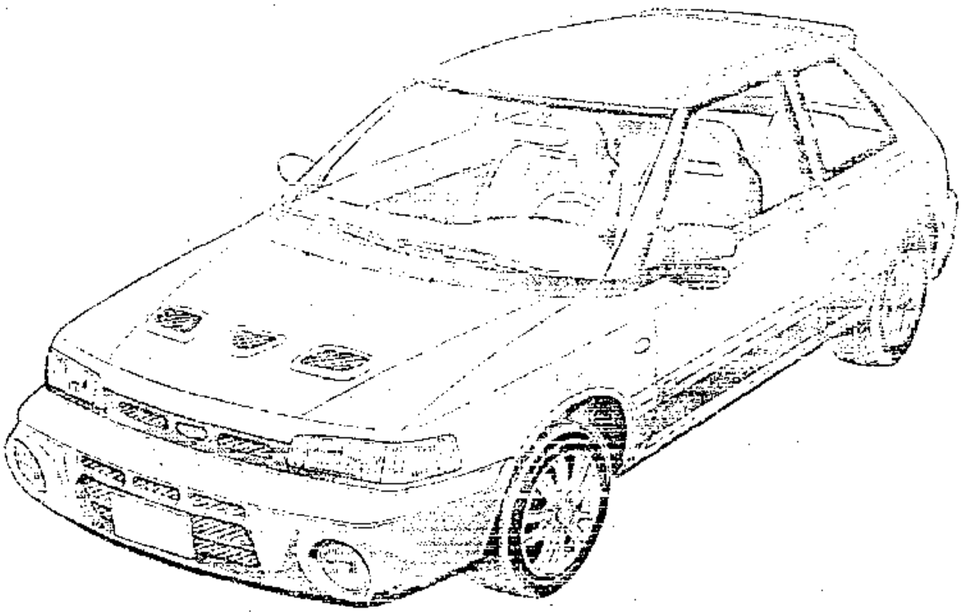
Mazda 323

Workshop Manual Supplement

JMZ BG83J200



1/92 1318-10-92A

Europe

Mazda 323 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)
1206-10-89F (Vol.2)
1229-10-89L
1275-10-91C

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 (■)

PRINTED IN JAPAN, JAN., '92 (N)
1318-10-92A

VEHICLE IDENTIFICATION NUMBERS (VIN)

JMZ BG83J200 500001 –

GENERAL INFORMATION

13EGIX-301

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

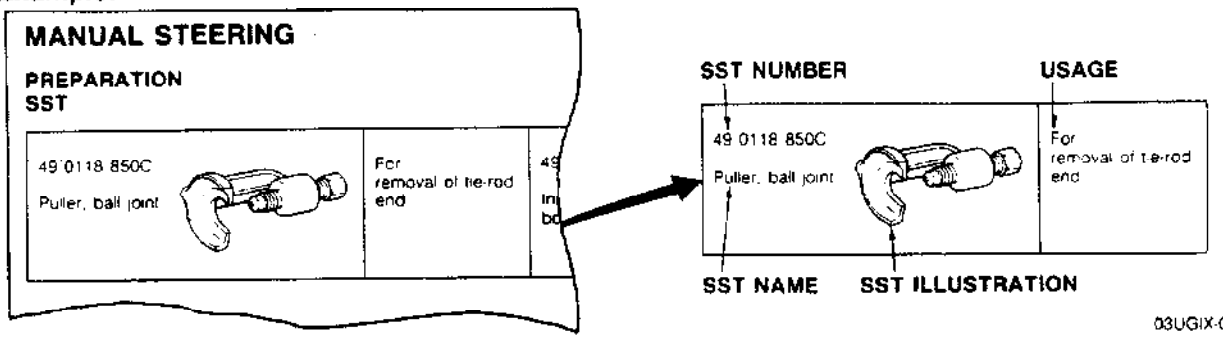
HOW TO USE THIS MANUAL

PREPARATION

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

GI

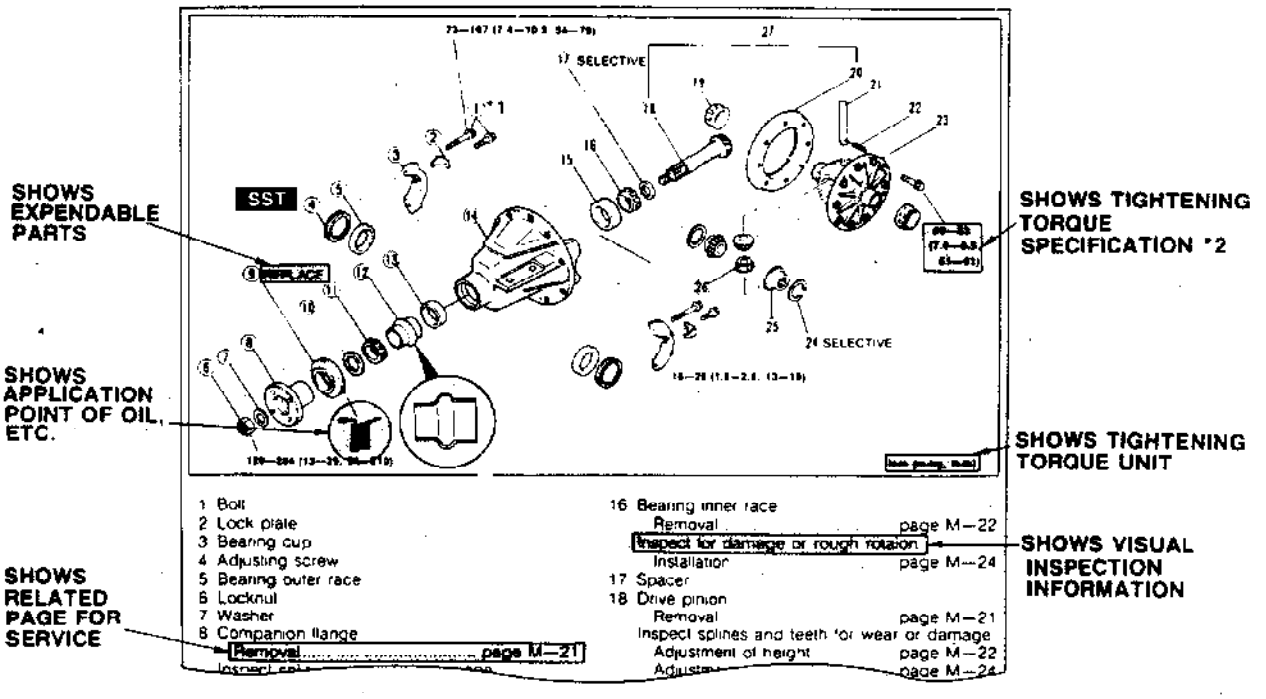
Example:



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 Nm {kgfm, ftlbf} 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

05UGIX-005

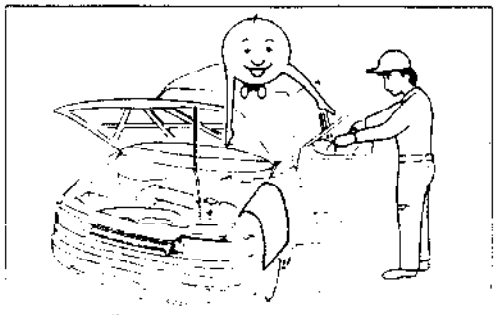
Note

- **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.

9MJGIX-036

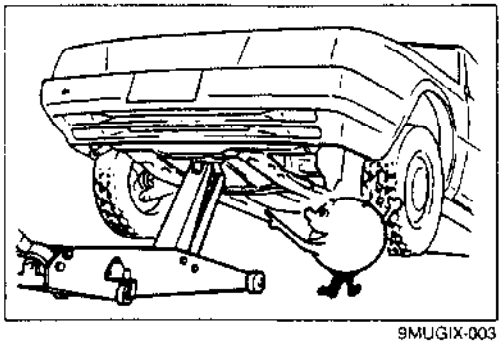


9MJGIX-037

FUNDAMENTAL PROCEDURES

PROTECTION OF THE VEHICLE

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



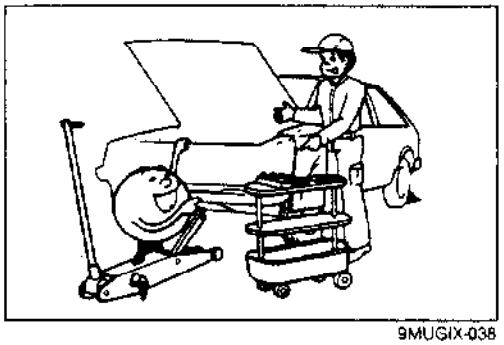
9MUGIX-003

A WORD ABOUT SAFETY

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

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

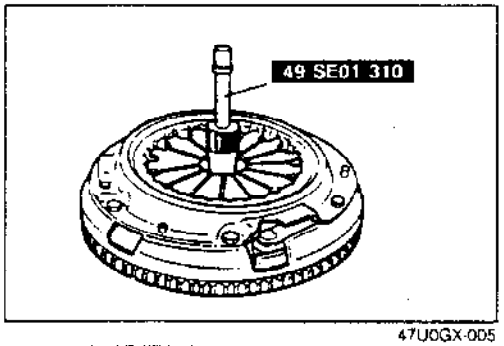
Start the engine only after making certain the engine compartment is clear of tools and people.



9MUGIX-038

PREPARATION OF TOOLS AND MEASURING EQUIPMENT

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



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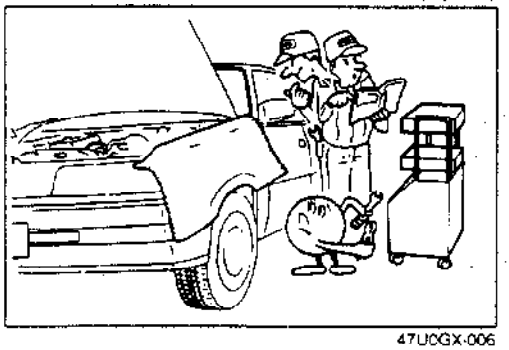
SPECIAL TOOLS

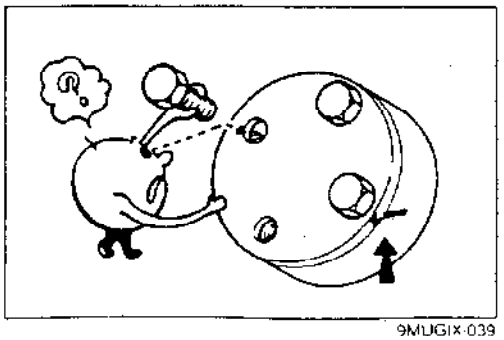
Use special tools when they are required.



47U0GX-006

REMOVAL OF PARTS

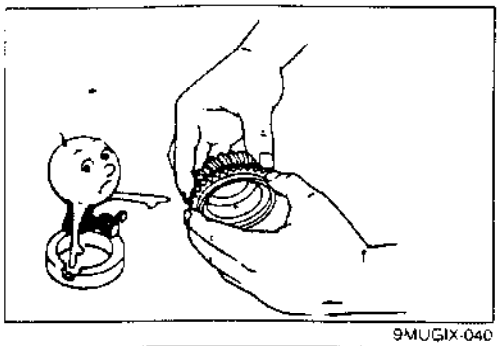
While correcting a problem, try also to determine its cause. Begin work only after first learning which parts and subassemblies must be removed and disassembled for replacement or repair.



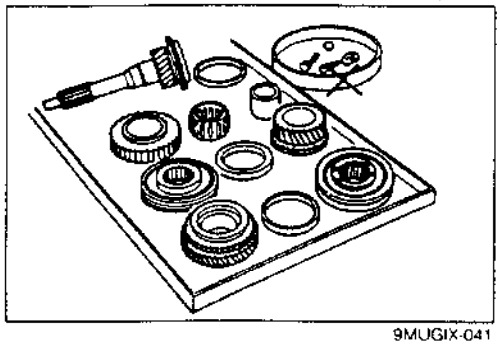
9MUGIX-039

DISASSEMBLY

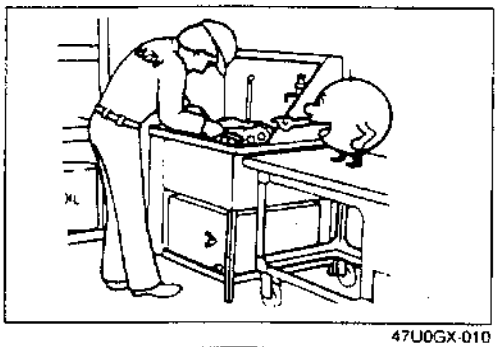
If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled in a way that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.


9MUGIX-040

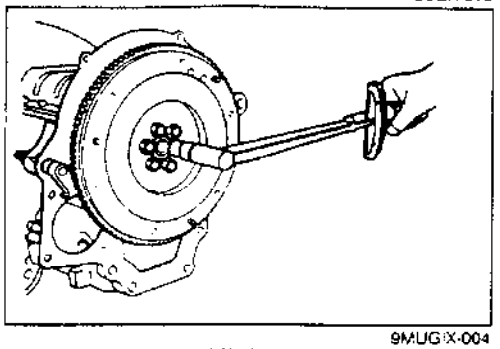
1. Inspection of parts
When removed, each part should be carefully inspected for malfunctioning, deformation, damage, and other problems.


9MUGIX-041

2. Arrangement of parts
All disassembled parts should be carefully arranged for re-assembly.
Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.

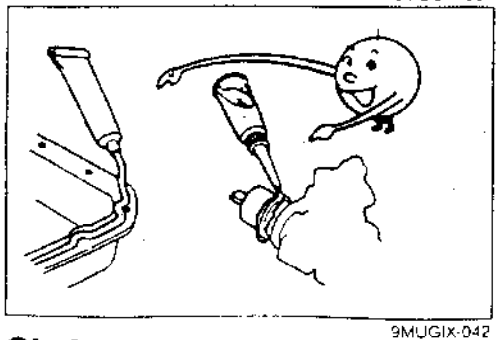

47U0GX-010

3. Cleaning parts for reuse
All parts to be reused should be carefully and thoroughly cleaned in the appropriate method.

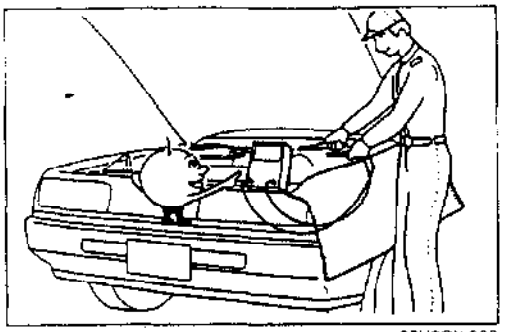

9MUGIX-004

REASSEMBLY
Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.
Refer to STANDARD BOLT AND NUT TIGHTENING TORQUE in Section TD for tightening torques not mentioned in the main text.
If removed, these parts should be replaced with new ones:

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


9MUGIX-042

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



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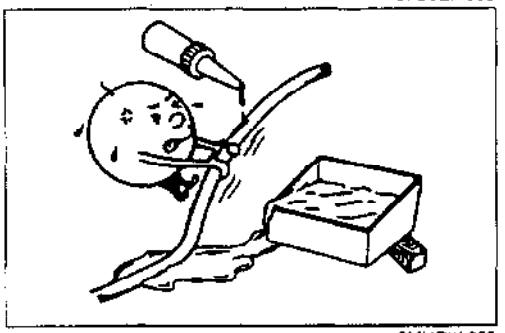


9MUGIX-005

ADJUSTMENTS

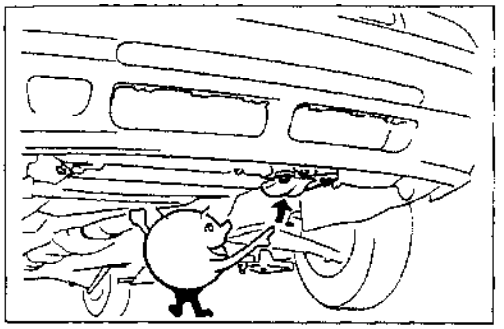
Use suitable gauges and/or testers when making adjustments.

RUBBER PARTS AND TUBING

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

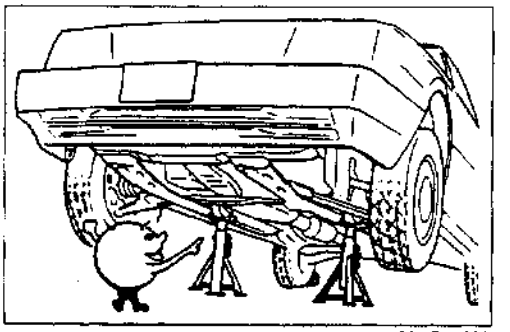
JACK AND SAFETY STAND POSITIONS

FRONT END
Jack position:
At the front crossmember



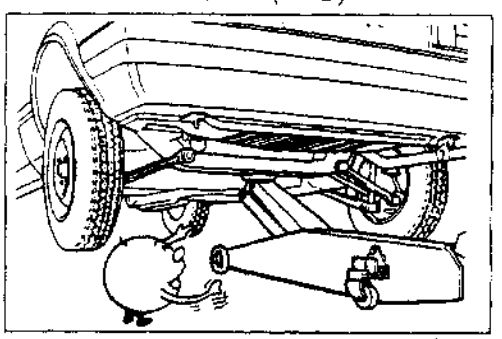
03UGIX-007

Safety stand positions:
On both sides of the body frame



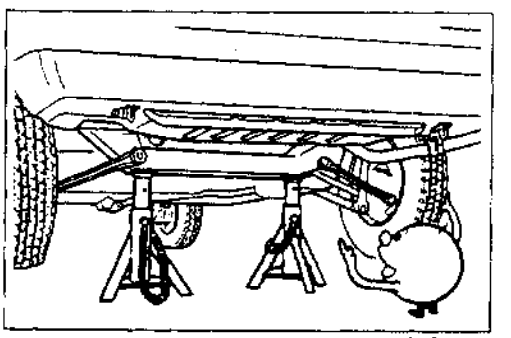
03UGIX-008

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



03UGIX-801

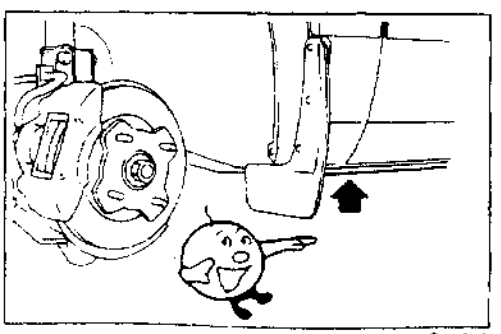
Safety stand positions:
On both sides of the body frame



03UGIX-010

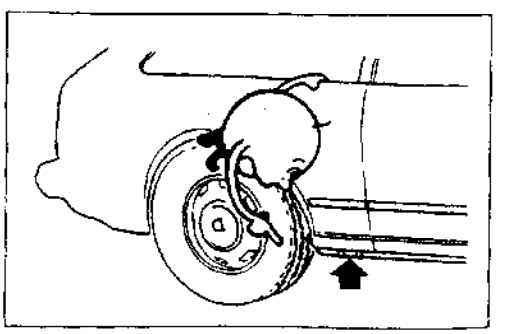
VEHICLE LIFT (2-SUPPORT TYPE) POSITIONS

FRONT END
Frame
Side sills



9MUGIX-010

REAR END
Frame
Side sills



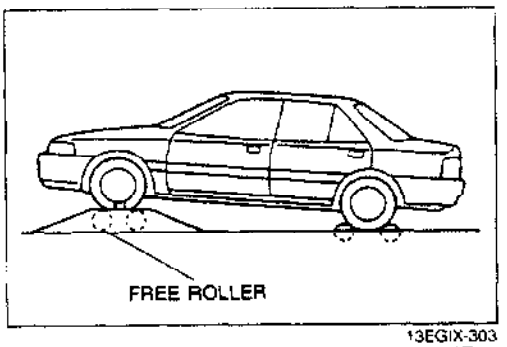
9MUGIX-011

MAINTENANCE NOTE

SPEEDOMETER TESTER CHECK

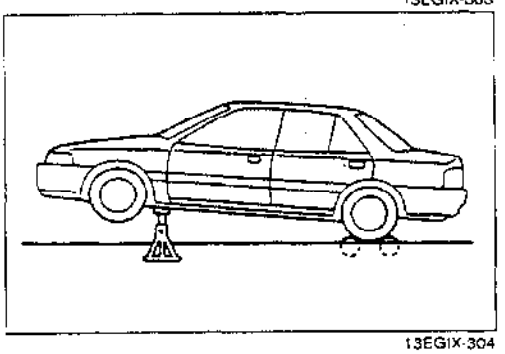
Caution
- **Do not clutch abruptly.**
- **Do not attempt rabbit starts or accelerate quickly.**

13EGIX-302



13EGIX-303

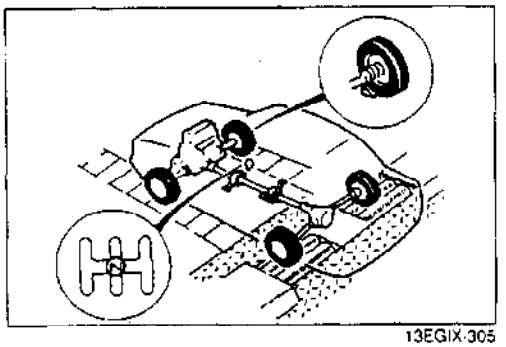
[Front wheel free-roller method]
1. Set the free roller securely on the floor under the front wheels by matching it to the wheel base and front tread.
2. Place the vehicle softly on the tester and free roller.
3. Start the engine, and engage the clutch softly at a low speed in 2nd gear; then gradually increase the speed.
4. Upon completion of the test, stop the engine by gradually decelerating with soft braking.



13EGIX-304

[Front wheel jack-up method]
1. Place the rear wheels on the roller
2. Jack up the front wheels and mount on a safety stand.
3. Start the engine, and engage the clutch softly at a low speed in 2nd gear; then gradually increase the speed

Caution
- **When using either the front wheel free-roller method or front wheel jack-up method, secure the vehicle to prevent forward and lateral movement by attaching towing hardware (chain or wire) to the front and rear tow hook or tie-down hook.**

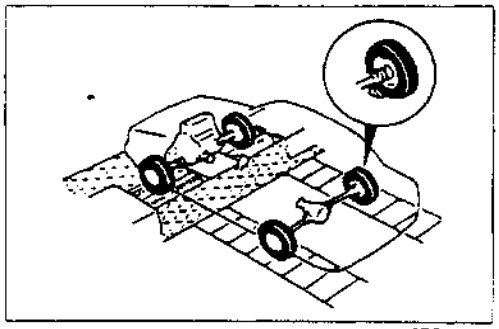


13EGIX-305

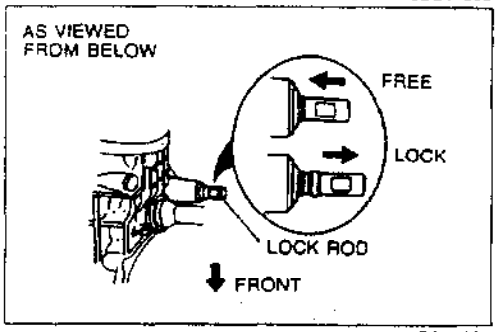
BRAKE TESTER CHECK

Caution
- **To stabilize the drag force of the viscous coupling, conduct the brake test after the speedometer test.**

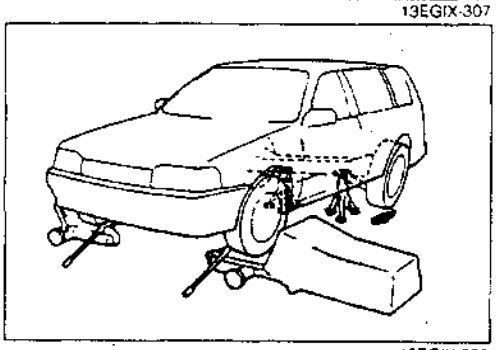
1. Place the wheels to be tested (front or rear) on the roller.
2. Shift into NEUTRAL.
3. Drive the tester roller and check.



13EGIX-306



13EGIX-307



13EGIX-308

CHASSIS DYNAMOMETER CHECK

Caution
- **Do not clutch abruptly.**
- **Do not attempt rabbit starts or accelerate quickly.**

1. Remove the propeller shaft.
2. Lock the center differential (2WD).
3. Place the front wheels on the roller.
4. Lock the rear wheels and apply the parking brake.
5. Drive the tester roller and check.
6. Upon completion of the test, gradually decelerate with soft braking and stop the engine.
7. When the test is done, return the differential lock rod to the free condition (4WD) and reinstall the propeller shaft.

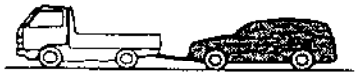
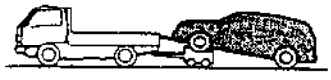
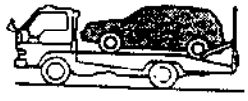
WHEEL BALANCER (On-the-car Balance)

1. Jack up all four wheels. Support the wheels to be checked (front or rear) with the wheel balancer sensor stand and the remaining wheels with safety stands.
2. Set the on-the-car balancer. With the center differential in free condition, drive the tires with the engine; then check.

TOWING

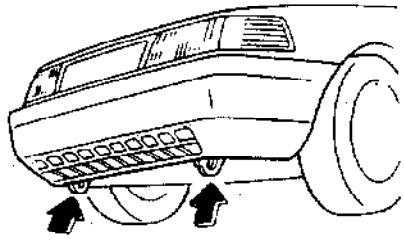
Caution

- **Use method ④ to tow vehicles having problems in the steering system or drivetrain.**

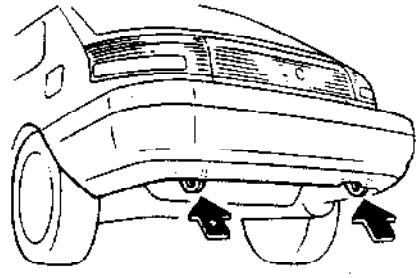
Towing method	Items to confirm		Remarks
	Parking brake	Transaxle shift position	
① Rope towing 	Released	Neutral	
② Towing with front wheels off ground 	Released	Neutral	Remove propeller shaft
③ Towing by wrecker truck 	Released	Neutral	Remove propeller shaft
④ Towing or hauling with all wheels off ground 	Engaged	Any position	

13EGIX309

TIE-DOWN HOOKS — FRONT

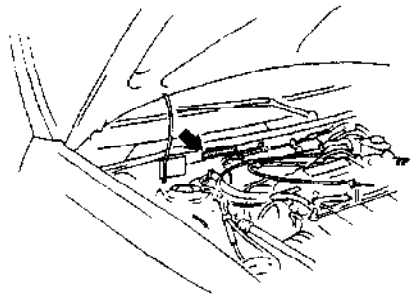


TIE-DOWN HOOKS — REAR (HATCHBACK)

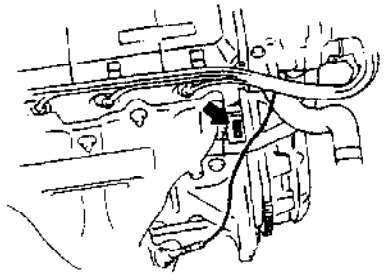


IDENTIFICATION NUMBER LOCATIONS

VEHICLE IDENTIFICATION NUMBER (VIN)



ENGINE MODEL AND NUMBER



9MUGIX-015

UNITS

N·m {kgf·m or kgf·cm, ft·lbf or in·lbf}	Torque
rpm	Revolutions per minute
A	Ampere(s)
V	Volt(s)
Ω	Ohm(s) (resistance)
kPa {kgf/cm², psi}	Pressure (usually positive)
mmHg {inHg}	Pressure (usually negative)
W	Watt
Liters {US qt, Imp qt}	Volume
mm {in}	Length

89U0GX-006

ABBREVIATIONS

ABDC	After bottom dead center
A/C	Air conditioner
ACC	Accessories
ATX	Automatic transaxle
ATDC	After top dead center
ATF	Automatic transmission fluid
BAC	Bypass air control
BBDC	Before bottom dead center
BTDC	Before top dead center
CPU	Central processing unit
EC-AT	Electronically-controlled automatic transmission
ECU	Engine control unit
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

03UGIX-802

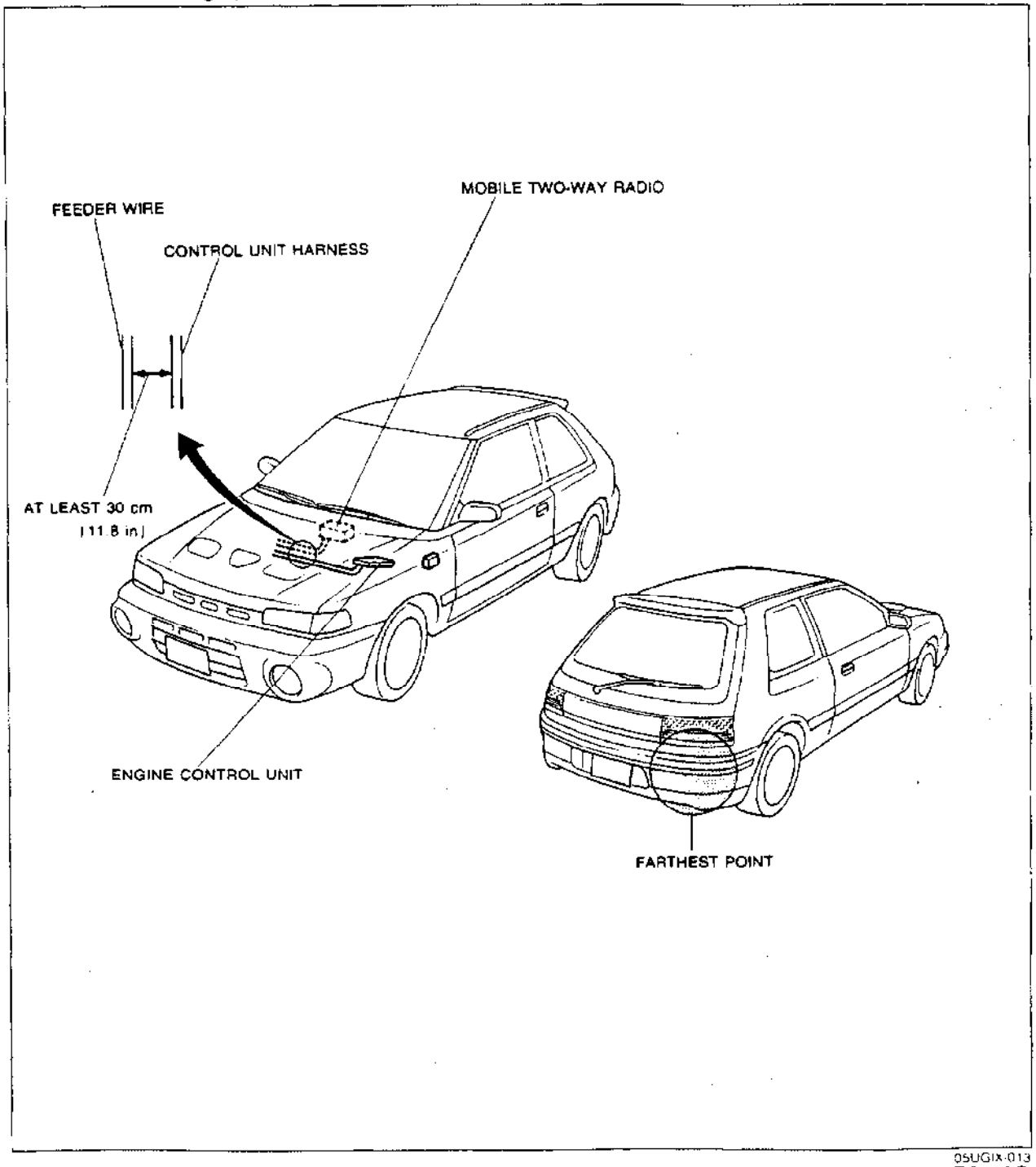
CAUTION

INSTALLATION OF MOBILE TWO-WAY RADIO SYSTEM

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

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

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

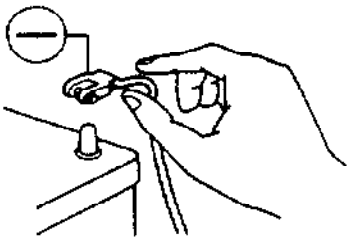


CAUTION

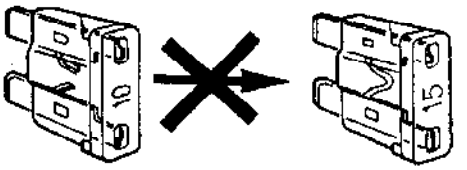
PRECAUTIONS TO TAKE WHEN SERVICING AN ELECTRICAL SYSTEM

- Note the following items when servicing the electrical system.
- Do not alter the wiring or electrical equipment in any way; this may damage the vehicle or cause a fire from short-circuiting a circuit or overloading it.

- The negative (–) battery cable must be removed first and installed last.



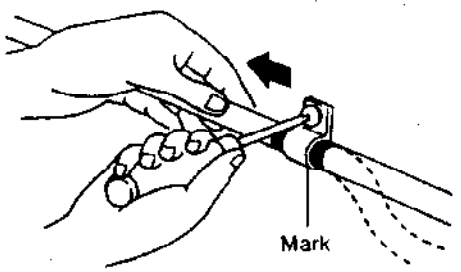
- Do not replace with fuses exceeding specified capacity.



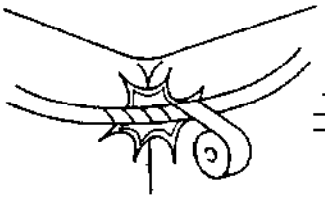
Caution
- Be sure that the ignition and other switches are off before disconnecting or connecting the battery cables. Failure to do so may damage the semiconductor components.

Caution
- Replacing a fuse with one of a larger capacity than designated may damage components or cause a fire.

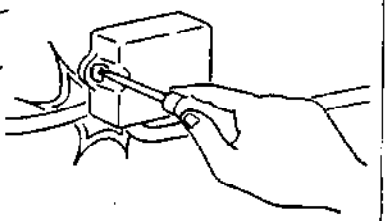
- Secure harnesses with provided clamps to take up slack.



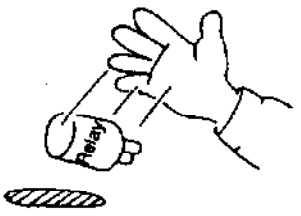
- Tape areas of the harness that may rub or bump against sharp edges to protect it from damage.



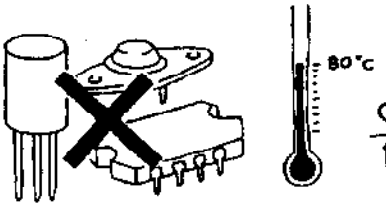
- When mounting components, be sure the harness is not caught or damaged.



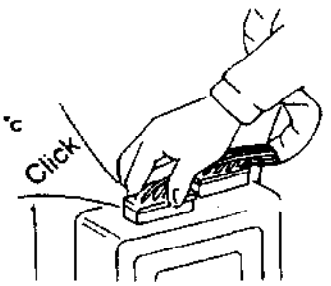
Caution
- Clamp all harnesses near vibrating components (for example, the engine) to remove slack and to prevent contact resulting from vibration.
- Do not handle electrical components roughly or drop them.



- Disconnect heatsensitive parts (for example, relays and ECU) when performing maintenance (such as welding) where temperatures may exceed 80°C (176°F).



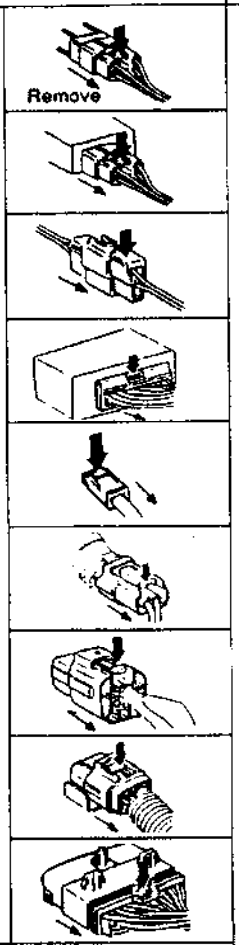
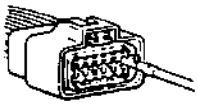
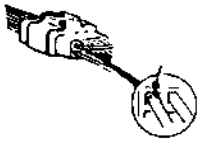
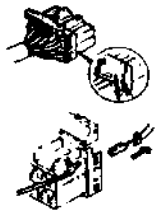
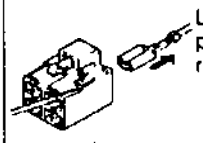
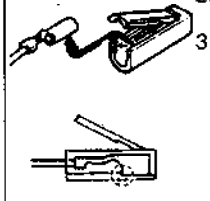
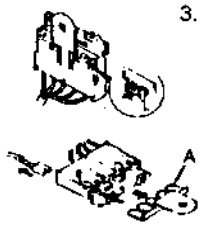
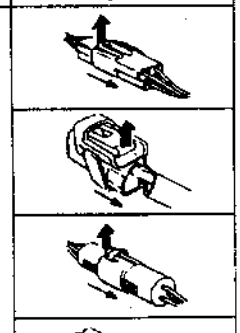
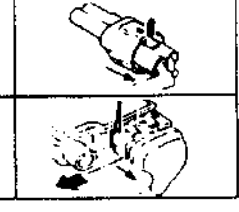
- Make sure that the connectors are securely connected when installed.



HANDLING CONNECTORS

Caution

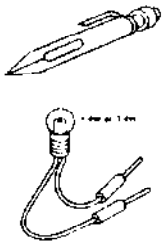
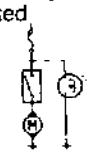
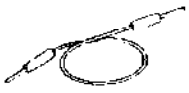
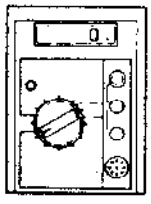
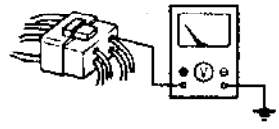
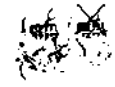
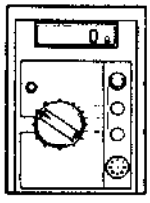
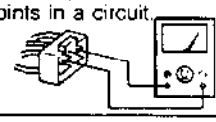
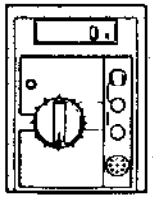
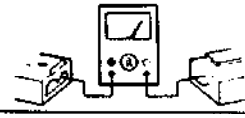
• Be sure to grasp the connectors, not the wires, when disconnecting them.

Connector removal	Checking connector contacts	Checking for loose terminals	Replacing terminals
Push type  	Caution Improperly engaged connectors will cause poor terminal contact.  When using a matching male terminal, make sure there is no looseness in the female terminal.	Caution A loose terminal will cause poor terminal contact.  Make sure the terminals are not pushed out of the connector when engaged.  Pull lightly on individual wires to check that they are secured in the terminal.	<CPU connector>  1. Raise the rear cover. 2. Lift the tab with a thin piece of metal and remove the terminal. <General connector>  Lift the tab with a thin piece of metal and remove the terminal. <Round connectors>  1. Raise the cover. 2. Lift the terminal to remove it. 3. Make sure the terminal is securely mounted in the connector when installing. <Common ground connectors>  1. Raise the cover. 2. Remove A. 3. Lift the tab with a thin piece of metal and remove the terminal.
Pull-up type 			
Spring type 			

13EGIX-3*1

CAUTION

USING ELECTRICAL MEASURING EQUIPMENT

Equipment	Use	Operation	Handling precautions
Test lamp 	Test to find open or shorted circuits	• Connect the test lamp between the circuit being measured and a ground. • The lamp will light if the circuit is energized to the point tested 	• Test lamps use 12V 1.4W or 3.4W bulbs or light-emitting diodes (LEDs). Using a large-capacity bulb may damage the ECU.
Jumper wire 	Used to create a temporary circuit	• Connect the jumper wire between the terminals of a circuit to bypass a switch. 	• Do not connect the jumper wire from the power source line to ground; this may cause burning or other damage to harnesses or electronic components.
Voltmeter 	Used for measuring the voltage of a circuit to find possible opens or shorts.	• Connect the positive (+) probe to the point where voltage is to be measured and the negative (–) probe to a ground. 	• Connect the voltmeter in parallel with the circuit. • Set the range to the desired voltage. • Use the service hole when measuring the voltage at the diagnosis connector.  • Tie a thin wire to the positive (+) probe to access narrow terminals.
Ohmmeter 	Used to find opens and shorts in the circuit, to confirm continuity and to measure resistance.	• Zero the ohmmeter.  • Verify that voltage is not applied to the circuit. • Connect the probes between two points in a circuit. 	• Zero the meter after switching to the measuring range. • Before using the ohmmeter, make sure the ignition switch is off or the negative (–) battery cable is disconnected to prevent burning or otherwise damaging the ohmmeter.
Ammeter 	Used to check alternator output, current supplied to the starter, and dark current within a circuit. Note Dark current is the constant flow of current while the ignition switch is OFF.	• Connect the ammeter in series with the circuit by touching the positive (+) probe to the power-side terminal and the negative (–) probe to the ground-side terminal. 	• Set the range to the desired amperage. • Connect the ammeter in series with the circuit. The ammeter may be burned or otherwise damaged if it is connected in parallel.

13EGIX-312

PRE-DELIVERY INSPECTION AND SCHEDULED MAINTENANCE SERVICES

13E0AX-301

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

MAINTENANCE TABLE

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

A

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.

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A 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 (Turbo)*4	Replace every 5,000 km (3,000 miles) or 6 months								
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 mls)								

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	I		I		I		I		I
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

13E0AX-303

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)

A

Chassis and body (Cont'd)

Steering and front suspension			I		I		I		I
MTX oil					A				R
Rear axle oil		R	A	A	R	A	A	A	R
Trabstercarrier 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
Driveshaft dust boots			I		I		I		I

13EDAX-304

ENGINE (DOHC)

FEATURES

SERVICE

13E0B2-301

OUTLINE

OUTLINE OF CONSTRUCTION

- The engine is the same as of the previous BP-DOHC Turbo engine. However, some of the components are modified for greater reliability and performance.
- Metallic sodium-filled exhaust valves are adopted.

13E0B2-302

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 cm³ {cu in}			1,839 {112.2}
Bore and stroke mm {in}			83.0 × 85.0 {3.27 × 3.35}
Compression ratio			8.2
Compression pressure kPa {kgf/cm², psi}-rpm			1,127 {11.5, 164}-300
Valve timing	IN	Open BTDC	2°
		Close ABDC	51°
	EX	Open BBDC	59°
		Close ATDC	6°
Valve clearance mm {in}		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.

13E0B2-303

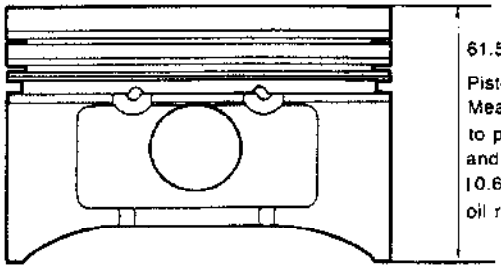
INTERCHANGEABILITY

The following chart shows interchangeability of the main parts of the previous BP DOHC Turbo engine and the new BP DOHC Turbo engine for 4WD models.

Symbols: O .... Interchangeable X .... Not interchangeable

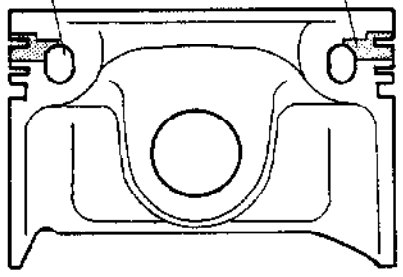
Part name			Interchangeability	Remark
Cylinder block related	Cylinder head		O	
	Camshaft oil seal		O	
	Cylinder head bolt		O	
	Cylinder head gasket		O	
	Cylinder head cover		O	
	Cylinder head cover gasket		O	
	Cylinder block		O	
	Main bearing cap		O	
	Main bearing support plate		O	
	Oil pan		×	Turbocharger oil return pipe hole increased from 13mm {0.51 in} to 17mm {0.67 in}
	Timing belt cover		O	
	Seal plate		O	
	Front oil seal		O	
	Rear oil seal		O	
Crankshaft related	Crankshaft		O	
	Main bearing		O	
	Thrust bearing		O	
	Connecting rod		×	Shape different
	Connecting rod bearing		O	
	Piston		×	Piston skirt shortened
	Piston pin		O	
	Piston ring	Top	×	Sectional shape different
		Second	×	Piston ring end gap increased from 0.15—0.30mm {0.006—0.011 in} to 0.35—0.50mm {0.014—0.019 in} (Measured in cylinder)
	Crankshaft pulley		×	Shape different
	Rear cover		O	
	Flywheel		O	
	Flywheel bolt		O	
Timing belt related	Timing belt		O	
	Timing belt crank pulley		O	
	Camshaft pulley		O	
	Timing belt tensioner and spring		O	
	Idler		O	
Valve related	Camshaft		O	
	HLA		O	
	Valve	Intake	O	
		Exhaust	×	Metallic sodium-filled valve
	Valve spring and seat	Intake	O	
		Exhaust	O	
	Valve guide		O	
	Valve seal		O	
Lubrication system related	Oil pump		O	
	Oil pump gasket		O	
	Oil strainer		O	
	Oil strainer gasket		O	
	Oil cooler		×	Heat dissipation capacity increased
	Oil jet		×	Shape different
	Oil filter		O	
Cooling system related	Water pump		O	
	Thermostat		O	
	Radiator		O	
	Cooling fan		O	

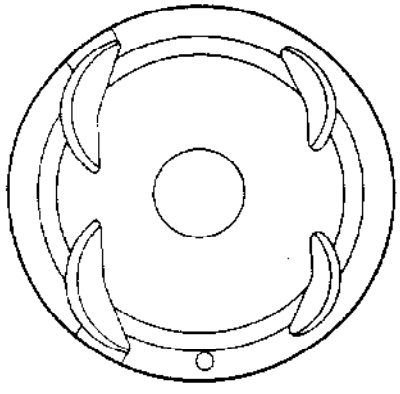
PISTON

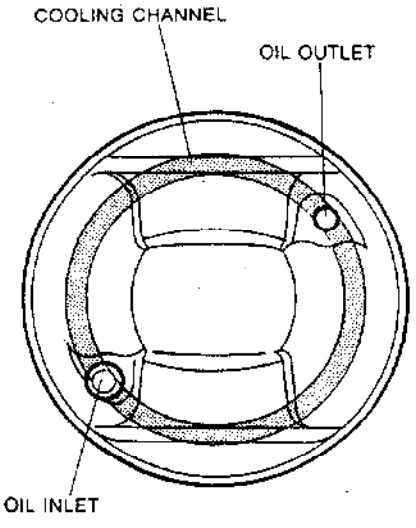


61.5mm (2.42 in) → 56.5mm (2.22 in)

Piston diameter Measured at 90° to pin bore axis and 16.5mm (0.650 in) below oil ring groove. ⇨ Piston diameter Measured at 90° to pin bore axis and 11.0mm (0.433 in) below oil ring groove.



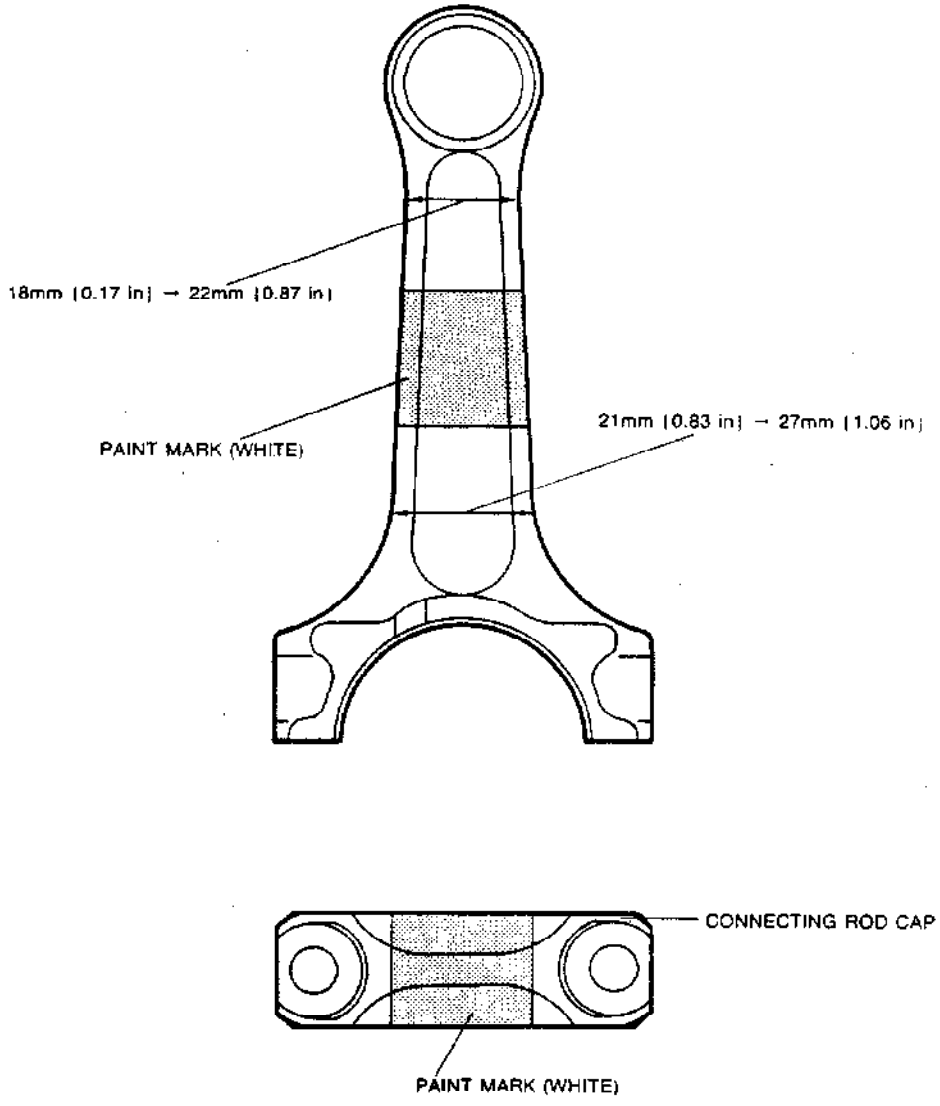




13E0B2-305

- The piston skirt is shortened for reduced weight and friction.
- A cast iron ring carrier is installed in the piston to reduce piston-ring groove wear.
- A cooling channel is incorporated in the body of the piston. The oil jet squirts oil into this cooling channel and the oil absorbs the heat from around the ring lands, reducing piston ring and cylinder wall wear

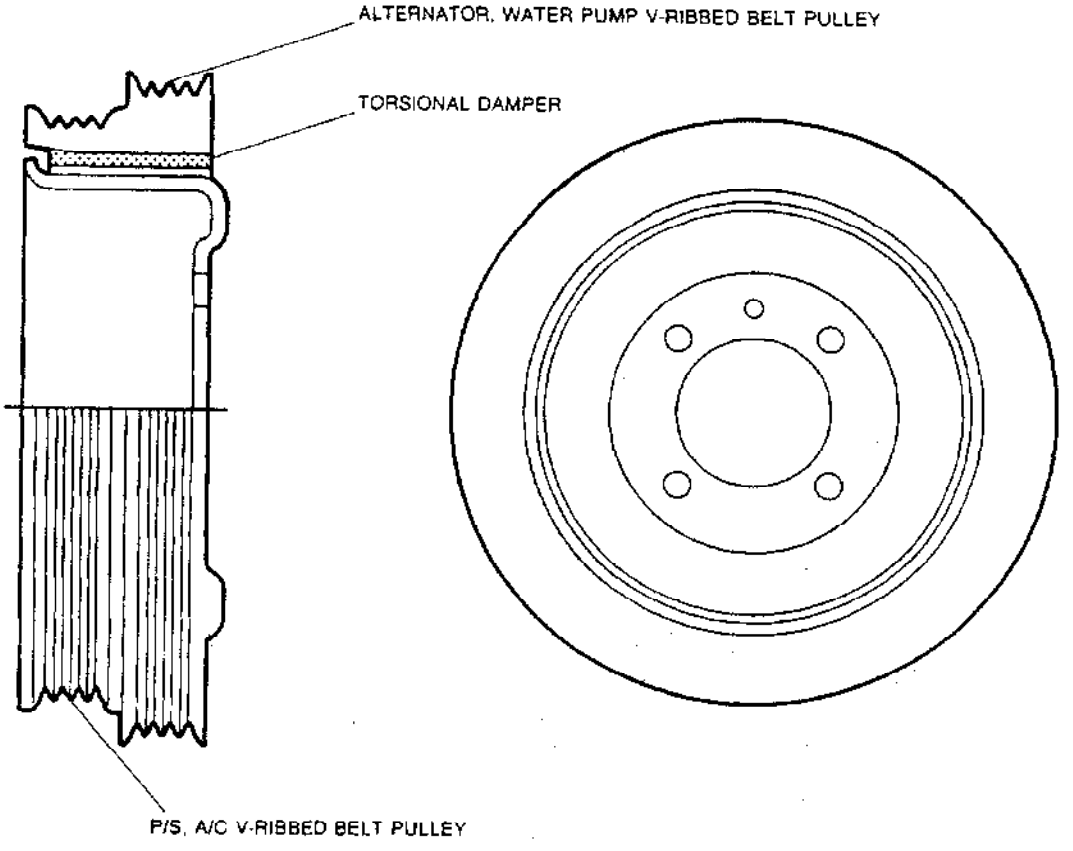
CONNECTING ROD

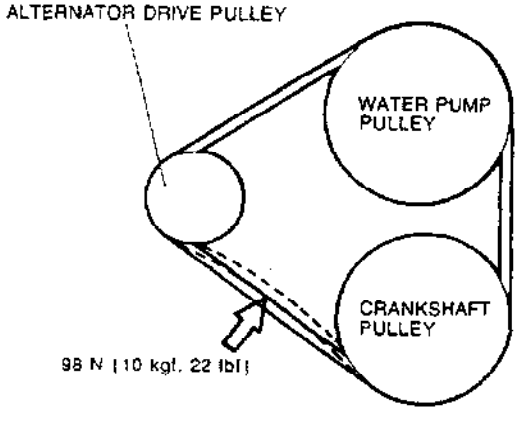


13E0B2-306

- The connecting rod beam is windened for increased strength.
- The connecting rod and cap are marked with white paint for identification.

CRANKSHAFT PULLEY





Deflection (98 N {10 kgf, 22 lbf}) mm {in}

Drive belt	New	Used	Limit
Alternator	5.5—7.0 {0.22—0.27}	6.0—7.5 {0.24—0.29}	8.0 {0.31}

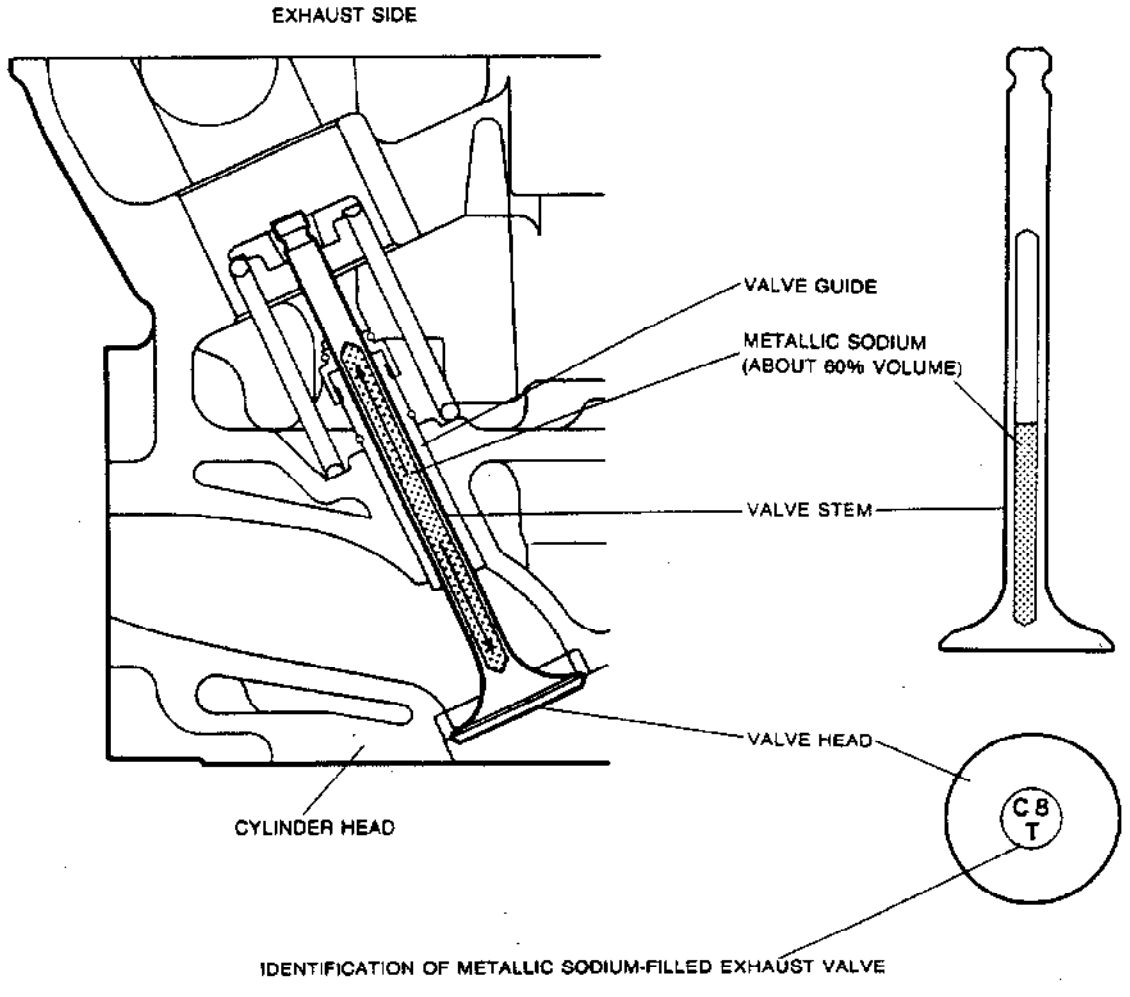
Tension N {kgf, lbf}

Drive belt	New	Used	Limit
Alternator	460—660 {46—68, 110—140}	400—580 {40—60, 88—130}	340 {35, 77}

13E0B2-307

- The alternator and water pump pulleys are changed to V-ribbed type for improved performance.
- With the adoption of the V-ribbed belt, the belt adjustment specifications are changed.

EXHAUST VALVE



IDENTIFICATION OF METALLIC SODIUM-FILLED EXHAUST VALVE

13E0B2-308

- Superior heat dissipating metallic sodium-filled exhaust valves are adopted. During engine operation, the metalic sodium inside the valve stem melts. As the valve moves up and down, the sodium splashes around inside the valve and helps to absorb heat from the cylinder head and to transfer it back to the engine coolant through the valve guide. In this way, the combustion chamber temperature is reduced, reducing knocking and improving fuel efficeincy.
- Special handling of sodium filled valves is required for personal safety. (See next page.)

INSTRUCTION FOR HANDLING METALLIC SODIUM-FILLED EXHAUST VALVE

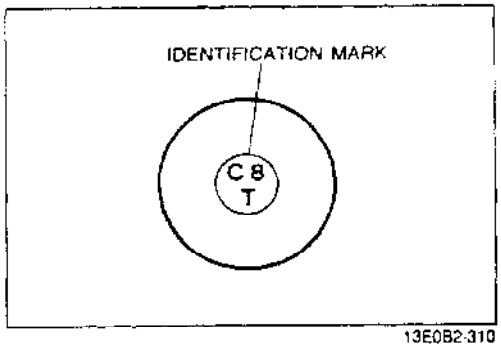
Improper handling of metallic sodium can cause sever burns, loss of eye sight, and the production of highly flammable hydrogen gas. Therefore, handle and dispose of such valves carefully.

First aid
- **If metallic sodium get into your eyes, quickly flush it out with large amounts of water. See a physician.**
- **If it gets on your skin, wash it off with plenty of water. See a physician.**
- **If it catches fire, use a dry powder fire extinguisher or dry sand to put it out. Never use water.**

Note
- **Do not use the valve as tool.**
- **Do not drain the metallic sodium from the valve.**
- **Neutralize the metallic sodium-filled valve before its disposal.**

Reference
- **" $\overset{C\,8}{T}$ " is embossed on the valve head to identify a metallic sodium-filled exhaust valve.**

13E0B2-309



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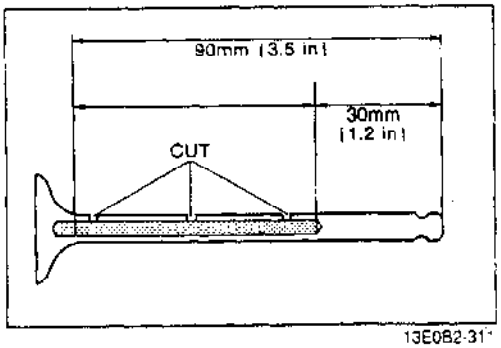

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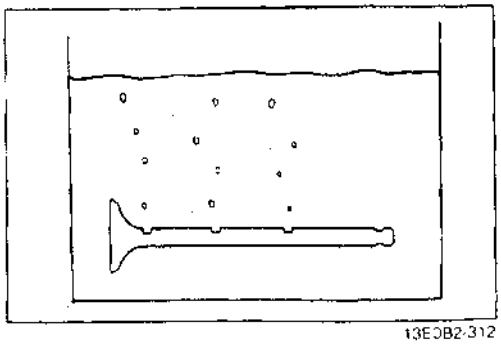

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Disposal procedure

Follow the procedure below to neutralize the valve.

(1) Prepare a water-filled bucket (10 Liters {11 US qt, 8.8 Imp qt} or more) and a dry powder fire extinguisher in a well ventilated place.

(2) Wear safety glasses and gloves.

Note
- ***If the valve is broken skip Step (3).***

(3) Secure the valve in a vice and, using a hacksaw, cut a few 1.5mm {0.059 in} deep slits 30—90mm {1.2—3.5 in} from the valve stem end.

(4) Quickly submerge the valve in the bucket of water. (Treat up to eight valve at a time.)

(5) Leave the valve in the water for about one hour until the bubbles stop. (Stir occasionally with a metal rod for complete reaction.)

Caution
- **Do not reach into the solution or let it get on your skin or clothing; burning may result.**

(6) Remove the valve with tongs and dispose of as for a conventional part.

(7) Follow local regulations for disposal of the solution.

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with 323 Workshop Manual [Europe, Australia (1229-10-89L)].

Engine
- Removal
- Installation

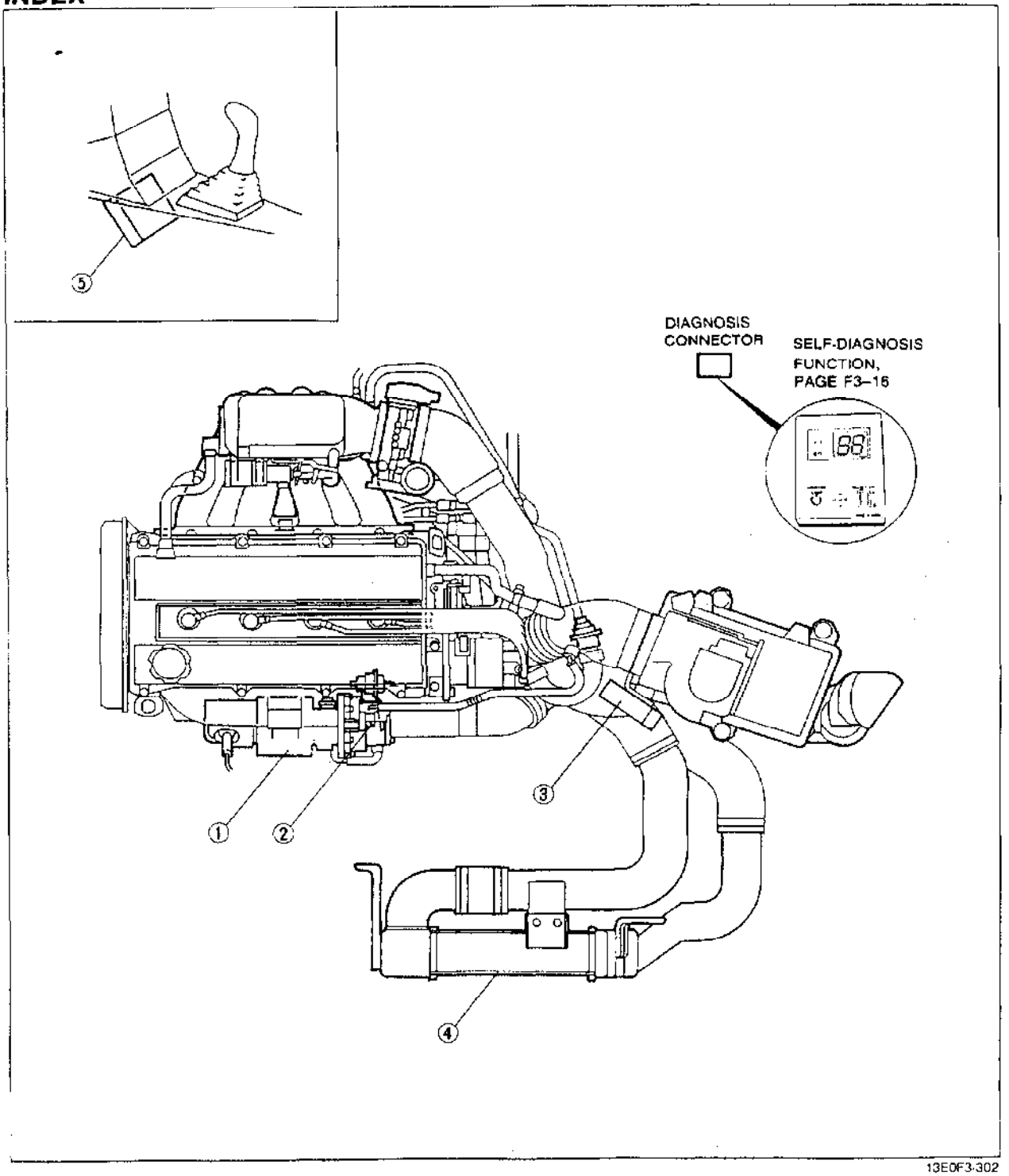
- The intercooler installation position is changed because the intercooler is enlarged. With this change, the engine can be removed and installed without removing the intercooler. The engine removal / installation procedure is the same as of the previous BP-DOHC Turbo engine.

13E0B2-313

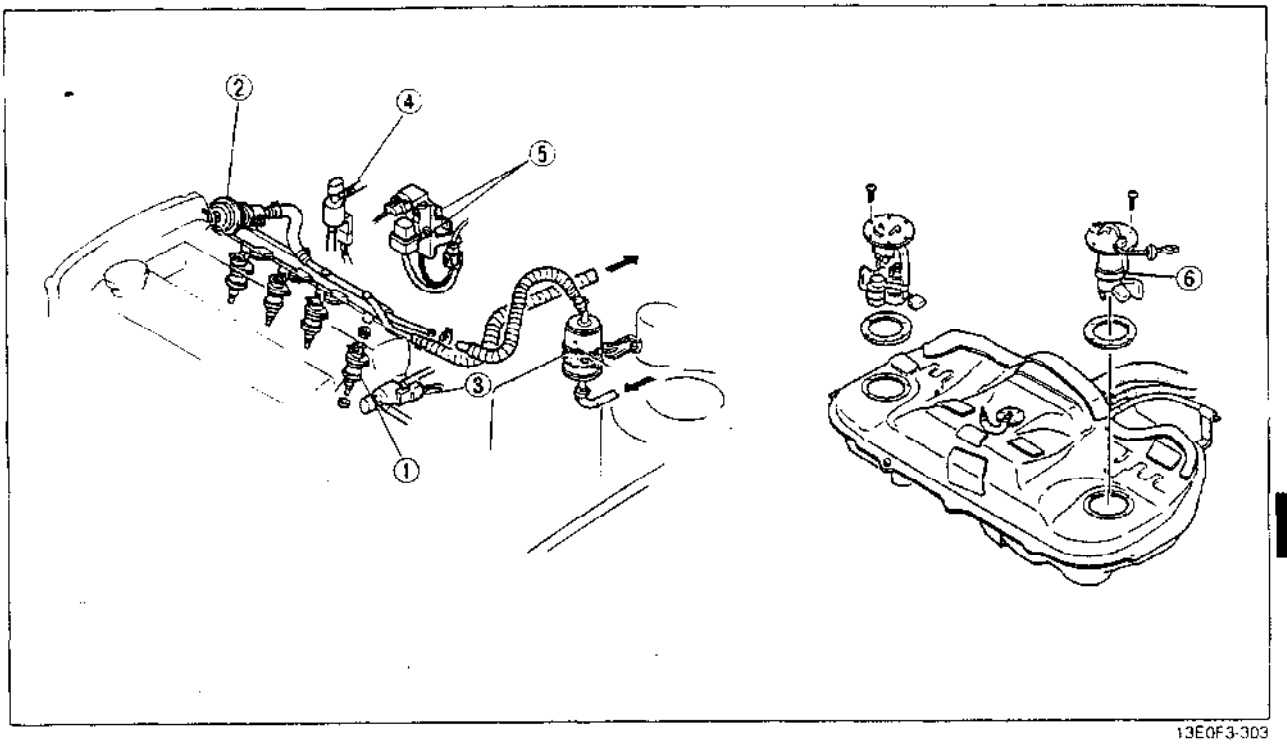
FUEL AND EMISSION CONTROL SYSTEMS

13E0F3-301

INDEX



13E0F3-302



13E0F3-303

OUTLINE

OUTLINE OF CONSTRUCTION

The fuel and emission control system of the new 323 4WD model is basically the same as that of the previous 323 4WD model; however some parts are changed. The changed parts and interchangable parts are shown below.

13E0F3-304

Changed parts

Components		Contents and purpose	Reference page
INTAKE AIR SYSTEM	Turbocharger	• Size increased for greater boost pressure • Wastegate solenoid valve is located on intake port of turbocharger to make system more compact	F3–10 F3–37
	Intercooler	Volume increased for improved	F3–10 F3–39
TURBOCHARGER CONTROL SYSTEM	Wastegate solenoid valve	• Wastegate solenoid valve changed to duty solenoid type for increased engine power and response • Wastegate solenoid valve is located on intake port of turbocharger to make system more compact	F3–11 F3–38
FUEL SYSTEM	Pressure regulator	One-stage operation changed to two-stage operation to improve hot restarting	F3–14 F3–41
	Fuel injector	High-ohmic type change to low-ohmic type with external solenoid resistor for improved fuel supply during high-speed driving	F3–12 F3–42
	Fuel pump resistor	Resistance reduced for surer fuel supply	F3–40
CONTROL SYSTEM	Pressure regulator control system	Two-stage operation used to improve hot restarting	F3–14 F3–43
	Air flow meter	Measures larger amount of air flow increased power Resistance values changed	F3– 9

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Interchangable parts

Intake air system
- Air valve
- Air bypass valve
- Air cleaner
- Air cleaner element

Fuel system
- Fuel filter assembly
- Fuel pump (transfer)
- Fuel vapor valve
- Check valve (two-way)

Evaporative system
- Charcoal canister
- Check valve (two-way)

Control system
- Throttle sensor
- Water thermosensor
- Knock sensor and control unit
- Oxygen sensor
- Fuel pump control unit
- Main relay
- Circuit opening relay

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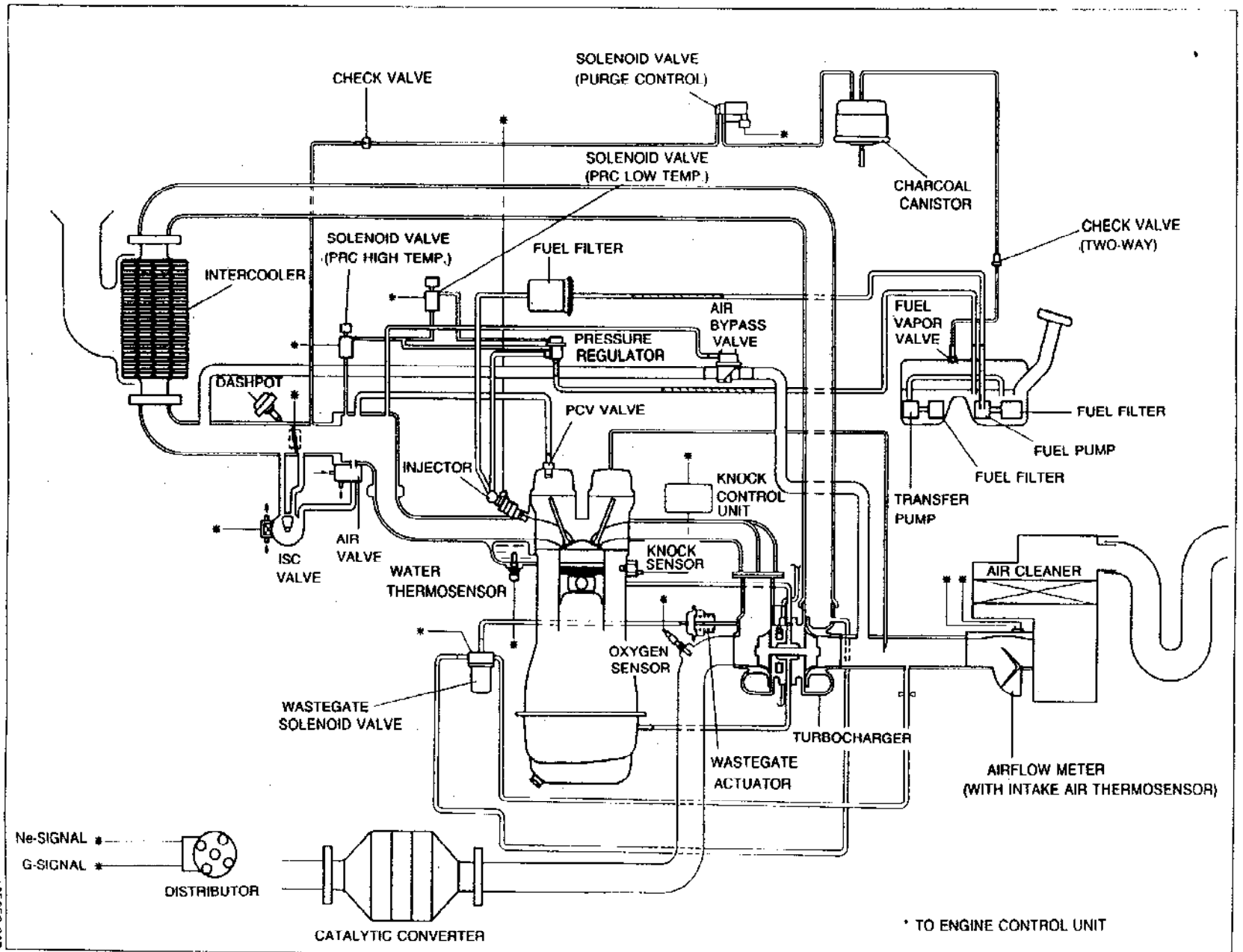
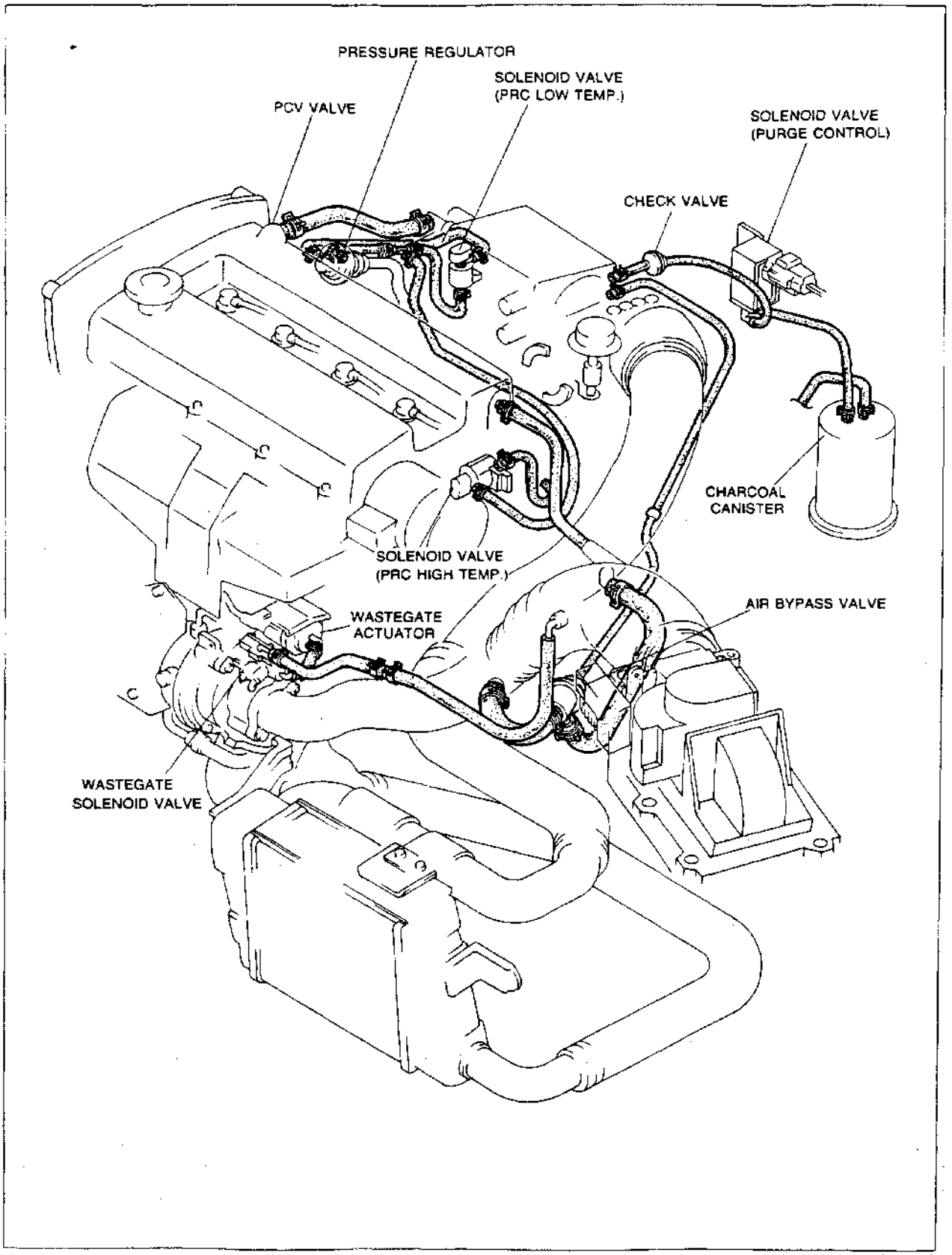
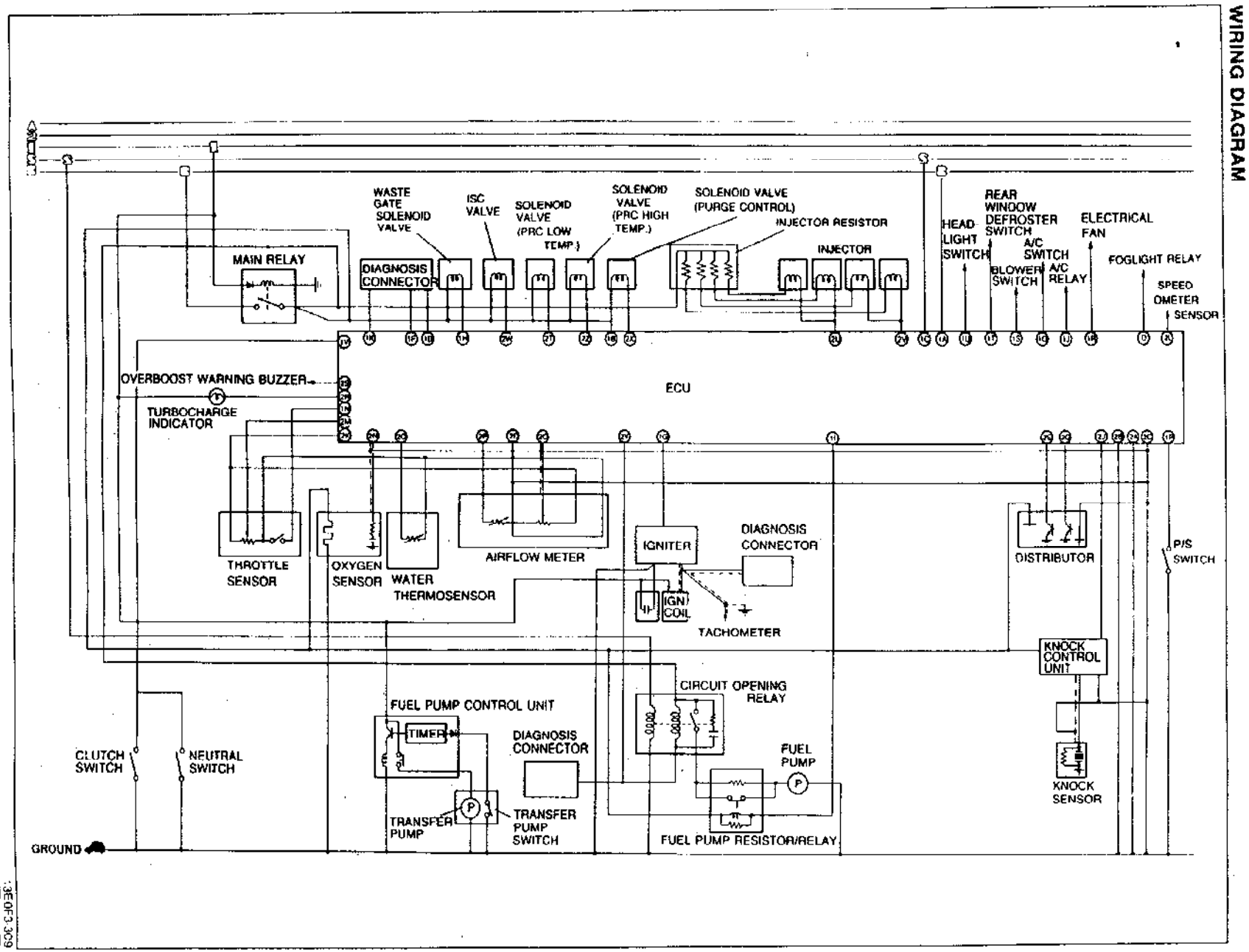

CHECK VALVE
SOLENOID VALVE (PURGE CONTROL)
SOLENOID VALVE (PRC LOW TEMP.)
CHARCOAL CANISTOR
CHECK VALVE (TWO-WAY)
SOLENOID VALVE (PRC HIGH TEMP.)
FUEL FILTER
INTERCOOLER
AIR BYPASS VALVE
FUEL VAPOR VALVE
PRESSURE REGULATOR
DASHPOT
PCV VALVE
FUEL FILTER
FUEL PUMP
FUEL FILTER
INJECTOR
KNOCK CONTROL UNIT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

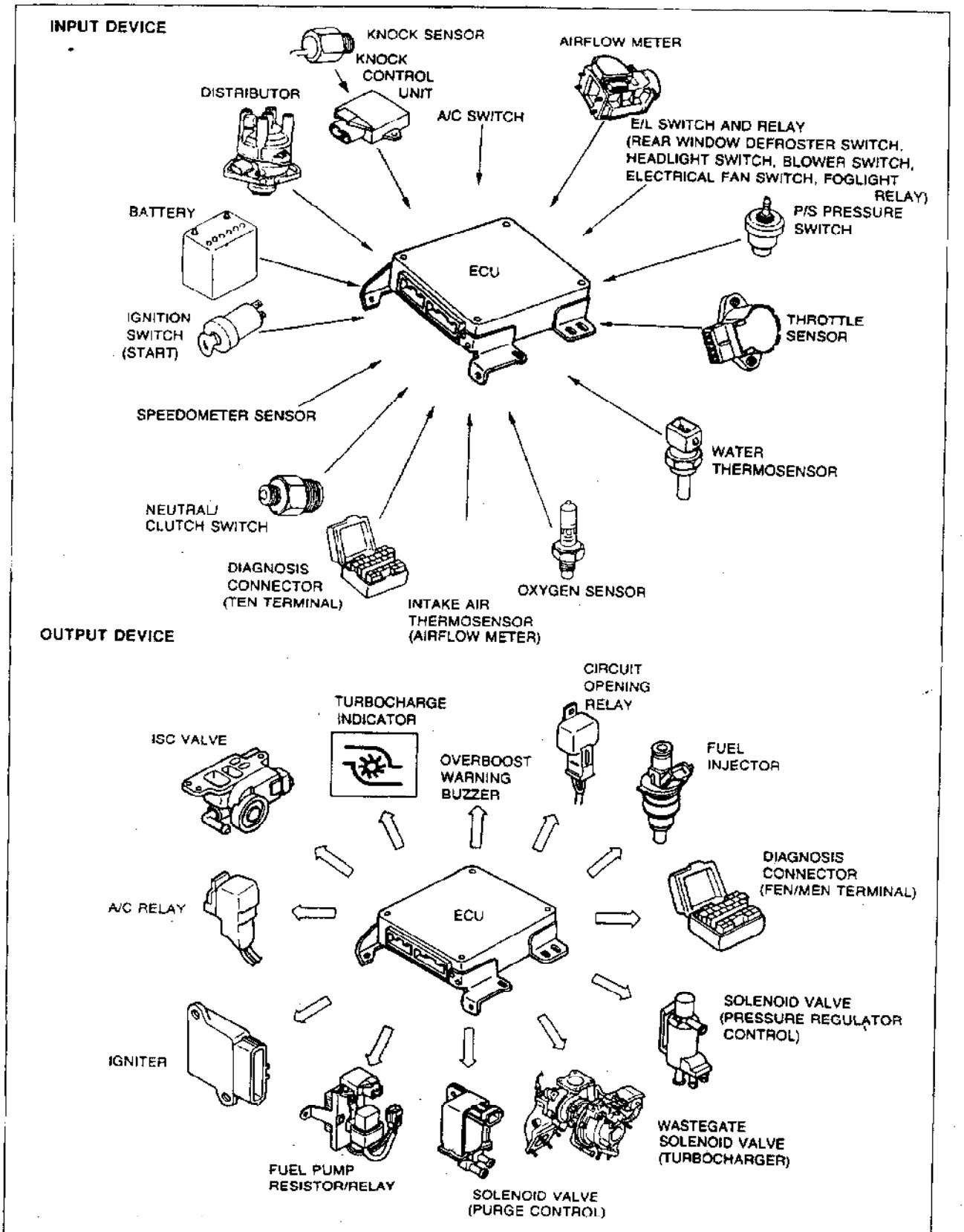
VACUUM HOSE ROUTING DIAGRAM



13E0F3-306


WASTE GATE SOLENOID VALVE
ISC VALVE
SOLENOID VALVE (PRC LOW TEMP.)
SOLENOID VALVE (PRC HIGH TEMP.)
SOLENOID VALVE (PURGE CONTROL)
INJECTOR RESISTOR
INJECTOR
MAIN RELAY
DIAGNOSIS CONNECTOR
HEAD LIGHT SWITCH
REAR WINDOW DEFROSTER SWITCH
A/C SWITCH
BLOWER SWITCH
A/C RELAY
ELECTRICAL FAN
FOGLIGHT RELAY
SPEED OMETER SENSOR
OVERBOOST WARNING BUZZER
TURBOCHARGE INDICATOR
ECU
THROTTLE SENSOR
OXYGEN SENSOR
WATER THERMOSENSOR
AIRFLOW METER
IGNITER
DIAGNOSIS CONNECTOR
IGN COIL
TACHOMETER
DISTRIBUTOR
P/S SWITCH
KNOCK CONTROL UNIT
KNOCK SENSOR
CIRCUIT OPENING RELAY
FUEL PUMP CONTROL UNIT
TIMER
DIAGNOSIS CONNECTOR
FUEL PUMP
TRANSFER PUMP
TRANSFER PUMP SWITCH
FUEL PUMP RESISTOR/RELAY
CLUTCH SWITCH
NEUTRAL SWITCH
GROUND

ECU RELATIONSHIP DIAGRAM



13ECF3-310

SPECIFICATIONS

Item \ Engine			BP TURBO
Idle speed*		rpm	800 ± 50
Ignition timing*		BTDC	10 ± 1°
Fuel pump			
Maximum output pressure		kPa {kgf/cm², psi}	490—736 {5.0—7.5, 71—110}
Transfer pump			
Maximum output pressure		kPa {kgf/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	Low	kPa {kgf/cm², psi}	265—314 {2.7—3.2, 38—46}
	High	kPa {kgf/cm², psi}	304—392 {3.1—4.0, 44—57}
Injector			
Type			Low-ohmic
Type of drive			Electromechanical
Resistance/injector		Ω	1—3 {at 20°C {68°F}}
Injector resistor			
Resistance/injector		Ω	6 {at 20°C {68°F}}
Idle-speed control (ISC) valve			
Type			Rotary
Resistance		Ω	11—13 {at 20°C {68°F}}
Solenoid valve (purge control)			
Resistance		Ω	23—27 {at 20°C {68°F}}
Solenoid valve (wastegate)			
Resistance		Ω	35—45 {at 20°C {68°F}}
Solenoid valve (PRC)			
Resistance	Low temp.	Ω	33—39 {at 20°C {68°F}}
	High temp.	Ω	33—39 {at 20°C {68°F}}
Water thermosensor			
Resistance		−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↔V_S	Fully closed	20—600
		Fully open	20—1,000
	E_2↔V_C		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↔F_C	Fully closed	∞
		Fully open	0
Oxygen sensor (ceramic heater coil)			
Resistance		Ω	Approx. 6 {at 20°C {68°F}}
Fuel tank			
Capacity		L {US gal, Imp gal}	60 {15.9, 13.2}
Air cleaner			
Element type			Oil permeated
Fuel			
Specification			Unleaded premium (RON 95 or higher)

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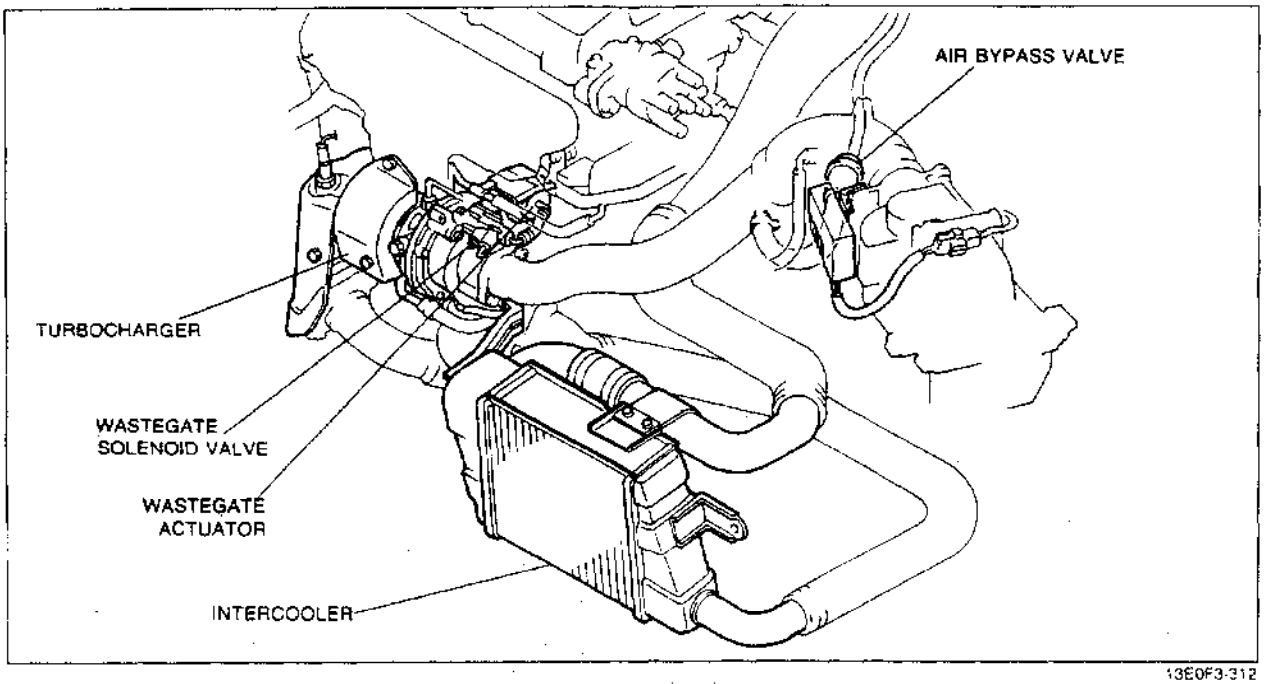
* TEN terminal of diagnosis connector grounded.
The ▭ mark indicates newly equipped parts.

TURBOCHARGER CONTROL

OUTLINE

- The capacity of the air-to-air intercooler is increased to reduce the intake air temperature and to the improve engine performance.
- With addition of the improved wastegate control system, the engine's high rpm torque is increased.



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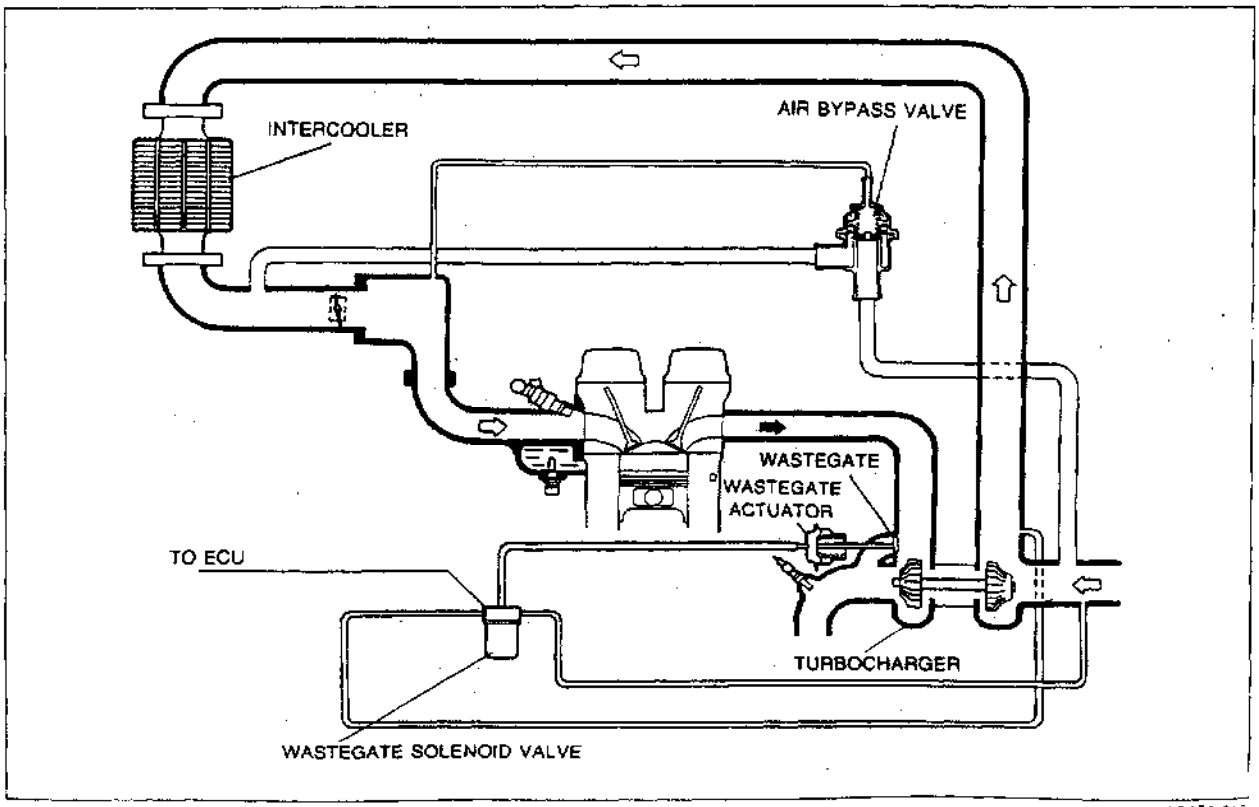
SYSTEM DIAGRAM



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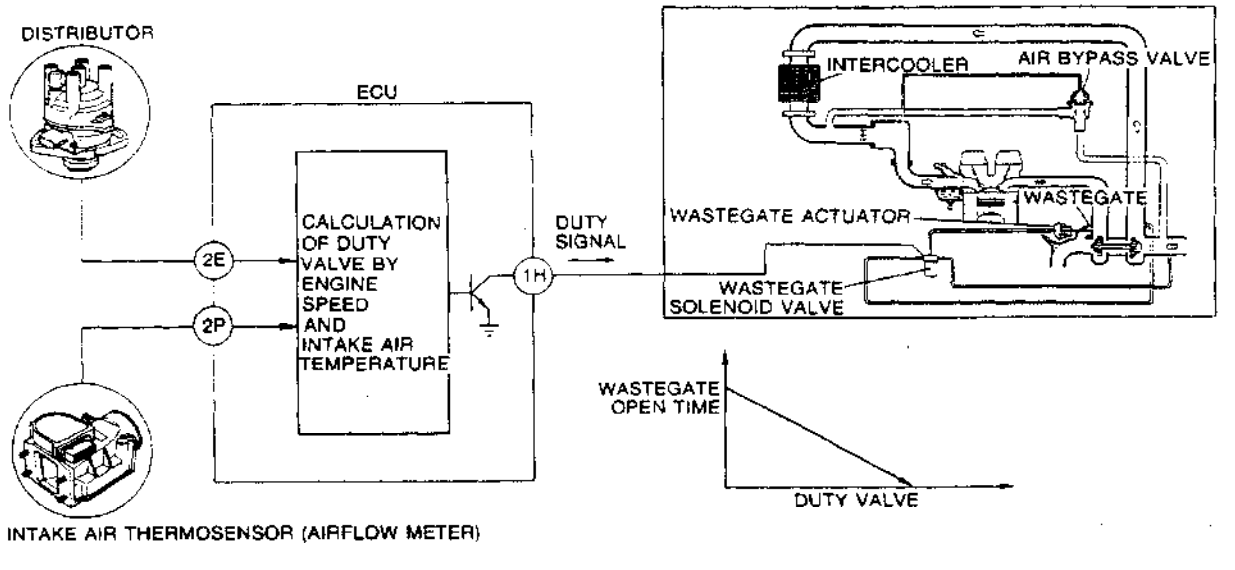
WASTEGATE CONTROL

The engine control unit controls the wastegate solenoid valve by duty signals to better control the boost pressure, increasing the engine's power and response.

13E0F3-313

System Diagram



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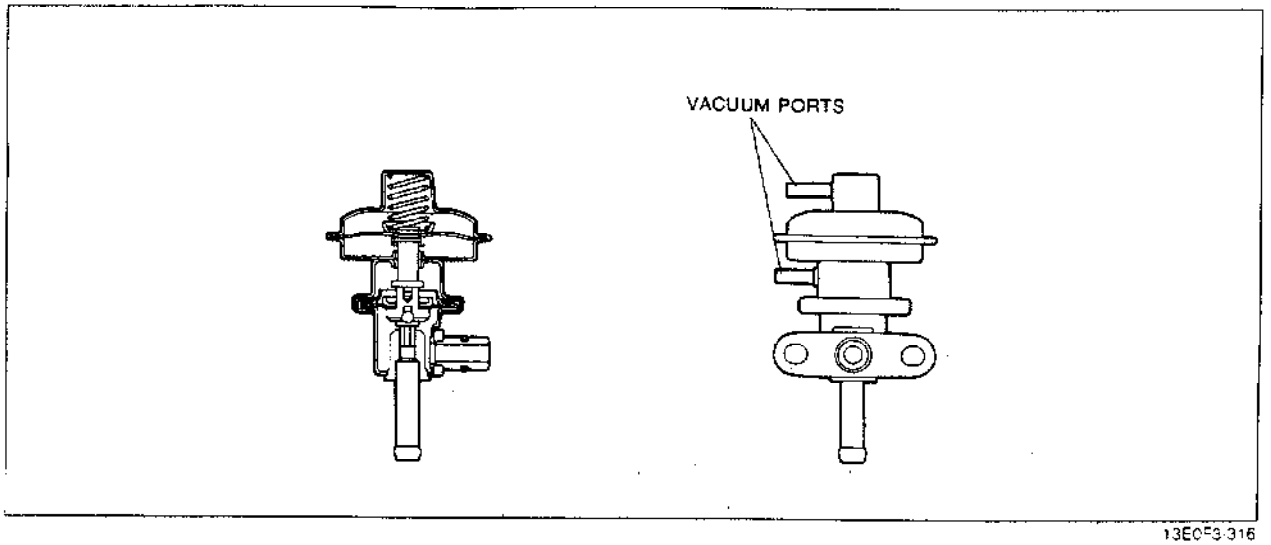
FUEL SYSTEM

OUTLINE

- The pressure regulator has two vacuum ports for its two-stage operation. (Refer to page F3–43.)
- The injectors are changed from high-ohmic type to low-ohmic type for improvement of the supply of fuel during high-speed engine operation.
- To decrease the current in the injectors, an external resistor is equipped and is mounted on the aircleaner housing.

