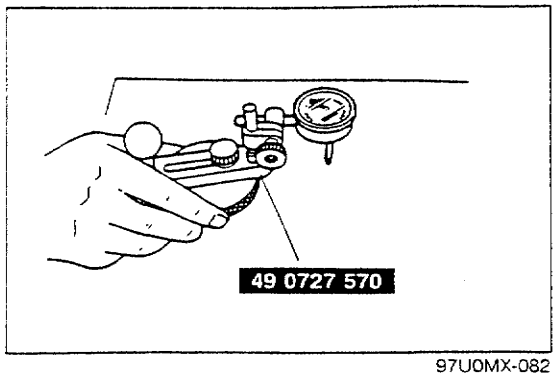
Adjustment of pinion height
1. Adjust the drive pinion height as follows with the **SST**.



03U0MX-870

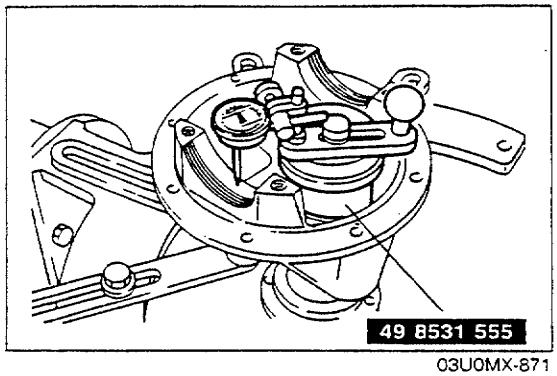
Note
- **Use the spacer that was removed.**
- **Do not install the collapsible spacer.**

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.



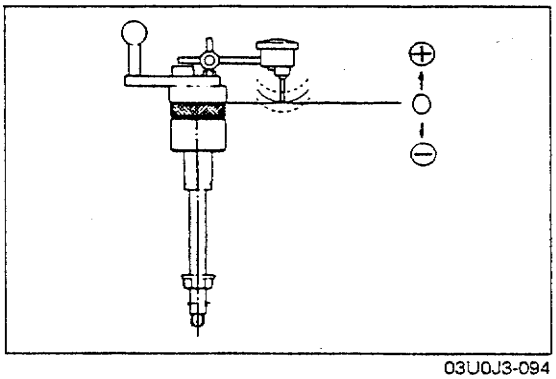
97U0MX-082

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



03U0MX-871

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

g) Average the values obtained in Step f.

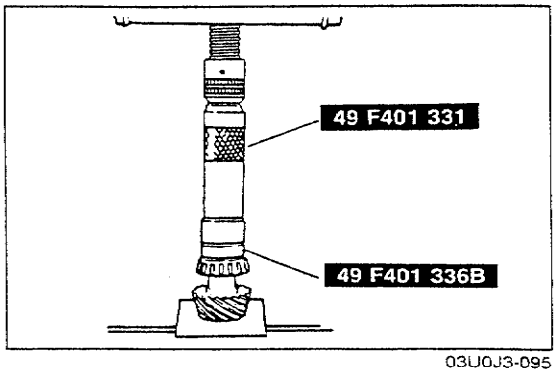
Specification: 0mm (0 in)

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

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.**



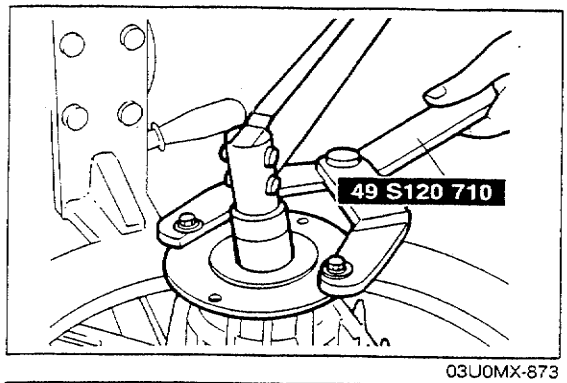
03U0J3-095

Adjustment of drive pinion preload

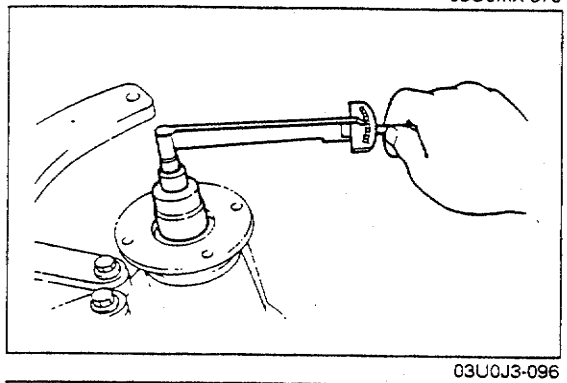
1. Install the spacer.

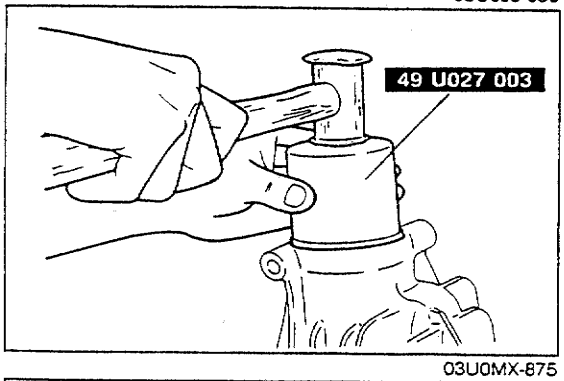
Note
- **Install the spacer selected from the pinion height adjustment above, being careful that the installation direction is correct.**
- **Press the bearing on until the force required suddenly increases.**

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

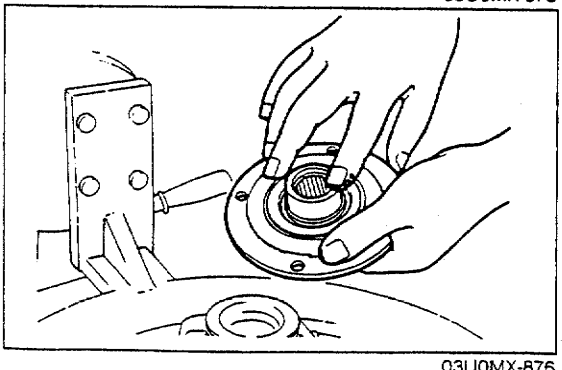


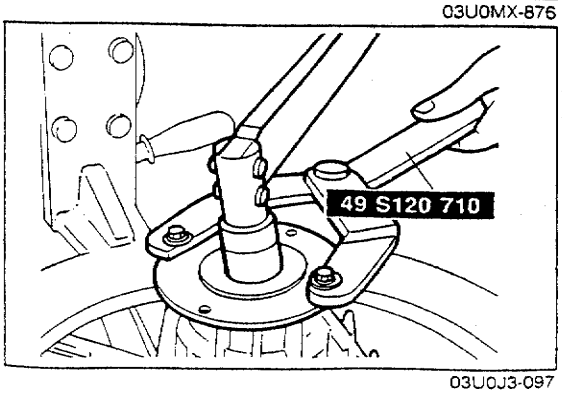
03U0MX-873


03U0J3-096



03U0MX-875


03U0MX-876



03U0J3-097

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.

Oil seal (Companion flange)

Caution
- **Apply differential oil to the oil seal lip.**

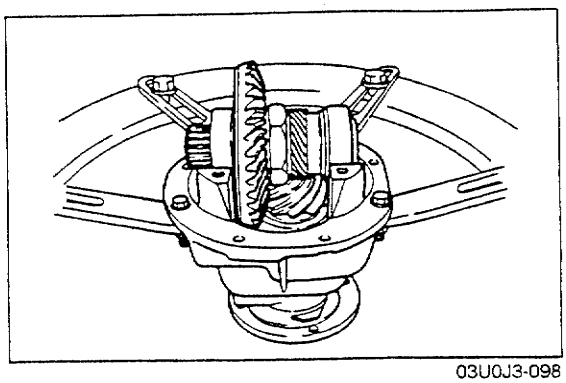
1. Tap a new oil seal into the differential carrier with the **SST**.

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

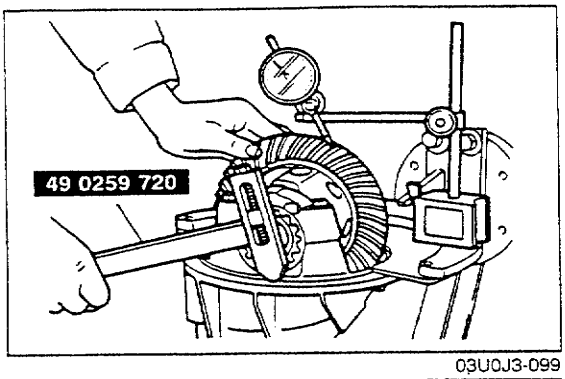
Nut (Companion flange)
1. Adjust the preload by tightening the flange nut.

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

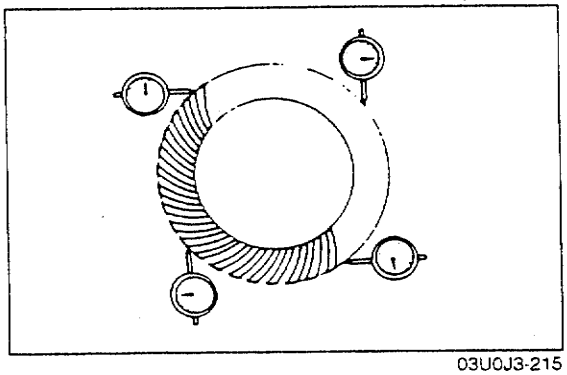
Tightening torque:
117—176 N·m (12—18 cm-kg, 86—130 in-lb)



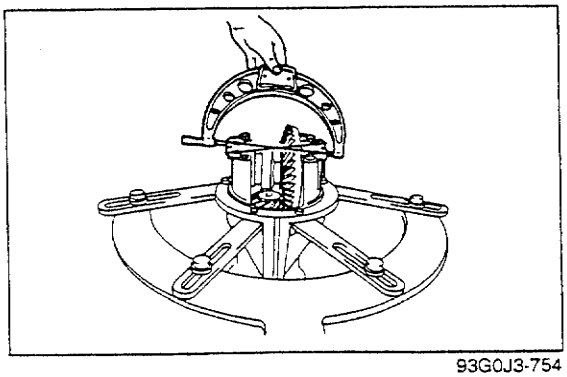
03U0J3-098



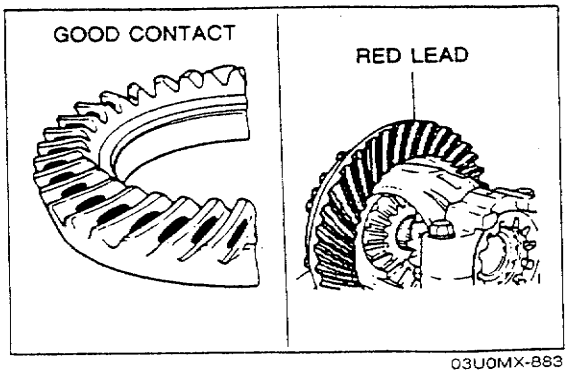
03U0J3-099



03U0J3-215



93G0J3-754



03U0MX-883

Adjustment of Backlash

1. Position the idler gear assembly in the carrier.
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.
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)**.
6. Tighten the adjusting screws equally until the distance between the pilot sections on the bearing caps is as specified.

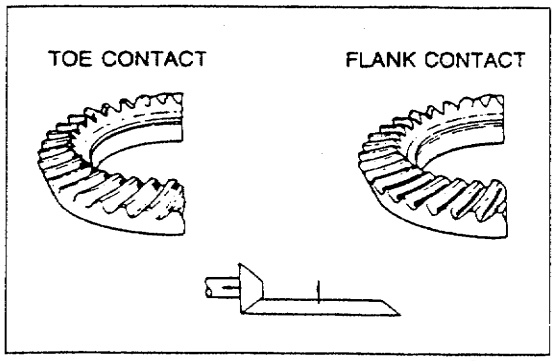
Specified distance:
142.137—142.200mm (5.596—5.599 in)

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

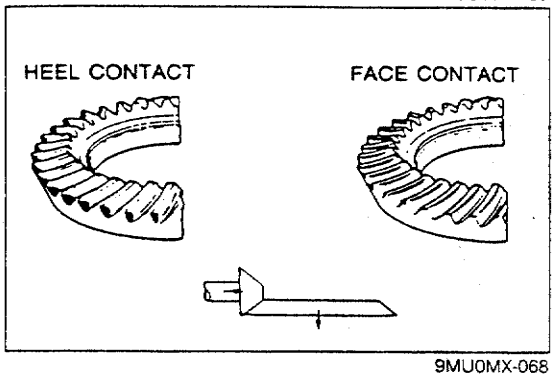
Tightening torque:
18—25 N·m (1.8—2.6 m-kg, 13—19 ft-lb)

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.



63G09X-385



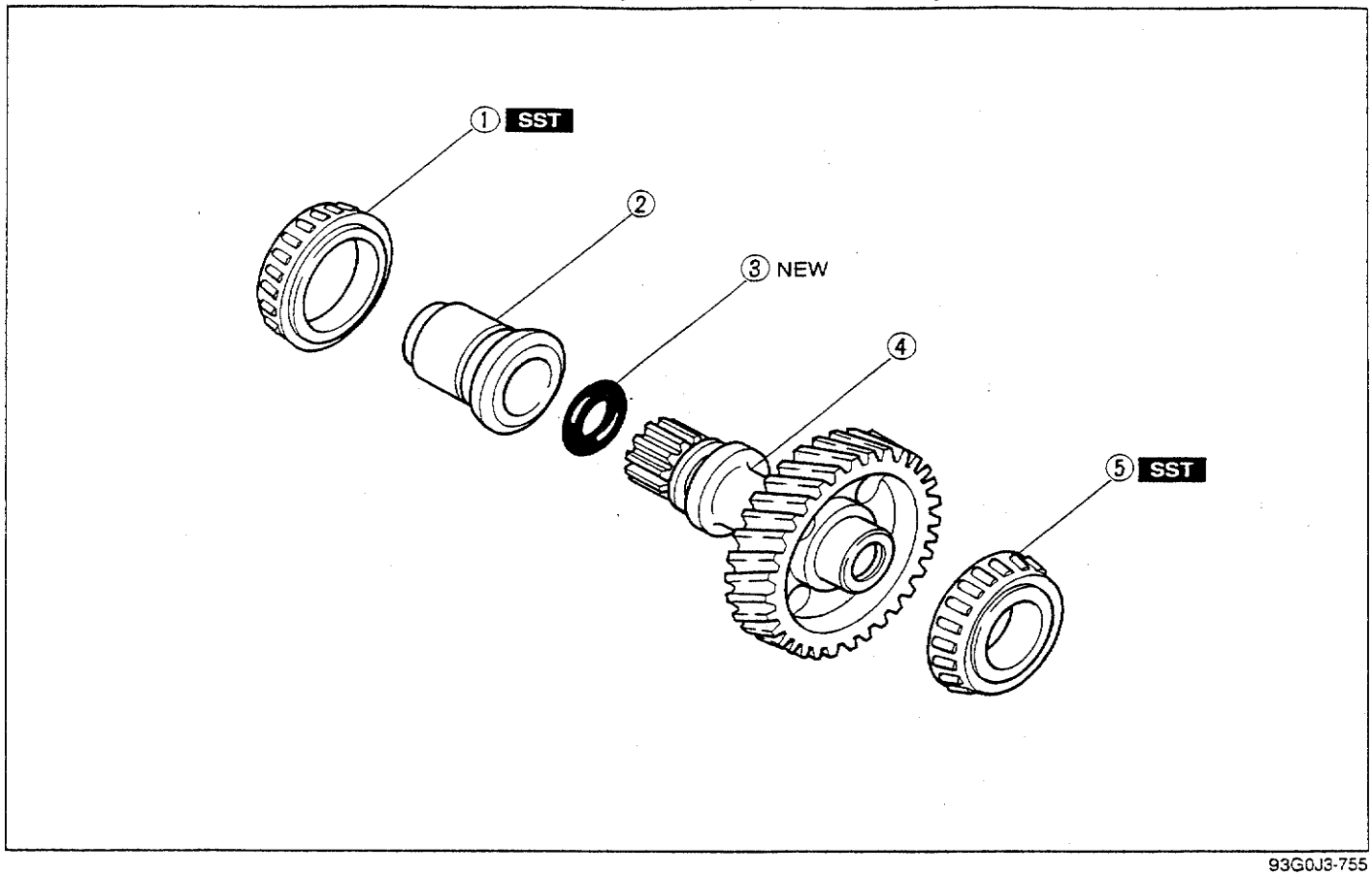
9MU0MX-068

(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.

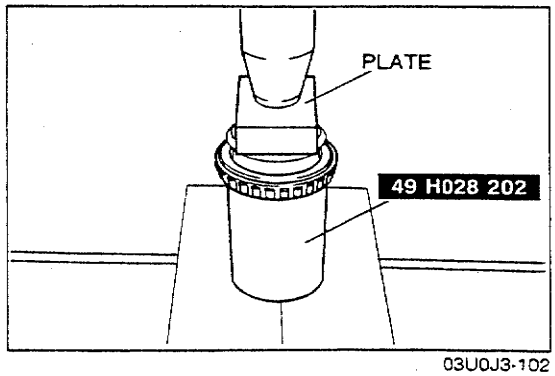
Idler Gear Assembly

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

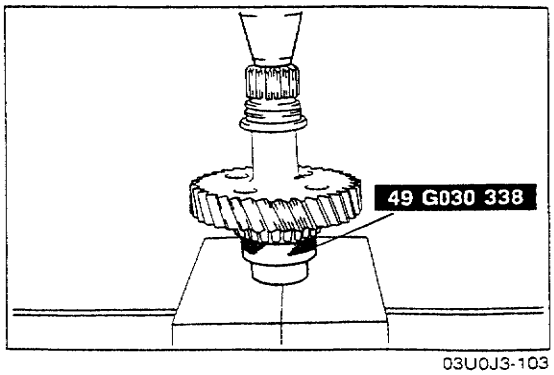


93G0J3-755

1. Bearing inner race (Joint sleeve side)
   Assembly Note..... page J3–82
2. Joint sleeve
3. O-ring
4. Idler gear
5. Bearing inner race (Idler gear side)
   Assembly Note..... page J3–82



03U0J3-102



03U0J3-103

Assembly note

Bearing inner race (Joint sleeve side)

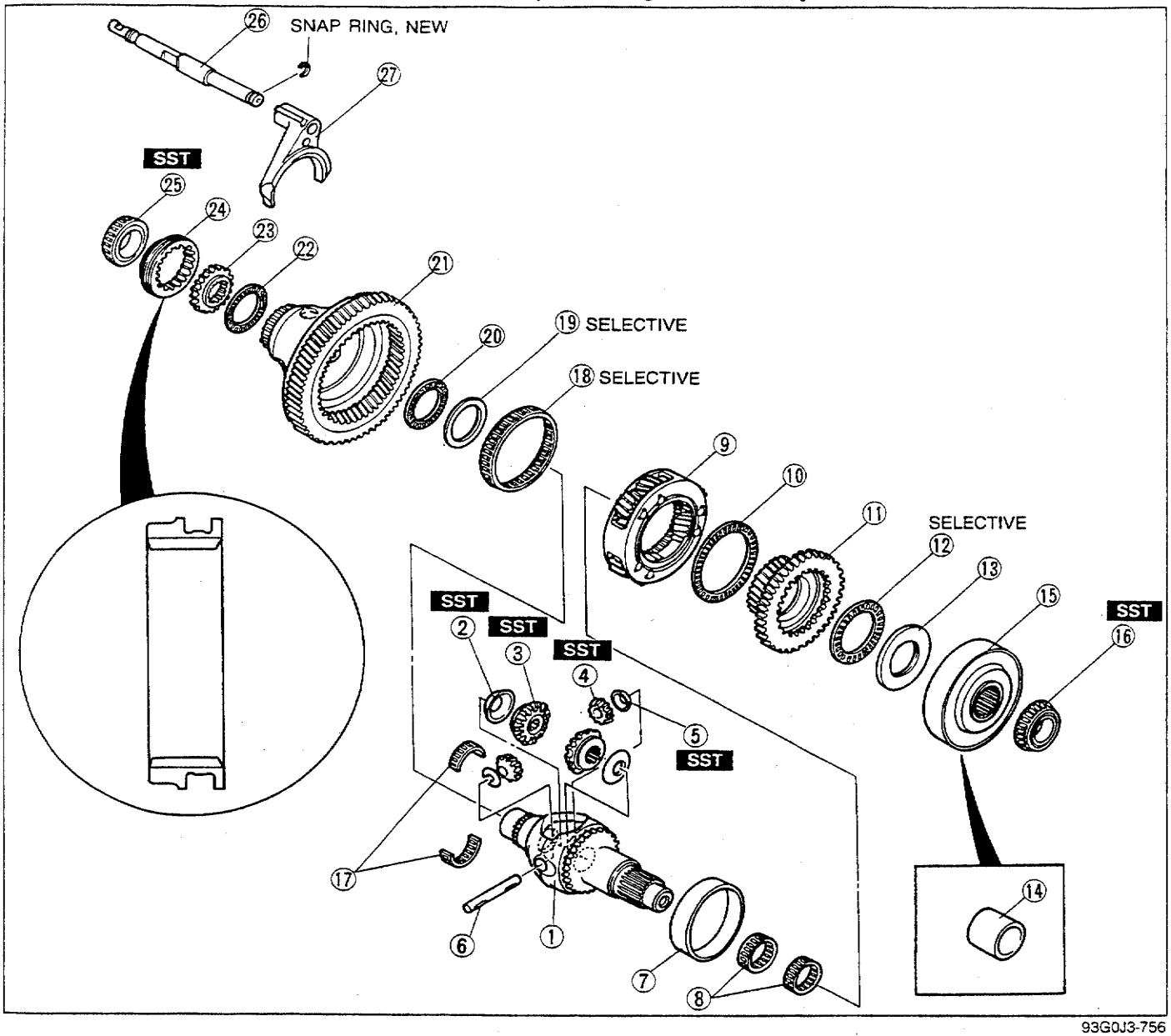
1. Install the bearing with the **SST**.

Bearing inner race (Idler gear side)

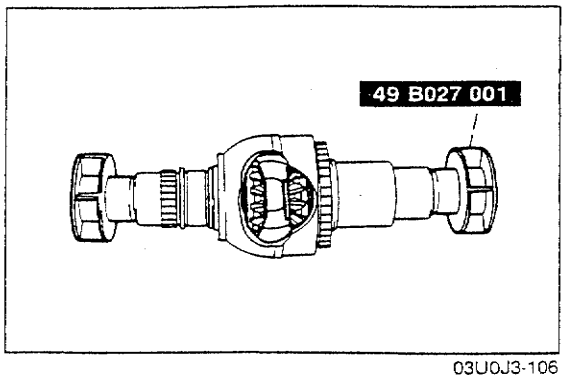
1. Install the bearing with the **SST**.

Front and Center Differential Assembly

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



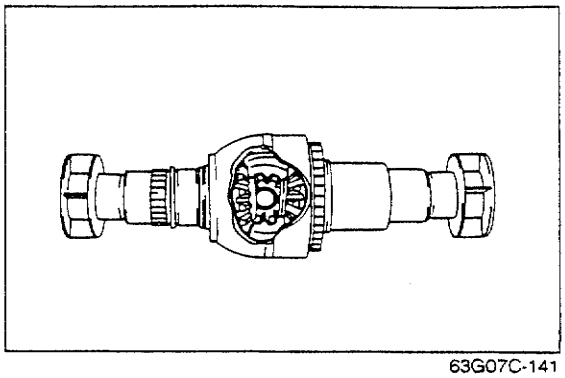
1. Front differential gear case
2. Washers
3. Side gears
   Assembly Note..... page J3–84
4. Pinion gears
   Assembly Note..... page J3–84
5. Washers
6. Pinion shaft
7. Front differential gear case sleeve
   Assembly Note..... page J3–84
8. Needle bearings
9. Planetary carrier assembly
10. Needle bearing
11. Sun gear
12. Needle bearing
13. Washer
14. Spacer (BP SOHC)
15. Viscous coupling (BP DOHC Turbo)
16. Bearing inner race (Sun gear side)
    Assembly Note..... page J3–86
17. Needle bearings
18. Needle bearing
19. Washer
    Assembly Note..... page J3–85
20. Needle bearing
21. Front ring gear
22. Needle bearing
23. Differential lock gear hub
24. Differential lock gear sleeve
25. Bearing inner race (Gear sleeve side)
    Assembly Note..... page J3–86
26. Center differential lock shift rod
27. Center differential lock shift fork



03U0J3-106

Side gears, pinion gears

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

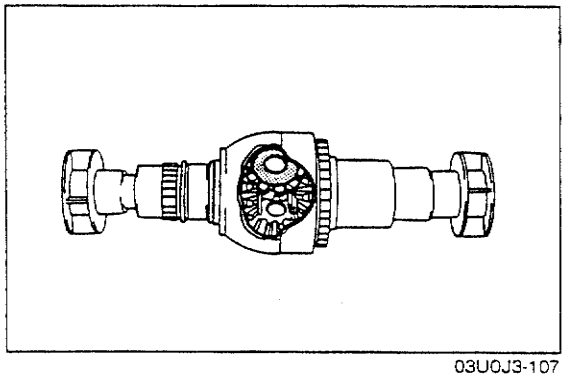


63G07C-141

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

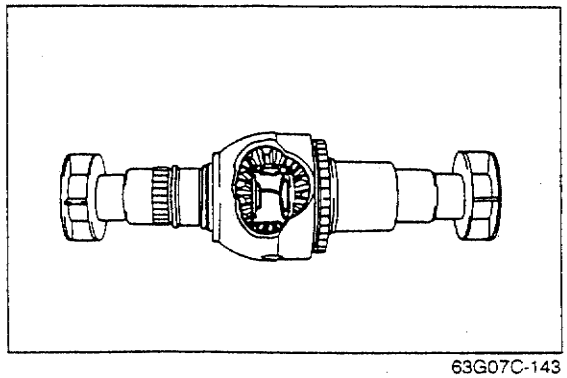
Note

- **Do not install the washer at this time.**



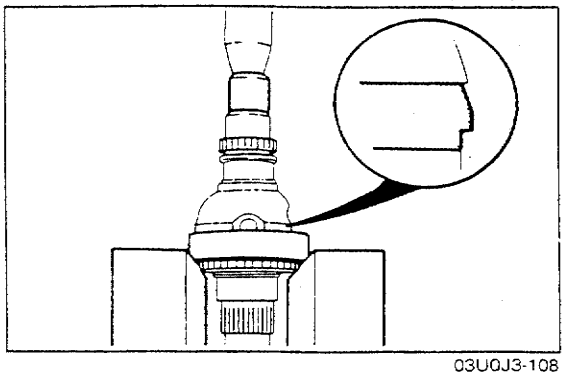
03U0J3-107

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.



63G07C-143

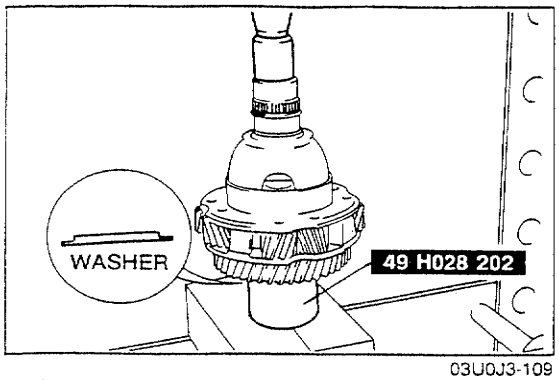
6. Align the pinion shaft holes of the pinion gears with the differential gear case.



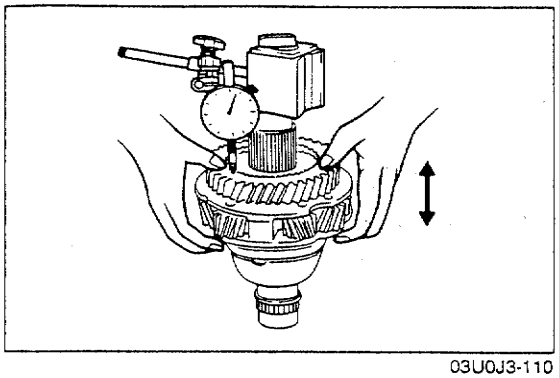
03U0J3-108

Front differential case sleeve

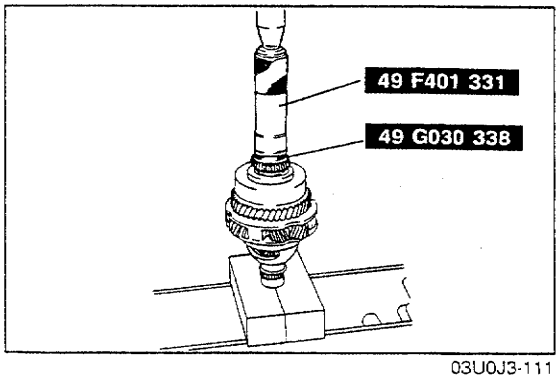
1. Install the front differential case sleeve with a press as shown in the figure.



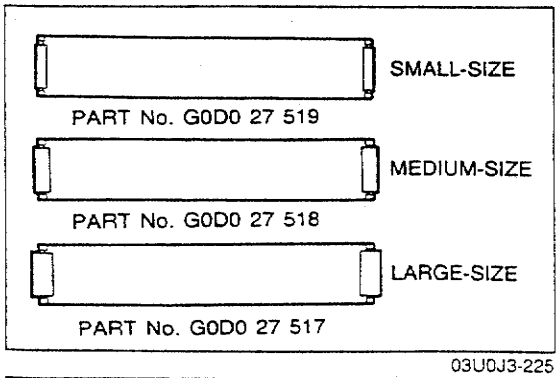
03U0J3-109



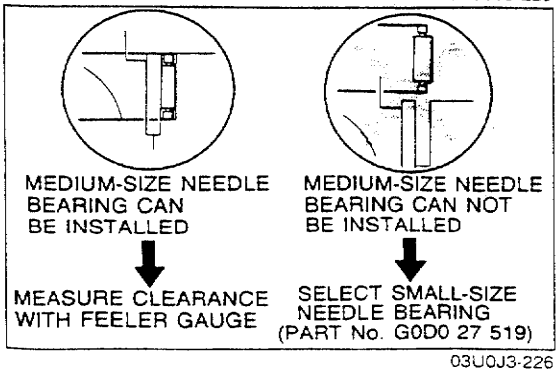
03U0J3-110



03U0J3-111



03U0J3-225



03U0J3-226

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)

Bearing inner race (Sun gear side)

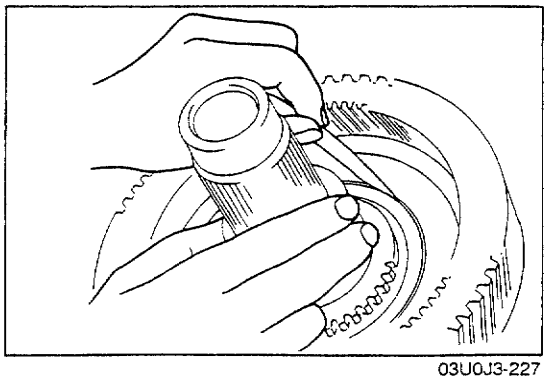
1. Install the bearing inner race with the **SST**.

Adjustment of front differential gear case radial clearance

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

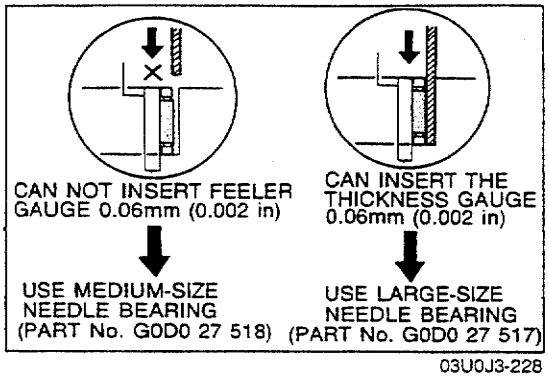
   Note
   - **Available gear case needle bearing part numbers.**
     Small..... G0D0 27 519
     Medium . G0D0 27 518
     Large..... G0D0 27 517

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.



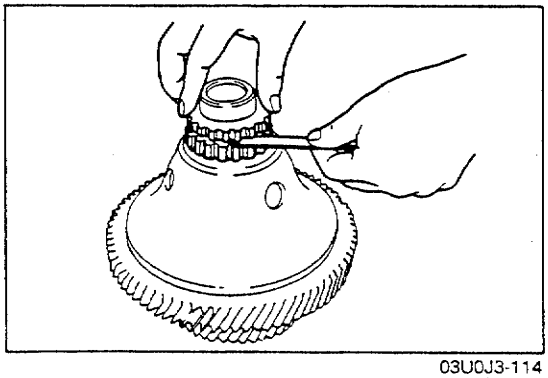
03U0J3-227

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.



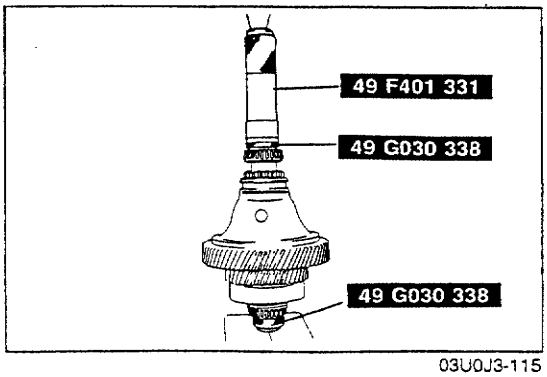
03U0J3-114

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.



03U0J3-115

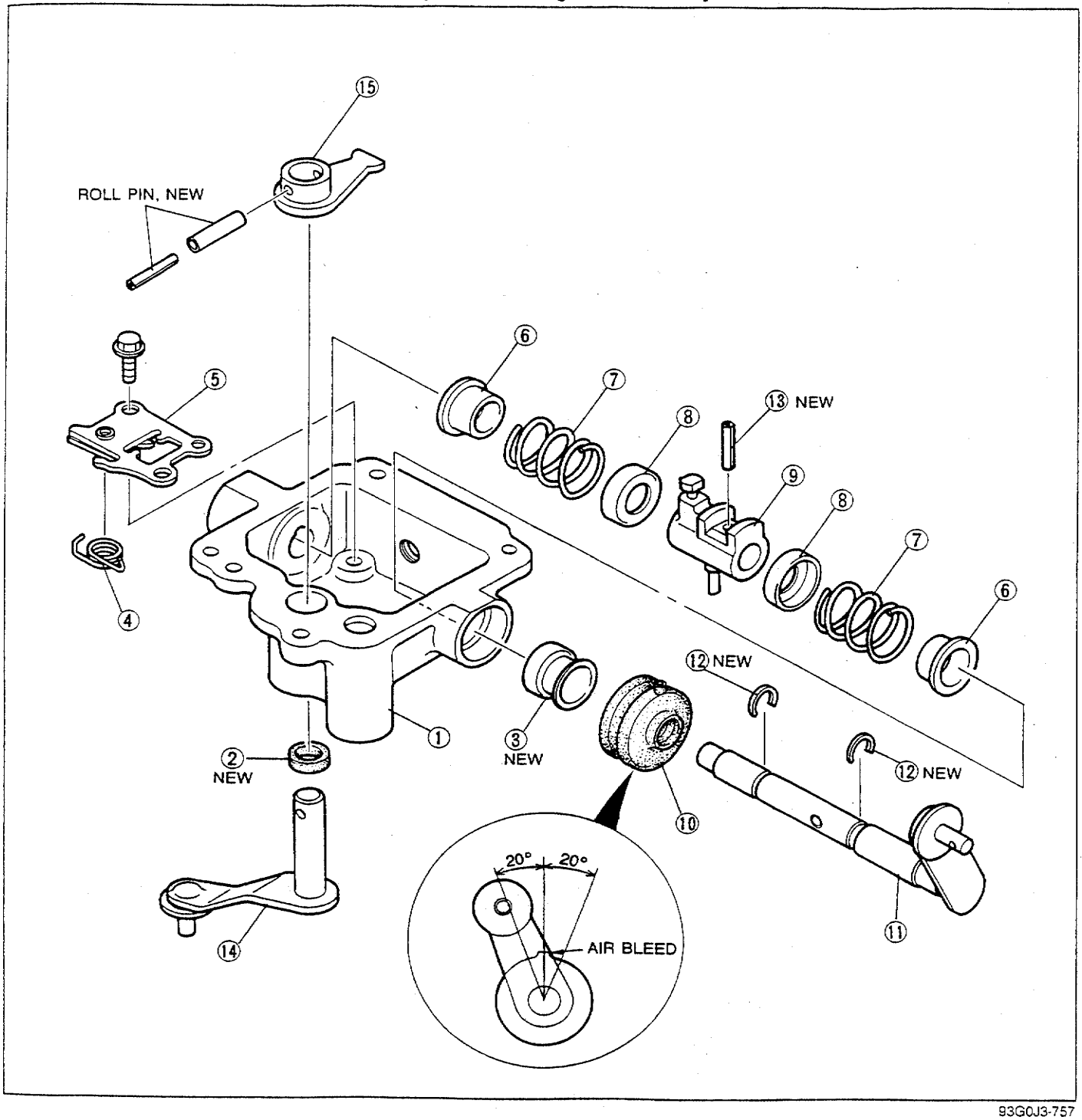
Washer thickness mm (in)		
1.20 (0.0472)	1.35 (0.0531)	1.50 (0.0590)
1.65 (0.0649)	1.80 (0.0708)	

Bearing inner race (Gear sleeve side)

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

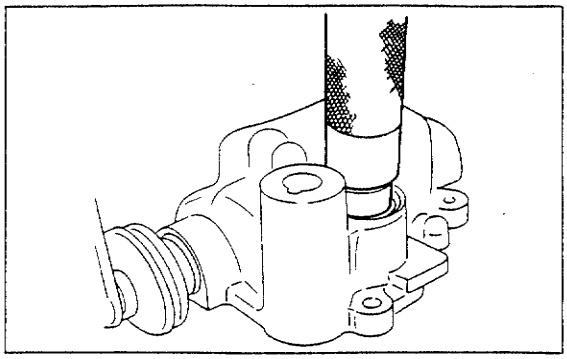
Top Cover Assembly

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



93G0J3-757

1. Top cover
2. Oil seal (Select lever side)
   Assembly Note..... page J3–88
3. Oil seal
   Assembly Note..... page J3–88
4. Reverse gate spring
5. Base plate assembly
6. Spring guides
7. Springs
   Assembly Note..... page J3–88
8. Washer
9. Inner shift lever
10. Boot
    Assembly Note..... page J3–88
11. Shift lever
    Assembly Note..... page J3–88
12. Snap rings
13. Roll pin
14. Select lever
15. Inner select lever

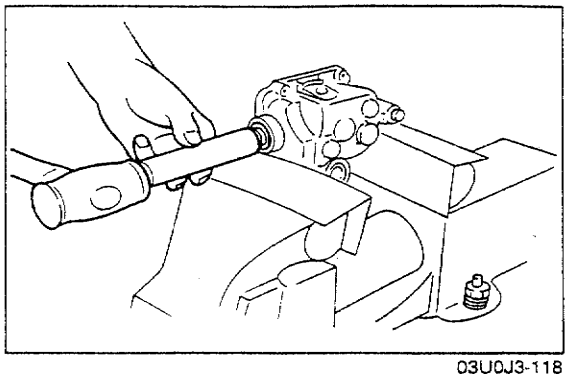


03U0J3-117

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.

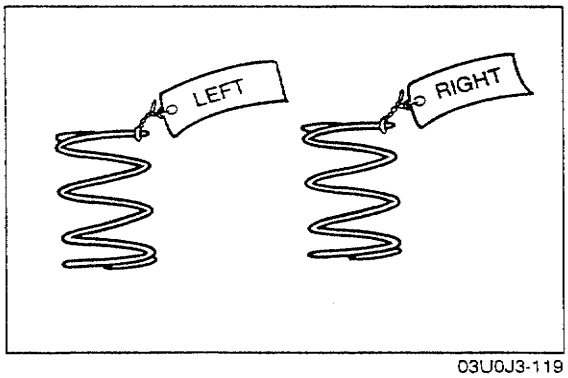


03U0J3-118

Oil seal

Caution
- **Apply transaxle oil to the oil seal lip.**

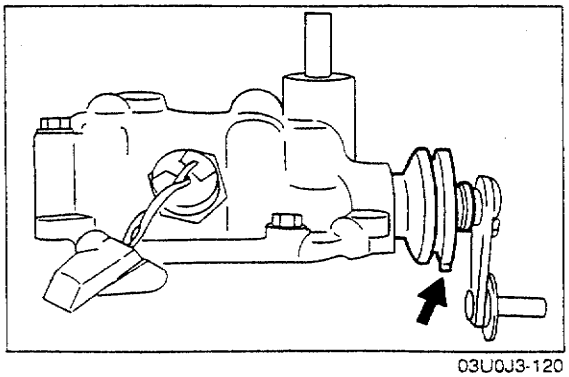
1. Install the new oil seal with a suitable pipe.



03U0J3-119

Springs

Caution
- **Do not misinstall the springs.**

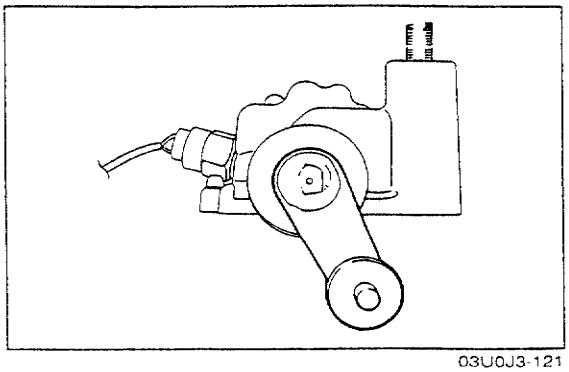


03U0J3-120

Boot

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

1. Install the boot.

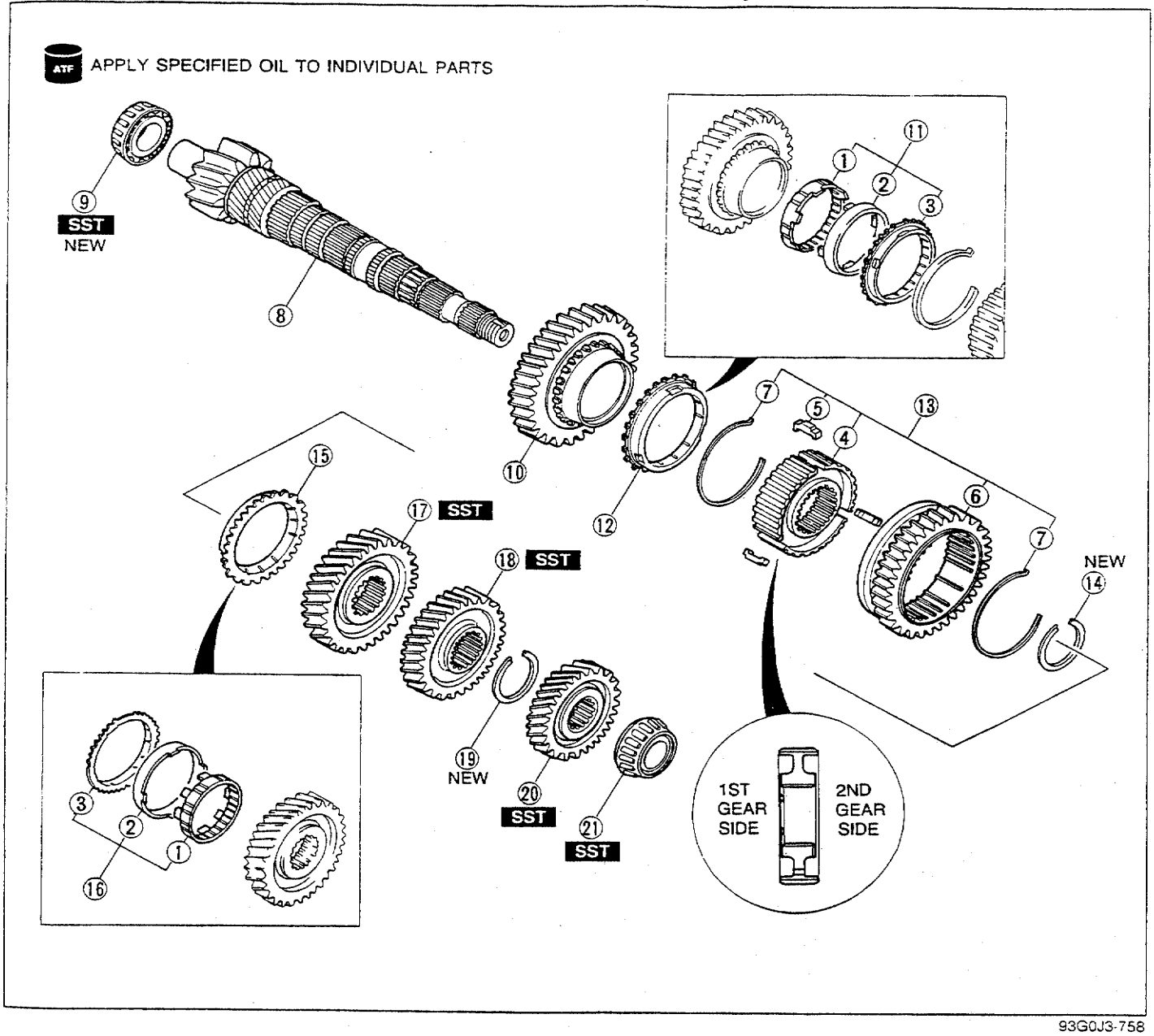


03U0J3-121

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

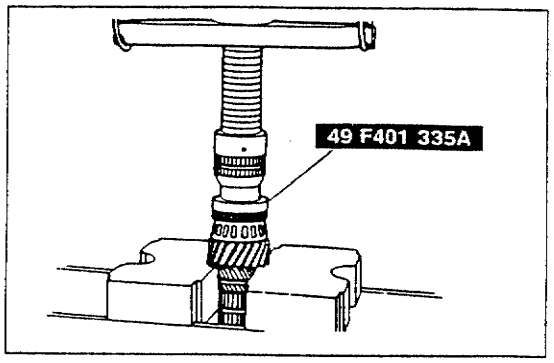
Secondary Shaft Assembly

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



93G0J3-758

1. Inner cone (BP Turbo)
2. Double cone (BP Turbo)
3. Synchronizer ring (BP Turbo)
4. Clutch hub (1st/2nd)
5. Synchronizer key
6. Clutch hub sleeve (1st/2nd)
7. Synchronizer key spring
8. Secondary shaft
9. Bearing inner race (Secondary shaft end)
   Assembly Note..... page J3–90
10. 1st gear
11. Double cone assembly
    Assembly Note..... page J3–90
12. Synchronizer ring (BP SOHC)
13. Clutch hub assembly (1st/2nd)
    Assembly Note..... page J3–90
14. Retaining ring
15. Synchronizer ring (BP SOHC)
16. Double cone assembly
    Assembly Note..... page J3–90
17. 2nd gear
    Assembly Note..... page J3–90
18. 3rd gear
    Assembly Note..... page J3–90
19. Retaining ring
20. 4th gear
    Assembly Note..... page J3–90
21. Bearing inner race
    Assembly Note..... page J3–90

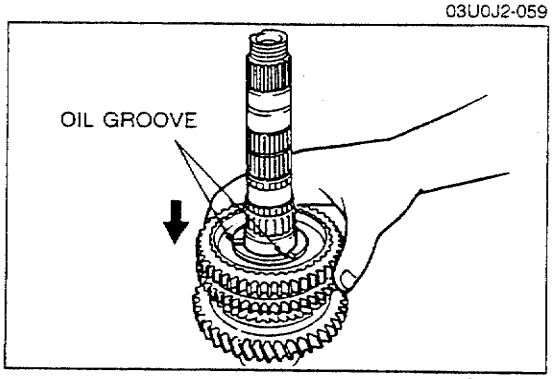


03U0J2-059

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).**

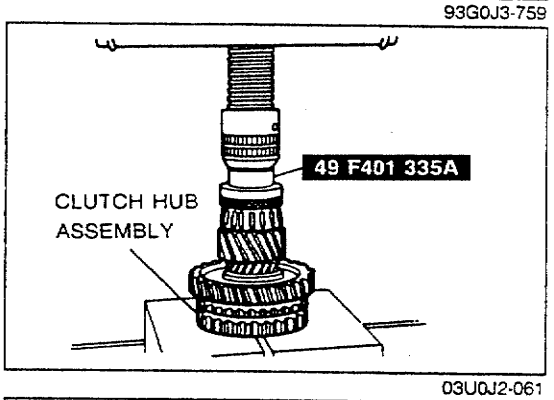


93G0J3-759

1st gear, synchronizer ring (1st) or double cone assembly (BP DOHC Turbo) and clutch hub assembly (1st/2nd)

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

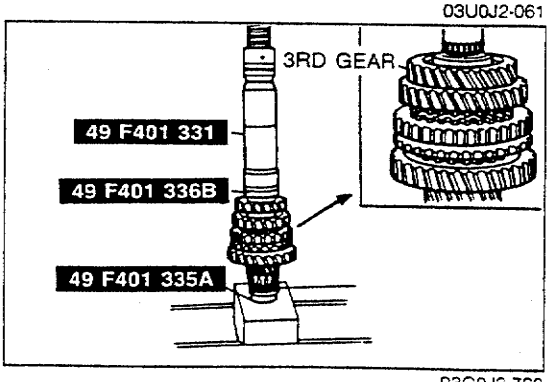
1. Assemble the 1st gear, synchronizer ring (1st) or double cone assembly (BP DOHC Turbo), and clutch hub assembly (1st/2nd), as shown in the figure.



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).**

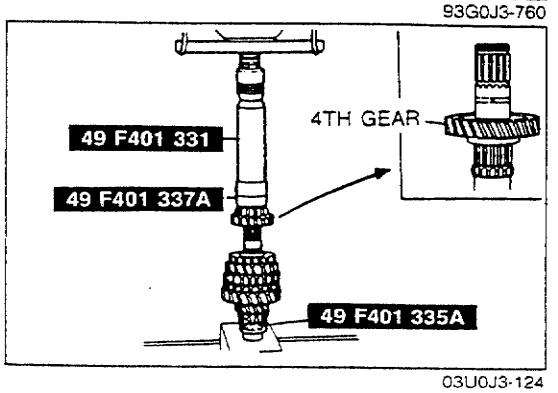


93G0J3-760

Synchronizer ring (2nd) or double cone assembly (BP DOHC Turbo), 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).**

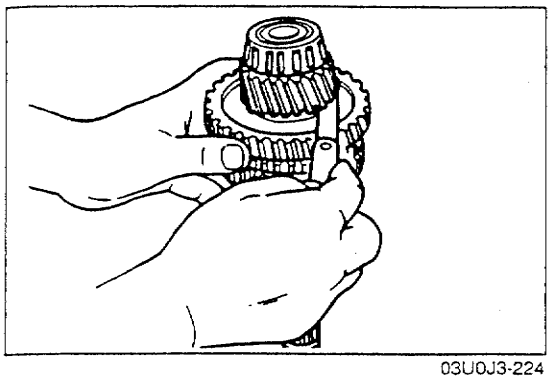


03U0J3-124

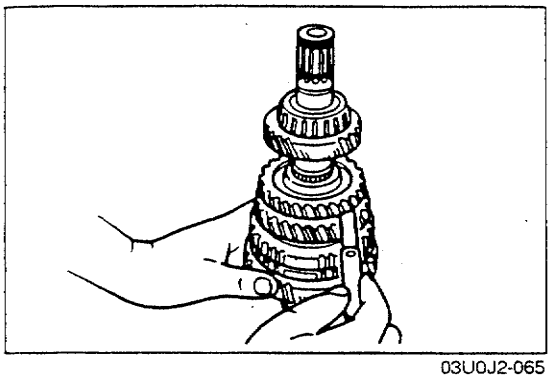
Secondary 4th gear and bearing inner race

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



03U0J2-065

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)

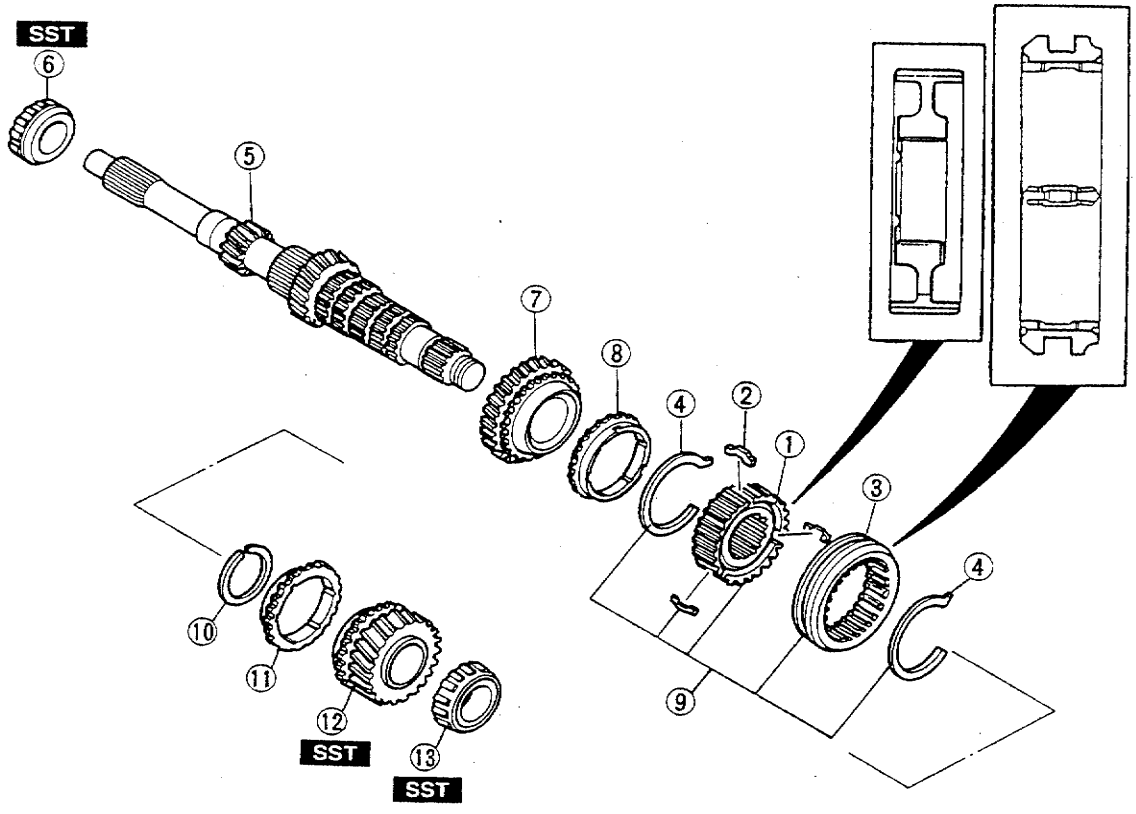
3. Measure the clearance between the 2nd gear and secondary 3rd gear.

   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.

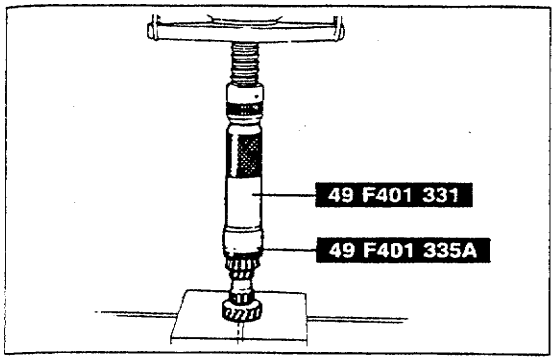
Primary Shaft Assembly

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



93G0J3-761

1. Clutch hub
   Assembly Note..... page J3–75
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 J3–93
7. 3rd gear
   Assembly Note..... page J3–93
8. Synchronizer ring (3rd)
   Assembly Note..... page J3–93
9. Clutch hub assembly (3rd/4th)
   Assembly Note..... page J3–75
10. Retaining ring
11. Synchronizer ring (4th)
    Assembly Note..... page J3–93
12. 4th gear
    Assembly Note..... page J3–93
13. Bearing inner race
    Assembly Note..... page J3–93

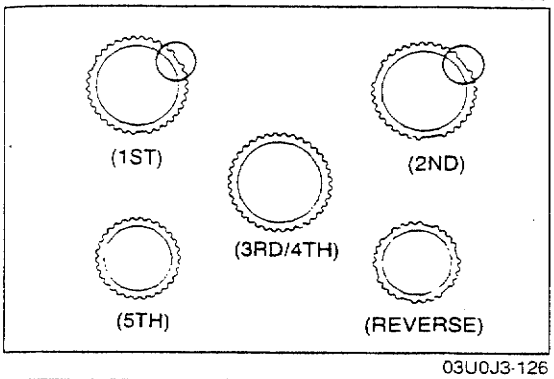


03U0J2-053

Bearing inner race (Primary shaft end)

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

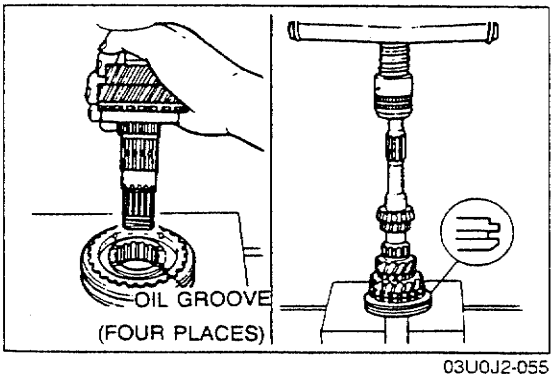
Note
- **Press to 19,620 N (2,000 kg, 4,400 lb).**



03U0J3-126

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

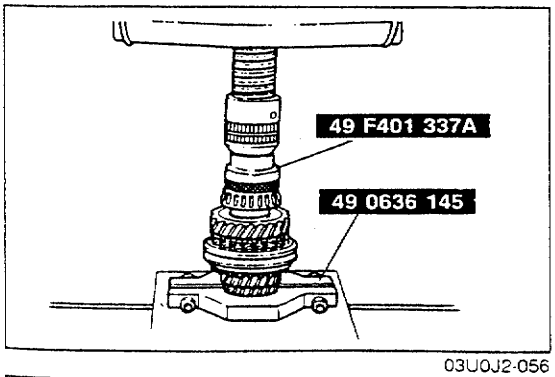
Note
- **The size of the 1st, 2nd, 3rd, and 4th synchronizer rings are the same. Be careful when installing them. The 2nd gear ring has the larger cut-out as shown in the illustration.**
- **Align the synchronizer ring grooves and clutch housing hub keys when installing.**



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).**

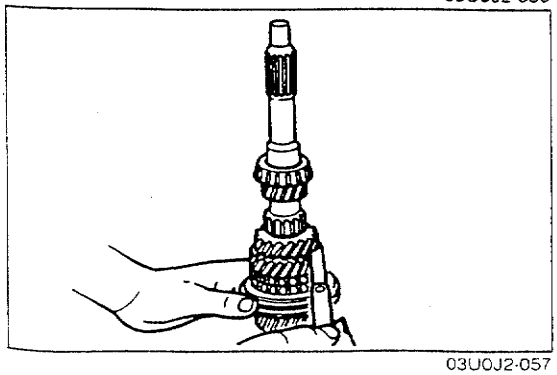


03U0J2-056

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

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

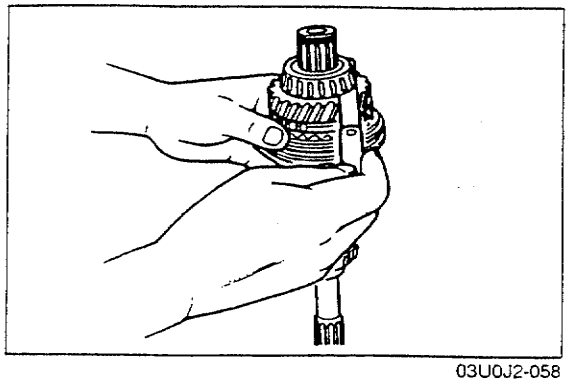
Note
- **Press to 19,620 N (2,000 kg, 4,400 lb).**



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.

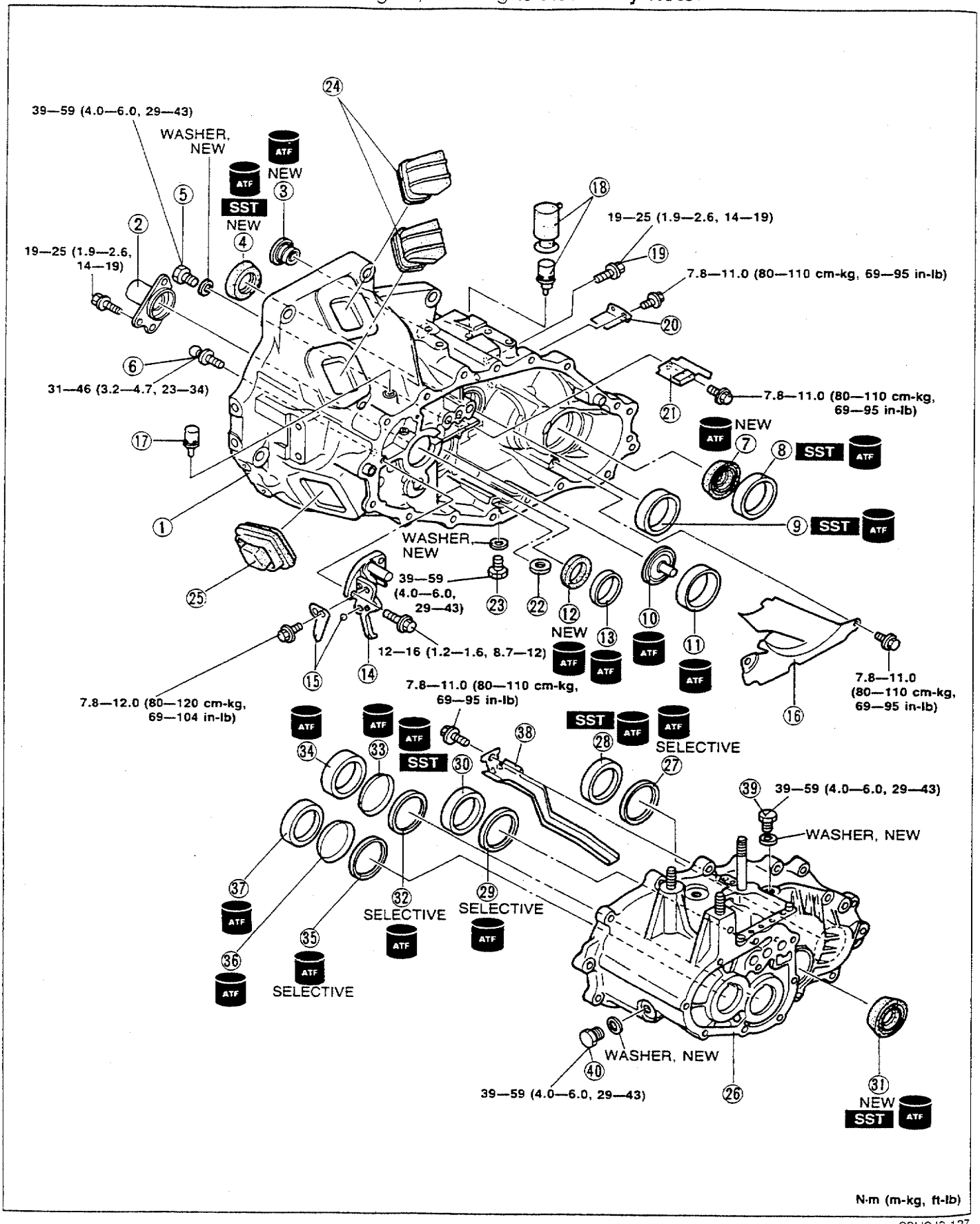
   Clearance: 0.165—0.365mm (0.0064—0.0144 in)
   Maximum : 0.415mm (0.0163 in)

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

MEMO

Clutch Housing and Transaxle Case Components

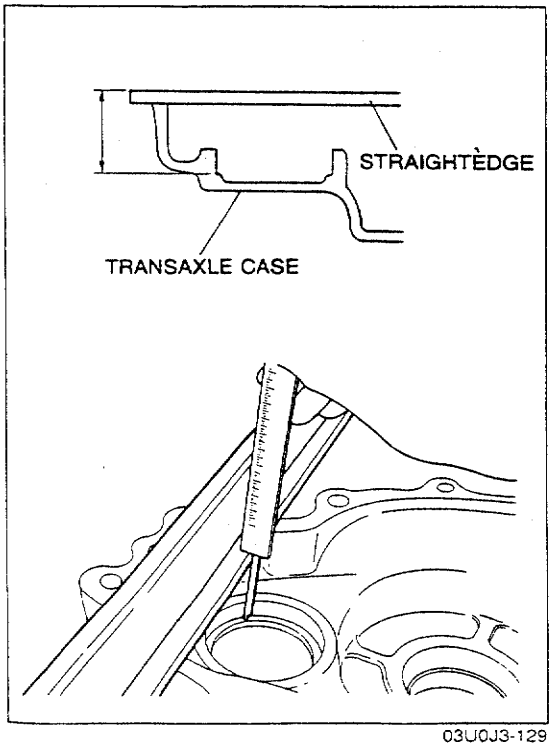
1. Select the adjustment shim(s), referring to **Bearing Preload Adjustment**.
2. Assemble in the order shown in the figure, referring to **Assembly Note**.



03U0J3-127

1. Clutch housing
2. Front cover
3. Oil seal (BP DOHC Turbo)
4. Oil seal
5. Plug
6. Pivot pin
7. Oil seal
8. Bearing outer race (Idler gear)
   Assembly Note..... page J3–104
9. Bearing outer race
   (Front and center differential)
   Assembly Note..... page J3–105
10. Funnel
11. Bearing outer race
12. Oil seal
13. Bearing outer race
14. Reverse lever support
15. Lever set spring and steel ball
16. Baffle
17. Air breather
18. Breather dust boot and air breather
19. Bolt
20. Baffle
21. Baffle
22. Magnet
23. Plug
24. Ventilator covers
25. Dust cover
26. Transaxle case
27. Adjustment shim
28. Bearing outer race
29. Adjustment shim
30. Bearing outer race
31. Oil seal (Front and center differential)
    Assembly Note..... page J3–104
32. Adjustment shim
33. Diaphragm spring
    Assembly Note..... page J3–105
34. Bearing outer race
35. Adjustment shim
36. Diaphragm spring
    Assembly Note..... page J3–105
37. Bearing outer race
38. Oil guide
39. Plug
40. Plug

93G0J3-762

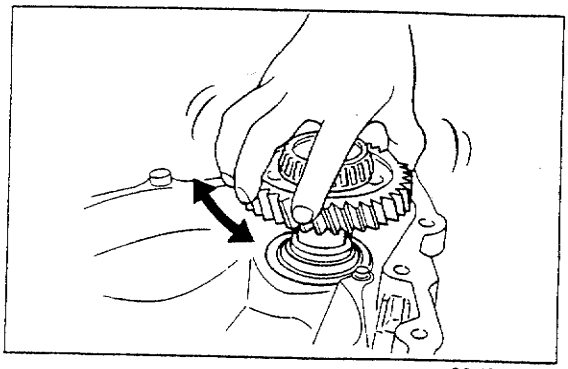


03U0J3-129

Idler gear adjustment shim selection

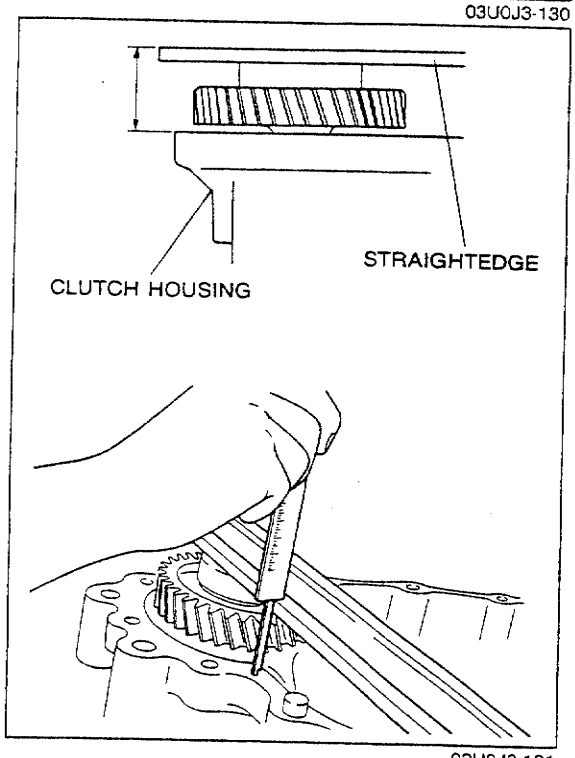
Note
- **Measure at three locations and average the reading.**

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)

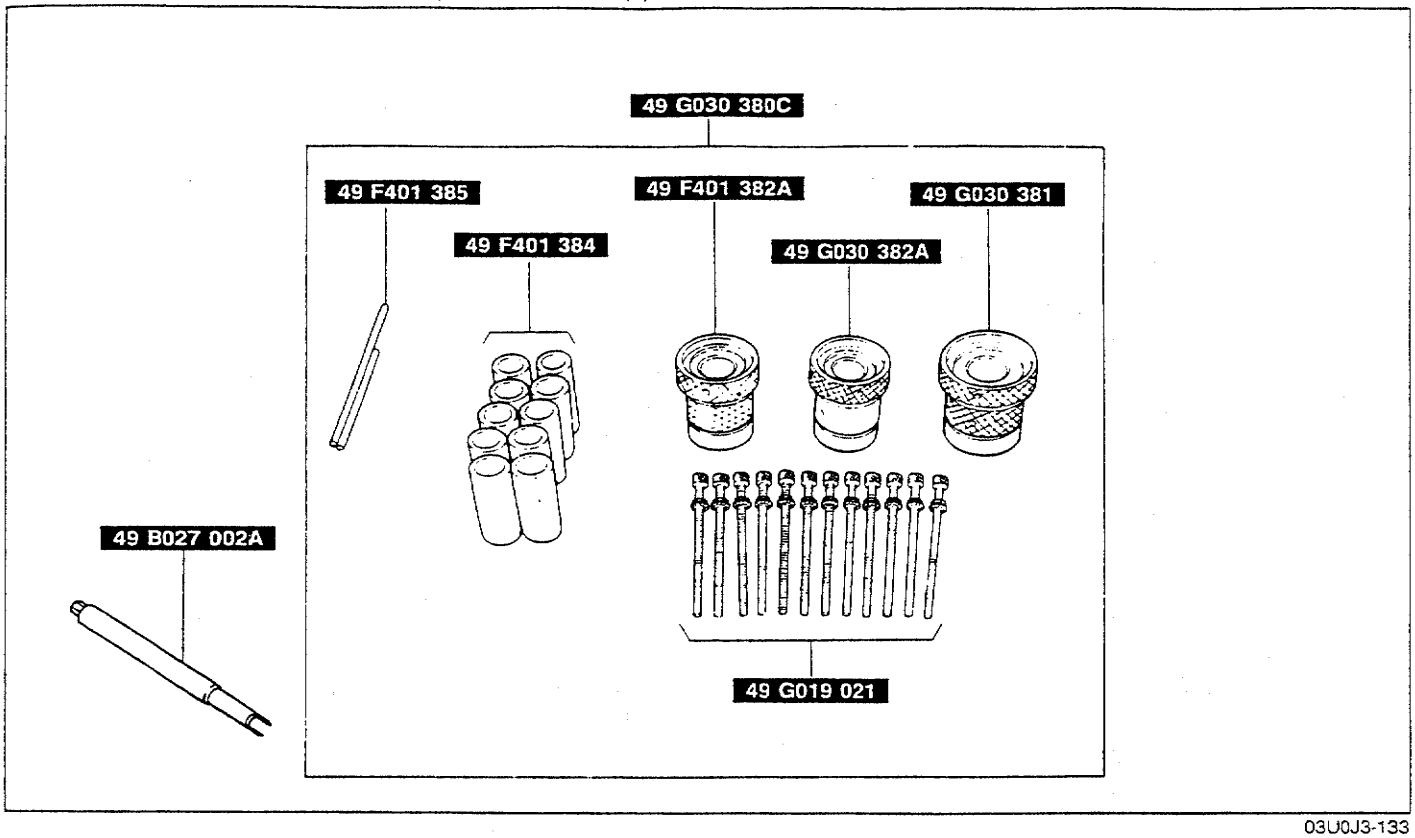
03U0J3-132

Caution
- **The number of shims used must not exceed two.**

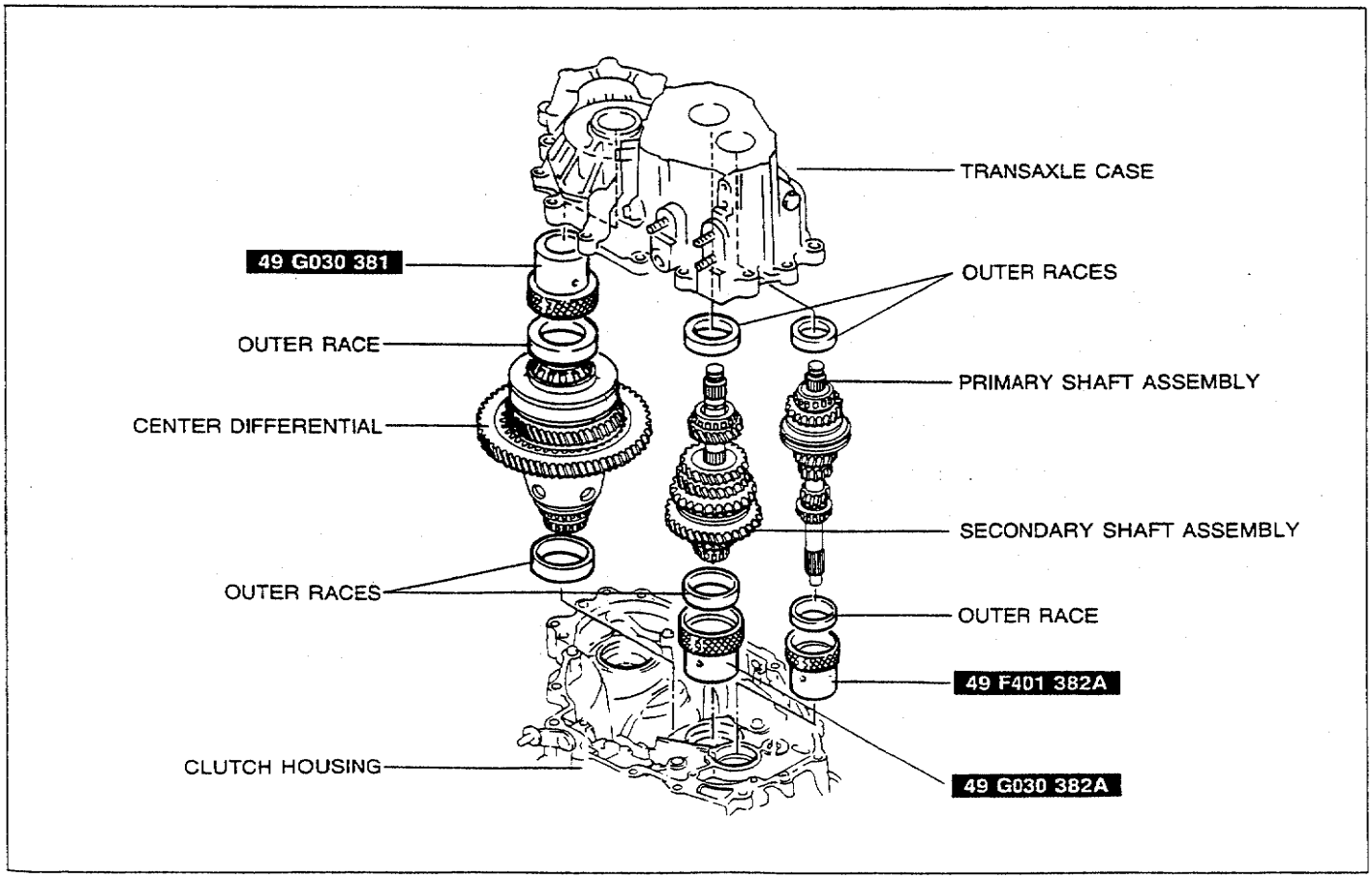
7. Select the shim as follows.
   (a) Subtract the bearing height (Step 6) from the depth of the bearing bore (Step 2).
   (b) Add 0.17mm (0.0067 in) to (a).
   (c) Add 0.22mm (0.0087 in) to (a).
   (d) Select the shim in the range between (b) and (c) from the table.

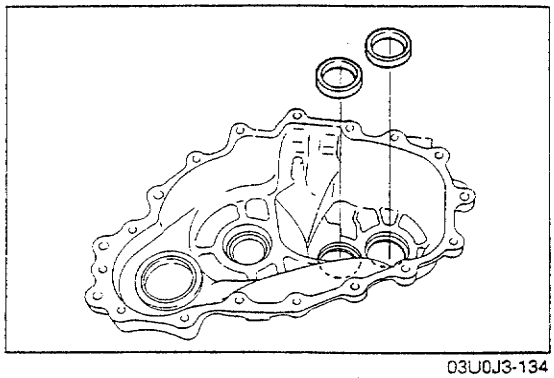
Bearing preload adjustment

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

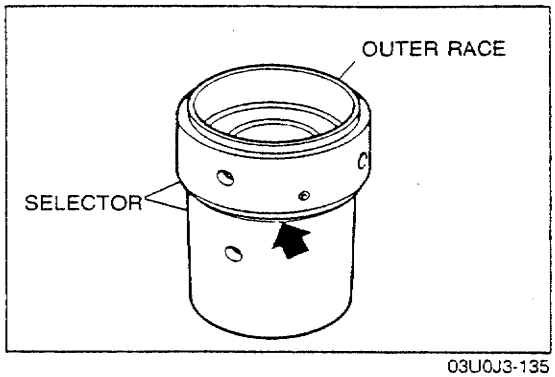




03U0J3-134

Primary and secondary shaft gear

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

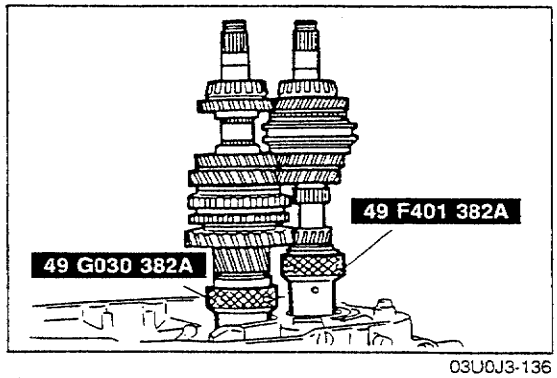


03U0J3-135

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

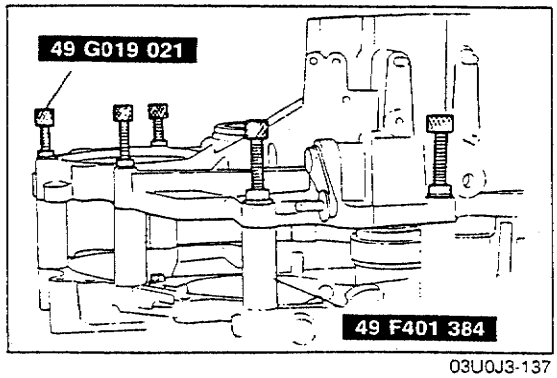
Note

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



03U0J3-136

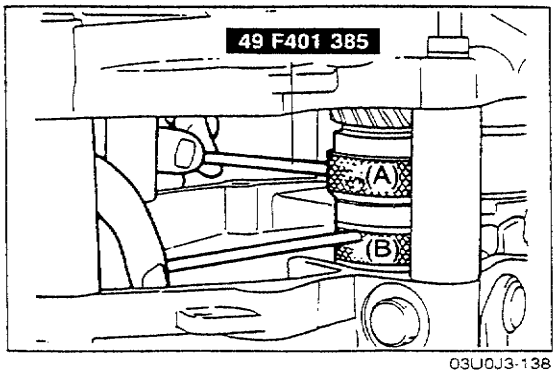
3. Set the **SST** (selectors) in place.
4. Mount the primary and secondary shaft gear assemblies onto the **SST** (selectors).



03U0J3-137

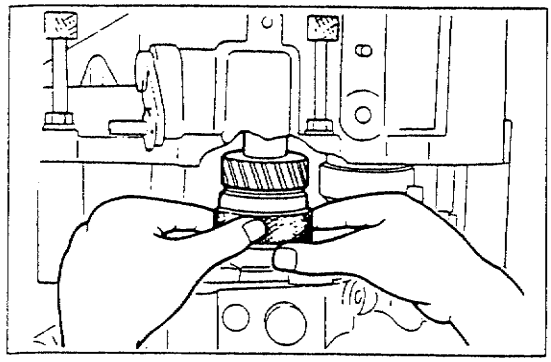
5. Set the **SST** (collars) between the transaxle case and the clutch housing, and install the **SST** (bolts), and tighten to the specified torque.

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



03U0J3-138

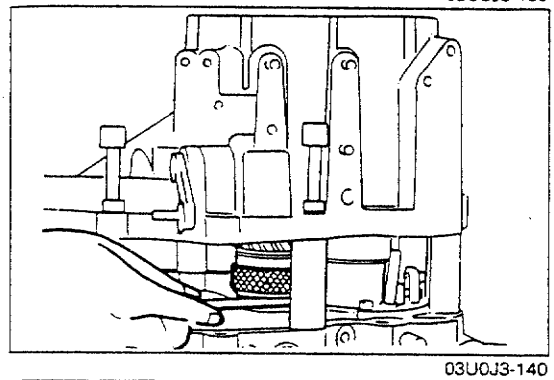
6. To seat the bearings, mount the **SST** (bar) on parts (A) and (B) of the **SST** (selectors), and turn the selector so the gap is enlarged.
   Move the bars by hand until the selector can no longer be turned, and then turn it in the reverse direction until the gap is eliminated.



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).**

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

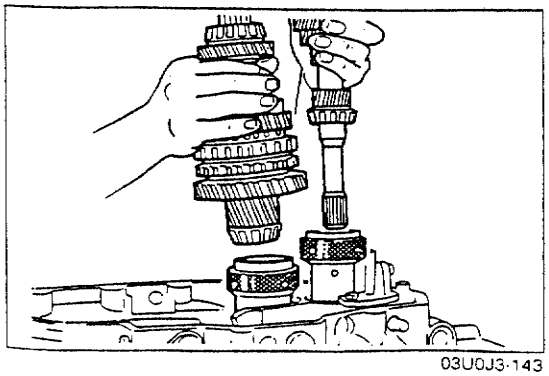
Note
- **The number of shims used must not exceed two.**

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).

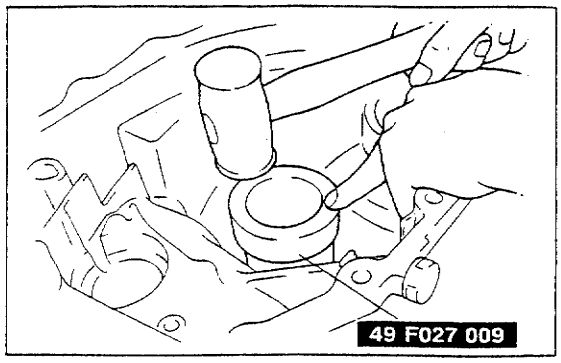
Example: 0.94mm (0.0370 in)
0.94mm (0.0370 in) – 0.70mm (0.0276 in)
[Diaphragm spring]
= 0.24mm (0.009 in)
So the nearest shim (on thick side) to 0.24mm (0.009 in) is 0.25mm (0.010 in).



03U0J3-142

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.

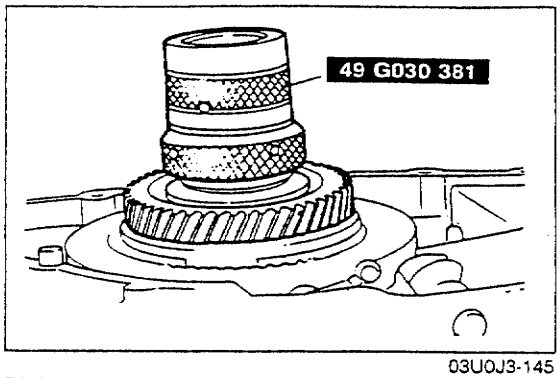
03U0J3-143



03U0J3-144

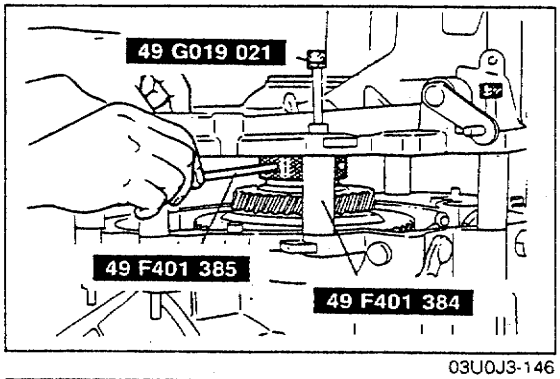
Front and center differential

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



03U0J3-145

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

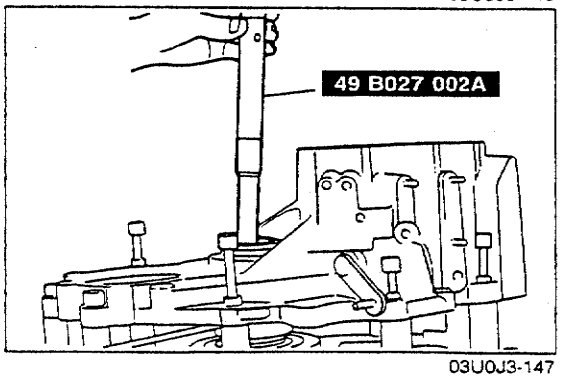


03U0J3-146

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

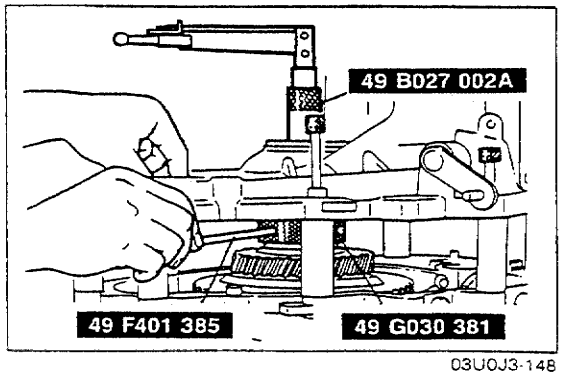
   Tightening torque:
   37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

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



03U0J3-147

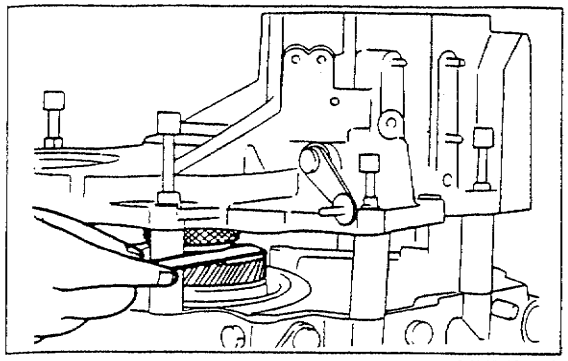
6. Insert the **SST**.



03U0J3-148

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)



03U0J3-149

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

03U0J3-150

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

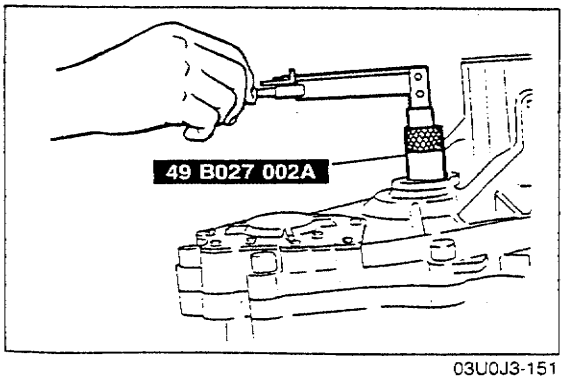
8. Measure the gap in the **SST** (selector).

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.



03U0J3-151

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)

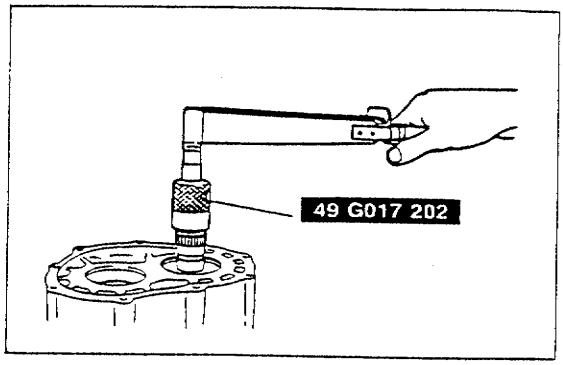
3. Connect the **SST** and install it through the driveshaft hole.

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



03U0J3-153

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)

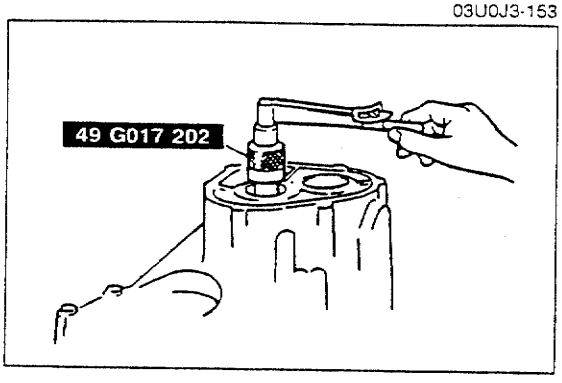
7. Remove the **SST**, transaxle case, primary shaft gear and front and center differential assembly.
8. Install the secondary shaft gear and transaxle case, and tighten to the specified torque.

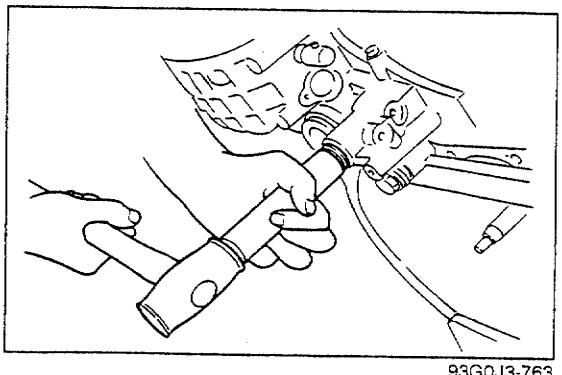
Tightening torque:
37—52 N·m (3.8—5.3 m-kg, 27—38 ft-lb)

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.

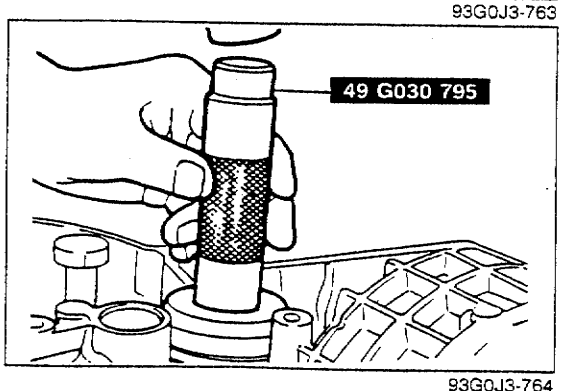



93G0J3-763

Assembly note
Oil seal (BP DOHC Turbo)

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

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

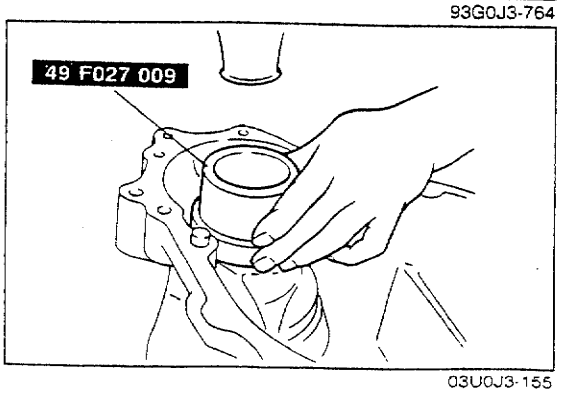


93G0J3-764

Oil seal (Front and center differential)

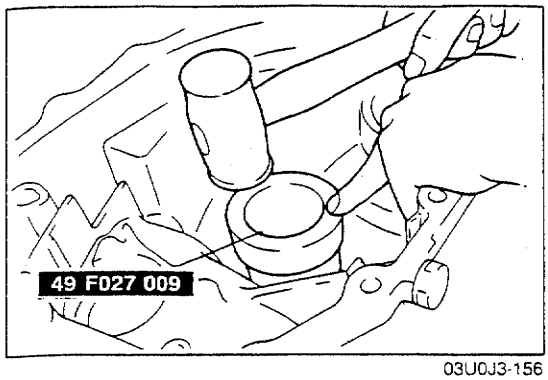
Caution
- **Apply transaxle oil to the outer edge of the oil seal.**

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



03U0J3-155

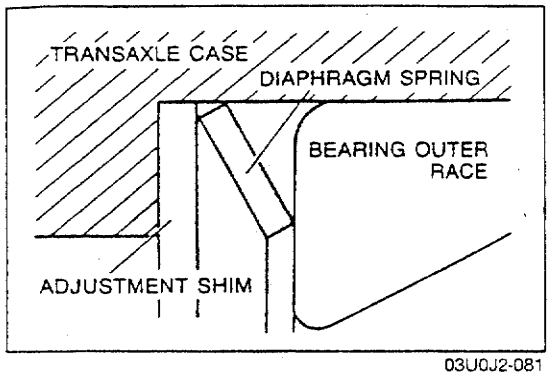
Bearing outer race (Idler gear)
1. Install the bearing outer race with the **SST**.



03U0J3-156

Bearing outer race (Front and center differential)

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



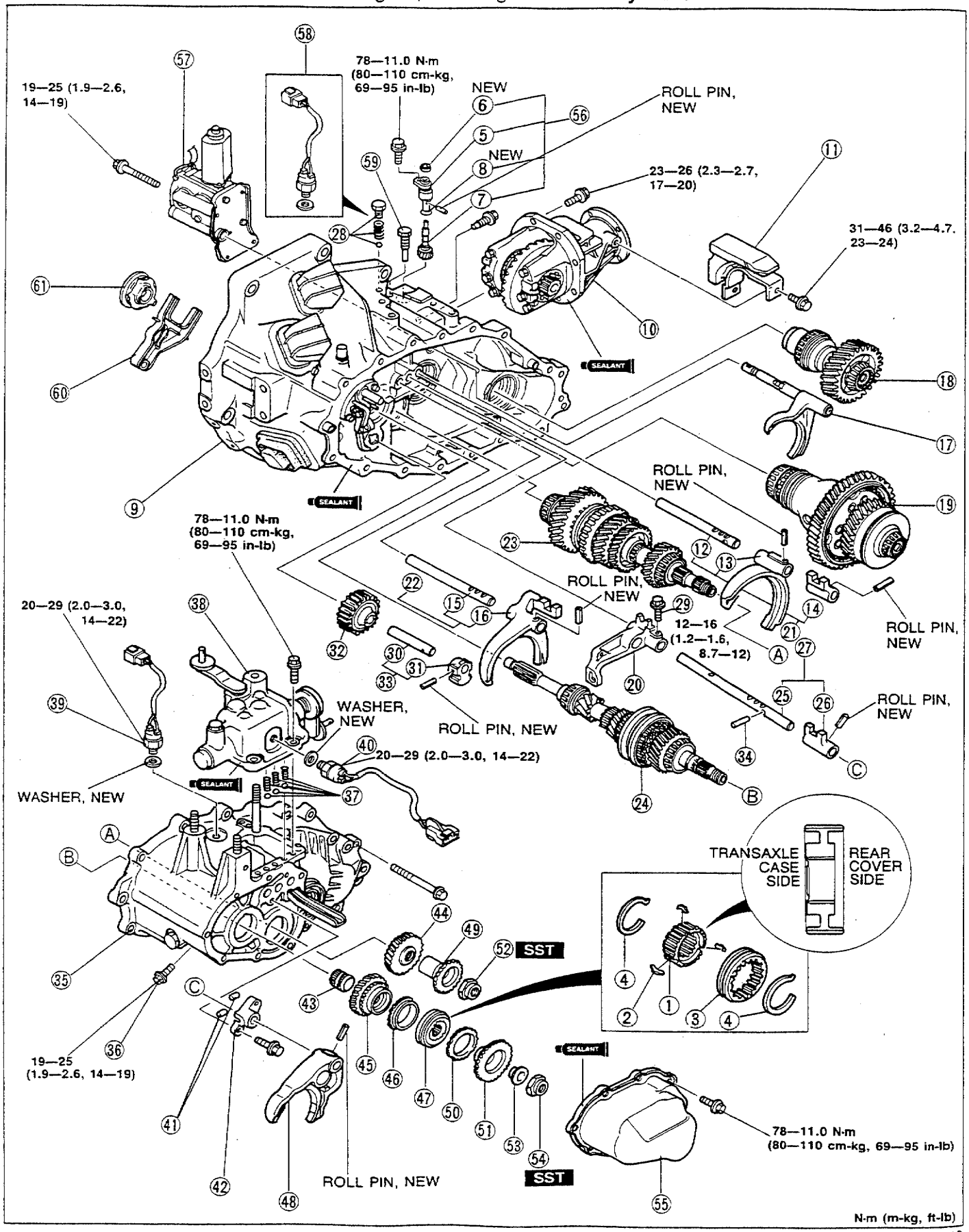
03U0J2-081

Diaphragm spring

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

5th/Reverse Gear and Housing Parts

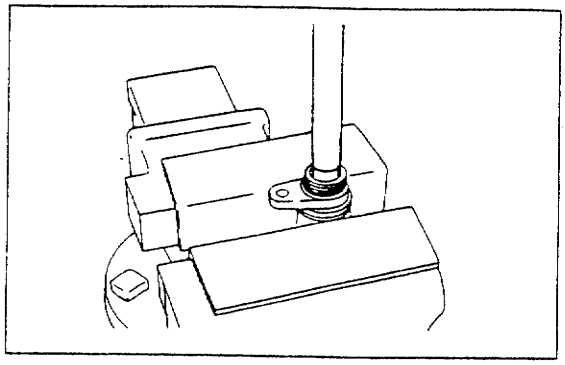
1. Assemble in the order shown in the figure, referring to **Assembly Note**.



03U0J1-113

1. Clutch hub
2. Synchronizer keys
3. Clutch hub sleeve
4. Synchronizer key springs
5. Speedometer sleeve
6. Oil seal (Speedometer driven gear assembly)
   Assembly Note..... page J3–108
7. Speedometer driven gear
   Assembly Note..... page J3–108
8. O-ring
9. Clutch housing assembly
10. Transfer carrier assembly
11. Dynamic damper
12. Shift rod (1st/2nd)
13. Shift fork (1st/2nd)
14. Shift rod end
15. Shift rod (3rd/4th)
16. Shift fork (3rd/4th)
17. Center differential lock shift fork
18. Idler gear assembly
    Assembly Note..... page J3–108
19. Front and center differential assembly
    Assembly Note..... page J3–108
20. Shift gate
21. Shift fork assembly (1st/2nd)
22. Shift fork assembly (3rd/4th)
23. Secondary shaft assembly
    Assembly Note..... page J3–108
24. Primary shaft assembly
    Assembly Note..... page J3–108
25. Shift rod
26. Shift rod end
27. Shift rod assembly
28. Steel ball, spring, and bolt (BP DOHC Turbo)
29. Bolt
30. Reverse idler gear shaft
31. Reverse idler gear support
32. Reverse idler gear
33. Reverse idler gear shaft assembly
    Assembly Note..... page J3–109
34. Interlock pin
    Assembly Note..... page J3–109
35. Transaxle case assembly
    Assembly Note..... page J3–109
36. Lock bolt
37. Steel balls and springs
38. Top cover assembly
    Assembly Note..... page J3–109
39. Back-up light switch
40. Neutral switch
41. Interlock pins
42. Interlock plate
43. Gear sleeve
44. Secondary 5th gear
45. Primary 5th gear
    Assembly Note..... page J3–110
46. Synchronizer ring
47. Clutch hub assembly
48. Shift fork
49. Secondary reverse synchronizer gear
50. Synchronizer ring
51. Primary reverse synchronizer gear
52. Locknut
    Assembly Note..... page J3–110
53. Spacer
54. Locknut
    Assembly Note..... page J3–110
55. Rear cover
    Assembly Note..... page J3–110
56. Speedometer driven gear assembly
57. Center differential lock motor (BP SOHC)
    Assembly Note..... page J3–110
58. Center differential lock switch (BP SOHC)
59. Differential lock set bolt
60. Clutch release fork
61. Clutch release bearing

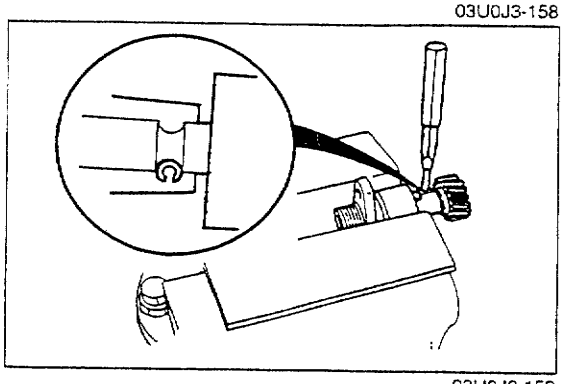
93G0J3-765



03U0J3-158

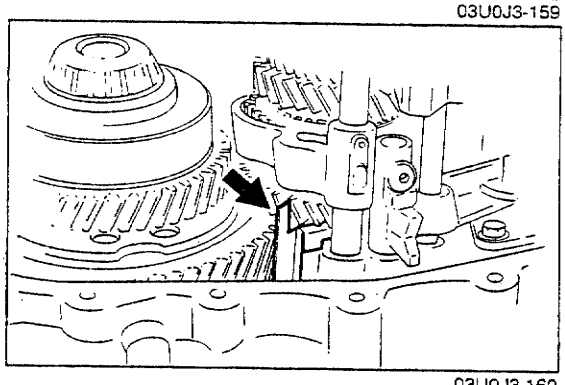
Assembly note
Oil seal (Speedometer driven gear assembly)
1. Install the new oil seal with a suitable pipe.

Pipe diameter: 16mm (0.629 in)



03U0J3-159

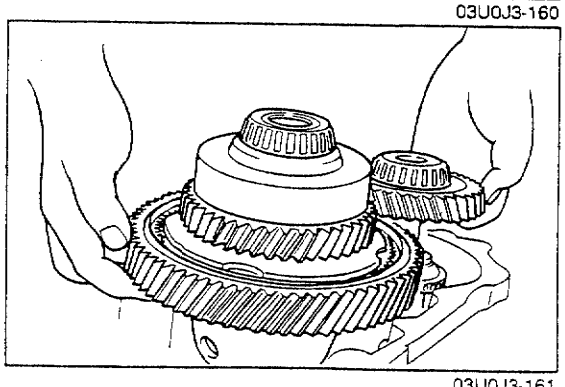
Speedometer driven gear
1. Install the new roll pin as shown in the figure.



03U0J3-160

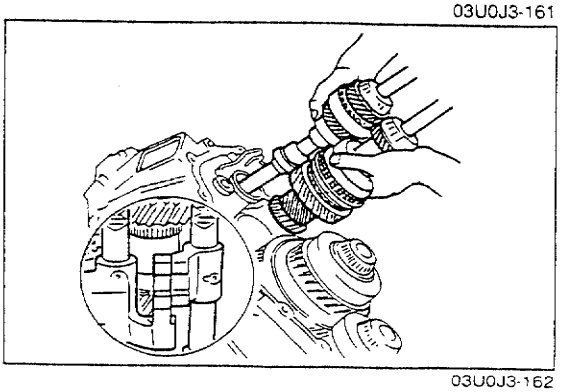
Primary shaft assembly, secondary shaft assembly, front and center differential, idler gear assembly

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



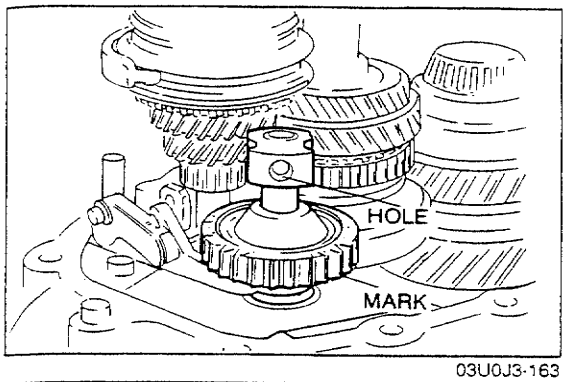
03U0J3-161

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.

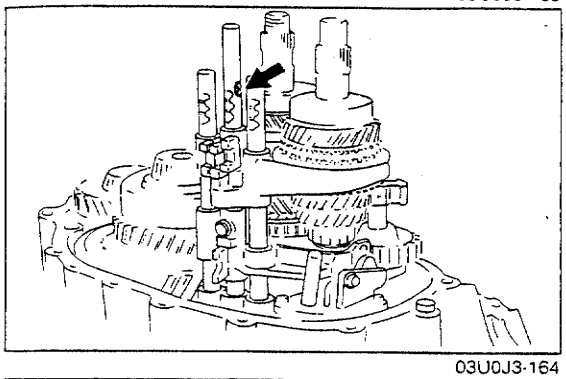


03U0J3-163

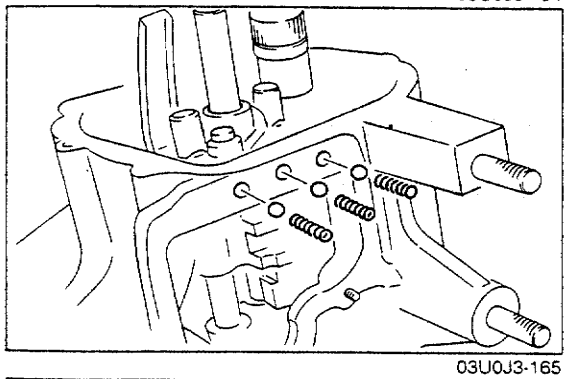
Reverse idler gear shaft assembly

Caution
- **Verify that the gears are properly engaged.**

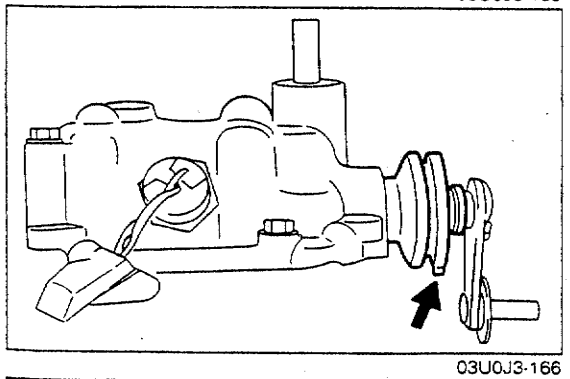
1. Align the lock bolt hole and mark of the clutch housing.


03U0J3-164

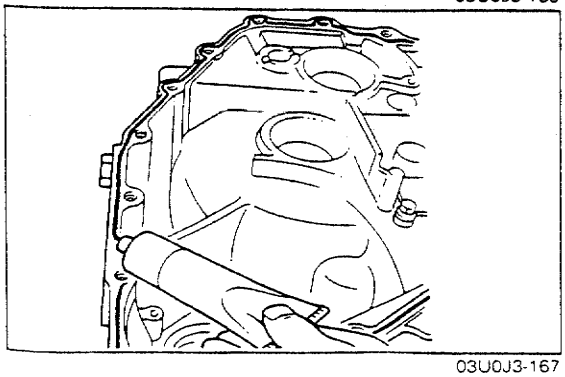
Interlock pin
1. Install the interlock pins as shown in the figure.


03U0J3-165

Top cover assembly
1. Install the steel balls and the springs.

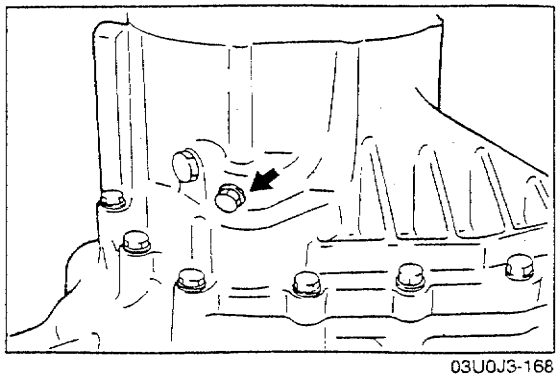

03U0J3-166

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


03U0J3-167

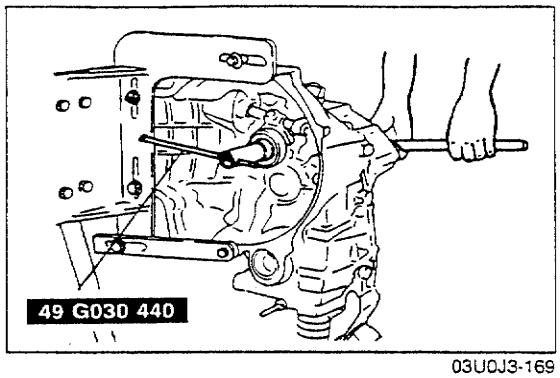
Transaxle case assembly
1. Apply a thin coat of sealant to the contact surfaces of the clutch housing and transaxle case.
2. Install and tighten the transaxle case installation bolts to the specified torque.

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



03U0J3-168

3. Install the bolt.



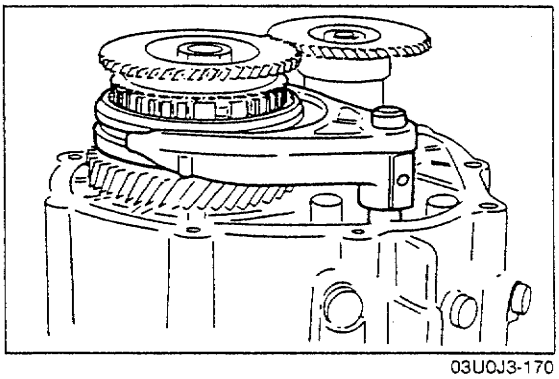
03U0J3-169

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.

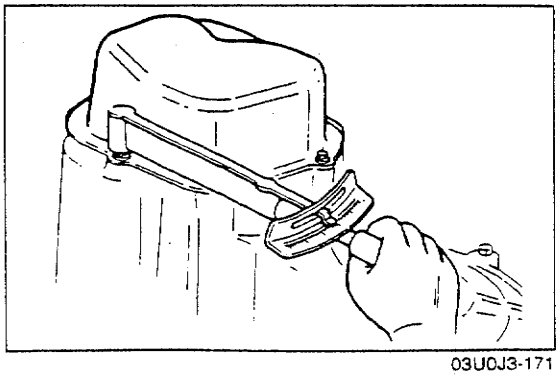


03U0J3-170

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.



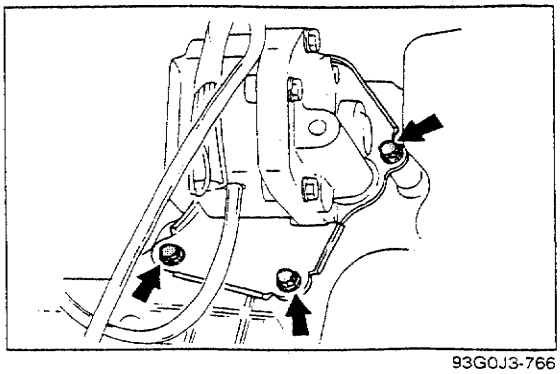
03U0J3-171

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)

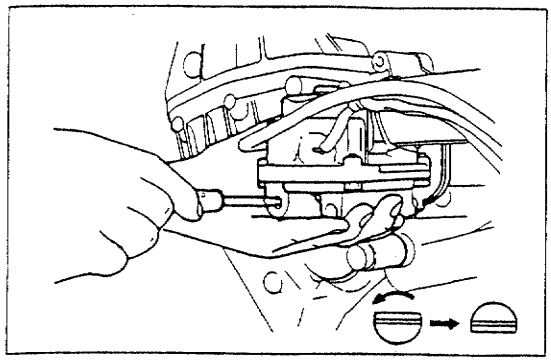


93G0J3-766

Center Differential Lock motor (BP SOHC)

1. Install the center differential lock motor.

Tightening torque:
19—25 N·m (1.9—2.6 m-kg, 14—19 ft-lb)



03U0J3-173

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

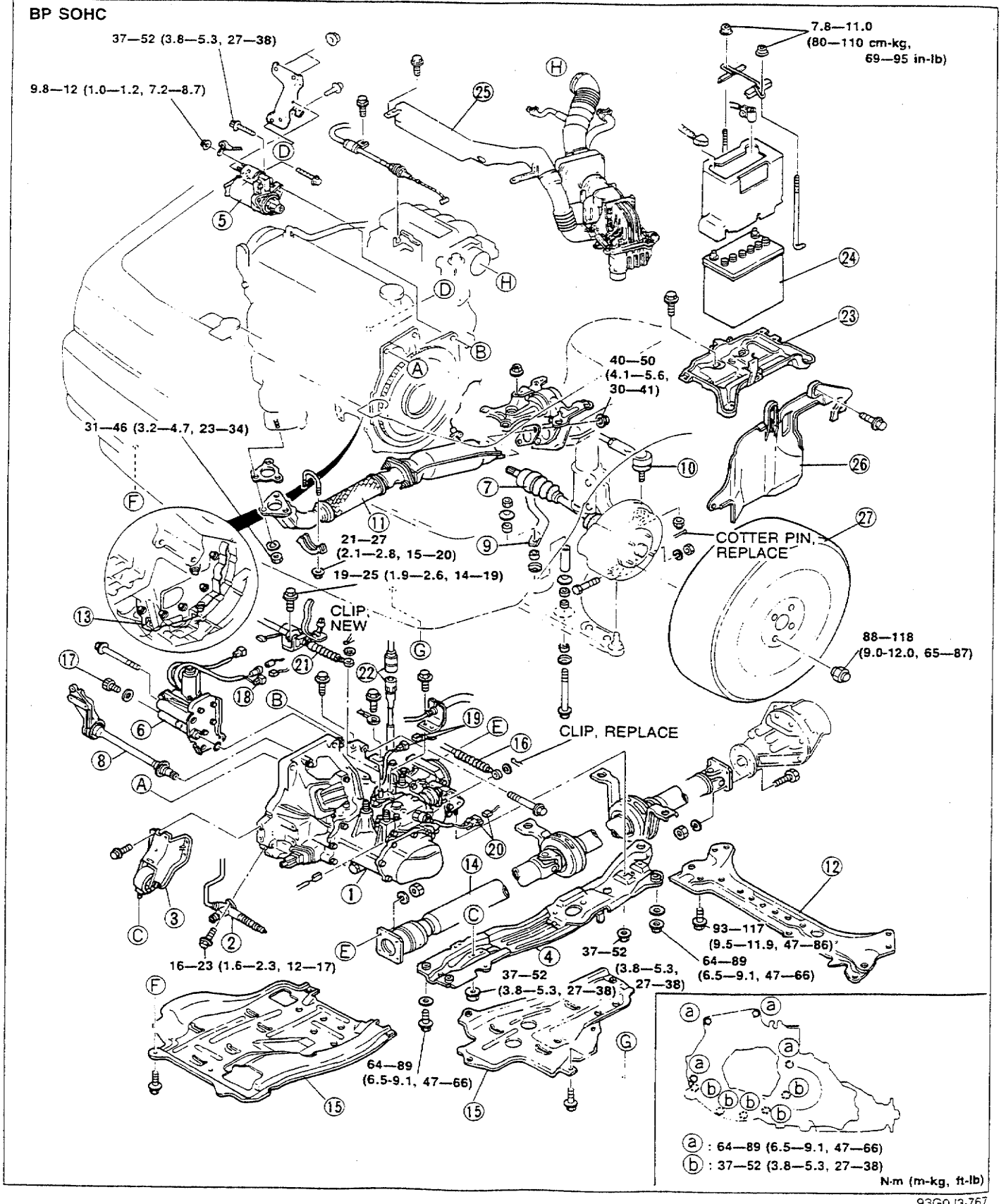
Tightening torque:
9—14 N·m (90—140 cm-kg, 78—122 ft-lb)

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 J3–36.)
4. Warm-up the engine and transaxle, and inspect for oil leakage and transaxle operation.

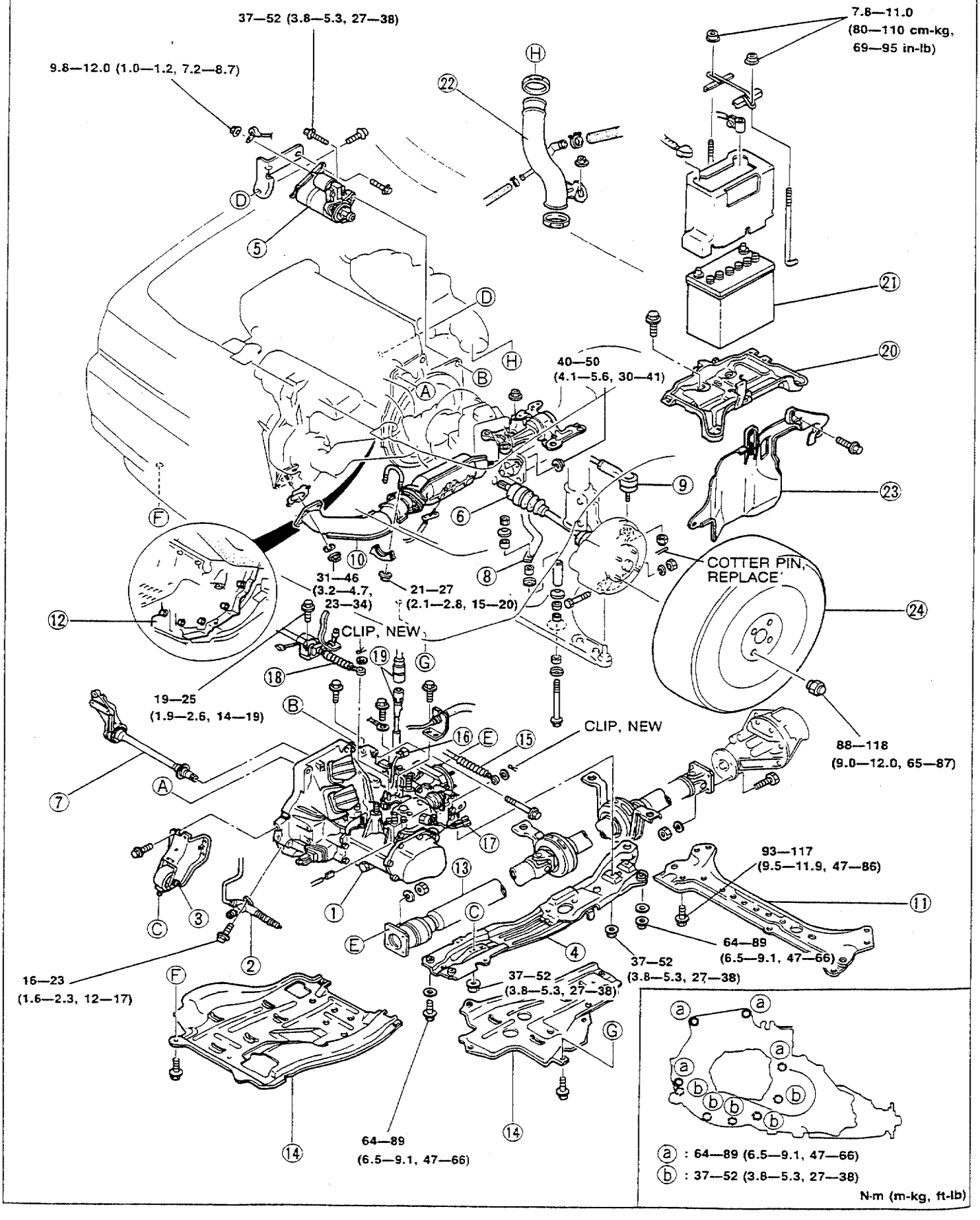


93G0J3-767

1. Transaxle and transfer unit
   Installation Note ..... page J3–115
2. Clutch release cylinder and clutch pipe
3. Engine mount No.2
4. Engine mounting member
   Installation Note ..... page J3–115
5. Starter
6. Center differential lock motor
7. Driveshaft
   Installation Note ..... page J3–116
8. Joint shaft
9. Stabilizer
   Installation Note ..... page J3–116
10. Tie-rod end
    Installation Note ..... page J3–117
11. Exhaust pipe
12. Crossmember
13. Integrated stiffener
14. Propeller shaft
    Installation Note ..... page J3–117
15. Undercover
16. Control cable
    Installation Note ..... page J3–117
17. Bolt
18. Differential lock motor connector
19. Back-up light switch connector
20. Neutral switch connector
    Installation Note ..... page J3–117
21. Shift cable
22. Speedometer cable
    Assembly Note..... page J3–118
23. Battery carrier
24. Battery
25. Air hose and air cleaner assembly
26. Splash shield
27. Wheel and tire

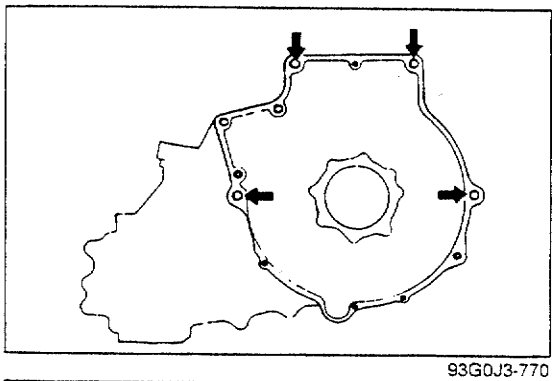
93G0J3-768

BP DOHC Turbo

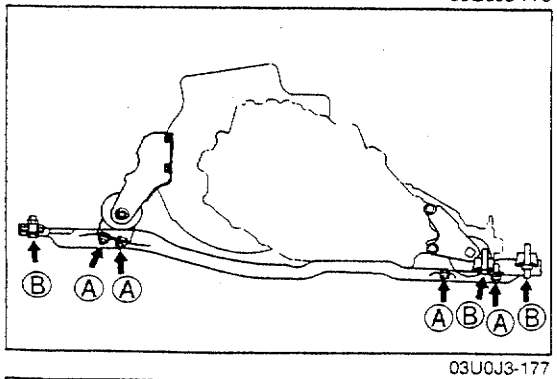


1. Transaxle and transfer unit
   Installation Note ..... page J3–115
2. Clutch release cylinder and clutch pipe
3. Engine mount No.2
4. Engine mounting member
   Installation Note ..... page J3–115
5. Starter
6. Driveshaft
   Installation Note ..... page J3–116
7. Joint shaft
8. Stabilizer
   Installation Note ..... page J3–116
9. Tie-rod end
   Installation Note ..... page J3–117
10. Exhaust pipe
11. Crossmember
12. Integrated stiffener
13. Propeller shaft
    Installation Note ..... page J3–117
14. Undercover
15. Control cable
    Installation Note ..... page J3–117
16. Back-up light switch connector
17. Neutral switch connector
    Installation Note ..... page J3–117
18. Shift cable
19. Speedometer cable
    Assembly Note..... page J3–118
20. Battery carrier
21. Battery
22. Air hose
23. Splash shield
24. Wheel and tire

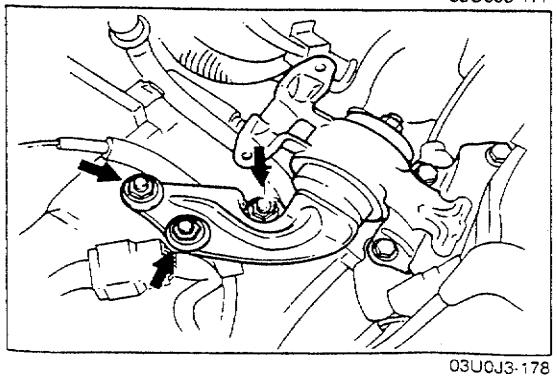
93G0J3-769



93G0J3-770



03U0J3-177



03U0J3-178

Installation Note
Transaxle and transfer unit
1. Mount the transaxle to the engine.

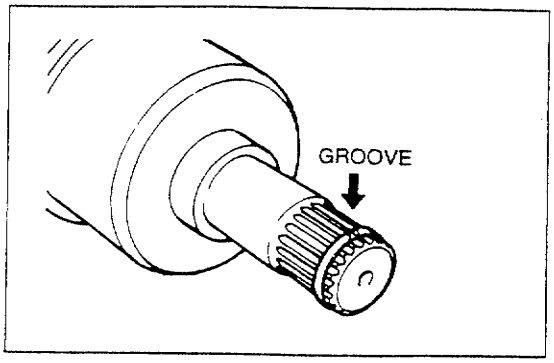
Tightening torque:
55—80 N·m (5.6—8.2 m-kg, 41—59 ft-lb)

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)



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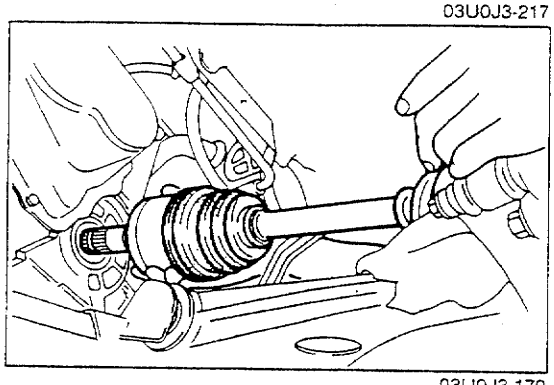
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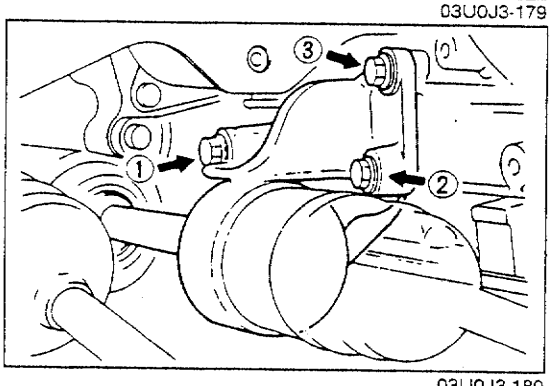

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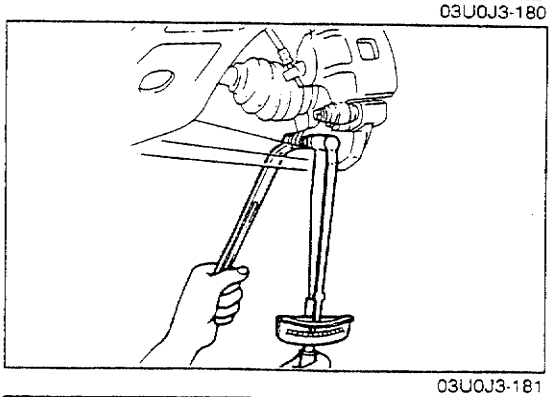
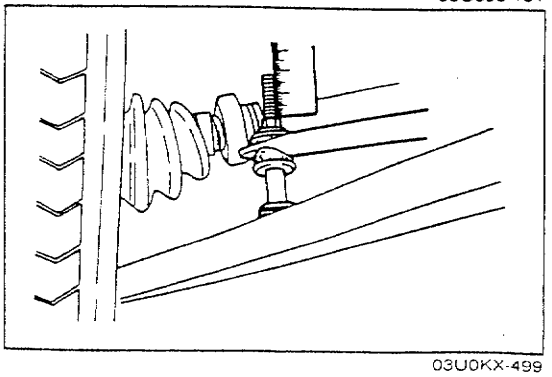

03U0J3-181


03U0KX-499

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.

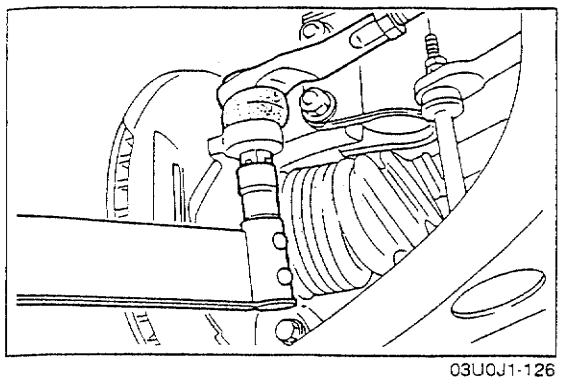
Tightening torque:
42—62 N·m (4.3—6.3 m-kg, 31—46 ft-lb)

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.



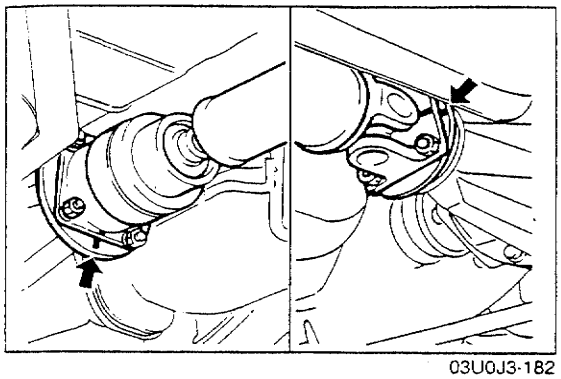
03U0J1-126

Tie-rod end

1. Install the locknut.

   Tightening torque:
   42—57 N·m (4.3—5.8 m-kg, 31—42 ft-lb)

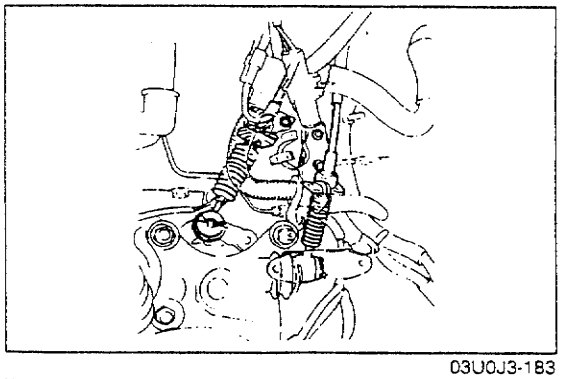
2. Secure the locknut with a new cotter pin.



03U0J3-182

Propeller shaft

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



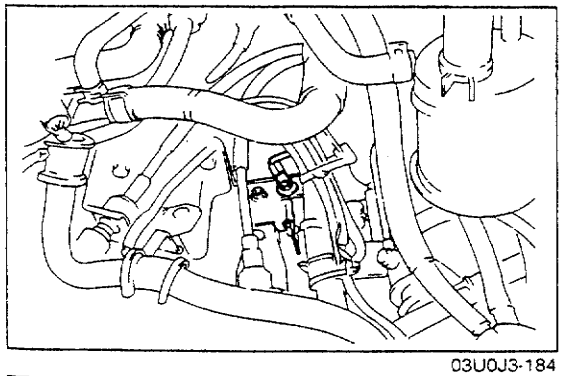
03U0J3-183

Control cable

1. Install the bracket.

   Tightening torque:
   18—25 N·m (1.9—2.6 m-kg, 13—18 ft-lb)

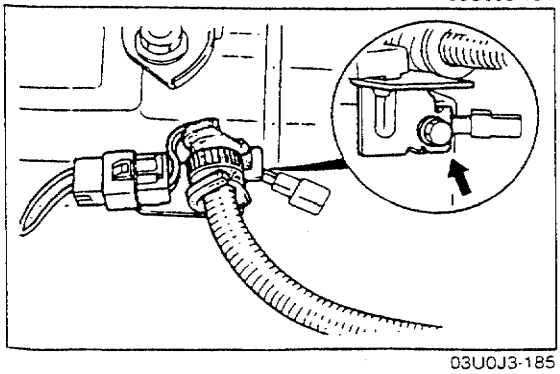
2. Attach the control cable to the bracket with the clip.
3. Connect the control cable to the transaxle and transfer unit and install the washers and the pins.



03U0J3-184

4. Connect the ground to the clutch pipe bracket.

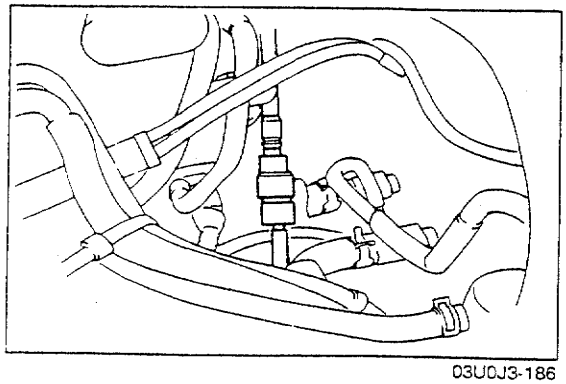
   Tightening torque:
   15—22 N·m (1.6—2.3 m-kg, 11—16 ft-lb)



03U0J3-185

Neutral switch connector

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



03U0J3-186

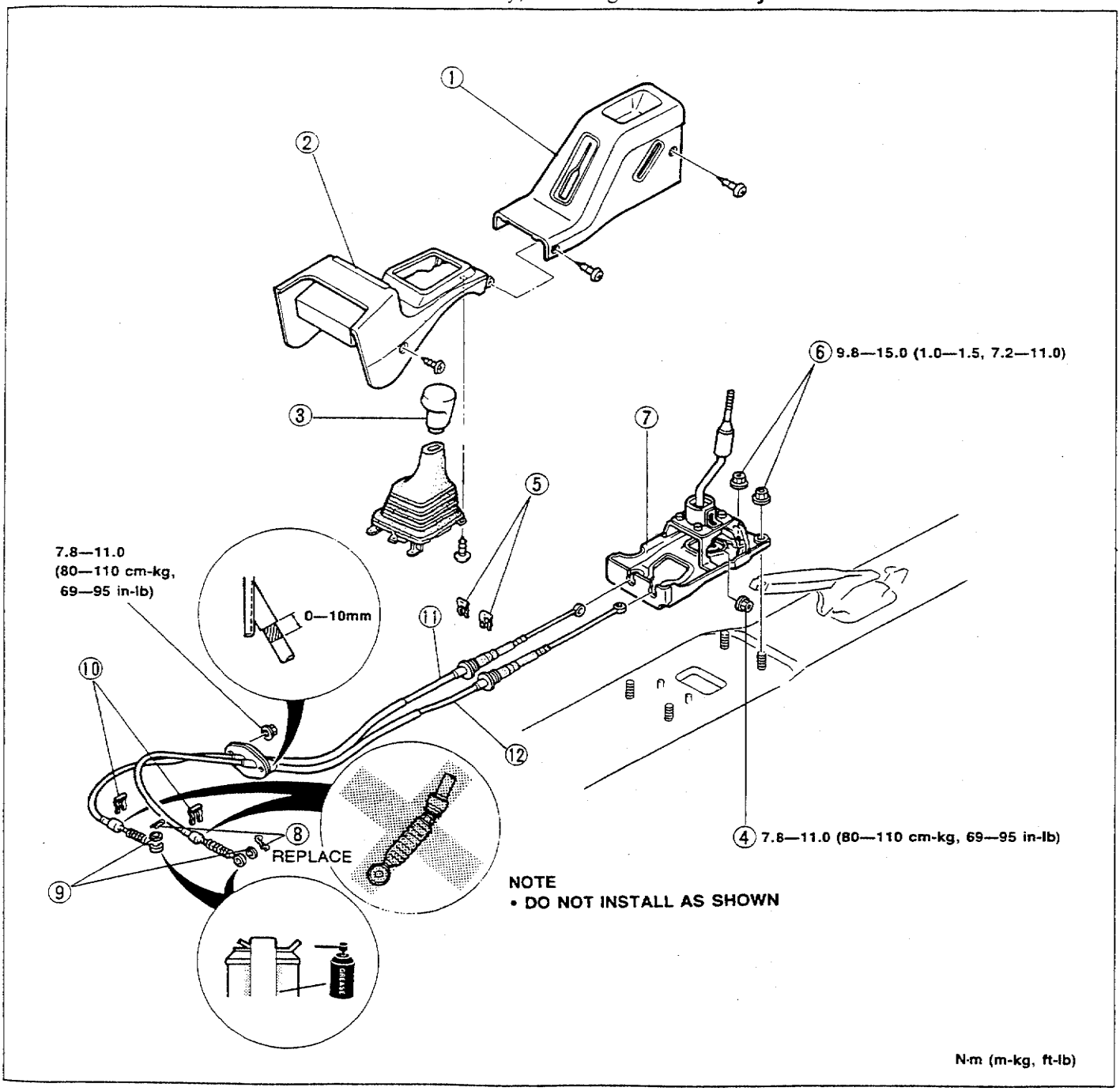
Speedometer cable

1. Connect the speedometer cable.

SHIFT MECHANISM

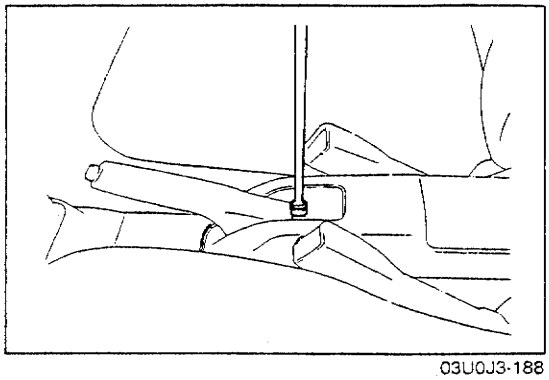
OVERHAUL

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**.



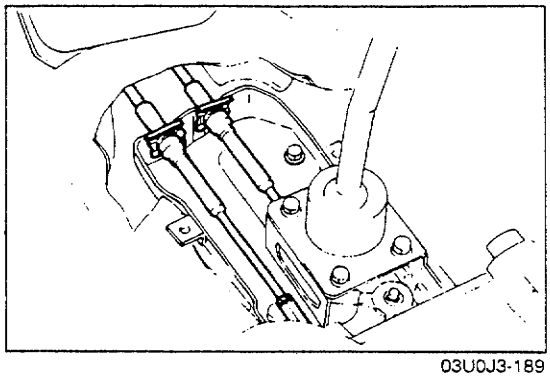
93G0J3-771

1. Rear console
   Assembly Note..... page J3–120
2. Front console
   Disassembly Note..... page J3–120
3. Shift lever knob
4. Nut (Cable)
5. Clips (Cable)
6. Nuts (Shift lever assembly)
7. Shift lever assembly
   Assembly Note..... page J3–120
8. Snap pins
9. Washers
10. Clips (Cable)
11. Select cable
12. Shift cable



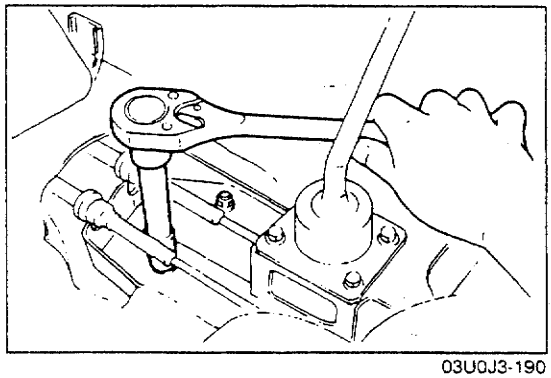
03U0J3-188

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



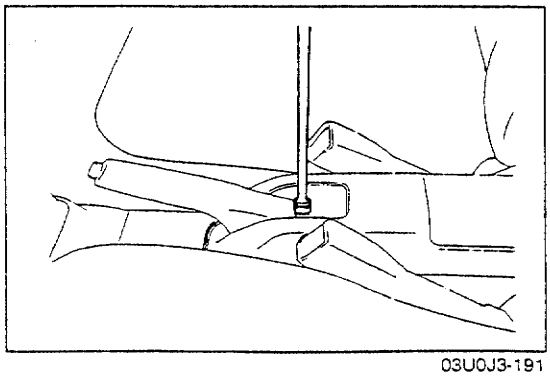
03U0J3-189

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.

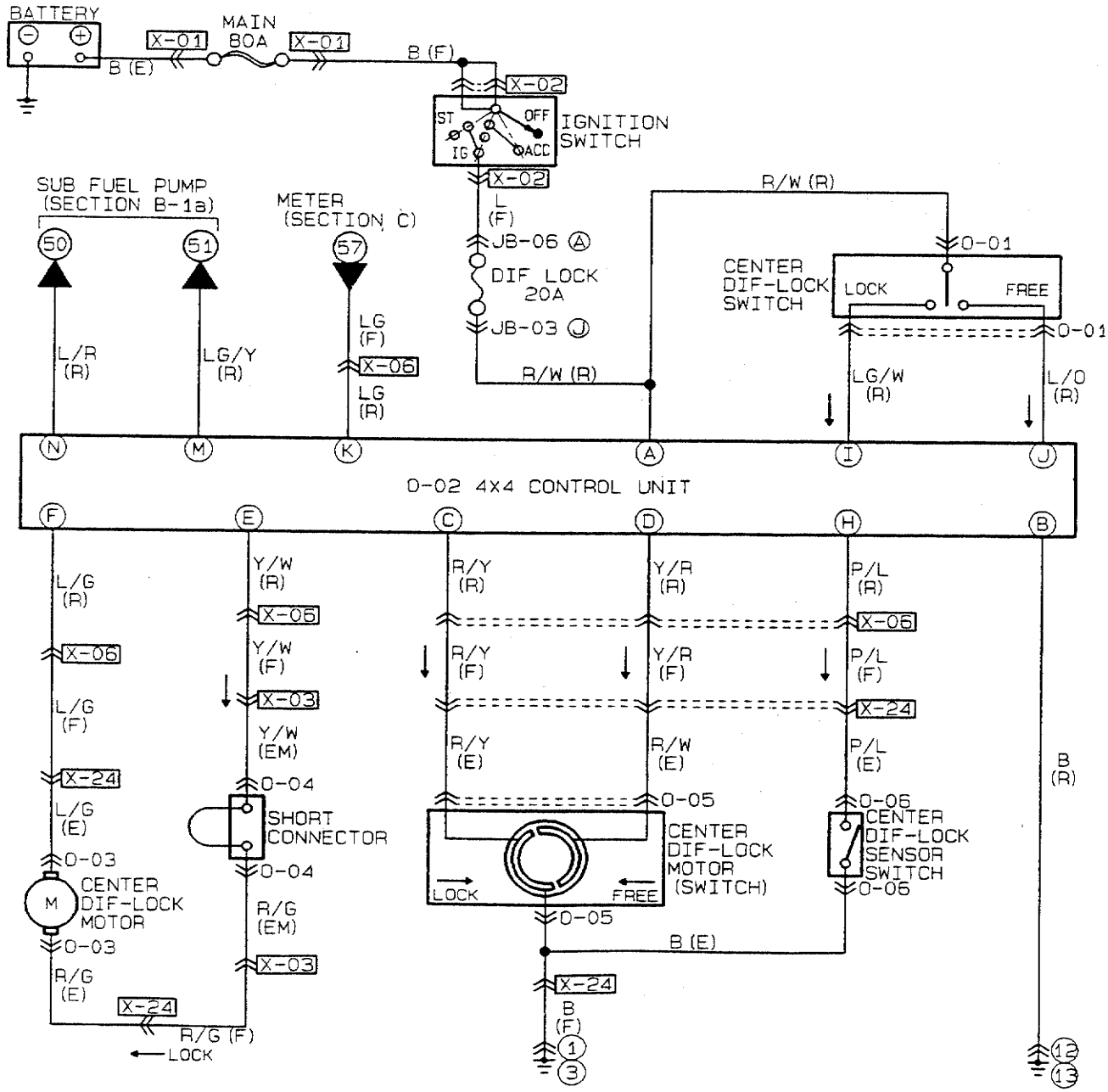


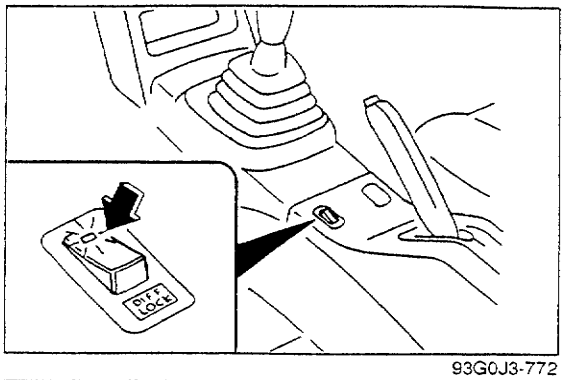
03U0J3-191

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

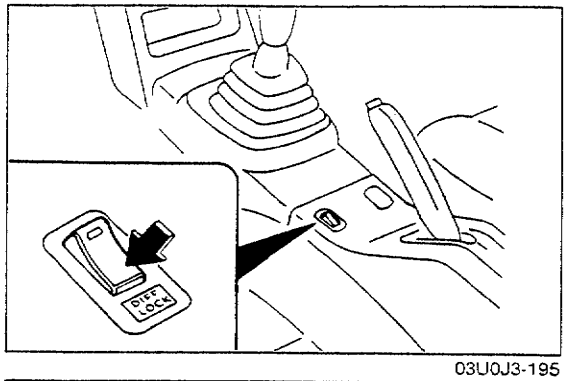
CENTER DIFFERENTIAL LOCK SYSTEM

SYSTEM DIAGRAM

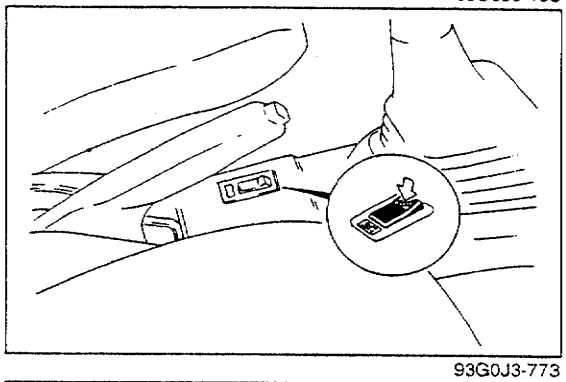


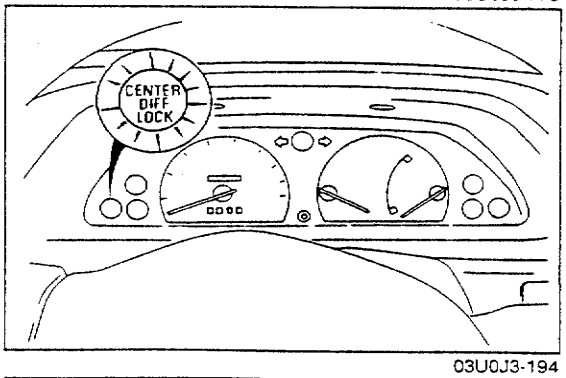


93G0J3-772

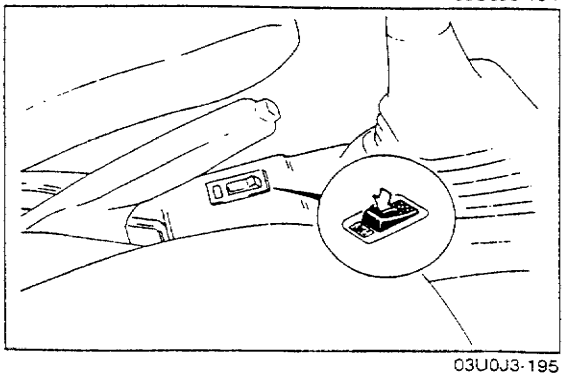


03U0J3-195


93G0J3-773



03U0J3-194


03U0J3-195

INSPECTION

(LH)

1. Turn the ignition switch ON.
2. Push the center differential lock switch ON. .
3. Verify that the indicator lamp is 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.

(RH)

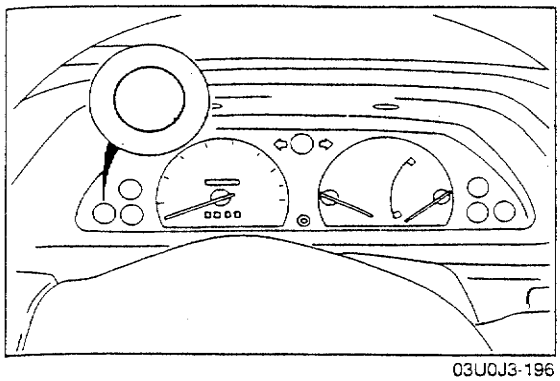
1. Turn the ignition switch ON.
2. Push the center differential lock switch ON.

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

Note

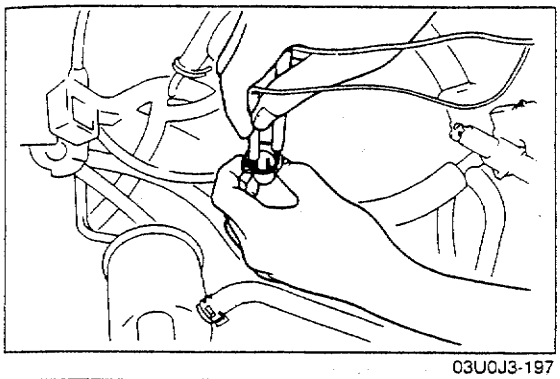
- **The indicator lamp will flash until the center differential is fully engaged. If necessary, move the vehicle forward until the differential engages.**

4. Push the center differential lock switch OFF.



03U0J3-196

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



03U0J3-197

CENTER DIFFERENTIAL LOCK MOTOR

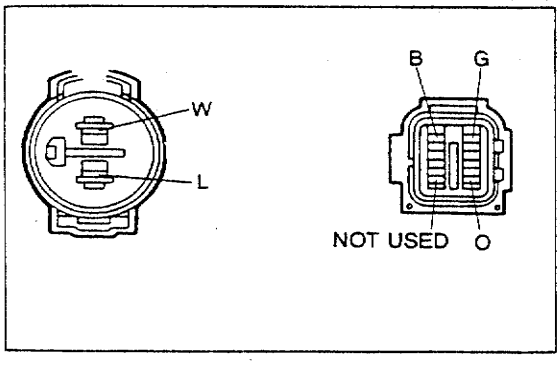
INSPECTION

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.

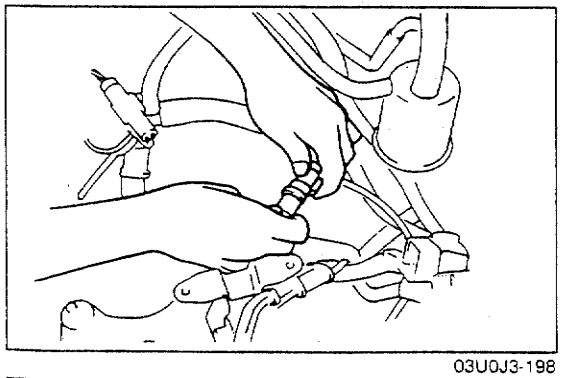
Unit: Ω (Ohm)

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



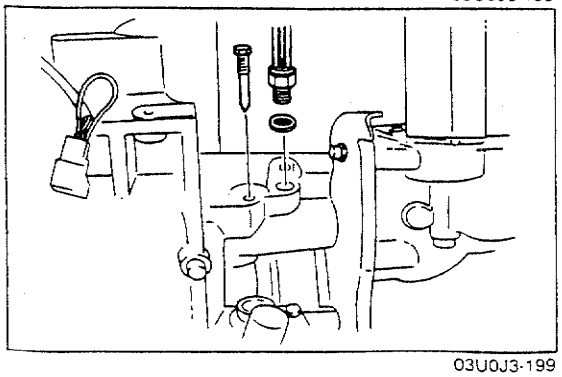
REPLACEMENT

1. Disconnect the negative battery terminal.
2. Disconnect the connector and breather hose of center differential lock motor and center differential lock sensor switch.



03U0J3-198

3. Remove the set bolt and center differential lock sensor switch.



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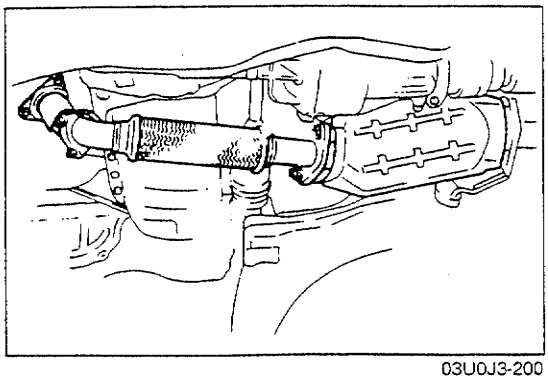
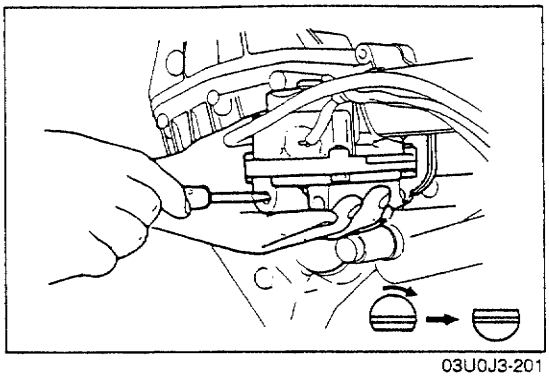


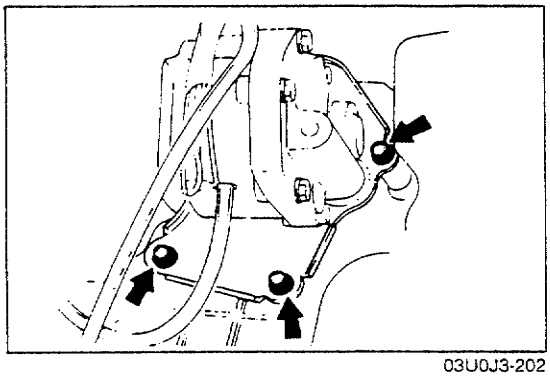
03U0J3-200

4. Remove the undercover and crossmember.
5. Remove the exhaust pipe.



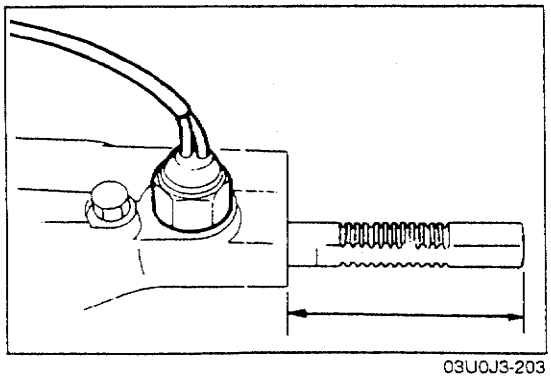
03U0J3-201

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



03U0J3-202

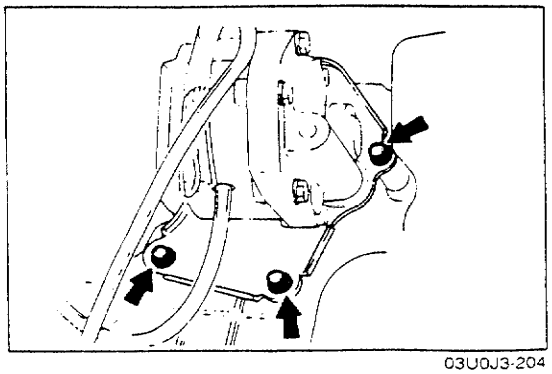
7. Remove the center differential lock motor from the transaxle and transfer unit.
8. Remove the O-ring from the center differential lock motor.



