ENGINE COOLING

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GENERAL

OUTLINE OF CHANGES

- The following service procedures have been established in line with the addition of vehicles with 4G63-MPI engine. The other items are the same as for the 4G64-GDI engine. <SPACE WAGON>
- The following service procedures have been established in line with the introduction of the 4G64-GDI engine with Variable Valve Timing. The other items are the same as for the previos 4G64-GDI engine.

GENERAL INFORMATION

Items			Specifications
Radiator	Performance kJ/h	4G6-GDI	205,100
		4G6-MPI	190,500

SERVICE SPECIFICATION

Items		Standard value
Thermostat <4G6-MPI>	Valve opening temperature of thermostat °C	82 ± 1.5
	Full-opening temperature of thermostat °C	95
	Valve lift (at 95°C) mm	8.5 or more

SEALANT

Items	Specified sealant	Remarks
Thermostat case assembly, Water outlet fitting	Mitsubishi Genuine Parts No. MD970389 or equivalent	Semi-drying sealant

TROUBLESHOOTING

INSPECTION CHART FOR TROUBLE SYMPTOMS

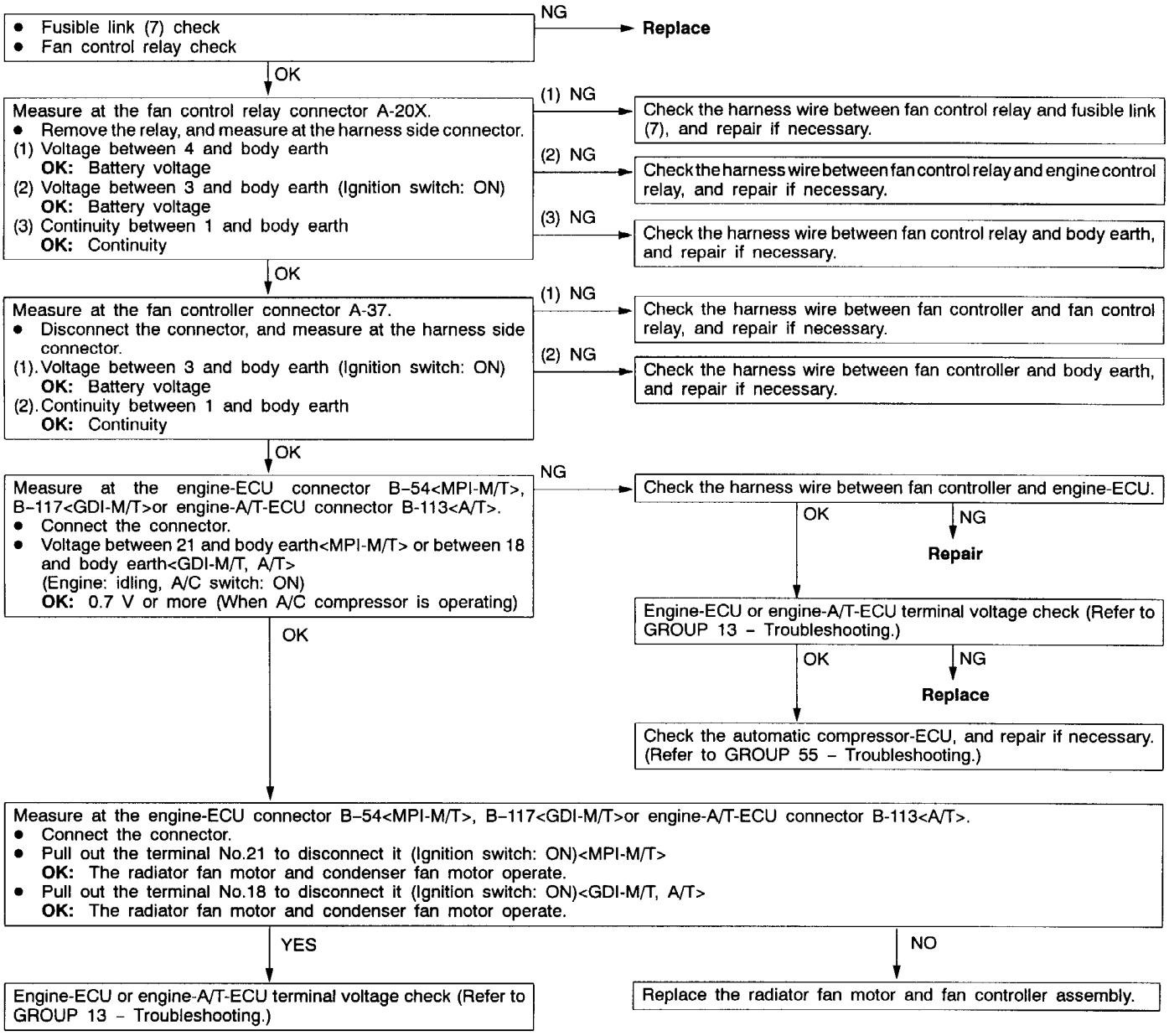
Trouble symptoms	Inspection procedure No.	Reference page
Radiator fan and condenser fan do not operate. <Vehicles with A/C> Radiator fan does not operate. <Vehicles without A/C>	1	14-3
Radiator fan and condenser fan do not change speed or stop. <Vehicles with A/C> Radiator fan does not change speed or stop. <Vehicles without A/C>	2	14-6
Radiator fan does not operate. <Vehicles with A/C>	3	14-7
Condenser fan does not operate. <Vehicles with A/C>	4	14-7

