COOLING

CONTENTS

E14AA--

SPECIFICATIONS

GENERAL SPECIFICATIONS

E14CA--

Items		Specifications
Cooling method		Water-cooled pressurized, forced circulation with electrical fan
Radiator		
Type		Pressurized corrugated fin type
Performance	J/h (kcal/h, BTU/h)	
<4G93, 4G63>		157,395 x 10^3 (37,600, 149,206)
<4G64–M/T, 4D65>		188,791 x 10^3 (45,100, 178,968)
<4G64–A/T>		202,186 x 10^3 (48,300, 191,666)
<4D68>		213,070 x 10^3 (50,900, 201,984)
Radiator cap		
High pressure valve opening pressure	kPa (kg/cm², psi)	75–105 (0.75–1.05, 11–15)
Vacuum valve opening pressure	kPa (kg/cm², psi)	-5 (-0.05, -0.7) or less
Automatic transmission oil cooler <Vehicles with A/T>		
Performance	J/h (kcal/h, BTU/h)	
<4G93, 4G63>		6,195 x 10^3 (1,480, 5,873)
<4G64>		6,405 x 10^3 (1,530, 6,071)
Thermostat		
Type		Wax pellet type with jiggle valve
Water pump		
Type		Impeller of centrifugal type

SERVICE SPECIFICATIONS

E14CB--

Items		Specifications
Standard value		
Range of coolant antifreeze concentration	%	30–60
Thermostat		
<4G93>		
Valve opening temperature of thermostat	°C (°F)	76.5 (170)
Full-opening temperature of thermostat	°C (°F)	90 (194)
<4G63, 4G64>		
Valve opening temperature of thermostat	°C (°F)	82 (180)
Full-opening temperature of thermostat	°C (°F)	95 (203)
<4D65>		
Valve opening temperature of thermostat	°C (°F)	82 (180)
Full-opening temperature of thermostat	°C (°F)	95 (203)
<4D68>		
Valve opening temperature of thermostat	°C (°F)	76.5 (170)
Full-opening temperature of thermostat	°C (°F)	90 (194)
Engine coolant temperature switch (on radiator)		
Opening temperature OFF → ON	°C (°F)	81–88 (179–190)
ON → OFF	°C (°F)	77 (171)
Resistor		
<4D65>		
Resistance	Ω	0.26–0.32

LUBRICANTS

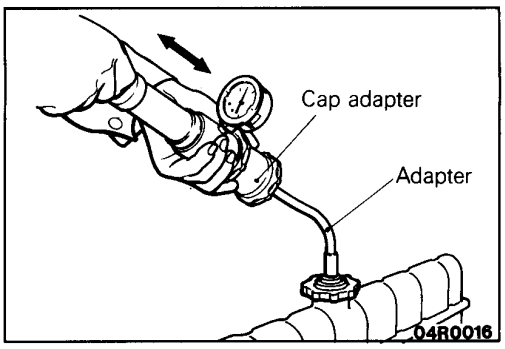
E14CD--

Items	Quantity		
	dm^3	U.S.qts.	Imp.qts.
Engine coolant HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT			
<4G93, 4G63, 4G64>	6.0	6.3	5.3
<4D65, 4D68>	7.5	7.9	6.6

SEALANT

E14CE--

Items	Specified sealant	Remarks
Cylinder block drain plug	3M Nut Locking Part No.4171 or equivalent	Drying sealant
Water pump	Mitsubishi Genuine Parts No. 970389 or equivalent	Semi-Drying sealant
Engine coolant gauge unit	3M ATD Parts No. 8660 or equivalent	Drying sealant
Engine coolant temperature sensor	3M Nut Locking Part No. 4171 or equivalent	Drying sealant
Engine coolant temperature switch	3M Nut Locking Part No. 4171 or equivalent	Drying sealant



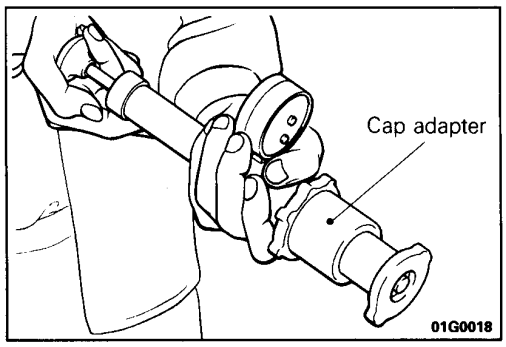
SERVICE ADJUSTMENT PROCEDURES
E14FAAA

COOLANT LEAK CHECKING

1. Confirm that the coolant level is up to the filler neck. Install a radiator cap tester and apply 160 kPa (1.6 kg/cm^2, 23 psi) pressure, and then check for leakage from the radiator hose or connections.

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

2. If there is leakage, repair or replace the appropriate part.



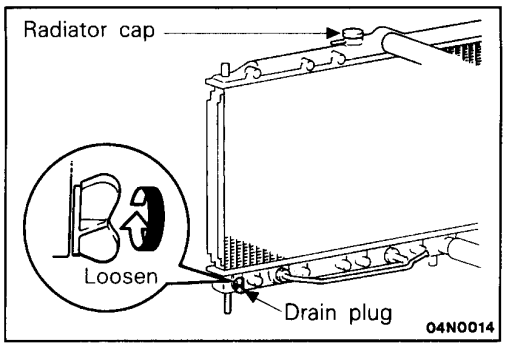
RADIATOR CAP VALVE OPENING PRESSURE CHECKING
E14FBAD

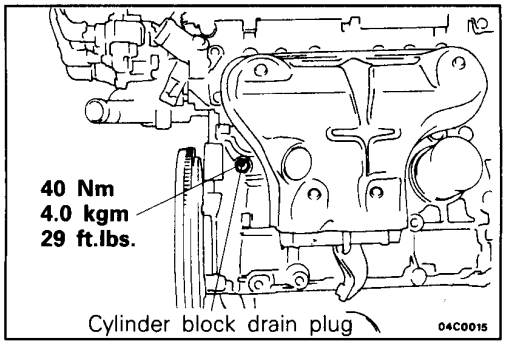
1. Use a cap adapter to attach the cap to the tester.
2. Increase the pressure until the indicator of the gauge stops moving.

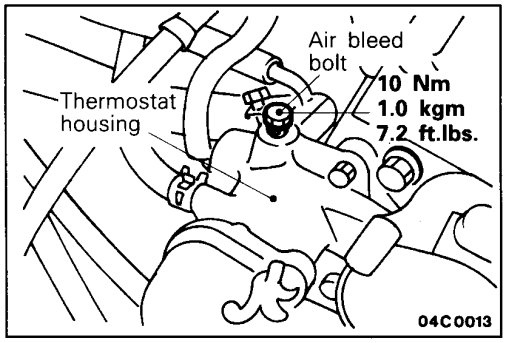
   Limit: 65 kPa (0.65 kg/cm^2, 9.2 psi)
   Standard value: 75–105 kPa (0.75–1.05 kg/cm^2, 11–15 psi)

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

   NOTE
   Be sure that the cap is clean before testing, since rust or other foreign material on the cap seal will cause an improper indication.







COOLANT REPLACEMENT E14FCAV

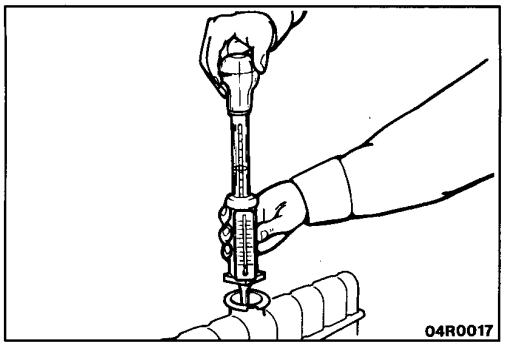
1. Drain the engine coolant by removing the drain plug and then the radiator cap.
2. Remove the drain plug from the cylinder block to drain the engine coolant. <4G93>
3. Open the air bleed bolt. <4G93>
4. Remove the reserve tank to drain the engine coolant.
5. When the engine coolant has drained, pour in water from the radiator cap to clean the engine coolant line.
6. Coat the thread of the cylinder block drain plug with the specified sealant and tighten to the specified torque. <4G93>

   Specified sealant: 3M Nut Locking Part No. 4171 or equivalent
7. Securely tighten the radiator drain plug. <4G93>
8. Install the reserve tank.
9. Fill the radiator until the engine coolant flows from the air bleed bolt section, and then close the air bleed bolt. <4G93>
10. Slowly pour the engine coolant into the mouth of the radiator until the radiator is full, and pour also into the reserve tank up to the FULL line.

