

COOLING SYSTEM

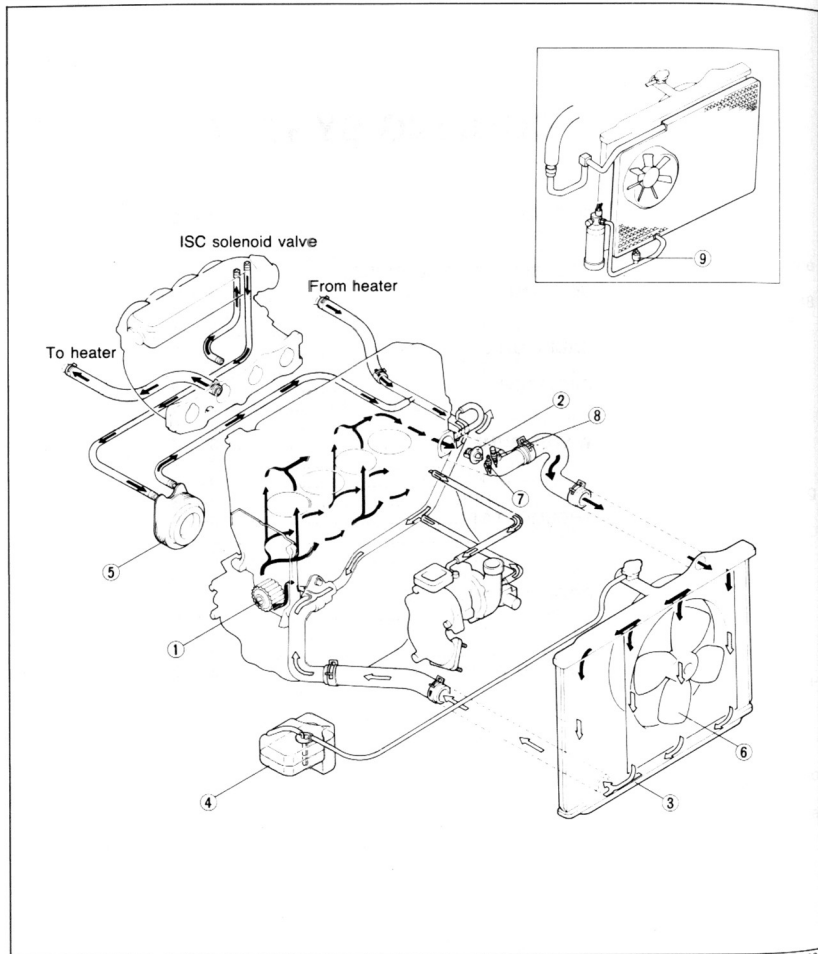
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3 OUTLINE

OUTLINE

COOLANT FLOW CHART



1. Water pump
2. Thermostat
3. Radiator
4. Coolant reservoir
5. Oil cooler (only Turbo)

6. Cooling fan
7. No.1 water thermo switch
8. No.2 water thermo switch
9. Pressure switch

96U03X 002

SPECIFICATIONS

Item		Engine model	F2	
Cooling system			Water-cooled, forced circulation	
Coolant capacity	liters (US qt, Imp qt)	With heater	7.5 (7.9, 6.6)	
		Without heater	7.0 (7.4, 6.2)	
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 blade			4
	Outer diameter of blade	mm (in)	MTX	320 (12.6)
ATX			340 (13.4)	