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

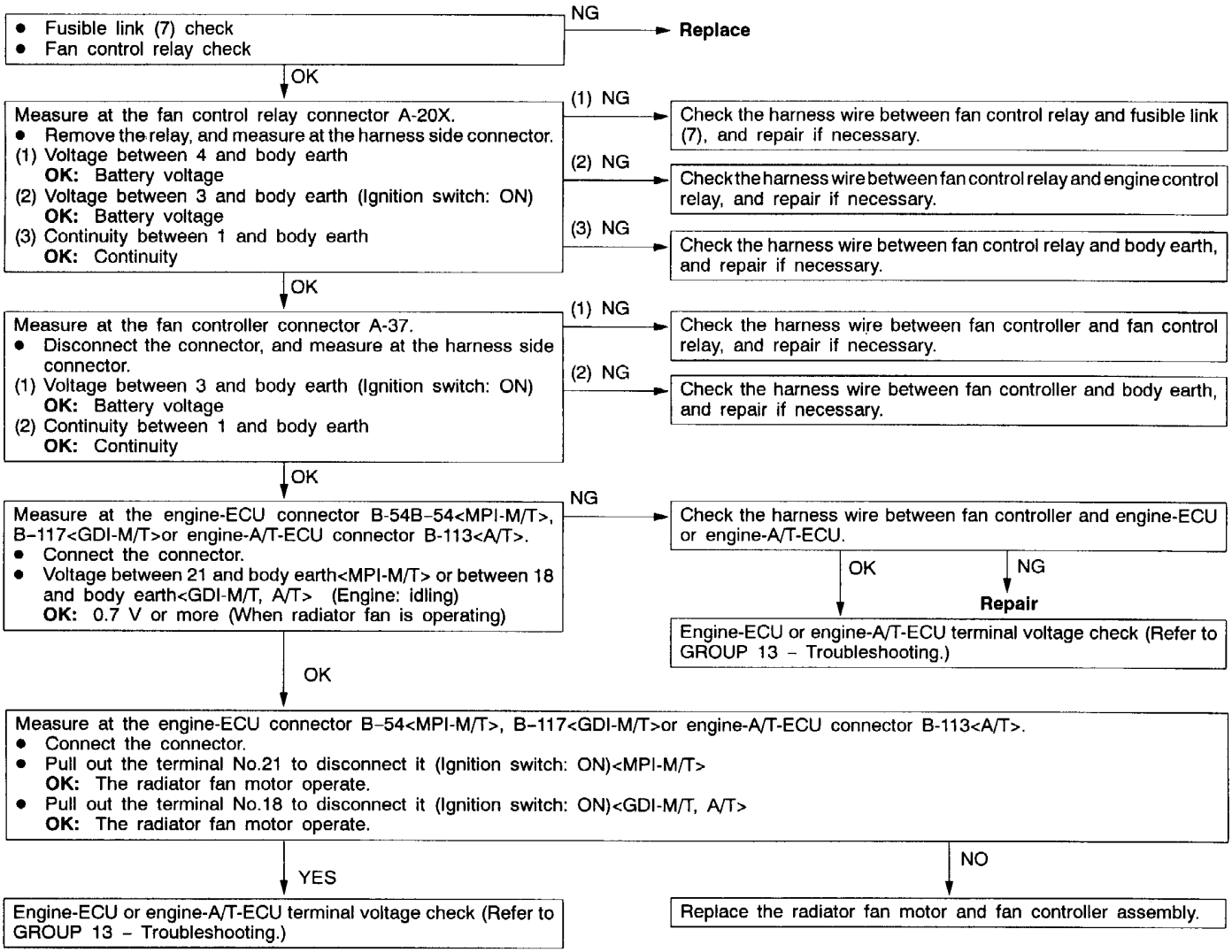
Inspection Procedure 1

Radiator fan and condenser fan do not operate. <Vehicles with A/C> Radiator fan does not operate. <Vehicles without A/C>	**Probable cause**
The cause could be a malfunction of the fan controller power supply or earth circuit. The cause could also be a malfunction of the fan controller or the engine-ECU<M/T>or engine-A/T-ECU<A/T>.	• Malfunction of fusible link • Malfunction of fan control relay • Malfunction of fan controller • Malfunction of engine-ECU<M/T> or engine-A/T-ECU<A/T> • Malfunction of wiring harness or connector

