GROUP 14

ENGINE COOLING

CONTENTS

GENERAL INFORMATION

M1141000102333

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 temperature, the thermostat opens to circulate the coolant through the radiator as well so that the heat absorbed by the coolant may be radiated into the air. The water pump is of the centrifugal impeller type and is driven by the drive belt from the crankshaft. The radiator is the corrugated fin, cross flow type.

SPECIFICATION

Item		Specification
Radiator	Performance kJ/h	201,800

SERVICE SPECIFICATIONS

M1141000302229

Item		Standard value	Limit
Valve opening pressure of radiator cap kPa		93 – 123	Minimum 83
Range of coolant antifreeze concentration of radiator %		30 – 60	–
Thermostat	Valve opening temperature of thermostat °C	82 ± 1.5	–
	Full-opening temperature of thermostat °C	95	–
	Valve lift mm	8.5 or more	–

LUBRICANT

M1141000402055

Item	Specified coolant	Quantity L
Engine coolant (including 0.65 L in the radiator condenser tank)	DIA QUEEN SUPER LONG LIFE COOLANT PREMIUM or equivalent*	Approximately 7.5

*NOTE: *similar high quality ethylene glycol based non-silicate, non-amine, non-nitrate and non-borate coolant with long life hybrid organic acid technology.*

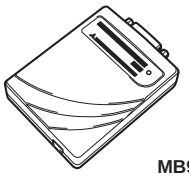
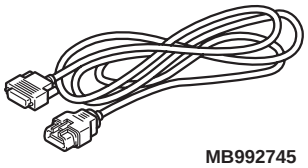
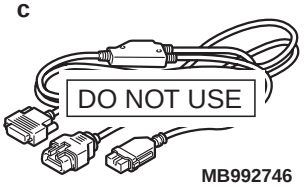
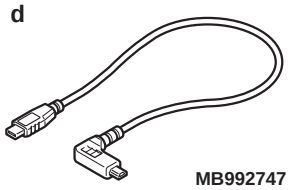
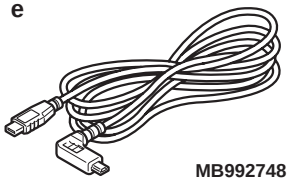
SEALANT

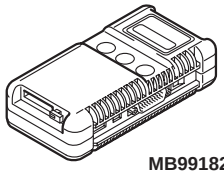
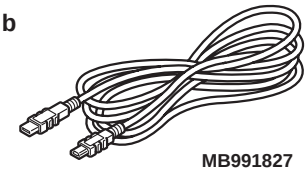
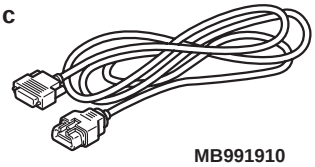
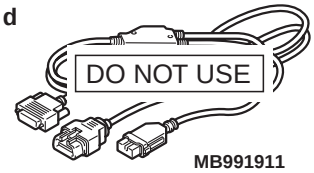
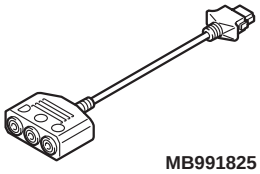
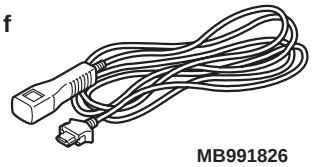
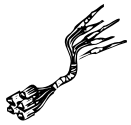
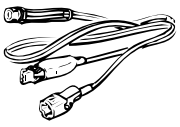
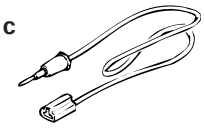
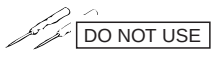
M1141000501822

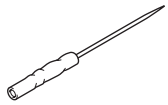
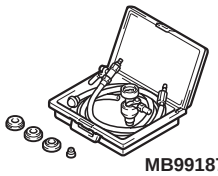
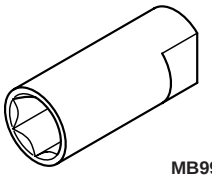
Item	Specified sealant	Remark
Engine coolant temperature sensor	ThreeBond 1324N, LOCTITE 262 or equivalent	Anaerobic sealant

SPECIAL TOOLS

M1141000601818

Tool	Number	Name	Use
a  MB992744 b  MB992745 c  MB992746 d  MB992747 e  MB992748 ACB05421AB	a. MB992744 b. MB992745 c. MB992746 d. MB992747 e. MB992748	a. Vehicle communication interface-Lite (V.C.I.-Lite) b. V.C.I.-Lite main harness A (for vehicles with CAN communication) c. V.C.I.-Lite main harness B (for vehicles without CAN communication) d. V.C.I.-Lite USB cable short e. V.C.I.-Lite USB cable long	• Reading diagnosis codes. • Actuator test.

Tool	Number	Name	Use
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991825 f  MB991826 MB991955	MB991955 a: MB991824 b: MB991827 c: MB991910 d: MB991911 e: MB991825 f: MB991826	M.U.T.-III sub assembly a: Vehicle communication interface (V. C. I.) b: M.U.T.-III USB cable c: M.U.T.-III main harness A (Vehicles with CAN communication system) d: M.U.T.-III main harness B (Vehicles without CAN communication system) e: M.U.T.-III measurement adapter f: M.U.T.-III trigger harness	**⚠ CAUTION** **For vehicles with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B instead, the CAN communication does not function correctly.** • Reading diagnosis codes. • Actuator test.
a  b  c  d  MB991223	MB991223 a: MB991219 b: MB991220 c: MB991221 d: MB991222	Harness set a: Check harness b: LED harness c: LED harness adapter d: Probe	Checking the continuity and measuring the voltage at the harness connector.

Tool	Number	Name	Use
 MB992006	MB992006	Extra fine probe	Continuity check and voltage measurement at harness wire or connector for loose, corroded or damaged terminals, or terminals pushed back in the connector.
 MB991870AB	MB991871	LLC changer	Coolant refilling.
 MB992042	MB992042	Water temperature sensor wrench	Engine coolant temperature sensor removal and installation.

TROUBLESHOOTING

INSPECTION CHART FOR TROUBLE SYMPTOMS

M1141005601095

Trouble symptom	Inspection procedure No.	Reference page
Radiator fan and condenser fan do not operate	1	P.14-5

SYMPTOM PROCEDURES

Inspection Procedure 1: Radiator Fan and Condenser Fan do not Operate

OPERATION

- Based on the signal from the engine coolant temperature sensor and the signal from the secondary pulley speed sensor signal (vehicle speed signal) from the CVT-ECU, and the A/C switch signal from the A/C-ECU, the engine-ECU sends the radiator fan and condenser fan control signal to the ETACS-ECU via CAN bus line.
- Based on the radiator fan and condenser fan control signal from the engine-ECU, the ETACS-ECU turns ON/OFF the radiator fan relay, condenser fan relay, and the fan control relay to control the rotation of the radiator fan motor and condenser fan motor.

TECHNICAL DESCRIPTION

- If the radiator fan and condenser fan do not operate, the radiator fan motor, the condenser fan motor, the radiator fan relay, the condenser fan relay, the fan control relay, the ETACS-ECU may be defective.
- The CAN bus line, ETACS-ECU, CVT system, A/C system, or MPI system may also be defective.

PROBABLE CAUSES

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the MPI system.
- Malfunction of the CVT system.
- Malfunction of the A/C system.
- Malfunction of fusible link SBF3.

- Malfunction of fusible link SBF4.
- Malfunction of radiator fan relay.
- Malfunction of condenser fan relay.
- Malfunction of fan control relay.
- Malfunction of radiator fan motor.
- Malfunction of condenser fan motor.
- Malfunction of engine compartment relay box.
- Malfunction of ETACS-ECU.
- Malfunction of engine-ECU.

