

GENERAL INFORMATION

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00-00 GENERAL INFORMATION

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HOW TO USE THIS MANUAL

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Range of Topics

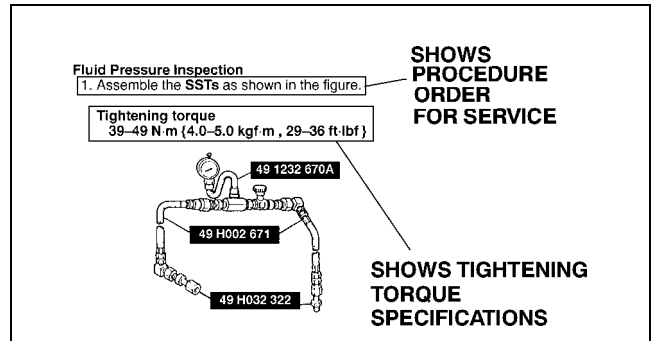
- This manual contains procedures for performing all required service operations. The procedures are divided into the following five basic operations:
 - Removal/Installation
 - Disassembly/Assembly
 - Replacement
 - Inspection
 - Adjustment
- Simple operations which can be performed easily just by looking at the vehicle (i.e., removal/installation of parts, jacking, vehicle lifting, cleaning of parts, and visual inspection) have been omitted.

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Service Procedure

Inspection, adjustment

- Inspection and adjustment procedures are divided into steps. Important points regarding the location and contents of the procedures are explained in detail and shown in the illustrations.



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Repair procedure

1. Most repair operations begin with an overview illustration. It identifies the components, shows how the parts fit together, and describes visual part inspection. However, only removal/installation procedures that need to be performed methodically have written instructions.
2. Expendable parts, tightening torques, and symbols for oil, grease, and sealant are shown in the overview illustration. In addition, symbols indicating parts requiring the use of special service tools or equivalent are also shown.
3. Procedure steps are numbered and the part that is the main point of that procedure is shown in the illustration with the corresponding number. Occasionally, there are important points or additional information concerning a procedure. Refer to this information when servicing the related part.

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Procedure ↓ **FRONT UPPER LINK, FRONT UPPER LEADING LINK REMOVAL/INSTALLATION**

“Removal/Installation” Portion ①

“Inspection After Installation” Portion ②

SHOWS SERVICE ITEM(S)

INDICATES RELEVANT REFERENCES THAT NEED TO BE FOLLOWED DURING INSTALLATION

SHOWS SPECIAL SERVICE TOOL (SST) FOR SERVICE OPERATION

SHOWS APPLICATION POINTS OF GREASE, ETC.

SHOWS EXPENDABLE PARTS

SHOWS DETAILS

SHOWS TIGHTENING TORQUE SPECIFICATIONS

SHOWS REFERRAL NOTES FOR SERVICE

SHOWS REFERRAL NOTES FOR SERVICE

SHOWS SPECIAL SERVICE TOOL (SST) NO.

SHOWS TIGHTENING TORQUE UNITS

INSTALL THE PARTS BY PERFORMING STEPS 1—3 IN REVERSE ORDER

SHOWS PROCEDURE ORDER FOR SERVICE

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the splash shield(s).
(See 09-11-11 SPLASH SHIELD INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Inspect the front wheel alignment and adjust it if necessary.

94-116 (9.5-11.9, 69-86)

44-53 (4.4-5.5, 32-39)

43-56 (4.3-5.8, 32-41)

79-107 (8.0-11.0, 58-79)

N·m (kgf·m, ft·lb)

1	Split pin
2	Nut
3	Upper lateral link ball joint
(See 02-13-6 Upper Lateral Link Ball Joint Removal Note)	
4	Cam nut, cam plate
5	Adjust cam bolt
6	Upper lateral link
7	Dust boot, clip (upper lateral link)
8	Split pin
9	Nut
10	Upper leading link ball joint
11	Upper leading link
12	Dust boot (upper leading link)

Upper Lateral Link Ball Joint Removal Note

- Remove the ball joint using the SSTs.

49 T028 303

49 T028 304 UPPER LEADING LINK

49 T028 305 UPPER LATERAL LINK









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Symbols

- There are eight symbols indicating oil, grease, fluids, sealant, and the use of **SST** or equivalent. These symbols show application points or use of these materials during service.

Symbol	Meaning	Kind		Symbol	Meaning	Kind
	Apply oil	New appropriate engine oil or gear oil			Apply sealant	Appropriate sealant
	Apply brake fluid	New appropriate brake fluid			Apply petroleum jelly	Appropriate petroleum jelly
	Apply automatic transaxle/transmission fluid	New appropriate automatic transaxle/transmission fluid			Replace part	O-ring, gasket, etc.
	Apply grease	Appropriate grease			Use SST or equivalent	Appropriate tools

Advisory Messages

- You'll find several **Warnings**, **Cautions**, **Notes**, **Specifications** and **Upper and Lower Limits** in this manual.

Warning

- A Warning indicates a situation in which serious injury or death could result if the warning is ignored.

Caution

- A Caution indicates a situation in which damage to the vehicle or parts could result if the caution is ignored.

Note

- A Note provides added information that will help you to complete a particular procedure.

Specification

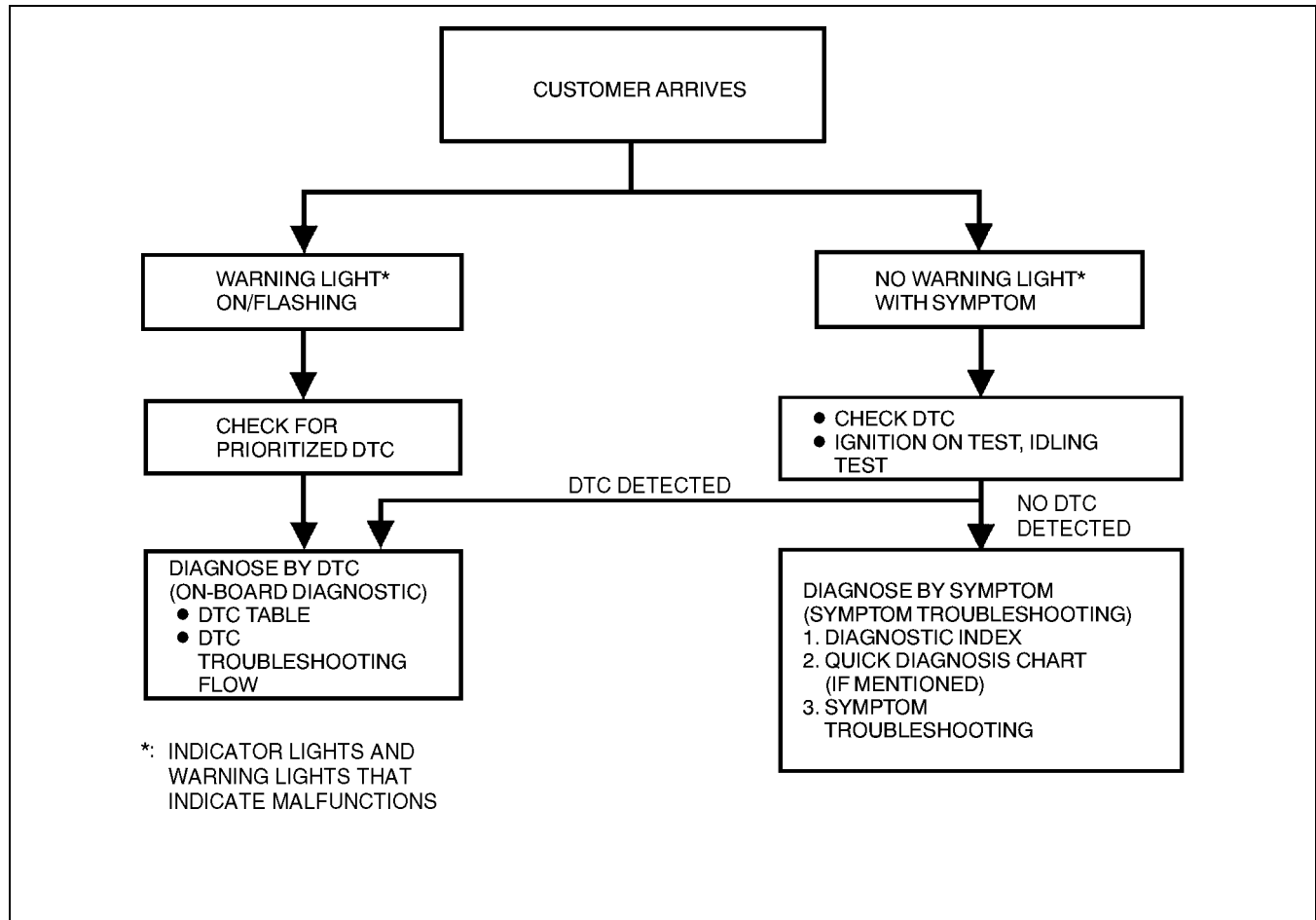
- The values indicate the allowable range when performing inspections or adjustments.

Upper and lower limits

- The values indicate the upper and lower limits that must not be exceeded when performing inspections or adjustments.

Troubleshooting Procedure Basic flow of troubleshooting

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DTC troubleshooting flow (on-board diagnostic)

- Diagnostic trouble codes (DTCs) are important hints for repairing malfunctions that are difficult to simulate. Perform the specific DTC diagnostic inspection to quickly and accurately diagnose the malfunction.
- The on-board diagnostic function is used during inspection. When a DTC is shown specifying the cause of a malfunction, continue the diagnostic inspection according to the items indicated by the on-board diagnostic function.

Diagnostic index

- The diagnostic index lists the symptoms of specific malfunctions. Select the symptoms related or most closely relating to the malfunction.

Quick diagnosis chart (If mentioned)

- The quick diagnosis chart lists diagnosis and inspection procedures to be performed specifically relating to the cause of the malfunction.

Symptom troubleshooting

- Symptom troubleshooting quickly determines the location of the malfunction according to symptom type.

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Procedures for Use

Using the basic inspection (section 05)

- Perform the basic inspection procedure before symptom troubleshooting.
- Perform each step in the order shown.
- The reference column lists the location of the detailed procedure for each basic inspection.
- Although inspections and adjustments are performed according to the reference column procedures, if the cause of the malfunction is discovered during basic inspection, continue the procedures as indicated in the remarks column.