    Recommended antifreeze:
    HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT

Quantity	**dm^3 (U.S.qts., Imp.qts.)**
<4G93, 4G63, 4G64>	**6.0 (6.3, 5.3)**
<4D65, 4D68>	**7.5 (7.9, 6.6)**

    NOTE
    For Norway, the non-amine type of antifreeze should be used.
11. Install the radiator cap securely.
12. Start the engine and warm the engine until the thermostat opens. (Touch the radiator hose with your hand to check that warm water is flowing.)
13. After the thermostat opens, race the engine at 3,000 r/min 3 times.
14. After the engine is stopped, wait until the engine has cooled down, and then remove the radiator cap to check the level of the liquid. If the level is low, repeat the operation from step 11.
    Lastly, if the level does not drop, fill the condense tank with coolant up to the FULL line.



CONCENTRATION MEASUREMENT E14FDAB

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

Standard value: 30–60 % (allowable concentration range)

RECOMMENDED ANTIFREEZE

Antifreeze	Allowable concentration
HIGH QUALITY ETHYLENE GLYCOL ANTIFREEZE COOLANT	30–60 %

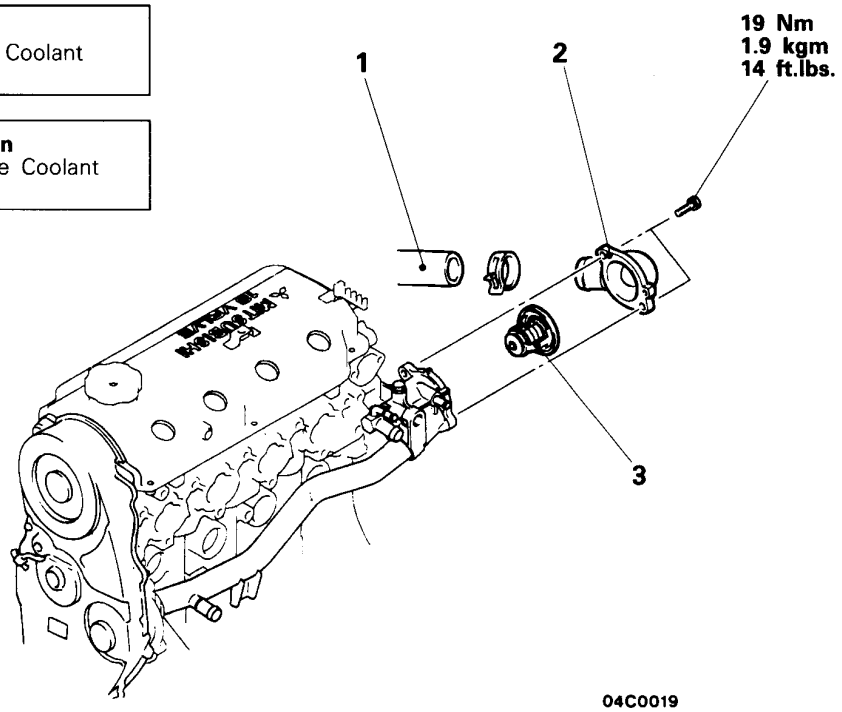
Caution
If the concentration of the antifreeze is below 30 %, the anti-corrosion property will be adversely affected. In addition, if the concentration is above 60 %, both the anti-freezeing and engine cooling properties will decrease, affecting the engine adversely. For these reasons, be sure to maintain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

THERMOSTAT <4G93> E14GA--

REMOVAL AND INSTALLATION

Pre-removal Operation
- Draining of the Engine Coolant (Refer to P.14-5.)

Post-installation Operation
- Supplying of the Engine Coolant (Refer to P.14-5.)



Removal steps
1. Connection for radiator upper hose
2. Water outlet fitting
◆◆ 3. Thermostat

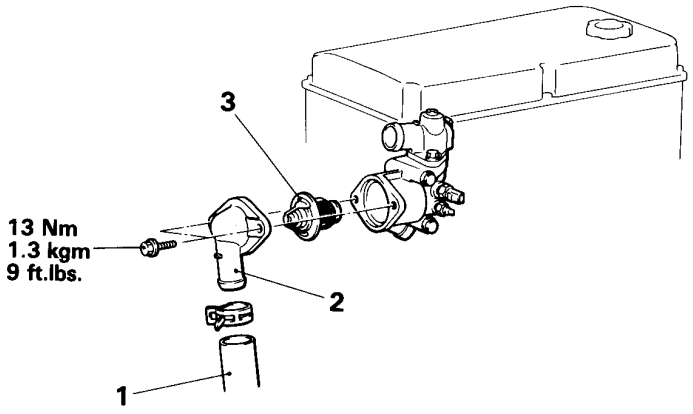
THERMOSTAT <4G63, 4G64>

E14GA--

REMOVAL AND INSTALLATION

Pre-removal Operation
- Draining of the Engine Coolant (Refer to P.14-5.)

Post-installation Operation
- Supplying of the Engine Coolant (Refer to P.14-5.)



04A0211

Removal steps
1. Connection for radiator lower hose
2. Water inlet fitting
3. Thermostat

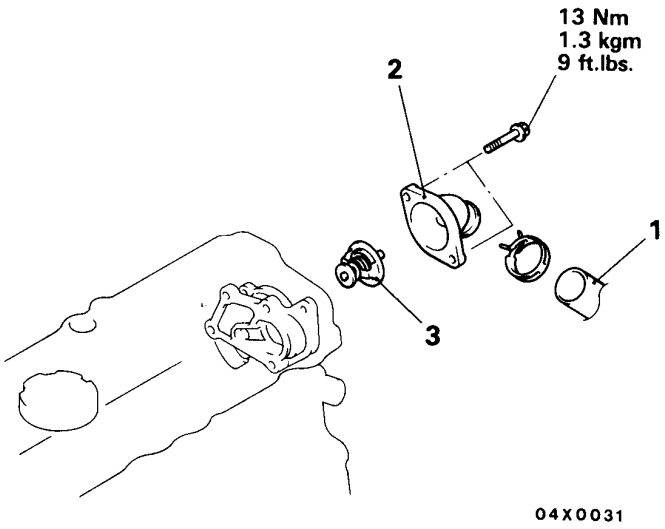
THERMOSTAT <4D68>

E14GA--

REMOVAL AND INSTALLATION

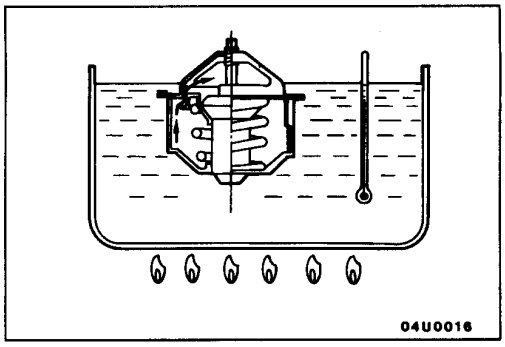
Pre-removal Operation
- Draining of the Engine Coolant (Refer to P.14-5.)

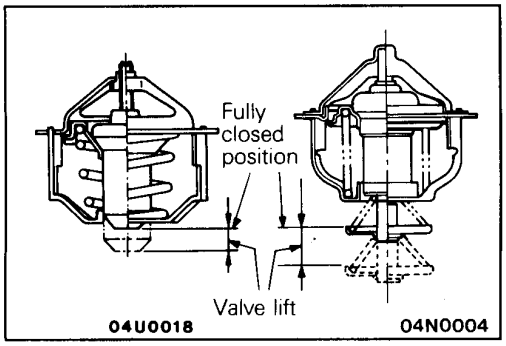
Post-installation Operation
- Supplying of the Engine Coolant (Refer to P.14-5.)

