

# ENGINE COOLING

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## GENERAL

### OUTLINE OF CHANGES

- Since the thermostat of 4G93-GDI engine is changed, the service procedures are made.
- Since the water hose is changed because of adopting the resin intake manifold, the service procedures are made.
- Since F9Q diesel engine is added, the service procedures are made.

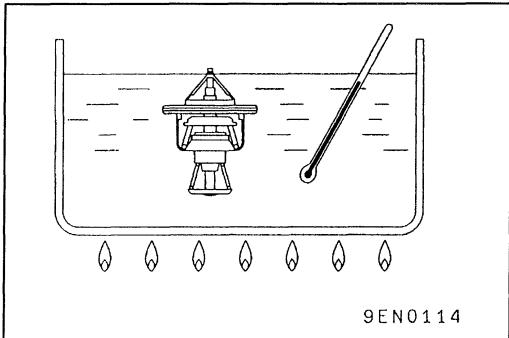
Other service procedures are the same as before.

### SERVICE SPECIFICATIONS

Items		Standard value
Thermostat <4G93-GDI>	Valve opening temperature of thermostat °C	82 ± 1.5
	Full-opening temperature of thermostat °C	95
	Valve lift (at 95°C) mm	8.5 or more

### SEALANT

Items	Specified sealant	Remarks
Thermostat case assembly <4G93-GDI> Water pump <F9Q>	Mitsubishi Genuine Parts No. MD970389 or equivalent	Semi-drying sealant