<Vehicles with A/C>



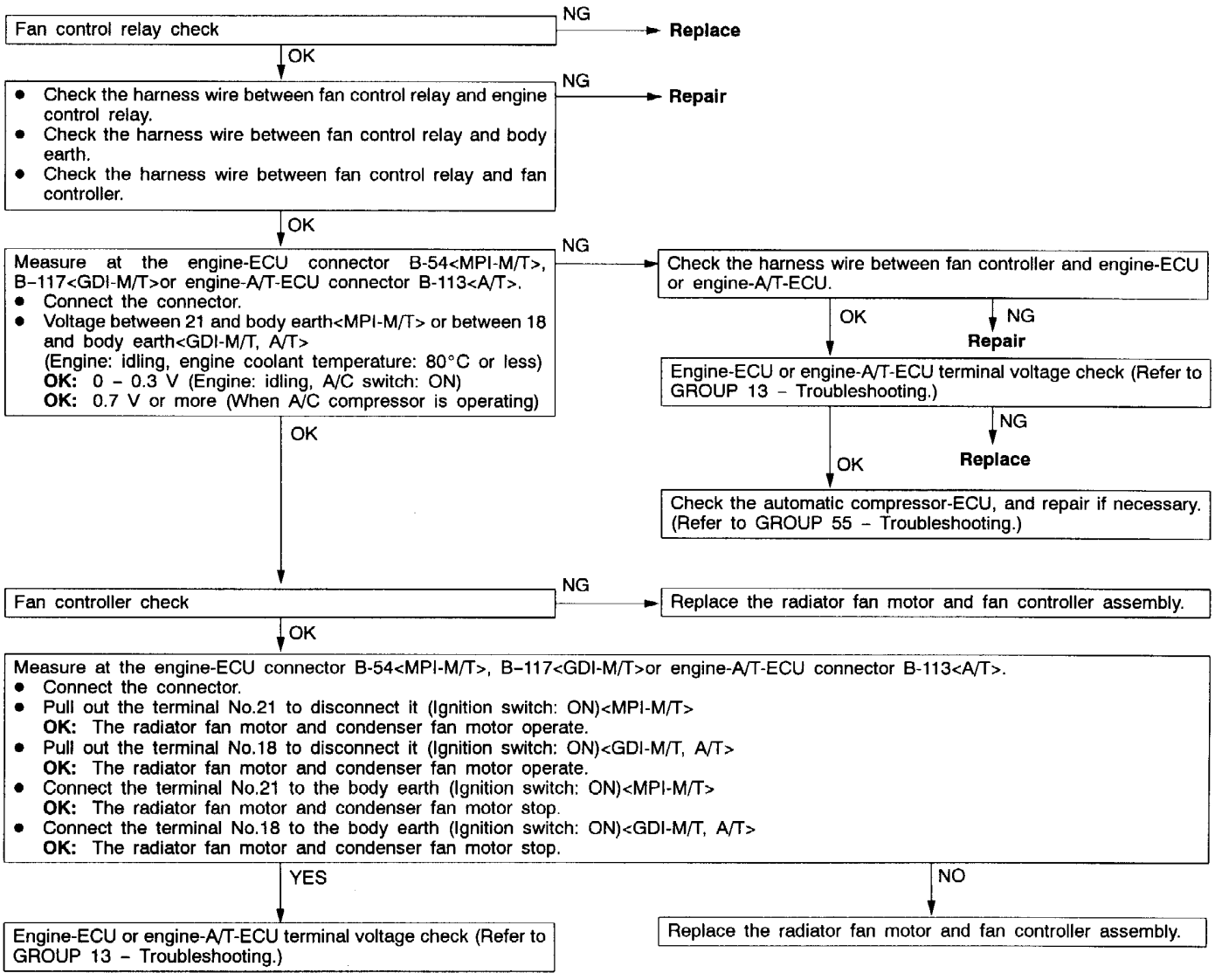
<Vehicles without A/C>



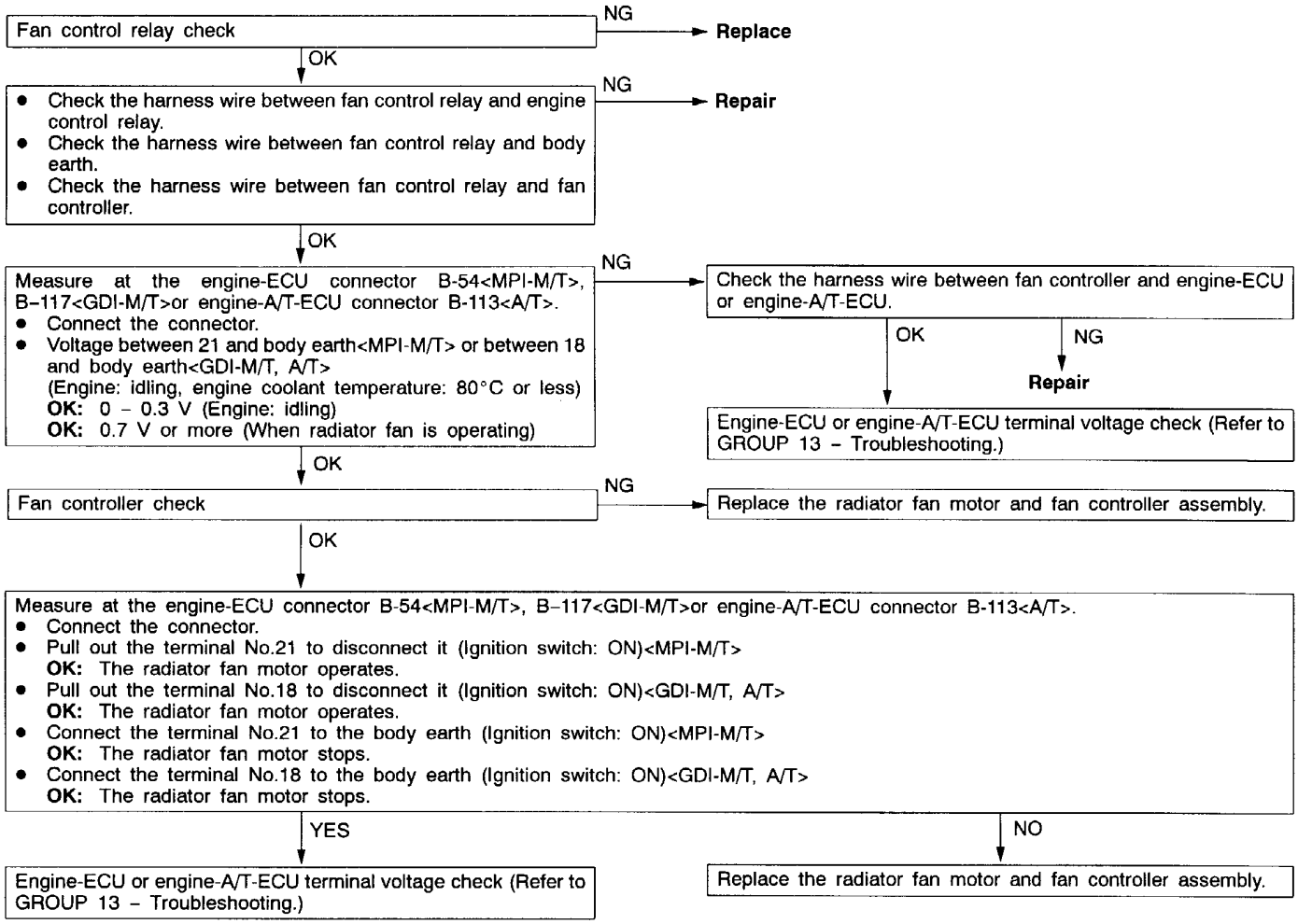
Inspection Procedure 2

Radiator fan and condenser fan do not change speed or stop. <Vehicles with A/C> Radiator fan does not change speed or stop. <Vehicles without A/C>	Probable cause
The fan controller carries out step-free control of the radiator fan motor and the condenser fan motor speeds using signals transmitted from the engine-ECU<M/T> or engine-A/T-ECU<A/T>.	• Malfunction of fan control relay • Malfunction of fan controller • Malfunction of engine-ECU<M/T> or engine-A/T-ECU<A/T> • Malfunction of wiring harness or connector