SHOWS INSPECTION ORDER		SHOWS ITEM NAMES FOR DETAILED PROCEDURES		SHOW POINTS REQUIRING ATTENTION BASED ON INSPECTION RESULTS	
AUTOMATIC TRANSAXLE BASIC INSPECTION					
STEP	INSPECTION		ACTION		
1	<ul style="list-style-type: none">• Turn ignition switch to ON position.• Does O/D OFF indicator light (illuminate/go out) correspond to O/D OFF switch position (on/off)?		Yes	Go to next step.	
			No	Perform symptom troubleshooting No.26 "O/D OFF indicator light does not illuminate when O/D OFF switch is turned to on", or No.27 "O/D OFF indicator light illuminates when O/D OFF switch is not turned to on".	
2	<ul style="list-style-type: none">• Turn ignition switch to ON position.• When selector lever is moved, are selector lever position and indicator aligned? Also, when other ranges are selected from N or P during idling, does vehicle creep within 1 to 2 seconds?		Yes	Go to next step.	
			No	Inspect selector lever. Repair or replace defective areas.	
3	<ul style="list-style-type: none">• Inspect the ATF color condition. (See 05-17-8 Automatic Transaxle Fluid (ATF) Condition Inspection)• Are ATF color and odor normal?		Yes	Go to next step.	
			No	Repair or replace any defective parts according to inspection result. Flush ATX and cooler line as necessary.	
4	<ul style="list-style-type: none">• Perform line pressure test. (See 05-17-2 Line Pressure Test)• Is line pressure okay?		Yes	Go to next step.	
			No	Adjust accelerator cable as necessary. Repair or replace any defective parts according to inspection result.	
5	<ul style="list-style-type: none">• Perform stall test.• Is stall speed is okay?		Yes	Go to next step.	
			No	Repair or replace defective parts according to inspection result.	

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Using the DTC troubleshooting flow

- DTC troubleshooting flow shows diagnostic procedures, inspection methods, and proper action to take for each DTC.

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POSSIBLE CAUSE describes possible point(s) of malfunction.

Indicates the inspection step No. to be performed (section 01 and 05)

STEP shows the order of troubleshooting.

INSPECTION describes the method to quickly determine the failed part(s).

DTC P0103

DTC P0103

DETECTION CONDITION

POSSIBLE CAUSE

MAF circuit high input

PCM monitors input voltage from TP sensor after ignition key is turned on. If input voltage at PCM terminal 68 is above 8.25 V, PCM determines that TP circuit has a malfunction.

Diagnostic support note

- This is a continuous monitor (CCM).
- MIL illuminates if PCM detects the above malfunction condition during first drive cycle. Therefore, PENDING CODE is not available.
- FREEZE FRAME DATA is available.
- DTC is stored in the PCM memory.

- MAF sensor malfunction
- Connector or terminal malfunction
- Open circuit in wiring between MAF sensor terminal D and PCM terminal 36
- Open circuit in MAF sensor ground circuit

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DETECTION CONDITION describes the condition under which the DTC is detected.

Indicates the circuit to be inspected (section 01 and 05)

Indicates the connector related to the inspection

MAF SENSOR

PCM

HARNESS SIDE CONNECTOR (VIEW FROM TERMINAL SIDE)

HARNESS SIDE CONNECTOR (VIEW FROM HARNESS SIDE)

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED <ul style="list-style-type: none"> Has FREEZE FRAME DATA been recorded? 	Yes Go to next step.
		No Record FREEZE FRAME DATA on repair order, then go to next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY <ul style="list-style-type: none"> Are related Service Bulletins and/or on-line repair information available? 	Yes Perform repair or diagnosis according to available repair information. If vehicle is not repaired, then go to next step.
		No Go to next step.
3	VERIFY CURRENT INPUT SIGNAL STATUS IS CONCERN INTERMITTENT OR CONSTANT <ul style="list-style-type: none"> Connect NGS tester to DLC-2. Start engine. Access MAF V PID using NGS tester. Is MAF V PID within 0.2 – 8.3 V? 	Yes Intermittent concern is existing. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See 01-03-33 INTERMITTENT CONCERN TROUBLESHOOTING)
		No Go to next step.
4	INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR <ul style="list-style-type: none"> Turn ignition key to OFF. Disconnect MAF sensor connector. Check for poor connection (damaged, pulled-out terminals, corrosion etc.). Are there any malfunctions? 	Yes Repair or replace terminals, then go to Step 8.

ACTION describes the appropriate action to take as according to the result (Yes/No).

Reference item(s) to perform ACTION

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Using the diagnostic index

- The symptoms of the malfunctions are listed in the diagnostic index for symptom troubleshooting.
- The exact malfunction symptoms can be selected by following the index.

NO.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Melts main or other fuse			(See 01-03-6 MELT NO.1 MAIN OR OTHER FUSE)
2	MIL comes on		MIL is illuminated incorrectly.	(See 01-03-7 NO.2 MIL COMES ON)
3	Will not crank		Starter does not work.	(See 01-03-8 NO.3 WILL NOT CRANK)
4	Hard start/long crank/erratic crank		Starter cranks engine at normal speed but engine requires excessive cranking time before starting.	(See 01-03-9 NO.4 HARD START/LONG CRANK/ERRATIC CRANK)
5	Engine stalls	After start/at idle	Engine stops unexpectedly at idel and/or after start.	(See 01-03-11 NO.5 ENGINE STALLS-AFTER START/AT IDLE)
6	Cranks normally but will not start		Starter cranks engine at normal speed but engine will not run.	(See 01-03-15 NO.5 CRANKS NORMALY BUT WILL NOT START)
7	Slow return to idle		Engine takes more time than normal to return to idle speed.	(See 01-03-19 NO.7 SLOW RETURN TO IDLE)
8	Engine runs rough/rolling idle		Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.	(See 01-03-20 NO.8 ENGINE RUNS ROUGH/ROLLING IDLE)
9	Fast idle/runs on		Engine speed continues at fast idle after warm-up. Engine runs after ignition switch is turned off.	(See 01-03-23 NO.9 FAST IDLE/RUNS ON)
10	Low idle/stalls during deceleration		Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.	(See 01-03-24 NO.10 LOW IDLE/STALLS DURING DECELERATION)

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Using the quick diagnosis chart

- The chart lists the relation between the symptom and the cause of the malfunction.
- The chart is effective in quickly narrowing down the relation between symptom and cause of the malfunction. It also specifies the area of the common cause when multiple malfunction symptoms occur.
- The appropriate diagnostic inspection relating to malfunction cause as specified by the symptoms can be selected by looking down the diagnostic inspection column of the chart.

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SYMPTOM QUICK DIAGNOSTIC CHART		PARTS WHICH MAY BE THE CAUSE OF PROBLEMS																					
		Possible factor																					
Troubleshooting item		Starter motor malfunction (Mechanical or electrical)	Starter circuit including ignition switch open	Improper engine oil level	Low or dead battery	Charging system malfunction	Improper engine compression	Improper valve timing	Hydrolocked engine	Improper engine oil viscosity	Improper dipstick	Base engine malfunction	Drive plate or flywheel seized	Improper tension or damaged drive belts	Improper engine coolant level	Water and anti-freeze mixture improperly	Cooling system malfunction (Radiator, hoses, overflow system, thermostat, etc.)	Cooling fan system malfunction	Engine or transaxle mounts improperly installed	Cooling fan or condenser fan seal improperly	Accelerator cable free play mis-adjustment	Fuel quality	
1	Melts main or other fuse																						
2	MIL comes on																						
3	Will not crank	x	x		x	x			x					x									
4	Hard start / long crank / erratic start / erratic crank																					x	
5	Engine stalls After start / at idle						x	x	x													x	
6	Cranks normally but will not start						x	x	x													x	
7	Slow return to idle																	x					
8	Engine runs rough / rolling idle						x	x														x	
9	Fast idle / runs on																				x		
10	Low idle / stalls during deceleration																						
11	Engine stalls / quits						x	x														x	
	Engine runs rough						x	x														x	
	Misses						x	x														x	
	Buck / jerk						x	x														x	
	Hesitation / stumble						x	x														x	
	Surges						x	x														x	
12	Lack / loss of power						x	x														x	
13	Knocking / pinging						x										x						
14	Poor fuel economy							x	x						x		x	x				x	
15	Emissions compliance						x	x					x				x						
16	High oil consumption/leakage												x	x	x								
17	Cooling system concerns Overheating													x	x	x	x	x					
18	Cooling system concerns Runs cold																x	x					
19	Exhaust smoke											x					x						
20	Fuel odor (in engine compartment)																						
21	Engine noise			x									x	x									
22	Vibration concerns (engine)													x					x	x			
23	A/C does not work sufficiently																						
24	A/C always on / A/C compressor runs continuously																						
25	A/C does not cut off under wide open throttle conditions																						
26	Exhaust sulphur smell																					x	
27	Fuel refill concerns																						
28	Fuel filling shut off issues																						
29	Intermittent concerns				x																		
30	Constant voltage																						
31	Spark plug condition						x			x	x				x							x	
32	Automatic transaxle concerns Upshift / downshift / engagement																						

1 CHOOSE THE ACTUAL SYMPTOM

2 PARTS WHICH MAY BE THE CAUSE OF PROBLEMS

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(See 05-01 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING)

YLU000WAA

GENERAL INFORMATION

Using the symptom troubleshooting

- Symptom troubleshooting shows diagnostic procedures, inspection methods, and proper action to take for each trouble symptom.

