SECTION CO
ENGINE COOLING SYSTEM

CONTENTS

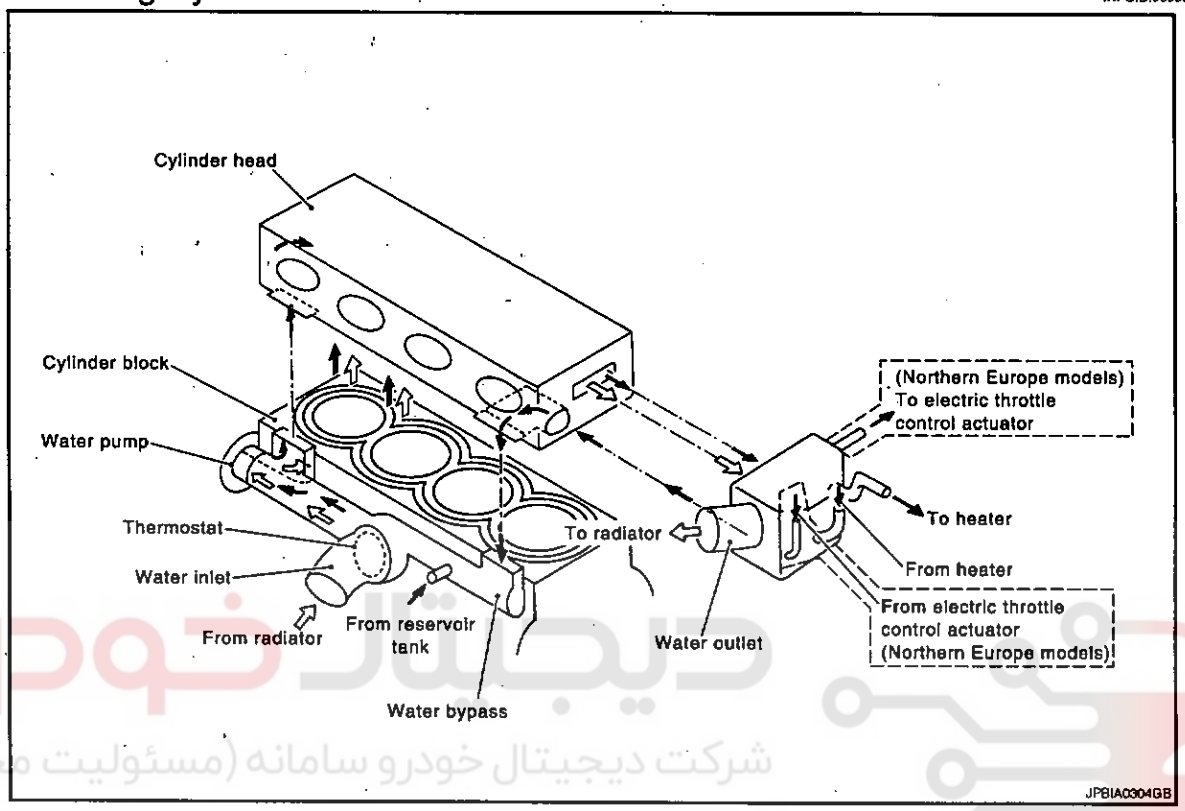
M9R

FUNCTION DIAGNOSIS

DESCRIPTION

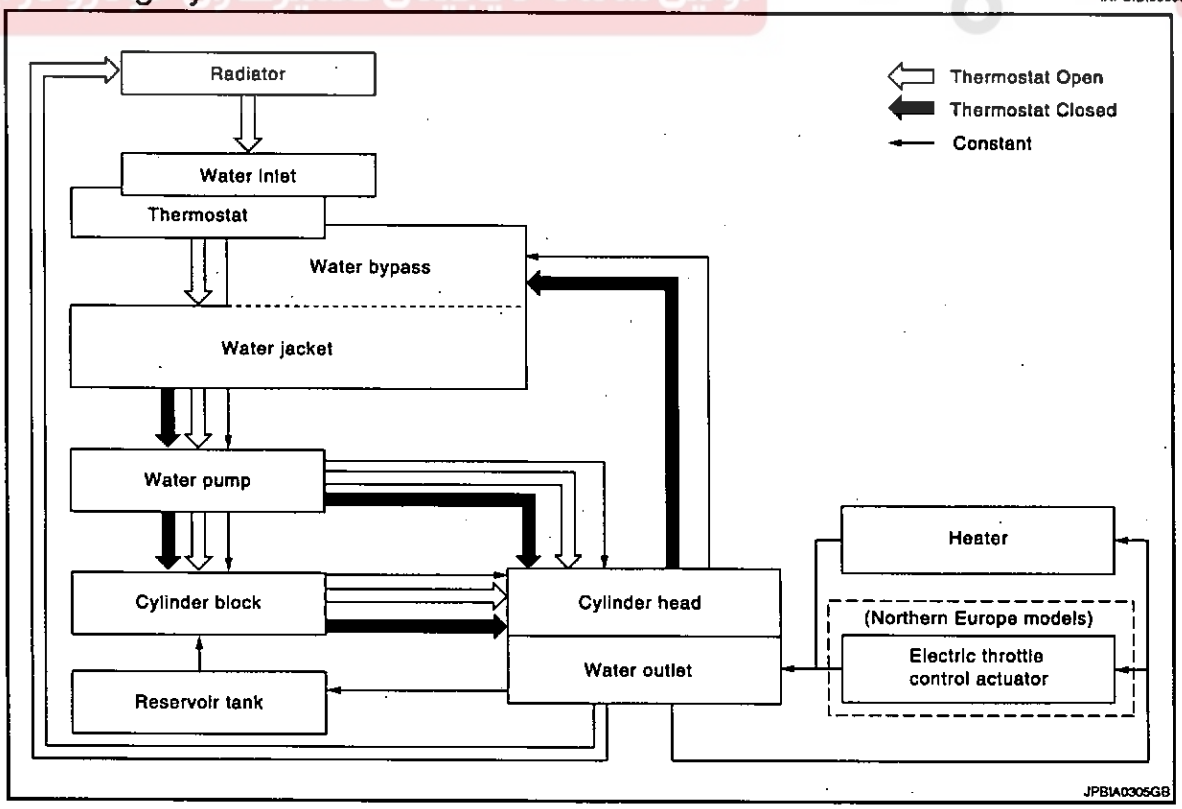
Engine Cooling System

INFOID:0000000004899430



Engine Cooling System Schematic

INFOID:0000000004899431



SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000004899432

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Physical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant viscosity	—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

OVERHEATING CAUSE ANALYSIS

	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Power train system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	Blocked air flow	
		Installed large fog lamp		

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000005022457

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted.
Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the "SRS AIR BAG".**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000004956916

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)

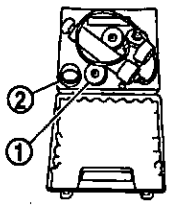
PREPARATION

PREPARATION

Special Service Tools

INFOID:0000000004899434

Tool number (RENAULT tool number) Tool name	Description
— (M.S. 554-07) Reservoir tank cap tester 1. Adapter A — (M.S. 554-01) 2. Adapter B — (M.S. 554-06)	Checking radiator and reservoir tank cap



E1BIA0058ZZ

ON-VEHICLE MAINTENANCE

ENGINE COOLANT

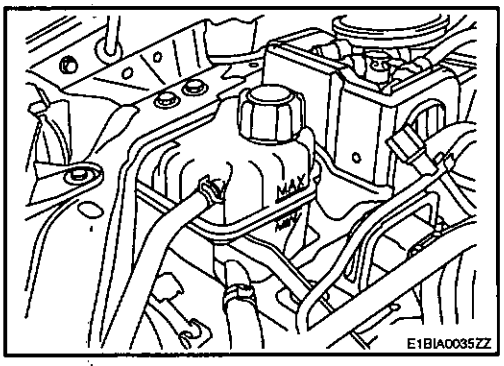
Inspection

INFOID:0000000004899435

LEVEL

- Check if the reservoir tank engine coolant level is within the "MIN" to "MAX" when the engine is cool.
- Adjust the engine coolant level as necessary.
- Check that the reservoir tank cap is tightened.

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.

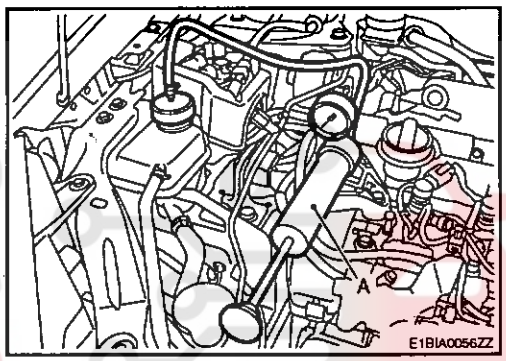


LEAKAGE

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.

Testing pressure: Refer to CO-23, "Radiator".

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.
CAUTION:
Higher test pressure than specified may cause radiator damage.



- If anything is found, repair or replace damaged parts.

Draining

INFOID:0000000004899436

WARNING:
- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around the reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Disconnect radiator hose (lower) and reservoir tank cap.
   When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to EM-94, "Exploded View".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing. Refer to CO-13, "Exploded View".
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-10, "Flushing".

Refilling

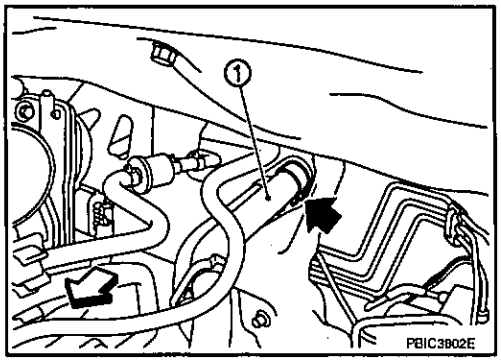
INFOID:0000000004899437

1. Install reservoir tank if removed.
2. Connect radiator hose (lower).
   - If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-94, "Exploded View".
3. Check that each hose clamp has been firmly tightened.

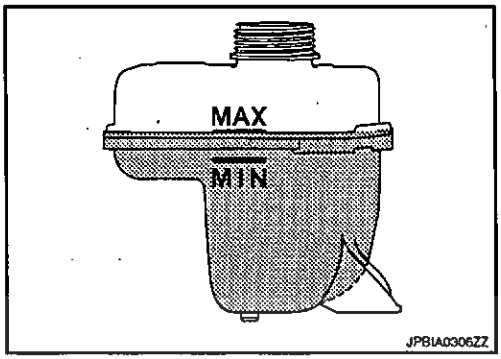
4. Disconnect heater hose (1) at position (⬅) in the figure.

⇦ : Vehicle front

- Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.



5. Fill reservoir tank to specified level.
   - Pour coolant slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.
   - When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.
   - Start engine without closing reservoir tank cap.
   - Keep engine racing at 1,500 rpm for about 2-3 minutes, filling reservoir tank up to MAX. Level, if necessary.
   - Use Genuine NISSAN Engine Coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-13, "Fluids and Lubricants".



Engine coolant capacity
(With reservoir tank at "MAX" level)
Refer to CO-23, "Periodical Maintenance Specification".

Reservoir tank engine coolant capacity
(At "MAX" level)
Refer to: CO-23, "Periodical Maintenance Specification".

6. Install reservoir tank cap.
7. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 2,000 - 2,500 rpm.
   - Check thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

   CAUTION:
   Watch water temperature gauge so as not to overheat engine.
8. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
9. Refill reservoir tank to "MAX" level line with engine coolant, if necessary.
10. Repeat steps 6 through 9 two or more times with reservoir tank cap installed until reservoir tank level no longer drops.
11. Check cooling system for leaks with engine running.
12. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
    - Sound may be noticeable at heater unit.
13. Repeat step 12 three times.
14. If sound is heard, bleed air from cooling system by repeating step 6 through 9 until reservoir tank level no longer drops.
15. Check that the reservoir tank cap is tightened.

Flushing

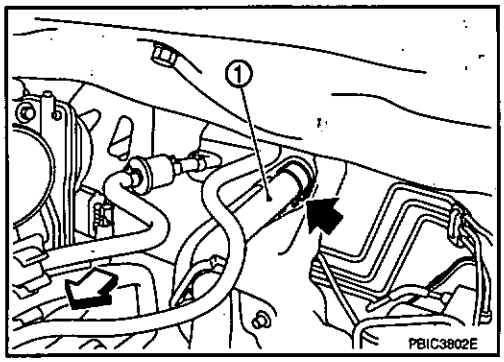
INFOID:0000000004899438

1. Install reservoir tank if removed, and connect radiator hose (lower).
   If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-94, "Exploded View".

2. Disconnect heater hose (1) at position (⬅) in the figure.

⇦ : Vehicle front

- Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.



3. Fill reservoir tank with water.
   - When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.
4. Install reservoir tank cap.
5. Run the engine and warm it up to normal operating temperature.
6. Rev the engine two or three times under no-load.
7. Stop the engine and wait until it cools down.
8. Drain water from the system. Refer to CO-9, "Draining".
9. Repeat steps 1 through 8 until clear water begins to drain from radiator.
10. Check that the reservoir tank cap is tightened.

RADIATOR

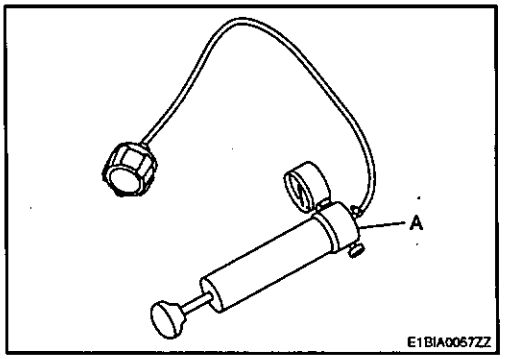
RESERVOIR TANK CAP

RESERVOIR TANK CAP : Inspection

INFOID:0000000004899439

- Fit the adapter to the reservoir tank cap tester [SST: — (M.S. 554-07)] (A) as shown.
- When connecting the reservoir tank cap to the reservoir tank cap tester, apply water or LLC to the reservoir tank cap seal part.
- Check reservoir tank cap relief pressure.

Standard: Refer to CO-23, "Radiator".



- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.

CAUTION:
When installing reservoir tank cap, thoroughly wipe out the reservoir tank filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:0000000004899440

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:
- **Be careful not to bend or damage radiator fins.**
- **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and connectors to prevent water from entering.**

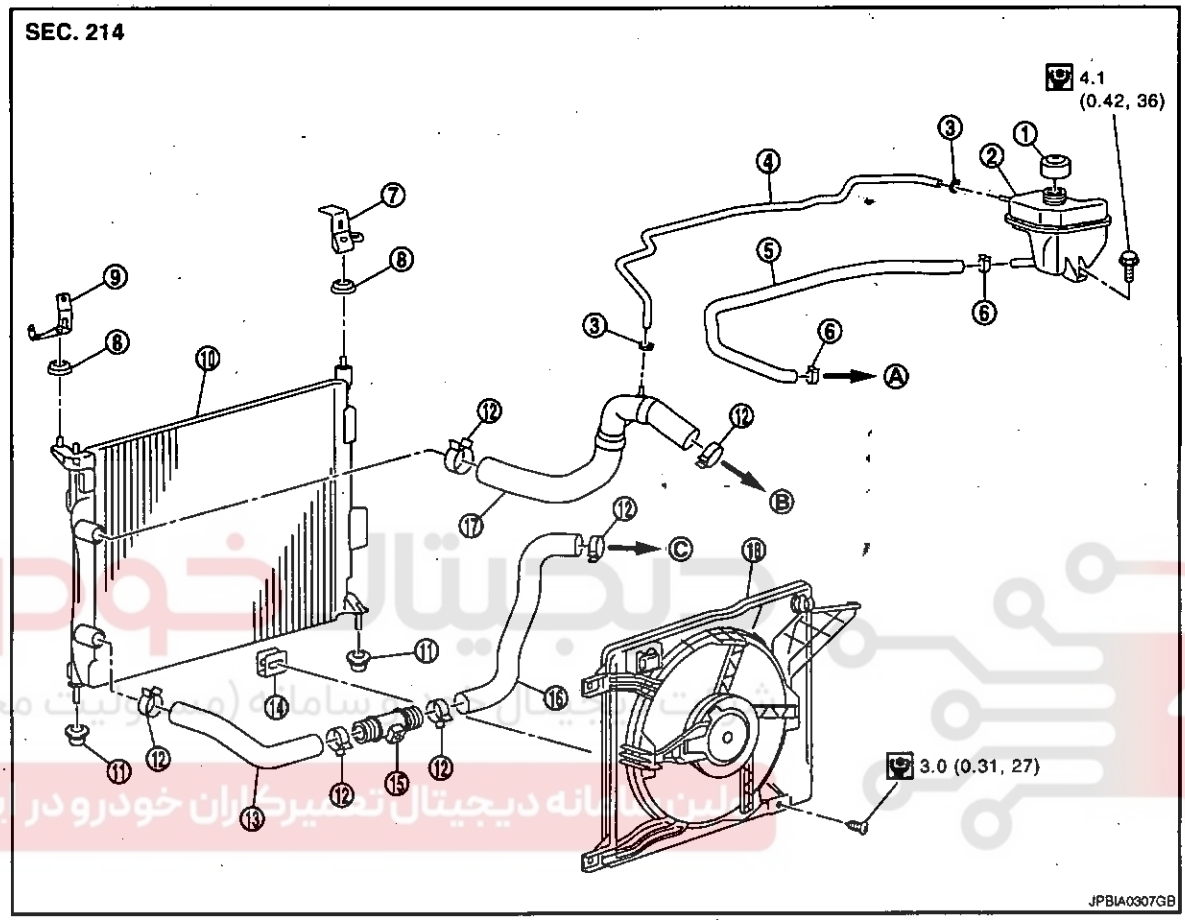
1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

ON-VEHICLE REPAIR

RADIATOR

Exploded View

INFOID:0000000004899441



1. Reservoir tank cap	2. Reservoir tank	3. Clamp
4. Reservoir tank hose	5. Reservoir tank hose	6. Clamp
7. Bracket	8. Mounting rubber (upper)	9. Bracket
10. Radiator	11. Mounting rubber (lower)	12. Clamp
13. Radiator hose (lower)	14. Clip	15. Radiator hose pipe
16. Radiator hose (lower)	17. Radiator hose (upper)	18. Cooling fan assembly
A. To cylinder block	B. To water outlet	C. To water inlet

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899442

REMOVAL

WARNING:

- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Drain engine coolant from radiator. Refer to CO-9, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**