03U0J3-203

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

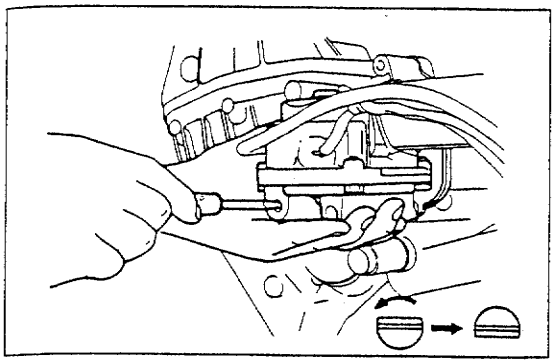
Standard length:
FREE: 75mm (2.95 in)
LOCK: 83mm (3.26 in)



03U0J3-204

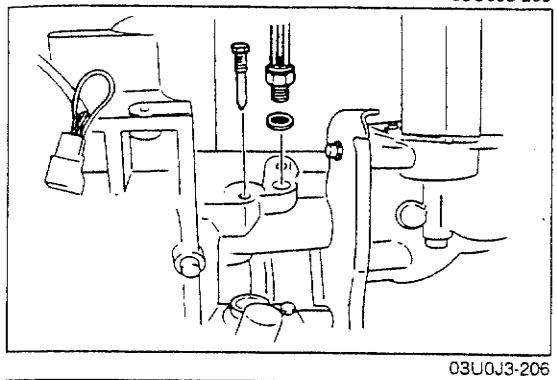
Note
- **Apply ATF to the O-ring.**

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

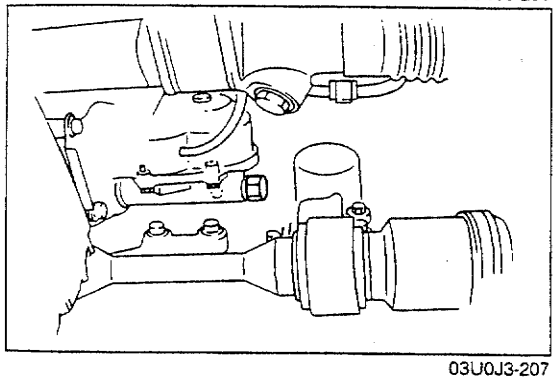
12. Turn the shift rod 180° counterclockwise with a screwdriver.



03U0J3-206

13. Install the mounting bolts.

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



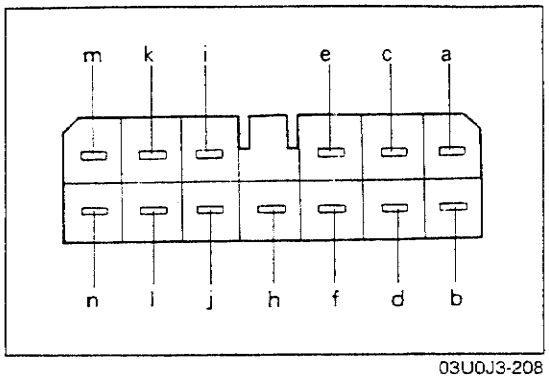
03U0J3-207

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)



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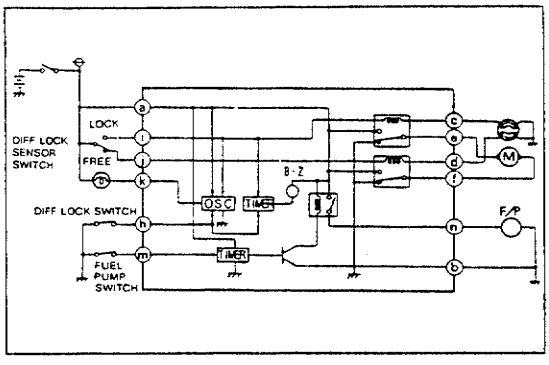
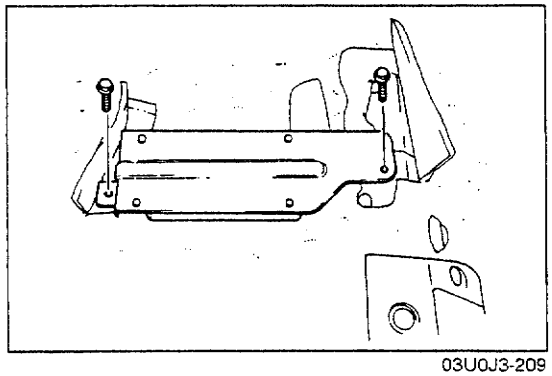
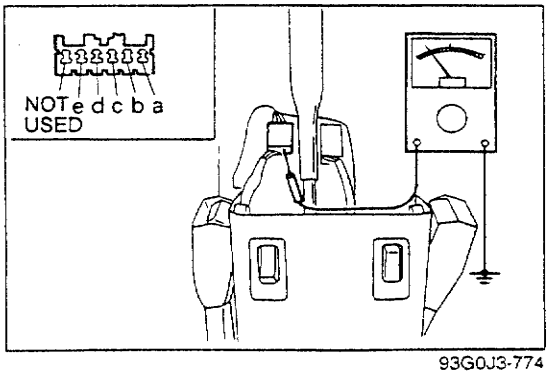
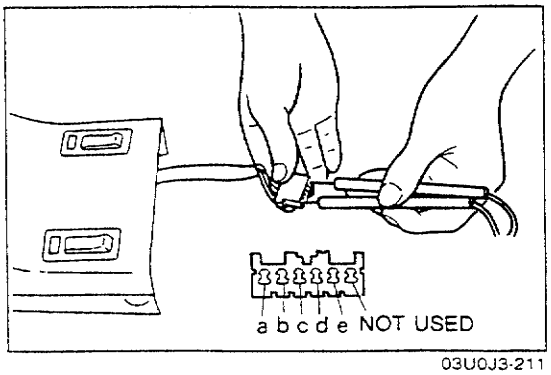




03U0J3-209



93G0J3-774



03U0J3-211

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.

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

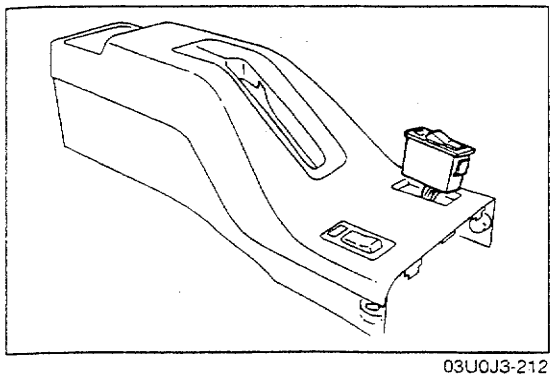
* Turn the light switch (first position).

Continuity

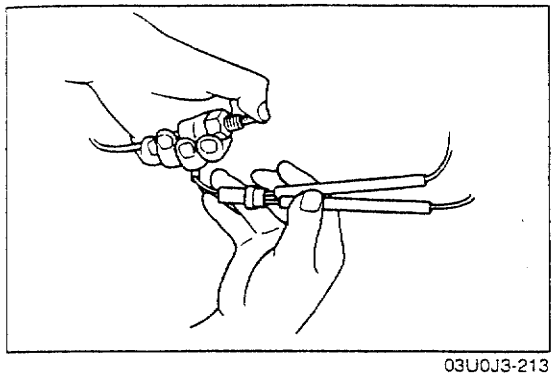
1. Disconnect the negative battery terminal.
2. Disconnect the connector of switch.
3. Check continuity in LOCK and FREE position.

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

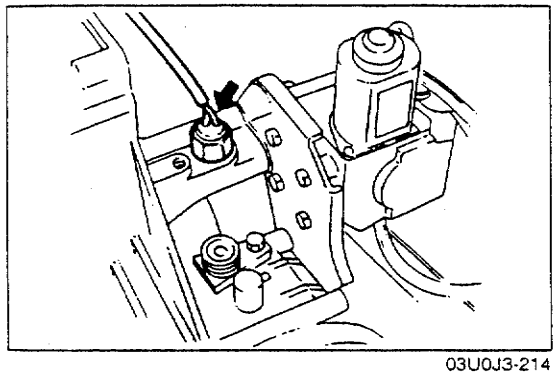
○—○: Indicates continuity



03U0J3-212



03U0J3-213



03U0J3-214

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

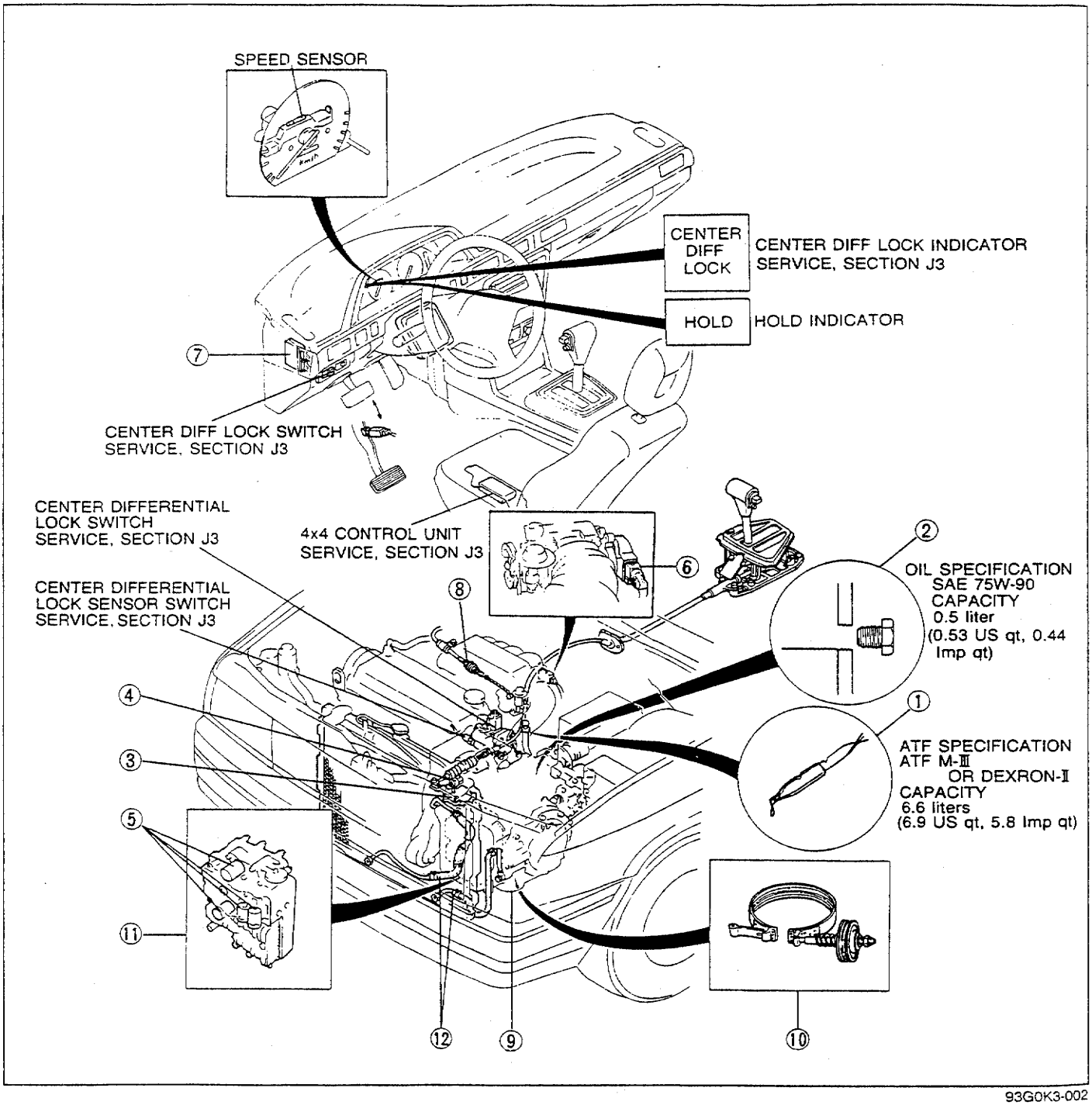
1. Disconnect the negative battery terminal.
2. Disconnect the connector of the center differential lock sensor switch.
3. Replace the switch.

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

AUTOMATIC TRANSAXLE AND TRANSFER UNIT (Electronically Controlled)

93G0K3-001

INDEX



93G0K3-002

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 unit have been made available for the 1990 323 for improved driveability and roadability.
- The construction and operation of the transaxle is the same as the 626 EC-AT (G4A-EL); however, the hydraulic circuit is modified. 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 the EC-AT is the same as the 626 EC-AT (G4A-EL) non-turbo model.
- The center differential employs a planetary carrier system 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 roads to bad roads and adverse weather conditions.
- 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.
- For a description of the operation of the transaxle and transfer unit, refer to Section J3.

93G0K3-003

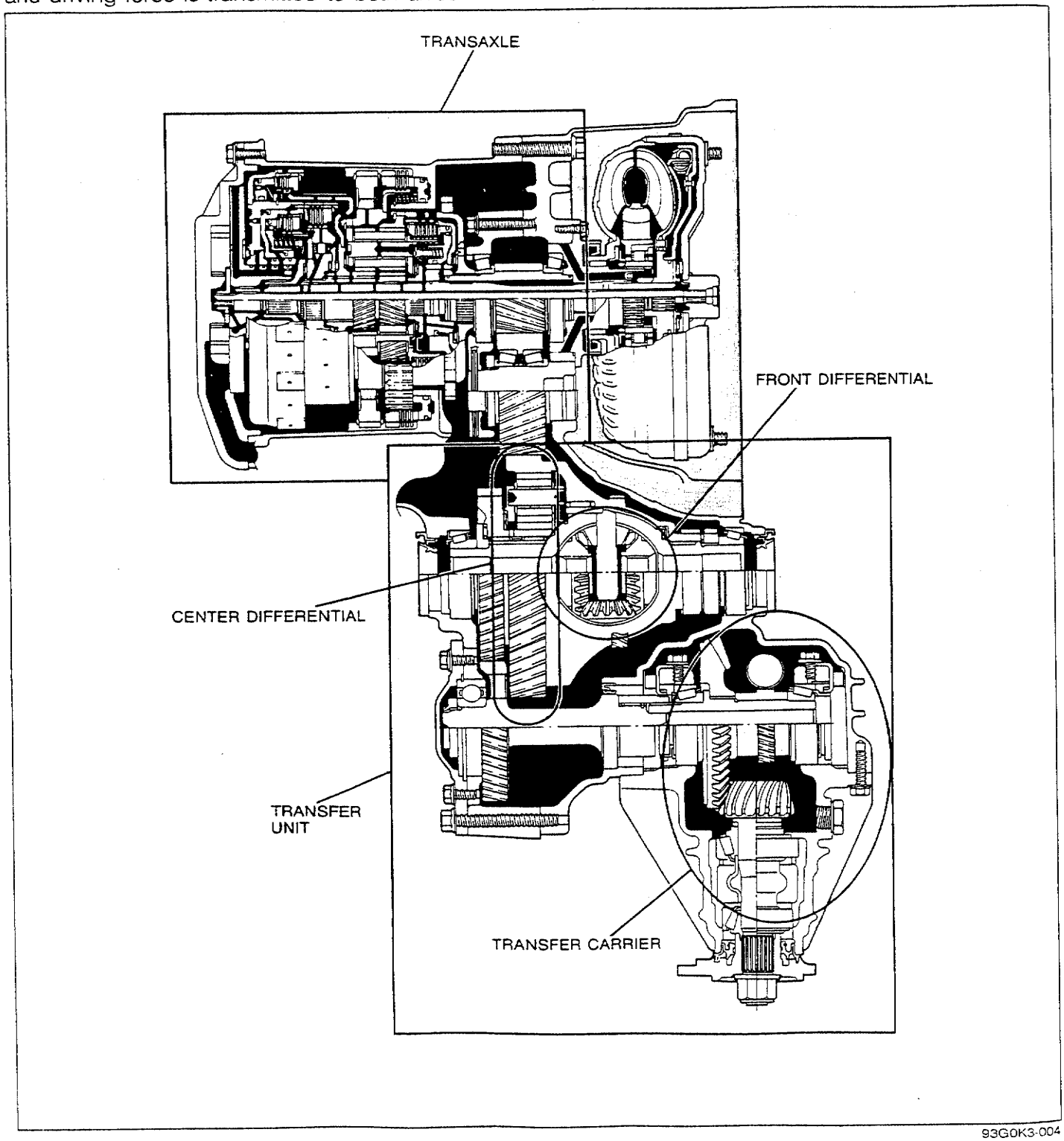
OUTLINE OF OPERATION

Driving force from the 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 relays this 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.



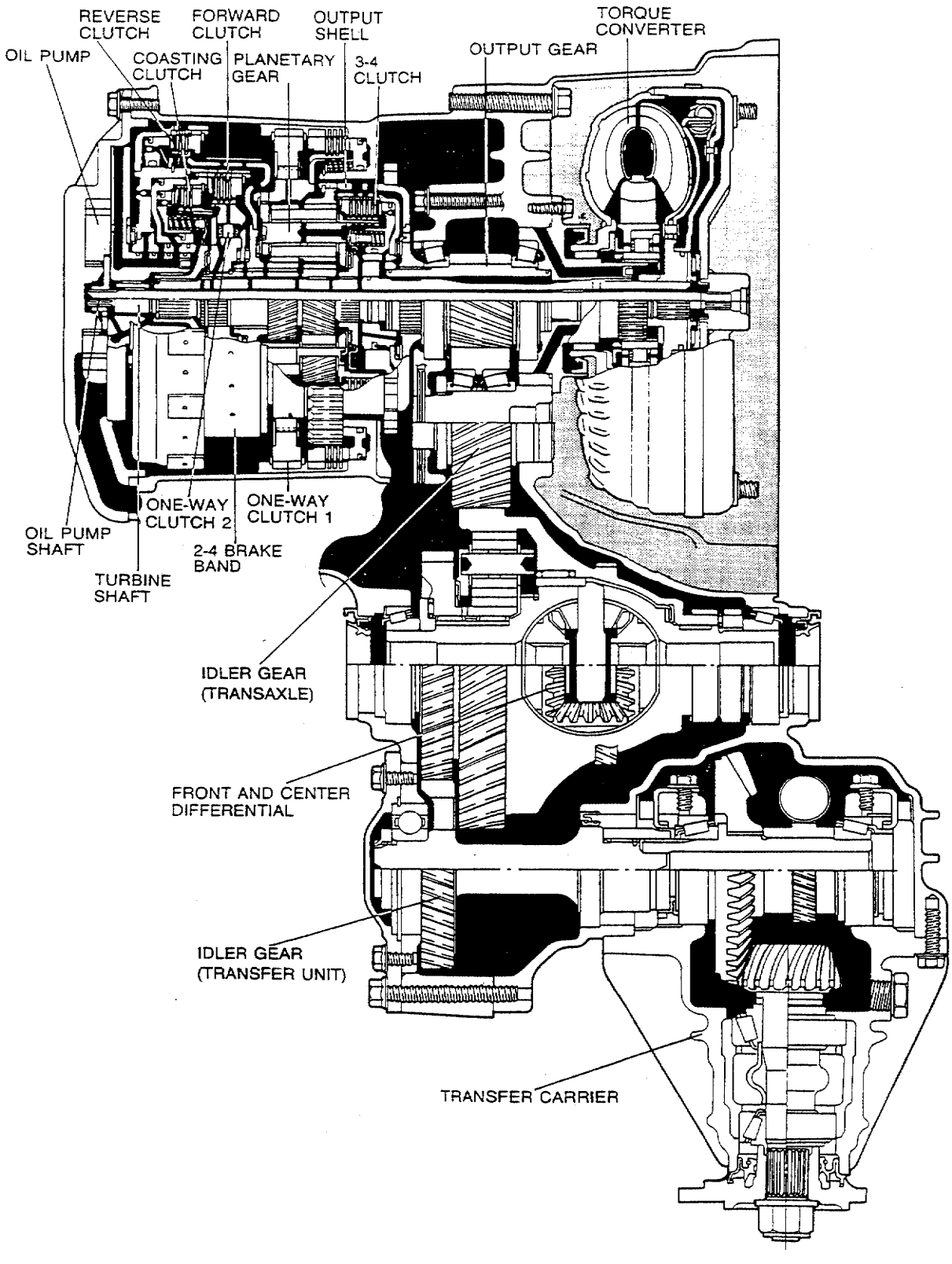
93G0K3-004

SPECIFICATIONS

Item \ Engine/Transaxle			BP SOHC (4WD) G4AX-EL
Transaxle			
Transaxle control			Floor shift
Lockup Mechanism			Electro hydraulic
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
		Idler gear side	50
	Number of idler 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 idler 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)

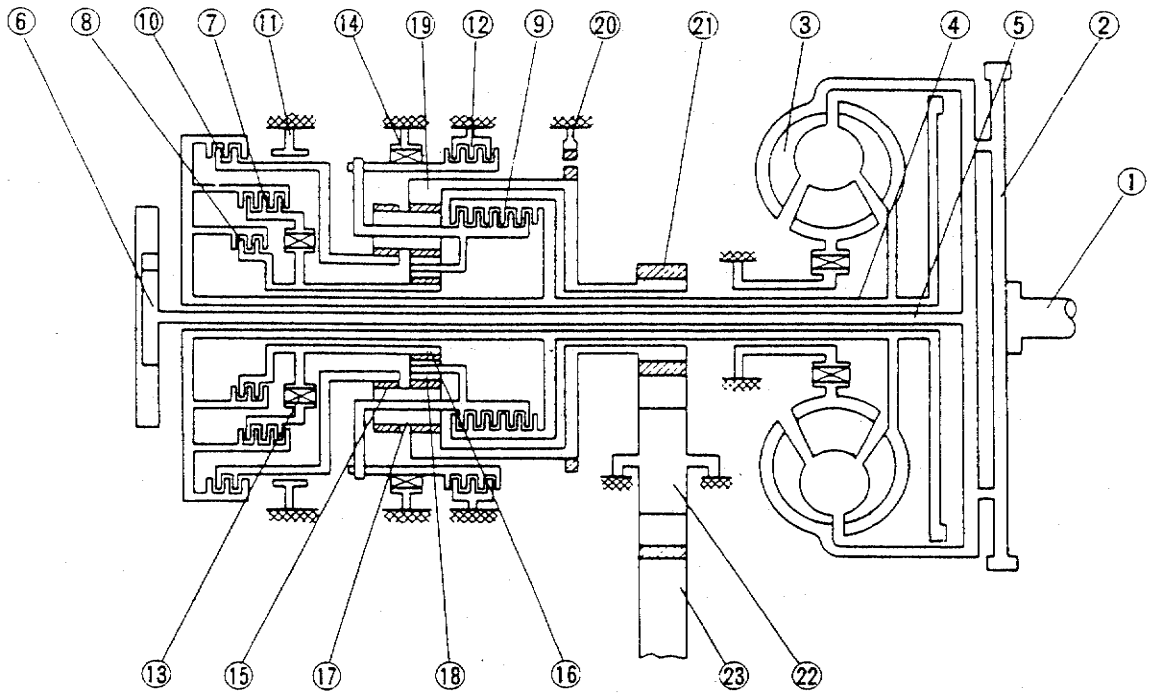
93G0K3-005

STRUCTURAL VIEW



03U0K2-006

POWERFLOW DIAGRAM



93G0K3-006

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

OPERATION OF COMPONENTS

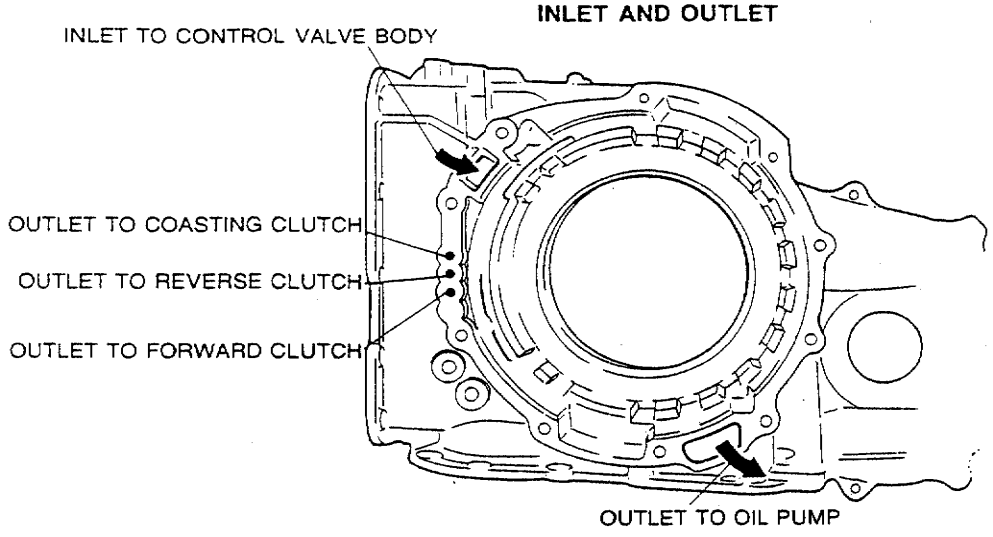
Mode	Range	Gear position		Engine braking effect	Forward clutch	Coasting clutch	3-4 clutch	Reverse clutch	2-4 brake		Low & reverse brake	One-way clutch 1	One-way clutch 2
									Applied	Released			
Normal	P	Park		—									
	R	Reverse		Yes				○			○		
	N	—	Below approx. 4 km/h (2.5 mph)	—									
	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

93G0K3-007

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

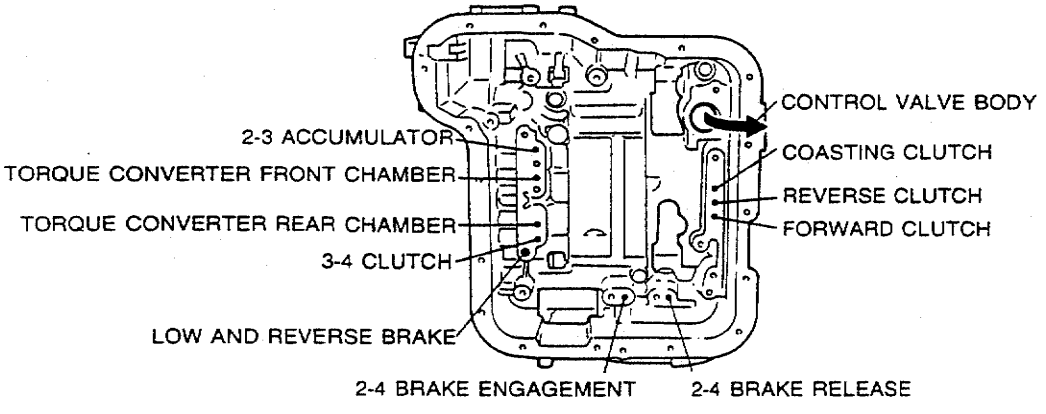
FLUID PASSAGE LOCATIONS
Transaxle Case

INLET AND OUTLET



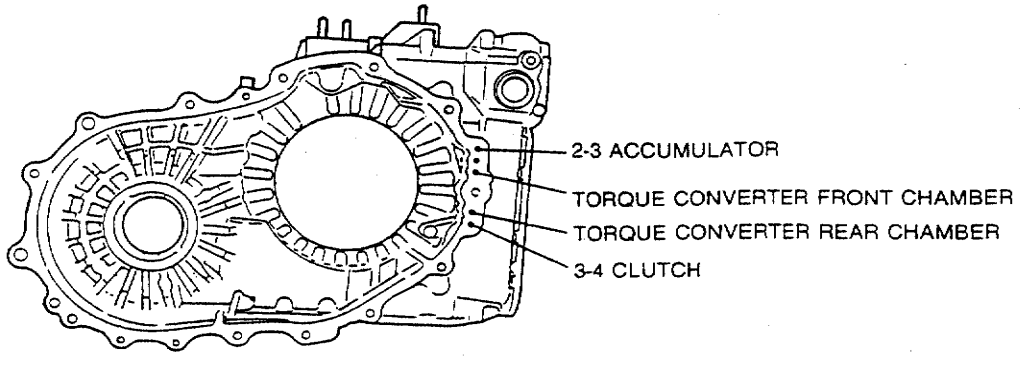
TRANSAXLE CASE

INLET



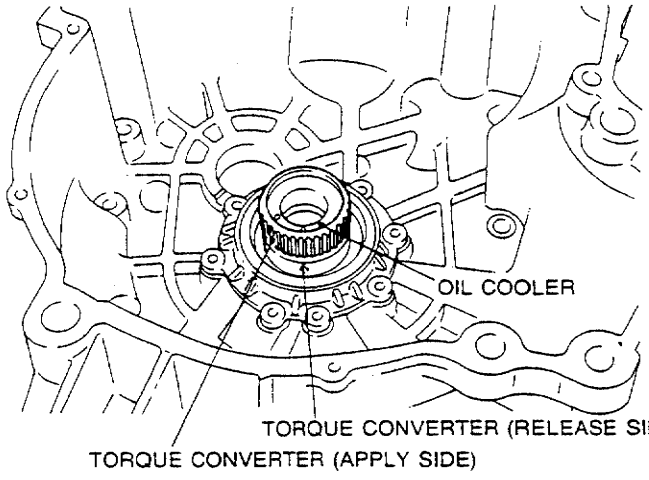
TRANSAXLE CASE

OUTLET

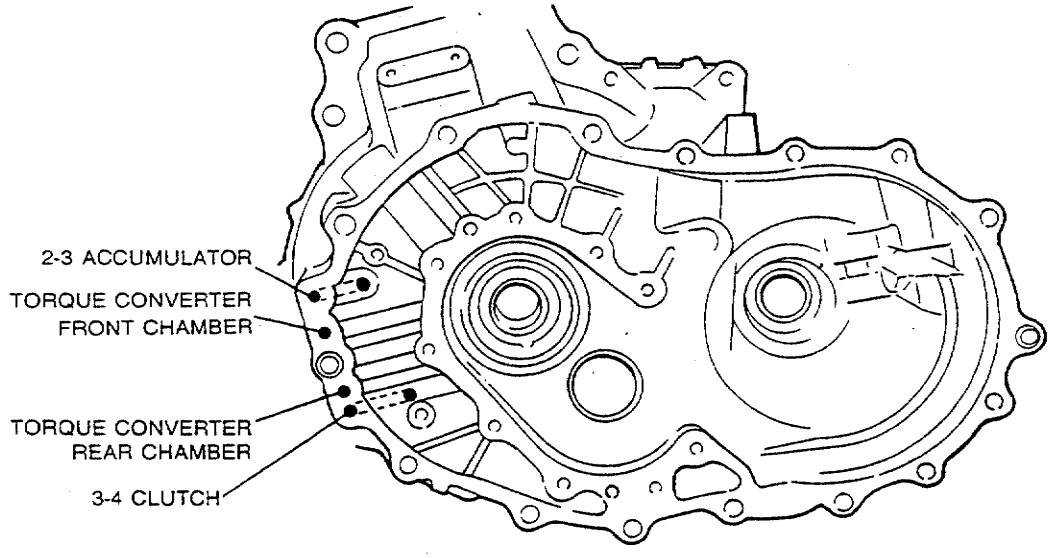


TRANSAXLE CASE

Clutch Housing



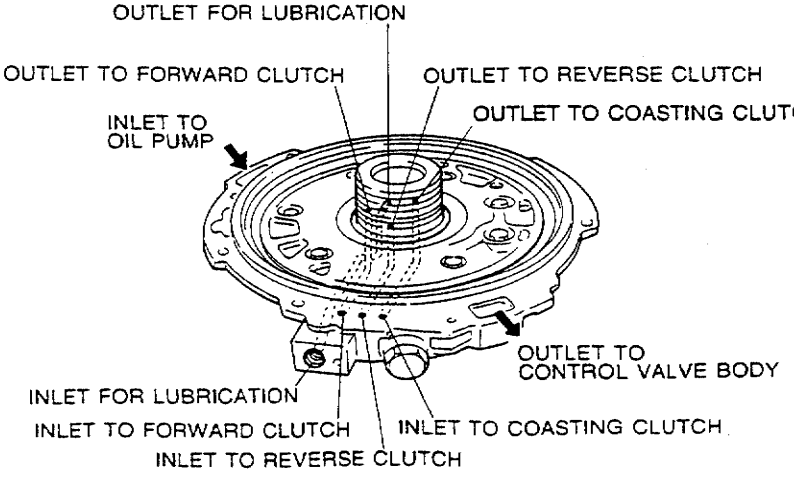
INLET



TRANSAXLE HOUSING

03U0KX-009

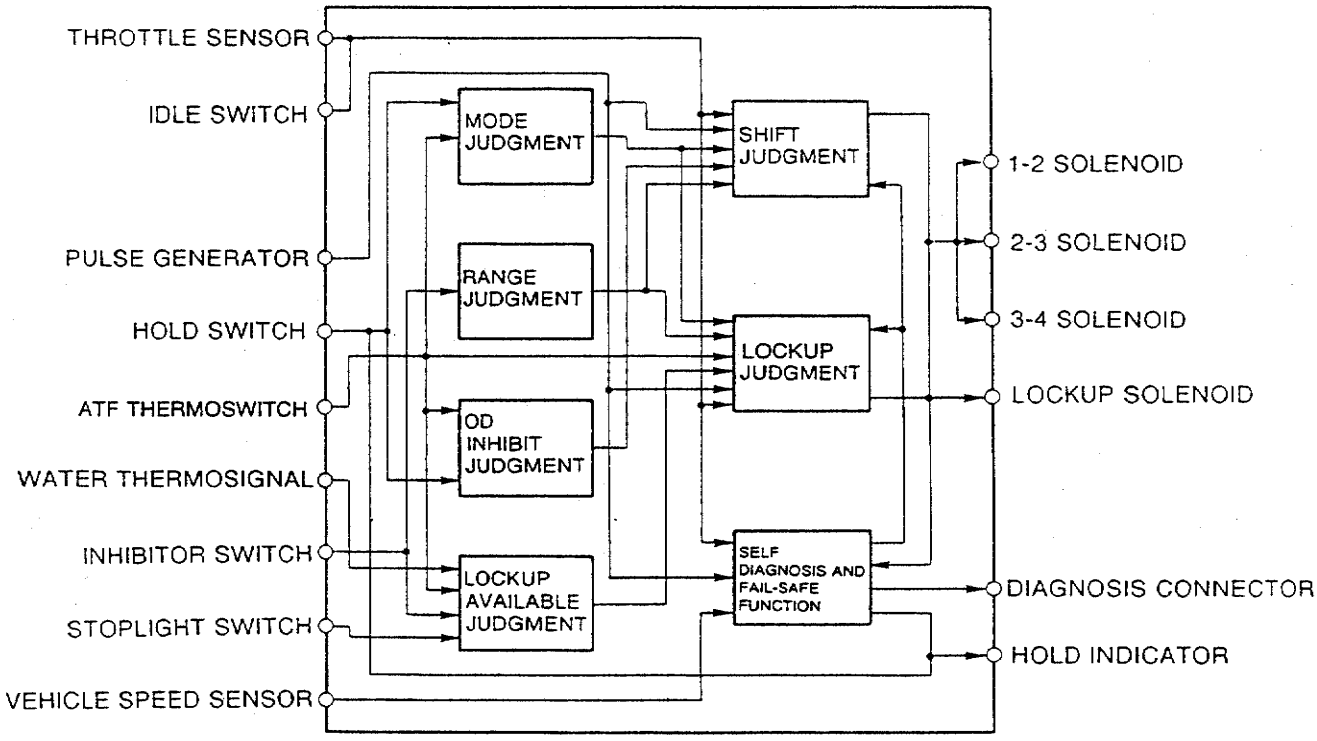
Oil Pump



03U0KX-010

ELECTRONIC CONTROL SYSTEM COMPONENTS

SYSTEM DIAGRAM

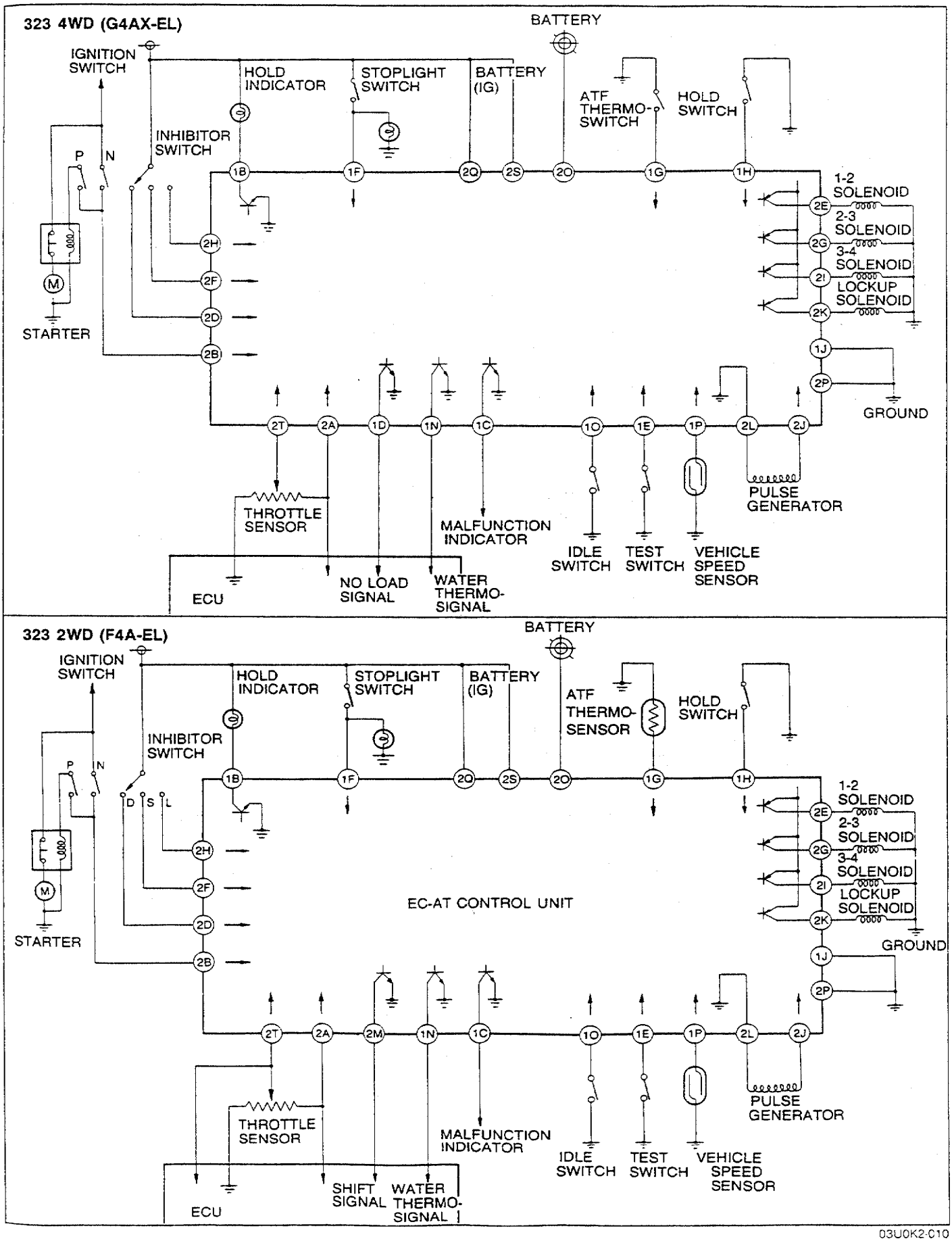


COMPONENT DESCRIPTIONS

Item			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 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 selector lever
	Hold switch		Sets Hold mode
	Stoplight switch		Detects use of service brakes
	Water thermosignal		Indicates engine coolant temperature
	ATF thermoswitch		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 self-diagnosis reveals malfunction
	No load signal		Sends no load signal (P and N ranges) to engine control unit

93G0K3-008

ELECTRICAL CIRCUIT



SOLENOID VALVE OPERATION TABLE

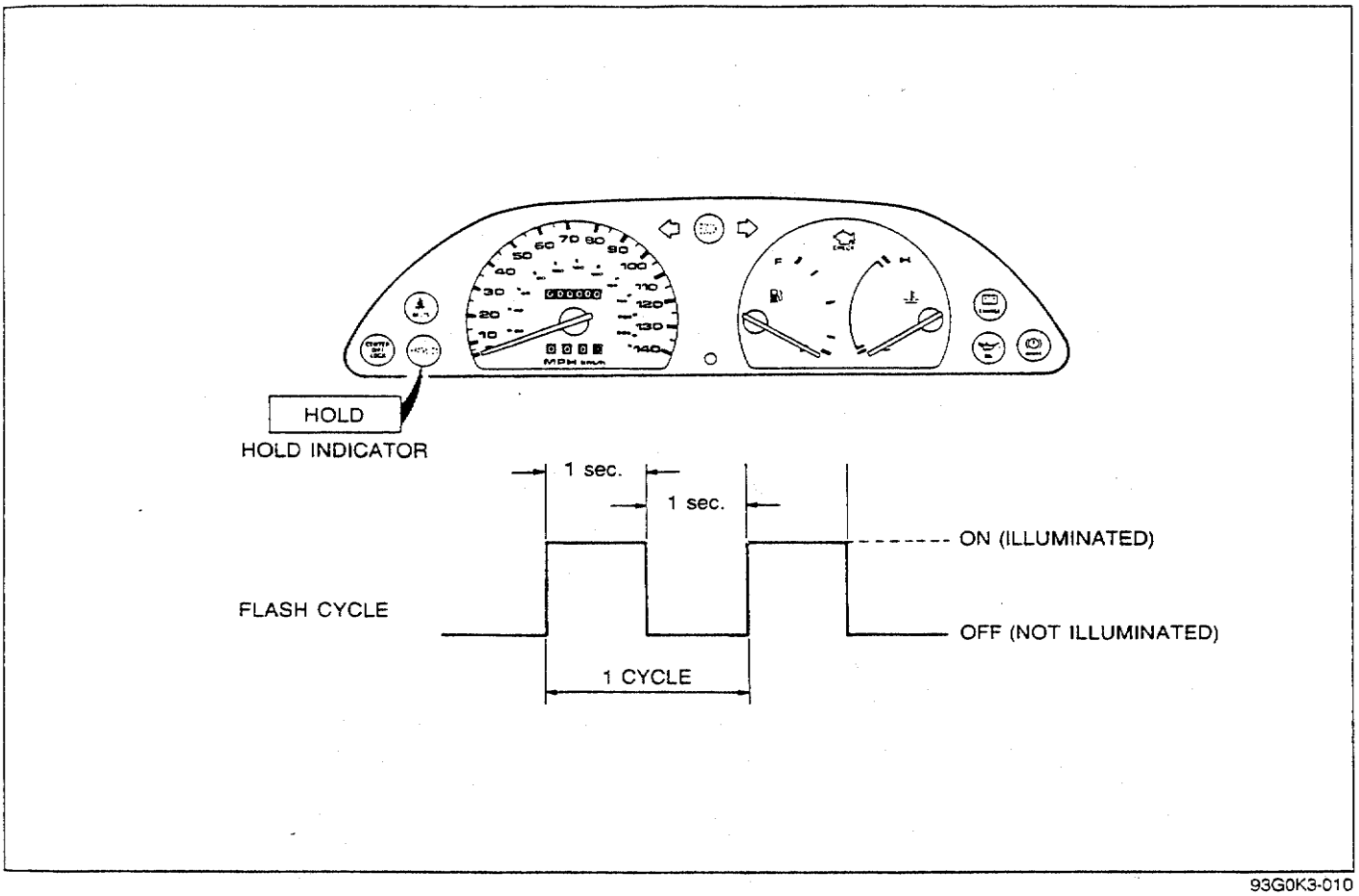
RANGE	GEAR		SOLENOID VALVES							
			323 2WD				323 4WD			
			1-2	2-3	3-4	Lockup	1-2	2-3	3-4	Lockup
P	Park				ON				ON	
R	Reverse		ON				ON			
N	—	Below approx. 4 km/h (2.5 mph)			ON				ON	
		Above approx. 5 km/h (3 mph)	ON				ON			
D	1st			ON	ON			ON	ON	
	2nd		ON	ON	ON		ON	ON	ON	
	3rd	Below approx.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

93G0K3-009

SELF-DIAGNOSIS SYSTEM

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

SELF-DIAGNOSIS FUNCTION



93G0K3-010

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 wiring harness

93G0K3-011

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.

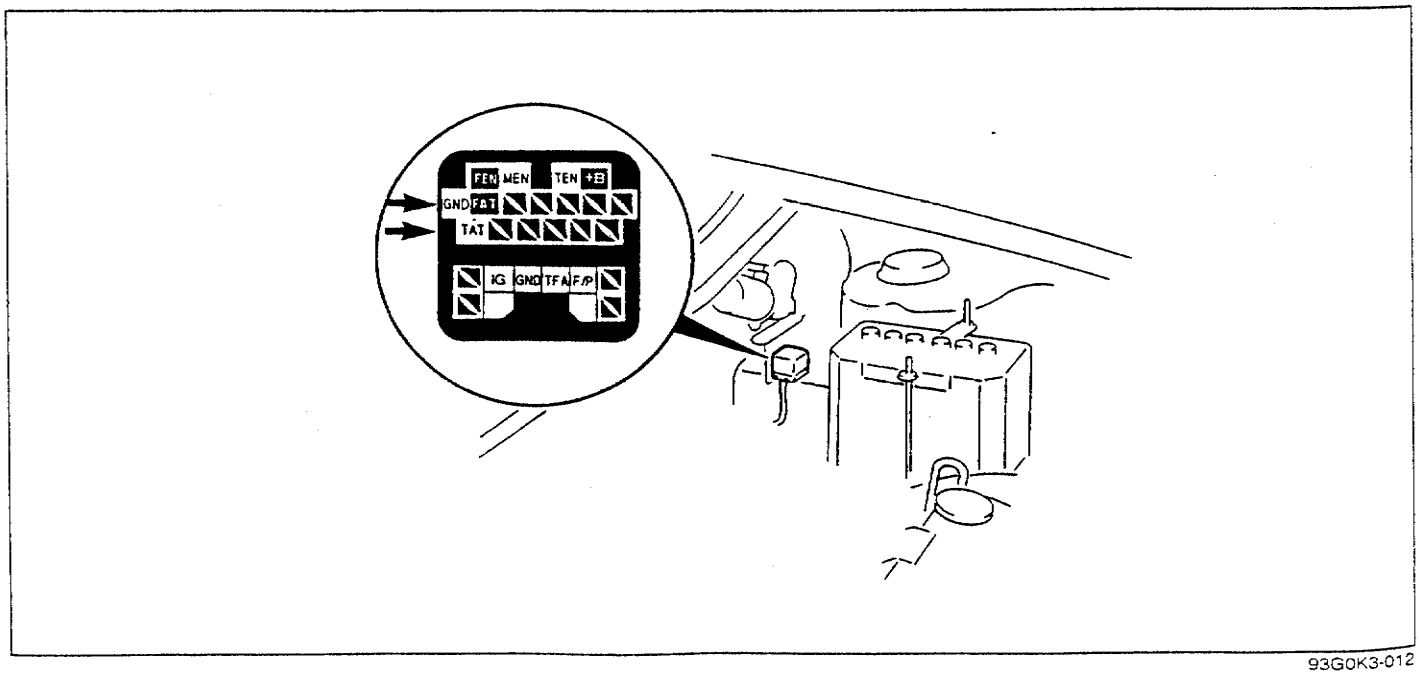
   Note
   - **If all solenoid valves are switched OFF, D and S ranges become 3rd gear position, L range becomes 1st gear position, and R range remains reverse gear position.**

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

03U0K2-014

DISPLAY OF MALFUNCTION CODE

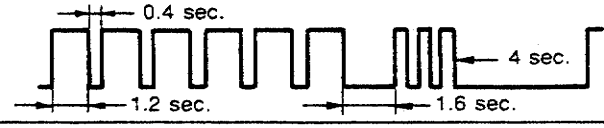
If a malfunction occurs in components which the EC-AT control unit can diagnose, the control unit causes the HOLD indicator to flash while the malfunction is continuing. At the same time, the control unit memorizes the code of the malfunction for later retrieval with the **EC-AT Tester** and **System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



93G0K3-012

Malfunction Code Table

The following table shows 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	
3-4 shift solenoid valve	62	
Lockup solenoid valve	63	

93G0K3-013

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	—	—						
D	1st	2.800	↕			↑ ↓		
	2nd	1.540	↕			↓		
	3rd	1.000	↕	X	X	↑	X	X
	OD	0.700		X	X			X
S	1st	2.800	↕					
	2nd	1.540	↕			↑		X
	3rd	1.000	↑	X	X	↑	X	X
	OD	0.700			X			X
L	1st	2.800	↕			↑		X
	2nd	1.540			X			X

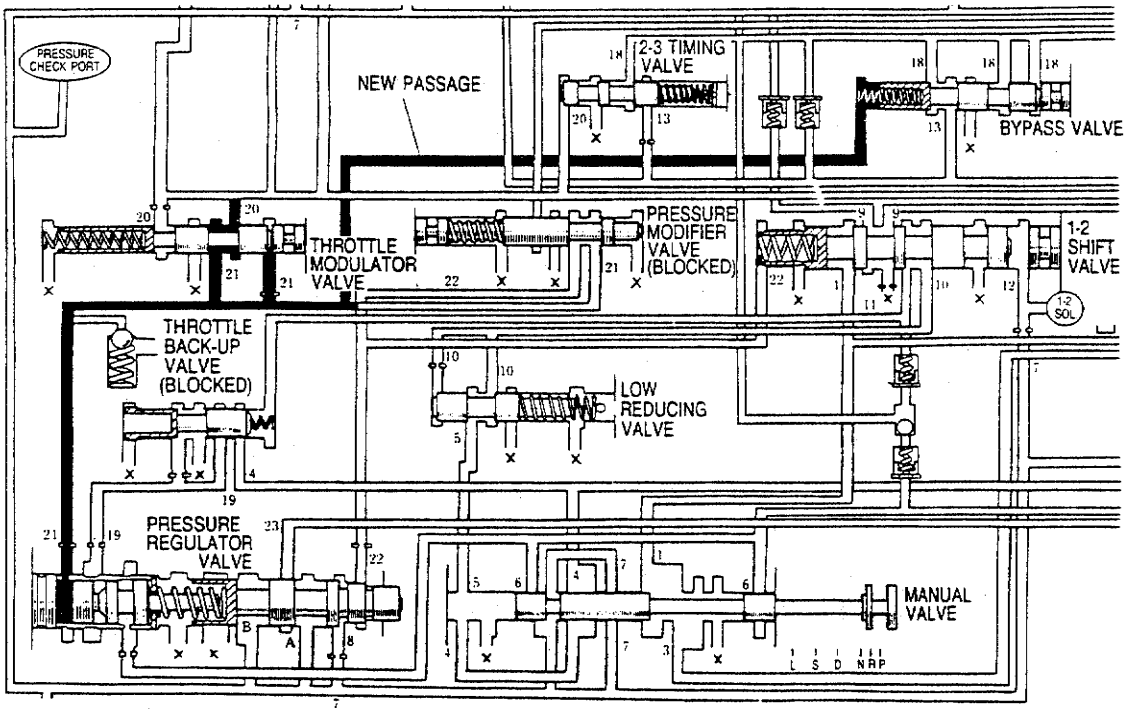
03U0K2-017

⬇⬆: Will not shift unless selector button depressed.
⇩⬆: Will shift without selector button depressed.
↕: Directions of possible shift.
X: Lockup or engine braking possible.

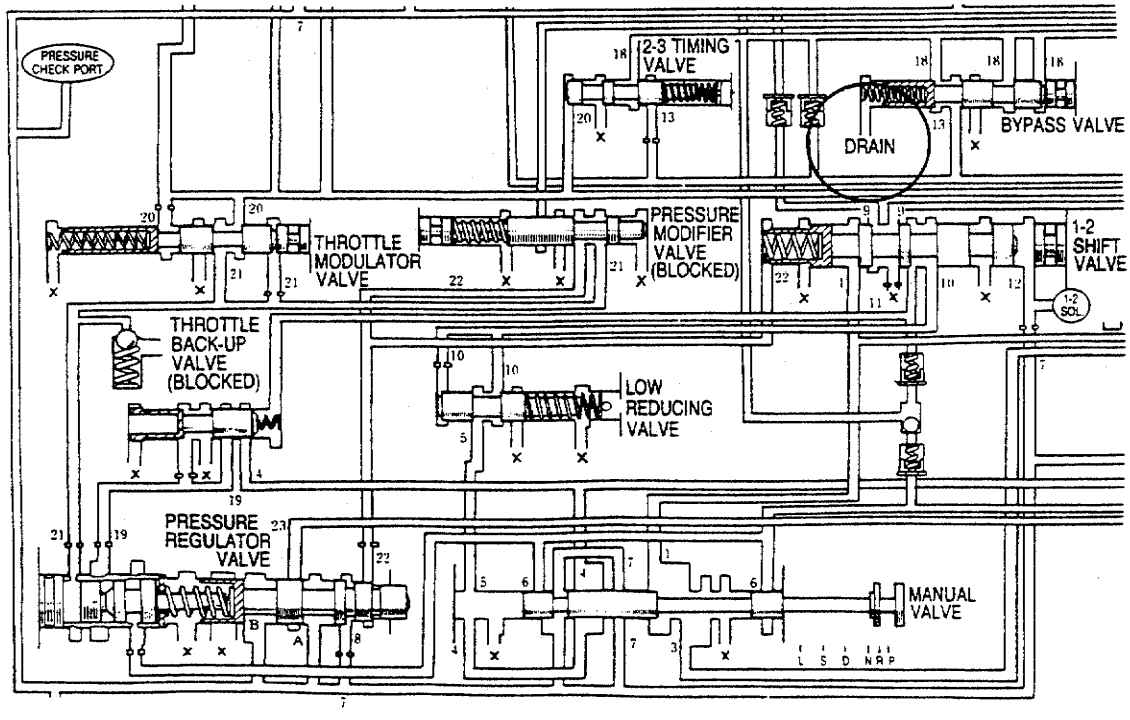
BYPASS VALVE HYDRAULIC CIRCUIT

The former drain circuit at the left end of the bypass valve is changed to a throttle modulator valve circuit. By this new circuit, the 3-4 clutch hydraulic pressure is controlled based on the throttle valve opening during the 2-3 upshift.
When the throttle valve is wide open, the throttle modulated pressure is high, moving the bypass valve to the right. This provides a rapidly rising line pressure at the 3-4 clutch to give positive engagement against the strong engine torque.

G4AX-EL (NEW)



G4A-EL

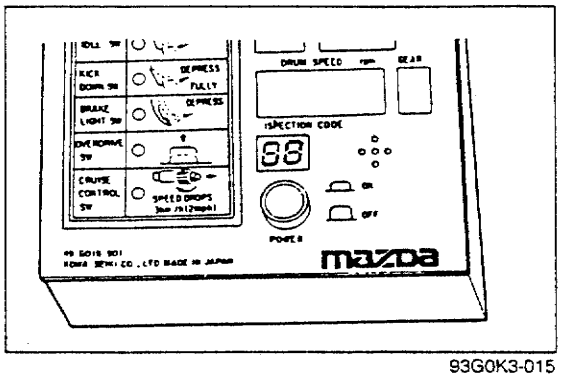


TROUBLESHOOTING GUIDE

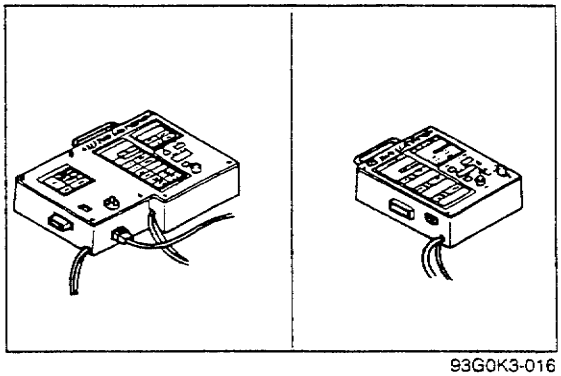
GENERAL NOTES

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.

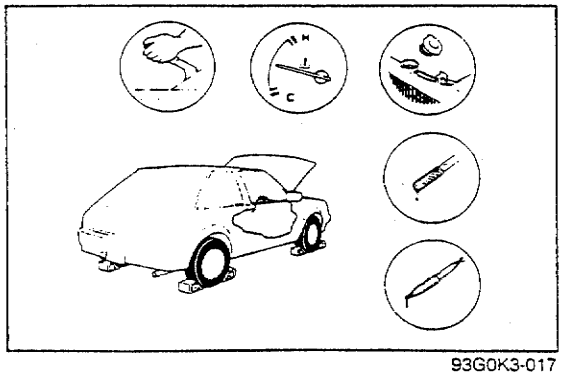
03U0KX-011



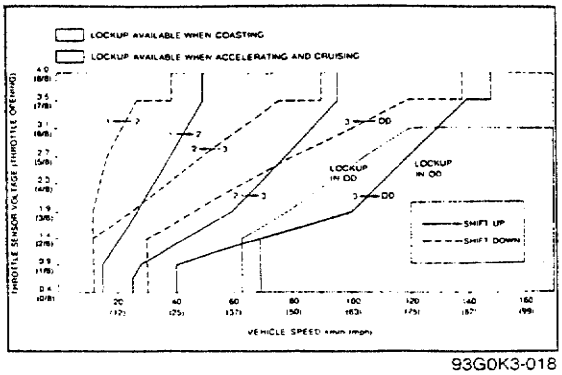
93G0K3-015



93G0K3-016



93G0K3-017



93G0K3-018

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 K3–104.)

Note
- **Malfunction code(s) can also be checked for by the flashing sequence of the HOLD indicator lamp. (Refer to page K3–107.)**

Step 2: Electric Signal Inspection
Check the signals to/from the EC-AT control unit with the **EC-AT Tester**. (Refer to page K3–143.)

Note
- **Signals can also be checked by checking the EC-AT control unit terminal voltages with a voltmeter. (Refer to page K3–114.)**

Step 3: Mechanical System Test
Check the engine stall speed, time lag, line pressure, and throttle pressure. (Refer to page K3–118.)

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 K3–126.)

If the 4 steps on page K3–20 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 K3–22 through 23.
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 during each step of the troubleshooting process to quickly locate the cause of the problem.

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-Diagnosis" column are diagnosed by the EC-AT control unit self-diagnosis function. The **EC-AT Tester** can be used for easy retrieval of any warning codes stored in the **EC-AT** control unit.
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," "Time Lag," "Oil Pressure," and "Road Test" columns can be checked for malfunction by performing the respective test.
5. The checking, adjustment, repair or replacement procedures for each component is described in the page(s) noted in the "Reference Page" column.

93G0K3-019

Inspection point and reference page / Item	Preliminary				Electronic control system												Hydraulic control system					Powertrain											
	K3–133	*Section K1	K3–136	*Section F2	*Section T	K3–139	K3–139	*Section F2	*Section F2	K3–144	*Section T	K3–141	K3–142	K3–142	K3–142	K3–142	K3–141	K3–197	K3–209	K3–200,209	K3–168	K3–281	K3–167	K3–173	K3–173	K3–173	K3–187	K3–197	K3–192	K3–185	K3–182	K3–164	K3–185	K3–239
	ATF level and condition	Selector lever	Throttle cable	Idle speed and ignition timing	Stoplight switch	Inhibitor switch	Hold switch	Idle switch	Throttle sensor	Water thermosignal	Vehicle speed sensor	Pulse generator	1-2 solenoid	2-3 solenoid	3-4 solenoid	Lockup solenoid	ATF thermoswitch	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
Self-diagnosis											○	○	○	○	○	○																	
Adjustment	○	○	○	○		○		○	○									○										○					
EC-AT TESTER					○	○	○	○	○	○	○	○	○	○	○	○	○																
Stall Test																		○	○		○		○			○		○		○	○		
Time Lag Test																				○				○				○					
Oil Pressure Test			○																○		○	○							○				
Road Test																		○						○	○		○	○	○	○		○		

* Refer to 323 Workshop Manual Volume 1 (1204-10-89F), Volume 2 (1206-10-89F).

93G0K3-020

ON-VEHICLE

Item		Inspection point and reference page	Preliminary				Electronic control system														Hydraulic control system		
			K3–133	*Section K1	K3–136	*Section F2	*Section T	K3–139	K3–139	*Section F2	*Section F2	K3–144	*Section T	K3–141	K3–142	K3–142	K3–142	K3–142	K3–141	K3–197	K3–209	K3–158
			ATF level and condition	Selector lever	Throttle cable	Idle speed and ignition timing	Stoplight switch	Inhibitor switch	Hold switch	Idle switch	Throttle sensor	Water thermosignal	Vehicle speed sensor	Pulse generator	1-2 solenoid	2-3 solenoid	3-4 solenoid	Lockup solenoid	ATF thermoswitch	Band servo (2-4 brake band)	Control valves	Accumulators
Accelerating	1	Vehicle does not move in D, S, L, and R ranges	○	○																	○	
	2	Vehicle moves in N range		○																	○	
	3	Vehicle moves in P range or parking gear not disengaged when P disengaged		○																		
	4	Excessive creep			○	○																
	5	No creep at all	○	○	○	○															○	
Shifting	6	No shift	○						○		○			○	○	○	○				○	
	7	Abnormal shift	○						○		○			○	○	○	○			○	○	
	8	Frequent shifting									○										○	
	9	Shift point high or low	○							○	○		○	○	○	○	○				○	
	10	No lockup					○		○		○	○		○	○	○	○	○			○	
	11	No kickdown							○		○			○	○	○	○					
Slipping	12	Engine flares or slips when accelerating vehicle	○																		○	
	13	Engine flares up or slips when upshifting or downshifting	○		○																○	
Shift shock	14	Excessive N to R or N to D range shift shock	○		○	○								○							○	○
	15	Excessive shift shock when upshifting and downshifting	○		○										○	○	○				○	○
Noise	16	Transaxle noisy in N or P ranges	○																			
	17	Transaxle noisy in D, S, L, and R ranges	○																			
Others	18	No engine braking	○												○		○				○	
	19	No mode changes							○		○		○	○	○	○	○	○	○			
	20	Transaxle overheats	○															○	○			
	21	Hold indicator lamp flashes									○		○	○	○	○	○	○				
	22	Engine will not start in N or P range or will start in other ranges		○				○														
	23	Engine stalls when shifted to D, S, L, and R ranges				○	○	○						○				○			○	
	24	Engine stalls when brake pedal depressed while driving at low speed or stopping				○	○							○				○	○		○	

* Refer to 323 Workshop Manual Volume 1 (1204-10-89F), Volume 2 (1206-10-89F).

93G0K3-021

OFF-VEHICLE

Hydraulic control system		Powertrain												
K3-168	K3-281	K3-167	K3-173	K3-173	K3-173	K3-187	K3-197	K3-192	K3-185	K3-182	K3-164	K3-185	K3-239	Inspection point and reference page / Item
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	
○	○	○	○		○			○	○	○	○			Vehicle does not move in D, S, L, and R ranges
	○		○	○										Vehicle moves in N range
											○			Vehicle moves in P range or parking gear not disengaged when P disengaged
														Excessive creep
○	○	○	○		○			○	○	○				No creep at all
○	○													No shift
	○													Abnormal shift
	○													Frequent shifting
	○													Shift point high or low
	○	○												No lockup
														No kickdown
○			○		○			○	○	○				Engine flares up or slips when accelerating vehicle
○	○		○			○	○		○	○				Engine flares up or slips when upshifting or downshifting
	○													Excessive N to R or N to D range shift shock
	○			○		○	○							Excessive shift shock when upshifting and downshifting
○		○												Transaxle noisy in N or P ranges
○		○										○	○	Transaxle noisy in D, S, L, and R ranges
	○			○				○						No engine braking
														No mode changes
○		○												Transaxle overheats
														Hold indicator lamp flashes
														Engine will not start in N or P ranges or will start in other ranges
		○	○											Engine stalls when shifted to D, S, L, and R ranges
	○	○												Engine stalls when brake pedal depressed while driving at low speed or stopping

Vehicle does not move in D, S, L, and R ranges	1	Accelerating
Vehicle moves in N range	2	Accelerating
Vehicle moves in P range or parking gear not disengaged when P disengaged	3	Accelerating
Excessive creep	4	Accelerating
No creep at all	5	Accelerating
No shift	6	Shifting
Abnormal shift	7	Shifting
Frequent shifting	8	Shifting
Shift point high or low	9	Shifting
No lockup	10	Shifting
No kickdown	11	Shifting
Engine flares up or slips when accelerating vehicle	12	Slipping
Engine flares up or slips when upshifting or downshifting	13	Slipping
Excessive N to R or N to D range shift shock	14	Shift shock
Excessive shift shock when upshifting and downshifting	15	Shift shock
Transaxle noisy in N or P ranges	16	Noise
Transaxle noisy in D, S, L, and R ranges	17	Noise
No engine braking	18	Others
No mode changes	19	Others
Transaxle overheats	20	Others
Hold indicator lamp flashes	21	Others
Engine will not start in N or P ranges or will start in other ranges	22	Others
Engine stalls when shifted to D, S, L, and R ranges	23	Others
Engine stalls when brake pedal depressed while driving at low speed or stopping	24	Others

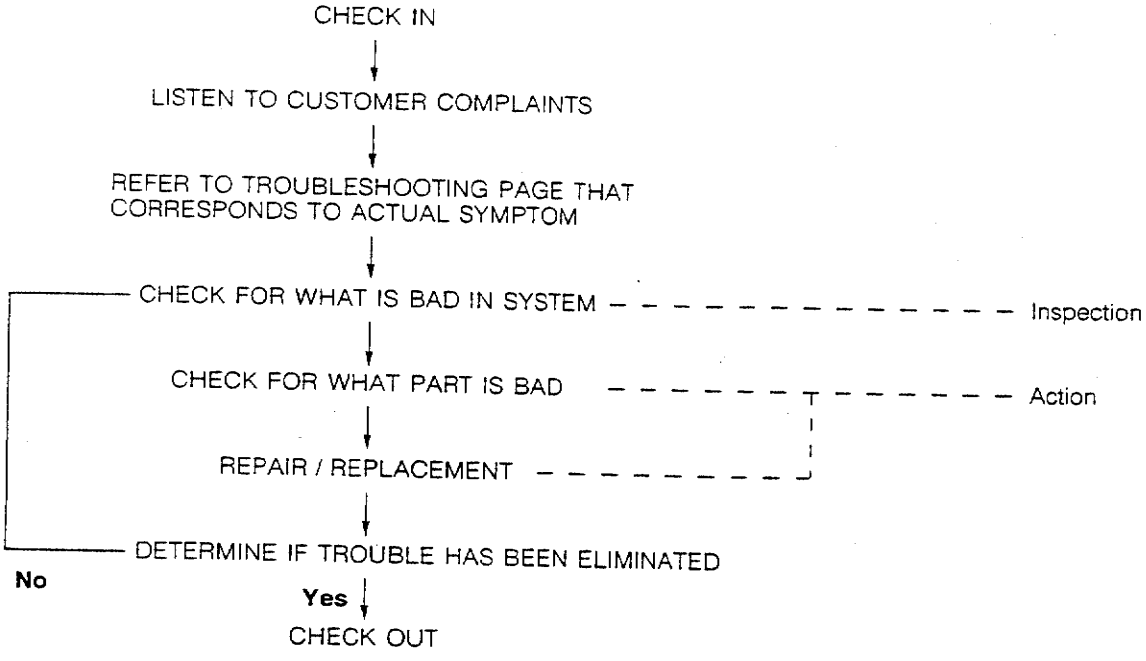
93G0K3-022

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.

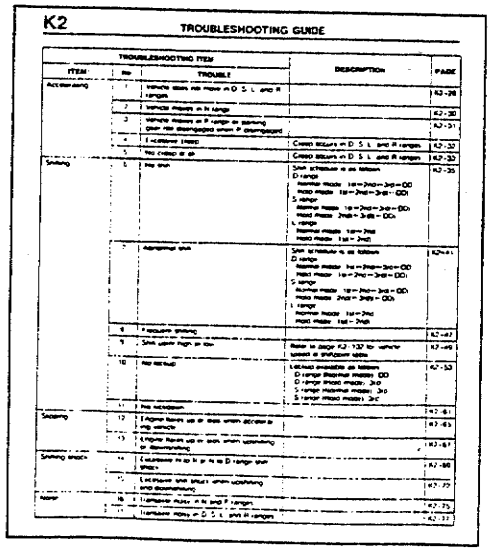
Workflow



93G0K3-023

Diagnostic Index

No.:
Each troubleshooting item is assigned a number.



Description:
Describes each troubleshooting item.

Page:
Shows the reference page.

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 ☞ **page K3–133** **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 K3–13**

93G0K3-024

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		K3–28
	2	Vehicle moves in N range		K3–30
	3	Vehicle moves in P range or parking gear not disengaged when P disengaged		K3–31
	4	Excessive creep	Creep occurs in D, S, L, and R ranges	K3–32
	5	No creep at all	No creep in D, S, L, and R ranges	K3–33
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)	K3–35
	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)	K3–41
	8	Frequent shifting		K3–47
	9	Shift point high or low	Refer to page K3–127 for vehicle speed at shiftpoint table	K3–49
	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	K3–53
	11	No kickdown		K3–61
Slipping	12	Engine flares up or slips when accelerating vehicle		K3–65
	13	Engine flares up or slips when upshifting or downshifting		K3–67
Shifting shock	14	Excessive N to R or N to D range shift shock		K3–69
	15	Excessive shift shock when upshifting and downshifting		K3–72
Noise	16	Transaxle noisy in N and P ranges		K3–75
	17	Transaxle noisy in D, S, L, and R ranges		K3–77

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)	K3–79
	19	No mode changes		K3–83
	20	Transaxle overheats		K3–88
	21	Hold indicator lamp flashes	Hold indicator flashes if a malfunction occurs of any of following components: • Vehicle speed sensor • Throttle sensor • Pulse generator • Solenoid valves (1-2, 2-3, 3-4, or lockup)	K3–92
	22	Engine will not start in N or P range or will start in other ranges		K3–93
	23	Engine stalls when shifted to D, S, L, and R ranges	Engine will start and run in P and N ranges	K3–95
	24	Engine stalls when brake pedal depressed while driving at low speed or stopping		K3–100

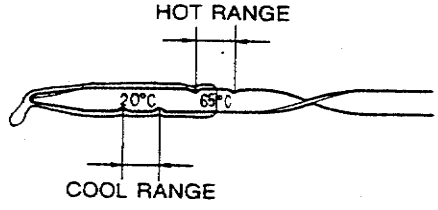
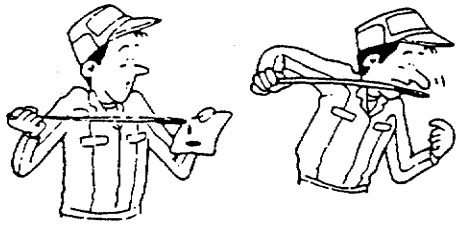
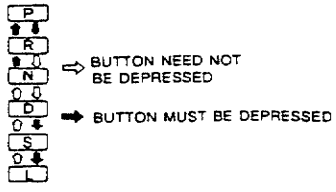
93G0K3-025

SYMPTOM TROUBLESHOOTING

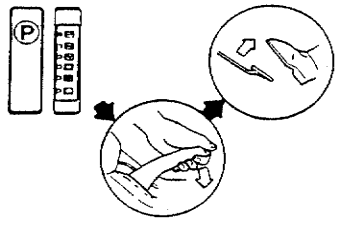
1	VEHICLE DOES NOT MOVE IN D, S, L, AND R RANGES
DESCRIPTION	• Vehicle does not move when accelerator depressed, engine speed increases

[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 ☞ **page K3–133** **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 K3–133**
2	Check if ATF condition is OK ☞ **page K3–133** 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	② condition Overhaul transaxle and repair or replace parts as necessary ☞ **page K3–133** ③ check for water leak at oil cooler and repair ④ condition Replace ATF
3	Check if selector lever operation is OK ☞ ***Section K1** 	Yes	Go to next step
		No	Adjust or repair selector lever ☞ ***Section K1**

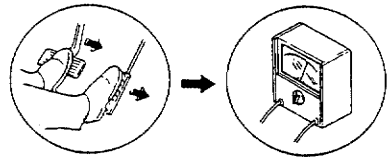
* Refer to 323 Workshop Manual Volume 2 (1206-10-89F).

<table>
<tr><th>STEP</th><th>INSPECTION</th><th></th><th>ACTION</th></tr>
<tr><td>4</td><td>Set selector lever in P range with vehicle on a gentle slope, release brakes, and check if vehicle rolls
  </td><td>Yes</td><td>Check parking mechanism
⇨ If OK, go to next step
⇨ If not OK, repair of replace parking mechanism</td></tr>
<tr><td></td><td></td><td>No</td><td>Go to next step</td></tr>
<tr><td>5</td><td>Check if line pressure and throttle pressure are within specification
☞ pages K3–122, 124
Line pressure:
<table>
<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>
<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>
</table>
Throttle pressure:
<table>
<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>
<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>
</table></td><td>Yes</td><td>Go to next step</td></tr>
<tr><td></td><td></td><td>No</td><td>Check for cause (Refer to Evaluation) ☞ pages K3–123, 125</td></tr>
<tr><td>6</td><td colspan="3">Try known good control valve body assembly or replace transaxle</td></tr>
</table>

93G0K3-026

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)

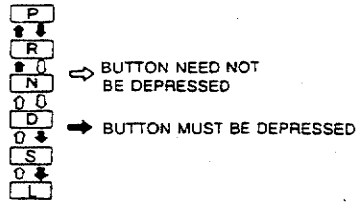
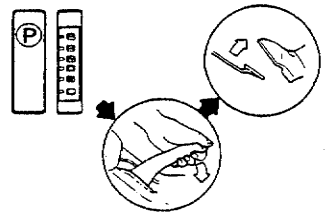
STEP	INSPECTION		ACTION
1	Check if selector lever operation is OK ☞ *Section K1 	Yes	Go to next step
		No	Adjust or repair selector lever ☞ *Section K1
2	Check if engine stall speed is OK ☞ page K3–118 **Engine stall speed: 2,550—2,650 rpm** 	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ page K3–120
3	Try known good EC-AT control unit, control valve body assembly, or replace transaxle		

* Refer to 323 Workshop Manual Volume 2 (1206-10-89F).

93G0K3-027

3	VEHICLE MOVES IN P RANGE OR PARKING GEAR NOT DISENGAGED WHEN P DISENGAGED
DESCRIPTION	• 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

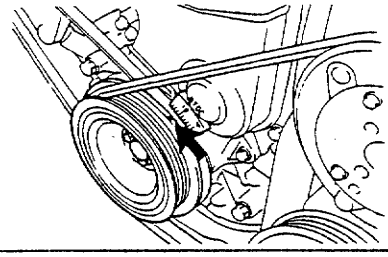
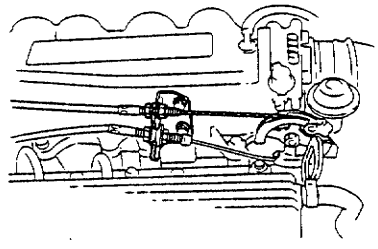
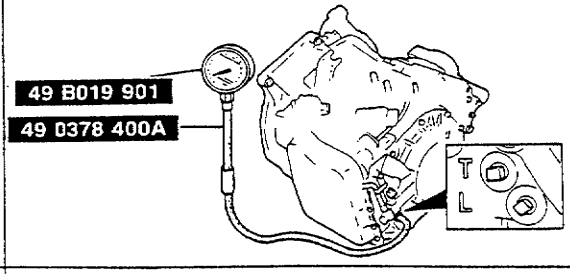
STEP	INSPECTION		ACTION
1	Check if selector lever operation is OK ☞ *Section K1 	Yes	Go to next step
		No	Adjust or repair selector lever ☞ *Section K1
2	Set selector lever in P range with vehicle on a gentle slope, release brakes, and check if vehicle rolls 	Yes	Check parking mechanism ⇨ If OK, go to next step. ⇨ If not OK, repair of replace parking mechanism
		No	Go to next step
3	Rebuild or replace transaxle		

* Refer to 323 Workshop Manual Volume 2 (1206-10-89F).

93G0K3-028

4	EXCESSIVE CREEP
DESCRIPTION	• Vehicle moves quickly in D, S, L, and R ranges without depressing accelerator **Note** **• N to R range or N to D range shift shock felt**

[TROUBLESHOOTING HINTS]
① Engine idle speed misadjusted
② Throttle cable misadjusted

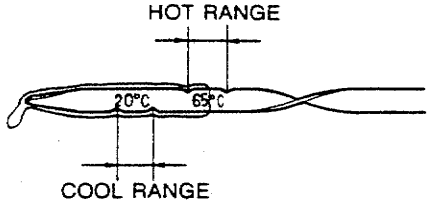
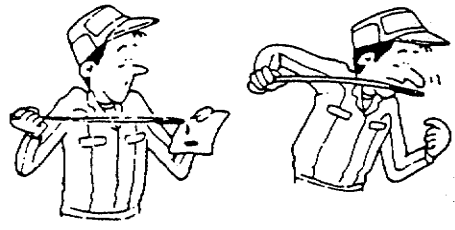
STEP	INSPECTION		ACTION
1	Check if ignition timing at idle is OK ☞ **page *F2–65** **Ignition timing (BTDC): 5 ± 1°** 	Yes	Check for correct idle speed ☞ **page *F2–65** **Idle speed: 750 ± 50 rpm** **(with parking brake applied)** ⇨ If OK, go to next step ⇨ If not OK, adjust idle speed ☞ **page *F2–65**
		No	Adjust ignition timing ☞ **page *F2–65**
2	Check if throttle cable operates smoothly and is installed correctly ☞ **page K3–136** 	Yes	Go to next step
		No	Replace throttle cable ☞ **page K3–136**
3	Check if line pressure at idle is OK ☞ **page K3–138** **Line pressure: 402—422 kPa** **(4.1—4.3 kg/cm², 58—61 psi)** **49 B019 901** **49 0378 400A**  	Yes	Go to next step
		No	Adjust throttle cable ☞ **page K3–138**
4	Rebuild or replace transaxle		

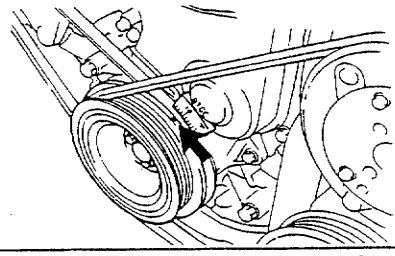
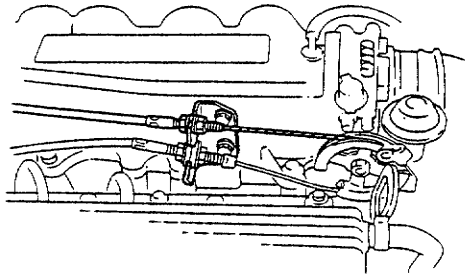
* Refer to 323 Workshop Manual Volume 1 (1204-10-89F).

93G0K3-029

5	NO CREEP AT ALL
DESCRIPTION	• Vehicle does not move in D, S, L, and R ranges when idling • Road condition: flat paved road **Note** **• S range HOLD mode creep normally reduced because transaxle in 2nd gear position**

[TROUBLESHOOTING HINTS]
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 K3–133 **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 K3–133
2	Check if ATF condition is OK ☞ page K3–133 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	② condition Overhaul transaxle and repair or replace parts as necessary ☞ page K3–133 ③ check for water leak at oil cooler and repair ④ condition Replace ATF

STEP	INSPECTION		ACTION
3	Check if ignition timing at idle is OK ☞ **page *F2–65** **Ignition timing (BTDC): 5 ± 1°** 	Yes	Check for correct idle speed ☞ **page *F2–65** **Idle speed: 750 ± 50 rpm** **(with parking brake applied)** ⇨ If OK, go to next step ⇨ If not OK, adjust idle speed ☞ **page *F2–65**
		No	Adjust ignition timing ☞ **page *F2–65**
4	Check if selector lever operation is OK ☞ ***Section K1** 	Yes	Go to next step
		No	Adjust or repair selector lever ☞ ***Section K1**
5	Check if throttle cable operates smoothly and is installed correctly ☞ **page K3–136** 	Yes	Go to next step
		No	Replace throttle cable ☞ **page K3–136**
6	Check if line pressure at idle is OK ☞ **page K3–122** **Line pressure:** Line pressure kPa (kg/cm², psi) Range / 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
		No	Adjust throttle cable ☞ **page K3–136**
7	Check if engine stall speed is OK ☞ **page K3–118** **Engine stall speed: 2,550—2,650 rpm**	Yes	Go to next step
		No	Check for cause (Refer to Evaluation) ☞ **page K3–120**
8	Rebuild or replace transaxle		

93G0K3-030

* Refer to 323 Workshop Manual Volume 1 (1204-10-89F), Volume 2 (1206-10-89F).

PROPELLER SHAFT

FEATURES

SERVICE

03U0LX-801

OUTLINE

OUTLINE OF CONSTRUCTION

1. The propeller shaft is a three-piece, four-joint type with two center bearings for support.

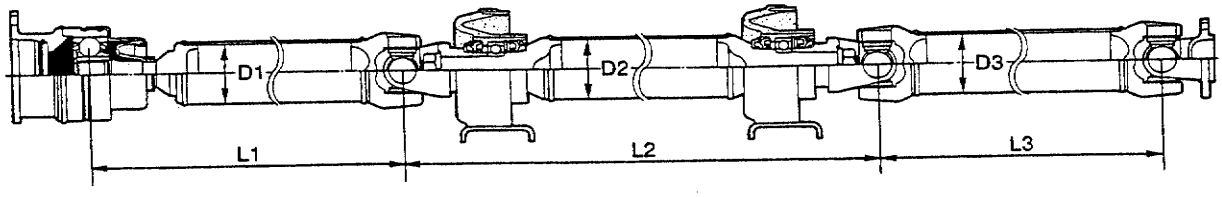
03U0LX-802

SPECIFICATIONS

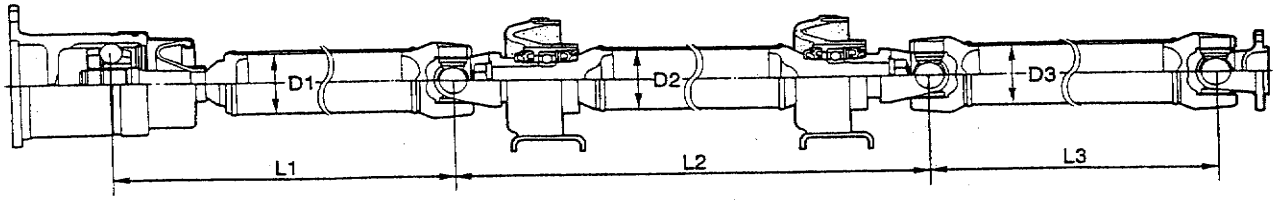
Item		Transaxle/Body type	MTX		ATX
			3HB	SEDAN	
Length	mm (in)	L_1	834.3 (32.84)		836.5 (32.93)
		L_2	584.0 (22.99)	634.0 (24.96)	
		L_3	437.0 (17.20)		
Outer diameter	mm (in)	D_1	75.0 (2.95)		
		D_2	57.0 (2.24)		
		D_3	57.0 (2.24)		

93G0LX-701

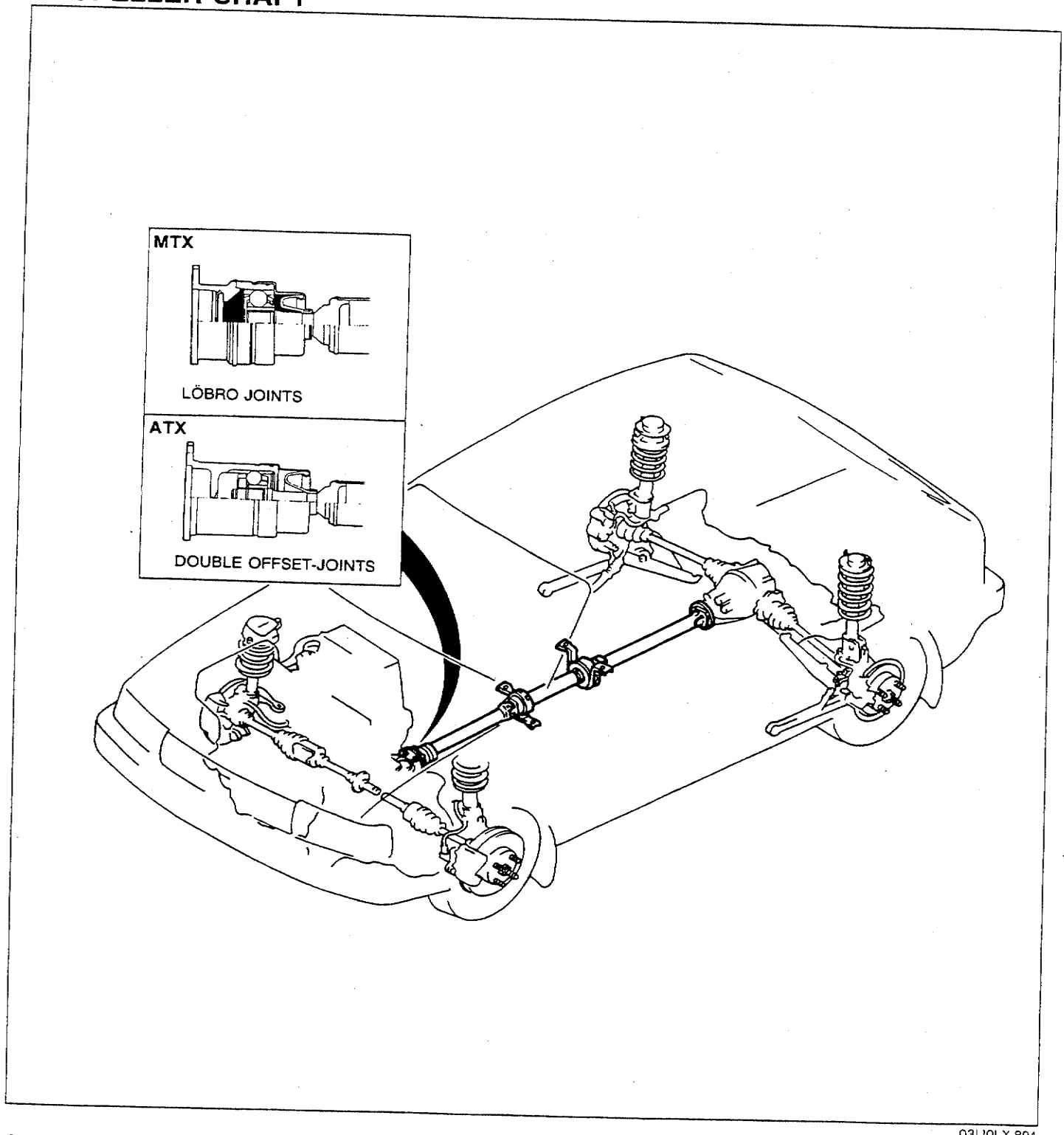
LÖBRO JOINTS



DOUBLE OFFSET JOINTS



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.

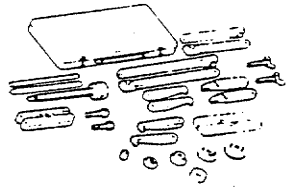
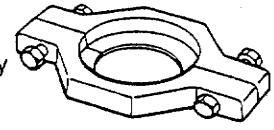
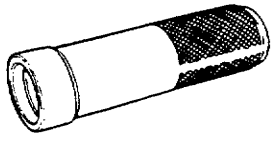
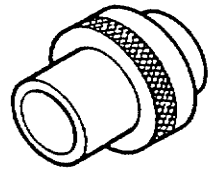
TROUBLESHOOTING GUIDE

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

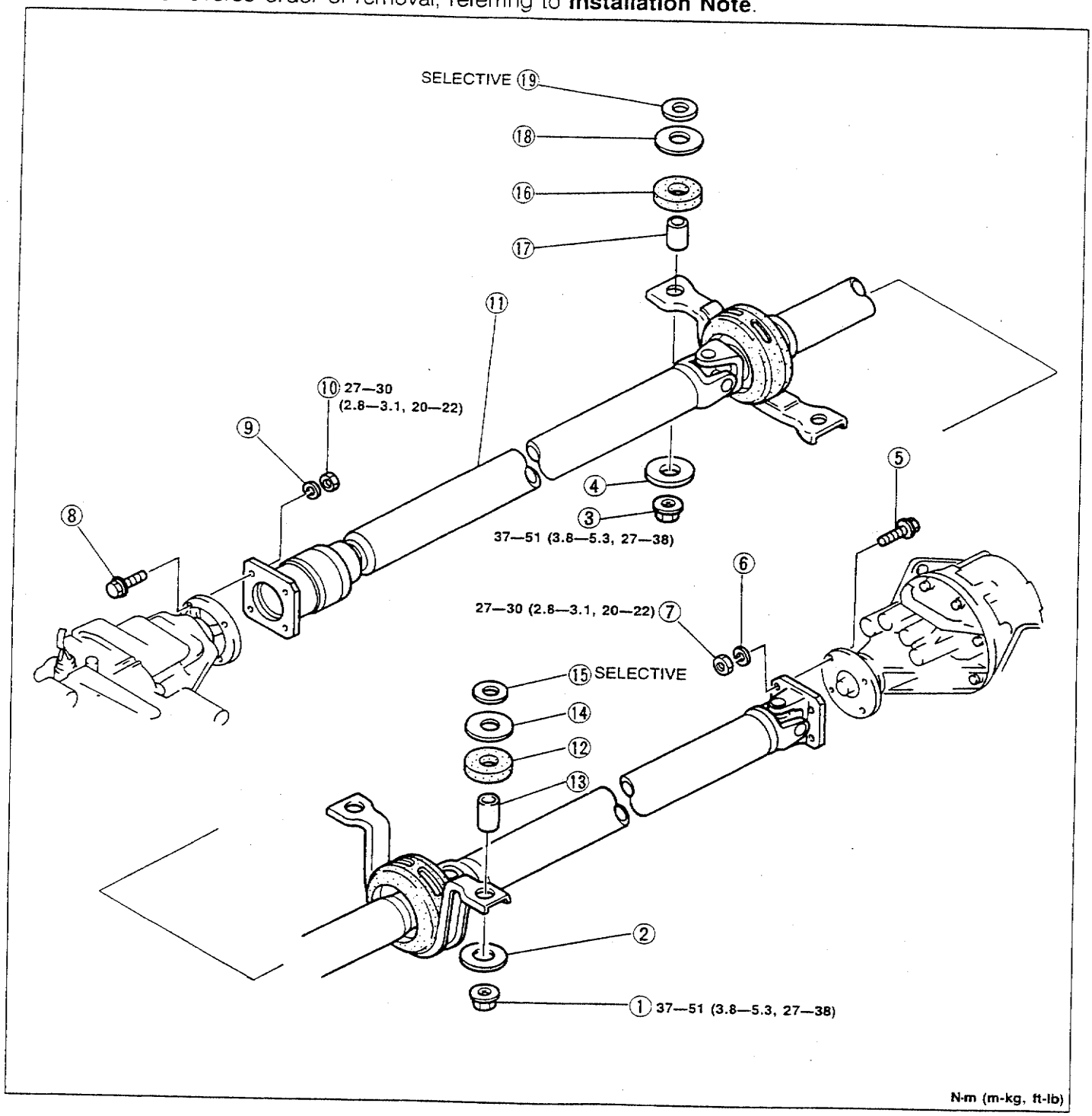
PREPARATION
SST

49 0839 425C Puller set, bearing 	For removal of center companion flange and center bearing	49 0636 145 Puller, fan pulley boss 	For removal of center bearing support assembly
49 F401 331 Body 	For installation of center bearing support assembly	49 H025 003 Installer, bearing 	For installation of center bearing support assembly

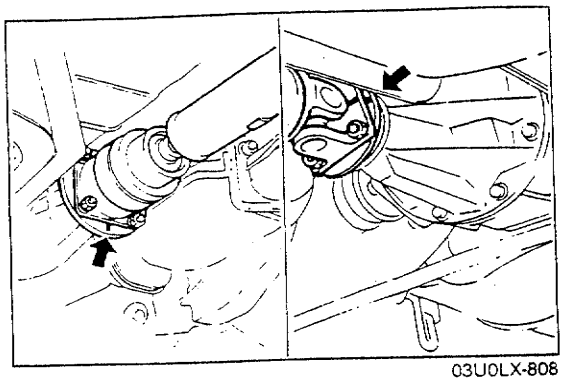
03U0LX-806

REMOVAL / INSPECTION / INSTALLATION

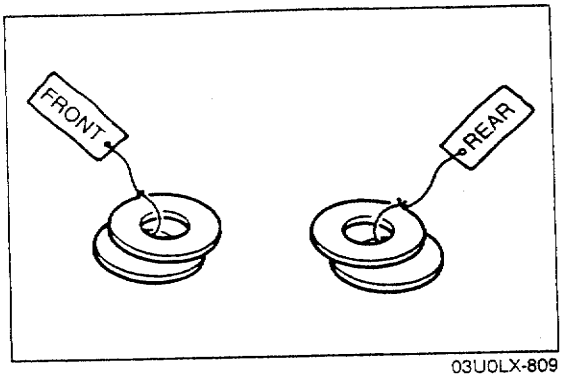
1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.



1. Nut
   Removal Note .... page L–6
2. Washer
3. Nut
4. Washer
5. Bolt
6. Lock washer
7. Nut
8. Bolt
9. Lock washer
10. Nut
11. Propeller shaft
    Inspection..... page L–9
    Installation Note.. page L–6
12. Bushing
13. Spacer
14. Washer
15. Spacers
    Removal Note .... page L–6
16. Bushing
17. Spacer
18. Washer
19. Spacer

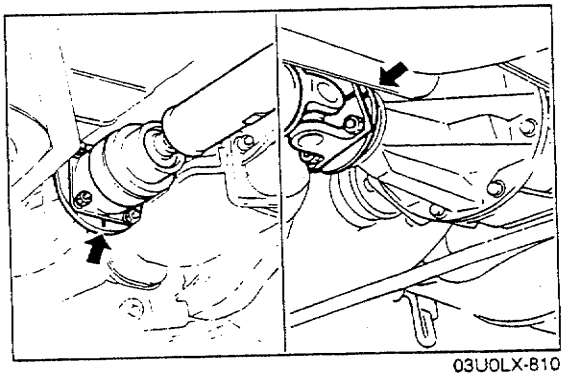

03U0LX-808

Removal Note
Nuts
1. Before removing the propeller shaft, mark the flanges for proper reassembly.

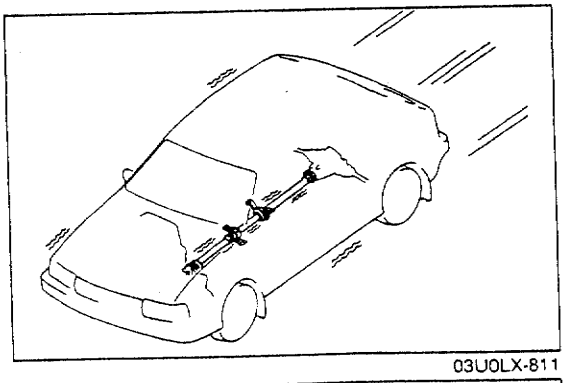


03U0LX-809

Spacers
1. Identify the spacers for proper reassembly.


03U0LX-810

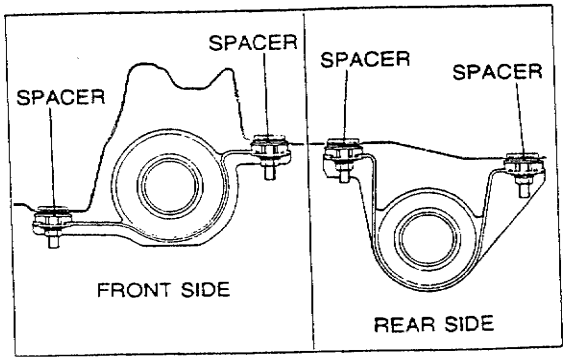
Installation Note
Propeller shaft
1. Align the marks and install the propeller shaft.


03U0LX-811

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.

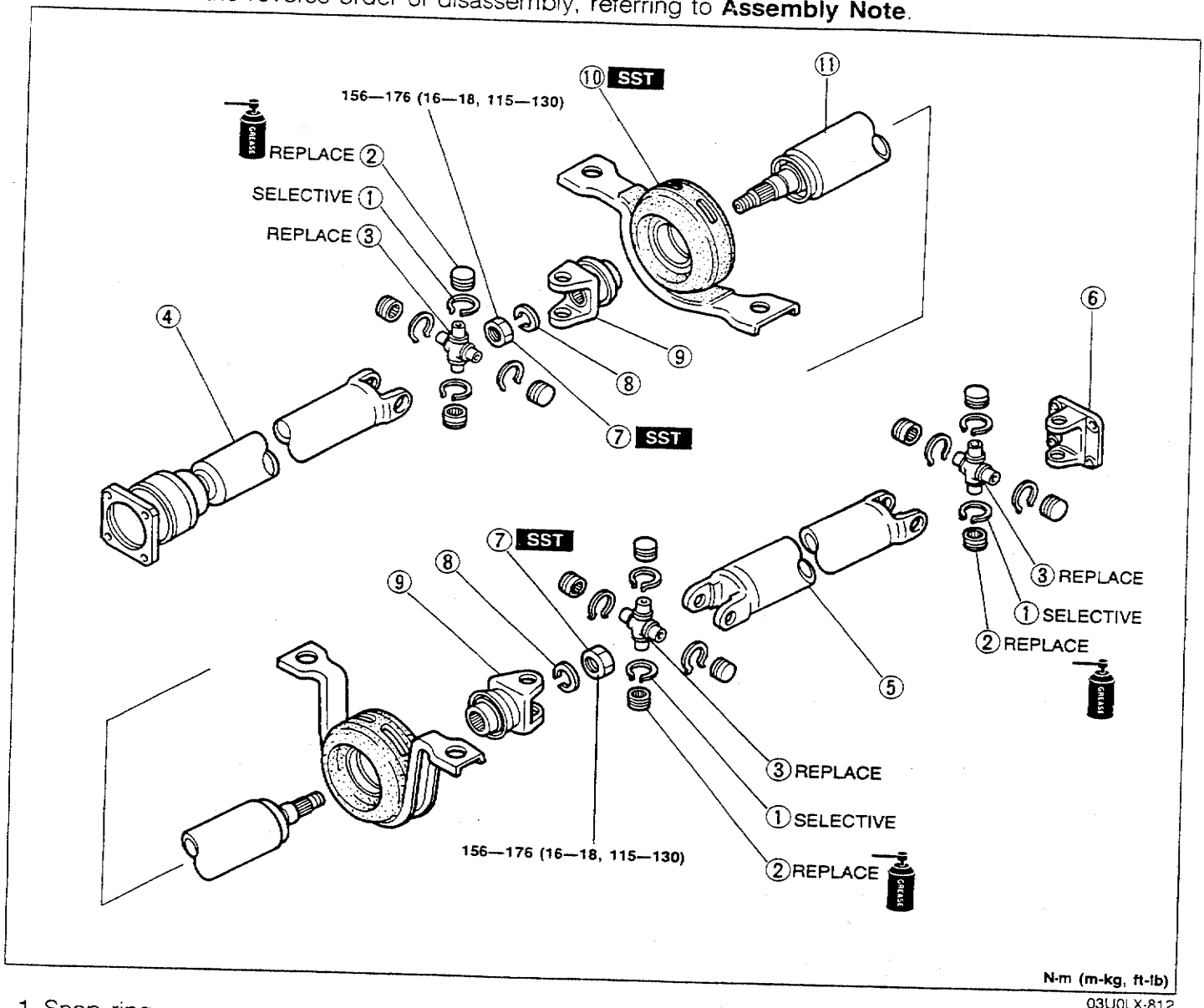


Spacer size mm (in)		
No spacer	1.6 (0.06)	3.2 (0.13)
4.5 (0.18)	6.0 (0.24)	8.0 (0.31)
10.0 (0.39)	13.0 (0.51)	

OVERHAUL

Caution
- **Use pads in the vise to prevent damaging the part.**

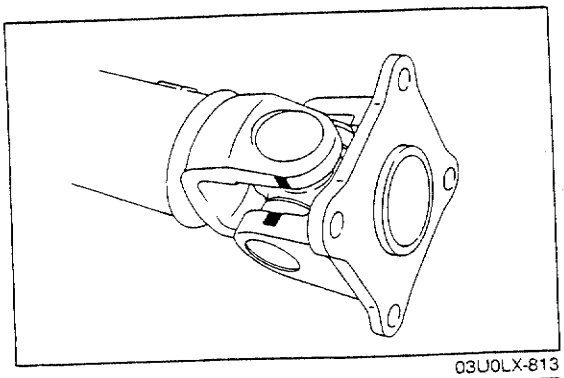
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



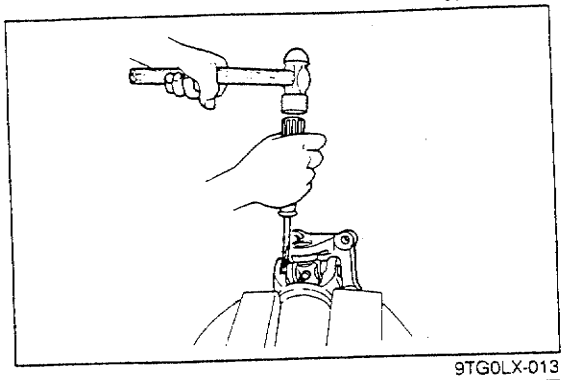
N·m (m-kg, ft-lb)

03U0LX-812

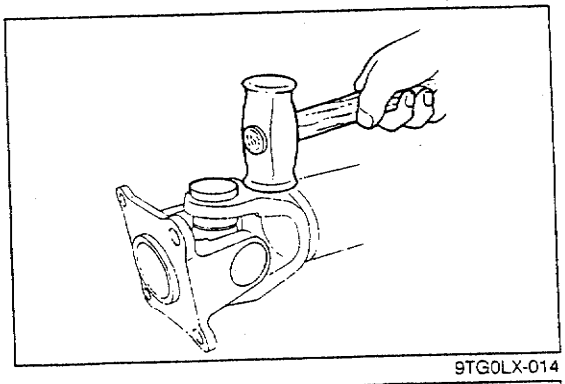
1. Snap ring
   - Disassembly Note ..... page L– 8
   - Assembly Note ..... page L–10
2. Bearing cup
   - Disassembly Note ..... page L– 8
   - Inspect for damage, wear and rough rotation
   - Assembly Note ..... page L– 9
3. Spider
4. Front propeller shaft
   - Inspection ..... page L– 9
5. Rear propeller shaft
   - Inspection ..... page L– 9
6. Yoke (Diff side)
7. Nut
   - Disassembly Note ..... page L– 8
   - Assembly Note ..... page L– 9
8. Lock washer
9. Yoke
10. Center bearing support assembly
    - Disassembly Note ..... page L– 8
    - Inspect for damage and rough rotation
    - Assembly Note ..... page L– 9
11. Center propeller shaft
    - Inspection ..... page L– 9


03U0LX-813

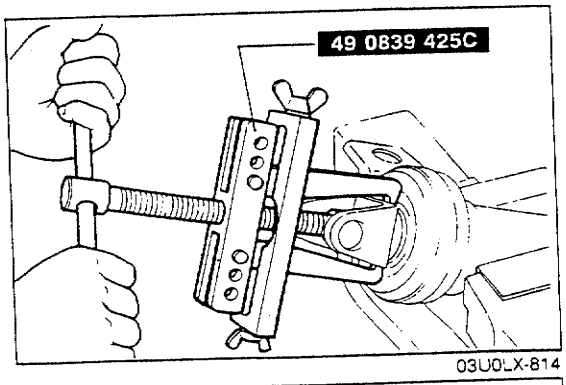
Disassembly Note
Snap ring
1. Mark the yoke and propeller shaft for proper reassembly.


9TG0LX-013

2. Clamp the propeller shaft in a vise.
3. Remove the snap ring.

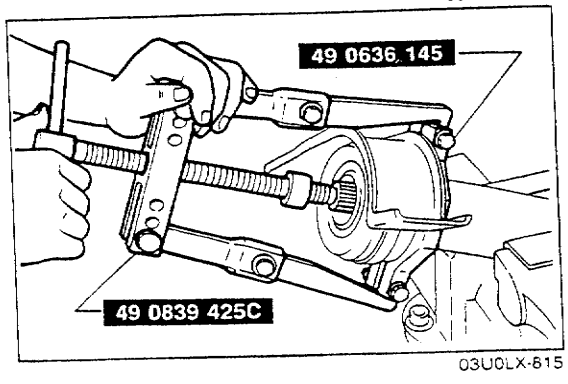

9TG0LX-014

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.



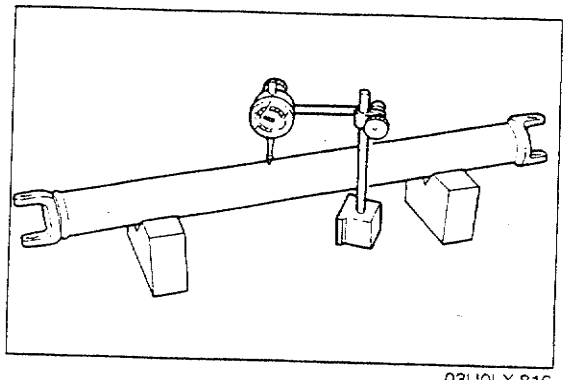
03U0LX-814

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**.



03U0LX-815

Center bearing support assembly
1. Remove the center bearing support assembly with the **SST**.



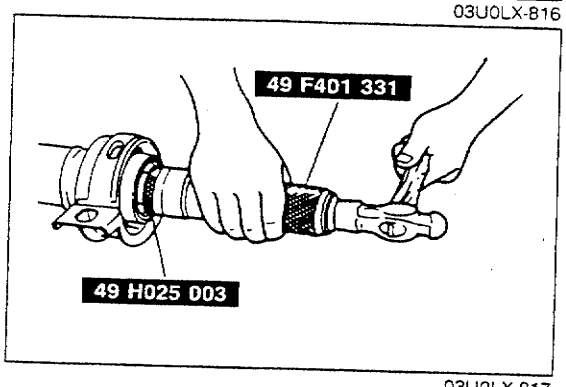
03U0LX-816

Inspection
Center propeller shaft

Caution
- **Replace the center propeller shaft as an assembly if runout is excessive.**

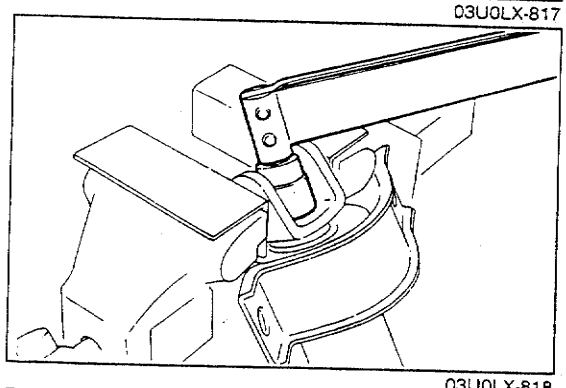
1. Measure the center propeller shaft runout with a dial indicator.

Runout: 0.4mm (0.0157 in) max.



03U0LX-817

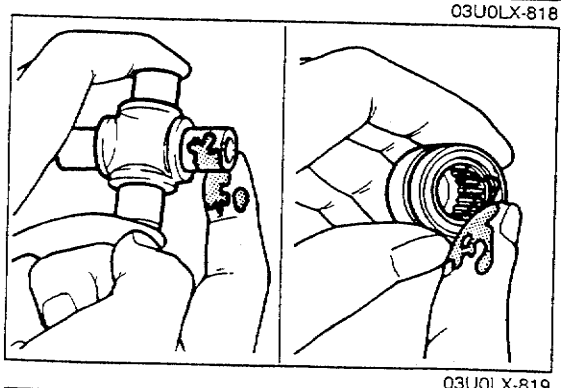
Assembly Note
Center bearing support assembly
1. Install the center bearing support assembly with the **SST**.



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)

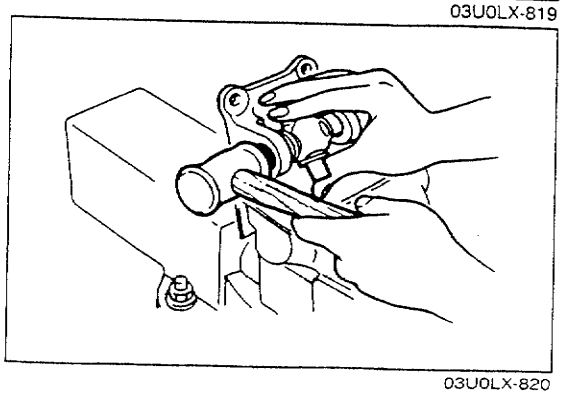


03U0LX-819

Bearing cup

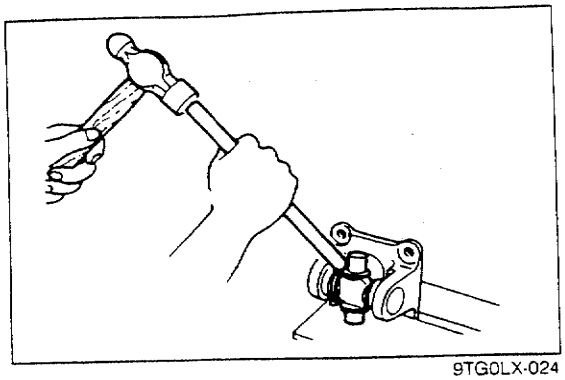
Caution
- **Do not reuse the snap rings, bearing cups, or spider.**

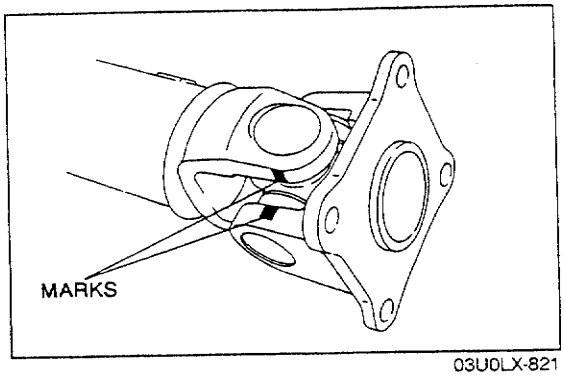
1. Apply lithium based grease to the roller bearings inside the bearing cups.
2. Clamp the yoke in a vise.



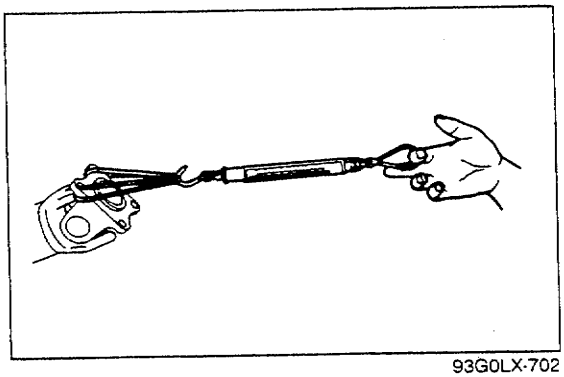
03U0LX-820

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.


9TG0LX-024



03U0LX-821


93G0LX-702

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)
Pull scale:
5.89—19.62 N (0.6—2.0 kg, 1.32—4.40 lb)

5. Install different snap rings to adjust the starting torque if necessary.

Snap ring thicknesses (19 types)

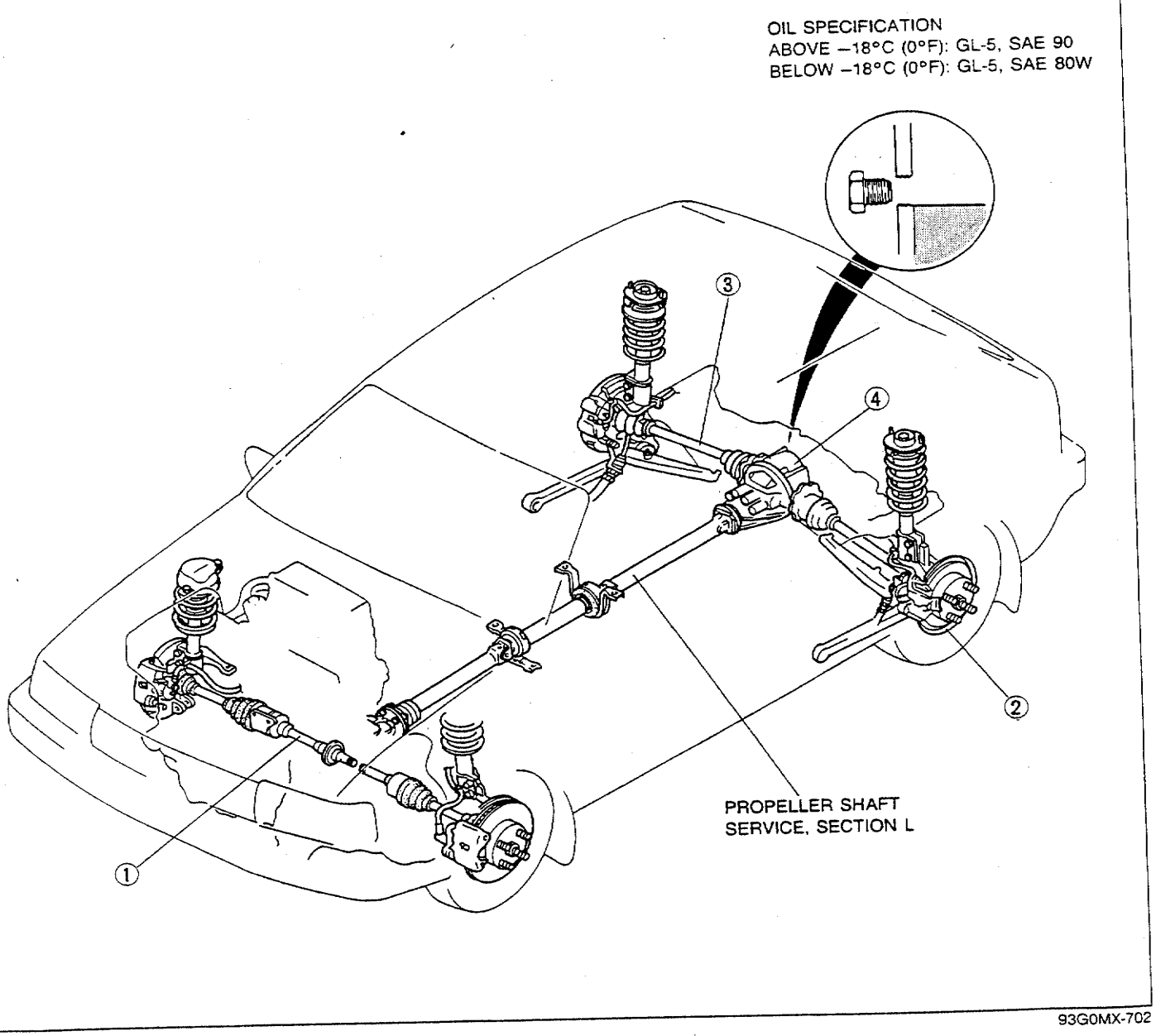
mm (in)

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)	

FRONT AND REAR AXLES

93G0MX-701

INDEX



OUTLINE

OUTLINE OF CONSTRUCTION

1. Double-offset joints, which feature low rotational fluctuation and low noise, and show excellent vibration resistance, are used for the driveshafts. ABS sensor rotors are mounted on the right and left driveshafts of ABS equipped models.
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. A viscous limited-slip differential is used for 3-door hatchbacks with the BP DOHC turbo engine. A standard non-limited-slip differential is used for other models.
4. Angular type ball bearings are employed for the rear wheel bearings for improved durability and serviceability.

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SPECIFICATIONS

Item \ Engine/Transaxle			BP SOHC, BP DOHC turbo	
			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)	SAE 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)	

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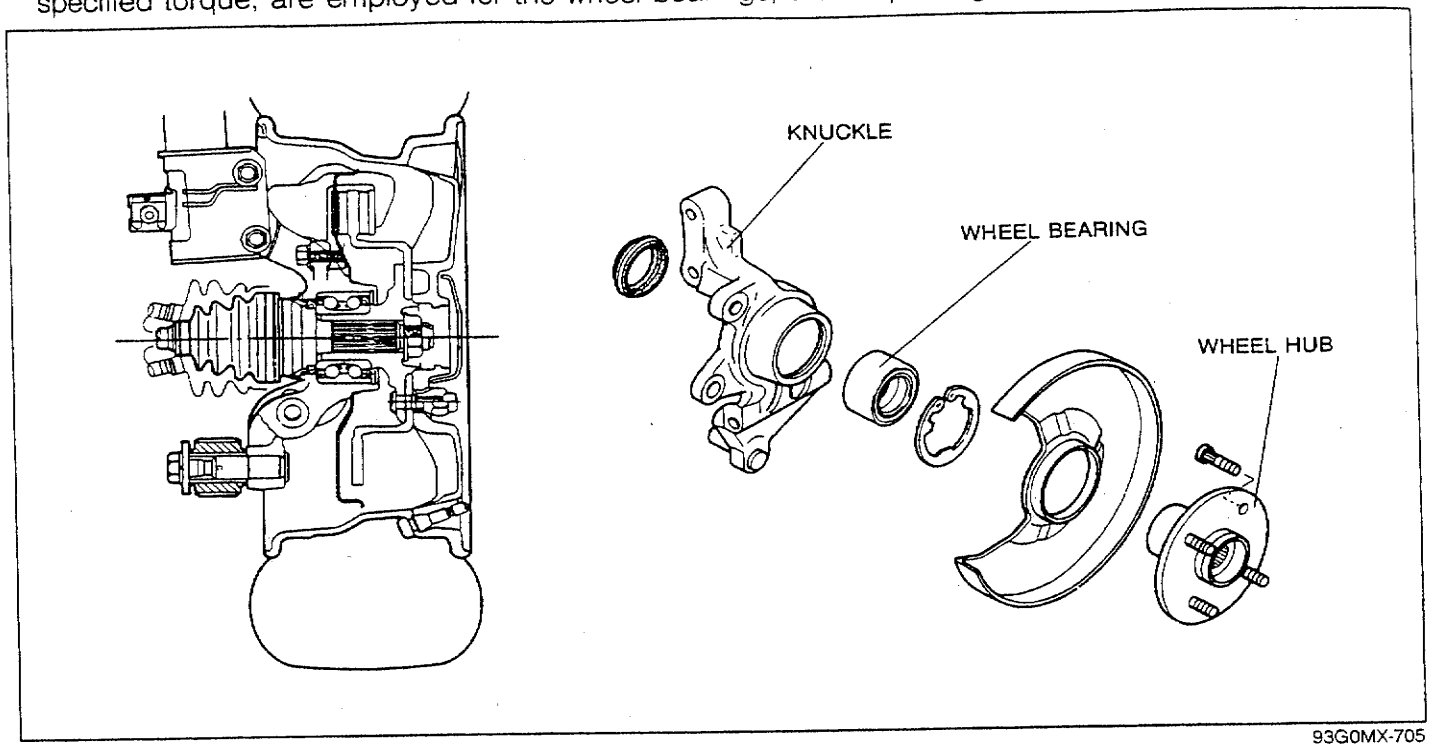
REAR AXLE AND DIFFERENTIAL

REAR AXLE

Wheel Bearing

- 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.

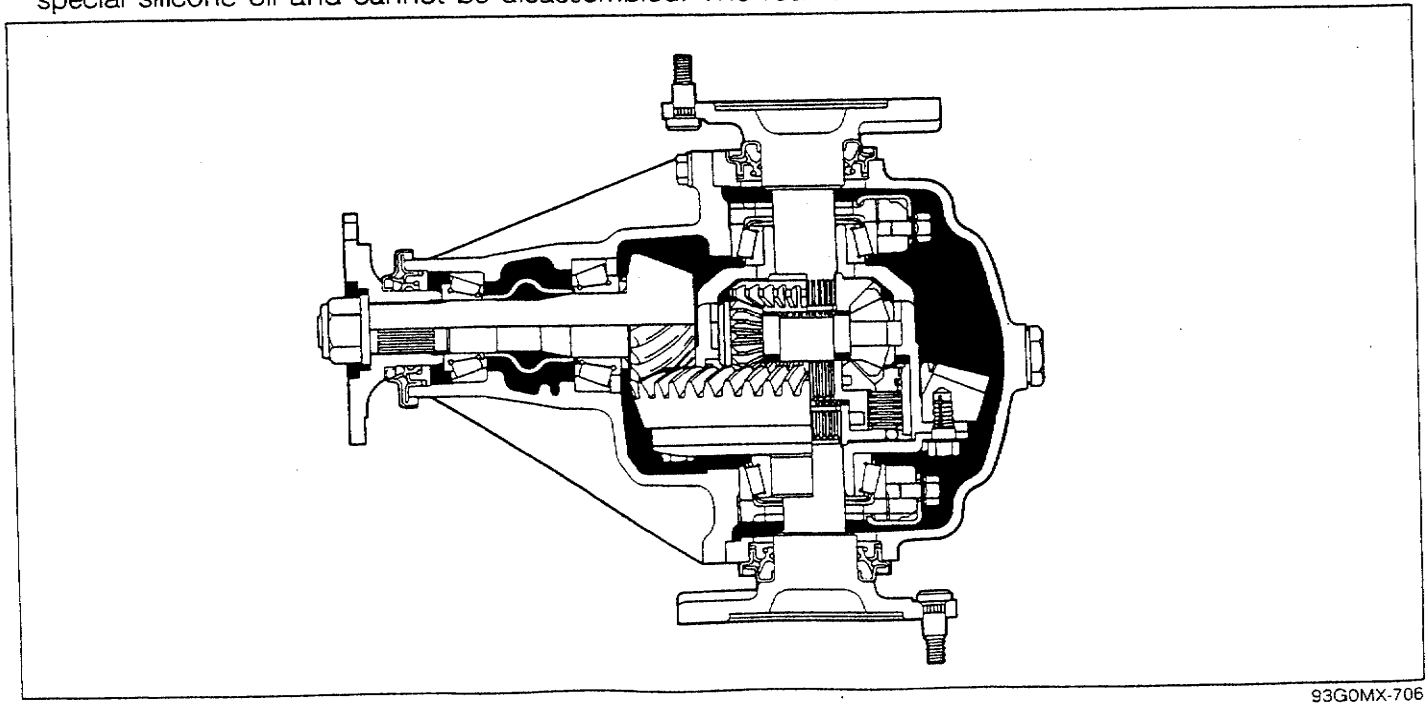


93G0MX-705

DIFFERENTIAL

Viscous Limited-Slip Differential (3-door Hatchback with BP DOHC turbo)

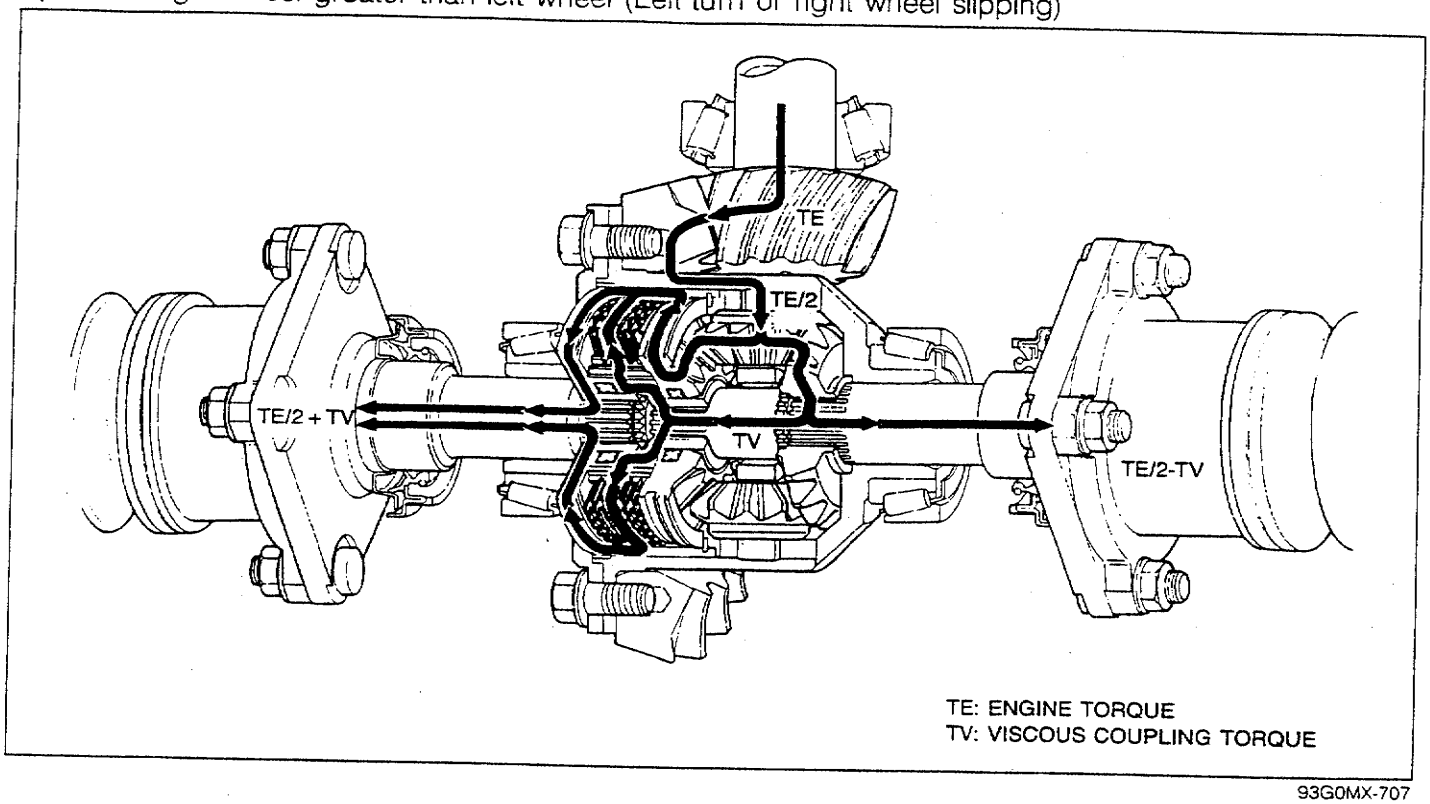
- A viscous limited-slip differential (LSD) employing a viscous coupling is used to assure driving stability on all road surfaces.
- The viscous coupling within the rear differential transmits drive power to the rear wheels and limits the speed difference between the wheels by the resistance of silicone oil. The viscous coupling contains a special silicone oil and cannot be disassembled. The rear differential contains standard lubricant.



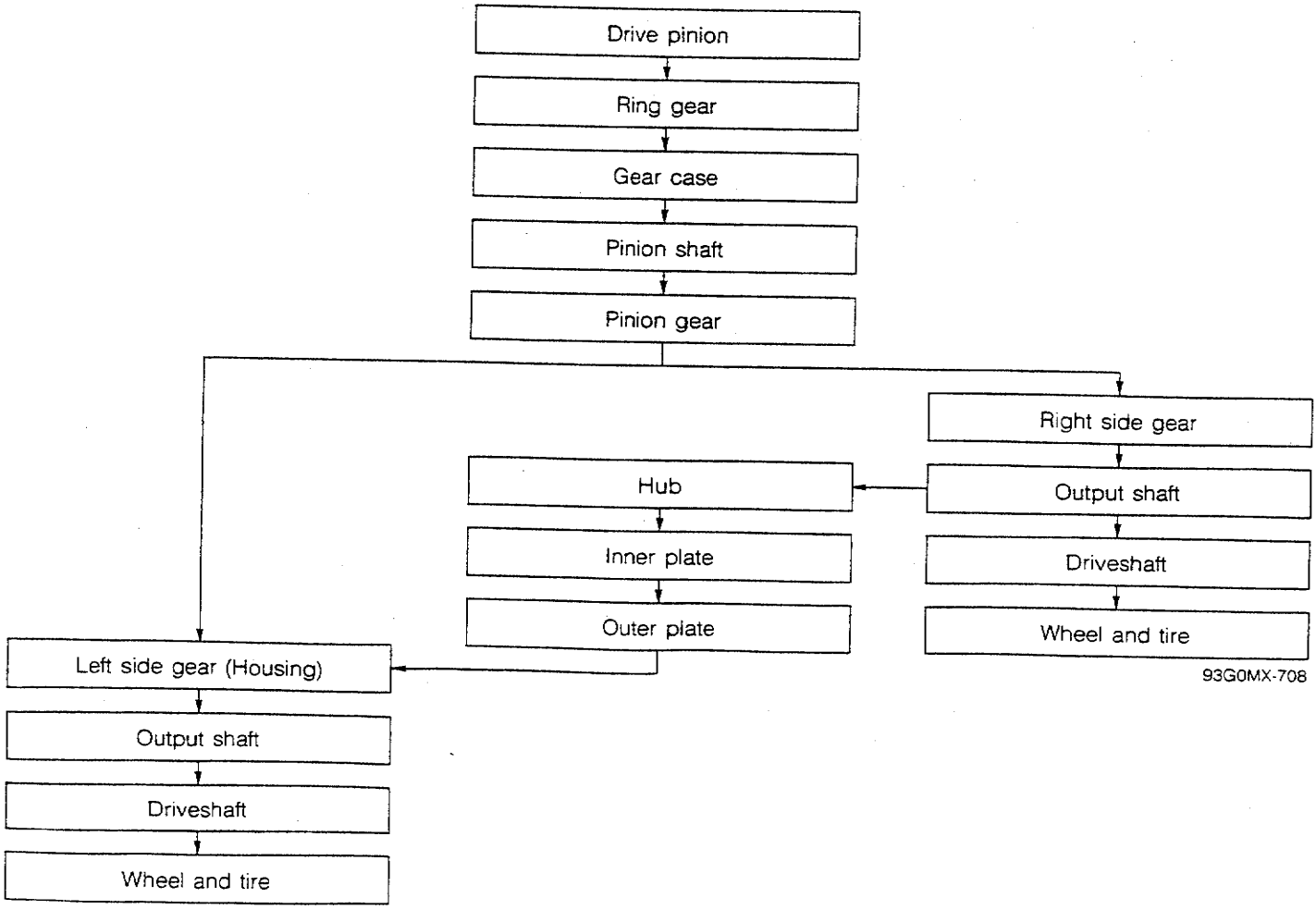
93G0MX-706

PROCESS OF POWER TRANSMISSION

Speed of right wheel greater than left wheel (Left turn or right wheel slipping)



93G0MX-707



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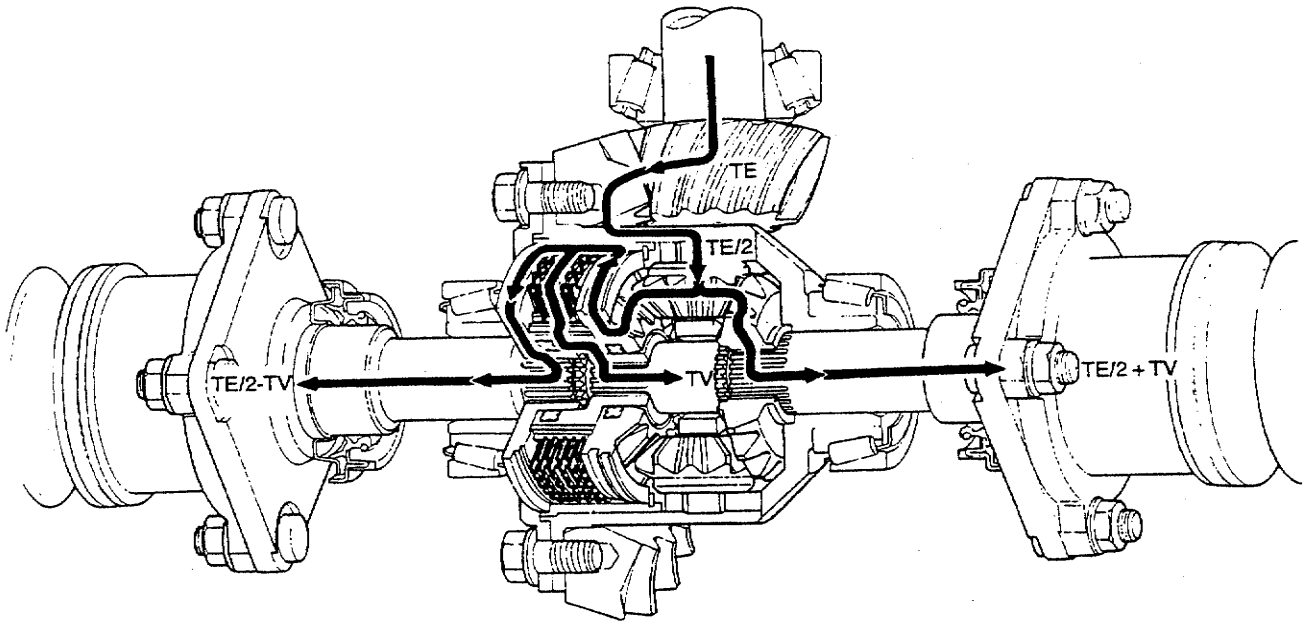
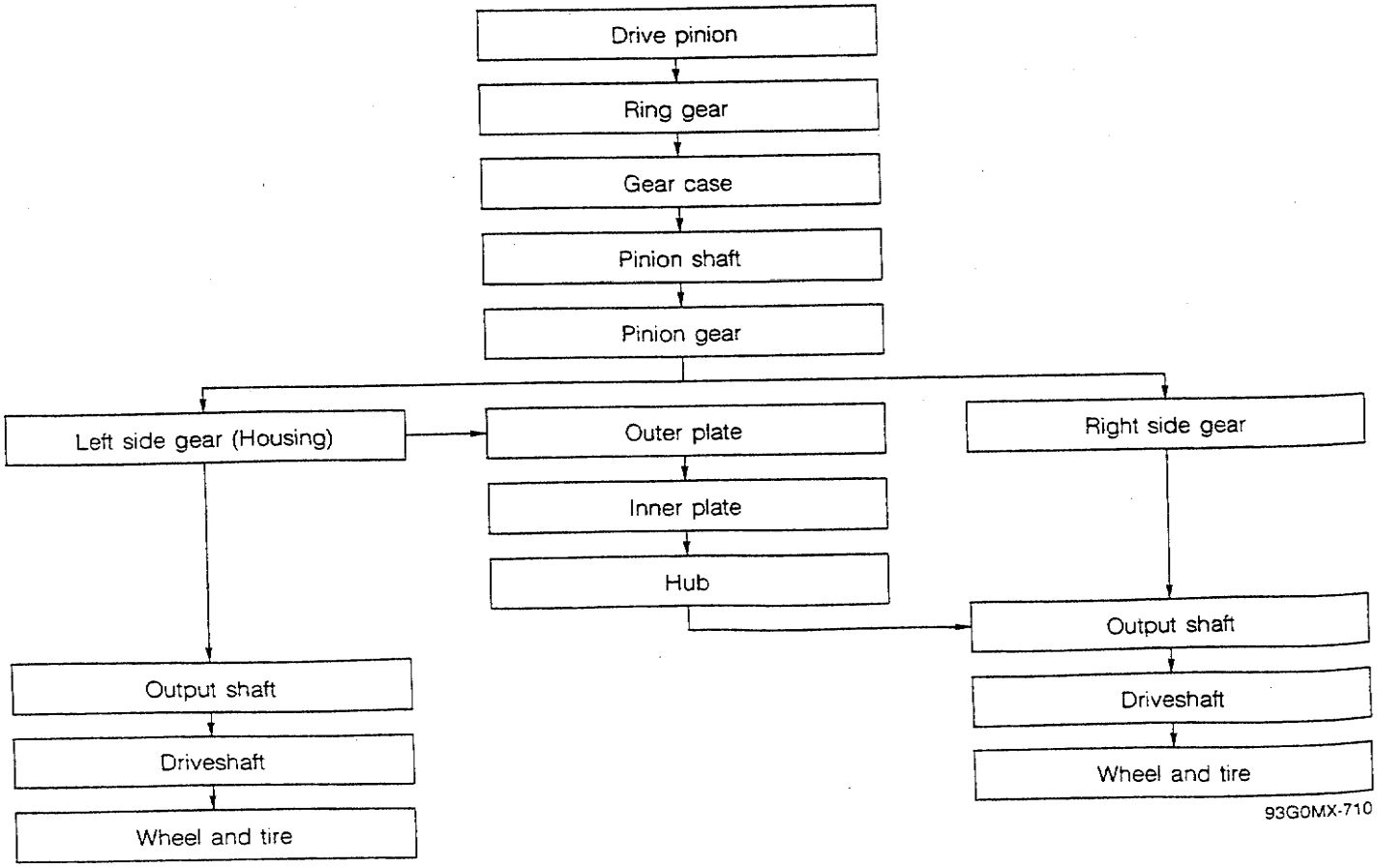
Speed of left wheel greater than right wheel



TE: ENGINE TORQUE
TV: VISCOUS COUPLING TORQUE

93G0MX-709



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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

Driveshaft
- Joint shaft
  Removal / Installation
  Disassembly / Inspection / Assembly
- Rear driveshaft
  Inspection / Removal / Installation
  Disassembly / Inspection / Assembly

Rear differential
- Removal / Installation
- Overhaul

Differential oil
- Inspection
- Replacement

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TROUBLESHOOTING GUIDE

REAR AXLE

Problem	Possible Cause	Action	Page
Abnormal noise	Bent bearing housing	Replace	—
	Bent driveshaft	Replace	M–19
	Worn or damaged wheel bearing	Replace	M–10
	Worn driveshaft spline	Replace	M–20

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DIFFERENTIAL

Problem	Possible Cause	Action	Page
Abnormal noise	Insufficient differential oil	Add oil	M–24
	Incorrect differential oil	Replace	M–24
	Improperly adjusted ring gear backlash	Adjust	M–36
	Poor contact of ring gear teeth	Adjust	M–36
	Worn or damaged side bearing	Replace	M–29
	Worn or damaged ring gear	Replace	M–29
	Worn or damaged drive pinion bearing	Replace	M–29
	Worn or damaged pinion and side gear	Replace	M–29
	Seized side gear and case	Replace	M–29
	Worn side gear spline	Replace	M–29
	Worn pinion shaft	Replace	M–29
	Loose companion flange nut	Tighten	M–35
	Worn thrust washer	Replace	M–35
	Improperly adjusted side gear preload	Adjust	M–35
	Improperly adjusted drive pinion gear preload	Adjust	M–34
Heat buildup	Insufficient differential oil	Add oil	M–24
	Insufficient gear backlash	Adjust	M–35
	Excessive bearing preload	Adjust	M–35
Oil leakage	Excessive differential oil	Remove oil	M–24
	Loose differential carrier	Tighten or repair	M–38
	Worn or damaged oil seal	Replace	M–25
No differential operation	Misassembled	Repair	M–29

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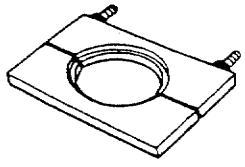
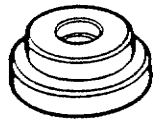
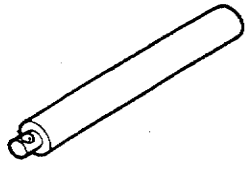
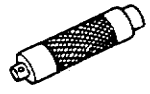
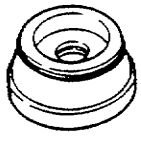
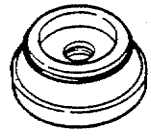
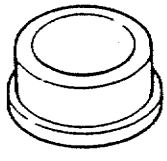
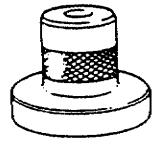
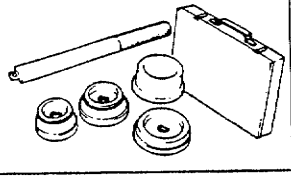
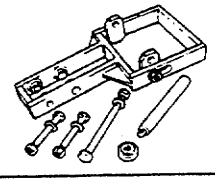
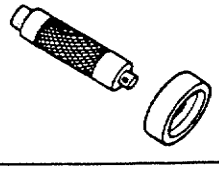
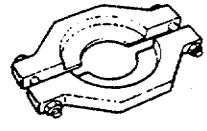
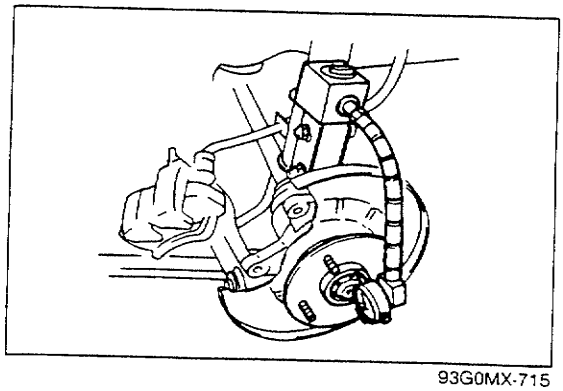
REAR AXLE

PREPARATION
SST

49 G030 370 Plate, removing 	For removal of wheel hub and wheel bearing	49 G030 727 Attachment A (Part of 49 B026 1A0) 	For removal of wheel hub
49 G033 102 Handle (Part of 49 B026 1A0) 	For removal of wheel hub	49 G030 797 Handle (Part of 49 G030 795) 	For removal of wheel hub
49 F027 005 Attachment 62 (Part of 49 F027 0A1) 	For removal of wheel bearing	49 F027 007 Attachment 72 (Part of 49 F027 0A1) 	For installation of wheel bearing
49 F027 009 Attachment 68 & 77 (Part of 49 F027 0A1) 	For installation of wheel bearing	49 V001 795 Installer, oil seal 	For installation of oil seal
49 F027 0A1 Installer set, bearing 	For installation of wheel bearing	49 B026 1A0 Puller, wheel hub 	For removal of wheel hub
49 G030 795 Installer, oil seal 	For installation of wheel bearing	49 H027 002 Remover, bearing 	For removal of wheel hub

93G0MX-714


93G0MX-715

DISC BRAKE TYPE

Preinspection

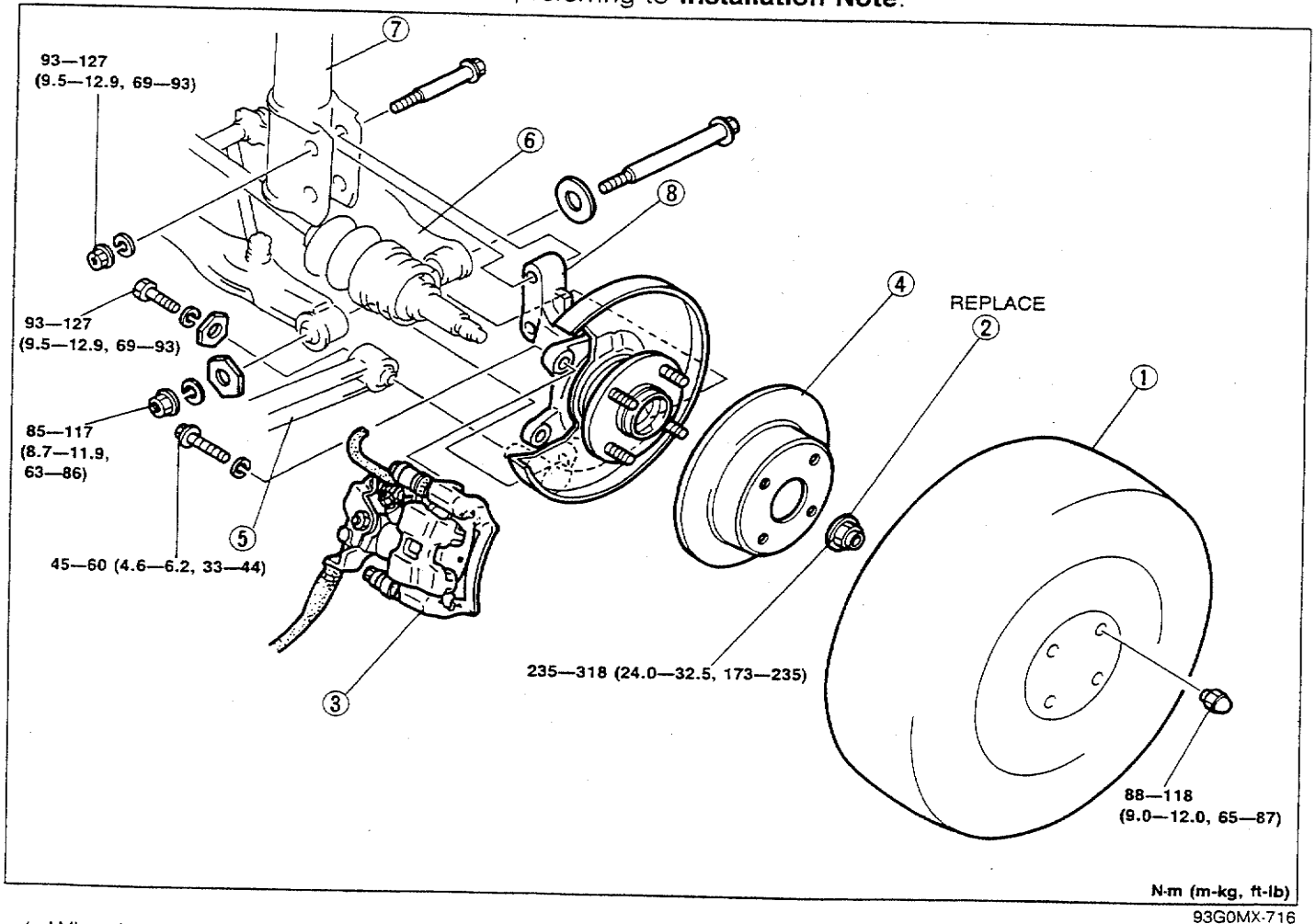
Wheel bearing play

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.

Wheel bearing play: 0.05mm (0.002 in) max.

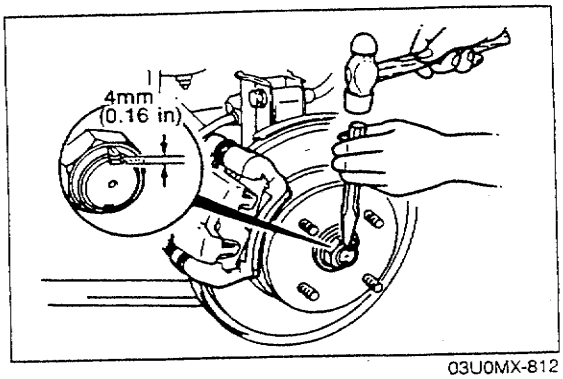
Removal / Inspection / Installation

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**.



93G0MX-716

1. Wheel and tire
2. Wheel hub nut
   Installation Note ..... page M–10
3. Brake caliper assembly
   Service ..... Section P
4. Disc plate
   Service ..... Section P
5. Trailing link
6. Lateral link
7. Shock absorber
8. Wheel hub, knuckle
   Disassembly / Inspection / Assembly ..... page M–10
   Inspect wheel hub and steering knuckle for damage or cracks.
   Inspect dust cover for damage or deformation.

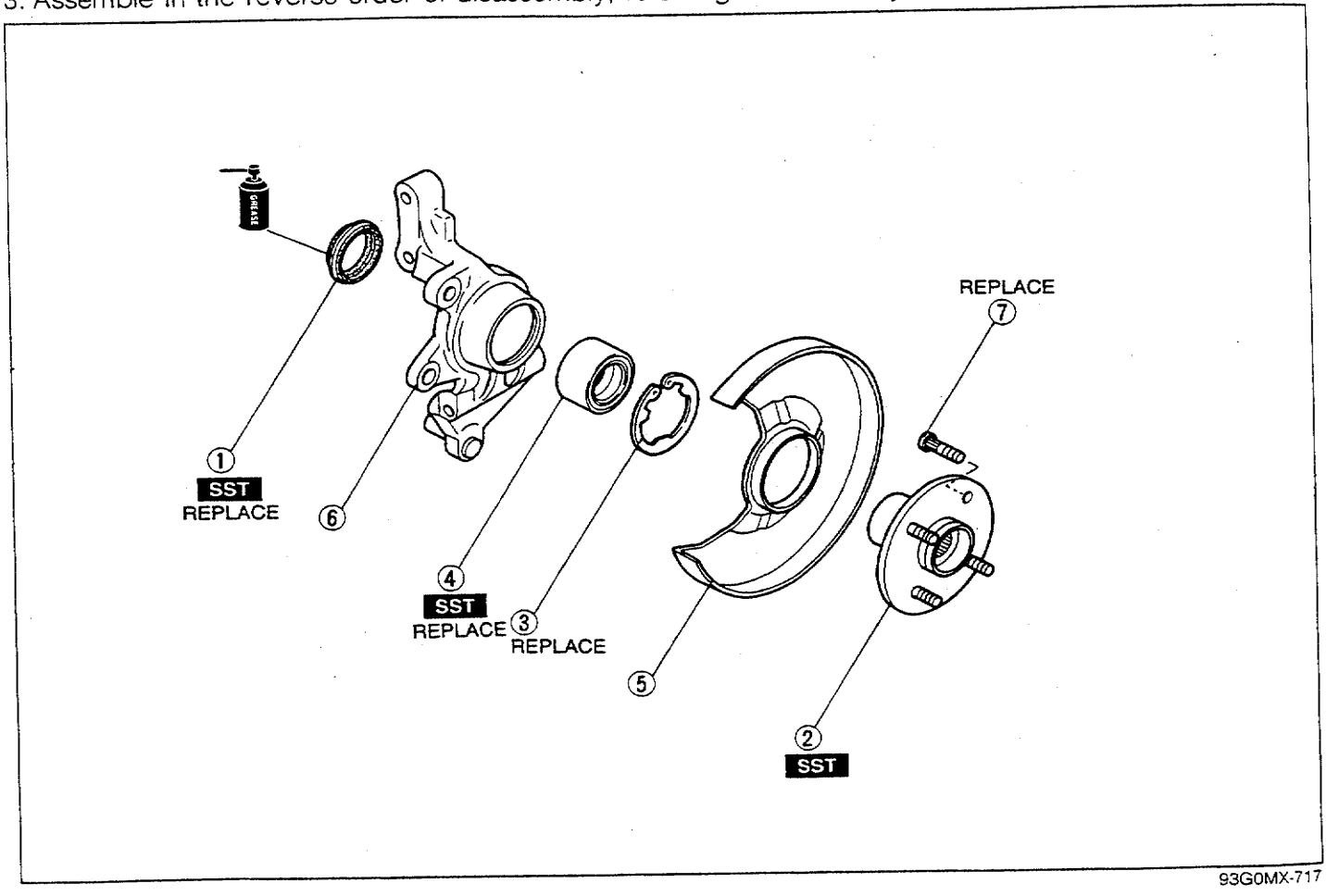


03U0MX-812

Installation Note
Wheel hub nut
1. Install a new nut, and stake it as shown.

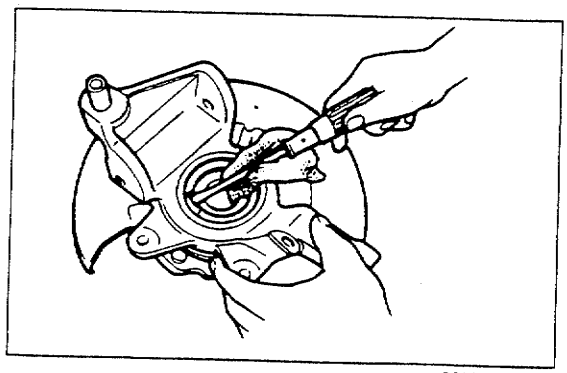
Tightening torque:
177—235 N·m (18—24 m-kg, 130—174 ft-lb)

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**.



