

GROUP 14

ENGINE COOLING

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GENERAL DESCRIPTION

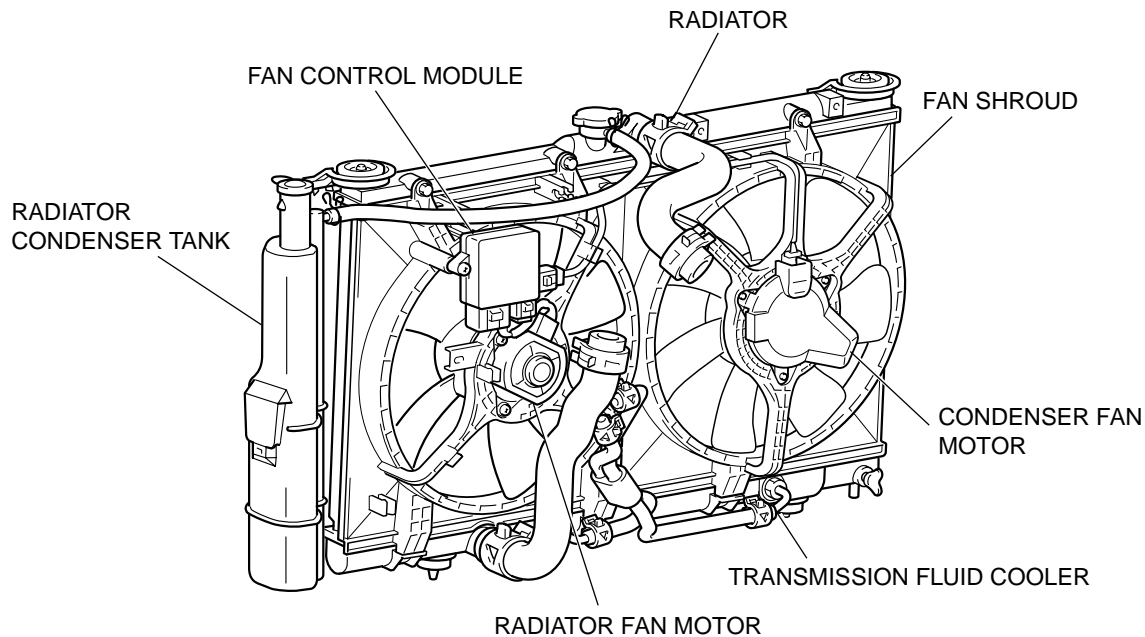
M1141000100423

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

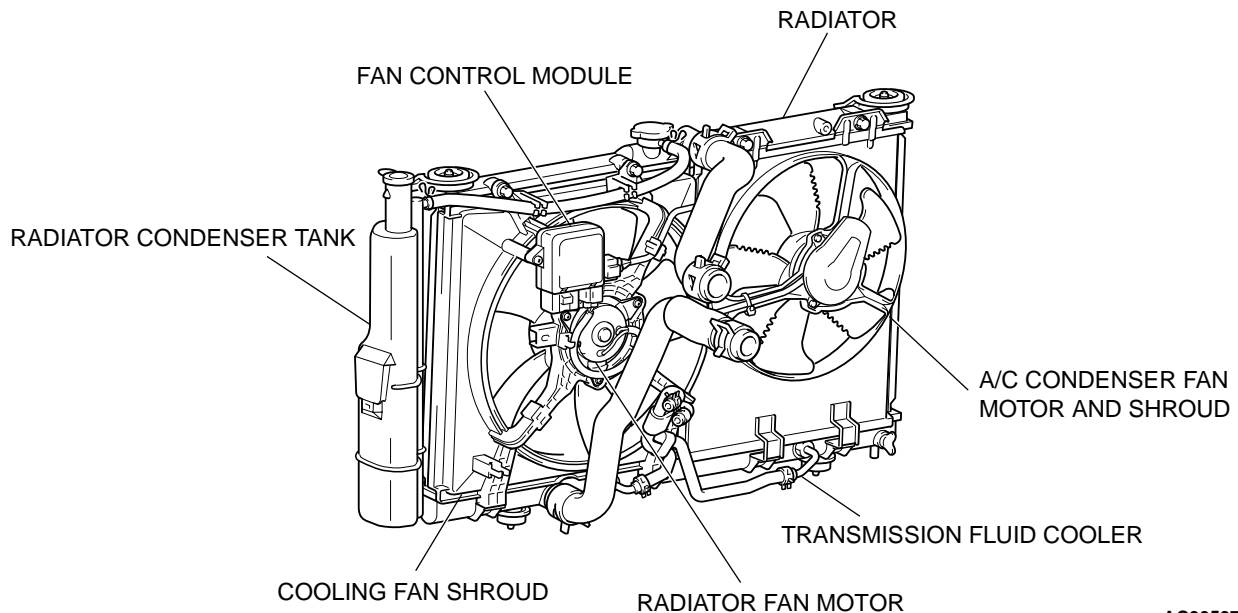
CONSTRUCTION DIAGRAM

<2.0L ENGINE>



AC308438 AB



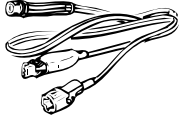
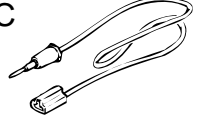

<2.4L ENGINE>



AC305975AB

SPECIAL TOOLS

M1141000600280

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 <p>MB991871</p>	MB991871 LLC changer	General service tool	Coolant refilling
<p>A</p>  <p>B</p>  <p>C</p>  <p>D</p>  <p>MB991223AG</p>	<p>MB991223</p> <p>A: MB991219</p> <p>B: MB991220</p> <p>C: MB991221</p> <p>D: MB991222</p> <p>Harness set</p> <p>A: Test harness</p> <p>B: LED harness</p> <p>C: LED harness adapter</p> <p>D: Probe</p>	General service tools	<p>Making voltage and resistance measurement during troubleshooting</p> <p>A: Connector pin contact pressure inspection</p> <p>B: Power circuit inspection</p> <p>C: Power circuit inspection</p> <p>D: Commercial tester connection</p>

ENGINE COOLING DIAGNOSIS

INTRODUCTION

M1141005300358

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

M1141005200351

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

M1141005600401

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Coolant Leak	1	P.14-5
Engine Overheating	2	P.14-6
Radiator Fan and Condenser Fan do not Operate	3	P.14-7
Radiator Fan and Condenser Fan do not Change Speed or Stop	4	P.14-17
Radiator Fan does not Operate	5	P.14-22
Condenser Fan does not Operate	6	P.14-23

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

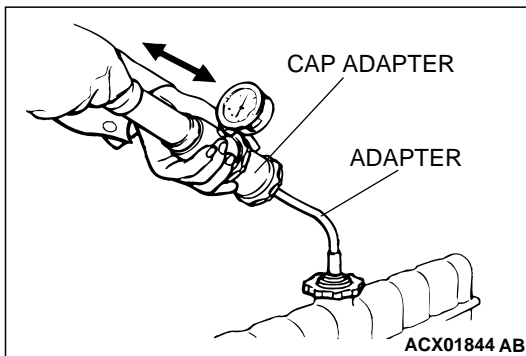
- Be sure to completely clean away any moisture from the places checked.
- When the tester is removed, be careful not to spill any coolant.
- When installing and removing the tester and when testing, be careful not to deform the filler neck of the radiator.

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: Is 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.14-25](#).

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.

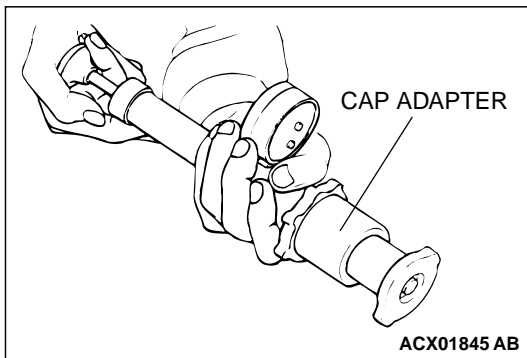
Minimum limit: 83 kPa (12 psi)

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.14-34](#).

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.00-45](#).

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 coolant temperature.

Q: Is the coolant temperature abnormally high?

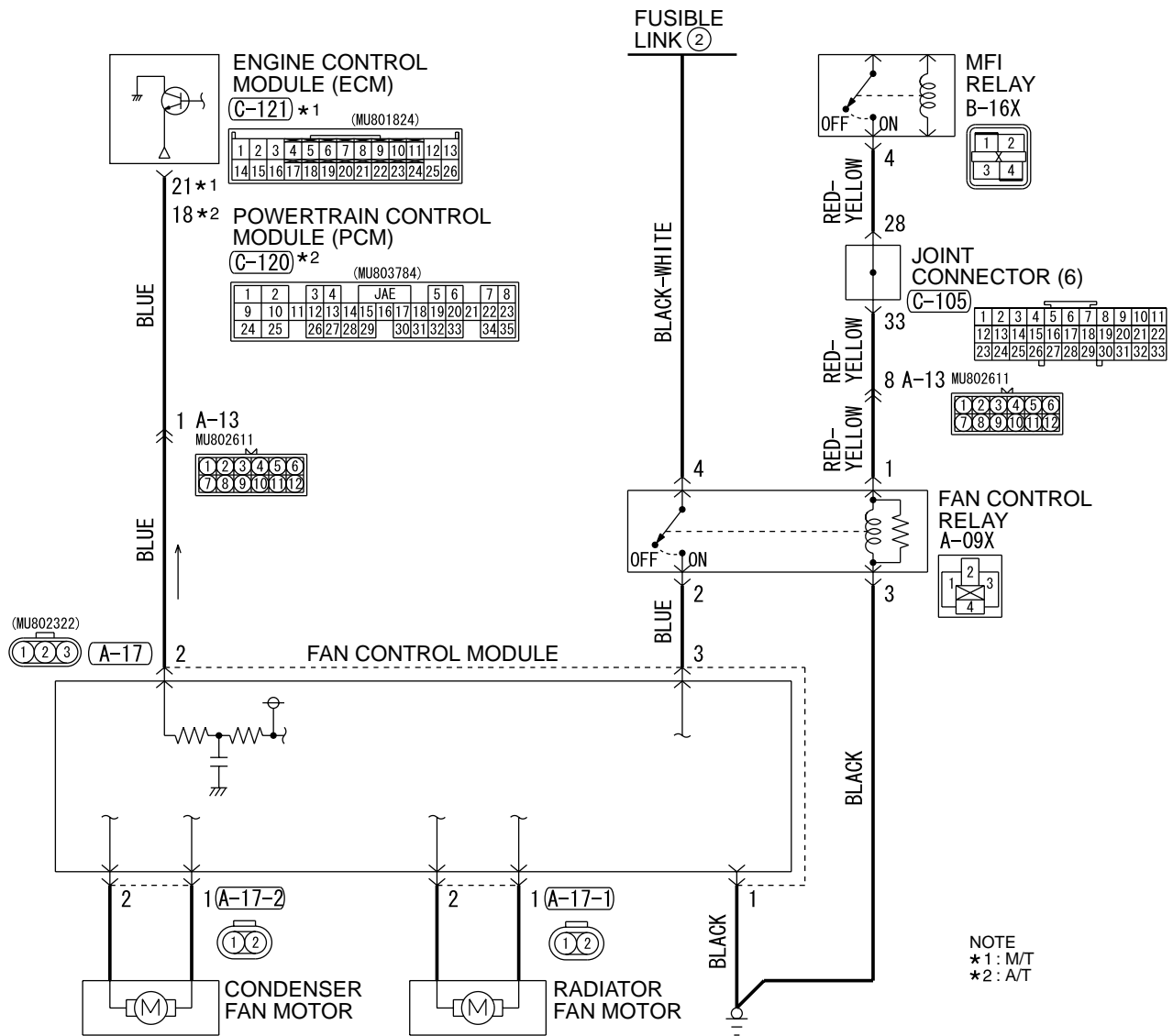
YES : Return to Step 2.

NO : The procedure is complete.

