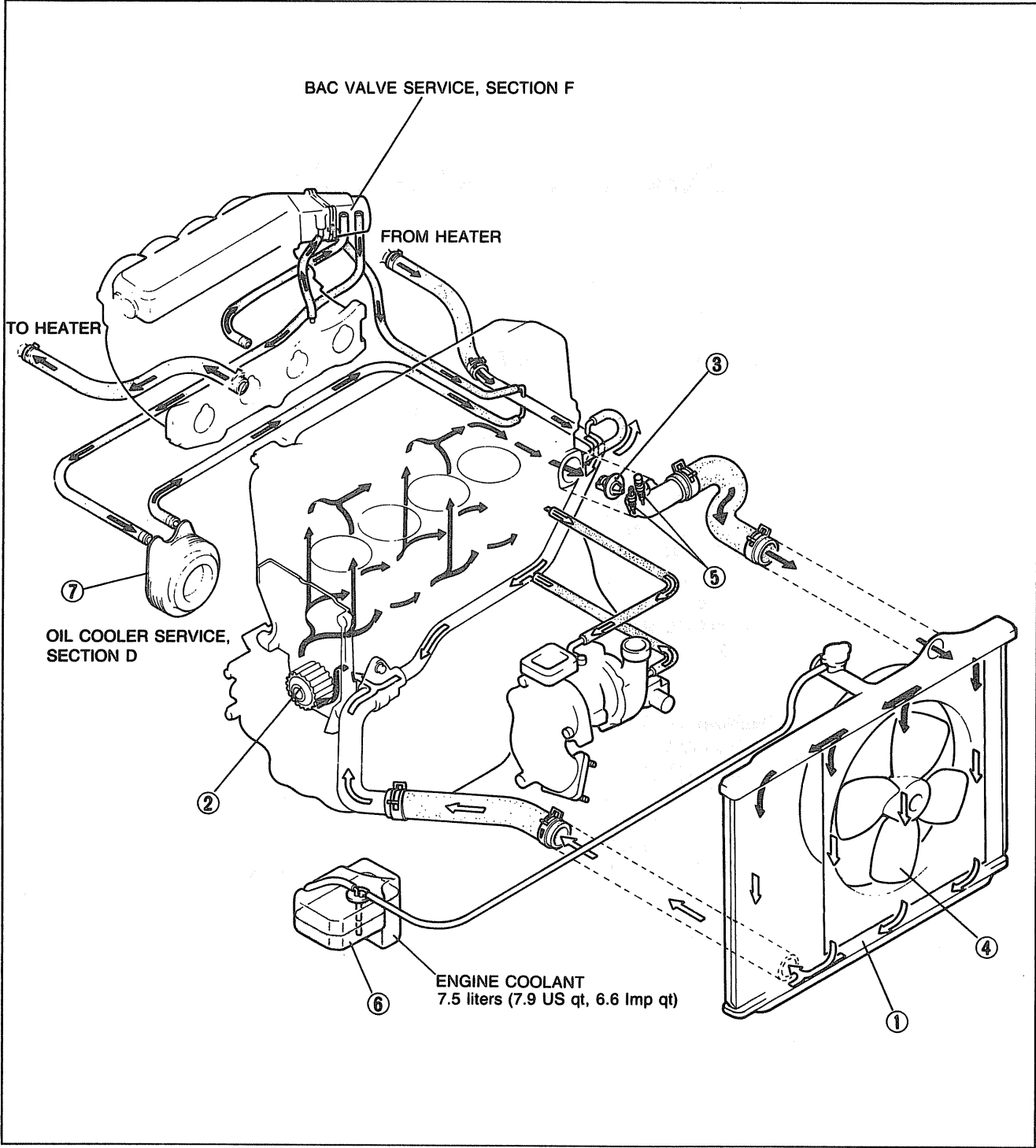


COOLING SYSTEM

INDEX	E- 2
OUTLINE	E- 3
SPECIFICATIONS	E- 3
TROUBLESHOOTING GUIDE	E- 3
COOLANT	E- 4
PREPARATION	E- 4
INSPECTION	E- 4
REPLACEMENT	E- 5
RADIATOR CAP	E- 6
PREPARATION	E- 6
INSPECTION	E- 6
RADIATOR	E- 7
REMOVAL / INSTALLATION	E- 7
INSPECTION	E- 7
WATER PUMP	E- 8
REMOVAL	E- 8
INSPECTION	E- 9
INSTALLATION	E- 9
THERMOSTAT	E-10
REMOVAL	E-10
INSPECTION	E-10
INSTALLATION	E-10
COOLING FAN	E-11
SYSTEM CIRCUITS	E-11
SYSTEM INSPECTION	E-12
FAN MOTOR	E-13
WATER THERMOSWITCH	E-14

INDEX



16U0EX-001

- 1. Radiator
Removal / Inspection /
Installation..... page E- 7
- 2. Water pump
Removal..... page E- 8
Inspection page E- 9
Installation..... page E- 9
- 3. Thermostat
Removal / Inspection /
Installation..... page E-10

- 4. Cooling fan
Removal / Installation..... page E-13
Inspection page E-11
- 5. Water thermostatic switch
Removal / Inspection /
Installation..... page E-14
- 6. Coolant reservoir
- 7. Oil cooler (Turbo)

OUTLINE

SPECIFICATIONS

Item		Engine	F2	
Cooling system			Water-cooled, forced circulation	
Coolant capacity liters (US qt, Imp qt)			7.5 (7.9, 6.6)	
Water pump	Type		Centrifugal, timing belt driven	
	Water seal		Unified seal	
Thermostat	Type		Wax, 2-stage	
	Opening temperature	°C (°F)	Sub: 83.5—86.5 (182—188), Main: 86.5—89.5 (188—193)	
	Full-open temperature	°C (°F)	100 (212)	
	Full-open lift	mm (in)	Sub: 1.5 (0.06) min., Main: 8.0 (0.31) min.	
Radiator	Type		Corrugated	
	Cap valve opening pressure	kPa (kg/cm ² , psi)	74—103 (0.75—1.05, 11—15)	
Cooling fan	Capacity	Turbo	MTX	80
			ATX	160
		Non-Turbo	MTX	80
			ATX	120
	Number of blades			4
	Outer diameter of blades	mm (in)	MTX	320 (12.6)
ATX			340 (13.4)	