13E0F3-315

Pressur regulator



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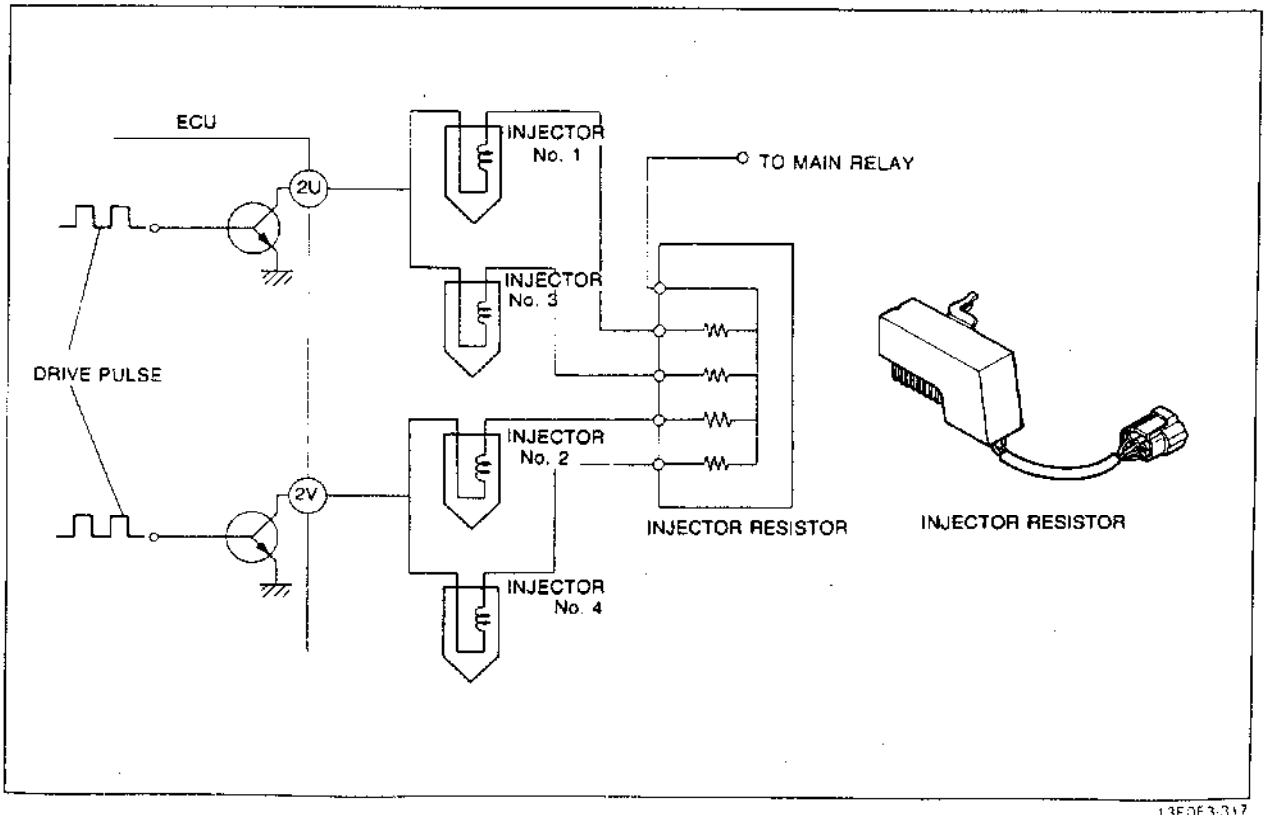
Injector



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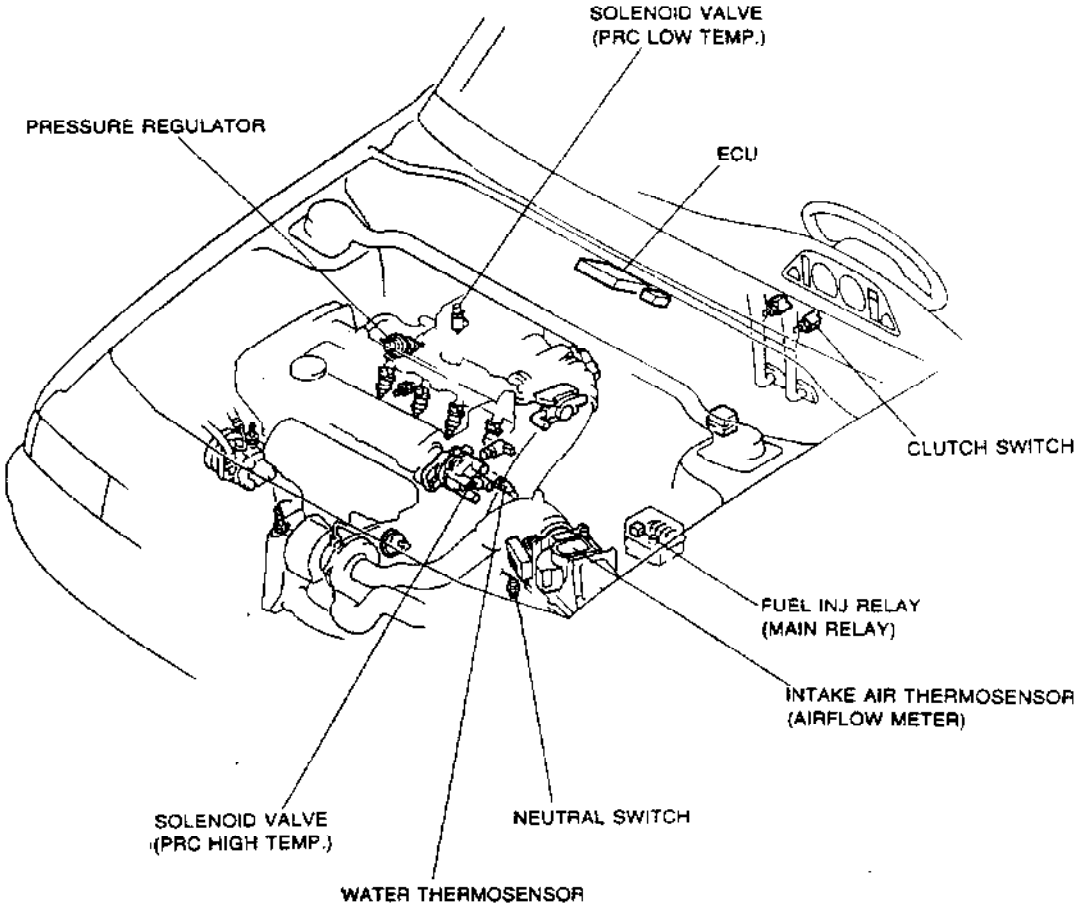
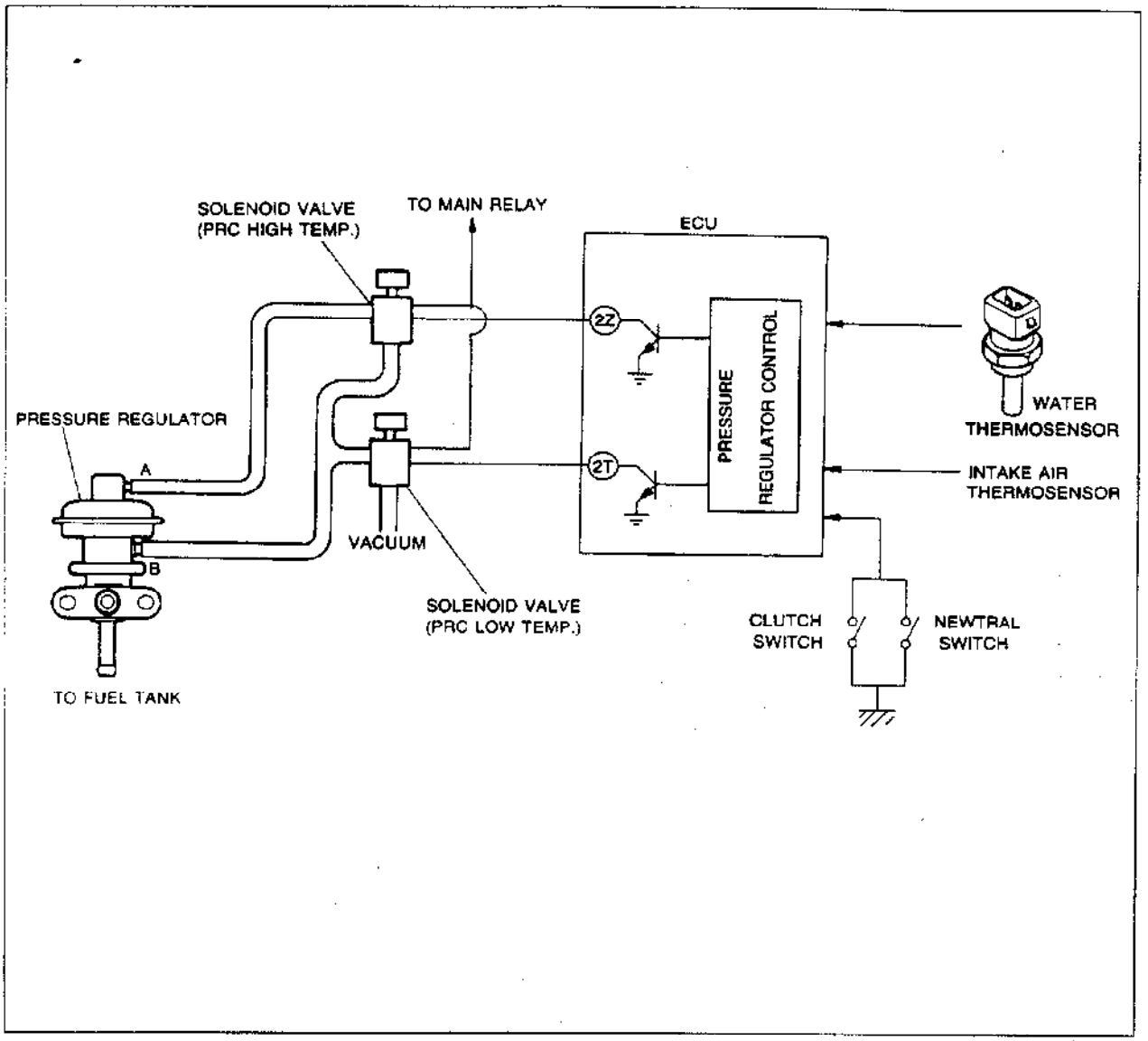
CONTROL SYSTEM

STRUCTURAL VIEW



PRESSURE REGULATOR CONTROL SYSTEM



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To prevent vaporlock in the fuel system during hot restart idle, a two-stage pressure regulator is adoped to the new 323 4WD.

Low temperature operation: The vacuum to the pressure regulator (A and B ports) is cut (solenoid valve [low temp.] ON), and the fuel injection pressure is increased to 284 kPa {2.90 kgf/cm^2, 41 psi}.

High temperature operation: The vacuum to the pressure regulator (A port) is cut (solenoid valve [high temp.] ON), and the fuel injection pressure is increased to 343 kPa {3.5 kgf/cm^2, 49 psi}.

Condition and operation

Condition			Operation			
Coolant temperature	Intake air temperature	Engine	Solenoid valve (low temp.)	Solenoid valve (high temp.)	Operation time	Operation
Above 90°C {194°F}	40°C {104°F}—50°C {122°F}	No load	ON	OFF	180s	Low temp.
	Above 50°C {122°F}		OFF	ON	210s	High temp.

13E0F3-319

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison to the Mazda 323 4-Wheel Drive Workshop Manual [1229-10-89L].

Turbocharger
- Removal / Installation

Wastegate solenoid valve
- Inspection

Intercooler
- Removal / Installation

Fuel pump (main)
- Inspection

Fuel pump resistor/relay
- System operation
- Inspection

Injector
- Inspection
- Volume test

Injector resistor
- Inspection

Pressure regulator control system
- Solenoid valve (pressure regulator control)

Engine control unit (ECU)
- Inspection

13E0F3 320

SELF-DIAGNOSIS FUNCTION

OUTLINE

The self-diagnostic function and diagnosis procedure are the same as for the previous 4WD model. However, there is an additional service (malfunction) code (No.35) for the new model.

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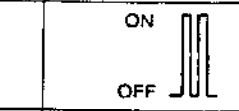
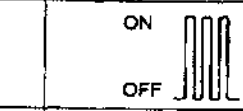
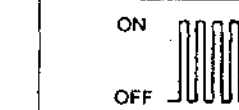
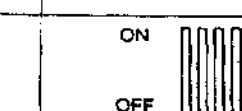
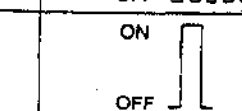
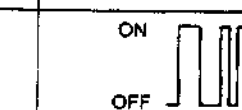
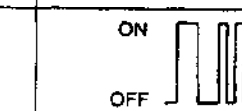
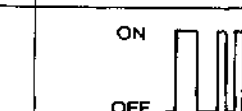
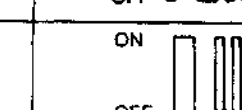
SERVICE CODE NUMBERS

Sensor or subsystem	Condition	Fail-safe	Malfunction display	
			Service code no.	Output signal pattern
NE-signal	No NE-signal	—	02	
G signal	No G signal	Cancels two-group injection	03	
Knock sensor	Open or short circuit	Retards ignition timing 1°	05	
Airflow meter	Open or short circuit	Basic fuel injection amount fixed as for two 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	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 seconds after engine starts (1,500 rpm)	Cancels engine feedback operation	15	
Feedback system	Sensor output continues unchanged 50 seconds after engine exceeds 1,500 rpm	Cancels engine feedback operation	17	

Sensor or subsystem	Condition	Fail-safe	Malfunction display	
			Service code no.	Output signal pattern
Fuel pump resistor/relay	Open or short circuit	—	24	
Solenoid valve (pressure regulator control, low temp.)		—	25	
Solenoid valve (purge control)		—	26	
ISC valve		—	34	
Solenoid valve (pressure regulator control, high temp.)		—	35	
Solenoid valve (Wastegate)		—	42	

13E0F3-322

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 twenty seconds to erase the service code from the ECU memory.**

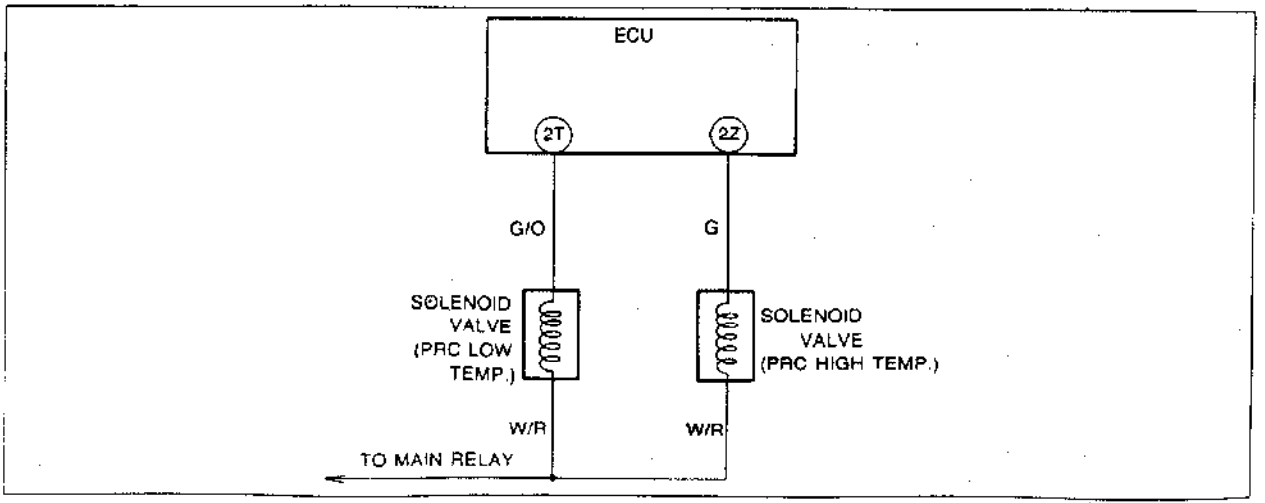
CODE NO.	25 (SOLENOID VALVE — PRESSURE REGULATOR CONTROL) (Low temperature opoeration)		
STEP	INSPECTION		ACTION
1	Disconnect connector from ECU; is there battery voltage at ECU terminal 2T (G/O) with ignition switch ON?	Yes	Check ECU terminal connector for poor connection ⇨ If OK, replace ECU ☞ page F3–2 ⇨ If not OK, repair or replace connector
		No	Go to next step
2	In same condition as in Step 1, is there battery voltage at solenoid valve (PRC low temp.) connector terminal wire (G/O)?	Yes	Repair or replace wiring harness (G/O)
		No	Go to next step
3	Is solenoid valve (PRC low temp.) OK? ☞ page F3–43	Yes	Check for a short or open circuit in wiring harness (main relay [FUEL INJ relay] — solenoid valve [PRC low temp.])
		No	Replace solenoid valve (PRC low temp.)

13E0F3-323

CODE NO.	35 (SOLENOID VALVE — PRESSURE REGULATOR CONTROL) (High temperature opoeration)		
STEP	INSPECTION		ACTION
1	Disconnect connector from ECU; is there battery voltage at ECU terminal 2Z (G) with ignition switch ON?	Yes	Check ECU terminal connector for poor connection ⇨ If OK, replace ECU ☞ page F3–2 ⇨ If not OK, repair or replace connector
		No	Go to next step
2	In same condition as in Step 1, is there battery voltage at solenoid valve (PRC high temp.) connector terminal wire (G)?	Yes	Repair or replace wiring harness (G)
		No	Go to next step
3	Is solenoid valve (PRC high temp.) OK? ☞ page F3–43	Yes	Check for a short or open circuit in wiring harness (main relay [FUEL INJ relay] — solenoid valve [PRC high temp.])
		No	Replace solenoid valve (PRC high temp.)

13E0F3-324

Circuit Diagram



13E0F3-325

TROUBLESHOOTING GUIDE

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 (HIGH, LOW TEMP.) (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*			○											○
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		○											○	
DISTRIBUTOR: NE SIGNAL	○	○	○	○	○	○	○		○	○	○	○	○	

13E0F3-326

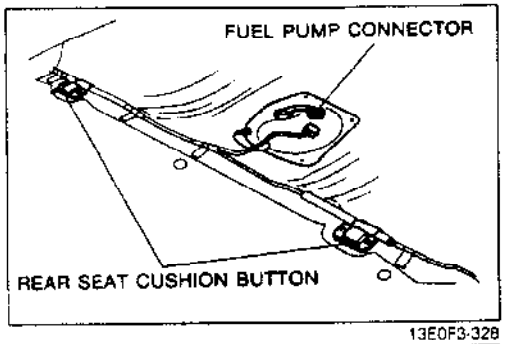
* E/L SIGNAL: Blower fan control switch second position or higher, electric cooling fan operating, headlights ON, or rear window defroster ON.

DIAGNOSTIC INDEX

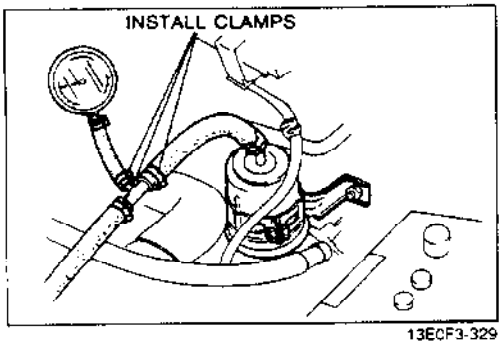
No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Will not crank or cranks slowly		Refer to Engine Electrical System	*1
2	Cranks normally but will not start	No combustion	Engine cranks at normal speed but shows no sign of firing	F3–22
3		Partial combustion—When engine cold	Engine cranks at normal speed but shows only partial combustion and will not continue to run	*1
4		Partial combustion—After warm-up	Engine cranks at normal speed and shows partial combustion but will not continue running after being hot soaked	F3–25
5	Cranks normally but hard to start	Always	Engine cranks at normal speed but requires excessive cranking time before starting	*1
6		When engine cold	Same condition as No. 5 when engine is cold Restarts normally after warm-up	*1
7		After warm-up	Same condition as No. 5 after running and being hot soaked Starts normally when cold	F3–27
8	Rough idle/Engine stalls at idle	Always	Engine stalls or vibrates excessively at idle	F3–29
9		Before warm-up	Engine stalls or vibrates excessively at idle during warm-up	*1
10		After warm-up	Engine runs normally at idle during warm-up but stalls or vibrates excessively after warm-up	F3–31
11		When A/C, P/S, or E/L ON	Engine stalls or vibrates excessively at idle when A/C, P/S, or E/L ON	*1
12	Rough idle/Engine stalls just after starting		Engine stalls or vibrates excessively just after starting (acceleration from idle)	*1
13	High idle speed after warm-up		Idle speed excessively high after warm-up	*1
14	Idle moves up and down/Idle hunts		Engine speeds up and down periodically at idle	F3–33
15	Engine stalls on deceleration		Engine unexpectedly stops running during or after deceleration	F3–35
16	Engine stalls suddenly (intermittent)		Engine intermittently stops running	F3–36
17	Hesitates/Stumbles on acceleration		Flat spot occurs just after accelerator is depressed, or mild jerking occurs during acceleration	*1
18	Surges while cruising		Unexpected change in engine speed that is usually repetitive	*1
19	Lack of power		Performance poor under load when throttle valve is wide open Maximum speed reduced	*2
20	Poor acceleration		Performance poor during acceleration	*2
21	Runs rough during deceleration/Backfire		Engine runs rough during deceleration, and abnormal combustion occurs in exhaust system	*1
22	Knocking		Abnormal combustion accompanied by audible "pinging" noise	*2
23	Fuel odor		Gasoline odor in cabin	*1
24	Exhaust sulfur smell		Exhaust gas has an unusual odor	*1
25	High oil consumption		Oil consumption excessive	*2
26	Poor fuel economy		Fuel economy unsatisfactory	*1
27	A/C does not work		Blower fan operates, but magnetic clutch does not	*1

13E0F3-327

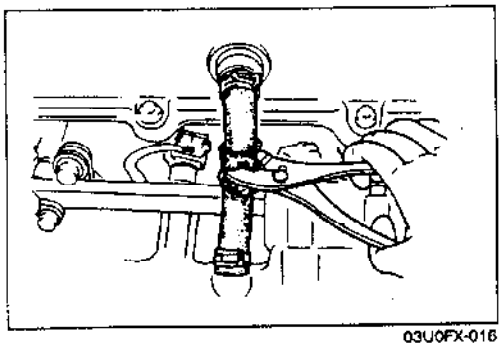
***1...Refer to 323 Workshop Manual (1203-10-89F).**
***2...Refer to 323 4-Wheel Drive Workshop Manual (1229-10-89L).**



13E0F3-328



13E0F3-329



03U0FX-016

PRECAUTIONS

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 as discribed below.
   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 fuel 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.**

Pinching Hose

When pinching an air hose or a fuel hose with pliers, wrap the hose with a rag to prevent damage.

SYMPTOM TROUBLESHOOTING

2	CRANKS NORMALLY BUT WILL NOT START (NO COMBUSTION)
DESCRIPTION	• Engine cranks at normal speed but shows no sign of firing • Battery in normal condition • Throttle valve not held fully open while cranking (dechoke system not operating) • Fuel in tank

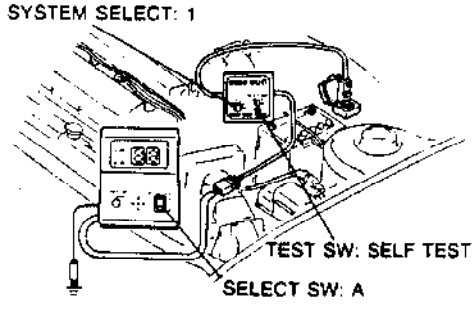
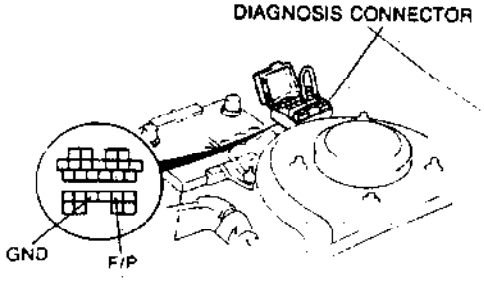
[TROUBLESHOOTING HINTS]

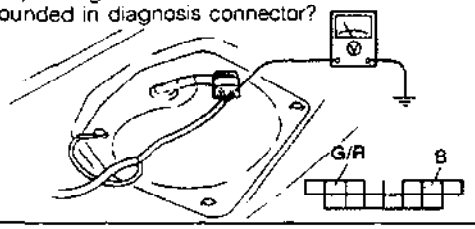
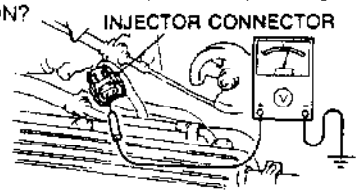
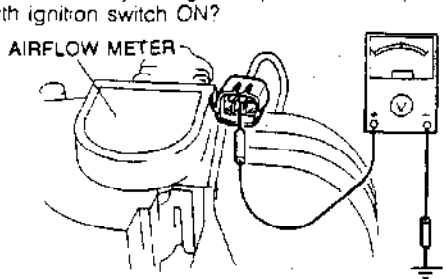
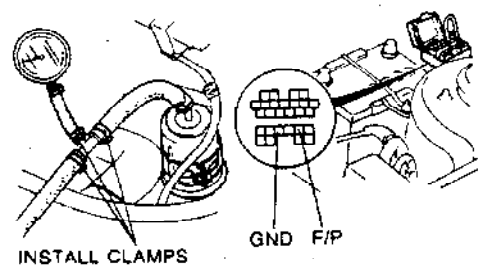
① No spark
- Ignition control malfunction
- Ignition system component malfunction

② No fuel injection
- Fuel pump inoperative
- Injectors inoperative

③ Low fuel line pressure

④ Low engine compression

STEP	INSPECTION		ACTION
1	Is strong blue spark visible at disconnected high-tension lead?	Yes	Go to Step 3
		No	Go to Step 2
2	Is "00" displayed on Self-Diagnosis Checker with ignition switch ON? 	Yes	Check ignition system (Refer to Troubleshooting "Misfire") ☞ **Section G**
		No	**Service Code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F3–16**
			"88" flashes Check ECU terminal 1F voltage ☞ **page F3–45** **Voltage: Battery voltage (Ignition switch ON)** ⇨ If OK, replace ECU ☞ **page F3–2** ⇨ If not OK, check wiring (ECU — Self-Diagnosis Checker)
3	Connect diagnosis connector terminals F/P and GND with jumper wire; is fuel pump operating sound heard with ignition switch ON? 	Yes	Does engine start in this condition? ⇨ If it does, check circuit-opening relay ⇨ If it does not, go to Step 5
		No	Go to next step

STEP	INSPECTION		ACTION
4	Is there battery voltage at fuel pump connector (G/R) with ignition switch ON and F/P terminal grounded in diagnosis connector? 	Yes	Check continuity of fuel pump between terminals G/R and B
		No	Check circuit opening relay
5	Is injector operating sound heard while engine is being cranked?	Yes	Go to Step 8
		No	Go to next step
6	Is there battery voltage at injector connector (No.1 (P), No.2 (R), No.3 (V), No.4 (O)) with ignition switch ON? 	Yes	Check ECU terminals 1N, 2A, 2U, and 2V voltages ☞ page F3–45
		No	Go to next step
7	Is there battery voltage at injector resistor (W/R) with ignition switch ON? 	Yes	Check injector resistor ⇨ If OK, check for a short circuit in wiring harness (Injector resistor—Injector) ⇨ If not OK, replace injector resistor
		No	Check for open circuit in wiring harness (Main relay (FUEL INJ relay)—Injector resistor)
8	Connect diagnosis connector terminals F/P and GND with jumper wire; is fuel line pressure correct with ignition switch ON? **Fuel Line pressure: 265—314 kPa (2.7—3.2 kgf/cm², 38—46 psi)** 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ⇨ If pressure **quickly** increases, check pressure regulator ⇨ If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose is not clogged, check fuel pump maximum pressure
			High pressure Check if fuel return hose is clogged or restricted ⇨ If it is not, replace pressure regulator ☞ page F3–3 ⇨ If it is, repair or replace it

STEP	INSPECTION		ACTION
9	Is engine compression correct? ☞ **Section B2** **Engine compression:** **1059 kPa {10.8 kgf/cm², 152 psi}-300 rpm**	Yes	Go to next step
		No	Check engine condition ☞ **Section B2** • Worn piston, piston rings or cylinder wall • Damaged cylinder head gasket • Damaged or warped cylinder head • Improper valve seating • Valve sticking in guide
10	Are all spark plugs OK? ☞ **Section G** • Wear and carbon buildup • Plug gap • Damage	Yes	Go to next step
		No	Clean, adjust
11	Try known good ECU; does condition improve? ☞ **page F3–2**		

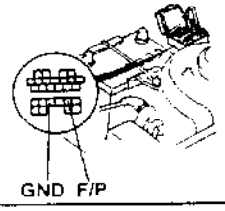
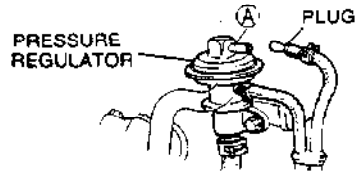
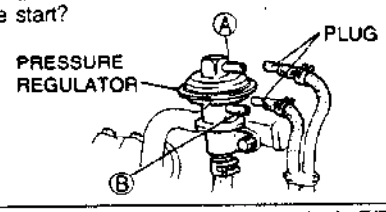
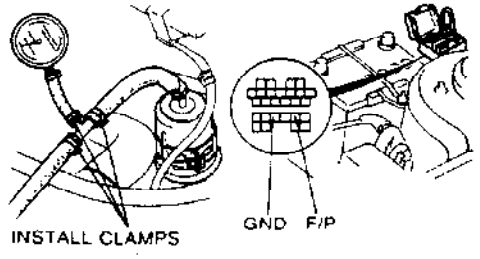
13E0F3-330

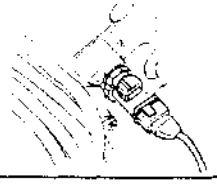
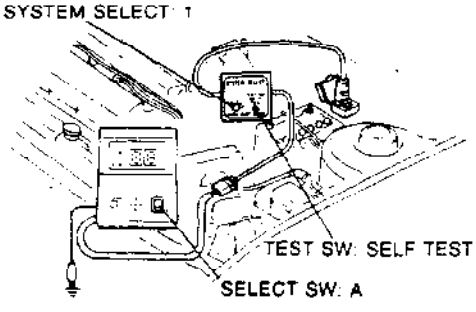
4	CRANKS NORMALLY BUT WILL NOT START (PARTIAL COMBUSTION) — AFTER WARM-UP
DESCRIPTION	• Engine cranks at normal speed and shows partial combustion but will not continue running after being hot soaked • Battery in normal condition • Engine starts normally when cold

[TROUBLESHOOTING HINTS]

① Air/Fuel mixture too rich
- Fuel injection control malfunction (correction for coolant temperature)
- Injector fuel leakage

② Vaporlock
- Fuel pressure not held in fuel line after engine is stopped
- Pressure regulator control system malfunction

STEP	INSPECTION		ACTION
1	Warm up engine to normal operating temperature and stop it Connect diagnosis connector terminals F/P and GND with jumper wire for 3 minutes with ignition switch ON; does engine start?  	Yes	Change to another brand of fuel
		No	Go to next step
2	Remove vacuum hose from pressure regulator (port A) and plug it; does engine start?  	Yes	Check pressure regulator control system (high temperature operation) ☞ **page F3–43**
		No	Go to next step
3	Remove both vacuum hoses from pressure regulator (ports A and B) and plug them; does engine start?  	Yes	Check pressure regulator control system (low temperature operation) ☞ **page F3–43**
		No	Go to next step
4	Connect diagnosis connector terminals F/P and GND with jumper wire; is fuel line pressure correct with ignition switch ON? **Fuel line pressure: 265—314 kPa (2.7—3.2 kgf/cm², 38—46 psi)**  	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ⇨ If pressure **quickly** increases, check pressure regulator ⇨ If pressure **gradually** increases, check fuel line and filter for clogging If hose is not clogged, check fuel pump maximum pressure
			High pressure Check if fuel return hose is clogged or restricted ⇨ If it is not, replace pressure regulator ☞ **page F3–3** ⇨ If it is, repair or replace it

STEP	INSPECTION		ACTION
5	In same condition as in Step 2, is fuel line pressure held after ignition switch is turned OFF? **Fuel line pressure: More than 147 kPa {1.5 kgf/cm², 21 psi} for 5 min.**	Yes	Go to Step 8
		No	Go to Step 7
6	In same condition as in Step 3, is fuel line pressure held after ignition switch is turned OFF? **Fuel line pressure: More than 147 kPa {1.5 kgf/cm², 21 psi} for 5 min.**	Yes	Go to Step 8
		No	Go to next step
7	Plug both vacuum ports of pressure regulator; is fuel line pressure held after ignition switch is turned OFF? **Fuel line pressure: More than 147 kPa {1.5 kgf/cm², 21 psi} for 5 min.**	Yes	Replace pressure regulator ☞ **page F3–3**
		No	Check fuel pump hold pressure ⇨ If OK, check injector for fuel leakage ☞ **page F3–42** ⇨ If not OK, replace fuel pump ☞ **page F3–3**
8	Disconnect water thermosensor connector; does engine start? 	Yes	Check water thermosensor ⇨ If OK, check connections of water thermosensor and ECU 2Q terminal ⇨ If not OK, replace water thermosensor ☞ **page F3–13**
		No	Go to next step
9	Is "00" displayed on Self-Diagnosis Checker with ignition switch ON? SYSTEM SELECT: 1  	Yes	Go to next step
		No	**Service Code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F3–16**
			"88" flashes Check ECU terminal 1F voltage ☞ **page F3–45** **Voltage: Battery voltage (Ignition switch ON)** ⇨ If OK, replace ECU ☞ **page F3–2** ⇨ If not OK, check wiring (ECU — Self-Diagnosis Checker)
10	Are if ECU terminal voltages are OK? (especially 1C, 2D, and 2Q) ☞ **page F3–45**	Yes	Go to next step
		No	Check for cause
11	Try known good ECU; does condition improve? ☞ **page F3–2**	Yes	Replace ECU ☞ **page F3–2**
		No	Change to another brand of fuel

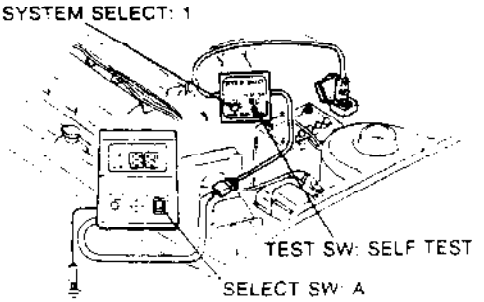
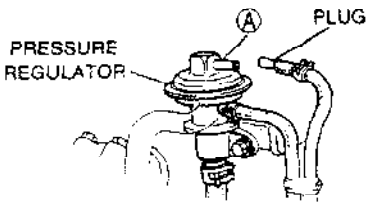
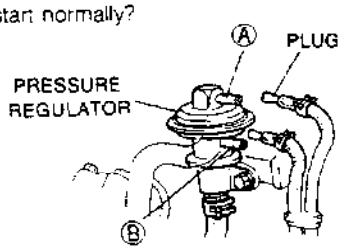
3E0F3-331

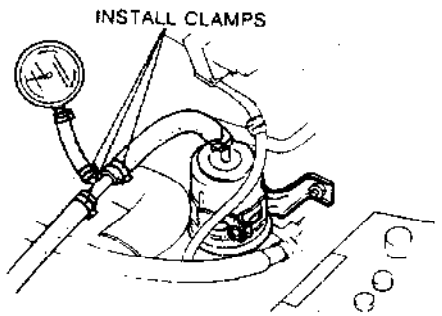
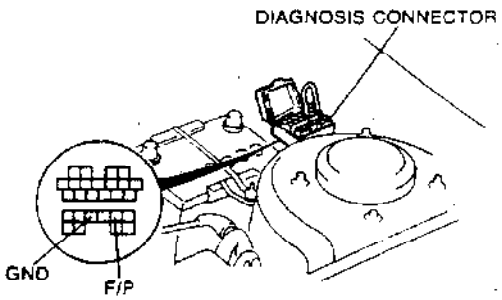
7	CRANKS NORMALLY BUT HARD TO START — AFTER WARM-UP
DESCRIPTION	• Engine cranks at normal speed but requires excessive cranking time before starting after running and being hot soaked • Battery in normal condition • Engine starts normally when cold • Engine runs normally at idle (If idle condition is not OK, refer to "Rough idle" [Nos. 8—12])

[TROUBLESHOOTING HINTS]

① Air/Fuel mixture too rich
- Fuel injection control malfunction
- Injector fuel leakage

② Vaporlock
- Fuel pressure not held in fuel line after engine is stopped
- Pressure regulator control system malfunction

STEP	INSPECTION		ACTION
1	Is "00" displayed on Self-Diagnosis Checker with ignition switch ON? 	Yes	Go to next step
		No	**Service Code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F3–16** **"88" flashes** Check ECU terminal 1F voltage ☞ **page F3–45** **Voltage: Battery voltage (ignition switch ON)** ⇨ If OK, replace ECU ☞ **page F3–2** ⇨ If not OK, check wiring (ECU — Self-Diagnosis Checker)
2	Remove vacuum hose from pressure regulator (port A) and plug it, does engine start normally? 	Yes	Check pressure regulator control system (high temperature operation) ☞ **page F3–43**
		No	Go to next step
3	Remove both vacuum hoses from pressure regulator (ports A and B) and plug them; does engine start normally? 	Yes	Check pressure regulator control system (low temperature operation) ☞ **page F3–43**
		No	Go to next step
4	Are ECU terminal voltages OK (especially 1C, 2D, 2Q and 2T)? ☞ **page F3–45**	Yes	Go to next step
		No	Check for cause

STEP	INSPECTION		ACTION
5	Run engine at idle; is fuel line pressure held after ignition switch is turned OFF? **Fuel line pressure: More than 147 kPa {1.5 kgf/cm², 21 psi} for 5 min.**  	Yes	Go to next step
		No	Plug both vacuum ports of pressure regulator; and check if fuel line pressure is held after ignition switch is turned OFF ⇨ If it is, replace pressure regulator ☞ page F3–3 ⇨ If it is not, check fuel pump hold pressure If fuel pump is OK, check injectors for fuel leakage ☞ page F3–42
6	Warm up engine to normal operating temperature and stop it Connect diagnosis connector terminals F/P and GND with jumper wire for 3 minutes with ignition switch ON; does engine start easily?  	Yes	Change to another brand of fuel
		No	Go to next step
7	Try known good ECU; does condition improve? ☞ page F3–3	Yes	Replace ECU ☞ page F3–3
		No	Change to another brand of fuel

13E0F3-332

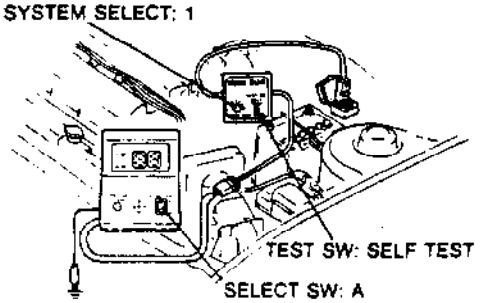
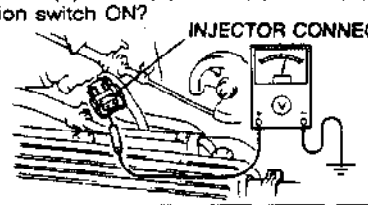
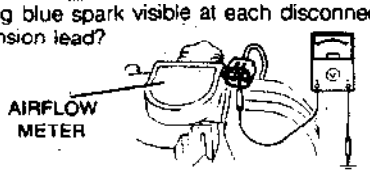
8	ROUGH IDLE/ENGINE STALLS AT IDLE — ALWAYS
DESCRIPTION	• Engine starts normally but stalls or vibrates excessively at idle in every condition

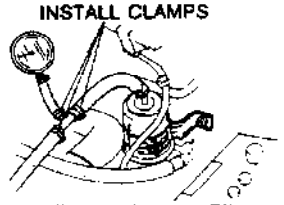
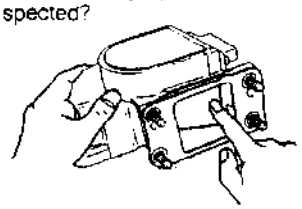
[TROUBLESHOOTING HINTS]

① Air/Fuel mixture too lean
- Air leakage
- Fuel injection control malfunction
- Low fuel line pressure

② One or more injectors clogged or not operating
③ Low intake air amount
④ Incorrect idle-speed
- Idle-speed misadjustment
- Idle-speed control malfunction

⑤ One or more spark plugs not firing
⑥ Low engine compression
⑦ Airflow meter stuck

STEP	INSPECTION		ACTION
1	Is "00" displayed on Self-Diagnosis Checker with ignition switch ON? SYSTEM SELECT: 1  	Yes	Go to next step
		No	**Service Code No. displayed** Check for cause (Refer to specified check sequence) **☞ page F3–16**
			"88" flashes Check ECU terminal 1F voltage **☞ page F3–45** **Voltage: Battery voltage (ignition switch ON)** ⇨ If OK, replace ECU **☞ page F3–2** ⇨ If not OK, check wiring (ECU — Self-Diagnosis Checker)
2	Are ECU terminal voltages OK (especially 2D, 2O, and 2Q)? **☞ page F3–45**	Yes	Go to next step
		No	Check for cause
3	Disconnect each high-tension lead at idle; does engine speed decrease equally at each cylinder?	Yes	Go to Step 9
		No	Go to next step
4	Is injector operating sound heard at idle?	Yes	Go to Step 7
		No	Stop engine and go to next step
5	Is there battery voltage at each injector connector (No.1 (P), No.2 (R), No.3 (V), No.4 (O)) with ignition switch ON?  	Yes	Check if injector resistance is OK **☞ page F3–41** **Resistance: Approx. 2.11Ω (at 20°C (68°F))** ⇨ If it is, check wiring (ECU — Injector) ⇨ If it is not, replace injector
		No	Go to next step
6	Is there battery voltage at injector resistor (W/R) with ignition switch ON?	Yes	Check injector resistor ⇨ If OK, check for short circuit in wiring (Injector resistor—Injector) ⇨ If not OK, replace injector resistor
		No	Check for open circuit in wiring (Main relay (FUEL INJ relay)—Injector resistor)
7	Is strong blue spark visible at each disconnected high-tension lead?  	Yes	Go to next step
		No	Check high-tension lead ⇨ If OK, check distributor cap and rotor ⇨ If not OK, replace high-tension lead

STEP	INSPECTION		ACTION
8	Are spark plugs OK? ☞ **Section G** •• Wear and carbon build up • Plug gap • Damage	Yes	Check for correct engine compression ⇨ If OK, replace injector ⇨ If not OK, check for cause ☞ **Section B2**
		No	Clean, adjust
9	Is fuel line pressure correct at idle? **Fuel line pressure: 265—314 kPa (2.7—3.2 kgf/cm², 38—48 psi)** **(Two vacuum hoses to pressure regulator disconnected)** **304—392 kPa (3.1—4.0 kgf/cm², 44—57 psi)** **(Upper vacuum hose to pressure regulator disconnected)** INSTALL CLAMPS 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ⇨ If pressure **quickly** increases, check pressure regulator ⇨ If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose is not clogged, check fuel pump maximum pressure
10	Does airflow meter move smoothly from fully closed to fully open when it is manually inspected? 	Yes	Go to next step
		No	Repair or replace
11	Is there air leakage at intake air system components?	Yes	Repair or replace
		No	Go to next step
12	Is engine compression correct? ☞ **Section B2** **Engine compression: 1059 kPa (10.8 kgf/cm², 152 psi)-300 rpm**	Yes	Go to next step
		No	Check for cause ☞ **Section B2**
13	Connect System Selector to diagnosis connector and set Test Switch to SELF TEST; is ignition timing correct at idle after warm-up? **Ignition timing (BTDC): 10 ± 1°**	Yes	Try known good ECU; does condition improves? ☞ **page F3—3**
		No	Adjust ignition timing

13E0F3-333

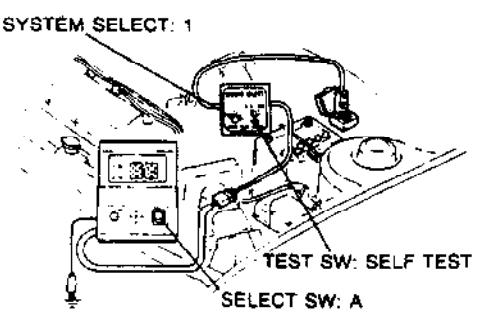
10	ROUGH IDLE/ENGINE STALLS AT IDLE — AFTER WARM-UP
DESCRIPTION	• Engine runs normally at idle during warm-up but engine stalls or vibrates excessively after warm

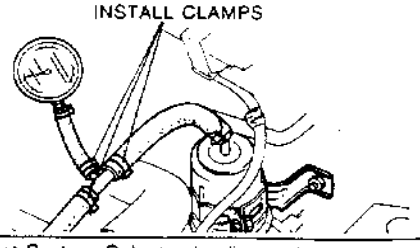
[TROUBLESHOOTING HINTS]

① Idle-speed control system malfunction
② Air/Fuel mixture too lean
- Air leakage
- Low fuel line pressure

③ Air/Fuel mixture too rich
- Fuel injection control malfunction (correction for coolant temperature)

④ Poor ignition
⑤ Low engine compression

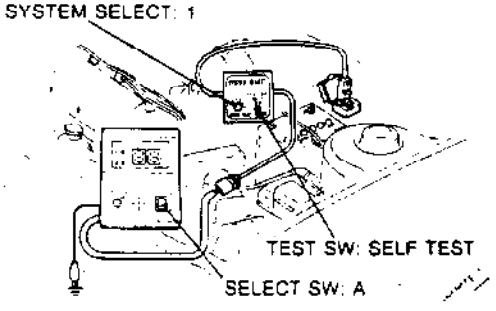
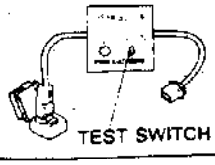
STEP	INSPECTION		ACTION
1	Is "00" displayed on Self-Diagnosis Checker with ignition switch ON?  	Yes	Go to next step
		No	**Service Code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F3–16** **"88" flashes** Check ECU terminal 1F voltage ☞ **page F3–45** **Voltage: Battery voltage (ignition switch ON)** ⇨ If OK, replace ECU ☞ **page F3–3** ⇨ If not OK, check wiring (ECU — Self-Diagnosis Checker)
2	Are ECU terminal voltages OK (especially 2D, 2O, and 2Q)? ☞ **page F3–45**	Yes	Go to next step
		No	Check for cause
3	Disconnect each high-tension lead at idle; does engine speed decrease equally at each cylinder?	Yes	Go to next step
		No	Go to Step 9
4	Is intake manifold vacuum correct at idle? **Vacuum: More than 450 mmHg (17.7 inHg)**	Yes	Go to next step
		No	Check for air leakage of intake air system components
5	Is air cleaner element clean?	Yes	Go to next step
		No	Replace air cleaner element

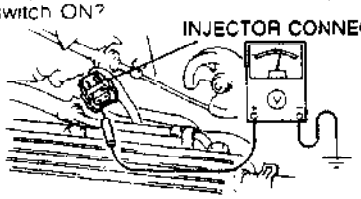
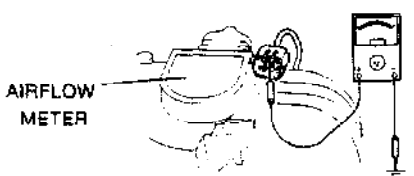
STEP	INSPECTION		ACTION
6	Is fuel line pressure correct at idle? **Fuel line pressure: 265—314 kPa {2.7—3.2 kgf/cm², 38—46 psi}** **(Two vacuums hose to pressure regulator disconnected)** **304—392 kPa {3.1—4.0 kgf/cm², 44—57 psi}** **(Upper vacuum hose to pressure regulator disconnected)** INSTALL CLAMPS 	Yes	Go to next step
		No	**Low pressure** Check fuel line pressure while pinching fuel return hose ⇨ If pressure **quickly** increases, check pressure regulator ⇨ If pressure **gradually** increases, check for clogging between fuel pump and pressure regulator If hose is not clogged, check fuel pump maximum pressure
7	Connect System Selector to diagnosis connector and set Test Switch to SELF TEST; is ignition timing at idle correct after warm-up? **Ignition timing (BTDC): 10 ± 1°**	Yes	Go to next step
		No	Adjust ignition system
8	Disconnect water thermosensor connector; does engine condition improve?	Yes	Replace water thermosensor
		No	Try known good ECU; does condition improve? ☞ **page F3–13**
9	Is injector operating sound heard at idle?	Yes	Go to next step
		No	Check if injector resistance is OK ☞ **page F3–42** **Resistance: Approx. 2.11Ω (at 20°C {68°F})** ⇨ If it is, check wiring (ECU — Injector) ⇨ If it is not, replace injector
10	Is engine compression correct? ☞ **Section G** **Engine compression: 1059 kPa {10.8 kgf/cm², 152 psi}-300 rpm**	Yes	Go to next step
		No	Check engine ☞ **Section B2**
11	Is strong blue spark visible at each disconnected high-tension lead?	Yes	Go to next step
		No	Check high-tension lead ☞ **Section G** ⇨ If OK, check distributor cap and rotor ⇨ If not OK, replace high-tension lead
12	Are spark plugs OK? ☞ **Section G** • Wear and carbon build up • Plug gap • Damage	Yes	Try known good ECU; does condition improve? ☞ **page F3–3**
		No	Clean, adjust

13E0F3-334

14	IDLE MOVES UP AND DOWN/IDLE HUNTS
DESCRIPTION	• Engine speeds up and down periodically at idle

[TROUBLESHOOTING HINTS]
① Idle switch (in throttle sensor) OFF at idle
② Air leakage
③ Fuel injection amount inconstant
• Poor contact point inside airflow meter
④ Poor ignition

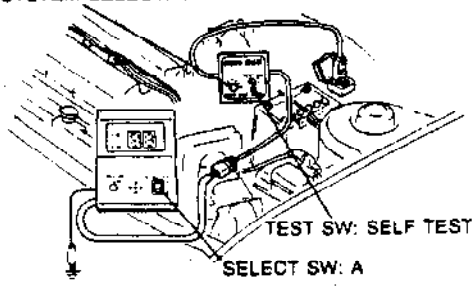
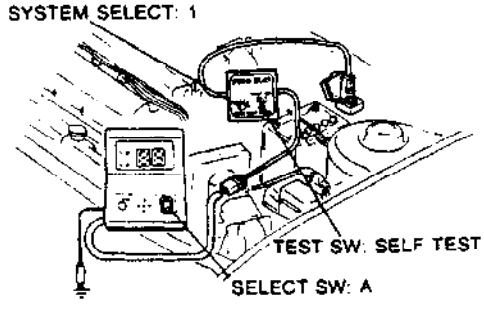
STEP	INSPECTION		ACTION
1	Is "00" displayed on Self-Diagnosis Checker with ignition switch ON? 	Yes	Go to next step
		No	**Service Code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F3–16**
			"88" flashes Check ECU terminal 1F voltage ☞ **page F3–45** **Voltage: Battery voltage (ignition switch ON)** ⇨ If OK, replace ECU ☞ **page F3–3** ⇨ If not OK, check wiring (ECU — Self-Diagnosis Checker)
2	Is intake manifold vacuum correct at idle? **Intake manifold vacuum: More than 450 mmHg {17.7 inHg}**	Yes	Go to next step
		No	**Low vacuum** Check for air leakage at intake air system
3	Is air cleaner element clean?	Yes	Go to next step
		No	Replace air cleaner element
4	Disconnect each high-tension lead at idle; does engine speed decrease equally at each cylinder?	Yes	Go to next step
		No	Go to Step 8
5	Are ECU terminal voltages OK? (especially 2D, 2Q, 2O) ☞ **page F3–45**	Yes	Go to next step
		No	Check for cause
6	Connect System Selector to diagnosis connector and set Test Switch to SELF TEST; is ignition timing at idle correct after warm-up? **Ignition timing (BTDC): 10 ± 1°** 	Yes	Go to next step
		No	Adjust ignition timing

STEP	INSPECTION		ACTION
7	Is airflow meter OK?	Yes	Go to Step 14
		No	Replace airflow meter
8	Is injector operating sound heard at idle?	Yes	Go to Step 11
		No	Step engine and go to next step
9	Is there battery voltage at injector connector (No.1 (P), No.2 (R), No.3 (V), No.4 (O)) with ignition switch ON?  	Yes	Is injector resistance OK? ☞ page F3–42 **Resistance: Approx. 2.11Ω (at 20°C (68°F))** ⇨ If it is, check wiring (ECU — Injector) ⇨ If it is not, replace injector
		No	Go to next step
10	Is there battery voltage at injector resistor (W/R) wire with ignition switch ON?  	Yes	Check injector resistor ⇨ If OK, check for short circuit in wiring (Injector resistor—Injector) ⇨ If not OK, replace injector resistor
		No	Check for open circuit in wiring (Main relay (FUEL INJ relay)—Injector resistor)
11	Is there strong blue spark visible at each disconnected high-tension lead?	Yes	Go to next step
		No	Check high-tension lead ⇨ If OK, check distributor cap and rotor ⇨ If not OK, replace high-tension lead
12	Are spark plugs OK? ☞ Section G • Wear and carbon build up • Plug gap • Damage	Yes	Is engine compression correct? ☞ Section B2 **Engine compression: 1059 kPa (10.8 kgf/cm², 152 psi)-300 rpm** ⇨ If OK, go to next step ⇨ If not OK, check for cause ☞ Section B2
		No	Clean, adjust
13	Check for injector leakage	Yes	Replace injector
		No	Go to next step
14	Try known good ECU; does condition improve? ☞ page F3–45		

13E0F3-335

15	ENGINE STALLS ON DECELERATION
DESCRIPTION	• Engine unexpectedly stops running during or after deceleration • Idle condition normal

[TROUBLESHOOTING HINTS]
Engine speed drops too much when releasing accelerator
① Idle-speed misadjustment
② Fuel-cut control malfunction
③ Loose connector disconnected by force of deceleration

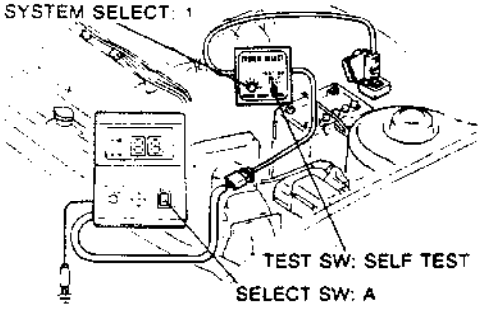
STEP	INSPECTION		ACTION
1	Is idle condition normal? **Idle speed: 800 ± 50 rpm (in neutral)**	Yes	Go to next step
		No	Adjust or perform Troubleshooting, Nos. 8—11 "ROUGH IDLE" (Refer to Workshop Manual (1203-10-89F))
2	Is "00" displayed on Self-Diagnosis Checker with ignition switch ON? SYSTEM SELECT: 1  	Yes	Go to next step
		No	**Service Code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F3–16** **"88" flashes** Check ECU terminal 1F voltage ☞ **page F3–45** **Voltage: Battery voltage (ignition switch ON)** ⇨ If OK, replace ECU ☞ **page F3–3** ⇨ If not OK, check wiring (ECU — Self-Diagnosis Checker)
3	Does Self-Diagnosis Checker Monitor Lamp with ignition switch ON show that switches operate correctly? SYSTEM SELECT: 1  	Yes	Go to next step
		No	**Lamp not ON or OFF with specified switch** Check for cause (Refer to specified check sequence) **Lamp always ON** Check wiring between (ECU terminal 1D — Self-Diagnosis Checker)
4	Are ECU terminal voltages OK? (especially 1V, 2D, 2O, 2U, 2V, and 2Q) ☞ **page F3–45**	Yes	Go to next step
		No	Check for cause
5	Check for poor connection of following parts • Ignition coil • Igniter • Distributor • High-tension lead • Injector • Injector resistor • Circuit-opening relay • ECU	Yes	Repair or replace
		No	Go to next step

STEP	INSPECTION		ACTION
6	Is cashpot correctly adjusted? **Dashpot set speed: Approx. 3,500 rpm**	Yes	Go to next step
		No	Adjust dashpot
7	Try known good ECU; does condition improve? ☞ **page F3–3**		

13E0F3-336

16	ENGINE STALLS SUDDENLY (INTERMITTENT)
DESCRIPTION	• Engine intermittently stops running • Before stalling, engine condition is OK

[TROUBLESHOOTING HINTS]
① Intermittently no spark or no fuel injection caused by vehicle vibration, acceleration, or deceleration
• Poor connection in wiring harness

STEP	INSPECTION		ACTION
1	Is "00" displayed on Self-Diagnosis Checker with ignition switch ON?  	Yes	Go to next step
		No	**Service Code No. displayed** Check for cause (Refer to specified check sequence) ☞ **page F3–16** **Note** • **When checking wiring harness and connectors, tap, move, and wiggle suspect sensor and/or harness to recreate problem**
			"88" flashes Check ECU terminal 1F voltage ☞ **page F3–45** **Voltage: Battery voltage (ignition switch ON)** ⇨ If OK, replace ECU ⇨ If not OK, check wiring (ECU — Self-Diagnosis Checker)
2	Check for poor connection of following parts • Ignition coil • Igniter • Distributor • High-tension lead • Injector • Injector resistor • Circuit-opening relay • ECU	Yes	Repair or replace
		No	Go to next step
3	Are ECU terminal voltages OK? (especially 1B, 2A, 2B, and 2C) ☞ **page F3–45** **Note** • **When checking voltages, tap, move, and wiggle harness and connector to recreate problem**	Yes	Go to Troubleshooting No. 2 "CRANKS NORMALLY BUT WILL NOT START (NO COMBUSTION)" ☞ **page F3–20**
		No	Check for cause

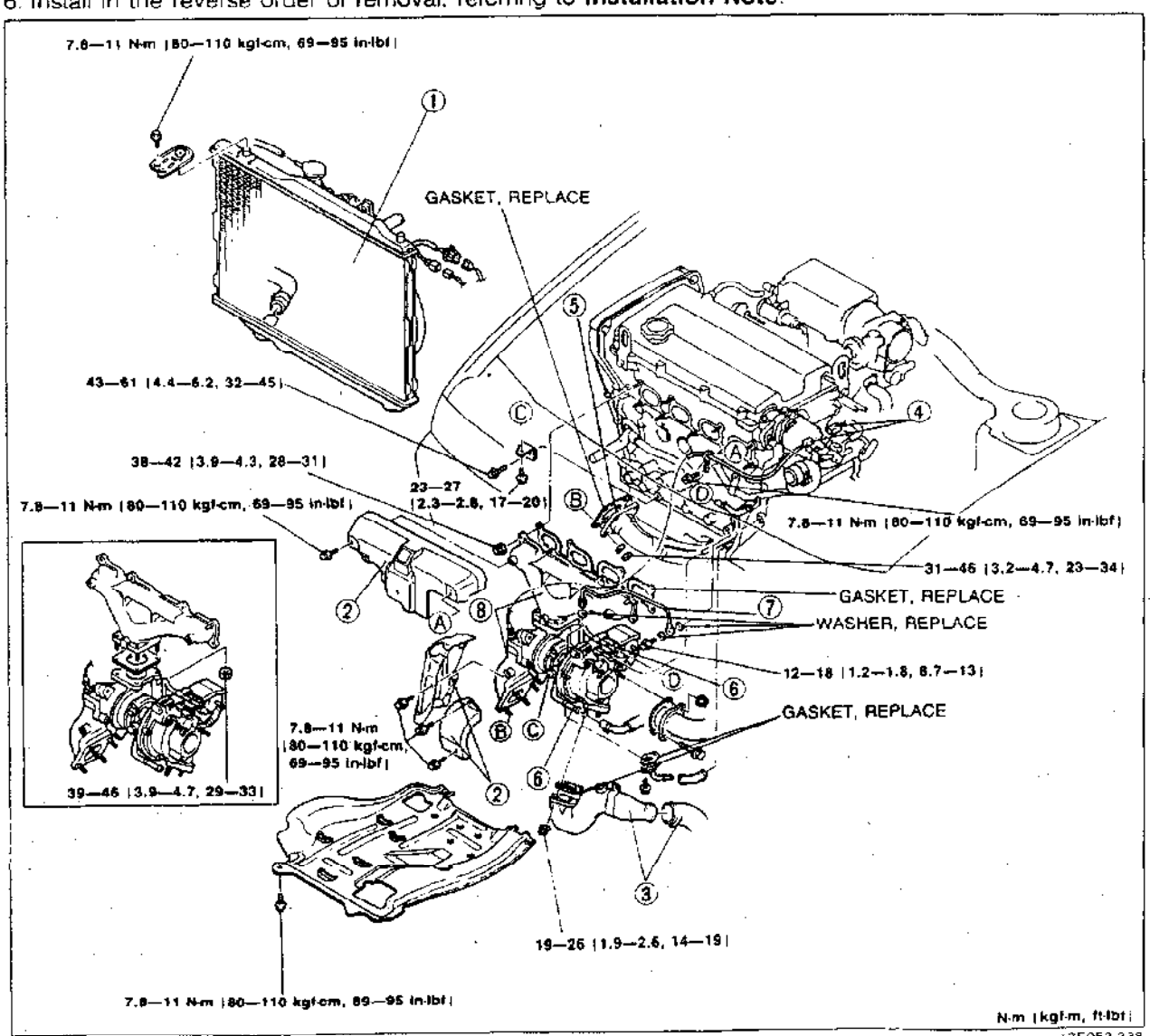
13E0F3-337

TURBOCHARGER CONTROL SYSTEM

TURBOCHARGER
Removal / Installation

Caution
- **Be careful of the 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 the turbocharger.**
  - **Use the specified new studs when installing the turbocharger.**

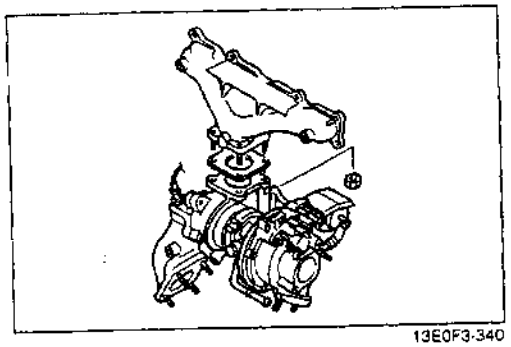
1. Disconnect the negative battery cable.
2. Raise the vehicle and support it on safety stands.
3. Remove the undercover.
4. Drain the engine coolant.
5. Remove in the order shown in the figure, referring to **Removal Note**.
6. Install in the reverse order of removal, referring to **Installation Note**.



13E0F3338

1. Radiator
2. Insulator
3. Air hose, and air pipe
4. Oxygen sensor connector
5. Front exhaust pipe
6. Water hose
7. Oil pipe
8. Exhaust manifold and turbocharger
   Removal Note ..... below
   Installation Note ..... below

13E0F3-339



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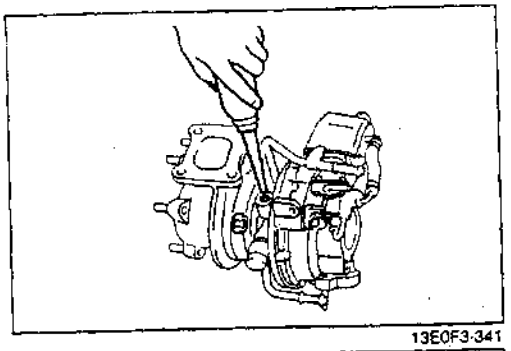

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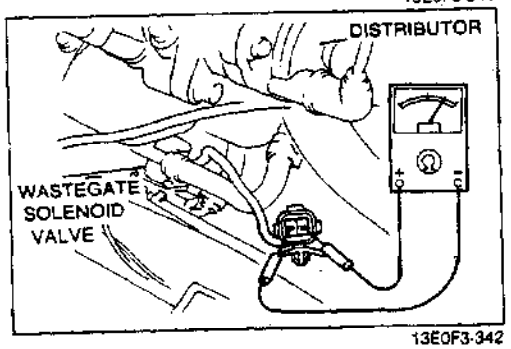


13E0F3-342

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

Installation Note
Exhaust manifold and turbocharger
1. Remove all old 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. Mount the turbocharger assembly 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.

WASTEGATE SOLENOID VALVE

Caution
- **The wastegate solenoid valve must be replaced with the turbocharger, it cannot be replaced by itself.**

Inspection
1. Disconnect the connector.
2. Measure the resistance of the solenoid valve.

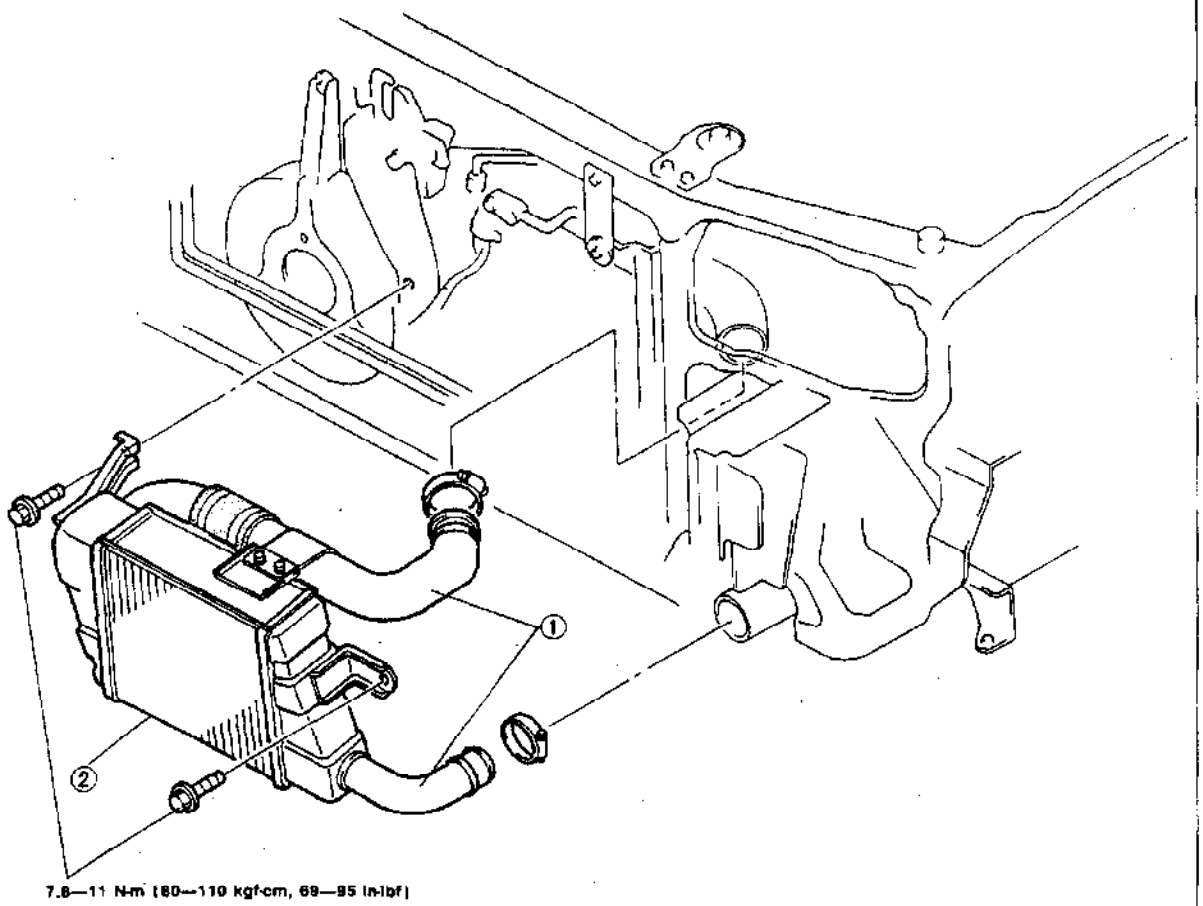
Resistance: 35—45 Ω (at 20°C {68°F})

3. If not as specified, replace the wastegate solenoid valve and turbocharger as an assembly, if necessary.
(Refer to page F3–37.)

INTERCOOLER

Removal / Installation

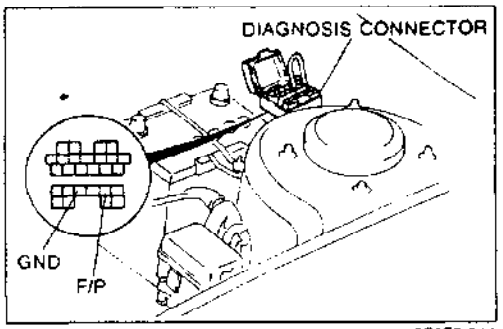
1. Remove the front bumper. (Refer to Section S.)
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



N·m (kgf-m, ft-lbf)

13E0F3-343

1. Air hose
2. Intercooler



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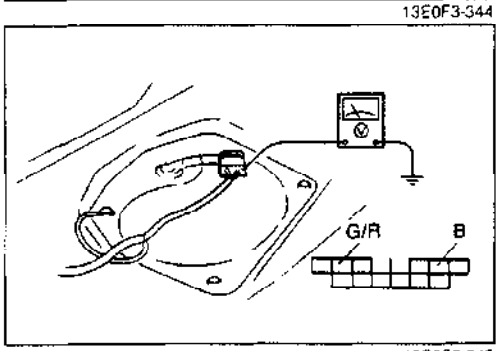

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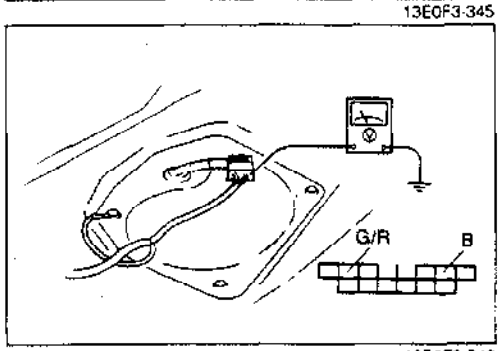


13E0F3-346

FUEL SYSTEM

FUEL PUMP

Inspection

Fuel pump operation

1. Connect the diagnosis connector F/P and GND terminals by using a jumper wire.
2. Remove the fuel filler cap.
3. Turn ON the ignition switch.
4. Listen at the filler inlet for the operational sound of the fuel pump.
5. Install the fuel filler cap.
6. If no sound is heard, measure the voltage between the fuel pump connector (G/R) to a ground.

Voltage: Battey voltage

7. If not as specified, check the circuit opening relay and circuit.
8. If as specified, check for continuity between fuel pump connector (G/R) and (B).
9. If there is continuity, replace the fuel pump.
10. If there is no continuity, repair the ground circuit.

FUEL PUMP RESISTOR/RELAY

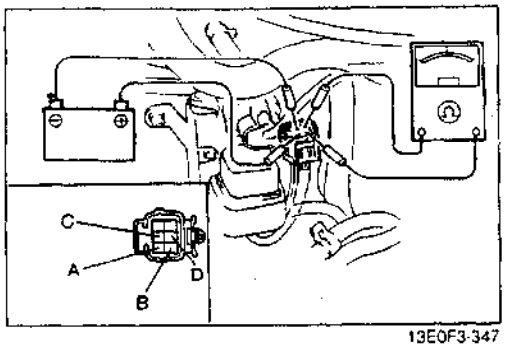
System Operation

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

Voltage

Cranking	Battery voltage
Ignition switch ON	0V

3. If not as specified, perform the following inspections, and repair or replace as necessary.
   - Fuel pump resistor/relay resistance (Refer to page F3–41.)
   - ECU 11 terminal voltage (Refer to page F3–45.)
   - Wiring harness and connector



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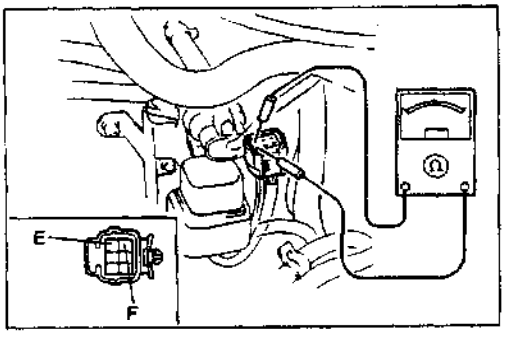

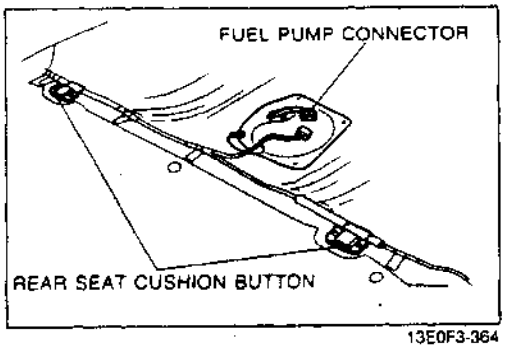

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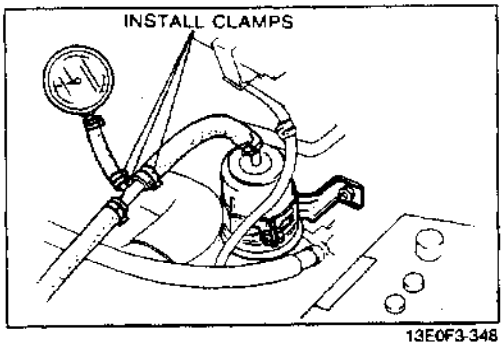


13E0F3-348

Inspection

1. Disconnect the resistor/relay connector.
2. Ground the fuel pump resistor relay terminal D.
3. Apply battery voltage and check for continuity as shown.

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

4. Measure the resistance between terminals E and F.

Resistance : 0.38—0.42Ω (at 20°C {68°F})

PRESSURE REGULATOR

Inspection

Fuel line pressure

Warning

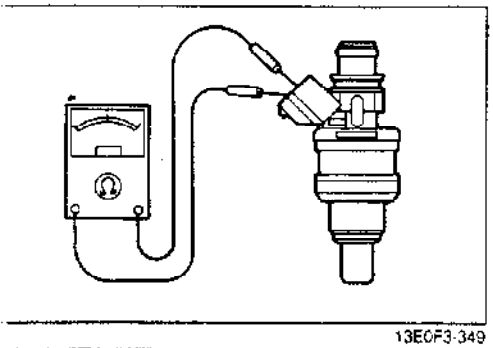
- **Before performing the following operation, release the fuel pressure from the fuel system to reduce the possibility of injury or fire. (Refer to page F3–21.)**

1. Disconnect the negative battery terminal.
2. Connect a fuel pressure gauge between the fuel filter and the fuel main hose. (Install clamps as shown.)
3. Connect the negative battery terminal.
4. Start the engine and run it at idle.
5. Measure the fuel line pressure.

Fuel line pressure:
206—255 kPa {2.1—2.6 kgf/cm^2, 30—37 psi}

6. Disconnect the upper vacuum hose from the pressure regulator and measure the fuel line pressure.

Fuel line pressure:
304—392 kPa {3.1—4.0 kgf/cm^2, 44—57 psi}



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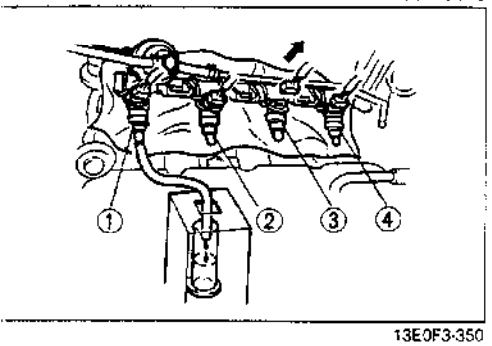

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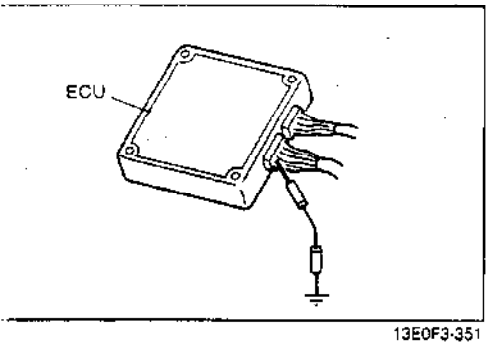


13E0F3-351

INJECTOR

Inspection

Injector resistance

1. Disconnect the injector harness.
2. Measure resistance of the injector.

Resistance: 1—3Ω (at 20°C (68°F))

3. If not as specified, replace the injector.

Volume Test

1. Remove the injectors and delivery pipe assembly with the conectors connected.
2. Affix the injectors to the delivery pipe by using wire.

Warning

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

Caution

- **Affix the injectors firmly to the delivery pipe so that they do not move.**

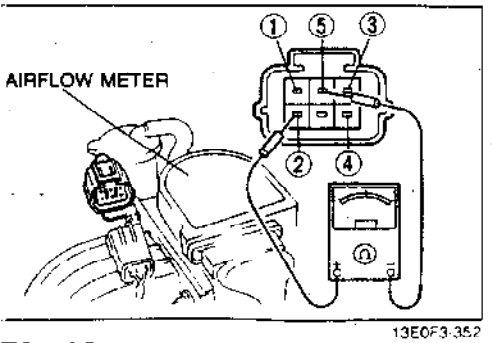
3. Turn the ignition switch ON and ground the F/P terminal of the diagnosis connector.
4. Test the individual injectors by following the procedure outlined in the chart below.

Test injector no.	Disconnect injector connector no.	Ground ECU terminal
1	3	2U
2	4	2V
3	1	2U
4	2	2V

5. Check the injection volume by using a graduated container.

Injection volume:
105—151 cc (6.40—9.22 cu in)/15 sec.

6. If the injection volume is not as specified, replace the injector.



13E0F3-352

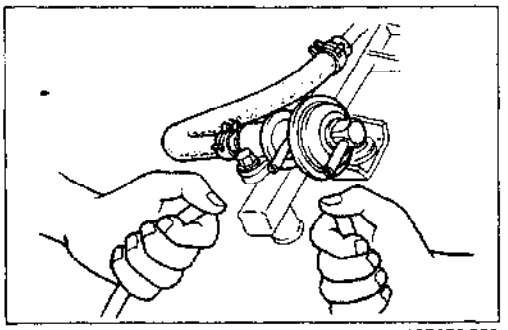
INJECTOR RESISTOR

Inspection

1. Disconnect the injector harness.
2. Measure resistance of the injector resistor.

Injector	Measured terminals	Resistance
No.1	①—⑤	6 Ω (at 20°C (68°F))
No.2	②—⑤	
No.3	③—⑤	
No.4	④—⑤	

3. If not as specified, replace the injector resistor.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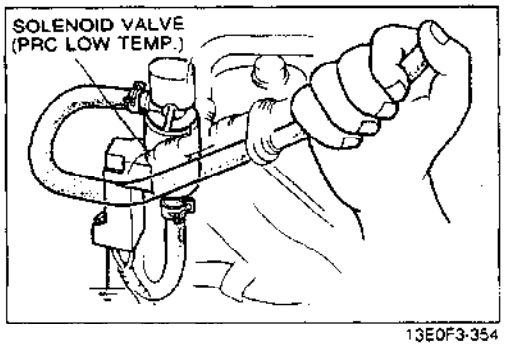

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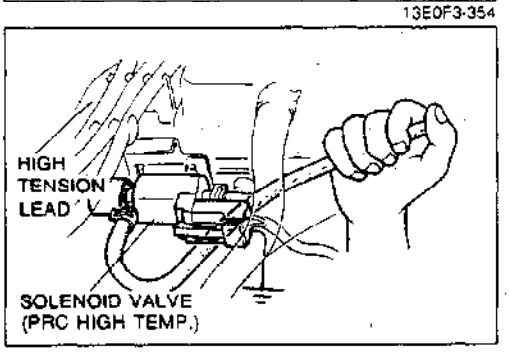

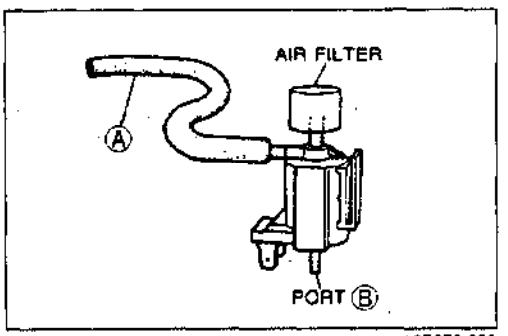

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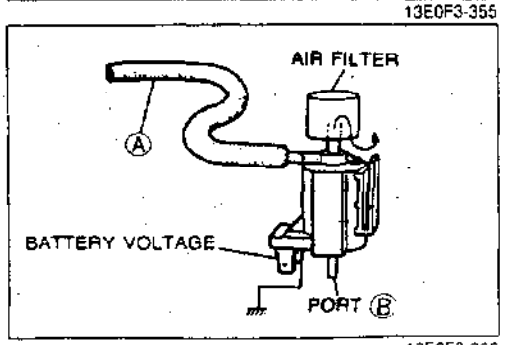


13E0F3-356

PRESSURE REGULATOR CONTROL SYSTEM

SOLENOID VALVE (PRESSURE REGULATOR CONTROL)

Inspection

On-vehicle

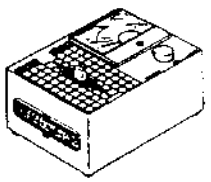
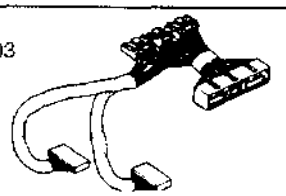
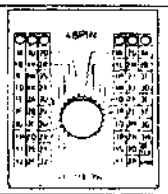
1. Start the engine and run it at idle (cold engine).
2. Disconnect the vacuum hoses from the pressure regulator, and verify that vacuum is felt at each hose.
3. Ground the solenoid valve terminal wire (G/O...low temp. and G...high temp.) by using a jumper wire, and verify that no vacuum is felt.
4. If vacuum is not as specified, check the solenoid valve.

Solenoid Valve (high and low temp.)

1. Disconnect the vacuum hose from the solenoid valve and the vacuum pipe.
2. Blow through the solenoid valve from port A.
3. Verify that air flows from port B.
4. Disconnect the solenoid valve connector.
5. Connect **battery voltage** and a ground to the terminals of the solenoid valve.
6. Blow through the solenoid valve from port A.
7. Verify that air flows from the valve air filter.
8. If not as specified, replace the solenoid valve.

CONTROL SYSTEM

PREPARATION
SST

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	—	—

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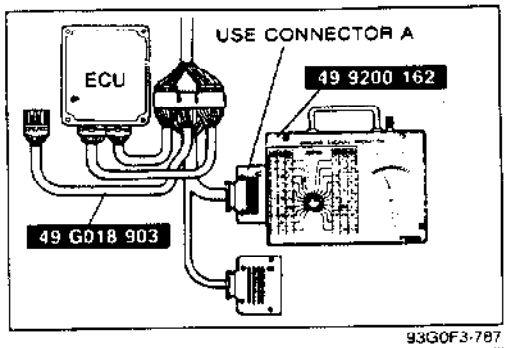

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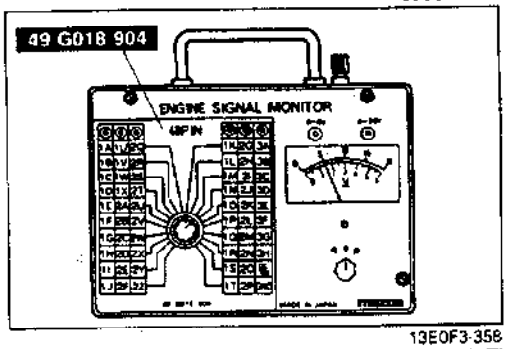

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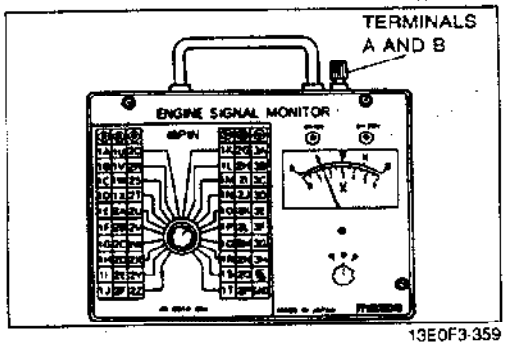


13E0F3-359

ENGINE CONTROL UNIT (ECU)

Inspection

1. Disconnect the ECU connectors.
2. Connect the **SST**s (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 F3–46 to F3–53.)
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 page F3–2.)

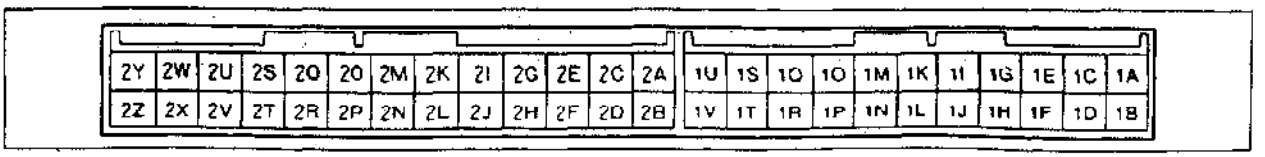
Caution

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

Terminal voltage
Reference date

VB: Battery voltage

Terminal	Input	Output	Connected to	Test condition		Correct voltage	Remark
1A	—	—	Battery	Constant		VB	For backup
1B	○		Main relay (FUEL INJ relay)	Ignition switch	OFF	0V	—
					ON	VB	
1C	○		Ignition switch (START)	While cranking		Approx. 10V	—
				Ignition switch ON		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.		VB	
				Test switch at O2 MONITOR with engine idling Monitor lamp illuminated		Approx. 5V	
				Test switch at O2 MONITOR with engine idling Monitor lamp not illuminated		VB	
1E	—	—	—	—		—	—
1F		○	Self-Diagnosis Checker (service code)	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		VB	
				Buzzer sounded		Below 2.5V	
				Buzzer not sounded		VB	
1G		○	Igniter	Ignition switch ON		0V	—
				Idle		Approx. 0.2V	
1H		○	Solenoid valve (wastegate)	Ignition switch ON		VB	—
				Idle		Approx. 2V	
1I		○	Fuel pump resistor/relay	While cranking		Approx. 10V	—
				Idle		Below 1.5V	
1J		○	A/C relay	Ignition switch ON		VB	—
				A/C switch ON at idle		Below 2.5V	
				A/C switch OFF at idle		VB	
1K	○		Diagnosis connector (TEN terminal)	System Selector test switch at O2 MONITOR		VB	—
				System Selector test switch at SELF TEST		Below 1.0V	
1L	—	—	—	—		—	—
1M	—	—	—	—		—	—



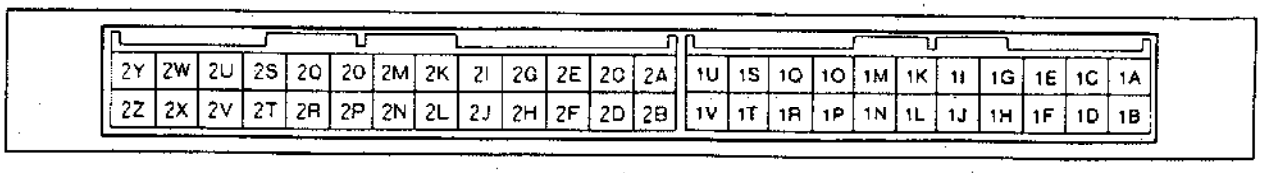
VB: Battery voltage

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 VB		• 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 • 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 VB		• Poor connection at ECU connector • ECU malfunction
Always 0V		• Short circuit in wiring from igniter to ECU terminal 1G
Always 0V or VB		• Refer to Code No.42 Troubleshooting (Refer to 323 4-Wheel Drive Workshop Manual (1229-10-89L))
Always VB		• Fuel pump resistor/relay malfunction
Always 0V		• Open or short circuit in wiring from ECU terminal 11 to fuel pump 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 VB		• 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 VB		• Open circuit in wiring from diagnosis connector terminal TEN to ECU terminal 1K • Open circuit in wiring from diagnosis connector terminal GND to ground
—		—
—		—

13E0F3-360

VB: Battery voltage

Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
1N *	O		Throttle sensor (idle switch)	Accelerator pedal released	Below 1.0V	Ignition switch ON
				Accelerator pedal depressed	VB	
1O	O		Foglight relay	Foglight switch ON	VB	—
				Foglight switch OFF	0V	
1P	O		P/S pressure switch	Ignition switch ON	VB	—
				P/S pressure switch ON at idle	Below 1.0V	
				P/S pressure switch OFF at idle	VB	
1Q	O		A/C switch	A/C switch ON	Below 2.5V	Ignition switch ON and blower motor ON
				A/C switch OFF	VB	
1R	O		Electric cooling fan switch	Fan operating (coolant temperature over 97°C (207°F) or diagnosis connector terminal TFA grounded)	Below 1.0V	—
				Fan not operating (idle)	VB	
1S	O		Blower control switch	Blower control switch OFF or 1st position	VB	Ignition switch ON
				Blower control switch 2nd or higher position	Below 1.0V	
1T	O		Rear window defroster switch	Rear window defroster OFF	Below 1.0V	Ignition switch ON
				Rear window defroster ON	VB	
1U	O		Headlight switch	Headlights ON	VB	—
				Headlights OFF	Below 1.0V	
1V	O		Neutral/Clutch switches	Neutral position or clutch pedal depressed	Below 1.0V	
				Others	VB	



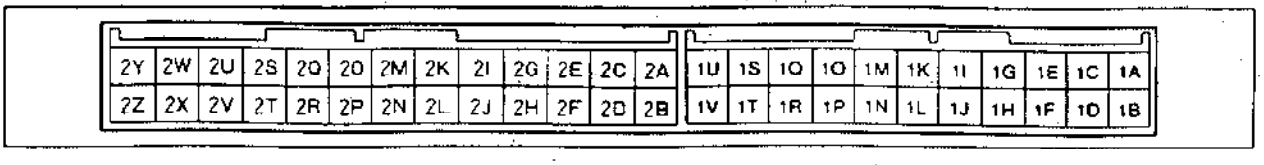
VB: Battery voltage

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 VB		• 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 VB (foglight switch OK)		• Foglight relay malfunction
Always below 1.0V		• Foglight relay malfunction
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 VB		• 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 VB (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 (electric 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 VB (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 VB		• Neutral switch malfunction • Clutch switch malfunction • Open circuit in wiring from ECU terminal 1V to neutral or clutch switch • Poor connection at ECU connector

13E0F3-361

VB: Battery voltage

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	0V or 5V	—
				Idle	Approx. 2V	
2F	—	—	—	—	—	—
2G	○		Distributor (G signal)	Ignition switch ON	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	○		Speedometer sensor	Ignition switch ON	0 or 5V	
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	VB	—



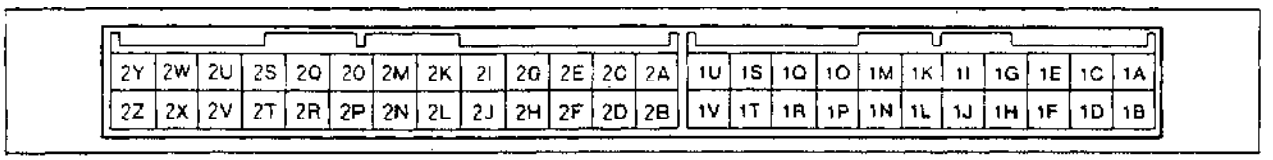
VB: Battery voltage

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 (Refer to 323 Workshop Manual (1203-10-89F))
—	—
Always approx. 0V or approx. 1.5V	• Refer to Code No. 03 Troubleshooting (Refer to 323 Workshop Manual (1203-10-89F))
—	—
—	—
Always 0V	• Refer to Code No. 05 Troubleshooting (Refer to 323 4-Wheel drive Workshop Manual (1229-10-89L))
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
—	• Refer to section T
Always 0V	• Throttle sensor malfunction • Short circuit in wiring from ECU terminal 2M to throttle sensor • Poor connection at ECU connector • ECU malfunction
Always approx. 5V	• Throttle sensor misadjustment • Open circuit in wiring from ECU terminal 2D to throttle sensor
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
Always 0V (after warm-up)	• Refer to Code No. 15 Troubleshooting (Refer to 323 Workshop Manual (1203-10-89F))
Always approx. 1V (after warm-up)	• Refer to Code No.17 Troubleshooting (Refer to 323 Workshop Manual (1203-10-89F))
Always 0V or approx. 5V	• Refer to Code No. 08 Troubleshooting (Refer to 323 Workshop Manual (1203-10-89F))
Always 0V or approx. 5V	• Refer to Code No. 10 Troubleshooting (Refer to 323 Workshop Manual (1203-10-89F))
Always 0V or approx. 5V	• Refer to Code No. 09 Troubleshooting (Refer to 323 Workshop Manual (1203-10-89F))
Always 0V	• Indicator broken • Open or short circuit in wiring from ECU 2R to ignition switch

13E0F3-362

VB: Battery voltage

Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
2S *		○	Overboost warning buzzer	Ignition switch ON	VB	—
2T		○	Solenoid valve (PRC low temp.)	180 sec. after engine started with coolant temperature is above 90°C {194°F} and intake air temperature is between 40°C {104°F} and 50°C {122°F}	Below 1.5V	No-load engine condition
				Other condition at idle	VB	
2U		○	Injector (Nos. 1, 3)	Ignition switch ON	VB	* Engine Signal Monitor: Green and red lamps flash
				Idle	VB*	
				Engine speed above 2,000 rpm during deceleration (after warm-up)	VB	
2V		○	Injector (Nos. 2, 4)	Ignition switch ON	VB	
				Idle	VB*	
				Engine speed above 2,000 rpm during deceleration (after warm-up)	VB	
2W		○	ISC valve	Ignition switch ON	Approx. 7V	—
				Idle	Approx. 9V	
2X		○	Solenoid valve (purge control)	Ignition switch ON	VB	—
				Idle	VB	
2Y		○	Circuit-opening relay	Ignition switch ON	VB	—
				Idle	Below 1.0V	
2Z		○	Solenoid valve (PRC high temp.)	210 sec. after engine started with coolant temperature above 90°C {194°F} and intake air temperature above 50°C {122°F}	Below 1.5V	No-load engine condition
				Other condition at idle	VB	—



VB: Battery voltage

Incorrect voltage	Possible cause
Always 0V	• Open or short circuit in wiring from ECU terminal 2S to buzzer
Always 0V or VB	• Refer to Code No.25 Troubleshooting (Refer to page F3-18)
Always 0V	• Main relay (FUEL INJ relay) malfunction • Open or short circuit in wiring from injector to ECU terminal 2U or 2V
Always VB	• ECU malfunction
Always 0V or VB	• Refer to Code No.34 Troubleshooting (Refer to 323 Workshop Manual (1203-10-89F))
Always 0V or VB	• Refer to Code No.26 Troubleshooting (Refer to 323 Workshop Manual (1203-10-89F))
Always 0V	• Open or short circuit in wiring from ECU terminal 2Y to relay
Always 0V or VB	• Refer to Code No. 35 Troubleshooting (Refer to page F3-18)

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ENGINE ELECTRICAL SYSTEM

FEATURES

SERVICE

13E0GX-301

OUTLINE

SPECIFICATIONS

Item			Engine: BP DOHC
Battery	Voltage	V	12
	Type and capacity	(20-hour rate)	55D23L (60Ah)
Dark current		mA	Max. 20
Alternator	Type		A·C
	Output	V-A	12-70
	Regulator type		Transistorized (built-in IC regulator)
	Regulated voltage	V	14.1—14.7
	Brush length mm (in)	Standard	21.5 (0.846)
		Minimum	8.0 (0.315)
	Drive belt deflection mm (in)/98 N (10 kgf, 22 lbf)	New	5.5—7.0 (0.22—0.27)
		Used	6.0—7.5 (0.24—0.29)
		Limit	8.0 (0.31)
Starter	Type		Direct
	Output	V-kW	12-0.65
	Brush length mm (in)	Standard	17 (0.67)
		Minimum	11.5 (0.453)
Distributor spark advance			Electronic spark advance (ESA)
Ignition timing (TEN terminal of diagnosis connector grounded)		BTDC	10 ± 1°
Ignition coil	Resistance (at 20°C (68°F))	Primary coil winding	0.81—0.99 Ω
		Secondary coil winding	10—16 kΩ
Spark plug	NGK		BKR6EVX 11*, BKR5EVX 11, BKR7EVX 11
	NIPPONDENSO		K20PR-TP11*, K16PR-TP11, K22PR-TP11
	Plug gap	mm (in)	1.0—1.1 (0.039—0.043)
Firing order			1—3—4—2

*Standard plug

13E0GX-302

SUPPLEMENTAL SERVICE INFORMATION

The following points shown in this section are changed in comparison with 323 Workshop Manual (1203-10-89F) and 323 Workshop Manual Supplement (1275-10-91C).

- **Alternator**
  Specifications
- **Starter**
  Specifications
- **Spark plug**
  Specifications

13E0GX-303

CLUTCH

FEATURES

13E0HX-301

OUTLINE

OUTLINE OF CONSTRUCTION

- A hydraulic clutch control mechanism is used.
- The basic construction is the same as the previous 323 BP DOHC turbo models, except that the thickness of clutch disc.

13E0HX-302

SPECIFICATIONS

Item \ Model/Engine/Transaxle			323 GT-R	Other 323 4WD
			BP DOHC turbo	
			G25MX-R (G5MX-R)	
Clutch control			Hydraulic	
Clutch cover	Type		Diaphragm spring	
	Set load	N {kgf, lbf}	5,494 {560, 1,232}	
Clutch disc	Outer diameter	mm {in}	230 {9.05}	
	Inner diameter	mm {in}	155 {6.10}	
	Thickness	Pressure plate side mm {in}	3.5 {0.14}	3.2 {0.13}
		Flywheel side mm {in}	3.5 {0.14}	3.2 {0.13}
Clutch pedal	Type		Suspended	
	Pedal ratio		6.55	
	Full stroke	mm {in}	135 {5.31}	
	Height (With carpet)	mm {in}	196—204 {7.72—8.03}	
Clutch master cylinder	Inner diameter	mm {in}	15.87 {0.625}	
Clutch release cylinder	Inner diameter	mm {in}	19.05 {0.750}	
Clutch fluid			SAE J1703 or FMVSS116 DOT-3	

13E0HX-303

MANUAL TRANSAXLE AND TRANSFER UNIT (G25MX-R)

FEATURES

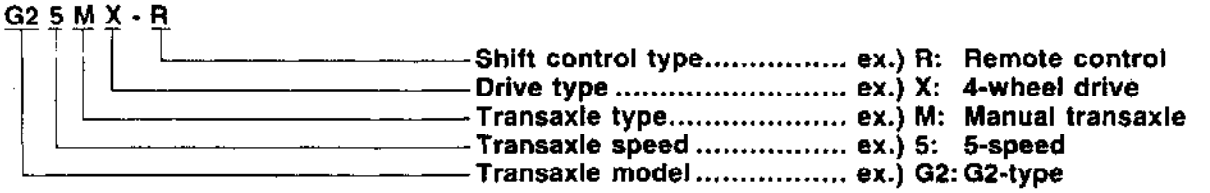
13E0J3-301

OUTLINE

OUTLINE OF CONSTRUCTION

- The 323 GT-R is added to the 323 BP DOHC turbo model lineup.
- All GT-R models are equpped with the G25MX-R (G5MX-R) manual transaxle and transfer unit.
- The transaxle and transfer unit is the same as in the 323 BP DOHC turbo models, except that the speedometer gear ratio is changed.