### THERMOSTAT <4G93-GDI>

#### INSPECTION

##### 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 ± 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.

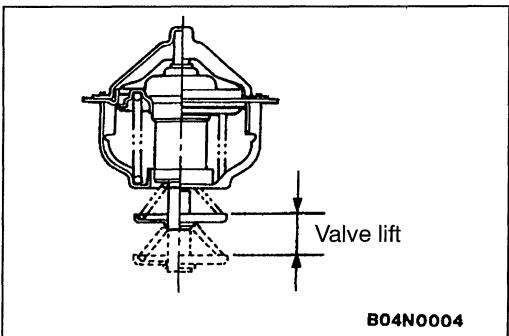
**Standard value:**

**Full-opening temperature: 95°C**

**Amount of valve lift: 8.5 mm or more**

#### NOTE

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

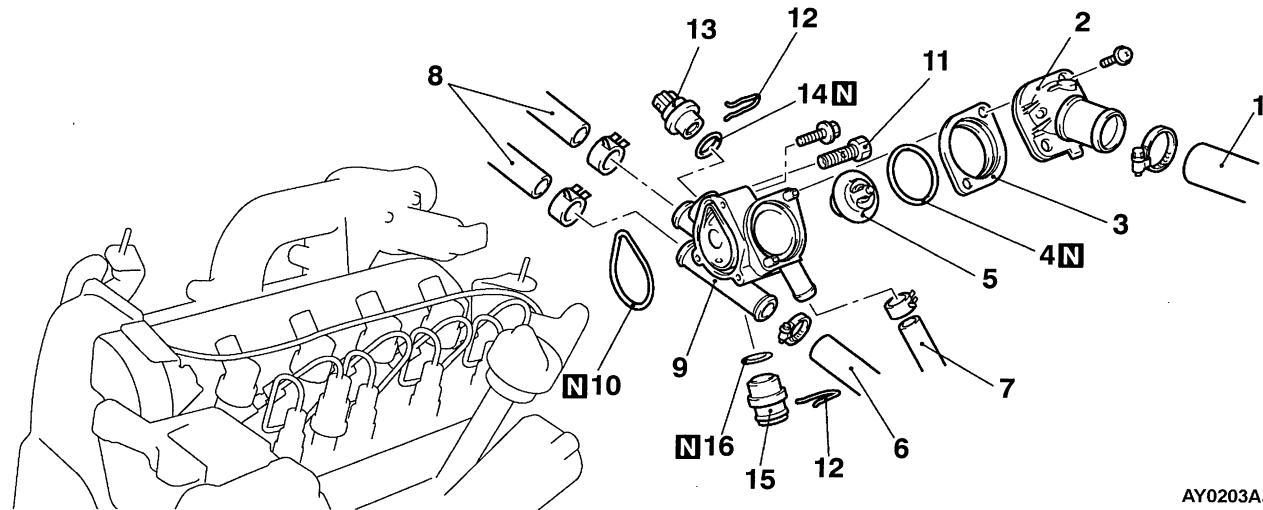


## THERMOSTAT <F9Q>

### REMOVAL AND INSTALLATION

**Pre-removal and Post-installation Operation**

- Engine Coolant Draining and Supplying
- Air Cleaner Removal and Installation  
(Refer to GROUP 15.)



#### Removal steps

◀A▶ ▶A◀ 1. Radiator upper hose connection  
2. Water inlet fitting  
3. Plate  
4. O-ring  
5. Thermostat  
6. Water hose connection  
7. Radiator lower hose connection  
8. Heater hoses connection

◀A▶ ▶A◀

9. Thermostat housing  
10. O-ring  
11. Bleed screw  
12. Clip  
13. Engine coolant temperature sensor  
14. O-ring  
15. Plug  
16. O-ring

### REMOVAL SERVICE POINT

#### ▶A◀ RADIATOR UPPER HOSE/RADIATOR LOWER HOSE DISCONNECTION

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

### INSTALLATION SERVICE POINT

#### ▶A◀ RADIATOR LOWER HOSE/RADIATOR UPPER HOSE CONNECTION

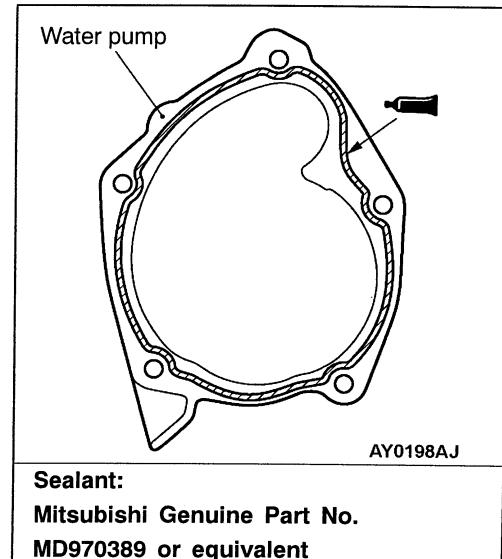
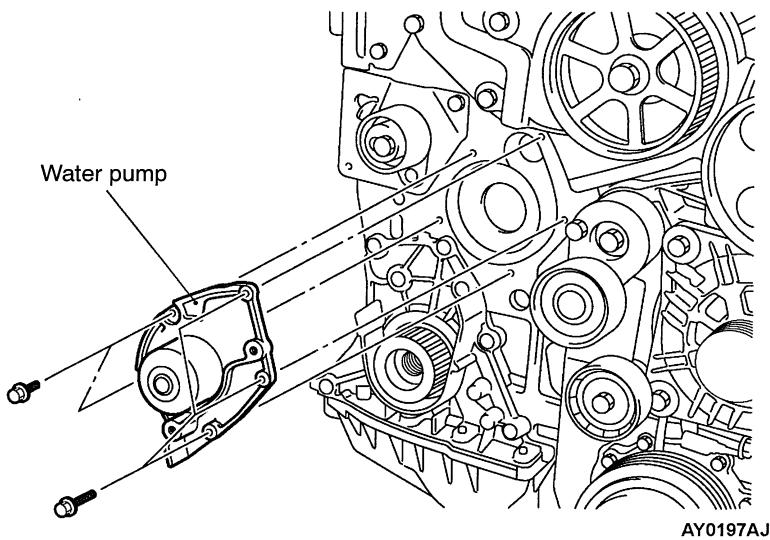
1. Insert each hose as far as the projection of the water inlet fitting.
2. Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

## WATER PUMP <F9Q>

### REMOVAL AND INSTALLATION

**Pre-removal and Post-installation Operation**

- Engine Coolant Draining and Supplying
- Timing Belt Removal and Installation  
(Refer to GROUP 11C.)