INSPECTION PROCEDURE 3: Radiator Fan and Condenser Fan do not Operate

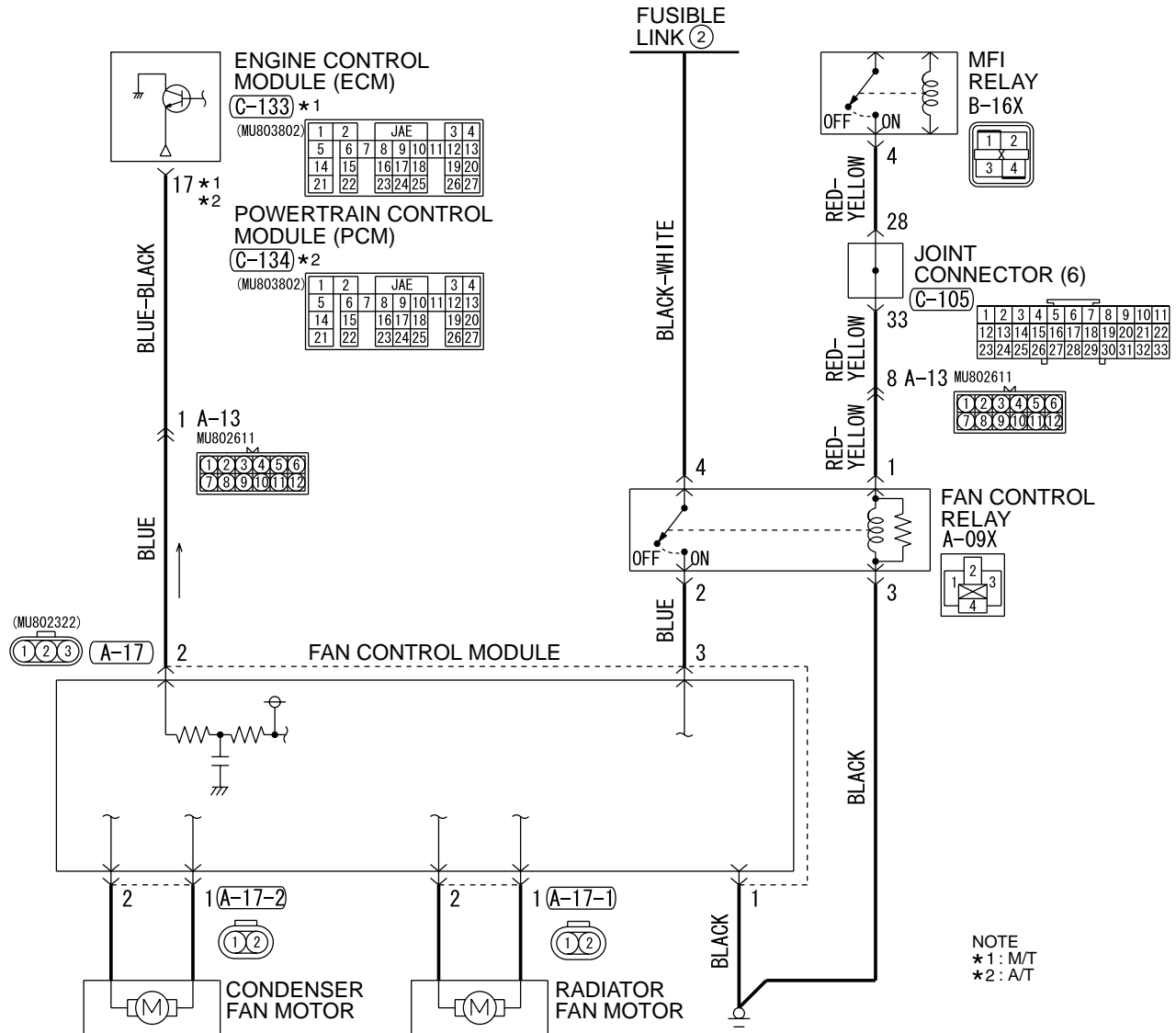
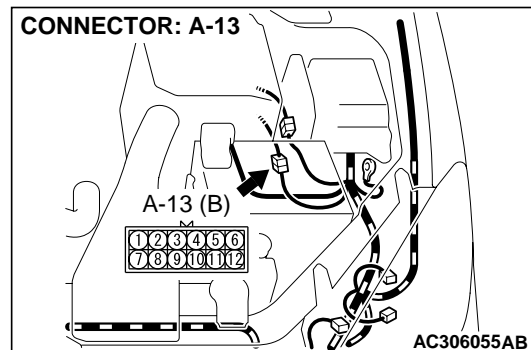
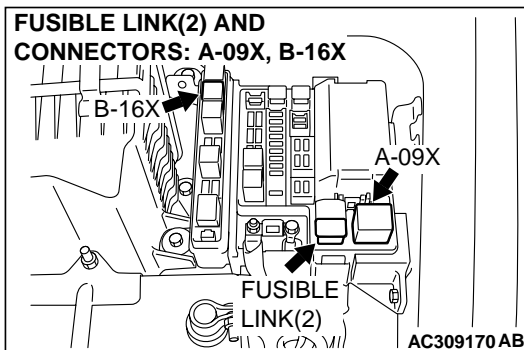
Radiator Fan and Condenser Driver Circuit

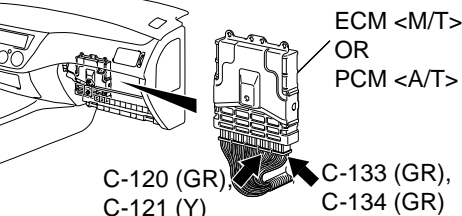
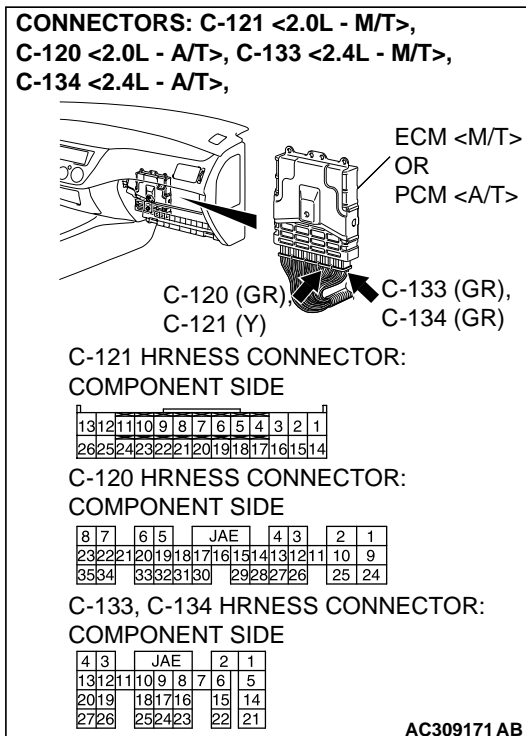
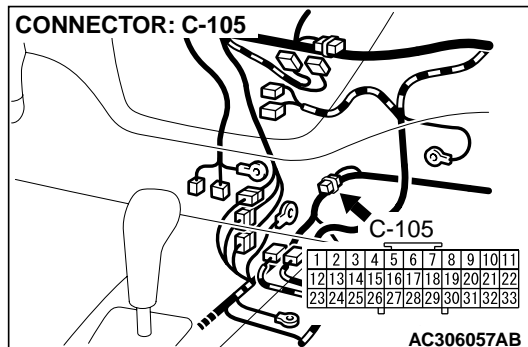
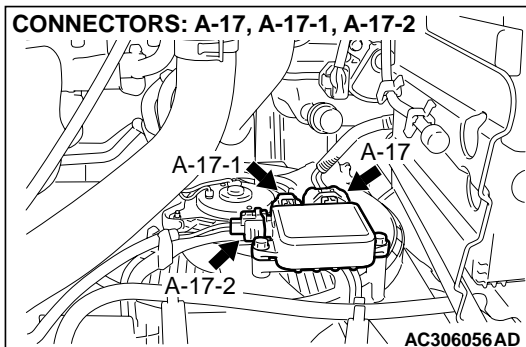
<2.0L ENGINE>



H4J06M01AA
AC309075AB

<2.4L ENGINE>

H4J06M01AA
AC309076AB



**C-121 HRNESS CONNECTOR:
COMPONENT SIDE**

13	12	11	10	9	8	7	6	5	4	3	2	1
26	25	24	23	22	21	20	19	18	17	16	15	14

**C-120 HRNESS CONNECTOR:
COMPONENT SIDE**

8	7	6	5	JAE	4	3	2	1
23	22	21	20	19	18	17	16	15
35	34	33	32	31	30	29	28	27
25	24							

**C-133, C-134 HRNESS CONNECTOR:
COMPONENT SIDE**

4	3	JAE	2	1
13	12	11	10	9
20	19	18	17	16
27	26	25	24	23
22	21			

CIRCUIT OPERATION

- The fan control module is powered from fusible link number 2.
- The ECM <M/T> or PCM <A/T> judges the required revolution speed of radiator fan motor and condenser fan motor using the input signals transmitted from A/C switch, automatic compressor controller, vehicle speed sensor and engine coolant temperature sensor. The ECM <M/T> or PCM <A/T> activates the fan control module to drive the radiator fan motor and condenser fan motor.

TECHNICAL DESCRIPTION

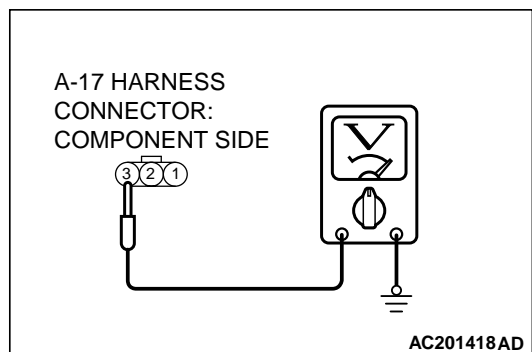
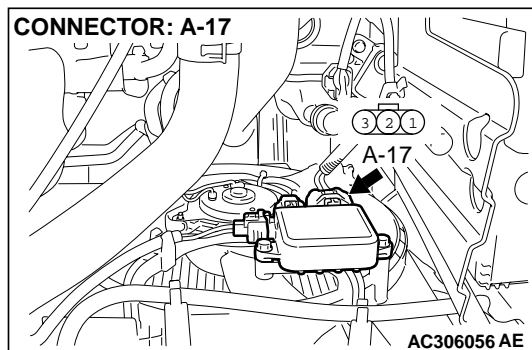
- The cause could be a malfunction of the fan control module power supply or ground circuit.
- The cause could also be a malfunction of the fan control module or the ECM <M/T> or PCM <A/T>.

TROUBLESHOOTING HINTS

- Malfunction of fusible link
- Malfunction of fan control relay
- Malfunction of MFI relay
- Malfunction of radiator fan motor
- Malfunction of condenser fan motor
- Malfunction of fan control module
- Malfunction of ECM <M/T> or PCM <A/T>
- Damaged wiring harness or connector

DIAGNOSIS**Required Special Tool:**

- MB991223: Harness Set

**STEP 1. Check the circuit at fan control module connector A-17 (terminal 3).**

- (1) Disconnect fan control module connector A-17, and measure at the harness side connector.
- (2) Measure the voltage between terminal number 3 and ground.

- When the ignition switch is turned to the "ON" position, voltage should measure battery positive voltage.

Q: Is there voltage battery positive voltage when the ignition switch is turned to the "ON" position?

YES : Go to Step 8.

NO : Go to Step 2.

STEP 2. Check the fan control relay.

Refer to [P.14-28](#).

Q: Is the fan control relay in good condition?

YES : Go to Step 3.

NO : Replace it, then go to Step 1.

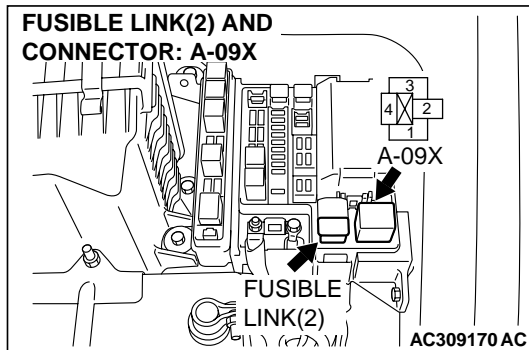
STEP 3. Check the MFI relay.

Refer to [P.13A-910](#).

Q: Is the MFI relay in good condition?

YES : Go to Step 4.

NO : Replace it, then go to Step 1.

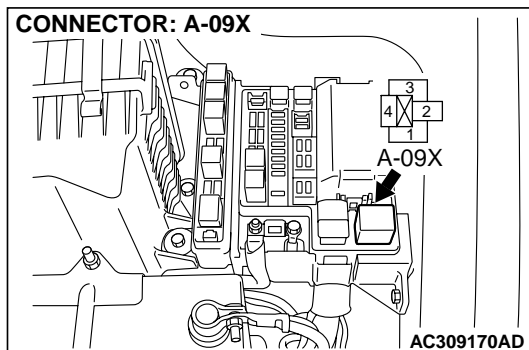


STEP 4. Check for harness damage between fusible link number 2 and fan control relay connector A-09X (terminal 4).

Q: Are the harness wires between fusible link number 2 and fan control relay connector A-09X damaged?

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

NO : Go to Step 5.

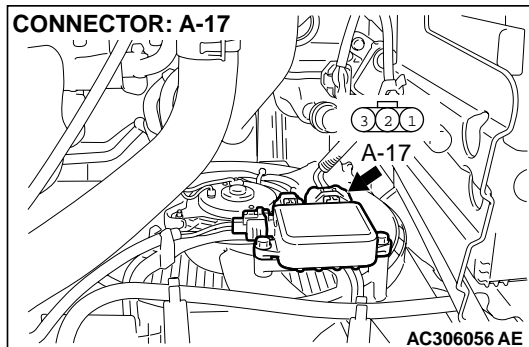


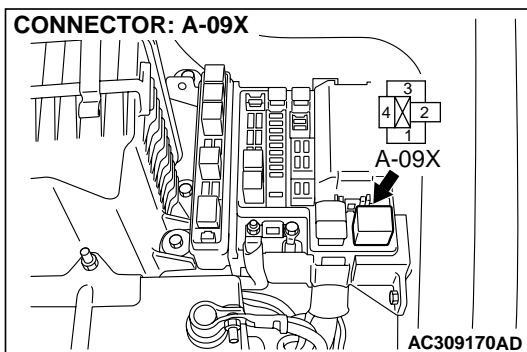
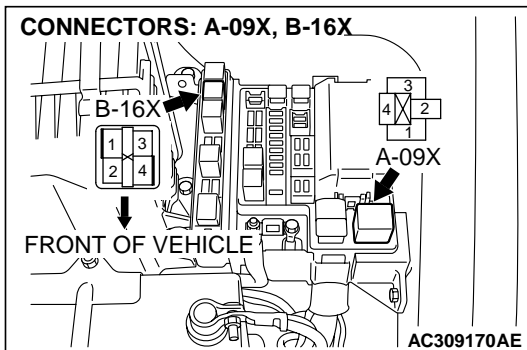
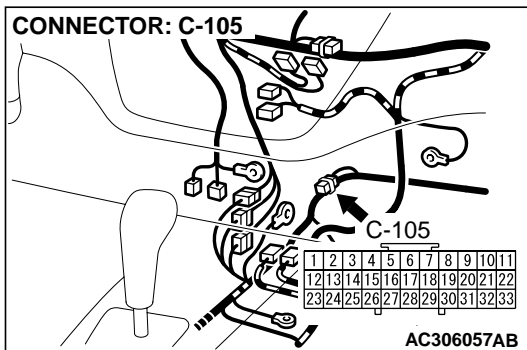
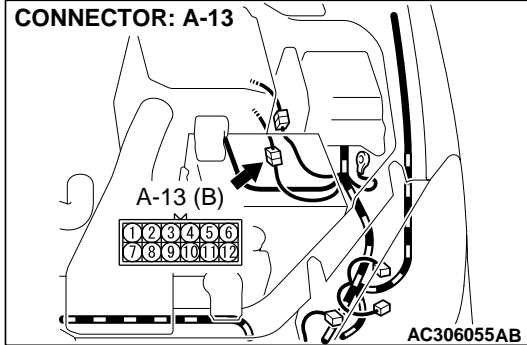
STEP 5. Check for harness damage between fan control relay connector A-09X (terminal 2) and fan control module connector A-17 (terminal 3).

