

# 1988 Mazda RX-7 Workshop Manual

## FOREWORD

This workshop manual is intended for use by service technicians of authorized Mazda dealers to help them service Mazda vehicles. This manual can be also useful for Mazda owners in diagnosing certain problems and performing some repair and maintenance on Mazda vehicles.

For proper repair and maintenance, it is important to be thoroughly familiarized with this manual. It is recommended that this manual always be kept in a handy place for quick and easy reference.

All the contents of this manual, including photographs, drawings, and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up-to-date.

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

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A new wiring diagram style has been beginning with the '88 RX-7.

Therefore, electrical circuit diagrams in this workshop manual may not be the same as in the wiring diagram.

**Mazda Motor Corporation  
HIROSHIMA JAPAN**

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# GENERAL INFORMATION

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## IMPORTANT INFORMATION

### BASIC ASSUMPTIONS

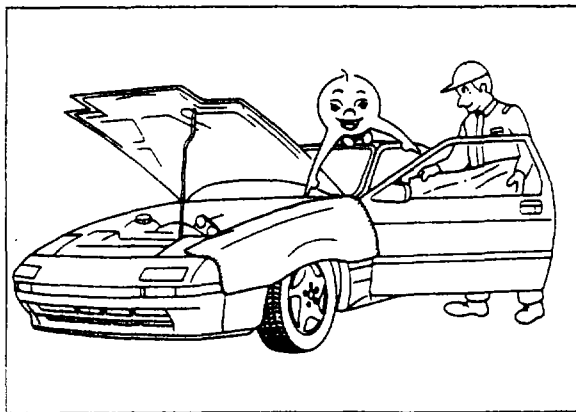
This workshop manual assumes that you have and know how to properly use certain special tools which are necessary for the safe and efficient performance of service operations on Mazda vehicles. The manual also assumes that you are familiar generally with automobile systems and basic service and repair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

### SAFETY RISK

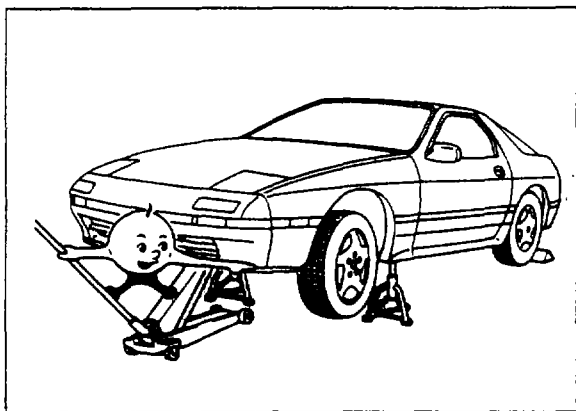
This manual contains certain notes, warnings, etc., which you should carefully read and follow in order to eliminate the risk of personal injury to yourself or others and the risk of improper service which may damage the vehicle or render it unsafe. The fact that there are no such notes, etc., with respect to any specific service method does not mean that 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 an authorized Mazda dealer.



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47U0GX-003

## FUNDAMENTAL PROCEDURES

As you read through the procedure, 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 that you should follow when you work on a vehicle.

### PROTECTION OF THE VEHICLE

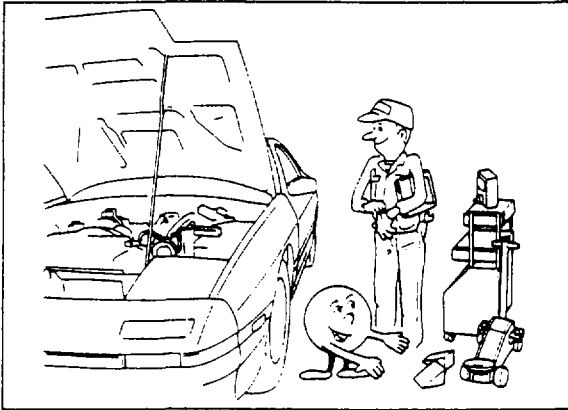
Always be sure to cover fenders, seats, and floor areas before starting work.

### A WORD ABOUT SAFETY

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

1. Block wheels.
2. Use only specified jacking positions.
3. Support vehicle with safety stands (rigid racks).

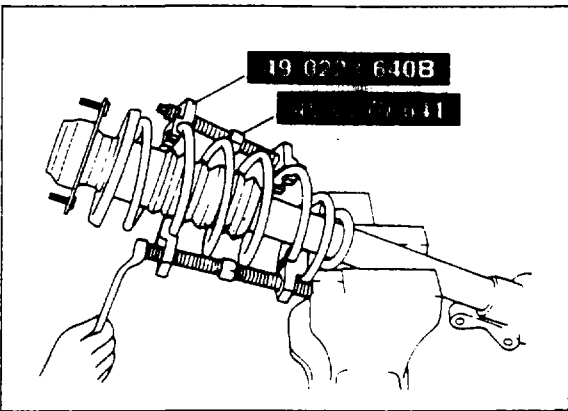
Start the engine only after making certain the engine compartment is clear of tools and all persons are clear.



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## **PREPARATION OF TOOLS AND MEASURING EQUIPMENT**

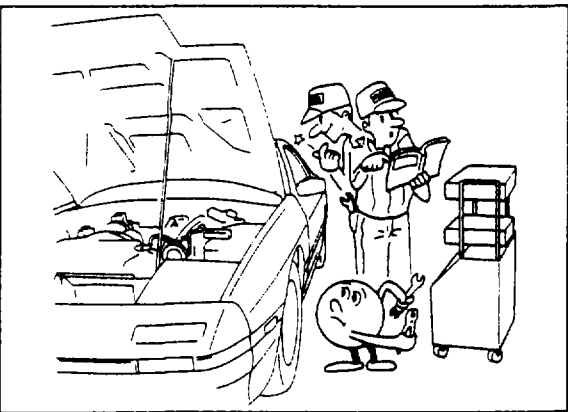
Be sure that all necessary tools and measuring equipment are available before starting any work activity.



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## **SPECIAL TOOLS**

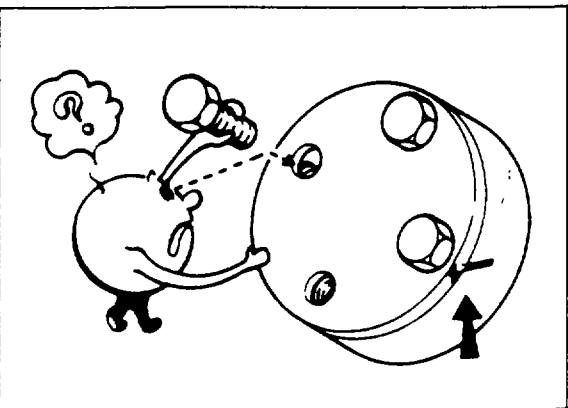
Use special tools when they are required.