Note
- **Transaxle code is as shown.**



13E0J3-302

SPECIFICATIONS

Transaxle and Transfer Unit

Item \ Model/Engine			323 GT-R	Other 323 4WD
			BP DOHC turbo	
Transaxle control			Floor shift	
Synchromesh system		Forward	Synchromesh	
		Reverse	Selective sliding and synchromesh	
Gear ratio		1st	3.454	
		2nd	1.833	
		3rd	1.310	
		4th	0.970	
		5th	0.717	
		Reverse	3.166	
Final gear ratio			4.214	
Speedometer gear ratio			1.045	1.000
Center differential	Type		Planetary carrier	
	Number of ring gear teeth	Outer	59	
		Inner	75	
	Number of pinion gear teeth	Outer	14	
		Inner	14	
	Number of sun gear teeth	Pinion gear side	43	
		Idler gear side	43	
	Number of idler gear teeth		37	
Oil	Grade		API service GL-4	
	Viscosity	All-season	ATF Dexron®II or M-III	
		Above −18°C (0°F)	SAE 75W-90	
	Capacity	L (US qt, Imp qt)	2.6 (2.7, 2.2)	

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Transfer Carrier

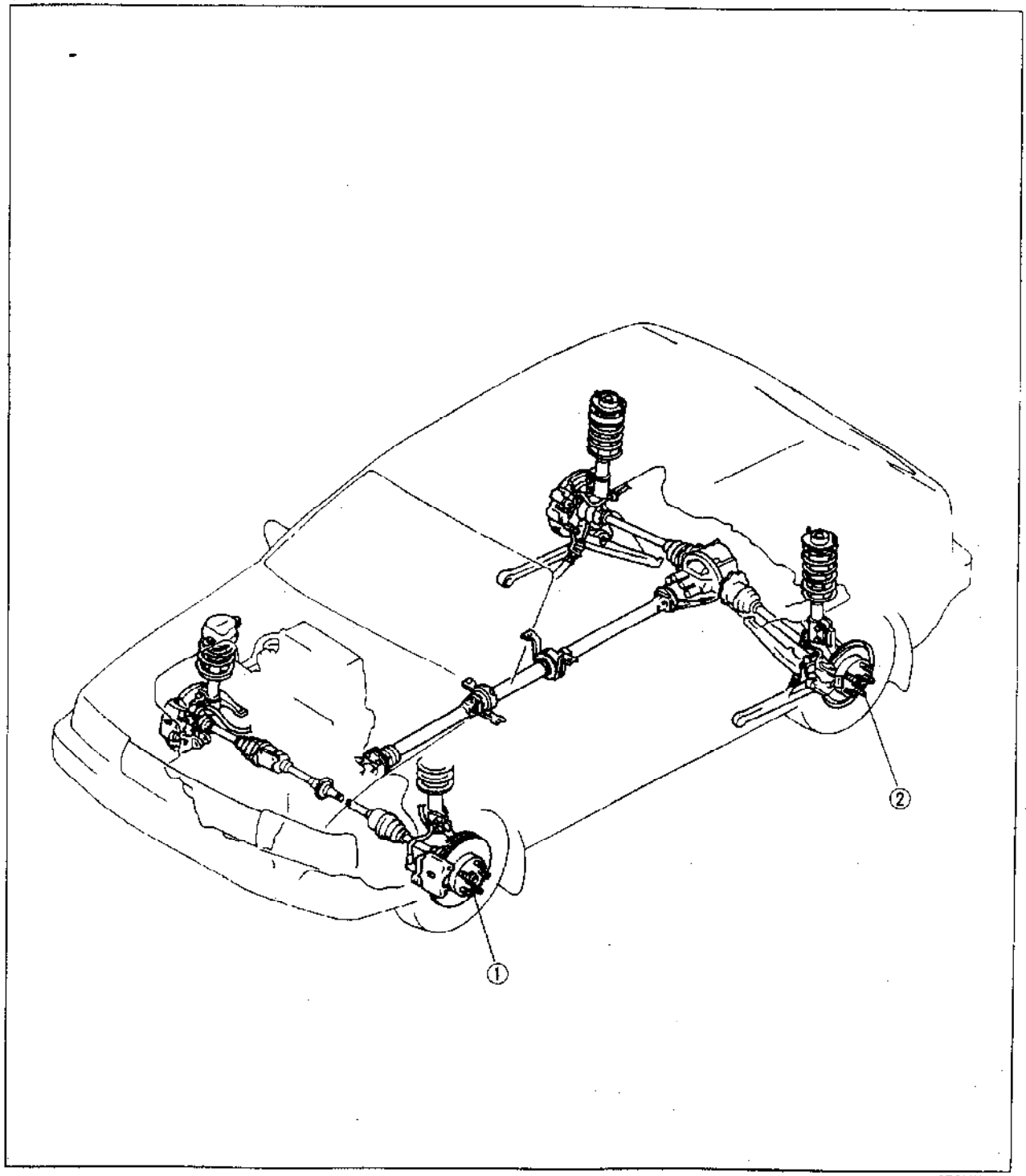
Number of teeth		Ring gear	37
		Pinion gear	11
Oil	Grade		API service GL-5
	Viscosity	Above −18°C (0°F)	SAE 90
		Below −18°C (0°F)	SAE 80W
	Capacity	L (US qt, Imp qt)	0.5 (0.53, 0.44)

13E0J3-304

FRONT AND REAR AXLES

13E0MX 301

INDEX



13E0MX-302

OUTLINE

OUTLINE OF CONSTRUCTION

- The construction and operation of the front and rear axles are basically the same as previous models.
- Because of the use of a high power engine, the following parts are modified to improve rigidity.
  (1) Larger front and rear bearings are used.
  (2) Larger front and rear knuckles are used.
  (3) A five-stud wheel hub is used.
- An ice scraper is newly installed on the rear knuckle to prevent ice from building up on the brake caliper. (Refer to page M–14.)

13E0MX-303

SPECIFICATIONS

Item			Specifications
Front driveshaft			
Joint type		Inside	Double offset joint
		Outside	Bell joint
Length of joint (between center of joint) mm {in}		Right	392 {15.4}
		Left	306 {0.83}
Shaft diameter mm {in}			21.0 {0.83}
Rear driveshaft			
Joint type		Inside	Double offset joint
		Outside	Bell joint
Length of joint (between center of joint) mm {in}		Right	519.5 {20.5}
		Left	489.5 {19.3}
Shaft diameter mm {in}			21.0 {0.83}
Joint shaft			
Length of joint mm {in}			357.2 {14.1}
Shaft diameter mm {in}			21.0 {0.83}
Front axle			
Bearing play axial direction mm {in}			0.05 {0.002}
Rear axle			
Bearing play axial direction mm {in}			0.05 {0.002}
Rear differential (viscous limited slip 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	Above –18°C {0°F}	SAE 90
		Below –18°C {0°F}	SAE 80W
	Capacity L {US qt, Imp qt}		0.65 {0.69, 0.57}

13E0MX-304

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with Mazda 323 Workshop Manuals (1206-10-89F) and (1229-10-89L).

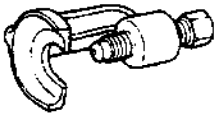
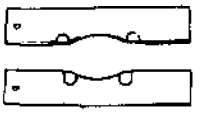
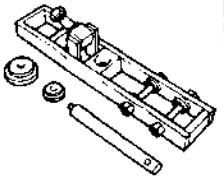
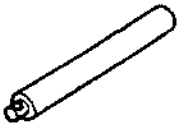
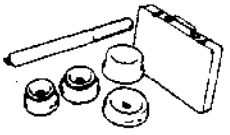
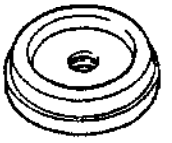
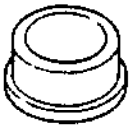
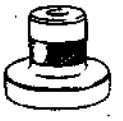
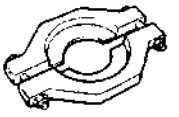
Front axle
- Removal / Inspection / Installation
- Disassembly / Inspection / Assembly

Rear axle
- Removal / Inspection / Installation
- Disassembly / Inspection / Assembly

13E0MX-305

FRONT AXLE

PREPARATION
SST

49 0118 850C Puller, ball joint 	For removal of tie rod end	49 F026 103 Puller, wheel hub 	For disassembly of wheel bearing
49 G033 1A1 Puller, wheel hub 	For disassembly and assembly of wheel hub	49 G033 102 Handle (Part of 49 G033 1A1) 	For removal of front wheel hub
49 G033 105 Attachment A (Part of 49 G033 1A1) 	For removal of front wheel hub	49 G033 107 Installer, dust cover 	For installation of dust cover
49 F027 0A1 Installer set, bearing 	For installation of bearing	49 G030 797 Handle (Part of 49 G030 795) 	For removal of wheel bearing
49 F027 005 Attachment 62 (Part of 49 F027 0A1) 	For removal of wheel bearing	49 F027 004 Attachment 80 (Part of 49 F027 0A1) 	For installation of wheel bearing
49 F027 009 Attachment 68 & 77 (Part of 49 F027 0A1) 	For installation of dust cover	49 V001 795 Installer, oil seal 	For installation of oil seal
49 G030 795 Installer, oil seal 	For installation of wheel bearing	49 H027 002 Remover, bearing 	For removal of wheel bearing

13E0MX-306

M

WHEEL HUB, STEERING KNUCKLE

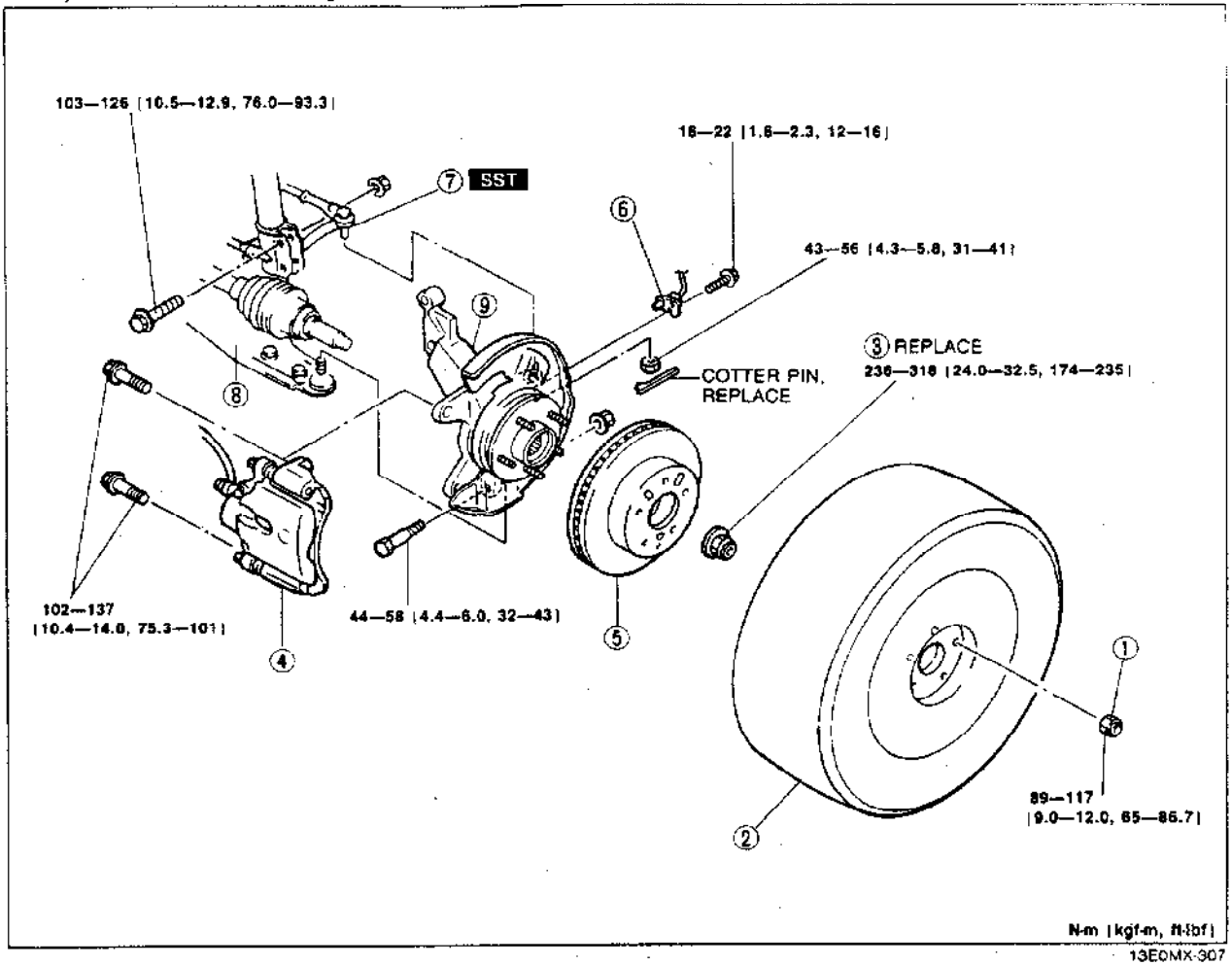
Removal / Inspection / Installation

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**.

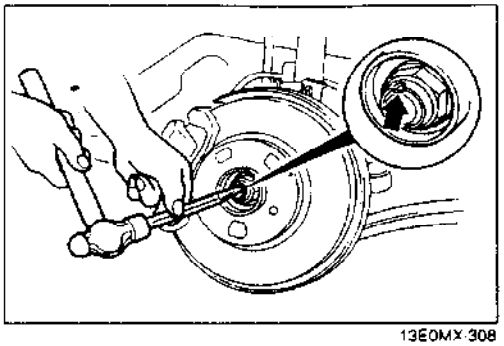
Caution

- **Loosely tighten the shock absorber bolts. Lower the vehicle and tighten the bolts to the specified torque with the vehicle unladen.**

4. Adjust the front wheel alignment.



1. Wheel hub nut
2. Wheel and tire
3. Locknut
   - Removal Note ..... page M–7
   - Installation Note ..... page M–7
4. Brake caliper assembly
   - Service ..... Section P
5. Disc plate
   - Inspection ..... Section P
6. ABS wheel speed sensor (if equipped)
7. Tie rod end
   - Removal Note ..... page M–7
   - Installation Note ..... page M–7
8. Lower ball joint
9. Steering knuckle, wheel hub, and dust cover
   - Inspect wheel hub for cracks and damage
   - Inspect knuckle spindle for cracks and damage
   - Inspect dust cover for damage and distortion
   - Disassembly / Inspection / Assembly ..... page M–8



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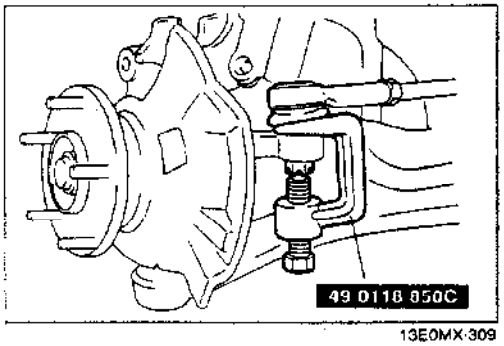

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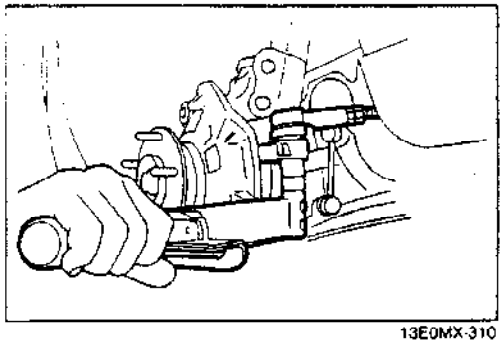

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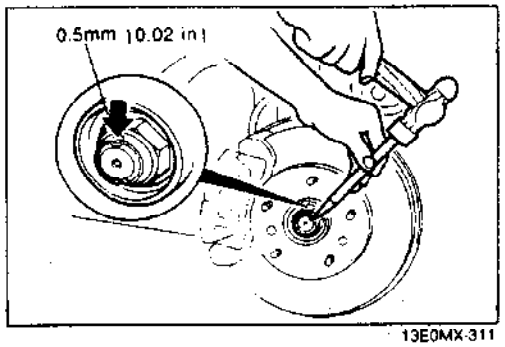

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Removal note
Locknut

Caution
- **Do not damage the drive shaft.**
- **Do not reuse the locknut.**

1. Raise the staked portion of the locknut using a chisel.
2. Lock the hub by applying the brakes.
3. Remove the locknut.

Tie rod end

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

Losen the nut and disconnect the tie rod end by using the **SST**.

Installation note
Tie rod end

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

Install the nut and secure it with the new cotter pin.

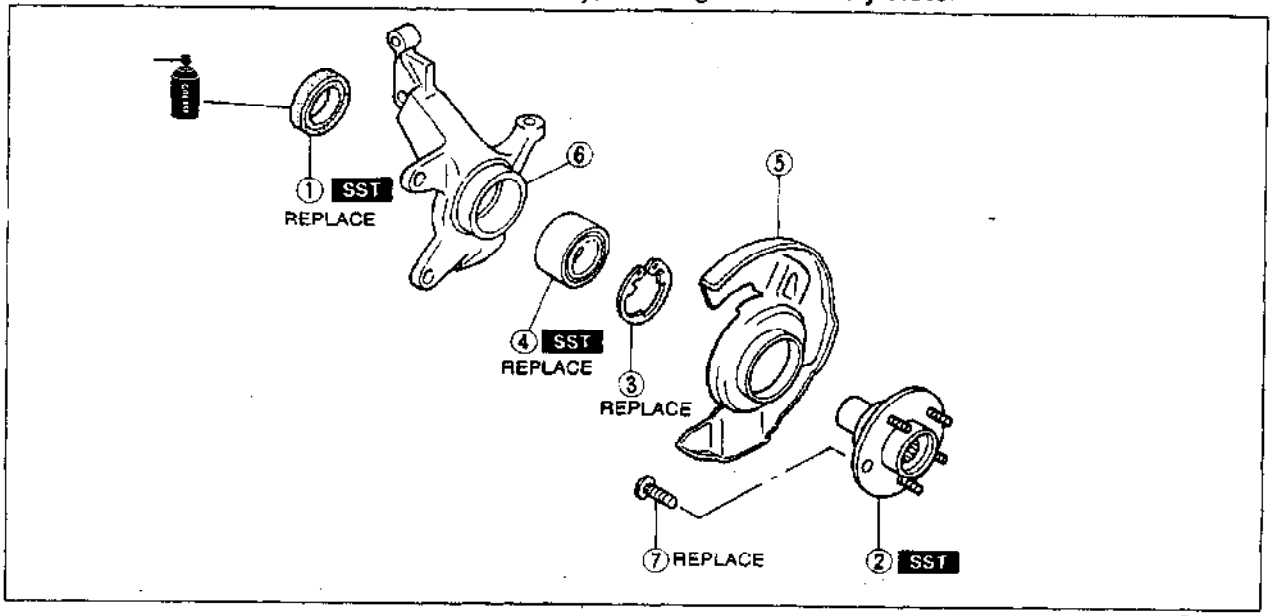
Tightening torque:
43—56 N·m {4.3—5.8 kgf·m, 31—41 ft·lbf}

Locknut
Install a new locknut and stake it, as shown.

Tightening torque: 236—318 N·m
{24.0—32.5 kgf·m, 174—235 ft·lbf}

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**.



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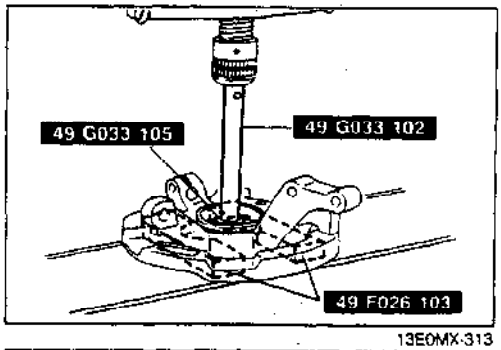
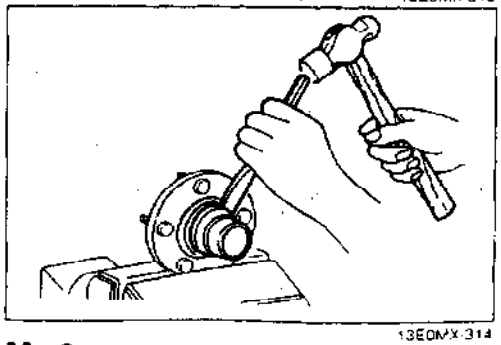
1. Oil seal
   Assembly Note ..... page M–10
2. Front wheel hub assembly
   Disassembly Note ..... below
   Assembly Note ..... page M–10
3. Retaining ring
4. Wheel bearing
   Disassembly Note ..... page M– 9
   Assembly Note ..... page M–10
5. Dust cover
   Disassembly Note ..... page M– 9
   Assembly Note ..... page M–10
6. Steering knuckle
7. Hub bolt
   Disassembly Note ..... page M– 9
   Assembly Note ..... page M– 9



13E0MX-313



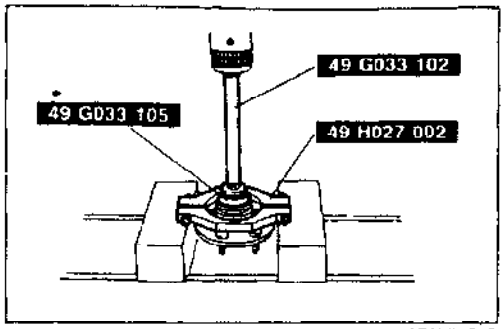
13E0MX-314

Disassembly note

Front wheel hub assembly

1. Remove the front wheel hub assembly by using the **SST**.

2. Make an opening between the wheel hub and the bearing race to allow for use of the **SST**.



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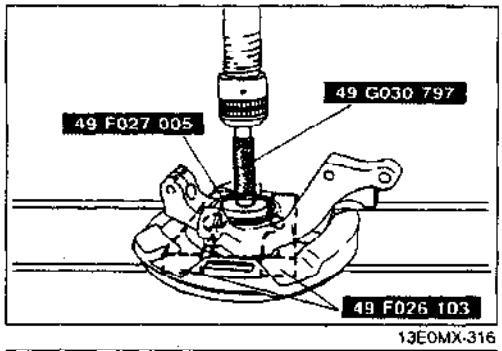
3. Press out the bearing race by using the **SST**.

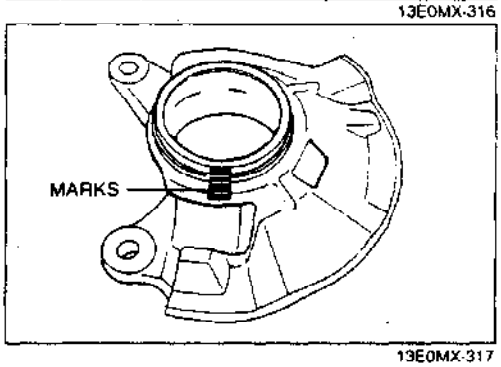


13E0MX-316

Wheel bearing

Caution
- **Do not reuse the wheel bearing.**

Remove the wheel bearing by using the **SST**.

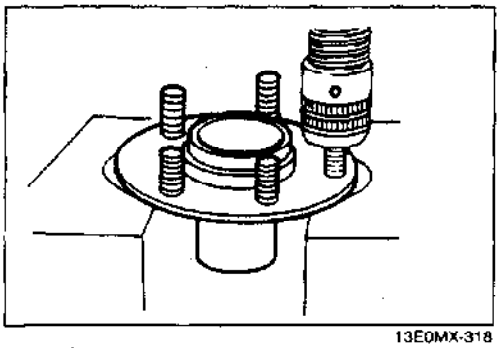


13E0MX-317

Dust cover

Caution
- **Do not remove the dust cover if not necessary.**
- **Do not reuse the dust cover if removed.**

1. Mark the dust cover and steering knuckle for proper reassembly.
2. Remove the dust cover by using a chisel.

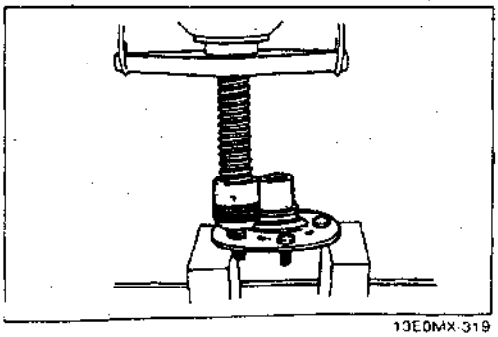

13E0MX-318

Hub bolt

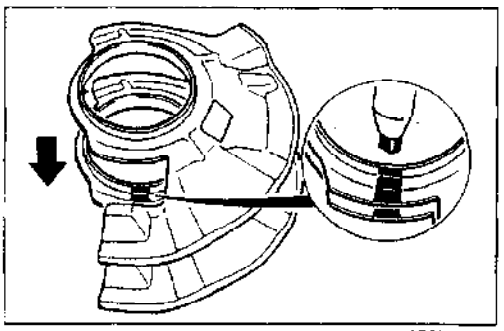
M

Caution
- **Do not remove the hub bolts if not necessary.**
- **Do not reuse the hub bolts if removed.**

Remove the hub bolts by using a press.


13E0MX-319

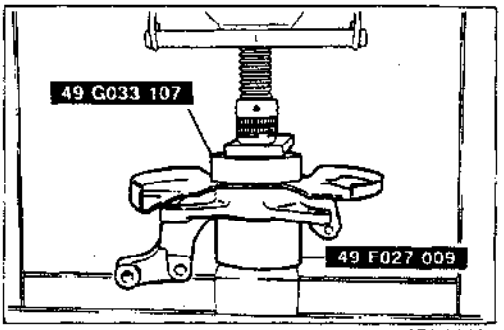
Assembly note
Hub bolt
Press in new hub bolts.



13E0MX-320

Dust cover

1. Mark the new dust cover as the one removed.



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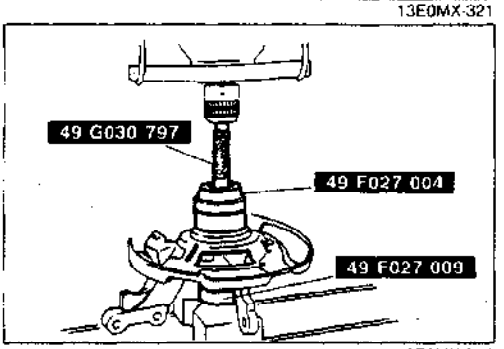
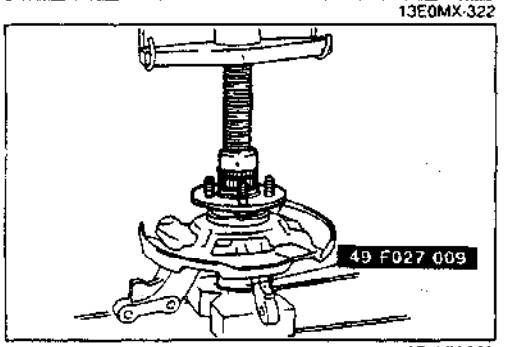
2. Align the marks of the new dust cover and the steering knuckle.
3. Install the dust cover by using a steel plate and the **SST**.



13E0MX-322

Wheel bearing

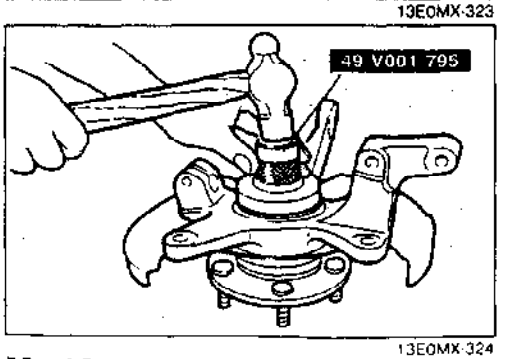
Install the new wheel bearing by using the **SST**.



13E0MX-323

Front wheel hub assembly

1. Install the front wheel hub assembly by using the **SST**.
2. Verify that the wheel hub rotates smoothly.



13E0MX-324

Oil seal

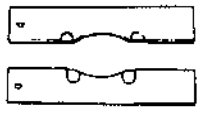
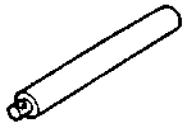
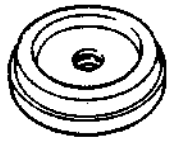
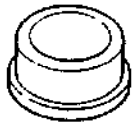
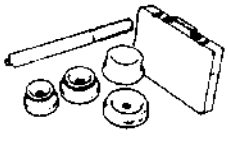
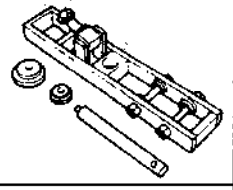
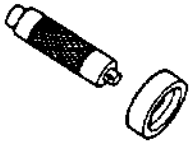
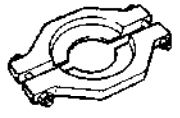
Caution

- **Use a new oil seal, and apply grease to the lip of the seal.**
- **Install the oil seal flush with the steering knuckle.**

Install the new oil seal by using the **SST**.

REAR AXLE

PREPARATION
SST

49 F026 103 Puller, wheel hub 	For removal of wheel bearing	49 G033 105 Attachment A (Part of 49 G033 1A1) 	For removal of wheel hub
49 G033 102 Handle (Part of 49 G033 1A1) 	For removal of wheel hub	49 G030 797 Handle (Part of 49 G030 795) 	For removal of wheel bearing
49 F027 005 Attachment 62 (Part of 49 F027 0A1) 	For removal of wheel bearing	49 F027 004 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 G033 1A1 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
49 G033 107 Installer, dust cover 	For installation of dust cover	—	—

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WHEEL HUB, KNUCKLE

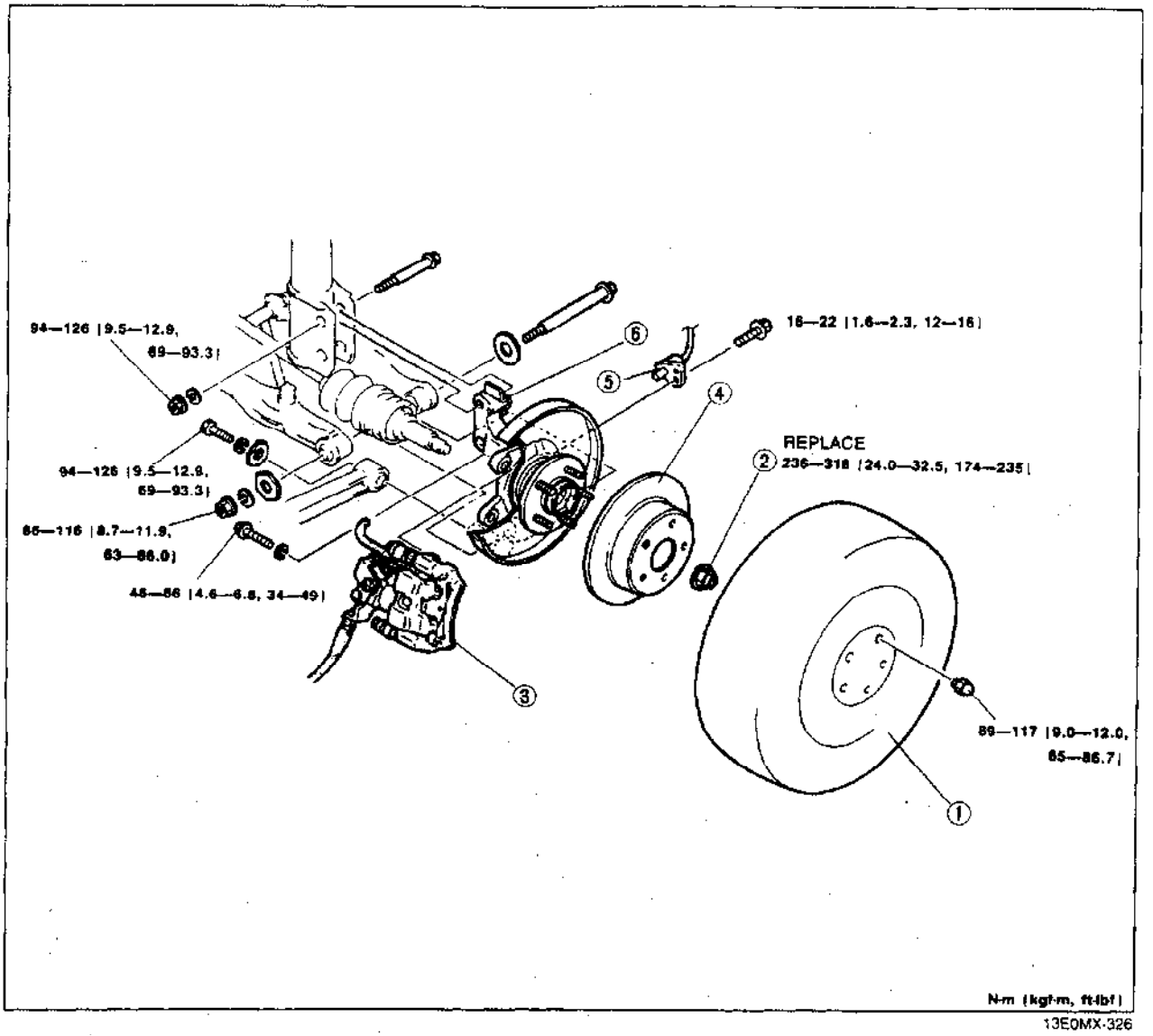
Removal / Inspection / Installation

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**.

Caution

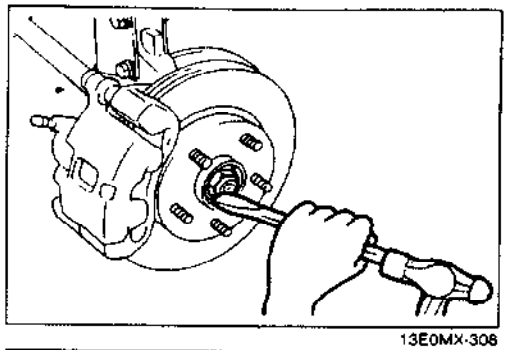
- **Loosely tighten the shock absorber bolts. Lower the vehicle and tighten the bolts to the specified torque with the vehicle unladen.**

4. Adjust the rear wheel alignment.

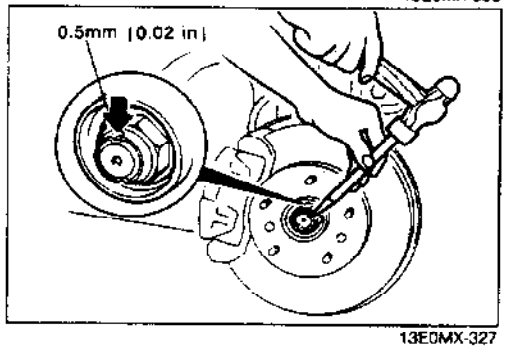


13E0MX-326

1. Wheel and tire
2. Locknut
   - Removal Note ..... page M–13
   - Installation Note ..... page M–13
3. Brake caliper assembly
   - Service ..... Section P
4. Disc plate
   - Service ..... Section P
5. ABS wheel speed sensor (if equipped)
6. Wheel hub, knuckle
   - Disassembly / Inspection / Assembly ..... page M–14
   - Inspect wheel hub and knuckle for damage or cracks
   - Inspect dust cover for damage or deformation



13E0MX-308



13E0MX-327

Removal note
Locknut

Caution
- **Do not damage the drive shaft.**
- **Do not reuse the locknut.**

1. Raise the staked portion of the locknut using a chisel.
2. Lock the hub by applying the brakes.
3. Remove the locknut.

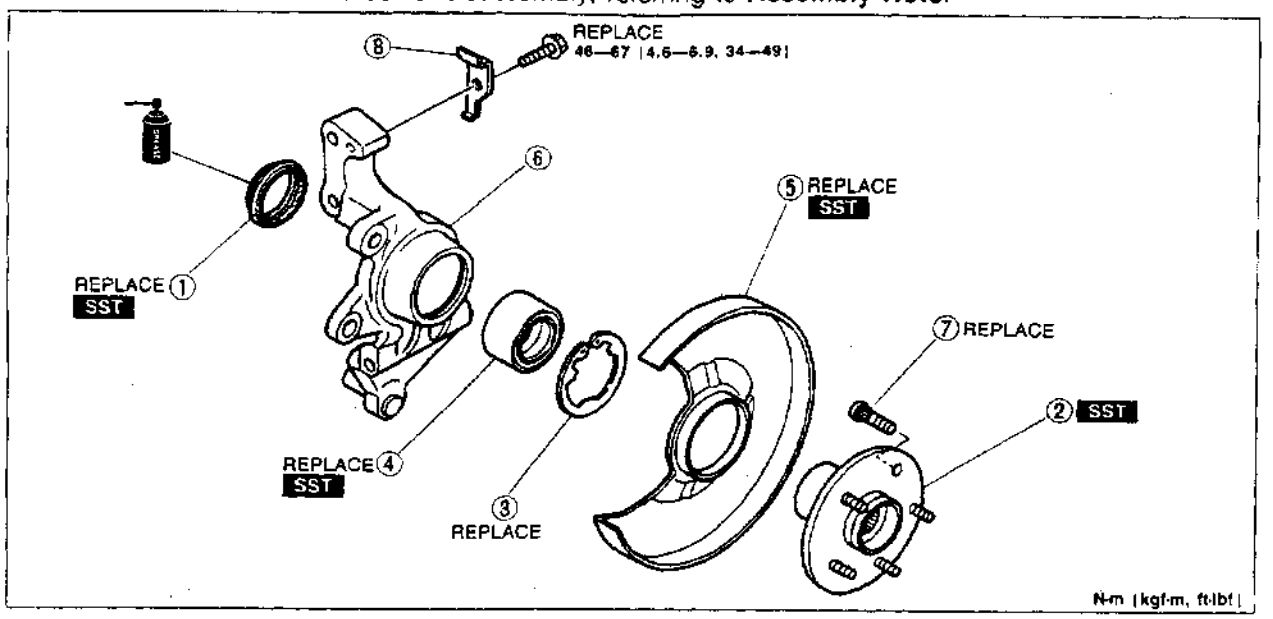
Installation note
Locknut

Install a new locknut and stake it, as shown.

Tightening torque: 236—318 N·m (24.0—32.5 kgf·m, 174—235 ft·lbf)

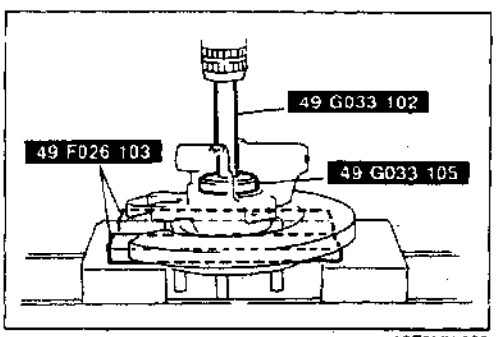
Disassembly / Inspection / Assembly

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**.

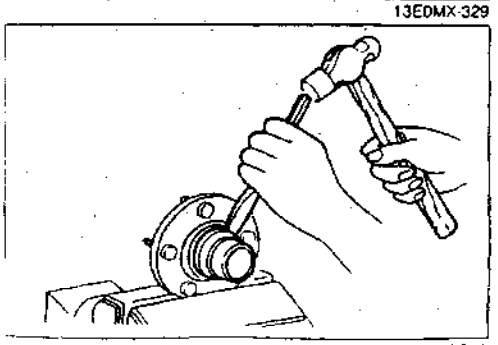


13E0MX-328

1. Oil seal
   Assembly Note ..... page M–17
2. Rear wheel hub assembly
   Disassembly Note ..... below
   Assembly Note ..... page M–16
3. Retaining ring
4. Wheel bearing
   Disassembly Note ..... page M–15
   Assembly Note ..... page M–16
5. Dust cover
   Disassembly Note ..... page M–15
   Assembly Note ..... page M–16
6. Knuckle
7. Hub bolt
   Disassembly Note ..... page M–15
   Assembly Note ..... page M–16
8. Ice scraper
   Disassembly Note ..... page M–15



13E0MX-329



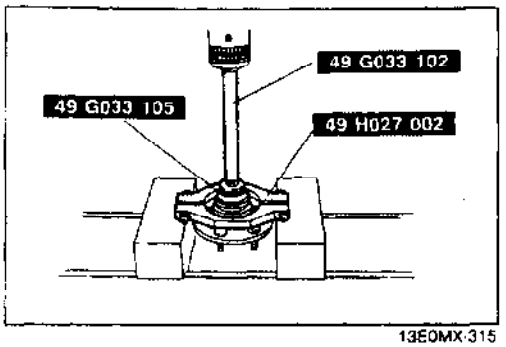
13E0MX-314

Disassembly note

Rear wheel hub assembly

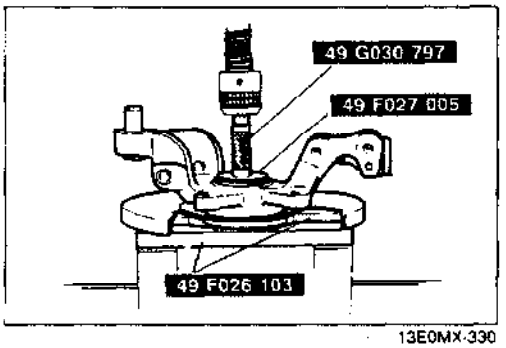
1. Remove the front wheel hub assembly by using the **SST**.

2. Make an opening between the wheel hub and the bearing race to allow for use of the **SST**.



13E0MX-315

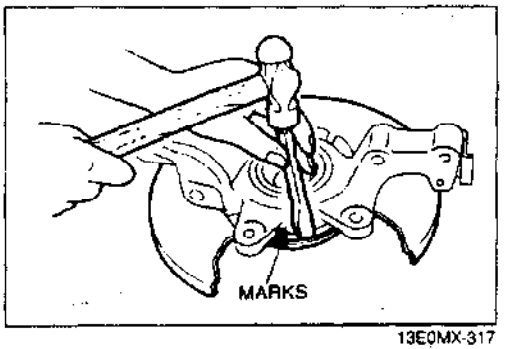
3. Press out the bearing race by using the **SST**.



13E0MX-330

Wheel bearing

Remove the wheel bearing by using the **SST**.

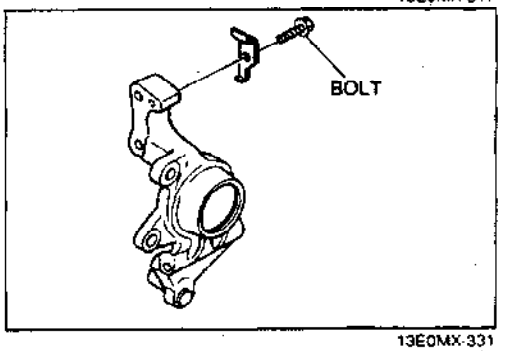


13E0MX-317

Dust cover

Caution
- **Do not remove the dust cover if not necessary.**
- **Do not reuse the dust cover if removed.**

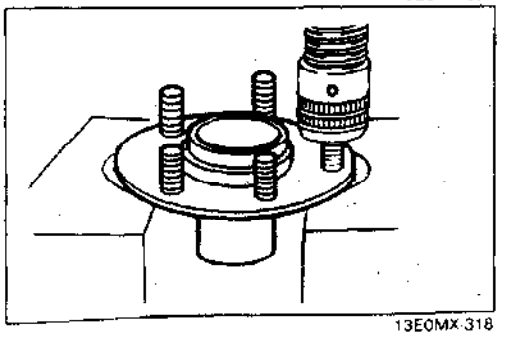
1. Mark the dust cover and steering knuckle for proper reassembly.
2. Remove the dust cover by using a chisel.



13E0MX-331

Ice scraper

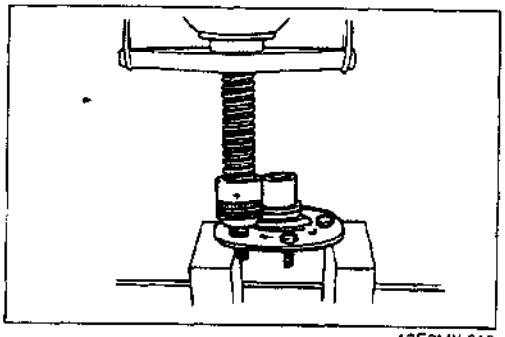
Caution
- **Do not remove the ice scraper if not necessary.**
- **If it is removed, use a new bolt applied specified thread locking compound.**


13E0MX-318

Hub bolt

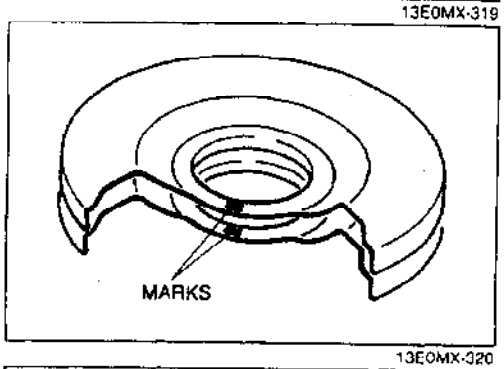
Caution
- **Do not remove the hub bolts if not necessary.**
- **Do not reuse the hub bolts if removed.**

Remove the hub bolts by using a press.



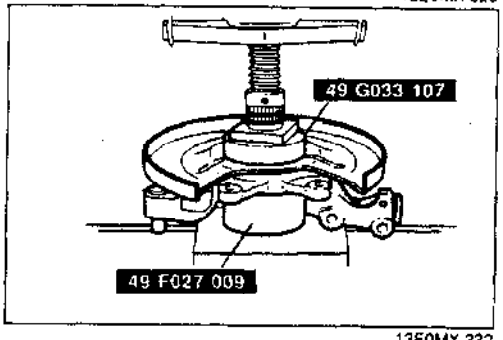
13E0MX-319

Assembly note
Hub bolt
Press in new hub bolts.



13E0MX-320

Dust cover
1. Mark the new dust cover as the one removed.



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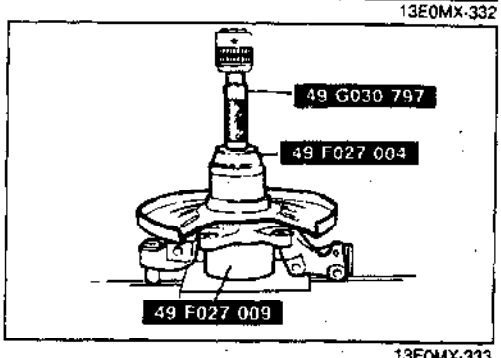
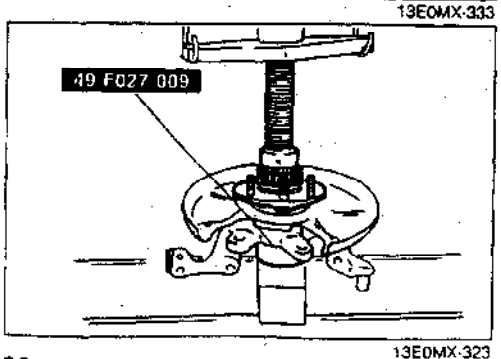
2. Align the marks of the new dust cover and the knuckle.
3. Install the dust cover by using a steel plate and the **SST**.



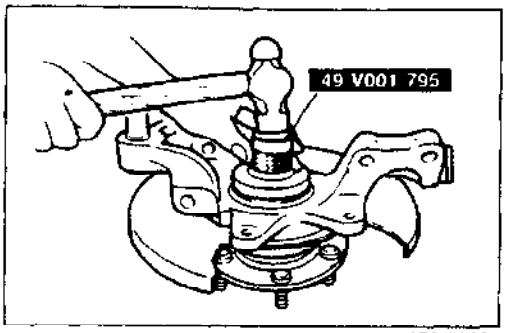
13E0MX-333

Wheel bearing
Using the **SST**, install the new wheel bearing.



13E0MX-323

Rear wheel hub assembly
1. Install the rear wheel hub assembly by using the **SST**.
2. Verify that the wheel hub rotates smoothly.



13E0MX-324

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.**

Install the new oil seal by using the **SST**.

STEERING SYSTEM

FEATURES

13E0NX-301

OUTLINE

OUTLINE OF CONSTRUCTION

- Engine speed sensing power steering (ESPS) is standard equipment for all models. The construction and operation are basically the same as for previous models.
- The lock-to-lock specification of the steering wheel is reduced from 2.76 to 2.51.

13E0NX-302

SPECIFICATIONS

Item		Specifications
Steering wheel	Outer diameter mm (in)	370 (14.57)
	Lock-to-lock turns	2.51
Steering shaft and joint	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)
Power steering fluid	Capacity L (US qt, Imp qt)	0.8 (0.85, 0.70)
	Type	ATF Dexron®II or M-III

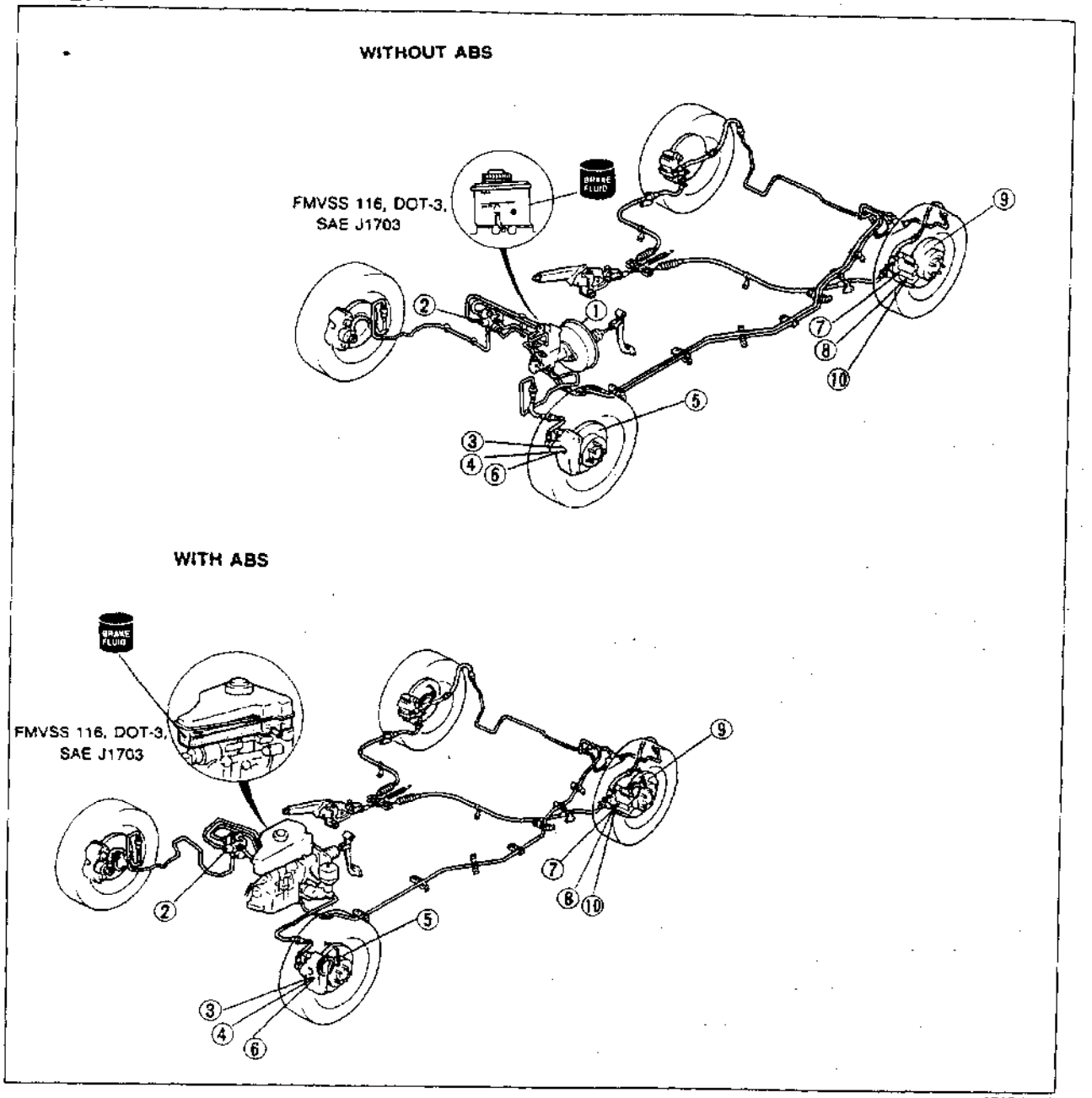
Shaded area indicates new specification.

13E0NX-303

BRAKING SYSTEM

13E0PX-301

INDEX



13E0PX-302

OUTL

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SPECIFI

Brake pa
Master cy
Front disc
Rear disc
Power brak
Braking for
Brake fluid
Parking bra

OUTLINE

OUTLINE OF CONSTRUCTION

- The brake system remains similar to that of the previous model.
- However, because all new models use a higher-horsepower engine, the brake system is enlarged as a whole.
- Vehicles without ABS use a portless-type master cylinder

13E0PX-303

SPECIFICATIONS

Item		Specification
Brake pedal	Type	Suspended
	Pedal lever ratio	4.1
	Max. stroke mm {in}	140 {5.51}
Master cylinder	Type	Tandem
	Cylinder inner diameter mm {in}	Without ABS: 25.4 {1.00} With ABS: 23.8 {0.94}
Front disc brake	Type	Ventilated disc
	Cylinder bore mm {in}	57.2 {2.25}
	Pad dimensions (area × thickness) mm^2 {in^2} × mm {in}	5,200 {8.06} × 10 {0.39}
	Disc plate dimensions (outer diameter × thickness) mm {in}	274 × 24 {10.79 × 0.94}
Rear disc brake	Type	Solid disc
	Cylinder bore mm {in}	34.9 {1.37}
	Pad dimensions (area × thickness) mm^2 {in^2} × mm {in}	3,200 {4.96} × 8 {0.31}
	Disc plate dimensions (outer diameter × thickness) mm {in}	280 × 10 {11.02 × 0.39}
Power brake unit	Type	Without ABS: Vacuum multiplier With ABS: Hydraulic multiplier
	Diameter (without ABS) mm {in}	188.4 {7.42} + 215.2 {8.47}
Braking force control device	Type	Without ABS: Dual proportioning valve With ABS: Proportioning valve
Brake fluid		FMVSS 116, DOT-3, SAE J1703
Parking brake	Type	Mechanical two-rear-wheel control
	Operation system	Center lever

13E0PX-304

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed and added in comparison with Workshop Manuals (1206-10-89F), (1229-10-89L) and (1275-10-91C).

Air bleeding (with ABS)

Power brake unit (SST newly established)
- Inspection (on-vehicle)

Proportioning valve (SST newly established)
- Inspection

Front brake
- Inspection (on-vehicle)
  Removal / Inspection / Installation

Disc pad
- Replacement

Disc plate
- Inspection

Caliper
- Disassembly / Inspection / Assembly

Rear brake
- Inspection (on-vehicle)
- Removal / Inspection / Installation

Disc pad
- Replacement

Disc plate
- Inspection

Caliper
- Disassembly / Inspection / Assembly

13E0PX-305

CON

PREP,
SST

49 025
Wrench

49 U04
Gauge,
pressur
(Part of
49 U04

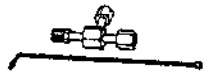
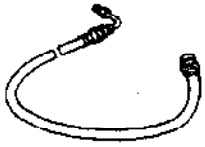
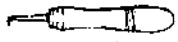
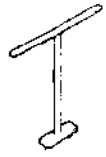
49 U04
Hose
(Part o
49 U04

49 0209
Air-out t

49 1258
Puller, b

CONVENTIONAL BRAKE SYSTEM

PREPARATION
SST

49 0259 770B Wrench, flare nut 	For removal and installation of brake pipe	49 U043 0A0 Gauge set, oil pressure 	For inspection of brake fluid pressure
49 U043 004 Gauge, oil pressure (Part of 49 U043 0A0) 	For inspection of brake fluid pressure	49 U043 005 Joint (Part of 49 U043 0A0) 	For inspection of brake fluid pressure
49 U043 006 Hose (Part of 49 U043 0A0) 	For inspection of brake fluid pressure	49 B043 002 Installer, bearing 	For installation of caliper needle bearing
49 0208 701A Air-out tool, boot 	For removal of piston seal	49 FA18 602 Wrench, disc brake piston 	For removal and installation of disc caliper piston
49 1258 071 Puller, bearing 	For removal of caliper needle bearing	49 0221 600C Expand tool, disc brake 	For installation of brake pads

13E0PX-306

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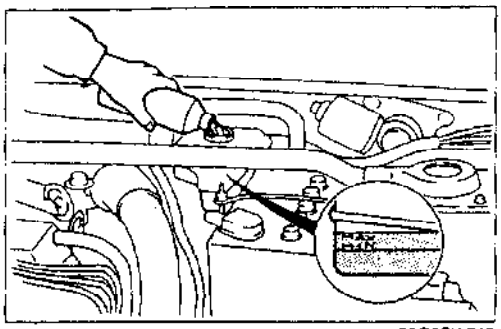
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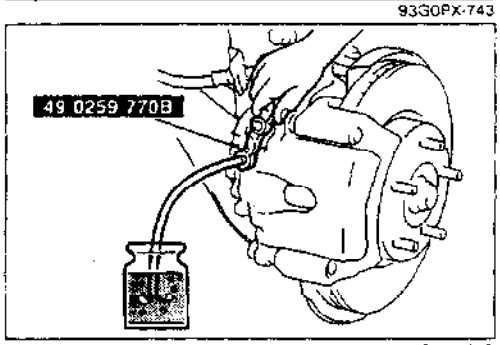

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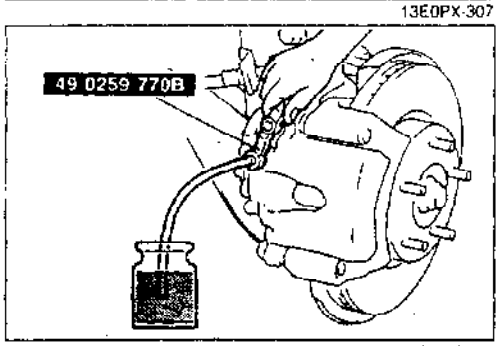


13E0PX-308

AIR BLEEDING (WITH ABS)

Front Brakes

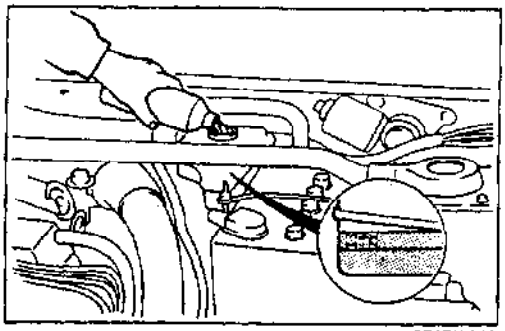
1. Fill the fluid reservoir to the MAX line with the specified brake fluid.

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 on safety stands.
3. Remove the bleeder cap and attach a vinyl hose to the bleeder screw.
4. Place the other end of the vinyl hose into a clear fluid-filled container.
5. Have an assistant depress the brake pedal a few times, and then hold it depressed.
6. Using the **SST**, loosen the bleeder screw and drain out the fluid and air. Retighten the bleeder screw.

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.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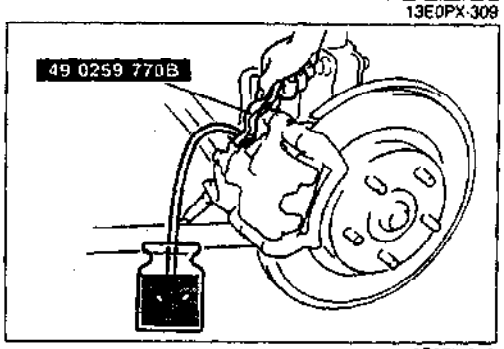

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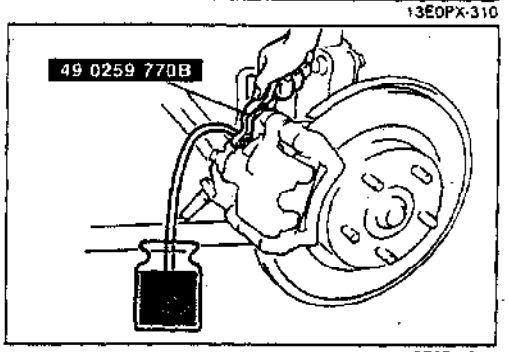


13E0PX-311

Rear Brakes

1. Fill the fluid reservoir to the MAX mark with the specified brake fluid.
2. With the ignition switch ON, fully depress the brake pedal several times.
3. When the hydraulic-unit pump stops add the specified brake fluid to the reservoir MAX mark if necessary.
   If the hydraulic-unit pump continues to run for more than one minute, do the following:

   (1) Jack up the vehicle and support it on safety stands.
   (2) Remove the bleeder cap and attach a vinyl hose to the bleeder screw.
   (3) Insert the other end of the vinyl hose into a clear container.
   (4) Loosen the bleeder screw by using the **SST**.
   (5) With the ignition switch ON, fully depress the brake pedal several times.
   (6) Tighten the bleeder screw and continue with Step 2 of the main procedure.

Caution

- **Do not run the hydraulic-unit pump for more than two minutes.**
- **The brake fluid reservoir must be kept 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 different brands of fluid.**

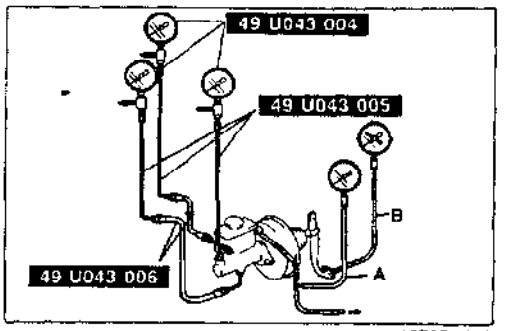
4. Jack up the vehicle and support it on safety stands.
5. Remove the bleeder cap and attach a vinyl hose to the bleeder screw.
6. Place the other end of the vinyl hose into a clear fluid-filled container.
7. With the ignition switch ON, have an assistant depress the brake pedal serveral times, and then hold the pedal down.

Caution

- **The two people should stay within voice contact of each other.**
- **Be sure the pedal remains depressed until the bleeder screw is tightened.**
- **Release the brake pedal intermittently to stop the pump motor.**
- **Care must be used when opening the rear caliper bleeder screw, because of the high pressure built up from a fully-charged accumulator.**

8. Use the **SST** to loosen the bleedes screw to let fluid and air escape. Retighten the bleeder screw by using the **SST**.
9. Repeat Steps 7 and 8 until no air bubbles are seen.
10. Check for correct brake operation.
11. Verify that there is no fluid leakage. Clean away any spilled fluid with rags.
12. After bleeding the air from the brake system, add brake fluid to the reservoir MAX mark.

13E0PX-312



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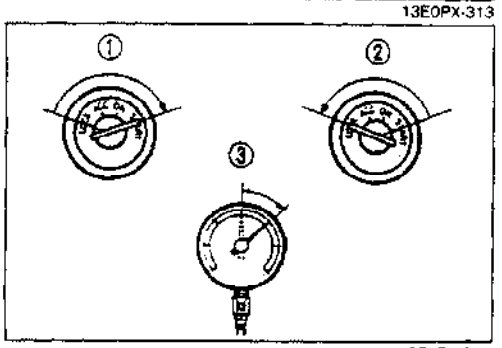

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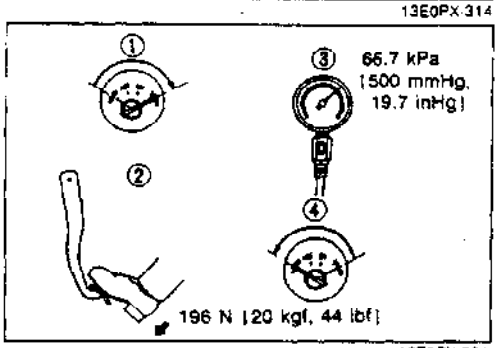

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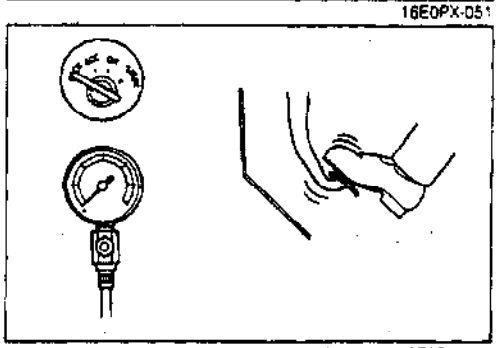
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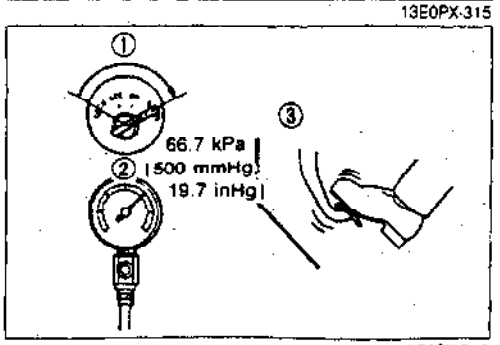


13E0PX-316

POWER BRAKE UNIT
Quick Inspection (On-vehicle)
Power brake unit function check
(Method-using tester)

Connect the **SST**, vacuum gauge A, and pedal depression force gauge B as shown in the figure. After bleeding the air from the **SST**, conduct the test as described in the 3steps below.

Note
- **Use commercially available vacuum gauge and pedal depression force gauge.**

a) Checking for vacuum loss
Unloaded condition
1. Start the engine.
2. Stop the engine when the vacuum gauge reading reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
3. Observe the vacuum gauge for **15 seconds**. If the gauge shows **63.3—66.7 kPa {475—500 mmHg, 18.7—19.7 inHg}**, the unit is operating.

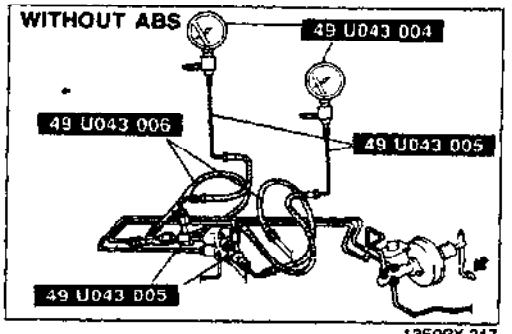
Loaded condition
1. Start the engine.
2. Depress the brake pedal with a force of **196 N {20 kgf, 44 lbf}**.
3. With the brake pedal depressed, stop the engine when the vacuum gauge reading reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
4. Observe the vacuum gauge for **15 seconds**. If the gauge shows **63.3—66.7 kPa {475—500 mmHg, 18.7—19.7 inHg}**, the unit is operating.

b) Checking for hydraulic pressure
1. If with the engine stopped (vacuum **0 kPa {0 mmHg, 0 inHg}**) the fluid pressure is within specification, the unit is operating.

Pedal force N {kgf, lbf}	Fluid pressure kPa {kgf/cm², psi}
196 {20, 44}	1080 {11, 156} min.

2. Start the engine. Depress the brake pedal when the vacuum reaches **66.7 kPa {500 mmHg, 19.7 inHg}**. If the fluid pressure is within specification, the unit is operating.

Pedal force N {kgf, lbf}	Fluid pressure kPa {kgf/cm², psi}
196 {20, 44}	6670 {68, 967} min.



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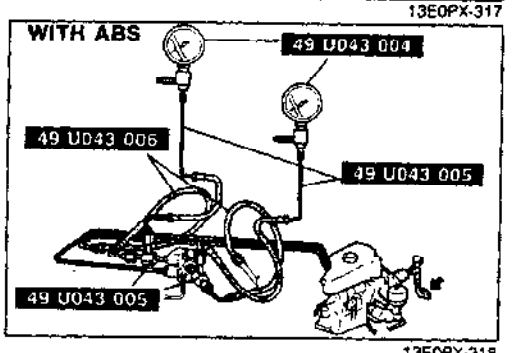

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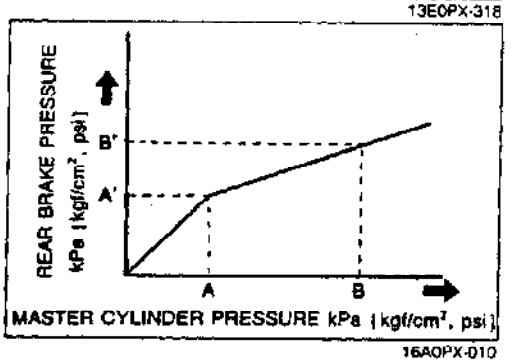


16A0PX-010

PROPORTIONING VALVE

Inspection

1. Connect the **SST** to the brake pipes with adapters as shown in the figure.

Adapter and flare nut tightening torque:
12.8—21.5 N·m {130—220 kgf·cm, 113—190 in·lbf}

Note
- **Disconnect and connect the brake pipes with SST.**

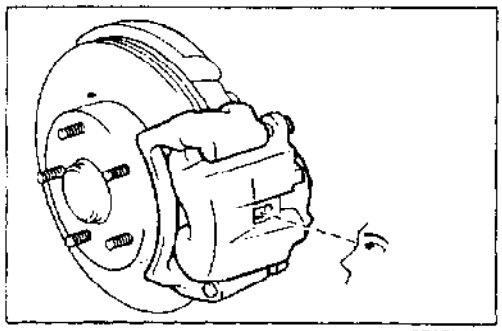
2. Bleed the air from the brake system.
3. Depress the brake pedal until the master cylinder pressure equals A; then record rear brake pressure A'.
4. Depress the brake pedal again, apply additional pressure until the pressure equals B; then record pressure B'.

Fluid pressure

kPa {kgf/cm², psi}

	A	A'	B	B'
WITHOUT ABS	1960 {20, 284}	1960 {20, 284} ±196 {2, 28}	5880 {60, 853}	2750 {28, 398} ±196 {2, 28}
WITH ABS	1960 {20, 284}	1960 {20, 284} ±196 {2, 28}	5880 {60, 853}	3140 {32, 455} ±294 {3, 42}

P



13E0PX-319

FRONT BRAKE (DISC)

Inspection (on-vehicle)

Disc pad

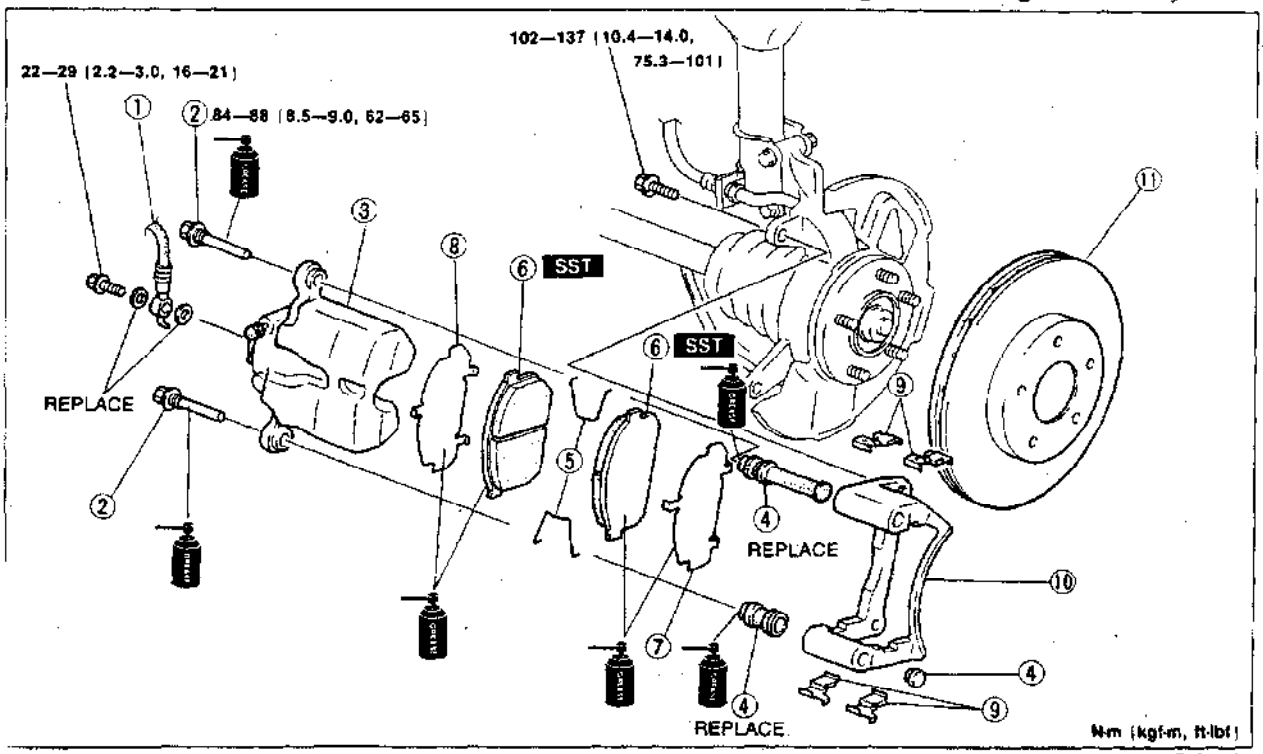
1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheels.
3. Sight through the caliper inspection hole and inspect the remaining thickness of the pads.

   Thickness: 2.0mm (0.08 in) min.

4. Replace the pads as a set (right and left wheels) if either is at or less than the minimum thickness.

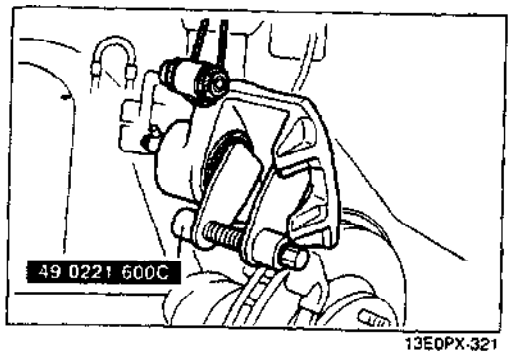
Removal / Inspection / Installation

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**.
4. After installation, perform the following.
   (1) Add fluid and bleed the air.
   (2) Check for fluid leakage.
   (3) Depress the pedal a few times, then verify that the brakes do not drag while rotating the wheel by hand.



13E0PX-320

1. Flexible hose
2. Bolt
3. Caliper
   Disassembly / Inspection / Assembly ..... page P–12
4. Boot
5. V-spring
6. Disc pad
   Inspection ..... above
   Installation Note ..... page P–11
7. Outer shim
8. Inner shim
9. Guide plate
10. Mounting support
11. Disc plate
    Inspection ..... page P–12



13E0PX-321

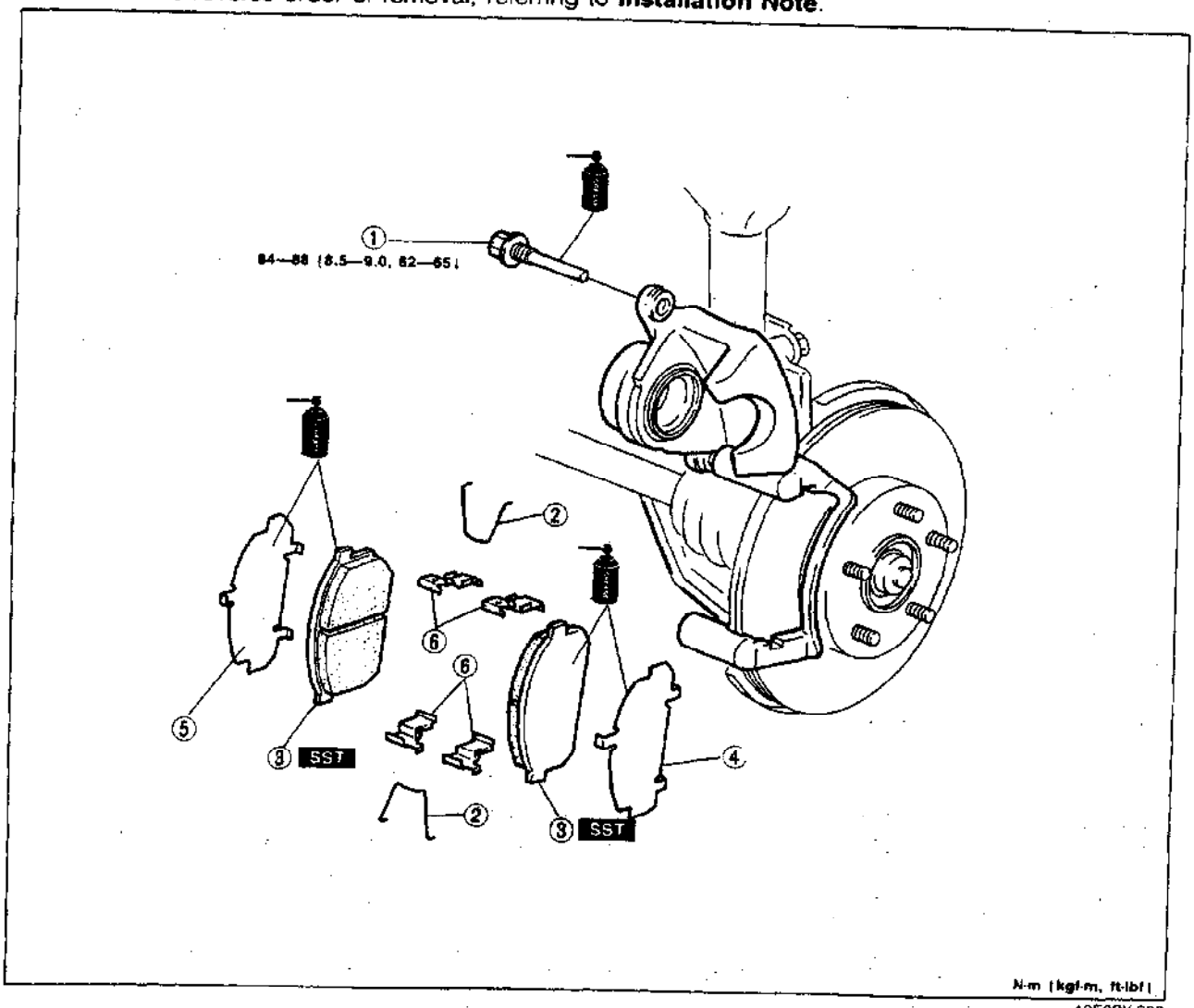
Installation note
Disc pad

Before installing the disc pads, push the piston fully inward by using the **SST**.

DISC PAD

Replacement

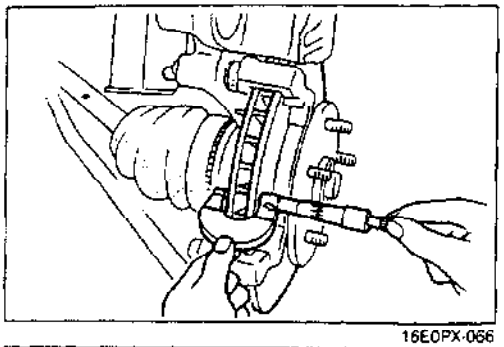
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal, referring to **Installation Note**.



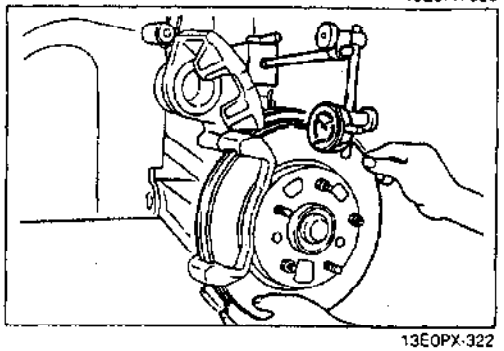
N·m (kgf·m, ft·lbf)

13E0PX-333

1. Bolt
2. V-spring
3. Disc pad
   installation Note ..... above
4. Outer shim
5. Inner shim
6. Guide plate



16E0PX-066



13E0PX-322

DISC PLATE

Inspection

Disc plate thickness

1. Measure the thickness of the disc plate.

Standard: 24mm {0.94 in}
Minimum: 22mm {0.87 in}

2. If the thickness is not within specification, replace the disc plate.

Disc plate runout

Caution
- **There must be no wheel bearing looseness.**

1. Measure the runout at the outer edge of the contact surface of the disc pad.

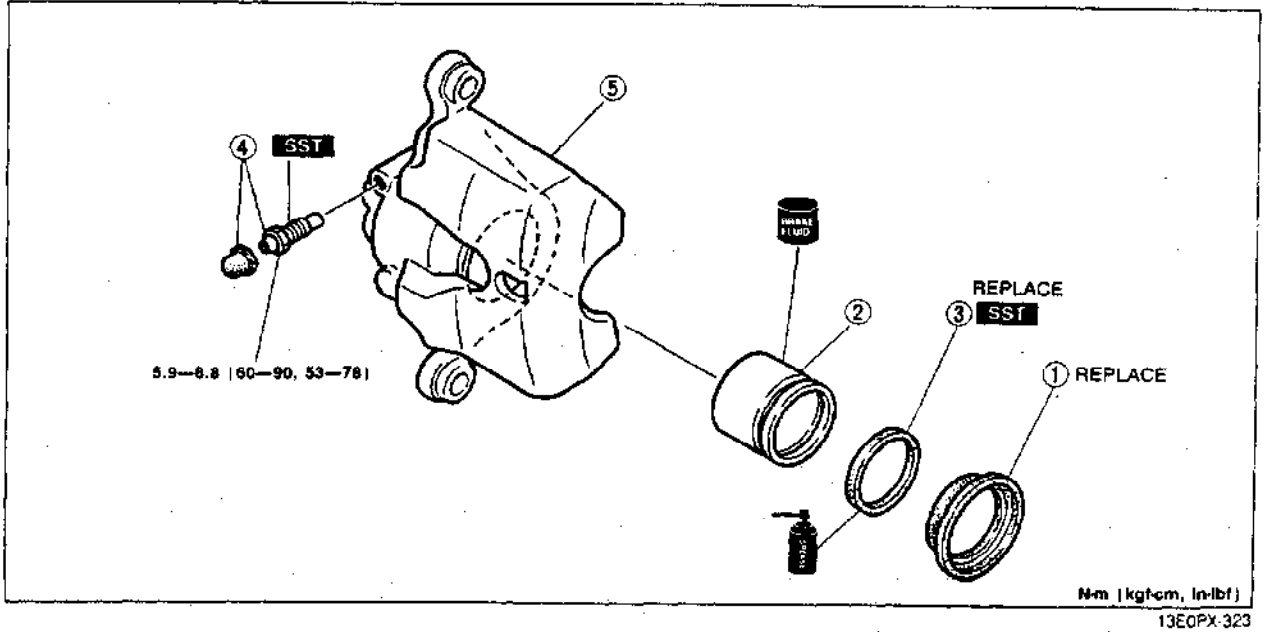
Runout: 0.1mm {0.004 in} max.

2. If the runout is not within specification, repair or replace the disc plate.

CALIPER

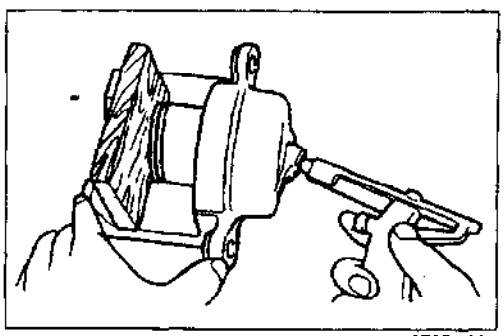
Disassembly / Inspection / Assembly

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



13E0PX-323

1. Dust seal
   Inspect for damage and poor sealing
2. Piston
   Disassembly Note..... page P–13
   Inspect for wear and rust
3. Piston seal
   Disassembly Note..... page P–13
4. Bleeder cap, bleeder screw
   Disassembly Note..... page P–13
   Assembly Note..... page P–13
5. Caliper body
   Inspect for damage, wear and rust

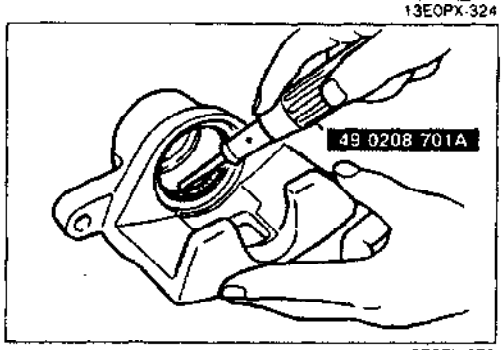


13E0PX-324

Disassembly note
Piston

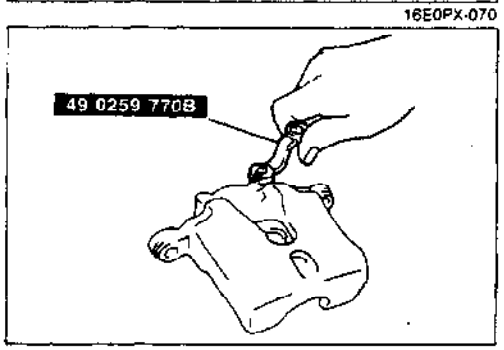
Caution
- **Blow the compressed air slowly to prevent the piston from popping out.**

1. Place a piece of wood in the caliper.
2. Blow compressed air through the pipe hole to force the piston out of the caliper.



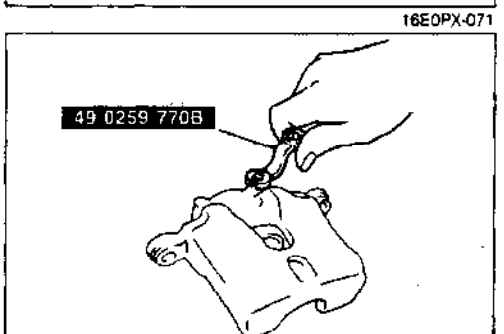
16E0PX-070

Piston seal
Remove the piston seal from the caliper by using the **SST**.



16E0PX-071

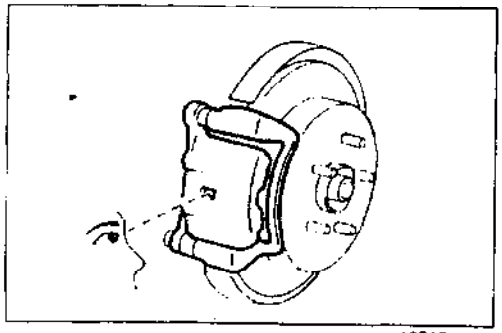
Bleeder screw
Loosen the bleeder screw by using the **SST**.



13E0PX-325

Assembly note
Bleeder screw
Tightening the bleeder screw by using the **SST**.

Tightening torque:
5.9—8.8 N·m {60—90 kgf-cm, 53—78 in-lbf}



16E0PX-073

REAR BRAKE (DISC)

Inspection (on-vehicle)

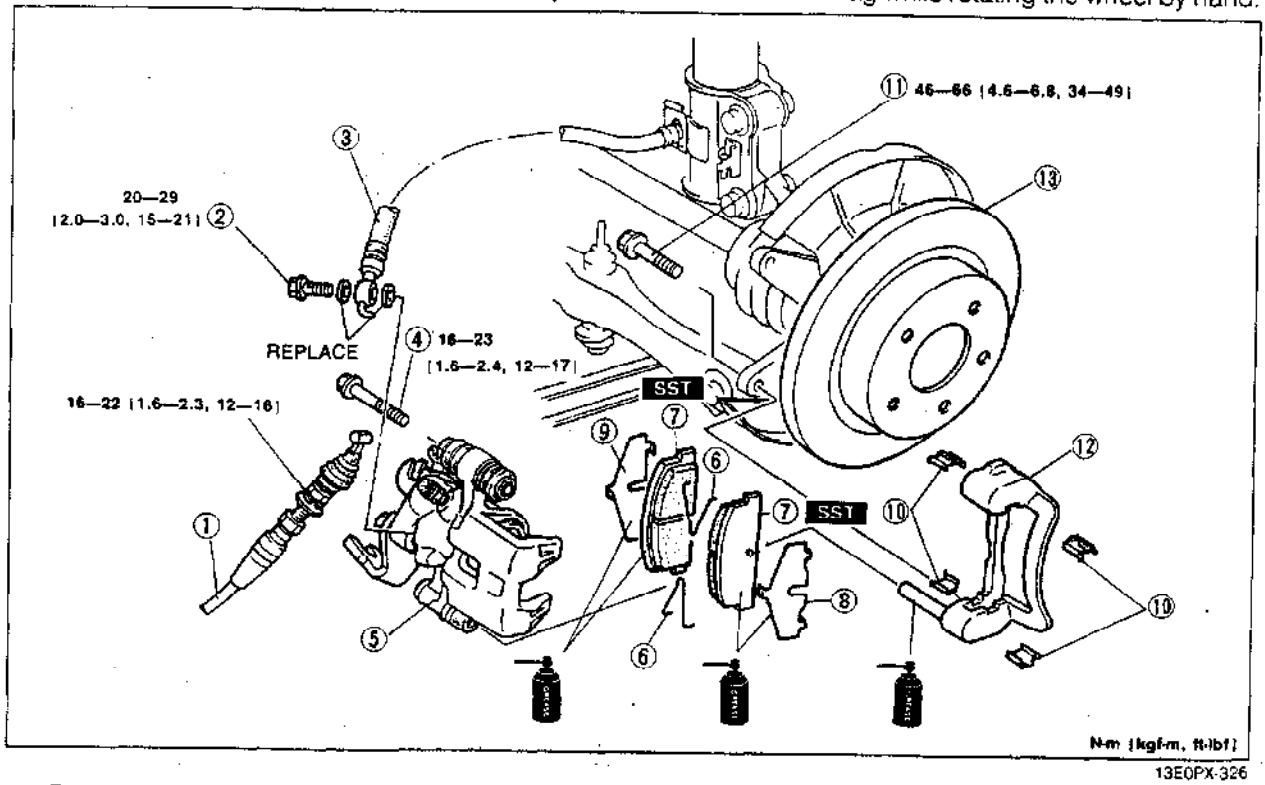
Disc pad

1. Jack up the rear of the vehicle and support it with safety stands.
2. Remove the wheel and tires.
3. Verify the remaining thickness of the pads.

Thickness: 1.0mm {0.04 in} min.

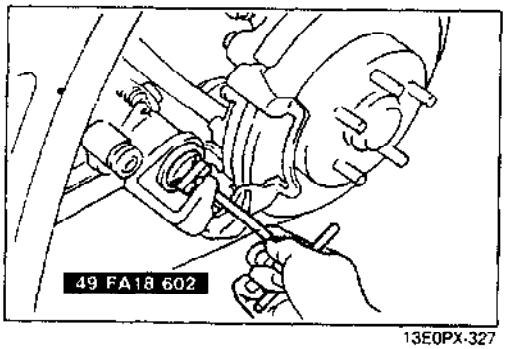
Removal / Inspection / Installation

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**.
4. After installation, check the following.
   (1) Add fluid and bleed the air.
   (2) Check for fluid leakage.
   (3) Adjust the parking brake lever stroke.
   (4) Depress the pedal a few times, then verify that the brakes do not drag while rotating the wheel by hand.



13E0PX-326

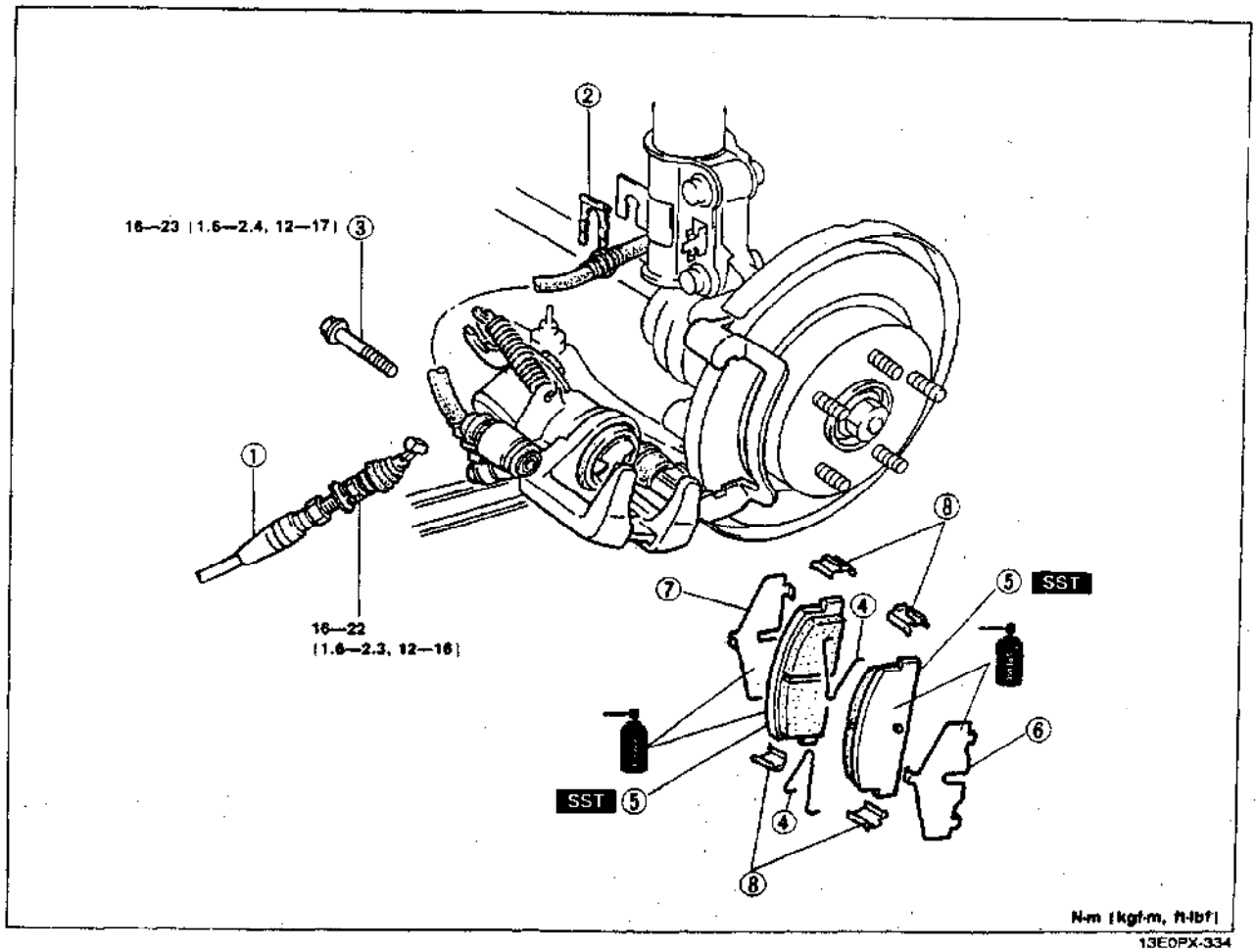
1. Parking cable
2. Connecting bolt
3. Brake hose
4. Lock bolt
5. Caliper
   Disassembly / Inspection / Assembly ..... page P–17
6. V-spring
7. Disc pad
   Installation Note ..... page P–15
   Inspection ..... above
8. Outer shim
9. Inner shim
10. Guide plate
11. Bolt
12. Mounting support
13. Disc plate
    Inspection ..... page P–16



13E0PX-327

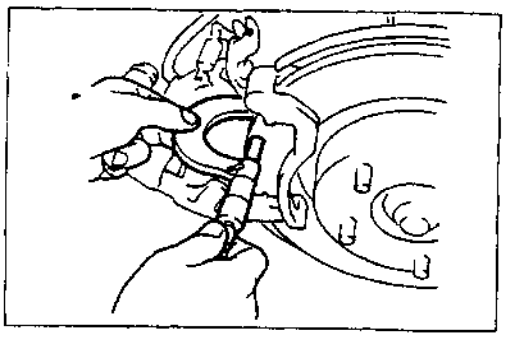
Installation note
Disc pad
Install the piston with the **SST** by turning it clockwise until it stops.

DISC PAD
Replacement
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**.
4. Adjust the parking brake lever stroke.

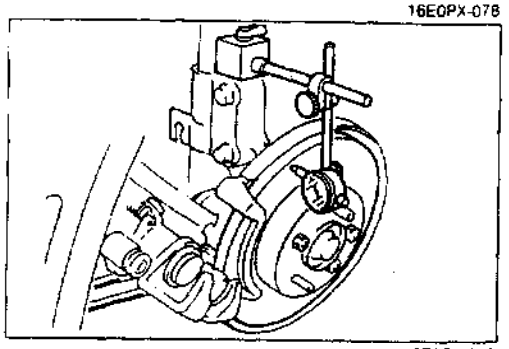


13E0PX-334

1. Parking brake cable
2. Clip
3. Lock bolt
4. V-spring
5. Disc pad
   Installation Note ..... above
6. Outer shim
7. Inner shim
8. Guide plate



16E0PX-078



13E0PX-328

DISC PLATE

Inspection

Disc plate thickness

1. Measure the thickness of the disc plate.

   Standard: 10mm {0.39 in}
   Minimum: 8mm {0.31 in}

2. If the thickness is not within specification, replace the disc plate.

Disc plate runout

Caution
- **There must be not wheel bearing looseness.**

1. Measure the runout at the outer edge of the contact surface of the disc pad.

   Runout: 0.1mm {0.004 in} max.

2. If the runout is not within specification, repair or replace the disc plate.

CALIPE
Disasse

Cautic
• Rep

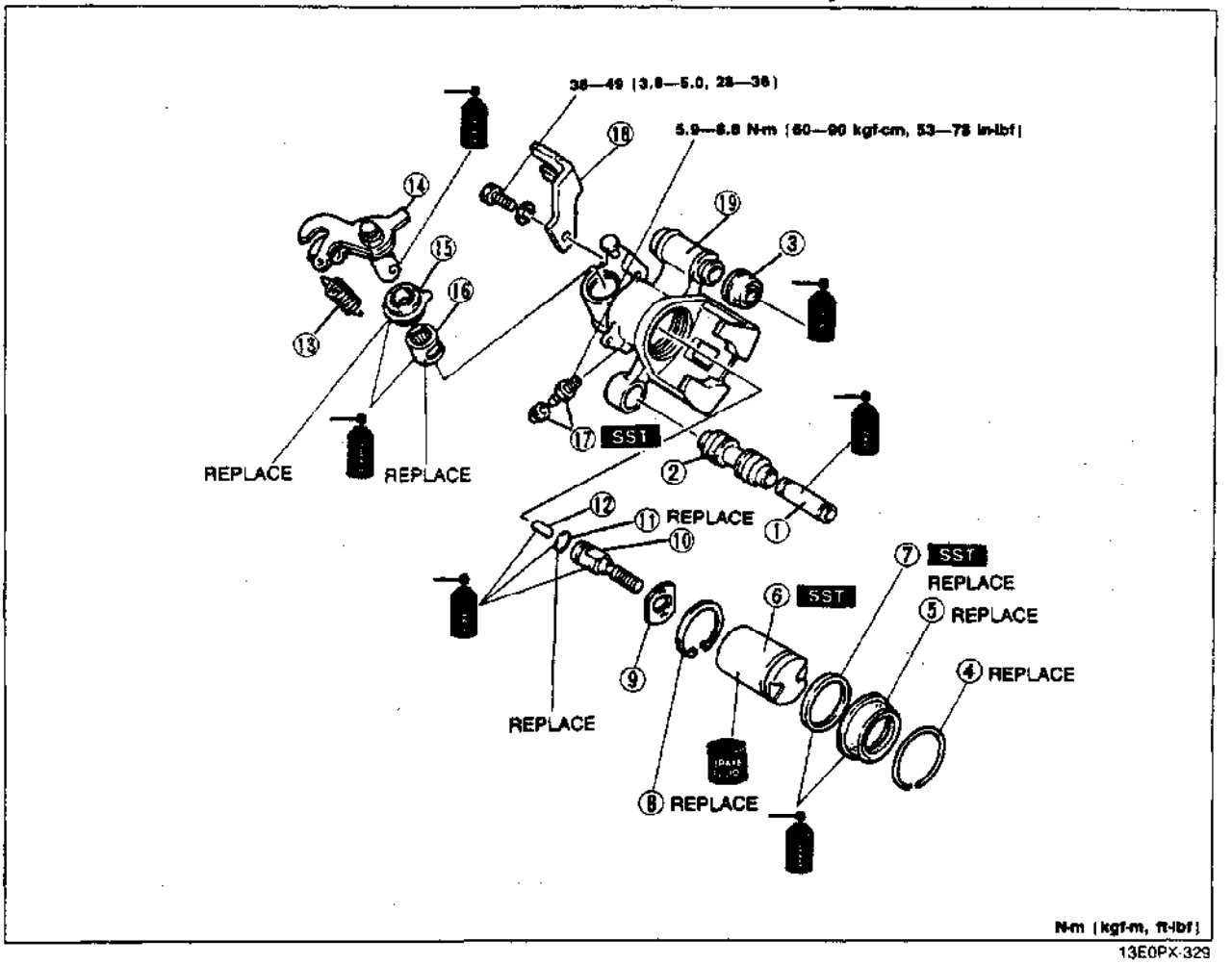
1. Disass
2. Inspec
3. Assem

1. Sleeve
2. Boot
3. Boot
4. Retainin
5. Dust sea
6. Piston
   Disas
   Assen
   Inspe
7. Piston se
   Disass
8. Snap rin
9. Stopper
10. Adjuster
    Inspec

CALIPER
Disassembly / Inspection / Assembly

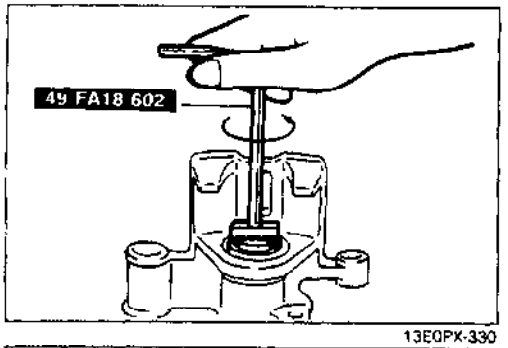
Caution
- **Replace the caliper assembly if a problem is found.**

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**.