Q: Are the harness wires between fan control relay connector A-09X (terminal 2) and fan control module connector A-17 (terminal 3) damaged?

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

NO : Go to Step 6.





STEP 6. Check for harness damage between MFI relay connector B-16X and fan control relay connector A-09X.

NOTE: After inspecting intermediate connector A-13 terminal 8 and joint connector C-105 terminal 28, 33 inspect the wires. If intermediate connector A-13 and joint connector C-105 are damaged, repair or replace them. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

Q: Are the harness wires between MFI relay connector B-16X (terminal 4) and fan control relay connector A-09X (terminal 1) damaged?

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

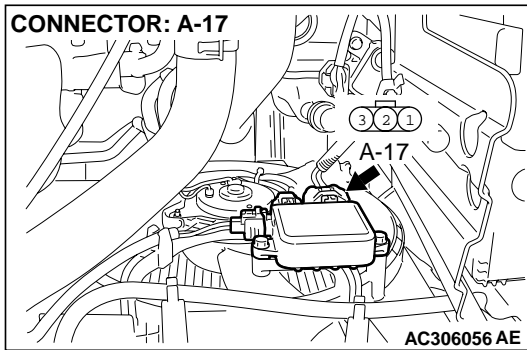
NO : Go to Step 7.

STEP 7. Check for harness damage between fan control relay connector A-09X (terminal 3) and ground.

Q: Are the harness wires between fan control relay connector A-09X (terminal 3) and ground damaged?

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

NO : Go to Step 8.



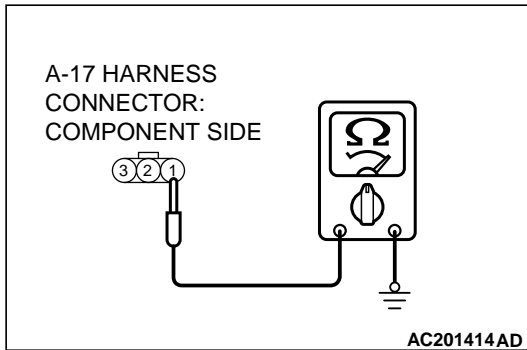
STEP 8. Check the circuit at fan control module connector A-17 (terminal 1).

- (1) Disconnect fan control module connector A-17, and measure at the harness side connector.
- (2) Measure the resistance between terminal number 1 and ground.

Q: Is the resistance less than 2 ohms?

YES : Go to Step 10.

NO : Go to Step 9.

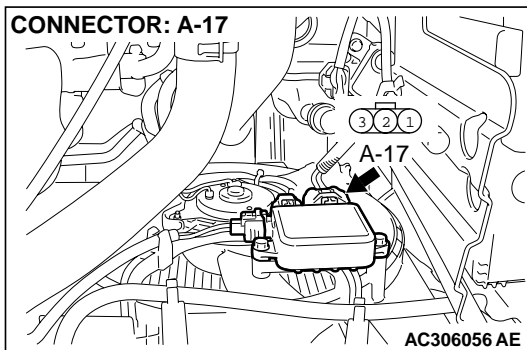


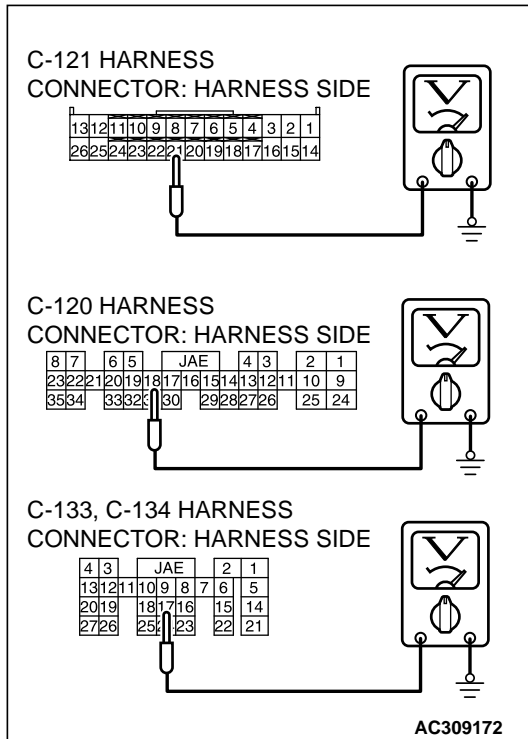
STEP 9. Check the harness wire between fan control module connector A-17 and ground.

Q: Are the harness wires between fan control module connector A-17 and ground damaged?

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

NO : Go to Step 10.





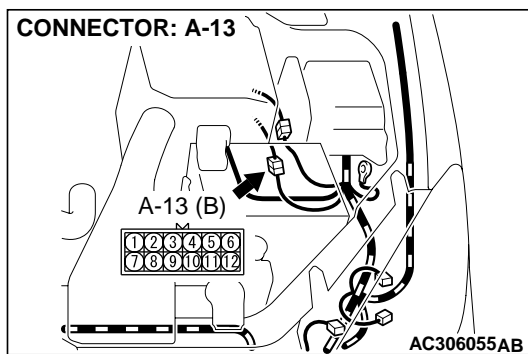
STEP 10. Measure the output circuit voltage at ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T> by backprobing.

- (1) Do not disconnect ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T>.
- (2) Start the engine and allow it to idle.
- (3) Measure the voltage between terminal number 21 <2.0L-M/T>, 18 <2.0L-A/T> or 17 <2.4L> and ground by backprobing.

Q: Is the voltage 0.7 volt or more when the radiator fan is operating?

YES : Go to Step 12.

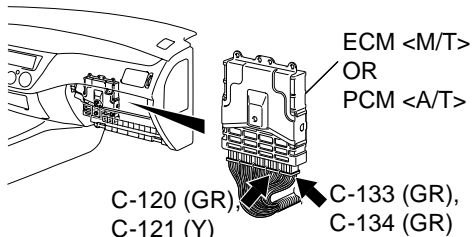
NO : Go to Step 11.



STEP 11. Check the harness wire between ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T> and fan control module connector A-17.

NOTE: If intermediate connector A-13 terminal 1 is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).

CONNECTORS: C-121 <2.0L - M/T>,
C-120 <2.0L - A/T>, C-133 <2.4L - M/T>,
C-134 <2.4L - A/T>.



C-121 HRNESS CONNECTOR:
COMPONENT SIDE

13	12	11	10	9	8	7	6	5	4	3	2	1
26	25	24	23	22	21	20	19	18	17	16	15	14

C-120 HRNESS CONNECTOR:
COMPONENT SIDE

8	7	6	5	JAE	4	3	2	1
23	22	21	20	19	18	17	16	15
35	34	33	32	31	30	29	28	27
25	24	23	22	21	20	19	18	17

C-133, C-134 HRNESS CONNECTOR:
COMPONENT SIDE

4	3	JAE	2	1
13	12	11	10	9
20	19	18	17	16
27	26	25	24	23

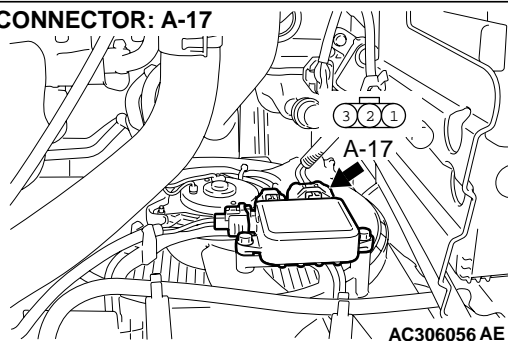
AC309171 AB

Q: Are the harness wires between ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T> and fan control module connector A-17 (terminal 2) damaged?

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

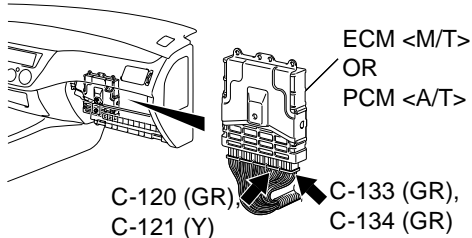
NO : Go to Step 12.

CONNECTOR: A-17



AC306056 AE

CONNECTORS: C-121 <2.0L - M/T>, C-120 <2.0L - A/T>, C-133 <2.4L - M/T>, C-134 <2.4L - A/T>.



**C-121 HRNESS CONNECTOR:
COMPONENT SIDE**

13	12	11	10	9	8	7	6	5	4	3	2	1
26	25	24	23	22	21	20	19	18	17	16	15	14

**C-120 HRNESS CONNECTOR:
COMPONENT SIDE**

8	7	6	5	JAE	4	3	2	1
23	22	21	20	19	18	17	16	15
35	34	33	32	31	30	29	28	27
26	25	24	23	22	21	20	19	18

**C-133, C-134 HRNESS CONNECTOR:
COMPONENT SIDE**

4	3	JAE	2	1
13	12	11	10	9
20	19	18	17	16
27	26	25	24	23
22	21	20	19	18

AC309171 AB

STEP 12. Check the fan control module at ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T>.

(1) Disconnect ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T>.

(2) Turn the ignition switch to the "ON" position.

Q: Do the radiator fan motor and condenser fan motor operate?

YES : Replace the ECM <M/T> or PCM <A/T>. Then go to Step 13.

NO : Replace the fan control module. Then go to Step 13.

STEP 13. Check the symptoms.

Q: Do the radiator fan and condenser fan operate correctly?

YES : The procedure is complete.

NO : Return to Step 1.

INSPECTION PROCEDURE 4: Radiator Fan and Condenser Fan do not Change Speed or Stop

NOTE: If the engine coolant temperature reaches 110°C (230°F) or higher, the radiator fan control runs the radiator 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 (230°F) or lower.]

**RADIATOR FAN AND CONDENSER FAN DRIVE
CIRCUIT**

Refer to [P.14-7](#).

CIRCUIT OPERATION

- The fan control module is powered from fusible link number 2.
- The ECM <M/T> or PCM <A/T> judges the required revolution speed of radiator fan motor and condenser fan motor using the input signals transmitted from A/C switch, automatic compressor controller, vehicle speed sensor and engine coolant temperature sensor. The ECM <M/T> or PCM <A/T> activates the fan control module to drive the radiator fan motor and condenser fan motor.

TECHNICAL DESCRIPTION

- The fan control module has variable control of the radiator fan motor and the condenser fan motor speeds using signals transmitted from the ECM <M/T> or PCM <A/T>.

TROUBLESHOOTING HINTS

- Malfunction of fan control relay
- Malfunction of fan control module
- Malfunction of ECM <M/T> or PCM <A/T>

DIAGNOSIS

Required Special Tool:

- MB991223: Harness Set

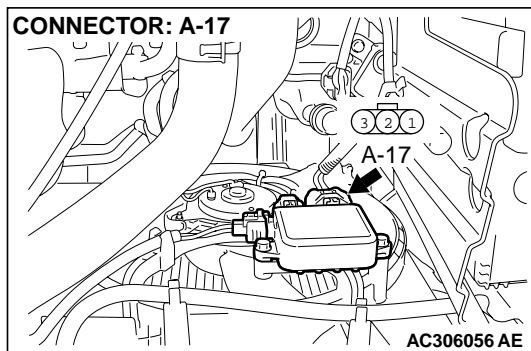
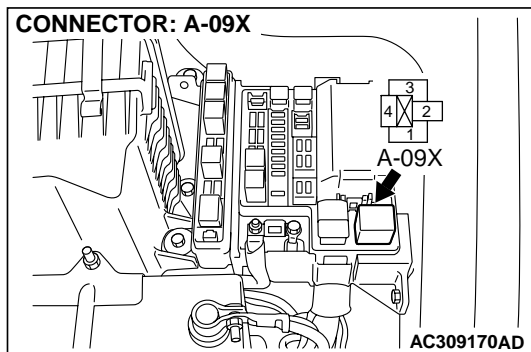
STEP 1. Check the fan control relay.

Refer to [P.14-28](#).

Q: Is the fan control relay in good condition?

YES : Go to Step 2.

NO : Replace the part, then go to Step 6.



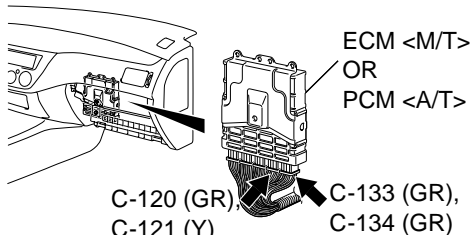
STEP 2. Check the harness wire between fan control relay connector A-09X (terminal 2) and fan control module connector A-17 (terminal 3).

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

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

NO : Go to Step 3.

CONNECTORS: C-121 <2.0L - M/T>, C-120 <2.0L - A/T>, C-133 <2.4L - M/T>, C-134 <2.4L - A/T>.



**C-121 HRNESS CONNECTOR:
COMPONENT SIDE**

13	12	11	10	9	8	7	6	5	4	3	2	1
26	25	24	23	22	21	20	19	18	17	16	15	14

**C-120 HRNESS CONNECTOR:
COMPONENT SIDE**

8	7		6	5		JAE				4	3		2	1
23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
35	34		33	32	31	30		29	28	27	26		25	24

**C-133, C-134 HRNESS CONNECTOR:
COMPONENT SIDE**

4	3	JAE					2	1
13	12	11	10	9	8	7	6	5
20	19		18	17	16		15	14
27	26		25	24	23		22	21

AC309171 AB

STEP 3. Measure the output circuit voltage at ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T> by backprobing.

- (1) Do not disconnect ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T>.
- (2) Start the engine and run it at idle. [Engine coolant temperature: 80°C (176°F) or less]
- (3) Measure the voltage between terminal number 21 <2.0L-M/T>, 18 <2.0L-A/T> or 17 <2.4L> and ground by backprobing.