<Vehicles with A/C>



<Vehicles without A/C>



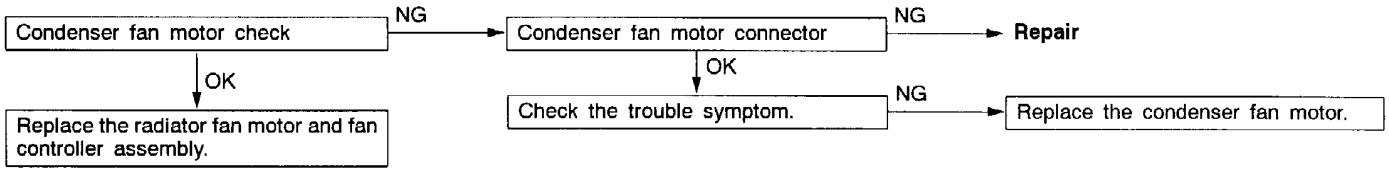
Inspection Procedure 3

Radiator fan does not operate. <Vehicles with A/C>	Probable cause
The cause could be a malfunction of the radiator fan motor or an open circuit between the fan controller and the radiator fan motor.	• Malfunction of radiator fan motor • Open circuit between fan controller and radiator fan motor

Replace the radiator fan motor and fan controller assembly.

Inspection Procedure 4

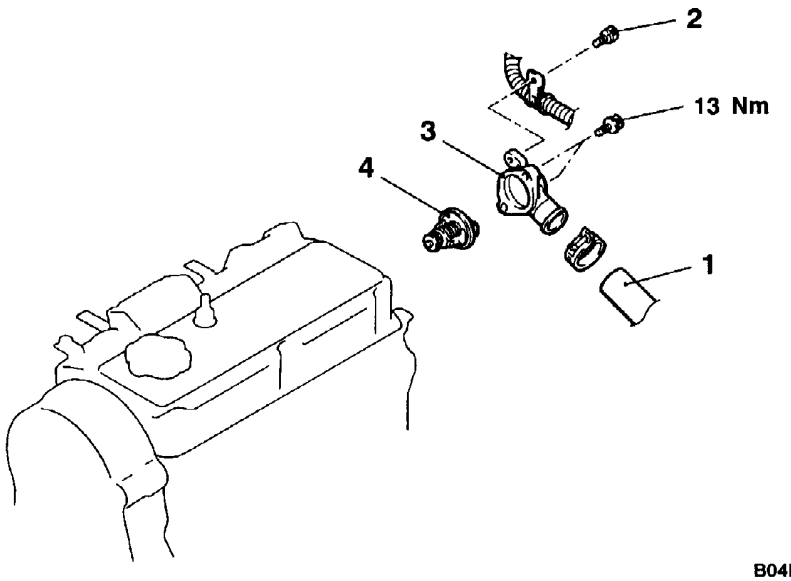
Condenser fan does not operate. <Vehicles with A/C>	Probable cause
The cause could be a malfunction of the condenser fan motor or of the fan controller.	• Malfunction of condenser fan motor • Malfunction of fan controller • Malfunction of wiring harness or connector



THERMOSTAT <4G6-MPI>

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Engine Coolant Draining and Supplying
- Air Intake Duct Removal and Installation



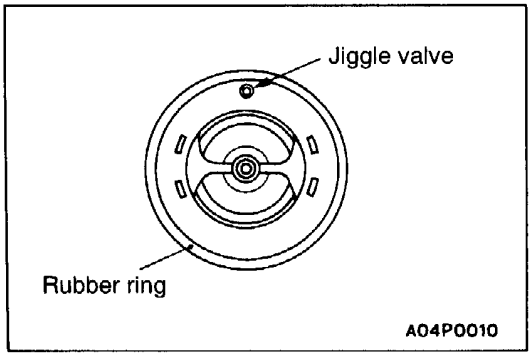
Removal steps

◀A▶ ▶B◀ 1. Radiator lower hose connection
2. Control wiring harness mounting bolt
3. Water inlet fitting
▶A◀ 4. Thermostat

REMOVAL SERVICE POINT

◀A▶ RADIATOR LOWER HOSE DISCONNECTION

After making mating marks on the radiator hose and the hose clamp, disconnect the radiator hose.