2. Remove air duct (inlet). Refer to EM-28, "Exploded View".
3. Remove reservoir tank hose at radiator hose (upper) side.
4. Disconnect connector from resistor and fan motor, and move harness to aside.
5. Remove cooling fan assembly. Refer to CO-15, "Exploded View".
   CAUTION:
   Be careful not to damage radiator core.
6. Remove radiator hose (upper and lower).
7. Remove liquid tank bracket mounting bolts. Refer to HA-50, "Exploded View".
8. Remove mounting bracket (upper).
9. Lift up the A/C condenser to disengage the radiator, and then remove the radiator.
   CAUTION:
   Be careful not to damage or scratch radiator and A/C condenser core.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:0000000004899443

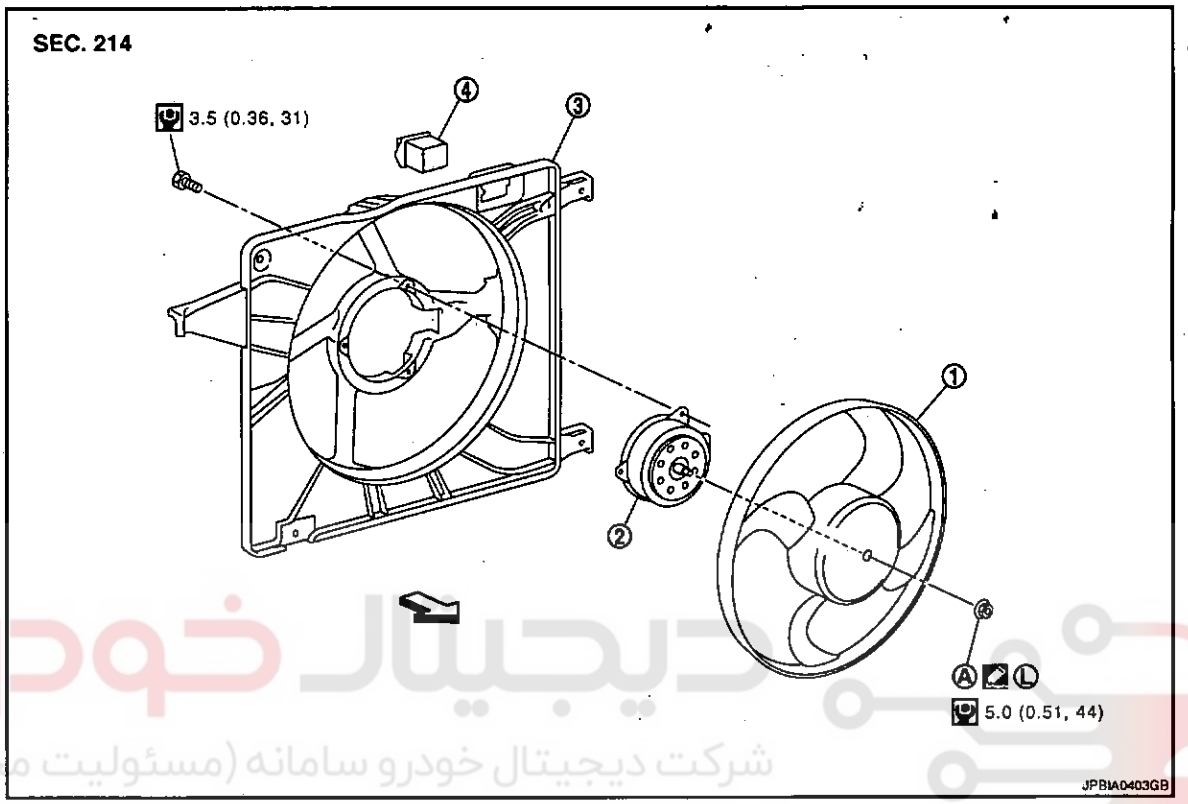
INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-9, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

COOLING FAN

Exploded View

INFOID:0000000004899444



1. Cooling fan
2. Fan motor
3. Fan shroud
4. Resistor

A. Reverse screw

Ⓐ Ⓛ : Apply thread locking sealant.

⇦ : Vehicle front

Refer to GI-3, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000004899445

REMOVAL

1. Remove air duct (inlet). Refer to EM-28, "Exploded View".
2. Disconnect harness connector from resistor and fan motor, and move harness to aside.
3. Remove cooling fan assembly.
   CAUTION:
   Be careful not to damage or scratch on radiator core.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).

NOTE:

Cooling fan is controlled by ECM.

Disassembly and Assembly

INFOID:0000000004899446

DISASSEMBLY

1. Remove resistor from fan shroud.
   CAUTION:
   Handle carefully to avoid dropping and shocks.
2. Remove cooling fan mounting nuts, and then remove the cooling fan.
   CAUTION:
   Reverse screw is used for the fan attachment nut. When removing or attaching, turn the screw the opposite way as for a normal screw.
3. Remove fan motor.

ASSEMBLY

Assembly is the reverse order of disassembly.
- Apply thread locking sealant on fan motor shaft.

Inspection

INFOID:0000000004899447

INSPECTION AFTER DISASSEMBLY

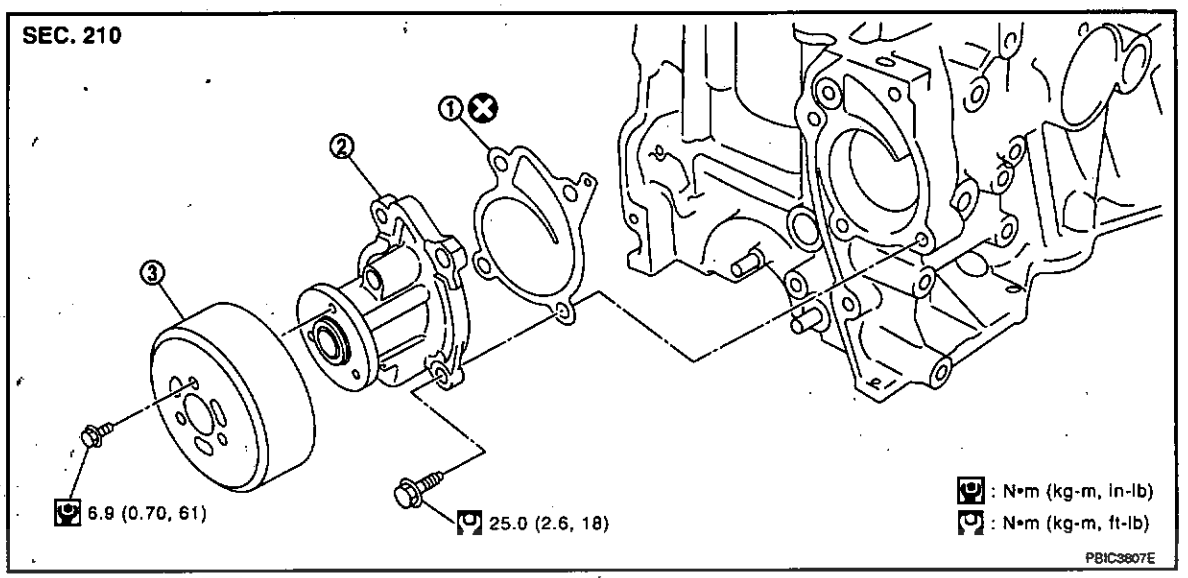
Cooling Fan

Inspect cooling fan for crack or unusual bend.
- If anything is found, replace cooling fan.

WATER PUMP

Exploded View

INFOID:0000000004899448



1. Gasket
2. Water pump
3. Water pump pulley

Refer to GI-3, "Components" for symbols in the figure.

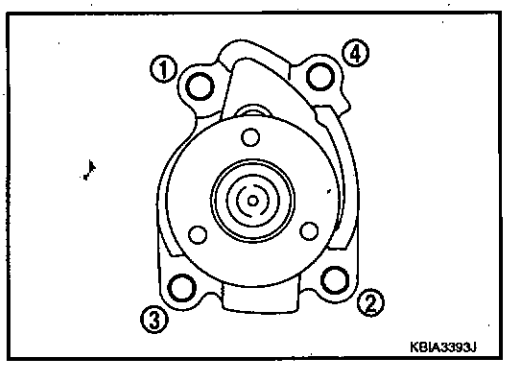
Removal and Installation

INFOID:0000000004899449

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-9, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
2. Steer front wheel to the right.
3. Remove front fender protector (RH). Refer to fender protector.
4. Loosen mounting bolts of water pump pulley before loosening belt tension of drive belt.
5. Remove drive belt. Refer to EM-17, "Removal and Installation".
6. Remove water pump pulley.
7. Remove water pump.
   - Loosen mounting bolts in reverse order as shown in the figure.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.

   CAUTION:
   - **Handle water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassemble and should replaced as a unit.**

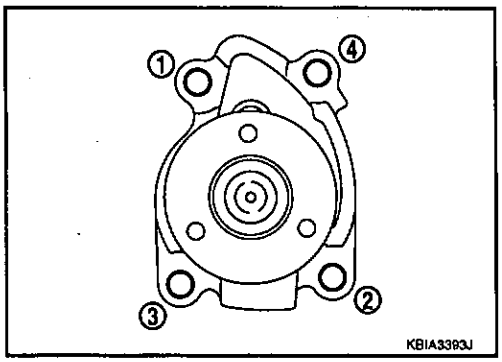


INSTALLATION

Note the following, and install in the reverse order of removal.

Water pump

• Tighten mounting bolts in numerical order as shown in the figure.

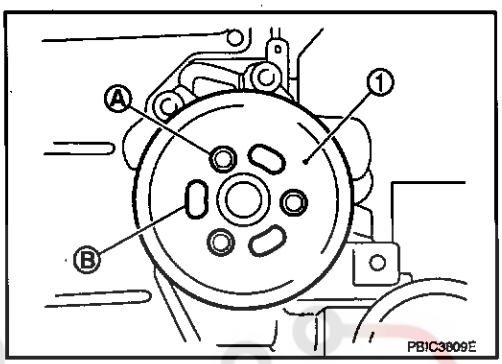


Water pump pulley

CAUTION:

Never install mounting bolts (A) to oblong holes (B).

1 : Water pump pulley

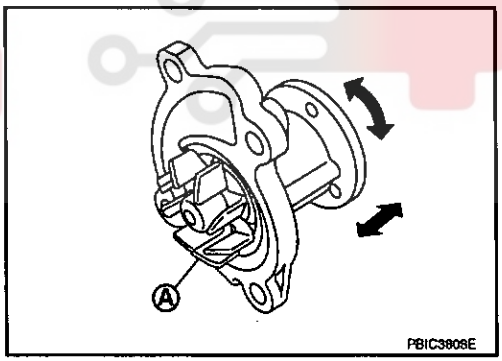


Inspection

INFOID:0000000004899450

INSPECTION AFTER REMOVAL

- Visually check if there is no significant dirt or rusting on water pump body and vane (A).
- Check that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



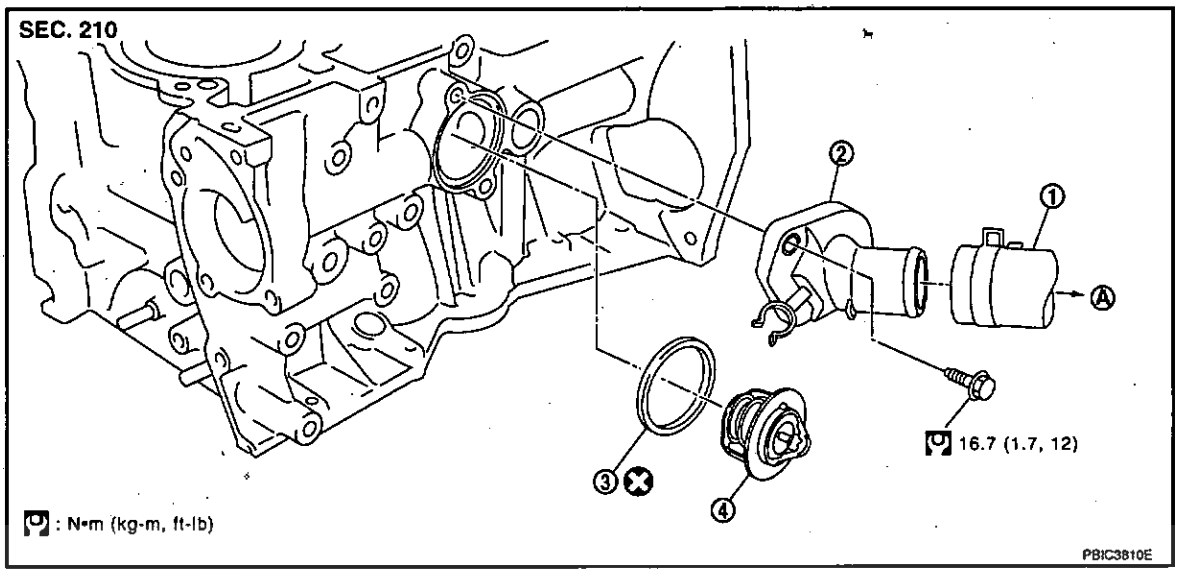
INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-9, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

THERMOSTAT

Exploded View

INFOID:0000000004899451



1. Radiator hose (lower)
2. Water inlet
3. Rubber ring
4. Thermostat
A. To radiator

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899452

REMOVAL

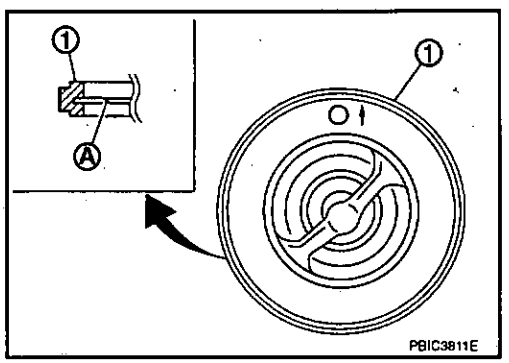
1. Drain engine coolant from radiator. Refer to CO-9, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Add paint mark, then disconnect radiator hose (lower) from water inlet. Refer to CO-13, "Exploded View".
3. Remove water inlet and thermostat.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.

INSTALLATION

Note the following, and install in the reverse order of removal.

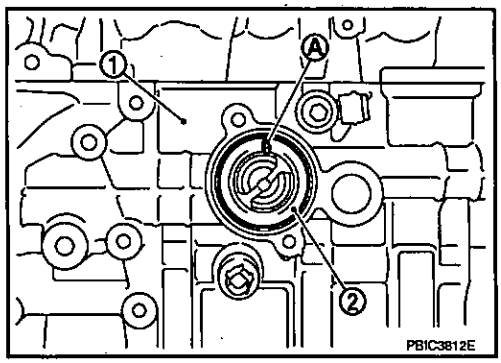
Thermostat

- Install thermostat with making rubber ring (1) groove fit to thermostat flange (A) with the whole circumference.



- Install thermostat (2) with jiggle valve (A) facing upwards.

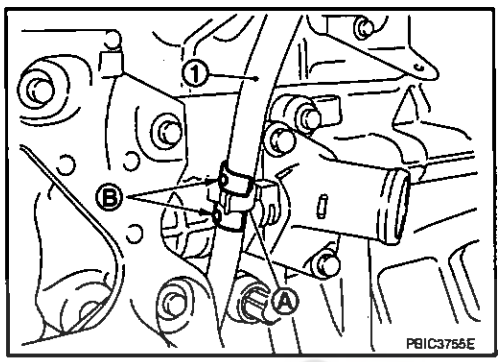
1 : Cylinder block



Water Inlet

After installation, fix water inlet clip (A) on the oil level gauge guide (1) as shown in the figure.

B : Positioning



Inspection

INFOID:0000000004899453

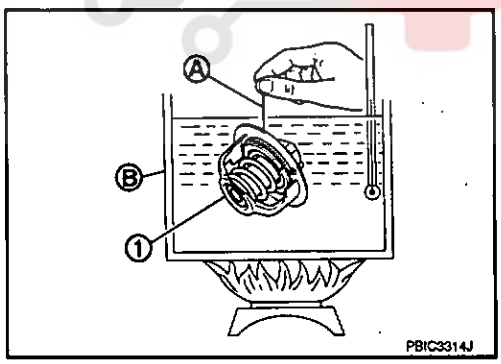
INSPECTION AFTER REMOVAL

WARNING:
Use a protector to prevent a burn during the work.

Thermostat

- Place a thread (A) so that it is caught in the valves of thermostat (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full open valve lift amount.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.

Standard: Refer to CO-23, "Thermostat".



- If out of the standard, replace thermostat.