13E0PX-329

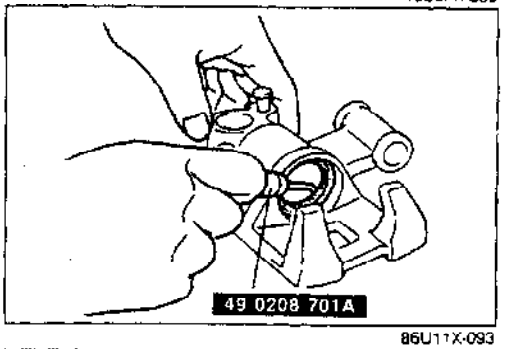
1. Sleeve
2. Boot
3. Boot
4. Retaining ring
5. Dust seal
6. Piston
   - Disassembly Note..... page P–18
   - Assembly Note..... page P–19
   - Inspect for wear and rust
7. Piston seal
   - Disassembly Note..... page P–18
8. Snap ring
9. Stopper
10. Adjuster spindle
    - Inspect for damage and wear
11. O-ring
12. Connecting link
    - Inspect for damage and wear
13. Return spring
14. Operating lever
15. Boot
16. Needle bearing
    - Disassembly Note..... page P–18
    - Assembly Note..... page P–19
17. Bleeder screw and rubber cap
    - Disassembly Note..... page P–18
    - Assembly Note..... page P–18
18. Cable bracket
19. Caliper body
    - Inspect for damage, wear and rust



13E0PX-330

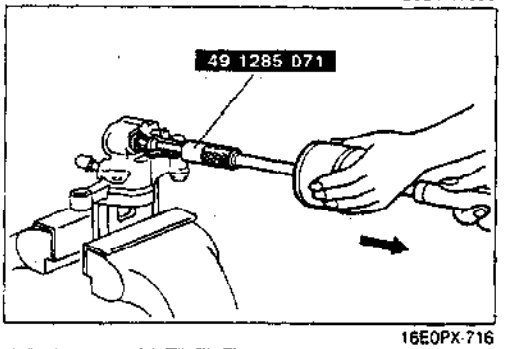
Disassembly note
Piston
Remove the piston with the **SST**.

Note
- **The piston is removed by turning the SST counter-clockwise.**



86U11X-093

Piston seal
Remove the piston seal with the **SST**.

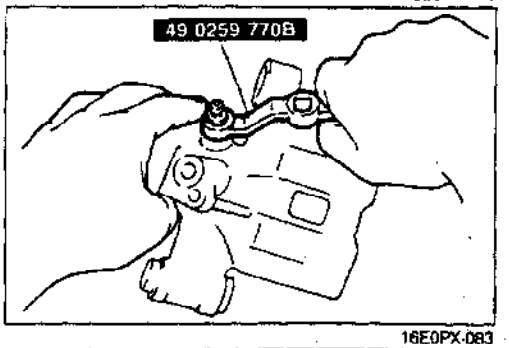


16E0PX-716

Needle bearing
1. Secure the caliper in a vise.

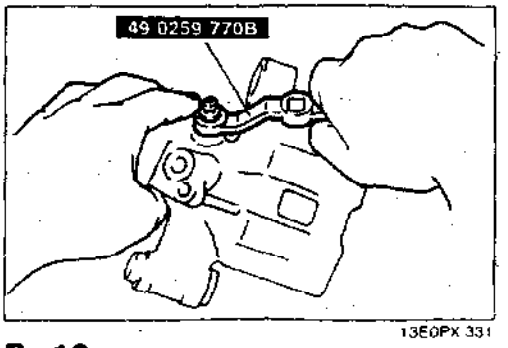
Caution
- **Do not remove the needle bearing if not necessary.**
- **Insert a soft, protective material (such as copper plates) in the jaws of the vise.**

2. Remove the needle bearing from the caliper with the **SST**.



16E0PX-083

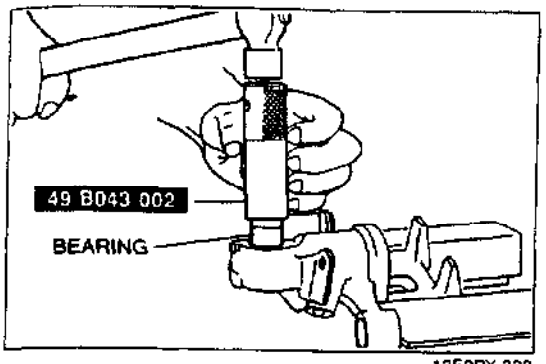
Bleeder screw
Loosen the bleeder screw by using the **SST**.



13E0PX-331

Assembly note
Bleeder screw
Tighten the bleed screw by using the **SST**.

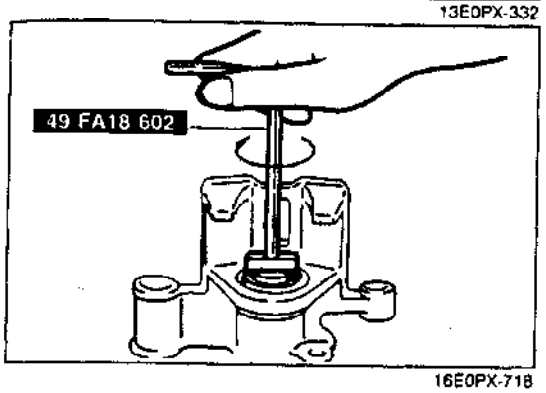
Tightening torque:
5.9—8.8 N·m (60—90 kgf·cm, 53—78 in·lbf)



13E0PX-332

Needle bearing

1. Set the new needle bearing in the caliper with the needle bearing hole facing the caliper cylinder.
2. Press the needle bearing into the caliper with the **SST** until the **SST** bottoms against the caliper.



16E0PX-718

Piston

Assemble the piston with the **SST**.

Note

- **The piston is assembled by turning the SST clockwise.**

WHEELS AND TIRES

FEATURES

SERVICE

13E0QX-301

OUTLINE

- The standard tire size is increased to 15 inches to improve vehicle performance.
- The spare tire is also increased to 15 inches.
- Five lug disc wheels are fitted.

13E0QX-302

SPECIFICATIONS
Standard Tire

Item			Specifications
Wheel	Size		15×5 1/2JJ
	Offset mm (in)		47.5 (1.87)
	Pitch circle diameter mm (in)		114.3 (5.50)
	Material		Aluminum alloy
Tire	Size		195/50R15 82V
	Air pressure kPa (kgf/cm², psi)	Front	235 (2.4, 35) *1, 245 (2.5, 36) *2
		Rear	215 (2.2, 32) *1, 245 (2.5, 36) *2

*1...Up to 3 persons
*2...~Full load

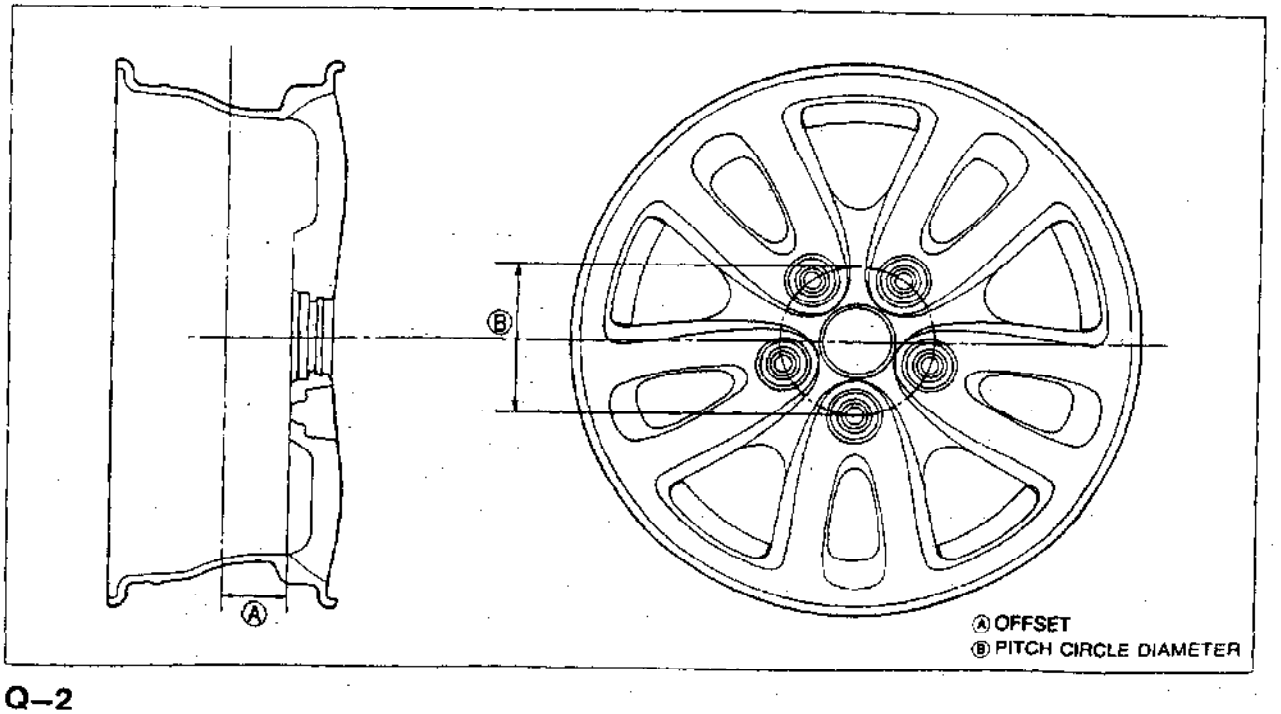
13E0QX-303

Temporary spare tire

Item			Specifications
Wheel	Size		15×4T
	Offset mm (in)		45 (1.77)
	Pitch circle diameter mm (in)		114.3 (5.50)
	Material		Steel
Tire	Size		T125/70D15
	Air pressure kPa (kgf/cm², psi)		415 (4.2, 60)

Shaded areas indicates new specifications.

13E0QX-304

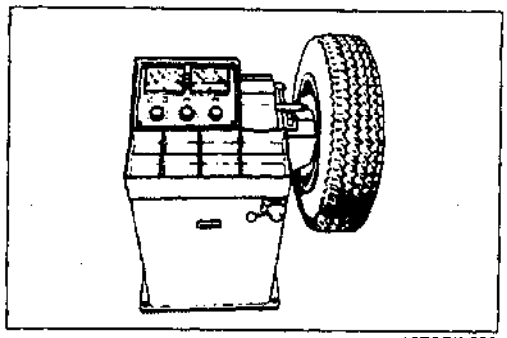


SUPPLEMENTAL SERVICE INFORMATION

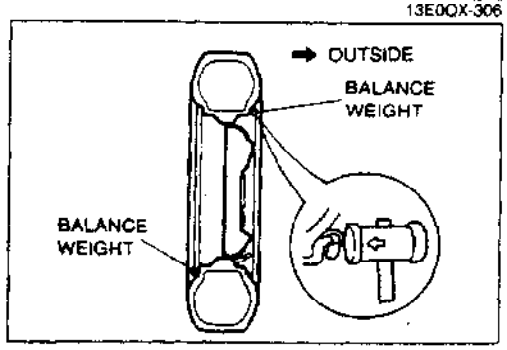
The following point in this section is changed in comparison with the Mazda 323 Workshop Manual Volume 2 (1206-10-89F).

- **Wheels and tires**
  Wheel balance adjustment

13E0QX-305



13E0QX-306



WHEELS AND TIRES

WHEEL BALANCE ADJUSTMENT

If a wheel becomes unbalanced or if a tire is replaced or repaired, the wheel must be rebalanced to within specification.

Maximum unbalance (at rim edge): 9 g (0.32 oz)

Caution

- **Do not use more than two balance weights on the inner or outer side of the wheel.**
- **One balance weight; max. 60 g (2.1 oz).**
- **If the total weight exceeds 100 g (3.5 oz) on one side, rebalance after moving the tire around on the rim.**
- **Attach the balance weights tightly to the wheel.**
- **Select suitable balance weights for aluminum alloy wheels.**

SUSPENSION

FEATURES

13E0RX-301

OUTLINE

OUTLINE OF CONSTRUCTION

- The construction and operation of the suspension system are basically the same as for previous models.
- The coil spring and shock absorber specifications are changed.
- The stabilizer specifications are changed.

13E0RX-302

SPECIFICATIONS

Item			Specifications
Front suspension			
Suspension type			Strut
Spring type			Coil spring
Shock absorber	Type		Oil filled
	Damping force N {kgf, lbf} at 0.3 m {12 in}/s	Expansion	1,470 {150, 330}
		Contraction	686 {70, 154}
Stabilizer	Type		Torsion bar
	Diameter mm {in}		23.0 {0.91}
Front wheel alignment (*Unladen)	Total toe-in	mm {in}	2 ± 3 {0.08 ± 0.12}
		degree	0°12' ± 18'
	Maximum steering degree	Inner	38° ± 3°
		Outer	30° ± 3°
	Camber angle degree		−0°45' ± 45'
	Caster angle degree		2°35' ± 45'
	Kingpin angle degree		12°10'
Rear suspension			
Suspension type			Strut
Spring type			Coil spring
Shock absorber	Type		Oil filled
	Damping force N {kgf, lbf} at 0.3 m {12 in}/s	Expansion	882 {90, 198}
		Contraction	392 {40, 88}
Stabilizer	Type		Torsion bar
	Diameter mm {in}		19.1 {0.75}
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'

13E0RX-303

* Fuel tank full; radiator coolant and engine oil at specified levels; and spare tire, jack, and tools in designated positions.

Front Coil Spring Specifications

Type	Identification mark color		Wire diameter mm {in}	Coil center diameter mm {in}	Free length mm {in}	Coil number
	M*1	A*2				
With sunroof	Pink	Green	14.5 {0.57}	132.5—158.5 {5.21—6.24}	271.6 {10.69}	3.35
Without sunroof	Light blue	Red	14.4 {0.56}	132.6—158.6 {5.22—6.24}	267.0 {10.51}	3.24

13E0RX-304

Rear Coil Spring Specifications

Type	Identification mark color	Wire diameter mm {in}	Coil center diameter mm {in}	Free length mm {in}	Coil number
	M*1				
With sunroof	Cream	8.8—12.5 {0.34—0.49}	128.5—131.2 {5.06—5.16}	334 {13.14}	6.19
Without sunroof	Pink	8.9—12.4 {0.35—0.48}	128.6—131.1 {5.06—5.16}	335 {13.18}	6.23

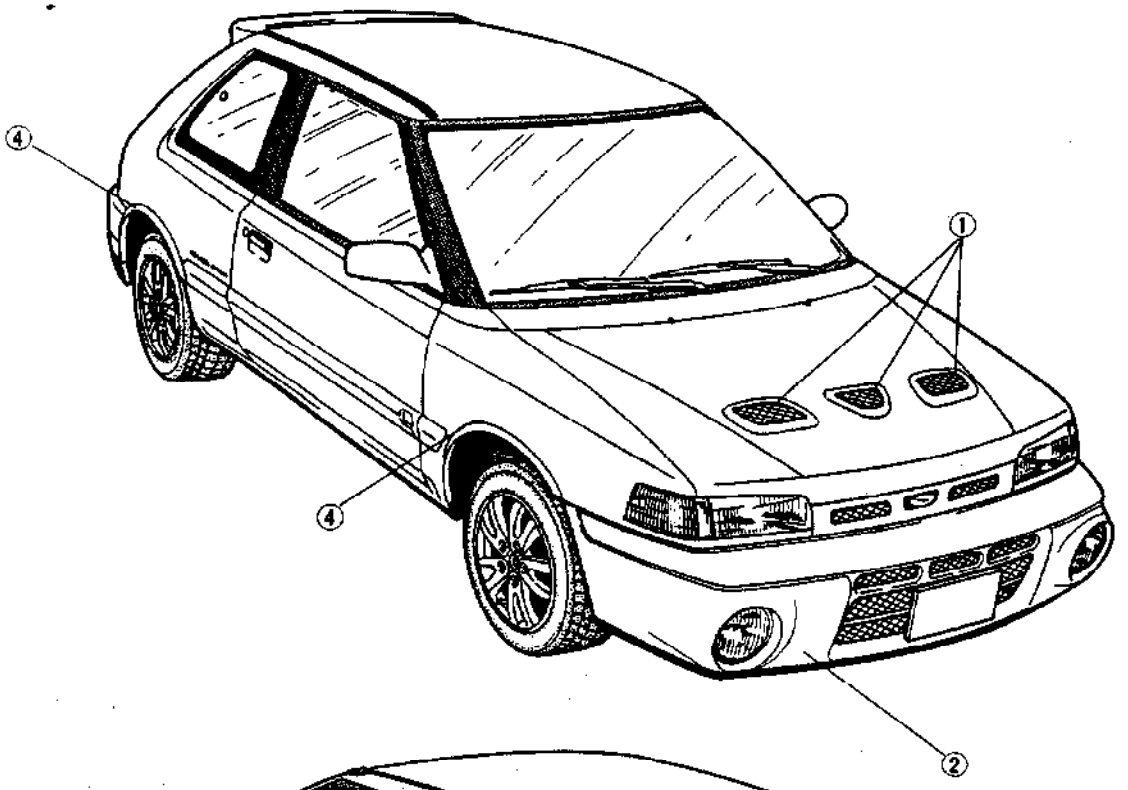
*1 Main identification mark on second coil from bottom.
*2 Auxiliary identification mark on third coil from bottom.
Shaded areas indicate new specifications

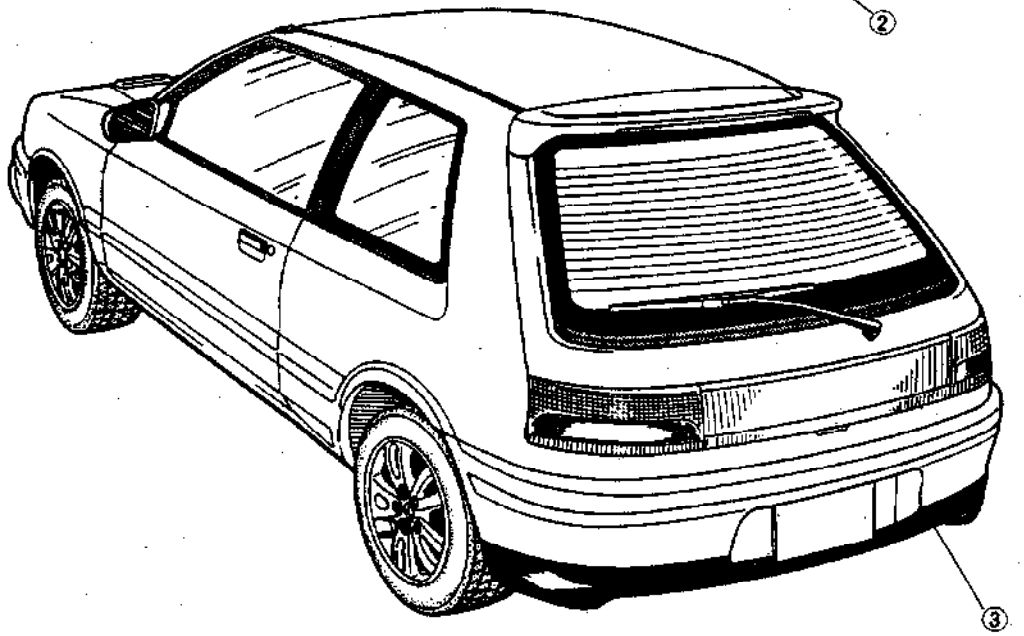
13E0RX-305

BODY

13E0SX-301

INDEX





13E0SX-302

OUTLINE

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BONNET BUL

• Bonnet bulg a high-qualit

OUTLINE

- The exterior parts are designed to emphasize the function and appearance of the superbly proportioned body.

OUTLINE OF CONSTRUCTION

13E0SX-303

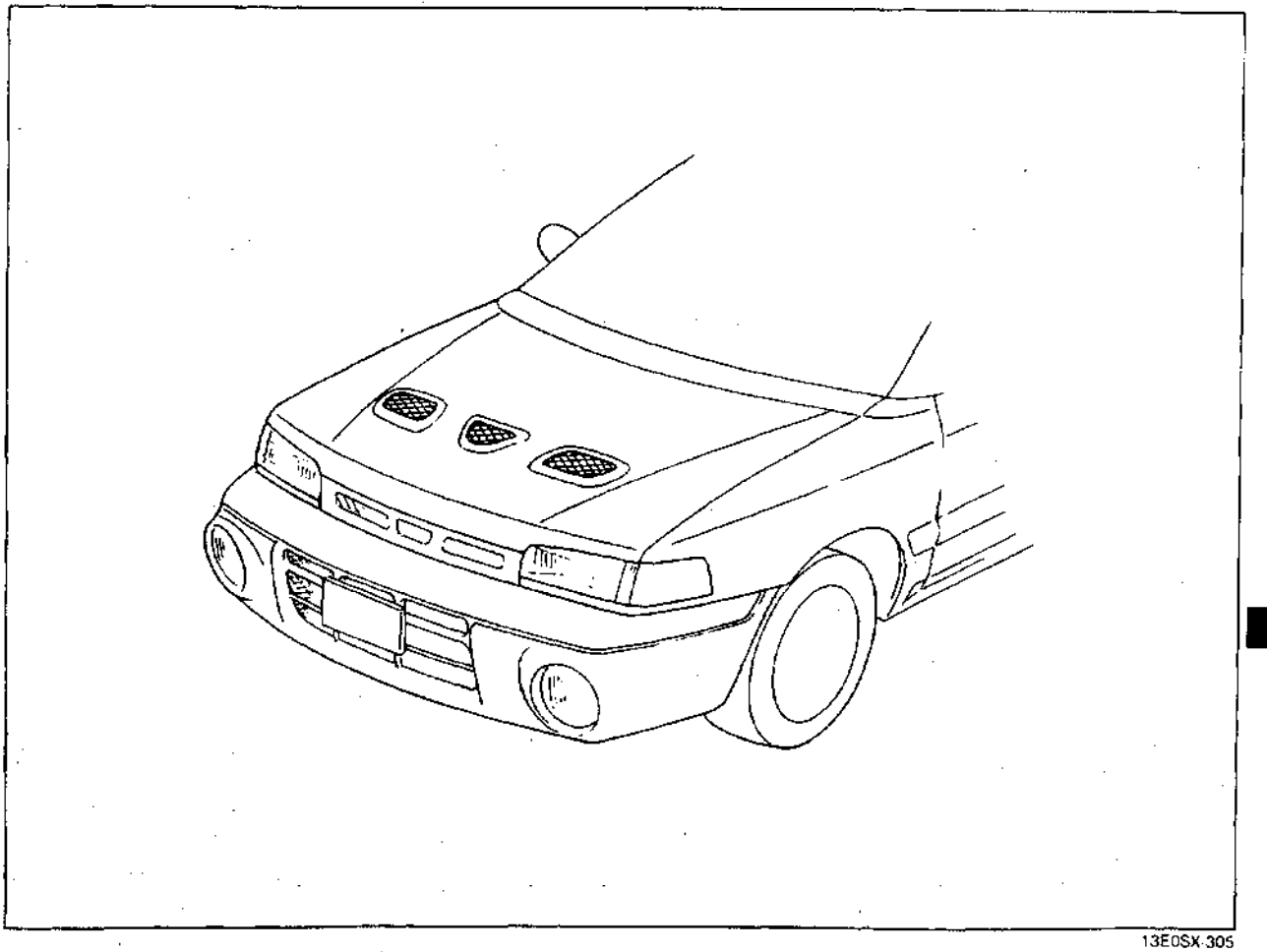
Improved appearance
- Bonnet bulges are provided in bonnet S–3
- A large, body-colored front bumper fascia is adopted S–4
- Wheel arch moldings are fitted to fenders S–5

Improved cooling efficiency
- Air inlet area of radiator grille is enlarged S–4
- Bumper mesh is provided in front bumper S–4

Improved aerodynamics
- Rear skirt is attached under rear bumper S–5

13E0SX-304

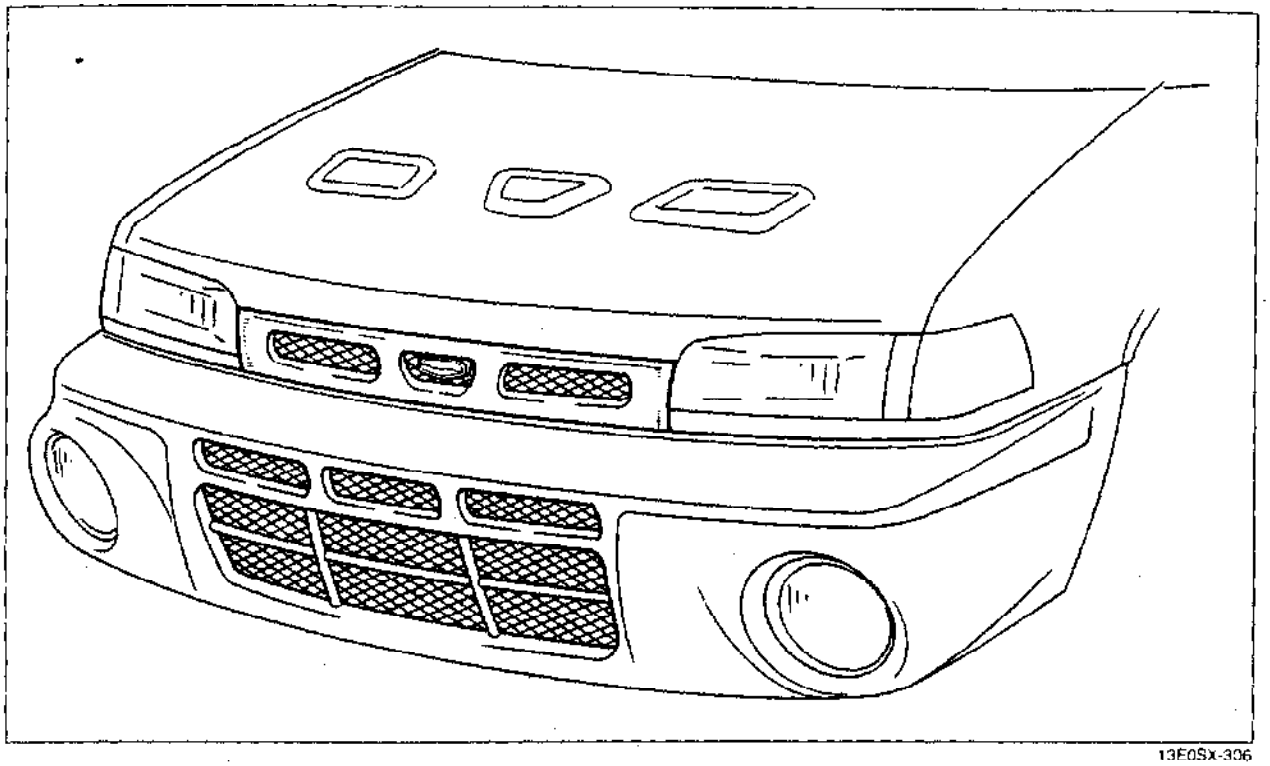
BONNET BULGE



13E0SX-305

- Bonnet bulges are fitted to the bonnet to match the dynamic appearance of the vehicle and to give it a high-quality look.

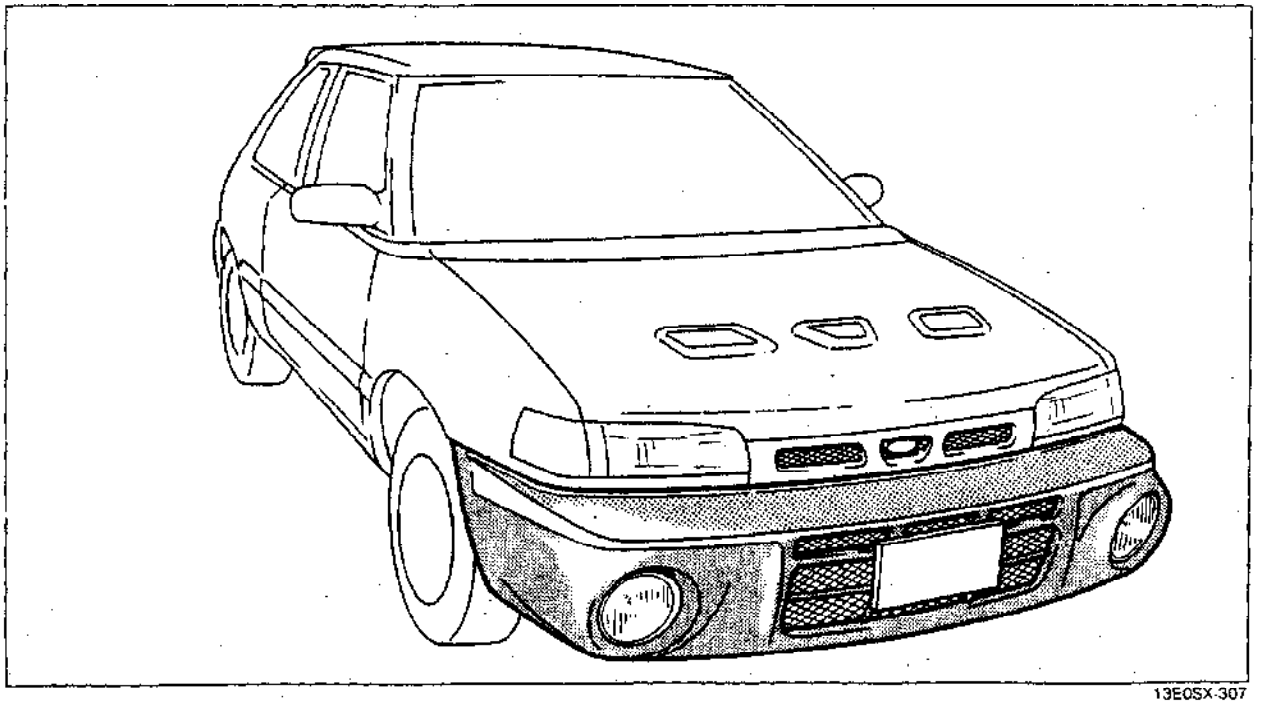
RADIATOR GRILLE



13E0SX-306

- The air inlet area of the radiator grille is enlarged for improved cooling efficiency.

FRONT BUMPER



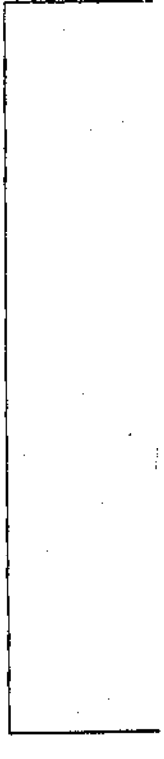
13E0SX-307

- The large front bumper includes fog lights and bumper mesh to give the vehicle a dynamic appearance.
- Light and rigid polyurethane is used for the bumper fascia.
- The air inlet area is adopted for improved cooling efficiency.

REAR SK

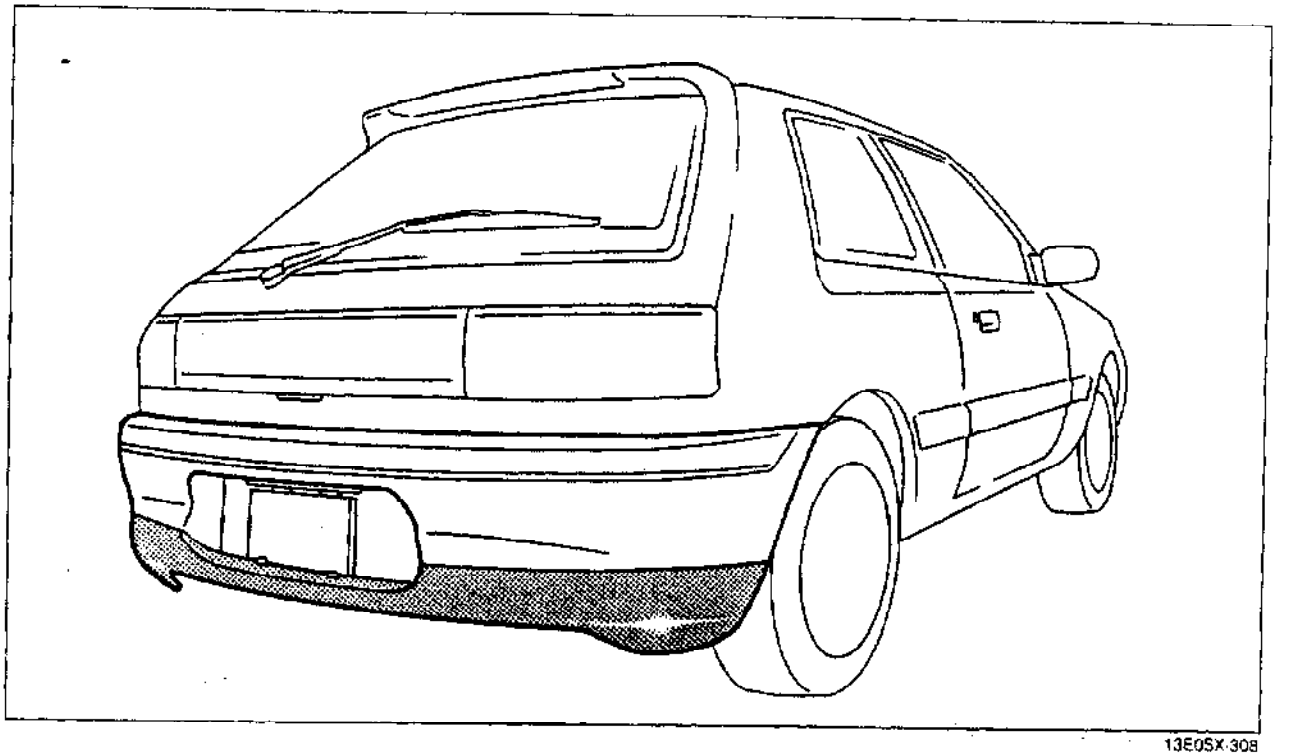
- The rear s
- Light and

WHEEL AR



- Wheel arc

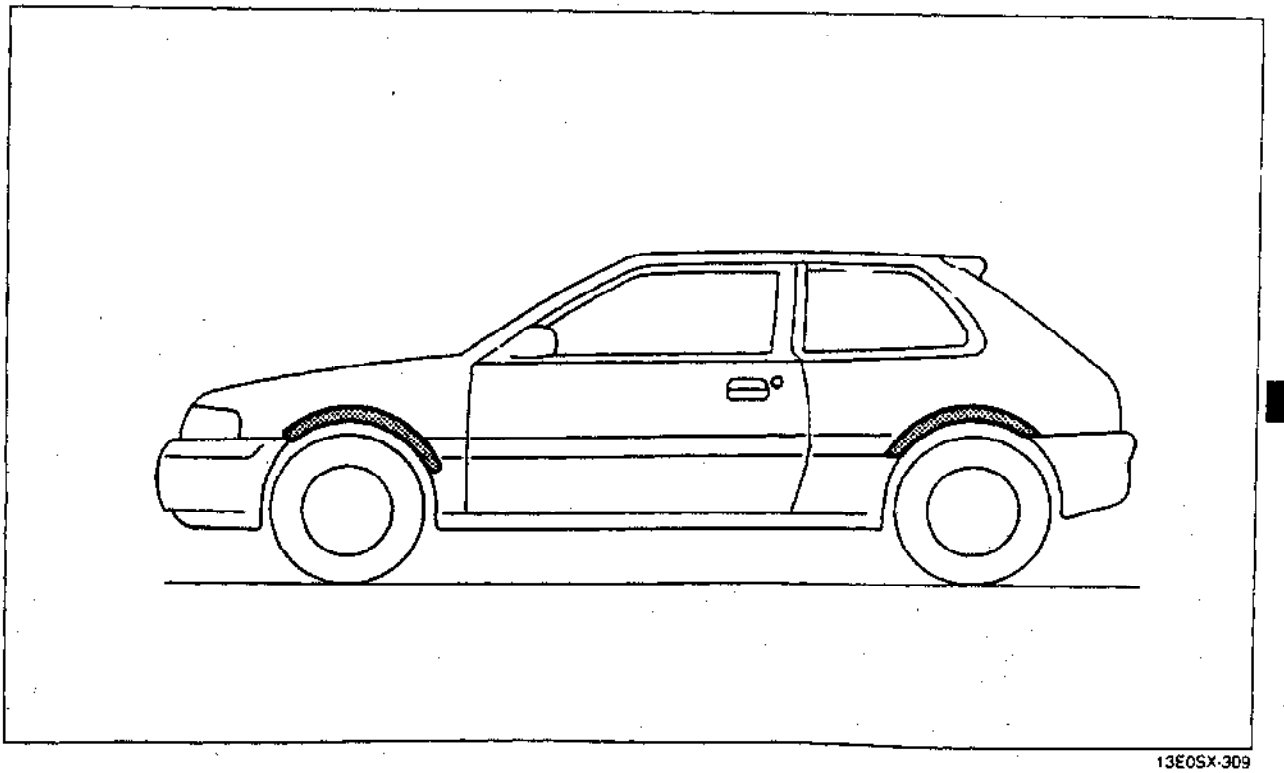
REAR SKIRT



13E0SX-308

- The rear skirt is added for improved vehicle aerodynamics.
- Light and rigid polyurethane is used.

WHEEL ARCH MOLDING



13E0SX-309

- Wheel arch moldings are fitted to the front and rear fenders to give the vehicle an aggressive look.

SUPPLEMENTAL SERVICE INFORMATION

The following points in this section are changed in comparison with 323 Workshop Manual (1229-10-89L).

BONNET BULGE
- Removal / Installation

FRONT BUMPER
- Removal / Installation

REAR SKIRT
- Removal / Installation

WHEEL ARCH MOLDING
- Removal / Installation

13E0SX-310

BONNE

COMPON
Removal
1. Remov
2. Install i

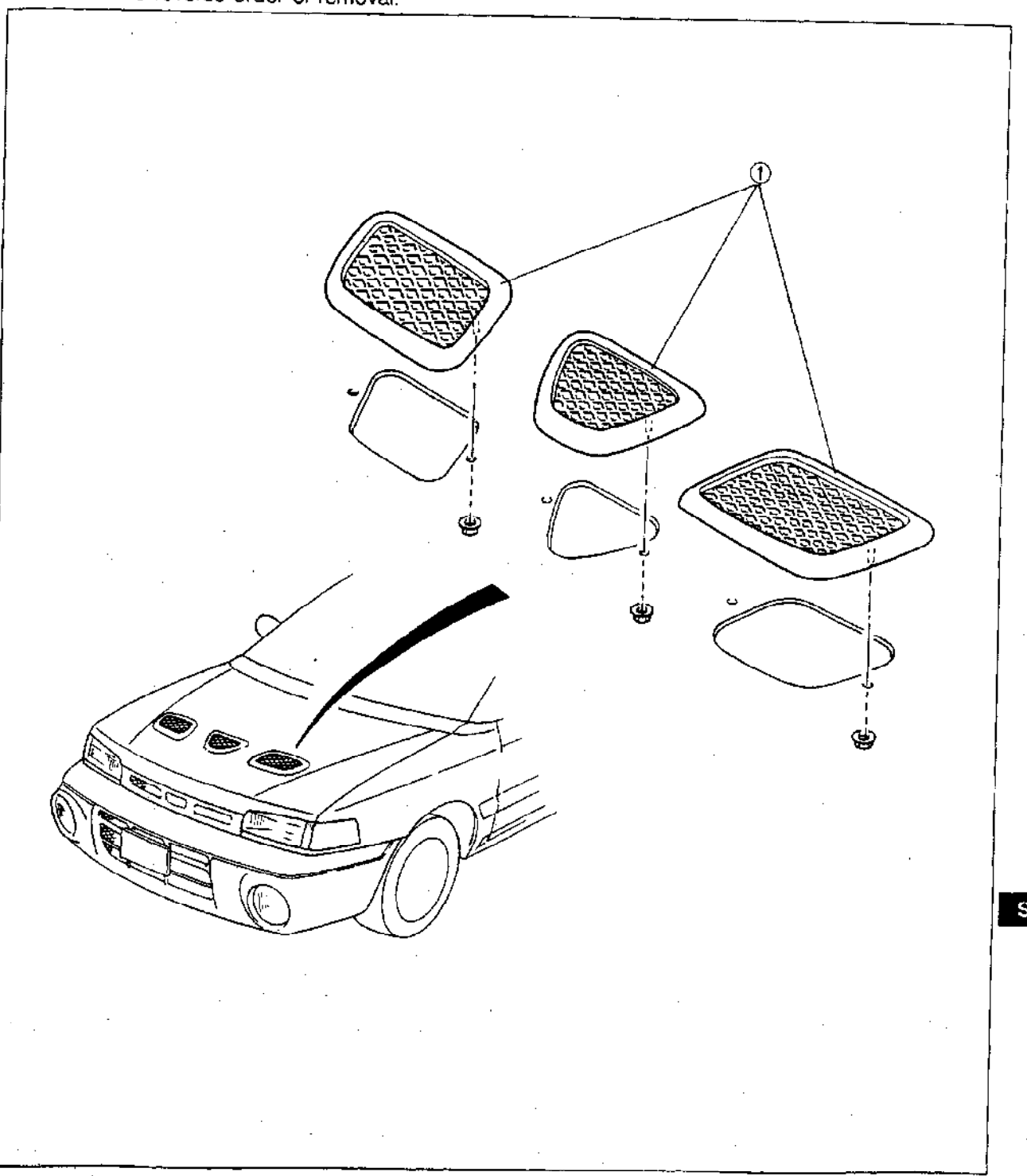
1. Bonnet

BONNET BULGE

COMPONENTS

Removal / Installation

1. Removal in the order shown in the figure.
2. Install in the reverse order of removal.



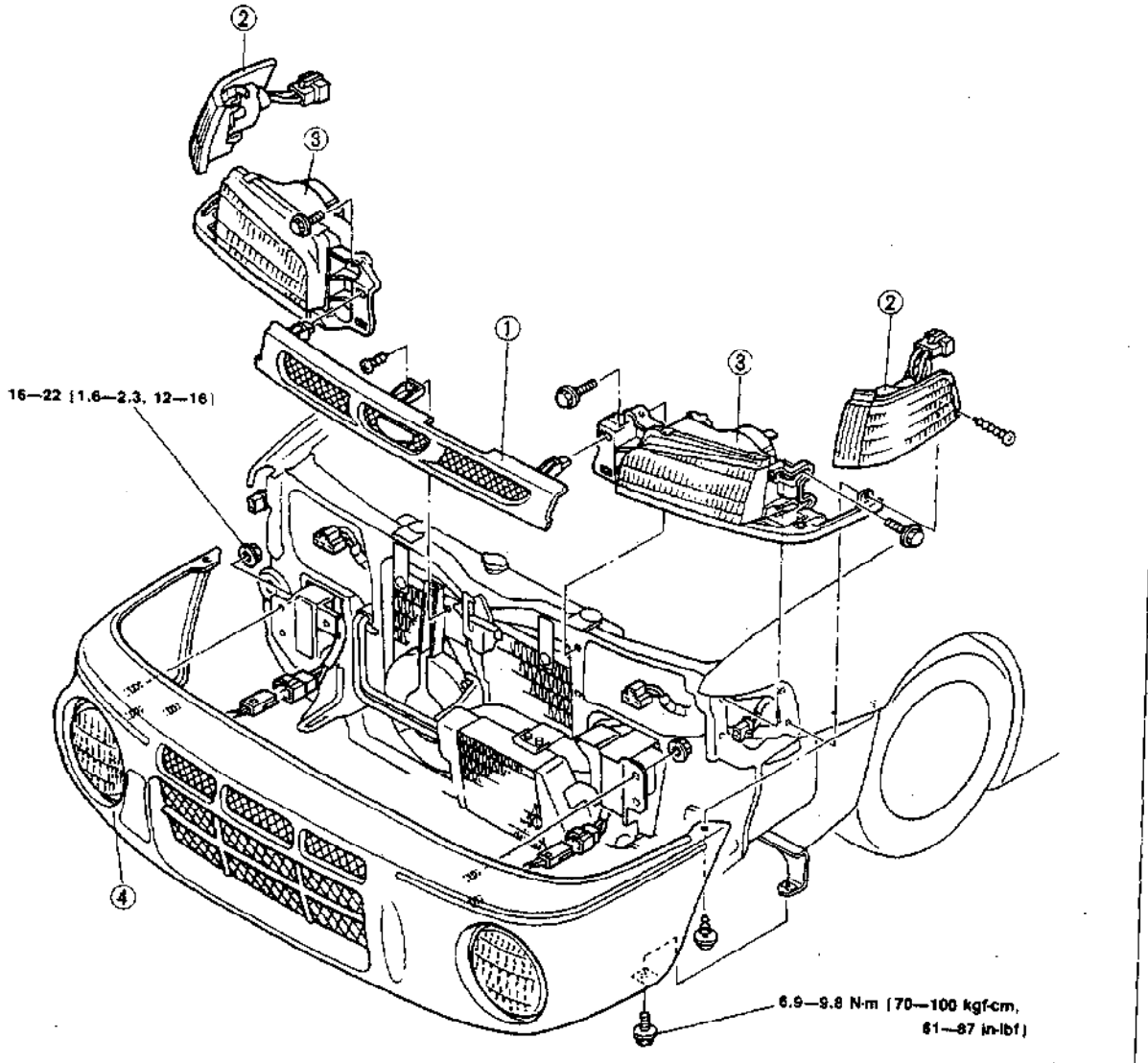
1. Bonnet bulge

FRONT BUMPER

COMPONENTS

Removal / Installation

1. Removal in the order shown in the figure.
2. Install in the reverse order of removal.



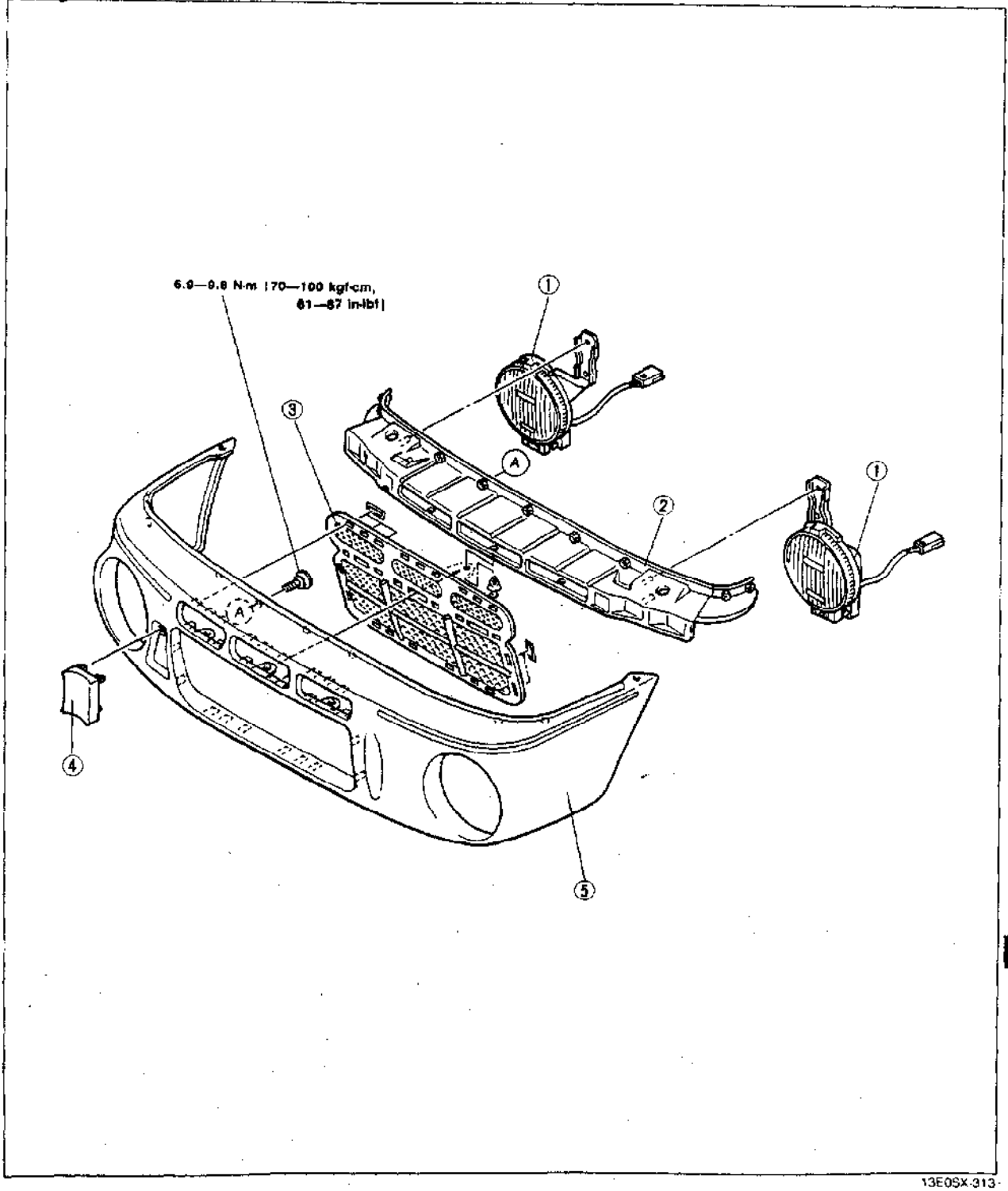
1. Radiator grille
2. Front conbination light
3. Headlight
4. Front bumper
   Disassembly / Assembly ..... page S–9

Disassembl
1. Disassemt
2. Assemble

1. Fog lights
2. Bumper rei
3. Bumper me

Disassembly / Assembly

1. Disassemble in the order shown in the figure.
2. Assemble in the reverse order of disassembly.



13E0SX-313

1. Fog lights
2. Bumper reinforcement
3. Bumper mesh
4. Hook cover
5. Bumper fascia

REAR SKIRT

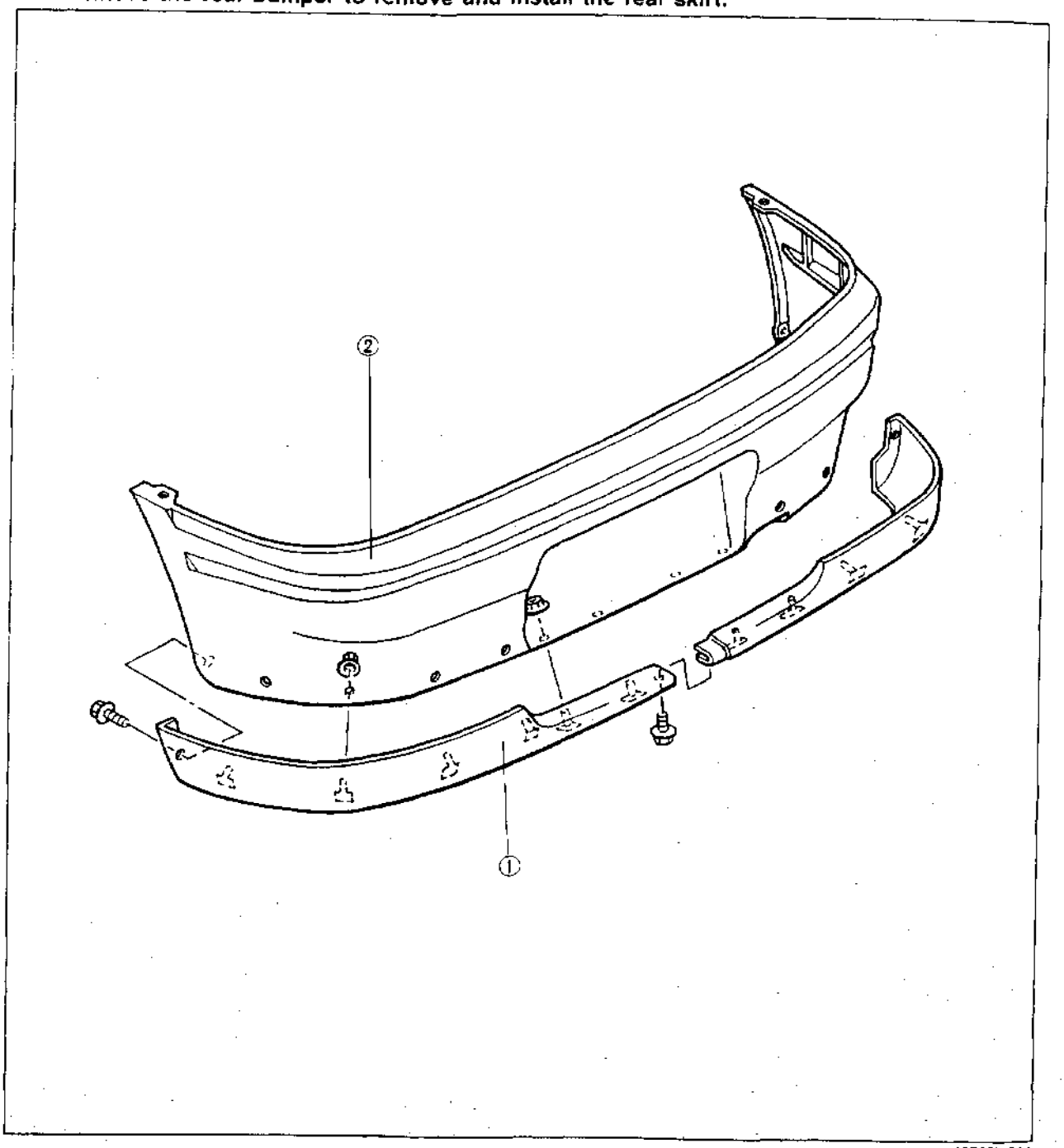
COMPONENTS

Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.

Note

- **Remove the rear bumper to remove and install the rear skirt.**



1. Rear skirt
2. Rear bumper

WHEEL

COMPONE
Removal /
1. Remove i
2. Install in t

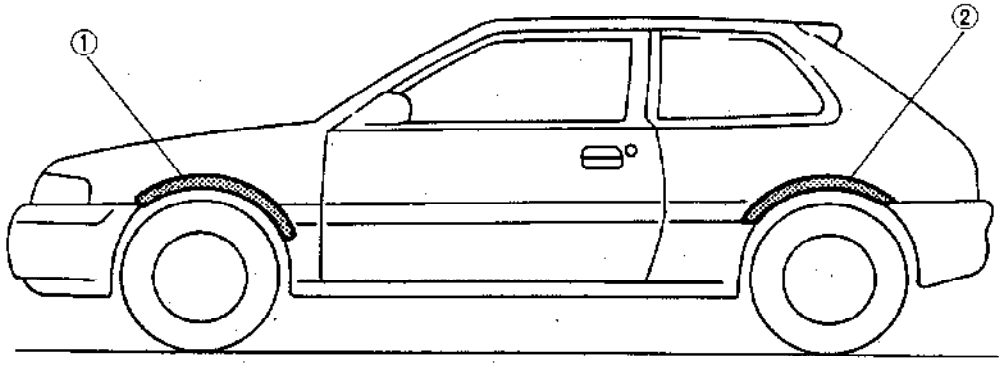
1. Front whe
Remov
Installat

WHEEL ARCH MOLDING

COMPONENTS

Removal / Installation

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**.



13E05X 315

1. Front wheel arch molding
   - Removal Note ..... page S–12
   - Installation Note ..... page S–13
2. Rear wheel arch molding
   - Removal Note ..... page S–12
   - Installation Noe ..... page S–14

WHEEL ARCH MOLDING

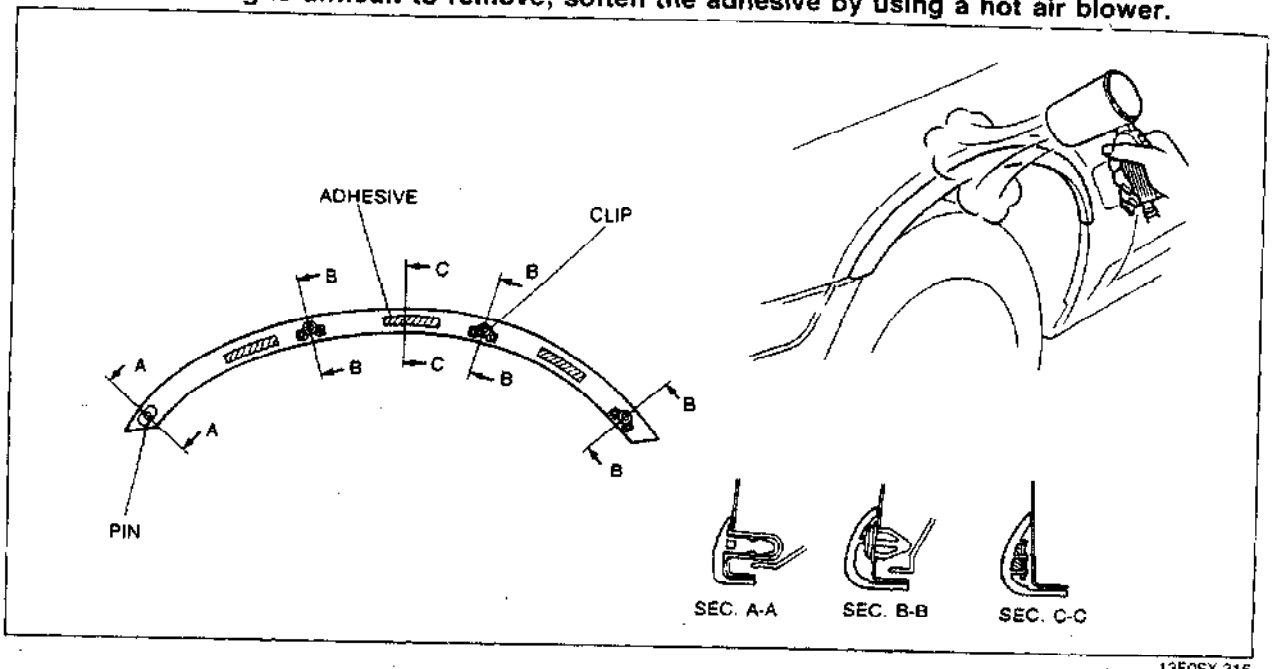
Removal Note

Front wheel arch molding

The front wheel arch moldings are attached to the body with adhesive and clips as shown in the figure. To remove the molding, pull it forward to unhook the pin and clips, taking care not to damage them.

Note

- **If the molding is difficult to remove, soften the adhesive by using a hot air blower.**



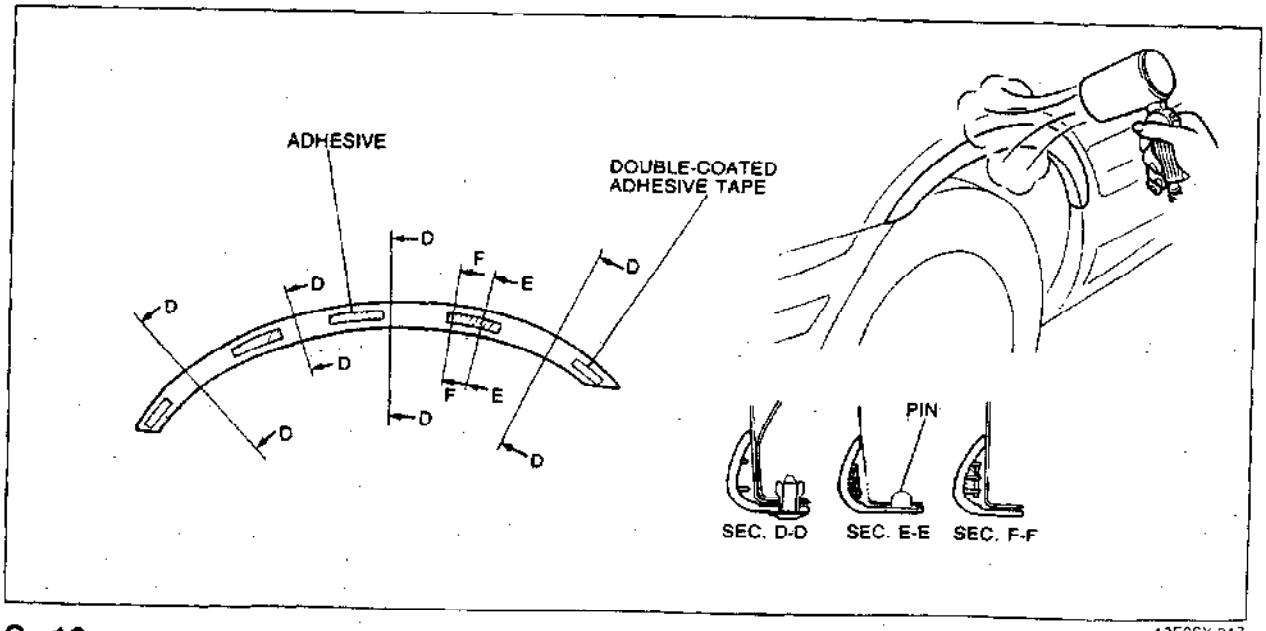
13E0SX-316

Rear wheel arch molding

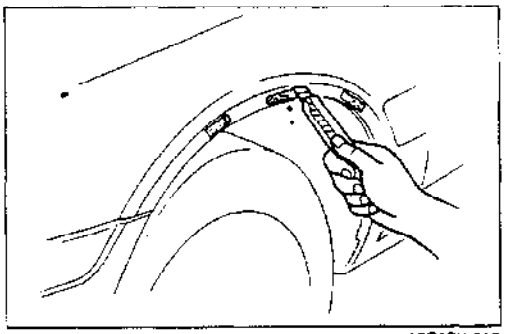
The rear wheel arch moldings are attached to the body with adhesive, double-coated adhesive tape, and fasteners. To remove the molding, first remove the fastners, then pull the molding forward to unhook the pin, taking care not to damage it.

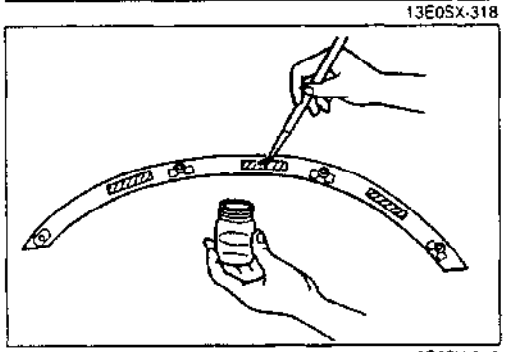
Note

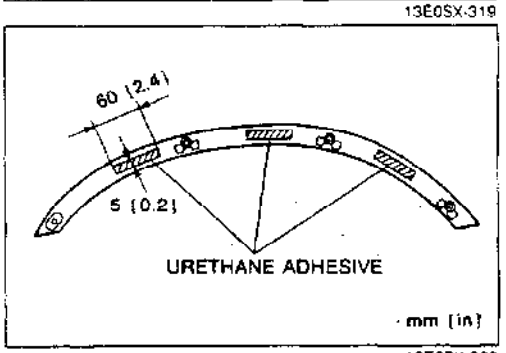
- **If the molding is difficult to remove, soften the adhesive and adhesive tape by using a hot air blower.**



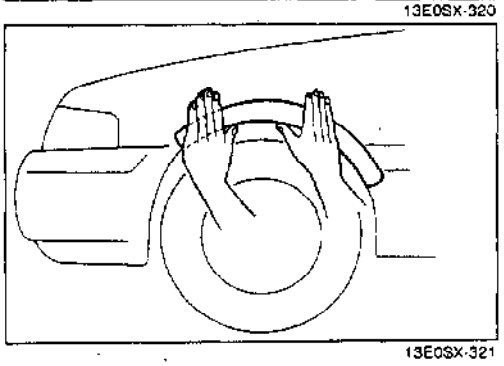
13E0SX-317


13E0SX-318


13E0SX-319



13E0SX-320


13E0SX-321

Installation Note
Front wheel arch molding

1. Remove the original adhesive from the molding mounting surface of the body.

Caution
- **Do not damage the surrounding painted area.**

Note
- **If the adhesive is difficult to remove, soften it by using a hot air blower.**

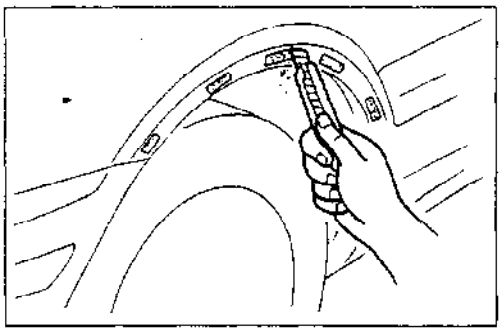
2. Clean and degrease the molding mounting surface of the body and the bonding area of the molding.
3. Apply primer to the bonding area of the molding and allow it to dry for **approximately 30 minutes**.

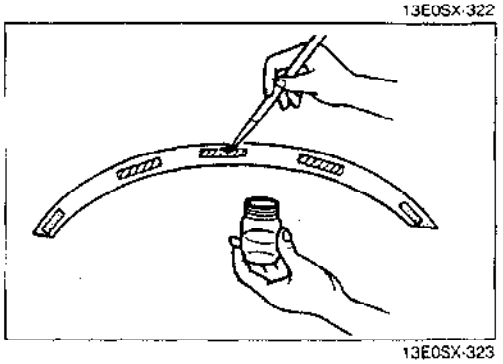
Caution
- **Keep the area free of dirt, moisture, and grease.**
- **Do not touch the primed surfaces.**

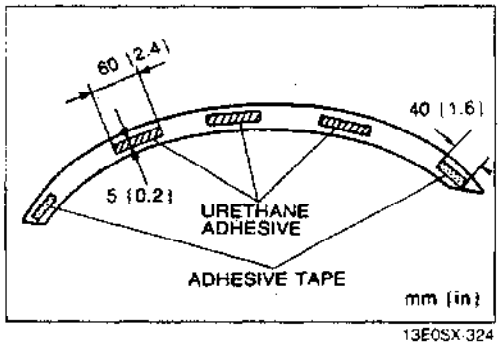
4. Apply urethane adhesive to the bonding area of the molding.

Caution
- **The application range of urethane adhesive at each point should be approximately 5 mm {0.2 in} wide and 60 mm {2.4 in} long. Do not apply excessive adhesive.**

5. Align the molding to the body with the pin and clips, and then install it.
6. Lightly press on the molding to obtain good adherence.


13E0SX-322


13E0SX-323



13E0SX-324

Rear wheel arch molding

1. Remove the original adhesive from the molding mounting surface of the body.

Caution
- **Do not damage the surrounding painted area.**

Note
- **If the adhesive is difficult to remove, soften it by using a hot air blower.**

2. Clean and degrease the molding mounting surface of the body and the bonding area of the molding.
3. Apply primer to the bonding area of the molding and allow it to dry for **approximately 30 minutes**.

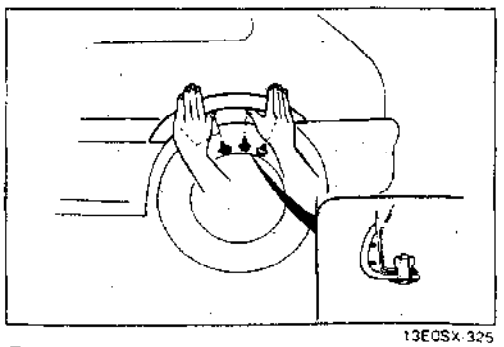
Caution
- **Keep the area free of dirt, moisture, and grease.**
- **Do not touch the primed surfaces.**

4. Apply strips of double-coated adhesive tape to the bonding area of the molding.

Note
- **Use 40 mm {1.6 in} lengths of tape.**

5. Apply urethane adhesive to the bonding area of the molding.

Caution
- **The application range of urethane adhesive should be approximately 5 mm {0.2 in} wide and 60 mm {2.4 in} long. Do not apply excessive adhesive.**

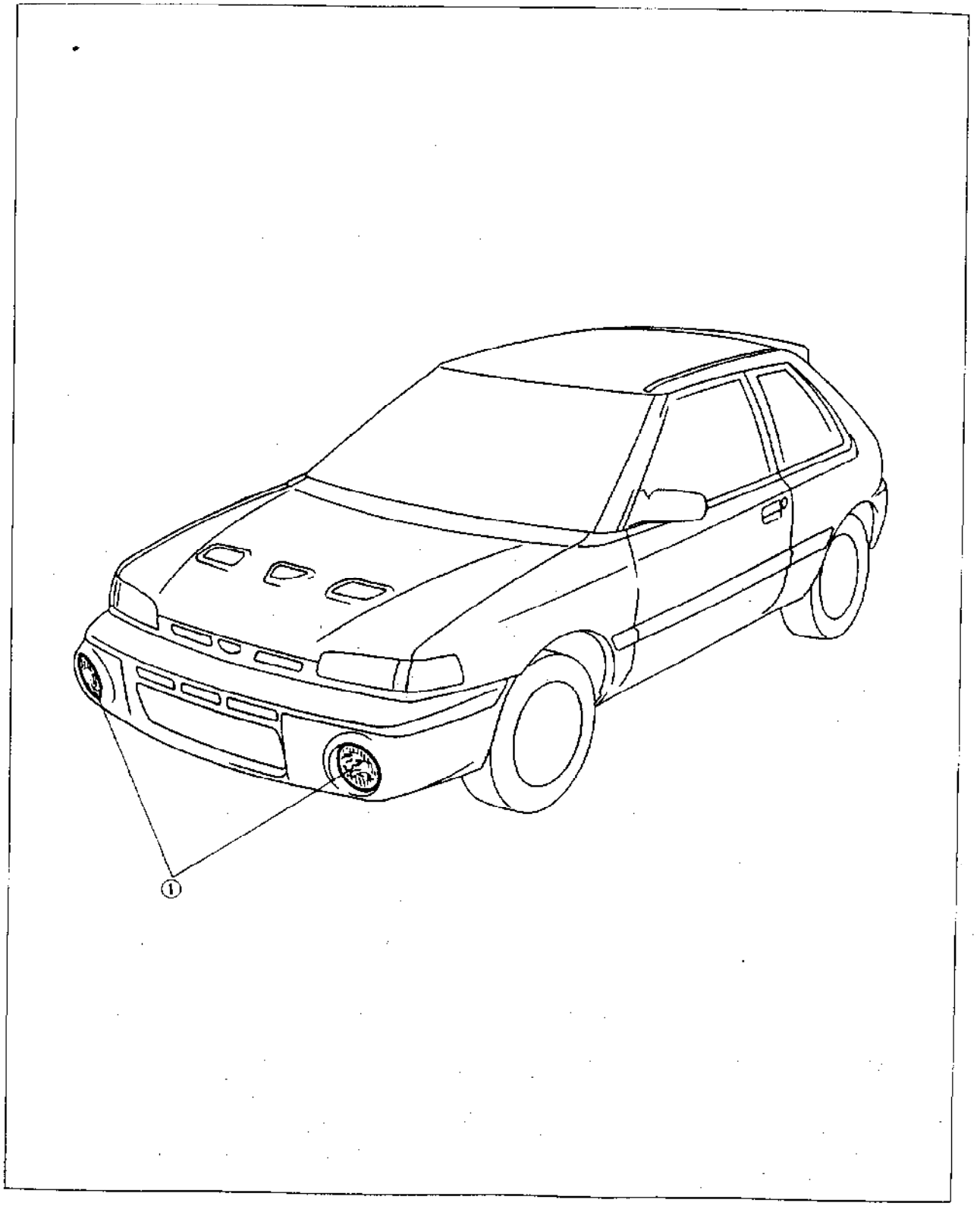

13E0SX-325

6. Peel the protection paper from the double-coated adhesive tape.
7. Align the molding to the body with the pin, and then install it.
8. Lightly press on the molding to obtain good adherence.
9. Install the fasteners.

BODY ELECTRICAL SYSTEM

13E0TX-301

INDEX



1. Front fog light
   Removal / Installation ..... page T–4

OUTLINE

FEATURES

To improv

To improv

LIGHTIN

SPECIFIC

Front fog li

OUTLINE

FEATURES

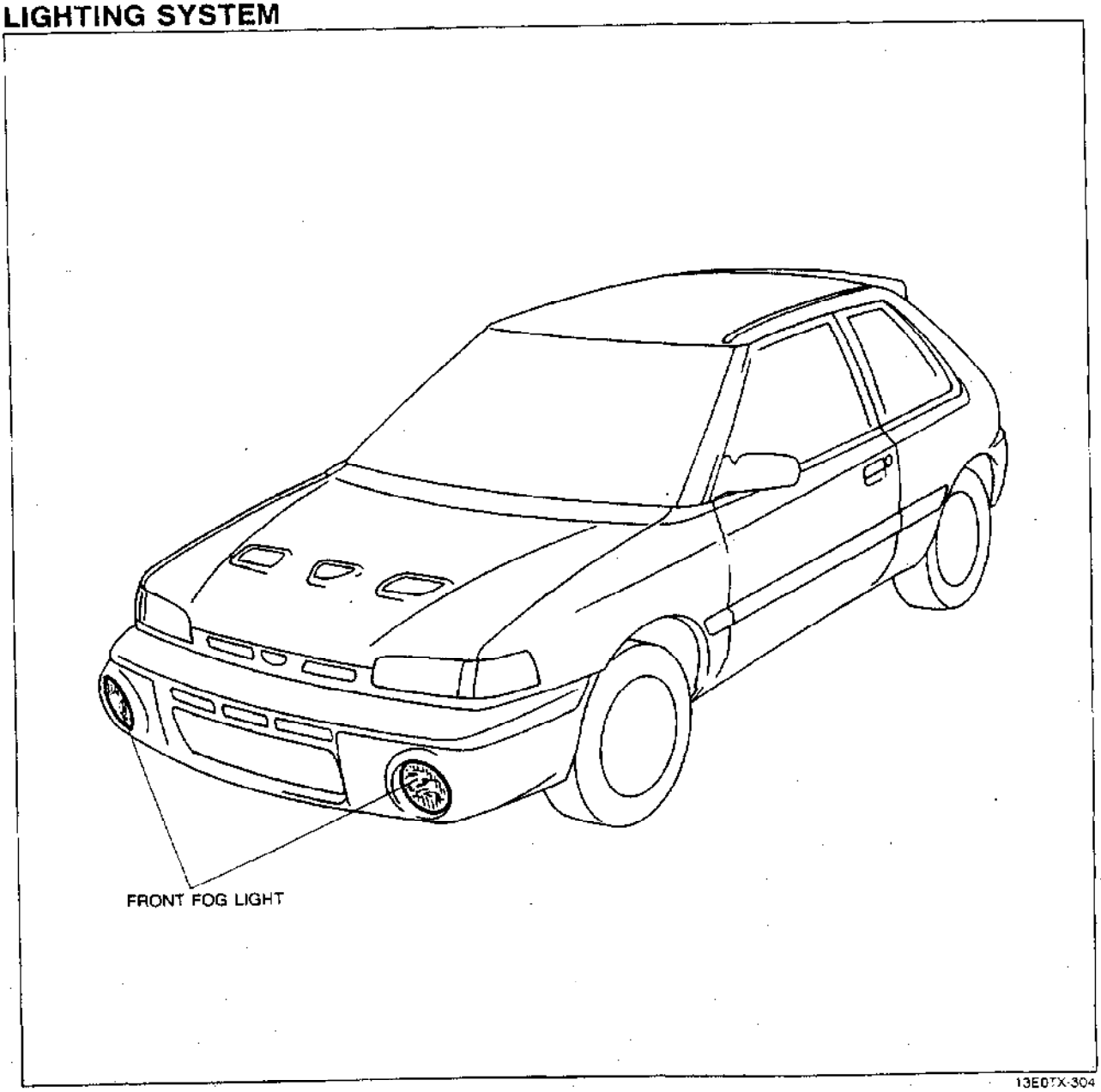
To improve marketability

To improve visibility

— Front fog lights are used

13E0TX-303

LIGHTING SYSTEM



13E0TX-304

SPECIFICATIONS

Item	Wattage (w)
Front fog light	55 × 2

SUPPLEMENTAL SERVICE INFORMATION

The following points shown in this section are changed in comparison with 323 Workshop manual supplement (1229-10-89L) and 323 Workshop manual supplement (1275-10-91C).

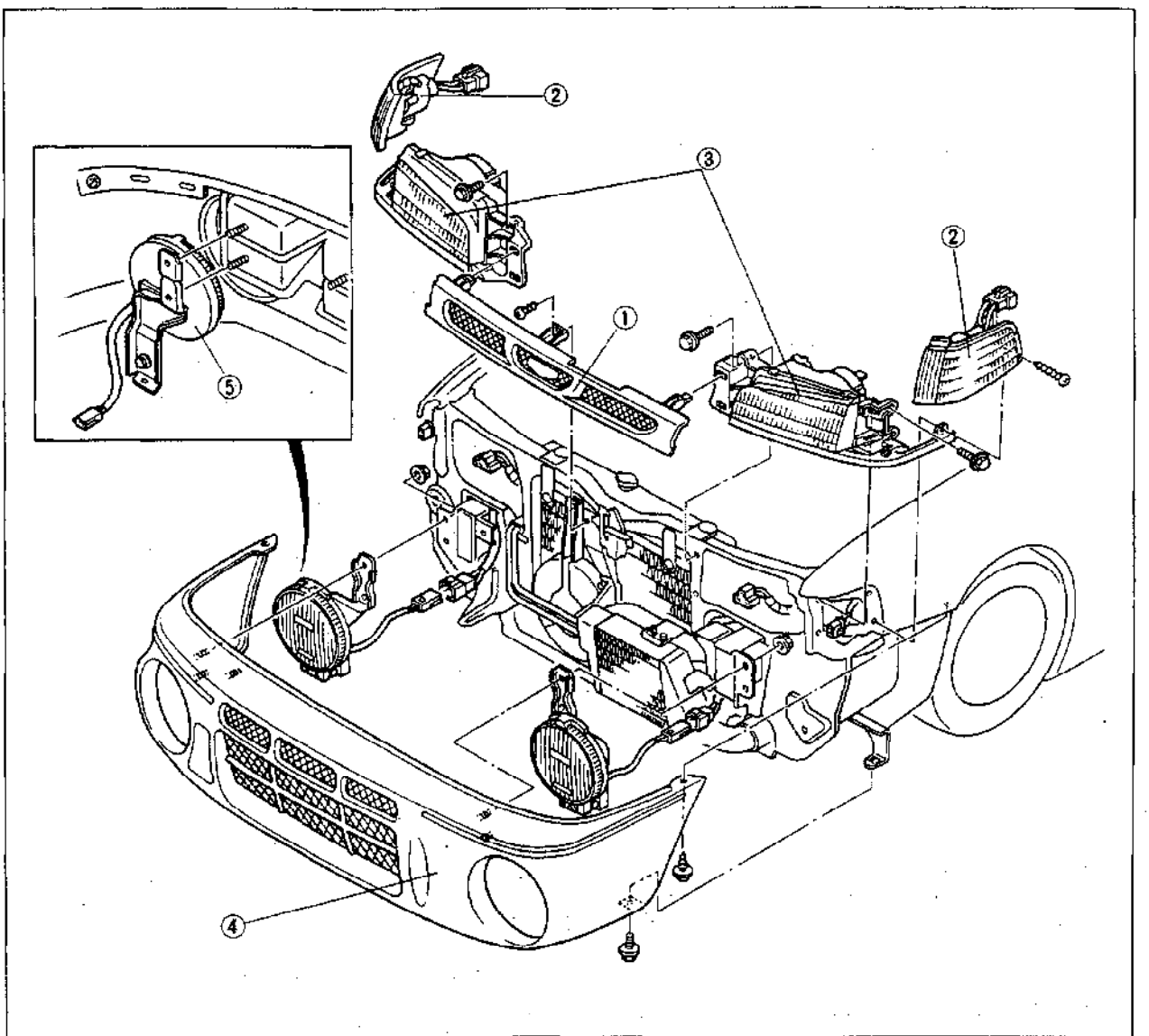
Front fog light
- Removal / Installation

13E0TX-305

EXTERIOR LIGHTING SYSTEM

FRONT FOG LIGHT
Removal / Installation

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



13E0TX-306

1. Radiator grille
2. Front combination light
3. Headlight
4. Front bumper
5. Front fog light

TECHNICAL DATA

13ETDX-301

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 × Stroke mm (in)			83.0 × 85.0 (3.27 × 3.35)
Total piston displacement cm^3 (cu in)			1,839 (112.2)
Compression ratio			8.2
Compression pressure kPa (kgf/cm^2, psi)·rpm	Standard		1,127 (11.5, 164)·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)
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 (kgf, lbf)/mm (in)		224—253 (22.8—25.8, 50—57)/39.5 (1.555)
Out-of-square mm (in)			1.62 (0.064) max.

Item \ Engine			BP DOHC turbo
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 11.0mm (0.433 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	0.35—0.50 (0.014—0.019)
		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)
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.

Item			Engine: BP DOHC turbo
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 kgf, 22 lbf}			9.0—11.5 {0.35—0.45}

LUBRICATION SYSTEM

Item		Engine: BP DOHC turbo
Lubricating method		Force-fed
Oil pump		
Type		Trochoid gear
Relief pressure kPa {kgf/cm², psi}		343—441 {3.5—4.5, 50—64}
Regulated pressure kPa {kgf/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 {kgf/cm², psi}		78—118 {0.8—1.2, 11—17}

Item	
Engine oil	
Capacity L {U	
Grade	
Viscosity number	A D A E E

COOLING SY

Item	
Cooling metho	
Water pump	
Type	
Impeller diame	
Number of imp	
Speed ratio	
Water seal typ	
Thermostat	
Type	
Opening temp	
Full-open tem	
Full-open lift	
Radiator	
Type	
Cap valve op	
Cooling circu	
Cooling fan	
Type	
Number of c	
Outer diame	
Capacity	
Current	
Water therm	
OFF→ON	
Radiator th	
OFF→ON	
Coolant	
Capacity	
Antifreeze s	

Item \ Engine		BP DOHC turbo
Engine oil		
Capacity L (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, SF or SG
Viscosity number	Above 30°C (86°F)	SAE 40
	0°C–40°C (32°F–104°F)	SAE 30
	–10°C–20°C (14°F–68°F)	SAE 20W-20
	Above –10°C (14°F)	SAE 20W-40 or 20W-50
	–25°C–30°C (–13°F–86°F)	SAE 10W-30
	Above –25°C (–13°F)	SAE 10W-40 or 10W-50
	Below 0°C (32°F)	SAE 5W-30
	Below –20°C (–4°F)	SAE 5W-20

COOLING SYSTEM

Item \ Engine		BP DOHC turbo
Cooling method		Water-cooled, forced circulation
Water pump		
Type		Centrifugal, V-belt driven
Impeller diameter	mm (in)	75 (2.95)
Number of impeller blades		6
Speed ratio		1 : 1.05
Water seal type		Unified mechanical seal
Thermostat		
Type		Wax, two-stage
Opening temperature	°C (°F)	Main: 86.5–89.5 (188–193) Sub: 83.5–86.5 (182–188)
Full-open temperature	°C (°F)	100 (212)
Full-open lift	mm (in)	Main: 8.0 (0.31) min. Sub: 1.5 (0.06) min.
Radiator		
Type		Corrugated fin
Cap valve opening pressure	kPa (kgf/cm², psi)	74–103 (0.75–1.05, 11–15)
Cooling circuit checking pressure	kPa (kgf/cm², psi)	103 (1.05, 15)
Cooling fan		
Type		Electric
Number of blades		5
Outer diameter	mm (in)	340 (13.4)
Capacity	W-V	160-12
Current	A	Hi: 13.3 + 10% max., Lo: 8.8 + 10% max.
Water thermoswitch		
OFF→ON	°C (°F)	97 (207)
Radiator thermoswitch		
OFF→ON	°C (°F)	105 (221)
Coolant		
Capacity	L (US qt, Imp qt)	6.0 (6.3, 5.3)
Antifreeze solution	Coolant protection	Specific gravity at 20°C (68°F)
	Above –16°C (3°F)	1.054
	Above –26°C (–15°F)	1.066
	Above –40°C (–40°F)	1.078

FUEL AND EMISSION CONTROL SYSTEMS

Item \ Engine				BP DOHC turbo
Idle speed			rpm	800 ± 50
Ignition timing*			BTDC	10 ± 1°
Fuel pump				
Maximum output pressure			kPa {kgf/cm², psi}	490—736 {5.0—7.5, 71—110}
Transfer pump				
Maximum output pressure			kPa {kgf/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	Low		kPa {kgf/cm², psi}	265—314 {2.7—3.2, 38—46}
	High		kPa {kgf/cm², psi}	304—392 {3.1—4.0, 44—57}
Injector				
Type				Low-ohmic
Type of drive				Electromechanical
Resistance			Ω	Approx. 2.11 Ω [at 20°C {68°F}]
Injector resistor				
Resistance/injector			Ω	6 [at 20°C {68°F}]
Idle-speed control (ISC) valve				
Type				Rotary
Resistance			Ω	11—13 [at 20°C {68°F}]
Solenoid valve (purge control)				
Resistance			Ω	23—27 [at 20°C {68°F}]
Solenoid valve (wastegate)				
Resistance			Ω	33—39 [at 20°C {68°F}]
Solenoid valve (PRC)				
Resistance	Low temp.		Ω	33—39 [at 20°C {68°F}]
	High temp.		Ω	33—39 [at 20°C {68°F}]
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	E2↔Vs		Ω	Fully closed: 20—600
				Fully open: 20—1,000
	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
Oxygen sensor (ceramic heater coil)				
Resistance			Ω	Approx. 6 [at 20°C {68°F}]
Fuel tank				
Capacity			L {US gal, Imp gal}	60 {15.9, 13.2}
Air cleaner				
Element type				Oil permeated
Fuel				
Specification				Unleaded premium (RON 95 or higher)

* TEN terminal of diagnosis connector grounded.

ENGINE EL

Item
Battery
Dark current*
Alternator
Starter
Distributor sp
Ignition timing (TEN terminal
Ignition coil
Spark plug

*1 Dark current
*2 Standard pl

ENGINE ELECTRICAL SYSTEM

Item \ Engine			BP DOHC turbo
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		12-70
	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 {0.32}
	Drive belt deflection 98 N {10 kgf, 22 lbf} mm {in}	New	5.5—7.0 {0.22—0.27}
		Used	6.0—7.5 {0.24—0.29}
		Limit	8.0 {0.31}
Starter	Type		Direct
	Output V-kW		12-0.85
	Brush length mm {in}	Standard	17 {0.67}
		Minimum	11.5 {0.46}
Distributor spark advance			Electronic spark advance (ESA)
Ignition timing BTDC (TEN terminal of diagnosis connector grounded)			10 ± 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	BKR6EVX11*2/ BKR5EVX11 BKR7EVX11
		NIPPONDENSO	K20PR-TP11*2/ K16PR-TP11 K22PR-TP11
	Plug gap mm {in}		1.0—1.1 {0.039—0.043}
	Firing order		1—3—4—2

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

CLUTCH

Item \ Engine/Transaxle			BP DOHC turbo G25MX-R (G5MX-R)
Clutch control			Hydraulic
Clutch pedal			
Type			Suspended
Pedal ratio		mm (in)	6.55
Full stroke		mm (in)	135 (5.31)
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)	0.200 (0.0079)
Clutch disc			
Type			Single dry plate
Runout limit		mm (in)	0.700 (0.0276)
Wear limit		mm (in)	0.3 (0.012) from rivet head
Outer diameter		mm (in)	230 (9.05)
Inner diameter		mm (in)	155 (6.10)
Facing thickness mm (in)	Flywheel side		3.5 (0.14)
	Pressure plate side		3.5 (0.14)
Clutch cover			
Type			Diaphragm spring
Set load		N (kgl, lbf)	5,494 (560, 1,232)
Clutch fluid			
Type			SAE J1703 or FMVSS116 DOT-3

MANUAL TRANSAXLE AND TRANSFER

Item \ Engine			BP DOHC turbo
Specification			
Transaxle type			G25MX-R (G5MX-R)
Transaxle control			Floor shift
Transaxle shift control			Cable
Syncromesh system			Forward: Synchromesh Reverse: Selective sliding and synchromesh
Gear ratio	1st		3.454
	2nd		1.833
	3rd		1.310
	4th		0.970
	5th		0.717
	Reverse		3.166
Final gear ratio			4.214
Speedometer gear ratio (Driven gear/drive gear)			1.045 (23/22)
Oil	Grade		API service GL-4
	Viscocity		All-season: ATF Dexron®II or M-III Above −18°C (0°F): SAE 75W-90
	Capacity	L (US qt, Imp qt)	2.6 (2.7, 2.2)
Runout			
Primary shaft gear runout		mm (in)	0.050 (0.0020)
Secondary shaft gear runout		mm (in)	0.015 (0.0006)
Clearance			
1st (Gear inner dia. -shaft outer dia)		mm (in)	0.030—0.080 (0.0012—0.0031)
2nd (Gear inner dia. -shaft outer dia)		mm (in)	0.030—0.080 (0.0012—0.0031)
3rd (Gear inner dia. -shaft outer dia)		mm (in)	0.030—0.080 (0.0012—0.0031)
4th (Gear inner dia. -shaft outer dia)		mm (in)	0.030—0.080 (0.0012—0.0031)
5th (Gear inner dia. -shaft outer dia)		mm (in)	0.030—0.080 (0.0012—0.0031)

Item \ Engine		BP DOHC turbo
1-2 shift fork and reverse gear mm {in}	Standard	0.10—0.45 {0.004—0.018}
	Wear limit	0.95 {0.037}
3-4 shift fork and clutch hub sleeve mm {in}	Standard	0.10—0.40 {0.004—0.016}
	Wear limit	0.90 {0.035}
5th shift fork and clutch hub sleeve mm {in}	Standard	0.10—0.36 {0.004—0.014}
	Wear limit	0.86 {0.034}
Reverse idle gear and reverse lever mm {in}	Standard	0.10—0.35 {0.004—0.014}
	Wear limit	0.85 {0.033}
Thrust clearance		
1st gear mm {in}	Standard	0.05—0.28 {0.002—0.011}
	Limit	0.33 {0.013}
2nd gear mm {in}	Standard	0.18—0.46 {0.007—0.018}
	Limit	0.51 {0.020}
3rd gear mm {in}	Standard	0.05—0.20 {0.002—0.008}
	Limit	0.25 {0.010}
4th gear mm {in}	Standard	0.17—0.37 {0.007—0.015}
	Limit	0.42 {0.017}
5th gear mm {in}	Standard	0.100—0.220 {0.0039—0.0087}
	Limit	0.270 {0.0106}
Primary shaft gear mm {in}	Standard	0—0.05 {0—0.002}
	Adjustment shims	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}
Secondary shaft gear mm {in}	Standard	0.03—0.08 {0.001—0.003}
	Adjustment shims	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}
Center differential		
Type		Planetary carrier
Number of ring gear teeth	Outer	59
	Inner	75
Number of pinion gear teeth	Outer	14
	Inner	14
Number of sun gear teeth	Pinion gear side	43
	Idle gear side	43
Number of idle-gear teeth		37
Bearing preload N·m {kgf-cm, in-lbf}		3.0—3.9 {30—40, 27—34}
Bearing preload adjustment shim mm {in}		0.10 {0.004}, 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 {0.031}, 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}, 1.35 {0.053}, 1.50 {0.059}, 1.65 {0.065}, 1.80 {0.071}
End play of sun gear mm {in}		0.100—0.300 {0.0039—0.0118}
Sun gear adjustment washer mm {in}		3.5 {0.138}, 3.7 {0.146}, 3.9 {0.154}, 4.1 {0.161}, 4.3 {0.169}
Transfer Carrier		
Final gear reduction ratio		4.214
Number of teeth	Ring gear	37
	Pinion gear	11
Oil	Type	API: GL-5 Above −18°C {0°F}: SAE 90 Below −18°C {0°F}: SAE 80W
	Capacity L {US qt, Imp qt}	0.5 {0.53, 0.44}

TD

Item \ Engine		BP DOHC turbo
Note		
Synchronizer ring outer diameter 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 dimension mm (in)	1st and 2nd	① 19.0 (0.748), ② 4.3 (0.17), ③ 5.0 (0.20)
	3rd and 4th	① 17.0 (0.669), ② 4.3 (0.17), ③ 5.0 (0.20)
	5th and reverse	① 17.0 (0.669), ② 4.3 (0.17), ③ 5.0 (0.20)

PROPELLER SHAFT

Item \ Engine/Transaxle Model		BP DOHC turbo G25MX-R (G5MX-R)
Length mm (in)	Front	834.3 (32.85)
	Center	584 (22.99)
	Rear	437 (17.20)
Outer diameter mm (in)	Front	75 (2.95)
	Center	57 (2.24)
	Rear	57 (2.24)

FRONT AND REAR AXLES

Item			Specifications
Front driveshaft			
Joint type		Inside	Double offset joint
		Outside	Bell joint
Length of joint (between center of joint) mm (in)		Right	392 (15.4)
		Left	306 (0.83)
Shaft diameter mm (in)			21.0 (0.83)
Rear driveshaft			
Joint type		Inside	Double offset joint
		Outside	Bell joint
Length of joint (between center of joint) mm (in)		Right	519.5 (20.5)
		Left	489.5 (19.3)
Shaft diameter mm (in)			21.0 (0.83)
Joint shaft			
Length of joint			357.2 (14.1)
Shaft diameter			21.0 (0.83)
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 (viscous limited slip 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	Above −18°C (0°F)	SAE 90
		Below −18°C (0°F)	SAE 80W
	Capacity L (US qt, Imp qt)		0.65 (0.69, 0.57)

STEERING SY

Steering wheel	
Outer diameter	
Free play	
Operation force	
Lock-to-lock	
Steering gear	
Type	
Steering gear r	
Backlash betwe	
Pinion preload	Prel
	Pre
Distance betwe	
Rack stroke	
Lubricant type	
Oil capacity	
Drive belt	
Deflection with	

BRAKING SY

Brake type	
Brake pedal	
Height	
Free play	
Reserve travel Clearance whe	
Master cylinde	
Master cylinder	
Front disc bra	
Type	
Thickness of pa	
Thickness of di	
Runout of disc	
Cylinder bore	
Rear brake (di	
Type	
Thickness of pa	
Thickness of dis	
Runout of disc	
Cylinder bore	
Parking brake	
Type	
Parking brake le When lever	

STEERING SYSTEM

Item		Specifications
Steering wheel		
Outer diameter mm {in}		370 {14.57}
Free play mm {in}		0—30 {0—1.18}
Operation force N {kgf, lbf}		29 {3.0, 6.6} or less
Lock-to-lock		2.51
Steering gear		
Type		Rack and pinion
Steering gear ratio		Infinite (∞)
Backlash between rack and pinion mm {in}		0 {0}
Pinion preload	N·m {kgf·cm, in·lbf} Preload measured by torque wrench	1.0—1.3 {10—14, 8.7—12.1}
	kgf {lbf} Preload measured by pull scale with attachment	1.0—1.4 {2.2—3.08}
Distance between left and right brackets mm {in}		258 {10.16}
Rack stroke mm {in}		121 {4.76}
Lubricant type		ATF Dexron®II or M-III
Oil capacity L {US qt, Imp qt}		0.8 {0.85, 0.70}
Drive belt		
Deflection with force of 98 N {10 kgf, 22 lbf} mm {in}		New belt: 8—9 {0.31—0.35} Used belt: 9—10 {0.35—0.39}

BRAKING SYSTEM

Item			Without ABS	With ABS
Brake type			Front ..... disc, Rear ..... disc	
Brake pedal				
Height mm {in}			203—206 {7.99—8.11}	
Free play mm {in}			4—7 {0.16—0.28}	12—15 {0.47—0.59}
Reserve travel mm {in} Clearance when pedal depressed at 589 N {60 kgf, 132 lbf}			70 {2.76} min	60 {2.36} min
Master cylinder				
Master cylinder	Type		Tandem	
	Bore diameter mm {in}		25.4 {1.00}	23.8 {0.94}
Front disc brake				
Type			Ventilated	
Thickness of pad mm {in}		Standard	10 {0.39}	
		Minimum	2 {0.08}	
Thickness of disc plate mm {in}		Standard	24 {0.94}	
		Minimum	22 {0.79}	
Runout of disc plate mm {in}			0.1 {0.004}	
Cylinder bore mm {in}			57.2 {2.25}	
Rear brake (disc)				
Type			Solid	
Thickness of pad mm {in}		Standard	8.0 {0.31}	
		Minimum	1 {0.04}	
Thickness of disc plate mm {in}		Standard	10 {0.39}	
		Minimum	8 {0.31}	
Runout of disc plate mm {in}			0.1 {0.004}	
Cylinder bore mm {in}			34.9 {1.37}	
Parking brake				
Type			Mechanical two-rear-wheel control	
Parking brake lever notches When lever is pulled at 98N {10 kgf, 22 lbf}			5—7	

Item	Without ABS	With ABS
Power brake unit		
Diameter mm {in}	188.4 {7.42} + 215.2 {8.47}	—
Fluid pressure per treading force kPa {kgf/cm², psi}/N {kgf, lbf}	More than 1,080 {11, 156}/196 {20, 44} at 0 kPa {mmHg, inHg} More than 8,730 {89, 1,270}/196 {20, 44} at 66.7 {500, 19.7} kPa {mmHg, inHg}	—
Rear wheel hydraulic control system		
Type	Dual proportioning valve	Proportioning valve
Switching point (Master cylinder pressure) kPa {kgf/cm², psi}	1,960 {20, 284}	

WHEELS AND TIRES

Item		Type	Standard	Temporary Spare
Wheel	Size		5 1/2-JJx15	4-Tx15
	Offset mm {in}		47.5 {1.87}	45 {1.77}
	Pitch circle diameter mm {in}		114.3 {4.50}	
	Material		Aluminum alloy	Steel
Tire	Size		195/50R15 82V	T125/70D15
	Air pressure kPa {kgf/cm², psi}	Front	*1 200 {2.4, 35} *2 245 {2.5, 36}	412 {4.2, 60}
		Rear	*1 216 {2.2, 32} *2 245 {2.5, 36}	
Wheel and tire	Runout limit mm {in}	Horizontal	2.0 {0.079}	2.5 {0.098}
		Vertical	1.5 {0.059}	2.0 {0.079}
	Unbalance	g {oz}	9 {0.31}	—

*1 ... Up to 3 persons
*2 ... — Full load

SUSPENSION

Item			Specifications
Front suspension			
Suspension type			Strut
Spring type			Coil spring
Shock absorber	Type		Oil
	Damping force N {kgf, lbf} at 0.3 m/s	Extended	1,470 {150, 330}
		Compressed	686 {70, 154}
Stabilizer	Type		Torsion bar
	Diameter	mm {in}	23.0 {0.91}
Front wheel alignment (*Unladen)	Total toe-in	mm {in}	2 ± 3 {0.08 ± 0.12}
		degree	0°12' ± 18'
	Turning angle degree	Inner	38° ± 3°
		Outer	30° ± 3°
	Camber angle	degree	−0°45' ± 45'
	Caster angle	degree	2°35' ± 45'
	Kingpin angle	degree	12°10'
Rear suspension			
Suspension type			Strut
Spring type			Coil spring
Shock absorber	Type		Oil
	Damping force N {kgf, lbf} at 0.3 m/s	Extended	882 {90, 198}
		Compressed	392 {40, 88}
Stabilizer	Type		Torsion bar
	Diameter	mm {in}	19.1 {0.75}
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'

* 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 center diameter mm {in}	Free length mm {in}	Coil number	Identification mark color	
						M*1	A*2
Front	With sunroof	14.5 {0.57}	132.5—158.5 {5.22—6.24}	271.5 {10.69}	3.35	Pink	Green
	Without sunroof	14.4 {0.56}	132.6—158.6 {5.22—6.24}	267.0 {10.51}	3.24	Light blue	Red
Rear	With sunroof	8.8—12.5 {0.34—0.49}	128.5—131.2 {5.05—5.17}	334 {13.15}	6.19	Cream	—
	Without sunroof	8.9—12.4 {0.35—0.48}	128.6—131.1 {5.06—5.16}	335 {13.19}	6.23	Pink	—

*1 Main identification mark color: Indicated on second coil from bottom.
*2 Auxiliary identification mark color: Indicated on third coil from buttom.

BODY ELECTRICAL SYSTEM

Item			Specifications (W)	
			ECE	Swiss
Exterior lamps	Headlight		60/55	
	Front fog light		55	
	Front turn signal light		21	
	Parking light		5	
	Front side turn light		5	
	Stop/Taillight		21/5	
	Taillight (3HB)		5	
	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	
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

13ESTX-301

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

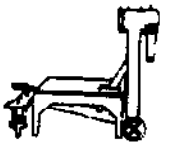
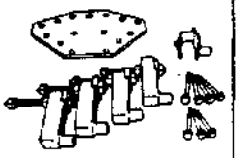
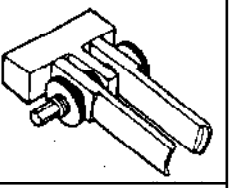
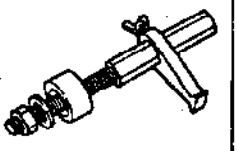
- **When ordering tool sets that consist of several tools, check the List in the Parts Catalogue to make sure that some tools are not duplicated in other sets you may already have. If they are, instead of ordering the set, order only those new tools that are needed.**
- **There are new SST explanations in this tool chart.**
  These tools are indicated by "NEW SST" in description column.