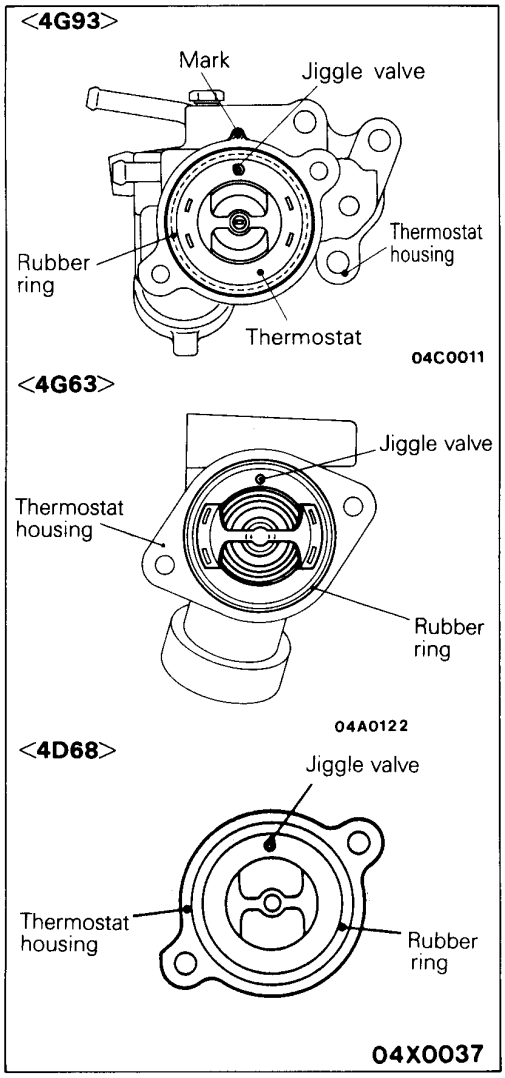


Removal steps

1. Connection for radiator lower hose
2. Water inlet fitting
3. Thermostat







INSPECTION E14FIAB

Immerse the thermostat in water, and heat the water while stirring. Check that the thermostat valve opening and fully open temperatures (valve lift when fully open is 10 mm [0.39 in.] or more < 4G63, 4G64, 4D68 > or 8 mm [0.32 in.] or more < 4G93, 4D65 >) are at standard temperatures.

Standard value

Item	Valve opening temperature °C (°F)	Fully open temperature °C (°F)
<4G93>	76.5 (170)	90 (194)
<4D65>	82 (180)	95 (203)
<4G63, 4G64>	82 (180)	95 (203)
<4D68>	76.5 (170)	90 (194)

NOTE
1. Measure valve height when fully closed. Calculate lift by measuring the height when fully open.
2. If valve opens even a little at normal temperature, the thermostat should be replaced.
3. If there is any serious warping, visible damage or break age, the thermostat should be replaced.
4. Remove any rust or deposits if present.

SERVICE POINTS OF INSTALLATION E14GDAH

3. INSTALLATION OF THERMOSTAT

Install the thermostat so that the jiggle valve is aligned with the mark on the thermostat housing.

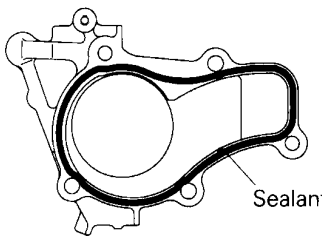
Caution
Make absolute sure that no oil is adhering to the rubber ring of the thermostat. In addition, be careful not to fold over or scratch the rubber ring when inserting.

WATER PUMP <4G93>

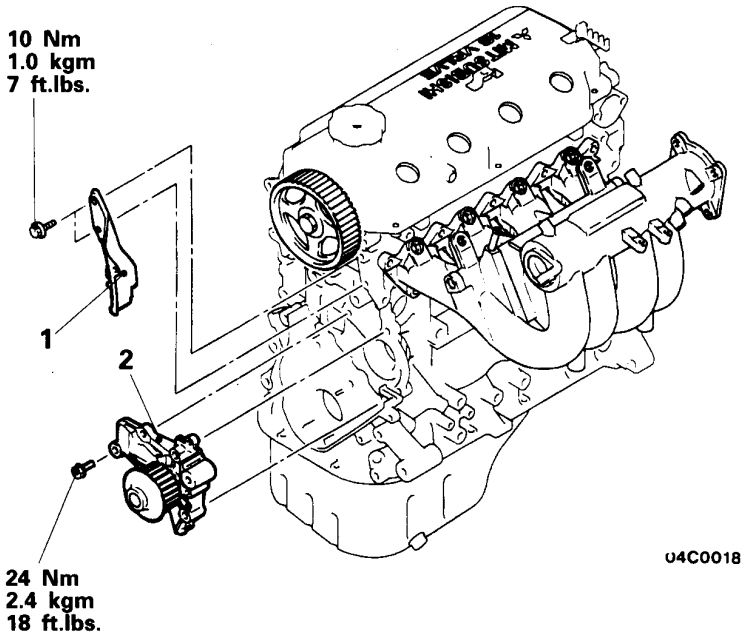
E14MA-1

REMOVAL AND INSTALLATION

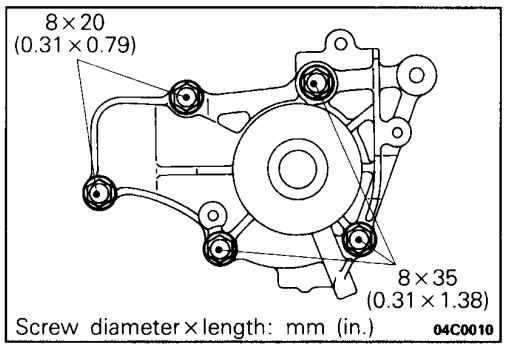
Pre-removal and Post-installation Operation
- Draining and Supplying of Engine Coolant (Refer to P.14-5.)
- Removal and Installation of Timing Belt (Refer to GROUP 11 – Timing Belt.)



Specified Sealant:
Mitsubishi Genuine Parts No. MD970389 or equivalent



Removal steps
1. Timing belt rear cover
2. Water pump



SERVICE POINTS OF INSTALLATION

E14MDBE

2. INSTALLATION OF WATER PUMP

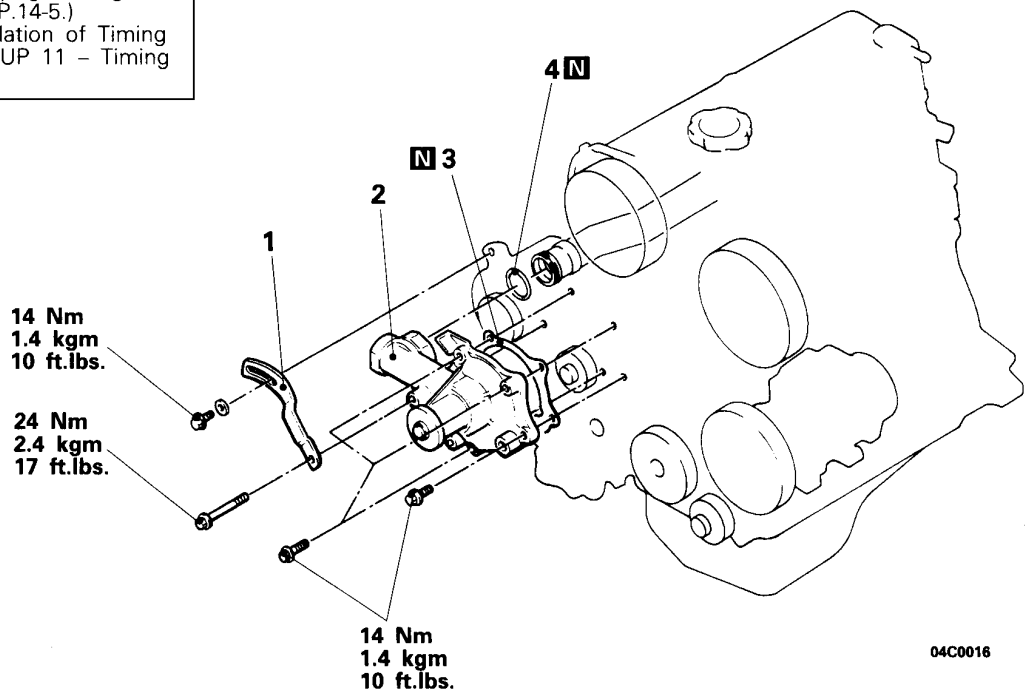
Water pump installation bolt size are different and caution must be paid to ensure that they are properly installed.