16U0EX-002

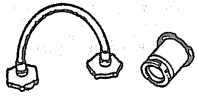
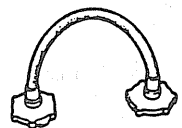

TROUBLESHOOTING GUIDE

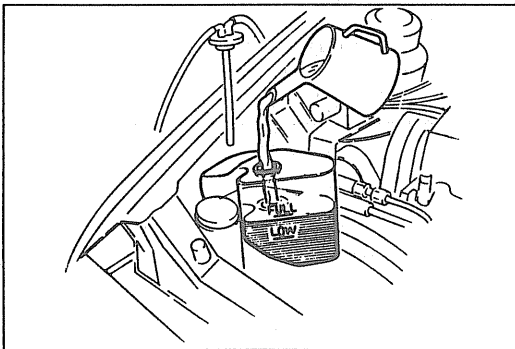
Problem	Possible Cause	Remedy	Page
Overheating	Insufficient coolant	Add	E- 4
	Coolant leakage	Repair	—
	Radiator fins clogged	Clean	E- 7
	Radiator cap malfunction	Replace	E- 5
	Cooling fan malfunction	Repair	E-11
	Thermostat malfunction	Replace	E-10
	Water passage clogged	Clean	E- 4
	Water pump malfunction	Repair or replace	E- 8
Corrosion	Impurities in coolant	Replace	E- 4

16U0EX-003

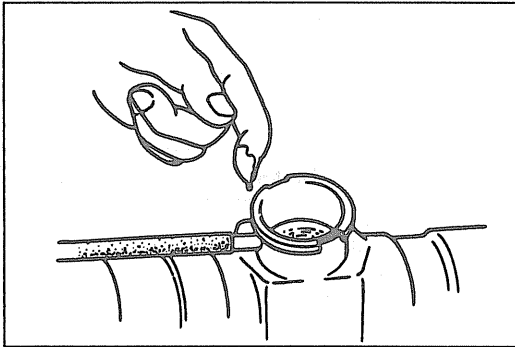
COOLANT

PREPARATION
SST

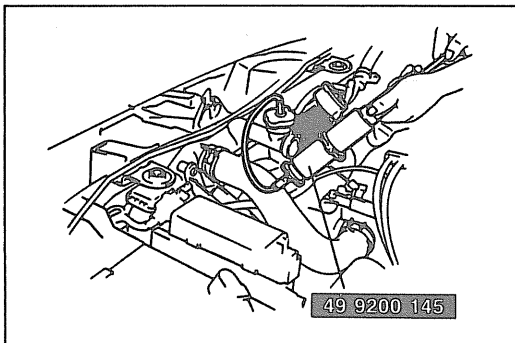
<p>49 9200 145</p> <p>Adapter set, radiator cap tester</p> 	<p>For coolant leakage inspection</p>	<p>49 9200 146</p> <p>Adapter A (Part of 49 9200 145)</p> 	<p>For coolant leakage inspection</p>
<p>49 9200 147</p> <p>Adapter B (Part of 49 9200 145)</p> 	<p>For coolant leakage inspection</p>	06U0EX-005	



06U0EX-006



69G03A-006



86U03X-005

INSPECTION

Coolant Level (Engine cold)

1. Check that the coolant level is near the radiator inlet port.
2. Check that the coolant level in the coolant reservoir is between the FULL and LOW marks.
Add coolant if necessary.

Warning

- Never remove the radiator cap while the engine is hot.
- Wrap a thick cloth around the cap when removing it.

Coolant Quality

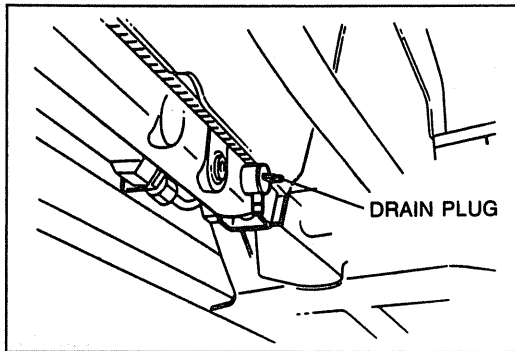
1. Check that there is no build-up of rust or scales around the radiator cap or radiator filler neck.
2. Check that coolant is free from oil.
3. Replace the coolant, if necessary.

Coolant Leakage

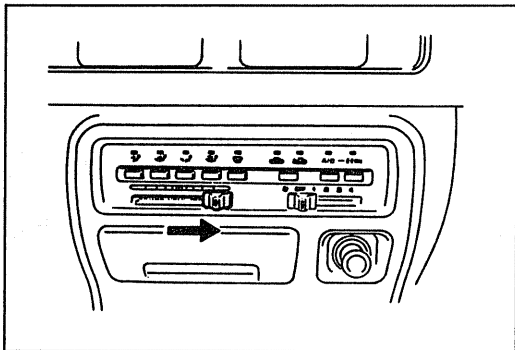
1. Connect a tester and SST to the radiator inlet port.
2. Apply 103 kPa (1.05 kg/cm², 15 psi) pressure to the system.
3. Check that the pressure is held.
If not, check for coolant leakage.

Warning

- When removing either the radiator cap or the tester, loosen it slowly until the pressure in the radiator is released, and then remove it.



86U03X-006



86U03X-028

REPLACEMENT

1. Remove the radiator cap and loosen the drain plug.
2. Drain the coolant into a suitable container.

Warning

- Never open the radiator cap while the engine is hot.
- Wrap a thick cloth around the cap when loosening.
- Use caution when draining hot coolant.

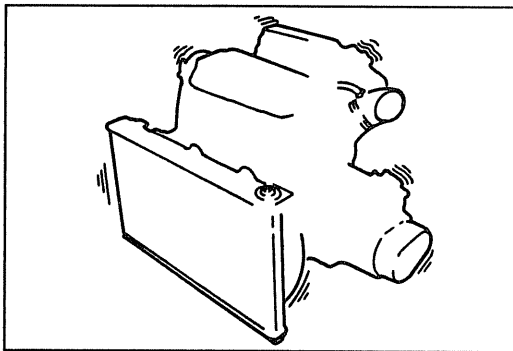
3. Set the heater control switch to the maximum heat position.
4. Flush the cooling system with water until all traces of color are gone, then let the system drain completely.
5. Fill with the proper mixture and amount of ethylene glycol-based coolant.