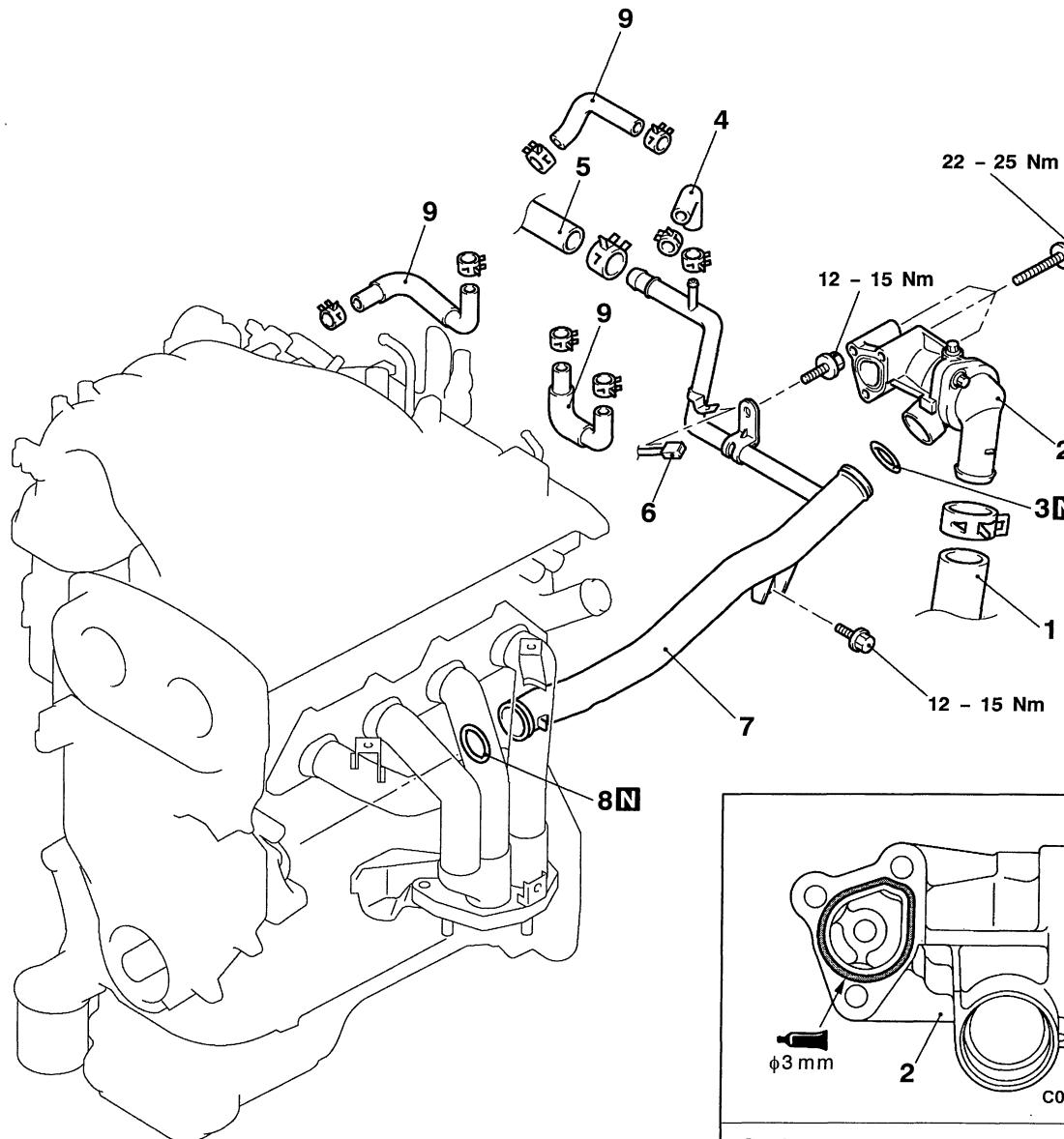


## WATER HOSE AND WATER PIPE <4G93-GDI>

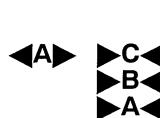
### REMOVAL AND INSTALLATION

#### Pre-removal and Post-installation Operation

- Under Cover Removal and Installation
- Engine Coolant Draining and Supplying
- Air Cleaner Removal and Installation
- Engine Cover and Control Wiring Harness Removal and Installation (Refer to GROUP 11A – Camshaft, Camshaft Oil Seal.)