INSTALLATION SERVICE POINTS

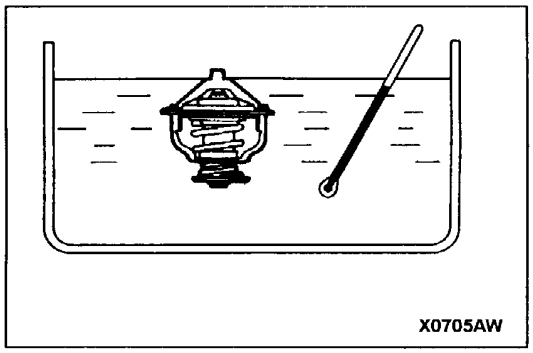
▶A◀ THERMOSTAT INSTALLATION

Install the thermostat so that the jiggle valve is facing straight up.

Caution
Make absolutely sure that no oil is adhering to the rubber ring of the thermostat. In addition, be careful not to fold over or scratch the rubber ring when inserting. If the rubber ring is damaged, replace the thermostat.

▶B◀ RADIATOR LOWER HOSE CONNECTION

1. Insert each hose as far as the projection of the water inlet fitting.
2. Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.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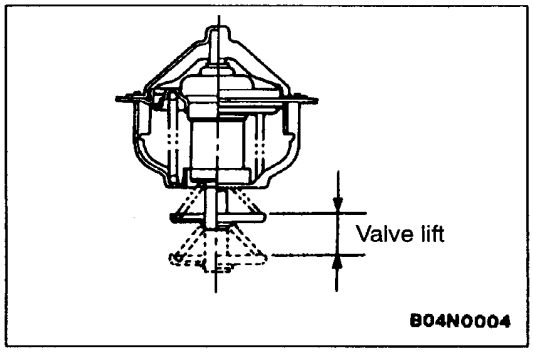

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INSPECTION

THERMOSTAT CHECK

1. Immerse the thermostat in water, and heat the water while stirring. Check the thermostat valve opening temperature.

   Standard value:

   Valve opening temperature: 82 ± 1.5°C

2. Check that the amount of valve lift is at the standard value when the water is at the full-opening temperature.

   Standard value:

   Full-opening temperature: 95°C

   Amount of valve lift: 8.5 mm or more

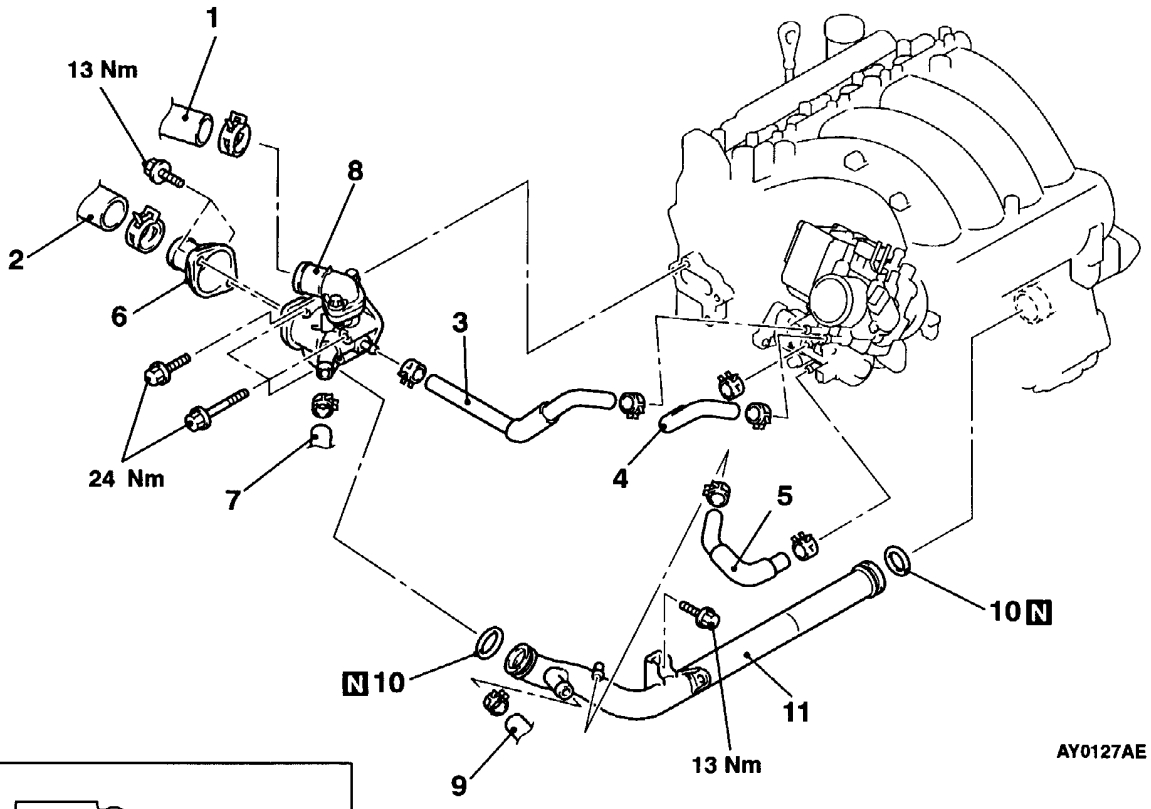
   NOTE
   Measure the valve height when the thermostat is fully closed, and use this measurement to calculate the valve height when the thermostat is fully open.