WATER PUMP <4D65>

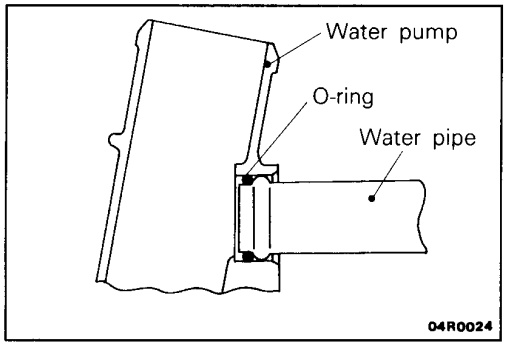
E14MA-2

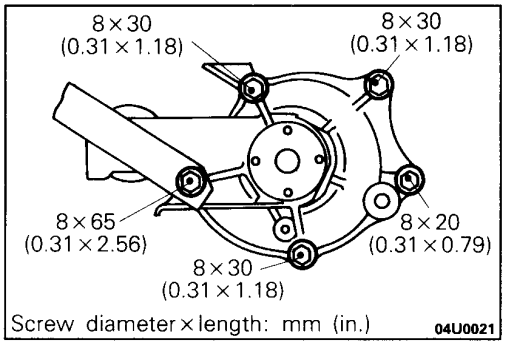
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Draining and Supplying of Engine Coolant (Refter to P.14-5.)
- Removal and Installation of Timing Belt (Refer to GROUP 11 – Timing Belt.)



Removal steps
1. Alternator brace
2. Water pump ◆◆
3. Water pump gasket
4. O-ring ◆◆





SERVICE POINTS OF INSTALLATION

E14MDAN

4. INSTALLATION OF O-RING

Insert the O-ring to the water inlet pipe, and coat the outlet circumference of the O-ring with water. By coating with water, the insertion to the water pump will become easier.

Caution
1. **Care must be taken not to permit engine oil or other greases to adhere to the O-ring.**
2. **When inserting the pipe, check to be sure that there is no sand, dirt, etc. on its inner surface.**

2. INSTALLATION OF WATER PUMP

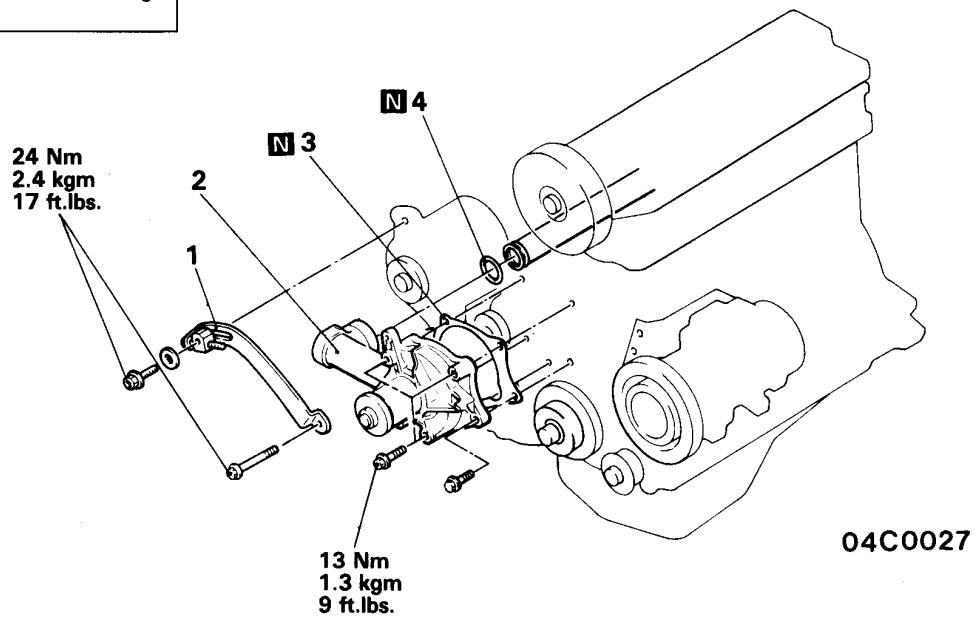
Water pump installation bolt size are different and caution must be paid to ensure that they are properly installed.

WATER PUMP <4G63>

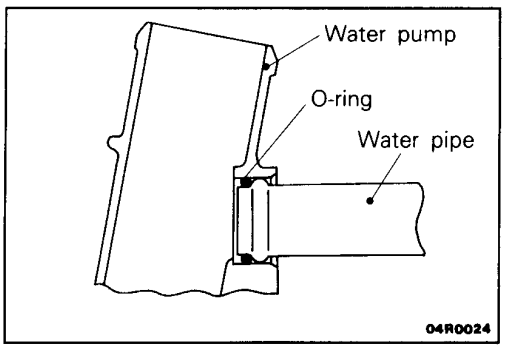
E14MA-3

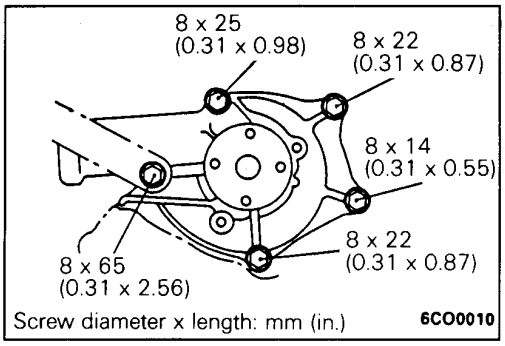
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Draining and Supplying of Engine Coolant (Refter to P.14-5.)
- Removal and Installation of Timing Belt (Refer to GROUP 11 – Timing Belt.)



Removal steps
1. Alternator brace
2. Water pump ◆◆
3. Water pump gasket
4. O-ring ◆◆





SERVICE POINTS OF INSTALLATION

E14MDAN

4. INSTALLATION OF O-RING

Insert the O-ring to the water inlet pipe, and coat the outlet circumference of the O-ring with water. By coating with water, the insertion to the water pump will become easier.

Caution
1. **Care must be taken not to permit engine oil or other greases to adhere to the O-ring.**
2. **When inserting the pipe, check to be sure that there is no sand, dirt, etc. on its inner surface.**

2. INSTALLATION OF WATER PUMP

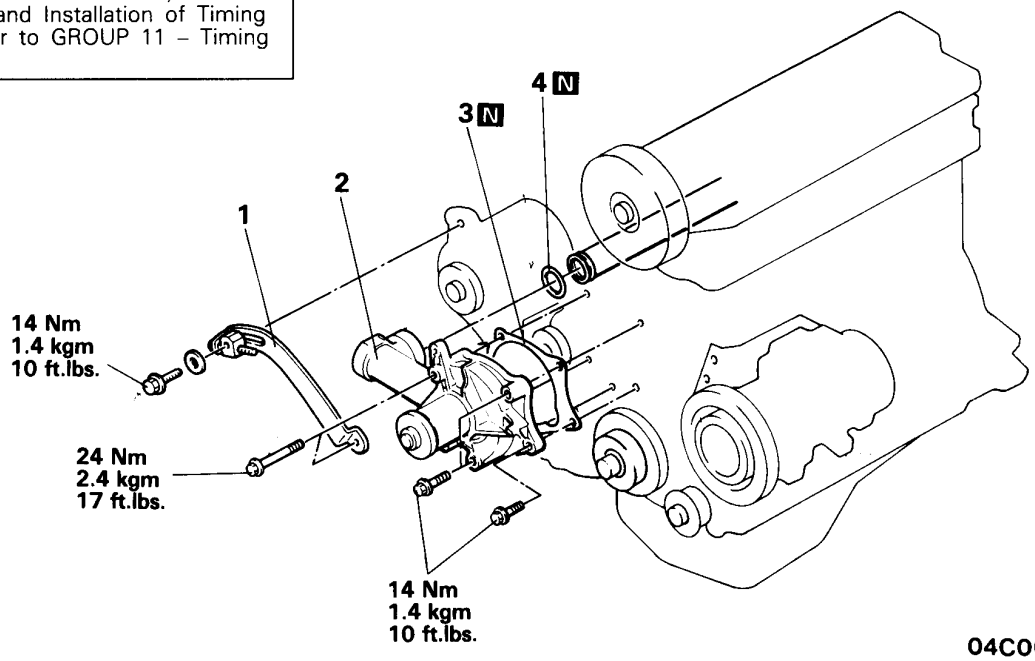
Water pump installation bolt size are different and caution must be paid to ensure that they are properly installed.

WATER PUMP <4G64>

E14MA-4

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Draining and Supplying of Engine Coolant (Refter to P.14-5.)
- Removal and Installation of Timing Belt (Refer to GROUP 11 – Timing Belt.)