DIAGNOSIS PROCEDURE

⚠ CAUTION

- **If there is any problem in the CAN bus lines, an incorrect diagnosis code may be set. Prior to this diagnosis, diagnose the CAN bus lines.**
- **Before replacing the ECU, ensure that the CAN bus lines is normal.**

STEP 1. Check the CAN bus system diagnosis.
Using M.U.T.-III, perform CAN bus diagnosis (Refer to GROUP 54C – Explanation About The M.U.T-III CAN Bus Diagnostics).

Q: Is the check result satisfactory?
YES : Go to Step 2.
NO : Repair the CAN bus lines (Refer to GROUP 54C – Troubleshooting, CAN Bus Diagnostic Table). Then go to Step 23.

STEP 2. Check the MPI system actuator test.
Using M.U.T.-III to check the MPI system actuator test (Refer to GROUP 13A – Troubleshooting, Actuator Test Reference Table).

- Item 14: Cooling fan motor

Q: Is the check result normal?
YES : Go to Step 22.
NO : Go to Step 3.

STEP 3. Check the MPI system diagnosis code.
Using M.U.T.-III, perform MPI system diagnosis code (Refer to GROUP 13A – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the MPI system (Refer to GROUP 13A – Troubleshooting, Inspection Chart for Diagnosis Code). Then go to Step 23.
NO : Go to Step 5 <M/T>.
NO : Go to Step 4 <CVT>.

STEP 4. Check the CVT system diagnosis code .
Using M.U.T.-III, perform CVT system diagnosis code (Refer to GROUP 23A – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the CVT system (Refer to GROUP 23A – Troubleshooting, Diagnosis Code Chart). Then go to Step 23.
NO : Go to Step 5.

STEP 5. Check the A/C system diagnosis code.
Using M.U.T.-III, perform A/C system diagnosis code (Refer to GROUP 55 – Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the A/C system (Refer to GROUP 55 – Troubleshooting, Diagnosis Code Chart). Then go to Step 23.
NO : Go to Step 6.

STEP 6. Check the ETACS system diagnosis code.
Using M.U.T.-III, perform ETACS system diagnosis code (Refer to GROUP 54A – ETACS, Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Repair the ETACS system (Refer to GROUP 54A – ETACS, Troubleshooting, Diagnosis Code Chart). Then go to Step 23.
NO : Go to Step 7.

STEP 7. Measure the terminal voltage at ETACS-ECU connector.
(1) Disconnect the ETACS-ECU connector and measure at the harness connector side.
(2) Measure the terminal voltage between terminal F/LO and earth, between terminal F/HI and earth.

OK: System voltage.

Q: Is the check result normal?
YES : Go to Step 13.
NO : Go to Step 8.

STEP 8. Connectors check: condenser fan relay connector, radiator fan relay connector, fan control relay connector, and ETACS-ECU connector.

Q: Is the check result normal?
YES : Go to Step 9.
NO : Repair or replace the damaged connector or replace the relay box. Then go to Step 23 .

STEP 9. Check the harness wire between condenser fan relay connector and ETACS-ECU connector terminal F/HI, between radiator fan relay connector and ETACS-ECU connector terminal F/LO, and between fan control relay connector and condenser fan connector.

- Check harness wire for open/short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 10.
NO : Repair or replace the damaged harness wire. Then go to Step 23.

STEP 10. Check the harness wire between fusible link SBF3 and condenser fan relay connector, between fusible link SBF3 and fan control relay connector, and between fusible link SBF4 and radiator fan relay connector.

- Check harness wire for open/short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 11.
NO : Repair or replace the damaged harness wire. Then go to Step 23.

STEP 11. Check the radiator fan relay, the condenser fan relay, and the fan control relay.
Refer to P.14-11.

Q: Is the check result normal?
YES : Go to Step 12.
NO : Replace the damaged relay (Refer to P.14-10). Then go to Step 23.

STEP 12. Check the fusible link SBF3 and SBF4.

Q: Is the check result normal?
YES : Go to Step 20.
NO : Replace the damaged fusible link. Then go to Step 23.

STEP 13. Connectors check: condenser fan relay connector, radiator fan relay connector, fan control relay connector, radiator fan motor connector, and condenser fan motor connector.

Q: Is the check result normal?
YES : Go to Step 14.
NO : Repair or replace the damaged connector or replace the relay box. Then go to Step 23 .

STEP 14. Check the harness wire between condenser fan relay connector and condenser fan motor connector, and between condenser fan motor connector and earth.

- Check harness wire for open/short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 15.
NO : Repair or replace the damaged harness wire. Then go to Step 23.

STEP 15. Check the harness wire between radiator fan relay connector and radiator fan motor connector, and between radiator fan motor connector and fan control relay connector.

- Check harness wire for open/short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 16.
NO : Repair or replace the damaged harness wire. Then go to Step 23.

STEP 16. Check the harness wire between fan control relay connector and condenser fan relay connector, and between fan control relay connector and earth.

- Check harness wire for open/short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 17.
NO : Repair or replace the damaged harness wire. Then go to Step 23.

STEP 17. Check the harness wire between fusible link SBF3 and condenser fan relay connector, and between fusible link SBF4 and radiator fan relay connector.

- Check harness wire for open/short circuit and damage.

Q: Is the check result normal?
YES : Go to Step 18.
NO : Repair or replace the damaged harness wire. Then go to Step 23.

STEP 18. Check the radiator fan relay, the condenser fan relay, and the fan control relay.
Refer to P.14-11.

Q: Is the check result normal?
YES : Go to Step 19.
NO : Replace the damaged relay (Refer to P.14-10). Then go to Step 23.

STEP 19. Check the radiator fan motor and the condenser fan motor.
Refer to P.14-12.

Q: Is the check result normal?
YES : Go to Step 20.
NO : Replace the damaged fan motor (Refer to P.14-19). Then go to Step 23.

STEP 20. Check the ETACS system diagnosis code.
Using M.U.T.-III, perform ETACS system diagnosis code (Refer to GROUP 54A – ETACS, Troubleshooting, Diagnosis Function).

Q: Is any diagnosis code set?
YES : Replace the ETACS-ECU (Refer to GROUP 54A – ETACS, ETACS-ECU). Then go to Step 23.
NO : Go to Step 21.

STEP 21. Check the MPI system actuator test.
Using M.U.T.-III, check the MPI system actuator test (Refer to GROUP 13A – Troubleshooting, Actuator Test Reference Table).
- Item 14: Cooling fan motor.

Q: Is the check result normal?
YES : Go to Step 22.
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 23.

STEP 22. Check the symptoms.

Q: Does the radiator fan and condenser fan operate normal?
YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points, How to Cope with Intermittent Malfunction).
NO : Replace the engine-ECU (Refer to GROUP 13A – Engine-ECU). Then go to Step 23.

STEP 23. Check the symptoms.

Q: Does the radiator fan and condenser fan operate normal?
YES : The procedure is complete.
NO : Return to Step 1.

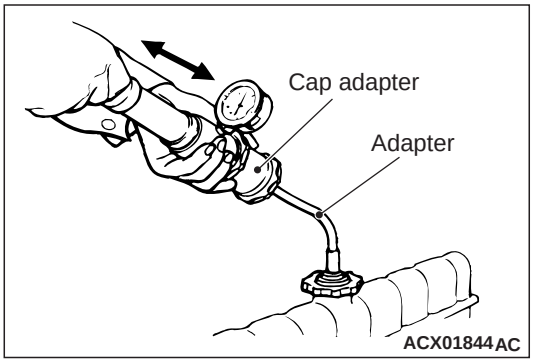
ON-VEHICLE SERVICE

ENGINE COOLANT LEAK CHECK

M1141001001240

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

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

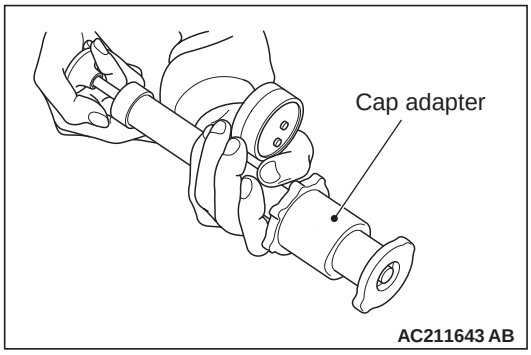


1. Check that the coolant level is up to the filler neck. Install a radiator tester and apply 160 kPa pressure, and then check for leakage from the radiator hose or connections.
2. If there is leakage, repair or replace the appropriate part.

