GROUP 14

ENGINE COOLING

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GENERAL INFORMATION

M1141000100456

The cooling system is designed to keep every part of the engine at appropriate temperature in whatever condition the engine may be operated. The cooling method is of the water-cooled, pressure forced circulation type in which the water pump pressurizes coolant and circulates it throughout the engine. If the engine coolant temperature exceeds the prescribed temperature, the thermostat opens to circulate the coolant through the radiator as well so that the heat absorbed by the coolant may be radiated into the air. The water pump is of the centrifugal type and is driven by the drive belt from the crankshaft. The radiator is the corrugated fin, down flow type. The cooling fan is controlled by the fan controller and engine-ECU depend on driving conditions.

Item		Specification
Radiator	Performance kJ/h	216,700

SERVICE SPECIFICATIONS

M1141000300483

Item			Standard value	Limit
Radiator cap pressure kPa			93 – 123	Minimum 83
Range of coolant antifreeze concentration of radiator %			30 – 60	-
Fan controller input voltage V		Ignition switch: "ON"	Battery positive voltage	-
Fan controller output voltage V		A/C switch: "OFF"	1 or less	-
		A/C switch: "ON"	Repeat steps 1) and 2). 1) 8.2 ± 2.6 2) Battery positive voltage ± 2.6	-
Thermostat	Valve opening temperature of thermostat °C		80 ± 1.5	-
	Full-opening temperature of thermostat °C		93	-
	Valve lift mm		9.5 or more	-

LUBRICANT

M1141000400424

Item	Specified lubricant	Quantity L
Engine coolant (including reserve tank)	DIA QUEEN SUPER LONG LIFE COOLANT or equivalent	6.0

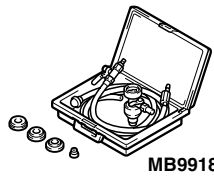
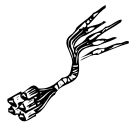
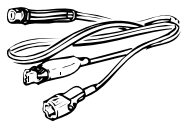
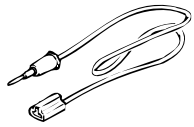
SEALANTS

M1141000500443

Item	Specified sealant	Remark
Cylinder block drain plug	3M Nut Locking Part No.4171 or equivalent	Drying sealant
Thermostat case	MITSUBISHI GENUINE PART MD970389 or equivalent	Semi-drying sealant
Water outlet fitting		

SPECIAL TOOLS

M1141000600310

Tool	Number	Name	Use
 MB991871	MB991871	LLC changer	Coolant refilling
A  B  C  D  MB991223AC	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Making voltage and resistance measurement during troubleshooting A: Connector pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection

TROUBLESHOOTING

INSPECTION CHART FOR TROUBLE SYMPTOMS

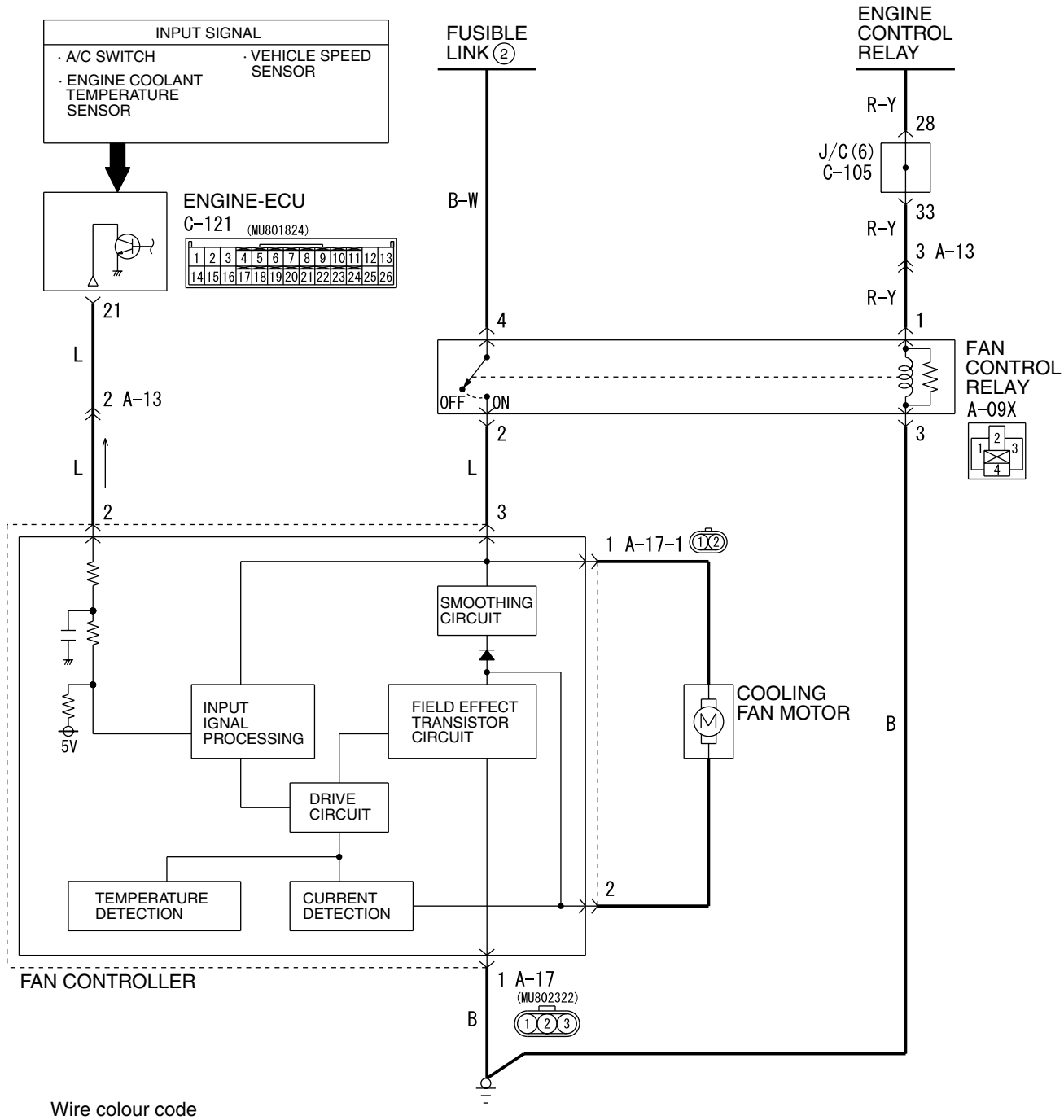
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Trouble symptom	Inspection procedure No.	Reference page
Cooling fan does not operate	1	P.14-4
Cooling fan does not change speed or does not stop	2	P.14-10

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1: Cooling fan does not operate

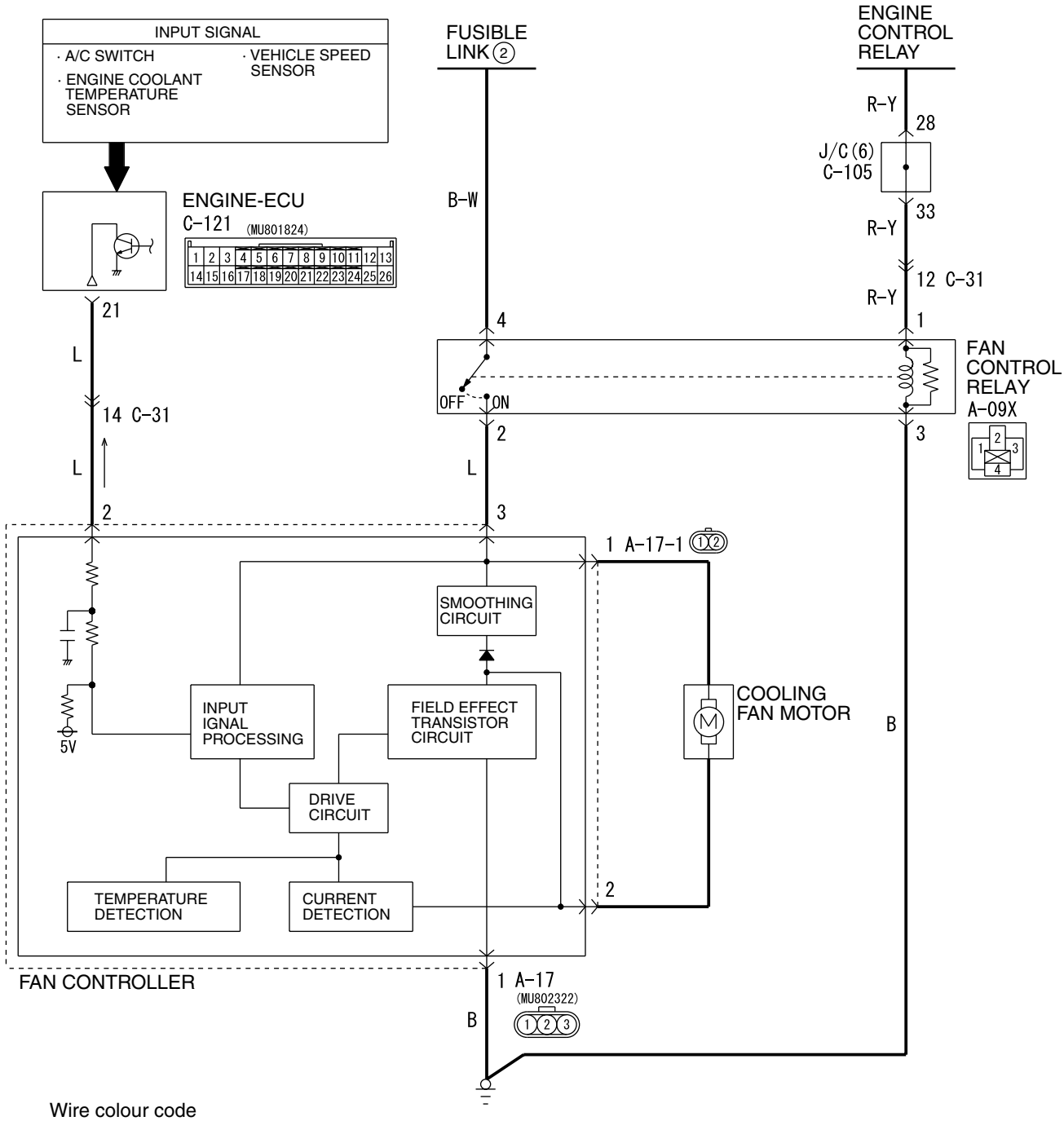
Cooling fan drive circuit <L.H. drive vehicles>



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4J14E00AA

Cooling fan drive circuit <R.H. drive vehicles>



Wire colour code
B : Black LG : Light green G : Green L : Blue W : White Y : Yellow SB : Sky blue
BR : Brown O : Orange GR : Gray R : Red P : Pink V : Violet

W4J14E01AA

CIRCUIT OPERATION

- The fan controller is powered from fusible link No.2.
- The engine-ECU judges the required revolution speed of cooling fan motor using the input signals transmitted from A/C switch, vehicle speed sensor and engine coolant temperature sensor. The engine-ECU activates the fan controller to drive the cooling fan motor.