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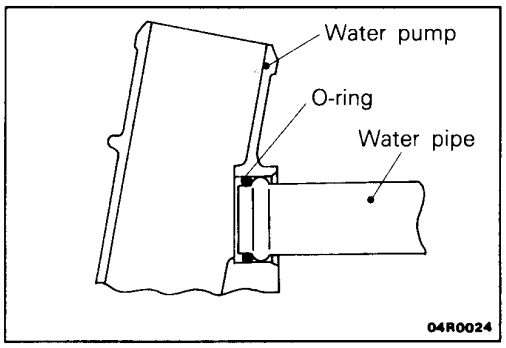
Removal steps
1. Alternator brace
2. Water pump ◆◆
3. Water pump gasket
4. O-ring ◆◆



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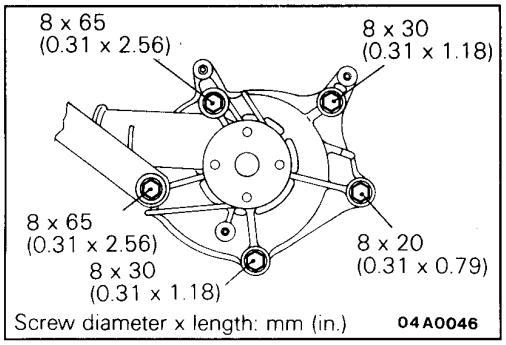


Screw diameter x length: mm (in.) 04A0046

SERVICE POINTS OF INSTALLATION

E14MDAN

4. INSTALLATION OF O-RING

Insert the O-ring to the water inlet pipe, and coat the outlet circumference of the O-ring with water. By coating with water, the insertion to the water pump will become easier.

Caution
1. **Care must be taken not to permit engine oil or other greases to adhere to the O-ring.**
2. **When inserting the pipe, check to be sure that there is no sand, dirt, etc. on its inner surface.**

2. INSTALLATION OF WATER PUMP

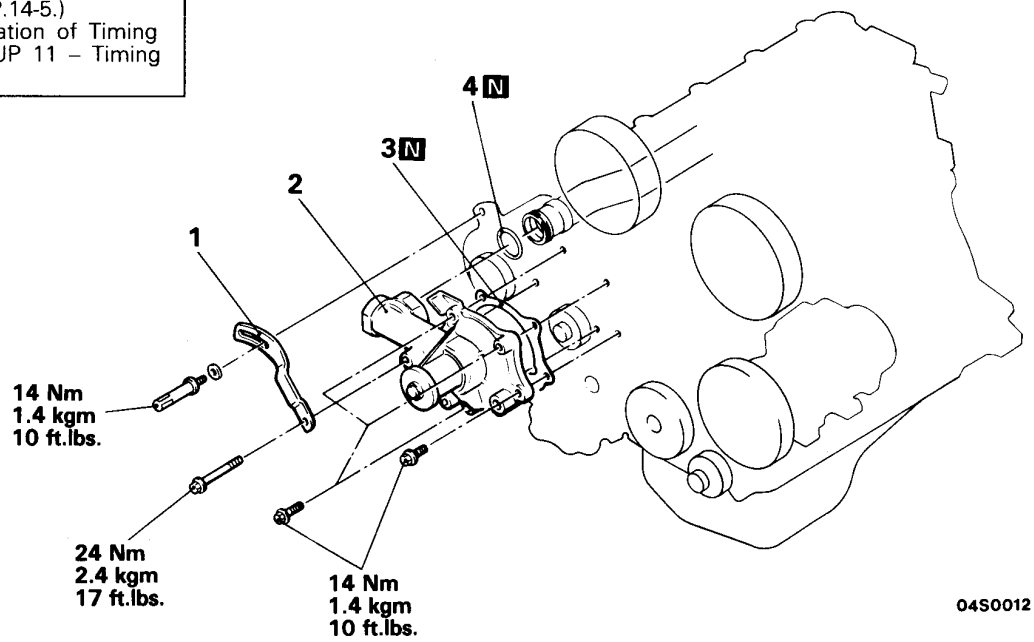
Water pump installation bolt size are different and caution must be paid to ensure that they are properly installed.

WATER PUMP <4D68>

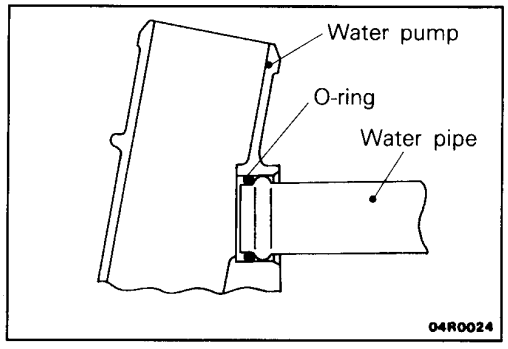
E14MA-5

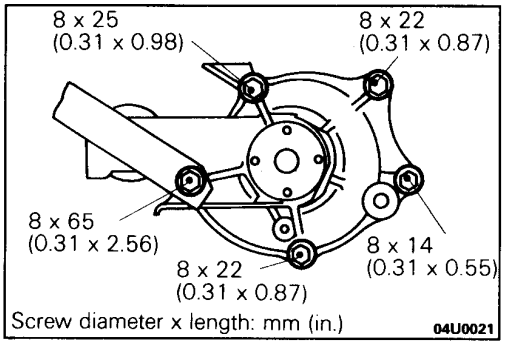
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Draining and Supplying of Engine Coolant (Refter to P.14-5.)
- Removal and Installation of Timing Belt (Refer to GROUP 11 – Timing Belt.)



Removal steps
1. Alternator brace
2. Water pump ◆◆
3. Water pump gasket
4. O-ring ◆◆





SERVICE POINTS OF INSTALLATION

E14MDAN

4. INSTALLATION OF O-RING

Insert the O-ring to the water inlet pipe, and coat the outlet circumference of the O-ring with water. By coating with water, the insertion to the water pump will become easier.

Caution
1. **Care must be taken not to permit engine oil or other greases to adhere to the O-ring.**
2. **When inserting the pipe, check to be sure that there is no sand, dirt, etc. on its inner surface.**

2. INSTALLATION OF WATER PUMP

Water pump installation bolt size are different and caution must be paid to ensure that they are properly installed.