RADIATOR CAP VALVE OPENING PRESSURE CHECK

M1141001301445

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



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

   Minimum limit: 83 kPa
   Standard value: 93 – 123 kPa
3. Replace the radiator cap if the reading does not remain at or above the limit.

ENGINE COOLANT REPLACEMENT

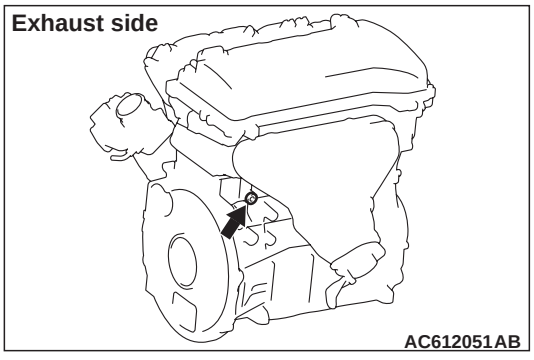
M1141001202991

1. Remove the front under cover panel (Refer to GROUP 51 – Under Cover – Removal and Installation).

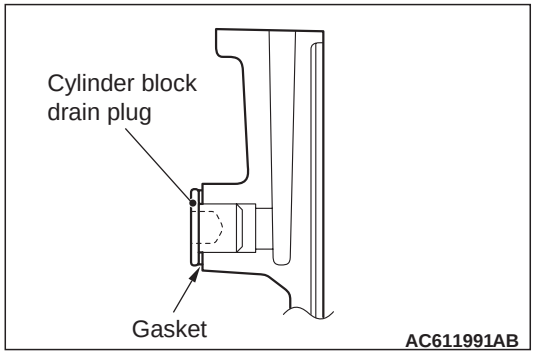
⚠ *WARNING*

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

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



3. Drain the water in the water jacket by unplugging the drain plug of the cylinder block.
4. Remove the radiator condenser tank and drain the coolant.

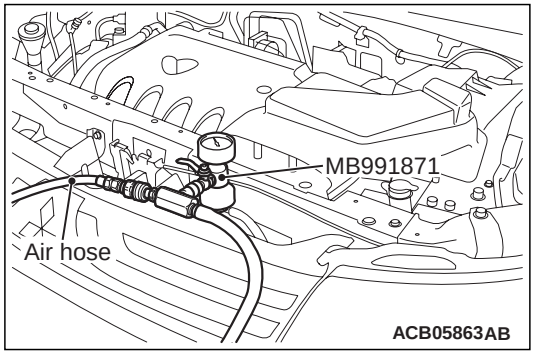


5. Replace the cylinder block drain plug gasket, and tighten the drain plug to the specified torque.

   Tightening torque: 39 ± 3 N·m
6. Securely tighten the radiator drain plug.
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 aluminium components.



8. Use special tool LLC changer (MB991871) to refill the engine coolant up to the top of the radiator port.

   Recommended antifreeze: DIA QUEEN SUPER LONG LIFE COOLANT PREMIUM or equivalent*

   NOTE: *similar high quality ethylene glycol based non-silicate, non-amine, non-nitrate and non-borate coolant with long life hybrid organic acid technology.

   Quantity: Approximately 7.5 L (including 0.65 L in the radiator condenser tank)

   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 work is to open 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.

16.Install the front under cover panel (Refer to GROUP 51 – Under Cover – Removal and Installation).

CONCENTRATION MEASUREMENT

M1141001101582

⚠ CAUTION

- **Engine coolant of less than 30% concentration has a less rust-proof effect. In a concentration of over 60%, the antifreeze effect and engine cooling performance of the engine coolant are deteriorated, causing a detrimental effect on the engine. Therefore, observe the service concentration range without fail.**
- **Use the Dia Queen Super Long Life Coolant Premium without adding water because the concentration is preadjusted to 50%.**

Using a hydrometer, check if the engine coolant concentration is within the standard value range.

Standard value: 30 to 60% (service concentration range)

WATER PUMP COOLANT LEAK CHECK

M1141008600842

Even when the water pump is normal, a residue of the coolant draining may be found on the drain hole, the vapour hole and the installation surface of the water pump. If a residue of the coolant draining is found, check the water pump leakage by following method.

1. Wipe off the residue of the coolant draining on the water pump.

⚠ WARNING

Make sure that the coolant is cold when removing the radiator cap.

2. Remove the radiator cap.

⚠ CAUTION

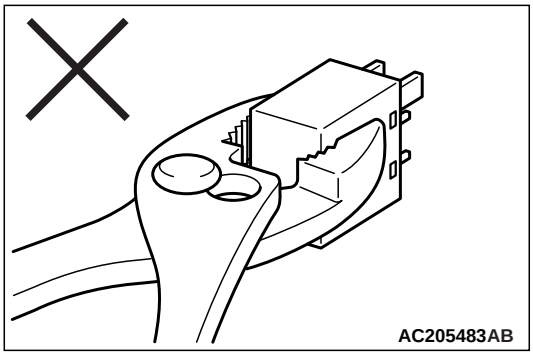
Do not pressurise 100 kPa or more.

3. Install the radiator cap tester, and pressurise with 100 kPa.
4. Hold the pressurised state for 20 minutes, and check that the water leakage from the drain hole, the vapour hole or the installation surface of the water pump.
5. Remove the radiator cap tester, and install the radiator cap.
6. Warm up the engine, let it idle for 20 minutes and stop it.
7. After the engine is stopped, check the water leakage from the drain hole, the vapour hole or the installation surface of the water pump.
8. If the water leakage is confirmed in the items 4 and 7, replace the water pump. (Refer to P.14-15) .

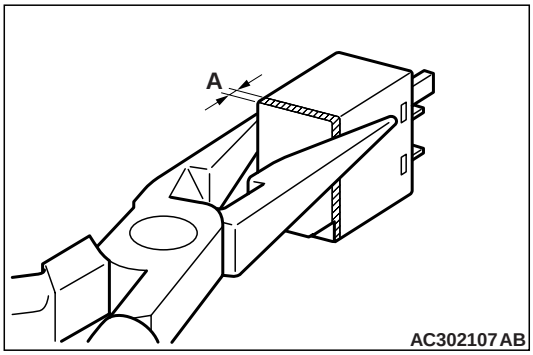
COOLING FAN RELAY REPLACEMENT

M1141007200368

⚠ CAUTION



Basically, remove or install the relay by hand. If the centre of relay has been pinched by pliers, it can be damaged.

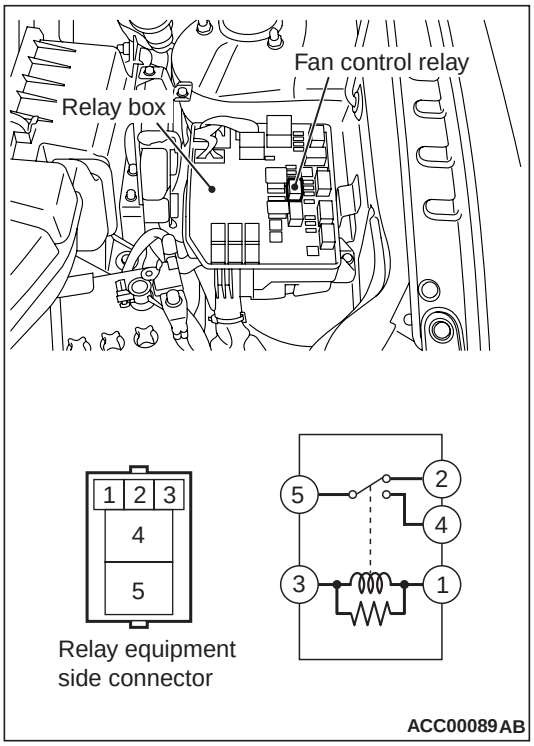


1. Remove the relay by hand. If it cannot be removed by hand, pinch the part A shown with long-nose pliers and remove the relay.
2. Install the new relay by hand.