DESCRIPTION describes what kind of TROUBLE SYMPTOM.	TROUBLE SYMPTOM	
	14	Engine flares up or slips when upshifting or down shifting
POSSIBLE CAUSE describes possible point of malfunction.	DESCRIPTION	<ul style="list-style-type: none">When accelerator pedal is depressed for driveway, engine speed increase but vehicle speed increase slowly.When accelerator is depressed while driving, engine speed increases but vehicle not.
	POSSIBLE CAUSE	<ul style="list-style-type: none">There is clutch slip because clutch is stuck or line pressure is low.<ul style="list-style-type: none">Clutch stuck, slippage (forward clutch, 3-4 clutch, 2-4 brake band, one-way clutch 1, one-way clutch 2)<ul style="list-style-type: none">Line pressure lowMalfunction or mis-adjustment of TP sensorMalfunction of VSSMalfunction of input/turbine speed sensorMalfunction of sensor groundMalfunction of shift solenoid A, B or CMalfunction of TCC solenoid valveMalfunction of body groundMalfunction of throttle cableMalfunction of throttle valve bodyPoor operating of mechanical pressure<ul style="list-style-type: none">Selector lever position disparityTR switch position disparity <p>Note</p> <ul style="list-style-type: none">Before following troubleshooting steps, make sure that Automatic Transaxle On-board Diagnostic and Automatic Transaxle Basic Inspection are conducted.
STEP shows the order of troubleshooting.	Diagnostic procedure	
Reference item(s) for additional information to perform INSPECTION	STEP	INSPECTION
	1	<ul style="list-style-type: none">Is line pressure okay?
INSPECTION describes the method to quickly determine the failed part.		ACTION
		<ul style="list-style-type: none">Yes Go to next step.No Repair or replace any defective parts according to inspection results.
	2	<ul style="list-style-type: none">Is shift point okay? <p>(See 05-17-5 ROAD TEST)</p>
		<ul style="list-style-type: none">Yes Go to next step.No Go to symptom troubleshooting No.9 "Abnormal shift".
	3	<ul style="list-style-type: none">Stop engine and turn ignition switch on.Connect NGS tester to DLC-2.Simulate SHIFT A, SHIFT B and SHIFT C PIDs for ON.Is operating sound of shift solenoids heard?
		<ul style="list-style-type: none">Yes<ul style="list-style-type: none">Overhaul control valve body and repair or replace any defective parts.(See ATX Workshop Manual GF4A-EL (9999-95-GF4A-00))If problem remains, replace or overhaul transaxle and repair or replace defective parts.(See 05-17-15 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION)No<ul style="list-style-type: none">Inspect for bend, damage, corrosion or loose connection if shift solenoid A, B, or C terminal on ATX.Inspect for shift solenoid mechanical stuck.(See 05-17-14 Inspection of Operation)If shift solenoids are okay, inspect for open or short circuit between PCM connector terminal A, B or C.
	4	<ul style="list-style-type: none">Verify test results.<ul style="list-style-type: none">If okay, return to diagnostic index to service any additional symptoms.If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.If vehicle is repaired, troubleshooting completed.If vehicle is not repaired or additional diagnostic information is not available, replace or reprogram PCM.

YLU000WA2

GENERAL INFORMATION

UNITS

A5U000000002W01

Electric current	A (ampere)		Torque	N·m (Newton meter)
Electric power	W (watt)			kgf·m (kilogram force meter)
Electric resistance	Ω (ohm)			kgf·cm (kilogram force centimeter)
Electric voltage	V (volt)			ft·lbf (foot pound force)
Length	mm (millimeter)			in·lbf (inch pound force)
	in (inch)		L (liter)	
Negative pressure	kPa (kilo pascal)		US gal (U.S. gallon)	
	mmHg (millimeters of mercury)		US qt (U.S. quart)	
	inHg (inches of mercury)		Imp gal (Imperial gallon)	
Positive pressure	kPa (kilo pascal)		Imp qt (Imperial quart)	
	kgf/cm ² (kilogram force per square centimeter)		ml (milliliter)	
			cc (cubic centimeter)	
	psi (pounds per square inch)		cu in (cubic inch)	
			fl oz (fluid ounce)	
Number of revolutions	rpm (revolutions per minute)		Weight	N (newton)
				g (gram)
				oz (ounce)

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Conversion to SI Units (Système International d'Unités)

- All numerical values in this manual are based on SI units. Numbers shown in conventional units are converted from these values.

Rounding Off

- Converted values are rounded off to the same number of places as the SI unit value. For example, if the SI unit value is 17.2 and the value after conversion is 37.84, the converted value will be rounded off to 37.8.

Upper and Lower Limits

- When the data indicates upper and lower limits, the converted values are rounded down if the SI unit value is an upper limit and rounded up if the SI unit value is a lower limit. Therefore, converted values for the same SI unit value may differ after conversion. For example, consider 2.7 kgf/cm² in the following specifications:

210—260 kPa {2.1—2.7 kgf/cm², 30—38 psi}
270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}

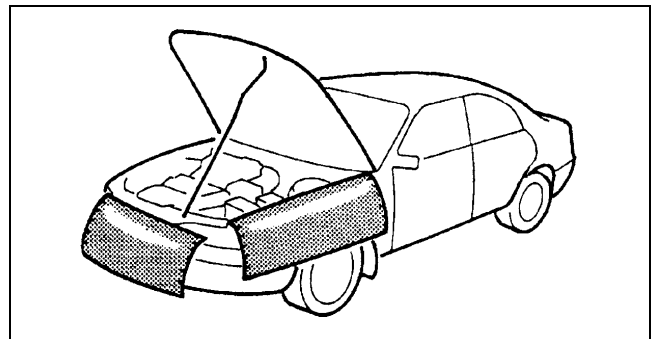
- The actual converted values for 2.7 kgf/cm² are 265 kPa and 38.4 psi. In the first specification, 2.7 is used as an upper limit, so the converted values are rounded down to 260 and 38. In the second specification, 2.7 is used as a lower limit, so the converted values are rounded up to 270 and 39.

FUNDAMENTAL PROCEDURES

A5U000000004W01

Protection of the Vehicle

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

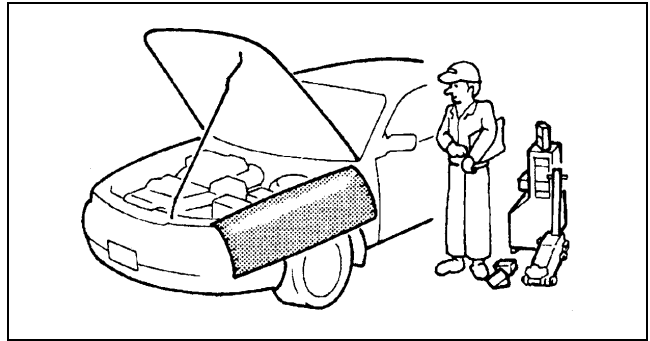


X3U000WAG

GENERAL INFORMATION

Preparation of Tools and Measuring Equipment

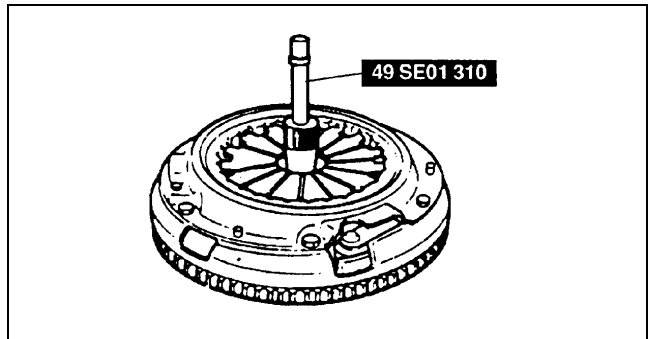
- Be sure that all necessary tools and measuring equipment are available before starting any work.



X3U000WAH

Special Service Tools

- Use special service tools or equivalent when they are required.



X3U000WAJ

Oil Leakage Inspection

- Use either of the following procedures to identify the type of oil that is leaking:

Using UV light (black light)

1. Remove any oil on the engine or transmission.

Note

- Referring to the fluorescent dye instruction manual, mix the specified amount of dye into the engine oil or ATF (or transmission oil).

2. Pour the fluorescent dye into the engine oil or ATF (or transmission oil).
3. Allow the engine to run for 30 min.
4. Inspect for dye leakage by irradiating with UV light (black light), and identify the type of oil that is leaking.
 - If no dye leakage is found, allow the engine to run for another 30 min or drive the vehicle, then reinspect.
5. Find where the oil is leaking from, then make necessary repairs.

Note

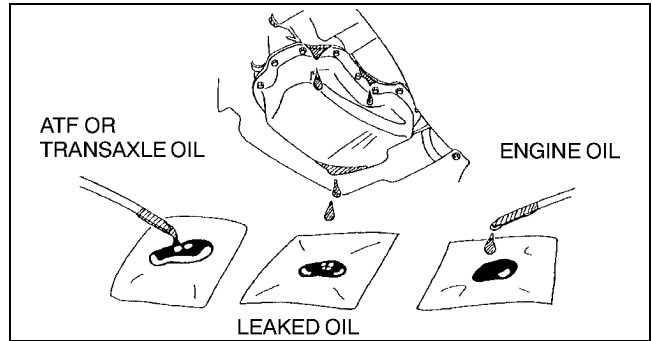
- To determine whether it is necessary to replace the oil after adding the fluorescent dye, refer to the fluorescent dye instruction manual.

Not using UV light (black light)

1. Gather some of the leaking oil using an absorbent white tissue.
2. Take samples of engine oil and ATF (or transmission oil), both from the dipstick, and place them next to the leaked oil already gathered on the tissue.

GENERAL INFORMATION

3. Compare the appearance and smell, and identify the type of oil that is leaking.
4. Remove any oil on the engine or transmission.
5. Allow the engine to run for 30 min.
6. Check the area where the oil is leaking, then make necessary repairs.



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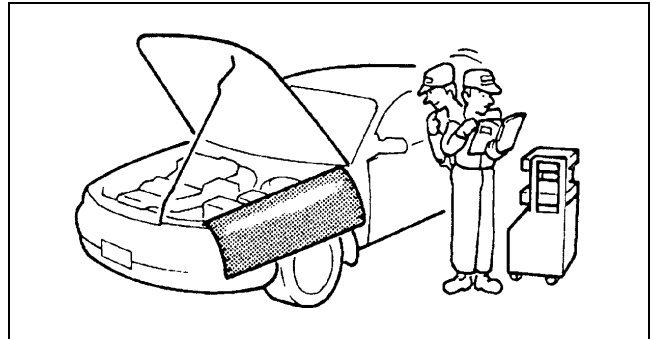
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Disconnection of Negative Battery Cable

- Before beginning any work, turn the ignition switch to the LOCK position, then disconnect the negative battery cable and wait for more than 1 min to allow the backup power supply of the SAS control module to deplete its stored power. Disconnecting the battery cable will delete the memories of the clock, audio, and DTCs, etc. Therefore, it is necessary to verify those memories before disconnecting the cable.

Removal of Parts

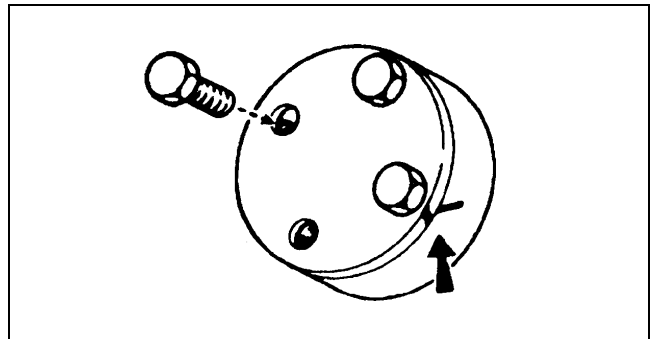
- While correcting a problem, also try to determine its cause. Begin work only after first learning which parts and subassemblies must be removed and disassembled for replacement or repair. After removing the part, plug all holes and ports to prevent foreign material from entering.



