

GROUP 14

ENGINE COOLING

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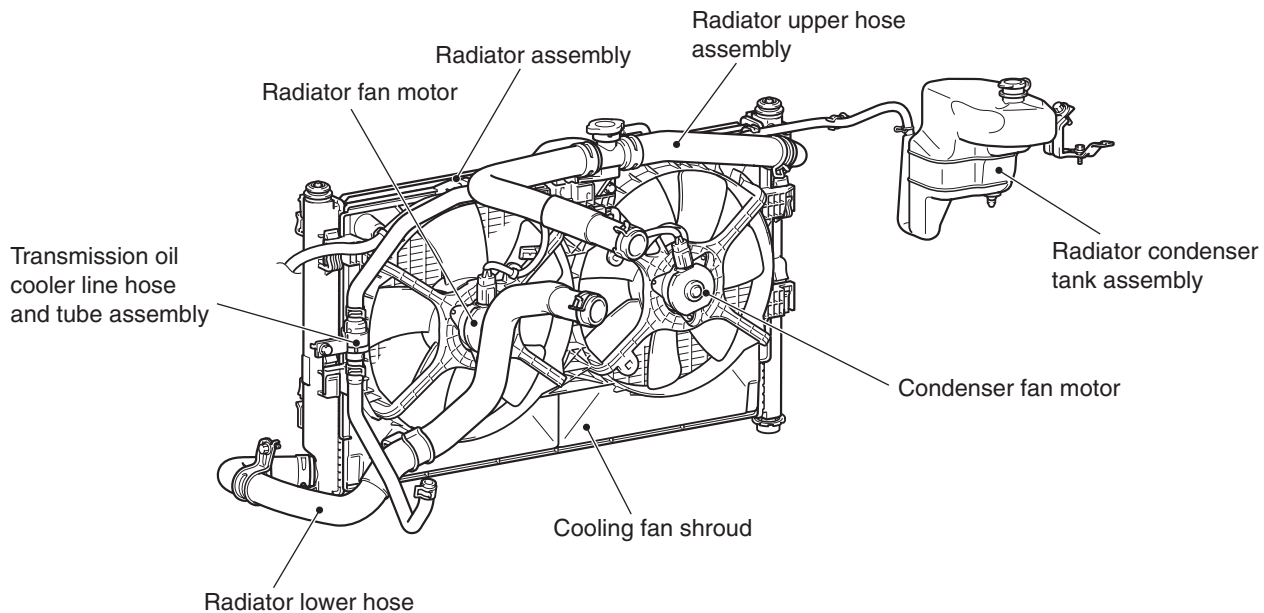
GENERAL INFORMATION

M1141000101028

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 coolant temperature exceeds the prescribed temper-

ature, 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 impeller type and is driven by the drive belt from the crankshaft. The radiator is the corrugated fin, cross flow type.

CONSTRUCTION DIAGRAM



AC608448AB

SERVICE SPECIFICATIONS

M1141000300944

Item		Standard value	Limit
Valve opening pressure of radiator cap kPa (psi)		93 –123 (14 –18)	Minimum 83 (12)
Thermostat	Valve opening temperature of thermostat °C (°F)	82 ±1.5 (180 ±1)	–
	Full-opening temperature of thermostat °C (°F)	95 (203)	–
	Valve lift mm (in)	8.5 (0.33) or more	–

COOLANT

M1141000400877

Item	Quantity dm ³ (qt)
Long life antifreeze coolant or an equivalent	7.0 (7.4)

SEALANT

M114100500885

Item	Specified sealant
Engine coolant temperature sensor	LOCTITE 262, Three bond 1324 or equivalent

ENGINE COOLING DIAGNOSIS**INTRODUCTION**

M1141005300400

The system cools the engine so that it does not over-heat and maintains the engine at an optimum temperature. The system components are the radiator, water pump, thermostat, condenser fan assembly. Possible faults include low coolant, contamination, belt loosening and component damage.

TROUBLESHOOTING STRATEGY

M1141005200395

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure to find most of the engine cooling faults.

1. Gather information from the customer.

2. Verify that the condition described by the customer exists.
3. Find and repair the malfunction by following the SYMPTOM CHART.
4. Verify that the malfunction is eliminated.

SYMPTOM CHART

M1141005600542

Symptom	Inspection procedure	Reference page
Coolant leak	1	P.14-4
Engine overheating	2	P.14-5
Radiator fan and condenser fan do not operate	3	P.14-6

SYMPTOM PROCEDURES

Inspection Procedure 1: Coolant Leak

DIAGNOSIS

STEP 1. Check for coolant leaks.

⚠ WARNING

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

⚠ CAUTION

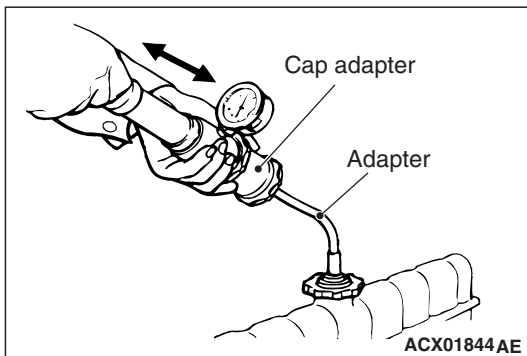
- Be sure to completely clean away any moisture from the places checked.
- When the tester is removed, be careful not to spill any coolant.
- When installing and removing the tester and when testing, be careful not to deform the filler neck of the radiator.

Check that the coolant level is up to the filler neck. Install a radiator tester and apply 160 kPa (23 psi) pressure, and then check for leakage from the radiator hose or connections.

Q: Is leakage present from the radiator hose or connections?

YES : Repair or replace the appropriate part, then go to Step 2.

NO : There is no action to be taken.



STEP 2. Retest the system.

Q: It there still coolant leakage?

YES : Return to Step 1.

NO : The procedure is complete.

Inspection Procedure 2: Engine Overheating

DIAGNOSIS

STEP 1. Remove the radiator cap and check for coolant contamination.

Q: Is the coolant contaminated with rust and oil?

YES : Replace it. Refer to [P.14-13](#).

NO : There is no action to be taken. Go to Step 2.

STEP 2. Check the radiator cap valve opening pressure.

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 gauge indicator stops moving.

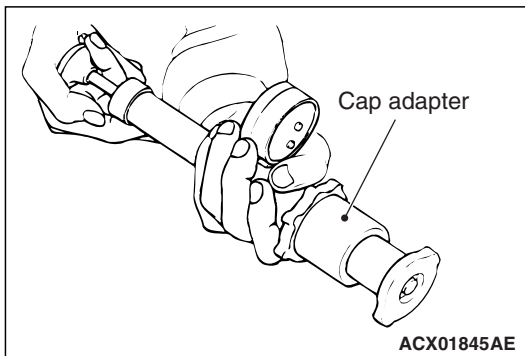
Minimum limit: 83 kPa (12 psi)

Standard value: 93 –123 kPa (14 –18 psi)

Q: Does the reading remain at or above the minimum limit?

YES : Go to Step 3.

NO : Replace the radiator cap. Then go to Step 5.



STEP 3. Check thermostat operation.

Refer to [P.14-20](#).

Q: Does the thermostat operate correctly?

YES : Go to Step 4.

NO : Replace the thermostat, then go to Step 5.

STEP 4. Check the drive belt for slippage or damage.

Refer to GROUP 00 –Maintenance Service, Drive Belts (Check Condition) [P.00-59](#).

Q: Is the drive belt loose or damaged?

YES : Adjust or replace the drive belt, then go to Step 5.

NO : There is no action to be taken.

STEP 5. Retest the system.

Check the engine coolant temperature.