COOLING FAN RELAY CONTINUITY CHECK

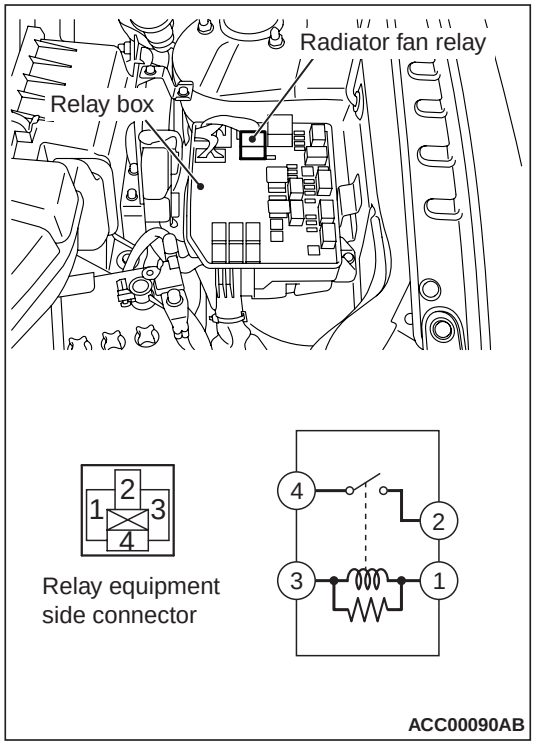
M1141006201818

FAN CONTROL RELAY CHECK



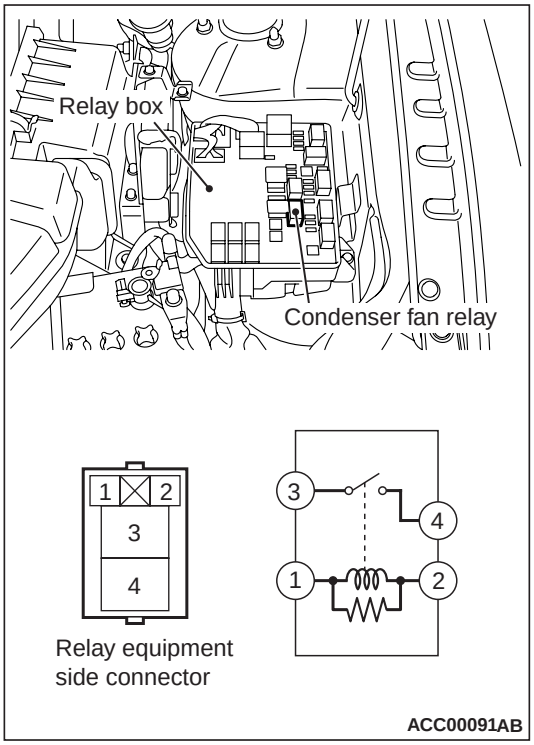
Battery voltage	Terminal No. to be connected to tester	Continuity test results
Not applied	2 – 5	Continuity (Less than 2 Ω)
	4 – 5	Open circuit
Connect terminal No. 3 and battery (+) terminal. Connect terminal No. 1 and battery (–) terminal.	2 – 5	Open circuit
	4 – 5	Continuity (Less than 2 Ω)

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. 3 and battery (+) terminal. Connect terminal No. 1 and battery (–) terminal.		Continuity (Less than 2 Ω)

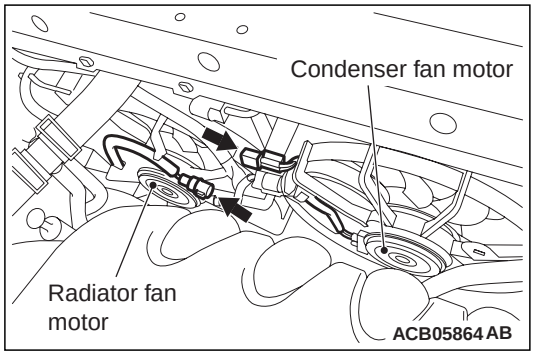
CONDENSER FAN RELAY CHECK



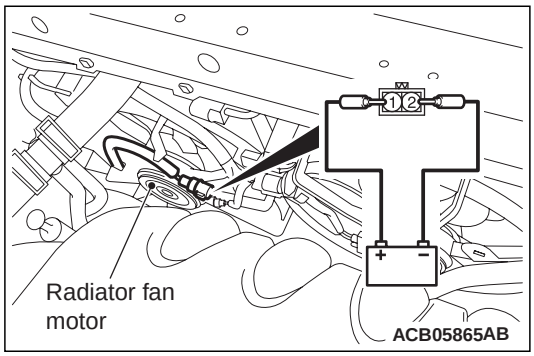
Battery voltage	Terminal No. to be connected to tester	Continuity test results
Not applied	3 – 4	Open circuit
Connect terminal No.1 and battery (+) terminal. Connect terminal No.2 and battery (–) terminal.		Continuity (Less than 2 Ω)

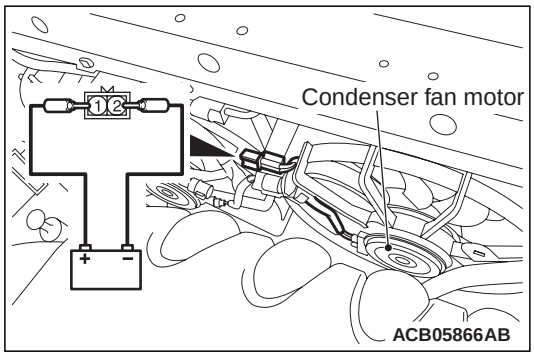
COOLING FAN MOTOR CHECK

M1141007600850



1. Disconnect the fan motor connector.





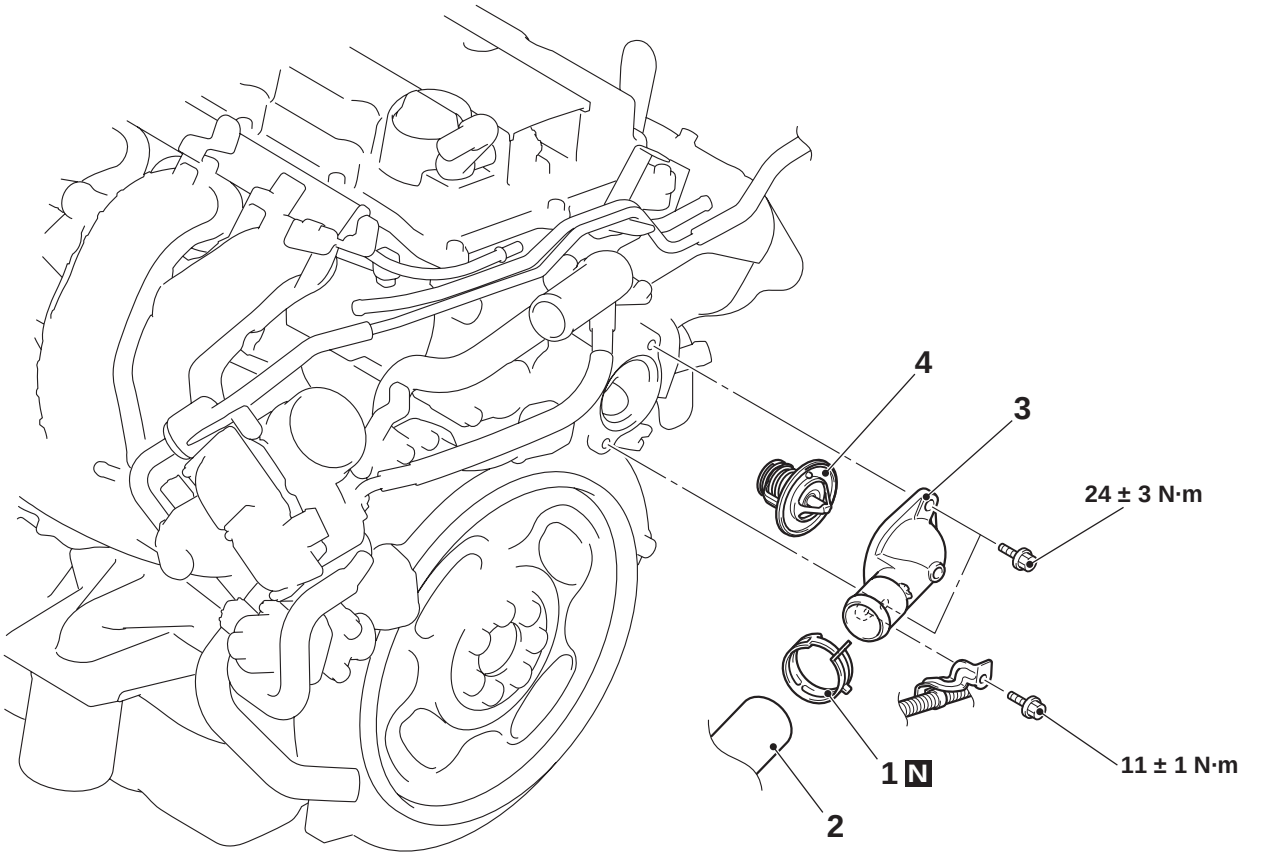
2. Check that the fan motor runs when a positive battery terminal is connected to the fan motor-side connector terminal No.1, and terminal No.2 is earthed. Also check to see that there is no abnormal sound emitted from the fan motor at this time.
3. If the fan motor is defective, replace it (Refer to P.14-19).
4. Connect the fan motor connector.