Caution

- Do not use alcohol- or methanol-based coolant.
- Use only soft (demineralized) water in the coolant mixture.

Anti-freeze solution mixture percentage

Protection	Volume percentage		Gravity at 20°C (68°F)
	Solution	Water	
Above -16°C (3°F)	35	65	1.054
Above -26°C (-15°F)	45	55	1.066
Above -40°C (-40°F)	55	45	1.078





86U03X-007

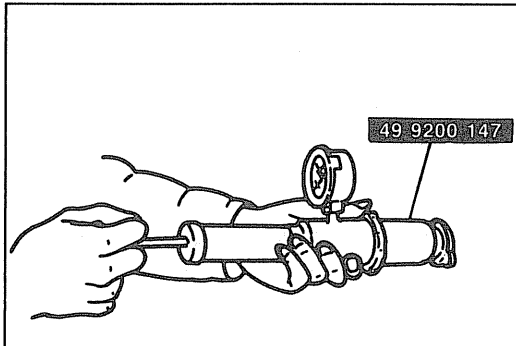
6. Run the engine at idle with the radiator cap removed. Let any air bleed from the system, and add more coolant.
7. Install the radiator cap, and inspect all connections for leakage.

RADIATOR CAP

PREPARATION
SST

<p>49 9200 145</p> <p>Adapter set, radiator cap tester</p> 	<p>For radiator cap inspection</p>	<p>49 9200 147</p> <p>Adapter B (Part of 49 9200 145)</p> 	<p>For radiator cap inspection</p>
--	--	---	--

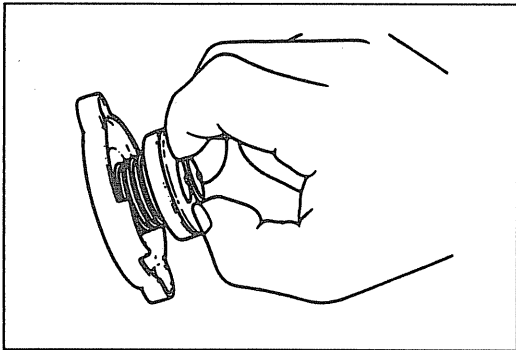
16U0EX-009



16U0EX-010

INSPECTION**Radiator Cap Valve**

1. Remove foreign material (such as water residue) from between the radiator cap valve and the valve seat.
2. Attach the radiator cap to a tester with the **SST**. Apply pressure gradually to **74—103 kPa (0.75—1.05 kg/cm², 11—15 psi)**.
3. Wait about 10 seconds; then check that the pressure has not decreased.



86U03X-009

Negative Pressure Valve

1. Pull the negative-pressure valve to open it. Check that it closes completely when released.
2. Check for damage on the contact surfaces, and for cracked or deformed seal packing.
3. Replace the radiator cap if necessary.