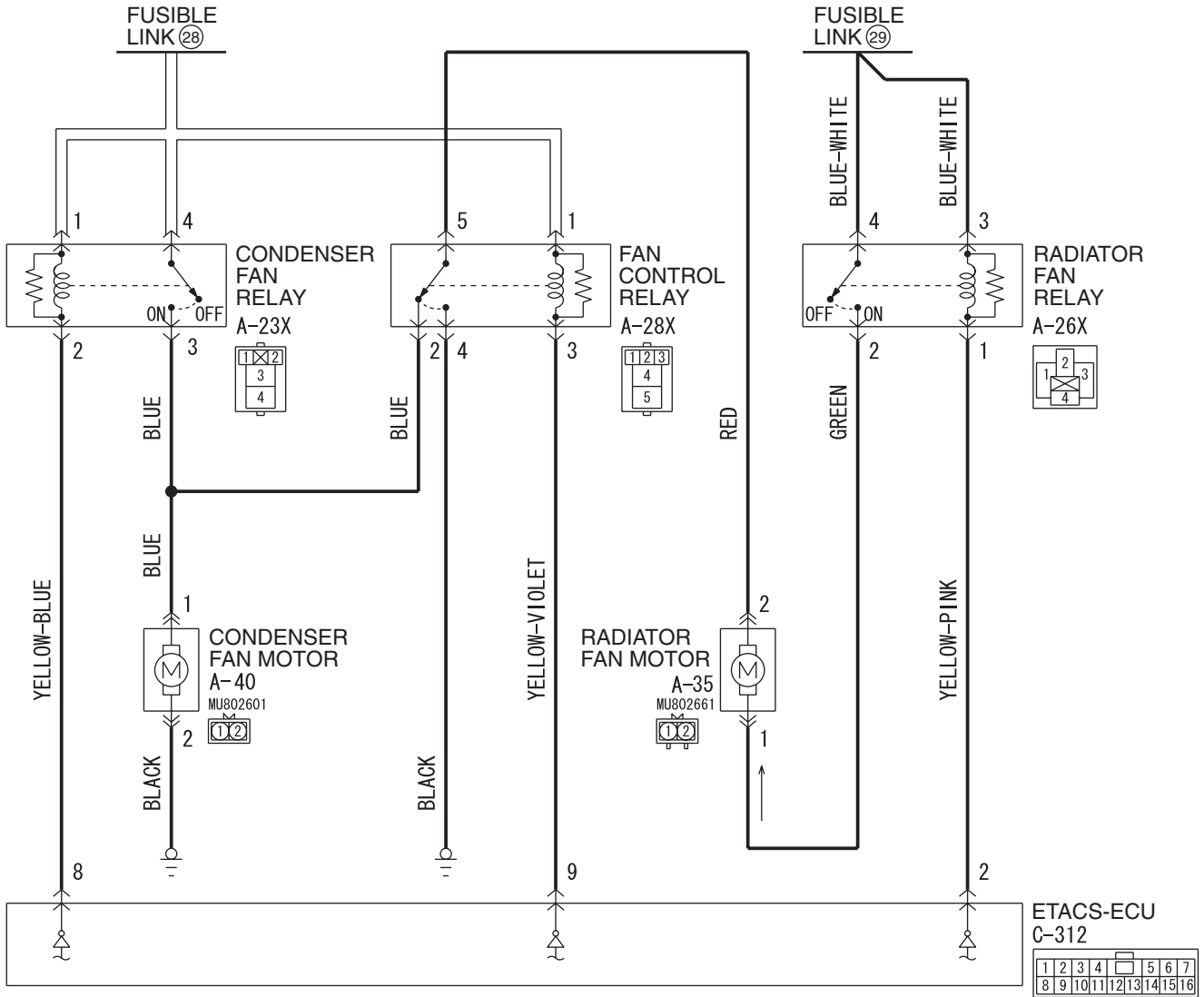
Q: Is the engine coolant temperature abnormally high?

YES : Return to Step 2.

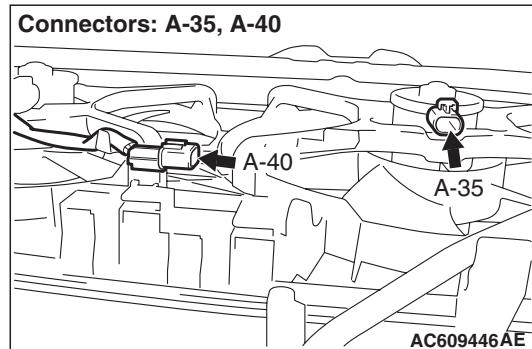
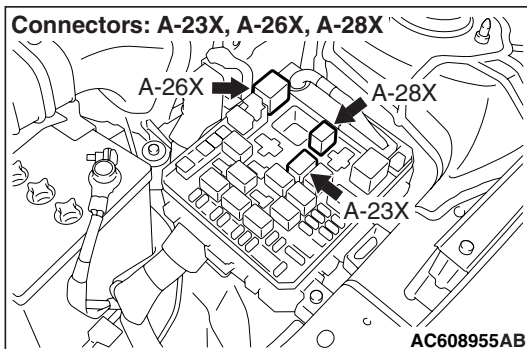
NO : The procedure is complete.

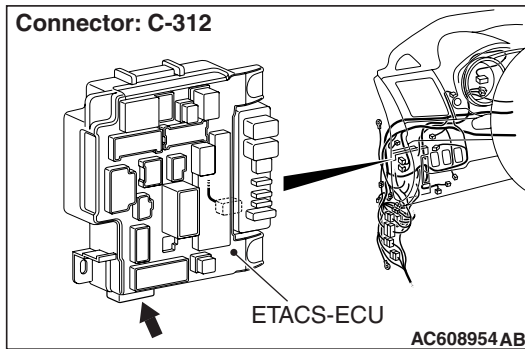
Inspection Procedure 3: Radiator Fan and Condenser Fan do not Operate

Radiator Fan and Condenser Fan Drive Circuit



W8G14M000A





CIRCUIT OPERATION

- Battery voltage is applied to the radiator fan relay (terminal 3), fan control relay (terminal 1), and condenser fan relay (terminal 1).
- ETACS-ECU (terminal 2, 8, and 9) turns ON the power transistor in the unit to apply current to the radiator fan relay, fan control relay, and condenser fan relay, thus turning ON the relays.
- When the radiator fan relay is turned ON and the fan control relay is also turned ON, battery voltage is applied from the radiator fan relay (terminal 2) to the radiator fan motor (terminal 1).

- When the condenser fan relay is turned ON, battery voltage is applied from the condenser fan relay (terminal 3) to the condenser fan motor (terminal 1).

FUNCTION

- When the radiator fan relay is turned ON, the radiator fan motor and condenser fan motor rotate at a low speed.
- When the radiator fan relay, fan control relay, and condenser fan relay are turned ON, the radiator fan motor and condenser fan motor rotate at a high speed.

TROUBLESHOOTING HINTS

- Malfunction of fusible link
- Malfunction of radiator fan relay
- Malfunction of fan control relay
- Malfunction of condenser fan relay
- Malfunction of radiator fan motor
- Malfunction of condenser fan motor
- Malfunction of relay box
- Malfunction of ETACS-ECU
- Damaged wiring harness or connector

DIAGNOSIS PROCEDURE

STEP 1. M.U.T.-III other system diagnosis codes

- Confirm whether the diagnosis codes are output from ETACS-ECU.

Q: Is the diagnosis code output?

YES : Perform the troubleshooting of ETACS-ECU (Refer to GROUP 54A –ETACS, Diagnosis Code Chart [P.54A-482](#)).

NO : Go to Step 2.

STEP 2. Check the cooling fan relay.

Refer to [P.14-15](#).

Q: Is the check result normal?

YES : Go to Step 3.

NO : Replace the relay.

STEP 3. Connectors check: A-23X condenser fan relay connector, A-26X radiator fan relay connector and A-28X fan control relay connector.

Check for the contact with terminals.

Q: Is the check result normal?

YES : Go to Step 4.

NO : Repair the defective connector.

STEP 4. Check the cooling fan motor.

Refer to [P.14-16](#).

Q: Is the check result normal?

YES : Go to Step 5.