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## **REMOVAL OF PARTS**

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

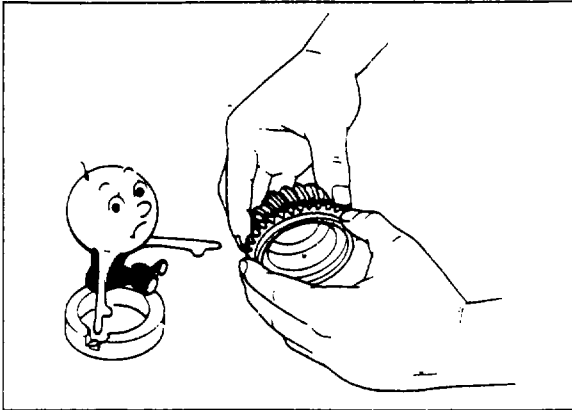


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## **DISASSEMBLY**

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

# G FUNDAMENTAL PROCEDURES

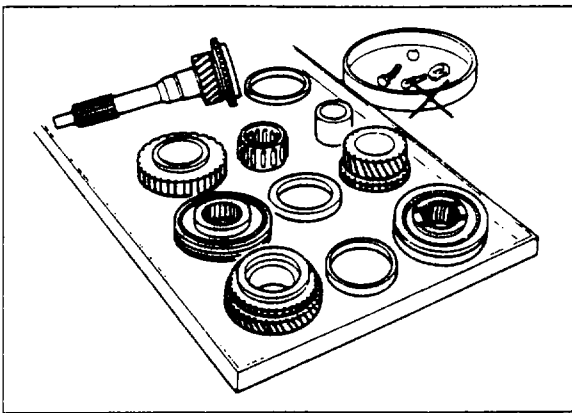


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## DISASSEMBLY

### 1. Inspection of parts

Each part when removed should be carefully inspected for malfunctioning, deformation, damage, and other problems.

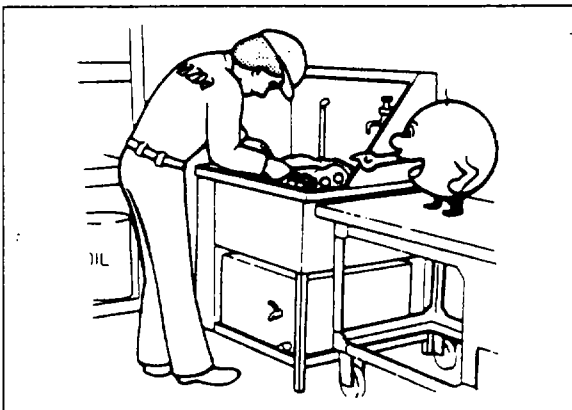


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### 2. Arrangement of parts

All disassembled parts should be carefully arranged for reassembly.

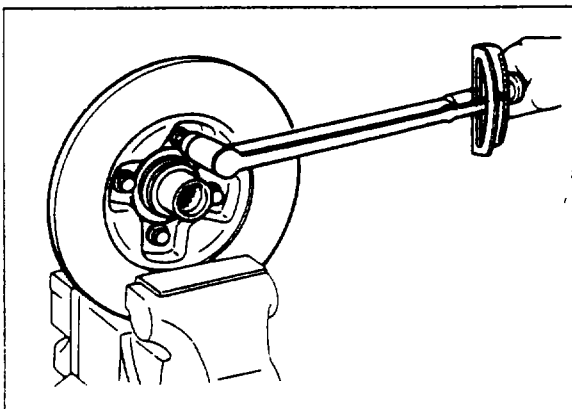
Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.



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### 3. Cleaning parts for reuse

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



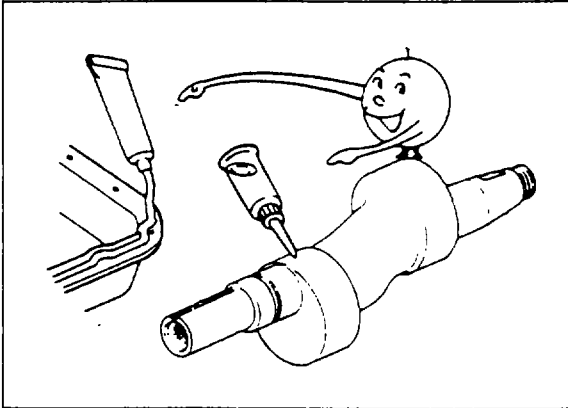
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## REASSEMBLY

Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.

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

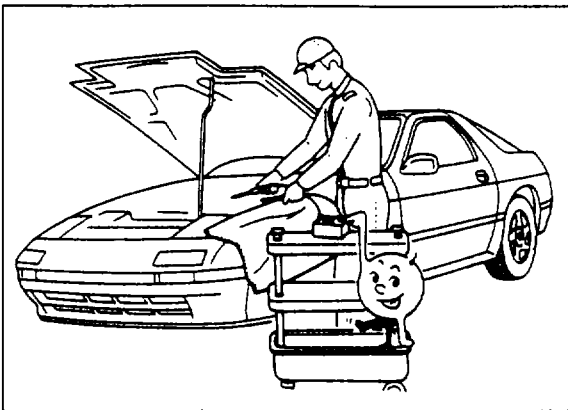
1. Oil seals
2. Gasket
3. O-rings
4. Lock washers
5. Cotter pins (split pins)
6. Nylon nuts



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Depending on where they are;

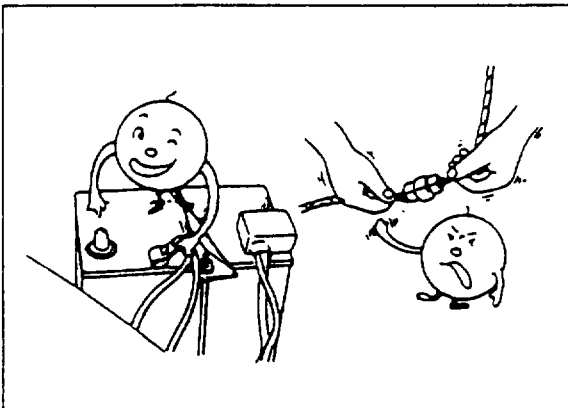
1. Sealant should be applied to gaskets.
2. Oil should be applied to the moving components of parts.
3. Specified oil or grease should be applied at the prescribed locations (oil seals, etc.) before assembly.



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## **ADJUSTMENTS**

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



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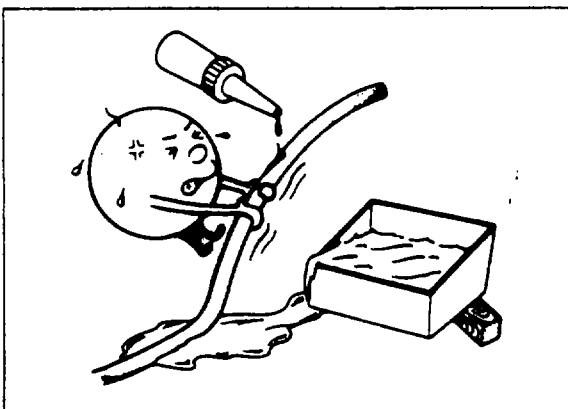
## **ELECTRICAL SYSTEM**

Be sure to disconnect the battery cable from the negative (-) terminal of the battery.

Never pull on the wiring when disconnecting connectors.

When locking connectors, make sure to listen for a "click" that will let you know they are securely locked.

Handle sensors and relays carefully. Be careful not to drop them or strike them against other parts.



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## **RUBBER PARTS AND TUBING**

Always prevent gasoline or oil from getting on rubber parts or tubing.