X3U000WAK

Disassembly

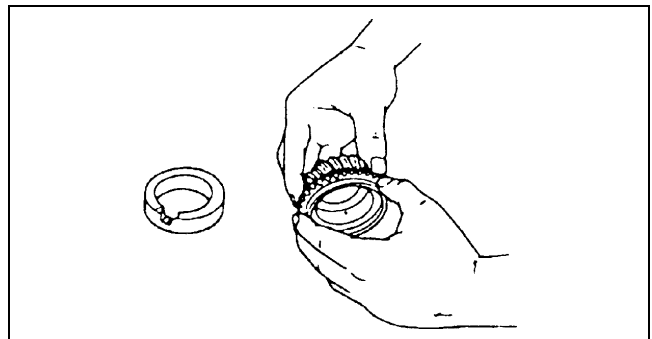
- If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be marked in a place that will not affect their performance or external appearance and identified so that reassembly can be performed easily and efficiently.



X3U000WAL

Inspection During Removal, Disassembly

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

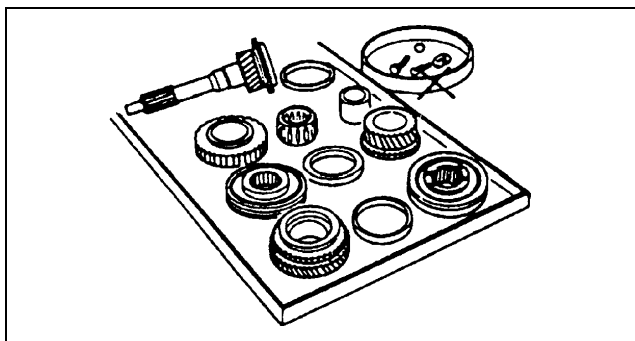


X3U000WAM

GENERAL INFORMATION

Arrangement of Parts

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



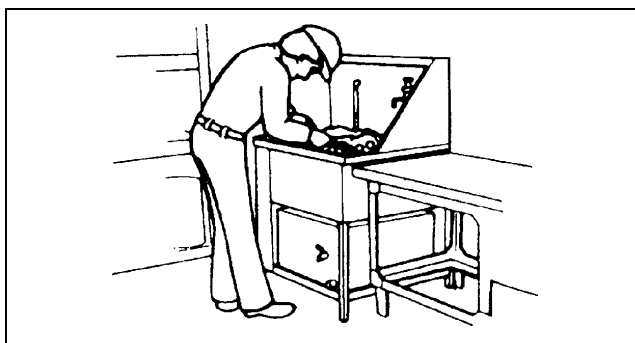
X3U000WAN

Cleaning of Parts

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

Warning

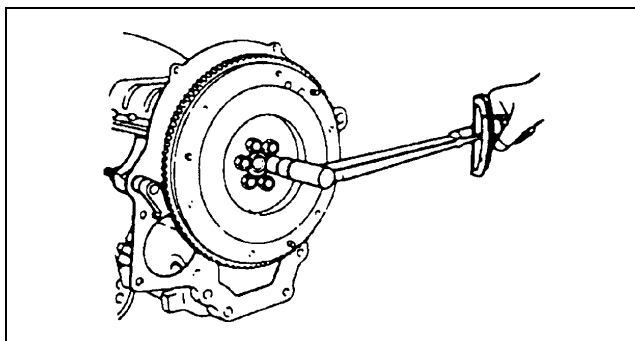
- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eye wear whenever using compressed air.**



X3U000WAP

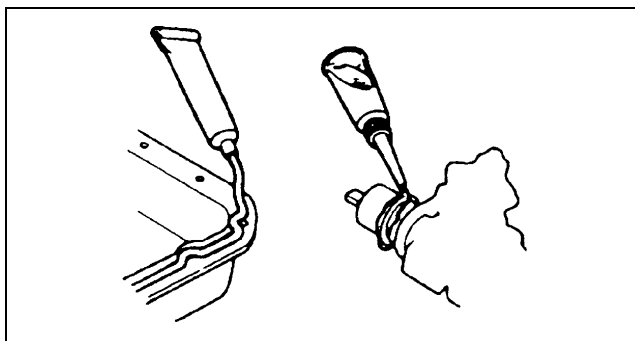
Reassembly

- Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.
- If removed, these parts should be replaced with new ones:
 - Oil seals
 - Gaskets
 - O-rings
 - Lockwashers
 - Cotter pins
 - Nylon nuts



X3U000WAQ

- Depending on location:
 - Sealant, gaskets, or both, should be applied to specified locations. When sealant is applied, parts should be installed before sealant hardens to prevent leakage.
 - Oil should be applied to the moving components of parts.
 - Specified oil or grease should be applied at the prescribed locations (such as oil seals) before reassembly.

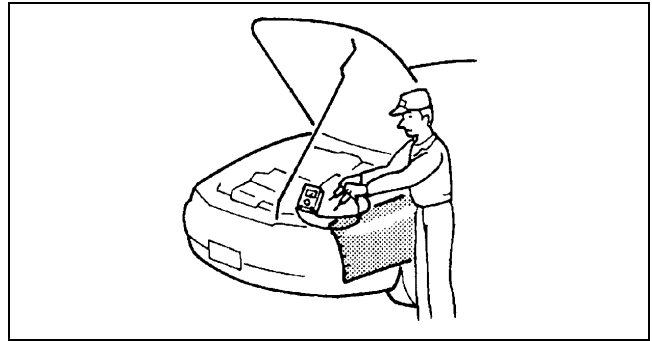


X3U000WAR

GENERAL INFORMATION

Adjustment

- Use suitable gauges and/or testers when making adjustments.

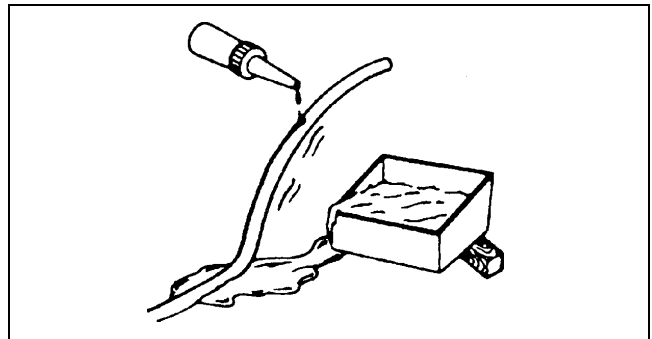


X3U000WAS

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Rubber Parts and Tubing

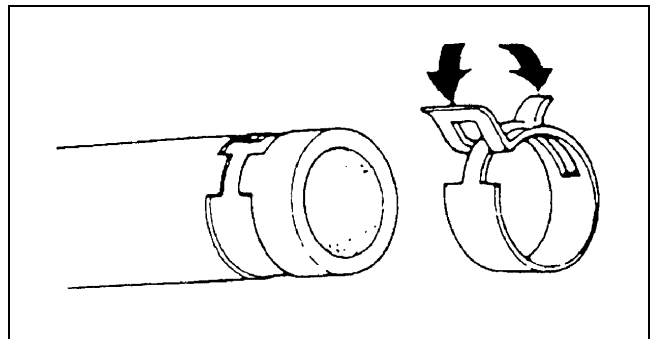
- Prevent gasoline or oil from getting on rubber parts or tubing.



X3U000WAT

Hose Clamps

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

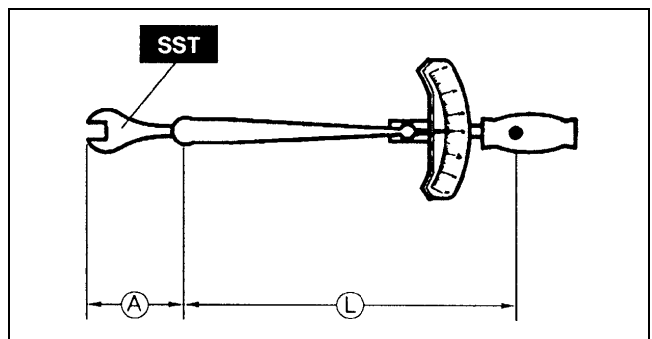


X3U000WAU

Torque Formulas

- When using a torque wrench-**SST** or equivalent combination, the written torque must be recalculated due to the extra length that the **SST** or equivalent adds to the torque wrench. Recalculate the torque using the following formulas. Choose the formula that applies to you.

Torque Unit	Formula
N·m	$N \cdot m \times [L / (L + A)]$
kgf·m	$kgf \cdot m \times [L / (L + A)]$
kgf·cm	$kgf \cdot cm \times [L / (L + A)]$
ft·lbf	$ft \cdot lbf \times [L / (L + A)]$
in·lbf	$in \cdot lbf \times [L / (L + A)]$



X3U000WAV

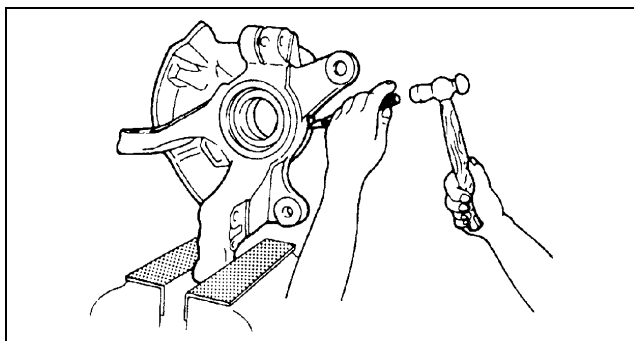
A : The length of the **SST** past the torque wrench drive.

L : The length of the torque wrench.

GENERAL INFORMATION

Vise

- When using a vise, put protective plates in the jaws of the vise to prevent damage to parts.



X3U000WAW

Dynamometer

- When test-running a vehicle on a dynamometer:
 - Place a fan, preferably a vehicle-speed proportional type, in front of the vehicle.
 - Connect an exhaust gas ventilation unit.
 - Cool the exhaust pipes with a fan.
 - Keep the area around the vehicle uncluttered.
 - Watch the water temperature gauge.