TECHNICAL DESCRIPTION

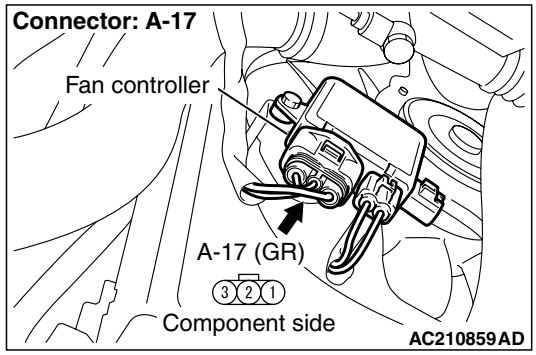
- The cause could be a malfunction of the fan controller power supply or earth circuit.
- The cause could also be a malfunction of the fan controller or the engine-ECU.

TROUBLESHOOTING HINTS

- Malfunction of fusible link
- Malfunction of fan control relay
- Malfunction of cooling fan motor
- Malfunction of fan controller
- Malfunction of engine-ECU
- Damaged wiring harness or connector

DIAGNOSIS

STEP 1. Check the circuit at fan controller connector A-17 terminal 3.



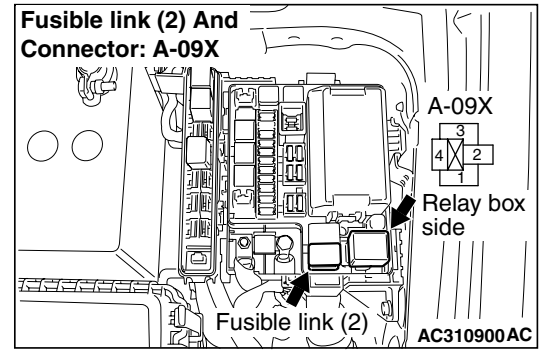
(1) Disconnect fan controller connector A-17, and measure at the harness side connector.
(2) Measure the voltage between terminal No.3 and earth.
- When the ignition switch is turned to the "ON" position, voltage should measure battery positive voltage.

Q: Is the voltage battery positive voltage when the ignition switch is turned to the "ON" position?
YES : Go to Step 7.
NO : Go to Step 2.

STEP 2. Check the fan control relay.
Refer to P.14-17.

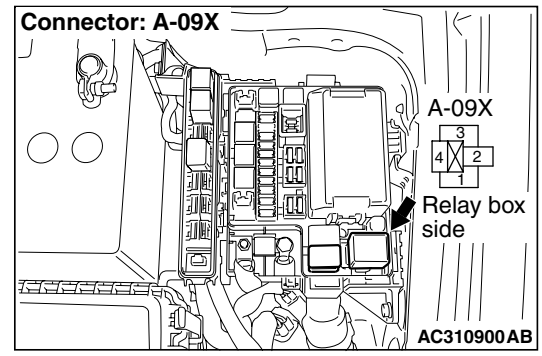
Q: Is the fan control relay in good condition?
YES : Go to Step 3.
NO : Replace it, then go to Step 1.

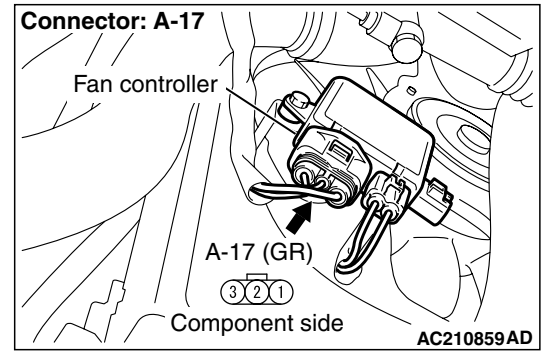
STEP 3. Check for harness damage between fusible link No.2 and fan control relay connector A-09X terminal 4.



Q: Are the harness wires between fusible link No.2 and fan control relay connector A-09X damaged?
YES : Repair or replace them, then go to Step 13.
NO : Go to Step 4.

STEP 4. Check for harness damage between fan control relay connector A-09X terminal 2 and fan controller connector A-17 terminal 3.

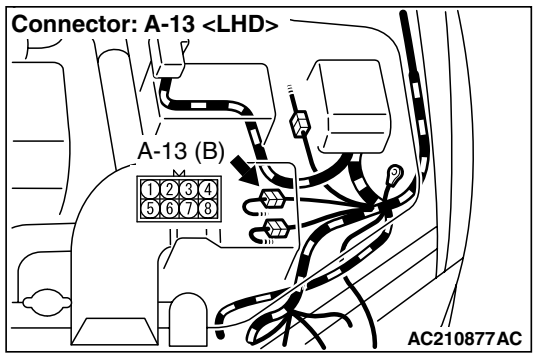


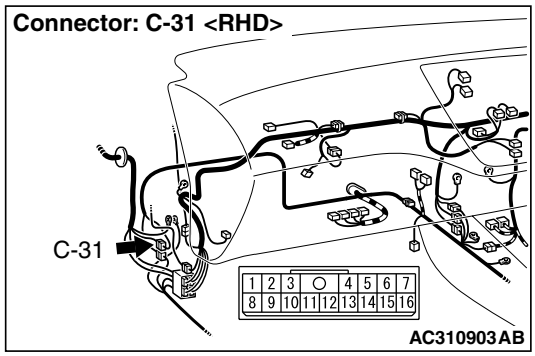


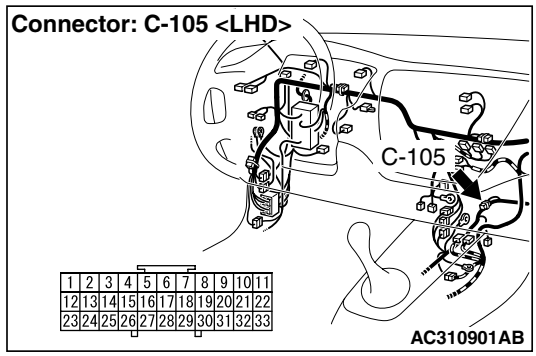
Q: Are the harness wires between fan control relay connector A-09X terminal 2 and fan controller connector A-17 terminal 3 damaged?
YES : Repair or replace them, then go to Step 13.
NO : Go to Step 5.

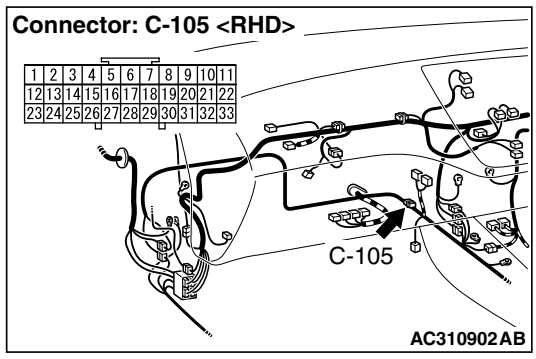
STEP 5. Check for harness damage between J/C (6) C-105 and fan control relay connector A-09X.

NOTE:

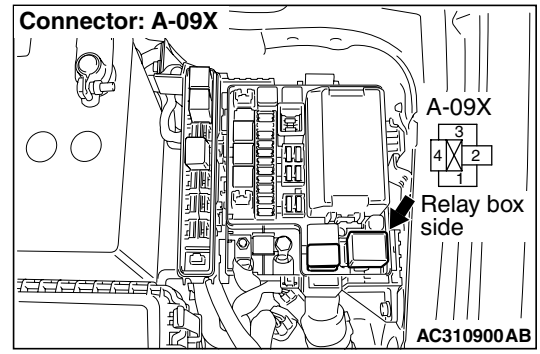


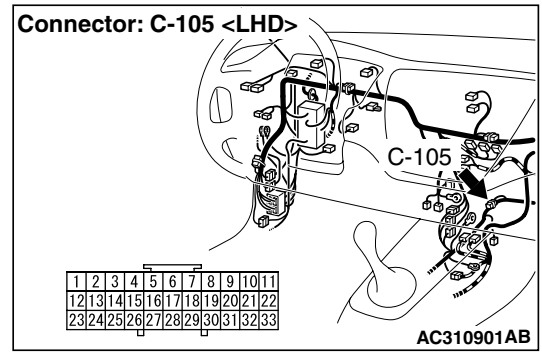


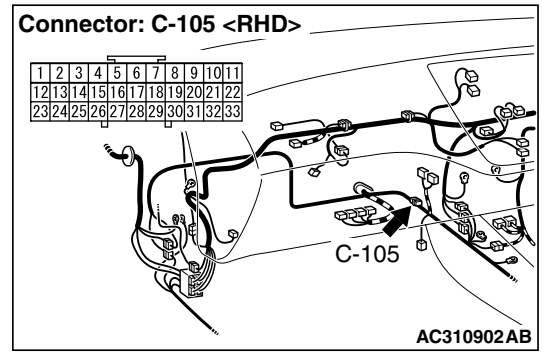




After inspecting intermediate connector A-13 <LHD> terminal 3, intermediate connector C-31 <RHD> terminal 12 and J/C (6) C-105 terminal 28, 33 inspect the wires. If intermediate connector A-13 <LHD>, C-31<RHD> and J/C (6) C-105 are damaged, repair or replace them. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-6.





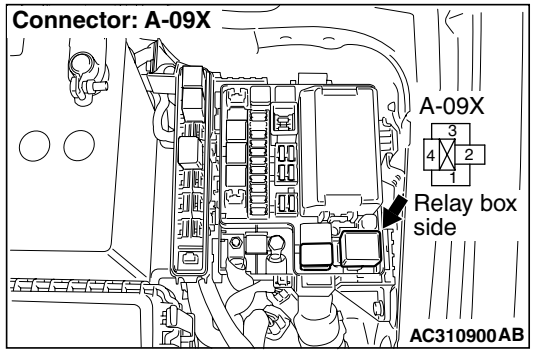


Q: Are the harness wires between J/C (6) C-105 terminal 28 and fan control relay connector A-09X terminal 1 damaged?

YES : Repair or replace them, then go to Step 13.

NO : Go to Step 6.

STEP 6. Check for harness damage between fan control relay connector A-09X terminal 3 and earth.

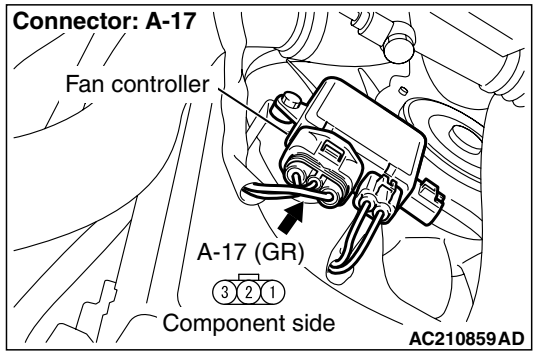


Q: Are the harness wires between fan control relay connector A-09X terminal 3 and earth damaged?
YES : Repair or replace them, then go to Step 13.
NO : Go to Step 7.

STEP 7. Check the cooling fan motor.
Refer to P.14-17.

Q: Is the cooling fan motor in good condition?
YES : Go to Step 8.
NO : Replace it, then go to Step 13.