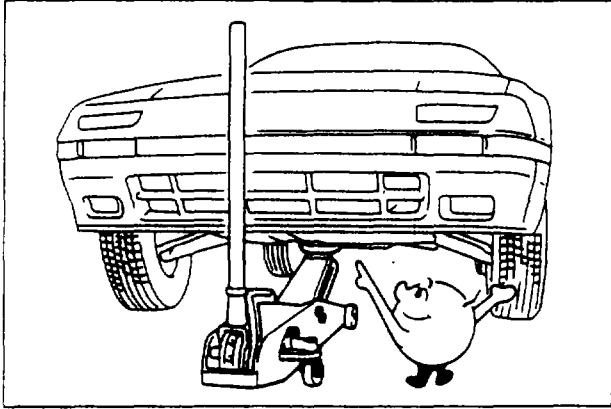
# G JACK AND SAFETY STAND (RIGID RACK) POSITIONS

## JACK AND SAFETY STAND (RIGID RACK) POSITIONS

### FRONT END

#### Jack position:

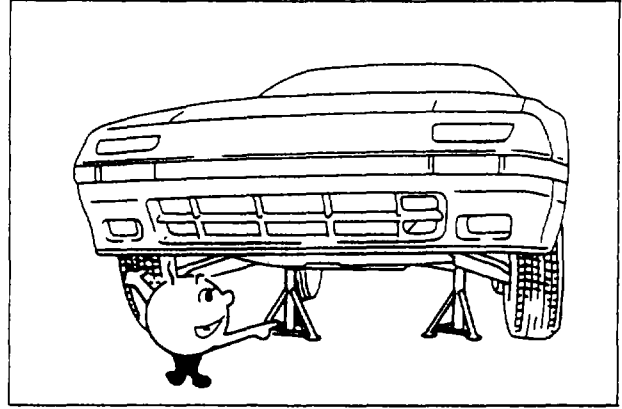
At the center of the crossmember



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#### Safety stand positions:

On both sides of the body frame

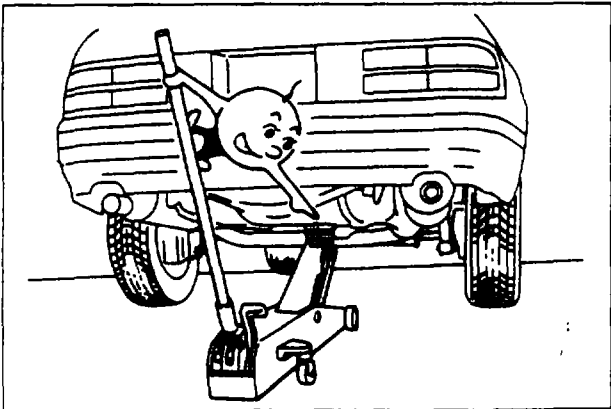


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### REAR END

#### Jack position:

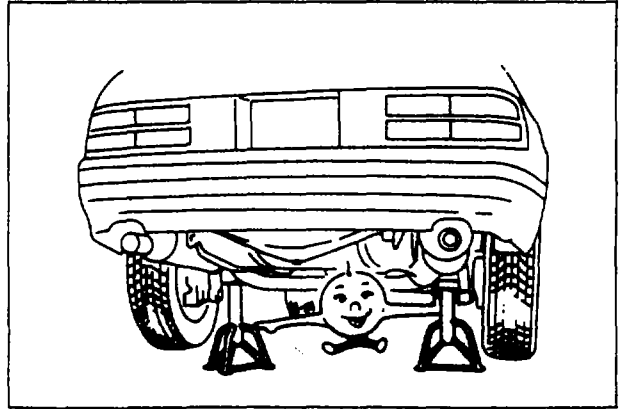
At the differential



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#### Safety stand positions:

On both sides of the body frame



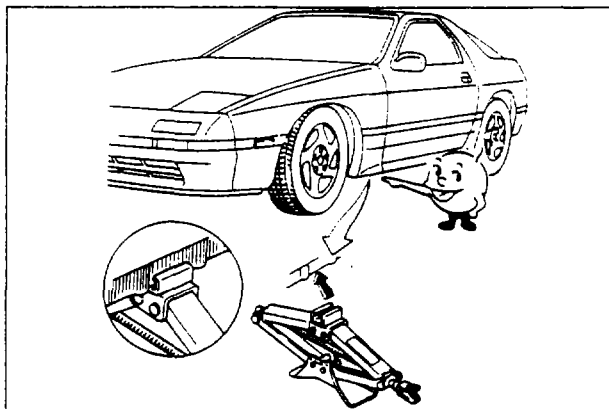
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## VEHICLE LIFT (2-SUPPORT TYPE) POSITIONS

### FRONT END

#### Frame

Side sills (front)

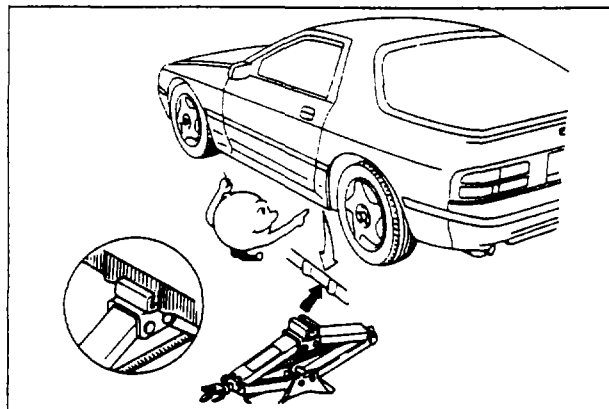


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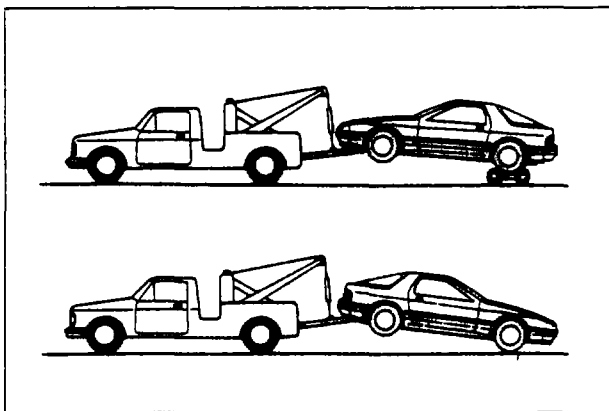
### REAR END

#### Frame

Side sills (rear)



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## TOWING

Proper lifting or towing equipment is necessary to prevent damage to the vehicle during any towing operation. State and local laws applicable to vehicles in tow must be followed.

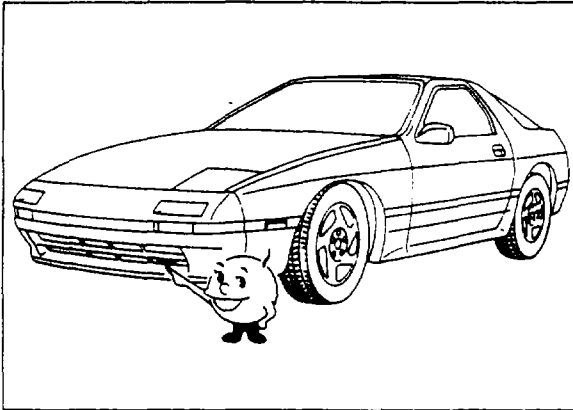
If towing is necessary, we recommend you have it done by your Mazda Dealer or a commercial tow truck service.