NO : Replace the fan motor.

STEP 5. Connectors check: A-40 condenser fan motor connector and A-35 radiator fan motor connector.

Check for the contact with terminals.

Q: Is the check result normal?

YES : Go to Step 6.

NO : Repair the defective connector.

STEP 6. Measure the voltage at radiator fan relay connector A-26X.

(1) Remove the radiator fan relay, and measure at relay box side.

(2) Measure the voltage between terminal 3 and earth.
Measure the voltage between terminal 4 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 8.

NO : Go to Step 7.

STEP 7. Check the harness between radiator fan relay connector A-26X (terminal 3, 4) and fusible link number 29.

- Check the power supply line for short or open circuit.

Q: Is the check result normal?

YES : An intermittent malfunction is suspected (Refer to GROUP 00 –How to use troubleshooting, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Repair the wiring harness.

STEP 8. Measure the voltage at fan control relay connector A-28X.

(1) Remove the fan control relay, and measure at relay box side.

(2) Measure the voltage between terminal 1 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 10.

NO : Go to Step 9.

STEP 9. Check the harness between fan control relay connector A-28X (terminal 1) and fusible link number 28.

- Check the power supply line for short or open circuit.

Q: Is the check result normal?

YES : An intermittent malfunction is suspected (Refer to GROUP 00 –How to use troubleshooting, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Repair the relay box.

STEP 10. Measure the voltage at condenser fan relay connector A-23X.

- (1) Remove the condenser fan relay, and measure at relay box side.
- (2) Measure the voltage between terminal 1 and earth.
Measure the voltage between terminal 4 and earth.

OK: System voltage

Q: Is the check result normal?

YES : Go to Step 12.

NO : Go to Step 11.

STEP 11. Check the harness between condenser fan relay connector A-23X (terminal 1, 4) and fusible link number 28.

- Check the power supply line for short or open circuit.

Q: Is the check result normal?

YES : An intermittent malfunction is suspected (Refer to GROUP 00 –How to use troubleshooting, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Repair the relay box.

STEP 12. Check the harness between radiator fan relay connector A-26X (terminal 2) and radiator fan motor connector A-35 (terminal 1).

- Check the output line for short or open circuit.

Q: Is the check result normal?

YES : Go to Step 13.

NO : Repair the wiring harness.

STEP 13. Check the harness between fan control relay connector A-28X (terminal 5) and radiator fan motor connector A-35 (terminal 2).

- Check the output line for short or open circuit.

Q: Is the check result normal?

YES : Go to Step 14.

NO : Repair the wiring harness.

STEP 14. Measure the resistance at fan control relay connector A-28X.

- (1) Remove the fan control relay, and measure at relay box side.
- (2) Measure the resistance between terminal 4 and body earth.

OK: Continuity (Less than 2 ohms)

Q: Is the check result normal?

YES : Go to Step 16.

NO : Go to Step 15.

STEP 15. Check the harness between fan control relay connector A-28X (terminal 4) and earth.

- Check the earth line for open circuit.

Q: Is the check result normal?

YES : An intermittent malfunction is suspected (Refer to GROUP 00 –How to use troubleshooting, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Repair the wiring harness.

STEP 16. Check the harness between fan control relay connector A-28X (terminal 2) and condenser fan relay connector A-23X (terminal 3).

- Check the output line for short or open circuit.

Q: Is the check result normal?

YES : Go to Step 17.

NO : Repair the wiring harness.

STEP 17. Check the harness between condenser fan relay connector A-23X (terminal 3) and condenser fan motor connector A-40 (terminal 1).

- Check the output line for short or open circuit.

Q: Is the check result normal?

YES : Go to Step 18.

NO : Repair the wiring harness.

STEP 18. Measure the resistance at condenser fan motor connector A-40.

- (1) Remove the condenser fan motor connector, and measure at harness side.
- (2) Check the continuity between terminal 2 and body earth.

OK: Continuity (Less than 2 ohms)

Q: Is the check result normal?

YES : Go to Step 20.

NO : Go to Step 19.

STEP 19. Check the harness between condenser fan motor connector A-40 (terminal 2) and earth.

- Check the earth line for open circuit.

Q: Is the check result normal?

YES : An intermittent malfunction is suspected (Refer to GROUP 00 –How to use troubleshooting, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Repair the wiring harness.

STEP 20. Check the harness between ETACS-ECU connector C-312 (terminal 2) and radiator fan relay connector A-26X (terminal 1).

- Check the ETACS-ECU input line for open circuit.

Q: Is the check result normal?

YES : Go to Step 21.

NO : Repair the wiring harness.

STEP 21. Check the harness between ETACS-ECU connector C-312 (terminal 9) and fan control relay connector A-28X (terminal 3).

- Check the ETACS-ECU input line for open circuit.

Q: Is the check result normal?

YES : Go to Step 22.

NO : Repair the wiring harness.

STEP 22. Check the harness between ETACS-ECU connector C-312 (terminal 8) and condenser fan relay connector A-23X (terminal 2).

- Check the ETACS-ECU input line for open circuit.

Q: Is the check result normal?

YES : Go to Step 23.

NO : Repair the wiring harness.

STEP 23. M.U.T.-III actuator test

Conduct the MPI system actuator test to check that the fan works (Refer to GROUP 13A –Troubleshooting, Actuator Test Reference Table [P.13A-901](#)).

- Item 14: Cooling fan

Q: Is the check result normal?

YES : An intermittent malfunction is suspected (Refer to GROUP 00 –How to use troubleshooting, How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS-ECU [P.54A-564](#)). Then go to Step 24.

STEP 24. Retest the system.

Check that the radiator fan and the condenser fan work.

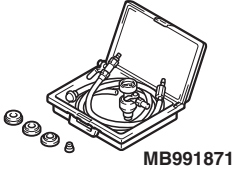
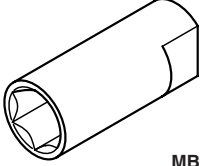
Q: Is the check result normal?

YES : The procedure is complete.

NO : Return to Step 1.

SPECIAL TOOLS

M114100600882

Tool	Tool number and name	Supersession	Application
 MB991871	MB991871 LLC changer	General service tool	Coolant refilling
 MB992042	MB992042 Water temp sensor wrench	MB992042-01	Engine coolant temperature sensor removal and installation

ON-VEHICLE SERVICE

ENGINE COOLANT LEAK CHECK

M1141001000690

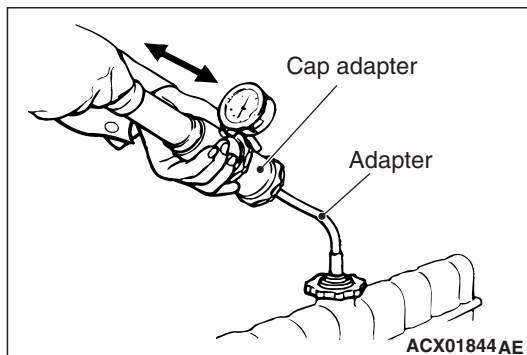
⚠ WARNING

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 (23 psi) 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 OPENING PRESSURE CHECK

M1141001300840

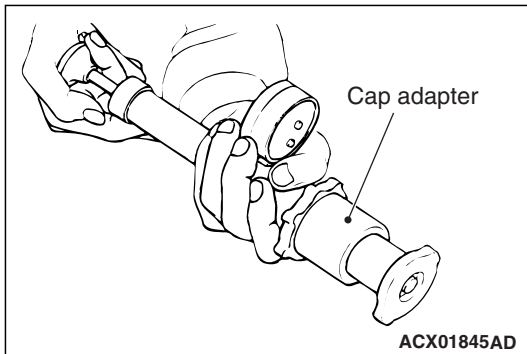
NOTE: Be sure that the cap is clean before testing. Rust or other foreign material on the cap seal will cause an improper reading.