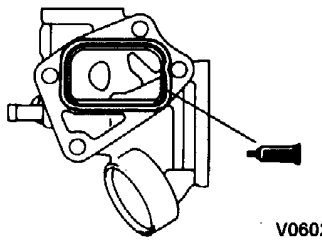
WATER HOSE AND WATER PIPE

REMOVAL AND INSTALLATION

<4G6-GDI>

Pre-removal and Post-installation Operation
- Engine Coolant Draining and Supplying
- Engine Cover Removal and Installation
- Air Cleaner Assembly Removal and Installation
- Intake Manifold and Air Intake Plenum Resonator Removal and Installation (Refer to GROUP15.)





Sealant:
Mitsubishi Genuine Part No. MD970389 or equivalent

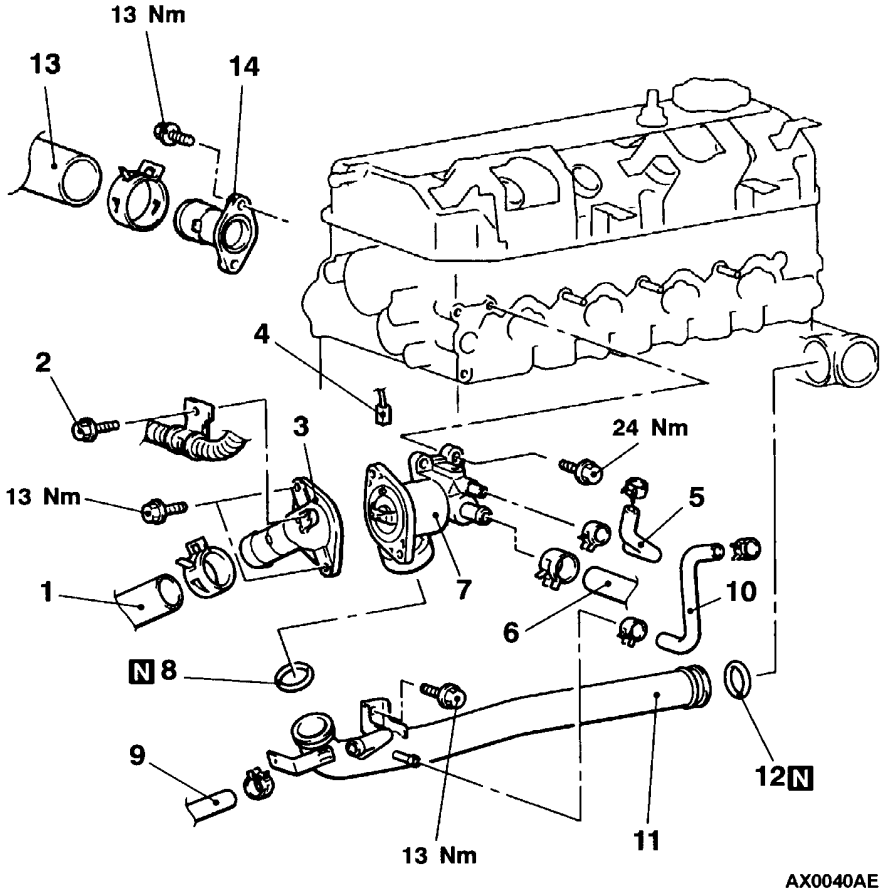
Removal steps

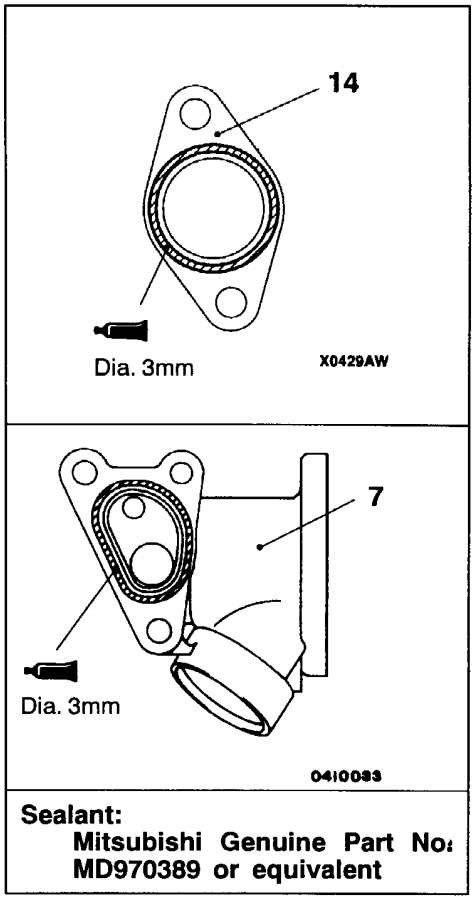
◀A▶ ▶B◀ 1. Radiator upper hose connection
◀A▶ ▶B◀ 2. Radiator lower hose connection
3. Water hose
4. Water hose
5. Water hose
6. Water inlet fitting
7. Heater hose connection
▶A◀ 8. Thermostat case assembly
9. Heater hose connection
▶C◀ 10. O-ring
- Oil pipe (Refer to GROUP 11A – Camshaft and Camshaft Oil Seal)

11. Water inlet pipe

<4G6-MPI>

Pre-removal and Post-installation Operation
- Engine Coolant Draining and Suppling
- Air Cleaner and Air Intake Hose Assembly Removal and Installation





Sealant:
Mitsubishi Genuine Part No: MD970389 or equivalent

Removal steps

◀A▶ ▶B◀ 1. Radiator lower hose connection
2. Control wiring harness mounting bolt
3. Water inlet fitting
4. Engine coolant temperature gauge unit connector
5. Water hose