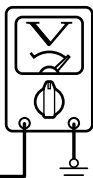
Q: Is the voltage 0 – 0.3 volt when the radiator fan is not operating?

YES : Go to Step 6.

NO : Go to Step 4.

**C-121 HARNESS
CONNECTOR: HARNESS SIDE**

13	12	11	10	9	8	7	6	5	4	3	2	1
26	25	24	23	22	21	20	19	18	17	16	15	14



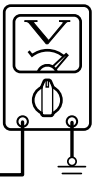
**C-120 HARNESS
CONNECTOR: HARNESS SIDE**

8	7		6	5		JAE				4	3		2	1
23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
35	34		33	32	31	30		29	28	27	26		25	24



**C-133, C-134 HARNESS
CONNECTOR: HARNESS SIDE**

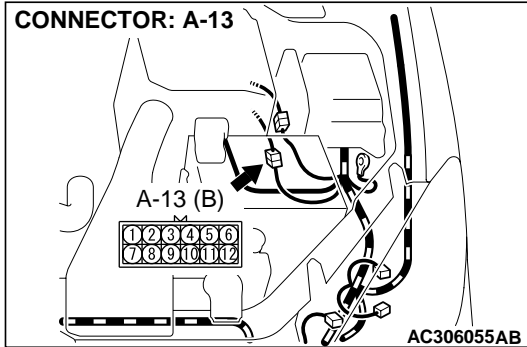
4	3	JAE					2	1
13	12	11	10	9	8	7	6	5
20	19		18	17	16		15	14
27	26		25	24	23		22	21



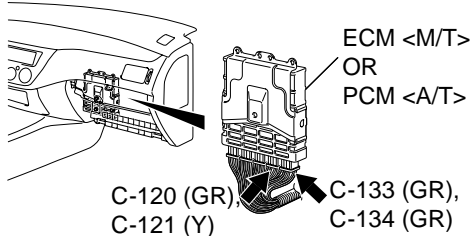
AC309172

STEP 4. Check the harness wire between ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T> and fan control module connector A-17.

NOTE: If intermediate connector A-13 terminal 1 is damaged, repair or replace it. Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#).



CONNECTORS: C-121 <2.0L - M/T>, C-120 <2.0L - A/T>, C-133 <2.4L - M/T>, C-134 <2.4L - A/T>.



C-121 HRNESS CONNECTOR:
COMPONENT SIDE

13	12	11	10	9	8	7	6	5	4	3	2	1
26	25	24	23	22	21	20	19	18	17	16	15	14

C-120 HRNESS CONNECTOR:
COMPONENT SIDE

8	7	6	5	JAE	4	3	2	1
23	22	21	20	19	18	17	16	15
35	34	33	32	31	30	29	28	27
26	25	24	23	22	21	20	19	18

C-133, C-134 HRNESS CONNECTOR:
COMPONENT SIDE

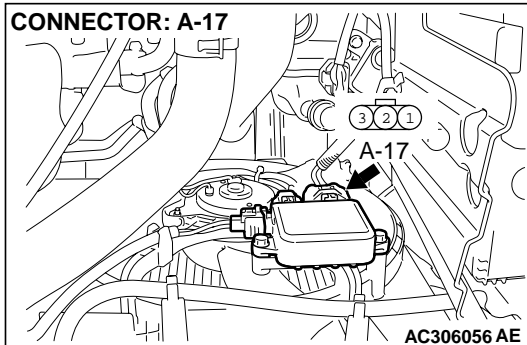
4	3	JAE	2	1
13	12	11	10	9
20	19	18	17	16
27	26	25	24	23
22	21	20	19	18

AC309171 AB

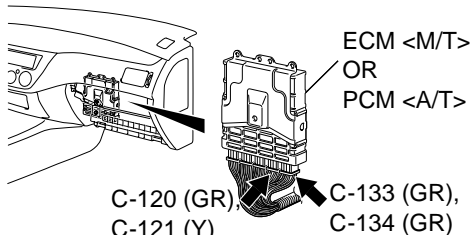
Q: Are the harness wires between ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T> and fan control module connector A-17 damaged?

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

NO : Go to Step 5.



CONNECTORS: C-121 <2.0L - M/T>, C-120 <2.0L - A/T>, C-133 <2.4L - M/T>, C-134 <2.4L - A/T>.



**C-121 HRNESS CONNECTOR:
COMPONENT SIDE**

13	12	11	10	9	8	7	6	5	4	3	2	1
26	25	24	23	22	21	20	19	18	17	16	15	14

**C-120 HRNESS CONNECTOR:
COMPONENT SIDE**

8	7	6	5	JAE				4	3	2	1			
23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
35	34	33	32	31	30	29	28	27	26				25	24

**C-133, C-134 HRNESS CONNECTOR:
COMPONENT SIDE**

4	3	JAE					2	1
13	12	11	10	9	8	7	6	5
20	19		18	17	16		15	14
27	26		25	24	23		22	21

AC309171 AB

STEP 5. Check the fan control module at ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T>.

- (1) Disconnect ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T>.
- (2) Pull out the pin 21 <2.0L-M/T>, 18 <2.0L-A/T> or 17 <2.4L> and connect it to the body ground.
- (3) Reconnect ECM connector C-121 (terminal 21) <2.0L-M/T>, C-133 (terminal 17) <2.4L-M/T> or PCM connector C-120 (terminal 18) <2.0L-A/T>, C-134 (terminal 17) <2.4L-A/T> with pin 21 <2.0L-M/T>, 18 <2.0L-A/T> or 17 <2.4L> still removed.
- (4) Turn the ignition switch to the " ON" position.

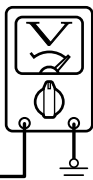
Q: Do the radiator fan motor and condenser fan motor stop?

YES : Replace the ECM <M/T> or PCM <A/T>. Then go to Step 6.

NO : Replace the fan control module. Then go to Step 6.

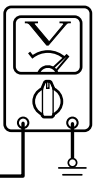
**C-121 HARNESS
CONNECTOR: HARNESS SIDE**

13	12	11	10	9	8	7	6	5	4	3	2	1
26	25	24	23	22	21	20	19	18	17	16	15	14



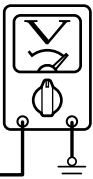
**C-120 HARNESS
CONNECTOR: HARNESS SIDE**

8	7		6	5		JAE				4	3		2	1
23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
35	34		33	32	31	30		29	28	27	26		25	24



**C-133, C-134 HARNESS
CONNECTOR: HARNESS SIDE**

4	3	JAE					2	1
13	12	11	10	9	8	7	6	5
20	19	18		17	16	15		14
27	26	25		24	23	22		21



AC309172

STEP 6. Check the symptoms.**Q: Do the radiator fan and condenser fan operate correctly?****YES :** The procedure is complete.**NO :** Return to Step 1.

INSPECTION PROCEDURE 5: Radiator Fan does not Operate

RADIATOR FAN AND CONDENSER FAN DRIVE CIRCUITRefer to [P.14-7](#).**CIRCUIT OPERATION**

- The fan control module is powered from fusible link number 2.
- The ECM <M/T> or PCM <A/T> judges the required revolution speed of radiator fan motor and condenser fan motor using the input signals transmitted from A/C switch, automatic compressor controller, vehicle speed sensor and engine coolant temperature sensor. The ECM <M/T> or PCM <A/T> activates the fan control module to drive the radiator fan motor and condenser fan motor.

TECHNICAL DESCRIPTION

The cause could be a malfunction of the radiator fan motor or an open circuit between the fan control module and the radiator fan motor.

TROUBLESHOOTING HINTS

- Malfunction of radiator fan motor
- Malfunction of fan control module

DIAGNOSIS

STEP 1. Check the radiator fan motor.Refer to [P.14-28](#).**Q: Is the radiator fan in good condition?****YES :** Go to Step 2.**NO :** Replace the radiator fan motor, then go to Step 3.

STEP 2. Check the fan control module.Refer to [P.14-27](#).**Q: Is the fan control module in good condition?****YES :** Go to Step 3.**NO :** Replace the fan control module, then go to Step 3.

STEP 3. Check the symptoms.**Q: Does the radiator fan operate correctly?****YES :** The procedure is complete.**NO :** Return to Step 1.

INSPECTION PROCEDURE 6: Condenser Fan does not Operate

RADIATOR FAN AND CONDENSER FAN DRIVE CIRCUIT

Refer to [P.14-7](#).

TECHNICAL DESCRIPTION

The cause could be a malfunction of the condenser fan motor or fan control module.

CIRCUIT OPERATION

- The fan control module is powered from fusible link number 2.
- The ECM <M/T> or PCM <A/T> judges the required revolution speed of radiator fan motor and condenser fan motor using the input signals transmitted from A/C switch, automatic compressor controller, vehicle speed sensor and engine coolant temperature sensor. The ECM <M/T> or PCM <A/T> activates the fan control module to drive the radiator fan motor and condenser fan motor.

TROUBLESHOOTING HINTS

- Malfunction of condenser fan motor
- Malfunction of fan control module

DIAGNOSIS

STEP 1. Check the condenser fan motor.

Refer to GROUP 55, Condenser and Condenser Fan Motor [P.55-124](#).

Q: Is the condenser fan motor in good condition?

YES : Go to Step 2.

NO : Replace the condenser fan motor, then go to Step 3.

STEP 2. Check the fan control module.

Refer to [P.14-27](#).

Q: Is the fan control module in good condition?

YES : Go to Step 3.

NO : Replace the fan control module, then go to Step 3.

STEP 3. Check the symptoms.

Q: Does the condenser fan operate correctly?

YES : The procedure is complete.

NO : Return to Step 1.

ON-VEHICLE SERVICE

ENGINE COOLANT LEAK CHECK

M1141001000344

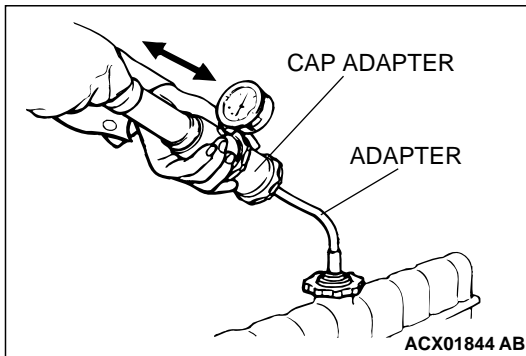
⚠ WARNING

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 PRESSURE CHECK

M1141001300420

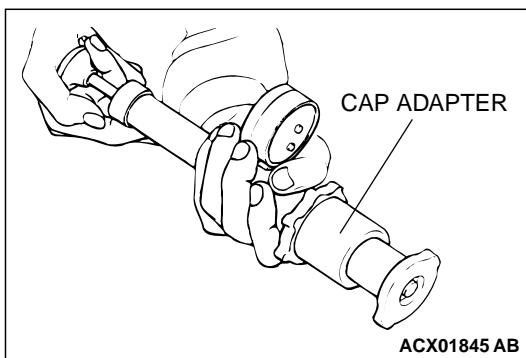
NOTE: Be sure that the cap is clean before testing. Rust or other foreign material on the cap seal will cause an improper reading.

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 REPLACEMENT

M1141001200490

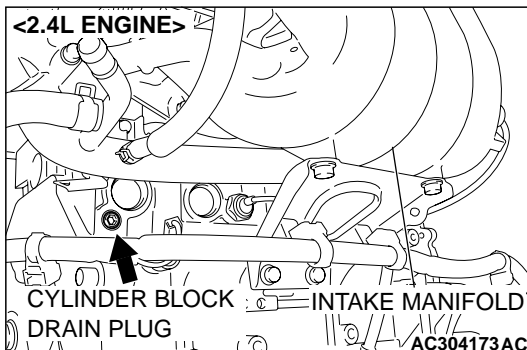
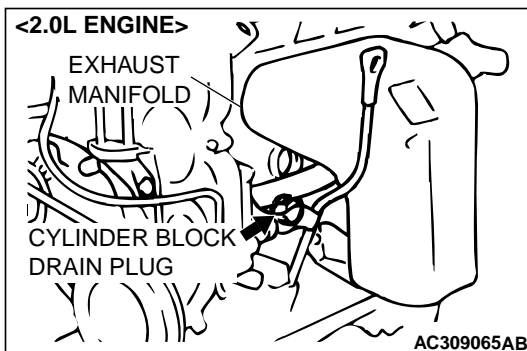
Required Special Tool:

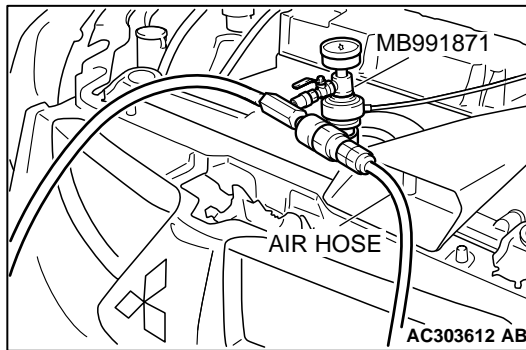
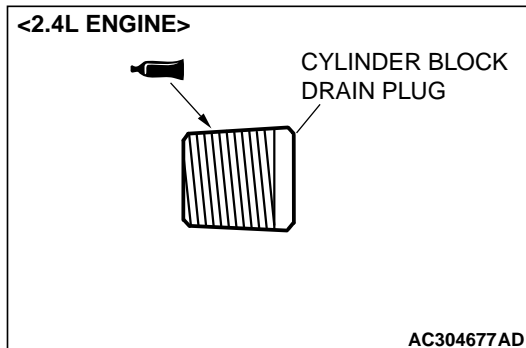
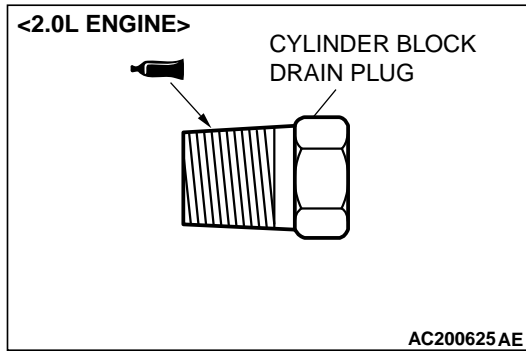
- MB991871: LLC changer

⚠ 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 counterclockwise a little to let the pressure escape through the vinyl tube. After relieving the steam pressure, remove the cap by slowly turning it counterclockwise.