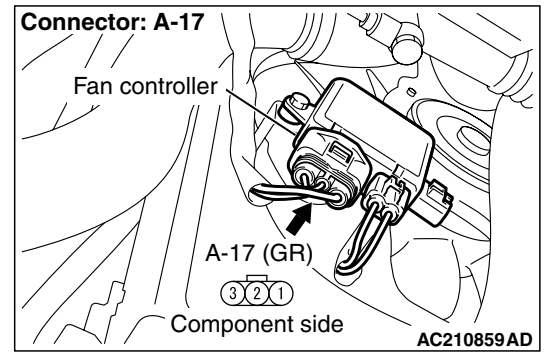
STEP 8. Check the circuit at fan controller connector A-17 terminal 1.



(1) Disconnect fan controller connector A-17, and measure at the harness side connector.
(2) Measure the resistance between terminal No.1 and earth.
- The resistance should measure less than 2 ohms.

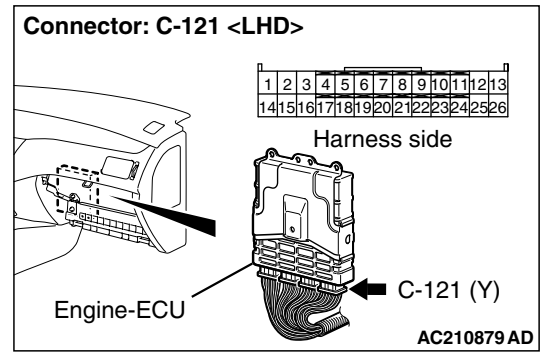
Q: Is the resistance less than 2 ohms?
YES : Go to Step 10.
NO : Go to Step 9.

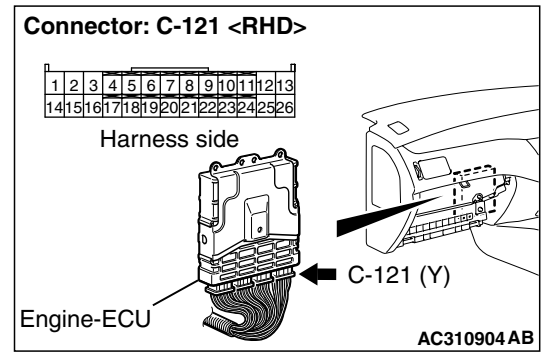
STEP 9. Check the harness wire between fan controller connector A-17 and earth.



Q: Are the harness wires between fan controller connector A-17 and earth damaged?
YES : Repair or replace them, then go to Step 13.
NO : Go to Step 10.

STEP 10. Measure the output circuit voltage at engine-ECU connector C-121 terminal 21 by backprobing.



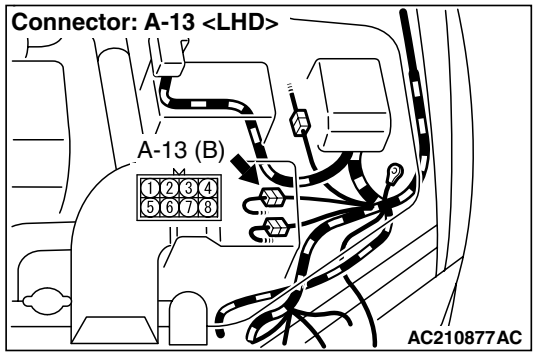


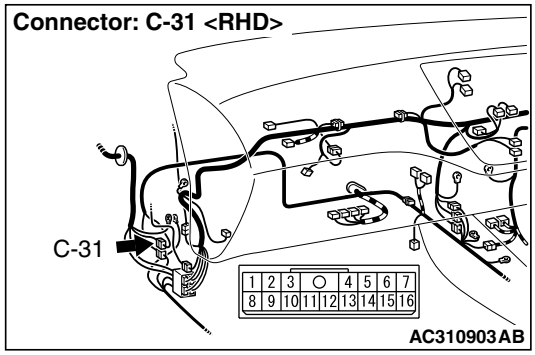
(1) Do not disconnect engine-ECU connector C-121.
(2) Start the engine and allow it to idle.
(3) Turn the A/C switch to the "ON" position.
(4) Measure the voltage between terminal No.21 and earth by backprobing.
- The voltage should measure 0.7 volt or more when the cooling fan is operating.

Q: Is the voltage 0.7 volt or more when the cooling fan is operating?
YES : Go to Step 12.
NO : Go to Step 11.

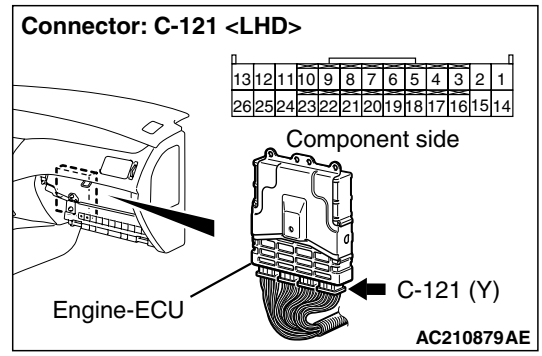
STEP 11. Check the harness wire between engine-ECU connector C-121 and fan controller connector A-17.

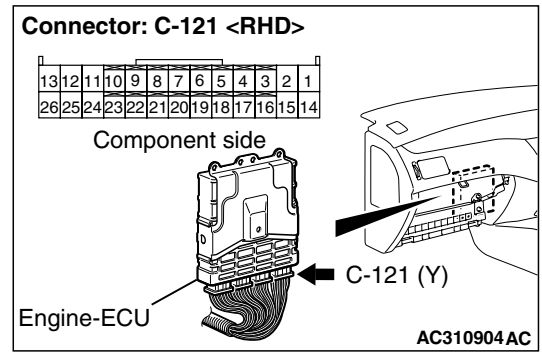
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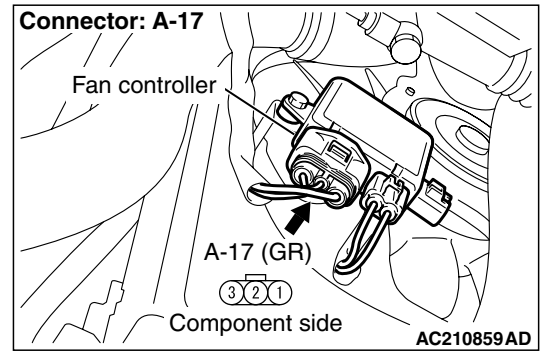




If intermediate connector A-13 <LHD> terminal 2 and intermediate connector C-31 <RHD> terminal 14 is damaged, repair or replace it. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-6.

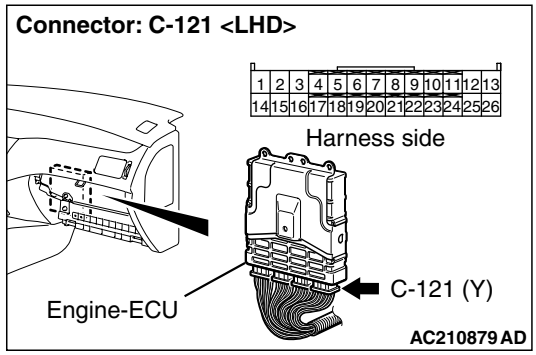


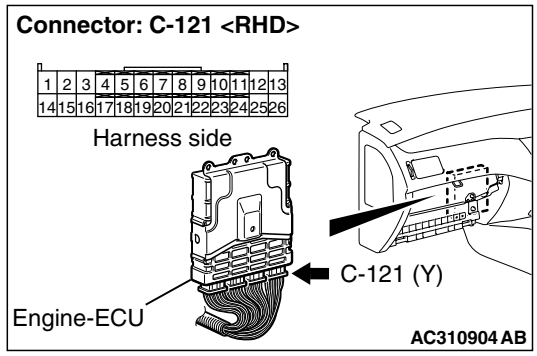




Q: Are the harness wires between engine-ECU connector C-121 terminal 21 and fan controller connector A-17 terminal 2 damaged?
YES : Repair or replace them, then go to Step 13.
NO : Go to Step 12.

STEP 12. Check the fan controller at engine-ECU connector C-121.





(1) Do not disconnect engine-ECU connector C-121.
(2) Pull out terminal No.21.
(3) Turn the ignition switch to the "ON" position.

Q: Does the cooling fan motor operate?
YES : Replace the engine-ECU. Then go to Step 13.
NO : Replace the fan controller. Then go to Step 13.

STEP 13. Check the symptoms.

Q: Does the cooling fan operate correctly?
YES : The procedure is complete.
NO : Return to Step 1.

INSPECTION PROCEDURE 2: Cooling fan does not change speed or does not stop

NOTE: If the engine coolant temperature reaches 110°C or higher, the cooling fan control runs the cooling fan for up to 5 minutes even after the ignition switch is turned to the "LOCK" (OFF) position (the fan stops its rotation when the engine coolant temperature decreases to 110°C or lower).

COOLING FAN DRIVE CIRCUIT

Refer to P.14-4.

CIRCUIT OPERATION

- The fan controller is powered from fusible link No.2.
- The engine-ECU judges the required revolution speed of cooling fan motor using the input signals transmitted from A/C switch, vehicle speed sensor and engine coolant temperature sensor. The engine-ECU activates the fan controller to drive the cooling fan motor.

TECHNICAL DESCRIPTION

- The fan controller has variable control of the cooling fan motor speed using signals transmitted from the engine-ECU.

TROUBLESHOOTING HINTS

- Malfunction of fan control relay
- Malfunction of fan controller
- Malfunction of engine-ECU

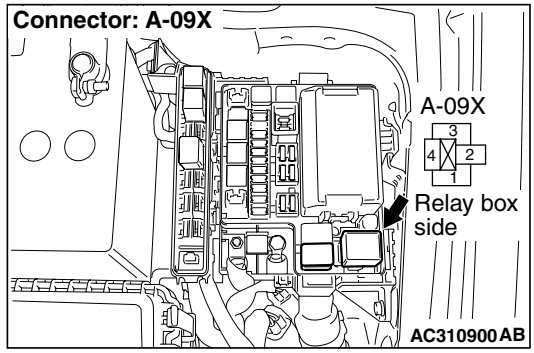
DIAGNOSIS

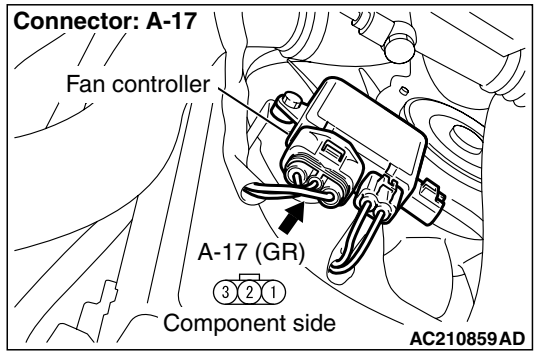
STEP 1. Check the fan control relay.

Refer to P.14-17.

Q: Is the fan control relay in good condition?
YES : Go to Step 2.
NO : Replace the part, then go to Step 8.

STEP 2. Check the harness wire between fan control relay connector A-09X terminal 2 and fan controller connector A-17 terminal 3.