### WITH MANUAL TRANSMISSION

If the transmission, rear axle and steering system are not damaged, the vehicle may be towed on all four wheels. If these components are damaged, use a towing dolly.

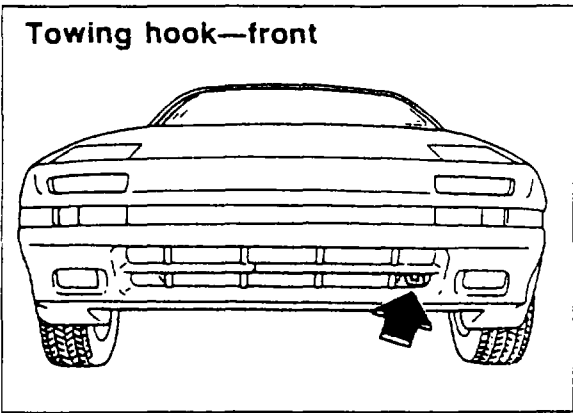


# G TOWING



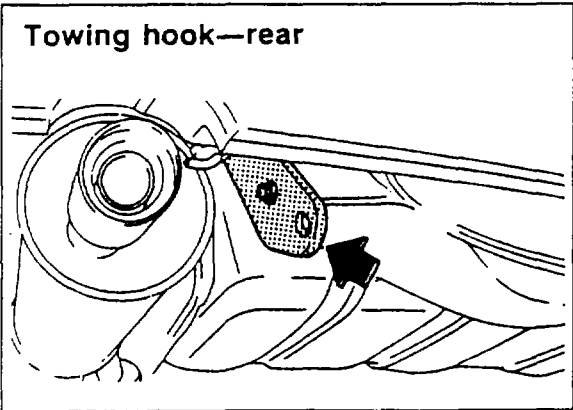
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## Towing hook—front



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## Towing hook—rear



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## WITH AUTOMATIC TRANSMISSION

If excessive damage or other conditions prevent towing the vehicle with the driving wheels off the ground, use wheel dollies. If all four wheels are on the ground, the vehicle may only be towed forward. In this case, do not exceed 30 mph (45 km/h) and/or a distance of 10 miles (15 km) or transmission damage could result.

If towing speed will exceed 30 mph (45 km/h), or if the towing distance will exceed 10 miles (15 km), use one of three methods:

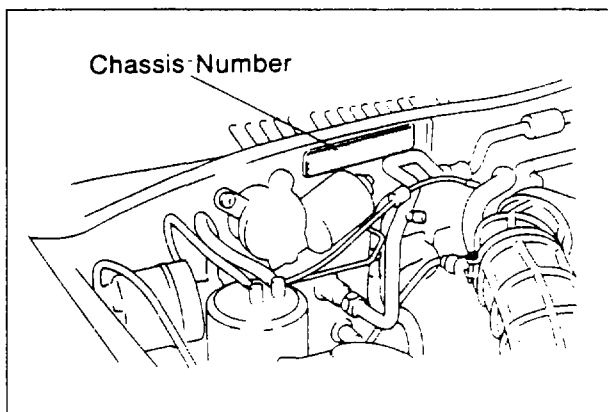
1. Place the rear wheels on a dolly.
2. Tow with the rear wheels off the ground.
3. Disconnect the propeller shaft.

If the transmission or rear axle are inoperative, tow with the rear wheels off the ground, or have the propeller shaft disconnected.

## CAUTION

- The following points are important when the vehicle is towed with all 4 wheels on the ground. Please be advised that the shift lever must be set at NEUTRAL, the ignition key in the "ACC" position and the parking brake released. Remember that the power assist for the brakes and steering (if equipped) will not be available when the engine is inoperative.
- The towing hook should be used only in an emergency situation, (e.g., to pull the vehicle out of a ditch, a snow bank or mud).
- When the towing hook is used, always pull the cable or chain in a straight direction with respect to the hook. Do not apply force to the hook in a side direction. To prevent damage, do not take up slack in the cable or chain too quickly.

### CHASSIS NUMBER LOCATION



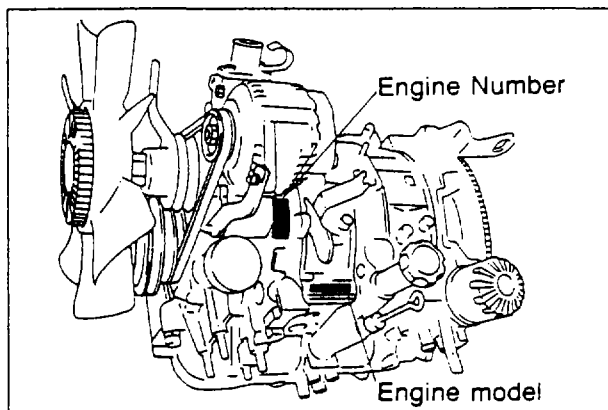
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### UNITS

N·m (m·kg, ft·lb or in·lb)	Torque
rpm	Revolutions per minute
A	Ampere(s)
V	Volt(s)
Ω	Ohm(s) (resistance)
kPa (kg/cm <sup>2</sup> , psi)	Pressure
mmHg (in Hg)	vacuum
W	Watt
cc(cu in)	capacity
liters (Us qt, Imp qt)	capacity

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### ENGINE MODEL AND NUMBER LOCATION



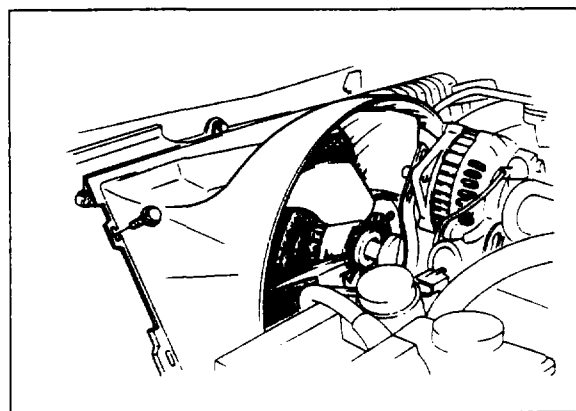
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### ABBREVIATIONS

ABS	Anti-lock brake system
A/C	Air conditioner
ACC	Accessories
ABDC	After bottom dead center
ATDC	After top dead center
A/T	Automatic transmission
ATF	Automatic transmission fluid
BAC	Bypass air control
BBDC	Before bottom dead center
BTDC	Before top dead center
E/GI	Electronic gasoline injection
ESA	Electronic spark advance
E/L	Electrical load
EX	Exhaust
IG	Ignition
IN	Intake
IC	Integrated circuit
INT	Intermittent
LH	Left hand
M/T	Manual transmission
M	Motor
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
ST	Start
SW	Switch

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### CAUTION



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Use caution when working near the engine cooling fan while the engine is running.