Note

- When the vehicle is on a chassis roller and only the front wheels rotate, the ABS warning light may illuminate. (See 04-02-3 ABS ON-BOARD DIAGNOSIS to turn off the warning light.)

INSTALLATION OF RADIO SYSTEM

A5U000000005W01

- If a radio system is installed improperly or if a high-powered type is used, the CIS and other systems may be affected. When the vehicle is to be equipped with a radio, observe the following precautions:
 - Install the antenna at the farthest point from control modules.
 - Install the antenna feeder as far as possible from the control module harnesses.
 - Ensure that the antenna and feeder are properly adjusted.
 - Do not install a high-powered radio system.

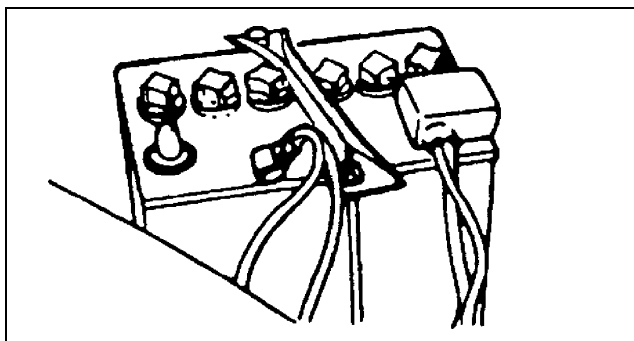
ELECTRICAL SYSTEM

A5U000000006W01

Electrical Parts

Battery cable

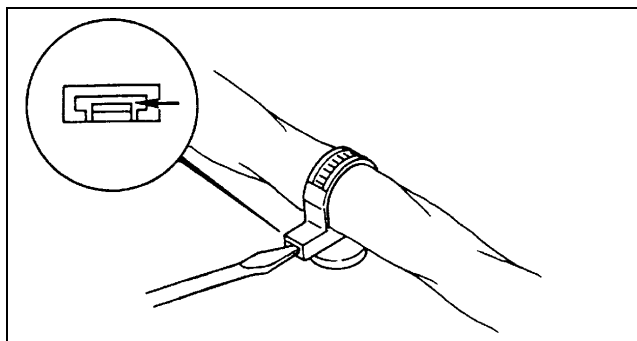
- Before disconnecting connectors or removing electrical parts, disconnect the negative battery cable.



X3U000WAX

Wiring Harness

- To remove the wiring harness from the clip in the engine room, pry up the hook of the clip using a flathead screwdriver.



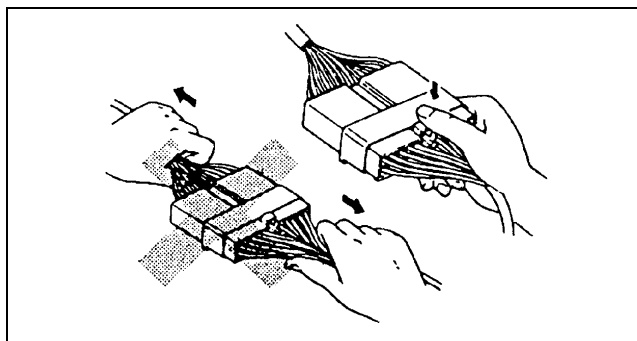
X3U000WBU

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Connectors

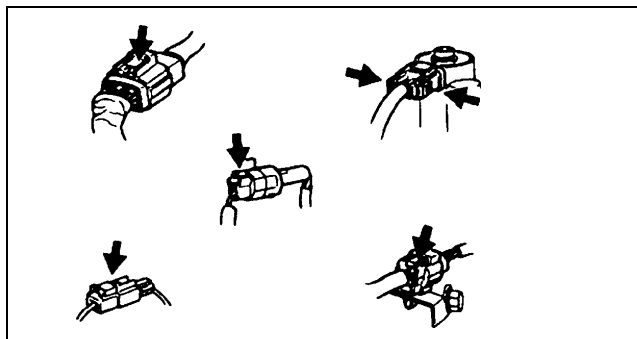
Disconnecting connectors

- When disconnecting connector, grasp the connectors, not the wires.



X3U000WAZ

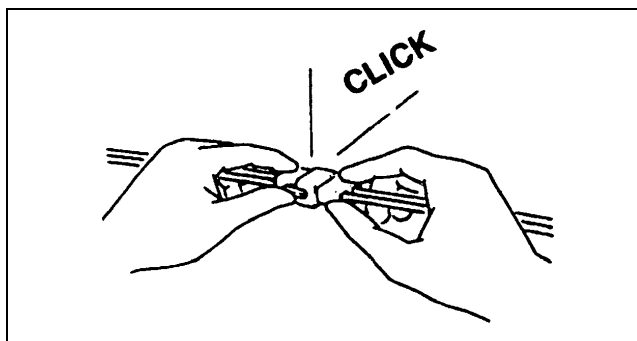
- Connectors can be disconnected by pressing or pulling the lock lever as shown.



X3U000WB0

Locking connector

- When locking connectors, listen for a click indicating they are securely locked.

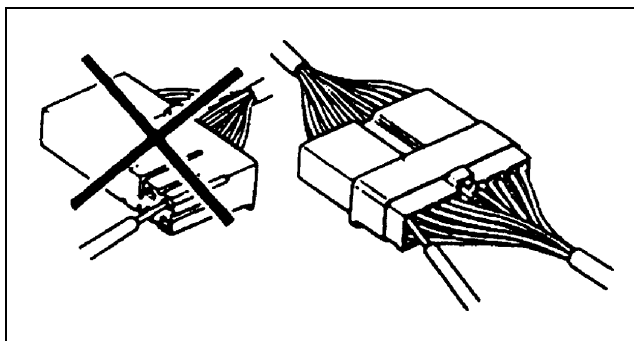


X3U000WB1

GENERAL INFORMATION

Inspection

- When a tester is used to inspect for continuity or measuring voltage, insert the tester probe from the wiring harness side.

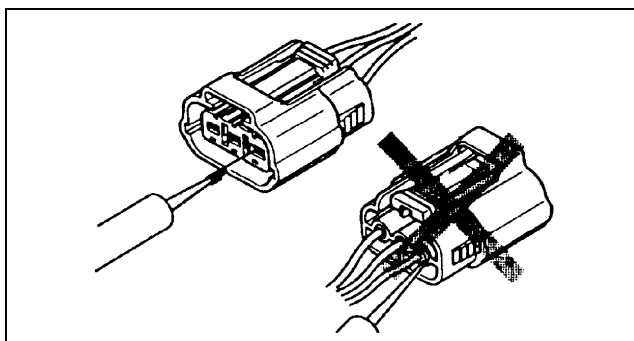


X3U000WB2

- Inspect the terminals of waterproof connectors from the connector side since they cannot be accessed from the wiring harness side.

Caution

- To prevent damage to the terminal, wrap a thin wire around the tester probe before inserting into terminal.

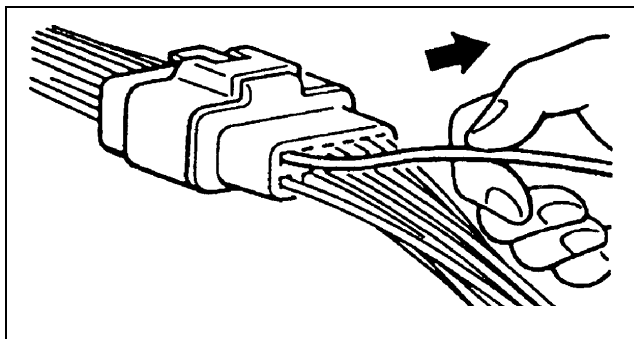


X3U000WB3

Terminals

Inspection

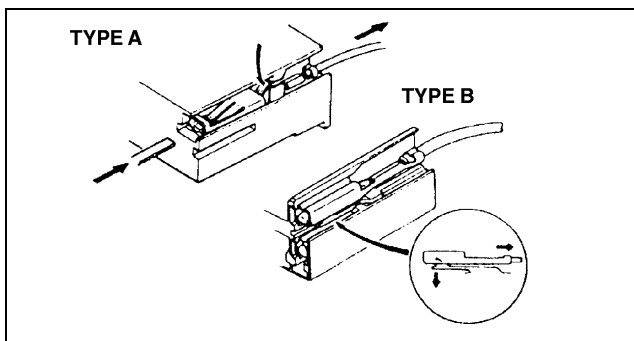
- Pull lightly on individual wires to verify that they are secured in the terminal.



X3U000WB4

Replacement

- Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.
- Insert a thin piece of metal from the terminal side of the connector and with the terminal locking tab pressed down, pull the terminal out from the connector.

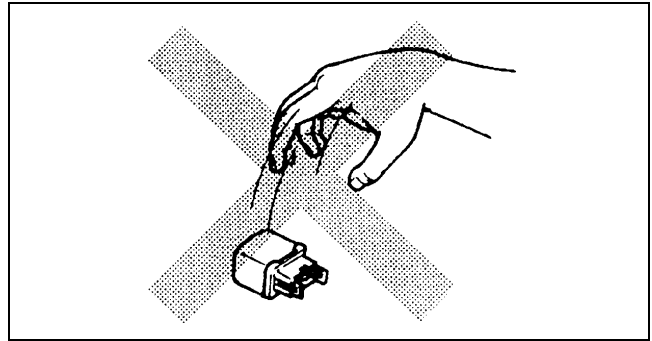


X3U000WB5

GENERAL INFORMATION

Sensors, Switches, and Relays

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



X3U000WB6

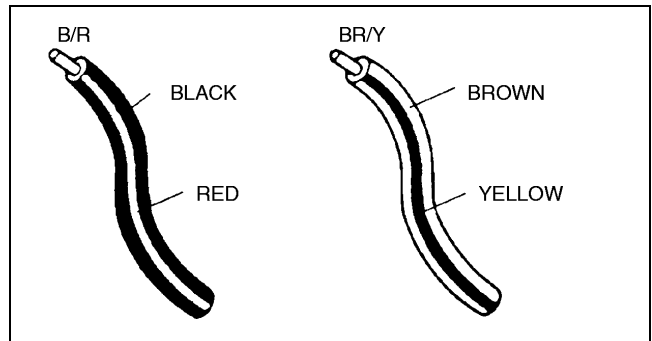
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Wiring Harness