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 (12 psi)

Standard value: 93 –123 kPa (14 –18 psi)

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



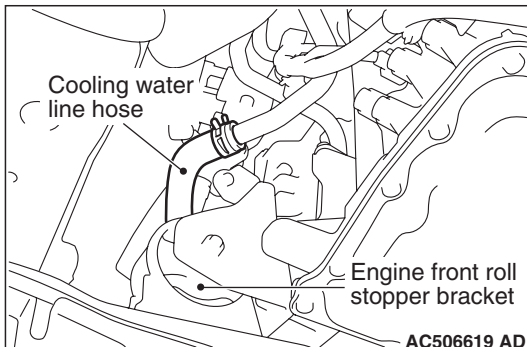
ENGINE COOLANT CHANGE

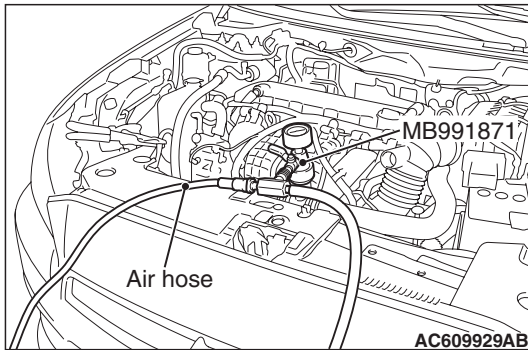
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⚠ WARNING

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.

1. Drain the water from the radiator, heater core and engine after unplugging the radiator drain plug and removing the radiator cap.
2. Disconnect the cooling water line hose and drain the coolant in the water jacket.
3. Remove the radiator condenser tank and drain the coolant.
4. Drain the coolant then clean the path of the coolant by injecting water into the radiator from the radiator cap area.
5. Install the cooling water line hose.
6. Securely tighten the drain plug of the radiator.
7. Reinstall the radiator condenser 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 aluminum components.

8. 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 MB991871 to refill the engine coolant up to the top of the radiator port. A convenient mixture is a 50% water and 50% antifreeze solution [freezing point: -31°C (-23.8 °F)].

Recommended antifreeze: Long Life Antifreeze Coolant or an equivalent

Quantity: 7.0 dm³ (7.4 quarts)

NOTE: For how to use special tool (MB991871), refer to its manufacturer's instructions.

9. Tighten the radiator cap securely.
10. Remove the radiator condenser tank cap, and add the engine coolant up to the "FULL" line.
11. Turn the A/C switch to OFF position to start the engine and warm up until the cooling fan operates.

NOTE: This step opens the thermostat fully.

12. Rev the engine several times and then stop it. Check that there are no coolant leaks.
13. Remove the radiator cap with the engine cool, and then refill the engine coolant up to the top of the radiator port.
14. Tighten the radiator cap securely.

⚠ CAUTION

Do not overfill the radiator condenser tank.

15. Remove the radiator condenser tank cap, and add the engine coolant up to the "FULL" line.

ENGINE COOLANT CONCENTRATION TEST

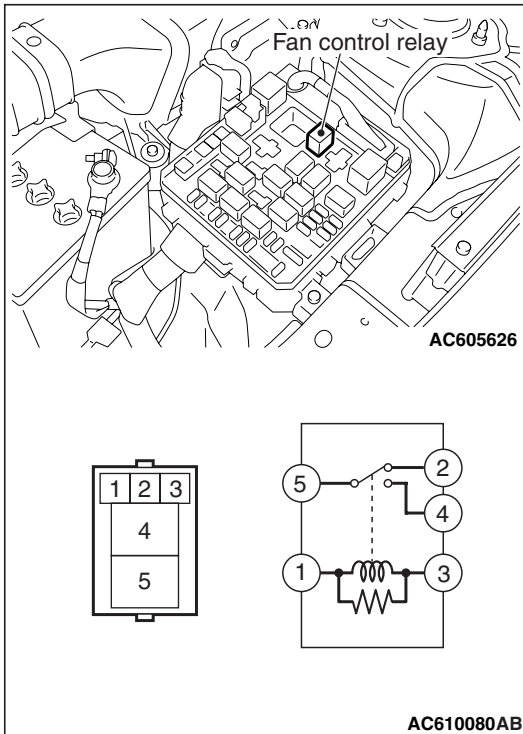
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Refer to GROUP 00, Recommended Lubricants and Lubricant Capacities Table [P.00-51](#).

COOLING FAN RELAY CONTINUITY CHECK

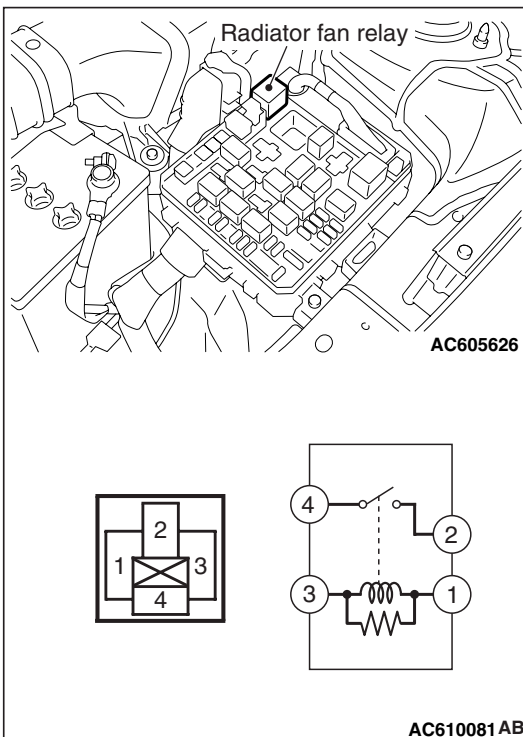
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FAN CONTROL RELAY CHECK



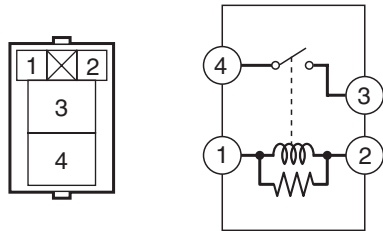
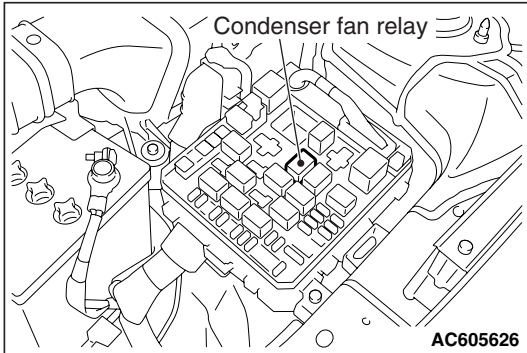
Battery voltage	Terminal No. to be connected to tester	Continuity test results
Not applied	2 –5	Continuity (Less than 2 ohms)
Not applied	4 –5	Open circuit
Connect terminal No. 1 and battery (+) terminal. Connect terminal No. 3 and battery (-) terminal.		Continuity (Less than 2 ohms)

RADIATOR FAN RELAY CHECK



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

CONDENSER FAN RELAY CHECK



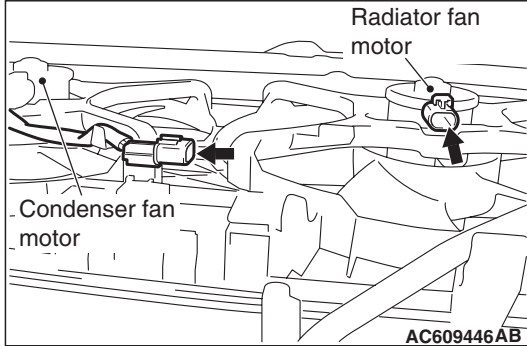
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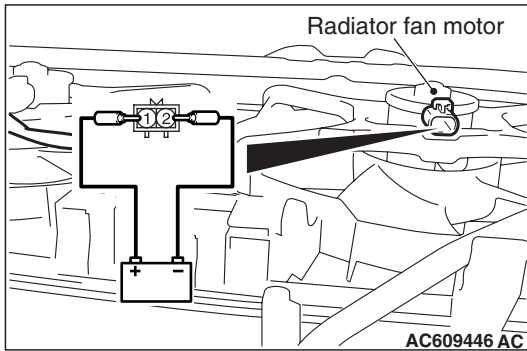
Battery voltage	Terminal No. to be connected to tester	Continuity test results
Not applied	3 -4	Open circuit
Connect terminal No.1 and battery (+) terminal. Connect terminal No.2 and battery (-) terminal.		Continuity (Less than 2 ohms)