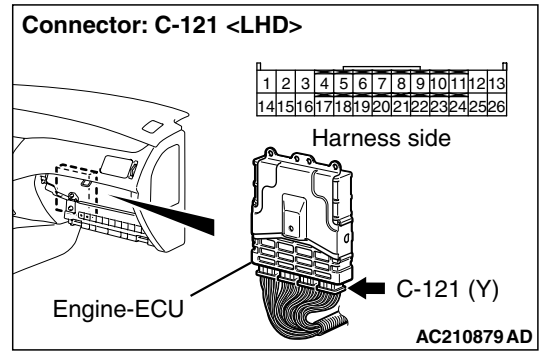


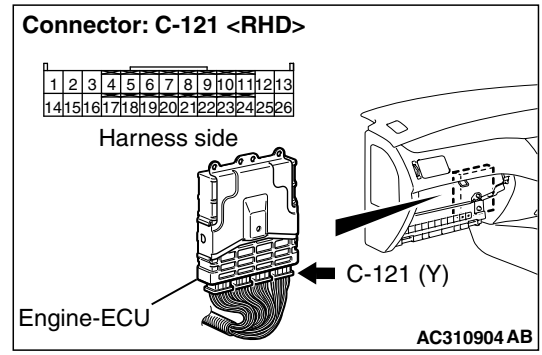
Q: Are the harness wire between fan control relay connector A-09X and fan controller connector A-17 damaged?

YES : Repair or replace the part, then go to Step 6.

NO : Go to Step 3.

STEP 3. Measure the output circuit voltage at engine-ECU connector C-121 terminal 21 by backprobing.





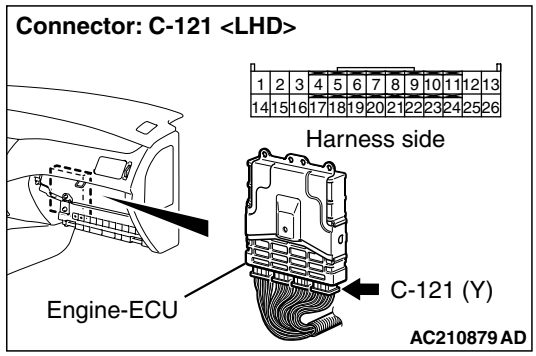
(1) Do not disconnect engine-ECU connector C-121.
(2) Start the engine and allow it to idle.
(3) Measure the voltage between terminal No.21 and earth by backprobing.
- The voltage should measure less than 0.3 volt when the cooling fan is not operating.

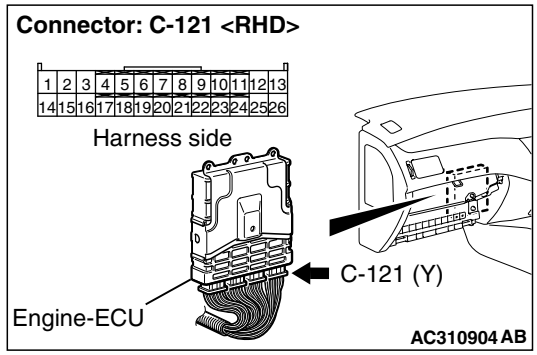
Q: Is the voltage less than 0.3 volt when the cooling fan is not operating?

YES : Go to Step 6.

NO : Go to Step 4.

STEP 4. Measure the output circuit voltage at engine-ECU connector C-121 terminal 21 by backprobing.



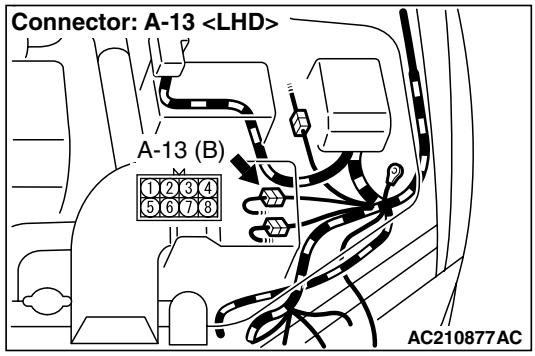


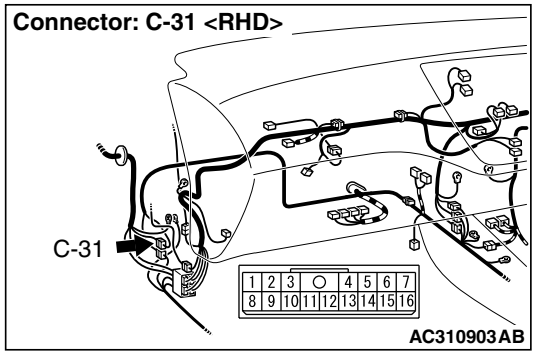
(1) Do not disconnect engine-ECU connector C-121.
(2) Start the engine and allow it to idle.
(3) Turn the A/C switch to the "ON" position.
(4) Measure the voltage between terminal No.21 and earth by backprobing.
- The voltage should measure 0.7 volt or more when the cooling fan is operating.

Q: Is the voltage 0.7 volt or more when the cooling fan is operating?
YES : Go to Step 6.
NO : Go to Step 5.

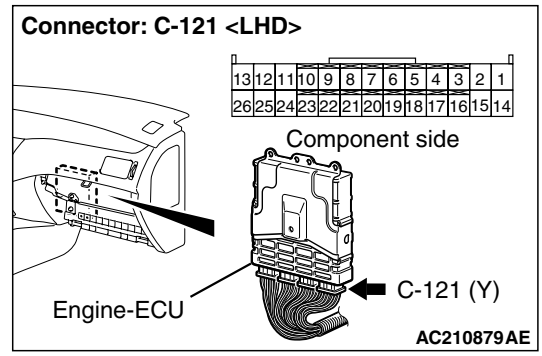
STEP 5. Check the harness wire between engine-ECU connector C-121 and fan controller connector A-17.

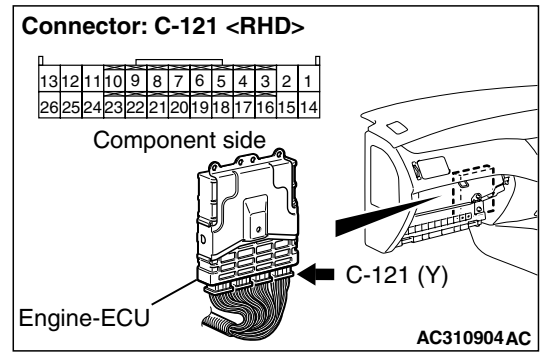
NOTE:

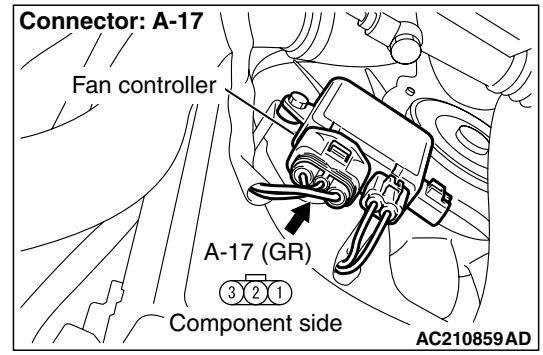




If intermediate connector A-13 <LHD> terminal 2 and intermediate connector C-31 <RHD> terminal 14 is damaged, repair or replace it. Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points P.00-6.

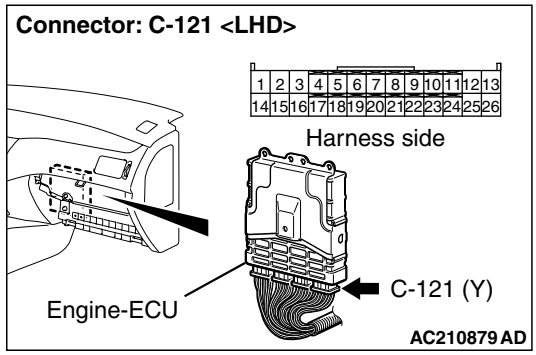


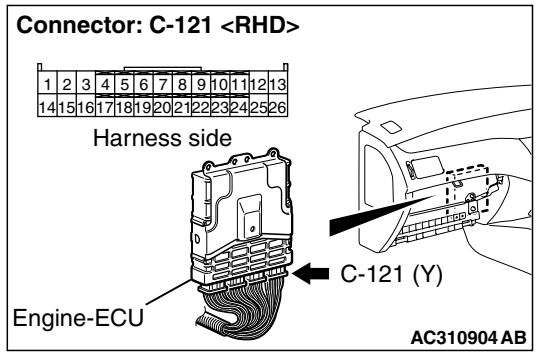




Q: Are the harness wires between engine-ECU connector C-121 terminal 21 and fan controller connector A-17 terminal 2 damaged?
YES : Repair or replace them, then go to Step 8.
NO : Go to Step 6.

STEP 6. Check the fan controller at engine-ECU connector C-121.

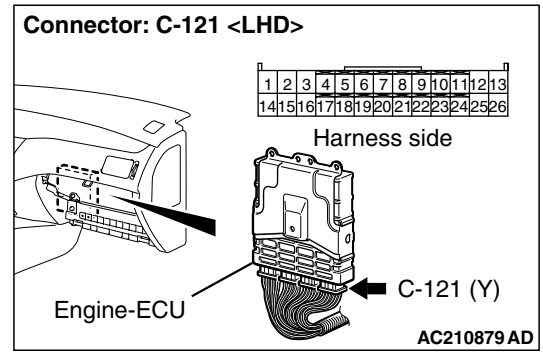


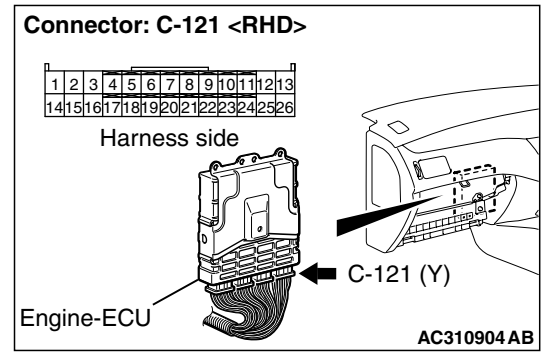


(1) Do not disconnect engine-ECU connector C-121.
(2) Pull out terminal No.21.
(3) Turn the ignition switch to the "ON" position.

Q: Does the cooling fan motor operate?
YES : Replace the engine-ECU. Then go to Step 8.
NO : Go to Step 7.

STEP 7. Check the fan controller at engine-ECU connector C-121.





(1) Disconnect engine-ECU connector C-121.
(2) Pull out terminal No.21.
(3) Connect terminal No.21 to the body earth.
(4) Turn the ignition switch to the "ON" position.

Q: Does the cooling fan motor stop running?
YES : Replace the engine-ECU. Then go to Step 8.
NO : Replace the fan controller. Then go to Step 8.

STEP 8. Check the symptoms.

Q: Does the cooling fan operate correctly?
YES : The procedure is complete.
NO : Return to Step 1.

ON-VEHICLE SERVICE

ENGINE COOLANT LEAK CHECK

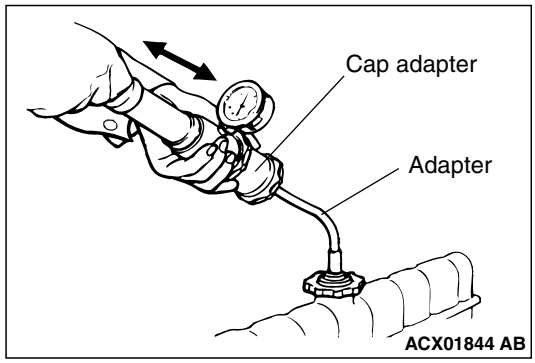
M1141001000388

⚠ WARNING

When pressure testing the cooling system, slowly release cooling system pressure to avoid getting burned by hot coolant.