Wiring color codes

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

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

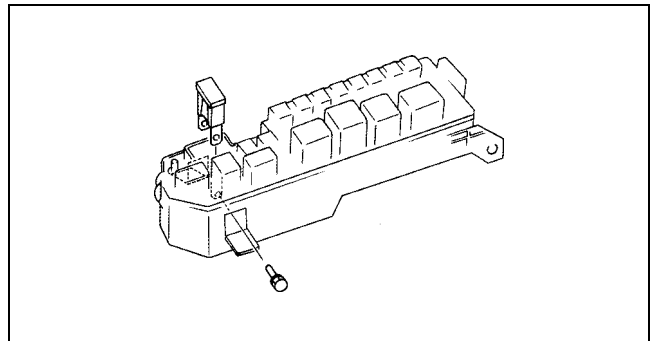


X3U000WB7

Fuse

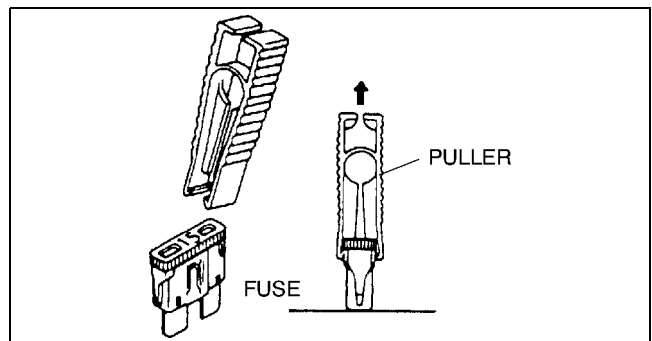
Replacement

- When replacing a fuse, be sure to replace it with one of the same capacity. If a fuse fails again, the circuit probably has a short and the wiring should be inspected.
- Be sure the negative battery terminal is disconnected before replacing a main fuse.



YMU000WA1

- When replacing a pullout fuse, use the fuse puller.



YMU000WAK

GENERAL INFORMATION

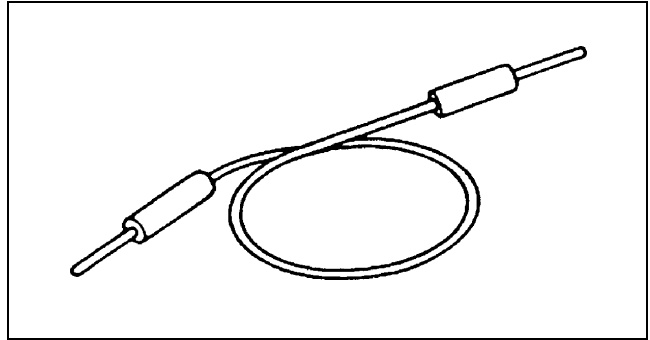
Electrical Troubleshooting Tools

Jumper wire

- A jumper wire is used to create a temporary circuit. Connect the jumper wire between the terminals of a circuit to bypass a switch.

Caution

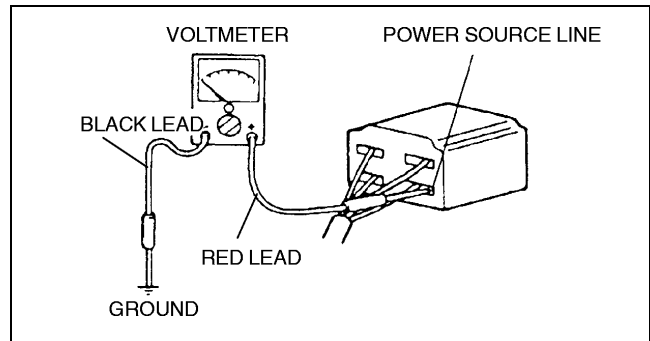
- Do not connect a jumper wire from the power source line to a body ground. This may cause burning or other damage to wiring harnesses or electronic components.**



X3U000WBB

Voltmeter

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



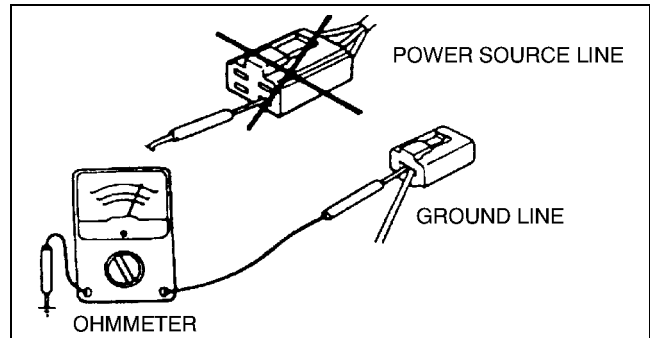
X3U000WBC

Ohmmeter

- The ohmmeter is used to measure the resistance between two points in a circuit and to inspect for continuity and short circuits.

Caution

- Do not connect the ohmmeter to any circuit where voltage is applied. This will damage the ohmmeter.**

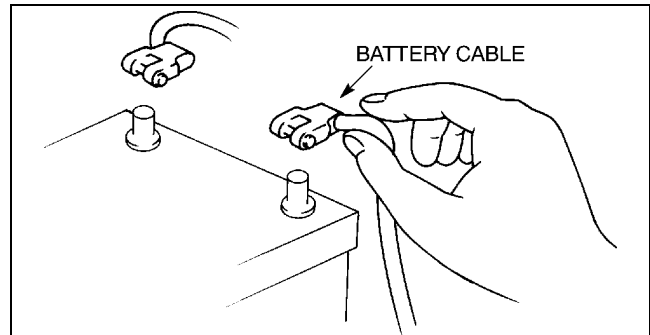


YMU000WAL

Precautions Before Welding

A vehicle has various electrical parts. To protect the parts from excessive current generated when welding, be sure to perform the following procedure.

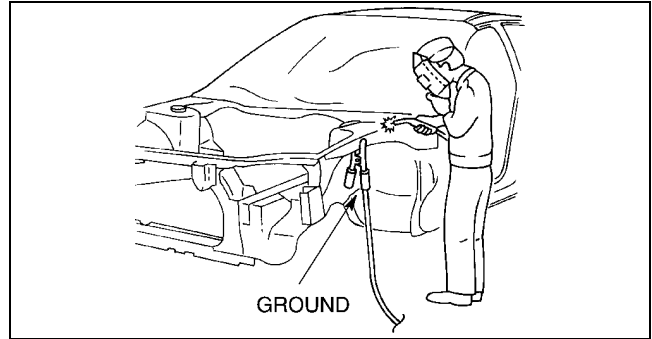
- Turn the ignition switch to the LOCK position.
- Disconnect the battery cables.



WGIWXX0007E

GENERAL INFORMATION

3. Securely connect the welding machine ground near the welding area.
4. Cover the peripheral parts of the welding area to protect them from weld spatter.



WGIWXX0008E

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JACKING POSITIONS

A5U000000007W01

Warning

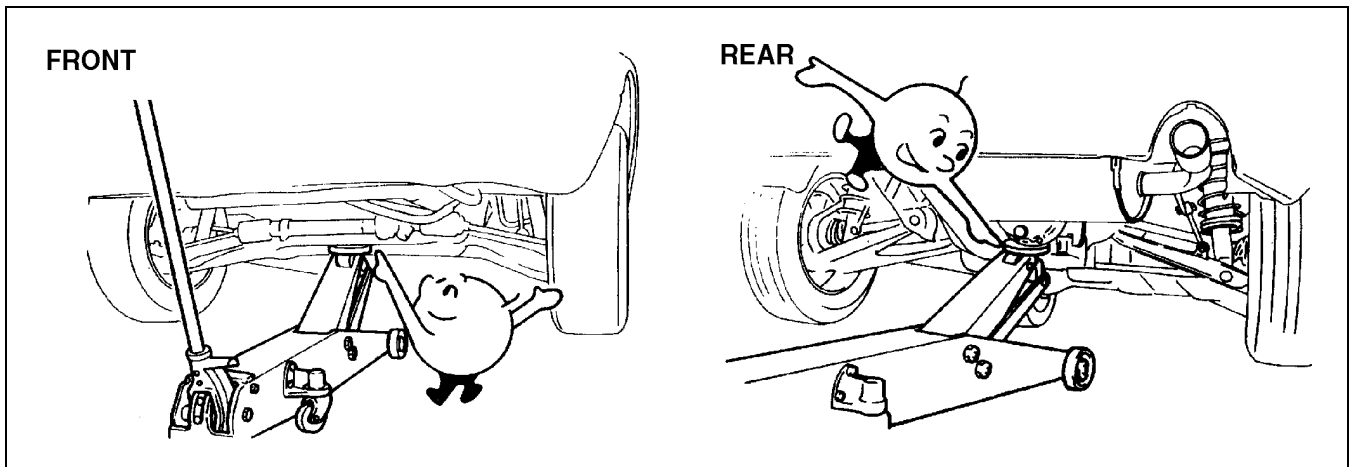
- Improperly jacking a vehicle is dangerous. The vehicle can slip off the jack and cause serious injury. Use only the correct front and rear jacking positions and block the wheels.
- Use safety stands to support the vehicle after it has been lifted.