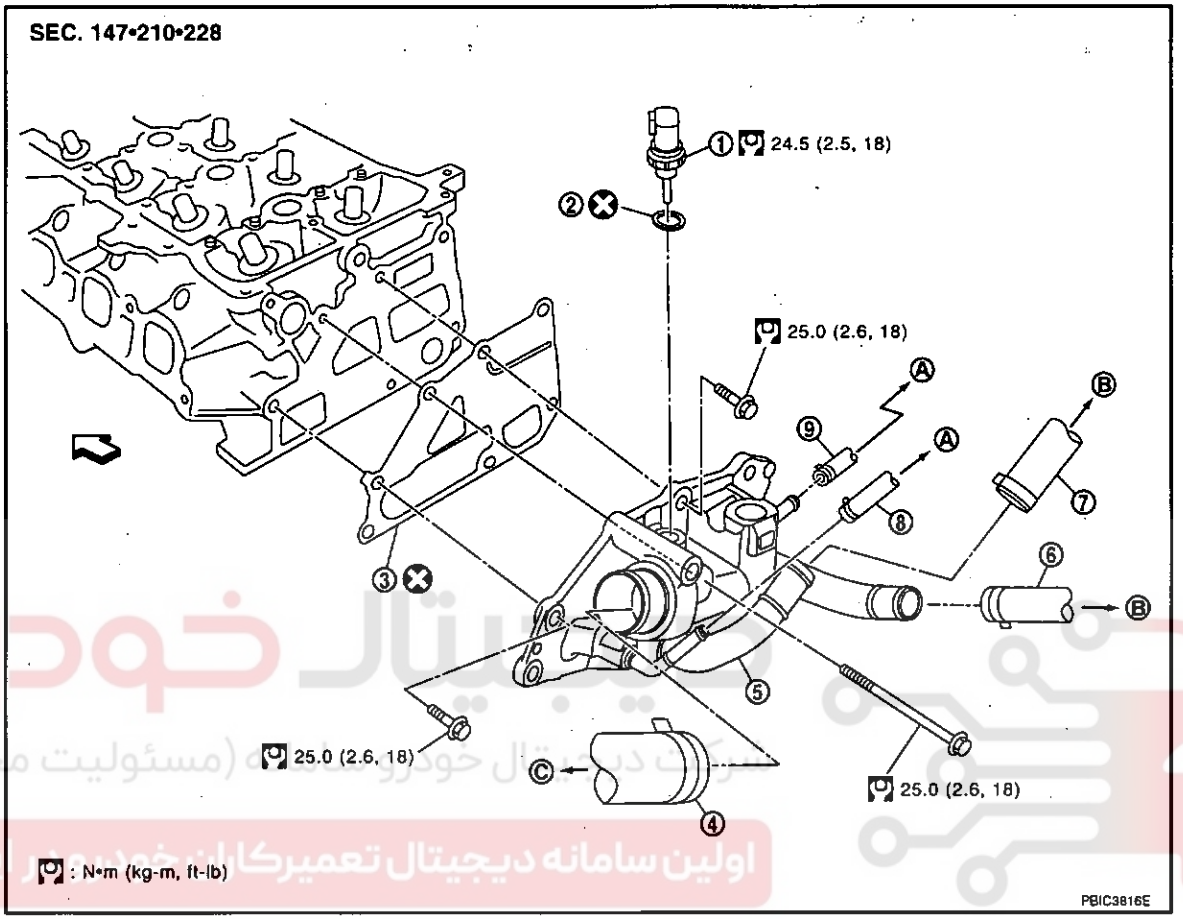
INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-9, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

WATER OUTLET

Exploded View

INFOID:0000000004899454



1.	Engine coolant temperature sensor	2.	Washer	3.	Gasket
4.	Radiator hose (upper)	5.	Water outlet	6.	Heater hose
7.	Heater hose	8.	Water hose (Northern Europe models)	9.	Water hose (Northern Europe models)
A.	To electric throttle control actuator	B.	To heater core	C.	To radiator

⇦ : Engine front

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899455

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-9, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Disconnect radiator hose (upper). Refer to CO-13, "Exploded View".
3. Disconnect harness connector from engine coolant temperature sensor.
4. Remove water hoses (Northern Europe models).
5. Remove heater hoses.
6. Remove water outlet.
7. Remove engine coolant temperature sensor from water outlet, if necessary.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:0000000004899456

INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-9, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000004899457

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity [With reservoir tank ("MAX" level)]	6.4 (5-5/8)
Reservoir tank engine coolant capacity (At "MAX" level)	0.8 (3/4)

Radiator

INFOID:0000000004899458

RESERVOIR TANK CAP

Unit: kPa (bar, kg/cm^2, psi)

Cap relief pressure	Standard	130.2 - 149.8 (1.3 - 1.5, 1.3 - 1.5, 18.9 - 21.7)

RADIATOR

Unit: kPa (bar, kg/cm^2, psi)

Leakage testing pressure	150 (1.5, 1.53, 21.75)

Thermostat

INFOID:0000000004899459

Thermostat	Standard
Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.0 mm/95°C (0.315 in/203°F)
Valve closing temperature	77°C (171°F)

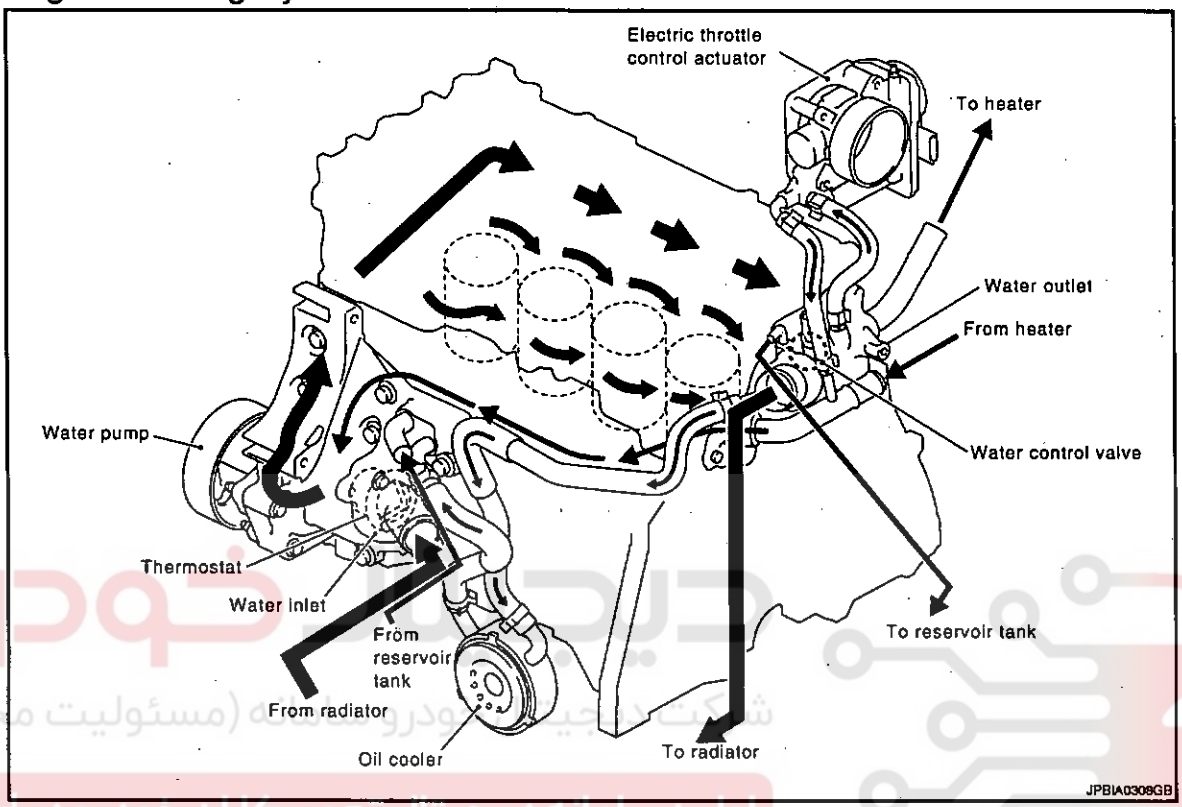
FUNCTION DIAGNOSIS

DESCRIPTION

M/T

M/T : Engine Cooling System

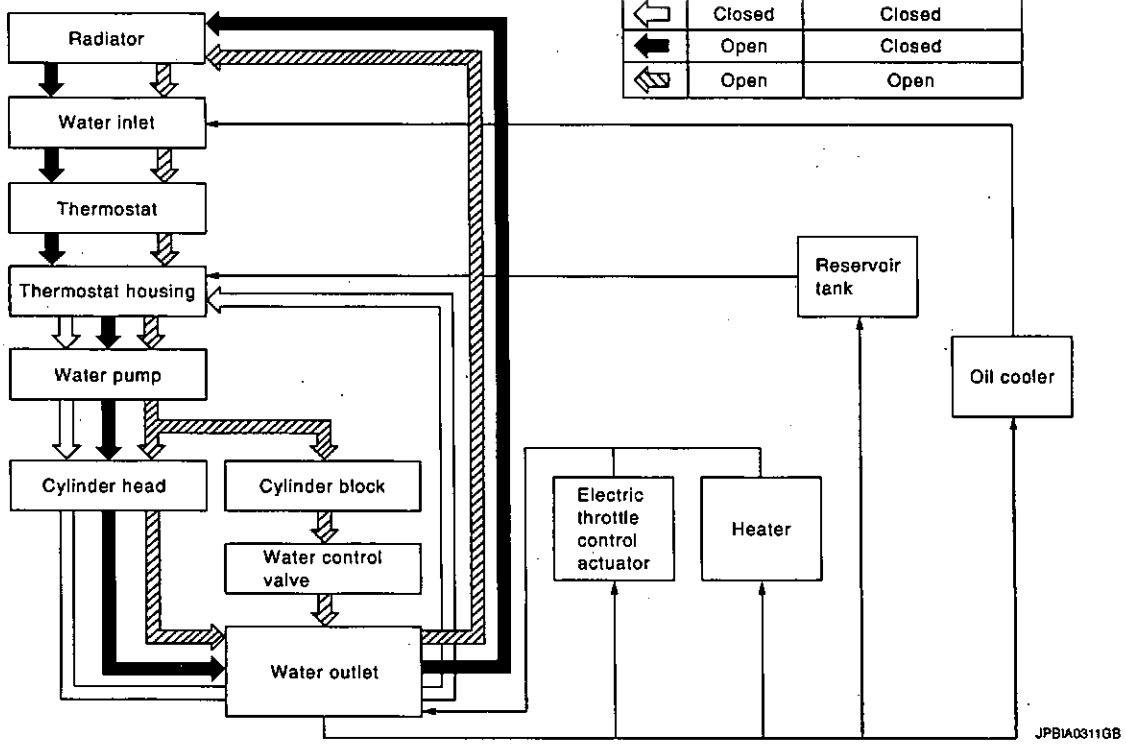
INFOID:0000000004899460



M/T : Engine Cooling System Schematic

INFOID:0000000004899461

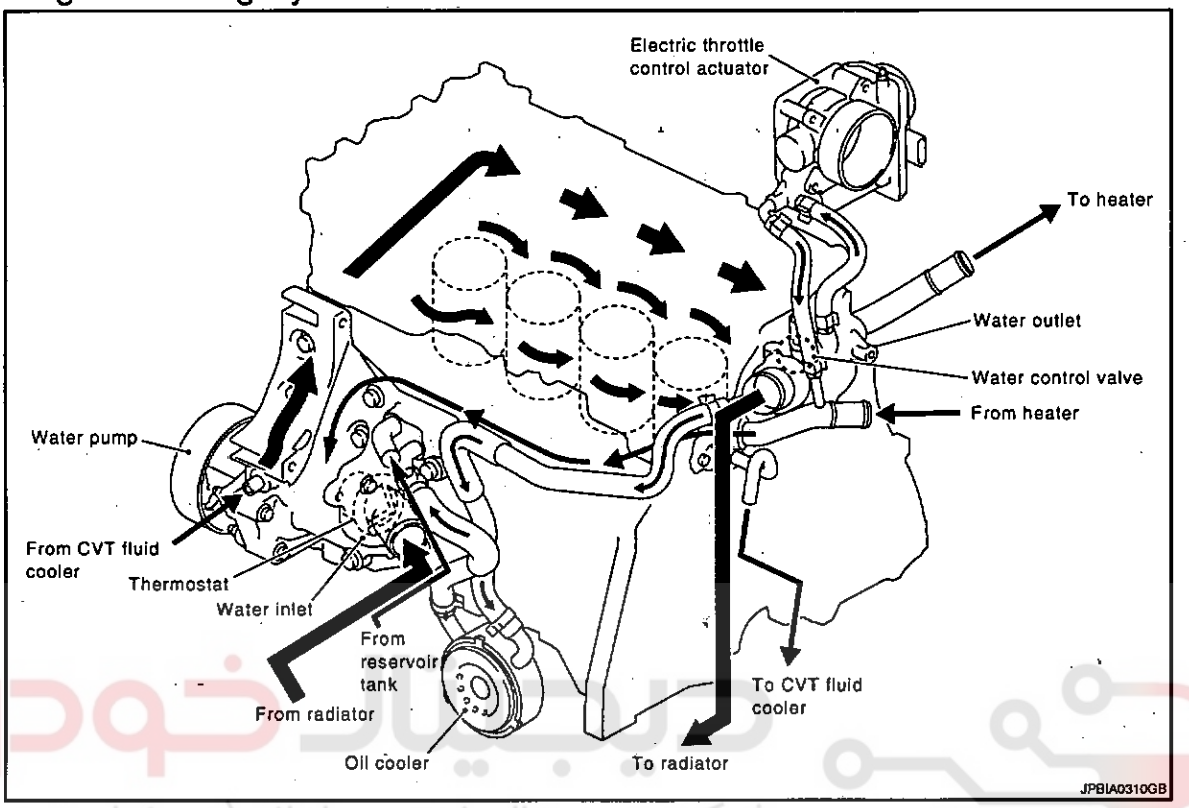
	Thermostat	Water control valve
⇦	Closed	Closed
⬅	Open	Closed
⇦	Open	Open



CVT

CVT : Engine Cooling System

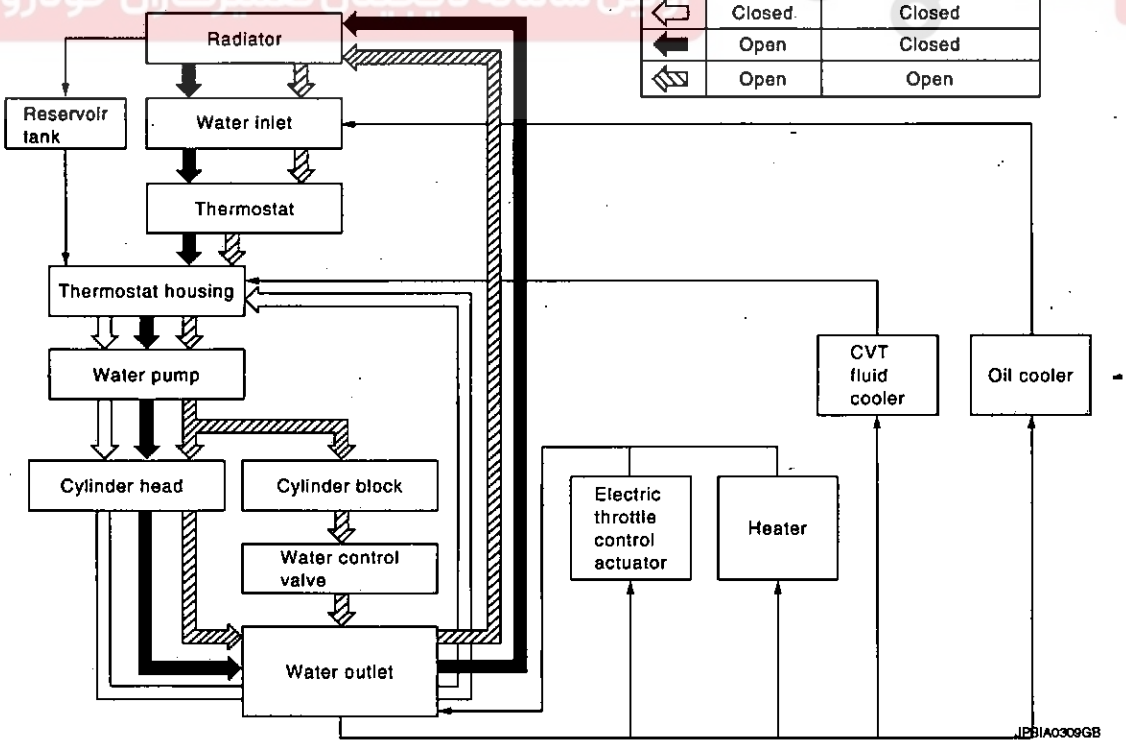
INFOID:0000000004899462



CVT : Engine Cooling System Schematic

INFOID:0000000004899463

	Thermostat	Water control valve
⇦	Closed	Closed
⬅	Open	Closed
⇦	Open	Open



SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000004899464

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Physical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant viscosity	—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

OVERHEATING CAUSE ANALYSIS

	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Power train system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	Blocked air flow	
		Installed large fog lamp		

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000005022460

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the "SRS AIR BAG".**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000004956918

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

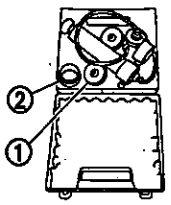
1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)

PREPARATION

PREPARATION

Special Service Tools

INFOID:0000000004899466

Tool number (RENAULT tool number) Tool name		Description
— (M.S. 554-07) Reservoir tank cap tester 1. Adapter A — (M.S. 554-01) 2. Adapter B — (M.S. 554-06)	 E1BIA0058ZZ	Checking radiator and reservoir tank cap

ON-VEHICLE MAINTENANCE

ENGINE COOLANT

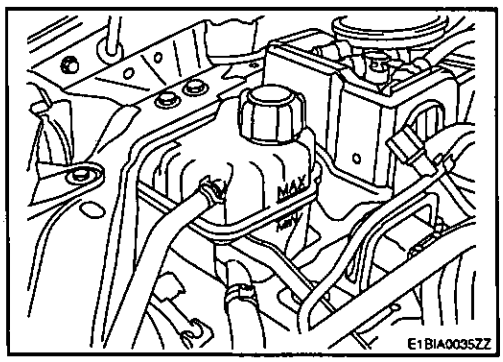
Inspection

INFOID:0000000004899467

LEVEL

- Check if the reservoir tank engine coolant level is within the "MIN" to "MAX" when the engine is cool.
- Adjust the engine coolant level as necessary.
- Check that the reservoir tank cap is tightened.

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.

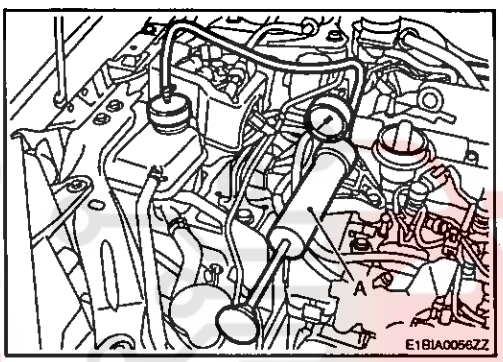


LEAKAGE

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.

Testing pressure: Refer to CO-46, "Radiator".

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.
CAUTION:
Higher test pressure than specified may cause radiator damage.



- If anything is found, repair or replace damaged parts.

Draining

INFOID:0000000004899468

WARNING:
- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around the reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Disconnect radiator hose (lower) and reservoir tank cap.
   When draining all of engine coolant in the system, open water drain plugs on cylinder block. Refer to EM-213, "Disassembly and Assembly".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing.
   - Remove of engine mounting insulator (RH) is necessary. Refer to EM-196, "M/T : Exploded View" (M/T models) or EM-201, "CVT : Exploded View" (CVT models).
3. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-31, "Flushing".

Refilling

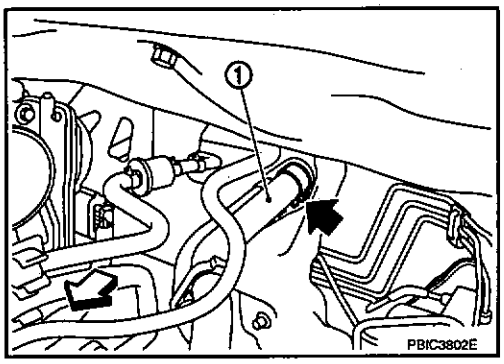
INFOID:0000000004899469

1. Install reservoir tank if removed.
2. Connect radiator hose (lower).
   If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-213, "Disassembly and Assembly".

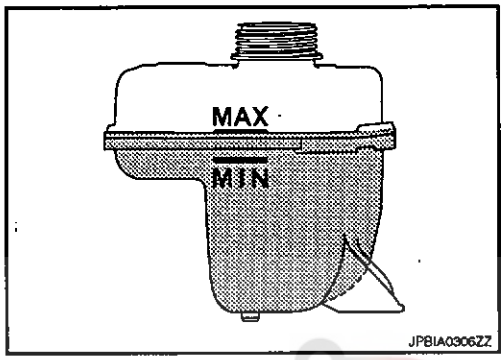
3. Check that each hose clamp has been firmly tightened.
4. Disconnect heater hose (1) at position (⇦) in the figure.