⚠ CAUTION

- **Be sure to completely clean away any moisture from the places checked.**
- **When the tester is taken out, be careful not to spill any coolant.**
- **Be careful when installing and removing the tester and when testing not to deform the filler neck of the radiator.**

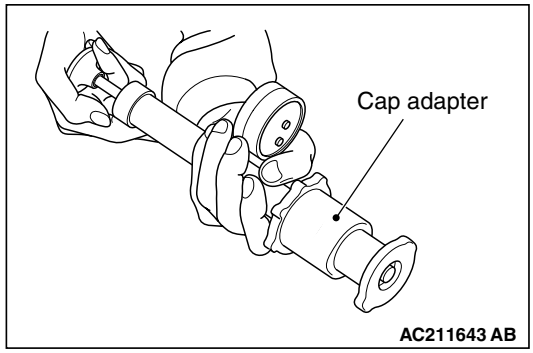


1. Check that the coolant level is up to the filler neck. Install a radiator tester and apply 160 kPa pressure, and then check for leakage from the radiator hose or connections.
2. If there is leakage, repair or replace the appropriate part.

RADIATOR CAP PRESSURE CHECK

M1141001300453

NOTE: Be sure that the cap is clean before testing. Rust or other foreign material on the cap seal will cause an improper reading.



1. Use a cap adapter to attach the cap to the tester.
2. Increase the pressure until the indicator of the gauge stops moving.

Minimum limit: 83 kPa
Standard value: 93 – 123 kPa

3. Replace the radiator cap if the reading does not remain at or above the minimum limit.

ENGINE COOLANT REPLACEMENT

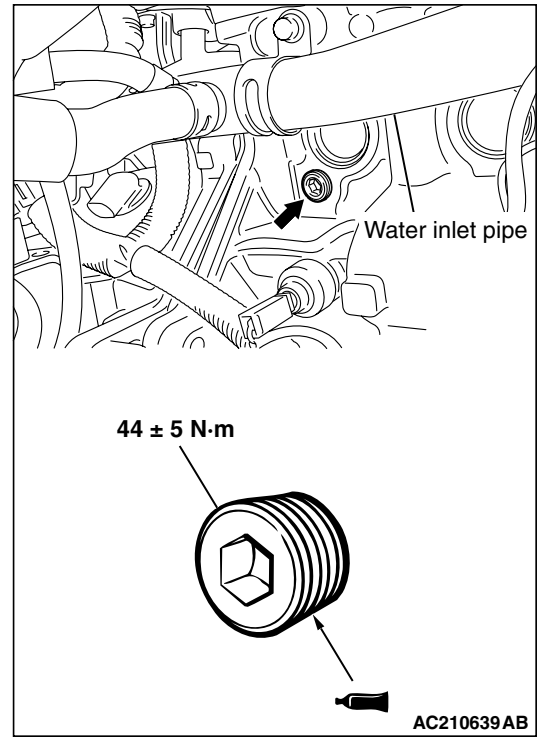
M1141001200553

1. Remove the under cover (Refer to GROUP 51, Front Bumper P.51-3).

⚠ WARNING

When removing the radiator cap, use care to avoid contact with hot coolant or steam. Place a shop towel over the cap and turn the cap anti-clockwise a little to let the pressure escape through the vinyl tube. After relieving the steam pressure, remove the cap by slowly turning it anti-clockwise.

2. Drain the water from the radiator, heater core and engine after unplugging the radiator drain plug and removing the radiator cap.

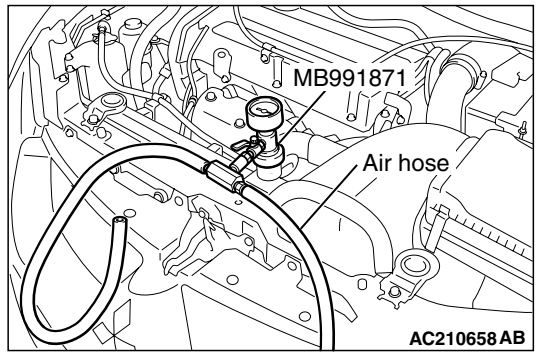


3. Drain the water in the water jacket by unplugging the drain plug of the cylinder block.
4. Remove the reserve tank and drain the coolant.
5. Drain the cooling water then clean the path of the cooling water by injecting water into the radiator from the radiator cap area.
6. Apply the designated sealant to the screw area of the cylinder block drain plug, and then tighten to the standard torque.

Specified sealant: 3M Nut Locking Part No.4171 or equivalent
Tightening torque: 44 ± 5 N·m

7. Securely tighten the drain plug of the radiator.
8. Assemble the reserve tank.

⚠ CAUTION
Do not use alcohol or methanol anti-freeze or any engine coolants mixed with alcohol or methanol anti-freeze. The use of an improper anti-freeze can cause corrosion of the aluminium components.



9. By referring to the section on coolant, select an appropriate concentration for safe operating temperature within the range of 30 to 60 %. Use special tool LLC changer (MB991871) to refill the coolant. A convenient mixture is a 50 % water and 50 % antifreeze solution (freezing point: –31°C).

   Recommended antifreeze: DIA QUEEN SUPER LONG LIFE COOLANT or equivalent
   Quantity: 6.0 L

   NOTE: For how to use the special tool, refer to its manufacturer's instructions.
10. Reinstall the radiator cap.
11. Start the engine and let it warm up until the thermostat opens.
12. Repeatedly revving the engine up to 3,000 r/min several times, then stop the engine.
13. Remove the radiator cap after the engine has become cold, and pour in coolant up to the brim. Reinstall the cap.

⚠ CAUTION
Do not overfill the reserve tank.

14. Add coolant to the reserve tank between the "FULL" and "LOW" mark if necessary.
15. Install the under cover (Refer to GROUP 51, Front Bumper P.51-3).

CONCENTRATION MEASUREMENT

M1141001100448

Measure the temperature and specific gravity of the engine coolant to check the antifreeze concentration.

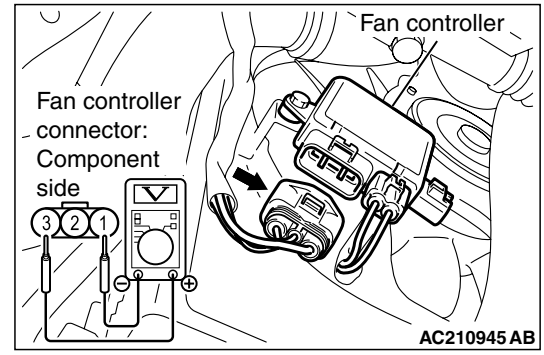
Standard value: 30 – 60 % (allowable concentration range)
Recommended antifreeze: DIA QUEEN SUPER LONG LIFE COOLANT or equivalent

⚠ CAUTION
If the concentration of the anti-freeze is below 30 %, the anti-corrosion property will be adversely affected. In addition, if the concentration is above 60 %, both the anti-freezing and engine cooling properties will decrease, affecting the engine adversely. For these reasons, be sure to maintain the concentration level within the specified range.

FAN CONTROLLER CHECK

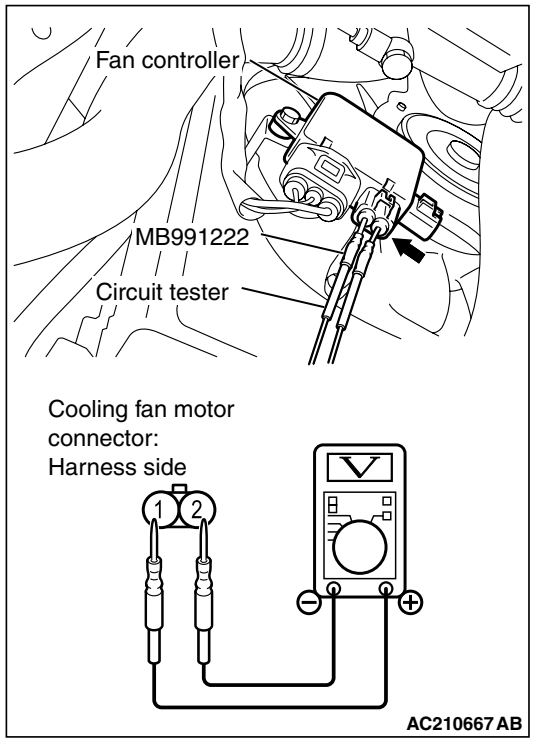
M1141006100238

1. Remove the centre under cover (Refer to GROUP 51, Front Bumper P.51-3).



2. Disconnect the fan controller connector.
3. Turn the ignition switch to the "ON" position, and measure the voltage between the harness-side connector terminals.

   Standard value: Battery positive voltage
4. Turn the ignition switch to the "LOCK" (OFF) position, and connect the fan controller connector.



5. Insert special tool probe (MB991222) at the back of the cooling fan motor connector.
6. Connect the special tool to the circuit tester.
7. Ensure that the A/C switch is off, and start the engine and run it at idle.
8. Measure the voltage between the cooling fan motor connector terminals.

   Standard value: 1V or less
9. Turn the A/C switch to the "ON" position.

⚠ WARNING

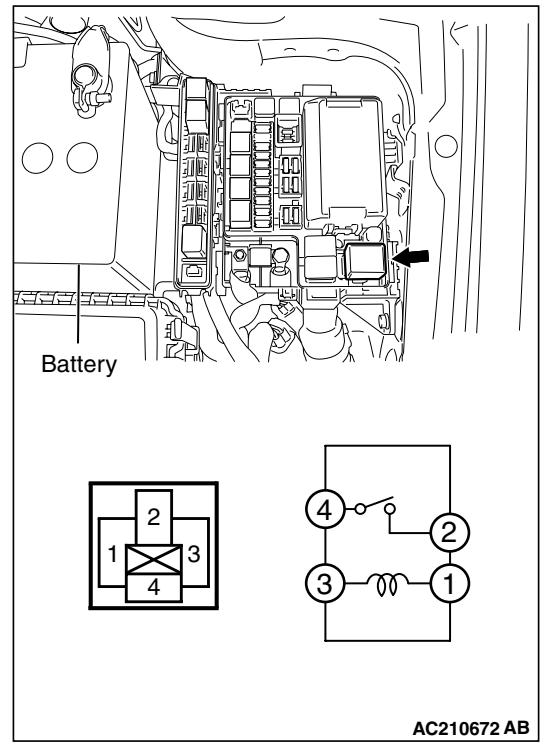
Stay clear of the fan when the fan starts running.

10. Measure the voltage between the cooling fan motor connector terminals while the fan is running. The voltage should repeat the values 1) and 2) below.

    Standard value:
    1) 8.2 ± 2.6 V
    2) Battery positive voltage ± 2.6 V
11. If the voltage does not repeatedly change as indicated, replace the fan controller.
12. Install the centre under cover (Refer to GROUP 51, Front Bumper P.51-3).