COOLING FAN MOTOR CHECK

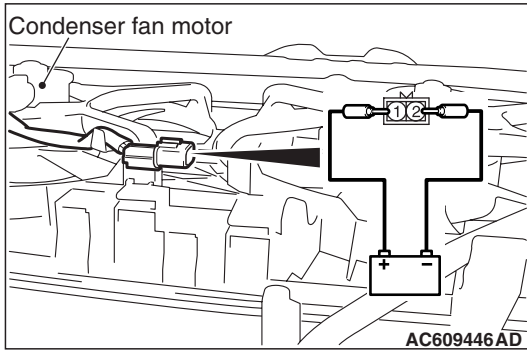
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1. Disconnect the fan motor connector.





2. Check that the fan motor runs when a positive battery terminal is connected to the fan motor-side connector terminal No.1, and terminal No.2 is grounded. Also check to see that there is no abnormal sound emitted from the fan motor at this time.
3. If the fan motor is defective, replace it (Refer to [P.14-26](#)).

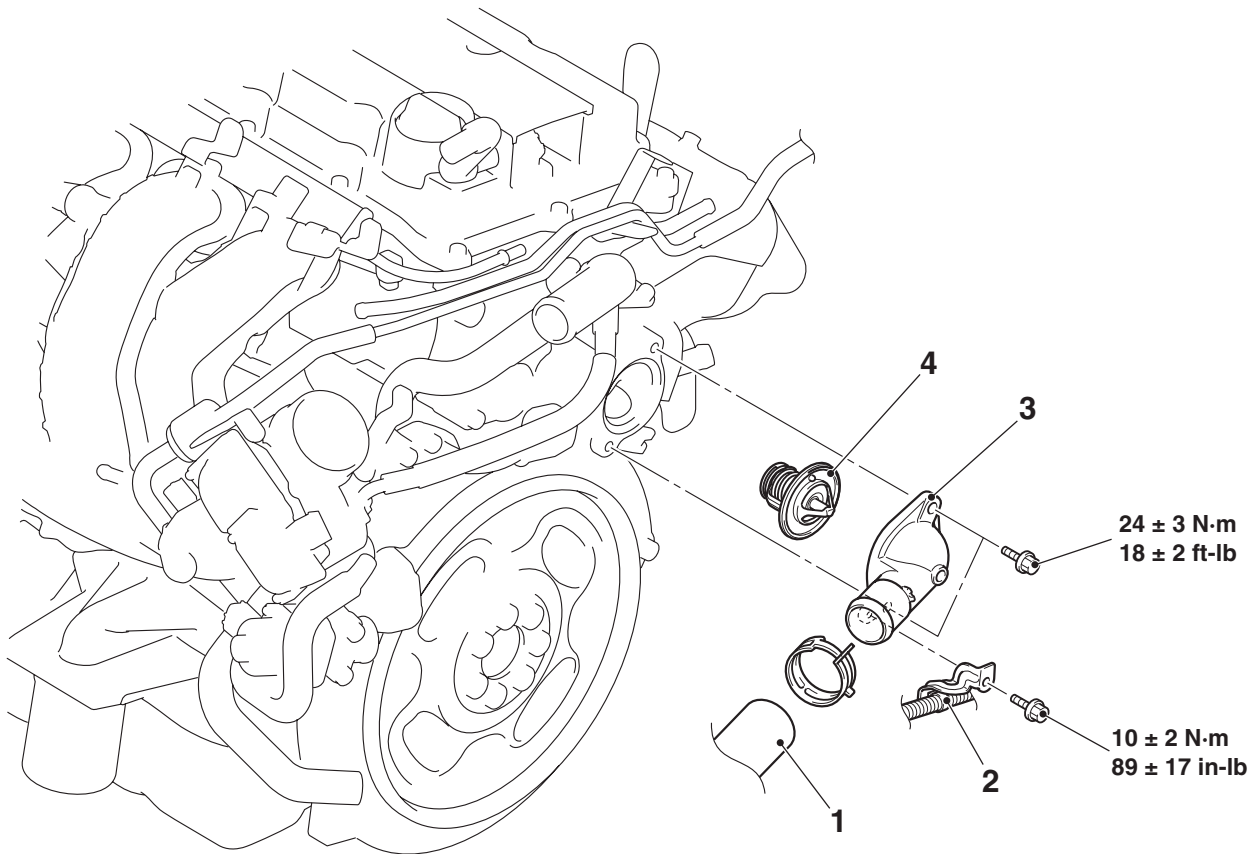


THERMOSTAT

REMOVAL AND INSTALLATION

M1141002401274

<p>Pre-removal operation</p> <ul style="list-style-type: none"> • Engine Coolant Draining (Refer to P.14-13). • Engine Upper Cover Removal (Refer to GROUP 11A – Camshaft P.11A-22). • Air Cleaner Assembly Removal (Refer to GROUP 15 –Air Cleaner P.15-4). 	<p>Post-installation operation</p> <ul style="list-style-type: none"> • Air Cleaner Assembly Installation (Refer to GROUP 15 – Air Cleaner P.15-4). • Engine Upper Cover Installation (Refer to GROUP 11A – Camshaft P.11A-22). • Engine Coolant Refilling (Refer to P.14-13).
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AC506788 AC

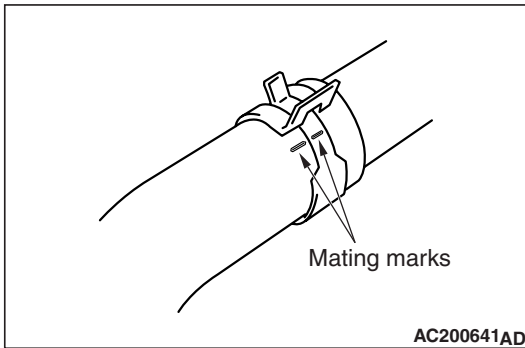
- <<A>> >>B<<
- Removal steps**
1. Radiator lower hose connection
 2. Control wiring harness clamp connection <CVT>

- >>A<<
- Removal steps (Continued)**
3. Cooling water inlet hose fitting
 4. Thermostat

REMOVAL SERVICE POINT

<<A>> RADIATOR LOWER HOSE DISCONNECTION

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



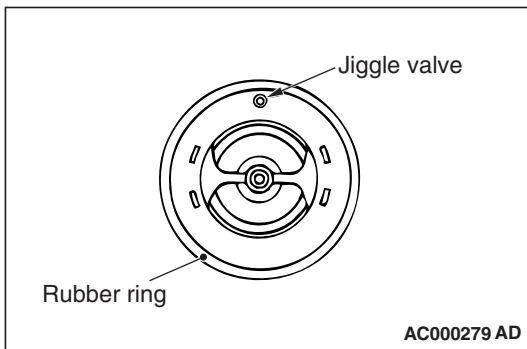
INSTALLATION SERVICE POINTS

>>A<< THERMOSTAT INSTALLATION

⚠ CAUTION

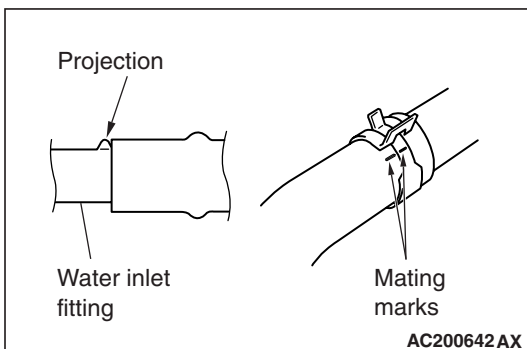
Make absolutely sure that no oil adheres to the rubber ring of the thermostat. Also do not fold or scratch the rubber ring during installation.