## CAUTION

### HOW TO USE THE TACHOMETER AND TIMING LIGHT

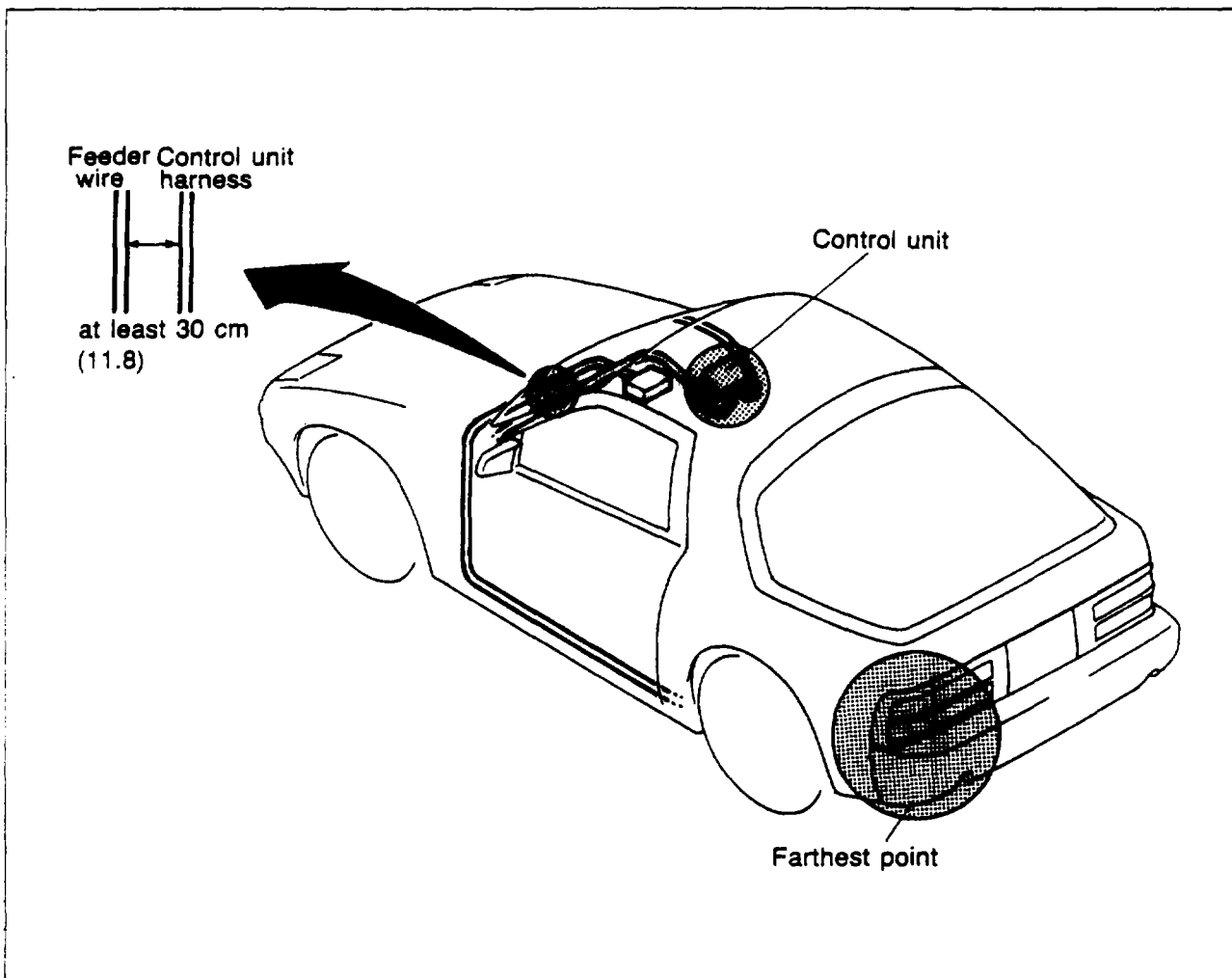
1. When using a **tachometer**, connect it to the **service connector** (black wire, black connector) at the **trailing side** coil with igniter.
2. If the tachometer does not function correctly on the trailing side coil, connect it to the **leading side** coil (Black wire terminal).
3. If using an **inductive (secondary pick up) type tachometer**, connect it to the **trailing side** high tension lead. If connected to the **leading side** coil, it will not function correctly.
4. Self powered timing lights might not function. Use only a vehicle-battery-powered timing light for checking ignition timing.

### INSTALLATION OF A MOBIL TWO-WAY RADIO SYSTEM

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

When vehicle is equipped with a mobile two-way radio system, observe the following precautions.

1. Install the antenna at the farthest point from the control unit.
2. Keep the antenna feeder away from the control unit harness as far as possible.  
**(at least 30 cm (11.8 in))**
3. Insure that the antenna and feeder are properly adjusted.
4. Do not install an excessively powerful mobile two-way radio system.



# PRE-DELIVERY INSPECTION AND SCHEDULED MAINTENANCE SERVICES

PRE-DELIVERY INSPECTION..... 0— 2  
SCHEDULED MAINTENANCE SERVICES .... 0— 3

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# 0 PRE-DELIVERY INSPECTION

## PRE-DELIVERY INSPECTION TABLE

### EXTERIOR

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

- Glass, exterior bright metal and paint for damage
- Wheel lug nuts
  - 88—118 N·m (9—12 m·kg, 65—87 ft·lb)
- Tire pressures (Refer to section 12)
- All weather strips for damage and detachment
- Operation of hood release and lock
- Operation of fuel lid and rear glass hatch opener
- Door operation and alignment
- Headlight aim

**INSTALL** the following parts

- Wheel caps (if equipped)
- Outside rearview mirror(s)
- Front air deflector (if equipped)
- Convertible top (if equipped)

### UNDER HOOD—ENGINE OFF

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

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

Protection °C (°F)	Specific gravity at 20 °C (68°F)
-4 (25)	1.028
-16 (3)	1.054
-26 (-15)	1.066
-40 (-40)	1.078

- Tightness of water hose clamps (including heater hoses)
- Tightness of battery terminals
- Drive belt tensions
- Accelerator cable and linkage for free movement
- Sub-zero starting system and fluid level

**CLEAN** spark plugs

**NOTE:** Do not blast with sand or abrasive cleaning materials

### INTERIOR

**INSTALL** the following parts:

- Rubber stopper for inside rearview mirror
- Fuse for accessories

**CHECK** the operations of the following items:

- Seat controls (sliding and reclining) and head rest
- Door locks
- Seat belts and warning system
- Ignition switch and steering lock
- All lights including warning and indicator lights and retractable headlight mechanism
- IC sound warning system
- Horn, wipers and washers (front and rear, if equipped)
- Radio and antenna (if equipped)
- Cigarette lighter and clock
- Remote control outside rearview mirror (if equipped)
- Power window (if equipped)
- Heater, defroster and air conditioner at various mode selections (if equipped)

- Sunroof (if equipped)
- Headlight cleaner (if equipped)
- Theft-deterrent system (if equipped)
- Convertible Top (if equipped)

### INTERIOR (cont'd)

**CHECK** the following items:

- Presence of spare fuse
- Upholstery and interior finish

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

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

	Pedal height mm (in)	free play mm (in)
Clutch pedal	220—225 (8.66—8.86)	0.6—3.0 (0.02—0.12)
Brake pedal	205—210 (8.07—8.27)	4—7 (0.16—0.28)

- Parking brake
  - 4—5 noches/98 N (10 kg, 22 lb)

### UNDER HOOD—ENGINE RUNNING AT OPERATING TEMPERATURE

**CHECK** the following items:

- By-pass air control system
- Automatic transmission fluid level
- Initial ignition timing
- Idle speed
- Setting of throttle sensor