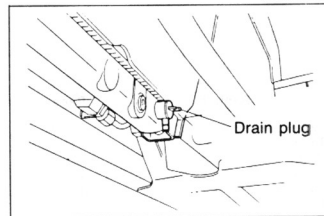
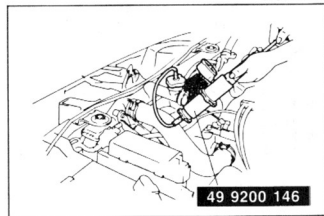
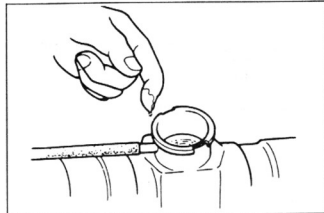
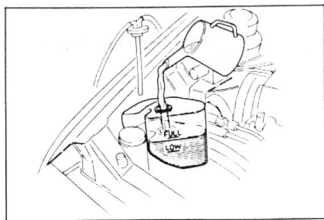
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TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy	Page
Overheating	Insufficient coolant	Add	3—4
	Coolant leakage	Repair	—
	Radiator fins clogged	Clean	3—6
	Radiator cap malfunction	Replace	3—5
	Cooling fan malfunction	Repair	3—10
	Thermostat malfunction	Replace	3—9
	Water passage clogged	Clean	3—4
	Water pump malfunction	Repair or replace	3—7
Corrosion	Impurities in coolant	Replace	3—4

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3 COOLANT



COOLANT

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

- a) **Never remove the radiator cap while the engine is hot.**
- b) **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

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

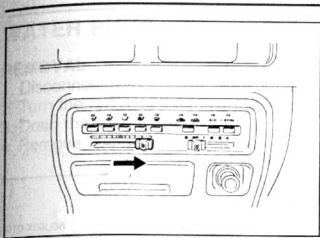
REPLACEMENT

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

Warning

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

COOLANT, RADIATOR CAP 3



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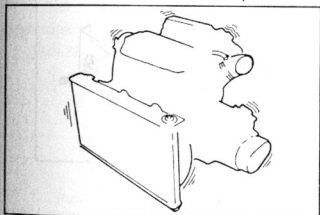
3. Set the heater control switch to the maximum heat position.
4. Flush the cooling system with water until all traces of color are gone, then let the system drain completely.
5. Fill with the proper mixture and amount of ethylene glycol-based coolant.

Caution

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

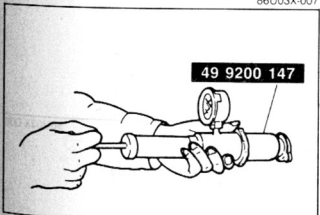
Anti-freeze solution mixture percentage

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



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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.



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RADIATOR CAP

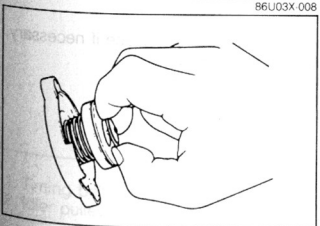
INSPECTION

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.

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.



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3 RADIATOR

RADIATOR

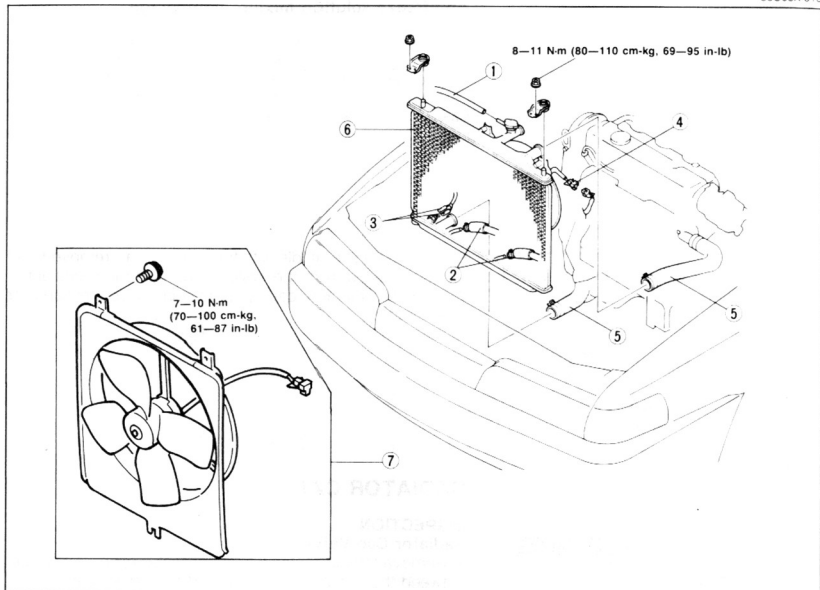
REMOVAL AND INSTALLATION

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

Note

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

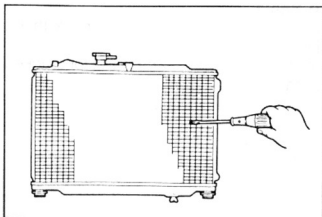
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1. Coolant reservoir hose
2. ATF hose (ATX)
3. Water thermo switch connector
4. Cooling fan connector

5. Upper and lower radiator hose
6. Cooling fan and radiator assembly
7. Cooling fan



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.