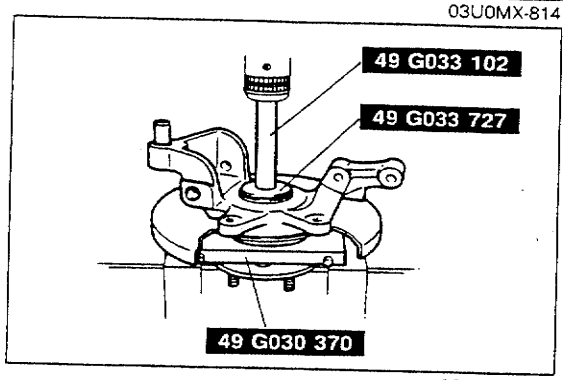
93G0MX-717

1. Oil seal
   Disassembly Note
   ..... page M–11
   Assembly Note page M–13
2. Wheel hub
   Disassembly Note
   ..... page M–11
   Inspect for cracks and other damage
   Assembly Note page M–13
3. Retaining ring
4. Wheel bearing
   Disassembly Note
   ..... page M–11
   Assembly Note page M–12
5. Dust cover
   Disassembly Note
   ..... page M–12
   Inspect for damage and distortion
   Assembly Note page M–12
6. Knuckle
   Inspect for cracks and other damage
7. Wheel stud
   Disassembly Note
   ..... page M–12
   Assembly Note page M–12



03U0MX-814

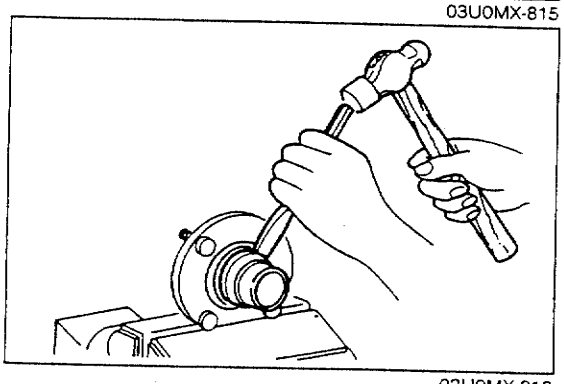
Disassembly Note
Oil seal
1. Remove the oil seal with a screwdriver.



03U0MX-815

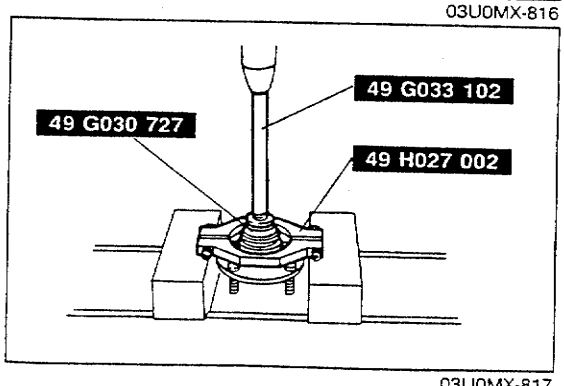
Wheel hub
1. Remove the wheel hub from the knuckle with the **SST** and a press.

Caution
- **Support the wheel hub by hand to prevent it from falling.**



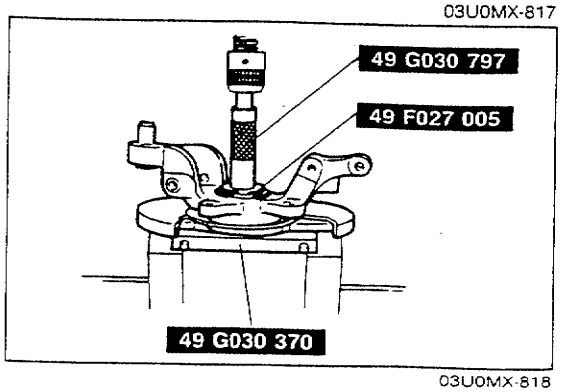
03U0MX-816

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.

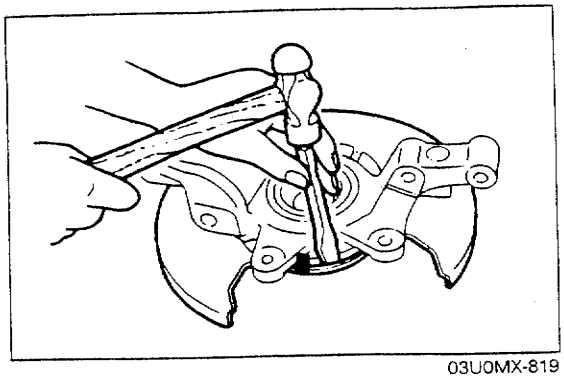


03U0MX-818

Wheel bearing

Caution
- **Do not reuse the removed wheel bearing.**

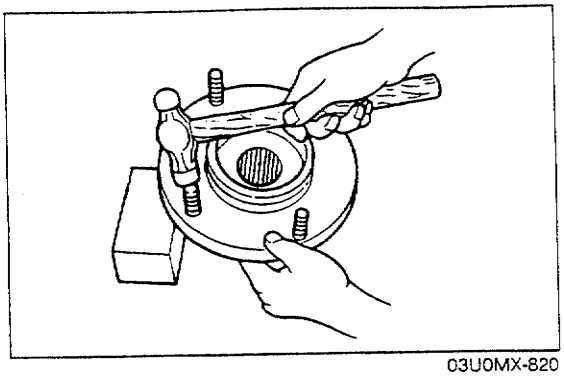
1. Remove the wheel bearing from the knuckle with the **SST** and a press.


03U0MX-819

Dust cover

Caution
- **Do not remove the dust cover if not necessary.**
- **Do not reuse the removed dust cover.**

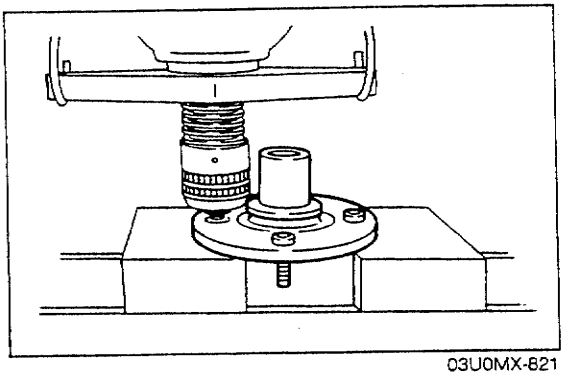
1. Mark the dust cover and knuckle for proper reassembly.
2. Remove the dust cover with a chisel.


03U0MX-820

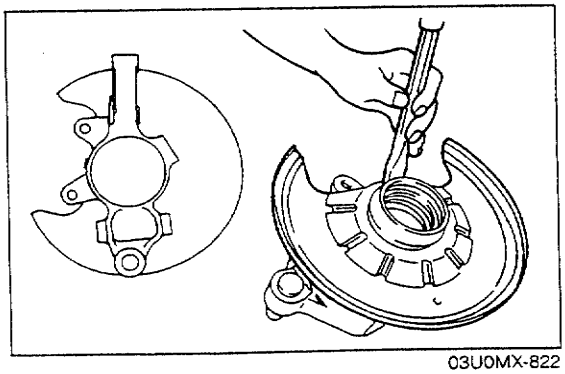
Wheel studs

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

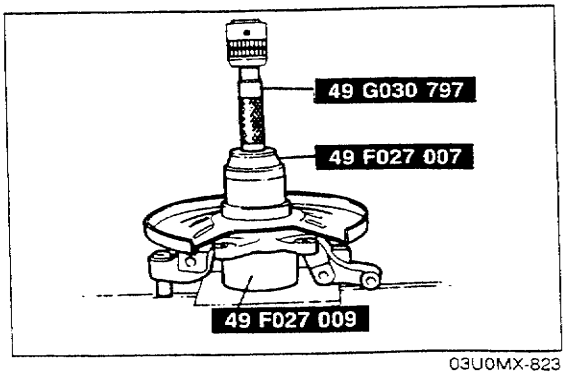
Assembly Note
Wheel stud
1. Install the new wheel studs with a press.


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.

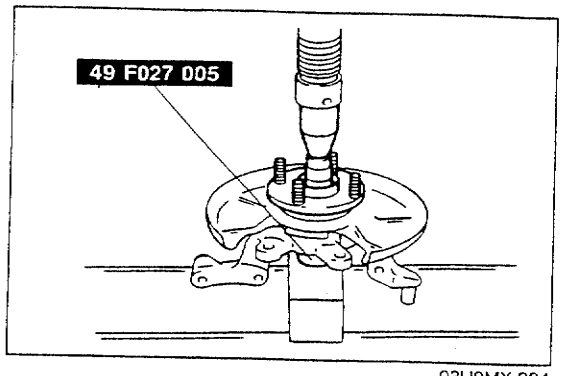
Caution
- **Install the new dust cover as shown.**

3. Install the new dust cover.

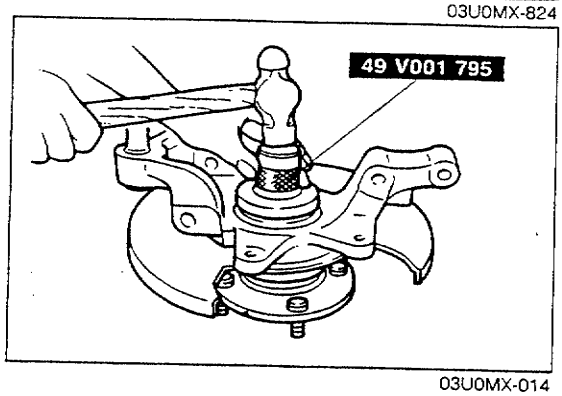


03U0MX-823

Wheel bearing
1. Press the new wheel bearing in with the **SST**.



03U0MX-824



03U0MX-014

Wheel hub

1. Press the wheel hub in with the **SST**.

Oil seal

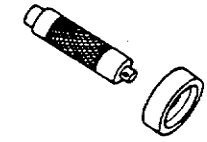
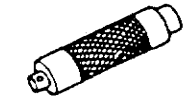
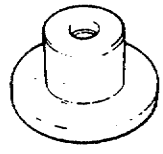
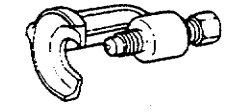
Caution

- **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**.

DRIVESHAFT

PREPARATION
SST

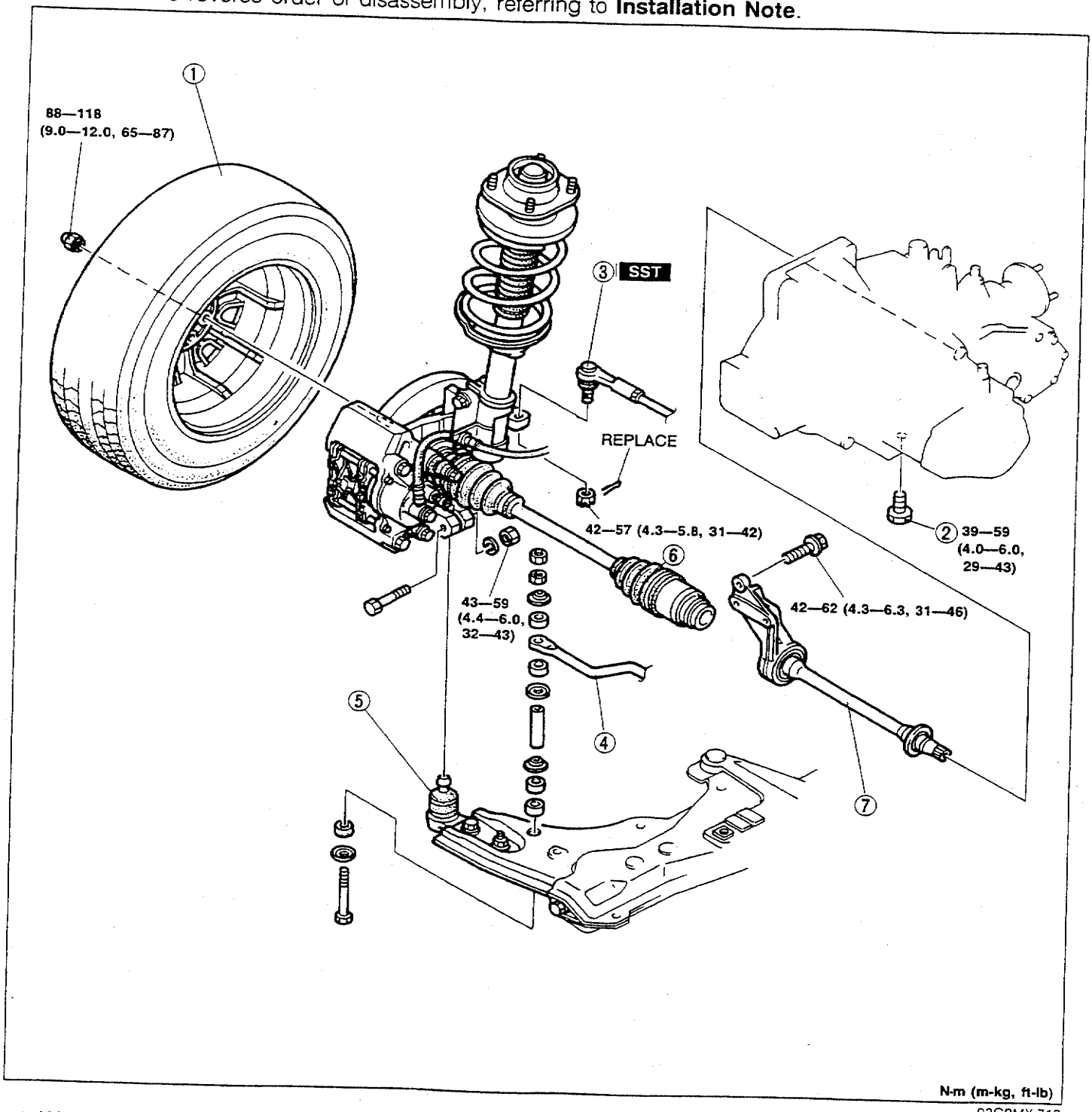
49 H034 201 Block, support 	For removal and installation of joint shaft	49 G030 795 Installer, oil seal 	For installation of bearing
49 G030 796 Body (Part of 49 G030 795) 	For installation of bearing	49 G030 797 Handle (Part of 49 G030 795) 	For installation of bearing
49 F026 102 Installer, bearing 	For removal of bearing	49 0118 850C Puller, ball joint 	For removal of ball joint

93G0MX-718

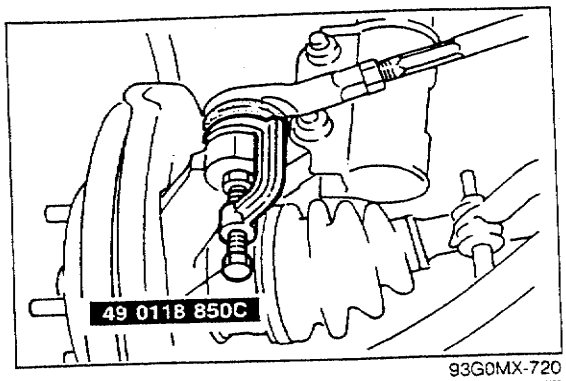
JOINT SHAFT

Removal / Installation

1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of disassembly, referring to **Installation Note**.



1. Wheel and tire
2. Drain plug (Differential)
3. Ball joint
   Removal Note ..... page M–16
4. Stabilizer
   Installation Note ..... page M–16
5. Lower arm
   Removal Note ..... page M–16
6. Driveshaft
   Removal Note ..... page M–16
7. Joint shaft
   Disassembly / Inspection / Assembly ..... page M–17
   Installation Note ..... page M–16

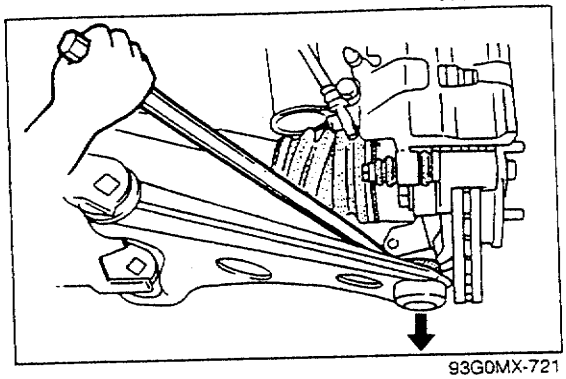


93G0MX-720

Removal note
Ball joint

Caution
- **Do not damage the dust seal.**
- **Use a new cotter pin when assembling.**

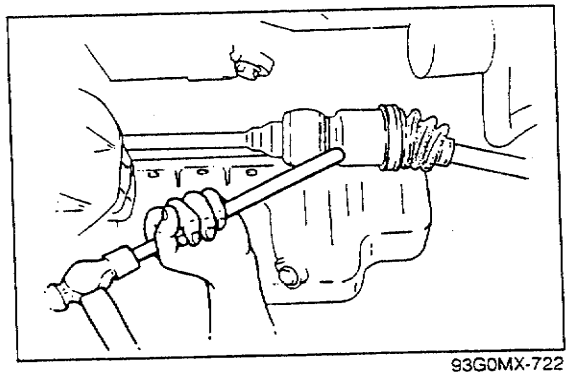
1. Remove the cotter pin, and loosen the nut a few turns.
2. Separate the ball joint from the knuckle arm with the **SST**.


93G0MX-721

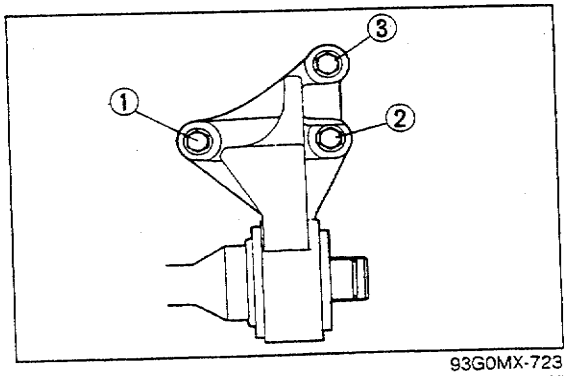
Lower arm

Caution
- **Cover the ball joint dust seal with a rag to prevent damage.**

1. Remove the clinch bolt and the nut.
2. Pry the lower arm downward to separate it from the steering knuckle.


93G0MX-722

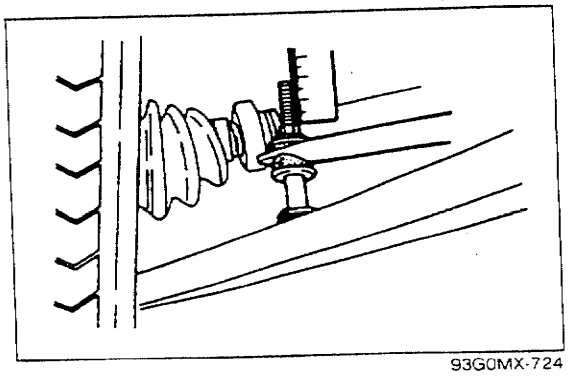
Driveshaft
1. Separate the driveshaft from the joint shaft with a brass bar.



93G0MX-723

Installation note
Joint shaft
1. Install the joint shaft and mount the joint shaft bracket.
2. Tighten the bolts in the order shown in the figure.

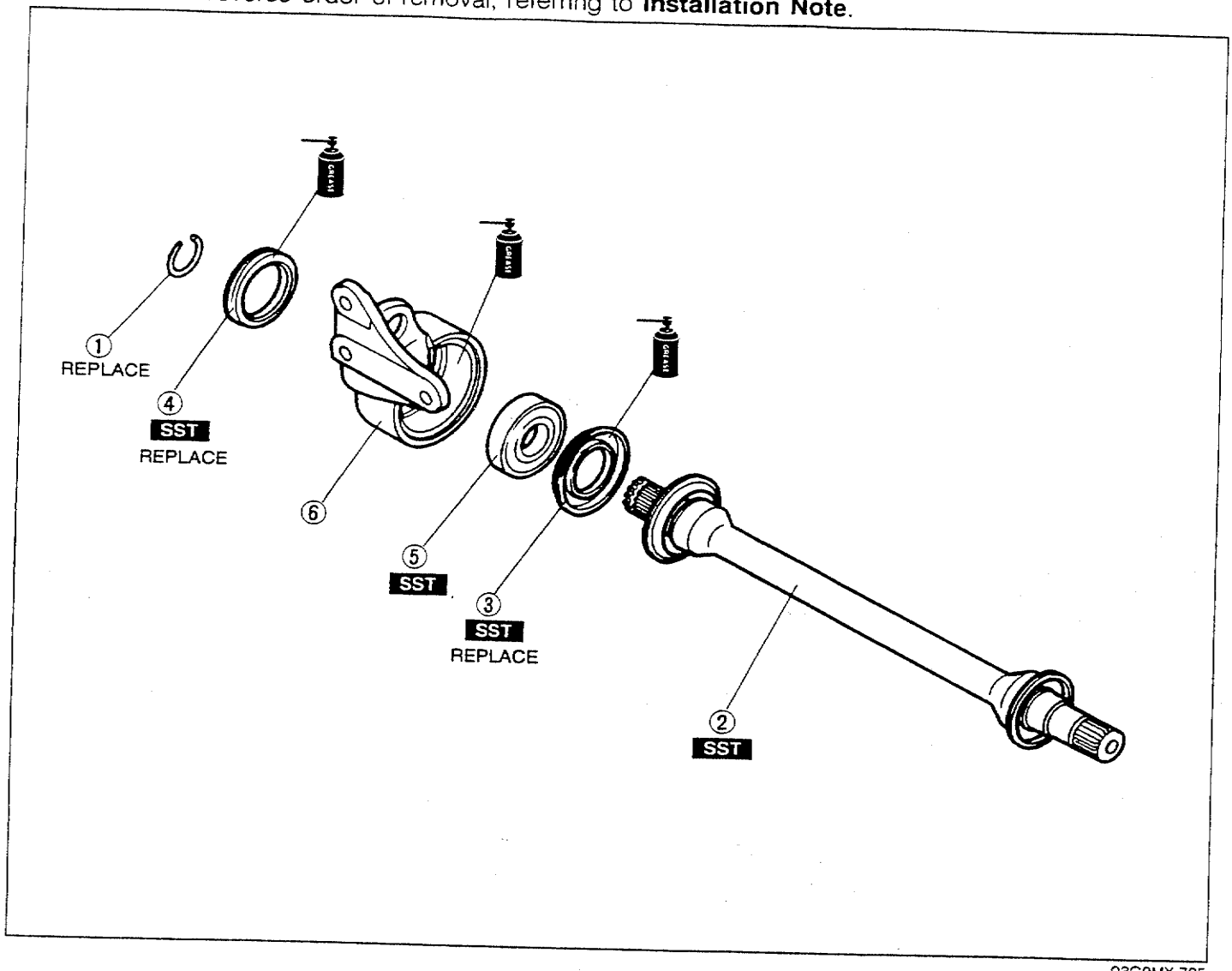
Tightening torque:
42—62 N·m (4.3—6.3 m-kg, 31—46 ft-lb)


93G0MX-724

Stabilizer
1. Install the stabilizer nuts so that **17.0mm (0.67 in)** to **19.0mm (0.75 in)** of thread is exposed at the end of the bolt.

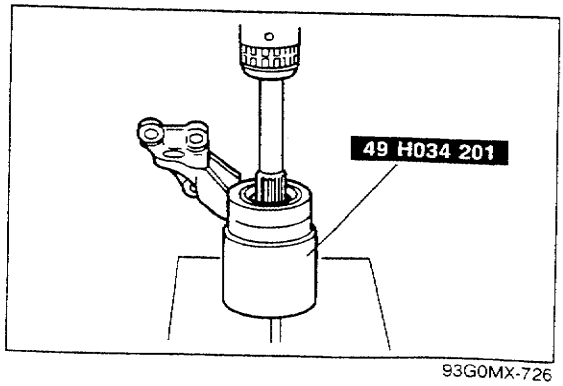
Disassembly / Inspection / Assembly

1. Disassembly in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.



93G0MX-725

1. Clip
2. Joint shaft
   - Disassembly Note ..... page M–17
   - Assembly Note ..... page M–18
   - Inspect splines for damage and wear
3. Rear oil seal
   - Assembly Note ..... page M–18
4. Front oil seal
   - Assembly Note ..... page M–18
5. Bearing
   - Disassembly Note ..... page M–18
   - Assembly Note ..... page M–18
   - Inspect for wear, damage, and operation
6. Bracket

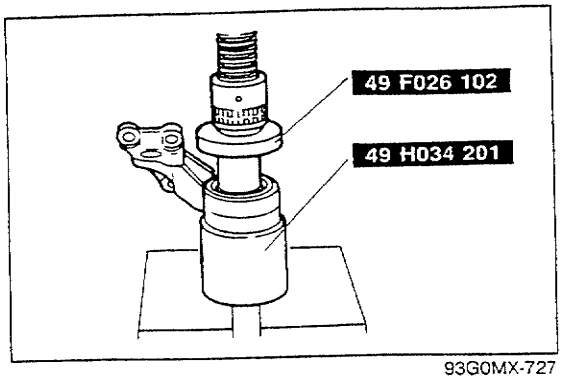


93G0MX-726

Disassembly note

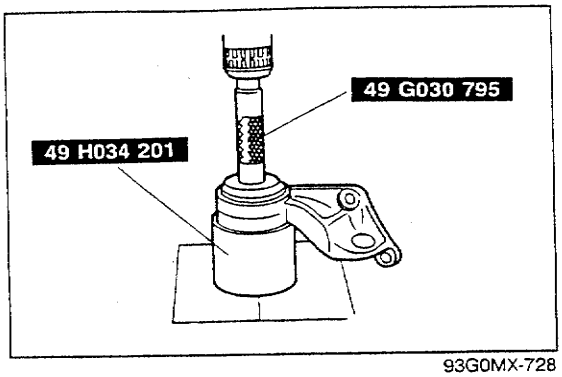
Joint shaft

1. Support the bracket with the **SST**.
2. Press out the joint shaft with a bar.



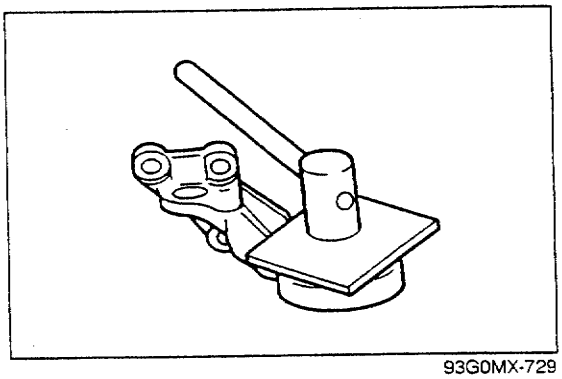
93G0MX-727

Bearing
1. Remove the front oil seal and bearing with the **SST**.

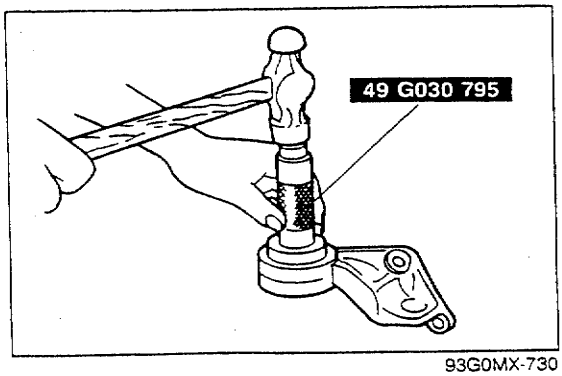


93G0MX-728

Assembly note
Bearing
1. Install the new bearing with the **SST**.

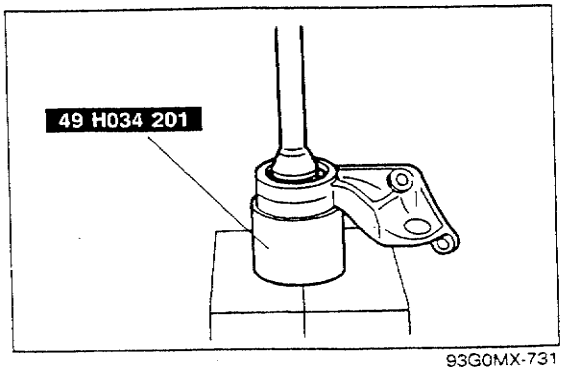

93G0MX-729

Front oil seal
1. Install the new front oil seal with a flat steel plate.



93G0MX-730

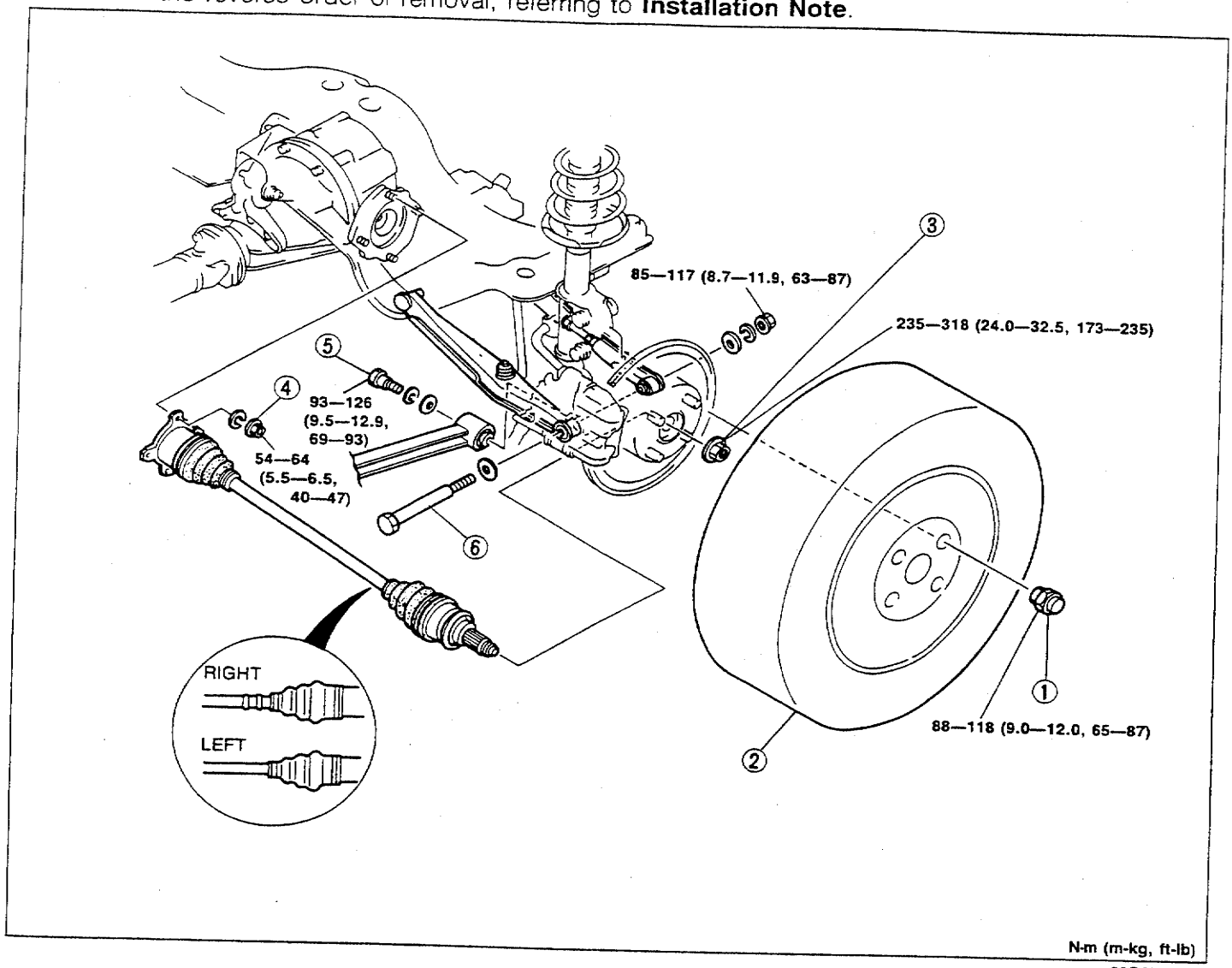
Rear oil seal
1. Install the new rear oil seal with the **SST**.



93G0MX-731

Joint shaft
1. Support the bracket with the **SST**.
2. Press in the joint shaft.

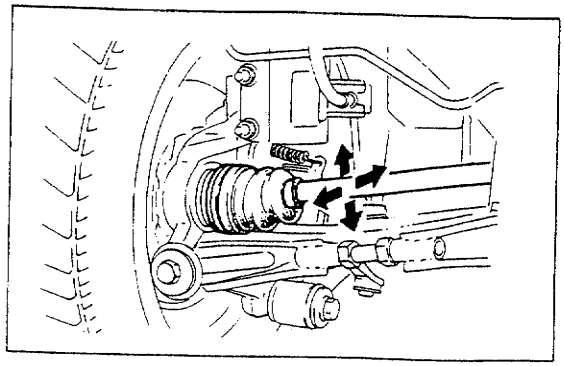
REAR DRIVESHAFT
Double-offset Joint
Inspection / Removal / Installation
1. Inspection the rear driveshaft, referring to **Inspection**.
2. Remove in the order shown in the figure, referring to **Removal Note**.
3. Install in the reverse order of removal, referring to **Installation Note**.



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

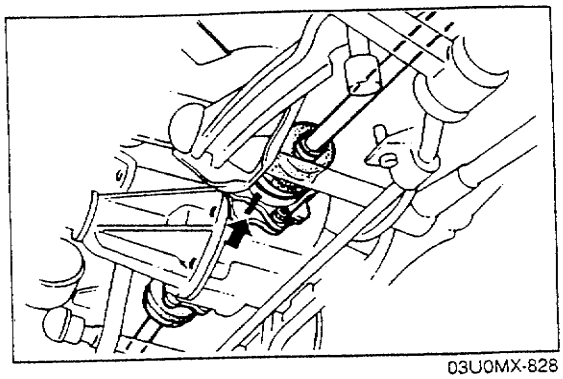
93G0MX-732

1. Wheel nuts
2. Wheel and tire
3. Wheel hub nut
4. Nuts (Driveshaft)
   Removal Note..... page M–20
5. Bolt (Trailing link)
6. Bolt (Lateral link)
7. Rear driveshaft
   Disassembly / Inspection / Assembly ..... page M–20



03U0MX-827

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.

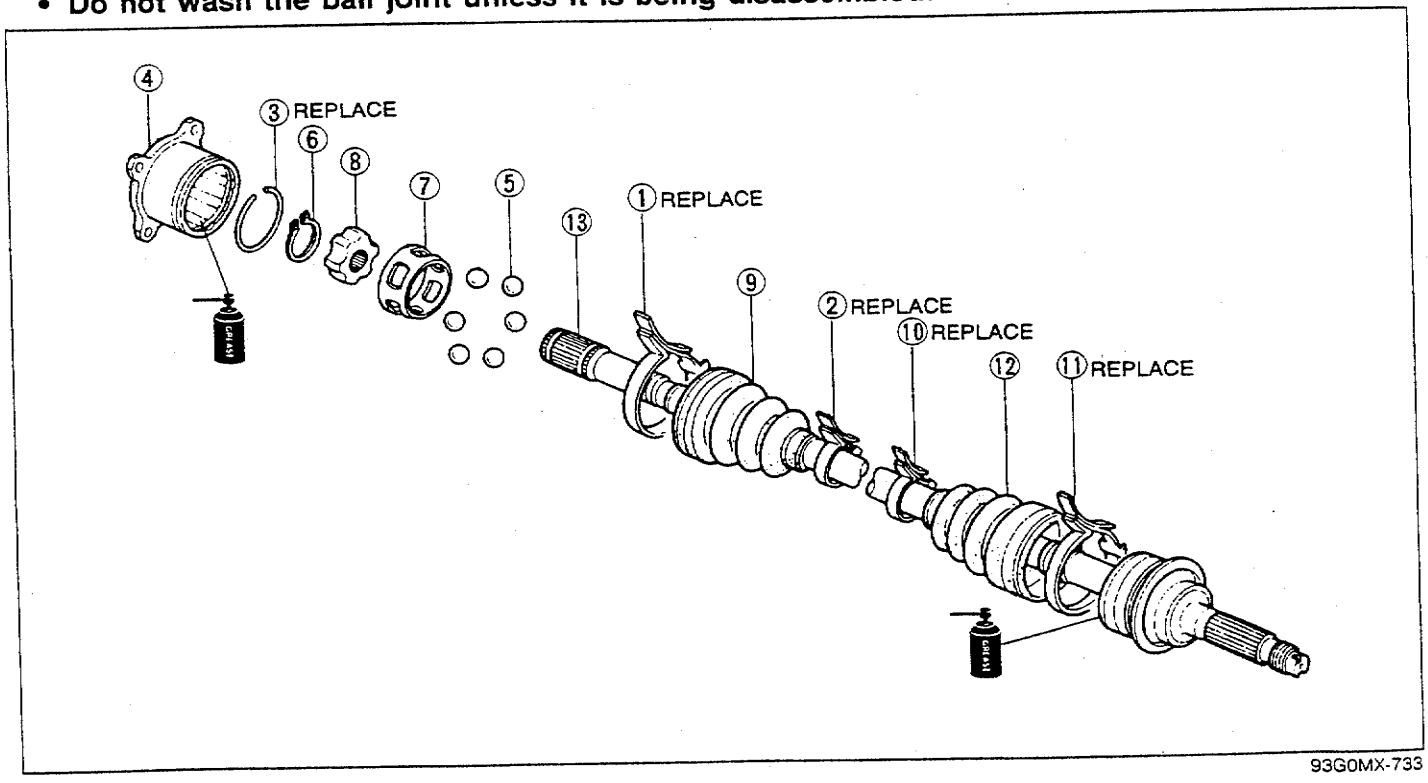


03U0MX-828

Removal Note
Nuts (Driveshaft)
1. Before removing the driveshaft, mark the driveshaft and output shaft for proper reassembly.

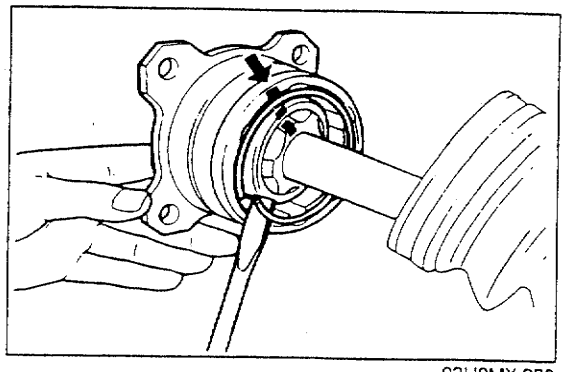
Disassembly / Inspection / Assembly
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3 Assemble in the reverse order of removal, referring to **Assembly Note**.

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.**



93G0MX-733

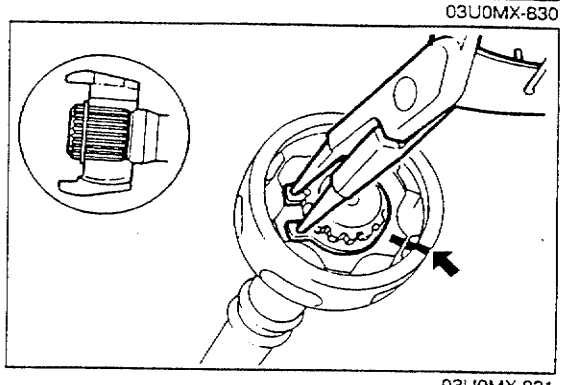
1. Boot band
2. Boot band
3. Clip
   Disassembly Note
   ..... page M–21
4. Outer ring
5. Ball
6. Snap ring
   Disassembly Note
   ..... page M–21
7. Cage
   Disassembly Note
   ..... page M–21
   Assembly Note page M–22
8. Inner ring
   Disassembly Note
   ..... page M–21
9. Boot
   Disassembly Note
   ..... page M–21
10. Boot band
11. Boot
    Disassembly Note
    ..... page M–21
    Assembly Note page M–22
12. Axleshaft
    Inspect for bending, twisting and other damage


03U0MX-830

Disassembly Note
Clip

Caution
- **Mark with paint, do not use a punch.**

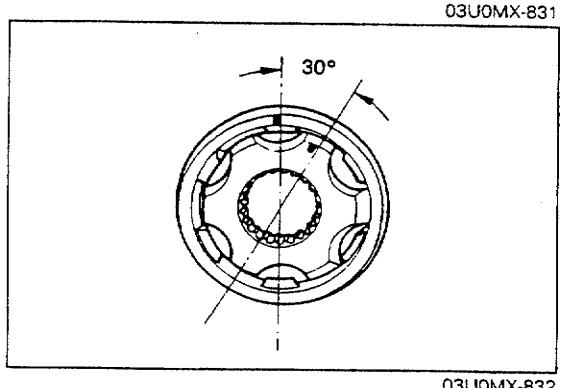
1. Mark the outer ring and the cage for proper reassembly.
2. Remove the clip with a screwdriver.


03U0MX-831

Snap ring

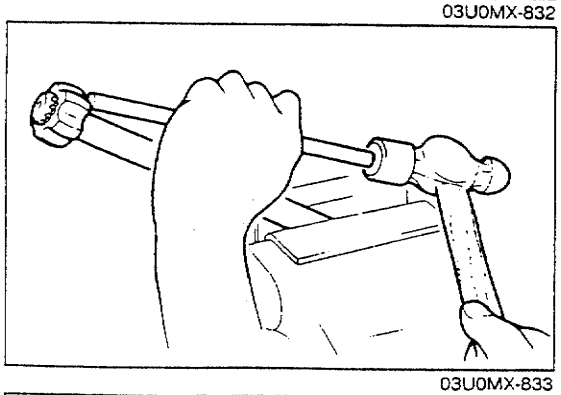
Caution
- **Mark with paint, do not use a punch.**

1. Mark the axleshaft, the cage and the inner ring for proper reassembly.
2. Remove the snap ring with snap-ring pliers.

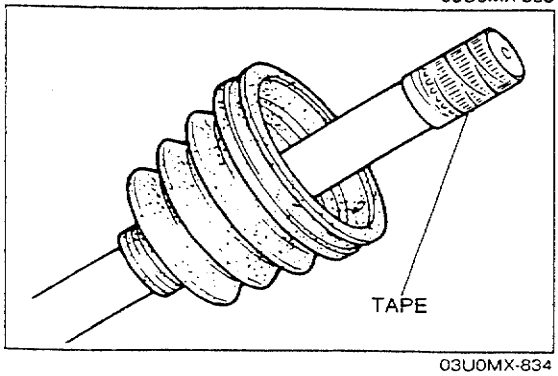


03U0MX-832

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.

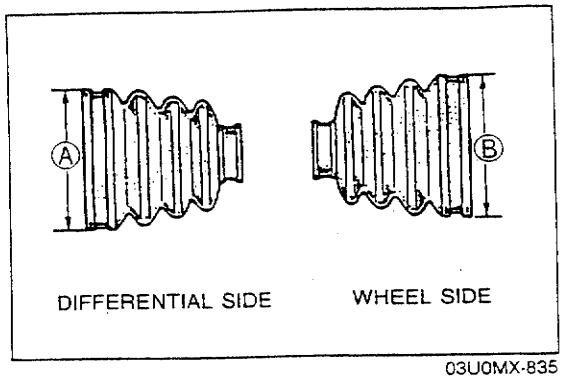


03U0MX-834

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.

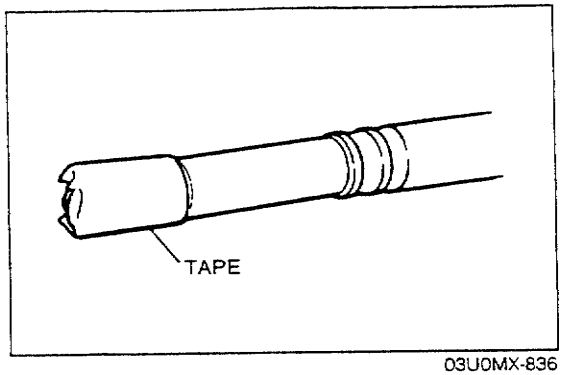


03U0MX-835

Assembly Note
Boot

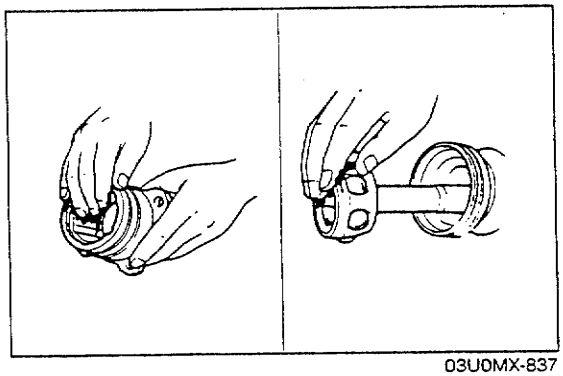
Caution
- **The wheel-side and transaxle-side boots are different.**

A: 89.9mm (3.54 in)
B: 85.2mm (3.35 in)



03U0MX-836

1. Wrap the splines of the wheel side of the shaft with tape and install the boot and a new boot band.

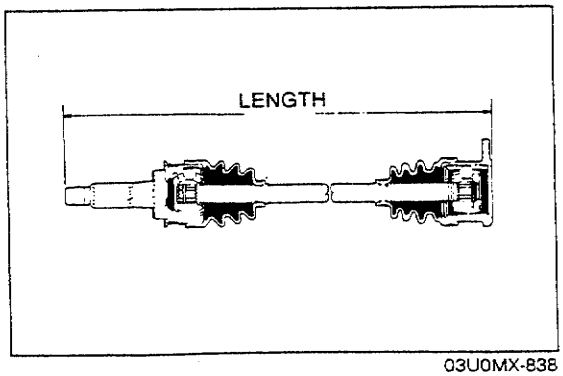


03U0MX-837

Caution
- **Do not use other than the specified grease.**

2. Apply molybdenum disulfide grease to the joint.

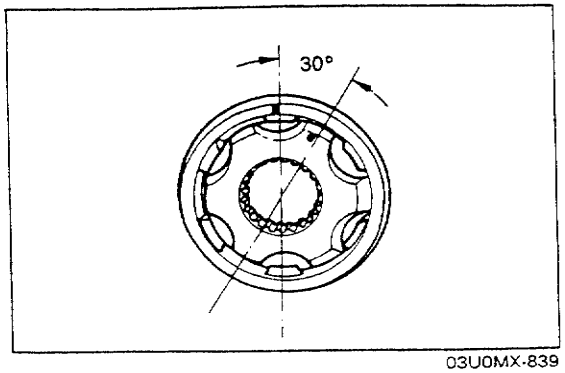
Quantity
Differential side: 75 g (2.64 oz)
Wheel side : 80 g (2.82 oz)



03U0MX-838

3. Measure the length of the driveshaft.

Standard length
Right side: 689mm (27.12 in)
Left side : 659mm (25.94 in)

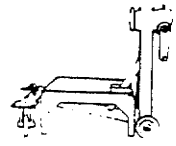
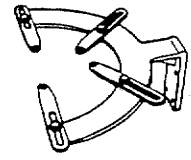
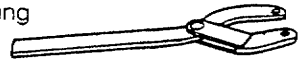
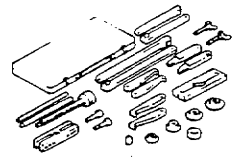
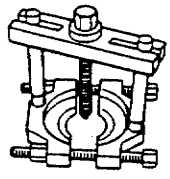
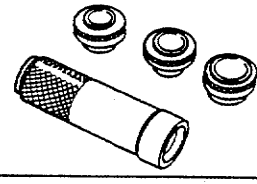
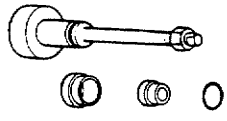
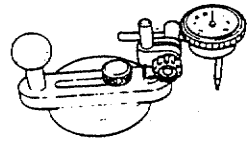
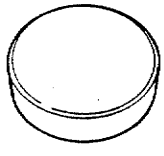
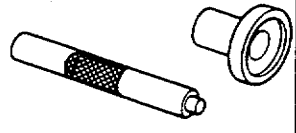
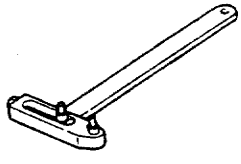
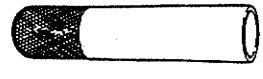
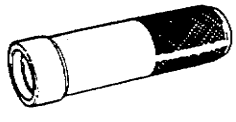
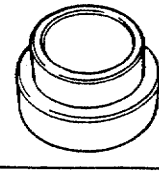


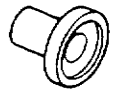
03U0MX-839

Cage
1. Install the cage at approximately 30° from the mark, then align the marks.

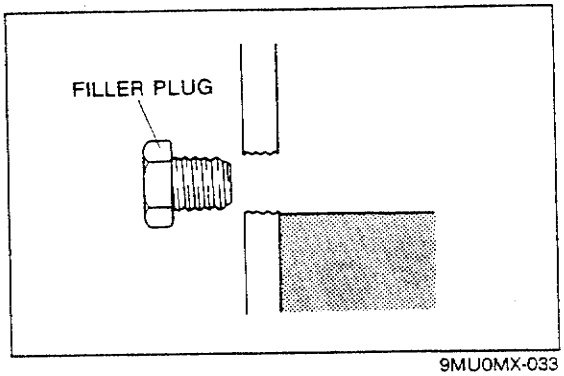
REAR DIFFERENTIAL

PREPARATION
SST

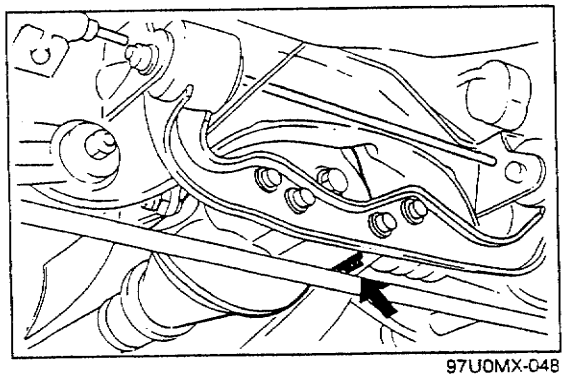
49 0107 680A Engine stand 	For installation of differential carrier	49 M005 561 Hanger, diff. carrier 	For support of differential carrier
49 S120 710 Holder, coupling flange 	For removal and installation of flange nut	49 0839 425C Pulier set, bearing 	For removal of bearing inner race
49 0710 520 Puller, bearing 	For removal of bearing inner race	49 F401 330B Installer set, bearing 	For installation of bearing inner race
49 8531 565 Pinion model 	For measurement of pinion height	49 0727 570 Gage body, pinion height (Part of 49 F027 0A0) 	For measurement of pinion height
49 N027 001 Gauge block 	For measurement of pinion height	49 M005 795 Installer set, oil seal 	For installation of oil seal
49 0259 720 Wrench, diff. side bearing adjusting nut 	For adjustment of drive pinion and ring gear backlash	49 0727 415 Installer, bearing 	For installation of oil seal
49 G038 338 Attachment E 	For installation of bearing inner race	49 8531 567 Collar A 	For measurement of pinion height
49 F401 331 Body (Part of 49 D017 2A1) 	For installation of bearing inner race	49 F401 336B Attachment B (Part of 49 D017 2A1) 	For installation of bearing inner race

49 M005 796 Body (Part of 49 M005 795) 	For installation of oil seal	49 M005 797 Handle (Part of 49 M005 795) 	For installation of oil seal

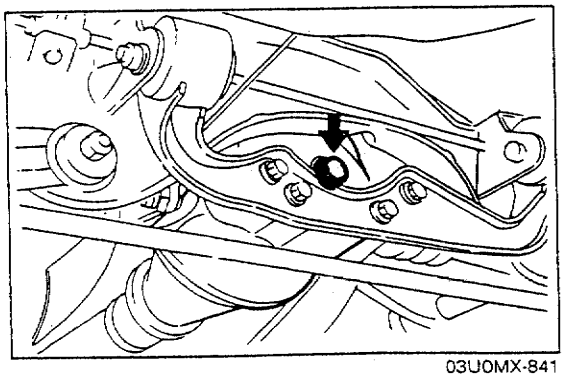
93G0MX-734



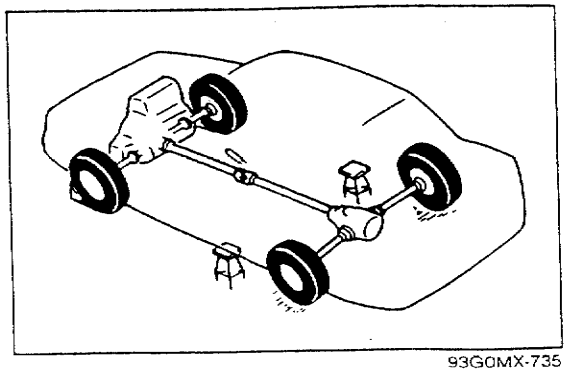
9MU0MX-033



97U0MX-048



03U0MX-841



93G0MX-735

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)

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)

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)

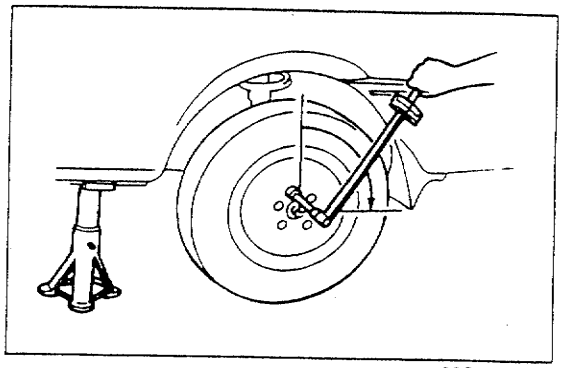
6. Install the filler plug.

Tightening torque:
39—54 N·m (4.0—5.5 m-kg, 29—40 ft-lb)

OPERATION INSPECTION

Viscous Limited-slip Differential

1. Turn the engine OFF and shift the transmission into reverse.
2. Block the front wheels with wheel chocks.
3. Jack up the rear wheels and support the vehicle with safety stands.
4. Release the parking brake.



93G0MX-736

5. Using a torque wrench on a wheel lug nut, measure the time it takes to turn the wheel **90°** while applying the specified torque.

   Specified torque: 15 N·m (150 cm-kg, 132 in-lb)
   Specified time: 4.0 sec. min.

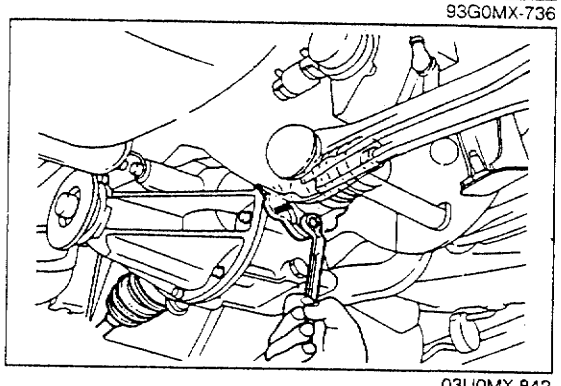
6. If not as specified, replace the viscous limited-slip differential and fill the differential with new specified oil. (Refer to pages M–17, 21.)

OIL SEAL (OUTPUT SHAFT)

Replacement

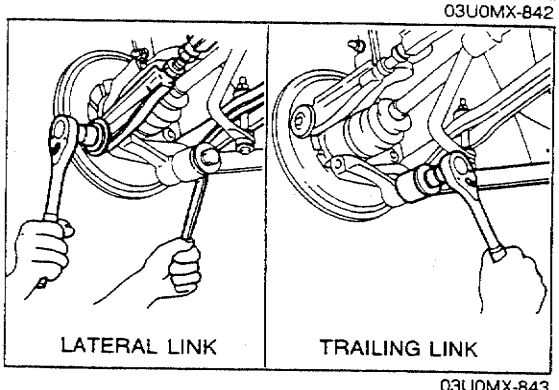
1. Jack up the vehicle and support it with safety stands.
2. Drain the differential gear oil.

Note
- **Mark the driveshaft and output shaft flanges for proper reassembly.**



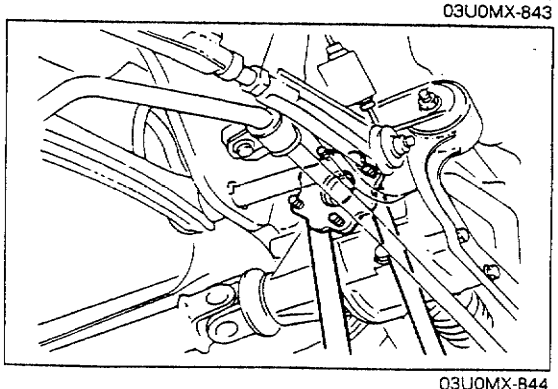
03U0MX-842

3. Separate the driveshaft from the differential, and suspend it as shown in the figure.



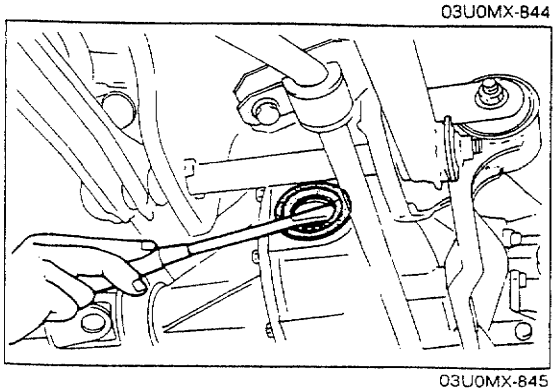
03U0MX-843

4. Remove the lateral link.
5. Remove the trailing link.
6. Pull the wheel hub out to separate the driveshaft from the output shaft.



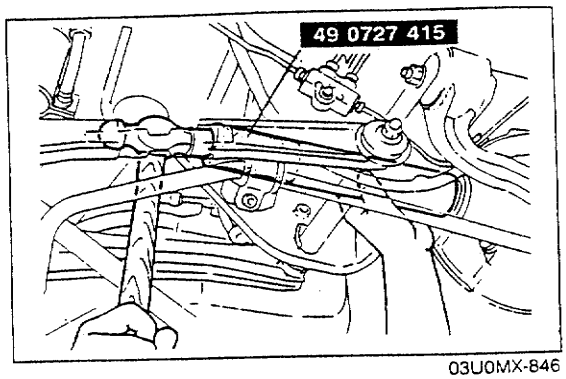
03U0MX-844

7. Remove the output shaft with two pry bars as shown in the figure.



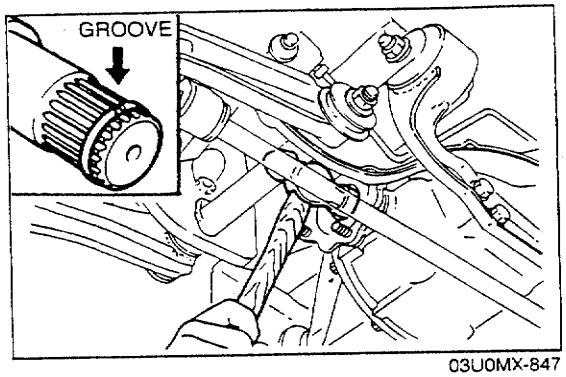
03U0MX-845

8. Remove the oil seal with a screwdriver.



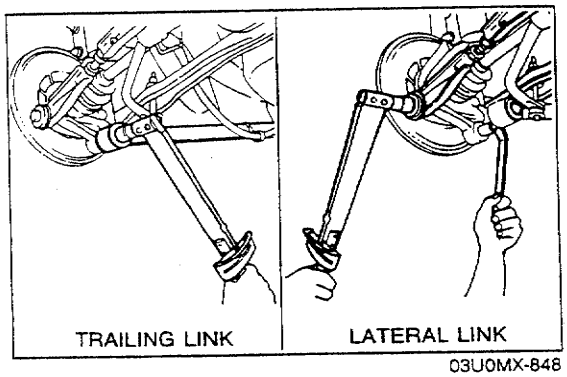
03U0MX-846

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.



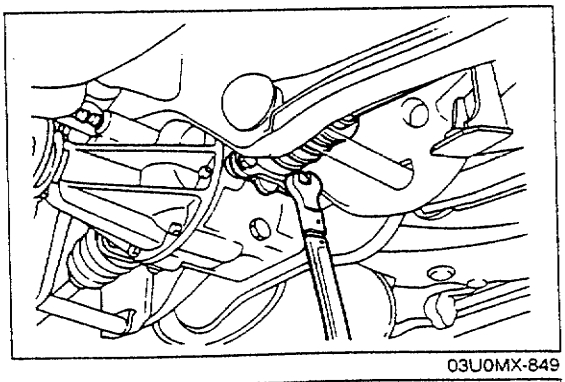
03U0MX-848

13. Install the lateral link.

Tightening torque:
63—75 N·m (6.4—7.6 m-kg, 46—55 ft-lb)

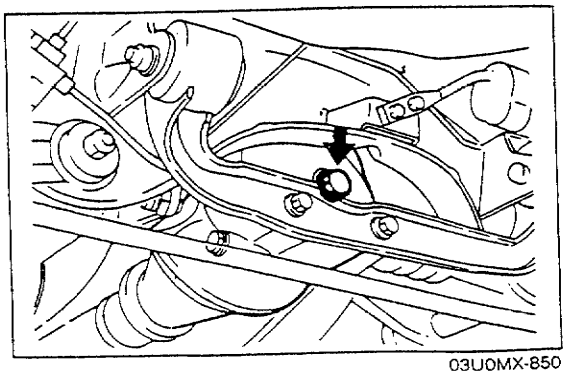
14. Install the trailing link.

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)

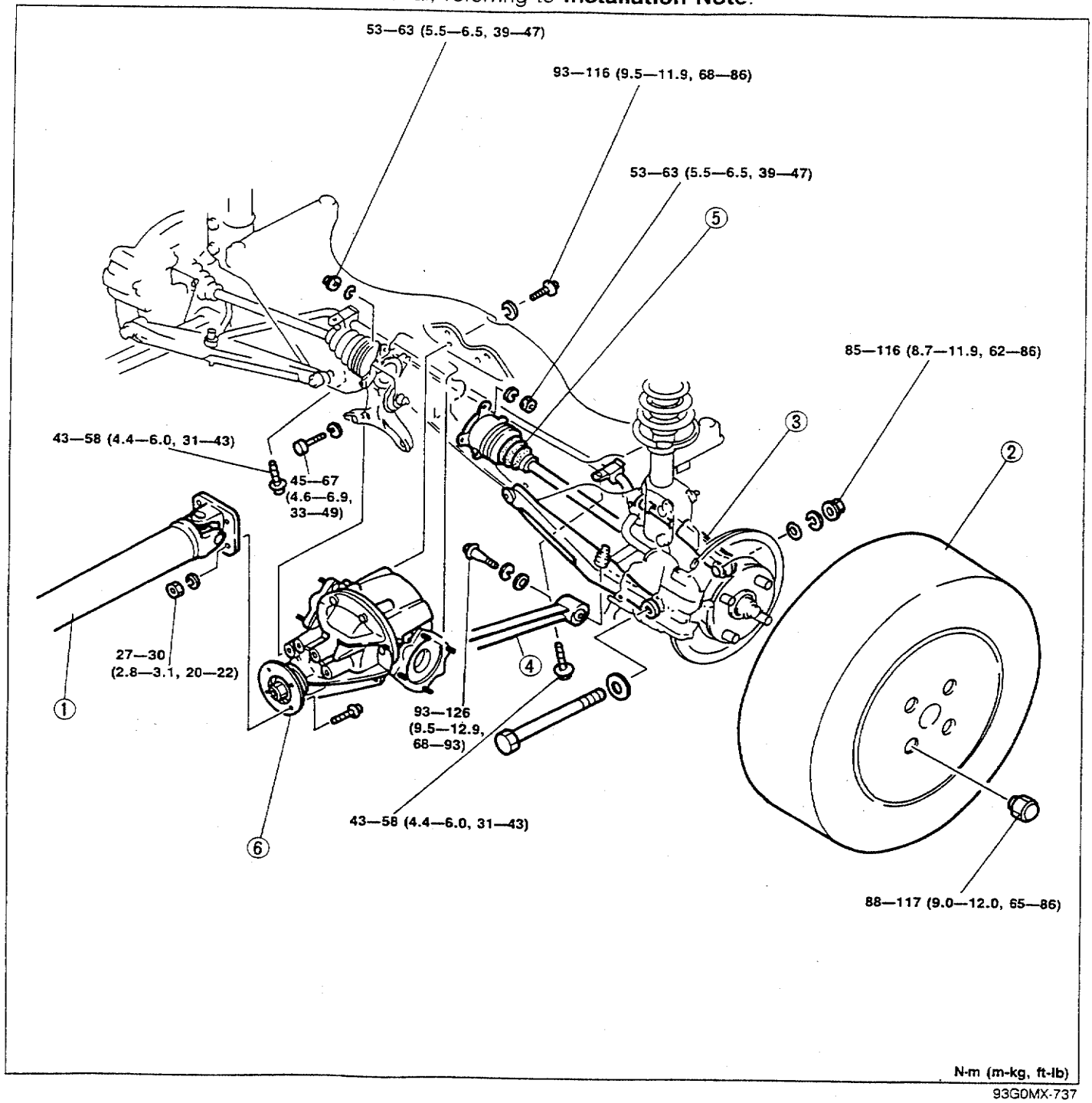
17. Install the filler plug and a new gasket.

Tightening torque:
39—54 N·m (4.0—5.5 m-kg, 29—40 ft-lb)

REAR DIFFERENTIAL
Removal / Installation

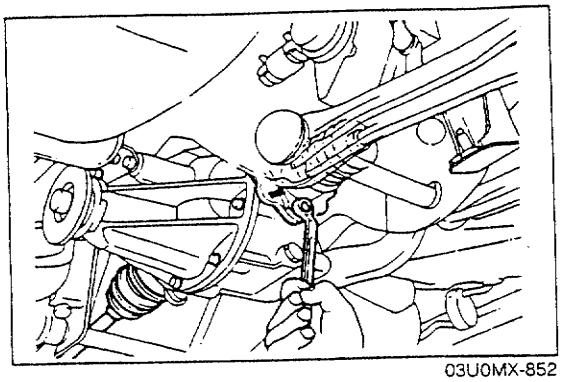
Note
- **Drain the differential oil before removal.**

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**.

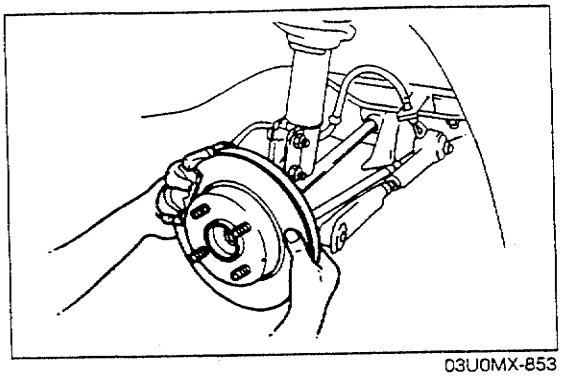


93G0MX-737

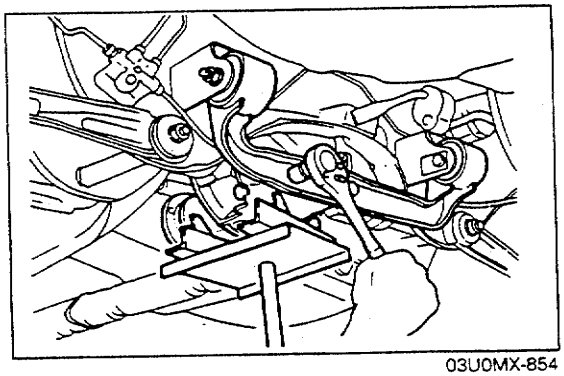
1. Propeller shaft
   Service ..... Section L
2. Wheel and tire
3. Lateral link
4. Trailing link
5. Driveshaft
   Removal Note . page M–28
   Installation Note
   ..... page M–28
6. Rear differential
   Removal Note . page M–28
   Installation Note
   ..... page M–28
   Overhaul..... page M–29


03U0MX-852

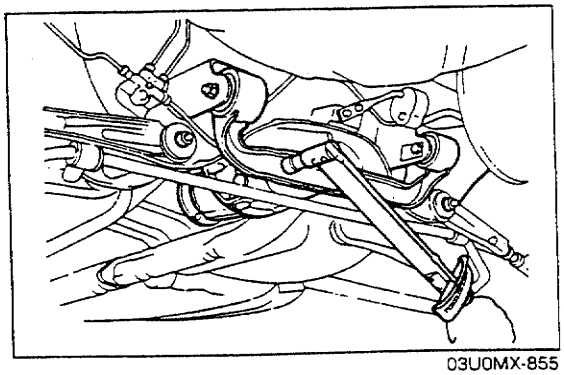
Removal Note
Driveshaft
1. Before removing the driveshaft, mark the driveshaft and output shaft for proper reassembly.


03U0MX-853

2. Pull the wheel hub out to separate the driveshaft from the output shaft.

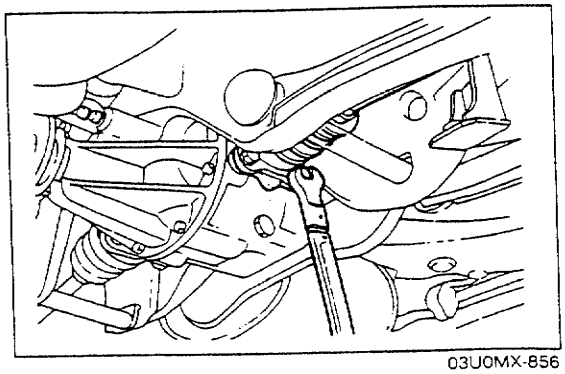

03U0MX-854

Rear differential
1. Support the differential with a jack while removing it.


03U0MX-855

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)


03U0MX-856

Driveshaft
1. Align the marks and reinstall the driveshaft.

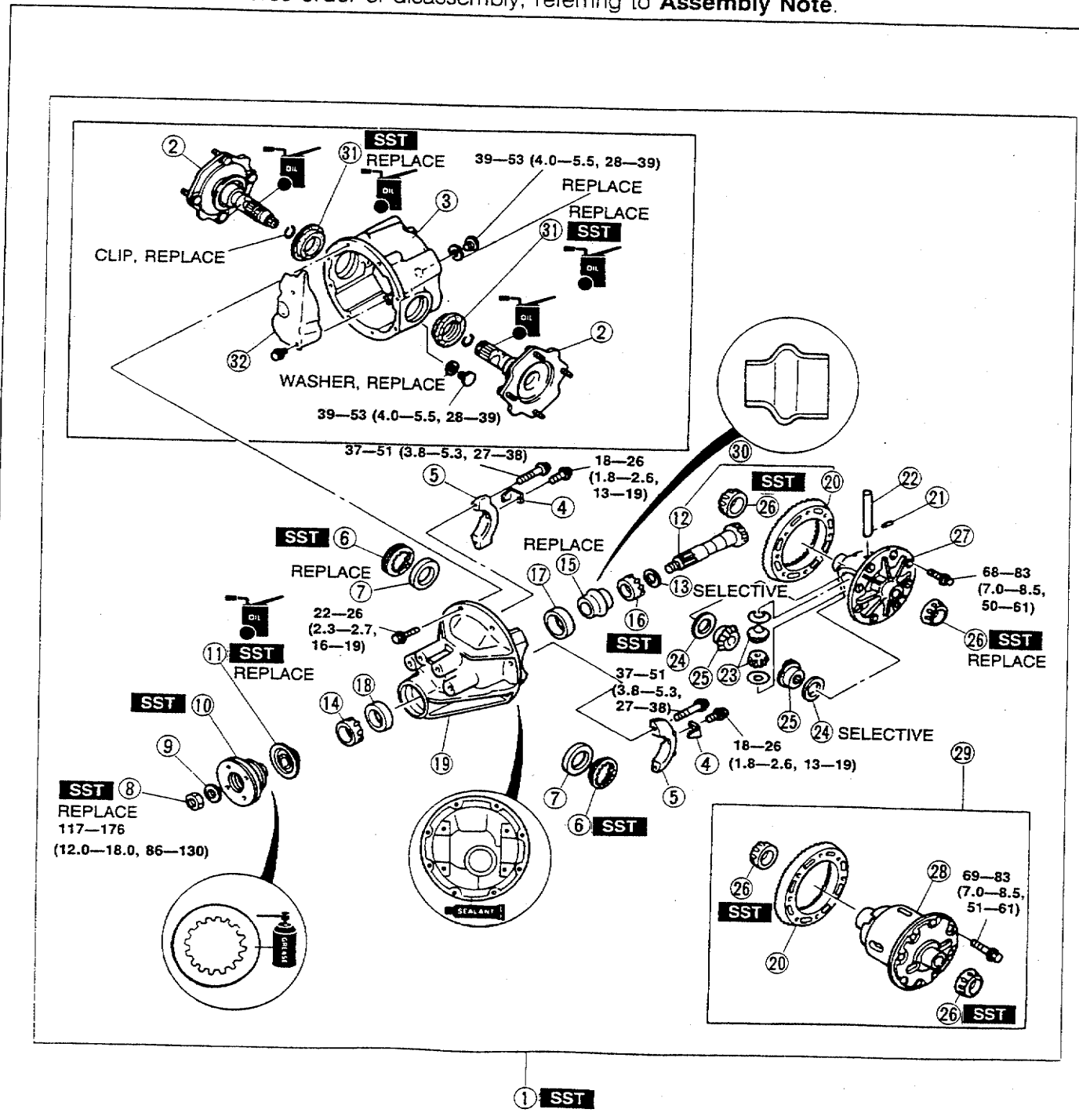
Tightening torque:
53—63 N·m (5.5—6.5 m-kg, 39—47 ft-lb)

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.**

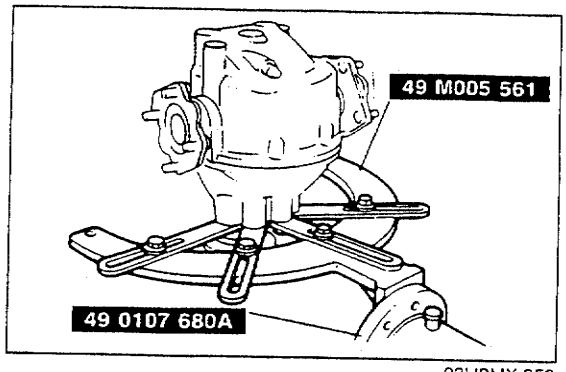
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



N·m (m-kg, ft-lb)

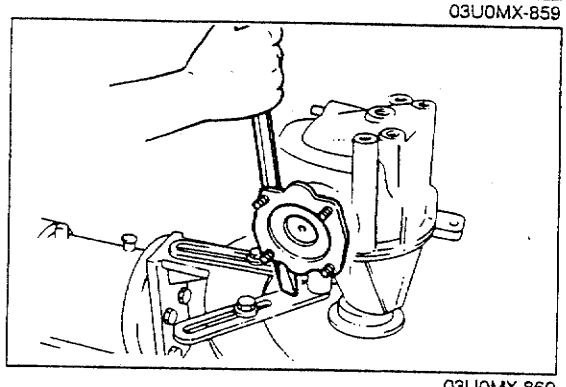
1. Differential gear assembly
   Disassembly Note..... page M–31
2. Output shaft
   Disassembly Note..... page M–31
   Assembly Note ..... page M–38
3. Differential case
   Assembly Note ..... page M–38
4. Lock plate
5. Bearing cap
   Disassembly Note..... page M–31
6. Adjusting screw
   Disassembly Note..... page M–31
7. Bearing outer race (Side bearing)
8. Nut (Companion flange)
   Disassembly Note..... page M–31
   Assembly Note ..... page M–35
9. Washer
10. Companion flange
    Disassembly Note..... page M–31
    Inspect splines for cracks and other damage
    Assembly Note ..... page M–35
11. Oil seal (Companion flange)
    Assembly Note ..... page M–35
12. Drive pinion
    Disassembly Note..... page M–32
    Inspect splines for cracks and other damage
13. Spacer
14. Bearing inner race (Front bearing)
    Inspect for rough rotation
15. Collapsible spacer
16. Bearing inner race (Rear bearing)
    Disassembly Note..... page M–32
    Inspect for rough rotation
17. Bearing outer race (Rear bearing)
    Disassembly Note..... page M–32
18. Bearing outer race (Front bearing)
    Disassembly Note..... page M–32
19. Differential carrier
20. Ring gear
    Inspect for cracks and other damage
21. Knock pin
    Disassembly Note..... page M–32
22. Pinion shaft
23. Pinion gear
    Inspect for cracks and other damage
24. Thrust washer
25. Side gear
    Inspect for cracks and other damage
26. Bearing inner race (Side bearing)
27. Gear case (Standard)
28. Gear case (Viscous L.S.D.)
29. Viscous L.S.D.
30. Final gear set
31. Oil seal (Output shaft)
    Assembly Note ..... page M–38
32. Baffle plate

93G0MX-738

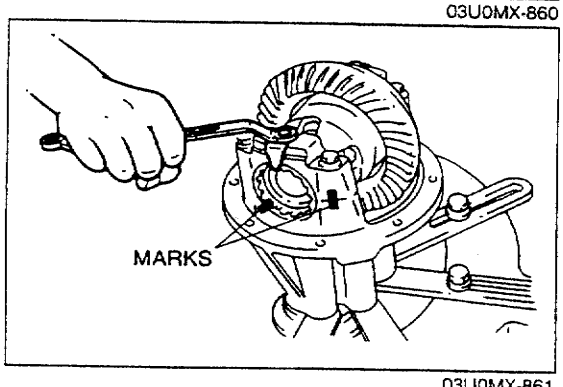


03U0MX-859

Disassembly Note
Differential gear assembly
1. Mount the differential carrier on the **SST**.


03U0MX-860

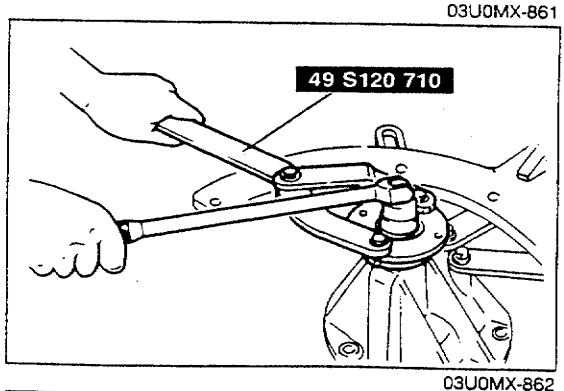
Output shaft
1. Remove the output shaft with a pry bar as shown in the figure.



03U0MX-861

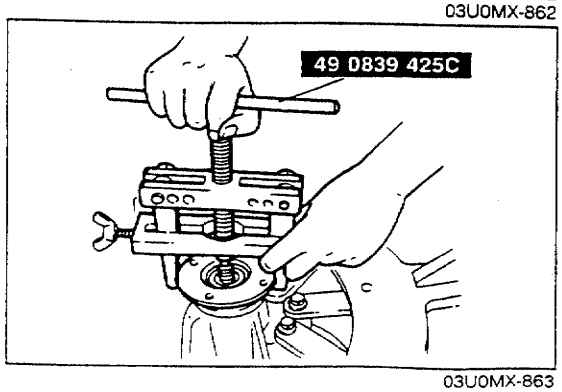
Bearing cap
1. Mark one bearing cap and the carrier.

Adjusting screw
1. Mark one adjusting screw and the carrier.



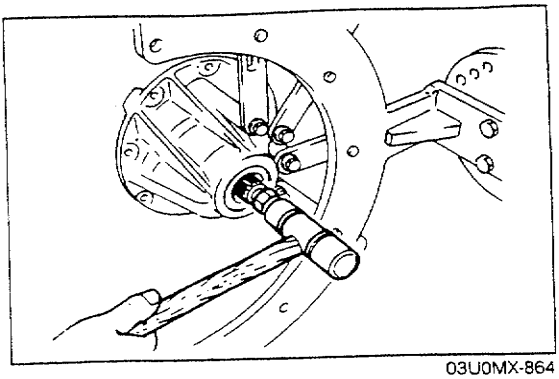
03U0MX-862

Nut (Companion flange)
1. Hold the companion flange with the **SST** and remove the nut.



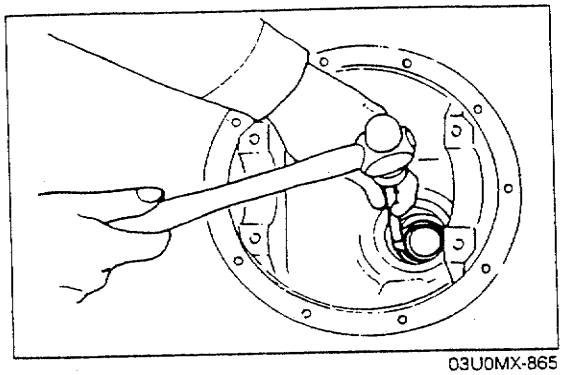
03U0MX-863

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


03U0MX-864

Drive pinion

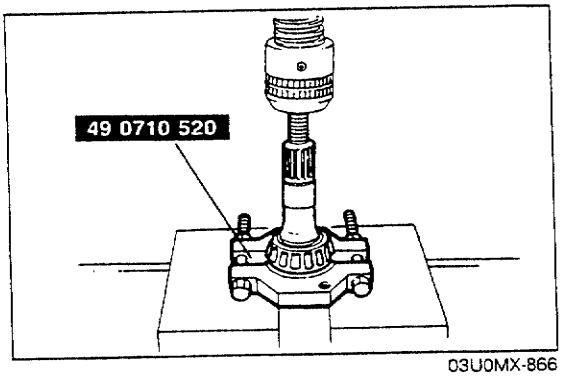
1. Push out the drive pinion by attaching a miscellaneous nut to the drive pinion and tapping it with a copper hammer.


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.

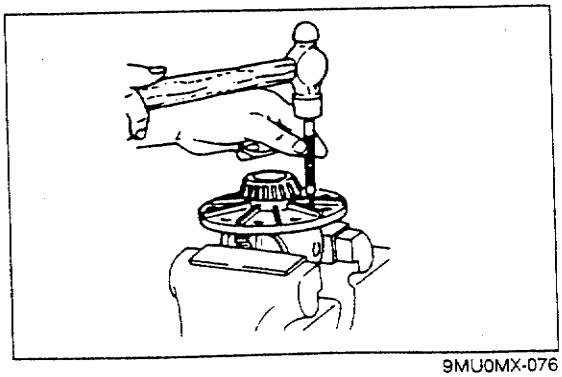


03U0MX-866

Bearing inner race (Rear bearing)

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

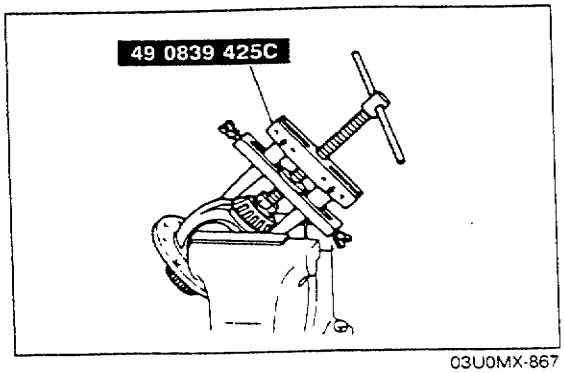
1. Remove the rear bearing with the **SST**.


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.

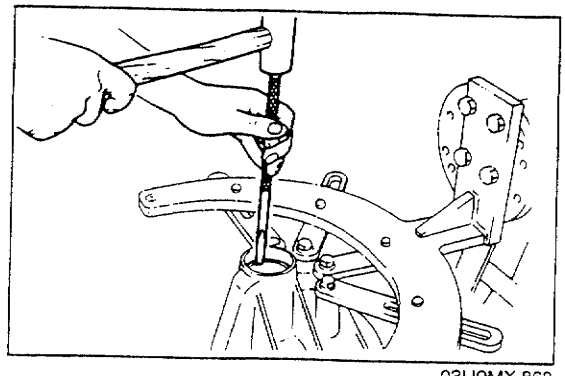


03U0MX-867

Bearing inner races (Side bearing)

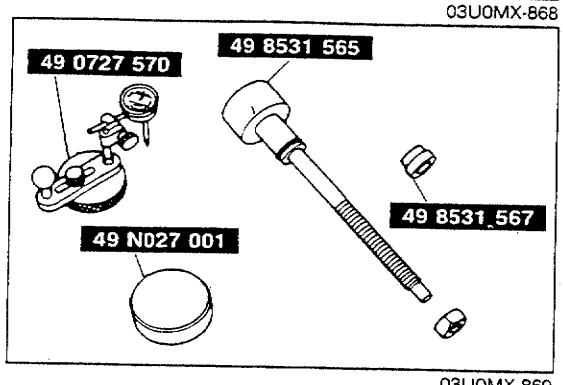
Note
- **Do not remove the bearing inner races if not necessary.**
- **Replace the bearing inner races with new bearings if removed.**

1. Remove the side bearings from the gear case with the **SST**.



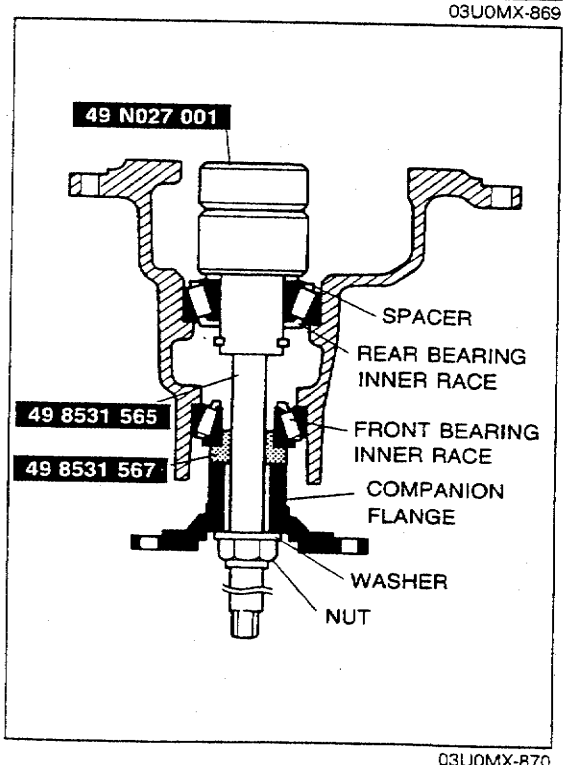
03U0MX-868

Assembly Note
Bearing outer race
1. Install the front and rear bearing outer races with a brass drift and a hammer.



03U0MX-869

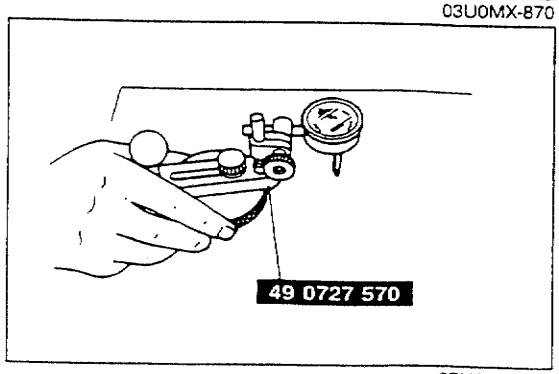
Adjustment of pinion height
1. Adjust the drive pinion height as follows with the **SST**.



03U0MX-870

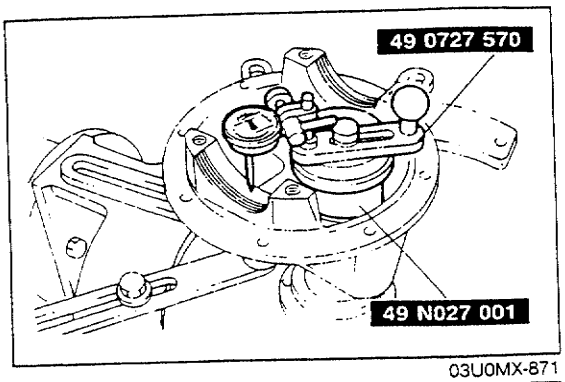
Note
- **Use the spacer that was removed.**
- **Do not install the collapsible spacer.**

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.



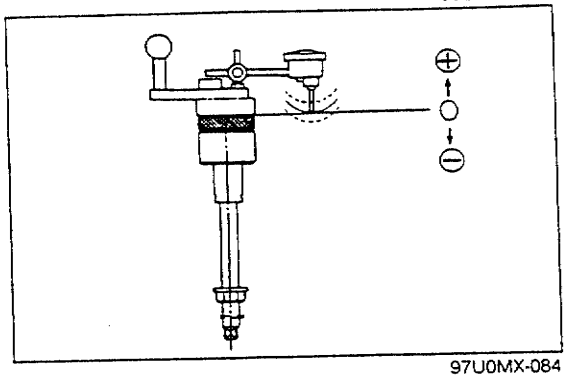
97U0MX-082

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



03U0MX-871

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.



97U0MX-084

g) Add the two (left and right) values obtained in Step f, and divide the total by 2.

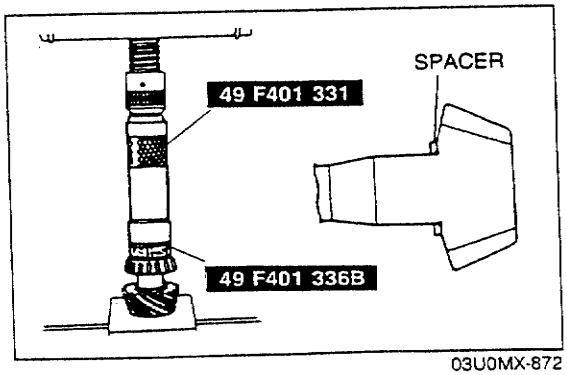
Specification: 0mm (0 in)

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

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.**



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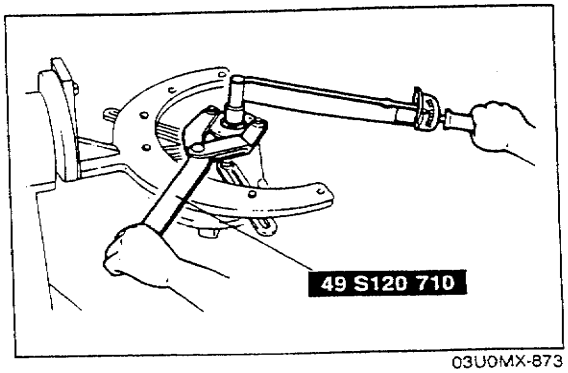
Adjustment of drive pinion preload

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.**



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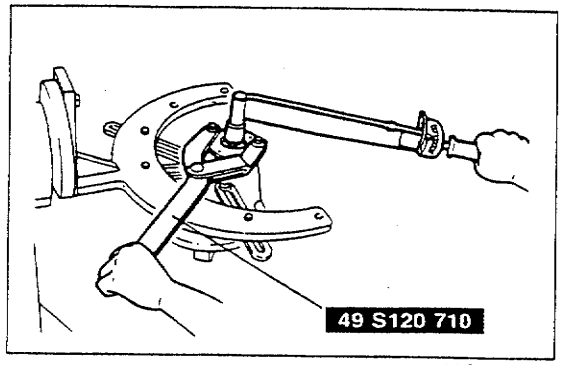
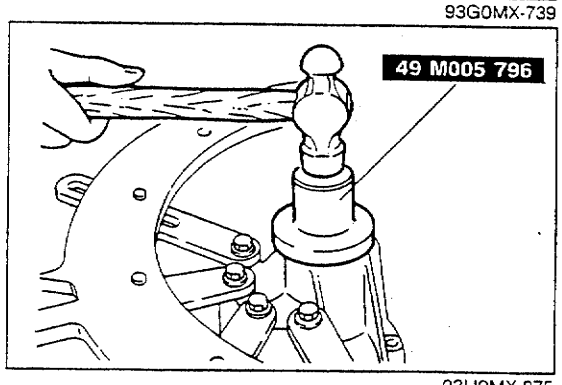
3. Install the collapsible spacer.
4. Install the drive pinion assembly.
5. Install the companion flange, and tighten the flange nut.

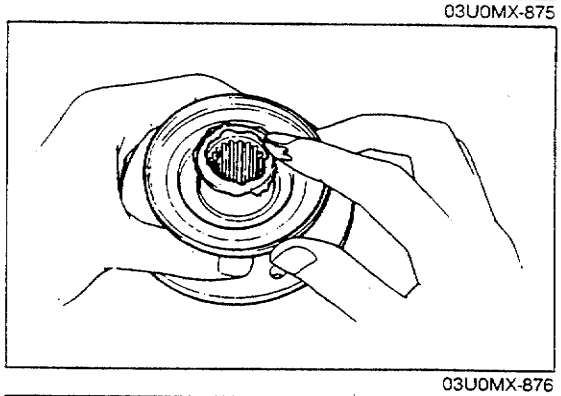
Tightening torque: 117 N·m (12 m-kg, 86 ft-lb)

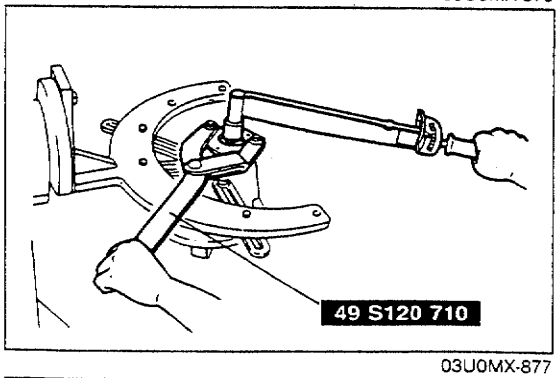


93G0MX-739

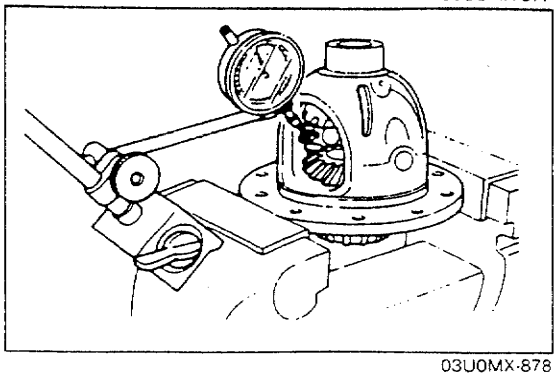


03U0MX-875


03U0MX-876



03U0MX-877


03U0MX-878

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)

Note
- **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.

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**.

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

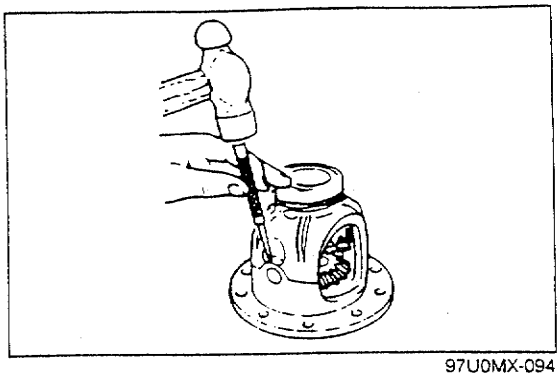
Nut (Companion flange)
1. Adjust the preload by tightening the flange nut.

Preload:
0.29—0.68 N·m (3—7 cm-kg, 2.6—6.0 in-lb)

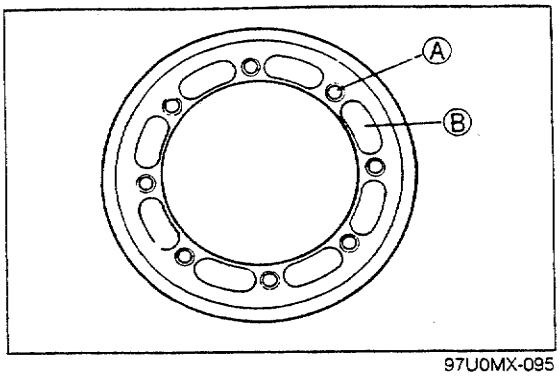
Tightening torque:
117—176 N·m (12—18 cm-kg, 86—130 in-lb)

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.

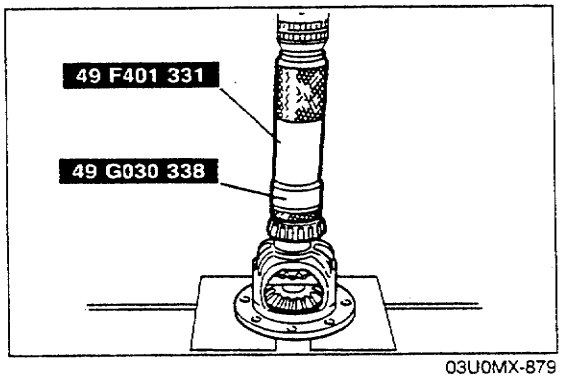
Backlash: 0—0.1mm (0—0.004 in)



97U0MX-094



97U0MX-095



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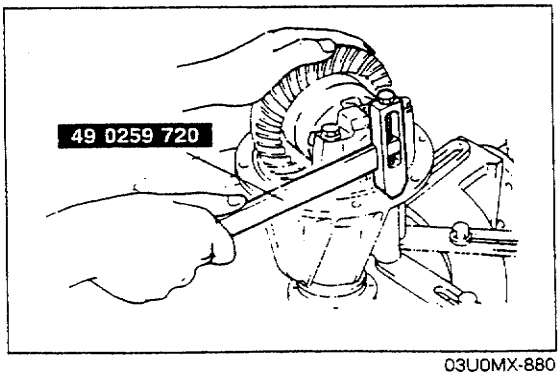
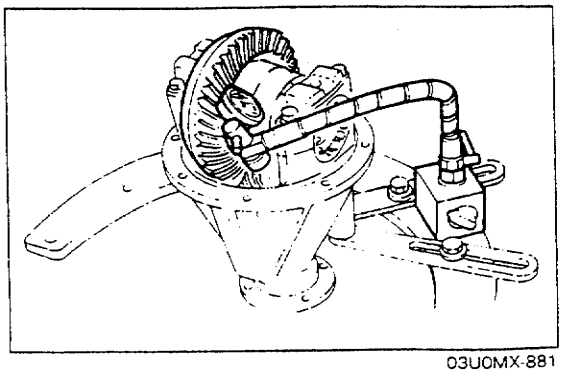


03U0MX-880



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 Ⓐ and Ⓑ around the gear back face.
2. Mount the ring gear onto the gear case.

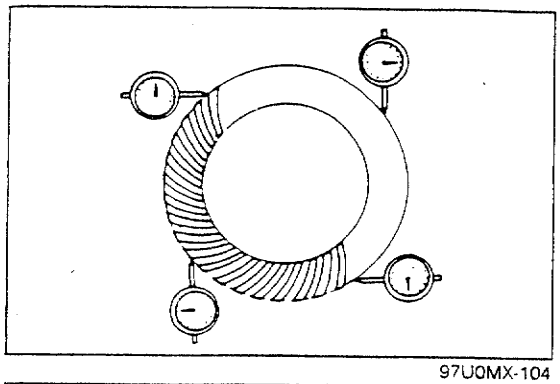
Tightening torque:
69—83 N·m (7.0—8.5 m-kg, 51—61 ft-lb)

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**.

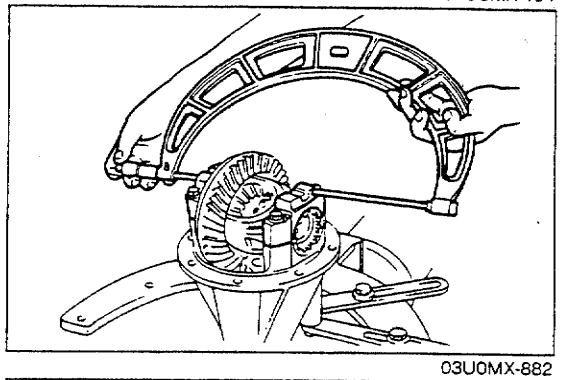
7. Mark the ring gear at four points at approx. **90°** intervals. Mount a dial indicator to the carrier so that the feeler comes into contact at a right angle with one of the ring gear teeth.
8. Turn both bearing adjusting screw, equally with the **SST** until the backlash is as specified.

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)**.

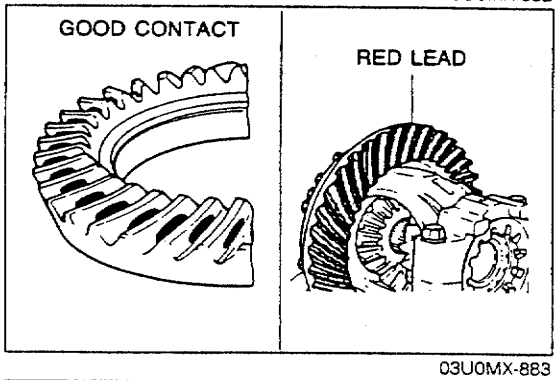


03U0MX-882

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

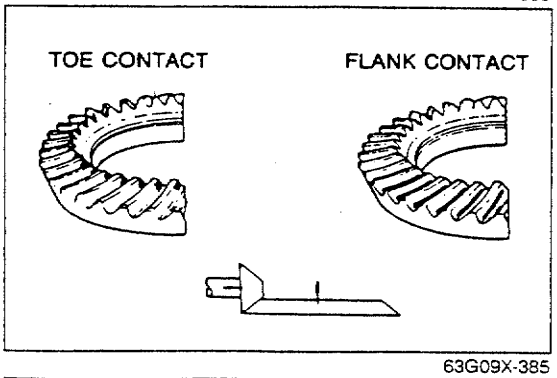
Specified distance:
150.13—150.20mm (5.910—5.913 in)

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



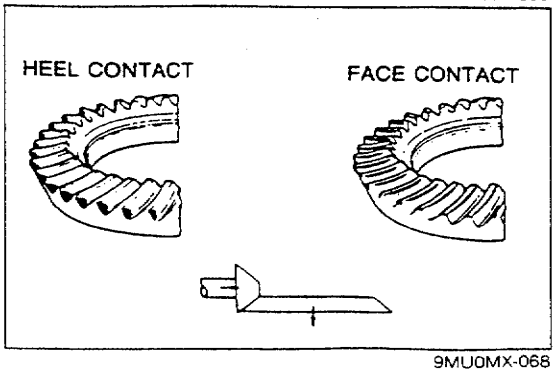
03U0MX-883

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.



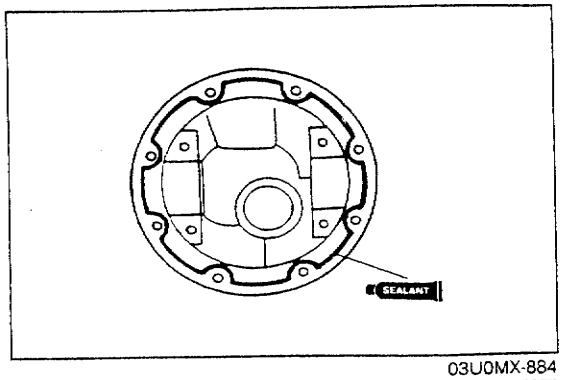
63G09X-385

(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.

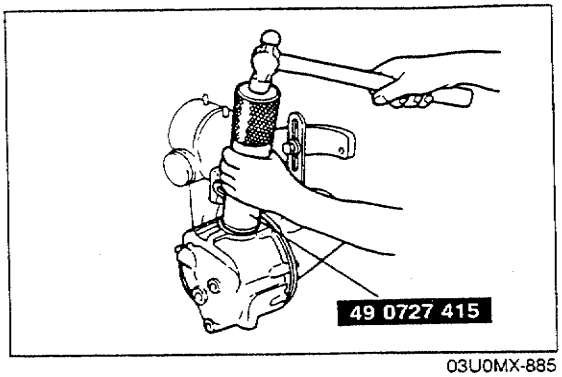


03U0MX-884

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)

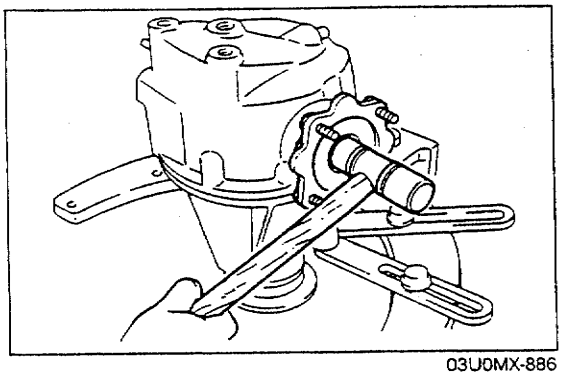


03U0MX-885

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

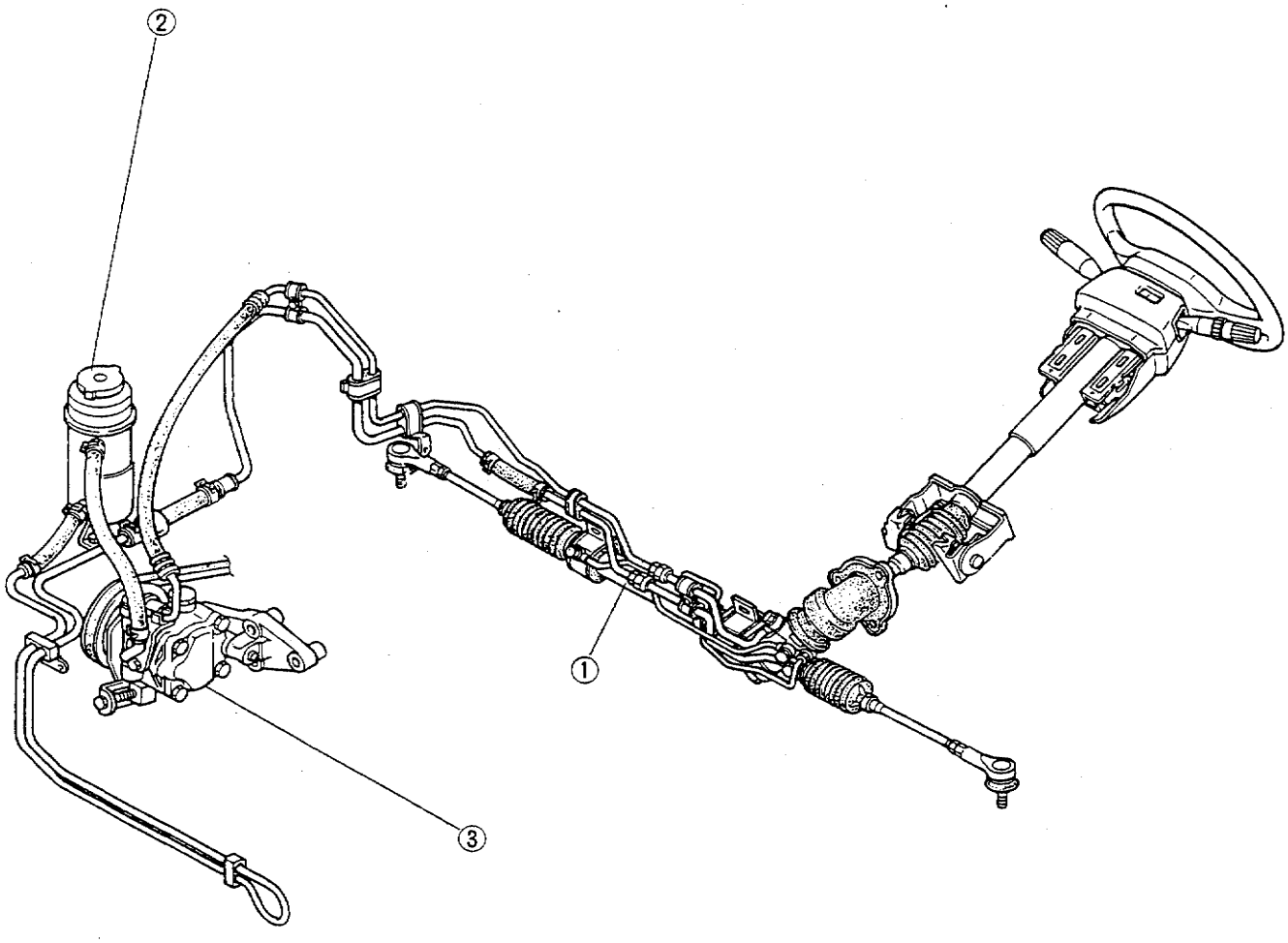
Output shaft

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

03U0NX-801

INDEX



03U0NX-802

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)	380 (14.96)
	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	
	Capacity	liter (US qt, Imp qt)	0.9—1.0 (0.95—1.06, 0.79—0.88)	

93G0NX-701

SUPPLEMENTAL SERVICE INFORMATION

The following points shown in this section are changed in comparison with Workshop Manual (1203-10-89F, 1204-10-89F, 1206-10-89F).

Steering gear and linkage
- Removal / Installation procedure
- Disassembly / Inspection / Assembly procedure

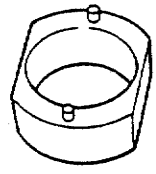
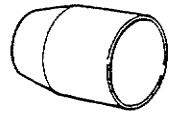
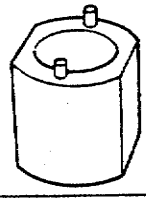
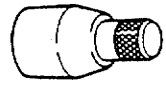
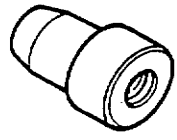
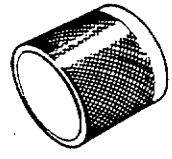
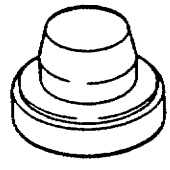
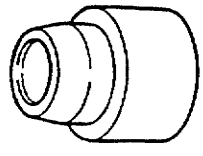
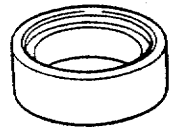
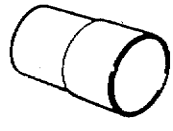
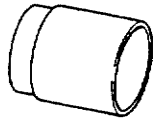
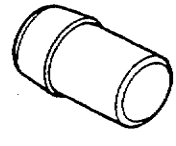
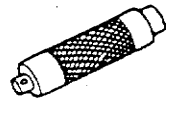
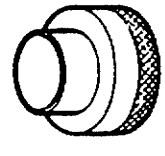
Power steering fluid
- Inspection procedure

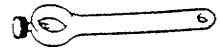
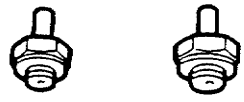
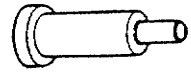
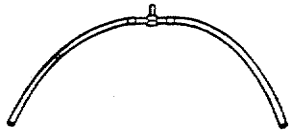
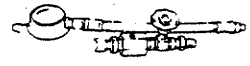
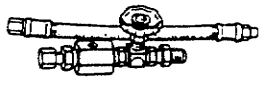
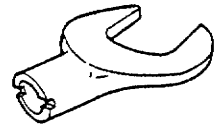
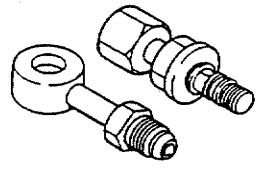
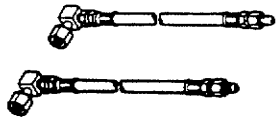
Power steering oil pump
- Disassembly / Inspection / Assembly procedure

93G0NX-702

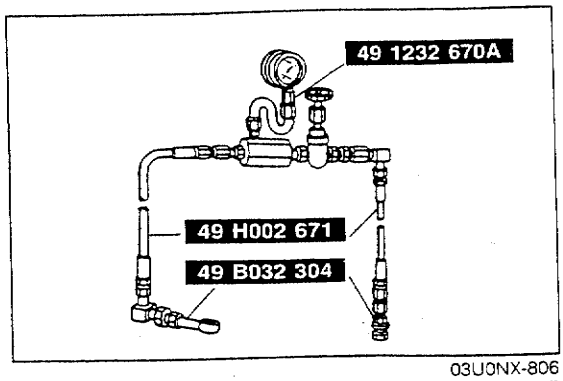
ENGINE SPEED SENSING POWER STEERING

PREPARATION
SST

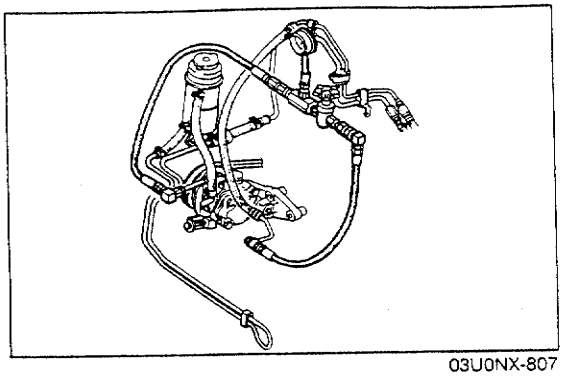
49 B032 306 Wrench, plug 	For removal and installation of plug	49 B032 312 Protector, slipper seal 	For installation of seal ring
49 B032 327 Wrench, outer box 	For removal and installation of outer box	49 B032 326 Protector, outer box 	For installation of outer box
49 B032 323 Remover body, rod seal 	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

49 B032 320 Wrench 	For removal and installation of adjustment cover locknut	49 0180 510B Attachment, preload 	For measurement of pinion torque
49 B032 321 Adapter 	For hermetic inspection	49 B032 305 Holder, power steering pump 	For installation of oil pump
49 G032 317 Hose (Part of 49 B032 3A1) 	For hermetic inspection	49 1232 670A Gauge set, power steering 	For measurement of fluid pressure
49 1232 673 Valve body (Part of 49 1232 670A) 	For measurement of fluid pressure	49 H032 301 Wrench 	For removal of tie-rod
49 1232 672 Gauge (Part of 49 1232 670A) 	For measurement of fluid pressure	49 B032 304 Adapter 	For measurement of fluid pressure
49 H002 671 Adapter 	For measurement of fluid pressure	49 G017 5A0 Support, engine 	For removal and installation of steering gear

03U0NX-805



03U0NX-806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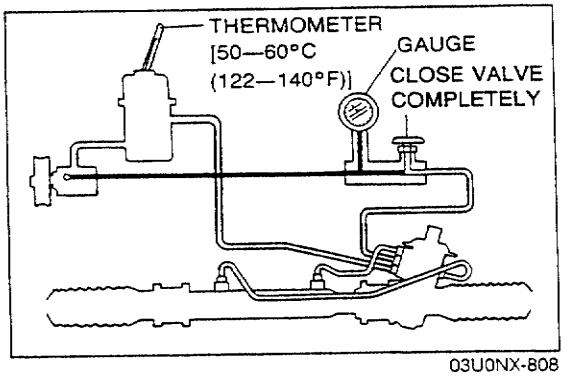
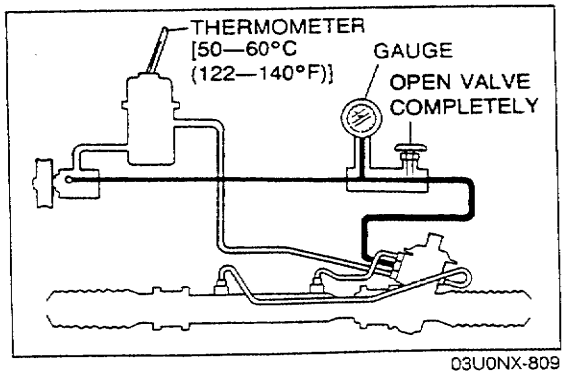


03U0NX-808



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/cm^2, 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/cm^2, 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)

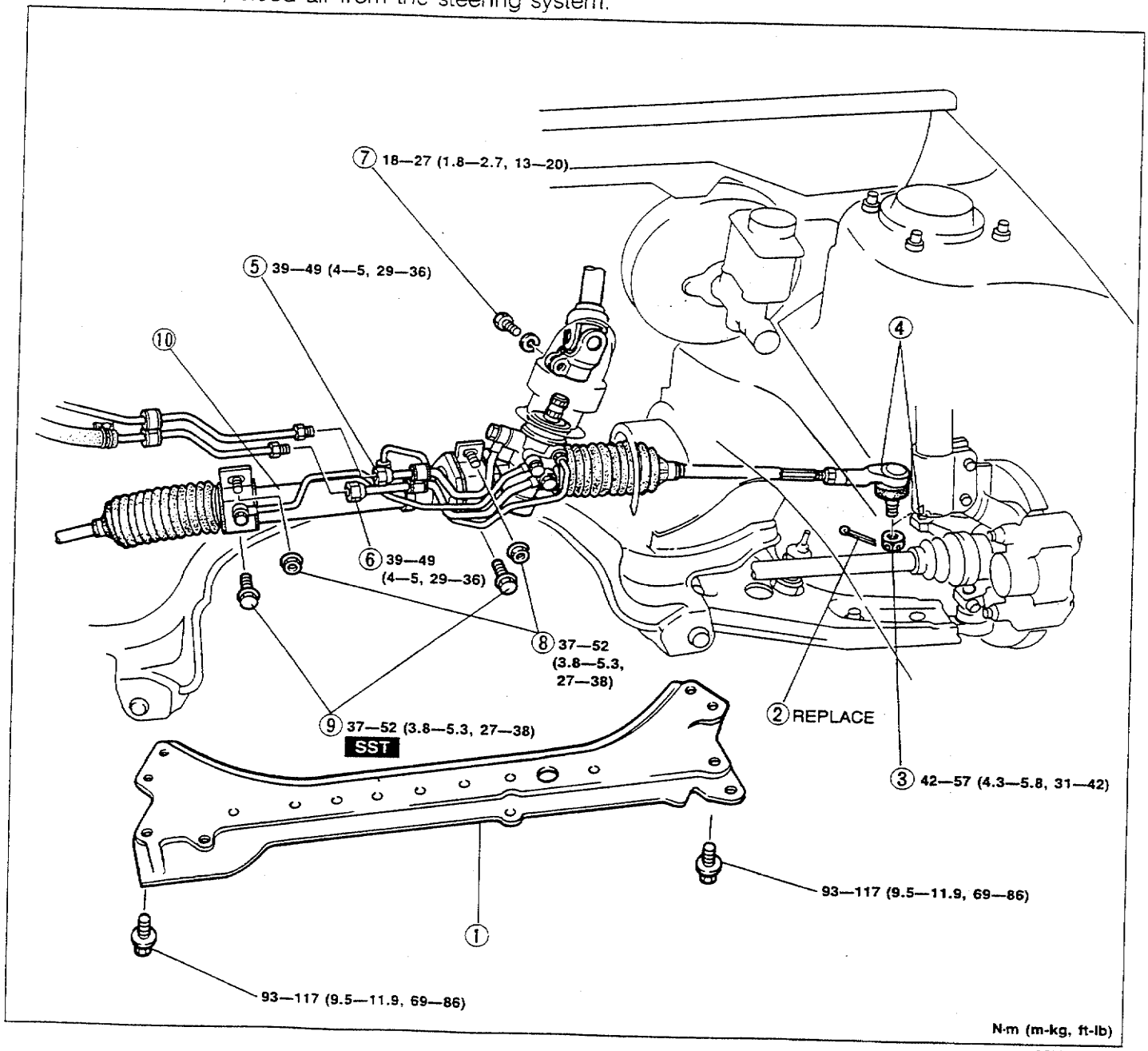
9. Bleed air from the system.

03U0NX-810

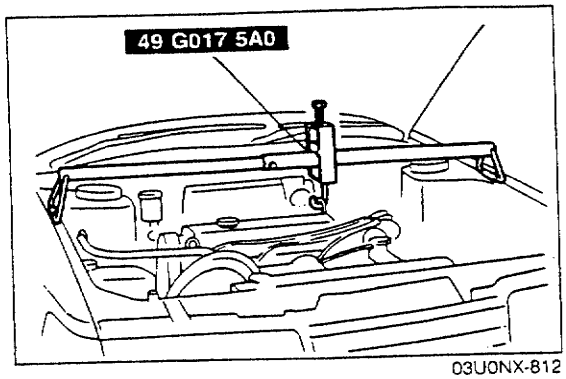
STEERING GEAR AND LINKAGE

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.

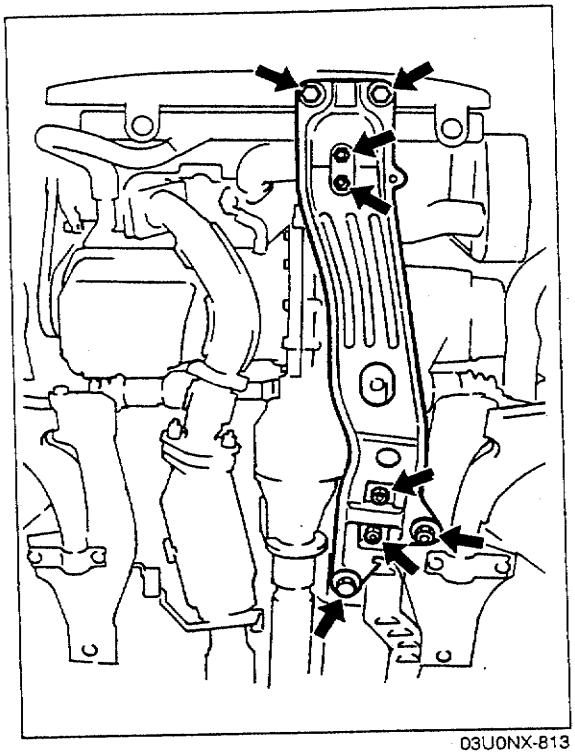


1. Crossmember
2. Cotter pin
3. Nut
4. Tie-rod end/Steering knuckle
5. Pressure pipe
6. Return pipe
7. Fixing bolt (intermediate shaft/pinion shaft)
8. Nut (Steering gear mounting nut)
9. Bolt (Steering gear mounting bolt)
   - Removal note ..... page N– 8
   - Installation note ..... page N– 9
10. Steering gear and linkage
    - Disassembly / Inspection / Assembly ..... page N–10

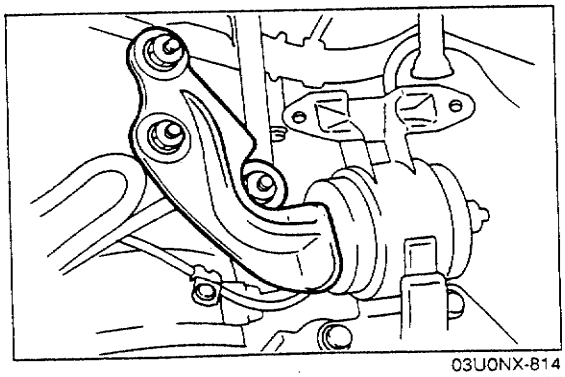


03U0NX-812

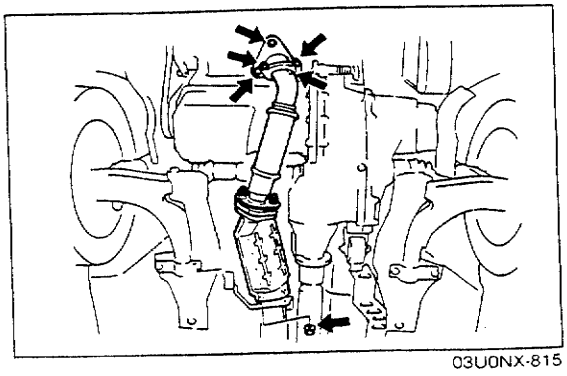
Removal note
Bolt (Steering gear mounting bolt)
1. Set the **SST** as shown.


03U0NX-813

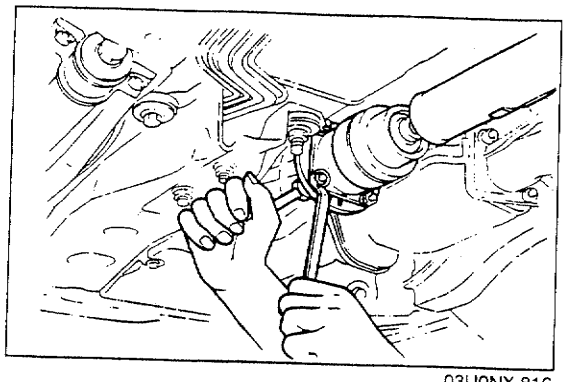
2. Remove the No.1 and No.2 engine mount nuts.
3. Remove the engine mount member.


03U0NX-814

4. Remove the No.4 engine mount mounting bolts.

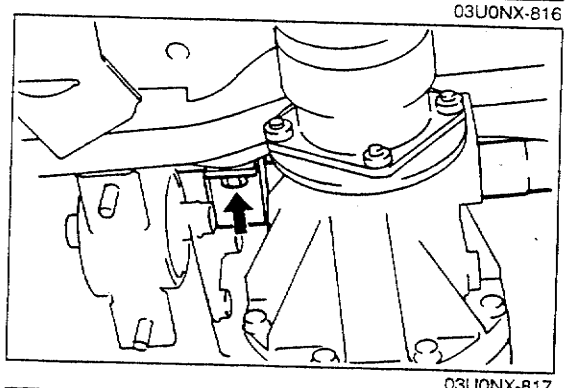

03U0NX-815

5. Remove the front exhaust pipe and the catalytic converter together.



03U0NX-816

6. Separate the front of propeller shaft.

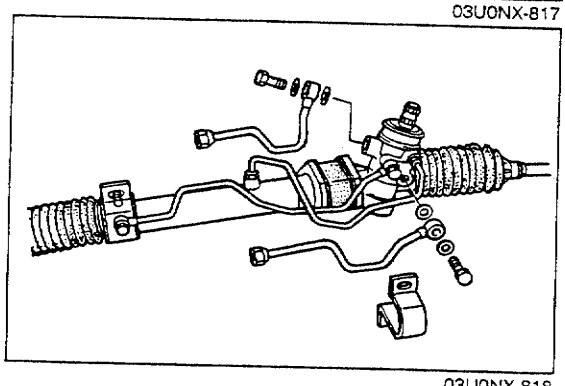


03U0NX-817

7. Lower the engine gradually until the lower left mounting bolt can be removed.

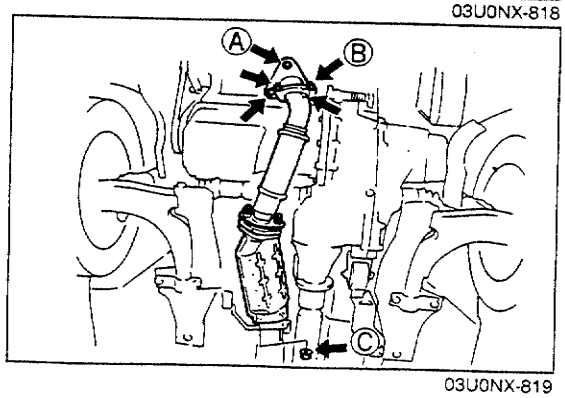
Caution
- **Do not lower the engine too much because it will damage the front left driveshaft bolt.**

8. Remove the lower left mounting bolt.



03U0NX-818

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.



03U0NX-819

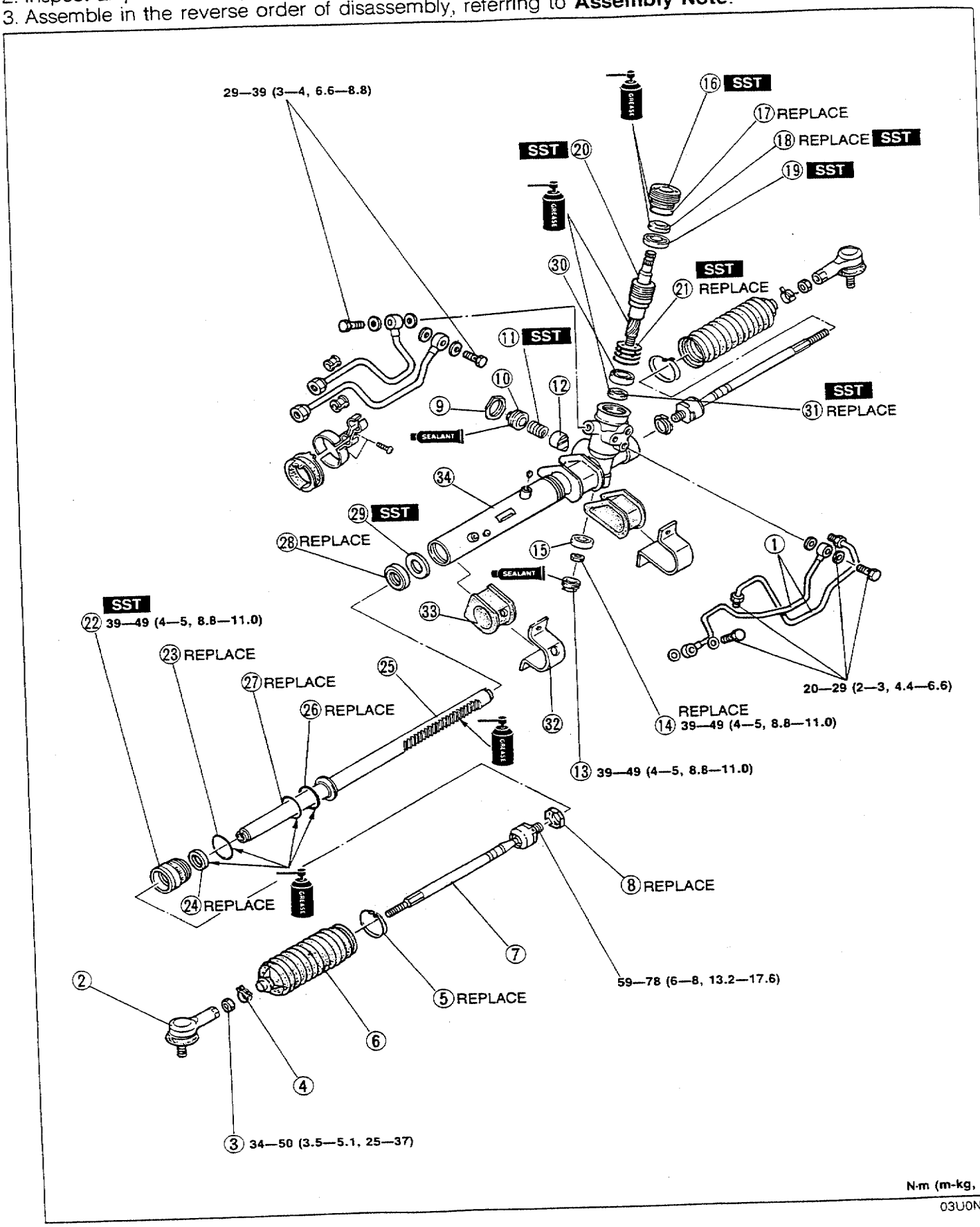
Installation note
Bolt (Steering gear mounting bolt)

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)

N·m (m-kg, ft-lb)

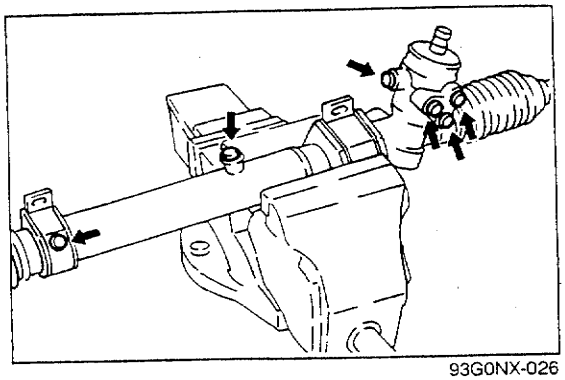
Disassembly / Inspection / Assembly

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**.



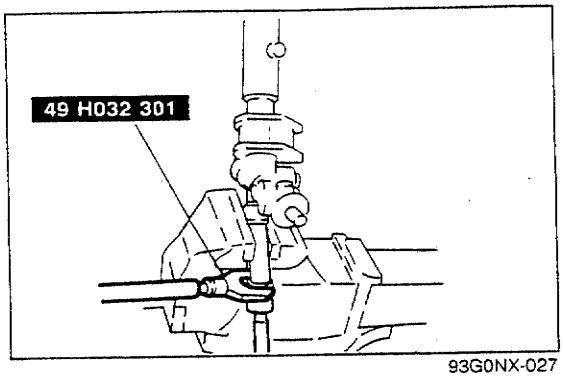
1. Oil pipe
   Disassembly note ..... page N–12
2. Tie-rod end
3. Locknut
4. Boot band
5. Boot wire
6. Boot
7. Tie-rod
   Disassembly note ..... page N–12
   Inspect for damage
   Inspect operation of ball joint
8. Washer
9. Locknut
   Disassembly note ..... page N–12
10. Adjusting cover
    Assembly note ..... page N–16
11. Spring
12. Support yoke
13. Housing cover
    Disassembly note ..... page N–12
14. Locknut
15. Bearing
    Inspect for wear and operation
16. Plug
    Disassembly note ..... page N–12
    Inspection ..... page N–14
    Assembly note ..... page N–15
17. O-ring
18. Oil seal
    Disassembly note ..... page N–13
19. Bearing
    Disassembly note ..... page N–13
    Inspect for wear and operation
20. Pinion shaft assembly
    Inspect for damage and wear
21. Seal ring
    Assembly note ..... page N–15
22. Outer box assembly
    Disassembly note ..... page N–13
    Assembly note ..... page N–14
23. O-ring
24. U-gasket
25. Steering rack
    Inspection ..... page N–14
    Assembly note ..... page N–14
26. Seal ring
27. O-ring
28. Oil seal
    Disassembly note ..... page N–13
29. Inner guide
    Disassembly note ..... page N–13
30. Bearing
    Inspect for wear and operation
31. Oil seal
    Assembly note ..... page N–15
32. Mounting bracket
33. Mounting rubber
34. Gear box
    Inspect for damage and crack

03U0NX-821


93G0NX-026

Disassembly note
Oil pipe

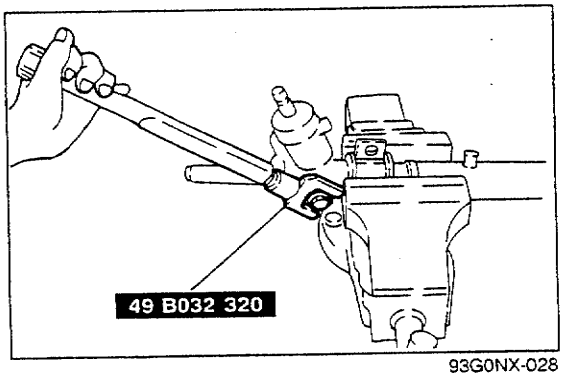
Caution
- **After disconnecting the pipes, use a plug or adhesive type tape to seal each port to prevent the entry of foreign materials.**



93G0NX-027

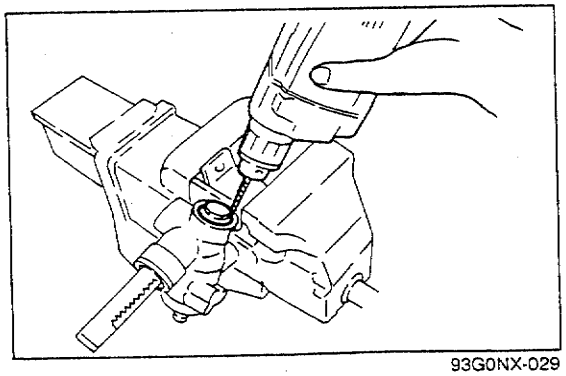
Tie-rod
1. Use the **SST** to remove the tie-rod.

Caution
- **To avoid scratching the rack, secure the rack in a vise protected with brass pads or cloth.**



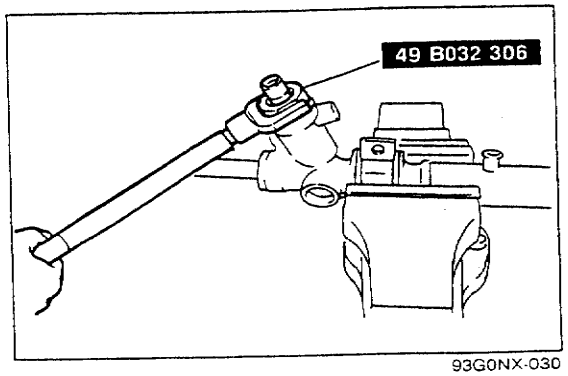
93G0NX-028

Locknut
1. Use the **SST** to remove the locknut.


93G0NX-029

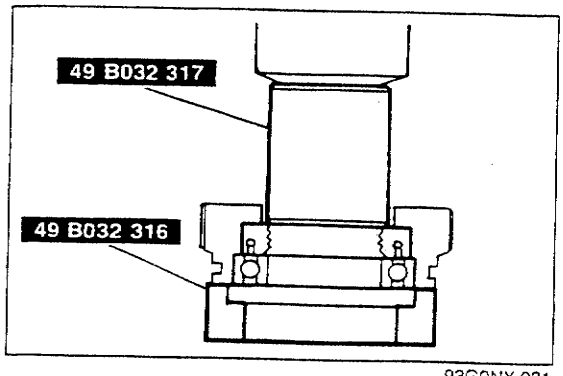
Housing cover
1. Use a drill (ϕ1.5mm (0.06 in)) to make a recessed area (approx. 1.5mm (0.06 in)) at the punch-crimped part of the threaded part.

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.



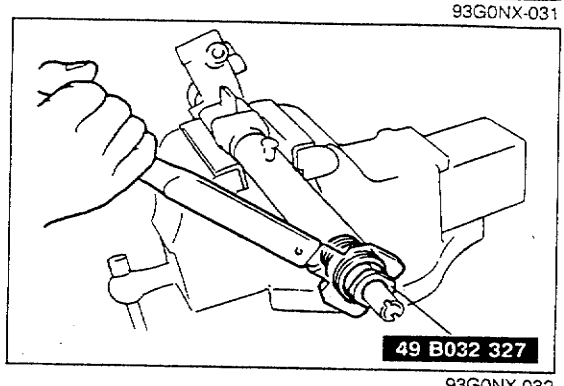
93G0NX-031

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.**



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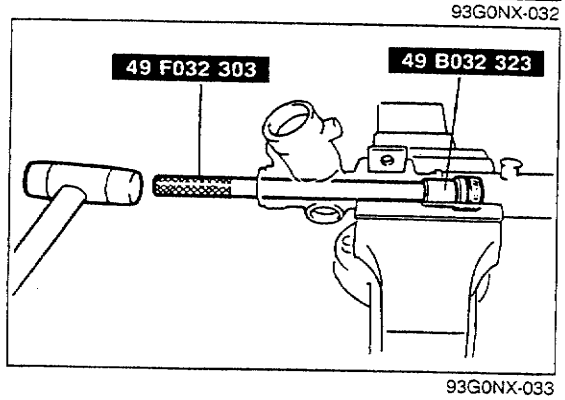
Outer box assembly

1. Use the **SST** to remove the outer box.



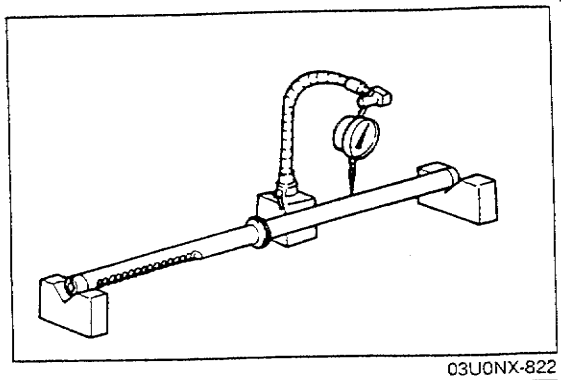
93G0NX-033

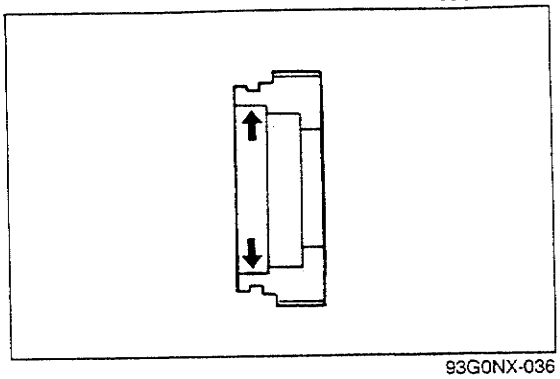
Oil seal and inner guide

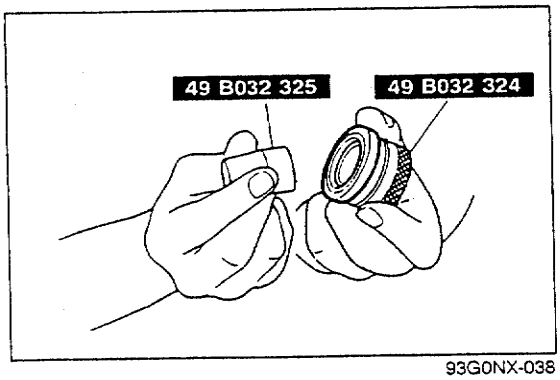
1. Use the **SST** to remove the oil seal and inner guide toward the cylinder side.

Caution

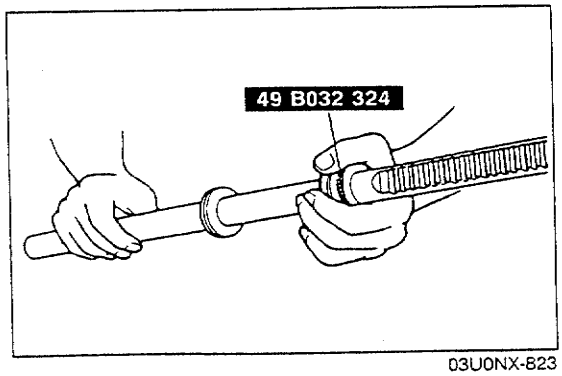
- **The oil seal can not be reused.**


03U0NX-822

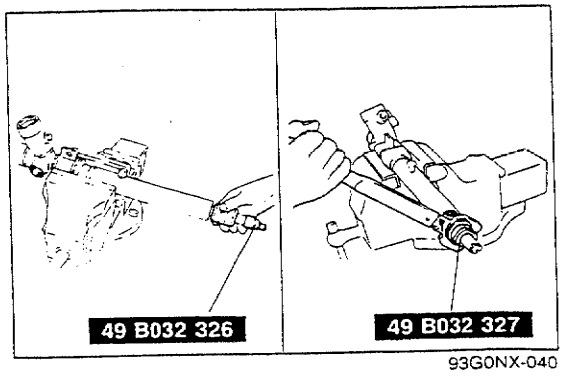

93G0NX-036



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

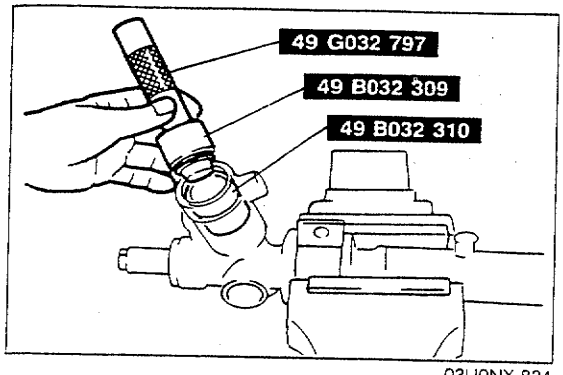
1. Install a new oil seal and new seal ring to the rack's piston.
2. After installing the seal ring, seat it properly at the piston circumference.
3. Install the oil seal and inner guide to the **SST**.
4. Using the **SST**, place the oil seal and inner guide at the edge of the steering rack's pinion.
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/cm^2, 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.



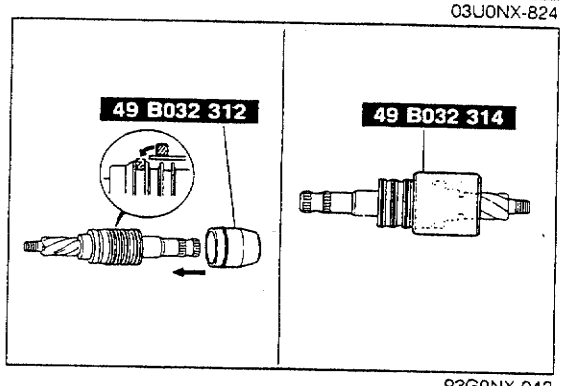
03U0NX-824

Oil seal

1. Use the **SST** to install a new oil seal to the gear housing.

Note

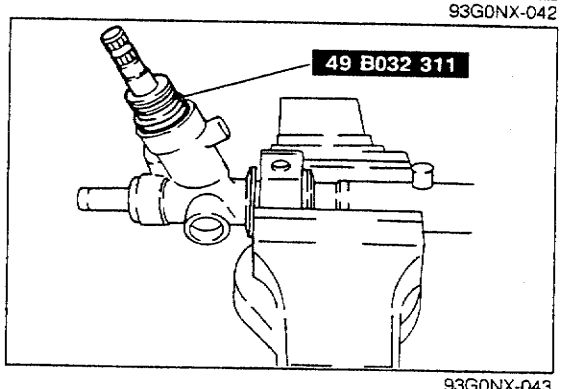
- **Apply grease to the oil seal.**



93G0NX-042

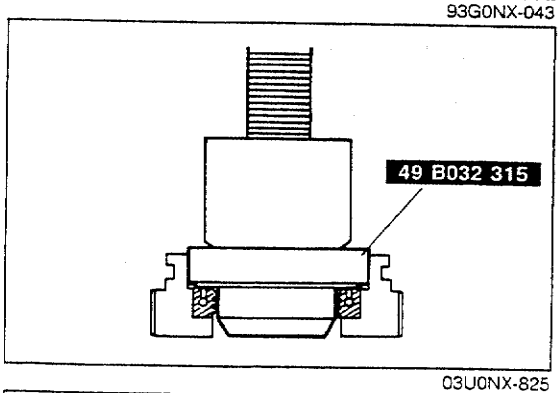
Seal ring

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.



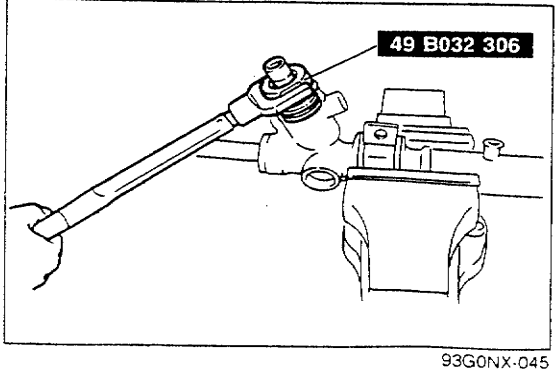
03U0NX-825

Plug

1. Use the **SST** to press in a new oil seal.
2. Press in by placing the flat plate against the bearing.

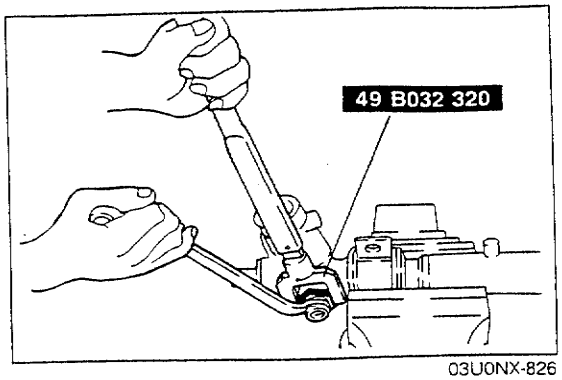
Caution

- **Apply grease to the oil seal and bearing.**

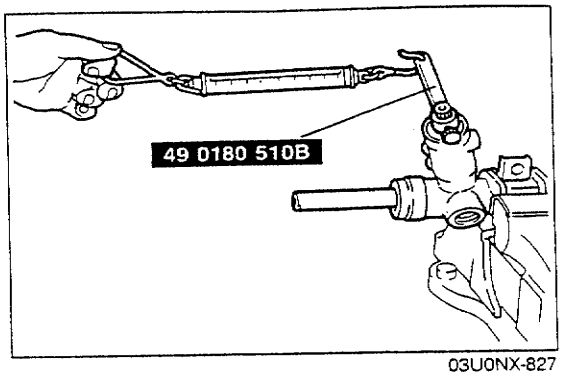


93G0NX-045

3. Use the **SST** to tighten the plug to the gear housing.



03U0NX-826



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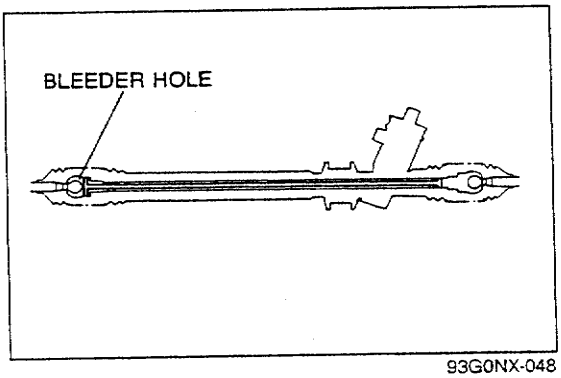

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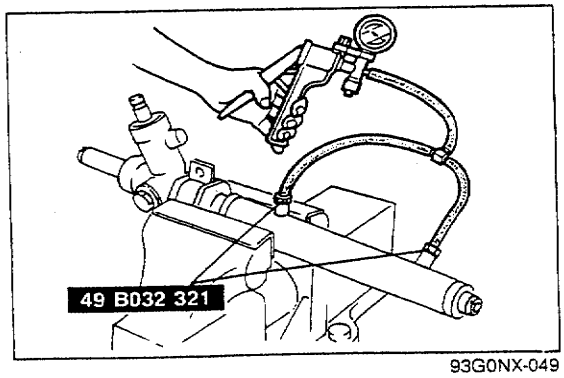


93G0NX-049

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.**

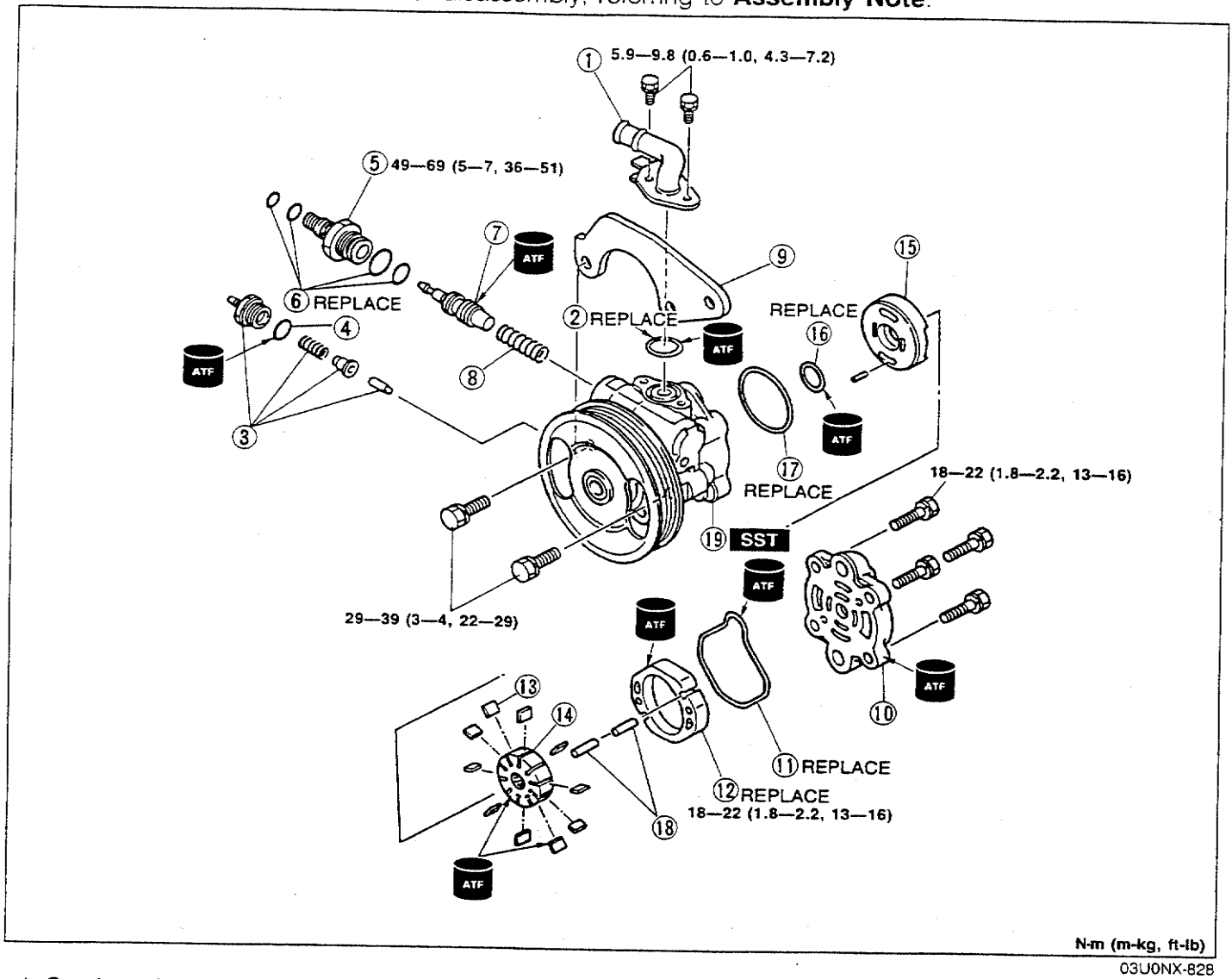
Cylinder air-tightness check

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

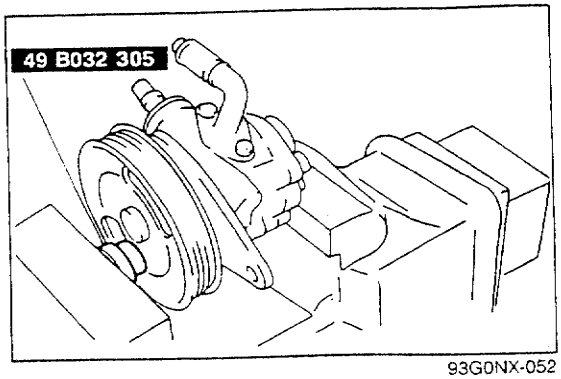
Disassembly / Inspection / Assembly

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**.