**NOTE:** Engine must not be started to perform this item.

### ON HOIST

**CHECK** the following items:

- Manual transmission oil level
- Rear axle oil level
- Underside fuel, coolant and hydraulic lines, fittings, connections and components for leaks
- Tires for cuts and 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 noise
- Engine general performance (including turbo)
- Emergency locking retractors
- Cruise control system (if equipped)

### AFTER ROAD TEST

- REMOVE seat and floor mat protective covers
- CHECK for necessary owner information materials, tools and spare tire in vehicle
- REMOVE identification color tape on directional tires

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# SCHEDULED MAINTENANCE SERVICES

**Schedule 1 (Normal Driving Condition)**

MAINTENANCE INTERVALS	Number of months or miles (kilometers), whichever comes first											Service data and inspection point	Page	
	Months	7.5	15	22.5	30	37.5	45	52.5	60					
	Miles (Km)	2,000 (3,000)	7,500 (12,000)	15,000 (24,000)	22,500 (36,000)	30,000 (48,000)	37,500 (60,000)	45,000 (72,000)	52,500 (84,000)	60,000 (96,000)				
<b>MAINTENANCE OPERATION</b>														
<b>Cooling System</b>														
Cooling system			I		I		I		I			I	<ul style="list-style-type: none"> <li>Hoses for cracks or wear</li> <li>Coolant level</li> </ul>	3-5
Engine coolant					R							R	<ul style="list-style-type: none"> <li>Coolant capacity: Turbo 8.7 liters (9.2 US qt, 7.7 Imp qt) Non-Turbo 7.3 liters (7.7 US qt, 6.4 Imp qt)</li> </ul>	3-5
<b>Fuel System</b>														
Idle speed	I		I <sup>2</sup>		I <sup>2</sup>		I <sup>2</sup>		I <sup>2</sup>			I	Idle speed: 750 ± 25 (A/T, N Range)	4A-77 4B-80
Fuel filter												R		4A-76 4B-79
Fuel lines					I <sup>1</sup>							I	<ul style="list-style-type: none"> <li>Fittings, connections and components for leaks</li> </ul>	4A-76 4B-79
<b>Electrical System</b>														
Engine oil level warning system			I		I		I		I			I		15A-39
Engine coolant level warning system					I		I		I			I		15A-42
Sub-zero starting assist system													Inspect the operation seasonally (sub-zero weather use only).	4A-87 4B-90
<b>Chassis and Body</b>														
Brake line hoses and connections			I		I		I		I			I	<ul style="list-style-type: none"> <li>Proper attachment and connections</li> </ul>	11-5
Disc brakes			I		I		I		I			I	<ul style="list-style-type: none"> <li>Caliper Operation</li> <li>Thickness of disc plate: minimum... 1 mm (0.04 in)</li> <li>Thickness of pad: minimum... 1 mm (0.04 in)</li> <li>Disc run out ... 1 mm (0.04 in)</li> </ul>	11-27 11-32
Steering operations and linkage					I		I		I			I	<ul style="list-style-type: none"> <li>Free play: 5-20 mm (0.20-0.79 in)</li> <li>Operation and looseness</li> <li>Fluid leakage or oozing</li> </ul>	10A-5 10B-5

Schedule 1 (Normal Driving Condition)

MAINTENANCE INTERVALS	Number of months or miles (kilometers), whichever comes first										Service data and inspection point	Page
	Months	7.5	15	22.5	30	37.5	45	52.5	60			
MAINTENANCE OPERATION	2,000	7,500	15,000	22,500	30,000	37,500	45,000	52,500	60,000			
(Kkm)	(3,000)	(12,000)	(24,000)	(36,000)	(48,000)	(60,000)	(72,000)	(84,000)	(96,000)			

Chassis and Body

Front suspension ball joints					I						I	• Damage, looseness and grease leakage	13-11
Drive shaft dust boots					I						I	• For cracks, damage, leakage of grease or looseness of band	9-16
Exhaust system heat shield					I						I	• clearance to body, and exhaust system	4A-83 4B-86
Front wheel bearings					L						L		9-4
Manual transmission oil											R		7A-3
Rear axle oil											R		9-4B
Bolts and nuts on chassis and body									T				
Toe control hub and control link					I						I		13-24 9-14

SCHEDULED 1 (NORMAL DRIVING CONDITION)

Chart symbols:

- I: Inspect, and if necessary correct, clean or replace
- R: Replace or change
- T: Tighten
- L: Lubricate

Remarks:

After 60 months or 60,000 miles (96,000 km), continue to follow the described maintenance items and intervals periodically. As for \* marked items in this maintenance chart, please pay attention to the following points.

\*1 This maintenance operation is recommended by Mazda. However, this maintenance is not necessary for emission warranty coverage or manufacturer recall liability.

\*2 This maintenance operation is required for Canada and all states except California. However we do recommend that this operation be performed on California vehicles as well.



# 0 SCHEDULED MAINTENANCE SERVICES

## Schedule 2 (Unique Driving Condition)

MAINTENANCE INTERVALS	Number of months or miles (kilometers), whichever comes first											Service data and inspection point	Page
	Months	5	10	15	20	25	30	35	40	45	50		
MAINTENANCE OPERATION	2	5	10	15	20	25	30	35	40	45	50	55	60
(x1000 Km)	(3)	(8)	(16)	(24)	(32)	(40)	(48)	(56)	(64)	(72)	(80)	(88)	(96)

### Engine

Drive belts (Except air pump drive belt)							I									<ul style="list-style-type: none"> <li>• Check for damage</li> <li>• Tension</li> </ul>	1-7
Engine oil	Non-Turbo	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Oil pan capacity: 4.4 liters (4.7 US qt, 3.9 Imp qt)	2-5
	Turbo															Replace every 3,000 miles (5,000 km) or 3 months	
Oil filter	Non-Turbo	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Oil filter capacity: 0.3 liters (0.32 US qt, 0.26 Imp qt)	2-7
	Turbo															Replace every 3,000 miles (5,000 km) or 3 months	

### Air Conditioner System (If equipped)

Refrigerant	Inspect the refrigerant amount annually													
Compressor	Inspect the operation annually													

### Air Cleaner

Air cleaner element				I <sup>2</sup>			R				I <sup>2</sup>						4A-53 4B-59
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### Ignition System

Spark plugs																	<ul style="list-style-type: none"> <li>• Plug gap 2.0 mm (0.08 in)</li> <li>• Recommended spark plugs</li> </ul> <table border="1"> <tr> <td>Leading</td> <td>Trailing</td> </tr> <tr> <td>NGK</td> <td>SD 10A SD 11A</td> </tr> </table>	Leading	Trailing	NGK	SD 10A SD 11A	5-31
Leading	Trailing																					
NGK	SD 10A SD 11A																					

### Cooling System

Cooling system							I										<ul style="list-style-type: none"> <li>• Hoses for cracks or wear</li> <li>• Coolant level</li> </ul>	3-5
Engine coolant																	<ul style="list-style-type: none"> <li>• Coolant capacity:</li> </ul> Turbo: 8.7 liters (9.2 US qt, 7.7 Imp qt) Non-Turbo: 7.3 liters (7.7 US qt, 6.4 Imp qt)	3-5

### Fuel System

Idle speed	I																Idle speed: 750 ± 25 (A/T: N Range)	4A-77 4B-80
Fuel filter																		4A-76 4B-79
Fuel lines																	<ul style="list-style-type: none"> <li>• Fittings, connections and components for leaks</li> </ul>	4A-76 4B-79

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

MAINTENANCE INTERVALS	Number of months or miles (kilometers), whichever comes first												Service data and inspection point	Page		
	Months	5	10	15	20	25	30	35	40	45	50	55			60	
	x1000 Miles	2	5	10	15	20	25	30	35	40	45	50			55	60
MAINTENANCE OPERATION	(x1000 Km)	(3)	(8)	(16)	(24)	(32)	(40)	(48)	(56)	(64)	(72)	(80)	(88)	(96)		

Electrical System

Engine oil level warning system																	15A-39
Engine coolant level warning system																	15A-42
Sub-zero starting assist system																	4A-87 4B-90

inspect the operation seasonally (sub zero weather use only).