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#### Removal steps

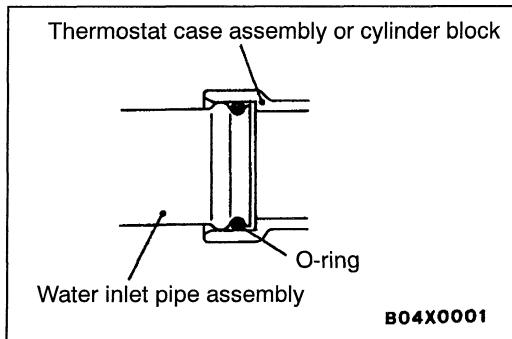
- 1. Radiator lower hose connection
- 2. Thermostat case assembly
- 3. O-ring
- 4. Water hose
- 5. Heater hose connection



- 6. Detonation sensor connector
- 7. Water inlet pipe
- 8. O-ring
- 9. Water hoses

**REMOVAL SERVICE POINT****◀A▶ RADIATOR LOWER HOSE DISCONNECTION**

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

**INSTALLATION SERVICE POINTS****▶A◀ O-RING INSTALLATION**

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

**Caution**

**Do not allow engine oil or other greases to adhere to the O-ring.**

**▶B◀ THERMOSTAT CASE ASSEMBLY INSTALLATION**

Squeeze out the sealant from the tube evenly and apply it so that there is not too much sealant and no places without sealant.

**Specified Sealant:**

**Mitsubishi Genuine Parts No. MD970389 or equivalent**

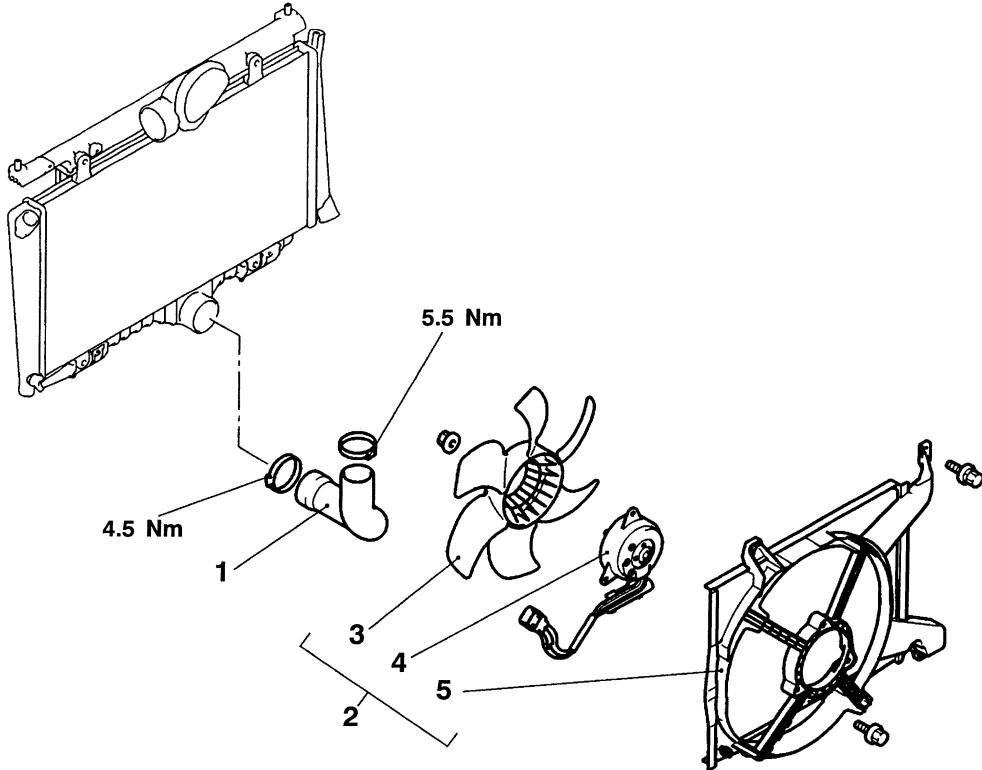
**▶C◀ RADIATOR LOWER HOSE CONNECTION**

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.