03U0NX-828

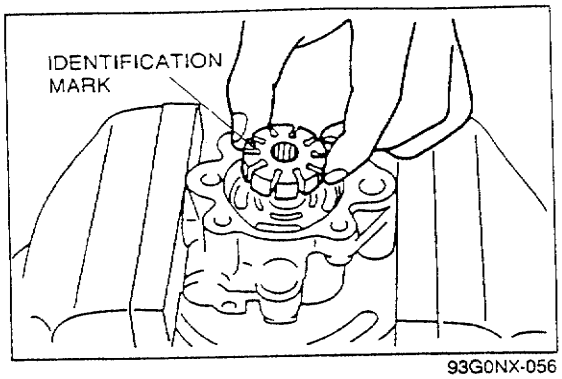
1. Suction pipe
2. O-ring
3. Pressure-switch assembly
4. O-ring
5. Connector
6. O-ring
7. Control valve
   Inspect for damage and wear
8. Spring
   Inspect for damage
9. Bracket
10. Pump body (rear)
    Inspect for damage and wear
11. O-ring
12. Cam ring
    Inspect for damage and wear
    Assembly note ..... page N–18
13. Vane
    Inspect for damage and wear
    Assembly note ..... page N–18
14. Rotor
    Inspect for damage and wear
    Assembly note ..... page N–18
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

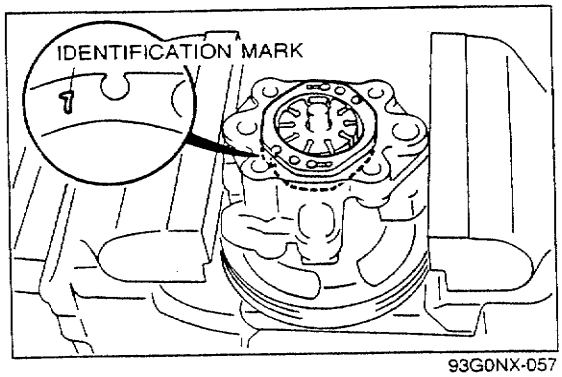
Disassembly note
Oil pump

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.



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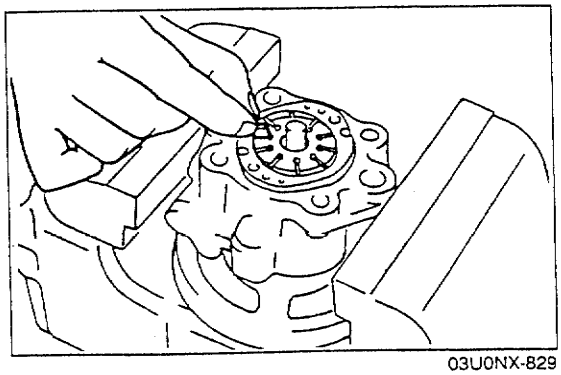
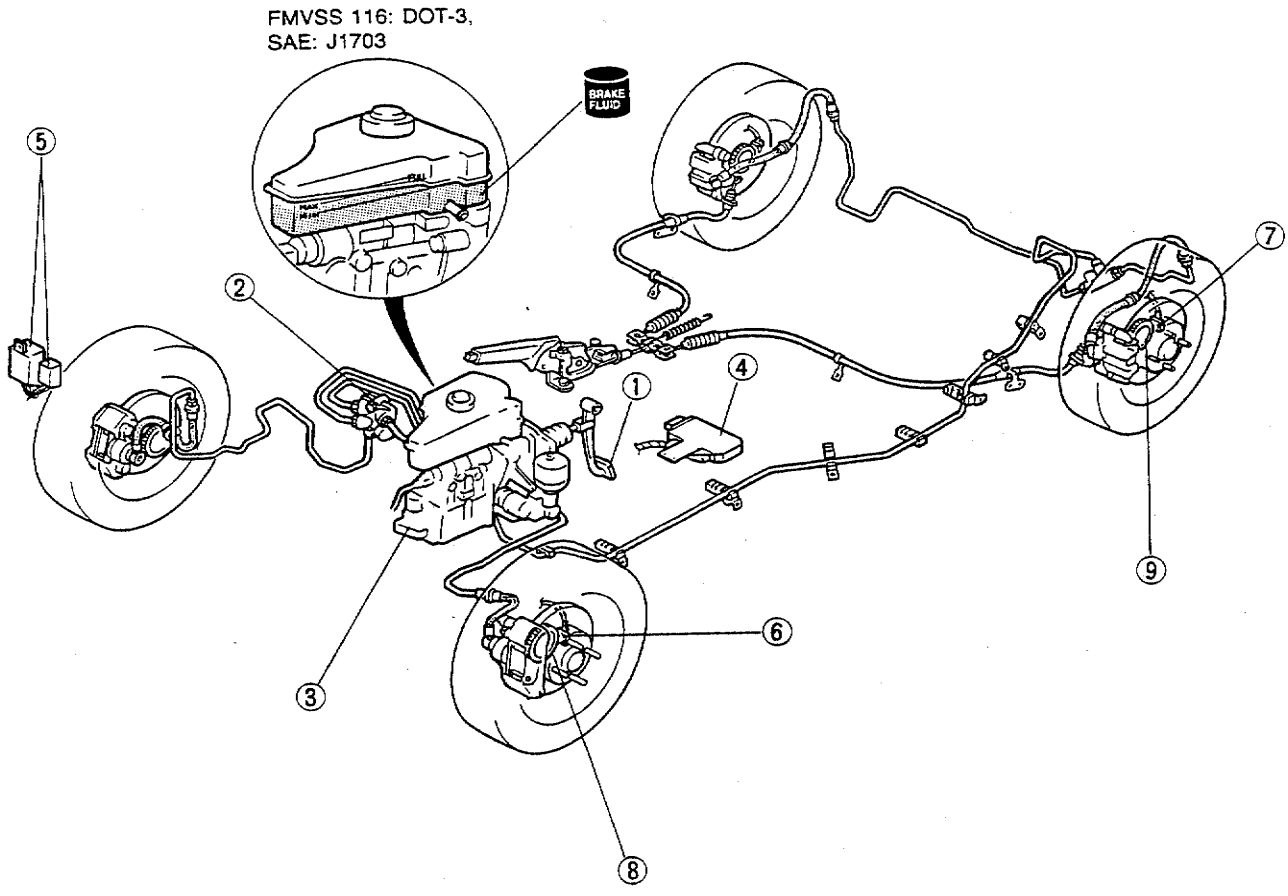
Cam ring
1. Install the cam ring so that its identification mark is facing downward.


03U0NX-829

Vane
1. Install the vanes (10 pieces) to the rotor, with the R part of the vanes facing outward.

BRAKING SYSTEM

INDEX



93G0PX-702

OUTLINE

OUTLINE OF CONSTRUCTION

1. A compact 4-wheel anti-lock brake system (ABS) is equipped for 323 4WD models (Switzerland).

93G0PX-703

SPECIFICATIONS

Item		Specification
Brake pedal	Type	Suspended
	Pedal lever ratio	(a): 4.1, (b): 4.2
	Max. stroke mm (in)	(a): 140 (5.51), (b): 131 (5.16)
Master cylinder (without ABS)	Type	Tandem (with level sensor)
	Cylinder inner diameter mm (in)	(c): Standard type: 22.22 (0.875) (d): Recessed type: 23.81 (0.937)
Front disc brake	Type	Ventilated disc (integral)
	Cylinder bore mm (in)	54 (2.13)
	Pad dimensions (area x thickness) mm^2 (in^2) x mm (in)	(e): 3,800 (5.89) x 10 (0.39) (f): 4,300 (6.66) x 10 (0.39)
	Disc plate dimensions mm (in) (outer diameter x thickness)	(e): 235 x 22 (9.25 x 0.87) (f): 257 x 22 (10.12 x 0.87)
Rear disc brake	Type	Solid disc (mounting support)
	Cylinder bore mm (in)	30.2 (1.19)
	Pad dimensions (area x thickness) mm^2 (in^2) x mm (in)	(a): 2,600 x 8.0 (4.03 x 0.31) (b): 2,600 x 7.5 (4.03 x 0.30)
	Disc plate dimensions mm (in) (outer diameter x thickness)	(e): 231 x 9 (9.09 x 0.35) (f): 251 x 9 (9.88 x 0.35)
Power brake unit	Type	Without ABS: Vacuum multiplier With ABS: Hydraulic multiplier
	Diameter mm (in) (without ABS)	(c): Single diaphragm: 214 (8.43) (d): Tandem diaphragm: 188.4 (7.42) + 215.2 (8.47)
Braking force control device	Type	Dual proportioning valve
Brake fluid		FMVSS 116: DOT-3 SAE: J1703
Parking brake	Type	Mechanical two-rear-wheel control
	Operation system	Center lever

93G0PX-704

(a): Except Australia
(b): Australia
(c): BP EGI MTX models
(d): BP EGI ATX and BP DOHC models
(e): BP EGI MTX (Except Australia)
(f): BP EGI MTX (Australia), BP EGI ATX and BP DOHC models

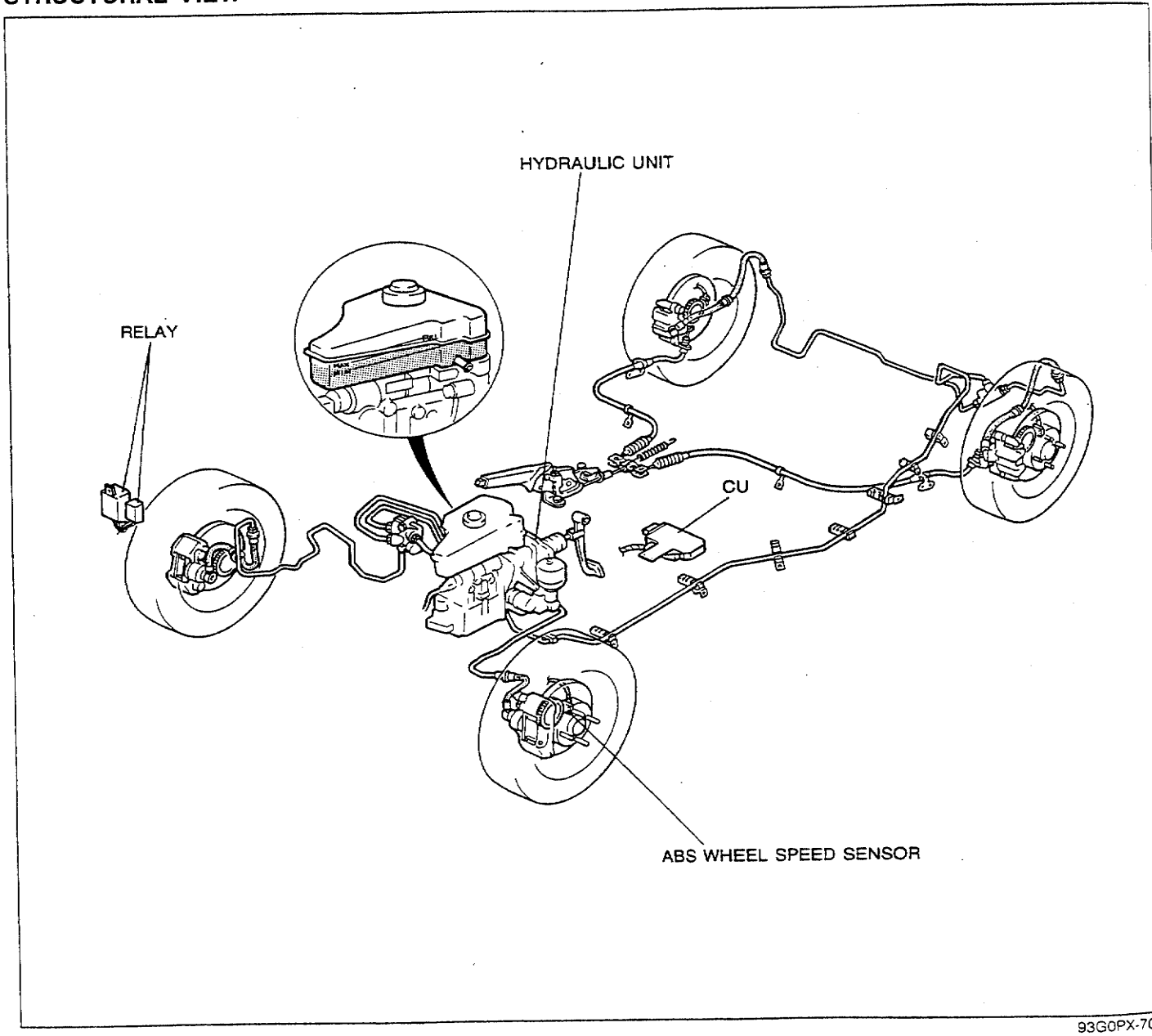
ANTI-LOCK BRAKE SYSTEM (ABS)

OUTLINE

- The anti-lock brake system (ABS) is an electronically-controlled brake system that controls the hydraulic pressure to the disc brake calipers to prevent wheel lockup and to control vehicle stability and steerability during hard braking or on slippery road surfaces.
- The ABS hydraulic unit and brake master cylinder are mounted in tandem. The two units work together during normal and anti-lock operation braking. The ABS hydraulic unit also functions as a power booster for the master cylinder.
- The ABS is an independent front-wheel-control, rear-axle-control (select low control), four-sensor, three-channel system. The main components are the master cylinder/hydraulic unit, (MC/HU) ABS control unit, four wheel-speed sensors and rotors, and two relays.

93G0PX-705

STRUCTURAL VIEW



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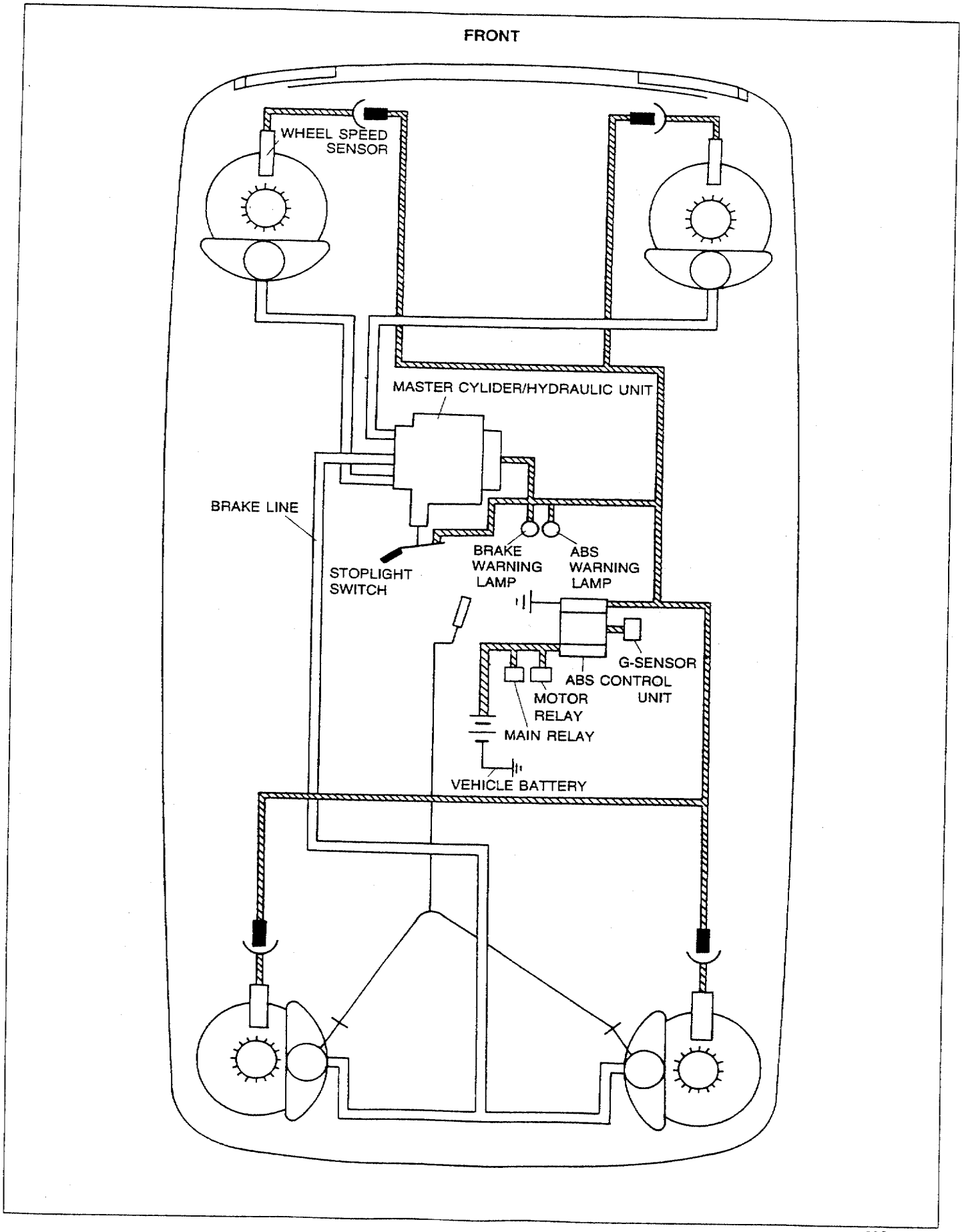
Note

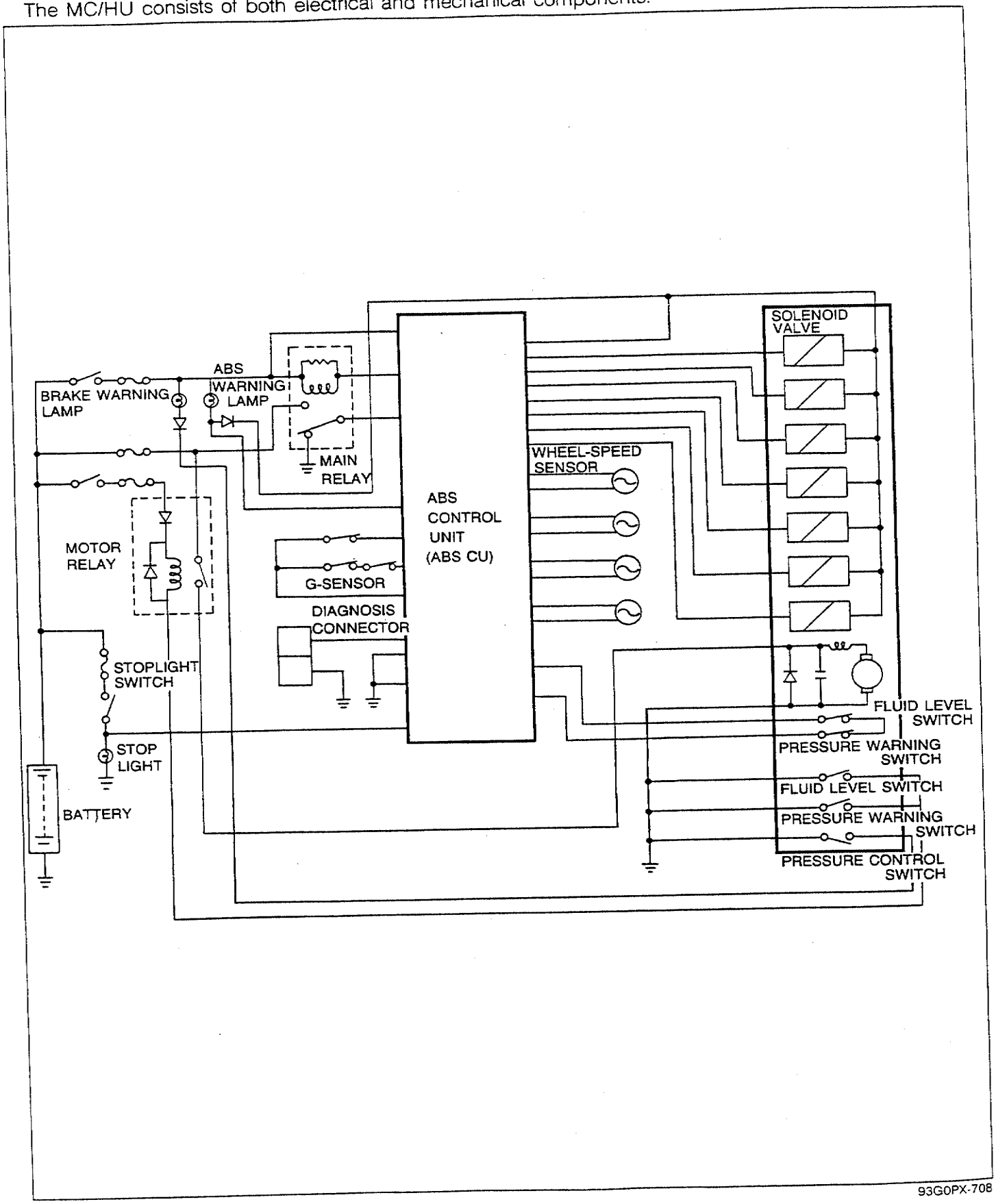
- **Select low control is a method that controls the hydraulic pressure of both rear brakes by comparing rear wheel speeds and then controlling the hydraulic pressure based on the side which is in greater danger of locking.**

SYSTEM DIAGRAM



ABS CIRCUIT DIAGRAM

- The electrical system of the ABS consists of the ABS control unit, wheel-speed sensors, relays, MC/HU warning lamps, and related wiring harnesses.
  The MC/HU consists of both electrical and mechanical components.



93G0PX-708

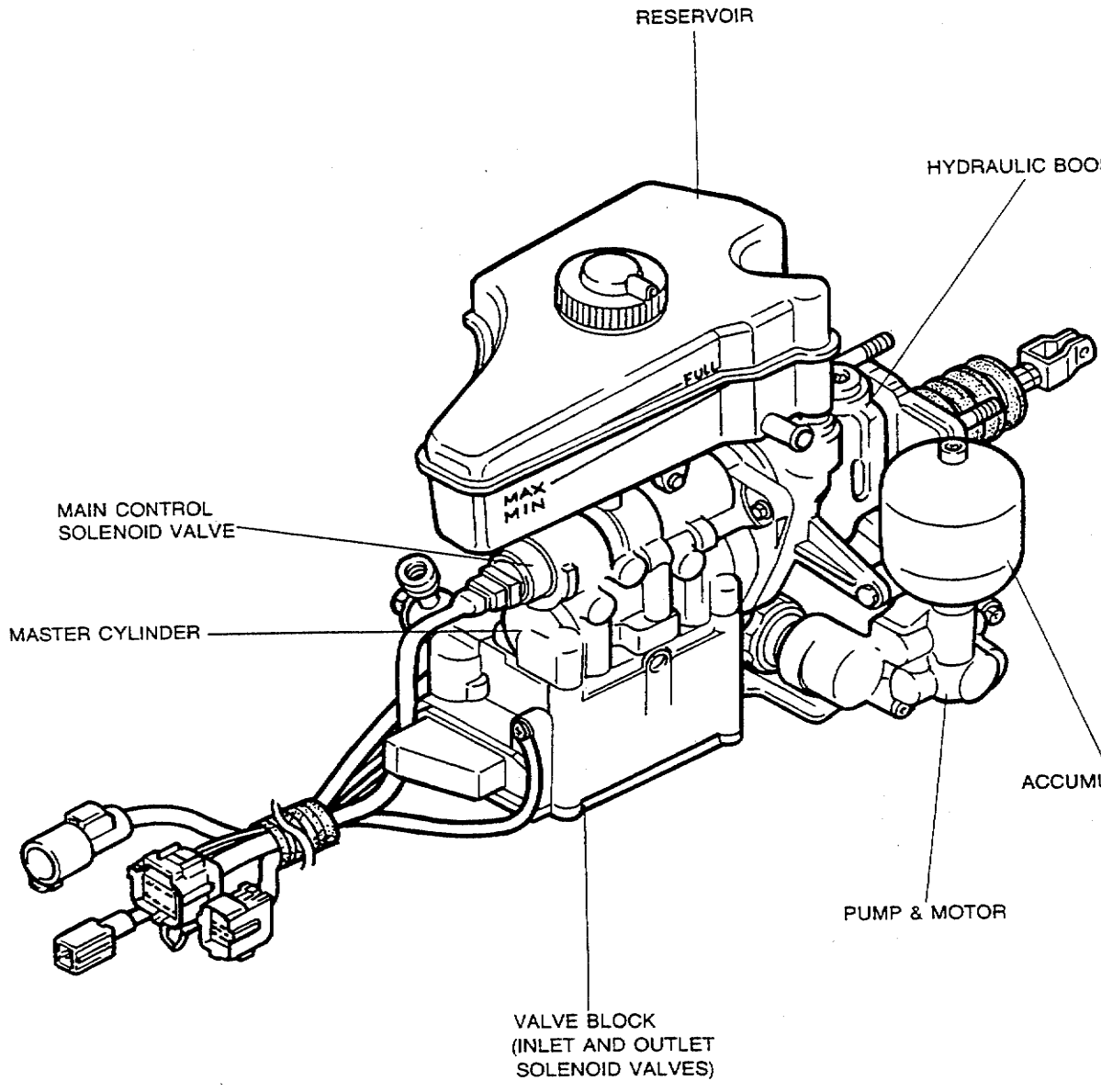
MAJOR COMPONENTS AND FUNCTION

Parts	Function
Wheel-speed sensor and rotor	• Creates rotational speed signal of wheels, and relays this data as electrical signals to ABS control unit
ABS control unit (ABS C/U)	• Receives and computes signals from ABS wheel-speed sensor; judges situation of wheel; and relays this data as electrical signals to CU for control of hydraulic fluid pressure to prevent wheel lockup during braking • Basic circuits of the unit are: 1) Operating circuit 2) Control circuit 3) Fail-safe circuit • In the event of ABS malfunction, fail-safe function allows normal braking operation and causes ABS warning lamp to illuminate
Master cylinder/hydraulic unit assembly	• Applies and controls hydraulic pressure applied to each brake caliper in accordance with signals from control unit The four pressure control operations are: 1) Normal 2) Pressure-reduction 3) Pressure-retention 4) Pressure-increase
Relay box	• Controls electrical circuit to master cylinder/hydraulic unit, solenoid valves and motor
G-sensor	• Senses deceleration rate of vehicle

93G0PX-709

MASTER CYLINDER/HYDRAULIC UNIT

- The master cylinder/hydraulic unit consists of the hydraulic booster, master cylinder (including main control solenoid valve) and valve block (three pairs of inlet and outlet solenoid valves).
- During ABS operation, the ABS control unit controls the hydraulic pressure of the hydraulic unit by switching the main control solenoid ON and the inlet and outlet solenoids ON and OFF to control the pressure of fluid in the brake calipers.



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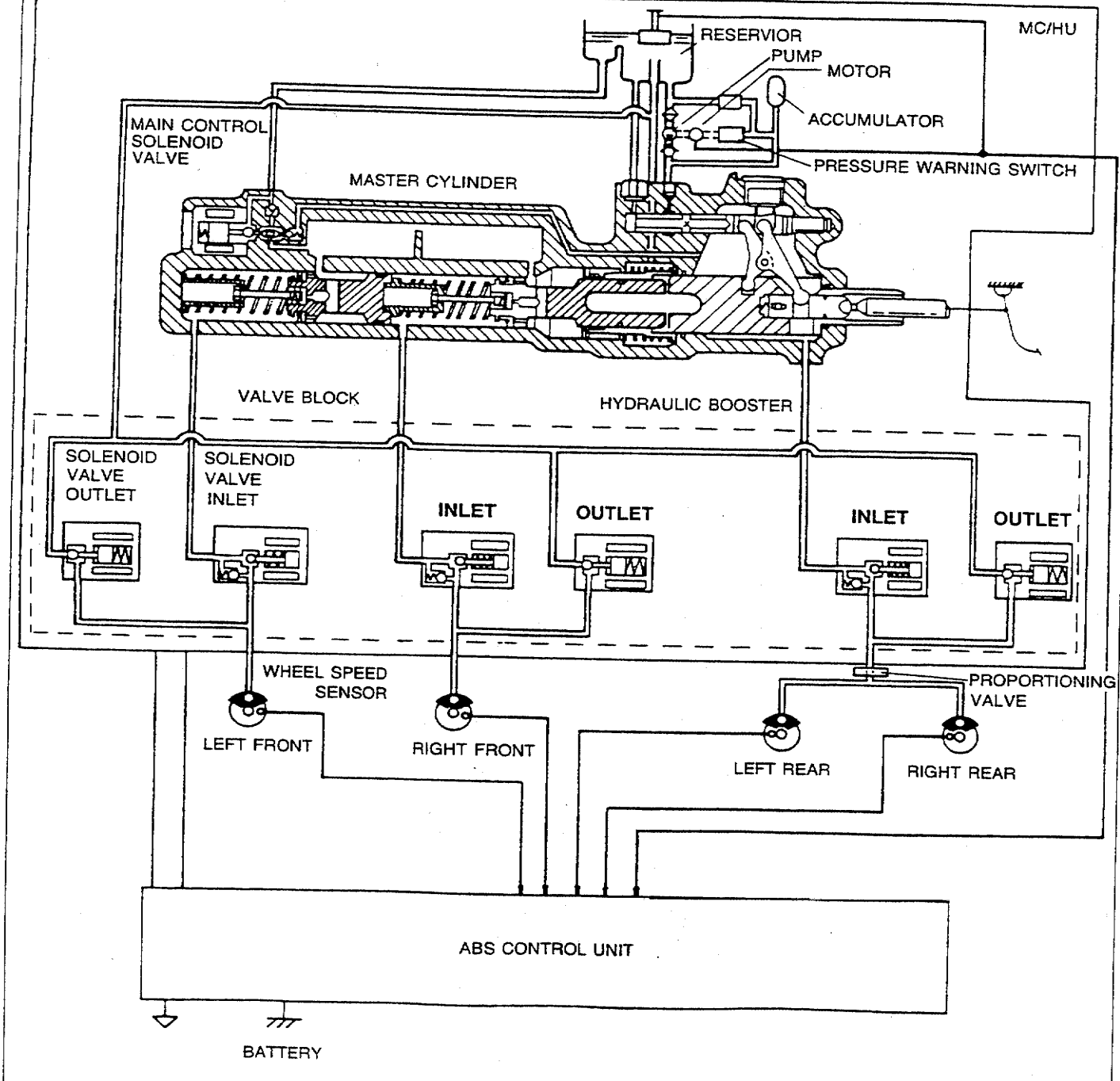
Hydraulic Circuit Structural View



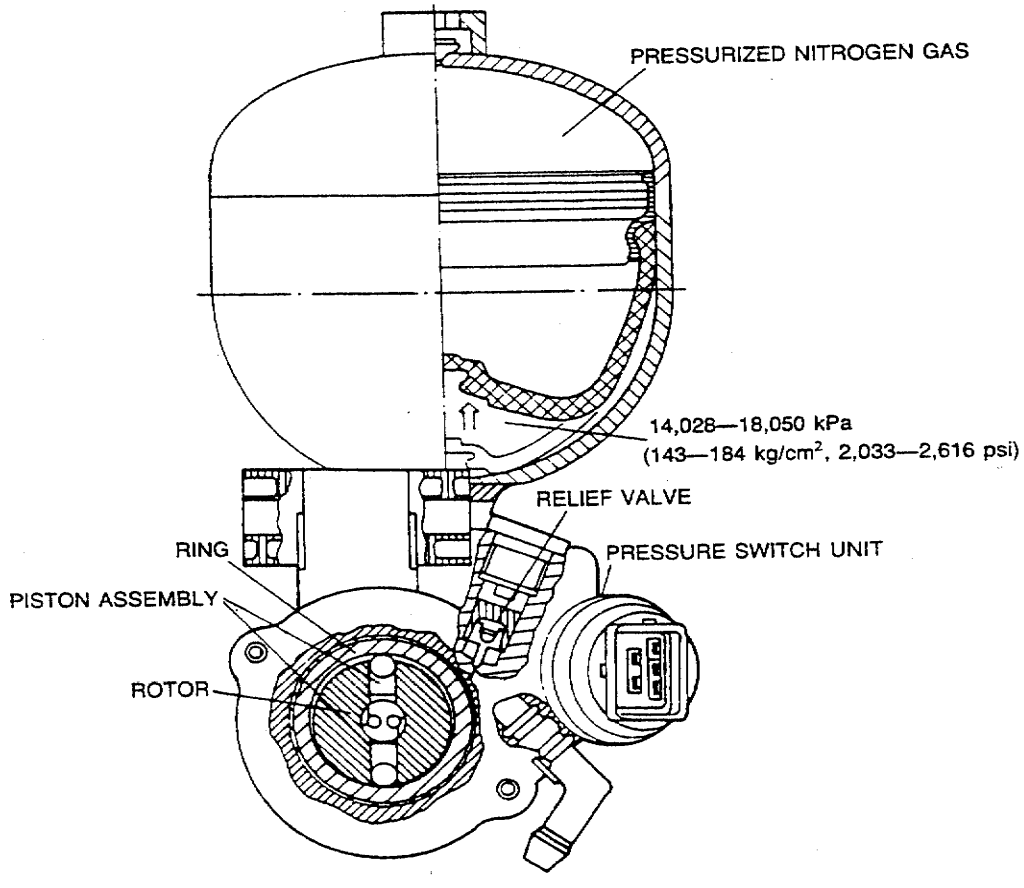
Hydraulic Pump and Accumulator

Hydraulic pump

- The hydraulic pump is an eccentric ring type electric pump which is activated by 12V through the motor relay and the pump control switch (within the pressure switch unit). The pump runs frequently at short periods of time to charge and maintain the pressure of the brake fluid in the accumulator at 14,028—18,050 kPa (143—184 kg/cm^2, 2,033—2,616 psi) and to supply high-pressure brake fluid to the service brake system. The integral relief valve opens at 23,054 kPa (235 kg/cm^2 3,342 psi) to allow pressurized fluid to escape to the reservoir in the event of a failure of the pressure control switch at the upper limit. The pump is electrically independent of the ABS control unit to assure hydraulic boost to the service brake system even if there is a malfunction of the ABS control unit.

Accumulator

The accumulator contains pressurized nitrogen gas and a rubber diaphragm.
It accumulates the brake fluid pressurized by the hydraulic pump. During normal braking the accumulator supplies pressurized brake fluid to the booster and the rear brakes. During ABS operation, it also supplies pressurized brake fluid to the front brakes.
The fluid pressure is maintained at **approx. 14,028—18,050 kPa (143—184 kg/cm^2, 2,033—2,616 psi)**.



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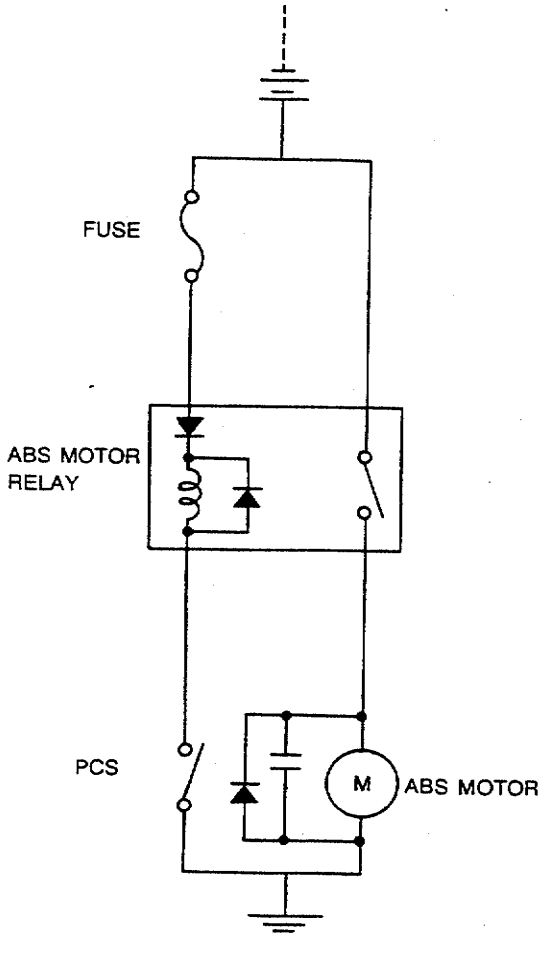
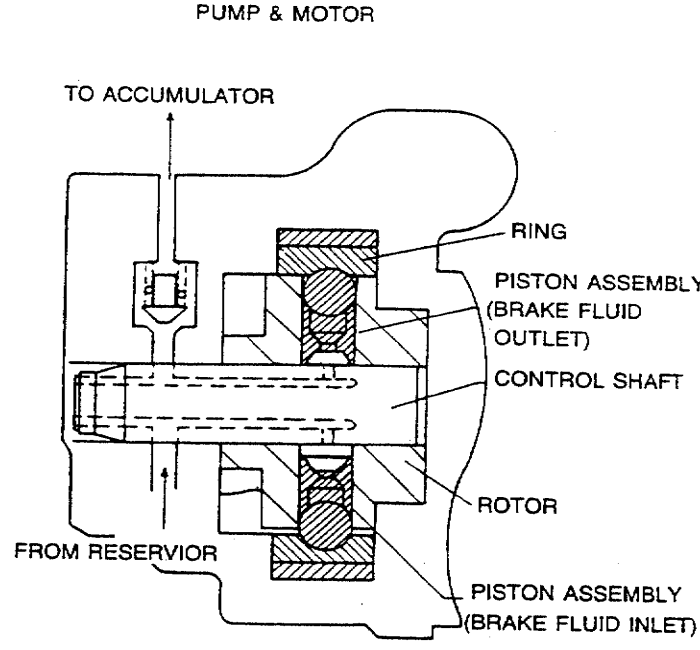
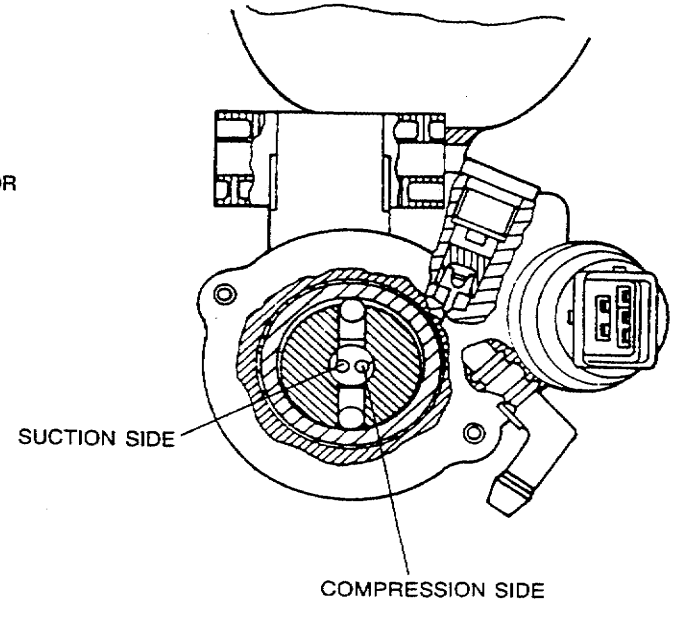
Hydraulic Pump Control

The hydraulic pump is electrically independent of the ABS control unit.
It is controlled by the pressure control switch (PCS) incorporated in the pressure switch unit.

- When the accumulator pressure drops below 12,753—14,715 kPa (130—150 kg/cm^2, 1,849—2,133 psi), the PCS comes ON and activates a motor relay. It supplies current to the hydraulic pump, thus pumping brake fluid to the accumulator.
- When the accumulator pressure reaches 15,696—18,639 kPa (160—190 kg/cm^2, 2,275—2,702 psi), the PCS turns OFF and stops the hydraulic pump.







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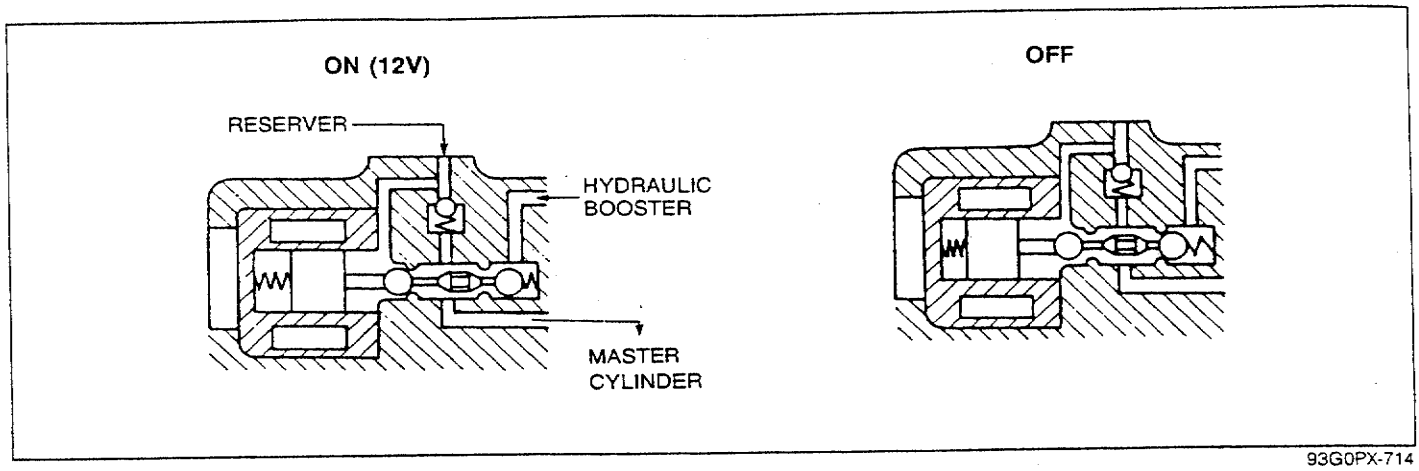
Solenoid Valves

- The various solenoid valves control hydraulic pressure to the brake calipers as controlled by the ABS control unit.

Main Control Solenoid Valve

- When current flows, the valve closes the passage between the reservoir and the master cylinder, and at the same time, opens the passage between the hydraulic booster and the master cylinder.
- When there is no current, the valve is pushed by spring force and opens the passage between the reservoir and the master cylinder, and closes the passage between the hydraulic booster and the master cylinder.



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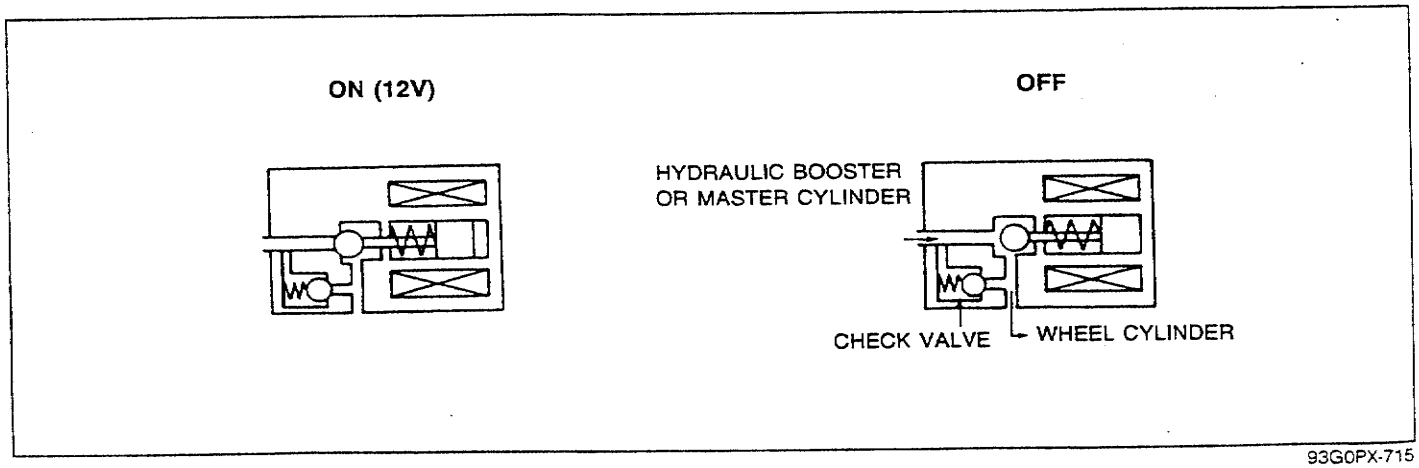
Inlet Solenoid Valves

- When current flows, the valve is closed, closing the passages between the master cylinder and the front brake calipers and between the hydraulic booster and rear brake calipers.
  It the hydraulic pressure in the brake caliper is higher than that of the master cylinder or hydraulic booster, the check valve in the solenoid valve opens to reduce the pressure to the same level as that of the master cylinder or hydraulic booster.
- When there is no current, the valve is opened, opening the passages between the master cylinder and the front brake calipers and between the hydraulic booster and the rear brake calipers.



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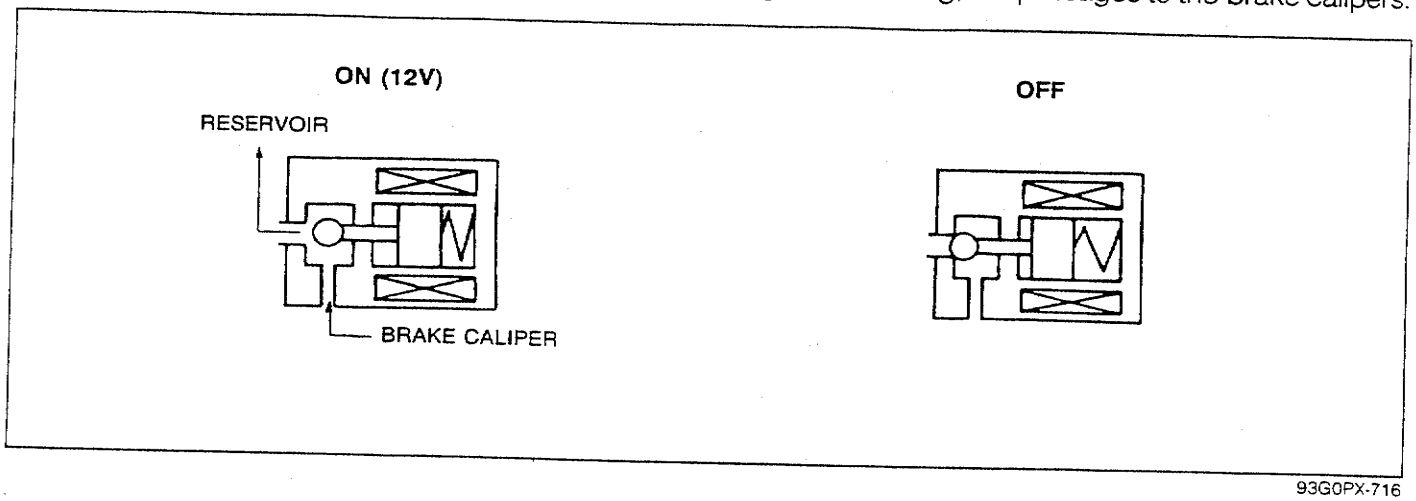
Outlet Solenoid Valve

- When current flows, the valves open the passages between the reservoir and the front and rear brake calipers.
- When there is no current, the valves are closed by spring force, closing, the passages to the brake calipers.



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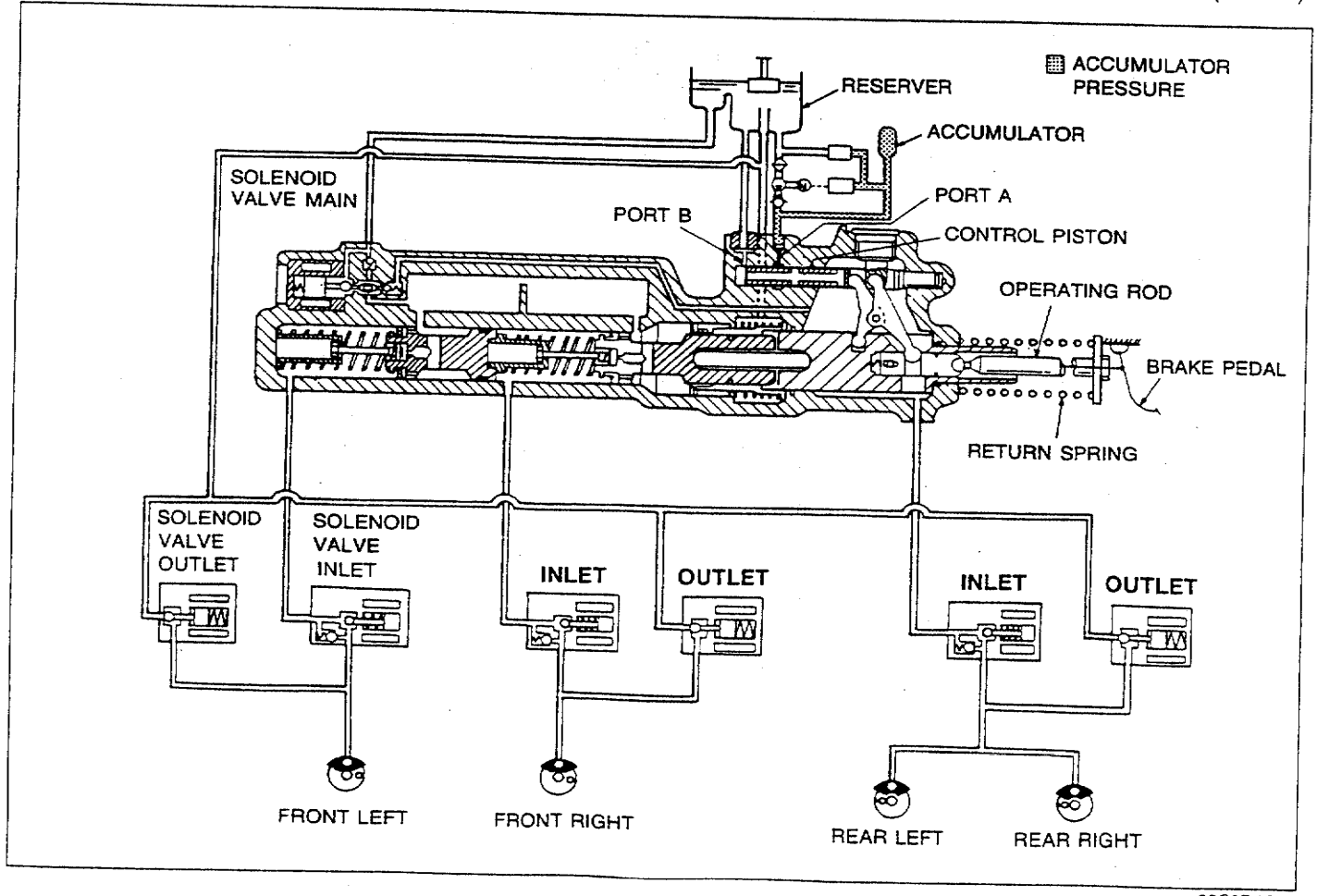
SYSTEM OPERATION

No Braking

- Accumulator pressure is available at the control piston in the hydraulic booster. Because there is no pressure on the operating rod, the control piston is closed by spring force, closing port A to the hydraulic booster and the rear brake calipers.
- Port B is open, allowing the fluid pressure in the reservoir and front brake calipers to be equal (atmospheric pressure).
- In this condition, all inlet solenoid valves are OFF (open) and all outlet solenoid valves are OFF (closed).



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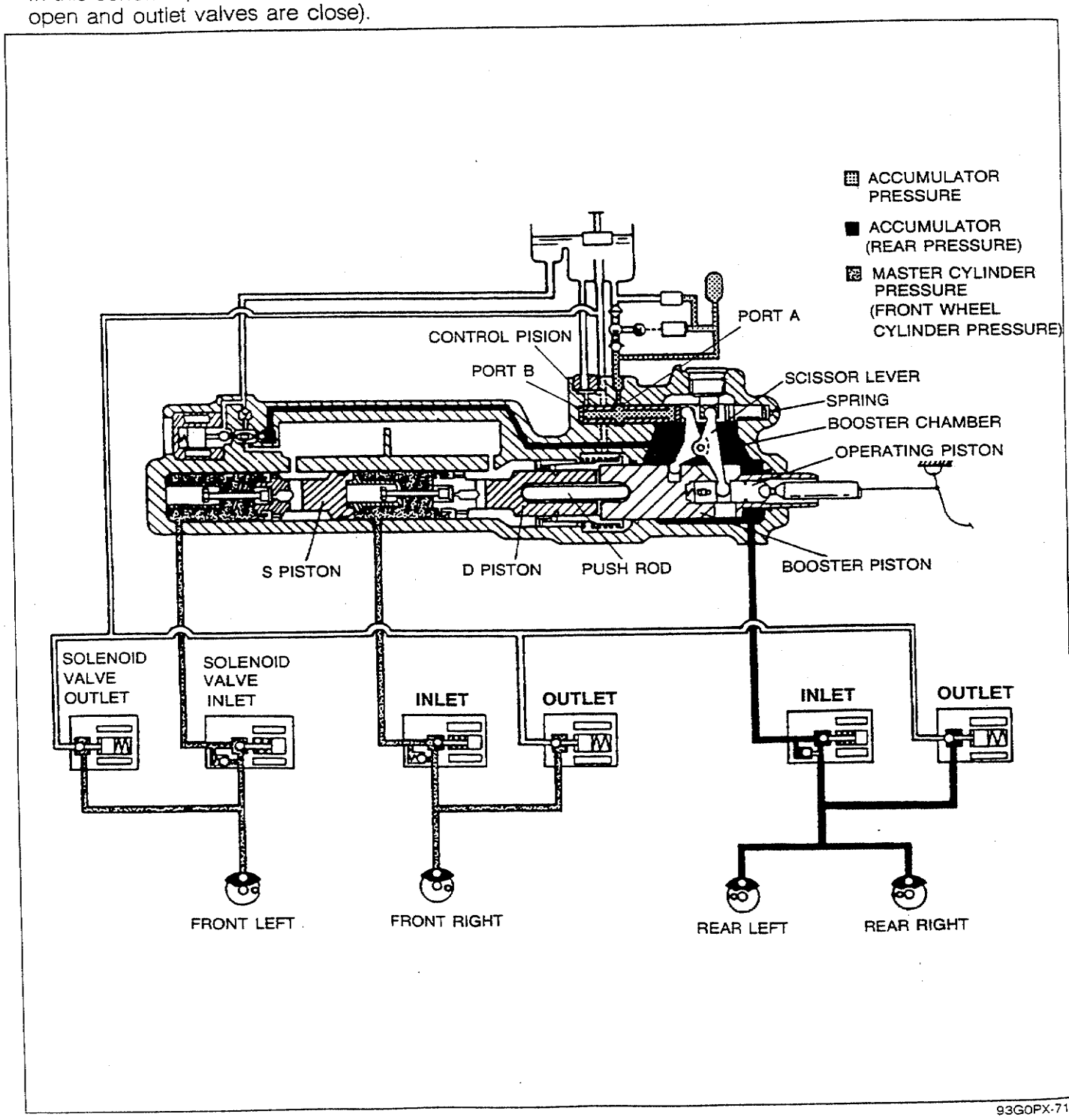
Normal Braking

- In this mode, normal power-assisted braking occurs.
- As the brake pedal is depressed, the operating piston is moved forward, pushing the scissor lever mechanism. This movement pushes the control piston to close port B and open port A, causing accumulator pressure to enter the booster chamber of the booster unit and to flow through the open inlet solenoid valve to the rear brake calipers.
- The accumulator pressure also pushes against the back of the booster piston to push it forward, pushing the master cylinder pistons (S-and D-piston) forward. Booster piston movement pulls back the control piston and closes the port A at where the booster chamber pressure balances with the combined force of the front wheel cylinder pressure and the return spring pushing against the S-and D-pistons. Booster chamber pressure thus actuates the front brake calipers through the open inlet solenoid valves.
- In this condition, all inlet and outlet solenoid valves are the same as no braking (OFF—inlet valves are open and outlet valves are close).



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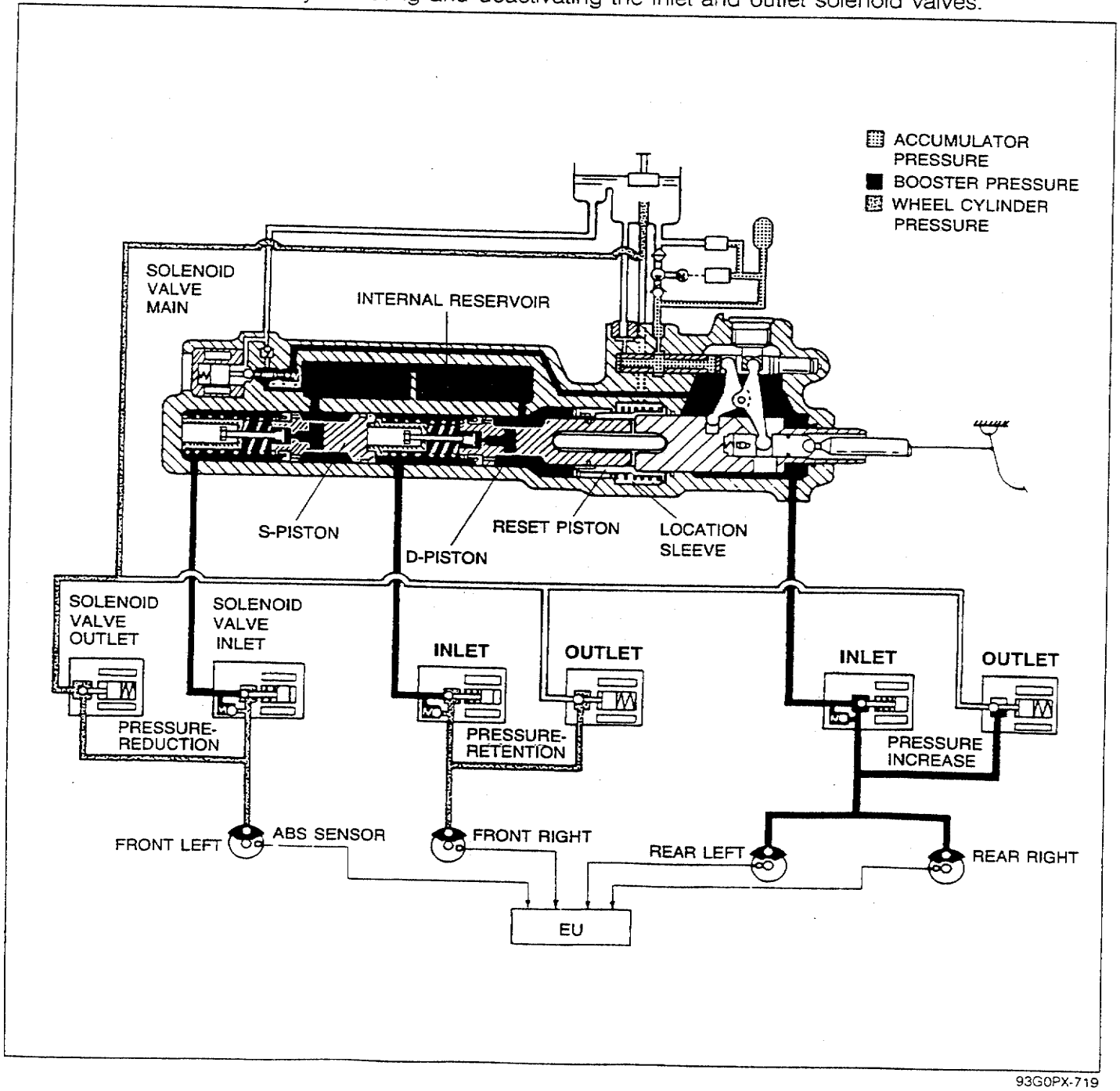
Switching from Normal Braking to ABS Operation

- As the ABS control unit has determined that lockup of one or more wheels is possible, the control unit closes the necessary inlet solenoid valve(s).
  If the control unit has determined that lockup is still possible, the control unit activates the main solenoid valve at the first pressure-reduction command. This allows booster chamber pressure to flow to the internal reservoir circuit and isolates all brake hydraulic circuits from the effects of brake pedal movement during ABS operation.
- Booster chamber pressure then causes fluid to flow from the internal reservoir circuit, through the outside of master cylinder piston holes and the inlet solenoid valves, to the front wheel cylinders.
- The brake fluid chambers at the backside of the master cylinder D-piston as well as in the frontside of the master cylinder S-piston are now subjected to booster chamber pressure and push the reset piston and the D-piston to the right. They then push against the booster piston to return the brake pedal to nearly the starting (at rest) position. This provides an adequate brake pedal stroke (master cylinder stroke) in the event of a malfunction in the anti-lock brake system.
- In the mean time, the switching from normal braking condition to ABS operation is made. The ABS operation will be carried out by activating and deactivating the inlet and outlet solenoid valves.



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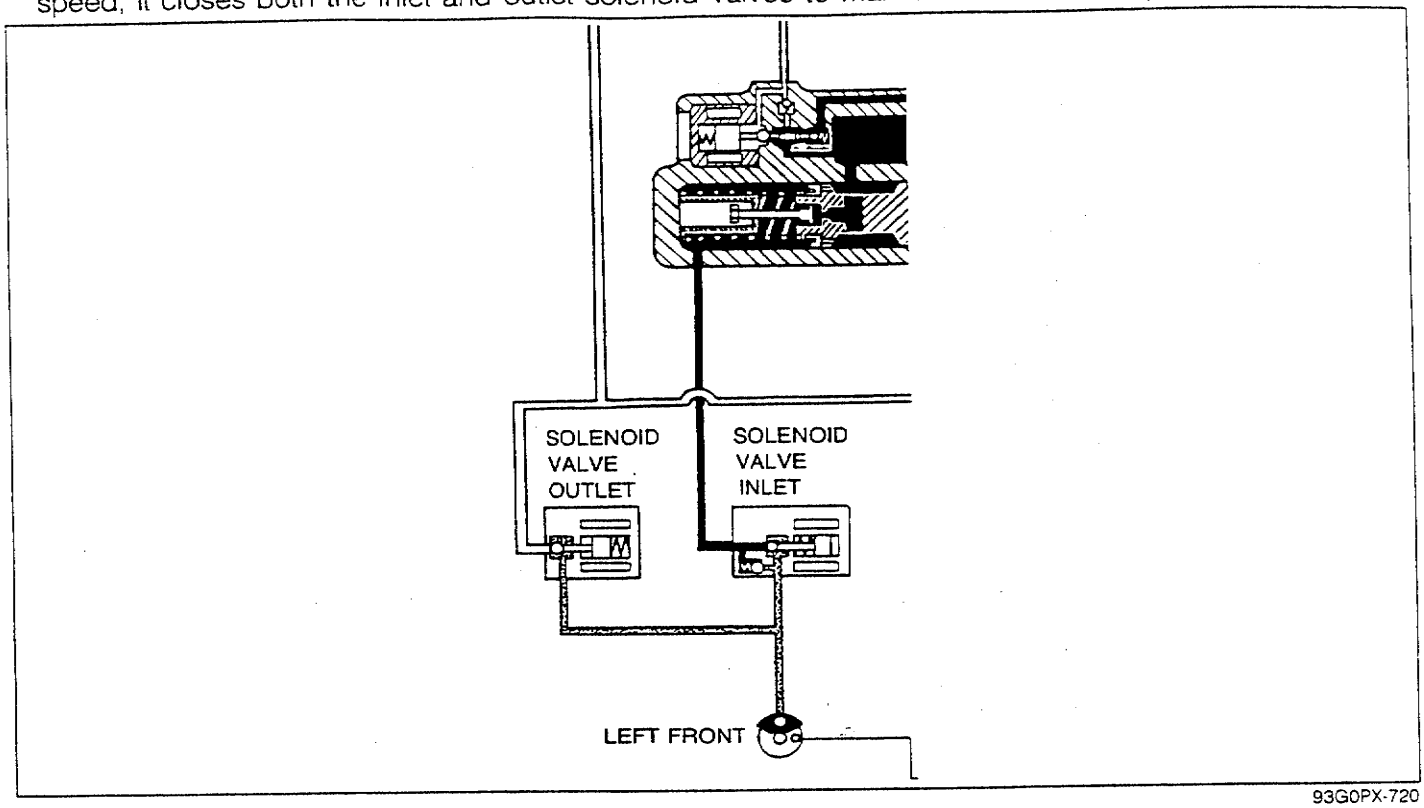
ABS Operation

Pressure retention

- If the ABS control unit senses that the wheel speed is appropriate for the estimated vehicle deceleration speed, it closes both the inlet and outlet solenoid valves to maintain the brake caliper pressure.



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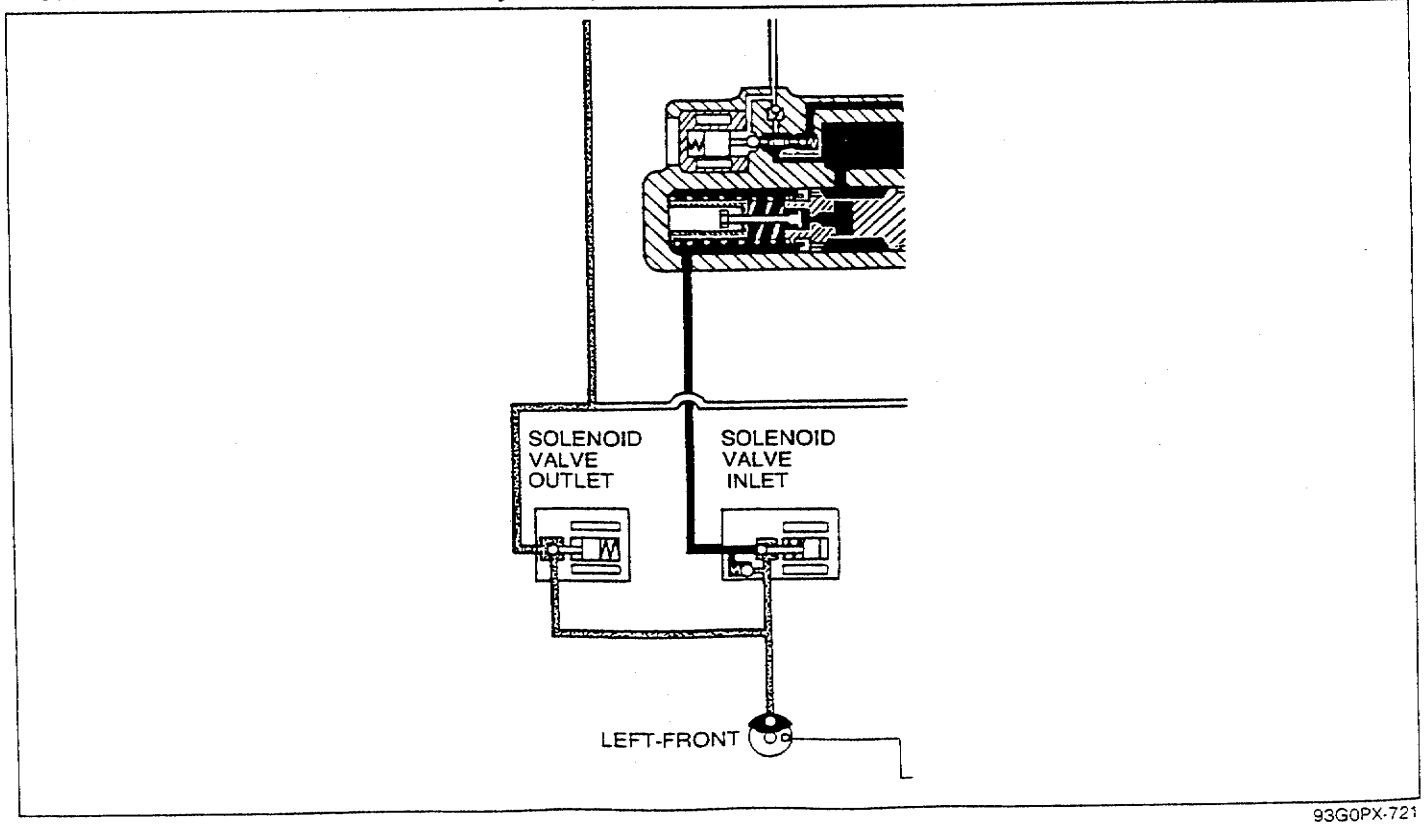
Pressure reduction

- If the wheel speed continues to decrease during pressure retention, the ABS control unit will open the outlet solenoid valve to allow brake cylinder pressure to be fed back to the reservoir to prevent wheel lockup.



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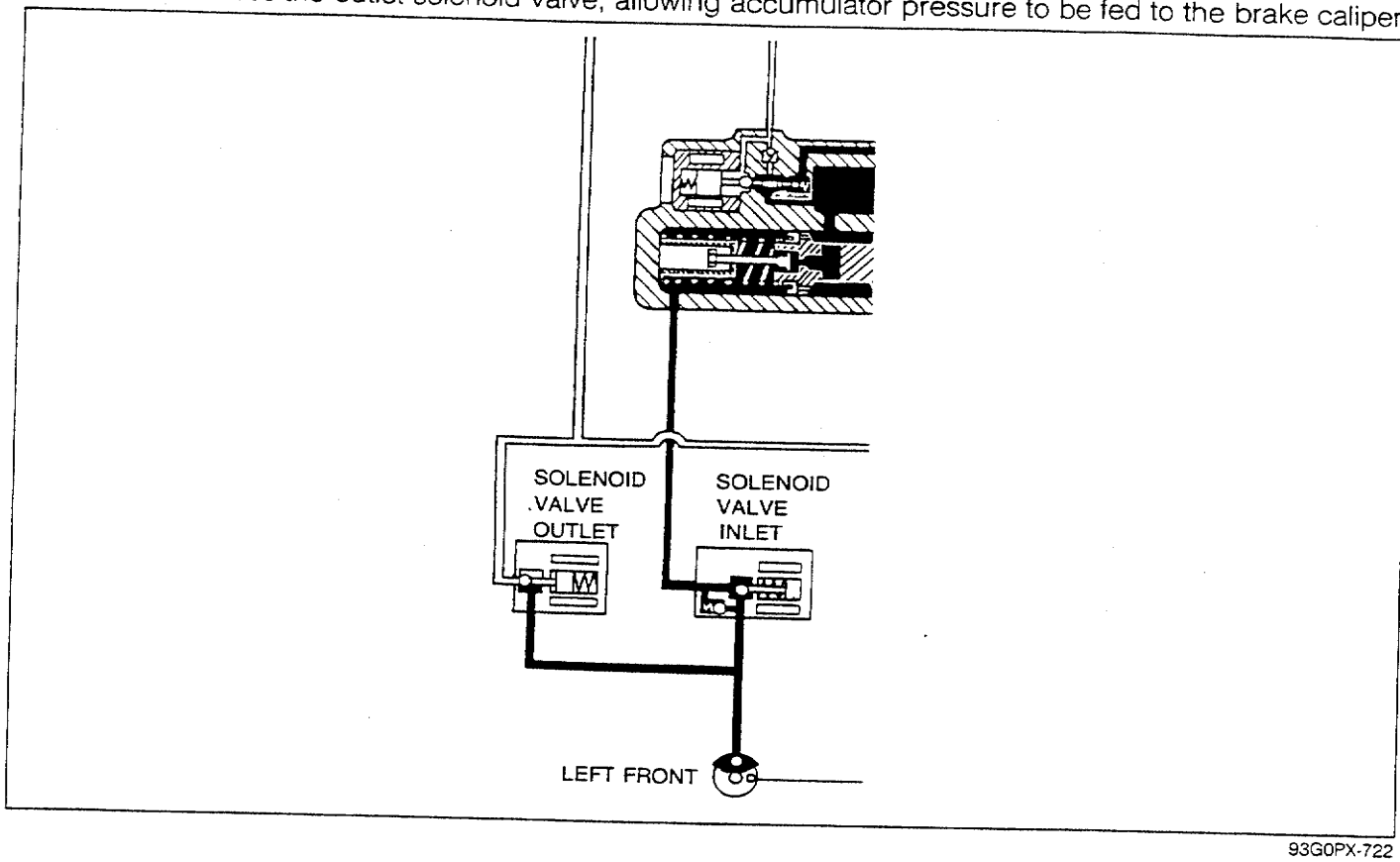
Pressure increase

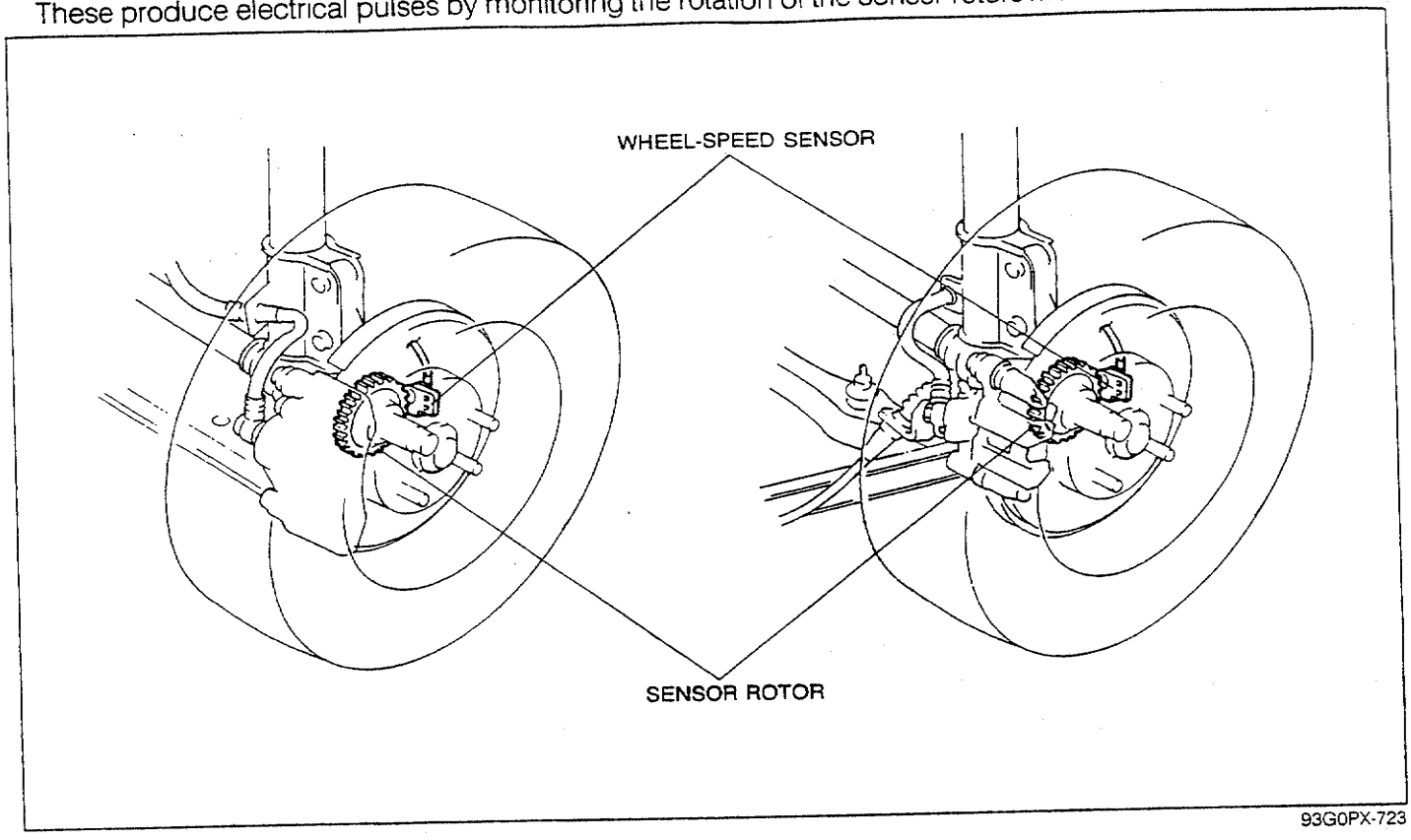
- If the wheel speed is not decelerating at the proper rate, the ABS control unit opens the inlet solenoid valve and closes the outlet solenoid valve, allowing accumulator pressure to be fed to the brake caliper.



93G0PX-722

WHEEL SPEED SENSOR AND ROTOR

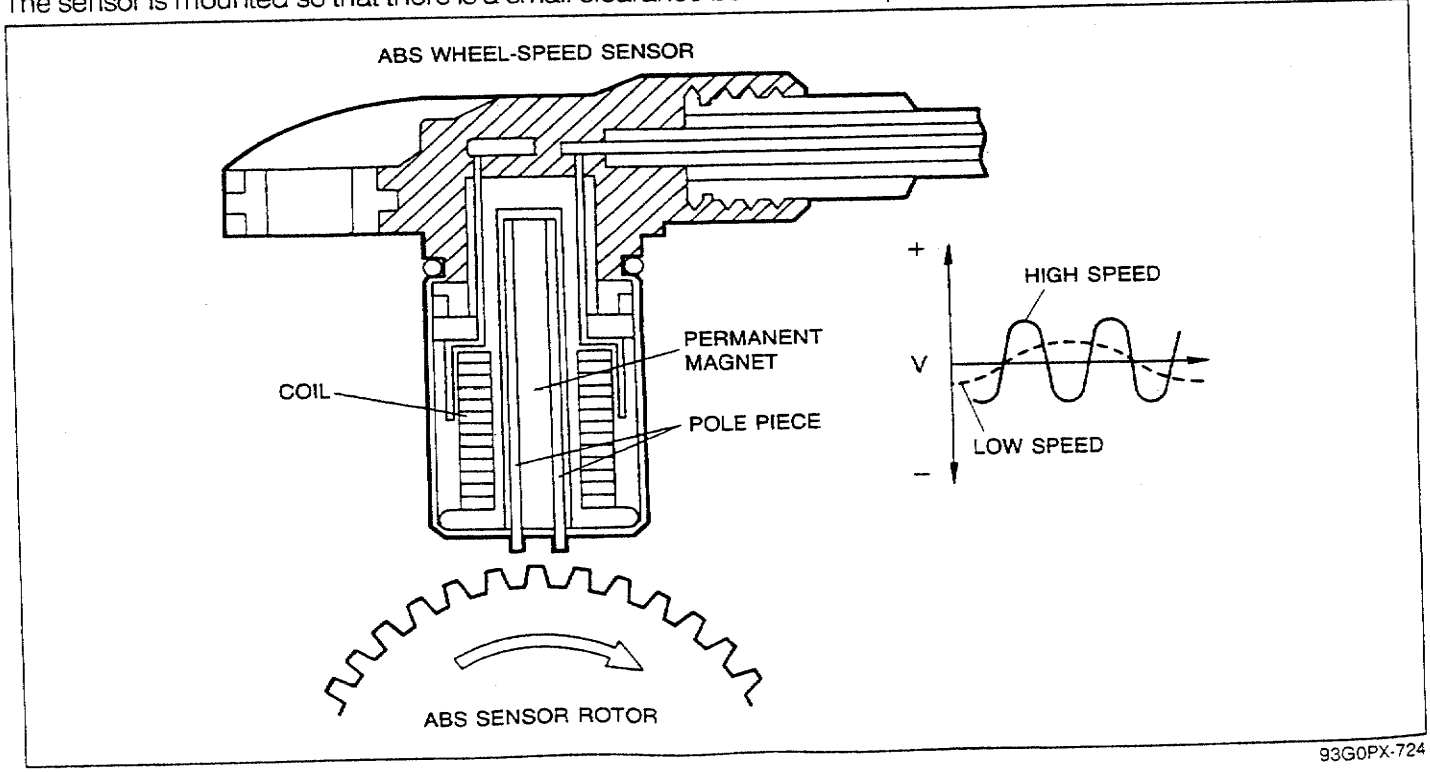
- The wheel speed sensors are mounted on the front and rear knuckles. These produce electrical pulses by monitoring the rotation of the sensor rotors mounted on the driveshafts.



93G0PX-723

Operation

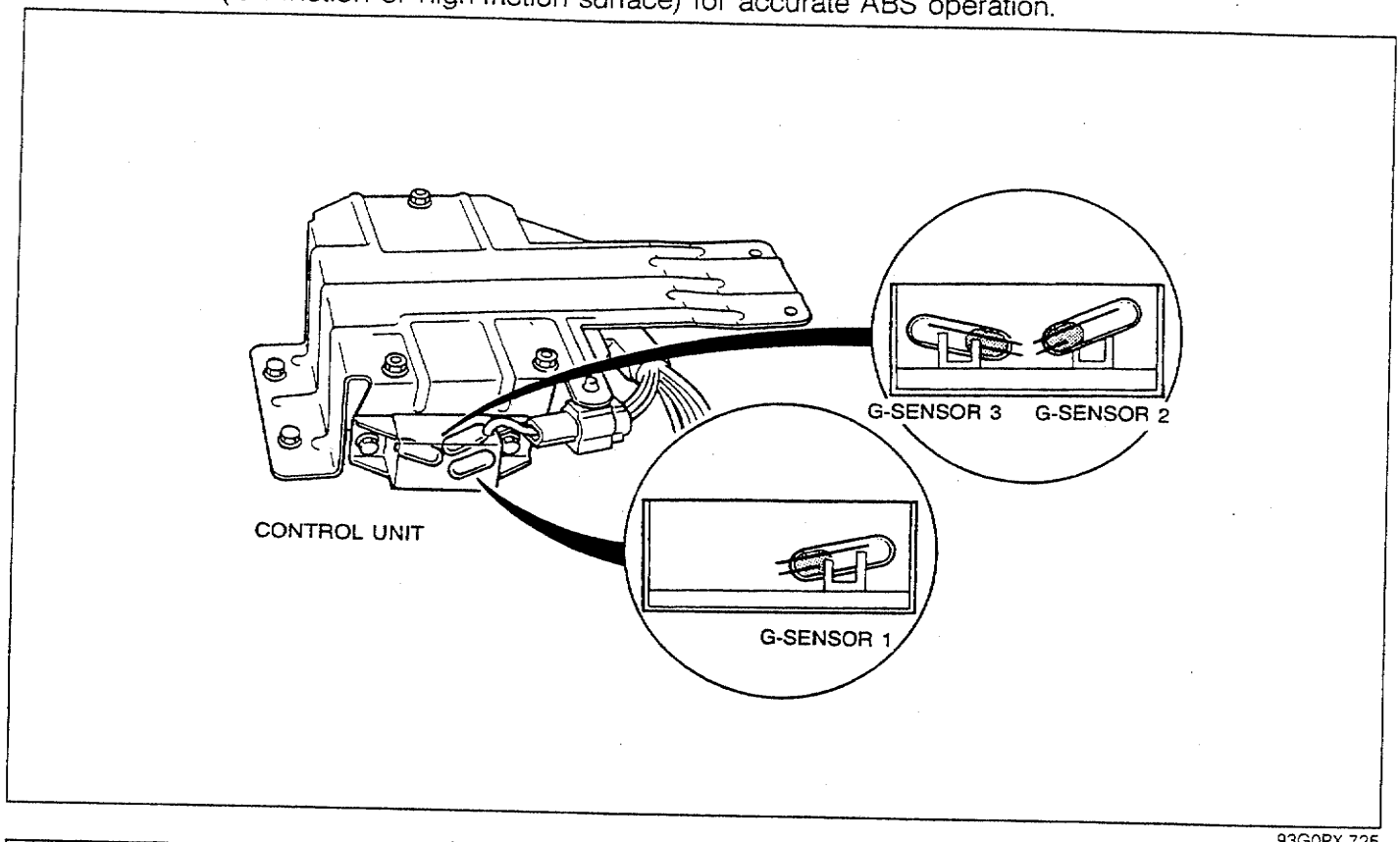
The sensor rotor on the driveshaft interrupts the magnetic fields of the wheel-speed sensor. This produces AC voltage which changes as the wheel speed changes. These voltage wave are sent to the ABS control unit as wheel-speed signals.
The sensor is mounted so that there is a small clearance between the speed sensor pick-up and the sensor rotor.



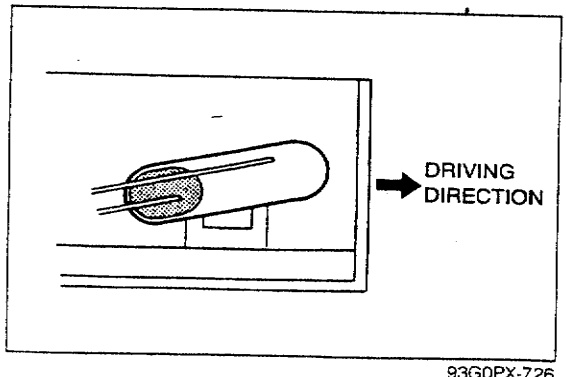
93G0PX-724

G-SENSOR UNIT

- The G-sensor unit is mounted on the side of the ABS control unit. It contains three mercury switches to defect deceleration of the vehicle in forward and reverse operation. The switches are normally ON and become OFF at 0.21 and 0.45G deceleration forward (G-sensors 1 and 2) and 0.26G deceleration reverse (G-sensor 3).
- With a 4WD vehicle, when the brakes are applied all four wheels may decelerate at the same speed regardless of the actual coefficient of friction of an individual wheel. This could lead to inaccurate ABS operation as the ABS control unit cannot judge the estimated vehicle speed. The G-sensors supply the necessary information (low-friction or high-friction surface) for accurate ABS operation.

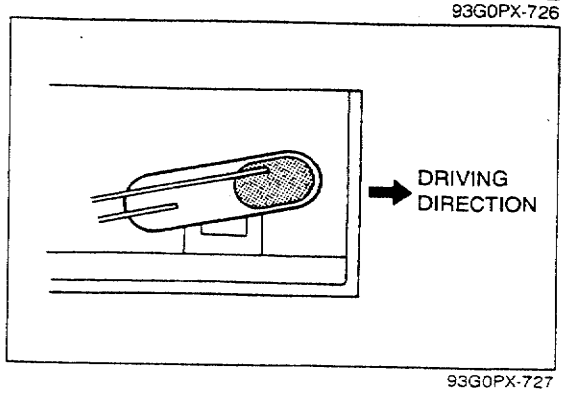


93G0PX-725



93G0PX-726

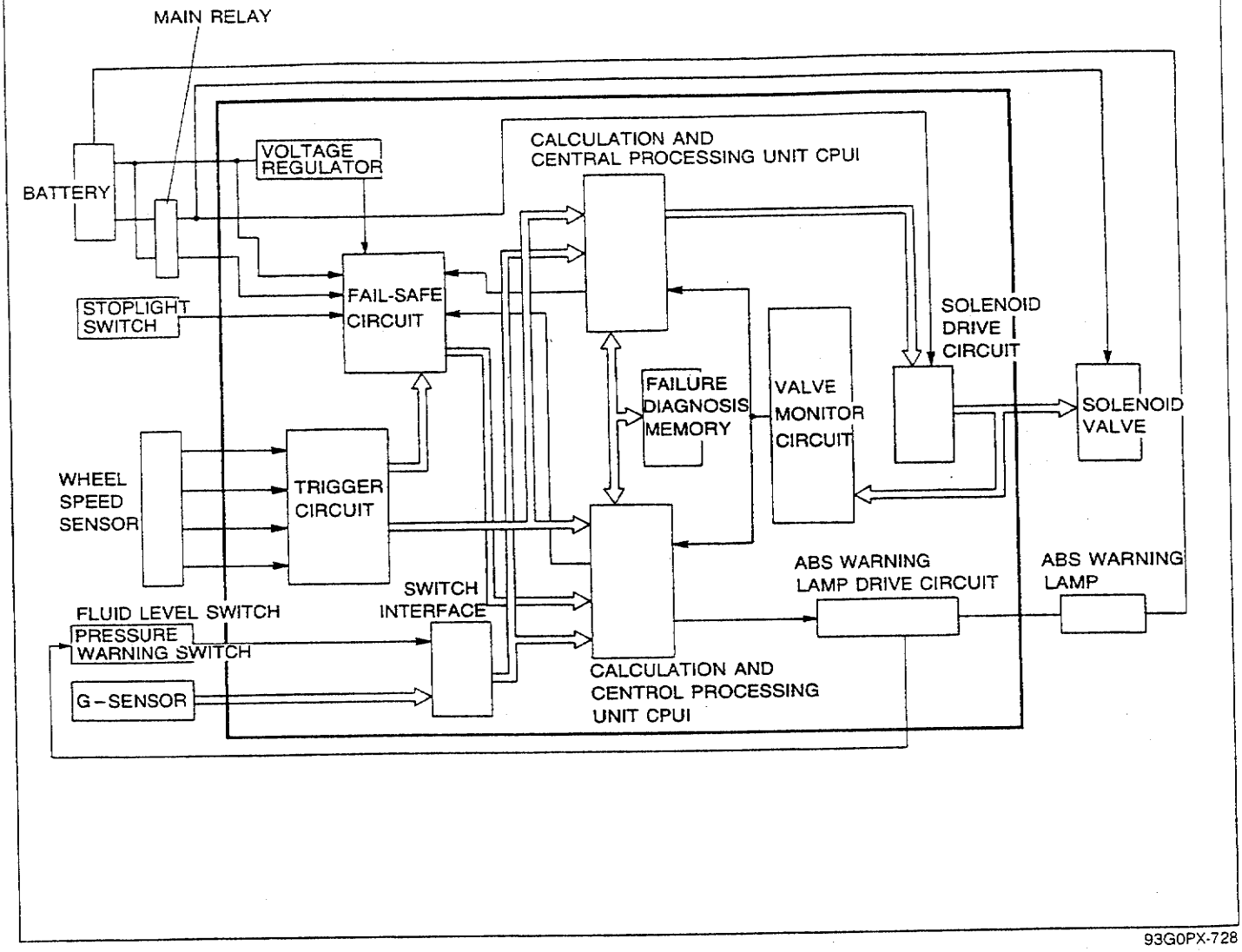
Low-friction Coefficient
If the vehicle deceleration is slight, the mercury in the sensor remains stationary and the switch remains ON.



93G0PX-727

High-friction Coefficient
If the vehicle deceleration is large, the mercury in the sensor moves and the switch is turned OFF.

ABS CONTROL UNIT



93G0PX-728

- The ABS control unit is mounted under the driver's seat. It constantly calculates wheel speeds and evaluates the situation of the wheels based on signals from the wheel-speed sensors, and, in turn, controls the hydraulic brake pressure to the brake calipers to prevent wheel lockup and assure the best stopping performance.
- The fail-safe function programed in the ABS control unit reverts the braking system to normal (no ABS) braking if a malfunction is detected.
- The self-diagnosis function programed in the ABS control unit checks for problems within itself and external input and output devices. It activates the ABS warning lamp to warm the driver of an ABS problem. It also stores in its memory any temporarily occurring problems and current problems.

FUNCTION OF ABS CONTROL UNIT CIRCUITS

Voltage Regulator

- This is the power supply for various circuits.

Trigger circuit

- This converts the sine wave signal from the wheel-speed sensor into a rectangular wave signal of a that is entered into the micro processor.

93G0PX-729

Fail-safe Circuit

- This cuts off the power supply through the main relay in the event of failure or malfunction of the ABS system. It consists of the stoplight switch, power supply voltage supervisory circuit and trigger circuit judgement circuit.

Calculation and central processing unit (CPU I & II)

- This is the circuit that receives the information from the wheel-speed sensors and then makes the necessary calculations and outputs the necessary information to control wheel lockup. The circuit contains two identical CPU's so that they may carry-out self-diagnosis of each other and the other input and output devices. It operates the self-diagnosis function, fail-safe function, and memory function.

Failure Memory Circuit

- This works in conjunction with CPU's to store information of failures which can later be retrieved by the technician during ABS system inspection.

Valve Monitor Circuit

- This is an interface circuit that feeds back the solenoid valve drive signal to the two CPU's. The CPU's can, by this feedback signal and solenoid valve test signal, monitor the electrical operation of the solenoid valve and solenoid drive circuit.

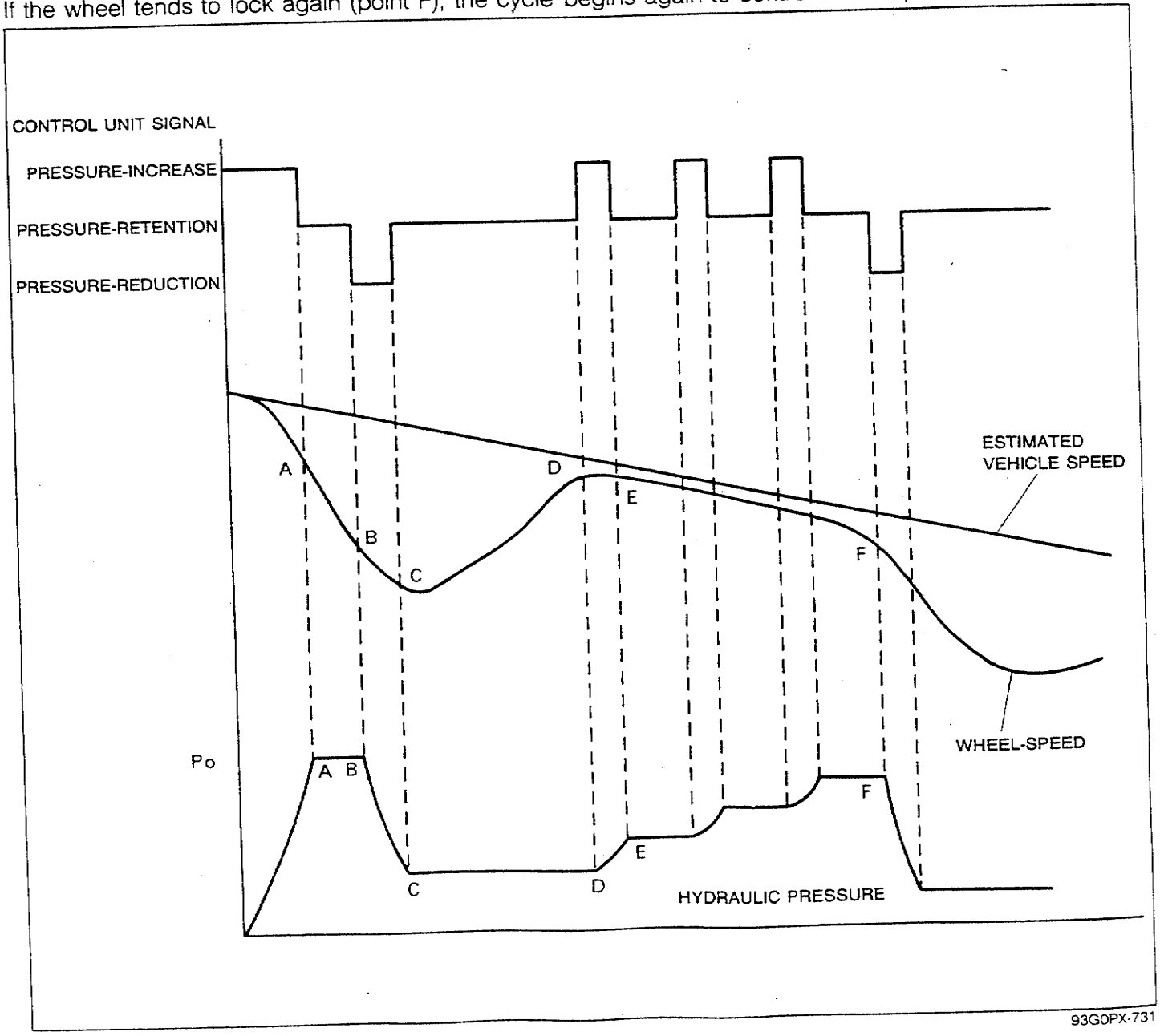
Solenoid Drive Circuit

- This circuit controls the solenoid valves to control hydraulic pressure to the brake calipers.

93G0PX-730

ABS CONTROL SYSTEM

The control unit computes the rotational speed of each individual wheel, based upon signals received from the four wheel speed sensors, and also computes the wheels' deceleration and acceleration, and thereafter projects an estimate of the vehicle speed.
The control logic is explained in a simple manner based on the illustration above.
When the brake pedal is firmly depressed, the speed of the wheel begins to decrease, which is subsequently followed by a tendency toward locking up (point A).
At that point, the control unit, in order to check for wheel lockup, computes the wheel slippage ratio, (the difference between the projected estimate of vehicle speed and the wheel speed) and compares the results with the preset formula for determination of lockup.
If it exceeds the preset value, the control unit sends a pressure-retention command to stabilize the brake hydraulic pressure. Then, the hydraulic pressure is reduced, the speed of the wheel begins to increase (point B), and the control unit concludes that the wheel may recover its speed.
It therefore sends a pressure-retention command to hold the current hydraulic pressure.
When the wheel speed reaches point C, the control unit concludes that the wheel is no longer in danger of locking up, and sends a command for increasing braking pressure.
The hydraulic pressure is then increased by repetition of increase and retention commands to regulate the braking force (point C—F).
If the wheel tends to lock again (point F), the cycle begins again to control wheel speed.



WARNING AND FAIL-SAFE FUNCTION

The anti-lock brake system has an ABS warning lamp as well as brake warning lamp to notify the driver of an ABS related problem.

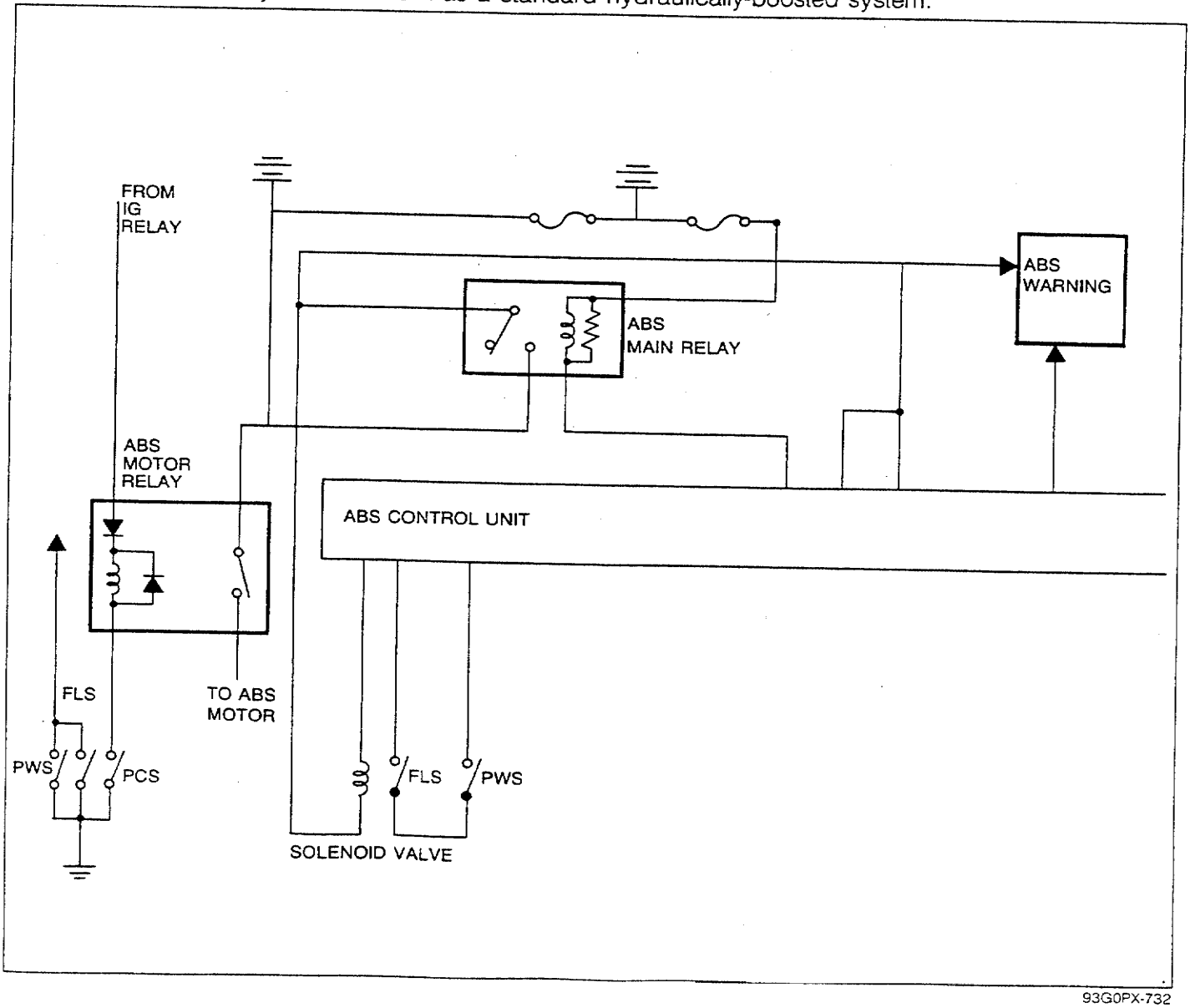
Brake Warning Lamp

The brake warning lamp illuminates if the brake fluid level in the reservoir drops below a certain point (detected by fluid level switch 1).

ABS Warning Lamp

The ABS warning lamp illuminates if one of the following conditions exist:

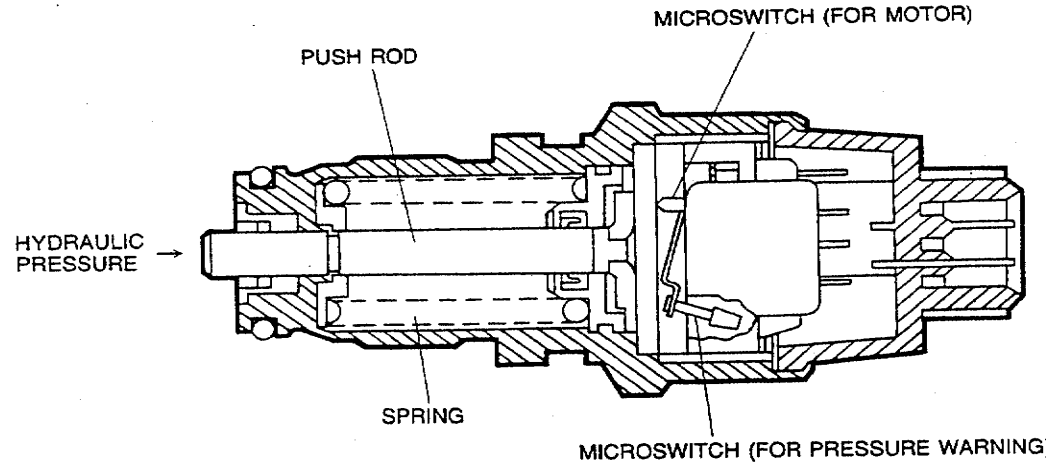
- Fluid level excessively low
  If the fluid level in the reservoir gets excessively low (detected by fluid level switch 2), the ABS control unit disables the ABS function as well as illuminates the ABS warning lamp.
  The brake system will work as a standard hydraulically-boosted system.
- Accumulator pressure excessively low
  If the fluid pressure in the accumulator gets excessively low (detected by the pressure warning switch), the ABS control unit disables the ABS function as well as illuminates the ABS warning lamp. The brakes will work with weaker hydraulic power assist until all accumulator pressure is depleted.
- Malfunction detected by self-diagnostic function of ABS control unit.
  The ABS control unit constantly monitors operation of the various input and output devices and its own internal circuitry. If a problem is found, the ABS warning lamp is illuminated and the ABS function is cancelled. The brake system will work as a standard hydraulically-boosted system.



93G0PX-732

PRESSURE SWITCH UNIT

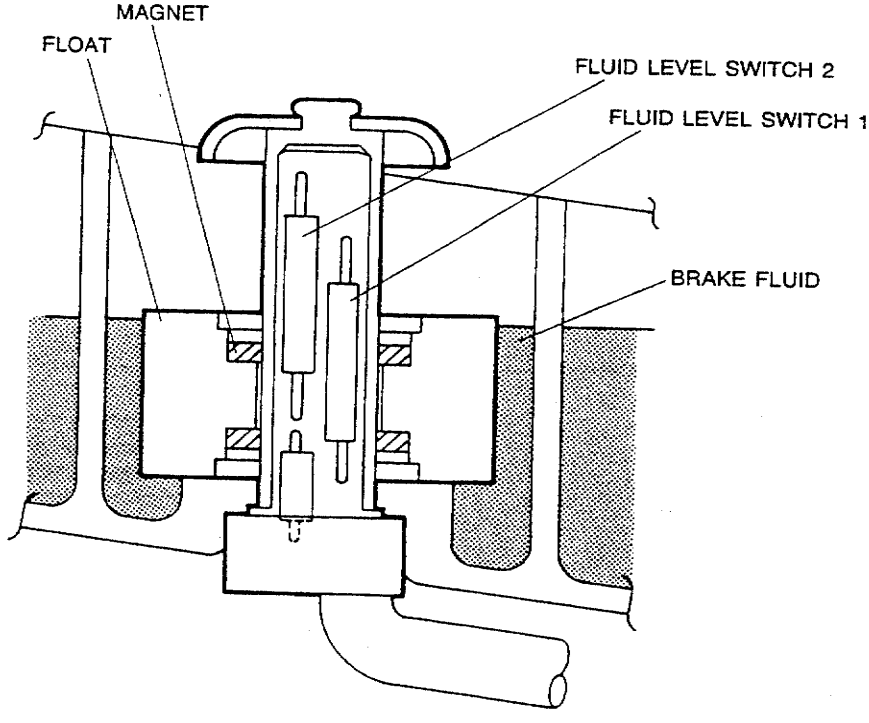
- The pressure switch unit is mounted in the pump unit. There are separate microswitches in this unit for the hydraulic pump control and pressure warning functions.
- Pressure Control Switch (PCS)
  The PCS is electrically independent of the ABS control unit. It monitors the fluid pressure in the accumulator. When the pressure drops below 12,753—14,715 kPa (130—150 kg/cm^2, 1,849—2,133 psi) the switch comes ON and activates the hydraulic pump. The switch and pump turn OFF at 15,696—18,639 kPa (160—190 kg/cm^2, 2,275—2,702 psi).
- Pressure Warning Switch (PWS)
  The PWS disables the ABS control unit and activates the ABS warning indicator lamp if the pressure drops below 9,320—11,772 kPa (95—120 km/cm^2, 1,351—1,704 psi).



93G0PX-733

FLUID LEVEL SWITCH

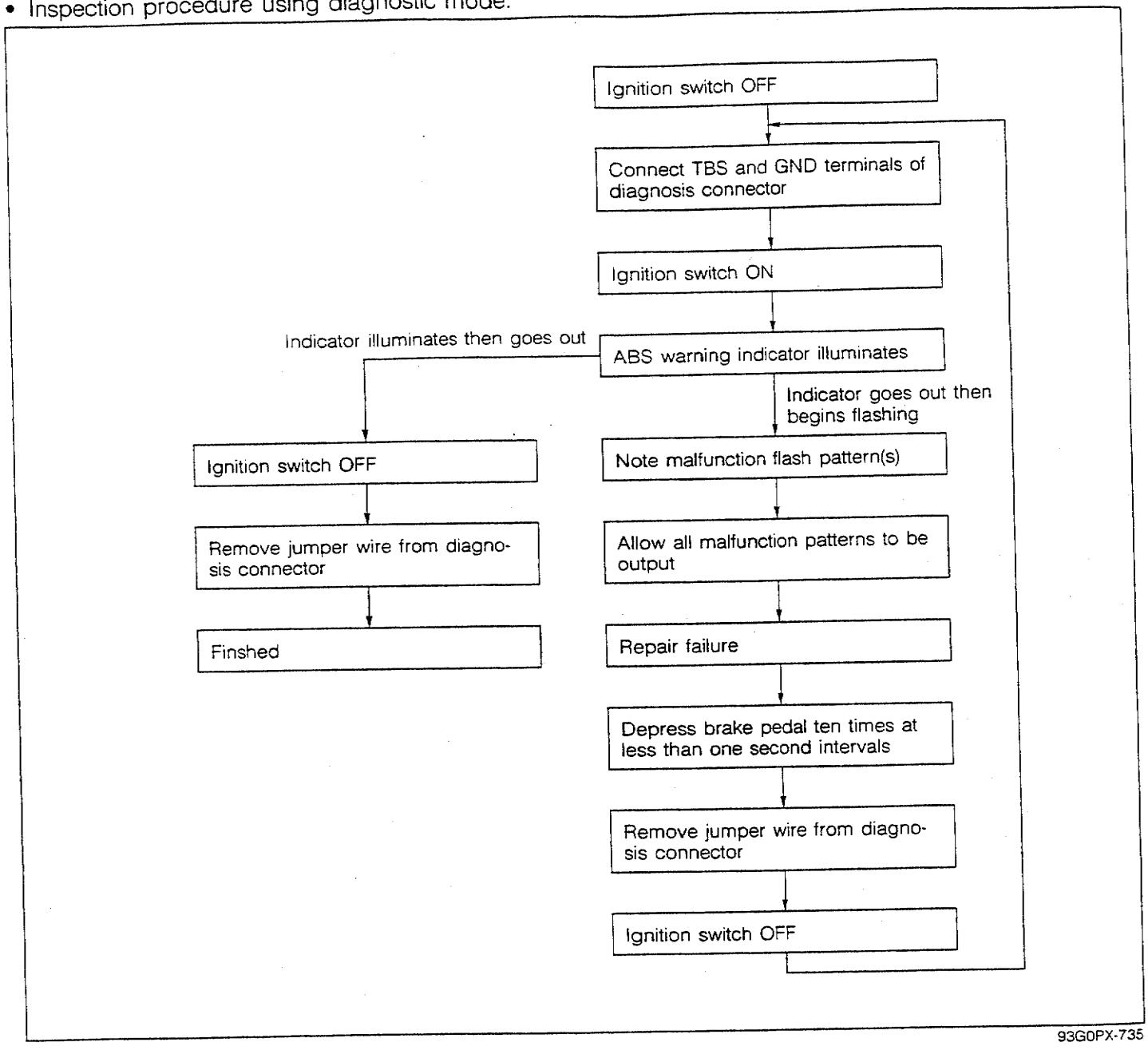
- The fluid level warning switch is a lead type switch consisting of two sets of contacts and a magnet (contain in the float). As the float level varies with the raising or lowering of the brake fluid in the fluid reservoir, the contacts are opened or closed.
- Fluid Level Switch 1
  If the fluid level drops below a certain point, this switch activates the brake warning indicator lamp to notify the driver that the brake fluid level in the reservoir is low.
- Fluid Level Switch 2
  If the fluid gets excessively low, this switch signals the ABS control unit to disable ABS function and illuminate the ABS warning indicator lamp.



93G0PX-734

DIAGNOSIS PROCEDURE

• Inspection procedure using diagnostic mode.

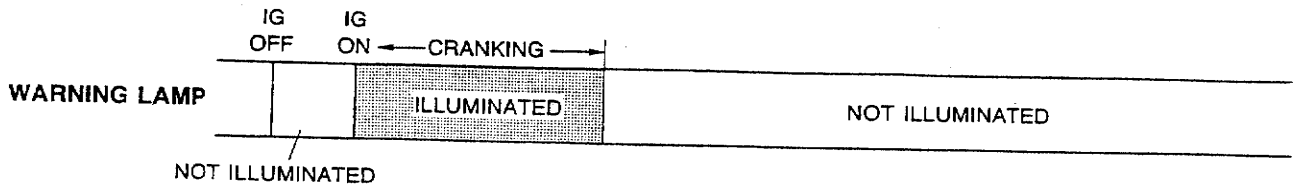


MALFUNCTION CODE AND MEMORY FUNCTIONS

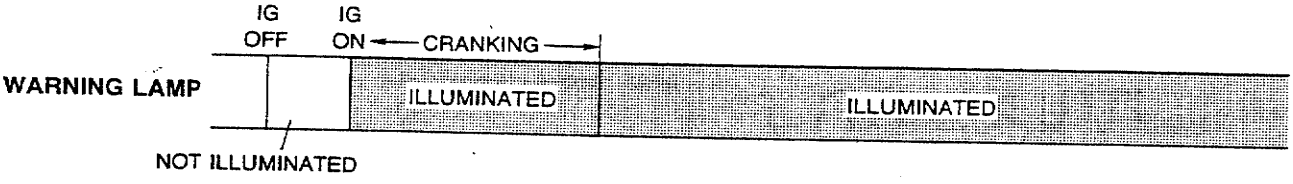
Malfunction mode

- As a result of self-diagnosis, the ABS control unit will store in its memory malfunction codes to aid the technician in diagnosing problems with the system. It also illuminates the ABS warning lamp to notify the driver of a current problem.

  - ABS normal



  - ABS present failure (Vehicle stopped or vehicle moving if wheel speed sensor or rotor)



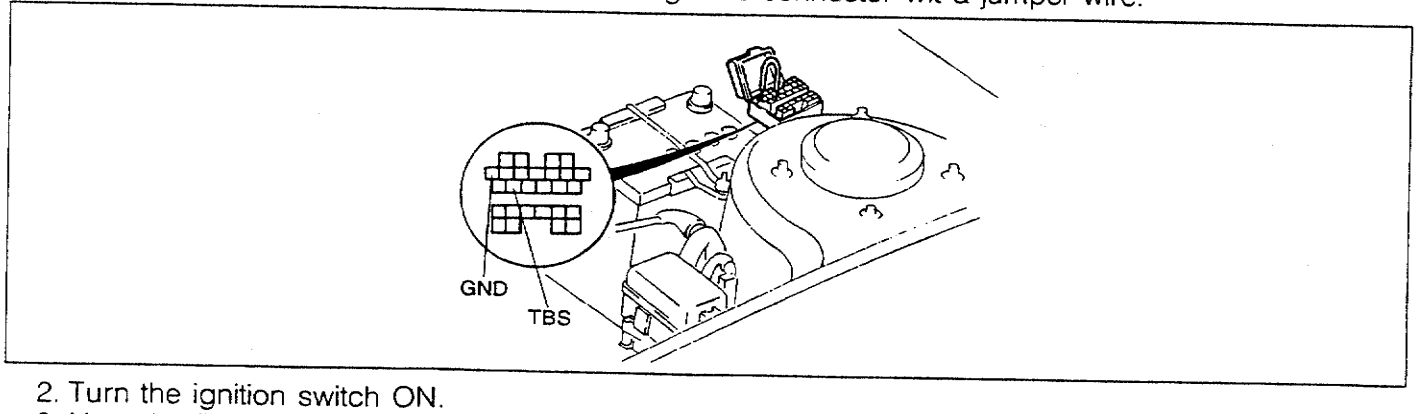
Caution

- **Repeated pumping of the brake pedal in a short period may cause the ABS warning lamp and brake warning lamp to illuminate and be input into the ABS control unit as a malfunction.**

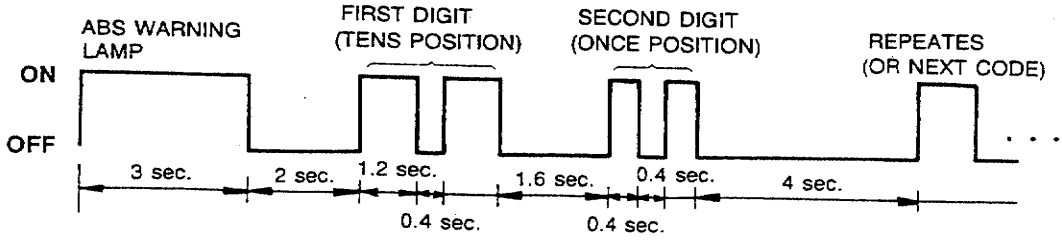
93G0PX-736

Diagnostic mode

1. Connect TBS and GND terminals of the diagnosis connector wit a jumper wire.



2. Turn the ignition switch ON.
3. Note the flashing of the ABS warning lamp to determine the malfunction code(s).

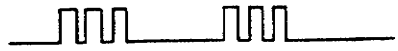
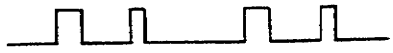


Note

- **If there is no malfunction code stored in the ABS control unit, the control unit will automatically advance to G-sensor test mode (Refer to page P–29.)**
- **Be sure to remove the jumper wire from the diagnosis connector after all checks and repairs are completed.**

93G0PX-737

Malfunction display

Malfunction code	Warning indicator pattern	Sensor or subsystem		Possible cause
01		Pressure warning switch/Fluid level switch		• Short circuit or PWS/FWS malfunction
03		G-sensor		• Short circuit or G-sensor malfunction (Refer to G-sensor test mode)
11		Right front	ABS wheel speed sensor/ABS sensor rotor	• Short or open circuit • Incorrect clearance (Sensor—Sensor rotor) • Damaged sensor rotor • Loose sensor rotor
12		Left front		
13		Right rear		
14		Left rear		
21		Main control solenoid valve		• Short or open circuit • Stuck valve • Plugged hydraulic circuit
22		Inlet or outlet Solenoid valve		• Short or open circuit • Stuck valve • Plugged hydraulic circuit
61		ABS control unit		Control unit malfunction

93G0PX-738

Cancellation of past failure code

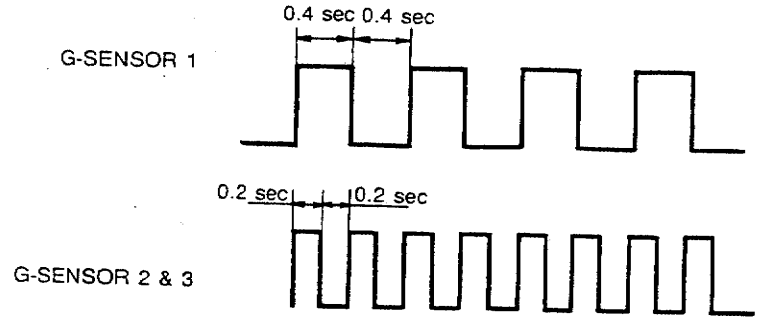
- Failure code stored in CU can be cancelled according to the following procedure.
  1. Output all the error codes stored.
  2. With diagnosis mode, ensure that first code is output again and depress brake pedal ten times with less than one second interval.
  3. When cancellation of error code is completed, it is switched to G-sensor indication mode. (Refer to page P–29.)

Note

- **Error codes will not be cancelled unless all the brake pedal application intervals are within one second.**
- **They cannot be cancelled when brake light bulb is burnt out or when they brake light switch is failed.**

G-sensor test mode

1. Without any malfunction codes stored in the ABS control unit, connect the TBS and GND terminals of the diagnosis connecter with a jumper wire.
2. If there is a probiem with a G-sensor the ABS warning indicator will flash in one of the patterns below when the ignition switch is ON.
3. Replace the G-sensor unit if necessary



Note

- **Refer to page P–47 for G-sensor function test.**

93G0PX-739

SUPPLEMENTAL SERVICE INFORMATION

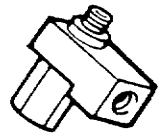
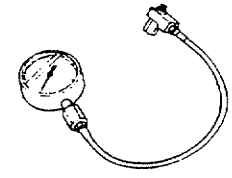
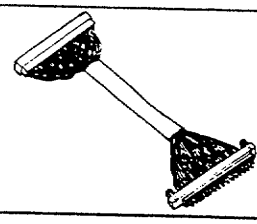
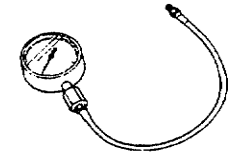
The following points in this section are changed in comparison with Workshop Manual (1206-10-89F).

- Air bleeding (with ABS)
- Brake fluid (with ABS)
  Inspection / Replacement
- Brake pedal (with ABS)
  Specification
- Master cylinder/Hydraulic unit (with ABS)
  Inspection / Removal / Installation
  Disassembly / Assembly
- Proportioning valve
  Specification
- ABS control unit (with ABS)
  Removal / Installation
- Relay (with ABS)
  Removal / Inspection / Installation
- Wheel speed sensor (with ABS)
  Removal / Installation / Inspection
- Sensor rotor (with ABS)
  Removal / Installation

93G0PX-740

BRAKING SYSTEM

PREPARATION
SST

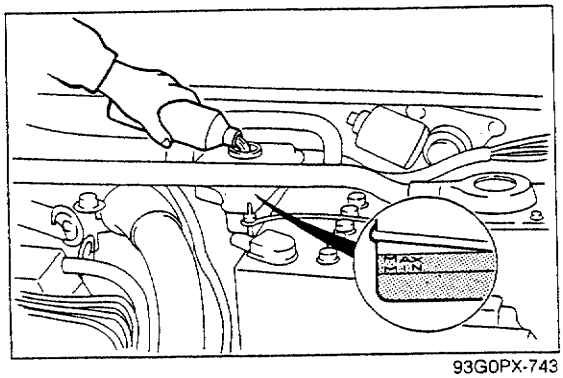
49 B066 0A0 Gauge set, oil pressure 	For measuring accumulator pressure	49 B066 003 Attachment (Part of 49 B066 6A0) 	For measuring accumulator pressure
49 B066 001 Harness 	For Inspection of ABS system	49 B066 002 Gauge and hose (Part of 49 B066 002) 	For measuring accumulator pressure

93G0PX-741

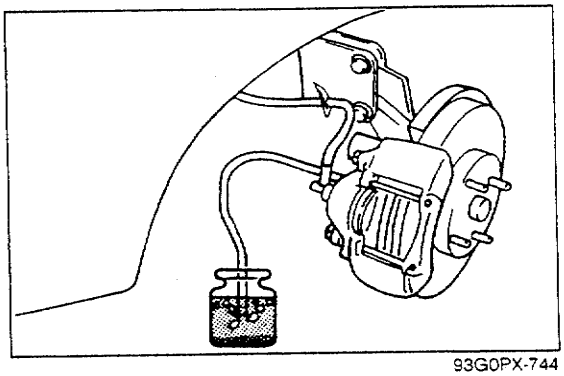
WARNING

- **Before servicing any component which contains hydraulic pressure, it is mandatory that the hydraulic pressure in the system be discharged. To discharge the system, with the ignition switch OFF, depress the brake pedal until heavy resistance is felt (approx. 20 times).**

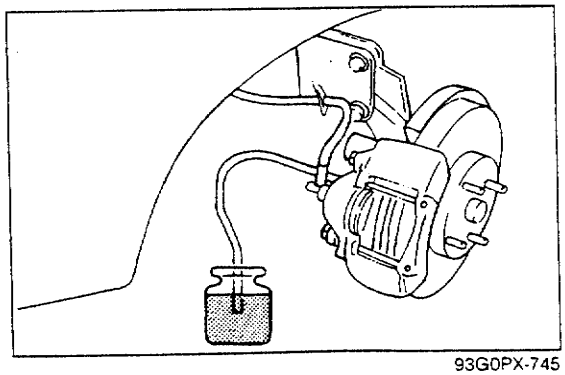
93G0PX-742



93G0PX-743



93G0PX-744



93G0PX-745

AIR BLEEDING (WITH ABS)

Front Brakes

1. Fill the fluid reservoir to the MAX line with the specified brake fluid.

Caution

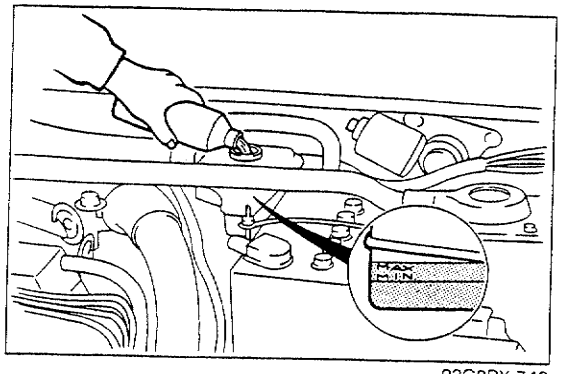
- **The brake fluid reservoir must remain 3/4 full during air bleeding.**
- **Be careful not to spill brake fluid onto a painted surface.**
- **Use only the specified brake fluid. Do not mix it with any other type.**

2. Jack up the vehicle and support it with safety stands.
3. Remove the bleeder cap and attach a vinyl hose to the bleeder plug.
4. Place the other end of the vinyl tube in a clear container.
5. Have an assistant depress the brake pedal a few times, and then hold it in the depressed position.
6. Loosen the bleeder screw, and drain out the fluid and air. Retighten the screw with the **SST**.

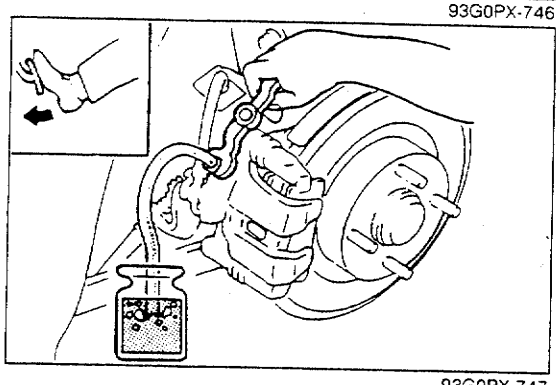
Caution

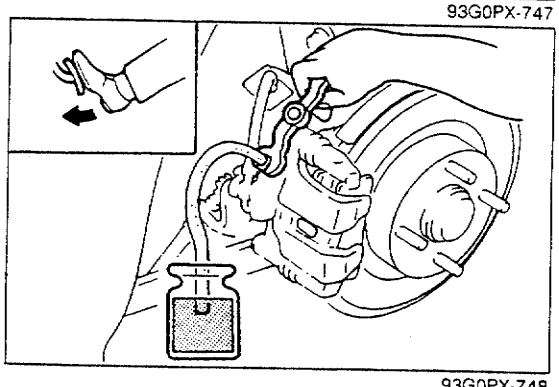
- **The two persons should stay in voice contact with each other.**
- **Be sure the pedal remains depressed until the air bleed screw is tightened.**

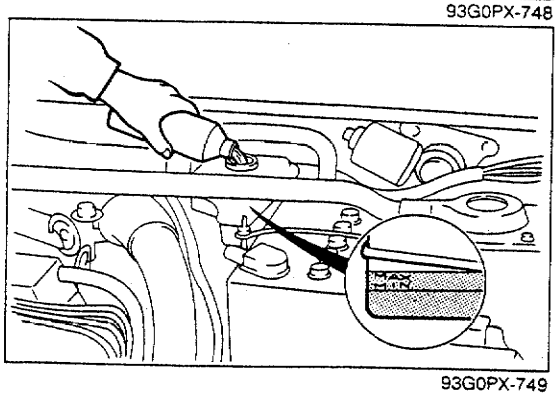
7. Repeat steps 5 and 6 until no air bubbles are seen.
8. Check for correct brake operation.
9. Verify that there is no fluid leakage. Clean away any spilled fluid with rags.
10. After bleeding the air, add brake fluid to the reservoir up to the MAX level.



93G0PX-746


93G0PX-747


93G0PX-748



93G0PX-749

Rear Brakes

1. Fill the fluid reservoir to the MAX line with the specified brake fluid.
2. With ignition switch, pump the brake pedal four or five times. When the operation of the hydraulic unit pump stop (sound stops), again add brake fluid up to the MAX line if necessary.

Caution

- **The brake fluid reservoir must be 3/4 full during air bleeding.**
- **Be careful not to spill brake fluid onto a painted surface.**
- **Use only the specified brake fluid. Do not mix it with any other type.**

3. Jack up the vehicle and support it with safety stands.
4. Remove the bleeder cap and attach a vinyl hose to the bleeder plug.
5. Place the other end of the vinyl tube in a clear container.
6. With the ignition ON, have an assistant depress the brake pedal a few times, and then hold it in the depressed position.

Caution

- **The two persons should stay in voice contact with each other.**
- **Be sure the pedal remains depressed until the air bleed screw is tightened.**
- **Release the brake pedal intermittently to stop the pump motor.**
- **Care must be used when opening the rear caliper bleeder screws, due to the high-pressure available from a fully charged accumulator at the bleeder screws.**

7. A second person should loosen the bleeder screw, drain out the fluid, and retighten the screw with the **SST**.
8. Repeat steps 6 and 7 until no air bubbles are seen.
9. Check for correct brake operation.
10. Verify that there is no fluid leakage. Clean away any spilled fluid with rags.
11. After bleeding the air, add brake fluid to the reservoir up to the MAX level.

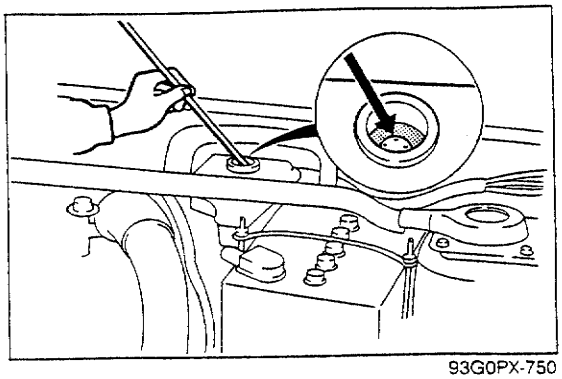
BRAKE FLUID (WITH ABS)

On-vehicle Inspection

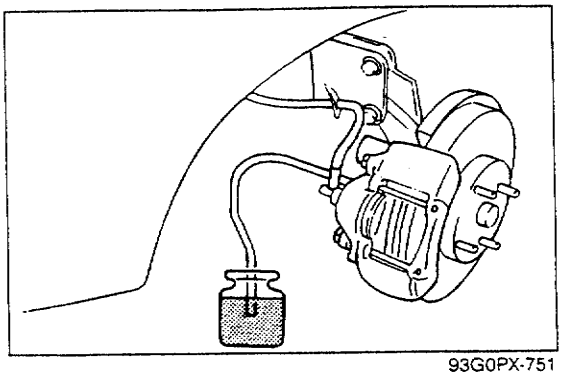
1. Verify that the fluid level in the reservoir is between the MAX and MIN lines on the reservoir.
2. If the level is low, depress the brake pedal several times with the ignition switch ON to start the hydraulic unit pump motor.
3. After the pump motor starts, release the brake pedal.
4. After the pump motor stops (sound stops), add brake fluid up to the MAX line.

Caution

- **Do not add brake fluid over the MAX line. It may overflow from the reservoir cap when accumulator fluid pressure is released.**



93G0PX-750



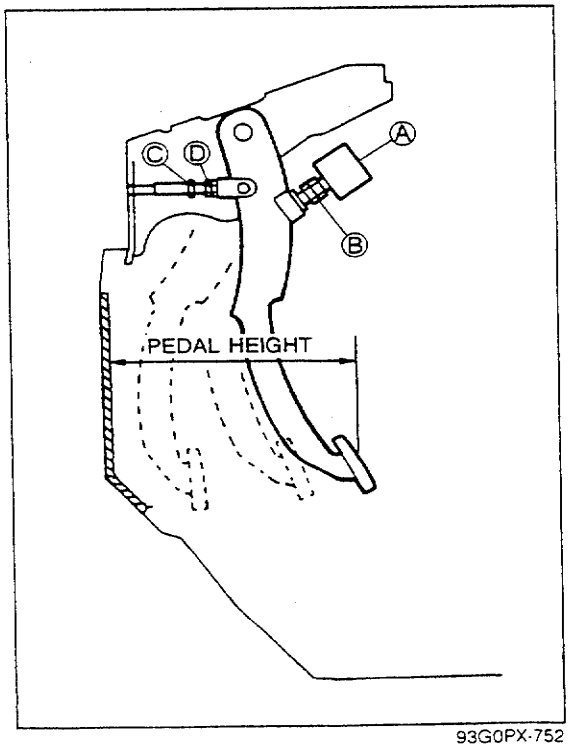
93G0PX-751

5. Check illumination of the brake warning lamp and ABS warning lamp by pressing down the float in the reservoir.

Note
- **As the float is pressed down, the brake warning lamp comes on before the ABS warning lamp.**

Replacement
1. Follow the procedure outlined in "Air Bleeding". (Refer to page P–32.)
2. Repeat the above procedure until new fluid is discharged from bleeder.

Note
- **The reservoir is common to the clutch reservoir. Refer to Section H for replacement of the clutch fluid.**



93G0PX-752

BRAKE PEDAL (WITH ABS)

On-vehicle Inspection

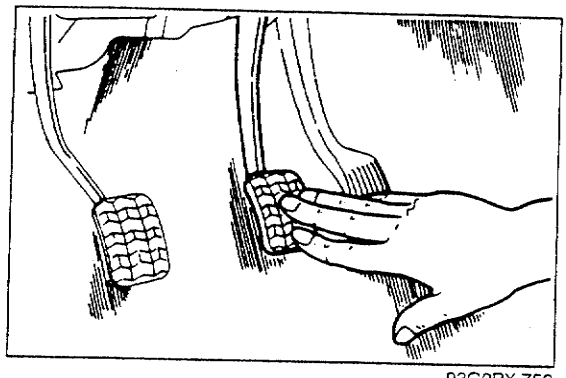
Warning
- **Adjust the pedal height and free play with the brake pedal is fully pulled back. If not done correctly, it may cause brake dragging.**

Pedal height

Inspection
1. Check that the distance from the center of the upper surface of the pedal pad to the carpet is as specified.

Pedal height: 206mm (8.1 in)

Adjustment
1. Disconnect the stoplight switch connector.
2. Loosen locknuts Ⓑ and turn switch Ⓐ until it does not contact the pedal.
3. Loosen locknut Ⓓ and turn rod Ⓒ to adjust the height.
4. Turn the stoplight switch until it contacts the pedal; then turn an additional 1/2-turn.
   Tighten locknuts Ⓑ and Ⓓ.
5. Verify operation of the stoplights.

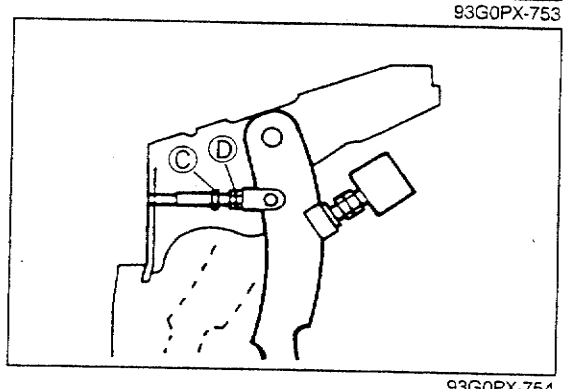


93G0PX-753

Pedal Play
Inspection

1. After depressing the pedal several times (about 20 times) to eliminate the accumulator pressure in the hydraulic unit, gently depress the pedal by hand and check the free play.

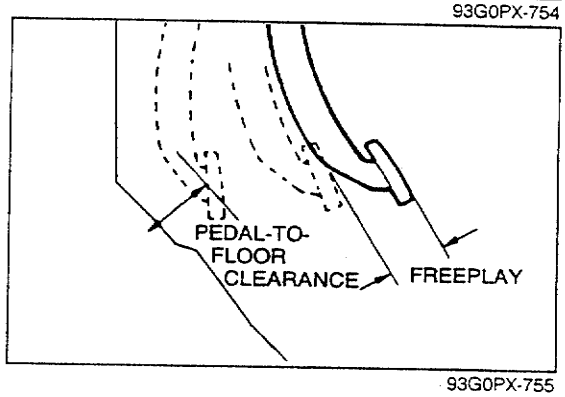
Pedal play: 12—15mm (0.47—0.59 in)



93G0PX-754

Adjustment

1. Loosen locknut D; then turn push rod C to adjust the free play.
2. After adjustment, tighten locknut D and check the pedal height and illumination of stoplight.



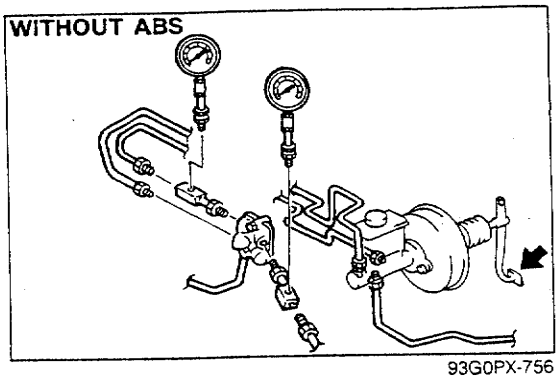
93G0PX-755

Pedal-to-floor Clearance
Inspection

1. Start the engine and check that the distance from the floor panel to the center of the upper surface of the pedal pad is as specified when the pedal is depressed with a force of 589 N (60 kg, 132 lb).

Pedal-to-floor clearance: 60mm (2.36 in) min.

2. If the distance is less than specified, check for air in the brake system.



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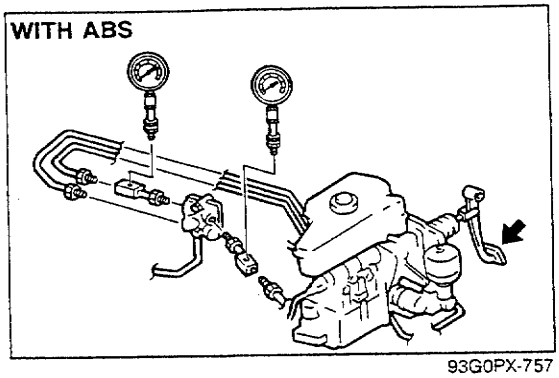

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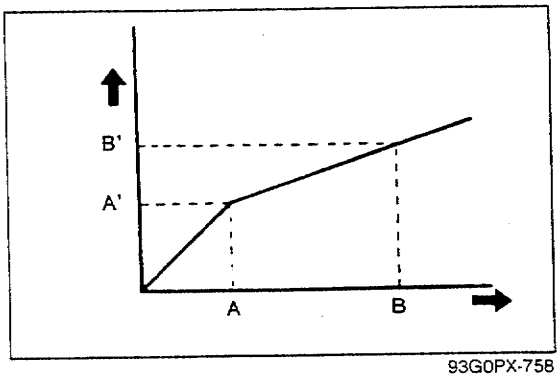


93G0PX-758

PROPORTIONING VALVE

Inspection

1. Connect two pressure gauges (9,810 kPa [100 kg/cm^2, 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 (49 0259 770B).**
   - **Use commercially available gauges.**

2. Bleed the air from the brake system. (Refer to page P–32.)
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 master cylinder pressure equals B; then record pressure B'.

   Caution
   - **Do not attempt to adjust the proportioning valve**

5. Verify that the pressures are as specified.
   If not, replace the proportioning valve.

Fluid pressure

kPa (kg/cm^2, psi)

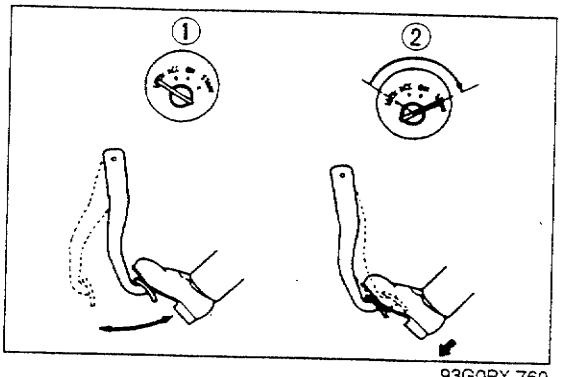
A	A'	B	B'
2,943 (30, 427)	2,943 (30, 427) ± 196 (2, 28)	5,886 (60, 853)	3,823 (39, 555) ± 294 (3, 43)

6. After inspection, bleed air from the system and check for fluid leaks.

MASTER CYLINDER/HYDRAULIC UNIT (WITH ABS)
On-vehicle Inspection

Note
- **The following simple inspection is to evaluate the condition and operation of the accumulator and the hydraulic unit pump motor. If a problem is found, conduct the specified hydraulic pressure test. (Refer to page P–38.)**
- **When depressing the brake pedal, a hissing will be heard from the hydraulic unit as the brake fluid in the accumulator is released.**

93G0PX-759



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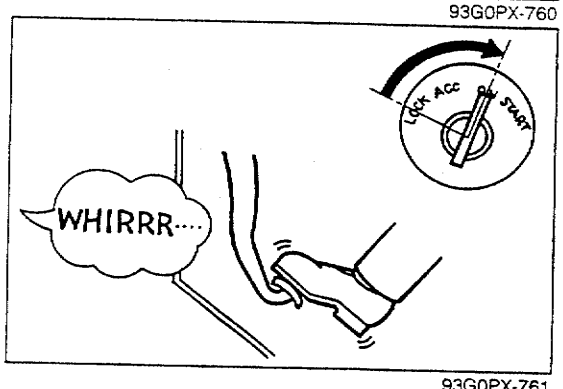

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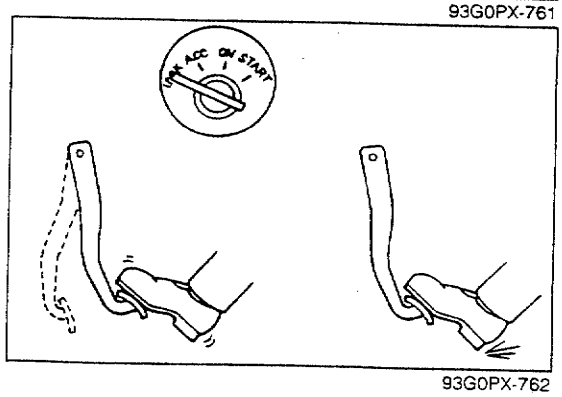


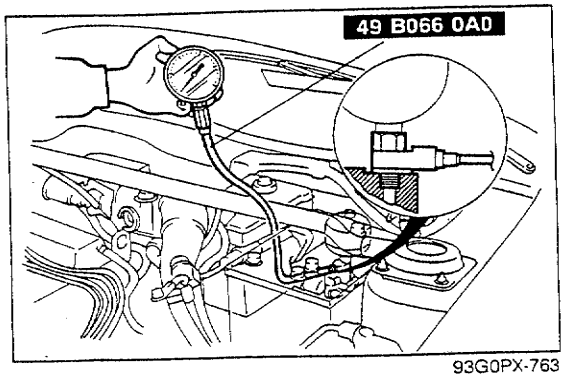
93G0PX-762

Pump and Accumulator
Operational check
1. With the ignition switch in the OFF position, depress the brake pedal several times (approx. 20 times) until heavy resistance is felt.
2. While holding the brake pedal depressed, turn the ignition switch ON and verify that the pump motor begins to operate and that the pedal drops.

Functional check
1. With the ignition ON, confirm the operation of pump is heared.
2. After pump stops, confirm that brake warning light and 4WABS warning light go off.
3. Confirm the sound of pump after four or five depressions of brake pedal.

Note
- **If the pump motor begins to operate after only one full stroke of the brake pedal, the gas in the accumulator may be leaking or there may be air in the brake system.**

4. With the ignition switch OFF, pump the brake pedal until heavy resistance is felt (approx. 20 times).
5. Turn the ignition switch to ON, and verify that the pump motor operates, then stops within one minute.



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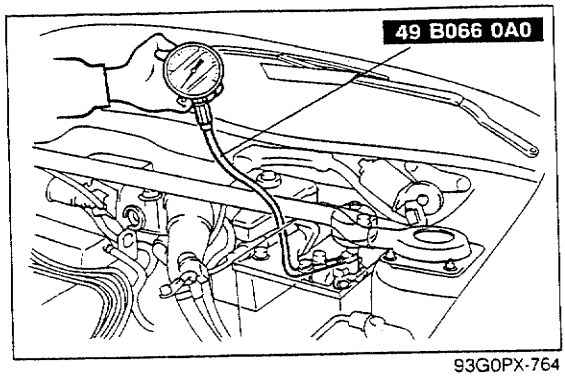

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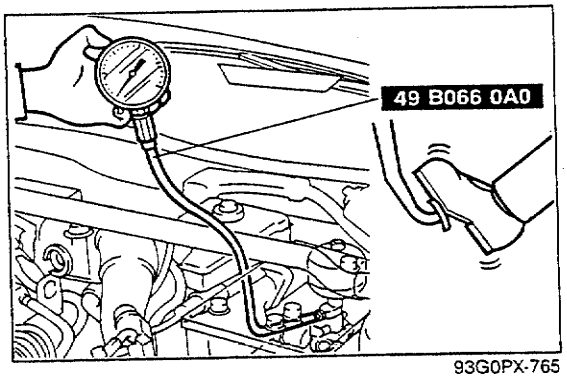

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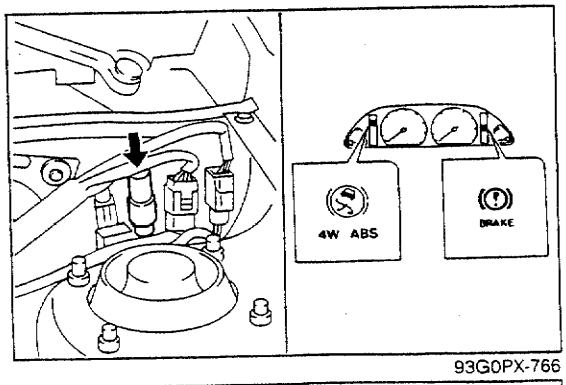

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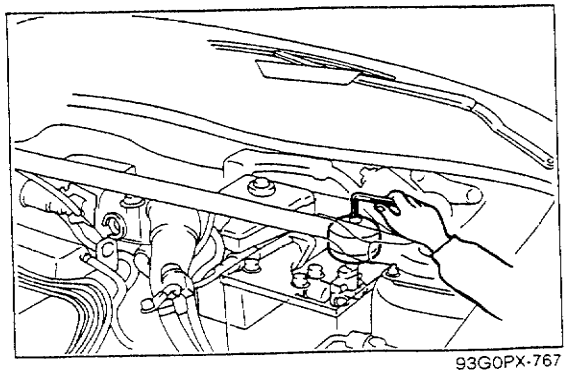

93G0PX-767

Hydraulic pressure test

1. With the ignition switch OFF, depress the brake pedal until heavy resistance is felt (approx. 20 times).
2. Remove the accumulator from the pump unit.
3. Mount the **SST** between the accumulator and the pump unit.

   Tightening torque:
   39—45 N·m (4—4.6 m-kg, 29—33 ft-lb)

   Caution
   - **Be careful not to damage the O-ring during installation of the accumulator.**

4. Bleed air from the system. (Refer to page P–32.)
5. Repeat step 1.
6. Turn the ignition switch ON and note the fluid pressure at the begining of pump motor operation. If not within specification, replace the accumulator.

   Fluid pressure:
   3,924—8,240 kPa (40—84 kg/cm^2, 569—1,194 psi)

7. Note the pressure when the pump motor stops. If not within specification, replace the pressure warning switch.

   Pressure:
   15,696—18,639 kPa
   (160—190 kg/cm^2, 2,275—2,702 psi)

8. Turn the ignition switch OFF, and depress the brake pedal until heavy resistance is felt (approx. 20 times).
9. Turn the ignition switch ON.
10. Verify that the pressure reaches **15,696—18,639 kPa (160—190 kg/cm^2 2,275—2,702 psi)** within **approx. 1 min.** after the pump motor starts.
    If the pressure is not as specified within **2 min.** replace the pump unit.
11. With the ignition switch still ON, depress the brake pedal slowly several times and measure pressure when pump again operates. It not within specification, replace the pressure warning switch.

    Pressure:
    12,753—14,715 kPa
    (130—150 kg/cm^2, 1,849—2,133 psi)

12. Disconnect the pump motor connector. With the ignition switch ON, depress the brake pedal slowly several times and measure the pressure when the brake and ABS warning lights come on.
    If not within specification, replace the pressure warning switch.

    Pressure:
    9,320—11,772 kPa
    (95—120 kg/cm^2, 1,351—1,706 psi)

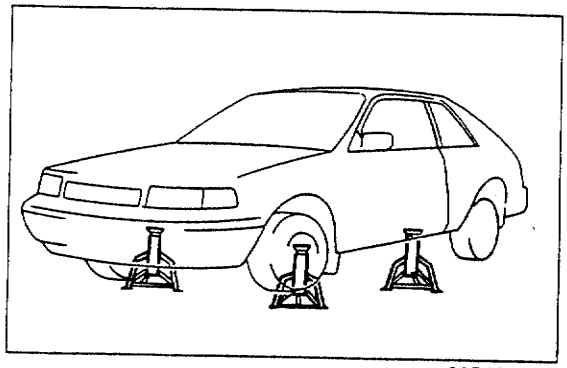
13. Connect the connector.
14. Turn the ignition switch OFF, and depress the brake pedal until heavy resistance is felt.
15. Remove the accumulator and gauge and **SST**.

16. Install a new accumulator O-ring and mount the accumulator.

Tightening torque:
39—45 N·m (4—4.6 m-kg, 29—33 ft-lb)

17. Bleed air from the system. (Refer to page P–32.)
18. Start the engine and depress the brake pedal strongly to check for fluid leakage.

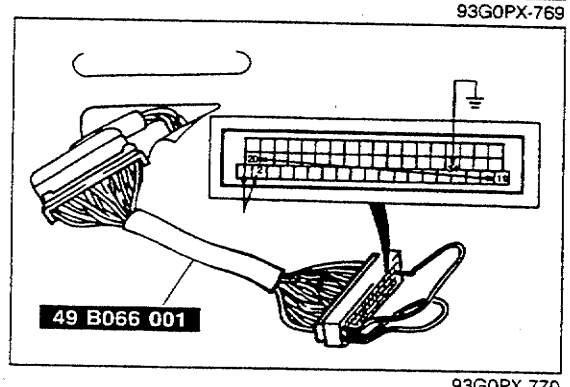
93G0PX-768



93G0PX-769

Inspection of hydraulic unit pressure-reduction

1. Jack up the vehicle and support it with safety stands.
2. Verify that the four wheels rotate.
3. Turn the ignition switch ON and wait until pump motor stops.
4. Turn the ignition switch OFF.
5. Remove front passenger seat and disconnect connector of the ABS control unit.
6. Install the **SST**.

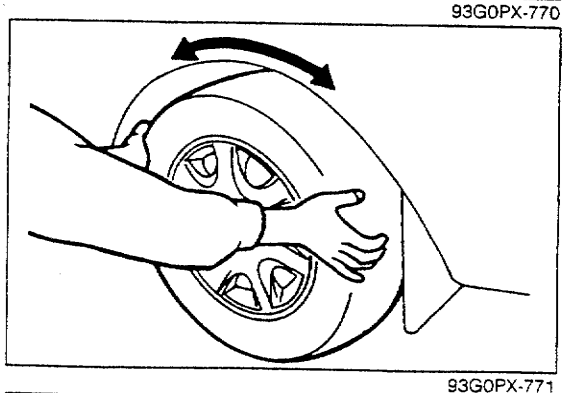


93G0PX-770

Caution

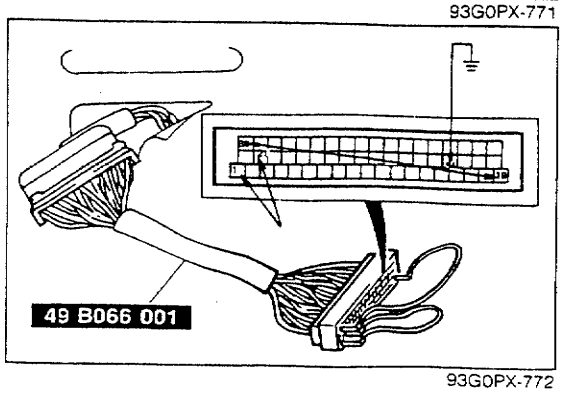
- **Never perform the following inspection without using the SST, the connector pins will be damaged.**

7. Ground terminal 34 of the **SST** with a jumper wire.
8. Jump terminal 2 to 1 and terminal 20 to 19.
9. Have an assistant depress the brake pedal, and verify that the left front wheel is locked.



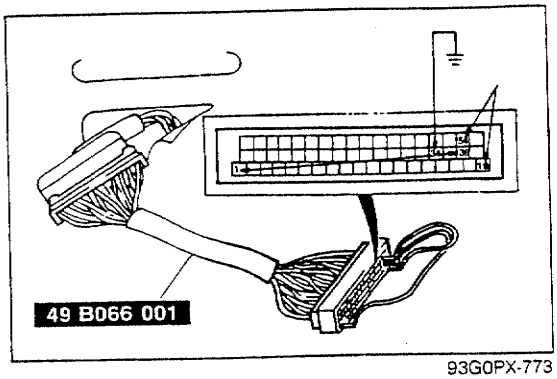
93G0PX-771

10. Holding the brake pedal depressed, turn the ignition switch ON. Verify that the left front wheel rotates when turned by hand.
11. Turn the ignition switch OFF, and disconnect the terminals connected in Step 8 (leave the ground terminal connected).



93G0PX-772

12. Connect terminal 21 to 1 and 38 to 19.
13. Perform inspection of the right front wheel following the procedure in Steps 9 and 10.
14. Turn the ignition switch OFF, and disconnect the terminals connected in Step 12.



93G0PX-773

15. Connect terminal 36 to 1 and 54 to 19.
16. Perform inspection of both rear wheels following the procedure in Steps 9 and 10.
17. If any test is not as specified, replace the valve block. (Refer to page P–43.)
18. Turn the ignition switch OFF, and disconnect the **SST**.
19. Reconnect the ABS control unit connector and install the control unit.
20. Install the seat.

Note

- **The above tests confirm the following:**

1) There is no major leakage of brake fluid within the hydraulic unit, the external lines or the brake calipers.
2) The electrical circuit (solenoids) within the hydraulic unit is operating correctly.
3) There is no problem with the main relay and valve control electrical circuit.

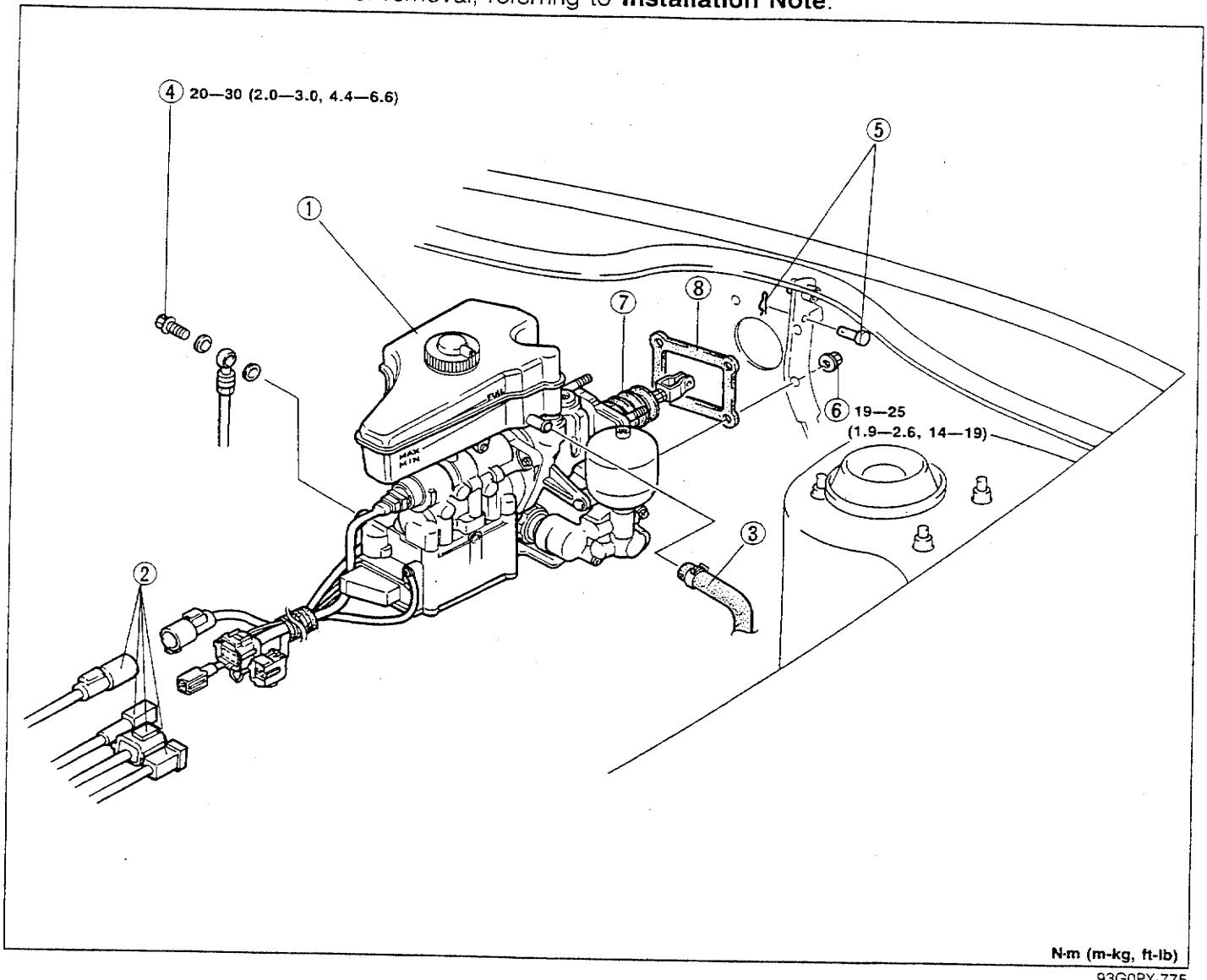
- **The following cannot be defined by the above tests:**

1) Operation of input circuits and devices to and including the ABS control unit.
2) Slight leakage of the external and internal hydraulic circuit.
3) Intermidiate malfunction of 1—3 above.