THERMOSTAT

REMOVAL AND INSTALLATION

M1141002403247

Pre-removal Operation	Post-installation Operation
• Engine Coolant Draining (Refer to P.14-9). • Engine Upper Cover Removal (Refer to GROUP 11A – Camshaft) . • Air Cleaner Assembly Removal (Refer to GROUP 15 – Air Cleaner) .	• Air Cleaner Assembly Installation (Refer to GROUP 15 – Air Cleaner) . • Engine Upper Cover Installation (Refer to GROUP 11A – Camshaft) . • Engine Coolant Refilling (Refer to P.14-9).

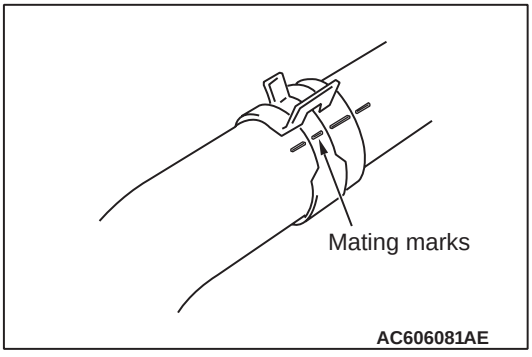


AC506788AE

			Removal steps
<<A>>	>>B<<	1.	Hose clip
<<A>>	>>B<<	2.	Radiator lower hose connection
		3.	Water inlet fitting
	>>A<<	4.	Thermostat

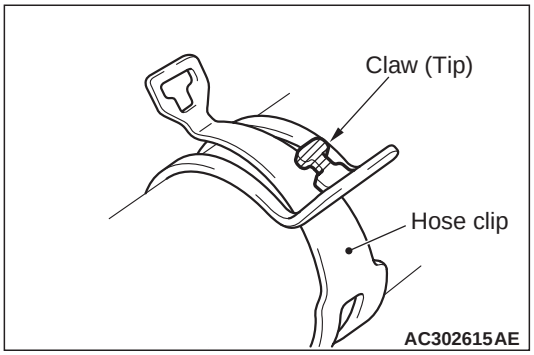
REMOVAL SERVICE POINT

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



AC606081AE

1. Make mating marks on the radiator lower hose and the hose clip as shown to install them in the original position.



2. Break off the tip of hose clip claw and spread out the hose clip, then disconnect the radiator lower hose.

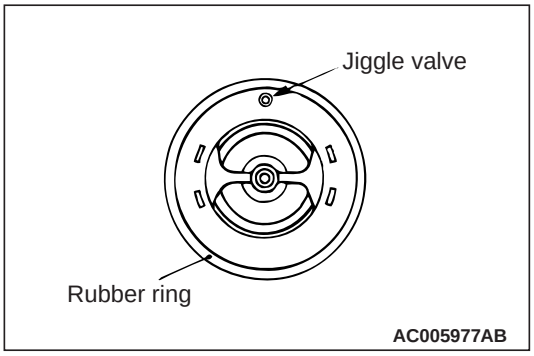
   NOTE: If there is a hose clip claw, the hose clip cannot spread to capacity because the claw contacts the hose clip.

INSTALLATION SERVICE POINTS

>>A<< THERMOSTAT INSTALLATION

⚠ CAUTION

Avoid adhesion of grease to the rubber ring of the thermostat. If the rubber ring is damaged, replace the thermostat.



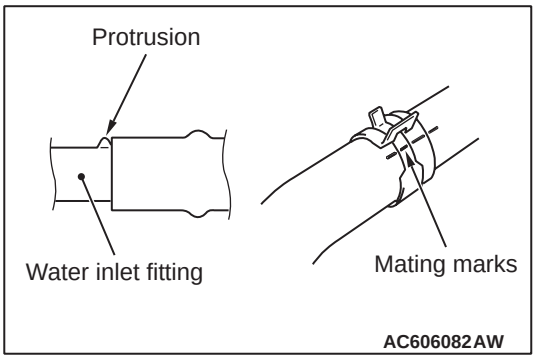
Install the thermostat with care to avoid peeling or damage to the rubber ring. When installing the thermostat, face the jiggle valve of the thermostat upward.

>>B<< RADIATOR LOWER HOSE/HOSE CLIP CONNECTION

⚠ CAUTION

Never reuse the hose clip whose claw is broken off to prevent the rusting.

1. Make mating mark on a new hose clip in the same position as the remove one.

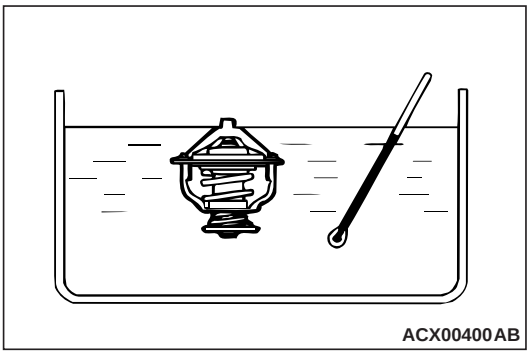


2. Insert the radiator lower hose until the protrusion of the water inlet fitting.
3. Align the mating marks on the radiator lower hose and hose clip.
4. Remove the hose clip claw and shorten the hose clip, then install the radiator lower hose.

INSPECTION

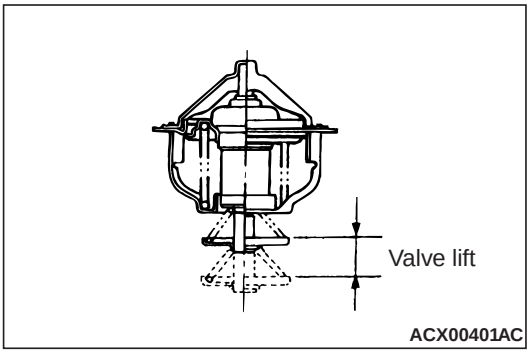
M1141002501969

THERMOSTAT CHECK



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

   Standard value: 82 ± 1.5°C



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

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.