RADIATOR

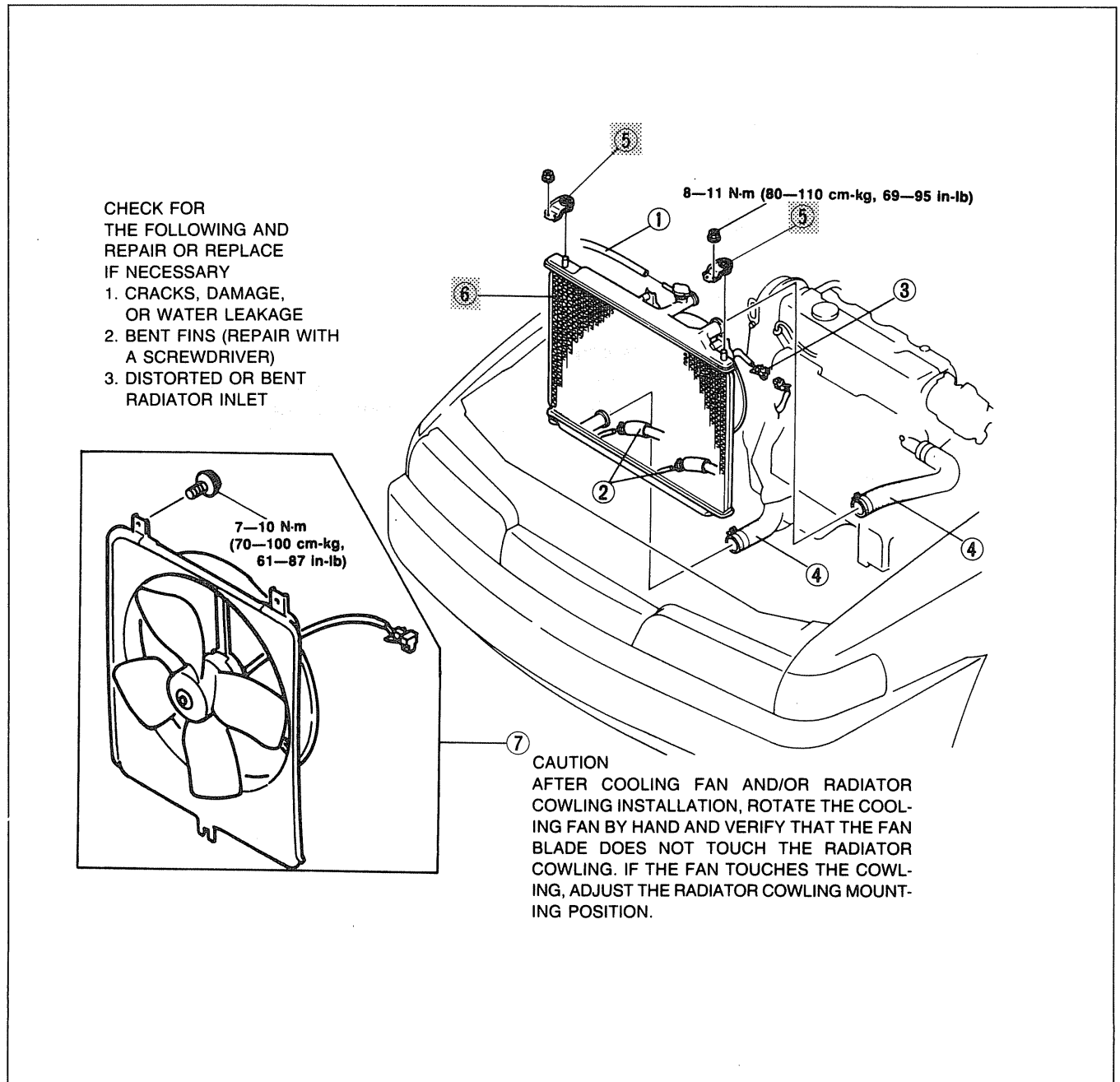
REMOVAL / INSTALLATION

1. Drain the engine coolant.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.

Note

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

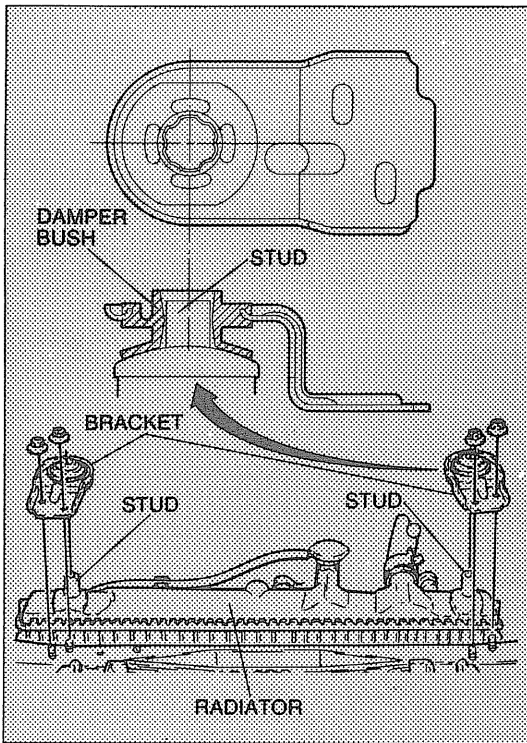
86U03X-010



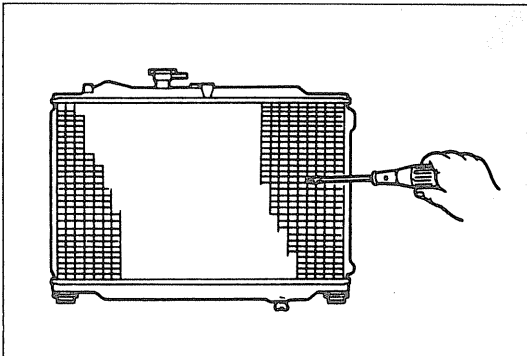
06U0EX-008

1. Coolant reservoir hose
2. ATF hose (ATX)
3. Cooling fan connector
4. Upper and lower radiator hose

5. Radiator bracket
6. Cooling fan and radiator assembly
7. Cooling fan



16U0EX-050



86U03X-012

Installation Notes

The damper bush on the bracket and the stud on the radiator should be centered as illustrated. Align the center by moving the radiator and/or brackets.

INSPECTION

Check the following points. Repair or replace if necessary.