⇦ : Vehicle front

- Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.



5. Fill reservoir tank to specified level.
   - Pour coolant slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.
   - When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.
   - Start engine without closing reservoir tank cap.
   - Keep engine racing at 1,500 rpm for about 2-3 minutes, filling reservoir tank up to MAX. Level, if necessary.
   - Use Genuine NISSAN Engine Coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-13, "Fluids and Lubricants"



Engine coolant capacity
(With reservoir tank at "MAX" level)

Refer to :CO-46, "Periodical Maintenance Specification"

Reservoir tank engine coolant capacity
(At "MAX" level)

Refer to CO-46, "Periodical Maintenance Specification".

6. Install reservoir tank cap.
7. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 2,000 - 2,500 rpm.
   - Check thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

   CAUTION:
   Watch water temperature gauge so as not to overheat engine.
8. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
9. Refill reservoir tank to "MAX" level line with engine coolant, if necessary.
10. Repeat steps 6 through 9 two or more times with reservoir tank cap installed until reservoir tank level no longer drops.
11. Check cooling system for leaks with engine running.
12. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
    - Sound may be noticeable at heater unit.
13. Repeat step 12 three times.
14. If sound is heard, bleed air from cooling system by repeating step 6 through 9 until reservoir tank level no longer drops.
15. Check that the reservoir tank cap is tightened.

Flushing

INFOID:0000000004899470

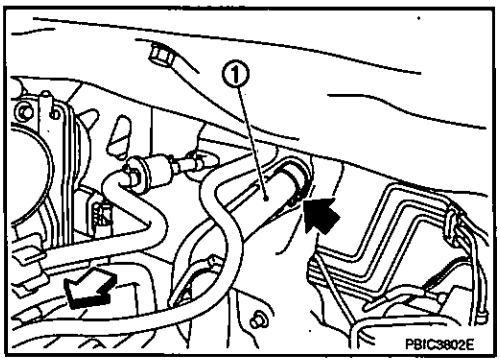
1. Install reservoir tank if removed, and connect radiator hose (lower).

If water drain plugs on cylinder block are removed, close and tighten them. Refer to EM-213, "Disassembly and Assembly".

2. Disconnect heater hose (1) at position (⇦) in the figure.

   ⇦ : Vehicle front

   - Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.



3. Fill reservoir tank with water.
   - When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.
4. Install reservoir tank cap.
5. Run the engine and warm it up to normal operating temperature.
6. Rev the engine two or three times under no-load.
7. Stop the engine and wait until it cools down.
8. Drain water from the system. Refer to CO-30, "Draining".
9. Repeat steps 1 through 8 until clear water begins to drain from radiator.
10. Check that the reservoir tank cap is tightened.

RADIATOR

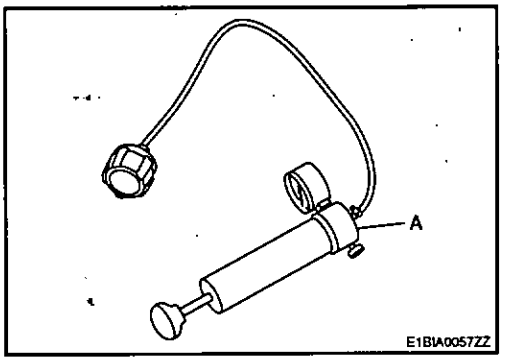
RESERVOIR TANK CAP

RESERVOIR TANK CAP : Inspection

INFOID:0000000004899471

- Fit the adapter to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.
- When connecting the reservoir tank cap to the reservoir tank cap tester, apply water or LLC to the reservoir tank cap seal part.
- Check reservoir tank cap relief pressure.

Standard: Refer to CO-46, "Radiator".



- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.

CAUTION:
When installing reservoir tank cap, thoroughly wipe out the reservoir tank filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:0000000004899472

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:
- **Be careful not to bend or damage radiator fins.**
- **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and connectors to prevent water from entering.**

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

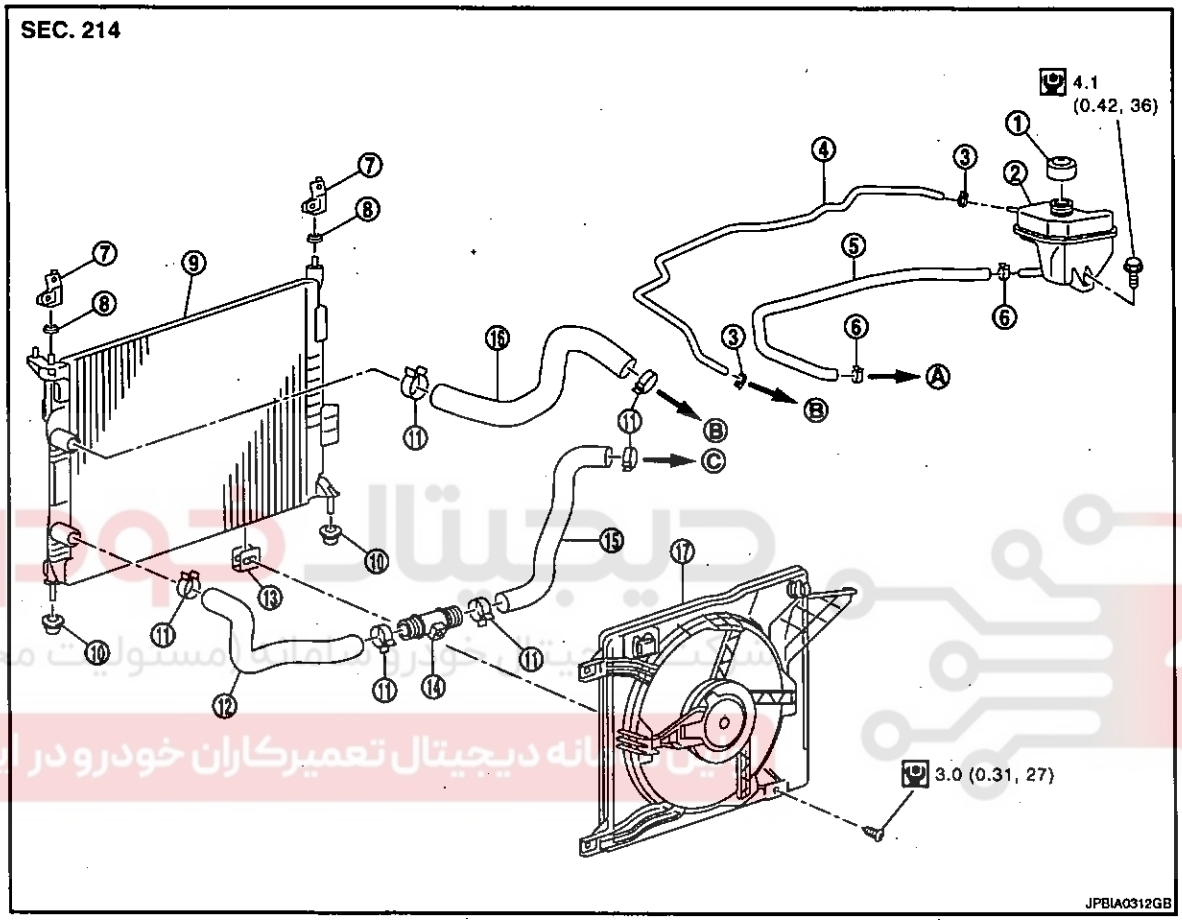
ON-VEHICLE REPAIR

RADIATOR

Exploded View

INFOID:0000000004899473

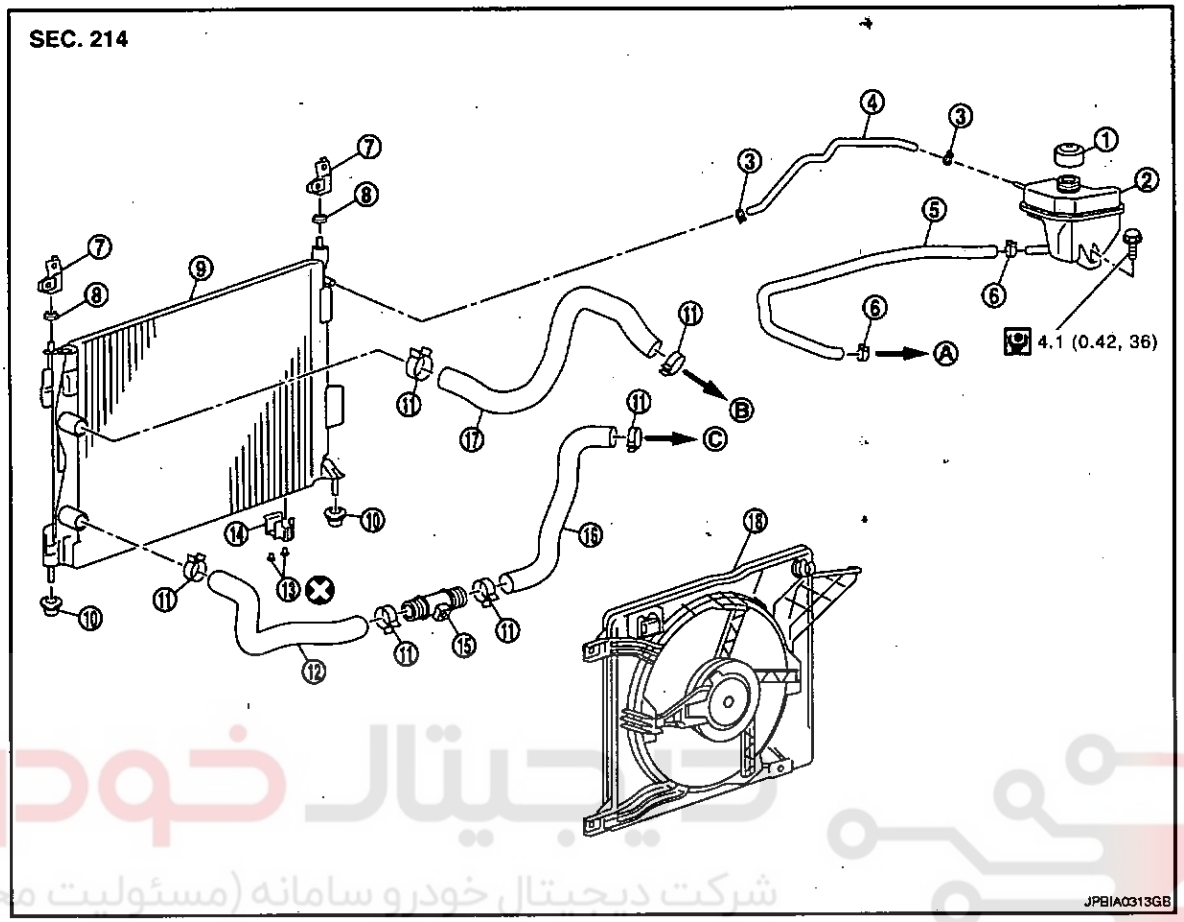
M/T models



1. Reservoir tank cap	2. Reservoir tank	3. Clamp
4. Reservoir tank hose	5. Reservoir tank hose	6. Clamp
7. Bracket	8. Mounting rubber (upper)	9. Radiator
10. Mounting rubber (lower)	11. Clamp	12. Radiator hose (lower)
13. Clip	14. Radiator hose pipe	15. Radiator hose (lower)
16. Radiator hose (upper)	17. Cooling fan assembly	
A. To thermostat housing	B. To water outlet	C. To water inlet

Refer to GI-3, "Components" for symbols in the figure.

CVT models



1. Reservoir tank cap	2. Reservoir tank	3. Clamp
4. Reservoir tank hose	5. Reservoir tank hose	6. Clamp
7. Bracket	8. Mounting rubber (upper)	9. Radiator
10. Mounting rubber (lower)	11. Clamp	12. Radiator hose (lower)
13. Rivet	14. Clip	15. Radiator hose pipe
16. Radiator hose (lower)	17. Radiator hose (upper)	18. Cooling fan assembly
A. To thermostat housing	B. To water outlet	C. To water inlet

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899474

REMOVAL

WARNING:

- **Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.**
- **Wrap a thick cloth around the reservoir tank cap. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
2. Remove air duct (inlet). Refer to EM-146, "Exploded View".
3. Remove reservoir tank hose at radiator side (CVT models).
4. Disconnect connector from resistor and fan motor, and move harness to aside.
5. Remove cooling fan assembly. Refer to CO-37, "Exploded View".
   CAUTION:
   Be careful not to damage radiator core.

6. Remove radiator hose (upper and lower).
7. Remove liquid tank bracket mounting bolts. Refer to HA-50, "Exploded View".
8. Remove mounting bracket (upper).
9. Lift up the A/C condenser to disengage the radiator, and then remove the radiator.
   CAUTION:
   Be careful not to damage or scratch radiator and A/C condenser core.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:0000000004899475

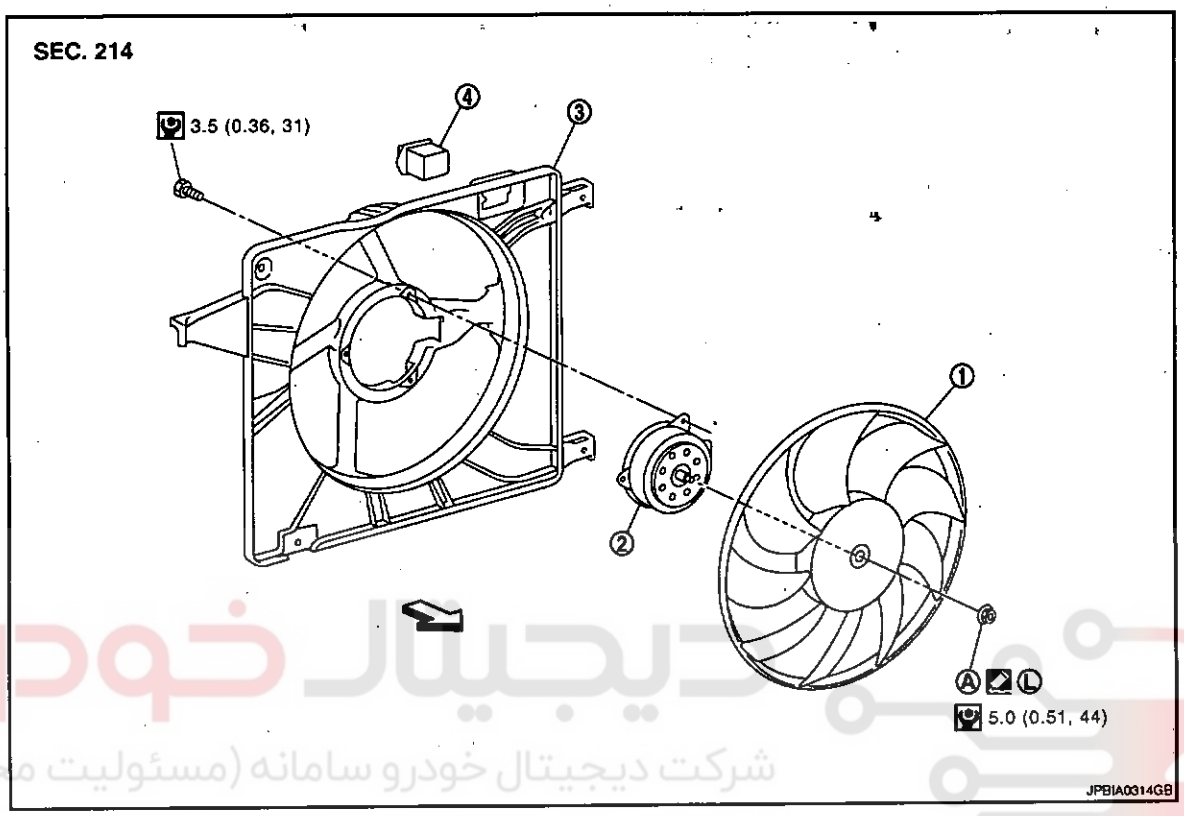
INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-30, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

COOLING FAN

Exploded View

INFOID:0000000004899476



1. Cooling fan
2. Fan motor
3. Fan shroud
4. Resistor

A. Reverse screw

A L : Apply thread locking sealant.

⇦ : Vehicle front

Refer to GI-3, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000004899477

REMOVAL

1. Remove air duct (inlet). Refer to EM-146, "Exploded View".
2. Disconnect harness connector from resistor and fan motor, and move harness to aside.
3. Remove cooling fan assembly.
   CAUTION:
   Be careful not to damage or scratch on radiator core.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged). (M/T models)

NOTE:

Cooling fan is controlled by ECM. For details, refer to EC-52, "System Diagram".

Disassembly and Assembly

INFOID:0000000004899478

DISASSEMBLY

1. Remove resistor from fan shroud.
   CAUTION:
   Handle carefully to avoid dropping and shocks.
2. Remove cooling fan mounting nut, and then remove the cooling fan.
   CAUTION:
   Reverse screw is used for the fan attachment screw. When removing or attaching, turn the screw the opposite way as for a normal screw.
3. Remove fan motor.

ASSEMBLY

Assembly is the reverse order of disassembly.
- Apply thread locking sealant on fan motor shaft.

Inspection

INFOID:0000000004899479

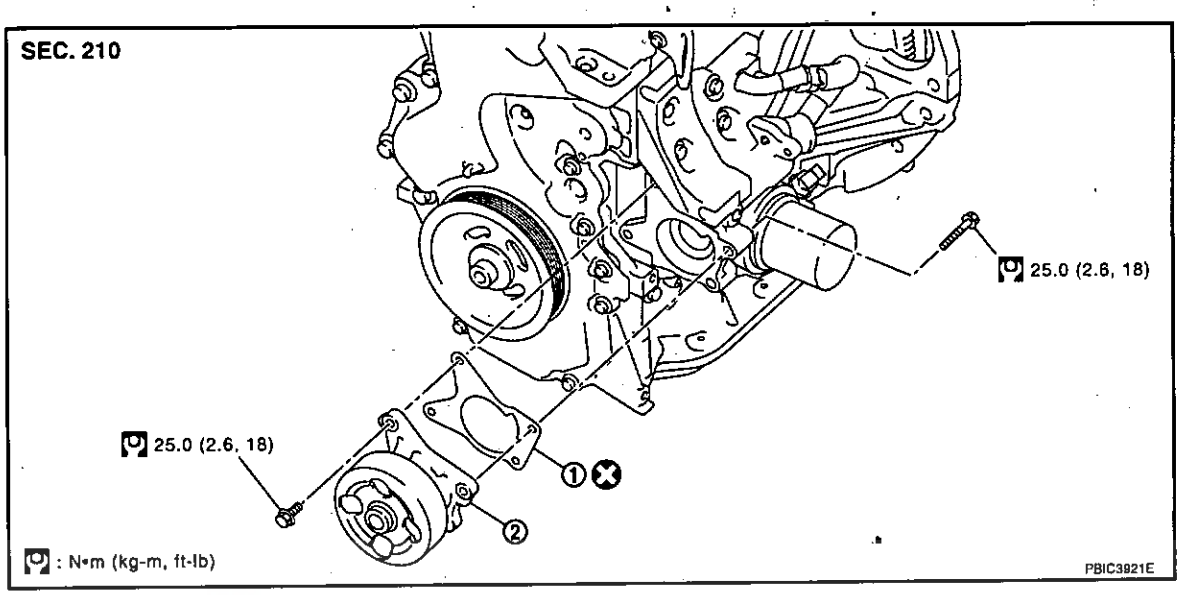
INSPECTION AFTER DISASSEMBLY

Cooling Fan
Inspect cooling fan for crack or unusual bend.
- If anything is found, replace cooling fan.