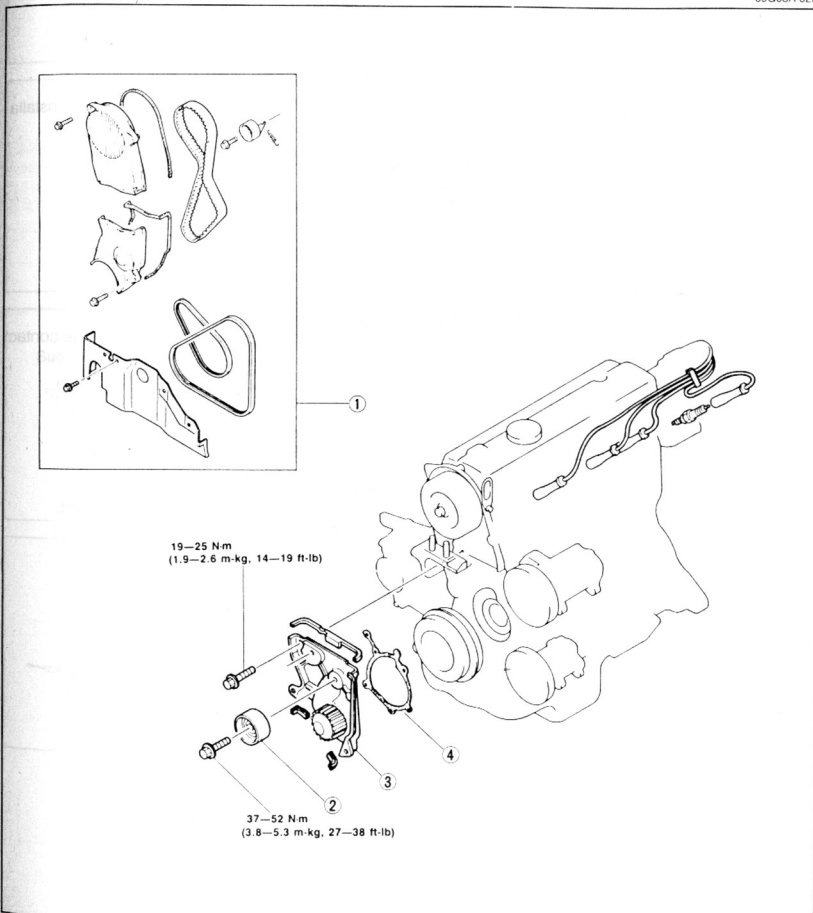
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WATER PUMP

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 sequence shown in the figure.

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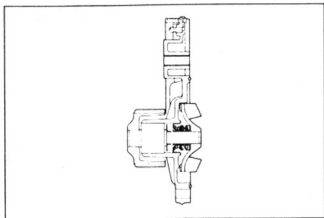


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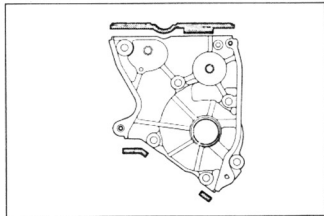
1. Timing belt (Refer to Section 1)
2. Idler pulley

3. Water pump
4. Gasket

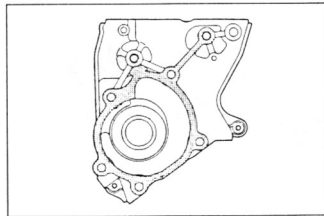
3 WATER PUMP



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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 the 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.