## RADIATOR FAN <F9Q>

### REMOVAL AND INSTALLATION

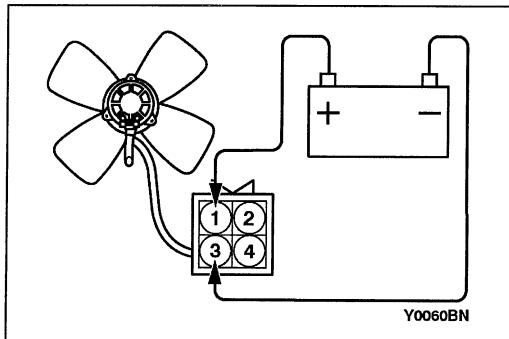
**Pre-removal and Post-installation Operation**  
Under Cover Removal and Installation



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#### Removal steps

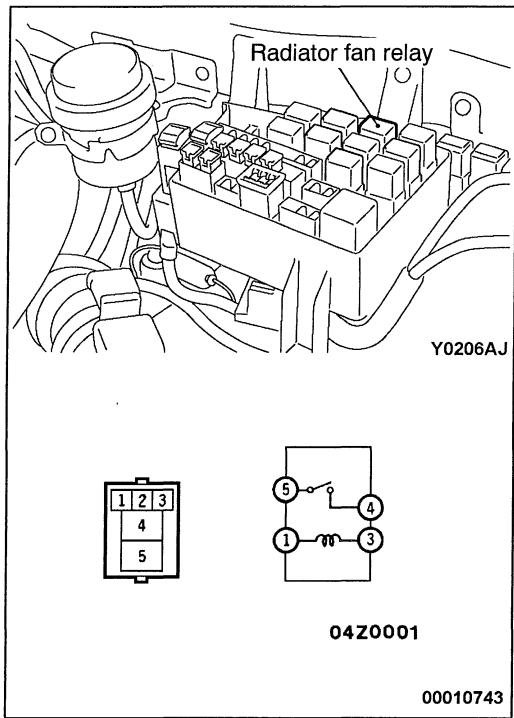
1. Air hose
- Centermember (Refer to GROUP 32.)
2. Radiator fan motor assembly
3. Radiator fan
4. Radiator fan motor
5. Radiator shroud



#### INSPECTION

##### RADIATOR FAN MOTOR CHECK

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.