Front

- At the center of the crossmember

Rear

- At the center of the differential



Z5U0000W101

VEHICLE LIFT (2 SUPPORTS) AND SAFETY STAND (RIGID RACK) POSITION

A5U000000008W01

Vehicle Lift Positions

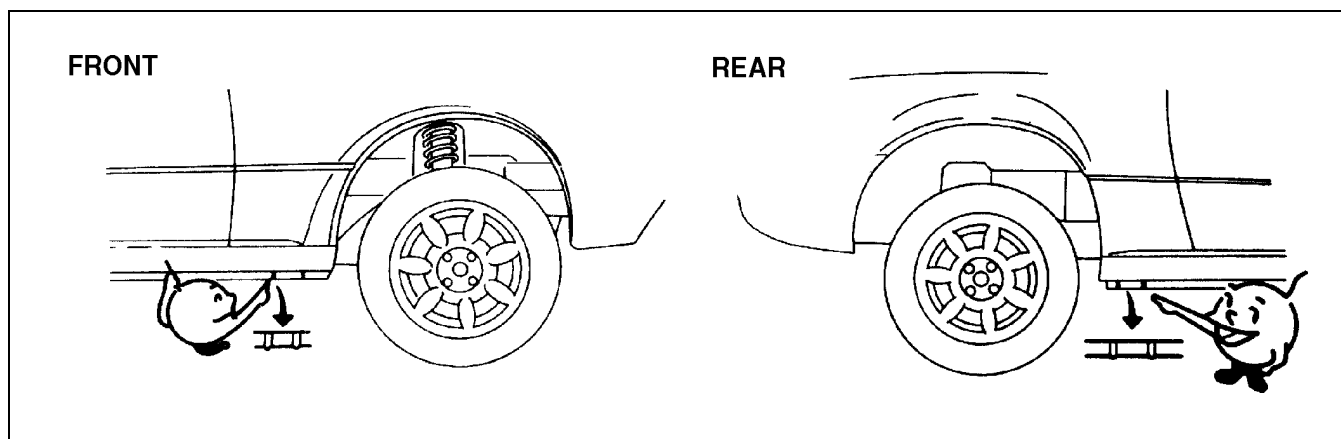
Front

- Both sides of the vehicle, on side sills

Rear

- Both sides of the vehicle, on side sills

GENERAL INFORMATION



Z5U0000W102

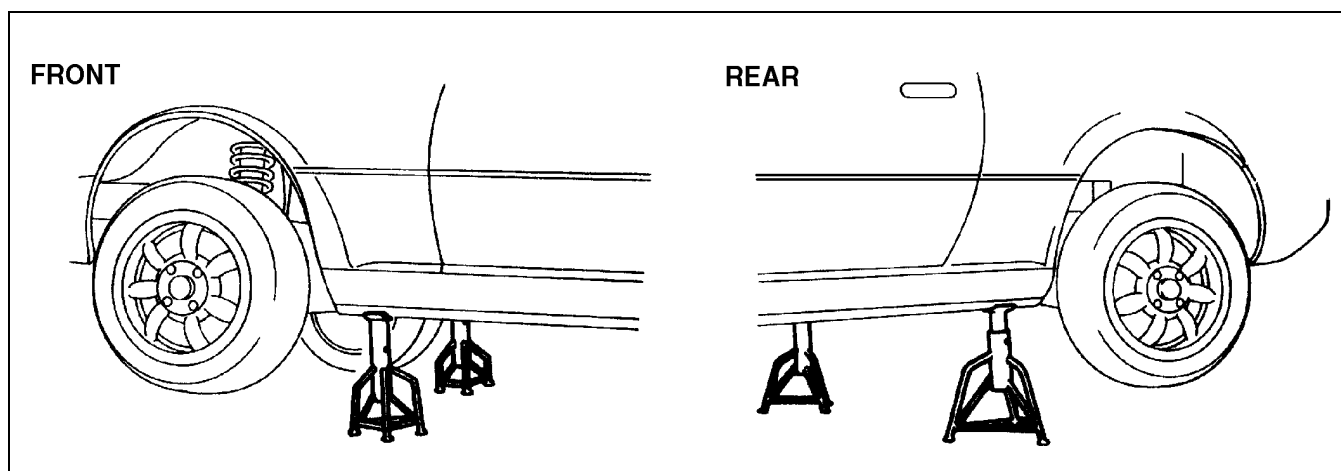
Safety Stand Positions

Front

- Both sides of the vehicle, on side sills

Rear

- Both sides of the vehicle, on side sills



Z5U0000W103

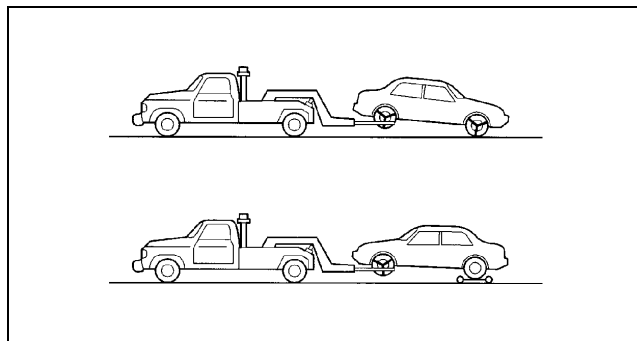
TOWING

A5U00000009W01

- Proper lifting and towing are necessary to prevent damage to the vehicle. State and local laws must be followed.
- A towed vehicle usually should have its rear wheels off the ground. If excessive damage or other conditions prevent this, use wheel dollies.

Caution

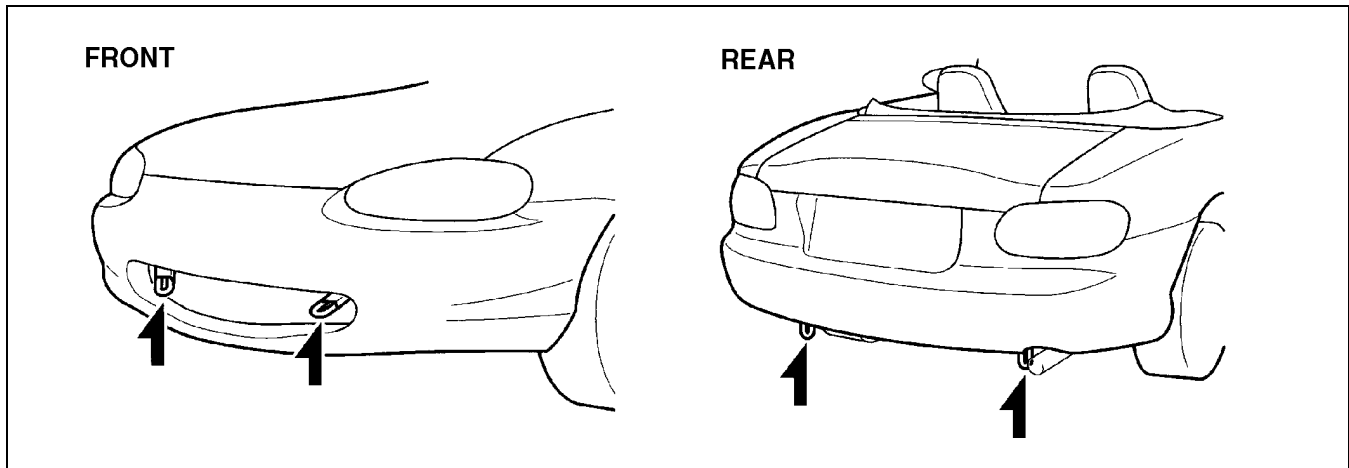
- Do not use the hook loops under the front and rear for towing. They are designed **ONLY** for tying down the vehicle when it is being transported. Using them for towing will damage the bumper.



X5U000WA8

GENERAL INFORMATION

Tiedown Hooks



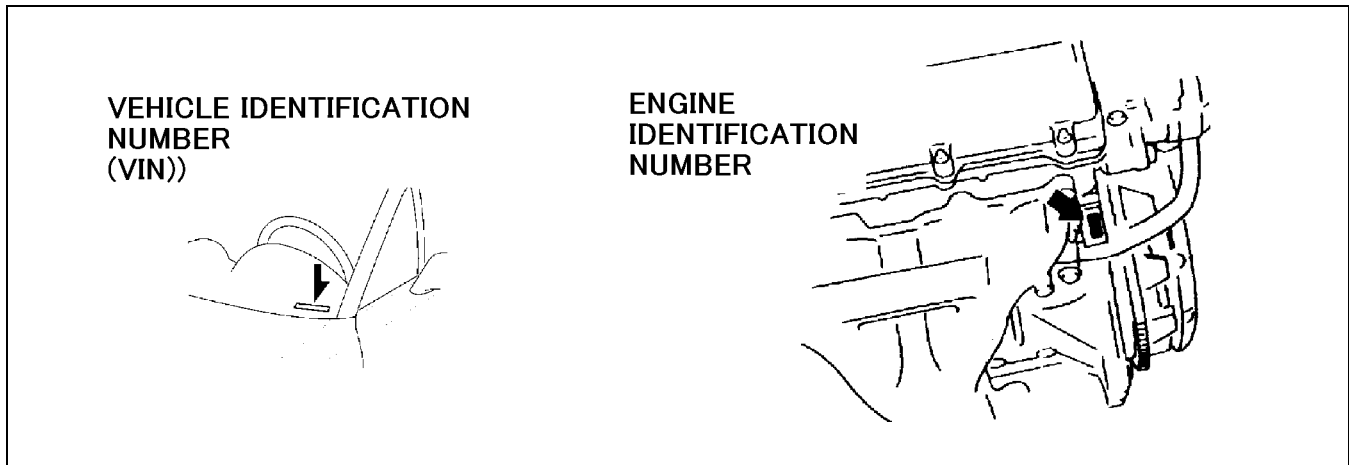
Z5U0000W104

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IDENTIFICATION NUMBER LOCATIONS

Vehicle Identification Number (VIN) and Engine Identification Number

A5U000000010W01



Z5U0000W105

SAE STANDARDS

A5U000000003W01

- In accordance with new regulations, SAE (Society of Automotive Engineers) standard names and abbreviations are now used in this manual. The table below lists the names and abbreviations that have been used in Mazda manuals up to now and their SAE equivalents.

SAE Standard			SAE Standard		
Abbreviation	Name	Remark	Abbreviation	Name	Remark
AP	Accelerator Pedal		MAP	Manifold Absolute Pressure	
ACL	Air Cleaner		MAF sensor	Mass Airflow Sensor	
A/C	Air Conditioning		MFI	Multiport Fuel Injection	
BARO	Barometric Pressure		OBD	On Board Diagnostic	
B+	Battery Positive Voltage		OL	Open Loop	
CAC	Charge Air Cooler		OC	Oxidation Catalytic Converter	
CL	Closed Loop		O2S	Oxygen Sensor	
CMP sensor	Camshaft Position Sensor		PID	Parameter Identification	
CTP	Closed Throttle Position		PNP	Park/Neutral Position	
CPP	Clutch Pedal Position		PCV	Positive Crankcase Ventilation	
CFI	Continuous Fuel Injection		PCM	Powertrain Control Module	#3
CKP sensor	Crankshaft Position Sensor		PSP	Power Steering Pressure	
DLC	Data Link Connector		PAIR	Pulsed Secondary Air Injection	Pulsed injection
DTM	Diagnostic Test Mode	#1	AIR	Secondary Air Injection	Injection with air pump
DTC	Diagnostic Trouble Code				
DLI	Distributorless Ignition				
EI	Electronic Ignition	#2			

GENERAL INFORMATION

SAE Standard		Remark	SAE Standard		Remark
Abbreviation	Name		Abbreviation	Name	
ECT	Engine Coolant Temperature		SFI	Sequential Multiport Fuel Injection	
EM	Engine Modification		3GR	Third Gear	
EVAP	Evaporative Emission		TB	Throttle Body	
EGR	Exhaust Gas Recirculation		TP sensor	Throttle Position Sensor	
FC	Fan Control		TCC	Torque Converter Clutch	
FF	Flexible Fuel		TCM	Transmission (Transaxle) Control Module	
4GR	Fourth Gear		TR	Transmission (Transaxle) Range	
FP	Fuel Pump		TC	Turbocharger	
FTP	Fuel Tank Pressure		TWC	Three Way Catalytic Converter	
GEN	Generator		VSS	Vehicle Speed Sensor	
GND	Ground		VR	Voltage Regulator	
HO2S	Heated Oxygen Sensor	With heater	VAF sensor	Volume Airflow Sensor	
IAC	Idle Air Control		WU-TWC	Warm Up Three Way Catalytic Converter	#4
IAT	Intake Air Temperature		WOP	Wide Open Throttle	
KS	Knock Sensor				
MIL	Malfunction Indicator Lamp				

#1 : Diagnostic trouble codes depend on the diagnostic test mode.