1. Drain the water from the radiator, heater core and engine after unplugging the radiator drain plug and removing the radiator cap.
2. Drain the water in the water jacket by unplugging the drain plug of the cylinder block.
3. Remove the radiator condenser tank and drain the coolant.
4. Drain the cooling water then clean the path of the cooling water by injecting water into the radiator from the radiator cap area.





5. Apply the designated sealant to the screw area of the cylinder block drain plug, and then tighten to the standard torque.

Specified sealant: 3M™ AAD Part No.8731 or equivalent

Tightening torque:

<2.0L Engine> 40 ± 5 N·m (30 ± 3 ft-lb)

<2.4L Engine> 44 ± 5 N·m (33 ± 3 ft-lb)

6. Securely tighten the drain plug of the radiator.
7. Assemble 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 coolant. A convenient mixture is a 50 % water and 50 % antifreeze solution [freezing point: -31°C (-32.8°F)].

Recommended antifreeze: Long Life Antifreeze Coolant or an equivalent

Quantity:

<2.0L Engine> 6.0 dm^3 (6.3 quarts)

<2.4L Engine> 7.0 dm^3 (7.4 quarts)

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

9. Reinstall the radiator cap.
10. Start the engine and let it warm up until the thermostat opens.
11. After repeatedly revving the engine up to 3,000 r/min several times, then stop the engine.
12. 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.

13. Add coolant to the reserve tank between the "FULL" and "LOW" mark if necessary.

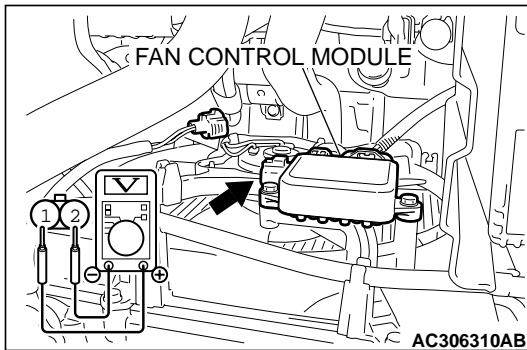
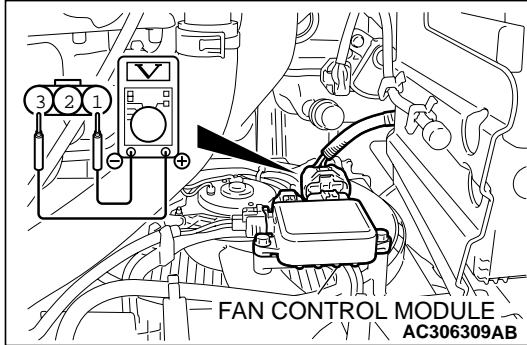
ENGINE COOLANT CONCENTRATION TEST

M1141001100404

Refer to GROUP 00, RECOMMENDED LUBRICANTS AND LUBRICANT CAPACITIES TABLE [P.00-36](#).

FAN CONTROL MODULE CHECK

M1141007400072



1. Remove the fan control module connector.
2. Turn the ignition switch to the "ON" position, and measure the voltage between the harness-side connector terminals.

Standard value: Battery positive voltage

3. Connect the fan control module connector, and disconnect the condenser fan motor connector.
4. Ensure that the A/C switch is off, and start the engine and run it at idle.
5. Measure the voltage between the fan control module-side connector terminals.

Standard value: 1V or less

6. Turn the A/C switch to the "ON" position.

⚠ WARNING

Stay clear of the fan when the fan starts running.

7. Measure the voltage between the fan control module-side connector terminals while the fan is running. The voltage should repeat the values 1) and 2) below.

Standard value:

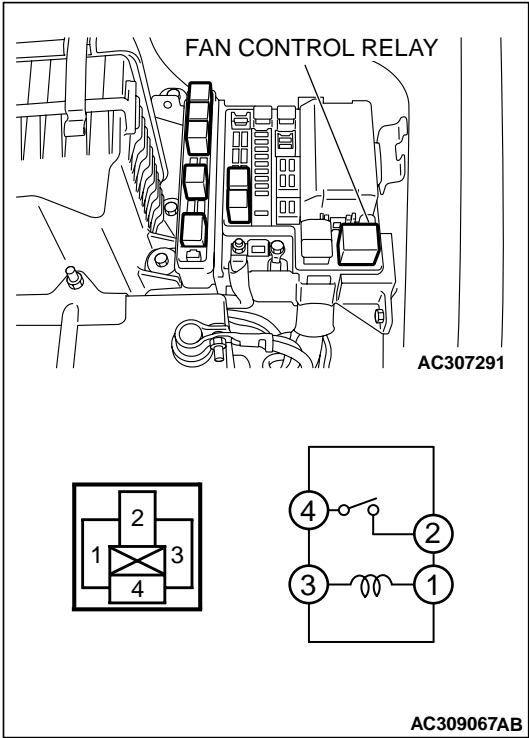
1) 8.2 ± 2.6 V

2) Battery positive voltage ± 2.6 V

8. If the voltage does not repeatedly change as indicated, replace the fan control module.

FAN CONTROL RELAY CONTINUITY CHECK

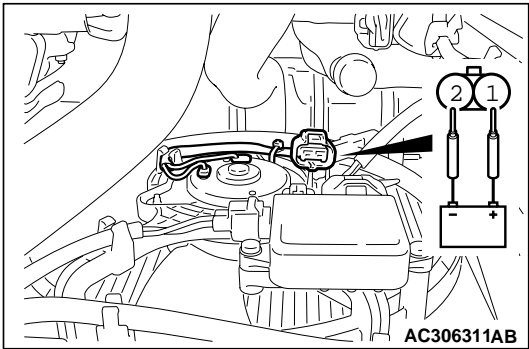
M1141006200321



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

RADIATOR FAN MOTOR CHECK

M1141007100101



1. Remove the radiator fan motor connector.
2. Check to see that the fan motor of the radiator turns when applying battery power between the connector terminals of the radiator fan motor. Also check to see that there is no abnormal sound coming from the radiator fan motor at this time.
3. If the radiator fan motor is defective, replace it.

RADIATOR

REMOVAL AND INSTALLATION

M1141001500532

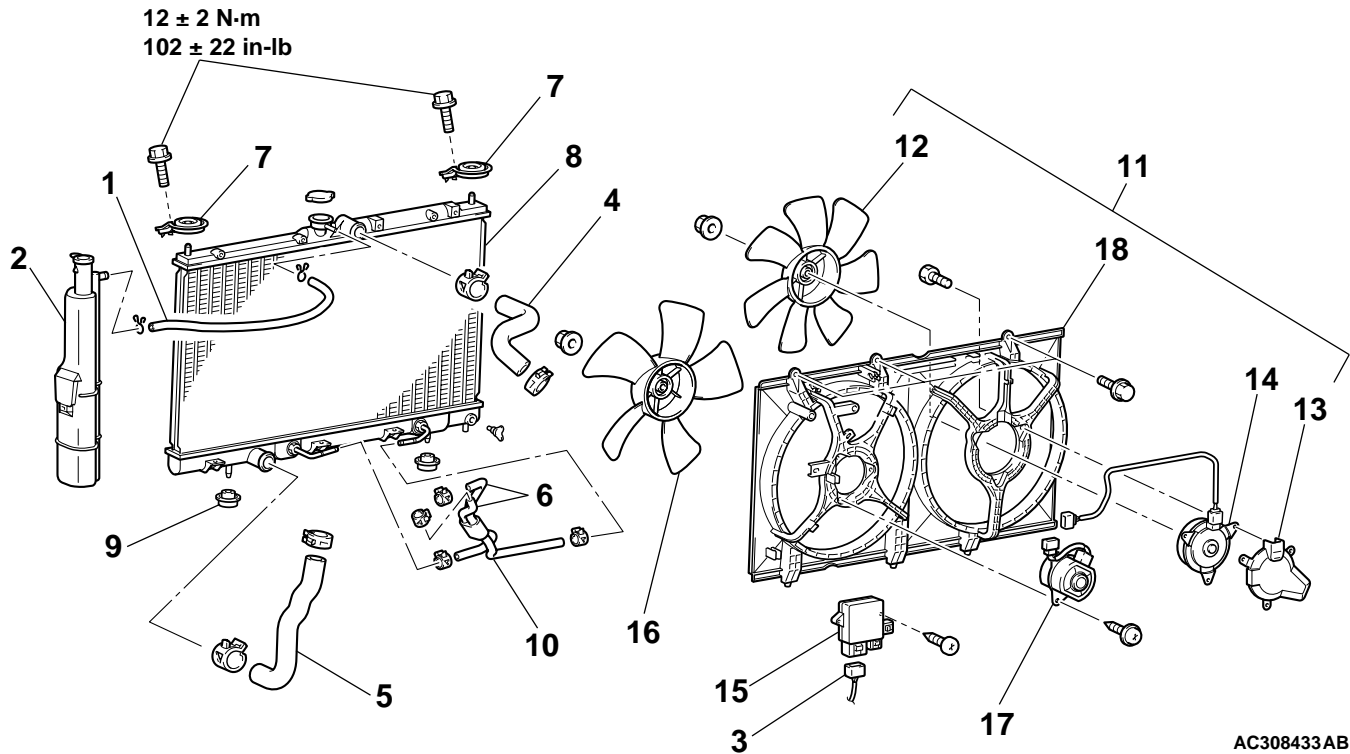
<2.0L ENGINE>

Pre-removal Operation

Engine Coolant Draining (Refer to P.14-25.)

Post-installation Operation

- A/T Fluid Refilling and Level Check (Refer to GROUP 00, Maintenance Service P.00-54.)
- Engine Coolant Refilling and Level Check (Refer to P.14-25.)



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RADIATOR REMOVAL STEPS

1. RUBBER HOSE
2. RADIATOR CONDENSER TANK ASSEMBLY
3. FAN CONTROL MODULE CONNECTOR
4. RADIATOR UPPER HOSE
5. RADIATOR LOWER HOSE
6. TRANSMISSION FLUID COOLER HOSE CONNECTION
7. UPPER INSULATOR
8. RADIATOR ASSEMBLY
9. LOWER INSULATOR
10. TRANSMISSION FLUID COOLER HOSE ASSEMBLY
11. FAN SHROUD ASSEMBLY

<<A>> >>A<<
<<A>> >>A<<
<>

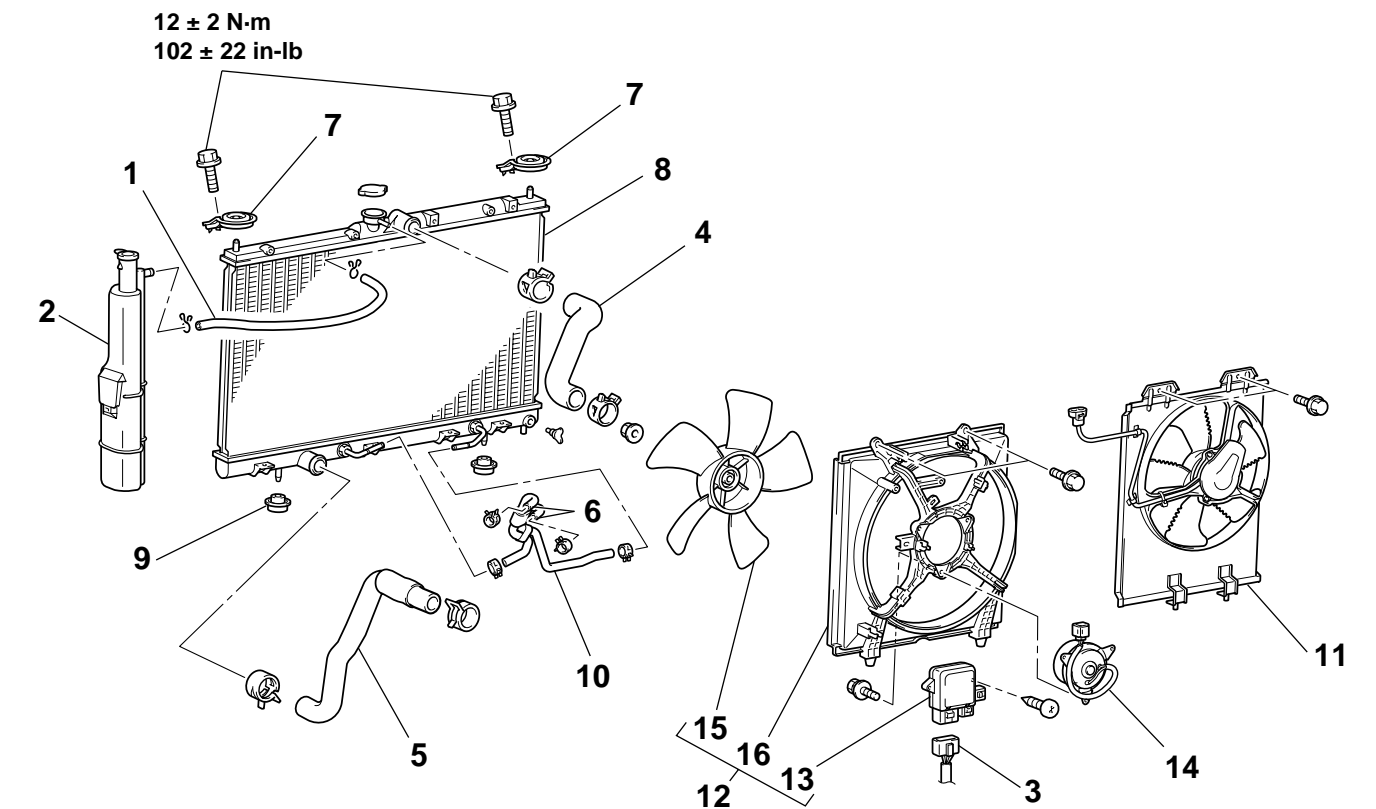
RADIATOR FAN MOTOR REMOVAL STEPS

1. RUBBER HOSE
2. RADIATOR CONDENSER TANK ASSEMBLY
3. FAN CONTROL MODULE CONNECTOR
4. RADIATOR UPPER HOSE
11. FAN SHROUD ASSEMBLY
12. CONDENSER FAN
13. HEAT PROTECTOR
14. CONDENSER FAN MOTOR
15. FAN CONTROL MODULE
16. RADIATOR FAN
17. RADIATOR FAN MOTOR
18. FAN SHROUD