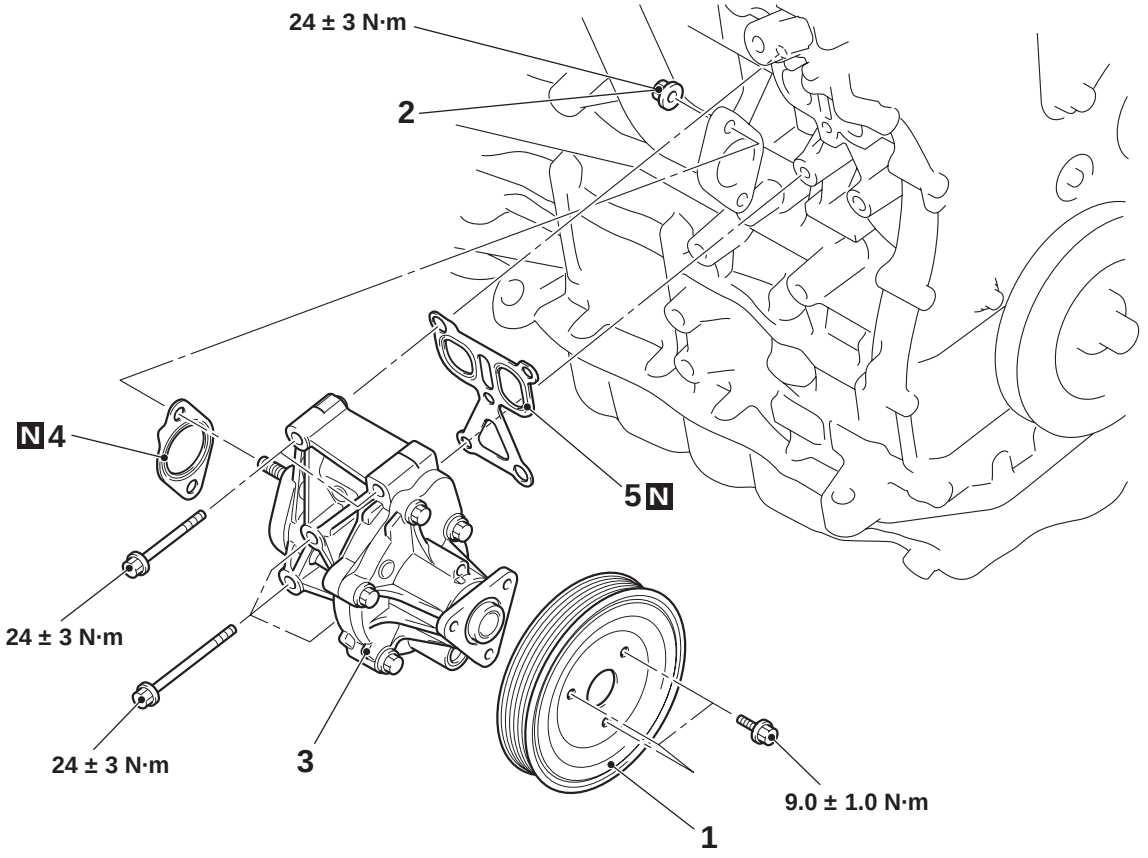
Standard value:
Full-opening temperature: 95°C
Amount of valve lift: 8.5 mm or more

WATER PUMP

REMOVAL AND INSTALLATION

M1141002702999

Pre-removal Operation	Post-installation Operation
• Engine Coolant Draining (Refer to P.14-9). • Alternator and Others Belt Removal (Refer to GROUP 11A – Crankshaft Pulley) .	• Alternator and Others Belt Installation (Refer to GROUP 11A – Crankshaft Pulley) . • Alternator and Others Belt Tension Check (Refer to GROUP 11A – On-vehicle Service, Drive Belt Tension Check and Adjustment) . • Engine Coolant Refilling (Refer to P.14-9).



AC509330 AB

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

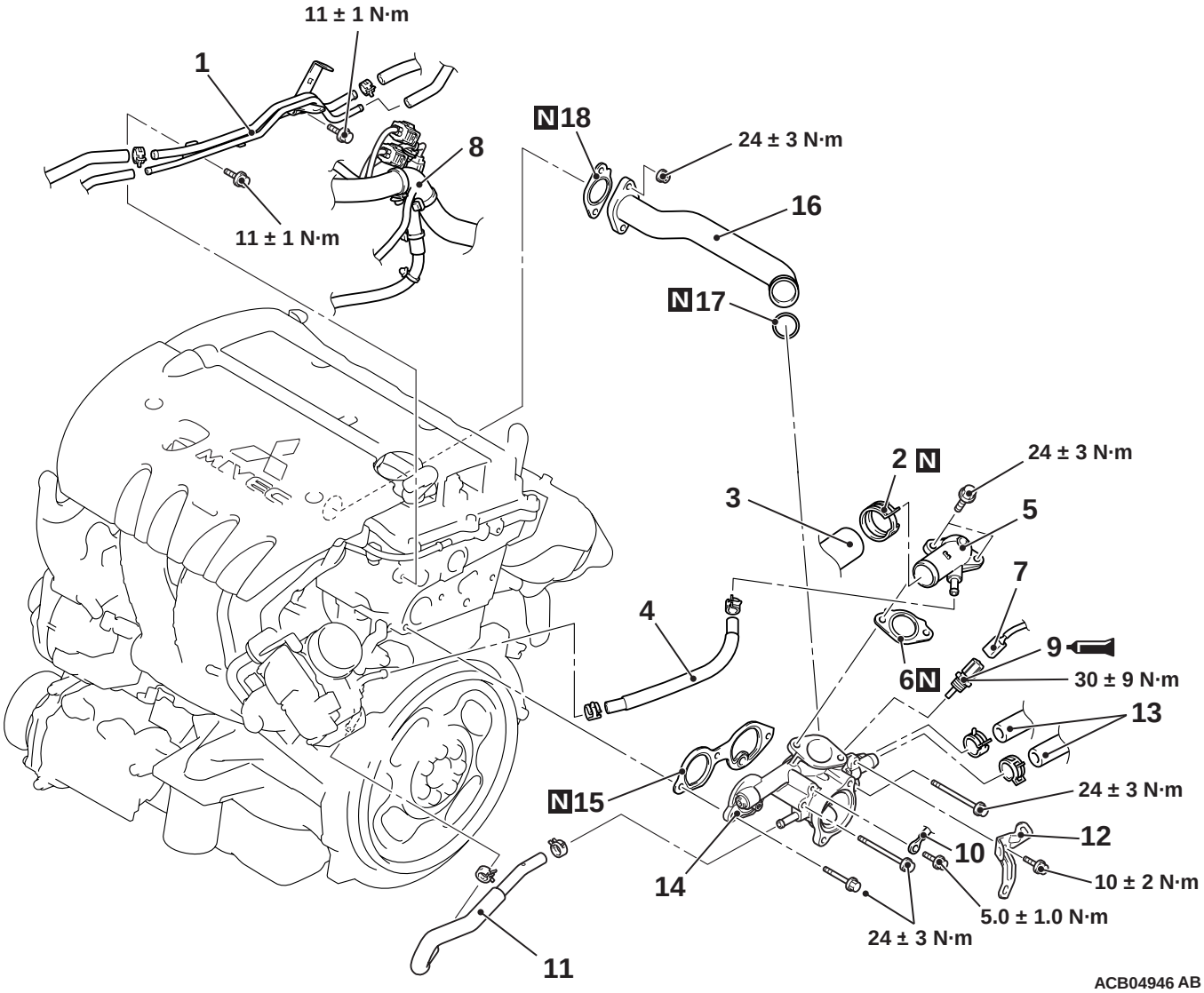
Removal steps (Continued)
3. Water pump
4. Cooling water line gasket
5. Water pump gasket

WATER HOSE AND WATER PIPE

REMOVAL AND INSTALLATION

M1141003304268

Pre-removal Operation	Post-installation Operation
• Engine Coolant Draining (Refer to P.14-9). • Engine Upper Cover Removal (Refer to GROUP 11A – Camshaft) . • Air Cleaner Assembly Removal (Refer to GROUP 15 – Air Cleaner) . • Thermostat Removal (Refer to P.14-13).	• Thermostat Installation (Refer to P.14-13). • Air Cleaner Assembly Installation (Refer to GROUP 15 – Air Cleaner) . • Engine Upper Cover Installation (Refer to GROUP 11A – Camshaft) . • Engine Coolant Refilling (Refer to P.14-9).