NOTES

RADIATOR

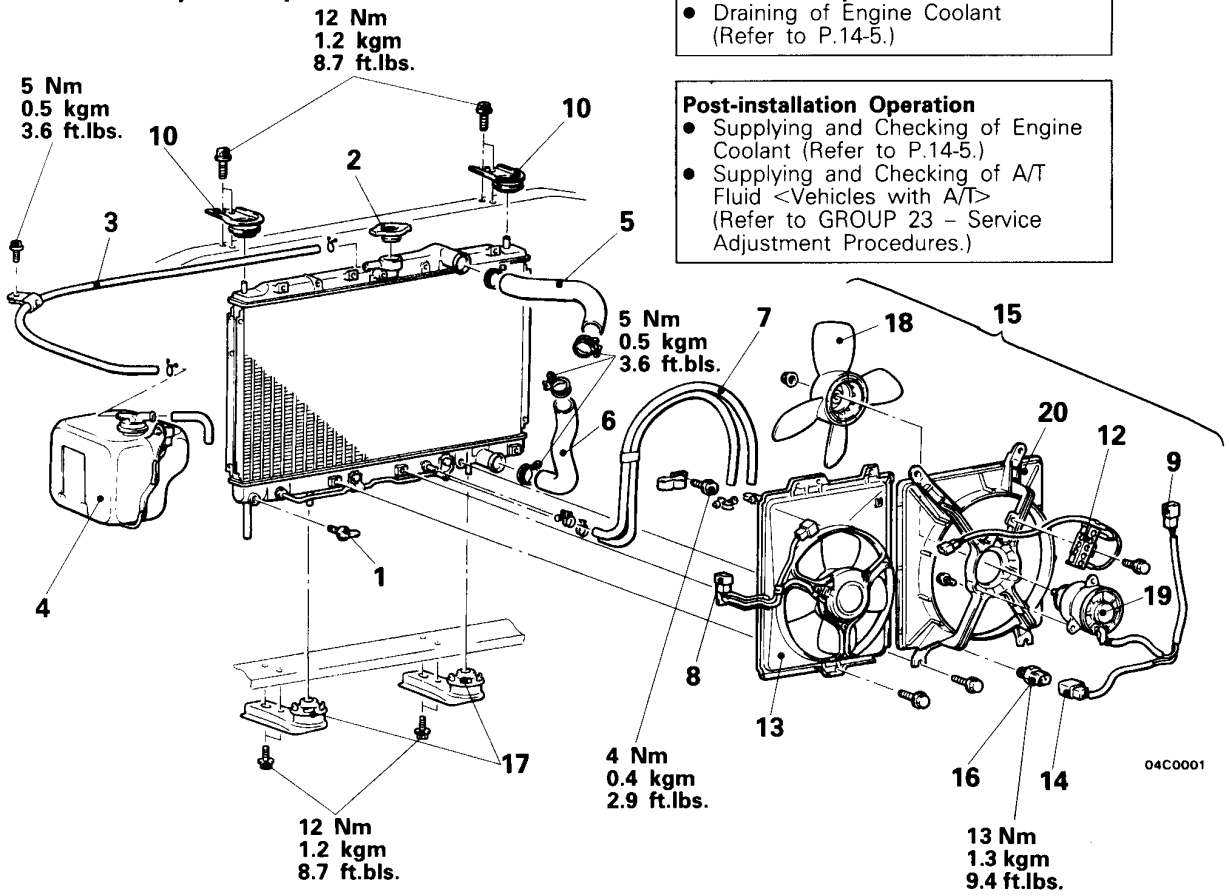
E14QA--

REMOVAL AND INSTALLATION

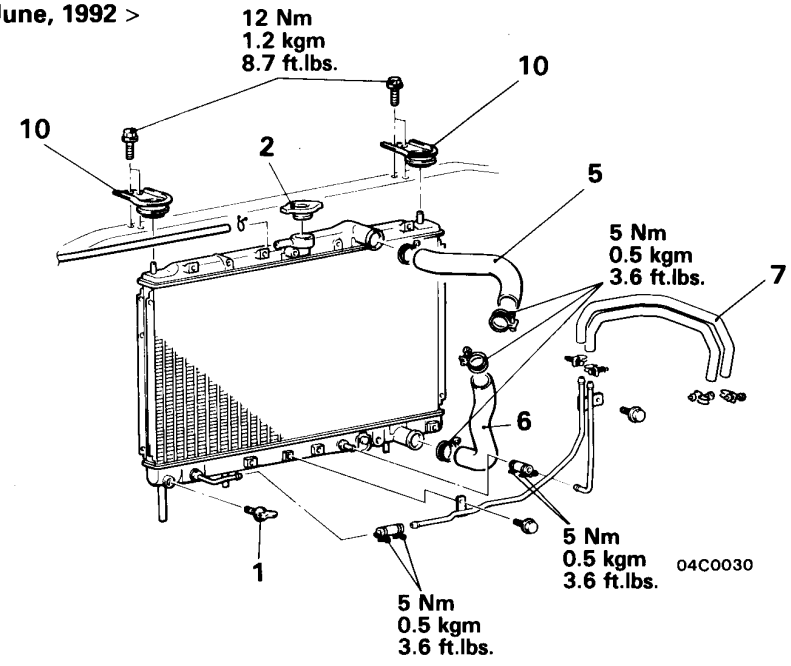
<Vehicles built up to May, 1992>

Pre-removal Operation
- Draining of Engine Coolant (Refer to P.14-5.)

Post-installation Operation
- Supplying and Checking of Engine Coolant (Refer to P.14-5.)
- Supplying and Checking of A/T Fluid <Vehicles with A/T> (Refer to GROUP 23 – Service Adjustment Procedures.)



< Vehicles built from June, 1992 >



Radiator removal steps

1. Drain plug
2. Radiator cap
3. Overflow tube
4. Reserve tank
5. Radiator upper hose
6. Radiator lower hose
7. ◆◆ Transmission fluid cooler hose (radiator side) <Vehicles with A/T>
8. Condenser fan connector <Vehicles with air conditioner>
9. Radiator fan connector
10. Upper insulator
11. Radiator assembly
12. Resistor
13. Condenser fan motor assembly <Vehicles with air conditioner>
14. Engine coolant temperature switch connector
15. Radiator fan motor assembly
16. Engine coolant temperature switch
17. Lower insulator
18. Fan
19. Radiator fan motor
20. Shroud

Radiator fan motor removal steps

1. Drain plug
2. Radiator cap
5. Radiator upper hose
8. Condenser fan connector <Vehicles with air conditioner>
9. Radiator fan connector
13. Condenser fan motor assembly <Vehicles with air conditioner>
14. Engine coolant temperature switch connector
15. Radiator fan motor assembly
18. Fan
19. Radiator fan motor
20. Shroud

NOTES

SERVICE POINTS OF REMOVAL E14QBAK

7. REMOVAL OF TRANSMISSION FLUID COOLER HOSE

After removing the hose from the radiator, plug the hose and the radiator nipple to prevent dust or foreign particles from getting in.

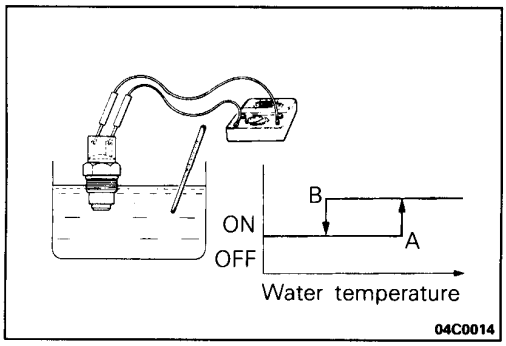
INSPECTION E14QCAN

ENGINE COOLANT TEMPERATURE SWITCH CHECK

(1) Immerse the engine coolant temperature switch into warm water or engine oil as shown in the illustration.
(2) Check the continuity with a circuit tester as the temperature of the liquid changes, and the condition is normal if it is within the following ranges.

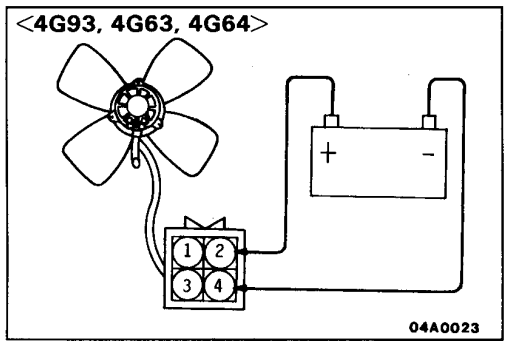
Standard value

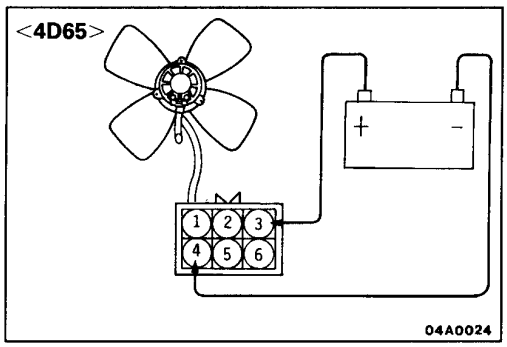
Items	For radiator fan
Temperature at point A (OFF→ON)	81°C–88°C (178°F–190°F)
Temperature at point B (ON→OFF)	77°C (171°F)

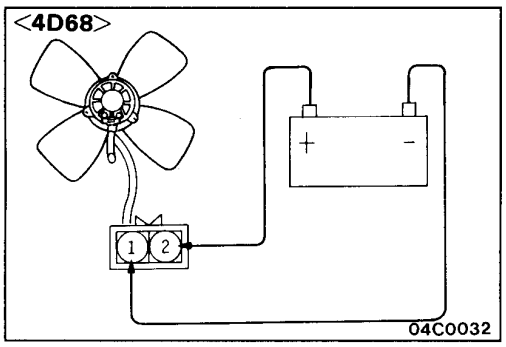


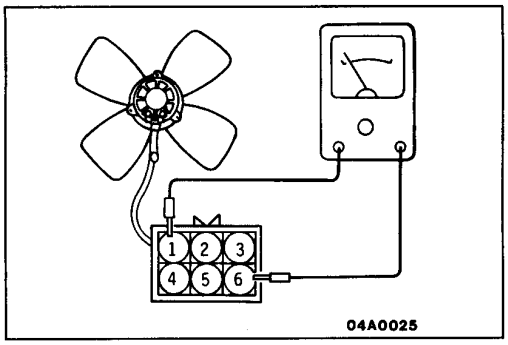
RADIATOR FAN MOTOR INSPECTION

(1) Check to be sure that the radiator fan rotates when battery voltage is applied between terminals (as shown in the figure).
(2) Check to see that abnormal noises are not produced, while motor is turning.