## RADIATOR FAN RELAY CONTINUITY CHECK

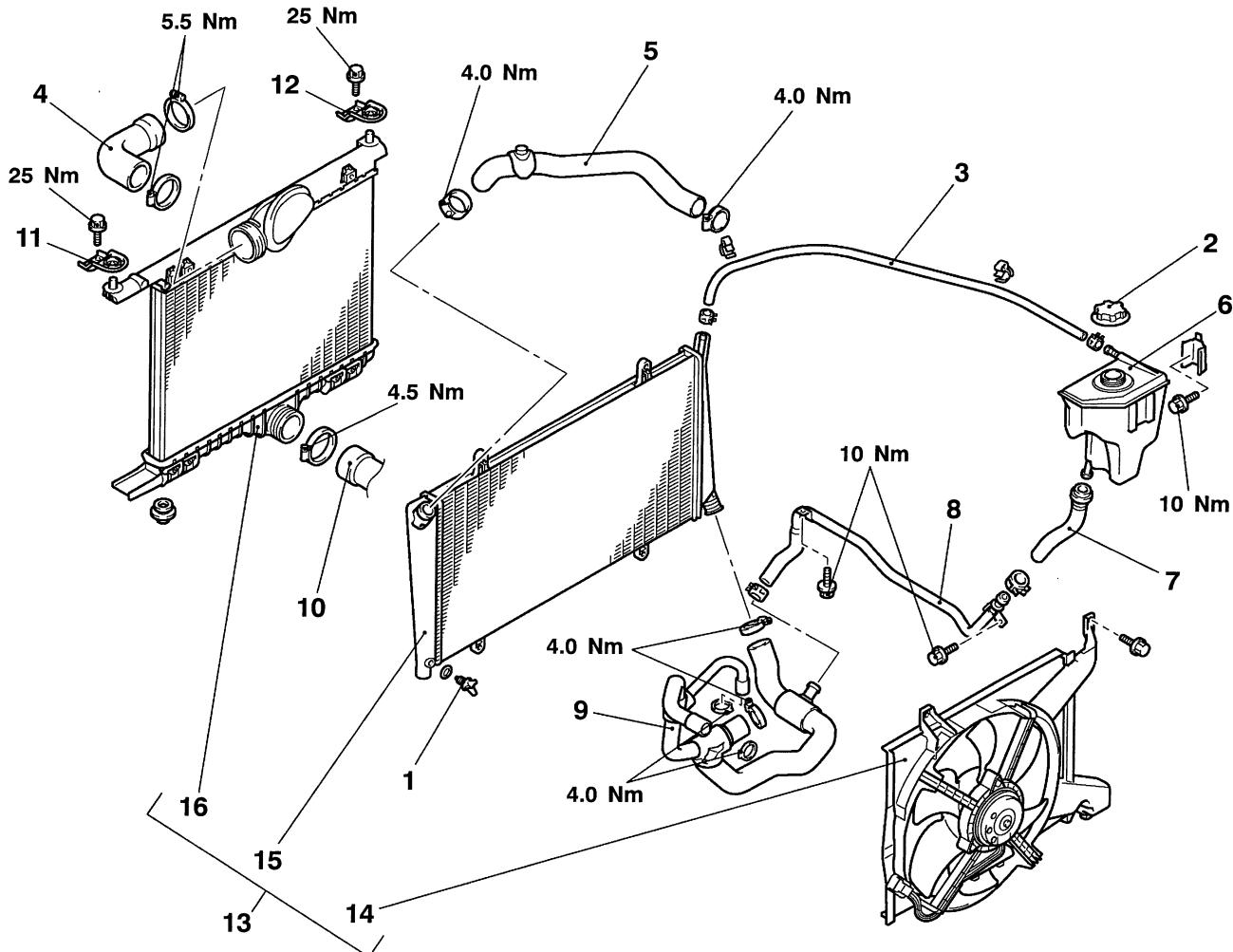
Battery voltage	Terminal No.			
	1	3	4	5
Not supplied	<input type="circle"/>	<input type="circle"/>		
Supplied	<input type="circle"/>	<input type="circle"/>	<input type="circle"/>	<input type="circle"/>

## RADIATOR <F9Q>

### REMOVAL AND INSTALLATION

**Pre-removal and Post-installation Operation**

- Engine Coolant Draining and Supplying
- Air Cleaner Removal and Installation  
(Refer to GROUP 15.)



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#### Removal steps

1. Drain plug	10. Air hose connection
2. Pressure cap	11. Upper insulator (L.H.)
3. Hot bottle hose	12. Upper insulator (R.H.)
4. Air hose	13. Radiator fan motor, radiator and intercooler assembly
◀A▶ ▶A◀ 5. Radiator upper hose	14. Radiator fan motor assembly
6. Hot bottle tank	15. Radiator assembly
7. Filler hose assembly	16. Intercooler assembly
◀A▶ ▶A◀ 8. Filler pipe assembly	
9. Radiator lower hose	

**REMOVAL SERVICE POINT****◀A▶ RADIATOR UPPER HOSE/RADIATOR LOWER HOSE DISCONNECTION**

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

**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.