93G0PX-774

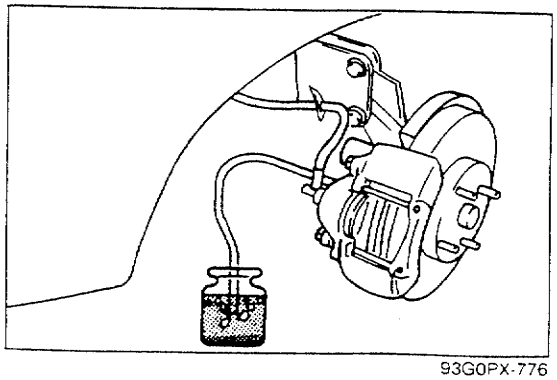
Removal / Installation

1. Before removal, release accumulator pressure by depressing the brake pedal several (about 20) times.
2. Remove the battery and disconnect the speedometer cable, and air pipe.
3. Remove in the order shown in the figure referring to **Removal Note**.
4. Install in the reverse order of removal, referring to **Installation Note**.



93G0PX-775

1. Brake fluid
   Removal Note ..... below
   Installation Note ..... page P–42
2. Connectors
3. Hose
4. Brake pipes
5. Spring pin and clevis pin
6. Nuts
7. Hydraulic unit
8. Gasket

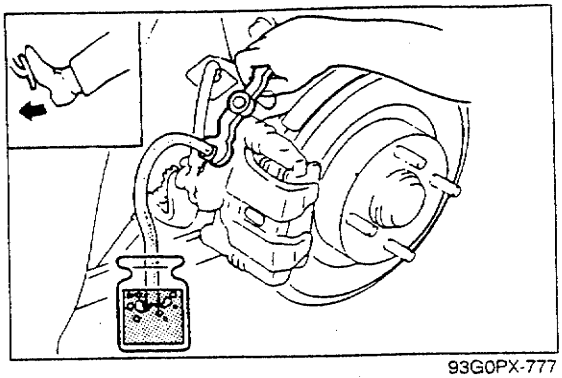


93G0PX-776

Removal Note

Brake fluid

1. Loosen a front brake bleeder screw with the **SST**.
2. Drain the brake fluid by pumping the brake pedal.


93G0PX-777

3. Loosen a rear brake bleeder screw with the **SST**.
4. With the ignition switch ON, drain the brake fluid by pumping the brake pedal.

Caution
- **Do not allow the pump motor to continue to run longer than two minutes.**

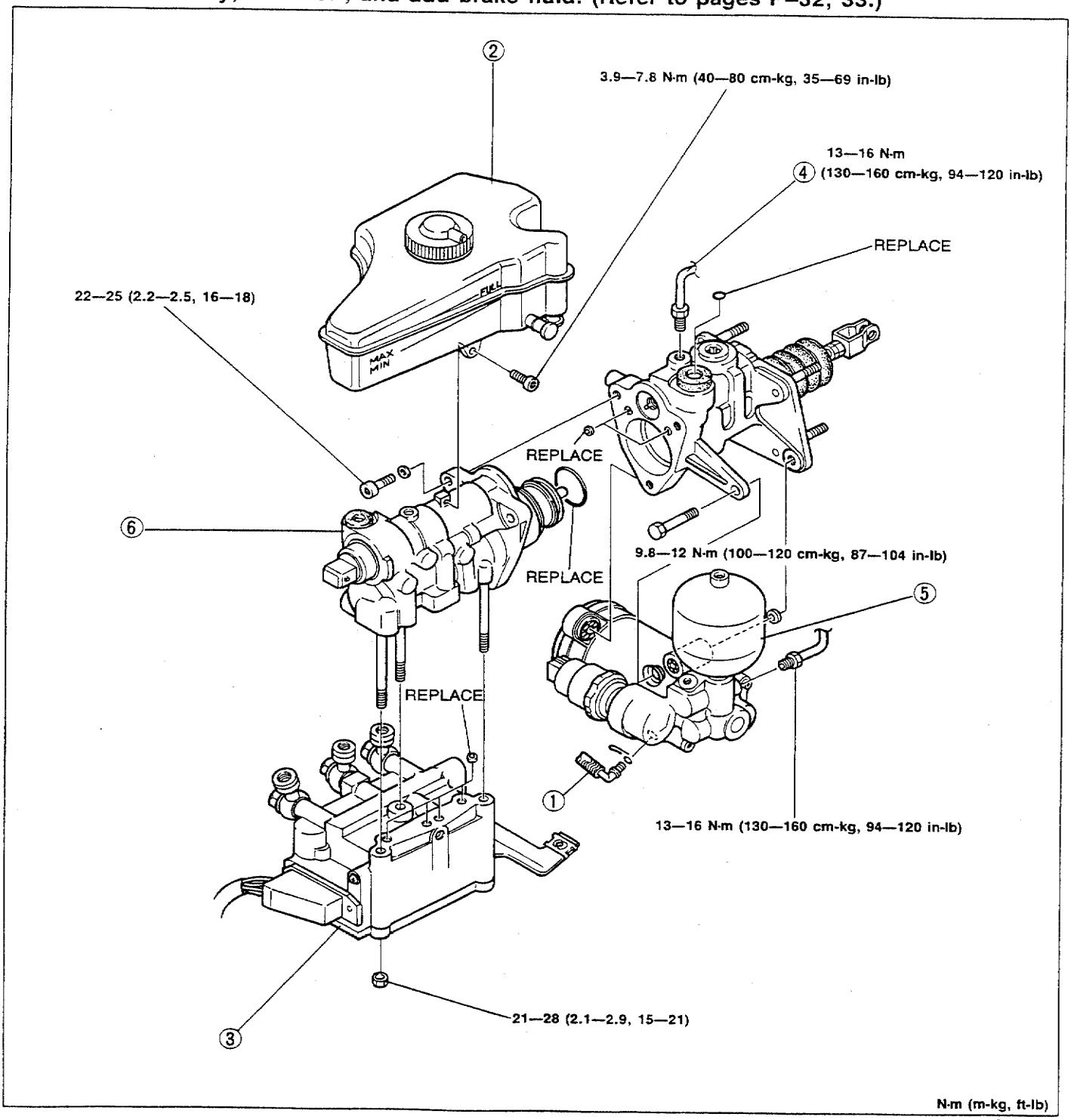
Installation Note
Brake fluid
1. Fill the reservoir with brake fluid and bleed the air. (Refer to page P–32.)

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.

Caution

- **After assembly, bleed air, and add brake fluid. (Refer to pages P–32, 33.)**

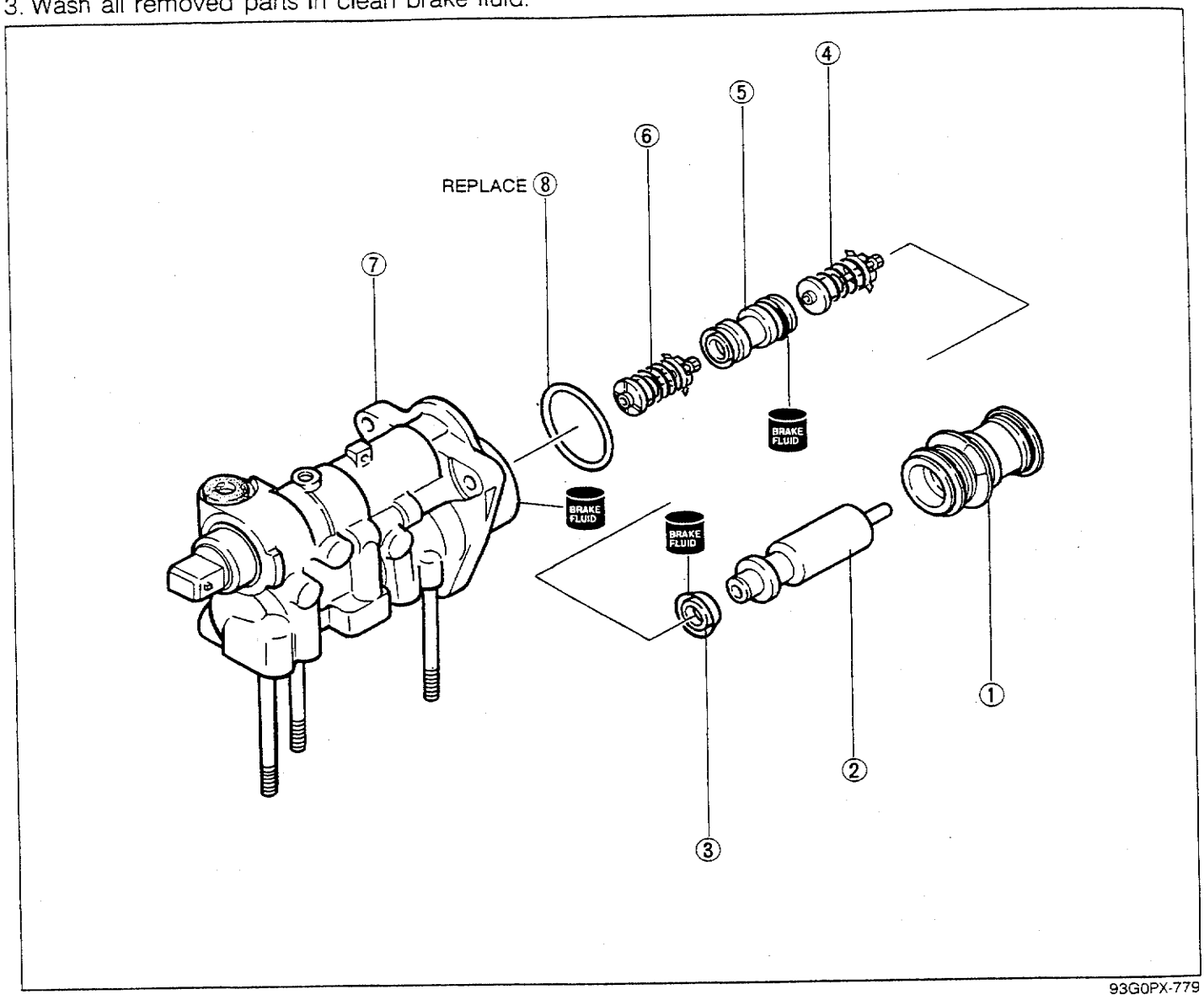


93G0PX-778

1. Hoses
2. Reservoir
3. Valve block
4. Brake pipes
5. Pump assembly
   Disassembly / Assembly ..... page P–45
6. Master cylinder assembly
   Disassembly / Assembly ..... page P–44
7. Booster assembly

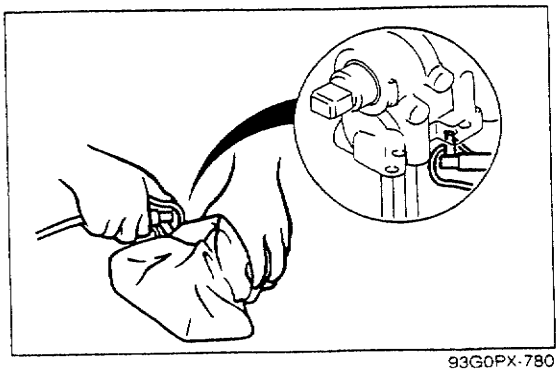
Disassembly / Assembly of Master Cylinder

1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Assemble in the reverse order of disassembly, referring to **Assembly Note**.
3. Wash all removed parts in clean brake fluid.



93G0PX-779

1. Reset piston assembly
   Assembly Note..... P–45
2. D-piston
3. Cup
4. Valve 1
5. S-piston assembly
   Disassembly Note..... below
6. Valve 2
7. Master cylinder body
8. O-ring



93G0PX-780

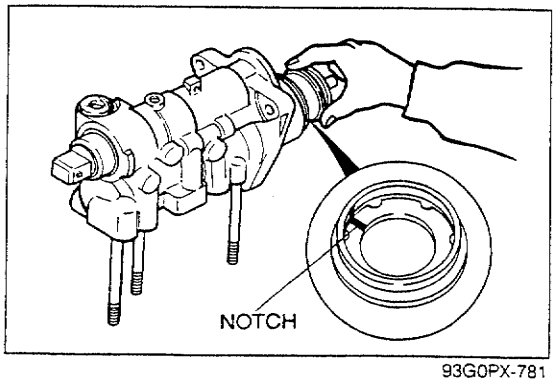
Disassembly Note

S-piston assembly

1. Blow compressed air through the secondary port as shown to force out the S-piston assembly.

Caution

- **Use a cloth to catch the brake fluid and piston.**

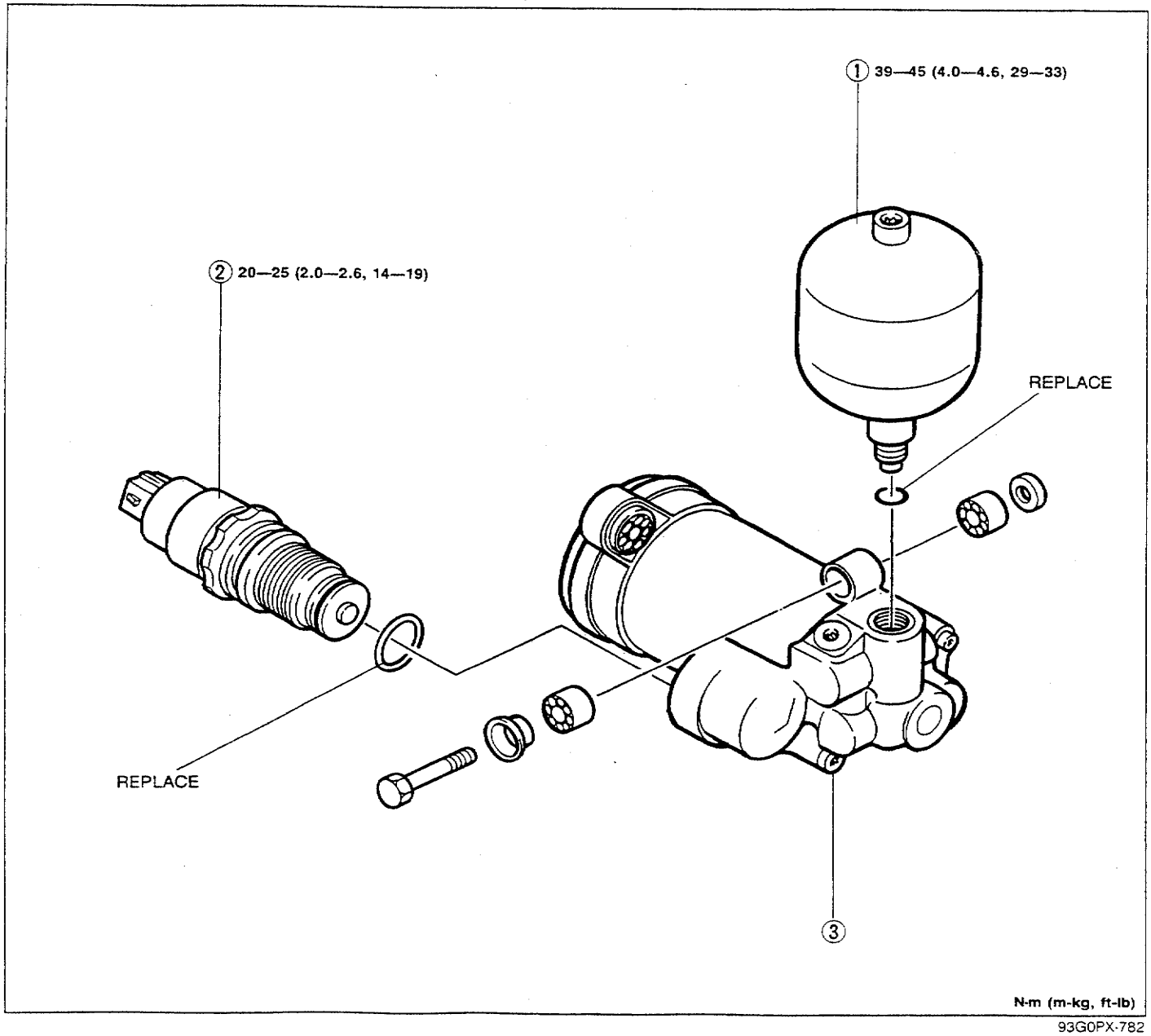


93G0PX-781

Assembly Note
Reset piston assembly
1. Install the reset piston, in the proper direction.

Caution
- **The notch in the reset piston must be positioned horizontally.**

Disassembly / Assembly of Pump Assembly
1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



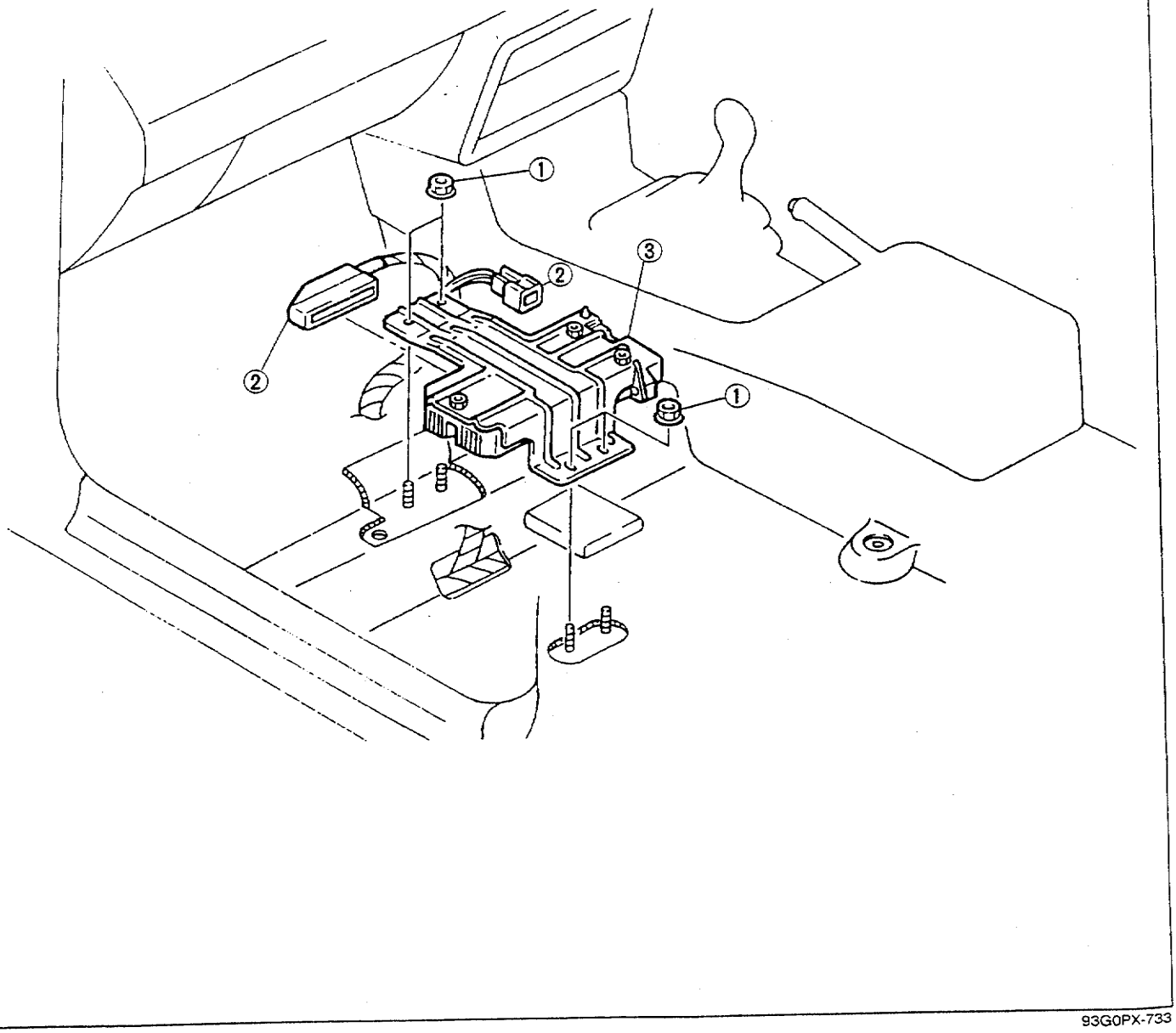
93G0PX-782

1. Accumulator
2. Pressure warning switch
3. Pump housing

ABS CONTROL UNIT

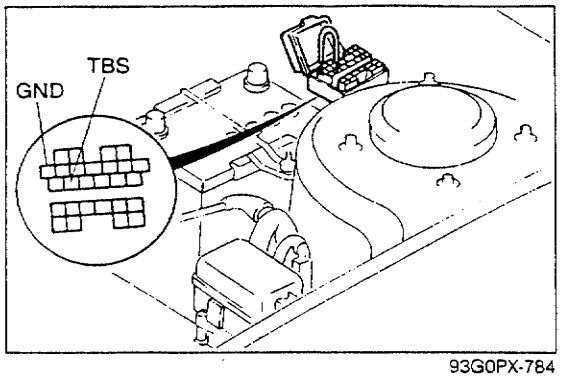
Removal / Installation

1. Disconnect the negative battery terminal.
2. Remove the driver seat.
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.
5. During installation, erase memorized malfunction code(s). (Refer to page P–29.)

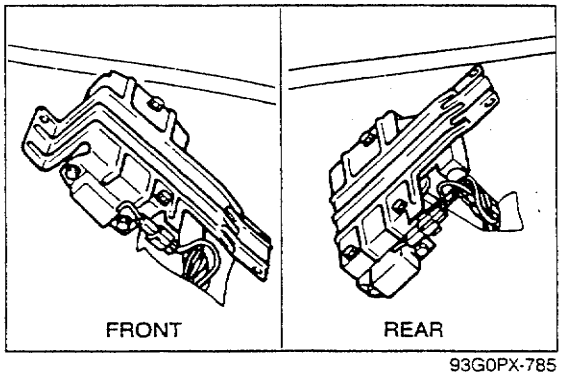


93G0PX-733

1. Nuts
2. Connectors
3. ABS control unit



93G0PX-784



93G0PX-785

G-SENSOR

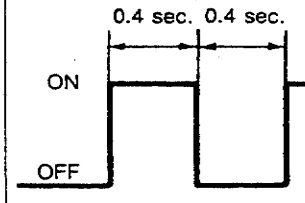
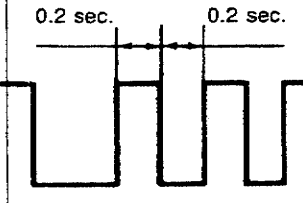
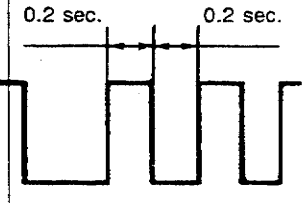
Inspection

1. Remove the ABS control unit. (Refer to page P–46.)
2. Place the vehicle on the level ground.
3. Connect terminals TBS and GND of the diagnosis connector with a jumper wire.
4. Turn the ignition switch ON.

Caution

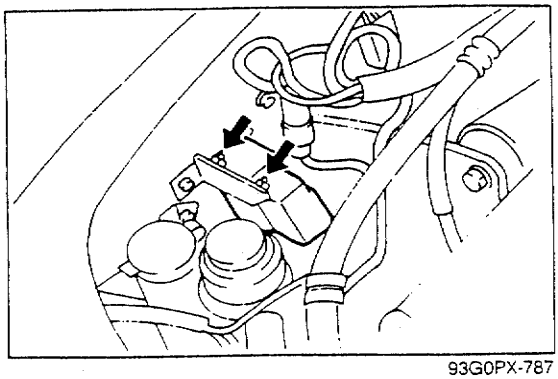
- **If a malfunction code is indicated by the ABS warning lamp, repair the defect and cancel the code. (Refer to page P–28.)**

5. Tilt ABS control unit slowly longitudinal in relation to its mounting direction and verify that the 4WABS warning light flashes as shown below.

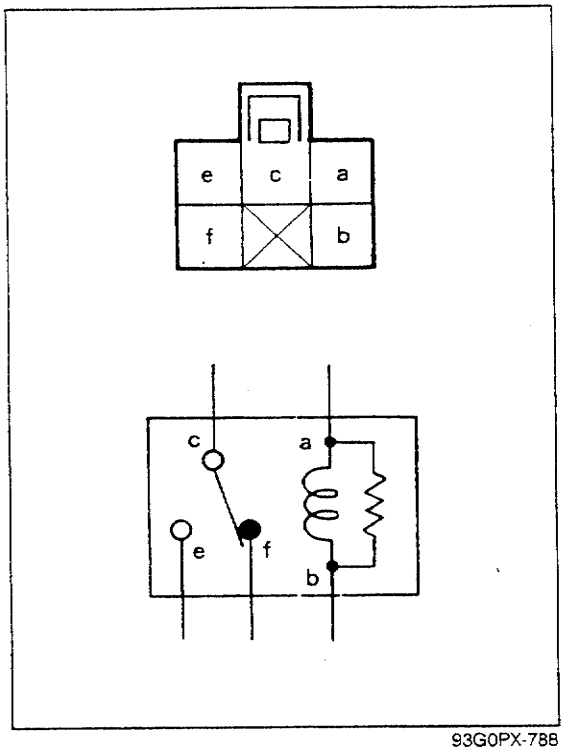
ABS C/U	Level	Tilted forward approx. 15°	Tilted forward approx. 30°	Tilted rearward approx. 16°
ABS warning lamp	OFF			

6. If not as specified, replace the ABS control unit.

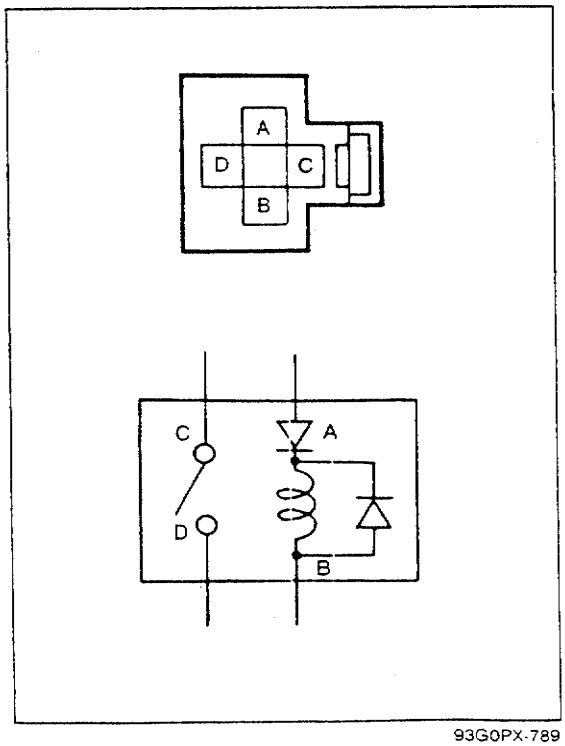
93G0PX-786



93G0PX-787



93G0PX-788



93G0PX-789

RELAY

Removal

1. Remove the negative battery terminal.
2. Remove the main relay and motor relay.
   (a) Remove the bolts and remove the main relay and motor relay from the bracket.
   (b) Disconnect the connector from each relay.

Inspection

Inspection of continuity

Main relay

1. Measure resistance between terminals a and b.

   Resistance: 90Ω ± 10Ω

2. Check continuity between terminals.
   (a) Continuity

Terminal	Continuity
c—f	Yes
c—e	No

   (b) Connect 12V between terminals a and b and check continuity.

Terminal	Continuity
c—f	No
c—e	Yes

3. If not as specified, replace the main relay.

Motor relay

1. Measure resistance between terminals A and B.

   Resistance: 57Ω ± 6Ω

2. Check continuity between terminals.

   (a) Continuity

Terminal	Continuity
C—D	No

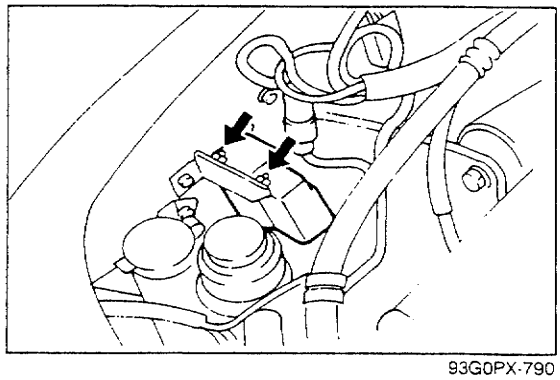
Caution

- **When applying 12V between terminals A and B, connect terminal A to positive and terminal B to negative.**

   (b) Apply 12V between terminals A and B and check continuity.

Terminal	Continuity
C—D	Yes

3. If not as specified, replace the motor relay.



93G0PX-790

Installation

Main relay and motor relay

1. Connect the connector to each relay.
2. Install the main relay and motor relay to the bracket and tighten the bolts.

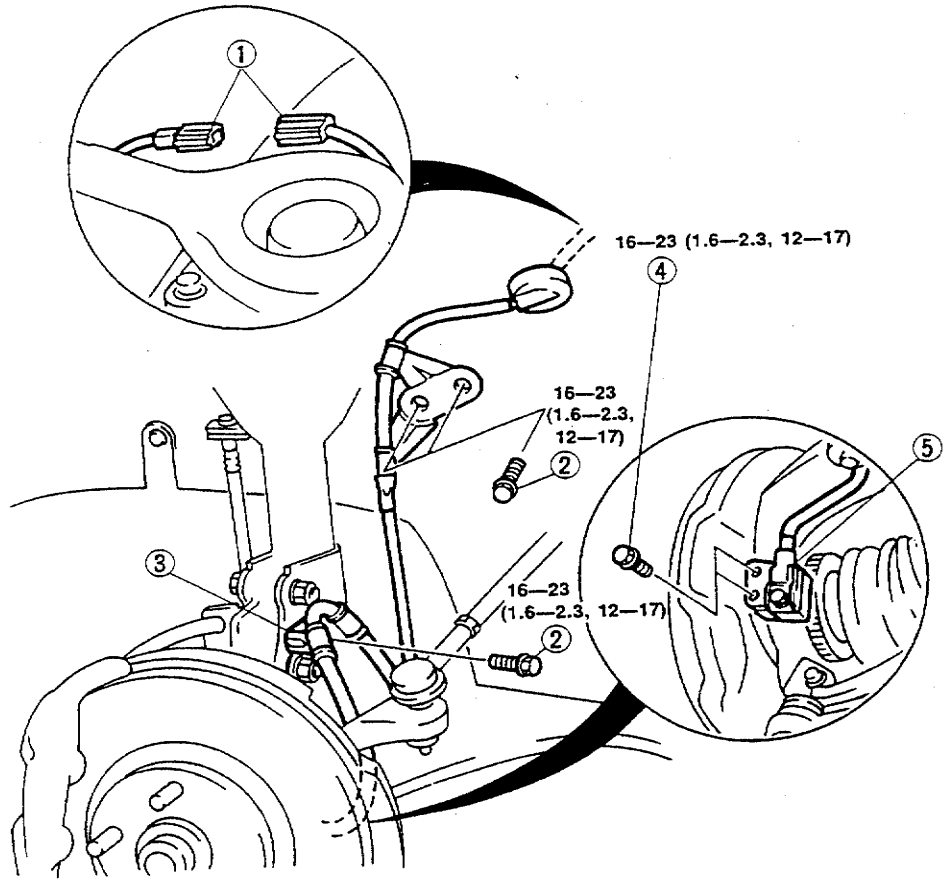
   Tightening torque:
   7.8—9.8 N·m (80—100 cm-kg, 69—87 in-lb)

3. Install the negative battery terminal.

WHEEL SPEED SENSOR (FRONT)

Removal / Installation

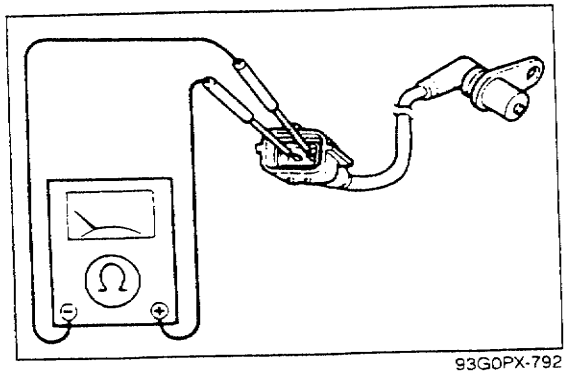
1. Removal in the order shown in the figure.
2. Install in the reverse order of removal.



N·m (m-kg, ft-lb)

93G0PX-791

1. Connector
2. Bolts
3. Bracket
4. Bolts
5. Wheel speed sensor
   Inspection..... below



93G0PX-792

Inspection

Wheel speed sensor

1. Measure resistance between terminals of the wheel speed sensor.

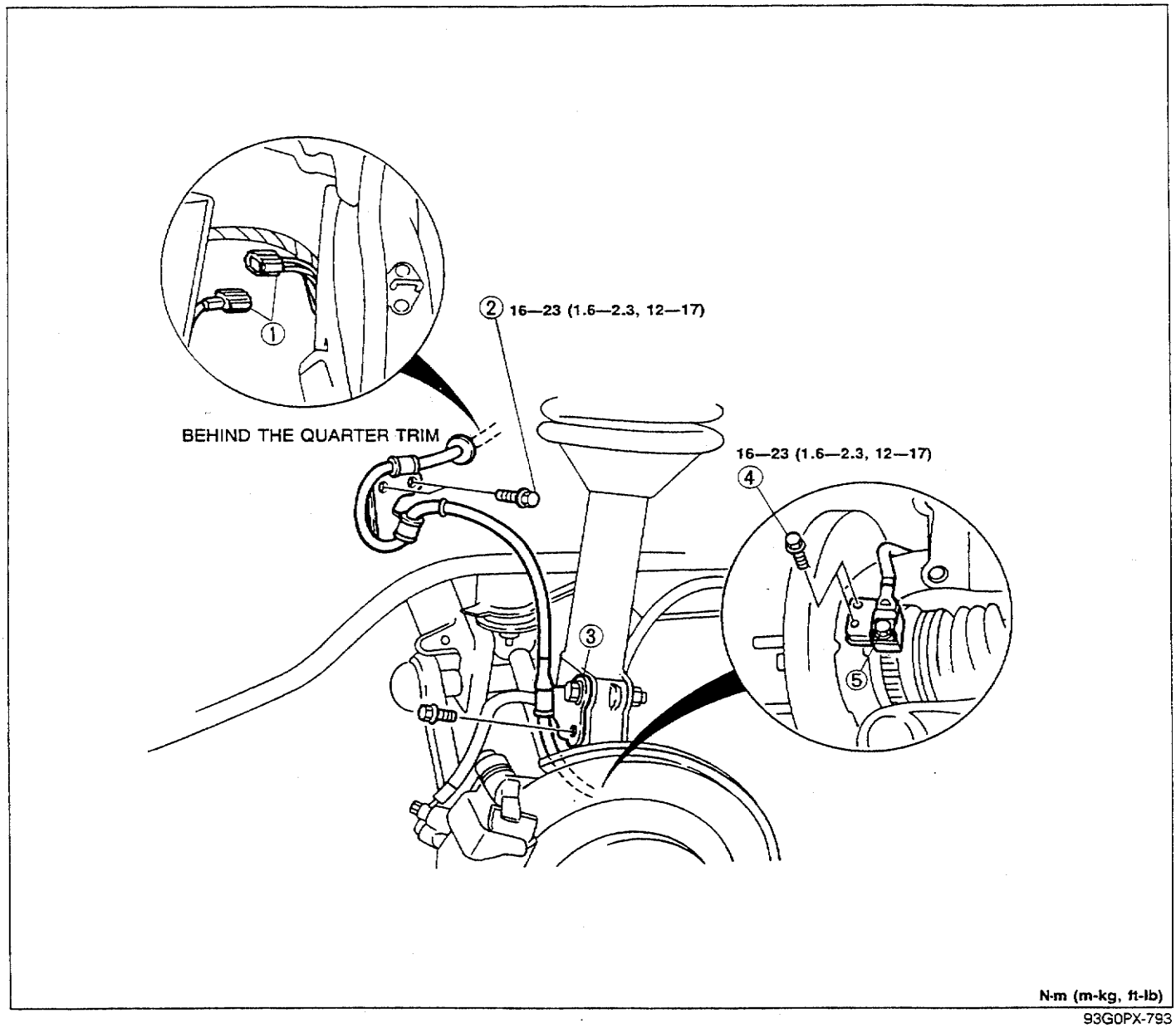
   Resistance: 1.1 kΩ ± 0.1 kΩ

2. If not as specified, replace the wheel speed sensor.

WHEEL SPEED SENSOR (REAR)

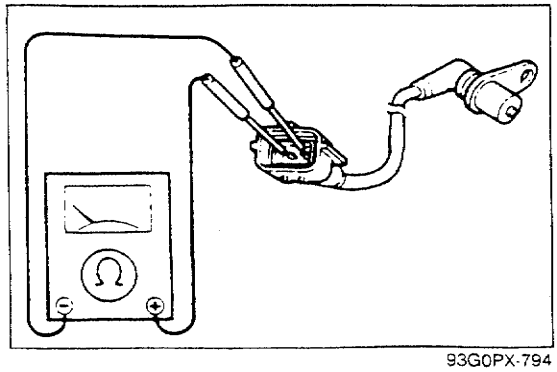
Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



93G0PX-793

1. Connector
2. Bolts
3. Bracket
4. Bolts
5. Wheel speed sensor
   Inspection..... below



93G0PX-794

Inspection

Wheel speed sensor

1. Measure resistance between terminals of the wheel speed sensor.

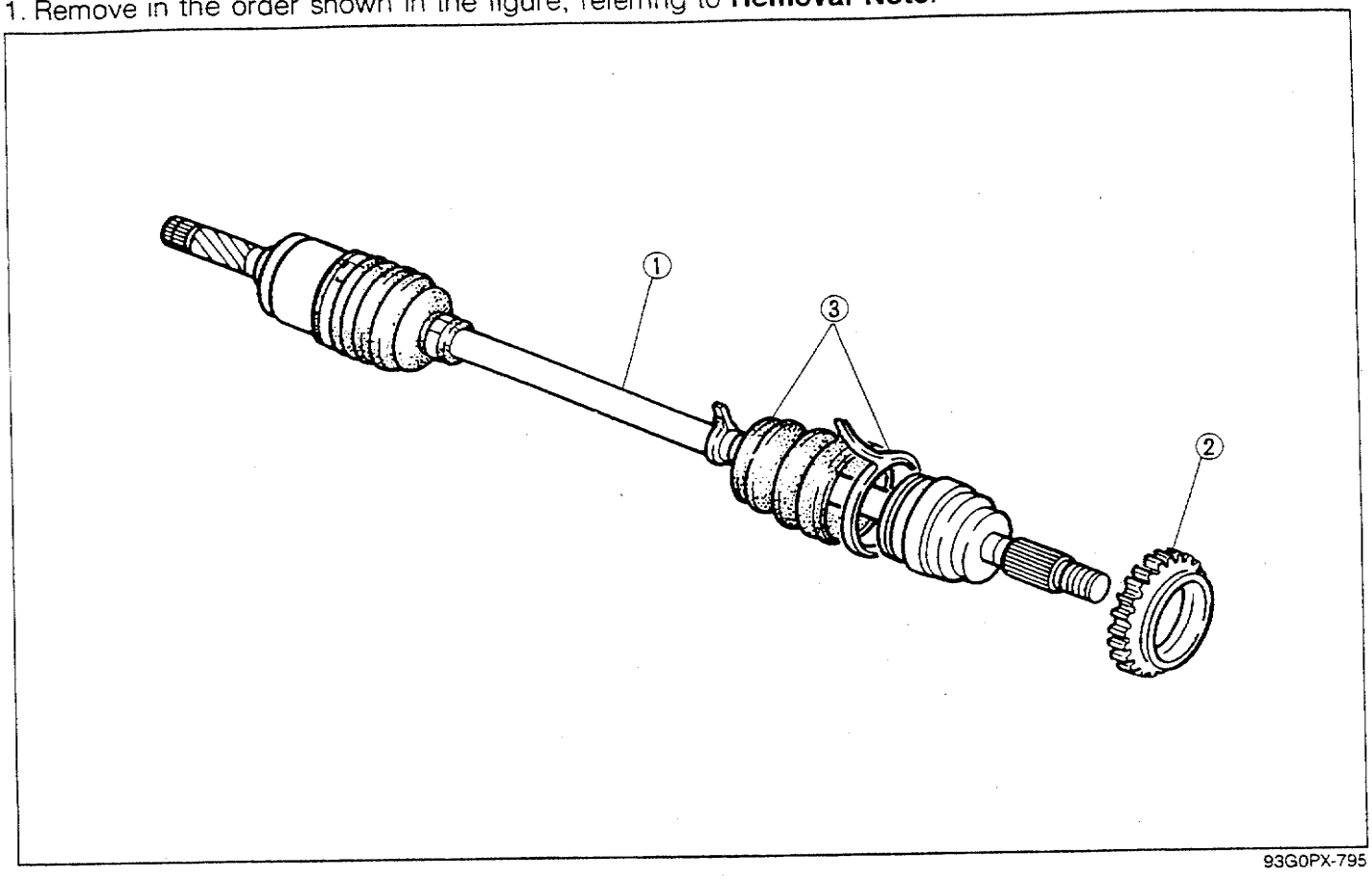
   Resistance: 1.1 kΩ ± 0.1 kΩ

2. If not as specified, replace the wheel speed sensor.

SENSOR ROTOR (FRONT)

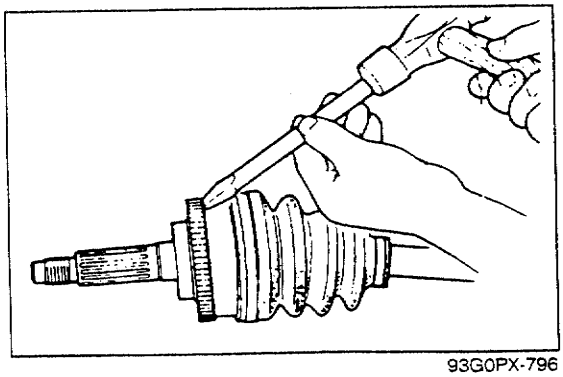
Removal

1. Remove in the order shown in the figure, referring to **Removal Note**.



93G0PX-795

1. Driveshaft
   Removal ..... .Section M
2. Sensor rotor
   Removal Note ..... below
3. Boot band and boot



93G0PX-796

Removal Note

Sensor rotor

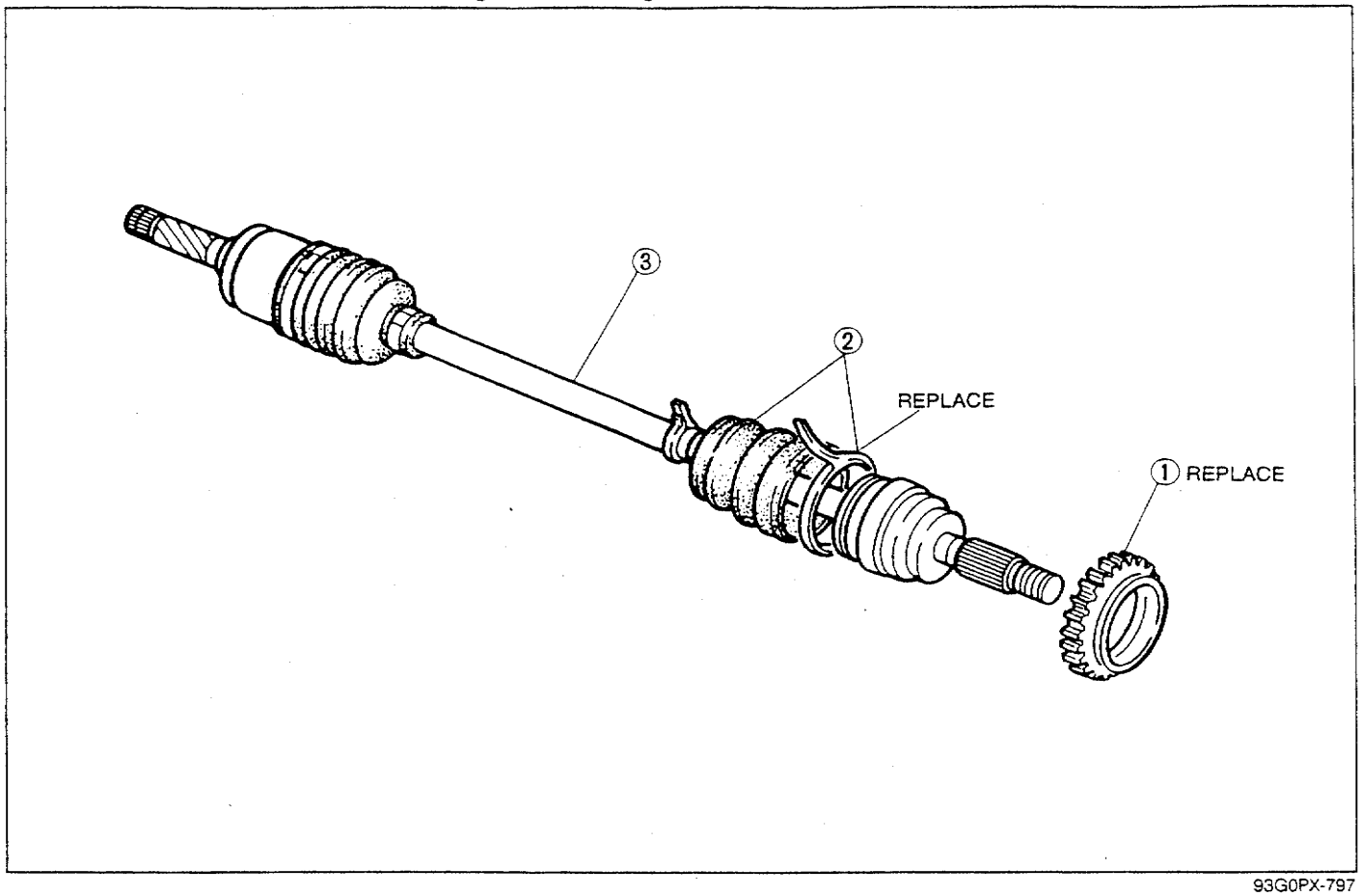
1. Tap the sensor rotor off the driveshaft with a chisel.

Caution

- **Do not reuse the sensor rotor.**

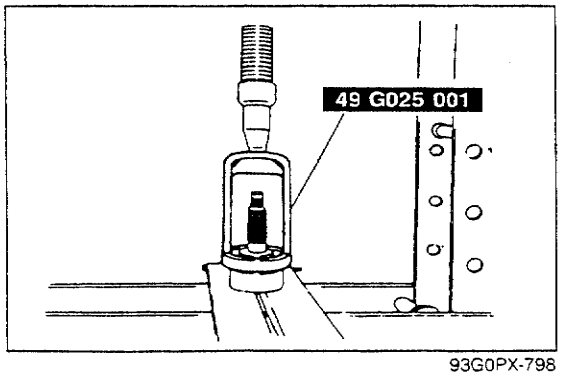
Installation

1. Install in the order shown in the figure, referring to **Installation Note**.



93G0PX-797

1. Sensor rotor
   Installation Note ..... below
2. Boot and boot band
3. Driveshaft
   Installation ..... Section M



93G0PX-798

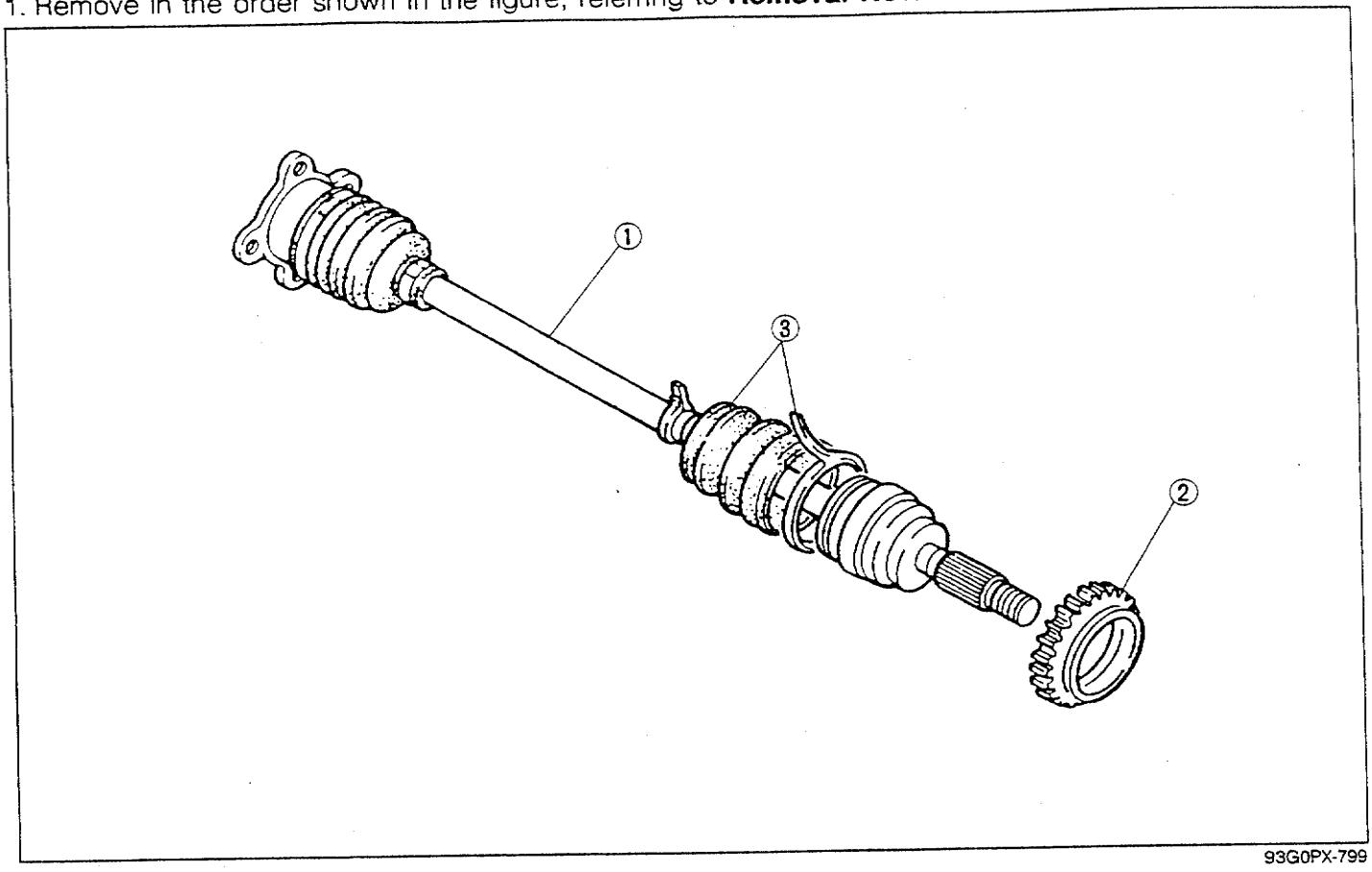
Installation Note
Sensor rotor

1. Set a new sensor rotor on the driveshaft and press it on with the **SST**.

SENSOR ROTOR (REAR)

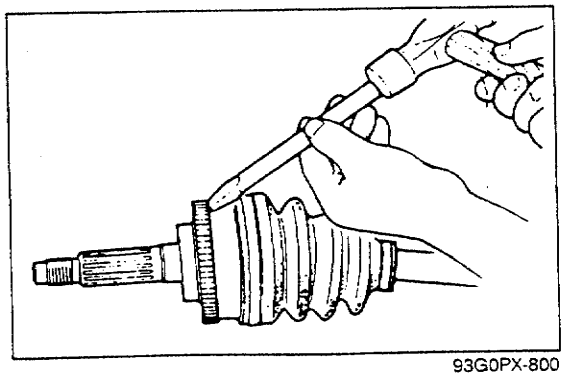
Removal

1. Remove in the order shown in the figure, referring to **Removal Note**.



93G0PX-799

1. Driveshaft
   Removal ..... Section M
2. Sensor rotor
   Removal Note ..... below
3. Boot band and boot



93G0PX-800

Removal Note

Sensor rotor

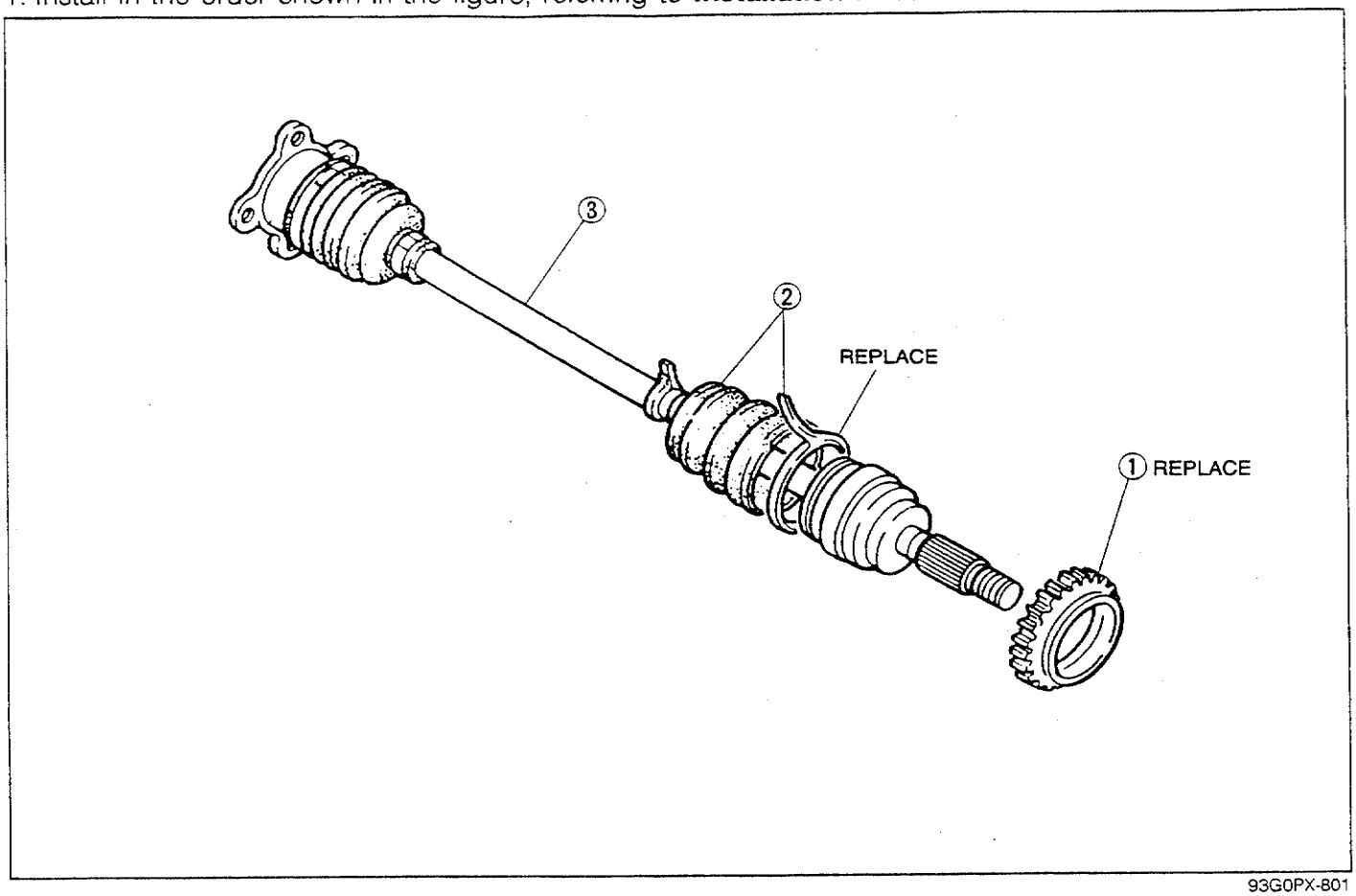
1. Tap the sensor rotor off the driveshaft with a chisel.

Caution

- **Do not reuse the sensor rotor.**

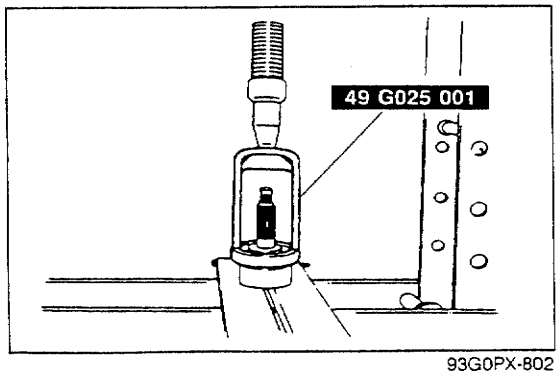
Installation

1. Install in the order shown in the figure, referring to **Installation Note**.



93G0PX-801

1. Sensor rotor
   Installation Note ..... below
2. Boot and boot band
3. Driveshaft
   Installation ..... Section M



93G0PX-802

Installation Note

ABS sensor rotor

1. Set a new sensor rotor on the driveshaft and press it on with the **SST**.

OUTLINE

The warning and fail-safe circuits of the ABS control unit work together to alert the driver of an ABS malfunction by illuminating the ABS warning indicator and to shut down ABS operation. When a problem occurs, the brake system goes to a normal hydraulic boosted system.

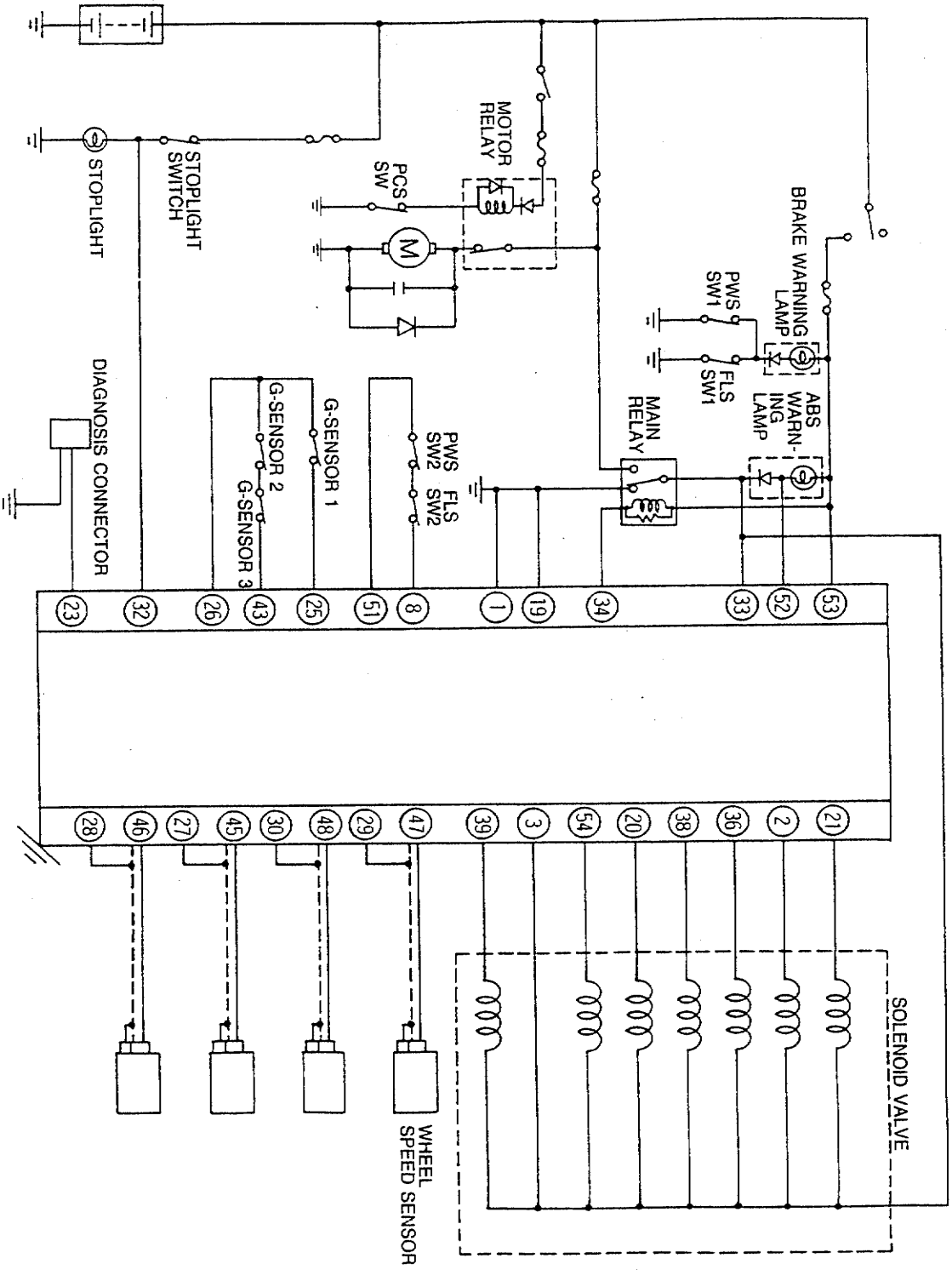
Troubleshooting
Malfunction codes are stored in the ABS control unit and are output during the diagnostic mode on command by the technician. These codes help to locate the probable cause of a malfunction. The codes are shown as flashing of the ABS warning indicator.

Service Note
Inspection of the 323 ABS is unique in the following ways.

- When the vehicle is jacked up, if a wheel is turned manually or by the engine for over 20 seconds while the ignition is ON, the ABS warning indicator may illuminate and a malfunction code will be stored in the ABS control unit. This is not to be considered a failure and must be erased from the control unit memory.
- Do not turn the ignition switch ON while an ABS related connector is disconnected. This will be judged as a malfunction and stored in the ABS control unit memory.
- Be sure to remove the jumper wire from the diagnosis terminal after inspecting and making repairs. The ABS may malfunction is this is not followed.
- The malfunction memory is not canceled by disconnecting the battery. After repairs are made, be sure to erase the memory as directed. (Refer to page P–13.)
- The ABS warning indicator may illuminate if a wheel is allowed to spin on during acceleration on a slippery surface. This is not a malfunction.

93G0PX-803

SYSTEM WIRING DIAGRAM



93G0PX-804

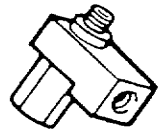
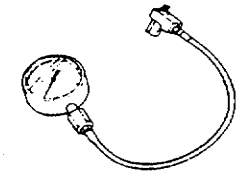
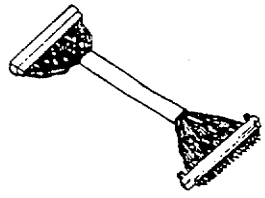
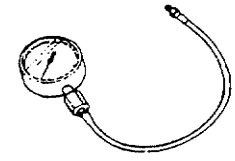
INPUT/OUTPUT RELATION TABLE

Output / Input	Hydraulic unit						ABS motor	Brake warning lamp	ABS warning lamp	Diagnosis connector
	Outlet			Inlet						
	Front		Rear	Front		Rear				
	Solenoid valve (Left)	Solenoid valve (Right)	Solenoid valve	Solenoid valve (Left)	Solenoid valve (Right)	Solenoid valve				
Speed sensor	○	○	○	○	○	○			○	○
G-sensor	○	○	○	○	○	○			○	○
Pressure control switch							○			
Pressure warning switch								○	○	
Fluid level switch								○	○	
Stoplight switch	○	○	○	○	○	○			○	
Main relay	○	○	○	○	○	○				○

93G0PX-805

PREPARATION

SST

49 B066 0A0 Gauge set, oil pressure 	For measuring accumulator pressure	49 B066 003 Attachment (Part of 49 B066 0A0) 	For measuring accumulator pressure
49 B066 001 Harness 	For inspection of ABS system	49 B066 002 Gauge and hose (Part of 49 B066 002) 	For measuring accumulator pressure

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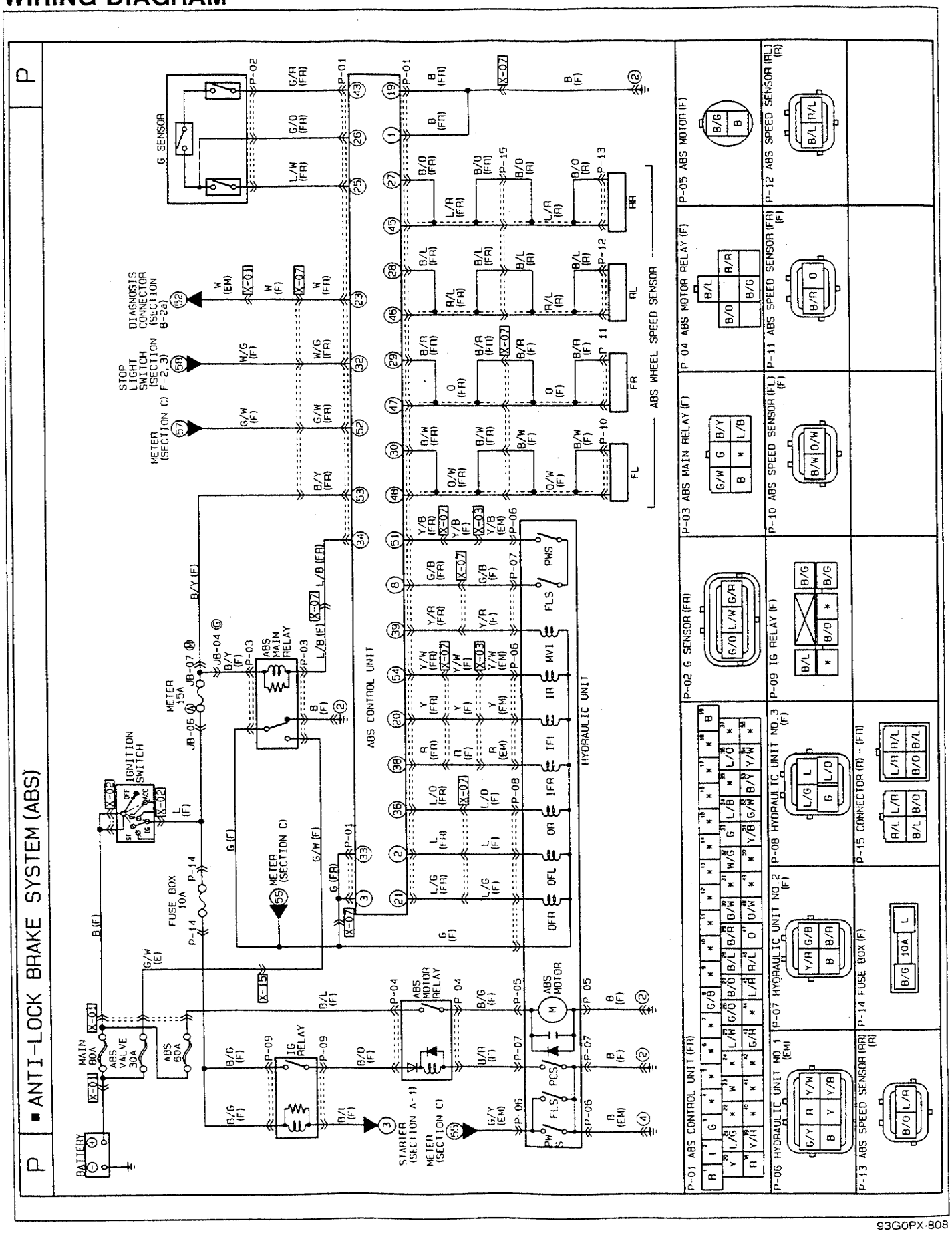
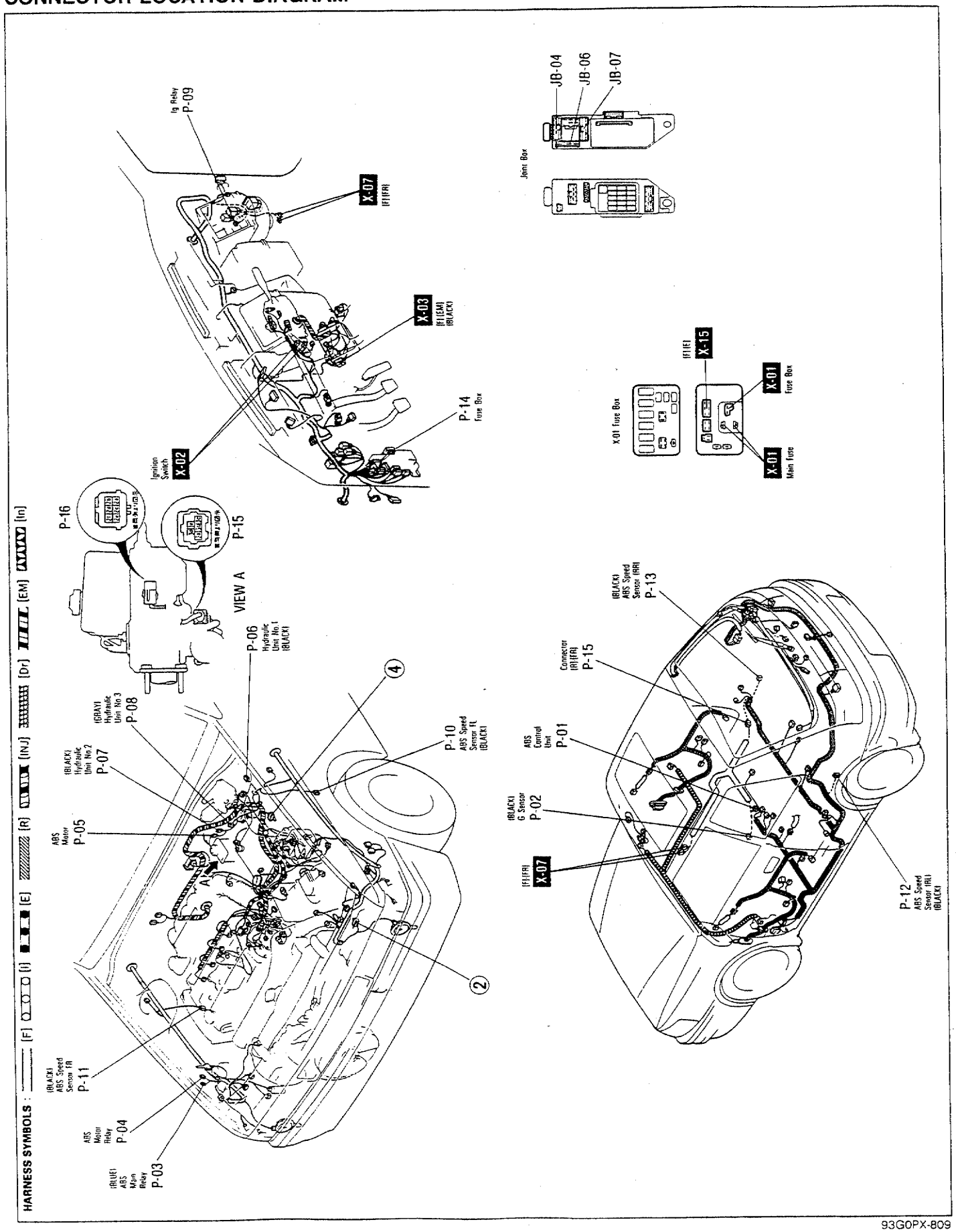
WIRING DIAGRAM



93G0PX-808

CONNECTOR LOCATION DIAGRAM



DIAGNOSIS CHART

Symptom \ Cause		Input							Output										
									Hydraulic unit										
									Outlet			Inlet							
									Front		Rear	Front		Rear					
		Speed sensor	G-sensor	Pressure control switch	Pressure warning switch	Fluid level switch	Stoplight switch	ABS main relay	Solenoid valve (LH)	Solenoid valve (RH)	Solenoid valve	Solenoid valve (LH)	Solenoid valve (RH)	Solenoid valve	ABS motor	Brake warning lamp	4WABS warning lamp	Diagnosis connector	ABS control unit
1	Warning indicator not illuminated when ignition switch terned ON															○	○		
2	Warning indicator remains ON	○	○	○	○	○			○	○	○	○	○	○					○
3	Warning indicator flashes at 0.2 second or 0.4 second cycle.		○															○	
4	Warning indicator illuminated when vehicle speed exceeds 10 km/h (6.2 mph)																	○	○
5	Both ABS warning lamp and brake warning lamp illuminated during braking								Caused by malfunction of hydraulic line										

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DIAGNOSTIC INDEX

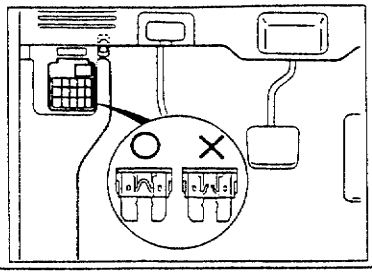
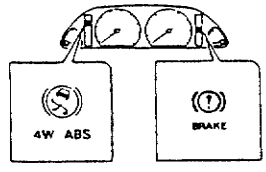
No.	Troubleshooting items	Remarks	Page
1	Warning lamp not illuminated when ignition switch turned ON.	—	P–64
2	Warning lamp remains ON	Warning lamp remains ON and ABS does not operate	P–65
3	Warning lamp flashes at 0.2 second or 0.4 second cycle	—	P–67
4	Warning lamp illuminated when vehicle speed exceeds 10 km/h (6.2 mph)	—	P–67
5	Brake warning light illuminates	Warning lamp remains ON	P–68
6	Both ABS warning lamp and brake warning lamp illuminated during braking	ABS does not operate	P–69

93G0PX-811

SYMPTOM TROUBLESHOOTING

1	Warning lamp not illuminated when ignition switch turned ON.
Detailed description	—

Possible cause:
- If other warning indicators do not illuminate, METER 15A fuse may be fused
- Failed indicator lamp or open in related wiring harness

STEP	INSPECTION		ACTION
1	Is METER 15A fuse OK? ☞ **page P–74** 	Yes	Go to next step
		No	Replace METER 15A fuse
2	Are harnesses of warning lamp normal? 	Yes	Inspect warning indicator ☞ **page P–82**
		No	Check illumination of warning indicator when terminal of ABS control unit or main relay connector is grounded ☞ **page P–75**

Condition	ABS CU	Main relay connector
	Terminal 52	L-03 (B/Y terminal)
a	○	×
b	×	○
c	○	○
d	×	×

○: ON ×: OFF

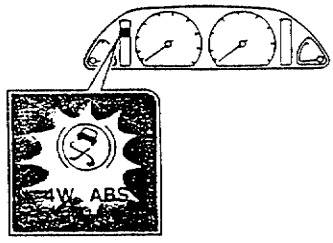
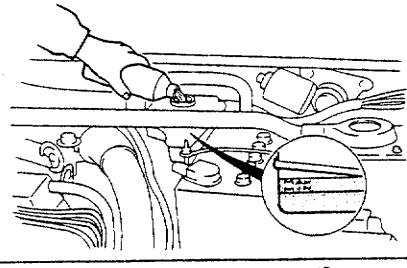
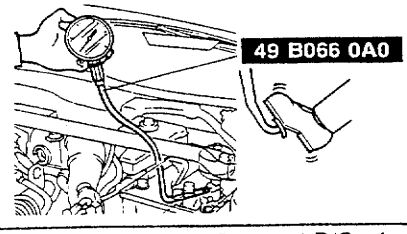
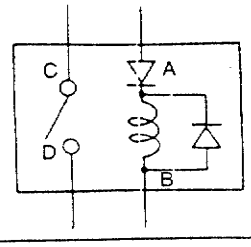
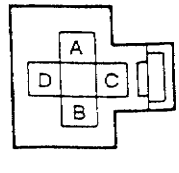
Condition a: Inspect harness between warning lamp and main relay
Condition b: Inspect harness between warning lamp and ABS CU
Condition c: Inspect harness between main relay and ground
Condition d: Inspect harness in instrument panel
Repair wiring harness

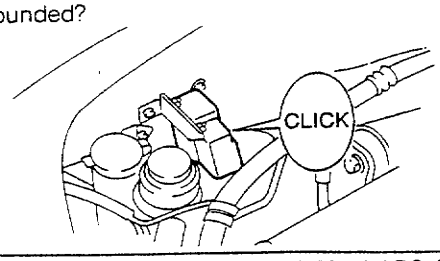
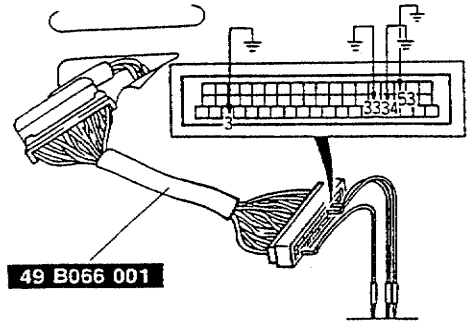
93G0PX-812

2	Warning lamp remains ON
Detailed description	Warning lamp remains ON and ABS does not operate

Possible Cause

- If ABS warning lamp only illuminates, activate diagnostic mode and check for malfunction code
- Low hydraulic pressure
  - 1 Insufficient brake fluid
  - 2 Leakage of hydraulic fluid
  - 3 Malfunction of ABS pump motor
  - 4 Malfunction of master cylinder/hydraulic unit
- Malfunction of pressure warning switch
- Malfunction of fluid level switch
- Malfunction of ABS control unit

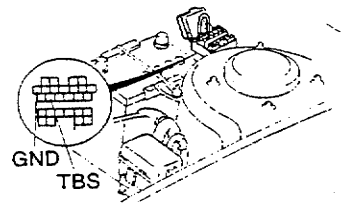
STEP	INSPECTION		ACTION
1	Check if warning indicator outputs malfunction code with ignition switch ON (Diagnosis connector terminals TBS and GND connected) ☞ page P–12 	Yes	Read malfunction code ⇨ Inspect as indicated ☞ page P–70
		No	Go to next step
2	Is brake fluid level at MAX? 	Yes	Go to next step
		No	Add brake fluid and return to Step 1
3	Is hydraulic pressure as specified? ☞ page P–77 	Yes	Inspect wiring harness of pressure warning switch or fluid level switch ☞ page P–88
		No	Go to next step
4	Connect terminal-wires B/L and B/G of motor relay connector (P-04) and depress brake pedal three or four times. Verify operation sound of motor is heard (Ignition switch ON) ☞ page P–75 C: B/L D: B/G  	Yes	Go to next step
		No	• Repair wiring harness between motor and motor relay or between motor and ground • Repair wiring harness between ignition switch and motor relay • Replace ABS 10A fuse • Replace pump motor

STEP	INSPECTION		ACTION
5	Is sound of relay heard when master cylinder/hydraulic unit terminal-wire (B/R) of connector P-07 is grounded? 	Yes	Go to next step
		No	• Repair wiring harness between motor relay and pressure warning switch or motor relay and power source • Replace motor relay • Replace ABS 10A fuse ☞ **page P–93**
6	Is voltage at terminals 3, 33 and 53 of ABS CU as specified? **Voltage: 10V min.** 	Yes	Replace pump unit
		No	• Repair wiring harness between battery and ABS CU • Inspect connection of ABS main relay • Replace ABS main relay ☞ **page P–92**

93G0PX-813

3	Warning lamp flashes at 0.2 second or 0.4 second cycle
Detailed description	—

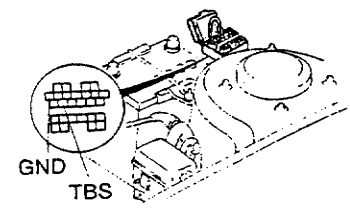
Possible cause:
- Diagnosis connector terminal TBS grounded
- Malfunction of G-sensor
- ABS control unit tilted
  (Diagnosis connector TBS terminal grounded)

STEP	INSPECTION		ACTION
1	Was jumper wire left connecting diagnosis terminals TBS and GND?  	No	Go to next step
		Yes	Remove jumper wire
2	Is operation of G-sensor OK? ☞ page P–80	Yes	Replace ABS control unit
		No	• Repair wiring harness between G-sensor and ABS control unit • Replace G-sensor unit

93G0PX-814

4	Warning indicator illuminated when vehicle speed exceeds 10 km/h (6.2 mph)
Detailed description	—

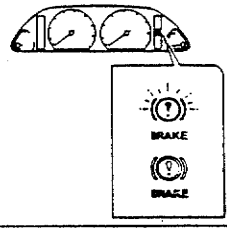
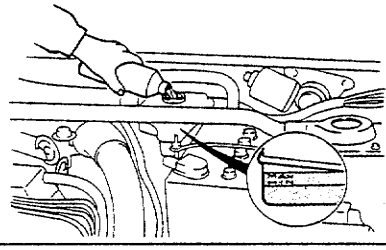
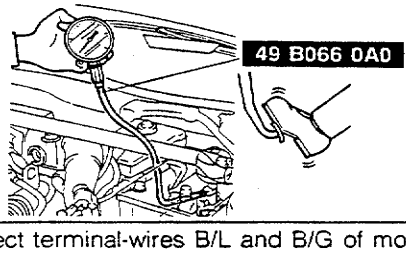
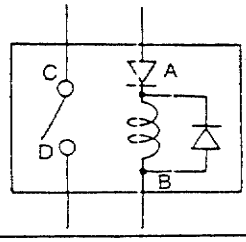
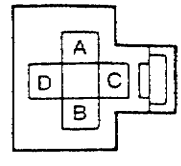
Possible cause
- Diagnosis connector terminal TBS grounded

STEP	INSPECTION		ACTION
1	Verify that there is no continuity between terminal TBS and ground  	No	Replace ABS control unit
		Yes	Short between terminal TBS and ground

93G0PX-815

5	Brake warning indicator illuminated
Detailed description	Warning light remains ON

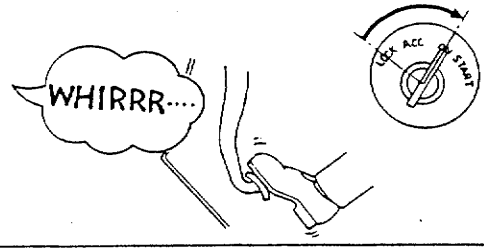
Possible cause:
- Low hydraulic pressure
  1. Insufficient brake fluid
  2. Leakage of hydraulic fluid
  3. Malfunction of pump motor
  4. Malfunction of master cylinder/hydraulic unit
- Malfunction of pressure warning switch
- Malfunction of fluid level switch
- Malfunction of pressure control switch
- Malfunction of ABS control unit

STEP	INSPECTION		ACTION
1	Start engine from ignition OFF condition and check if brake warning lamp goes OFF 	Yes	Go to next step
		No	Repair short in brake warning lamp wiring harness
2	Is brake fluid level at MAX? 	Yes	Go to next step
		No	Add brake fluid and return to Step 1
3	Is hydraulic pressure as specified? ☞ page P–77 	Yes	Inspect pressure warning switch, fluid level switch and pressure control switch ☞ page P–89
		No	Go to next step
4	Connect terminal-wires B/L and B/G of motor relay connector (P-04) and depress brake pedal three or four times Verify operation sound of motor is heard (Ignition switch: ON) ☞ page P–75	Yes	Go to next step
		No	• Repair wiring harness between motor and motor relay or between motor and ground • Repair wiring harness between ignition switch and motor relay • ABS 10A fusing • Malfunction of pump motor
5	Is sound of relay heard when master cylinder/hydraulic unit terminal-wire (B/R) of connector P-07 is grounded? ☞ page P–76  B: B/R 	Yes	Replace pump motor ☞ page P–82
		No	• Defective harness between motor relay and pressure warning switch or motor relay and power source. • Malfunction of motor relay • ABS 10A fuse

93G0PX-816

6	**Both ABS warning lamp and brake warning lamp illuminated during braking**
Detailed description	ABS does not operate

Possible cause:
- Low hydraulic pressure
  1. Leakage of hydraulic fluid
  2. Malfunction of accumulator
  3. Malfunction of master cylinder/hydraulic unit
  4. Air in brake system

STEP	INSPECTION		ACTION
1	Is accumulator function OK? ☞ **page P–81** 	Yes	Go to next step
		No	Check for air in system If no air found, conduct hydraulic pressure test ☞ **page P–77**
2	Change accumulator, leave it for 30 min. Measure the fluid pressure **Fluid pressure,** **13,734 km (140 kg/cm^2, 1,991 psi) min**	Yes	Repair fluid leakage
		No	Replace hydraulic unit

93G0PX-817

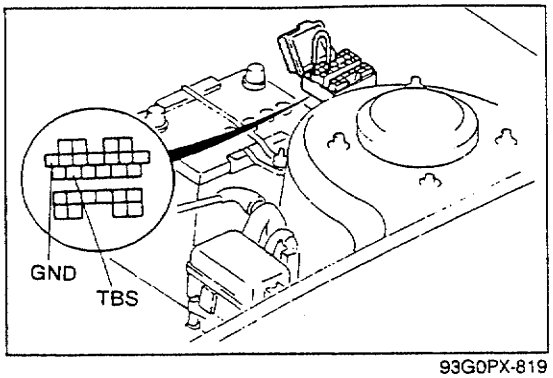
SELF-DIAGNOSTIC FUNCTION

INSPECTION BY DIAGNOSTIC MODE

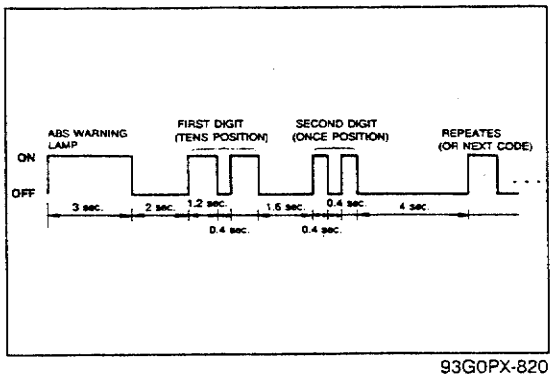
Diagnostic Mode

Malfunction of the input and output devices can be checked for in this mode by noting the flash pattern of the ABS warning indicator. (Refer to pages P–71, 72.)

93G0PX-818



93G0PX-819



93G0PX-820

Inspection Procedure

Preparation

1. Park the vehicle on level ground.
2. Connect terminals TBS and GND of the diagnosis connector with a jumper wire.

Retrieving malfunction codes

1. Turn the ignition switch ON and verify that the ABS warning lamp is ON.
2. After about three seconds the ABS warning will begin to flash.
3. Note the flash pattern of the warning lamp.

Note

- **If there is more than one malfunction, the codes will be indicated in numerical order, lowest number first.**

4. Perform the inspection as indicated by the malfunction code number. (Refer to page P–72.)

Note

- **If there is no malfunction code to be output, the system will advance to G-sensor inspection mode. (Refer to page P–29.)**
- **Do not disconnect the TBS terminal during output of malfunction codes.**
- **The ABS warning indicator will return to normal function about two seconds after disconnecting terminal TBS.**

CANCELLATION OF MALFUNCTION CODE

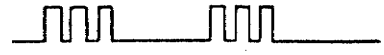
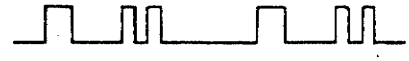
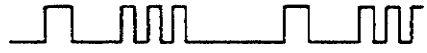
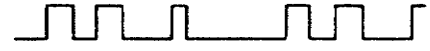
- Failure code stored in CU can be cancelled according to the following procedure.
  1. Output all the error codes stored.
  2. With diagnosis mode, ensure that first code is output again and depress brake pedal ten times with less than one second interval.
  3. When cancellation of error code is completed, it is switched to G-sensor indication mode. (Refer to page P–29.)

Note

- **Error codes will not be cancelled unless all the brake pedal application intervals are within one second.**
- **They cannot be cancelled when brake light bulb is burnt out or when they brake light switch is failed.**

93G0PX-821

MALFUNCTION CODES

Malfunction code	Warning indicator pattern	Sensor or subsystem		Possible cause
01		Pressure warning switch/ Fluid level switch		• Short circuit or PWS/FWS malfunction
03		G-sensor		• Short circuit or G-sensor malfunction (Refer to G-sensor test mode)
11		Right front	ABS wheel-speed sensor/ABS sensor rotor	• Short or open circuit • Incorrect clearance (Sensor—Sensor rotor) • Damaged sensor rotor • Loose sensor rotor
12		Left front		
13		Right front		
14		Left front		
21		Main control solenoid valve		• Short or open circuit • Stuck valve • Plugged hydraulic circuit
22		Inlet or outlet solenoid valve		• Short or open circuit • Stuck valve • Plugged hydraulic circuit
61		ABS control unit		Control unit malfunction

93G0PX-822

Note

- **Refer to page P–73 for inspection procedure and the appropriate page.**

Code No.01	Pressure warning switch/fluid level switch		
Step	Inspection	Note	Page
1	Inspect pressure warning switch and fluid level switch	Inspect wiring harnesses between ABS CU and each switch	P–88, 89

93G0PX-823

Code No.03	G-sensor		
Step	Inspection	Note	Page
1	Inspect G-sensor	Inspect wiring harness between ABS CU and G-sensor	P–80

93G0PX-824

Code No.11, 12, 13, 14	ABS wheel speed sensor/ABS sensor rotor		
Step	Inspection	Note	Page
1	Inspect connection of ABS CU connector	Inspect wiring harness between ABS CU and wheel speed sensor	—
2	Inspect wheel speed sensor concerned	Disconnect ABS CU connector and measure resistance of wheel speed sensor	P–86
3	Inspect ABS wheel speed sensor mounting	Inspect for looseness, damage or excessive gap	P–86
4	Inspect ABS sensor rotor	Inspect for damage or looseness	P–87

93G0PX-825

Code No.21, 22	Solenoid valve (Main control, Inlet, Outlet)		
Step	Inspection	Note	Page
1	Inspect solenoid valve	Inspect solenoid valve for damage	P–91
2	Inspect wiring harness between solenoid valve and ABS CU	Inspect for open or short circuit	—
3	Inspect ABS system operation	Struck or plugged valve	P–84
4	Inspect for battery voltage	Inspect wiring harness for open or short circuit Inspect main relay for proper connection	P–79

93G0PX-826

Code No.61	ABS EU		
Step	Inspection	Note	Page
1	Replace ABS control unit	Malfunction of ABS CU	—

93G0PX-827

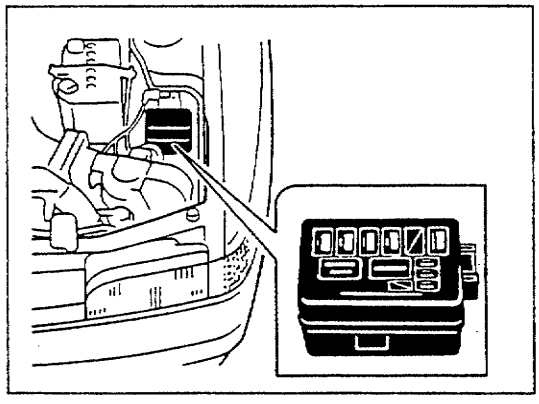
SIMPLE INSPECTION

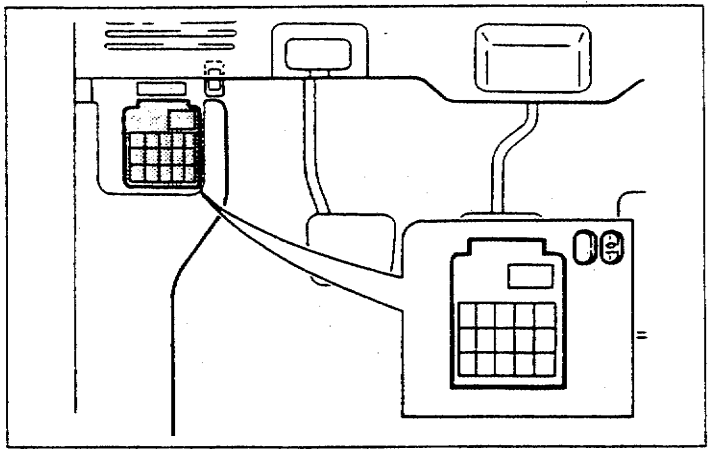
INSPECTION OF FUSE

Fuses which are related to ABS are as follows.

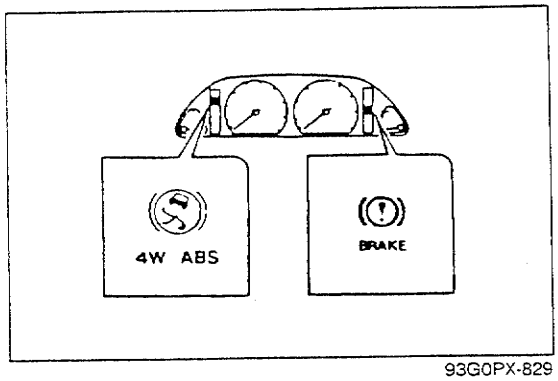
Fuse and rating	Location	Condition when fuse burned
ABS 60A	In main fuse box	ABS warning indicator illuminated (Motor and solenoids do not operate)
MAIN 80A		Not operate
ABS 10A	Fuse panel (at left side kick panel)	Motor does not operate
STOP 10A		Stoplights do not operate (Slight effect on feeling when ABS activated)
METER 15A		All warning indicators do not illuminate

Inspection
Inspect fuse referring to the above table.





93G0PX-828



93G0PX-829

INSPECTION OF ABS WARNING INDICATOR

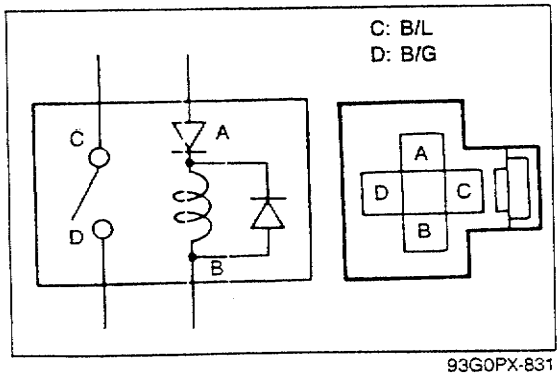
1. Disconnect the ABS CU with the ignition switch OFF.
2. Turn the ignition switch ON.
3. Verify that the ABS warning lamp is ON.
4. Disconnect the relay box connector.
5. Verify that the ABS warning lamp is OFF.
6. If not as specified, repair wiring harness or replace ABS control unit.

7. Ground the terminals as shown below to inspect the electrical circuits.
8. Repair as indicated.

Part / Terminal No. / Condition	Terminal: ABS CU, Terminal 52	Terminal: Main relay connector, Terminal L-03 (B/Y)	Action
ⓐ	○	X	Repair wiring harness between warning light and main relay
ⓑ	X	○	Repair wiring harness between warning light and ABS CU
ⓒ	○	X	Repair wiring harness between main relay and GND
ⓓ	X	X	Replace valve or repair wiring harness in the meter

93G0PX-830

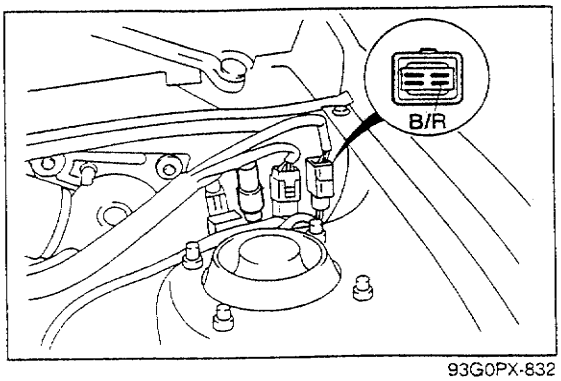
○: ON X: OFF



93G0PX-831

INSPECTION OF PUMP MOTOR HARNESS

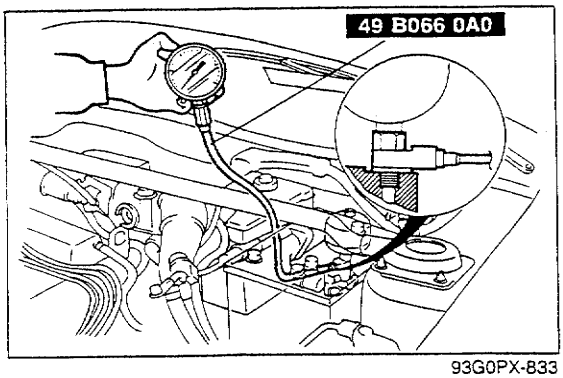
1. Disconnect the motor relay connector with the ignition switch OFF.
2. Jump terminal-wires (B/L) and (B/G) of the motor relay connector (P-04), and depress the brake pedal three or four times.
3. Verify that the motor operates.
4. If not as specified, replace the fuse or repair the wiring harness, and check the pump motor. (Refer to page P–82.)
   (Motor—Motor relay)
   (Motor—Ground)
   (Ignition switch—Motor relay)



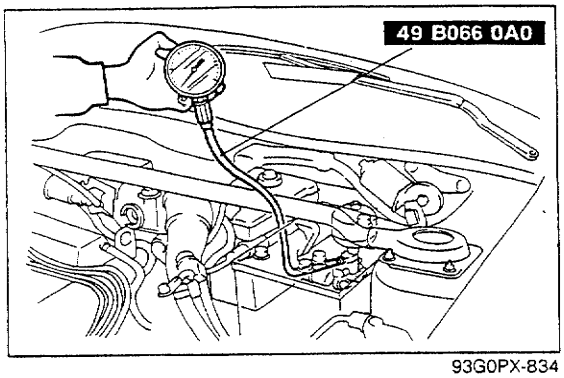
93G0PX-832

INSPECTION OF MOTOR RELAY

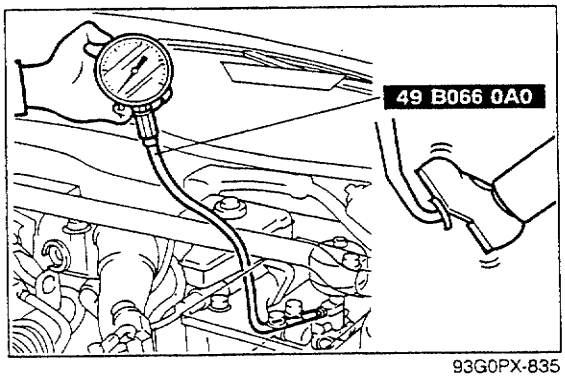
1. Disconnect the master cylinder/hydraulic connector (P-07) with the ignition switch OFF.
2. Turn the ignition switch ON.
3. Jump terminal-wire (B/R) of connector P-07 to ground.
4. Verify that the motor relay clicks and the pump motor operates.
5. If not as specified replace the **ABS (10A)** fuse, motor relay, or repair the wiring harness.
   (Motor relay—Pressure warning switch)
   (Motor relay—Ignition switch)



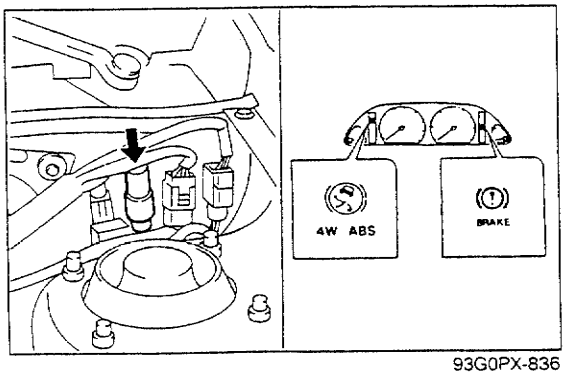
93G0PX-833



93G0PX-834



93G0PX-835



93G0PX-836

HYDRAULIC PRESSURE TEST

Hydraulic pressure test

1. With the ignition switch OFF, depress the brake pedal unit heavy resistance is felt (approx. 20 times).
2. Remove the accumulator from the pump unit.
3. Mount the **SST** between the accumulator and the pump unit.

Tightening torque:
39—45 N·m (4—4.6 m-kg, 29—33 ft-lb)

Caution
- **Be careful not to damage the O-ring during installation of the accumulator.**

4. Bleed air from the system. (Refer to page P–32.)
5. Repeat step 1.
6. Turn the ignition switch ON and note the fluid pressure at the beginning of pump motor operation. If not within specification, replace the accumulator.

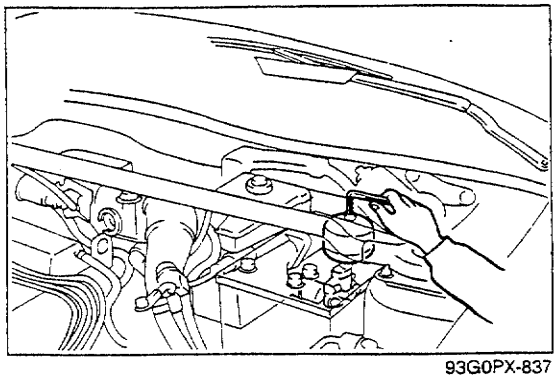
Fluid pressure:
3,924—8,240 kPa (40—84 kg/cm^2, 569—1,194 psi)

7. Note the pressure when the pump motor stops. If not within specification, replace the pressure warning switch.

Pressure:
15,696—18,639 kPa
(160—190 kg/cm^2, 2,275—2,702 psi)

8. Turn the ignition switch OFF, and depress the brake pedal until heavy resistance is felt (approx. 20 times).
9. Turn the ignition switch ON.
10. Verify that the pressure reaches **15,696—18,639 kPa (160—190 kg/cm^2, 2,275—2,702 psi)** within **approx. 1 min.** after the pump motor starts.
    If the pressure is not as specified within **2 min.** replace the pump unit.
11. With the ignition switch still ON, depress the brake pedal slowly several times and measure pressure when pump again operates. If not within specification, replace the pressure warning switch.

Pressure:
12,753—14,715 kPa
(130—150 kg/cm^2, 1,849—2,133 psi)



93G0PX-837

12. Disconnect the pump motor connector. With the ignition switch ON, depress the brake pedal slowly several times and measure the pressure when the brake and ABS warning lights come on. If not within specification, replace the pressure warning switch.

    Pressure:
    9,320—11,772 kPa
    (95—120 kg/cm^2, 1,351—1,706 psi)

13. Connect the connector.
14. Turn the ignition switch OFF, and depress the brake pedal until heavy resistance is felt.
15. Remove the accumulator and gauge and **SST**.
16. Install a new accumulator O-ring and mount the accumulator.

    Tightening torque:
    39—45 N·m (4—4.6 m-kg, 29—33 ft-lb)

17. Bleed air from the system. (Refer to page P–33.)
18. Start the engine and depress the brake pedal strongly to check for fluid leakage.

93G0PX-838

INSPECTION OF BATTERY VOLTAGE

Battery voltage

When the battery is discharged, ABS will not operate and the ABS warning indicator illuminates. This is not indicated as malfunction during the diagnostic mode. Inspect battery voltage if a discharged battery is suspected.

(Procedure)

1. Start the engine and run it at idle.
2. Measure the battery voltage.

Voltage: 10V min

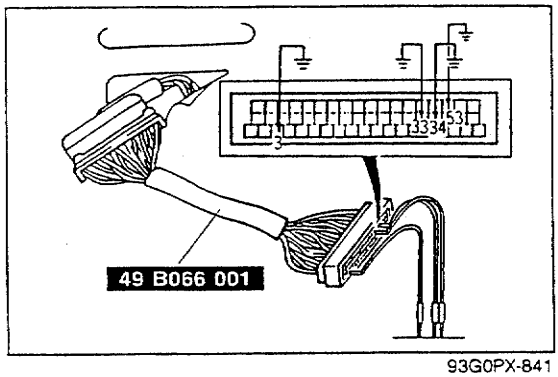
3. Charge or replace the battery.

93G0PX-839

ABS control unit current

1. Turn the ignition switch OFF.
2. Remove front passenger seat and disconnect the ABS CU connector.

93G0PX-840

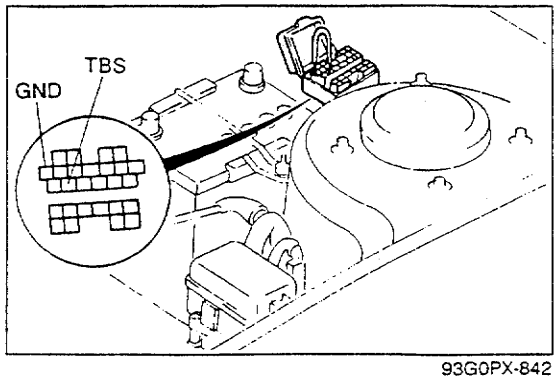


93G0PX-841

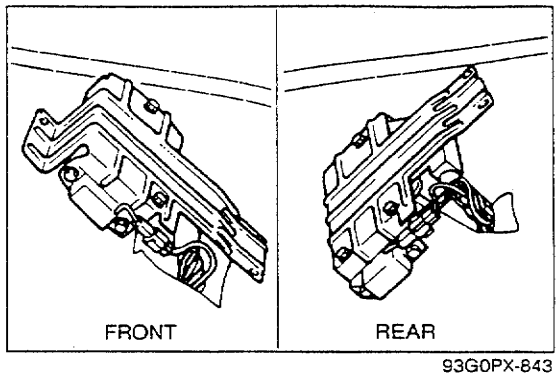
3. Connect the **SST**.
4. Connect terminals 34 and GND of the **SST**.
5. Turn the ignition switch ON.
6. Measure the voltage between GND and terminals 3, 33, and 53.

Voltage: 10V min

7. If not as specified, repair the main relay connector or the wiring harness and inspect the main replay. (Refer to page P–92.)



93G0PX-842



93G0PX-843

INSPECTION OF G-SENSOR

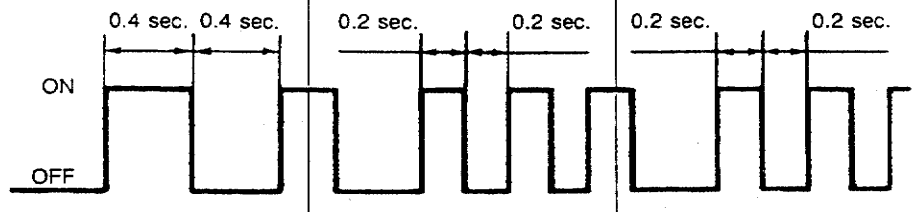
Inspection

1. Remove the ABS control unit. (Refer to page P–44.)
2. Place the vehicle on the level ground.
3. Connect terminals TBS and GND of the diagnosis connector with a jumper wire.
4. Turn the ignition switch ON.

Caution

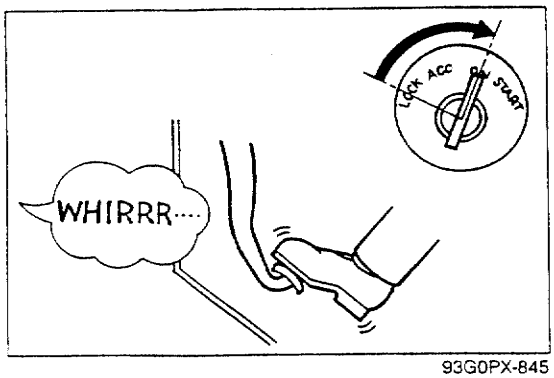
- **If a malfunction code is indicated by the ABS warning lamp, repair the defect and cancel the code. (Refer to page P–28.)**

5. Tilt ABS control unit slowly longitudinal in relation to its mounting direction and verify that the ABS warning lamp flashes as shown below.

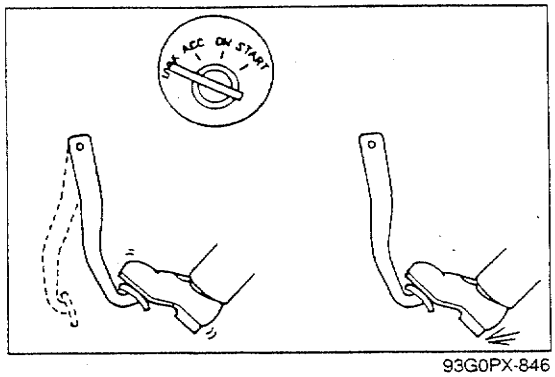
ABS C/U	Level	Tilted forward approx. 15°	Tilted forward approx. 30°	Tilted rearward approx. 16°
ABS warning lamp	OFF			

93G0PX-844

6. If not as specified, replace the ABS control unit.



93G0PX-845



93G0PX-846

INSPECTION OF ACCUMULATED PRESSURE FUNCTION

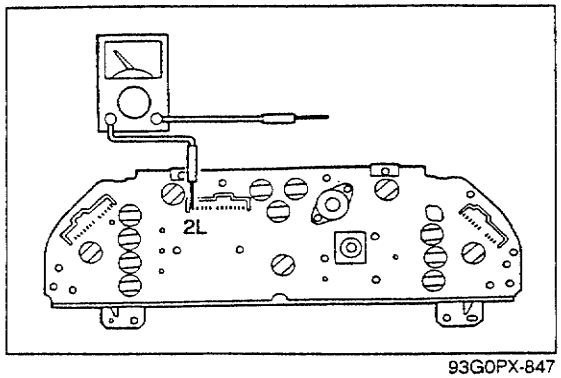
Functional check

1. With the ignition ON, confirm the operation of pump is wared.
2. After pump stops, confirm that brake warning lamp and ABS warning lamp go off.
3. Confirm the sound of pump after four or five depressions of brake pedal.

Note

- **If the pump motor begins to operate after only one full stroke of the brake pedal, the gas in the accumulator may be leaking or there may be air in the brake system.**

4. With the ignition switch OFF, pump the brake pedal until heavy resistance if felt (approx. 20 times).
5. Turn the ignition switch to ON, and verify that the pump motor operates, then stops within one minute.



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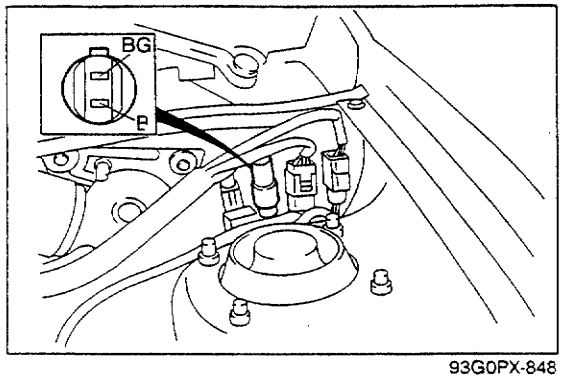

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FURTHER INSPECTION

INSPECTION OF ABS WARNING INDICATOR

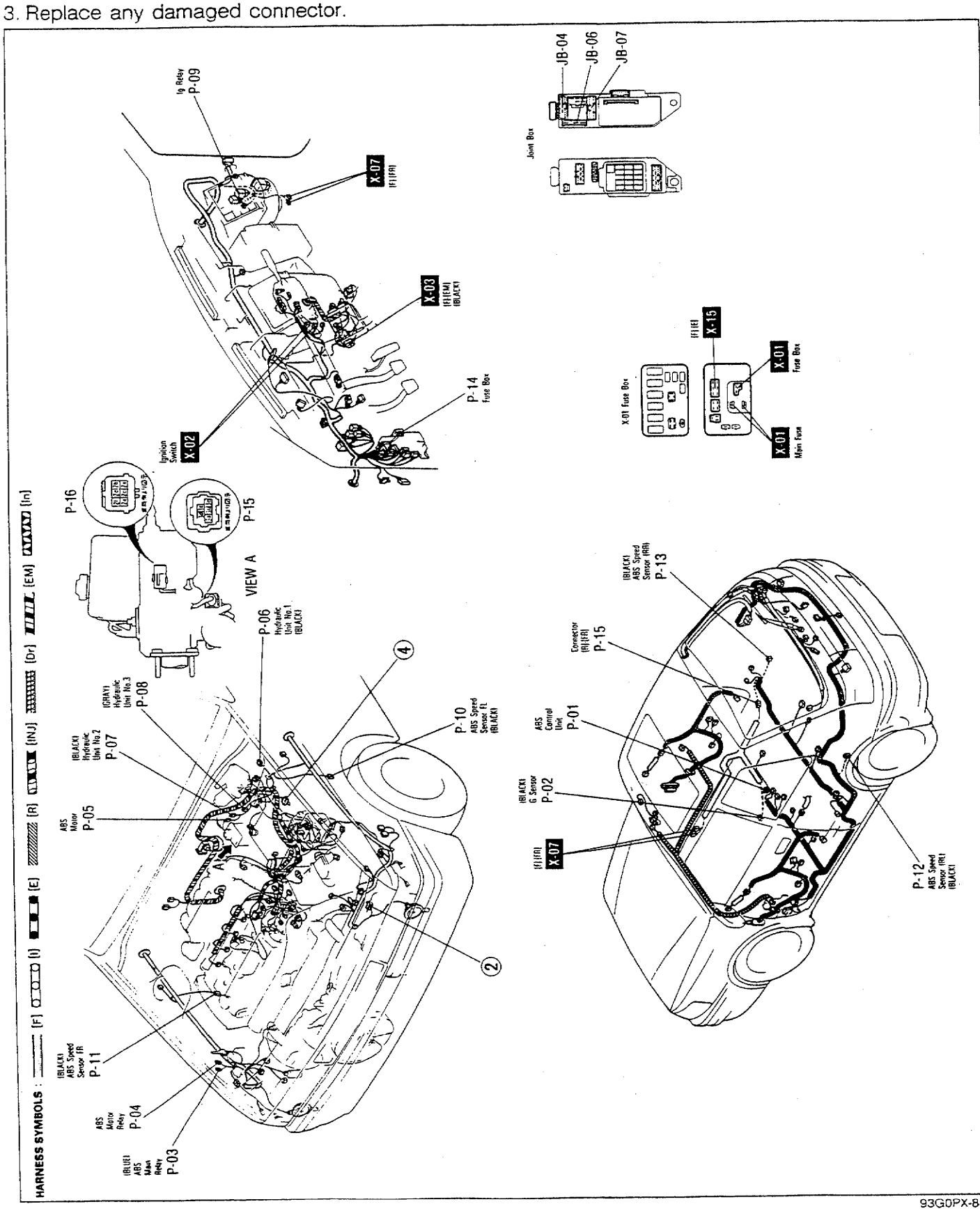
1. Remove the instrument panel.
2. Remove the ABS warning indicator bulb.
3. Replace the bulb if necessary.

INSPECTION OF PUMP MOTOR

1. With the ignition switch ON, disconnect the motor connector.
2. Connect 12V to terminal-wire (B/G) and ground terminal-wire (B). Verify that the motor operates.
3. If not as specified, replace the pump motor. (Reuse the accumulator and PWS.)

INSPECTION OF ABS RELATED CONNECTORS

1. Refer to the location chart and check each connector by removing it and checking for damaged or corroded pins.
2. Reconnect each connector and verify that it is firmly locked in place.
3. Replace any damaged connector.



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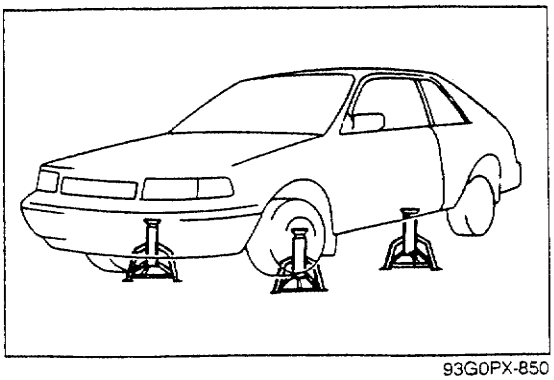

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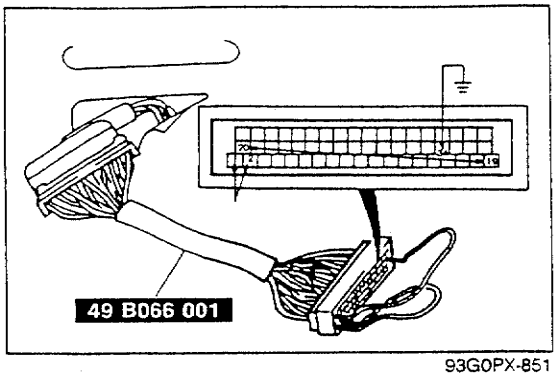

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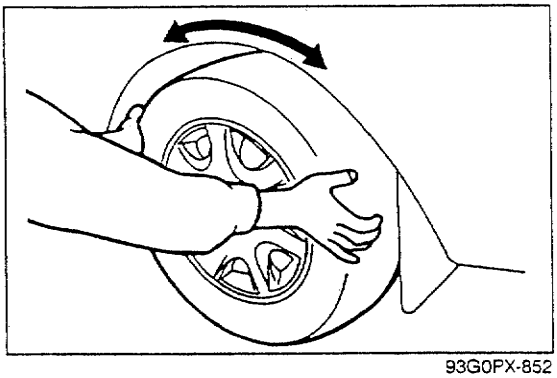

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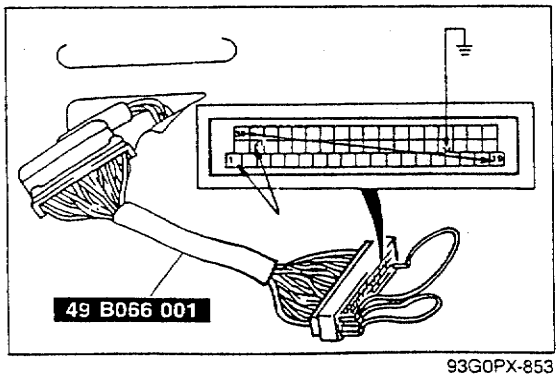


93G0PX-853

INSPECTION OF MC/HU PRESSURE REDUCTION

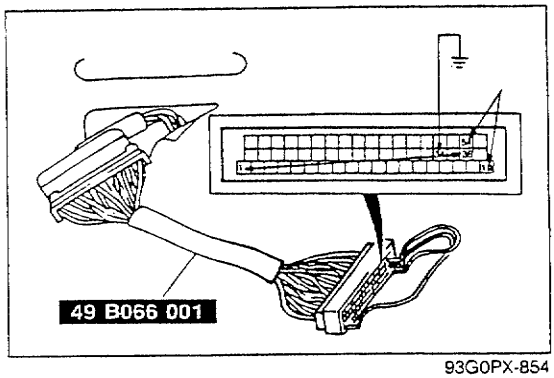
Inspection of hydraulic unit pressure-reduction

1. Jack up the vehicle and support it with safety stands.
2. Verify that the four wheels rotate.
3. Turn the ignition switch ON and wait until pump motor stops.
4. Turn the ignition switch OFF.
5. Remove front passenger seat and disconnect connector of the ABS control unit.
6. Install the **SST**.

Caution

- **Never perform the following inspection without using the SST, the connector pins will be damaged.**

7. Ground terminal 34 of the **SST** with a jumper wire.
8. Jump terminal 2 to 1 and terminal 2C to 19.
9. Have an assistant depress the brake pedal, and verify that the left front wheel is locked.
10. Holding the brake pedal depressed, turn the ignition switch ON. Verify that the left front wheel rotates when turned by hand.
11. Turn the ignition switch OFF, and disconnect the terminals connected in Step 8 leave the ground terminal connected.
12. Connect terminal 21 to 1 and 38 to 19.
13. Perform inspection of the right front wheel following the procedure in Step 9 and 10.
14. Turn the ignition switch OFF, and disconnect the terminals connected in Step 12.



93G0PX-854

15. Connect terminal 36 to 1 and 54 to 19.
16. Perform inspection of both rear wheels following the procedure in Steps 9 and 10.
17. If any test is not as specified, replace the valve block. (Refer to page P–43.)

18. Turn the ignition switch OFF, and disconnect the **SST**.
19. Reconnect the ABS control unit connector and install the control unit.
20. Install the seat.

Note

- **The above tests confirm the following:**

1) There is no major leakage of brake fluid within the hydraulic unit, the external lines or the brake calipers.
2) The electrical circuit (solenoids) within the hydraulic unit is operating correctly.
3) There is no problem with the main relay and valve control electrical circuit.

- **The following cannot be defined by the above tests:**

1) Operation of input circuits and devices to and including the ABS control unit.
2) Slight leakage of the external and internal hydraulic circuit.
3) Intermediate malfunction of 1—3 above.

93G0PX-855

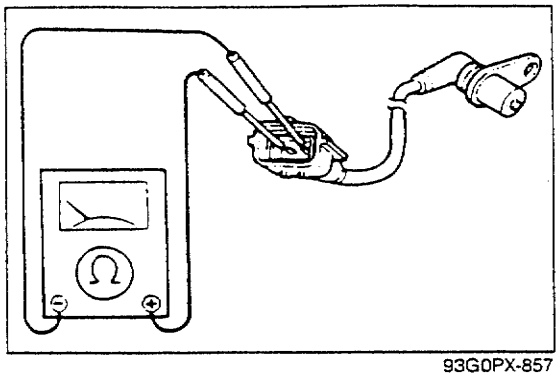
INSPECTION OF WHEEL SPEED SENSOR

1. Check the wheel speed sensor for proper mounting.
   (1) Verify that the sensor is mounted securely and that it is not damaged.
   (2) Measure the clearance between the sensor rotor and sensor.

   Clearance: 1.35mm (0.053 in) max.

   (3) If not within specification, repair or replace as necessary.

93G0PX-856



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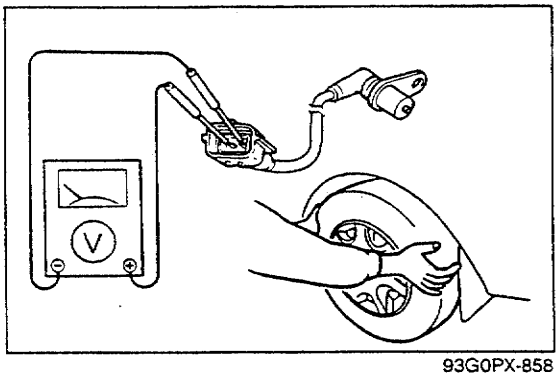
2. Measure resistance of the wheel speed sensor.
   (1) Disconnect the sensor, and measure the resistance between the terminals of the sensor.

   Resistance: 1.1 kΩ ± 0.1 kΩ

   (2) Replace the wheel speed sensor as necessary.



93G0PX-858

3. Measure the output voltage of the wheel speed sensor.
   (1) Jack up the vehicle and support it on safety stands.
   (2) Disconnect the sensor, and connect a voltmeter (AC range) between the terminals.
   (3) Rotate the wheel at 1 turn/second and note the indicated voltage.

   Output voltage (AC range): 0.15—0.7V

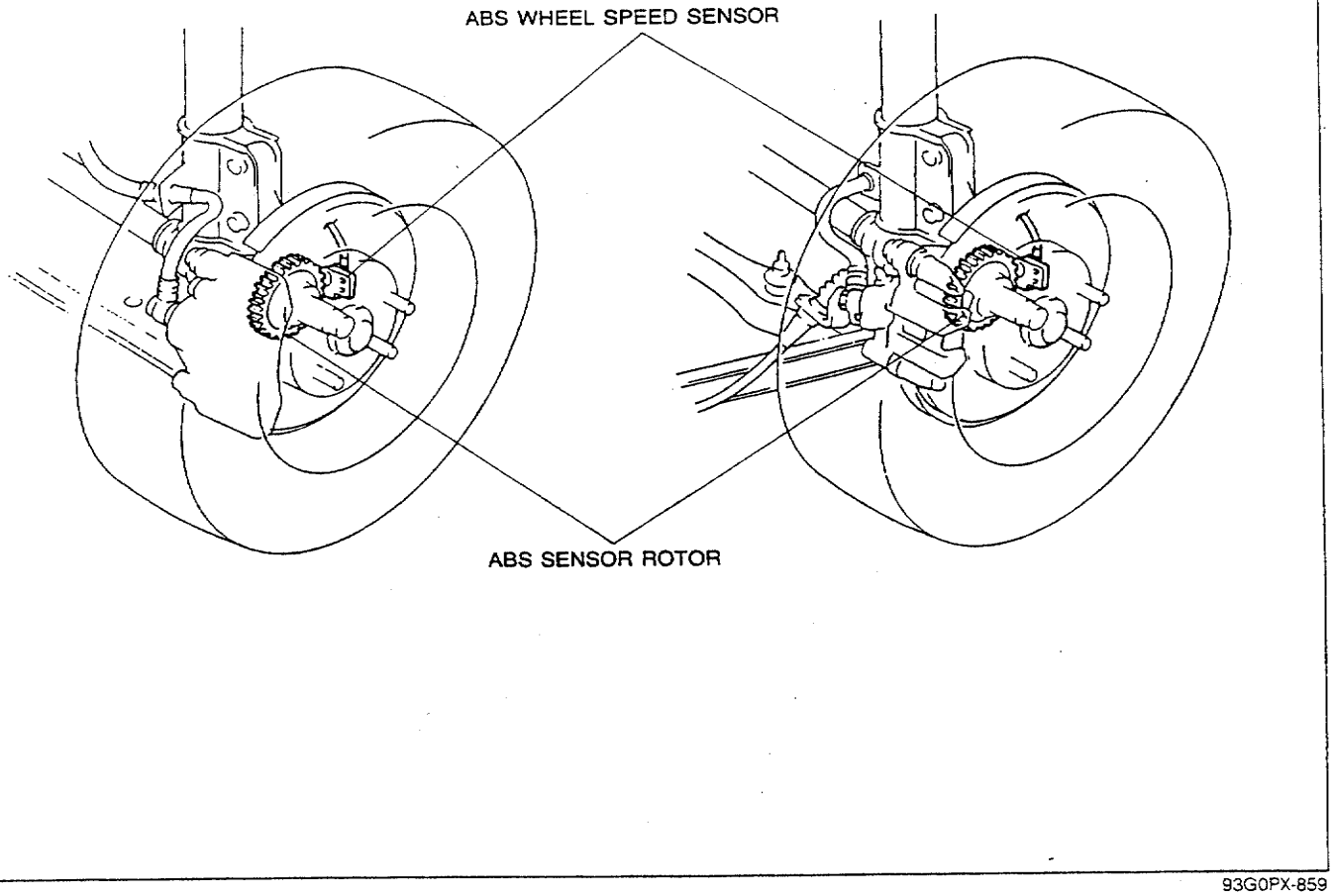
   (4) Replace the wheel speed sensor as necessary.

Caution

- **Do not turn the wheel with the ignition switch ON and the sensor connected. Doing so will input a malfunction into the ABS control unit.**
- **Do not disconnect the sensor with the ignition switch ON. Doing so will input a malfunction into the ABS control unit.**

INSPECTION OF SENSOR ROTOR

1. Jack up the vehicle and support it on safety stands.
2. Remove the tire and wheel.
3. Inspect the sensor rotor for looseness or damage.
4. Replace the sensor rotor if necessary.



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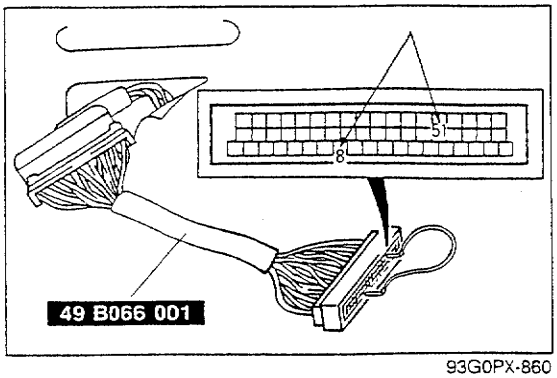

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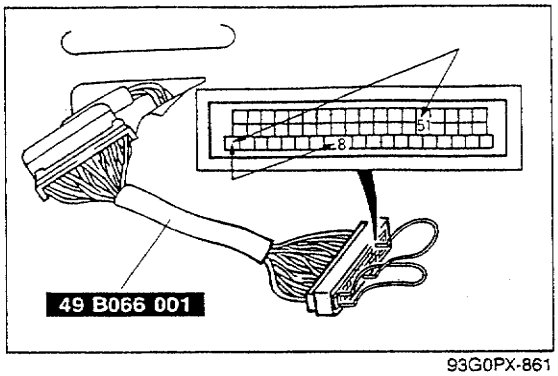

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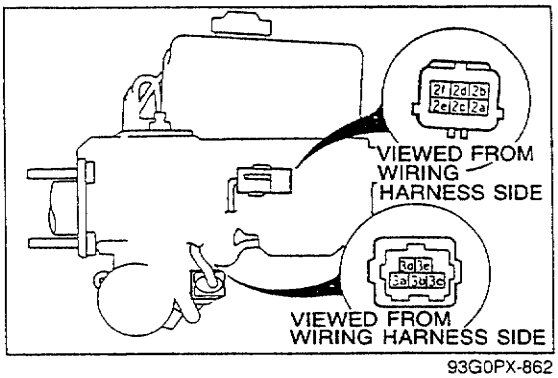


93G0PX-862

MC/HU (PRESSURE WARNING SWITCH/FLUID LEVEL SWITCH SWITCH 2)

Inspection of Harness

1. Start the engine and wait at least one minute. If the pump motor activates, wait until it stops.
2. Turn the ignition switch OFF and disconnect the connector of the ABS control unit.
3. Check continuity between the following terminals and follow the action.

Terminal 8—51

Continuity	Action
Yes	Go to Step 4
No	Repair wiring harness (CU—PWS—FLS) Inspect motor (S-11)

4. Check continuity between the following terminals and follow the action.

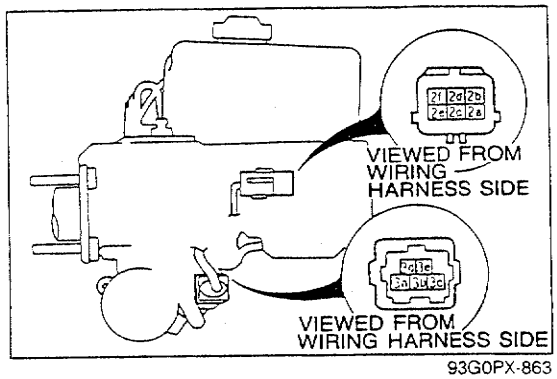
Terminals 1—8
Terminals 1—51

Continuity	Action
No	Go to Step 5
Yes	Inspect harness (ABS CU—PWS—FLS)

5. Disconnect hydraulic unit connector (P-07). Check continuity between the following terminals and follow the action.

Terminal P-16 (2b) (harness side)—
Terminal P-15 (3c) (harness side)
Terminal P-07 (G/B) (unit side)—
Terminal P-16 (2a) (harness side)
Terminal P-06 (Y/B) (unit side)—
Terminal P-15 (3e) (harness side)

Continuity	Action
Yes	OK
No	Replace valve block



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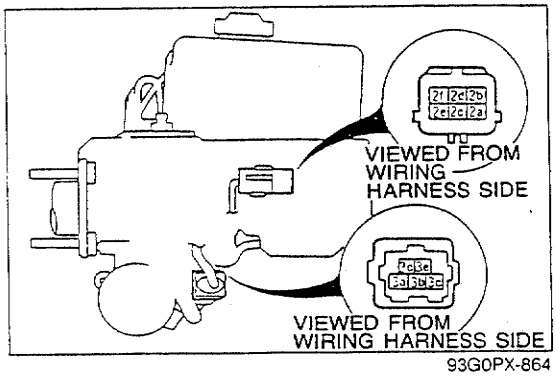

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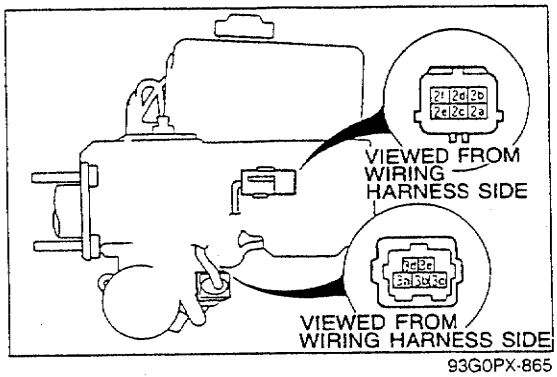


93G0PX-865

MC/HU (PRESSURE WARNING SWITCH, FLUID LEVEL SWITCH SWITCH 1/PRESSURE CONTROL SWITCH)

Inspection of PWS and FLS SW1

1. Start the engine and wait at least one minute. If the pump motor activates, wait until it stops.
2. Verify that the fluid level in the reservoir is at MAX.
3. Turn the ignition switch OFF.
4. Disconnect the hydraulic unit connector (P-15). Check continuity between the terminals below (unit side) (PWS) and follow the action.

Terminals P-15 (3a)—P-15 (3b)

Continuity	Action
Yes	Replace PWS
No	Go to Step 5

5. Disconnect hydraulic unit connector (P-16). Check continuity between the terminals below (unit side) and follow the action.

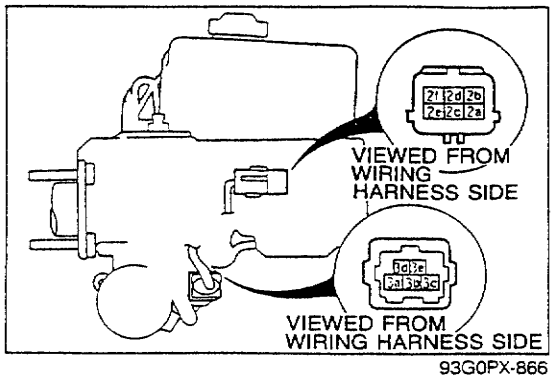
Terminals P-16 (2b, 2c)—P-16 (2e, 2d)

Continuity	Action
Yes	Replace reservoir
No	Go to Step 6

6. Disconnect hydraulic unit connector (P-06). Check continuity between the terminals below and follow the action.

Terminal P-06 (B) (unit side)—P-16 (2c) (harness side)
Terminal P-16 (2b) (harness side)—P-15 (3a) (harness side)

Continuity	Action
Yes	Inspect PCS (Refer to page P–90)
No	Replace valve block



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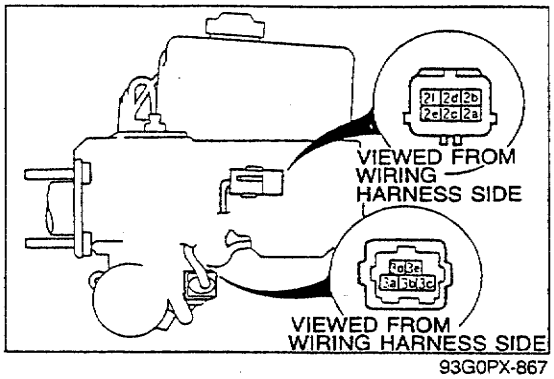


93G0PX-867

Inspection of PCS

1. Turn the ignition switch OFF.
2. Depress the brake pedal lightly about 20 times.
3. Check continuity between the terminals below and follow the action.

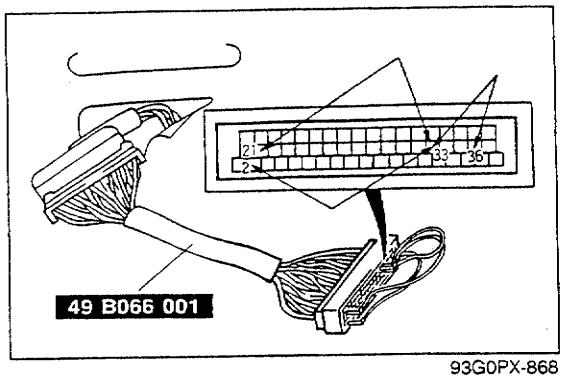
Terminal P-15 (3a) (unit side)—
Terminal P-15 (3d) (unit side)

Continuity	Action
Yes	Go to Step 4
No	Replace PWS

4. Disconnect the hydraulic unit connector (P-07). Check continuity between the terminals below and follow the action.

Terminal P-07 (B/R) (unit side)—
Terminal P-16 (2c) (harness side)
Terminal P-15 (3a) (harness side)—
Terminal P-16 (2b) (harness side)
Terminal P-16 (2c) (harness side)—
Terminal P-06 (B) (unit side)

Continuity	Action
Yes	Go to next step
No	Replace valve block



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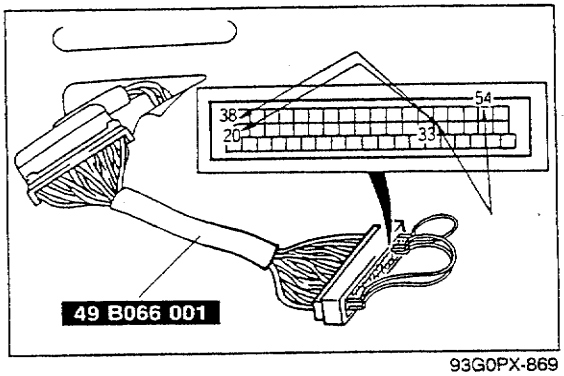

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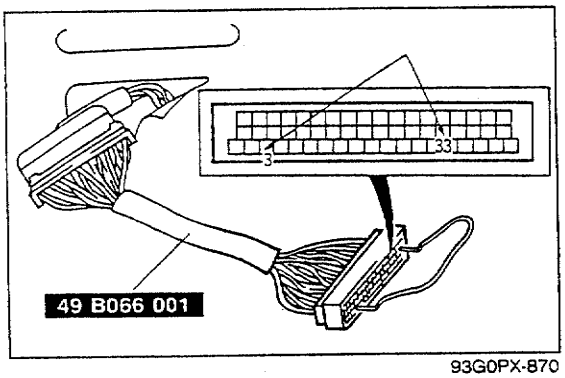


93G0PX-870

MC/HU (INSPECTION OF SOLENOID VALVE)

Inspection of solenoid valve

1. Turn the ignition switch OFF and disconnect the master cylinder/hydraulic unit connector.
2. Measure resistance between following connectors.

Terminals 33—21
Terminals 33—2
Terminals 33—36

Resistance: 3.8Ω

Terminals 33—28
Terminals 33—20
Terminals 33—54

Resistance: 6Ω

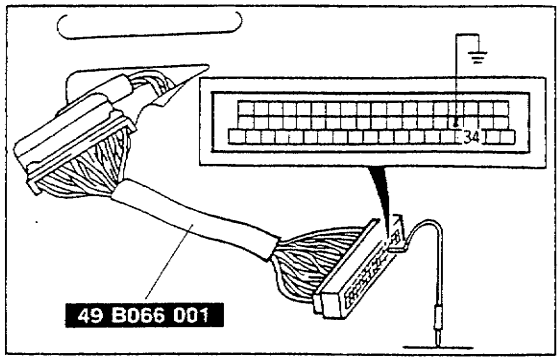
Terminals 33—39

Resistance: 4.1Ω

Terminals 33—3

Continuity: 0Ω

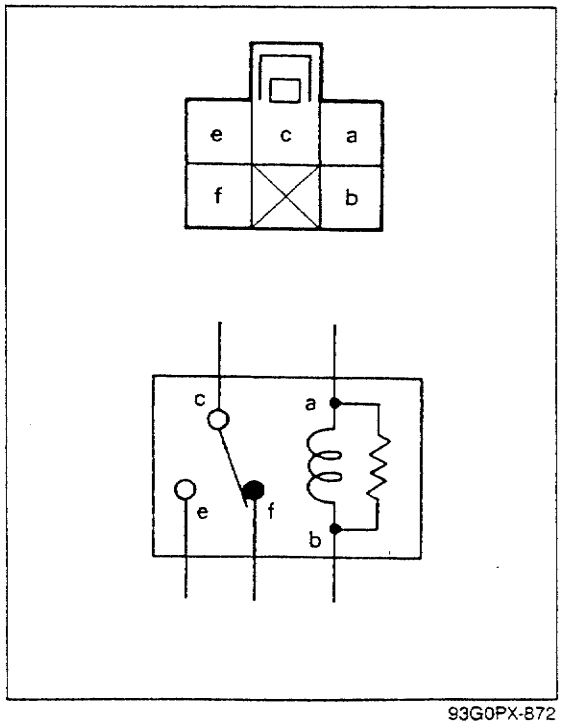
3. If not as specified, replace the valve block or repair the wiring harness.



93G0PX-871

MAIN RELAY

1. Turn the ignition switch OFF and disconnect CU connector.
2. Turn the ignition switch ON.
3. Connect terminal No.34 of the connector to a ground.
4. Verify the following:
   a) At time of connection, a click is heard.
   b) After connecting, warning lamp goes OFF.
   c) 12V is applied between terminal No.33 connector and a ground.
5. If not as specified:
   a) Inspect main relay.
   b) Repair wiring harnesses. (Main relay—ABS CU—Main relay—Power source)
   c) Inspect diode for warning lamp.
   d) Repair wiring harness. (Main relay—ABS CU)
   e) Replace fuse.



93G0PX-872

Inspection of continuity

1. Measure resistance between terminals a and b.

   Resistance: 90Ω ± 10Ω

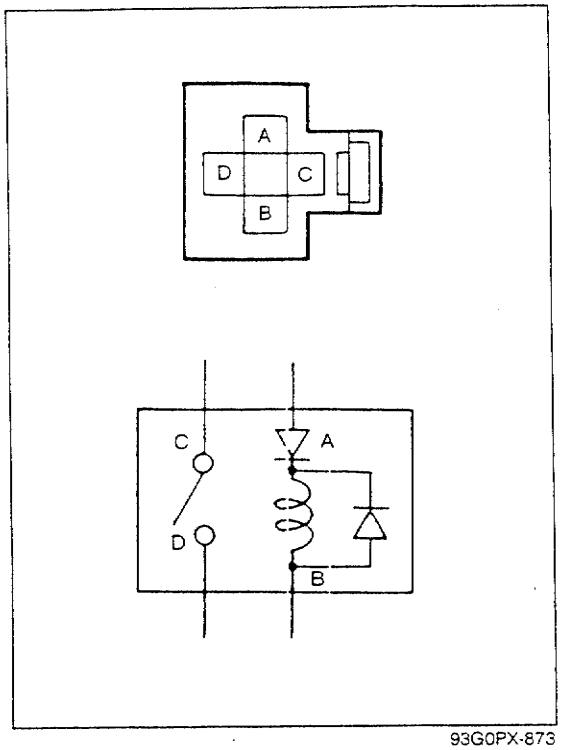
2. Check continuity between terminals.
   (a) Continuity

Terminal	Continuity
c—f	Yes
c—e	No

   (b) Connect 12V between terminals a and b and check continuity.

Terminal	Continuity
c—f	No
c—e	Yes

3. If not as specified, replace the main relay.



93G0PX-873

MOTOR RELAY

1. Measure the resistance between terminals A and B.

Resistance: 57Ω ± 6Ω

2. Check continuity between terminal.
   (a) Continuity

Terminal	Continuity
C—D	No

Caution

- **When applying 12V between terminals A and B, connect terminal A to positive and terminal B to negative.**

(b) Apply 12V between terminals A and B and check continuity.

Terminal	Continuity
C—D	Yes

3. If not as specified, replace the motor relay.

WHEELS AND TIRES

FEATURES

93G0QX-701

OUTLINE

SPECIFICATIONS

ADR

Item \ Type			Standard
Wheel	Size		5-J x 14 5 1/2-JJ x 14
	Offset mm (in)		45 (1.77)
	Pitch circle diameter mm (in)		100 (3.94)
	Material		Steel or aluminum alloy
Tire	Size		175/65R14 82S 195/60R14 85H
	Air pressure kPa (kgf/cm², psi)	Front	175/65R14 82S: 220 (2.2, 32), 195/60R14 85H: 200 (2.0, 29)
		Rear	175/65R14 82S: 200 (2.0, 29), 195/60R14 85H: 180 (1.8, 26)

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ECE

Item \ Type			Standard	Temporary spare
Wheel	Size		5-J x 13	4-T x 14
	Offset		45 (1.77)	
	Pitch circle diameter mm (in)		100 (3.94)	
	Material		Steel or aluminum alloy	Steel
Tire	Size		175/70R13 82S	T115/70D14
	Air pressure kPa (kgf/cm², psi)	Front	200 (2.0, 29)	412 (4.2, 60)
		Rear	180 (1.8, 26)	

93G0QX-703

Sweden, Switzerland

Item \ Type			Standard	Temporary spare
Wheel	Size		5-J x 13 5 1/2-JJ x 14	4T x 14
	Offset		45 (1.77)	
	Pitch circle diameter mm (in)		100 (3.94)	
	Material		Steel or aluminum alloy	Steel
Tire	Size		175/70R13 82S 175/70R13 82H 195/60VR14	T115/70D14 T115/70R14
	Air pressure kPa (kgf/cm², psi)	Front	200 (2.0, 29)	412 (4.2, 60)
		Rear	180 (1.8, 26)	

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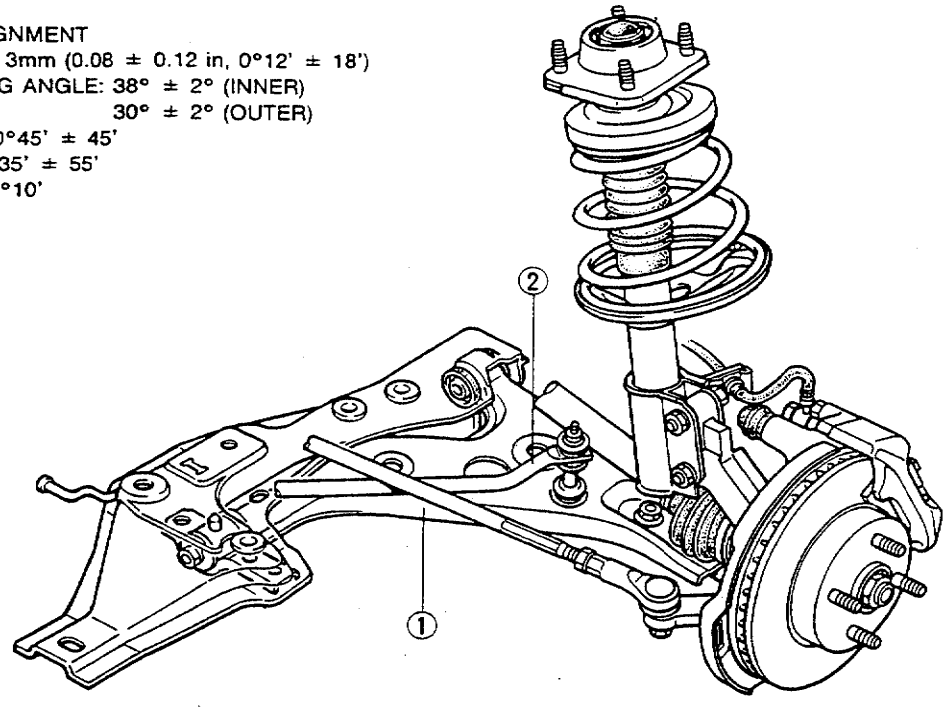
SUSPENSION

93G0RX-701

INDEX

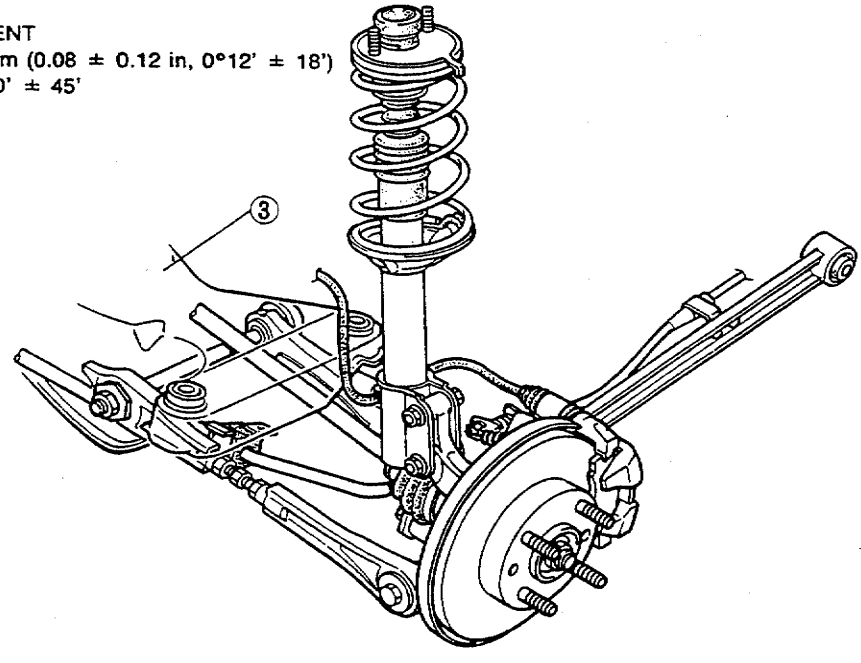
FRONT SUSPENSION

FRONT WHEEL ALIGNMENT
TOTAL TOE-IN: 2 ± 3mm (0.08 ± 0.12 in, 0°12' ± 18')
MAXIMUM STEERING ANGLE: 38° ± 2° (INNER)
30° ± 2° (OUTER)
CAMBER ANGLE: –0°45' ± 45'
CASTER ANGLE: 2°35' ± 55'
KINGPIN ANGLE: 12°10'



REAR SUSPENSION

REAR WHEEL ALIGNMENT
TOTAL TOE-IN: 2 ± 3mm (0.08 ± 0.12 in, 0°12' ± 18')
CAMBER ANGLE: –0°20' ± 45'



93G0RX-702

OUTLINE

OUTLINE OF CONSTRUCTION

- The suspension system is basically the same as for 2WD models.
- Wheel alignment, shock absorber, coil spring specifications are different than 2WD models.

93G0RX-703

SPECIFICATIONS

Item			BP SOHC (M5)	BP SOHC (EC-AT)	BP DOHC turbo
Front suspension					
Suspension type			Strut		
Spring type			Coil spring		
Shock absorber	Type		Oil		
	Damping force N (kg, lb) at 0.3 m/s	Extended	677 (69, 152)		903 (92, 202)
		Compressed	177 (18, 40)		373 (38, 84)
Stabilizer	Type		Torsion bar		
	Diameter mm (in)		17.5 (0.69)	19.0 (0.75)	22.0 (0.87)
Front wheel alignment (*Unladen)	Total toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)		
		degree	0°12' ± 18'		
	Turning angle degree	Inner	38° ± 2°		
		Outer	30° ± 2°		
	Camber angle degree		−0°45' ± 45'		
	Caster angle degree		2°45' ± 45'		
	Kingpin angle degree		12°10'		
Rear suspension					
Suspension type			Strut		
Spring type			Coil spring		
Shock absorber	Type		Oil		
	Damping force N (kg, lb) at 0.3 m/s	Extended	716 (73, 161)		834 (85, 187)
		Compressed	265 (27, 59.4)		353 (36, 79.2)
Stabilizer	Type		Torsion bar		
	Diameter mm (in)		19.1 (0.75)		20 (0.79)
Rear wheel alignment (*Unladen)	Total toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)		
		degree	0°12' ± 18'		
	Camber angle degree		−0°20' ± 45'		

93G0RX-704

* 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	
						*1 M	*2 A
Front	A	13.3 (0.52)	147.0—173.0 (5.79—6.81)	300.5 (11.83)	3.43	Purple	Yellow
	B	13.4 (0.53)	146.0—172.0 (5.75—6.77)	301.5 (11.87)	3.49	Light blue	Yellow
	C	13.7 (0.54)	146.6—172.6 (5.77—6.80)	302.0 (11.89)	3.52	Pink	White
	D	14.4 (0.57)	147.0—173.0 (5.79—6.81)	267.0 (10.51)	3.24	Light blue	Red
	E	14.4 (0.57)	147.0—173.0 (5.79—6.81)	263.0 (10.35)	3.24	Purple	Blue
Rear	F	10.1—11.5 (0.40—0.45)	140 (5.5)	339 (13.35)	5.65	Yellow	—
	G	9.7—11.7 (0.38—0.46)		337 (13.27)	5.55	Brown	—
	H	10.2—11.8 (0.40—0.46)		336 (13.23)	5.79	Purple	—
	I	9.5—11.2 (0.37—0.44)		372 (14.6)	5.84	Red	—
	J	10.2—11.4 (0.40—0.45)		370 (14.6)	6.04	Gray	—
	K	9.8—11.1 (0.39—0.44)		383 (15.08)	6.35	Green	—

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*1 Main identification mark color: Indicated on second coil from bottom.
*2 Auxiliary identification mark color: Indicated on third coil from bottom.