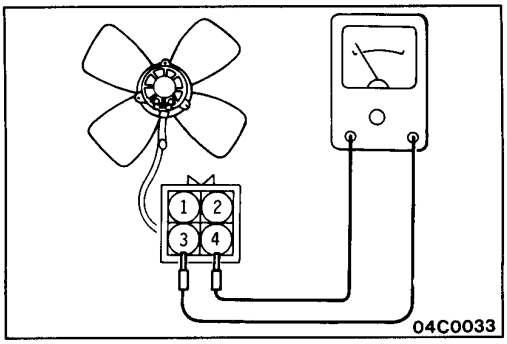




RESISTOR INSPECTION <4D65>

(1) Remove the radiator fan motor connector.
(2) Measure the resistance between terminals ① and ⑥.
(3) The condition can be considered to be satisfactory if the measured resistance value is within the following range.

Resistance value: 0.26 – 0.32 Ω

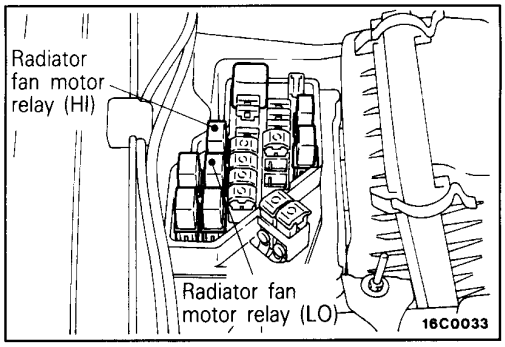


RESISTOR INSPECTION <4D68>

(1) Remove the resistor connector.
(2) Measure the resistance between terminals ③ and ④.
(3) The condition can be considered to be satisfactory if the measured resistance value is within the following range.

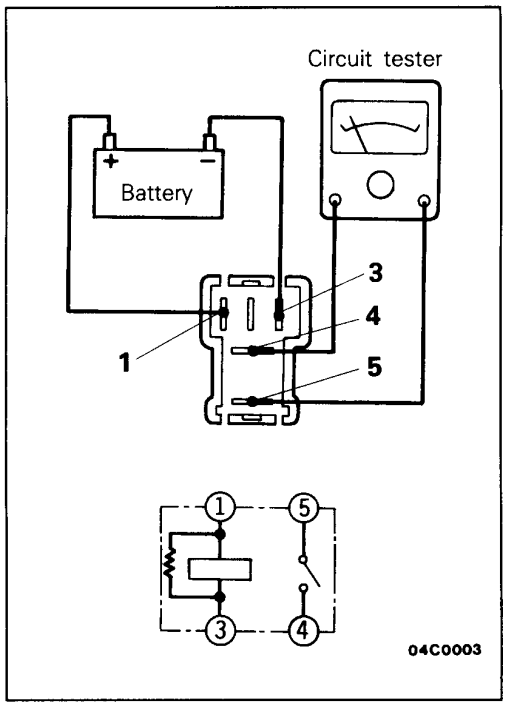
Resistance value: 0.26 – 0.32 Ω

NOTES



RADIATOR FAN MOTOR RELAY CHECK

(1) Remove the radiator fan motor (HI) and (LO) relays from the relay box inside the engine compartment.



(2) Check the continuity between terminals 4–5 when battery voltage is applied between terminals 1–3.

When current is flowing	Between terminals 4–5	Continuity
When current is not flowing	Between terminals 1–3	Continuity
	Between terminals 4–5	No continuity

ENGINE COOLANT TEMPERATURE GAUGE UNIT, ENGINE COOLANT TEMPERATURE SWITCH AND ENGINE COOLANT TEMPERATURE SENSOR

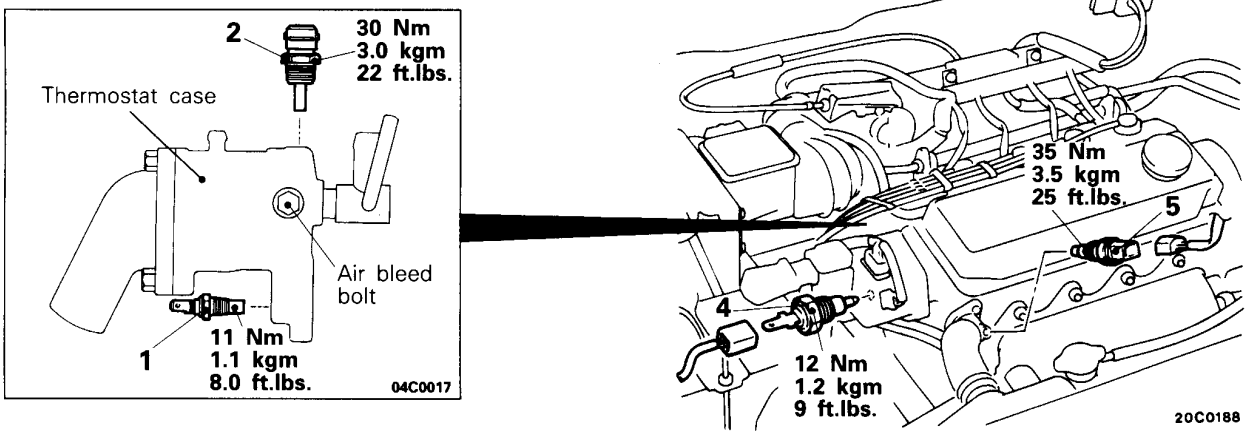
REMOVAL AND INSTALLATION

E14UA--

Pre-removal Operation
- Draing of the Coolant (Refer to P.14-5.)

Post-installation Operation
- Supplying of the Coolant (Refer to P.14-5.)

<4G93>



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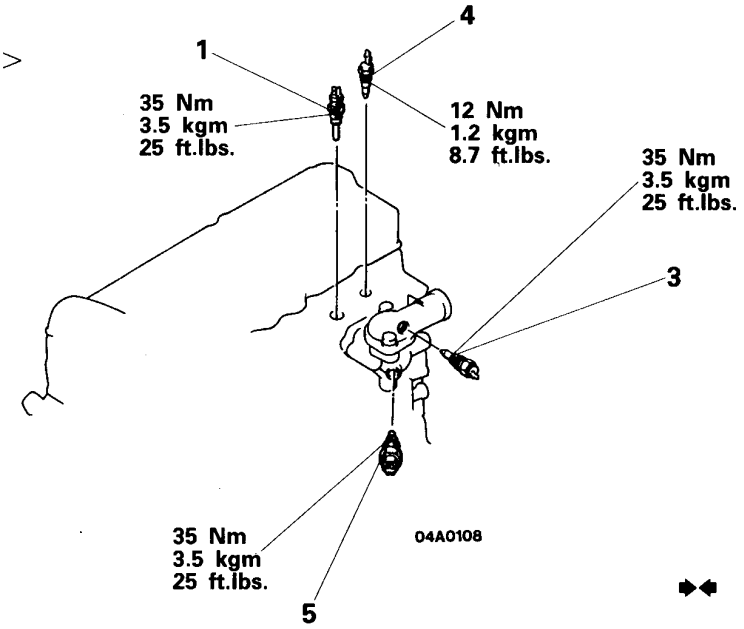


Removal steps
- ◆◆ 1. Engine coolant temperature gauge unit
- ◆◆ 2. Engine coolant temperature sensor (Engine control)
- ◆◆ 3. Engine coolant temperature switch (for radiator fan)
- ◆◆ 4. Engine coolant temperature switch (for condenser fan)
- ◆◆ 5. Engine coolant temperature switch (for air conditioner)