Removal steps

<<A>> >>C<< 1. Vacuum pipe assembly
<<A>> >>C<< 2. Hose clip
3. Radiator upper hose connection
4. Throttle body water feed hose
5. Water outlet fitting
6. Water outlet fitting gasket
7. Engine coolant temperature sensor connector

Removal steps (Continued)

8. Control wiring harness connection
<<B>> >>B<< 9. Engine coolant temperature sensor
10. Earth cable connection
11. Throttle body water return hose
12. Wiring harness bracket
13. Heater hose connection
14. Thermostat case

Removal steps (Continued)

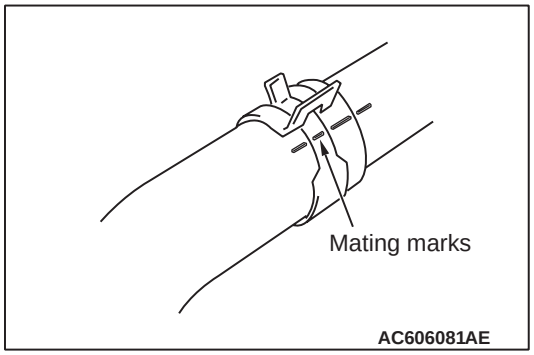
15. Thermostat case gasket
16. Water inlet pipe

>>A<< 17. O-ring

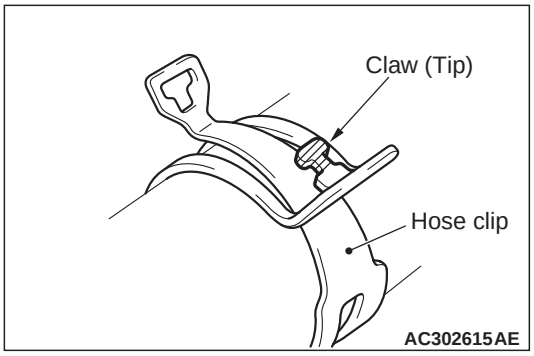
18. Water pipe gasket

REMOVAL SERVICE POINTS

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



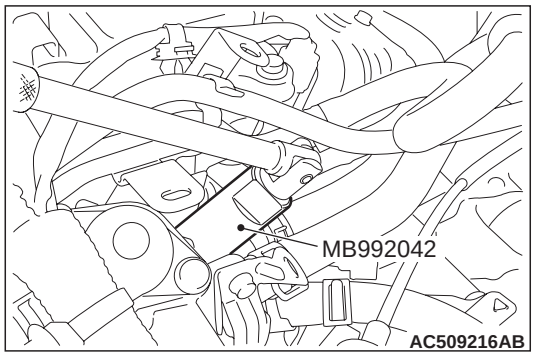
1. Make mating marks on the radiator upper hose and the hose clip as shown to install them in the original position.



2. Break off the tip of hose clip claw and spread out the hose clip, then disconnect the radiator upper hose.

   NOTE: If there is a hose clip claw, the hose clip cannot spread to capacity because the claw contacts the hose clip.

<<B>> ENGINE COOLANT TEMPERATURE SENSOR REMOVAL

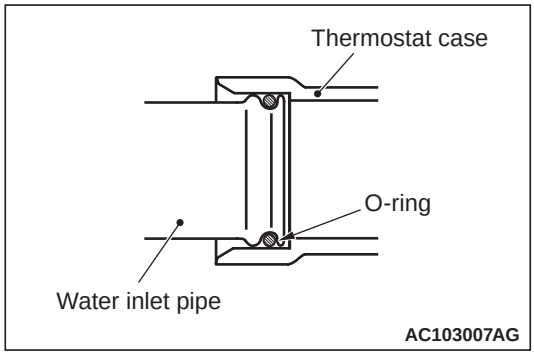


Use special tool water temp sensor wrench (MB992042) to remove the engine coolant temperature sensor.

INSTALLATION SERVICE POINTS

>>A<< O-RING INSTALLATION

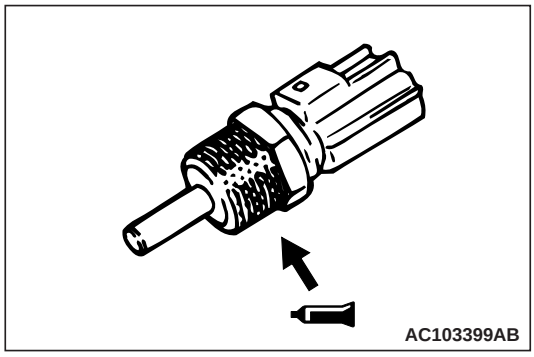
⚠ CAUTION



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

Fit the O-ring in the water 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



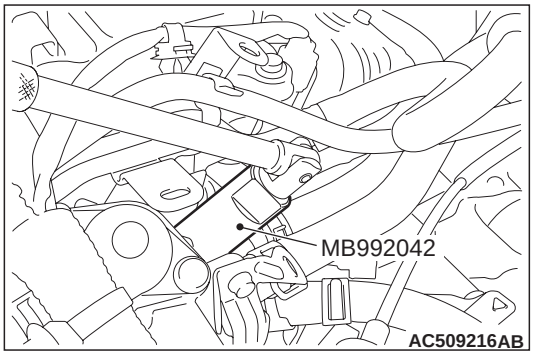
1. Apply the specified sealant to the thread of the engine coolant temperature sensor.

Specified sealant: ThreeBond 1324N or equivalent

NOTE: Install the engine coolant temperature sensor immediately after applying sealant.

⚠ CAUTION

After the installation, until a sufficient period of time (one hour or more) elapses, do not apply the oil or water to the sealant application area or start the engine.



2. Use special tool water temp sensor wrench (MB992042) to tighten the engine coolant temperature sensor to the specified torque.

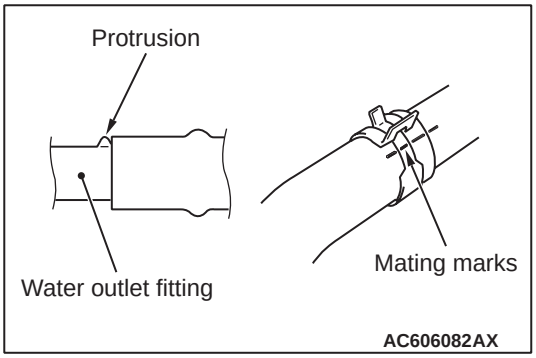
   Tightening torque: 30 ± 9 N·m

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

⚠ CAUTION

Never reuse the hose clip whose claw is broken off to prevent the rusting.

1. Make mating mark on a new hose clip in the same position as the remove one.



2. Insert the radiator upper hose until the protrusion of the water outlet fitting.
3. Align the mating marks on the radiator upper hose and hose clip.
4. Remove the hose clip claw and shorten the hose clip, then install the radiator upper hose.