Coil Spring Applications
ADR

Model	Engine	Transaxle	Front coil spring	Rear coil spring	
				RH	LH
SEDAN	BP SOHC	M5	B	I	I
		EC-AT	C	I	I
	BP DOHC turbo	M5	E	H	H

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ECE

Model	Engine	Transaxle	Front coil spring	Rear coil spring	
				RH	LH
SEDAN	BP SOHC	M5	B	K	K
3HB			A	K	K

93G0RX-707

Sweden, Switzerland

Model	Engine	Transaxle	ABS	Sunroof	Front coil spring	Rear coil spring	
						RH	LH
SEDAN	BP SOHC	M5	—	—	B	I	I
			—	○	B	J	J
3HB			—	—	B	K	K
			—	○	B	I	I
	BP DOHC turbo		○	○	E	F	F
			—	○	E	F	F
			—	—	D	F	F

M5..... Manual transaxle (5-speed)
EC-AT.... Electronically controlled automatic transaxle
ABS..... Anti-lock brake system

93G0RX-708

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Workshop Manual (1203-10-89F, 1204-10-89F, 1206-10-89F).

Front lower arm
- Removal / Inspection / Installation procedure

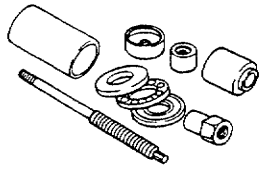
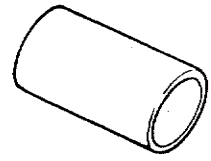
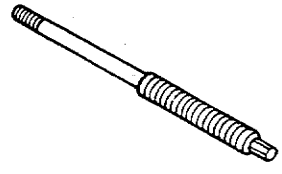
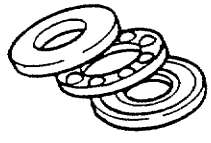
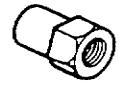
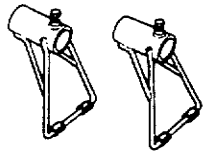
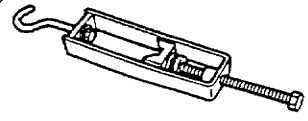
Front stabilizer
- Removal / Inspection / Installation procedure

Rear crossmember
- Removal / Installation procedure

93G0RX-709

FRONT SUSPENSION (STRUT)

PREPARATION
SST

49 B034 2A0 Replacer, rubber bushing 	For removal and installation of lower arm bushing	49 B034 202 Support block (Part of 49 B034 2A0) 	For removal of lower arm bushing
49 B034 203 Guide (Part of 49 B034 2A0) 	For installation of lower arm bushing	49 B034 204 Attachment (Part of 49 B034 2A0) 	For removal and installation of lower arm bushing
49 B034 205 Replacer (Part of 49 B034 2A0) 	For installation of lower arm bushing	49 B034 206 Shaft (Part of 49 B034 2A0) 	For removal and installation of lower arm bushing
49 G034 205 Bearing (Part of 49 B034 2A0) 	For removal and installation of lower arm	49 W038 002 Nut (Part of 49 B034 2A0) 	For removal and installation of lower arm
49 G017 5A0 Support, engine (Part of 49 B034 2A0) 	For support of engine	49 G017 501 Bar (Part of 49 G017 5A0) 	For support of engine
49 G017 502 Support (Part of 49 G017 5A0) 	For support of engine	49 G017 503 Hook (Part of G017 5A0) 	For support of engine

03U0RX-807

FRONT LOWER ARM

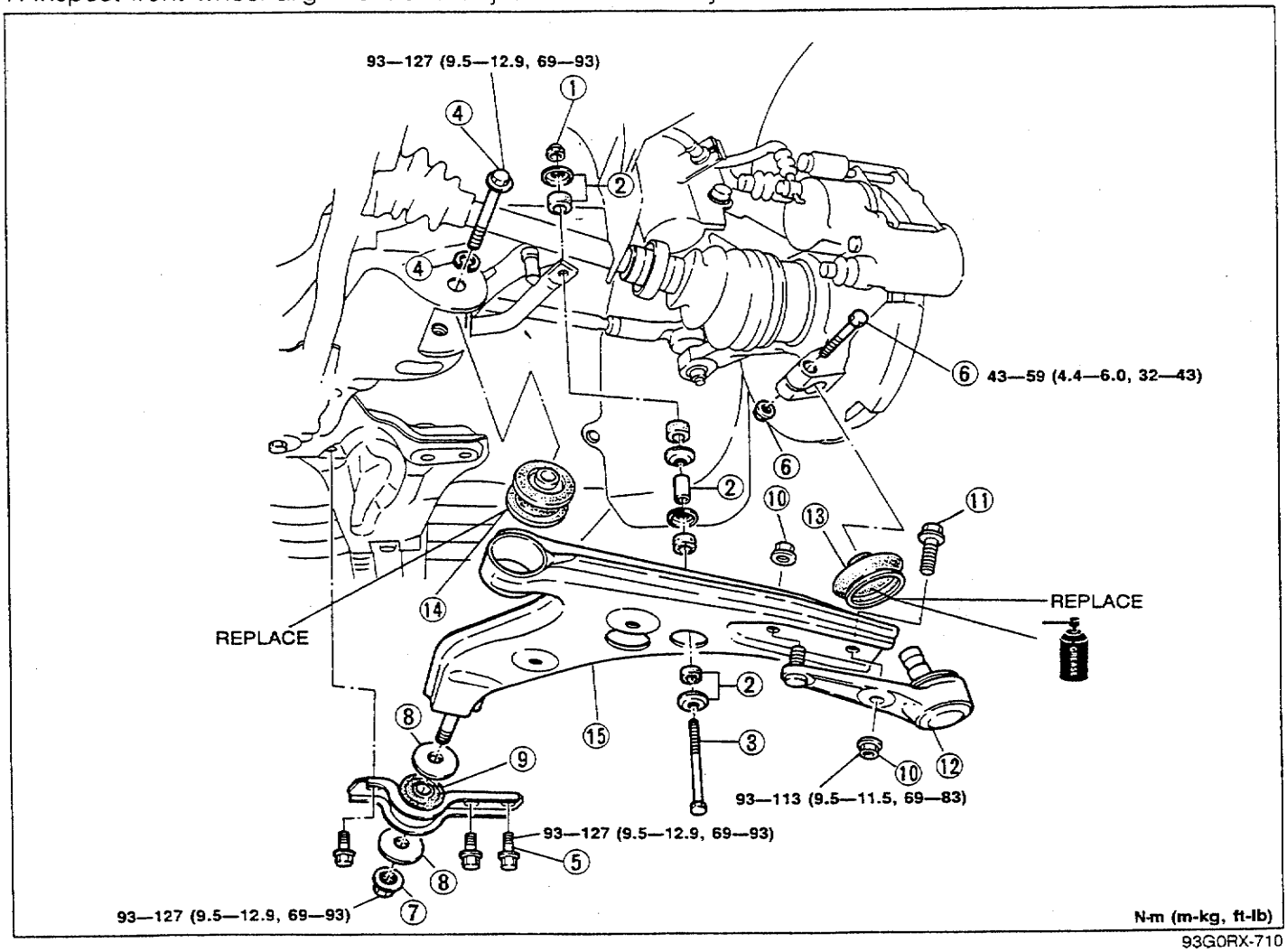
Removal / Inspection / Installation

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheel and tire.
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**.
6. Tighten all nuts and bolts to the specified torques, referring to the figure.

Caution

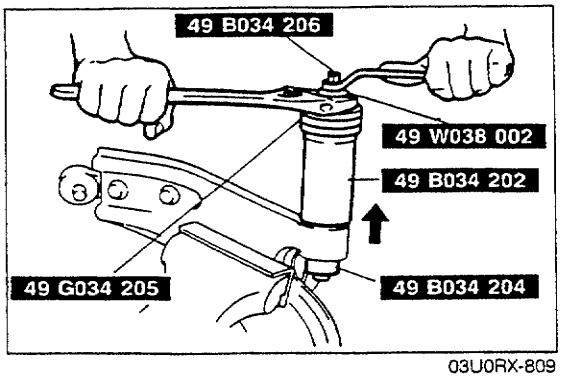
- **Loosely tighten the lower arm when installing. Lower the vehicle and tighten all nuts and bolts to the specified torques with the vehicle unladen.**

7. Inspect front wheel alignment and adjust it as necessary.

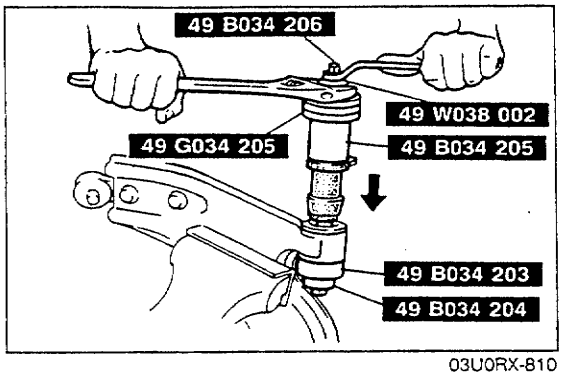


93G0RX-710

1. Stabilizer nut
2. Retainer, bushing and spacer
   Inspect bushing for wear and damage
3. Stabilizer bolt
4. Bolt and washer
5. Bolt
6. Bolt and nut
7. Nut
8. Washer
9. Lower arm bushing (rear)
   Inspect for wear and damage
10. Nut
11. Bolt
12. Lower arm ball joint
    Inspect for damage and malfunction
13. Ball joint dust boot
14. Lower arm bushing
    Removal note ..... page R–7
    Installation note ..... page R–7
15. Front lower arm
    Inspect for cranking and other damage



03U0RX-809



03U0RX-810

Removal note
Lower arm bushing (front)
1. Remove the lower arm bushing in the direction of the arrow with the **SST**.

Installation note
Lower arm bushing (front)
1. Apply soapy water to the lower arm bushing.
2. Press in the lower arm bushing in the direction of the arrow with the **SST**.

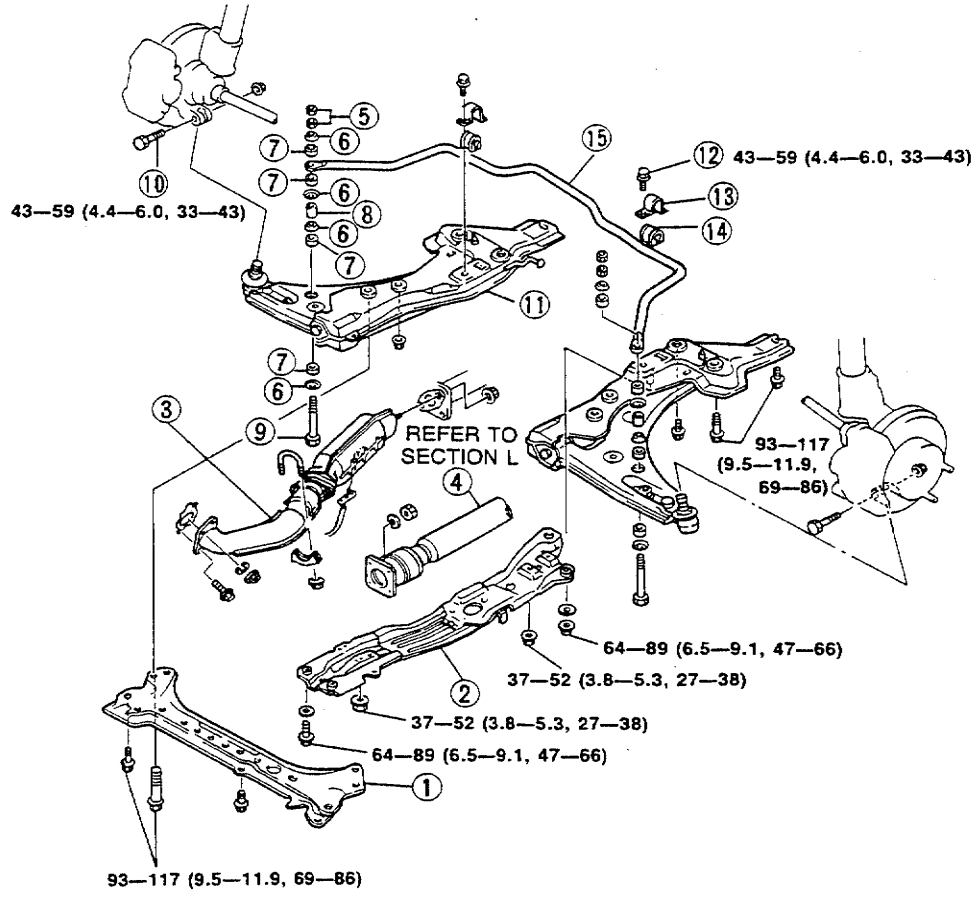
FRONT STABILIZER

Removal / Inspection / Installation

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheel and tire.
3. Remove the undercover.
4. Remove in the order shown in the figure, referring to **Removal Note**.
5. Inspect all parts and repair or replace as necessary.
6. Install in the reverse order of removal.
7. Tighten all nuts and bolts to the specified torques, referring to the figure.

Caution

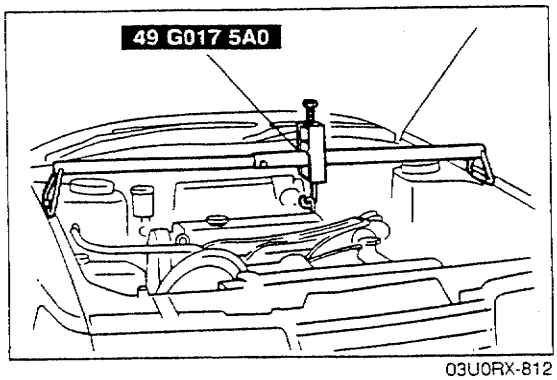
- **Loosely tighten the stabilizer bracket bolts when installing. Lower the vehicle and tighten all nuts and bolts to the specified torques with the vehicle unladen.**



N·m (m-kg, ft-lb)

93G0RX-711

1. Front crossmember
2. Engine mount member
   Removal note ..... page R-9
3. Front exhaust pipe
4. Propeller shaft
5. Stabilizer nut
6. Retainer
7. Bushing
8. Spacer
9. Bolt (Stabilizer arm)
10. Clinch bolt
11. Lower arm and bracket assembly
12. Bolt (Stabilizer bracket)
13. Stabilizer brakcet
14. Stabilizer bushing
15. Front stabilizer

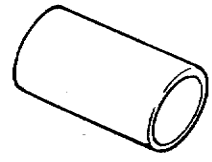
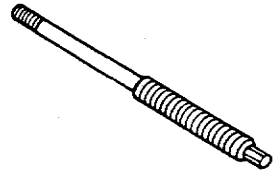
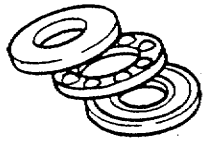


03U0RX-812

Removal note
Engine mount member
1. Support the engine with the **SST** and remove the engine mount member.

REAR SUSPENSION (STRUT)

PREPARATION
SST

49 B034 2A0 Replacer, rubber bushing 	For removal of crossmember bushing	49 B034 202 Support block (Part of 49 B034 2A0) 	For removal of crossmember bushing
49 B034 204 Attachment (Part of 49 B034 2A0) 	For removal of crossmember bushing	49 B034 206 Shaft (Part of 49 B034 2A0) 	For removal of crossmember bushing
49 G034 205 Bearing (Part of 49 B034 2A0) 	For removal of crossmember bushing	49 W038 002 Nut (Part of 49 B034 2A0) 	For removal of crossmember bushing

03U0RX-813

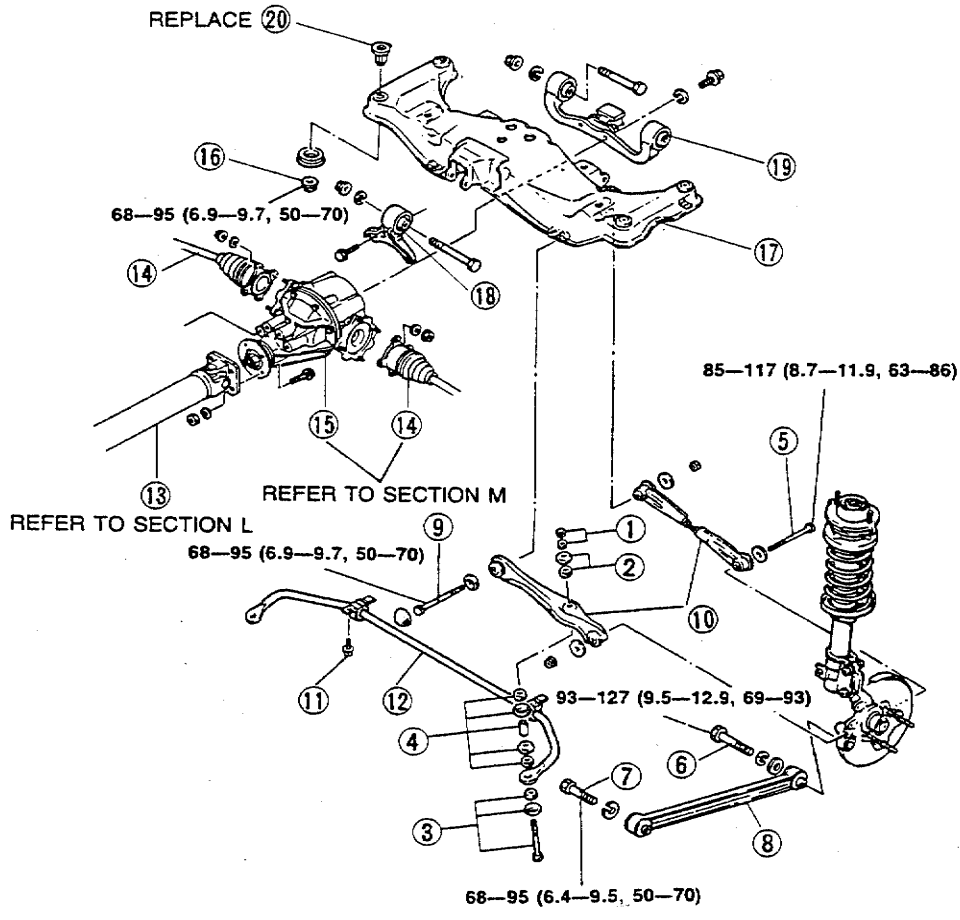
REAR CROSSMEMBER

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

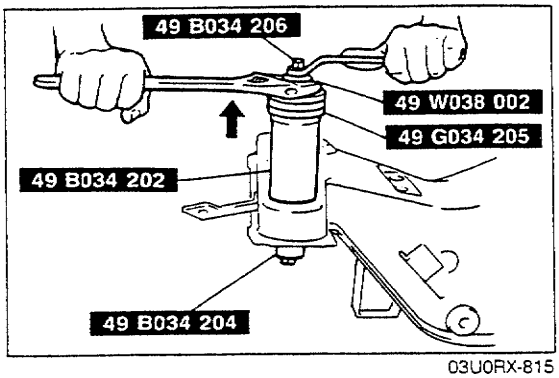
- **Loosely tighten the lateral link and trailing link bolts and nuts when installing. Lower the vehicle and tighten all nuts and bolts to the specified torques with the vehicle unladen.**



N·m (m-kg, ft-lb)

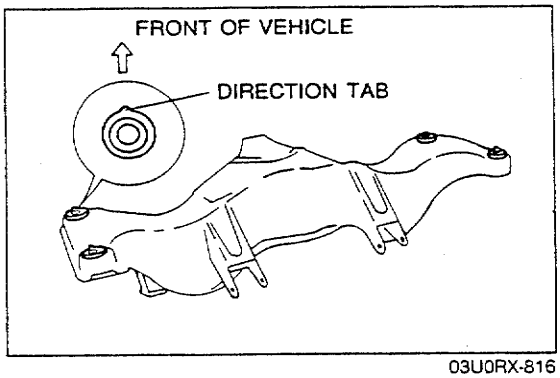
93G0RX-712

1. Nut (Stabilizer)
2. Bushing and retainer
3. Bolt, retainer and bushing
4. Retainer, bushing and spacer
5. Bolt (Lateral link)
6. Bolt (Trailing link)
7. Bolt (Trailing link)
8. Trailing link
9. Bolt (Lateral link)
10. Lateral link
11. Bolt
12. Rear stabilizer
13. Propeller shaft
14. Driveshaft
15. Rear differential
16. Nut (Rear crossmember)
17. Rear crossmember
18. Front rubber mount
19. Rear rubber mount
20. Crossmember bushing
    Removal note... page R–11
    Installation note
    ..... page R–11



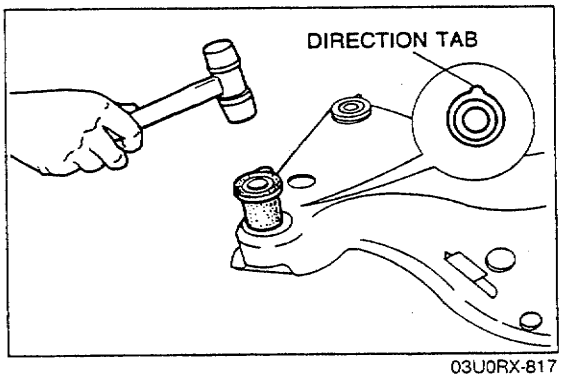
03U0RX-815

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

93G0SX-701

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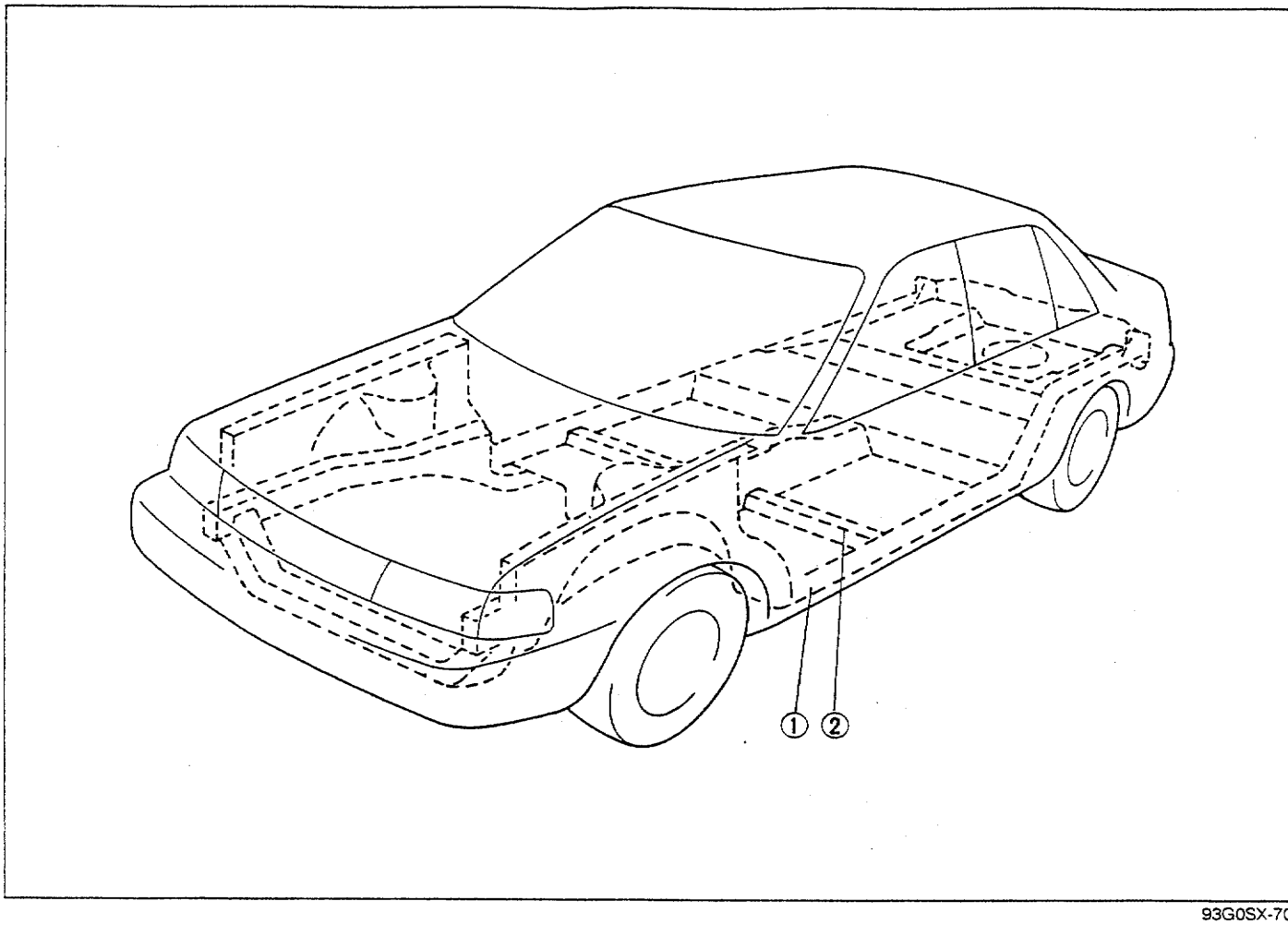


93G0SX-702

OUTLINE

OUTLINE OF CONSTRUCTION

The body for the 4WD model is basically the same as for the 2WD model; however, the underbody is slightly changed.

93G0SX-703

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparsion with Workshop Manual (1206-10-89F).

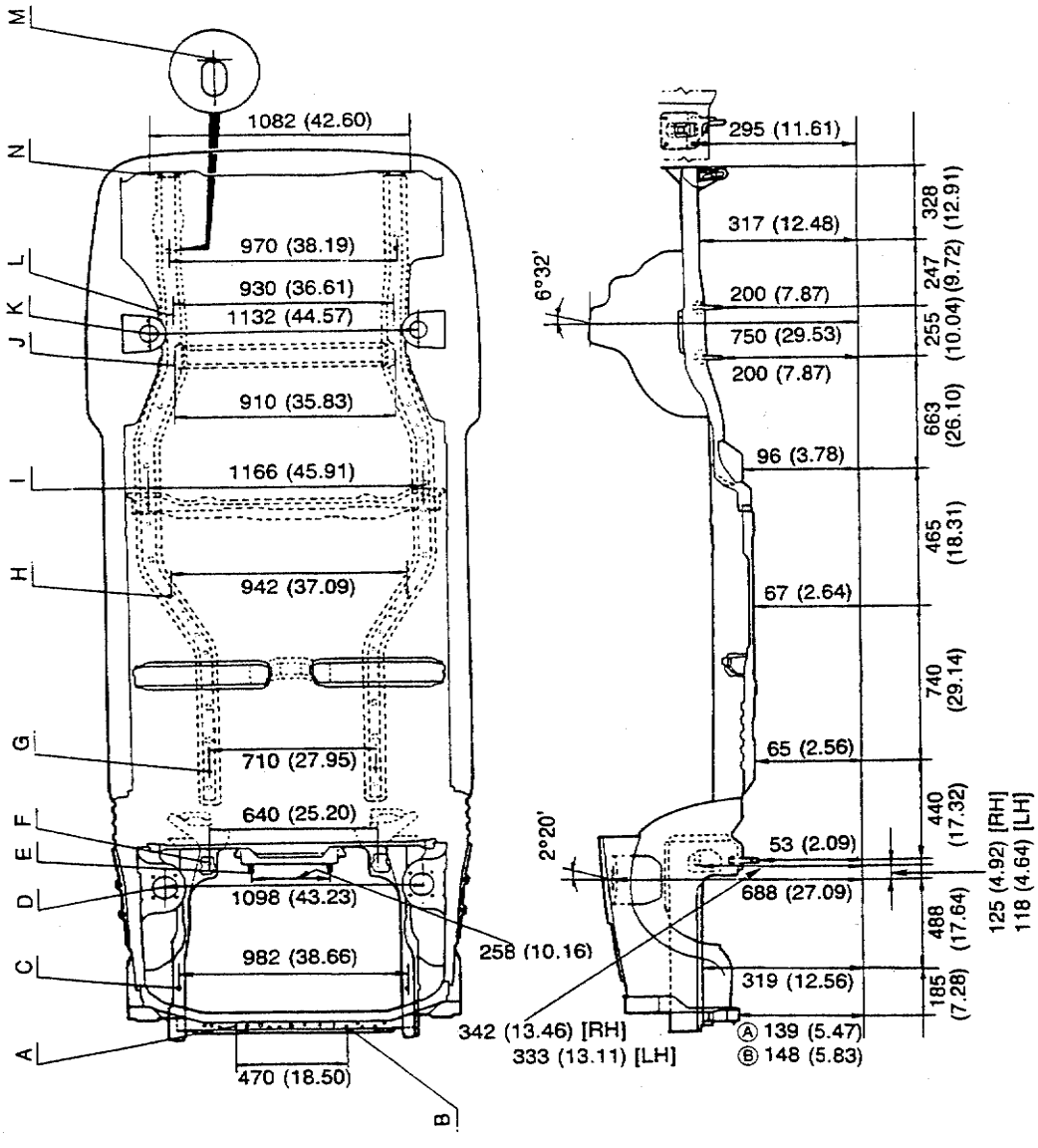
Underbody projected dimensions
Underbody straight-line dimensions

93G0SX-704

UNDERBODY DIMENSIONS

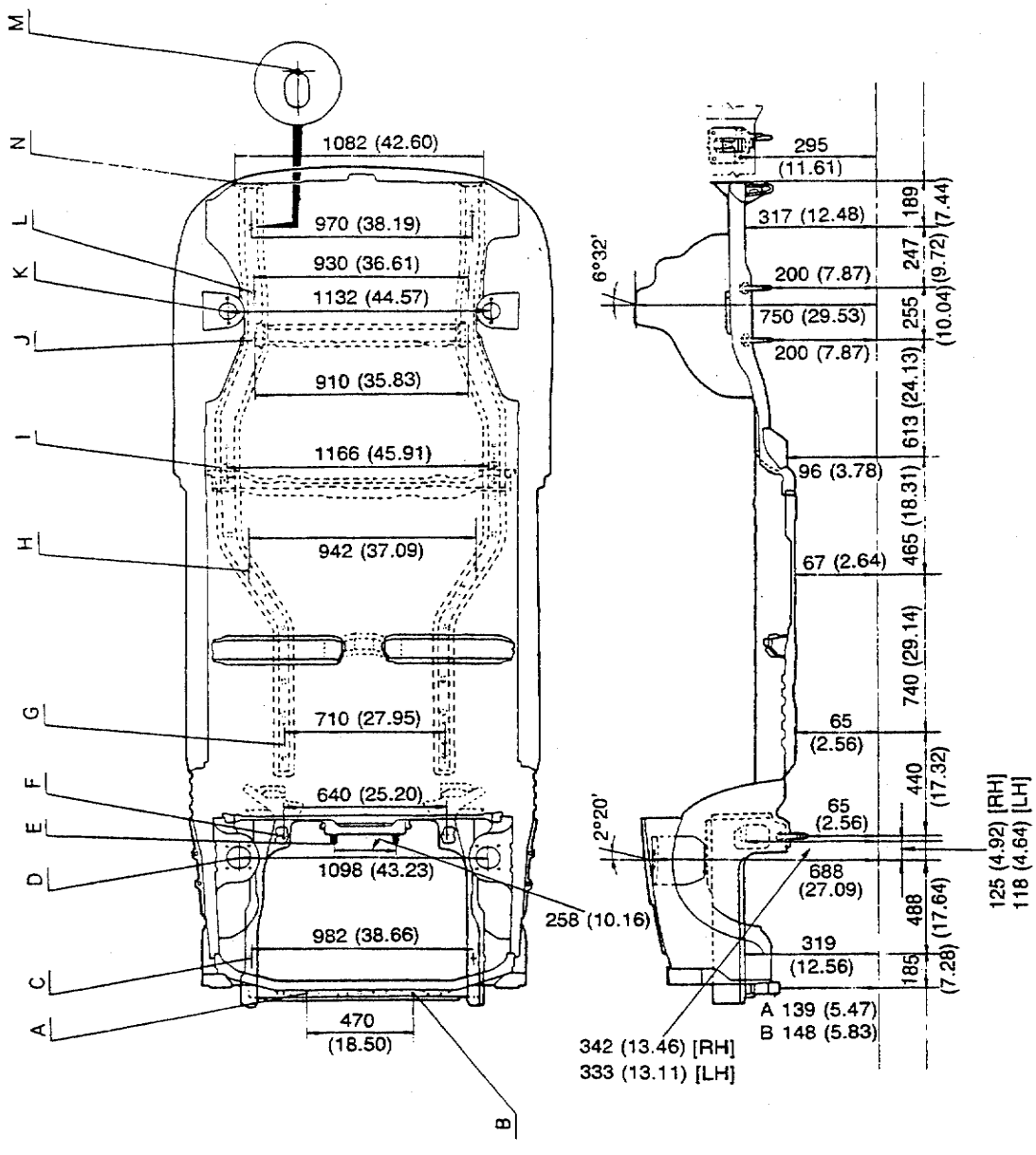
UNDERBODY PROJECTED DIMENSIONS

SEDAN



3HB

mm (in)



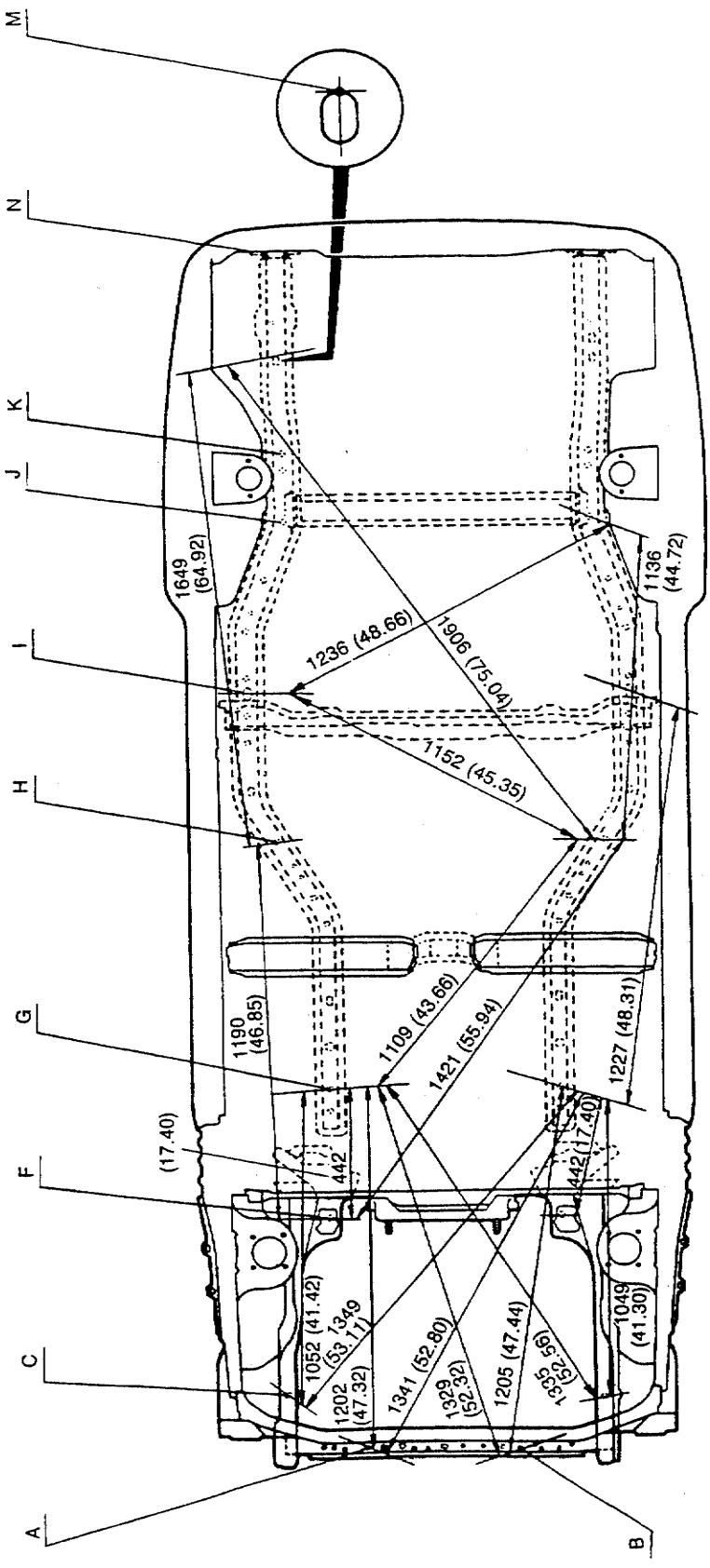
A: CROSSMEMBER REFERENCE HOLE ϕ12 (0.47)
B: CROSSMEMBER REFERENCE HOLE ϕ12 (0.47)
C: FRONT FRAME REFERENCE HOLE ϕ16 (0.63)
D: FRONT SUSPENSION MOUNTING BLOCK MOUNTING SURFACE
E: STEERING GEAR MOUNTING BOLT
F: CROSSMEMBER MOUNTING BOLT
G: FRONT FRAME B REFERENCE HOLE ϕ16 (0.63)

H: FRONT FRAME B REFERENCE HOLE ϕ20 (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 ϕ12 (0.47)

93G0SX-705

UNDERBODY STRAIGHT-LINE DIMENSIONS

SEDAN

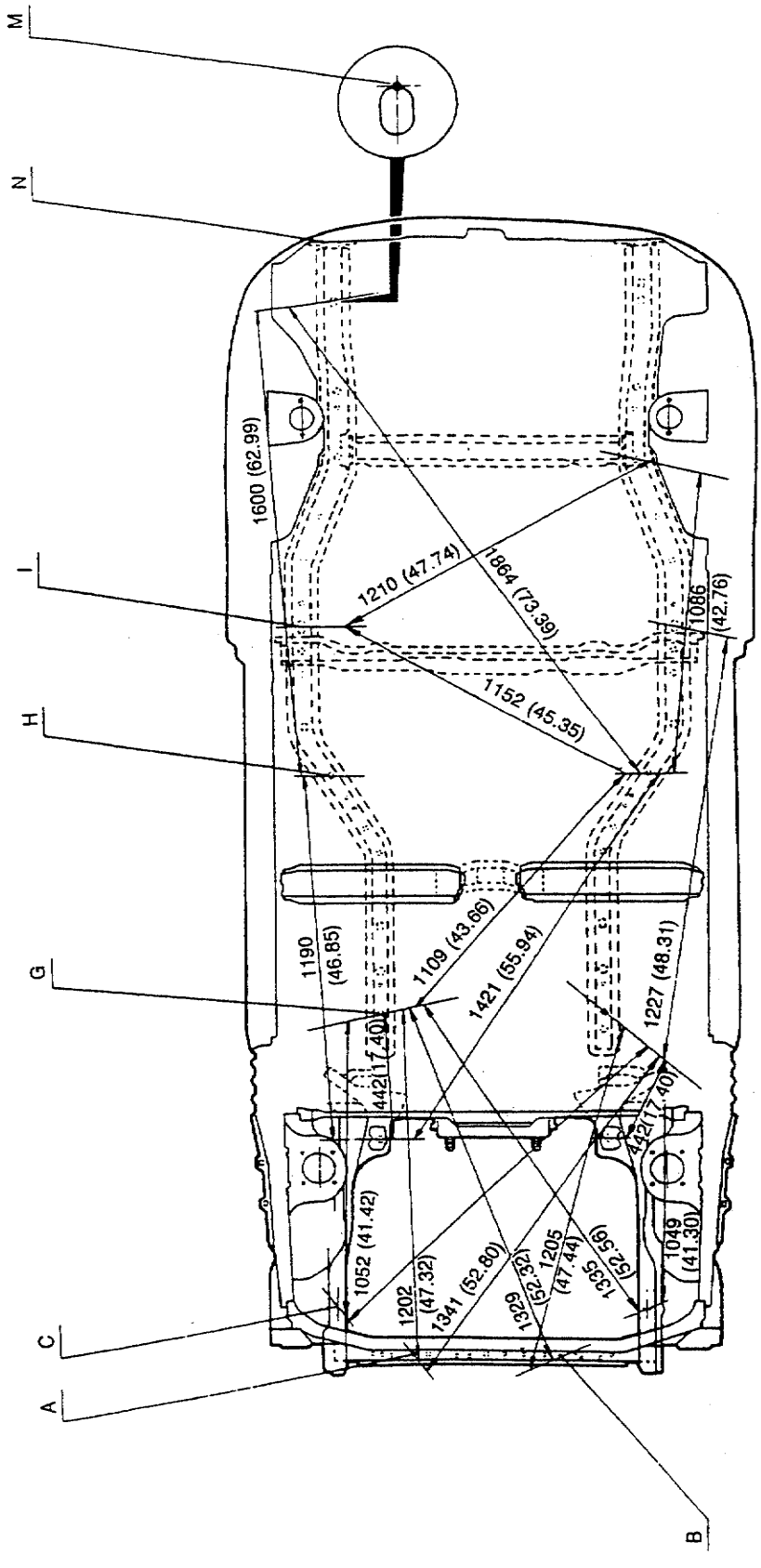


A: CROSSMEMBER REFERENCE HOLE ϕ12 (0.47)
B: CROSSMEMBER REFERENCE HOLE ϕ12 (0.47)
C: FRONT FRAME REFERENCE HOLE ϕ16 (0.63)
F: CROSSMEMBER MOUNTING BOLT
G: FRONT FRAME B REFERENCE HOLE ϕ16 (0.63)

H: FRONT FRAME B REFERENCE HOLE ϕ20 (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
M: REAR SIDE FRAME REFERENCE HOLE 16 x 22 (0.63 x 0.87)
N: REAR BUMPER MOUNTING HOLE ϕ12 (0.47)

mm (in)

3HB



A: CROSSMEMBER REFERENCE HOLE ϕ12 (0.47)
B: CROSSMEMBER REFERENCE HOLE ϕ12 (0.47)
C: FRONT FRAME REFERENCE HOLE ϕ16 (0.63)
G: FRONT FRAME B REFERENCE HOLE ϕ16 (0.63)

H: FRONT FRAME B REFERENCE HOLE ϕ20 (0.79)
I: TRAILING LINK BRACKET REFERENCE HOLE 10 x 12 (0.39 x 0.47)
M: REAR SIDE FRAME REFERENCE HOLE 16 x 22 (0.63 x 0.87)
N: REAR BUMPER MOUNTING HOLE ϕ12 (0.47)

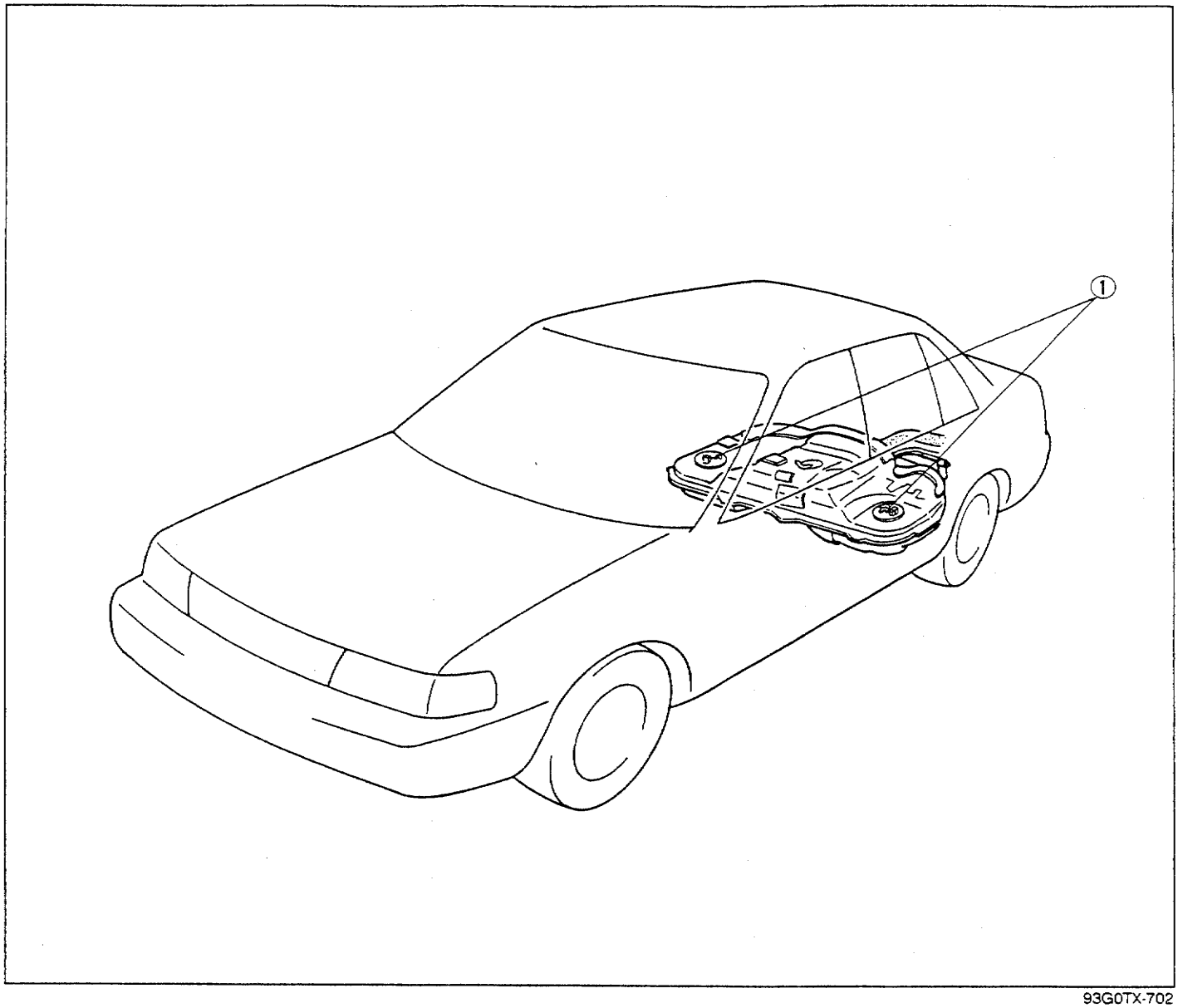
mm (in)

93G0SX-706

BODY ELECTRICAL SYSTEM

93G0TX-701

INDEX



93G0TX-702

1. Fuel pump and gauge sender units (in fuel tank)
   Inspection ..... page T–7

OUTLINE

OUTLINE OF CONSTRUCTION

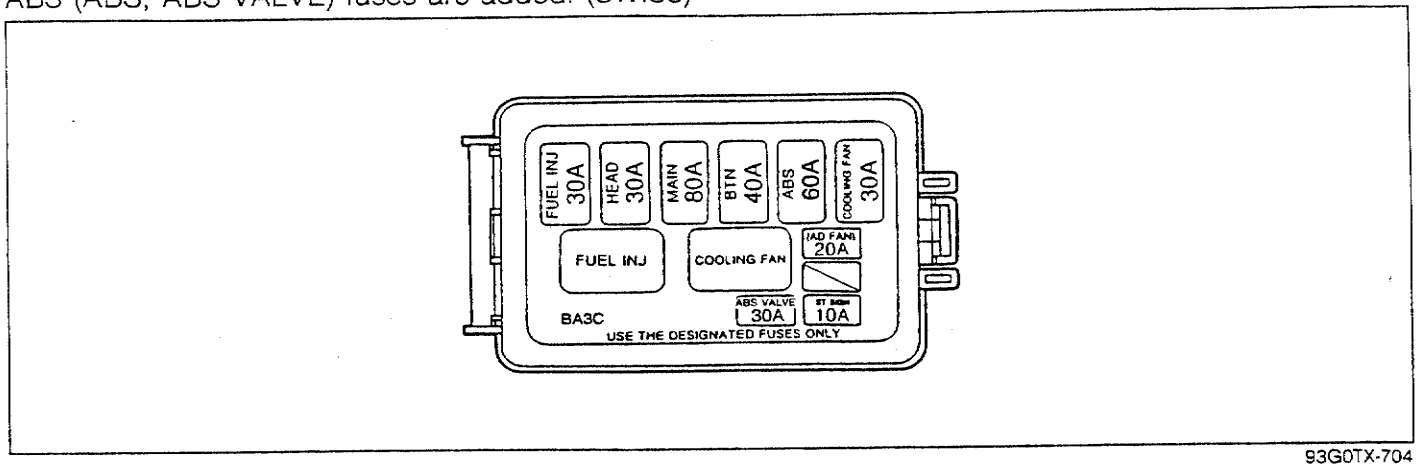
The body electrical system for the 4WD model is basically the same as for the 2WD model; however, with the addition of 4WD and Anti-lock Brake System (ABS) components, newly designated fuses are included and the warning and indicator lamp system is upgraded.

93G0TX-703

FUSE

MAIN FUSE BLOCK

ABS (ABS, ABS VALVE) fuses are added. (SWISS)



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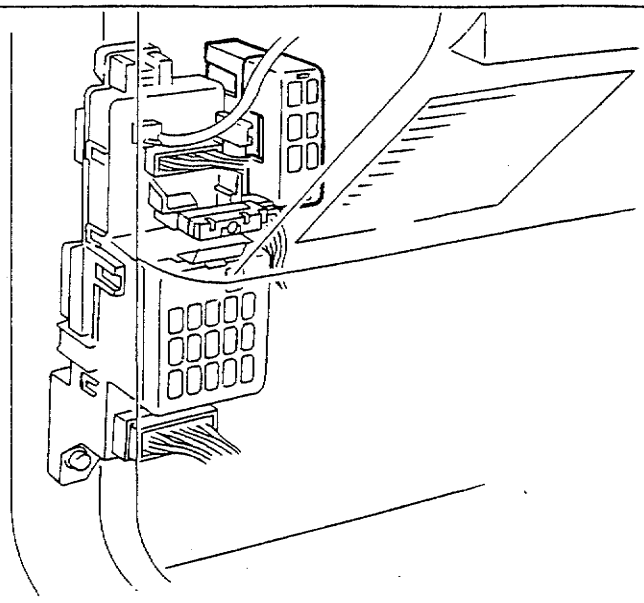
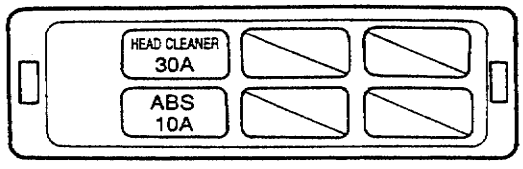
Fuse/Amperage	Protected circuit
ABS 60A	Anti-lock brake system
ABS VALVE 30A	Anti-lock brake system

FUSE BOX

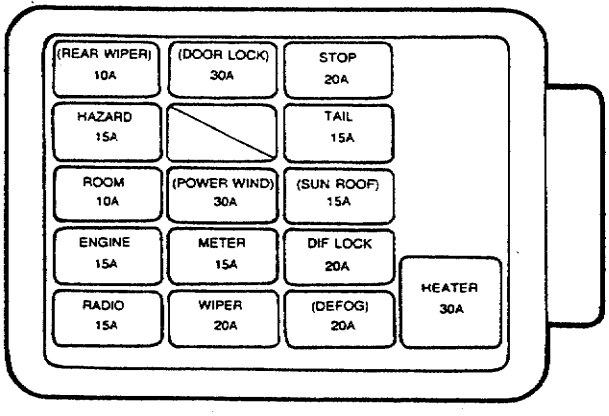
A center differential lock (DIF LOCK) and an anti-lock brake system (ABS) fuse are added depending on the market.



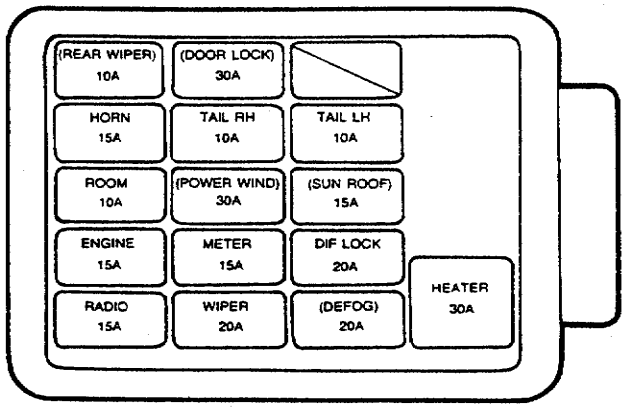
SWISS



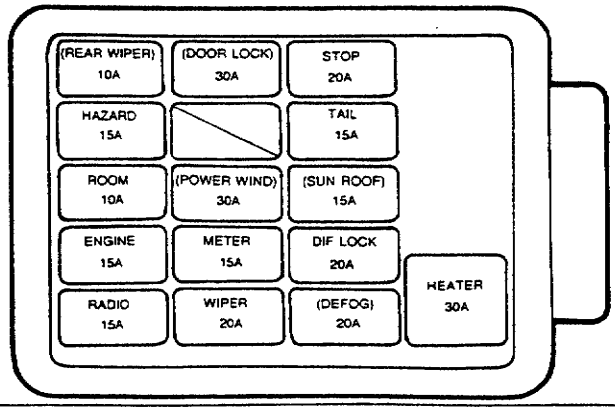
AUSTRALIA



WEST GERMANY



ECE, SWISS, SWEDEN



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Fuse/Amperage	Protected circuit
ABS 10A	Anti-lock brake system
DIF LOCK 20A	Center differential lock

HEADLIGHT LEVELING SYSTEM (WEST GERMANY)

LEVELING SWITCH POSITION

The headlight leveling position for 4WD model is changed regarding category D.

Category	Front seat		Rear seat	Load	Switch position
	Driver	Passenger			
A	X	—	—	—	0
B	X	X	—	—	0
C	X	X	X	—	1
D	X	X	X	X	1
E	X	—	—	X	3

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X: Yes —: No

WARNING SYSTEM

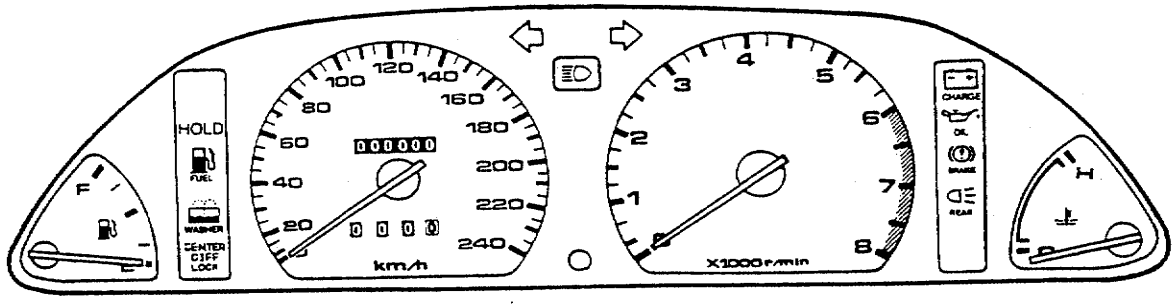
WARNING AND INDICATOR LAMP

With the addition of the center differential lock, turbocharger and ABS indicators, the arrangement of the warning and indicator lamps is changed.

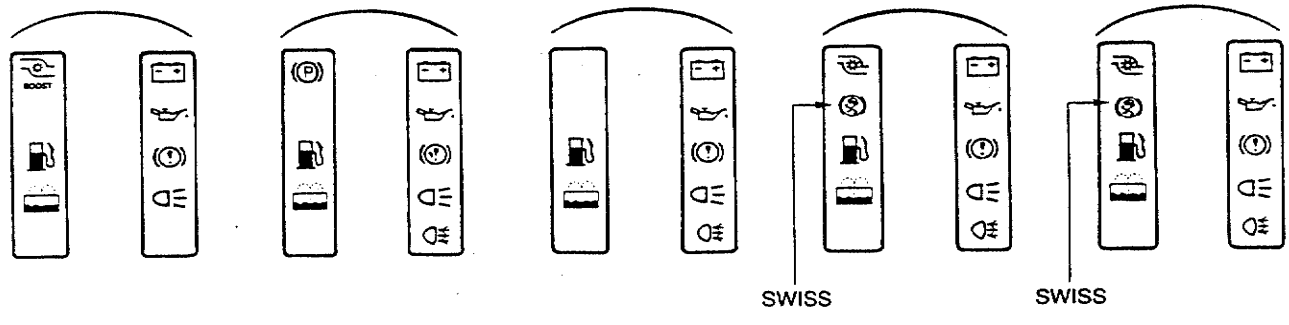
With the addition of the turbocharger, an overboost warning buzzer is added (in meter).

WITH TACHOMETER

AUSTRALIA (BP SOHC)

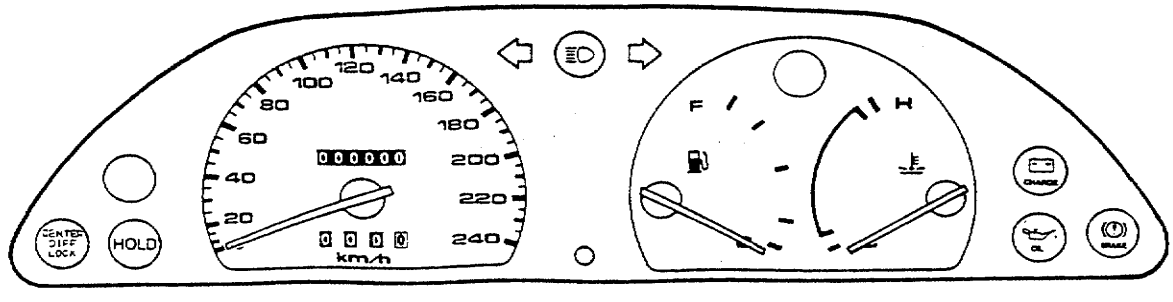


AUSTRALIA (BP DOHC TURBO) | ECE (BP SOHC) | ECE, SWISS, SWEDEN (BP SOHC) | SWISS, SWEDEN (BP DOHC TURBO) | SWISS, SWEDEN (BP DOHC TURBO)



WITHOUT TACHOMETER

AUSTRALIA (BP SOHC)



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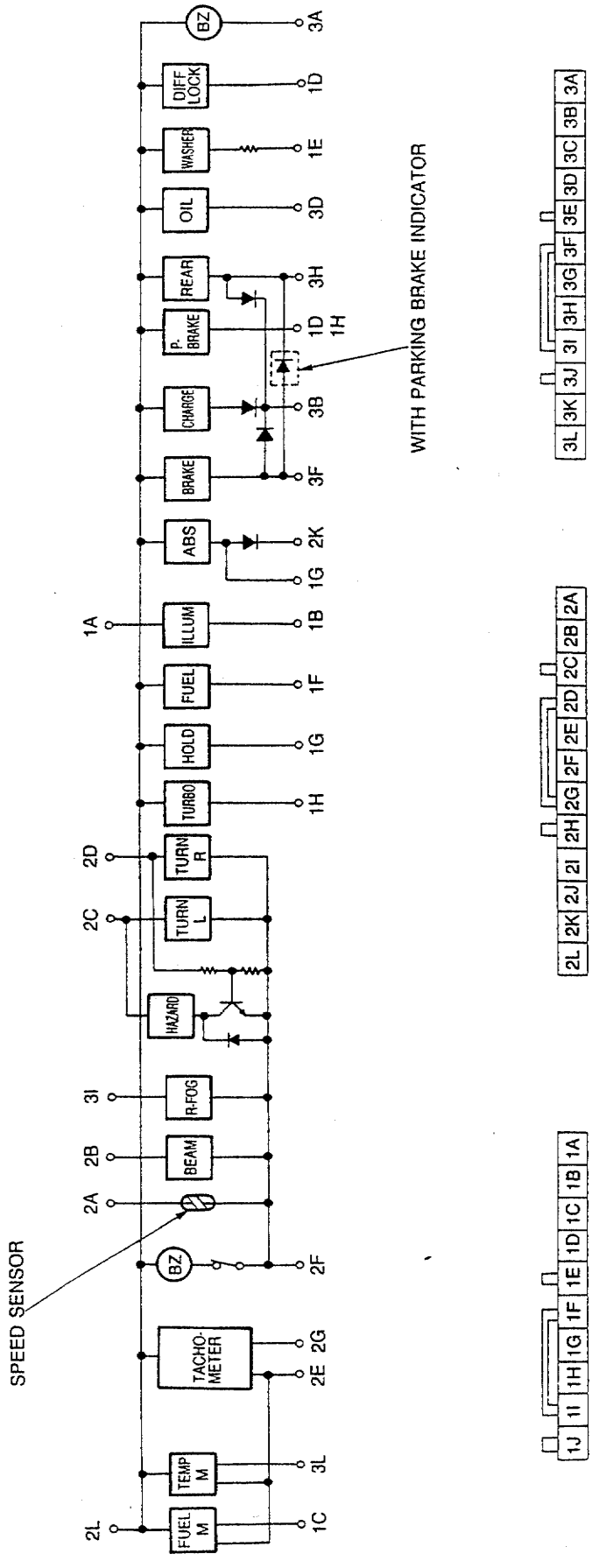
Circuit Diagram



TERMINAL	CONNECTED TO
1A	COMBINATION SWITCH
1B	GROUND
1C	FUEL TANK SENDER UNIT
1D	4WD CONTROL UNIT (BP SOHC; ECE, SWISS, SWEDEN, AUSTRALIA)
1E	WASHER LEVEL SENSOR
1F	FUEL TANK SENDER UNIT
1G	EC-AT CONTROL UNIT (BP SOHC; ECE, SWISS SWEDEN, AUSTRALIA)
	ABS CONTROL UNIT (BP DOHC TURBO; SWISS)
1H	ENGINE CONTROL UNIT (BP DOHC TURBO)
	PARKING BRAKE SWITCH (BP SOHC; ITALY)
1I	—
1J	—

TERMINAL	CONNECTED TO
2A	SPEED SENSOR OUTPUT (BP SOHC; ECE, SWISS SWEDEN, AUSTRALIA)
2B	LIGHT SWITCH (HIGH BEAM)
2C	TURN SWITCH (L)
2D	TURN SWITCH (R)
2E	GROUND
2F	GROUND
2G	IGN COIL (IGNITER)
2H	—
2I	—
2J	—
2K	ABS CONTROL UNIT (BP DOHC TURBO; SWISS)
2L	IG_1 BATTERY

TERMINAL	CONNECTED TO
3A	ENGINE CONTROL UNIT (BP DOHC TURBO)
3B	ALTERNATOR
3C	—
3D	OIL PRESSURE SWITCH
3E	—
3F	BRAKE FLUID SWITCH PARKING BRAKE SWITCH (EXCEPT ITALY)
3G	—
3H	STOPLIGHT CHECKER
3I	REAR FOG LIGHT SWITCH
3J	—
3K	—
3L	WATER TEMPERATURE SENDER UNIT

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SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Workshop Manual (1206-10-89F).

Fuel pump and gauge sender units
- Inspection

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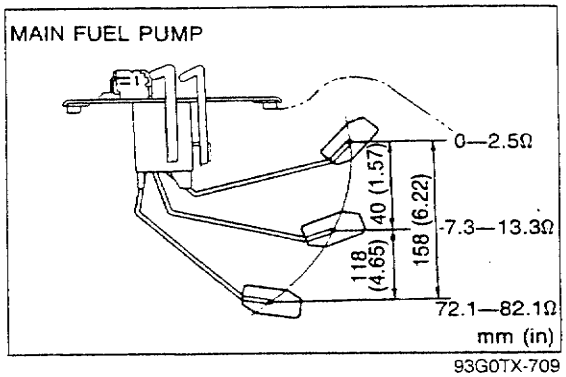

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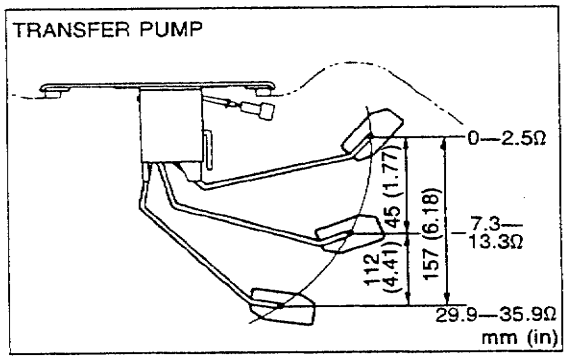


INSTRUMENT CLUSTER

FUEL PUMP AND GAUGE SENDER UNITS

Inspection

1. Remove the fuel pump and gauge sender units. (Refer to Section F.)
2. Disconnect the fuel gauge sender unit connectors.
3. Measure resistance of each unit while slowly moving the unit arm its full stroke.
4. If not as specified, replace the faulty fuel pump and gauge sender unit.

TECHNICAL DATA

93GTDX-701

MEASUREMENTS

Item \ Body 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)

B1. ENGINE (BP SOHC)

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/cm², 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		1.20 (0.047)
Valve face angle		IN		45°
		EX		45°
Valve length mm (in)	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.
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)

Item \ Engine			BP SOHC
Piston ring			
Thickness mm (in)		Top	Australia...1.47—1.49 (0.0579—0.0587), Europe...1.470—1.495 (0.0579—0.0589)
		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—1.540 (0.0598—0.0604)
		Oil	3.02—3.04 (0.1189—0.1197)
Piston ring-to-ring groove clearance mm (in)		Top	Australia...0.030—0.065 (0.0012—0.0026), Europe...0.025—0.065 (0.0010—0.0026)
		Second	0.030—0.070 (0.0012—0.0028)
		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)
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)
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)

B2. ENGINE (BP DOHC turbo)

Item \ Engine			BP DOHC turbo
Type			Gasoline, 4-cycle
Cylinder arrangement and number			In-line 4-cylinders
Combustion chamber			Pentroof
Valve system			DOHC, 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			8.2
Compression pressure kPa (kg/cm^2, psi)-rpm	Standard		1,059 (10.8, 154)-300
	Minimum		785 (8.0, 114)-300
	Maximum difference between each cylinder		196 (2.0, 28)
Valve timing	IN	Open BTDC	2°
		Close ABDC	51°
	EX	Open BBDC	59°
		Close ATDC	8°
Valve clearance mm (in)		IN	0: Maintenance-free
		EX	0: Maintenance-free
Cylinder head			
Height mm (in)			133.8—134.0 (5.268—5.276)
Distortion mm (in)			0.10 (0.004) max.
Grinding mm (in)			0.10 (0.004) max.
Cylinder head-to-HLA clearance mm (in)		Standard	0.025—0.066 (0.0010—0.0026)
		Maximum	0.18 (0.0071)
Valve and valve guide			
Valve head diameter mm (in)		IN	32.9—33.1 (1.295—1.303)
		EX	27.85—28.15 (1.096—1.108)
Valve head margin thickness mm (in)		IN	0.85—1.35 (0.0335—0.0531)
		EX	0.925—1.475 (0.0364—0.0581)
Valve face angle		IN	45°
		EX	45°
Valve length mm (in)	IN	Standard	101.34 (3.990)
		Minimum	100.84 (3.970)
	EX	Standard	101.44 (3.994)
		Minimum	100.94 (3.974)
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 (0.0012—0.0026)
		Maximum	0.20 (0.008)

Item \ Engine			BP DOHC turbo
Guide projection (Height "A") mm (in)		IN	18.3—18.9 (0.720—0.744)
		EX	18.3—18.9 (0.720—0.744)
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	44.55—45.45 (1.7539—1.7894)
		Maximum	46.5 (1.831)
	EX	Standard	44.55—45.45 (1.7539—1.7894)
		Maximum	46.5 (1.831)
Valve spring			
Free length	Standard mm (in)		46.26 (1.821)
	Minimum N (kg, lb)/mm (in)		224—253 (22.8—25.8, 50—57)/39.5 (1.555)
Out-of-square mm (in)			1.62 (0.064) max.
Camshaft			
Cam height mm (in)	IN	Standard	44.094 (1.7360)
		Wear limit	43.894 (1.7281)
	EX	Standard	44.603 (1.7560)
		Wear limit	44.403 (1.7481)
Journal diameter mm (in)		Standard (No.1—No.5)	25.940—25.965 (1.0213—1.0222)
		Out-of-round	0.05 (0.002) max.
Camshaft bearing oil clearance mm (in)		Standard (No.1—No.5)	0.035—0.081 (0.0014—0.0032)
		Maximum	0.15 (0.006)
Camshaft runout mm (in)			0.03 (0.0012) max.
Camshaft end play mm (in)		Standard	0.07—0.19 (0.0028—0.0075)
		Maximum	0.2 (0.008)
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.
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	1.470—1.495 (0.0579—0.0589)
		Second	1.47—1.49 (0.0579—0.0587)
End gap (Measured in the 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	1.52—1.54 (0.0598—0.0606)
		Oil	3.02—3.04 (0.1189—0.1197)

Item			Engine: BP DOHC turbo
Piston ring-to-ring groove clearance mm (in)		Top	0.025—0.065 (0.0010—0.0026)
		Second	0.03—0.07 (0.0012—0.0028)
		Maximum	0.15 (0.006)
Piston pin			
Diameter mm (in)			19.987—19.993 (0.7869—0.7871)
Piston-to-piston pin clearance mm (in)			−0.005—0.013 (−0.0002—0.0005)
Connecting rod bush-to-piston pin clearance mm (in)			0.010—0.027 (0.0004—0.0011)
Connecting rod and connecting rod bearing			
Length (Center to center) mm (in)			132.85—132.95 (5.230—5.234)
Bending mm (in)			0.075 (0.0030) max./50 (1.97)
Small end bore (Bush inner diameter) mm (in)			20.003—20.014 (0.7875—0.7880)
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)
	0.75 (0.030) undersize	Standard	49.204—49.208 (1.9372—1.9373)
		Minimum	49.152 (1.9351)
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), 0.75 (0.030)
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	0.080—0.282 (0.0031—0.0111)
		Maximum	0.30 (0.0118)
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)			9.0—11.5 (0.35—0.45)

D. LUBRICATION SYSTEM

Item \ Engine			BP SOHC, BP DOHC turbo
Lubricating method			Force-fed
Oil pump			
Type			Trochoid gear
Relief pressure	kPa (kg/cm², psi)		343—441 (3.5—4.5, 50—64)
Regulated pressure	kPa (kg/cm², 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/cm², 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 SD, SE or SF
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/Transaxle		BP SOHC		BP DOHC turbo
		MTX	ATX	MTX
Cooling method		Water-cooled, forced circulation		
Water pump				
Type		Centrifugal, V-belt driven		
Impeller diameter	mm (in)	70 (2.76)		75 (2.95)
Number of impeller blades		6		
Speed ratio		1 : 1.05		
Water seal type		Unified mechanical seal		
Thermostat				
Type		Wax, single-stage*1, Wax, two-stage*2		Wax, two-stage
Opening temperature	°C (°F)	80.5—83.5 (177—182)*1		Main: 86.5—89.5 (188—193) Sub: 83.5—86.5 (182—188)
		Main: 86.5—89.5 (188—193)*2 Sub: 83.5—86.5 (182—188)		
Full-open temperature	°C (°F)	95 (203)*1, 100 (212)*2		100 (212)
Full-open lift	mm (in)	8.5 (0.335) or more*1		Main: 8.0 (0.31) min. Sub: 1.5 (0.06) min.
		Main: 8.0 (0.31) min.*2 Sub: 1.5 (0.06) min.		
Radiator				
Type		Corrugated fin		
Cap valve opening pressure	kPa (kg/cm², psi)	74—103 (0.75—1.05, 11—15)		
Cooling circuit checking pressure	kPa (kg/cm², psi)	103 (1.05, 15)		

*1...Except cold area, *2...Cold area only

Item \ Engine/Transaxle		BP SOHC		BP DOHC turbo
		MTX	ATX	MTX
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 ± 1	Hi: 13.3 + 10% max., Lo: 8.8 + 10% max.	
Water thermoswitch				
OFF→ON	°C (°F)	91 (196)*1, 97 (207)*2		97 (207)
Radiator thermoswitch				
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

*1...Except cold area, *2...Cold area only

F1. FUEL AND EMISSION CONTROL SYSTEMS (WITHOUT CATALYTIC CONVERTER)

Item \ Engine			BP SOHC
Idle speed	rpm		850 ± 50
Ignition timing*	BTDC		5 ± 1°
Fuel pump			
Maximum output pressure	kPa (kg/cm², psi)		441—589 (4.5—6.0, 64—85)
Transfer pump			
Maximum output pressure	kPa (kg/cm², 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/cm², psi)		264—314 (2.7—3.2, 38.3—45.5)
Injector			
Type			High-ohmic
Resistance	Ω		12—16
Idle-up solenoid valve			
Resistance	Ω		Solenoid A.....17—23, Solenoid B, C.....27—38
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	E_2 ↔ Vs	Fully closed	200—600
		Fully open	20—1,200
	E_2 ↔ Vc		200—400
	E_2 ↔ THA_A (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
	E_1 ↔ Fc	Fully closed	∞
		Fully open	0

* TEN terminal of diagnosis connector grounded.

Item \ Engine	BP SOHC
Fuel tank	
Capacity liters (US gal, Imp gal)	60 (15.8, 13.2)
Air cleaner	
Element type	Oil permeated
Fuel	
Specification	Regular (91 RON or higher)

F2. FUEL AND EMISSION CONTROL SYSTEMS (WITH CATALYTIC CONVERTER)

Item \ Engine			BP SOHC	BP TURBO
Idle speed rpm			750 ± 50	800 ± 50
Ignition timing* BTDC			5 ± 1°	10 ± 1°
Fuel pump				
Maximum output pressure kPa (kg/cm², psi)			441—589 (4.5—6.0, 64—85)	
Sub fuel pump				
Maximum output pressure kPa (kg/cm², psi)			39 (0.4, 5.7) or higher	
Fuel filter				
Type	Low-pressure side		Nylon element (in fuel pump)	
	High-pressure side		Paper element	
Pressure regulator				
Regulating pressure kPa (kg/cm², 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	
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	$E_2 \leftrightarrow V_S$	Fully closed	200—600	
		Fully open	20—1,200	
	$E_2 \leftrightarrow V_C$		200—400	
	$E_2 \leftrightarrow THA_A$ (Intake air thermosensor)	−20°C (−4°F)	13,600—18,400	
		20°C (68°F)	2,210—26,900	
		60°C (140°F)	493—667	
	$E_1 \leftrightarrow F_C$	Fully closed	∞	
		Fully open	0	
Oxygen sensor (Ceramic heater coil)				
Resistance Ω			—	Approx. 6 [at 20° (68°F)]
Fuel tank				
Capacity liters (US gal, Imp gal)			60 (15.9, 13.2)	
Air cleaner				
Element type			Oil permeated	
Fuel				
Specification			Unleaded regular (RON 91 or higher)	Europe...Unleaded premium (RON 95 or higher) Australia...Unleaded regular (RON 91 or higher)

* TEN terminal of diagnosis connector grounded.

G. ENGINE ELECTRICAL SYSTEM

Item \ Engine/Transaxle			BP TURBO	BP SOHC	
			MTX	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		Coaxical reduction
	Output V-kW		12-0.85	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 BTDC (TEN terminal of diagnosis connector grounded)			10 ± 1°	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*2/ BKR5E*3 BKR6E11*2/ BKR6E*3		
		Nippon Denso	K16PR-U11*2/ K16PR-U*3 K20PR-U11*2/ K20PR-U*3		
	Plug gap mm (in)		1.0—1.1 (0.039—0.043)*2/ 0.7—0.8 (0.028—0.031)*3		
	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.)
*2 With catalytic converter *3 Without catalytic converter

H. CLUTCH

Item \ Engine/Transaxle		BP SOHC	BP DOHC turbo
		G5MX-R	
Clutch control		Hydraulic	
Clutch pedal			
Type		Suspended	
Pedal ratio	LHD	6.55	
	RHD	6.70	
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)	230 (9.05)
Inner diameter mm (in)		150 (5.91)	155 (6.10)
Facing thickness mm (in)	Flywheel side	3.5 (0.138)	3.2 (0.126)
	Pressure plate side	4.1 (0.161)	3.2 (0.126)

Item \ Engine/Transaxle	BP SOHC	BP DOHC turbo
	G5MX-R	
Clutch cover		
Type	Diaphragm spring	
Set load N (kg, lb)	3,846 (392, 862)	5,494 (560, 1,232)

J3. MANUAL TRANSAXLE AND TRANSFER

Item \ Engine/Transaxle			BP SOHC	BP DOHC turbo
			G5MX-R	
Transmission				
Shift lever position			Floor shift	
Gear ratio	First		3.307	3.454
	Second		1.833	
	Third		1.233	1.310
	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	0.095—0.345 (0.004—0.014)	
		Wear limit	0.845 (0.03)	
Clearance of shift fork and clutch sleeve mm (in)	Standard	1st—2nd	0.100—0.358 (0.004—0.014)	
		3rd—4th	0.100—0.400 (0.004—0.016)	
		5th—Rev.	0.100—0.400 (0.060—0.016)	
	Wear limit	1st—2nd	0.858 (0.034)	
		3rd—4th	0.900 (0.035)	
		5th—Rev.	0.900 (0.035)	
Clearance of synchronizer ring and gear mm (in)		Standard	1.02—1.98 (0.040—0.078)	
		Wear limit	0.5 (0.020)	
Gear thrust clearance mm (in)	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	0.100—0.220 (0.004—0.009)	
		Limit	0.270 (0.011)	
Bearing preload adjust shim mm (in)	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)	

Item \ Engine/Transaxle			BP SOHC	BP DOHC turbo
			G5MX-R	
Center differential				
Type			Planetary carrier	
Number of ring gear teeth		Outer	79	59
		Inner	66	75
Number of pinion gear teeth		Outer	14	
		Inner	14	
Number of sun gear teeth		Pinion gear side	33	43
		Idle gear side	43	
Number of idler-gear teeth			37	
Bearing preload		N·m (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			0.10—0.30 (0.004—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			4.388	4.214
Number of teeth	Ring gear		37	
	Pinion gear		11	
Fluid	Grade		API GL-5	
	Viscocity	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 \ Engine/Transaxle			BP SOHC
			G4AX-EL
Torque converter stall torque ratio			1,700—1,900 : 1
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/cm², 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/cm², 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)

Item	Engine/Transaxle		BP SOHC G4AX-EL
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)
Coasting clutch	Number of drive/driven plates		2/2
	Drive plate thickness mm (in)	Standard	1.6 (0.063)
		Minimum	1.4 (0.055)
	Coasting clutch clearance mm (in)		1.0—1.2 (0.040—0.047)
	Retaining ring size mm (in)		4.6 (0.181), 4.8 (0.189), 5.0 (0.197), 5.2 (0.205), 5.4 (0.213), 5.6 (0.220)
	Return spring free length mm (in)		29.8 (1.173)
Reverse clutch	Number of drive/driven plates		2/2
	Drive plate thickness mm (in)	Standard	1.6 (0.063)
		Minimum	1.4 (0.055)
	Reverse clutch clearance mm (in)		0.8—1.0 (0.031—0.040)
	Retaining ring size mm (in)		6.6 (0.260), 6.8 (0.268), 7.0 (0.276), 7.2 (0.283), 7.4 (0.291), 7.6 (0.299)
Low and reverse brake	Number of drive/driven plates		4/4
	Drive plate thickness mm (in)	Standard	1.6 (0.063)
		Minimum	1.4 (0.055)
	Low and reverse brake clearance mm (in)		2.1—2.4 (0.083—0.094)
	Retaining ring size 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)
	Return spring free length mm (in)		20.5 (0.807)
	Sun gear drum bushing mm (in)		33.425 (1.316)
	Small sun gear bushing mm (in)		24.021 (0.946)

Item	Engine/Transaxle		BP SOHC G4AX-EL
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	33.425 (1.316)
Small sun gear	Bushing inner diameter mm (in)	Maximum	24.021 (0.946)
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, 0.26—7.8)
Preload adjust shims		mm (in)	0.10 (0.004), 0.12 (0.005), 0.14 (0.006), 0.16 (0.0063), 0.18 (0.007), 0.20 (0.008), 0.50 (0.020)
Output gear bearing preload		N·m (cm-kg, in-lb)	0.03—0.9 (0.3—9, 0.26—7.8)
Preload adjust shims		mm (in)	0.10 (0.004), 0.12 (0.005), 0.14 (0.006), 0.16 (0.0063), 0.18 (0.007), 0.20 (0.008), 0.50 (0.020)
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		N·m (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		mm (in)	0.15—0.30 (0.006—0.012)
Ring gear end play adjustment washer		mm (in)	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		mm (in)	0.10—0.30 (0.004—0.012)
Sun gear adjustment washer		mm (in)	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			4.388
Number of teeth	Ring gear		37
	Pinion gear		11
Fluid	Grade		API GL-5
	Viscocity	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)

Spring Specification

Spring name		Outer diameter mm (in)	Free length mm (in)	No. of coil	Wire diameter mm (in)
Premain control valve body	N-R accumulator front spring	15.9 (0.626)	41.4 (1.629)	9.5	1.4 (0.055)
	1-2 accumulator large spring	16.0 (0.629)	72.1 (2.838)	17.0	2.2 (0.086)
	Bypass spring	4.9 (0.192)	27.6 (1.086)	25.0	0.55 (0.021)
	Servo control spring	4.9 (0.192)	27.6 (1.086)	25.0	0.55 (0.021)
	2-3 timing spring	*6.7 (0.263)	26.5 (1.043)	14.0	0.8 (0.031)
	N-R accumulator rear spring	11.1 (0.437)	62.0 (2.441)	22.0	1.2 (0.047)
	N-D accumulator front spring	9.8 (0.386)	60.9 (2.398)	9.5	1.1 (0.043)
	Coasting bypass spring	5.8 (0.228)	37.7 (1.484)	18.5	0.6 (0.024)
	3-2 timing spring	*6.6 (0.259)	28.6 (1.126)	10.0	0.8 (0.031)
	3-2 capacity spring	*4.4 (0.173)	30.6 (1.205)	13.1	0.5 (0.020)
Main control valve body	2-3 timing spring	*6.7 (0.263)	26.5 (1.043)	14.0	0.8 (0.031)
	Low-reducing spring	8.7 (0.343)	38.3 (1.508)	14.5	0.9 (0.035)
	1-2 shift spring	8.7 (0.343)	41.3 (1.626)	15.5	1.0 (0.039)
	2-3 shift spring	7.4 (0.291)	36.6 (1.441)	14.0	0.8 (0.031)
	Throttle backup spring	9.65 (0.380)	26.9 (1.059)	7.5	0.55 (0.022)
	3-4 shift spring	7.4 (0.291)	36.6 (1.441)	14.0	0.8 (0.031)
	Throttle modulator spring	6.3 (0.248)	47.9 (1.886)	26.5	0.8 (0.031)
	Throttle spring	5.4 (0.213)	47.2 (1.858)	28.25	0.8 (0.031)
Rear control valve body	Pressure regulator spring	11.5 (0.452)	26.5 (1.043)	9.5	1.0 (0.039)
	Lockup control spring	5.0 (0.196)	35.2 (1.386)	21.0	0.6 (0.024)
2-3 accumulator valve	2-3 accumulator valve spring	11.3 (0.444)	75.9 (2.988)	25.0	1.8 (0.070)

*: Inner diameter

L. PROPELLER SHAFT

Item \ Engine	BP SOHC	BP DOHC turbo
Deflection limit mm (in)	0.4 (0.016)	
Starting torque of the universal joint N·m (cm-kg, in-lb)	0.294—0.981 (3—10, 2.6—8.6)	

M. FRONT AND REAR AXLES

Item \ Engine/Transaxle		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			Engine speed sensing power steering	
Steering wheel				
Outer diameter		mm (in)	370 (14.57)	380 (14.96)
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	Preload measured by torque wrench	N·m (cm-kg, in-lb)	1.0—.1.3 (10—14, 8.7—12.1)	
	Preload measured by pull scale with attachment	kg (oz)	1.0—1.4 (35.3—49.4)	
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	
Oil capacity		liter (US qt, Imp qt)	0.9—1.0 (0.95—1.06, 0.79—0.88)	
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
Brake pedal			
Height		mm (in)	(a): 196—199 (7.72—7.83) (b): 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)	(c): 22.22 (0.875) (d): 23.81 (0.937)
Front disc brake			
Type			Ventilated
Thickness of pad	Standard	mm (in)	10 (0.39)
	Minimum		2 (0.08)
Thickness of disc plate	Standard	mm (in)	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	Standard	mm (in)	(b): 7.5 (0.30) (a): 8.0 (0.31)
	Minimum		1 (0.04)
Thickness of disc plate	Standard	mm (in)	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

(a) Except Australia
(b) Australia
(c) BP EGI MTX models
(d) BP EGI ATX and BP DOHC models

Item	Specifications
Power brake unit (without 4WABS)	
Diameter mm (in)	(c): 214 (8.43) (d): 188.4 (7.42)+215.2 (8.47)
Fluid pressure per treading force kPa (kg/cm², psi)/N (kg, lb)	(c): More than 1,373 (14, 199)/196 (20, 44) at 0 mmHg (0 inHg) More than 7,063 (72, 1,024)/196 (20, 44) at 500 mmHg (19.7 inHg) (d): More than 1,079 (11, 156)/196 (20, 44) at 0 mmHg (0 inHg) More than 8,731 (89, 1,266)/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/cm², psi)	2,943 (30, 427)

(c) BP EGI MTX models (d) BP EGI ATX and BP DOHC models

Q. WHEELS AND TIRES

ADR

Item	Type		Standard
Wheel	Size		5-Jx14 5 1/2-JJx14
	Offset mm (in)		45 (1.77)
	Pitch circle diameter mm (in)		100 (3.94)
	Material		Steel or aluminum alloy
Tire	Size		175/65R14 82S 195/60R14 85H
	Air pressure kPa (kg/cm², psi)	Front	175/65R14 82S: 220 (2.2, 32), 195/60R14 85H: 200 (2.0, 29)
		Rear	175/65R14 82S: 200 (2.0, 29), 195/60R14 85H: 180 (1.8, 26)
Wheel and tire	Runout limit mm (in)	Horizontal	2.0 (0.079)
		Vertical	1.5 (0.059)
	Unbalance limit g (oz)		20 (0.71)

ECE

Item	Type		Standard	Temporary Spare
Wheel	Size		5-Jx13	4-Tx14
	Offset		45 (1.77)	
	Pitch circle diameter mm (in)		100 (3.94)	
	Material		Steel or aluminum alloy	Steel
Tire	Size		175/70R13 82S	T115/70D14
	Air pressure kPa (kg/cm², psi)	Front	200 (2.0, 29)	412 (4.2, 60)
		Rear	180 (1.8, 26)	
Wheel and tire	Runout limit mm (in)	Horizontal	2.0 (0.079)	
		Vertical	1.5 (0.059)	
	Unbalance g (oz)		20 (0.71)	

Sweden, Switzerland

Item \ Type			Standard	Temporary Spare
Wheel	Size		5-Jx13 5 1/2-JJx14	4Tx14
	Offset		45 (1.77)	
	Pitch circle diameter mm (in)		100 (3.94)	
	Material		Steel or aluminum alloy	Steel
Tire	Size		175/70R13 82S 175/70R13 82H 195/60VR14	T115/70D14 T115/70R14
	Air pressure kPa (kg/cm², psi)	Front	200 (2.0, 29)	412 (4.2, 60)
		Rear	180 (1.8, 26)	
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 \ Engine			BP SOHC (M5)	BP SOHC (EC-AT)	BP DOHC turbo
Front suspension					
Suspension type			Strut		
Spring type			Coil spring		
Shock absorber	Type		Oil		
	Damping force N (kg, lb) at 0.3 m/s	Extended	677 (69, 152)		903 (92, 202)
		Compressed	177 (18, 40)		373 (38, 84)
Stabilizer	Type		Torsion bar		
	Diameter mm (in)		17.5 (0.69)	19.0 (0.75)	22.0 (0.87)
Front wheel alignment (*Unladen)	Total toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)		
		degree	0°12' ± 18'		
	Turning angle degree	Inner	38° ± 2°		
		Outer	30° ± 2°		
	Camber angle degree		−0°45' ± 45'		
	Caster angle degree		2°45' ± 45'		
	Kingpin angle degree		12°10'		
Rear suspension					
Suspension type			Strut		
Spring type			Coil spring		
Shock absorber	Type		Oil		
	Damping force N (kg, lb) at 0.3 m/s	Extended	716 (73, 161)		834 (85, 187)
		Compressed	265 (27, 59.4)		353 (36, 79.2)
Stabilizer	Type		Torsion bar		
	Diameter mm (in)		19.1 (0.75)		20 (0.79)
Rear wheel alignment (*Unladen)	Total toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)		
		degree	0°12' ± 18'		
	Camber angle degree		−0°20' ± 45'		

M5..... Manual transaxle (5-speed)
EC-AT... Electronically controlled automatic transaxle
* Fuel tank full; radiator coolant and engine oil at specified levels; and spare tire, jack, and tools in designated positions.
Refer to page R–3 for the coil spring specifications.

T. BODY ELECTRICAL SYSTEM

Item			Specifications (W)		
			ECE	Swiss	Australia
Exterior lamps	Headlight		60/55		
	Front turn signal light		21		
	Parking light		5		
	Front side turn light		5		
	Stop/Taillight		21/5		
	Taillight (3HB)		5		—
	High mount stoplight		—		18.4
	Rear turn single light		21		
	Back-up light		21		
	License plate light		5		
	Flash-to-pass light		55 (Austria)	—	—
	Running light		55 (Sweden, Norway, Iceland)		—
	Rear fog light		21		—
Interior lamps	Interior and spot lamp	Interior	10		
		Spot	6		
	Interior lamp		10		
	Spot lamp (in overhead console)		8		
	Cargo compartment lamp		5		
	Turnk compartment lamp		5		
Indicator and warning lamps	High beam		3.4		
	Turn light		3.4		
	Brake		3		
	Hold		3		
	Charge		3		
	Oil pressure		3		
	Washer		3		
	Turbo		3		
	Fuel		3		
	Rear fog		3		
	ABS		3		
	Parking brake		3		
	Illumination		3.4		
	Rear		3		
	Diff. lock		3		

STANDARD BOLT AND NUT TIGHTENING TORQUE

Diameter mm (in)	Pitch mm (in)	4T			6T			8T		
		N·m	m-kg	ft-lb	N·m	m-kg	ft-lb	N·m	m-kg	ft-lb
6 (0.236)	1 (0.039)	4.2—6.2	0.43—0.63	3.1—4.6	6.9—9.8	0.7—1.0	5.0—7.2	7.8—11.8	0.8—1.2	5.8—8.8
8 (0.315)	1.25 (0.049)	9.8—14.7	1.0—1.5	7.2—10.8	16—23	1.6—2.3	12—17	18—26	1.8—2.7	13—20
10 (0.394)	1.25 (0.049)	20—28	2.0—2.9	14—21	31—46	3.2—4.7	23—34	36—54	3.7—5.5	27—40
12 (0.472)	1.5 (0.059)	34—50	3.5—5.1	25—37	55—80	5.6—8.2	41—59	63—93	6.4—9.5	46—69
14 (0.551)	1.5 (0.059)	—	—	—	75—103	7.7—10.5	56—76	102—137	10—14	75—101
16 (0.630)	1.5 (0.059)	—	—	—	116—157	12—16	85—116	156—211	16—22	115—156
18 (0.709)	1.5 (0.059)	—	—	—	167—225	17—23	123—166	221—299	23—31	163—221
20 (0.787)	1.5 (0.059)	—	—	—	231—314	24—32	171—231	308—417	31—43	227—307
22 (0.866)	1.5 (0.059)	—	—	—	314—423	32—43	231—312	417—564	43—58	307—416
24 (0.945)	1.5 (0.059)	—	—	—	475—546	41—56	298—403	536—726	55—74	396—536

SPECIAL TOOLS

93GSTX-701

GENERAL INFORMATION

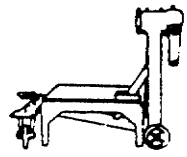
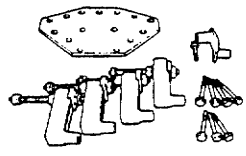
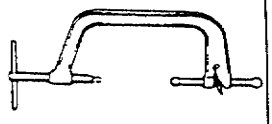
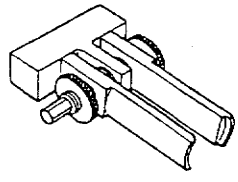
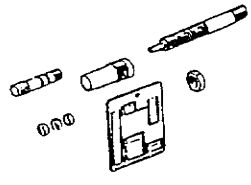
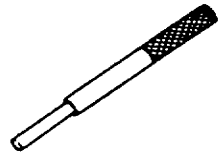
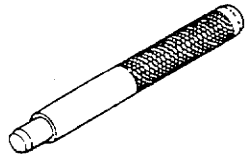
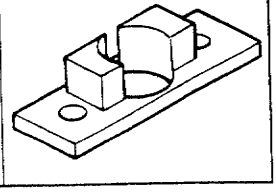
The letters A and B in the priority column indicate the degree of importance of each tool.
A.....Indispensable
The tools ranked A in this list are indispensable for performing operations satisfactorily, easily, safely, and efficiently. It is, therefore advisable that all service shops have these tools.
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.

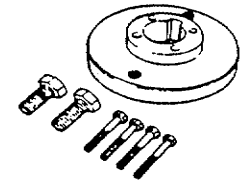
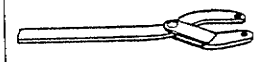
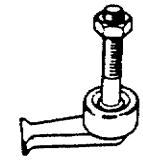
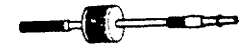
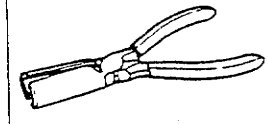
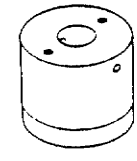
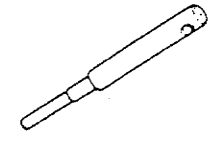
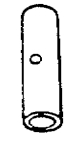
Note

- **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.

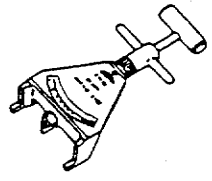
03USTX-002

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 0A2 Pivot	A	
49 L012 0A0 Installer set, valve seal & valve guide (BP DOHC)	A	
49 B012 005 Remover & installer, valve guide	A	
49 0221 061A Remover & installer, piston pin (BP DOHC)	A	
49 H011 001A Support block head (BP SOHC)	A	

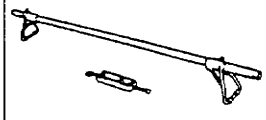
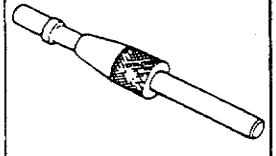
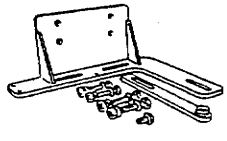
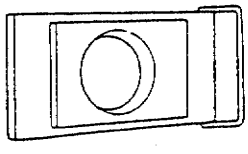
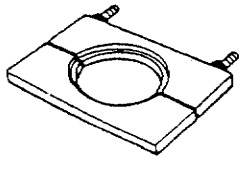
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B011 102 Lock tool, crankshaft	A	
49 S120 710 Holder, coupling flange	A	
49 E301 060 Brake, ring gear	A	
49 1285 071 Puller, needle bearing	A	
49 S120 170 Remover, valve seal (BP DOHC)	A	
49 D011 001 Support block body (BP SOHC)	A	
49 H011 002 Installer, piston pin (BP SOHC)	A	
49 8134 044 Guide, piston pin (BP SOHC)	A	

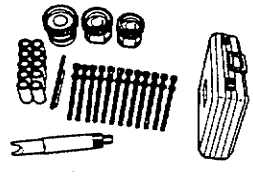
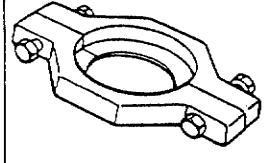
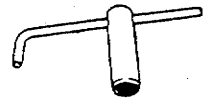
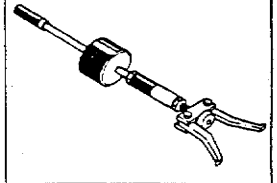
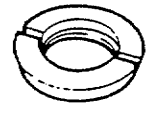
ENGINE (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 8134 045 Guide, piston pin (BP SOHC)	A	
49 9200 020 V-ribbed belt tension gauge	B	

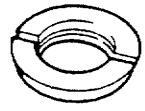
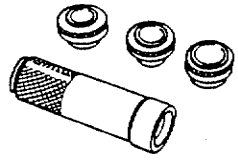
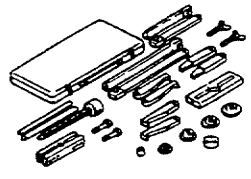
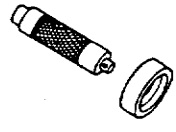
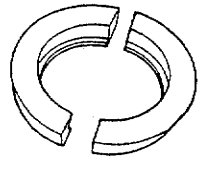
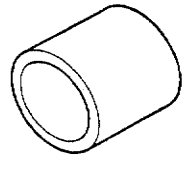
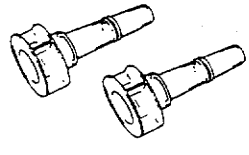
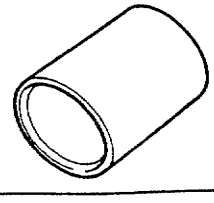
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 9200 145 Adapter set, radiator cap tester	A	
49 G014 001 Wrench, oil filter	A	

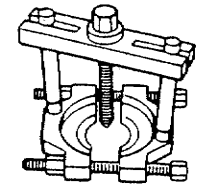
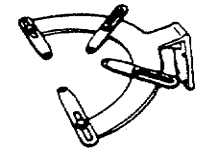
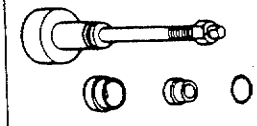
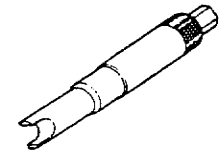
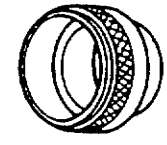
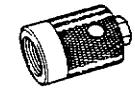
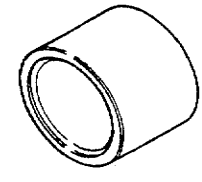
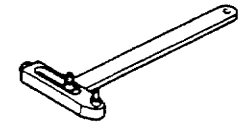
CLUTCH AND MANUAL TRANSAXLE

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 F401 366A Plate	A	
49 G030 370 Removing plate	A	

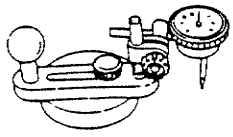
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G030 380C Shim selector set	A	
49 0636 145 Puller, fan pulley boss	A	
49 G030 440 Holder, primary shaft	A	
49 W032 2A0 Remover, bearing	A	
49 B092 372 Attachment F	A	

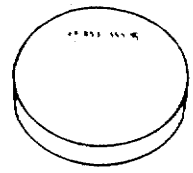
CLUTCH AND MANUAL TRANSAXLE (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B092 374 Attachment H	A	
49 F401 330B Installer set, bearing	A	
49 0839 425C Puller set, bearing	A	
49 G030 795 Installer, oil seal	A	
49 B027 003 Attachment M	A	
49 U027 003 Installer, oil seal	A	
49 B027 001 Holder, differential side gear	A	
49 H028 202 Block L	A	

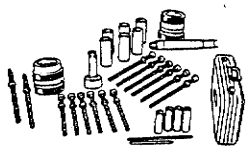
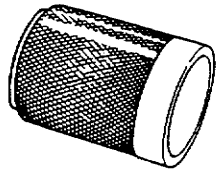
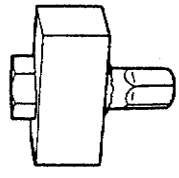
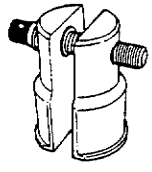
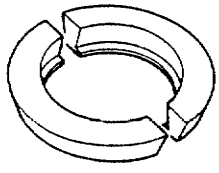
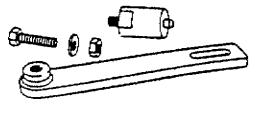
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0710 520 Puller bearing	A	
49 M005 561 Hanger, differential carrier	A	
49 8531 565 Pinion model	A	
49 B027 002A Preload adapter	A	
49 G030 338 Attachment E	A	
49 B017 102 Preload adapter	A	
49 G026 103 Support block	A	
49 0259 720 Adjustment wrench, side bearing	B	

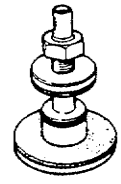
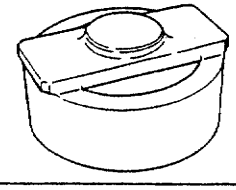
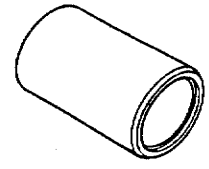
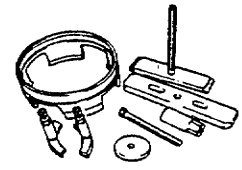
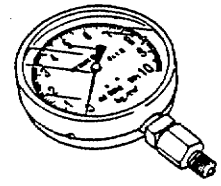
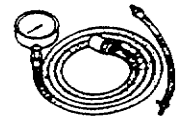
CLUTCH AND TRANSAXLE (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0727 570 Gauge body, pinion height adjust	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 8531 555 Gauge block	A	

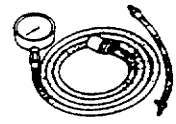
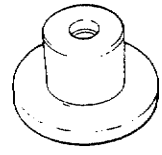
AUTOMATIC TRANSAXLE

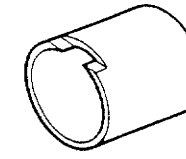
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G019 0A5A Shim selector set	A	
49 G019 011 Bearing installer	A	
49 FT01 439 Holder, idle gear shaft	A	
49 G019 013 Bearing remover	A	
49 G019 022 Attachment K	A	
49 G019 0A2 Turbine shaft holder	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G019 012 Leak checker	A	
49 G019 017 Oil seal installer	A	
49 S120 785 Boot installer, ball joint dust cover	A	
49 G019 0A7A Compressor set, return spring	A	
*1 49 B019 901 Gauge, oil pressure	A	
49 0378 400A Gauge set, oil pressure	A	

*1 Only Australia

AUTOMATIC TRANSAXLE (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
*2 49 B019 9A2 Gauge set, oil pressure	A	
49 F026 102 Installer, bearing	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 H034 201 Support block	A	
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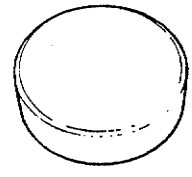
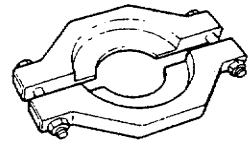
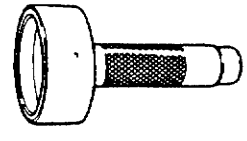
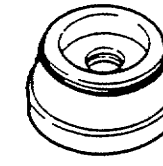
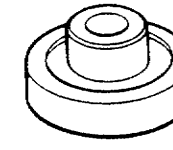
*2 Only Europe

DIFFERENTIAL

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 N027 001 Gauge block	A	
49 H027 002 Remover, bearing	A	
49 B001 795 Installer, oil seal	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F027 005 Attachment ϕ62	A	
49 H033 101 Remover, bearing	A	
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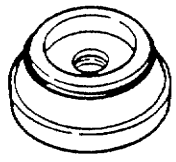
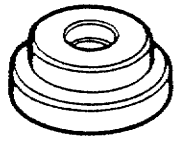
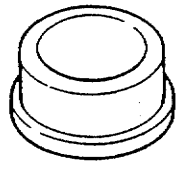
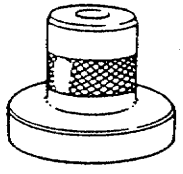
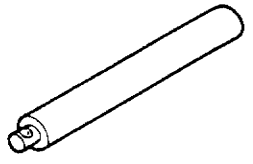
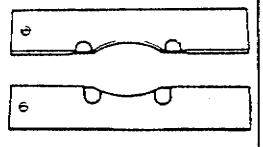
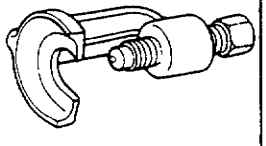
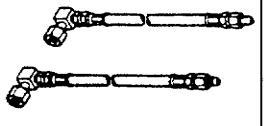
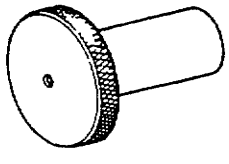
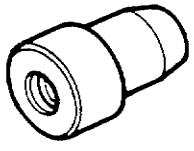
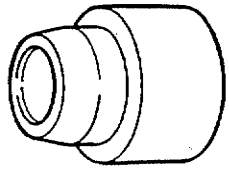
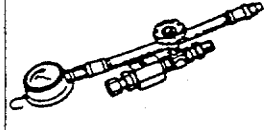
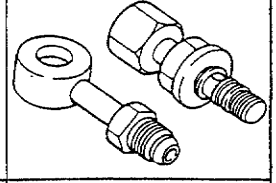
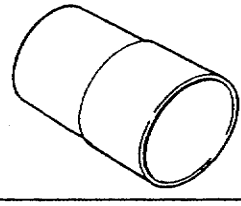
FRONT AND REAR AXLES

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F027 007 Attachment ϕ72	A	
49 G030 727 Attachment A	A	
49 F027 009 Attachment ϕ68 and 77	A	

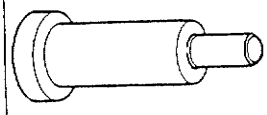
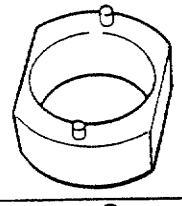
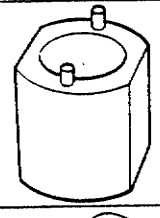
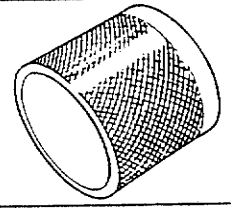
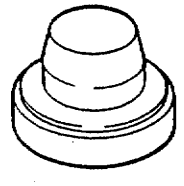
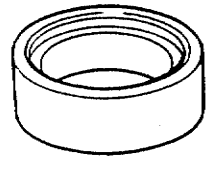
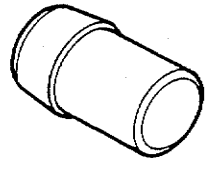
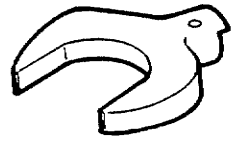
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 V001 795 Installer, oil seal	A	
49 G033 102 Handle	A	
49 F026 103 Puller, wheel hub	A	

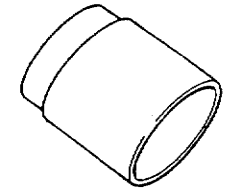
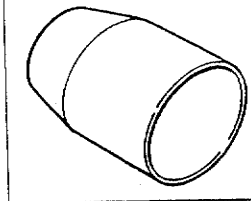
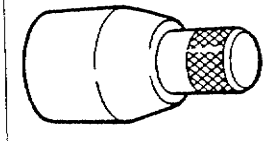
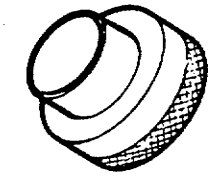
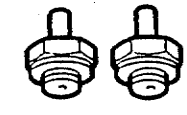
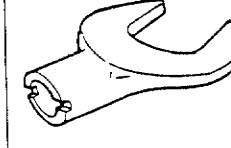
STEERING SYSTEM

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0118 850C Puller, ball joint	B	
49 H002 671 Adapter	A	
49 G033 108 Adapter, caster camber gauge	A	
49 B032 323 Remover body, rod seal **NEW SST**	A	

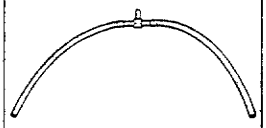
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B032 309 Installer body, pinion seal	A	
49 1232 670A Gauge set, power steering	A	
49 B032 304 Adapter	A	
49 B032 310 Protector, pinion seal	A	

STEERING SYSTEM (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B032 305 Holder, power steering pump	A	
49 B032 306 Wrench, plug	A	
49 B032 327 Wrench, outher box **NEW SST**	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 **NEW SST**	A	
49 B032 320 Wrench	A	

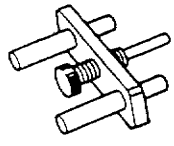
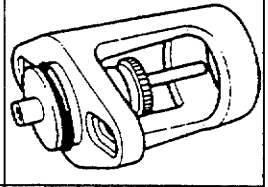
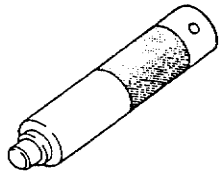
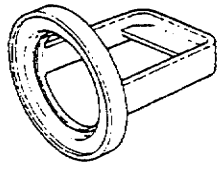
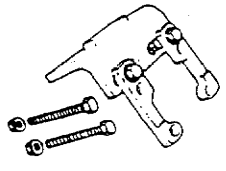
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B032 311 Protector, slipper seal	A	
49 B032 312 Protector, slipper seal	A	
49 B032 326 Protector, outer box **NEW SST**	A	
49 B032 324 Protector body, rod seal **NEW SST**	A	
49 B032 321 Adapter	A	
49 F032 303 Handle	A	
49 H032 301 Wrench	A	
49 B032 317 Remover, bearing & oil seal	B	

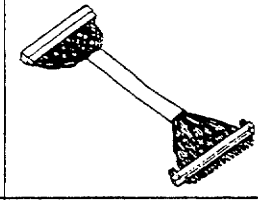
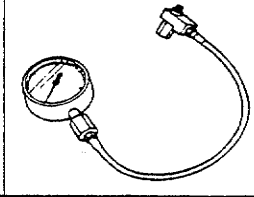
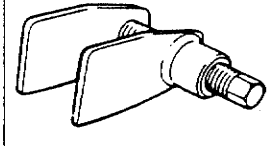
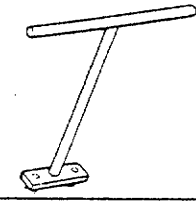
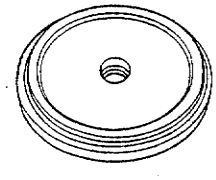
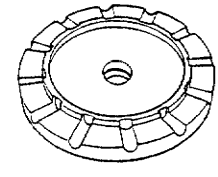
STEERING SYSTEM (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G032 317 House	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
—	—	—

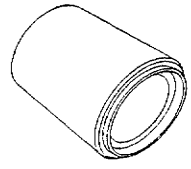
BRAKING SYSTEM

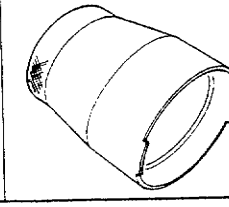
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0259 770B Wrench, flare nut	A	
49 F043 001 Adjust gauge	A	
*1 49 B043 001 Adjust gauge	A	
49 B043 002 Installer, bearing	A	
*2 49 G025 001 Installer, sensor rotor (ABS)	A	
*2 49 F032 301 Hanger, power steering pump (ABS)	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
*2 49 B066 001 Harness (ABS) **NEW SST**	A	
*2 49 B066 0A0 Oil pressure gauge (ABS) **NEW SST**	A	
49 0221 600C Expand tool, disc brake	B	
49 FA18 602 Wrench, disc brake piston	B	
*1 49 L043 001 Setting tool, retainer	A	
*1 49 L043 002 Setting tool, retainer	A	

*1 Only Australia
*2 Only Europe

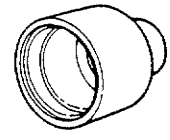
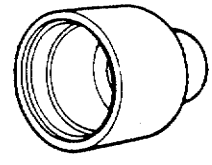
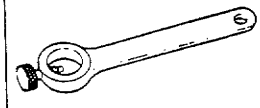
BRAKING SYSTEM (CONT'D)

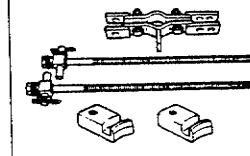
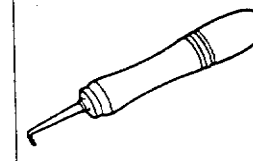
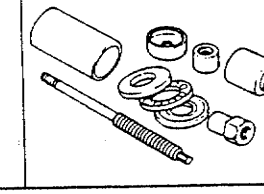
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
*1 49 L043 003 Setting tool, retainer	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
*1 49 L043 004 Protector	A	

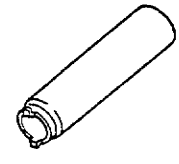
*1 Only Australia

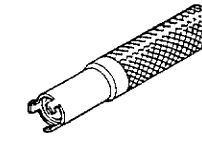
FRONT AND REAR SUSPENSIONS

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 1243 785 Installer, dust boot	A	
49 8038 785 Installer, dust boot	A	
49 0180 510B Attachment, preload	B	

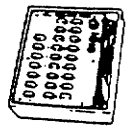
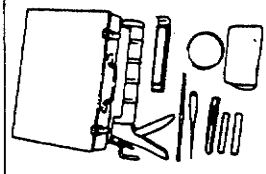
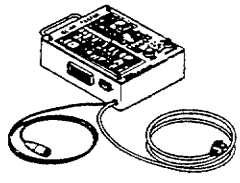
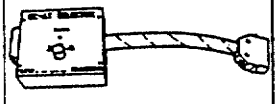
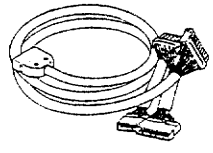
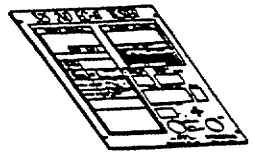
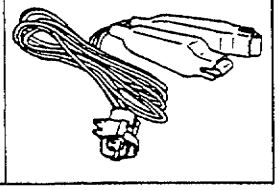
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G034 1A0 Compressor, coil spring	A	
49 0208 701A Air out tool, boot	B	
49 B034 2A0 Replacer, rubber bush	A	

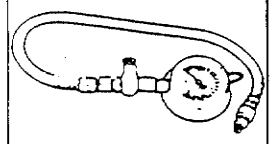
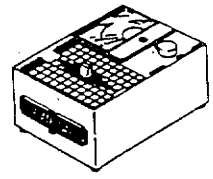
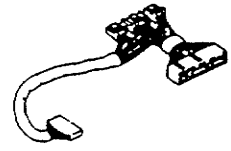
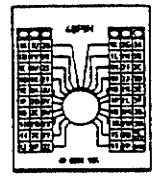
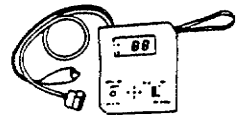
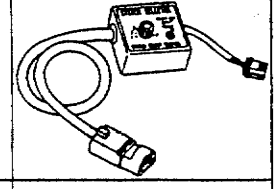
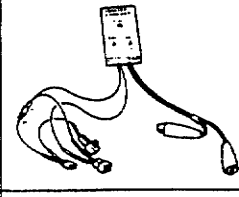
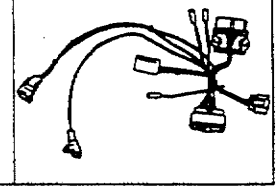
AIR CONDITIONER SYSTEM

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B061 005 Replacer, seal plate	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B061 006 Replacer, shaft seal	A	

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	
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 F019 901 Adapter harness (EC-AT tester)	A	
49 B019 904 Panel (EC-AT tester)	A	
49 L018 901 Injector checker	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0187 280 Oil pressure gauge	B	
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	
49 N018 001 Adapter harness (Igniter checker)	A	

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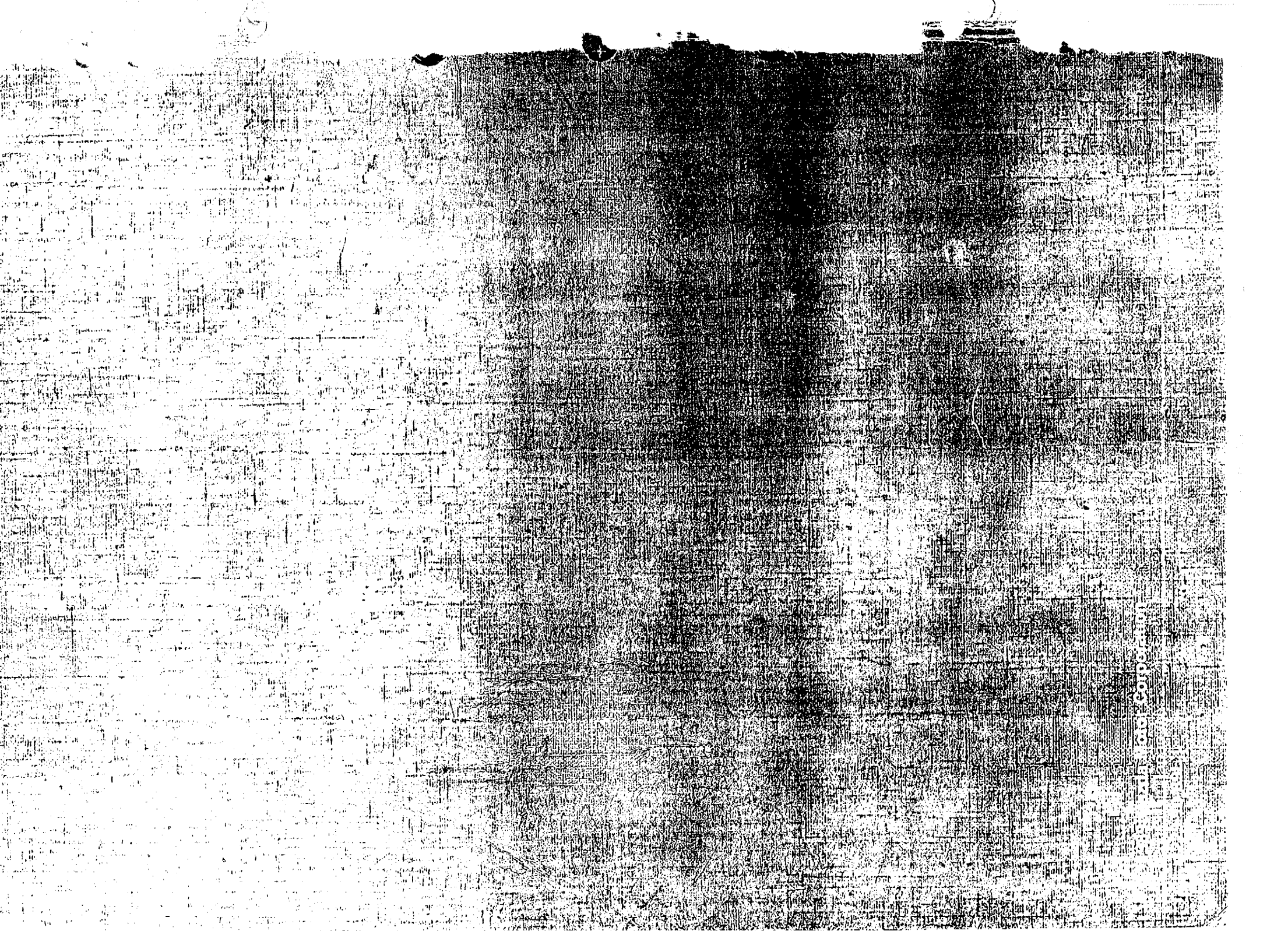
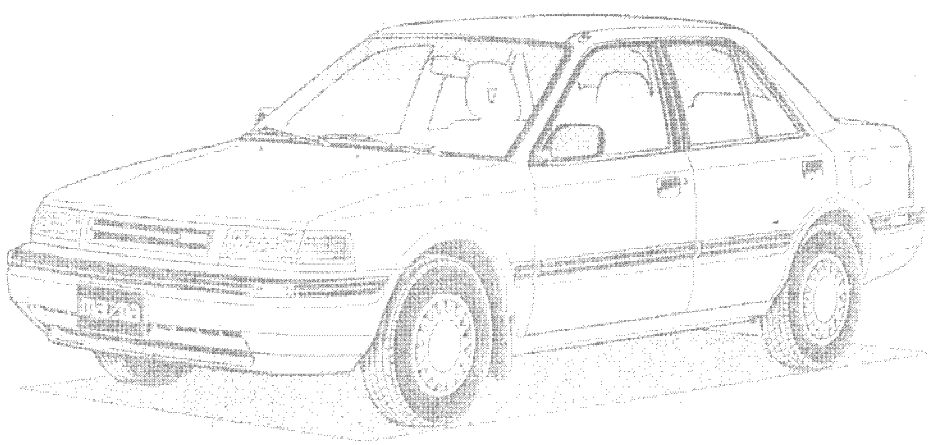


Mazda 323

4WD

Wiring Diagram

JMO BG10P100



12/89 5162-10-89L

mazda

Australia

Mazda 323 4WD

Wiring Diagram

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)
JMO BG10P1 00 100001 ~

SECTION INDEX

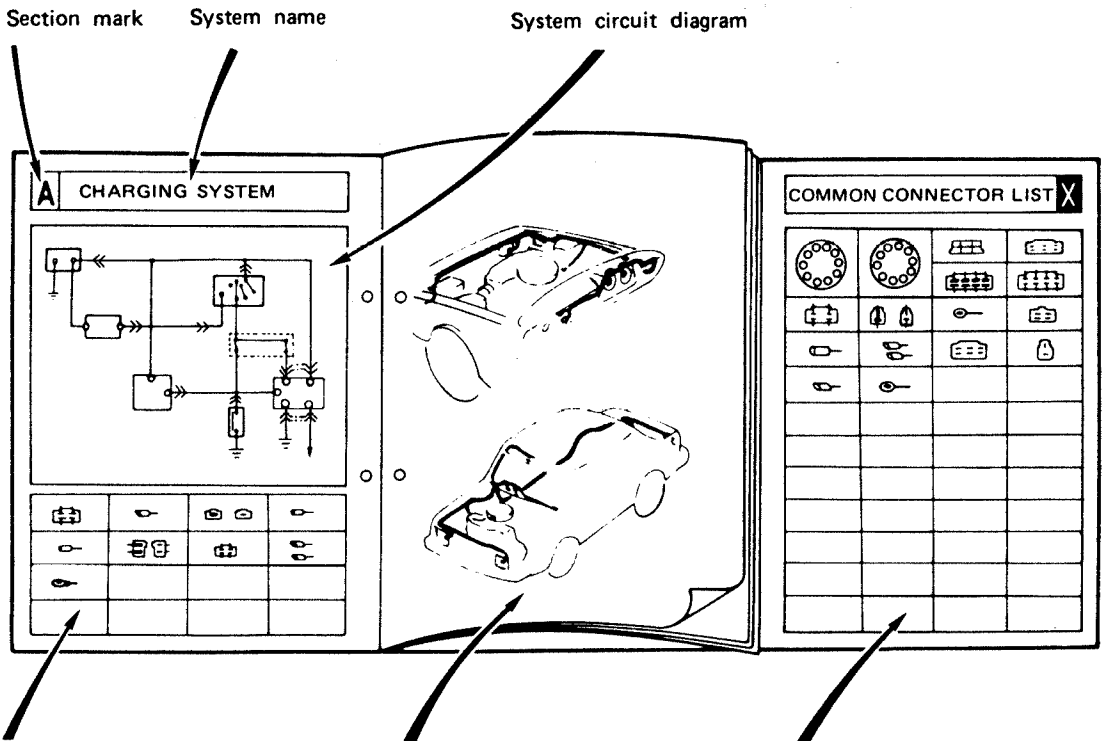
PRINTED IN JAPAN Dec. '89 (K)
5162-10-89L

HOW TO USE THIS WIRING DIAGRAM

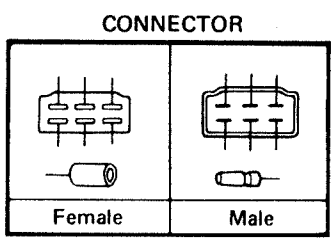
The complete electrical system is divided into charging system, ignition system, etc.

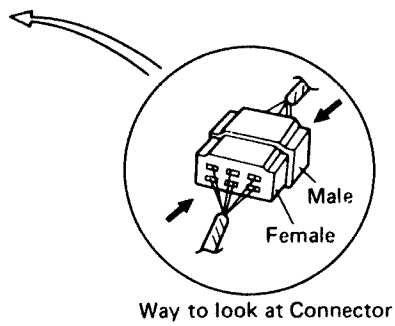
Each system is shown on both right and left pages as described below.

When reading the wiring diagram, following should be noted:



- Connector diagram identifies the exclusive applicable connectors for the circuit.
- Right page illustrates the actual location of each connector and the routing diagram of the harness.
- The last page, "Section X", illustrates common connectors related to each system.



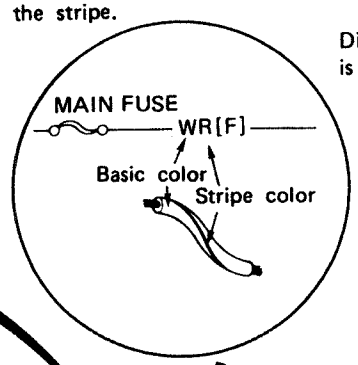


Way to look at Connector

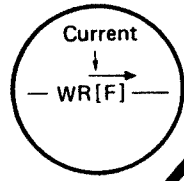
WIRING COLOR CODE

Wiring color code is indicated with alphabetical letter(s). The first letter indicates the basic color of the wire, and second letter (if any) indicates that the color of the stripe.

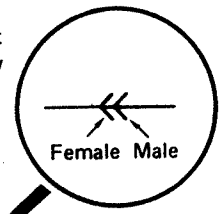
CODE	COLOR	CODE	COLOR
B	Black	Lg	Light green
Br	Brown	O	Orange
G	Green	R	Red
L	Blue	Y	Yellow
Lb	Light blue	W	White



Direction of current is shown by the arrow

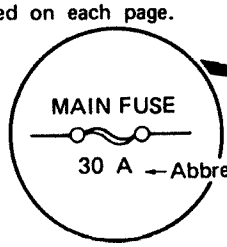


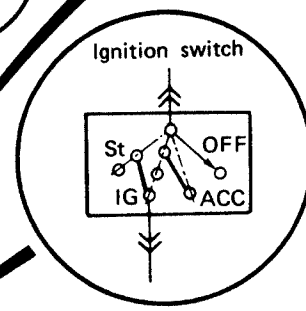
CONNECTOR

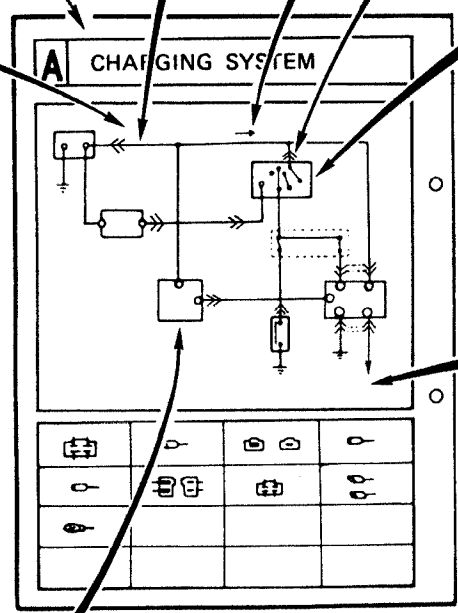


Wiring Harness Color is Shown

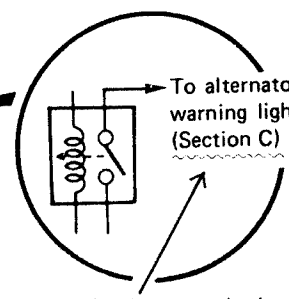
The same fusible link and fuses are indicated on each page.







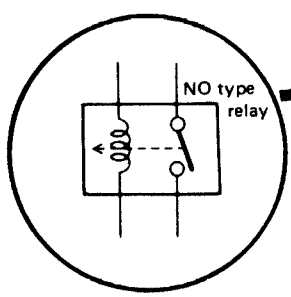
Circuit is shown with the ignition switch off.



Legend in the parenthesis ( ) indicates the reference section.

ABBREVIATIONS USED IN THIS BOOKLET

Abbr.	Term	Abbr.	Term
St	Start	A	Ampere
IG	Ignition	W	Watt
ACC	Accessory	R	Resistance
AS	Auto stop	Tr	Transistor
INT	Intermittent	M	Motor
Lo	Low	SW	Switch
Mi	Middle	Sq	Square per millimeter
Hi	High		
R.H.	Right hand	EC-AT	Electrically Automatic transaxle
L.H.	Left hand		
F.R	Front right	M/T	Manual transmission
F.L	Front left		
R.R	Rear right	NO.	Normal opened
R.L	Rear left	NC	Normal closed
V	Volt		



The relays and switches are identified as NC (normal closed), or NO (normal opened), to indicate their normal position when they are not in operation.

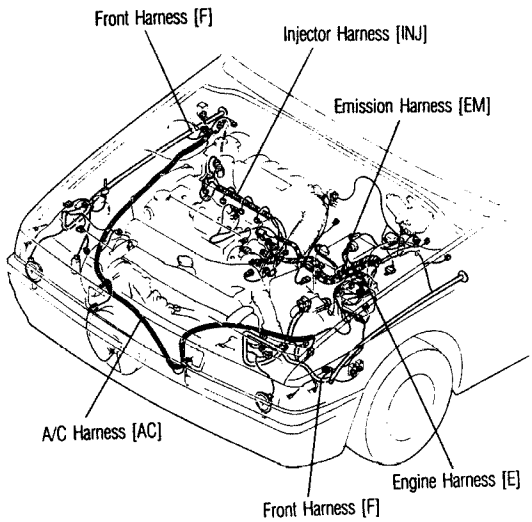
	Relay		Switch	
	NO type relay	NC type relay	NO switch	NC switch
Not in operation	Stop	Flow	Stop	Flow
In operation	Flow	Stop	Flow	Stop

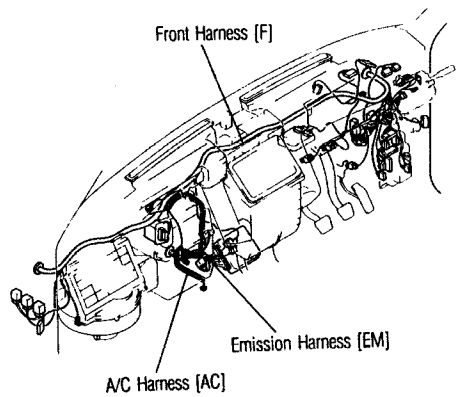
HOW TO USE THIS WIRING DIAGRAM

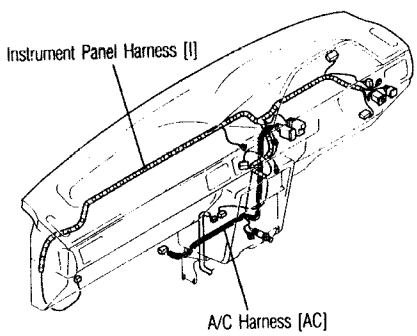
HARNESS SYMBOLS

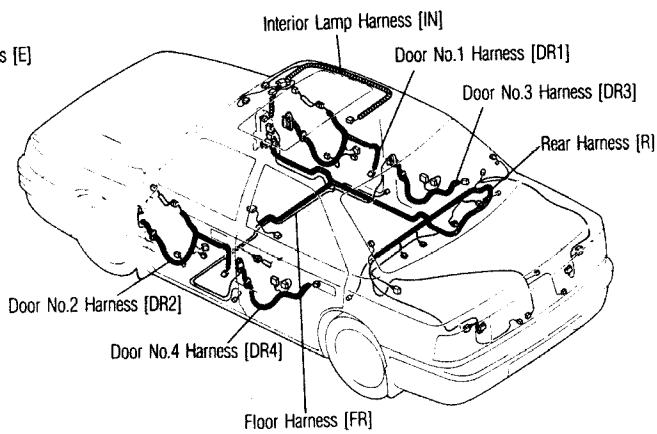
Each harness is distinguished by a symbol to indicate to which harness belong a wiring and connector in circuit diagrams and connector charts.

DESCRIPTION OF HARNESS	SYMBOL		DESCRIPTION OF HARNESS	SYMBOL	
Front Harness	[F]		Interior Lamp Harness	[IN]	
Engine Harness	[E]		Floor Harness	[FR]	
Instrument Panel Harness	[I]		Door No.1 Harness	[DR1]	
Rear Harness	[R]		Door No.2 Harness	[DR2]	
Rear No.2 Harness	[R2]		Door No.3 Harness	[DR3]	
Rear No.3 Harness	[R3]		Door No.4 Harness	[DR4]	
Emission Harness	[EM]		A/C Harness	[AC]	
Injector Harness	[INJ]				

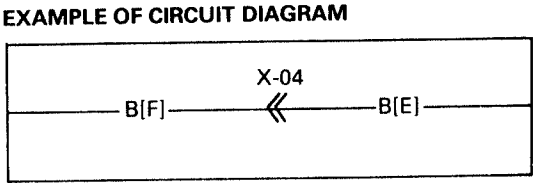








EXAMPLE OF CIRCUIT DIAGRAM

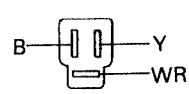


* It is seen from the above that the male-side black line of the X-04 shows the engine harness and the female-side black line shows the front harness.

* It is seen from the above that the X-04 connector is a connector connecting the engine and the front.

EXAMPLE OF CONNECTOR

C-03 Fuel Tank Gauge Unit [R]

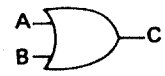
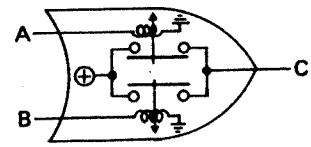
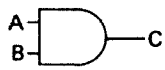
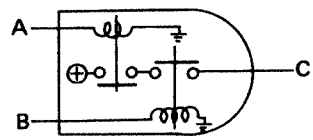
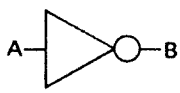
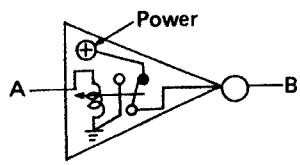
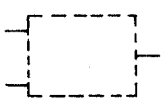
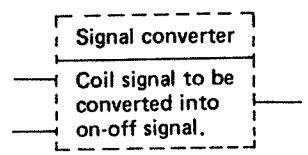


* It is seen from the above that this connector (C-03) is on the Rear harness.

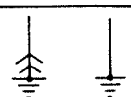
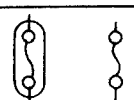
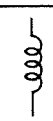
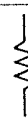
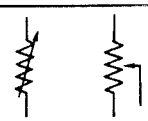
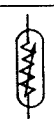
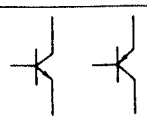
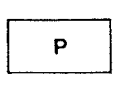
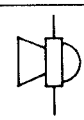
SYMBOLS IN THIS WIRING DIAGRAM

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.

OR 	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.	
AND 	In case of 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.	
INV. (Inverter) 	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.	
	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.	