FAN CONTROL RELAY CONTINUITY CHECK

M1141006200354

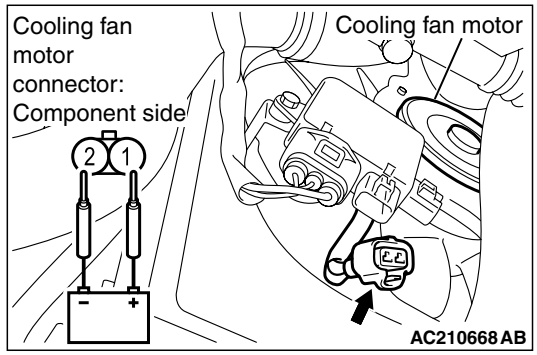


Battery voltage	Terminal No.to be connected to tester	Continuity test results
Not applied	4 – 2	Open circuit
• Connect terminal No.1 and battery (+) terminal. • Connect terminal No.3 and battery (–) terminal.	4 – 2	Less than 2 ohms

COOLING FAN MOTOR CHECK

M1141007100134

1. Remove the centre under cover (Refer to GROUP 51, Front Bumper P.51-3).



2. Remove the cooling fan motor connector.

⚠ WARNING

Stay clear of the fan when the fan starts running.

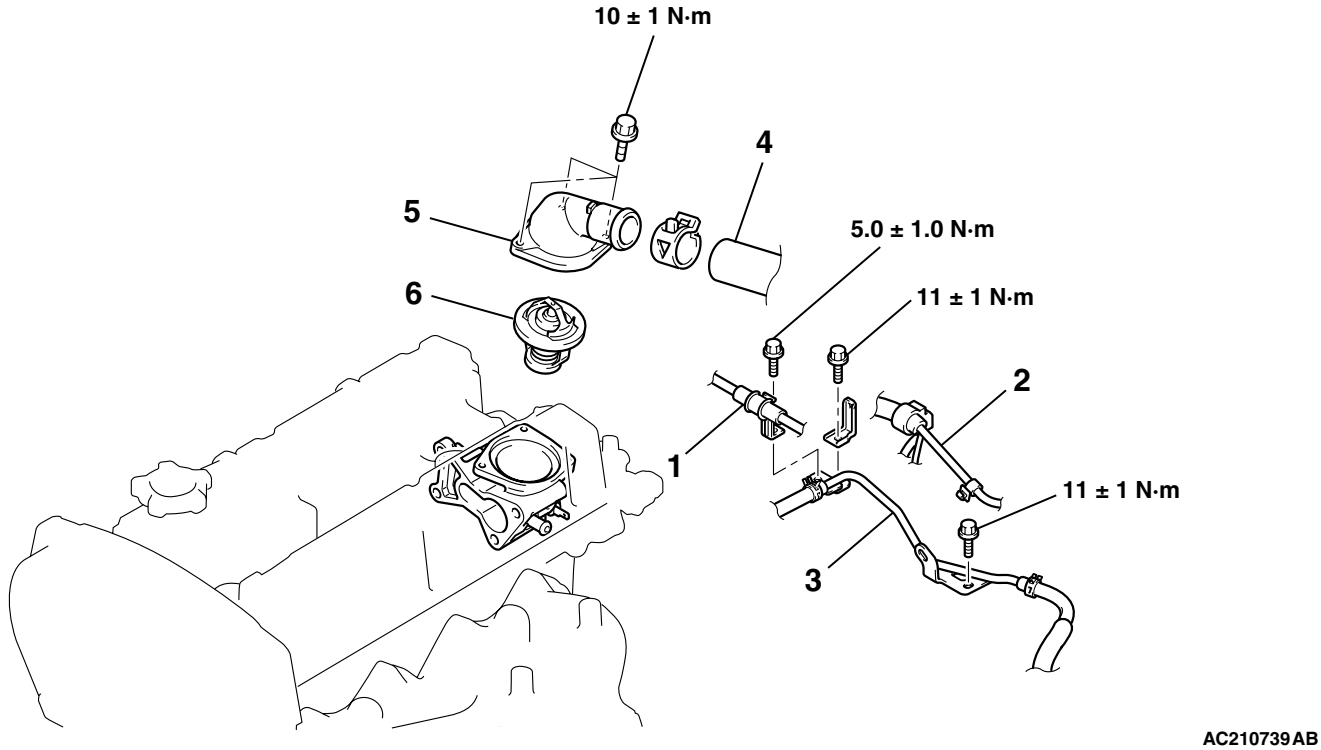
3. Check to see that the fan motor of the radiator turns when applying battery power between the connector terminals of the cooling fan motor. Also check to see that there is no abnormal sound coming from the cooling fan motor at this time.
4. If the cooling fan motor is defective, replace it.
5. Install the centre under cover (Refer to GROUP 51, Front Bumper P.51-3).

THERMOSTAT

REMOVAL AND INSTALLATION

M1141002400549

Pre-removal Operation	Post-installation Operation
• Under Cover Removal (Refer to GROUP 51, Front Bumper P.51-3). • Engine Coolant Draining (Refer to P.14-15). • Intake Air Duct Removal (Refer to GROUP 15, Air Cleaner P.15-6). • Air Hose E, Air Pipe C and Air Hose D Removal (Refer to GROUP 15, Intercooler P.15-7).	• Air Hose E, Air Pipe C and Air Hose D Installation (Refer to GROUP 15, Intercooler P.15-7). • Intake Air Duct Installation (Refer to GROUP 15, Air Cleaner P.15-6). • Engine Coolant Refilling (Refer to P.14-15). • Under Cover Installation (Refer to GROUP 51, Front Bumper P.51-3).



Removal steps

1. Accelerator cable connection <LH drive vehicles>
2. Control wiring harness connection
3. Vacuum hose and pipe assembly

<<A>> >>C<< 4. Radiator upper hose connection

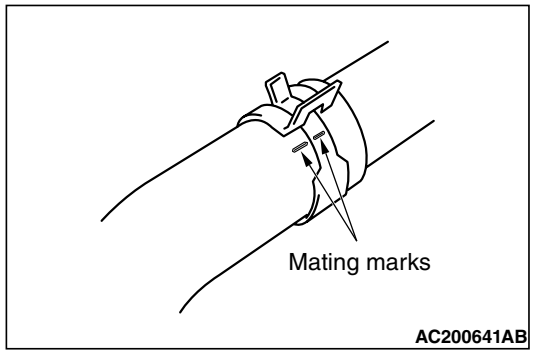
Removal steps (Continued)

>>B<< 5. Water outlet fitting

>>A<< 6. Thermostat

REMOVAL SERVICE POINT

<<A>> RADIATOR UPPER HOSE DISCONNECTION



Make mating marks on the radiator hose and the hose clamp. Disconnect the radiator hose.

INSTALLATION SERVICE POINTS

>>A<< THERMOSTAT INSTALLATION

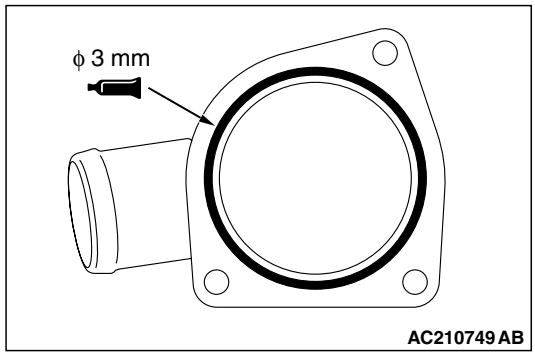
⚠ CAUTION

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.

Install the thermostat being careful not to fold over or scratch the rubber ring.

>>B<< WATER OUTLET FITTING INSTALLATION

1. Remove sealant from the water outlet fitting and thermostat case surfaces.



2. Apply a bead of the sealant to the thermostat case mating surface of the water outlet fitting as shown.

   Specified sealant: MITSUBISHI GENUINE PART MD970389 or equivalent

   NOTE: Install the water outlet fitting within 15 minutes after applying liquid gasket.

3. Install the water outlet fitting to the thermostat case.

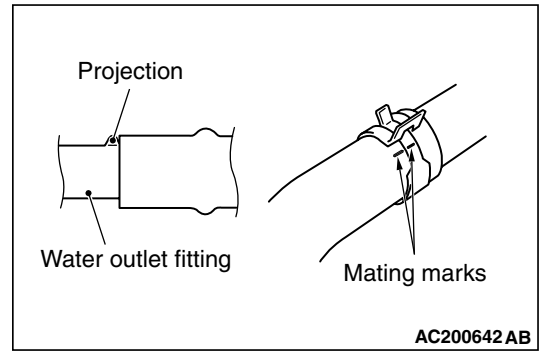
⚠ CAUTION

Then wait at least one hour. Never start the engine or let engine oil or coolant touch the adhesion surface during that time.

4. Tighten the water outlet fitting mounting bolts to the specified torque.

   Tightening torque: 10 ± 1 N·m

>>C<< RADIATOR UPPER HOSE CONNECTION

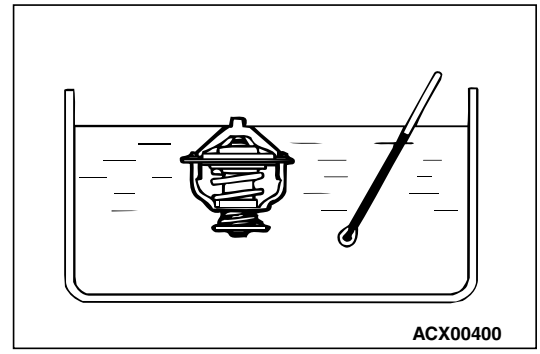


1. Insert each hose as far as the projection of the water outlet fitting.
2. Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

INSPECTION

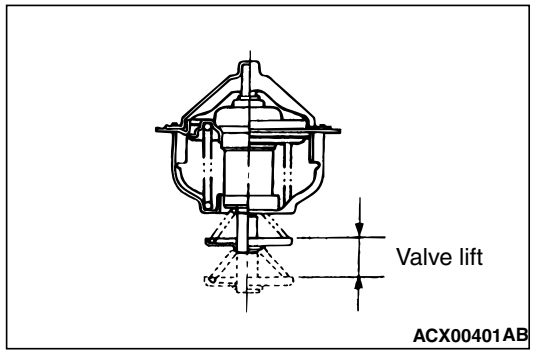
M1141002500494

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: 80 ± 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.