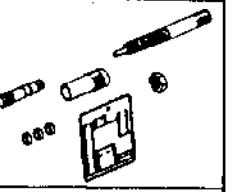
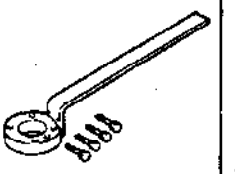
13ESTX-302

ENGINE

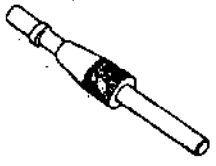
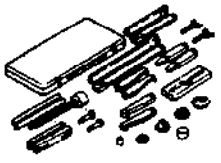
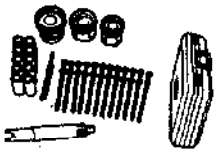
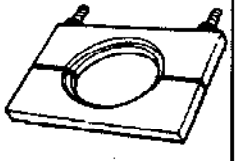
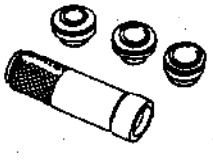
TOOL & DESC
49 0107 Engine
49 L01 Hanger engine
49 063 Arm, v lifter
49 B0 Pivot
49 S1 Remo seal
49 E Brak

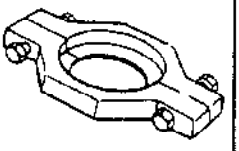
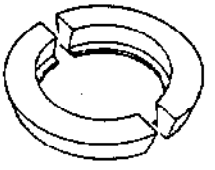
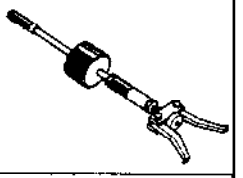
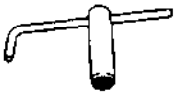
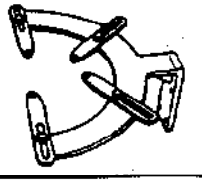
ENGINE

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 S120 170 Remover, valve seal	A	
49 E011 1A0 Brake, ring gear	A	

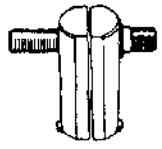
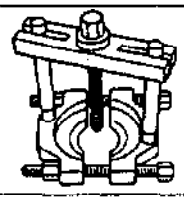
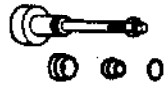
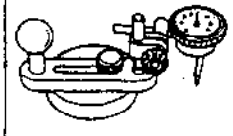
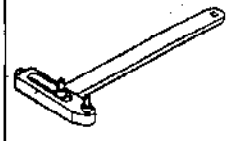
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 L012 0A0 Installer set, valve seal & valve guide	A	
49 B012 005 Remover & installer, valve guide	A	
49 0221 061A Remover & installer, piston pin	A	
49 D011 102 Lock tool, crankshaft	A	
49 G014 001 Wrench, oil filter	A	
49 9200 145 Adapter, radiator cap tester	A	

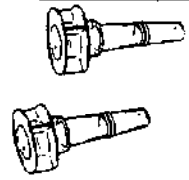
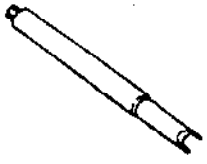
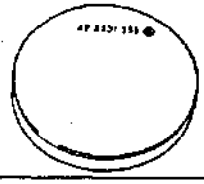
CLUTCH AND MANUAL TRANSAXLE

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G017 5A0 Engine support	A	
49 SE01 310A Clutch disc centering tool	A	
49 G019 0A0 Hanger, transaxle	A	
49 0839 425C Puller set, bearing	A	
49 G030 380C Shim selector set	A	
49 S120 710 Holder, coupling flange	A	
49 G030 370 Removing plate	A	
49 F401 330B Installer set, bearing	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0636 145 Puller, fan pulley boss	A	
49 G030 795 Installer, oil seal	A	
49 G017 1A0 Remover set, bearing	A	
49 B027 003 Attachment M	A	
49 W032 2A0 Remover set, bearing	A	
49 G030 440 Holder, primary shaft	A	
49 G030 338 Attachment E	A	
49 M005 561 Hanger, differential carrier	A	

CLUTCH AND MANUAL TRANSAXLE (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 FT01 361 Remover, bearing	A	
49 0710 520 Puller, bearing	A	
49 8531 565 Drive pinion model	A	
49 0727 570 Gauge body, pinion height	A	
49 0259 720 Adjustment wrench, side bearing	B	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B027 001 Holder, diff. side gear	A	
49 B027 002A Preload adaptor	A	
49 8531 555 Gauge block	A	
49 B017 102 Preload adapter	A	
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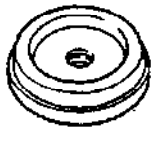
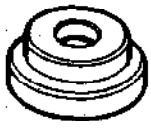
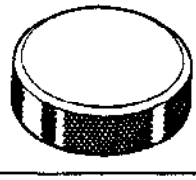
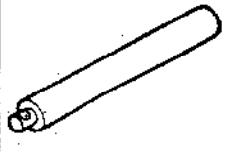
FRONT AND REAR AXLES

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F027 004 Attachment ϕ80	A	
49 G033 105 Attachment A	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 N027 001 Gauge block	A	
49 G033 102 Handle	A	

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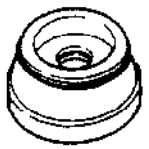
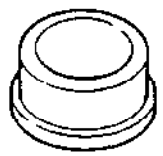
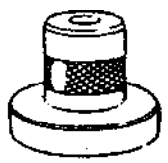
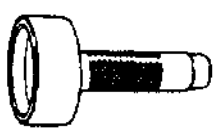
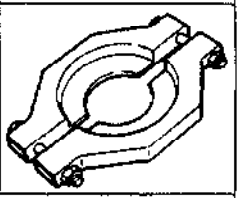
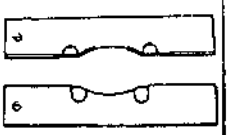
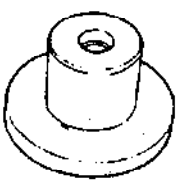
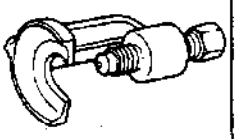
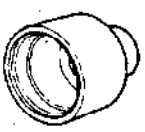
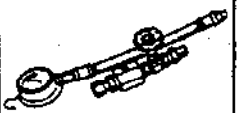
FRONT AND REAR AXLES (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 F027 005 Attachment ϕ62	A	
49 F027 009 Attachment ϕ68 and ϕ77	A	
49 V001 795 Installer, oil seal	A	
49 B001 795 Installer, oil seal	A	

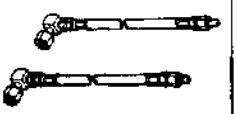
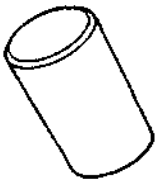
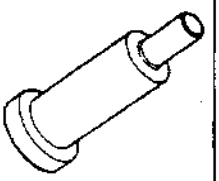
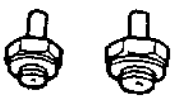
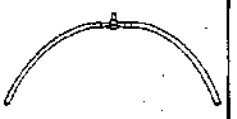
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 H034 201 Support block	A	
49 H027 002 Remover, bearing	A	
49 F026 103 Puller, wheel hub	A	
49 F026 102 Installer, bearing	A	

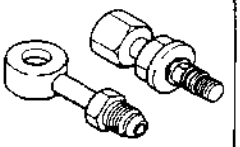
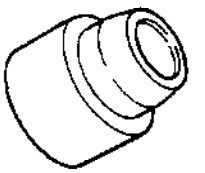
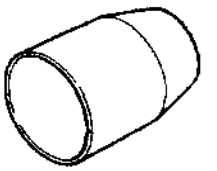
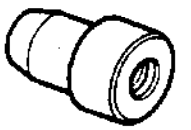
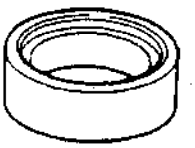
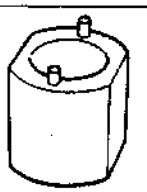
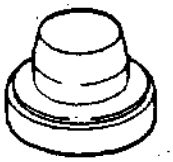
STEERING

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B019 0180 510B Attachment preload	B	
49 0118 850C Puller, ball joint	A	
49 1243 785 Installer, dust boot	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G033 108 Adapter, caster camber gauge	A	
49 H032 301 Wrench (Power steering)	A	
49 1232 670A Gauge set, power steering	A	

STEERING (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 H002 671 Adapter (Power steering)	A	
49 B032 317 Remover, bearing & oil seal (Power steering)	B	
49 B032 324 Protector body, rod seal	A	
49 B032 305 Holder, power steering pump (Power steering)	A	
49 B032 326 Protector, outer box	A	
49 B032 306 Wrench, plug (Power steering)	A	
49 B032 321 Adapter (Power steering)	A	
49 G032 317 House (Power steering)	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B032 304 Adapter (Power steering)	A	
49 B032 309 Installer body, pinion seal (Power steering)	A	
49 B032 312 Protector, slipper seal (Power steering)	A	
49 B032 314 Slipper seal former (Power steering)	A	
49 B032 323 Remover body, rod seal	A	
49 B032 316 Support block, plug (Power steering)	A	
49 B032 327 Wrench, outer box	A	
49 B032 315 Installer, oil seal (Power steering)	A	

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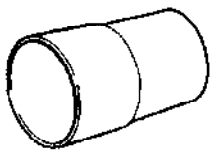
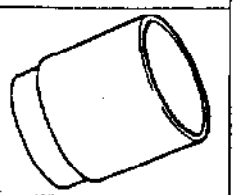
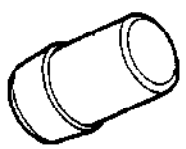
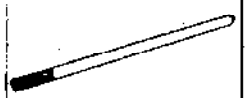
STEERING (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B032 310 Protector, pinion seal (Power steering)	A	
49 B032 311 Protector, slipper seal (Power steering)	A	
49 B032 325 Guide, rod seal	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B032 320 Wrench (Power steering)	A	
49 F032 303 Handle (Power steering)	A	
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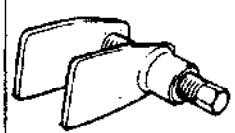
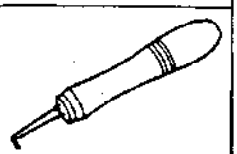
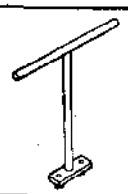
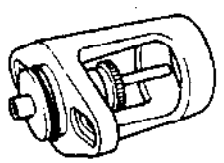
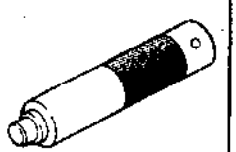
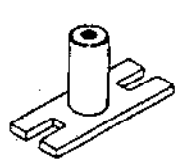
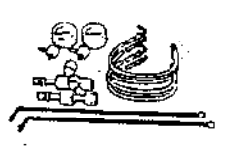
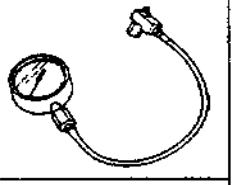
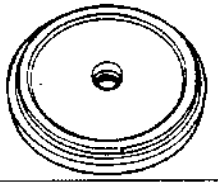
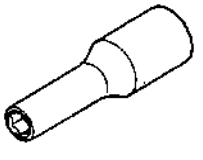
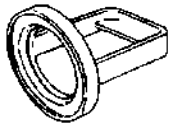
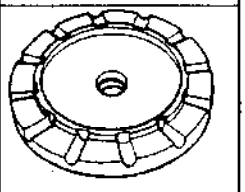
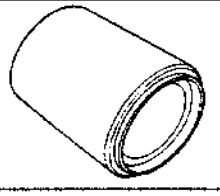
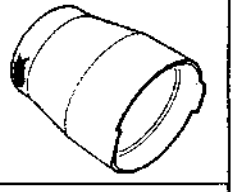
BRAKING

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0259 770B Wrench, flare nut	A	
49 0221 600C Expand tool, disc brake	B	
49 0208 701A Air out tool, boot	B	
49 FA18 602 Wrench,disc brake piston	B	

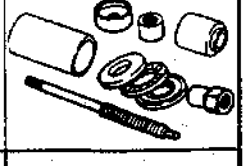
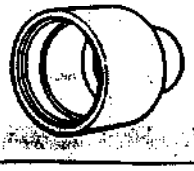
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B043 001 Adjust gauge	A	
49 B043 002 Installer, bearing	A	
49 B043 003 Turning, lock tool	A	
49 U043 0A0 Gauge set, oil pressure	A	

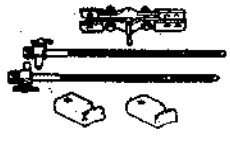
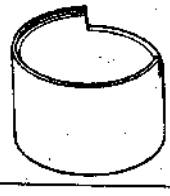
BRAKING (CONT'D)

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 1285 071 Puller, needle bearing	A	
49 B066 001 Harness (ABS)	A	
49 B066 0A0 Oil pressure gauge (ABS)	A	
49 L043 001 Setting tool, retainer	A	
49 B043 004 Socket wrench	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G025 001 Installer, sensor rotor	A	
49 L043 002 Setting tool, retainer	A	
49 L043 003 Setting tool, retainer	A	
49 L043 004 Protector	A	
—	—	—

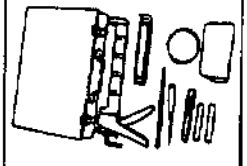
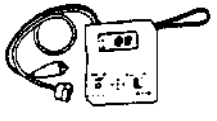
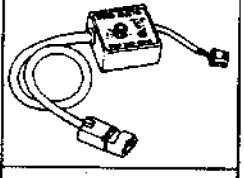
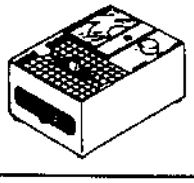
FRONT AND REAR SUSPENSION

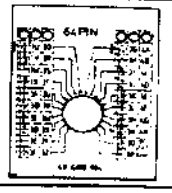
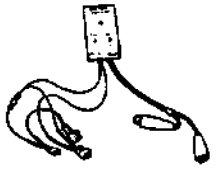
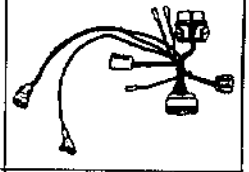
TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 B034 2A0A Replacer set, rubber bush	A	
49 8038 785 Installer, dust boot	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G034 1A0 Compressor, coil spring	A	
49 B034 201 Support block	B	

ST

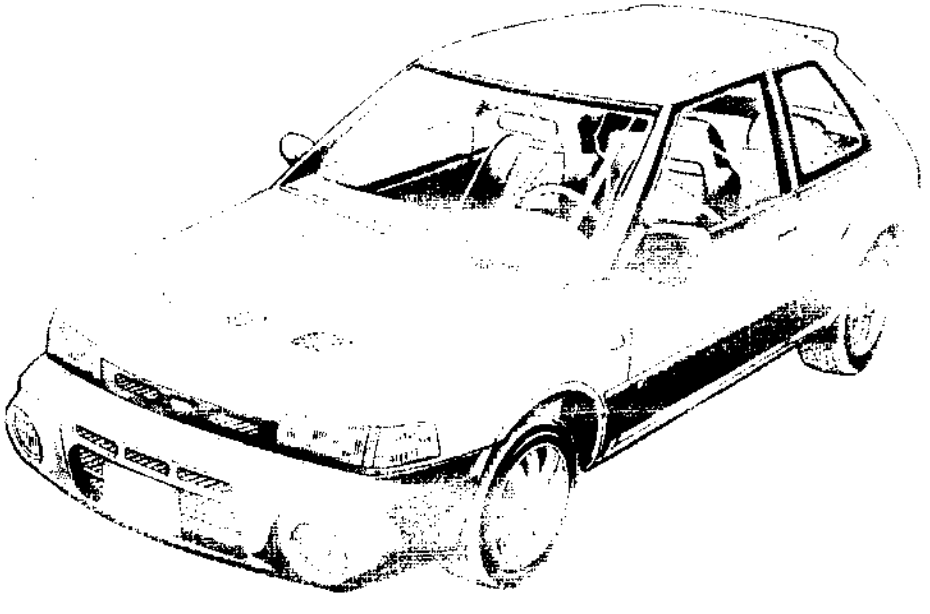
CHECKER AND OTHER EQUIPMENT

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 0187 280 Gauge, oil pressure	A	
49 0839 285 Checker, fuel & thermometer	A	
49 0305 870A Tool set, window	A	
49 H018 9A1 Checker, self-diagnosis	A	
49 B019 9A0 System selector	A	
49 9200 162 Monitor, engine signal	A	

TOOL NUMBER & DESCRIPTION	PRIORITY	ILLUSTRATION
49 G018 903 Adapter harness	A	
49 G018 904 Sheet	A	
49 F018 002 Igniter checker	A	
49 N018 001 Adapter harness	A	
49 D066 801A Removing tool	A	
—	—	—

Mazda 323 4WD

Wiring Diagram



Europe(LHD)

SYSTEM INDEX

Mazda 323 4WD

Wiring Diagram

Europe (LHD)

FOREWORD

This wiring diagram incorporates the wiring schematics of the basic vehicle and available optional equipment. Actual vehicle wiring may vary slightly depending on optional equipment or local specifications, or both.
All information in this booklet is based on information available at the time of printing. Mazda Motor Corporation reserves the right to make changes without previous notice.

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

PRINTED IN JAPAN, JAN. '92 Ⓚ
5232-10-92A

VEHICLE IDENTIFICATION NUMBERS (VIN) (CHASSIS NUMBER)

JMZ BG83J200 500001~

WIRING COLOR CODE

Color	Code	Color	Code
Blue	L	Natural	N
Black	B	Orange	O
Brown	BR	Pink	P
Dark Blue	DL	Red	R
Dark Green	DG	Purple	PU
Green	G	Tan	T
Gray	GY	White	W
Light Blue	LB	Yellow	Y
Light Green	LG	Violet	V

GENERAL INFORMATION

GI

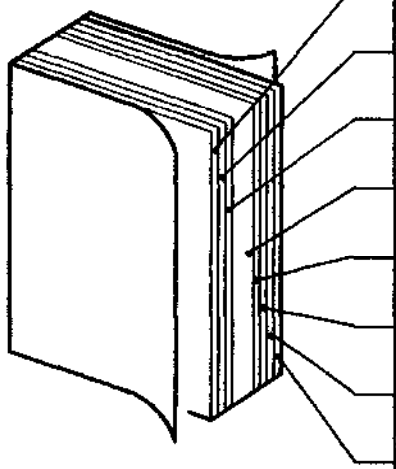
Wiring Diagrams

Reading Wiring Diagrams

Troubleshooting

Contents of wiring diagrams

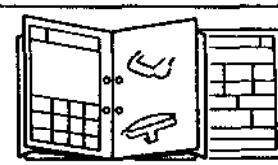
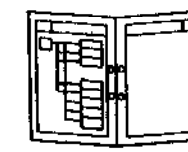
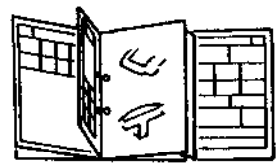
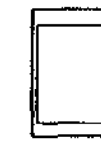
- This document comprises the 8 groups shown below. The main components are summarized in the components location diagram at the end of the document.



GI	**General Information**	A how-to on using and reading wiring diagrams, using test equipment, checking harnesses and connectors, and finding trouble spots
Y	**Ground points**	Ground routes from and to the battery
W	**Electrical wiring schematics**	Shows main fuses and other fuses for each system
A~U	**Circuit diagrams for individual systems**	Shows circuit and connector diagrams and component and connector location diagrams
X	**Common connectors**	Shows connectors common throughout system
JB	**Joint box complete wiring system**	Shows internal circuits and connectors
PL	**Parts location**	Shows location of major electrical parts
PI	**Index**	Gives page number of circuit diagram for each component

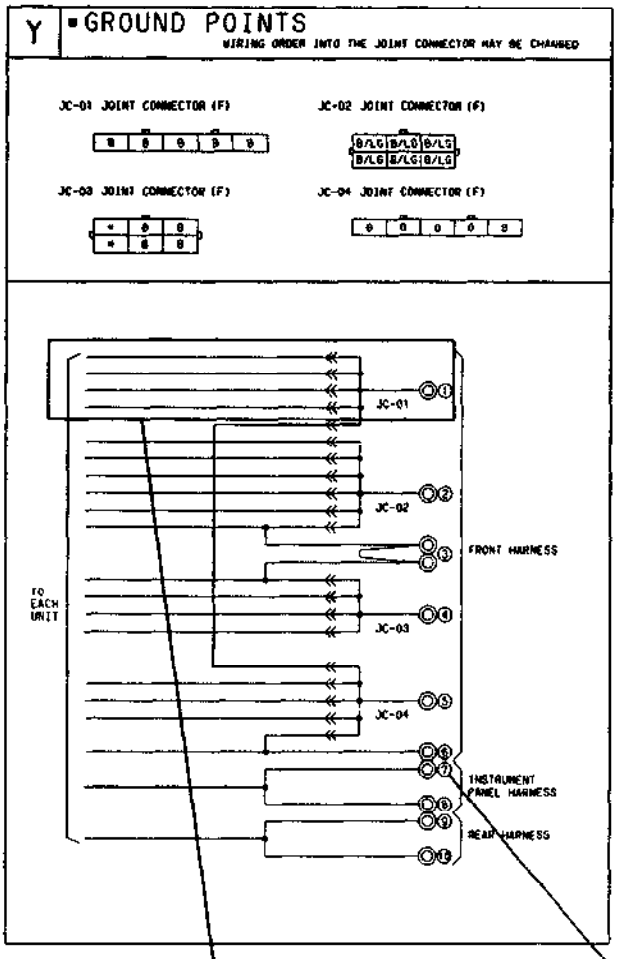
Using wiring diagrams

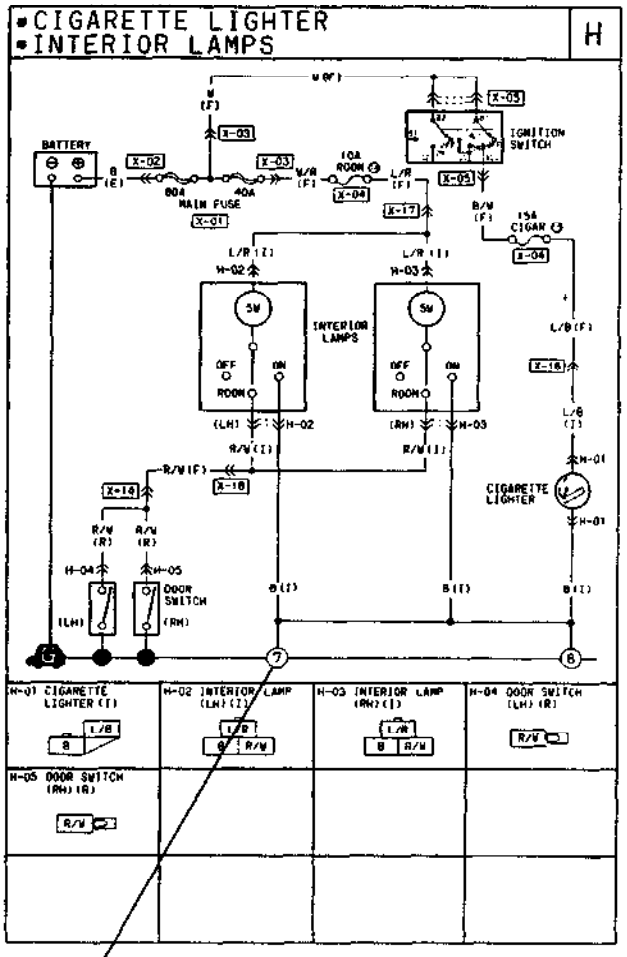
- The use of the wiring diagram depends on its application.

Application	Use	Application	Use
For checking circuits of individual systems	 Open to page with circuit diagram and harness routing to be used and fold out common connector diagram or joint box diagram.	For checking fuse connections	 Open to electrical wiring schematic.
For checking ground circuit of individual systems	 Open to page with ground point diagram and fold out common connector diagram or joint box diagram.	For finding page numbers of systems and components	Parts Index  or System Index  Open to parts index or system index.

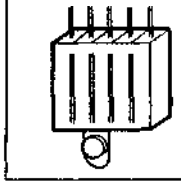
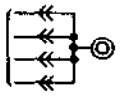
Ground points

- This shows ground points of the harness.





Ground indication

On vehide	Indication
	To circuit 

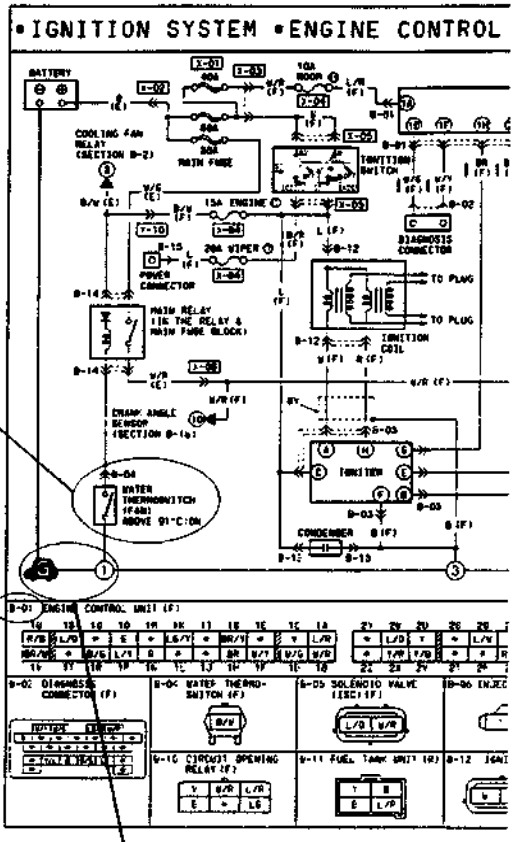
On circuit diagrams and ground points

The ground connection numbers in system circuit diagrams correspond to those in the ground point diagram.

System circuit diagram/connector diagram

- These diagrams show the circuits for each system, from the power supply to the ground. The power supply side is on the upper part of the page, the ground side on the lower part. The diagrams describe circuits with the ignition switch off.

  Below is an explanation of the various points in the diagram.



Indicates operating conditions for switches.

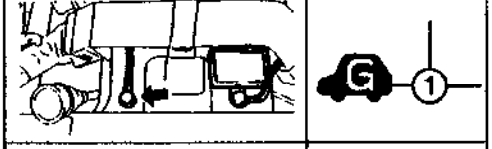
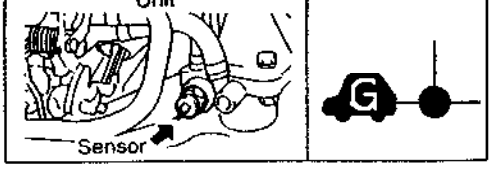
Connector code

The prefix letter indicates the system in which the connector is used.

JB: Joint box connections
X : Common connectors
A : Charging system/starting system connectors
B : Engine control system connectors
C : Gauge control system connectors
D : Wiper system connectors
E : Lighting system connectors
F : Signal system connectors
G : Air-conditioning system connectors
H : Transmission Control sysetm connectors
I : Interior lamp system connectors
J : Audio/radio connectors
K : Power window/power door lock system connectors
L : Remote control mirror system connectors
M : Sliding sunroof system connectors
N : Power steering/4-wheel steering system connectors
O : Anti-lock brake system connectors.
P : Power seat/seat heater system connectors
Q : Auto cruise control system connectors
R : Auto adjusting suspension system connectors
S : Passive shoulder belt control/Airbag system connectors
T : Others
Y : Ground connector

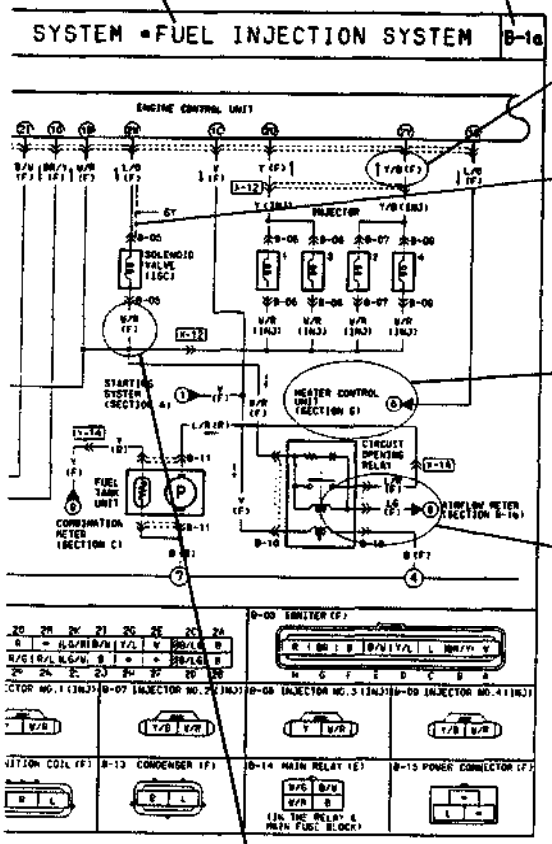
Ground numbers

A harness ground is represented differently than a unit ground.

Types of grounds	Symbol
Harness	
Unit	

System name

System code



Current symbol

Current flows in the direction of the arrow.

Indicates shielded wire. *

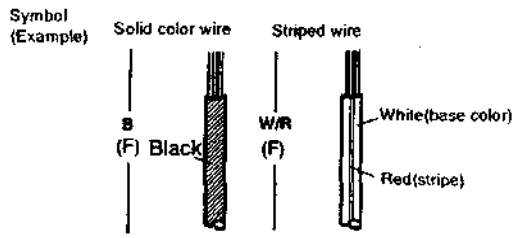
*Shielded wire:
Prevents signal disturbances from electrical interference.
Wire is covered by a metal meshing for grounding.

The number indicates that the circuit continues to the related system diagram.

Wire color code (harness symbol)

- Two-color wires are indicated by a two-letter symbol. The first indicates the base color of the wire, the second the color of the stripe. For example:

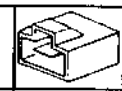
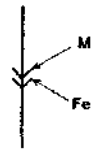
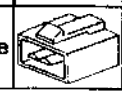
  W/R is a white wire with a red strip
  BR/Y is a brown wire with a yellow strip



- The harness symbol is in ( ) following the harness symbols (refer to GI-7.).

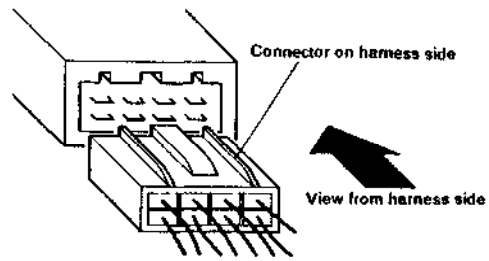
Connector symbols

- Male and female connectors are represented as follows in the circuit and connector diagrams.

		Circuit diagram symbol	Connector diagram symbol
Male			
Female			

- Like connectors are linked by dashed lines between the connector symbols.
- Connector diagrams show connectors on the harness side. The terminal indicates the view from the harness side.

(Example)



- Colors for connectors except milk-white are given in locations.
- Unused terminals are indicated by ✳ .

Routing diagram

- The routing diagram shows where electrical components are on the system circuit diagram by call out line and connector symbols.
- Specified values are listed beside the routing diagram or on the following page.

Connector symbol

Shows the system that uses the connector.

(Example)

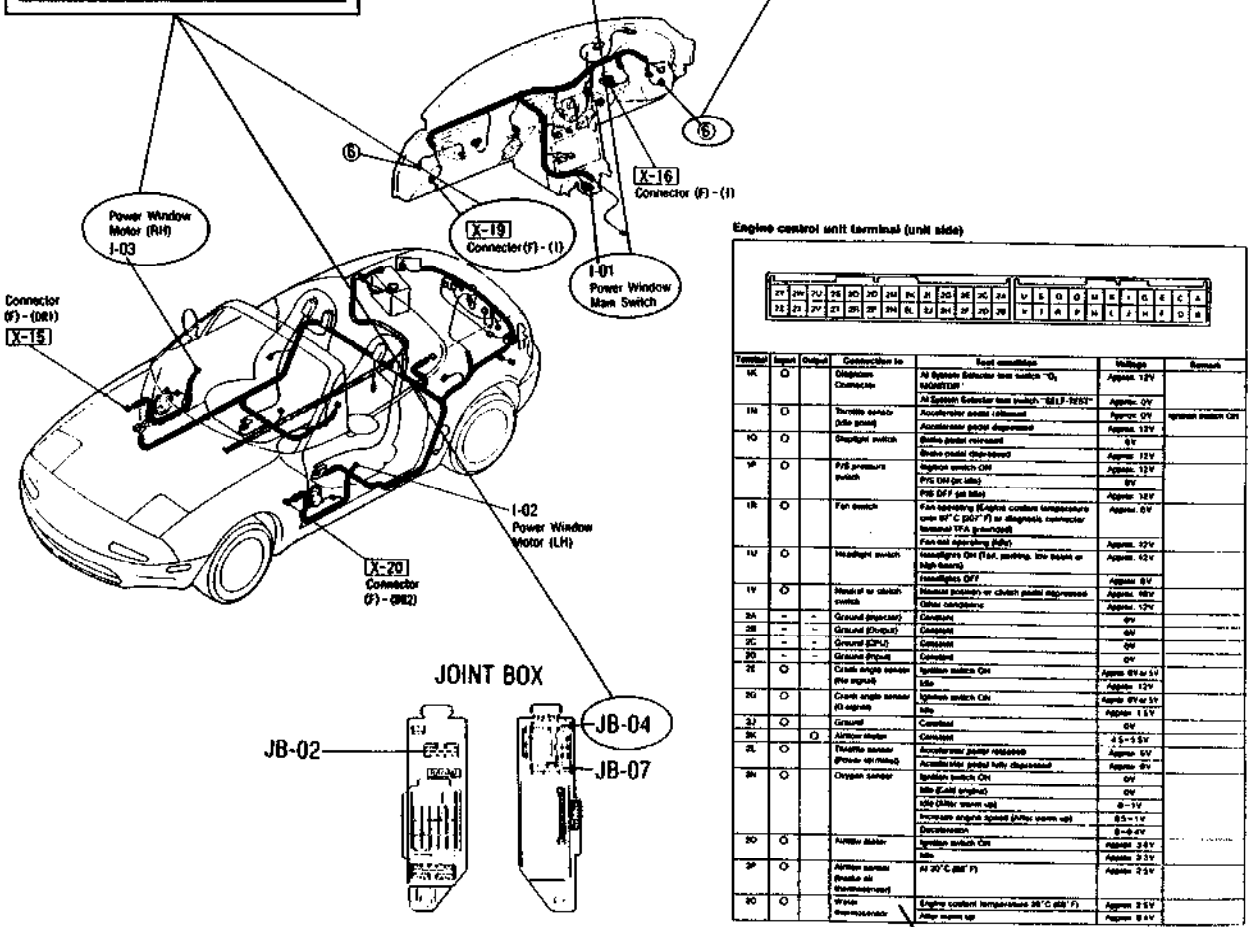
Connector	Symbol
Joint box	JB-04
Common connectors	X-19
System connectors	I-03

Component name

Shows the names of components in routing diagrams.

Ground symbol

Shows the ground in system diagrams.

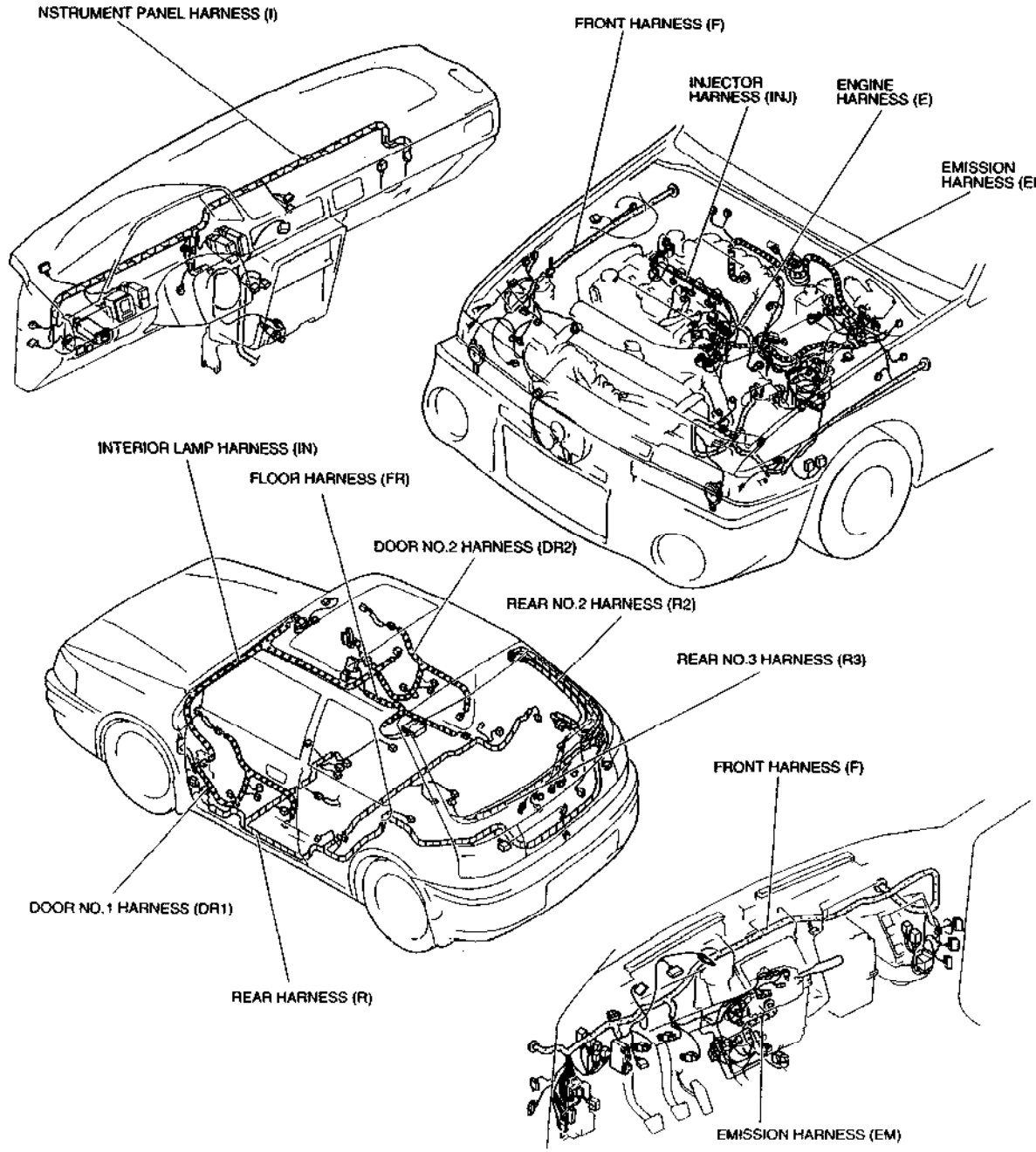


Specified values

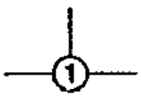
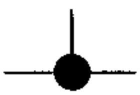
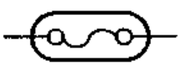
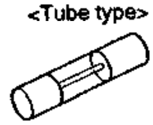
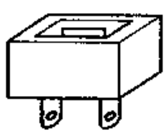
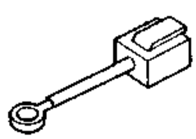
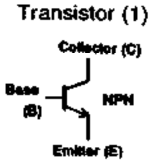
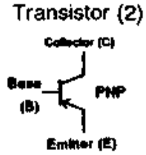
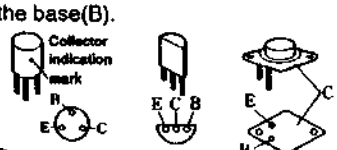
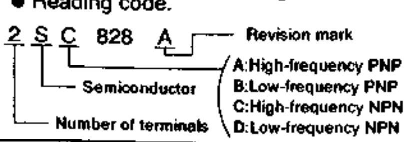
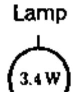
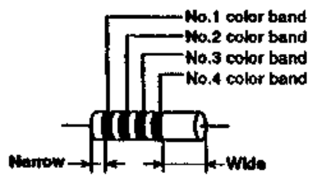
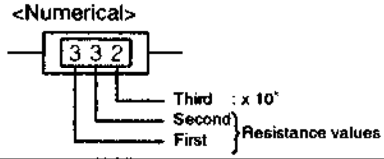
Shows values for determining whether an electrical component is good.

HARNESS SYMBOLS

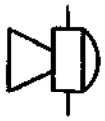
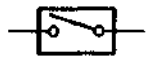
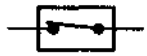
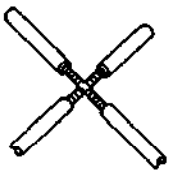
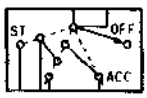
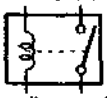
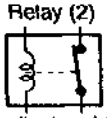
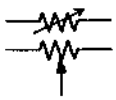
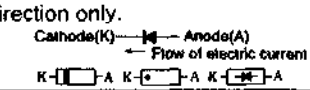
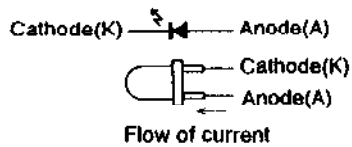
DESCRIPTION OF HARNESS	SYMBOL		DESCRIPTION OF HARNESS	SYMBOL	
FRONT HARNESS	(F)		EMISSION HARNESS	(EM)	
ENGINE HARNESS	(E)		INJECTOR HARNESS	(INJ)	
INSTRUMENT PANEL HARNESS	(I)		INTERIOR LAMP HARNESS	(IN)	
REAR HARNESS	(R)		FLOOR HARNESS	(FR)	
REAR NO.2 HARNESS	(R2)		DOOR NO.1 HARNESS	(DR1)	
REAR NO.3 HARNESS	(R3)		DOOR NO.2 HARNESS	(DR2)	

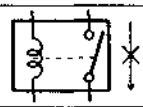
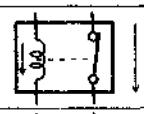
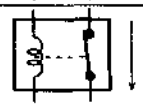
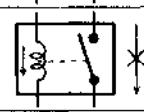


Symbols

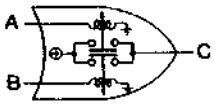
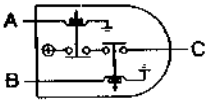
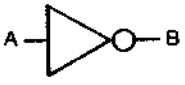
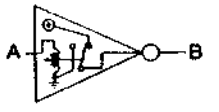
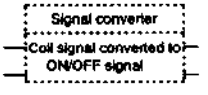
Symbol	Meaning
Battery 	● Generates electricity through chemical reaction. ● Supplies direct current to circuits.
Ground (1)  Ground (2) 	● Connecting point to vehicle body or other ground wire where current flows from positive to negative terminal of battery. ● Ground (1) indicates a ground point to body through wire harness. ● Gound (2) indicates point where component is grounded directly to body. Remarks ● Current will not flow through a circuit if ground is faulty.
Fuse (1)  (box) Fuse (2)  (Cartridge) Main fuse/Fusible link 	● Melts when current flow exceeds that specified for circuit, interrupts current flow. Precautions ● Do not replace with fuses exceeding specified capacity. <Blade type>  <Tube type>  <Cartridge type>  <Fusible link> 
Transistor (1)  Transistor (2) 	● Electrical switching component. ● Turns on when voltage is applied to the base(B).  ● Reading code. 
Lamp 	● Emits light and generates heat when current flows through filament.
Resistance	● A resistor with a constant value. ● Mainly used to protect electrical components in circuits by maintaining rated voltage. ● Reading resistance values. <Colored >  (see color table below) <Numerical> 
Motor 	● Converts electrical energy into mechanical energy.
Pump 	● Pulls in and discharges gases and liquids.
Cigarette lighter 	● Electrical coil that generates heat.

Color	No.1	No.2	No.3	No.4
	Resistance values		Multiplier	Tolerance
Black	0	0	$\times 10^0$	
Brown	1	1	$\times 10^1$	
Red	2	2	$\times 10^2$	
Orange	3	3	$\times 10^3$	
Yellow	4	4	$\times 10^4$	
Green	5	5	$\times 10^5$	
Blue	6	6	$\times 10^6$	
Purple	7	7	$\times 10^7$	
Grey	8	8	$\times 10^8$	
White	9	9	$\times 10^9$	
Gold			$\times 10^{-1}$	±5%
Silver			$\times 10^{-2}$	±10%
				±20%

Symbol	Meaning	Symbol	Meaning
Horn 	● Generates sound when current flows.	Switch (1)  Normally open (NO)	● Allows or breaks current flow by opening and closing circuits.
Speaker 		Switch (2)  Normally closed (NC)	
Heater 	● Generates heat when current flows.	Harness  (Not connected)  (Connected)	● Unconnected intersecting harness.  ● Connected intersecting harness. 
Speed sensor 	● Movement of magnet in speedometer turns contact within sensor on and off.		
Ignition switch 	● Turning ignition key switches circuit to operate various component.		
Relay (1)  Normally open (NO)	● Current flowing through coil produces electromagnetic force causing contact to open or close.		
Relay (2)  Normally closed (NC)			
Sensor (variable) 	● Resistance changes with other components operation.	Diode	● Known as a semiconductor rectifier, the diode allows current flow in one direction only. 
Sensor (thermistor) 	● Resistance changes with temperature.	Light-emitting diode (LED) 	● A diode that lights when current flows. ● Unlike ordinary bulbs, the diode does not generate heat when it. 
Capacitor	● Component that temporarily stores electrical charge.		
Solenoid 	● Current flowing through coil generates electromagnetic force to operate plungers.	Reference diode (Zener diode)	● Allows current to flow in one direction up to a certain voltage; allows current to flow in the other direction once that voltage is exceeded.

	No current to coil	Current to coil
Normally open relay (NO)	 No flow	 Flow
Normally closed relay (NC)	 Flow	 No flow

Logic symbols

Types of logic symbols	Operation	Expressing output	Simple relay circuits
OR 	Input to A or B will produce output at C.	Low electrical potential (L) at A and B → no output (L) at C High electrical potential (H) at A or B → output (H) at C	
AND 	Input to A and B will produce output at C.	High electrical potential (H) at A and B → output (H) at C Low electrical potential (L) at A or B → no output (L) at C	
INV 	No input to A will produce an output at B. An input to A will not produce an output at B.	Low electrical potential (L) at A → no ground (H) B High electrical potential (H) at A → grounds (L) B	
PROCESS 	Simplified representation of complex functions within circuit describes main function. 1. Signal detector for engine control unit, cooling unit, and tachometer. 2. Signal converter for turn and hazard flasher unit and igniter unit.		(Examples) Igniters 

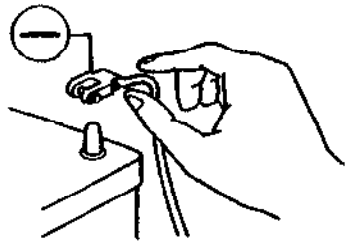
Abbreviations used in this booklet

A	Ampere
AAS	Autoadjusting Suspension
ABS	Antilock Brake System
ACC	Accessory
ACCEL	Accelerator
ACV	Air Control Valve
ADD	Additional
AE	Acoustic Equilibration
AIS	Air Injection System
ALL	Automatic Load Leveling
ALT	Alternator
AM	Amplitude Modulation
AMP	Amplifier
ANT	Antenna
AS	Autostop
ASV	Air Supply Valve
AT	Automatic transmission
ATP	Atmospheric Pressure
ATX	Automatic Transaxle
A/C	Air Conditioner
A/F	Air Fuel
A/R	Auto Reverse
B	Battery
BAC	Bypass Air Control Valve
B/L	Bilevel
CARB	Carburetor
CCT	Circuit
CIGAR	Cigarette
COMBI	Combination
CON	Conditioner
CONT	Control
CPU	Central Processing Unit
CSD	Cold-Start Device
DEF	Defroster
DOHC	Double-Overhead Camshaft
ECPS	Electronically Controlled Power Steering
ECU	Engine Control Unit
EGI	Electronic Gasoline Injection
EGR	Exhaust Gas Recirculation
ELEC	Electric
ELR	Emergency Locking Retractor
ETR	Electronic Tuner
EXH	Exhaust
F	Front
FICB	Fast-Idle Cam Breaker
FM	Frequency Modulation
F/B	Feedback
F/I	Fuel Injector
GEN	Generator
HEAT	Heater
HEI	High-Energy Ignition
HI	High
H/D	Heater/Defroster
IG	Ignition
ILLUMI	Illumination
INT	Intermittent
ISC	Idle-Speed Control
JB	Joint Box
LCD	Liquid Crystal Display
LF	Left Front
LH	Left Hand
LO	Low
LR	Left Rear
LW	Low Wave
M	Motor
MID	Middle
MIL	Malfunction Indicator Lamp
MIN	Minute
MIX	Mixture
MPX	Multiplex
MT	Manual Transmission
MTR	Mechanical Tuning Radio
MTX	Manual Transaxle
MW	Middle Wave
NC	Normally Closed
NO	Normally Open
OD	Overdrive
OFF	Switch Off
ON	Switch On
P	Power
PRCV	Pressure Regulator Control Solenoid Valve
PRG	Purge Solenoid Valve
PTC	Positive Temperature Coefficient Heater
P/S	Power Steering
QSS	Quick-Start System
R	Rear
REC	Recirculation
RF	Right Front
RH	Right Hand
RPM	Revolutions Per Minute
RR	Right Rear
SOL	Solenoid
SQ	Squares Per Milimeter
ST	Start
SW	Switch
TCV	Twin Scroll Turbocharger Solenoid Valve
TEMP	Temperature
TICS	Triple Induction Control System
TR	Transistor
TWS	Total Wiring System
V	Volt
VENT	Ventilation
VOL	Volume
VRIS	Variable Resonance Induction System
W	Watt(s)

Precautions to take when servicing an electrical system

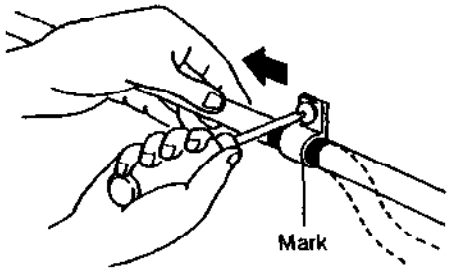
- Note the following items when servicing the electrical system.
- Do not alter the wiring or electrical equipment in any way; this may damage the vehicle or cause a fire from short-circuiting a circuit or overloading it.

- The negative (-) battery cable must be removed first and installed last.



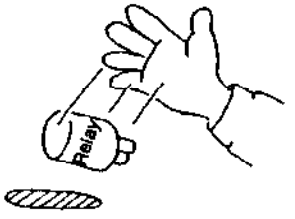
Caution
- Be sure that the ignition and other switches are off before disconnecting or connecting the battery cables.
  Failure to do so may damage the semiconductor components.

- Secure harnesses with provided clamps to take up slack.

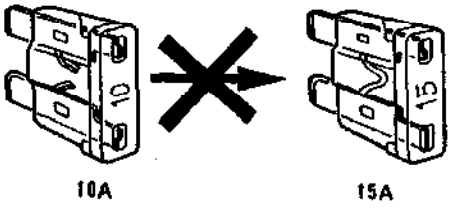


Caution
- Clamp all harnesses near vibrating components (for example, the engine) to remove slack and to prevent contact resulting from vibration.

- Do not handle electrical components roughly or drop them.

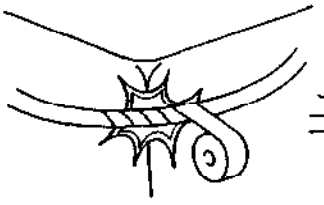


- Do not replace with fuses exceeding specified capacity.

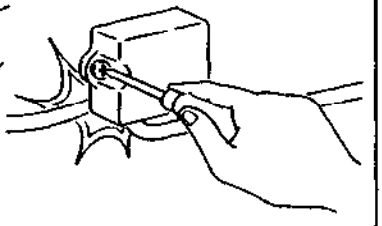


Caution
- Replacing a fuse with one of a larger capacity than designated may damage components or cause a fire.

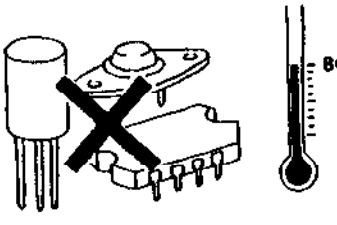
- Tape areas of the harness that may rub or bump against sharp edges to protect it from damage.



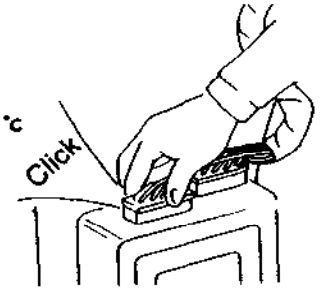
- When mounting components, be sure the harness is not caught or damaged.



- Disconnect heat-sensitive parts (for example, relays and ECU) when performing maintenance (such as welding) where temperatures may exceed 80°C (176°F).



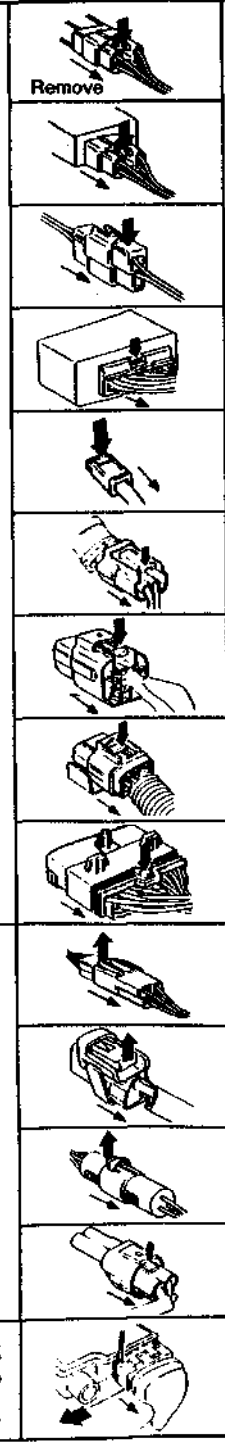
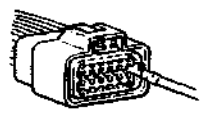
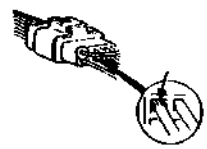
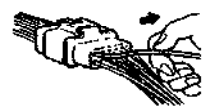
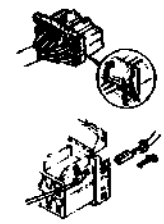
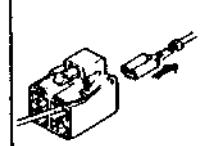
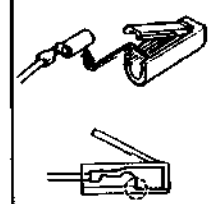
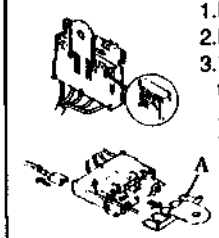
- Make sure that the connectors are securely connected when installed.



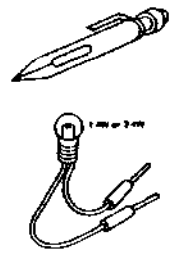
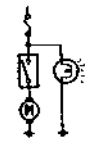
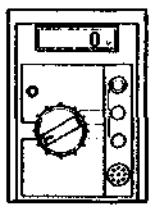
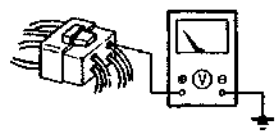
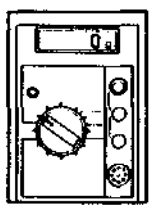
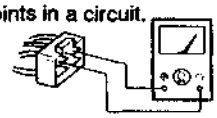
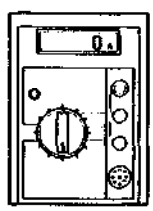
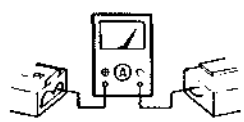
Handling connectors

Caution

- Be sure to grasp the connectors, not the wires, when disconnecting them.

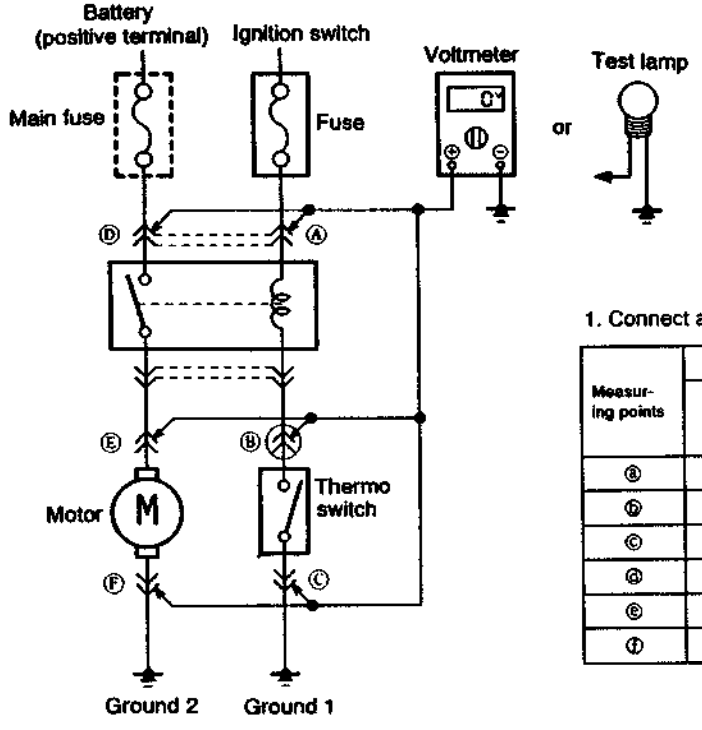
Connector removal	Checking connector contacts	Checking for loose terminals	Replacing terminals
Push type 	Caution Improperly engaged connectors will cause poor terminal contact.  When using a matching male terminal, make sure there is no looseness in the female terminal.	Caution A loose terminal will cause poor terminal contact.  Make sure the terminals are not pushed out of the connector when engaged.  Pull lightly on individual wires to check that they are secured in the terminal.	<CPU connector>  1.Raise the rear cover. 2.Lift the tab with a thin piece of metal and remove the terminal.
			<General connector>  Lift the tab with a thin piece of metal and remove the terminal.
			<Round connectors>  1.Raise the cover. 2.Lift the terminal to remove it. 3.Make sure the terminal is securely mounted in the connector when installing.
Pull-up type			<Common ground connectors>  1.Raise the cover. 2.Remove A. 3.Lift the tab with a thin piece of metal and remove the terminal.
Spring type			

Using electrical measuring equipment

Equipment	Use	Operation	Handling precautions
Test lamp 	Test to find open or shorted circuits.	● Connect the test lamp between the circuit being measured and a ground. ● The lamp will light if the circuit is energized to the point tested. 	● Test lamps use 12V 1.4W or 3.4W bulbs or light-emitting diodes (LEDs). Using a large-capacity bulb may damage the CPU.
Jumper wire 	Used to create a temporary circuit.	● Connect the jumper wire between the terminals of a circuit to bypass a switch. 	● Do not connect the jumper wire from the power source line to a ground; this may cause burning or other damage to harnesses or electronic components.
Voltmeter 	Used for measuring the voltage of a circuit to find possible opens or shorts.	● Connect the positive (+) probe to the point where voltage is to be measured and the negative (−) probe to a ground. 	● Connect the voltmeter in parallel with the circuit. ● Set the range to the desired voltage. ● Use the service hole when measuring the voltage at the diagnosis connector.  ● Tie a thin wire to the positive (+) probe to access narrow terminals.
Ohmmeter 	Used to find opens and shorts in the circuit, to confirm continuity and to measure resistance.	● Zero the ohmmeter.  ● Verify that voltage is not applied to the circuit. ● Connect the probes between two points in a circuit. 	● Zero the meter after switching to the measuring range. ● Before using the ohmmeter, make sure the ignition switch is off or the negative (−) battery cable is disconnected to prevent burning or otherwise damaging the ohmmeter.
Ammeter 	Used to check alternator output, current supplied to the starter, and dark current within a circuit. Note Dark current is the constant flow of current while the ignition switch is OFF.	● Connect the ammeter in series with the circuit by touching the positive (+) probe to the power-side terminal and the negative (−) probe to the ground-side terminal. 	● Set the range to the desired amperage. ● Connect the ammeter in series with the circuit. The ammeter may be burned or otherwise damaged if it is connected in parallel.

Measuring voltage

Checks



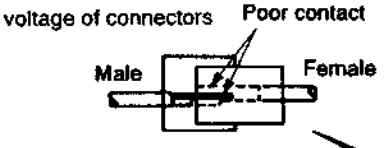
1. Connect a voltmeter or test lamp to the measuring points.

Measuring points	Circuit operation (normal)					
	Ignition switch: OFF		Ignition switch: ON			
			Thermo switch: OFF		Thermo switch: ON	
Ⓐ	0V	×	12V	☼	12V	☼
Ⓑ	0V	×	12V	☼	0V	×
Ⓒ	0V	×	0V	×	0V	×
Ⓓ	12V	☼	12V	☼	12V	☼
Ⓔ	0V	×	0V	×	12V	☼
Ⓕ	0V	×	0V	×	0V	×

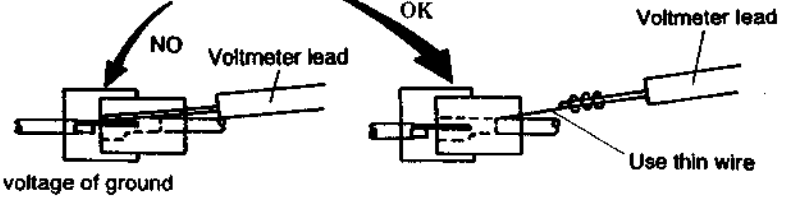
☼ : Test lamp ON
× : Test lamp OFF

Precautions during checks

Measuring voltage of connectors

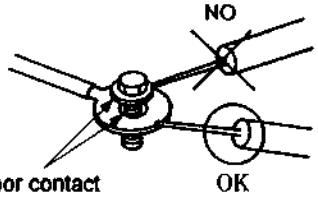


A voltmeter probe may momentarily connect a terminal when inserted into the connector and give an erroneous reading when checking for improperly engaged connectors, poor terminal contacts, or loose terminals.



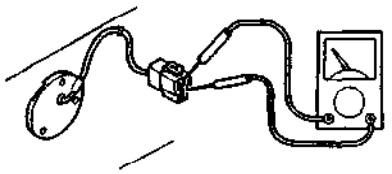
Measuring voltage of ground

Touch the voltmeter probe to the ground wire when checking the ground circuit.



Measuring continuity/resistance

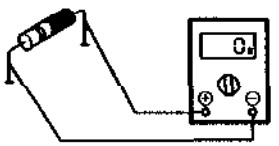
Checking switches



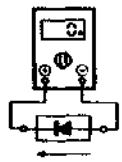
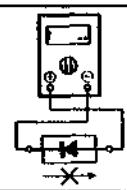
Touch the ohmmeter probes to the switch terminals to check continuity.

Caution
Verify the operating state of the switch before checking continuity because readings vary accordingly.

Checking diodes

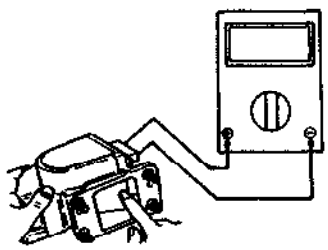


Continuity is checked according to the direction of the positive (+) and negative (-) probes of the ohmmeter in the circuit containing the diode.

Connection	Continuity
	Yes
	No

Note
The negative (-) probe of the ohmmeter is connected to the positive terminal of the internal ohmmeter battery, the positive (+) probe to the negative terminal of the battery.

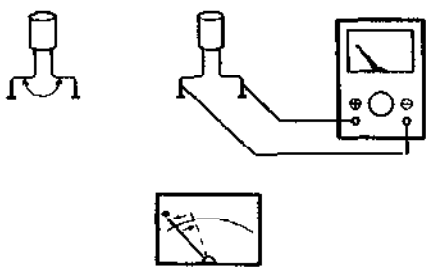
Checking sensors and solenoid valves



Connect the ohmmeter probes to the sensor or solenoid valve terminals to check resistance.

Caution
Verify the operating state of the sensor before checking resistance because readings vary accordingly.

Checking condensers

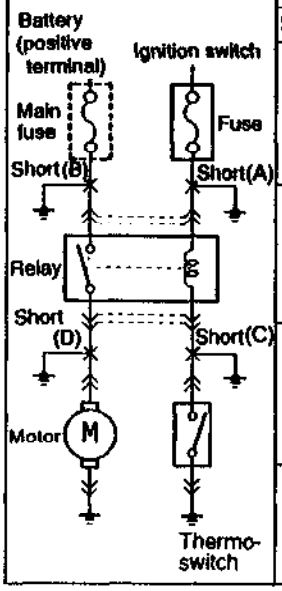


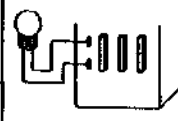
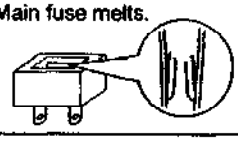
1. Short between the terminals with a jumper wire to discharge the capacitor.
2. Set the ohmmeter range to x10k Ω and connect it to the capacitor terminals.
3. The capacitor is good if the needle of the ohmmeter swings once and returns to its original position.

Finding short circuits

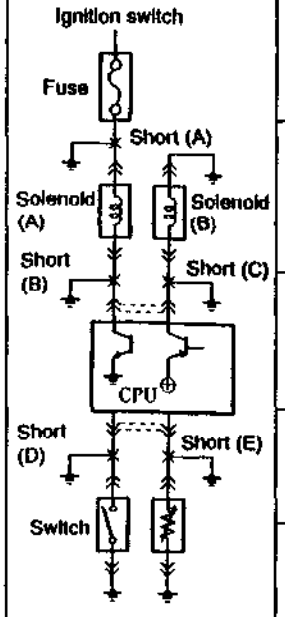
Shorts occur between the power (positive) and ground (negative) sides of a circuit.
Therefore, finding a short circuit requires determining how the circuit is routed.

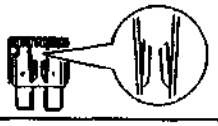
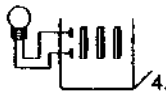
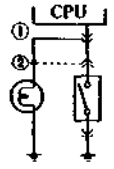
Circuits not connected to control unit



Examples		Finding short circuit
Short location	**Symptom**	
Short (A)	● Fuse melts. 	 Test lamp  1. Remove the fuse and main fuse of the circuit. 2. Disconnect all connectors of electrical components in the circuit. 3. Attach a voltmeter or test lamp to the fuse box and reconnect each connector, beginning nearest the power source. 4. Check the voltmeter reading or test lamp as the connectors are connected.
Short (B)	● Main fuse melts. 	
Short (C)	● The motor operates regardless of whether the thermoswitch is ON or OFF when the ignition switch is ON. ● The fuse is not melted.	
Short (D)	● The main fuse melts when the ignition switch and thermo-switch are ON and the relay is operating.	A short has occurred where the voltmeter reading changes or the test lamp comes on.

Circuits connected to control unit



Examples		Finding short circuit
Short location	**Symptom**	
Short (A)	● Fuse melts. 	 Test lamp  1. Remove the fuse and main fuse of the circuit. 2. Disconnect all connectors of electrical components in the circuit. 3. Attach a voltmeter or test lamp to the fuse box and reconnect each connector, beginning nearest to the power source. 4. Check the voltmeter reading or test lamp as the connectors are connected.
Short (B)	● Solenoid A operates when the ignition switch is ON.	
Short (C)	● The CPU transistor burns out when the ignition switch is turned ON.	A short has occurred where the voltmeter reading changes or the test lamp comes on.
Short (D)	● The CPU thinks the switch is ON because the same conditions exist as when the switch is ON.	Sensor/switch  1. Attach the test lamp or voltmeter to the CPU connector. 2. Connect to the switch/ sensor connector. 3. Check the voltmeter reading or test lamp.
Short (E)	● The CPU senses the sensor to be 0 Ω because the same conditions exist as when the resistance value is 0 Ω. ● The CPU equipped with the self-diagnosis function outputs the code.	A short has occurred where the voltmeter reads 0V or the test lamp goes out.

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Y

■ GROUND POINTS

WIRING ORDER INTO JOINT CONNECTOR MAY BE CHANGED

JC-01 JOINT CONNECTOR (F)

B	B	B	B	B

JC-02 JOINT CONNECTOR (F)

B	B	B	B	B

JC-03 JOINT CONNECTOR (F)

B	B	B/G	B	B

JC-04 JOINT CONNECTOR (EM)

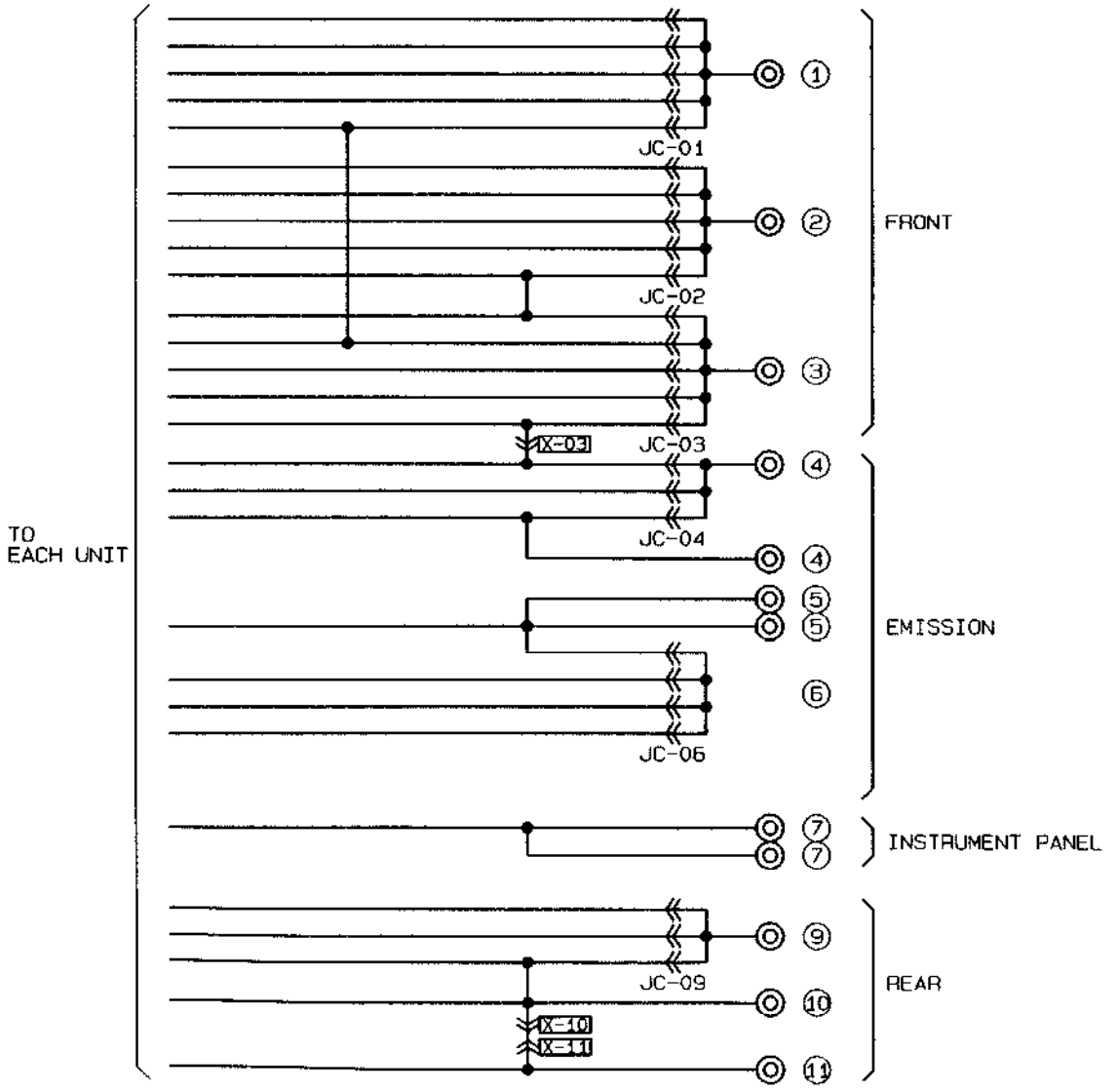
B	B	B

JC-06 JOINT CONNECTOR (EM)

*	B/LG	B/LG
*	B/LG	B/BR

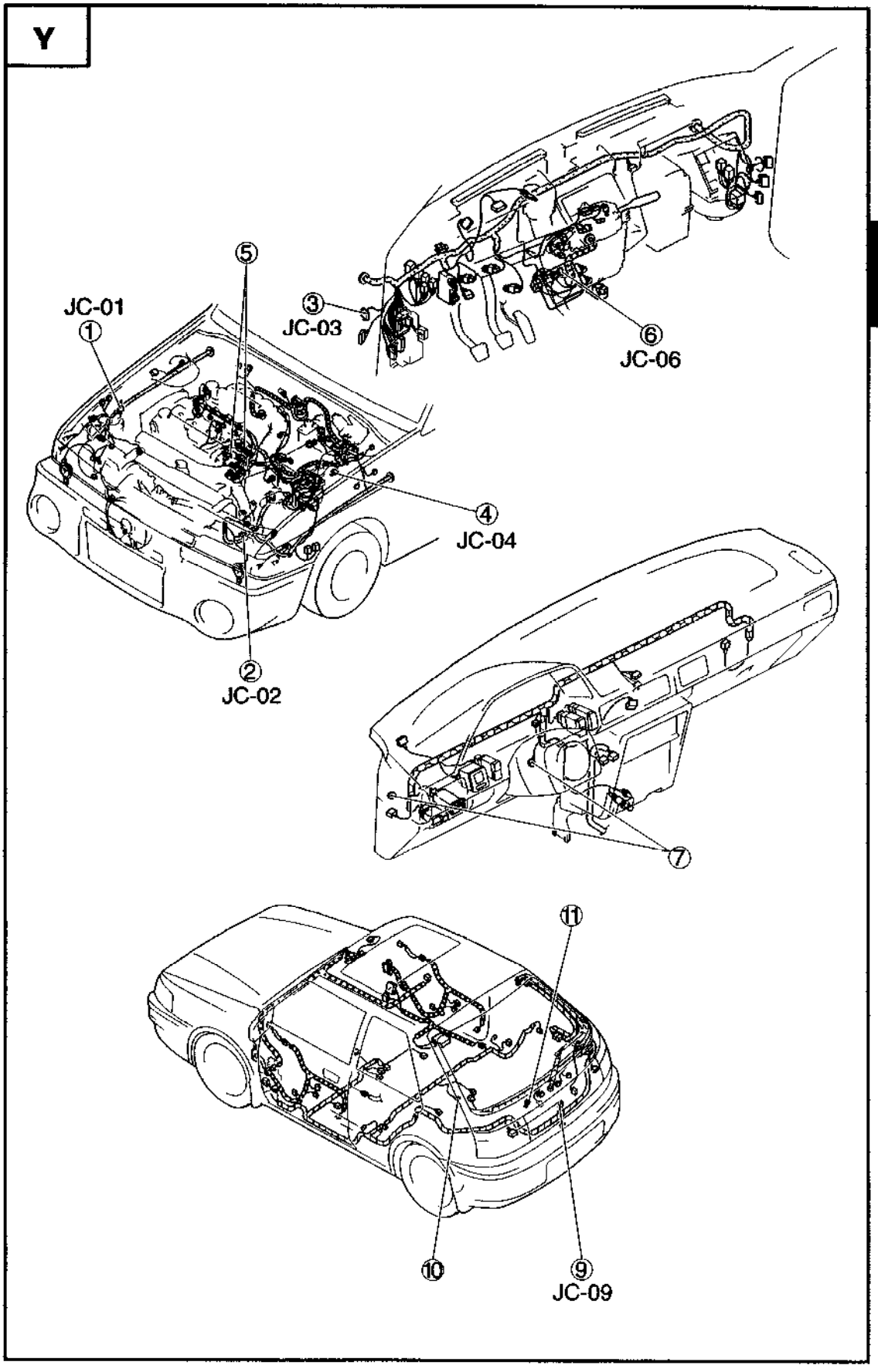
JC-09 JOINT CONNECTOR (R)

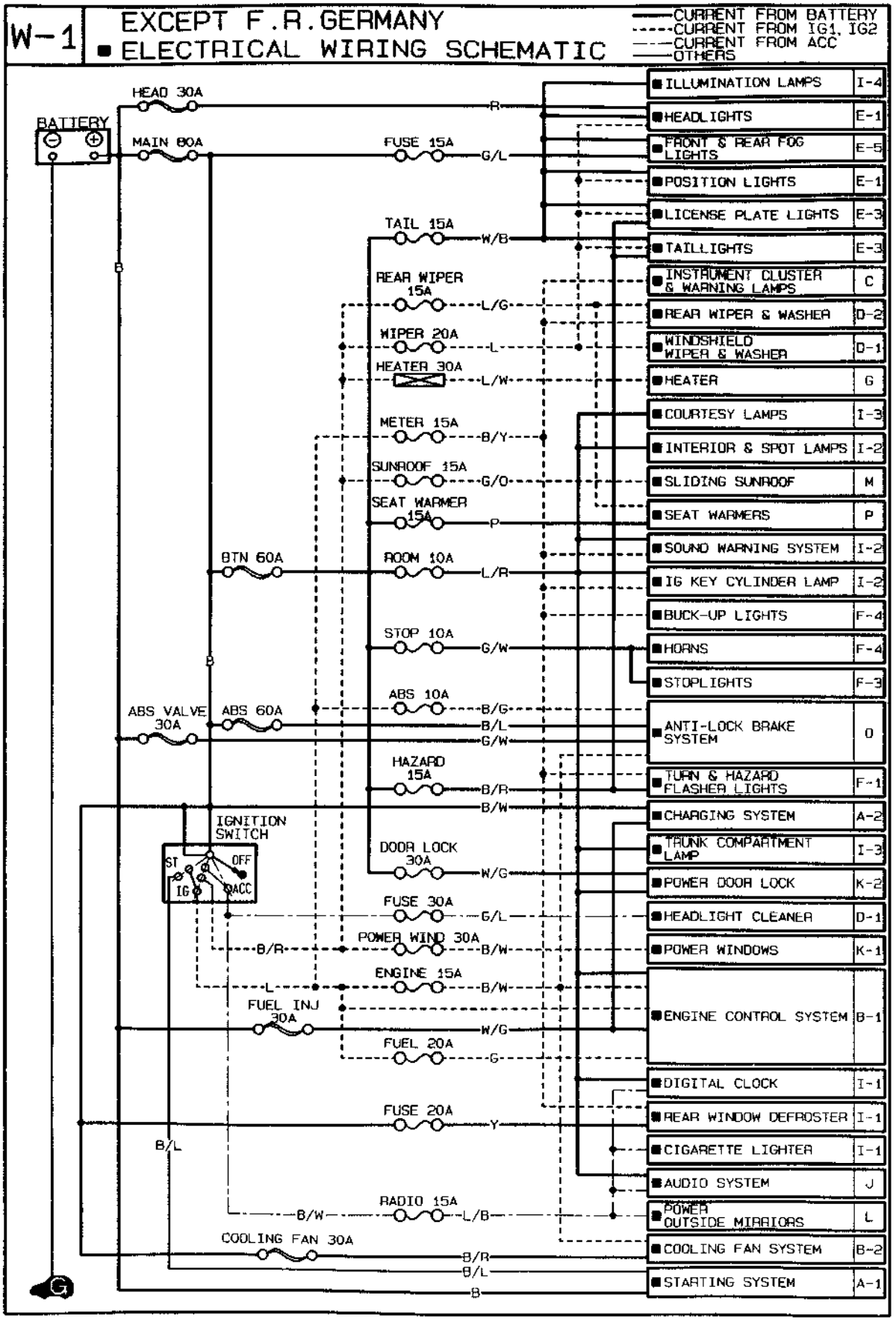
B	B	B

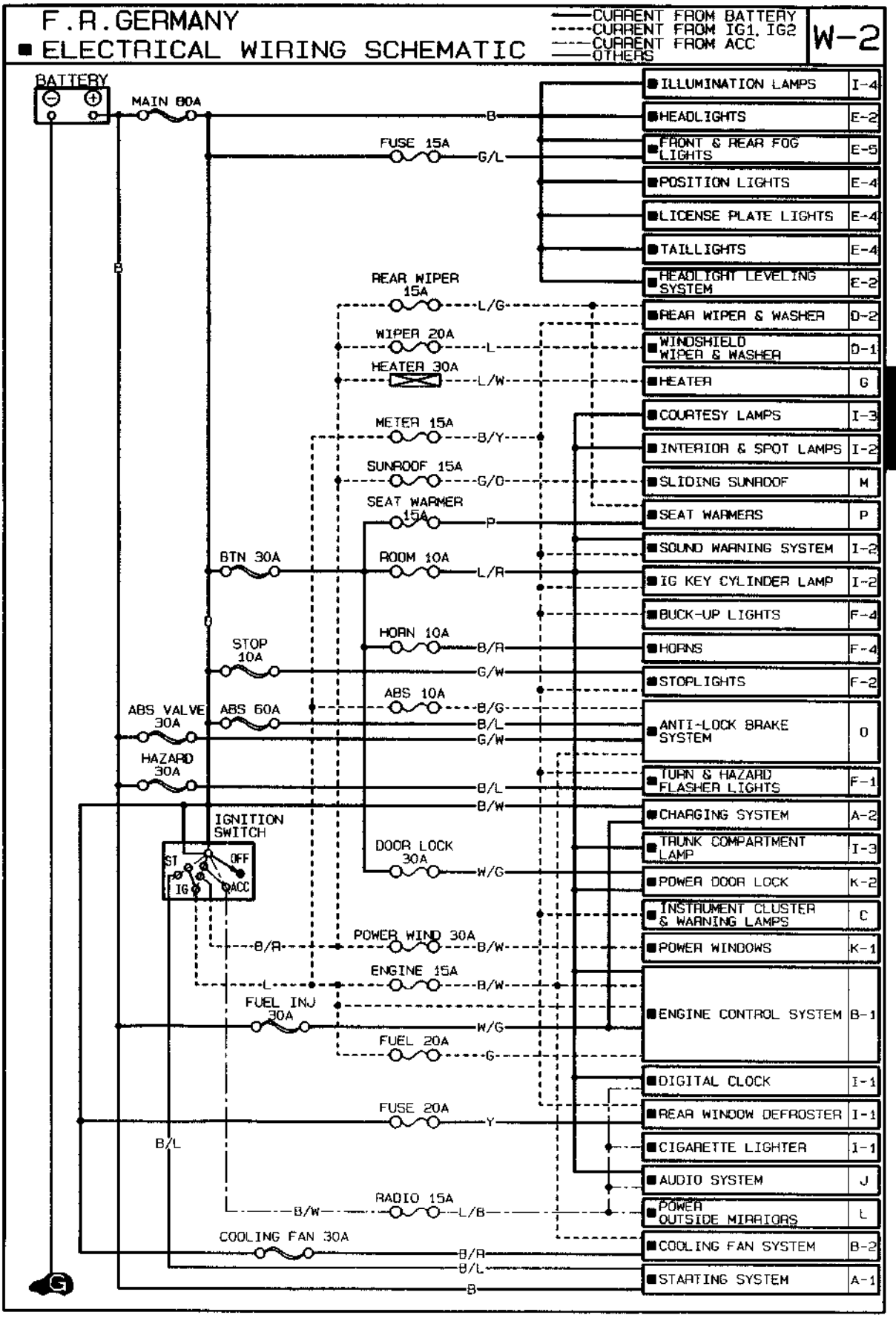


HARNESS SYMBOL : F) (E) (I) (R) (DR) (IN) (FR) (EM) (INJ)

Y




W-1
EXCEPT F.R.GERMANY
ELECTRICAL WIRING SCHEMATIC
CURRENT FROM BATTERY
CURRENT FROM IG1, IG2
CURRENT FROM ACC
OTHERS
BATTERY
HEAD 30A
MAIN 80A
FUSE 15A
TAIL 15A
REAR WIPER 15A
WIPER 20A
HEATER 30A
METER 15A
SUNROOF 15A
SEAT WARMER 15A
BTN 60A
ROOM 10A
STOP 10A
ABS 10A
ABS VALVE 30A
ABS 60A
HAZARD 15A
IGNITION SWITCH
ST
OFF
IG
ACC
DOOR LOCK 30A
FUSE 30A
POWER WIND 30A
ENGINE 15A
FUEL INJ 30A
FUEL 20A
FUSE 20A
RADIO 15A
COOLING FAN 30A
ILLUMINATION LAMPS I-4
HEADLIGHTS E-1
FRONT & REAR FOG LIGHTS E-5
POSITION LIGHTS E-1
LICENSE PLATE LIGHTS E-3
TAILLIGHTS E-3
INSTRUMENT CLUSTER & WARNING LAMPS C
REAR WIPER & WASHER D-2
WINDSHIELD WIPER & WASHER D-1
HEATER G
COURTESY LAMPS I-3
INTERIOR & SPOT LAMPS I-2
SLIDING SUNROOF M
SEAT WARMERS P
SOUND WARNING SYSTEM I-2
IG KEY CYLINDER LAMP I-2
BUCK-UP LIGHTS F-4
HORNS F-4
STOPLIGHTS F-3
ANTI-LOCK BRAKE SYSTEM O
TURN & HAZARD FLASHER LIGHTS F-1
CHARGING SYSTEM A-2
TRUNK COMPARTMENT LAMP I-3
POWER DOOR LOCK K-2
HEADLIGHT CLEANER D-1
POWER WINDOWS K-1
ENGINE CONTROL SYSTEM B-1
DIGITAL CLOCK I-1
REAR WINDOW DEFROSTER I-1
CIGARETTE LIGHTER I-1
AUDIO SYSTEM J
POWER OUTSIDE MIRRORS L
COOLING FAN SYSTEM B-2
STARTING SYSTEM A-1


F.R.GERMANY
ELECTRICAL WIRING SCHEMATIC
CURRENT FROM BATTERY
CURRENT FROM IG1, IG2
CURRENT FROM ACC
OTHERS
W-2
BATTERY
MAIN 80A
FUSE 15A
REAR WIPER 15A
WIPER 20A
HEATER 30A
METER 15A
SUNROOF 15A
SEAT WARMER 15A
BTN 30A
ROOM 10A
HORN 10A
STOP 10A
ABS 10A
ABS VALVE 30A
ABS 60A
HAZARD 30A
IGNITION SWITCH
ST
IG
OFF
ACC
DOOR LOCK 30A
POWER WIND 30A
ENGINE 15A
FUEL INJ 30A
FUEL 20A
FUSE 20A
RADIO 15A
COOLING FAN 30A
ILLUMINATION LAMPS I-4
HEADLIGHTS E-2
FRONT & REAR FOG LIGHTS E-5
POSITION LIGHTS E-4
LICENSE PLATE LIGHTS E-4
TAILLIGHTS E-4
HEADLIGHT LEVELING SYSTEM E-2
REAR WIPER & WASHER D-2
WINDSHIELD WIPER & WASHER D-1
HEATER G
COURTESY LAMPS I-3
INTERIOR & SPOT LAMPS I-2
SLIDING SUNROOF M
SEAT WARMERS P
SOUND WARNING SYSTEM I-2
IG KEY CYLINDER LAMP I-2
BUCK-UP LIGHTS F-4
HORNS F-4
STOPLIGHTS F-2
ANTI-LOCK BRAKE SYSTEM O
TURN & HAZARD FLASHER LIGHTS F-1
CHARGING SYSTEM A-2
TRUNK COMPARTMENT LAMP I-3
POWER DOOR LOCK K-2
INSTRUMENT CLUSTER & WARNING LAMPS C
POWER WINDOWS K-1
ENGINE CONTROL SYSTEM B-1
DIGITAL CLOCK I-1
REAR WINDOW DEFROSTER I-1
CIGARETTE LIGHTER I-1
AUDIO SYSTEM J
POWER OUTSIDE MIRRORS L
COOLING FAN SYSTEM B-2
STARTING SYSTEM A-1
W

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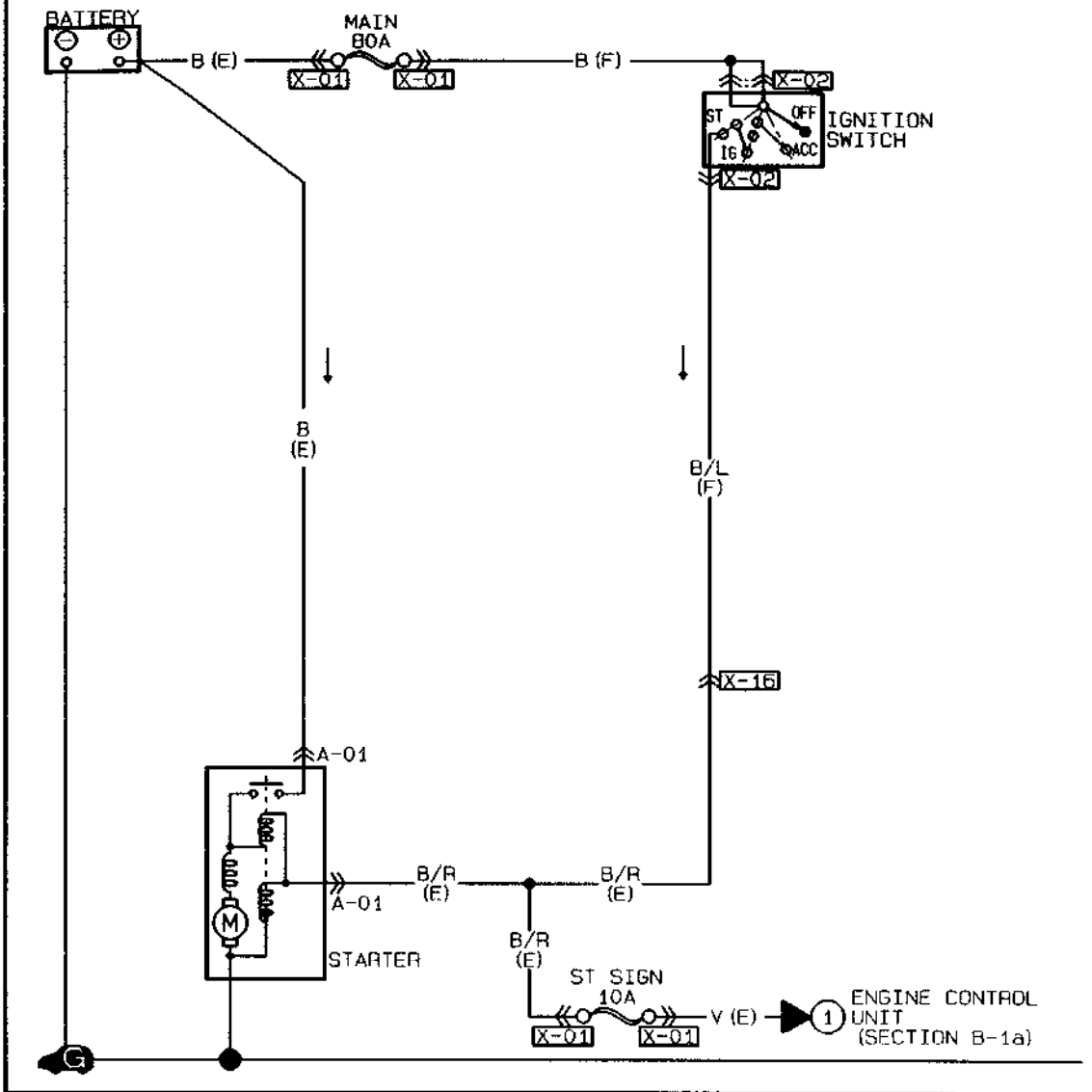
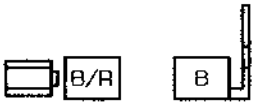
SYSTEM CIRCUIT DIAGRAM/ CONNECTOR LOCATIONS

A~

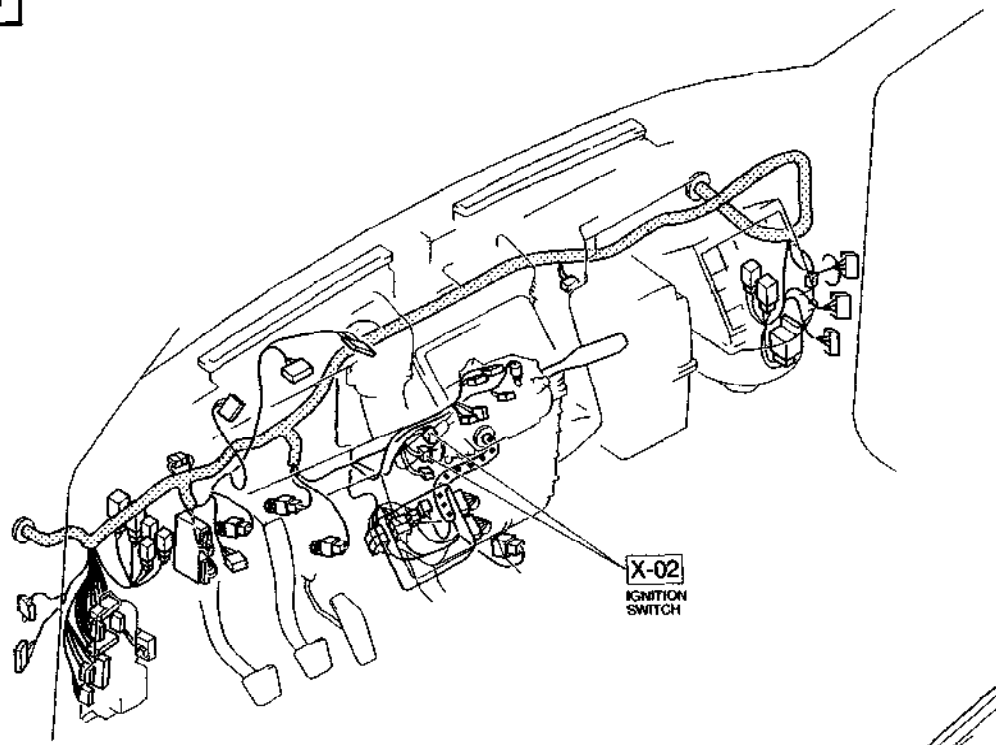
A-1 ■ STARTING SYSTEM

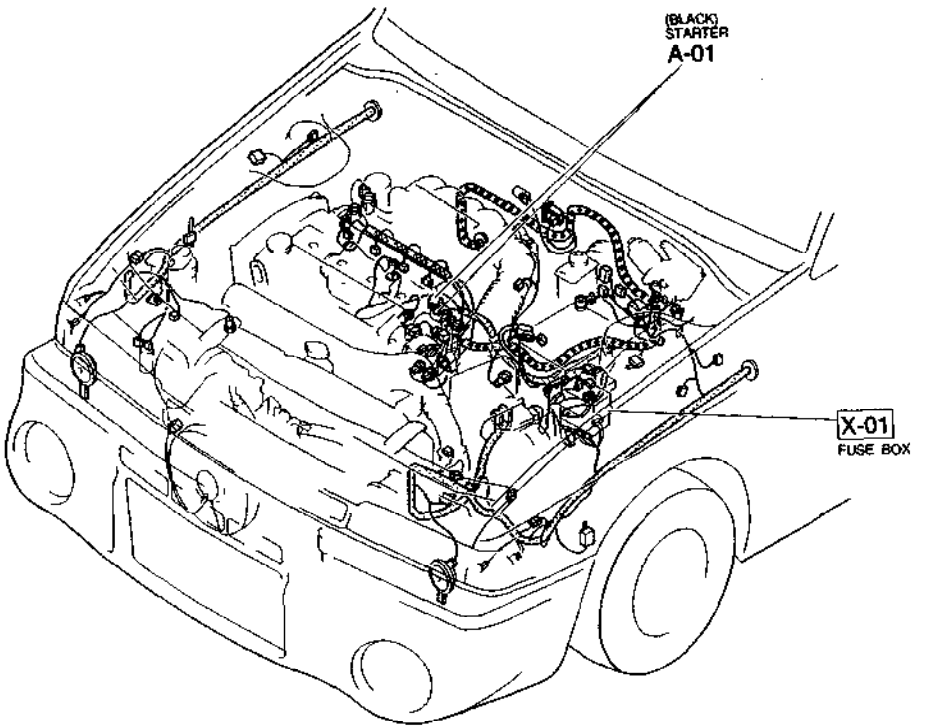


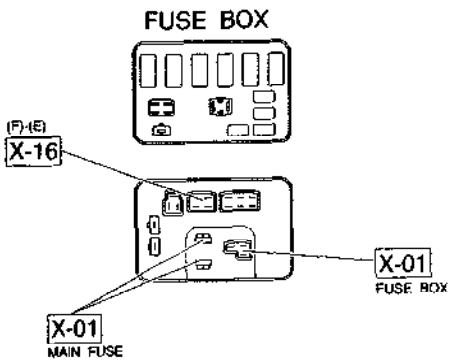
A-01 STARTER (E)