Install the thermostat so that the jiggle valve is facing straight up. Be careful not to fold or scratch the rubber ring.



>>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.



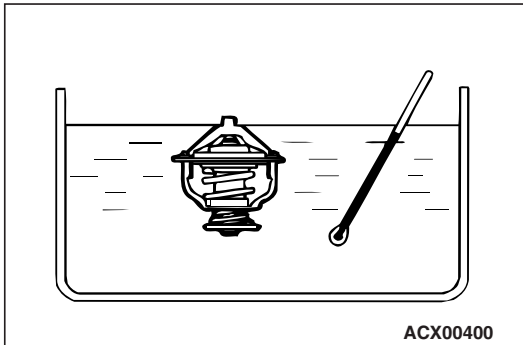
INSPECTION

M1141002500814

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: $82 \pm 1.5^\circ \text{C}$
($180 \pm 3^\circ \text{F}$)**



ACX00400

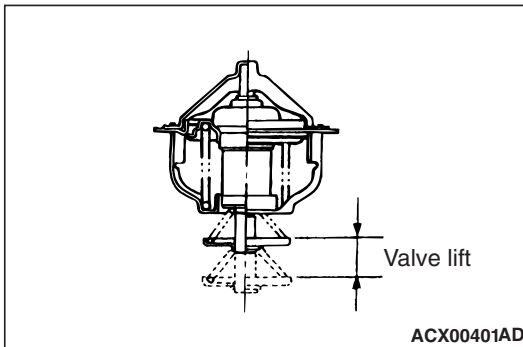
2. Check that the amount of valve lift is at the standard value when the water is at the full-opening temperature.

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: 95°C (203°F)

Amount of valve lift: 8.5 mm (0.33 inch) or more



ACX00401AD

WATER PUMP

REMOVAL AND INSTALLATION

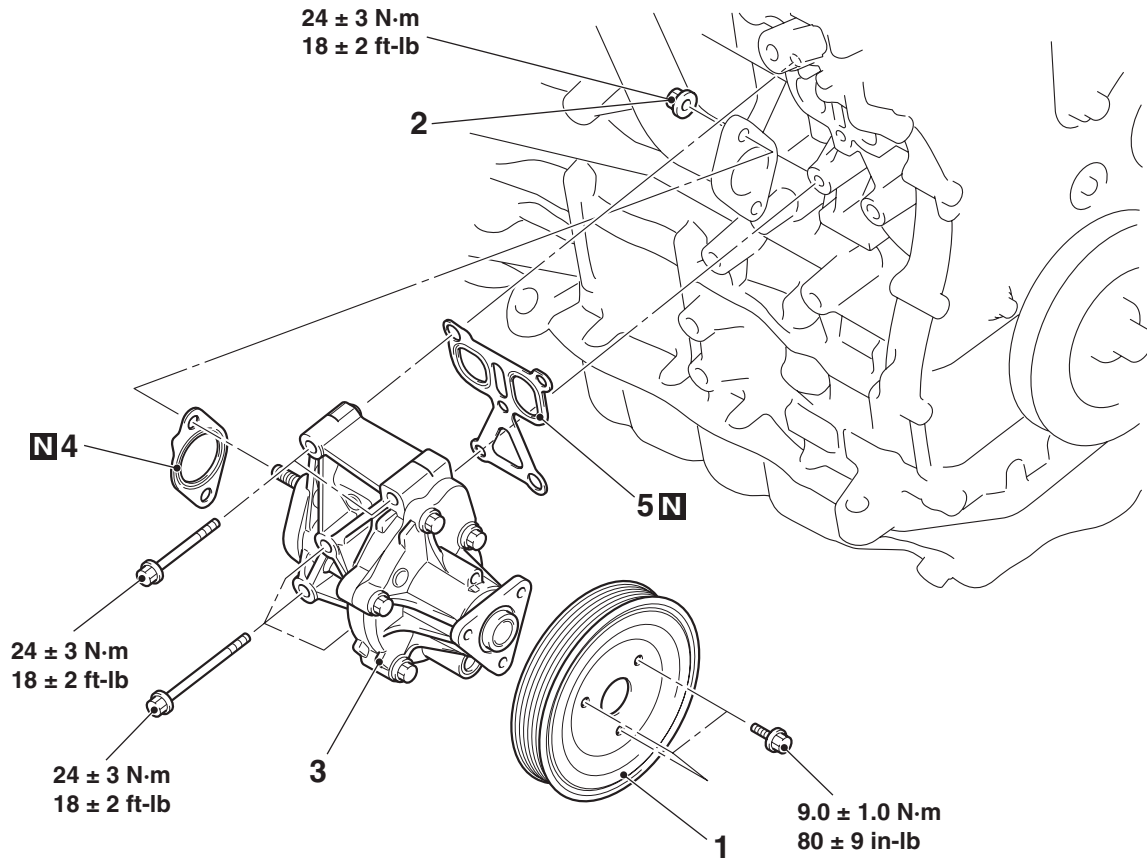
M1141002701338

Pre-removal operation

- Engine Coolant Draining (Refer to P.14-13).
- Drive Belt Removal (Refer to GROUP 11A –Crankshaft Pulley P.11A-19.)

Post-installation operation

- Drive Belt Installation (Refer to GROUP 11A –Crankshaft Pulley P.11A-19.)
- Drive Belt Tension Check (Refer to GROUP 11A –Engine Adjustment, Drive Belt Tension Check and Adjustment P.11A-9.)
- Engine Coolant Refilling (Refer to P.14-13).



AC509330AC

Removal steps

1. Water pump pulley
2. Water pump inlet pipe mounting nuts

Removal steps (Continued)