1. Cracks, damage, or water leakage
2. Bent fins (Repair with a screwdriver)
3. Distorted or bent radiator inlet.

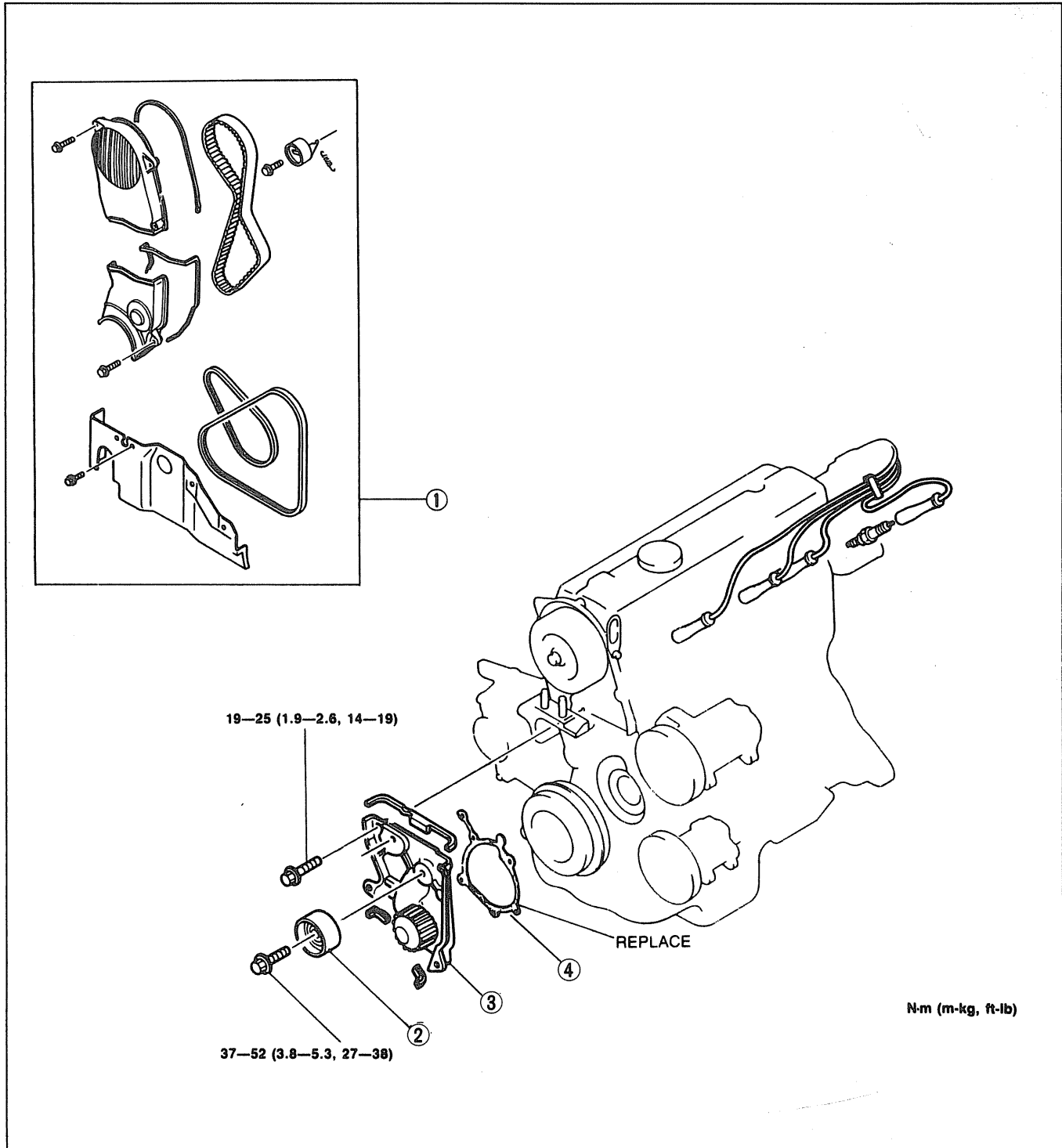
MEMO

WATER PUMP

REMOVAL

1. Disconnect the negative battery cable.
2. Turn the crankshaft so that the No.1 cylinder is at TDC of compression.
3. Drain the engine coolant.
4. Remove in the order shown in the figure.

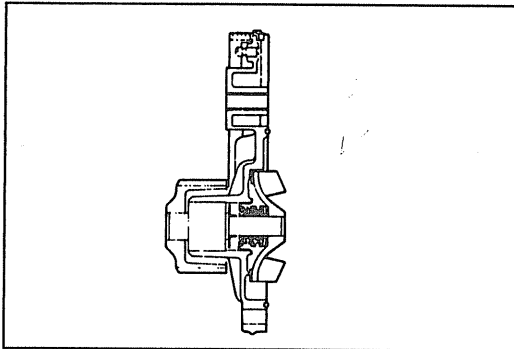
16U0EX-004



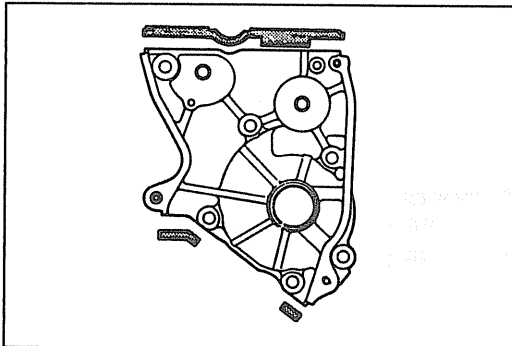
06U0EX-007

1. Timing belt (Refer to Section B)
2. Idler pulley

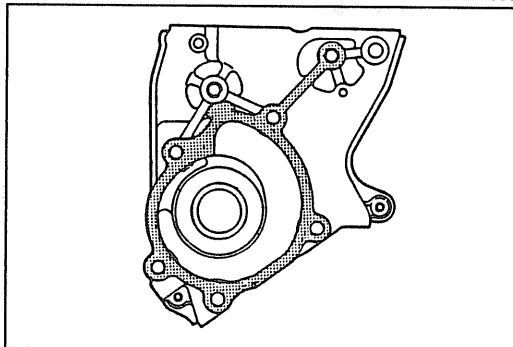
3. Water pump
4. Gasket



96U03X-012



16U0EX-005



96U03X-009

INSPECTION

Check the following. Replace the water pump if necessary.

1. Cracks or damage
2. Abnormal noise, bearing sticking or looseness.

INSTALLATION

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

Installation Note

Rubber seal

Install the rubber seals on the water pump.

Water pump

1. Remove any gasket fragments, dirt, or oil from the contact surfaces.
2. Install a new gasket on the water pump.
3. Install the water pump.

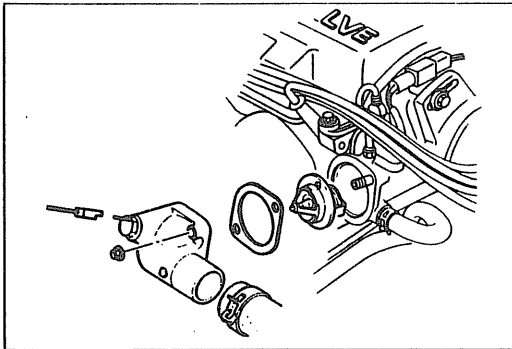
Tightening torque:

19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)

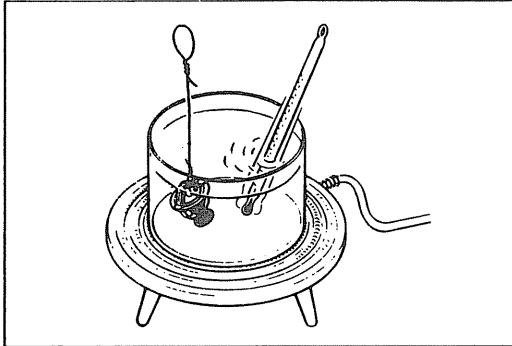
Steps After Installation

1. Supply the specified amount and type of coolant.
2. Start the engine and check for leakage.

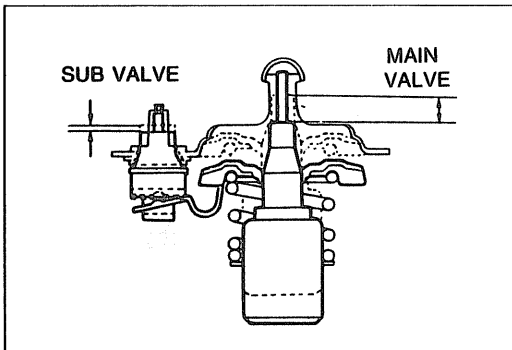




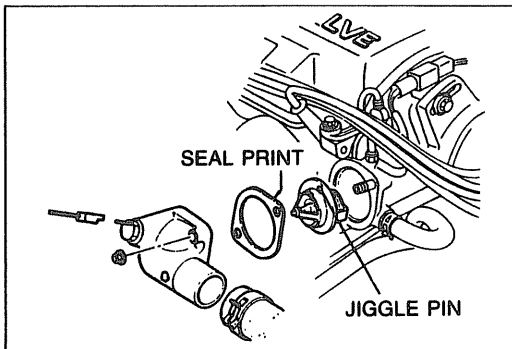
69G03B-010



96U03X-010



69G03B-012



86U03X-018

THERMOSTAT

REMOVAL

1. Drain the engine coolant.
2. Remove the thermostat cover.
3. Remove the thermostat.

INSPECTION

Check the thermostat. Replace if necessary.