6. Heater hose connection
▶A◀ 7. Thermostat case assembly
▶C◀ 8. O-ring
9. Heater hose connection
10. Water hose
11. Water inlet pipe assembly
▶C◀ 12. O-ring
◀A▶ ▶B◀ 13. Radiator upper hose connection
▶A◀ 14. Water outlet fitting

REMOVAL SERVICE POINT

◀A▶ RADIATOR UPPER HOSE/RADIATOR LOWER HOSE DISCONNECTION

After making mating marks on the radiator hose and the hose clamp, disconnect the radiator hose.

INSTALLATION SERVICE POINTS

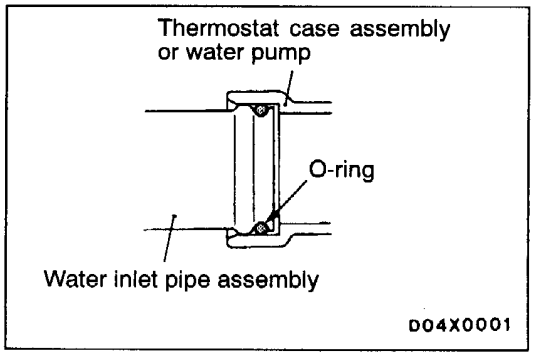
▶A◀ WATER OUTLET FITTING/THERMOSTAT CASE ASSEMBLY INSTALLATION

Squeeze out the sealant from the tube evenly and apply it so that there is not too much sealant and no places without sealant.

Specified Sealant:
Mitsubishi Genuine Part No. MD970389 or equivalent

▶B◀ RADIATOR LOWER HOSE/RADIATOR UPPER HOSE CONNECTION

1. Insert each hose as far as the projection of the water inlet fitting or water outlet fitting.
2. Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.



▶C◀ O-RING INSTALLATION

Insert the O-ring to the water inlet pipe assembly and coat the outer circumference of the O-ring with water or engine coolant.

Caution
Do not allow engine oil or other greases to adhere to the O-ring

INSPECTION

WATER PIPE AND HOSE CHECK

Check the water pipe and hose for cracks, damage, clog and replace them if necessary.