3. Water pump
4. Cooling water line gasket
5. Water pump gasket

WATER HOSE AND WATER PIPE

REMOVAL AND INSTALLATION

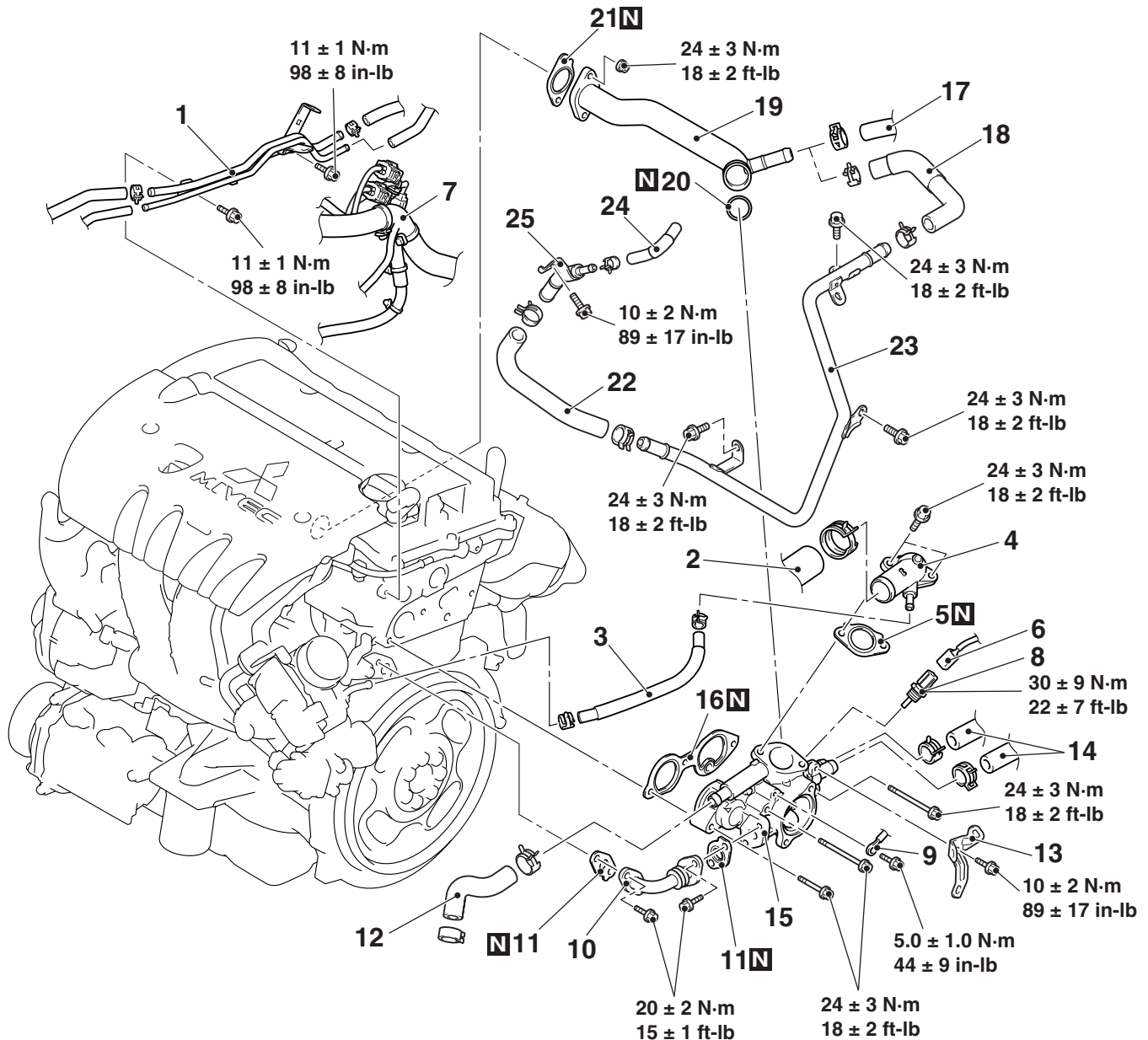
M1141003301496

Pre-removal operation

- Engine Coolant Draining (Refer to P.14-13).
- Engine Cover Removal (Refer to GROUP 11A –Camshaft P.11A-22).
- Air Cleaner Assembly Removal (Refer to GROUP 15 –Air Cleaner P.15-4.)
- Thermostat Removal (Refer to P.14-18.)

Post-installation operation

- Thermostat Installation (Refer to P.14-18.)
- Air Cleaner Assembly Installation (Refer to GROUP 15 – Air Cleaner P.15-4.)
- Engine Cover Installation (Refer to GROUP 11A –Camshaft P.11A-22.)
- Engine Coolant Refilling (Refer to P.14-13).



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Removal steps

<<A>> >>C<<

1. Vacuum pipe assembly
2. Radiator upper hose
3. Throttle body water feed hose
4. Cooling water outlet hose fitting
5. Cooling water outlet hose fitting gasket

Removal steps (Continued)

<> >>B<<

6. Engine coolant temperature sensor connector
7. Control wiring harness connection
8. Engine coolant temperature sensor

Removal steps (Continued)

9. Ground cable connection
10. EGR valve pipe <vehicles for California>
11. EGR pipe gasket <vehicles for California>
12. Cooling water line hose <vehicles for California>
13. Wiring harness bracket
14. Heater hose connection
15. Thermostat case
16. Thermostat case gasket
17. Transmission oil cooler line hose connection <CVT>
18. Cooling water line hose <M/T>
19. Water pump inlet pipe
20. O-ring
21. Cooling water line gasket
22. Cooling water line hose <M/T>
23. Cooling water line pipe <M/T>
24. Throttle body water return hose <vehicles for Federal –M/T>
25. Cooling water line pipe <vehicles for Federal –M/T>

>>A<<

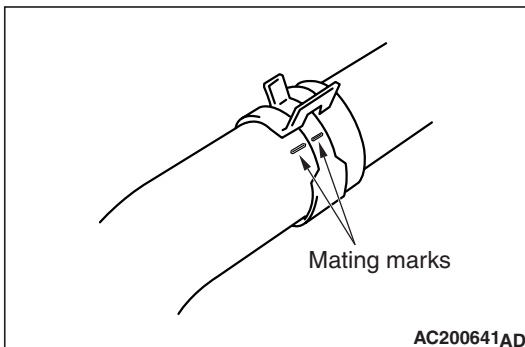
Required Special Tool:

- MB992042: Water Temp Sensor Wrench

REMOVAL SERVICE POINTS

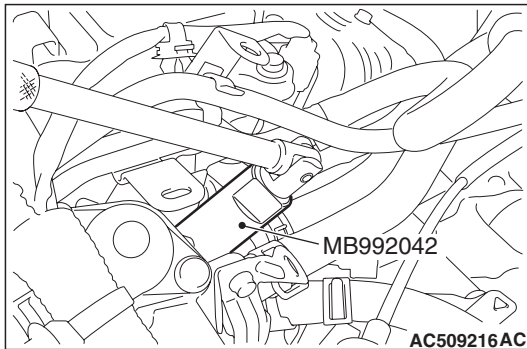
<<A>> RADIATOR UPPER HOSE DISCONNECTION

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



<> ENGINE COOLANT TEMPERATURE
SENSOR REMOVAL

Use special tool MB992042 to remove the engine coolant temperature sensor.



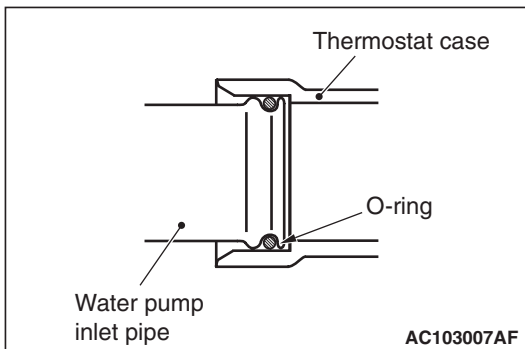
INSTALLATION SERVICE POINTS

>>A<< O-RING INSTALLATION

⚠ CAUTION

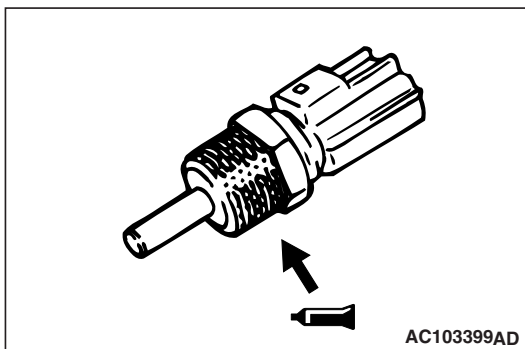
Avoid adhesion of engine oil or grease to the O-ring.

Fit the O-ring in the water pump inlet pipe groove, wet the O-ring circumference or the pipe mounting area inner wall, and then insert the O-ring.

>>B<< ENGINE COOLANT TEMPERATURE
SENSOR INSTALLATION

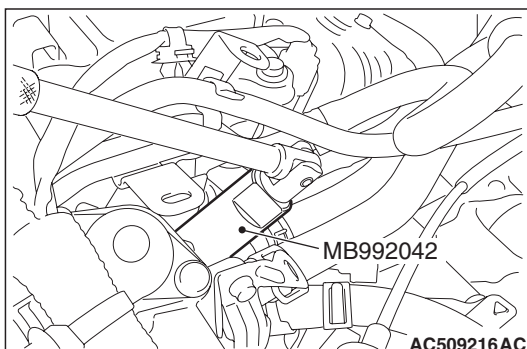
1. Apply sealant to the engine coolant temperature sensor thread.