Chassis and Body

Brake line hoses and connections																		11-5
Brake fluid																		11-5
Disc brakes																		11-27 11-32
Sleering operations and linkage																		10A-5 10B-5
Front suspension ball joints																		13-11
Exhaust system heat shield																		4A-83 4B-86
Drive shaft dust boots																		9-16
Front wheel bearings																		9-4
Manual transmission oil																		7A-3
Rear axle oil																		9-48
Bolts and nuts on chassis and body																		—
Toe control hub and control link																		13-24 9-14

# 0 SCHEDULED MAINTENANCE SERVICES

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## SCHEDULE 2 (UNIQUE DRIVING CONDITION)

### Chart symbols:

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

R:Replace or change

T:Tighten

L:Lubricate

### Remarks:

After 60 months or 60,000 miles (96,000 km), continue to follow the described maintenance items and intervals periodically. As for \* marked items in this maintenance chart please pay attention to the following points.

\*1 This maintenance operation is recommended by Mazda. However, this maintenance is not necessary for emission warranty coverage or manufacturer recall liability

\*2 This maintenance operation is required for Canada and all states except California. However we do recommend that this operation be performed on California vehicles as well.

# ENGINE

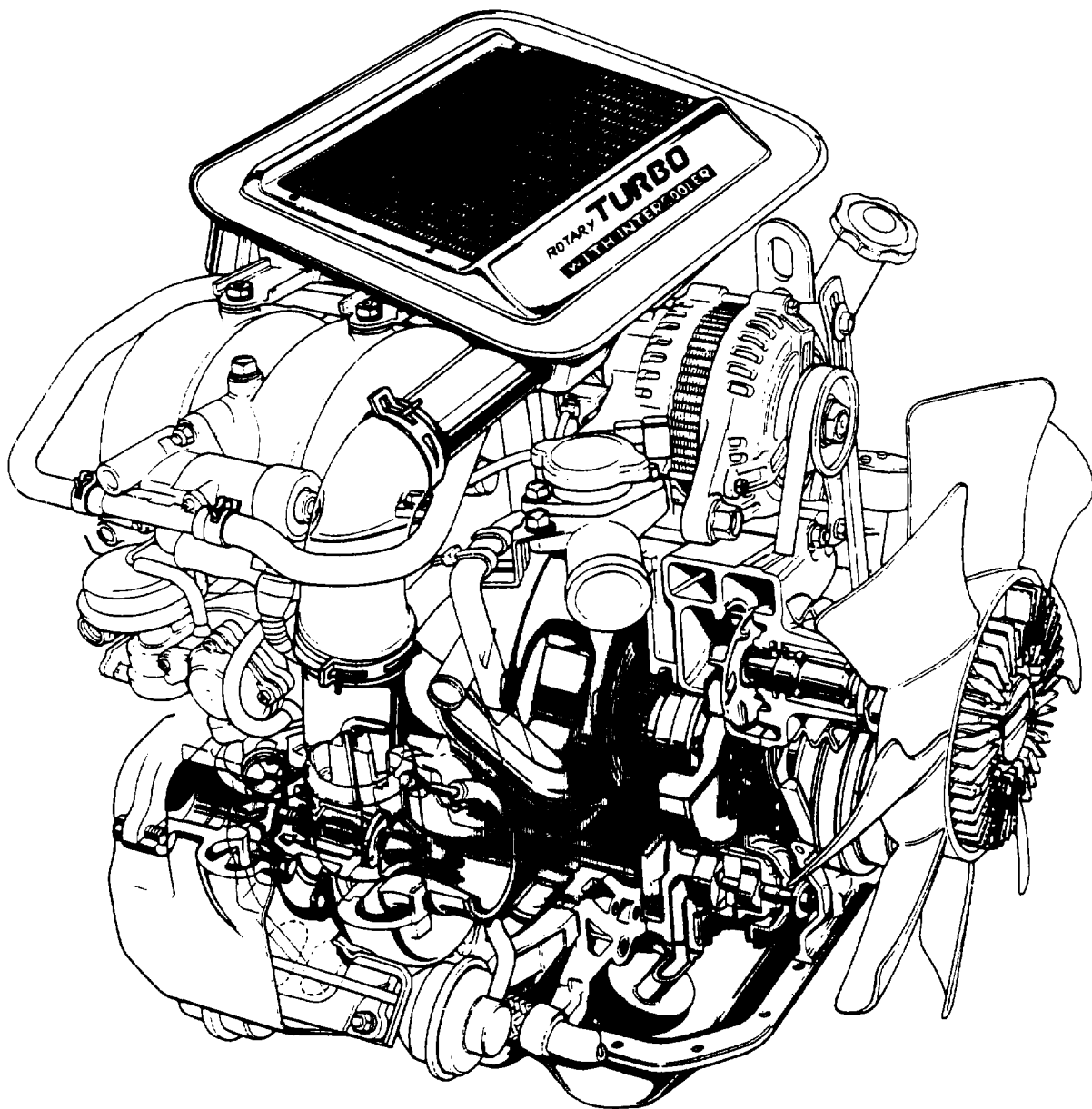
- OUTLINE** ..... 1- 2
  - STRUCTURAL VIEW..... 1- 2
  - SPECIFICATIONS..... 1- 4
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- ON-VEHICLE INSPECTION** ..... 1-10
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- DISASSEMBLY** ..... 1-22
  - EXTERNAL (TURBO) ..... 1-22
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  - INTERNAL..... 1-30
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  - INTERNAL..... 1-52
  - EXTERNAL (TURBO) ..... 1-69
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# 1 OUTLINE