#2 : Controlled by the PCM

#3 : Device that controls engine and powertrain

#4 : Directly connected to exhaust manifold

ABBREVIATIONS

A5U000000011W01

A/C	Air conditioner	LR	Left rear
AAS	Air adjusting screw	LSD	Limited slip differential
ABS	Antilock brake system	M	Motor
ACC	Accessories	MT	Manual transmission
ALC	Automatic level control	N	Neutral
AT	Automatic transmission	OCV	Oil control valve
ATF	Automatic transmission fluid	O/D	Overdrive
CDCV	Canister drain cut valve	OFF	Switch off
CM	Control module	ON	Switch on
D range	Drive range	P	Park
DRL	Daytime running light	P position	Park position
EBD	Electronic brakeforce distribution	PAD	Passenger air bag deactivation
EC-AT	Electronically controlled automatic transmission	R position	Reverse position
ELR	Emergency locking retractor	REC	Recirculate
EX	Exhaust	RF	Right front
FP RLY	Fuel pump relay	RH	Right hand
HI	High	RR	Right rear
HU	Hydraulic unit	S range	Slope range
IAC	Idle air control	SAS	Sophisticated air bag sensor
IG	Ignition	SST	Special service tool
IN	Intake	SW	Switch
INT	Intermittent	TAS	Throttle adjusting screw
L range	Low range	TFT	Transmission fluid temperature
LCD	Liquid crystal display	TNS	Tail number side lights
LF	Left front	TR	Transmission range
LH	Left hand	VTCS	Variable tumble control system
LO	Low	1GR	First gear
		2GR	Second gear

PRE-DELIVERY INSPECTION

Pre-Delivery Inspection Table

EXTERIOR

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

- ☐ Glass, exterior bright metal and paint for damage
- ☐ Convertible top and detachable hardtop (if equipped) for damage
- ☐ Wheel lug nuts
- ☐ All weatherstrips for damage or detachment
- ☐ Operation of hood release and lock
- ☐ Operation of fuel lid
- ☐ Door operation and alignment
- ☐ Headlight aiming

TRUNK ROOM

- ☐ Check spare tire and air pressure
- ☐ Inspect operation of trunk lid internal release

INSTALL the following parts:

- ☐ Wheel caps (if equipped)
- ☐ Mast antenna (if equipped)

UNDER HOOD—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 and clutch master cylinder fluid level
- ☐ Windshield washer reservoir fluid level
- ☐ Radiator coolant level and specific gravity
- ☐ Tightness of battery terminals

INTERIOR

CHECK the operation of the following items:

- ☐ Seat controls (sliding and reclining)
- ☐ Seat belts and warning system
- ☐ Air bag system using warning light
- ☐ Cruise control system (if equipped)
- ☐ Ignition switch and steering lock
- ☐ Starter interlock switch (clutch pedal)
- ☐ Power windows (if equipped)
- ☐ Door locks
- ☐ All lights including warning and indicator lights
- ☐ Horn, wipers, and washers
- ☐ Wiper blades performance
Clean the wiper blades and windshield, if necessary
- ☐ Audio system
- ☐ Cigarette lighter
- ☐ Power outside mirrors (if equipped)
- ☐ Heater, defroster, and air conditioner at all mode selections (if equipped)

CHECK the following items:

- ☐ Presence of spare fuse
- ☐ Upholstery and interior finish

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

- ☐ Pedal height and free play of brake and clutch pedal (See 04–11–3 BRAKE PEDAL INSPECTION.) (See 05–10–4 CLUTCH PEDAL INSPECTION.)
- ☐ Parking brake (See 04–12–1 PARKING BRAKE INSPECTION.)

UNDER HOOD—ENGINE RUNNING AT OPERATING TEMPERATURE

CHECK the following items:

- ☐ Automatic transmission oil level

ON HOIST

CHECK the following items:

- ☐ 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
- ☐ Manual transmission oil level
- ☐ Differential oil level

ROAD TEST

CHECK the following items:

- ☐ Brake operation
- ☐ Clutch operation
- ☐ Steering control
- ☐ Operation of meters and gauges
- ☐ Squeaks, rattles, or unusual noises
- ☐ Overall engine performance
- ☐ Seat belt emergency locking retractors
- ☐ Cruise control system (if equipped)

AFTER ROAD TEST

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

The following items must be done just before delivery to your customer.

- ☐ Load test battery and charge if necessary (Load test result: Volts)
- ☐ Adjust tire pressure to specification
- ☐ Clean outside of vehicle
- ☐ Install fuses for accessories
- ☐ Remove seat and floor mat protective covers
- ☐ Vacuum and clean interior of vehicle
- ☐ Inspect installation of option parts with invoice

GENERAL INFORMATION

SCHEDULED MAINTENANCE

A5U000000013W01

Scheduled Maintenance Table

Schedule 1: (Normal driving conditions) U.S.A.

- The vehicle is mainly operated where none of the "unique driving conditions" apply.

Maintenance Item	Maintenance Interval (Number of months or kilometers (miles), whichever comes first)								
	Months	6	12	18	24	30	36	42	48
	×1000 kilometers	12	24	36	48	60	72	84	96
	(×1000 miles)	(7.5)	(15)	(22.5)	(30)	(37.5)	(45)	(52.5)	(60)
ENGINE									
Engine valve clearance									I
Engine timing belt	Replace every 96,000 km (60,000 miles).								
Drive belt (tension)				I					I
Engine oil	R	R	R	R	R	R	R	R	R
Engine oil filter	R	R	R	R	R	R	R	R	R
COOLING SYSTEM									
Cooling system				I					I
Engine coolant	Replace at first 72,000 km (45,000 miles) or 36 months; after that, every 48,000 km (30,000miles)or 24 months.								
FUEL SYSTEM									
Idle speed				I					I
Air cleaner element				R					R
Fuel lines & hoses	*			I					I
Hoses & tubes for emission	*								I
IGNITION SYSTEM									
Spark plugs				R					R
CHASSIS AND BODY									
Brake lines, hoses & connections				I					I
Disc brakes				I					I
Steering operation & linkages				I					I
Manual transmission oil									R
Rear differential oil									R
Front suspension ball joints				I					I
Driveshaft dust boots				I					I
Bolts & nuts on chassis & body				I					I
Exhaust system heat shields				I					I
All locks & hinges	L	L	L	L	L	L	L	L	L
AIR CONDITIONER SYSTEM (IF INSTALLED)									
Refrigerant amount		I		I		I			I
Compressor operation		I		I		I			I

Chart symbols

- I** : Inspect and repair, clean, adjust, or replace if necessary. (Oil-permeated air cleaner elements cannot be cleaned using the air-blow method.)
- R** : Replace
- L** : Lubricate

Remarks

- After the described period, continue to follow the described maintenance at the recommended intervals.
 - Refer below for a description of items marked* in the maintenance chart.
- *: According to state and federal regulations, failure to perform maintenance on these items will not void your emissions warranties. However, Mazda recommends that all maintenance services be performed at the recommended time or mileage period to ensure long-term reliability.

GENERAL INFORMATION

Schedule 2: Canada, Puerto Rico, and (Unique driving conditions) U.S.A.

Unique driving conditions consists of

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

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Maintenance Item	Maintenance Interval (Number of months or kilometers (miles), whichever comes first)												
	Months	4	8	12	16	20	24	28	32	36	40	44	48
	×1000 kilometers	8	16	24	32	40	48	56	64	72	80	88	96
	(×1000 miles)	(5)	(10)	(15)	(20)	(25)	(30)	(35)	(40)	(45)	(50)	(55)	(60)
ENGINE													
Engine valve clearance													I
Engine timing belt	Replace every 96,000 km (60,000 miles).												
Drive belts (tension)							I						I
Engine oil	except for Puerto Rico	R	R	R	R	R	R	R	R	R	R	R	R
	for Puerto Rico	Replace every 5,000 km (3,000 miles) or 3 months											
Engine oil filter		R	R	R	R	R	R	R	R	R	R	R	R
COOLING SYSTEM													
Cooling system							I						I
Engine coolant	Replace at first 72,000 km (45,000 miles) or 36 months; after that, every 48,000 km (30,000 miles) or 24 months.												
Engine coolant level		I	I	I	I	I	I	I	I	I	I	I	I
FUEL SYSTEM													
Idle speed							I						I
Air cleaner element			I*				R			I*			R
Fuel lines & hoses	*						I						I
Hoses & tubes for emission	*												I
IGNITION SYSTEM													
Spark plugs							R						R
ELECTRICAL SYSTEM													
Function of all lights		I	I	I	I	I	I	I	I	I	I	I	I
CHASSIS AND BODY													
Brake lines, hoses & connections							I						I
Brake & clutch fluid level		I	I	I	I	I	I	I	I	I	I	I	I
Disc brakes			I				I			I			I
Tire inflation pressure and tire wear		I	I	I	I	I	I	I	I	I	I	I	I
Steering operation & linkages							I						I
Power steering fluid level		I	I	I	I	I	I	I	I	I	I	I	I
Manual transmission oil							R						R
Rear differential oil							R						R
Front suspension ball joints							I						I
Driveshaft dust boots							I						I
Bolts & nuts on chassis & body			I				I			I			I
Exhaust system heat shields							I						I
All locks & hinges		L	L	L	L	L	L	L	L	L	L	L	L
Washer fluid level		I	I	I	I	I	I	I	I	I	I	I	I
AIR CONDITIONER SYSTEM (IF INSTALLED)													
Refrigerant amount			I				I			I			I
Compressor operation			I				I			I			I

GENERAL INFORMATION

Chart symbols

- I** : Inspect and repair, clean, adjust, or replace if necessary. (Oil-permeated air cleaner elements cannot be cleaned using the air-blow method.)
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