INSPECTION

M1141003400876

WATER PIPE AND HOSE CHECK

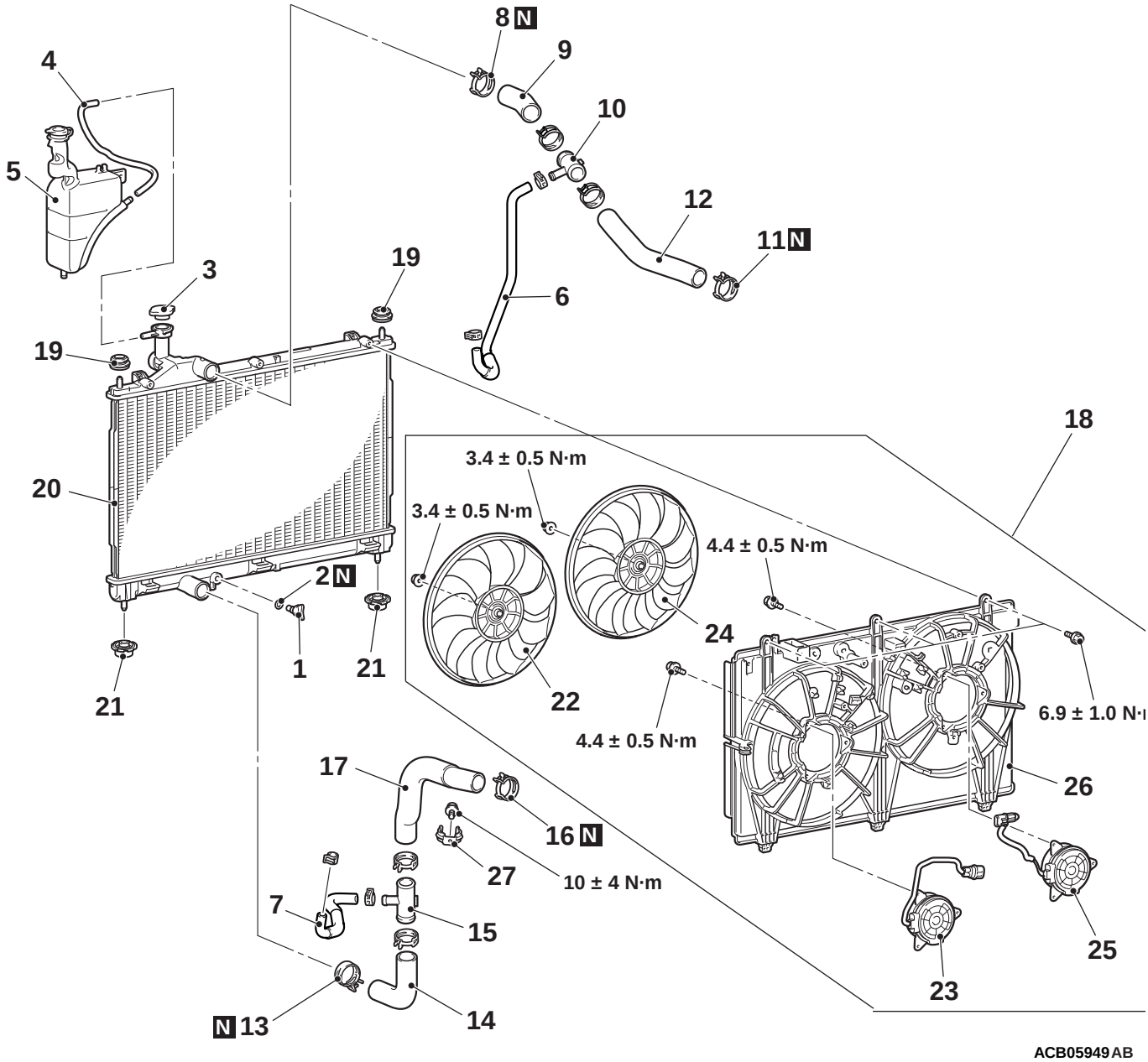
Check the water pipe and hose for cracks, damage and clogs. Replace them if necessary.

RADIATOR

REMOVAL AND INSTALLATION

M1141001503940

Pre-removal Operation	Post-installation Operation
• Front under cover panel and front extension under cover panel removal (Refer to GROUP 51 – Under Cover). • Engine coolant draining (Refer to P.14-9). • Air Cleaner assembly removal (Refer to GROUP 15 – Air Cleaner) .	• Air cleaner assembly installation (Refer to GROUP 15 – Air Cleaner) . • Engine coolant refilling (Refer to P.14-9). • Front under cover panel and front extension under cover panel installation (Refer to GROUP 51 – Under Cover).



ACB05949 AB

Removal steps

1. Radiator drain plug
2. O-ring
3. Radiator cap
4. Radiator condenser tank hose
5. Radiator condenser tank

<<A>> >>A<<

<<A>> >>A<<

Removal steps (Continued)

6. CVT fluid cooler feed hose
7. CVT fluid cooler return hose
8. Hose clip
9. Radiator upper hose
10. Water pipe

Removal steps (Continued)

<<A>> >>A<< 11. Hose clip
<<A>> >>A<< 12. Radiator upper hose
<<A>> >>A<< 13. Hose clip
<<A>> >>A<< 14. Radiator lower hose
15. Water pipe
<<A>> >>A<< 16. Hose clip
<<A>> >>A<< 17. Radiator lower hose
- Radiator fan motor connector connection
- Condenser fan motor connector connection

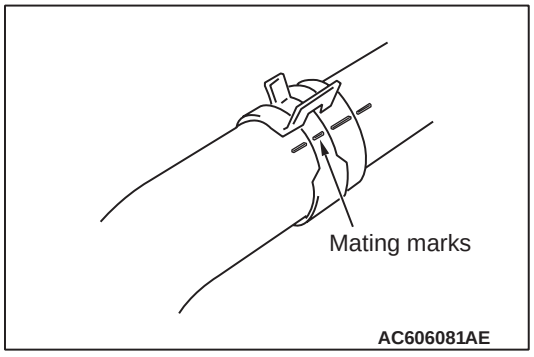
18. Fan, fan motor and fan shroud assembly
- Front end upper bar assembly (Refer to GROUP 42A – Loose Panel)

19. Support upper insulator
- Condenser assembly (Refer to GROUP 55 – Condenser Assembly

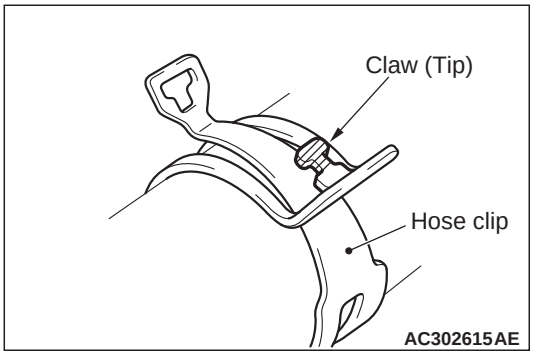
20. Radiator assembly
21. Support lower insulator
22. Radiator fan
23. Radiator fan motor
24. Condenser fan
25. Condenser fan motor
26. Fan shroud
27. Radiator hose support

REMOVAL SERVICE POINTS

<<A>> HOSE CLIP/RADIATOR HOSE REMOVAL



1. Make mating marks on the radiator hose and the hose clip as shown to install them in the original position.



2. Break off the tip of hose clip claw and spread out the hose clip, then disconnect the radiator hose.

   NOTE: If there is a hose clip claw, the hose clip cannot spread to capacity because the claw contacts the hose clip.

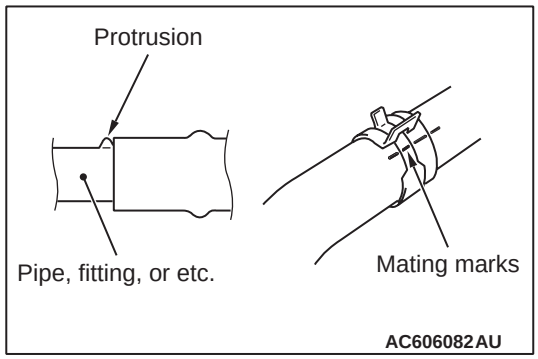
INSTALLATION SERVICE POINTS

>>A<< RADIATOR HOSE/HOSE CLIP CONNECTION

⚠ CAUTION

Never reuse the hose clip whose claw is broken off to prevent the rusting.

1. Make mating mark on a new hose clip in the same position as the remove one.



2. Insert the radiator hose until the protrusion of the pipe.
3. Align the mating marks on the radiator hose and hose clip.
4. Remove the hose clip claw and shorten the hose clip, then install the radiator hose.