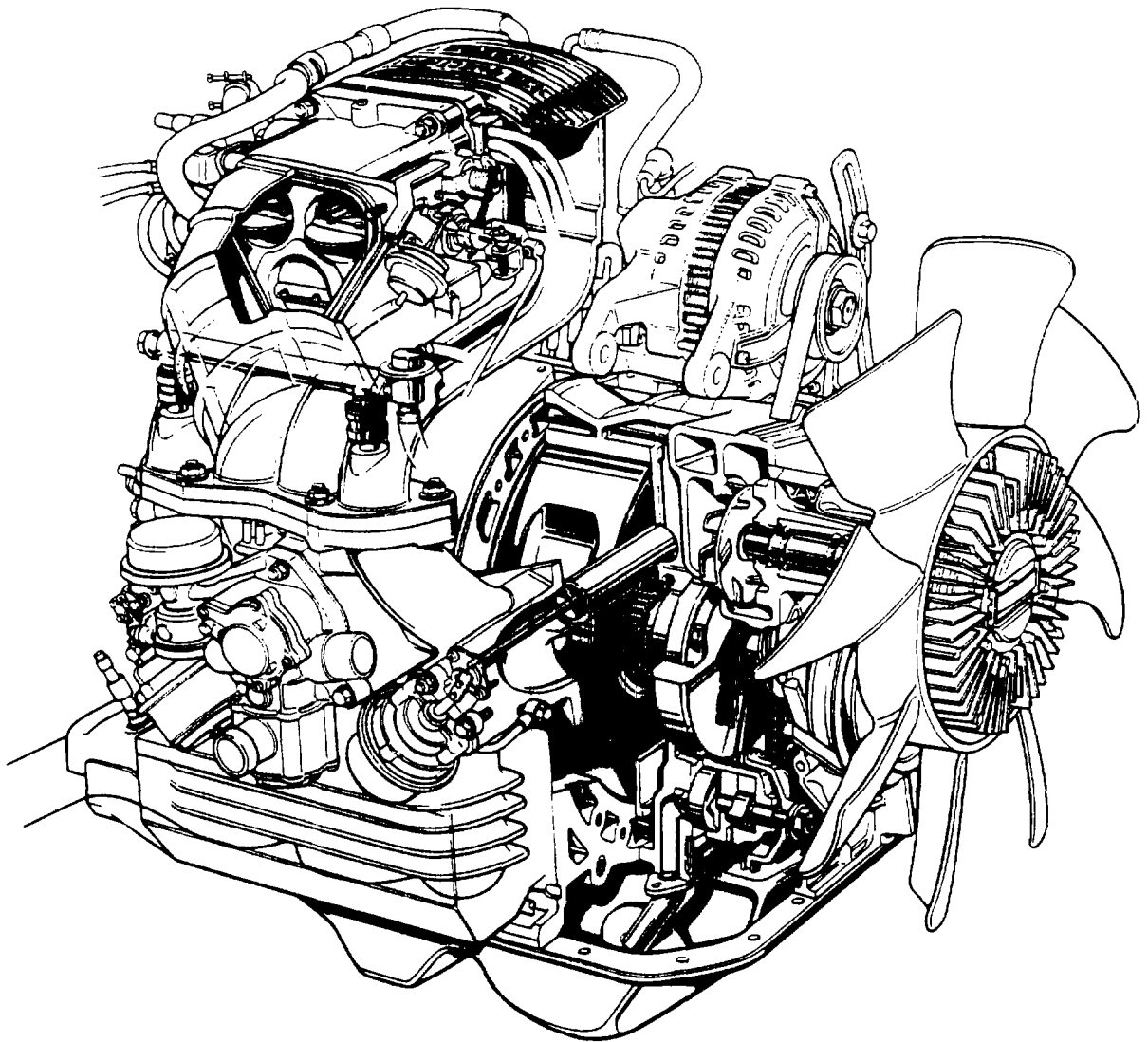
## OUTLINE

### STRUCTURAL VIEW

TURBO



NON-TURBO



# 1 TROUBLESHOOTING GUIDE

## SPECIFICATIONS

Items		Model	Turbo	Non-Turbo	
Engine type			Rotary engine		
Displacement		cc (cu in)	654 x 2 (40.0 x 2)		
Number of cylinders and arrangement			2 rotors, longitudinal		
Combustion chamber type			Bathtub		
Compression ratio			8.5 : 1	9.4 : 1	
Air induction			4 port induction	6 port induction	
Port timing	Intake	Open	Primary	32° ATDC	
			Secondary	32° ATDC	
			Auxiliary	—	45° ATDC
	Close		Primary	50° ABDC	40° ABDC
			Secondary	50° ABDC	30° ABDC
			Auxiliary	—	70° ABDC
	Exhaust	Open		75° BBDC	
				48° ATDC	
Fuel supply system			EGI		
Ignition timing	Trailing		20° ATDC (RED)		
	Leading		5° ATDC (YELLOW)		
Idle speed		rpm	750 ± 25		

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## TROUBLESHOOTING GUIDE

Problem	Possible cause	Remedy	Page
<b>Difficult starting</b>	<b>Insufficient compression</b>		
	Deformation or abnormal wear of side housing	Replace	1-42
	Deformation or abnormal wear of rotor housing	Replace	1-45
	Wear of rotor grooves	Replace	1-45
	Deformation or poor fastening of rotor seals	Replace	1-47
	Worn or weak spring	Replace	—
	<b>Malfunction of fuel system</b>	Refer to Section 4	
	<b>Malfunction of electrical system</b>	Refer to Section 5	
<b>Poor idling</b>	<b>Insufficient compression</b>		
	Deformation or abnormal wear of side housing	Replace	1-42
	Deformation or abnormal wear of rotor housing	Replace	1-45
	Wear of rotor grooves	Replace	1-45
	Deformation or poor fastening of rotor seals	Replace	1-47
	Worn or weak spring	Replace	—
	<b>Malfunction of fuel system</b>	Refer to Section 4	
	<b>Malfunction of ignition system</b>	Refer to Section 5	

Problem	Possible cause	Remedy	Page
<b>Insufficient power</b>	<b>Insufficient compression</b> Deformation or abnormal wear of side housing Deformation or abnormal wear of rotor housing Wear of rotor grooves Deformation or poor fastening of rotor seals Worn or weak spring	Replace Replace Replace Replace	1—42 1—45 1—45 1—47
	<b>Malfunction of fuel system</b>	Refer to Section 4	
	<b>Malfunction of ignition system</b>	Refer to Section 5	
	<b>Malfunction in combustion chamber</b> Carbon accumulation	Remove and clean	1—40
<b>Abnormal combustion</b>	<b>Malfunction of fuel system</b>	Refer to Section 4	
	<b>Malfunction of ignition system</b>	Refer to Section 5	
	<b>Leakage into combustion chamber</b> Deformation or abnormal wear of side housing Malfunction of rotor (blowholes) Scratched or burred rotor land Malfunction of oil seal (incorrect angle)	Replace Replace Replace Replace	1—42 1—45 1—45 1—47
<b>Excessive oil consumption</b>	<b>Leakage into coolant passages</b> Deformed rotor housing Malfunction of sealing rubber	Replace Replace	1—45 —
	<b>Leakage to outside of engine</b>	Refer to Section 2	
	<b>Malfunction of lubricating system</b>	Refer to Section 2	
	<b>Engine noise</b>	<b>Rotor seal noise</b> Malfunction of rotor seals Malfunction of housing Malfunction of seal spring Malfunction of metering oil pump	Replace Replace Replace Refer to Section 2
<b>Knocking noise</b> Accumulation of carbon		Remove and clean	1—40
<b>Hitting noise</b> Malfunction of main bearing or rotor bearing Excessive end play Foreign matter in internal gear or stationary gear, or malfunction of gear		Replace Adjust Replace	1—44,46 1—64 1—43
<b>Other</b> Malfunction of water pump bearing Drive belt tension Malfunction of alternator bearing Exhaust gas leakage Malfunction of fuel system		Refer to Section 3 Adjust Refer to Section 5 Refer to Section 4 Refer to Section 4	1— 7

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