Specified sealant: LOCTITE 262 or equivalent



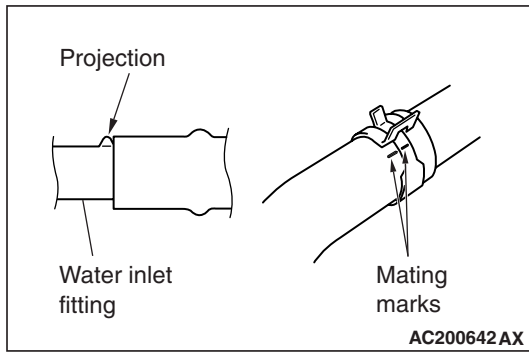
2. Use special tool MB992042 to tighten the engine coolant temperature sensor to the specified torque.

Tightening torque: 30 ± 9 N·m (22 ± 7 ft-lb)



>>C<< RADIATOR UPPER 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.



INSPECTION

M1141003400542

Water Pipe and Hose Check

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

RADIATOR

REMOVAL AND INSTALLATION

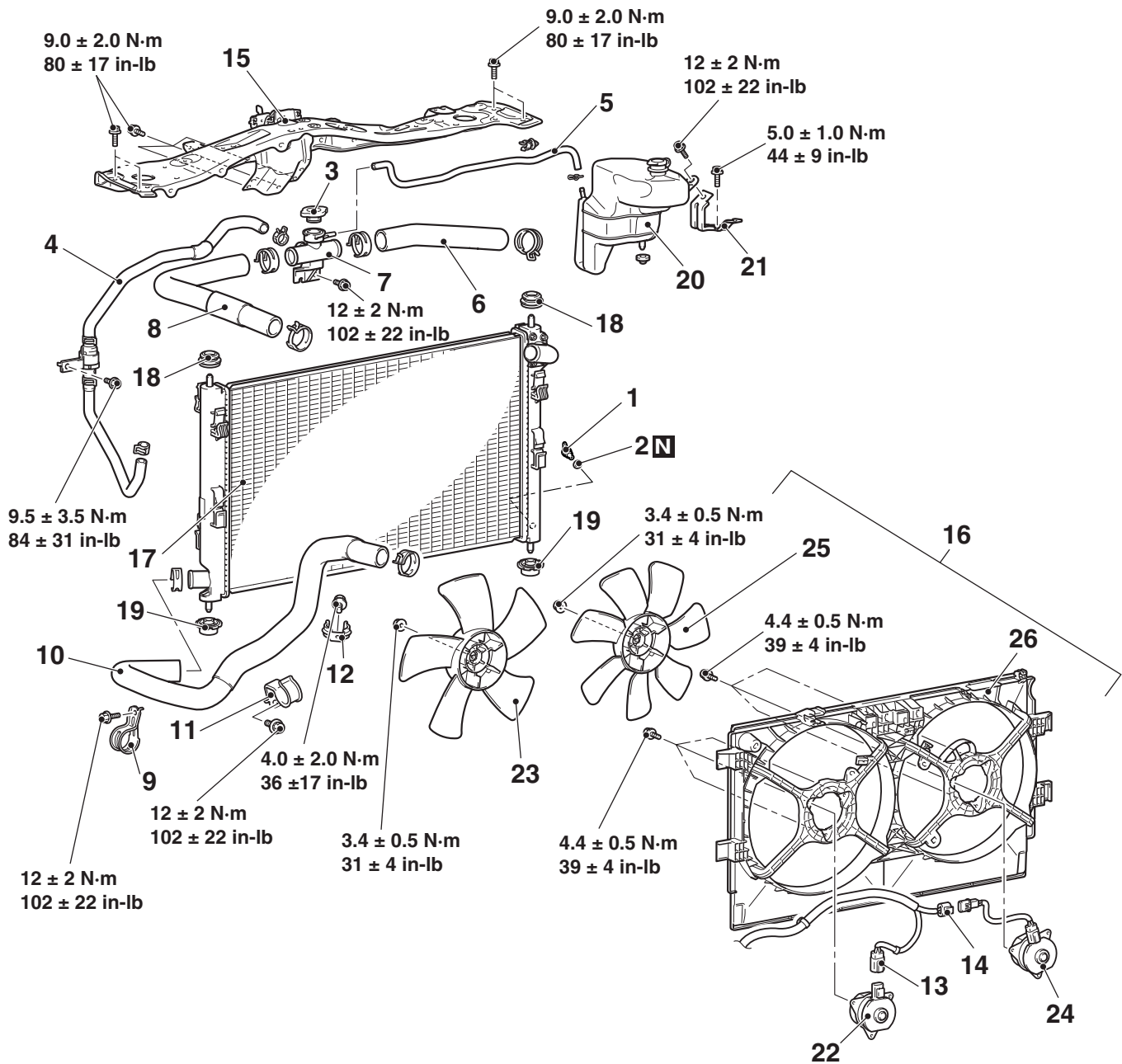
M1141001501654

Pre-removal operation

- Engine Room Under Cover Front A Removal (Refer to GROUP 51 –Under Cover P.51-16).
- Engine coolant Draining (Refer to P.14-13).
- Air Cleaner Removal (Refer to GROUP 15 - Air Cleaner P.15-4).

Post-installation operation

- Air Cleaner Installation (Refer to GROUP 15 - Air Cleaner P.15-4).
- Engine coolant Refilling and Check (Refer to P.14-13).
- Engine Room Under Cover Front A Installation (Refer to GROUP 51 –Under Cover P.51-16).



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Radiator removal steps

1. Radiator drain plug
2. O-ring
3. Radiator cap
4. Transmission fluid cooler line hose assembly <CVT>

<<A>> >>A<<

<<A>> >>A<<

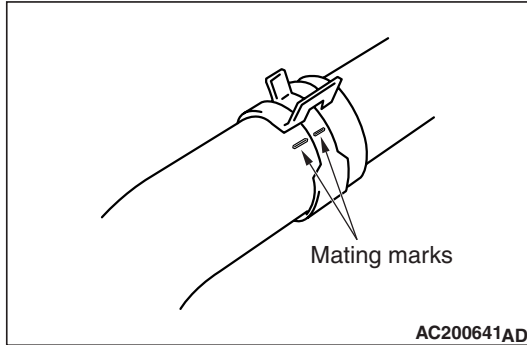
Radiator removal steps

5. Radiator condenser tank hose
6. Radiator upper hose
7. Radiator cap assembly
8. Radiator upper hose
9. Radiator hose clamp

- <<A>> >>A<<
- Radiator removal steps**
10. Radiator lower hose
 11. Radiator hose bracket <M/T>
 12. Radiator hose support <CVT>
 13. Radiator fan motor connector
 14. Condenser fan motor connector
 - Headlamp support panel cover (Refer to GROUP 51 –Front Bumper Assembly and Radiator Grille [P.51-3](#)).
 - Hood lock release cable, hood switch (Refer to GROUP 42 – Hood [P.42A-7](#)).
 - Front impact sensor (Refer to GROUP 52B –Front Impact Sensors [P.52B-361](#)).
 15. Front end upper bar assembly
 16. Fan, fan motor and fan shroud assembly
 17. Radiator assembly
 18. Support upper insulator
 19. Support lower insulator
 20. Radiator condenser tank
 21. Radiator condenser tank bracket
- Fan shroud removal steps**
5. Radiator condenser tank hose
 7. Radiator cap assembly
 13. Radiator fan motor connector
 14. Condenser fan motor connector
 - Headlamp support panel cover (Refer to GROUP 51 –Front Bumper Assembly and Radiator Grille [P.51-3](#)).
 - Hood lock release cable, hood switch (Refer to GROUP 42 – Hood [P.42A-7](#)).
 15. Front end upper bar assembly
 16. Fan, fan motor and fan shroud assembly
 22. Radiator fan motor
 23. Fan
 24. Condenser fan motor
 25. Fan
 26. Fan shroud

REMOVAL SERVICE POINT**<<A>> RADIATOR UPPER HOSE/RADIATOR LOWER HOSE REMOVAL**

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

**INSTALLATION SERVICE POINT****>>A<< RADIATOR LOWER HOSE/RADIATOR UPPER HOSE INSTALLATION**

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