GRAPHIC SYMBOLS

				
Battery	Ground	Fuse	Main Fuse	Motor
				
Coil solenoid	Resistance	Variable resistance	Thermister	Diode
				
Condenser	Transistor	Pump	Lamp	Horn
				
Speaker	Cigar lighter	Heater	Illuminated Diode	Zener Diode

PI PARTS INDEX

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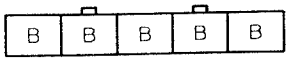
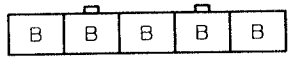
JC ■ JOINT CONNECTOR & GROUND CIRCUIT

WIRING ORDER INTO THE JOINT CONNECTOR MAY BE CHANGED

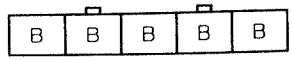
JC-01 JOINT CONNECTOR (F)



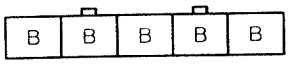
JC-02 JOINT CONNECTOR (F)



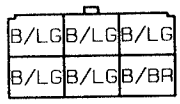
JC-03 JOINT CONNECTOR (F)



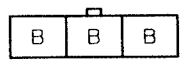
JC-04 JOINT CONNECTOR (EM)



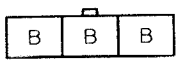
JC-06 JOINT CONNECTOR (EM)

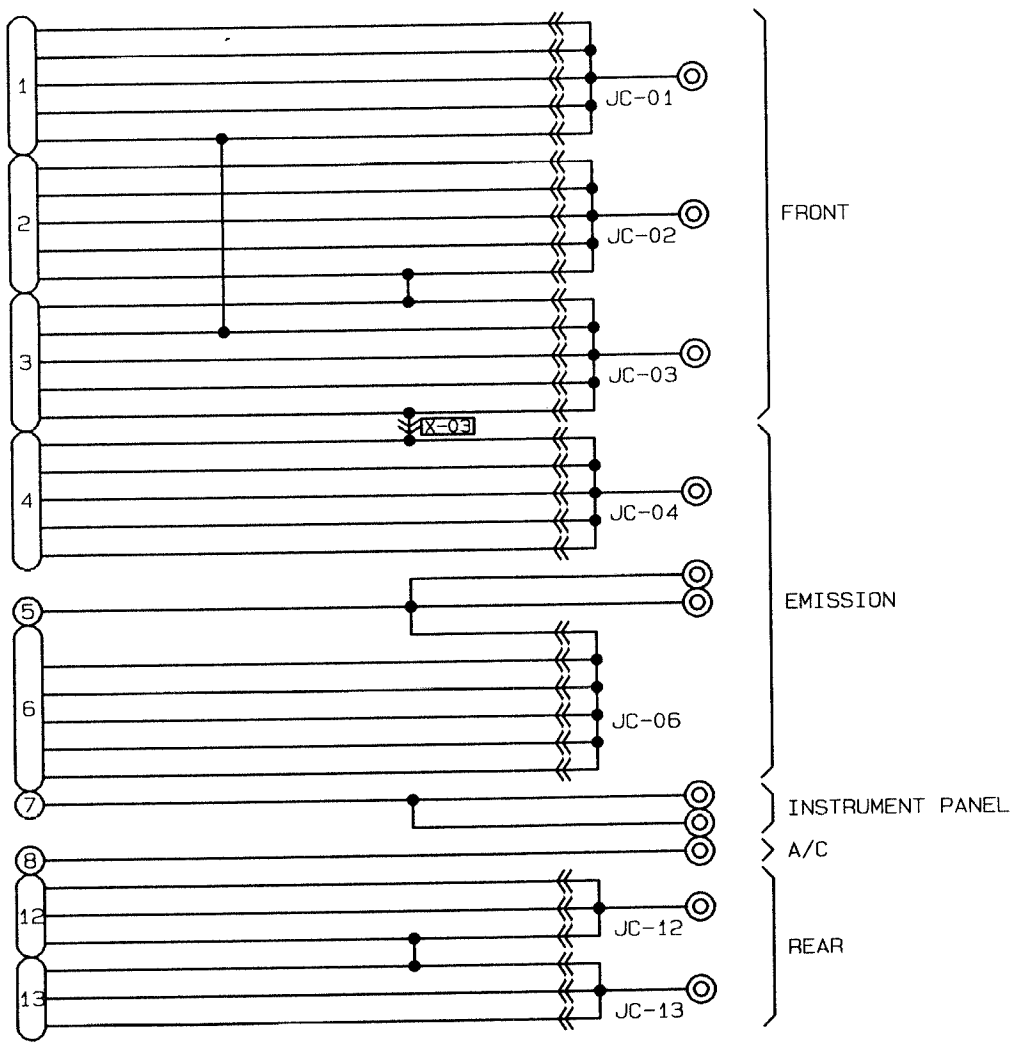


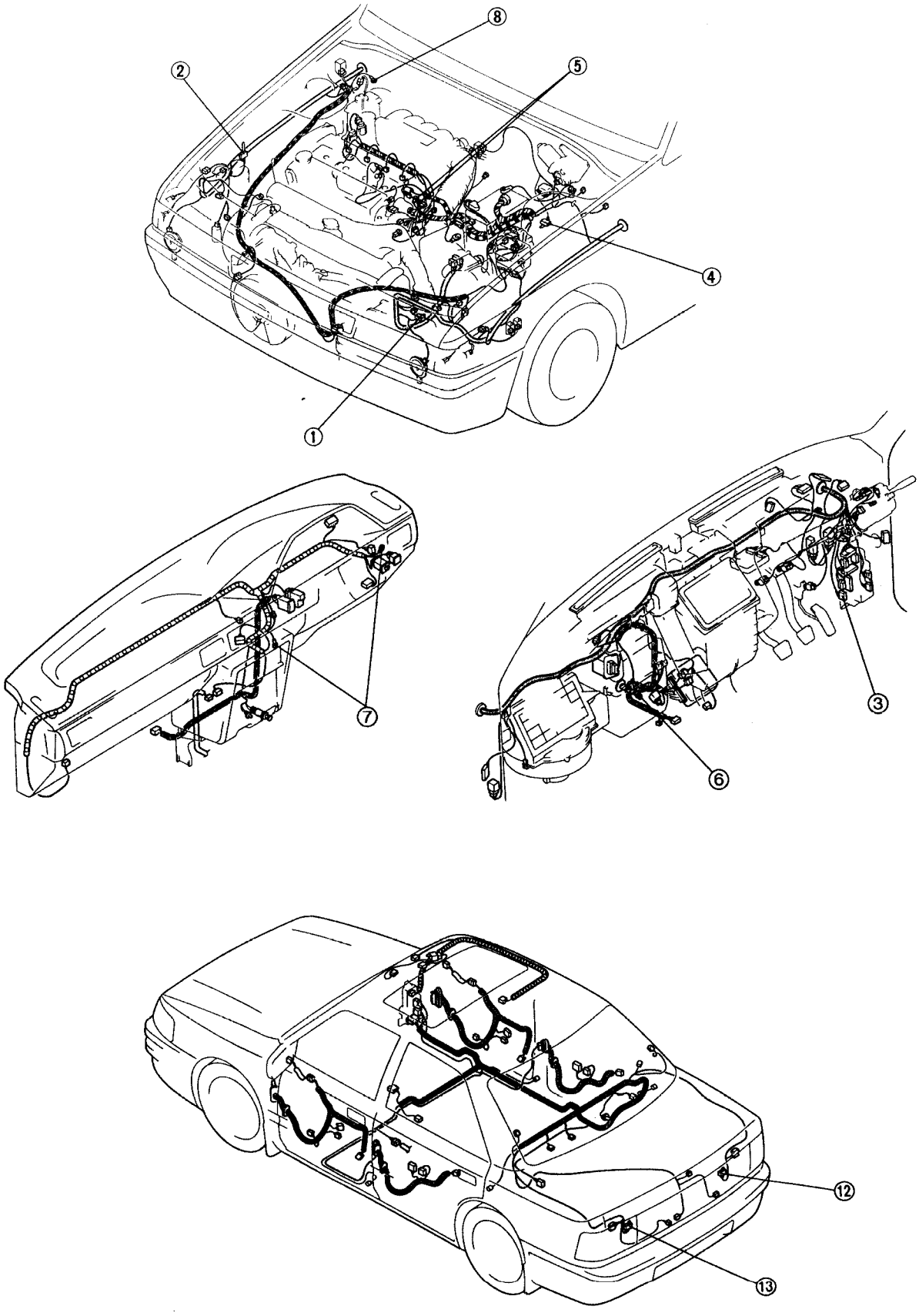
JC-12 JOINT CONNECTOR (R)



JC-13 JOINT CONNECTOR (R)



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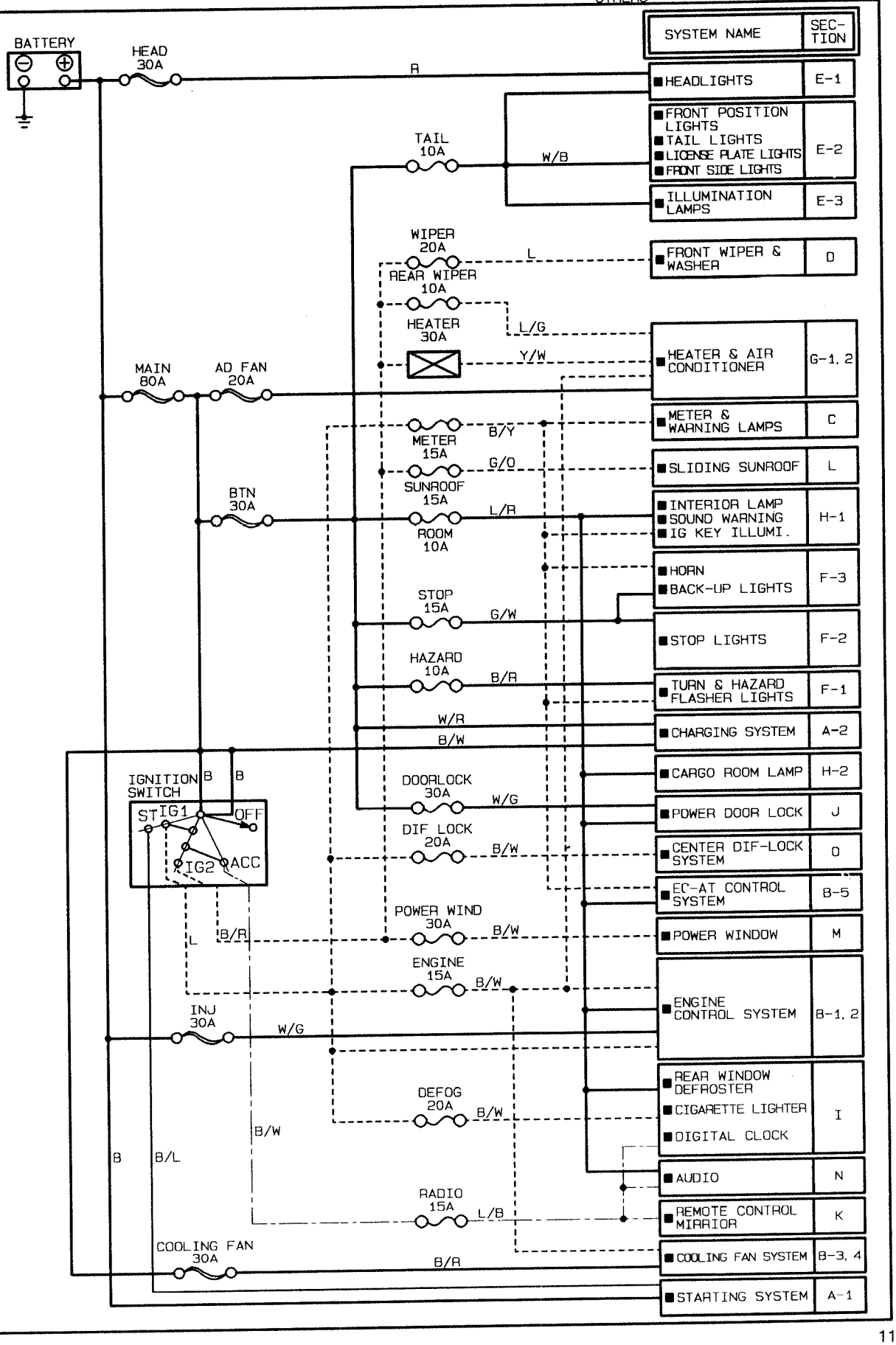
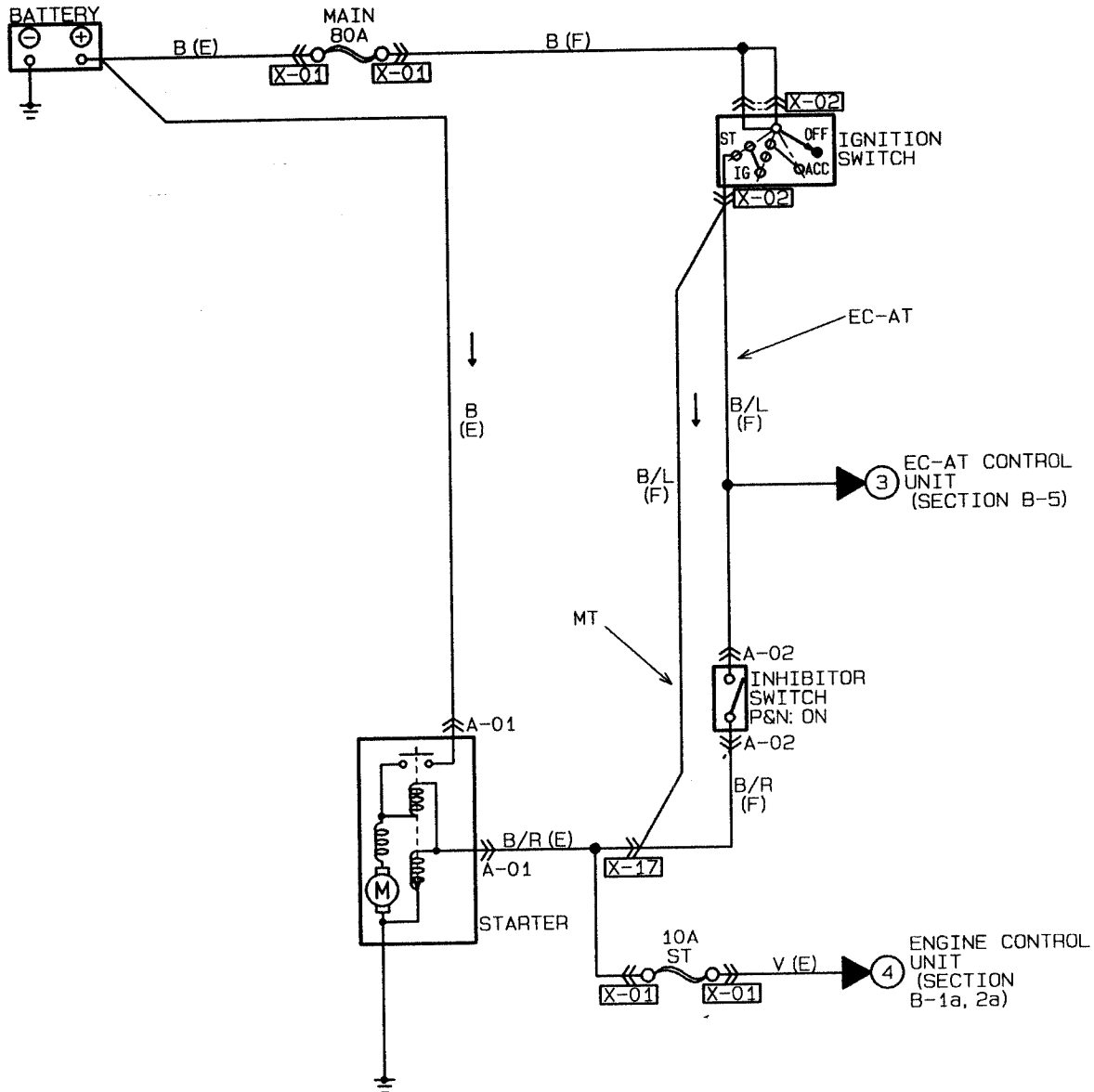
■ ELECTRICAL WIRING SCHEMATIC

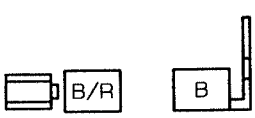
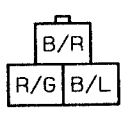
——— CURRENT FROM BATTERY
- - - - - - CURRENT FROM IG1, IG2
——— CURRENT FROM ACC
——— OTHERS

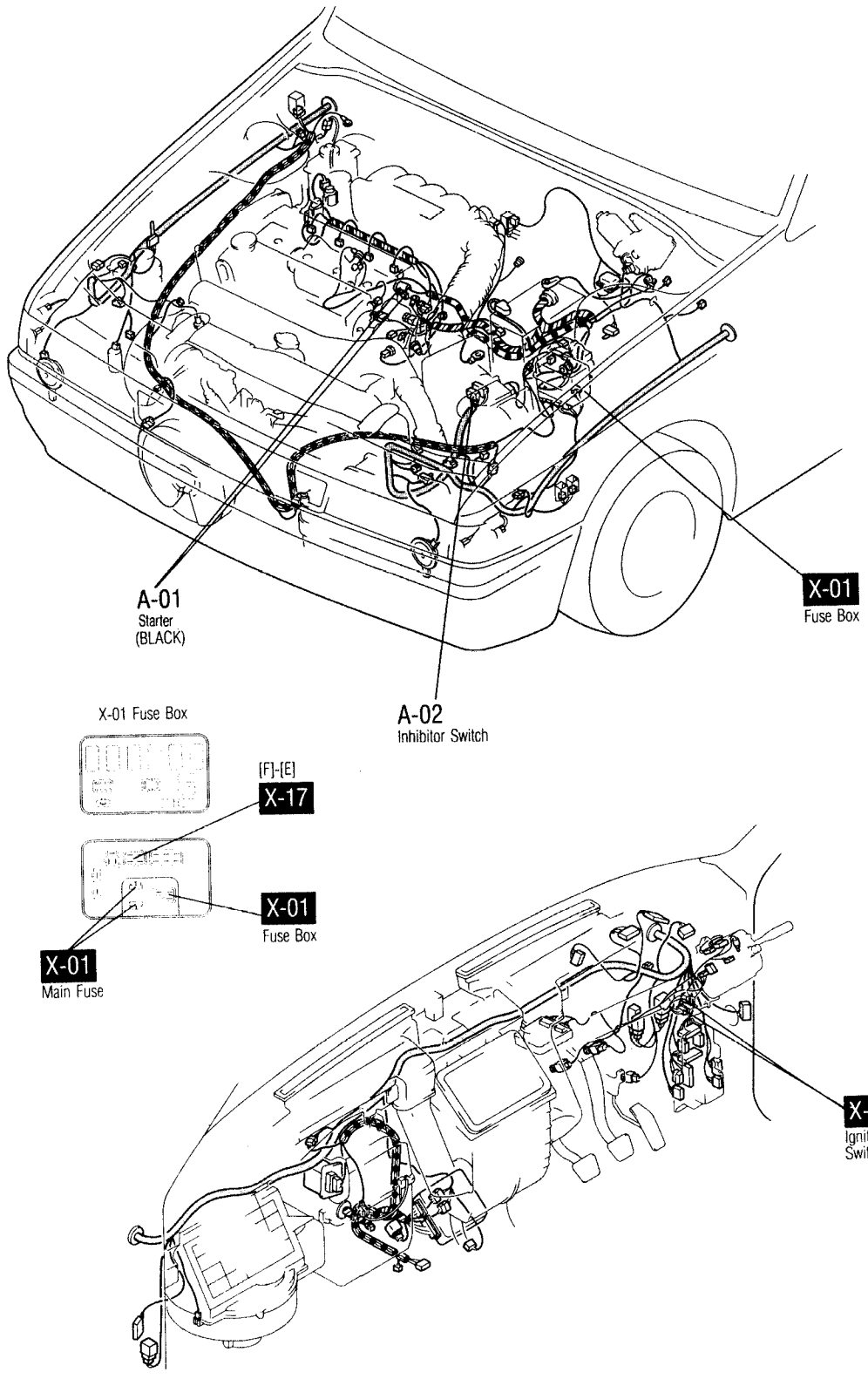
W



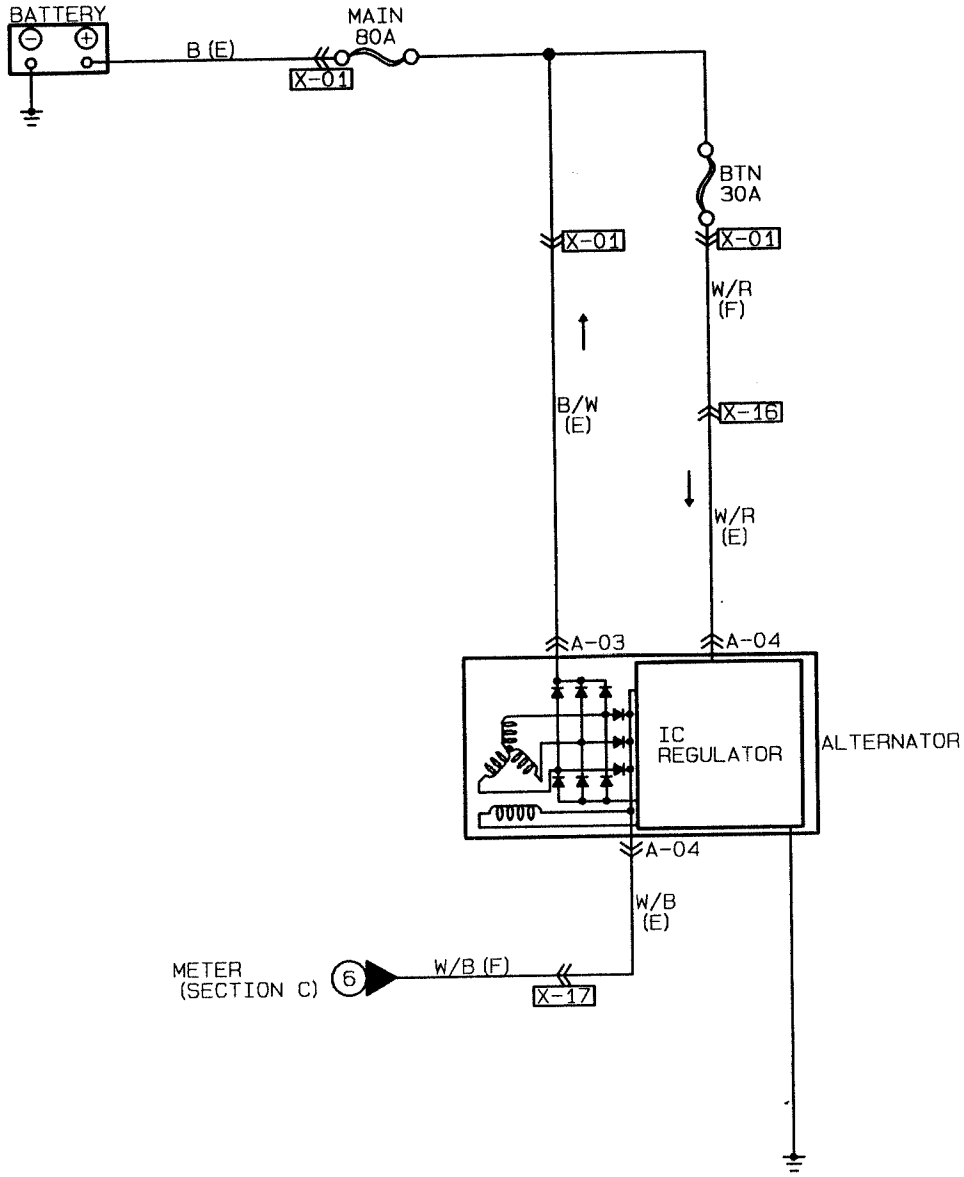
A-1 ■ STARTING SYSTEM



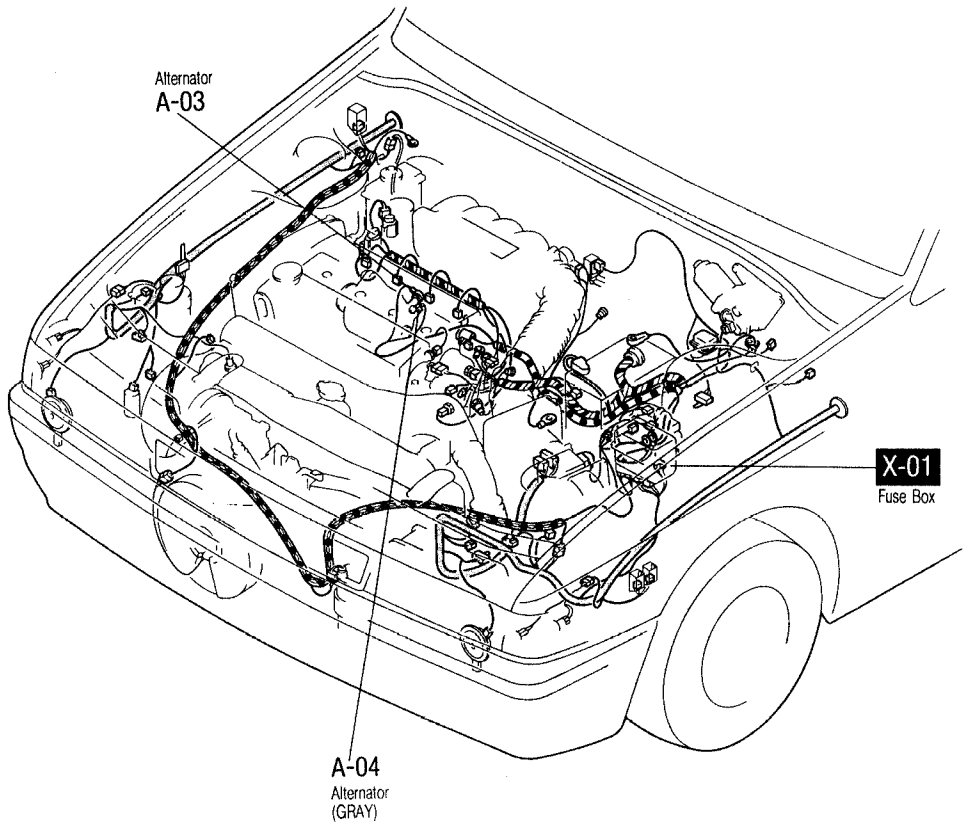
A-01 STARTER (E)	A-02 INHIBITOR SWITCH (F)		
			

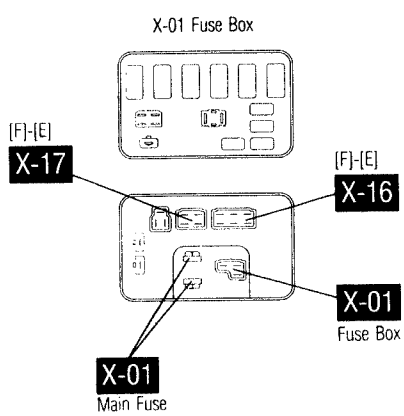

A-01
Starter
(BLACK)
X-01
Fuse Box
A-02
Inhibitor Switch
X-01 Fuse Box
[F]-[E]
X-17
X-01
Fuse Box
X-01
Main Fuse
X-02
Ignition
Switch

A-2 ■ CHARGING SYSTEM

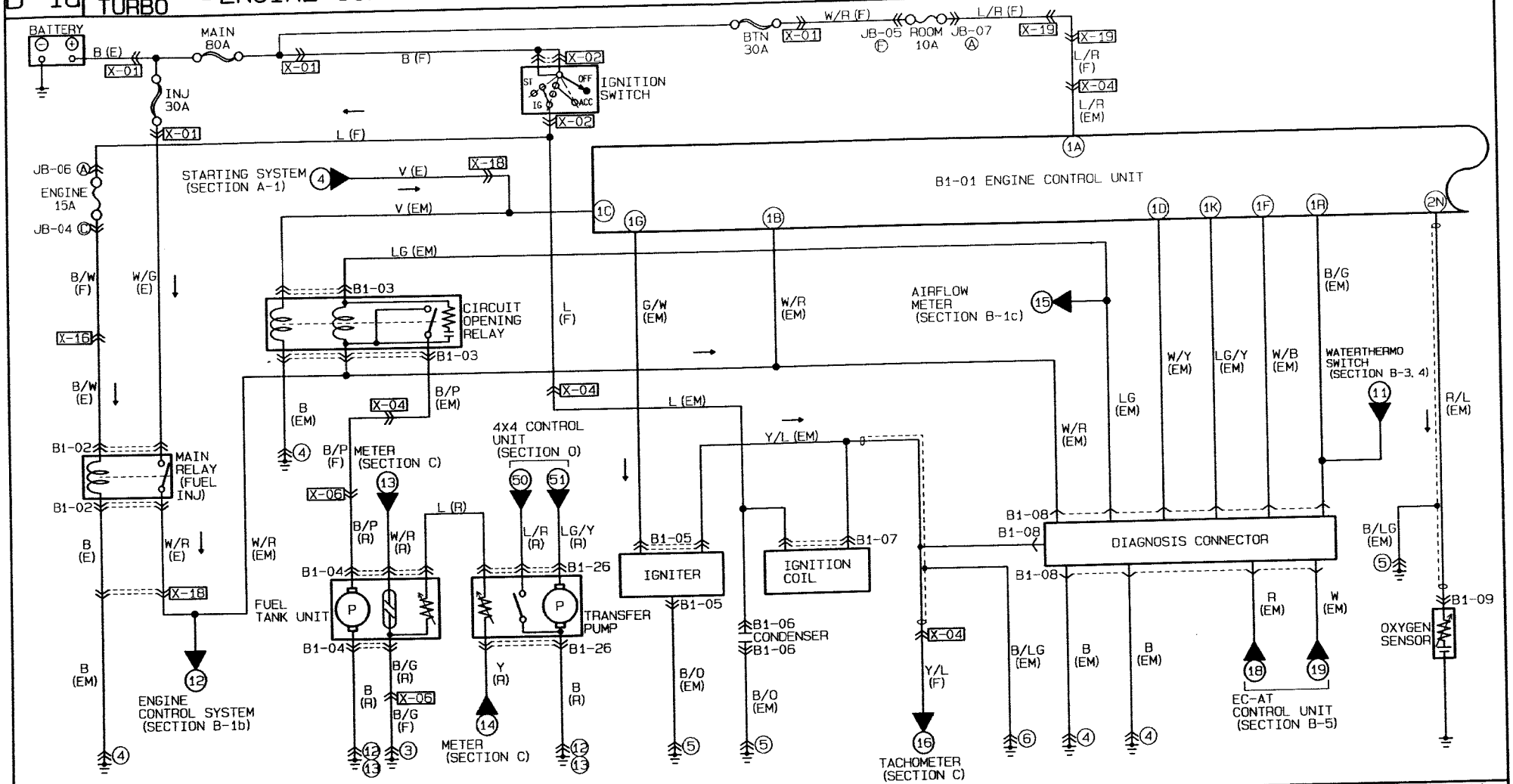


A-03 ALTERNATOR (E)	A-04 ALTERNATOR (E)		
B/W	W/R | W/B		


Alternator
A-03
X-01
Fuse Box
A-04
Alternator
(GRAY)


X-01 Fuse Box
[F]-[E]
X-17
[F]-[E]
X-16
X-01
Fuse Box
X-01
Main Fuse

B-1a NON TURBO ■ENGINE CONTROL SYSTEM (1/3)



B1-01 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) L	*	LG/Y	*	G/W	*	V	L/R
BR/Y (B/L)	B/L	B/G	L/Y	R/W	*	L/B	*	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
*	L/O	Y	*	L/W	R	(LG/W) *	LG/R	*	*	W	B/LG	B/O
* (L/G)	W/L	Y/B	G/O	*	R/B	R/L	LG/W (*)	B (LG/R)	*	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

B1-02 MAIN RELAY (E) (FUEL INJ)

W/G	B/W
W/R	B

B1-03 CIRCUIT OPENING RELAY (EM)

V	W/R	B/P
B	*	LG

B1-04 FUEL TANK UNIT (R)

B		B/P
B/G	*	W/R
		L

B1-05 IGNITER (EM)

Y/L	B/O	G/W

B1-06 CONDENSER (EM)

B/O	L

B1-07 IGNITION COIL (EM)

L	Y/L

B1-08 DIAGNOSIS CONNECTOR (EM)

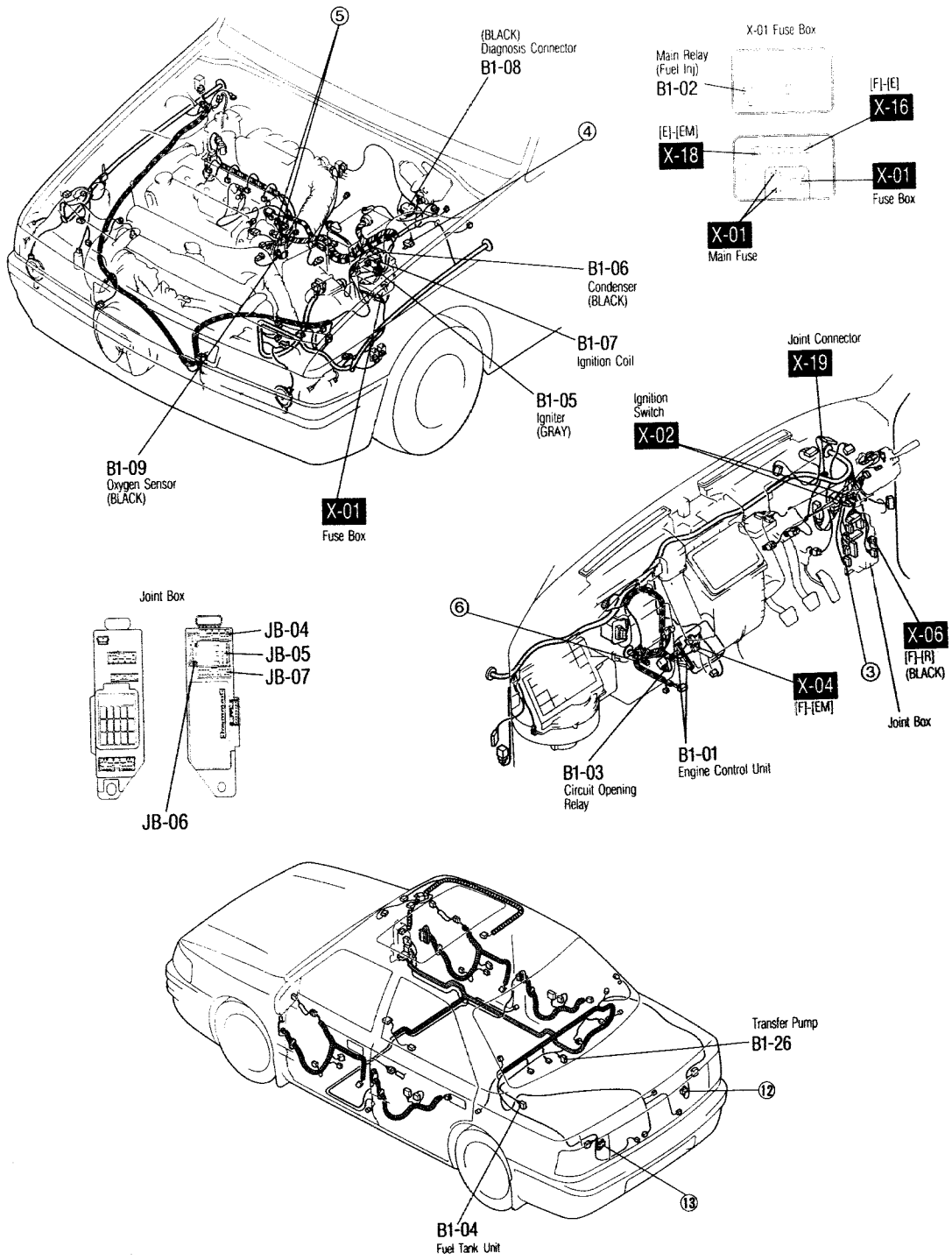
W/R	LG/Y		W/Y	W/B		
*	*	*	*	*	(R) *	B
*	*	*	*	*	(W) *	
*	LG	B/G	B	Y/L	*	
*					*	

B1-09 OXYGEN SENSOR (EM)

R/L

B1-26 TRANSFER PUMP (R)

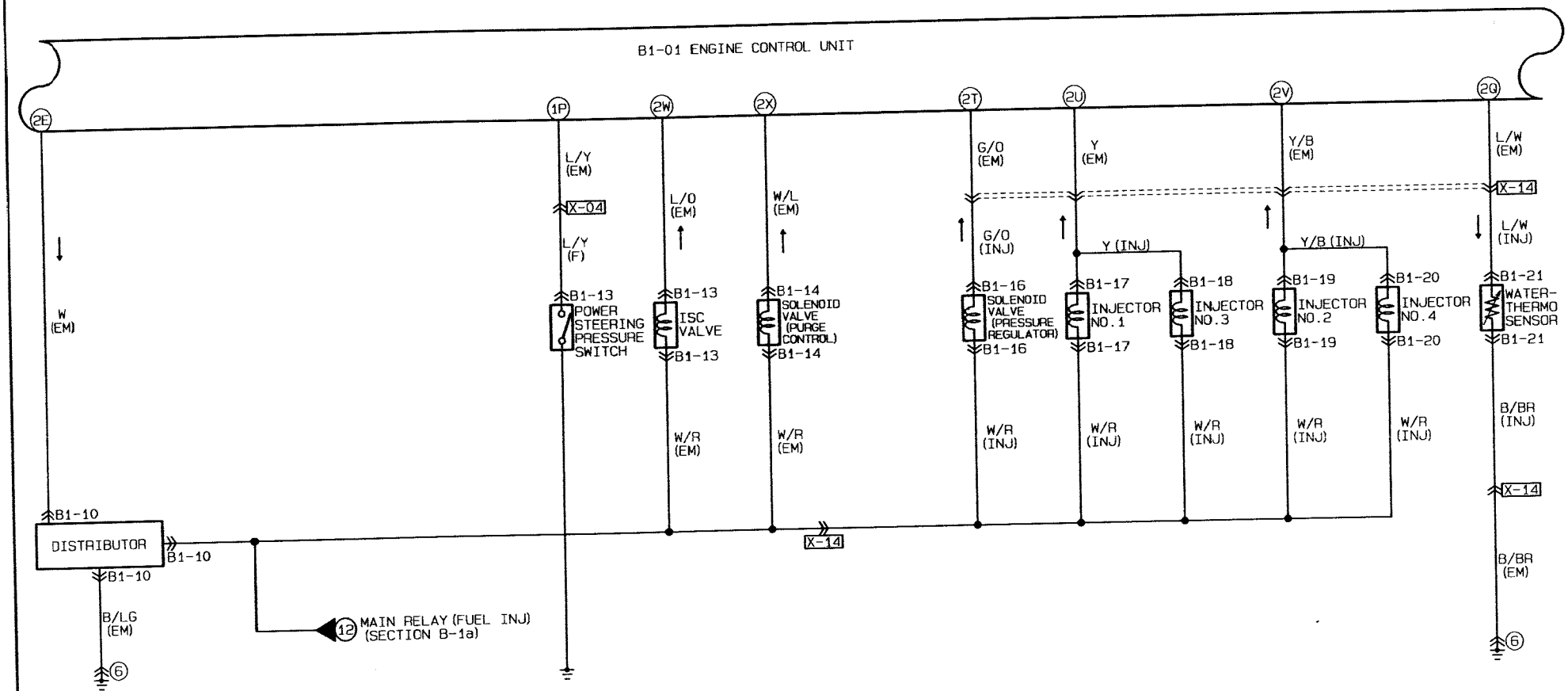
LG/Y		L/R
B	*	L
		Y



Terminal Voltage

	Terminal	Connection to	Test condition		Correct voltage
22P	1A	Battery	Constant		Approx. 12V
	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
			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 not illuminated		Approx. 12V
	1F	Self-Diagnosis Checker (Code Number)	Buzzer sounded for 3 sec. after ignition switch OFF→ON		Below 2.5V
			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) or diagnosis connector terminal TFA grounded)		Below 1.0V
			Fan not operating (Idle)		Approx. 12V
26P	2N	Oxygen sensor	Ignition switch ON		0V
			Idle (Cold engine)		0V
			Idle (After warm-up)		0—1.0V
			Increasing engine speed (After warm-up)		0.5—1.0V
			Deceleration		0—0.4V

■ENGINE CONTROL SYSTEM (2/3)

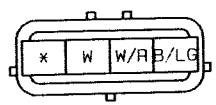


B1-01 ENGINE CONTROL UNIT (EM)

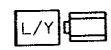
1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	(G/O) G/B	(G/R) L	*	LG/Y	*	G/W	*	V	L/R
BR/Y (B/L)	B/L	B/G	L/Y	R/W	*	L/B	*	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
* (L/G)	L/O	Y	*	L/W	R	(LG/W) *	LG/R	*	*	W	B/LG	B/O
	W/L	Y/B	G/O	*	R/B	R/L	LG/W (*)	B (LG/R)	*	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

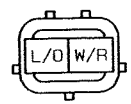
B1-10 DISTRIBUTOR (EM)



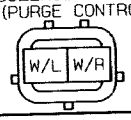
B1-12 POWER STEERING PRESSURE SWITCH (F)



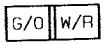
B1-13 ISC VALVE (EM)



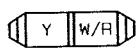
B1-14 SOLENOID VALVE (PURGE CONTROL) (EM)



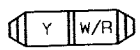
B1-16 SOLENOID VALVE (PRESSURE REGULATOR) (INJ)



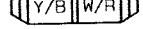
B1-17 INJECTOR NO.1 (INJ)



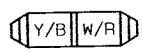
B1-18 INJECTOR NO.3 (INJ)



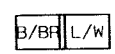
B1-19 INJECTOR NO.2 (INJ)

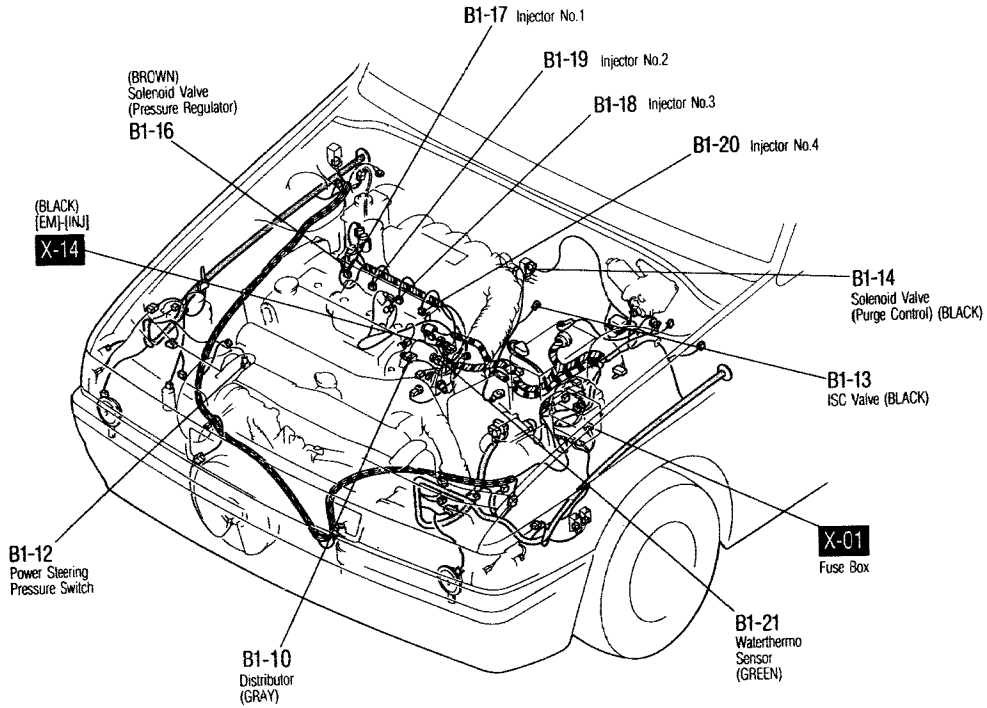


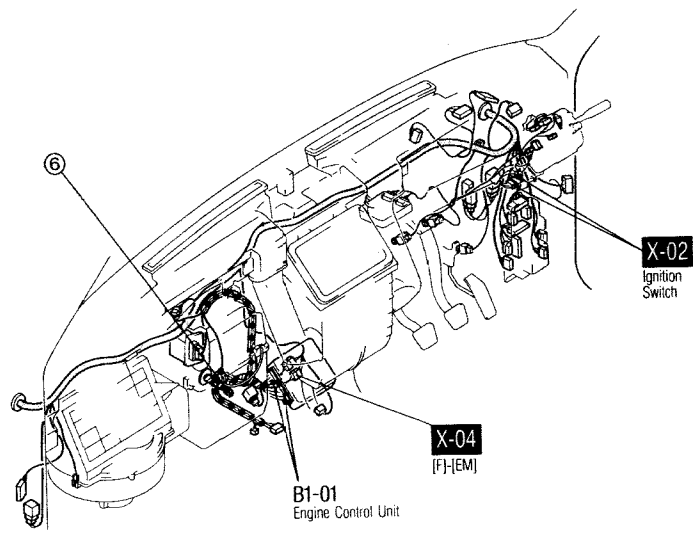
B1-20 INJECTOR NO.4 (INJ)



B1-21 WATERTHERMO SENSOR (INJ)



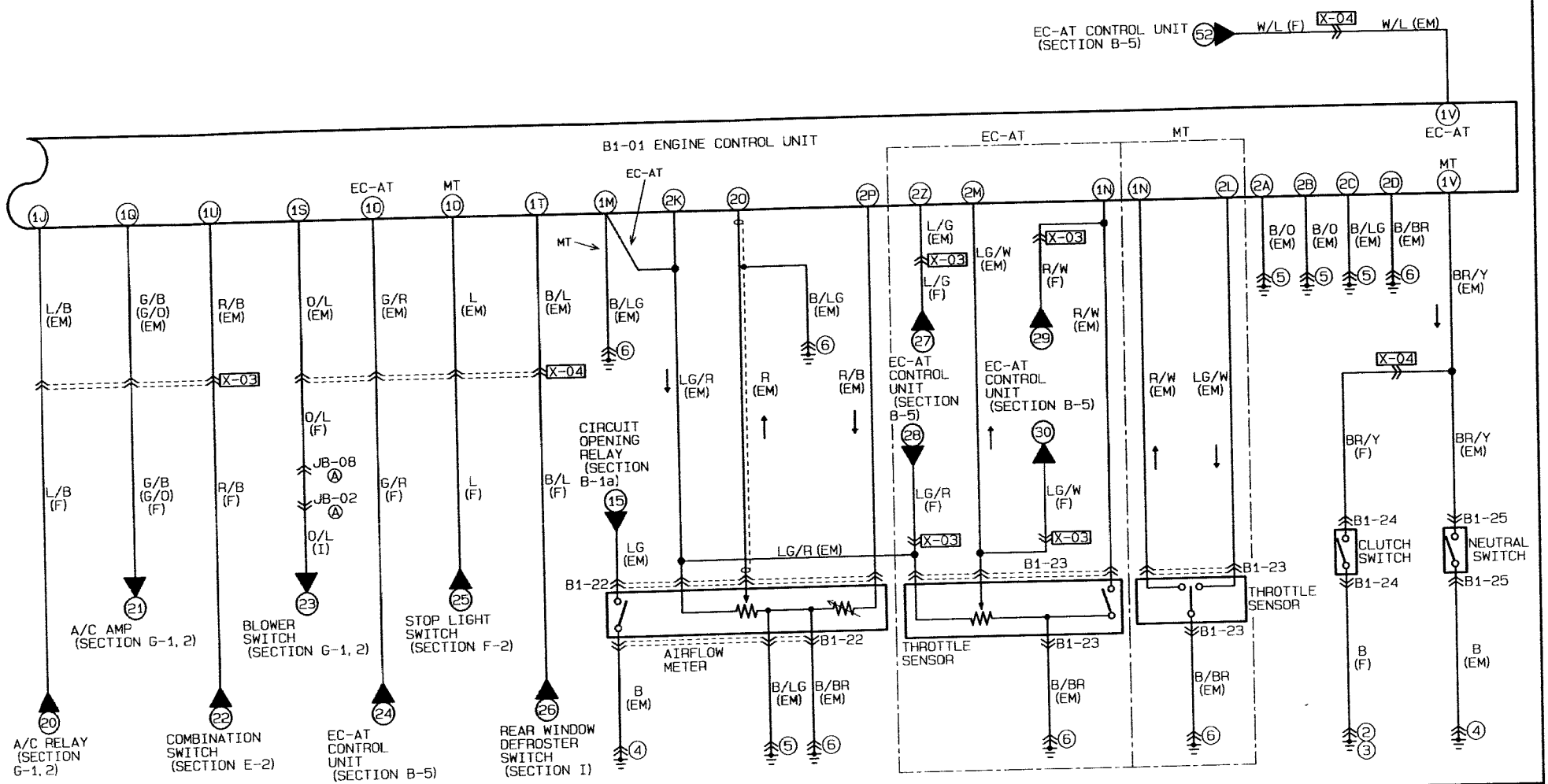




Terminal Voltage

	Terminal	Connection to	Test condition	Correct voltage
22P	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
26P	2E	Distributor (Ne-signal)	Ignition switch ON	Approx. 0V or 5V
			Idle	Approx. 2V
	2Q	Water thermosensor	Engine coolant temperature 20°C (68°F)	Approx. 2.5V
			After warm-up	Below 0.5V
	2T	Solenoid valve (Pressure regulator)	120 seconds after engine started when engine coolant temperature above 90°C (194°F) and intake air temperature above 50°C (122°F)	Below 1.5V
			Other condition at idle	Approx. 12V
	2U	Injector (Nos. 1, 3)	Ignition switch ON	Approx. 12V
			Idle	Approx. 12V
			Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx. 12V
	2V	Injector (Nos. 2, 4)	Ignition switch at idle	Approx. 12V
			Idle	Approx. 12V
			Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx. 12V
	2W	ISC valve	Ignition switch ON	Approx. 12V
			Idle	Approx. 10V
	2X	Solenoid valve (Purge control)	Ignition switch ON	Approx. 12V
			Idle	Approx. 12V

B-1c NON TURBO ■ENGINE CONTROL SYSTEM (3/3)



B1-01 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) L	*	LG/Y	*	G/W	*	V	L/R
BR/Y (B/L)	B/L	B/G	L/Y	R/W	*	L/B	*	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
*	L/O	Y	*	L/W	R	(LG/W) *	LG/R	*	*	W	B/LG	B/O
* (L/G)	W/L	Y/B	G/O	*	R/B	R/L	LG/W (*)	B (LG/R)	*	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

B1-22 AIRFLOW METER (EM)

R/B	R	B/BR	LG/R	B/LG	B	LG

B1-23 THROTTLE SENSOR (EM)

EC-AT: B/BR | R/W | LG/W | LG/R

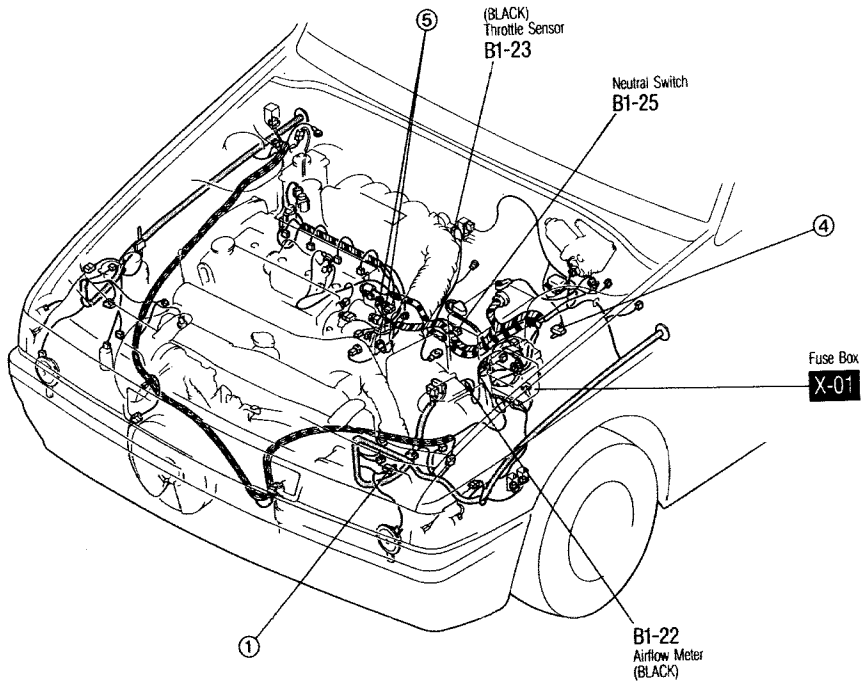
MT: LG/W | B/BR | R/W

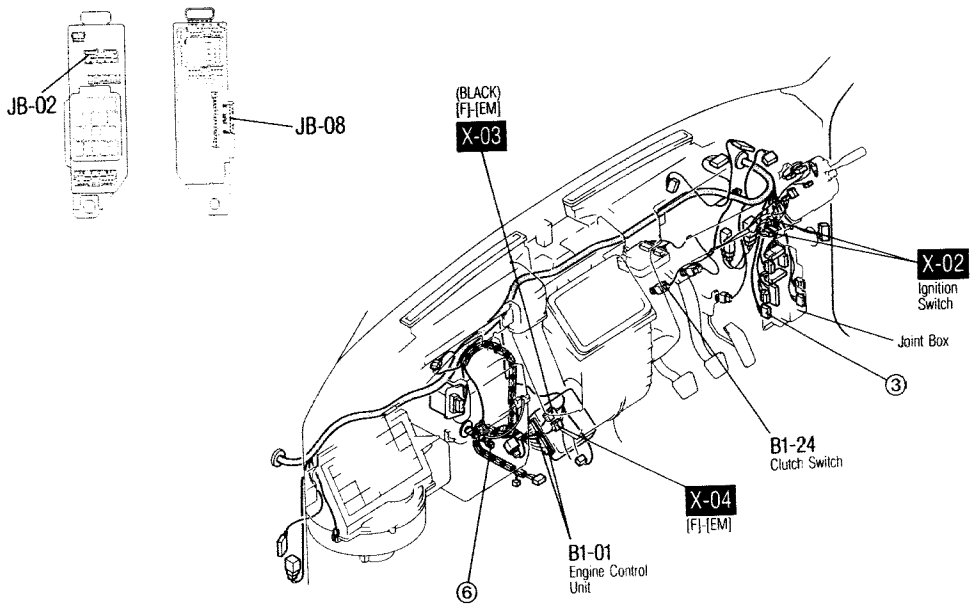
B1-24 CLUTCH SWITCH (F)

B	BR/Y

B1-25 NEUTRAL SWITCH (EM)

BR/Y	B

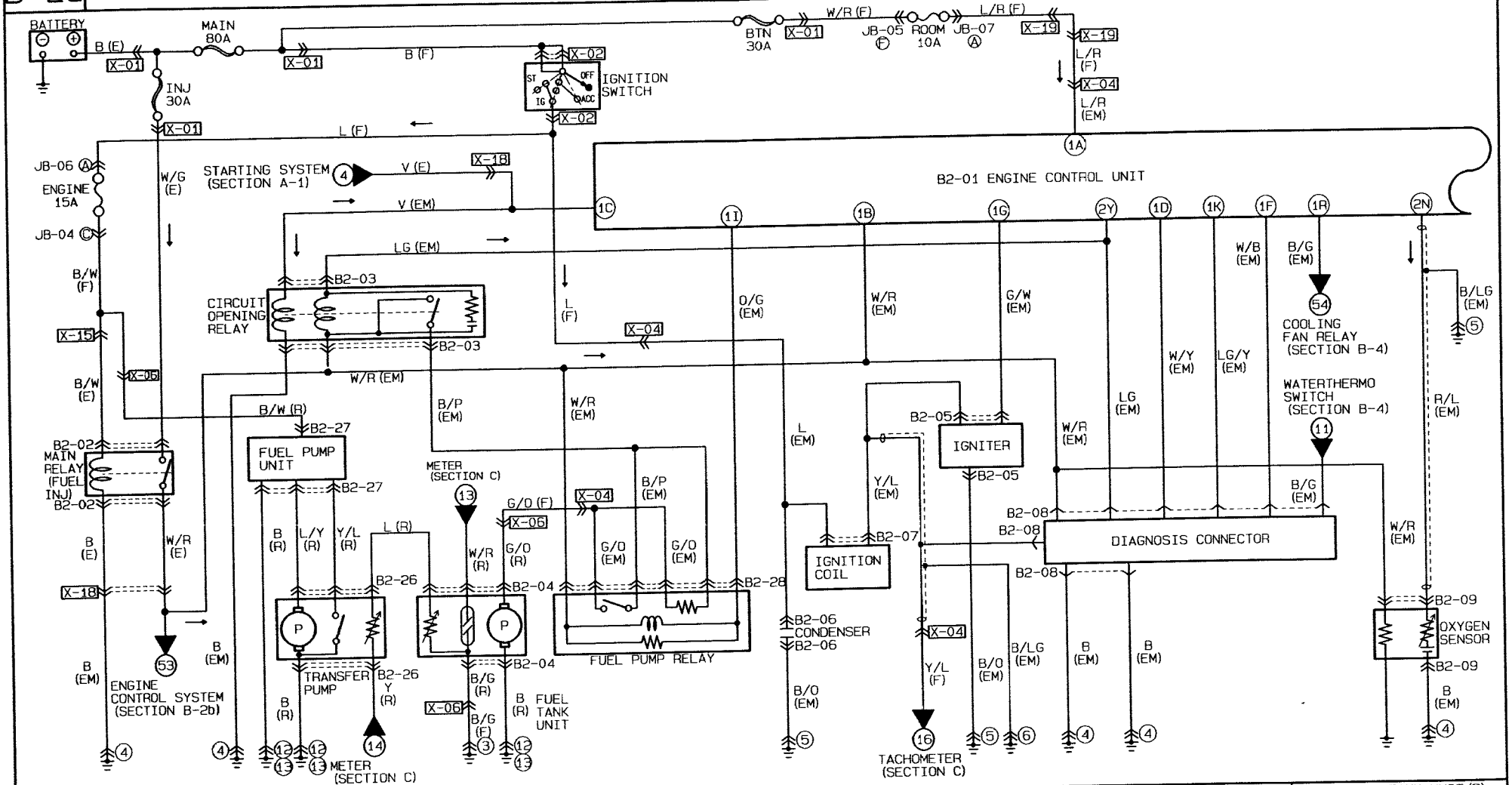




Terminal Voltage

	Terminal	Connection to	Test condition	Correct voltage
22P	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
	1M	Ground (MTX)	Constant	0V
		Throttle sensor (ATX)/EC-AT control unit (ATX)/Airflow meter	Constant	4.5—5.5V
	1N	Throttle sensor (Idle switch) (MTX/ATX) EC-AT control unit (ATX)	Accelerator pedal released	Below 1.0V
			Accelerator pedal depressed	Approx. 12V
	1O	Stoplight switch (MTX)	Brake pedal released	Below 1.0V
			Brake pedal depressed	Approx. 12V
		EC-AT control (ATX)	—	Below 1.0V
	1Q	A/C switch	A/C switch ON	Below 2.5V
			A/C switch OFF	Approx. 12V
	1S	Blower control switch	Blower control switch OFF or 1st position	Approx. 12V
			Blower control switch 2nd or higher position	Below 1.0V
	1T	Rear window defroster switch	Rear window defroster switch OFF	Below 1.0V
			Rear window defroster switch ON	Approx. 12V
	1U	Headlight switch	Headlights ON	Approx. 12V
			Headlights OFF	Below 1.0V
	1V	Neutral/Clutch switches (MTX)	Neutral position or clutch pedal depressed	Below 1.0V
			Others	Approx. 12V
		Inhibitor switch (ATX)	N or P range	Below 1.0V
			Others	Approx. 12V
26P	2A	Ground (Injector)	Constant	0V
	2B	Ground (Output)	Constant	0V
	2C	Ground (CPU)	Constant	0V
	2D	Ground (Input)	Constant	0V
	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	Approx. 5V
			Accelerator pedal fully depressed	Below 1.0V
	2M	Throttle sensor (ATX)/EC-AT control unit (ATX)	Accelerator pedal released	Approx. 0.5V
			Accelerator pedal fully depressed	Approx. 4.0V
	2O	Airflow meter	Ignition switch ON	Approx. 3.8V
			Idle	Approx. 3.3V
	2P	Intake air thermosensor	Ambient air temperature 20°C (68°F)	Approx. 2.5V
	2Z	EC-AT control unit (ATX)	Engine coolant temperature below 72°C (162°F) at idle	Below 2.5V
			Engine coolant temperature below 72°C (162°F) at idle	Approx. 12V

B-2a TURBO ■ENGINE CONTROL SYSTEM (1/3)



B2-01 ENGINE CONTROL UNIT (EM)

1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	G/B	L	B	LG/Y	O/G	G/W	*	V	L/R
BR/Y	B/L	B/G	L/Y	R/W	*	L/B	O/B	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
LG	L/O	Y	R/Y	L/W	R	LG/W	LG/R	*	Y/L	W	B/LG	B/O
*	W/L	Y/B	G/O	P	R/B	R/L	*	R/Y	*	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

B2-02 MAIN RELAY (E) (FUEL INJ)

W/G	B/W
W/R	B

B2-03 CIRCUIT OPENING RELAY (EM)

V	W/R	B/P
B	*	LG

B2-04 FUEL TANK UNIT (R)

B		G/O
B/G	*	W/R
		L

B2-05 IGNITER (EM)

Y/L	B/O	G/W

B2-06 CONDENSER (EM)

B/O	L

B2-07 IGNITION COIL (EM)

L	Y/L

B2-08 DIAGNOSIS CONNECTOR (EM)

W/R	LG/Y		W/Y	W/B		
*	*	*	*	*	*	B
*	*	*	*	*	*	
*	LG	B/G	B	Y/L	*	
*					*	

B2-09 OXYGEN SENSOR (EM)

R/L	B	W/R

B2-26 TRANSFER PUMP (R)

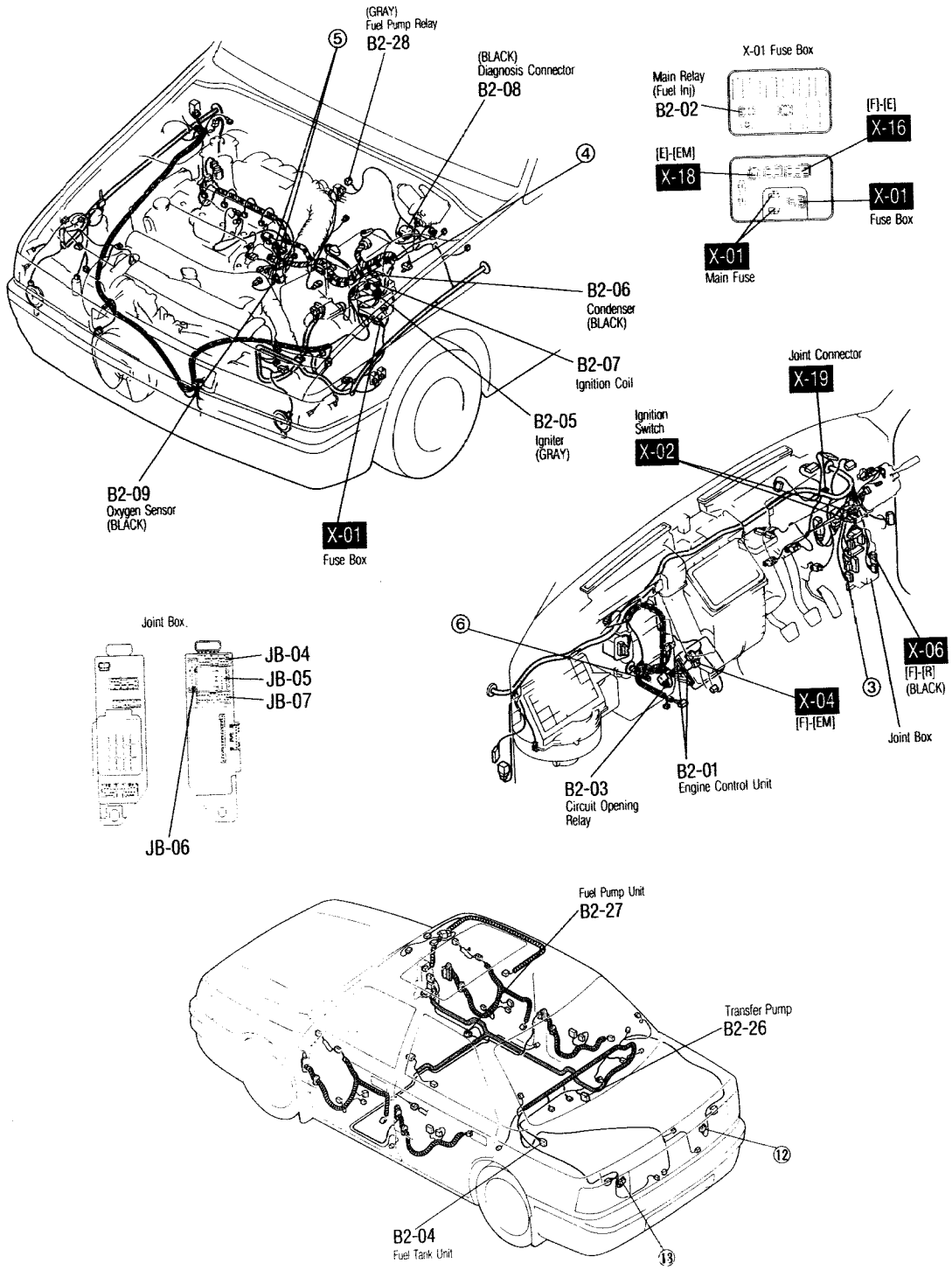
Y/L		L/Y
B	*	L
		Y

B2-27 FUEL PUMP UNIT (R)

B/W	B
Y/L	L/Y

B2-28 FUEL PUMP RELAY (EM)

B/P	W/R	B/P
G/O	O/G	G/O

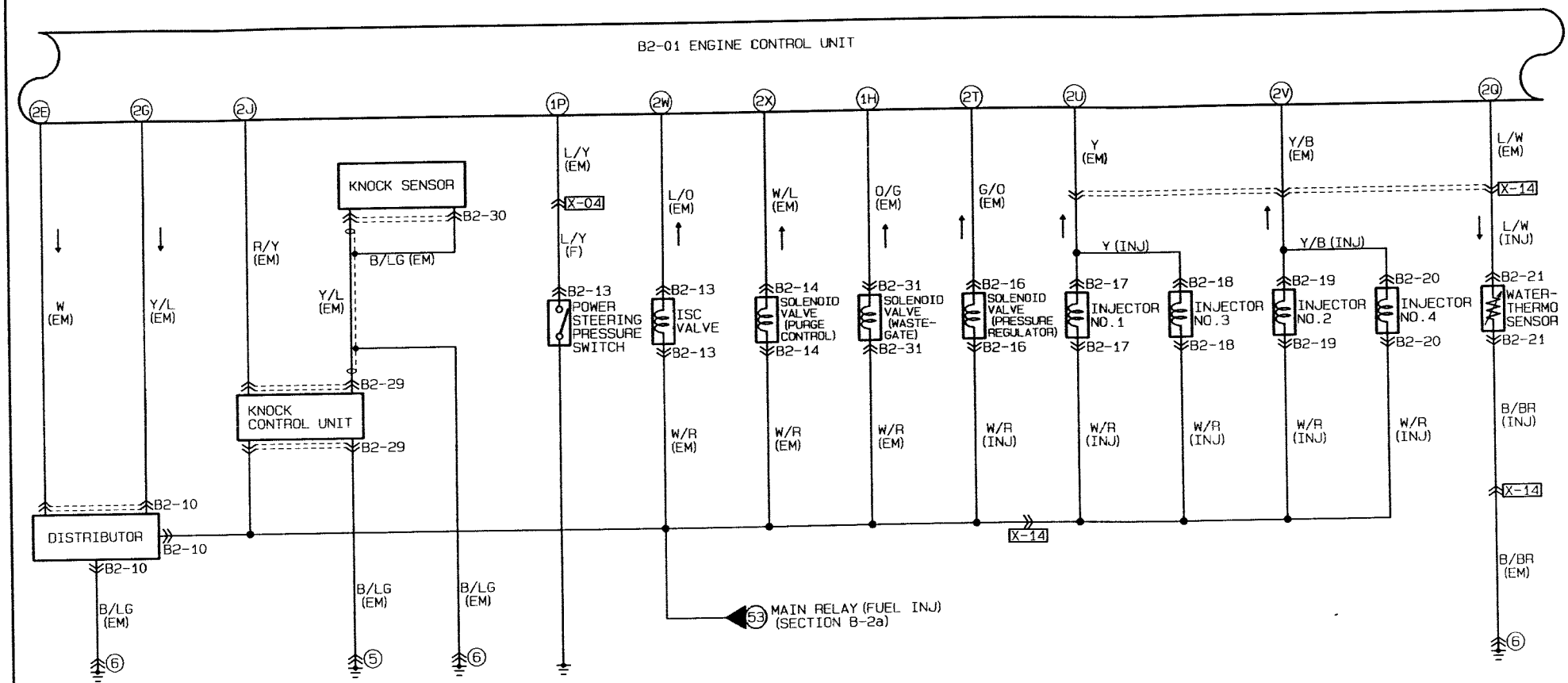


Terminal Voltage

	Terminal	Connection to	Test condition		Correct voltage
22P	1A	Battery	Constant		Approx. 12V
	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
			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 not illuminated		Approx. 12V
	1F	Self-Diagnosis Checker (Code Number)	Buzzer sounded for 3 sec. after ignition switch OFF→ON		Below 2.5V
			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
	1I	Fuel pump resistor/relay	While cranking		Approx. 12V
			Idle		Below 1.5V
	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) or diagnosis connector terminal TFA grounded)		Below 1.0V
			Fan not operating-(Idle)		Approx. 12V
26P	2N	Oxygen sensor	Ignition switch ON		0V
			Idle (Cold engine)		0V
			Idle (After warm-up)		0—1.0V
			Increasing engine speed (After warm-up)		0.5—1.0V
			Deceleration		0—0.4V
	2Y	Circuit opening relay	Ignition switch ON		Approx. 12V
			Idle		Below 1.0V

TURBO ■ENGINE CONTROL SYSTEM (2/3)

B-2b

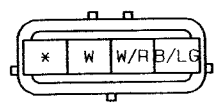


B2-01 ENGINE CONTROL UNIT (EM)

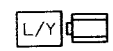
1V	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	G/B	L	B	LG/Y	O/G	G/W	*	V	L/R
BR/Y	B/L	B/G	L/Y	R/W	*	L/B	O/B	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

2Y	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
LG	L/O	Y	R/Y	L/W	R	LG/W	LG/R	*	Y/L	W	B/LG	B/O
*	W/L	Y/B	G/O	P	R/B	R/L	*	R/Y	*	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

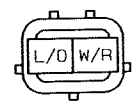
B2-10 DISTRIBUTOR (EM)



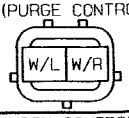
B2-12 POWER STEERING PRESSURE SWITCH (F)



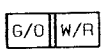
B2-13 ISC VALVE (EM)



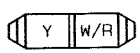
B2-14 SOLENOID VALVE (PURGE CONTROL) (EM)



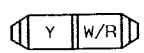
B2-16 SOLENOID VALVE (PRESSURE REGULATOR) (INJ)



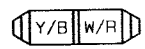
B2-17 INJECTOR NO.1 (INJ)



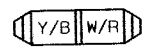
B2-18 INJECTOR NO.3 (INJ)



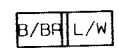
B2-19 INJECTOR NO.2 (INJ)



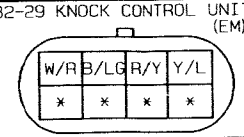
B2-20 INJECTOR NO.4 (INJ)



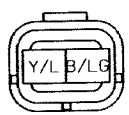
B2-21 WATERTHERMO SENSOR (INJ)



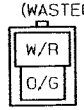
B2-29 KNOCK CONTROL UNIT (EM)

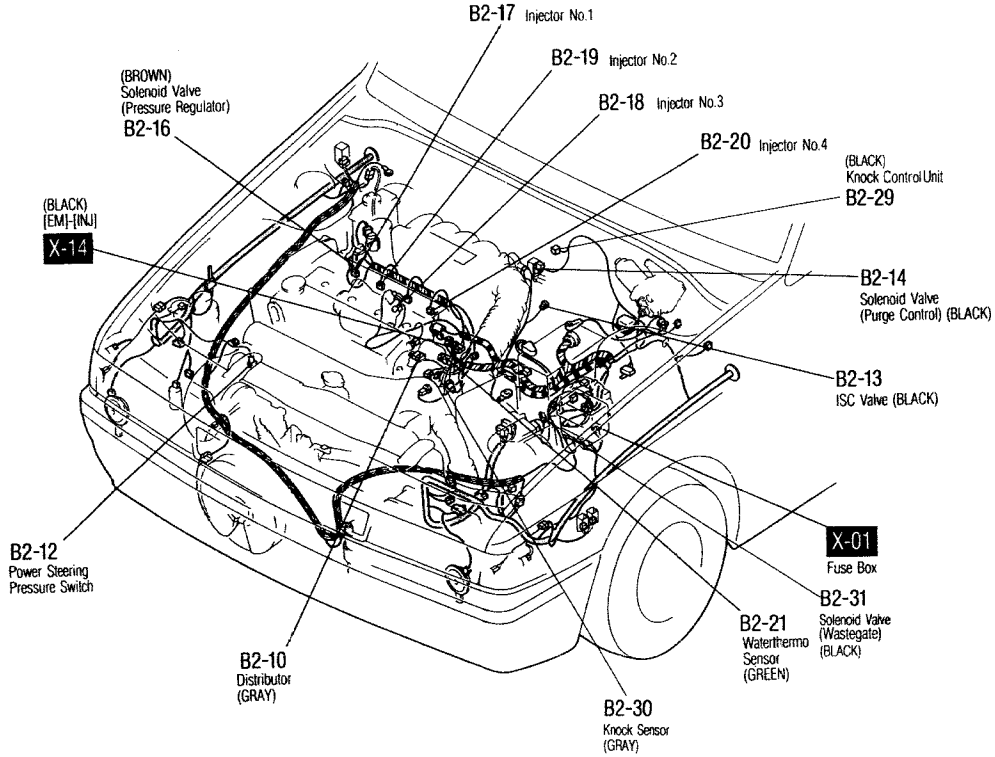


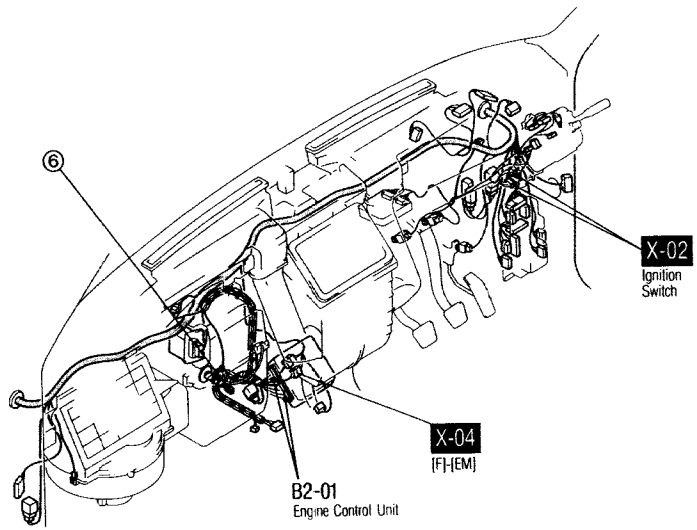
B2-30 KNOCK SENSOR (EM)



B2-31 SOLENOID VALVE (WASTEGATE) (EM)

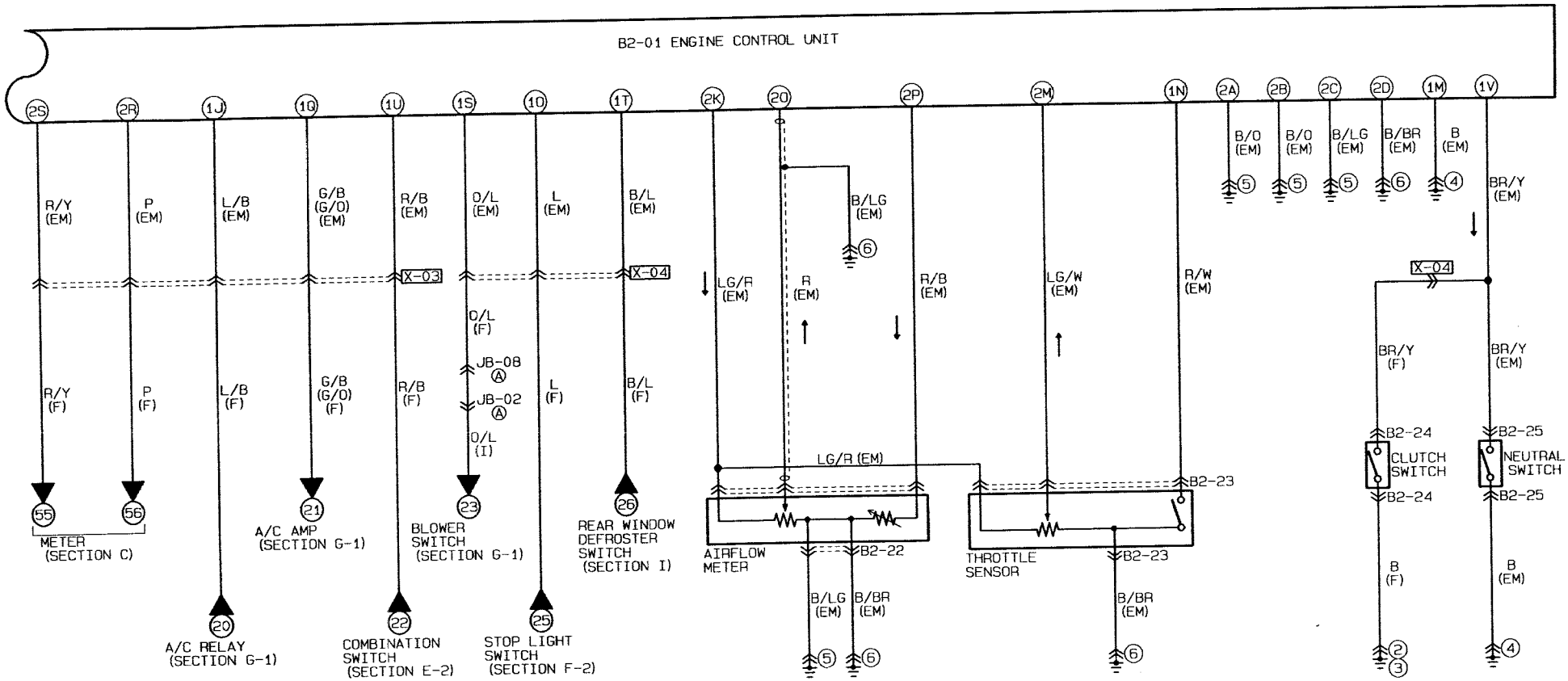






Terminal Voltage

	Terminal	Connection to	Test condition	Correct voltage
22P	1H	Solenoid valve (Wastegate)	Engine speed below 5,300 rpm	Approx. 12V
			Engine speed above 5,300 rpm	Below 1.5V
	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
26P	2E	Distributor (Ne-signal)	Ignition switch ON	Approx. 0V or 5V
			Idle	Approx. 2V
	2G	Distributor (G-signal)	Ignition switch ON	Approx. 0V or 5V
			Idle	Approx. 1.5V
	2J	Knock control unit	Idle	Approx. 4.0V
	2Q	Water thermosensor	Engine coolant temperature 20°C (68°F)	Approx. 2.5V
			After warm-up	Below 0.5V
	2T	Solenoid valve (Pressure regulator)	180 seconds after engine started when engine coolant temperature above 90°C (194°F) and intake air temperature above 58°C (136°F)	Below 1.5V
			Other condition at idle	Approx. 12V
	2U	Injector (Nos. 1, 3)	Ignition switch ON	Approx. 12V
			Idle	Approx. 12V
			Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx. 12V
	2V	Injector (Nos. 2, 4)	Ignition switch at idle	Approx. 12V
			Idle	Approx. 12V
			Engine speed above 2,000 rpm on deceleration (After warm-up)	Approx. 12V
	2W	ISC valve	Ignition switch ON	Approx. 7V
			Idle	Approx. 9V
	2X	Solenoid valve (Purge control)	Ignition switch ON	Approx. 12V
			Idle	Approx. 12V



B2-01 ENGINE CONTROL UNIT (EM)

1U	1S	1Q	1O	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	G/B	L	B	LG/Y	O/G	G/W	*	V	L/R
BR/Y	B/L	B/G	L/Y	R/W	*	L/B	O/B	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

2Y*	2W	2U	2S	2Q	2O	2M	2K	2I	2G	2E	2C	2A
LG	L/O	Y	R/Y	L/W	R	LG/W	LG/R	*	Y/L	W	B/LG	B/O
*	W/L	Y/B	G/O	P	R/B	R/L	*	R/Y	*	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

B2-22 AIRFLOW METER (EM)

R/B	R	B/BR	LG/R	B/LG	*	*

B2-23 THROTTLE SENSOR (EM)

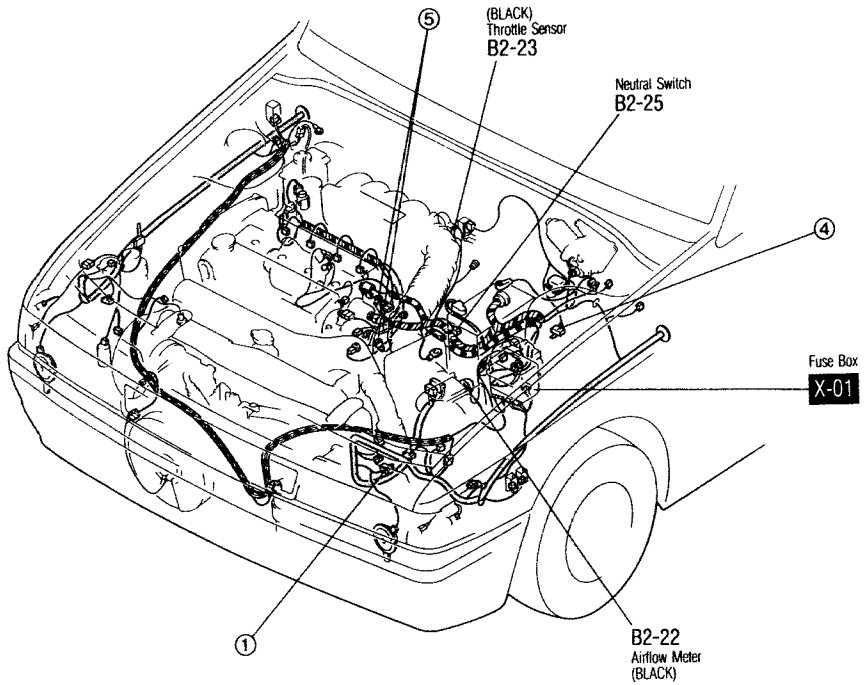
B/BR	R/W	LG/W	LG/R

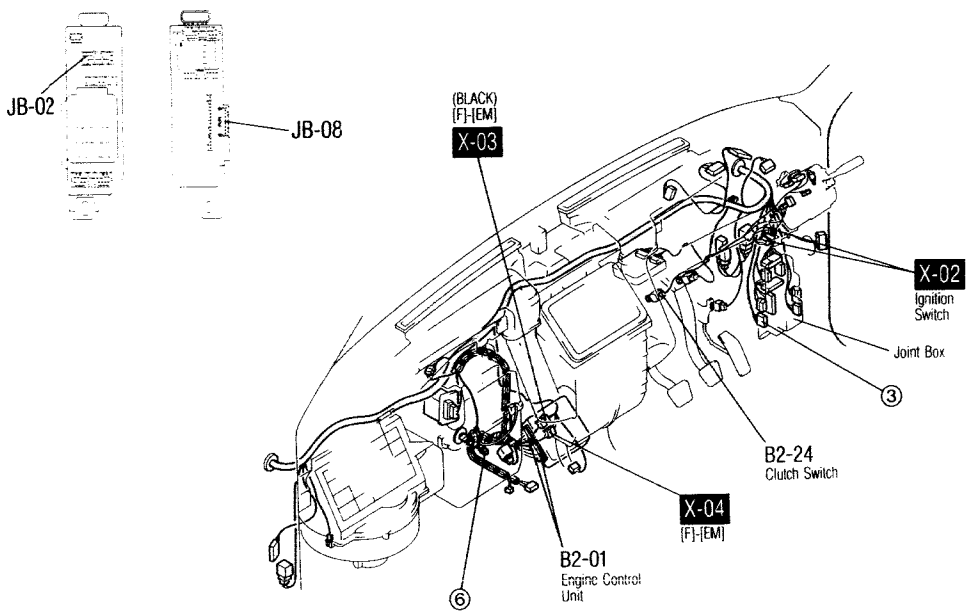
B2-24 CLUTCH SWITCH (F)

B	BR/Y

B2-25 NEUTRAL SWITCH (EM)

BR/Y	B

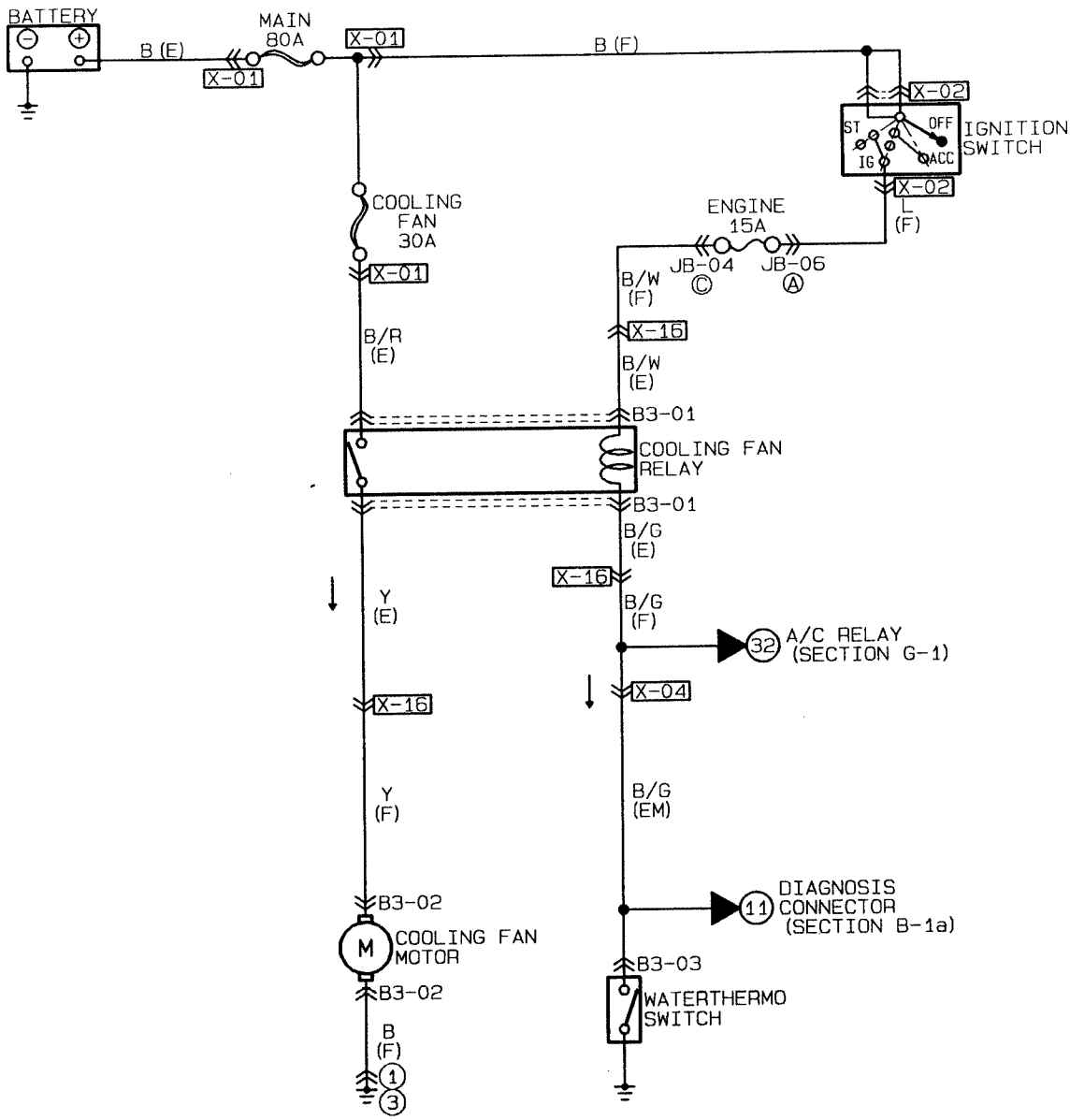


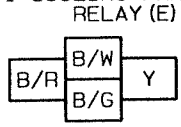
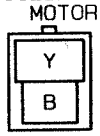


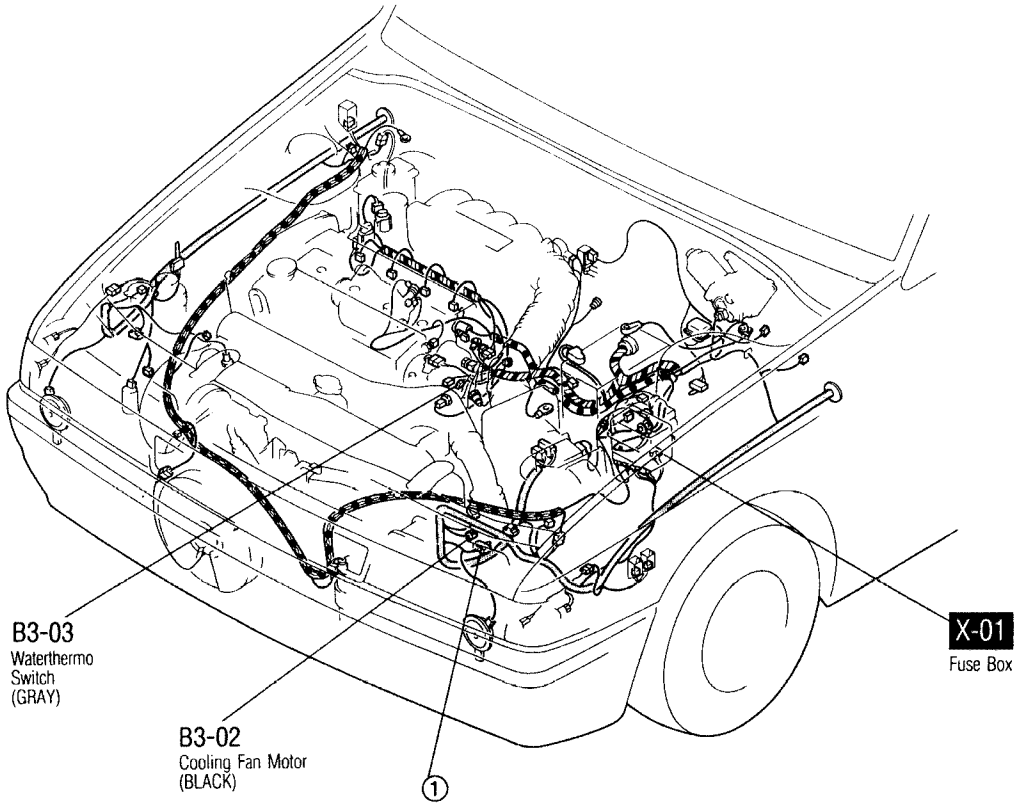
Terminal Voltage

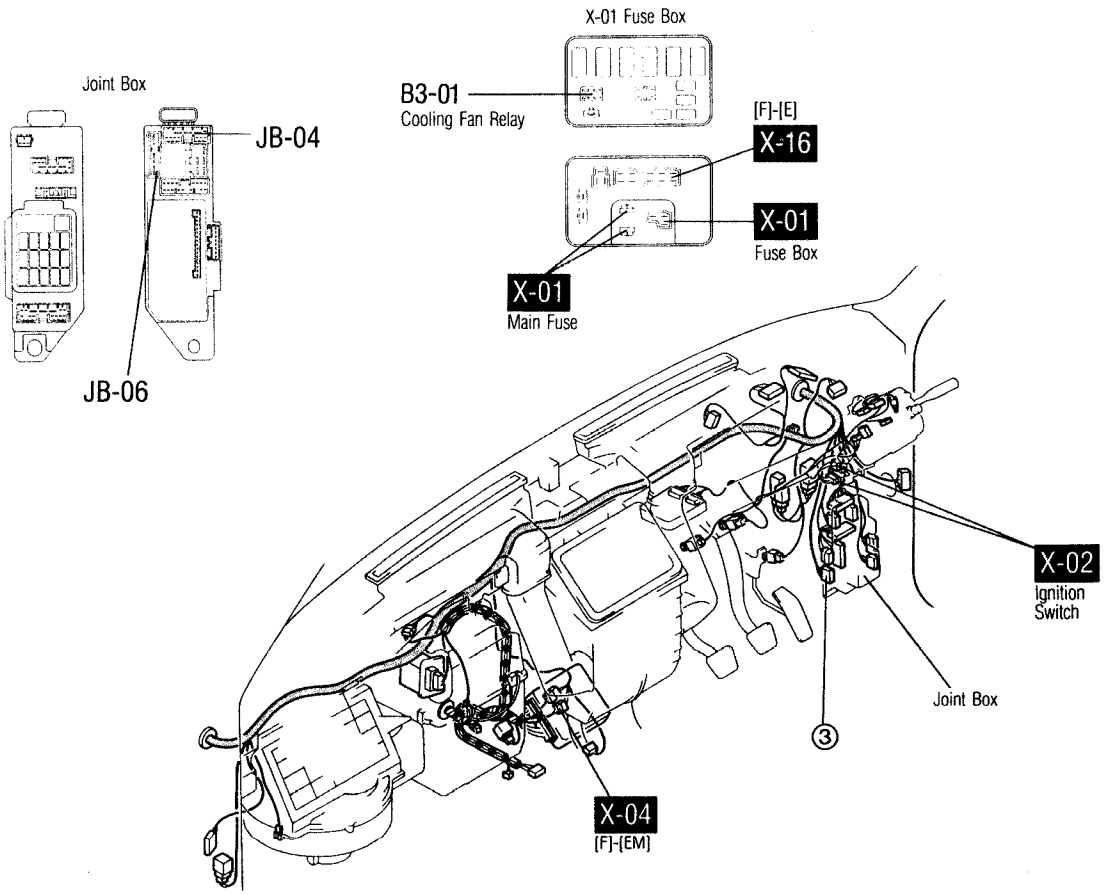
	Terminal	Connection to	Test condition	Correct voltage
22P	1J	A/C relay	Ignition switch ON	Approx. 12V
			A/C switch ON at idle	Below 2.5V
			A/C switch OFF at idle	Approx. 12V
	1M	Ground	Constant	Below 1.0V
	1N	Throttle sensor (Idle switch)	Accelerator pedal released	Below 1.0V
			Accelerator pedal depressed	Approx. 12V
	1O	Stoplight switch	Brake pedal released	Below 1.0V
	1Q	A/C switch	A/C switch ON	Below 2.5V
			A/C switch OFF	Approx. 12V
	1S	Blower control switch	Blower control switch OFF or 1st position	Approx. 12V
			Blower control switch 2nd or higher position	Below 1.0V
	1T	Rear window defroster switch	Rear window defroster switch OFF	Below 1.0V
			Rear window defroster switch ON	Approx. 12V
	1U	Headlight switch	Headlights ON	Approx. 12V
			Headlights OFF	Below 1.0V
	1V	Neutral/Clutch switches	Neutral position or clutch pedal depressed	Below 1.0V
			Others	Approx. 12V
26P	2A	Ground (Injector)	Constant	0V
	2B	Ground (Output)	Constant	0V
	2C	Ground (CPU)	Constant	0V
	2D	Ground (Input)	Constant	0V
	2K	Throttle sensor/ Airflow meter	Constant	4.5—5.5V
	2M	Throttle sensor	Accelerator pedal released	Approx. 0.5V
			Accelerator pedal fully depressed	Approx. 4.0V
	2O	Airflow meter	Ignition switch ON	Approx. 3.8V
			Idle	Approx. 3.0V
	2P	Intake air thermosensor	Ambient air temperature 20°C (68°F)	Approx. 2.5V
	2R	Turbocharge indicator	Ignition switch ON	Approx. 12V
	2S	Overboost warning buzzer	Ignition switch ON	Approx. 12V

B-3 EXCEPT TURBO & EC-AT ■ COOLING FAN SYSTEM

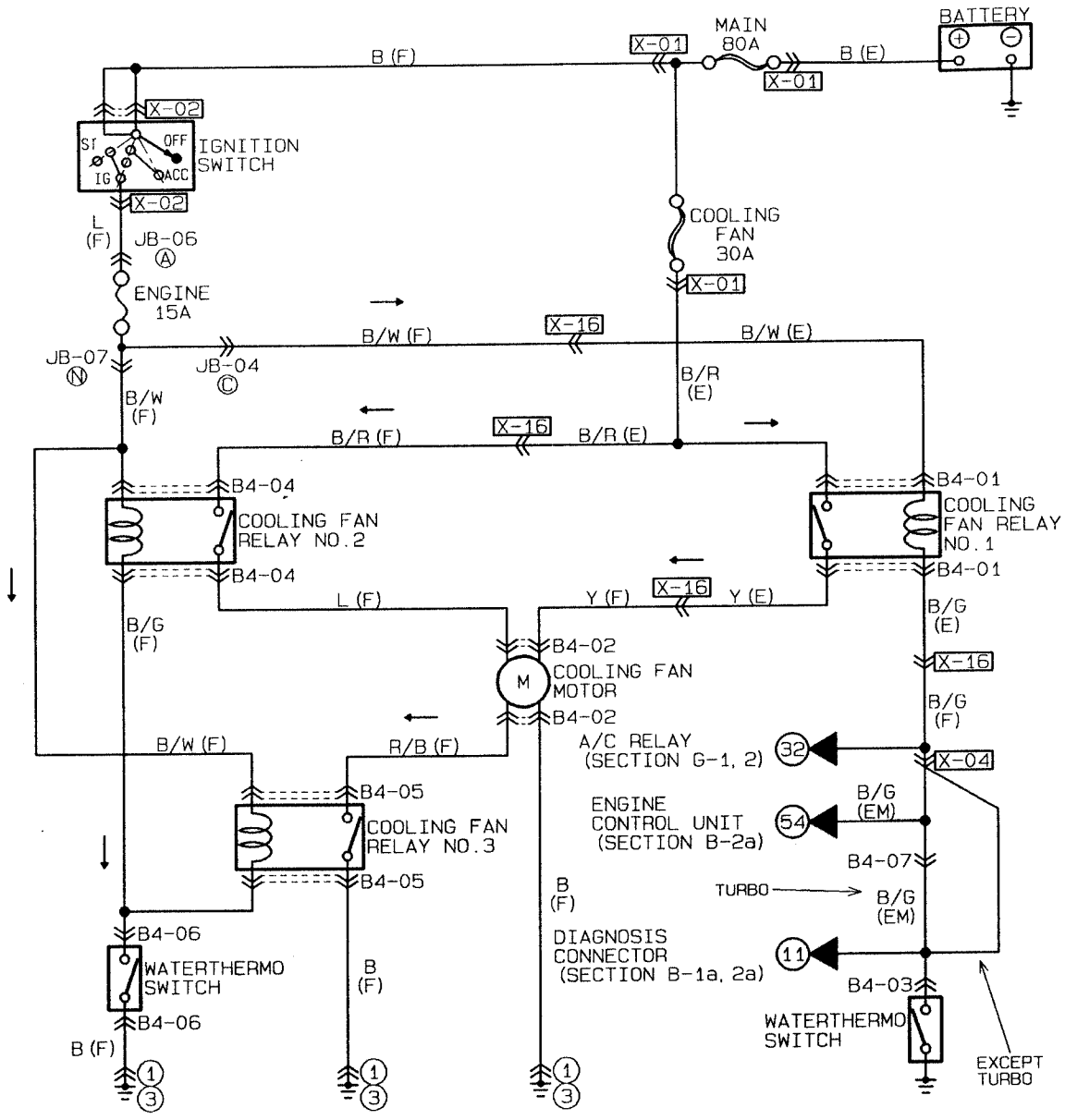


B3-01 COOLING FAN RELAY (E)	B3-02 COOLING FAN MOTOR (F)	B3-03 WATERTHERMO SWITCH (EM)	
			

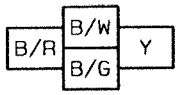

B3-03
Waterthermo Switch (GRAY)
B3-02
Cooling Fan Motor (BLACK)
①
X-01
Fuse Box


Joint Box
JB-04
JB-06
X-01 Fuse Box
B3-01
Cooling Fan Relay
[F]-[E]
X-16
X-01
Fuse Box
X-01
Main Fuse
X-02
Ignition Switch
Joint Box
③
X-04
[F]-[EM]

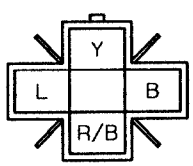
B-4 TURBO & EC-AT ■COOLING FAN SYSTEM



B4-01 COOLING FAN RELAY NO.1 (E)

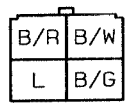


B4-02 COOLING FAN MOTOR (F)

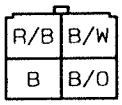


B4-03 WATERTHERMO SWITCH (EM)

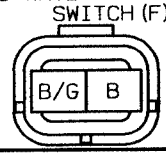
B4-04 COOLING FAN RELAY NO.2 (F)



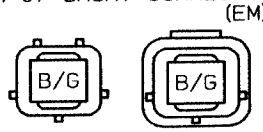
B4-05 COOLING FAN RELAY NO.3 (F)

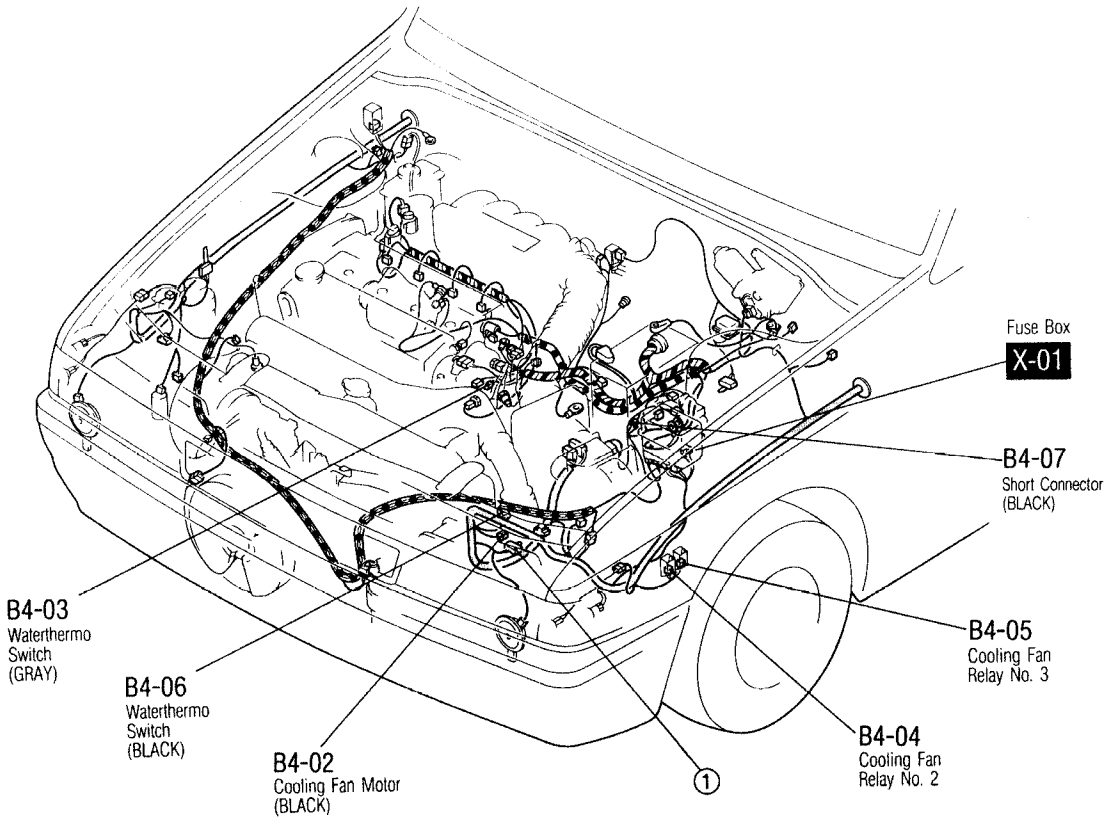


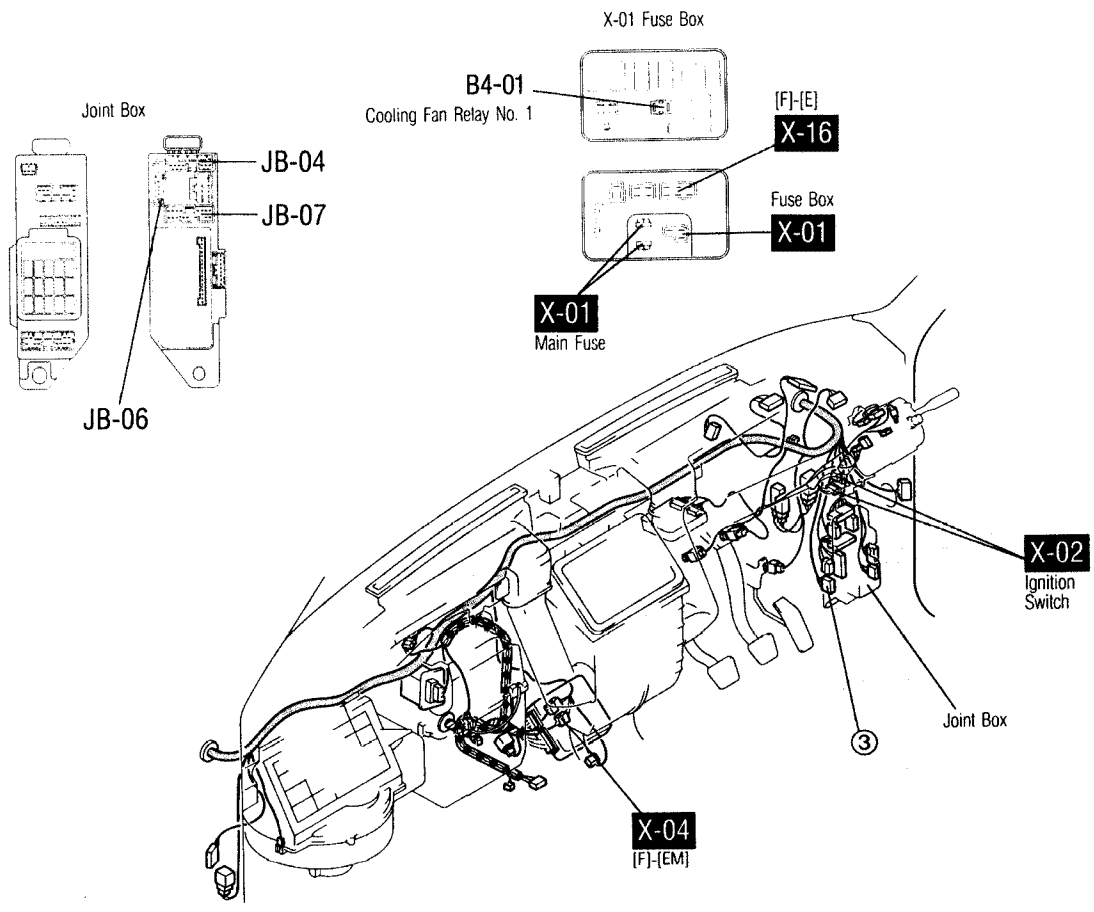
B4-06 WATERTHERMO SWITCH (F)



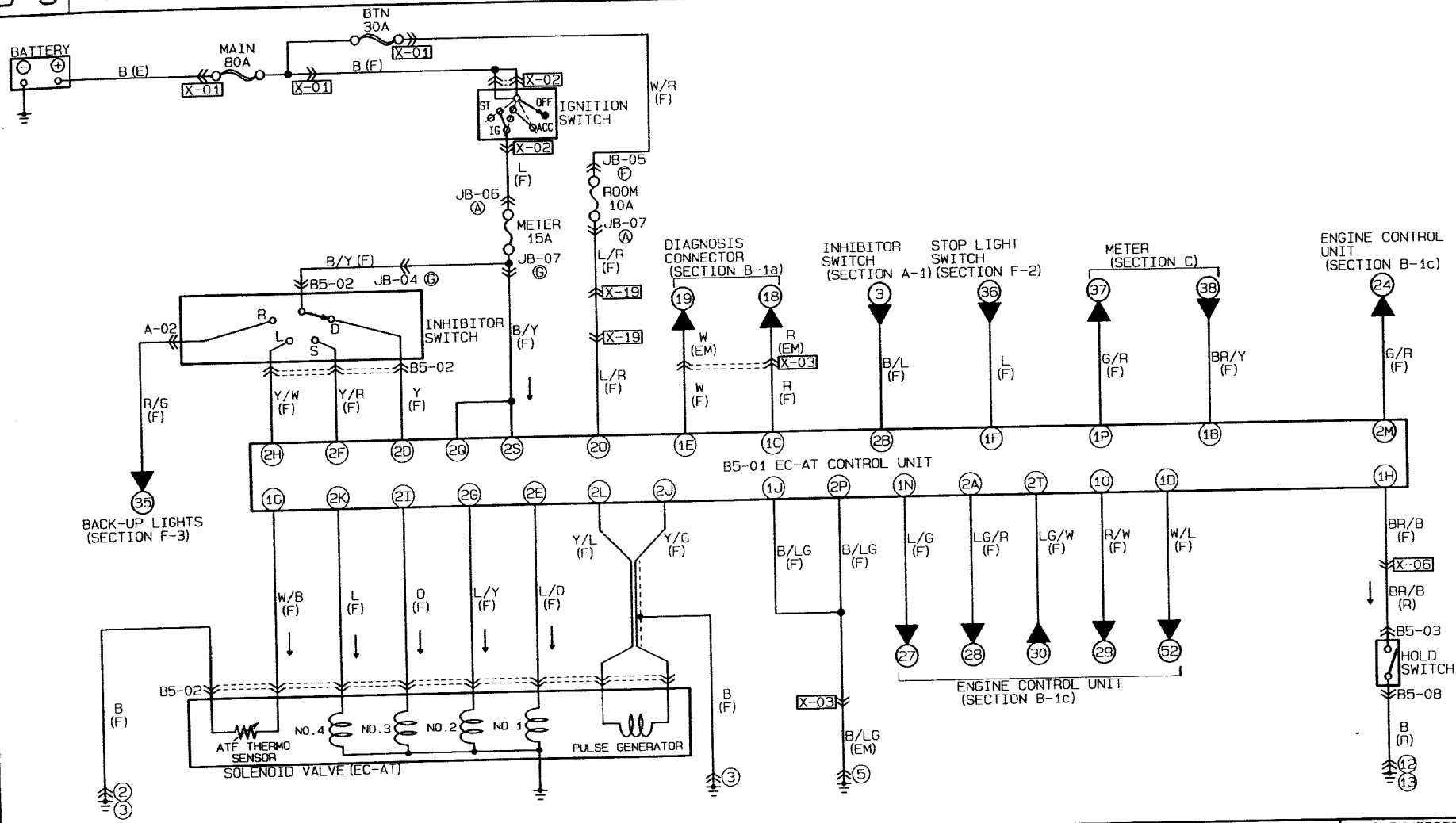
B4-07 SHORT CONNECTOR (EM)




Fuse Box
X-01
B4-07
Short Connector
(BLACK)
B4-03
Waterthermo
Switch
(GRAY)
B4-06
Waterthermo
Switch
(BLACK)
B4-02
Cooling Fan Motor
(BLACK)
B4-05
Cooling Fan
Relay No. 3
B4-04
Cooling Fan
Relay No. 2
①


X-01 Fuse Box
B4-01
Cooling Fan Relay No. 1
[F]-[E]
X-16
Fuse Box
X-01
X-01
Main Fuse
Joint Box
JB-04
JB-07
JB-06
X-02
Ignition
Switch
Joint Box
③
X-04
[F]-[EM]

B-5 ■EC-AT CONTROL SYSTEM



B5-01 EC-AT CONTROL UNIT (F)

1O	1N	1K	1I	1G	1E	1C	1A
R/W	*	*	*	W/B	W	R	*
G/R	L/G	*	B/LG	BR/B	W/G	*	BR/Y
1P	1N	1L	1J	1H	1F	1D	1B

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

B5-02 SOLENOID VALVE (EC-AT) &INHIBITOR SWITCH (F)

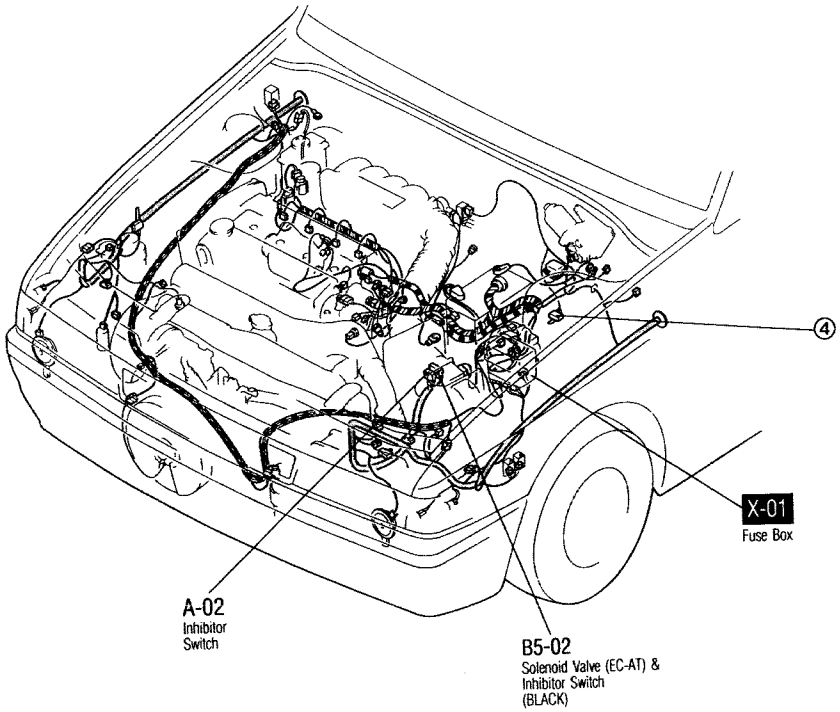
B/Y	W/B	Y/R	Y/G	L/O	O
B	Y	Y/W	Y/L	L/Y	L

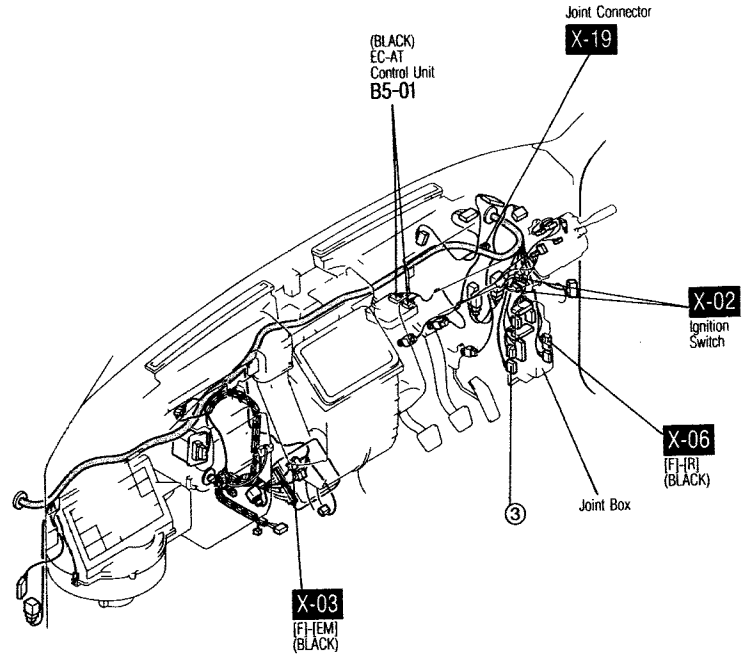
B8-03 HOLD SWITCH (R)

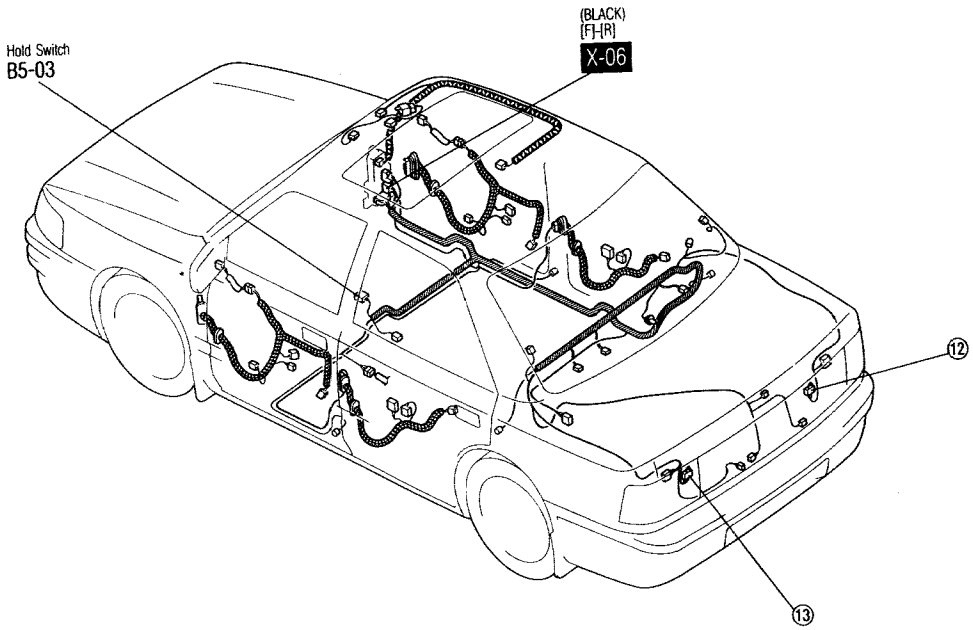
BR/B	R/B	*
B	R	*

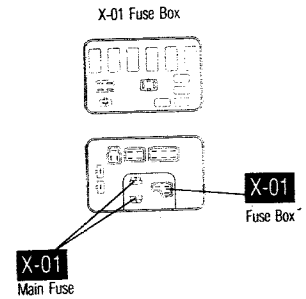
A-02 INHIBITOR SWITCH (F)

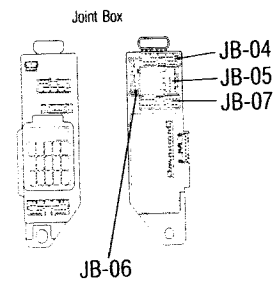
B/R	
R/G	B/L


④
X-01
Fuse Box
A-02
Inhibitor
Switch
B5-02
Solenoid Valve (EC-AT) &
Inhibitor Switch
(BLACK)

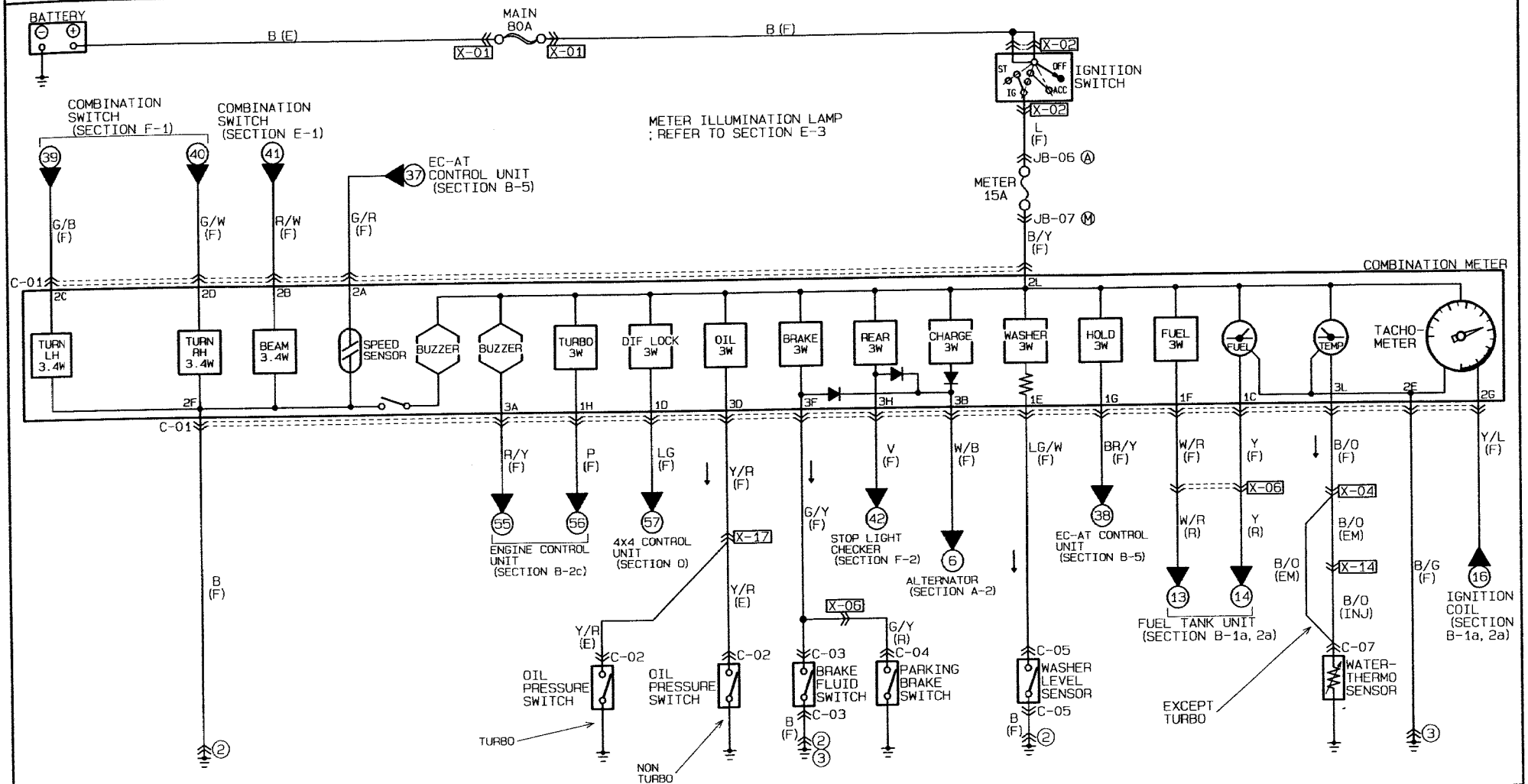

Joint Connector
X-19
(BLACK)
EC-AT
Control Unit
B5-01
X-02
Ignition
Switch
X-06
[F]-[R]
(BLACK)
③
Joint Box
X-03
[F]-[EM]
(BLACK)


Hold Switch
B5-03
(BLACK)
[F]-[R]
X-06
⑫
⑬

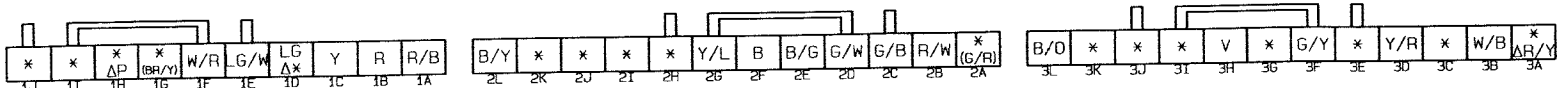

X-01 Fuse Box
X-01
Fuse Box
X-01
Main Fuse


Joint Box
JB-04
JB-05
JB-07
JB-06

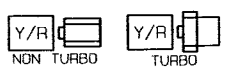
■ METER & WARNING LAMPS



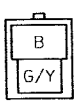
C-01 METER (F)



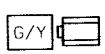
C-02 OIL PRESSURE SWITCH (E)



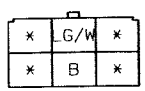
C-03 BRAKE FLUID SWITCH (F)



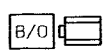
C-04 PARKING BRAKE SWITCH (R)

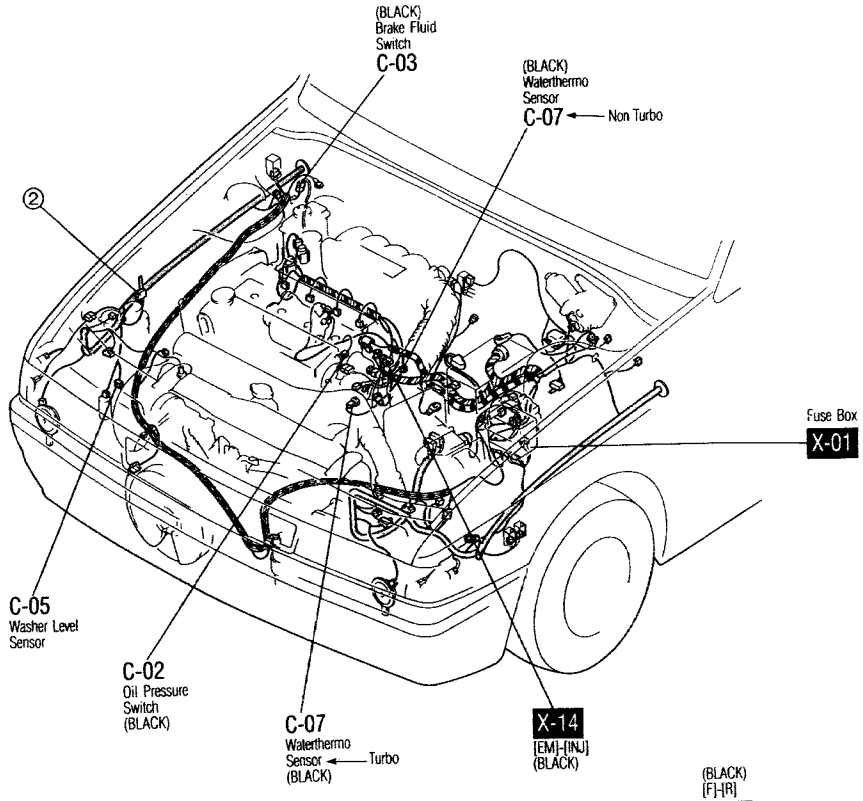


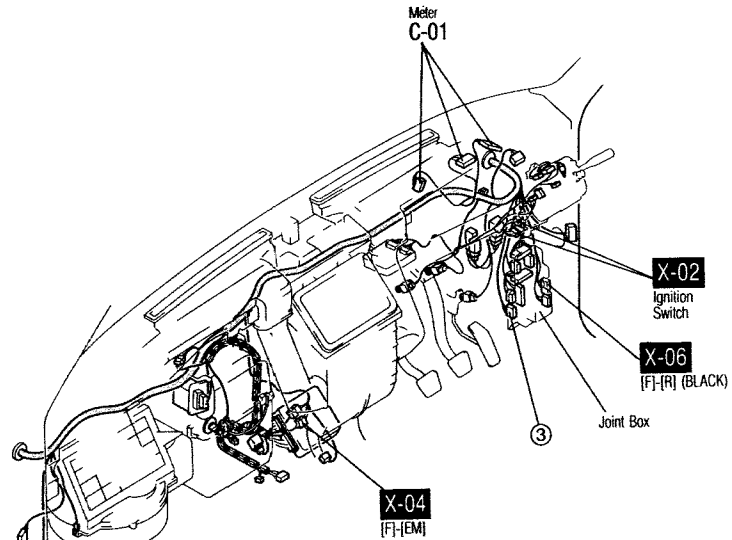
C-05 WASHER LEVEL SENSOR (F)

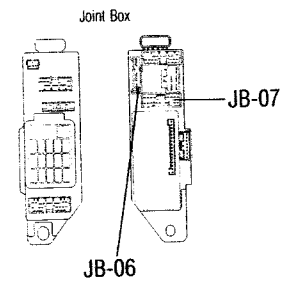


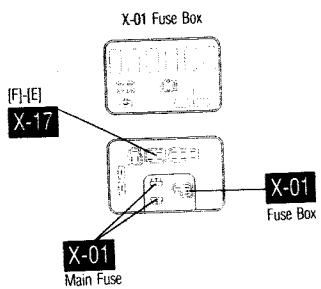
C-07 WATERTHERMO SENSOR (EM) (INJ)

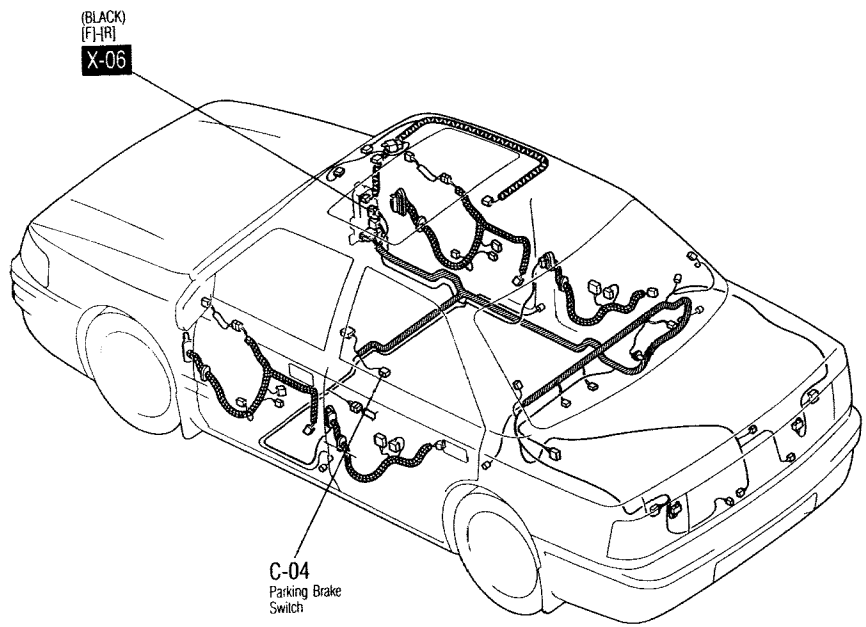



(BLACK)
Brake Fluid
Switch
C-03
(BLACK)
Waterthermo
Sensor
C-07 ← Non Turbo
②
Fuse Box
X-01
C-05
Washer Level
Sensor
C-02
Oil Pressure
Switch
(BLACK)
C-07
Waterthermo
Sensor ← Turbo
(BLACK)
X-14
[EM]-[INJ]
(BLACK)

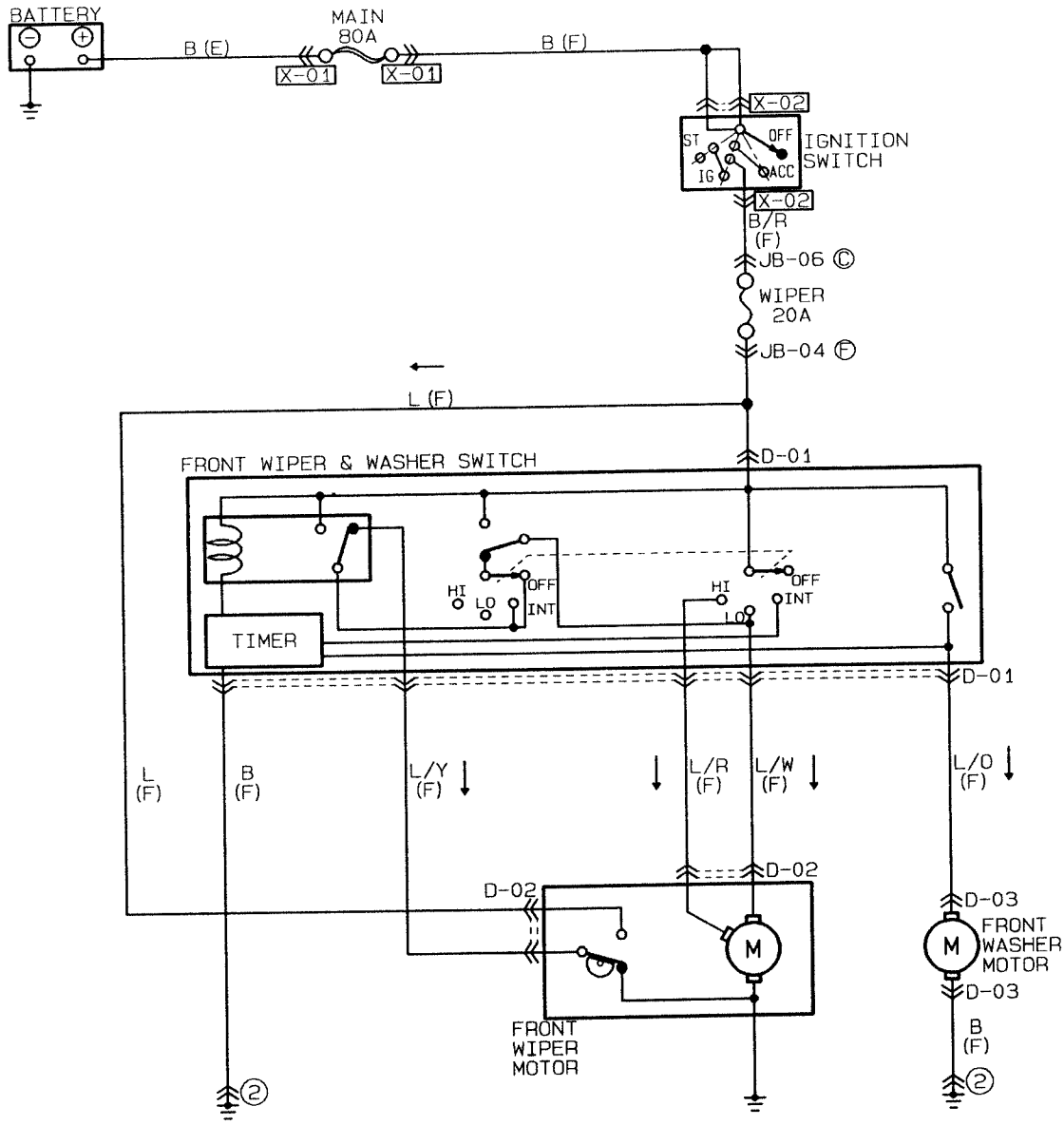

Meter
C-01
X-02
Ignition
Switch
X-06
[F]-[R] (BLACK)
Joint Box
③
X-04
[F]-[EM]


Joint Box
JB-07
JB-06

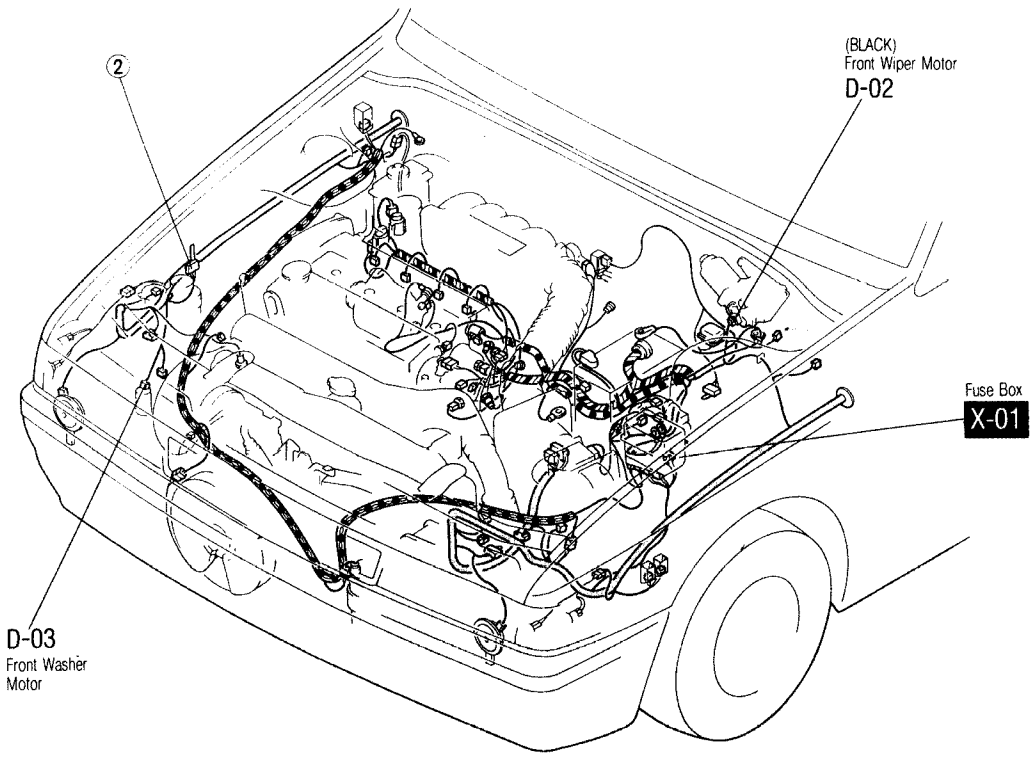

X-01 Fuse Box
[F]-[E]
X-17
X-01
Fuse Box
X-01
Main Fuse

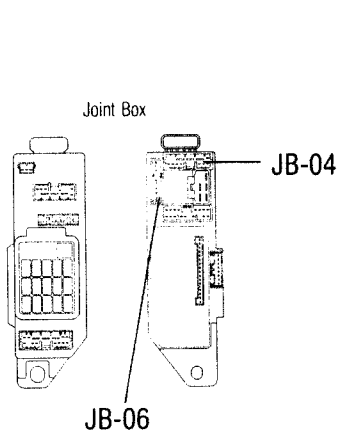

(BLACK)
[F]-[R]
X-06
C-04
Parking Brake
Switch

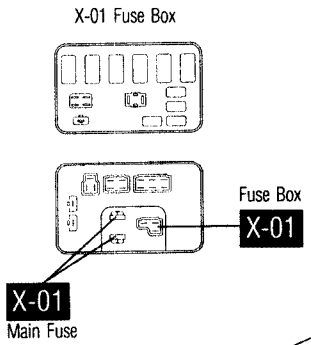
D ■ FRONT WIPER & WASHER

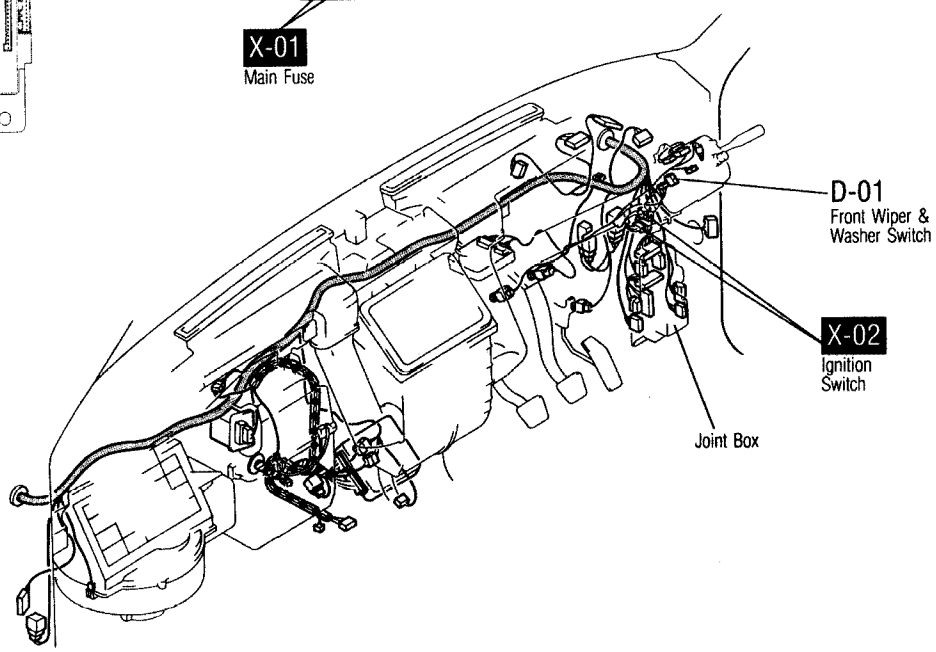


D-01 FRONT WIPER & WASHER SWITCH (F)	D-02 FRONT WIPER MOTOR (F)	D-03 FRONT WASHER MOTOR (F)	
B / L/Y / L / * / L/O / L/W / L/R	L/W / L / L/R / L/Y	B / L/O	

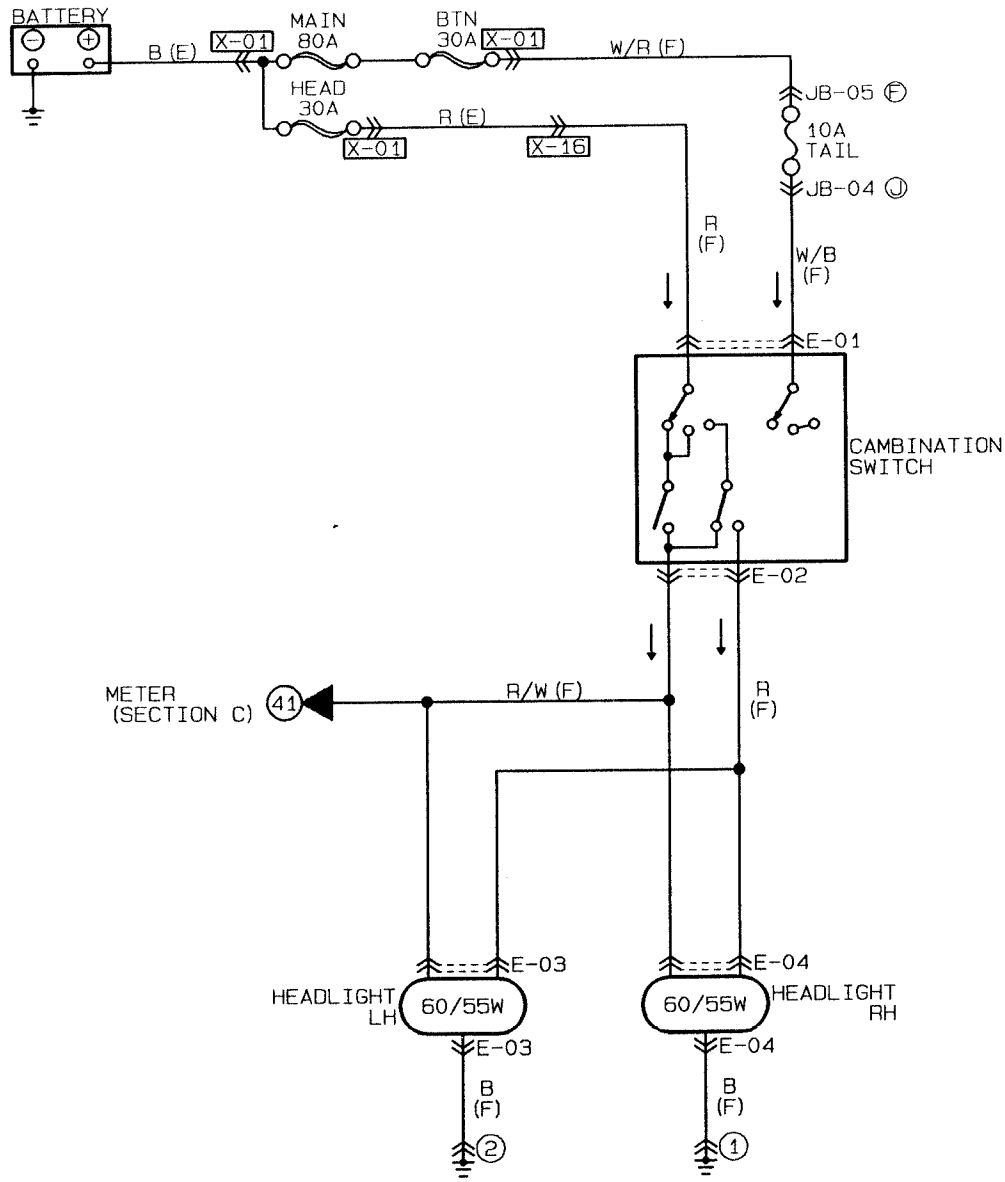

2
(BLACK)
Front Wiper Motor
D-02
Fuse Box
X-01
D-03
Front Washer
Motor

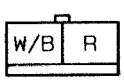
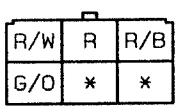
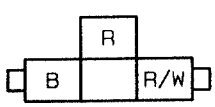
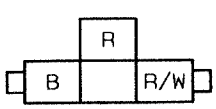

Joint Box
JB-04
JB-06

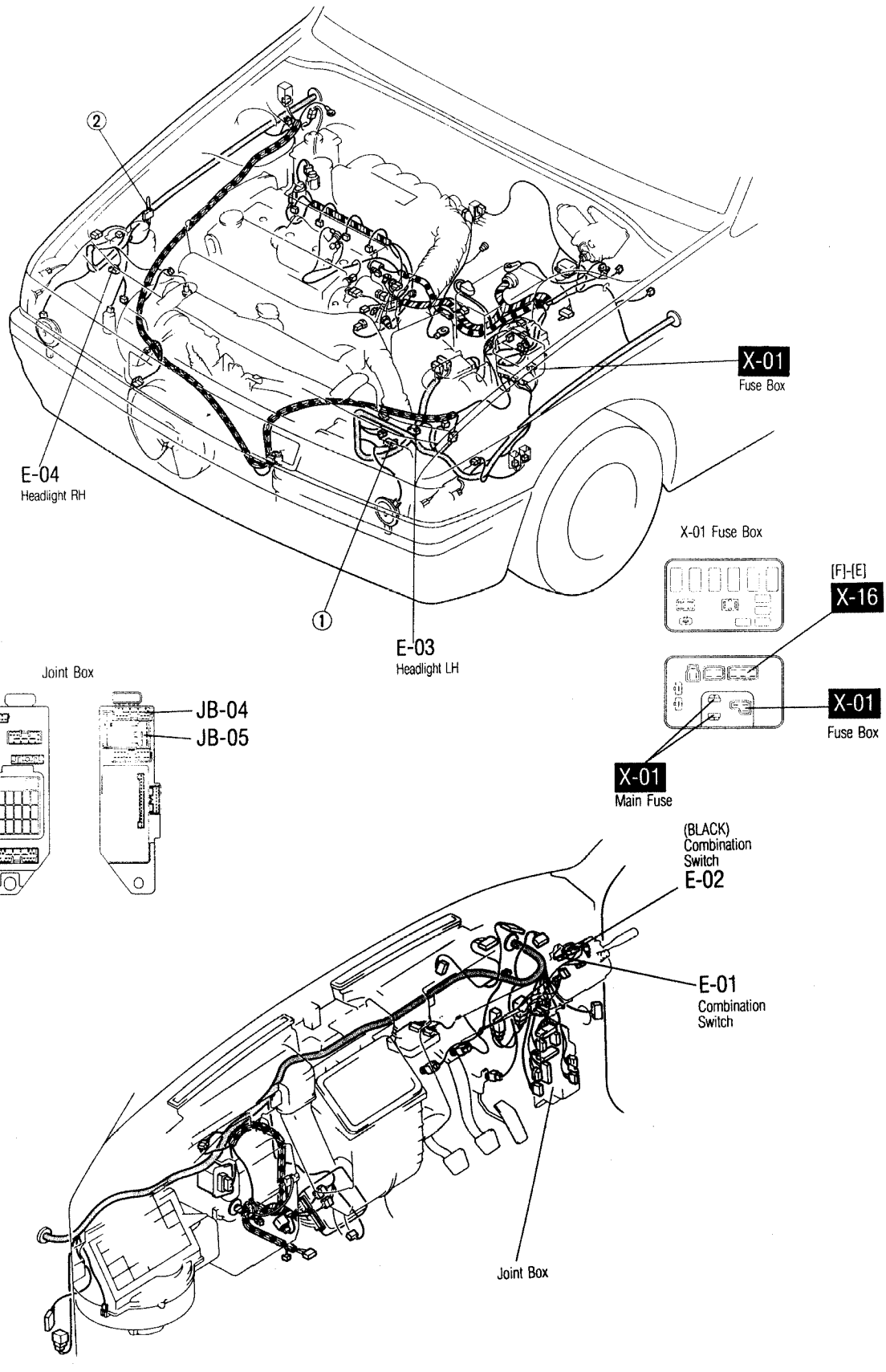

X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse


D-01
Front Wiper &
Washer Switch
X-02
Ignition
Switch
Joint Box

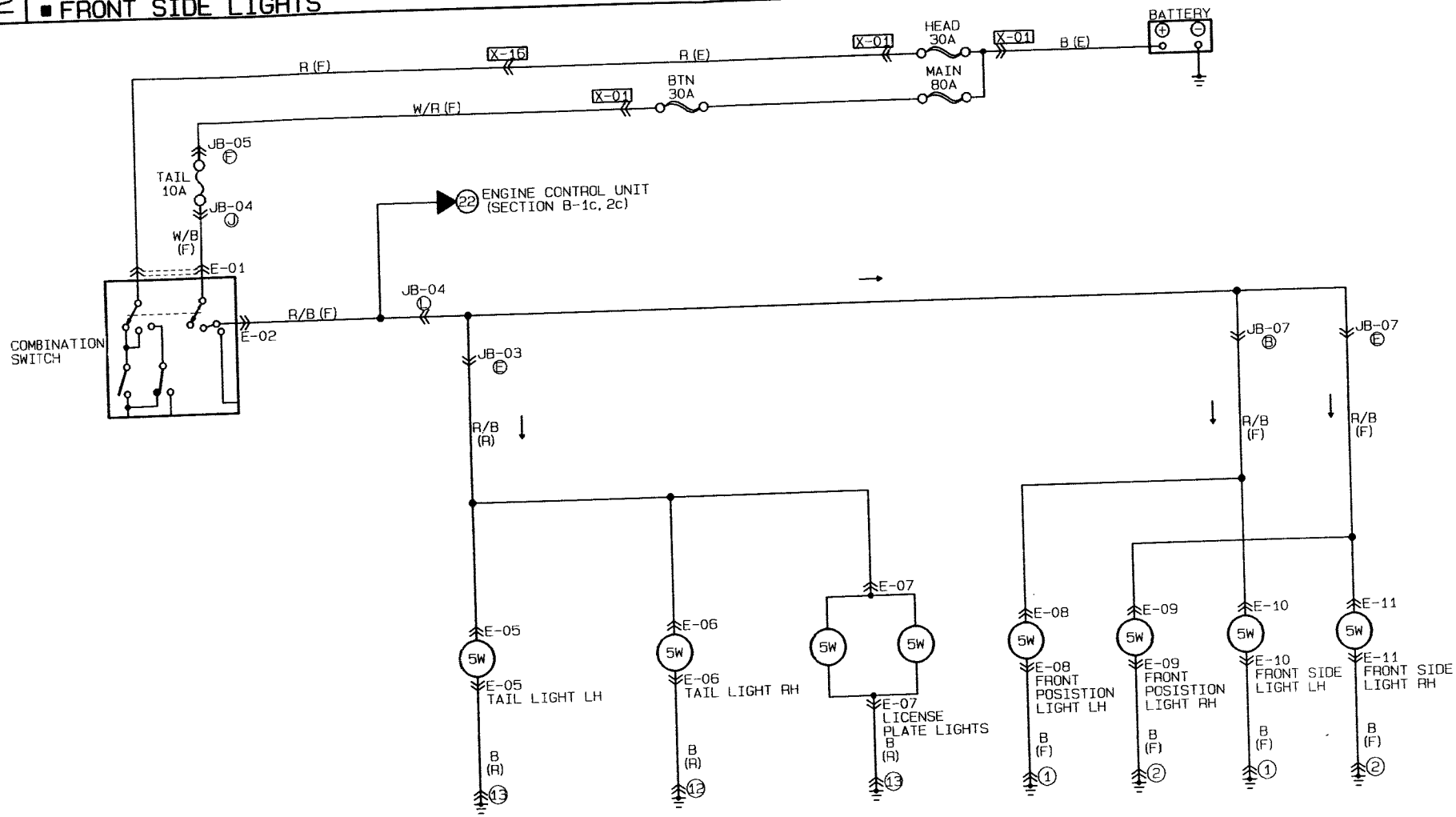
E-1 ■ HEADLIGHTS



E-01 COMBINATION SWITCH (F)	E-02 COMBINATION SWITCH (F)	E-03 HEADLIGHT LH (F)	E-04 HEADLIGHT RH (F)
			

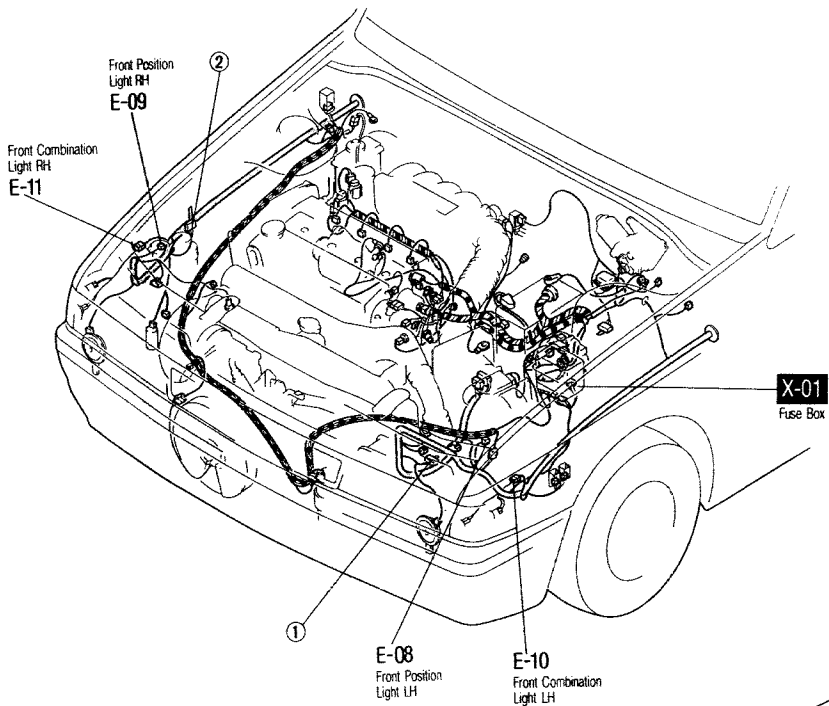

②
X-01
Fuse Box
E-04
Headlight RH
①
E-03
Headlight LH
X-01 Fuse Box
[F]-[E]
X-16
X-01
Fuse Box
X-01
Main Fuse
Joint Box
JB-04
JB-05
(BLACK)
Combination
Switch
E-02
E-01
Combination
Switch
Joint Box

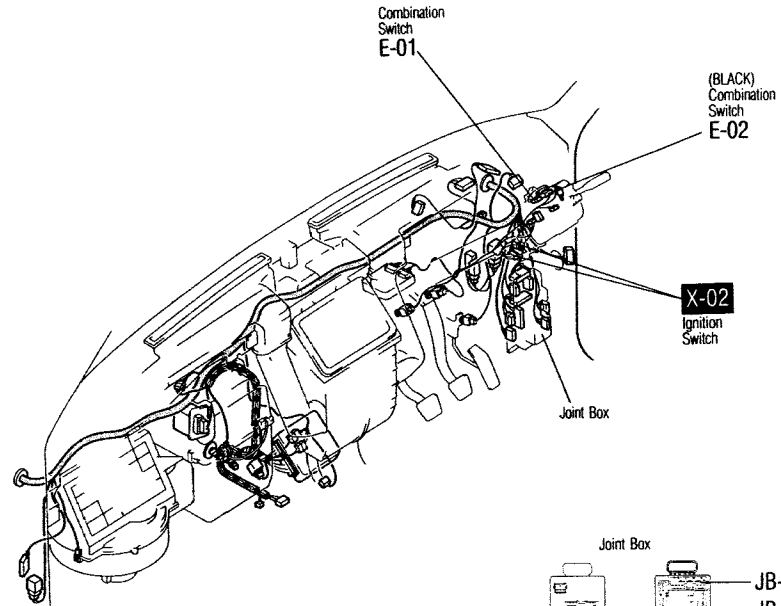
E-2 ■TAIL LIGHTS ■LICENSE PLATE LIGHTS ■FRONT POSITION LIGHTS ■FRONT SIDE LIGHTS

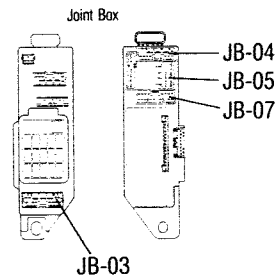


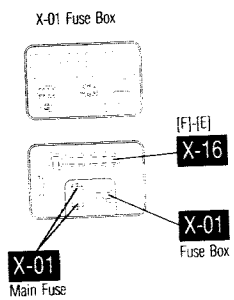
E-01 COMBINATION SWITCH (F)	E-02 COMBINATION SWITCH (F)	E-05 REAR COMBINATION LIGHT LH (R)	E-06 REAR COMBINATION LIGHT RH (R)	E-07 LICENSE PLATE LIGHT (R)	E-08 FRONT POSITION LIGHT LH (F)	E-09 FRONT POSITION LIGHT RH (F)
W/B R	R/W R R/B G/O * *	* R/G G/B B R/B G	* R/G G/W B R/B G	B R/B	B R/B	B R/B

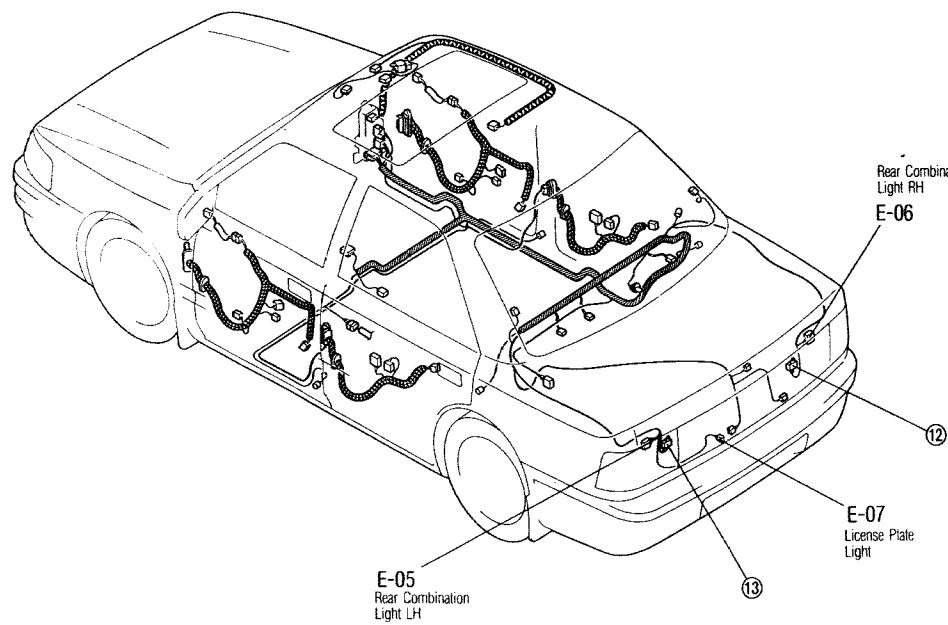
E-10 FRONT COMBINATION LIGHT LH (F)	E-11 FRONT COMBINATION LIGHT RH (F)
G/B R/B B	G/W R/B B


Front Position Light RH
E-09
②
Front Combination Light RH
E-11
X-01
Fuse Box
①
E-08
Front Position Light LH
E-10
Front Combination Light LH


Combination Switch
E-01
(BLACK) Combination Switch
E-02
X-02
Ignition Switch
Joint Box

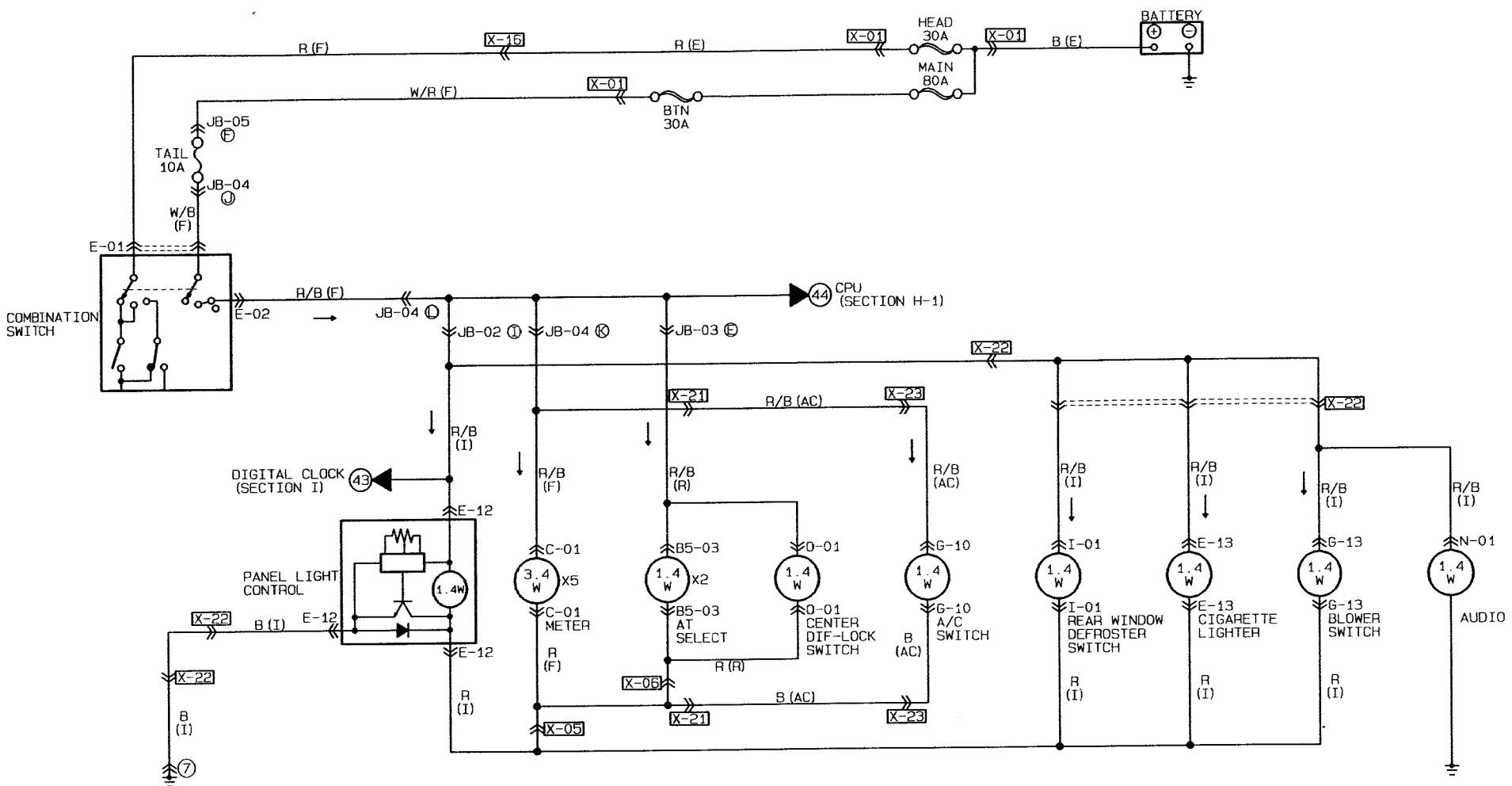

Joint Box
JB-04
JB-05
JB-07
JB-03


X-01 Fuse Box
[F]-[E]
X-16
X-01
Fuse Box
X-01
Main Fuse


Rear Combination Light RH
E-06
⑫
E-07
License Plate Light
⑬
E-05
Rear Combination Light LH

■ ILLUMINATION LAMPS

E-3



E-01 COMBINATION SWITCH (F)

W/B	R

E-02 COMBINATION SWITCH (F)

R/W	R	R/B
G/O	*	*

E-12 PANEL LIGHT CONTROL (I)

B		R
*	*	R/B	*

E-13 CIGARETTE LIGHTER ILLUMINATION (I)

R	R/B

B5-03 AT SELECT (R)

BR/B	R/B	*
B	R	*

C-01 METER (F)

*	*	P	BR/Y	W/R	LG/W	LG	Y	R	R/B

G-10 A/C SWITCH (AC)

G/W		G/R
B	L/Y	L/G	R/B

G-13 BLOWER SWITCH (I)

L	L/Y		O/L	R	R/B
L/W		L/R		B	

I-01 REAR WINDOW DEFROSTER SWITCH (I)

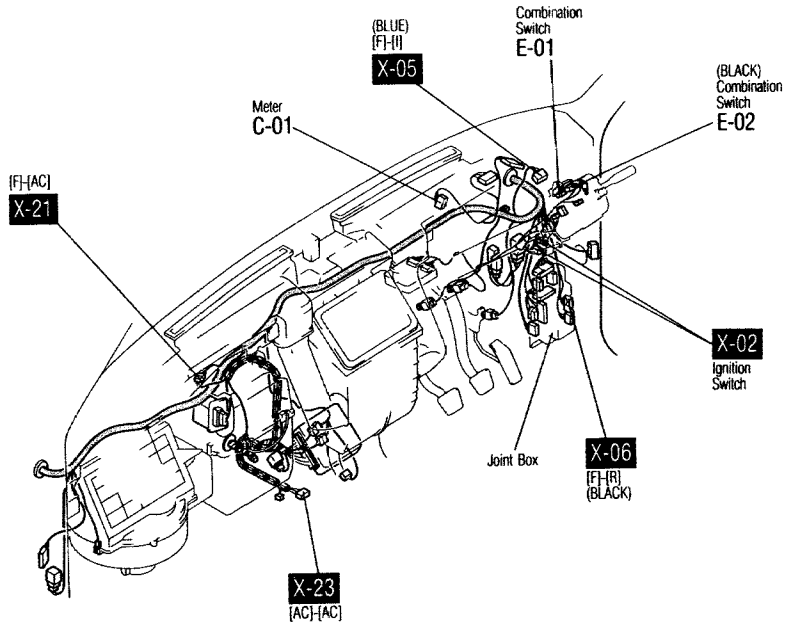
*	B/L	R/B
B	B/W	R

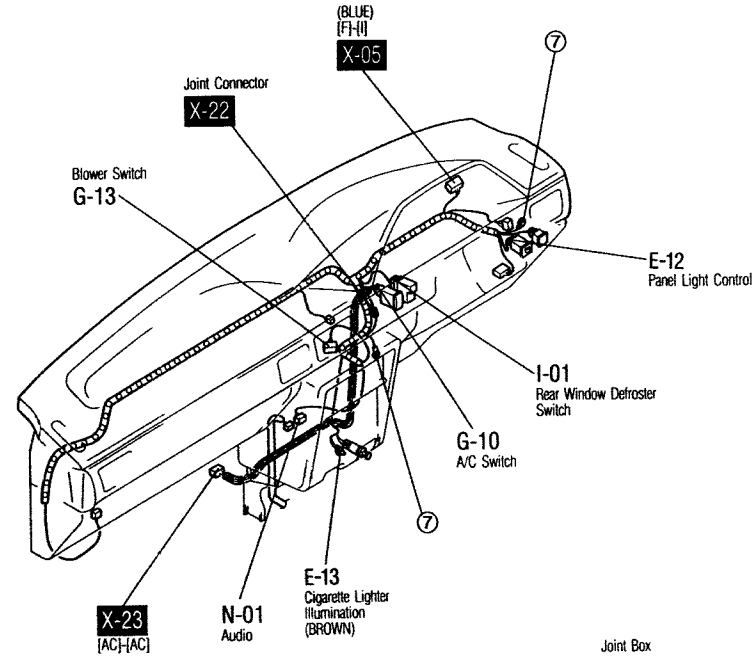
N-01 AUDIO (I)

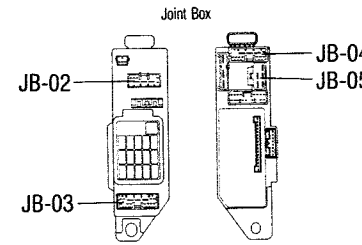
L	V		R/B	L/R	L/B
W	L/O	*	*	*	*	*

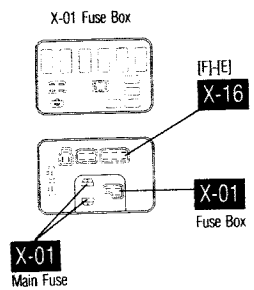
O-01 CENTER DIF-LOCK SWITCH (R)

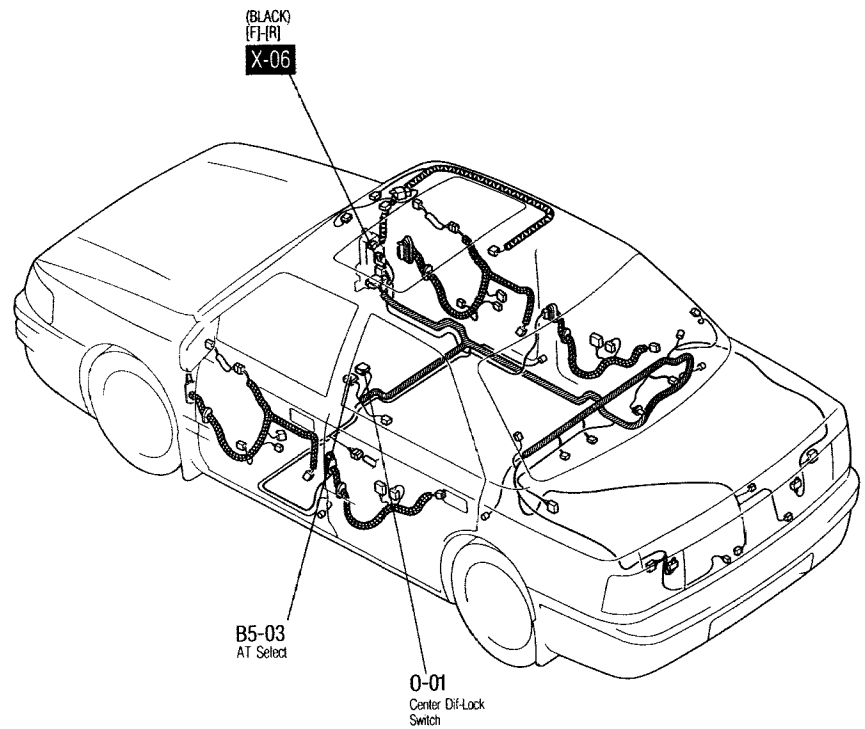
R/B	R	R/W	L/O	LG/W	*


(BLUE)
[F]-[I]
X-05
Combination
Switch
E-01
(BLACK)
Combination
Switch
E-02
Meter
C-01
[F]-[AC]
X-21
X-02
Ignition
Switch
Joint Box
X-06
[F]-[R]
(BLACK)
X-23
[AC]-[AC]

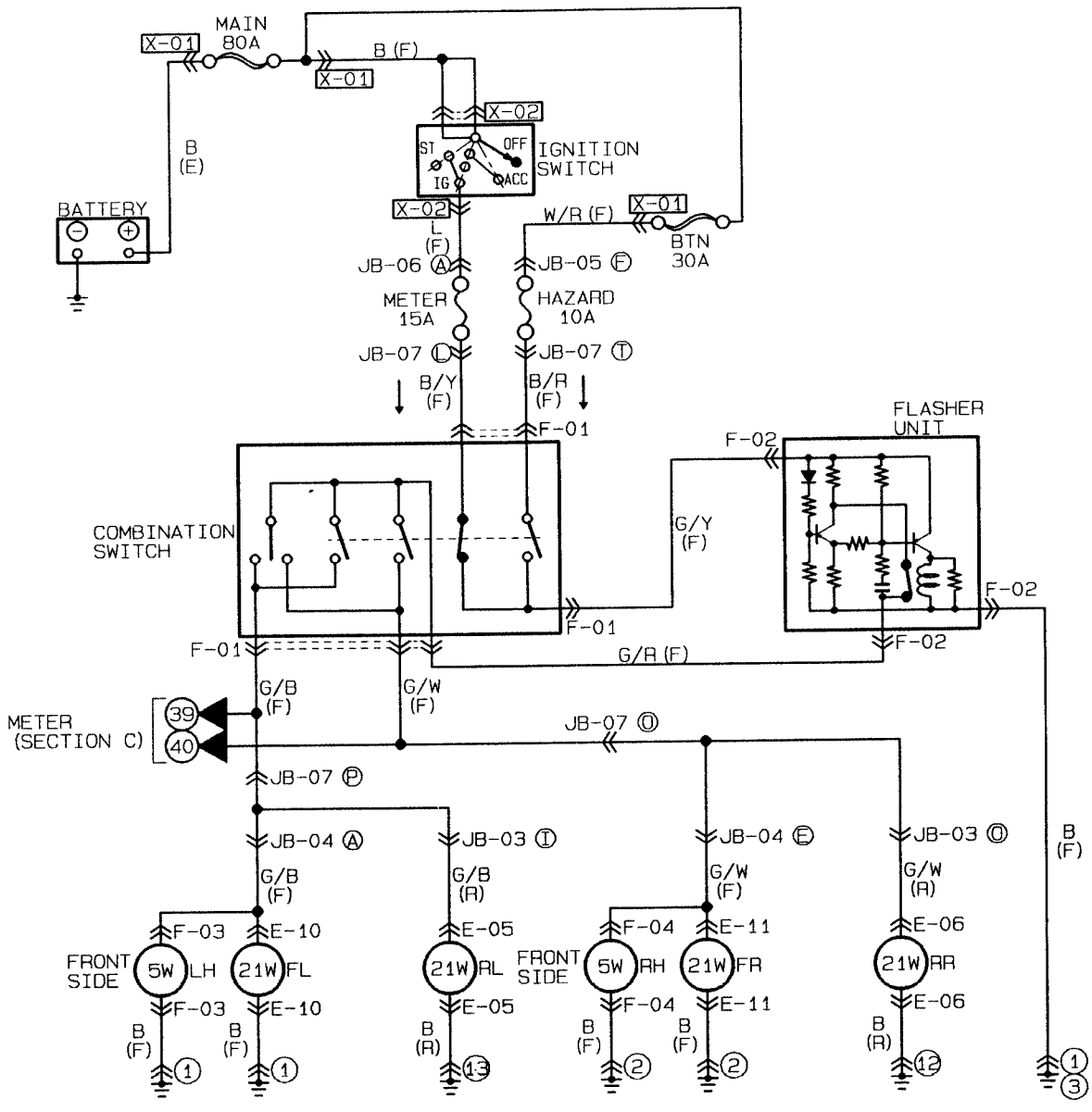

(BLUE)
[F]-[I]
X-05
Joint Connector
X-22
Blower Switch
G-13
E-12
Panel Light Control
I-01
Rear Window Defroster
Switch
G-10
A/C Switch
E-13
Cigarette Lighter
Illumination
(BROWN)
N-01
Audio
X-23
[AC]-[AC]