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

Standard value:
Full-opening temperature: 93°C
Amount of valve lift: 9.5 mm or more

WATER PUMP

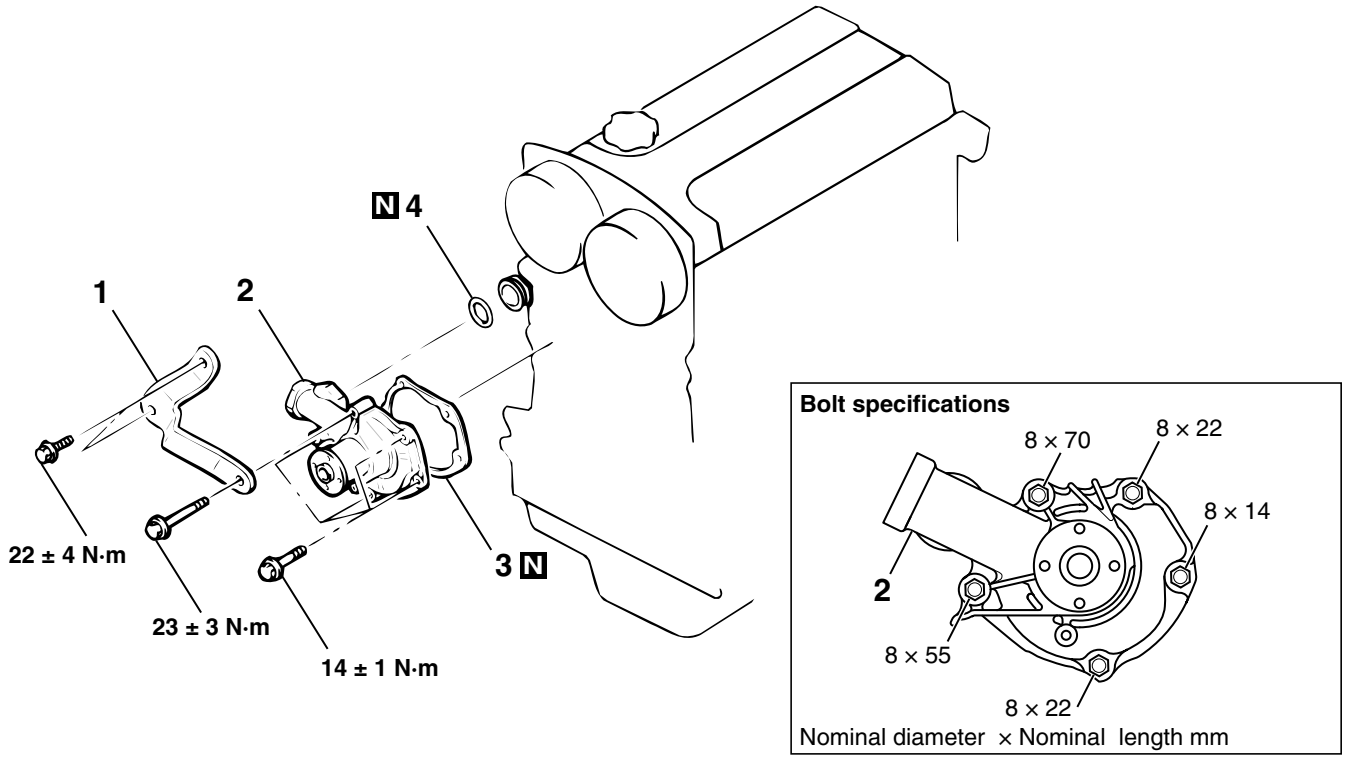
REMOVAL AND INSTALLATION

M1141002700595

⚠ CAUTION

If the vehicle is equipped with the Brembo™ disc brake, during maintenance, take care not to contact the caliper with tools or parts, because the caliper paint will be scratched.

Pre-removal Operation	Post-installation Operation
• Under Cover Removal (Refer to GROUP 51, Front Bumper P.51-3). • Engine Coolant Draining (Refer to P.14-15). • Timing Belt Tensioner Adjuster Removal (Refer to GROUP 11A, Timing Belt P.11A-34).	• Timing Tensioner Adjuster Belt Installation (Refer to GROUP 11A, Timing Belt P.11A-34). • Engine Coolant Refilling (Refer to P.14-15). • Under Cover Installation (Refer to GROUP 51, Front Bumper P.51-3).



AC202463 AC

Removal steps

1. Alternator brace
2. Water pump

Removal steps (Continued)

3. Water pump gasket

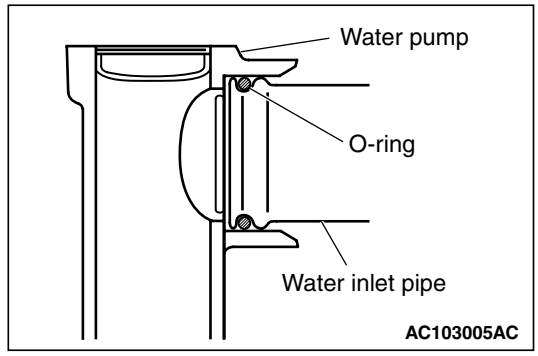
>>A<< 4. O-ring

INSTALLATION SERVICE POINT

>>A<< O-RING INSTALLATION

⚠ CAUTION

Do not let the O-ring get contaminated with grease or engine oil.



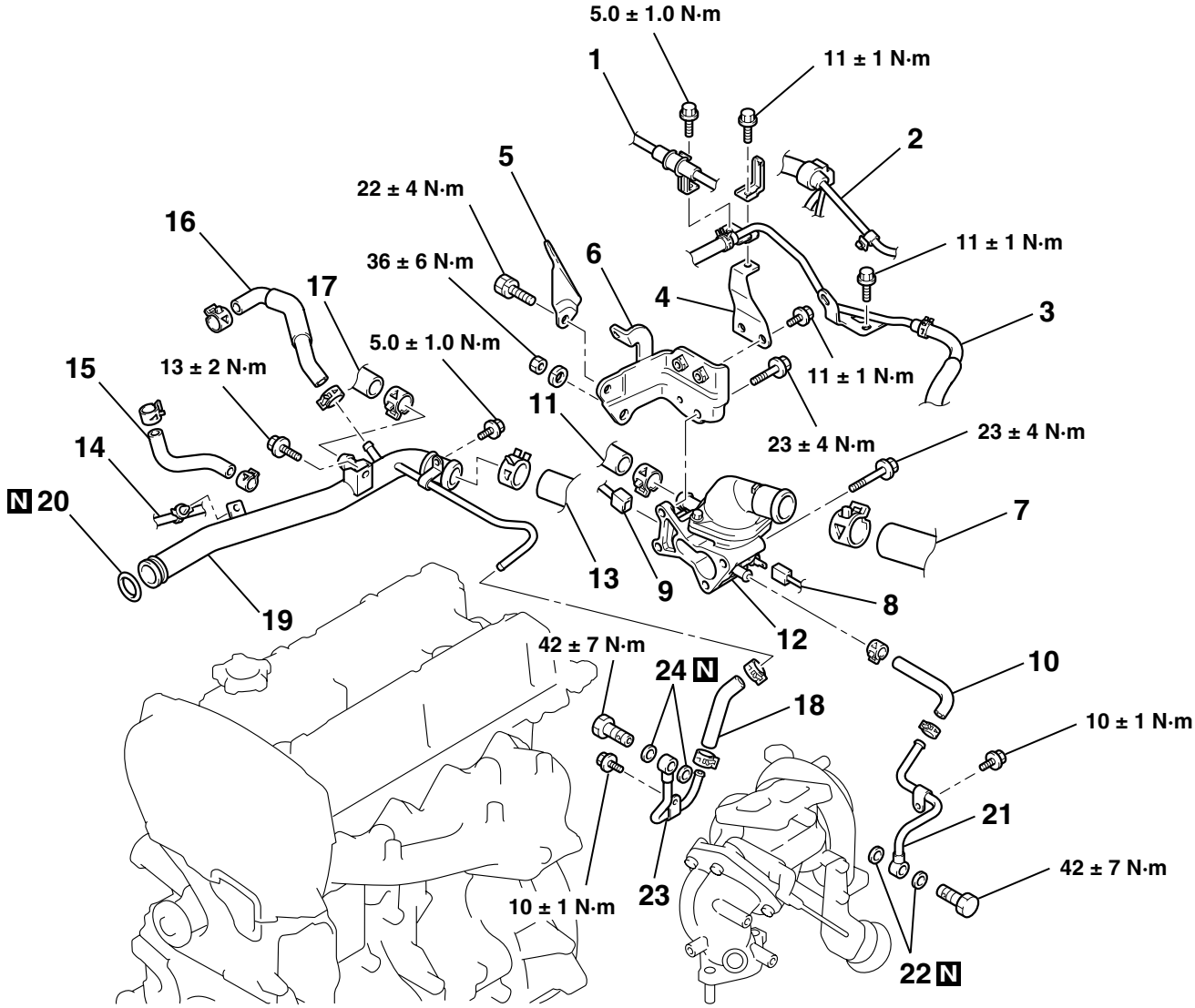
Fit an O-ring into the O-ring groove located at the end of the water inlet pipe and apply water to the O-ring or the inside of the mounting surface of the water pump for insertion.

WATER HOSE AND WATER PIPE

REMOVAL AND INSTALLATION

M1141003300620

Pre-removal Operation	Post-installation Operation
• Under Cover Removal (Refer to GROUP 51, Front Bumper P.51-3). • Engine Coolant Draining (Refer to P.14-15). • Battery and Battery Tray Removal • Air Cleaner Assembly Removal (Refer to GROUP 15, Air Cleaner P.15-6). • Turbocharger Bypass Valve Assembly, Air By-pass Hose, Air Hose E, Air Pipe C and Air Hose D Removal (Refer to GROUP 15, Intercooler P.15-7).	• Turbocharger Bypass Valve Assembly, Air By-pass Hose, Air Hose E, Air Pipe C and Air Hose D Installation (Refer to GROUP 15, Intercooler P.15-7). • Air Cleaner Assembly Installation (Refer to GROUP 15, Air Cleaner P.15-6). • Battery and Battery Tray Installation • Engine Coolant Refilling (Refer to P.14-15). • Under Cover Installation (Refer to GROUP 51, Front Bumper P.51-3).



AC210740 AB

Removal steps

1. Accelerator cable connection <LH drive vehicles>
2. Control wiring harness connection
3. Vacuum hose and pipe assembly
4. Vacuum pipe bracket

<<A>> >>C<<

Removal steps (Continued)

5. Engine hanger
6. Bracket
7. Radiator upper hose connection
8. Engine coolant temperature gauge unit connector

Removal steps (Continued)

9. Engine coolant temperature sensor connector
10. Water feed hose
11. Heater hose connection

>>D<< 12. Water outlet fitting and thermostat case assembly

<<A>> >>C<< 13. Radiator lower hose connection

14. Detonation sensor connection
15. Water feed hose
16. Water return hose
17. Heater hose connection
18. Water return hose

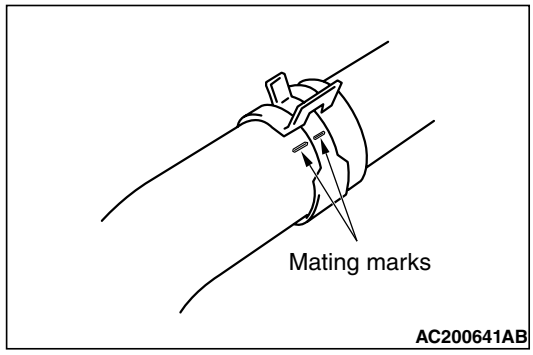
>>B<< 19. Water inlet pipe

>>A<< 20. O-ring

21. Turbocharger water feed pipe
22. Gaskets
    - Turbocharger and exhaust fitting assembly (Refer to GROUP 15, Exhaust Manifold and Turbocharger P.15-16).
23. Turbocharger water return pipe
24. Gaskets

REMOVAL SERVICE POINT

<<A>> RADIATOR UPPER HOSE/RADIATOR LOWER HOSE DISCONNECTION

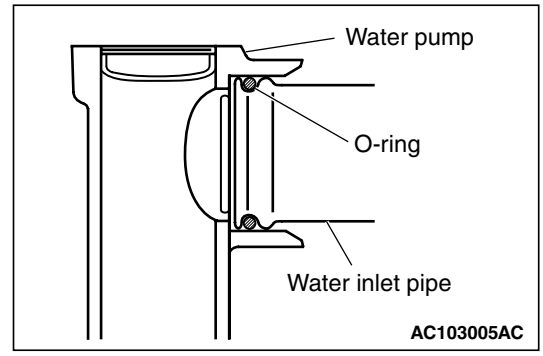


Make mating marks on the radiator hose and the hose clamp. Disconnect the radiator hose.