<<A>> >>A<<

<2.4L ENGINE>

Pre-removal Operation Engine Coolant Draining (Refer to P.14-25).	Post-installation Operation <ul style="list-style-type: none">A/T Fluid Refilling and Level Check (Refer to GROUP 00, Maintenance Service P.00-54).Engine Coolant Refilling and Level Check (Refer to P.14-25).
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RADIATOR REMOVAL STEPS

- <<A>> >>A<<
<<A>> >>A<<
<>
- RUBBER HOSE
 - RADIATOR CONDENSER TANK ASSEMBLY
 - FAN CONTROL MODULE CONNECTOR
 - RADIATOR UPPER HOSE
 - RADIATOR LOWER HOSE
 - TRANSMISSION FLUID COOLER HOSE CONNECTION
 - UPPER INSULATOR
 - RADIATOR ASSEMBLY
 - LOWER INSULATOR
 - TRANSMISSION FLUID COOLER HOSE ASSEMBLY

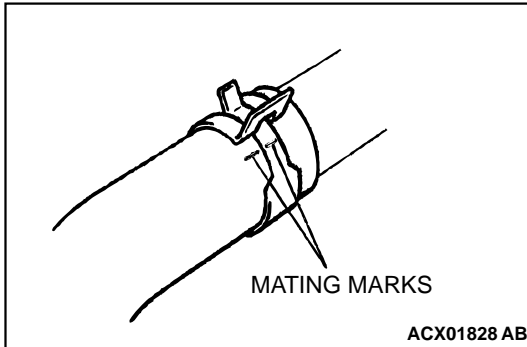
RADIATOR REMOVAL STEPS

- <<A>> >>A<<
- A/C CONDENSER FAN MOTOR AND SHROUD
 - COOLING FAN SHROUD ASSEMBLY
 - RADIATOR FAN MOTOR REMOVAL STEPS
 - RADIATOR CONDENSER TANK ASSEMBLY
 - RADIATOR UPPER HOSE
 - COOLING FAN SHROUD ASSEMBLY
 - FAN CONTROL MODULE
 - RADIATOR FAN MOTOR
 - RADIATOR FAN
 - 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.



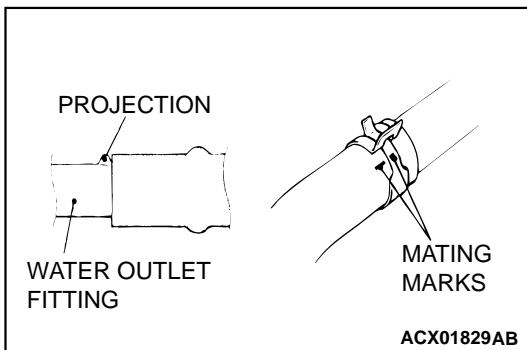
<> TRANSMISSION FLUID COOLER HOSE CONNECTION

After disconnecting the hose, plug it to avoid entry of dust or foreign material.

INSTALLATION SERVICE POINT

>>A<< RADIATOR LOWER HOSE/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.

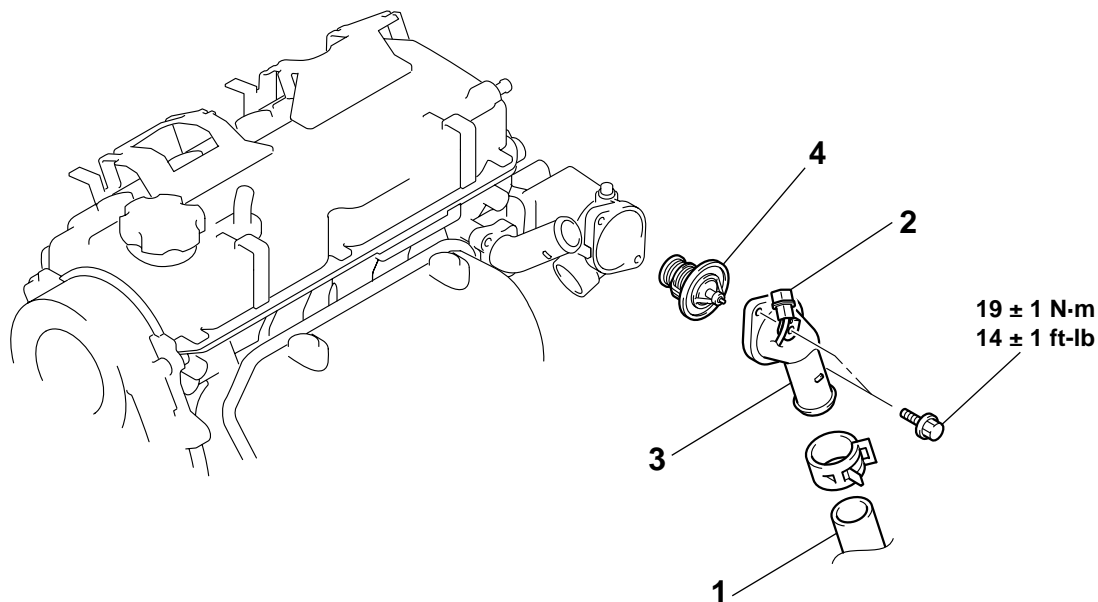


THERMOSTAT

REMOVAL AND INSTALLATION

M1141002400486

<2.0L ENGINE>

Pre-removal and Post-installation OperationEngine Coolant Draining and Refilling (Refer to [P.14-25.](#))

AC100806 AB

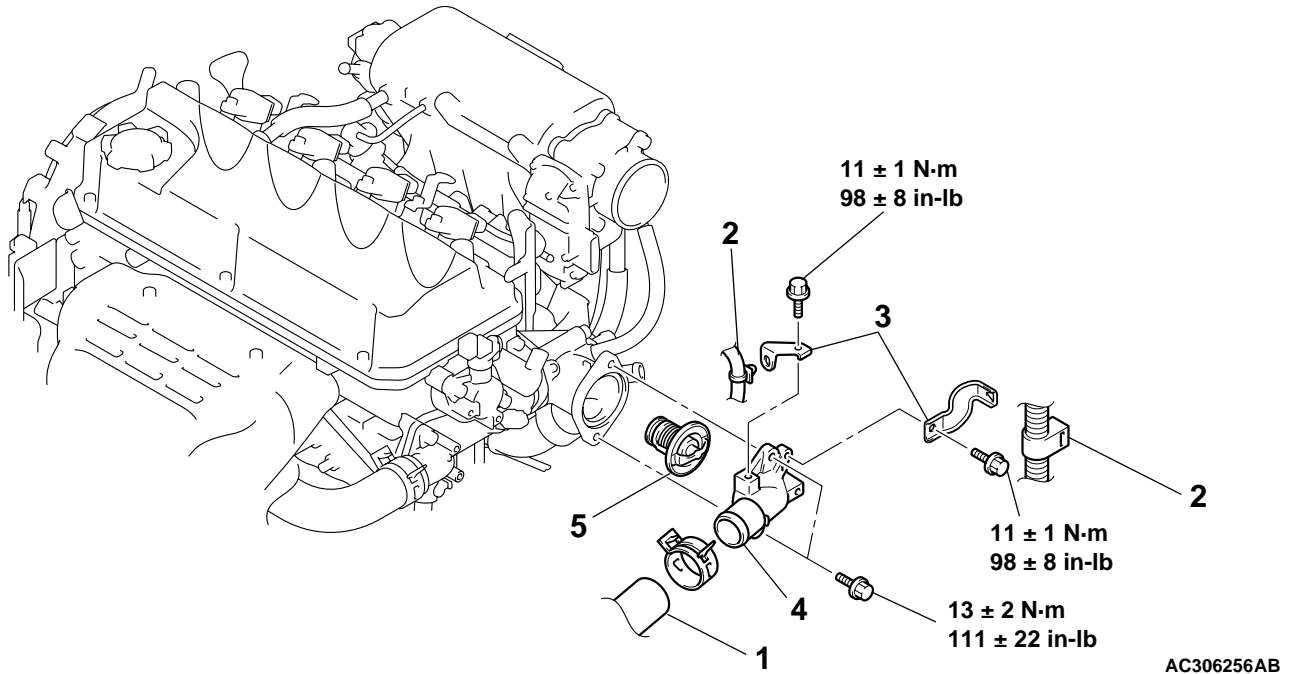
- <<A>> >>B<<
- REMOVAL STEPS**
1. RADIATOR LOWER HOSE CONNECTION
 2. HEATED OXYGEN SENSOR CLAMP

- REMOVAL STEPS (Continued)**
- >>A<<
3. WATER INLET FITTING
 4. THERMOSTAT

<2.4L ENGINE>

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Refilling (Refer to P.14-25).
- Air Cleaner Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-4).
- Battery and Battery Tray Removal and Installation.



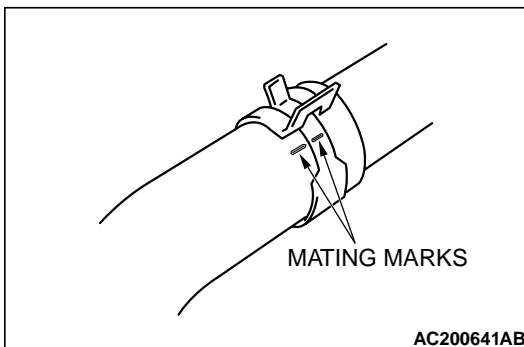
- <<A>> >>B<<
1. RADIATOR LOWER HOSE CONNECTION
 2. CONTROL WIRING HARNESS CONNECTION

- >>A<<
3. CONTROL WIRING HARNESS CONNECTION BRACKET
 4. WATER INLET FITTING
 5. THERMOSTAT

REMOVAL SERVICE POINT

<<A>> RADIATOR LOWER HOSE DISCONNECTION

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



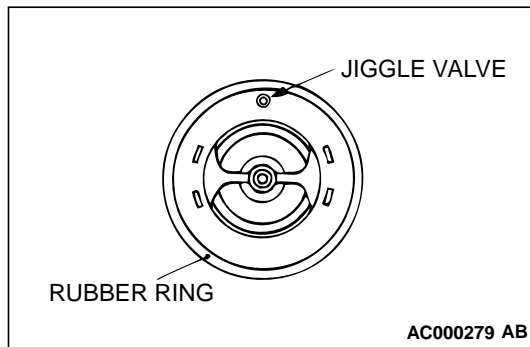
INSTALLATION SERVICE POINTS

>>A<< THERMOSTAT INSTALLATION

⚠ CAUTION

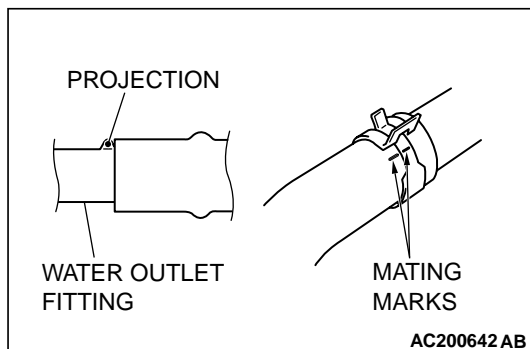
Make absolutely sure that no oil adheres to the rubber ring of the thermostat. Also do not fold or scratch the rubber ring during installation.

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.



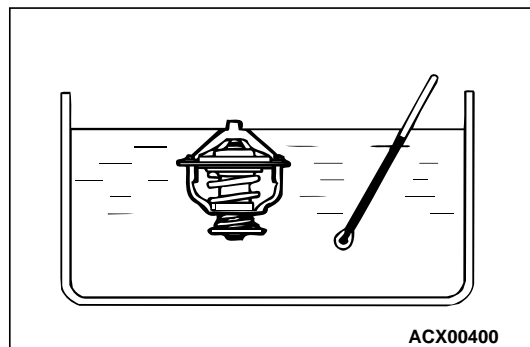
INSPECTION

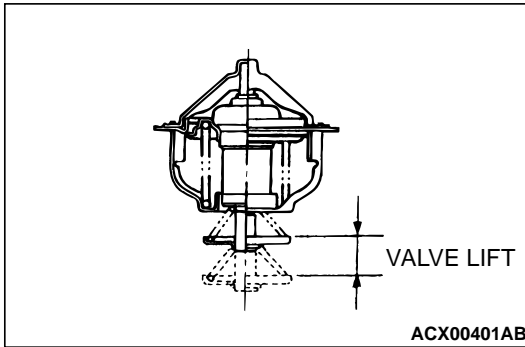
M1141002500461

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





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 (203°F)

Amount of valve lift: 8.5 mm (0.33 inch)

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.