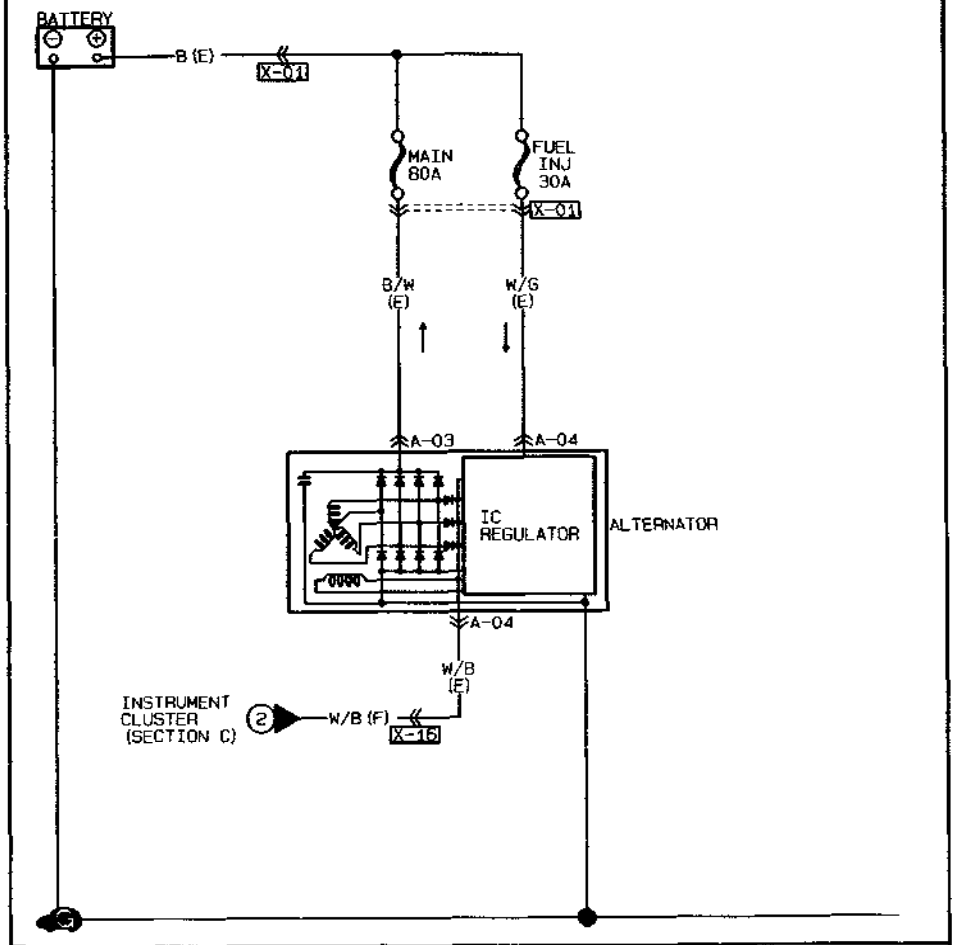
A-1


X-02
IGNITION SWITCH


(BLACK)
STARTER
A-01
X-01
FUSE BOX


FUSE BOX
(F)-(E)
X-16
X-01
FUSE BOX
X-01
MAIN FUSE

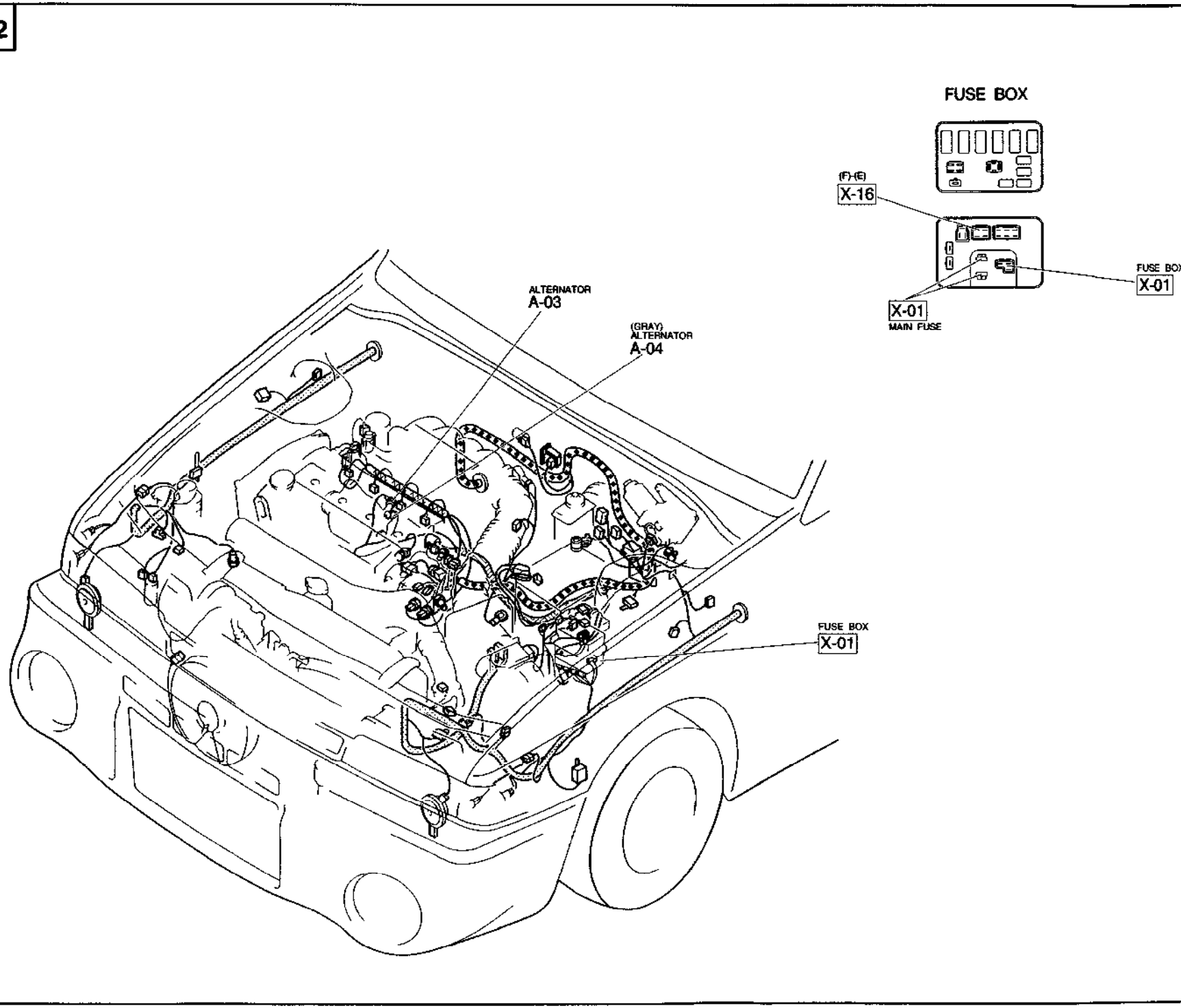
A-2 ■ CHARGING SYSTEM



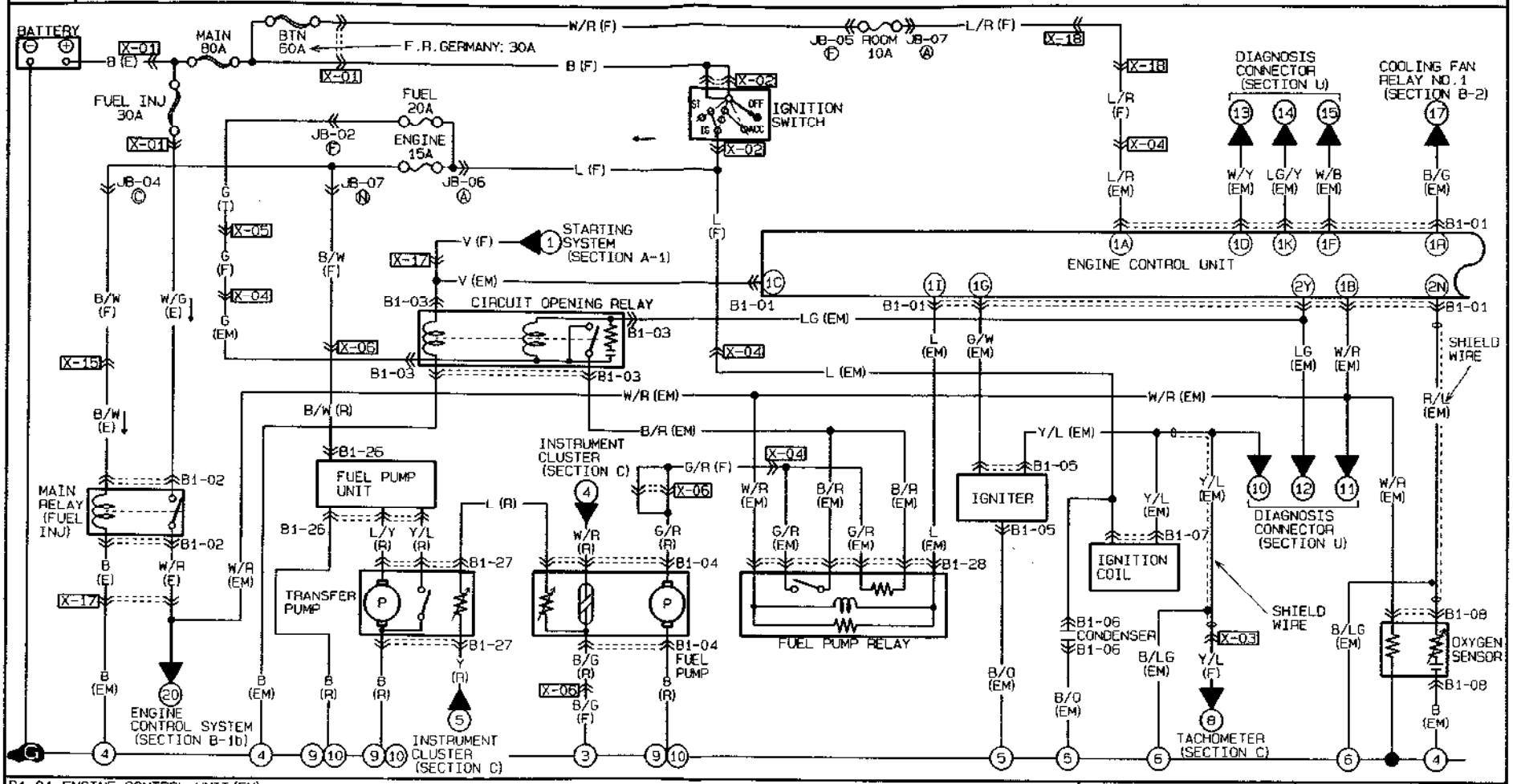
A-03 ALTERNATOR (E)	A-04 ALTERNATOR (E)		
B/W	W/G W/B		

HARNESS SYMBOL : (F) (E) (I) (R) (DR) (IN) (FR) (EM) (INJ)

A-2



B-1a ■ 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/B	G	*	LG/Y	L	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	P/B	B/LG	B/O
G	W/L	Y/B	G/O	W	R/B	R/L	G/R	R/Y	*	*	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	G	B/R
B	*	LG

B1-04 FUEL PUMP (R)

	G/R				B
*	L	W/R	B/G	*	*

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 OXYGEN SENSOR (EM)

R/L	B	W/R

B1-26 FUEL PUMP UNIT (R)

B/W	B
Y/L	L/Y

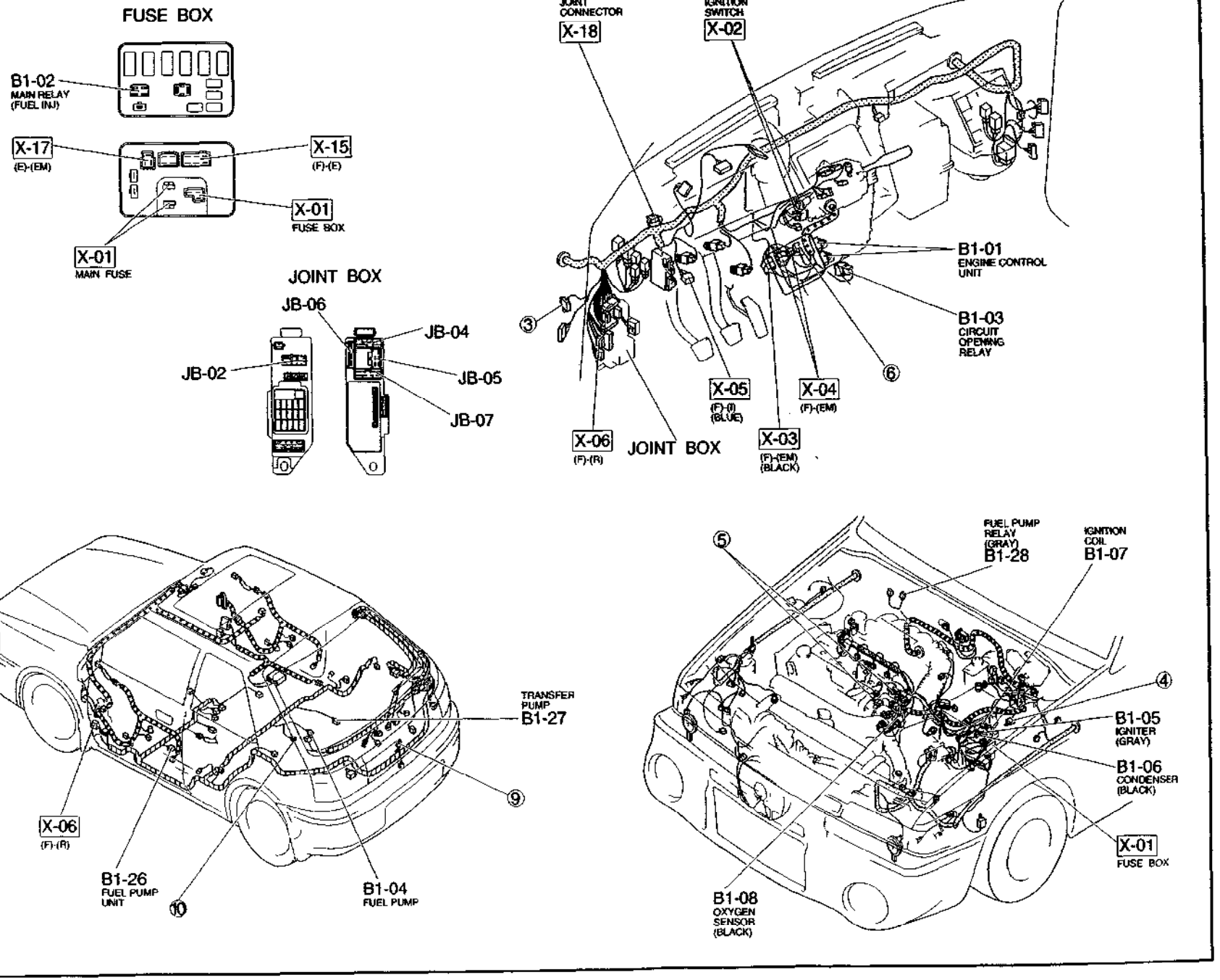
B1-27 TRANSFER PUMP (R)

Y/L			L/Y
B	*	L	Y

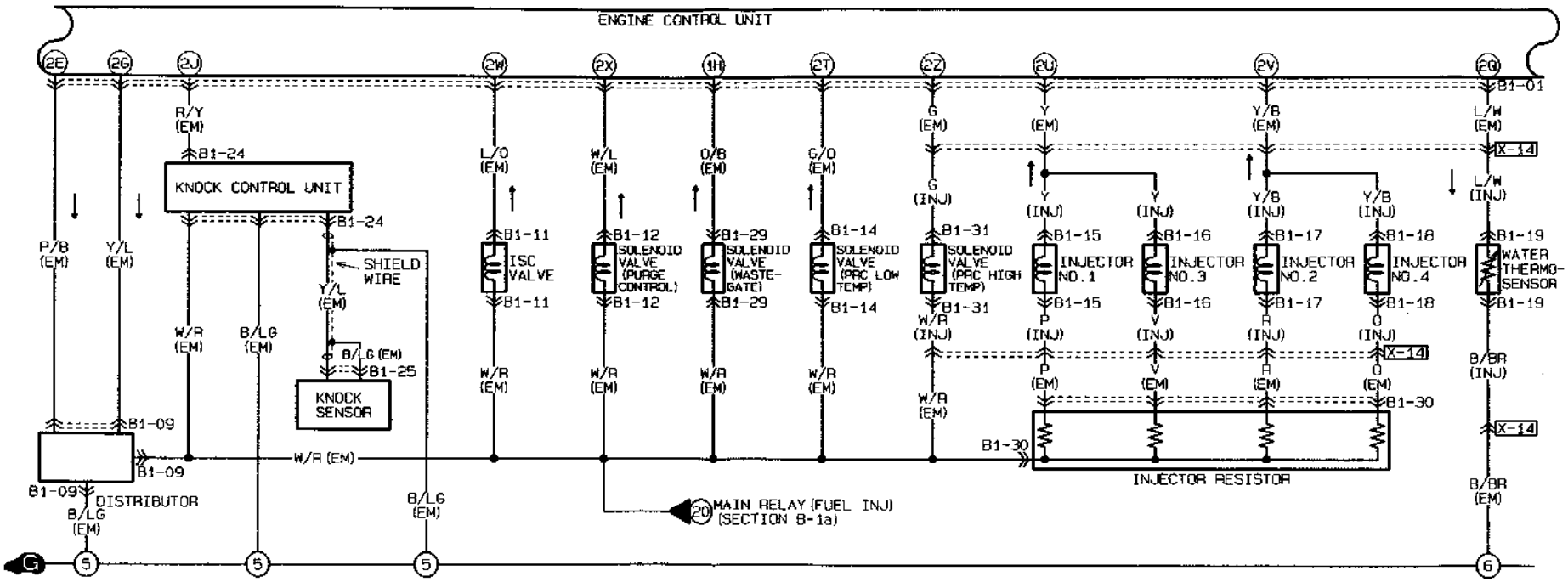
B1-28 FUEL PUMP RELAY (EM)

B/R	W/R	B/R
G/R	L	G/R

B-1a


FUSE BOX
B1-02
MAIN RELAY
(FUEL INJ)
X-17
(E)-(EM)
X-15
(F)-(E)
X-01
FUSE BOX
X-01
MAIN FUSE
JOINT BOX
JB-06
JB-04
JB-02
JB-05
JB-07
JOINT
CONNECTOR
X-18
IGNITION
SWITCH
X-02
B1-01
ENGINE CONTROL
UNIT
B1-03
CIRCUIT
OPENING
RELAY
X-05
(F)-(I)
(BLUE)
X-04
(F)-(EM)
X-06
(F)-(R)
JOINT BOX
X-03
(F)-(EM)
(BLACK)
TRANSFER
PUMP
B1-27
X-06
(F)-(R)
B1-26
FUEL PUMP
UNIT
B1-04
FUEL PUMP
FUEL PUMP
RELAY
(GRAY)
B1-28
IGNITION
COIL
B1-07
B1-05
IGNITER
(GRAY)
B1-06
CONDENSER
(BLACK)
X-01
FUSE BOX
B1-08
OXYGEN
SENSOR
(BLACK)

■ 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/B	G	*	LG/Y	L	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	P/B	B/LG	B/O
G	W/L	Y/B	G/O	W	R/B	R/L	G/R	R/Y	*	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

B1-09 DISTRIBUTOR (EM): Y/L | P/B | W/R | B/LG

B1-11 ISC VALVE (EM): L/O | W/R

B1-12 SOLENOID VALVE (PURGE CONTROL) (EM): W/L | W/R

B1-14 SOLENOID VALVE (PRC LOW TEMP) (EM): G/O | W/R

B1-15 INJECTOR NO.1 (INJ): Y | P

B1-16 INJECTOR NO.3 (INJ): Y | V

B1-17 INJECTOR NO.2 (INJ): Y/B | R

B1-18 INJECTOR NO.4 (INJ): Y/B | O

B1-19 WATER THERMOSENSOR (INJ): B/BR | L/W

B1-24 KNOCK CONTROL UNIT (EM): W/R * | B/LG * | R/Y * | Y/L *

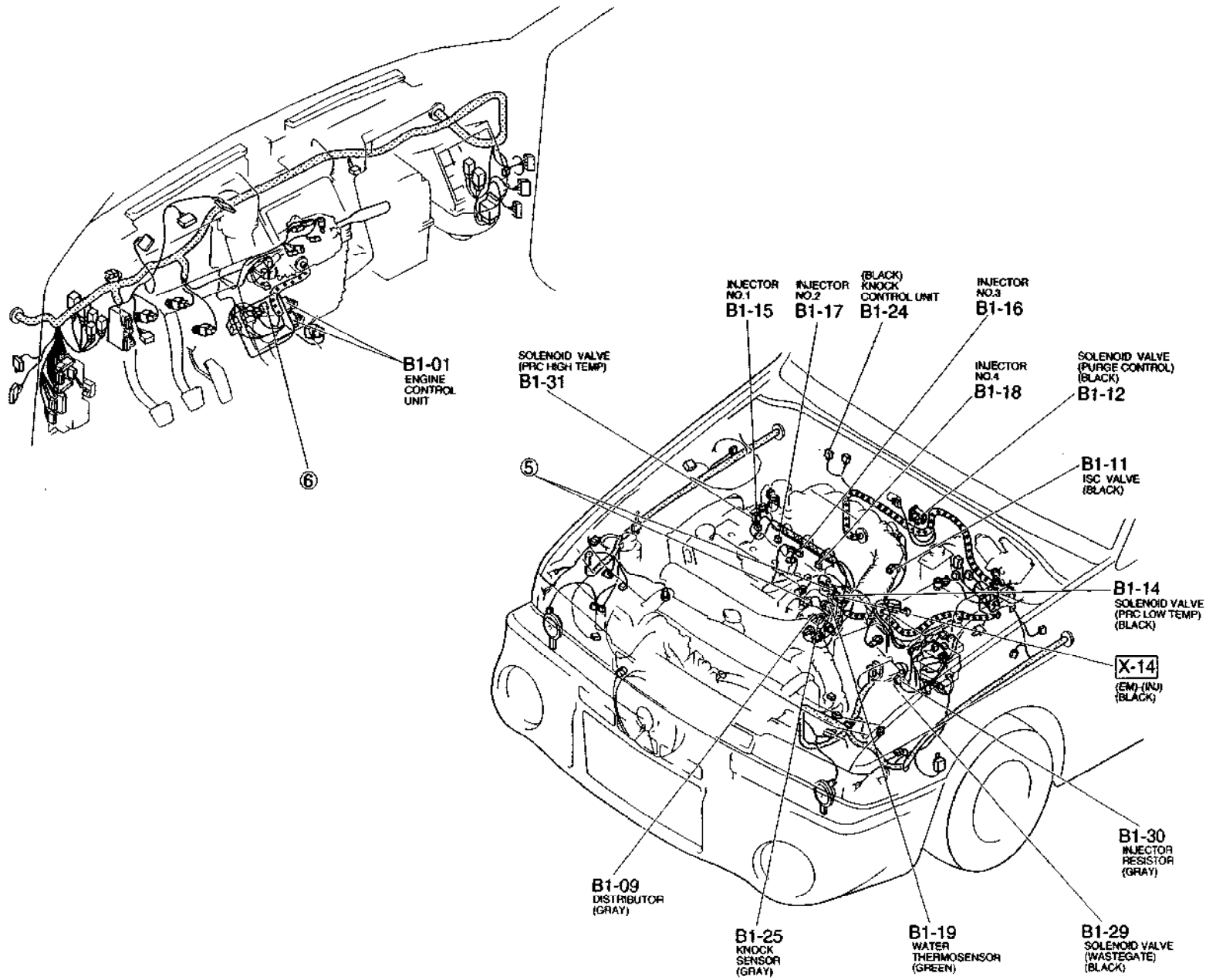
B1-25 KNOCK SENSOR (EM): Y/L | B/LG

B1-29 SOLENOID VALVE (WASTEGATE) (EM): W/R | O/B

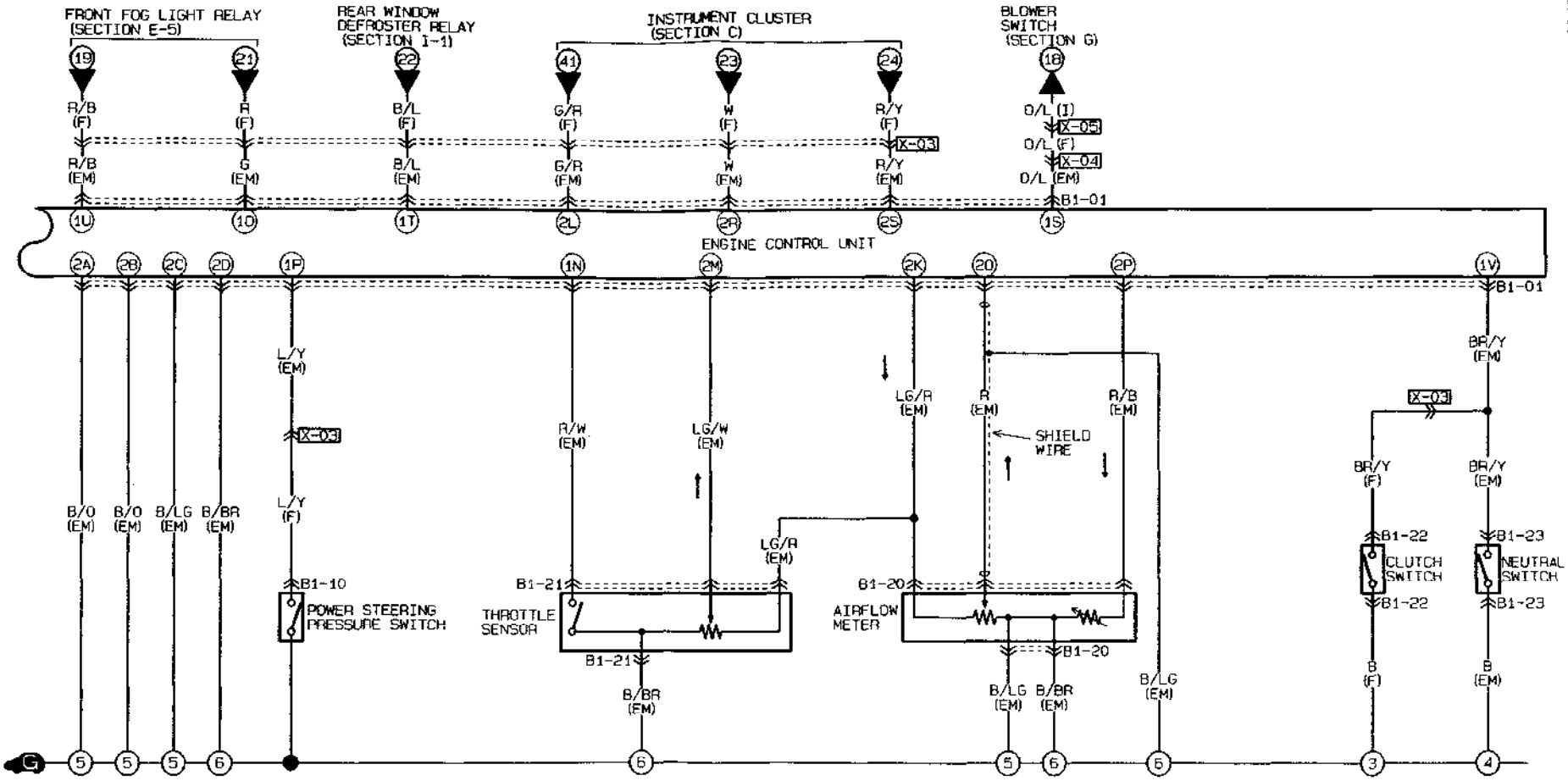
B1-30 INJECTOR RESISTOR (EM): P | W/R | V / R | * | O

B1-31 SOLENOID VALVE (PRC HIGH TEMP) (INJ): G | W/R

B-1b


B1-01
ENGINE CONTROL UNIT
⑥
⑤
INJECTOR NO.1
B1-15
INJECTOR NO.2
B1-17
(BLACK) KNOCK CONTROL UNIT
B1-24
INJECTOR NO.3
B1-16
INJECTOR NO.4
B1-18
SOLENOID VALVE (PRC HIGH TEMP)
B1-31
SOLENOID VALVE (PURGE CONTROL) (BLACK)
B1-12
B1-11
ISC VALVE (BLACK)
B1-14
SOLENOID VALVE (PRC LOW TEMP) (BLACK)
X-14
(EM)-(INJ) (BLACK)
B1-30
INJECTOR RESISTOR (GRAY)
B1-09
DISTRIBUTOR (GRAY)
B1-25
KNOCK SENSOR (GRAY)
B1-19
WATER THERMOSENSOR (GREEN)
B1-29
SOLENOID VALVE (WASTEGATE) (BLACK)

B-1c ■ ENGINE CONTROL SYSTEM (3/3)

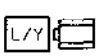


B2-01 ENGINE CONTROL UNIT (EM)

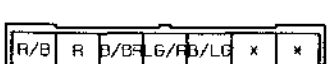
1U	1S	1Q	1D	1M	1K	1I	1G	1E	1C	1A
R/B	O/L	G/B	G	*	LG/Y	L	G/W	*	V	L/R
BR/Y	B/L	B/G	L/Y	R/W	*	L/B	O/B	W/B	W/Y	W/R
1V	1T	1R	1P	1N	1L	1J	1H	1F	1D	1B

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	P/B	B/LG	B/O
G	W/L	Y/B	G/O	W	R/B	R/L	G/R	R/Y	*	*	B/BR	B/O
2Z	2X	2V	2T	2R	2P	2N	2L	2J	2H	2F	2D	2B

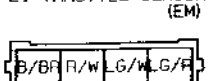
B1-10 POWER STEERING PRESSURE SWITCH (F)



B1-20 AIRFLOW METER (EM)

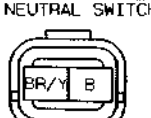


B1-21 THROTTLE SENSOR (EM)



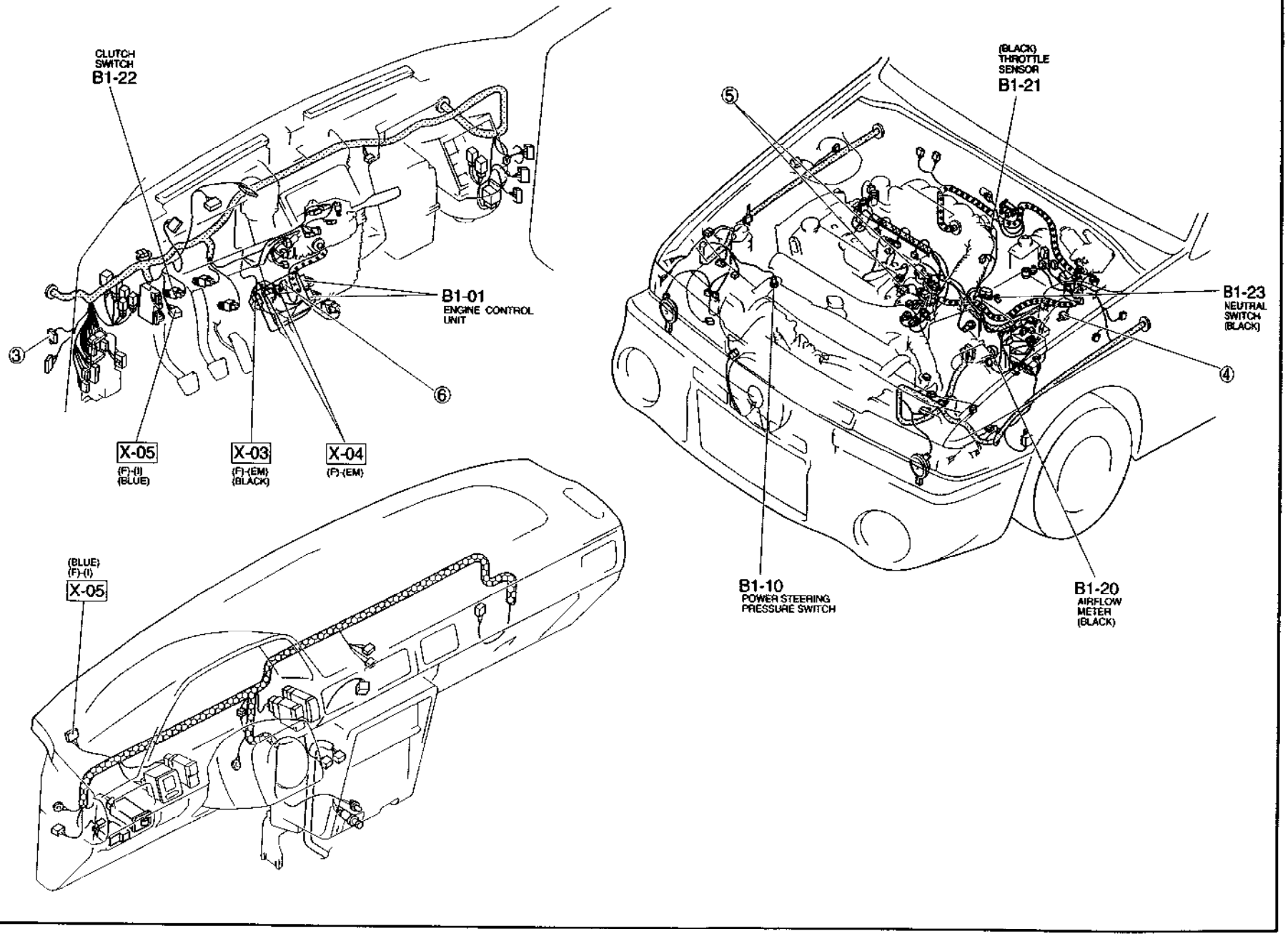
B1-22 CLUTCH SWITCH (F)

B1-23 NEUTRAL SWITCH (EM)



HARNESS SYMBOL : (F) (E) (I) (R) (DR) (IN) (FR) (EM) (INJ)

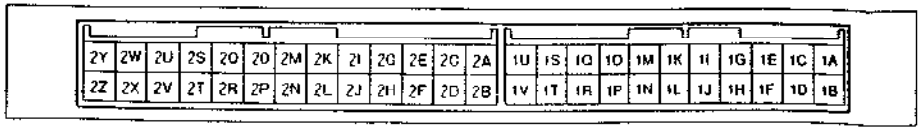
B-1c



Reference data

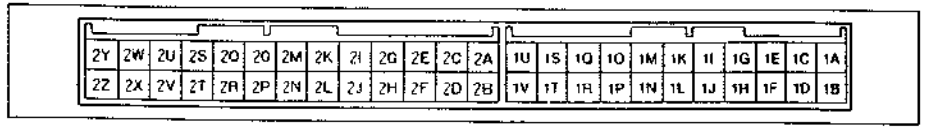
Vs: Battery voltage

Terminal	Input	Output	Connected to	Test condition		Correct voltage	Remark
1A	—	—	Battery	Constant		Vs	For backup
1B	O		Main relay (FUEL INJ relay)	Ignition switch	OFF	0V	—
					ON	Vs	
1C	O		Ignition switch (START)	While cranking		Approx. 10V	—
				Ignition switch ON		0V	
1D		O	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.		Vs	
				Test switch at O2 MONITOR with engine idling Monitor lamp illuminated		Approx. 5V	
				Test switch at O2 MONITOR with engine idling Monitor lamp not illuminated		Vs	
1E	—	—	—	—		—	—
1F		O	Self-Diagnosis Checker (service code)	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.		Vs	
				Buzzer sounded		Below 2.5V	
				Buzzer not sounded		Vs	
1G		O	Igniter	Ignition switch ON		0V	—
				Idle		Approx. 0.2V	
1H		O	Solenoid valve (wastegate)	Ignition switch ON		Vs	—
				Idle		Approx. 2V	
1I		O	Fuel pump resistor/relay	While cranking		Approx. 10V	—
				Idle		Below 1.5V	
1J		O	A/C relay	Ignition switch ON		Vs	—
				A/C switch ON at idle		Below 2.5V	
				A/C switch OFF at idle		Vs	
1K	O		Diagnosis connector (TEN terminal)	System Selector test switch at O2 MONITOR		Vs	—
				System Selector test switch at SELF TEST		Below 1.0V	
1L	—	—	—	—		—	—
1M	—	—	—	—		—	—



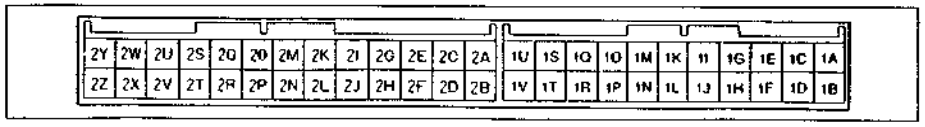
Vs: Battery voltage

Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
1N	O		Throttle sensor (idle switch)	Accelerator pedal released	Below 1.0V	Ignition switch ON
				Accelerator pedal depressed	Vs	
1O	O		Foglight relay	Foglight switch ON	Vs	—
				Foglight switch OFF	0V	
1P	O		P/S pressure switch	Ignition switch ON	Vs	—
				P/S pressure switch ON at idle	Below 1.0V	
				P/S pressure switch OFF at idle	Vs	
1Q	O		A/C switch	A/C switch ON	Below 2.5V	Ignition switch ON and blower motor ON
				A/C switch OFF	Vs	
1R	O		Electric cooling fan switch	Fan operating (coolant temperature over 97°C [207°F] or diagnosis connector terminal TFA grounded)	Below 1.0V	—
				Fan not operating (idle)	Vs	
1S	O		Blower control switch	Blower control switch OFF or 1st position	Vs	Ignition switch ON
				Blower control switch 2nd or higher position	Below 1.0V	
1T	O		Rear window defroster switch	Rear window defroster OFF	Below 1.0V	Ignition switch ON
				Rear window defroster ON	Vs	
1U	O		Headlight switch	Headlights ON	Vs	—
				Headlights OFF	Below 1.0V	
1V	O		Neutral/Clutch switches	Neutral position or clutch pedal depressed	Below 1.0V	
				Others	Vs	



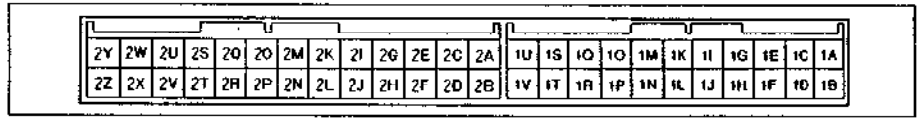
Vb: Battery voltage

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	O		Distributor (NE-signal)	Ignition switch ON	0V or 5V	—
				Idle	Approx. 2V	
2F	—	—	—	—	—	—
2G	O		Distributor (G signal)	Ignition switch ON	0V or 5V	
				Idle	Approx. 1.5V	
2H	—	—	—	—	—	—
2I	—	—	—	—	—	—
2J	O		Knock control unit	Idle	Approx. 4.0V	—
2K	O		Throllle sensor/ Airflow meter	Constant	4.5—5.5V	—
2L	O		Speedometer sensor	Ignition switch ON	0 or 5V	
2M	O		Throttle sensor	Accelerator pedal released	Approx. 0.5V	—
				Accelerator pedal fully depressed	Approx. 4.0V	
2N	O		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	O		Airflow meter	Ignition switch ON	Approx. 3.8V	—
				Idle	Approx. 3.0V	
2P	O		Intake air thermosensor	Ambient air temperature 20°C (68°F)	Approx. 2.5V	In airflow meter
2Q	O		Water thermosensor	Engine coolant temperature 20°C (68°F)	Approx. 2.5V	—
				After warm-up	Below 0.5V	
2R		O	Turbocharge indicator	Ignition switch ON	Vb	—

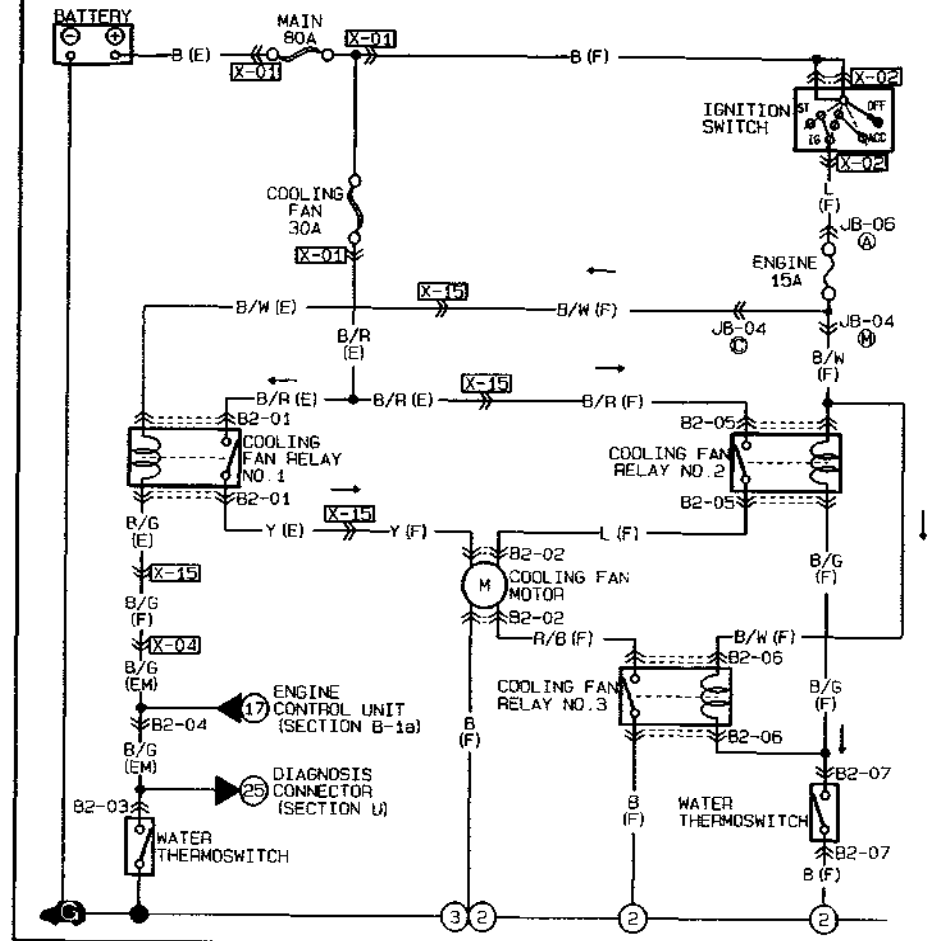


Vb: Battery voltage

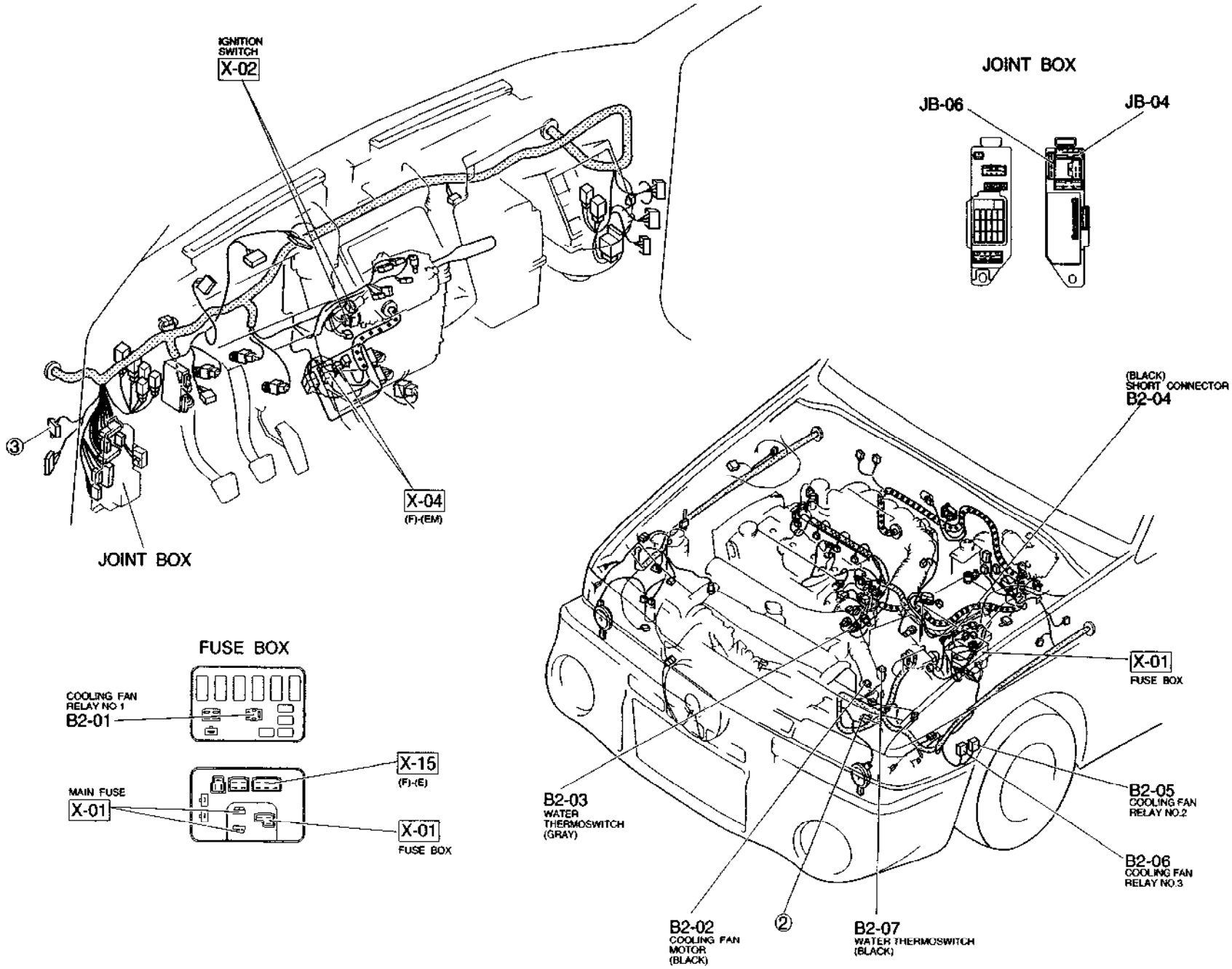
Terminal	Input	Output	Connected to	Test condition	Correct voltage	Remark
2S		O	Overboost warning buzzer	Ignition switch ON	Vb	—
2T		O	Solenoid valve (PRC low temp.)	180 sec. after engine started with coolant temperature is above 90°C (194°F) and intake air temperature is between 40°C (104°F) and 50°C (122°F)	Below 1.5V	No-load engine condition
				Other condition at idle	Vb	
2U		O	Injector (Nos. 1, 3)	Ignition switch ON	Vb	*Engine Signal Monitor: Green and red lamps flash
				Idle	Vb*	
				Engine speed above 2,000 rpm during deceleration (after warm-up)	Vb	
2V		O	Injector (Nos. 2, 4)	Ignition switch ON	Vb	
				Idle	Vb*	
				Engine speed above 2,000 rpm during deceleration (after warm-up)	Vb	
2W		O	ISC valve	Ignition switch ON	Approx. 7V	—
				Idle	Approx. 9V	
2X		O	Solenoid valve (purge control)	Ignition switch ON	Vb	—
				Idle	Vb	
2Y		O	Circuit-opening relay	Ignition switch ON	Vb	—
				Idle	Below 1.0V	
2Z		O	Solenoid valve (PRC high temp.)	210 sec. after engine started with coolant temperature above 90°C (194°F) and intake air temperature above 50°C (122°F)	Below 1.5V	No-load engine condition
				Other condition at idle	Vb	—



B-2 ■ COOLING FAN SYSTEM

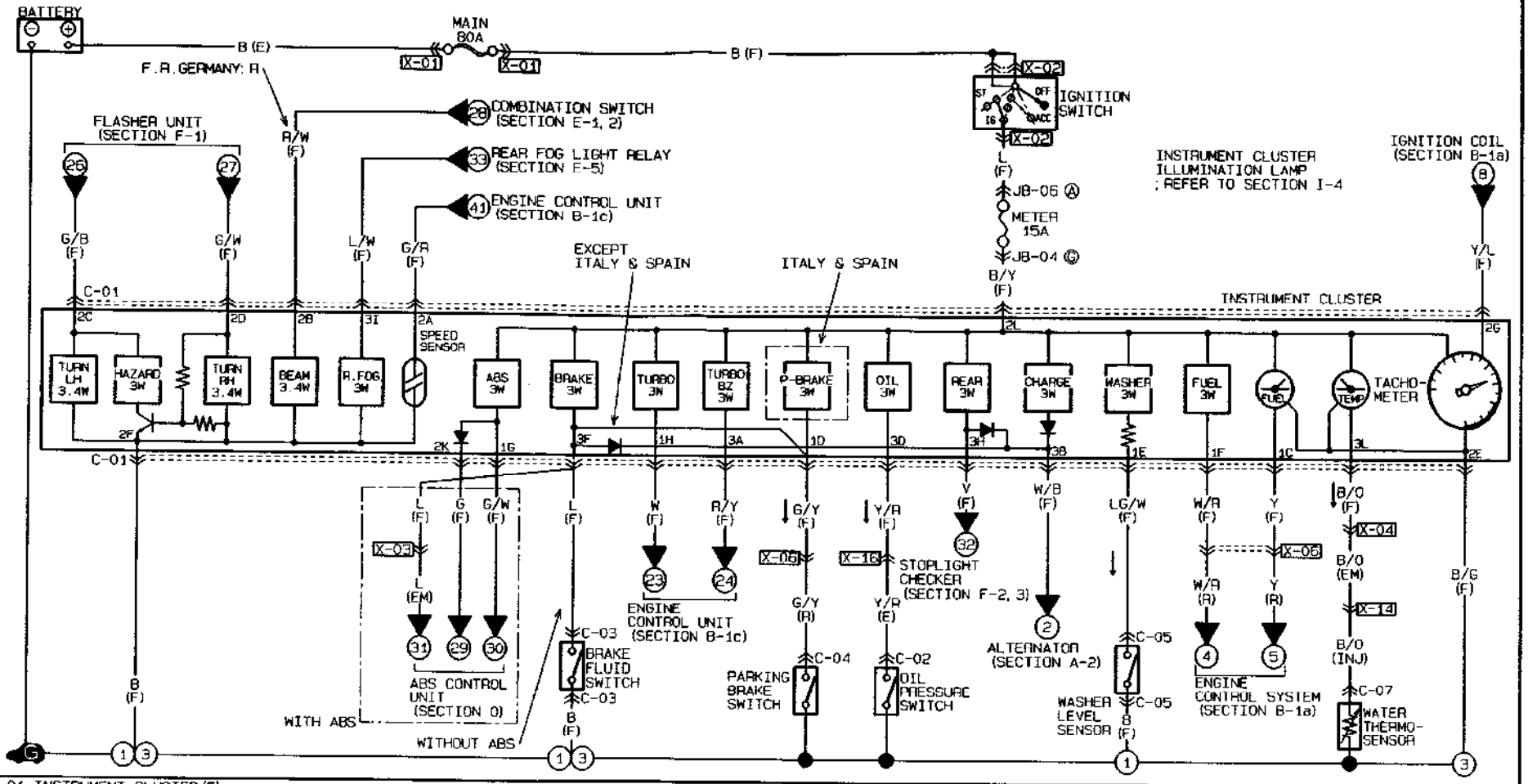


B-2

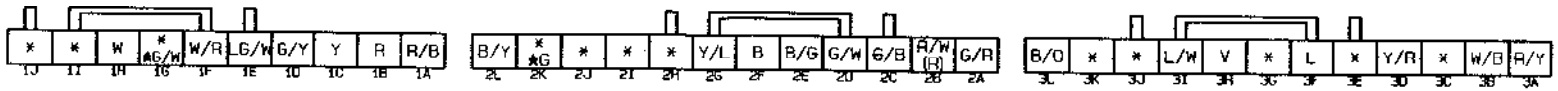

IGNITION SWITCH
X-02
JOINT BOX
JB-06
JB-04
③
X-04
(F)-(EM)
JOINT BOX
(BLACK) SHORT CONNECTOR
B2-04
X-01
FUSE BOX
FUSE BOX
COOLING FAN RELAY NO.1
B2-01
X-15
(F)-(E)
MAIN FUSE
X-01
X-01
FUSE BOX
B2-03
WATER THERMOSWITCH (GRAY)
B2-05
COOLING FAN RELAY NO.2
B2-06
COOLING FAN RELAY NO.3
B2-02
COOLING FAN MOTOR (BLACK)
②
B2-07
WATER THERMOSWITCH (BLACK)

C ■ INSTRUMENT CLUSTER & WARNING LAMPS

() ... F.R.GERMANY
★ ... ABS

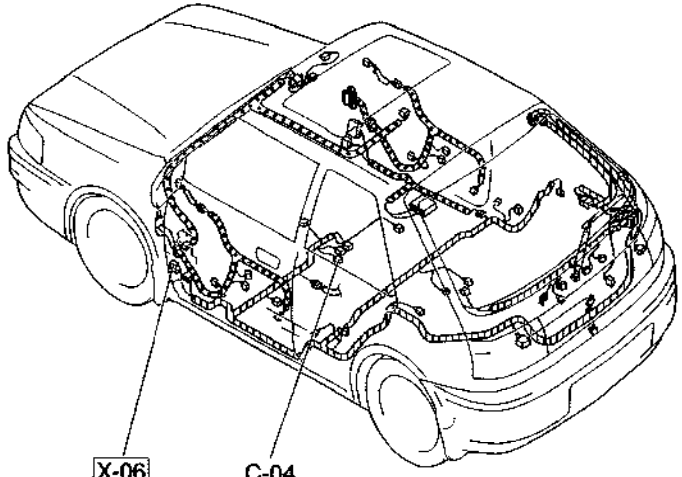


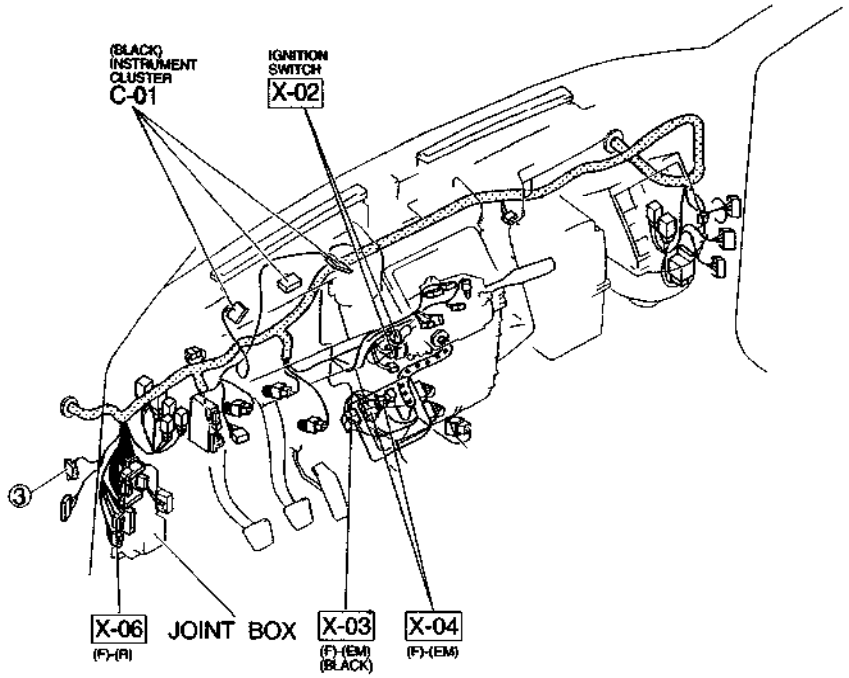
C-01 INSTRUMENT CLUSTER (F)



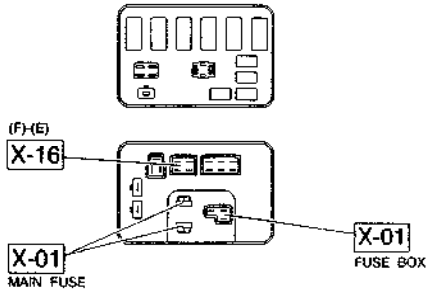
C-02 OIL PRESSURE SWITCH (E)	C-03 BRAKE FLUID SWITCH (F)	C-04 PARKING BRAKE SWITCH (R)	C-05 WASHER LEVEL SENSOR (F)	C-07 WATER THERMOSENSOR (INJ)		
Y/R	B / L	G/Y	* LG/W (*) G/L / * B (*) Y/W	B/O		

C

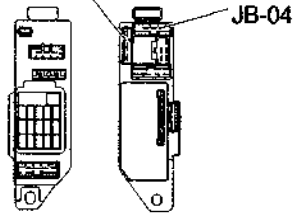


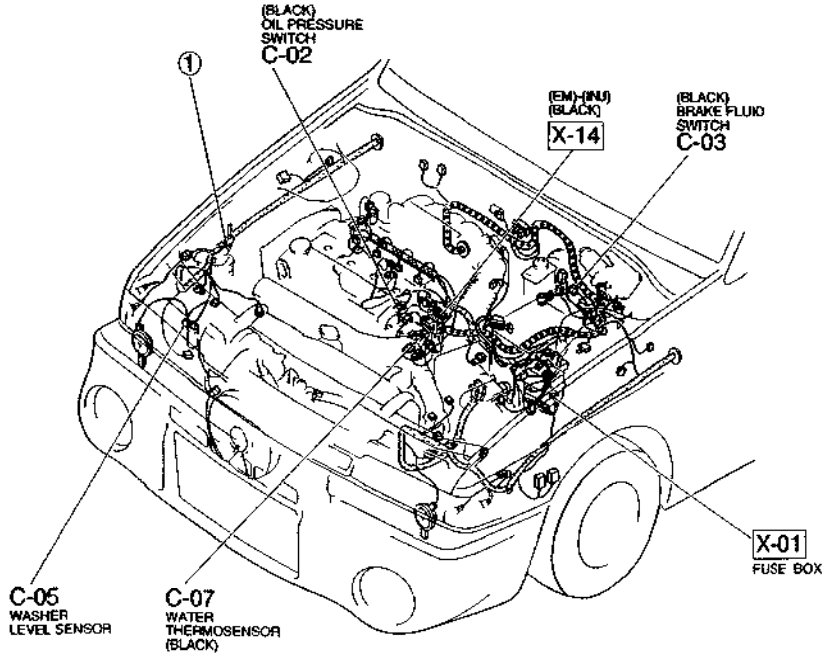


FUSE BOX



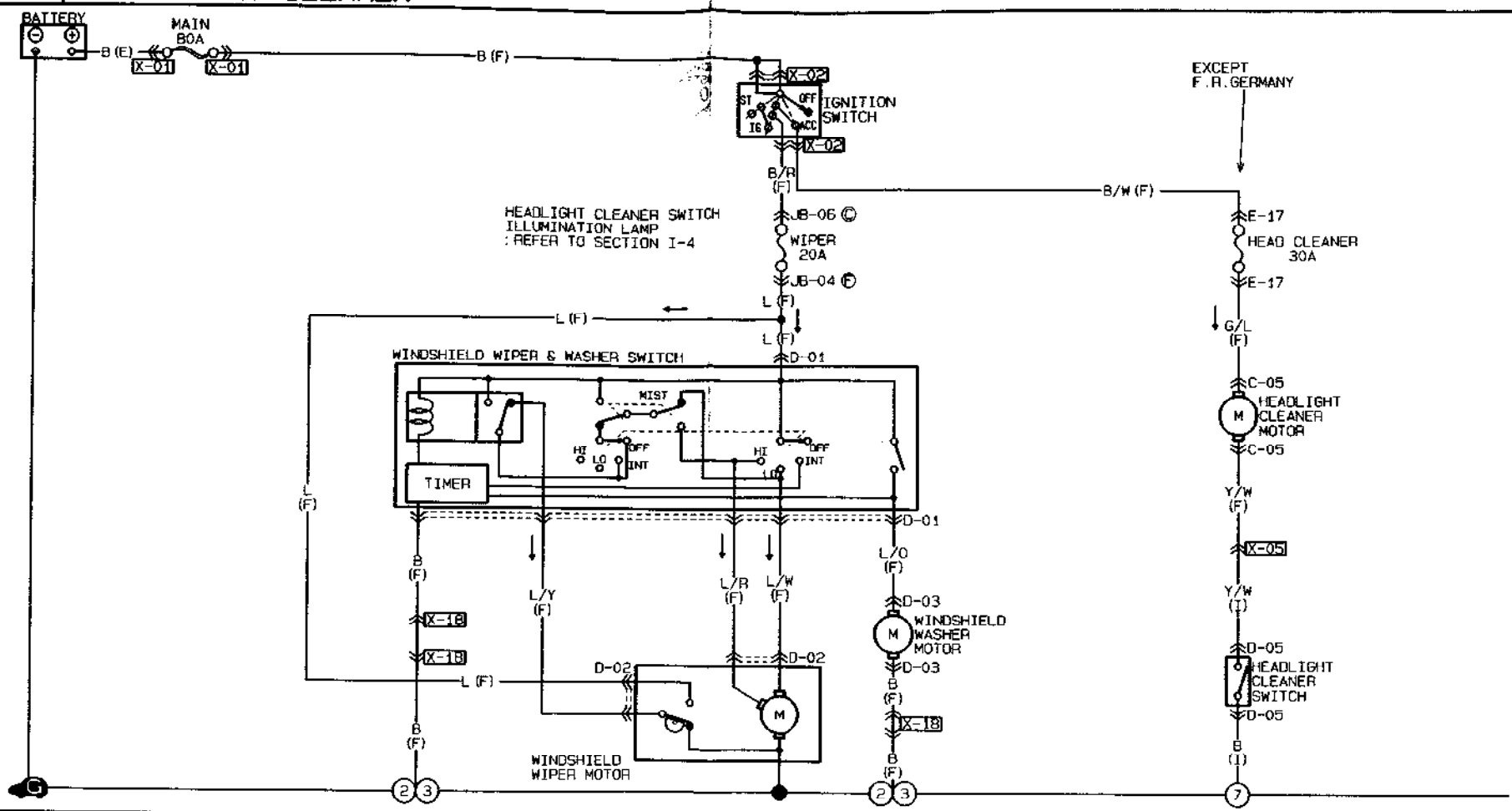
JOINT BOX





D-1 ■WINDSHIELD WIPER & WASHER ■HEADLIGHT CLEANER

( ) . . . F.R.GERMANY



D-01 WINDSHIELD WIPER & WASHER SWITCH (F)

L/Y		L/O	L
L/W	B	L/R	*

D-02 WINDSHIELD WIPER MOTOR (F)

L/W	L/R
L	L/Y

D-03 WINDSHIELD WASHER MOTOR (F)

B
L/O

C-05 HEADLIGHT CLEANER MOTOR (F)

*	LG/W	(*) G/L
*	B	Y/W (*)

D-05 HEADLIGHT CLEANER SWITCH (I)

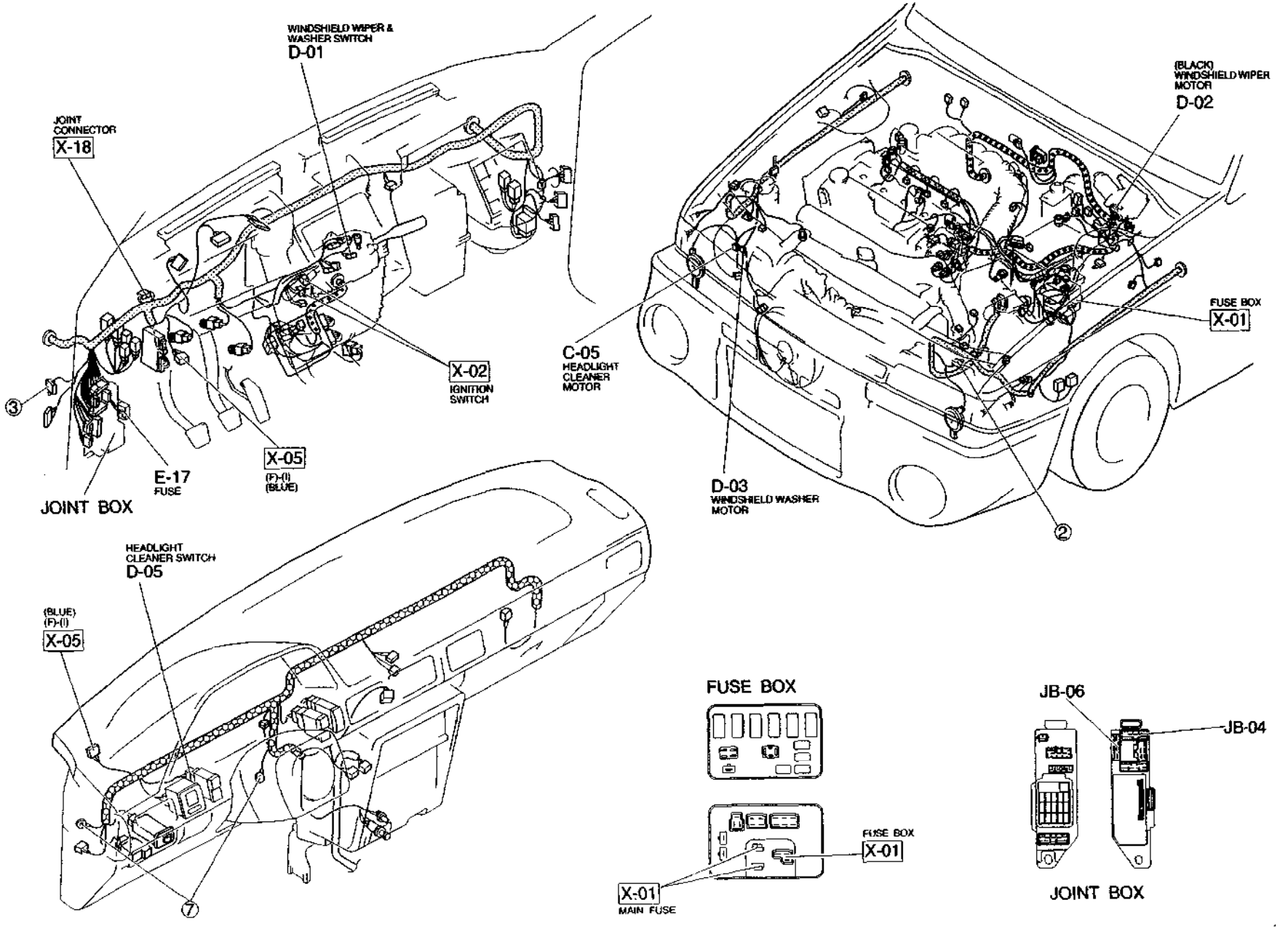
*			R/B
*	Y/W	B	R

E-17 FUSE (F)

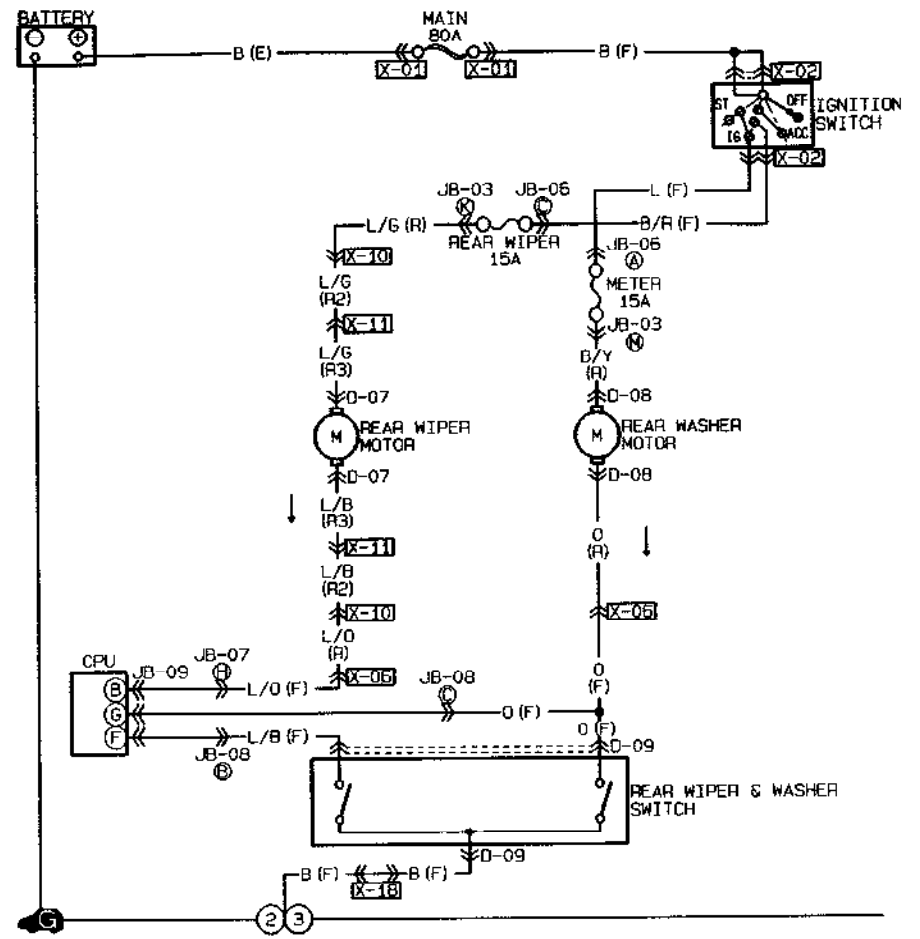
G/L	① B/W	B	③ Y	* ⑤	*
	② *		④ G/L	* ⑥	*

① HEAD CLEANER 30A
② *
③ DEFOG 20A
④ F.FOG 15A
⑤ *
⑥ *

D-1

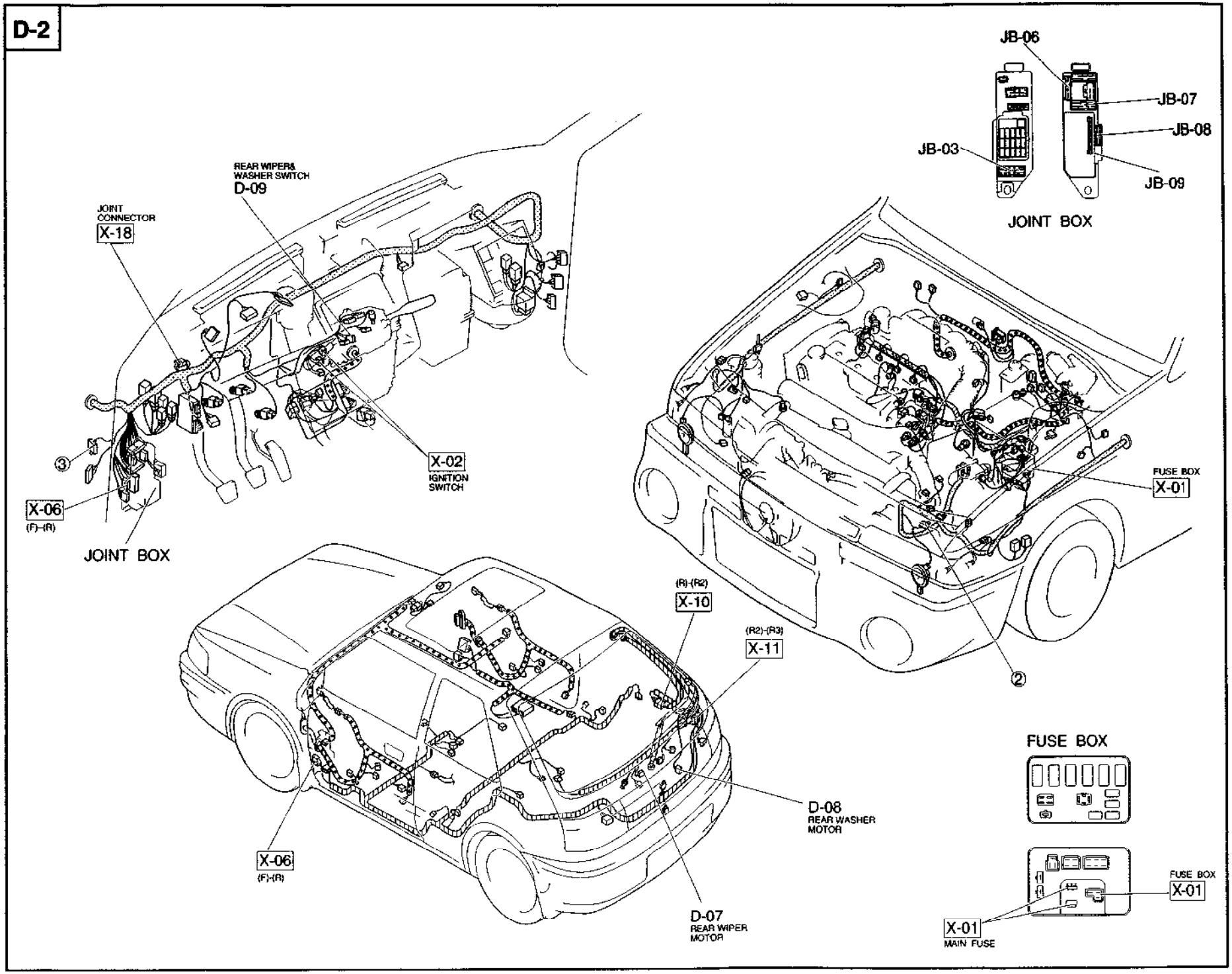

WINDSHIELD WIPER & WASHER SWITCH
D-01
JOINT CONNECTOR
X-18
X-02
IGNITION SWITCH
C-05
HEADLIGHT CLEANER MOTOR
(BLACK) WINDSHIELD WIPER MOTOR
D-02
FUSE BOX
X-01
③
E-17
FUSE
X-05
(F)-(I)
(BLUE)
JOINT BOX
D-03
WINDSHIELD WASHER MOTOR
②
HEADLIGHT CLEANER SWITCH
D-05
(BLUE)
(F)-(I)
X-05
⑦
FUSE BOX
FUSE BOX
X-01
X-01
MAIN FUSE
JB-06
JB-04
JOINT BOX

D-2 ■REAR WIPER & WASHER

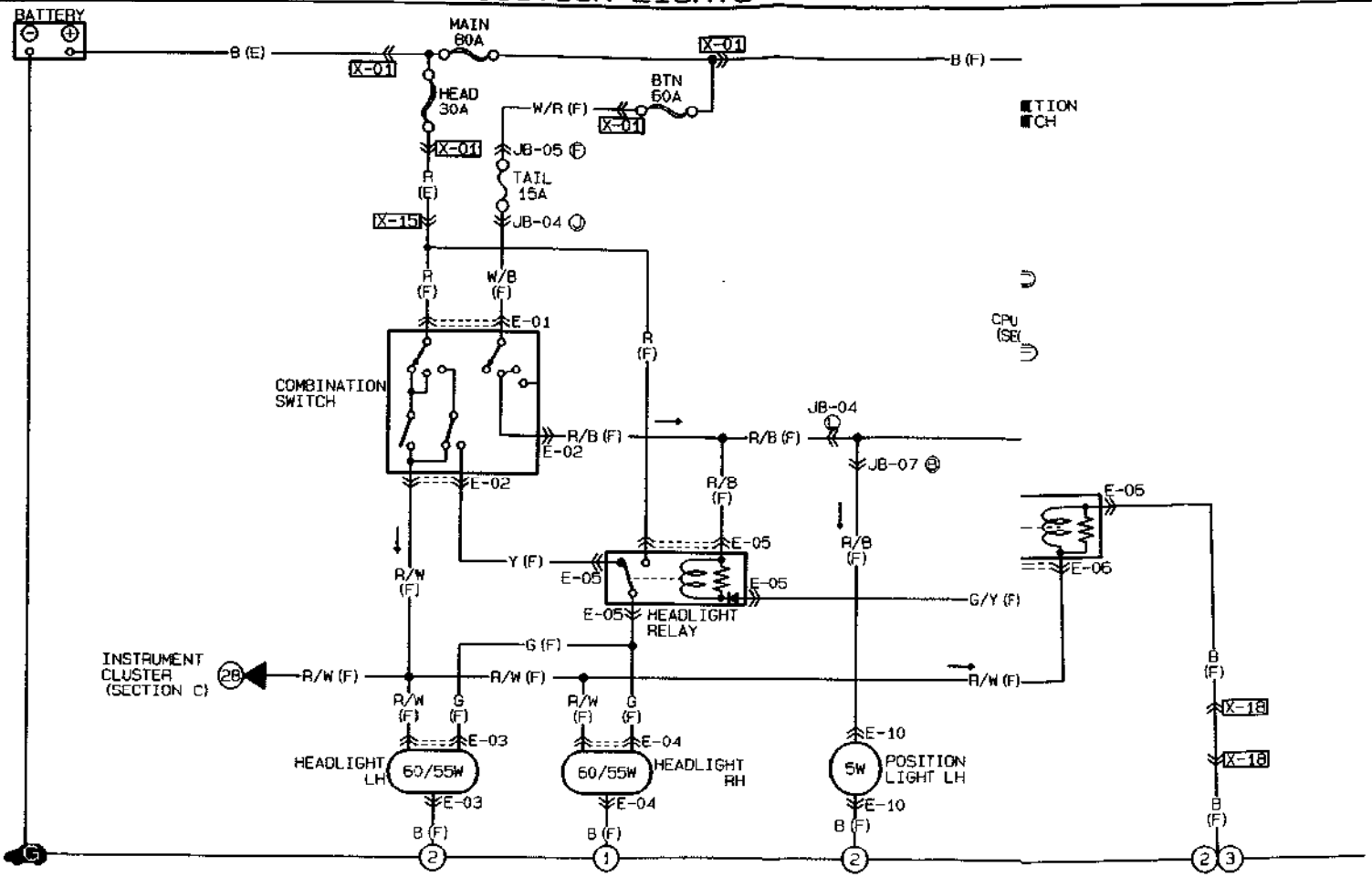


D-07 REAR WIPER MOTOR (R3)	D-08 REAR WASHER MOTOR (A)	D-09 REAR WIPER & WASHER SWITCH (F)	
L/G L/B	O B/Y	B O L/B	

D-2

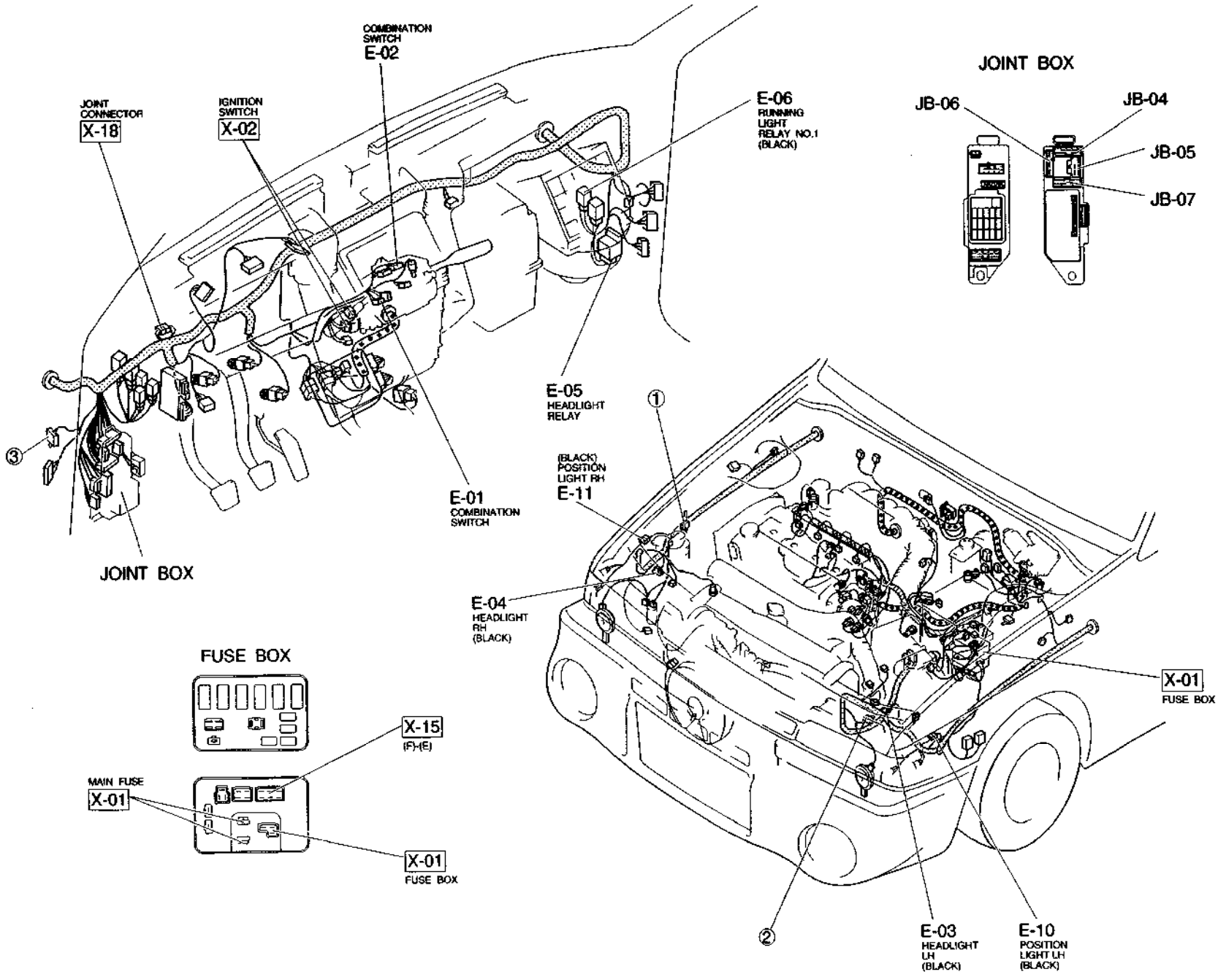

JB-06
JB-07
JB-08
JB-03
JB-09
JOINT BOX
REAR WIPER& WASHER SWITCH
D-09
JOINT CONNECTOR
X-18
X-02
IGNITION SWITCH
③
X-06
(F)-(R)
JOINT BOX
FUSE BOX
X-01
②
(R)-(R2)
X-10
(R2)-(R3)
X-11
D-08
REAR WASHER MOTOR
X-06
(F)-(R)
D-07
REAR WIPER MOTOR
FUSE BOX
FUSE BOX
X-01
X-01
MAIN FUSE

E-1 EXCEPT F.R.GERMANY ■HEADLIGHTS ■POSITION LIGHTS



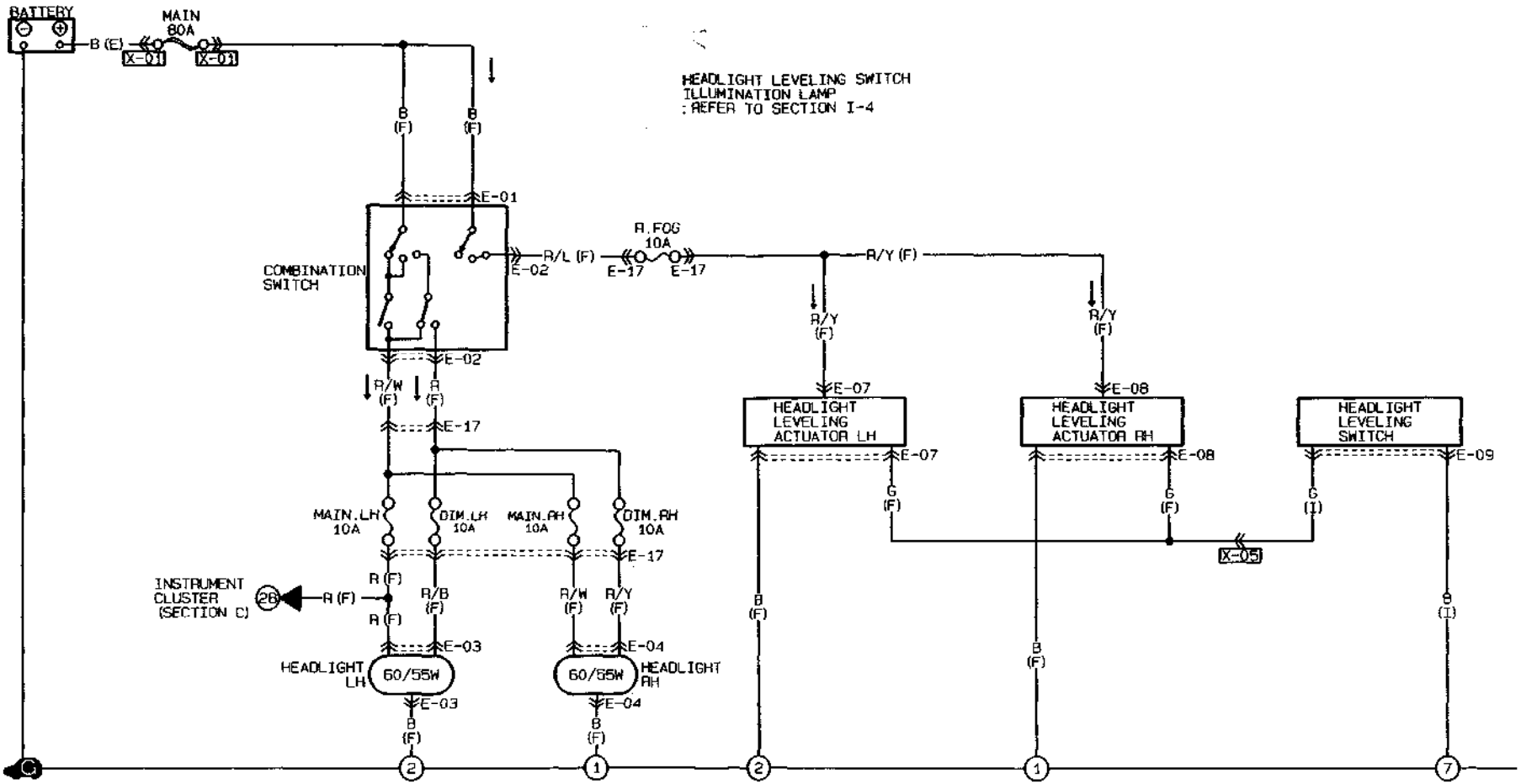
E-01 COMBINATION SWITCH (F) W/B | R	E-02 COMBINATION SWITCH (F) G/O | R/Y | * R/B | Y | R/W	E-03 HEADLIGHT LH (F) G B | R/W	E-04 HEADLIGHT RH (F) G B | R/W	E-05 RING LIGHT NO. 1 (F) L | R/W * | B	E-10 POSITION LIGHT LH (F) R/B | B | G/B
E-11 POSITION LIGHT RH (F) R/B | B | G/W					

E-1

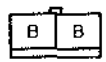

COMBINATION SWITCH
E-02
JOINT CONNECTOR
X-18
IGNITION SWITCH
X-02
E-06
RUNNING LIGHT RELAY NO.1
(BLACK)
JOINT BOX
JB-06
JB-04
JB-05
JB-07
E-05
HEADLIGHT RELAY
(BLACK)
POSITION LIGHT RH
E-11
E-01
COMBINATION SWITCH
JOINT BOX
E-04
HEADLIGHT RH
(BLACK)
FUSE BOX
X-15
(F)-(E)
MAIN FUSE
X-01
X-01
FUSE BOX
X-01
FUSE BOX
E-03
HEADLIGHT LH
(BLACK)
E-10
POSITION LIGHT LH
(BLACK)

E-2 F.R.GERMANY

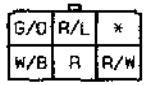
■HEADLIGHTS
■HEADLIGHT LEVELING SYSTEM



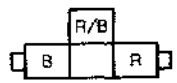
E-01 COMBINATION SWITCH (F)



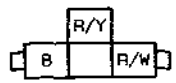
E-02 COMBINATION SWITCH (F)



E-03 HEADLIGHT LH (F)

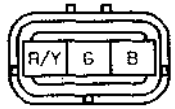


E-04 HEADLIGHT RH (F)

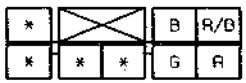


E-07 HEADLIGHT LEVELING ACTUATOR LH (F)

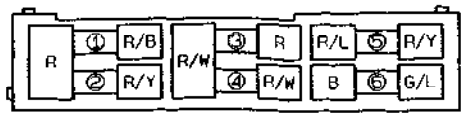
E-08 HEADLIGHT LEVELING ACTUATOR RH (F)



E-09 HEADLIGHT LEVELING SWITCH (I)

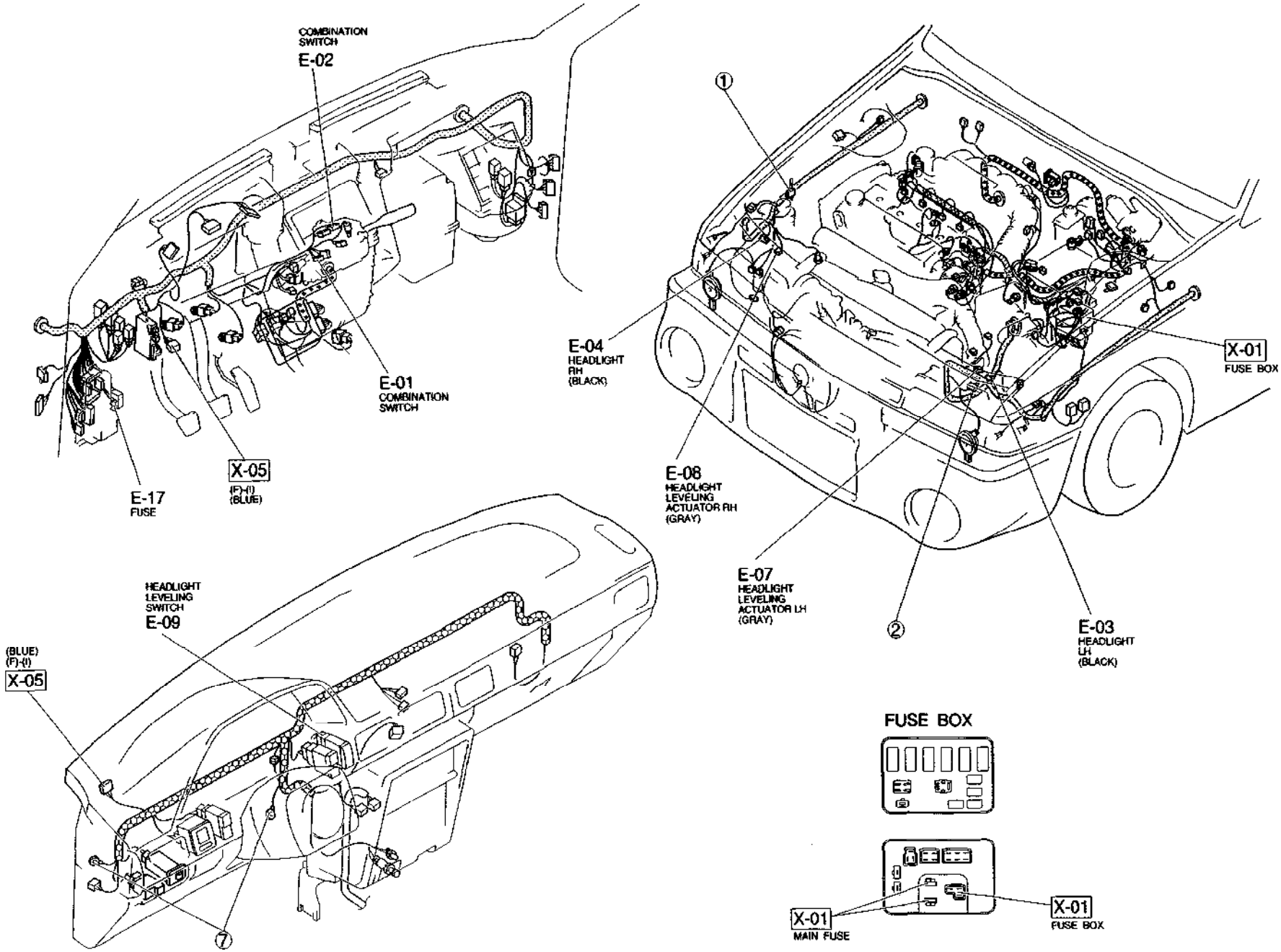


E-17 FUSE (F)

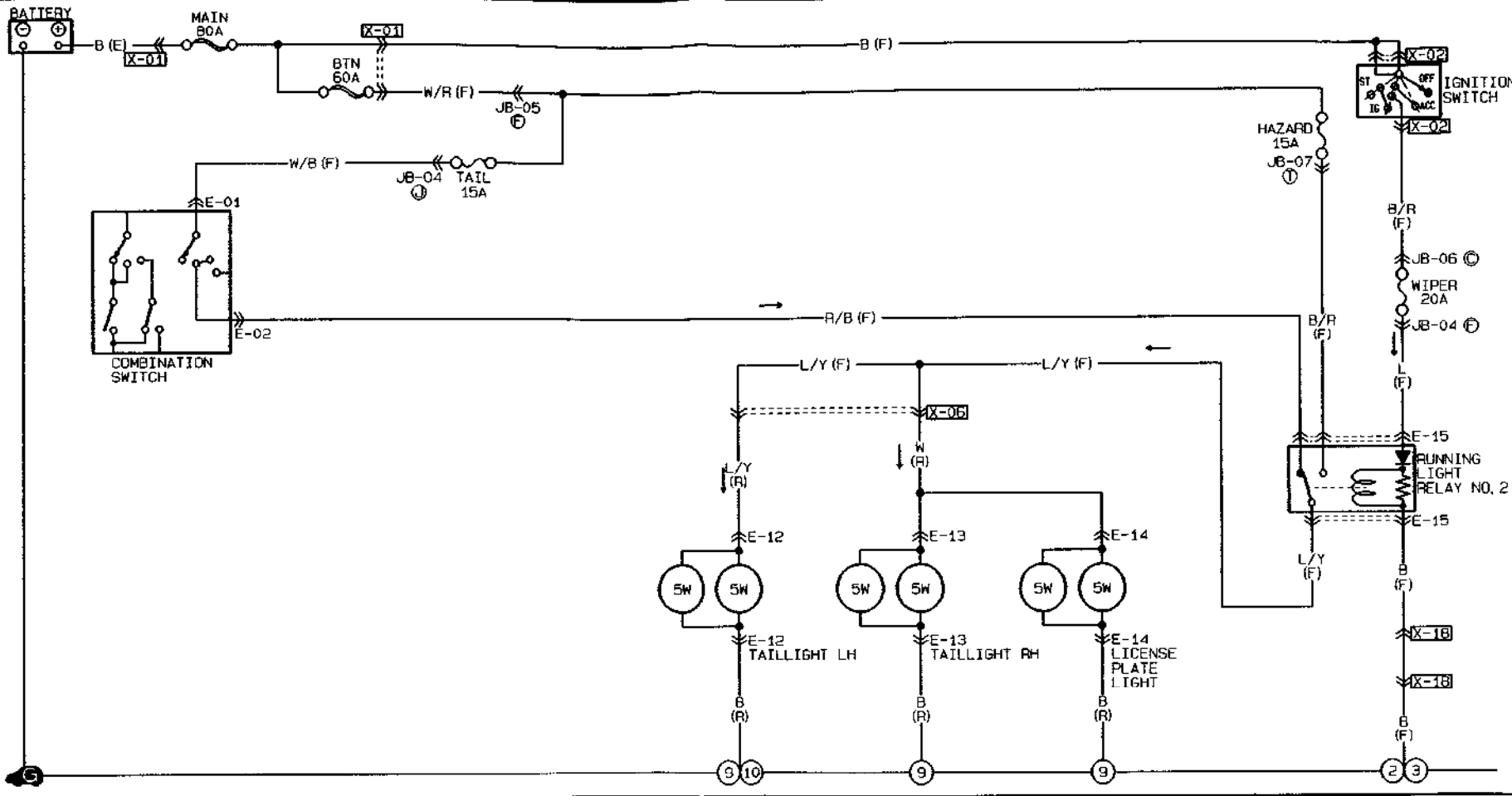


① DIM.LH 10A
② DIM.RH 10A
③ MAIN.LH 10A
④ MAIN.RH 10A
⑤ R.FOG 10A
⑥ F.FOG 15A

E-2

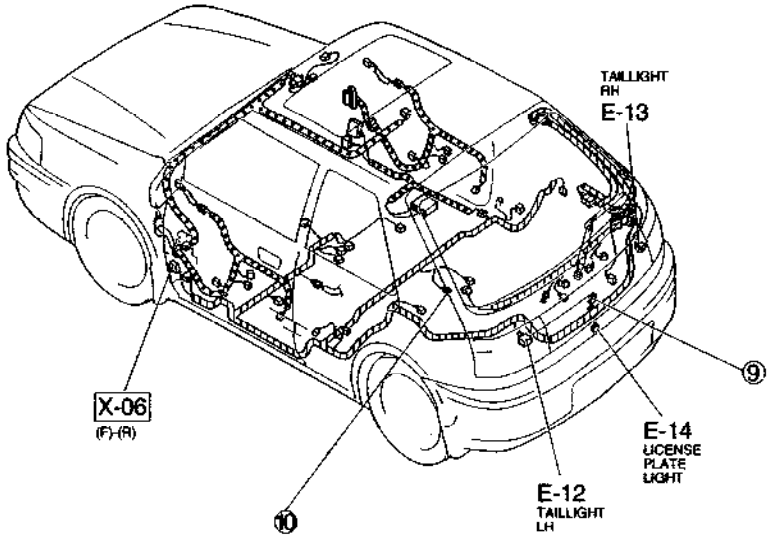

COMBINATION SWITCH
E-02
E-01
COMBINATION SWITCH
E-17
FUSE
X-05
(F)-(I)
(BLUE)
E-04
HEADLIGHT RH
(BLACK)
①
X-01
FUSE BOX
E-08
HEADLIGHT LEVELING ACTUATOR RH
(GRAY)
E-07
HEADLIGHT LEVELING ACTUATOR LH
(GRAY)
②
E-03
HEADLIGHT LH
(BLACK)
HEADLIGHT LEVELING SWITCH
E-09
(BLUE)
(F)-(I)
X-05
⑦
FUSE BOX
X-01
MAIN FUSE
X-01
FUSE BOX

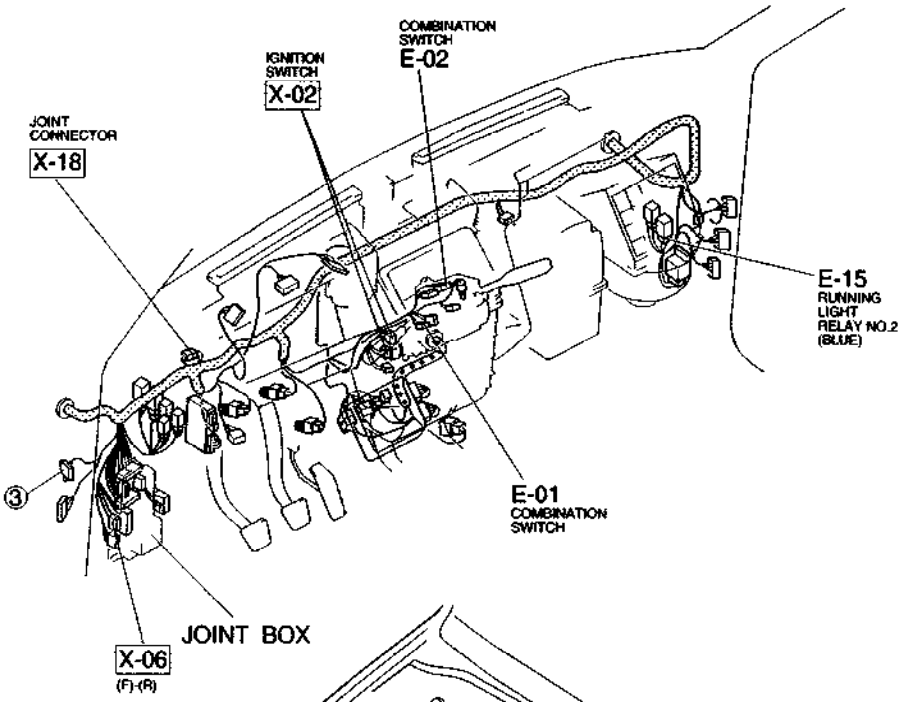
E-3 EXCEPT F.R.GERMANY ■TAILLIGHTS ■LICENSE PLATE LIGHTS



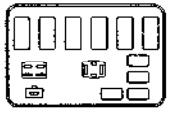
E-01 COMBINATION SWITCH (F)	E-02 COMBINATION SWITCH (F)	E-12 TAILLIGHT LH (R)	E-13 TAILLIGHT RH (R)	E-14 LICENSE PLATE LIGHT (R)	E-15 RUNNING LIGHT RELAY NO. 2 (F)	
W/B R	G/O R/Y * R/B Y R/W	* R/G G/B B L/Y G	* R/G G/W B W G	B W	B/R L/Y L R/B * B	