INSTALLATION SERVICE POINTS

>>A<< O-RING INSTALLATION

⚠ CAUTION
Do not let the O-ring get contaminated with grease or engine oil.



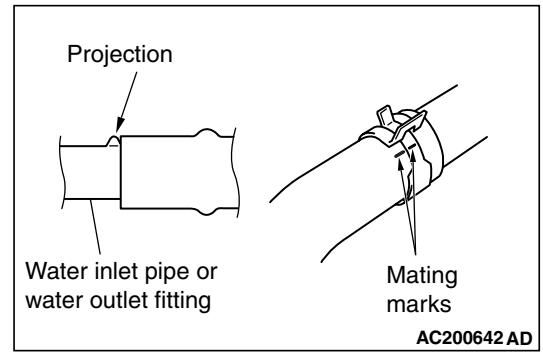
Fit an O-ring into the O-ring groove located at the end of the water inlet pipe and apply water to the O-ring or the inside of the mounting surface of the water pump for insertion.

>>B<< WATER INLET PIPE INSTALLATION

Temporarily install the water inlet pipe. After installing the water outlet fitting and thermostat case assembly, tighten the mounting bolt of the water inlet pipe to the specified torque.

Tightening torque
M6 bolt: 5.0 ± 1.0 N·m
M8 bolt: 13 ± 2 N·m

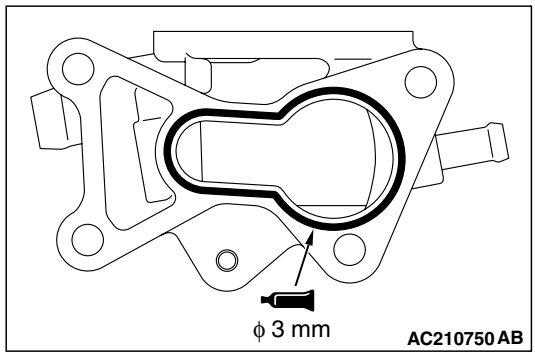
>>C<< RADIATOR LOWER HOSE/RADIATOR UPPER HOSE CONNECTION



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

>>D<< WATER OUTLET FITTING AND THERMOSTAT CASE ASSEMBLY INSTALLATION

1. Remove sealant from the thermostat case and cylinder head surfaces.



2. Apply a bead of the sealant to the cylinder head mating surface of the thermostat case as shown.

   Specified sealant: MITSUBISHI GENUINE PART MD970389 or equivalent

   NOTE: Install the water outlet fitting and thermostat case assembly within 15 minutes after applying liquid gasket.

3. Install the water outlet fitting and thermostat case assembly to the cylinder head.

⚠ CAUTION

Then wait at least one hour. Never start the engine or let engine oil or coolant touch the adhesion surface during that time.

4. Tighten the thermostat case mounting bolts to the specified torque.

   Tightening torque: 23 ± 4 N·m

INSPECTION

M1141003400360

WATER PIPE AND HOSE CHECK

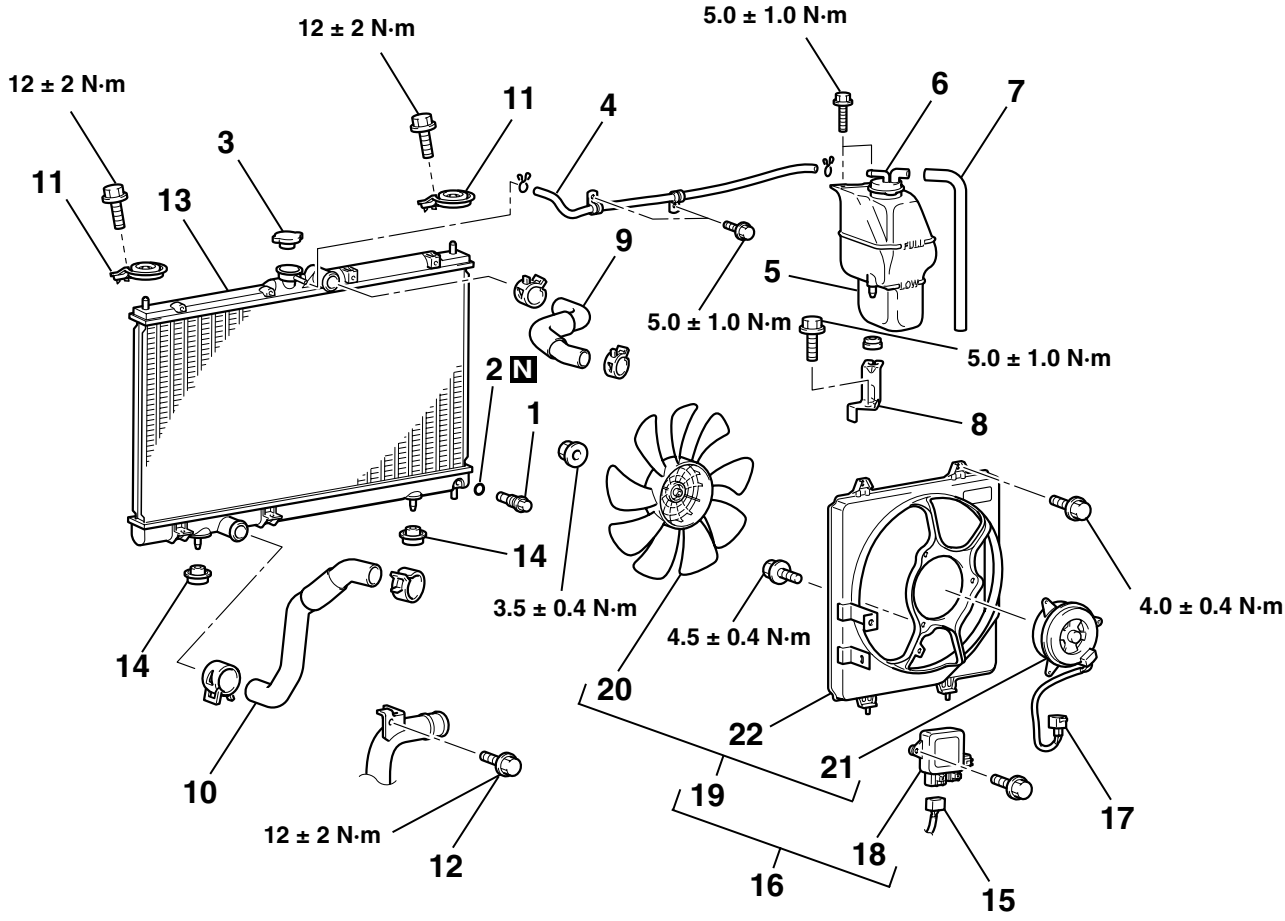
Check the water pipe and hose for cracks, damage and clogs. Replace them if necessary.

RADIATOR

REMOVAL AND INSTALLATION

M1141001500606

Pre-removal Operation	Post-installation Operation
• Under Cover Removal (Refer to GROUP 51, Front Bumper P.51-3). • Engine Coolant Draining (Refer to P.14-15). • Battery and Battery Tray Removal • Air Cleaner Assembly Removal (Refer to GROUP 15, Air Cleaner P.15-6). • Air Hose E, Air Pipe C and Air Hose D Removal (Refer to GROUP 15, Intercooler P.15-7).	• Air Hose E, Air Pipe C and Air Hose D Installation (Refer to GROUP 15, Intercooler P.15-7). • Air Cleaner Assembly Installation (Refer to GROUP 15, Air Cleaner P.15-6). • Battery and Battery Tray Installation • Engine Coolant Refilling (Refer to P.14-15). • Under Cover Installation (Refer to GROUP 51, Front Bumper P.51-3).



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Radiator removal steps

1. Radiator drain plug
2. O-ring
3. Radiator cap
4. Reserve tank hose
5. Reserve tank
6. Reserve tank cap
7. Reserve tank hose
8. Reserve tank bracket

<<A>> >>A<< 9. Radiator upper hose

<<A>> >>A<< 10. Radiator lower hose

11. Upper insulator

<<B>> 12. Air pipe B mounting bolt

13. Radiator assembly
14. Lower insulator

Radiator removal steps

15. Fan controller connector
16. Fan controller, cooling fan motor, fan and shroud assembly

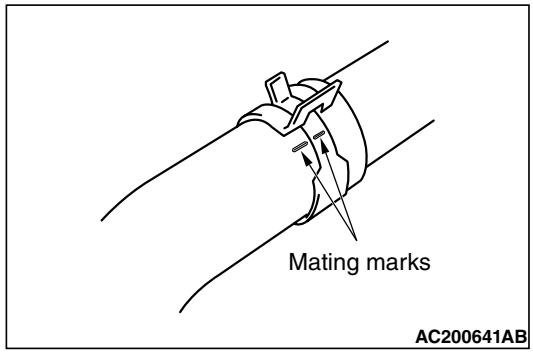
Fan controller and cooling fan motor removal steps

<<B>> 12. Air pipe B mounting bolt

15. Fan controller connector
17. Cooling fan motor connector
18. Fan controller
19. Cooling fan motor, fan and shroud assembly
20. Cooling fan
21. Cooling fan motor
22. Cooling fan shroud

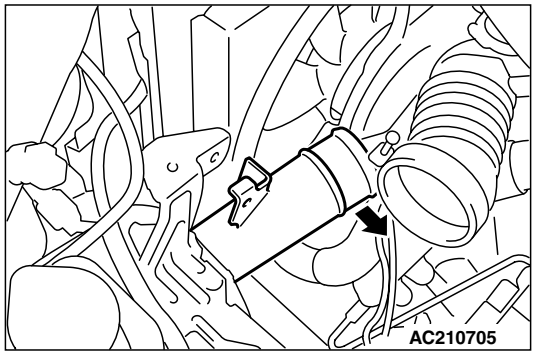
REMOVAL SERVICE POINTS

<<A>> RADIATOR UPPER HOSE/RADIATOR LOWER HOSE DISCONNECTION



Make mating marks on the radiator hose and the hose clamp. Disconnect the radiator hose.

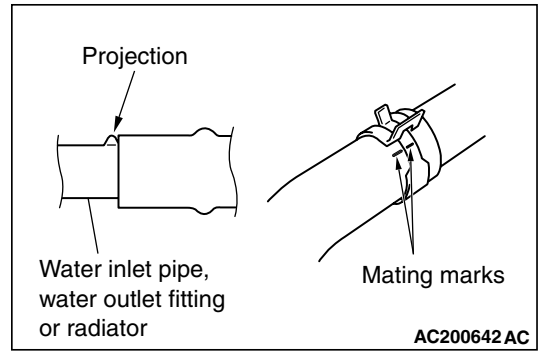
<<B>> AIR PIPE B MOUNTING BOLT REMOVAL



After removing the bolt, position air pipe B out of the way so that the pipe does not interfere with the radiator assembly or the cooling fan motor, the fan and shroud assembly.

INSTALLATION SERVICE POINT

>>A<< RADIATOR LOWER HOSE/RADIATOR UPPER HOSE CONNECTION



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

NOTES