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)

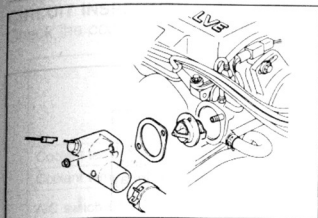
Main valve: 86.5—89.5°C (188—193°F)

Full-open temperature: 100°C (212°F)

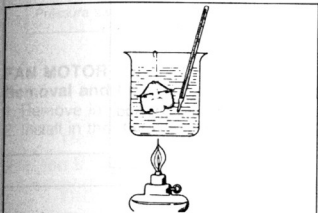
Full-open lift

Sub valve : 1.5 mm (0.06 in) min.

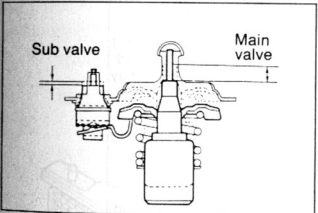
Main valve: 8.0 mm (0.31 in) min.



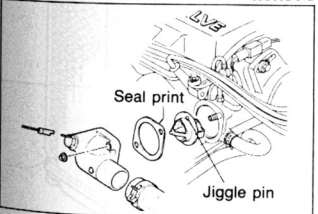
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INSTALLATION

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:

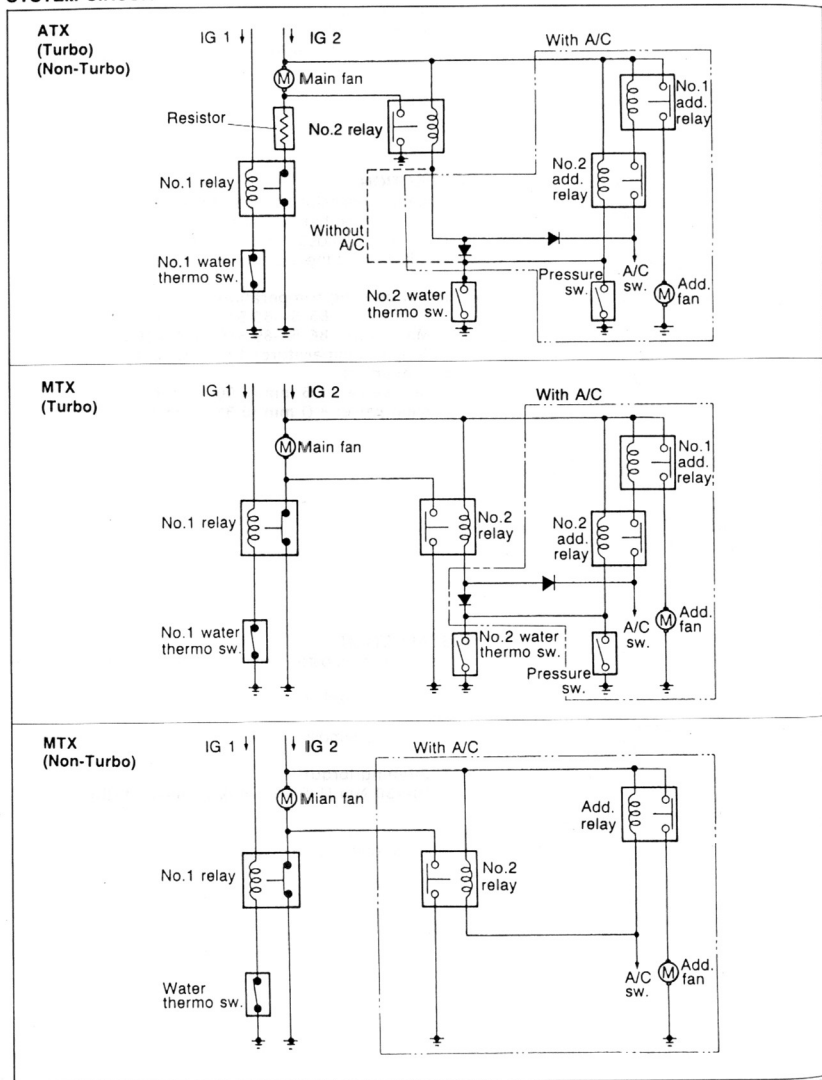
19—30 N·m (1.9—3.1 m·kg, 14—22 ft·lb)

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

3 COOLING FAN

COOLING FAN

SYSTEM CIRCUIT



CIRCUIT INSPECTION

Check the cooling fan operation.