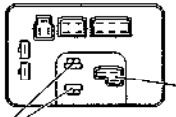
E-3





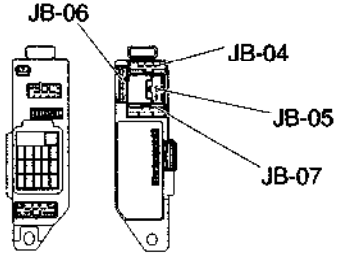
FUSE BOX

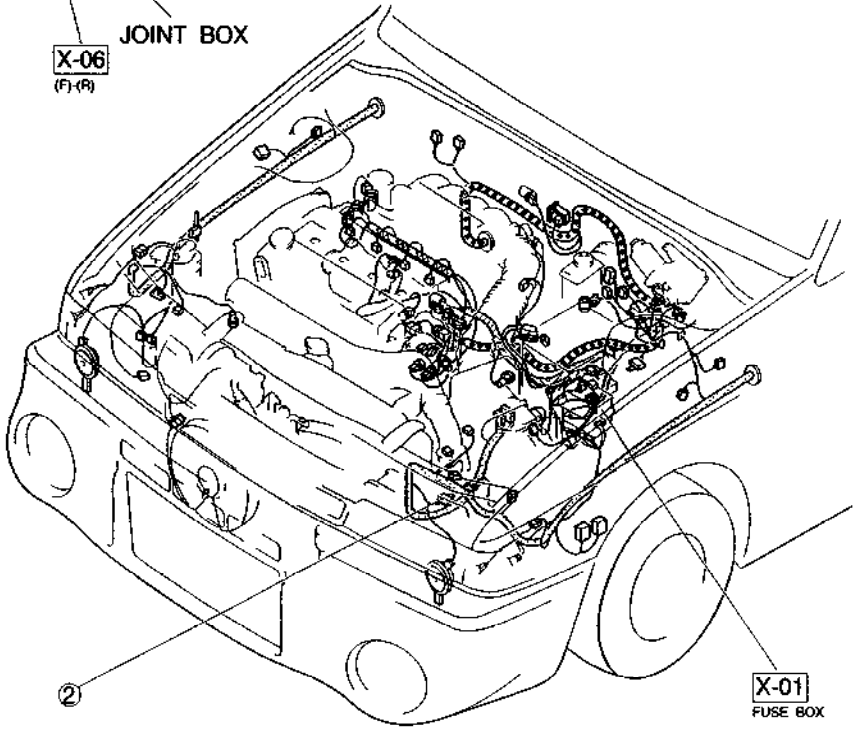




X-01
MAIN FUSE

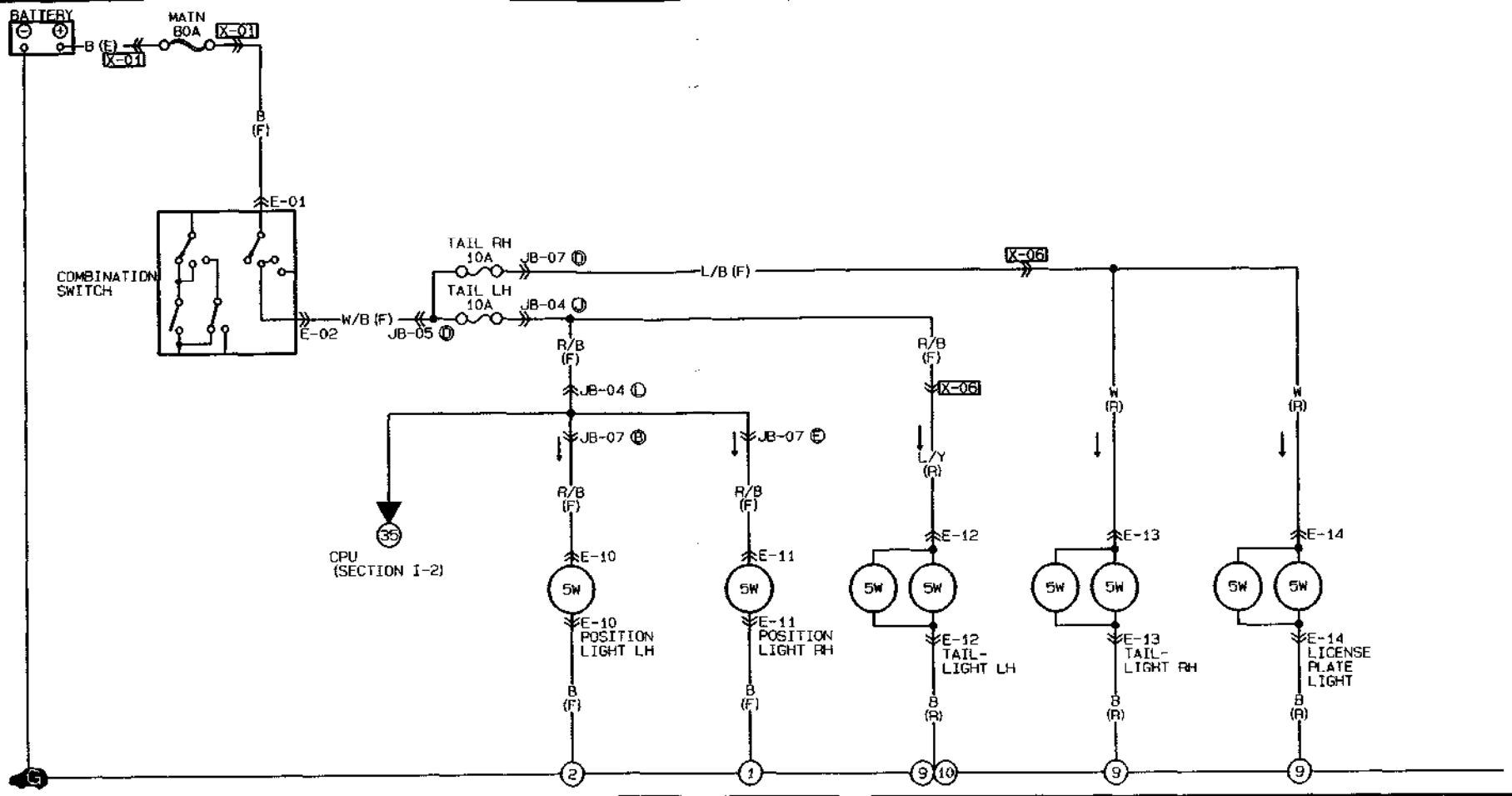
JOINT BOX





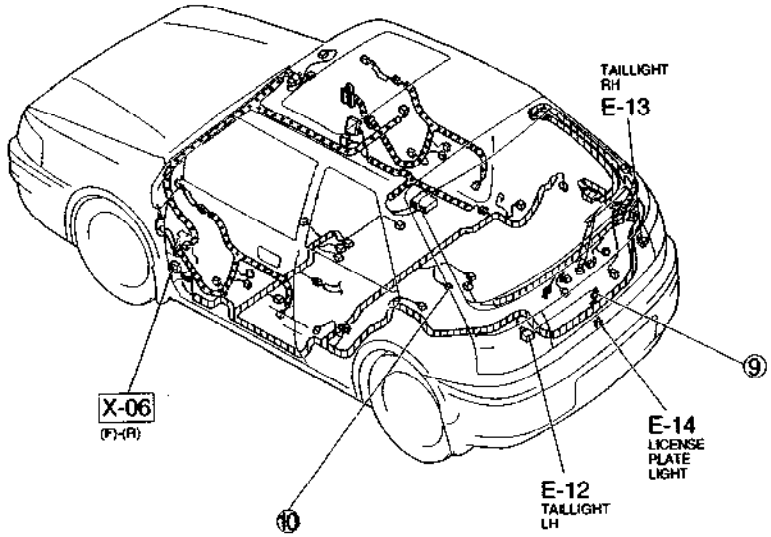
E-4 F.R.GERMANY

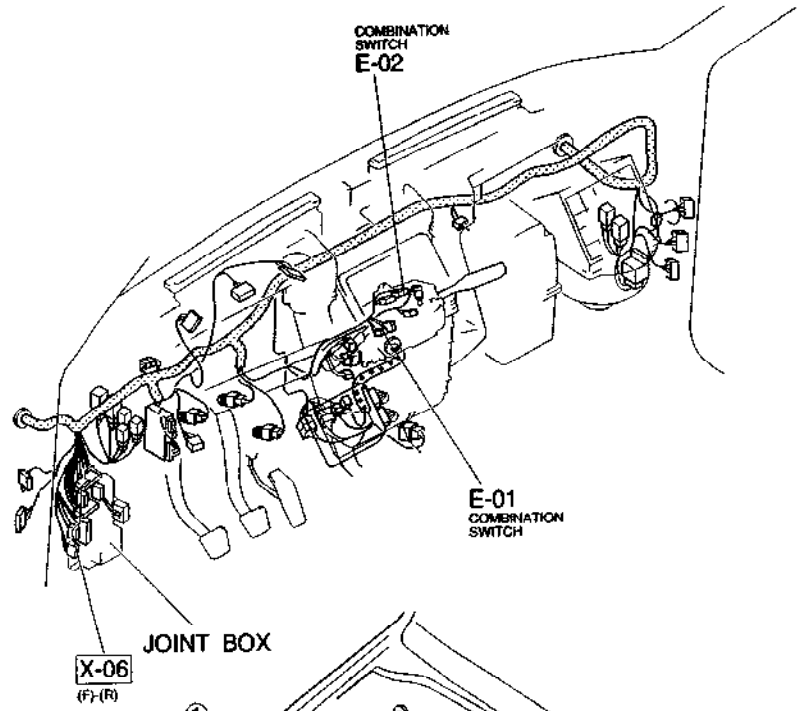
■ POSITION LIGHTS ■ LICENSE PLATE LIGHTS
■ TAILLIGHTS



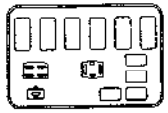
E-01 COMBINATION SWITCH (F)	E-02 COMBINATION SWITCH (F)	E-10 POSITION LIGHT LH (F)	E-11 POSITION LIGHT RH (F)	E-12 TAILLIGHT LH (R)	E-13 TAILLIGHT RH (R)	E-14 LICENSE PLATE LIGHT (R)
B B	G/O R/L * / W/B R R/W	R/B B G/B	R/B B G/W	* R/G G/B / B L/Y G	* R/G G/W / B W G	B W

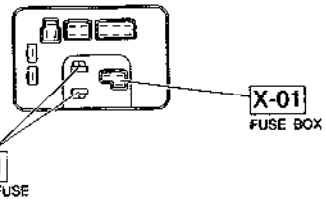
E-4



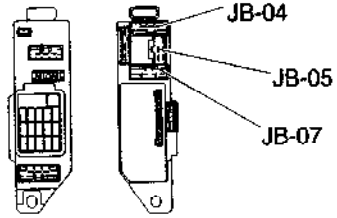


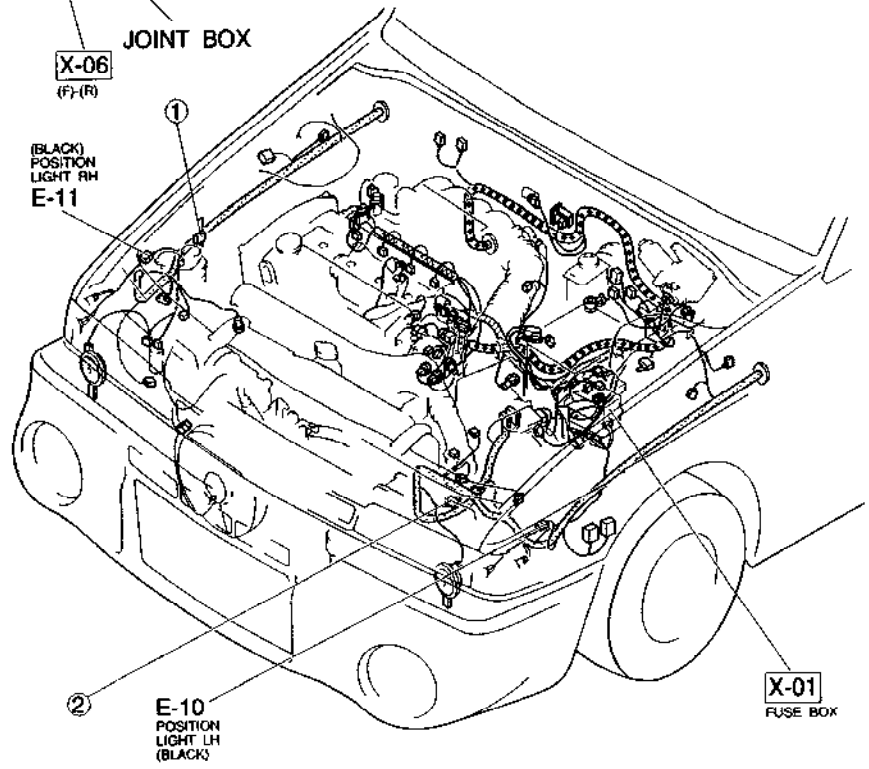
FUSE BOX





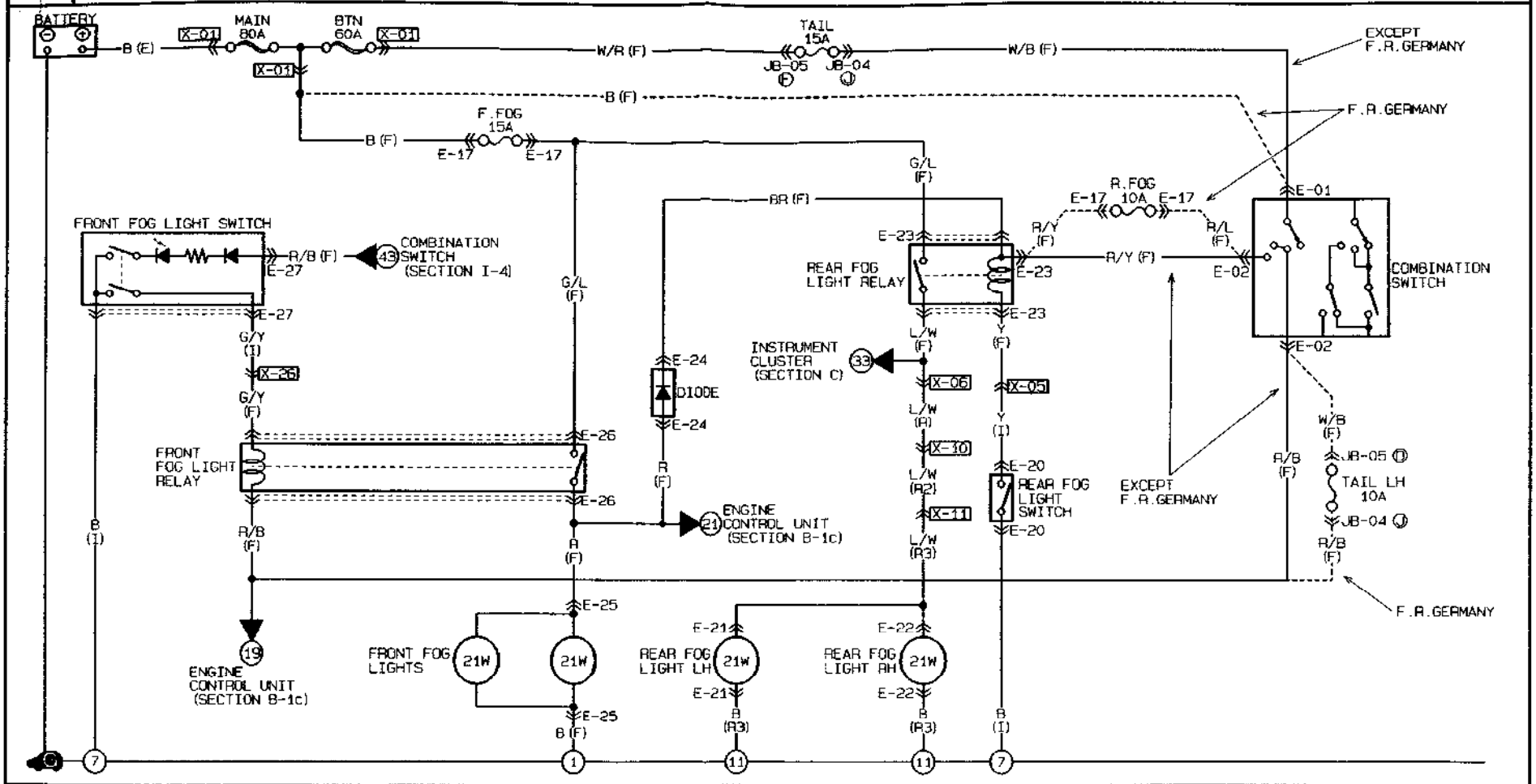
JOINT BOX



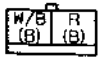


E-5 ■FRONT & REAR FOG LIGHTS

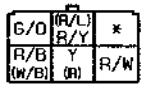
() . . . F.A.GERMANY



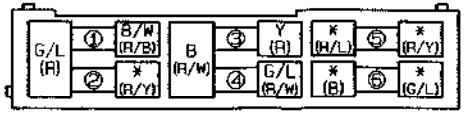
E-01 COMBINATION SWITCH (F)



E-02 COMBINATION SWITCH (F)

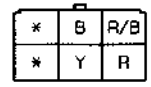


E-17 FUSE (F)



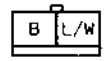
① HEAD CLEANER	30A	(DIM.LH	10A)
② *		(DIM.RH	10A)
③ DEFOG	20A	(MAIN.LH	10A)
④ F.FOG	15A	(MAIN.RH	10A)
⑤ *		(R.FOG	10A)
⑥ *		(F.FOG	15A)

E-20 REAR FOG LIGHT SWITCH (I)

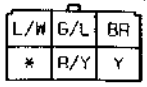


E-21 REAR FOG LIGHT LH (A3)

E-22 REAR FOG LIGHT RH (A3)



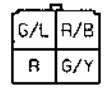
E-23 REAR FOG LIGHT RELAY (F)



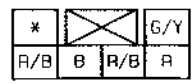
E-24 DIODE (F)

E-25 FRONT FOG LIGHT (F)

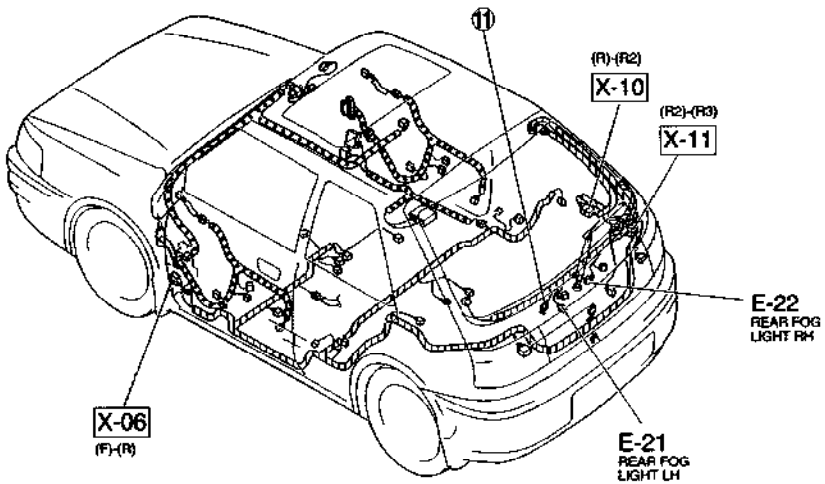
E-26 FRONT FOG LIGHT RELAY (F)

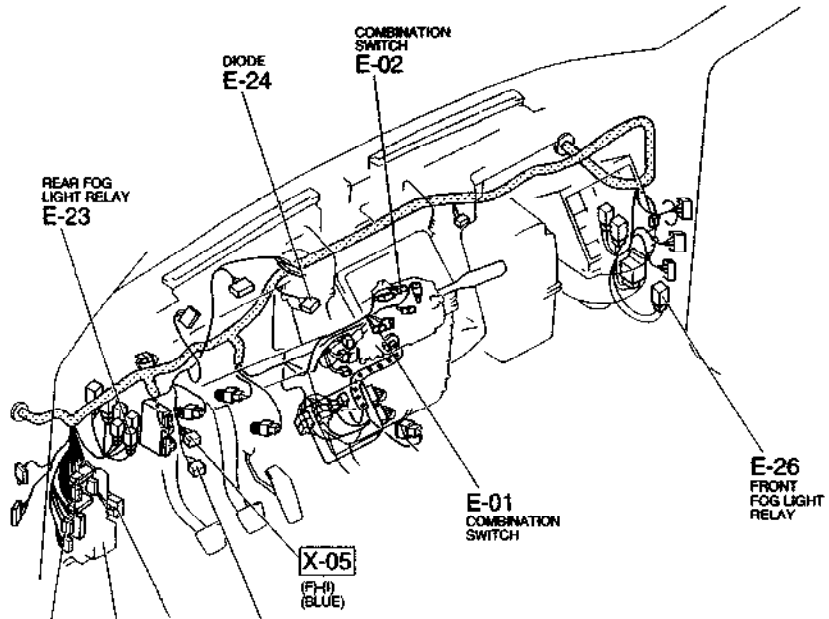


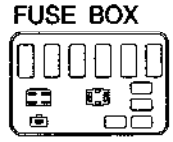
E-27 FRONT FOG LIGHT SWITCH (I)

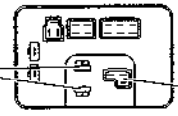


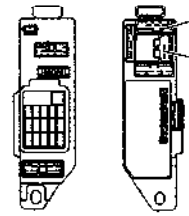
E-5

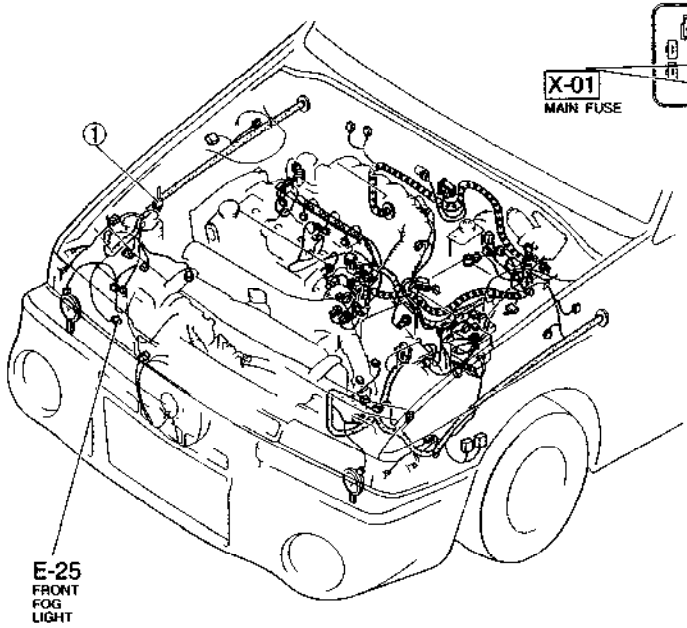

11
(R)-(R2)
X-10
(R2)-(R3)
X-11
E-22
REAR FOG
LIGHT RH
X-06
(F)-(R)
E-21
REAR FOG
LIGHT LH

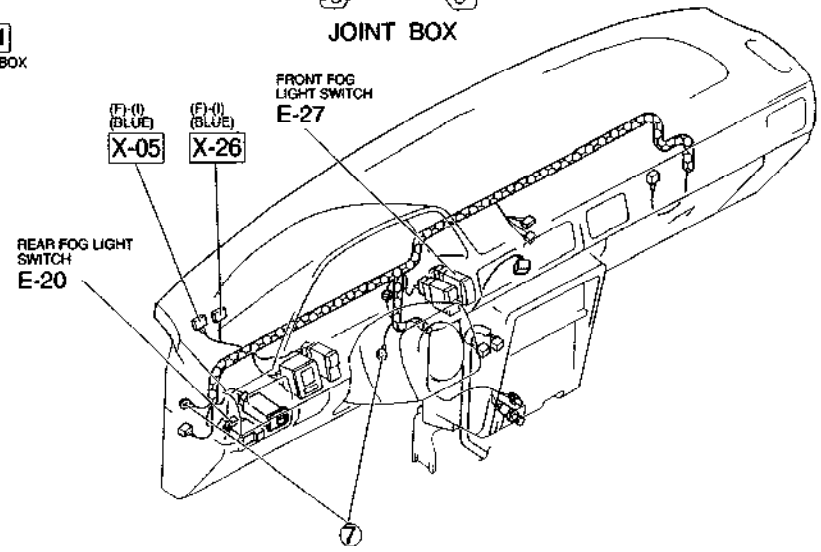

DIODE
E-24
COMBINATION
SWITCH
E-02
REAR FOG
LIGHT RELAY
E-23
E-26
FRONT
FOG LIGHT
RELAY
E-01
COMBINATION
SWITCH
X-05
(F)-(I)
(BLUE)
E-17
FUSE
X-26
(F)-(I)
(BLUE)
X-06
(F)-(R)
JOINT BOX


FUSE BOX


X-01
MAIN FUSE
X-01
FUSE BOX

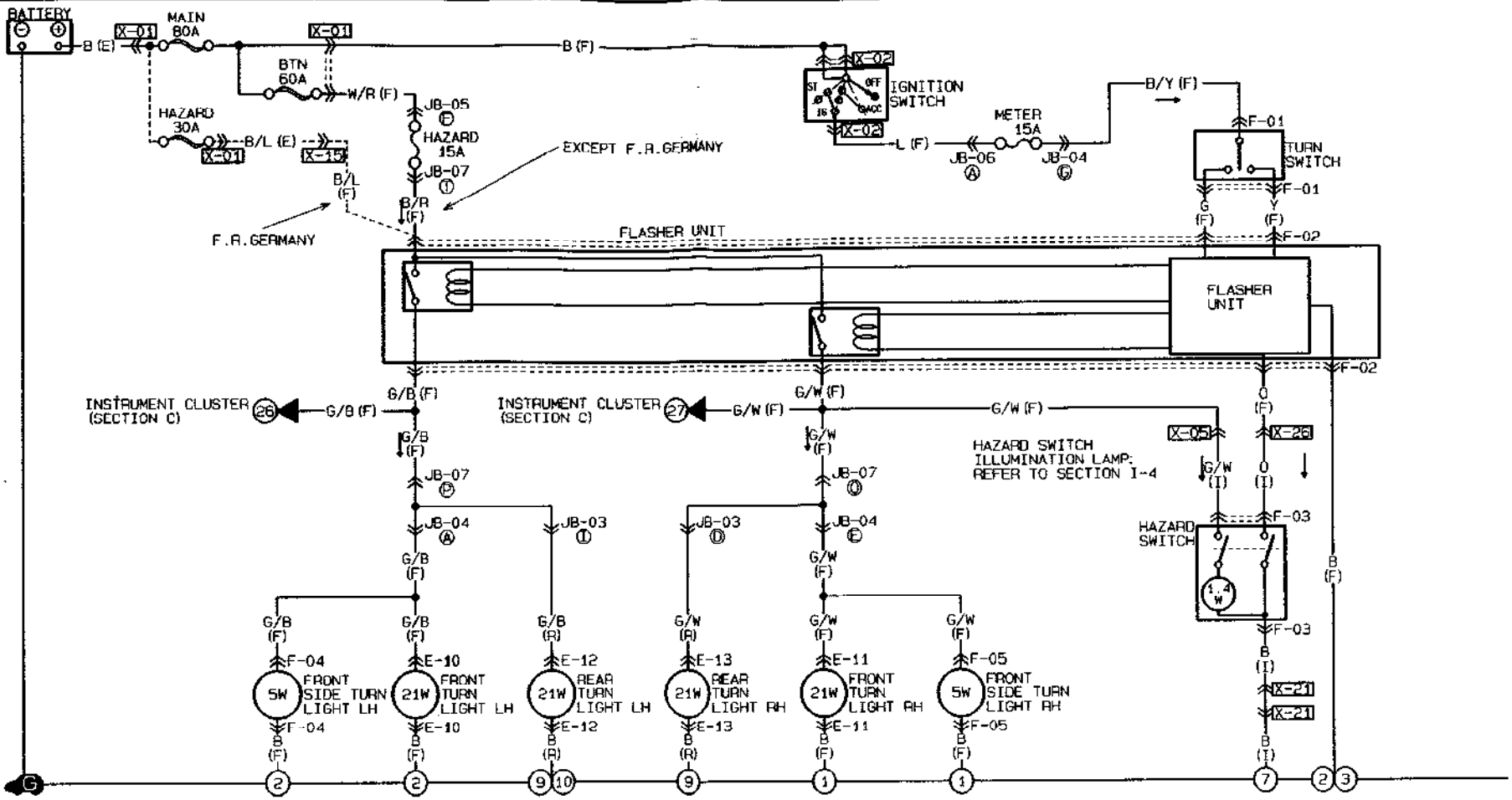

JB-04
JB-05
JOINT BOX


1
E-25
FRONT
FOG
LIGHT


FRONT FOG
LIGHT SWITCH
E-27
(F)-(I)
(BLUE)
X-05
(F)-(I)
(BLUE)
X-26
REAR FOG LIGHT
SWITCH
E-20
7

F-1 ■ TURN & HAZARD FLASHER LIGHTS

() ....F.R.GERMANY



F-01 TURN SWITCH (F)

Y	*	*	*
B/Y	G	*	*

F-02 FLASHER UNIT (F)

G/W	G	O	B
B/R (B/L)	Y	G/B	*

F-03 HAZARD SWITCH (I)

*	*			O	B
*	*	R/B	R	*	G/W

F-04 FRONT SIDE TURN LIGHT LH (F)

B
G/B

F-05 FRONT SIDE TURN LIGHT RH (F)

B
G/W

E-10 FRONT TURN LIGHT LH (F)

R/B	B	G/B

E-11 FRONT TURN LIGHT RH (F)

R/B	B	G/W

E-12 REAR TURN LIGHT LH (R)

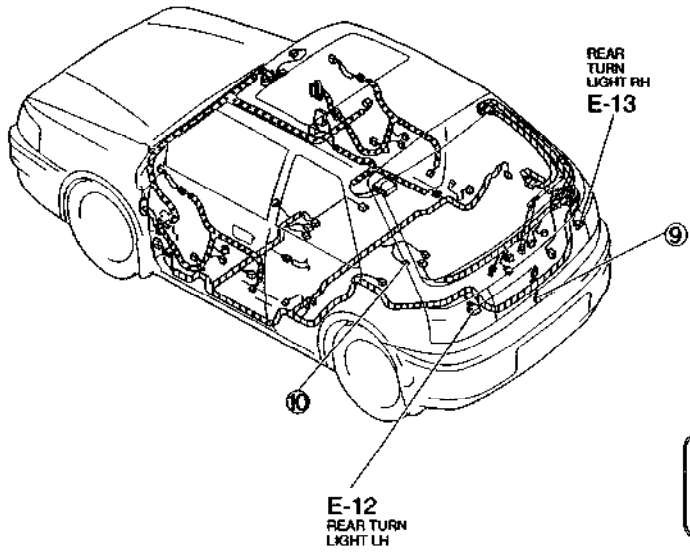
*	R/G	G/B
B	L/Y	G

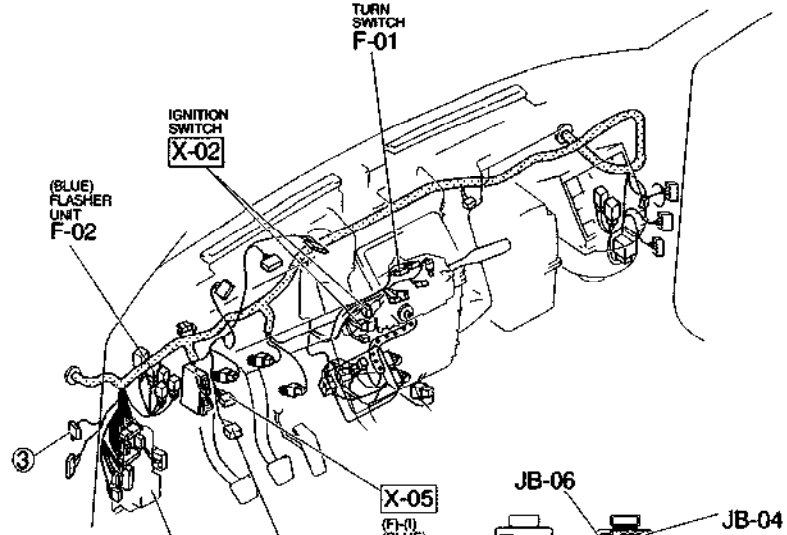
E-13 REAR TURN LIGHT RH (R)

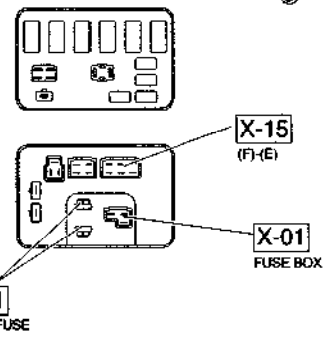
*	R/G	G/W
B	W	G

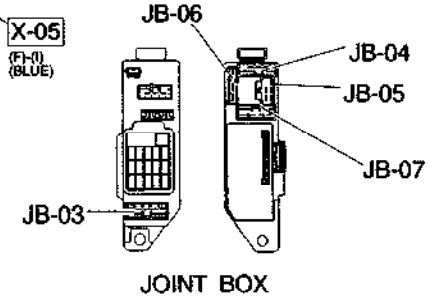
HARNESS SYMBOL : (F) (E) (I) (R) (DR) (IN) (FR) (EM) (INJ)

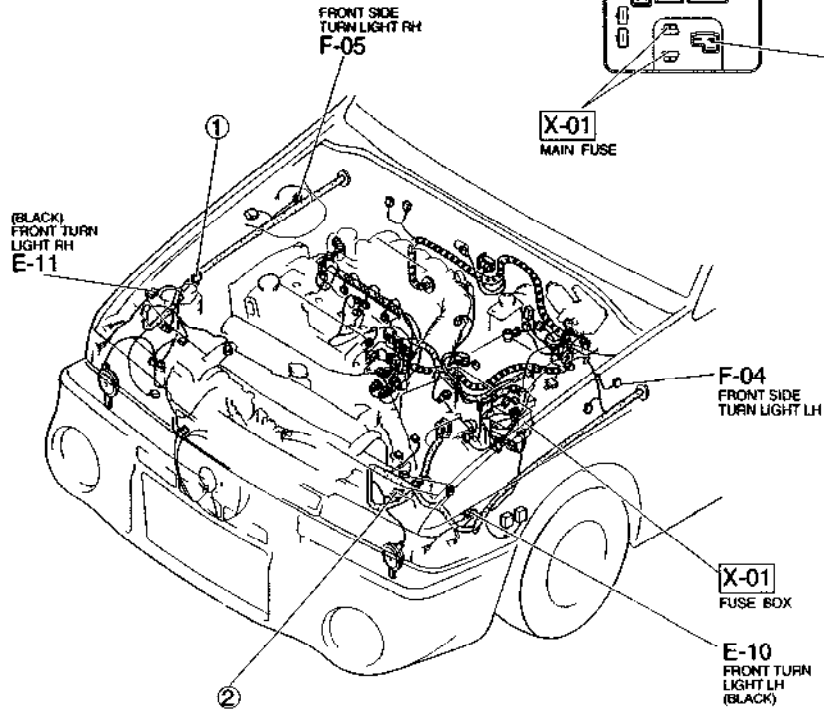
F-1

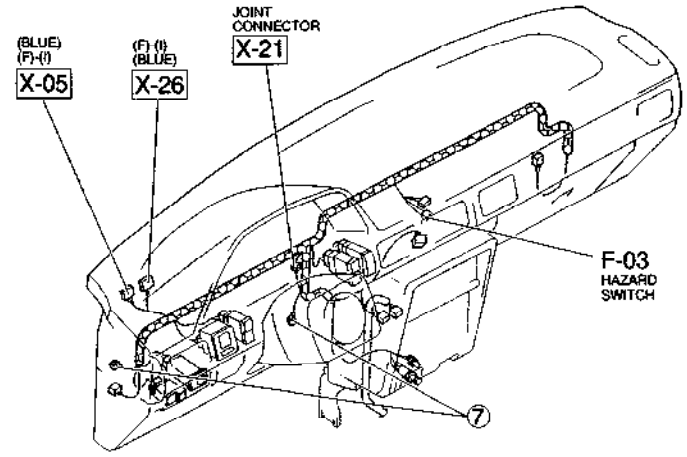




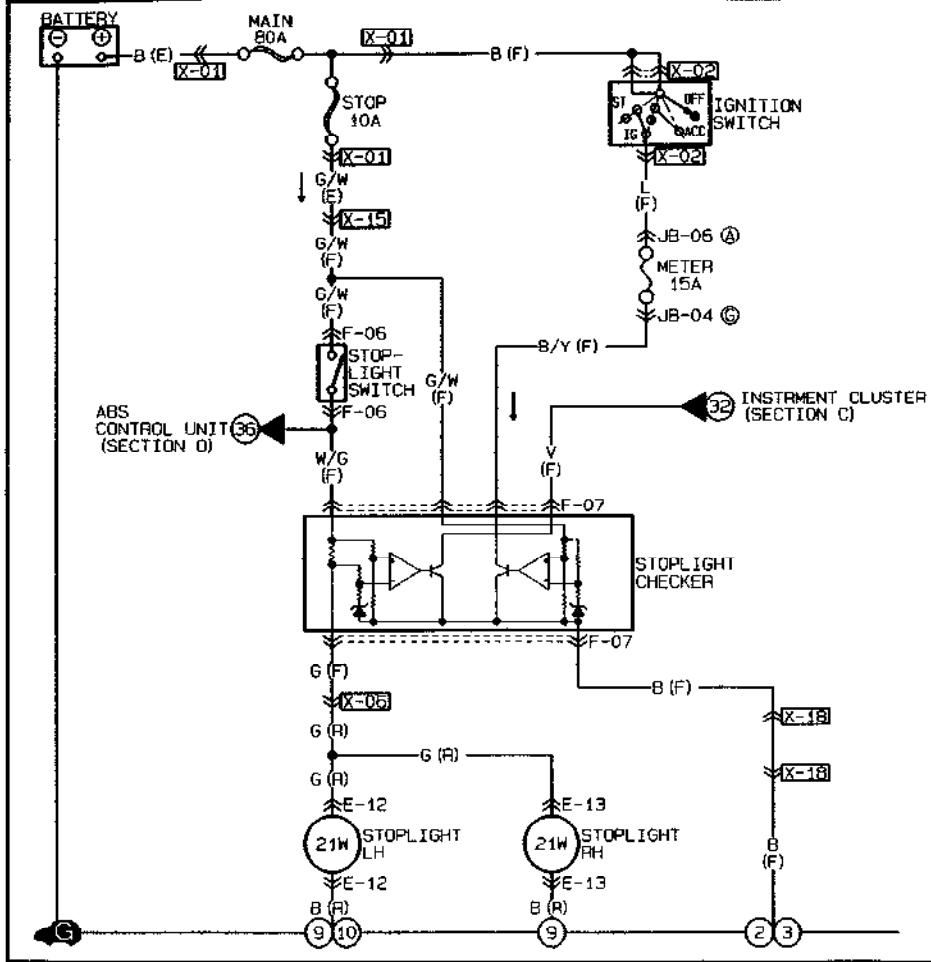






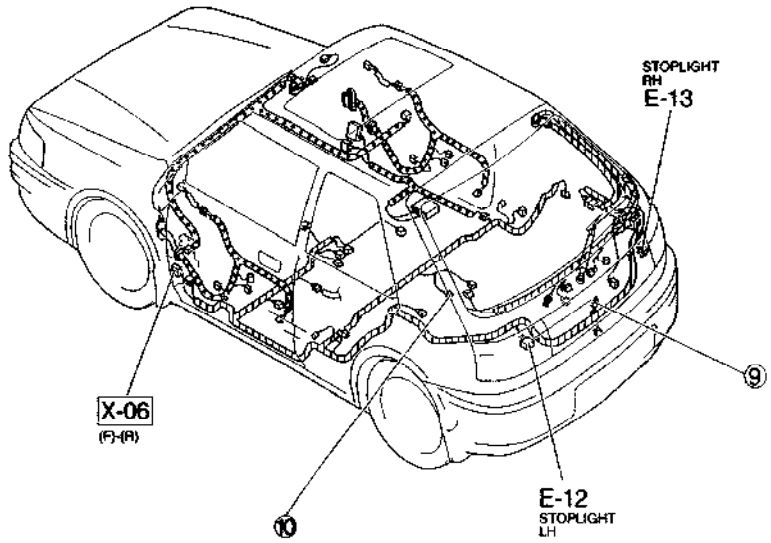


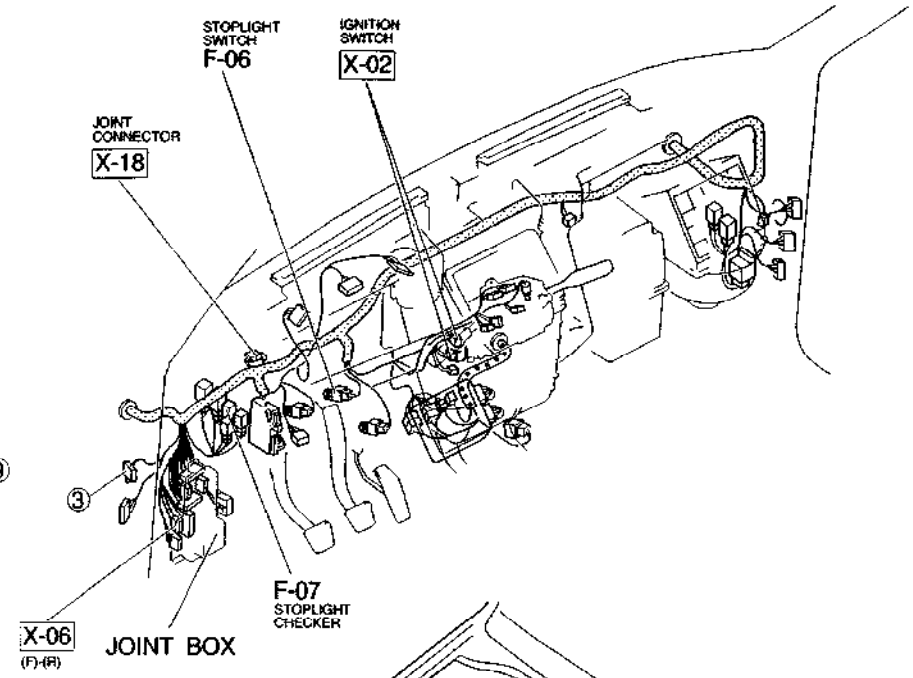
F-2 F.R.GERMANY ■ STOPLIGHTS



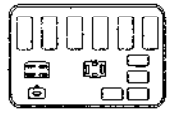
F-06 STOPLIGHT SWITCH (F)	F-07 STOPLIGHT CHECKER (F)	E-12 STOPLIGHT LH (A)	E-13 STOPLIGHT RH (A)
W/G G/W	* B/Y G/W B W/G V G	* R/G G/B B L/Y G	* R/G G/W B W G

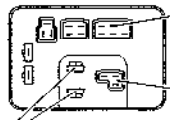
F-2





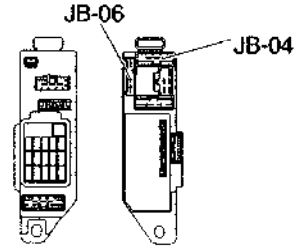
FUSE BOX

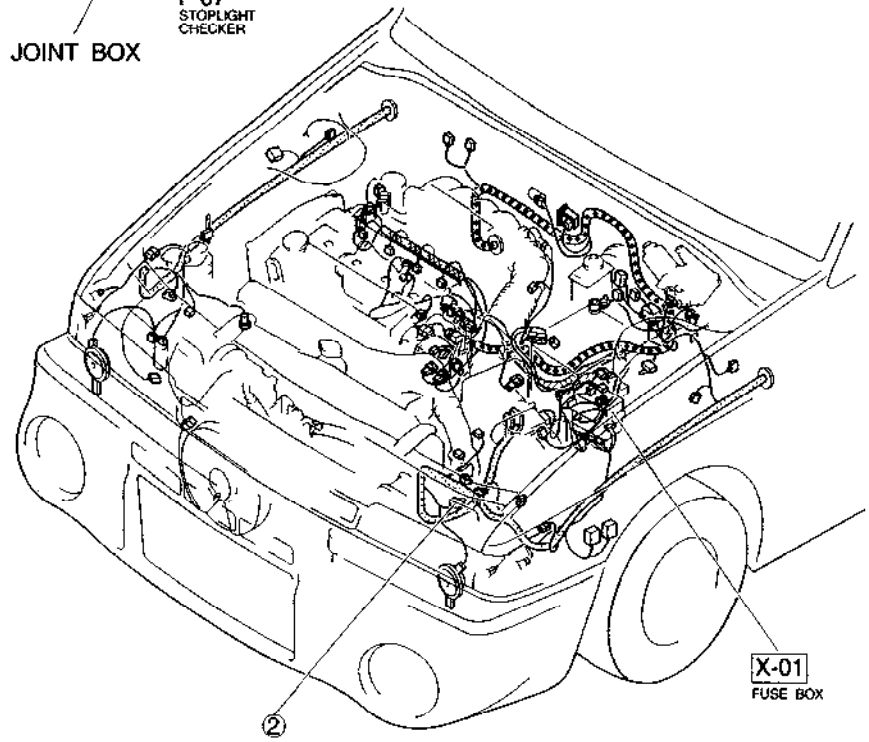




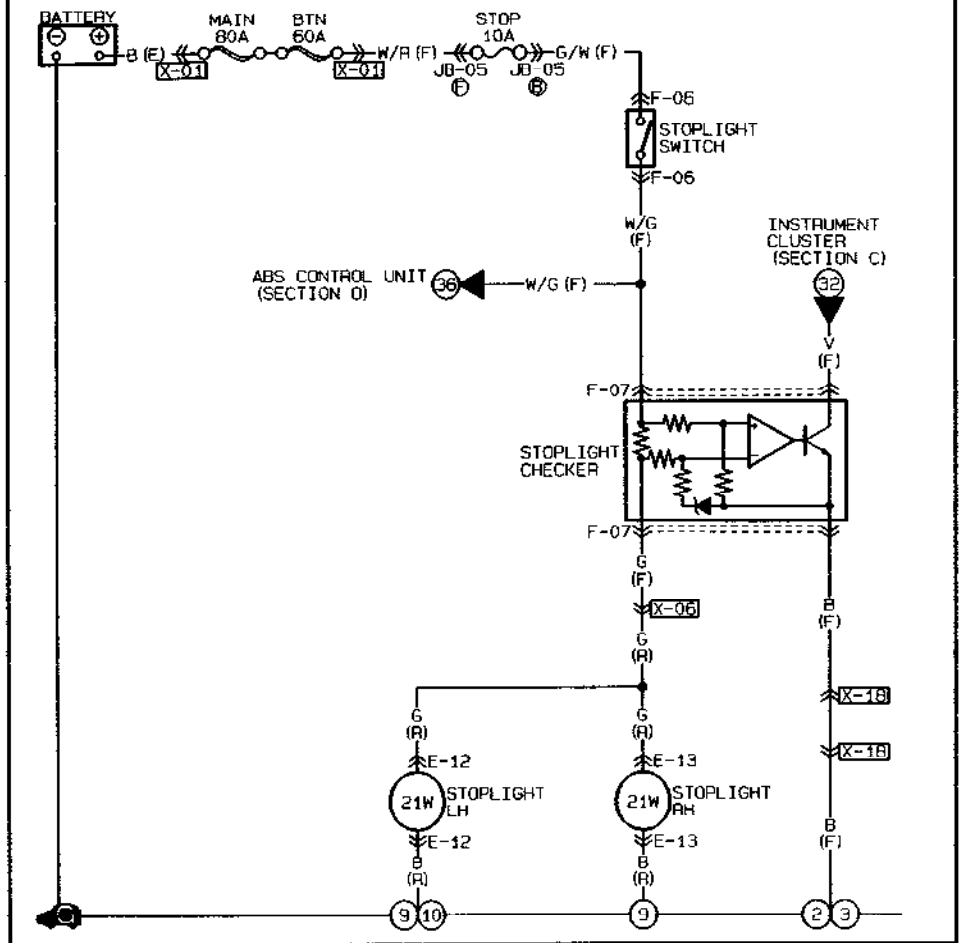
X-01
MAIN FUSE

JOINT BOX





F-3 EXCEPT F.R.GERMANY ■ STOPLIGHTS



F-06 STOPLIGHT SWITCH (F)

W/G	
G/W	

F-07 STOPLIGHT CHECKER (F)

V	W/G
G	B

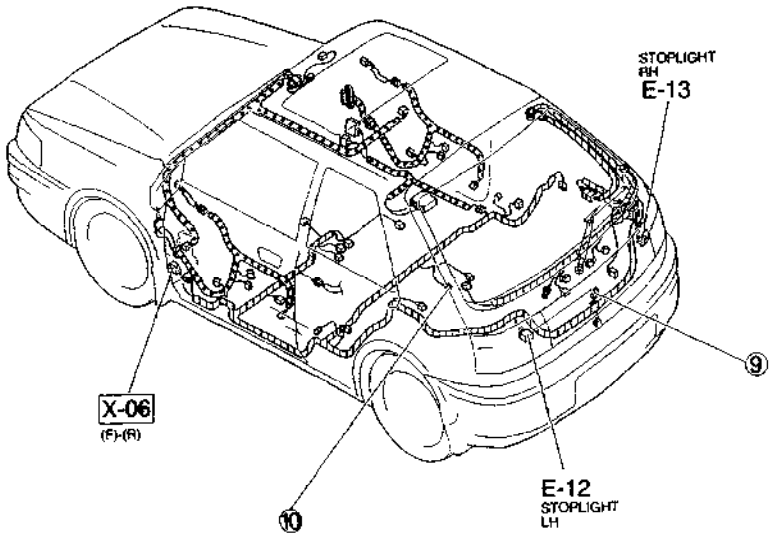
E-12 STOPLIGHT LH (R)

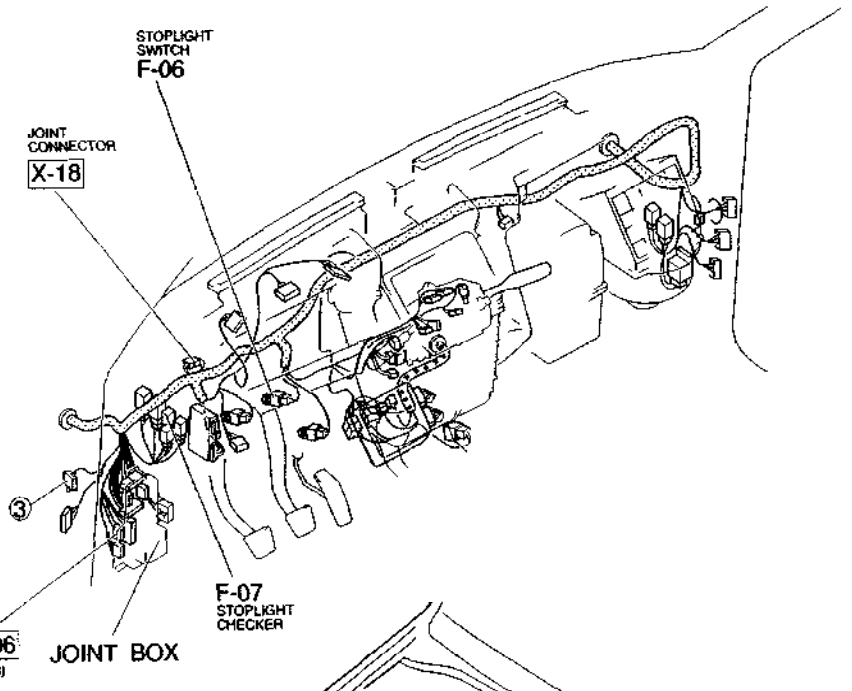
*	R/G	G/B
B	L/Y	G

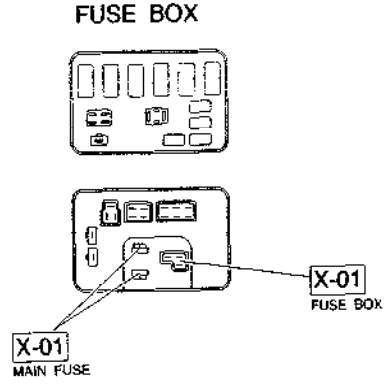
E-13 STOPLIGHT RH (R)

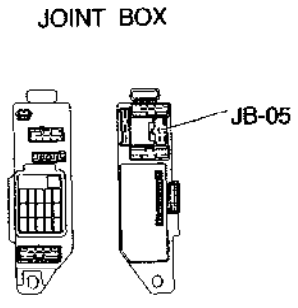
*	R/G	G/W
B	W	G

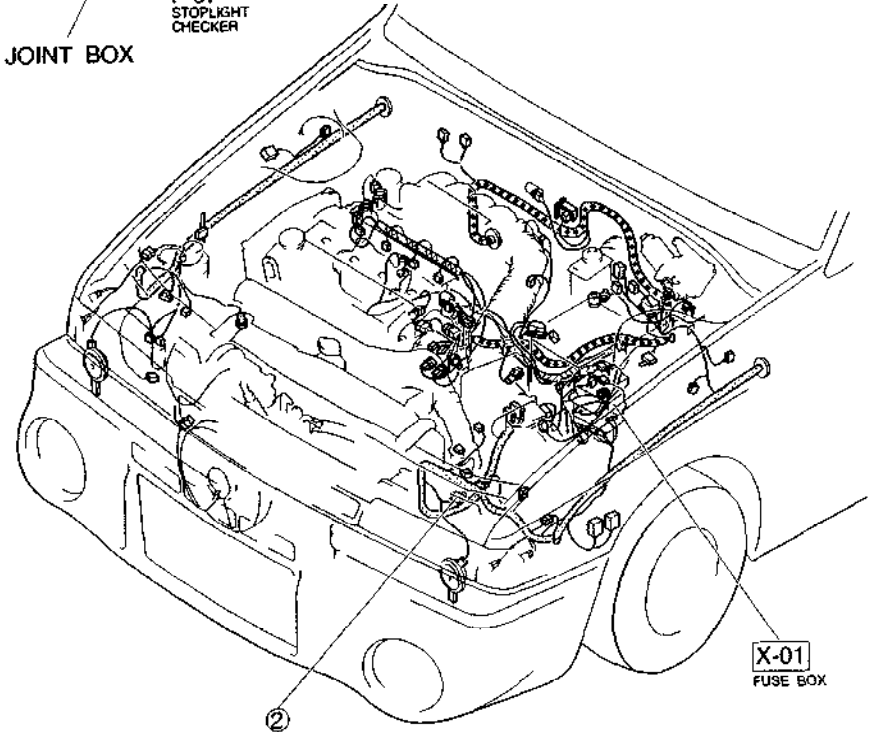
F-3


STOPLIGHT RH
E-13
X-06
(F)-(R)
E-12
STOPLIGHT LH
⑨
⑩


STOPLIGHT SWITCH
F-06
JOINT CONNECTOR
X-18
③
X-06
(F)-(R)
JOINT BOX
F-07
STOPLIGHT CHECKER

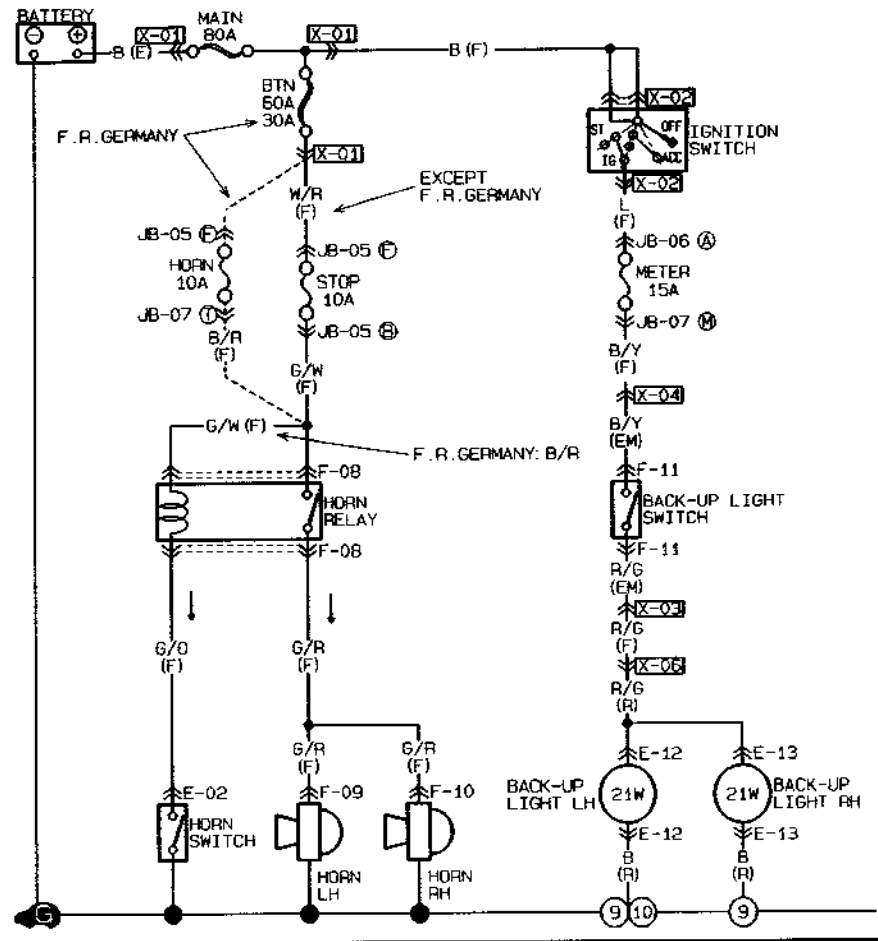

FUSE BOX
X-01
FUSE BOX
X-01
MAIN FUSE


JOINT BOX
JB-05

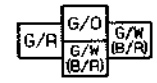

②
X-01
FUSE BOX

F-4 ● HORNS ● BACK-UP LIGHTS

( ) . . . F.R.GERMANY

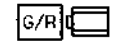


F-08 HORN RELAY (F)

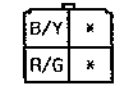


F-09 HORN LH (F)

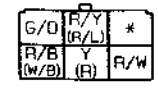
F-10 HORN RH (F)



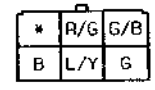
F-11 BACK-UP LIGHT SWITCH (EM)



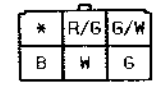
E-02 HORN SWITCH (F)



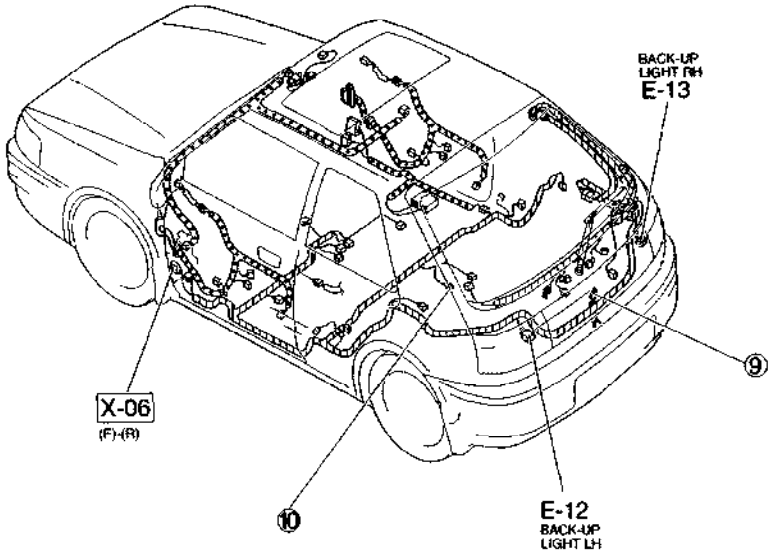
E-12 BACK-UP LIGHT LH (R)

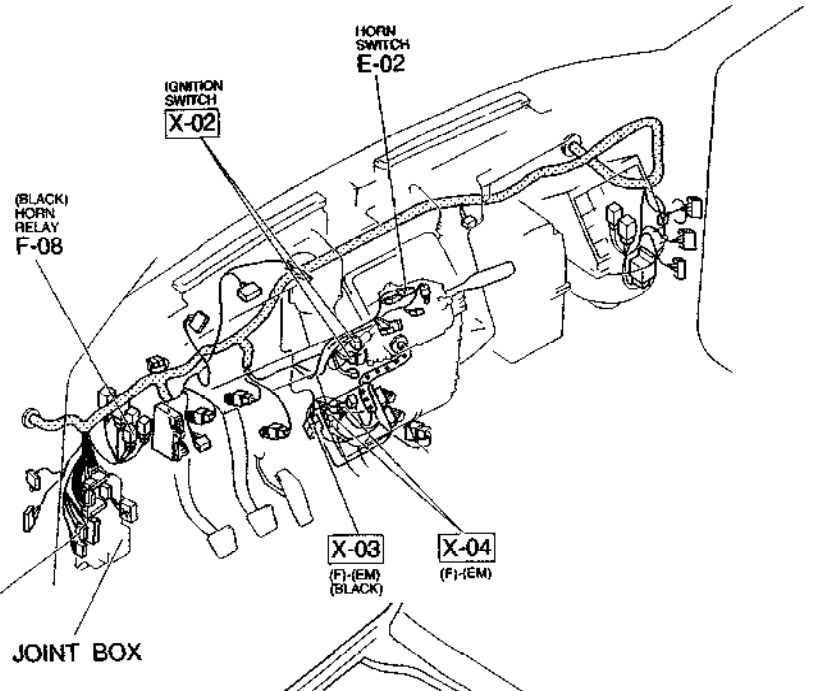


E-13 BACK-UP LIGHT RH (R)

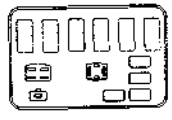


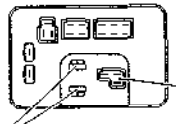
F-4





FUSE BOX

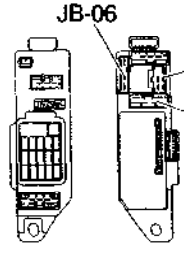


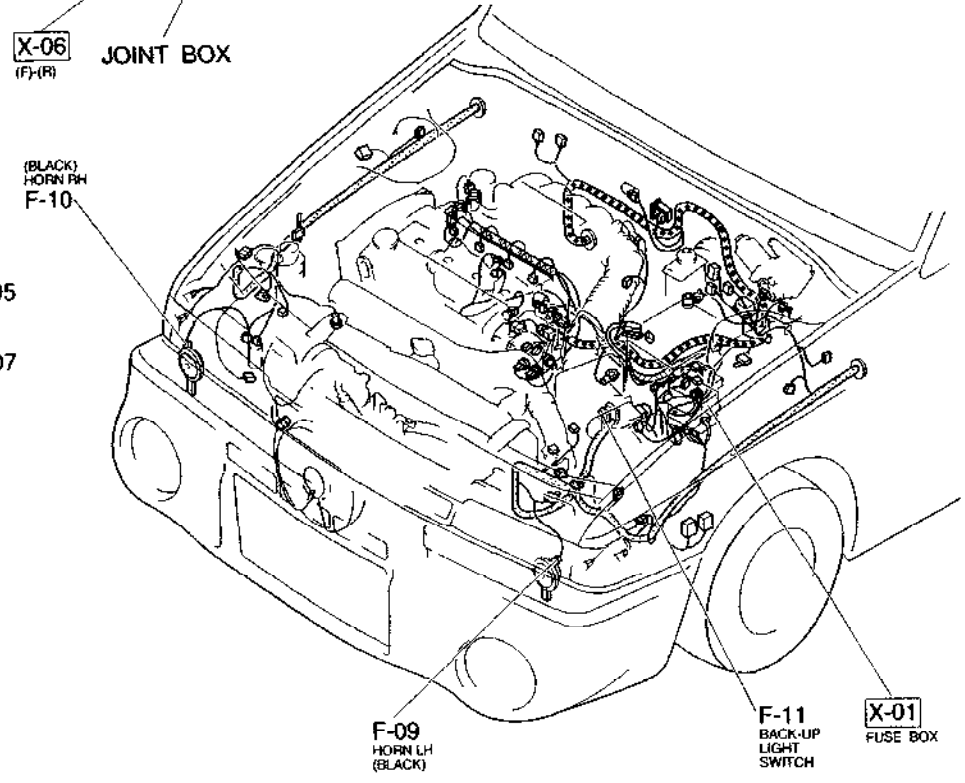


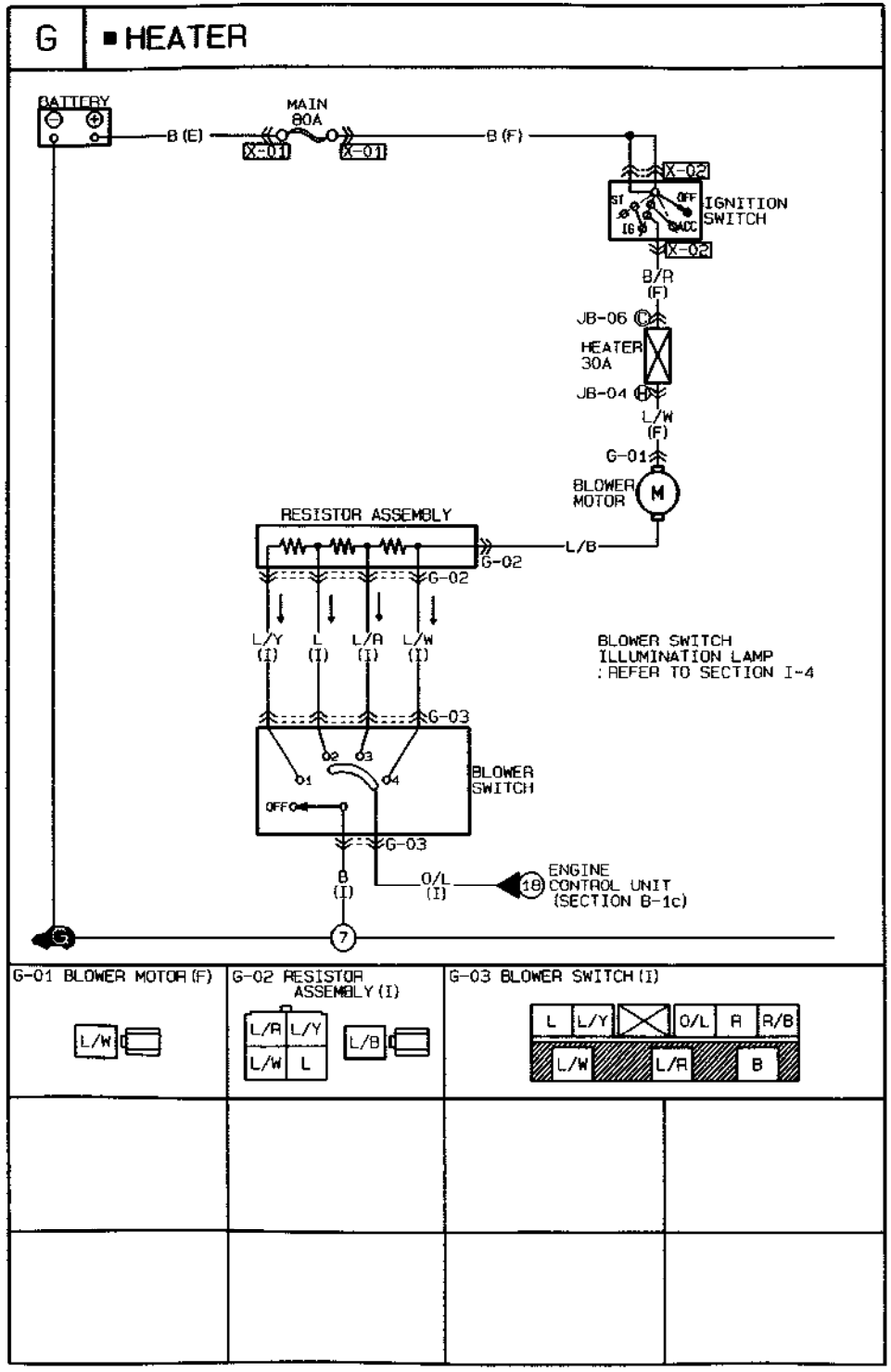
X-01
FUSE BOX

X-01
MAIN FUSE

JOINT BOX

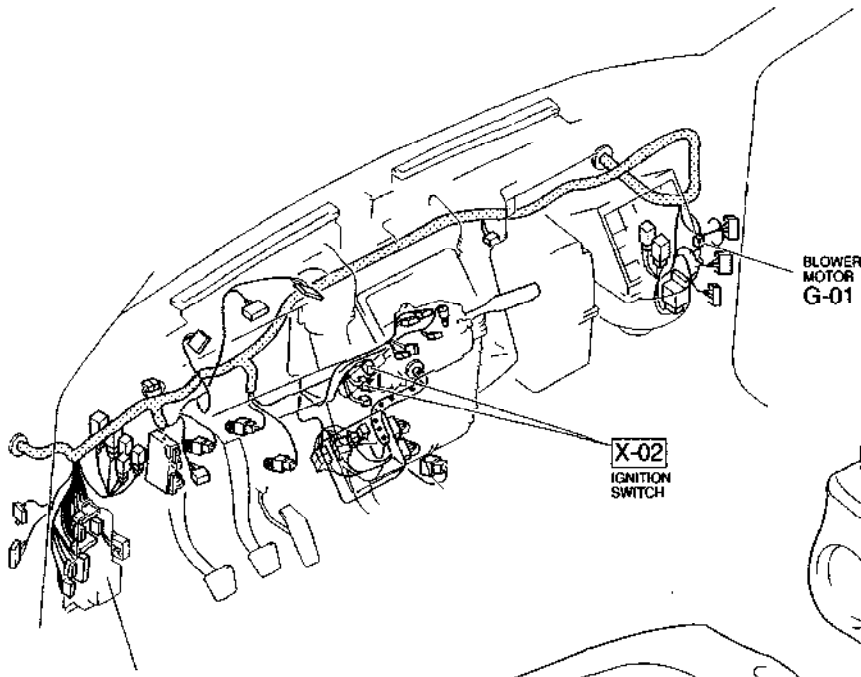


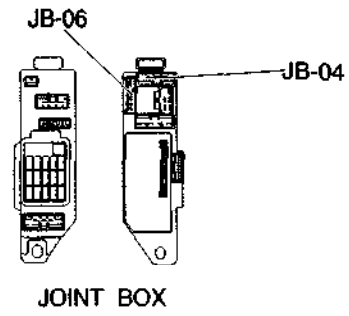


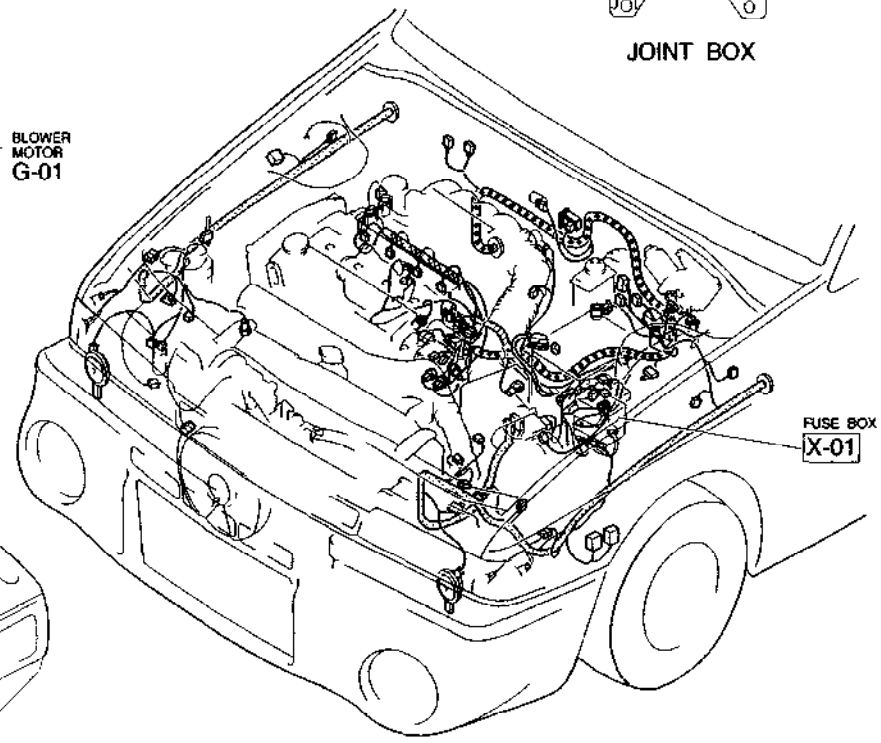

G
■ HEATER
BATTERY
MAIN
80A
B (E)
X-01
X-01
B (F)
X-02
IGNITION
SWITCH
X-02
B/R
(F)
JB-06
HEATER
30A
JB-04
L/W
(F)
G-01
BLOWER
MOTOR
M
RESISTOR ASSEMBLY
L/B
G-02
G-02
L/Y
(I)
L
(I)
L/R
(I)
L/W
(I)
BLOWER SWITCH
ILLUMINATION LAMP
: REFER TO SECTION I-4
G-03
BLOWER
SWITCH
OFF
G-03
B
(I)
O/L
(I)
18
ENGINE
CONTROL UNIT
(SECTION B-1c)
G
7
G-01 BLOWER MOTOR (F)
L/W
G-02 RESISTOR
ASSEMBLY (I)
L/R
L/Y
L/W
L
L/B
G-03 BLOWER SWITCH (I)
L
L/Y
O/L
R
R/B
L/W
L/R
B

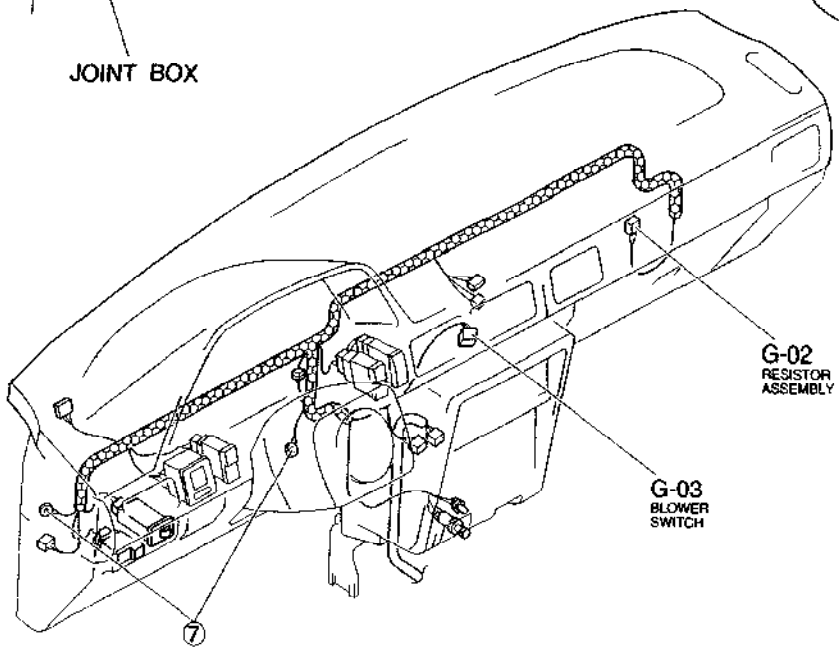
HARNESS SYMBOL : (F) (E) (I) (R) (DR) (IN) (FR) (EM) (INJ)

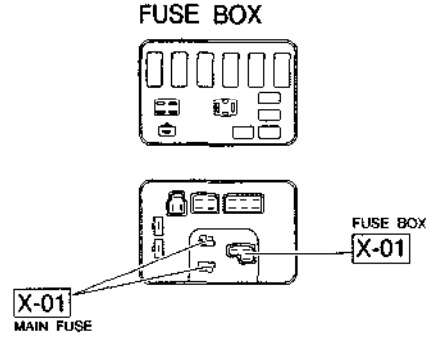
G











I-1 ■REAR WINDOW DEFROSTER ■DIGITAL CLOCK ■CIGARETTE LIGHTER

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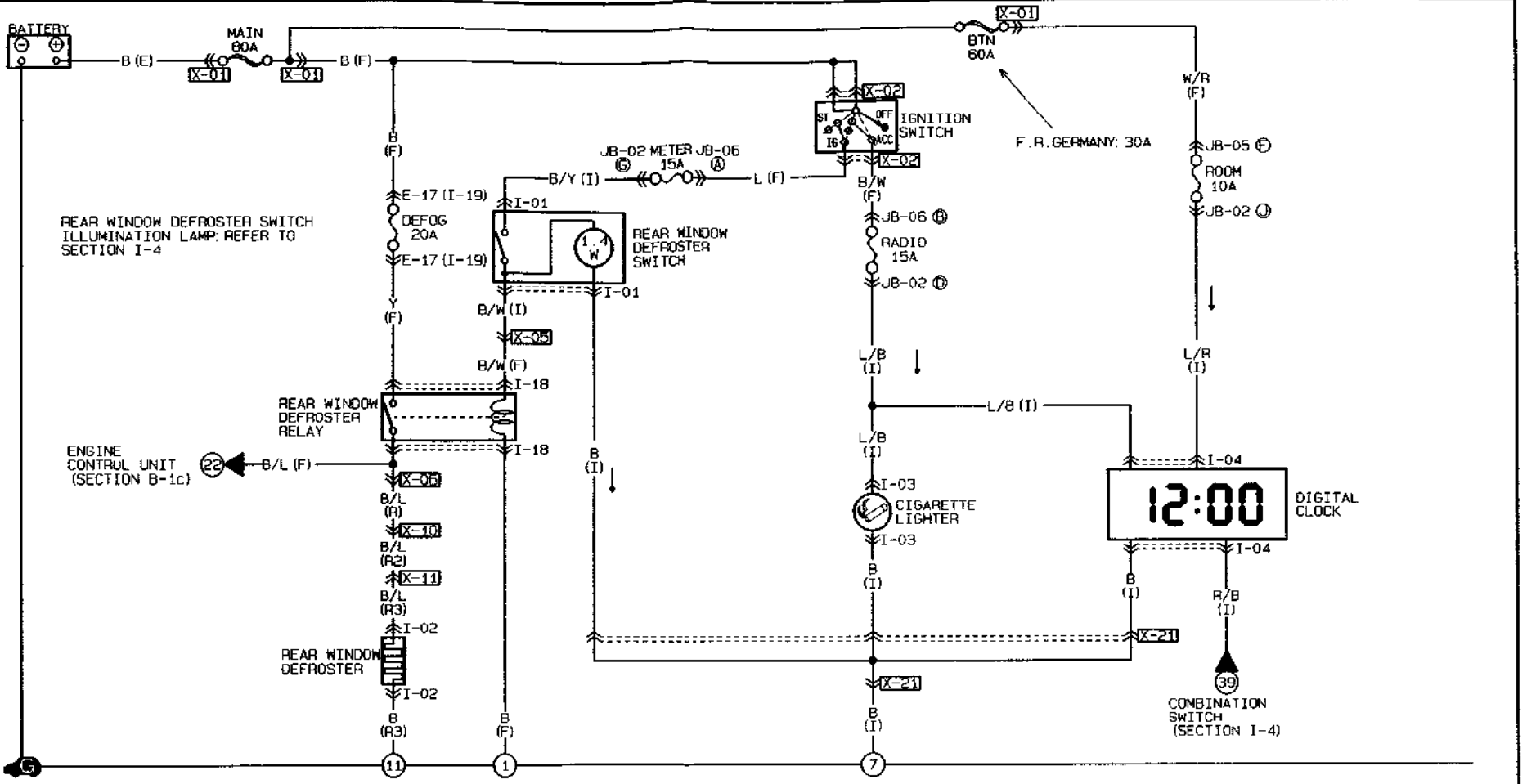


I-01 REAR WINDOW DEFROSTER SWITCH (I)

*	B/W	R/B
B	B/Y	R

I-02 REAR WINDOW DEFROSTER (R3)

B/L — B

I-03 CIGARETTE LIGHTER (I)

L/B — B

I-04 DIGITAL CLOCK (I)

R/B	B
L/B	L/R

I-18 REAR WINDOW DEFROSTER RELAY (F)

Y	B/W
B/L	B

E-17 FUSE (F)

G/L (R)	① B/W (R/B)	② * (B/Y)	B (R/W)	③ Y (R)	④ G/L (R/W)
* (R/L)	⑤ * (R/Y)	* (B)	⑥ * (G/L)		

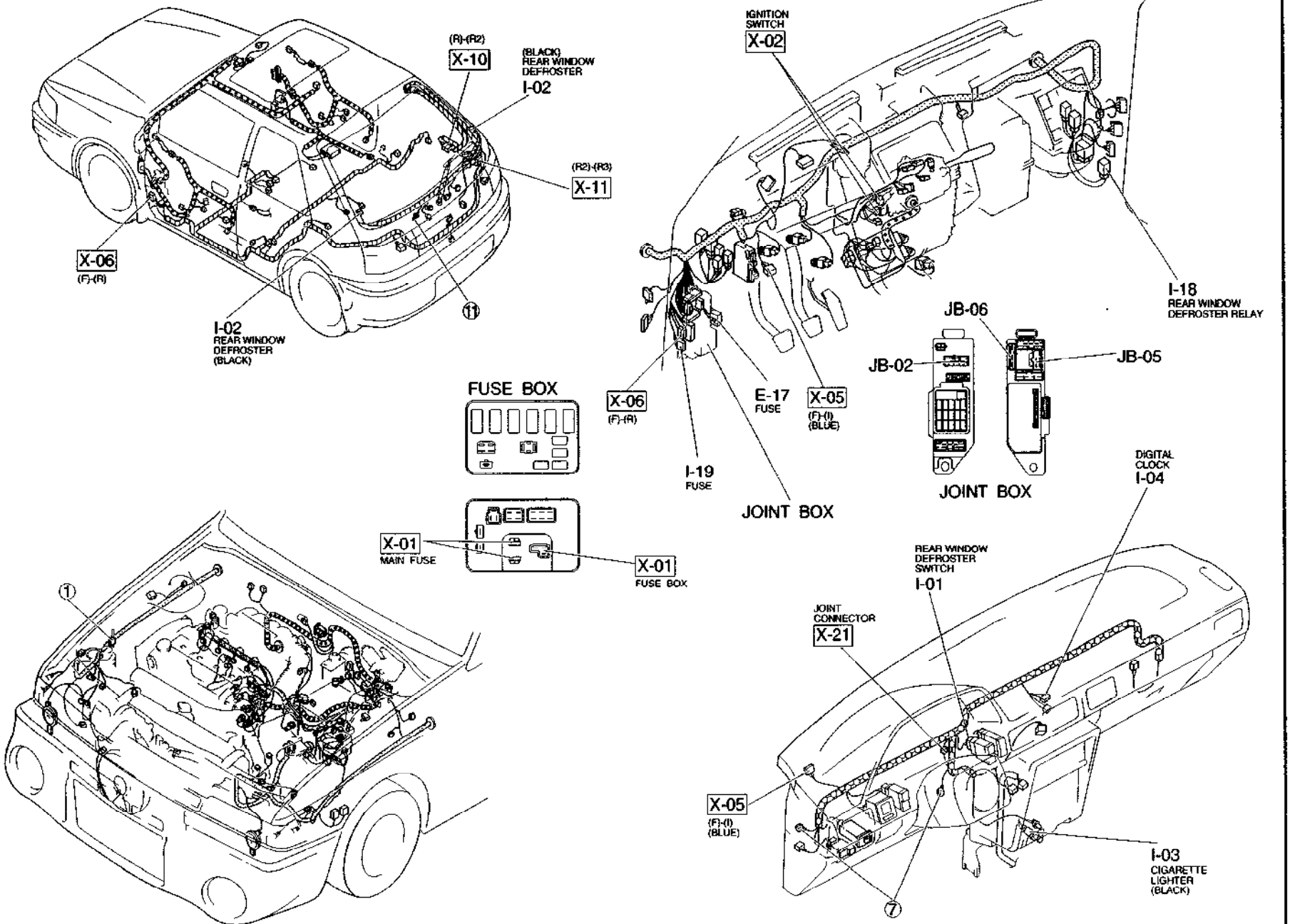
①	HEAD CLEANER	30A	(DIM.LH 10A)
②	*		(DIM.RH 10A)
③	DEFOG	20A	(MAIN.LH 10A)
④	F.FOG	15A	(MAIN.RH 10A)
⑤	*		(R.FOG 10A)
⑥	*		(F.FOG 15A)

I-19 FUSE (F)

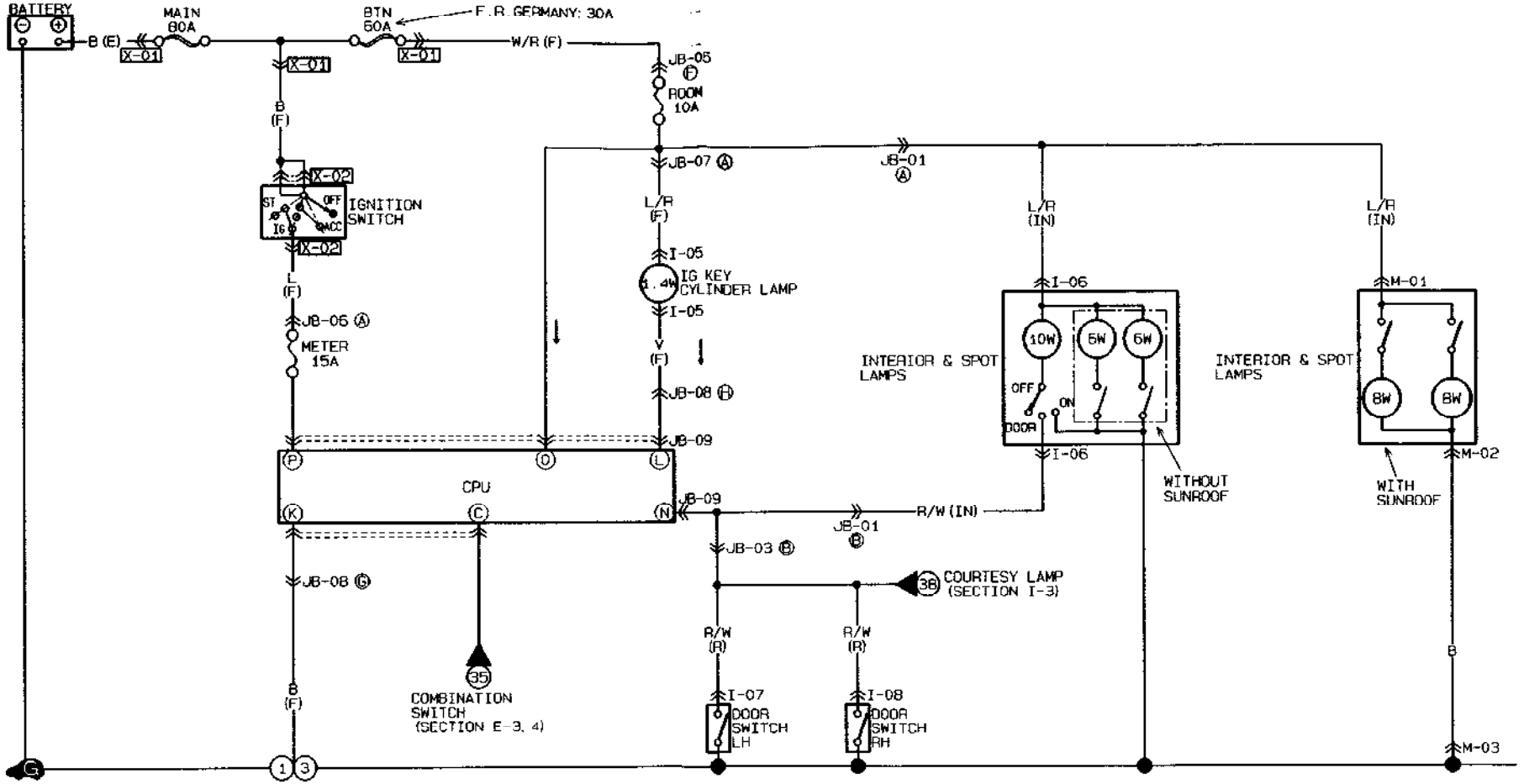
Y	20A	B

DEFOG

I-1


(R)-(R2)
X-10
(BLACK)
REAR WINDOW
DEFROSTER
I-02
(R2)-(R3)
X-11
X-06
(F)-(R)
I-02
REAR WINDOW
DEFROSTER
(BLACK)
11
IGNITION
SWITCH
X-02
I-18
REAR WINDOW
DEFROSTER RELAY
JB-06
JB-02
JB-05
JOINT BOX
X-06
(F)-(R)
E-17
FUSE
X-05
(F)-(I)
(BLUE)
I-19
FUSE
JOINT BOX
FUSE BOX
X-01
MAIN FUSE
X-01
FUSE BOX
1
DIGITAL
CLOCK
I-04
REAR WINDOW
DEFROSTER
SWITCH
I-01
JOINT
CONNECTOR
X-21
X-05
(F)-(I)
(BLUE)
I-03
CIGARETTE
LIGHTER
(BLACK)
7

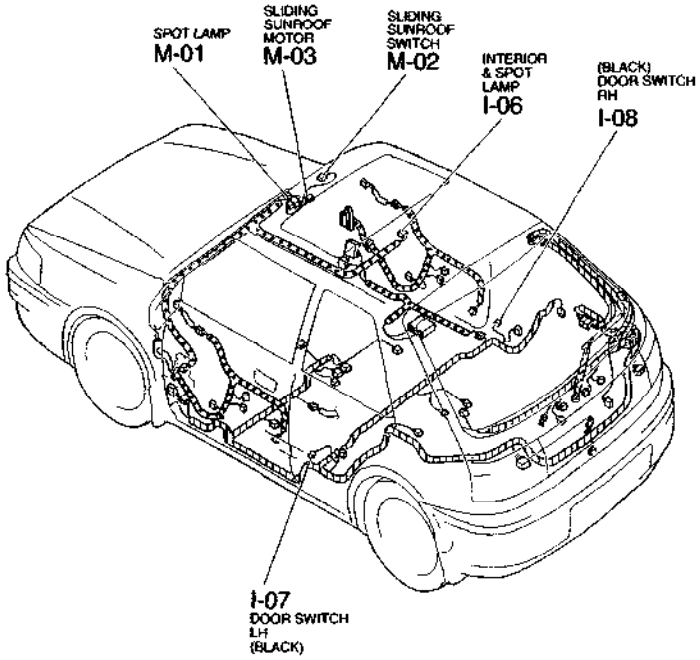
I-2 ■ INTERIOR & SPOT LAMPS ■ IG KEY CYLINDER LAMP ■ SOUND WARNING SYSTEM

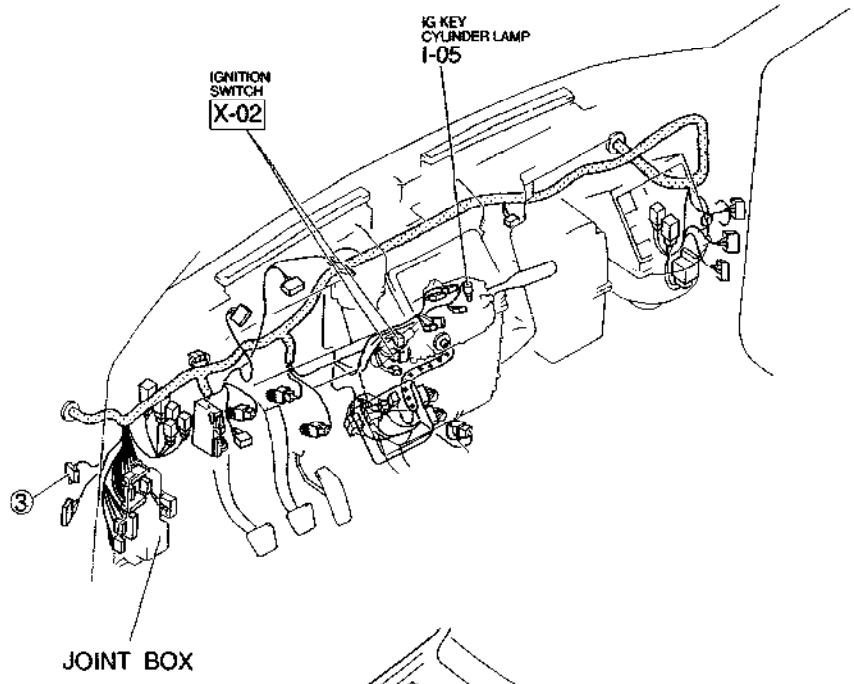


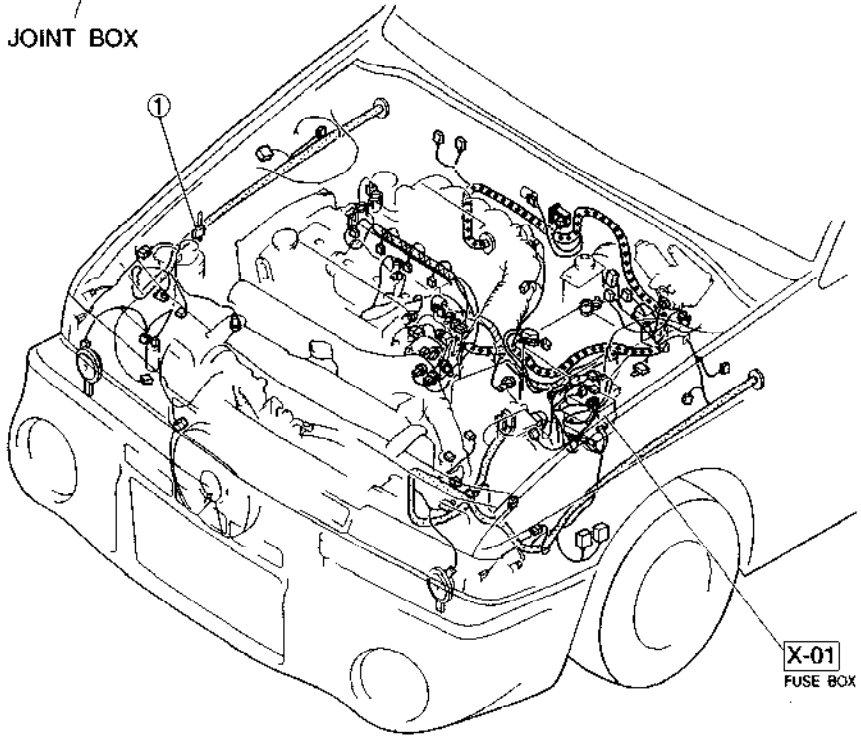
I-05 IG KEY CYLINDER LAMP (F)	I-06 INTERIOR & SPOT LAMP (IN)	I-07 DOOR SWITCH LH (R)	I-08 DOOR SWITCH RH (R)	M-01 SPOT LAMP (IN)	M-02 SLIDING SUNROOF SWITCH
V | L/R	WITHOUT SUNROOF: R/W | L/R; WITH SUNROOF: R/W | L/R	R/W	R/W	G/O | L/R	L/G | L/W | G; B | L | L/Y

M-03 SLIDING SUNROOF MOTOR
Y | L/Y | L/G; Y/R | B | L | L/G | L/W

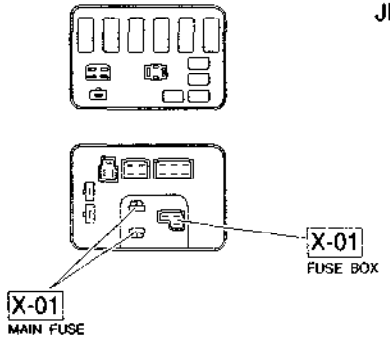
I-2



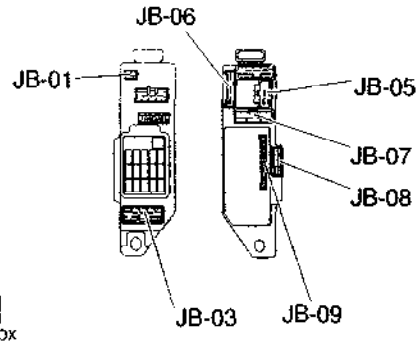




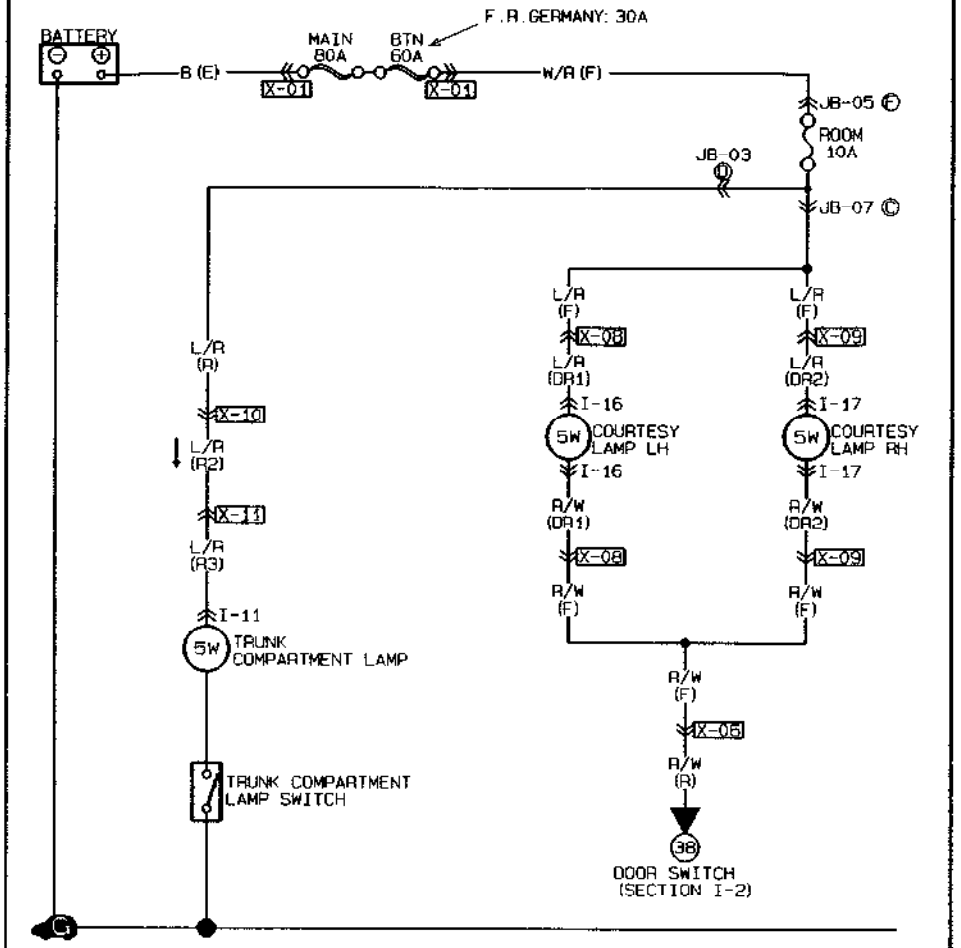
FUSE BOX



JOINT BOX



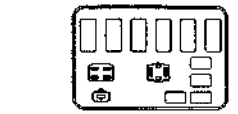
I-3 ■ TRUNK COMPARTMENT LAMP ■ COURTESY LAMPS