WATER PUMP

Exploded View

INFOID:0000000004899480



1. Gasket
2. Water pump

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899481

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belts.**
2. Remove front fender protector (RH). Refer to EXT-22, "Exploded View".
3. Remove drive belt. Refer to EM-136, "Removal and Installation".
4. Remove water pump.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.

   CAUTION:
   - **Handle water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassemble and should replaced as a unit.**

INSTALLATION

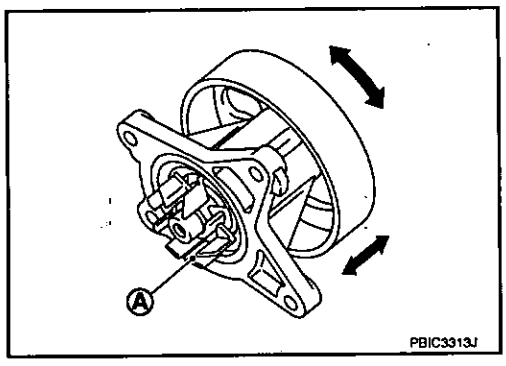
Install in the reverse order of removal.

Inspection

INFOID:0000000004899482

INSPECTION AFTER REMOVAL

- Visually check if there is no significant dirt or rusting on water pump body and vane (A).
- Check that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



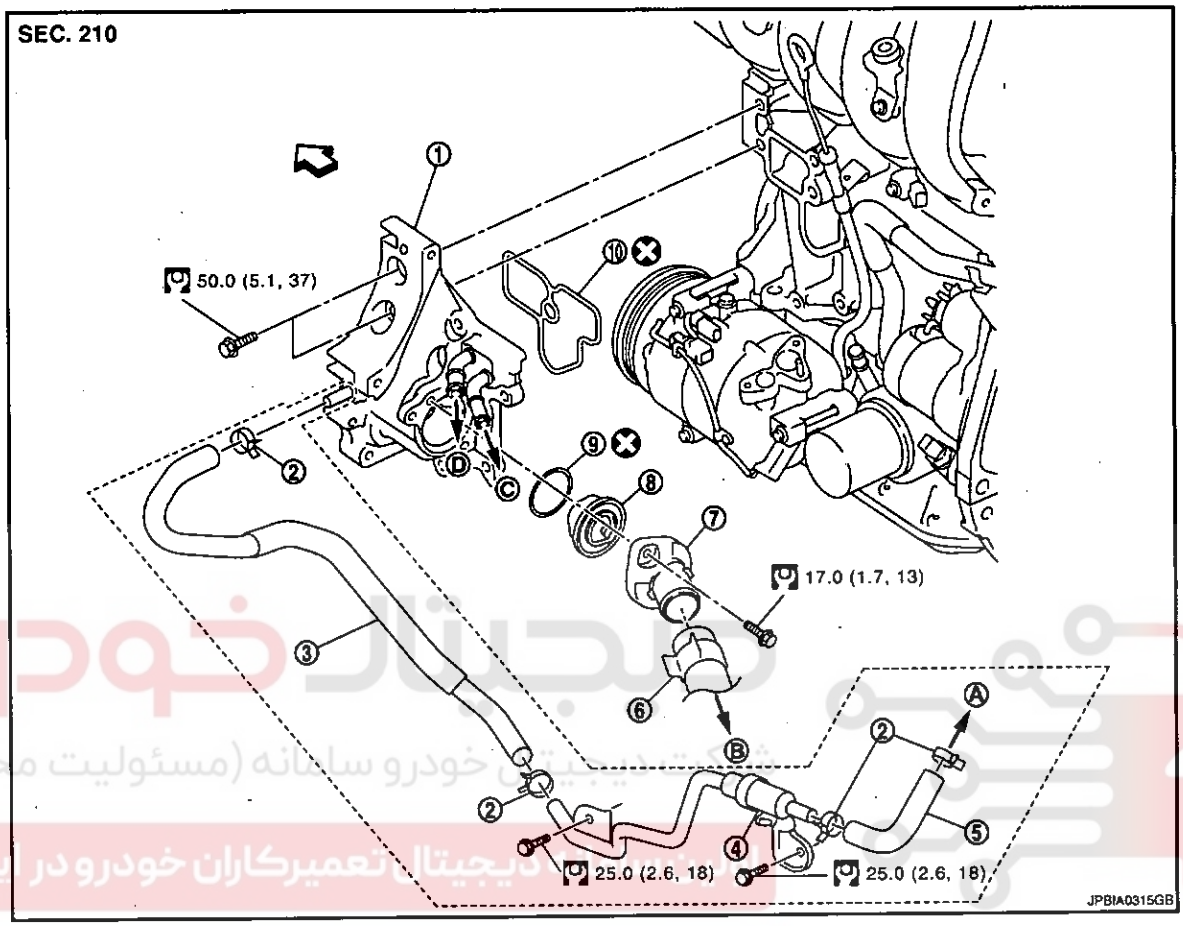
INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-30, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

THERMOSTAT

Exploded View

INFOID:0000000004899483



1. Thermostat housing	2. Clamp (CVT models)	3. Water hose (CVT models)
4. Heater thermostat (CVT models)	5. Water hose (CVT models)	6. Radiator hose (lower)
7. Water inlet	8. Thermostat	9. Rubber ring
10. Gasket		
A. To CVT fluid cooler	B. To radiator	C. To oil cooler
D. To reservoir tank		
⇦ : Engine front		

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899484

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Disconnect the battery cable from the negative terminal. Refer to PG-89, "Exploded View".
3. Add paint mark, then disconnect radiator hose (lower) from water inlet. Refer to CO-34, "Exploded View".
4. Remove water inlet and thermostat.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.
5. Remove thermostat housing with the following procedure:

a. Remove water pump. Refer to CO-39, "Exploded View".

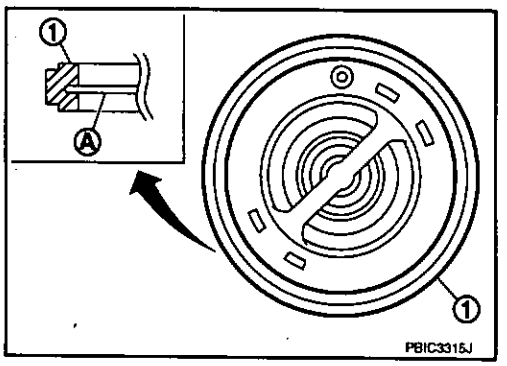
b. Remove alternator. Refer to CHG-20, "MR20DE MODELS : Exploded View".
c. Disconnect water hoses.

INSTALLATION

Note the following, and install in the reverse order of removal.

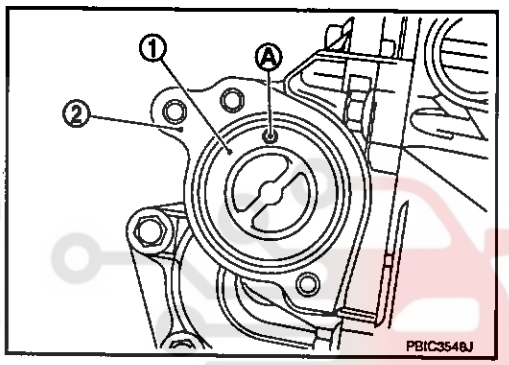
Thermostat

- Install thermostat with making rubber ring (1) groove fit to thermostat flange (A) with the whole circumference.



- Install thermostat (1) with jiggle valve (A) facing upwards.

2 : Cylinder block



INFOID:0000000004899485

Inspection

INSPECTION AFTER REMOVAL

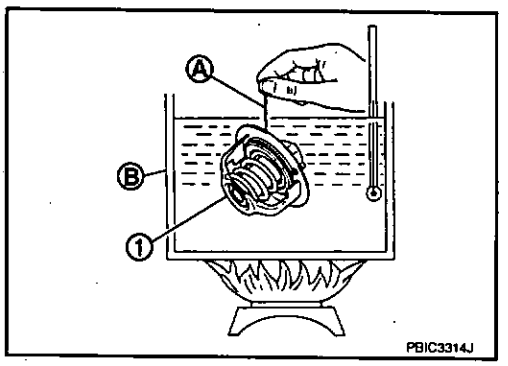
WARNING:
Use a protector to prevent a burn during the work.

Thermostat

- Place a thread (A) so that it is caught in the valves of thermostat (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the full open valve lift amount.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.

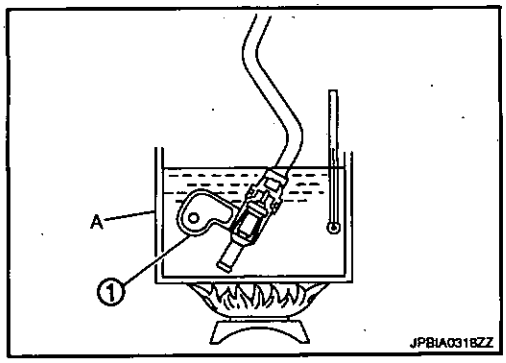
Standard: Refer to CO-46, "Thermostat".

- If out of the standard, replace thermostat.



Heater Thermostat (CVT models)

- Fully immerse the heater thermostat (1) in a container (A) filled with water. Continue heating the water while stirring.
- Continue heating the heater thermostat for 5 minutes or more after bringing the water to a boil.
- Quickly take the heater thermostat out of the hot water, measure the heater thermostat within 10 seconds.

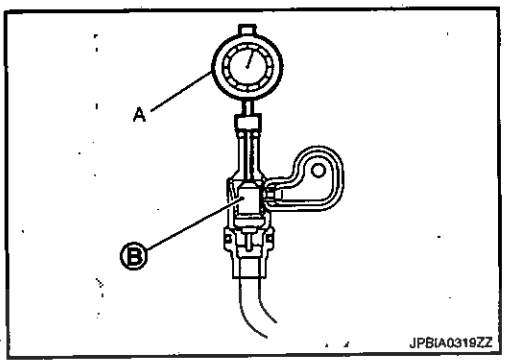


- Place dial indicator (A) on the pellet (B) and measure the elongation from the initial state.

Standard

: Refer to CO-46, "Heater Thermostat (CVT models)".

- If out of the standard, replace heater thermostat.



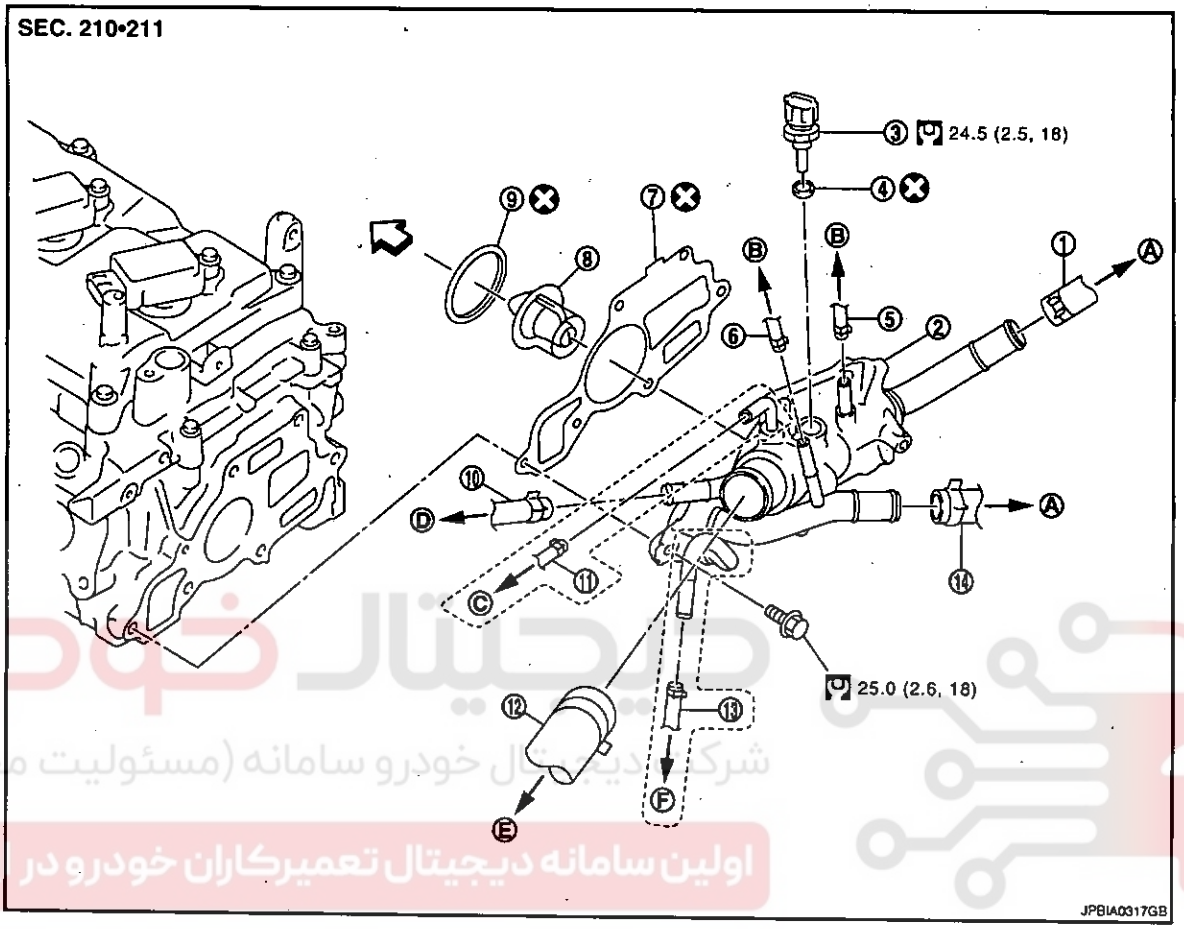
INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-30, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

WATER OUTLET

Exploded View

INFOID:0000000004899486



1. Heater hose
2. Water outlet
3. Engine coolant temperature sensor
4. Washer
5. Water hose
6. Water hose
7. Gasket
8. Water control valve
9. Rubber ring
10. Water hose
11. Reservoir tank hose (M/T models)
12. Radiator hose (upper)
13. Water hose (CVT models)
14. Heater hose
A. To heater
B. To electric throttle control actuator
C. To reservoir tank
D. To oil cooler
E. To radiator
F. To CVT fluid cooler
⇦ : Engine front

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899487

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-30, "Draining".
   CAUTION:
   - **Perform this step when engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Disconnect radiator hose (upper). Refer to CO-34, "Exploded View".
3. Disconnect harness connector from engine coolant temperature sensor.
4. Remove reservoir tank hose (M/T models). Refer to CO-34, "Exploded View".
5. Remove water hoses and heater hoses.
6. Remove water outlet.

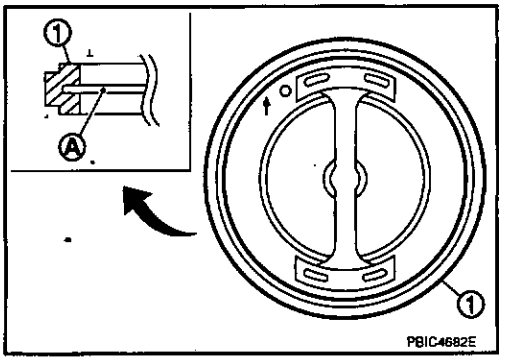
7. Remove engine coolant temperature sensor from water outlet, if necessary.

INSTALLATION

Note the following, and install in the reverse order of removal.

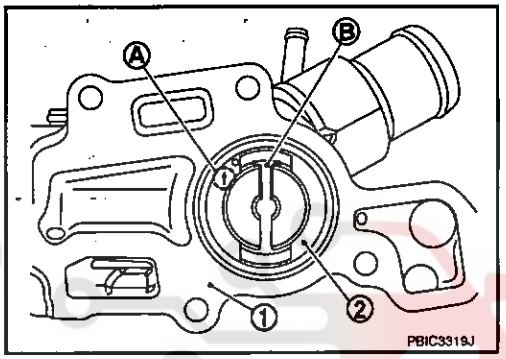
Water Control Valve

- Install water control valve with making rubber ring (1) groove fit to water control valve flange (A) with the whole circumference.



- Install water control valve (2) with the arrow (A) facing up and the frame center part (B) facing upwards.

1 : Water outlet



INFOID:0000000004899488

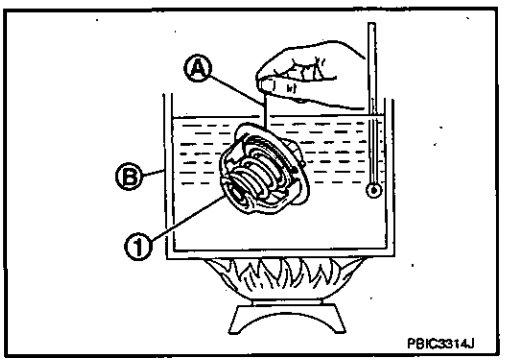
Inspection

INSPECTION AFTER REMOVAL

WARNING:
Use a protector to prevent a burn during the work.

Water Control Valve

- Place a thread (A) so that it is caught in the valves of water control valve (1). Immerse fully in a container (B) filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the continuous valve lifting toward maximum valve lift.
  NOTE:
  The maximum valve lift amount standard temperature for water control valve is the reference value.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.



Standard: **Refer to CO-46, "Water Control Valve".**

- If out of the standard, replace water control valve.

INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-30, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000004899489

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity (With reservoir tank at "MAX" level)	M/T models	7.0 (6-1/8)
	CVT models	8.6 (7-5/8)
Reservoir tank engine coolant capacity (At "MAX" level)		0.8 (3/4)

Radiator

INFOID:0000000004899490

RESERVOIR TANK CAP

Unit: kPa (bar, kg/cm^2, psi)

Reservoir tank cap relief pressure	Standard	130.2 - 149.8 (1.3 - 1.5, 1.3 - 1.5, 18.9 - 21.7)

RADIATOR

Unit: kPa (bar, kg/cm^2, psi)

Leakage testing pressure	150 (1.5, 1.53, 21.75)

Thermostat

INFOID:0000000004899491

Standard

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8.0 mm/95°C (0.315 in/203°F)
Valve closing temperature	77°C (171°F)

Heater Thermostat (CVT models)

INFOID:0000000004899492

Standard

Valve lift	More than 4.5 mm (0.177 in)

Reference value

Valve opening temperature	82°C (180°F)
Maximum valve lift	5.0 mm/95°C (0.197 in/203°F)

Water Control Valve

INFOID:0000000004899493

Standard

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Maximum valve lift	8.0 mm/108°C (0.315 in/226°F)
Valve closing temperature	90°C (194°F)

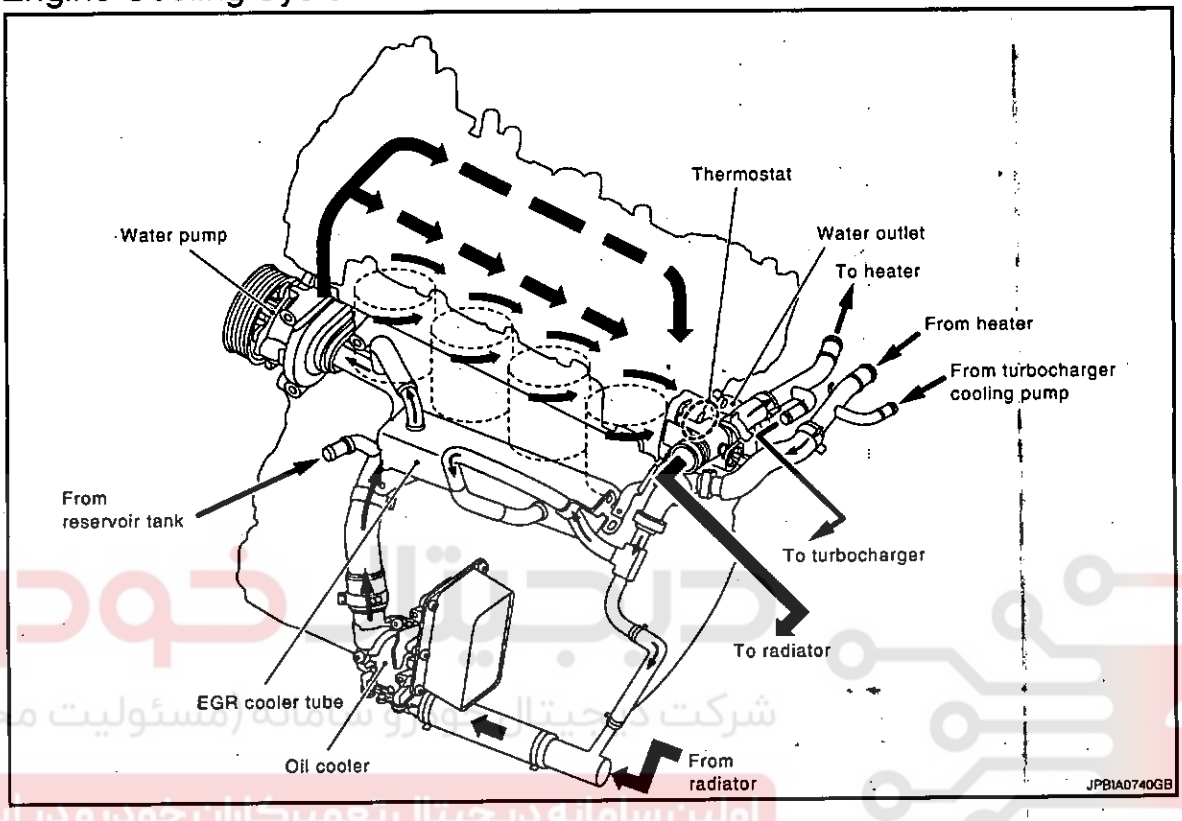
FUNCTION DIAGNOSIS

DESCRIPTION

M/T

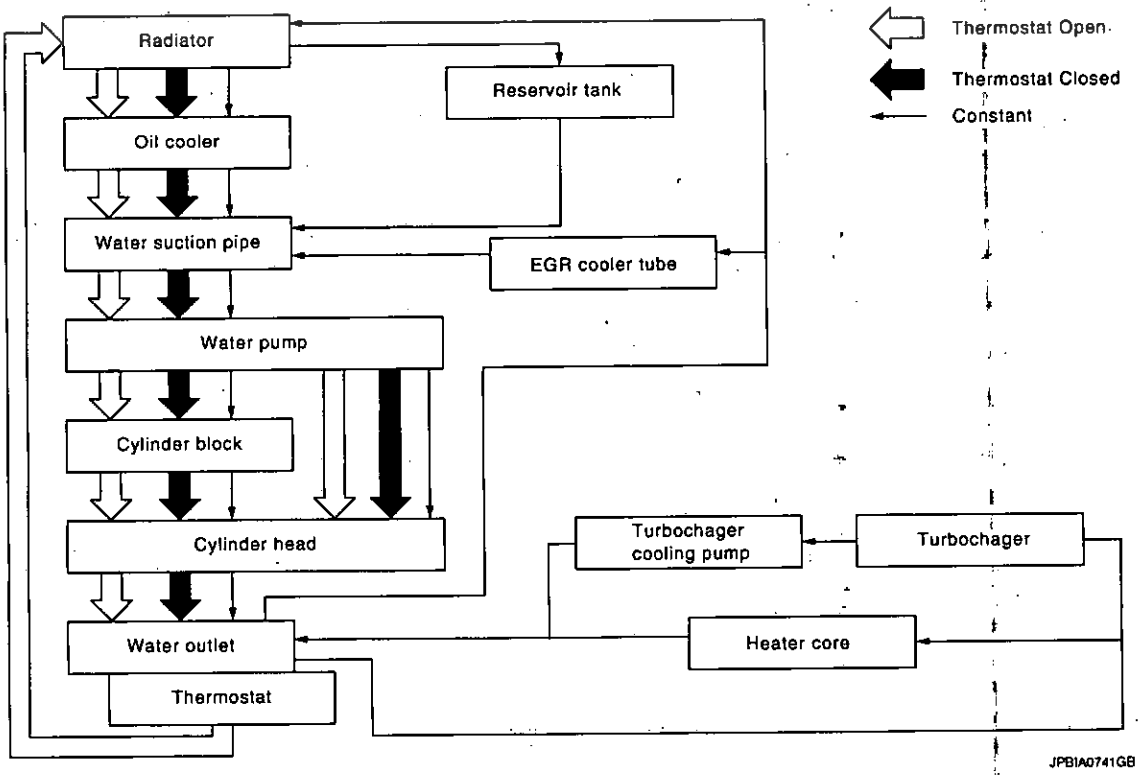
M/T : Engine Cooling System

INFOID:0000000004899494



M/T : Engine Cooling System Schematic

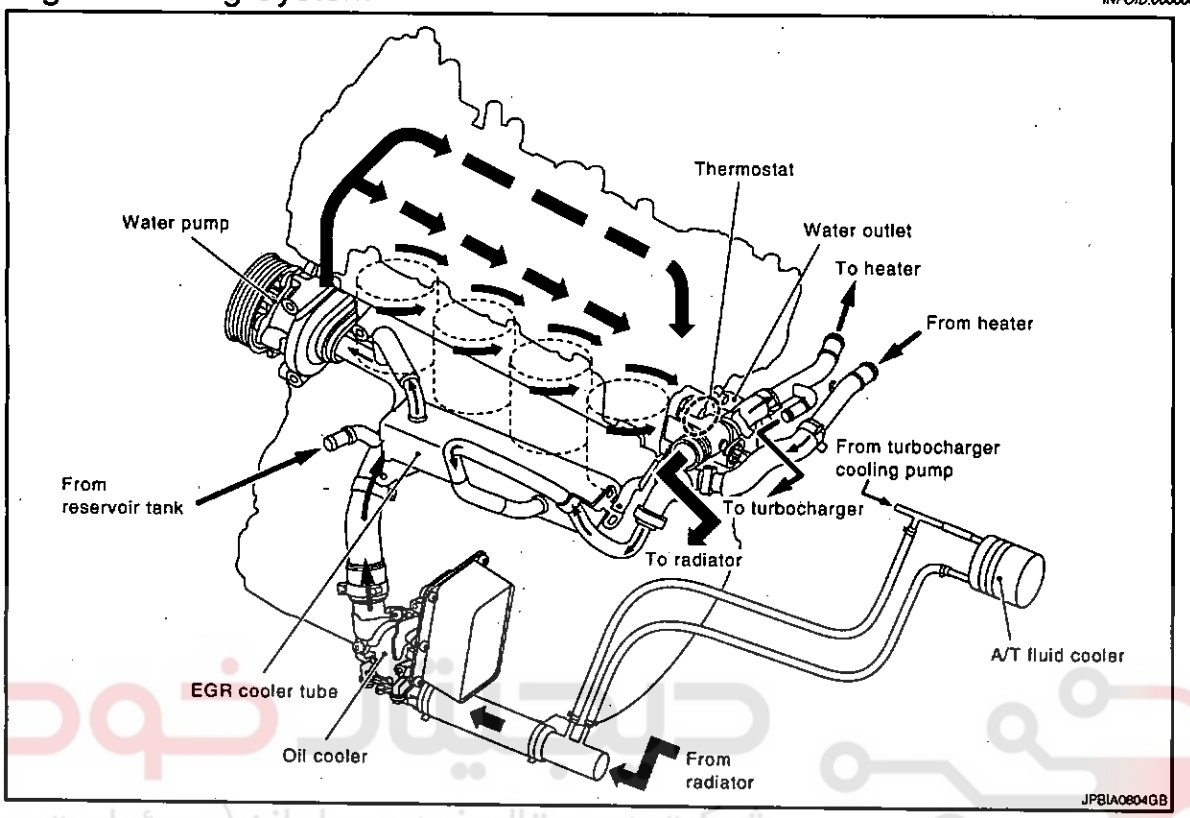
INFOID:0000000004899495



A/T

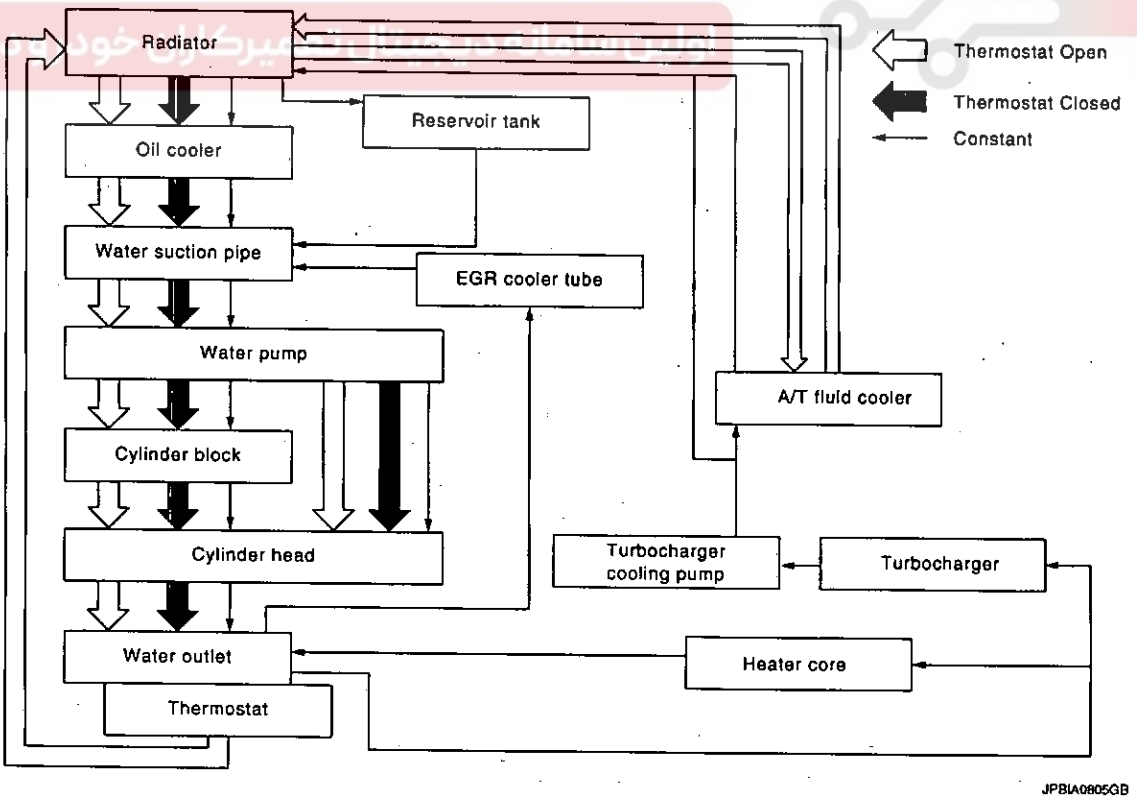
A/T : Engine Cooling System

INFOID:0000000004899496



A/T : Engine Cooling System Schematic

INFOID:0000000004899497



SYMPTOM DIAGNOSIS

OVERHEATING CAUSE ANALYSIS

Troubleshooting Chart

INFOID:0000000004899498

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat stuck closed	—	
		Damaged radiator fins	Dust contamination or paper clogging	
			Physical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant viscosity	—
	Insufficient engine coolant	Engine coolant leakage	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Reservoir tank cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leakage into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

OVERHEATING CAUSE ANALYSIS

	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Power train system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	Blocked air flow	
		Installed large fog lamp		

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000005022468

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the "SRS AIR BAG".**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000004956920

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.
For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.
If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)

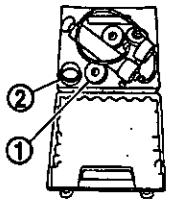
PREPARATION

PREPARATION

Special Service Tools

INFOID:0000000004899500

Tool number (RENAULT tool number) Tool name	Description
— (M.S. 554-07) Reservoir tank cap tester 1. Adapter A — (M.S. 554-01) 2. Adapter B — (M.S. 554-06)	Checking radiator and reservoir tank cap



E1BIA0058ZZ

ON-VEHICLE MAINTENANCE

ENGINE COOLANT

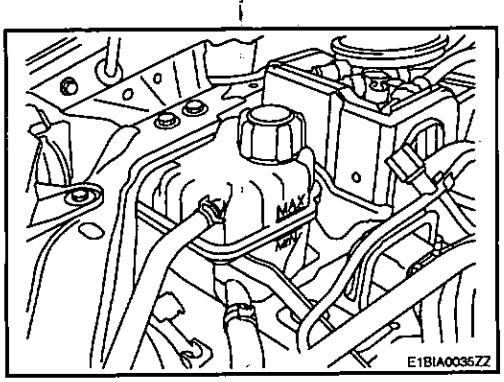
Inspection

INFOID:0000000004899501

LEVEL

- Check if the reservoir tank engine coolant level is within the "MIN" to "MAX" when the engine is cool.
- Adjust the engine coolant level as necessary.
- Check that the reservoir tank cap is tightened.

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.

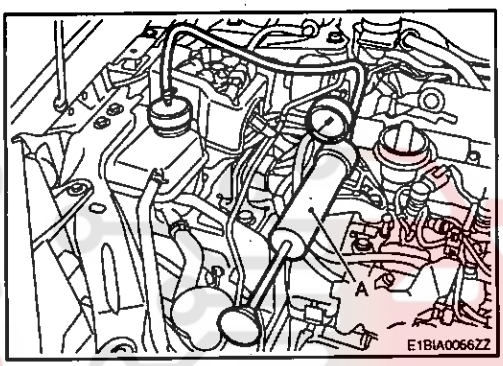


LEAKAGE

- To check for leakage, fit the adapter to the reservoir tank, and then connect it to the reservoir tank cap tester [SST: — (M.S.554-07)] (A) as shown.

Testing pressure: Refer to CO-68, "Radiator".

WARNING:
Never remove reservoir tank cap when engine is hot. Serious burns could occur from high-pressure engine coolant escaping from reservoir tank.
CAUTION:
Higher test pressure than specified may cause radiator damage.



- If anything is found, repair or replace damaged parts.

Draining

INFOID:0000000004899502

WARNING:
- **Never remove reservoir tank cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator and reservoir tank.**
- **Wrap a thick cloth around the caps. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Remove engine undercover.
2. Disconnect radiator hose (lower), and then remove reservoir tank cap. Refer to CO-57, "Exploded View".
   CAUTION:
   Perform this step when engine is cold.
3. Remove reservoir tank if necessary, and drain engine coolant and clean reservoir tank before installing.
   - Removal of engine mounting insulator (RH) is necessary. Refer to EM-315, "Exploded View".
4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-54, "Flushing".

Refilling

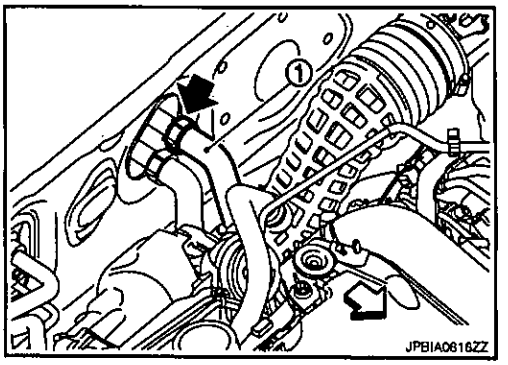
INFOID:0000000004899503

1. Install reservoir tank if removed.
2. Connect radiator hose (lower). Refer to CO-57, "Exploded View".
3. Check that each hose clamp has been firmly tightened.

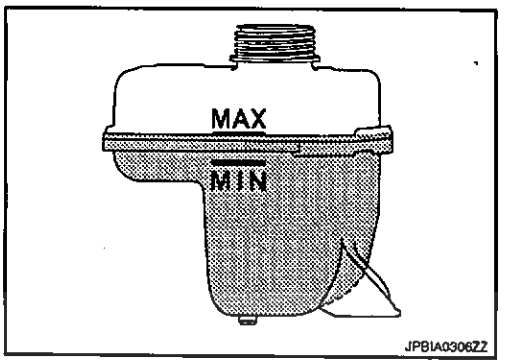
4. Disconnect heater hose (1) at position (⬅) in the figure.

⇦ : Vehicle front

- Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.