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

Initial opening temperature

Sub valve : 83.5—86.5°C (182—188°F)

Main valve: 86.5—89.5°C (188—193°F)

Full-open temperature: 100°C (212°F)

Full-open lift

Sub valve : 1.5mm (0.06 in) min.

Main valve: 8.0mm (0.31 in) min.

INSTALLATION

1. Install the thermostat into the cylinder head with jiggle pin at the top.
2. Install a new gasket with the seal print side facing the cylinder head.
3. Install the thermostat cover.

Tightening torque:

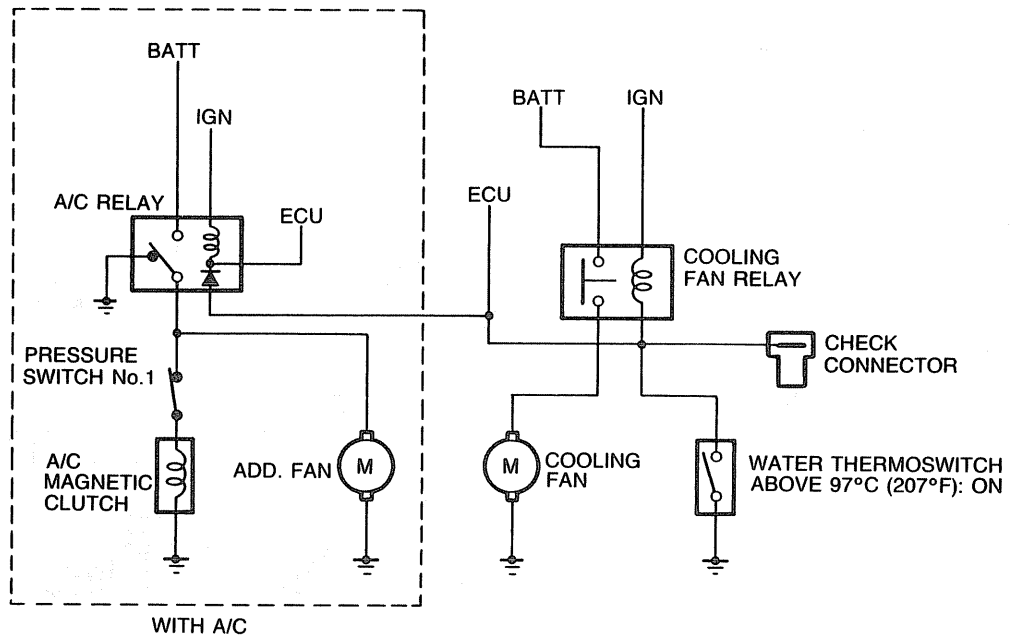
19—30 N·m (1.9—3.1 m·kg, 14—22 ft·lb)