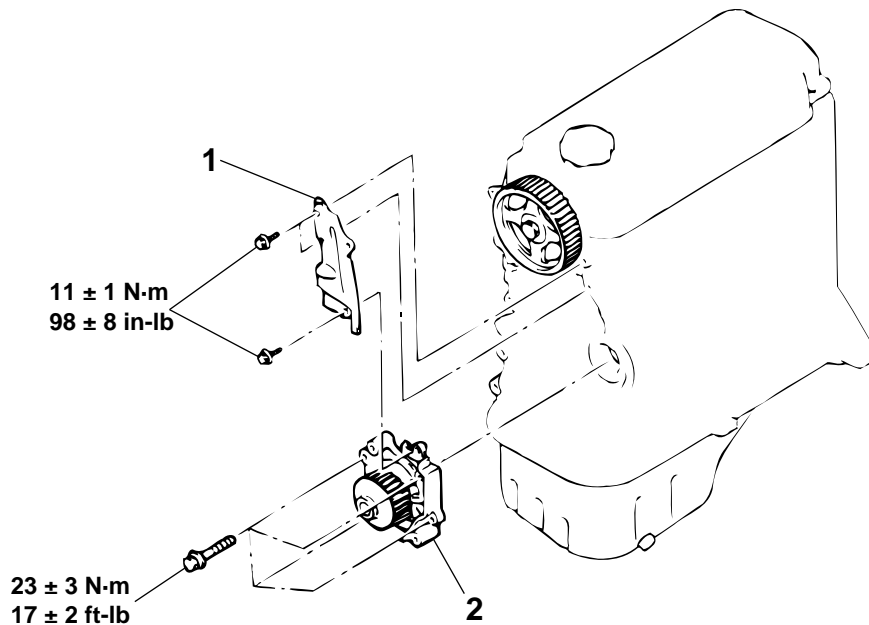
WATER PUMP

REMOVAL AND INSTALLATION <2.0L ENGINE>

M1141002700506

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Refilling (Refer to [P.14-25.](#))
- Timing Belt Removal and Installation (Refer to GROUP 11A, Timing Belt [P.11A-45.](#))



AC100957AB

REMOVAL STEPS

1. TIMING BELT REAR UPPER COVER CONNECTION
- >>A<< 2. WATER PUMP

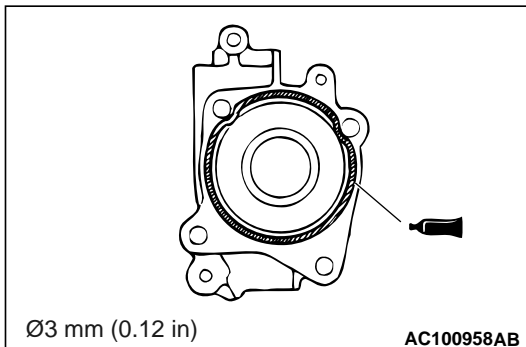
INSTALLATION SERVICE POINT

>>A<< WATER PUMP INSTALLATION

1. Use a gasket scraper or wire brush to completely eliminate all gasket material on the gasket mounting surface.
2. Apply a bead of the specified sealant.

Specified sealant: 3M™ AAD Part No.8672, 8704, 3M™ AAD Part No.8679/8678 or equivalent

3. With the sealant still wet (within 15 minutes after the sealant is applied), install the water pump. Do not apply the sealant in an area more than the required.



REMOVAL AND INSTALLATION <2.4L ENGINE>

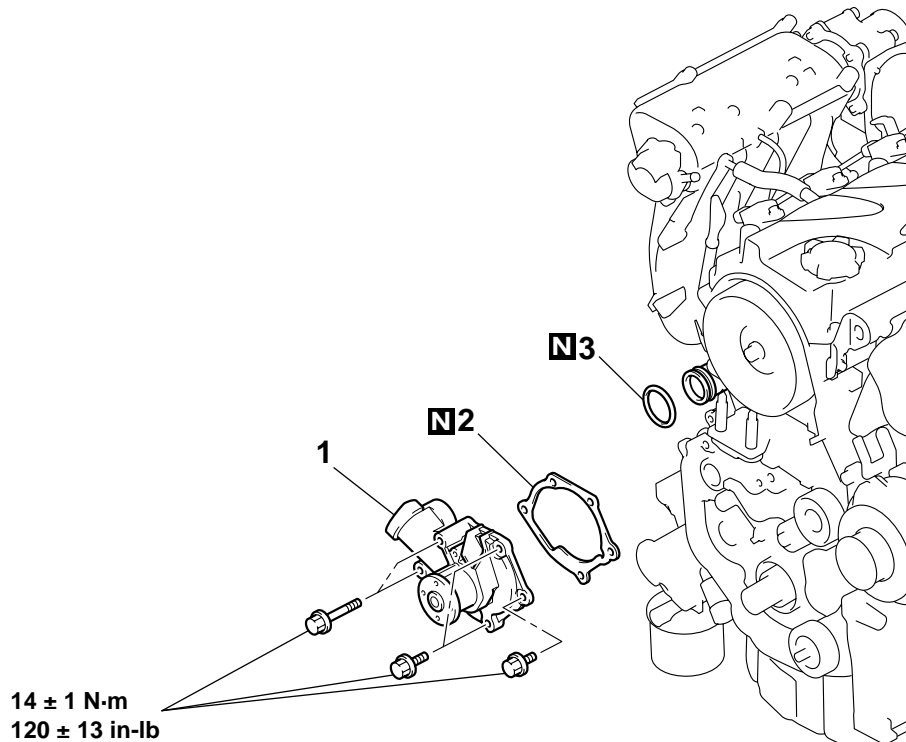
M1141002700517

Pre-removal Operation

- Engine Coolant Draining (Refer to [P.14-25](#)).
- Timing Belt Removal (Refer to GROUP 11C, Timing Belt [P.11C-48](#)).

Post-installation Operation

- Timing Belt Installation (Refer to GROUP 11C, Timing Belt [P.11C-48](#)).
- Engine Coolant Refilling (Refer to [P.14-25](#)).



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REMOVAL STEPS

- >>B<< 1. WATER PUMP

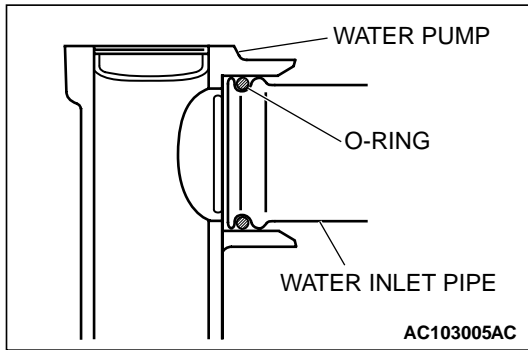
REMOVAL STEPS (Continued)

- >>A<< 2. WATER PUMP GASKET
3. O-RING

INSTALLATION SERVICE POINTS

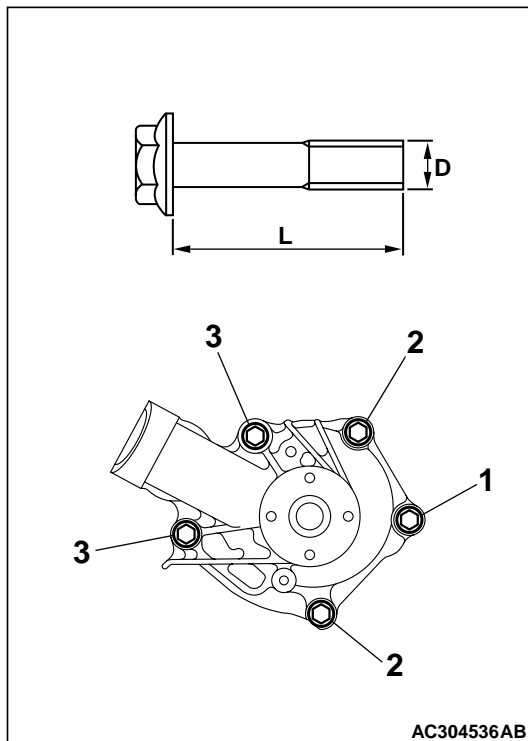
>>A<< O-RING INSTALLATION

1. Fit the O-ring to the O-ring groove at the tip of the water inlet pipe.
2. Wet the O-ring or the inner part of the water pump assembling area with water or coolant, then insert the water inlet pipe.



>>B<< WATER PUMP INSTALLATION

NO.	BOLT DIAMETER (D) × LENGTH (L) mm (in)
1	8 × 14 (0.3 × 0.6)
2	8 × 22 (0.3 × 0.9)
3	8 × 55 (0.3 × 2.2)



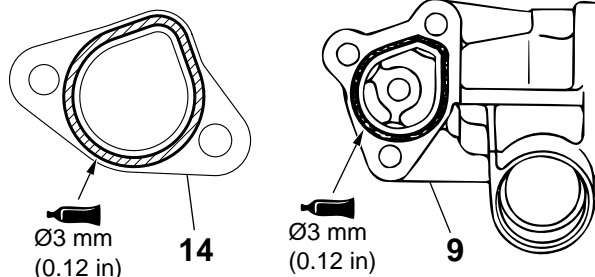
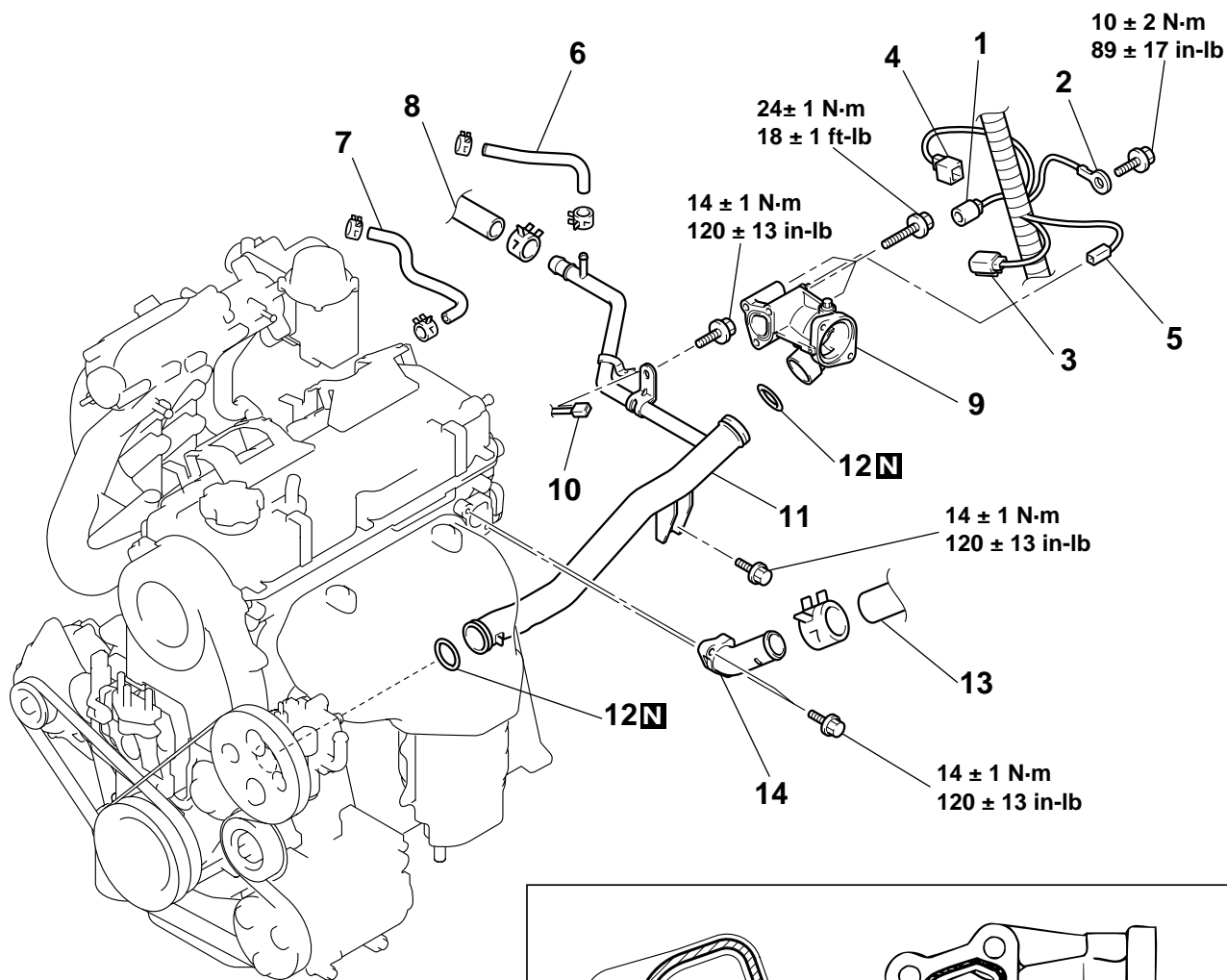
WATER HOSE AND WATER PIPE

REMOVAL AND INSTALLATION <2.0L ENGINE>

M1141003300512

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Supplying (Refer to P.14-25.)
- Air Cleaner Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-4.)
- Thermostat Removal and Installation (Refer to P.14-32).



SEALANT:
3M™ AAD PART NO. 8672, 3M™ AAD PART
NO. 8679/8678 OR EQUIVALENT

AC100805AC

REMOVAL STEPS

1. ENGINE COOLANT
TEMPERATURE SENSOR
CONNECTOR
2. GROUND CABLE
3. KNOCK SENSOR CONNECTOR
4. CAMSHAFT POSITION SENSOR
CONNECTOR
5. ENGINE COOLANT
TEMPERATURE GAUGE UNIT
CONNECTOR
6. WATER HOSE
7. WATER HOSE

>>A<<

>>C<<
<<A>> >>B<<

>>A<<

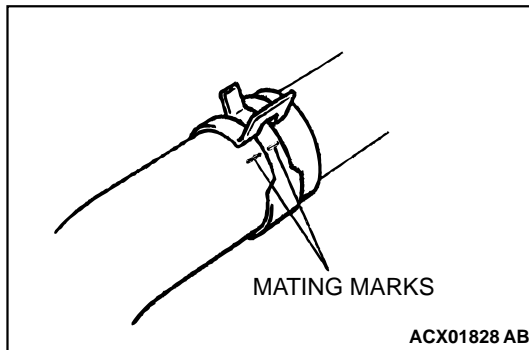
REMOVAL STEPS (Continued)

8. HEATER HOSE CONNECTION
9. THERMOSTAT CASE
ASSEMBLY
10. KNOCK SENSOR CONNECTOR
11. WATER INLET PIPE ASSEMBLY
12. O-RING
13. RADIATOR UPPER HOSE
CONNECTION
14. WATER OUTLET FITTING

REMOVAL SERVICE POINT

<<A>> RADIATOR UPPER HOSE DISCONNECTION

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



INSTALLATION SERVICE POINTS

**>>A<< WATER OUTLET FITTING/THERMOSTAT CASE
ASSEMBLY INSTALLATION**

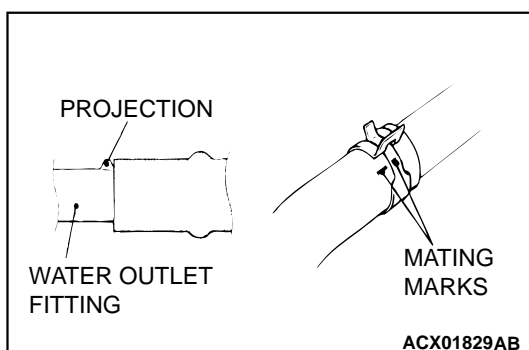
1. Use a gasket scraper or wire brush to completely eliminate all gasket material on the gasket mounting surface.