I-11 TRUNK COMPARTMENT LAMP (R3)	I-16 COURTESY LAMP LH (DR1)	I-17 COURTESY LAMP RH (DR2)	
L/R	R/W L/R	R/W L/R	

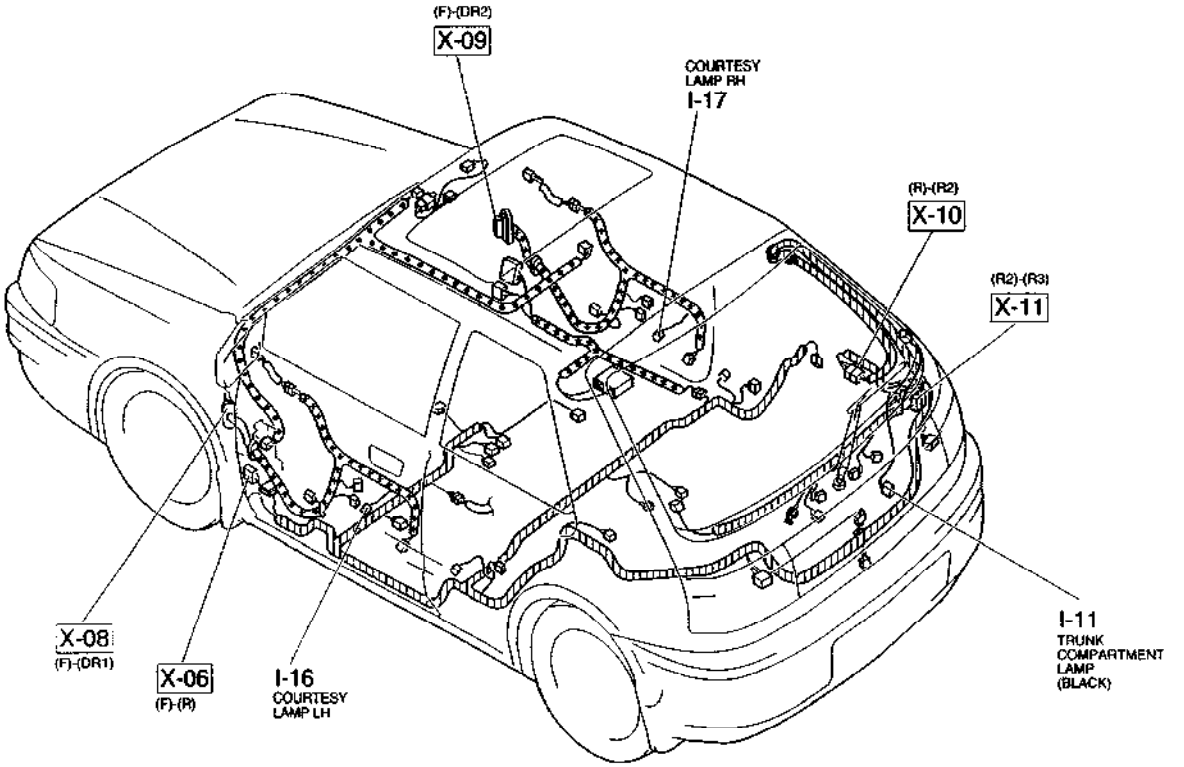
I-3

FUSE BOX

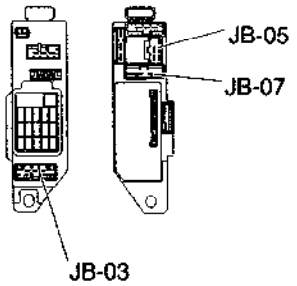


X-01
FUSE BOX

X-01
MAIN FUSE



JOINT BOX



I-4 ■ ILLUMINATION LAMPS

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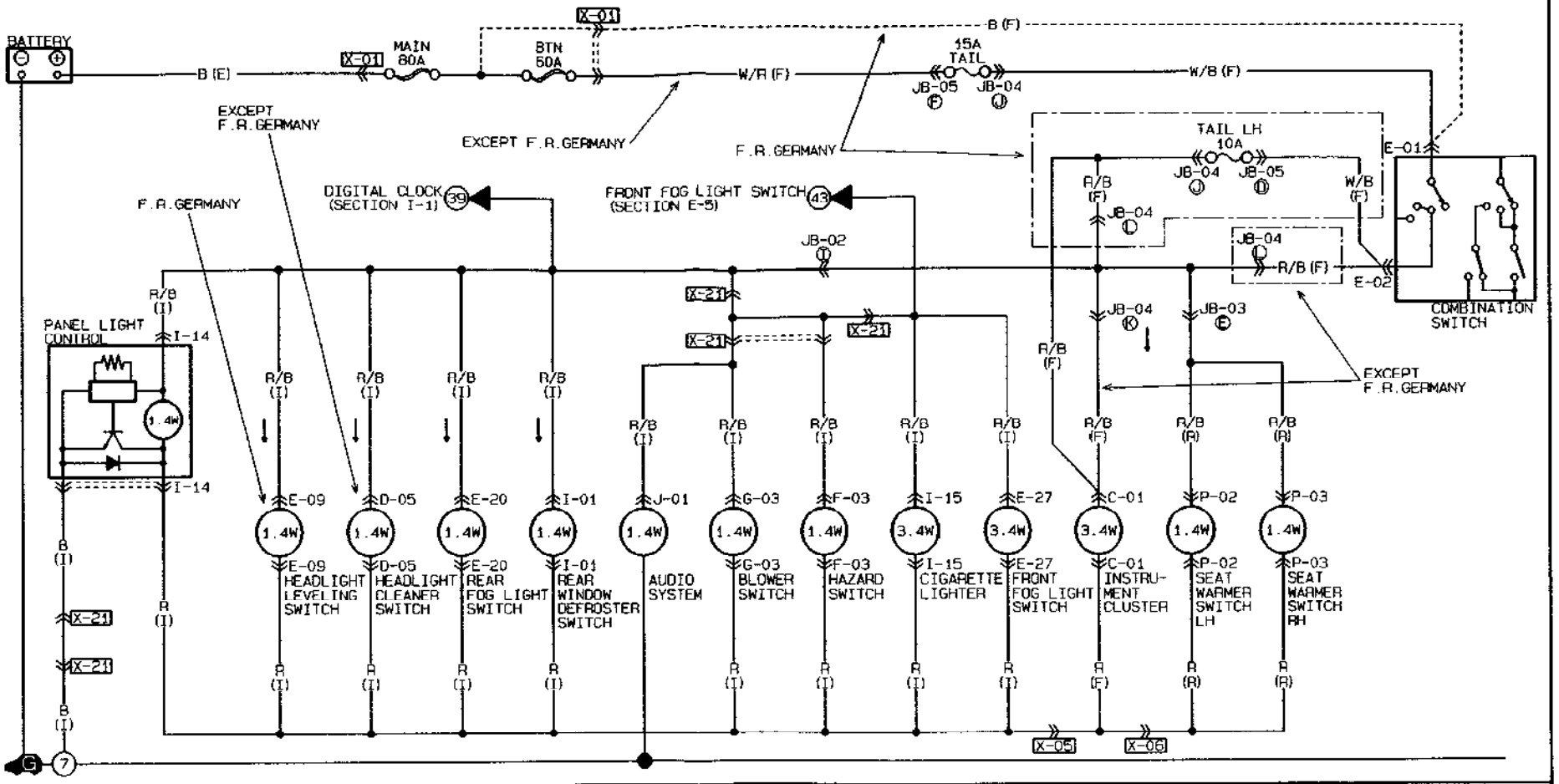
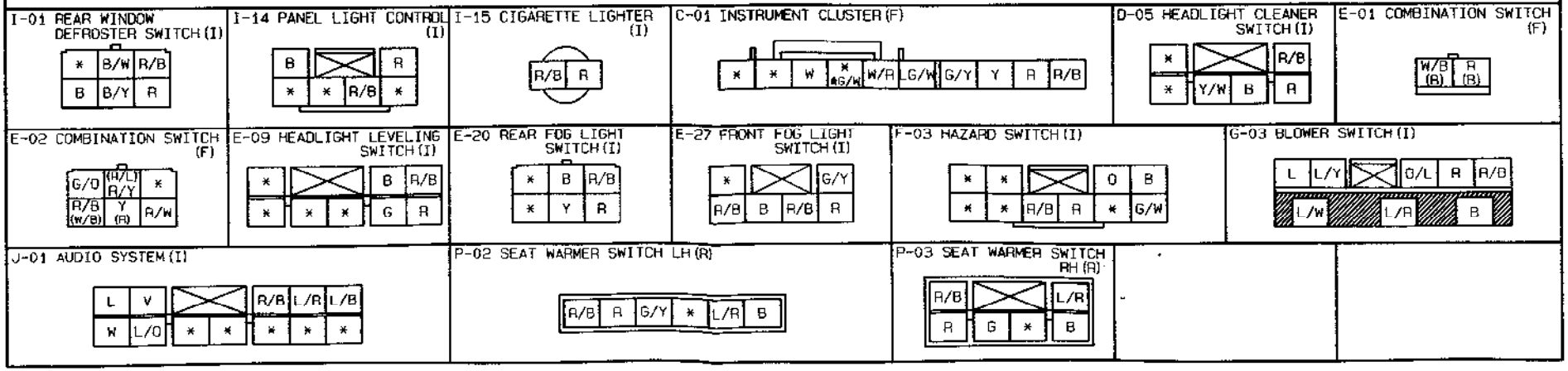
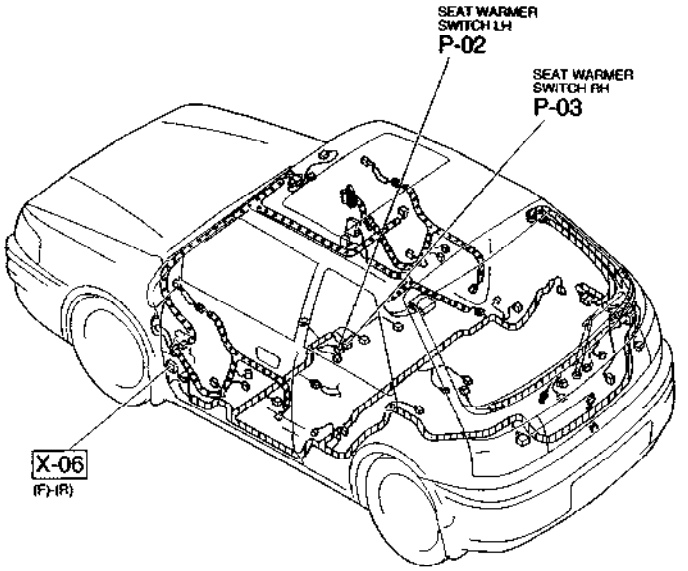
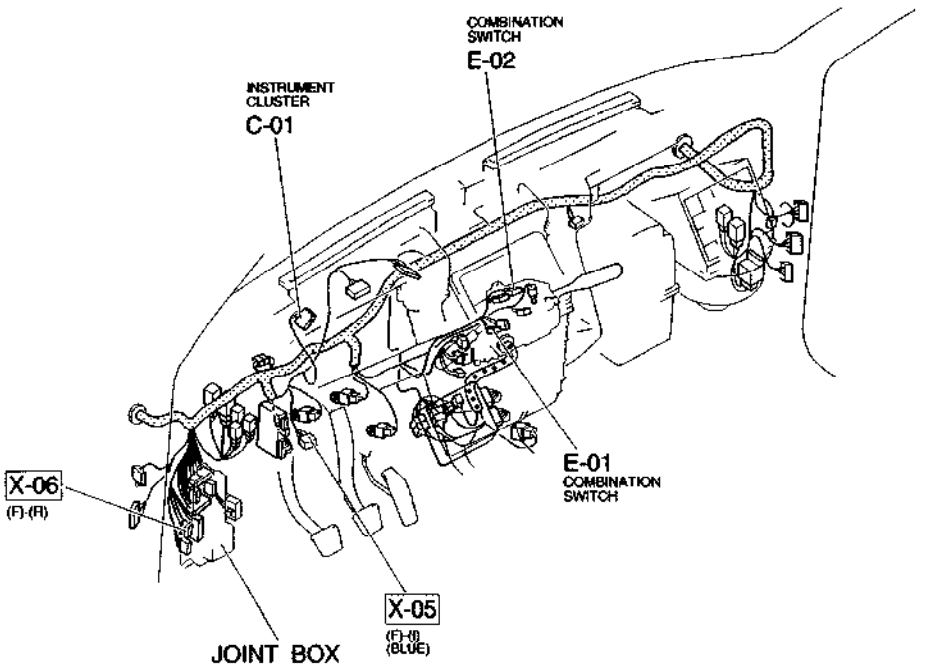
★ . . . ABS

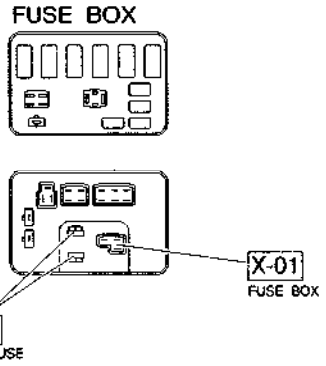


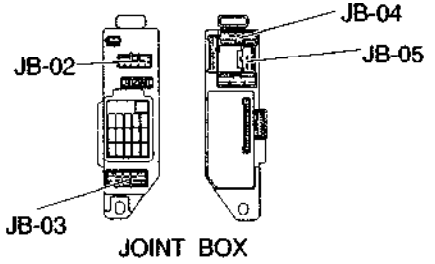


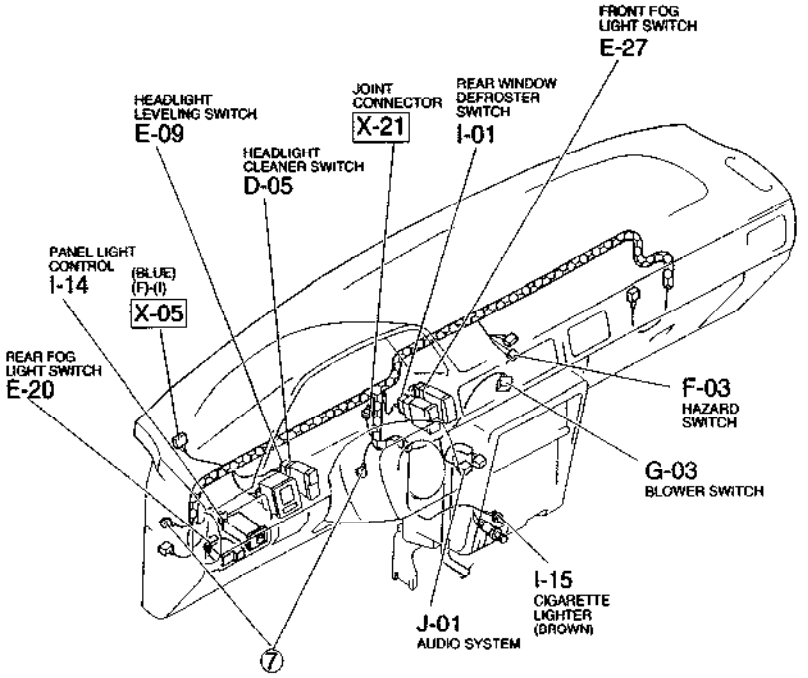
I-4


SEAT WARMER SWITCH LH
P-02
SEAT WARMER SWITCH RH
P-03
X-06
(F)-(R)

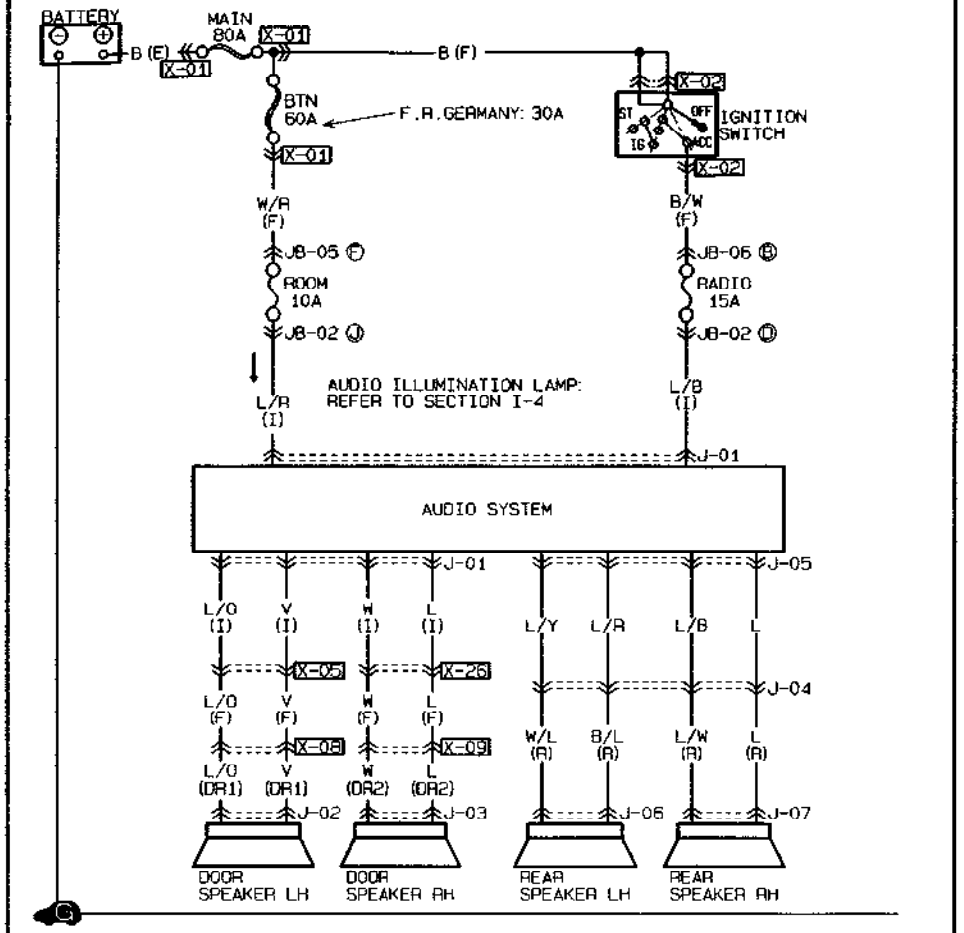

COMBINATION SWITCH
E-02
INSTRUMENT CLUSTER
C-01
E-01
COMBINATION SWITCH
X-06
(F)-(R)
X-05
(F)-(I)
(BLUE)
JOINT BOX


FUSE BOX
X-01
FUSE BOX
X-01
MAIN FUSE

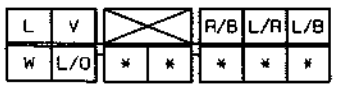

JB-04
JB-05
JB-02
JB-03
JOINT BOX


FRONT FOG LIGHT SWITCH
E-27
HEADLIGHT LEVELING SWITCH
E-09
JOINT CONNECTOR
X-21
REAR WINDOW DEFROSTER SWITCH
I-01
HEADLIGHT CLEANER SWITCH
D-05
PANEL LIGHT CONTROL
I-14
(BLUE)
(F)-(I)
X-05
REAR FOG LIGHT SWITCH
E-20
F-03
HAZARD SWITCH
G-03
BLOWER SWITCH
I-15
CIGARETTE LIGHTER
(BROWN)
J-01
AUDIO SYSTEM
7

J ■ AUDIO SYSTEM



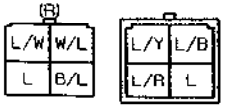
J-01 AUDIO SYSTEM (I)



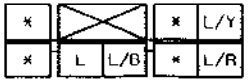
J-02 DOOR SPEAKER LH (DR1)

J-03 DOOR SPEAKER RH (DR2)

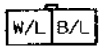
J-04 REAR SPEAKER CORD (R)



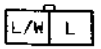
J-05 AUDIO SYSTEM



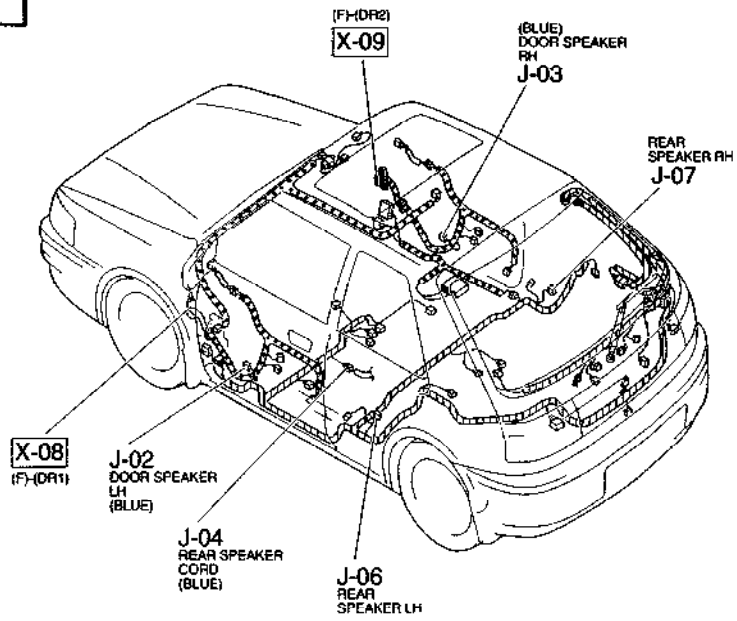
J-06 REAR SPEAKER LH (R)

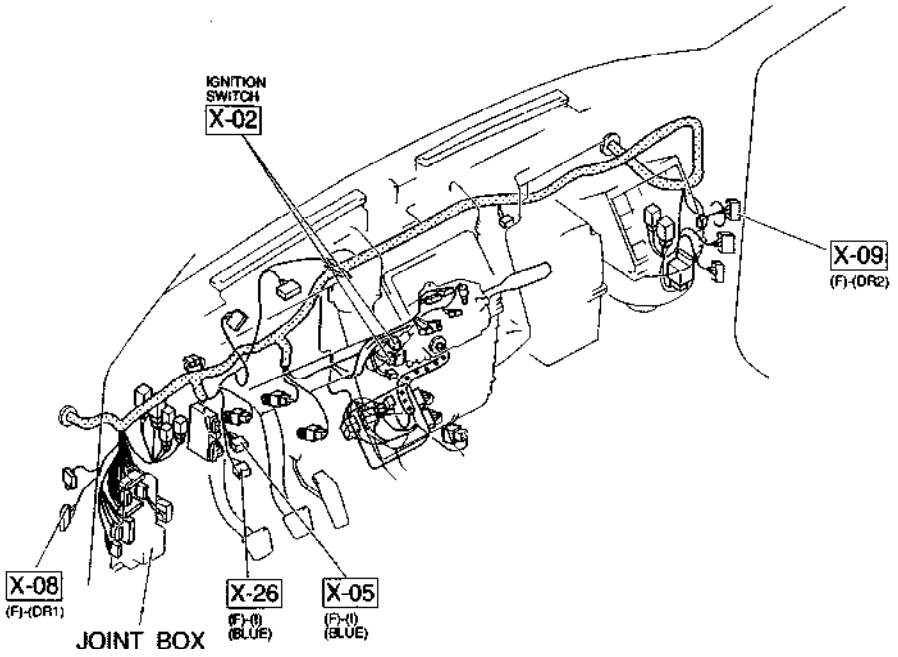


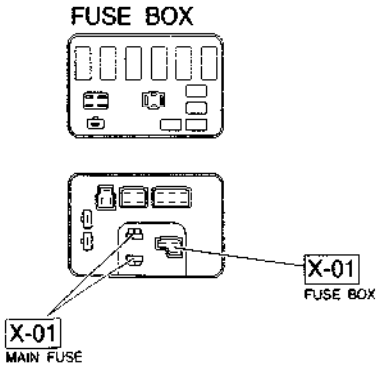
J-07 REAR SPEAKER RH (R)

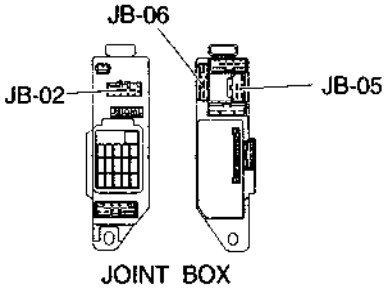


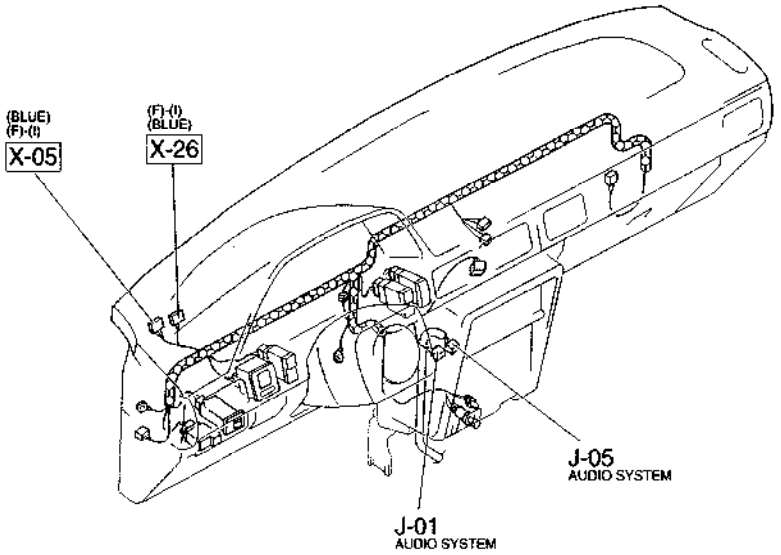
J


(F)-(DR2)
X-09
(BLUE)
DOOR SPEAKER
RH
J-03
REAR
SPEAKER RH
J-07
X-08
(F)-(DR1)
J-02
DOOR SPEAKER
LH
(BLUE)
J-04
REAR SPEAKER
CORD
(BLUE)
J-06
REAR
SPEAKER LH

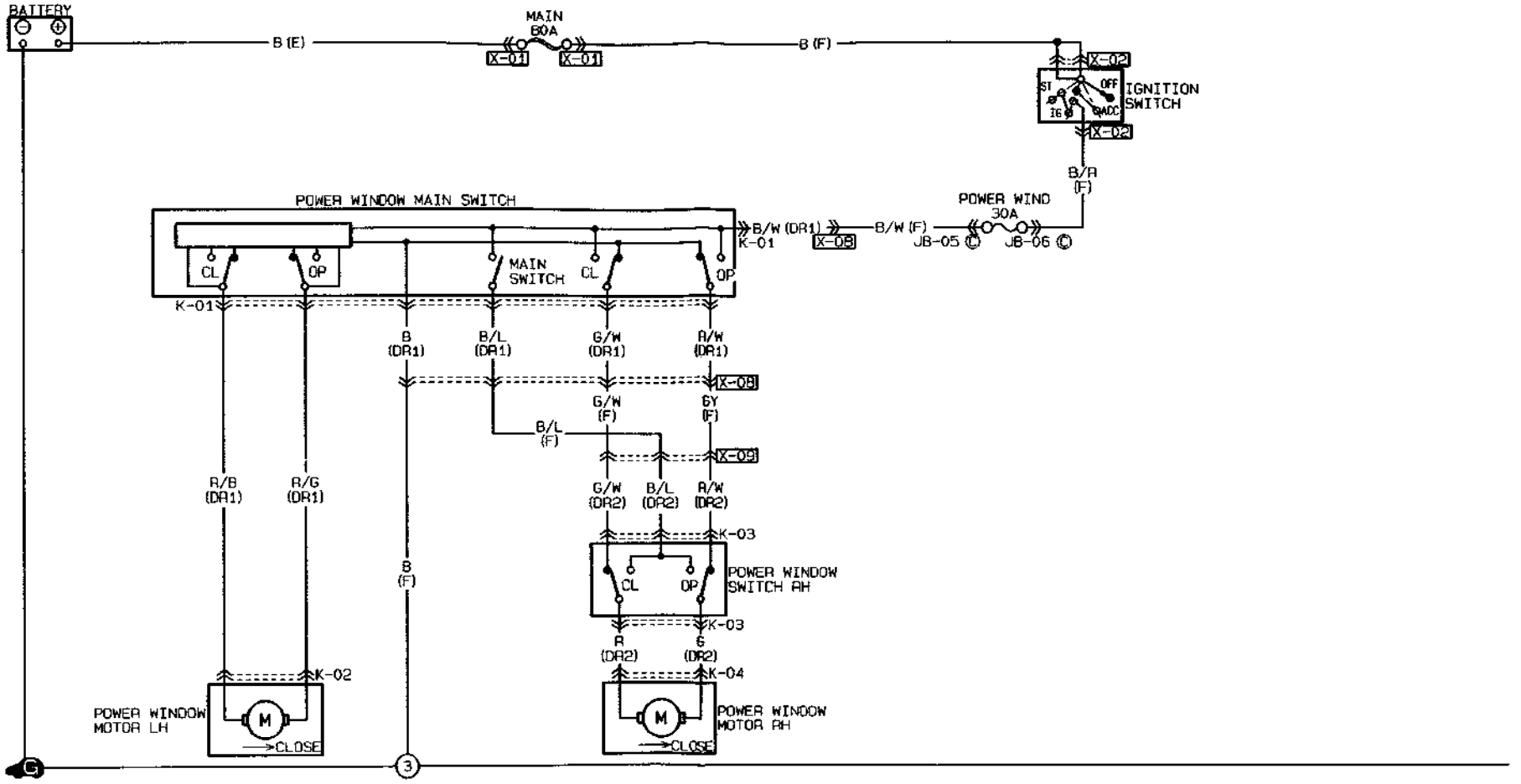

IGNITION
SWITCH
X-02
X-09
(F)-(DR2)
X-08
(F)-(DR1)
JOINT BOX
X-26
(F)-(I)
(BLUE)
X-05
(F)-(I)
(BLUE)


FUSE BOX
X-01
FUSE BOX
X-01
MAIN FUSE


JB-06
JB-02
JB-05
JOINT BOX

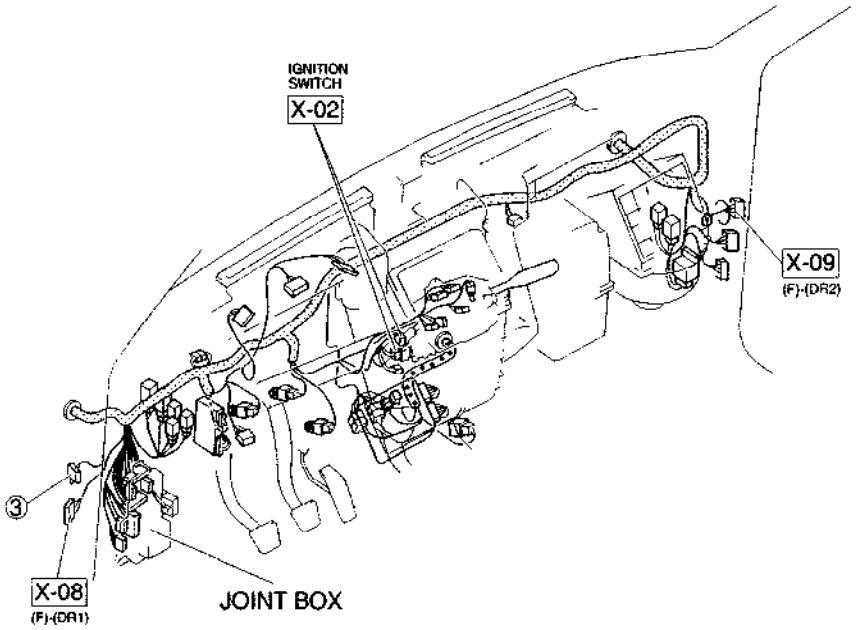

(BLUE)
(F)-(I)
X-05
(F)-(I)
(BLUE)
X-26
J-05
AUDIO SYSTEM
J-01
AUDIO SYSTEM

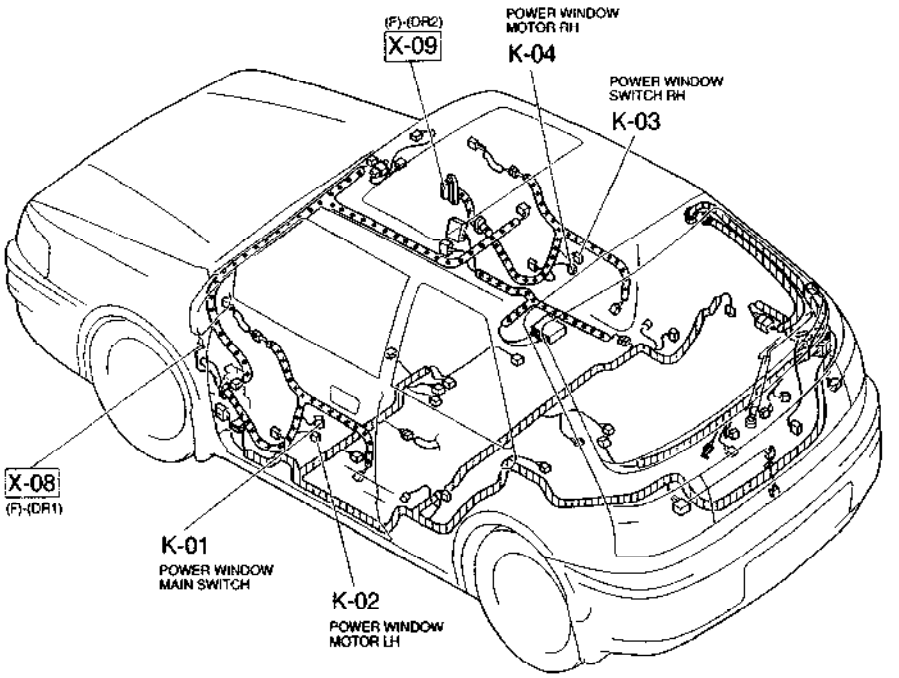
K-1 ■ POWER WINDOWS

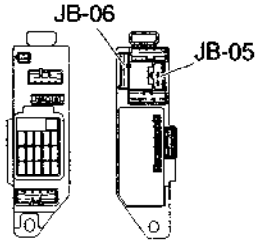


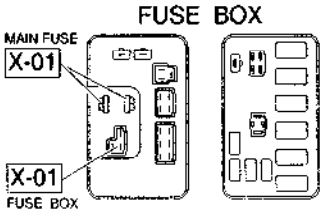
K-01 POWER WINDOW MAIN SWITCH (DR1)	K-02 POWER WINDOW MOTOR LH (DR1)	K-03 POWER WINDOW SWITCH RH (DR2)	K-04 POWER WINDOW MOTOR RH (DR2)
R/G, B, R/W / R/B, B/W, B/L, G/W	R/B / R/G	R, G/W, R/W, *, G, B/L	R / G

K-1

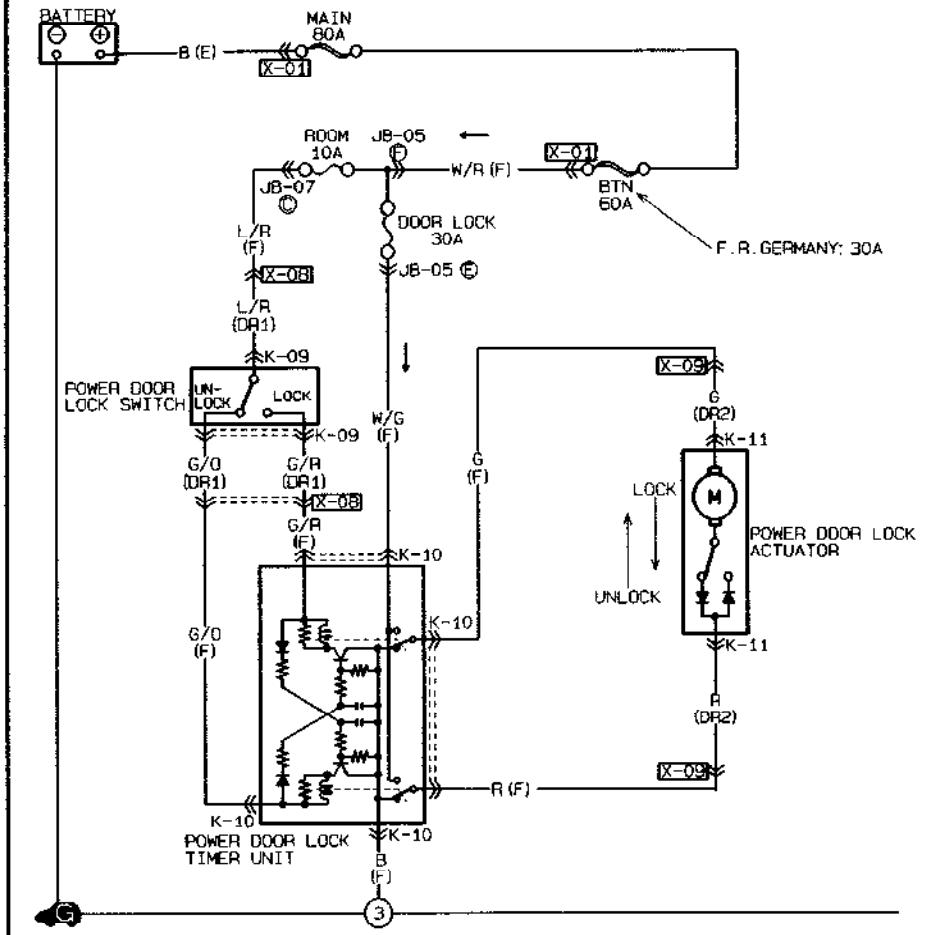

IGNITION SWITCH
X-02
X-09
(F)-(DR2)
③
X-08
(F)-(DR1)
JOINT BOX


(F)-(DR2)
X-09
POWER WINDOW MOTOR RH
K-04
POWER WINDOW SWITCH RH
K-03
X-08
(F)-(DR1)
K-01
POWER WINDOW MAIN SWITCH
K-02
POWER WINDOW MOTOR LH


JB-06
JB-05
JOINT BOX


FUSE BOX
MAIN FUSE
X-01
X-01
FUSE BOX

K-2 ■ POWER DOOR LOCK



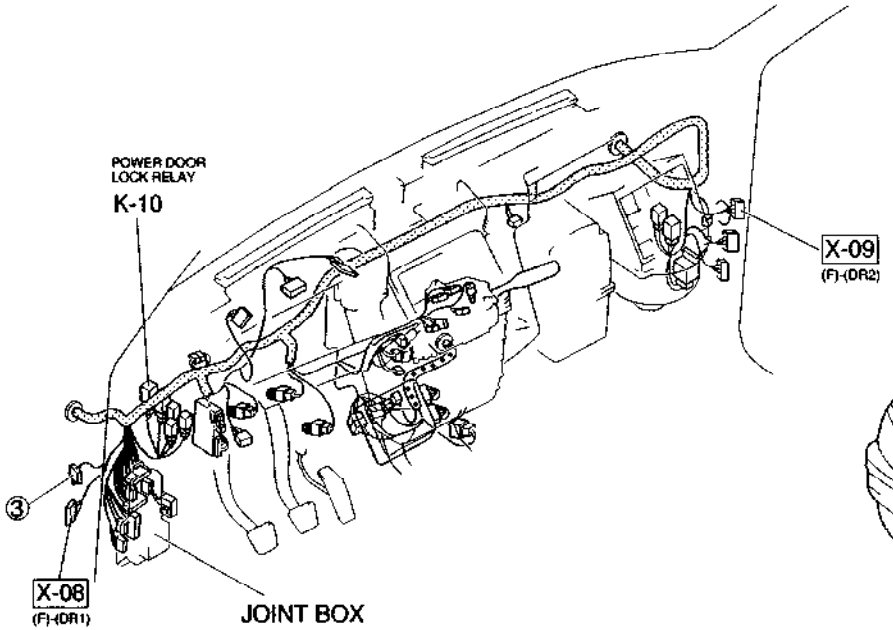
K-09 POWER DOOR LOCK SWITCH (DR1)

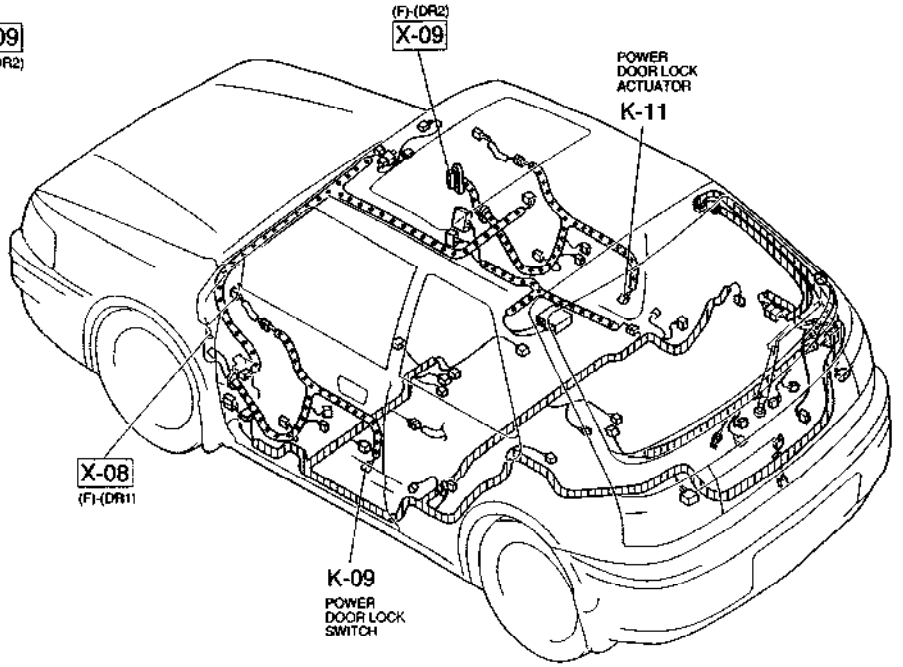
K-10 POWER DOOR LOCK TIMER UNIT (F)

*	G	G/O	B
*	R	G/R	W/G

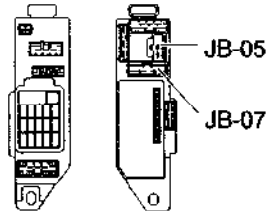
K-11 POWER DOOR LOCK ACTUATOR (DR2)

K-2

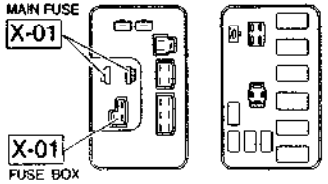




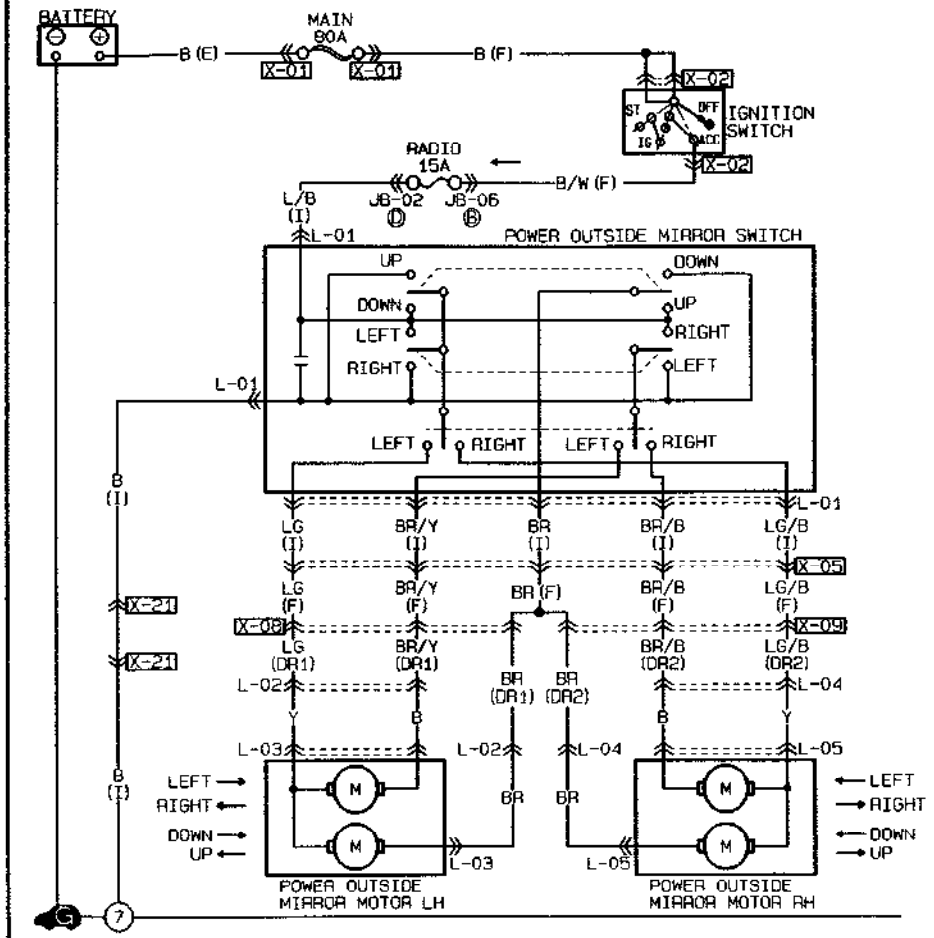
JOINT BOX



FUSE BOX



L ■POWER OUTSIDE MIRRORS



L-01 POWER OUTSIDE MIRROR SWITCH (I)

BR	L/B		LG/B	LG
B	*	*	*	BR/Y	BR/B

L-02 DR1-MIRROR (DR1)

LG	BR
BR/Y	*

BR	Y
*	B

L-03 POWER OUTSIDE MIRROR MOTOR LH

Y	BR
B	*

L-04 DR2-MIRROR (DR2)

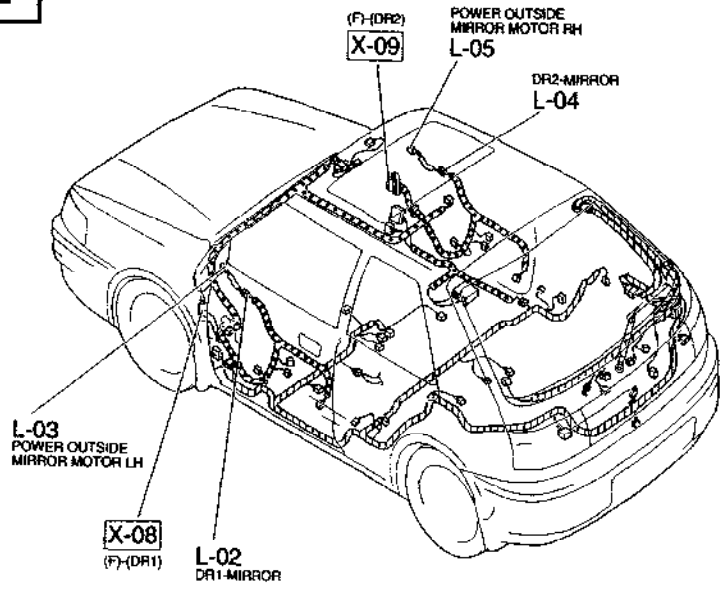
LG/B	BR
BR/B	*

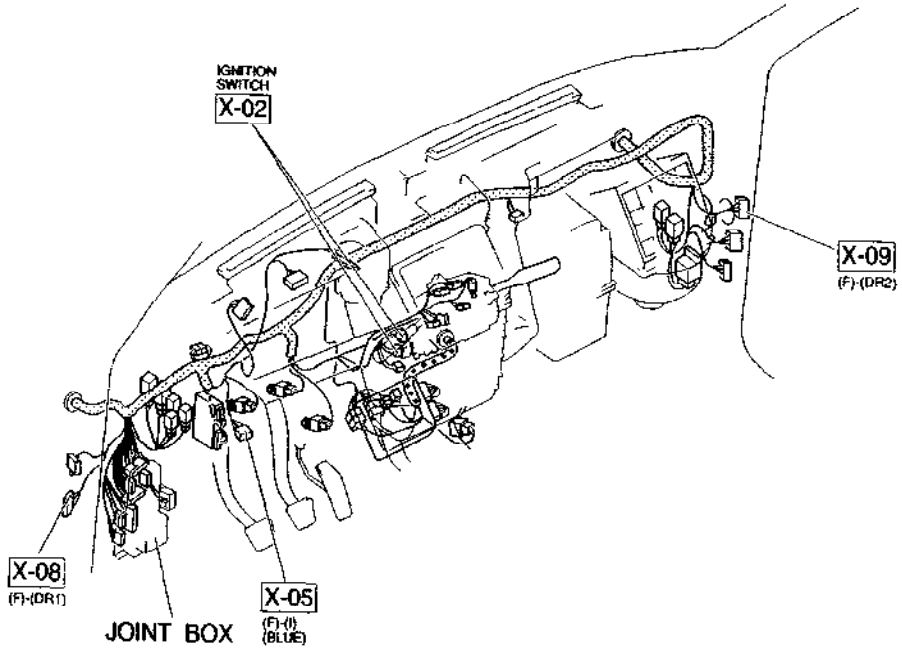
BR	Y
*	B

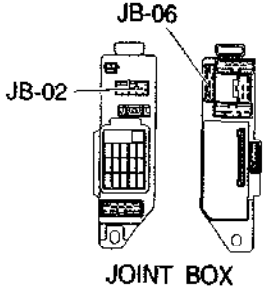
L-05 POWER OUTSIDE MIRROR MOTOR RH

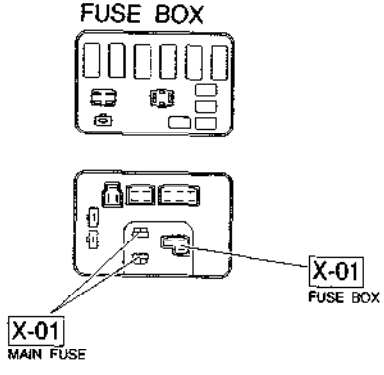
Y	BR
B	*

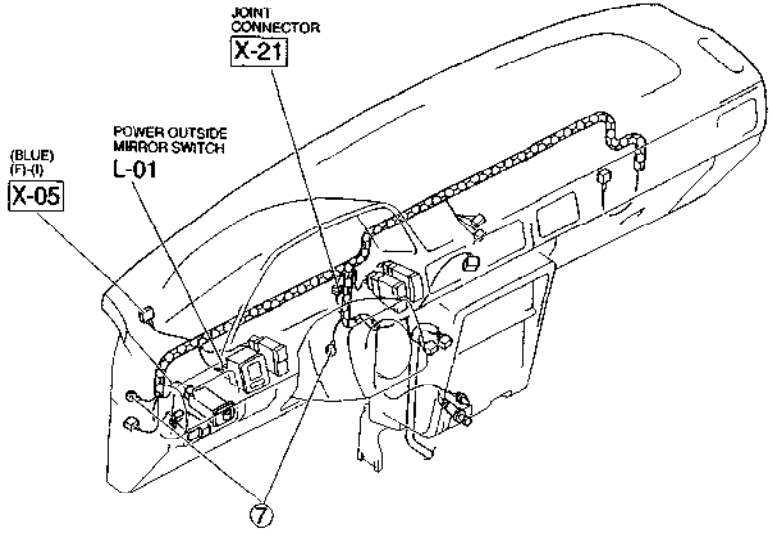
L


(F)-(DR2)
X-09
POWER OUTSIDE MIRROR MOTOR RH
L-05
DR2-MIRROR
L-04
L-03
POWER OUTSIDE MIRROR MOTOR LH
X-08
(F)-(DR1)
L-02
DR1-MIRROR

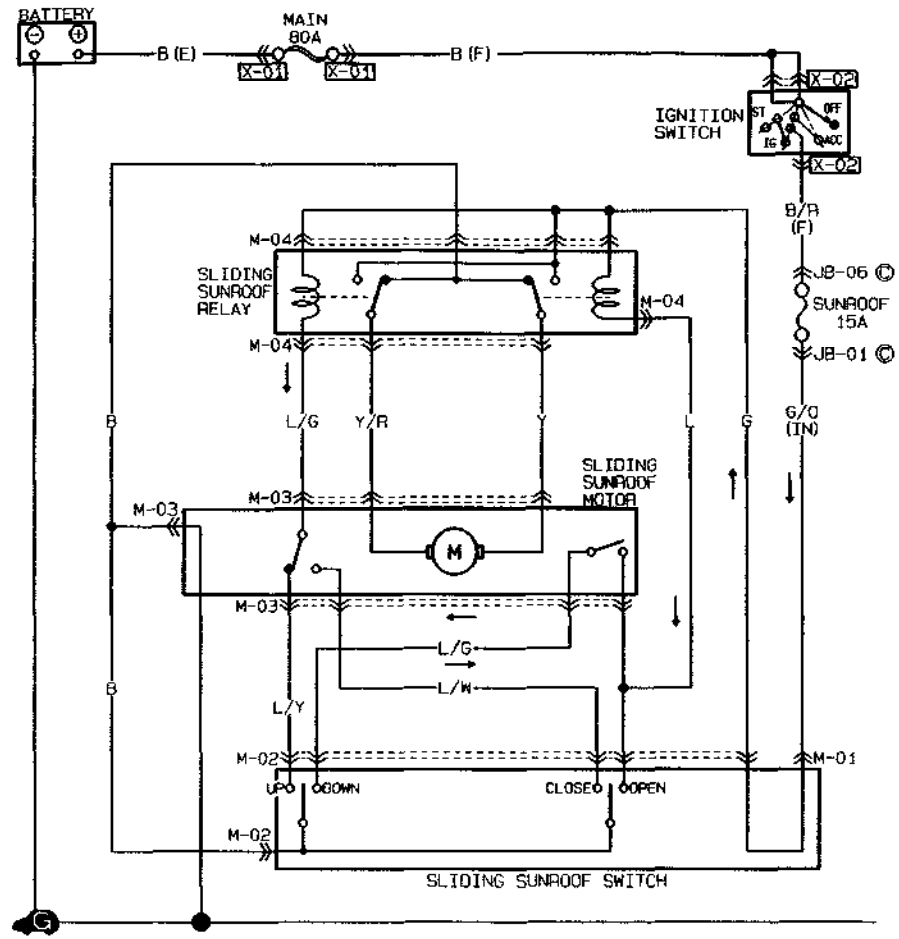

IGNITION SWITCH
X-02
X-09
(F)-(DR2)
X-08
(F)-(DR1)
JOINT BOX
X-05
(F)-(I)
(BLUE)


JB-06
JB-02
JOINT BOX


FUSE BOX
X-01
FUSE BOX
X-01
MAIN FUSE

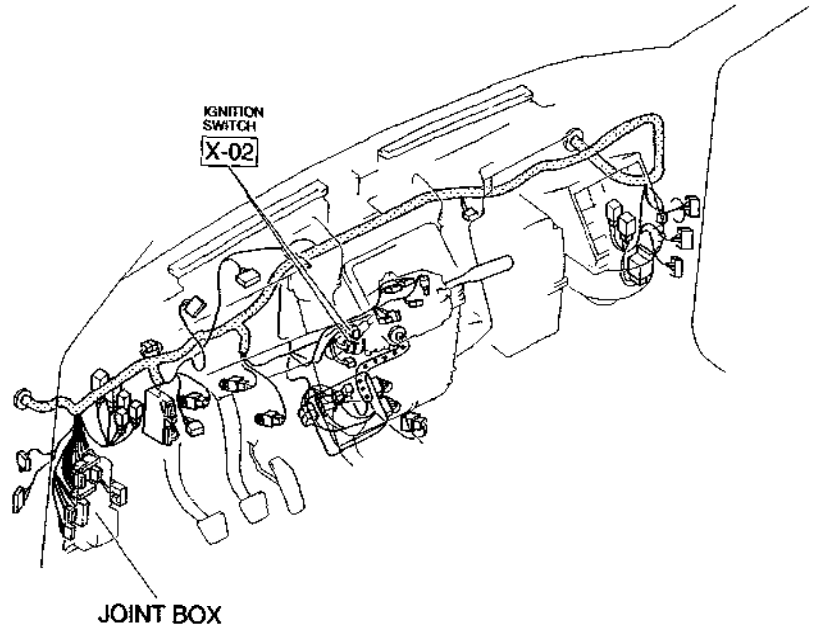

JOINT CONNECTOR
X-21
POWER OUTSIDE MIRROR SWITCH
L-01
(BLUE)
(F)-(I)
X-05
7

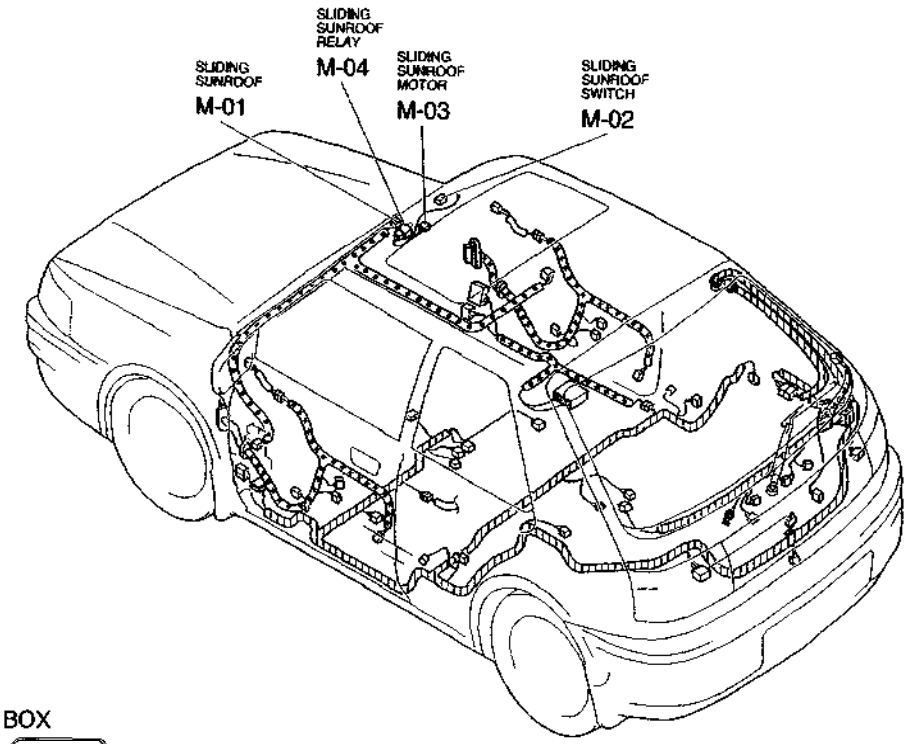
M ■ SLIDING SUNROOF

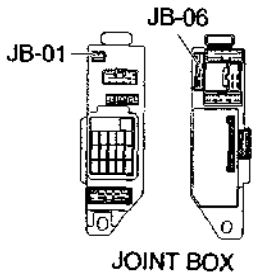


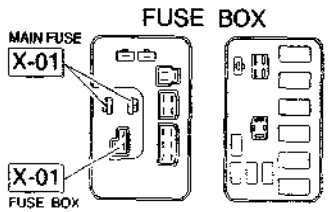
M-01 SLIDING SUNROOF (IN)	M-02 SLIDING SUNROOF SWITCH	M-03 SLIDING SUNROOF MOTOR	M-04 SLIDING SUNROOF RELAY
G/O L/R	L/G L/W G B L L/Y	Y L/Y L/G Y/R B L L/G L/W	Y/R G Y L/G B G G L

M

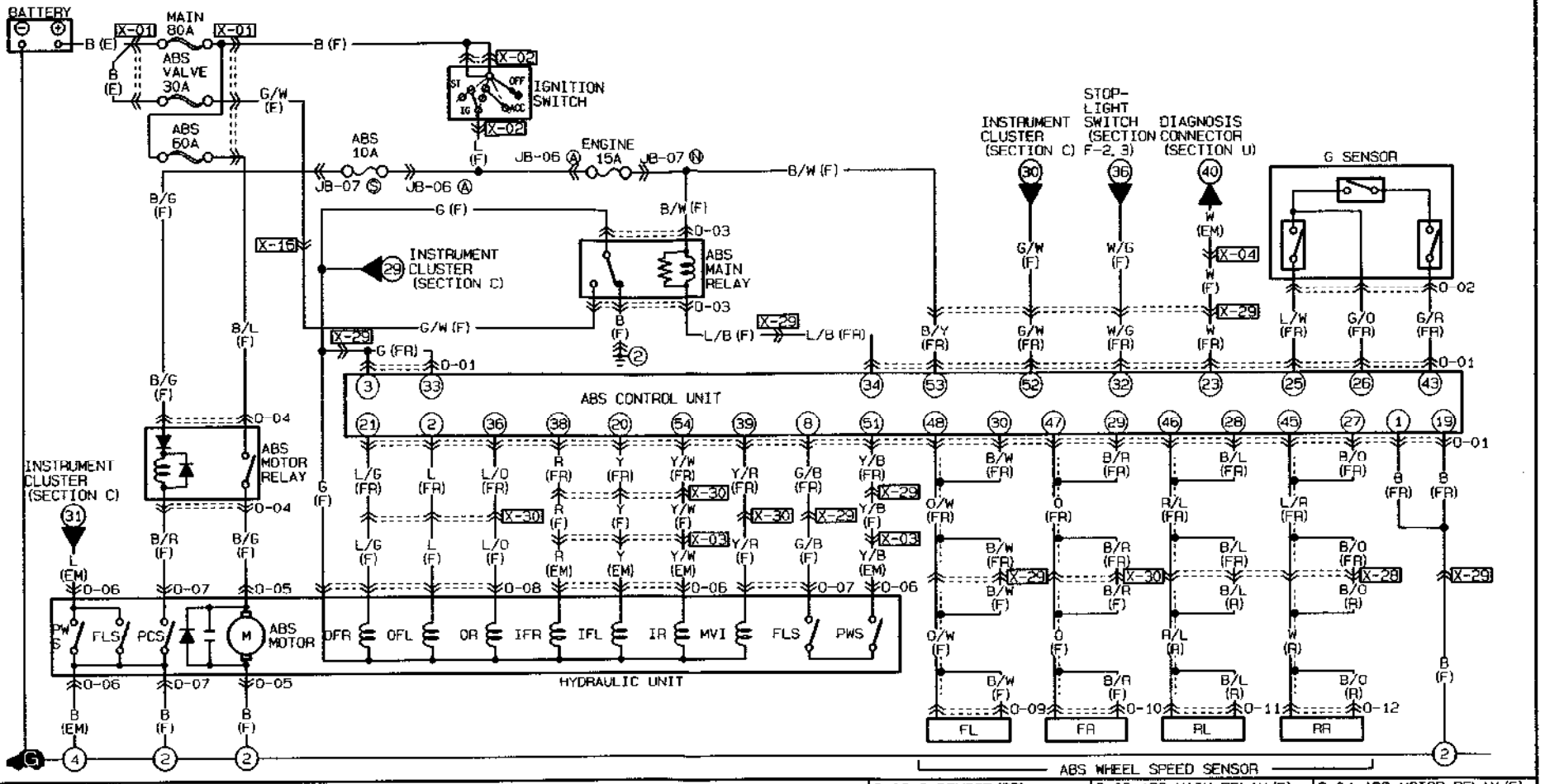

IGNITION SWITCH
X-02
JOINT BOX

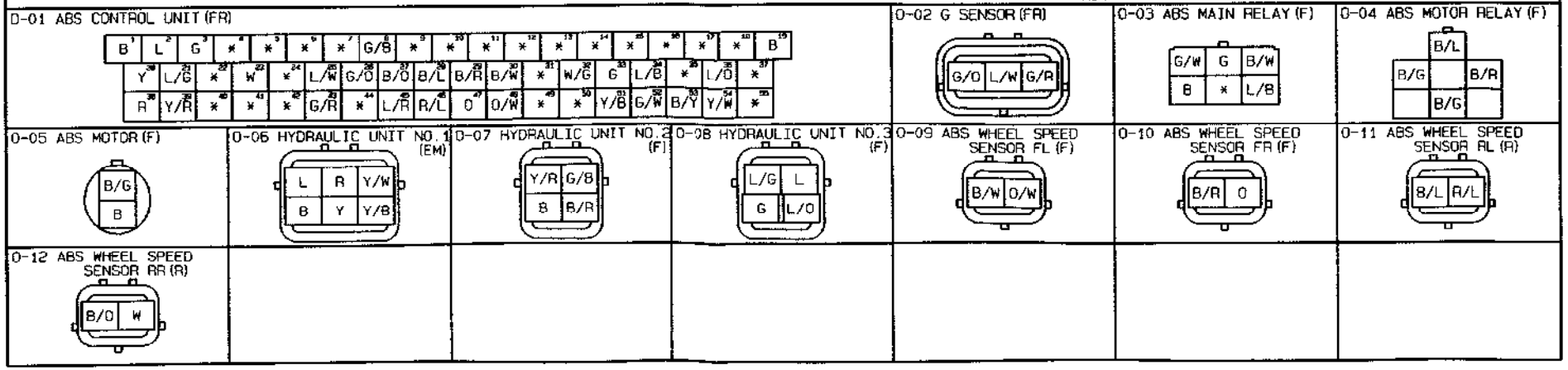

SLIDING SUNROOF
M-01
SLIDING SUNROOF RELAY
M-04
SLIDING SUNROOF MOTOR
M-03
SLIDING SUNROOF SWITCH
M-02


JB-06
JB-01
JOINT BOX

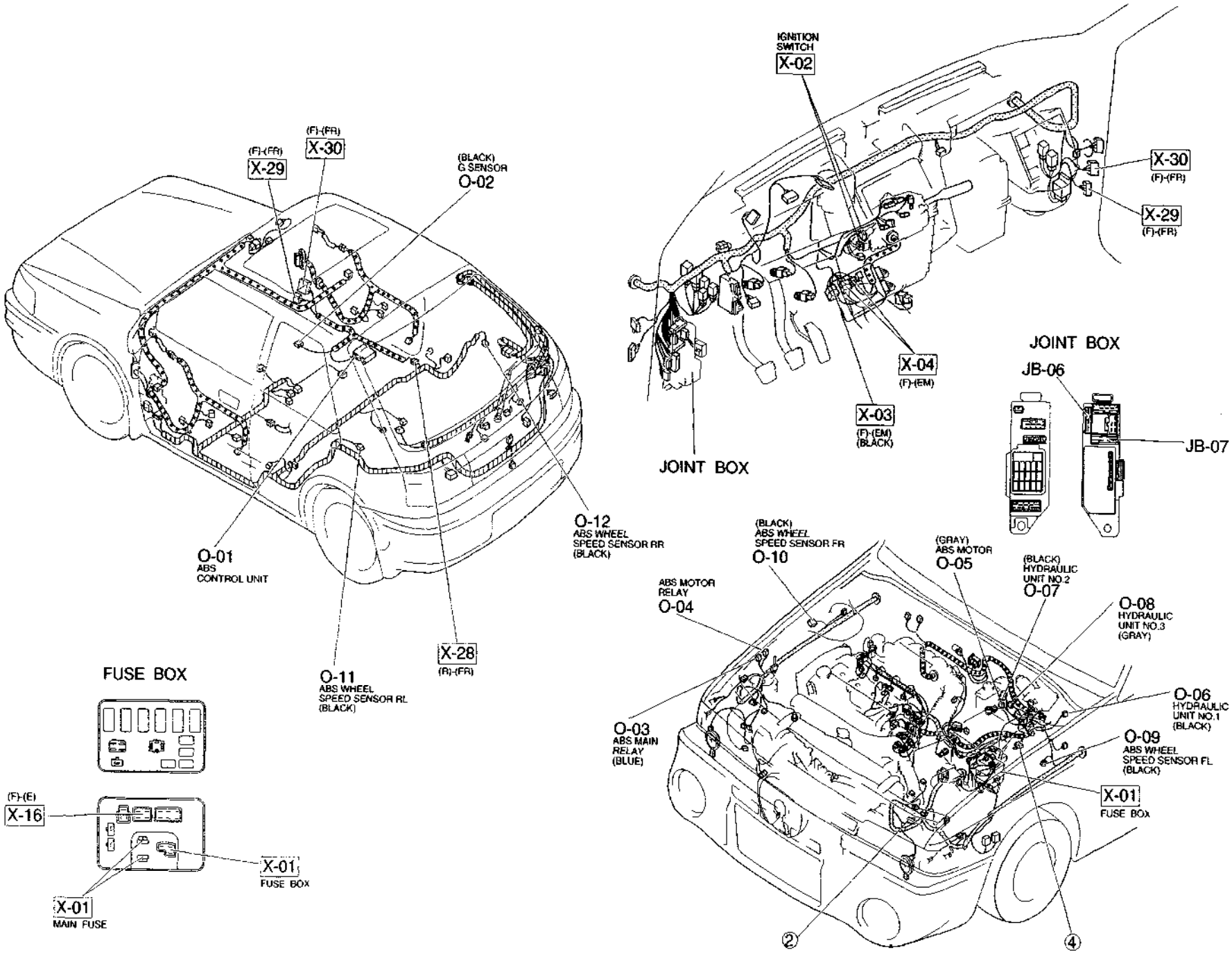

FUSE BOX
MAIN FUSE
X-01
X-01
FUSE BOX

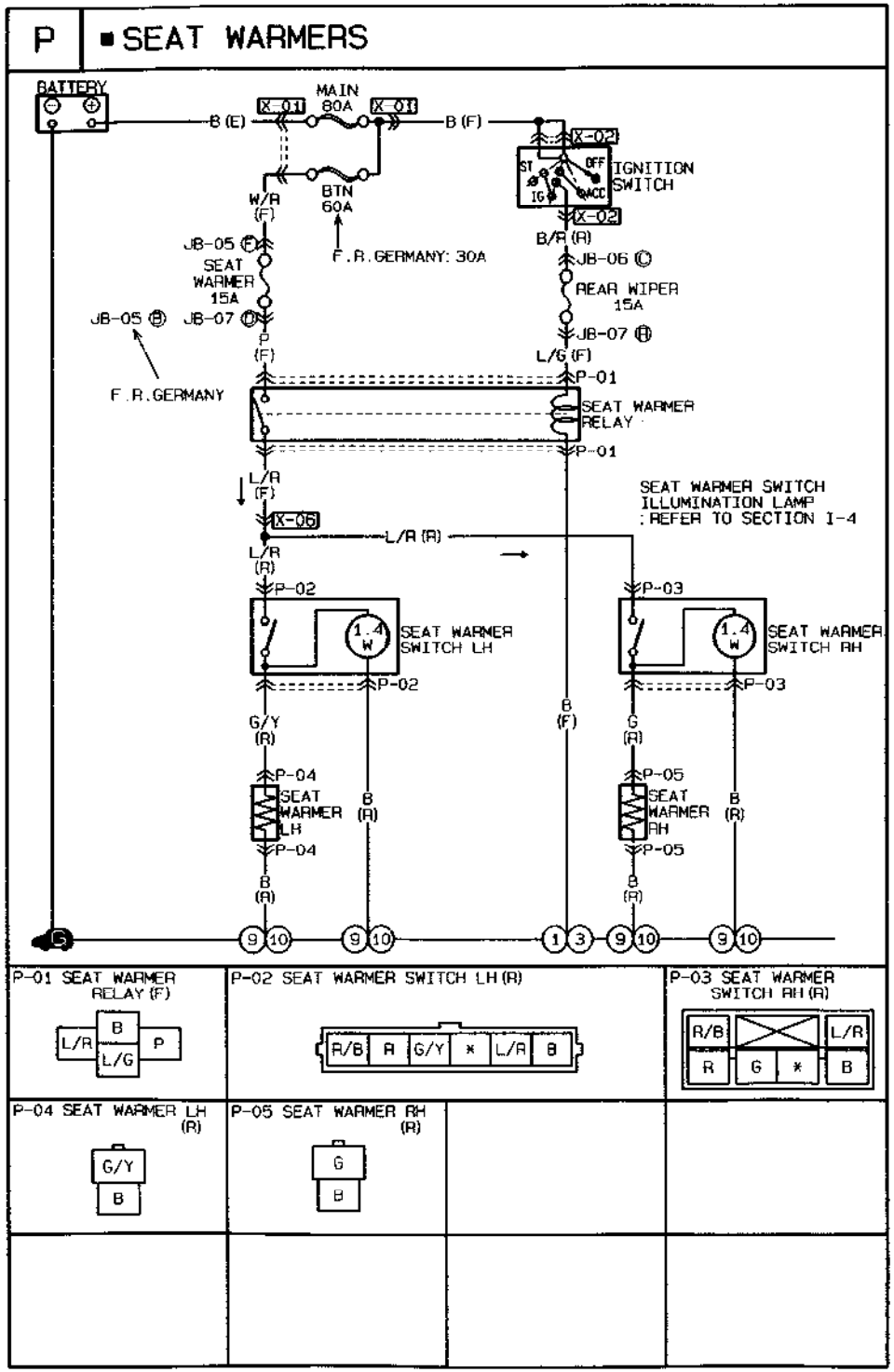
■ ANTI-LOCK BRAKE SYSTEM (ABS)



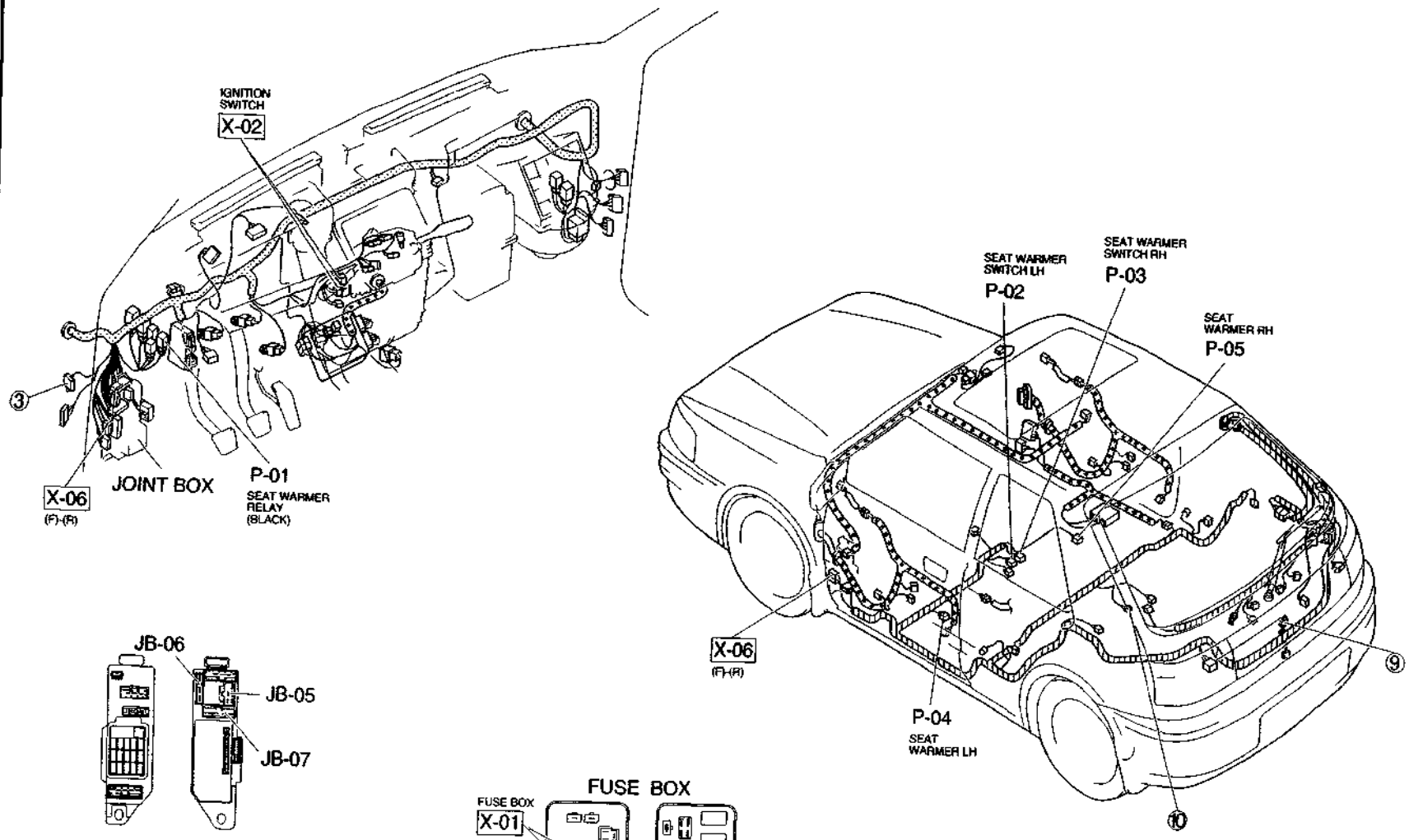


O


IGNITION SWITCH
X-02
X-30
(F)-(FR)
X-29
(F)-(FR)
(BLACK)
G SENSOR
O-02
X-30
(F)-(FR)
X-29
(F)-(FR)
X-04
(F)-(EM)
X-03
(F)-(EM)
(BLACK)
JOINT BOX
JOINT BOX
JB-06
JB-07
O-01
ABS
CONTROL UNIT
O-12
ABS WHEEL
SPEED SENSOR RR
(BLACK)
(BLACK)
ABS WHEEL
SPEED SENSOR FR
O-10
(GRAY)
ABS MOTOR
O-05
(BLACK)
HYDRAULIC
UNIT NO.2
O-07
ABS MOTOR
RELAY
O-04
O-08
HYDRAULIC
UNIT NO.3
(GRAY)
X-28
(R)-(FR)
O-11
ABS WHEEL
SPEED SENSOR RL
(BLACK)
FUSE BOX
O-06
HYDRAULIC
UNIT NO.1
(BLACK)
O-03
ABS MAIN
RELAY
(BLUE)
O-09
ABS WHEEL
SPEED SENSOR FL
(BLACK)
X-01
FUSE BOX
(F)-(E)
X-16
X-01
FUSE BOX
X-01
MAIN FUSE
②
④

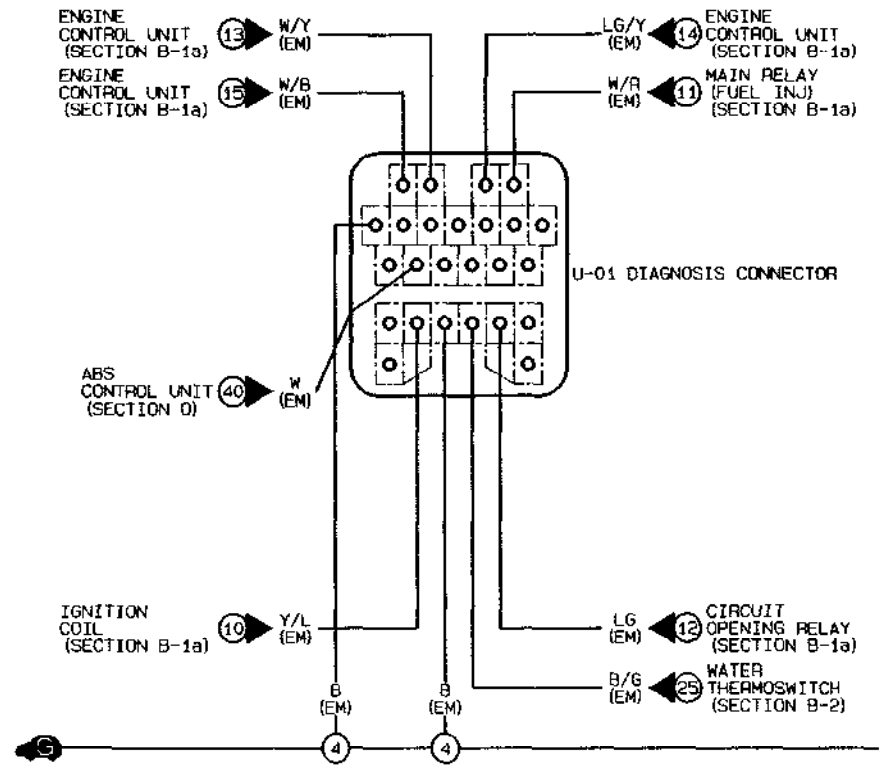

P
■ SEAT WARMERS
BATTERY
MAIN 80A
X-01
B (E)
B (F)
X-02
IGNITION SWITCH
ST
ACC
IG
OFF
W/R (F)
BTN 60A
F.R.GERMANY: 30A
B/R (A)
JB-05 (F)
SEAT WARMER 15A
JB-06 (C)
REAR WIPER 15A
JB-05 (B)
JB-07 (D)
JB-07 (H)
P (F)
L/G (F)
F.R.GERMANY
P-01
SEAT WARMER RELAY
L/R (F)
X-06
L/R (A)
SEAT WARMER SWITCH ILLUMINATION LAMP
: REFER TO SECTION I-4
L/R (R)
P-02
P-03
SEAT WARMER SWITCH LH
SEAT WARMER SWITCH RH
1.4 W
G/Y (R)
B (F)
G (A)
P-04
P-05
SEAT WARMER LH
SEAT WARMER RH
B (R)
B (A)
G
9
10
1
3
P-01 SEAT WARMER RELAY (F)
L/R
B
P
L/G
P-02 SEAT WARMER SWITCH LH (R)
R/B
R
G/Y
*
L/R
B
P-03 SEAT WARMER SWITCH RH (R)
R/B
L/R
R
G
*
B
P-04 SEAT WARMER LH (R)
G/Y
B
P-05 SEAT WARMER RH (R)
G
B

P

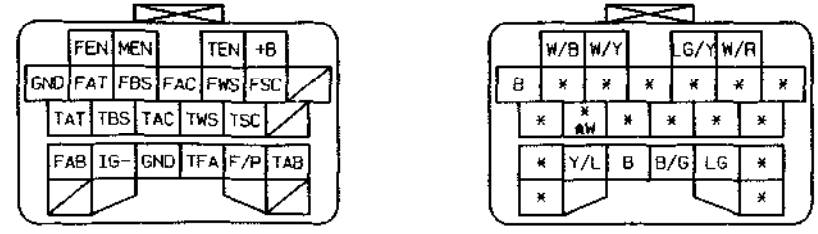

IGNITION SWITCH
X-02
③
X-06
(F)-(R)
JOINT BOX
P-01
SEAT WARMER RELAY (BLACK)
SEAT WARMER SWITCH LH
P-02
SEAT WARMER SWITCH RH
P-03
SEAT WARMER RH
P-05
X-06
(F)-(R)
P-04
SEAT WARMER LH
⑨
⑩
JB-06
JB-05
JB-07
JOINT BOX
FUSE BOX
FUSE BOX
X-01
X-01
MAIN FUSE

U ■DIAGNOSIS CONNECTOR

★...ABS

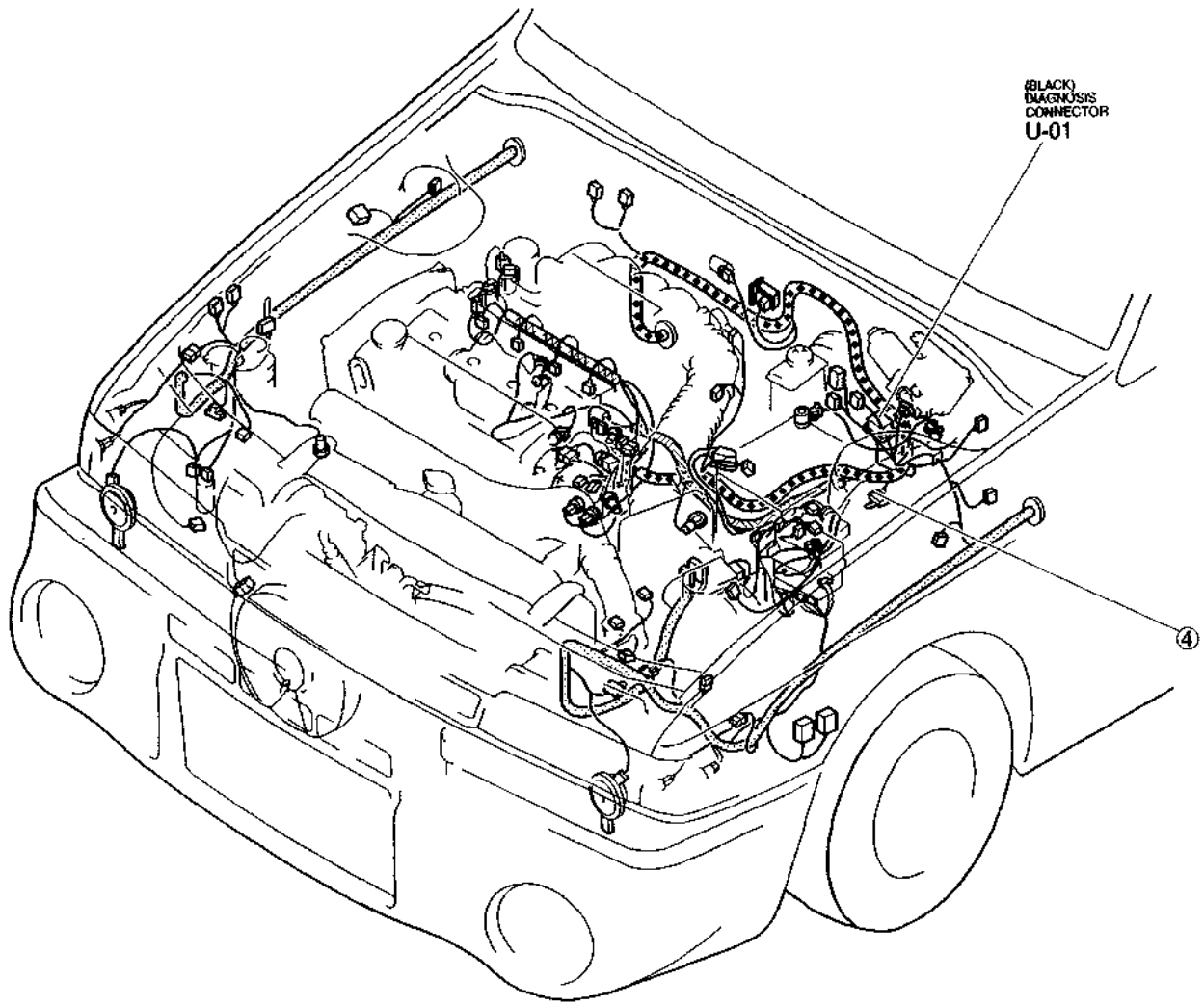


U-01 DIAGNOSIS CONNECTOR (EM)



NOTE; THIS IS THE CONNECTOR AS SEEN FROM THE TERMINAL SIDE.

U



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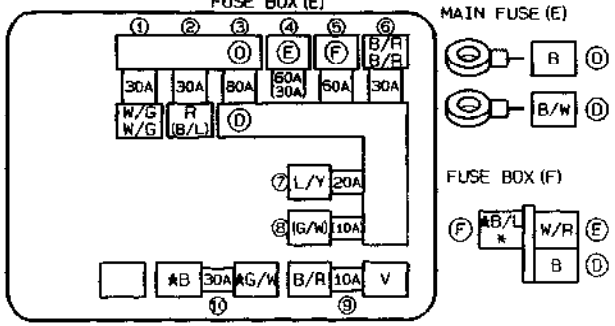
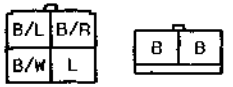
X-1 ■ COMMON CONNECTOR LIST (1/2)

★ . . . ABS
( ) . . . F.R.GERMANY

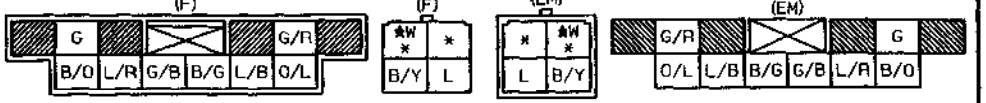
X-01 MAIN FUSE



X-02 IGNITION SWITCH (F)

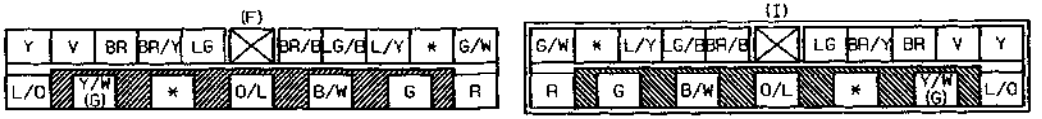


X-04 FRONT (F) -EMISSION (EM)

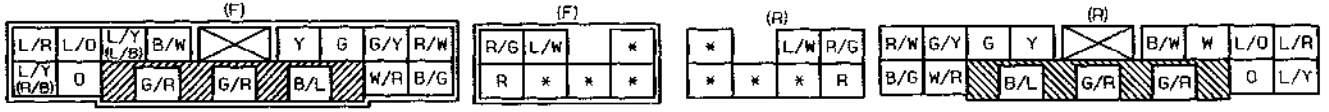


X-03 FRONT (F) -EMISSION (EM)

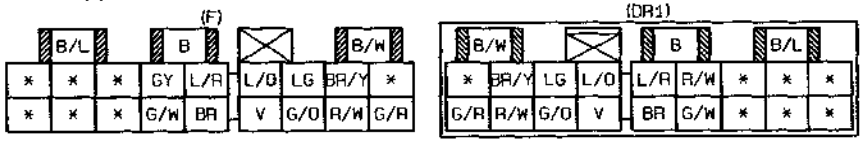
X-05 FRONT (F) -INSTRUMENT PANEL (I)



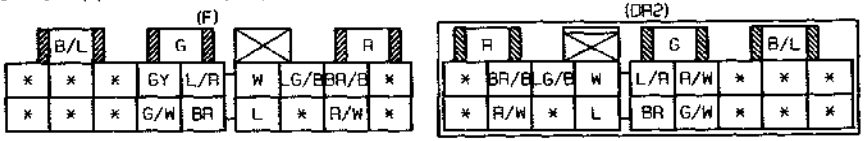
X-06 FRONT (F) -REAR (R)



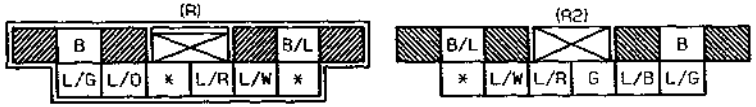
X-08 FRONT (F) -DOOR NO.1 (DR1)



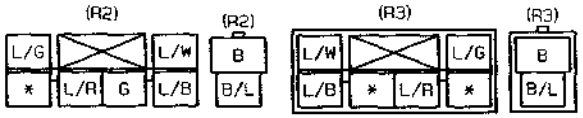
X-09 FRONT (F) -DOOR NO.2 (DR2)



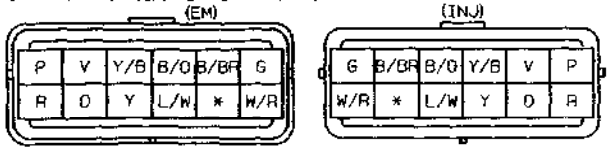
X-10 REAR (R) -REAR NO.2 (R2)



X-11 REAR NO.2 (R2) -REAR NO.3 (R3)



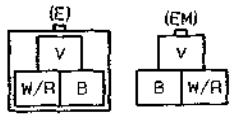
X-14 EMISSION (EM) -INJECTOR (INJ)



X-15 FRONT (F) -ENGINE (E)

X-16 FRONT (F) -ENGINE (E)

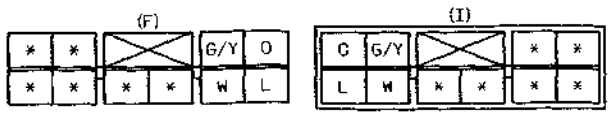
X-17 ENGINE (E) -EMISSION (EM)



X-18 JOINT CONNECTOR (F)

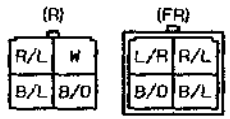
X-21 JOINT CONNECTOR (I)

X-26 FRONT (F) -INSTRUMENT PANEL (I)

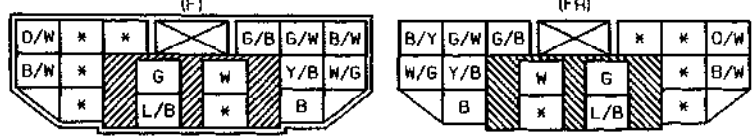


X-2 ■ COMMON CONNECTOR LIST (2/2)

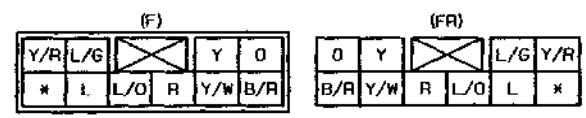
X-28 REAR (R) -FLOOR (FR)



X-29 FRONT (F) -FLOOR (FA)

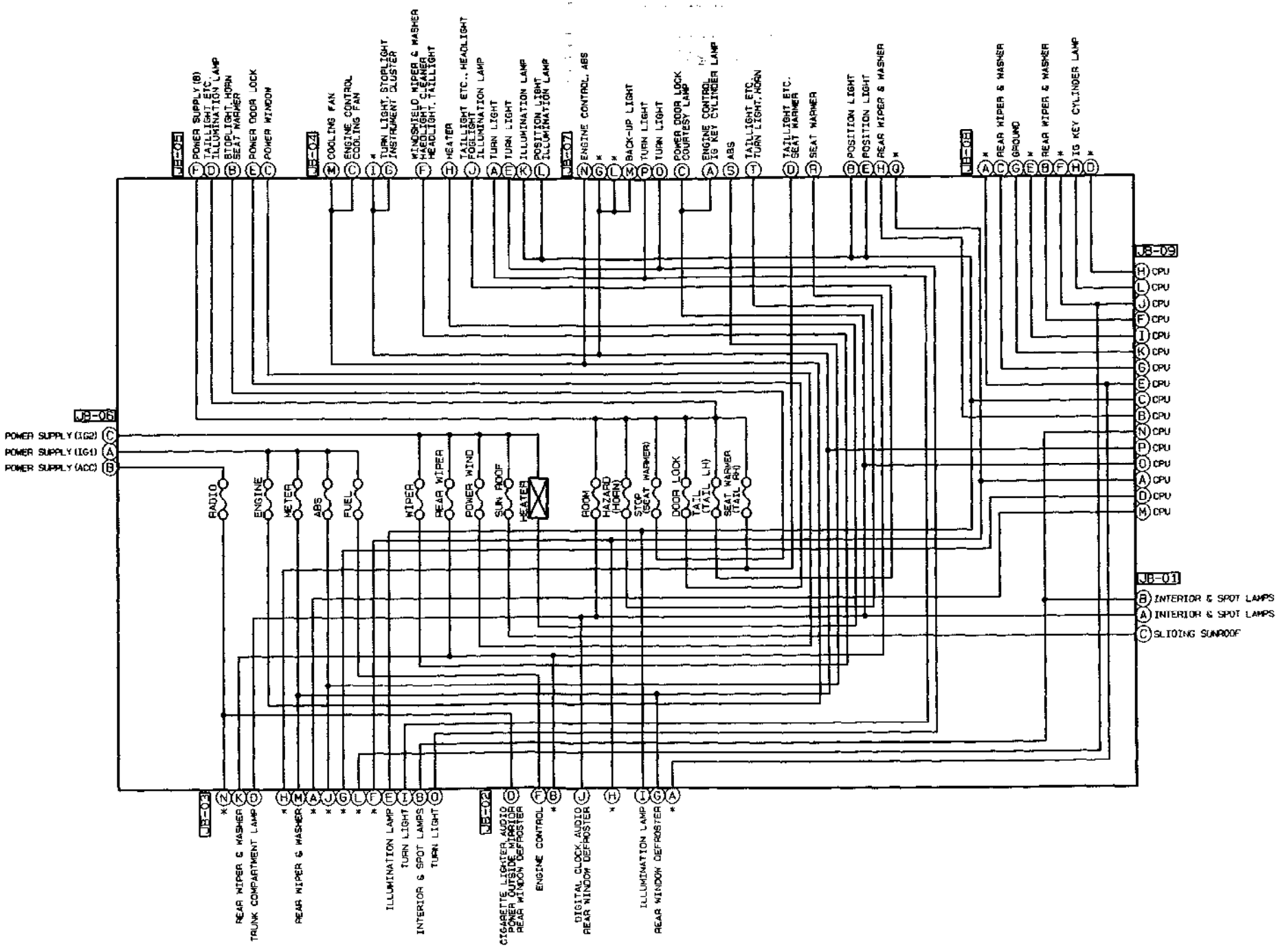


X-30 FRONT (F) -FLOOR (FA)



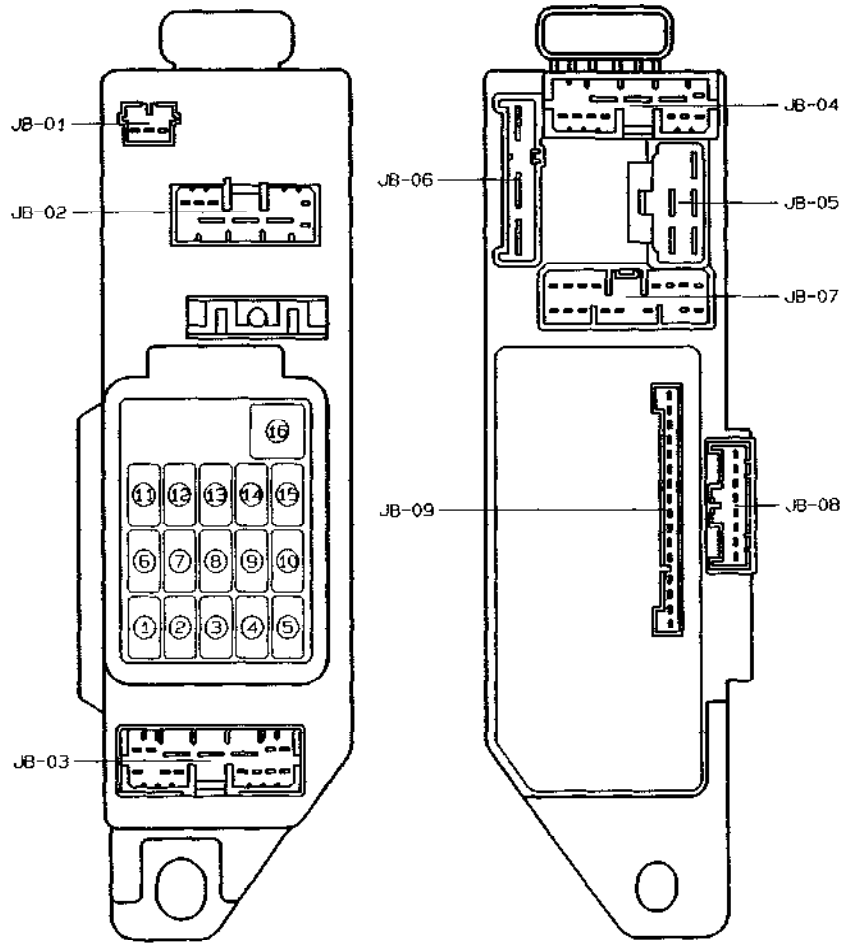
JB

■ INTER CONNECTING DIAGRAM OF JOINT BOX



■ JB CONNECTORS LOCATION

() . . . F.R.GERMANY



①	REAR WIPER	15A		
②	HAZARD	15A	(HORN	10A)
③	ROOM	10A		
④	ENGINE	15A		
⑤	RADIO	15A		
⑥	DOOR LOCK	30A		
⑦	SEAT WARMER	15A	(TAIL RH	10A)
⑧	POWER WIND	30A		
⑨	METER	15A		
⑩	WIPER	20A		
⑪	STOP	10A	(SEAT WARMER	15A)
⑫	TAIL	15A	(TAIL LH	10A)
⑬	SUN ROOF	15A		
⑭	ABS	10A		
⑮	FUEL	20A		
⑯	HEATER	30A		

■ JOINT BOX

() . . . F.R.GERMANY
★ . . . ABS

JB-01 INTERIOR LAMP HARNESS

C	B	A
G/O	R/W	L/R

JB-02 INSTRUMENT PANEL HARNESS

J	I	G	E	C	A
L/R	R/B	B/Y	*	*	*
*	*	G	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	B/Y	*	*	*		L/R	R/W
O	M	J	H	F		O	B

JB-04 FRONT HARNESS

L	K	I	G	E	C	A
R/B	R/B (★)	*	B/Y	G/W	B/W	G/B
B/W	W/B (P/B)	L/W	L	*	*	
M	J	H	F	O	B	

JB-05 FRONT HARNESS

E	C	A
W/G	B/W	*
W/R	(W/B) *	(P) 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/G *	*	G/W	B/Y	*	R/B	L/R	L/R
B/R	L/G	G/B	B/W	*	*	L/O	*	P (L/B)	R/B
T	R	P	N	L	J	R	F	D	B

JB-08 FRONT HARNESS

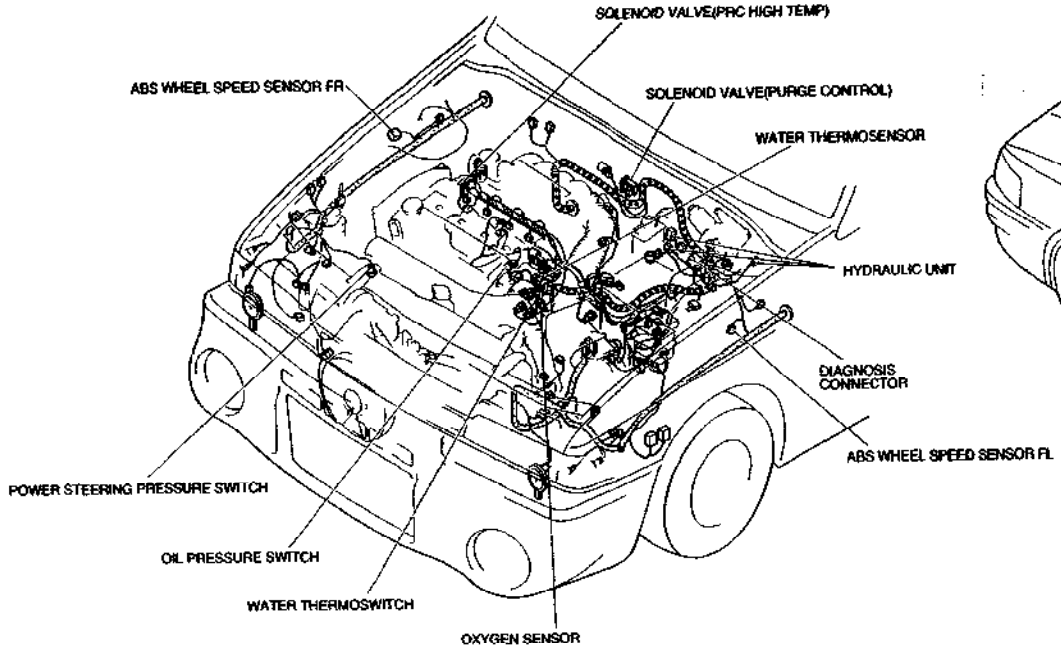
V	B	*	*	*	O	L/B	*
H	G	F	E	D	C	B	A

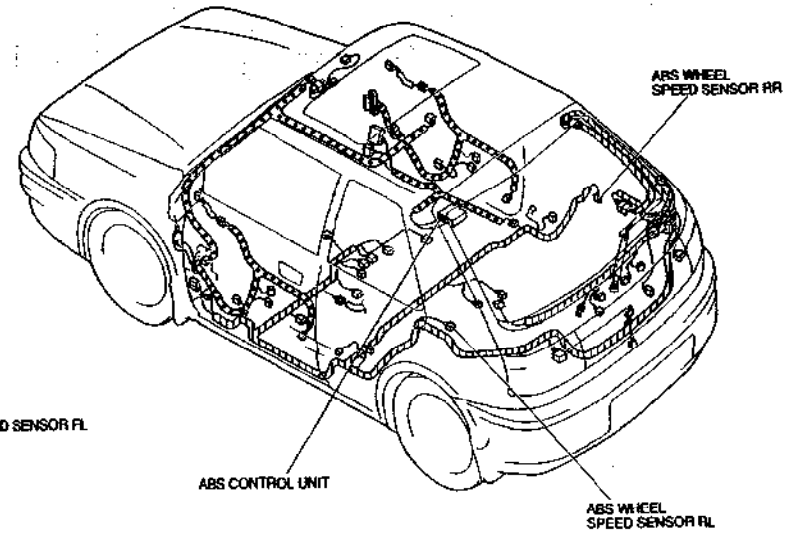
JB-09 CPU

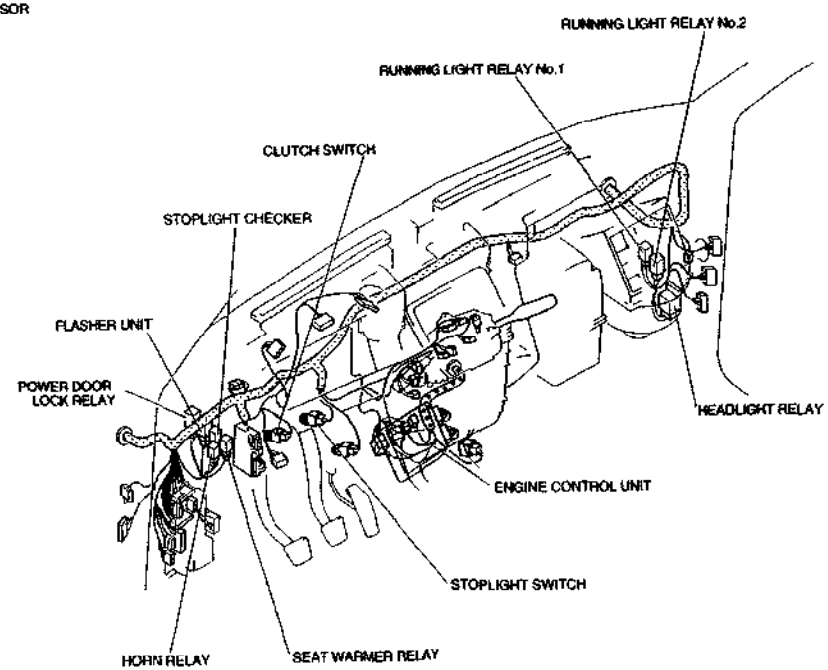
P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A

PL

PL


SOLENOID VALVE(PRC HIGH TEMP)
ABS WHEEL SPEED SENSOR FR
SOLENOID VALVE(PURGE CONTROL)
WATER THERMOSENSOR
HYDRAULIC UNIT
DIAGNOSIS CONNECTOR
ABS WHEEL SPEED SENSOR RL
POWER STEERING PRESSURE SWITCH
OIL PRESSURE SWITCH
WATER THERMOSWITCH
OXYGEN SENSOR


ABS WHEEL SPEED SENSOR RR
ABS CONTROL UNIT
ABS WHEEL SPEED SENSOR RL


RUNNING LIGHT RELAY No.2
RUNNING LIGHT RELAY No.1
CLUTCH SWITCH
STOPLIGHT CHECKER
FLASHER UNIT
POWER DOOR LOCK RELAY
HEADLIGHT RELAY
ENGINE CONTROL UNIT
STOPLIGHT SWITCH
HORN RELAY
SEAT WARMER RELAY

PARTS INDEX

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