4. Replenish the coolant.
5. Start the engine and check for leaks.

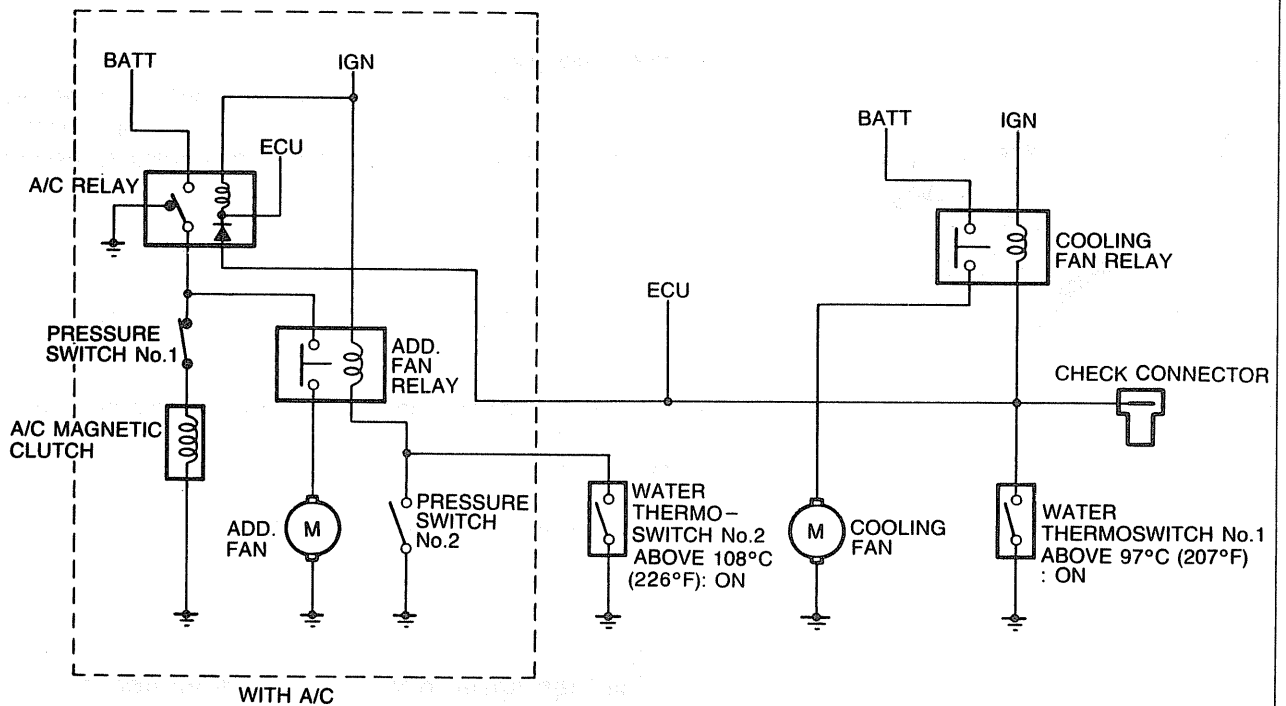
COOLING FAN

SYSTEM CIRCUITS

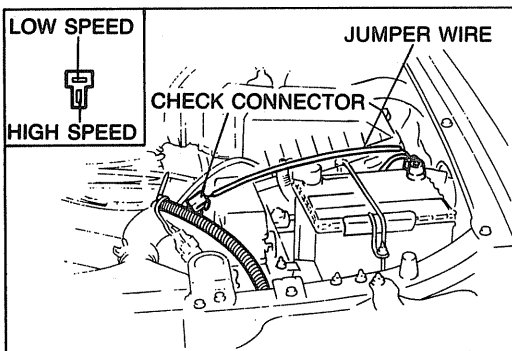
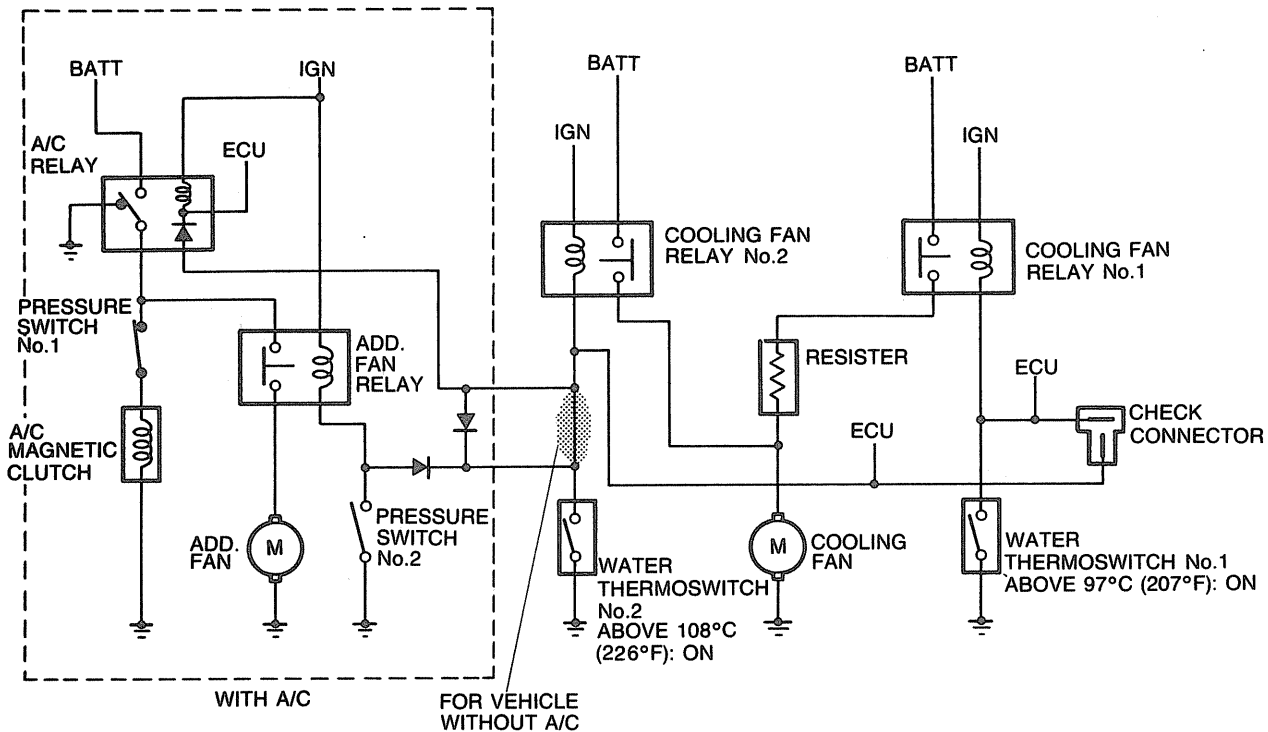
NON-TURBO MTX



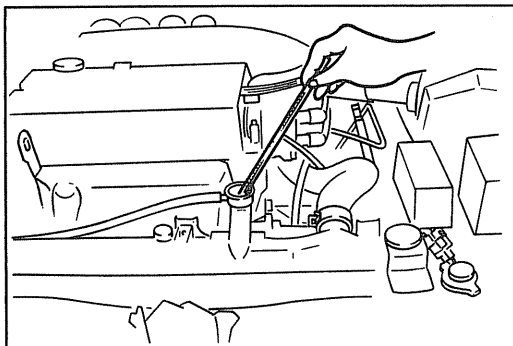
TURBO MTX



ATX



06U0EX-010



06U0EX-011

SYSTEM INSPECTION

1. Ground the check connector to a ground with a jumper wire.
2. Turn the ignition switch ON and verify that the fan operates. If the fan does not operate, inspect the cooling fan system components and harness.

3. Remove the radiator cap and place a thermometer in the radiator filler neck.
4. Start the engine.
5. Verify that the fan operates when the coolant temperature reaches approx. 97°C (207°F). If the fan does not operate, the water thermostat is probably at fault. (Refer to page E-14.)