Joint Box
JB-02
JB-03
JB-04
JB-05


X-01 Fuse Box
[F]-[E]
X-16
X-01
Fuse Box
X-01
Main Fuse


(BLACK)
[F]-[R]
X-06
B5-03
AT Select
0-01
Center Dif-Lock
Switch

F-1 ■ TURN & HAZARD FLASHER LIGHTS



TURN & HAZARD FLASHER LIGHTS

F-01 COMBINATION SWITCH (F)

B/Y	G/Y	B/R
G/W	G/R	G/B

F-02 FLASHER UNIT (F)

G/R	
G/Y	B

F-03 FRONT SIDE TURN LIGHT LH (F)

B
G/B

F-04 FRONT SIDE TURN LIGHT RH (F)

B
G/W

E-05 REAR COMBINATION LIGHT LH (R)

*	R/G	G/B
B	R/B	G

E-06 REAR COMBINATION LIGHT RH (R)

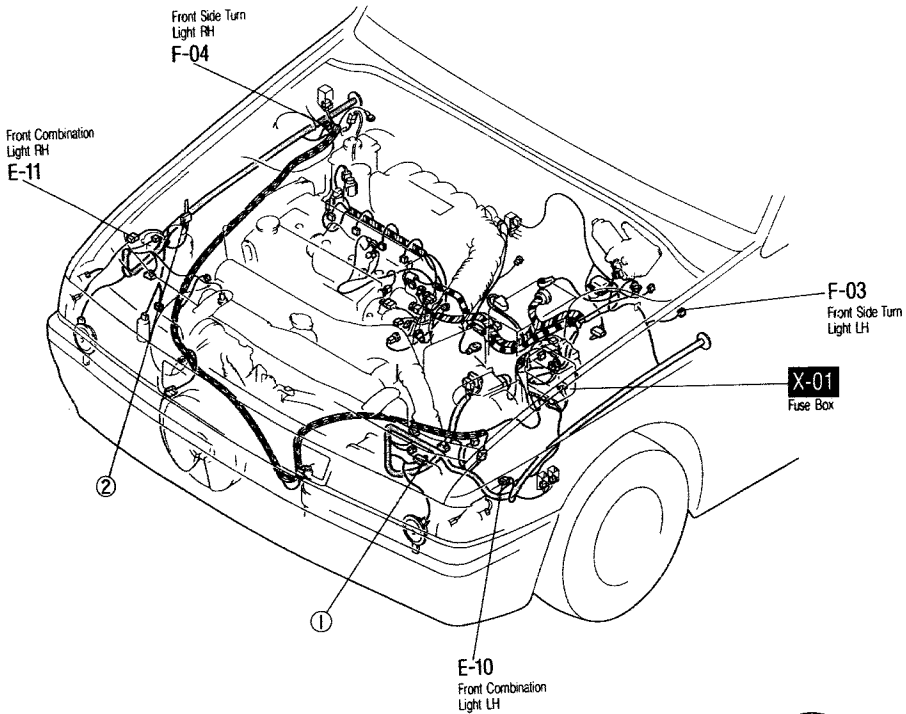
*	R/G	G/W
B	R/B	G

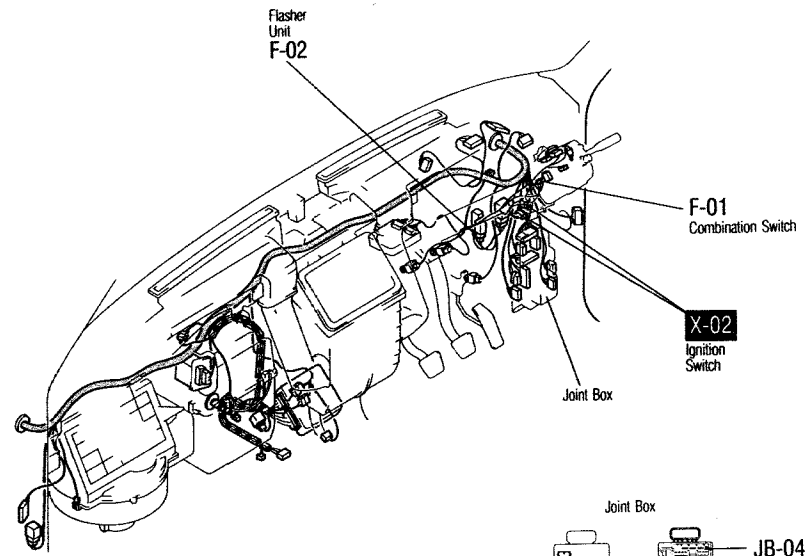
E-10 FRONT COMBINATION LIGHT LH (F)

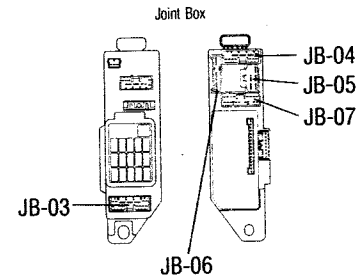
G/B	
R/B	B

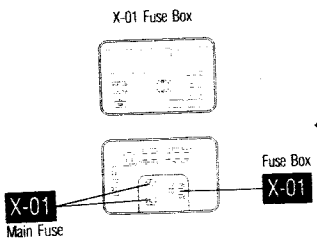
E-11 FRONT COMBINATION LIGHT RH (F)

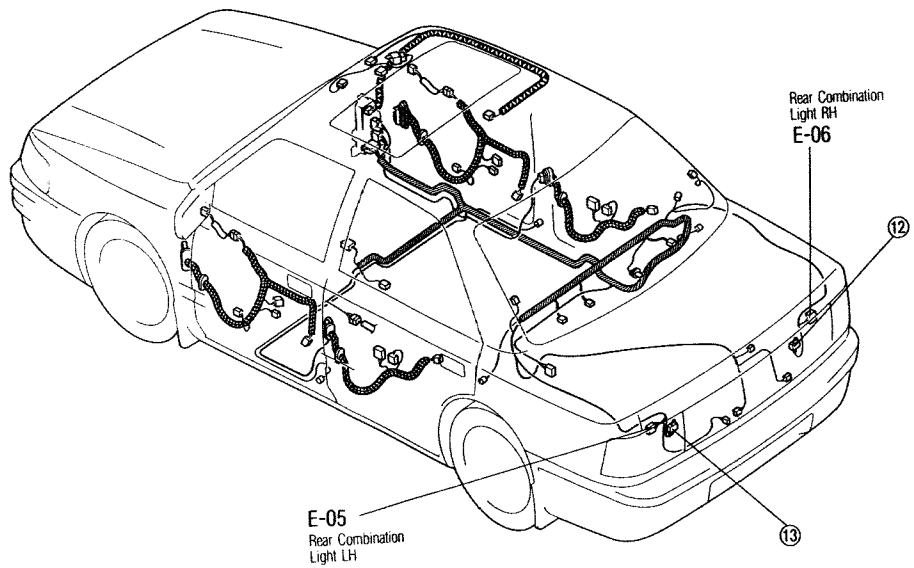
G/W	
R/B	B


Front Side Turn Light RH
F-04
Front Combination Light RH
E-11
F-03
Front Side Turn Light LH
X-01
Fuse Box
②
①
E-10
Front Combination Light LH

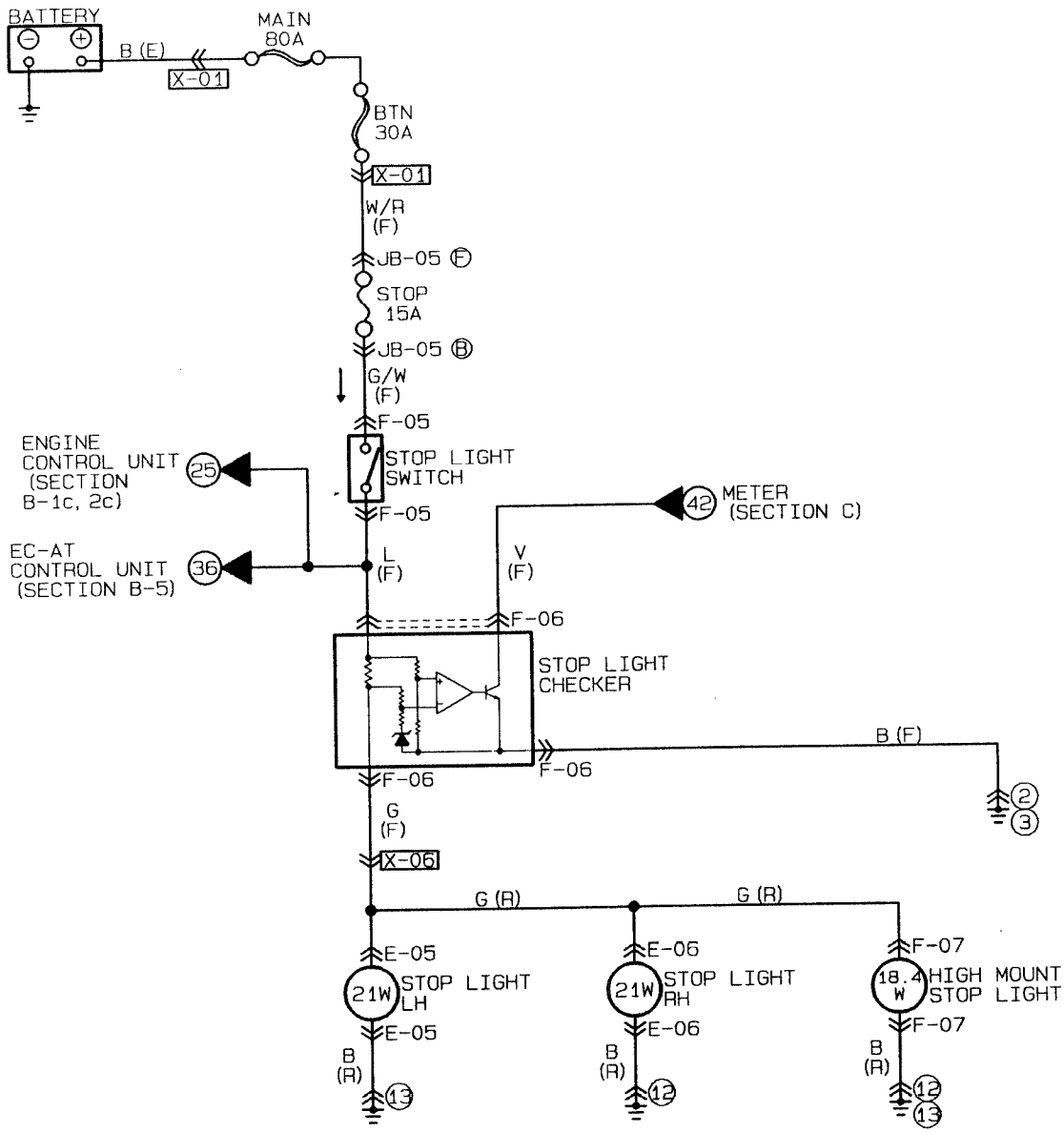

Flasher Unit
F-02
F-01
Combination Switch
X-02
Ignition Switch
Joint Box


Joint Box
JB-04
JB-05
JB-07
JB-03
JB-06


X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse

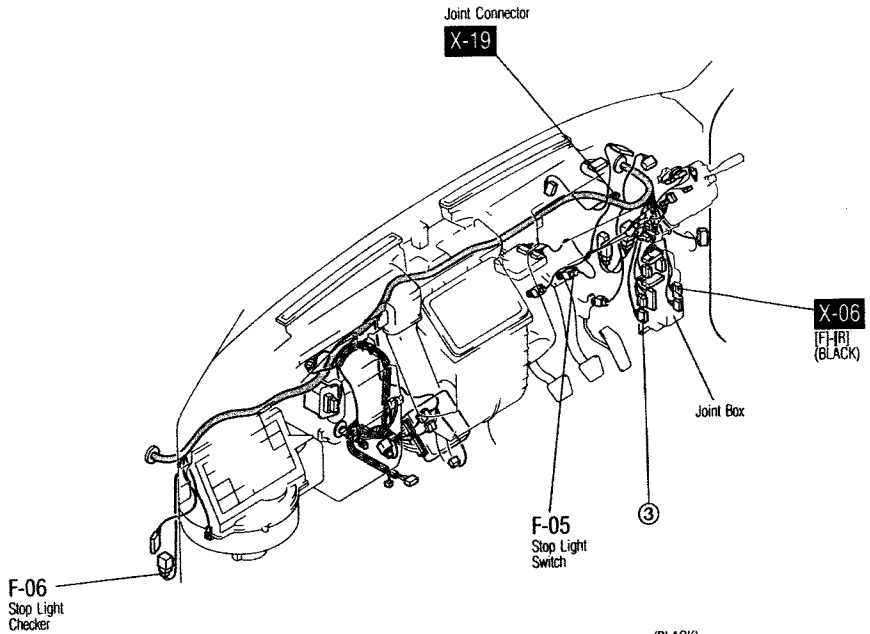

Rear Combination Light RH
E-06
⑫
⑬
E-05
Rear Combination Light LH

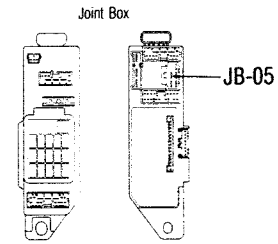
F-2 ■ STOP LIGHTS

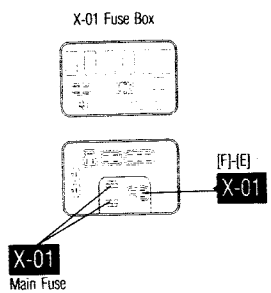


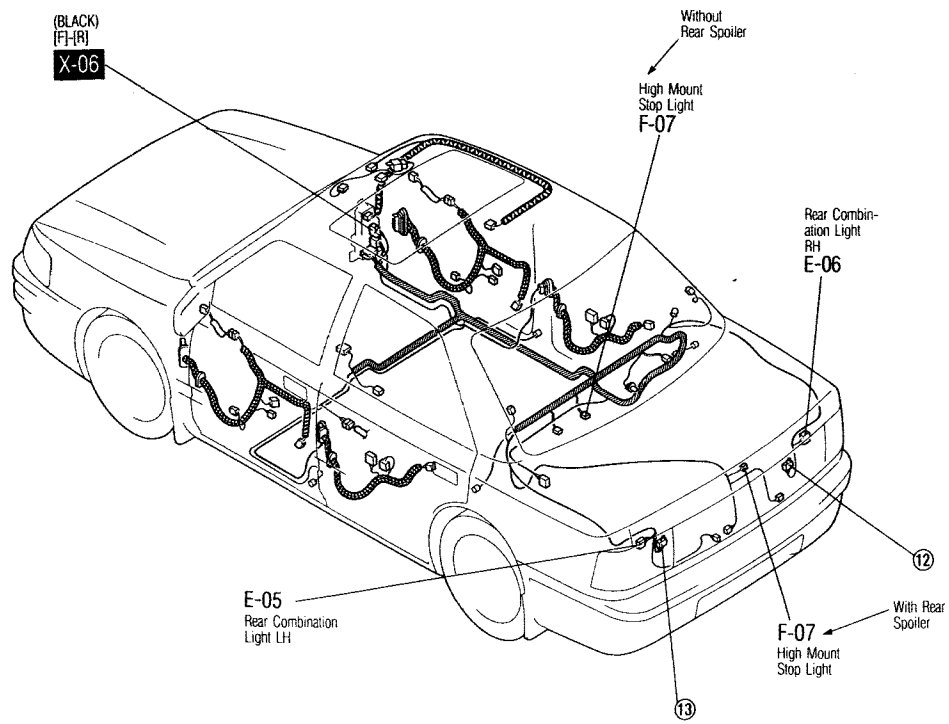
F-05 STOP LIGHT SWITCH (F)	F-06 STOP LIGHT CHECKER (F)	F-07 HIGH MOUNT STOP LIGHT (R)	E-05 REAR COMBINATION LIGHT LH (R)
L / G/W	V / L; G / B	B / G	* / R/G / G/B; B / R/B / G

E-06 REAR COMBINATION LIGHT RH (R)			
* / R/G / G/W; B / R/B / G			

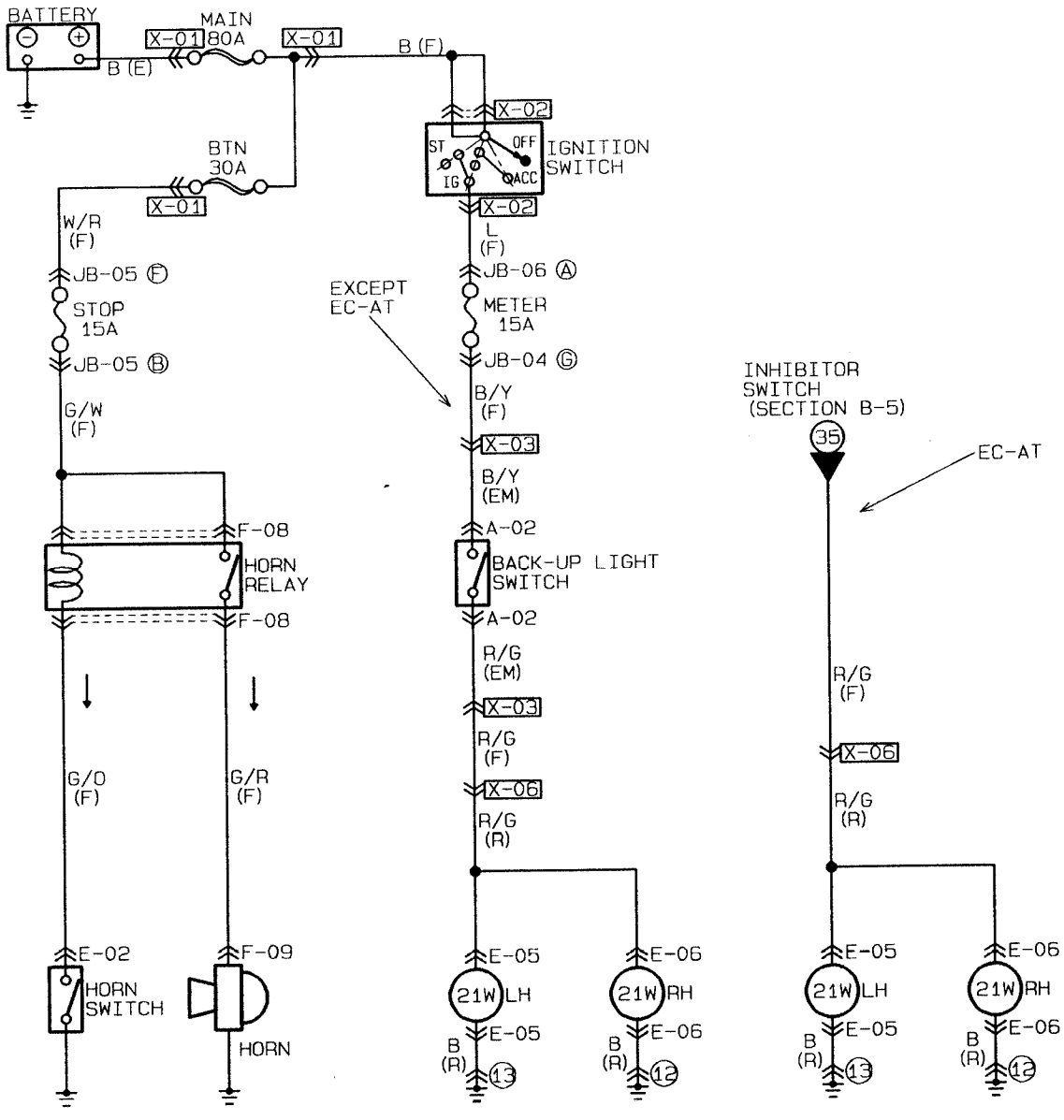

Joint Connector
X-19
X-06
(F)-(R)
(BLACK)
Joint Box
F-05
Stop Light
Switch
F-06
Stop Light
Checker


Joint Box
JB-05


X-01 Fuse Box
(F)-(E)
X-01
X-01
Main Fuse

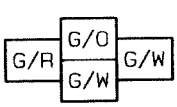

(BLACK)
(F)-(R)
X-06
Without
Rear Spoiler
High Mount
Stop Light
F-07
Rear Combin-
ation Light
RH
E-06
E-05
Rear Combination
Light LH
With Rear
Spoiler
F-07
High Mount
Stop Light

F-3 ■ HORN ■ BACK-UP LIGHTS



BACK-UP LIGHTS

F-08 HORN RELAY (F)



F-09 HORN (F)

F-10 BACK-UP LIGHT SWITCH (EM)

R/G	*
B/Y	*

E-02 HORN SWITCH (F)

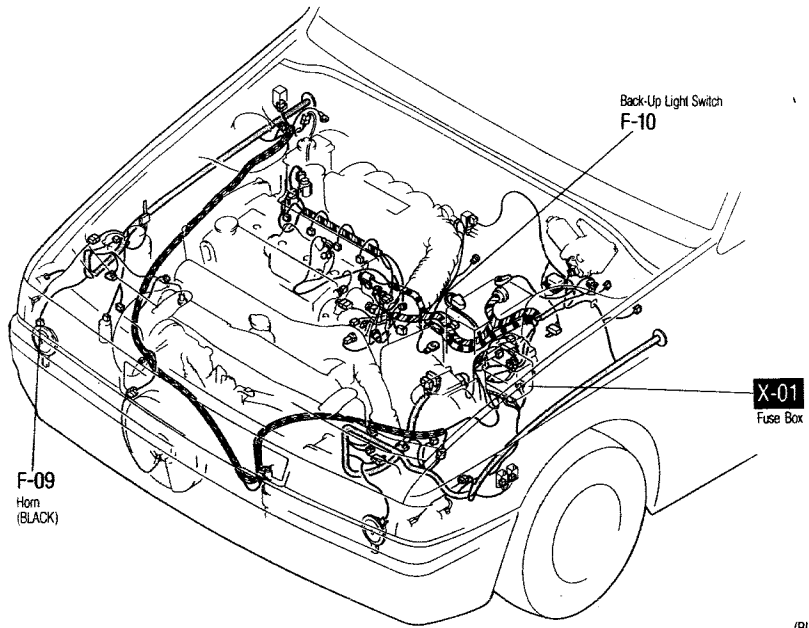
R/W	R	R/B
G/O	*	*

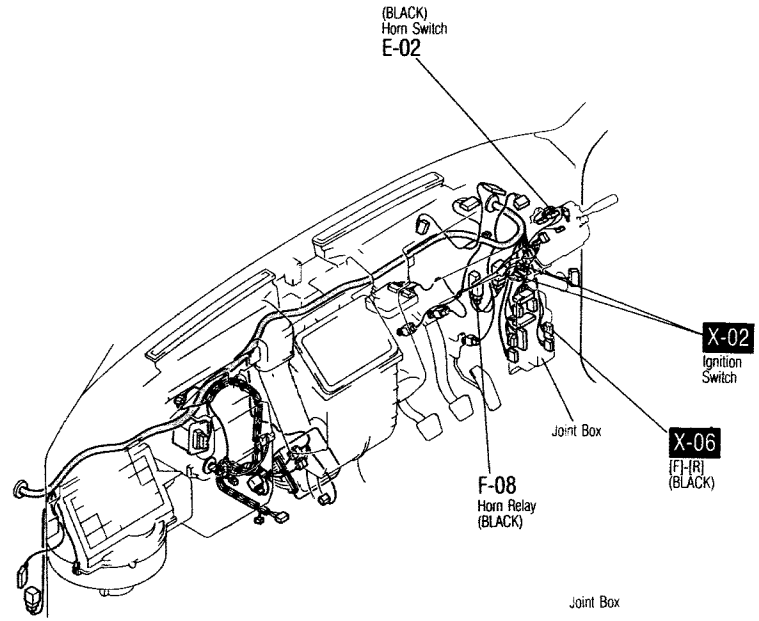
E-05 REAR COMBINATION LIGHT LH (R)

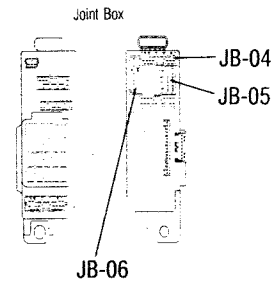
*	R/G	G/B
B	R/B	G

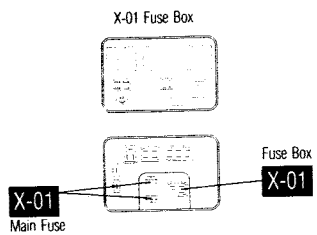
E-06 REAR COMBINATION LIGHT RH (R)

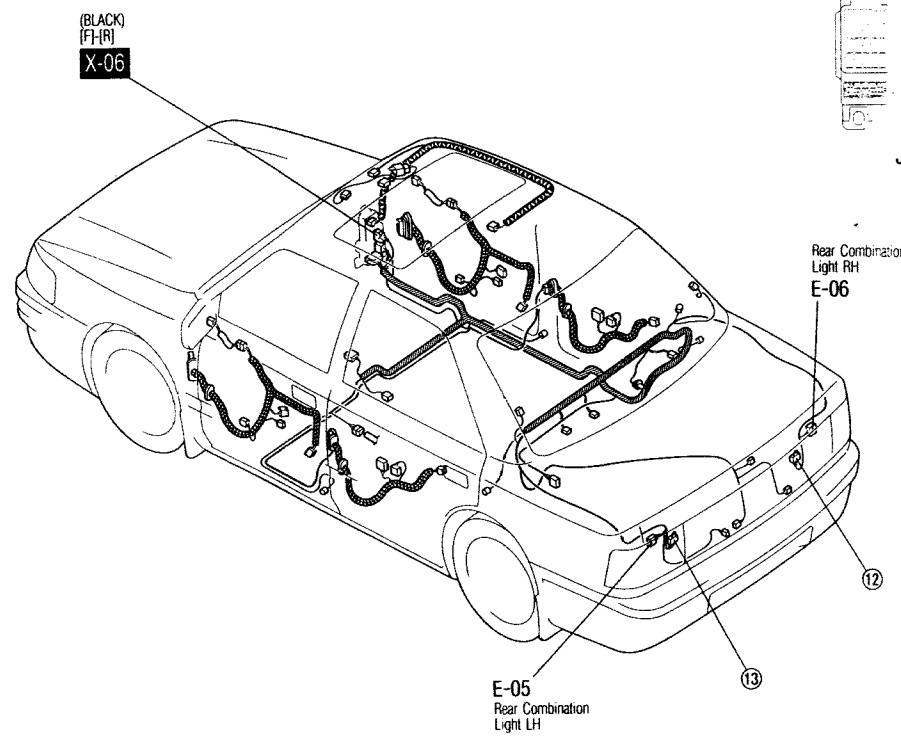
*	R/G	G/W
B	R/B	G

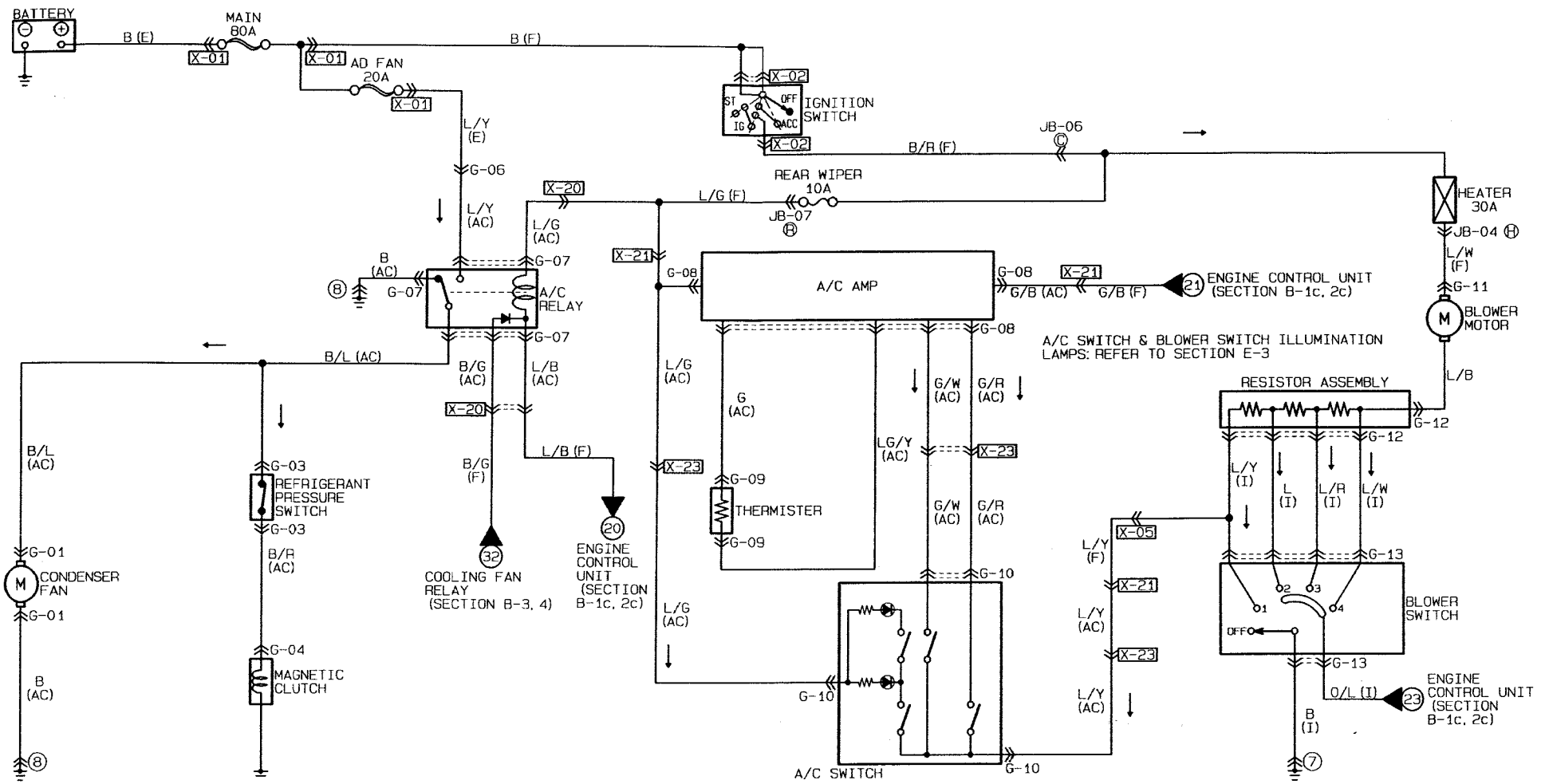

Back-Up Light Switch
F-10
X-01
Fuse Box
F-09
Horn
(BLACK)


(BLACK)
Horn Switch
E-02
X-02
Ignition
Switch
Joint Box
X-06
(F)-(R)
(BLACK)
F-08
Horn Relay
(BLACK)


Joint Box
JB-04
JB-05
JB-06

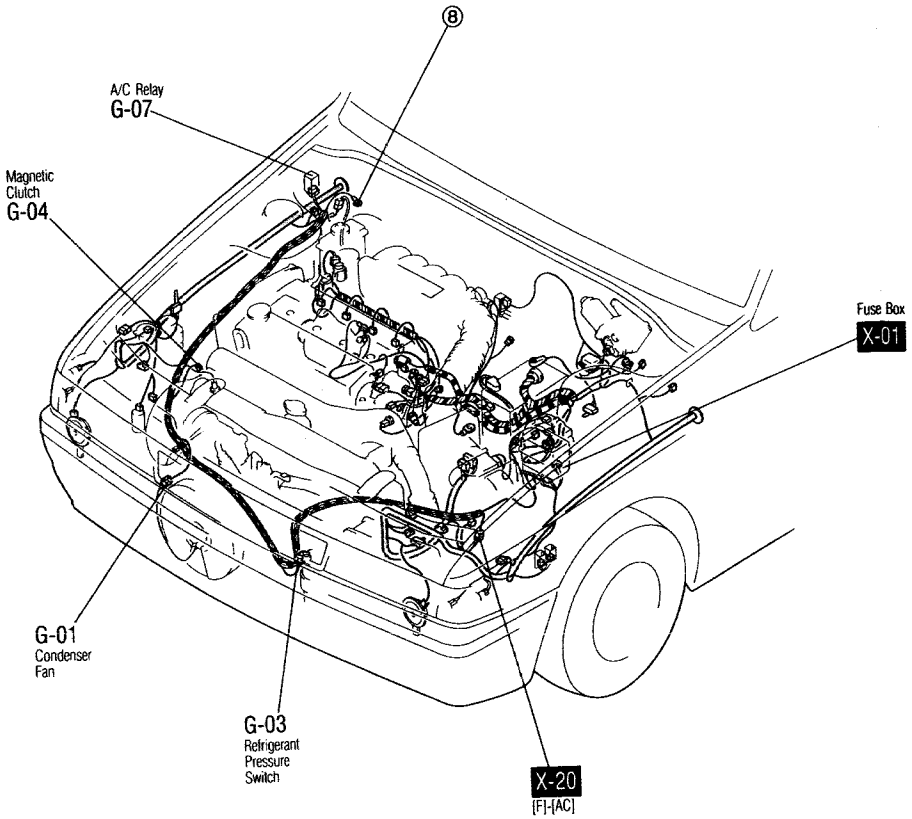

X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse

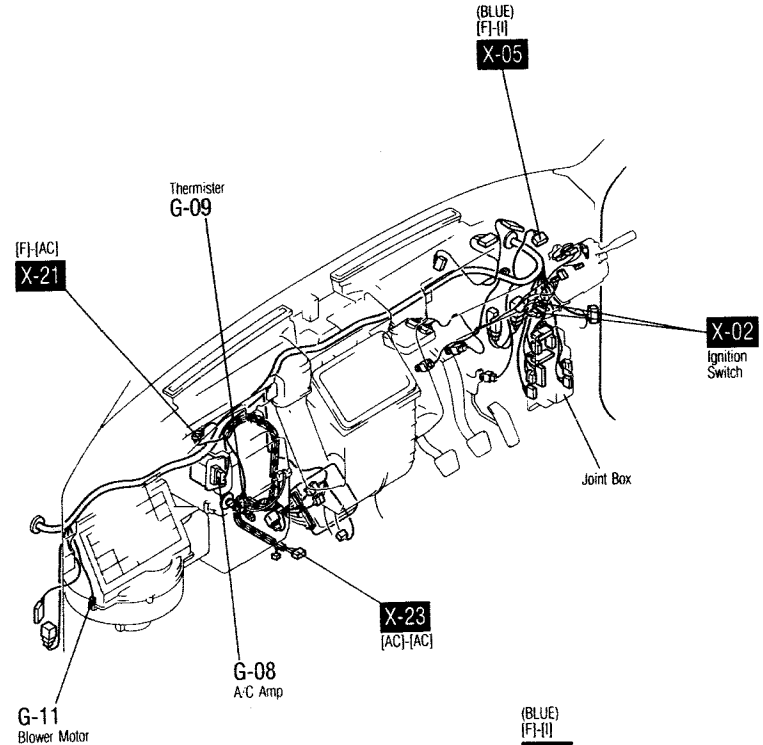

(BLACK)
(F)-(R)
X-06
Rear Combination
Light RH
E-06
12
13
E-05
Rear Combination
Light LH

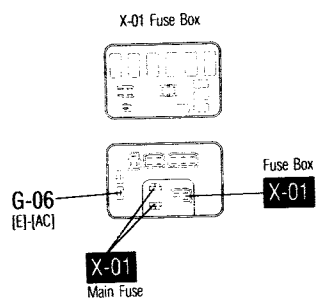


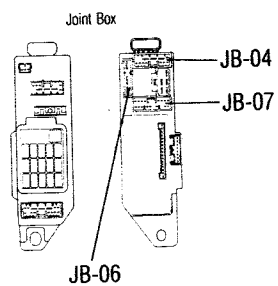
G-01 CONDENSER FAN (AC)	G-03 REFRIGERANT PRESSURE SWITCH (AC)	G-04 MAGNETIC CLUTCH (AC)	G-06 (E) – (AC) CONNECTOR	G-07 A/C RELAY (AC)	G-08 A/C AMP (AC)	G-09 THERMISTER (AC)
B/L, B	B/L, B/R	B/R	(E) L/Y — (AC) L/Y	L/Y, B/L, L/B, B, L/G, B/G	L/G, LG/Y, G, G/R, G/B, *, G/W	LG/Y, G

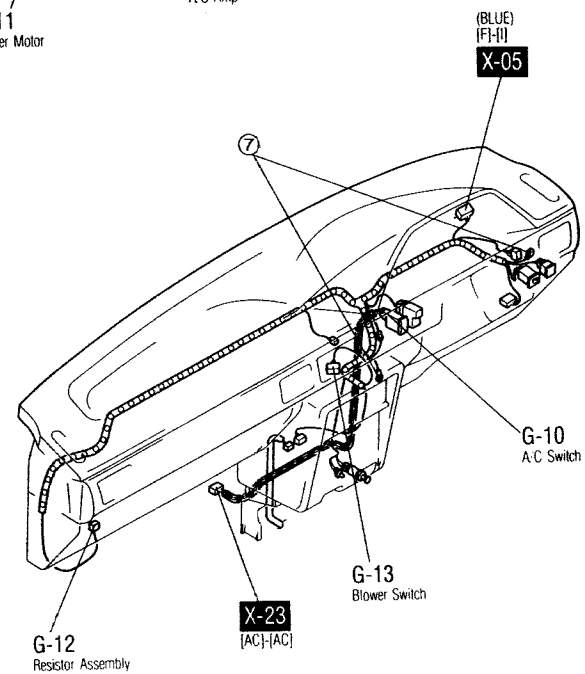
G-10 A/C SWITCH (AC)	G-11 BLOWER MOTOR (F)	G-12 RESISTOR ASSEMBLY (I)	G-13 BLOWER SWITCH (I)
G/W, G/R, B, L/Y, L/G, R/B	L/W	L, L/R, L/Y, L/W, L/B	L, L/Y, O/L, R, R/B, L/W, L/R, B

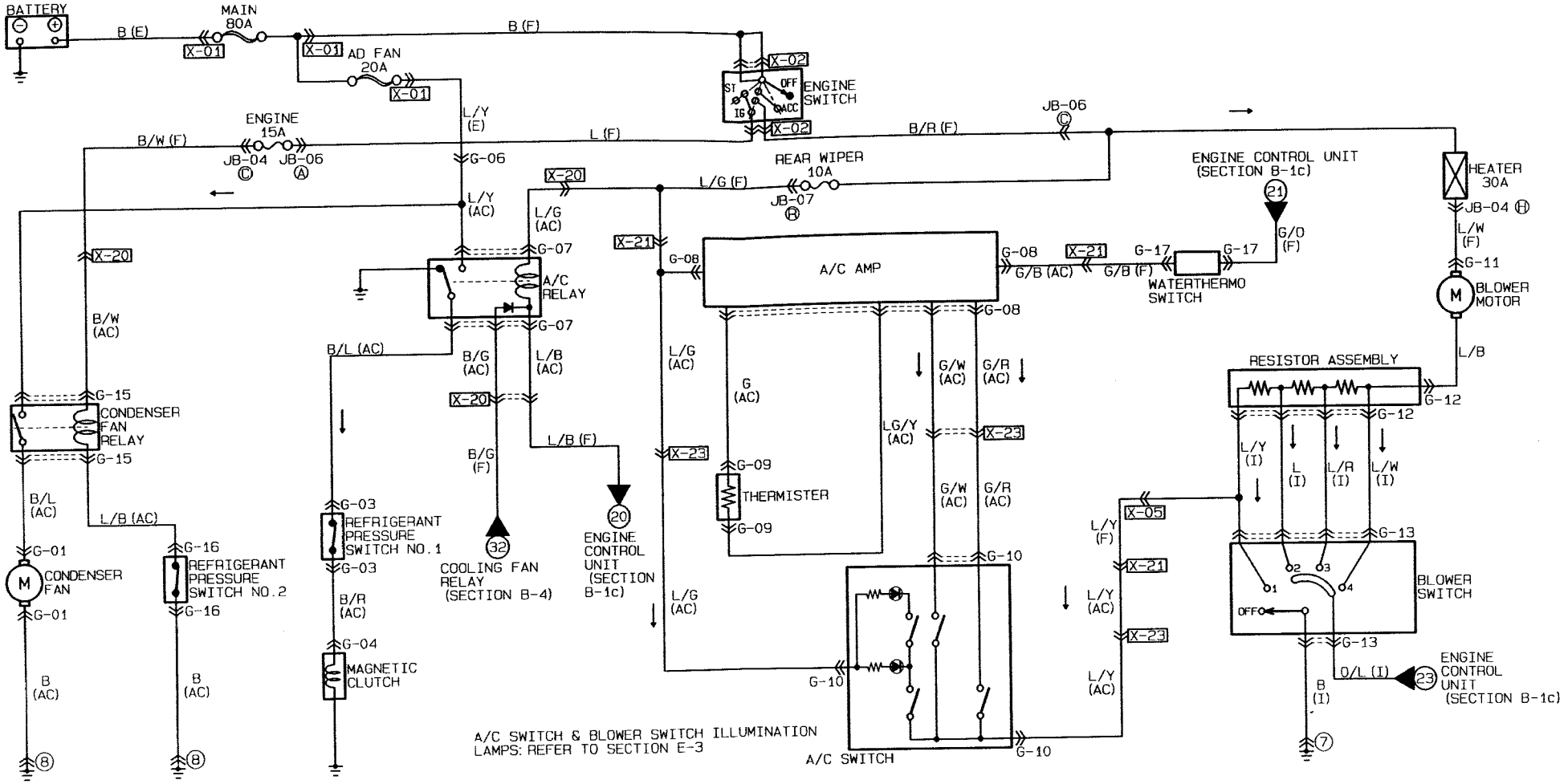

⑧
A/C Relay
G-07
Magnetic Clutch
G-04
Fuse Box
X-01
G-01
Condenser Fan
G-03
Refrigerant Pressure Switch
X-20
[F]-[AC]

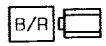
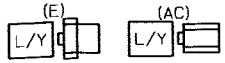
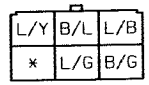
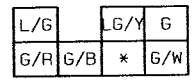
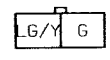
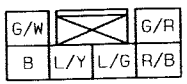
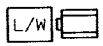
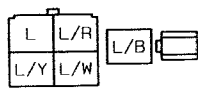
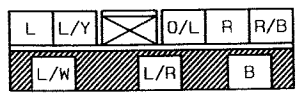
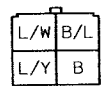

(BLUE)
[F]-[I]
X-05
Thermister
G-09
[F]-[AC]
X-21
X-02
Ignition Switch
Joint Box
X-23
[AC]-[AC]
G-08
A/C Amp
G-11
Blower Motor

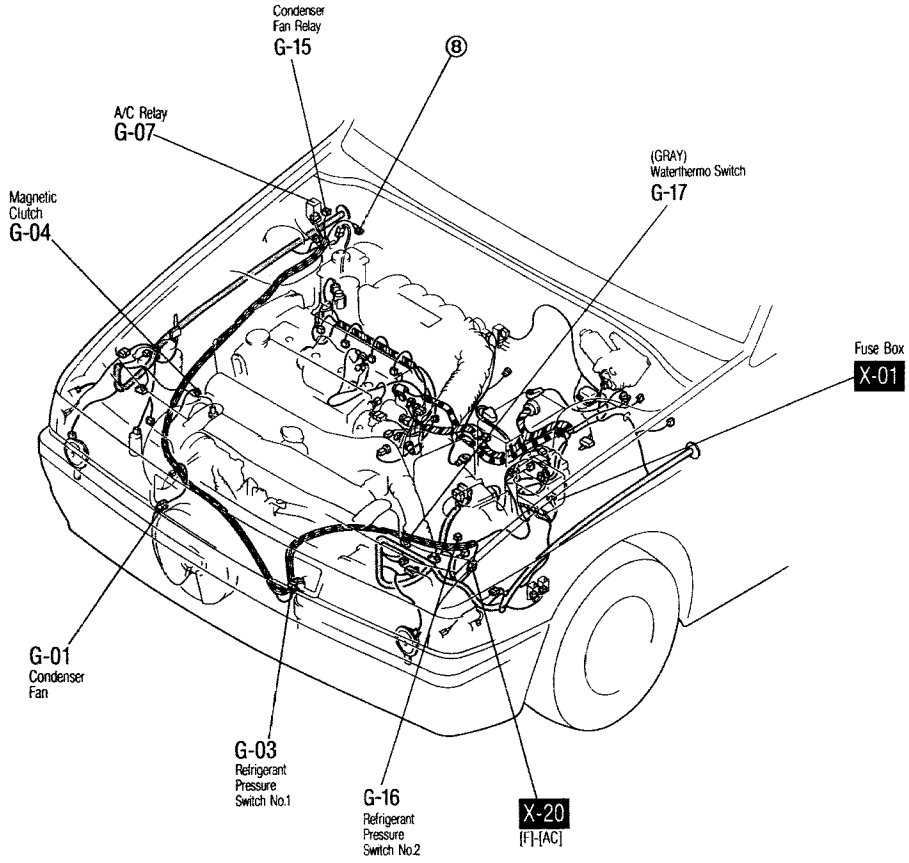

X-01 Fuse Box
Fuse Box
X-01
G-06
[E]-[AC]
X-01
Main Fuse

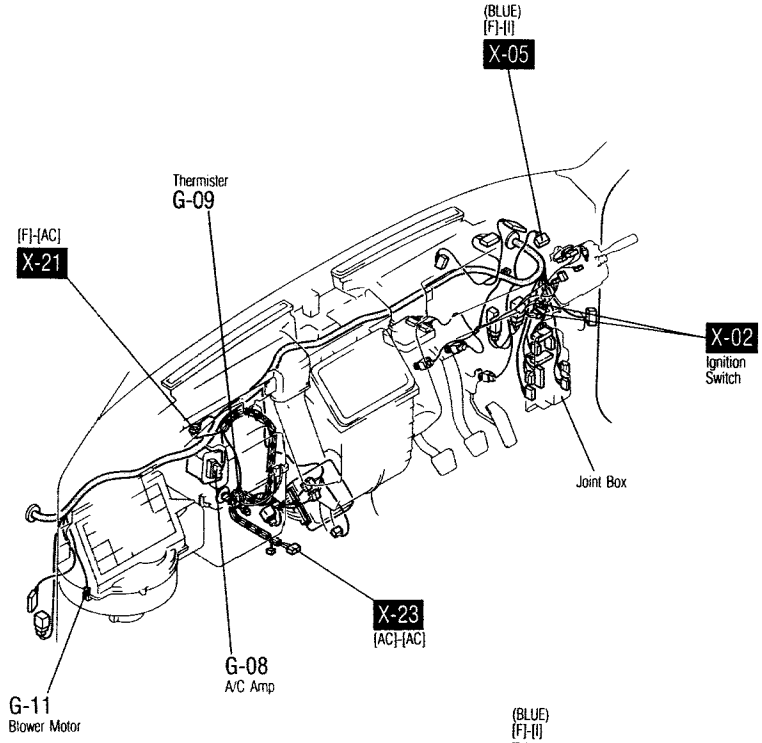

Joint Box
JB-04
JB-07
JB-06

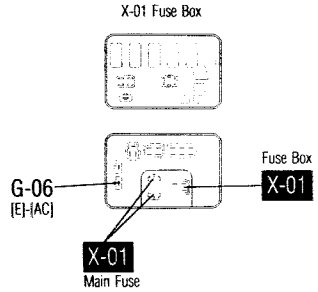

(BLUE)
[F]-[I]
X-05
⑦
G-10
A/C Switch
G-13
Blower Switch
X-23
[AC]-[AC]
G-12
Resistor Assembly

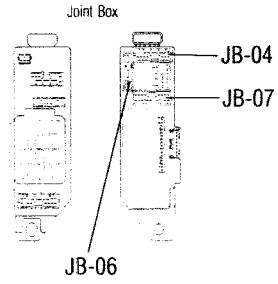


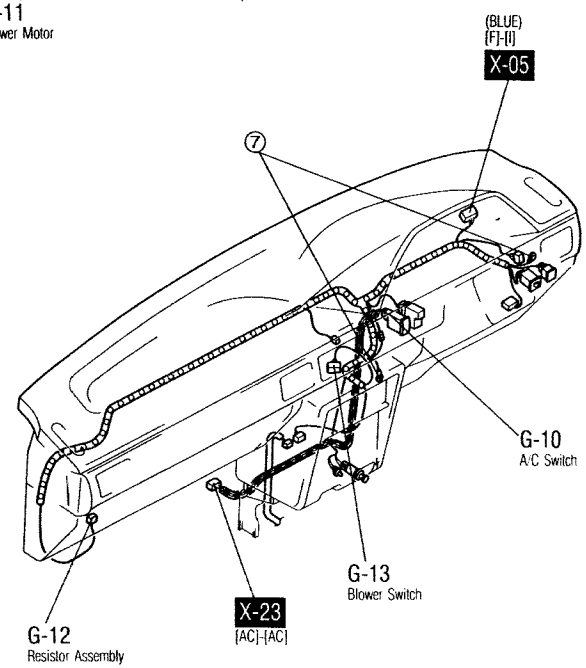
G-01 CONDENSER FAN (AC) 	G-03 REFRIGERANT PRESSURE SWITCH NO.1 (AC)* 	G-04 MAGNETIC CLUTCH (AC) 	G-06 (E) - (AC) CONNECTOR 	G-07 A/C RELAY (AC) 	G-08 A/C AMP (AC) 	G-09 THERMISTER (AC) 
G-10 A/C SWITCH (AC) 	G-11 BLOWER MOTOR (F) 	G-12 RESISTOR ASSEMBLY (I) 	G-13 BLOWER SWITCH (I) 		G-15 CONDENSER FAN RELAY (AC) 	G-16 REFRIGERANT PRESSURE SWITCH NO.2 (AC) 
G-17 WATERTHERMO SWITCH (F) 						


Condenser Fan Relay
G-15
⑧
A/C Relay
G-07
Magnetic Clutch
G-04
(GRAY)
Waterthermo Switch
G-17
Fuse Box
X-01
G-01
Condenser Fan
G-03
Refrigerant Pressure Switch No.1
G-16
Refrigerant Pressure Switch No.2
X-20
[F]-[AC]

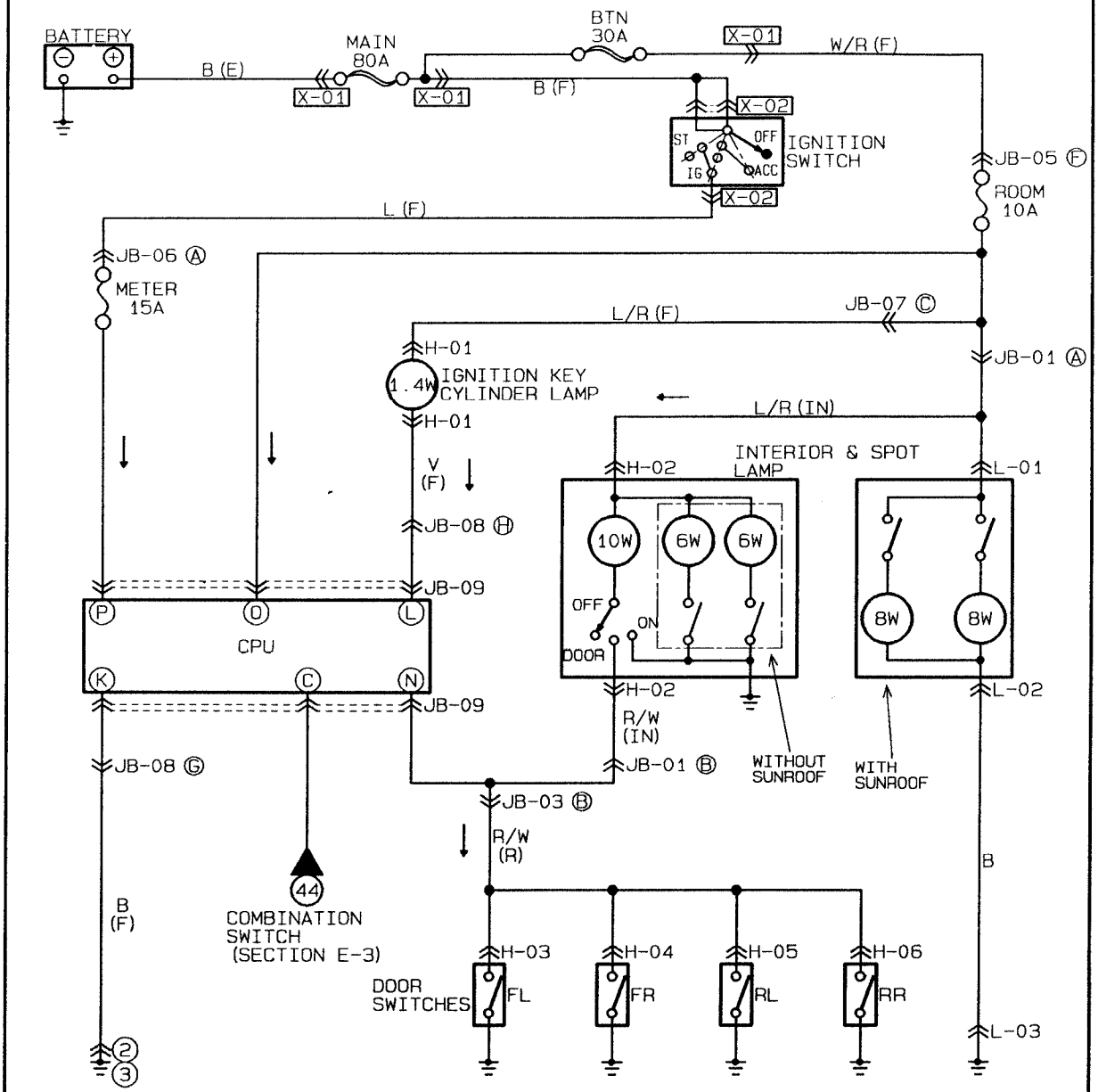

(BLUE)
[F]-[I]
X-05
Thermister
G-09
[F]-[AC]
X-21
X-02
Ignition Switch
Joint Box
X-23
[AC]-[AC]
G-08
A/C Amp
G-11
Blower Motor


X-01 Fuse Box
Fuse Box
G-06
[E]-[AC]
X-01
X-01
Main Fuse

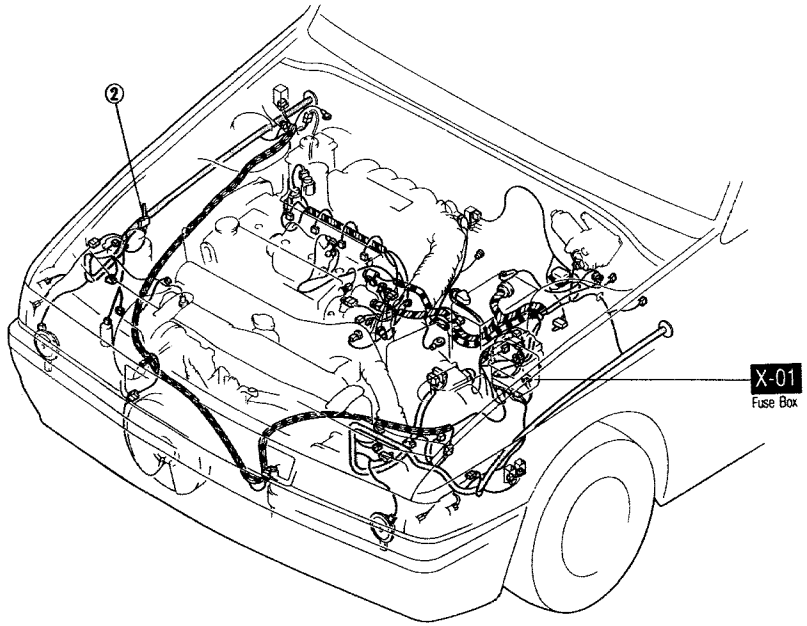

Joint Box
JB-04
JB-07
JB-06

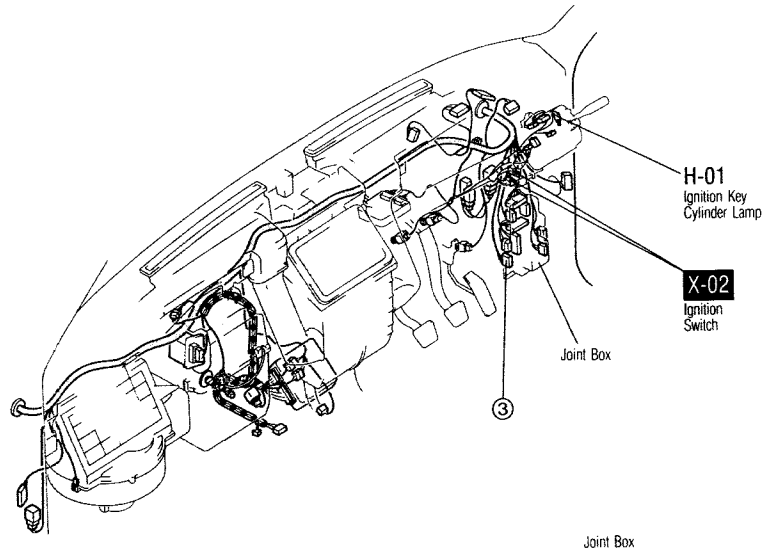

(BLUE)
[F]-[I]
X-05
⑦
G-10
A/C Switch
G-13
Blower Switch
X-23
[AC]-[AC]
G-12
Resistor Assembly

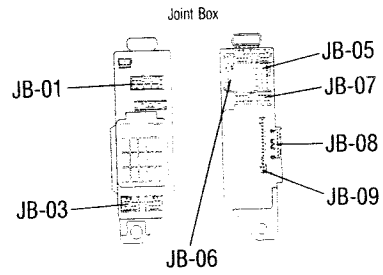
H-1 ■ INTERIOR LAMP ■ SOUND WARNING SYSTEM ■ IGNITION KEY CYLINDER LAMP

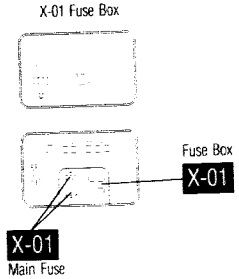


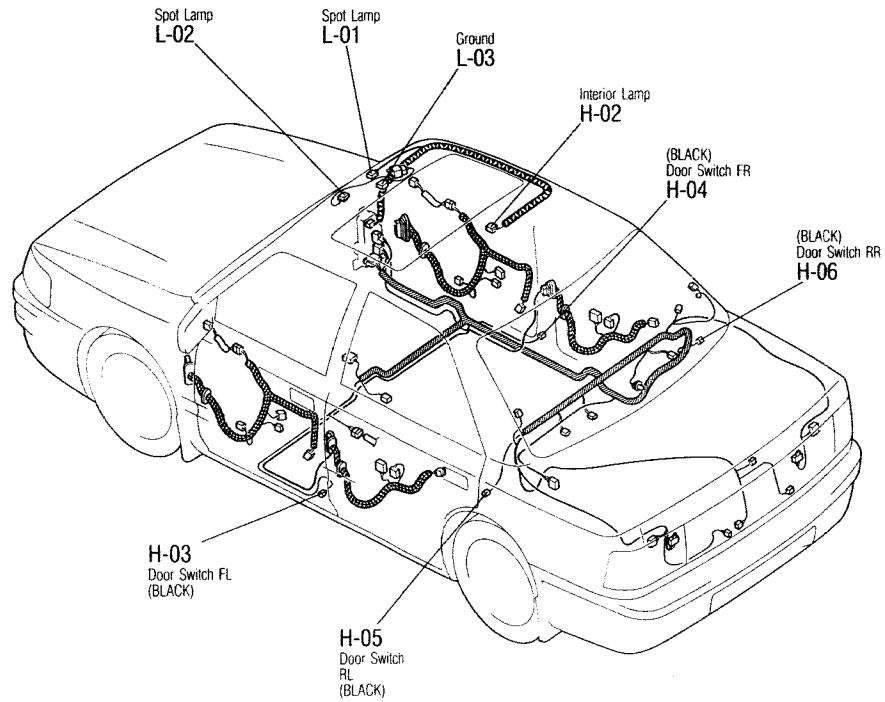
H-01 IGNITION KEY CYLINDER LAMP (F) V | L/R	H-02 INTERIOR LAMP (IN) R/W | L/R — WITHOUT SUNROOF R/W / L/R — WITH SUNROOF		H-03 DOOR SWITCH FL (R) R/W
H-04 DOOR SWITCH FR (R) R/W	H-05 DOOR SWITCH RL (R) R/W	H-06 DOOR SWITCH RR (R) R/W	L-01 SPOT LAMP (IN) G/O / L/R
L-02 SPOT LAMP L/G | L/W | G B | L | L/Y	L-03 GROUND Y | — | L/Y | L/G Y/R | B | L | L/G | L/W		


②
X-01
Fuse Box

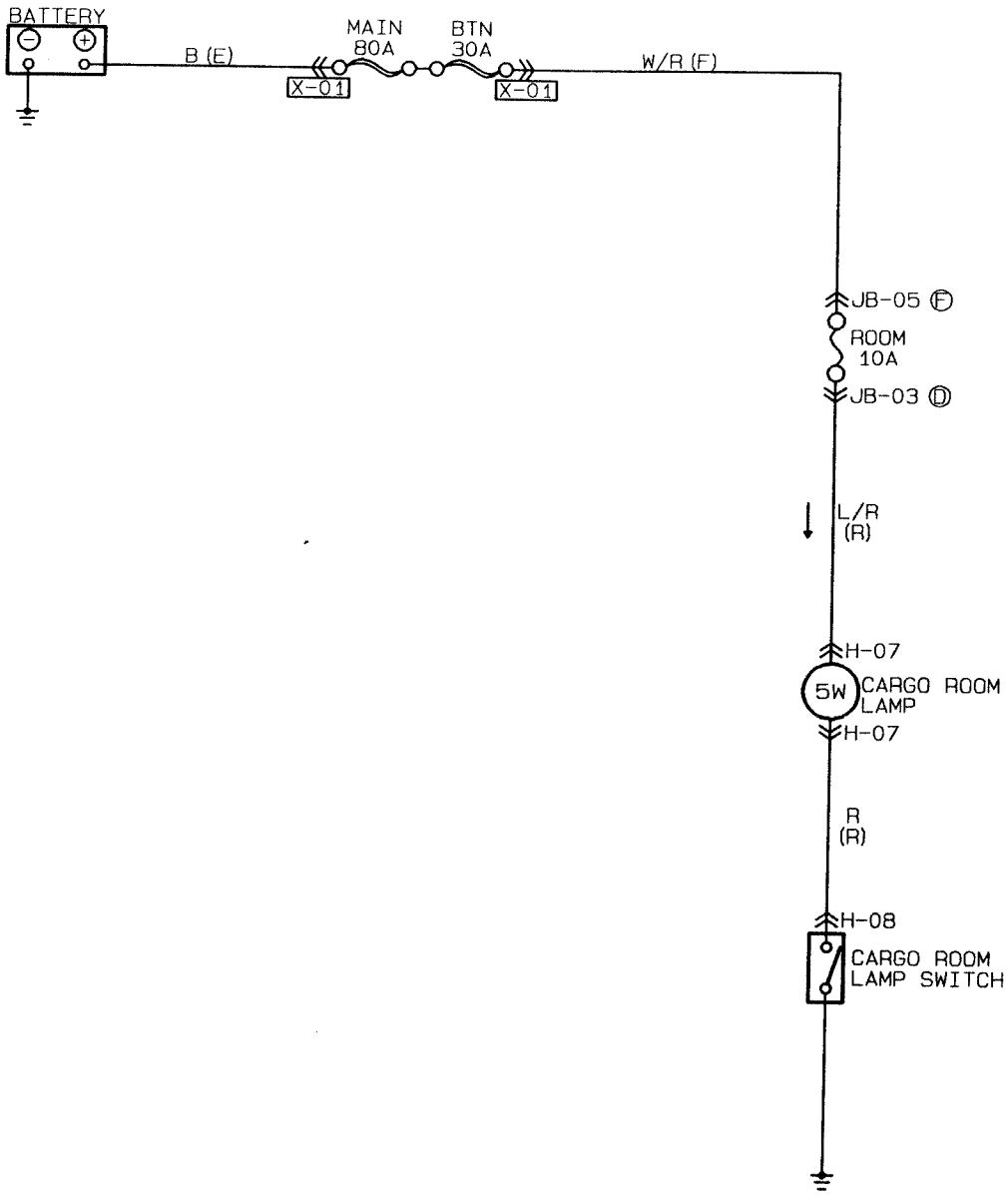

H-01
Ignition Key
Cylinder Lamp
X-02
Ignition
Switch
Joint Box
③


Joint Box
JB-01
JB-03
JB-05
JB-07
JB-08
JB-09
JB-06

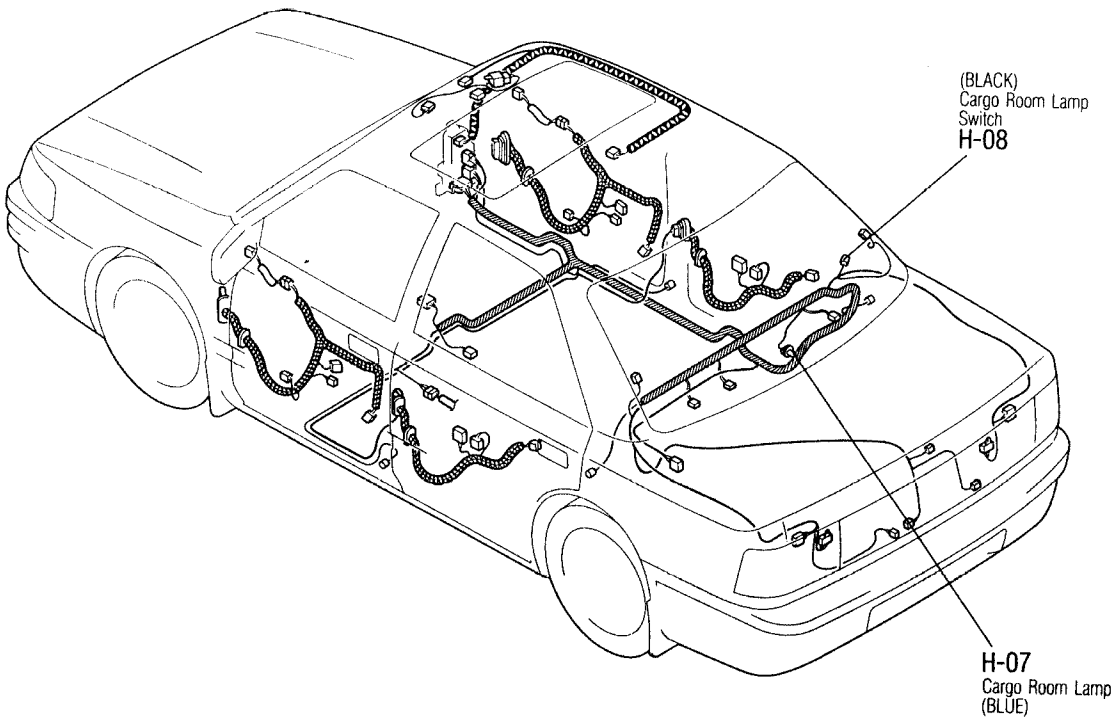

X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse

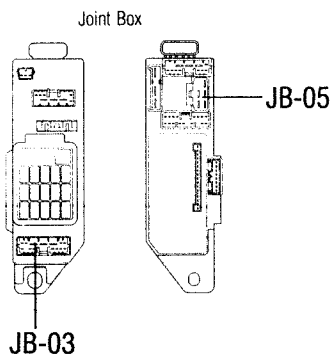

Spot Lamp
L-02
Spot Lamp
L-01
Ground
L-03
Interior Lamp
H-02
(BLACK)
Door Switch FR
H-04
(BLACK)
Door Switch RR
H-06
H-03
Door Switch FL
(BLACK)
H-05
Door Switch
RL
(BLACK)

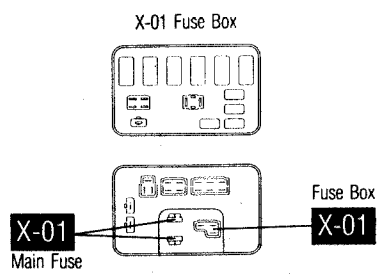
H-2 ■ CARGO ROOM LAMP



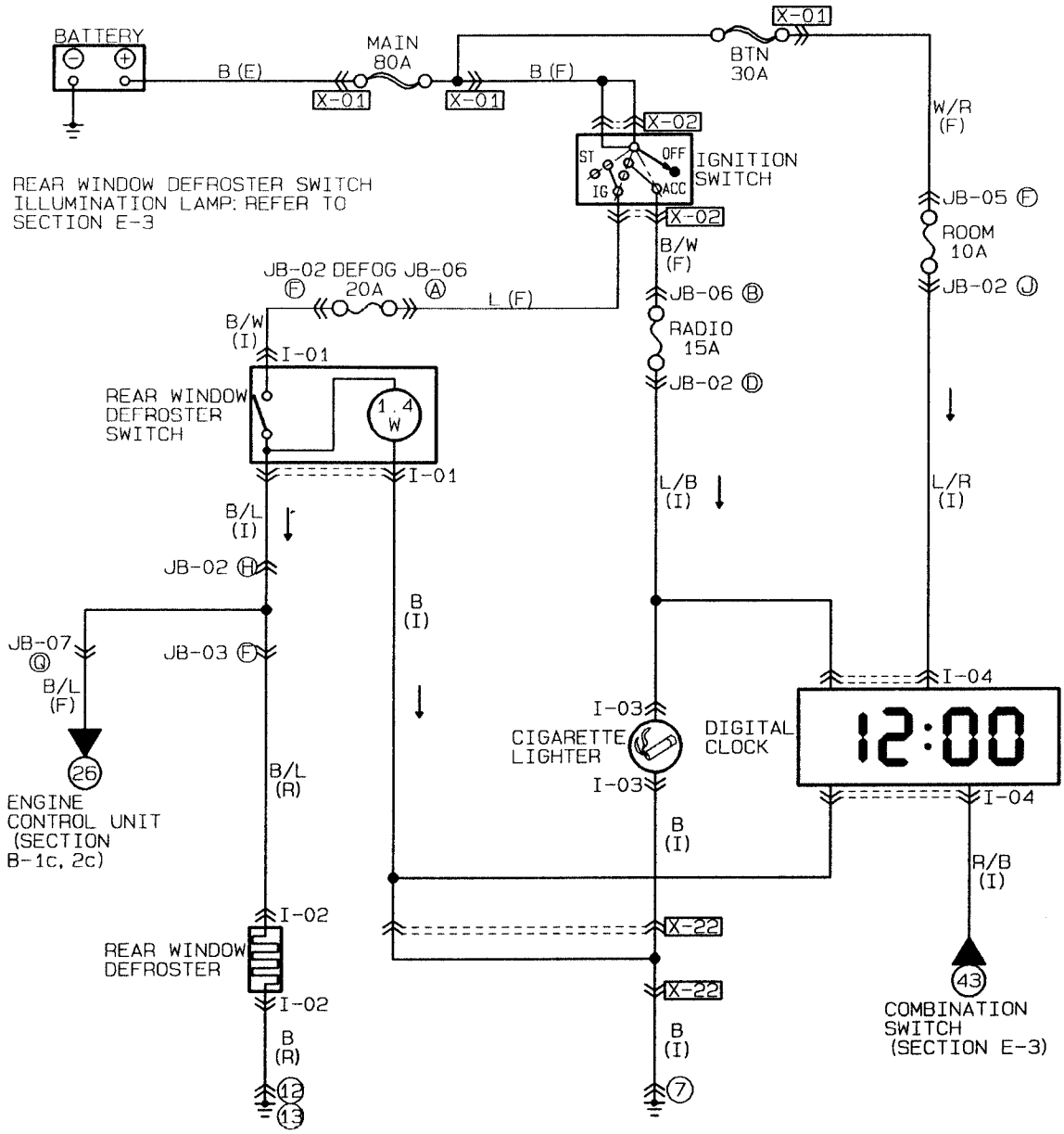
H-07 CARGO ROOM LAMP (R)	H-08 CARGO ROOM LAMP SWITCH (R)		
R L/R	R		

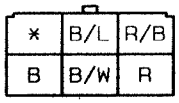
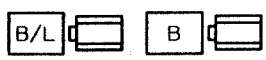
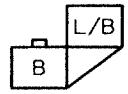
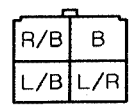

(BLACK)
Cargo Room Lamp
Switch
H-08
H-07
Cargo Room Lamp
(BLUE)

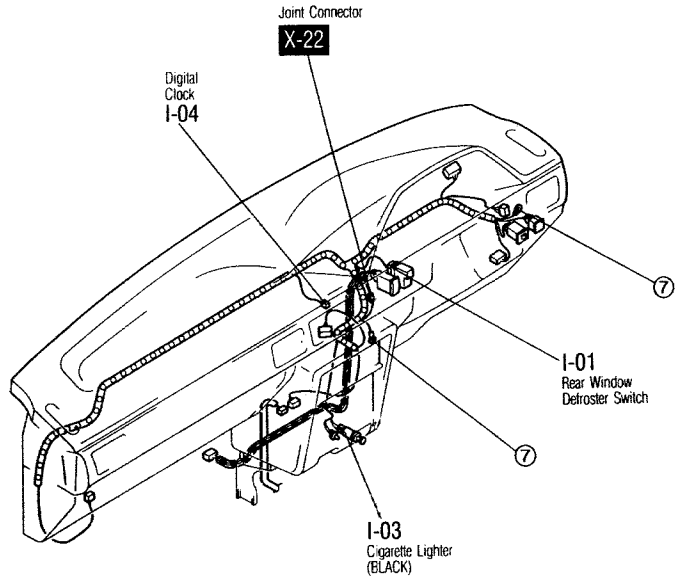

Joint Box
JB-05
JB-03

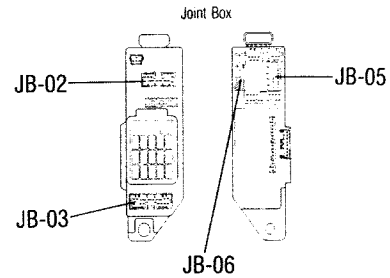

X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse

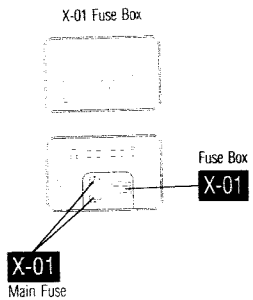
I ■ REAR WINDOW DEFROSTER ■ DIGITAL CLOCK ■ CIGARETTE LIGHTER

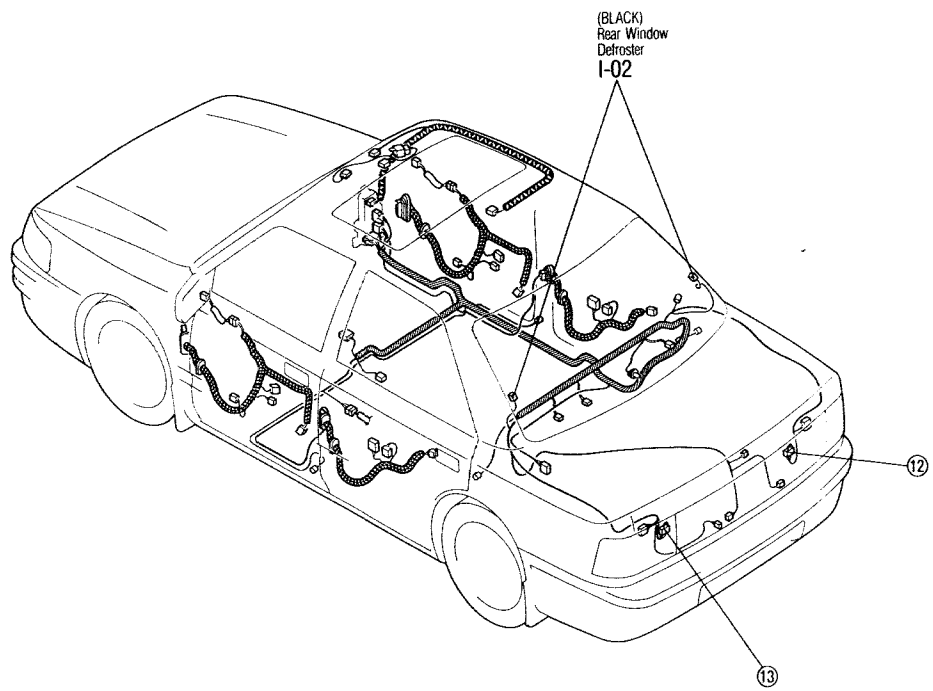


I-01 REAR WINDOW DEFROSTER SWITCH (I)	I-02 REAR WINDOW DEFROSTER (R)	I-03 CIGARETTE LIGHTER (I)	I-04 DIGITAL CLOCK (I)
			

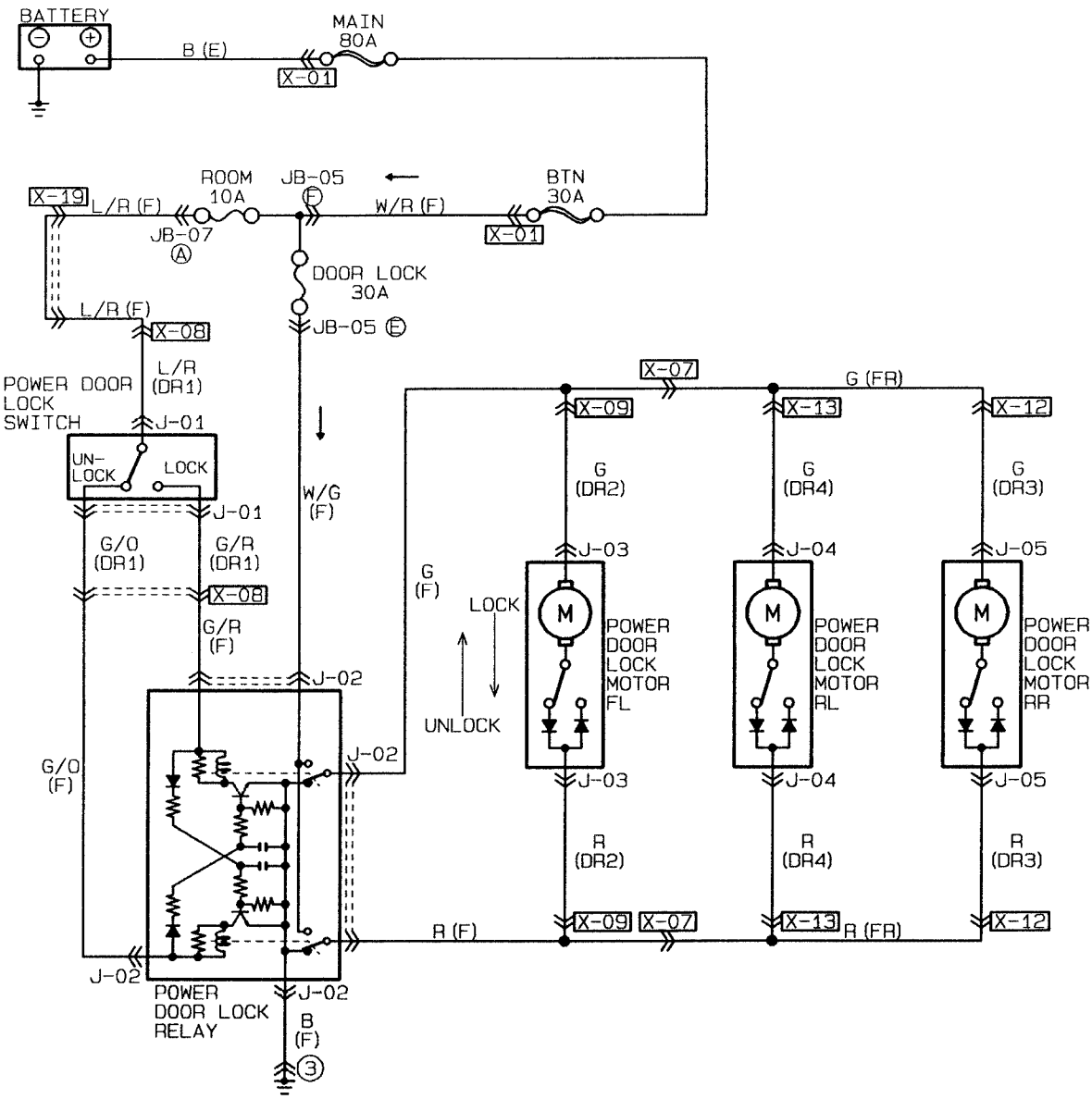

Joint Connector
X-22
Digital
Clock
I-04
⑦
I-01
Rear Window
Defroster Switch
⑦
I-03
Cigarette Lighter
(BLACK)


Joint Box
JB-02
JB-05
JB-03
JB-06

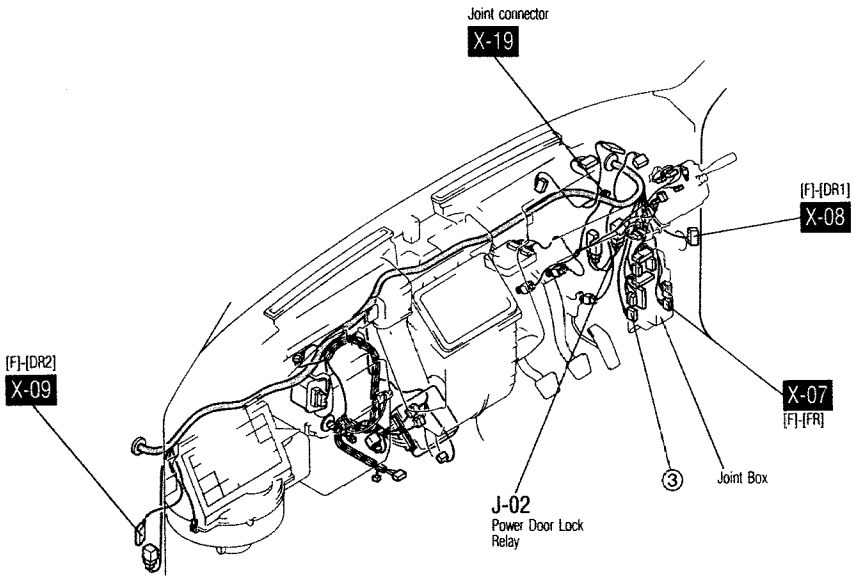

X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse

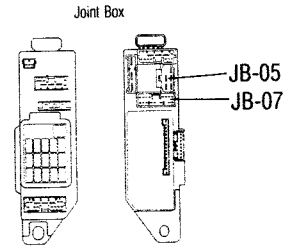

(BLACK)
Rear Window
Defroster
I-02
⑫
⑬

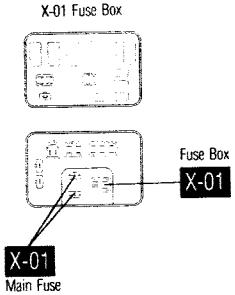
J ■ POWER DOOR LOCK

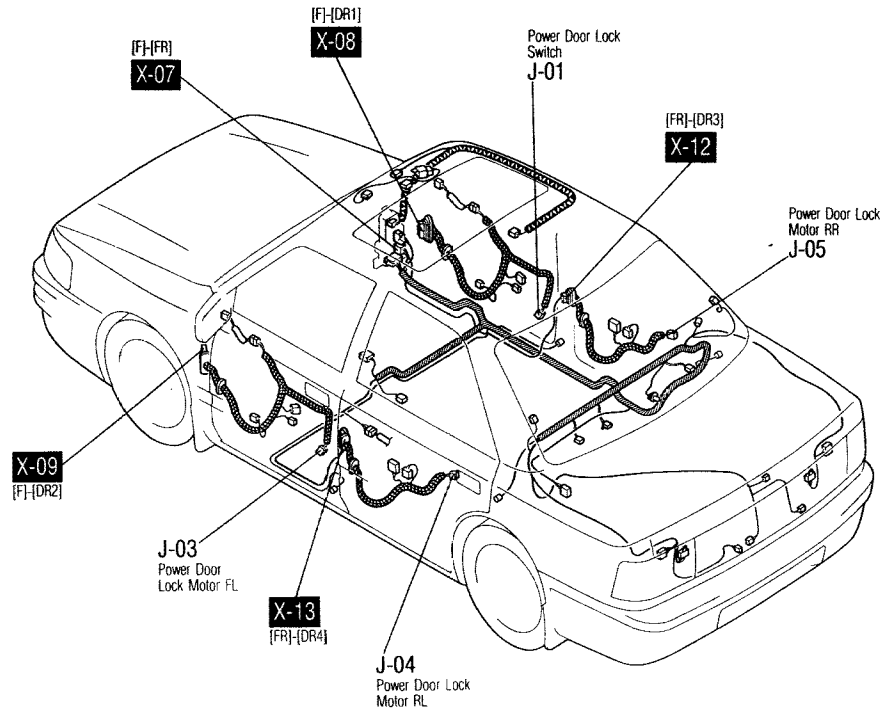


J-01 POWER DOOR LOCK SWITCH (DR1) L/R G/O | G/R	J-02 POWER DOOR LOCK RELAY (F) * G | G/O | B * R | G/R | W/G	J-03 POWER DOOR LOCK MOTOR FL (DR2) R G	J-04 POWER DOOR LOCK MOTOR RL (DR4) R G
J-05 POWER DOOR LOCK MOTOR RR (DR3) R G			

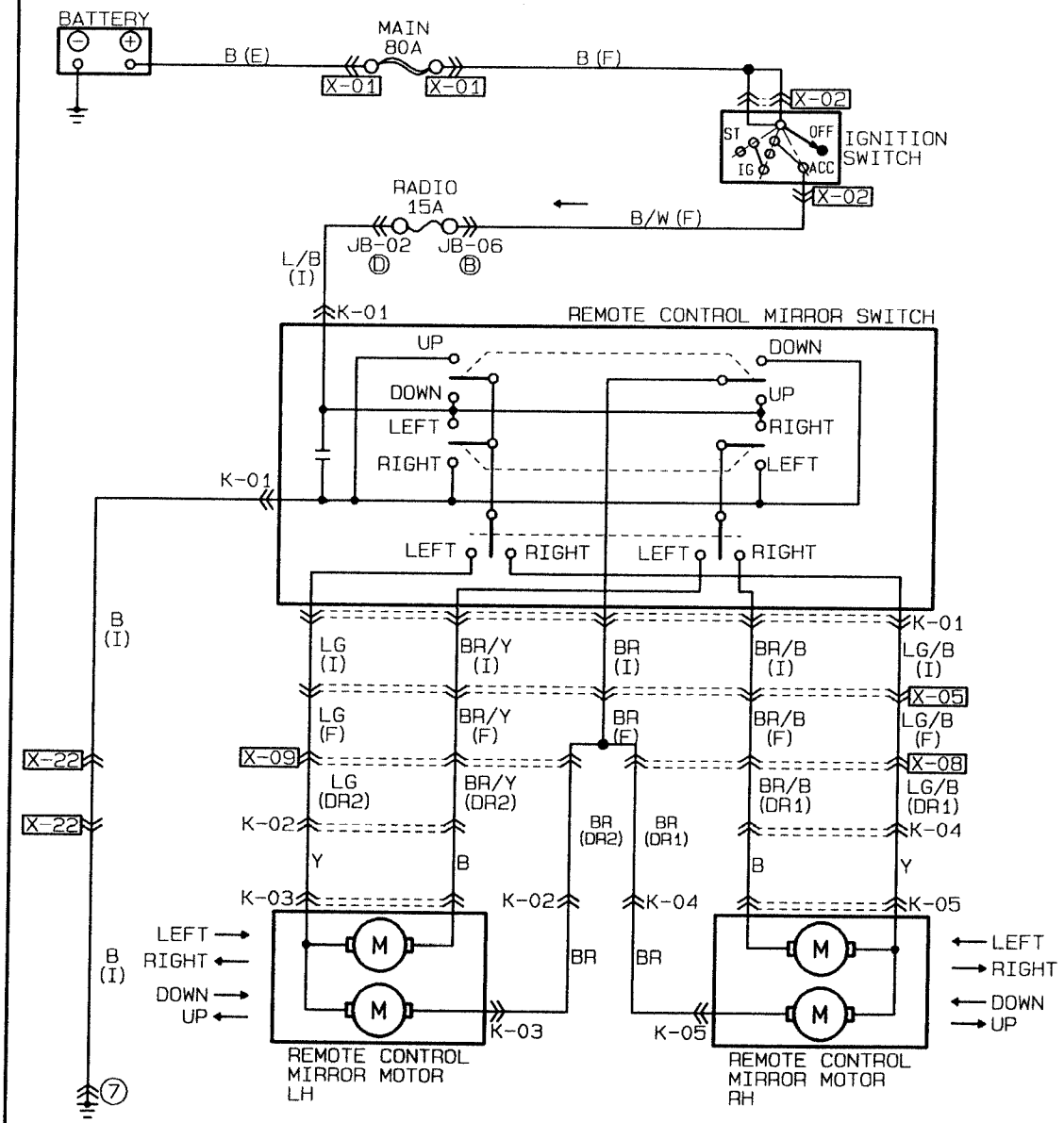

Joint connector
X-19
[F]-[DR1]
X-08
[F]-[DR2]
X-09
X-07
[F]-[FR]
③
Joint Box
J-02
Power Door Lock
Relay


Joint Box
JB-05
JB-07


X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse


[F]-[DR1]
X-08
[F]-[FR]
X-07
Power Door Lock
Switch
J-01
[FR]-[DR3]
X-12
Power Door Lock
Motor RR
J-05
X-09
[F]-[DR2]
J-03
Power Door
Lock Motor FL
X-13
[FR]-[DR4]
J-04
Power Door Lock
Motor RL

K ■ REMOTE CONTROL MIRROR



K-01 REMOTE CONTROL MIRROR SWITCH (I)

BR	L/B		LG/B	LG
B	*	*	*	BR/Y	BR/B

K-02 DR2-MIRROR (DR2)

LG	BR
BR/Y	*

BR	Y
*	B

K-03 REMOTE CONTROL MIRROR MOTOR LH

Y	BR
B	*

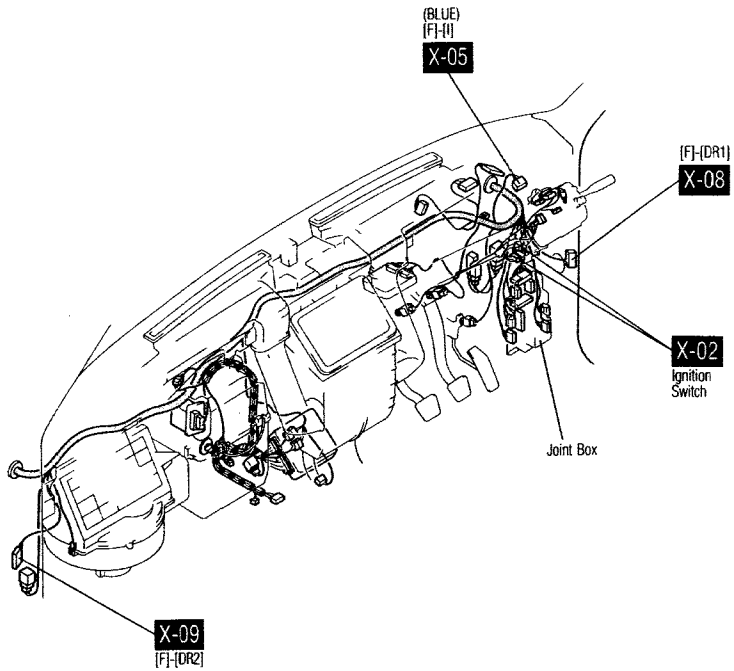
K-04 DR1-MIRROR (DR1)

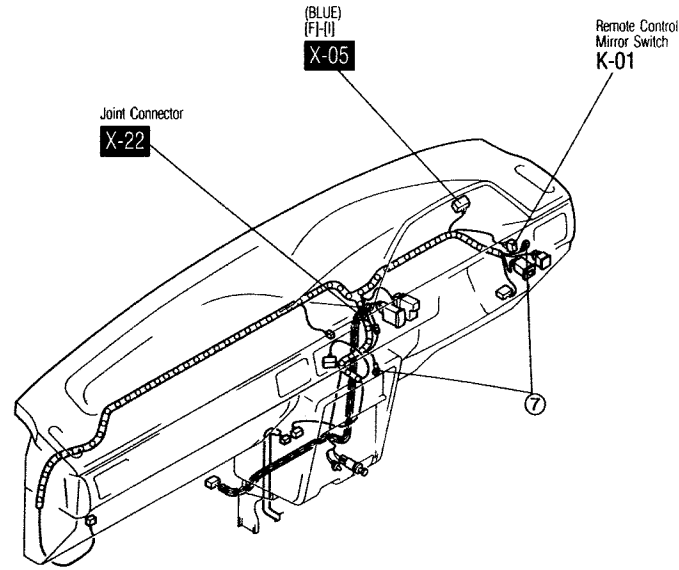
LG/B	BR
BR/B	*

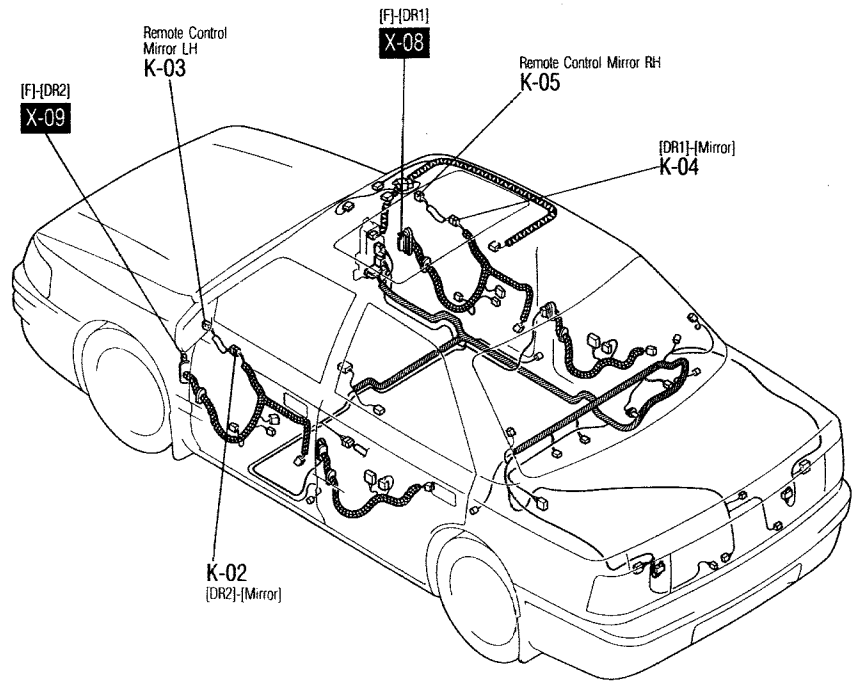
BR	Y
*	B

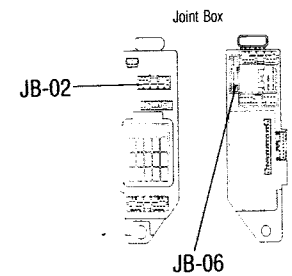
K-05 REMOTE CONTROL MIRROR MOTOR RH

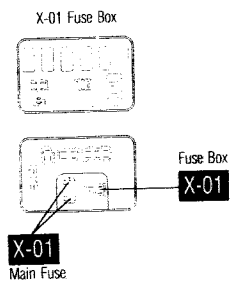
Y	BR
B	*


(BLUE)
[F]-[I]
X-05
[F]-[DR1]
X-08
X-02
Ignition Switch
Joint Box
X-09
[F]-[DR2]

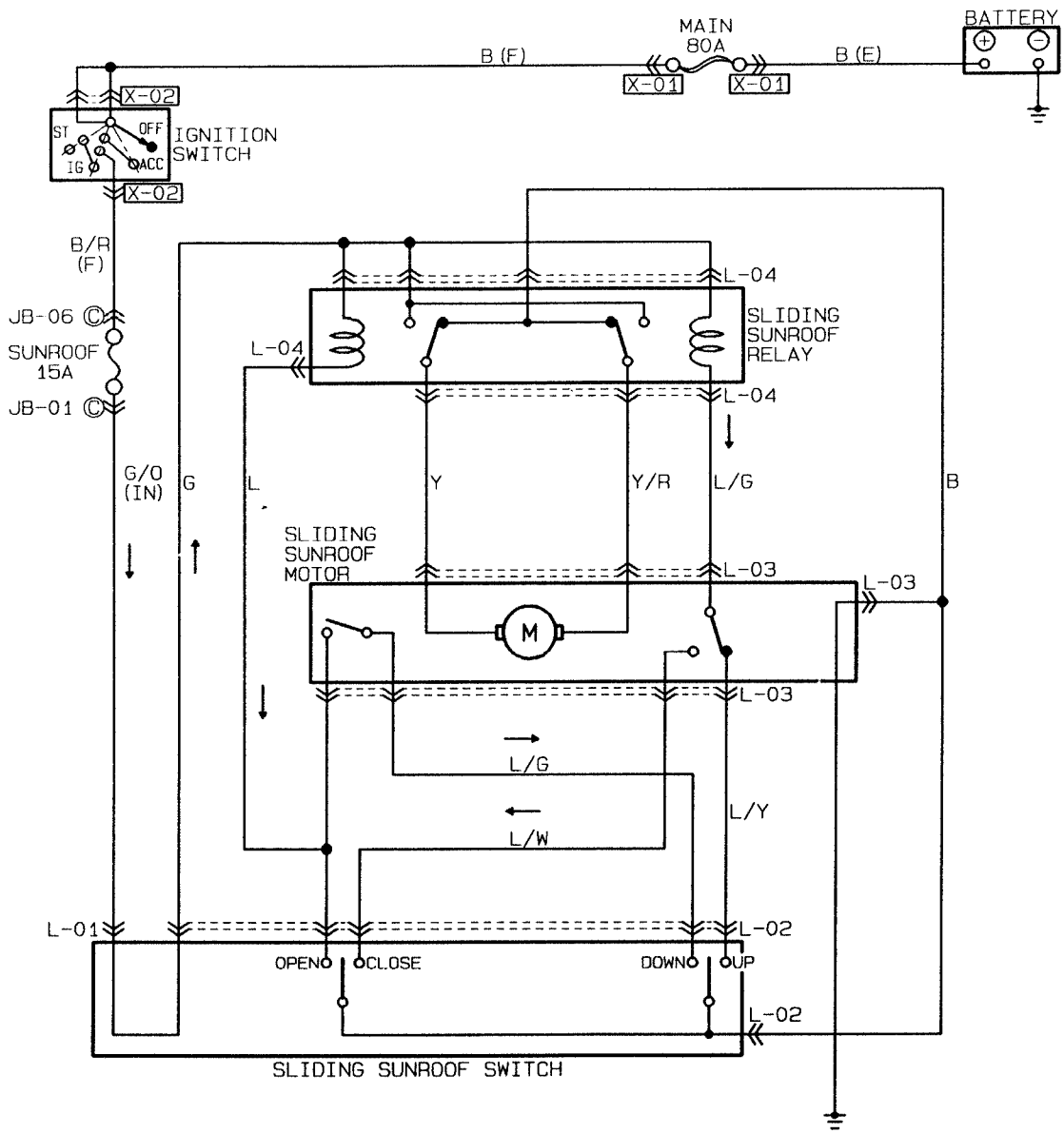

(BLUE)
[F]-[I]
X-05
Remote Control Mirror Switch
K-01
Joint Connector
X-22
7


Remote Control Mirror LH
K-03
[F]-[DR1]
X-08
Remote Control Mirror RH
K-05
[F]-[DR2]
X-09
[DR1]-[Mirror]
K-04
K-02
[DR2]-[Mirror]

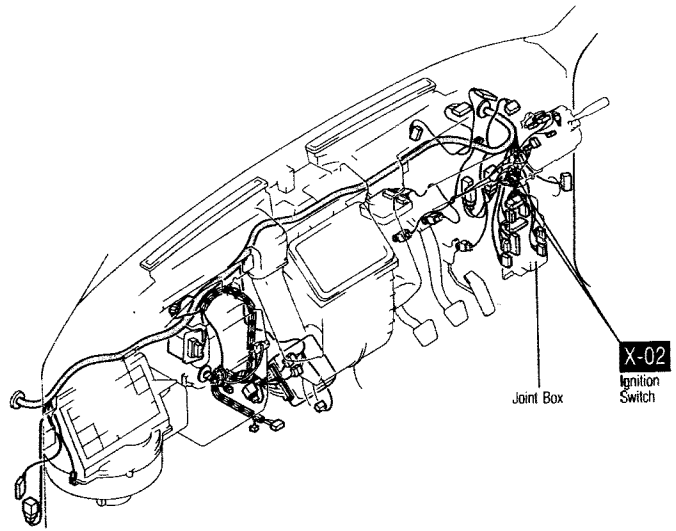

Joint Box
JB-02
JB-06

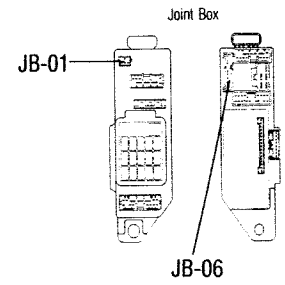

X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse

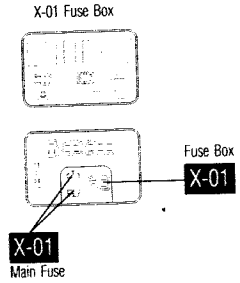
L ■ SLIDING SUNROOF

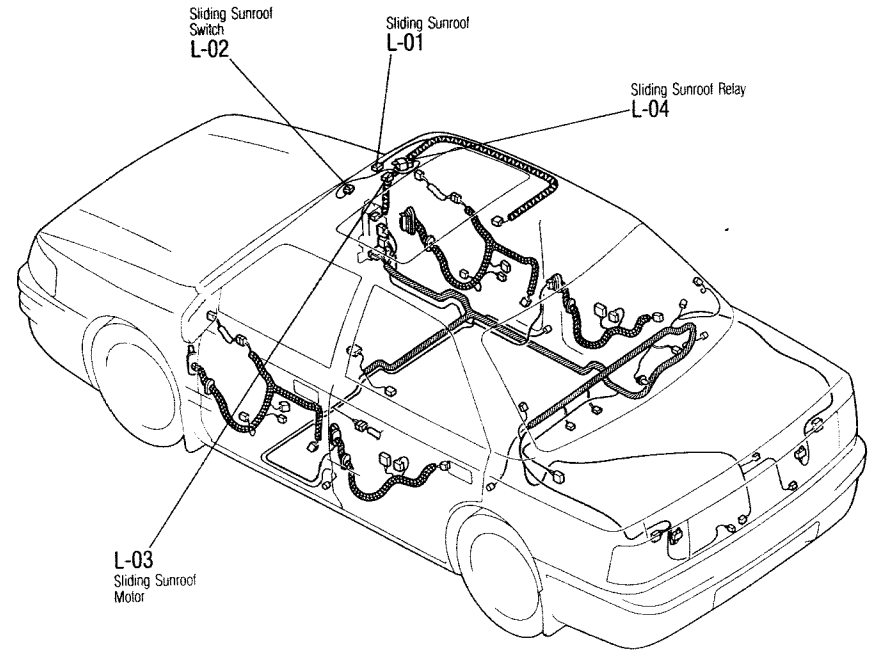


L-01 SLIDING SUNROOF (IN)	L-02 SLIDING SUNROOF SWITCH	L-03 SLIDING SUNROOF MOTOR	L-04 SLIDING SUNROOF RELAY
G/O L/R	L/G L/W G B L L/Y	Y — L/Y L/G Y/R B L L/G L/W	Y/R — G Y L/G B G G L

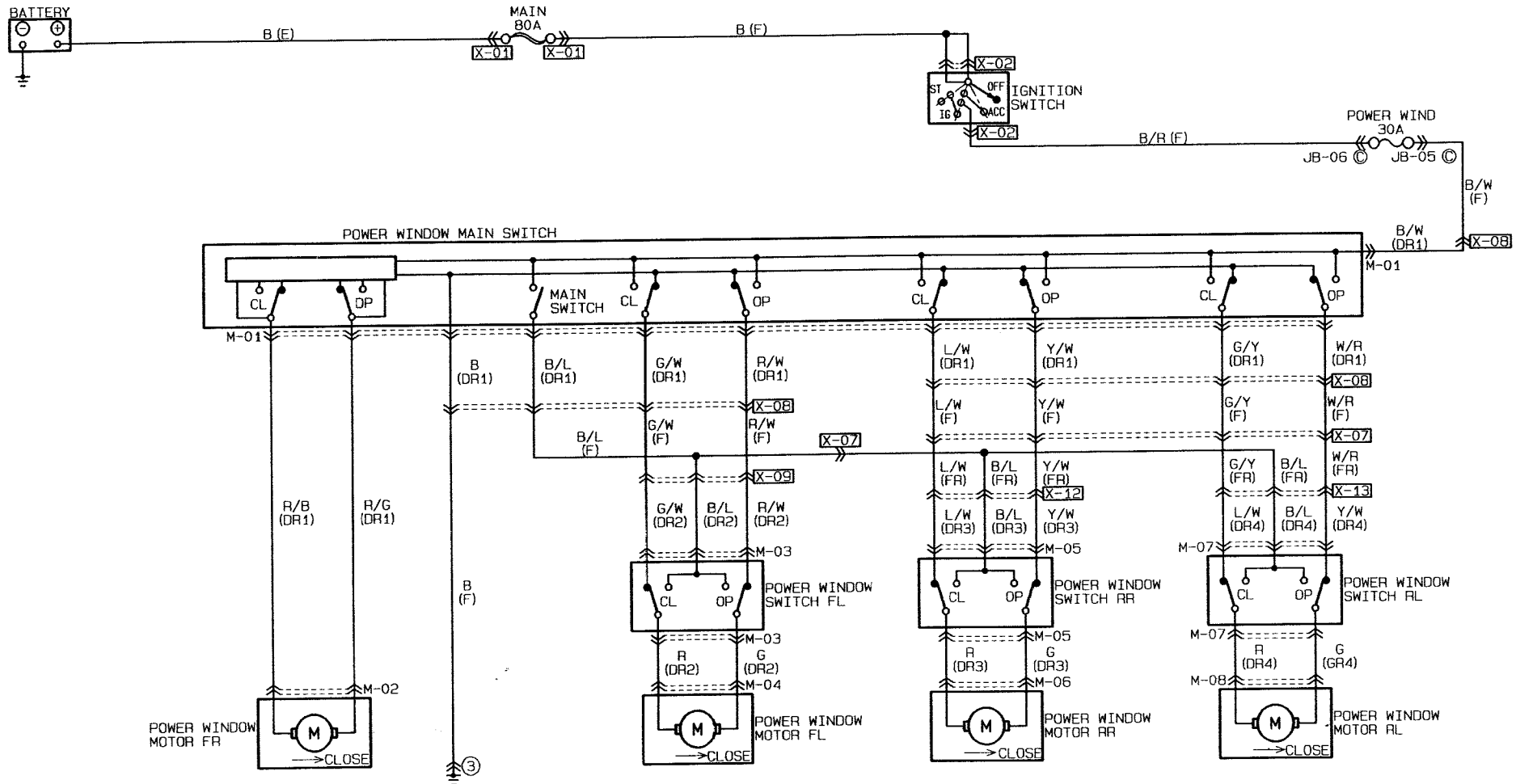

X-02
Ignition Switch
Joint Box


Joint Box
JB-01
JB-06


X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse


Sliding Sunroof Switch
L-02
Sliding Sunroof
L-01
Sliding Sunroof Relay
L-04
L-03
Sliding Sunroof Motor

■ POWER WINDOW



M-01 POWER WINDOW MAIN SWITCH (DR1)

G/Y	W/R		Y/W	L/W	B/W
R/W	G/W	B	B/L	R/B	R/G

M-02 POWER WINDOW MOTOR FR (DR1)

M-03 POWER WINDOW SWITCH FL (DR2)

G		R/W
G/W	R	B/L

M-04 POWER WINDOW MOTOR FL (DR2)

M-05 POWER WINDOW SWITCH RR (DR3)

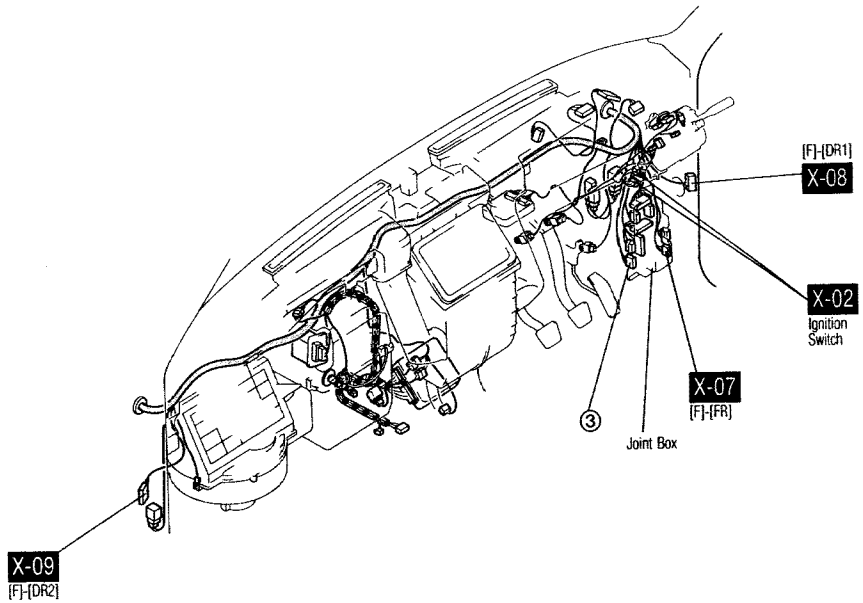
R	G	L/W	Y/W	B/L	*

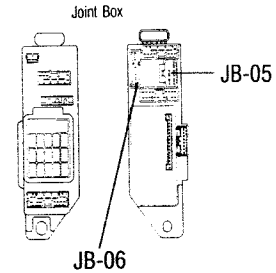
M-06 POWER WINDOW MOTOR RR (DR3)

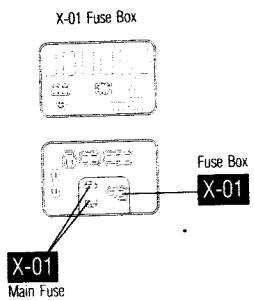
M-07 POWER WINDOW SWITCH RL (DR4)

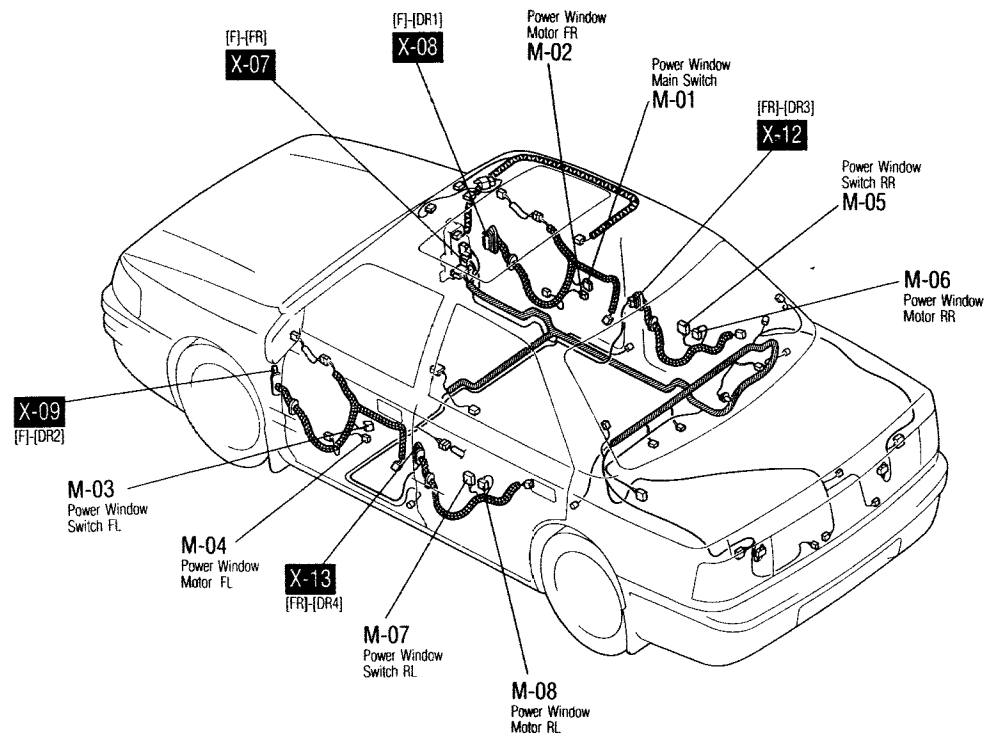
R	G	L/W	Y/W	B/L	*

M-08 POWER WINDOW MOTOR RL (DR4)

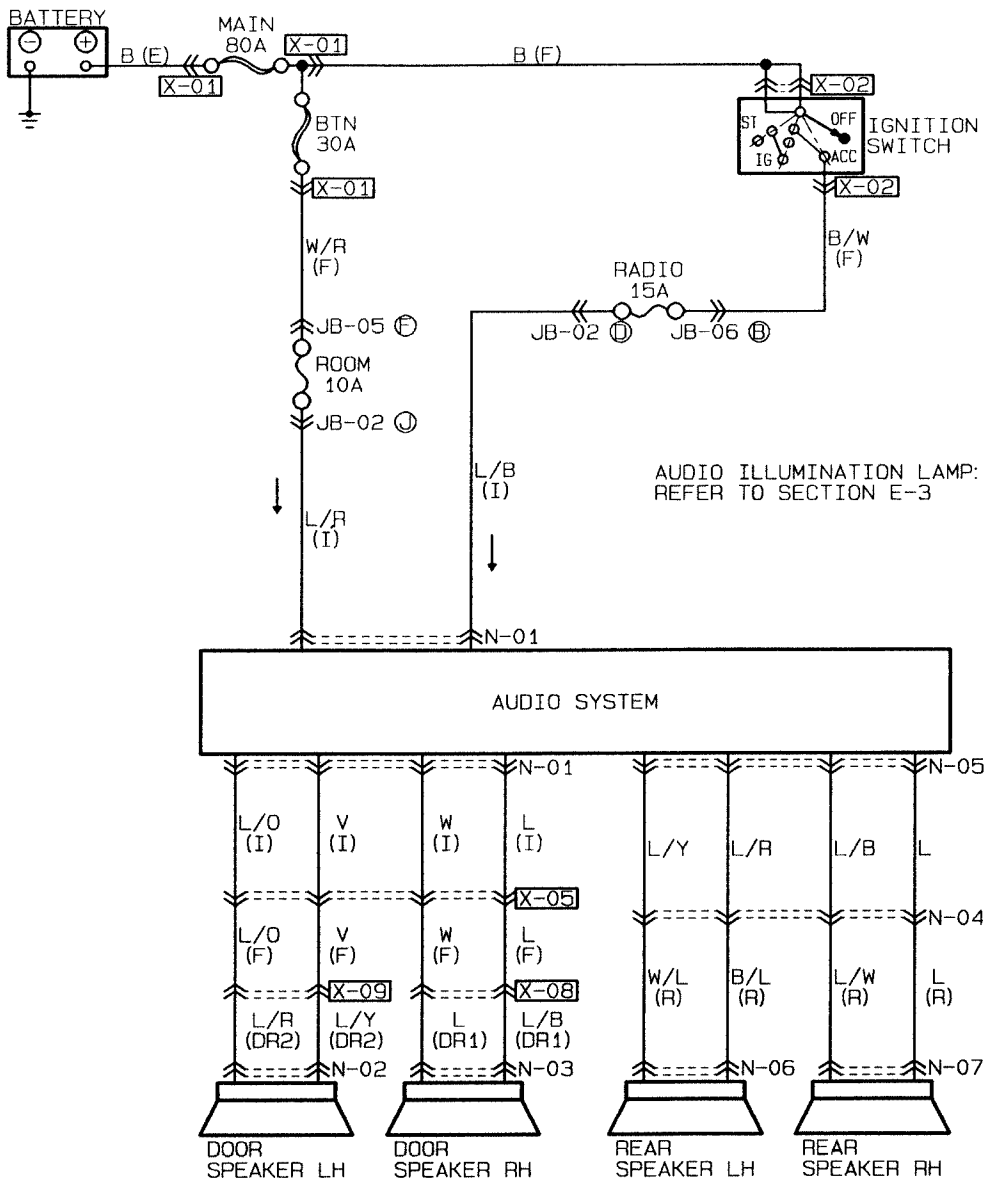

[F]-[DR1]
X-08
X-02
Ignition Switch
X-07
[F]-[FR]
③
Joint Box
X-09
[F]-[DR2]


Joint Box
JB-05
JB-06


X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse


[F]-[FR]
X-07
[F]-[DR1]
X-08
Power Window Motor FR
M-02
Power Window Main Switch
M-01
[FR]-[DR3]
X-12
Power Window Switch RR
M-05
M-06
Power Window Motor RR
X-09
[F]-[DR2]
M-03
Power Window Switch FL
M-04
Power Window Motor FL
X-13
[FR]-[DR4]
M-07
Power Window Switch RL
M-08
Power Window Motor RL

N ■ AUDIO



N-01 AUDIO SYSTEM (I)

L	V			R/B	L/R	L/B
W	L/O	*	*	*	*	*

N-02 DOOR SPEAKER LH (DR2)

L/R
L/Y

N-03 DOOR SPEAKER RH (DR1)

L
L/B

N-04 REAR SPEAKER CORD (R)

(R)

L/W	W/L
L	B/L

L/Y	L/B
L/R	L

N-05 AUDIO SYSTEM

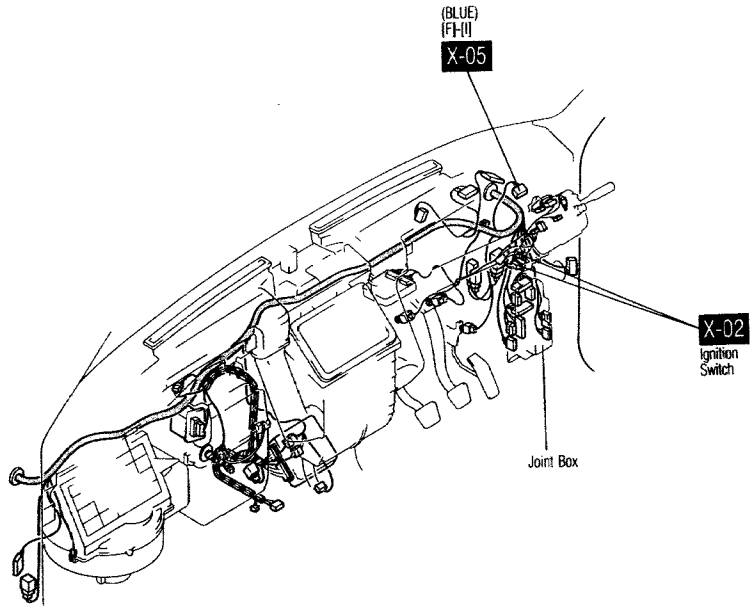
*			*	L/Y
*	L	L/B	*	L/R

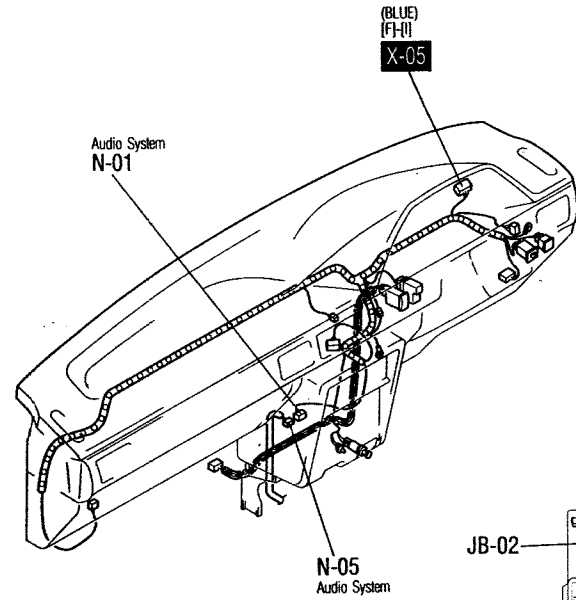
N-06 REAR SPEAKER LH (R)

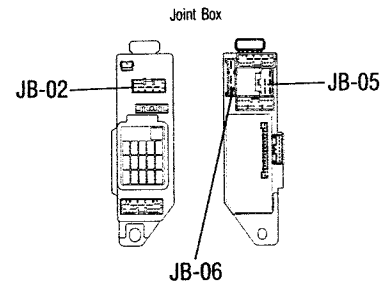
W/L	B/L

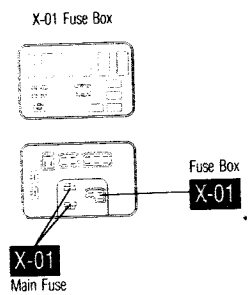
N-07 REAR SPEAKER RH (R)

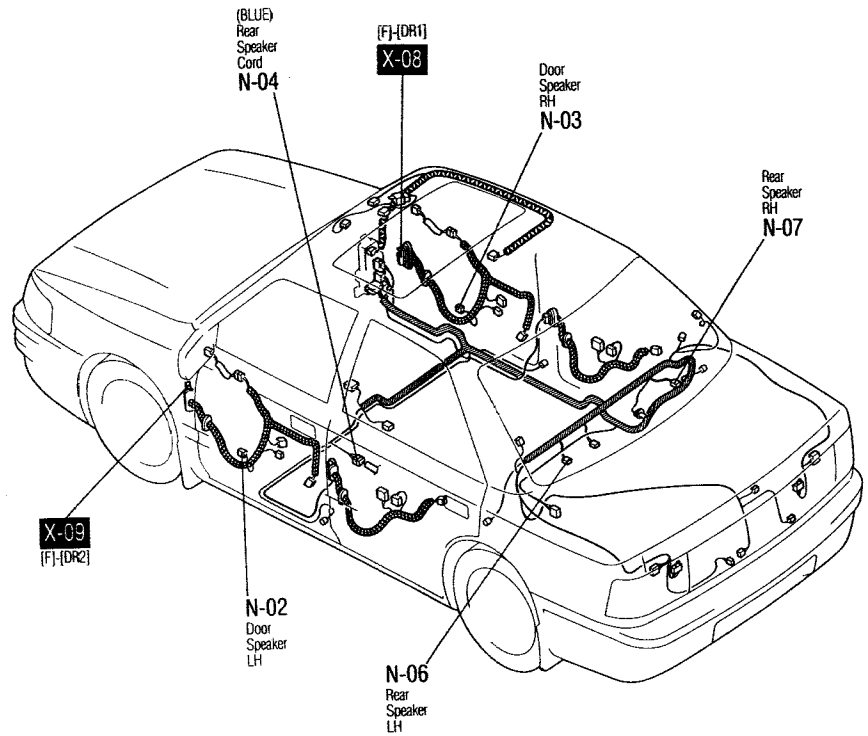
L/W	L


(BLUE)
[F]-[I]
X-05
X-02
Ignition Switch
Joint Box

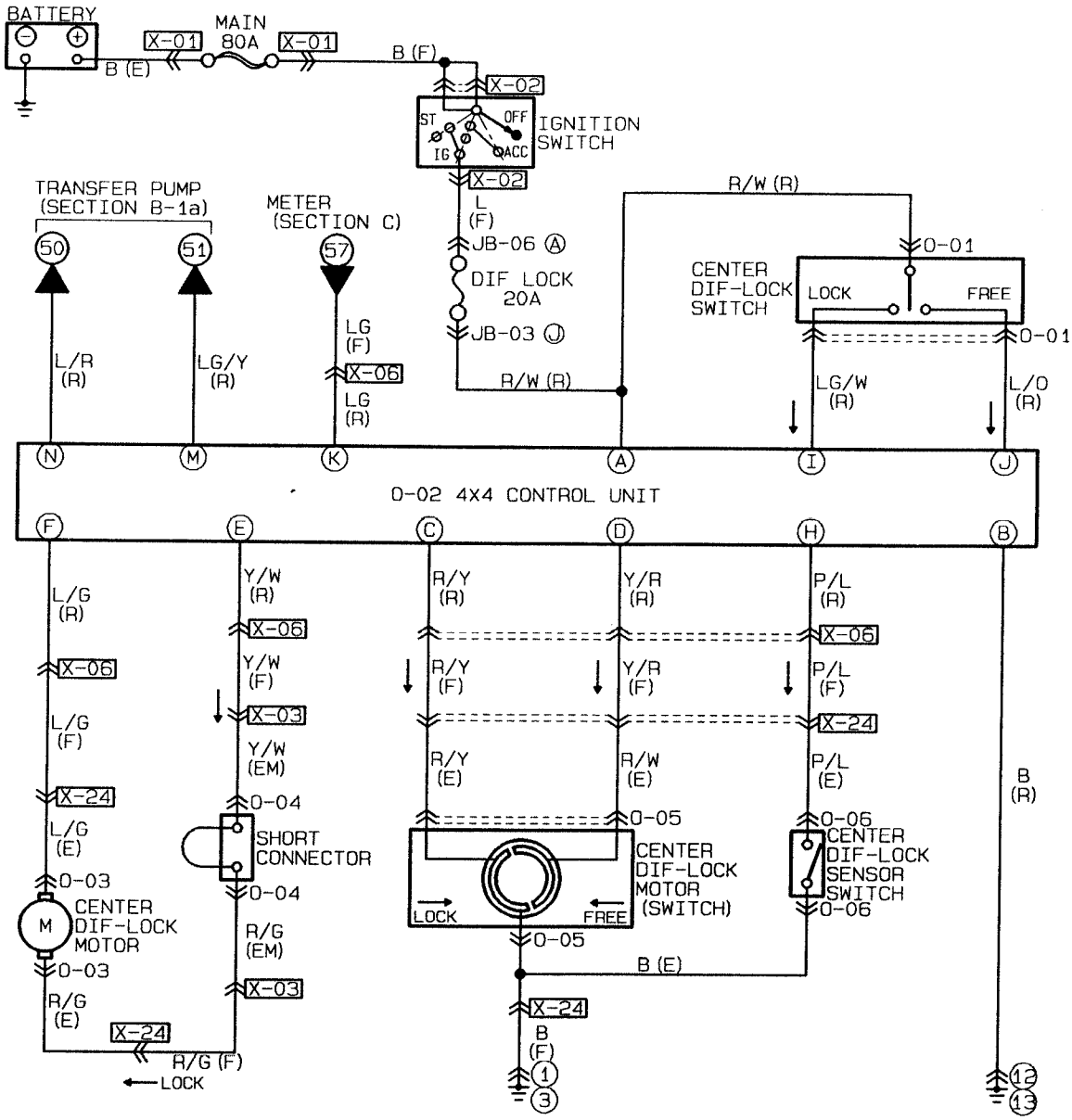

(BLUE)
[F]-[I]
X-05
Audio System
N-01
N-05
Audio System


Joint Box
JB-02
JB-05
JB-06


X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse


(BLUE)
Rear
Speaker
Cord
N-04
[F]-[DR1]
X-08
Door
Speaker
RH
N-03
Rear
Speaker
RH
N-07
X-09
[F]-[DR2]
N-02
Door
Speaker
LH
N-06
Rear
Speaker
LH

0 ■ CENTER DIF-LOCK SYSTEM



0-01 CENTER DIF-LOCK SWITCH (R)

R/B	R	R/W	L/O	LG/W	*

0-02 4X4 CONTROL UNIT (R)

M	K	I		E	C	A
LG/Y	LG	LG/W		Y/W	R/Y	R/W
L/R	*	L/O	P/L	L/G	Y/R	B
N	L	J	H	F	D	B

0-03 CENTER DIF-LOCK MOTOR (E)

R/G
L/G

0-04 SHORT CONNECTOR (EM)

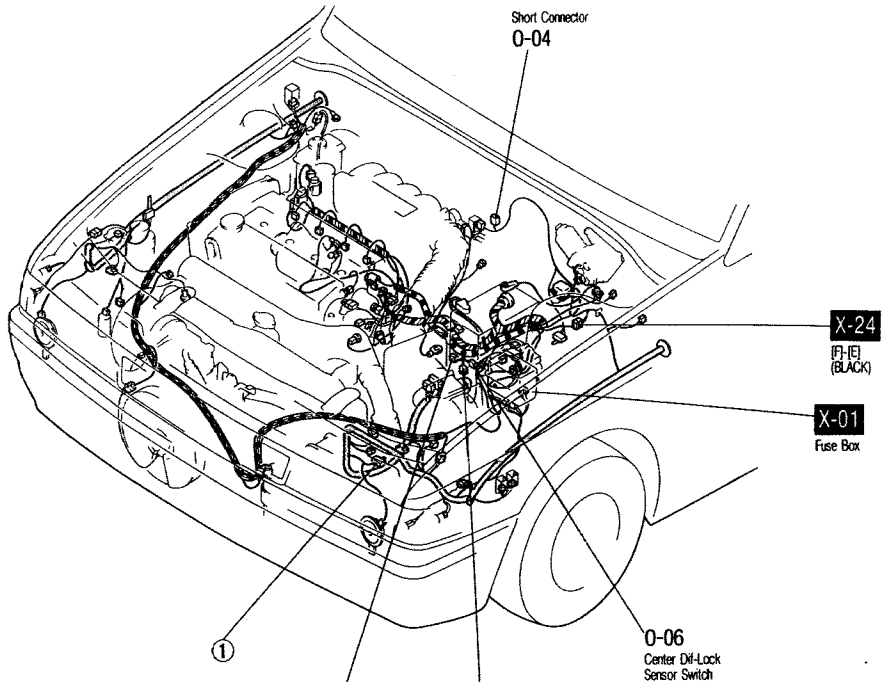
R/G
Y/W

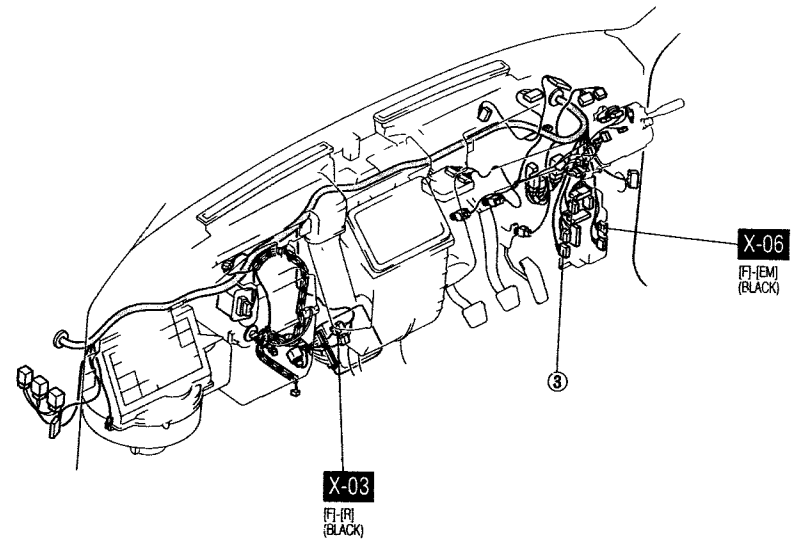
0-05 CENTER DIF-LOCK MOTOR (SWITCH) (E)

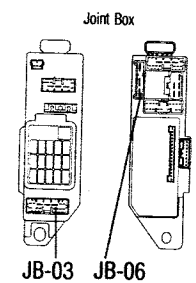
R/W	B
*	R/Y

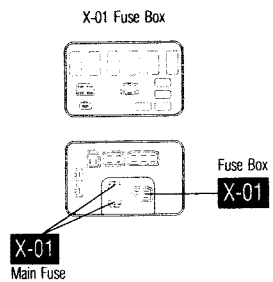
0-06 CENTER DIF-LOCK SENSOR SWITCH (E)

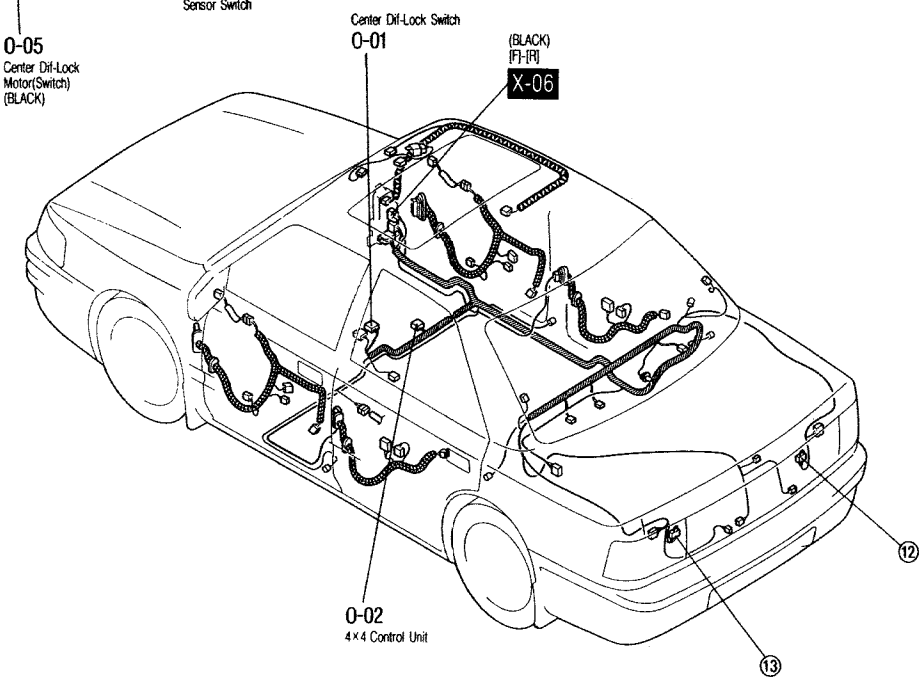
B	P/L


Short Connector
0-04
X-24
[F]-[E]
(BLACK)
X-01
Fuse Box
①
0-03
Center Dif-Lock
Motor
0-05
Center Dif-Lock
Motor(Switch)
(BLACK)
0-06
Center Dif-Lock
Sensor Switch


X-06
[F]-[EM]
(BLACK)
③
X-03
[F]-[R]
(BLACK)


Joint Box
JB-03
JB-06


X-01 Fuse Box
Fuse Box
X-01
X-01
Main Fuse


Center Dif-Lock Switch
0-01
(BLACK)
[F]-[R]
X-06
0-02
4×4 Control Unit
⑫
⑬

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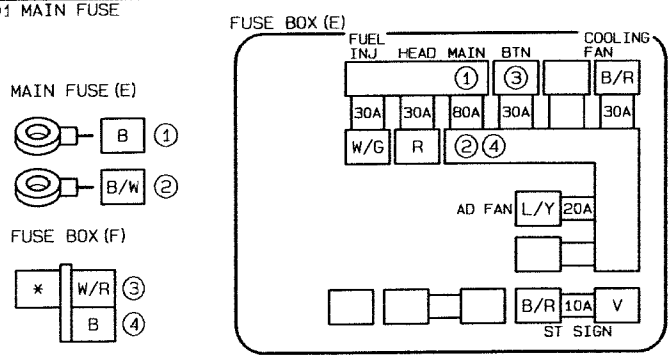
■ COMMON CONNECTOR LIST

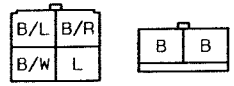
() . . . EC-AT
Δ . . . TURBO

X

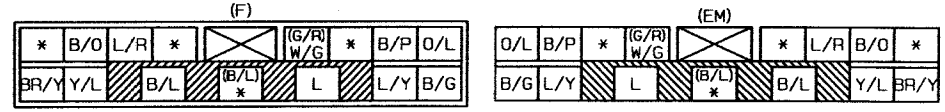
X-01 MAIN FUSE



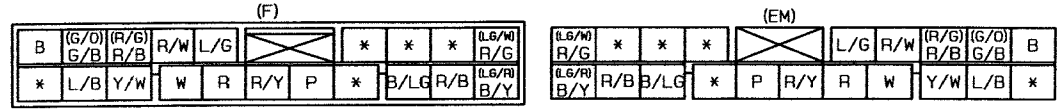
X-02 IGNITION SWITCH (F)



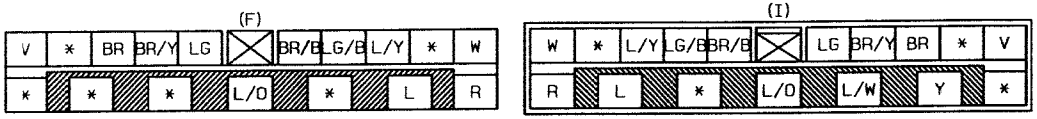
X-04 FRONT (F) -EMISSION (EM)



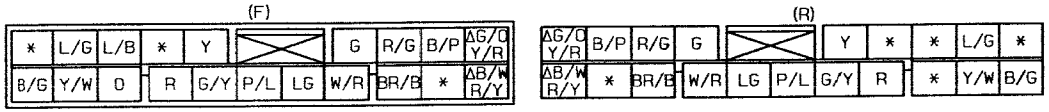
X-03 FRONT (F) -EMISSION (EM)



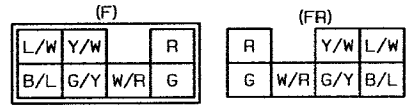
X-05 FRONT (F) -INSTRUMENT PANEL (I)



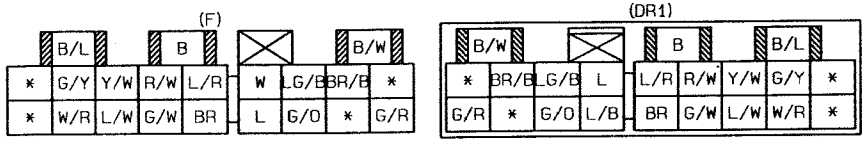
X-06 FRONT (F) -REAR (R)



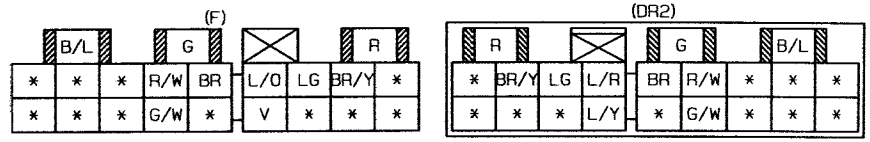
X-07 FRONT (F) -FLOOR (FR)



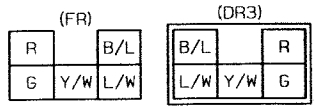
X-08 FRONT (F) -DOOR NO.1 (DR1)



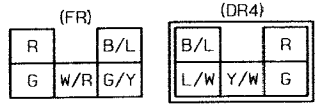
X-09 FRONT (F) -DOOR NO.2 (DR2)



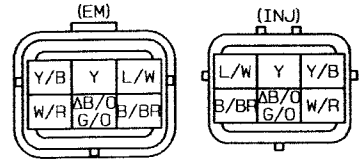
X-12 FLOOR (FR) -DOOR NO.3 (DR3)



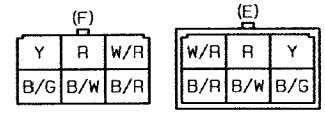
X-13 FLOOR (FR) -DOOR NO.4 (DR4)



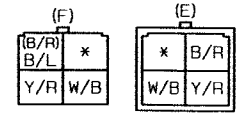
X-14 EMISSION (EM) -INJECTOR (INJ)



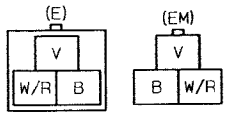
X-16 FRONT (F) -ENGINE (E)



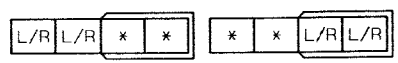
X-17 FRONT (F) -ENGINE (E)



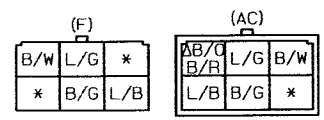
X-18 ENGINE (E) -EMISSION (EM)



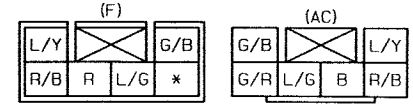
X-19 JOINT COONECTOR (F)



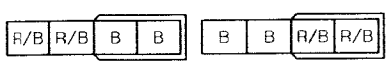
X-20 FRONT (F) -A/C (AC)



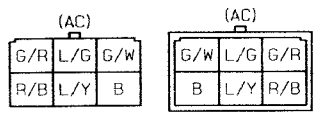
X-21 FRONT (F) -A/C (AC)



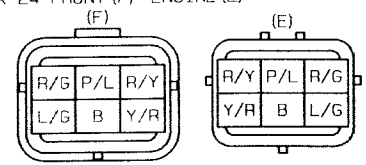
X-22 JOINT COONECTOR (I)



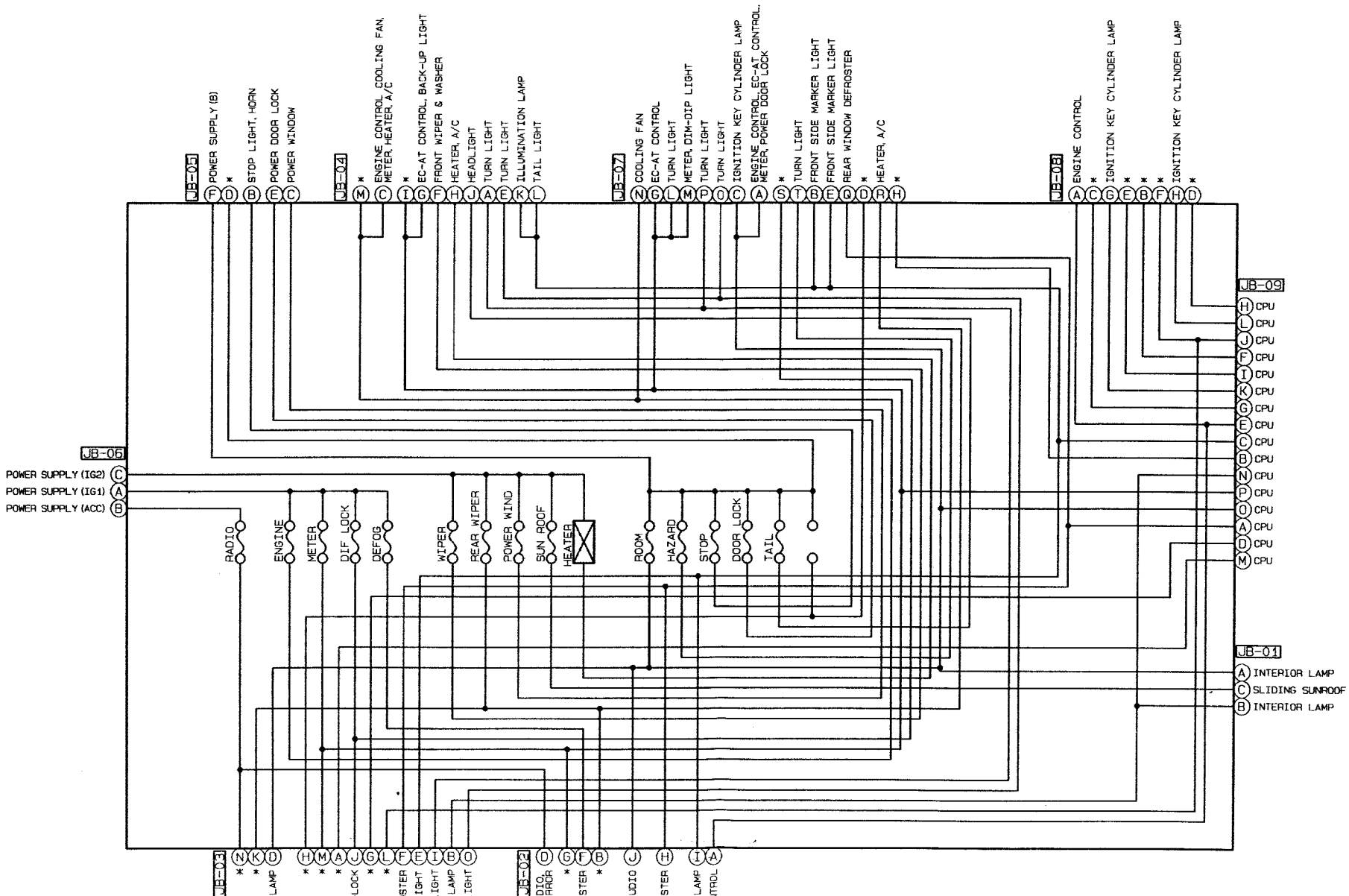
X-23 A/C (AC) -A/C (AC)



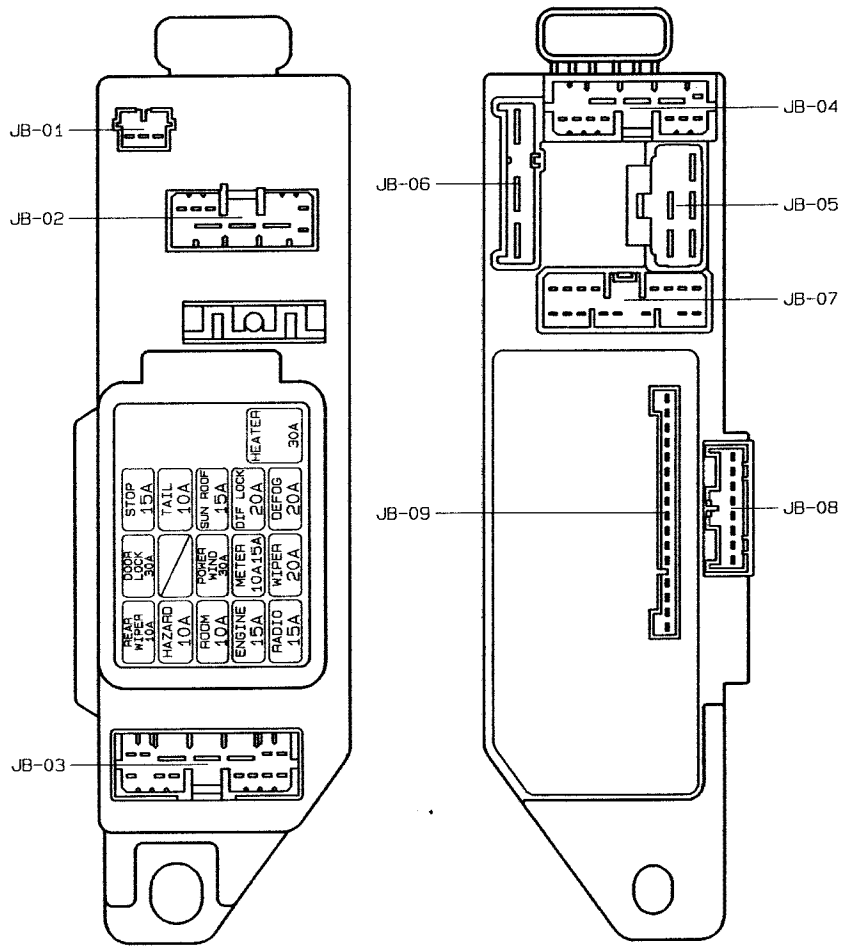
X-24 FRONT (F) -ENGINE (E)



■ INTER CONNECTING DIAGRAM OF JOINT BOX



■ JB CONNECTOR LOCATION



■ JOINT BOX

JB-01 INTERIOR LAMP HARNESS

G/O	R/W	L/R
C	B	A

JB-02 INSTRUMENT PANEL HARNESS

J	I	G		E	C	A
L/R	R/B	*		*	*	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
*	*	L/G	G/B		*	R/B	*	*
G/W	*	R/W		*	B/L		L/R	R/W
O	M	J		H	F		D	B

JB-04 FRONT HARNESS

L	K	I		G	E	C	A
R/B	R/B	*		B/Y	G/W	B/W	G/B
*	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

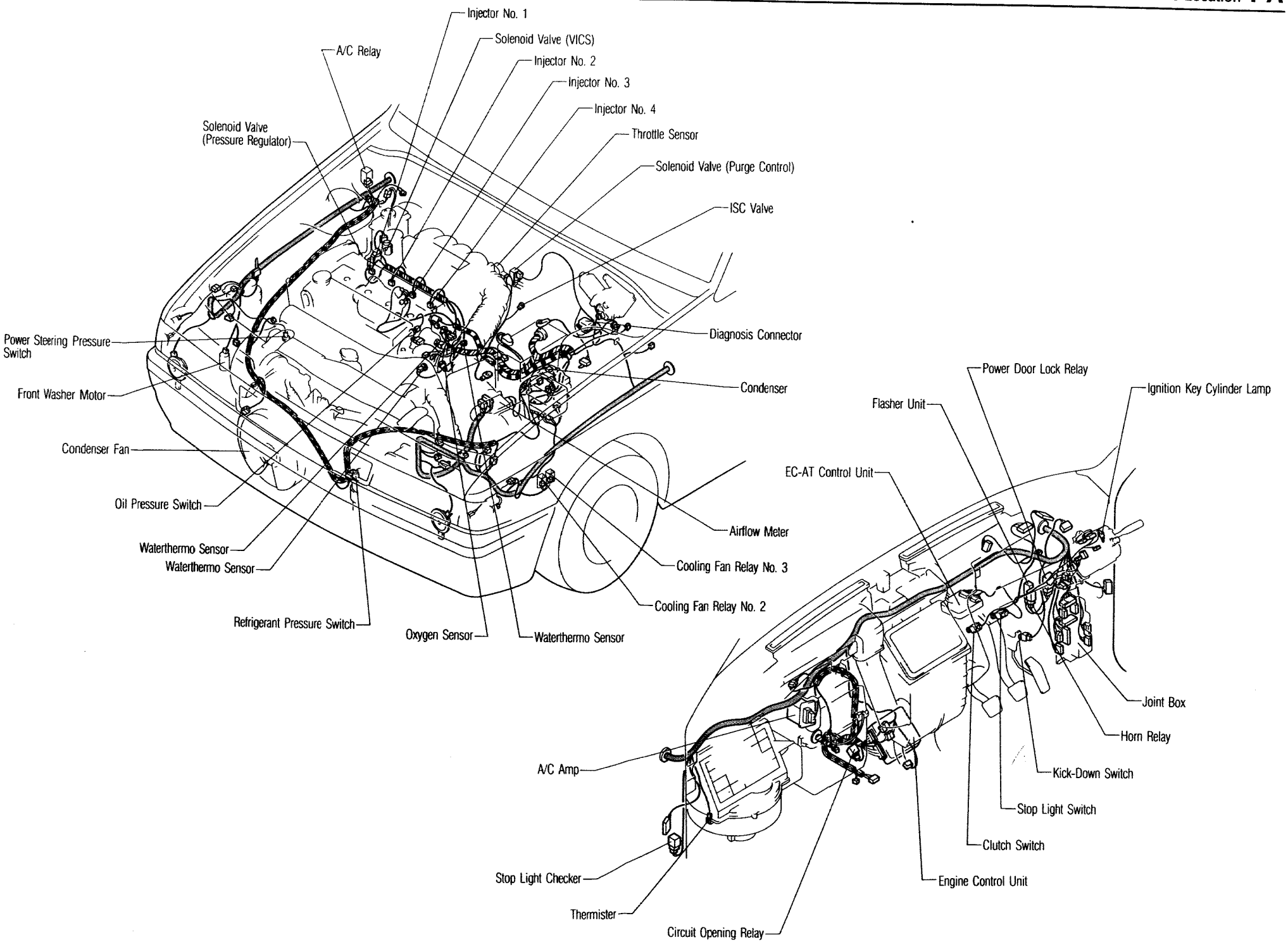
S	Q	O	M		G	E	C	A
*	B/L	G/W	B/Y		B/Y	R/B	L/R	L/R
B/R	L/G	G/B		B/W	B/Y	*	*	*	*	R/B
T	R	P		N	L	J	H	F	D	B

JB-08 FRONT HARNESS

V	B	*	*	*	*	*	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


Injector No. 1
Solenoid Valve (VICS)
A/C Relay
Injector No. 2
Injector No. 3
Injector No. 4
Solenoid Valve (Pressure Regulator)
Throttle Sensor
Solenoid Valve (Purge Control)
ISC Valve
Power Steering Pressure Switch
Diagnosis Connector
Front Washer Motor
Condenser
Condenser Fan
Oil Pressure Switch
Airflow Meter
Waterthermo Sensor
Waterthermo Sensor
Cooling Fan Relay No. 3
Cooling Fan Relay No. 2
Refrigerant Pressure Switch
Oxygen Sensor
Waterthermo Sensor
Power Door Lock Relay
Ignition Key Cylinder Lamp
Flasher Unit
EC-AT Control Unit
Joint Box
Horn Relay
A/C Amp
Kick-Down Switch
Stop Light Switch
Clutch Switch
Stop Light Checker
Engine Control Unit
Thermister
Circuit Opening Relay