5. Fill reservoir tank to specified level.
   - Pour coolant slowly of less than 2 ℓ (1-3/4 Imp qt) a minute to allow air in system to escape.
   - When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.
   - Start engine without closing reservoir tank cap.
   - Keep engine racing at 1,500 rpm for about 2-3 minutes, filling reservoir tank up to MAX. Level, if necessary.
   - Use Genuine NISSAN Engine Coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-13, "Fluids and Lubricants".



Engine coolant capacity
(With reservoir tank at "MAX" level)
Refer to CO-68, "Periodical Maintenance Specification".

Reservoir tank engine coolant capacity
(At "MAX" level)
Refer to: CO-68, "Periodical Maintenance Specification".

6. Install reservoir tank cap.
7. Warm up engine until opening thermostat. Standard for warming-up time is approximately 10 minutes at 2,000 - 2,500 rpm.
   - Check thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

   CAUTION:
   Watch water temperature gauge so as not to overheat engine.
8. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
9. Refill reservoir tank to "MAX" level line with engine coolant, if necessary.
10. Repeat steps 6 through 9 two or more times with reservoir tank cap installed until reservoir tank level no longer drops.
11. Check cooling system for leaks with engine running.
12. Warm up the engine, and check for sound of engine coolant flow while running engine from idle up to 3,000 rpm with heater temperature controller set at several position between "COOL" and "WARM".
    - Sound may be noticeable at heater unit.
13. Repeat step 12 three times.
14. If sound is heard, bleed air from cooling system by repeating step 6 through 9 until reservoir tank level no longer drops.
15. Check that the reservoir tank cap is tightened.

Flushing

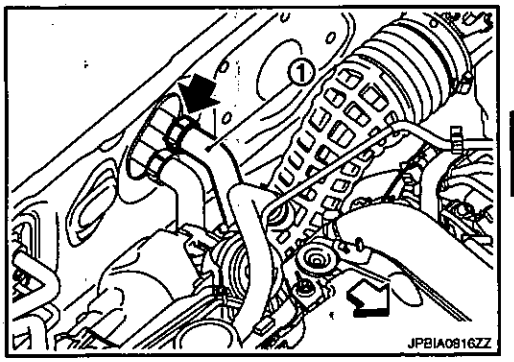
INFOID:0000000004899504

1. Install reservoir tank if removed.
2. Connect radiator hose (lower). Refer to CO-57, "Exploded View".

3. Disconnect heater hose (1) at position (⇦) in the figure.

⇦ : Vehicle front

- Enhance heater hose as high as possible, keeping heater hose end above reservoir tank MAX level.



4. Fill reservoir tank with water.
   - When coolant from heater unit starts to drain, connect heater hose and continue to fill up to reservoir tank MAX level.
5. Install reservoir tank cap.
6. Run the engine and warm it up to normal operating temperature.
7. Rev the engine two or three times under no-load.
8. Stop the engine and wait until it cools down.
9. Drain water from the system. Refer to CO-53, "Draining".
10. Repeat steps 1 through 9 until clear water begins to drain from radiator.
11. Check that the reservoir tank cap is tightened.

RADIATOR

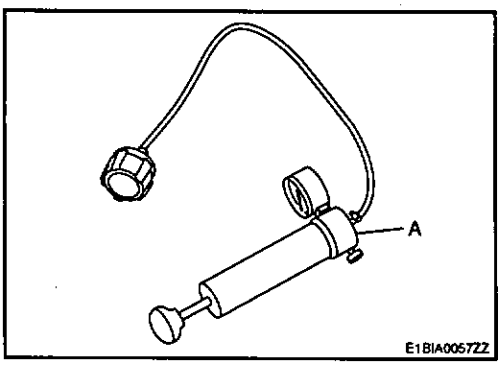
RESERVOIR TANK CAP

RESERVOIR TANK CAP : Inspection

INFOID:0000000004899505

- Fit the adapter to the reservoir tank cap tester [SST: — (M.S. 554-07)] (A) as shown.
- When connecting the reservoir tank cap to the reservoir tank cap tester, apply water or LLC to the reservoir tank cap seal part.
- Check reservoir tank cap relief pressure.

Standard: Refer to CO-68, "Radiator".



- Replace the reservoir tank cap if the engine coolant passes through it, or if any fur signs is detected.

CAUTION:
When installing reservoir tank cap, thoroughly wipe out the reservoir tank filler neck to remove any waxy residue or foreign material.

RADIATOR

RADIATOR : Inspection

INFOID:0000000004899506

Check radiator for mud or clogging. If necessary, clean radiator as follows.

CAUTION:
- **Be careful not to bend or damage radiator fins.**
- **When radiator is cleaned without removal, remove all surrounding parts such as radiator cooling fan assembly and horns. Then tape harness and connectors to prevent water from entering.**

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (4.9 bar, 5 kg/cm^2, 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

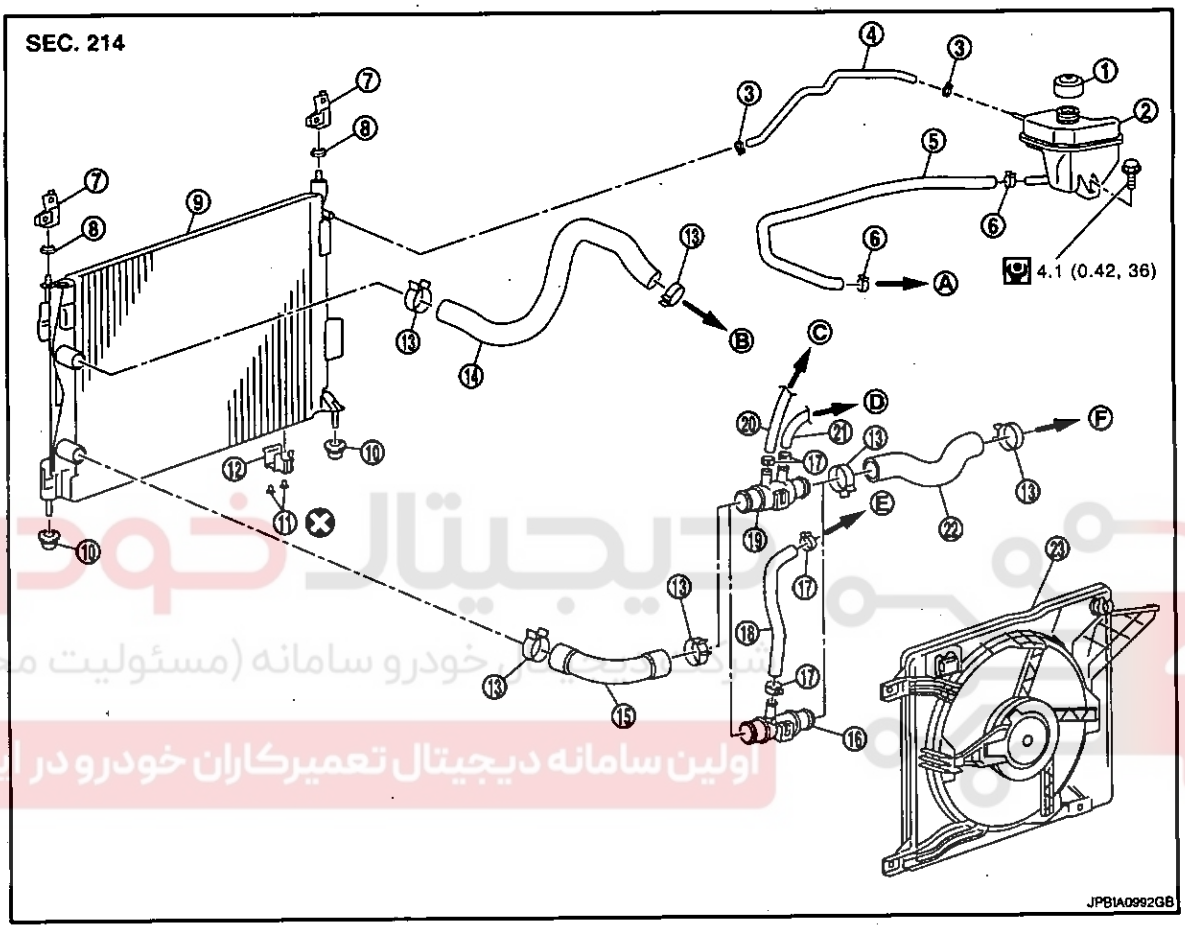
ON-VEHICLE REPAIR

RADIATOR

Exploded View

INFOID:0000000004899507

REMOVAL



1. Reservoir tank cap	2. Reservoir tank	3. Clamp
4. Reservoir tank hose (upper)	5. Reservoir tank hose (lower)	6. Clamp
7. Mounting bracket	8. Mounting rubber (upper)	9. Radiator
10. Mounting rubber (lower)	11. Rivet	12. Clip
13. Clamp	14. Radiator hose (upper)	15. Radiator hose (lower)
16. Radiator hose pipe (M/T models)	17. Clamp	18. Water hose (M/T models)
19. Radiator hose pipe (A/T models)	20. Water hose (A/T models)	21. Water hose (A/T models)
22. Radiator hose (lower)	23. Cooling fan assembly	
A. To water suction pipe	B. To water outlet	C. To A/T fluid cooler
D. To turbocharger cooling pump	E. To EGR cooler tube	F. To oil cooler

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899508

REMOVAL

WARNING:

- **Never remove reservoir tank cap when engine is hot. Serious burns may occur from high-pressure engine coolant escaping from radiator and reservoir tank.**
- **Wrap a thick cloth around the caps. Slowly turn it a quarter of a turn to release built-up pressure. Then turn it all the way.**

1. Remove engine undercover.
2. Drain engine coolant from radiator. Refer to CO-53, "Draining".
   CAUTION:
   Perform this step when the engine is cold.
3. Remove air duct (inlet). Refer to EM-265, "Exploded View".
4. Remove front grille and air guide. Refer to EXT-18, "Exploded View".
5. Remove air inlet hose, air inlet pipe and bracket. Refer to EM-268, "Exploded View".
6. Remove liquid tank pipe fixing screw from radiator right side. Refer to HA-50, "Exploded View".
7. Remove mounting bracket and mounting rubber (upper).
8. Disconnect harness connector from resistor and fan motors, and move harness to aside.
9. Disconnect radiator hose (upper).
10. Remove cooling fan assembly.
    CAUTION:
    Be careful not to damage radiator core when removing.
11. Disconnect reservoir tank hose (upper) from radiator.
12. Disconnect radiator hose (lower).
13. Remove radiator.
    CAUTION:
    Be careful not to damage or scratch radiator core.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:0000000004899509

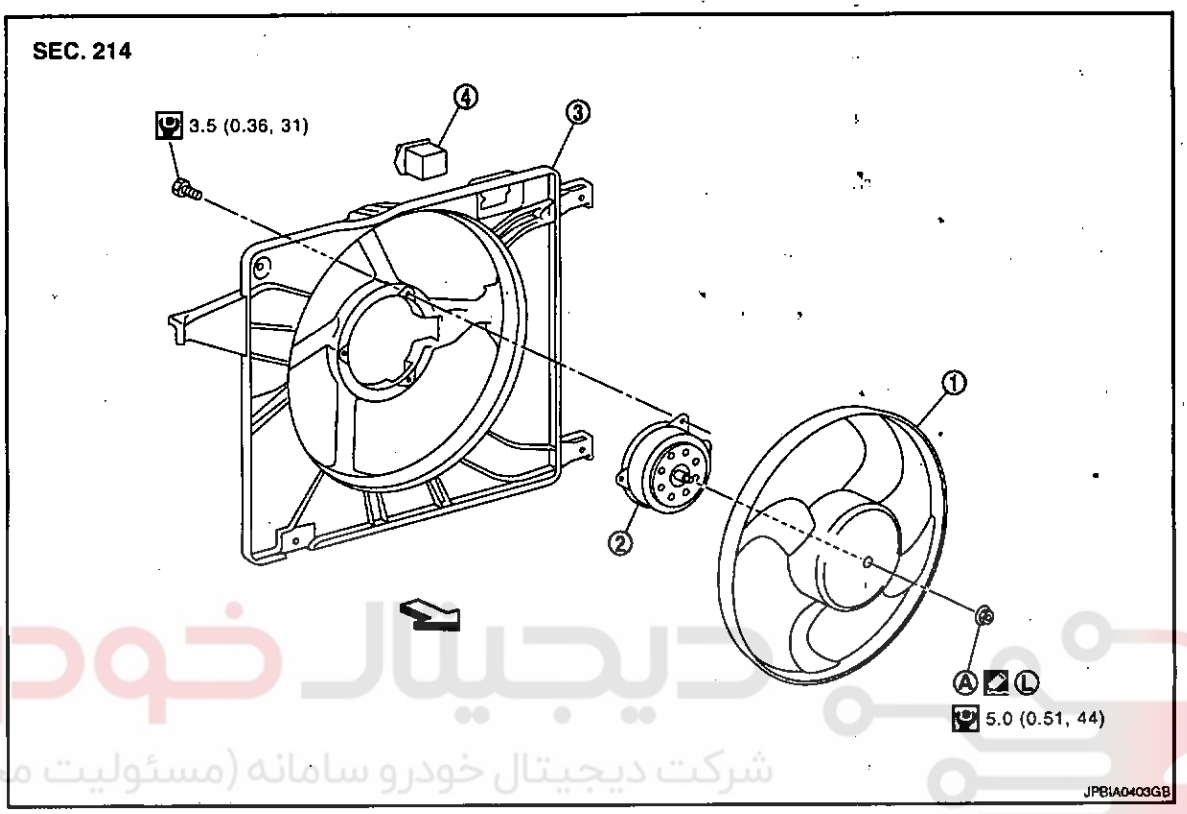
INSPECTION AFTER INSTALLATION

- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-53, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

COOLING FAN

Exploded View

INFOID:0000000004899510



1. Cooling fan
2. Fan motor
3. Fan shroud
4. Resistor

A. Reverse screw

: Apply thread locking sealant.

: Vehicle front

Refer to GI-3, "Components" for symbols not described on the above.

Removal and Installation

INFOID:0000000004899511

REMOVAL

1. Remove engine undercover.
2. Drain engine coolant from radiator. Refer to CO-53, "Draining".
   CAUTION:
   Perform this step when the engine is cold.
3. Remove air duct (inlet). Refer to EM-265, "Exploded View".
4. Remove air inlet hose, air inlet pipe and bracket. Refer to EM-268, "Exploded View".
5. Remove mounting bracket and mounting rubber (upper).
6. Disconnect harness connector from resistor and fan motors, and move harness to aside.
7. Disconnect radiator hose (upper).
8. Remove cooling fan assembly.
   CAUTION:
   Be careful not to damage radiator core when removing.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

Only use genuine parts for fan shroud mounting bolt and observe the specified torque (to prevent radiator from being damaged).
NOTE:
Cooling fan is controlled by ECM.

Disassembly and Assembly

INFOID:0000000004899512

DISASSEMBLY

1. Remove resistor from fan shroud.
   CAUTION:
   Handle carefully to avoid dropping and shocks.
2. Remove cooling fan mounting nuts, and then remove the cooling fan.
   CAUTION:
   Reverse screw is used for the fan attachment nut. When removing or attaching, turn the screw the opposite way as for a normal screw.
3. Remove fan motor.

ASSEMBLY

Assembly is the reverse order of disassembly.
- Apply thread locking sealant on fan motor shaft.

Inspection

INFOID:0000000004899513

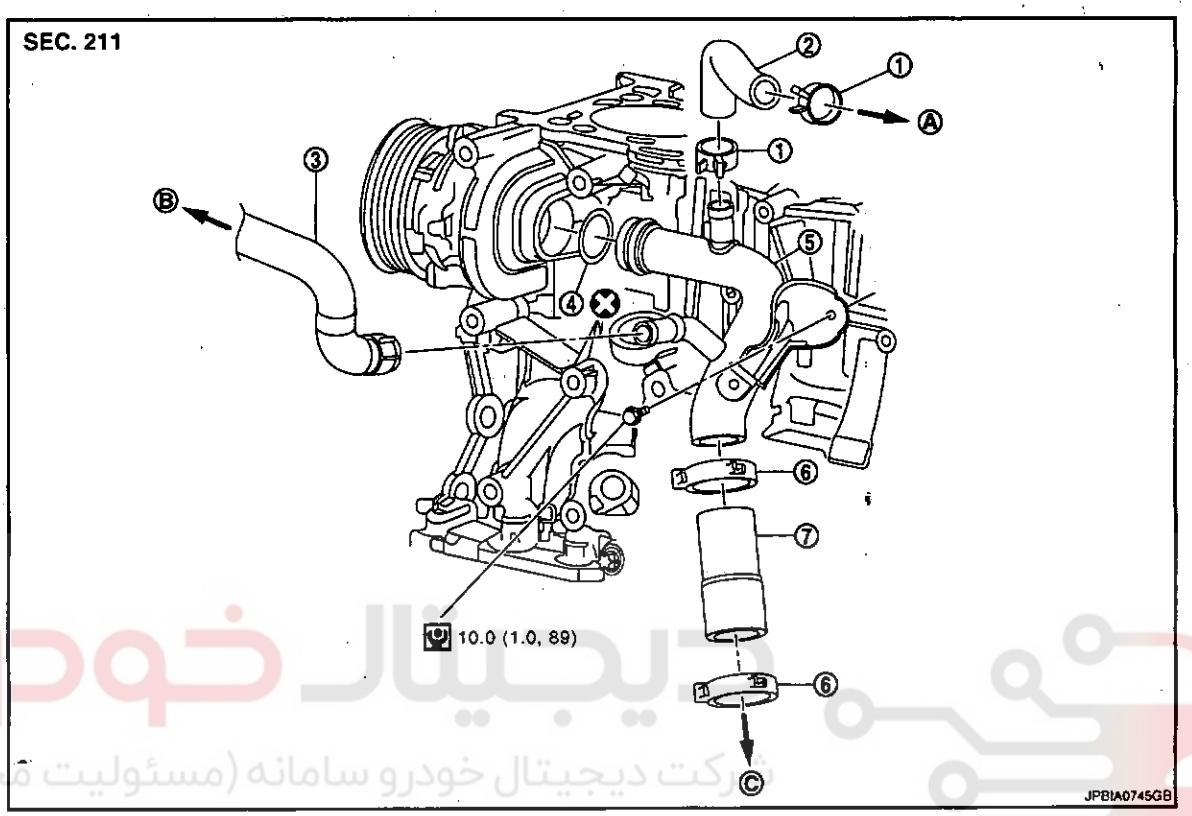
INSPECTION AFTER DISASSEMBLY

Cooling Fan
Inspect cooling fan for crack or unusual bend.
- If anything is found, replace cooling fan.