Note

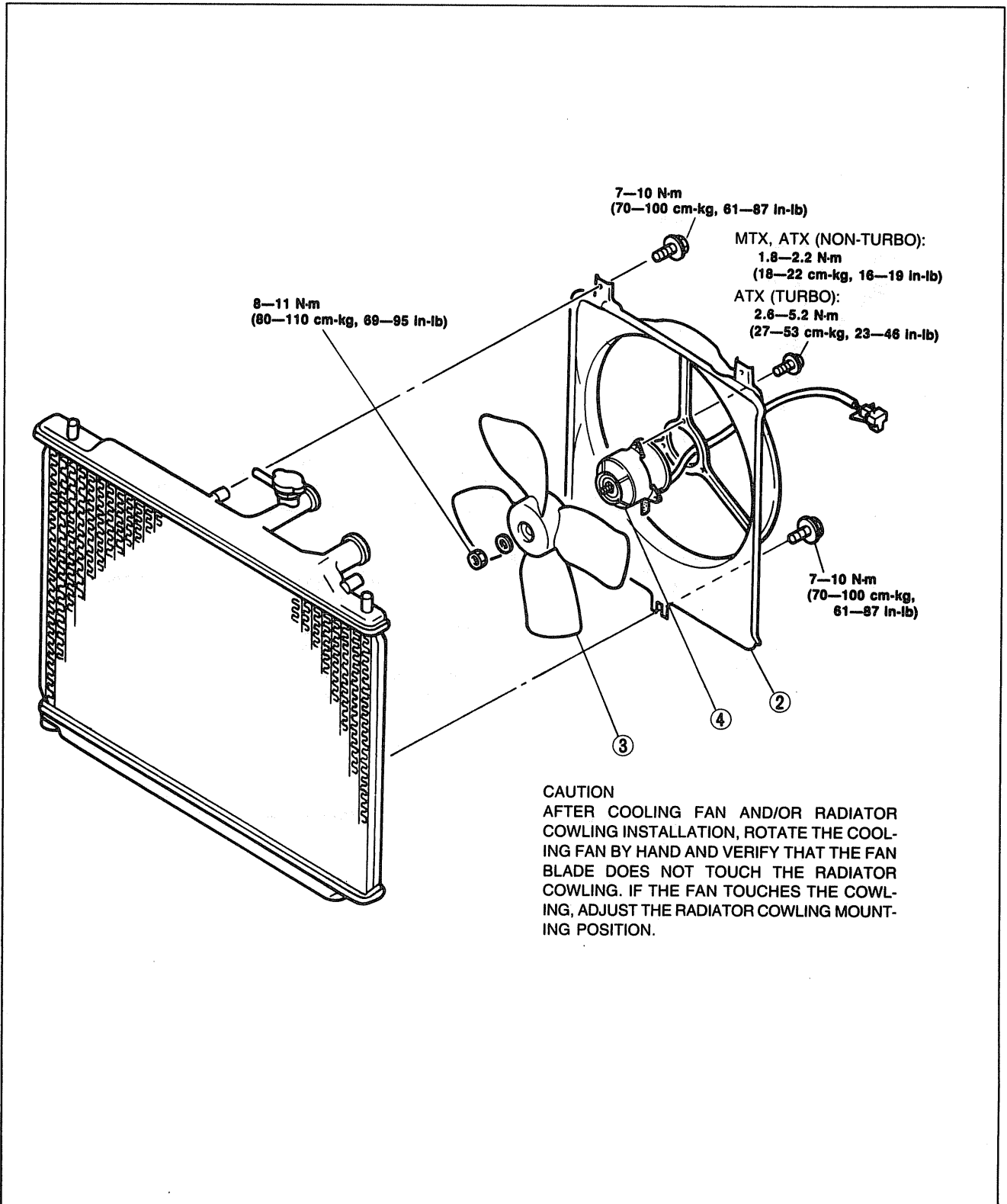
- The high-speed operation (provided only for ATX) cannot be checked by the inspection procedures above. The high-speed operation requires above 108°C (226°F).

FAN MOTOR

Removal / Installation

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

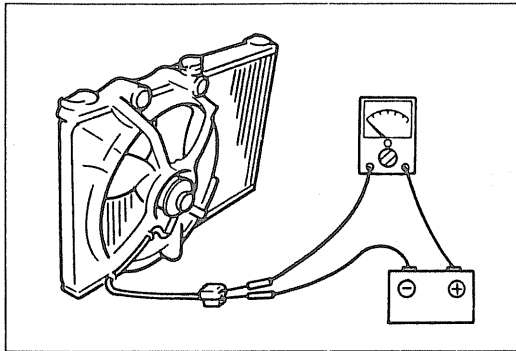
16U0EX-006



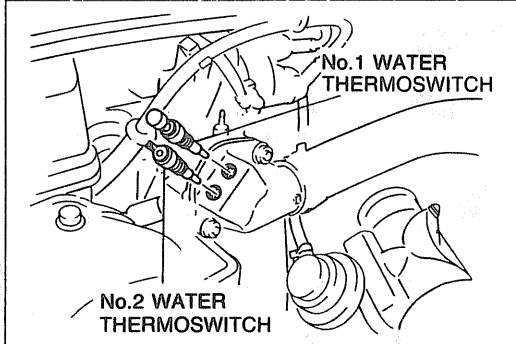
16U0EX-007

1. Cooling fan assembly (Refer to page E-7)
2. Cowling

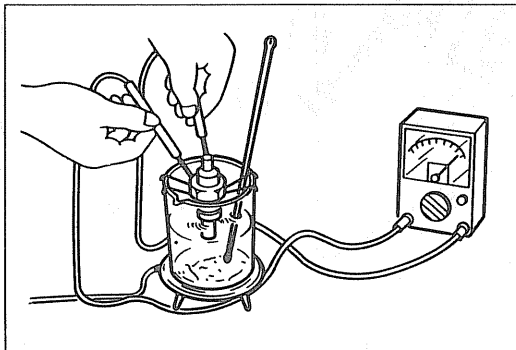
3. Fan
4. Fan motor



96U03X-013



06U0EX-013



06U0EX-014

Inspection

1. Connect an ammeter and battery to the fan motor connectors.
2. Check that the fan motor operates smoothly at the specified current.

Current

(A)

Turbo	MTX	5.6—7.6
	ATX	10.6—16.6
Non-Turbo	MTX	5.6—7.6
	ATX	8.0—11.0

3. Replace the fan motor if necessary.

WATER THERMOSWITCH

1. Remove the cooling fan water thermostwitch.

2. Place the water thermostwitch in engine oil.
3. Heat the engine oil gradually, and check for continuity of the switch with an ohmmeter. Replace if necessary.

Warning

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

No.1 water thermostwitch:

over 97°C (207°F) OFF → ON

No.2 water thermostwitch:

over 108°C (226°F) OFF → ON

4. Install the water thermostwitch and a new O-ring.

Caution

- Do not use sealing tape.