Condition	Operating fan				
	With A/C			Without A/C	
	ATX	MTX		ATX	MTX
Turbo		Non-Turbo			
Coolant temp. over 97°C (177°F)	Main (Lo)	Main	Main	Main (Lo)	Main
Coolant temp. over 108°C (226°F)	Main (Hi)	Main	—	Main (Hi)	—
A/C switch ON	Main (Hi)	Main	Main, Additional	—	—
Pressure switch ON	Main (Hi), Additional	Main, Additional	—	—	—

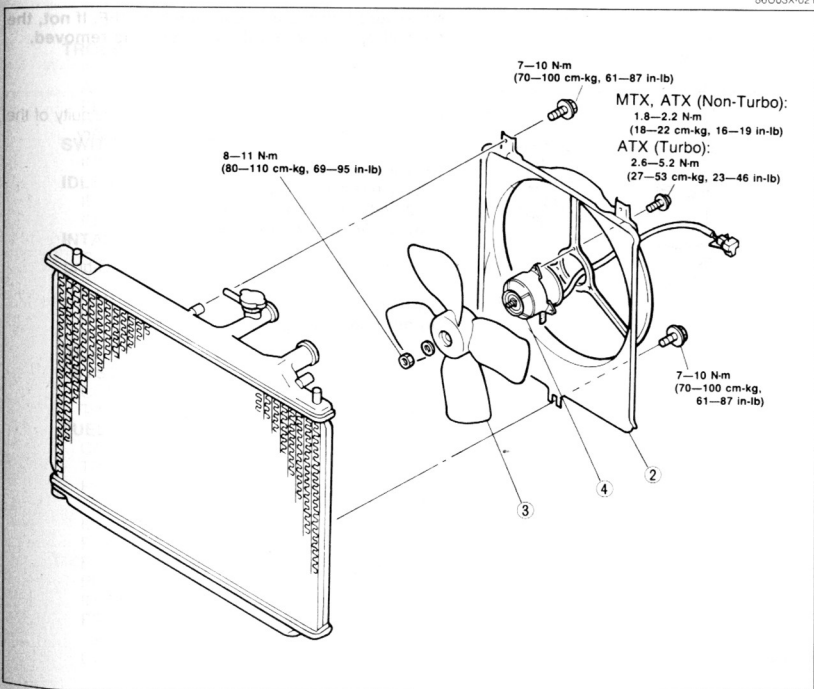
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FAN MOTOR

Removal and Installation

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

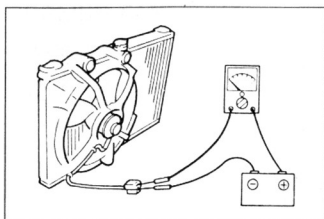
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1. Cooling fan assembly (Refer to page 3-6)
2. Cowling
3. Fan
4. Fan motor

3 COOLING FAN



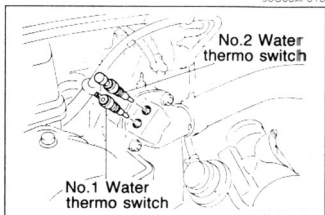
Inspection

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



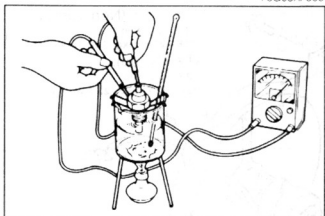
3. Replace the fan motor if necessary.

WATER THERMO SWITCH

1. Remove the cooling fan water thermo switch.

Note

Make sure that the ignition switch is OFF. If not, the fan will operate when the connector is removed.



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

No.1 water thermo switch:

over 97°C (207°F) ON → OFF

No.2 water thermo switch:

over 108°C (226°F) OFF → ON

4. Install the water thermo switch and a new O-ring.

Caution

Do not use sealing tape.