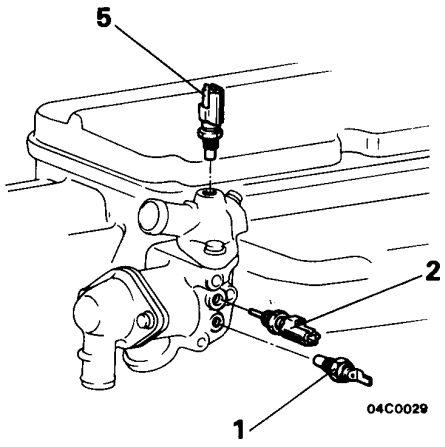
REMOVAL AND INSTALLATION

E14UA--

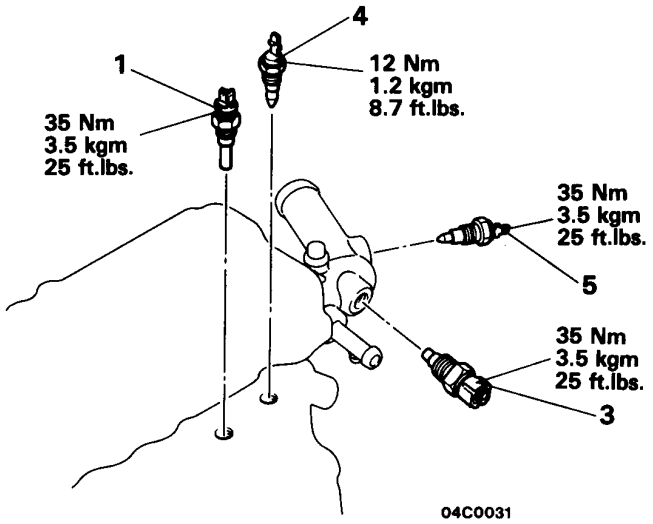
Pre-removal Operation
- Draing of the Coolant (Refer to P.14-5.)

Post-installation Operation
- Supplying of the Coolant (Refer to P.14-5.)

<4G63, 4G64>



<4D68>

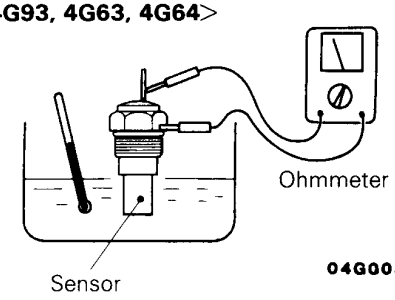


Removal steps

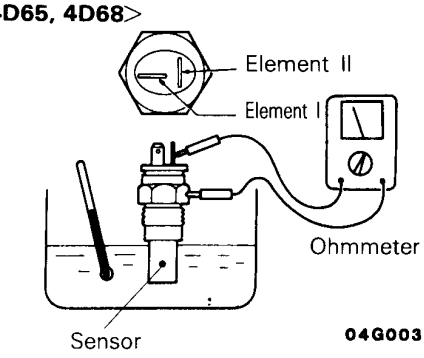
1. Engine coolant temperature gauge unit
2. Engine coolant temperature sensor (Engine control)
3. Engine coolant temperature switch (for radiator fan)
4. Engine coolant temperature switch (for condenser fan)
5. Engine coolant temperature switch (for air conditioner)

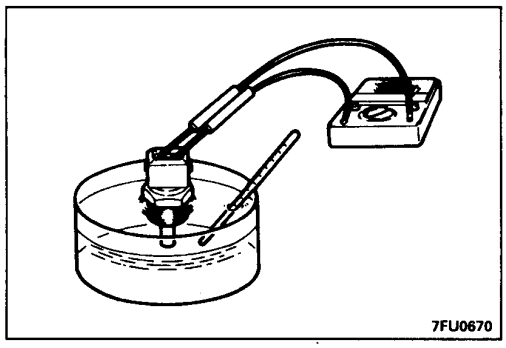
NOTES

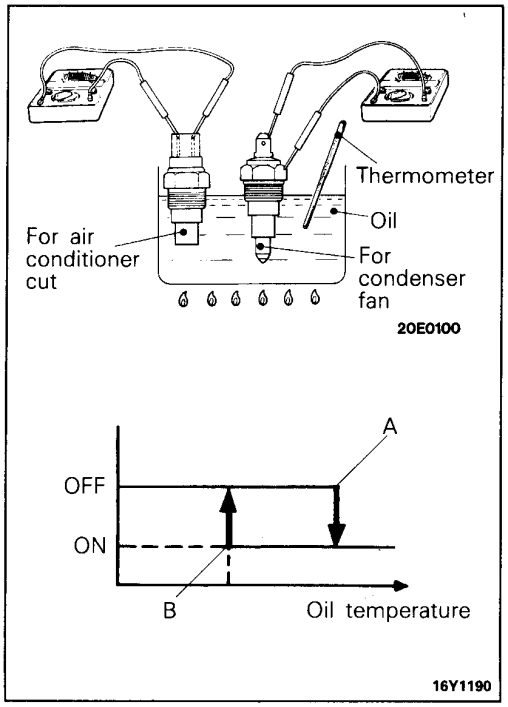
<4G93, 4G63, 4G64>



<4D65, 4D68>







INSPECTION

E14UCAR

ENGINE COOLANT TEMPERATURE GAUGE UNIT

Raise the engine coolant temperature and measure the resistance if within the standard value.

<4G93, 4G63, 4G64>

Standard value: 104±13.5 Ω [at 70°C (158°F)]

<4D65, 4D68>

Standard value:

Element I (Glow control)	
At 20°C (68°F)	**3.25±0.33 kΩ**
Element II (Engine coolant temperature gauge)	
At 70°C (158°F)	**104±13.5 Ω**

ENGINE COOLANT TEMPERATURE SENSOR

Raise the engine coolant temperature and measure the resistance if within the standard value.

Standard value:

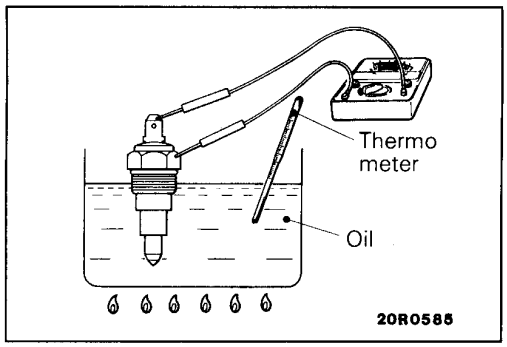
At 20°C (68°F)	**2.45±0.24 kΩ**
At 80°C (176°F)	**296±32 Ω**

ENGINE COOLANT TEMPERATURE SWITCH CHECK

(1) Immerse the engine coolant temperature switch in engine oil as shown in the illustration.
(2) Check the continuity with the circuit tester when the temperature of the oil has been changed. The condition is normal if there is continuity within the following ranges of temperature.

Standard value

Item	For air conditioner cut	For condenser fan
Temperature at point A (ON→OFF)	112°C–118°C (234°F–244°F)	97°C (207°F)
Temperature at point B (OFF→ON)	108°C (226°F)	100°C–104°C (212°F–219°F)



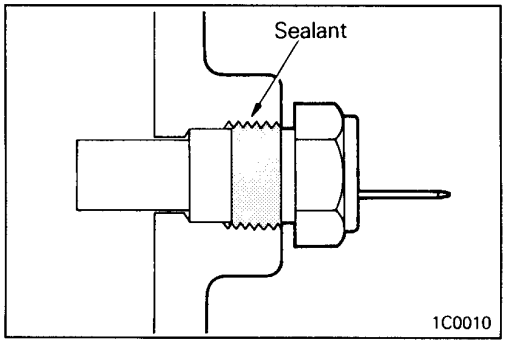
ENGINE COOLANT TEMPERATURE SWITCH (FOR RADIATOR FAN)

(1) Immerse the engine coolant temperature switch in oil and then heat (by using a gas stove flame or similar method) so as to increase the oil temperature.
(2) Check to be sure that the engine coolant temperature switch is switched ON when the oil temperature reaches the standard value.

<4D65>
Standard value:
Vehicles with air conditioner
100–104°C (212–219°F)
Vehicles with engine oil cooler fan motor
112–118°C (234–244°F)

<4D68>
Standard value: 107–113°C (225–235°F)

Caution
The oil used above should be engine oil and should be stirred well while being heated; do not heat more than necessary.



SERVICE POINTS OF INSTALLATION E14UDAI

5./4./3. INSTALLATION OF ENGINE COOLANT TEMPERATURE SWITCH /2. ENGINE COOLANT TEMPERATURE SENSOR UNIT

Apply sealant to threaded portion and tighten.

Specified sealant: 3M Nut Locking Part No. 4171 or equivalent

1. INSTALLATION OF ENGINE COOLANT TEMPERATURE GAUGE UNIT

Apply sealant to threaded portion and tighten.

Specified sealant: 3M ATD Part No. 8660 or equivalent