WATER PIPING

Exploded View

INFOID:0000000004899514



1. Clamp
2. Water hose
3. Reservoir tank hose (lower)
4. O-ring
5. Water suction pipe
6. Clamp
7. Water hose

A. To EGR cooler tube
B. To reservoir tank
C. To oil cooler

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899515

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-53, "Draining".
   CAUTION:
   Perform this step when engine is cold.
2. Disconnect water hoses and reservoir tank hose (lower).
   CAUTION:
   Never adhere the engine coolant to electronic equipments. (alternator etc.)
3. Remove EGR cooler tube. Refer to EM-270, "Exploded View".
4. Remove multifunction support bracket. Refer to EM-263, "Exploded View".
5. Remove water suction pipe.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.

INSTALLATION

Note the following, and install in the reverse order of removal.

- When inserting water suction pipe end into cylinder block, apply a neutral detergent to O-ring. Then insert it immediately.

Inspection

INFOID:0000000004899516

INSPECTION AFTER INSTALLATION

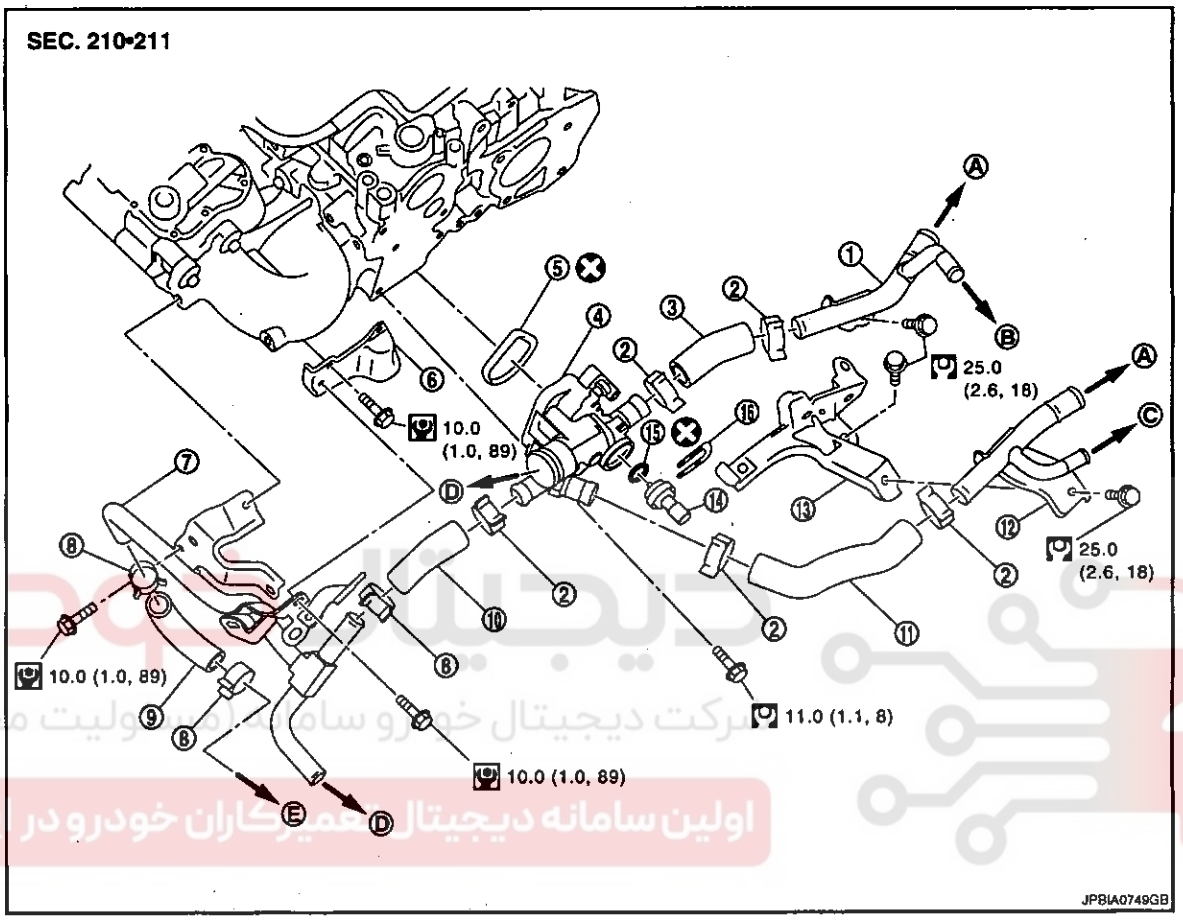
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-53, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

WATER OUTLET AND THERMOSTAT ASSEMBLY

Exploded View

INFOID:0000000004899517

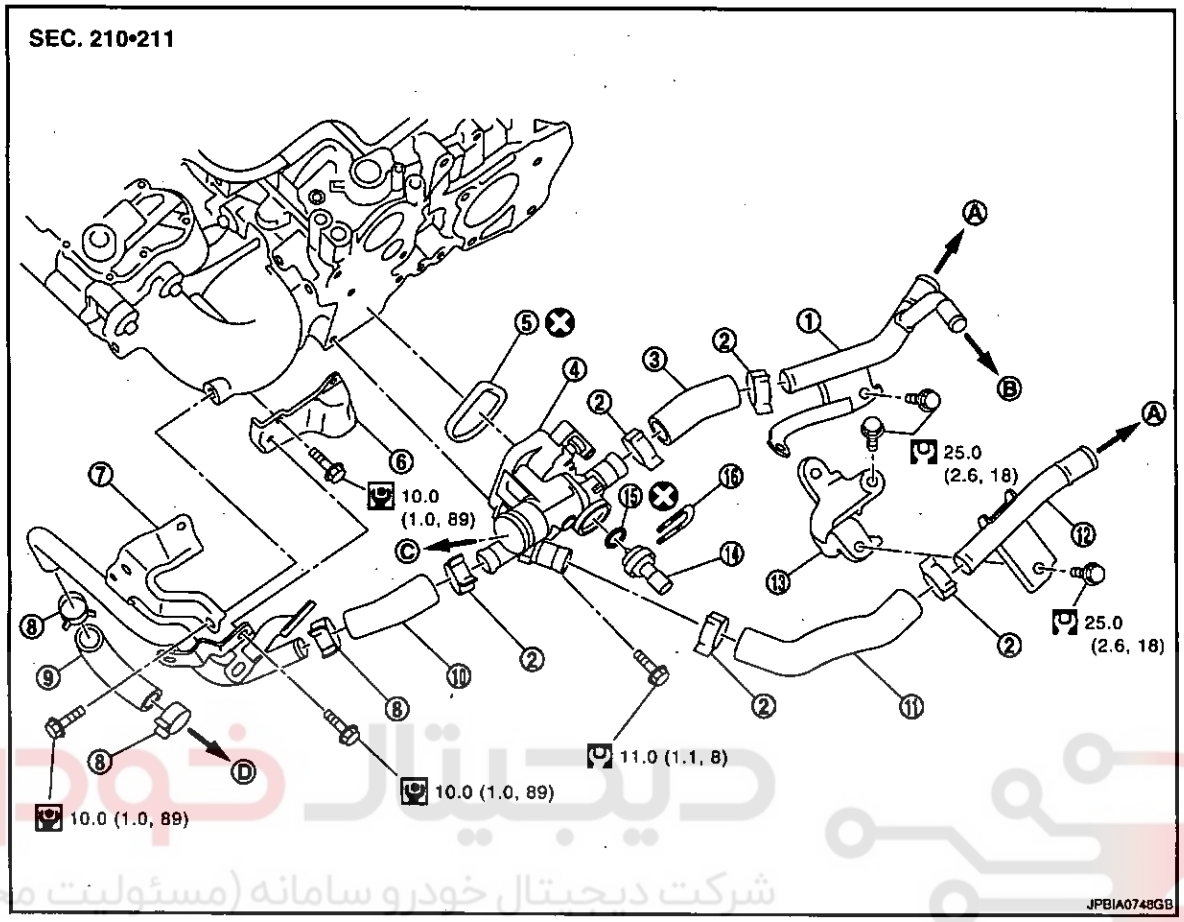
M/T models



1.	Heater pipe	2.	Clamp	3.	Heater hose
4.	Water outlet and thermostat assembly	5.	Rubber ring	6.	Bracket
7.	Water pipe	8.	Clamp	9.	Water hose
10.	Water hose	11.	Heater hose	12.	Heater pipe
13.	Mounting bracket	14.	Engine coolant temperature sensor	15.	O-ring
16.	Clip				
A.	To heater core	B.	To turbocharger	C.	To turbocharger cooling pump
D.	To radiator	E.	To EGR cooler tube		

Refer to GI-3, "Components" for symbols in the figure.

A/T models



1. Heater pipe	2. Clamp	3. Heater hose
4. Water outlet and thermostat assembly	5. Rubber ring	6. Bracket
7. Water pipe	8. Clamp	9. Water hose
10. Water hose	11. Heater hose	12. Heater pipe
13. Mounting bracket	14. Engine coolant temperature sensor	15. O-ring
16. Clip		
A. To heater core	B. To turbocharger	C. To radiator
D. To EGR cooler tube		

Refer to GI-3, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000004899518

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-53, "Draining".
   CAUTION:
   Perform this step when engine is cold.
2. Remove battery. Refer to PG-89, "Exploded View".
3. Remove air duct assembly and air cleaner case. Refer to EM-265, "Exploded View".
4. Disconnect radiator hose (upper). Refer to CO-57, "Exploded View".
5. Disconnect harness connector from engine coolant temperature sensor.
6. Disconnect water hoses and heater hoses.
7. Remove heater pipes.
8. Remove water outlet and thermostat assembly.
9. Remove engine coolant temperature sensor from water outlet and thermostat assembly, if necessary.
   CAUTION:
   Handle carefully to avoid any shock to engine coolant temperature sensor.

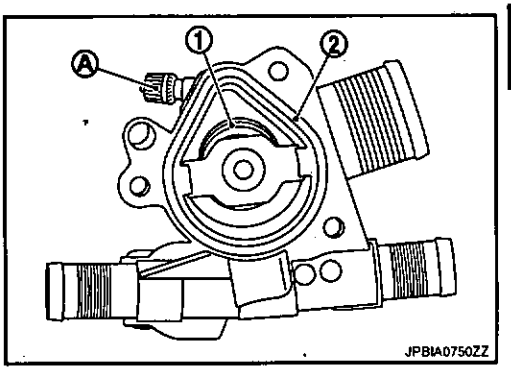
INSTALLATION

Note the following, and install in the reverse order of removal.

Water outlet and thermostat assembly

- Check that installation of the thermostat (1) and the rubber ring (2) to the cylinder head.

A : Air relief plug



Inspection

INFOID:0000000004899519

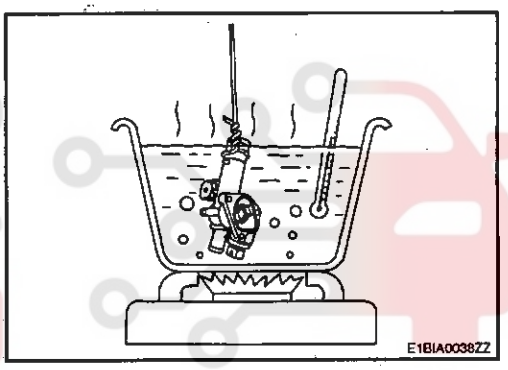
INSPECTION AFTER REMOVAL

Water outlet and thermostat assembly

1. Check valve seating condition at ordinary room temperatures. It should seat tightly.
2. Check valve operation.
   - If the malfunctioning condition, when valve seating at ordinary room temperature, or measured values are out of the standard, replace water outlet and thermostat assembly.

Standard:

Refer to CO-68, "Water Outlet and Thermostat Assembly".



INSPECTION AFTER INSTALLATION

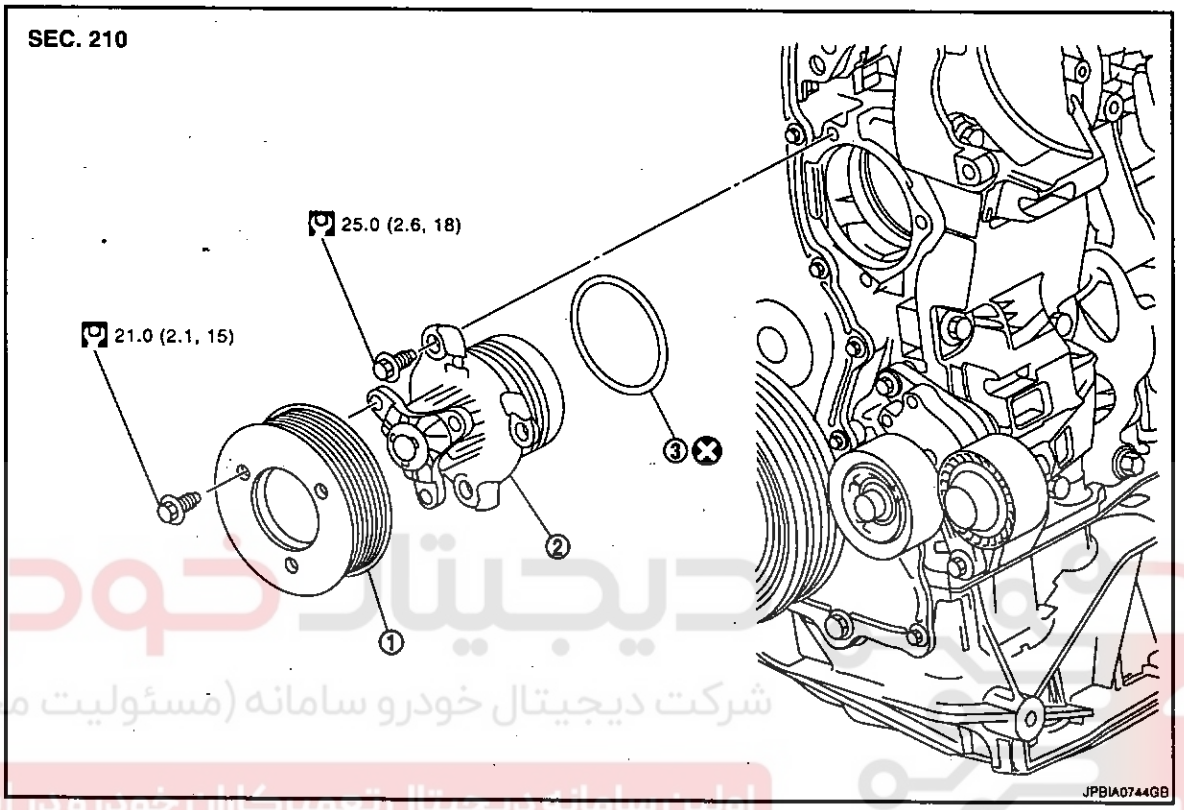
- Check that the reservoir tank cap is tightened.
- Check for leaks of engine coolant using the adapter and the reservoir tank cap tester [SST: — (M.S. 554-07)]. Refer to CO-53, "Inspection".
- Start and warm up the engine. Visually check that there is no leaks of engine coolant.

DISASSEMBLY AND ASSEMBLY

WATER PUMP

Exploded View

INFOID:0000000004899520



1. Water pump pulley
2. Water pump
3. O-ring

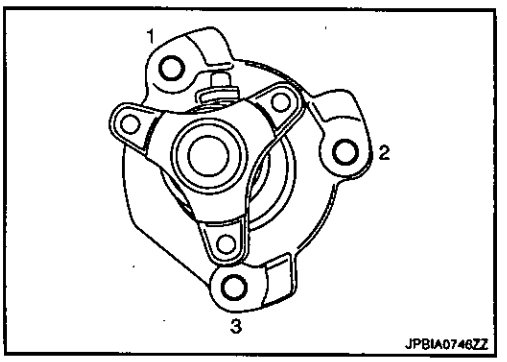
Refer to GI-3, "Components" for symbols in the figure.

Disassembly and Assembly

INFOID:0000000004899521

REMOVAL

1. Remove engine assembly. Refer to EM-315, "Exploded View".
   NOTE:
   Water pump cannot be removed with an onboard condition.
2. Remove water pump pulley.
3. Remove water pump.
   • Loosen mounting bolts in reverse order as shown in the figure.
   CAUTION:
   - **Handle water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassembled and should be replaced as a unit.**

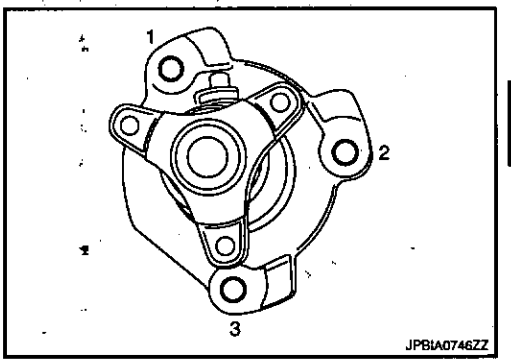


INSTALLATION

Note the following, and install in the reverse order of removal.

Water pump

- Tighten mounting bolts in numerical order as shown in the figure.
- When inserting water pump end into cylinder block, apply a neutral detergent to O-ring. Then insert it immediately.

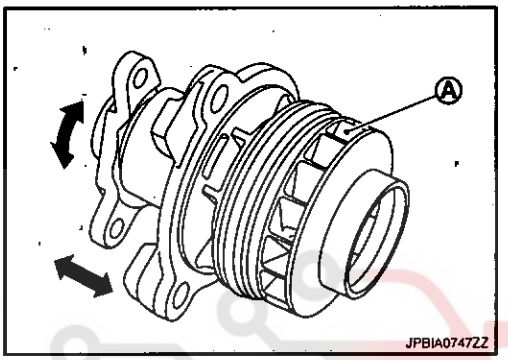


Inspection

INFOID:0000000004899522

INSPECTION AFTER DISASSEMBLY

- Visually check if there is no significant dirt or rusting on water pump body and vane (A).
- Check that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000004899523

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Engine coolant capacity (With reservoir tank at "MAX" level)	M/T models	8.4 (7-3/8)
Reservoir tank engine coolant capacity (At "MAX" level)		0.8 (3/4)

Radiator

INFOID:0000000004899524

RESERVOIR TANK CAP

Unit: kPa (bar, kg/cm^2, psi)

Cap relief pressure	Standard	130.2 - 149.8 (1.3 - 1.5, 1.3 - 1.5, 18.9 - 21.7)

RADIATOR

Unit: kPa (bar, kg/cm^2, psi)

Leakage testing pressure	150 (1.5, 1.53, 21.75)

Water Outlet and Thermostat Assembly

INFOID:0000000004899525

Standard

Valve opening temperature	86 - 89°C (187 - 192°F)
Maximum valve lift	8.5 mm/101°C (0.335 in/214°F)