**Specified Sealant: 3M™ AAD Part No.8672, 3M™ AAD
Part No.8679/8678 or equivalent**

2. With the sealant still wet (within 15 minutes after the sealant is applied), install the thermostat case and water outlet fitting. Do not apply the sealant in an area more than the required.

>>B<< 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.

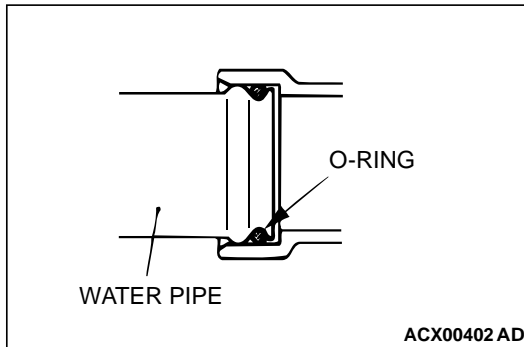


>>C<< O-RING INSTALLATION

⚠ CAUTION

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

Insert the O-ring to the water pipe, and coat the outer portion of the O-ring with water or engine coolant.

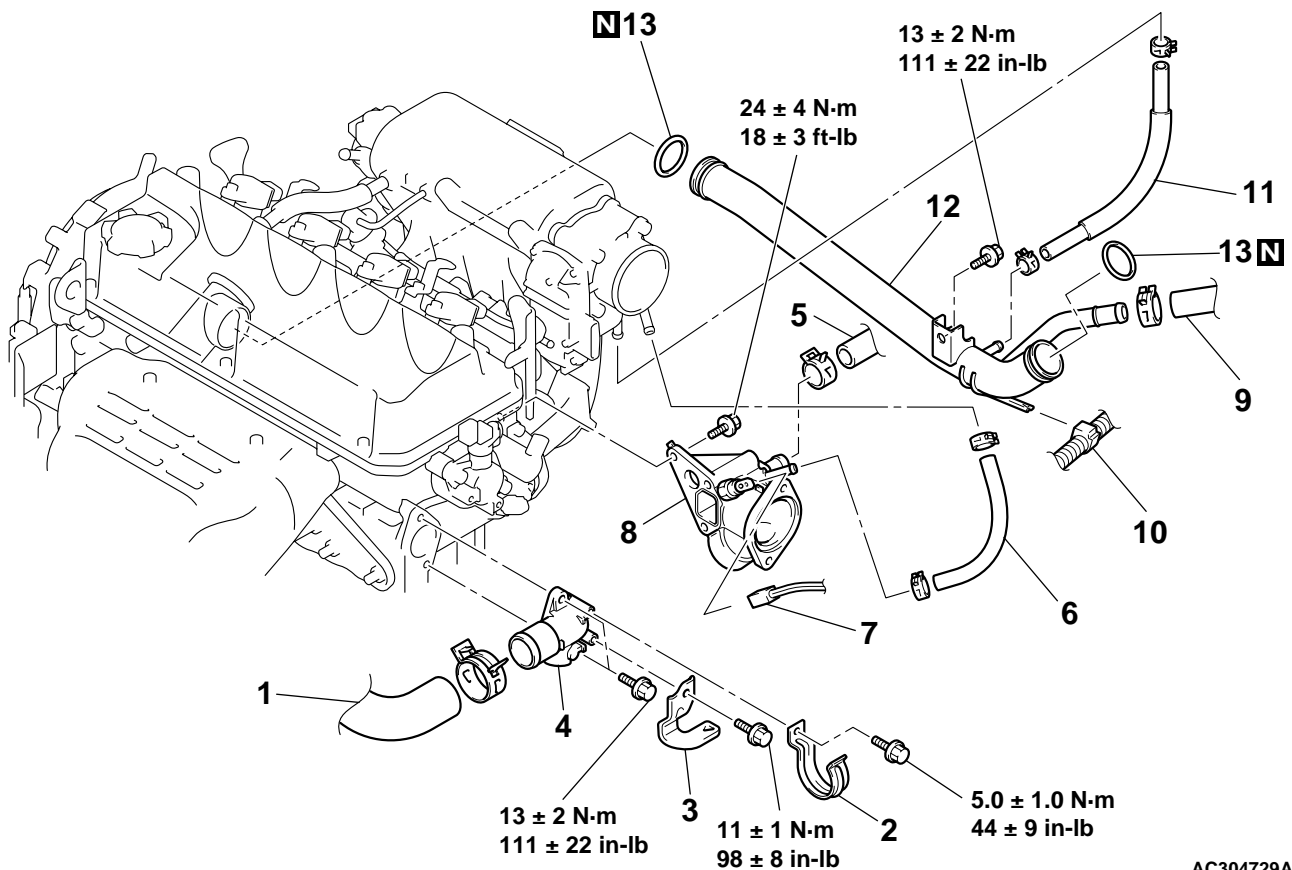


REMOVAL AND INSTALLATION <2.4L ENGINE>

M1141003300523

Pre-removal and Post-installation Operation

- Engine Coolant Draining and Supplying (Refer to P.14-25).
- Air Cleaner Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-4).
- Thermostat Removal and Installation (Refer to P.14-32).



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<<A>> >>C<<

- REMOVAL STEPS**
1. RADIATOR UPPER HOSE CONNECTION
 2. RADIATOR HOSE CLAMP
 3. CONTROL WIRING HARNESS CONNECTION BRACKET

>>B<<

- REMOVAL STEPS (Continued)**
4. WATER OUTLET FITTING
 5. HEATER HOSE CONNECTION
 6. WATER RETURN HOSE

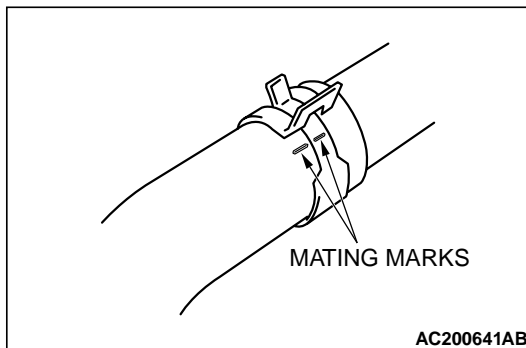
REMOVAL STEPS (Continued)

7. ENGINE COOLANT
TEMPERATURE GAUGE UNIT
CONNECTOR
- >>B<< 8. THERMOSTAT CASE
ASSEMBLY
9. HEATER HOSE CONNECTION
10. HARNESS CLAMP
11. WATER FEED HOSE
12. WATER INLET PIPE ASSEMBLY
- >>A<< 13. O-RING

REMOVAL SERVICE POINT

<<A>> RADIATOR UPPER HOSE DISCONNECTION

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



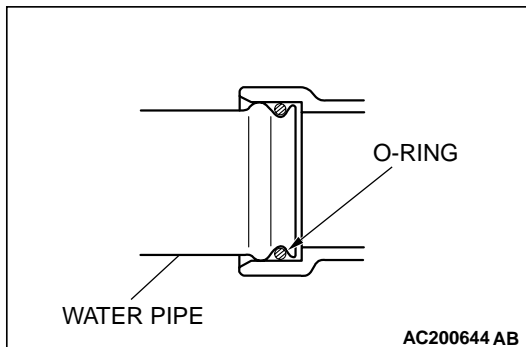
INSTALLATION SERVICE POINTS

>>A<< O-RING INSTALLATION

⚠ CAUTION

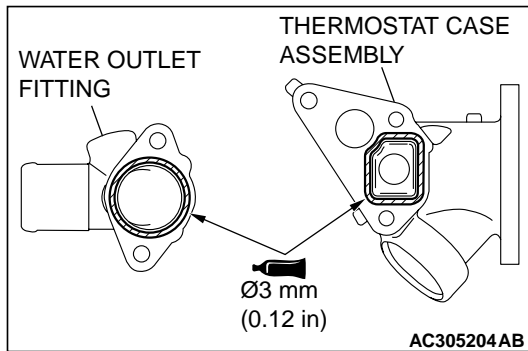
Do not allow engine oil or other grease to adhere to the O-ring

Insert the O-ring to the water pipe, and coat the outer portion of the O-ring with water or engine coolant.



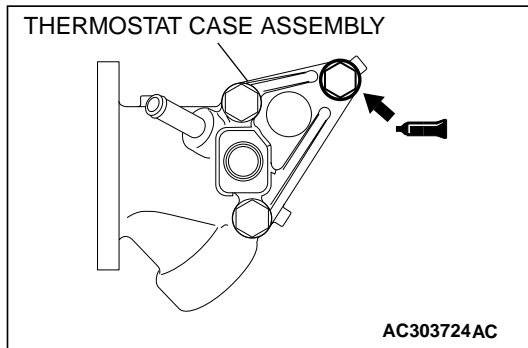
>>B<< THERMOSTAT CASE ASSEMBLY/WATER OUTLET FITTING INSTALLATION

1. Use a gasket scraper or wire brush to completely eliminate all gasket material on the gasket mounting surface.



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

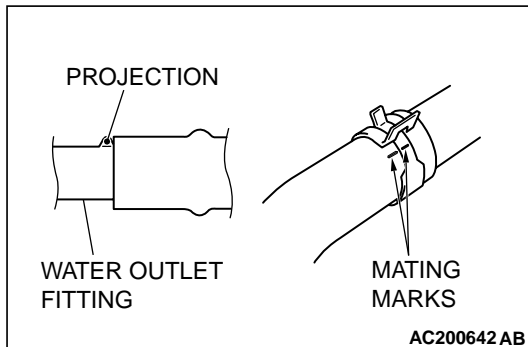
Specified Sealant: 3M™ AAD part No.8672, 3M™ AAD part No.8679/8678 or equivalent



3. Apply sealant to the thread of the thermostat case assembly bolts as shown.

Specified Sealant: 3M™ AAD part No.4170 or equivalent

4. With the sealant still wet (within 15 minutes after the sealant is applied), install the thermostat case. Do not apply the sealant in an area more than the required.



>>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

M1141003400348

Water Pipe and Hose Check

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

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1141005000302

ITEM	SPECIFICATION
Cylinder block drain plug <2.0L ENGINE>	40 ± 5 N·m (30 ± 3 ft-lb)
Cylinder block drain plug <2.4L ENGINE>	44 ± 5 N·m (33 ± 3 ft-lb)
Radiator	
Upper insulator bolt	12 ± 2 N·m (102 ± 22 in-lb)
Thermostat	
Control wiring harness connection bracket bolt <2.4L ENGINE>	11 ± 1 N·m (98 ± 8 in-lb)
Radiator hose clamp bolt <2.4L ENGINE>	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Water inlet fitting bolt <2.0L ENGINE>	19 ± 1 N·m (14 ± 1 in-lb)
Water inlet fitting bolt <2.4L ENGINE>	13 ± 2 N·m (111 ± 22 in-lb)
Water hose and water pipe <2.0L ENGINE>	
Ground cable bolt	10 ± 2 N·m (89 ± 17 in-lb)
Thermostat case assembly bolt	24 ± 1 N·m (18 ± 1 ft-lb)
Water inlet pipe assembly bolt	14 ± 1 N·m (120 ± 13 in-lb)
Water outlet fitting bolt	14 ± 1 N·m (120 ± 13 in-lb)
Water hose and water pipe <2.4L ENGINE>	
Control wiring harness connection bracket bolt	11 ± 1 N·m (98 ± 8 in-lb)
Radiator hose clamp bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Thermostat case assembly bolt	24 ± 4 N·m (18 ± 3 ft-lb)
Water inlet pipe assembly bolt	13 ± 2 N·m (111 ± 22 in-lb)
Water outlet fitting bolt	13 ± 2 N·m (111 ± 22 in-lb)
Water pump <2.0L ENGINE>	
Timing belt rear upper cover connection bolt	11 ± 1 N·m (98 ± 8 ft-lb)
Water pump bolt	23 ± 3 N·m (17 ± 2 in-lb)
Water pump <2.4L ENGINE>	
Water pump bolt	14 ± 1 N·m (120 ± 13 in-lb)

SERVICE SPECIFICATIONS

M1141000300450

ITEM		STANDARD VALUE	LIMIT
Fan control module V	A/C OFF	1 or less	-
	A/C ON	Repeat steps 1) and 2). 1) 8.2 ± 2.6 2) Battery positive voltage ± 2.6	-
High-pressure valve opening pressure of radiator cap kPa (psi)		93 – 123 (14 – 18)	83 (12)
Thermostat	Valve opening temperature of thermostat °C (°F)	82 ± 1.5 (180 ± 3)	-
	Full-opening temperature of thermostat °C (°F)	95 (203)	-
	Valve lift mm (in)	8.5 (0.33) or more	-

COOLANT

M1141000400372

ITEM		QUANTITY dm ³ (qt)
Long Life Antifreeze Coolant or an equivalent	2.0L ENGINE	6.0 (6.3)
	2.4L ENGINE	7.0 (7.4)

SEALANT

M1141000500379

ITEM	SPECIFIED SEALANT
Cylinder block drain plug	3M™ AAD Part No.8731 or equivalent
Thermostat case assembly, Water outlet fitting	3M™ AAD Part No.8672, 3M™ AAD Part No.8679/8678 or equivalent
Thermostat case assembly bolt <2.4 L ENGINE>	3M™ AAD Part No.4170 or equivalent
Water pump <2.0 L ENGINE>	3M™ AAD Part No.8672, 3M™ AAD Part No.8679/8678 or equivalent